



GSM Association Roaming Database, Structure and Updating

Version 18

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1 Introduction

1.1 Scope of document

In order to have a common and simple overview of the most important data related to International Roaming, a database for storing this data has been created, according to the [RAEX Business Requirements defined in Annex C](#).

This version of the document is binding on all GSMA members from 01 January 2025.

1.2 Definitions

For the purposes of the present document, the following terms and definitions apply.

1.3 Glossary

Term	Meaning
AAA	Authentication, Authorization, Accounting
API	API Application Programming Interface
APN	Access Point Name
ASN	Autonomous System Number
CAMEL	Customized Applications for Mobile networks using Enhanced Logic
CAP	CAMEL Application Part
CC	Country Code
CCITT	International Telegraph and Telephone Consultative Committee
CMM	Connected Mode Mobility
CE	Coverage Enhancement
CRL	Certificate Revocation List
DNS	Domain Name Service
eDRX	Extended Discontinuous Reception
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standards Institute
FQDN	Fully Qualified Domain Name
GPRS	General Packet Radio Service
GSMA	GSM Association
GRX	GPRS Roaming Exchange
GSN	GPRS Support Node
GTT-IP	Global text Telephony over IP
GUI	Graphical User Interface
GW	Gateway
HQ	Headquarters

Term	Meaning
IMSI	International Mobile Station Identity
IoT	Internet of Things
IP	Internet Protocol
IPX	IP eXchange
LPWA	Low Power Wide Area
LTE	Long Term Evolution
LTE-M	LTE Cat-M1
M2M	Machine-2-Machine
M2MDO	Machine-2-Machine Dedicated Operator
M2MIS	Machine-2-Machine Integrated Solution
MAP	Mobile Application Part
MCC	Mobile Country Code
MCX	Mission Critical Service
MGT	Mobile Global Title
MNC	Mobile Network Code
MOCN	Multi-Operator Core Network
MSC	Mobile Services Switching Centre
MSISDN	Mobile Subscriber ISDN Number
MSRN	Mobile Subscriber Roaming Number
MVNO	Mobile Virtual Network Operator
MNO	Mobile Network Operator
NAS	Non-Access Stratum
NB-IoT	Narrowband IoT
NC	Network Code
NDC	National Destination Code
OCSP	Online Certificate Status Protocol
PC	Point Code
PKCS	Public Key Cryptography Standards
PMN	Public Mobile Network
PRD	Permanent Reference Document
PSM	Power Saving Mode
RAEX	Roaming Agreement EXchange
RH	Roaming Hub
RILTE	Roaming in Long Term Evolution
RTT	Real-time Text Telephony
RVAS	Roaming Value Added Service

Term	Meaning
SAN	Subject Alternative Name
SCCP	Signalling Connection Control Part
SMSC	Short Message Service Centre
SS7	Signalling System no. 7
SSO	Single Sign-On
TOTP	Time-based One-time Password

Table 1- Glossary

1.4 References

Ref	Doc Number	Title
[1]	GSMA PRD WA.03	WAS Definitions & Abbreviations
[2]	GSMA PRD BA.46	Non-Terrestrial Roaming Principles
[3]	GSMA PRD BA.21	Network Extension Principle
[4]	GSMA PRD BA.48	M2M Roaming Principles
[5]	Solution Directions	Solution Directions for Inter-Operator Key Management Stage 2 – Analysis and Recommendations
[6]	RFC 2119	“Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997. Available at http://www.ietf.org/rfc/rfc2119.txt
[7]	RFC 8174	Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words https://www.rfc-editor.org/info/rfc8174
[8]	GSMA PRD FS.34	Key Management for 4G and 5G inter-PMN Security
[9]	GSMA PRD TD.13	TADIG Code Naming Convention
[10]	GSMA PRD FS.52	Global Title Leasing Code of Conduct
[11]	GSMA PRD NG.119	Emergency Communication
[12]	ETSI TS 103.625	Emergency Communications (EMTEL)
[13]	3GPP TS 26.114	IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction

2 Structure of The Database

The following information is stored in the GSM Association RAEX IR.21 Roaming Database for each MNO, (Mobile Network Operator):

- Organization Information:
 - The Organization Name
 - The Operators home country in abbreviated format
 - Information for each Network(s), Roaming Hubbing and Hosted Network belonging to the Organization including:
 - The TADIG code used by the operator according TD.13 [9]
 - Network Information
 - SE.13 Database information: the Technology and the Frequency used by the operator, Presentation of Country initials and Mobile Network Name, the abbreviated Mobile Network name, the Network Colour code and the (U) SIM header information.
- Numbering Information

- International and Domestic SCCP GW information
- Type of SCCP protocol available at PMN
- Information about Subscriber Identity Authentication
- The test number available at PMN for service testing
- The information concerning introduction of MAP, a list of the Application Context with the current version and the time planned for changing to the next higher version
- Addresses of network elements with Time Zone information
- Information about USSD availability and the supported phase
- CAMEL Application Part (CAP) version
- Information associated with GPRS network identifiers, such as APN operator identifier, list of test APNs, Data Service supported with Class Capabilities etc.
- Information associated with IP Roaming and IP interworking towards the GRX provider, such as DNS IP addresses/names (primary and secondary), IP address range(s), AS Number etc. of the PMN
- MMS Inter-working and WLAN Information
- Detailed numbering information where needed
- Information about contact persons listed by service and troubleshooting contacts
- Information related to any type of Hosted Network, including non-terrestrial and satellite. Available information is: TADIG code, Global Title Addresses, MSRN Ranges and IP Address Ranges
- Information for LTE Roaming
- Information for LWPA Roaming
- Information for emergency services

3 Use cases

3.1 Overall context

The GSMA PRD IR.21 is designed in such a way to cover different use cases, which are described in the figure hereafter.

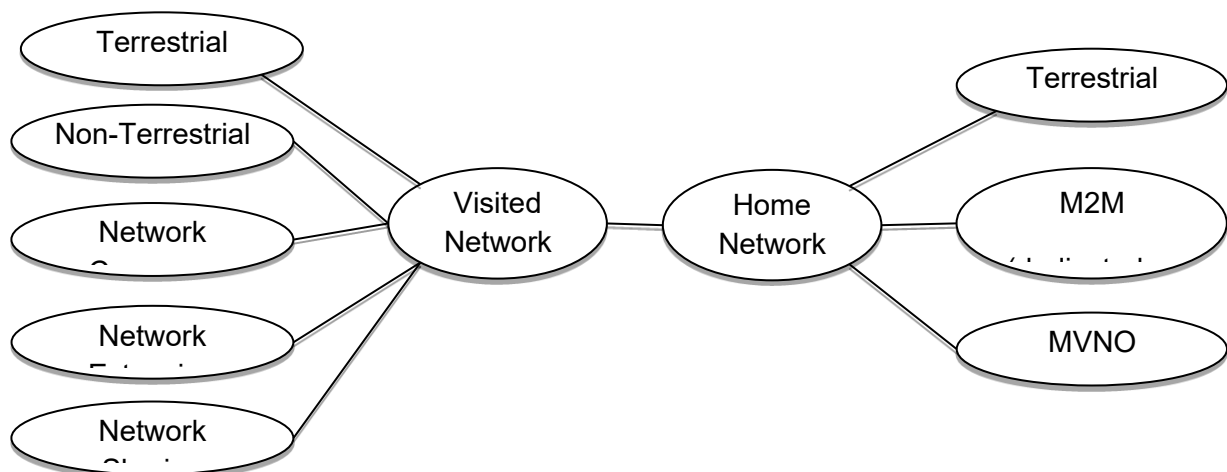


Figure 1 Use Cases

The first list describes the basic network type, which could be defined as the first network type in GSMA PRD IR.21.

- Terrestrial – mono MCC-MNC (IMSI)
- Non-Terrestrial (Aeronautical, maritime)
- Full MVNO
- Dedicated M2M (M2MDO)

The second list describes the additional network type, which could be defined on top of the basic network type in GSMA PRD IR.21

- + Multi user MCC-MNC (IMSI)
- + Light MVNO
- + Integrated M2M (M2MIS)
- + Network Sharing (MOCN)
- + Network Extension (same MCC-MNC) – Hosted networks
- + Network Extension (new MCC-MNC)

3.2 Basic network type - Terrestrial – mono MCC-MNC (IMSI)

The Terrestrial Roaming is roaming related to a Territory as identified by the ITU, for example Canada, Italy or United Kingdom.

Terrestrial operators are composed of:

- Visited network: identified by MCC-MNC broadcast on radio network and associated TADIG Code
- Home network: identified by MCC-MNC assigned to end user (IMSI) and associated TADIG Code

3.3 Basic network type - Non-Terrestrial (Aeronautical, maritime)

Non-terrestrial operators are wholly independent from any Terrestrial network and operate in International Zones and National Zones such as International Waters or Airspace where they are authorised to do so.

Non-Terrestrial operators are composed of Visited network, identified by MCC-MNC broadcast on radio network and associated TADIG Code (Aircraft operators: AAA and Maritime operators: AAM).

Non-terrestrial Roaming principles are defined in GSMA PRD BA.46 [2].

3.4 Basic network type – Full MVNO

A mobile virtual network operator (MVNO) is a mobile operator that does not own the mobile network infrastructure over which it provides services to its customers.

MVNOs are composed of Home network, identified by MCC-MNC assigned to end user (IMSI) and associated TADIG Code.

Full MVNO owns their own MCC-MNC (and associated TADIG code), and uses most of the time an MNO in order to deploy international roaming.

3.5 Basic network type - M2M dedicated providers (M2MDO)

A Machine-2-Machine (M2M) provider is a mobile actor that deploys Machine communication technology. An M2MDO is an M2M Dedicated MNO which supplies M2M specific traffic over an independent MCC/MNC and TADIG code providing full transparency towards roaming partners of its M2M Customers. M2M Roaming principles are defined in GSMA PRD BA.48 [4].

M2MDO providers are composed of Home network, identified by MCC-MNC (distinct 901 code issued by ITU) assigned to end user (IMSI) and associated TADIG Code.

3.6 Additional Network type + Multi-user MCC-MNC (IMSI)

Some operators have multiple MCC-MNC ranges (and associated TADIG code) to define their subscribers (IMSI). The additional MCC-MNC could be defined in GSMA PRD IR.21, in an additional section 4 defining the additional MCC-MNC associated to subscribers.

3.7 Additional Network type + Light MVNO

An MVNO could be hosted by an MNO inside its own MCC-MNC ranges.

Some sections (GT, IP, ASN ...) enable the addition of attributes to mention Light MVNO usage.

3.8 Additional Network type + M2M integrated Solutions (M2MIS)

A Machine-2-Machine (M2M) provider is a mobile actor that deploys Machine communication technology. M2MIS are M2M solutions hosted by MNOs where the M2M Traffic is integrated (or included) within their existing MNO traffic. The M2M usage is not defined at the network level and may or may not be defined at the billing level with independent MCC/MNC and TADIG codes.

M2M Roaming principles are defined in GSMA PRD BA.48 [4].

Transparency is provided for the M2MIS by using APNs or IMSI sub-ranges, which could be defined in M2M section 23.

3.9 Additional Network type + Network Sharing (MOCN)

Some operators are sharing networks using MOCN that allows a network operator to provide access to a single radio access network by other operators. The shared MCC/MNC has to be configured in the GSMA PRD IR.21 of the different operators, sharing the Radio Access Network.

This information is inside the section 4 (Routing Information) – “MCC-MNC codes used for MOCN”.

3.10 Additional Network type + Network Extension (same MCC-MNC) – Hosted networks

Some networks are extended for other services, but using the same MCC-MNC. So, in order to discriminate the 2 usages, Hosted Network section must be filled with an associated TADIG code and GT/IP specific addresses.

A typical example is the extension of a network to provide maritime network, using the same MCC-MNC as the terrestrial network.

Network Extension Roaming principles are defined in GSMA PRD BA.21 [3] and GSMA PRD BA.46 [2].

3.11 Additional Network type + Network coverage Extension (new MCC-MNC)

Some operators have several MCC-MNC networks in order to cover one country. Additional MCC-MNC could be seen as network coverage extension.

A typical example is the extension of a national coverage in some rural areas.

The additional MCC-MNC should be mentioned in the IP section 17 (Any *additional* MNC/MCC that may be sent RAI or LAI in GTP messaging from SGSNs/SGWs).

3.12 Network type mapping

Section 1 will contain the overall picture of the operator, defining which network type is really implemented by the operators.

The table hereafter summarizes the different network types described above:

- V (VPLMN) for inbound roaming
- H (HPLMN) for outbound roaming

TADIG	MCC-MNC	V/H	Network type
Basic	Basic	V/H	Terrestrial
Basic	Basic	V	Non-Terrestrial
Basic	Basic	H	Full MVNO
Basic	Basic	H	Dedicated M2M (M2MDO)
Additional	Additional	H	+ Multi user MCC-MNC IMSI
Same	Same	H	+ Light MVNO
Same	Same	H	+ Integrated M2M (M2MIS)
Same	Additional	V	+ Network Sharing
Additional	Same	V	+ Network Extension (same MCC-MNC)
Same	Additional	V	+ Network Coverage Extension (different MCC-MNC)

Table 2 : Different Network Types

Typical examples are listed hereafter:

Terrestrial – mono MCC-MNC (IMSI) - NTT (Japan)

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
JPND0	JPND0	440-10	V/H	Terrestrial

Non-Terrestrial (Aeronautical, maritime) - Tampnet AS

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
AAMT1	AAMT1	901-71	V	Non Terrestrial (maritime)

Full MVNO - Telenet Belgium

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
BELKO	BELKO	206-20	V/H	Terrestrial
BELKO	BELTN	206-05	H	Full MVNO

Dedicated M2M (M2MDO) - Sierra Wireless France

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
AAZ24	AAZ24	208-24	H	Dedicated M2M

+ Multi user MCC-MNC (IMSI) – ATT (USA)

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
USACG	USACG	310-410	V/H	Terrestrial
USACG	USAMF	310-280	H	Terrestrial
USACG	USAAT	310-280	H	Terrestrial
USACG	USABS	310-150	H	Terrestrial
USACG	USAPB	310-170	H	Terrestrial
USACG	USACC	310-030	H	Terrestrial
USACG	USAFN	310-100	H	Terrestrial

+ Light MVNO – Telstra Australia

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
AUSTA	AUSTA	505-01	V/H	Terrestrial
AUSTA	AUSTA	505-01	H	Light MVNO (Lycamobile)

+ Integrated M2M (M2MIS) – POST Luxembourg

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
LUXPT	LUXPT	270-01	V/H	Terrestrial
LUXPT	LUXPT	270-014 270-016001	H	Integrated M2M

+ Network Sharing (MOCN) – Telia Finland

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
FINTF	FINTF	244-91	V/H	Terrestrial
FINTF	FINTF	244-36	V	Network Sharing (MOCN)

+ Network Extension (same MCC-MNC) - TIM Italy

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
ITASI	ITASI	222-01	V/H	Terrestrial
ITASI	ITAGT	222-01	V	Non Terrestrial Network Extension (maritime)

+ Network Extension (new MCC-MNC) – Orange France

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
FRAF1	FRAF1	208-01	V/H	Terrestrial
FRAF1	FRAF1	208-02	V	Network Coverage Extension
FRAF1	AAZOR	901-31	H	Dedicated M2M

Finally, the table hereafter summarizes the mapping of the different uses case and the GSMA PRD IR.21 sections and parameters.

	1	2	4	4	13	15	17	22	23
	Org	Net	E212	E164	NE	CAP	IP	Hosted	M2M
Terrestrial	M	M	M	M	O	O	O	-	-
Non-Terrestrial	M	M	M	M	O	O	O	-	-
Full MVNO	M	-	M	M	O	O	O	-	-
Dedicated M2M	M	-	M	M	O	O	O	-	M
+ Multi user MCC-MNC	M	-	M	O	O	O	O	-	-
+ Light MVNO	-	-	-	Mvno attribute	Mvno attribute	Mvno attribute	Mvno attribute	-	-
+ Integrated M2M	-	-	-	-	-	-	-	-	M
+ Network Sharing	M	-	Mocn mccmnc	-	-	-	-	-	-
+ Network Extension	M	-	-	-	-	-	-	M	-
+ Network Coverage Extension	M	-	-	-	-	-	RAI/LAI mccmnc	-	-

Table 3: Mapping of the Different Uses Cases

4 Reports

Reporting is explained in detail in Annex H.

5 Procedures for updating the database

When data for a PMN changes, or when a new PMN is introduced, the procedures for updating the Roaming Database and for distributing the information to the other PMNs are as follows:

The PMN sends the updating information to the GSMA Members Gateway RAEX IR.21 Application, according to the RAEX IR.21 exchange process described in [Annex C.3](#).

The timescales for a PMN to send information about a change of data to the GSM Member Gateway RAEX IR.21 Application is at least 3 months before change takes place

The GSMA Members Gateway RAEX IR.21 Application updates the database with the information provided.

The IR.21 information for each PMN is available on the GSM Association's Members Gateway RAEX IR.21 Application. A nominated contact from each PMN operator can make changes to update the information on this database for their respective network only.

After a new change on the PMN information occurs all the other PMN operators will receive automatic notification that a change has been made to that operator's IR.21 information, as described in Annex C.5.

6 Confidentiality

IR.21 information is confidential and cannot be disclosed by another operator that does not own the information.

In order to guarantee a minimum set of security, in terms of not providing access to IR.21 data from wrong entities, these confidentiality rules allow the Mobile Operator owner of the IR.21 information, to define methods and criteria to share specific information and in order not to disclose the information to non-authorised parties.

The sharing of the IR.21 information is generally defined within contractual relationship with the other party and the relationship criteria represent the need and the basis to exchange IR.21 data.

The IR.21 sections included in Annex A are classified by two main categories:

1. Non-Confidential Information: these sections are free to being retrieved and used by the organisations
2. Confidential Information: these sections may be restricted by the owner with specific policies

Notwithstanding the provisions above, the GSMA reserves the right to use GSMA members' "Non-Confidential Information", as classified in Annex A, to support the provision of essential services that aid Non-GSMA members in the delivery of Emergency services.

The list of the IR.21 Non-Confidential sections is the following:

Section	Title
1	Organisation Information
2	Network
4.1	Routing Information - IMSI
21	Contact

Table 4 :Non-Confidential Sections

All the other sections could be Confidential (except these are classified as Non-Confidential).

Note 1: Section 1, 2, 4.1 and 21 are Non-Confidential: this provides key information to all roaming players such TADIG code, MCC/MNC, Radio Bands, services supported and contact information.

Note 2: up to release 16, an IR.21 submission could be private (not published to the RAEX users). Since release 17, private IR.21 submissions are no more accepted; only confidential sections are applicable (Private IR.21 submissions in R16 could be implemented in R17 by defining all sections as Confidential – except 1, 2, 4.1 and 21 which are always disclosed to the RAEX users).

Since release 17, private IR.21 are no more supported; only confidential sections are applicable (Private IR.21 in R16 could be implemented in R17 by defining all sections as Confidential – except 1, 2, 21 and 30 which are always disclosed to the RAEX users).

7 Global Title (GT) Leasing

The practice of leasing GTs (by a “GT lessor” to a “GT lessee”) has enabled additional entities (GT lessees) to gain access to the global SS7 network and to exchange signalling messages using GTs associated with the GT lessor. This reduces routing transparency, and introduces security risks for MNOs and their customers, as described in PRD FS.52 “GT Leasing Code of Conduct” [10].

Each MNO member of the GSMA that leases one or more of its GTs to one or more third parties (called a GT Lessee) should clearly specify, in the RAEX IR.21 Routing Information section, which of its GTs are leased.

- The leased GTs should be specified, and the value of the mandatory parameter “Network Owner” should be set to value “GT Leasing”.
- For the leased GTs, the value of the parameter “Location / GT Leasing details” should contain the business name of the GT Lessee and the type of signalling node that is using the leased GT.

MNOs that wish to claim compliance with FS.52 “GT Leasing Code of Conduct” MUST provide this information and MUST configure the RAEX IR.21 Routing Information section as non-confidential, so that the information is available to all RAEX users.

Annex A

Updating of the GSM Association roaming database

GSMA Roaming Database

IR.21 Data

[Space blank for logo positioning, centred]

Effective Date of Change:	DD-MM-YYYY
----------------------------------	------------

A.1 ORGANISATION INFORMATION

Section ID: 1 (Mandatory)

Organisation Name:	<Organisation Name>
Country Initials:	<XXX>

TADIG summary

TADIG	MCC/MNC	VPMN/HPMN	Network Type

History of Changes

Date of Change	Section ID	TADIG Code	Description
YYYY-MM-DD			
YYYY-MM-DD			

A.2 NETWORK

Section ID: 2 (Mandatory, Repeating)

TADIG Code:	XXXXYY (Fill with TADIG Code Associated to the Network. See TD.13 [9])
Network Name:	<Network Name>

Technology:	Frequency list:	Coverage
2G-GSM		
3G-UTRA/FDD		
3G-UTRA/TDD		
4G-E-UTRA		
4G-E-UTRA-MIoT-LTE-M		
4G-E-UTRA-MIoT-NB-IOT		
4G-MIoT-NB-IOT Deployment Mode		
4G-EN-DC Band Combination	Custom type in field with ENDC combination syntax	
5G-NR	Frequency list triplet: Band, Duplex Mode and Frequency in MHz:	

Service Status and Planned Closure and availability (Radio network)¹

Roaming Services supported as VPMN	Support (Y/N)	Planned closure date	Planned availability date
2G			
3G			
4G			
MIoT-LTE-M			

¹ 2/3G sunset guidelines are defined in GSMA PRD NG.121

MIoT-NB-IOT			
VoLTE			
5G-NR			

Service Status and Planned Closure and availability (Core network)²

Roaming Services supported as VPMN	Support (Y/N)	Planned closure date	Planned availability date
CS			
PS			
EPC			
VoIMS			
MCX			
5G SA			

Service Status and Planned Closure and availability (Core network)

Roaming Services supported as HPMN	Support (Y/N)	Planned closure date	Planned availability date
CS			
PS			
EPC			
VoIMS			

² 2/3G sunset guidelines are defined in GSMA PRD NG.121

MCX			
5G SA			

A.3 ROUTING INFORMATION

Section ID: 4 (Mandatory)

A.3.1 Routing Information - IMSI

Section ID: 4.1 (Mandatory)

E. 212-E-214 translation				
Mobile Country Code (MCC)	Mobile Network Code (MNC)	E.212 prefix	E.214 Mobile Global Title (MGT) CC	E.214 Mobile Global Title (MGT) NC

- MCC /MNC are defined also in section 1
- E.212 prefix will be translated to E.214 Mobile Global Title (MGT), composed of Country Code (CC) and Network Code (NC)

Typical examples are listed hereafter:

Classical translation on 5 digits (MCC/MNC)	208	01	20801	33	689
Translation on more than 5 digits (8)	647	00	64700011	262	69200
	647	00	64700012	262	69200
	647	00	64700611	262	69200
	647	00	64700612	262	69200

MCC-MNC codes used for MOCN	Mobile Country Code (MCC)	Mobile Network Code (MNC)

- Add smart dependency for VPMN only operators
 - If VPMN is selected and HPMN unselected, then following Routing subsections shall become optional:
 - E.214 Mobile Global Title (MGT)

A.3.2 Routing Information

Section ID: 4.2 (Mandatory)

ITU-T E.164 Number series	Operator ID 1 (for Roaming HUBs)	TT 23 (for Roaming HUBs)	Country Code (CC)	National Destination Code (NDC)	SN Range Start	SN Range Stop	Range Length	Primary International DPC	Secondary International DPC	Network Owner
MSISDN Number Range(s):										
Network Nodes Global Title Number Range(s):		N/A N/A								
MSRN Number Range(s):		N/A N/A								N/A

- Add smart dependency for VPMN only operators
 - If VPMN is selected and HPMN unselected, then following Routing subsections shall become optional:
 - E.164 MSISDN number ranges
- Add smart dependency for HPMN only operators
 - If HPMN is selected and VPMN unselected, then following Routing subsection shall become optional:
 - E.164 MSRN number ranges

Does Number Portability apply?	
---------------------------------------	--

3

List of E.164 Number Ranges due to Number Portability	CC	NDC	SN Range Start	SN Range Stop

(U) Sim Header:	
------------------------	--

Additional Information:	
--------------------------------	--

Short number translation information	Short number	Long number	Service name

A.4 INTERNATIONAL SCCP GATEWAY

Section ID: 5 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

* List values from the TADIG list of Section 1

International SCCP Carrier List

SCCP Carrier Info

SCCP carrier Name:	
Connectivity Information	
Date of Launch	

3

Date of Closure		
DPC List		
DPC Info		
Signature	<i>Type</i>	International DPC

A.5 DOMESTIC SCCP GATEWAY

Section ID: 6 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

* List values from the TADIG list of Section 1

Domestic SCCP Carrier List

SCCP Carrier Info

SCCP carrier Name:	
Date of Launch	
Date of Closure	
DPC List	
DPC Info	
Signature:	
<i>Type:</i>	
Domestic DPC:	

A.6 SCCP PROTOCOL AVAILABLE AT PMN FOR CONNECTION FOR INTERNATIONAL SS7 ROAMING

Section ID: 7 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

***** , *****

* List values from the TADIG list of Section1

SCCP Protocol available at PMN	Availability (Yes/No)
ETSI (ITU):	
ANSI:	

A.7 SUBSCRIBER IDENTITY AUTHENTICATION

Section ID: 8 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

***** , *****

* List values from the TADIG list of Section1

Authentications	Performed (Yes/No)
Authentication performed for Roaming subscribers at the commencement of GSM service	
Authentication performed for roaming subscribers in case of GPRS	
A5 Cipher Algorithm version in use	

A.8 Test Numbers Information

Section ID: 9 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

***** , *****

* List values from the TADIG list of Section1

Number Type	Test Number	Location	Comments

A.9 MOBILE APPLICATION PART (MAP)

Section ID: 10

(Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

* List values from the TADIG list of Section 1

Interworking Specifically for Roaming

Application Context Name	Current Version in			Comment
	Inbound Roaming		Outbound Roaming ⁴	
	MSC/VLR	SGSN		
networkLocUp		N/A		
roamingNumberEnquiry		N/A		
InfoRetrieval				
subscriberDataMng				
networkFunctionalSs		N/A		
mwdMngt				
shortMsgMT-Relay (shortMsgRelay in v1)				
shortMsgMO-Relay (shortMsgRelay in v1)				
ss-InvocationNotification		N/A		
subscriberInfoEnquiry				
gprsLocationUpdate	N/A			
locationCancellation				
msPurging				
reset				
networkUnstructuredSs Reporting		N/A		
callCompletion		N/A		
istAlerting		N/A		
serviceTermination		N/A		
locationSvcGateway	N/A	N/A		
mm-EventReporting		N/A		
authenticationFailureReport				
imsiRetrieval		N/A		
gprsNotifyContext	N/A			
gprsLocationInfoRetrieval	N/A			
failureReport	N/A			
secureTransportHandling				

⁴ The term "Outbound Roaming" denotes any one of the following nodes that is located in the home PLMN only: HLR, gsmSCF, SMS-IW MSC, SMS-GMSC.

A.10 MAP INTER OPERATOR SMS ENHANCEMENT

Section ID: 12 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

* List values from the TADIG list of Section1

Inter-Operator SMS Enhancement

Application Context Name	Current Version in			Comment
	SMS-IW MSC	SMS-GMSC	HLR	
shortMsgGateway	N/A			
shortMsgAlert		N/A		

List of SMS IW Hub Provider

SMS IW Hub Provider Name

Network Owner

This table is used to identify SMS hub provider (Name) used by the MNO. Depending the network owner (e.g. MNO, MVNO,...), multiple SMS hub providers could be used. SMS hub Provider Name will be completed using a drop down list to assure that name is the correct one.

A.11 NETWORK ELEMENTS INFORMATION

Section ID: 13 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

* ****, **** List values from the TADIG list of Section1

Node Type	GT Address or GT Address Range	IP Address or IP Address Range (IPv4)	IP Address or IP Address Range (IPv6)	Vendor Info	UTC Time Offset

A.12 USSD INFORMATION

Section ID: 14 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

* List values from the TADIG list of Section 1

USSD capability available?	
Supported phase:	

A.13 CAMEL INFO

Section ID: 15 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

* List values from the TADIG list of Section 1

gsmSSF/MSC

CAP Version supported Inbound	Planned Version	Planned Date:
CAP Version supported Outbound	Planned Version	Planned Date:

CAMEL Functionality Information

Service name	SK	CAP Version	SCP GT Address(es)

CAMEL re-Routing Numbering Information

List of numbers used for re-routing purposes ⁵	

⁵ To provide information of Re Routing CAMEL number for troubleshooting

A.14 PACKET DATA SERVICES INFORMATION

Packet data service information

Section ID: 16.1 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes
 ****, ****
 ****, **** * List values from the TADIG list of Section 1

This section contains typical examples of APN used for Packet data service testing (WEB, MMS, WAP, M2M).

List of APN Operator Identifiers

APN Operator Identifier

APN WEB List (for testing)

APN	APN Type Home or VPLMN Routed	Required PDU Session Type	Required PDN Type	APN Credential			ISP DNS IP address (primary)	ISP DNS IP address (secondary)
				Required PDP Type	Username	Password		
	H-APN, V-APN or both	Any one or more of the following: IPv4, IPv6, IPv4v6, Ethernet, Unstructured	Any one or more of the following: IPv4, IPv6, IPv4v6, Non-IP, Ethernet	Any one or more of the following: PPP, IPv4, IPv6, IPv4v6, Non-IP				

APN MMS List (for testing)

APN	Username	Password	MMS Gateway IP address for MMS	Messaging Server URL

APN WAP List (for testing)

APN	Username	Password			

APN M2M List (for testing)

APN	Username	Password		

A.14.1 GPRS data network information

Section ID: 16.2 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

 ***** * List values from the TADIG list of Section 1

This section contains roaming configuration for GPRS data service (2G and 3G).

GTP Version

Data Services supported in 2G, GPRS, EDGE and 3G, HSDPA, HSUPA

2G Data Service	Multislot Class Capability

3G Data Service **UE 3G Category**

Data Services supported in 2G, GPRS, EDGE and 3G, HSDPA, HSUPA	
2G Data Service	Multislot Class Capability
Multiple PDP Context Support	

IPv6 Connectivity Information	Supported (Yes/No)
	[Yes/No]
	[Yes/No]
	[Yes/No]
	[Yes/No]

VPMN support of Local Breakout							
[Yes/No]	[Yes/No]	[Yes/No]	[Yes/No]	[Yes/No]	[Yes/No]	[Yes/No]	[Yes/No]

List of 2G/3G QOS profiles				
Profile name				
Traffic Class				
ARP				
evolvedARP				
eARP Priority Level				
eARP Pre-emption vulnerability				
eARP Pre-emption capability				
Maximum Bit Rate Uplink				
Maximum Bit Rate Downlink				
Delivery order				
Maximum SDU size				
SDU format information				
SDU error ratio				
Residual BER				
Delivery of erroneous SDUs				
Guaranteed bit rate uplink				
Guaranteed bit rate downlink				
Traffic handling priority				
Support of Speech source				
Signalling indication				

Note: for all parameters, If Yes please indicate how many simultaneous Primary PDP context are supported by the network

A.15 GRX/IPX Routing for data roaming

Section ID: 17(Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

****, **** * List values from the TADIG list of Section 1

IP addresses

IP addresses or IP address range(s) of all operator's nodes that connect to the inter-PMN IP backbone network known as the "GRX" e.g. GGSNs, SGSNs, MMSCs, MME/SGWs, SEPP/UPFs, AAA Servers/Proxies, DNS Servers etc. This information is used for firewall and Border Gateway configuration (see PRD IR.34).

All IP address ranges used by PMN for connection to Inter-PMN IP backbone (IPv4)	IP Address Range for GRX/IPX data roaming (IPv4)	IPX VLAN	Network Owner

All IP address ranges used by PMN for connection to Inter-PMN IP backbone (IPv6)	IP Address Range for GRX/IPX data roaming (IPv6)	IPX VLAN	Network Owner

MCC/MNC (RAI/ULI)

Provide the details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any SGSN in the VPMN to the GGSN/PGW in the HPMN, in the Create PDP Context Request and Update PDP Context Request GTP messages. If only the MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank.

Any <i>additional</i> MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in GTP messaging from SGSNs/SGWs	MCC (3 digit)	MNC (2 or 3 digit)	Network Owner

Any <i>additional</i> MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs	MCC (3 digit)	MNC (2 or 3 digit)	Network Owner

MNO ASN

Each MNO is identified by one ASN (as minimum). Other ASN could be used by the MNO depending Network Owner (e.g. MNO, MVNO,...). This section contains ONLY ASN information related to MNO (no ASN from GRX/IPX).

MNO's ASN(Autonomous System Numbers) list for GRX/IPX service	ASN/ ASN4B	Network Owner

Any <i>additional</i> MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs	MCC (3 digit)	MNC (2 or 3 digit)	Network Owner

GRX/IPX Providers

This table is used to identify GRX/IPX provider (ASN and Name) used by the MNO. Depending the network owner (e.g. MNO, MVNO,...), multiple GRX/IPX providers could be used. GRX/IPX Provider Name will be completed using a drop down list to assure that name is the correct one.

List of GRX/IPX Providers	GRX/IPX Provider ASN	GRX/IPX Provider Name	Network Owner

DNS/ENUM

List of PMN authoritative DNS server IP addresses and domain	IP address (IPv4)	IP address (IPv6)	DNS name	Priority	Network Owner

List of PMN local caching DNS server IP addresses and domain	IP address (IPv4)	IP address (IPv6)	DNS name	Priority	Network Owner

List of PMN ENUM servers	IPv4 address	IPv6 address	ENUM Server Name	ENUM Server Type	Network Owner

IPv4 address that responds to ping/traceroute:	
IPv6 address that responds to ping/traceroute:	

List of GRX/IPX Providers	ASN for GRX/IPX Provider	GRX/IPX Provider Name	Network Owner

A.16 MMS INTERWORKING INFORMATION

Section ID: 18 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

****, **** * List values from the TADIG list of Section1

MMS Element Data

Domain name of MMSC	IP Address Range for MMSC	Max. size of MMS allowed	Delivery Report allowed? (Y/N)	Read Report allowed? (Y/N)	IP address(es) of Incoming MTA	IP address(es) of Outgoing MTA

List of MMS IW Hub Provider	MMS IW Hub Provider Name	MMS IW Hub Provider GT Address

A.17 WLAN INFORMATION

Section ID: 19 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

****, **** * List values from the TADIG list of Section1

List of RADIUS server/ RADIUS proxy IP address(es)	IP Address

List of IP address range(s) used for WLAN roaming	IP Address Range

List of WLAN Service Brand	Brand Name	Realm

A.18 LTE ROAMING INFORMATION

Section ID: 20 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section1

IPX Interconnection Information

IPX Diameter Provider Names

Date of Launch

Date of Closure

IP addresses of Diameter Agents	Primary	Secondary

Realms used by IPX DA

Diameter architecture option 5 or 6

Roaming Interconnection

Diameter:	
EPC Realm(s)/domain name(s) used for Roaming purpose	epc.mnc<MNC>.mcc<MCC>.3gppnetwork.org 3GPP 23.003 §19.2
FQDN of the Diameter Edge Agent	
Primary IP addresses of DEA FQDN	
Secondary IP addresses of DEA FQDN	
S6a:	
Is S6a supported without IWF?	[Yes/No]
Is IWF available to allow support of inter-PMN MAP interface for connection towards HSS?	[Yes/No]
Is IWF available to allow support of inter-PMN MAP interface for connection towards MME?	[Yes/No]
S6d:	
Is S6d used for legacy SGSN?	[Yes/No]
S9:	
Is S9 used?	[Yes/No]

Voice ITW

IMS/CSFB/other	
----------------	--

Roaming CS FallBack

Roaming CS FallBack method?	Roaming Retry (MTRR) Roaming Forward (MTRF) Not supported
-----------------------------	---

Home PMN Information For LTE Roaming Agreement Only

Is LTE-only roaming supported?	[Yes/No]
--------------------------------	----------

Visited PMN Information For LTE Roaming Agreement Only

Is LTE-only roaming supported?	[Yes/No]
--------------------------------	----------

Home PMN Information For 2G/3G Roaming Agreement Only

Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]

Visited PMN Information For 2G/3G Roaming Agreement Only

Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]

Home PMN Information For 2G/3G and LTE Roaming Agreement

Scenario 1 supported?	[Yes/No]
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]
Scenario 4 supported?	[Yes/No]
Scenario 5 supported?	[Yes/No]
Scenario 6 supported?	[Yes/No]

Visited PMN Information For 2G/3G and LTE Roaming Agreement

Scenario 1 supported?	[Yes/No]
Scenario 2 supported?	[Yes/No]
Scenario 3 supported?	[Yes/No]
Scenario 4 supported?	[Yes/No]
Scenario 5 supported?	[Yes/No]
Scenario 6 supported?	[Yes/No]

**Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field)
that may be sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages**

Visited PLMN Id AVP 1407	MCC (3 digit)	MNC (2 or 3 digit)
-----------------------------	---------------	--------------------

List of LTE QOS profiles

Profile name				
QCI				
ARP Priority Level				

ARP Pre-emption vulnerability				
ARP Pre-emption capability				
Maximum Bit Rate Uplink				
Maximum Bit Rate Downlink				
Guaranteed bit rate uplink				
Guaranteed bit rate downlink				

Control of QoS parameters within the VPMN MME/S4-SGSN		
Service name		
Service supported	(Yes/No)	
Bearer Type		
QCI	Allowed QCI Value List	
	Remap or not if QCI received from HPMN does not meet requirement	
	Remap Value	
ARP	Allowed ARP-PL Value List	
	Allowed ARP Pre-emption Vulnerability List	
	Allowed ARP Pre-emption Capability List	
	Downgrade or not if ARP received from HPMN does not meet requirement	
	Downgrade Value	
APN AMBR	Allowed Max-Requested-Bandwidth for uplink	
	Allowed Max-Requested-Bandwidth for downlink	
Maximum Bit Rate	Allowed Maximum Value for uplink(kbps)	
	Allowed Maximum Value for downlink(kbps)	
Guaranteed Bit Rate	Allowed Maximum Value for uplink(kbps)	
	Allowed Maximum Value for downlink(kbps)	
Comments		

IPv6 Connectivity Information		Supported (Yes/No)
MME	IPv6 PDN Type	[Yes/No]
	IPv4v6 PDN Type	[Yes/No]
SGW	IPv6 PDN Type	[Yes/No]
	IPv4v6 PDN Type	[Yes/No]
PGW	IPv6 PDN Type	[Yes/No]
	IPv4v6 PDN Type	[Yes/No]

Information for DIAMETER certificates exchange	
IP Addresses of IPsec GW:	
IP Address of the first IPsec GW	[List/Range/Subnetmask of IP addresses]

IP address of the second IPsec GW:	[List/Range/Subnetmask of IP addresses]
Certificates available from the RAEX IR.21 Database	
Certificate of first IPsec GW:	[Yes/No]
Certificate of second IPsec GW:	[Yes/No]
Operator roaming sub-CA certificate	[Yes/No]
Diameter End To End Security support	
Supported DESS Phases	DESS Phase 1 (Authentication and Integrity protection) DESS Phase 1 (Authentication and Integrity protection) and DESS Phase 2 (Encryption) Not supported
DESS function delegated to IPX provider	<IPX provider Name>

5G Early Drop support		
	AS HPMN (outbound)	As VPMN (inbound)
5G NSA supported	Y/N	Y/N
DNS PGW NAPTR includes +nc-nr	Y/N	Y/N
NSA Option for EN-DC (VPMN only)		3, 3A, 3X
ARD set with feature list AVP#27	Y/N	
Restrict access for NR when HSS does not set the feature list AVP#27		Y/N

A.19 CONTACT INFORMATION

Section ID: 21 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****

****, **** * List values from the TADIG list of Section1

Troubleshooting Office Information Item

Location		
Office Time Zone in UTC		
Office Hours	Weekday(s)	Start Time
	Mon, Tue, Wed	
	Thu, Fri	
Main Contact for Troubleshooting (Office Hours)	Person Name or Team Name	Tel.
Escalation Contact for Troubleshooting	Person Name or Team Name	Tel.
24 x 7 Troubleshooting Contact (Out of Office Hours)	Person Name or Team Name	Tel.
Location		
Office Time Zone in UTC		
Office Hours	Weekday(s)	Start Time

Escalation Contact for Troubleshooting	Person Name or Team Name	Tel.	Email

24 x 7 Troubleshooting Contact (Out of Office Hours)	Person Name or Team Name	Tel.	Email

Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	<small>Escalation Contact for roaming troubleshooting out of office hours. Should be different to Main Contact for Troubleshooting.</small>	Tel.	Email

Roaming Troubleshooting Ticketing System	
Ticket System Web Address	
Ticket System Email Address	
Trouble shooting receipt preference	

SCCP Inquiries and ordering of SS7 Routes	Person Name or Team Name	Tel.	Email

Roaming Coordinator	Person Name or Team Name	Tel.	Email

IREG Tests	Person Name or Team Name	Tel.	Email

TADIG Tests	Person Name or Team Name	Tel.	Email

CAMEL Tests	Person Name or Team Name	Tel.	Email

GPRS Contact	Person Name or Team Name	Tel.	Email

Contact Person(s) (in PMN) for GRX connectivity	Person Name or Team Name	Tel.	Email

Contact person (in PMN) to verify authority of a GRX provider to add/modify data in Root DNS	Person Name Person Name or Team Name	Tel.	Email

Contact person(s) for IW MMS	Person Name Person Name or Team Name	Tel.	Email
Contact person(s) for IW SMS	Person Name Person Name or Team Name	Tel.	Email

Contact person(s) for WLAN	Person Name Person Name or Team Name	Tel.	Email

Contact person(s) for Certificates and Key management	Person Name Person Name or Team Name	Tel.	Email

Other Contacts

IR21 Distribution Email Address	Email

A.20 HOSTED NETWORKS

Section ID: 22 (Optional, Repeating)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section1

List of Hosted Network Data

Hosted Network Data						
Network Name:						
Country:						
TADIG Code						
Network Type	<i>Choose between "Terrestrial" or "Non-Terrestrial"</i>					
List of Hosted Network Nodes						
Node Type	GT (E.164) Address(es)	IP Address(es)	MSRN Range(s)			
			CC	NDC	SN Range Start	SN Range End

Hosted Network Data

Hosted Network Data							
Network Name:							
Country:							
TADIG Code							
Network Type	<i>Choose between "Terrestrial" or "Non-Terrestrial"</i>						
List of Hosted Network Nodes							
Node Type	GT (E.164) Address(es)	IP Address(es)	MSRN Range(s)				Location
			CC	NDC	SN Range Start	SN Range End	

A.21 M2M Roaming Information

Section ID: 23 (Optional, Repeating)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section1

List of Subrange IMSI

Subrange IMSI	Description	Example

A.22 Roaming Hub provider

Section ID: 25 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section1

A.23 VoIMS ROAMING INFORMATION

Section ID: 26 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section1

VoIMS Roaming architectures supported as VPMN

S8HR	[Yes/No]
------	----------

VoIMS Roaming architectures supported as HPMN

S8HR	[Yes/No]
------	----------

VoIMS Roaming architectures supported as VPMN

N9HR	[Yes/No]
------	----------

VoIMS Roaming architectures supported as HPMN

N9HR	[Yes/No]
------	----------

VoIMS Roaming service supported as VPMN

GTT-IP	[Yes/No]
--------	----------

VoIMS Roaming service supported as HPMN

GTT-IP	[Yes/No]
--------	----------

Mobility and Voice Continuity

SRVCC technology supported as VPMN	eSRVCC (3GPP rel. 11 and above) Basic SRVCC (3GPP rel. 10 and before) Not supported
SRVCC technology supported as HPMN	eSRVCC (3GPP rel. 11 and above) Basic SRVCC (3GPP rel. 10 and before) Not supported

Lawful Interception / Data retention

Does VPMN require encryption deactivation by HPMN for IMS procedures	Yes/No
--	--------

EPS QoS to be enforced

Maximum QoS profile supported for "ims" well known APN	<EPS QoS profile> name described in section 20 (LTE Roaming Information) and dedicated to "ims" APN.
--	--

A.24 LPWA ROAMING INFORMATION

Section ID: 27 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****, ****
****, **** * List values from the TADIG list of Section1

LTE-M Services supported as HPMN (outbound)

IP version	IPv4 IPv6
------------	--------------

	Dual-stack
Data transport via control plane	[Yes/No]
Data transport via user plane	[Yes/No]
NIDD support	[Yes/No]
NIDD via SCEF	[Yes/No]
NIDD via PgW	[Yes/No]
Power Saving Mode / PSM	[No Static Dynamic]
Extended Discontinuous Reception / eDRX	[No Static Dynamic]
SMS	[Yes/No]
SMS buffering period	
VoLTE over LTE-M	[Yes/No]
IPX GTP Firewall	[Yes/No]
IPX Firewall GTP Idle timer value	
LTE-M Services supported as VPMN (inbound)	
IP version	IPv4 IPv6 Dual-stack
Data transport via control plane	[Yes/No]
Data transport via user plane	[Yes/No]
NIDD support	[Yes/No]
NIDD via SCEF	[Yes/No]
NIDD via PgW	[Yes/No]
Release Assistance Indication Rel. 14	[Yes/No]
Power Saving Mode/PSM	[No Static Dynamic]
PSM T3324 timer minimum value	
PSM T3324 timer maximum value	
PSM extended T3412 timer minimum value	
PSM extended T3412 timer maximum value	
PSM packet buffering support	[Yes/No]
PSM packet buffering volume	
DRX cycle timer	
Extended Discontinuous Reception / eDRX	[Yes/No]
eDRX cycle timer minimum value	
eDRX cycle timer maximum value	
eDRX PTW minimum value	
eDRX PTW maximum value	
eDRX packet buffering support	[Yes/No]
eDRX packet buffering volume	
Connected Mode Mobility / CMM	[Yes/No]
RRC Inactivity timer duration	
Coverage Enhancement Mode A / CE	[Yes/No]
RRC Inactivity timer duration for Mode A	
Coverage Enhancement Mode B / CE	[Yes/No]
RRC Inactivity timer duration for Mode B	
SMS	[Yes/No]
SMS buffering period	
VoLTE over LTE-M	[Yes/No]
IPX GTP Firewall	[Yes/No]
IPX Firewall GTP Idle timer value	
UE Power class support	Class 3 Class 5

NB-IoT Services supported as HPMN (outbound)

IP version	IPv4 IPv6 Dual-stack
Data transport via control plane	[Yes/No]
Data transport via user plane	[Yes/No]
NIDD support	
NIDD via SCEF	[Yes/No]
NIDD via PgW	[Yes/No]
Power Saving Mode / PSM	[No Static Dynamic]
Extended Discontinuous Reception / eDRX	[No Static Dynamic]
SMS	[Yes/No]
SMS buffering period	
IPX Firewall GTP Idle timer value	

NB-IoT Services supported as VPMN (inbound)

IP version	IPv4 IPv6 Dual-stack
Data transport via control plane	[Yes/No]
Data transport via user plane	[Yes/No]
NIDD support	
NIDD via SCEF	[Yes/No]
NIDD via PgW	[Yes/No]
Release Assistance Indication Rel. 13	[Yes/No]
Release Assistance Indication Rel. 14	[Yes/No]
Power Saving Mode / PSM	[No Static Dynamic]
PSM T3324 timer minimum value	
PSM T3324 timer maximum value	
PSM extended T3412 timer minimum value	
PSM extended T3412 timer maximum value	
PSM packet buffering support	[Yes/No]
PSM packet buffering volume	
DRX cycle timer	
Extended Discontinuous Reception / eDRX	[No Static Dynamic]
eDRX cycle timer minimum value	
eDRX cycle timer maximum value	
eDRX PTW minimum value	
eDRX PTW maximum value	
eDRX packet buffering support	[Yes/No]
eDRX packet buffering volume	
RRC Inactivity timer duration	
Coverage Extension	[Yes/No]
RRC Inactivity timer duration for CE1	
RRC Inactivity timer duration for CE2	
RRC Inactivity timer duration for CE3	
SMS	[Yes/No]
SMS buffering period	
IPX GTP Firewall	[Yes/No]
IPX Firewall GTP Idle timer value	

UE Power class support	Class 3 Class 5 Class 6
------------------------	-------------------------------

A.25 5G SA Roaming Information

Section ID: 28 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes⁶

5G SA SIGNALLING

Each SEPP (representing the MNO) shall be defined based on the next table, defining the following parameters:

SEPP information					
SEPP model	MCC/MNC List	Well-known FQDN	SEPP FQDN	IPX provider	SEPP-N32 parameters

Different SEPP model could be defined (1/2/3/4), associated to a (list of) MCC/MNC as defined in NG.140 [x].

A well-known FQDN (associated to the different models) is associated to the SEPP.

SEPP FQDN could be found via a DNS NAPTR query or using IR.21 parameter, compliant with one of the four 5G SA models.

An IPX provider could be provided optionally.

Finally, some SEPP_N32 parameters are added for protocol support, and parameters support.

Typical examples are listed hereafter:

Model 1 bilateral example

- well-known FQDN: sepp.5gc.mnc001.mcc010.3gppnetwork.org
- SEPP FQDN: sepp-id.sepp.5gc.mnc001.mcc010.3gppnetwork.org

Model 2-Hosted SEPP example

- well-known FQDN: sepp.5gc.mnc001.mcc010.3gppnetwork.org
- SEPP FQDN: sepp-id.sepp.5gc.mnc001.mcc010.carrier-id.ipxnetwork.org

⁶ Fill-in that section if the information is also applicable with other networks of your organization or for MVNO

Model 2-Hosted SEPP – group example

- well-known FQDN: sepp.5gc.mnc001.mcc010.3gppnetwork.org
- SEPP FQDN: sepp-id.sepp.5gc.mnc002.mcc020.carrier-id.ipxnetwork.org (group SEPP)

Model 3-Service Hub example

- well-known FQDN: sepp.5gc.service-hub-id.ipxnetwork.org
- SEPP FQDN: sepp-id.sepp.5gc.service-hub-id.ipxnetwork.org

Model 4-Roaming Hub example

- well-known FQDN: sepp.5gc.roaming-hub-id.ipxnetwork.org
- SEPP FQDN: sepp-id.sepp.5gc.roaming-hub-id.ipxnetwork.org

5G SA DATA

For 5G data roaming, 2 options (LBO/HR) could be foreseen:

Data 5G Roaming Architectures Supported as VPMN	
N9HR	[Yes/No]
N9LBO	[Yes/No]

Data 5G Roaming Architectures Supported as HPMN	
N9HR	[Yes/No]
N9LBO	[Yes/No]

List of 5GS QoS profiles				
Profile name				
5QI ⁷				
ARP Priority Level ⁸				
ARP Pre-emption vulnerability				
ARP Pre-emption capability				
Maximum Bit Rate Uplink				
Maximum Bit Rate Downlink				
Guaranteed bit rate downlink				
Guaranteed bit rate uplink				

⁷ Mandatory

⁸ Mandatory

A.26 SMS Roaming Information

Section ID: 29 (Mandatory)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes⁹

****,****

SMS exchange -as VPLMN

SMS Delivery mechanism

SMS over IP	[Yes/No]
SMS over NAS via SS7	[Yes/No]
SMS over NAS via Diameter	[Yes/No]
SMS over NAS via HTTPs	[Yes/No]

SMS exchange -as VPLMN

SMS Delivery mechanism

SMS over IP	[Yes/No]
SMS over NAS via SS7	[Yes/No]
SMS over NAS via Diameter	[Yes/No]
SMS over NAS via HTTPs	[Yes/No]

A.27 Emergency Services

Section ID: 30 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

****,****

****,**** * List values from the TADIG list of Section 1

⁹ Fill-in that section if the information is also applicable with other networks of your organization or for MVNO

Emergency calls

	VoNR VoLTE CS Fallback
--	------------------------------

In 4G networks, emergency calls are supported using VoLTE. However, if VoLTE is not available, the call can still be completed by falling back to 2G or 3G using circuit-switched access. With the rollout of 5G, emergency calls can also be made over VoNR. For more details on emergency call procedures, see GSMA PRD NG.119 [11].

The serving network can download additional emergency numbers (especially local emergency numbers) to the UE in order to enable UE detection of an emergency session.

	[Yes/No]
	[Yes/No]
	[Yes/No]
	[Yes/No]

Real Time Text (RTT)

VPMN technology natively supports GTT-IP / RTT to emergency center	[Yes/No]
--	----------

Global text Telephony over IP (GTT-IP) / Real Time Text (RTT) to emergency center (PSAP).

With the introduction of IMS in 4G, new services such as GTT-IP and RTT became available. These services are especially important for people who are Deaf, Deafblind, or Hard of Hearing, as they allow real-time communication and access to emergency services. Depending on local regulations, operators may also be required to provide access to emergency center for inbound roamers.

eCall

VPMN technology strategy for eCall	None eCall NGeCall
------------------------------------	--------------------------

eCall is an in-vehicle emergency call to 112 that can be triggered automatically by in-vehicle sensors or manually by passengers. It sends a Minimum Set of Data (MSD) and opens an audio channel between the vehicle and the eCall PSAP using public mobile networks. While eCall works exclusively on 2G/3G, NG eCall is based on 4G and 5G. Depending on local regulations, operators may also be required to support eCall services for both local users and inbound roamers. For further information regarding eCall, refer to GSMA PRD NG.119.

Advance Mobile Location (AML)

VPMN technology strategy for AML	None SMS HTTP
----------------------------------	---------------------

Advanced Mobile Location (AML) is a technology that automatically transmits a caller’s precise location to emergency services when an emergency call (e.g., to 112 or 911) is made from a mobile device. ETSI has defined two mechanisms for transmitting location information: via SMS or via an HTTP connection. Depending on local regulations, operators may be required to support AML services for both local customers and inbound roamers. For further information regarding AML, refer to GSMA PRD NG.119.

A.28 Roaming Protection Information

Section ID: 31 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes¹⁰

*****, *****

Inbound roaming protection

Technology	Protection coverage	Comment
SS7 (2G/3G)	[All/Partial/Not Disclosed]	
Diameter (4G)	[All/Partial/Not Disclosed]	
GTP (2G/3G/4G)	[All/Partial/Not Disclosed]	
HTTPS (5G)	[All/Partial/Not Disclosed]	

Inbound Roamer Protection applies mainly on Category 2 and is defined in FS.21, section 16.

Fill-in that section if the information is also applicable with other networks of your organization or for MVNO

Annex B

Different rules are applied when introducing parameters in IR.21 RAEX tool to improve data consistency.

The excel file attached hereafter describes those rules for the different RAEX tool releases.



IR21 007_06 RAEX
IR.21 Checks GSMA in

Annex C

C.1 RAEX IR.21 Business Requirements

RAEX IR.21 provides the means of distributing the IR.21 information using a pre-defined data format and according to a standardized business process.

C.1.1 Key benefits of using RAEX IR.21 tool

- Free of cost for all GSMA members
- Global Access through Member Gateway/Roaming Gateway
- Intuitive to use – user can self-start right post login
- In-line with latest IR.21 specifications
- RAEX Support – Create, Update, Validate, on screen display, XML/PDF Export
- RAEX IR.21 distribution – send updates to your roaming partners on a button click
- Get real time alerts about IR.21 updates from your roaming partners
- Track the workflow of distributed documents
- Run reports through IR.21 information

C.1.2 Benefits of using RAEX IR.21 tool

As per the RAEX IR.21 business case using the application saves an organization a minimum of 36,000 Euros annually and factoring in the current 300 operators using this system the IR.21 application saves the industry in access of 10 million Euros annually

C.1.3 How to migrate to the system

- Request the 'IR.21 Administrator', 'IR.21 Read Only' or 'IR.85 Administrator' access package on Member Gateway by going to the homepage, navigating to the 'My Member Gateway' tab, and clicking on 'My Access' in the drop down.
- Please refer to the below table for a description of what each access package allows you to do.

Role	Description
IR21-Admin	Able to upload, modify, delete, create, approve, distribute IR.21 files and download received Roaming Partner IR.21 files.
IR21-ReadOnly	Able to download received Roaming Partner IR.21 files.
IR85-Admin	This role is for Roaming Hubs only and enables the user to upload, create, approve, distribute, download IR.85 documents as well as view those received from their Connected Partners.

- Access Roaming Gateway (RAEX) by clicking on the [Roaming Gateway \(RAEX\)](#) button on the Member Gateway homepage.
- The following user guides and a section for FAQs can be found on [Roaming Gateway \(RAEX\)](#):
 - [Roaming features](#)
 - [Document Handling](#)
 - [RAEX creator](#)
 - [Certificate database](#)
 - [3rd party API integration](#)
 - [FAQs](#)
- More resources can be found at the bottom of the [RAEX homepage](#).
- This includes RAEX Sample Files, RAEX Schemas, RAEX Training presentation slides, and a RAEX Training video.

C.1.4 How to get further help and support

- Contact our first line support@roamsys.com
- Contact RAEX IR.21 Project Team on below email ids
 - Carmen Kwok (GSMA): CKwok@gsma.com
 - Javier Sendin (GSMA): jsendin@gsma.com
 - Fabrizio Fiorucci (Telecom Italia): fabrizio1.fiorucci@telecomitalia.it
 - Marc Balon (NRG chair): marc.balon@orange.com

C.2 RAEX IR.21 Exchange process and Notification functionalities

This section highlights and describes the distribution process to be used by the parties using RAEX IR.21 format.

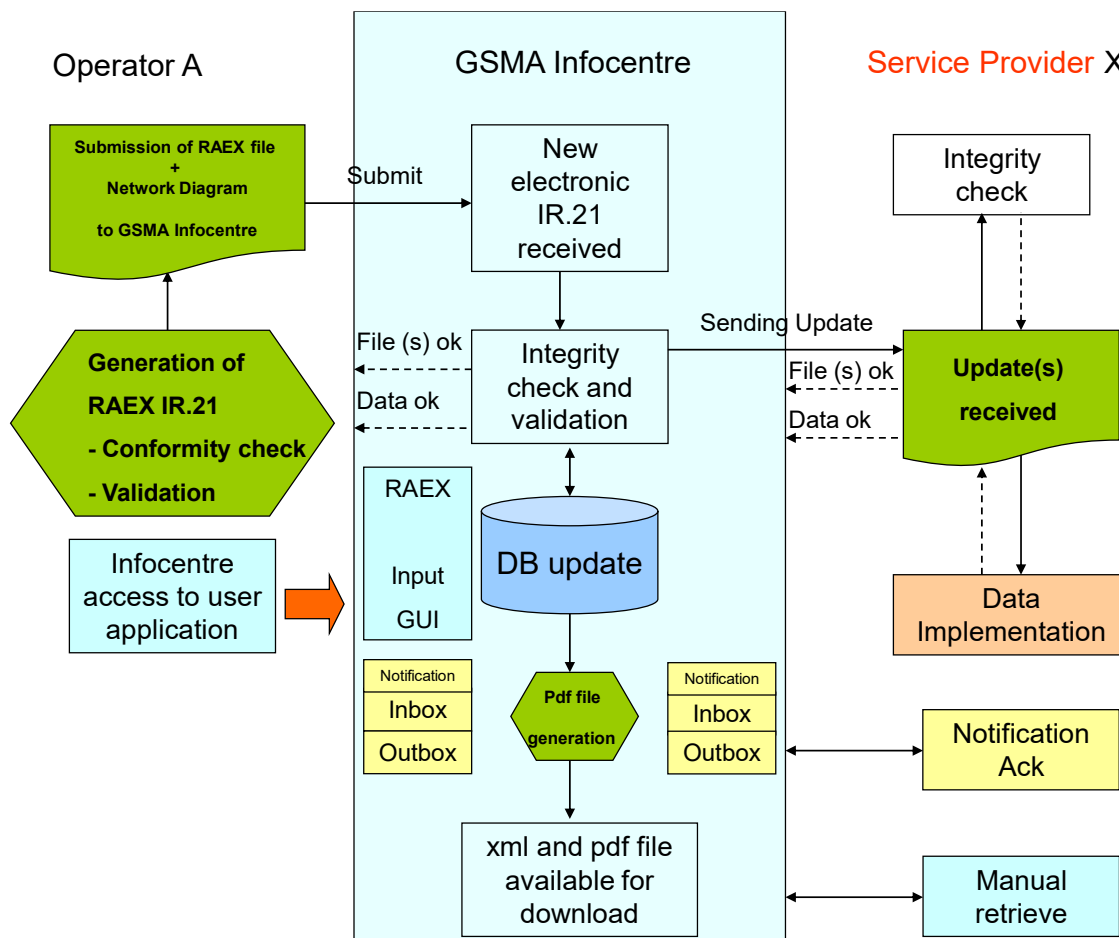


Figure 2RAEX IR.21 Exchange Process

C.3 Details of Exchange process in manual or GUI scenarios

Operator A generates the RAEX IR.21 File containing all IR.21 data. Operator A should ensure that the File it produces is correctly formatted and populated. For this purpose an XML file template is used. Within the file the date of the change is indicated.

Operator A is also allowed to upload an image containing its network interconnection diagram

Submit the RAEX IR.21 File and an image to the GSMA RAEX tool. The RAEX tool will use this data to update the Internal Roaming Database. There will be a special section folder to allow a RAEX format upload.

An acknowledgement from the RAEX tool, communicating the file has been correctly accepted and uploaded. Note: The RAEX tool should also verify the integrity of the file and the structure according to the RAEX principles, and ensure that the uploaded file is the latest IR.21 version. It is out of scope to verify the correctness of data inserted by operators.

Operator A may use the RAEX tool GUI as an interface for submitting its network data. The Internal Roaming Database is updated as per point 3.

The RAEX tool sends a notification to the receiving party (to receiving parties listed accordingly) a new RAEX IR.21 is available within the website. This is done according to the notification preferences set by the receiving party within the RAEX tool. The notification sent to the receiving parties may contain a number of RAEX IR.21 available.

SPX, on the receiving party side, will receive the updated notification and/or the updated XML file(s) and network diagrams, as it optionally has chosen within the notification/distribution section on the RAEX tool.

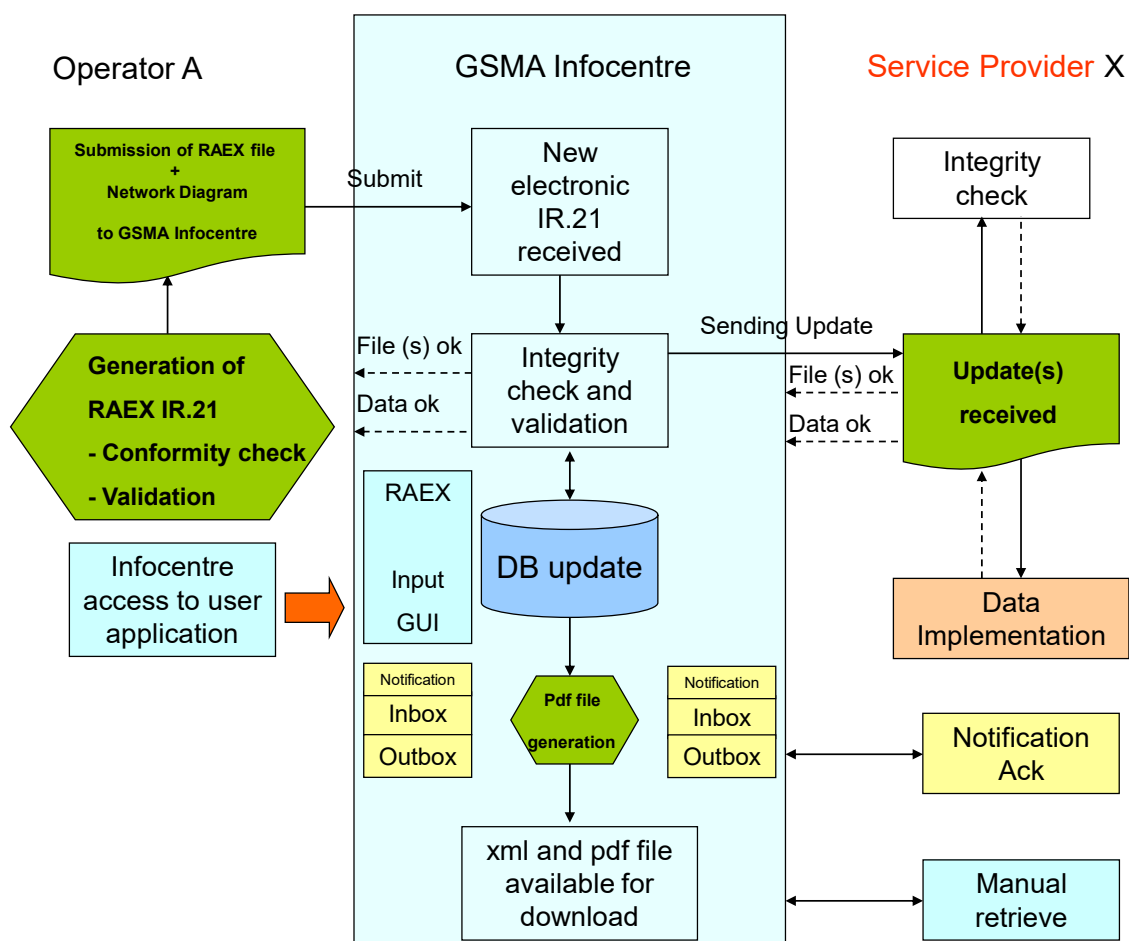
SPX checks RAEX file(s) received for opening and readability of data. Any error on the file or corruption should be troubleshooted directly with the other party

Once the file has been verified by the receiving party, it will be loaded into systems according to internal procedures defined (for example manually, electronically)

According to the notification functionality, the party will communicate the right implementation and definition of the data sending back notification acknowledgement via the GSMA RAEX IR.21 Application (see 3.3)

SPX is also able to manually retrieve XML/PDF IR.21 updated files and network diagrams.

The RAEX tool for backward compatibility always generates PDF versions.



C.4 Notification functionalities

The notification of IR.21 updates is implemented per week (that is on Fridays) and contains a list of updates generated by operators and the reply acknowledges, if any/still.

The format of the notification is by email and the content provided is represented as listed below:

- Organization and contact name providing the update
- Alert number and URL to get access to the content
- Accessing the GSMA Members Gateway page, an operator may acknowledge the receipt and provide implementation feedback (that is implemented or planned [date]). This is represented by an operator “outbox” section. This information is either transmitted back to the operator who sent the update and stored into an “inbox” section for that operator on the Members Gateway.
- Reply method on email received could be used. The reply must contain information on acknowledge and implementation as above. The automation on the Members Gateway replies the mechanism above for storing and providing back acknowledges.
- The weekly notification also contains the status of acknowledges with Members Gateway URL to point for verification and consequently the table with operator list – Alert number of acks replied.

C.4.1 Company Logo

Every operator is allowed to upload its company logo on the Members Gateway at the same time the XML file is provided. The logo format can be a JPG file and will be automatically integrated into the PDF file while converted with the XML schema. The name of the file shall be “logo.jpg”.

If the update is done directly on the Members Gateway via GUI, the company logo can also be loaded in the input page.

The company logo position will be in the first page of GSMA PRD IR.21

C.4.2 Access to roaming Database

Members Gateway designated IR.21 administrators can access to Roaming Database for information retrieval. The method consists of accessing the relative page on the Members Gateway containing the front end mask selection.

The mask contains a wizard to allow a cascade selection of the elements that are allowed to be queried. Possible elements are those defined in IR.21 Data Definition. The format of the output is provided in clear/text content.

At the same URL containing the query wizard, there is also the reference for downloading the entire IR.21 in XML or PDF versions.

C.4.3 File naming convention

A Naming convention is applied to RAEX IR.21 file according to GSMA IT specifications. It contains the following information:

- File type
- TADIG Code
- Organisation name/title

- Distribution Date
- Infocentre Id reference number

C.4.4 Version Control and Change Log

The main reference for IR.21 data is Annex A. Every potential change/addition to data structure and definition, with principles of Change Request process, will mirror changes in RAEX structure. A revision control mechanism in use is still valid and also applied for RAEX sections.

A general ChangeLog is automatically populated with the information already present per section on the RAEX tool.

It is defined by two fields:

- DATE
- DESCRIPTION

Operators must every time use the latest version definition and IR.21 RAEX documents, in order to avoid any lack of data or fields into their networks. Operators can distribute only the latest released IR.21 version via the RAEX IR.21 tool.

A version control mechanism is maintained by the RAEX tool.

C.4.5 Structure of data

This paragraph shows the structure of the sections included within IR.21 Annex A with the purpose of:

- A - Characterize sections with a tag (mandatory, optional, conditional)
- B - Define dependencies between sections, if any
- C - Identifying correctly the section name

In consideration of new services still in a design stage and scenarios already live (that is network extensions) it is proposed to structure the IR.21 information considering these new services and to base the identification of a PMN with the IMSI associated, as described in the image attached.

Major level of the structure contains operator general information, the "organization name" that manages a single or a group of PMN(s), major identified with the element "network" (level 1). Unique reference in this network level, according to IMSI and MGT information, is the TADIG code, managed and released by GSMA to every PMN.

Every PMN has a major definition with the fields IMSI and MGT and with the possibility of having multiple IMSI series translated in a single MGT. At the same level, a differentiation by NDC is represented with the right parameters associated. This need is to accomplish those PMN who are indicating different SCCP GW destinations for their E.164 ranges.

Every operator will have as many different network data blocks as the pair of IMSI / MGT series they have.

Representation of extended and non-terrestrial network will be given by a new section named "Hosted Networks".

Roaming Hubbing will have its own section with relevant information on HUB provider.

The aim of the structure is logical, in order to let the data being reflected and verified within stable conditions.

In the below diagram, IR.21 sections are quoted with ID reference and colour marked according to this legend:

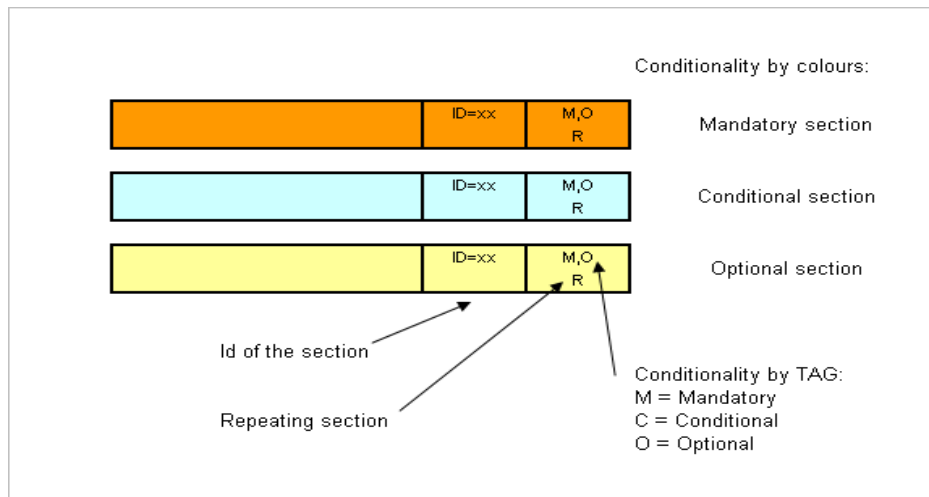


Figure 3RAEX IR.21 Conditionality legend

Represented below are the Data Structure of IR.21 sections:

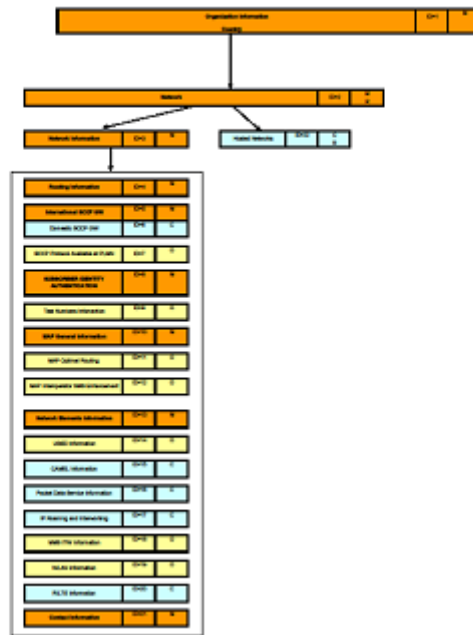


Figure 4RAEX IR.21 Sections Data structure

Annex D IR.21 DATA DICTIONARY

This chapter contains detailed information for every field populated within IR.21, indicating whether they are Mandatory, Optional, type of content in the description of the field. This data should be used to further define technical requirements for RAEX XML file.

Starting from 6.3, top fields “Section name” and “ID” are used to uniquely identify the section, to be further addressed or referenced.

A legend is also created to define the structure of the content data.

Description

The table below describes each of the column headings used within the data dictionary. Every sub-chapter identifies the section name in the GSMA PRD IR.21

Column	Description	Example
Section Name	The name of the section	
ID	Section Id for reference	
Parent	Major referring element	
Element name	The name of the element described	
Format	Type format of the element	
Conditionality	Each element is defined as “Mandatory”, “Optional” or “Conditional”. - Conditional elements have a condition described in the particular “Description” field of the element. - Mandatory elements are a must. - Optional elements may not be present.	M= Mandatory C= Conditional O= Optional R= “Repeating” means the element can be used more times.
Value Indicator	If available, the value indicator contains a list of fix values allowed for the particular element or sub-element content	“Y,N” means either value “Y” – yes or “N” – no, is allowed to be set.
Description	Textual description of the “IR.21 Element’s content”	Explicit description in case of “conditional” elements

Terms legend

This legend is created with the intention to define the structure of common data repeated within the document. Elements defined in this legend are reported to the “format” field in next sections:

Name	Format	Value(s) allowed	Example
Date	yyyymmdd		20070116
E.164GT Address	ITU E.164 number composed of CC+NDC+SN, max length xx digits		393359609600
E.164GT Address range	ITU E.164 number range, length is max xx digits		393351111111-393359999999
IMSI	ITU E.212 number composed by MCC+MNC+MSIN, length is max 15 digits		222011234567890
MGT	ITU E.214 number translated from E.212 and composed by CC+NC+MSIN, length is max xx digits		393391234567890
ITU DPC	Point code expressed in decimal format: a-b-c, length is max xx digits	a,c=1digit 0-9 b=3 digits 0 to 999	2-046-0
ANSI DPC	Point code expressed in decimal format: a-b-c, length is max xx digits	a=1digit 0-9 b=3 digits 0 to 999 c=2 digits 0 to 99	2-046-00
APN Op Id	mncxxx.mccxxx.gprs	X=0-9	mnc001.mcc222.gprs
IPv4 Address	a.b.c.d (IPv4 format)	a=1-255 b=0-255 c=0-255 d=1-255	222.234.222.234
IPv6 Address	x:x:x:x:x:x:x	'x's are one to four hexadecimal digits of the eight 16-bit pieces of the address.	Ref to RFC4291: 2001:DB8::8:800:200C:417A as unicast address. Ipv6 is represented as regular expression.
IP Address range	a.b.c.d/x	a=1-255 b=0-255 c=0-255 d=0-255 x= CIDR denotation of subnet mask. Values allowed are 1-32	222.234.222.0/16
ASN	xxxxxxxxxx	Numeric Max 10 digit = 1- 6553565535	16232

Alpha	Alphanumeric		
Tel Number	(+) Number	(+) Number (fixed or mobile)	+390612345678
WAP GW IP address	IP Address :port number		222.234.222.234:8080
Domain Name	Dot Alpha		Example: www.colorado.edu
URL (Uniform Resource Locator)	URL		http://wap.google.it ; port may be included. Example: http://wap.google.it:3447

History of Changes

Section name: History of changes			Conditionality: M,R		
Parent	Element Name	Format	Conditionality	Value Indicator	Description
	Section ID	Numeric	M		ID of the section that has been modified.
	Date of change	Date	M		Represents the date when the change has been made to the section
	Description	Alphanumeric, max 512 chars	M		Brief description of changes made to the section

Effective date of change

Section name: Effective date of changes			ID: 0	Conditionality: M,R	
Parent	Element Name	Format	Conditionality	Value Indicator	Description
	Effective date of change	Date	M		Represents the date when the updated information contained into IR.21 will become effective

D.1 Organization information

Section name: Organization Information				ID: 1	Conditionality: M
Parent	Element Name	Format	Conditionality	Values	Description
Organization Information	Organization Name	Alphanumeric Max 128 chars	M		Identifies the name of the operator
Organization Information	Country Initials	Text Max 3 chars	M		Country Code abbreviated according to ISO 3166
Organization Information	Network	N/A	M,R		Element containing all the information related to a particular network
Organization Information	TADIG summary	N/A	M,R		List of all the TADIG code
TADIG summary	TADIG	Alpha, max 5 chars	M		TADIG code associated to MCC/MNC of the network, TD.13 [9]
TADIG summary	MCC/MNC	N/A	M		3 digits for MCC Max 3 digits for MNC
TADIG summary	VPMN/HPMN	Listed values	M	V (VPLMN-inbound), H (HPLMN- outbound), V/H (VPLMN-inbound and HPLMN- outbound),	V - VPLMN role is inbound roaming H - HPLMN role is outbound roaming
TADIG summary	Network Type	Listed values	M	Terrestrial, Non-Terrestrial (Aerial), Non-Terrestrial(maritime), Satellite/Space MVNO (Full), M2M Dedicated Operator (M2MDO), M2M Integrated Solution (M2MIS), multi MCC-MNC (IMSI), MVNO (Light), Network Sharing (MOCN), Network Extension	The following network type are based on HPMN and/or VPMN Terrestrial, (normally HPMN and VPMN) Non-Terrestrial(Aerial) (VPMN), Non-Terrestrial(maritime) (VPMN), Satellite/Space (HPMN or VPMN) MVNO (Full), (HPMN) M2M Dedicated Operator (M2MDO), (HPMN) M2M Integrated Solution (M2MIS), (HPMN) multi MCC-MNC (IMSI), (HPMN) MVNO (Light), (HPMN) Network Sharing (MOCN), (VPMN) Network Extension (VPMN)

D.2 Network

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditionality	Values	Description	
Network	TADIG Code	Alpha, max 5 chars	M		TADIG code associated to MCC/MNC of the network, according TD.13 [9]	
Network	Network Name	Alpha, max 256 chars	O		Network Name	
Network	Supported Technology Frequencies		O		Group element containing supported technology frequencies At least one item must have a value different than « none », e.g. 2G-GSM Frequency = GSM 900	
Supported Technology Frequencies	2G-GSM		M		Group element containing a list of frequencies for GSM. These elements are Mandatory only for the Primary Terrestrial Network	
2G-GSM	2G-GSM Frequency	Drop down list	M, R	None T-GSM 380 T-GSM 410 GSM 450 GSM 480 GSM 710 GSM 750 T-GSM 810 GSM 850 GSM 900 E-GSM 900 R-GSM 900 DCS 1800 PCS 1900	This is a repeating element containing the GSM supported frequency bands.	
2G-GSM	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite	
Supported Technology Frequencies	3G-UTRA/FDD		M		Group element containing a list of frequencies for UTRA/FDD. . These elements are Mandatory only for the Primary Terrestrial Network	

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
3G-UTRA/FDD	3G-UTRA/FDD Frequency	Drop down list	M, R	0 - None 1 - IMT 2.1 GHz 2 - PCS 1900 3 - DCS 1800 4 - AWS 5 - 850 MHz 7 - 2.6 GHz 8 - 900 MHz 9 - 1700 MHz 10 - Extended AWS 11 - 1.5 GHz Lower 12 - 700 MHz Lower, A+B+C 13 - 700 MHz Upper 14 - Public Safety 19 - 800 MHz upper 20 - 800 MHz EDD 21 - 1.5 GHz Upper 22 - 3.5 Ghz 25 - PCS 1900 + G Block 26 - 800 MHz iDEN	This is a repeating element containing the UTRA/FDD supported frequency bands.
3G-UTRA/FDD	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
Supported Technology Frequencies	3G-UTRA/TDD		M		Group element containing a list of frequencies for UTRA/TDD. These elements are Mandatory only for the Primary Terrestrial Network

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
3G-UTRA/TDD	3G-UTRA/TDD Frequency	drop down list	M, R	None A -TDD 2000 B -TDD 1900 C -TDD PCS D -TDD 2.6 GHz E - TDD 2.3 GHz F -TDD 1.9 GHz	This is a repeating element containing the UTRA/TDD supported frequency bands
3G-UTRA/TDD	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
Supported Technology Frequencies	4G-E-UTRA		M		Group element containing a list of frequencies for E-UTRA. These elements are Mandatory only for the Primary Terrestrial Network
4G-E-UTRA	4G-E-UTRA Frequency	Drop down list	M, R	0 - None 1 - IMT 2.1 GHz 2 - PCS 1900 3 - DCS 1800 4 - AWS 5 - 850 MHz 7 - 2.6 GHz 8 - 900 MHz 9 - 1700 MHz 10 - Extended AWS 11 - 1.5 GHz Lower 12 - 700 MHz Lower, A+B+C 13 - 700 MHz Upper 14 - Public Safety 17 - 700 MHz Lower, B+C 18 - 800 MHz lower	This is a repeating element containing E-UTRA supported frequency bands. Defined in 3GPP TS 36.101

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
				19 - 800 MHz upper 20 - 800 MHz EDD 21 - 1.5 GHz Upper 22 - 3.5 Ghz 23 - 2 GHz S-Band 24 - L Band 25 - PCS 1900 + G Block 26 - 800 MHz iDEN 27 - 850 MHz lower 28 - 700 MHz APAC 33 - TDD 2000 - 34 - TDD 2000 35 - TDD 1900 36 - TDD 1900 37 - TDD PCS 38 - TDD 2.6 GHz - 39 - TDD 1.9 GHz 40 - TDD 2.3 GHz 41 - TDD 2.5 GHz 42 - TDD 3.4 GHz 43 - TDD 3.6 GHz 44 - 700 MHz APAC 45 - TDD 1400 46 - TDD 5000 47 - TDD 5800	

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
				48 - TDD 3500 49 - TDD 3500 50 - TDD 1400 51 - TDD 1400 52 - TDD 3000 53 - TDD 2400 54 - TDD 1600 65 - FDD 1900 66 - FDD 1700 AWS 68 - FDD 600 70 - FDD 1700 AWS 2-4 71 - FDD 600 72 - FDD 450 PMR 73 - FDD 450 PMR 74 - FDD 1500 Lower L-Band 75 - FDD 1500 L-Band 76 - FDD 1500 L-Band Extension 85 - FDD 700 87 - FDD 410 88 - FDD 410 103 - FDD 700 106 - FDD 900 107 - SDO 600 UHF 108 - SDO 500 UNF 252 - SDL 5200 255 - SDL 5800	

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
4G-E-UTRA	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
SupportedTechnologyFrequencies	4G-E-UTRA-MIoT-LTE-M		M		Group element containing a list of frequencies for E-UTRA for LTE-M (MIoT) . These elements are Mandatory only for the Primary Terrestrial Network
4G-E-UTRA- MIoT - LTE-M	4G-E-UTRA-MIoT-LTE-M Frequency	Drop down list	M, R	Same list as “4G-E-UTRA Frequency” Element Name	This is a repeating element containing E-UTRA supported frequency bands for LTE-M (MIoT).
4G-E-UTRA- MIoT - LTE-M	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
SupportedTechnologyFrequencies	4G-E-UTRA-MIoT-NB-IOT		M		Group element containing a list of frequencies for E-UTRA for NB-IOT (MIoT) . These elements are Mandatory only for the Primary Terrestrial Network
4G-E-UTRA- MIoT - NB-IOT	4G-E-UTRA-MIoT-NB-IOT Frequency	Drop down list	M, R	Same list as “4G-E-UTRA Frequency” Element Name	This is a repeating element containing E-UTRA supported frequency bands for NB-IOT (MIoT).
4G-E-UTRA- MIoT - NB-IOT	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
SupportedTechnologyFrequencies	4G-MIoT-NB-IOT Deployment Mode		M, O		Group element containing the list of NB-IoT specific deployment options.
4G-MIoT-NB-IOT Deployment Mode	MIoT-NB-IOT Deployment Mode	Drop Down List	M, R	0 – None 1 – Standalone 2 – Guard Band 3 - Inband 4 – Hybrid	Element contain the names of the NB-IoT-specific frequency deployment options.
4G-MIoT-NB-IOT Deployment Mode	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite
Supported Technology Frequencies	4G-EN-DC Band Combination List		O		Group element containing a list of supported E-UTRAN New Radio – Dual Connectivity band combinations.

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditionality	Values	Description	
4G-EN-DC Band Combination List	EN-DC Band Combination		M, R		Repeating element containing the name and all frequencies for the custom defined EN-DC band combination.	
EN-DC Band Combination	EN-DC Band Combination Name	Alpha, max 256 chars	M		Element containing the name for the custom defined EN-DC band combination.	
EN-DC Band Combination Supported	FrequencyList		M		Group element containing a list of frequencies for the custom defined technology	
FrequencyList	Frequency	Alpha, max 32 chars	M, R		This is a repeating element containing the supported frequency.	
EN-DC Band Combination	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite	
SupportedTechnologyFrequencies	5G NR		M		Group element containing a list of frequencies for 5G NR . These elements are Mandatory only for the Primary Terrestrial Network	
5G NR	5G NR Frequency	Drop Down List	M, R	None n1 FDD 2100 n2 FDD 1900 n3 FDD 1800 n5 FDD 850 n7 FDD 2600 n8 FDD 900 n12 FDD 700 n13 FDD 700 n14 FDD 700 n18 FDD 850 n20 FDD 800 n24 FDD 1600 n25 FDD 1900 n26 FDD 850 n28 FDD 700 n29 SDL 700	This is a repeating element containing 5G NR supported frequency bands and frequencies. The element contains a triplet of: Band, Duplex mode, Frequency in MHz TS 38.101-1 FR1 and TS 38.101-2 FR2 TS 38.101-1 V18.3.0 (2023-09)	

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditionality	Values	Description	
				n30 FDD 2300 n34 TDD 2100 n38 TDD 2600 n39 TDD 1900 n40 TDD 2300 n41 TDD 2500 n46 TDD 5200 n47 TDD 5900 n48 TDD 3500 n50 TDD 1500 n51 TDD 1500 n53 TDD 2500 n65 FDD 2100 n66 FDD 1700 n66 FDD 2100 n70 FDD 2000 n71 FDD 600 n74 FDD 1500 n75 SDL 1500 n76 SDL 1500 n77 TDD 3700 n78 TDD 3500 n79 TDD 4700 n80 SUL 1800 n81 SUL 900 n82 SUL 800 n83 SUL 700 n84 SUL 2100 n85 FDD 700 n86 SUL 1700 n89 SUL 850 n90 TDD 2500 n91 FDD 800 n91 FDD 1500		

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditionality	Values	Description	
				n92 FDD 800 n92 FDD 1500 n93 FDD 900 n93 FDD 1500 n94 FDD 900 n94 FDD 1500 n95 SUL 2100 n96 TDD 6000 n97 SUL 2300 n98 SUL 1900 n99 SUL 1600 n100 FDD 800 n100 FDD 900 n101 TDD 1900 n102 TDD 6000 n104 TDD 6500 n105 FDD 600 n109 FDD 700 n109 FDD 1500 n254 FDD 2400 n255 FDD 1600 n256 FDD 2100 n257 28 GHz n258 26 GHz n259 41 GHz n260 39 GHz n261 28 GHz n262 47 GHz n263 60 GHz n510 28 GHz n511 28 GHz n512 28 GHz		
5G NR	Coverage	Listed values	O	global, nation-wide, major cities, limited	Global for satellite	

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
Network	Service Status – Planned Closure and Availability	N/A	M,R		List all supported roaming services in separate tables for core and radio network part with the possibility to define planned availability and closure date for each service.
Service Status - Planned Closure and Availability (Radio network)	Roaming Services	Listed values	M	2G 3G 4G MlIoT-LTE-M MlIoT-NB-IOT 5G NR	MlIoT-LTE-M: Mobile IoT - Long Term Evolution for Machines MlIoT-NB-IOT: Mobile IoT - Narrow Band IoT 5G-NR: 5G New Radio
Service Status - Planned Closure and Availability (Radio network)	Planned closure date	Date	O		
Service Status - Planned Closure and Availability (Radio network)	Planned availability date	Date	O		
Service Status - Planned Closure and Availability (Core network)	Roaming Services	Listed values	M	CS PS EPC VoIMS MCX 5G SA	CS: Circuit-Switched network CS: Packet-Switched network EPC: Evolved Packet Core network VoIMS: Voice over IP Multimedia Subsystem MCX: Mission Critical based on specific QoS 5G SA: 5G Standalone
Service Status - Planned Closure and Availability (Core network)	Planned closure date	Date	O		
Service Status - Planned Closure and Availability (Core network)	Planned availability date	Date	O		
Service Status - Planned Closure and Availability	Roaming Services	Listed values	M	CS PS	CS: Circuit-Switched network PS: Packet-Switched network

Section name: Network				ID: 2	Conditionality: M,R
Parent	Element Name	Format	Conditionality	Values	Description
Availability (Core network) as Home Network				EPC VoIMS MCX 5G SA	EPC: Evolved Packet Core network VoIMS: Voice over IP Multimedia Subsystem MCX: Mission Critical based on specific QoS 5G SA: 5G Standalone
Service Status - Planned Closure and Availability (Core network) as Home Network	Planned closure date	Date	O		
Service Status - Planned Closure and Availability (Core network) as Home Network	Planned availability date	Date	O		

The tables hereafter summarize the mapping of the different services, and the IR.21 sections Conditionality (M/C/O).

Service Status - Planned Closure and Availability (Radio network)

		4	5	20	23	24
	Supported	Routing	International SCCP gateway	LTE	M2M	LPWA
2G	Y / N	M / O	C / O	-	-	-
3G	Y / N	M / O	C / O	-	-	-
4G	Y / N	-	-	M / O	-	-
MIoT-LTE-M	Y / N	-	-	-	O / O	M / O
MIoT-NB-IOT	Y / N	-	-	-	O / O	M / O
5G NR	Y / N	-	-	-	-	-

Service Status - Planned Closure and Availability (Core network) as Visited Network

		4	5	20	26	28
	Supported	Routing	International SCCP gateway	LTE	VoLTE (VoIMS)	5G SA roaming
CS	Y / N	M / O	C / O	-	-	-
PS	Y / N	M / O	C / O	-	-	-
EPC	Y / N	-	-	M / O	-	-
VoIMS	Y / N	-	-	-	M / O	-
MCX	Y / N	-	-	O		O
5G SA	Y / N	-	-	-	-	M / O

Service Status - Planned Closure and Availability (Core network) as Home Network

		4	5	20	26	28
	Supported	Routing	International SCCP gateway	LTE	VoLTE (VoIMS)	5G SA roaming
CS	Y / N	M / O	C / O	-	-	-
PS	Y / N	M / O	C / O	-	-	-
EPC	Y / N	-	-	M / O	-	-
VoIMS	Y / N	-	-	-	M / O	-
MCX	Y / N	-	-	O		O
5G SA	Y / N	-	-	-	-	M / O

D.3 Network Information

Section name: Network Information			ID: 3	Conditionality: M		
Parent	Element Name	Format	Conditionality	Value Indicator	Description	
Network Information	Routing Information - IMSI	N/A	M			
Network Information	Routing Information	N/A	M		Not Available for "Data Only" Networks	
Network Information	International SCCP GW	N/A	CM		Mandatory for first network, optional for others	
Network Information	Domestic SCCP GW	N/A	OC			
Network Information	SSCP Protocol available at PMN for International Roaming	N/A	O			
Network Information	Subscriber Identity Authentication	N/A	CM		Mandatory for first network, optional for others	
Network Information	Testing Number Information	N/A	O			
Network Information	MAP General Information	N/A	CM		Mandatory for first network, optional for others	
Network Information	MAP Interoperator SMS Enhancement	N/A	O			
Network Information	Network Elements	N/A	CM		Mandatory for first network, optional for others	
Network Information	SMSC Address	N/A	M			

Section name: Network Information				ID: 3	Conditionality: M
Parent	Element Name	Format	Conditionality	Value Indicator	Description
Network Information	USSD Information	N/A	OM		
Network Information	CAMEL Information	N/A	OC		Section is mandatory, where CAMEL service is supported by the PMN
Network Information	Packet Data Services Information	N/A	OC		
Network Information	GPRS Data Services Information	N/A	OC		
Network Information	IP Roaming and IP Interworking Data Roaming Information	N/A	OC		
Network Information	MMS ITW Information	N/A	O		
Network Information	WLAN Information	N/A	O		
Network Information	LTE Roaming Information	N/A	O		
Network Information	Contact Information	N/A	CM		Mandatory for first network, optional for others
Network Information	M2M Roaming Information	N/A	O, R		
Network Information	Roaming HUB Provider Information	N/A	C		
Network Information	VoIMS Roaming Information	N/A	O		

Section name: Network Information			ID: 3	Conditionality: M	
Parent	Element Name	Format	Conditionality	Value Indicator	Description
Network Information	LPWA Roaming Info Section	N/A	C		At least one list within the section shall be enabled.
Network Information	5G SA Roaming Information	N/A	O		
Network Information	SMS Roaming Information	N/A	M		
Network Information	Roaming Protection Information	N/A	O		

D.4 Routing Information

D.4.1 Routing Information - IMSI

Section name: Routing Information-IMSI			ID: 4.1	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description
Routing Information-IMSI	E.212-E.214 translation	N/A	M,R		Table to define E.212 to E.214 translation from E.212 (MCC/MNC) to E.214 (CC/NC)
E.212-E.214 translation	E.212 Number Series	N/A	M		According ITU E.212, IMSI is composed by: 3 digits for MCC / Max 3 digits for MNC
E.212 Number Series	Mobile Country Code (MCC)		M		
E.212 Number Series	Mobile Network Code (MNC)		M		

Section name: Routing Information-IMSI				ID: 4.1	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description	
E.212-E.214 translation	E.212 Number prefix	Numeric	C		Same format as IMSI.	
E.212-E.214 translation	E.214 Mobile Global Title (MGT)	N/A	C		Field is mandatory for HPMN networks, optional for VPMN only networks.	
E.214 Mobile Global Title (MGT)	Country Code of MGT(CC)		M			
E.214 Mobile Global Title (MGT)	Network Code of MGT (NC)	Numeric	M		Only non-negative integer values are allowed	
Routing Information-IMSI	MCC-MNC codes used for MOCN	N/A	O,R		3 digits for MCC / Max 3 digits for MNC	
MCC-MNC codes used for MOCN	Mobile Country Code (MCC)		M			
MCC-MNC codes used for MOCN	Mobile Network Code (MNC)	Numeric	M		Only non-negative integer values are allowed	

D.4.2 Routing Information

Section name: Routing Information				ID: 4.2	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9] Fill-in that section if the information is also applicable with other networks of your organization or for MVNO	
Routing Information	CCITT E.164 Number Series	N/A	M		Contains definitions for the node ranges in use in the PMN.	

Section name: Routing Information			ID: 4.2	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description
Routing Information	Number Portability	Boolean	M	Yes No	
Routing Information	Numbering Information	N/A	M		
Routing Information	Short number translation information		O		
Numbering Information	E.164 Number Ranges due to Number Portability	E.164 GT Address	M,R		E.164 Number Ranges due to Number Portability may be included in this section.
Numbering Information	(U) Sim Header	Numeric 6 digits	O		
Numbering Information	Additional Information	Alpha (max 512 chars)	M		Additional Information about Numbering and addressing may be included in this section.
CCITT E.164 Number Series	MSISDN(s) number ranges	N/A	C,R		Number ranges in use in the PMN. Field is mandatory for HPMN networks, optional for VPMN only networks.
CCITT E.164 Number Series	Network nodes Global Title number range(s)	N/A	M,R		
CCITT E.164 Number Series	MSRN Number Range(s)	N/A	C,R		Field is mandatory for VPMN networks, optional for HPMN only networks. Definitions for Roaming Number ranges provided for MT calls in the PMN.
MSISDN(s) number ranges	Country Code (CC)		M		
MSISDN(s) number ranges	National Destination Code (NDC)		M		

Section name: Routing Information				ID: 4.2	Conditionality: M
Parent	Element Name	Format	Conditionality	Values	Description
MSISDN(s) number ranges	SN Range Start	Numeric	O		1 to x digits If CC-NDC range is a single range, this field should remain empty
MSISDN(s) number ranges	SN Range Stop	Numeric	C		Shall be present if SN Range Start is present Shall have the same number of digits as SN Range Start SN Range Stop should be greater than SN Range Start Overlapping value with another MNO's IR.21 are not allowed except "MOCN"
MSISDN(s) number ranges	International DPC Primary		C		Primary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"
MSISDN(s) number ranges	International DPC Secondary		C		Secondary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"
MSISDN(s) number ranges	Network Owner	Listed Values	M	MNO MVNO MOCN Sponsor Network	Only if selected, the value provides information about what the number range is used for..
Network nodes Global Title number range(s)	Network Owner With GT Leasing	Listed Values	M	MNO MVNO MOCN Sponsor Network GT Leasing	Only if selected, the value provides information about what the number range is used for..
Network nodes Global Title number range(s)	SN Range Start	Numeric	O		1 to x digits If CC-NDC range is a single range, this field should remain empty

Section name: Routing Information				ID: 4.2	Conditionality: M
Parent	Element Name	Format	Conditionality	Values	Description
Network nodes Global Title number range(s)	SN Range Stop	Numeric	C		Shall be present if SN Range Start is present Shall have the same number of digits as SN Range Start SN Range Stop should be greater than SN Range Start Overlapping value with another MNO's IR.21 are not allowed except "MOCN"
Network nodes Global Title number range(s)	International DPC Primary		C		Primary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"
Network nodes Global Title number range(s)	International DPC Secondary		C		Secondary Destination Point Code parameters mandatory for Signalling routing configuration. This field must be filled if SCCP routing differentiation is applied to group of E.164 number series, by using one of the DPC values defined in section "International SCCP GW"
MSISDN(s) number ranges	Operator ID	3-6 BCD	C		Only used for IR.85 file type.
Network nodes Global Title number range(s)	Operator ID	3-6 BCD	C		Only used for IR.85 file type.
Network nodes Global Title number range(s)	Translation Type	0-255	C		Only used for IR.85 file type.
MSISDN(s) number ranges	Translation Type	0-255	C		Only used for IR.85 file type.
MSISDN(s) number ranges	Location	Alpha Max 64 Char	O		

Section name: Routing Information			ID: 4.2	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description
Network nodes Global Title number range(s)	GT Leasing details	Alpha Max 64 Char	O		For leased GTs, specify the business name of the GT lessee and the type of signalling node that is using the leased GT.
MSRN Number Range(s)	Country Code (CC)		M		
MSRN Number Range(s)	National Destination Code (NDC)		M		
MSRN Number Range(s)	SN Range Start	Numeric	O		1 to x digits If CC-NDC range is a single range, this field should remain empty
MSRN Number Range(s)	SN Range Stop	Numeric	C		Shall be present if SN Range Start is present Shall have the same number of digits as SN Range Start
MSRN Number Range(s)	Location	Alpha Max 64 Char	O		
E.164 Number Ranges due to Number Portability	Country Code (CC)		M		
E.164 Number Ranges due to Number Portability	National Destination Code (NDC)		M		
E.164 Number Ranges due to Number Portability	SN Range Start	Numeric	O		1 to x digits If CC-NDC range is a single range, this field should remain empty
E.164 Number Ranges due to Number Portability	SN Range Stop	Numeric	C		Shall be present if SN Range Start is present Shall have the same number of digits as SN Range Start
Short number translation information	Translation information		C, R		
Translation information	Short number	Numeric	M		Short number to be translated by the VMSC

Section name: Routing Information				ID: 4.2	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description	
Translation information	Long number	ITU E.164 number	M		Long number result of the short number translation without international call prefix (+, 00, 011...)	
Translation information	Service name	Alpha	M		Name of the service accessed when dialling the short number (voice mail, customer care...)	

D.5 International SCCP GW

Section name: International SCCP GW				ID: 5	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9] Fill-in that section if the information is also applicable with other networks of your organization or for MVNO
International SCCP GW	SCCP Carrier	N/A	M,R		
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	M		The name of the SCCP Carrier
SCCP Carrier	DPC Info	N/A	M,R		
SCCP Carrier	Connectivity Information	Listed values	M	Primary/Backup	Define the preferred type of connectivity Primary or Backup
SCCP Carrier	Date of Launch	Date	O		
SCCP Carrier	Date of Closure	Date	O		
DPC Info	Signature	Alpha max 64 letters	M		Name associated to the switching centre
DPC Info	Type	Text max 64 chars	O		Type of switching centre: ISC, MSC, Stand-alone SCCP
DPC Info	International DPC	Alpha	M		Destination Point Code parameters mandatory for Signalling routing configuration. This value can be used for defining Primary and Secondary DPC information in Routing Information Section. Both ANSI and ITU format shall be supported

D.6 Domestic SCCP GW

Section name: Domestic SCCP GW				ID: 6	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9].

Section name: Domestic SCCP GW				ID: 6	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
					Fill-in that section if the information is also applicable with other networks of your organization or for MVNO
Domestic SCCP GW	SCCP Carrier	N/A	M,R		
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	M		The name of the SCCP Carrier
SCCP Carrier	DPC Info	N/A	M,R		
DPC Info	Signature	Alpha max 64 letters	M		Name associated to the switching centre
DPC Info	Type	Text max 64 chars	O		Type of switching centre: ISC, MSC, Stand-alone SCCP
SCCP Carrier	Date of Launch	Date	M		
SCCP Carrier	Date of Closure	Date	M		
DPC Info	Domestic DPC	Alpha	M		Destination Point Code parameters mandatory for Signalling routing configuration Both ANSI and ITU format shall be supported
DPC Info	Comments	Text max 64 chars	O		To provide more information about the specific DPC used (that is primary, secondary)

D.7 SCCP Protocol available at PMN for connection for International SS7 Roaming Signalling

Section name: SCCP Protocol available at PMN				ID: 7	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]

SCCP Protocol available at PMN	ETSI (ITU-T)	Boolean	M	Yes/No	
SCCP Protocol available at PMN	ANSI	Boolean	M	Yes/No	
SCCP Protocol available at PMN	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

D.8 SUBSCRIBER IDENTITY AUTHENTICATION

Section name: Subscriber Identity Authentication			ID: 8	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]

Subscriber Identity Authentication	Authentication performed for roaming subscribers at the commencement of GSM Service	Boolean	M	Yes/No	Write YES if authentication is performed as described within the current version of SG.15 under section Subscriber Identity Authentication/ Roamed Subscriber. Otherwise write NO SG.15 v 3.0.0 says in section 2.2 Roamed Subscribers: For roamed subscribers (at the commencement of GSM service) authentication is to be performed on every occasion of:- a) Network access using IMSI b) Location updating involving VLR change c) Network access for at least 1 in x mobile originated and terminated call set-ups (incl. SMS). The value of x will be defined in the roaming agreements and should be less than 10 d) Supplementary service operation outside call e) Cipher key sequence number mismatch If GPRS is supported, authentication is also to be performed on every occasion of:- a) GPRS attach b) routing area updating involving SGSN change c) PDP context activation d) P-TMSI signature mismatch, if P-TMSI signature is used e) P-TMSI signature not inserted in a Attach Request or Routing Area Update Request
Subscriber Identity Authentication	Authentication performed for roaming subscribers in case of GPRS	Boolean	C	Yes/No	Mandatory where GPRS is supported: Write YES if authentication is performed as described within the current version of SG.15 under section Subscriber Identity Authentication/ Roamed Subscriber if GPRS is supported. Otherwise write NO. If GPRS is not supported fill in N/A
Subscriber Identity Authentication	A5 Cipher Algorithm version in use	Alpha	M		Version of A5 algorithm in use
Subscriber Identity Authentication	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable

List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13
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D.9 Test Numbers Information

Section name: Test Numbers Information				ID: 9	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
Test Numbers Information	Test Number	N/A	M,R		
Test Number	Number Type	Listed values	M	AAC DAAC FAAC VTAAC RTAAC NNAAC NNDAAAC NNFAAC NNVTAAC NNRTAAC CLIAAC CLIDAAAC CLIFAAC CLIVTAAC CLIRTAAC SMSIW MMSIW SMS-C	Possible Number Types for test numbers are: AAC – Voice Automatic Answering Circuit DAAC – Data Automatic Answering Circuit FAAC – Fax Automatic Answering Circuit VTAAC – Video Telephony Automatic Answering Circuit RNAAC – MSRN range Automatic Answering Circuit NN* – For any AAC type if an AAC is accessible from Network-Network Interconnection Interface only Number Type is prefixed with NN (for example NNAAC for voice AAC) CLI* – For any AAC type if an AAC in any way presents received CLI information Number Type is prefixed with CLI (for example CLIAAC for voice AAC) SMSIW – test number for SMS Interworking testing MMSIW – test number for MMS Interworking testing Service Centre Address for SMS-MO Testing
Test Number	Number	E.164	M		
Test Number	Location	Text max 32 char	O		

Section name: Test Numbers Information				ID: 9	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Test Number	Comments	Text max 128 char	O		
Test Numbers Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

D.10 MAP Interworking Specifically for Roaming

In this section, all the elements described contain maximum three sub elements. MSC/VLR and SGSN are relevant in case of Inbound Roaming context. Outbound Roaming does not require any differentiation. The values applicable to these sub elements are: MAPv1, MAPv2, MAPv3 or Not Applicable. All the elements defined in the following table are Mandatory.

Section name: MAP Interworking Specifically for Roaming			ID: 10	Conditionality: C
Parent	Element Name	Applicable Sub Elements	Description	
MAP Interworking Specifically for Roaming	networkLocUp	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	roamingNumberEnquiry	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	InfoRetrieval	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	subscriberDataMngt	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming		
MAP Interworking Specifically for Roaming	networkFunctionalSs	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming		

Section name: MAP Interworking Specifically for Roaming		ID: 10	Conditionality: C
Parent	Element Name	Applicable Sub Elements	Description
MAP Interworking Specifically for Roaming	MwdMngt	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	shortMsgMT-Relay (called shortMsgRelay in v1)	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	shortMsgMO-Relay (called shortMsgRelay in v1)	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	ss-InvocationNotification	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	subscriberInfoEnquiry	Inbound Roaming: MSC/VLR Outbound Roaming	
MAP Interworking Specifically for Roaming	gprsLocationUpdate	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	locationCancellation	Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	MsPurging	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	reset	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	networkUnstructuredSs	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming	
MAP Interworking Specifically for Roaming	Reporting	Inbound Roaming: MSC/VLR Outbound Roaming	

Section name: MAP Interworking Specifically for Roaming			ID: 10	Conditionality: C
Parent	Element Name	Applicable Sub Elements	Description	
MAP Interworking Specifically for Roaming	CallCompletion	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	IstAlerting	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	serviceTermination	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	locationSvcGateway	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	mm-EventReporting	Outbound Roaming		
MAP Interworking Specifically for Roaming	AuthenticationFailureReport	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	ImsiRetrieval	Inbound Roaming: MSC/VLR Inbound Roaming: SGSN Outbound Roaming		
MAP Interworking Specifically for Roaming	GprsNotifyContext	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking Specifically for Roaming	gprsLocationInfoRetrieval	Inbound Roaming: SGSN Outbound Roaming		
MAP Interworking Specifically for Roaming	FailureReport	Inbound Roaming: SGSN Outbound Roaming		
MAP Interworking Specifically for Roaming	secureTransportHandling	Inbound Roaming: SGSN Outbound Roaming		

Section name: MAP Interworking Specifically for Roaming			ID: 10		Conditionality: C
Parent	Element Name	Applicable Sub Elements			Description
Parent	Element Name	Format	Conditionality	Values	Description
MAP Interworking Specifically for Roaming	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13

D.11 MAP Inter-Operator SMS Enhancement

All the elements described in the following section contain maximum three sub elements. SMS-GMSC and SMS-IW MSC are relevant in case of Inbound Roaming context. HLR is the element for Outbound Roaming. The values applicable to these sub elements are: MAPv1, MAPv2, MAPv3 or Not Applicable. All the elements defined in the following table are Optional.

Section name: MAP Inter-Operator SMS Enhancement			ID: 12		Conditionality: O
Parent	Element Name	Applicable Sub Elements			Description
Inter-Operator SMS Enhancement	shortMsgGateway	Inbound Roaming: SMS-GMSC Outbound Roaming: HLR			
Inter-Operator SMS Enhancement	shortMsgAlert	Inbound Roaming: SMS-IW MSC Outbound Roaming: HLR			
Inter-Operator SMS Enhancement	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
Inter-Operator SMS Enhancement	SMS IW Hub Provider(s)	N/A	O, R		SMS hub providers are listed in this parameter
SMS IW Hub Provider(s)	SMS IW Hub Provider(s) Name(s)	Alpha, max 64 chars	M		Name of the SMS hub Provider is entered via a controlled drop-down list to guarantee consistency
SMS IW Hub Provider(s)	Network Owner	Listed Values	M	MNO MVNO MOCN Sponsor Network	Only if selected, the value provides information about what is used for.
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

D.12 Network Elements Information

Section name: Network Elements Information			ID: 13	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
Network Elements Information	Network Node	N/A	M,R		
Network Node	Node Type	Listed values	M	BTS BSC NodeB RNC E-NodeB CGSN EIR GGSN GMSC HLR MMSC MSC MSC-2G MSC-3G MSC-2G+3G MSC/VLR MSC/VLR-2G MSC/VLR-3G MSC/VLR-2G+3G SCP SGSN SGSN-2G SGSN-3G SGSN-2G+3G SMSC IP-SMGW SSP	Type of the node (the complete list to be defined) Wifi roaming includes TWAG, ePDG and AAA

Section name: Network Elements Information				ID: 13	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
				HSS VLR MME SGW PGW PCRF IN MGW MSS/VLR SoR USSD GW Other LBO-H LBO-V SMSC-NP TWAG ePDG AAA	
Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	O		GT address or range of GT addresses GT Address Range Stop should be greater than GT Address Range Start Overlapping value(s) are not allowed in this element The value(s) should also be included in section 4.
Network Node	IP Address(es) IPv4	IP Address range(s)	O		IP address or range of IP addresses The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /32. Overlapping value(s) are not allowed in this element The value(s) should be included in Section 17
Network Node	IP Address(es) IPv6	IP Address range(s)	O		IP address or range of IP addresses (IPv6) are present in case of SGSN or GGSN node types and if supported by corresponding nodes The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /128.

Section name: Network Elements Information				ID: 13	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values	Description	
					Overlapping value(s) are not allowed in this element The value(s) should be included in Section 17	
Network Node	Vendor Info	Alpha max 64 chars	O			
Network Node	UTC Time Offset	UTC	M		Time Zone of the area most served by MSC/VLR, in UTC + offset	
Network Elements Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable	
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13	

D.13 USSD Information

Section name: USSD Information				ID: 14	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]	
USSD Information	USSD capability available	Boolean	Mandatory	Yes/No	Yes means USSD capability is supported including all of case a), section 5.1.2, 3GPP TS 22.090 / GSM 02.90.	
USSD Information	Supported USSD Phase	Listed values	Conditional	Phase 1 Phase 2	The field is mandatory, where USSD capability is available. - Phase 1 only support mobile initiated operation (pull operation) - Phase 2 support for network initiated operation (pull and push operation).	
USSD Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable	

List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]
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D.14 CAMEL Information

Section name: CAMEL Information				ID: 15	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
CAMEL Info	gsmSSF/MSC	N/A	M		
gsmSSF/MSC	CAP Version Supported Inbound	Listed values	O	CAPv1 CAPv2 CAPv3	Some operators may restrict the use of CAMEL on specific PMNs
gsmSSF/MSC	CAP Version Supported Outbound	Listed values	O	CAPv1 CAPv2 CAPv3	Some operators may restrict the use of CAMEL on specific PMNs
gsmSSF/MSC	CAP Version Planned	N/A	O		
CAP Version Planned	Planned Version	Listed values	M	CAPv2 CAPv3	
CAP Version Planned	Planned Date	Date	O		
CAMEL Info	CAMEL re-Routing Numbering Information	N/A	O		

Section name: CAMEL Information				ID: 15	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
CAMEL re-Routing Numbering Information	List of numbers used for re-routing purposes	E.164GT Address	M,R		To provide information of Re Routing CAMEL number for troubleshooting
CAMEL Info	CAMEL Functionality Information	N/A	O,R		
CAMEL Functionality Information	Services name	Alpha max 64 chars	M		
CAMEL Functionality Information	SK	Numeric	M		
CAMEL Functionality Information	CAMEL Version	Listed values	M	CAPv1 CAPv2 CAPv3	
CAMEL Functionality Information	SCP GT Addresses	E.164 GT Address	M,R		One or more SCP GT Addresses referring to the service name SCP GT Address Range Stop should be greater than SCP GT Address Range Start Overlapping value(s) are not allowed in this element The value(s) should also be included in section 4
CAMEL Info	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according to TD.13 [9]

D.15 Packet Data Services Information**D.15.1 Packet Data Services Information**

Section name: Packet Data Services Information				ID: 16.1	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according to TD.13 [9]
Packet Data Services Information	APN Operator Identifier	APN OpID	M,R		APN Operator Identifier used for GGSN resolution. The last three labels of the APN Operator Identifier must be in the form: MNC.MCC.GPRS (for GPRS) and MNC.MCC.3gppnetwork.org (for LTE)
Packet Data Services Information	List of APN's available for testing and troubleshooting	N/A	O		
List of APN's available for testing and troubleshooting	WEB	N/A	O,R		
WEB	APN	Alpha	M		WEB APNs available for testing and troubleshooting
WEB	APN Type	Listed Values	M, R	H-APN V-APN	Specifies if the APN is Home Routed, VPLMN Routed or both
WEB	Required PDU Session Type	Listed Values	M, R	IPv4 IPv6 IPv4v6 Ethernet Unstructured	Specifies the required PDU session type for 5GC required by HPMN for the DNN, which is especially required for DNN Type with V-DNN.

Section name: Packet Data Services Information				ID: 16.1	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
WEB	Required PDN Type	Listed Values	M, R	IPv4 IPv6 IPv4v6 Non-IP Ethernet	Specifies the required PDN Type for EPC/GPRS required by HPMN for the APN, which is especially required for APN Type with V-APN.
WEB	Required PDP Type	Listed Values	M, R	PPP IPv4 IPv6 IPv4v6 Non-IP	Specifies the required PDN Type for GPRS required by HPMN for the APN, which is especially required for APN Type with V-APN.
WEB	Username	Alpha	O		
WEB	Password	Alpha	O		
WEB	ISP DNS IP address (primary)	IP Address	O		
WEB	ISP DNS IP address (secondary)	IP address	O		
List of APN's available for testing and troubleshooting	WAP	N/A	O,R		
WAP	APN	Alpha	M		WAP APNs available for testing and troubleshooting
WAP	APN Type	Listed Values	M, R	H-APN V-APN	Specifies if the APN is Home Routed, VPLMN Routed or both
WAP	Username	Alpha	O		
WAP	Password	Alpha	O		
WAP	WAP Gateway IP address	WAP GW IP address	M		

Section name: Packet Data Services Information				ID: 16.1	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
WAP	WAP Server URL	URL	M		
WAP	WAP 1.0 Port(s)	Numeric	O,R		Numeric Field 6 Digits, no drop down list
WAP	WAP 2.0 Port(s)	Numeric	O,R		Numeric Field 6 Digits, no drop down list
List of APN's available for testing and troubleshooting	MMS	N/A	O,R		
MMS	APN	Alpha	M		MMS APNs available for testing and troubleshooting
MMS	Username	Alpha	O		
MMS	Password	Alpha	O		
MMS	MMS Gateway IP address	WAP GW IP address	M		
MMS	Messaging Server URL	URL	M		
List of APN's available for testing and troubleshooting	M2M	N/A	O,R		
M2M	APN	Alpha	M		M2M APNs available for testing and troubleshooting
M2M	Username	Alpha	O		
M2M	Password	Alpha	O		

Section name: Packet Data Services Information				ID: 16.1	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
M2M	ISP DNS IP address (primary)	IP Address	O			
M2M	ISP DNS IP address (secondary)	IP address	O			
Packet Data Services Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable	
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]	

D.15.1 GPRS Data network Information

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according to TD.13 [9]
GPRS Data Network Information	GTP Version	N/A	M		
GTP Version	SGSN	Listed Values	M,R	GTPv0 GTPv1 GTPv2	This is a repeating element containing the values of GTP version supported The highest GTP version which operators support. (e.g.: R97 and R98: ver.0, R99 and after R99 : ver.1) It is recommended that GTPver1 be supported from 00:00:00 1st January 2005, otherwise while GTPver0 only is supported by a network that network should apply the configuration defined in IR.34
GTP Version	GGSN	Listed Values	M,R	GTPv0 GTPv1 GTPv2	This is a repeating element containing the values of GTP version supported The highest GTP version which operators support. (e.g.: R97 and R98: ver.0, R99 and after R99 : ver.1) It is recommended that GTPver1 be supported from 00:00:00 1st January 2005, otherwise while GTPver0 only is supported by a network that network should apply the configuration defined in IR.34
GPRS Data Network Information	Data services supported	N/A	O,R		Repeating fields indicating one or more data services supported in a PMN
Data services supported	Data Service	Listed Values	M,R	GPRS EDGE 3G PS HSDPA	

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
				HSUPA	
Data services supported	Multislot Class Capability	Alpha	O		Maximum Multislot class capability available
Packet Data Services Information	Multiple PDP Context support	N/A	M		Query on Multiple PDP context support
Multiple PDP Context Support	Supported or Not Supported	Boolean	M	Yes/No	If Yes please indicate how many simultaneous Primary PDP context are supported by the network
Multiple PDP Context Support	Number of simultaneous Primary PDP Context	Numeric	M,C		
GPRS Data Network Information	IPv6 Connectivity Information	N/A	M,R		Query on IPv6 connectivity support
IPv6 Connectivity Information	SGSN support	N/A	M		
SGSN support	IPv4v6 PDP Type	Boolean	M	Yes/No	Network declaring "No support for IPv4v6" should support modification of inbound roaming UE IPv4v6 request to IPv4 as specified in GSMA PRD IR.33 section 3.5.1. The subscribed PDP Context Type could be IPv4 only, IPv4 and IPv6 or IPv4v6 as specified in GSMA PRD IR.33 section 3.5.3 Table 3.
SGSN support	IPv6 PDP Type	Boolean	M	Yes/No	
IPv6 Connectivity Information	GGSN support	N/A	M		
GGSN support	IPv4v6 PDP Type	Boolean	M	Yes/No	
GGSN support	IPv6 PDP Type	Boolean	M	Yes/No	

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
GPRS Data Network Information	VPMN support of Local Breakout		O		Indicates whether MNO as VPMN supports Local Breakout
VPMN support of Local Breakout	Support Local Breakout as VPMN	Boolean	M	Yes/No	
VPMN support of Local Breakout	Supported PDU Session Type / PDN Type / PDP Type	N/A	M		Indicates the supported PDU Session / PDN Type at SMF / PGW as VPMN for Local Breakout
Supported PDU Session Type / PDN Type / PDP Type	IPv4	Boolean	M	Yes/No	
Supported PDU Session Type / PDN Type / PDP Type	IPv6	Boolean	M	Yes/No	
Supported PDU Session Type / PDN Type / PDP Type	IPv4v6	Boolean	M	Yes/No	
Supported PDU Session Type / PDN Type / PDP Type	Ethernet	Boolean	M	Yes/No	
Supported PDU Session Type / PDN Type / PDP Type	Unstructured	Boolean	M	Yes/No	
Supported PDU Session Type / PDN Type / PDP Type	Non-IP	Boolean	M	Yes/No	
Supported PDP Session Type / PDN Type / PDP Type	PPP	Boolean	M	Yes/No	
GPRS Data Network Information	List of 2G/3G QOS profiles		O,R		List of QOS profiles. It shall be possible to define up to 10 QOS profiles.
List of 2G/3G QOS profiles	Profile name	Alpha	M		Free text that could be used as a reference in AA.14.

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of 2G/3G QOS profiles	Traffic Class	Alpha	M,R	Conversational; streaming; interactive; background	Types of application for which the Radio Access Bearer service is optimised. List of traffic class values separated by comma
List of 2G/3G QOS profiles	ARP	Alpha	M,R	1; 2; 3	Specifies the relative importance compared to other UMTS bearers for allocation and retention of the UMTS bearer. List of ARP values separated by comma
List of 2G/3G QOS profiles	evolvedARP	Boolean	M	Supported ; Not Supported	Mention if eARP is supported on the QoS profile
evolvedARP	eARP Priority Level	Alpha	C,R	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13;14;15	List of eARP PL values separated by comma
evolvedARP	eARP Pre-emption vulnerability	Boolean	C	enabled; disabled	ARP PVI values 0-enabled 1-disabled
evolvedARP	eARP Pre-emption capability	Boolean	C	enabled; disabled	ARP PCI values 0-enabled 1-disabled
List of 2G/3G QOS profiles	Maximum Bit Rate Uplink	Numeric	O	no drop down list 0 to 10Gbps	The Maximum bitrate is the upper limit a user or application can accept or provide.
List of 2G/3G QOS profiles	Maximum Bit Rate Downlink	Numeric	O	no drop down list 0 to 10Gbps	The Maximum bitrate is the upper limit a user or application can accept or provide.
List of 2G/3G QOS profiles	Delivery order	Boolean	O	Yes/No	Indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.
List of 2G/3G QOS profiles	Maximum SDU size	Numeric	O	From 10 to 1520 octets per steps of 10	The maximum SDU size for which the network shall satisfy the negotiated QoS.
List of 2G/3G QOS profiles	SDU format information	Numeric	O		List of possible exact sizes of SDUs Not applicable for Interactive and Background traffic classes

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of 2G/3G QOS profiles	SDU error ratio	Alpha	O	Drop down list 1*10-2 7*10-3 1*10-3 1*10-4 1*10-5 1*10-6 1*10-1	Indicates the fraction of SDUs lost or detected as erroneous.
List of 2G/3G QOS profiles	Residual BER	Alpha	O	Drop down list 5*10-2 1*10-2 5*10-3 4*10-3 1*10-3 1*10-4 1*10-5 1*10-6 6*10-8	Indicates the undetected bit error ratio for each sub-flow in the delivered SDUs.
List of 2G/3G QOS profiles	Delivery of erroneous SDUs	Boolean	O	Yes/No	Indicates whether SDUs with detected errors shall be delivered or not.
List of 2G/3G QOS profiles	Guaranteed bit rate Uplink	Numeric	O	no drop down list 0 to 10Gbps	Describes the bitrate the UMTS bearer service shall guarantee to the user or application. Not applicable for Interactive and Background traffic classes.
List of 2G/3G QOS profiles	Guaranteed bit rate Downlink	Numeric	O	no drop down list 0 to 10Gbps	Describes the bitrate the UMTS bearer service shall guarantee to the user or application. Not applicable for Interactive and Background traffic classes.
List of 2G/3G QOS profiles	Traffic handling priority	Alpha	O,R	1 2 3	Specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers. Optional for Interactive traffic class Not applicable for other traffic classes

Section name: GPRS Data Network Information				ID: 16.2	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
					List of THP values separated by comma	
List of 2G/3G QOS profiles	Support of Speech source	Boolean	O	Yes/No	Not applicable for Interactive and Background traffic classes Optional for other traffic classes	
List of 2G/3G QOS profiles	Support of Signalling indication	Boolean	O	Yes/No	Only applicable for Interactive traffic class Optional for other traffic classes	

D.16 GRX /IPX Routing for data roaming

Section name: IP-Roaming and IP-Interworking Information			ID: 17	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
IP-Roaming and IP-Interworking Information	All IP address ranges used by PMN for connection to Inter-PMN IP backbone	IPv4 address ranges	M,R		IP addresses or IP address range(s) of all operator's nodes that connect to the inter-PMN IP backbone network known as the "GRX" for example GGSNs, SGSNs, MMSCs, MME/SGWs, SEPP/UPFs, AAA Servers/Proxies, DNS Servers etc. This information is used for firewall and Border Gateway configuration (see PRD IR.34). The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /32. Overlapping value(s) with another MNO's IR.21 should not be allowed except "MOCN"
All IP address ranges used by PMN for connection to Inter PMN IP backbone	IPX VLAN	Listed Values	M	Data-Roaming Control-Roaming	Different IPX VLAN are defined in IR.34: - Data-Roaming for 2G/3G/4G/5G Mobile Data Roaming (Gp, S8, N9 and DNS), mainly for SGSNs, GGSNs, S-GW, P-GW, Data Roaming (GRX), DNS slave, UPF - Control-Roaming for 5G N32, mainly for SEPP
All IP address ranges used by PMN for connection to Inter PMN IP backbone	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
IP-Roaming and IP-Interworking Information	All IP address ranges used by PMN for connection to Inter-PMN IP backbone (IPv6)	IPv6 address ranges	O,R		IP addresses or IP address range(s) of all operator's nodes that connect to the inter-PMN IP backbone network known as the "GRX" for example GGSNs, SGSNs, MMSCs, MME/SGWs, SEPP/UPFs, AAA Servers/Proxies, DNS Servers etc. This information is

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
					used for firewall and Border Gateway configuration (see PRD IR.34). The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /128. Overlapping value(s) with another MNO's IR.21 should not be allowed except "MOCN"
All IP address ranges used by PMN for connection to Inter PMN IP backbone (IPv6)	IPX VLAN	Listed Values	M	Data-Roaming Control-Roaming	Different IPX VLAN are defined in IR.34: - Data-Roaming for 2G/3G/4G/5G Mobile Data Roaming (Gp, S8, N9 and DNS), mainly for SGSNs, GGSNs, S-GW, P-GW, Data Roaming (GRX), DNS slave, UPF - Control-Roaming for 5G N32, mainly for SEPP
All IP address ranges used by PMN for connection to Inter PMN IP backbone (IPv6)	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
IP-Roaming and IP-Interworking Information	Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in GTP messaging from SGSNs	N/A			Provide the details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any SGSN in the VPMN to the GGSN/PGW in the HPMN, in the Create PDP Context Request and Update PDP Context Request GTP messages. If only the MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank.
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in	MCC	MCC (3 digits)	O		Multiple values allowed

Section name: IP-Roaming and IP-Interworking Information			ID: 17	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
GTP messaging from SGSNs					
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in GTP messaging from SGSNs	MNC	MNC (2/3 digits)	O		Multiple values allowed
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in GTP messaging from SGSNs	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
IP-Roaming and IP-Interworking Information	Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs/SGWs	N/A			Provide the details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any SGSN/SGW in the VPMN to the GGSN/PGW in the HPMN, in the Create PDP Context Request and Update PDP Context Request GTP messages. If only the MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank.
Any additional MNC/MCC (that is different to the	MCC	MCC (3 digits)	O		Multiple values allowed

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs/SGWs						
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs/SGWs	MNC	MNC (2/3 Digits)	O		Multiple values allowed	
Any additional MNC/MCC (that is different to the MNC/MCC in the E.212 field) that may be sent in the User Location Information (ULI) in GTP messaging from SGSNs/SGWs	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN		
MNO's ASN (Autonomous System Numbers) list for GRX/IPX service	Autonomous System Number(s) (ASN/ASN4B)	Numeric from 0 to 4294967296	M,R		MNO's ASN. The Autonomous System Number (ASN) is a 16- or 32-bit integer that every PMN must assign to their IP network that is seen as one Autonomous System (AS). The ASN enables the exchange of exterior routing information between neighbouring Autonomous	

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
					Systems. According to RFC4893, 4-Byte AS Numbers refers to ASN in the range 0.0 – 65535.65535. Numeric implementation will result in: - ASN 3 Bytes: 0 to 65535 - ASN 4 Bytes: 65536 to 4294967296 Each MNO is identified by one ASN as minimum. Other ASN could be used by the MNO depending Network Owner (e.g. MNO, MVNO,...). This section contains ONLY ASN information related to MNO Note: Define the rule to verify that the completed ASN is not part of the GRX/IPX ASN drop list.
MNO's ASN (Autonomous System Numbers) list for GRX/IPX service	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
List of GRX/IPX Providers	GRX/IPX provider(s)	Alpha max 64 chars	M		Name of the GRX/IPX Provider is entered via a controlled drop-down list to guarantee consistency Note: depending on the network owner (e.g., MNO, MVNO), multiple providers can be recorded.
List of GRX/IPX Providers	Autonomous System Number(s) (ASN/ASN4B)	Numeric from 0 to 4294967296	M,R		GRX/IPX ASN. The Autonomous System Number (ASN) is a 16- or 32-bit integer that every PMN must assign to their IP network that is seen as one Autonomous System (AS). The ASN enables the exchange of exterior routing information between neighbouring Autonomous Systems. According to RFC4893, 4-Byte AS Numbers refers to ASN in the range 0.0 – 65535.65535. Numeric implementation will result in: - ASN 3 Bytes: 0 to 65535 - ASN 4 Bytes: 65536 to 4294967296 ASN will be completed automatically based on the GRX/IPX provider name selected from the drop down list

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of GRX/IPX provider(s)	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
IP-Roaming and IP-Interworking Information	List of PMN authoritative DNS server IP addresses & domain	N/A	C,R		IP address(es) and name(s) of DNS server(s) that are authoritative for the domain names of a PMN. Note that DNS hostname(s) given in this field should match the actual name(s) configured in the operator DNS server(s) (this is to avoid conflict with the NS records in the Root DNS and operator DNS servers). Authoritative DNS is a DNS server in a PMN that answer DNS requests/queries from local caching DNS servers of partner PMNs, for further information see IR.67. Field shall be mandatory if one of the following apply: - TADIG code is defined as HPMN in TADIG summary (section 1) and 2G, 3G or 4G is supported (section 2) - 5G SA is supported (section 2)".
List of PMN authoritative DNS server IP addresses and domain	IP Address (IPv4)	IPv4 Address	M		
List of PMN authoritative DNS server IP addresses and domain	IP Address (IPv6)	IPv6 Address	O		
List of PMN authoritative DNS server IP addresses & domain	DNS name	List values	M	mcc{MCC}.mnc{MNC}.gprs epc.mcc{MCC}.mnc{MNC}.3gpp.network.org	List values will be generated from MCC/MNC in Section 1.

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of PMN authoritative DNS server IP addresses & domain	Priority	Numeric from 1 to 20	O		
List of PMN authoritative DNS server IP addresses & domain	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN	
IP-Roaming and IP-Interworking Information	List of PMN local caching DNS server IP addresses & domain	N/A	C,R		IP address(es) and name(s) of the caching DNS server. Caching DNS server is a DNS server in a PMN that send DNS requests/queries to the authoritative DNS server of the partner PMN in order to resolve domain names on behalf of local network elements, e.g. MME, SGSN, SGW, MMSC. For further information see IR.67. If an IP Address is defined, the name of the DNS Server is not a Mandatory Element Field shall be mandatory if one of the following apply: - TADIG code is defined as VPMN in TADIG summary (section 1) and 2G, 3G or 4G is supported (section 2) - 5G SA is supported (section 2)
List of PMN local caching DNS server IP addresses & domain	IP Address (IPv4)	IPv4 Address	M		
List of PMN local caching DNS server IP addresses & domain	IP Address (IPv6)	IPv6 Address	O		
List of PMN local caching DNS server IP addresses & domain	DNS Name	FQDN	O		

Section name: IP-Roaming and IP-Interworking Information				ID: 17	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
List of PMN local caching DNS server IP addresses & domain	Priority	Numeric from 1 to 20	O			
List of PMN local caching DNS server IP addresses & domain	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN		
IP-Roaming and IP-Interworking Information	List of PMN ENUM Servers	N/A	O,R			
List of PMN ENUM servers	IPv4 address	IPv4 Address	M			
List of PMN ENUM servers	IPv6 address	IPv6 Address	O			
List of PMN ENUM servers	ENUM Server Name	FQDN	O			
List of PMN ENUM servers	ENUM Type	Alpha	O	Tier 0 Tier 1 Tier 2	Type of ENUM server in the hierarchical GSMA ENUM model	
List of PMN ENUM Servers	Network Owner	Listed Values	M	MNO MVNO Sponsor Network MOCN		
IP-Roaming and IP-Interworking Information	IPv4 address that responds to ping/traceroute	IPv4 Address	O,R		Pingable and traceroutable IP address of a node within the operator's AS. Maximum size for ping is 64 bytes. Minimum time interval for pinging is 1 hour.	
IP-Roaming and IP-Interworking Information	IPv6 address that responds to ping/traceroute	IPv6 Address	O,R		Pingable and traceroutable IP address of a node within the operator's AS. Maximum size for ping is 64 bytes. Minimum time interval for pinging is 1 hour.	

D.17 MMS Interworking Information

Section name: MMS Interworking Information			ID: 18	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according to TD.13 [9]
MMS Interworking Information	MMSE		M,R		
MMSE	Domain name of MMSC	Domain name	M		
MMSE	IP address range for MMSC	IP Address range	M		IP addresses or IP address range(s) of MMSC that give onto the inter-PMN backbone. This information is used for firewall and Border Gateway configuration. The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /32.
MMSE	IP address(es) of incoming MTA	IP Address	M,R		
MMSE	IP address(es) of outgoing MTA	IP Address	M,R		
MMSE	Max. size of MMS allowed	Pattern “Kb”, numeric	O		
MMSE	Delivery Report allowed	Boolean	M	Yes/No	
MMSE	Read Report allowed	Boolean	M	Yes/No	
MMSE	MMS IW Hub Provider(s) GT addresses	E.164GT Address range	O,R		
MMSE	MMS IW Hub Provider(s) Name(s)	Alpha, max 64 chars	O		

Section name: MMS Interworking Information			ID: 18	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
MMS Interworking Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according to TD.13 [9]

D.18 WLAN Information

Section name: WLAN Information			ID: 19	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according to TD.13 [9]
WLAN Information	RADIUS server/ RADIUS proxy IP address(es) – Incoming Traffic	IP address	M,R		
WLAN Information	RADIUS server/ RADIUS proxy IP address(es) – Outgoing Traffic	IP address	M,R		
WLAN Information	IP address range(s) used for WLAN roaming signalling	IP address range	M,R		“Subnet IP address range(s) in the form of x.x.x.x/n to which the RADIUS server/proxy IP address also belongs”. The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /32.
WLAN Information	Realm(s)	Domain name	M,R		
WLAN Information	Brand name of the WLAN service	Alpha	M,R		Brand name of the Home Wireless Operator WLAN service seen by the end user in the web based login

Section name: WLAN Information				ID: 19	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
					page. The brand name can be used to mask the realm from the end user in web based login pages for example by utilizing a dropdown box into realm known by the network. This enables an operator to change its roaming realm with reduced impact to the user experience. If the operator has multiple roaming realms they have to be mapped one-to-one to brand names
WLAN Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according to TD.13 [9]

D.19 LTE ROAMING Information

Section name: LTE ROAMING Information			ID: 20	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according to TD.13 [9]
LTE Roaming Information	IPX Interconnection Information	N/A	M		Mandatory set to allow the filling of at least the IPX Provider name(s)
IPX Interconnection Information	IPX Diameter Provider Names	Alpha, max 64 char	M,R		The name of the IPX Provider
IPX Diameter provider Name	Date of Launch	Date	O		
IPX Diameter provider Name	Date of Closure	Date	O		
IPX Diameter Provider Names	IP Address of DiameterAgents	N/A	O, R		
IP Address of the Diameter Edge Agent	Primary	IP Address	M,R		This entry shows Diameter Agent information if outsourced to IPX for deployment examples 5 and 6
IP Address of the Diameter Edge Agent	Secondary	IP Address	M,R		This entry shows Diameter Agent information if outsourced to IPX for deployment examples 5 and 6
IPX Provider Names	Realms used by IPX DA		O		Realm used for IPX DEA interconnection
IPX Interconnection Information	Diameter architecture	Listed Value	O	Option 5 Option 6	According to PRD IR.88 IPX Diameter deployment examples
LTE Roaming Information	Roaming Interconnection	N/A	M		
Roaming Interconnection	Diameter	N/A			
Roaming Interconnection	S6a	N/A			Support of S6a (with or without IWF) is a requirement for full LTE roaming.
Roaming Interconnection	S6d	N/A			
Roaming Interconnection	S9	N/A			

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Diameter	EPC Realm(s)/Domain Name(s) used for Roaming purposes	EPC Realm	M,R	One or several realms	Realm(s) are in the form of epc.mnc<MNC>.mcc<MCC>.3gppnetwork.org as defined in 3GPP 23.003 §19.2
Diameter	FQDN of the Diameter Edge Agent	FQDN	O, R		GSMA PRD IR.88 specifies 6 deployment examples for Diameter Edge Agent : if MNO DEA are directly reachable over IPX network (example 1 to 4), these fields should be fulfilled
FQDN of the Diameter Edge Agent	Primary IP addresses of DEA FQDN	IP address	M		If SCTP Multi-homing is supported, Primary and Secondary addresses should be written
FQDN of the Diameter Edge Agent	Secondary IP addresses of DEA FQDN	IP address	C		If SCTP Multi-homing is supported, Primary and Secondary addresses should be written
S6a	Is MAP interface available for connection to HSS (PMN supports MAP-IWF to HSS)?	Boolean	M	Y/N	Specifies if the InterWorking Function is available in the PMN
S6a	Is MAP interface available for connection to MME (PMN supports MAP-IWF to MME)?	Boolean	M	Y/N	Specifies if the Interworking Function is available in the PMN
S6d	Is S6d used for legacy SGSN?	Boolean	M	Y/N	Specifies if the SGSN supports the S6d Diameter interface
S9	Is S9 used for PCC?	Boolean	M	Y/N	Specifies if Policy Control will be used within S9 interface
LTE Roaming Information	SMS ITW	N/A	M		
Voice ITW	IMS	Boolean	O	Y/N	Specifies if VoLTE is supported in the PMN
Voice ITW	CS Fallback	Boolean	O	Y/N	Specifies if CSFB for voice is supported in the PMN
Voice ITW	Other	Boolean	O	Y/N	Specifies any other way than CSFB and VoLTE to support voice in the PMN
LTE Roaming Information	Roaming CS FallBack	N/A	M		Roaming Retry is optional for CSFB, as defined in 3GPP TS 23.272 and described in GSMA PRD IR.88
Roaming CS FallBack	Roaming CS FallBack method?	Listed Value	M	Roaming Retry (MTRR)	Specifies if the Roaming CS FallBack mechanism supported in the PMN Roaming Retry and Roaming Forward procedures for

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
				Roaming Forward (MTRF) Not supported	CS CallBack are optional, as defined in 3GPP TS 23.272 and described in GSMA PRD IR.88
LTE Roaming Information	Home PMN Information For LTE Roaming Agreement Only	N/A	M		
Home PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	M	Y/N	Information for Roaming Outbound scenarios
LTE Roaming Information	Visited PMN Information For LTE Roaming Agreement Only	N/A	M		
Visited PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	M	Y/N	Information for Roaming Inbound scenarios
LTE Roaming Information	Home PMN Information For 2G/3G Roaming Agreement Only	N/A	M		Scenario 1 is same as legacy GPRS roaming Scenario 2 and 3 are described in GSMA PRD IR.88 Section 4.2.2.1 "2G/3G Roaming Agreement Only"
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 2 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 3 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
LTE Roaming Information	Visited PMN Information For 2G/3G Roaming Agreement Only	N/A	M		
Visited PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 2 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Visited PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 3 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
LTE Roaming Information	Home PMN Information for 2G/3G and LTE Roaming Agreement	N/A	M		All Scenarios are described in GSMA PRD IR.88 Section 4.2.2.2"4.2.2.2 2G/3G and LTE Roaming Agreement"
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 1 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 2 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 3 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 4 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 5 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on this Local BreakOut Roaming Scenario
Home PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 6 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on this Local BreakOut Roaming Scenario

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
LTE Roaming Information	Visited PMN Information for 2G/3G and LTE Roaming Agreement	N/A	M		All Scenarios are described in GSMA PRD IR.88 Section 4.2.2.2"4.2.2.2 2G/3G and LTE Roaming Agreement"
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 1 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 2 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 3 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 4 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on Roaming Scenarios
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 5 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on this Local BreakOut Roaming Scenario
Visited PMN Information for 2G/3G and LTE Roaming Agreement	Is Scenario 6 supported?	Boolean	M	Y/N	Refers to PRD IR.88 for clarification on this Local BreakOut Roaming Scenario
LTE Roaming Information	Additional MNC/MCC sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages	N/A	C		Details of any MNC/MCC that is different to the E.212 field (located at the top of the IR.21 form) that can be sent from any MME in the VPMN to the HSS in the HPMN, in the S6a Diameter Update Location Request or Authentication information request. If only the

Section name: LTE ROAMING Information			ID: 20	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
					MNC/MCC as stated in the E.212 field is sent to the HPMN, this table should be left blank
Additional MNC/MCC sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages	MCC	MCC (3 digits)	O,R		Multiple values allowed
Additional MNC/MCC sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages	MNC	MNC (2/3 digits)	O,R		Multiple values allowed
LTE Roaming Information	List of LTE QOS profiles	N/A	O,R		Sub-section listing the different QOS profiles with one mandatory profile for the default QOS.
List of LTE QOS profiles	Profile name	Alpha	M		Free text that could be used as a reference in AA.14.
List of LTE QOS profiles	QCI	Listed Value	M,R	1; 2; 3; 4; 5; 6; 7; 8; 9; 65; 66; 67; 69; 70; 75; 79; 80;	List of QCI values separated by comma
List of LTE QOS profiles	ARP Priority Level	Listed Value	M,R	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13;14;15	List of ARP PL values separated by comma Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
List of LTE QOS profiles	ARP Pre-emption vulnerability	Boolean	M	enabled; disabled	ARP PVI values 0-enabled 1-disabled Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
List of LTE QOS profiles	ARP Pre-emption capability	Boolean	M	enabled; disabled	ARP PCI values 0-enabled 1-disabled Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
List of LTE QOS profiles	Guaranteed Bit rates for uplink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for QCI = 1 to 4 Absent for QCI = 5 to 9 Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones

Section name: LTE ROAMING Information			ID: 20	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of LTE QoS profiles	Guaranteed Bit rates for downlink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for QCI = 1 to 4 Absent for QCI = 5 to 9 Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
List of LTE QoS profiles	Maximum Bit rates for uplink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for QCI = 5 to 9 Absent for QCI = 1 to 4 Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
List of LTE QoS profiles	Maximum Bit rates for downlink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for QCI = 5 to 9 Absent for QCI = 1 to 4 Mandatory for Guaranteed Bit Rate EPS bearers. Not applicable for non-GBR ones
LTE Roaming Information	IPv6 Connectivity Information	N/A	M		Query on IPv6 connectivity support
LTE Roaming Information	Control of QoS parameters within the VPMN MME/S4-SGSN	N/A	O,R		Sub-section listing QoS Control of different Services with four mandatory Services for Internet, IMS Signalling, IMS Voice, IMS Video
Control of QoS parameters within the VPMN MME/S4-SGSN	Service name	Listed Value	M	Internet; IMS Signalling, IMS Voice, IMS Video; Other;	Only one Value allowed to be chosen. When choose "Other", to fulfill the service name free text box is required
Control of QoS parameters within the VPMN MME/S4-SGSN	Service supported	Boolean	M	Yes/No	When choose "No", following all elements are absent
Control of QoS parameters within the VPMN MME/S4-SGSN	Bearer Type	Boolean	O	GBR/Non-GBR	Mandatory for Service supported = Yes
Control of QoS parameters within the VPMN MME/S4-SGSN	QCI	N/A	O		Mandatory for Service supported = Yes
QCI	Allowed QCI Value List	Listed Value	O	1; 2; 3; 4; 5; 6; 7; 8; 9; 65; 66; 67; 69; 70; 75; 79; 80;	Mandatory for Service supported = Yes

Section name: LTE ROAMING Information			ID: 20	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
QCI	Remap or not if QCI received from HPMN does not meet requirement	Boolean	O	Yes/No	Mandatory for Service supported = Yes
QCI	Remap Value	Free text	O		Mandatory for Remap or not if QCI received from HPMN does not meet requirement = Yes. Absent for Remap or not if QCI received from HPMN does not meet requirement = No
Control of QoS parameters within the VPMN MME/S4-SGSN	ARP	N/A	O		Mandatory for Service supported = Yes
ARP	Allowed ARP-PL Value list	Listed Value	O	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13;14;15	Mandatory for Service supported = Yes List of ARP PL values separated by comma
ARP	Allowed ARP Preemption Vulnerability List	Listed Value	O	enabled, disabled	Mandatory for Service supported = Yes List of ARP PVI values separated by comma 0-enabled 1-disabled
ARP	Allowed ARP Preemption Capability List	Listed Value	O	enabled, disabled	Mandatory for Service supported = Yes List of ARP PCI values separated by comma 0-enabled 1-disabled
ARP	Downgrade or not if ARP received from HPMN does not meet requirement	Boolean	O	Yes/No	Mandatory for Service supported = Yes
ARP	Downgrade Value	Free text	O		Mandatory for Downgrade or not if ARP received from HPMN does not meet requirement = Yes; Absent for Downgrade or not if ARP received from HPMN does not meet requirement = No
Control of QoS parameters within the VPMN MME/S4-SGSN	APN AMBR	N/A	O		Mandatory for Service supported = Yes and Bearer Type = Non-GBR Absent for Bearer Type = GBR

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
APN AMBR	Allowed Max-Requested-Bandwidth for uplink	Free text	O		Mandatory for Service supported = Yes and Bearer Type = Non-GBR Absent for Bearer Type = GBR
APN AMBR	Allowed Max-Requested-Bandwidth for downlink	Free text	O		Mandatory for Service supported = Yes and Bearer Type = Non-GBR Absent for Bearer Type = GBR
Control of QoS parameters within the VPMN MME/S4-SGSN	Maximum Bit Rate	N/A	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Maximum Bit Rate	Allowed Maximum Value for uplink(kbps)	Free text	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Maximum Bit Rate	Allowed Maximum Value for downlink(kbps)	Free text	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Control of QoS parameters within the VPMN MME/S4-SGSN	Guaranteed Bit Rate	N/A	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Guaranteed Bit Rate	Allowed Maximum Value for uplink(kbps)	Free text	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Guaranteed Bit Rate	Allowed Maximum Value for downlink(kbps)	Free text	O		Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR
Control of QoS parameters within the VPMN MME/S4-SGSN	Comments	Free text	O		Used for free comments, limited to 100 characters
IPv6 Connectivity Information	MME support	N/A	M		
MME support	IPv4v6 PDP Type	Boolean	M	Yes/No	Specifies if the MME supports IPv4v6 connectivity type
MME support	IPv6 PDP Type	Boolean	M	Yes/No	Specifies if the MME supports IPv6 connectivity type
IPv6 Connectivity Information	SGW support	N/A	M		

Section name: LTE ROAMING Information			ID: 20		Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
SGW support	IPv4v6 PDP Type	Boolean	M	Yes/No	Specifies if the SGW supports IPv4v6 connectivity type Network declaring “No support for IPv4v6” should support modification of inbound roaming UE IPv4v6 request to IPv4 as specified in GSMA PRD IR,88 section 6.2.1.2.
SGW support	IPv6 PDP Type	Boolean	M	Yes/No	Specifies if the SGW supports IPv6 connectivity type
IPv6 Connectivity Information	PGW support	N/A	M		
PGW support	IPv4v6 PDP Type	Boolean	M	Yes/No	Specifies if the PGW supports IPv4v6 connectivity type
PGW support	IPv6 PDP Type	Boolean	M	Yes/No	Specifies if the PGW supports IPv6 connectivity type
LTE Roaming Information	Diameter Certificates Exchange	N/A	O		
Diameter Certificates Exchange	IP Address of IPsec GW	N/A	M		
IP Address of IPsec GW	IP address of the first IPsec GW	IP address	O		If Security Gateway applies, please specify proper IP Address
IP Address of IPsec GW	IP address of the second IPsec GW	IP address	O		If Security Gateway applies, please specify proper IP Address
Diameter Certificates Exchange	Certificates	N/A	M		File to be downloaded in PEM format (typical size: 1 to 4 Kb) from the RAEX IR.21 application
Certificates	Certificate of first IPsec GW	Boolean	O	Yes/No	CER definition, if applicable the certificate must be stored into the RAEX Application for distribution
Certificates	Certificate of second IPsec GW	Boolean	O	Yes/No	CER definition, if applicable the certificate must be stored into the RAEX Application for distribution
Certificates	Operator roaming sub-CA certificate	Boolean	O	Yes/No	CER definition, if applicable the certificate must be stored into the RAEX Application for distribution A certificate signing only the sub-set of the operator network which is accessible by the roaming partner
LTE roaming Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

Section name: LTE ROAMING Information			ID: 20		Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
Diameter End To End Security support	Supported DESS phases	Listed Value	M	DESS Phase 1 (Authentication and Integrity protection) DESS Phase 1 (Authentication and Integrity protection) and DESS Phase 2 (encryption) Not supported	Specifies the supported Phase(s) of Diameter End to End security (DESS). Only one value is permitted. DESS as described in GSMA PRD FS.19, Annex D and E Only DESS Phase 1 applies at this point in time because DESS Phase 2 is not specified yet	
Diameter End To End Security support	DESS function delegated to IPX provider	Alphanumeric Max 128 chars	C		Specifies a single designated IPX provider that supports DESS on behalf of the operator. Shall be present if supported DESS Phases is other than "not supported" and DESS function is delegated.	
LTE Roaming Information	5G Early Drop support	N/A	M		Specifies if there is support for 5G 3GPP Early Drop	
5G Early Drop support	5G NSA supported	N/A	M			
5G NSA supported	As HPMN	Boolean	M	Yes/No		
5G NSA supported	As VPMN	Boolean	M	Yes/No		
5G Early Drop support	DNS PGW NAPTR includes +nc-nr	N/A	M		New Radio network capability in NAPTR DNS records	
DNS PGW NAPTR includes +nc-nr	As VPMN	Boolean	M	Yes/No		
DNS PGW NAPTR includes +nc-nr	As HPMN	Boolean	M	Yes/No		
5G Early Drop support (VPMN only)	NSA Option for EN-DC	Listed Value	O	3, 3A, 3X		
ARD set with feature list AVP#27	As HPMN	Boolean	M	Yes/No	Reference to bit 27 of AVP Feature List ID=2 in Diameter Update Location procedures	
Restrict access for NR when HSS does	As VPMN	Boolean	M	Yes/No		

Section name: LTE ROAMING Information			ID: 20	Conditionality: O		
Parent	Element Name	Format	Conditionality	Values	Description	
not set the feature list AVP#27						

D.20 Contact Information

For this section a new Format type is defined named "Contact" as represented below. It occurs in in Contact Type elements. Conditionality is defined only if "Repeating" occurs.

Format Type: Contact					
Parent	Element Name	Format	Conditionality	Values	Description
Contact	Contact List	Listed Values	M	Person Name Team Name	
Contact List	Person Name	N/A	R		Contact for escalating roaming faults as per PRD IR.78
Contact List	Team Name	Alpha, max 64 chars	R		
Person Name	Given Name		M		
Person Name	Family Name		M		
Person Name	Prefix		O		
Person Name	Job Title		O		
Person Name Team Name	E-mail/Tel	Listed Values	M	E-mail Tel	At least E-mail or Telephone shall be provided
E-mail/Tel	Tel	Tel number	C,R for mandatory Contact type R for optional Contact type		Tel Number could be Fixed or Mobile. Professional telephone number are recommended, e.g. operation center (potentially 24H/7days)
E-mail/Tel	E-Mail	Email	C,R for mandatory Contact type R for optional Contact type		Generic e-mail addresses are recommended, e.g. roamingsupport@operator.com

Section name: Contact Information				ID: 21	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	members "TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
Contact Information	Contact Type	Listed Values		Roaming Troubleshooting Contact Information Roaming Troubleshooting Ticketing System Information (for example: www.ticketingsystem.com; To log into the ticketing system please contact: name@domain.com) SCCP inquiries and ordering of SS7 routes Roaming Coordinator IREG Tests TADIG Tests CAMEL Tests GPRS Contact Contact person(s) (in PMN) for GRX connectivity Contact person (in PMN) to verify authority of a GRX provider to add/modify data in Root DNS Contact person(s) for IW MMS Contact person(s) for IW SMS Contact person(s) for WLAN Contact person(s) for Certificates and Key management Other contacts	
Contact Type	Roaming Troubleshooting Contact Information	N/A	M		
Roaming Troubleshooting Contact Information	Troubleshooting Office Information	N/A	M,R		
Troubleshooting Office Information	Location (City)	Alpha, max 64 chars	M		
Troubleshooting Office Information	Office Time Zone in UTC	UTC	M		

Section name: Contact Information				ID: 21	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
Troubleshooting Office Information	Office Hours	Time range	M		
Roaming Troubleshooting Contact Information	Main Contact for Troubleshooting (Office Hours)	N/A	M		
Main Contact for Troubleshooting (Office Hours)	Team Name	Alpha, max 64 chars	M		
Main Contact for Troubleshooting (Office Hours)	Tel	Tel number	M,R		Tel Number could be Fixed or Mobile
Main Contact for Troubleshooting (Office Hours)	E-Mail	Email	M,R		
Roaming Troubleshooting Contact Information	Escalation Contact for Troubleshooting	N/A	M		
Escalation Contact for Troubleshooting	Person Name	Alpha, max 64 chars	M		
Escalation Contact for Troubleshooting	Tel	Tel number	M,R		Tel Number could be Fixed or Mobile
Escalation Contact for Troubleshooting	E-Mail	Email	M,R		
Roaming Troubleshooting Contact Information	24 x 7 Troubleshooting Contact (Out of Office Hours)	N/A	M		
24 x 7 Troubleshooting Contact (Out of Office Hours)	Team Name	Alpha, max 64 chars	M		

Section name: Contact Information				ID: 21	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
24 x 7 Troubleshooting Contact (Out of Office Hours)	Tel	Tel number	M,R		Tel Number could be Fixed or Mobile
24 x 7 Troubleshooting Contact (Out of Office Hours)	E-Mail	Email	M,R		
Roaming Troubleshooting Contact Information	Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	N/A	M		
Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	Team Name	Alpha, max 64 chars	M		
Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	Tel	Tel number	M,R		Tel Number could be Fixed or Mobile
Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	E-Mail	Email	M,R		
Contact Type	SCCP inquiries and ordering of SS7 routes	Contact	M,R		
Contact Type	Roaming Coordinator	Contact	M,R		
Contact Type	IREG Tests	Contact	Contact Type		

Section name: Contact Information				ID: 21	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
Contact Type	TADIG Tests	Contact	M,R		
Contact Type	CAMEL Tests	Contact	O,R		
Contact Type	GPRS Contact	Contact	O,R		
Contact Type	Contact person(s) (in PMN) for GRX connectivity	Contact	O,R		
Contact Type	Contact person (in PMN) to verify authority of a GRX provider to add/modify data in Root DNS	Contact	O,R		
Contact Type	Contact person(s) for IW MMS	Contact	O,R		
Contact Type	Contact person(s) for WLAN	Contact	O,R		
Contact Type	Contact person(s) for Certificates and Key management	Contact	M,R		
Other Contact	Job Title	Contact	O,R		
Job Title		Text	M		
Contact Information	Contact point (address) for distribution of	Alpha, max 256 chars	M,R		

Section name: Contact Information				ID: 21	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
	updating of the roaming database				
Contact Information	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

D.21 Hosted Networks

Section name: Hosted Networks			ID: 22	Conditionality: O,R	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
Hosted Networks	Network	N/A	M		
Network	Name		M		Name of the Hosted network
Network	Type		M	Terrestrial, NonTerrestrial	
Network	TADIG Code		M		
Network	Network Node	N/A	M,R		
Network Node	Node Type	Listed values	M	(U)MSC/VLR (U)SGSN SGW	Type of node
Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	M		GT address or range of GT addresses
Network Node	MSRN Range		C,R		MSRN range Mandatory if network node is of MSC/VLR or UMSC/VLR type Else not required
MSRN	Location		O		
Network Node	IP Address(es)	IP Address range(s)	C, R		IP address or range of IP addresses Mandatory if network node is SGSN or SGW The value(s) shall have a subnet mask, e.g. host addresses shall be specified as /32.
Hosted Networks	List of TADIG codes	N/A	O		List of IMSI ranges for which the section content is also applicable
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated to MCC/MNC of the network, according TD.13 [9]

D.22 M2M Roaming information

Section name: M2M Roaming Information				ID: 23	Conditionality: O,R
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List		M, R	“TADIG” of table [TADIG summary] in Section 1 TADIG code associated to MCC/MNC of the network, according TD.13 [9]
M2M Roaming Information	List of Sub-Range IMSI	N/A	M		The M2M Integrated Solution uses the same Network as its host MNO. In the case of the M2MIS with dedicated MCC/MNC, the M2MIS is not required to send a listing of APNs as this is inherent in the MCC/MNC that all M2MIS traffic is M2M
List of Sub-Range IMSI	Subrange IMSI	Numeric max 10 digits	M		The M2MIS may identify its M2M traffic by identifying a specific sub-range of IMSIs of the MNO. The sub-range of IMSIs provides transparency to the VPMN of SMS and voice traffic in addition to data traffic.
List of Sub-Range IMSI	Description	Char max 256	O		
List of Sub-Range IMSI	Example	Char max 256	O		

D.23 Roaming Hub provider

Section name: Roaming Hub provider				ID: 25	Conditionality: C
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
Roaming Hub provider	Organisation HUB Name	Alphanumeric Max 128 chars	M		Identifies the name of the HUB which issues the GSMA PRD IR.85.
Roaming Hub provider	HUB Country	Text Max 3 chars	M		Country Code abbreviated according to ISO 3166
Roaming Hub provider	HUB TADIG code	5 character	M		TADIG code according TD13
Roaming Hub provider	Alias TADIG Code	5 character	O		TADIG code according TD13
Roaming Hub provider	Routing method	Listed value	O	MTP routing, TT method, Alias GT	Identifies the architecture used for the connectivity between the destination operator and the HUB.

D.24 VoIMS ROAMING Information

Section name: VoIMS ROAMING Information				ID: 26	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
VoIMS Roaming Information	VoIMS Roaming architectures supported as VPMN	N/A	M		

Section name: VoIMS ROAMING Information				ID: 26	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
VoIMS Roaming architectures supported as VPMN	S8HR	Boolean	M	Y/N		
VoIMS Roaming architectures supported as VPMN	N9HR	Boolean	M	Y/N		
VoIMS Roaming service supported as VPMN	GTT-IP	Boolean	M	Y/N		
VoIMS Roaming Information	VoIMS Roaming architectures supported as HPMN	N/A	M			
VoIMS Roaming architectures supported as HPMN	S8HR	Boolean	M	Y/N		
VoIMS Roaming architectures supported as HPMN	N9HR	Boolean	M	Y/N		
VoIMS Roaming service supported as HPMN	GTT-IP	Boolean	M	Y/N		
VoLTE Roaming Information	Mobility and Voice Continuity	N/A	M			
Mobility and Voice Continuity	SRVCC technology supported as VPMN	Listed value	M	eSRVCC Basic SRVCC Not supported		
Mobility and Voice Continuity	SRVCC technology supported as HPMN	Listed value	M	eSRVCC Basic SRVCC Not supported		
S8HR/N9HR Roaming constraints	Lawful Interception / Data retention	N/A	M			

Section name: VoIMS ROAMING Information				ID: 26	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Lawful Interception / Data retention	Does VPMN require encryption deactivation by HPMN for IMS procedures	Boolean	M	Y/N	In order for HPMN to de-activate ciphering encryption
S8HR Roaming constraints	EPS QoS to be enforced	N/A	O		
EPS QoS to be enforced	Maximum QoS profile supported for "ims" well known APN	Alpha	M		<EPS QoS profile> name described in section 20 (LTE Roaming Information) and dedicated to "ims" APN

D.25 LPWA ROAMING Information

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
LPWA Roaming Information	LTE-M Services supported as HPMN	N/A	O		
LTE-M Services supported as HPMN	IP Version	Listed Value	M, R	IPv4 IPv6 Dual-stack	IP version support on APNs
LTE-M Services supported as HPMN	Data transport via control plane	Boolean	M	Y/N	Support for IP data delivery, using control plane Clot EPS optimisation with IP PDN types
LTE-M Services supported as HPMN	Data transport via user plane	Boolean	M	Y/N	Support for IP data delivery, using user plane optimisation with IP PDN types
LTE-M Services supported as HPMN	NIDD support	Boolean	M	Y/N	
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	Support of NIDD via the Service Capability Exposure Function (SCEF) (non-standardised interface, e.g. REST API or message protocol such as MQTT)
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	Support of NIDD via the Packet Gateway (UDP encapsulation via private APN or through a dedicated backhaul, e.g. IPSec).
LTE-M Services supported as HPMN	Release Assistance Indicator Rel 14	Boolean	O	Y/N	

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.	
Parent	Element Name	Format	Conditionality	Values	Description	
LTE-M Services supported as HPMN	Power Saving Mode / PSM	Listed Value	M	No Static Dynamic		
LTE-M Services supported as HPMN	Extended Discontinuous Reception / eDRX	Listed Value	M	No Static Dynamic		
LTE-M Services supported as HPMN	SMS	Boolean	M	Y/N		
SMS	SMS buffering period	Alpha	C, M C = SMS equals Yes		Period of time MT SMS are stored in case UE is unreachable.	
LTE-M Services supported as HPMN	VoLTE	Boolean	M	Y/N		
LTE-M Services supported as HPMN	IPX GTP Firewall	Boolean	M	Y/N		
LTE-M Services supported as HPMN	IPX Firewall GTP Idle timer value	Alpha	C, M C = IPX GTP Firewall equals Yes			
LPWA Roaming Information	LTE-M Services supported as VPMN	N/A	O			
LTE-M Services supported as VPMN	IP Version	Listed Value	M, R	IPv4 IPv6 Dual-stack	IP version support on APNs for inbound roamers (IPv4, IPv6 and/or Dual-stack)	
LTE-M Services supported as VPMN	Data transport via control plane	Boolean	M	Y/N	Support for IP data delivery for inbound roamers, using Control Plane Clot EPS optimisation with IP PDN types	

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
LTE-M Services supported as VPMN	Data transport via user plane	Boolean	M	Y/N	Support for IP data delivery for inbound roamers, using User Plane Optimisation with IP PDN types
LTE-M Services supported as VPMN	NIDD support	Boolean	M	Y/N	Support of Non-IP data delivery (NIDD) for inbound roamers, using the Control Plane CloT EPS optimization with Non-IP PDN type
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	Via SCEF: The non-IP data is transferred to the HPLMN via the Service Capability Exposure Function (SCEF). The delivery of this data to the customer application server is via a non-standardised interface (for example a REST API or a message protocol such as MQTT).
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	Via PGW: The non-IP data is transferred to the HPLMN via the Packet Gateway. The delivery of this data to the customer application server is either via a UDP encapsulation via private APN through a dedicated backhaul (e.g. IPSec).
LTE-M Services supported as VPMN	Release Assistance Indicator Rel 14	Boolean	O	Y/N	3GPP Release 14 feature "RAI for Access Stratum (AS)" is available for both Control and User Plane CloT EPS optimisation. When AS RAI is configured, UE may trigger a buffer status report (BSR) with zero byte size, indicating to eNB that no further data is expected in UL or DL in the near future and the connection may be released.
LTE-M Services supported as VPMN	Power Saving Mode / PSM	Listed Value	M	No Static Dynamic	Feature which helps devices save battery power and achieve longer battery lives. If MNO allows overwriting of T3324 and T3412 ("Dynamic" PSM), min/max values shall be input, otherwise network default value shall be defined.
Power Saving Mode / PSM	PSM T3324 timer minimum value	Alpha	C, M	0 to 11,160 seconds	Timer T3324 defines the time during which the IoT module or chipset remains in Idle mode before

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
			C = Power Saving Mode / PSM is not equal to No		switching to a “deep-sleep mode” where it becomes unreachable.
Power Saving Mode / PSM	PSM T3324 timer maximum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	0 to 11,160 seconds	Timer T3324 defines the time during which the IoT module or chipset remains in Idle mode before switching to a “deep-sleep mode” where it becomes unreachable.
Power Saving Mode / PSM	PSM T3412 timer minimum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	2 seconds to 9,920 hours	Long Periodic Tracking Area Update used to periodically notify the availability of the IoT device to the network. The benefit of the Long-Periodic TAU is that chipset protocol stack can remain longer in idle or deep sleep mode before it must reconnect and send a TAU message.
Power Saving Mode / PSM	PSM T3412 timer maximum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	2 seconds to 9,920 hours	Long Periodic Tracking Area Update used to periodically notify the availability of the IoT device to the network. The benefit of the Long-Periodic TAU is that chipset protocol stack can remain longer in idle or deep sleep mode before it must reconnect and send a TAU message.
Power Saving Mode / PSM	PSM packet buffering support	Boolean	C, M C = Power Saving Mode / PSM is not equal to No	Y/N	Indication whether downlink packets are being buffered in the S-GW while IoT device remains unreachable due to PSM. If supported, maximum number and/or size of the buffered packets shall be defined.
PSM packet buffering support	PSM packet buffering volume	Alpha	C, M C = PSM packet buffering support equals Yes		Maximum number and/or size of the buffered packets per UE.

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
LTE-M Services supported as VPMN	DRX cycle timer	Alpha	M		By momentarily switching off the receive section of the radio chipset for a fraction of a second (the interval being controlled by the network-defined DRX Timer parameter, T DRX), IoT devices are able to save power. Value of T DRX timer shall be defined.
LTE-M Services supported as VPMN	Extended Discontinuous Reception / eDRX	Listed Value	M	No Static Dynamic	Extended Discontinuous Reception can be used by IoT devices to reduce power consumption. By momentarily switching off the receive section of the radio chipset IoT devices are able to save power. IoT devices listen for paging messages from the network during fixed time windows, called Paging Transmission Windows (PTW). eDRX may provide a good compromise for many use cases between device reachability and power consumption. Parameters TeDRX and TPTW shall be defined with min/max values if networks allows overriding, otherwise default network values shall be provided as both min and max values
Extended Discontinuous Reception / eDRX	eDRX cycle timer minimum value	Alpha	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer min value
Extended Discontinuous Reception / eDRX	eDRX cycle timer maximum value	Alpha	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer max value

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
Extended Discontinuous Reception / eDRX	eDRX PTW minimum value	Alpha	C, O C = Extended Discontinuous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW min value
Extended Discontinuous Reception / eDRX	eDRX PTW maximum value	Alpha	C, O C = Extended Discontinuous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW max value
Extended Discontinuous Reception / eDRX	eDRX packet buffering support	Boolean	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	Y/N	Indication whether downlink packets are being buffered on the S-GW while IoT device remains unreachable due to eDRX. If supported, maximum number and/or size of the buffered packets shall be defined.
eDRX packet buffering support	eDRX packet buffering volume	Alpha	C, M C = eDRX packet buffering support equals Yes		Maximum number and/or size of the buffered packets per UE.
LTE-M Services supported as VPMN	Coverage Mobility Mode / CMM	Boolean	M	Y/N	
LTE-M Services supported as VPMN	RRC Inactivity timer duration	Alpha	M		T RRC timer value defining how long the UE is held in RRC Connected mode during periods of inactivity. Important from battery lifetime perspective as most of power consumption occurs when the UE is in connected mode

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
LTE-M Services supported as VPMN	Coverage Enhancement Mode A / CE	Boolean	M	Y/N	
Coverage Enhancement Mode A / CE	RRC Inactivity timer duration for Mode A	Alpha	C, M C = Coverage Enhancement Mode A / CE equals Yes		T RRC timer value when the UE is operating in Coverage Enhancement Mode A
LTE-M Services supported as VPMN	Coverage Enhancement Mode B / CE	Boolean	M	Y/N	
Coverage Enhancement Mode B / CE	RRC Inactivity timer duration for Mode B	Alpha	C, M C = Coverage Enhancement Mode B / CE equals Yes		T RRC timer value when the UE is operating in Coverage Enhancement Mode B
LTE-M Services supported as VPMN	SMS	Boolean	M	Y/N	
SMS	SMS buffering period	Alpha	C, M C = SMS equals Yes		Period of time MT SMS are stored in case UE is unreachable.
LTE-M Services supported as HPMN	VoLTE	Boolean	M	Y/N	
LTE-M Services supported as VPMN	IPX GTP Firewall	Boolean	M	Y/N	

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
LTE-M Services supported as VPMN	IPX Firewall GTP Idle timer value	Alpha	C, M C = IPX GTP Firewall equals Yes		Indication how long the GTP tunnel is kept open and how long the device may remain inactive without losing its PDN connection. Critical information for the efficient use of the PSM feature in a Roaming scenario.
LTE-M Services supported as VPMN	UE Power class support	Listed Value	M, R	Class 3 Class 5	Support of 3GPP-defined power classes which may significantly affect the performance/battery of the IoT device
LPWA Roaming Information	NB-IoT Services supported as HPMN	N/A	O		
NB-IoT Services supported as HPMN	IP Version	Listed Value	M, R	IPv4 IPv6 Dual-stack	IP version support on APNs
NB-IoT Services supported as HPMN	Data transport via control plane	Boolean	M	Y/N	Support for IP data delivery, using control plane Clot EPS optimisation with IP PDN types
NB-IoT Services supported as HPMN	Data transport via user plane	Boolean	M	Y/N	Support for IP data delivery, using user plane optimisation with IP PDN types
NB-IoT Services supported as HPMN	NIDD support	Boolean	M	Y/N	
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	Support of NIDD via the Service Capability Exposure Function (SCEF) (non-standardised interface, e.g. REST API or message protocol such as MQTT)
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	Support of NIDD via the Packet Gateway (UDP encapsulation via private APN or through a dedicated backhaul, e.g. IPSec).

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.	
Parent	Element Name	Format	Conditionality	Values	Description	
NB-IoT Services supported as HPMN	Power Saving Mode / PSM	Listed Value	M	No Static Dynamic		
NB-IoT Services supported as HPMN	Extended Discontinuous Reception / eDRX	Listed Value	M	No Static Dynamic		
NB-IoT Services supported as HPMN	SMS	Boolean	M	Y/N		
SMS	SMS buffering period	Alpha	C, M C = SMS equals Yes			
NB-IoT Services supported as HPMN	IPX GTP Firewall	Boolean	M	Y/N		
NB-IoT Services supported as HPMN	IPX Firewall GTP Idle timer value	Alpha	C, M C = IPX GTP Firewall equals Yes		Period of time MT SMS are stored in case UE is unreachable.	
LPWA Roaming Information	NB-IoT Services supported as VPMN	N/A	O			
NB-IoT Services supported as VPMN	IP Version	Listed Value	M, R	IPv4 IPv6 Dual-stack	IP version support on APNs for inbound roamers (IPv4, IPv6 and/or Dual-stack)	
NB-IoT Services supported as VPMN	Data transport via control plane	Boolean	M	Y/N	Support for IP data delivery for inbound roamers, using Control Plane Clot EPS optimisation with IP PDN types	
NB-IoT Services supported as VPMN	Data transport via user plane	Boolean	M	Y/N	Support for IP data delivery for inbound roamers, using User Plane Optimisation with IP PDN types	

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
NB-IoT Services supported as VPMN	NIDD support	Boolean	M	Y/N	Support of Non-IP data delivery (NIDD) for inbound roamers, using the Control Plane CloT EPS optimization with Non-IP PDN type
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	Support of Non-IP data delivery (NIDD) for inbound roamers, using the Control Plane CloT EPS optimization with Non-IP PDN type
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	Via SCEF: The non-IP data is transferred to the HPLMN via the Service Capability Exposure Function (SCEF). The delivery of this data to the customer application server is via a non-standardised interface (for example a REST API or a message protocol such as MQTT).
NB-IoT Services supported as VPMN	Release Assistance Indicator Rel 13	Boolean	O	Y/N	3GPP release 13 feature "RAI for Non-Access Stratum (NAS)" enables the UE to release Radio Resource Control (RRC) connection prior to expiration of the RRC inactivity timer.
NB-IoT Services supported as VPMN	Release Assistance Indicator Rel 14	Boolean	O	Y/N	3GPP Release 14 feature "RAI for Access Stratum (AS)" is available for both Control and User Plane CloT EPS optimisation. When AS RAI is configured, UE may trigger a buffer status report (BSR) with zero byte size, indicating to eNB that no further data is expected in UL or DL in the near future and the connection may be released.
NB-IoT Services supported as VPMN	Power Saving Mode / PSM	Listed Value	M	No Static Dynamic	Feature which helps devices save battery power and achieve longer battery lives. If MNO allows overwriting of T3324 and T3412 ("Dynamic" PSM), min/max values shall be input, otherwise network default value shall be defined.
Power Saving Mode / PSM	PSM T3324 timer minimum value	Alpha	C, M	0 to 11,160 seconds	Timer T3324 defines the time during which the IoT module or chipset remains in Idle mode before

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
			C = Power Saving Mode / PSM is not equal to No		switching to a “deep-sleep mode” where it becomes unreachable.
Power Saving Mode / PSM	PSM T3324 timer maximum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	0 to 11,160 seconds	Timer T3324 defines the time during which the IoT module or chipset remains in Idle mode before switching to a “deep-sleep mode” where it becomes unreachable.
Power Saving Mode / PSM	PSM T3412 timer minimum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	2 seconds to 9,920 hours	Long Periodic Tracking Area Update used to periodically notify the availability of the IoT device to the network. The benefit of the Long-Periodic TAU is that chipset protocol stack can remain longer in idle or deep sleep mode before it must reconnect and send a TAU message.
Power Saving Mode / PSM	PSM T3412 timer maximum value	Alpha	C, M C = Power Saving Mode / PSM is not equal to No	2 seconds to 9,920 hours	Long Periodic Tracking Area Update used to periodically notify the availability of the IoT device to the network. The benefit of the Long-Periodic TAU is that chipset protocol stack can remain longer in idle or deep sleep mode before it must reconnect and send a TAU message.
Power Saving Mode / PSM	PSM packet buffering support	Boolean	C, M C = Power Saving Mode / PSM is not equal to No	Y/N	Indication whether downlink packets are being buffered in the S-GW while IoT device remains unreachable due to PSM. If supported, maximum number and/or size of the buffered packets shall be defined.
PSM packet buffering support	PSM packet buffering volume	Alpha	C, M C = PSM packet buffering support equals Yes		Maximum number and/or size of the buffered packets per UE.
NB-IoT Services supported as VPMN	DRX cycle timer	Alpha	M		By momentarily switching off the receive section of the radio chipset for a fraction of a second (the interval being controlled by the network-defined DRX

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
					Timer parameter, T DRX), IoT devices are able to save power. Value of T DRX timer shall be defined.
NB-IoT Services supported as VPMN	Extended Discontinuous Reception / eDRX	Listed Value	M	No Static Dynamic	Extended Discontinuous Reception can be used by IoT devices to reduce power consumption. By momentarily switching off the receive section of the radio chipset IoT devices are able to save power. IoT devices listen for paging messages from the network during fixed time windows, called Paging Transmission Windows (PTW). eDRX may provide a good compromise for many use cases between device reachability and power consumption. Parameters TeDRX and TPTW shall be defined with min/max values if networks allows overriding, otherwise default network values shall be provided as both min and max values
Extended Discontinuous Reception / eDRX	eDRX cycle timer minimum value	Alpha	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer min value
Extended Discontinuous Reception / eDRX	eDRX cycle timer maximum value	Alpha	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer max value
Extended Discontinuous Reception / eDRX	eDRX PTW minimum value	Alpha	C, O C = Extended Discontinuous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW min value

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.
Parent	Element Name	Format	Conditionality	Values	Description
Extended Discontinuous Reception / eDRX	eDRX PTW maximum value	Alpha	C, O C = Extended Discontinuous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW max value
Extended Discontinuous Reception / eDRX	eDRX packet buffering support	Boolean	C, M C = Extended Discontinuous Reception / eDRX is not equal to No	Y/N	Indication whether downlink packets are being buffered on the S-GW while IoT device remains unreachable due to eDRX. If supported, maximum number and/or size of the buffered packets shall be defined.
eDRX packet buffering support	eDRX packet buffering volume	Alpha	C, M C = eDRX packet buffering support equals Yes		Maximum number and/or size of the buffered packets per UE.
NB-IoT Services supported as VPMN	RRC Inactivity timer	Alpha	M		T RRC timer value defining how long the UE is held in RRC Connected mode during periods of inactivity. Important from battery lifetime perspective as most of power consumption occurs when the UE is in connected mode
NB-IoT Services supported as VPMN	Coverage Enhancement support	Boolean	M	Y/N	
Coverage Enhancement support	RRC Inactivity timer duration for CE Level 1	Alpha	C, M C = Coverage Extension equals Yes		T RRC timer value when the UE is operating in Coverage Enhancement level 1
Coverage Enhancement support	RRC Inactivity timer duration for CE Level 2	Alpha	C, M C = Coverage Extension equals Yes		T RRC timer value when the UE is operating in Coverage Enhancement level 2

Section name: LPWA ROAMING Information		ID: 27			Conditionality: C, M C = At least one list within the section shall be enabled.	
Parent	Element Name	Format	Conditionality	Values	Description	
Coverage Enhancement support	RRC Inactivity timer duration for CE Level 3	Alpha	C, M C = Coverage Extension equals Yes		T RRC timer value when the UE is operating in Coverage Enhancement level 3	
NB-IoT Services supported as VPMN	SMS	Boolean	M	Y/N		
SMS	SMS buffering period	Alpha	C, M C = SMS equals Yes		Period of time MT SMS are stored in case UE is unreachable.	
NB-IoT Services supported as VPMN	IPX GTP Firewall	Boolean	M	Y/N		
NB-IoT Services supported as VPMN	IPX Firewall GTP Idle timer value	Alpha	C, M C = IPX GTP Firewall equals Yes		Indication how long the GTP tunnel is kept open and how long the device may remain inactive without losing its PDN connection. Critical information for the efficient use of the PSM feature in a Roaming scenario.	
NB-IoT Services supported as VPMN	UE Power class support	Listed Value	M, R	Class 3 Class 5 Class 6	Support of 3GPP-defined power classes which may significantly affect the performance/battery of the IoT device	

D.26 5G SA ROAMING Information

Section name: 5G SA Roaming Information			ID: 28	Conditionality: O		
Parent	Element Name	Format	Conditionality	Values	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	“TADIG” of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]	

Section name: 5G SA Roaming Information				ID: 28	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
5G SA Roaming Information	SEPP information	N/A	M, R		
SEPP information	SEPP Model	Listed values	M	Model 1 Model 2 Model 3 Model 4	Model 1: direct connection between PLMN Model 2: connection via outsourced/hosted SEPP Model 3: connection via service hub Model 4: connection via roaming hub (only for IR.85)
SEPP information	MCC-MNC List for SEPP		M, R		
SEPP information	Well-known FQDN	FQDN	M		Model 1: sepp.5gc.mnc.mcc.3gppnetwork.org Model 2: sepp.5gc.mnc.mcc.3gppnetwork.org or sepp.5gc.mnc.mcc.<HostedSEPP-ID>.ipxnetwork.org Model 3: sepp.5gc.<ServiceHub-ID>.ipxnetwork.org Model 4: sepp.5gc.<RoamingHub-ID>.ipxnetwork.org (only for IR.85)
SEPP information	SEPP FQDN	FQDN	O		SEPP FQDN could be found via a DNS NAPTR query or using this IR.21 parameter, compliant with one of the four 5G SA models: - Model 1: <sepp-id>.sepp.5gc.mnc.mcc.3gppnetwork.org - Model 2: <sepp-id>..sepp.5gc.mnc.mcc.3gppnetwork.org or <sepp-id>..sepp.5gc.mnc.mcc.<HostedSEPP-ID>.ipxnetwork.org - Model 3: <sepp-id>..sepp.5gc.<ServiceHub-ID>.ipxnetwork.org - Model 4: <sepp-id>..sepp.5gc.<RoamingHub-ID>.ipxnetwork.org (only for IR.85)
SEPP information	IPX provider	N/A	O		IPX Provider delivering the SEPP in Model 2/3 and Model 4 (only for IR.85)
MCC-MNC List for SEPP	Mobile Country Code (MCC)		M		3 digits for MCC

Section name: 5G SA Roaming Information				ID: 28	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
MCC-MNC List for SEPP	Mobile Network Code (MNC)	Numeric	M		Max 3 digits for MNC Only non-negative integer values are allowed	
IPX provider	IPX provider Name	Alpha max 64 chars	M		Name of the IPX Provider	
IPX provider	Autonomous System Number(s) (ASN/ASN4B)	Numeric from 0 to 4294967296	M		The Autonomous System Number (ASN) is a 16- or 32-bit integer that every PMN must assign to their IP network that is seen as one Autonomous System (AS). The ASN enables the exchange of exterior routing information between neighbouring Autonomous Systems. According to RFC4893, 4-Byte AS Numbers refers to ASN in the range 0.0 – 65535.65535. Numeric implementation will result in: ASN 3 Bytes: 0 to 65535 ASN 4 Bytes: 65536 to 4294967296	
SEPP information	SEPP-N32 parameters	N/A				
SEPP-N32 parameters	SEPP-N32protocol-TLS supported	Boolean	M	Y/N		
SEPP-N32 parameters	SEPP-N32protocol-PRINS supported	Boolean	M	Y/N		
5G SA Roaming Information	5G SA Roaming architectures supported as VPMN	N/A	M			
5G SA Roaming architectures supported as VPMN	N9HR	Boolean	M	Y/N	N9HR support in 5G SA Roaming architectures as VPMN	
5G SA Roaming architectures supported as VPMN	N9LBO	Boolean	M	Y/N	N9LBO support in 5G SA Roaming architectures as VPMN	

Section name: 5G SA Roaming Information				ID: 28	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
5G SA Roaming Information	5G SA Roaming architectures supported as HPMN	N/A	M			
5G SA Roaming architectures supported as HPMN	N9HR	Boolean	M	Y/N	N9HR support in 5G SA Roaming architectures as HPMN	
5G SA Roaming architectures supported as HPMN	N9LBO	Boolean	M	Y/N	N9LBO support in 5G SA Roaming architectures as HPMN	
5G SA Roaming Information	List of 5GS QOS profiles	N/A	O,R		Sub-section listing the different QOS profiles with one mandatory profile for the default QOS.	
List of 5GS QOS profiles	Profile name	Alpha	M		Free text that could be used as a reference in AA.14.	
List of 5GS QOS profiles	5QI	Listed Value	M,R	1; 2; 3; 4; 5; 6; 7; 8; 9; 65; 66; 67; 69; 70; 71; 72; 73; 74 75; 76; 79; 80; 82; 83; 84; 85; 86; 87; 88; 89; 90	List of 5QI values separated by comma Standardized 5QI values have one-to-one mapping to a standardized combination of 5G QoS characteristics as specified 3GPP TS 23.501 in Table 5.7.4-1.	
List of 5GS QOS profiles	ARP Priority Level	Listed Value	M,R	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13;14;15	List of ARP PL values separated by comma, 1 as the highest priority	
List of 5GS QOS profiles	ARP Pre-emption vulnerability	Boolean	M	enabled; disabled	ARP PVI values are 0-enabled or 1-disabled	
List of 5GS QOS profiles	ARP Pre-emption capability	Boolean	M	enabled; disabled	List of ARP PCI values are 0-enabled or 1-disabled	
List of 5GS QOS profiles	Guaranteed Bit rates for uplink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for Guaranteed Bit Rate 5GS bearers. Not applicable for non-GBR ones	
List of 5GS QOS profiles	Guaranteed Bit rates for downlink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for Guaranteed Bit Rate 5GS bearers. Not applicable for non-GBR ones	

Section name: 5G SA Roaming Information			ID: 28	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of 5GS QOS profiles	Maximum Bit rates for uplink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for Guaranteed Bit Rate 5GS bearers. Not applicable for non-GBR ones
List of 5GS QOS profiles	Maximum Bit rates for downlink	Numeric	O	no drop down list 0 to 10Gbps	Mandatory for Guaranteed Bit Rate 5GS bearers. Not applicable for non-GBR ones

D.27 SMS ROAMING Information

Section name: SMS Roaming Information			ID: 29	Conditionality: M	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13
SMS Roaming Information	SMS ITW HPLMN	N/A	M		Defines the SMS capabilities available in the HPLMN
SMS ITW HPLMN	SMS Delivery Mechanism	N/A			Defines the SMS delivery mechanism available in the HPLMN
SMS Roaming Information	SMS ITW VPLMN	N/A	M		Defines the SMS capabilities available in the VPLMN
SMS ITW VPLMN	SMS Delivery Mechanism	N/A			Defines the SMS delivery mechanism available in the VPLMN
SMS Delivery Mechanism	SMS over NAS via SS7	Boolean	M	Y/N	Specifies if SMS over SS7 is supported in the PMN
SMS Delivery Mechanism	SMS over NAS via Diameter	Boolean	M	Y/N	Specifies if SMS over Diameter is supported in the PMN
SMS Delivery Mechanism	SMS over NAS via HTTPs	Boolean	M	Y/N	Specifies if SMS over NAS is supported in the PMN via HTTPs

D.28 Emergency Services Information

Section name: Emergency Services Information			ID: 30	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]
S8HR/N9HR Roaming constraints	Emergency calls	N/A	M		Applicable to S8HR and also N9HR
Emergency calls	VPLMN technology Strategy for EC	Listed value	M,R	VoNR VoLTE CS Fallback	In 4G networks, emergency calls are supported using VoLTE. However, if VoLTE is not available, the call can still be completed by falling back to 2G or 3G using circuit-switched access. With the rollout of 5G, emergency calls can also be made over VoNR. For more details on emergency call procedures, see GSMA PRD NG.119 [11]. Note: all elements can be selected
Emergency calls	List of Local Emergency Numbers in use at the VPMN	N/A	O, R		Assumption; same emergency numbers are defined on LTE and NR
List of Local Emergency Numbers in use at the VPMN	Number	MSISDN	M		Maximum 15 digits
List of Local Emergency Numbers in use at the VPMN	Service	Alpha	M		Name of emergency service corresponding to the number
List of Local Emergency Numbers in use at the VPMN	URN Information	URN Service	M		URN information and validity indicator should follow sub-clause 9.9.3.37A of 3GPP TS 24.301 Typical examples are listed below: General emergency call: urn:service:sos Fire brigade: urn:service:sos.fire Ambulance / medical assistance: urn:service:sos.ambulance

Section name: Emergency Services Information				ID: 30	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Emergency calls	MME announce the Emergency number list toward inbound roamer's UE	Boolean	M	Yes No	The serving network (MME) can download additional emergency numbers (especially local emergency numbers) to the UE in order to enable UE detection of an emergency session. Applicable to 4G/LTE using S8HR
Emergency calls	AMF announce the Emergency number list toward inbound roamer's UE	Boolean	M	Yes No	The serving network (AMF) can download additional emergency numbers (especially local emergency numbers) to the UE in order to enable UE detection of an emergency session. Applicable to 5G/NR using N9HR
Emergency calls	VPLMN accepts unauthenticated IMS Emergency call	Boolean	M	Yes No	Boolean to identify if a VPLMN accepts unauthenticated IMS Emergency call
Emergency calls	VPLMN accepts IMS Emergency call without UICC	Boolean	M	Yes No	Boolean to identify if a VPLMN accepts IMS Emergency call without UICC
Real Time Text	VPMN technology natively support for GTT-IP / RTT to emergency center	Boolean	M	Yes No	With the introduction of IMS in 4G, new services such as GTT-IP and RTT became available. These services are especially important for people who are Deaf, Deafblind, or Hard of Hearing, as they allow real-time communication and access to emergency services. Depending on local regulations, operators may also be required to provide access to emergency center for inbound roamers. Boolean parameter to indicate whether the VPLMN natively supports GTT-IP/RTT for emergency services
Real Time Text	List of Numbers to access the Emergency Center via GTT-IP / RTT	N/A	O, R		
List of Numbers to access the Emergency Center via GTT-IP / RTT	Number	MSISDN	M		Maximum 15 digits Typical examples: 112, 911 or Local emergency numbers.

Section name: Emergency Services Information				ID: 30	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
List of Numbers to access the Emergency Center via GTT-IP / RTT ecall	Service	Alpha	M		Name of emergency service corresponding to the number Typical examples: emergency, police, ambulance, fire
	VPMN technology strategy for eCall	Listed value	M,R	None eCall NGeCall	eCall is an in-vehicle emergency call to 112 that can be triggered automatically by in-vehicle sensors or manually by passengers. It sends a Minimum Set of Data (MSD) and opens an audio channel between the vehicle and the eCall PSAP using public mobile networks. While eCall works exclusively on 2G/3G, NG eCall is based on 4G and 5G. Depending on local regulations, operators may also be required to support eCall services for both local users and inbound roamers. For further information regarding eCall, refer to GSMA PRD NG.119.eCall works exclusively on 2G/3G, NG eCall is based on 4G and 5G Note: eCall and NG eCall, both can be selected
Advance Mobile Location	VPMN technology strategy for AML	Listed value	M,R	None SMS HTTP	Advanced Mobile Location (AML) is a technology that automatically transmits a caller's precise location to emergency services when an emergency call (e.g., to 112 or 911) is made from a mobile device. ETSI TS 103 625 [12] has defined two mechanisms for transmitting location information: via SMS or via an HTTP connection. Depending on local regulations, operators may be required to support AML services for both local customers and inbound roamers. For further information regarding AML, refer to GSMA PRD NG.119. Note: SMS and HTTP, both can be selected

Section name: Emergency Services Information			ID: 30	Conditionality: O		
Parent	Element Name	Format	Conditionality	Values	Description	
Advance Mobile Location	List of emergency numbers that trigger the sending of location information via AML	N/A	O, R			
List of emergency numbers that trigger the sending of location information via AML	Number	MSISDN	M		Maximum 15 digits Typical examples: 112, 911 or Local emergency numbers.	
List of emergency numbers that trigger the sending of location information via AML	Service	Alpha	M		Name of emergency service corresponding to the number Typical examples: emergency, police, ambulance, fire	

D.29 Roaming Protection Information

Section name: Roaming Protection Information			ID: 31	Conditionality: O		
Parent	Element Name	Format	Conditionality	Values	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13	
Roaming Protection Information	Inbound Roaming Protection	N/A	M		Defines the Roaming protection capabilities available in the VPLMN (FS.21 section 16)	

Section name: Roaming Protection Information				ID: 31	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Inbound Roaming Protection	Inbound Roaming Protection SS7	N/A	M		SS7:– Category 2 packets as defined in FS.11 Annex A. There are 20 GSM-MAP Request packets defined in Annex A in FS.11 that fall into this category which are permitted over international links. (FS.21 section 16)
Inbound Roaming Protection SS7	Protection Coverage	Drop down list	M	ALL PARTIAL NOT DISCLOSED	<ul style="list-style-type: none"> • ALL, in this case, the protecting operator has indicated that they are attempting to protect all packets in this category, as listed in the respective GSMA guidelines. • PARTIAL, in this case, the protecting operator has indicated that they filter some of the packets in this category. An exact list of the packets covered or not covered is not required to include – it may not be provided for security reasons and to reduce complexity. However, if desired by the protecting operator, details could be given in the comments section. Operators should be encouraged to move to an ALL state over time. • NOT DISCLOSED, in this case, the protecting operator has not indicated they have inbound security or not. It may exist, but the operator is not advertising it.
Inbound Roaming Protection SS7	Comment	Text max 100 chars	O		To provide more information about Inbound Roaming Protection SS7
Inbound Roaming Protection	Inbound Roaming Protection Diameter	N/A	M		Diameter:– Category 2 packets as defined in FS.19 Annex A. There are 4 S6a/S6d Request packets defined in Annex A in FS.19 that fall into this category which are permitted over international links. There are a number of additional Category 2 packets for other interfaces like S6c, Rx over S9, S7a/S7d, 3GPP PC6/Pc7, T6a/b, T7, however in reality these packets are never encountered over international links and so are not covered here. (FS.21 section 16)

Section name: Roaming Protection Information				ID: 31	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
Inbound Roaming Protection Diameter	Protection Coverage	Drop down list	M	ALL PARTIAL NOT DISCLOSED	<ul style="list-style-type: none"> • ALL, in this case, the protecting operator has indicated that they are attempting to protect all packets in this category, as listed in the respective GSMA guidelines. • PARTIAL, in this case, the protecting operator has indicated that they filter some of the packets in this category. An exact list of the packets covered or not covered is not required to include – it may not be provided for security reasons and to reduce complexity. However, if desired by the protecting operator, details could be given in the comments section. Operators should be encouraged to move to an ALL state over time. • NOT DISCLOSED, in this case, the protecting operator has not indicated they have inbound security or not. It may exist, but the operator is not advertising it.
Inbound Roaming Protection Diameter	Comment	Text max 100 chars	O		To provide more information about Inbound Roaming Protection Diameter
Inbound Roaming Protection	Inbound Roaming Protection GTP	N/A	M		GTP-C: Category 2 packets as defined in FS.20 Annex B. There are 2 GTP-C v1 and 3 GTP-C v2 S5/S8 packets defined in Annex B of FS.20 which are permitted over international links. (FS.21 section 16)
Inbound Roaming Protection GTP	Protection Coverage	Drop down list	M	ALL PARTIAL NOT DISCLOSED	<ul style="list-style-type: none"> • ALL, in this case, the protecting operator has indicated that they are attempting to protect all packets in this category, as listed in the respective GSMA guidelines. • PARTIAL, in this case, the protecting operator has indicated that they filter some of the packets in this category. An exact list of the packets covered or not covered is not required to include – it may not be provided for security reasons and to reduce complexity. However, if desired by the protecting

Section name: Roaming Protection Information				ID: 31	Conditionality: O
Parent	Element Name	Format	Conditionality	Values	Description
					operator, details could be given in the comments section. Operators should be encouraged to move to an ALL state over time. • NOT DISCLOSED, in this case, the protecting operator has not indicated they have inbound security or not. It may exist, but the operator is not advertising it.
Inbound Roaming Protection GTP	Comment	Text max 100 chars	O		To provide more information about Inbound Roaming Protection GTP
Inbound Roaming Protection	Inbound Roaming Protection HTTPS	N/A	M		5G SA: Category 2 packets as defined in FS.36 Annex A. There are 8 3GPP Rel16 N26, 3 N8, 3 NL3, and 3 other 3GPP Rel16 non-callback packets defined in Annex A of FS.36 which are permitted over international links. Note: this is a tentative packet Categorisation and may need to be further refined based on 5G specification clarification/specific mobile network configurations. (FS.21 section 16)
Inbound Roaming Protection HTTPS	Protection Coverage	Drop down list	M	ALL PARTIAL NOT DISCLOSED	<ul style="list-style-type: none"> • ALL, in this case, the protecting operator has indicated that they are attempting to protect all packets in this category, as listed in the respective GSMA guidelines. • PARTIAL, in this case, the protecting operator has indicated that they filter some of the packets in this category. An exact list of the packets covered or not covered is not required to include – it may not be provided for security reasons and to reduce complexity. However, if desired by the protecting operator, details could be given in the comments section. Operators should be encouraged to move to an ALL state over time. • NOT DISCLOSED, in this case, the protecting operator has not indicated they have inbound security

Section name: Roaming Protection Information				ID: 31	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
					or not. It may exist, but the operator is not advertising it.	
Inbound Roaming Protection HTTPS	Comment	Text max 100 chars	O		To provide more information about Inbound Roaming Protection HTTPS	

Annex E Release management

E.1 RAEX IR.21 Change Management

Changes in the RAEX IR.21 process have implications in other PRDs such as TD.81. Release Management Procedures must be aligned for all GSMA data interchange formats, in order to provide implementation time and rules for testing and migration. TADIG is the Working Group within the GSMA responsible for the specification and maintenance of data interchange formats.

Therefore, the RAEX IR.21 Release Management Process will be aligned to the document already defined and in place within the TADIG group.

The Release Management principles for RAEX IR.21 are defined below

Format	Submission of All Req's	Approval of All Changes			Latest Implem. Date
RAEX IR.21	24 October 2025	12 Nov 2025			15 Nov 2026

The RAEX IR.21 tool, updated to support the latest IR.21 version, will be available 4 months after the IR.21 release. Once the schedule for the next IR.21 release is confirmed, operators will receive continuous notifications informing them of the updated release until they have upgraded to the latest version.

E.2 RAEX IR.21 Version Control

When a new IR.21 is released, a new version of RAEX Business Requirements and related TADIG documentation will also be created and SPs will need to support a new RAEX IR.21 version. It may also occur that development of TD documents may in turn create a change to RAEX IR.21. These changes are indicated using a latest version number.

Senders and receivers of IR.21 data in the new RAEX IR.21 version will need to make a change to their systems in order to create/accept any new information being exchanged in the newer RAEX IR.21 version.

Senders will need to indicate in their IR.21 ID.3 network information, which version of RAEX IR.21 they will 'send' to and can 'receive' from their roaming partners in order for them to understand what version of RAEX IR.21 is being supported by that Operator.

Versions older than the last two versions will be marked as "Outdated." Roaming partners will receive a warning dialog when they attempt to download potentially outdated information.

For Example:

After the implementation of IR.21 version 18, versions older than release 17 will be marked as "Outdated".

E.3 Other information

This Binding PRD IR.21 is subject to the Operator Compliancy Grading Solution (OCGS) as defined in BA.49 from November 1st, 2014.

Annex F Tools

F.1 Introduction

F.1.1 Overview & Scope

This section describes the requirements for the RAEX Tools platform and application to support the DESS key management stage 2 solution and outlines features (at a high-level) that would support those requirements. This solution, as described in 0, is based on bilateral trust and on publishing (root) certificates on the RAEX Tools platform.

Upload, storage and distribution of certificates will be implemented on RAEX Tools independently of IR.21 files and document management, and will therefore not affect the IR.21 structure. Certificate management is a separate RAEX Tool to IR.21, but these requirements are included in this document to ensure user visibility and ease of access, and due to the use of a shared RAEX Tools platform.

F.1.2 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this section are to be interpreted as described in RFC 2119 0 and clarified by RFC8174 0, when, and only when, they appear in all capitals, as shown here.

F.2 Basic Principles and Assumptions

This section contains the principles and assumptions related to the use of the RAEX Tools IR.21 platform and application (hereafter called RAEX Tools) for enable certificate exchange between relevant entities.

Ref.	Description
BPR1	A user authentication and authorisation mechanism SHALL be available for certificate management via RAEX Tools, using a single sign-on (SSO) mechanism via the Infocentre ² replacement that SHALL meet the security requirements in this document. The Infocentre ² replacement may define user roles and RAEX Tools could take these (e.g. name, email address, company, phone #, user role(s)) via API.
BPR2	Upload, storage and distribution of certificates may be implemented on RAEX Tools independently of IR.21 files and document management.
BPR3	RAEX Tools SHALL serve as a repository for root certificates, or alternatively subordinate (intermediate) certificates derived from the root at the discretion of the certificate owner. RAEX Tools SHALL NOT host leaf certificates. Notes Organisations will need a mechanism to revoke leaf certificates (e.g. via web server with CRL and OCSP). If organisations are running a web server, then they can host the leaf certs on the web server anyway (also allows for more dynamic updates or CRL & OCSP), and RAEX Tools does not need to host them.

F.3 Roles and Entities

Ref.	Description
ROL1	It SHALL be possible for MNOs, IPX providers, RVAS providers and Roaming Hubs (hereafter collectively referred to as organisations) to publish certificates via RAEX Tools.
ROL2	Separate roles and permissions SHALL exist on RAEX Tools for IR.21 / IR.85 management and certificate management.
ROL3	Only users with “manage certificate” permissions SHALL be able to manage certificates in RAEX Tools. This applies regardless of whether management takes place via the user interface or the API.
ROL4	Each organisation shall have a unique organisation identifier assigned on the RAEX Tools platform. Each certificate shall be linked to an organisation.

F.4 RAEX Tools Application

Ref.	Description
APP1	<p>It SHALL be possible for organisations to add up to 8 certificates in BASE64 encoded PEM format to RAEX Tools.</p> <p>Notes: In most cases, it will be sufficient for RAEX Tools to host 2 certificates per organisation (i.e. current certificate + rollover certificate) There may be use cases (e.g. organisation mergers & acquisitions, others not yet foreseen) that require organisations to publish additional certificates.</p>
APP2	<p>RAEX Tools SHALL check uploaded certificates and only permit publication of certificates in which the required certificate fields and X.509 extensions (as defined in FS.34 0) have been populated. Properties / data extracted from an uploaded certificate SHALL be presented to the user for review prior to publication.</p> <p>Notes System is expected just to parse and display the certificate information, to ensure that it is semantically correct and to validate to the user that what has been uploaded is intended.</p>
APP3	<p>RAEX Tools SHALL check (e.g. via PKCS#7, OpenSSL) if a private key is included in uploaded PEM files. If a private key is detected, a security alert SHALL be presented to the user telling them to discard the key pair. RAEX Tools SHALL discard the file and not make it available to other users.</p> <p>Notes: The private key check will mitigate the impact of that roaming operations staff unfamiliar with security uploading their private key (although unlikely if in separate files). But if private key is uploaded, then a security breach has already occurred, and user should be advised to discard the key pair.</p>
APP4	It SHALL be possible to store roll-over certificates.
APP5	<p>In addition to root or intermediate certificates (see APP1), RAEX Tools MUST also enable organisations to indicate up to 8 URLs that point to websites that can be used to download additional certificates. These URLs MUST be made available using the same mechanisms as the certificates are made available. The certificate management permission applies. The system MUST ensure that each URL starts with https and its length does not exceed 1024 characters.</p> <p>Notes: (The following notes are not RAEX Tools requirements, but are included here for context and as a basis for future work and development of FS.34.) The web server pointed to by the URL should contain all additional information needed for proper certificate management. This includes: Providing CRLs for download (or running an OCSP service)</p>

Ref.	Description
	<p>Providing intermediary certificates for download</p> <p>Providing leaf certificates for download (to be used for DESS Phase 1)</p> <p>To enable automated downloading of the above information from the web server, it shall be possible to construct the URL that points to the particular information of interest on the web server. The user of the information gets the URL of the web server from the RAEX Tools entry. The user should then be able to append a pre-defined structure to the URL to construct the URL to call for obtaining the information. FS.34 should define the structure of the web server itself and also which URLs (for CRLs for certificate chains) should be put into the X.509 certificates themselves</p>
APP6	<p>RAEX Tools SHALL make all certificates and URLs from all organisations visible and available to all other organisations. The system SHALL highlight to the user all expired certificates.</p> <p>Notes: There is no need for RAEX Tools to enable organisations to publish different certificates for different partners or sets of partners Organisations that do not have a valid certificate or no certificate at all shall be shown, with an indication of the certificate status e.g. expired / revoked / absent. All RAEX Tools users shall be able to view and download the certificates of other organizations (since certificate information is not confidential).</p>
APP7	<p>It SHALL be possible for users to download one or multiple certificates in a single file format (BASE64 encoded PEM).</p> <p>Notes Organisations can download the file in the single format supported by RAEX Tools (BASE64 encoded PEM) and convert if needed. There is no need for RAEX Tools to convert between file formats.</p>
APP8	<p>RAEX Tools SHALL broadcast user-instigated notices in relation to certificate status (e.g. new certificates, revoked certificates)</p> <p>It SHALL be sufficient to re-use the existing comment and reminder functionality available on RAEX Tools for IR.21 documents (basically emails).</p> <p>Users SHALL be able to configure email notification settings (e.g. disable email notifications, request weekly summary emails)</p> <p>Users SHALL be able to pull user-instigated notices via an API</p> <p>Notes Objective is to try and reuse existing RAEX Tools functionality. Avoid additional requirements in relation to handling of revoked certificates. Just distribute notices as instigated by users. Nice to have: It should be possible to not receive emails from specific organisations (blocklist), e.g. because they are not your roaming partners?</p>
APP9	<p>It SHALL be possible for users to automatically download certificates from RAEX (or from URLs where the certificate is directly accessible) to the network elements via an API.</p>

F.5 Security

Ref.	Description
SEC1	Integrity protection of certificates uploaded, stored and distributed via RAEX Tools SHALL be provided. Confidentiality protection of certificates is not required.
SEC2	Access to RAEX Tools SHALL be protected by two-factor authentication following accepted best practices (e.g. Time-based One-time Password (TOTP)) Notes: This may be provided indirectly using single sign-on (SSO) via the Infocentre ² replacement.
SEC3	Users SHALL be able to access an audit trail of changes (i.e. replacements) to their own organisation's certificates (i.e. who made a change and when during the previous 5 years). An archive of certificates is not required. Notes: Nice to have: Users should be able to access an audit trail of changes (i.e. replacements) to all other organisations' certificates (for the previous 5 years). This audit trail should not identify individual users at other organisations.

F.6 Planned Features based on Requirements

F.6.1 "My certificate" section

- Upload your own certificate > Review certificate, e.g. issuer and validity dates
- Publish certificate (and inform "partners" about new certificate via email)
- Revoke certificate (and upload new certificate)
- Access audit trail for own certificates

F.6.2 "All certificates" section

- List all certificates with some basic metadata (e.g. organisation, issuer, validity dates, publish date) (one row per organisation)
- Single and bulk download operations (without format conversions)
- Access to audit trails for all organisations (but without identifying individual users at other organisations)

F.6.3 API access by Organisations

- Get list of all certificates
- Result will include organisation-specific metadata (MCC/MNO, TADIG code, organisation ID) to speed up subsequent API requests.
- Get latest certificate by organisation ID (available for all organisations) or by other identifiers where they exist for an organisation (MCC/MNC, TADIG code), or by the following fields within the certificate: Issuer Common Name or Subject Common Name.
- If certificates include multiple MCC/MNCs, searching by any MCC/MNC in the certificate will return the certificate.
- Get specific certificate by organisation ID (available for all organisations) or by other identifiers where they exist for an organisation (MCC/MNC, TADIG code), or by the following fields within the certificate: Issuer Common Name or Subject Common Name.

F.6.4 Supplier Security Management

Although not part of the functional requirements, the supplier of certificate management for RAEX Tools should provide a complete security life cycle to include the following:

- Secure development practices with static and dynamic security code reviews
- Regular vulnerability scans
- Regular 3rd part security audits which should be provided back to GSMA and its members
- Hardening of systems
- Monitoring for ongoing security events
- Policies which outline how often these tests will be done
- Policies which outline how long issues discovered will take to be resolved (primarily in the area of bugs or vulnerabilities discovered which have a security implication)
- Incident response plan to ensure GSMA and MNOs are notified of security incidents. This communication plan should be clearly communicated to the MNO's who are using RAEX
- An audit trail of changes to the RAEX Tools system & application and the authentication system (if separate).

Annex G Global Title (GT) Leasing

The practice of leasing GTs (by a “GT lessor” to a “GT lessee”) has enabled additional entities (GT lessees) to gain access to the global SS7 network and to exchange signalling messages using GTs associated with the GT lessor. This reduces routing transparency, and introduces security risks for MNOs and their customers, as described in PRD FS.52 “GT Leasing Code of Conduct” [9].

Each MNO member of the GSMA that leases one or more of its GTs to one or more third parties (called a GT Lessee) should clearly specify, in the RAEX IR.21 Routing Information section, which of its GTs are leased.

- The leased GTs should be specified, and the value of the mandatory parameter “Network Owner” should be set to value “GT Leasing”.
- For the leased GTs, the value of the parameter “Location / GT Leasing details” should contain the business name of the GT Lessee and the type of signalling node that is using the leased GT.

MNOs that wish to claim compliance with FS.52 “GT Leasing Code of Conduct” MUST provide this information and MUST configure the RAEX IR.21 Routing Information section as non-confidential, so that the information is available to all RAEX users.

Annex H RAEX IR.21 Reports

H.1 Description of current report

This section describes the existing reports based on available RAEX IR.21 information. The information available is that which the owner has agreed to share with the GSMA Members who may or may not be Roaming Partners.

H.2 MSISDN Number ranges

This report lists all the MSISDN number ranges per operator and per TADIG code as described on the following table.

MSISDN Report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 4 – TADIG code
CC	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
NDC	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
SN range start	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
SN range stop	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
Network owner	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
Location	Section 4 – Routing Information ITU E.164 Number series (MSISDN)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.3 Global Title Number ranges

This report lists all global title number ranges per operator and per TADIG code as described on the following table.

GT report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 4 – TADIG code
CC	Section 4 – Routing Information ITU E.164 Number series (GT)
NDC	Section 4 – Routing Information ITU E.164 Number series (GT)
SN range start	Section 4 – Routing Information ITU E.164 Number series (GT)
SN range stop	Section 4 – Routing Information ITU E.164 Number series (GT)
Network owner	Section 4 – Routing Information ITU E.164 Number series (GT)
GT leasing details	Section 4 – Routing Information ITU E.164 Number series (GT)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.4 MSRN Number ranges

This report lists all MSRN number ranges per operator and TADIG code as described on the following table.

MSRN report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 4 – TADIG code
CC	Section 4 – Routing Information ITU E.164 Number series (MSRN)
NDC	Section 4 – Routing Information ITU E.164 Number series (MSRN)
SN range start	Section 4 – Routing Information ITU E.164 Number series (MSRN)
SN range stop	Section 4 – Routing Information ITU E.164 Number series (MSRN)
Location	Section 4 – Routing Information ITU E.164 Number series (MSRN)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.5 Number portability

This report lists all number portability information per operator and per TADIG code as described on the following table.

NP report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 4 – TADIG code
CC	Section 4 – List of E.164 Number Ranges due to Number Portability
NDC	Section 4 – List of E.164 Number Ranges due to Number Portability
SN range start	Section 4 – List of E.164 Number Ranges due to Number Portability
SN range stop	Section 4 – List of E.164 Number Ranges due to Number Portability
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.6 Test numbers

This report lists all test numbers per operator and per TADIG code as described on the following table.

Test nbr report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 9 – TADIG code
Number type	Section 9 – Tests Numbers Information
Number	Section 9 – Tests Numbers Information
Location	Section 9 – Tests Numbers Information
Comments	Section 9 – Tests Numbers Information
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Network nodes This report lists all network node's information per operator and per TADIG code as described on the following table.

Network Nodes report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 13 – TADIG code
Node type	Section 13 – Network Elements Information
CC	Section 13 – Network Elements Information (GT)
NDC	Section 13 – Network Elements Information (GT)
SN range start	Section 13 – Network Elements Information
SN range stop	Section 13 – Network Elements Information
IPv4 address / address range	Section 13 – Network Elements Information (IPv4)
IPv6 address / address range	Section 13 – Network Elements Information (IPv6)
Vendor	Section 13 – Network Elements Information
UTC offset	Section 13 – Network Elements Information
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

APN operator identifiers This report lists all APNs operator identifiers and their description per operator and per TADIG code as described on the following table.

APN report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 16 – TADIG code
APN operator ID	Section 16 – Packet Data Services Information – List of APN Operator Identifiers
Description	Section 16 – Packet Data Services Information – List of APN Operator Identifiers
Example	Section 16 – Packet Data Services Information – List of APN Operator Identifiers
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Connection to inter-PMN IP backbone This report lists all IP addresses (IPv4) per operator and per TADIG code.

IP report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
IP address range	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
IPX VLAN	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
Network Owner	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.7 Connection to inter-PMN IPv6 backbone

This report lists all IP v6 addresses per operator and by TADIG code.

IP report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
IP V6 address range	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
IPX VLAN	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
Network Owner	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.8 Autonomous system numbers

This report lists all MNO's ASN per operator and per TADIG code as described on the following table.

ASN report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
ASN	Section 17 – MNO’s ASN list for GRX/IXP service
Network Owner	Section 17 – MNO’s ASN list for GRX/IXP service (To be added)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

H.9 Contacts

This report lists all contact information per operator and per TADIG code as described on the following table.

Contact report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 21 – TADIG code
Type	Section 21 – Contact Information
Name	Section 21 – Contact Information
Phone	Section 21 – Contact Information
Email	Section 21 – Contact Information
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

TADIG report This report lists all TADIG/MCC-MNC, H/V role (inbound/outbound) and Network type as described on the table below. This report could be used to improve TD13 with MCC/MNC.

TADIG/MCC-MNC report	Extracted from R16	Extracted before R16
Country name	Based on Section 1 – Country Initials	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code	Sender TADIG
TADIG code	Section 1 – Tadig summary	Section 4 – TADIG code
MCC-MNC	Section 1 – Tadig summary	Section 4 – MCC/MNC
H/V Role (Inbound/Outbound)	Section 1 – Tadig summary	
Network type	Section 1 – Tadig summary	
Inbound	Roaming route opening (Inbound Roaming agreements)	
Outbound	Roaming route opening (Outbound Roaming agreements)	

Typical example

Country	Operator	TADIG code	MCC-MNC	H/V Role (Inbound/Outbound)	Network type	Inbound	Outbound
France	OFR	FRAF1	208 01	H/V	Terrestrial	Live	Live
France	OFR	AAZOR	901 31	H	Terrestrial	N/A	Planned
France	OFR	AAZOR	208 01	H	Terrestrial	N/A	Planned

H.10 Radio Frequency report

This report lists all radio frequencies used by an operator as described on the table below.

Note: one line report per radio frequency. This report could be used to improve TS.25.

Radio report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
Technology	Section 2 – Network - Technology
Frequency	Section 2 – Network – Frequency List
Coverage	Section 2 – Network - Coverage
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Country	Operator	TADIG code	Technology	Frequency	Coverage	Inbound	Outbound
France	OFR	FRAF1	GSM	GSM 900	nation-wide	Live	Live

France	OFR	FRAF 1	GSM	DCS 1800	nation- wide	Live	Live
France	OFR	FRAF 1	UTRAFDD	1 - IMT 2.1 GHz	nation- wide	Live	Live
France	OFR	FRAF 1	UTRAFDD	8 - 900 MHz	nation- wide	Live	Live
France	OFR	FRAF 1	EUTRA	1 - IMT 2.1 GHz	nation- wide	Live	Live
France	OFR	FRAF 1	EUTRA	3 - DCS 1800	nation- wide	Live	Live
France	OFR	FRAF 1	EUTRA	1 - IMT 2.1 GHz	nation- wide	Live	Live
France	OFR	FRAF 1	EUTRA	3 - DCS 1800	nation- wide	Live	Live
France	OFR	FRAF 1	EUTRA_MIoT_LTE_ M	20 - 800 MHz EDD	nation- wide	Live	Live
France	OFR	FRAF 1	FiveG NR	n78 - TDD 3500	nation- wide	Live	Live

H.11 Radio Service report

This report lists all the radio roaming services (2G, 3G, 4G, MIoT-LTE-M, MIoT-NB-IOT, 5G NR) deployed by a visited operator as described on the table below and their status and planned closure date.

Radio Service report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
Radio Service	Section 2 – Network - Service Status -Radio (R17)
Support (Y/N)	Section 2 – Network - Service Status-Radio – Support (Y/N) (R17)
Planned closure date	Section 2 – Network - Service Status-Radio - planned closure date (R17)
Planned availability date	Section 2 – Network - Service Status-Radio - planned availability date (R17)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Country	Operator	TADIG code	Radio service	Support (Y/N)	Planned closure date	Planned availability date	Inbound	Outbound
France	OFR	FRAF1	2G	Y	Date 1	Date 0	Live	Live
France	OFR	FRAF1	3G	Y	Date 2	Date 0	Live	Live
France	OFR	FRAF1	4G	Y		Date 0	Live	Live
France	OFR	FRAF1	MIoT-LTE-M	Y		Date 3	Live	Live
France	OFR	FRAF1	MIoT-NB-IOT	N			Live	Live
France	OFR	FRAF1	5G NR	Y		Date 4	Live	Live

H.12 Core Service report

This report lists all the core roaming services (CS, PS, EPC, VoIMS, 5G SA) deployed by a visited operator as described on the table below and their status and planned closure date.

Core Service report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
Radio Service	Section 2 – Network - Service Status -Core (R17)
Support (Y/N)	Section 2 – Network - Service Status-Core – Support (Y/N) (R17)
Planned closure date	Section 2 – Network - Service Status-Core - planned closure date (R17)
Planned availability date	Section 2 – Network - Service Status-Core - planned availability date (R17)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Country	Operator	TADIG code	Core service	Support (Y/N)	Planned closure date	Planned availability date	Inbound	Outbound
France	OFR	FRAF1	CS	Y	Date 1	Date 0	Live	Live
France	OFR	FRAF1	PS	Y	Date 2	Date 0	Live	Live
France	OFR	FRAF1	EPC	Y		Date 0	Live	Live
France	OFR	FRAF1	VoIMS	Y		Date 3	Live	Live
France	OFR	FRAF1	5G SA	Y		Date 4	Live	Live

H.13 Emergency Call configuration report

This report lists the emergency call configuration deployed by a visited operator.

Core Service report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
MCC-MNC	Section 1 – TADIG summary
VPLMN technology Strategy for EC	Section 30 – Emergency Services
MME announce the Emergency number list toward inbound roamer's UE	Section 30 – Emergency Services
AMF announce the Emergency number list toward inbound roamer's UE	Section 30 – Emergency Services
VPLMN accepts unauthenticated IMS Emergency call	Section 30 – Emergency Services
VPLMN accepts IMS Emergency call without UICC	Section 30 – Emergency Services

H.14 Emergency Call number report

This report lists the emergency call numbers in use at the VPMN.

Core Service report	Extracted from
Country name	Based on Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
MCC-MNC	Section 1 – TADIG summary
List of Local Emergency Numbers in use at the VPLMN	Section 30 – Emergency Services

H.15 IR21 version

This report lists the IR.21 version per operator and per TADIG code as described on the following table.

IR.21 version report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 1 – TADIG summary
IR.21 version	RAEX Schema version
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	17.0	Live	Live
Belgium	OBE	BELMO	BELMO	16.0	Live	Live

H.16 Mobile Global Title range

This report lists all MGT per operator and per TADIG code as described on the following table.

MGT range report	Extracted from									
Country name	Section 1 – Country Initials									
Operator	Section 1 – Organization Name									
Sender TADIG	Header – Sender TADIG code									
TADIG code	Section 4 – TADIG code									
CC	Section 4 – Routing Information – List of E. 214 Mobile Global Title (MGT)									
NC	Section 4 – Routing Information – List of E. 214 Mobile Global Title (MGT)									
Network Owner	Section 4 – Routing Information – List of E. 214 Mobile Global Title (MGT)									
Inbound	Roaming route opening (Inbound Roaming agreements)									
Outbound	Roaming route opening (Outbound Roaming agreements)									

Typical example

France	OFR	FRAF1	FRAF1	33	689	00000 0	00999 9	MNO	Live	Live
Belgium	OBE	BELMO	BELM O	32	495			MNO	Live	Live

H.17 Home Short Number range

This report lists all short number translation per operator and per TADIG code as described on the following table.

Home Short Number range report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 4 – TADIG code
Short number	Section 4 – Routing Information – Short number translation information
Long number	Section 4 – Routing Information – Short number translation information
Service name	Section 4 – Routing Information – Short number translation information
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	888	33654185468	Voice mail	Live	Live
France	OFR	FRAF1	FRAF1	3900	33969393900	Customer Service	Live	Live

H.18 2G/3G QoS Profiles

This report lists all 2G/3G QoS profiles deployed per operator and per TADIG code as described on the following table.

2G/3G QoS profiles report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 16 – TADIG code
Profile name	Section 16 – List of 2G/3G QOS profiles
Traffic Class	Section 16 – List of 2G/3G QOS profiles
ARP	Section 16 – List of 2G/3G QOS profiles
Evolved ARP	Section 16 – List of 2G/3G QOS profiles
eARP Priority Level	Section 16 – List of 2G/3G QOS profiles
eARP Pre-emption vulnerability	Section 16 – List of 2G/3G QOS profiles
eARP Pre-emption capability	Section 16 – List of 2G/3G QOS profiles
Maximum Bit Rate Uplink	Section 16 – List of 2G/3G QOS profiles
Maximum Bit Rate Downlink	Section 16 – List of 2G/3G QOS profiles
Delivery order	Section 16 – List of 2G/3G QOS profiles
Maximum SDU size	Section 16 – List of 2G/3G QOS profiles

SDU format information	Section 16 – List of 2G/3G QOS profiles
SDU error ratio	Section 16 – List of 2G/3G QOS profiles
Residual BER	Section 16 – List of 2G/3G QOS profiles
Delivery of erroneous SDUs	Section 16 – List of 2G/3G QOS profiles
Guaranteed bit rate uplink	Section 16 – List of 2G/3G QOS profiles
Guaranteed bit rate downlink	Section 16 – List of 2G/3G QOS profiles
Traffic handling priority	Section 16 – List of 2G/3G QOS profiles
Support of Speech source	Section 16 – List of 2G/3G QOS profiles
Signalling indication	Section 16 – List of 2G/3G QOS profiles
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Country	Operator	Sender TADIG	TADIG code	Profile name	Traffic Class	AR P	Evolved ARP	...	Inbound	Outbound
Belgium	Proximus	BELTB	BELTB	BRONZE03	Interactive	2	Yes		Live	Live
Belgium	Proximus	BELTB	BELTB	SILVER03	Interactive	2	Yes		Live	Live
Belgium	Proximus	BELTB	BELTB	GOLD03	Interactive	2	Yes		Live	Live
Belgium	Proximus	BELTB	BELTB	PROFIL03	Interactive	2	Yes		Live	Live

H.19 Authoritative DNS Servers

This report lists all Authoritative DNS servers' information per operator and per TADIG code as described on the following table.

Authoritative DNS report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
IP address (IPv4)	Section 17 – List of PMN authoritative DNS server IP addresses and names
IP address (IPv6)	Section 17 – List of PMN authoritative DNS server IP addresses and names
DNS name	Section 17 – List of PMN authoritative DNS server IP addresses and names
Priority	Section 17 – List of PMN authoritative DNS server IP addresses and names
Network Owner	Section 17 – List of PMN authoritative DNS server IP addresses and names
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FR AF1	FR AF1	212.234.xx.xx		DNS1.mnc001.mcc208.3gppnetwork.org	MNO		Live	Live
France	OFR	FR AF1	FR AF1	212.234.xx.xx		DNS2.mnc001.mcc208.3gppnetwork.org	MNO		Live	Live
Belgium	OBE	BEL MO	BEL MO	212.224.xxx.xxx		DNS1.epc.mnc010.mcc206.3gppnetwork.org	MNO	1	Live	Live
Belgium	OBE	BEL MO	BEL MO	212.224.xxx.xxx		DNS2.epc.mnc010.mcc206.3gppnetwork.org	MNO	2	Live	Live

H.20 Local Caching DNS Servers

This report lists all Local caching DNS servers' information per operator and per TADIG code as described on the following table.

Local Caching DNS report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
IP address (IPv4)	Section 17 – List of PMN local caching DNS server IP addresses and domain
IP address (IPv6)	Section 17 – List of PMN local caching DNS server IP addresses and domain
DNS Domain	Section 17 – List of PMN local caching DNS server IP addresses and domain
Priority	Section 17 – List of PMN local caching DNS server IP addresses and domain
Network Owner	Section 17 – List of PMN local caching DNS server IP addresses and domain
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Country	Operator	Country Code	Country Code	IP Address	IP Address	DNS Domain	Priority	Network Owner	Inbound	Outbound
France	OFR	FRA	FRA	212.234.x	x.xx	DNS1.mnc001.mcc208.3gpnetwork.org	MNO		Live	Live
France	OFR	FRA	FRA	212.234.x	x.xx	DNS2.mnc001.mcc208.3gpnetwork.org	MNO		Live	Live
Belgium	OBE	BEL	BEL	212.224.x	xx.xxx	DNS1.epc.mnc010.mcc206.3gppnetwork.org	MNO	1	Live	Live
Belgium	OBE	BEL	BEL	212.224.x	xx.xxx	DNS2.epc.mnc010.mcc206.3gppnetwork.org	MNO	2	Live	Live

H.21 GRX/IPX Providers

This report lists all GRX/IPX providers used per operator and per TADIG code as described on the following table.

GRX/IPX providers report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 17 – TADIG code
ASN for GRX/IPX providers	Section 17 – List of GRX/IPX Providers
GRX/IPX provider name	Section 17 – List of GRX/IPX Providers
Network Owner	Section 17 – List of GRX/IPX Providers
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	2300	Orange Carrier	MNO	Live	Live
Belgium	OBE	BELMO	BELMO	2300	Orange Carrier	MNO	Live	Live
Belgium	Proximus	BELTB	BELTB	64516	BICS	MNO	Live	Live

H.22 LTE QoS Profiles

This report lists all LTE QoS profiles deployed per operator and per TADIG code as described on the following table.

LTE QoS profiles report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 20 – TADIG code
Profile name	Section 20 – List of LTE QOS profiles
QCI	Section 20 – List of LTE QOS profiles
ARP Priority Level	Section 20 – List of LTE QOS profiles
ARP Pre-emption vulnerability	Section 20 – List of LTE QOS profiles
ARP Pre-emption capability	Section 20 – List of LTE QOS profiles
Maximum Bit Rate Uplink	Section 20 – List of LTE QOS profiles
Maximum Bit Rate Downlink	Section 20 – List of LTE QOS profiles
Guaranteed bit rate uplink	Section 20 – List of LTE QOS profiles
Guaranteed bit rate downlink	Section 20 – List of LTE QOS profiles
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	default - Roam 4G	8,9	11, 12, 13, 14	Enabled	Disabled		Live	Live
France	OFR	FRAF1	FRAF1	Default -IMS	5	11, 12, 13, 14, 15	Disabled	Enabled		Live	Live
France	OFR	FRAF1	FRAF1	Dedicated-VoLTE	1	11, 12, 13, 14, 15	Disabled	Enabled		Live	Live

H.23 VoIMS roaming

This reports lists all the VoIMS roaming services supported by an operator as described on the table below.

VoIMS roaming report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 26 – TADIG code
S8HR as VPMN	Section 26 - VoIMS Roaming architectures supported as VPMN – S8HR
S8HR as HPMN	Section 26 - VoIMS Roaming architectures supported as HPMN – S8HR
N9HR as VPMN	Section 26 - VoIMS Roaming architectures supported as VPMN – N9HR
N9HR as HPMN	Section 26 - VoIMS Roaming architectures supported as HPMN – N9HR
SRVCC technology supported as VPMN	Section 26 – SRVCC technology supported as VPMN
SRVCC technology supported as HPMN	Section 26 – SRVCC technology supported as HPMN
Lawful Interception	Section 26 - Does VPMN require encryption deactivation by HPMN for IMS procedures
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	Y	Y	N	N	eSRVCC	eSRVCC	Y	Live	Live
Belgium	OBE	BELMO	BELMO	Y	Y	N	N	N	N	Y	Live	Live

H.24 5G QoS Profiles

This report lists all 5GS QoS profiles deployed per operator and per TADIG code as described on the following table.

5G QoS profiles report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 28 – TADIG code
Profile name	Section 28 – List of 5GS QOS profiles
5QI	Section 28 – List of 5GS QOS profiles
ARP Priority Level	Section 28 – List of 5GS QOS profiles
ARP Pre-emption vulnerability	Section 28 – List of 5GS QOS profiles
ARP Pre-emption capability	Section 28 – List of 5GS QOS profiles
Maximum Bit Rate Uplink	Section 28 – List of 5GS QOS profiles
Maximum Bit Rate Downlink	Section 28 – List of 5GS QOS profiles
Guaranteed bit rate uplink	Section 28 – List of 5GS QOS profiles
Guaranteed bit rate downlink	Section 28 – List of 5GS QOS profiles
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	default - Roam 4G	8,9	11, 12, 13, 14	Enabled	Disabled		Live	Live
France	OFR	FRAF1	FRAF1	Default -IMS	5	11, 12, 13, 14, 15	Disabled	Enabled		Live	Live
France	OFR	FRAF1	FRAF1	Dedicated-VoLNR	1	11, 12, 13, 14, 15	Disabled	Enabled		Live	Live

H.25 SEPP information

This report lists all SEPP information used per operator and per TADIG code as described on the following table.

SEPP information report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 28 – TADIG code
SEPP model	Section 28 – SEPP information
MCC/MNC list	Section 28 – SEPP information
Well-known FQDN	Section 28 – SEPP information
SEPP FQDN	Section 28 – SEPP information
IPX provider	Section 28 – SEPP information
SEPP-N32 parameters	Section 28 – SEPP information
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

France	OFR	FRAF1	FRAF1	Model 2	20801 90131	sepp.5gc.mnc.mcc.3gppnetwork.org	sepp1.sepp.5gc.group-orange.orange.lpxnetwork.org		Live	Live

H.26 SMS capability

This report lists the SMS capabilities supported per operator and per TADIG code as described on the following table.

SMS capability report	Extracted from
Country name	Section 1 – Country Initials
Operator	Section 1 – Organization Name
Sender TADIG	Header – Sender TADIG code
TADIG code	Section 29 – TADIG code
SMS over IP as VPMN	Section 29 – SMS ITW-as VPLMN - SMS over IP
SMS over NAS via SS7 as VPMN	Section 29 – SMS ITW-as VPLMN - SMS over NAS via SS7
SMS over Nas via Diameter as VPMN	Section 29 – SMS ITW-as VPLMN - SMS over Nas via Diameter
SMS over NAS via HTTPS as VPMN	Section 29 – SMS ITW-as VPLMN - SMS over NAS via HTTPS
SMS over IP as HPMN	Section 29 – SMS ITW-as HPLMN - SMS over IP
SMS over NAS via SS7 as HPMN	Section 29 – SMS ITW-as HPLMN – SMS over NAS via SS7
SMS over Nas via Diameter as HPMN	Section 29 – SMS ITW-as HPLMN - SMS over Nas via Diameter
SMS over NAS via HTTPS as HPMN	Section 29 – SMS ITW-as HPLMN - SMS over NAS via HTTPS
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

Typical example

Franc e	OFR	FRAF1	FRAF1	Y	Y	N	N	Y	Y	N	N	Live	Liv e

Document Management

I.2 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
Draft	Dec. '92 - June '92	For EREG Discussions		
0.0.1	June 1992	For EREG Discussions		
1.0.1	June 1992	For EREG Discussions		
3.0.0	12th June 1992	Approved at MoU 20		
3.1.0		Approved at MoU 20 Note: No change to IR.21, only a new printout of the GSM Association Roaming database		
3.2.0	10 th June 1993	Approved at MoU 24 - Includes CR no.2		
3.2.1		Approved at MoU 25 - Includes CR no.3		
3.2.2		Approved at MoU 26 - Includes CR no.4		
3.3.3	18 th October 1995	Approved at MoU 32 - Includes CR no.5		
3.4.0	18 th January 1996	Approved at MoU 33 - Includes CR no.6		
3.4.1	29 th May 1996	Approved at MoU 34 - Includes CR no.7		
3.4.2	3 rd October 1996	Conversion to PRD TD.15		
3.4.3	25 th November 1996	Approved at IREG 31. Includes CR no.8, non-strategic: Removing the reference to PRD IR.22		
3.5.0	October 1999	CR# 9. PL Doc 181/99 Rev 1. Approved at Plenary 42		
3.6.0	27 th April 2000	CR#10, PL Doc 030/00 approved at Plenary 43		
3.7.0	October 2000	Approved at Plenary 44 – CRs # 11 and 12		
3.8.0	May 2002	CR IREG 016/02 rev1 addition of new field containing network's SMSC GT addresses to allow operators with MSCs that require full SMSC addresses to enter them correctly CR IREG 019/02 rev1 introduction of GPRS and GSM vendor information		
3.8.1	August 2002	CR 013 IREG Doc 107/02 rev2 approved at IREG#43. Addition of "Pingable and traceroutable IP address" field in the "GPRS Information" section, in order to facilitate GPRS roaming testing and troubleshooting.		
3.8.2	February 2003	NCR 014 IREG Doc 019/03 rev1 approved at IREG#44. Addition of a GTP version field in the "GPRS		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
		Information" section, in order to clarify the GTP version supported by the operator.		
3.8.3	February 2003	NCR 015 IREG Doc 020/03 rev1 approved at IREG#44. Addition of MMS Information section.		
3.8.4	February 2003	NCR 016 IREG Doc 027/03 approved at IREG#44. Adding new fields to the CAP version information section, to show which CAMEL partial implementations are supported.		
3.9.0	February 2003	SCR 017 IREG Doc 029/03 Rev 1 approved at IREG#44. Adding a new section on WLAN information.		
3.9.1	February 2003	NCR 018 IREG Doc 035/03 Rev 1 approved at IREG#44 Introduction of minimum time to inform roaming partners when updating IP based services Information.		
3.9.2	August 2003	NCR 019 on the IR.21 ver.3.9.1 for addition of the Application Context in MAP		
3.9.3	August 2003	NCR 20 to IR.21 Re AAC numbers		
3.9.4	August 2003	NCR 21 on the IR.21 Ver.3.9.1 for Clarification of supporting GTP version1		
3.9.5	November 2003	NCR 024 on the IR.21 for correction of AC name in MAP		
3.9.6	November 2003	NCR 025 on the IR.21 for clarification of supporting latest version of Release		
3.9.7	May 2004	NCR 027 to IR.21 v.3.9.6		
3.9.8	October 2004	NCR 029 to IR.21 v.3.9.7 implemenation of compliance to SG.15		
3.9.9	March 2005	Three NCR to IR.21 v.3.9.8 NCR 030 : Addition of new section regarding Authentication to record compliance with SG.15 NCR 031 : Structure reorganization of Miscellaneous section NCR 032 : Provided a mechanism to detect SIM Box usage		
3.9.10	June 2005	MCR 032: Addition of MMS Hub provider information and MMS Hub provider data		
3.9.11	August 2005	NCR033: Introduction of an update interval for SMS-SC addresses MCR034: Record of A5 cipher algorithm in use by each operator		
4.0	November 2005	MCR035: Identification of operator network technology standard MCR036: New section called "IP-Roaming and IP-Interworking information" containing proper information for GRX Interworking and for Master Root DNS Server MCR037: New section for SCCP Protocol availability at PMN		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
4.1	March 2007	MCR 038: GPRS Information section change and addition of fields for data service support		
4.2	April 2007	MCR 039: New section containing MSC and VLR Time Zone information		
4.3	March 2008	MCR 046: collection of following CR MCR040: Enhancement of SMSC and CAMEL information sections MCR041: Removal of SS7 Access Solution section MCR042: Including Roaming Hubbing Information MCR043: Including USSD Information MCR044: Contact Point section review for Miscellaneous MCR045: Redesign of Auto Roam Section		
5.0	March 2008	MCR047: RAEX Business requirements and Infocentre improvements for notification procedures Editorial changes accordingly Revision of Annex A output		
5.2	July 2008	Editorial change on [Unrestricted]		
5.3	September 2008	MCR048: Revision of Annex A including new form template according xml schema Revision of IR.21 Data Dictionary Definition of Network Type Elements Removal of Technology and Frequency elements from IR21 Company logo in the output template Revision of Update Intervals Section Clarification of WLAN Roaming Signalling IP List		
5.4	March 2009	MCR049: Revision of Data Dictionary and Output Template. Changes needed after "proof of concept" analysis, to allow correct definition of operator's data MCR050: - Revision of Annex A including "Comments" field on SCCP Carrier sections - Addition of CAMEL Re-Routing number information - Addition of Dual Access column in Network Elements information		
6.0	November 2009	MCR051: Removal of Roaming Hubbing section due to introduction of PRD IR.85	IREG eVote EMC#79	Fabrizio Fiorucci / Telecom Italia, Italy
6.0	December 2009	MCR052: Addition of new section for RILTE information Addition of RAI information Editorial correction on section Id 3	IREG#57 EMC#79	Fabrizio Fiorucci / Telecom Italia, Italy

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
6.1	April 2010	mCR053: Support (or not support) of multiple PDP context	Signal#48	Fabrizio Fiorucci / Telecom Italia, Italy
6.2	October 2010	MCR054: -Definition of a Release Management proposal for RAEX IR.21 -Allow Roaming Hubs and other entities to receive IR.21 by replacing "Operator" with "Service Provider" in the text -State that RAEX IR.21 process is a "Binding" process.	IREG#58 EMC#80 DAG#73	Fabrizio Fiorucci / Telecom Italia, Italy
7.0	March 2011	First version of 2012 release MCR057: This CR is created in order to align the latest agreement made in Packet/RILTE on 2G/3G+LTE co-existence roaming scenarios. Also, current IR.21 on LTE roaming information (name of the information, Diameter sections) needs to be updated to align the latest IR.88.	Signal#53 Packet#49 IREG#59	Itsuma Tanaka / NTT DoCoMo, Japan
7.1	May 2011	MCR059: IPv6 and IPV4IPv6 connectivity type MCR060: Support of QCI values MCR062: Introduction of RAEX process MCR061: list of short number translation Submitted to DAG & EMC for approval	Signal#54 Packet#50 IREG#60 EMC	Laurent Dubesset/Orange France Fabrizio Fiorucci/Telecom Italia
7.2	October 2011	MCR063: RAEX Emergency Release 1 MCR064: Integration of SE.13 information MCR065: Additional Network Node Values	Signal#55 IREG#60 EMC	Fabrizio Fiorucci/Telecom Italia Anton Golubchyy/Kyivstar Jose Antonio Aranda/GSMA Janet Newman/Cellular One
7.3	January 2012	MCR068: Embedded Mobile APN Transparency	Signal#57 Packet#54 IREG#61	Nina Le Kim/T-Mobile US
8.0	May 2012	MCR069: 32 Bit ASN definition	Signal#58 Packet#55 IREG#62	Fabrizio Fiorucci/TI

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
8.1	July 2012	MCR071: information for Diameter inter-operator interfaces	Signal#60 IREG#62	Michele Zarri/Deutsche Telecom
8.2	July 2012	MCR075: correction in Hosted Network section MCR076: correction in Network Element Information section MCR077: correction in CAMEL Information section MCR078: conditionality definition of SE.13 fields	Signal#62 IREG eVote DAG#953	Fabrizio Fiorucci/Telecom Italia Laurent Dubusset/Orange FT
8.3	November 2012	MCR072: Network Sharing wording MCR073: ARP and Bit rates in LTE Information Section MCR074: QoS and Bit Rates in Packet Data Services Information section MCR079: Enhancements of International SCCP Gateway Section MCR080: SE.13 DB: Re-insertion of Technology and Frequency information MCR082: Simplification of IR.21 for organisations with multiple networks MCR083: Data Dictionary Correction for Camel and IP Roaming and ITW Sections	Signal#64 IREG#63	S. Dalluege/VDF DE F.Fiorucci/Telecom Italia Laurent Dubusset/Orange FT
9.1	June 2013	CR1001: foot note alignment to PRD IR.88 CR1002: description for LTE Information Section CR1003: addition of USSD Interworking	Signal#67 IREG#64	F.Fiorucci/Telecom Italia L. Dubusset/Orange FT R. Duric/Infobip
9.2	November 2013	CR T8: RAEX Business Requirements Add-ons CR1005: Addition of Network Name CR1006: Addition of Ticketing system field under troubleshooting contact CR1007: Binding Date for RAEX IR.21 CR1008: Correction of Data Services supported in Packet Data Services CR1009: IR.21 Confidentiality CR1010: Addition of DEA FQDN CR1011: Removal of HSS, PCRF and MME Hostnames	Signal#69 Signal#70 Signal#71 IREG#65	F.Fiorucci/Telecom Italia S. Bhat/GSMA Dave Wittekind/Guyana TLC I.Tanaka/NTT DoCoMo
9.3	September 2014	CR1012: post 2013 Release fixing for ASN and QoS definitions CR1013: IPX DEA information for LTE Roaming CR1014: new dates for Change Management Process in RAEX IR.21 CR1016: EU Reg III – LBO IF-2 definitions CR1017: IR.21 document validity CR1018: M2M Roaming information CR1019: OCGS Integration CR1020: Adding MVNO section for IP Data	IREG#66	F.Fiorucci/Telecom Italia C.Bonnet/Orange France K.Stephenson/H3G UK

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		CR1021: LTE QoS profiles alignment with IR.88 CR1022: addition of operator EPC Realm(s) for LTE Roaming Editorial changes applied		
10.0	September 2015	CR1023: 2G-3G QOS eARP support enhancements CR1028: LTE Roaming Scenarios alignment with IR.88 CR1029: Diameter Clarification and Roaming Forward option CR1030: E.164 Routing Information for MVNO CR1031: Support of 15 Digits MSISDN Editorial Changes applied	IREG#67	C.Bonnet/Orange France F.Fiorucci/Telecom Italia
10.1	January 2016	CR1032: Hubbing information according to IR.85 requirements CR1034: PMIP information removal CR1035: Frequency Bands alignment CR1036: APN Home or Local Routed CR1037: Cleaning and Editorial modifications	NG#2	M. Ambrozie/VRS C. Bonnet/Orange F. Fiorucci/TIM
11	November 2017	CR1038: addition of ENUM server IP address CR1039: SMS-C testing information CR1040: IPv6 Addressing CR1041: SMS-C information for NP CR1043: VoLTE Roaming Information	NG#4	Catherine Livet (Tata Communications) Cédric Bonnet (Orange) Mark McGinley (AT&T Mobility) Fabrizio Fiorucci (TIM Italy)
11.1	April 2018	CR1045: data Dictionary change in LTE CR1046: Network extension info in LTE CR1048: Unused filed removal CR1051: Support of Translation Type (TT) for Network Nodes and for AGT Access Method CR1052: Alias TADIG code field in Roaming Hub Provider Information Section	NG#5 NG#6	Fabrizio Fiorucci (TIM Italy) K. Leach (Sprint) S. Renfer (Comfone)
12.0	November 2018	CR1053: frequency band name modification	NG#7	K. Leach (Sprint) M. Balon (Orange)

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13.0	June 2019	CR1054: LPWA Fields CR1055 Requirements for RAEX 2019 release Editorial Correction terms from RiLTE#70	NG#8	F. Fiorucci (TIM Italy) M. Mc Ginley (AT&T)
14.1	October 2020	CR1057: Reinserting ShortCode information CR 1058: Editorial Change for SMSOver term CR1060: IPv4v6 UE request handling clarification CR1064: Usage of IR.21 Data CR1065: 5G NSA Information and editorial changes	NG#9	F. Fiorucci (TIM Italy) J. Gullstrand (GSMA)
15.0	July 2021	CR 1059: Emergency numbers addons CR 1067: 2G3G Sunset CR 1068: deletion of VoLTE LBO CR 1071: 5G NR Frequency Bands	NG#10	F. Fiorucci (TIM Italy) M. Balon (Orange) H. Ishigawa (NTT DoCoMo)
15.1	July 2021	Editorial change on Routing information for MVNO Network Node E.164 Range Editorial review to adapt the EN-DC Band combination list		F. Fiorucci (TIM Italy) M. Luca (Roamsys)
15.2	Dec 2021	Editorial typo correction on section C.5.14 for Short Number Information		F. Fiorucci (TIM Italy) M. Luca (Roamsys)
16.0	June 2022	CR 1056: Addition of supported PDU Session PDN type per DNNAPN CR 1063: DESS support indicators CR 1066: Major editorial changes CR 1069: Update for LTE Hosted Networks CR1070: IoT Quality Parameters CR 1073: Additional information section sizing CR 1075: Use cases CR 1076: TADIG issues CR 1077: GT address issues CR 1078: IP address issues CR 1079: Section 2_Network CR 1080: Section 4_Routing Information CR 1081: Section 5 and 6_SCCP Gateway CR 1082: Section 13_Node information CR 1083: Section 16_GTP Version CR 1084: Section 17_Roaming and IP CR 1085: Section 20_LTE Roaming Information	NG#15	H. Ishigawa (NTT DoCoMo) Ewout Pronk (NetNumber, Inc) Marc Balon (Orange) F. Fiorucci (TIM Italy) Wayne Law, GSMA 5G IoT Strategy Group Yue Zhao (NTT DOCOMO, Inc.) D. Maxwell (GSMA)

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		CR 1086: Section 26_Emergency calls CR 1087: Revision of Update Intervals scheme CR 1088: Certificate Management Support Requirements for RAEX Tools CR 1090: Change URN information conditionality to MANDATORY CR1091: GT Leasing		Eddy GOFFIN (ORANGE Belgium nv/SA)
17.0		CR1092: 5G SA Roaming CR1093: Basics CR1094: GT Leasing CR1095: Reports CR1098: Section 2 improvements CR1099: Section 1 improvemenst CR1100: Escalation Contact CR1101: DNS correction CR1102: MG references CR1103: 4G 5G frequency CR1104: CAPv3 data removal CR1106: Confidentiality CR1107: LPWA improvements	NG#19	Marc Balon (Orange) Ewout Pronk (NetNumber Inc.), Edward Yau (Syniverse), Ahmad Muhanna (Mavenir), Andreas Pashalids (BSI), Matsusako Azumi (Softbank), Pradeep Bhardwaj (Syniverse), Mihaela Ambrozie (Vodafone) Mark Lipford (Syniverse), Pieter Veenstra (NetNumber, Inc.), Wayne Cutler (GSMA) David Maxwell, GSMA Priit Rohusaar Alain Bach (POST Luxembourg Andrew Tezak
17.1	Oct 2024	CR1108: confidentiality clarification CR1109: SMS parameter mandatory – alignment with RAEX implementation	NRG_023	Javier Sendin (GSMA) Marc Balon (Orange), David Houstek (roamsys)
18.0	Oct 2025	CR1105: Inbound Roaming protection CR1110: MSISDN length CR1111: GTT-IP (Global Text Telephony over IP) Roaming on top of VoIMS Roaming CR1112: GAP analysis CR1113: Report on Emergency call CR1114: Clarifications on confidentiality and public reports	NG#21 NG#22	Anna Shylina, Lifecell Hyewon Lee (Apple) Fabrizio Fiorucci (TIM Italy)

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
		CR1115: Additional Emergency Call configurations in Section ID 26 CR1116: New section for emergency services CR1117: RAEX Tool improvements (changes deployed in RAEX Tool) CR1118: Removal of "Public" and Annex C update r.1 CR1119: Update MSRN, MSISDN and MGT description in Annex D CR1120: Editorial changes CR1121: Emergency improvements CR1122: Add various reports CR1123: Section 4 split CR1124: Section 17 improvements CR1125: Section 16 improvements CR1126: Improvements of Release section CR1127: Contact section improvements CR1128: MCX CR1129: Improve IP addresses description (IPv4 and v6) in Annex D CR1130: SMS HUB CR1131: Rules CR1132: Confidentiality clarification for emergency communication		Ismail Emre (Telefonica Germany) Sateliot Michael Weilandt (Telefonica Germany) Marc Balon (Orange) David Houstek (Roamsys) Julia Gullstrand (GSMA) Priit Rohusaar (OQ Technology) Azumi Matsusako (SoftBank) Eddy Goffin (Orange) Tidiane Diallo (Orange) Liwen Wang (NTT DOCOMO)

I.2 Other Information

Type	Description
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Editor / Company	Fabrizio Fiorucci, TIM Italy

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