

GSM Association Roaming Database, Structure and Updating Version 17.0 20-June-2024

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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 <u>RAEX</u> <u>Business Requirements defined in Annex C</u>.

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
САР	CAMEL Application Part
CC	Country Code
CCITT	International Telegraph and Telephone Consultative Committee
СММ	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
GUI	Graphical User Interface
GW	Gateway
HQ	Headquarters
IMSI	International Mobile Station Identity

Term	Meaning			
loT	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			
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			
RVAS	Roaming Value Added Service			
SAN	Subject Alternative Name			
SCCP	Signalling Connection Control Part			
SMSC	Short Message Service Centre			

Term	Meaning
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

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

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.



The first list describes the <u>basic network type</u>, 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 <u>additional network type</u>, 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. V17.0 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 before:

- 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	Н	Full MVNO	
Basic	Basic	Н	Dedicated M2M (M2MDO)	
Additional	Additional	Н	+ Multi user MCC-MNC IMSI	
Same	Same	Н	+ Light MVNO	
Same	Same	Н	+ 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)	

Typical examples are listed hereafter:

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

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
JPNDO	JPNDO	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	Н	Full MVNO

Dedicated M2M (M2MDO) - Sierra Wireless France

Sender TADIG	TADIG	MCC-MNC	V/H	Network type
AAZ24	AAZ24	208-24	Н	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	Н	Terrestrial

USACG	USAAT	310-280	Н	Terrestrial
USACG	USABS	310-150	Н	Terrestrial
USACG	USAPB	310-170	Н	Terrestrial
USACG	USACC	310-030	Н	Terrestrial
USACG	USAFN	310-100	Н	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	Н	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	Н	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	Н	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	М	М	Μ	М	0	0	0	-	-
Non-Terrestrial	Μ	М	М	М	0	0	0	-	-
Full MVNO	Μ	-	М	М	0	0	0	-	-
Dedicated M2M	Μ	-	М	М	0	0	0	-	Μ
+ Multi user MCC- MNC	М	-	м	0	0	0	0	-	-

+ Light MVNO	-	-	-	Mvno attribute	Mvno attribute	Mvno attribute	Mvno attribute	-	-
+ Integrated M2M	-	-	-	-	-	-	-	-	М
+ Network Sharing	М	-	Mocn mccmnc	-	-	-	-	-	-
+ Network Extension	М	-	-	-	-	-	-	М	-
+ Network Coverage Extension	М	-	-	-	-	-	RAI/LAI mccmnc	-	-

4 Reports

NOTE: Production of the reports have yet to be agreed with the GSM Association.

Currently, the following information is available through the GSMA Infocentre RAEX IR.21 Application

Section	Subsection
Routing	MSISDN number ranges
Routing	Global title number ranges
Routing	MSRN number ranges
Routing	Number portability
Test numbers	Test numbers
Network elements	Network nodes
Packet-switched data	APN operator identifiers
IP roaming and inter-working	Connection to inter-PMN IP backbone
IP roaming and inter-working	Autonomous system numbers
Contacts	Contacts

The MNO interest of those public reports is quite limited due to the lack of completeness (no confidential or private data).

Those public reports are defined more 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 GSM Infocentre RAEX IR.21 Application, according to the RAEX IR.21 exchange process described in <u>Annex C.3.</u>

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

The GSM Infocentre 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 Infocentre 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 this way in Annex A, to support the development of an industry specific, easy to integrate, threat sharing initiative defined T-ISAC that will assist GSMA members in the detection of Fraud and Security attacks.

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

1	Organisation Information
2	Network
21	Contact

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

Note 1: Section 1,2 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, IR.21 could be private (not published in the public domain)

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 and 21 which are always public)

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=""></organisation>
Country Initials:	<xxx></xxx>

TADIG summary

TADIG	MCC/MNC	VPMN/HPMN	Network Type
<sender></sender>			

History of Changes

Date of Change	Sectio n ID	TADI G Code	Description
YYYY-MM-DD			
YYYY-MM-DD			

A.2 NETWORK

landatory, Repeating)

TADIG Code:	XXXYY (Fill with TADIG Code Associated to the Network. See TD.13 [9])
Network Name:	<network name=""></network>

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			
MIoT-NB-IOT			
VoLTE			
5G-NR			

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

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

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

A.3 NETWORK INFORMATION

Section ID: 3 (Mandatory)

The following information refer to the network identified by TADIG Code: XXXYY

RAEX Version: YYYY

A.4 ROUTING INFORMATION

Section ID: 4 (Mandatory)

ITU-T E.164 Number series	Oper ator ID 1 (for Roam ing HUBs)	TT 23 (for Roamin g HUBs	Countr y Code (CC)	Nation al Destin ation Code (NDC)	SN Rang e Start	SN Range Stop	Primary Internati onal DPC	Secon dary Intern ational DPC	Netwo rk Owner	Locati on	()
MSISDN Number Range(s):											ľ

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

3 3 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"

3 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"

Network Nodes Global Title Number Range(s): MSRN Number Range(s):										N/A	
ITU-T E.164 Number series	Oper ator ID 1 (for Roam ing HUBs)	TT 23 (for Roam ing HUBs	Coun try Code (CC)	National Destinat ion Code (NDC)	SN Range Start	SN Range Stop	Prima ry Intern ation al DPC	Seconda ry Internati onal DPC	Netwo rk Owner	Locati on	
MSISDN Number Range(s):											
Network Nodes Global Title Number Range(s):		N/A								N/A	
MSRN Number Range(s):		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
 - E.214 Mobile Global Title (MGT)
- 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

E. 212 Number series:	Mobile Country Code (MCC)	Mobile Network Code (MNC)

³ If Network Owner value is "GT Leasing", specify the business name of the GT Lessee and the type of signalling node that is using the leased GT. See section Error! Reference source not found. for more information.

E. 214 Mobile Global Title	Country Code of	Network Code of MGT
(MGT)	MGT (CC)	(NC)

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

Does Number Portability	
apply?	

15 Digit MSISDN support Y/N

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

(U) Sim Header:	

Additional	
Information:	

Short number translation	Short number	Long number	Service name
information			

A.5 INTERNATIONAL SCCP GATEWAY

Section ID: 5 (Conditional)

Section Not Applicable

Or

4

Section is also applicable for the following TADIG codes

***** *****

* List values from the TADIG list of Section1

International SCCP Carrier List

SCCP Carrier Info

SCCP carrier Name:		
Connectivity Information		
Date of Launch		
Date of Closure		
DPC List	· ·	
DPC Info		
Signature	Туре	International DPC

A.6 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 Section1

Domestic SCCP Carrier List	
SCCP Carrier Info	
SCCP carrier Name:	
Date of Launch	
Date of Closure	
DPC List	
DPC Info	
Signature:	

Туре:	
Domestic DPC:	

A.7 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.8 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.9 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.10 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 Section1

Interworking Specifically for Roaming				
Application Context Name	Current Version in		Comment	
	Inbound Roaming		Outbound	
	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)				

⁵ The term "Outbound Roaming" denotes any one of the following nodes that is located in the home PLMN only: HLR, gsmSCF, SMS-IWMSC, SMS-GMSC.

ss-InvocationNotification		N/A	
subscriberInfoEnquiry			
gprsLocationUpdate	N/A		
locationCancellation			
msPurging			
reset			
networkUnstructuredSs		N/A	
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			

A.11 MAP INTER OPERATOR SMS ENHANCEMENT

(Optional)

Section ID: 12

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- IWMSC	SMS- GMSC	HLR	

shortMsgGateway	N/A		
shortMsgAlert		N/A	

A.12 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.13 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 Section1

USSD capability available?	
Supported phase:	

A.14 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 Section1

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)				
CANEL TO Douting Numbering							
CAMEL re-Routing Numbering	Information						
List of numbers used for re-routing pu	rposes6						

⁶ To provide information of Re Routing CAMEL number for troubleshooting

A.15 PACKET DATA SERVICES INFORMATION

Section ID: 16 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes

**** *****

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

List of APN Operator Identifiers APN Operator Identifier

APN W	APN WEB List (for testing)								
				APN Cred	ential		ISP DNS	ISP DNS	
APN	APN Type Home or VPLMN Routed	Required PDU Session Type	Required PDN Type	Required PDP Type	Username	Password	IP address (primary)	IP address (second ary)	
	H- APN,V- APN or both	Any one or more of the following: IPv4, IPv6, IPv4v6, Ethernet, Unstructu red	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 MI	MS List	(for testing))						
APN Cree	dential	Username	Passwor	d	WAP Gateway for MMS	/ IP address	Messaging Server URI	<u></u>	
APN M2M List (for testing)									
APN Credential				ISP DNS IP address (primary)		ISP DNS IP address			
APN		Username	Passwor	d	~ • •		(secondary	/)	

GTP Version	
SGSN:	
GGSN:	

Data Services supported in 2G, GPRS, EDGE and 3G, HSDPA, HSUPA					
2G Data Service	Multislot Class Capability				
3G Data Service	UE 3G Category				
Multiple PDP Context Support					
Supported or Not Supported					
Number of simultaneous Primary PDP context					

IPv6 Connectivity Information		Supported (Yes/No)
SGSN	IPv6 PDP Type	[Yes/No]
	IPv4v6 PDP Type	[Yes/No]
GGSN	IPv6 PDP Type	[Yes/No]
	IPv4v6 PDP Type	[Yes/No]

VPMN support of Local Breakout							
Support Local	Supported PDU Session Type / PDN Type / PDP Type						
Breakout as VPMN	IPv4	IPv6	IPv4v6	Ethernet	Unstructured	Non-IP	PPP
[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		
Source statistics descriptor		
Signalling indication		

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

A.16 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 Section1

List of All IP address ranges used by PMN for connection to Inter-PMN	IP Address Range for GRX/IPX data roaming (IPv4)	IPX VLAN	Network Owner
IP backbone ⁷			

List of All IP address ranges used by PMN for connection to Inter-PMN	IP Address Range for GRX/IPX data roaming (IPv6)	IPX VLAN	Network Owner
IP backbone ⁸			

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

MNO's ASN(Autonomous	ASN/ ASN4B	Network Owner
GRX/IPX service		

7 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).

8 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).

8 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	MCC (3 digit)	MNC (2 or 3 digit)	Network Owner
MNC/MCC in the E.212			
field) that may be sent in			
the User Location			
Information (ULI) in GTP			
messaging from SGSNs			

List of PMN authoritative	IP address	IP address	DNS Name
DNS server IP addresses	(IPv4)	(IPv6)	
and names			

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

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

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

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

A.17 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	Deliver y Report allowe d? (Y/N)	Read Report allowe d? (Y/N)	IP address(e s) of Incoming MTA	IP address(es) of Outgoing MTA
List of MMS Provider	IW Hub	MMS IW Hub	Provider	Name	MMS IW Hu GT Address	ıb Provider s

MMS Element Data

Domain name of MMSC	IP Address Range for MMSC	Max. size of MMS allowed	Deliver y Report allowe d? (Y/N)	Read Report allowe d? (Y/N)	IP address(e s) of Incoming MTA	IP address(es) of Outgoing MTA
List of MMS Provider	IW Hub	MMS IW Hu	b Provider	Name	MMS IW Hu GT Addres	ıb Provider s

A.18 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	
IP address(es)		
List of IP address range(s) used for	IP Address Range	
WLAN roaming		
List of WLAN Service Brand	Brand Name	Realm

A.19 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	Primary	Secondary
Agents		
Realms used by IPX DA		
Diameter architecture option 5 or 6		
Roaming Interconnection		
Diameter:		
EPC Realm(s)/domain name(s) epc.mnc <mnc>.mcc<mcc>.3gppnetwork.org</mcc></mnc>		

used for Roaming purpose	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:	1
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]	
Seconaria 2 augmented?		
Scenario 3 supported?		

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	MCC (3 digit)	MNC (2 or 3 digit)		
AVP 1407				

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 Preemption Vulnerability List
	Allowed ARP Preemption 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 Connectiv	ity 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)
	Not supported
DESS function delegated to IPX provider	<ipx name="" provider=""></ipx>

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	Y/N
when HSS does not set	
the feature list AVP#27	

A.20 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

Troubleshooti	ng Office Infor	mation Item	
Location			
Office Time Zone in UTC			
Office Hours	Week Day(s)	Start Time	
	Mon, Tue, Wed		-
	Thu, Fri		
Main Contact for	Team Name	Tel.	
Troubleshootin g			
(Office Hours)			
Escalation	Person Name	Tel.	
Troubleshootin			-
g			
24 x 7	Team Name	Tel.	-
g Contact (Out			
of Office Hours)			
Location		1	1
Office Time			
Zone in UTC			
Office Hours	Week Day(s)	Start Time	

Escalation	Person Name	Tel.	Email
Contact for			
Troubleshooting			

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

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

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

Roaming	Person Name	Tel.	Email
Coordinator			

IREG Tests	Person Name	Tel.	Email

TADIG Tosts	Person Name	Tel.	Email
TADIO TESIS			

CAMEL Tests	Person Name	Tel.	Email

GPRS Contact	Person Name	Tel.	Email

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

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

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

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

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

Other Contacts

IR21	Email
Distribution	
Email Address	

A.21 HOSTED NETWORKS 22

Section ID:

(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	Choose between "Terrestrial" or "Non-Terrestrial"
List of Hested Netwo	ork Nodos

List of Hosted Network Nodes

Node Type	GT (E.164)	IP	MSRN Range(s)			
	Address(es)	Address(es)	J J	NDC	SN Range Start	SN Range End

Hosted Network Data				
Network Name:				
Country:				
TADIG Code				
Network Type	Choose between "Terrestrial" or "Non-Terrestrial"			

List of Hosted Network Nodes

Node Type	GT (E.164)	IP	MSRN Range(s)				Location
	Address(es)	Address(es)	CC	NDC	SN Range Start	SN Range End	

A.22 M2M Roaming Information

Section ID: 23 (Optional, Repeating)

Section Not Applicable

Or

V17.0

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.23 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.24 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]
Mobility and Voice Continuity		
SRVCC technology supported as	eSRVCC	(3GPP rel. 11 and above)
VPMN	Basic SRVCC (3GPP rel. 10 and before)	
Not suppo		orted
SRVCC technology supported as eSRVCC (3		(3GPP rel. 11 and above)
HPMN	Basic SRVCC (3GPP rel. 10 and before)	
	Not supported	

S8HR / N9HR Roaming constraints

Emergency calls

VPLMN technology Strategy for EC	VoNR
	VoLTE
	CS Fallback

List of Local Emergency Numbers	Number	Service	URN Information ⁱ	
in use at the VPMN				

MME announce the Emergency number list toward inbound roamer's UE ?	[Yes/No]
AMF announce the Emergency number list toward inbound roamer's UE ?	[Yes/No]

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.25 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 (or	itbound)		
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 Discontinous 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 Discontinous 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 (or	utbound)
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 Discontinous Reception / eDRX	[No
	Static
SMS	
SMS buffering period	
IPX Firewall GTP Idle timer value	
NB-IoT Services supported as VPMN (in	bound)
IP version	IPv4
	IPv6
Data transport via control plane	
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
DSM T2224 timer minimum volue	Dynamicj
PSN 13324 timer maximum value	
PSM 13324 timer maximum value	
PSM extended 13412 timer minimum value	
PSM extended 13412 timer maximum value	
PSM packet buffering support	[Yes/No]
PSM packet buffering volume	
DRX cycle timer	
Extended Discontinous Reception / eDRX	[No
	Static
	Dynamicj

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.26 5G SA Roaming Information

Section ID: 28 (Optional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes⁹

***** *****

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

⁹ 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

<u>5G SA DATA</u>

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 ¹⁰		
ARP Priority Level ¹¹		
ARP Pre-emption vulnerability		
ARP Pre-emption capability		
Maximum Bit Rate Uplink		
Maximum Bit Rate Downlink		
Guaranteed bit rate downlink		

10 Mandatory

11 Mandatory

Guaranteed bit rate uplink		

A.27 SMS Roaming Information

Section ID: 29 (Conditional)

Section Not Applicable

Or

Section is also applicable for the following TADIG codes¹²

***** *****

SMS ITW-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 ITW-as HPLMN

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]

¹² Fill-in that section if the information is also applicable with other networks of your organization or for MVNO

Annex B

empty

Annex C

C.1 RAEX IR.21 Business Requirements

In addition to the Word, Excel or PDF IR.21, Operators may also choose to exchange IR.21 data electronically by using RAEX IR.21 until a defined date.

If the "electronic" way is considered the initial option, after the defined deadline electronic format may become the only admitted and certified way to exchange PMN information.

RAEX IR.21 provides the means of exchanging the IR.21 using a pre-defined data format and according to a standardized business process represented here. The standard IR.21 will remain the legally binding document.

RAEX IR.21, when used, should conform to the latest version of IR.21 in order to avoid any loss of changes on Roaming Partners data.

RAEX IR.21 requirements are **Binding** within the GSMA Community.

For RAEX purposes, Service Providers (SP) in this document will be considered: Operators and Roaming Hubbing Providers.

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

- Free of cost for all GSMA members
- Global Access through Infocentre2
- 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

RAEX IR.21 current usage

More than 600 operators are using the system to send their IR.21 information to their Roaming Partners and around 860 organizations in 210 countries are receiving their roaming partner details through the system.

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 <u>Roaming Gateway (RAEX)</u> button on the Member Gateway homepage.
- The following user guides and a section for FAQs can be found on <u>Roaming Gateway</u> (<u>RAEX</u>):
- Roaming features
- Document Handling
- RAEX creator
- <u>Certificate database</u>
- <u>3rd party API integration</u>
- FAQs
- More resources can be found at the bottom of the <u>RAEX homepage</u>.
- 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): <u>CKwok@gsma.com</u>
 - Javier Sendin (GSMA): jsendin@gsma.com
 - Fabrizio Fiorucci (Telecom Italia): fabrizio1.fiorucci@telecomitalia.it
 - Marc Balon (NRG chair): <u>marc.balon@orange.com</u>

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

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

C.3 RAEX IR.21 exchange process

Is supposed to have the exchange process performed by GSMA Infocentre.

The implementation of the data input could be executed in two different ways:

- A Manual by Mobile Network Operator
- B Using Infocentre GUI
- (A). Manual by Mobile Network Operator
 - According to the diagram below, an Operator could populate its own RAEX IR.21 XML file and submit it to the GSMA Infocentre using the procedure described.
 - The Operator that submits the file to the Infocentre is in charge of conformity check and data validation.
 - Conformity checks and validation of the data and the file are operations in charge of the sending Operator. The Infocentre allows the Operator to bring an image file containing the network interconnection diagram.
 - The Infocentre allows the Operator to bring an image file containing the network interconnection diagram.
- (B). Using Infocentre GUI
 - The Infocentre GUI is an evolution of the user interface actually used for populating the Roaming Database. The GUI application is in charge to validate the integrity of the data and produce XML and PDF files. These will be then available for download.

If option A or B is used, once the data upload or data entry is completed, notification/distribution process starts towards the operator lists accordingly.



Figure 1: RAEX IR.21 Exchange Process

C.4 Details of Exchange process in manual or GUI scenarios

The first four steps are applicable in the manual upload of the XML file and network image by a PMN:

- 1. 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.
- 2. Operator A Is also allowed to upload an image containing its network interconnection diagram
- 3. Submit the RAEX IR.21 File and an image to the GSMA Infocentre. The Infocentre will use this data to update the Internal Roaming Database. There will be a special section folder to allow a RAEX format upload.
- 4. An acknowledgement from the Infocentre, communicating the file has been correctly accepted and uploaded. Note: The Infocentre should also verify the integrity of the file and the structure according to the RAEX principles. It is out of scope to verify the correctness of data inserted by operators.
- 5. Operator A may use the Infocentre GUI as an interface for submitting its network data. The Internal Roaming Database is updated as per point 3.
- 6. The Infocentre 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 Infocentre. The notification sent to the receiving parties may contain a number of RAEX IR.21 available.

- 7. 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 Infocentre.
- 8. 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
- 9. 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)
- 10. According to the notification functionality, the party will communicate the right implementation and definition of the data sending back notification acknowledgement via the GSMA Infocentre RAEX IR.21 Application (see 3.3)

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

The Infocentre for backward compatibility always generates PDF versions.

C.5 Notification functionalities

The notification of IR.21 updates is implemented per week (that is on Fridays) and contains a list of updates generates 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 Infocentre 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 Infocentre.
- Reply method on email received could be used. The reply must contain information on acknowledge and implementation as above. The automation on the Infocentre replies the mechanism above for storing and providing back acknowledges.
- The weekly notification contains also the status of acknowledges with Infocentre URL to point for verification and consequently the table with operator list Alert number of acks replied.

C.5.1 Company Logo

Every operator is allowed to upload its company logo on the Infocentre 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 Infocentre via GUI, the company logo can also be loaded in the input page.

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

C.5.2 Access to roaming Database

Infocentre designated IR.21 administrators can access to Roaming Database for information retrieval. The method consists of accessing the relative page on the Infocentre 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.5.3 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.5.4 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 Infocentre.

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.

A version control mechanism is maintained by the Infocentre.

C.5.5 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.21information 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 2: RAEX IR.21 Conditionality legend

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



Figure 3: RAEX 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 IR.21 section name in

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".	M= Mandatory
	- Conditional elements have a condition described in the particular	C= Conditional
	"Description" field of the element.	O= Optional
	- Mandatory elements are a must.	
	- Optional elements may not be present.	
Value Indicator	If available the value indicator contains a list of fix values allowed for the	"Repeating" means the element can be used more times.
	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 by		393359609600
	CC+NDC+SN, max length xx digits		202254444444 202250000000
E.164GT Address	digits		39332111111-393329999999
IMSI	ITU F.212 number composed by		222011234567890
	MCC+MNC+MSIN, length is max 15 digits		
MGT	ITU E.214 number translated from E.212		393391234567890
	and composed by		
	CC+NC+MSIN, length is max xx digits		
ITU DPC	Point code expressed in decimal format: a-	a,c=1digit 0-9	2-046-0
	b-c, length is max xx digits	b=3 digits 0 to 999	
ANSI DPC	Point code expressed in decimal format: a-	a=1digit 0-9	2-046-00
	b-c, length is max xx digits	D=3 digits 0 to 999	
			mpc001 mcc222 apro
	a h c d (IPv4 format)	∧=0-9 2−1-255	222.234.222.2915
II V4 AUUIESS		h = 1-255	
		c=0-255	
		d=1-255	
IPv6 Address	X:X:X:X:X:X:X:X:X	'x's are one to four hexadecimal digits of the	Ref to RFC4291:
		eight 16-bit pieces of the address.	2001:DB8::8:800:200C:417A as unicast address.
			lpv6 is represented as regular expression.
IP Address range	a.b.c.d/x	a=1-255	222.234.222.0/16
		b=0-255	
		c=0-255	
		d=0-255	
		x= CIDR denotation of subnet mask. Values	
		allowed are 1-32	
ASN	XXXXXXXXX	Numeric Max 10 digit = 1- 6553565535	16232
Alpha	Alphanumeric		
Tel Number	(+) Number	(+) Number (fixed or mobile)	+390612345678
WAP GW IP	IP Address :port number		222.234.222.234:8080
address			

Domain Name	Dot Alpha	Example: www.colorado.edu
URL (Uniform	URL	http://wap.google.it; port may be included.
Resource Locator)		Example: http://wap.google.it:3447

History of Changes

Section name: History o	of changes			Conditionality: M,I	र		
Parent	Element Name	Format	Conditiona	lity	Value Indicator	Description	
	Section ID	Numeric	М			ID of the section that has been mod	ified.
	Date of change	Date	М			Represents the date when the chan section	ge has been made to the
	Description	Alphanumeric, max 512 chars	Μ			Brief description of changes made to	o the section

Effective date of change

Section name: Effective date of changes				ID: 0	Conditionality: M,F	3
Parent	Element Name	Format	Conditiona	lity	Value Indicator	Description
	Effective date of change	Date	М			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	М		Identifies the name of the operator	
Organization Information	Country Initials	Text Max 3 chars	М		Country Code abbreviated according to ISO 3166	
Organization Information	Network	N/A	M,R		Element containing all the information related to a network	
Organization Information	TADIG summary	N/A	M,R		List of all the TADIG code	
TADIG summary	TADIG	Alpha, max 5 chars	М		TADIG code associated to MCC/MNC of the netwo	
TADIG summary	MCC/MNC	N/A	М		3 digits for MCC Max 3 digits for MNC	
TADIG summary	VPMN/HPMN	Listed values	м	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	М	Terrestrial, Non-Terrestrial(Aerial), Non-Terrestrial(maritime), MVNO (Full), M2M Dedicated Operator (M2MDO), M2M Integrated Solution (M2MIS), multi MCC-MNC (IMSI), MVNO (Light).		

		Network Sharing (MOCN),	
		Network Extension	

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	М			TADIG code associated to MCC/MNC of the network, act [9]
Network	Network Name	Alpha, max 256 chars	0			Network Name
Network	Supported Technology Frequencies		0			Group element containing supported technology frequent At least one item must have a value different than « none GSM Frequency = GSM 900
SupportedTechnologyF requencies	2G-GSM		М			Group element containing a list of frequencies for GSM. are Mandatory only for the Primary Terrestrial Network
2G-GSM	2G-GSMFrequency	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 supporte bands.

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditionality		Values	Description
2G-GSM	Coverage	Listed values	0		nation-wide, major cities, limited	
SupportedTechnologyF requencies	3G-UTRA/FDD		М			Group element containing a list of frequencies for UTRA/ elements are Mandatory only for the Primary Terrestrial N
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 Upper 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 su frequency bands.
3G-UTRA/FDD	Coverage	Listed values	0		nation-wide, major cities, limited	
SupportedTechnologyF requencies	3G-UTRA/TDD		М			Group element containing a list of frequencies for UTRA/ elements are Mandatory only for the Primary Terrestrial N

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 su frequency bands
3G-UTRA/TDD	Coverage	Listed values	0		nation-wide, major cities, limited	
SupportedTechnologyF requencies	4G-E-UTRA		М			Group element containing a list of frequencies for E-UTR elements are Mandatory only for the Primary Terrestrial N
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 19 - 800 MHz upper 20 - 800 MHz EDD	This is a repeating element containing E-UTRA supported bands. Defined in 3GPP TS 36.101

			ID: 2	Conditionality: M,R	
Element Name	Format	Conditional	lity	Values	Description
				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 - 34 - TDD 1900 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 48 - TDD 3500 50 - TDD 1400 51 - TDD 1400 52 - TDD 3000 53 - TDD 2400 54 - TDD 1900	
				66 - FDD 1700 AWS	
	Element Name	Element Name Format Image: Provide the second se	Element Name Format Conditional Image: Construction of the second se	Element Name Format Conditionality	ID: 2 Conditionality: M,R Element Name Format Conditionality Values 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 APAC 33 - TDD 2000 - 34 - TDD 2000 35 - TDD 1900 36 - TDD 100 36 - TDD 100 36 - TDD 100 36 - TDD 1400 46 - TDD 500 47 - TOD 5500 47 - TOD 5500 48 - TDD 3500 48 - TDD 1400 45 - TDD 1400 45 - TDD 1400 45 - TDD 1400 45 - TDD 1400 46 - TDD 500 47 - TD

Section name: Network				ID: 2	Conditionality: M,R	
Parent	Element Name	Format	Conditiona	lity	Values	Description
					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 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	
4G-E-UTRA	Coverage	Listed values	0		nation-wide, major cities, limited	
SupportedTechnologyF requencies	4G-E-UTRA-MIoT- LTE-M		М			Group element containing a list of frequencies for E-UTR (MIoT) . These elements are Mandatory only for the Prim 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 bands for LTE-M (MIoT).

Section name: Network			ID: 2	Conditionality: M,	R	
Parent	Element Name	Format	Conditiona	lity	Values	Description
4G-E-UTRA- MIoT - LTE-M	Coverage	Listed values	0		nation-wide, major cities, limited	
SupportedTechnologyF requencies	4G-E-UTRA-MIoT - NB-IOT		м			Group element containing a list of frequencies for E-UTR (MIoT) . These elements are Mandatory only for the Prim 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 bands for NB-IOT (MIoT).
4G-E-UTRA- MIoT -NB- IOT	Coverage	Listed values	0		nation-wide, ma cities, limited	ijor
SupportedTechnologyF requencies	4G-MioT-NB-IOT Deployment Mode		M, O			Group element containing the list of NB-IoT specific deple
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 freque deployment options.
4G-MioT-NB-IOT Deployment Mode	Coverage	Listed values	0		nation-wide, major cities, limited	
Supported Technology Frequencies	4G-EN-DC Band Combination List		0			Group element containing a list of supported E-UTRAN New I Connectivity band combinations.
4G-EN-DC Band Combination List	EN-DC Band Combination		M, R			Repeating element containing the name and all frequencies for 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 to combination.

Section name: Network				ID: 2	Conditionality: M	R	
Parent	Element Name	Format	Conditiona	lity	Values	Description	
EN-DC Band Combination Supported	FrequencyList		м			Group element containing a list of frequencies for the custom technology	
FrequencyList	Frequency	Alpha, max 32 chars	M, R			This is a repeating element containing the supported freque	
EN-DC Band Combination	Coverage	Listed values	0		nation-wide, major cities, limited		
SupportedTechnologyF requencies	5G NR		М			Group element containing a list of frequencies for 5G NR . Th 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 n13 FDD 700 n14 FDD 700 n20 FDD 850 n20 FDD 800 n24 FDD 1600 n25 FDD 1900 n26 FDD 850 n28 FDD 700 n29 SDL 700 n30 FDD 2300 n34 TDD 2100 n38 TDD 2600 n39 TDD 1900 n40 TDD 2300	This is a repeating element containing 5G NR supported 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	l	
Parent	Element Name	Format	Conditional	lity	Values	Description	
					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		
					n92 FDD 800		
					n92 FDD 1500		
					n93 FDD 900		
					n93 FDD 1500		

Section name: Network				ID: 2	Conditionality: M,R		
Parent	Element Name	Format	Conditional	lity	Values	Description	
					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	1	
5G NR	Coverage	Listed values	0		nation-wide, major		
					cities, limited		
Section name: Network				ID: 2	Conditionality: M,R		
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Parent	Element Name	Format	Conditiona	lity	Values	Description	
Network	Service Status – Planned Closure and Availability	N/A	M,R			List all supported roaming services in separate table network part with the possibility to define planned as closure date for each service.	⊧s for ∕ailab
Service Status - Planned Closure and Availability (Radio network)	Roaming Services	Listed values	м		2G 3G 4G MIoT-LTE-M MIoT-NB-IOT 5G NR	MIoT-LTE-M: Mobile IoT - Long Term Evolution for MIoT-NB-IOT: Mobile IoT - Narrow Band IoT 5G-NR: 5G New Radio	√lach
Service Status - Planned Closure and Availability (Radio network)	Planned closure date	Date	0				
Service Status - Planned Closure and Availability (Radio network)	Planned availability date	Date	0				
Service Status - Planned Closure and Availability (Core network)	Roaming Services	Listed values	М		CS PS EPC VoIMS 5G SA	CS: Circuit-Switched network CS: Packet-Switched network EPC: Evolved Packet Core network VoIMS: Voice over IP Multimedia Subsystem 5G SA: 5G Standalone	
Service Status - Planned Closure and Availability (Core network)	Planned closure date	Date	0				

Section name: Network			ID: 2	Conditionality: M,R			
Parent	Element Name	Format	Conditiona	lity	Values	Description	
Service Status - Planned Closure and Availability (Core network)	Planned availability date	Date	0				

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

		4	5	20	23	24
	Supported	Routing	International SCCP gateway	LTE	М2М	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	-	-	-	0/0	M / O
MIoT-NB-IOT	Y/N	-	-	-	0/0	M / O
5G NR	Y / N	-	-	-	-	-

Service Status - Planned Closure and Availability (Radio network)

Service Status - Planned Closure and Availability (Core 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	-	-	М/О	-	-
VoIMS	Y/N	-	-	-	M/O	-
5G SA	Y / N	-	-	-	-	M / O

D.3 Network Information

Section name: Network Information					3	Co	onditionality: M
Parent	Element Name	Format	Conditional	ity	Value Indica	ator	Description
Network Information	Routing Information	N/A	М				Not Available for "Data Only" Networks
Network Information	International SCCP GW	N/A	СМ				Mandatory for first network, optional for others
Network Information	Domestic SCCP GW	N/A	ос				

Section name: Netw	Section name: Network Information				: 3	Co	onditionality: M	
Parent	Element Name	Format	Conditional	ity	Value Indica	ator	Description	
Network Information	SSCP Protocol available at PMN for International Roaming	N/A	0					
Network Information	Subscriber Identity Authentication	N/A	СМ				Mandatory for first network, optional for others	
Network Information	Testing Number Information	N/A	0					
Network Information	MAP General Information	N/A	СМ				Mandatory for first network, optional for others	
Network Information	MAP Interoperator SMS Enhancement	N/A	0					
Network Information	Network Elements	N/A	СМ				Mandatory for first network, optional for others	
Network Information	SMSC Address	N/A	м					
Network Information	USSD Information	N/A	ОМ					
Network Information	CAMEL Information	N/A	ос				Section is mandatory, where CAMEL service is supported by the PMN	
Network Information	Packet Data Services Information	N/A	ос					
Network Information	IP Roaming and IP Interworking Data Roaming Information	N/A	ос					
Network Information	MMS ITW Information	N/A	0					

Section name: Network Information				ID	: 3	Co	onditionality: M	
Parent	Element Name	Format	Conditional	ity	Value Indica	ator	Description	
Network Information	WLAN Information	N/A	0					
Network Information	LTE Roaming Information	N/A	0					
Network Information	Contact Information	N/A	СМ				Mandatory for first network, optiona	l for others
Network Information	M2M Roaming Information	N/A	0, R					
Network Information	Roaming HUB Provider Information	N/A	С					
Network Information	VoIMS Roaming Information	N/A	0					
Network Information	LPWA Roaming Info Section	N/A	С				At least one list within the section sl	nall be enabled.
Network Information	5G SA Roaming Information	N/A	0					
Network Information	SMS Roaming Information	N/A	0					

D.4 Routing Information

Section name: Routing Information			ID: 4		Conditi	ionality: M	
Parent	Element Name	Format	Conditionality	у	Values	<u> </u>	Description
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" [TADIG su in Section 1	of table ummary]	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	М				Contains definitions for the node ranges in use in the PMN.
Routing Information	E.212 Number Series	N/A	М				According ITU E.212, IMSI is composed by: 3 digits for MCC / Max 3 digits for MNC
Routing Information	E.214 Mobile Global Title (MGT)	N/A	С				Field is mandatory for HPMN networks, optional for VPMN only networks.
Routing Information	MCC-MNC codes used for MOCN	N/A	O,R				3 digits for MCC / Max 3 digits for MNC
Routing Information	Number Portability	Boolean	М		Yes No		
Routing Information	15 Digit MSISDN support	Boolean	м		Yes No		This information is related to Roaming and Interconnection scenarios and provides information if an MNO supports MSISDN length up to 15 Digits for its own customers and roamers.
Routing Information	Numbering Information	N/A	Μ				
Routing Information	Short number translation information		0				

Section name: Routing Information			ID: 4		Conditi	ionality: M		
Parent	Element Name	Format	Conditionali	ty	Values		Description	
Numbering Information	E.164 Number Ranges due to Number Portability	E.164 GT Address	M,R				E.164 Number Ranges due to Numb included in this section.	er Portability may be
Numbering Information	(U) Sim Header	Numeric 6 digits	0					
Numbering Information	Additional Information	Alpha (max 512 chars)	М				Additional Information about Number be included in this section.	ing and addressing may
CCITT E.164 Number Series	MSISDN(s) number ranges	N/A	C,R				Number ranges in use in the PMN. F HPMN networks, optional for VPMN	ield is mandatory for 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 networ only networks. Definitions for Roaming Number rang calls in the PMN.	<s, for="" hpmn<br="" optional="">ges provided for MT</s,>
MSISDN(s) number ranges	Country Code (CC)		М					
MSISDN(s) number ranges	National Destination Code (NDC)		М					
MSISDN(s) number ranges	SN Range Start	Numeric	0				1 to x digits If CC-NDC range is a single range, empty	this field should remain
MSISDN(s) number ranges	SN Range Stop	Numeric	С				Shall be present if SN Ran Shall have the same number of di SN Range Stop should be greate	ge Start is present gits as SN Range Start r than SN Range Start

Section name: Routing Information			ID: 4	C		ionality: M		
Parent	Element Name	Format	Conditionali	ty	Values		Description	
							Overlapping value with another MN except "MOCN"	IO's IR.21 are not allowed
MSISDN(s) number ranges	International DPC Primary		С				Primary Destination Point Code par Signalling routing configuration. This SCCP routing differentiation is appli number series, by using one of the section "International SCCP GW"	ameters mandatory for s field must be filled if ied to group of E.164 DPC values defined in
MSISDN(s) number ranges	International DPC Secondary		С				Secondary Destination Point Code Signalling routing configuration. This SCCP routing differentiation is appli number series, by using one of the section "International SCCP GW"	parameters mandatory for s field must be filled if ied to group of E.164 DPC values defined in
MSISDN(s) number ranges	Network Owner	Listed Values	М		MNO MVNO MOCN Sponsor Net	twork	Only if selected, the value provides i number range is used for	nformation about what the
Network nodes Global Title number range(s)	Network Owner With GT Leasing	Listed Values	М		MNO MVNO MOCN Sponsor Net GT Leasing	twork	Only if selected, the value provides i number range is used for	nformation about what the
Network nodes Global Title number range(s)	SN Range Start	Numeric	0				1 to x digits If CC-NDC range is a single range empty	, this field should remain
Network nodes Global Title number range(s)	SN Range Stop	Numeric	С				Shall be present if SN Ra Shall have the same number of c SN Range Stop should be greate	nge Start is present ligits as SN Range Start er than SN Range Start

Section name: Routing Information				ID: 4 C		Condit	ionality: M	
Parent	Element Name	Format	Conditionali	ity	Values		Description	
							Overlapping value with another MNC except "MOCN"	's IR.21 are not allowed
Network nodes Global Title number range(s)	International DPC Primary		С				Primary Destination Point Code parar Signalling routing configuration. This SCCP routing differentiation is applied number series, by using one of the D section "International SCCP GW"	neters mandatory for ïeld must be filled if d to group of E.164 PC values defined in
Network nodes Global Title number range(s)	International DPC Secondary		С				Secondary Destination Point Code pa Signalling routing configuration. This SCCP routing differentiation is applied number series, by using one of the D section "International SCCP GW"	rameters mandatory for ïeld must be filled if d to group of E.164 PC values defined in
MSISDN(s) number ranges	Operator ID	3-6 BCD	С				Only used for IR.85 file type.	
Network nodes Global Title number range(s)	Operator ID	3-6 BCD	С				Only used for IR.85 file type.	
Network nodes Global Title number range(s)	Translation Type	0-255	С				Only used for IR.85 file type.	
MSISDN(s) number ranges	Translation Type	0-255	С				Only used for IR.85 file type.	
MSISDN(s) number ranges	Location	Alpha Max 64 Char	0					
Network nodes Global Title number range(s)	GT Leasing details	Alpha Max 64 Char	0				For leased GTs, specify the business and the type of signalling node that is	name of the GT lessee using the leased GT.

Section name: Routing Information				ID: 4		Conditi	ionality: M	
Parent	Element Name	Format	Conditionali	ty	Values		Description	
MSRN Number Range(s)	Country Code (CC)		М					
MSRN Number Range(s)	National Destination Code (NDC)		М					
MSRN Number Range(s)	SN Range Start	Numeric	0				1 to x digits If CC-NDC range is a single range empty	e, this field should remain
MSRN Number Range(s)	SN Range Stop	Numeric	С				Shall be present if SN Ra Shall have the same number of digi	nge Start is present ts as SN Range Start
MSRN Number Range(s)	Location	Alpha Max 64 Char	0					
E.212 Number Series	Mobile Country Code (MCC)		М					
E.212 Number Series	Mobile Network Code (MNC)		М					
E.214 Mobile Global Title (MGT)	Country Code of MGT(CC)		М					
E.214 Mobile Global Title (MGT)	Network Code of MGT (NC)	Numeric	М				Only non negative integer values a	e allowed
MCC-MNC codes used for MOCN	Mobile Country Code (MCC)		М					

Section name: Routing Information					D: 4 Condi		onality: M			
Parent	Element Name	Format	Conditionali	ty	Values		Description			
MCC-MNC codes used for MOCN	Mobile Network Code (MNC)	Numeric	М	м		Only non negative integer values a	e allowed			
E.164 Number Ranges due to Number Portability	Country Code (CC)		М							
E.164 Number Ranges due to Number Portability	National Destination Code (NDC)		М							
E.164 Number Ranges due to Number Portability	SN Range Start	Numeric	0				1 to x digits If CC-NDC range is a single range empty	e, this field should remain		
E.164 Number Ranges due to Number Portability	SN Range Stop	Numeric	С				Shall be present if SN Ra Shall have the same number of dig	nge Start is present ts as SN Range Start		
Short number translation information	Translation information		C, R							
Translation information	Short number	Numeric	М				Short number to be translated by th	e VMSC		
Translation information	Long number	ITU E.164 number	М	M					Long number result of the short nur international call prefix (+, 00, 011	nber translation without)
Translation information	Service name	Alpha	М	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 Co		onality: C			
Parent	Element Name	Format	Conditional	Conditionality Values		Description				
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R "TADIG" of [TADIG sumr in Section 1		"TADIG" of table [TADIG summary] in Section 1		"TADIG" of table [TADIG summary] in Section 1		TADIG code associated to MCC/MNC of the according TD.13 [9] Fill-in that section if the information is also a other networks of your organization or for M	network, applicable with IVNO
International SCCP GW	SCCP Carrier	N/A	M,R							
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	М				The name of the SCCP Carrier			
SCCP Carrier	DPC Info	N/A	M,R							
SCCP Carrier	Connectivity Information	Listed values	М		Primary/Bac	kup	Define the preferred type of connectivity Primary or Backup			
SCCP Carrier	Date of Launch	Date	0							
SCCP Carrier	Date of Closure	Date	0							
DPC Info	Signature	Alpha max 64 letters	М				Name associated to the switching centre			
DPC Info	Туре	Text max 64 chars	0				Type of switching centre: ISC, MSC, Stand-	alone SCCP		
DPC Info	International DPC	Alpha	м				Destination Point Code parameters mandate routing configuration. This value can be use Primary and Secondary DPC information in Information Section. Both ANSI and ITU format shall be supported	ory for Signalling d for defining Routing ∌d		

D.6 Domestic SCCP GW

Section name: Domestic SCCP GW					ID: 6 Co		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R "TADIG" of ta [TADIG summ in Section 1		"TADIG of table [TADIG summary] in Section 1 TADIG code associated to MCC/MNC of the according TD.13 [9]. Fill-in that section if the information is also a other networks of your organization or for N		he network, applicable with MVNO	
Domestic SCCP GW	SCCP Carrier	N/A	M,R					
SCCP Carrier	SCCP Carrier Name	Alpha max 64 chars	М				The name of the SCCP Carrier	
SCCP Carrier	DPC Info	N/A	M,R					
DPC Info	Signature	Alpha max 64 letters	М				Name associated to the switching centre	
DPC Info	Туре	Text max 64 chars	0				Type of switching centre: ISC, MSC, Stand	d-alone SCCP
SCCP Carrier	Date of Launch	Date	М					
SCCP Carrier	Date of Closure	Date	М					
DPC Info	Domestic DPC	Alpha	М				Destination Point Code parameters manda routing configuration Both ANSI and ITU format shall be suppor	atory for Signalling rted
DPC Info	Comments	Text max 64 chars	0				To provide more information about the spe (that is primary, secondary)	ecific DPC used

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

Section name: SCCP Protocol available at PMN				ID: 7 Conditio		Condit	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R "TADIG" of table T [TADIG summary] a 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	М	M Yes/No				
SCCP Protocol available at PMN	List of TADIG codes	N/A	0			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/MN according TD.13 [9]	IC of the network,		

D.8 SUBSCRIBER IDENTITY AUTHENTICATION

Section name: Subscriber Identity Authentication				ID: 8	ID: 8 Conditi		ionality: C	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R "TADIG" of ta [TADIG summ in Section 1		"TADIG" of table TADIG summary] n Section 1		NC of the network,	

Subscriber Identity Authentication	Authentication performed for roaming subscribers at the commencement of GSM Service	Boolean	М	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 at 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 at every occasion of:- a) GPRS attach b) routing area updating involving SGSN change c) PDP context activation d) P-TIMSI 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	С	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 spported. Otherwise write NO. If GPRS is not supported fill in N/A
Subscriber Identity Authentication	A5 Cipher Algorithm version in use	Alpha	М		Version of A5 algorithm in use
Subscriber Identity Authentication	List of TADIG codes	N/A	0		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 Conditio		Conditi	ionality: O	
Parent	Element Name	Format	Conditional	lity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" of [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MN according TD.13 [9]	VC of the network,
Test Numbers Information	Test Number	N/A	M,R					
Test Number	Number Type	Listed values	М		AAC DAAC FAAC VTAAC RTAAC NNAAC NNDAAC NNFAAC NNFAAC NNRTAAC CLIAAC CLIDAAC CLIFAAC CLIVTAAC CLIRTAAC		Possible Number Types for test num AAC – Voice Automatic Answering DAAC – Data Automatic Answering FAAC – Fax Automatic Answering VTAAC – Video Telephony Automa RNAAC – MSRN range Automatic A NN* – For any AAC type if an AAC in Network-Network Interconnection In Type is prefixed with NN (for example AAC) CLI* – For any AAC type if an AAC received CLI information Number Ty (for example CLIAAC for voice AAC SMSIW – test number for SMS Inter MMSIW – test number for MMS Inter Service Centre Address for SMS-M	nbers are: Circuit Circuit Dircuit tic Answering Circuit Answering Circuit is accessible from nterface only Number ole NNAAC for voice in any way presents ype is prefixed with CLI c) rworking testing erworking testing O Testing

Section name: Test Numbers Information				ID: 9 C		Condit	ionality: O	
Parent	Element Name	Format	Conditionali	ity	Values		Description	
					MMSIW SMS-C			
Test Number	Number	E.164	Μ					
Test Number	Location	Text max 32 char	0					
Test Number	Comments	Text max 128 char	0					
Test Numbers Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the se applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according TD.13 [9]	NC of the network,

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 doesn't 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 Inte	ID: 10	(Conditionality: C		
Parent	Element Name	Applicable Sub Elements			cription
MAP Interworking Specifically for Roaming	networkLocUp	Inbound Roaming: MSC/VLR Outbound Roaming			

Section name: MAP Inte	Section name: MAP Interworking Specifically for Roaming			Conditionality: C
Parent	Element Name	Applicable		Description
		Sub Elements		
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		
MAP Interworking Specifically for Roaming	MwdMngt	Inbound Roaming: MSC/VLR Outbound Roaming		
MAP Interworking	shortMsgMT-Relay	Inbound Roaming: MSC/VLR		
Specifically for Roaming	(called shortMsgRelay in v1)	Outbound Roaming		
MAP Interworking	shortMsgMO-Relay	Inbound Roaming: MSC/VLR		
Specifically for Roaming	(called shortMsgRelay in v1)	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		

Section name: MAP Inte	Section name: MAP Interworking Specifically for Roaming			Conditionality: C
Parent	Element Name	Applicable Sub Elements		Description
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		
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		

Section name: MAP Inte	rworking Specifically for Ro	baming		ID: 10		Conditionality: C
Parent	Element Name	Applicable Sub Elements			De	escription
MAP Interworking Specifically for Roaming	locationSvcGateway	Inbound Roami Outbound Roar	ng: MSC/VLR ming			
MAP Interworking Specifically for Roaming	mm-EventReporting	Outbound Roar	ming			
MAP Interworking Specifically for Roaming	AuthenticationFailureRepor	t Inbound Roami Outbound Roar	ng: MSC/VLR ming			
MAP Interworking Specifically for Roaming	ImsiRetrieval	Inbound Roami Inbound Roami Outbound Roar	ng: MSC/VLR ng: SGSN ning			
MAP Interworking Specifically for Roaming	GprsNotifyContext	Inbound Roami Outbound Roar	ng: MSC/VLR ming			
MAP Interworking Specifically for Roaming	gprsLocationInfoRetrieval	Inbound Roami Outbound Roar	ng: SGSN ming			
MAP Interworking Specifically for Roaming	FailureReport	Inbound Roami Outbound Roar	ng: SGSN ming			
MAP Interworking Specifically for Roaming	secureTransportHandling	Inbound Roami Outbound Roar	ng: SGSN ming			
Parent	Element Name	Format	Conditionalit	y Values	De	scription
MAP Interworking Specifically for Roaming	List of TADIG codes	N/A	0		Lis	st of IMSI ranges for which the section ntent is also applicable

Section name: MAP Interworking Specifically for Roaming				ID: 10			Conditionality: C	
Parent	Element Name	Applicable Sub Elements		ſ			scription	
List of TADIG codes	TADIG Code	Alpha, max 5 chars M, R				TAI the	DIG code associated to MCC/MNC of 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-IWMSC 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	cement		ID: 12			Conditionality: O		
Parent	Element Name Applicable Sub Elements			s				Description
Inter-Operator SMS Enhancement	shortMsgGateway		Inbound Roar Outbound Roa	ning: SMS-G aming: HLR	GMSC			
Inter-Operator SMS Enhancement	shortMsgAlert		Inbound Roar Outbound Roa	ning: SMS-I\ aming: HLR	WMSC			
Inter-Operator SMS Enhancement	List of TADIG codes	N/A		0			Lis sec	t of IMSI ranges for which the tion content is also applicable
List of TADIG codes	TADIG Code	Alpha	a, max 5 chars	M, R TA		TA MC TD	DIG code associated to C/MNC of the network, according .13 [9]	

D.12 Network Elements Information

Section name: Network	Elements Information			ID: 13	Condit		ionality: C	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" o [TADIG su in Section 1	f table ummary]	TADIG code associated to MCC/MNC of according TD.13 [9]	f the network,
Network Elements Information	Network Node	N/A	M,R					
Network Node	Node Type	Listed values	М		BTS BSC NodeB RNC E-NodeB CGSN EIR GGSN GMSC HLR MMSC MSC-2G MSC-2G MSC-2G MSC-2G MSC-2G MSC-2G+3C MSC/VLR-2 MSC/VLR-2 MSC/VLR-2 SCP SGSN SGSN-2G SGSN-2G SGSN-2G SGSN-2G+3 SMSC	6 G G+3G 8G	Type of the node (the complete list to be Wifi roaming includes TWAG, ePDG and AAA	e defined)

Section name: Network	Section name: Network Elements Information			ID: 13		Conditi	onality: C	
Parent	Element Name	Format	Conditionali	ty	Values		Description	
					IP-SMGW SSP HSS VLR MME SGW PGW PCRF IN MGW MSS/VLR SoR USSD GW Other LBO-H LBO-H LBO-V SMSC-NP TWAG ePDG			
Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	0				GT address or range of GT address GT Address Range Stop should be Range Start Overlapping value(s) are not allowe The value(s) should also be include	es greater than GT Address d in this element d in section 4.
Network Node	IP Address(es) IPv4	IP Address or IP Address range(s)	0				IP address or range of IP addresses The value(s) should have a subnet i Overlapping value(s) are not allowe The value(s) should be included in S	; nask d in this element Section 17

Section name: Network Elements Information				ID: 13		Conditi	ionality: C	
Parent	Element Name	Format	Conditional	ity	Values		Description	
Network Node	IP Address(es) IPv6	IP Address or IP Address range(s)	0				IP address or range of IP addresses case of SGSN or GGSN node types corresponding nodes The value(s) should have a subnet Overlapping value(s) are not allowe The value(s) should be included in s	(IPv6) are present in and if supported by mask d in this element Section 17
Network Node	Vendor Info	Alpha max 64 chars	0					
Network Node	UTC Time Offset	UTC	М				Time Zone of the area most served offset	by MSC/VLR, in UTC +
Network Elements Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the se applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according TD.13	IC of the network,

D.13 USSD Information

Section name: USSD Information						Conditi	ionality: O	
Parent	Element Name	Format	Conditionality		Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" of table [TADIG summary] in Section 1		TADIG code associated to MCC/MI according TD.13 [9]	NC of the network,
USSD Information	USSD capability available	Boolean	Mandatory		Yes/No		Yes means USSD capability is supp a), section 5.1.2, 3GPP TS 22.090	oorted including all of case 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	0		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.14 CAMEL Information

Section name: CAMEL Informa	ition			ID: 15	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	TADIG code associated network, according TD.13 [S	to MCC/MNC of the 9]
CAMEL Info	gsmSSF/MSC	N/A	М			
gsmSSF/MSC	CAP Version Supported Inbound	Listed values	0	CAPv1 CAPv2 CAPv3	Some operators may restric specific PMNs	t the use of CAMEL on
gsmSSF/MSC	CAP Version Supported Outbound	Listed values	0	CAPv1 CAPv2 CAPv3	Some operators may restric specific PMNs	t the use of CAMEL on

Section name: CAMEL Informa	ation		ID: 15	Conditionality: O	
Parent	Element Name	Format	Conditionality	Values	Description
gsmSSF/MSC	CAP Version Planned	N/A	0		
CAP Version Planned	Planned Version	Listed values	М	CAPv2 CAPv3	
CAP Version Planned	Planned Date	Date	0		
CAMEL Info	CAMEL re-Routing Numbering Information	N/A	0		
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	М		
CAMEL Functionality Information	SK	Numeric	М		
CAMEL Functionality Information	CAMEL Version	Listed values	М	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

Section name: CAMEL Informa	tion	ID: 15	Conditionality: O			
Parent	Element Name	Format	Conditionality	Values	Description	
CAMEL Info	List of TADIG codes	N/A	0		List of IMSI ranges for whic also applicable	h the section content is
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R		TADIG code associated network, according TD.13	to MCC/MNC of the]

D.15 Packet Data Services Information

Section name: Packet Data Services Information				ID: 16 C		Condit	ionality: O	
Parent	Element Name	Format	Conditional	Conditionality			Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MI according TD.13 [9]	NC of the network,
Packet Data Services Information	APN Operator Identifier	APN OpID	M,R				APN Operator Identifier used for GO three labels of the APN Operator Id form: MNC.MCC.GPRS (for GPRS) MNC.MCC.3gppnetwork.org (for LT	SSN resolution. The last entifier must be in the and E)
Packet Data Services Information	List of APN's available for testing and troubleshooting	N/A	0					
List of APN's available for testing and troubleshooting	WEB	N/A	O,R					

Section name: Packet Data Services Information				ID: 16		Conditionality: O		
Parent	Element Name	Format	Conditional	ity	Values		Description	
WEB	APN	Alpha	м				WEB APNs available for testing and	d troubleshooting
WEB	APN Type	Listed Values	M, R		H-APN V-APN		Specifies if the APN is Home Route	ed,VPLMN Routed or both
WEB	Required PDU Session Type	Listed Values	M, R		IPv4 IPv6 IPv4v6 Ethernet Unstructured		Specifies the required PDU session HPMN for the DNN, which is espec Type with V-DNN.	type for 5GC required by ially required for DNN
WEB	Required PDN Type	Listed Values	M, R		IPv4 IPv6 IPv4v6 Non-IP Ethernet		Specifies the required PDN Type fo HPMN for the APN, which is especi Type with V-APN.	or EPC/GPRS required by ally required for APN
WEB	Required PDP Type	Listed Values	M, R		PPP IPv4 IPv6 IPv4v6 Non-IP		Specifies the required PDN Type fo HPMN for the APN, which is especi Type with V-APN.	or GPRS required by ally required for APN
WEB	Username	Alpha	0					
WEB	Password	Alpha	0					
WEB	ISP DNS IP address (primary)	IP Address	0					

Section name: Packet Data Services Information					ID: 16		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
WEB	ISP DNS IP address (secondary)	IP address	0					
List of APN's available for testing and troubleshooting	WAP	N/A	O,R					
WAP	APN	Alpha	М				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	0					
WAP	Password	Alpha	0					
WAP	WAP Gateway IP address	WAP GW IP address	Μ					
WAP	WAP Server URL	URL	Μ					
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 dow	'n list
List of APN's available for testing and troubleshooting	MMS	N/A	O,R					
MMS	APN	Alpha	Μ				MMS APNs available for testing and	d troubleshooting

Section name: Packet Data Services Information				ID: 16		Conditi	onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
MMS	Username	Alpha	0					
MMS	Password	Alpha	0					
MMS	WAP Gateway IP address	WAP GW IP address	Μ					
MMS	WAP Server URL	URL	М					
List of APN's available for testing and troubleshooting	M2M	N/A	O,R					
M2M	APN	Alpha	М				M2M APNs available for testing and	I troubleshooting
M2M	Username	Alpha	0					
M2M	Password	Alpha	0					
M2M	ISP DNS IP address (primary)	IP Address	0					
M2M	ISP DNS IP address (secondary)	IP address	0					
Packet Data Services Information	GTP Version	N/A	М					
GTP Version	SGSN	Listed Values	M,R	И,R			This is a repeating element containi version supported The highest GTP version which ope R97 and R98: ver.0, R99 and after	ng the values of GTP rators support. (e.g.: R99 : ver.1)

Section name: Packet Data Services Information					Condit		ionality: O
Parent	Element Name	Format	Conditional	ity	Values		Description
							It is recommend 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 recommend 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
Packet Data Services Information	Data services supported	N/A	M,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 HSUPA		
Data services supported	Multislot Class Capability	Alpha	0				Maximum Multislot class capability available
Packet Data Services Information	Multiple PDP Context support	N/A	м				Query on Multiple PDP context support
Multiple PDP Context Support	Supported or Not Supported	Boolean	м		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				

Section name: Packet Data Services Information					16 0		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
Packet Data Services Information	IPv6 Connectivity Information	N/A	M,R				Query on IPv6 connectivity support	
IPv6 Connectivity Information	SGSN support	N/A	М					
SGSN support	IPv4v6 PDP Type	Boolean	М		Yes/No		Network declaring "No support for IPv4v6" should suppor modification of inbound roaming UE IPv4v6 request to IPv as specified in GSMA PRD IR.33 section 3.5.1. The subscribed PDP Context Type could be IPv4 only, IPv4 a IPv6 or IPv4v6 as specified in GSMA PRD IR.33 section 3.5.3 Table 3.	
SGSN support	IPv6 PDP Type	Boolean	М		Yes/No			
IPv6 Connectivity Information	GGSN support	N/A	Μ					
GGSN support	IPv4v6 PDP Type	Boolean	Μ		Yes/No			
GGSN support	IPv6 PDP Type	Boolean	Μ		Yes/No			
Packet Data Services Information	VPMN support of Local Breakout		0				Indicates whether MNO as VPMN supports Local Breakou	ıt
VPMN support of Local Breakout	Support Local Breakout as VPMN	Boolean	М		Yes/No			
VPMN support of Local Breakout	Supported PDU Session Type / PDN Type / PDP Type	N/A	м				Indicates the supported PDU Session / PDN Type at SMF PGW as VPMN for Local Breakout	/

Section name: Packet Data Services Information			ID: 16		Conditi	onality: O		
Parent	Element Name	Format	Conditional	ity	Values		Description	
Supported PDU Session Type / PDN Type / PDP Type	IPv4	Boolean	м		Yes/No			
Supported PDU Session Type / PDN Type / PDP Type	IPv6	Boolean	М		Yes/No			
Supported PDU Session Type / PDN Type / PDP Type	IPv4v6	Boolean	м		Yes/No			
Supported PDU Session Type / PDN Type / PDP Type	Ethernet	Boolean	м		Yes/No			
Supported PDU Session Type / PDN Type / PDP Type	Unstructured	Boolean	м		Yes/No			
Supported PDU Session Type / PDN Type / PDP Type	Non-IP	Boolean	М		Yes/No			
Supported PDP Session Type / PDN Type / PDP Type	РРР	Boolean	М		Yes/No			
Packet Data Services 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	Μ				Free text that could be used as a re	ference in AA.14.
List of 2G/3G QOS profiles	Traffic Class	Alpha	M,R		Conversation streaming;	nal;	Types of application for which the F service is optimised. List of traffic class values separated	adio Access Bearer

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Section name: Packet Data Services Information					Condi		ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
					interactive; background			
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	М		Supported ; Supported	Not	Mention if eARP is supported on th	e 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	0		no drop down list 0 to 10Gbps		The Maximum bitrate is the upper I can accept or provide.	imit a user or application
List of 2G/3G QOS profiles	Maximum Bit Rate Downlink	Numeric	0		no drop dow 0 to 10Gbps	n list	The Maximum bitrate is the upper limit a user or application can accept or provide.	
List of 2G/3G QOS profiles	Delivery order	Boolean	0		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	0		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	0				List of possible exact sizes of SDU Not applicable for Interactive and B	s Background traffic classes

Section name: Packet Data Services Information				ID: 16	16		onality: O		
Parent	Element Name	Format	Conditionali	ty	Values		Description		
List of 2G/3G QOS profiles	SDU error ratio	Alpha	0		Drop down li 1*10 ⁻² 7*10 ⁻³ 1*10 ⁻³ 1*10 ⁻⁴ 1*10 ⁻⁵ 1*10 ⁻⁶ 1*10 ⁻¹	ist	Indicates the fraction of SDUs lost of	or detected as erroneous.	
List of 2G/3G QOS profiles	Residual BER	Alpha	0		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 i the delivered SDUs.		
List of 2G/3G QOS profiles	Delivery of erroneous SDUs	Boolean	0		Yes/No		Indicates whether SDUs with detec delivered or not.	ted errors shall be	
List of 2G/3G QOS profiles	Guaranteed bit rate Uplink	Numeric	0		no drop down list 0 to 10Gbps		Describes the bitrate the UMTS bea guarantee to the user or application Not applicable for Interactive and B	arer service shall 1. ackground traffic classes.	
List of 2G/3G QOS profiles	Guaranteed bit rate Downlink	Numeric	0		no drop down list 0 to 10Gbps		Describes the bitrate the UMTS bea guarantee to the user or application Not applicable for Interactive and B	arer service shall 1. ackground traffic classes.	
List of 2G/3G QOS profiles	Traffic handling priority	Alpha	O,R		1 2 3		Specifies the relative importance for belonging to the radio access bears of other bearers.	r handling of all SDUs er compared to the SDUs	
Section name: Packet D	Section name: Packet Data Services Information				ID: 16 Con		onality: O		
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Parent	Element Name	Format	Conditional	Conditionality			Description		
							Optional for Interactive traffic class Not applicable for other traffic classes List of THP values separated by comma		
List of 2G/3G QOS profiles	Support of Speech source	Boolean	0		Yes/No		Not applicable for Interactive and B Optional for other traffic classes	Not applicable for Interactive and Background traffic classes Optional for other traffic classes	
List of 2G/3G QOS profiles	Support of Signalling indication	Boolean	0	Yes/No			Only applicable for Interactive traffic Optional for other traffic classes	c class	
Packet Data Services Information	List of TADIG codes	N/A	0	0			List of IMSI ranges for which the section content is als applicable		
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/M according TD.13 [9]	NC of the network,	

D.16 GRX /IPX Routing for data roaming

Section name: IP-Roami		ID: 17		Condit	ionality: O			
Parent	Element Name	Format	Conditionality		Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" ([TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MN according TD.13 [9]	NC of the network,
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 that connect to the inter-PMN IP bac the "GRX" for example GGSNs, SG MME/SGWs, SEPP/UPFs, AAA Set) of all operator's nodes ckbone network known as SNs, MMSCs, rvers/Proxies, DNS

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17		Conditi	onality: O
Parent	Element Name	Format	Conditional	ity	Values		Description
							Servers etc. This information is used for firewall and Border Gateway configuration (see PRD IR.34). The value(s) should have a subnet mask Overlapping value(s) with another MNO's IR.21 should not be allowed except "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 used for firewall and Border Gateway configuration (see PRD IR.34). The value(s) should have a subnet mask Overlapping value(s) with another MNO's IR.21 should not be allowed except "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	MCC	MCC (3 digits)	0				Multiple values allowed

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17	Conditi		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in 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)	0				Multiple values allowed	
IP-Roaming and IP- Interworking Information	MNO's ASN (Autonomous System Numbers) list for GRX/IPX service	N/A	M,R					
MNO's ASN (Autonomous System Numbers) list for GRX/IPX service	Autonomous System Number(s) (ASN/ASN4B)	Numeric from 0 to 4294967296	M,R				The Autonomous System Number (integer that every PMN must assign seen as one Autonomous System (the exchange of exterior routing info neighbouring Autonomous Systems 4-Byte AS Numbers refers to ASN i 65535.65535. Numeric implementat - ASN 3 Bytes: 0 to 65535 - ASN 4 Bytes: 65536 to 429496725	ASN) is a 16 or 32 bit to their IP network that is AS). The ASN enables ormation between According to RFC4893, n the range 0.0 – tion will result in:

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17		Conditi	ionality: O	
Parent	Element Name	Format	Conditionali	ty	Values		Description	
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 the E.212 field (located at the top of t be sent from any SGSN/SGW in the Y GGSN/PGW in the HPMN, in the Cre Request and Update PDP Context Re If only the MNC/MCC as stated in the the HPMN, this table should be left bl	that is different to he IR.21 form) that can VPMN to the ate PDP Context equest GTP messages. E.212 field is sent to lank.
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	MCC	MCC (3 digits)	0				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	MNC	MNC (2/3 Digits)	0				Multiple values allowed	
IP-Roaming and IP- Interworking Information	List of PMN authoritative DNS	N/A	C,R				IP address(es) and name(s) of DNS s authoritative for the domain names of hostname(s) given in this field should	server(s) that are f a PMN. Note that DNS I match the actual

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17	ID: 17 C		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
	server IP addresses & domain						name(s) configured in the operator D avoid conflict with the NS records in to operator DNS servers). Authoritative a PMN that answer DNS requests/qu caching DNS servers of partner PMN see IR.67. Field shall be mandatory if one of the - TADIG code is defined as HPMN in (section 1) and 2G, 3G or 4G is supp - 5G SA is supported (section 2)".	NS server(s) (this is to he Root DNS and DNS is a DNS server in Jeries from local ls, for further information following apply: TADIG summary orted (section 2)
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 ca Caching DNS server is a DNS server DNS requests/queries to the authorit partner PMN in order to resolve doma local network elements, e.g. MME, S further information see IR.67. If an IP name of the DNS Server is not a Mar Field shall be mandatory if one of the - TADIG code is defined as VPMN in (section 1) and 2G, 3G or 4G is supp - 5G SA is supported (section 2)	iching DNS server. in a PMN that send ative DNS server of the ain names on behalf of GSN, SGW, MMSC. For Address is defined, the indatory Element following apply: TADIG summary orted (section 2)
List of PMN authoritative DNS server IP addresses and domain	IP Address (IPv4)	IPv4 Address	М					

Section name: IP-Roami	ng and IP-Interworking Ir	nformation			Conditi	ionality: O		
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of PMN authoritative DNS server IP addresses and domain	IP Address (IPv6)	IPv6 Address	0					
List of PMN authoritative DNS server IP addresses & domain	Domain	List values	М		mcc{MCC}.mnc{MN C}.gprs epc.mcc{MCC}.mnc {MNC}.3gpp.networ k.org		List values will be generated from N	ICC/MNC in Section 1.
List of PMN authoritative DNS server IP addresses & domain	Priority	Numeric from 1 to 20	0					
List of PMN local caching DNS server IP addresses & domain	IP Address (IPv4)	IPv4 Address	М					
List of PMN local caching DNS server IP addresses & domain	IP Address (IPv6)	IPv6 Address	0					
List of PMN local caching DNS server IP addresses & domain	Name	FQDN	0					
IP-Roaming and IP- Interworking Information	List of PMN ENUM Servers	N/A	O,R					
List of PMN ENUM servers	IPv4 address	IPv4 Address	М					

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17		Conditi	onality: O	
Parent	Element Name	Format	Conditionali	ity	Values		Description	
List of PMN ENUM servers	IPv6 address	IPv6 Address	0					
List of PMN ENUM servers	ENUM Server Name	FQDN	0					
List of PMN ENUM servers	ENUM Type	Alpha	0		Tier 0 Tier 1 Tier 2		Type of ENUM server in the hierarc model	hical GSMA ENUM
IP-Roaming and IP- Interworking Information	IPv4 address that responds to ping/traceroute	IPv4 Address	O,R				Pingable and traceroutable IP addre operator's AS. Maximum size for pir time interval for pinging is 1 hour.	ess of a node within the € is 64 bytes. Minimum
IP-Roaming and IP- Interworking Information	IPv6 address that responds to ping/traceroute	IPv6 Address	O,R				Pingable and traceroutable IP addre operator's AS. Maximum size for pir time interval for pinging is 1 hour.	ess of a node within the s is 64 bytes. Minimum
IP-Roaming and IP- Interworking Information	List of GRX/IPX Providers	N/A	M,R					
List of GRX/IPX Providers	GRX/IPX provider(s)	Alpha max 64 chars	Μ				Name of the GRX/IPX Provider	
List of GRX/IPX Providers	Autonomous System Number(s) (ASN/ ASN4B)	Numeric from 0 to 4294967296	М				The Autonomous System Number (integer that every PMN must assign seen as one Autonomous System (the exchange of exterior routing info neighbouring Autonomous Systems 4-Byte AS Numbers refers to ASN in 65535.65535. Numeric implementat - ASN 3 Bytes: 0 to 65535 - ASN 4 Bytes: 65536 to 429496725	ASN) is a 16- or 32-bit to their IP network that is AS). The ASN enables ormation between According to RFC4893, n the range 0.0 – tion will result in:

Section name: IP-Roami	ing and IP-Interworking Ir	nformation		ID: 17		Condit	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
IP-Roaming and IP- Interworking Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the se applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according to TD.13 [9]	NC of the network,
All IP address ranges used by PMN for connection to Inter PMN IP backbone	IPX VLAN	Listed Values	М		Data-Roamir Control-Roai	ng ming	Different IPX VLAN are defined in If - Data-Roaming for 2G/3G/4G/5G M S8, N9 and DNS), mainly for SGSN Data Roaming (GRX), DNS slave, U - Control-Roaming for 5G N32, main	R.34: Iobile Data Roaming (Gp, s, GGSNs, S-GW, P-GW, JPF nly for SEPP
All IP address ranges used by PMN for connection to Inter PMN IP backbone (IPv6)	IPX VLAN	Listed Values	М		Data-Roamir Control-Roai	ng ming	Different IPX VLAN are defined in If - Data-Roaming for 2G/3G/4G/5G M S8, N9 and DNS), mainly for SGSN Data Roaming (GRX), DNS slave, L - Control-Roaming for 5G N32, main	R.34: Nobile Data Roaming (Gp, s, GGSNs, S-GW, P-GW, JPF hly for SEPP
All IP address ranges used by PMN for connection to Inter PMN IP backbone	Network Owner	Listed Values	М		MNO MVNO Sponsor Net MOCN	twork		
All IP address ranges used by PMN for connection to Inter PMN IP backbone (IPv6)	Network Owner	Listed Values	М		MNO MVNO Sponsor Net MOCN	twork		
Any additional MNC/MCC (that is different to the	Network Owner	Listed Values	М		MNO MVNO Sponsor Net	twork		

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17		Conditi	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
MNC/MCC in the E.212 field) that may be sent in the Routing Area Identity (RAI) in GTP messaging from SGSNs					MOCN			
MNO's ASN (Autonomous System Numbers) list for GRX/IPX service	Network Owner	Listed Values	М		MNO MVNO Sponsor Net MOCN	work		
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	М		MNO MVNO Sponsor Net MOCN	work		
List of PMN authoritative DNS server IP addresses & domain	Network Owner	Listed Values	М		MNO MVNO Sponsor Net MOCN	work		
List of PMN local caching DNS server IP addresses & domain	Network Owner	Listed Values	М		MNO MVNO Sponsor Net MOCN	work		
List of PMN ENUM Servers	Network Owner	Listed Values	М		MNO MVNO Sponsor Net	work		

Section name: IP-Roami	ng and IP-Interworking Ir	nformation		ID: 17		Conditi	ionality: O	
Parent	Element Name	Format	Conditional	Conditionality			Description	
					MOCN			
List of GRX/IPX provider(s)	Network Owner	Listed Values	М		MNO MVNO Sponsor Network			
IP-Roaming and IP- Interworking Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the se applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according TD.13 [9]	VC of the network,

D.17 MMS Interworking Information

Section name: MMS Inte	Section name: MMS Interworking Information					Condit	ionality: O	
Parent	Element Name	Format	Conditionality		Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MI according TD.13 [9]	NC of the network,
MMS Interworking Information	MMSE		M,R					
MMSE	Domain name of MMSC	Domain name	М					
MMSE	IP address range for MMSC	IP Address range	М				IP addresses or IP address range(s the inter-PMN backbone. This infor and Border Gateway configuration	s) of MMSC that give onto mation is used for firewall

Section name: MMS Interworking Information						Conditi	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
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	0					
MMSE	Delivery Report allowed	Boolean	М		Yes/No			
MMSE	Read Report allowed	Boolean	М		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	0					
MMS Interworking Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the sec applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according TD.13 [9]	IC of the network,

D.18 WLAN Information

Section name: WLAN Information					ID: 19 Condi		ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" of [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MI according TD.13 [9]	NC of the network,
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 the RADIUS server/proxy IP addres	form of x.x.x.x/n to which s also belongs".
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 seen by the end user in the web bar brand name can be used to mask th user in web based login pages for e dropdown box into realm known by an operator to change its roaming r to the user experience. If the operator realms they have to be mapped one	Operator WLAN service sed login page. The ne realm from the end xample by utilizing a the network. This enables ealm with reduced impact or has multiple roaming e-to-one to brand names

Section name: WLAN Information					ID: 19		ionality: O	
Parent	Element Name	Format	Conditional	nditionality Values		Description		
WLAN Information	List of TADIG codes	N/A	0				List of IMSI ranges for which the se applicable	ction content is also
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R				TADIG code associated to MCC/MN according TD.13 [9]	NC of the network,

D.19 LTE ROAMING Information

Section name: LTE ROAMING Information		ID: 20	Conditionalit		ty: O		
Parent	Element Name	Format	Conditional ity	Value	S	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R	"TAI [TADI in Sec	DIG" of table G summary] tion 1	TADIG code associated to Mo according TD.13 [9]	CC/MNC of the network,
LTE Roaming Information	IPX Interconnection Information	N/A	М			Mandatory set to allow the filli name(s)	ng of at least the IPX Provide
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	0				
IPX Diameter provider Name	Date of Closure	Date	0				
IPX Diameter Provider Names	IP Address of DiameterAgents	N/A	0, R				
IP Address of the Diameter Edge Agent	Primary	IP Address	M,R			This entry shows Diameter Ag IPX for deployment examples	ent information if outsourced 5 and 6
IP Address of the Diameter Edge Agent	Secondary	IP Address	M,R			This entry shows Diameter Ag IPX for deployment examples	ent information if outsourced 5 and 6
IPX Provider Names	Realms used by IPX DA		0			Realm used for IPX DEA inter	connection
IPX Interconnection Information	Diameter architecture	Listed Value	0	Option Option	15 16	According to PRD IR.88 IPX I	Diameter deployment example
LTE Roaming Information	Roaming Interconnection	N/A	М				
Roaming Interconnection	Diameter	N/A					

Section name: LTE ROAMING Information			ID: 20	ID: 20 Conditionality		ty: O	
Parent	Element Name	Format	Conditional ity	Values	5	Description	
Roaming Interconnection	S6a	N/A				Support of S6a (with or witho LTE roaming.	ut IWF) is a requirement for
Roaming Interconnection	S6d	N/A					
Roaming Interconnection	S9	N/A					
Diameter	EPC Realm(s)/Domain Name(s) used for Roaming purposes	EPC Realm	M,R	One realms	or several	Realm(s) are in epc.mnc <mnc>.mcc<mcc>. 3GPP 23.003 §19.2</mcc></mnc>	the form 3gppnetwork.org as defined
Diameter	FQDN of the Diameter Edge Agent	FQDN	0, R			GSMA PRD IR.88 specifies 6 Diameter Edge Agent : if MNC over IPX network (example 1 fulfilled	deployment examples for DEA are directly reachable to 4), these fields should be
FQDN of the Diameter Edge Agent	Primary IP addresses of DEA FQDN	IP address	М			If SCTP Multi-homing is support addresses should be written	orted, Primary and Secondar
FQDN of the Diameter Edge Agent	Secondary IP addresses of DEA FQDN	IP address	С			If SCTP Multi-homing is support addresses should be written	orted, Primary and Secondar
S6a	Is MAP interface available for connection to HSS (PMN supports MAP-IWF to HSS)?	Boolean	М	Y/N		Specifies if the InterWorking F in the PMN	unction is available
S6a	Is MAP interface available for connection to MME (PMN supports MAP-IWF to MME)?	Boolean	М	Y/N		Specifies if the Interworking F in the PMN	unction is available
S6d	Is S6d used for legacy SGSN?	Boolean	М	Y/N		Specifies if the SGSN support	s the S6d Diameter interface
1470	•					·	

Section name: LTE ROAMING Information		ID: 20	Conditional		ity: O		
Parent	Element Name	Format	Conditional ity	Values	3	Description	
S9	Is S9 used for PCC?	Boolean	М	Y/N		Specifies if Policy Control will S9 interface	be used within
LTE Roaming Information	SMS ITW	N/A	М				
SMS ITW	SMS Delivery Mechanism	N/A					
SMS Delivery Mechanism	SMS over IP	Boolean	0	Y/N		Specifies if SMS over IMS is s	upported in the PMN
SMS Delivery Mechanism	SMS over NAS (SGs)	Boolean	М	Y/N		Specifies if SMS over SGs (S	67) is supported in the PMN
SMS Delivery Mechanism	SMS over NAS (SGd)	Boolean	М	Y/N		Specifies if SMS over SGd (Di PMN	ameter) is supported in the
LTE Roaming Information	Voice ITW	N/A	М				
Voice ITW	IMS	Boolean	0	Y/N		Specifies if VoLTE is supporte	d in the PMN
Voice ITW	CS Fallback	Boolean	0	Y/N		Specifies if CSFB for voice is	supported in the PMN
Voice ITW	Other	Boolean	0	Y/N		Specifies any other way than over the PMN	CSFB and VoLTE to support
LTE Roaming Information	Roaming CS FallBack	N/A	М			Roaming Retry is optional for 23.272 and described in GSM	CSFB, as defined in 3GPP T A PRD IR.88
Roaming CS FallBack	Roaming CS FallBack method?	Listed Value	М	Roami (MTRF	ng Retry R)	Specifies if the Roaming CS F in the PMN Roaming Retry and Roaming	allBack mechanism support

Section name: LTE ROAMING Information			ID: 20	: 20 Condition		ity: O	
Parent	Element Name	Format	Conditional ity	Values	5	Description	
				Roaming Forward (MTRF) Not supported		CallBack are optional, as defir described in GSMA PRD IR.8	ned in 3GPP TS 23.272 and 3
LTE Roaming Information	Home PMN Information For LTE Roaming Agreement Only	N/A	М				
Home PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	М	Y/N		Information for Roaming Outb	ound scenarios
LTE Roaming Information	Visited PMN Information For LTE Roaming Agreement Only	N/A	М				
Visited PMN Information For LTE Roaming Agreement Only	Is LTE only roaming supported?	Boolean	М	Y/N		Information for Roaming Inbou	ind scenarios
LTE Roaming Information	Home PMN Information For 2G/3G Roaming Agreement Only	N/A	М			Scenario 1 is same as legacy Scenario 2 and 3 are describe 4.2.2.1 "2G/3G Roaming Agre	GPRS roaming d in GSMA PRD IR.88 Sectio ement Only"
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 2 supported?	Boolean	М	Y/N		Refers to PRD IR.88 for clarifi Roaming Scenarios	cation on
Home PMN Information For 2G/3G Roaming Agreement Only	Is Scenario 3 supported?	Boolean	М	Y/N		Refers to PRD IR.88 for clarifi Roaming Scenarios	cation on
LTE Roaming Information	Visited PMN Information For 2G/3G Roaming Agreement Only	N/A	М				

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

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

Section name: LTE ROAMING Information			ID: 20	ID: 20 Co		ty: O	
Parent	Element Name	Format	Conditional ity	Values	S	Description	
LTE Roaming Information	Additional MNC/MCC sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages	N/A	С			Details of any MNC/MCC that (located at the top of the IR.21 any MME in the VPMN to the Diameter Update Location Re information request. If only the E.212 field is sent to the HPM blank	is different to the E.212 field form) that can be sent from HSS in the HPMN, in the S6a quest or Authentication MNC/MCC as stated in the N, this table should be left
Additional MNC/MCC sent in the Visited PLMN Id AVP in Diameter ULR or AIR messages	мсс	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 differer mandatory profile for the defait	t QOS profiles with one Ilt QOS.
List of LTE QOS profiles	Profile name	Alpha	М			Free text that could be used a	s a reference in AA.14.
List of LTE QOS profiles	QCI	Listed Value	M,R	1; 2; 3; 9; 65; 6 75; 79;	4; 5; 6; 7; 8; 6; 67; 69; 70; 80;	List of QCI values separated b	y comma
List of LTE QOS profiles	ARP Priority Level	Listed Value	M,R	1; 2; 3; 9; 10; 1 13;14;1	4; 5; 6; 7; 8; 1; 12; 5	List of ARP PL values separat Mandatory for Guarantied Bit applicable for non-GBR ones	ed by comma Rate EPS bearers. Not

Section name: LTE ROAMING Information		ID: 20	20 Conditionalit		ty: O			
Parent	Element Name	Format	Conditional ity	Values	5	Description		
List of LTE QOS profiles	ARP Pre-emption vulnerability	Boolean	M	enabled	d; disabled	ARP P 0-enabled Mandatory for Guarantied applicable for non-GBR ones	/I Bit Rate EPS	valu 1-disabl bearers. N
List of LTE QOS profiles	ARP Pre-emption capability	Boolean	M	enabled	d; disabled	ARP PCI values 0-enabled 1-c Mandatory for Guarantied applicable for non-GBR ones	<mark>lisabled</mark> Bit Rate EPS	bearers. N
List of LTE QOS profiles	Guaranteed Bit rates for uplink	Numeric	0	no drop down list 0 to 10Gbps		o drop down list to 10GbpsMandatory for QCI = 1 to 4 Absent for QCI = 5 to 9 Mandatory for Guarantied Bit Rate EPS I applicable for non-GBR ones		rs. Not
List of LTE QOS profiles	Guaranteed Bit rates for downlink	Numeric	0	no drop down list 0 to 10Gbps		Mandatory for QCI = 1 to 4 Absent for QCI = 5 to 9 Mandatory for Guarantied Bit I applicable for non-GBR ones	Rate EPS beare	rs. Not
List of LTE QOS profiles	Maximum Bit rates for uplink	Numeric	0	no drop 0 to 100) down list Gbps	Mandatory for QCI = 5 to 9 Absent for QCI = 1 to 4 Mandatory for Guarantied Bit I applicable for non-GBR ones	Rate EPS beare	rs. Not
List of LTE QOS profiles	Maximum Bit rates for downlink	Numeric	0	no drop down list 0 to 10Gbps		Mandatory for QCI = 5 to 9 Absent for QCI = 1 to 4 Mandatory for Guarantied Bit I applicable for non-GBR ones	Rate EPS beare	rs. Not
LTE Roaming Information	IPv6 Connectivity Information	N/A	М			Query on IPv6 connectivity su	oport	

Section name: LTE ROAMING Information		ID: 20	Conditionalit		y: O	
Parent	Element Name	Format	Conditional ity	Values	5	Description
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 for mandatory Services for Internet, IMS Signalling, IMS Voice IMS Video
Control of QoS parameters within the VPMN MME/S4-SGSN	Service name	Listed Value	М	Interne Signal Voice, Other;	et; IMS ling, IMS IMS Video;	Only one Value allowed to be chosen. When choose "Other", to fulfill the service name free te box is required
Control of QoS parameters within the VPMN MME/S4-SGSN	Service supported	Boolean	М	Yes/N	0	When choose "No", following all elements are absent
Control of QoS parameters within the VPMN MME/S4-SGSN	Bearer Type	Boolean	0	GBR/N	Non-GBR	Mandatory for Service supported = Yes
Control of QoS parameters within the VPMN MME/S4-SGSN	QCI	N/A	0			Mandatory for Service supported = Yes
QCI	Allowed QCI Value List	Listed Value	0	1; 2; 3 9; 65; 70; 75	; 4; 5; 6; 7; 8; 66; 67; 69; ; 79; 80;	Mandatory for Service supported = Yes
QCI	Remap or not if QCI received from HPMN does not meet requirement	Boolean	0	Yes/N	0	Mandatory for Service supported = Yes
QCI	Remap Value	Free text	0			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	0			Mandatory for Service supported = Yes

Section name: LTE ROA	MING Information		ID: 20		Conditionali	ty: O
Parent	Element Name	Format	Conditional ity	Values	5	Description
ARP	Allowed ARP-PL Value list	Listed Value	0	1; 2; 3 9; 10; 13;14;	; 4; 5; 6; 7; 8; 11; 12; 15	Mandatory for Service supported = Yes List of ARP PL values separated by comma
ARP	Allowed ARP Preemption Vulnerability List	Listed Value	0	enable	ed, 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	0	enable	ed, 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	0	Yes/N	0	Mandatory for Service supported = Yes
ARP	Downgrade Value	Free text	0			Mandatory for Downgrade or not if ARP received from HPI 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	0			Mandatory for Service supported = Yes and Bearer Type = Non-GBR Absent for Bearer Type = GBR
APN AMBR	Allowed Max-Requested-Bandwidth for uplink	Free text	0			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	0			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	0			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	0			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	0			Mandatory for Service supported = Yes and Bearer Type = GBR Absent for Bearer Type = Non-GBR

Section name: LTE ROA	MING Information		ID: 20		Conditionalit	y: O
Parent	Element Name	Format	Conditional ity	Values	;	Description
Control of QoS parameters within the VPMN MME/S4-SGSN	Guaranteed Bit Rate	N/A	0			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	0			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	0			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	0			Used for free comments, limited to 100 characters
IPv6 Connectivity Information	MME support	N/A	М			
MME support	IPv4v6 PDP Type	Boolean	М	Yes/No)	Specifies if the MME supports IPv4v6 connectivity type
MME support	IPv6 PDP Type	Boolean	М	Yes/No)	Specifies if the MME supports IPv6 connectivity type
IPv6 Connectivity Information	SGW support	N/A	М			
SGW support	IPv4v6 PDP Type	Boolean	М	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	М	Yes/No		Specifies if the SGW supports IPv6 connectivity type
IPv6 Connectivity Information	PGW support	N/A	М			
PGW support	IPv4v6 PDP Type	Boolean	М	Yes/No)	Specifies if the PGW supports IPv4v6 connectivity type

Section name: LTE ROA	MING Information		ID: 20		Conditionali	ty: O	
Parent	Element Name	Format	Conditional ity	Values	5	Description	
PGW support	IPv6 PDP Type	Boolean	М	Yes/No	C	Specifies if the PGW supports	IPv6 connectivity type
LTE Roaming Information	Diameter Certificates Exchange	N/A	0				
Diameter Certificates Exchange	IP Address of IPsec GW	N/A	м				
IP Address of IPsec GW	IP address of the first IPsec GW	IP address range	0			If Security Gateway applies, p proper IP Address	lease specify
IP Address of IPsec GW	IP address of the secondIPsec GW	IP address range	0			If Security Gateway applies, p proper IP Address	lease specify
Diameter Certificates Exchange	Certificates	N/A	М			File to be downloaded in PEM from the RAEX IR.21 application	format (typical size: 1 to 4 k on
Certificates	Certificate of first IPsec GW	Boolean	0	Yes/No	0	CER definition, if applicable th be stored into the RAEX Appli	e certificate must cation for distribution
Certificates	Certificate of second IPsec GW	Boolean	0	Yes/No	0	CER definition, if applicable the stored into the RAEX Appli	e certificate must cation for distribution
Certificates	Operator roaming sub-CA certificate	Boolean	0	Yes/No	D	CER definition, if applicable th be stored into the RAEX Appli A certificate signing only the s which is accessible by the roa	e certificate must cation for distribution ub-set of the operator netwo ming partner
LTE roaming Information	List of TADIG codes	N/A	0			List of IMSI ranges for which t applicable	ne section content is also

Section name: LTE ROA	MING Information		ID: 20		Conditionality: O		
Parent	Element Name	Format	Conditional ity	Values	5	Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars	M, R			TADIG code associated to MC according TD.13 [9]	C/MNC of the network,
Diameter End To End Security support	Supported DESS phases	Listed Value	М	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 security (DESS).Only one valu DESS as described in GSMA Only DESS Phase 1 applies a DESS Phase 2 is not specified	e(s) of Diameter End to End le is permitted. PRD FS.19, Annex D and E t this point in time because d yet
Diameter End To End Security support	DESS function delegated to IPX provider	Alphanumeric Max 128 chars	с			Specifies a single designated DESS on behalf of the operato DESS Phases is other than "n function is delegated.	IPX provider that supports or. Shall be present if support ot supported" and DESS
LTE Roaming Information	5G Early Drop support	N/A	М			Specifies if there is support for	5G 3GPP Early Drop
5G Early Drop support	5G NSA supported	N/A	М				
5G NSA supported	As HPMN	Boolean	М	Yes/No	C		
5G NSA supported	As VPMN	Boolean	М	Yes/No	C		
5G Early Drop support	DNS PGW NAPTR includes +nc-nr	N/A	М			New Radio network capability	in NAPTR DNS records
DNS PGW NAPTR includes +nc-nr	As VPMN	Boolean	М	Yes/No	D		
DNS PGW NAPTR includes +nc-nr	As HPMN	Boolean	М	Yes/No	0		
5G Early Drop support (VPMN only)	NSA Option for EN-DC	Listed Value	0	3, 3A,	3X		

Section name: LTE ROAMING Information			ID: 20	ID: 20		ty: O	
Parent	Element Name	Format	Conditional ity	nal Values		Description	
ARD set with feature list AVP#27	As HPMN	Boolean	М	Yes/No	0	Reference to bit 27 of AVP Fe Update Location procedures	ature List ID=2 in Diameter
Restrict access for NR when HSS does not set the feature list AVP#27	As VPMN	Boolean	М	Yes/No	0		

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	Person Name	Alpha, max 64 chars					Contact for escalating roaming faults	as per PRD IR.78
Contact	Tel	Tel number	R				Tel Number could be Fixed or Mobile	
Contact	E-Mail	Email	R				Generic e-mail addresses are recomn roamingsupport@operator.com	nended, e.g.

Section name: Contact	Information			ID: 21	Conditionality: C			
Parent	Element Name	Format	Conditionality	Values		Description		
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R	"TADIG" of table [T	ADIG summary] in Section 1	TADIG code associated to MCC/MNC of the network, according TD.13 [9]		
Contact Information	Contact Type	Listed Values		Roaming Troublesho Roaming Troublesho (for example: www.tid ticketing system plea name@domain.com) routes Roaming Coordinator IREG Tests TADIG Tests CAMEL Tests GPRS Contact Contact person(s) (in Contact person(s) for Contact person(s) for Other contacts	oting Contact Information oting Ticketing System Information cketingsystem.com; To log into the se contact: SCCP inquiries and ordering of SS7 r PMN) for GRX connectivity MN) to verify authority of a GRX fy data in Root DNS IW MMS IW SMS WLAN Certificates and Key management			
Contact Type	Roaming Troubleshooting Contact Information	N/A	М					
Roaming Troubleshooting Contact Information	Troubleshooting Office Information	N/A	M,R					

Section name: Contact Information				ID: 21	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values		Description
Troubleshooting Office Information	Location (City)	Alpha, max 64 chars	М			
Troubleshooting Office Information	Office Time Zone in UTC	UTC	М			
Troubleshooting Office Information	Office Hours	Time range	М			
Roaming Troubleshooting Contact Information	Main Contact for Troubleshooting (Office Hours)	N/A	М			
Main Contact for Troubleshooting (Office Hours)	Team Name	Alpha, max 64 chars	М			
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	М			
Escalation Contact for Troubleshooting	Person Name	Alpha, max 64 chars	М			

Section name: Contact	Section name: Contact Information			ID: 21	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values		Description
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	М			
24 x 7 Troubleshooting Contact (Out of Office Hours)	Team Name	Alpha, max 64 chars	М			
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	М			
Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	Team Name	Alpha, max 64 chars	М			
Escalation Contact for 24 x 7 Troubleshooting (Out of Office Hours)	Tel	Tel number	M,R			Tel Number could be Fixed or Mobile

Section name: Contact Information				ID: 21	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values		Description
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			
Contact Type	TADIG Tests	Contact	M,R			
Contact Type	CAMEL Tests	Contact	<mark>O,R</mark>			
Contact Type	GPRS Contact	Contact	<mark>O,R</mark>			
Contact Type	Contact person(s) (in PMN) for GRX connectivity	Contact	<mark>O,R</mark>			
Contact Type	Contact person (in PMN) to verify authority of a GRX provider to add/modify data in Root DNS	Contact	<mark>O,R</mark>			
Contact Type	Contact person(s) for IW MMS	Contact	O,R			
Contact Type	Contact person(s) for WLAN	Contact	O,R			

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Section name: Contact Information				ID: 21	Conditionality: C	
Parent	Element Name	Format	Conditionality	Values		Description
Contact Type	Contact person(s) for Certificates and Key management	Contact	M,R			
Other Contact	Job Title	Contact	O,R			
Job Title		Text	М			
Contact Information	Contact point (address) for distribution of updating of the roaming database	Alpha, max 256 chars	M,R			
Contact Information	List of TADIG codes	N/A	0			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		Condit				
Parent	Element Name	Format	Conditional	ity	Values	<u>.</u>	Description			
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R	M, R		"TADIG" [TADIG sι in Section		of table mmary]	TADIG code associated to MCC/MNC network, according TD.13 [9]	C of the
Hosted Networks	Network	N/A	М							
Network	Name		М				Name of the Hosted network			
Network	Туре		М		Terrestrial, NonTerrestr	ial				
Network	TADIG Code		М							
Network	Network Node	N/A	M,R							
Network Node	Node Type	Listed values	М	M		۲	Type of node			
Network Node	GT (E.164) Address(es)	E.164 GT Address or E.164 GT Address range	М				GT address or range of GT addresse	es		
Network Node	MSRN Range		C,R				MSRN range Mandatory if network node is of MSC UMSC/VLR type Else not required	C/VLR or		
MSRN	Location		0							
Network Node	IP Address(es)	IP Address or	C, R				IP address or range of IP addresses	i		

Section name: Hosted Networks				ID: 22	Conditi		ionality: O,R	
Parent	Element Name	Format	Conditional	ity	Values		Description	
		IP Address range(s)					Mandatory if network node is SGSN or SGW	
Hosted Networks	List of TADIG codes	N/A	0				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/MN network, according TD.13 [9]	IC of the

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 charsDro	op Down List	M, R	"TADIG" of table [TADIG summary] in Section 1	of TADIG code associated to MCC/MNC of the network, according TD.13 [9]	
M2M Roaming Information	List of Sub-Range IMSI	N/A	0			The M2M Integrated same Network as its In the case of the M MCC/MNC, the M2M send a listing of API in the MCC/MNC that	d Solution uses the host MNO. I2MIS with dedicated IIS is not required to Ns as this is inherent at all M2MIS traffic is
List of Sub-Range IMSI	Subrange IMSI	Numeric max 10 digits	М			M2M The M2MIS may ider by identifying a speci IMSIs of the MNO. T	ntify its M2M traffic ific sub-range of he sub-range of

Section name: M2M Roaming Information				ID: 23	Conditionality: C),R	
Parent	Element Name	Format	Conditionality	Values		Description	
						IMSIs provides trans VPMN of SMS and v addition to data traffi	parency to the oice traffic in c.
List of Sub-Range IMSI	Description	Char max 256	0				
List of Sub-Range IMSI	Example	Char max 256	0				
D.23 Roaming Hub provider

Section name: Roal	ming 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	Μ		Identifies the name of the HUB which issues the IR.85.
Roaming Hub provider	HUB Country	Text Max 3 chars	М		Country Code abbreviated according to ISO 3166
Roaming Hub provider	HUB TADIG code	5 character	Μ		TADIG code according TD13
Roaming Hub provider	Alias TADIG Code	5 character	0		TADIG code according TD13
Roaming Hub provider	Routing method	Listed value	0	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		Condit	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" of [TADIG suited in Section 1	of table mmary]	TADIG code associated to MCC/MN according TD.13 [9]	C of the network,
VoIMS Roaming Information	VoIMS Roaming architectures supported as VPMN	N/A	М					
VoIMS Roaming architectures supported as VPMN	S8HR	Boolean	М		Y/N			

Section name: VoIMS R		ID: 26		Conditi	ionality: O			
Parent	Element Name	Format	Conditional	ity	Values		Description	
VoIMS Roaming architectures supported as VPMN	N9HR	Boolean	М		Y/N			
VoIMS Roaming Information	VoIMS Roaming architectures supported as HPMN	N/A	М					
VoIMS Roaming architectures supported as HPMN	S8HR	Boolean	М		Y/N			
VoIMS Roaming architectures supported as HPMN	N9HR	Boolean	М		Y/N			
VoLTE Roaming Information	Mobility and Voice Continuity	N/A	М					
Mobility and Voice Continuity	SRVCC technology supported as VPMN	Listed value	М		eSRVCC Basic SRVC Not supporte	C ed		
Mobility and Voice Continuity	SRVCC technology supported as HPMN	Listed value	М		eSRVCC Basic SRVC Not supporte	C ed		
VoLTE Roaming Information	S8HR/N9HR Roaming constraints	N/A	C				If S8HR or N9HR supported as VPN	IN or HPMN
S8HR/N9HR Roaming constraints	Emergency calls	N/A	М				Applicable to S8HR and also N9HR	
Emergency calls	VPLMN technology Strategy for EC	Listed value	M,R		VoNR VoLTE CS Fallback		Note: all elements can be selected	
Emergency calls	List of Local Emergency Numbers in use at the VPMN	N/A	0, R				Assumption; same emergency num and NR	bers are defined on LTE
List of Local Emergency Numbers in use at the VPMN	Number	MSISDN	М				Maximum 15 digits	

Section name: VoIMS ROAMING Information				ID: 26		Conditi	ionality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of Local Emergency Numbers in use at the VPMN	Service	Alpha	М				Name of service corresponding to the	ne number
List of Local Emergency Numbers in use at the VPMN	URN Information	URN Service	М				URN information and validity indicat clause 9.9.3.37A of 3GPP TS 24.30	or should follow sub- 1
Emergency calls	MME announce the Emergency number list toward inbound roamer's UE	Boolean	М		Yes No		Applicable to 4G/LTE using S8HR	
Emergency calls	AMF announce the Emergency number list toward inbound roamer's UE	Boolean	М		Yes No		Applicable to 5G/NR using N9HR	
S8HR/N9HR Roaming constraints	Lawful Interception / Data retention	N/A	М					
Lawful Interception / Data retention	Does VPMN require encryption deactivation by HPMN for IMS procedures	Boolean	М		Y/N		In order for HPMN to de-activate cip	hering encryption
S8HR Roaming constraints	EPS QoS to be enforced	N/A	0					
EPS QoS to be enforced	Maximum QoS profile supported for "ims" well known APN	Alpha	М				<eps profile="" qos=""> name descri Roaming Information) and dedicated</eps>	bed in section 20 (LTE d 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 charsDr Down List	^{rop} 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	0		
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	М	Y/N	Support for IP data delivery, using control plane CIoT EPS optimisation with IP PDN types
LTE-M Services supported as HPMN	Data transport via use plane	er Boolean	М	Y/N	Support for IP data delivery, using user plane optimisation with IP PDN types
LTE-M Services supported as HPMN	NIDD support	Boolean	М	Y/N	
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	
LTE-M Services supported as HPMN	Release Assistance Indicator Rel 14	Boolean	0	Y/N	
LTE-M Services supported as HPMN	Power Saving Mode / PSM	Listed Value	М	No Static Dynamic	
LTE-M Services supported as HPMN	Extended Discontinou Reception / eDRX	us Listed Value	М	No Static	

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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
				Dynamic	
LTE-M Services supported as HPMN	SMS	Boolean	М	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	М	Y/N	
LTE-M Services supported as HPMN	IPX GTP Firewall	Boolean	Μ	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	0		
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	М	Y/N	Support for IP data delivery for inbound roamers, using Control Plane CloT EPS optimisation with IP PDN types
LTE-M Services supported as VPMN	Data transport via use plane	er Boolean	М	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	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

Section name: LPWA Information	ROAMING	ID: 27		Conditionality: C, M C = At least one list within the section shall be enabled.	
Parent	Element Name	Format	Conditionality	Values	Description
			C = NIDD Support equals yes		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	0	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	М	No Static Dynmaic	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 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 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	С, М	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

Section name: LPWA Information	ROAMING	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		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.
LTE-M Services supported as VPMN	DRX cycle timer	Alpha	М		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 Discontinuos Reception / eDRX	S Listed Value	М	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 Discontinous Reception / eDRX	eDRX cycle timer minimum value	Alpha	C, M C = Extended Discontinous	5.12 to 10,485.76 seconds	eDRX cycle timer 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
			Reception / eDRX is not equal to No		
Extended Discontinous Reception / eDRX	eDRX cycle timer maximum value	Alpha	C, M C = Extended Discontinous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer max value
Extended Discontinous Reception / eDRX	eDRX PTW minimum value	Alpha	C, O C = Extended Discontinous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW min value
Extended Discontinous Reception / eDRX	eDRX PTW maximum value	Alpha	C, O C = Extended Discontinous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW max value
Extended Discontinous Reception / eDRX	eDRX packet buffering support	Boolean	C, M C = Extended Discontinous 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 Mod / CMM	de Boolean	М	Y/N	

Section name: LPWA ROAMING Information		D: 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	RRC Inactivity timer duration	Alpha	М		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
LTE-M Services supported as VPMN	Coverage Enhancemer Mode A / CE	^{nt} Boolean	Μ	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 Enhancemer Mode B / CE	^{nt} Boolean	Μ	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	М	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	Μ	Y/N	
LTE-M Services supported as VPMN	IPX GTP Firewall	Boolean	M	Y/N	

Section name: LPWA Information	ROAMING	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 loosing 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 suppo	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	0		
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	М	Y/N	Support for IP data delivery, using control plane CIoT EPS optimisation with IP PDN types
NB-IoT Services supported as HPMN	Data transport via user plane	Boolean	М	Y/N	Support for IP data delivery, using user plane optimisation with IP PDN types
NB-IoT Services supported as HPMN	NIDD support	Boolean	М	Y/N	
NIDD support	NIDD via SCEF	Boolean	C, O C = NIDD Support equals yes	Y/N	
NIDD support	NIDD via PgW	Boolean	C, O C = NIDD Support equals yes	Y/N	
NB-IoT Services supported as HPMN	Power Saving Mode / PSM	Listed Value	М	No Static Dynamic	
NB-IoT Services supported as HPMN	Extended Discontinuos Reception / eDRX	⁵ Listed Value	М	No Static Dynamic	

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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	SMS	Boolean	М	Y/N	
SMS	SMS buffering period	Alpha	C, M C = SMS equals Yes		
NB-IoT Services supported as HPMN	IPX GTP Firewall	Boolean	М	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	0		
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	М	Y/N	Support for IP data delivery for inbound roamers, using Control Plane CIoT EPS optimisation with IP PDN types
NB-IoT Services supported as VPMN	Data transport via use plane	er Boolean	М	Y/N	Support for IP data delivery for inbound roamers, using User Plane Optimisation with IP PDN types
NB-IoT Services supported as VPMN	NIDD support	Boolean	М	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).

Section name: LPWA ROAMING Information		ID: 2	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	Release Assistance Indicator Rel 13		Boolean	0	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	0	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	М	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 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	g Mode / 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.

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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
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	М		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.
NB-IoT Services supported as VPMN	Extended Discontinous Reception / eDRX	S Listed Value	М	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 Discontinous Reception / eDRX	eDRX cycle timer minimum value	Alpha	C, M C = Extended Discontinous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer min value
Extended Discontinous Reception / eDRX	eDRX cycle timer maximum value	Alpha	C, M C = Extended Discontinous Reception / eDRX is not equal to No	5.12 to 10,485.76 seconds	eDRX cycle timer max value
Extended Discontinous Reception / eDRX	eDRX PTW minimum value	Alpha	C, O C = Extended Discontinous	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
			Reception / eDRX is not equal to No		
Extended Discontinous Reception / eDRX	eDRX PTW maximum value	Alpha	C, O C = Extended Discontinous Reception / eDRX is not equal to No	2.56 to 40.96 seconds	PTW max value
Extended Discontinous Reception / eDRX	eDRX packet buffering support	g Boolean	C, M C = Extended Discontinous 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	g 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	М		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 Enhanceme support	ent Boolean	М	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
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

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	SMS	Boolean	Μ	Y/N	
SMS	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	Μ	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 loosing 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 suppo	ort 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 Co		Conditi	onality: O	
Parent	Element Name	Format	Conditionality		Values		Description	
List of TADIG codes	TADIG Code	Alpha, max 5 chars Drop Down List	M, R		"TADIG" [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MI according TD.13 [9]	NC of the network,
5G SA Roaming Information	SEPP information	N/A	M, R					
SEPP information	SEPP Model	Listed values	М		Model 1 Model 2		Model 1: direct connection between Model 2: connection via outsourced	PLMN /hosted SEPP

Section name: 5G SA Roaming Information					ID: 28		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
	MCC-MNC List for				Model 3 Model 4		Model 3: connection via service hub Model 4: connection via roaming hub	(only for IR.85)
SEPP information	SEPP		M, R				Model 1: sepp.5gc.mnc.mcc.3gppnet	work.org
SEPP information	Well-known FQDN	FQDN	Μ				sepp.5gc.mnc.mcc. <hostedsepp-id Model 3: sepp.5gc.<servicehub-id>. Model 4: sepp.5gc.<roaminghub-id for IR.85)</roaminghub-id </servicehub-id></hostedsepp-id 	 ipxnetwork.org ipxnetwork.org ipxnetwork.org (only
SEPP information	SEPP FQDN	FQDN	0				SEPP FQDN could be found via a DN using this IR.21 parameter, complian SA models: - Model 1: <sepp-id>.sepp.5gc.mnc.r - Model 2: <sepp-id>sepp.5gc.mnc. <sepp-id>sepp.5gc.mnc.mcc.<host Ipxnetwork.org - Model 3: <sepp-id>sepp.5gc.<ser ID>.ipxnetwork.org - Model 4: <sepp-id>sepp.5gc.<roa ID>.ipxnetwork.org (only for IR.85)</roa </sepp-id></ser </sepp-id></host </sepp-id></sepp-id></sepp-id>	NS NAPTR query or t with one of the four 5G mcc.3gppnetwork.org mcc.3gppnetwork.org or edSEPP-ID>. viceHub- amingHub-
SEPP information	IPX provider	N/A	0				IPX Provider delivering the SEPP in I and Model 4 (only for IR.85)	Model 2/3
MCC-MNC List for SEPP	Mobile Country Code (MCC)		М				3 digits for MCC	

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

Section name: 5G SA Roaming Information			ID: 28 C		Conditi	onality: O		
Parent	Element Name	Format	Conditional	ity	Values		Description	
5G SA Roaming architectures supported as VPMN	N9HR	Boolean	M	М			N9HR support in 5G SA Roaming a	rchitectures as VPMN
5G SA Roaming architectures supported as VPMN	N9LBO	Boolean	Μ		Y/N		N9LBO support in 5G SA Roaming	architectures as VPMN
5G SA Roaming Information	5G SA Roaming architectures supported as HPMN	N/A	Μ					
5G SA Roaming architectures supported as HPMN	N9HR	Boolean	M		Y/N		N9HR support in 5G SA Roaming a	rchitectures 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 QO mandatory profile for the default QC	S profiles with one DS.
List of 5GS QOS profiles	Profile name	Alpha	М				Free text that could be used as a re	ference in AA.14.
List of 5GS QOS profiles	5QI	Listed Value	M,R		1; 2; 3; 4; 5; 9; 65; 66; 67 71; 72; 73; 76; 79; 80; 84; 85; 86; 89; 90	6; 7; 8; ; 69; 70; 74 75; 82; 83; 87; 88;	List of 5QI values separated by con Standardized 5QI values have of standardized combination of 5G specified 3GPP TS 23.501 in Table	nma ne-to-one mapping to a QoS characteristics as 5.7.4-1.

Section name: 5G SA Roaming Information				ID: 28	ID: 28 Cor		onality: O	
Parent	Element Name	Format	Conditional	ity	Values		Description	
List of 5GS QOS profiles	ARP Priority Level	Listed Value	M,R	M,R		6; 7; 8; 1; 12;	List of ARP PL values separated by 1 as the highest priority	comma,
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; dis	abled	List of ARP PCI values are 0-enabled or 1-disabled	
List of 5GS QOS profiles	Guaranteed Bit rates for uplink	Numeric	0		no drop dow 0 to 10Gbps	n list	Mandatory for Guarantied Bit Rate & applicable for non-GBR ones	5GS bearers. Not
List of 5GS QOS profiles	Guaranteed Bit rates for downlink	Numeric	0		no drop dow 0 to 10Gbps	n list	Mandatory for Guarantied Bit Rate s applicable for non-GBR ones	5GS bearers. Not
List of 5GS QOS profiles	Maximum Bit rates for uplink	Numeric	0		no drop down list 0 to 10Gbps		Mandatory for Guarantied Bit Rate s applicable for non-GBR ones	5GS bearers. Not
List of 5GS QOS profiles	Maximum Bit rates for downlink	Numeric	0		no drop down list 0 to 10Gbps		Mandatory for Guarantied Bit Rate s applicable for non-GBR ones	5GS bearers. Not

D.27 SMS ROAMING Information

Section name: SMS Roa	Section name: SMS Roaming Information				ID: 29 C		ionality: M	
Parent	Element Name	Format	Conditional	lity Values			Description	
List of TADIG codes	TADIG Code	Alpha, max 5 charsDrop Down List	M, R		"TADIG" of [TADIG su in Section 1	of table ummary]	TADIG code associated to MCC/MN according TD.13	NC of the network,
SMS Roaming Information	SMS ITW HPLMN	N/A	Μ				Defines the SMS capabilities availa	ble in the HPLMN
SMS ITW HPLMN	SMS Delivery Mechanism	N/A					Defines the SMS delivery mecanisn	n available in the HPLMN
SMS Roaming Information	SMS ITW VPLMN	N/A	М				Defines the SMS capabilities availa	ble in the VPLMN
SMS ITW VPLMN	SMS Delivery Mechanism	N/A					Defines the SMS delivery mecanism	n available in the VPLMN
SMS Delivery Mechanism	SMS over NAS via SS7	Boolean	М	/ Y/N		Specifies if SMS over SS7 is suppo	rted in the PMN	
SMS Delivery Mechanism	SMS over NAS via Diameter	Boolean	М		Y/N		Specifies if SMS over Diameter is s	supported in the PMN
SMS Delivery Mechanism	SMS over NAS via HTTPs	Boolean	М		Y/N		Specifies if SMS over NAS is suppo HTTPs	orted in the PMN via

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 in the Permanent Reference Document (PRD) TD.34

The table below summarizes the timescales for the "RAEX IR.21 Scheduled Releases" according to Section 2.1 of TD.34:

Format	Submission	Approval of	Submission	Approval of	Latest
	of Major	Major	of Minor	Minor	Implem.
	Req's	Changes	Req's	Changes	Date
RAEX	15 October	15 December	15 April	15 June	1 October
IR.21	[Year]	[Year]	[Year+1]	[Year+1]	[Year+1]

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.

For Example:

RAEX IR.21 2010 All SPs must use the most recent version of RAEX IR.21.

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.

The criteria to be used for compliancy to this PRD are as follows:

• The company is RAEX IR.21 compliant to the latest version and is distributing and downloading RAEX IR.21 updates via GSMA RAEX Application

Annex F Certificate Management Support Requirements for RAEX 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
	with CRL and OCSP). If organisations are running a web server, then they can host

Ref.	Description
	the leaf certs on the web server anyway (also allows for more dynamic updates or CRL & OCSP), and RAEX Tools doesn't 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	It SHALL be possible for organisations to add up to 8 certificates in BASE64 encoded PEM format to RAEX Tools.
	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.
APP2	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.
	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.
APP3	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.
	Notes:

Ref.	Description
	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.
APP4	It SHALL be possible to store roll-over certificates.
APP5	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.
	Notes: (<i>The following notes are not RAEX Tools requirements, but are included here for</i> <i>context and as a basis for future work and development of FS.34.</i>) 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) Providing intermediary certificates for download Providing leaf certificates for download (to be used for DESS Phase 1) 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
APP6	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. Notes: There is no need for RAEX Tools to enable organisations to publish different certificates for different partners or sets of partners Organisations that don't 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 organisations (since certificate information is not confidential).
APP7	It SHALL be possible for users to download one or multiple certificates in a single file format (BASE64 encoded PEM). 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

Ref.	Description
	RAEX Tools SHALL broadcast user-instigated notices in relation to certificate status (e.g. new certificates, revoked certificates)
	It SHALL be sufficient to re-use the existing comment and reminder functionality available on RAEX Tools for IR.21 documents (basically emails).
	Users SHALL be able to configure email notification settings (e.g. disable email notifications, request weekly summary emails)
APP8	Users SHALL be able to pull user-instigated notices via an API
	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?
APP9	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.

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.
0500	Access to RAEX Tools SHALL be protected by two-factor authentication following accepted best practices (e.g. Time-based One-time Password (TOTP)
SEC2	Notes:
	This may be provided indirectly using single sign-on (SSO) via the Infocentre ² replacement.
	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.
SEC3	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
- Polices 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 MNO's 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 Public reports

H.1 Description of current report

This section describes the existing public reports which could be used to give an insights of public IR.21 information. Public reports are based on public catalog.

• MSIDN 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 – Organisation Name
TADIG code	Section 4 – TADIG code
СС	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)

• 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 – Organisation Name
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)

• 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 – Organisation Name
TADIG code	Section 4 – TADIG code
сс	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)

• 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 – Organisation Name
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)

• 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 – Organisation Name
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 <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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
IP address / address range	Section 13 – Network Elements Information (limited to IPv4)
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 <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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 (limited to IPv4) per operator and per TADIG code.

IP report	Extracted from
Country <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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
Network Owner	Section 17 – List of All IP address ranges used by PMN for connection to inter-PMN IP backbone (To be added)
Inbound	Roaming route opening (Inbound Roaming agreements)
Outbound	Roaming route opening (Outbound Roaming agreements)

• 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 <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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)

• Contacts

This report lists all contact's 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 – Organisation Name
TADIG code	Section 21 – TADIG code
Туре	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 (new in R17)

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.

TADIC/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 – Organisation Name	Section 1 – Organisation Name	
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	Н	Terrestrial	N/A	Planned
France	OFR	AAZOR	208 01	Н	Terrestrial	N/A	Planned

• Radio frequency report (new in R17)

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 – Organisation Name
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	Technology	Frequency	Coverage	Inbound	Outbound
		code					
France	OFR	FRAF1	GSM	GSM 900	nation-wide	Live	Live
France	OFR	FRAF1	GSM	DCS 1800	nation-wide	Live	Live
France	OFR	FRAF1	UTRAFDD	1 - IMT 2.1 GHz	nation-wide	Live	Live
France	OFR	FRAF1	UTRAFDD	8 - 900 MHz	nation-wide	Live	Live
France	OFR	FRAF1	EUTRA	1 - IMT 2.1 GHz	nation-wide	Live	Live
France	OFR	FRAF1	EUTRA	3 - DCS 1800	nation-wide	Live	Live
France	OFR	FRAF1	EUTRA	1 - IMT 2.1 GHz	nation-wide	Live	Live
France	OFR	FRAF1	EUTRA	3 - DCS 1800	nation-wide	Live	Live
France	OFR	FRAF1	EUTRA_MIoT_LTE_M	20 - 800 MHz EDD	nation-wide	Live	Live
France	OFR	FRAF1	FiveGNR	n78 - TDD 3500	nation-wide	Live	Live

• Radio Service report (new in R17)

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 <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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	Radio	Support	Planned	Planned	Inbound	Outbound
		code	service	(Y/N)	closure date	availability date		
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-	Y		Date 3	Live	Live
			LTE-M					
France	OFR	FRAF1	MIoT-	N			Live	Live
			NB-IOT					
France	OFR	FRAF1	5G NR	Y		Date 4	Live	Live

• Core Service report (new in R17)

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 <mark>name</mark>	Based on Section 1 – Country Initials
Operator	Section 1 – Organisation Name
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	Inbound	Outbound
						date		
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

Annex I 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		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
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 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.		

Version Data		Brief Description of Change	Approval	Editor /
version	Date	Brief Description of Change	Authority	Company
3.9.0	February	SCR 017 IREG Doc 029/03 Rev 1		
	2003	approved at IREG#44. Adding a new		
		section on WLAN information.		
3.9.1	February	NCR 018 IREG Doc 035/03 Rev 1		
	2003	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		
202	August 2002			
3.9.3	August 2003	NCR 20 to TR.21 Re AAC humbers		
3.9.4	August 2003	NCR 21 on the IR.21 Ver.3.9.1 for		
		Clarification of supporting GTP		
205	November	NCD 024 on the ID 24 for correction of		
3.9.5		AC name in MAR		
206	2003 November	NCP 025 on the IP 21 for elevitication		
3.9.0	2003	of supporting latest version of Release		
397	May 2004	NCR 027 to IR 21 v 3 9 6		
398	October	NCR 029 to IR 21 v 3.9.7		
0.0.0	2004	implementaion of compliance to SG 15		
3.9.9	March 2005	Three NCR to IR 21 v.3.9.8		
0.010		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 MIMS Hub		
3011	August 2005	NCP033: Introduction of an undate		
5.5.11	August 2005	interval for SMS-SC addresses		
		MCR034: Record of A5 cipher		
		algorithm in use by each operator		
4.0	November	MCR035: Identification of operator		
	2005	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		
		NUCRU37: New Section for SUCP		
11	March 2007	MCP 038: CDPS Information contian		
4.1		change and addition of fields for data		
		service support		
4.2	April 2007	MCR 039: New section containing		
		MSC and VLR Time Zone information		

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
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 Editiorial changes accordingly Revision of Annex A output		
5.2	July 2008	Editorial change on [Unrestricted]		
5.3	September 2008 March 2009	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 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
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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/Oran ge France Fabrizio Fiorucci/Teleco m 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/Teleco m Italia Anton Golubchy/Kyivs tar Jose Antonio Aranda/GSMA Janet Newman/Cellul ar 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

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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	Signa#62 IREG eVote DAG#953	Fabrizio Fiorucci/Teleco m Italia Laurent Dubusset/Oran ge 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/Telec om Italia Laurent Dubusset/Oran ge FT
9.1	June 2013	CR1001: foot note alignement to PRD IR.88 CR1002: description for LTE Information Section CR1003: addition of USSD Interworking	Signal#67 IREG#64	F.Fiorucci/Telec om Italia L. Dubusset/Oran ge 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/Telec om Italia S. Bhat/GSMA Dave Wittekind/Guya na 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 Chamge 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	IREG#66	F.Fiorucci/Telec om Italia C.Bonnet/Oran ge France K.Stephenson/ H3G UK

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		CR1020: Adding MVNO section for IP Data 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/Oran ge France F.Fiorucci/Telec om 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 Communication s) 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: freqeuncy band name modification	NG#7	K. Leach (Sprint)

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				M. Balon (Orange)
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: Reinsertign 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 mistypo 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	NG#15	H. Ishigawa (NTT DoCoMo) Ewout Pronk (NetNumber, Inc) Marc Balon (Orange) F. Fiorucci (TIM Italy) Wayne Law, GSMA 5G IoT Strategy Group

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
		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 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		Yue Zhao (NTT DOCOMO, Inc. D. Maxwell (GSMA) 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

I.2 Other Information

Туре	Description
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