

The WRC series

GSMA Public Policy Position Paper
World Radiocommunication Conference 2019
Mobile Industry view on Agenda Item 1.13

July 2017

Copyright © 2017 GSMA

Executive Summary



5G will be at the heart of the future of communications from virtual reality and autonomous cars, to the industrial internet and smart cities. At the same time, it will also help guarantee the quality of today's most popular applications.

The success of 5G is dependent on harmonised mobile spectrum across three categories of frequency bands: sub-1 GHz, 1-6 GHz and above 6 GHz. The latter range has the potential to transform the mobile broadband experience with ultra-high speeds and low latencies. The extent of mobile's access to this spectrum will be determined over the next two years.

The World Radiocommunication Conference 2019 (WRC-19) will be vital to realising the vision for 5G. The work at WRC-19, centred around Agenda Item 1.13 (AI 1.13), will look at spectrum for mobile broadband in frequencies between 24.25 and 86 GHz.

This paper outlines the GSMA's key positions on the work carried out in relation to AI 1.13:

1. **A successful identification of spectrum for IMT under Agenda Item 1.13 is vital to realise the full potential of mobile 5G networks.**
2. **At this point in the WRC-19 cycle, the GSMA supports focusing studies on the 26 GHz, 32 GHz and 40 GHz bands. The 26 GHz band has the highest priority.**
3. **Bands above 24 GHz offer a good opportunity for the coexistence of 5G and other wireless services.**
4. **Bands above 45 GHz also need further consideration.**

Background

The previous WRC in 2015 recognised the needs of upcoming evolutions of mobile networks and acted to enable WRC-19 to fulfil those needs. It decided to open the door for possible new bands for mobile broadband between 24.25 and 86 GHz with Agenda Item 1.13 at the next WRC.

To address AI 1.13 at WRC-19, sharing and compatibility studies are required to ensure IMT systems can co-exist with other primary services in the bands under consideration. The specially created Task Group 5/1 is the ITU group responsible for these studies and will conclude its work well ahead of the WRC. It will also develop the initial regulatory proposals for WRC-19 to make additional spectrum available for mobile broadband.

Sharing and compatibility studies need to consider coexistence with services in the same and in adjacent bands where appropriate. Technical and operational parameters are also considered along with deployment scenarios and time frames.

The development of 5G is accelerating worldwide, creating new network architectures with new technologies such as massive MIMO and network slicing. The line-up of potential services is also growing rapidly alongside this expansion of new technology, but a lack of new harmonised spectrum can hamper these advancements.

Regulators and industry stakeholders each have a crucial role to play. Regulatory certainty on what bands will be available creates a platform for the necessary investment to bring innovative, affordable new products and services to consumers.

Frequencies considered under AI 1.13

24.25-27.5 GHz
31.8-33.4 GHz
37-43.5 GHz
45.5-50.2 GHz
50.4-52.6 GHz
66-76 GHz
81-86 GHz



IMT spectrum needs



The ITU has concluded its analysis on IMT spectrum needs for frequencies above 24 GHz. The results are shown in three ranges: 24.25-33.4 GHz, 37-52.6 GHz and 66-86 GHz. Different metrics were applied including traffic-based, application-based and technical performance-based approaches. Information from individual countries is also included, each country having stated its needs based on national considerations.

The results vary depending upon the approach used and the assumed metrics. In broad terms, the highest needs come from the densest urban areas (between 15-20 GHz across the three ranges, depending on the assumptions). A summary of results can be found in the Annex with the full document at **https://www.itu.int/md/R15-TG5.1-C-0036/en**

WRC Positions

1. **A successful identification of spectrum for IMT under Agenda Item 1.13 is vital to realise the full potential of 5G networks.**
   The GSMA has laid out its vision for 5G, including extremely high data speeds and low latencies. The ITU's work is crucial in standardising IMT-2020 and ensuring it delivers instant, high bandwidth connectivity. Spectrum above 24.25 GHz will form an important part of 5G and must be identified to enable this vision.

   The work carried out on AI 1.13 is an important opportunity to make this a reality within the WRC process.

2. **At this point in the WRC-19 cycle, the GSMA supports focusing studies on the 26 GHz, 32 GHz and 40 GHz bands. The 26 GHz band has the highest priority.**
   There are several reasons why the 26 GHz, 32 GHz and 40 GHz bands are the most promising for study.

   The band with the highest priority, 26 GHz (24.25-27.5 GHz), is already seeing traction around the globe for mobile broadband services. It has been acknowledged in Europe as a 'pioneer band' for 5G while China has also voiced support for it.

   There are technical and economic benefits as well. The 26 GHz band is adjacent to the 28 GHz band, allowing a broad tuning range, economies of scale and early equipment availability. The 28 GHz band will be used as the first millimetre-wave 5G band in the US, South Korea and Japan, with implementation done outside of the WRC-19 process and under an existing mobile allocation. Equipment can be implemented with this tuning range supporting both bands, which will allow different countries to flexibly use different portions of the bands. This is further facilitated by a 1 GHz overlap with the Korean implementation, which covers 26.5-29.5 GHz.

   Recognising the need for a significant amount of new spectrum to enable 5G, the GSMA also supports studies at 32 GHz (31.8-33.4 GHz) and 40 GHz, which includes 38 GHz (37-40.5 GHz) and 42 GHz (40.5-43.5 GHz). The 40 GHz band will support common equipment across a wide tuning range, which will allow different regions to flexibly use portions of this band.

3. **Bands above 24 GHz offer a good opportunity for the coexistence of 5G and other wireless services.**
   The smaller coverage area of higher frequencies can lessen interference concerns in mobile networks and increase the opportunity for spectrum sharing. That means 5G may be able to use the same bands with other services. Such services can still operate in different geographical areas, with the help of suitable interference mitigation methods.

   The use of these higher bands could also simplify cross-border interference issues as neighbouring countries can use the same spectrum for different services.

4. **Bands above 45 GHz also need further consideration.**
   Spectrum above 45 GHz is also expected to play an important role in future mobile networks. Depending on the use case considered, a WRC identification to IMT could allow these frequencies to support the future growth of 5G. The GSMA continues to assess the potential uses of these bands.

Annex

Spectrum needs for frequency ranges between 24.25 and 86 GHz

	Examples	Associated conditions for different examples (For details, please see the corresponding sections in the Annex A)	Spectrum needs in total (GHz)	Spectrum needs (GHz) per range
Application-based approach	1	Overcrowded, Dense urban and Urban areas	18.7	3.3 (24.25-33.4 GHz range) 6.1 (37-52.6 GHz range) 9.3 (66-86 GHz range)
		Dense urban and Urban areas	11.4	2.0 (24.25-33.4 GHz range) 3.7 (37-52.6 GHz range) 5.7 (66-86 GHz range)
	2	Highly crowded area	3.7	0.67 (24.25-33.4 GHz range) 1.2 (37-52.6 GHz range) 1.9 (66-86 GHz range)
		Crowded area	1.8	0.33 (24.25-33.4 GHz range) 0.61 (37-52.6 GHz range) 0.93 (66-86 GHz range)
Technical performance-based approach (Type 1)	1	User experienced data rate of 1 Gbit/s with N simultaneously served users/devices at the cell edge, e.g., Indoor	3.33 (N=1), 6.67 (N=2), 13.33 (N=4)	Not available
		User experienced data rate of 100 Mbits/s with N simultaneously served users/devices at the cell-edge, for wide area coverage	0.67 (N=1), 1.32 (N=2), 2.64 (N=4)	Not available
	2	eMBB Dense Urban	0.83-4.17	Not available
		eMBB Indoor Hotspot	3-15	Not available
	3	With a file transfer of 10 Mbits by a single user at cell-edge in 1 msec	33.33 GHz (one direction)	Not available
		With a file transfer of 1 Mbit by a single user at cell-edge in 1 msec	3.33 GHz (one direction)	
		With a file transfer of 0.1 Mbits by a single user at cell-edge in 1 msec	333 MHz (one direction)	
Technical performance-based approach (Type 2)	–	Dense urban micro	14.8-19.7	5.8-7.7 (24.25-43.5 GHz range)
		Indoor hotspot		9-12 (24.25-43.5GHz and 45.5 86 GHz range)
Information from some countries based on their national considerations	–	–	7-16	2-6 (24.25-43.5 GHz range) 5-10 (43.5-86 GHz range)

Source: https://www.itu.int/md/R15-TG5.1-C-0036/en





GSMA HEAD OFFICE
Floor 2
The Walbrook Building
25 Walbrook
London EC4N 8AF
United Kingdom
Tel: +44 (0)20 7356 0600
Fax: +44 (0)20 7356 0601