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GSMA (Hong Kong), Telstra Corporation Limited

**CONSIDERATIONS ON WRC-19 AGENDA ITEM 1.13**

**Introduction**

5G systems will provide higher data rates and greatly enhanced capacity with increased spectral efficiency. To provide this capacity, higher frequency bands will be required for IMT. Agenda Item 1.13 of WRC-19, in accordance with Resolution 238 (WRC-15), seeks to find spectrum above 24 GHz for IMT that will form part of the fabric of 5G services. mmWave frequencies will cater for the highest capacity needs of 5G and will offer new services reliant on their higher throughput.

Resolution **238 (WRC-15)** invites ITU-R to conduct and complete in time for WRC-19 the appropriate sharing and compatibility studies for the frequency bands:

* 24.25-27.5 GHz
* 31.8-33.4 GHz
* 37-40.5 GHz
* 40.5-42.5 GHz
* 42.5-43.5 GHz
* 45.5-47 GHz
* 47-47.2 GHz
* 47.2-50.2 GHz
* 50.4-52.6 GHz
* 66-71 GHz
* 71-76 GHz
* 81-86 GHz

Studies for WRC-19 agenda item 1.13 estimated the spectrum needs for the terrestrial component of IMT in the frequency range between 24.25 GHz and 86 GHz, in accordance with Resolution **238 (WRC-15)** and [CA/226](http://www.itu.int/md/R00-CA-CIR-0226/en).

The GSMA supports the identification of the following bands for IMT:

* + **24.25-27.5 GHz (26 GHz range)**
	+ **37-43.5 GHz (40 GHz range)**
	+ **66-71 GHz**

Due to the large amount of spectrum needed for 5G services, further consideration is still required for all the other frequency bands, except for the 32 GHz band.

The work of the relevant study group – TG 5/1 – has now been completed and certain issues are worthy of note. The ITU-R has carried out sharing and compatibility studies between IMT and other services allocated in the bands being considered. These have shown that extra conditions are necessary for certain services. However, the studies have shown that for others there is already sufficient protection margin between the level of emissions expected from an IMT network and the level that could potentially cause interference. In these cases, no extra conditions are necessary.

In the 26 GHz range, a lot of work has focused on the co-existence with passive services in the band 23.6-24 GHz. While it is important to protect passive services, it should be done with the right limit. Otherwise, an overly onerous limit will severely restrict the use of IMT in the 26 GHz band. The GSMA’s study on OOBE limits for base stations supports the values **-**32 to -35 dB(W/200 MHz). This falls within the range supported by other regional groups ASMG and ATU, as well as preliminarily by CITEL.

* **-32 to -37dB(W/200 MHz) for BS;**
* **-28 to -30dB(W/200 MHz) for UE.**

With regard to the 40 GHz band, a globally harmonised range at 37-43.5 GHz is also important as the wider tuning range will allow for the greatest possible economies of scale and bring the widest benefits of harmonisation to consumers.

The Draft CPM Report for Agenda Item 1.13 is now a complex compendium of every possible condition. It is possible, through the current text, to identify a band for IMT on paper, but effectively render it unusable on the ground. There is a risk at WRC-19 that, unless only the optimal technical conditions are applied, the IMT use of the bands will be severely limited. In this document the co-sourcing organisation outlines the optimal conditions to ensure protection of other services where required but still supporting IMT.

**2. Overview by Frequency Band**

**A. 26 GHz**

The GSMA suggests APT Members to support a new IMT footnote for the 26 GHz range such as:

***5.A113b*** *The frequency band 24.25-27.5 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolutions* ***[A113-IMT 26 GHZ] (WRC-19)*** *and* ***750 (Rev.WRC-19)*** *apply.     (WRC‑19)*

The GSMA believes the following methods for the band 24.25-27.5 GHz are the most appropriate:

* Method A2, Alternative 2: identification to terrestrial component of IMT in 24.25-27.5 GHz (in the mobile service), including allocation of the band 24.25-25.25 GHz to the mobile service (except aeronautical mobile) on a primary basis in Regions 1 and 2.
	+ Condition A2a: Option 1 – Resolution 750 (Rev. WRC-19) in Table 1-1. Resolution 750 (Rev. WRC-15) Table 1-1 to be updated within the following ranges:
		- IMT-2020 BS: -32 to -37 dB(W/200 MHz)
		- IMT-2020 UE: -28 to -30 dB(W/200 MHz)

For all other conditions, no action is necessary due to results of sharing and compatibility studies. In detail, the following is applied:

* + Condition A2b: Option 3 – no condition necessary
	+ Condition A2c: Option 4 - no condition necessary
	+ Condition A2d: Option 4 - no condition necessary
	+ Condition A2e: Option 9 - no condition necessary
	+ Condition A2f: Option 3 - no condition necessary
	+ Condition A2g: Option 4 - no condition necessary

**B. 40 GHz (37-43.5 GHz)**

While there are three sub-segments to the 40 GHz range, this should be treated in its entirety as a wider tuning range in order to support global harmonisation. A single footnote covering the frequency range 37-43.5 GHz should thus be supported.

The GSMA suggests APT Members to support creation of a new IMT footnote for the 40 GHz range along the following lines:

***5.B113X****The frequency band 37-43.5 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution****[B113-IMT 40/50 GHZ] (WRC-19)****applies.    (WRC‑19)*

 **2.1 37-40.5 GHz**

Suggested methods:

* Method C2, Alternative 2: identification to terrestrial component of IMT in 37-40.5 GHz (in the mobile service)

For the conditions associated with this band, no action is necessary due to results of sharing and compatibility studies.

In detail, the following is applied:

* + Condition C2a: Option 4 – no condition necessary
	+ Condition C2b: Option 6 – no condition necessary
	+ Condition C2c: Option 3 - no condition necessary
	+ Condition C2d: Option 2 - no condition necessary
	+ Condition C2e: Option 3 - no condition necessary

Although there is an EESS (passive) allocation in the adjacent band 36-37 GHz, it should be noted that it is not a passive band and not listed in Footnote **5.340**. It is a shared band between passive and active services, therefore Resolution **750 (Rev.WRC-15)** would not be applicable. Footnote **5.550A** and Resolution **752 (WRC-07)** both apply in this case, as demonstrated by the results of the sharing studies.

 **2.2 40.5-42.5 GHz**

The GSMA suggests APT Members to support:

* Method D2, Alternative 2: identification to terrestrial component of IMT in 40.5-42.5 GHz (in the mobile service), including upgrade of the existing secondary allocation to the MS in the frequency band 40.5-42.5 GHz to a primary allocation.

For the conditions associated with this band, no action is necessary due to results of sharing and compatibility studies.

In detail, the following is applied:

* + Condition D2a: Option 5 – no condition necessary
	+ Condition D2b: Option 3 – no condition necessary
	+ Condition D2c: Option 3 - no condition necessary

 **2.3 42.5-43.5 GHz**

The GSMA suggests APT Members to support:

* Method E2, Alternative 2: identification to terrestrial component of IMT in 42.5-43.5 GHz (in the mobile service)

For the conditions associated with this band, no action is necessary due to results of sharing and compatibility studies.

In detail, the following is applied:

* + Condition E2a: Option 7 – no condition necessary
	+ Condition E2b: Option 3 – no condition necessary
	+ Condition E2c: Option 4 - no condition necessary

**C. 50 GHz range**

 **3.1 45.5-47 GHz**

Suggested methods:

* Method F2, Alternative 2: identification to terrestrial component of IMT in 45.5-47 GHz (in the mobile service)

While no studies were done for this band, it is noted that the allocations in this band are same as in the band 66-71 GHz and the results for this should be applicable for the sharing studies with ISS and MSS.

In detail, the following is applied:

* + Condition F2a: TBD
	+ Condition F2b: Option 3 – no condition necessary

 **3.2 47.2-50.2 GHz**

Suggested methods:

* Method H2, Alternative 2: identification to terrestrial component of IMT in 47.2-50.2 GHz (in the mobile service)
	+ Condition H2a: Option 2 – Resolution 750 (Rev. WRC-19) in Table 1-1, taking into account RR No. 5.340.1.

For the other conditions associated with this band, no action is necessary due to results of sharing and compatibility studies.

In addition, the following is applied:

* + Condition H2b: Option 8 – no condition necessary
	+ Condition H2c: Option 3 – no condition necessary
	+ Condition H2d: Option 4 – no condition necessary

 **3.4 50.4-52.6 GHz**

The GSMA suggests APT Members to support:

* Method I2, Alternative 2: identification to terrestrial component of IMT in 50.4-52.6 GHz (in the mobile service)
	+ Condition I2a: Option 2 Resolution 750 (Rev. WRC-19) in Table 1-1, taking into account RR No. 5.340.1.

For the other conditions associated with this band, no action is necessary due to results of sharing and compatibility studies.

In addition, the following is applied:

* + Condition I2a: Option 3 – no condition necessary
	+ Condition I2b: Option 7 – no condition necessary
	+ Condition I2c: Option 4 – no condition necessary

**D. 66-71 GHz**

The GSMA suggests APT Members to support a new IMT footnote for the 66-71 GHz range along the following lines:

***5.J113b*** *The frequency band 66-71 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. [Resolution* ***[C113-IMT 66/71 GHZ] (WRC-19)*** *applies.]     (WRC‑19)*

The following methods for the band 66-71 GHz should be adopted:

* Method J2, Alternative 2: identification to terrestrial component of IMT in 66-71 GHz (in the mobile service)

For the conditions associated with this band the following is applied:

* + Condition J2a: Option 1
		- to take into account the latest technical characteristics of IMT and MGWS/WAS and
		- to invite ITU-R to develop Recommendations and Reports that will assist administrations in ensuring that applications and services in the band 66-71 GHz can utilize the band efficiently including the development of appropriate sharing protocols between IMT and MGWS/WAS where needed
	+ Condition J2b: Option 1 – Revise RR No. **5.553** to remove the 66-71 GHz frequency band from that footnote

Condition J2c: Option 3 – no condition necessary

**3. Summary**

With work at TG 5/1 now concluded, it is important for APT Members to review the results of the studies and the Draft CPM Report in order to identify the best way to satisfy Agenda Item 1.13: additional bands for IMT-2020 above 24 GHz.

The co-sourcing organization and companies to this contribution believes that APT members support for the most adequate methods and subsequent conditions will be vital at CPM and WRC and will lead to the successful roll-out of high capacity 5G in the APT region.

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