

*Preliminary GSC positions
on WRC-19 agenda items 1.13 IMT*

Goal: To preserve access to satellite spectrum for existing and future systems

- **Genesis:** Resolution 238 (WRC-15)
- **Issue:** to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis.

Background: 33.25 GHz of additional spectrum has been identified at WRC-15 as candidate bands for further studies for 5G/IMT.

- This is sufficient spectrum from which to find 'more' spectrum for IMT/mobile/5G
- Important to consider ONLY these bands which were identified as candidate bands on the basis of global consensus at WRC-2015
- Harmonisation of spectrum is key to the development of both satellite and terrestrial wireless telecommunications



GLOBAL SATELLITE COALITION

GSC General Position

AI 1.13 Additional spectrum for IMT

- There is a need for access to sufficient spectrum for connectivity for terrestrial and satellite broadband services.
- Respect WRC-15 decision, by remaining within candidate bands specified in Resolution 238.
- There is a need for continued, sustainable and viable access for broadband FSS services for current and future earth station utilization of the 24.25--27.5 GHz bands, and in both directions in appropriate parts of 40/50 GHz, without undue geographical or technical constraints.
 - FSS needs access to sufficient core broadband spectrum for *ubiquitous* user terminals – this cannot be shared with IMT.
 - FSS also needs access to broadband spectrum for *individually licensed* earth stations. This can be shared but there must be reasonable measures to ensure also future deployment of the FSS services.
- There is a real potential for interference from IMT transmitters in the mm wave bands into satellite receivers. Need to adopt measures for protection of the FSS from IMT operations in bands that are identified for IMT by WRC-19.
- IMT identification *should* be harmonized on a global (*for example*, 26 GHz, 66 GHz) or ITU-R Region basis (*for example* 40 GHz), *as appropriate*, and only bands expected to be used for IMT should be identified. This will give the technical and regulatory certainty required for investment and deployment of global broadband satellites systems.
- Support identification for IMT in the bands as discussed below.



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AI 1.13 Additional spectrum for IMT

GSC Position: Band 24.25-27.5 GHz (band A)

- An identification for IMT in the band 24.25-27.5 GHz is possible with appropriate regulatory measures to protection and enable sustainable, viable access for FSS and other space service operations.

CPM text: Method A2 (either Alternative 1 or 2) for IMT identification with the following conditions (and ITU-R Resolution [A113-IMT 26 GHz] (WRC-19)).

Measures for FSS and ISS space stations in the band 24.25-27.5 GHz

- To limit the aggregate IMT interference into FSS space receivers through the introduction in the RR of a limit on the Total Radiated Power (TRP) for IMT base station of 37 dBm/200 MHz¹. Furthermore, with the conditions that the main beam of IMT base stations should not point above the horizon². Such limit on IMT base stations would not put any undue constraints on IMT deployment (12dB higher than maximum level from WP5D).

CPM text: Condition A2e Option 3 with 37 dBm/200 MHz. Also Condition A2g Option 3 or 4 (Monitoring of IMT characteristics including deployment) is supported.

Measures for transmitting FSS earth stations

- The band is to be used for individually licensed FSS Earth stations at known locations (for example gateways), therefore appropriate zones around FSS Earth stations where IMT base stations could potentially receive interference can be determined, and co-existence be ensured.
- Need to adopt provisions to enable deployment of future FSS earth stations.

CPM text: Condition A2d Option 1.

¹ Some regional groups and countries propose a condition on maximum power of IMT base stations, in accordance with studies and to respect RR21.5.

² CEPT, RCC and CITEL (see latest IAP) propose a condition on elevation of IMT base stations; APG and ASMG are still considering it.



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AI 1.13 Additional spectrum for IMT

GSC Position: Band 37 – 43.5 GHz (bands C, D and E)

- Current HDFSS identifications as per table below should be preserved.
- Need for connectivity for both terrestrial and satellite: FSS needs access to sufficient and sustainable spectrum for deployment of ubiquitous user terminals, notably in the bands identified for HDFSS (i.e. High-Density FSS, as per footnote RR5.516B), These, and other bands where ubiquitous user terminals will be deployed, cannot be shared with IMT.
- Provisions should be adopted to enable the deployment of future FSS earth stations (both user terminals and individually licensed earth stations).

	37-39.5 GHz	39.5-40	40-40.5	40.5-42 GHz	42-43.5 GHz
Region 1		HDFSS			
Region 2			HDFSS		
Region 3			HDFSS		

- For example CEPT has prioritized the band 40.5-43.5 GHz for IMT whereas several CITELE countries have prioritized the band 37-40 GHz for IMT. Some R2 administrations (Mexico, Canada) propose to avoid IMT in HDFSS bands, USA proposes to prioritize 40-42 GHz for satellite use including HDFSS.
- Bands should not be identified for IMT in a Region where it is not foreseen, or where it is known to not be feasible, to deploy IMT in practice.

AI 1.13 Additional spectrum for IMT

GSC Position: Band 37 – 43.5 GHz (bands C, D and E) (con't)

- IMT identification in the range as per the table below would provide 3 GHz of spectrum for IMT in all ITU Regions and would allow common IMT equipment to be used, provided the RF equipment can tune across the whole 37-43.5 GHz range.

	37-39.5 GHz	39.5-40	40-40.5	40.5-43.5 GHz
Region 1	No change			IMT
Region 2	IMT		No change	
Region 3	No change			IMT

- **Region 1:** IMT identification in 40.5-43.5 GHz on the basis of sharing with individually licensed FSS earth stations, that preserves current HDFSS identification in 39.5-40.5 GHz.
- **Region 2:** IMT identification in 37-40 GHz on the basis of sharing with individually licensed FSS earth stations, and which preserves current HDFSS identifications in 40-42 GHz and provides protections for user terminal use.
- **Region 3:** IMT identification in 40.5-43.5 GHz on the basis of sharing with individually licensed FSS earth stations, that preserves current HDFSS identifications in 40-40.5 GHz, harmonized with Region 1.



GLOBAL SATELLITE COALITION

AI 1.13 Additional spectrum for IMT

GSC Position: Band 37 – 40.5 GHz (band C)

IMT identification in 37-40 GHz in ITU-R Region 2

- An identification for IMT in the band 37-40 GHz is possible in ITU-R Region 2 with appropriate regulatory measures to protection and enable sustainable, viable access for the FSS.

CPM text: Method C2 (either Alternative 1 or 2), for IMT identification limited to the band 37-40 GHz in Region 2, and with the conditions below (in ITU-R Resolution [B113-IMT 40/50 GHZ] (WRC-19)).

Note that to allow for FSS user terminals in the range 37 – 43.5 GHz, the GSC position in Region 2 for the band 40 - 40.5 GHz and in Regions 1 and 3 for the band 37- 40.5 GHz is NOC (Method C1).

Measures for receiving FSS earth stations in the band 37-40 GHz in ITU-R Region 2

- The band is to be used for individually licensed FSS Earth stations at known locations (for example gateways), therefore appropriate zones around FSS Earth stations where these stations could potentially receive interference can be determined, and co-existence be ensured.
- Need to adopt provisions to enable deployment of future FSS earth stations.

CPM text: Condition C2b Option 1.



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AI 1.13 Additional spectrum for IMT

GSC Position: Band 40.5 – 42.5 GHz (band D)

IMT identification in 40.5-42.5 GHz in ITU-R Regions 1 and 3

- An identification for IMT in the band 40.5-42.5 GHz is possible in ITU-R Regions 1 and 3 with appropriate regulatory measures to protection and enable sustainable, viable access for the FSS.

CPM text: Method D2 (either Alternative 1 or 2), for IMT identification limited to the band 40.5-42.5 GHz in R1 and R3, and with the conditions below (in ITU-R Resolution [B113-IMT 40/50 GHZ] (WRC-19)).

Note that to allow for FSS user terminals in the range 37 – 43.5 GHz, the GSC position in Region 2 for the band 40.5 - 42.5 GHz is NOC (Method D1)

Measures for receiving FSS earth stations in the band 40.5 - 42.5 GHz in ITU-R Regions 1 and 3

- The band is to be used for individually licensed FSS Earth stations at known locations (for example gateways), therefore appropriate zones around FSS Earth stations where these stations could potentially receive interference can be determined, and co-existence be ensured.
- Need to adopt provisions to enable deployment of future FSS earth stations.

CPM text: Condition D2a Option 1.



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GSC Position: Band 42.5 – 43.5 GHz (band E)

AI 1.13 Additional spectrum for IMT

IMT identification in 42.5-43.5 GHz in Regions 1 and 3

- An identification for IMT in the band 42.5-43.5 GHz is possible in ITU-R Region 1 and 3 with appropriate regulatory measures to protection and enable sustainable, viable access for the FSS.

CPM text: Method E2 (either Alternative 1 or 2) for IMT identification limited to the band 42.5-43.5 GHz in R1 and R3, and with the conditions below (in ITU-R Resolution [B113-IMT 40/50 GHz] (WRC-19)).

Note that to allow for FSS user terminals in the range 37 – 43.5 GHz, the GSC position in Region 2 for the band 42.5 - 43.5 GHz is NOC (Method E1)

Measures for FSS space stations in the band 42.5 - 43.5 GHz in ITU-R Regions 1 and 3

- To limit the aggregate IMT interference into FSS space receivers through the introduction in the RR of a limit on the Total Radiated Power (TRP) for IMT base station of 40 dBm/200 MHz. Furthermore, the main beam of IMT base stations should not point above the horizon. Such limit on IMT base stations would not put any undue constraints on IMT deployment (15dB higher than maximum level from WP5D).

CPM text: Condition E2a Option 2 with 40 dBm/200 MHz. Also Condition E2c Option 3 or 4 (Monitoring of IMT characteristics including deployment) is supported.

Measures for transmitting FSS earth stations in the band 42.5 - 43.5 GHz in ITU-R Regions 1 and 3

- The band is to be used for individually licensed FSS Earth stations at known locations (for example. gateways), therefore appropriate zones around FSS Earth stations where IMT base stations could potentially receive interference can be determined, and co-existence be ensured.
- Need to adopt provisions to enable deployment of future FSS earth stations.
- *E2d Option 1*

GSC Position: Bands 47.2-50.2 GHz (band H) and 50.4-52.6 GHz (band I)

Already large amounts of spectrum are supported for IMT identification in the bands 24.25-27.5 GHz globally, 40.5-43.5 GHz in R1 and R3 and 37-40 GHz in R2, and 66-71 GHz globally. There is limited interest for IMT at 50 GHz, IMT and HDFSS (5.516B) are not compatible, hence no change to the RR in the bands 47.2 –50.2 GHz and 50.4-52.6 GHz is recommended.

The U.S. has designated the 48.2-50.2 GHz band for satellite use, including HDFSS.

If however IMT identifications in the band 47.2 –50.2 GHz and 50.4-52.6 are considered appropriate by WRC-19, protection measures similar to the ones in the band 42.5-43.5 GHz should be adopted, for both gateways and user terminals, as appropriate.

GSC Position: Bands 66-71 GHz (band J), 71-76 GHz (band K), and 81-86 GHz (band L)

- IMT identification through Method J2 (either alternative 1 or 2) with the conditions of ITU-R Resolution [C113-IMT 66/71GHZ] (WRC-19), Methods K2 and L2 (either alternative 1 or 2) with the conditions of ITU-R Resolution [E113-IMT 70/80GHZ] (WRC-19).

GSC Position: Recommendations and Conclusions

- Focus should be on IMT identification in the bands:
 - 24.25-27.5 GHz (Globally)
 - 37-40 GHz in ITU Region 2, 40.5-43.5 GHz in ITU Regions 1 and 3.
 - 66-71 GHz (Globally)

with appropriate regulatory measures for the protection of satellite services in a Resolution referenced in the footnotes.

- No bands outside those in Resolution 238 (WRC-15) should be considered

Summary of Methods and Options (CPM text) supported by GSC for AI1.13

Band	IMT-2020	Draft CPM Text
24.25-27.5 GHz (Band A)	Yes	Method A2 (Alternative 1 or 2), subject to: <ul style="list-style-type: none"> Condition A2d Option 1 Condition A2e Option 3 (with 37 dBm/200 MHz) Condition A2g Option 3 or 4 Draft ITU-R Resolution [A113-IMT 26 GHZ] (WRC-19)
31.8-33.4 GHz (Band B)	No	Method B1 (No Change)
37.0-40.5 GHz (Band C)	Yes in Region 2 except in 40-40.5 GHz No in Regions 1 and 3	<ul style="list-style-type: none"> In Region 1: Method C1 (NOC). In Region 2, Method C2, Conditions C2b Option 1 for the band 37-40 GHz and C1 (NOC) for the band 40-40.5 GHz. In Region 3: Method C1 (NOC). Draft ITU-R Resolution [B113-IMT 40/50GHZ]
40.5-42.5 GHz (Band D)	Yes in Regions 1 and 3 No in Region 2	<ul style="list-style-type: none"> In Region 1: Method D2, Conditions D2a Option 1. In Region 2: Method D1 (NOC), In Region 3: Method D2, Conditions D2a Option 1. Draft ITU-R Resolution [B113-IMT 40/50GHZ]
42.5-43.5 GHz (Band E)	Yes in Regions 1 and 3 No in Region 2	<ul style="list-style-type: none"> In Region 1: Method E2, with conditions below: In Region 2: Method E1 (NOC), In Region 3: Method E2, with conditions below: <ul style="list-style-type: none"> Condition E2a Option 2 (with 40 dBm/200 MHz) Condition E2c Option 3 or 4 Condition E2d Option 1 Draft ITU-R Resolution [B113-IMT 40/50GHZ]
45.5-47.2 GHz (Bands F and G)	No	Method F1 and G1 (No Change)
47.2-50.2 GHz (Band H)	No	Method H1 (No Change)
50.4-52.6 GHz (Band I)	No	Method I1 (No Change)
66-71 GHz (Band J)	Yes	Method J2 (either alternative 1 or 2) with the conditions of draft ITU-R Resolution [C113-IMT 66/71GHZ-J2] (WRC-19)
71-76 GHz (Band K)	Yes	Method K2 (either alternative 1 or 2) with the conditions of draft ITU-R Resolution [E113-IMT 70/80GHZ] (WRC-19)
81-86 GHz (Band L)	Yes	Method L2 (either alternative 1 or 2) with the conditions of draft ITU-R Resolution [E113-IMT 70/80GHZ] (WRC-19)