

8 August 2019

The Chairman

Malaysian Communications and Multimedia Commission (MCMC)

MCMC Tower 1
Jalan Impact, Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
Malaysia
Tel: +60 3 8688 8000
Fax: +60 3 8688 1000

Subject: Public Consultation on Proposed Malaysia's Positions for World Radiocommunication Conference 2019 (WRC-19) Agenda Items

We refer to MCMC's consultation on proposed Malaysia's positions for WRC-19 Agenda Items (Consultation).

Inmarsat is pleased to provide MCMC with our response to the Consultation in an annexure to this letter, in the template specified by MCMC. This response pertains to a number of WRC-19 agenda items relevant to Inmarsat.

I remain available to provide you with further information or clarification on this submission if required.

Sincerely,

A handwritten signature in blue ink, appearing to be "ZM", written over a light blue horizontal line.

Zeina Mokaddem

Director, Regulatory and Market Access

Annex 1: Inmarsat Response to the Consultation in MCMC's Template

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
Working Party 1: Land Mobile and Fixed Services		
1.	1.11	<p>Agenda Item 1.11: to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations, in accordance with Resolution 236 (WRC-15);</p> <p>Inmarsat is of the view that harmonization of frequency bands for RSTT use can be achieved through applicable ITU-R Recommendations and/or Reports. Therefore, no changes to the Radio Regulations are necessary and WRC-19 does not need to take specific action to harmonize spectrum for RSTT. Inmarsat does not support regional or global harmonization of RSTT frequency ranges in MSS or FSS bands that would impact satellite operation.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
2.	1.12	<p>Agenda Item 1.12: to consider possible global or regional harmonized frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems (ITS) under existing mobile-service allocations, in accordance with Resolution 237 (WRC-15);</p> <p>Inmarsat is of the view that harmonization of frequency bands for ITS use can be achieved through applicable ITU-R Recommendations and/or Reports. Therefore, no changes to the Radio Regulations are necessary and WRC-19 does not need to take specific action to harmonize spectrum for ITS. Inmarsat does not support regional or global harmonization of ITS frequency ranges in MSS or FSS bands that would impact satellite operation.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
3.	1.14	<p>Agenda Item 1.14: to consider, on the basis of ITU-R studies in accordance with Resolution 160 (WRC-15), appropriate regulatory actions for high-altitude platform stations (HAPS), within existing fixed-service allocations;</p>

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>The CPM Report contains three Methods: Method A (no change), Method B (which includes various options to identify new allocations for HAPS or to upgrade existing allocations to worldwide use), and Method C (suppression of existing HAPS designation). The candidate frequency bands identified within Resolution 160 (WRC-15) are:</p> <ul style="list-style-type: none"> - 6 440-6 520 MHz and 6 560-6 640 MHz; - 21.4-22 GHz (Region 2 only); - 24.25-27.5 GHz (Region 2 only); - 27.9-28.2 GHz and 31-31.3 GHz; - 38-39.5 GHz; - 47.2-47.5 GHz and 47.9-48.2 GHz. <p>Inmarsat does not support new regulations for HAPS that could constrain FSS in the following existing HAPS bands:</p> <ul style="list-style-type: none"> • 6 440-6 520 MHz and 6 560-6 640 MHz • 27.9-28.2 GHz • 47.2-47.5 GHz and 47.9-48.2 GHz <p>Additionally, Inmarsat does not support new regulations for HAPS that could constrain FSS in the potential new band of: 38-39.5 GHz.</p> <p>In general, most of the identified candidate bands for HAPS will operate reverse band¹ operation to FSS links. For such cases, Inmarsat considers the pfd levels – identified within the CPM report for HAPS platform transmissions – sufficient to protect FSS satellite receivers. However, sufficient physical separation would be necessary to ensure the protection of any FSS earth station receivers from potential interference from HAPS ground/gateway transmissions, or to avoid interference from FSS earth stations into HAPS ground/gateway transmissions. Studies in the CPM report indicate the separation distance is up to around 60 km for the 27.9-28.2 GHz band, and up to around 15 km for the 38-39.5 GHz band. Inmarsat has concerns on how such large physical separations may be ensured by HAPs ground transmissions to FSS earth station receivers, particularly in the case of high density use of FSS earth stations such as in VSAT applications. Furthermore, coexistence issues will be more difficult relative to operation of HAPS gateway stations, if there are also to HAPS consumer premises equipment (CPE) transmissions planned in the candidate HAPS bands, since their numbers will be significantly larger and they will be deployed more ubiquitously.</p>

¹ Reverse band working is the operation of HAPS-to-ground/gateway communication links with FSS Earth-to-space communication links, and the operation of ground/gateway-to-HAPS communication links with FSS space-to-Earth communication links.

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>On the various proposed Methods contained with the CPM report:</p> <ul style="list-style-type: none"> for the <u>6 GHz</u> candidate frequency bands, it is in doubt whether HAP systems could be developed and operated effectively to comply with the low limits that have been identified to protect FSS satellite receivers. Inmarsat therefore supports the suppression of HAPS identification at 6 440- 6 520 MHz (Option C of CPM report) or, failing this, for HAPS to be limited to reverse band operation with FSS links (operating HAPS-to-ground links only) as provided in Method 1B1 for the 6 440-6 520 MHz frequency range. <p>Note no proposals are identified in the CPM report to operate ground-to-HAPS links (which would be co-directional with FSS Earth-to-space links) in the frequency band 6 560-6 640 MHz. The Methods identified within the CPM text for the 6 560-6 640 MHz is either non-change (Method A) or suppression of the allocation (Method C). Inmarsat supports either of the methods for the 6 560-6 640 MHz band, with preference for Method C;</p> <ul style="list-style-type: none"> for the <u>27.9-28.2 GHz</u> and <u>31-31.3 GHz</u> candidate frequency bands, Inmarsat recognises there are inevitable pressures to allocate these bands for HAPS use on a world-wide basis. Inmarsat does not operate services in the 31-31.3 GHz band and therefore sees no impact. However, we note the 27.9-28.2 GHz band is proposed for ESIM operation under WRC-19 Agenda Item 1.5, and Inmarsat has concerns there may be national restrictions placed by administrations in the licensing of FSS earth stations to protect HAPS gateway receivers and HAPS CPE receivers. Inmarsat operates FSS gateway earth stations in this band today and has firm plans to also use this band for user terminals (including ESIM) in the future. Inmarsat, therefore, supports the adoption of Method 6B1, Option 2, which includes regulatory provisions that HAPS shall not cause harmful interference to, nor claim protection from existing services; For the <u>38-39.5 GHz</u> candidate frequency band, Inmarsat accepts reverse band sharing between ground/gateway-to-HAPS links and FSS space-to-Earth operation provided that FSS gateway operation is protected. However, Inmarsat has significant concerns and does not support the identification of this band for HAPS-to-ground/gateway transmissions that will be co-directional with FSS (space-to-Earth) transmissions, as there will be significant potential for interference

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>from HAPS platform transmissions to FSS earth station receivers.</p> <p>For the co-directional sharing case, it is noted HAPS supporters are advocating that the protection of FSS systems inside a country are national considerations and that HAPS use will be able to protect existing and planned earth-station gateway sites within a country by avoiding HAPS platform transmissions in that direction. However, given the 38 GHz band is a key expansion band for FSS links, Inmarsat considers co-directional use by HAPS with FSS is not feasible in practice due to the planned large coverage area of HAPS platforms within a country (potentially covering the entire country), which will likely result in interference and constraints on FSS earth station use within a country.</p> <p>In the event that WRC-19 authorises HAPS-to-ground links in the 38-39.5 GHz band (i.e., Method B2 Option 1a or 1c, or variant of these Methods), Inmarsat would wish to see regulatory provisions included within an associated Resolution that specify hard limits for the protection of the FSS in neighbouring countries and not just coordination triggers for FSS systems, as is currently proposed. Here, explicit agreement would be necessary to exceed pfd limits in neighbouring countries, aligning with the regulatory provisions proposed for the protection of fixed and mobile service use in neighbouring countries. Inmarsat also supports regulatory provisions be introduced to limit the density of HAPS ground terminals that are operated (e.g., through minimum gain requirements for HAPS antenna at 38 GHz) in order to limit the potential for interference to FSS VSAT networks from the operation of large numbers of HAPS transmissions at unspecified locations. Inmarsat would also support inclusion within the Resolution of pfd limits necessary to protect FSS gateway earth-station use within a country. These limits would provide guidance to administrations on the protection requirements of FSS systems that are licensed within a country.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
4.	1.15	
Working Party 2: Broadband Applications in the Mobile Service		
5.	1.13	Agenda Item 1.13: to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238 (WRC-15);</p> <p>The following bands are within the scope of this agenda item:</p> <ul style="list-style-type: none"> • 24.25-27.5 GHz • 31.8-33.4 GHz • 37-40.5 GHz (FSS DL) • 40.5-42.5 GHz (FSS DL) • 42.5-43.5 GHz (FSS UL) • 45.5-47 GHz (MSS UL and DL) • 47-47.2 GHz • 47.2-50.2 GHz (FSS UL) • 50.4-52.6 GHz, FSS UL (50.4-51.4 only) • 66-76 GHz • 81-86 GHz <p>Inmarsat has no objection to the identification of the bands 24.25-27.5 GHz and 66-71 GHz for IMT. International developments indicate that these bands are likely to be identified at WRC-19. Inmarsat also has no objection to the identification of the 31.8-33.4 GHz band, however there seems to be little international interest to identify this band.</p> <p>Inmarsat has firm plans to use the Q/V FSS bands (37.5-51.4 GHz) on future satellites, with four satellites currently on order that will use these bands, so any consideration of IMT identification in these bands should ensure protection of satellite services as well as the possibility to deploy future gateways and user terminals.</p> <p>Inmarsat respectfully discourages MCMC from any consideration of possible identification of the 28 GHz band (27.5-30 GHz) for IMT. This band was expressly excluded from the scope of Agenda Item 1.13 and at the same time recognised as a critical band for existing FSS services and their future applications such as ESIM, which aim to improve broadband connectivity everywhere, on land, at sea and in the air. Given the difficulties in sharing spectrum by IMT systems with incumbent services at 28 GHz and the need to ensure globally harmonized spectrum available for FSS for broadband applications, Inmarsat notes a number of regional groups (e.g. CEPT and ASMG) have already explicitly excluded this band from any consideration for IMT identification.</p> <p>Bands 37.5-40.5 GHz, 40.5-42.5 GHz and 42.5-43.5 GHz:</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions																								
		<p>In these bands, Inmarsat could agree to a soft band segmentation, whereby IMT would be identified on a non-exclusive basis in portions of these bands on a regional basis, and with the possibility for the FSS to operate gateways links in the future in the IMT band segments. The bands identified for IMT should not include bands already identified for HDFSS.</p> <p>Due to decisions already taken by certain regions and countries, Inmarsat supports the following IMT identifications on a regional basis:</p> <ul style="list-style-type: none"> • Region 1: IMT identification in 40.5-43.5 GHz on the basis of sharing with FSS gateways that preserves current HDFSS identification in the band 39.5-40.5 GHz, as well as an additional portion of downlink spectrum at 37.5-39.5 GHz that is not shared with IMT. • Region 2: IMT identification in 37-40 GHz, which preserves the current HDFSS identifications in 40-42 GHz and an additional portion of FSS use that is not shared with IMT. • Region 3: IMT identification that preserves current HDFSS identifications in 40-40.5 GHz, as well as an additional portion of downlink spectrum at 37.5- 40 GHz for FSS use that is not shared with IMT. The IMT band should be harmonised with Region 1 to reduce the fragmentation of the band for other services including the FSS. <p>The proposed allocations are illustrated on the figure below. The grey granulated cells indicate regional HDFSS allocations.</p> <table border="1" data-bbox="496 1384 1331 1552"> <thead> <tr> <th></th> <th>37-39.5</th> <th>39.5-40</th> <th>40-40.5</th> <th>40.5-42</th> <th>42-43.5</th> </tr> </thead> <tbody> <tr> <td>Region 1</td> <td>NOC</td> <td>NOC</td> <td></td> <td>IMT</td> <td></td> </tr> <tr> <td>Region 2</td> <td>IMT</td> <td></td> <td>NOC</td> <td></td> <td>NOC</td> </tr> <tr> <td>Region 3</td> <td>NOC</td> <td></td> <td>NOC</td> <td>IMT</td> <td></td> </tr> </tbody> </table> <p>This segmentation approach is supported in several regional groups. The CEPT and ASMG have already prioritised the band 40.5-43.5 GHz for IMT, whereas several CITELE countries have prioritised the band 37-40 GHz for IMT. It is desirable that bands identified for IMT are feasible for its use in many countries and conversely that bands that are not suitable in the majority of countries are not identified for IMT to ensure a harmonised and efficient use of spectrum for both IMT and other services.</p> <p>The above identification would provide 3 GHz of spectrum for IMT in all ITU Regions and would allow common IMT equipment to be used, considering the RF equipment will be able to tune across the whole 37-43.5 GHz range.</p>		37-39.5	39.5-40	40-40.5	40.5-42	42-43.5	Region 1	NOC	NOC		IMT		Region 2	IMT		NOC		NOC	Region 3	NOC		NOC	IMT	
	37-39.5	39.5-40	40-40.5	40.5-42	42-43.5																					
Region 1	NOC	NOC		IMT																						
Region 2	IMT		NOC		NOC																					
Region 3	NOC		NOC	IMT																						

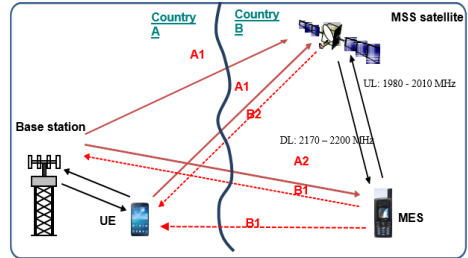
No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>In the 37.5-42.5 GHz band, Inmarsat also supports developing ITU-R Recommendations to assist administration in ensuring protection of existing and future FSS earth stations and inviting administrations to apply these Recommendations when introducing IMT in the band.</p> <p>In the band 42.5-43.5 GHz there is a risk of interference into FSS satellites. In order to provide FSS with a known and stable interference environment to operate and develop services in, a limit on the Total Radiated Power (TRP) of IMT base stations of 44 dBm/200MHz is proposed to be introduced into the Radio Regulations together with the requirement to restrict the operation of IMT base-station antenna at elevation angles higher than 0 degrees relative to the horizon, as per the assumptions used for studies in TG5/1. This TRP limit also provides extra flexibility to IMT operations, as the level is 16 dB higher than the operational TRP level identified by WP 5D.</p> <p>A footnote should also be included in the Radio Regulations to invite administrations to ensure a balance is reached in the allocation of services in the frequency bands 37.5-42.5 GHz (downlink), 42.5-43.5 GHz (uplink), 47.2-50.2 GHz (uplink) and 50.4-51.4 GHz (uplink), between spectrum available to FSS, including spectrum for ubiquitous earth stations deployment (e.g. the HDFSS) and gateway earth stations use, and that identified for IMT.</p> <p>Regarding the CPM Report, Inmarsat supports the following methods:</p> <p>In the band 37-40.5 GHz:</p> <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). <p>In the band 40.5-42.5 GHz:</p> <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. <p>In the band 42.5-43.5 GHz:</p> <ul style="list-style-type: none"> - In Region 1: Method E2, Condition E2a Option 2, Condition E2c Option 3 or 4, Condition E2d Option 1. - In Region 2, Method E1 (NOC). - In Region 3: Method E2, Condition E2a Option 2, Condition E2c Option 3 or 4, Condition E2d Option 1. <p>47.2-50.2 GHz and 50.4-52.6 GHz: Inmarsat supports no change to the RR in the bands 47.2-50.2 GHz and 50.4-52.6 GHz as sufficiently large amounts of spectrum are supported for IMT</p>

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>identification in the bands 24.25-27.5 GHz, 37-43.5 GHz and 66-71 GHz and it is noted there is limited interest for IMT development at 50 GHz.</p> <p>Regarding the proposed Malaysia position, Inmarsat courteously suggests that Malaysia oppose IMT identification in Region 3 for the bands 37-40.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz. These bands have allocations to the FSS, BSS or MSS and these bands should be available free of the restrictions that would be necessary for sharing with IMT systems, so that adequate spectrum is available for planned satellite systems in Malaysia and elsewhere.</p>
6.	1.16	<p>Agenda Item 1.16: to consider issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service, in accordance with Resolution 239 (WRC-15);</p> <p>The bands under study for RLANs include FSS uplink allocations, but these bands are not used or planned to be used by Inmarsat. Inmarsat is therefore neutral on this agenda item.</p>
7.	9.1 (Issue 9.1.1)	<p>Agenda Item 9.1.1: Resolution 212 (Rev.WRC-15) - Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz</p> <p>This agenda item considers the coexistence and compatibility of the terrestrial and satellite components of IMT in the frequency bands 1980-2010 MHz and 2170-2200 MHz. Inmarsat has an operational system deployed (“Europasat”) which includes a complementary ground component.</p> <p>In the CPM Report on this agenda item, there are two views: “View 1” proposes the adoption of regulatory measures to ensure coexistence of the satellite and terrestrial components of IMT, while “View 2”, despite all ITU-R studies showing the potential for very high levels of interference in scenario A1 (see below), proposes “No Change” to the RR, based on an approach of bi-lateral coordination between administrations.</p> <p>There are four interference scenarios as shown below:</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
------	-------------	---

Interference scenarios

Scenario	From	To
A1	Terrestrial IMT base station or mobile station	Satellite IMT space station
A2	Terrestrial IMT base station	Satellite IMT MES
B1	Satellite IMT MES	Terrestrial IMT base station or UE
B2	Satellite IMT space station	Terrestrial IMT UE



1. Scenario A1:

- The most significant and problematic interference is from Scenario A1. Under this deployment scenario, there is a significant potential for harmful interference from the terrestrial component of IMT to space stations in the satellite component of IMT. Interference is not just theoretical - cases of harmful interference to MSS satellites currently operating in the band 1980-2010 MHz have already been reported to the ITU by Inmarsat and other satellite operators. Those cases are currently not resolved, reflecting the practical difficulties to identify the source and location(s) of interference received at satellite receivers, and to subsequently resolve interference generated from transmission in other administrations.
- ITU-R studies show that interference levels from transmitting IMT user equipment (**UEs**) into MSS space station receivers in the band 1980-2010 MHz are generally benign. However, interference levels from transmitting IMT base stations into space stations in that band could lead to significant levels of interference exceeding the protection criterion by up to 52.2 dB. This interference can originate from IMT **base stations** deployed in neighbouring countries or non-adjacent countries to the country or countries having the satellite service coverage.
- As part of the ITU-R studies, several technical and operational measures have been identified to improve the compatibility between the terrestrial and satellite components of IMT, however, given the exceedance of the satellite protection level of up to 52.2 dB, and noting that some of the proposed mitigation measures are not realistic, there is no assurance that these proposed mitigation measures would be effective. Furthermore, there is currently no requirement in the RR for administrations to implement such mitigations.

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<ul style="list-style-type: none"> ➤ To address the potential interference to MSS space stations, Inmarsat supports the adoption in the RR of conditions to ensure that the band 1980-2010 MHz may be used for terrestrial IMT systems only in a manner compatible with existing and future MSS systems serving other countries. This would ensure adequate protection to MSS satellites and would allow administrations, if they choose, to deploy terrestrial IMT systems in the same band. ➤ Inmarsat recommends the inclusion in the RR of a 20 dBm/5 MHz e.i.r.p. limit, applicable to terrestrial IMT base stations. Such a limit would prevent the use of the band for high power base stations, but would allow low EIRP base stations use for indoor and small cell area coverage. The limit would also allow the band to be used by IMT user terminals without constraint. Additionally, an exception could be made in the 1980-1990 MHz band for those countries listed in RR No. 5.389B where terrestrial base stations which exceed this limit have already been authorised. ➤ It is understood that the some countries in North America operate a mobile system with a different frequency arrangement that results in base stations operating in the 1990-2000 MHz that may also require an exception to be made. <p>2. Scenario A2 and B1:</p> <ul style="list-style-type: none"> ➤ Potential interference between the terrestrial IMT systems and MSS earth stations can be managed by the existing cross-border coordination provisions in the RR. Appendix 7 of the RR contains parameter values to allow coordination distances to be established. <p>3. Scenario B2:</p> <ul style="list-style-type: none"> ➤ The studies for Scenario B2 show that the transmissions from some IMT space stations could cause interference into the IMT UEs with exceedance of 8.9 to 22.9 dB. ➤ Potential interference from MSS satellites to terrestrial IMT systems can be managed by the establishment of pfd threshold values in the RR. The pfd thresholds currently contained in Table 5-2 of Appendix 5 for this band (i.e. -128/-118 dB(W/m²) for GSO MSS, -123/-113 dB(W/m²) for non-GSO MSS) would provide protection to the terrestrial component of IMT and other terrestrial services that may use the band 2170-2200 MHz. Since MSS systems could exceed these threshold values in some areas coordination of the MSS downlink may be needed with the

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>relevant administrations. It is also proposed to add an additional pfd coordination threshold value of -108.8 dB(W/m²) in 1 MHz to Table 5-2 of Appendix 5 of the RR in the band 2170-2200 MHz for protection of terrestrial IMT stations.</p> <p>In conclusion, Inmarsat supports the adoption of changes to the RR in accordance with “View 1”.</p> <p>The “View 2” approach would not resolve the interference for MSS satellites in the band 1980-2010 MHz, placing satellite systems at high risk of being rendered inoperable by interference, the onset of which already experienced today. Additionally, the “View 2” approach suffers from several major drawbacks:</p> <ul style="list-style-type: none"> ➤ There is no procedure or process established in the RR to identify the administrations that would need to coordinate their terrestrial IMT systems with satellite MSS space station receivers. ➤ Coordination is unlikely to be effective, considering the major interference excess shown in the technical studies (up to 52.2 dB), and considering that terrestrial mobile operators are unlikely to be able to modify their networks to mitigate the interference, while also meeting their commercial and roll-out obligations. ➤ In any bi-lateral coordination regime, it is unlikely to be practical for a terrestrial administration to impose new constraints on previously licensed terrestrial mobile operators in their country. <p>We note that the proposed Malaysia position is that “that bilateral/multilateral discussions between different administrations provide greater operational flexibility while ensuring coexistence between the two components of IMT deployed in different countries”. While Inmarsat agrees with this approach for Scenarios A2, B1 and B2, Inmarsat is firmly of the view that this “View 2” approach would not be effective in the case of interference scenario A1 for the reasons explained above. Inmarsat courteously suggests the MCMC considers a review of its position for the case of Scenario A1 and considers supporting the “View 1” approach, with application of EIRP limits in the band 1980-2010 MHz to prevent harmful interference to existing and future MSS satellite use in these band. This approach would allow Malaysia to deploy terrestrial IMT if it chooses to do so, but would also ensure that harmful interference would not be caused to MSS satellites.</p>
8.	9.1 (Issue 9.1.5)	

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
9.	9.1 (Issue 9.1.8)	

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
Working Party 3: Satellite Services		
10.	1.4	
11.	1.5	<p>Agenda Item 1.5: to consider the use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution 158 (WRC-15);</p> <p>WRC-15 adopted regulations for the operation of ESIMs in the bands 19.7-20.2 GHz and 29.5-30 GHz, and Inmarsat operates ESIMs in these bands on the Global Xpress system. Inmarsat also operates ESIMs in the bands 19.2-19.7 GHz and 29-29.5 GHz, which are included in the scope of this agenda item. Furthermore, Inmarsat has already commissioned future satellites that expand the frequency bands used for Global Xpress to cover the entire frequency range within the scope of this agenda item.</p> <p>Consequently, Inmarsat supports the introduction of earth stations in motion (ESIMs) in the bands 17.7-19.7 GHz and 27.5-29.5 GHz under the existing primary FSS allocations. In particular, Inmarsat supports Method B of the CPM Report, which is the only method to satisfy this agenda item.</p> <p>Method B proposes the addition of a new footnote (No. 5.A15) in Article 5 of the Radio Regulations with a reference to a new WRC Resolution (draft new Resolution [A15]) providing the conditions for the operation of ESIM and protection of the services to which the bands are allocated, and consequential suppression of Resolution 158 (WRC-15). Resolution [A15] was developed by WP 4A during this study cycle and agreed as Method B in the CPM Report at the CPM-2 meeting. Some of the provisions in Resolution [A15], however, were not agreed at WP4A or CPM-2 meeting and views of different administrations are represented as options in the Resolution. The main issues and the proposed way forward are discussed below.</p> <p style="padding-left: 40px;">1) Protection of space services in the 27.5-29.5 GHz band:</p> <p>Studies concluded that if ESIM transmissions remain within the envelope of the GSO FSS network with which ESIM communicates, the interference environment for other space services would remain unchanged and would therefore be acceptable.</p> <p>ITU-R studies, however, developed provisions to provide additional protection to non-GSO FSS systems. These provisions are included in Annex 1 of Resolution [A15]. It is agreed that these limits should apply in the band 27.5-</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>28.6 GHz, where RR No. 22.2 applies and therefore non-GSO FSS systems and GSO FSS networks do not coordinate. Some administrations believe that the same limits should apply in the band 28.6-29.1 GHz, where coordination under RR No. 9.11A applies.</p> <p>Inmarsat’s view is that it is sufficient to include limits to protect non-GSO FSS only in the 27.5-28.6 GHz band. In the remainder of the band, where 9.11A coordination applies, ESIM operation within the envelope of the GSO FSS network ensures that the interference environment for NGSO FSS systems remains unchanged.</p> <p>It is noted there is also a placeholder in Annex 1 for possible limits to protect non-GSO MSS feeder links that operate in the band 29.1-29.5 GHz. However, coordination under RR 9.11A applies between non-GSO MSS feeder links and GSO FSS networks.</p> <p>Consequently, Inmarsat’s view is that no limits are required to protect non-GSO MSS feeder links in the band 29.1-29.5 GHz, since ESIM operation within the envelope of the GSO FSS network ensures that the interference environment for NGSO MSS feeder links remains unchanged.</p> <p>2) Coexistence with space services in the 17.7-19.7 GHz band:</p> <p>Studies concluded that if ESIM operation remains within the envelope of the GSO FSS network with which ESIM communicates, the operation of other space services would not be constrained. It is noted that ESIM should not claim more protection from non-GSO FSS systems operating in the band 17.8-18.6 GHz than afforded by the EPFD limits specified in RR No. 22.5C. Additional provisions are only required for BSS feeder link operation in the band 17.7-18.4 GHz (Earth-to-space) which is in the opposite direction to ESIM operation (space-to-Earth). For this specific scenario, it was concluded that ESIM should not claim protection from BSS feeder link operation in the band 17.7-18.4 GHz.</p> <p>3) Protection of terrestrial services in the 27.5-29.5 GHz band:</p> <p>Studies concluded that in the band 27.5-29.5 GHz, terrestrial fixed and mobile service stations can be protected as follows:</p> <p>a) Aeronautical ESIM (A-ESIM) should comply with PFD limits at the surface of the Earth, and when in line-of-sight of a territory of an administration. The same principle for the protection of terrestrial service stations is applied to aircraft earth station operation in the band 14-14.5 GHz. Different PFD masks have been proposed and one</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>option in the example Resolution also proposes to combine an altitude limit with one of the PFD limits on A-ESIM.</p> <p>b) Maritime ESIM (M-ESIM) should comply with a minimum distance from the low-water mark of a coastal state and an associated maximum e.i.r.p spectral density limit towards that coastal state. The same principle for the protection of terrestrial service stations is applied to operation of Earth Stations on Vessels (ESV) in the bands 5 925-6 425 GHz and 14.0-14.5 GHz. Distances in the range 60 to 120 km have been proposed by different administrations and sector members.</p> <p>c) Land ESIM (L-ESIM) should operate under the condition of no interference into terrestrial stations in neighbouring countries until coordination between concerned administrations is complete.</p> <p>It was agreed during the studies that M-ESIMs that meet the limit in item b) above are deemed to have met their obligation not to cause interference to terrestrial services and no further coordination is required with coastal administrations prior to M-ESIM operation. However, there was no agreement that A-ESIM that meet the limit in item a) above are also deemed to have met their obligation not to cause interference to terrestrial services. Some administrations believe that the limits in item a) should be used as guidelines that administrations can use when they authorize A-ESIM on their territory.</p> <p>Inmarsat is of the view that the same principle should apply in both cases, i.e. that A-ESIM and M-ESIM that meet the limits in item a) and item b) respectively can be considered to protect terrestrial services. In addition, mandatory harmonised limits provide more certainty that terrestrial services will be protected. (See resolves 1.2.5 of the Resolution [A15] and Annex 2.)</p> <p>With regard to <i>M-ESIM limits</i>, the calculation of minimum distances from the low-water mark to protect terrestrial service stations from M-ESIM interference should be based on the methodology used for Earth Stations on Vessels operating in the bands 5 925-6 425 MHz and 14-14.5 GHz as documented in Resolution 902 (WRC-03) and ITU-R Recommendation SF.1650.</p> <p>Inmarsat considers a distance of 120 km – maximum of the range of distances proposed by administrations – is overly conservative due to the following assumptions used in the study:</p> <ul style="list-style-type: none"> - Resolution 902 (WRC-03) methodology is not considered and the study assumes that M-ESIMs are stationary in front of the MS antenna, which is in conflict with the dynamic nature of ESIM operation;

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<ul style="list-style-type: none"> - Mobile service protection criteria of $I/N = -6$ dB is associated with the percentage of time of 1%. $I/N = -6$ dB is a long-term criterion and should be associated with at least 20% of time for such interference scenarios, which was the assumption in all the other studies provided to WP4A on M-ESIM; - M-ESIM channel bandwidth of 100 MHz is used without any use of duty cycle, which translates into an unrealistic assumption of one satellite being able to serve only about 20 ESIM in the band 27.5-29.5 GHz within the coverage of a beam. This figure reduces for satellites networking having frequency reuse between beams. <p>M-ESIM studies carried out in WP 4A on the basis of Resolution 902 methodology show that a minimum distance of 60-70 km is sufficient to protect both fixed and mobile service stations. The distance is in good alignment with section 1.1 of Annex 2 of the draft new Resolution [A15] that notes a preference to a 60-70 km minimum distance.</p> <p>Inmarsat supports a distance of 70 km for the protection of mobile and fixed service stations from M-ESIM terminals.</p> <p>With regard to A-ESIM limits, Inmarsat supports Option 1 in Annex 2, Part 2 of Resolution [A15], which was proposed by the CEPT and corresponds to the PFD mask that was adopted for ESIM operation in Europe in 2013 (see ECC Decision ECC/DEC(13)01). Several studies have been submitted to WP4A showing that the PFD mask under Option 1 provides ample protection to terrestrial services. In particular, one CEPT study provides an analysis that takes into consideration the dynamic nature of interference and indicates that the PFD mask adequately protects both fixed and mobile services. In fact, the study shows that once operation of the mobile service is taken into consideration, the PFD mask offers up to 20 dB of margin between the maximum interference levels caused by A-ESIM operation and mobile service protection criterion. A similar methodology was used to establish the PFD values in Recommendation ITU-R M.1643 for the operation of AES in the band 14-14.5 GHz.</p> <p>The PFD mask provided in Option 2 is obtained from a study on the protection of mobile services. The PFD mask is solely based on the characteristics of the victim mobile service receiver and applies a single protection criterion of $I/N = -6$ dB without any separate consideration for short-term and long-term protection nor probability of interference. This means the PFD mask is based on the assumption that the $I/N = -6$ dB MS protection criterion should be met for 100% of time. $I/N = -6$ dB is a long-term criterion and should be associated with at least 20% of time. Since no time component is considered, the analysis results in an overly conservative PFD mask. Both A-ESIM and MS operation are dynamic in nature, which also results in a dynamic interference environment. Interference can only occur if the main beam of MS stations is pointed towards the aircraft and the mobile station is along the azimuth of A-ESIM antenna. This simultaneous occurrence of events is highly unlikely, especially considering that</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>the mobile stations will be operated in dense urban areas where clutter can be assumed to occur. In addition, the mask is calculated based on the assumption that the MS base station is pointing towards the horizon. According to the characteristics provided by WP 5A, MS base station beam can be electronically be steered in a range of -6 degrees to -60 degrees for 20 m high BS and -3 degrees to -60 degrees for 10 m high BS with respect to the horizontal plane. Hence, the beam cannot be pointed towards the horizon and the proposed PFD mask protects antenna pointing angles which do not conform to MS deployments described by WP5A.</p> <p>With regard to the proposal for an altitude limit on A-ESIM, such a limit is not required since compliance with a PFD mask is sufficient to protect terrestrial services. Limitations on ESIM operational altitude is one mechanism that allows ESIM operators to meet the PFD mask on the ground but the necessary value is highly dependent on ESIM operational parameters (ESIM location, azimuth and elevation angle, emission power and aircraft fuselage loss). An altitude limitation in the Resolution [AI15] would unnecessarily constrain ESIM operation and limit the efficient use of spectrum as the altitude limitation would be defined under worst case assumptions that overestimate interference for most ESIM operational scenarios.</p> <p>Regarding the proposed Malaysia views and position for agenda item 1.5, Inmarsat makes the following comments:</p> <ul style="list-style-type: none"> • Regarding Maritime ESIM, Inmarsat agrees with the position for and proposes that Malaysia supports a minimum distance of 70 km. • Regarding Aircraft ESIM, Inmarsat agrees that maximum pfd limits are necessary and Inmarsat proposes that Malaysia supports the “Option 1” pfd mask, that would adequately protect any terrestrial services planned for the 28 GHz band in Malaysia, including “5G” services”. For the reasons explained above, there is no need for an altitude distance in addition to pfd limits. • Regarding Land ESIM, the proposed view suggests that Land ESIM would not be considered in Malaysia. While noting that such considerations are a national matter and should not exclude the potential for land ESIM in the Radio Regulations, Inmarsat considers it is premature to conclude that Land ESIM would not be able to operate in Malaysia. The extensive use of the 18 GHz band by the FSS would have no impact on the potential use of this band for receiving ESIM. Even if the 18 GHz band is extensively used by the FS, Land ESIM would operate on a non-protected basis in this band. While use of the 28 GHz band for 5G would create sharing difficulties for Land ESIM, some administrations which plan to introduce 5G are considering making only part of the band 27.5-29.5 GHz available for 5G or introducing

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>geographical constraints to 5G deployment. This approach could allow for at least part of the 28 GHz band to be used for Land ESIM.</p> <p>Inmarsat agrees with the general position that the operation of ESIM, which complies with the mandated operational limits as stated in the new ITU-R Resolution should not release the relevant administrations and operators from their obligation to ensure protection of the existing services operating in 17.7-19.7 GHz and 27.5-29.5 GHz frequency bands. The inclusions of the pfd limits, minimum off-shore distance and other elements in the Resolution as described above will ensure that harmful interference is not caused.</p>
12.	1.6	<p>Agenda Item 1.6: to consider the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space), in accordance with Resolution 159 (WRC-15);</p> <p>Inmarsat is of the view that any possible use of these bands by non-GSO FSS networks should ensure the protection of GSO FSS networks, and that any revision of GSO unwanted emission limits to protect EESS (passive) systems in the 50.2-50.4 GHz band should not require the implementation of large guard bands to adjacent FSS Earth-to-space allocations (e.g., resulting in 10s to 100 of MHz unusable bandwidth). There are two issues within WRC-19 agenda 1.6:</p> <p><u>Issue 1. Developing a regulatory framework for non-GSO FSS satellite systems in the 50/40 GHz frequency bands.</u></p> <p>There are two methods to address this issue.</p> <p>Method A presents a regulatory and technical implementation to modify Article 22 of the Radio Regulation. Provisions are proposed to enable the operation of non-GSO systems, based upon the time allowance for the C/N value specified in the short-term performance objective and the decrease in spectral efficiency (for networks using adaptive code modulation) of the specified short-term and long-term performance objectives.</p> <p>There are two integral ITU-R Recommendations associated with the regulatory solutions being considered within Method A being developed within WP 4A. One is Preliminary Draft New Recommendation ITU-R S.[50/40 GHz FSS SHARING METHODOLOGY] that defines the permissible levels of interference in a satellite network (GSO and non-GSO) in the fixed-satellite service caused by other co-directional FSS and BSS networks operating in the 50/40 GHz frequency bands. The other key recommendation is the Preliminary Draft New</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>Recommendation ITU-R S.[50/40 REFERENCE LINKS] containing GSO system link characteristics that is used in the sharing methodology.</p> <p>Unfortunately, WP4A did not reach consensus to elevate the associated documents to draft new Recommendations. This is likely to mean Administrations will need to make proposals directly to WRC-19 to incorporate in an associated Resolution, definitions for the sharing methodology and the maximum permissible interference from non-GSO systems into GSO FSS and BSS systems that were being considered as a part of the WP 4A draft recommendations.</p> <p>Method B proposes to carry forward the studies to a new WRC-23 agenda item towards the development of epfd limits.</p> <p><u>Issue 2. Modification of Resolution 750 (Rev.WRC-15) for the protection of EESS (passive) in the band 50.2-50.4 GHz.</u></p> <p>Two options are considered:</p> <ul style="list-style-type: none"> - Option A: Revision of limits for non-GSO systems only; - Option B: Revision of limits for both GSO networks and non-GSO systems <p><u>Inmarsat's Position:</u></p> <p>From an Inmarsat perspective, the main issues outstanding to be addressed for WRC-19 on the agenda item 1.6 are:</p> <p><u>For Issue 1:</u> How to define the short and long term interference criteria within the regulatory methods for Issue 1 for agenda item 1.6, given the absence of approved ITU-R Recommendations on sharing methodology and reference links.</p> <p>Inmarsat supports Method A on the development of maximum long-term and short-term interference limits within any associated resolution, and which are specified in terms of the potential for interference from a single non-GSO system, and from all co-frequency non-GSO systems.</p> <p>We consider the short-term single-entry allowance may be based on not exceeding a 3% unavailability of GSO FSS reference links, in terms of the lowest C/N, and corresponding to the shortest time percentage. For the long-term single-entry allowance, we consider that this may be based a maximum decrease of 3% in the long-term spectral efficiency (SE) of GSO FSS reference links under faded conditions. The aggregate allowance should be limited to 10% and be evaluated within a consultative group, as proposed within the Method A of the CPM text. We also support the development of a small number (around 4) GSO</p>

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions	
		<p>FSS reference links that are incorporated within any associated resolution to cover the operation of different earth station antenna sizes. We also support inclusion of a ‘parametric approach’ identified within the WP4A draft recommendation on reference links to evaluate the application of the GSO FSS generic links over a range of link parameters. We also consider any supplementary links submitted by administrations be evaluated and discussed within the consultative group taking into account views of both non-GSO and GSO FSS operators.</p> <p>Inmarsat is of the opinion the above approach will provide a reasonable balance between achieving the protection of GSO FSS networks and facilitating sharing of non-GSO FSS systems with GSO FSS systems in the 50/40 GHz bands.</p> <p><u>For Issue 2:</u> Whether changes are permitted under agenda item 1.6 to revise the unwanted emissions limits contained in Resolution 750 (Rev. WRC-15) for GSO FSS systems.</p> <p>Inmarsat is of the view that the title of Resolution 159 (WRC-15) and provisions of <i>resolves 4</i> limit any revision of Resolution 750 at WRC-19 to non-GSO FSS system unwanted emissions only. It is noted minimal studies to date have been conducted within WP 4A to assess the impact the proposed significant reduction (up to 40 dB) in unwanted emission limits for GSO FSS systems will have on the FSS. The proposed significant reduction is likely to lead to need for significant guard band requirements (10s to 100s of MHz) on FSS systems. Also, further studies are necessary to assess whether additional mitigation techniques may be implemented at EESS (passive) receivers to account for the fixed geometry of the potential for interference from FSS GSO earth stations that may result in improved compatibility with EESS (passive) receivers. It is also noted No 5.340.1 indicates the allocation to the EESS (passive) and the space research service (passive) in the band 50.2-50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary allocated services in those bands.</p> <p>For these reasons Inmarsat supports the examination of revisions to Resolution 750 (Rev. WRC-15) for GSO FSS systems be considered at WRC-23.</p> <p>Inmarsat agrees with the proposed Malaysia position for Issue 1 and Issue 2.</p>	
13.	7 ²	A	Support a rigorous milestone process to ensure that non-GSO systems are subject to requirements that are challenging and proportionate to those applying to GSO systems

² Inmarsat has no requirements for extensive changes to the ITU coordination procedures and does not support a detailed overhaul of Articles 9 & 11 of the Radio Regulations. Inmarsat believes the current process of incremental evolution of the procedures at successive WRCs remains appropriate.

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions	
13.	7		Inmarsat agrees with the proposed Malaysia position.
		B	Support application of the coordination arc to MSS networks for MSS-MSS and MSS-FSS coordination (CPM report: Option B). Inmarsat agrees with the proposed Malaysia position.
		C1	
		C2	
		C3	
		C4	
		C5	
		C6	
		C7	
		D	Support publication of a definitive list of network specific coordination (CPM Report: Method D1) requirements Inmarsat agrees with the proposed Malaysia position.
		E	
		F	
		G	
		H	Support requirement for additional Appendix 4 data items, noting further study required for any additional items. Inmarsat agrees with the proposed Malaysia position.

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions	
		I	
		J	
		K	
14.	9.1 (Issue 9.1.2)		
15.	9.1 (Issue 9.1.3)	<p>Agenda Item 9.1.3: Resolution 157 (WRC-15) - Study of technical and operational issues and regulatory provisions for new non-geostationary-satellite orbit systems in the 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz frequency bands allocated to the fixed-satellite service;</p> <p>Inmarsat uses parts of the C-band spectrum in question for telemetry. Any changes to the current provisions should maintain protection of GSO FSS. Inmarsat notes that there is little interest in this agenda item and no change is the likely outcome at WRC-19.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>	
16.	9.1 (Issue 9.1.9)	<p>Agenda Item 9.1.9: Resolution 162 (WRC-15) Studies relating to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space)</p> <p>This band is a possible future option for Inmarsat feeder links to help meet demand for growing spectrum needs. Note that this band is included in the scope of AI 1.13.</p> <p>Inmarsat supports the definition of appropriate regulatory measures allowing new primary allocations to the fixed-satellite service (FSS) in the frequency band 51.4-52.4 GHz (Earth-to-space) limited to FSS feeder links for geostationary orbit use, as this opportunity will offer 5 GHz of spectrum in two contiguous segments (3 GHz + 2 GHz) that can be used directly with the downlink band to facilitate the deployment of future satellite systems.</p> <p>The large amount of contiguous spectrum would offer opportunities for gateways with higher throughput requirements and at the same time release spectrum for user terminals in Ka-band. It should be noted that such gateway operation may be limited in certain locations due to enhanced propagation</p>	

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>attenuation in the Q/V bands and regulatory restriction related to the protection of other services.</p> <p>To protect GSO EESS (passive) sensors, Inmarsat supports option 2 from the CPM Report, which establishes the orbital locations to be protected by reduced unwanted emissions from the FSS earth station.</p> <p>Inmarsat notes the proposed Malaysia position and encourages Malaysia to support the new allocation to the FSS in this band, irrespective of the outcome related to AI 1.13.</p>
Working Party 4: Science Services		
17.	1.2	
18.	1.3	
19.	1.7	
Working Party 5: Maritime, Aeronautical and Amateur Services		
20.	1.1	
21.	1.8	<p>Agenda Item 1.8: to consider possible regulatory actions to support Global Maritime Distress Safety Systems (GMDSS) modernization and to support the introduction of additional satellite systems into the GMDSS, in accordance with Resolution 359 (Rev.WRC-15);</p> <p>Inmarsat supports the modernization of GMDSS and is of the view that additional satellite systems supporting GMDSS should meet the minimum set of performance specifications standards that are required. Inmarsat is the current GMDSS satellite provider and will continue to provide GMDSS services for the maritime community. Inmarsat MESs transmit in the adjacent band to Iridium, i.e. 1626.5-1660.5 MHz.</p> <p>Regarding “Issue B”, the introduction of the new GMDSS operator, Iridium has now been accepted by the IMO as part of the GMDSS and it is likely that WRC-19 will identify in the RR the frequencies used by Iridium as being available for GMDSS. Inmarsat does not oppose such identification, but Iridium’s use of satellite downlinks in all or part of the band 1613-1626.5 MHz for GMDSS operations should not introduce additional constraints on Inmarsat’s</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>operations in the band above 1626.5 MHz in accordance with Method B2 in the CPM Report.</p> <p>The CPM Report for this item includes Inmarsat’s proposal for language in a footnote that should be adopted in the RR along with identification of Iridium frequencies for GMDSS. In the CPM Report, this is identified as Method B2, with the following example text: <i>“In order not to constrain the operation of MSS terminals on ships in the band 1 626.5-1 660.5 MHz, maritime mobile earth stations receiving in the band 1616-1 626.5 MHz shall not claim protection from emissions of maritime mobile earth stations transmitting in the band 1 626.5-1 660.5 MHz”</i></p> <p>There are two main approaches proposed to identify the Iridium frequencies in the RR. Method B1 would retain the current secondary status of the MSS space-to-Earth allocation. Method B4 would upgrade the downlink allocation to primary. If either of Method B1 or B4 are followed, the additional footnote text in Method B2 should be included in Article 5 of the RR to ensure that Iridium cannot seek protection from interference from Inmarsat in the future.</p> <p>Inmarsat is also opposed to modification of RR 5.364, for which some proposed revisions would modify the sharing conditions of the mobile satellite service in the band below 1626.5 MHz with respect to the in aeronautical radionavigation service and the fixed service. Such a change would be contrary to the Res 359 requirement that the new GMDSS system “should operate within the interference environment of existing systems”.</p> <p>Inmarsat is also opposed to any changes under this agenda item that would change the current RR with respect to the AMS(R)S in the band 1610-1626.5 MHz, which would be outside the scope of the agenda item.</p> <p>Regarding the proposed Malaysia position for Issue B, Inmarsat suggests that the position be enhanced to reference the need to ensure no negative impact on existing operations in the adjacent bands, as proposed:</p> <p><u>“Malaysia supports the introduction of additional GMDSS satellite provider, which could provide enhancement of maritime safety in terms of availability and robustness. Changes to the RR should ensure that other existing services, including the MSS in the adjacent bands, are not adversely affected.”</u></p>
22.	1.9.1	

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
23.	1.9.2	
24.	1.10	<p>Agenda Item 1.10: to consider spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System (GADSS), in accordance with Resolution 426 (WRC-15);</p> <p>Inmarsat will continue to have a significant role in the provision of distress and safety communications for aircraft using our L-band services and Inmarsat is generally supportive of the modernization and the introduction of Global Aeronautical Distress and Safety System (GADSS). Inmarsat’s systems are already able to provide service to meet the emerging new requirements for GADSS such as more frequent tracking updates and the retrieval of flight recorder data.</p> <p>ICAO have identified system components for GADSS based on performance requirements for different elements such as: aircraft tracking under normal and abnormal conditions, autonomous distress tracking and post flight localization and recovering. There are a small number of changes that would need to be made within the Radio Regulations, for example, to Chapter VII Distress and Safety Communications (Articles 30 to 34) to introduce the concept of GADSS. No changes have been identified to Article 5 of the Radio Regulations.</p> <p>There are three methods identified with the CPM Report. Method A has been developed within the ICAO FSMP framework, Method B has been proposed by Russia and Method C by France. The main differences between Method A and Method B are that Method B also proposes the development of ITU-R Recommendations to include the technical characteristics, protection criteria and frequency bands of the systems that are contributing to GADSS. Method C is an explicit no change method recognising ICAO is able to implement GADSS under the current RR.</p> <p>Inmarsat supports the adoption of Method A of the CPM Report together with inclusion of a new footnote in the RR that would provide further assurance to parties that any systems developed and operated as a part of a GADSS element will not establish any additional priority in the Radio Regulations for the radiocommunication services. Inmarsat can also support adoption of Method C (no change) recognising that studies within ICAO have determined that the GADSS requirements can be satisfied using existing systems operating within existing aeronautical frequency allocations and distress spectrum. Inmarsat however does not support the adoption of Method B as it is unnecessary restrictive given that ICAO have identified some GADSS elements that do not require a safety allocation (e.g. possible use of FSS for post flight location), and the ICAO elements are defined in terms of functional specifications (e.g., performance requirements for aircraft tracking) and as</p>

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>such do not specify what this service should be nor the protection requirements. Method B will also require ITU-R actions to align with any update, modification or evolution of GADSS requirements within ICAO.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
25.	9.1 (Issue 9.1.4)	<p>Agenda Item 9.1.4: Resolution 763 (WRC 15) Stations on board sub-orbital vehicles;</p> <p>Inmarsat supports the conclusions of the CPM text that “there is no requirement for any change to the Radio Regulations at WRC-19. Further operational, technical and regulatory issues may need to be addressed, which require continuing studies, on the status of the station aboard sub-orbital vehicles and type of applications, through the appropriate mechanism and on the potential interference to be considered with regards to radiocommunication systems operating on sub-orbital vehicles. Resolution 763 (WRC-15) could be revised, or a new resolution could be developed to support these further studies by considering a future agenda item”.</p> <p>Inmarsat would like to see maximum flexibility in the provision of MSS and FSS services in providing communication to sub-orbital vehicles, particularly when the sub-orbital vehicles are operating over remote and oceanic regions during their phases of flight. Inmarsat therefore supports the addition of a new agenda item for WRC-23 to establish the regulatory provisions necessary to support communications to stations on-board sub-orbital vehicles during all stages of their flight, and would like all existing MSS and FSS allocations to be within the scope of such an agenda item. The scope of the new agenda item should also permit examination of whether, or under what circumstances, communications to launch vehicles can be considered as part of communications to sub-orbital vehicles.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
Working Party 6: General Issues		
26.	2	
27.	4	<p>Agenda Item 4: in accordance with Resolution 95 (Rev.WRC-07), to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;</p> <p>Inmarsat has positions on the following:</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>1. Resolution 422 (WRC-12) on methodology to calculate AMS(R)S spectrum.</p> <p><i>Inmarsat can support the suppression of Res 422, as a result of approval of Recommendation ITU-R M.2091.</i></p> <p>2. Resolution 344 (Rev.WRC-12): Management of the maritime identity numbering resource.</p> <p><i>Inmarsat supports some updating of this Resolution, to reflect recent revision to management of the maritime mobile service identity (MMSI) and to revise some outdated reference to Inmarsat ship earth stations.</i></p> <p>3. Resolution 154 (WRC-15): C-band VSATs for aeronautical safety systems.</p> <p><i>Inmarsat supports no change to support ongoing C-band use by FSS.</i></p> <p>4. Resolution 140 (WRC -15): EPFD limits in 19.7-20.2 GHz.</p> <p><i>Inmarsat would not support relaxation of limits for NGSO systems in this band.</i></p> <p>5. Recommendation 316 (REV.MOB-87) on Use of ship earth stations within harbours and other waters under national jurisdiction. This Recommendation will likely require updates in the context of the addition of Iridium to the GMDSS.</p> <p><i>Inmarsat supports retaining the Recommendation with some modifications to generalize the text on provision of GMDSS systems and to bring it up-to-date.</i></p> <p>Inmarsat agrees with the proposed Malaysia position and invites Malaysia to support the specific positions in the Resolutions and Recommendations as above.</p>
28.	8	<p>Inmarsat notes that Malaysia is included in footnote 5.524, which provides for an additional allocation to the fixed and mobile services in the band 19.7-20.2 GHz on a primary basis. Furthermore, Malaysia is included in footnote 5.542, which provides for an additional allocation to the fixed and mobile services in the band 29.5-31 GHz on a secondary basis.</p> <p>These bands are generally allocated exclusively to satellite services (FSS and MSS) and are heavily used by fixed and mobile satellite terminals for uplinks and downlinks. It is understood that most countries do not use these bands</p>

No.	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		for terrestrial services, even in those countries named in the footnotes. To provide a clear and stable regulatory framework for satellite operators using this band, administrations named in these footnotes are encouraged to review and if possible remove their names.
29.	9.1 (Issue 9.1.6)	
30.	9.1 (Issue 9.1.7)	<p>Agenda Item 9.1.7: Resolution 958 (WRC-15) - Urgent studies required in preparation for WRC-19 - Unauthorized operation of earth station terminals (Res. ITU-R 64);</p> <p>Inmarsat is of the view that the current regulations, in particular RR Article 18, are adequate to prevent the operation of unauthorized earth stations and this is primarily a national enforcement matter. Inmarsat would be concerned with new constraining requirements on FSS operators.</p> <p>A new WRC Resolution has been proposed to introduce additional measures to address the issue of unauthorised uplink transmissions of earth station terminals (Option 2 of issue 2a in the CPM Report). The practical need for the regulatory process detailed in the Resolution remains unclear to Inmarsat. Satellite networks utilize various architectures and often the exact location of terminals is not tracked as developing these capabilities adds cost and complexity to the network. Under these circumstances, detailed information is required regarding the location and operation of the unauthorized terminal in order for the satellite operator to be able to accurately identify the unauthorized terminal and the associated local service provider or end-user to resolve it. However, if the location and operation of the terminal is established with such accuracy, it remains unclear why administrations are not able to take action themselves to rectify the issue without involving the notifying administration.</p> <p>The Resolutions also seems to place new obligations on the notifying administration to continuously confirm the licensing requirements of any earth station before it is connected to the notified satellite network. This requirement would be outside the jurisdiction of the notifying administration as well as impossible to accomplish in practice for global satellite operations.</p> <p>Consequently, Inmarsat supports Option 1 – no change to the radio regulations – with regards to issue 2a of the CPM Report.</p> <p>Issue 2b under this agenda item related to possible methods that will assist administrations in managing the unauthorized operation of earth station terminals deployed within their respective territories. For this issue, Inmarsat</p>

No .	Agenda Item	Proposed Malaysia (MLA) Views and Positions
		<p>supports the development of ITU-R Report and Recommendations as guidance material for administrations. No change to the RR is necessary for this issue.</p> <p>Inmarsat agrees with the proposed Malaysia position.</p>
31.	10	<p>Agenda item 10: possible agenda items for future conferences</p> <p>Inmarsat supports a WRC-23 agenda item to consider MSS (space-to-space) allocations in the bands 1518-1544 MHz, 1545-1559 MHz, 1626.5-1645.5 MHz, 1646.5-1660.5 MHz and 1668-1675 MHz. Such an allocation would support the requirements of many LEO satellites that currently operate with limited and non-real-time support through a network of earth stations. The addition of space-to-space communications within the MSS would provide an effective means for continuous monitoring and control of such LEO satellites, which would enhance security and efficiency of operations.</p> <p>Inmarsat is opposed to the consideration of IMT identifications in the 27.5-29.5 GHz at WRC-23.</p> <p>Regarding the proposed position of Malaysia, Malaysia is invited to consider supporting the specific new agenda item proposed by Inmarsat described above.</p>