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| **World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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| PLENARY MEETING | **Addendum 1 to Document 67(Add.21)-E** |
|  | **7 October 2019** |
|  | **Original: English** |
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| Papua New Guinea | |
| Proposals for the work of the conference | |
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| Agenda item 9.1(9.1.1) | |

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC-15;

9.1 (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

Issue 9.1.1: Resolution 212 (Rev.WRC-15)

*to study possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries, in particular for the deployment of independent satellite and terrestrial components of IMT and to facilitate development of both the satellite and terrestrial components of IMT*

# 1 Background

The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz have been identified in the Radio Regulations (RR) for use by International Mobile Telecommunications (IMT). Within these broader frequency ranges, the frequency bands 1 980‑2 010 MHz and 2 170-2 200 MHz are allocated to the fixed service (FS), mobile service (MS) and mobile-satellite service (MSS) on a co-primary basis. The MSS allocation in the Earth‑to-space direction is in the 1 980-2 010 MHz band and in the space-to-Earth direction is in the 2 170‑2 200 MHz band. Both the satellite and terrestrial components of IMT have been deployed or are being considered for further deployment in these bands.

Pursuant to Resolution **212 (Rev.WRC-15)**, ITU-R studies considered the issue of coexistence and compatibility between the terrestrial component of IMT (comprised of base station(s) (BS(s)) and user equipment (UE)) and the satellite component of IMT (comprised of MSS space stations and mobile earth station(s) (MES(s)) in different countries for four interference scenarios, A1, A2, B1, and B2, respectively.

Figure 1: Interference scenarios between the satellite and terrestrial components of IMT



Table 1: Interference scenarios

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| Scenario | Interference From | Interference To | Frequency Band |
| A1 | IMT BS (downlink)  IMT UE (uplink) | IMT space station | 1 980-2 010 MHz |
| A2 | IMT BS | IMT MES | 2 170-2 200 MHz |
| B1 | IMT MES | IMT BS  IMT UE | 1 980-2 010 MHz |
| B2 | IMT space station | IMT UE | 2 170-2 200 MHz |

According to the ITU-R studies, potential interference may be managed for three of the four sharing scenarios by technical and operational measures through the application of the coordination procedures in the RR. For the remaining case of transmitting IMT terrestrial stations in respect of receiving IMT space stations in the frequency band 1 980-2 010 MHz (Scenario A1), the level of potential interference from IMT UE into IMT space stations is low and can be mitigated by technical and operational measures while the level of potential interference from IMT BS into IMT space stations is high and cannot wholly be eliminated by technical and operational measures.

Two views are expressed in the Conference Preparatory Meeting (CPM) Report (CPM 19-2) concerning agenda item 9.1.1. View 1 proposes technical and regulatory measures to ensure coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT. View 2 proposes no changes to the RR, relying instead on bilateral/multilateral coordination between administrations.

Therefore, WRC-19 should take action to ensure coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in different countries.

# 2 Views and proposals

Papua New Guinea supports China (WRC-19 Document 28, Addendum 21, Addendum 1) and View 1 of the CPM Report concerning agenda item 9.1, issue 9.1.1, which will enable both the terrestrial and satellite component of IMT to coexistence without interference. The View 2 approach would put the MSS at high risk of being rendered inoperable by interference.

It should be pointed out that there are no provisions in the RR to trigger bilateral coordination or to identify the concerned administrations to address interference from IMT BSs into IMT space station in Scenario A1 and from IMT space stations to IMT UEs in Scenario B2. Although several technical and operational mitigation measures were identified in studies, the interference could be only reduced partially, but not wholly eliminated. Therefore, both technical methods and additional regulatory measures should be considered.

View 1 provide a solution to ensure long-term sharing by terrestrial IMT and satellite IMT. Establishment of regulations and coordination procedures could help administrations to deploy their terrestrial or satellite systems and avoid harmful interference.

Based on View 1, Papua New Guinea proposes that Resolution **212 (Rev. WRC-15)** regarding WRC-19 agenda item 9.1, issue 9.1.1 should be modified as follows:

– Adopt a maximum e.i.r.p. limit of 20 dBm/5 MHz on terrestrial stations in the mobile service transmitting in the frequency band 1 980‑2 010 MHz to ensure that this band is used as an uplink by both services, with an exception for the 1 980-1 990 MHz band for those countries listed in RR No. **5.389B** (Scenario A1).

– Establish a new coordination threshold pfd value produced at the Earth’s surface by IMT space stations, for instance –108.8 dB(W/(m2)) in 1 MHz, to protect terrestrial stations of IMT in the frequency band 2 170-2 200 MHz (Scenario B2).

Modifications to Resolution **212 (Rev. WRC-15)** to reflect the above are also included.

MOD PNG/67A21A1/1

RESOLUTION 212 (Rev.WRC‑19)

Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that Resolution ITU‑R 56 defines the naming for International Mobile Telecommunications (IMT);

*b)* that the ITU Radiocommunication Sector (ITU‑R), for WRC‑97, recommended approximately 230 MHz for use by the terrestrial and satellite components of IMT;

*c)* that ITU‑R studies forecast that additional spectrum may be required to support the future services of IMT and to accommodate future user requirements and network deployments;

*d)* that ITU‑R has recognized that space techniques are an integral part of IMT;

*e)* that, in No. **5.388**, WARC‑92 identified frequency bands to accommodate certain mobile services, now called IMT,

noting

*a)* that the terrestrial component of IMT has already been deployed or is being considered for deployment in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz;

*b)* that the satellite component of IMT has already been deployed or is being considered for further deployment in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz;

*c)* that the availability of the satellite component of IMT in the frequency bands 1 980‑2 010 MHz and 2 170-2 200 MHz simultaneously with the terrestrial component of IMT in the frequency bands identified in No. **5.388** would improve the overall implementation and the attractiveness of IMT;

*d)* that for the case of transmitting IMT terrestrial stations in respect of receiving IMT space stations in the frequency band 1 980-2 010 MHz, the level of potential interference from IMT user equipment into IMT space stations is low and can be mitigated by technical and operational measures while the level of potential interference from IMT base stations into IMT space stations is high and cannot wholly be eliminated by technical and operational measures,

noting further

*a)* that co‑coverage, co-frequency deployment of independent satellite and terrestrial IMT components is not feasible unless techniques, such as the use of an appropriate guardband or other mitigation techniques, are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT;

*b)* that, when the satellite and terrestrial components of IMT are deployed in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in different geographical areas, technical or operational measures may need to be implemented to avoid harmful interference, and further studies by ITU‑R are required in this regard;

*c)*that some difficulties have been raised in addressing potential interference between the satellite and terrestrial components of IMT,

resolves

1 that administrations which implement IMT:

*a)* should make the necessary frequencies available for system development;

*b)* should use those frequencies when IMT is implemented;

*c)* should use the relevant international technical characteristics, as identified by ITU‑R and ITU‑T Recommendations;

2 for the purpose of protection of IMT space stations from interference of IMT terrestrial systems, the equivalent isotropically radiated power of any IMT terrestrial station in the mobile service shall not exceed 20 dBm/5 MHz in the frequency band 1 980-2 010 MHz, except for terrestrial stations in the frequency band 1980-1990 MHz for the countries listed in No. **5.389B**;

3 for the purpose of protection of IMT terrestrial stations from interference of IMT space stations, a coordination threshold pfd value of –108.8 dB(W/m2) in 1 MHz produced at the Earth’s surface by IMT space stations in the mobile-satellite service in the frequency band 2 170-2 200 MHz shall be applied,

encourages administrations

to give due consideration to the accommodation of other services currently operating in these frequency bands when implementing IMT.

**Reasons:** Modifications to Resolution **212 (Rev.WRC-15)** are proposed to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries.

If the conference finds that it cannot adopt the measures called for under *resolves* 2and3in the above proposal, then Papua New Guinea proposes that WRC-19 consider the following operational alternative for *resolves* in Resolution **212** **(Rev.WRC-15)** that contains only operational and technical measures as called for in this Resolution.

MOD PNG/67A21A1/2

RESOLUTION 212 (Rev.WRC‑19)

Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

……

resolves

1 that administrations which implement IMT:

*a)* should make the necessary frequencies available for system development;

*b)* should use those frequencies when IMT is implemented;

*c)* should use the relevant international technical characteristics, as identified by ITU‑R and ITU‑T Recommendations;

*d)* should employ technical and operational measures to allow coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT in the frequency bands 1 980-2 010 MHz and 2 170‑2 200 MHz;

2 that the use of the frequency band 1 980-2 010 MHz by the terrestrial component of IMT shall be limited to transmissions from user equipment to base stations,

**Reasons:** Modifications to Resolution **212 (Rev.WRC-15)** are proposed focusing only on operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries.

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