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| Summary:  |
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| Proposal: |
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1. The following pages are intended to be compiled in one CEPT Brief on AI 9

DRAFT CEPT BRIEF ON AGENDA ITEM 9.1 Issue 9.1.1

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

This agenda item addresses technical and operational measures to ensure the co-existence and compatibility between the satellite and terrestrial components of IMT in 1 980-2 010 MHz and 2 170-2 200 MHz in different countries.

# Preliminary CEPT position

CEPT is of the view that it is required to carry out compatibility studies and to define compatibility conditions of terrestrial component of IMT (in the mobile service) and satellite GSO and NGSO systems (in the mobile satellite service) in the frequency bands 1980-2010 MHz and 2170-2200 MHz considering the case that these frequency bands are used by the mobile service and mobile satellite service in different countries.

CEPT supports adequate measures for protection of MSS satellites from harmful interference from the terrestrial component of IMT, taking into account that the bands 1980-2010 MHz and 2170-2200 MHz are prioritised for MSS use in CEPT. For example, this can be achieved by limiting the e.i.r.p. of stations in the uplink band (1980-2010 MHz) or limiting the use of this band to the transmission from terminals to base stations. There is no requirement for additional measures to manage potential interference between the terrestrial IMT systems and MSS earth stations.

# Background

In accordance with Resolution 212 (Rev. WRC-15) noting further a) and b):

* 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 guard band or other mitigation techniques, are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT;
* 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 adjacent 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.

The bands 1 980-2 010 MHz and 2 170-2 200 MHz are prioritised for MSS use in CEPT.

In CEPT the bands 1 980-2 010 MHz and 2 170-2 200 MHz are designated to the MSS (see ECC Decision (06)09). MSS operations may include a “complementary ground component”, however it is a requirement of that Decision that the ground component operates in the same direction as the satellite links (i.e. base station transmit in the MSS downlink band; base station receive in the MSS uplink band). If independent terrestrial mobile systems were to operate in the opposite direction, this would increase the risk of interference.

ITU-R WP 4C and WP 5D have joint responsibilities for studies under this agenda item.

WP 4C is responsible for the studies with respect to the satellite component of IMT, taking into account the technical and operational characteristics provided by WP 5D, while WP 5D is responsible for the studies with respect to the terrestrial component of IMT, taking into account the technical and operational characteristics provided by WP 4C.

Currently WP 4C and WP 5D are developing the Working Document towards the Preliminary Draft New Report or Recommendation ITU-R M.[MSS&IMT-ADVANCED SHARING].The scope of this document is to address the studies under Resolution 212 (Rev. WRC-15) and covers only the satellite component of IMT and the terrestrial component of IMT-Advanced.

Considering the recommended frequency arrangements for the terrestrial component for IMT, as contained in Recommendation ITU-R M.1036, there are four interference scenarios to be considered as showed in Table 1.

Table 1: Inerference scenarios to consider (ITU-R M.1036)

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| 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 |

Potential interference between the terrestrial IMT systems and MSS earth stations (Scenarios A2 and B1) can be managed by the current cross-border coordination provisions in the RR. Appendix 7 of the RR contains parameter values to allow coordination distances to be established.

Potential interference from MSS satellites to terrestrial IMT systems (Scenario B2) can be managed by the establishment of pfd threshold values in the RR. The pfd thresholds contained in Table 5-2 of Appendix 5 would provide adequate protection to the terrestrial component of IMT and other terrestrial services that may use the band 2170-2200 MHz. However there is some ambiguity about the effectiveness of the current threshold values, given Note 3 of Table 5-2 of Appendix 5: “The coordination thresholds in the band 2 160-2 170 MHz (Region 2) and 2 170-2 200 MHz (all Regions) to protect other terrestrial services do not apply to International Mobile Telecommunications (IMT) systems, as the satellite and the terrestrial components are not intended to operate in the same area or on common frequencies within these bands.” This footnote may be considered for deletion in order to remove the ambiguity. Further analysis on this may be required.

There is potential for harmful interference from the terrestrial component of IMT to the space stations in the satellite component of IMT (Scenario A1), including interference arising from a different country. Studies show that interference levels from transmitting IMT UEs in the band 1980-2010 MHz is generally acceptable, but deployment of transmitting IMT base stations in that band in a different country could lead to interference levels exceeding the criterion by up to [52] dB. By avoiding base station transmission in the band 1980-2010 MHz, this situation is prevented.

While doing so is consistent with some of the recommended frequency arrangements for terrestrial IMT (frequency arrangements “B1”, “B6” and “B7” in Table 4 in Recommendation ITU-R M.1036), there are other recommended frequency arrangements for terrestrial IMT that would place the base station transmitter in part of the MSS uplink band (frequency arrangements “B3” and “B5” in Table 4 in Recommendation ITU-R M.1036). The use of either of these two frequency arrangements could cause harmful interference to MSS space stations in the satellite component of IMT.

To address the potential interference to MSS space stations, there are a range of options, including an ITU-R Recommendation that would recommend limits on terrestrial stations to ensure that the band is used only for terrestrial IMT downlinks, and inclusion of new e.i.r.p. limits in Article 21 to limit terrestrial IMT emissions towards an MSS satellite.

# List of relevant documents

ITU-Documentation (Recommendations, Reports, other)

* Annex 9 to Working Party 4C Chairman’s Report (4C/261) WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW [RECOMMENDATION OR REPORT] ITU-R M.[MSS&IMT-ADVANCED SHARING] Coexistence and compatibility study between mobile satellite systems and terrestrial IMT-Advanced systems in the IMT-2 GHz bands in different countries.

CEPT and/or ECC Documentation (Decisions, Recommendations, Reports)

* ECC/DEC/(06)09

EU Documentation (Directives, Decisions, Recommendations, other), if applicable

* Commission Decision of 14 February 2007 on the harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of systems providing mobile satellite services: (2007/98/EC)
* Commission Decision of 13 May 2009 on the selection of operators of pan-European systems providing mobile satellite services (MSS): (2009/449/EC).

# Actions to be taken

Monitor studies in ITU-R WP 4C and ITU-R WP 5D

# Relevant information from outside CEPT (examples of these are below)

## European Union (date of proposal)

## Regional telecommunication organisations

APT (date of proposal)

ATU (date of proposal)

Arab Group (15-20 April 2017)

Follow up the studies on this issue in the ITU Radio Sector Working Groups and support technical, operational and procedural measures for IMT systems to ensure compatibility between the terrestrial and satellite components of IMT systems in the frequency bands 1885-2025 MHz and 2110-2200 MHz.

Invite Arab administrations to clarify their preference for using either the terrestrial component or the satellite component or both.

CITEL (July 2017)

Preliminary Views

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| Canada | There should not be any impact from the outcome of these studies on the existing use of the frequency bands by the terrestrial component of IMT in 2 170-2 180 MHz (part of the 1 710-1 780 / 2 110-2 180 MHz IMT frequency band) nor on flexible MS/MSS use in 2 000-2 010 & 2 180-2 200 MHz. |
| Mexico | For the administration of Mexico, it is important to know the outcomes of these studies, since the bands 1710 - 1780/2110 - 2180 MHz and 1850 - 1920/1930 - 2000 MHz are designated for the terrestrial component of IMT in Mexico. The segmentation specified for these bands is based on an FDD scheme in which the 1710-1780 MHz and 1850-1920 MHz segments are used for base-mobile transmission and the 2110-2180 MHz and 1930-2000 MHz segments are used for base-mobile transmission. In addition, Mexico is authorized to exploit the emission and reception rights of signals and frequency bands associated with foreign satellite systems that cover—and can provide services within—its national territory at the 2000-2010/2190-2200 MHz frequency band.Accordingly, if the 1 980-2 000 MHz and 2 170-2 190 MHz frequency bands were used for the satellite component of IMT in a country with which Mexico shares borders, it would be necessary to set out the technical and operational measures to ensure coexistence and compatibility between the two IMT components |

RCC (14 April, 2017)

The RCC Administrations are in favour of development of technical and operational measures as well as regulatory provisions with regard to IMT systems in order to ensure compatibility between IMT terrestrial component (in mobile service) and IMT satellite component (in mobile-satellite service) in the frequency bands 1980−2010 MHz and 2170−2200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries.

The RCC Administrations consider that when developing technical and operational measures with regard to terrestrial IMT systems only those characteristics of IMT systems which are specified in ITU-R Recommendations and Reports should be used.

## International organisations

IATA (date of proposal)

ICAO (date of proposal)

IMO (date of proposal)

NATO (23 June 2017)

This NATO military assessment summary is a common military assessment of the NATO Nations on the potential impacts and benefits of Agenda Item 9.1, Issue 9.1.1. It does not constitute a common position of the NATO Nations.

From a military perspective, studies under this issue present a limited risk on NATO military usage in adjacent bands.

SFCG (June 2016)

SFCG should continue to monitor the developments of this agenda item in WPs 4C and 5D for any potential outcomes that could degrade the use of the 2 200-2 290 MHz band by the space science services.

WMO and EUMETNET (date of proposal)

## Regional organisations

ESA (date of proposal)

Eurocontrol (date of proposal)

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (date of proposal)