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Editor’s Note: The following pages are intended to be compiled in one CEPT Brief on AI 9

DRAFT CEPT BRIEF ON AGENDA ITEM 9.1 – ISSUE 9.1.5 – RESOLUTION 154 (WRC-12))

# ISSUE

Resolution 154 (WRC-12) “Consideration of technical and regulatory actions in order to support existing and future operation of fixed satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1”

“considering

(…)

c) where an adequate terrestrial communication infrastructure is not available, fixed-satellite service (FSS) earth stations are the only viable option to augment the communication infrastructure in order to satisfy the overall communications infrastructure requirements of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO);

(…)

resolves to invite ITU-R

to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information referred to in considering c)”

# Preliminary CEPT position

CEPT supports the modification of Resolution 154 (WRC-12) to urge relevant administrations in Region 1 to use special care in the coordination, assignment, and management of frequencies taking into consideration the potential impact on FSS earth stations [in neighbouring countries] used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information in the band 3 400-4 200 MHz.

In this regard, CEPT is of the view that the RR should be limited to international issues and not for those within a given country, noting that the results of ITU-R studies can be relevant to both types of issues.

CEPT considers that regulatory procedures currently exist in the Radio Regulations to address the issues raised by Resolution 154 (WRC-12), i.e. to coordinate, with their neighbouring countries, and to notify their receiving earth stations, to use relevant ITU-R methodologies to ensure compliance with RR No. 5.430A.

# Background

## General considerations

Allocations in the RR have to be differentiated from the actual implementation and use of systems and applications. It is up to each ITU Member State or group of Member States to decide on the actual use of the frequency bands in their countries taking into account the sharing conditions and coordination requirement defined in the RR in order to protect spectrum use, based on an allocation, in other countries. This is why frequency bands are often allocated to more than one radiocommunication service, even if they are not compatible. i.e. are not possible to use simultaneously in the same geographical area.

An allocation does not mean that a frequency will be used for that specific service in
a country; it only provides an opportunity to use the frequencies. Each Member State need to decide on the use of a frequency band based on the user requirements. The condition for use within a country is a national decision.

## reliable distribution of meteorological information

Through a chain of European support projects (PUMA and MESA) and initiatives (AMESD), a pan-African network of 53 countries and five regional centres has been established, equipped with the infrastructure, training and support required for receiving the latest space-based meteorological and environmental data, images and products from meteorological satellites.

The reception of the meteorological data through the EUMETCast distribution system and the corresponding network of C-Band reception stations in the African countries is fundamental for providing each county with the means to develop their own meteorological applications to enhance quality of life through, for example, better water and agricultural management. The initiative is enabling them to provide accurate weather forecasts, monitor extreme weather events, improve disaster management and forestall drought, starvation and other life-threatening events, saving lives and property.

For this purpose, Europe continuously supplies meteorological satellite data and products free of charge via the EUMETCast dissemination system using C-Band transponder capacity on European communication satellites and provides support in the maintenance and upgrading of the C-Band receiving stations operated by the individual African National Meteorological and Hydrological Service.

## safe operation of aircraft

[The efficient provision of air navigation services requires the implementation and operation of ground communications infrastructure with high availability, reliability and integrity. In some countries in Africa, the difficulty of fulfilling these requirements, given the extent of the airspace and weakness in terrestrial communication infrastructure, has led to the extensive deployment of an aeronautical communication infrastructure based on VSAT systems operating in the fixed-satellite service (FSS). The frequency band of operation is the 3 400-4 200 MHz band (with the standard C-band frequency range being 3 700-4 200 MHz and the extended C-band frequency range being 3400-3700 MHz), which, due to more pronounced rain attenuation at higher frequency bands, is the most viable option for satellite links with high availability in tropical regions. This infrastructure currently spans the entire region and is crucial to ensure the continued growth of traffic while maintaining safe operation of aircraft.]

In Resolution 154 (WRC-12) it is marked, that remote and rural areas often still lack a terrestrial communication infrastructure that meets the evolving requirements of modern civil aviation and the cost of providing and maintaining such an infrastructure could be expensive, particularly in remote regions. That’s why the use of FSS earth stations, deployed in some countries in Region 1 for aeronautical communications has the potential to significantly enhance communications between air traffic control centres as well as with remote aeronautical stations.

## Previous ITU-R Studies

Recommendation ITU-R SF.1486 addresses that the frequency band 3 400-3 700 MHz is allocated worldwide on a primary basis to the fixed service (FS) and the fixed-satellite service (FSS), particularly by systems using very small aperture terminals (VSATs). This band is used for terrestrial point-to-multipoint (P-MP) systems operating in the FS for providing fixed wireless access (FWA) and that this use is growing rapidly in many countries. There is a need to protect co-primary services and to assess further the sharing conditions between FWA systems and these services, Recommendation ITU-R SF.1486 says that co-frequency sharing between VSAT and P-MP systems may be difficult for VSATs operating at low elevation angles. It describes the methodology to facilitate sharing between VSAT earth stations in the FSS and FWA stations, as well as to use the interference mitigation methods for diminishing of the P-MP systems influence to VSATs.

Results of studies on compatibility of broadband wireless access systems and fixed-satellite service networks in the 3400-4200 MHz band are shown in Report ITU-R S.2199. It gives examples of FSS systems and FSS receive earth stations, FSS and BWA system parameters, sharing and compatibility studies and results.

According to Article 5 of Radio Regulations, in the majority[[1]](#footnote-1) of countries in Region 1, the frequency band 3 400-3 600 MHz is allocated to the mobile service (including IMT systems) on a primary basis. It should be noted that in Regions 2 and 3 the frequency band 3400-3500 MHz is allocated to the mobile service on a secondary basis and the frequency band 3500-4200 MHz is allocated to the mobile service on a primary basis As a consequence, the stations of the mobile service may interfere to the VSATs in the [neighbouring] countries.

Recommendation ITU-R S.1856 describes methodologies for determining whether an IMT station at a given location operating in the band 3 400-3 600 MHz would transmit without exceeding the power flux-density limits in the Radio Regulations Nos. 5.430A, 5.432A, 5.432B and 5.433A. It shows how the method may be used to determine the size and shape of the area just inside the border of a country outside of which operation of an IMT mobile terminal would meet the pfd limit at 3 m above ground at any point on that border.

Within the scope of ITU-R guidance on technical parameters and methodologies for sharing studies, related to systems in the land mobile service has been developed which describes mitigation techniques that can improve spectrum sharing (Recommendation ITU-R M.1825).

Report ITU-R M.2109 provides a summary of the sharing studies between IMT Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 and 4 500-4 800 MHz frequency bands. In preparation for WRC-07, these bands were identified as candidate bands for future development of IMT-2000 and IMT-Advanced systems, as described in Report ITU-R M.2079.

# List of relevant documents

ITU-Documentation (Recommendations, Reports, other)

Resolution 20 (WRC-03) – Technical cooperation with developing countries in the field of aeronautical telecommunications.

Resolution 154 (WRC-12) – Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1.

Radio Regulations, Article 5, Nos. 5.430A, 5.431A, 5.432, 5.432A, 5.432B, 5.433A.

Recommendation ITU-R SF.1486 – Sharing methodology between fixed wireless access systems in the fixed service and very small aperture terminals in the fixed-satellite service in the 3 400-3 700 MHz band.

Report ITU-R S.2199 – Studies on compatibility of broadband wireless access systems and fixed-satellite service networks in the 3 400-4 200 MHz band.

Recommendation ITU-R F.1488 – Frequency block arrangements for fixed wireless access systems in the range 3 400-3 800 MHz.

Recommendation ITU-R S.1856 – Methodologies for determining whether an IMT station at a given location operating in the band 3 400-3 600 MHz would transmit without exceeding the power flux-density limits in the Radio Regulations Nos. 5.430A, 5.432A, 5.432B and 5.433A.

Recommendation ITU-R M.1825 – Guidance on technical parameters and methodologies for sharing studies related to systems in the land mobile service.

Report ITU-R M.2109 – Sharing studies between IMT Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 and 4 500-4 800 MHz frequency bands.

Recommendation ITU-R M.1634 – Interference protection of terrestrial mobile service systems using Monte Carlo simulation with application to frequency sharing.

Attachment 4.14 of Chapter 4 of Document 5D/441 – Working document towards a preliminary draft new Report «Compatibility study between FSS networks and IMT systems in the band 3 400-3 600 MHz for small cell deployments».

Attachment 4.10 of Chapter 4 of Document 5D/196 – Workplan for a Preliminary Draft New Report on the compatibility study between IMT [low power systems]/[systems, including low power systems] and FSS networks in the band 3 400-3 600 MHz.

Attachment 4.16 of Chapter 4 of Document 5D/441 – Detailed workplan for a preliminary draft new Report “Compatibility study between FSS networks and IMT systems in the band 3 400-3 600 MHz for small cell deployments”.

Document 4A/468, Annex 35 – “Working document - Draft CPM text on WRC-15 Agenda Item 9.1, issue 9.1.5”. Section “5/9.1.5/4 Regulatory and procedural considerations” of this document contains possible modifications to Resolution 154 (WRC-12) in response to this agenda item. CEPT administrations are invited to review them with a view of developing a possible ECP.

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

ECC/DEC/(06)04 – The harmonised conditions for devices using Ultra-Wideband (UWB) technology in bands below 10.6 GHz.

CEPT Report 009 – Harmonise radio spectrum use for Ultra-Wideband Systems in the European Union.

Report from CEPT to the European Commission (CEPT Report 017) in response to the Mandate: to identify the conditions relating to the harmonised introduction in the European Union of radio applications based on ultra-wideband (UWB) technology. Complementary report. Final Report on 30 March 2007.

Report B from CEPT to European Commission (CEPT Report 034) in response to the Mandate 4 on Ultra-Wideband (UWB). Final Report on 30 October 2009.

ECC Report 064 – The protection requirements of radiocommunications systems below 10.6 GHz from generic UWB applications.

ECC Report 094 – Technical requirements for UWB LDC devices to ensure the protection of FWA systems.

ECC Report 100 – Compatibility studies in the band 3400- 3800 MHz between Broadband Wireless Access (BWA) systems and other services.

ECC Report 120 – Technical requirements for UWB DAA (Detect And Avoid) devices to ensure the protection of Radiolocation services in the bands 3.1 - 3.4 GHz and 8.5 - 9 GHz and BWA terminals in the band 3.4 - 4.2 GHz.

ECC Report 170 – Specific UWB Applications in the bands 3.4 - 4.8 GHz and 6 - 8.5 GHz Location Tracking Applications for Emergency Services (LAES), location tracking applications type 2 (LT2) and location tracking and sensor Applications for automotive and transportation environments (LTA).

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

# Actions to be taken

1. to prepare proposals to possible technical and regulatory measures to support the existing and future FSS earth stations in the 3 400-4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information.
2. to study the relationships between the choice of frequencies internationally used for the safe operation of aircraft and reliable distribution of meteorological information and national planning decisions.
3. to prepare proposals to the draft European Common Proposal.
4. to prepare proposals to the draft CPM Report.
5. to analyse the outcome of WRC-07 with regards to its agenda item 1.6 “to consider additional allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz and 6 GHz, in accordance with Resolution 414 (WRC-03) and, to study current satellite frequency allocations, that will support the modernization of civil aviation telecommunication systems, taking into account Resolution 415 (WRC-03);”

# 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 (December 2013)

Follow up the current studies with a condition not to affect the band 3400-3600 MHz which is allocated to mobile service and identified for the IMT systems.

CITEL (date of proposal)

RCC (November 2013)

The RCC administrations consider that the technical and regulatory measures

The RCC Administrations support the development of possible technical and regulatory measures in some countries in Region 1 in order to support existing and future FSS earth stations within the band 3400-4200 MHz used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information.

In order to protect the FSS earth stations from IMT networks in the band 3400-3600 MHz in some countries in Region 1 it is possible to use technical conditions of RR No.5.430A.

The RCC Administrations consider that technical and regulatory measures under Resolution 154 (WRC-12) should not limit the use of the band 3400-4200 MHz by other existing and planned systems and services in other countries, including SOS for the purpose of spacecraft control)

## International organisations

IATA (date of proposal)

ICAO (November 2013)

IMO (date of proposal)

SFCG (date of proposal)

WMO (March 2013)

WMO supports technical and regulatory actions to protect the FSS operations in the band 3 400-4 200 MHz for the dissemination of meteorological data in Region 1.

In addition, WMO states its requirement to maintain relevant fixed satellite service capacity and availability in the 3 400-4 200 MHz frequency band)

## Regional organisations

ESA (date of proposal)

EUMETNET (December 2012)

EUMETNET supports studies and regulatory measures that would improve situation of existing and future FSS earth stations in the 3 400-4 200 MHz in Region 1.

Eurocontrol (date of proposal)

EUMETSAT (February 2013)

EUMETSAT as operator of the European meteorological satellites and the organization which supplies through the framework of the PUMA, AMESD and MESA projects the meteorological satellite data and products free of charge via the EUMETCast dissemination system to the African National Meteorological and Hydrological Services, and who provides support in the maintenance and upgrading of the C-Band receiving stations, is of the view that African countries should not be hampered by any decision of WRC-15 in their aim to support existing and future operation of fixed satellite service earth stations receiving meteorological data within the band 3 400-4 200 MHz)

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

1. Albania, Algeria, Germany, Andorra, Saudi Arabia, Austria, Azerbaijan, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cameroon, Cyprus, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Egypt, Spain, Estonia, Finland, France and French overseas departments and communities in Region 1, Gabon, Georgia, Greece, Guinea, Hungary, Ireland, Iceland, Israel, Italy, Jordan, Kuwait, Lesotho, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Malawi, Mali, Malta, Morocco, Mauritania, Moldova, Monaco, Mongolia, Montenegro, Mozambique, Namibia, Niger, Norway, Oman, Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Senegal, Serbia, Sierra Leone, Slovenia, South Africa, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia, Turkey, Ukraine, Zambia and Zimbabwe, [↑](#footnote-ref-1)