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| Summary:  |
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| Proposal: |
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DRAFT CEPT BRIEF ON AGENDA ITEM 1.3

1.3 to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz, in accordance with Resolution 766 (WRC-15);

# ISSUE

Resolution 766 (WRC-15) invites WRC-19 to consider, based on the results of ITU Radiocommunication Sector (ITU-R) studies, the possibility of upgrading the secondary MetSat (space-to-Earth) allocation to primary status and adding a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz, while providing protection and not imposing any additional constraints on existing primary services to which the frequency band is already allocated and in the adjacent frequency bands.

# Preliminary CEPT position

CEPT supports that the MetSat (space-to-Earth) allocation should be upgraded from secondary to primary status and a primary EESS (space-to-Earth) allocation should be added in the frequency band 460-470 MHz provided that

priority of MetSat over EESS as currently expressed in the RR is retained;

the protection of primary services in the frequency band and in adjacent frequency bands is ensured;

“MetSat and EESS earth stations will not claim protection from stations in the fixed and mobile services”, as stated in recognizing f) of Res 766.

# Background

Data Collection Systems (DCS) operate on geostationary and non-geostationary orbits in the meteorological‑satellite service (MetSat) and the Earth exploration-satellite service (EESS) (Earth‑to-space) systems in the frequency band 401-403 MHz (uplink) and 460-470 MHz (downlink). DCS systems are essential for monitoring and predicting climate change, monitoring ocean, and water resources, weather forecasting and assisting in protecting biodiversity, as well as improving maritime security.

Data collection systems have been operating globally under a secondary allocation and on a primary basis in some countries under No 5.290, but this use is constrained by coordination under Article 9.21. This has led to differing limitations and protection criteria and has posed a barrier to implementation of essential DCS components on a global basis.

One of the EESS/MetSat usages comprises the data collection platforms gathering information activity related to the Earth, the environment and scientific application, weather and environment observation. The data, which are collected by ground platforms, are sent to the corresponding satellites that retransmit the retrieved information to dedicated earth stations. DCS are particularly useful for the collection of data from remote and inhospitable locations where it may provide the only possibility for data relay. Even so, the system has very many uses in areas with a highly developed infrastructure. The installations required for relay of the data tend to be inexpensive, unobtrusive and normally blend easily into the local environment.

The frequency band 460-470 MHz is currently allocated to the MetSat service (space-to-Earth) on a secondary basis. However, it is to be noted that the MetSat service is primary in a few countries according to No 5.290.

According to No. 5.289, Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460‑470 MHz and 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table of Allocations.

Amongst others, this band is currently used by the Advanced Data Collection System (A-DCS) also called ARGOS which is a unique worldwide location and data collection system dedicated to studying oceans and atmospheric conditions, preserving and monitoring wildlife, volcanoes, fishing fleets, shipments of dangerous goods, humanitarian applications and managing water resources.

DCS help the scientific community to better monitor and understand our environment, but also helps industry to comply with environmental protection regulations implemented by various governments. This positioning capability also permits applications such as monitoring drifting ocean buoys and studying wildlife migration paths.

A primary allocation to the MetSat service and EESS (downlink) in the frequency band 460-470 MHz would provide confidence to space and meteorological agencies deeply involved in Satellite Data Collection Programs and the public sectors funding the development and operation of such systems. These space programs have been representing a long term effort and investment for decades between the time when the program is officially decided, the development, the launch phase, the time when the various satellites are in operation, keeping in mind that usually many satellites are deployed in order to provide a continuous service. In addition, space and meteorological agencies are investing in the continuity of these programs providing subsequent satellites and payloads. An upgrade would also provide the necessary long-term continuity for these programs of public interest.

An upgrade of the existing MetSat allocation and a new primary EESS allocation would allow operators of Data collection platforms to design and operate their systems with more confidence. Regulatory measures need to be developed to protect the mobile and fixed service. One method usually used to protect the incumbent terrestrial services from a satellite downlink signal, is to use an adequate pfd (power flux density) limit.

ITU-R Working Party (WP) 7B which is responsible for this agenda item is drafting a report regarding this agenda item. A revised version of this PDN Report provides an almost complete list of technical elements related to EESS and METSAT as well as other incumbent services in the band 460-470 MHz. Moreover, in order to have adequate pfd levels on the ground, future satellites may implement spread spectrum multiple access (SSMA) transmission techniques. The report also includes a draft list of the technical characteristics of the incumbent services, from several ITU-R Reports and Recommendations listed in the following section. An important step has been made to synthetize technical elements in order to propose a single set of parameters to be used in studies toward the derivation of relevant pfd limits to protect incumbent services operated in-band or in adjacent bands.

WP5A, WP5C and WP5D provided WP7B the list of systems and characteristics of the fixed and mobile systems deployed in the frequency band 460-470 MHz.

WP 5A indicated that for narrow band systems (systems having bandwidths such as 6.25 12.5 or 25 kHz), both Mobile Stations (MS) and Base Stations (BS) can be receiving in the 460-470 MHz. Recommendation ITU-R M.1808 indicates the list of required parameters: sensitivity, bandwidth, antenna gain and protection ratio. However, for systems having larger bandwidths (1 250 kHz in Recommendation ITU-R M.1808 or 1 230 kHz in Report ITU-R M.2110 referenced as CDMA450 from the IMT-2000 family) the mobile stations (MS) are receiving in the band 460-470 MHz. WP5D confirmed the characteristics of the systems corresponding to the IMT-2000 family, and also the fact that these mobile stations use the higher part (460-470 MHz) of the duplex frequency 450-470 MHz for receiving.

WP5A also indicated that Report ITU-R M.2014 contains information on the digital land mobile systems for Land Mobile services including PPDR. Radio interface standards for PPDR are included in Recommendation ITU‑R M.2009. The main PPDR technologies that can be used for this study are Analogue, Project 25, TETRA and LTE. Technical parameters of Analogue (FM), Project 25 (Digital C4FM) and TETRA (BPSK, QPSK, 8-PSK, 16-QAM) technologies are all reflected within Recommendation ITU‑R M.1808. The characteristics of LTE systems used by WP 7B for sharing studies under this agenda item for PPDR applications within the frequency band 460-470 MHz are taken from [ECC Report 240](http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP240.PDF) and the PPDR transmissions have a 3 MHz bandwidth. In addition, WP 5A pointed out that PPDR will also be using a bandwidth of 5 MHz in this band and the parameters for LTE with a 3 MHz bandwidth can also be used for LTE with a 5 MHz bandwidth.

Currently in the ITU-R PDNR “Studies related to proposed change in 460-470 MHz secondary allocation for MetSat to primary and addition of primary allocation to EESS”, the following mask for non-GSO satellites is given to protect some terrestrial services:

This pfd mask needs to be updated at the next WP7B meeting.

However, CEPT studies show that the following pfd mask for non-GSO satellites is needed to protect the fixed service:

Further studies are required then to assess the effect of this mask on the other incumbent services in that frequency band and maybe changed, if needed.

In addition, the WP7B Preliminary Draft New Report shows that the protection of the radio astronomy service in the frequency band 406.1-410 MHz from the non-GSO DCS downlink emissions is ensured through a filtering pattern. Therefore, the EESS (space-to-Earth) for non-GSO DCS emissions will not cause interference to the radio astronomy stations in the 406.1-410 MHz frequency band.

Studies to protect the broadcasting service in the adjacent band need to be completed.

# List of relevant documents

## ITU-Documentation (Recommendations, Reports, other)

* Recommendation ITU-R F.699: Reference radiation patterns for fixed wireless system antennas for use in coordination studies and interference assessment in the frequency range from 100 MHz to about 70 GHz
* Recommendation ITU-R F.755: Point-to-multipoint systems in the fixed service
* Recommendation ITU-R F.758: System parameters and considerations in the development of criteria for sharing or compatibility between digital fixed wireless systems in the fixed service and systems in other services and other sources of interference
* Recommendation ITU-R M.478: Technical characteristics of equipment and principles governing the allocation of frequency channels between 25 and 3 000 MHz for the FM land mobile service
* Recommendation ITU-R M.1767: Protection of land mobile systems from terrestrial digital video and audio broadcasting systems in the VHF and UHF shared bands allocated on a primary basis
* Recommendation ITU-R M.1808: Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 869 MHz to be used in sharing studies
* Report ITU-R M.2039: Characteristics of terrestrial IMT-2000 systems for frequency sharing/interference analyses
* Report ITU-R M.2110: Sharing studies between radiocommunication services and IMT systems operating in the 450-470 MHz band dated 2007
* Annex 19 to Working Party 7B Chairman’s Report, April 2017: Preliminary Draft New Report ITU-R SA.[460 MHZ METSAT-EESS]: Studies related to proposed change in 460-470 MHz secondary allocation for MetSat to primary and addition of primary allocation to EESS

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

* ECC Decision EEC/DEC/(16)02: Harmonised technical conditions and frequency bands for the implementation of (BB-PPDR) systems
* ECC Decision EEC/DEC/(08)05: Harmonisation of frequency bands for the implementation of digital PPDR radio applications in 380-470 MHz range
* ECC Decision EEC/DEC/(06)06: Narrow Band Digital Land Mobile PMR/PAMR in the 80 MHz, 160 MHz and 400 MHz bands
* ECC Decision EEC/DEC/(04)06: Wide Band Digital PMR/PAMR in the 400 MHz and 800/900 MHz
* ECC Report 240: Studies for BB PPDR and other applications in 410-430 and 450-470 MHz and adjacent bands
* ECC Report 218: Harmonised conditions and spectrum bands for the implementation of future European BB-PPDR systems
* ECC Report 104: Mobile systems in the band 450-470 MHz vs DVB-T in UHF TV channel 21
* ECC Report 39: Impact of CDMA-PAMR on 12.5/25 kHz PMR/PAMR in 410-430/450-470 MHz

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

# Actions to be taken

Determine technical and operational characteristics of BS systems operating in adjacent band

Verify whether the pfd mask assumed to protect the fixed service will also protect the mobile service operating in this frequency range and the broadcast service in the adjacent band

Examine possible regulatory actions

Support the development of a pfd-mask for GSO satellites

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

## European Union (date of proposal)

## Regional telecommunication organisations

APT (21 July 2017)

APT Members support the ITU-R studies in accordance with Resolution 766 (WRC-15) to conduct and complete, in time for WRC-19, the necessary technical, operational and regulatory studies on the possibility to upgrade the secondary allocation of the meteorological-satellite service (space-to-Earth) to primary status and a primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460‑470 MHz. provided that the appropriate measures are taken to ensure the protection of, and also not imposing additional constraints on the existing primary services in the band 460-470 MHz and also in the adjacent bands.

ATU (May 2017)

No preliminary position on this agenda item yet.

But the APM19-2 agreed to:

Encourage administrations to contribute and actively participate in the studies being carried out in accordance with Resolution 766 (WRC 15) whilst maintaining a “no change “ to the current allocation status until studies prove that incumbent services are adequately protected with no additional constraints imposed on them. This view was informed by the heavy deployment of Mobile and Digital terrestrial television (DTT) services in the band and adjacent band in the majority of the African countries which need to be protected.

ASMG (20 April 2017)

* These frequency bands are widely used in Arab countries for mobile and fixed services.
* ASMG doesn’t support the possible upgrading of the secondary allocation to the meteorological satellite service (space-to-earth) to primary status and a primary allocation to the Earth exploration satellite service (space-to-earth) in the frequency band 460-470MHz.
* Follow up studies under this agenda item and ensure the protection of the existing services.

CITEL (09 January 2018)

No preliminary view on this agenda item yet.

But the following issues are currently under discussion:

* An upgrade of the Metsat and EESS allocation to primary status would provide regulatory certainty for data collection systems.
* Measures need to be taken to ensure protection of and that no constraints are put on, fixed and mobile services, including the use of the band for IMT.

United States of America

The United States supports conducting and completing sharing and compatibility studies with the co-primary fixed and mobile services, including IMT systems. These studies would determine the feasibility of potentially upgrading the MetSat (space-to-Earth) allocation to primary status, and the potential addition of a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz, while protecting the current primary allocations for fixed and land mobile services including IMT systems and maintaining the conditions contained in No. 5.289

RCC (09 January 2018)

The RCC Administrations consider that there is a need to harmonize frequency allocations used by data collection systems (DCS) in the meteorological-satellite service and the Earth exploration-satellite service.

The RCC Administrations support studies on this issue, in particular, for the purpose of establishing the constraints for space stations, which ensure acceptable interference level.

However upgrading the secondary allocation to the meteorological-satellite service (space-to-Earth) to a primary status and a primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz are possible under the following conditions:

* The protection of the terrestrial services to which the frequency band 460-470 MHz is allocated on a primary basis, which ensure acceptable interference level;
* The proposed measures for the protection of the terrestrial services will not impose additional constraints on the existing satellite systems and the networks operated within meteorological-satellite service and the Earth exploration-satellite service;
* Maintaining priority of the meteorological-satellite service over the Earth exploration-satellite service.

## International organisations

IATA (date of proposal)

ICAO (September 2016)

No position so far

IMO (July 2017)

Protection of the existing maritime mobile service used for on-board communication stations to which the frequency band is already allocated on a primary basis should be ensured, and no additional constraints should be imposed.

NATO (27 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 1.3. It does not constitute a common position of the NATO Nations.

Several NATO nations are using the band 460 - 470 MHz for various types of military applications, mostly in the mobile service (PMR) on a shared basis with other users depending on countries.

SFCG (September 2017)

SFCG supports studies and analyses under Agenda Item 1.3 and the effort to raise the regulatory status of MetSat and EESS space-to-Earth usage. SFCG recognizes the need for harmonization of the global operating environment to allow full development of critical MetSat systems.

The MetSat (space-to-Earth) allocation should be upgraded from secondary to primary status and a primary EESS (space-to-Earth) allocation should be added in the frequency band 460-470 MHz while providing protection and not imposing any additional constraints on existing primary services to which the frequency band is already allocated. This should be realised while retaining the priority of MetSat over EESS as currently expressed in the RR. The SFCG does not support limitations on an upgraded allocation which would make the allocation effectively unusable.

WMO and EUMETNET (January 2017)

WMO supports the upgrade of the METSAT (space-to-Earth) allocation to primary in the frequency band 460-470 MHz with the use of an appropriate PFD limit to protect incumbent services.

WMO also supports creation of a primary allocation to the EESS (space-to-Earth) in the frequency band 460-470 MHz with the use of an appropriate PFD limit to protect incumbent services, while retaining the priority of MetSat over EESS as currently expressed in footnote RR No. 5.289.

EUMETSAT (October 2016)

EUMETSAT supports the SFCG position on this WRC-19 agenda item.

## Regional organisations

ESA (October 2016)

ESA supports the SFCG position on this WRC-19 agenda item.

Eurocontrol (date of proposal)

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (September 2016)

No position so far