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| **Radiocommunication Study Groups** |  |
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| Source:  Subject: WRC-19 agenda item 1.15 [Resolution **767 (WRC-15)**](http://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000C0016PDFE.pdf) |  |
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| Working document towards draft cpm text  for wrc-19 agenda item 1.15 | |

CHAPTER 1

Land mobile and fixed issues

(Agenda items 1.11, 1.12, 1.14, 1.15)

Agenda item 1.15

(**WP 1A** / **WP 3J**[[1]](#footnote-1)1, **WP 3K**1, **WP 3M**1, **WP 5A**[[2]](#footnote-2)2, **WP 5C**2, **WP 7C**[[3]](#footnote-3)3, **WP 7D**3,   
(WP 4A), (WP 5D), (WP 6A))

*1.15 to consider identification of frequency bands for use by administrations for the land-mobile and fixed services applications operating in the frequency range 275-450 GHz, in accordance with Resolution* ***767 (WRC-15)****;*

Resolution **767 (WRC‑15)** – *Studies towards an identification for use by administrations for land-mobile and fixed services applications operating in the frequency range 275 450 GHz*

# 1/1.15/1 Executive summary

This agenda item seeks to identify spectrum for LMS and FS application in the 275-450 GHz band while ensuring the protection of the existing EESS(passive) and RAS applications identified in RR No. **5.565**. Working Party 1A is developing a new sharing report SM.[275-450GHz SHARING]. This sharing report contains the results of compatibility studies between LMS and FS applications and both EESS(passive) and RAS in the 275-450 GHz band.

Preliminary studies concerning the compatibility of EESS(passive) and LMS and FS applications concluded that the following bands currently identified for EESS (passive) in RRN**° 5.565** cannot be made available to the FS: [296-306 GHz, 313-320 GHz and 331-356 GHz]. In the remaining parts of the 275-450 GHz range, FS identification can be envisaged noting that these results do not include an assessment of compatibility with the radio astronomy service. Further studies are needed to examine the compatibility between EESS(passive) and other LMS/FS applications.

Compatibility studies between the RAS and LMS/FS applications concluded that atmospheric attenuation independent of free-space losses at 275–450 GHz is not sufficient to provide compatibility between FS and RAS operations in the absence of other considerations. Separation distances and or avoidance angles between RAS stations and FS stations should be considered depending on the deployment environment of FS stations.

The method identified that may satisfy the agenda item are listed below:

**Method A** – Identify the frequency bands that are compatible with both EESS(passive) and RAS with respect to the land-mobile and fixed service applications by a new footnote.

**Other methods** – [TBD]

# 1/1.15/2 Background

RR N**° 5.565** was revised in accordance with Resolution **950 (Rev.WRC-07)**, and the specific frequency bands were identified for measurements by passive services, such as the radio astronomy service, the earth exploration satellite service (passive), and the space research service (passive). The bands of interest to EESS/SRS (passive) from 275 to 3 000 GHz have been addressed in Report ITU-R RS.2194 and the sharing studies between the radio astronomy service and active services in the frequency range 275-3 000 GHz have been conducted in Report ITU-R RA.2189. In the specific identification of the frequencies in the range of 275-1 000 GHz, the passive services do not preclude use of this range by active services.

The active devices which can operate above 275 GHz were researched and developed by many R & D organizations and the applications of high-data-rate wireless communication systems above 100 Gbit/s have been discussed within international standardization organizations. Several use cases such as wireless links for data centers, close proximity wireless connections, intra-device communications and fronthaul/backhaul links which are expected to be operated in the band above   
275 GHz are summarized in Report ITU-R SM.2352. The studies on the land mobile and fixed service applications have been studied by the relevant Working Parties based on Question ITU-R 256/5 and 257/5, respectively. The reports ITU-R F.[300GHz\_FS\_CHAR] and ITU-R M.[300GHz\_MS\_CHAR] summarize the technical and operational parameters as well as the spectrum needs for each of the applications.

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# 1/1.15/3 Summary and Analysis of the results of ITU-R studies

*[This section should contain a summary of the technical and operational studies performed within ITU-R, including a list of relevant ITU-R Recommendations. Depending on the agenda item, this section could be divided in two parts, one part dealing with the summary of technical and operational studies* *and the other part dealing with the analysis of the results of studies.  
The results of the ITU-R studies should also be analysed with respect to the possible methods of satisfying the agenda item, and presented in a concise manner.]*

## 1/1.15/3.1 Technical and operational characteristics and spectrum needs

### 1/1.15/3.1.1 Land mobile service applications

Report ITU-R M.[300GHZ\_MS\_CHAR] provides the technical and operational characteristics and spectrum needs of land-mobile service applications operating in the frequency band 275-450 GHz .

### 1/1.15/3.1.2 Fixed service applications

Report ITU-R F.[300GHZ\_FS\_CHAR] provides the technical and operational characteristics and spectrum needs of fixed service applications operating in the frequency band 275-450 GHz.

### 1/1.15/3.1.3 Passive service applications

[TBD]

## 1/1/15/3.2 Sharing and compatibility studies in the frequency range 275 to 450 GHz

[*Editor’s note: In 1/1.15/3.2.2 the Frequency range 275 to 450 GHz is added because the characteristics of the LMS include the range 275-450 GHz and those of the FS include 275-325 GHz and 380-445 GHz These two sections can be merged, stay separated or be divided in different sub-bands so that the final structure reflects the results of the sharing studies in the end.*]

The frequency band 275-323 GHz is identified for radio astronomy service application, and the frequency bands 275-286 GHz, 296-306 GHz and 313-356 GHz for Earth exploration-satellite service (passive) and space research service (passive) applications. In the frequency range below 275 GHz, the band 265-275 GHz is allocated to FS, FSS (Earth-to-space), MS and RAS, where   
No. **5.149** applies.

#### 1/1.15/3.2.1. Sharing and compatibility studies for EESS (passive)

The studies concluded that the following bands currently identified for EESS (passive) in RRN**° 5.565** cannot be made available to the FS: [296-306 GHz, 313-320 GHz and 331-356 GHz]. In the remaining parts of the 275-450 GHz range, FS identification can be envisaged noting that these results do not include compatibility with the radio astronomy service which is addressed in the following section.

#### 1/1.15/3.2.2 Sharing and compatibility studies for RAS

Compatibility studies between the RAS and LMS/FS applications concluded that atmospheric attenuation independent of free-space losses at 275–450 GHz is not sufficient to provide compatibility between FS and RAS operations in the absence of other considerations. In the bands identified for RAS in RR N**°** **5.565** (275-323 GHz, 327-371 GHz, 388-424 GHz and 426-442 GHz), separation distances and or avoidance angles between RAS stations and FS stations should be considered depending on the deployment environment of FS stations.

# 1/1.15/4 Methods to satisfy the agenda item

The following methods are considered to satisfy this agenda item and may be applied to the candidate frequency bands. These are:

**Method A** – Identify the frequency bands that are compatible with both EESS(passive) and RAS with respect to the land-mobile and fixed service applications by a new footnote.

**Other methods** – [TBD]

## 1/1.15/4.1 Frequency band 275-450 GHz

Method A – New footnote 5.A115 to the relevant part of the Radio Regulations is proposed.

Reason: Studies have shown compatibility between EESS(passive) and RAS in all band except [296-306 GHz, 313-320 GHz and 331-356 GHz]. The remaining spectrum can be identified for LMS/FS applications [pending the results of further studies].

# 1/1.15/5 Regulatory and procedural considerations

Examples of regulatory text relating to Method A to satisfy the agenda item

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations  
(See No. 2.1)

|  |  |  |
| --- | --- | --- |
| 248-3 000 GHz | | |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 248-250 AMATEUR  AMATEUR-SATELLITE  Radio astronomy  5.149 | | |
| 250-252 EARTH EXPLORATION-SATELLITE (passive)  RADIO ASTRONOMY  SPACE RESEARCH (passive)  5.340 5.563A | | |
| 252-265 FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space)  RADIO ASTRONOMY  RADIONAVIGATION  RADIONAVIGATION-SATELLITE  5.149 5.554 | | |
| 265-275 FIXED  FIXED-SATELLITE (Earth-to-space)  MOBILE  RADIO ASTRONOMY  5.149 5.563A | | |
| 275-3 000 (Not allocated) 5.565 ADD 5.A115 | | |

ADD

**5.A115** The following frequency bands are identified for use by administrations for the implementation of the following active service applications:

* land-mobile service applications: 275-296 GHz, XXX-YYY GHz, …. 380-392 GHz, XXX-YYY GHz, 409-411 GHz, XXX-YYY GHz, 439-450 GHz;
* fixed service applications: 275-296 GHz, XXX-YYY GHz, …. 380-392 GHz, XXX-YYY GHz, 409-411 GHz, XXX-YYY GHz, 439-450 GHz;

Administrations wishing to make these identified frequency bands available for land-mobile and/or fixed service applications are urged to take all practicable steps to protect passive services operating according to RR N°**5.565** until the date when the Table of Frequency Allocations is established in the 275-1 000 GHz frequency range. Frequency bands in the 275-450 GHz range not identified under this footnote were deemed incompatible with the existing EESS(passive) and RAS applications identified in RR N°**5.565**.

In the frequency bands 275-323 GHz, 327-371 GHz, 388-424 GHz and 426-442 GHz, some specific conditions (e.g. minimum separation distances and/or avoidance angles) may be necessary to ensure protection of radio astronomy sites from land-mobile and/or fixed service applications, on a case by case basis.

SUP

RESOLUTION 767 (WRC-15)

Studies towards an identification for use by administrations for land-mobile and fixed services applications operating in the frequency range 275-450 GHz

1. 1 WP 3J, WP 3K and WP 3M will undertake studies with respect to the *invite ITU-R 3* andsubmit the initial results to WP 1A by November 2016 and final results of the studies before June 2017. [↑](#footnote-ref-1)
2. 2 WP 5A and WP 5C will undertake studies with respect to the *invite ITU-R 1* and *2* for applications in the land-mobile and fixed services and submit the initial results to WP 1A by November 2016 and final results of the studies before June 2017. [↑](#footnote-ref-2)
3. 3 WP 7C and WP 7D will developed technical and operational characteristics of passive systems and submit the initial information with this regards to WP 1A by November 2016 and final information before June 2017. [↑](#footnote-ref-3)