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| **Radiocommunication Study Groups** |  |
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| **Annex 8 to Working Party 5A Chairman’s Report** | |
| WORKING DOCUMENT TOWARDS DRAFT CPM TEXT | |
| CHAPTER 3  Aeronautical, maritime and radiolocation issues (Agenda items 1.5, 1.15, 1.16, 1.17, 1.18) | |

AGENDA ITEM 1.18

(WP 5B[[1]](#footnote-1)(1) for *invites ITU‑R i) and ii)* andWP 5A for *invites ITU‑R iii)* / WP 1B,  
WP 7B, WP 7C, WP 7D, (WP 3M))

*1.18 to consider a primary allocation to the radiolocation service for automotive applications in the 77.5-78.0 GHz frequency band in accordance with Resolution* ***(WRC-12)****;*

Resolution **654 (WRC-12)**: Allocation of the band 77.5-78 GHz to the radiolocation service to support automotive short-range high-resolution radar operations

## 3/1.18/1 Executive summary

[TBD]

## 3/1.18/2 Background

Portions of the 76-81 GHz frequency band are allocated to the radio astronomy service (RAS), amateur and amateur-satellite and radiolocation services on a primary or secondary basis and to the space research (space-to-Earth) service on a secondary basis. At frequencies above 30 GHz, radio propagation decreases more rapidly with distance than at lower frequencies and antennas that can narrowly focus transmitted energy are practical and of modest size. While the limited range of such transmissions might appear to be a major disadvantage for many applications, it does allow the reuse of frequencies over very short distances and, thereby enables a higher concentration of transmitters to be located in a geographical area than is possible at lower frequencies.

The attenuation of the transmissions, however, varies depending on the water vapour content of the atmosphere and other atmospheric factors.

There has been significant growth in the use of automobile radar systems, and these systems are expected to become relatively commonplace within a few years because of consumer demand for increased vehicle safety. Studies have shown that the use of collision avoidance technology can prevent or lessen the severity of a significant number of traffic accidents. In certain parts of the world, automotive radars have successfully operated in this portion of the spectrum, particularly the 76-77 GHz band, for many years without mitigation methods or deactivation methods and without increased reports of interference to licensed services.

The ITU Council, in adopting Resolution 1318 (Council 2010), stated that ICTs, including intelligent transport systems (ITS), provide mechanisms for human and vehicle safety; and invited members of the union to take practical steps to further national and domestic policies, programs and/or educational initiatives in the use of ICTs to improve global road safety.

#### 3/1.18/2.x Regulatory status of radiolocation service in the frequency band 76-81 GHz

Currently, the radiolocation service is allocated globally on primary basis in the 76-77.5 GHz, and 78-81 GHz frequency bands. Obtaining a possible global primary radiolocation allocation in the 77.5-78 GHz frequency band provides for a harmonized, contiguous band for radiolocation service, including collision avoidance related automotive radar applications in the 76-81 GHz frequency band. It should be noted that RR No. **5.149** urges administrations to take all practicable steps to protect the radio astronomy service from harmful interference in the band. A primary allocation to the radiolocation service in the frequency band 77.5-78 GHz would establish regulatory priority over the radio astronomy and space research (space-to-Earth) services, which are allocated on a secondary basis. Means to ensure that the provisions of FN No **5.149** are not diminished may need to be considered.

## 3/1.18/3 Summary of the technical and operational studies, including a list of relevant ITU-R Recommendations

[TBD]

## 3/1.18/4 Analysis of the results of studies relating to the possible methods of satisfying the agenda item

[TBD]

## 3/1.18/5 Method(s) to satisfy the agenda item for consideration by the WRC-15 and the advantages and disadvantages of each method

[TBD]

### 3/1.18/5.1 Method A

A primary allocation to the radiolocation service on a worldwide basis, limited to automotive applications, between 77.5 GHz and 78 GHz.

Advantages

– Provides worldwide harmonization for safety and collision avoidance related automotive radar applications in the 76-81 GHz frequency band, which, if implemented, will very likely result in reduced traffic fatalities and injuries on the road.

– Provides a broader manufacturing base and increased volume of equipment (globalization of markets) resulting in economies of scale and expanded equipment availability.

– The nature of these short range automotive radars along with the propagation characteristics of the 76-81 GHz frequency band will facilitate sharing with incumbent services.

Disadvantage

– In some areas, mitigation methods such as appropriate emission power limits   
and antenna height limits may be needed to avoid potential interference to the radio astronomy service (RAS) operating in the 77.5-78 GHz band. It should however be noted that there are already primary allocations to the radiolocation service in the bands 76-77.5 GHz and 78-81 GHz.

### 3/1.18/5.2 Method B

A primary allocation to the radiolocation service on a worldwide basis between 77.5 GHz and 78 GHz.

Advantages

– Provides worldwide harmonization for radiolocation in the 76-81 GHz frequency band that would enable short-range high-resolution radar applications, including the safety and collision avoidance related automotive radar applications, which, if implemented, will very likely result in reduced traffic fatalities and injuries on the road.

– Provides a broader manufacturing base and increased volume of equipment (globalization of markets) resulting in economies of scale and expanded equipment availability.

– The nature of these short-range radars along with the propagation characteristics of the 76-81 GHz frequency band will facilitate sharing with incumbent services.

– Would not limit the future development of short-range high-resolution radar to automotive applications.

Disadvantage

– In some areas, mitigation methods such as appropriate emission power limits and antenna height limits may be needed to avoid potential interference to the radio astronomy service (RAS) operating in the 77.5-78 GHz band. It should however be noted that there are already primary allocations to the radiolocation service in the bands 76-77.5 GHz and 78-81 GHz.

## 3/1.18/6 Regulatory and procedural considerations

Table 1 below is an extract of Article **5** of the RR in the 76-81 GHz frequency band and the related footnotes.

Table 1

Existing allocations in the frequency band 76-81 GHz

76-81 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| … | | |
| 76-77.5 RADIO ASTRONOMY  RADIOLOCATION  Amateur  Amateur-satellite  Space research (space-to-Earth)  5.149 | | |
| 77.5-78 AMATEUR  AMATEUR-SATELLITE  Radio astronomy  Space research (space-to-Earth)  5.149 | | |
| 78-79 RADIOLOCATION  Amateur  Amateur-satellite  Radio astronomy  Space research (space-to-Earth)  5.149 5.560 | | |
| 79-81 RADIO ASTRONOMY  RADIOLOCATION  Amateur  Amateur-satellite  Space research (space-to-Earth)  5.149 | | |

5.560 In the band 78-79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz, 4 950-4 990 MHz, 102-109.5 GHz,

25 550-25 670 kHz, 4 990-5 000 MHz, 111.8-114.25 GHz,

37.5-38.25 MHz, 6 650-6 675.2 MHz, 128.33-128.59 GHz,

73-74.6 MHz in Regions 1 and 3, 10.6-10.68 GHz, 129.23-129.49 GHz,

150.05-153 MHz in Region 1, 14.47-14.5 GHz, 130-134 GHz,

322-328.6 MHz, 22.01-22.21 GHz, 136-148.5 GHz,

406.1-410 MHz, 22.21-22.5 GHz, 151.5-158.5 GHz,

608-614 MHz in Regions 1 and 3, 22.81-22.86 GHz, 168.59-168.93 GHz,

1 330-1 400 MHz, 23.07-23.12 GHz, 171.11-171.45 GHz,

1 610.6-1 613.8 MHz, 31.2-31.3 GHz, 172.31-172.65 GHz,

1 660-1 670 MHz, 31.5-31.8 GHz in Regions 1 and 3, 173.52-173.85 GHz,

1 718.8-1 722.2 MHz, 36.43-36.5 GHz, 195.75-196.15 GHz,

2 655-2 690 MHz, 42.5-43.5 GHz, 209-226 GHz,

3 260-3 267 MHz, 48.94-49.04 GHz, 241-250 GHz,

3 332-3 339 MHz, 76-86 GHz, 252-275 GHz

3 345.8-3 352.5 MHz, 92-94 GHz,

4 825-4 835 MHz, 94.1-100 GHz,

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. **4.5** and **4.6** and Article **29**).     (WRC‑07)

### 3/1.18/6.1 Method A

The regulatory approach under this Method is to add a primary allocation for the radio location service in the Table of Frequency Allocations of RR Article **5**, and add a footnote limiting radiolocation operations in 77.5-78 GHz to automotive applications and, if necessary, including relevant technical limitations (See the Editor’s Note below). Sharing studies will assess whether mitigation measures such as emission power limits may be needed to avoid potential interference with RAS in the band. The other consequential action under this method would be to suppress Resolution **654 (WRC-12)**.

ARTICLE 5

Frequency allocations

**MOD**

76-81 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| … | | |
| 76-77.5 RADIO ASTRONOMY  RADIOLOCATION  Amateur  Amateur-satellite  Space research (space-to-Earth)  5.149 | | |
| 77.5-78 AMATEUR  AMATEUR-SATELLITE  RADIOLOCATION 5.A118  Radio astronomy  Space research (space-to-Earth)  5.149 | | |
| 78-79 RADIOLOCATION  Amateur  Amateur-satellite  Radio astronomy  Space research (space-to-Earth)  5.149 5.560 | | |
| 79-81 RADIO ASTRONOMY  RADIOLOCATION  Amateur  Amateur-satellite  Space research (space-to-Earth)  5.149 | | |

*[Editor’s note: The ongoing sharing studies will assess whether technical limitations such as emission power limits and antenna height limits are needed to avoid potential interference to incumbent services. In the case the studies conclude that technical limitations are needed, it would be necessary to add appropriate text referring to the system characteristics including power limits.*

*It is anticipated that automotive radars will standardize their system and operational characteristics in order to harmonize operations on a world-wide basis in the band. WP 5A is currently developing a Recommendation ITU-R M.[AUTO] which describes the system and operational characteristics including power levels for automotive radars operating in the   
76-81 GHz band.]*

**ADD 5.A118**

The use of the 77.5-78 GHz frequency band by the radiolocation service is limited to automotive applications.

**SUP**

RESOLUTION 654 (WRC-12)

Allocation of the band 77.5-78 GHz to the radiolocation service to support automotive short-range high-resolution radar operations

### 3/1.18/6.2 Method B

The regulatory approach under this Method is to add a primary allocation to RLS in the Table of Frequency Allocations of RR Article **5**, and add, if necessary, a footnote with relevant technical limitations (See the Editor’s Note below. Sharing studies will assess whether mitigation measures such as emission power limits and antenna height limits may be needed to avoid potential interference with RAS in the band. The other consequential action under this method would be to suppress Resolution **654 (WRC-12)**.

ARTICLE 5

Frequency allocations

**MOD**

76-81 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| … | | |
| 76-77.5 RADIO ASTRONOMY  RADIOLOCATION  Amateur  Amateur-satellite  Space research (space-to-Earth)  5.149 | | |
| 77.5-78 AMATEUR  AMATEUR-SATELLITE  RADIOLOCATION 5.A118  Radio astronomy  Space research (space-to-Earth)  5.149 | | |
| 78-79 RADIOLOCATION  Amateur  Amateur-satellite  Radio astronomy  Space research (space-to-Earth)  5.149 5.560 | | |

*[Editor’s note: The ongoing sharing studies will assess whether technical limitations such as emission power limits and antenna height limits are needed to avoid potential interference to incumbent services. In the case the studies conclude that technical limitations are needed, it would be necessary to add appropriate text referring to the system characteristics.*

*It is anticipated that short-range high-resolution radar applications will standardize their system and operational characteristics in order to harmonize operations on a world-wide basis in the band. WP 5A is currently developing a Recommendation ITU-R M.[AUTO] which describes the system and operational characteristics including power levels for automotive radars operating in the 76-81 GHz band. These and other studies should be used to develop possible regulatory text. Any footnote should be general and not refer to specific systems or applications.]*

**5.A118**

TBD

**SUP**

RESOLUTION 654 (WRC-12)

Allocation of the band 77.5-78 GHz to the radiolocation service to support automotive short-range high-resolution radar operations

1. (1) (based on spectrum requirements from Working Party 5A). [↑](#footnote-ref-1)