

Draft European Common Proposals regarding WRC-07 Agenda Item 1.5

PART [..]

Agenda Item 1.5 – Additional allocations to aeronautical telemetry/telecommand

Introduction

WRC-07 agenda item 1.5 invites the Conference “to consider spectrum requirements and possible additional spectrum allocations for aeronautical telecommand and high-bit rate aeronautical telemetry, in accordance with Resolution 230 (WRC-03)”. Based on the assessment requested by Resolution 230 (WRC-03), Europe’s position is that:

1. Europe supports at least 105 MHz additional spectrum requirements to satisfy wideband aeronautical mobile telemetry requirements above 3 GHz based on studies related to Aeronautical flight testing.
 2. No secondary allocation to the mobile service in the frequency band 3 – 16 GHz has been identified for the implementation of wideband aeronautical telemetry and associated telecommand.
 3. Due to successful results of sharing studies to accommodate spectrum requirements for telemetry, Europe supports a primary allocation to the aeronautical mobile service in the band [5030-5091], 5091-5150 and 5150-5250 MHz for telemetry links. [In the band 5 030 – 5 091 MHz the telemetry is limited to flight testing]. The protection of services currently allocated is ensured by pfd limits per AMT station based on a worst case scenario for flight testing deployment.
- Europe does not support any additional AMS allocation for the use of UAV payloads as it is assessed that the current MOBILE allocations below 16 GHz should be sufficient for the short term requirement.
4. Due to the unavailability of the aeronautical technology it is assessed that the bands already allocated to mobile service above 16 GHz are not suitable for the short term telemetry and associated telecommand requirements. Therefore the European position is not to further study these bands.

Taking into account the above proposals Article 5 would be amended as follows:

Proposals

MOD EUR/1.5/1

4800 - 5570 MHz

Allocation to services		
Region 1	Region 2	Region 3
5 030-5 091	AERONAUTICAL RADIONAVIGATION	
[AERONAUTICAL MOBILE ADD 5.ZZZ]	5.367	MOD 5.444
5 091 - 5 150	AERONAUTICAL RADIONAVIGATION	
	AERONAUTICAL MOBILE ADD 5.ZZZ	
	5.367	MOD 5.444A
5150-5250	AERONAUTICAL RADIONAVIGATION	
	FIXED-SATELLITE (Earth-to-space) 5.447A	
	MOBILE 5.446A 5.446B	
	ADD 5.YYY ADD 5.XXX	
	5.446	5.447 5.447B 5.447C

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MOD EUR/1.5/2

5.444 The band 5030-5091 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band.

Reason: It is expected that MLS will be implemented primarily in the band 5030-5091 MHz with the band 5091-5150 MHz being used to meet those requirements that cannot be accommodated in the band 5030-5091 MHz. Therefore it is proposed to maintain the ARNS allocation in both bands but restrict the applicability of footnote 5.444 to the band 5030-5091 MHz to reflect the difference in expected MLS use between the two bands.

MOD EUR/1.5/3

5.444A *Additional allocation:* the band 5 091-5 150 MHz is also allocated to the fixed-satellite service (Earth to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A.

In the band 5 091-5 150 MHz, the following conditions also apply:

- prior to 1 January 2018, the use of the band 5 091-5 150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be made in accordance with Resolution 114 (Rev.WRC-03);
- after 1 January 2012, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;

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– after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation and the aeronautical mobile service. (WRC-03)

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ADD EUR/1.5/4

5.ZZZ The use of the band [5 030] [5 091] - 5 150 MHz by aeronautical mobile service shall be in accordance with Resolution [AMT 5 GHz (WRC-07)] and is limited to transmissions of telemetry; [the transmissions in the 5030-5091 MHz is limited to the flight testing].

ADD EUR/1.5/5

5.YYY The use of the band 5 150-5 250 MHz by aeronautical mobile service is limited to transmissions of telemetry. Resolution [AMT 5 GHz (WRC-07)] shall apply.

ADD EUR/1.5/6

5.XXX Telemetry stations in aeronautical mobile service operating in the bands 5150-5250 MHz shall not claim protection from other stations operating in accordance with the Table. **No5.43A** does not apply.

MOD EUR/1.5/7

5.446A The use of the bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile service except aeronautical mobile shall be in accordance with Resolution **229 (WRC-03)**.

ADD EUR/1.5/8

RESOLUTION ITU-R [AMT 5 GHz]

Use of the band [5 030-5091]-5 250 MHz by the aeronautical mobile service for the implementation of aeronautical mobile telemetry applications

The World Radiocommunication Conference (Geneva, 2007),

considering

- a) the allocation of the frequency band 5 030-5 150 MHz to the aeronautical radionavigation service;
- b) the allocation of the 5 091-5 150 MHz band to the fixed-satellite (FSS) (Earth-to-space), which is limited to feeder links of non-geostationary satellite (non-GSO) systems in the mobile-satellite service (MSS);

- c) that the band 5 000-5 150 MHz is also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. **9.21**;
- d) that the band 5 150 – 5 250 MHz is also allocated to the mobile service (MS) on a primary basis;

recognizing

- a) that spectrum efficiency is enhanced in situations where new applications can be implemented compatibly in heavily occupied bands;
- b) that studies have been conducted within the ITU-R concerning the sharing and compatibility of aeronautical mobile telemetry (AMT) for flight testing with other services in the band 5 030-5 150 MHz;

noting

- a) that ITU-R studies describe methods in Report ITU-R M.[AMS-FSS] for ensuring compatibility and sharing between the AMS and FSS operating in the band 5 091-5 250 MHz that result in interference from AMT aircraft stations transmissions, based on a worst case deployment scenario, to the fixed-satellite service spacecraft receivers of no more than 1% $\Delta T_{\text{satellite}}/T_{\text{satellite}}$;
- b) that Recommendation ITU-R M.[AMT 5 030-5 250 MHz] provides the technical and operational requirements for aircraft stations of aeronautical mobile service limited to transmissions of telemetry for flight testing that should be used by administrations as a technical guideline for establishing conformance requirements for aircraft stations for worldwide use,

resolves

- 1** that administrations choosing to implement aeronautical mobile telemetry in the band [5 030][5091] -5 150 MHz shall utilize the criteria set forth below:
- limit transmissions to aircraft stations only, see No. **1.83**;
 - bi-laterally coordinate with administrations operating Microwave Landing Systems and whose territory is located with the distance "D" of the AMT flight area, where "D" is determined by the following equation:

$$D = 43 + 10^{[127.55 - 20 \log(f) + E]/20}$$

where:

- D is the distance separation (km) triggering the coordination;
- f is the minimum frequency (MHz) used by the AMT system; and
- E is the peak equivalent isotropically radiated power density (dBW in 150 kHz) of the aircraft transmitter.

- 2** that, for the protection of the fixed satellite service, a telemetry aircraft station in the band 5 091-5 250 MHz should be designed in such a manner that one aircraft station transmitter power flux-density be limited to $-198.7 \text{ dB(W/(m}^2 \cdot 1.23 \text{ MHz))}$ at the FSS satellite orbit for spacecraft using full Earth coverage receive antennas. The FSS satellite orbit is taken at 1414 km altitude.

3 that, for the protection of the mobile service, in the 5 150-5 250 MHz frequency band, the maximum pfd produced at the surface of the Earth by emissions from an aircraft station, of an aircraft station system limited to transmissions of telemetry for flight testing network should not exceed: $-79.4 \text{ dB(W/(m}^2 \cdot 20\text{MHz))}-\text{Gr}(\theta)$

$\text{Gr}(\theta)$ represents the mobile service receiver antenna pattern versus elevation angle θ and is defined as follows:

WAS elevation antenna pattern

Elevation angle, φ (degrees)	Gain (dBi)
$45 < \varphi \leq 90$	-4
$35 < \varphi \leq 45$	-3
$0 < \varphi \leq 35$	0
$-15 < \varphi \leq 0$	-1
$-30 < \varphi \leq -15$	-4
$-60 < \varphi \leq -30$	-6
$-90 < \varphi \leq -60$	-5

4 that, for the protection of the AM(R)S, in the 5 030-5 150 MHz frequency band, the maximum pfd produced at the surface of the Earth by emissions from an aircraft station of an AMS system limited to transmissions of telemetry for flight testing network should not exceed: $-89.4 \text{ dB(W/(m}^2 \cdot 20\text{MHz))}-G_r(\theta)$.

$G_r(\theta)$ represents the mobile service receiver antenna pattern versus elevation angle θ and is defined as follows:

$$G_r(\theta) = \max[G_1(\theta), G_2(\theta)]$$

$$G_1(\theta) = 6 - 12 \left(\frac{\theta}{27} \right)^2$$

$$G_2(\theta) = -6 + 10 \log \left[\left(\max \left\{ \frac{|\theta|}{27}, 1 \right\} \right)^{-1.5} + 0.7 \right]$$

where:

$G(\theta)$: gain relative to an isotropic antenna (dBi)

θ : absolute value of the elevation angle relative to the angle of maximum gain (degrees)

5 that, the pfd limits in resolves 3 and 4 which protect terrestrial services may be exceeded on the territory of any country whose administration has so agreed.

Editorial note 1: to make more clear what the proposals are under the separate agenda items this proposal intends for the time being not to accommodate the requirements of both a.i.1.5 and a.i.1.6 of WRC-07. The proposal is aligned as far as practicable with the draft ECP for agenda item 1.6 and the intention is to align both proposals at later stage again in the framework of PT3.

Editorial note 2: the scope of the terms “flight testing” and “aeronautical security transmissions” needs to be studied

Rationale:

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Two studies conducted within CEPT under Resolution 230 (WRC-2003) indicate that wideband telemetry transmissions between aircraft under test and their associated remote stations will require at least 105 MHz. The most suitable candidate band for this purpose could be the band [5030][5091]-5250 MHz. However, the band 5091-5150 MHz is also proposed for AM(R)/AMS allocation under 1.6 Agenda Item and compatibility with this service can only be guaranteed by geographical/frequency separation. Therefore although the requirement is for 105 MHz the allocation of wider bandwidth allows flexibility in areas where such separation is required.