European Common Proposals regarding WRC-07 Agenda Item 1.17

PART [..]

Introduction

WRC-03 made a secondary allocation to the FSS for feeder links for non-geostationary-satellite networks in the mobile-satellite service with service links below 1 GHz through No 5.339A in the bands 1390-1392 MHz (Earth-to-space) and 1430-1432 MHz (space-to-Earth). However, due to the fact that there was a lack of studies and test measurements with regard to the protection of other services in the bands or in the passive band 1400-1427 MHz it was decided that these additional allocations shall not be used until the completion of all studies and the results of these studies reported to WRC-07.

The frequency band 1 350 – 1 400 MHz is allocated on a primary basis in all Regions to the radiolocation service and in Region 1 to the fixed and mobile services. The band 1 370 – 1 400 MHz is in all three Regions allocated on a secondary basis to the space research (passive) and Earth exploration-satellite (passive) services by 5.339. In addition, in 5 CEPT countries existing installations of the radio navigation service may continue to operate in the band 1 350- 1 400 MHz. The band 1330 – 1400 MHz is also used by the RAS for observations of the red-shifted hydrogen line and RR 5.149 urges administrations to take all practicable steps to protect it from harmful interference.

The band 1 400-1 427 MHz is allocated to the Earth exploration-satellite (passive) service, the radio astronomy service and the space research (passive) service on a worldwide basis. For the radio astronomy service (RAS) this band is the most important band for studies of the hydrogen line and for continuum observations. This band is also used world-wide for the Very Long Baseline Interferometry (VLBI) technique which is utilised for radio astronomical studies requiring the highest angular resolution. For the Earth exploration satellite service, the band 1400 – 1427 MHz is a vital resource for measuring salinity and other aspects of the Earth and its atmosphere. This band is one of the few bands for which footnote 5.340 prohibits all emissions, emphasising its particular importance for the science community.

The band 1427-1452 MHz is allocated on a primary basis to the fixed and mobile services worldwide. The band 1427-1429 MHz is also allocated on a primary basis to the space operation service (Earth-to-space) in all 3 Regions. In 8 countries the band 1429-1535 is also allocated on a primary basis to the aeronautical mobile service exclusively for the purposes of aeronautical telemetry within the national territory by 5.342.

a) Band 1430-1432 MHz (downlink)

CEPT and ITU-R studies based on the fractional degradation of performance criterion have concluded that a pfd limit of -164dBW/m² in 4 kHz should be adequate to protect the fixed service, as well as some stations in the mobile service. This pfd limit will impose severe constraints on the design of the downlink, and will conduct the SS satellite designers to opt for up-to-date modulation and coding techniques, increasing the cost, while maintaining a very low link margin.

In order to protect the aeronautical telemetry systems used under the mobile service in the territory of countries identified in 5.342 the following pfd limits are required :

–181	dB(W/m^2)	$0 \leq \alpha \leq 4$
–193 +20 log α	dB(W/m^2)	$4 < \alpha \leq 20$
–213.3 + 35.6 log α	dB(W/m^2)	$20 < \alpha \leq 60$
–150	dB(W/m^2)	$60 < \alpha \leq 90$

where α is the angle of arrival (degrees above the horizontal plane);

These limits are impossible to achieve, and will impose the satellite emissions to be shut down when in visibility of the territory of Administrations listed in 5.342. This basically makes the allocation unusable above a large part of the world including all CEPT countries.

To protect the radioastronomy service in the band 1400-1427 MHz, the following epfd limit would be required:

- An epfd limit of –243 dBW/m² in 27 MHz for 98 % of 2000 seconds measurement periods at each radio astronomy station for continuum observations, and
- An epfd limit of –259 dBW/m² in any 20 kHz for 98 % of 2000 seconds measurement periods at each radio astronomy station for spectral line observations.

Studies available in the ITU have shown that an unwanted power limit of -46 dBW in the passive band 1400-1427 MHz at the satellite antenna port would be sufficient to protect all EESS systems which are expected to use the band, including the ESA SMOS sensor.

Studies based on laboratory tests and simulations have shown that these limits could be achieved, however, no measurements of emissions from equipment that would be employed in operational systems have been provided.

b) Band 1390-1392 MHz (uplink)

The protection of ground-based stations of terrestrial services within the band 1390-1392 MHz shall be made by appropriate separation distances of the order of several hundreds km.

Sharing with transportable and maritime stations in the radiolocation service is not feasible because their position can not be determined in advance.

Sharing with airborne stations in the radiolocation service would not be feasible, although such application has not been identified in CEPT countries.

Moreover, additional constraints need to be applied to the MSS feeder link Earth stations for the protection of the radioastronomy service in adjacent band as well as in the band 1330-1400 MHz, which is not really allocated to the RAS, but identified in No. **5.149**. The following pfd limits would be required:

- a pfd limit of -180 dBW/m^2 for 98 % of 2000 seconds measurement periods at any radioastronomy stations performing continuum observations in the band 1400-1427 MHz

- a pfd limit of -196 dBW/m^2 for 98 % of 2000 seconds measurement periods in any 20 kHz bandwidth at any radioastronomy station performing spectral line observations in the band 1330-1427 MHz for the protection of the radio astronomy service.

CEPT studies have shown that an emission power limit of -63 dBW in the band 1400-1427 MHz at the antenna port of the MSS feeder link Earth station would protect all EESS passive sensors operating in the 1400-1427 MHz band from harmful interference from the uplink.

Studies based on laboratory tests and simulations have shown that these limits could be achieved, however, no measurements of emissions from equipment that would be employed in operational systems have been provided.

Because of all the constraints listed above, the FSS allocations will not be usable in CEPT countries.

Moreover, the 'passive' attitude of the proponents of the allocation seems to indicate that the allocation is no longer needed, and that other allocated frequency bands may be used by those MSS feeder links.

Because of these two reasons, CEPT proposes to suppress the provisional allocation to FSS in the 1.4 GHz band.

Proposals

ARTICLE 5

MOD EUR/XXA17/1

1 300-1 525 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 350-1 400 FIXED MOBILE RADIOLOCATION 5.149 5.338 5.339 SUP 5.339A	**1 350-1 400** RADIOLOCATION 5.149 5.334 5.339 SUP 5.339A	
1 400-1 427	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
1 427-1 429	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341	
1 429-1 452 FIXED MOBILE except aeronautical mobile SUP 5.339A 5.341 5.342	**1 429-1 452** FIXED MOBILE 5.343 SUP 5.339A 5.341	

SUP EUR/XXA17/2

5.339A

Reasons: *To suppress the provisional allocation to the FSS for MSS feeder links due to the sharing or compatibility difficulties with all other services using the allocated bands or the adjacent passive band..*

SUP EUR/XXA17/3

RESOLUTION 745 (WRC-03)

Protection of existing services in all Regions from non-geostationary-satellite networks in the fixed-satellite service using the frequency bands around 1.4 GHz on a secondary basis

Reasons: *Consequential to the above proposals.*