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| **Radiocommunication Study Groups** |  |
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| Annex 6 to Working Party 5A Chairman’s Report |
| WORKING DOCUMENT TOWARDS PRELIMINARY DRAFT CPM TEXT FOR WRC-23 AGENDA ITEM 9.1, TOPIC B) |
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CHAPTER 5

General issues

(Agenda items 2, 4 and 9.1 topics a), b), c) and d))

Agenda item 9.1(9.1-b)

# 5/9.1-b *Review of the amateur service and the amateur-satellite service allocations in the frequency band 1 240-1 300 MHz to determine if additional measures are required to ensure protection of the radionavigation-satellite (space-to-Earth) service operating in the same band in accordance with Resolution 774 (WRC-19)*

Resolution **774 (WRC-19)** – *Studies on technical and operational measures to be applied in the frequency band 1 240-1 300 MHz to ensure the protection of the radionavigation-satellite service (space-to-Earth)*

(**WP5A** / **WP3M, WP4C[[1]](#footnote-1)\*,** **WP7C**)

Summary of the results of ITU-R studies

CPM23-1 in its report [CA/251](https://www.itu.int/md/R00-CA-CIR-0251/en) split the work on WRC-23 agenda item 9.1, topic b), between WP4C and WP5A with WP5A being the responsible group. WP4C was responsible for the detailed interference analysis required by *resolves to invite ITU-R* 2 of Resolution **774 (WRC-19)** between stations of the amateur service and receivers of the radionavigation-satellite service. The results of the studies undertaken by WP4C were sent to WP5A so that it could draft the CPM text for WRC‑23 and produce a final ITU-R report on the agenda item. WP5A was also responsible for the review amateur service applications and compilation of appropriate and relevant parameters of amateur service stations for the studies undertaken by WP4C.

Preliminary draft new Report ITU-R M.[Amateur-RNSS], preliminary draft new Report ITU-R M.[AMATEUR.CHARACTERISTICS] provides the detailed information on the studies undertaken.

The radionavigation satellite service in this frequency band is used by various global RNSS systems (GALILEO, GLONASS, COMPASS, GPS, QZSS) in different portions of the band 1 240‑1 300 MHz, for various applications, including high-accuracy localisation services with ubiquitous deployment of RNSS receivers.

Some cases of harmful interference caused by emissions in the amateur service into RNSS (space-to-Earth) receivers have occurred, as recognized in Resolution **774 (WRC-19)**. As mandated by this Resolution, ITU-R has carried out two theoretical studies and two measurement campaigns.

Theoretical studies

Two theoretical studies were undertaken in order to provide the assessment of the geographical extent of the interference caused by a representative set of transmitting stations of the amateur service into GALILEO E6 and COMPASS B3 receivers. The simulations indicated interference areas around radio amateur stations with an extent of several km, up to [TBD] km, depending on the nature of the amateur emission (from narrow band telegraphy up to wide band digital television).

Receiver measurement campaigns triggered by reported interference cases

A first measurement campaign was performed in Germany, after one amateur television transmission caused harmful interference to an RNSS reference receiver located near Munich (Germany) operating in the frequency range 1 260-1 300 MHz. The tests utilised representative amateur emissions which were inserted into the antenna input port of a 30 MHz bandwidth RNSS receiver, at the Galileo E6 centre frequency and with frequency offsets dependent on the type of amateur emission considered in accordance with IARU band plan. Measurements of the post-correlation *C/N*0 degradation led to the conclusion that the worst case occurs when an interfering signal is applied on the E6 centre frequency, while frequency separation from centre frequency yields significantly higher tolerable levels for the interfering signal, in particular when this interfering signal falls out of the 30 MHz receiver bandwidth. A non-constant envelope of the interfering signal leads to high scattering of the receivers observed *C/N*0. An additional Interference Suppression Unit (ISU) used for some of the tests can significantly reduce the impact of certain interfering signals, particularly for narrowband signals (B < 150 kHz) but did not lead to strong receiver immunity against the wider amateur television signals.

A second measurement campaign was performed in the region of Varese (Italy), after an FM modulated signal transmitted by an amateur radio repeater has caused harmful interference to Galileo E6 receivers multiple times. The effect of amateur emissions with different power levels and different central frequencies was considered on three different RNSS receivers characterised by different front-end bandwidth spanning approximately from 30 MHz to the full 40 MHz. Results show that of the [four] measured amateur applications the two which show the highest compatibility potential with RNSS receivers, provided that power levels remain below certain thresholds, are narrow band FM and digital data. On the other hand, unlike the narrow band applications, wideband amateur television applications caused harmful interference even at relatively low power and therefore may offer lower compatibility potential.

[Preliminary conclusions

Harmful interference caused by emissions from the stations in the amateur service into RNSS (space‑to-Earth) receivers have been observed, documented, reported, but also confirmed by simulation studies. To avoid such cases of interference in the future, proper guidelines for the use of the frequency band 1 240-1 300 MHz by stations of the amateur and amateur-satellite services should be considered in order to assure the protection of the RNSS.]

[TBD]

1. \* WP4C is responsible for developing studies on *resolves to invite ITU-R* 2 of Resolution **774 (WRC-19)** and sending this to WP5A. [↑](#footnote-ref-1)