



International Amateur Radio Union

Summary Meeting Report

ITU-R WP4C #29: 6 – 13 Sept 2022 (Hybrid Meeting)

Relating to preparatory work on WRC23 AI 9.1b only

The IARU was represented by Ole Garpstad (LA2RR – ITU Lead) and Barry Lewis (G4SJH – WRC23 AI9.1b Lead).

The IARU provided one written contribution to this meeting. [This can be found here.](#)

Background

As detailed in the report from WRC23 CPM-1, ITU-R WP4C is a contributing group and is responsible for developing the studies identified under *invites 2* of Resolution 774 on **WRC23 AI 9.1 topic b (RNSS and Amateur services coexistence)**.

As usual, the contributions relating to this work were quickly referred to Sub Group 4C3 and dealt with directly in the 4C3 group chaired by Mr Mitome from Japan (standing in for Mr Harding the usual chair). Sub group 4C3 met for nine sessions over the period of the meeting.

Contributions to the meeting relevant to AI 9.1b

The draft technical report **ITU-R M.[AMATEUR_RNSS]** which had been attached as Annex 1 to the chairman's report Doc 4C/333 from the previous meeting formed the basis as the working document for the work to progress.

Doc 4C/345 – Liaison document from WP5A.

Doc 4C/355 – IARU – Amateur usage information for ITU-R M.[AMATEUR-RNSS].

Doc 4C/358 – Japan – Antenna height study.

Doc 4C/361 – Russian Federation - New study for ITU-R M.[AMATEUR-RNSS].

Doc 4C/362 – Russian Federation - Proposal for a liaison back to WP5A.

Doc 4C/368 – USA - Revisions for ITU-R M.[AMATEUR-RNSS]

Doc 4C/369 - USA – Proposal for a liaison back to WP5A

Doc 4C/374 – China – Updated and new studies for ITU-R M.[AMATEUR-RNSS].

Doc 4C/376 – China – Proposal for a liaison back to WP5A.

Doc 4C/379 – France – Proposal for a liaison back to WP5A.

Doc 4C/380 – France – Updated studies for ITU-R M.[AMATEUR-RNSS].

IARU objectives

The IARU objectives for the meeting on the 9.1b topic were:

1) To maintain the integrity of the amateur and amateur satellite service characteristics provided through WP5A.

- 2) To have the information contained in contribution 4C/355 incorporated into the draft Report.
- 3) Ensure any contributed studies choose appropriate characteristics for the scenarios under study.
- 4) Ensure that appropriate conclusions are drawn for all studies.

Meeting Activity

Preliminary draft report ITU-R M.[AMATEUR-RNSS]:

The drafting group dealt with contributions updating the current studies and added new elements from France, China, Japan and the Russian Federation.

France updated their study across the GALILEO system spectrum to correct some errors and introduce some new low power levels, France assumed characteristics relevant to a “Home Station 1” and a “Permanent Station” operating at 1W to 300W anywhere in the band with an emission less than 128kHz and a wideband signal operating in those parts identified for ATV (1272 – 1290 MHz). “Home Station 2” was considered for EME in the 1296-1298MHz portion over the same power range. The antenna main beam distances were calculated for a range of power levels. This table below summarises the results of the French study related to the GALILEO system frequency range and provides insight into the difficulties the amateur service faces:

Maximum distance where the protection criteria of Galileo were not satisfied for narrow band amateur applications

Power	Maximum interference distance								
	Region 1			Region 2			Region 3		
	HS1	HS2 at 10 deg	PS	HS1	HS2 at 10 deg	PS	HS1	HS2 at 10 deg	PS
1 mW	1.1 km	-	1.1 km	1.1 km	-	1.1 km	1.1 km	-	1.1 km
5 mW	1.55 km	1.1 km	1.4 km	1.55 km	1.1 km	1.4 km	1.2 km	1.1 km	1.4 km
0.1 W	3.25 km	2.25 km	3.15 km	3.25 km	2.25 km	3.15 km	2.55 km	2.25 km	3.15 km
1W	5.15 km	3.6 km	5.45 km	5.15 km	3.6 km	5.45 km	4.2 km	3.6 km	5.4 km
10 W	8.15 km	5.6 km	8.9 km	8.15 km	5.6 km	8.9 km	6.6 km	5.6 km	8.8 km
50 W	10.95 km	7.6 km	12.2 km	10.95 km	7.6 km	12.2 km	9.1 km	7.6 km	12.1 km
100 W	12.7 km	8.65 km	13.95 km	12.7 km	8.65 km	13.95 km	10.3 km	8.65 km	13.8 km
200 W	14.3 km	9.85 km	15.95 km	14.3 km	9.85 km	15.95 km	11.85 km	9.85 km	15.8 km
300 W	15.7 km	10.65 km	17.25 km	15.7 km	10.65 km	17.25 km	12.7 km	10.65 km	17.05 km

The “home station1” HS1 assumes an 18dBi antenna at 12m. HS2 (“home station 2”) is used in an EME scenario and in the study details there are other elevation angles considered. PS refers to “Permanent Station” such as a repeater or beacon station. Similar results are in the report for broadband applications. It can be seen that even at a very low power level the RNSS receiver protection criteria can be exceeded.

The Chinese studies now include narrowband applications, satellite uplink and ATV. Similar interference distances are recorded. In addition China provided a contribution that sought to estimate the time that an amateur satellite might be visible for an uplink transmission (in 1260-1270 MHz).

The Russian Federation studies now include narrowband applications and an ATV repeater station scenario. GLONASS general purpose receivers and air-navigation receivers are assumed. The results for the general purpose receivers are similar to those from other studies but the airborne case shows exceedance results extending up to 100km.

Japan provided a short study to examine the impact of increased antenna height on the potential interference distances.

All these studies required revision during the meeting discussion in order to improve the assumptions and parameters used.

WP4C plenary agreed to elevate the document to Draft New Report status and will pass it to Study Group 4 (SG4) for adoption. This means that drafting is complete.

Proposals for liaison to WP5A:

Several parties (France, Russian Federation, China and the US) provided contributions proposing a liaison response to WP5A that included elements proposed for the **Recommendation ITU-R M.[AS_GUIDANCE]** under development in 5A. Several of these proposed operational measures including specific power levels in certain parts of the band based on their specific studies.

These proposals were not discussed in detail (they were considered to be WP5A work) and have been attached in annexes to the liaison for further consideration by WP5A. The liaison was adopted in 4C plenary to be sent to WP5A.

The chairman's report is in **4C/388** but the relevant output documents will appear as contributions in SG4 or WP5A as appropriate.

IARU Observations

All the studies have assumed static scenarios without any consideration of the geographic distribution and density of amateur transmitters or the temporal aspects of amateur operations. Some studies take account of antenna patterns but many results and conclusions are based only on worst case main beam consideration.

Proposals that may restrict our ability to operate in certain parts of the band and at the power levels allowed today are likely. This discussion will continue in WP5A.

Next WP-4C meeting

21st –27th June 2023