CGMS-51-WGI-WP-03
31 March 2023

Prepared by: EUMETSAT
Agenda Item 3.1
Discussed at WG-I

Subject	**Report from the CGMS WGI Task Group on RFI detection, monitoring and mapping (incl. latest ToR, status on current & proposed/planned activities)**
In response to CGMS action/recommendation	WGI/A49.01
HLPP reference	2.2: Radio Frequency (RF) protection
Executive Summary	CGMS has tasked Working Group I to establish a Task Group on RFI detection, monitoring and mapping. This paper introduces the Task Group, describes its activities in the past year and the plans for the coming period.
Action/Recommendation proposed	Recommendation: Working Group I to instruct TGRFI to pursue the establishment of a set of best practices for the RFI detection, monitoring, and mapping based on the common aspects of the approaches already adopted by members.

1 INTRODUCTION

Triggered by Working Paper CGMS-49-CGMS-WP-11, CGMS-49 requested agencies to nominate participants to a Task Group to establish the initial ideas about mechanisms regarding the detection, monitoring and mapping of RFI, initially in the 24 GHz passive band. The Task Group on RFI Detection, Monitoring and Mapping (TGRFI) was established in response to this request. The group had its kick-off meeting in May 2022.

This paper briefly summarises the status of the Group and its activities to date, and looks forward to its upcoming activities.

2 CURRENT STATUS

2.1 Membership

The current membership of the TGRFI is listed below:

CMA	NIE Jing
CMA	WU Shengli
EUMETSAT	Markus Dreis
EUMETSAT	Simon Elliott - chairman
KMA	Dohyeung Kim
KMA	Junho Kim
NOAA	Beau Backus
NOAA	William “Skip” Dronen
WMO	Ken Holmlund*
WMO	Heikki Pohjola*
WMO	Zoya Andreeva*

WMO was formerly represented by Ken Holmlund. The TGFI meetings have also been supported by Zoya Andreeva and Heikki Pohjola from WMO.

2.2 Terms of Reference

The initial tasks of this team include:

- Gathering the views and ideas members already developed and activities they have already undertaken in this context;
- Exchange on members interaction with scientists and forecasters regarding ways for extracting data from existing instruments for impact assessments;
- Developing possible plans for approaching detection, monitoring and mapping of RFI and evaluate their feasibility;
- Summarising the findings of the group for presentation at CGMS-50.

WGI agreed that Simon Elliott from EUMETSAT would lead TGRFI..

2.3 Current activities

2.3.1 TGRFI-I

At the first full meeting of the Group in July 2022, NOAA and EUMETSAT gave overall presentations of their spectrum concerns and activities on RFI detection, monitoring and mapping. CMA and KMA were invited to prepare corresponding presentations for the next meeting, which was planned for late August / early September 2022. The capability of Metop-SG Micro-Wave Imager (MWI) to monitor RFI (comparing Gaussian and non-Gaussian signals) was noted and a paper on the subject shared in the Group.

2.3.2 TGRFI-II

The Group met again in September 2022. WU Shengli from CMA gave a presentation about the impact of RFI on the MWRI instrument of FY-3D (the instrument is out of service on the earlier FY-3s and not on FY-3E, where WindRAD is hosted instead. The presentation focussed on 10 and 18 GHz interference. Impact was shown both detected in the signal (cold look calibration mode) from ~45 North over Europe and North America, and using O-B methods for 10 GHz over the oceans. TGRFI identified similar monitoring on a recurrent basis as a key approach to assessing the possible impact of 5G. KMA were invited to give a corresponding presentation at the next possible time, but subsequently confirmed that as no such RFI monitoring activities are undertaken by KMA, KARI (Korea Aerospace Research Institute) or KASI (Korea Astronomy and Space Science Institute). As such, the Group decided to proceed using the inputs from NOAA, CMA and EUMETSAT.

2.3.3 TGRFI-III

At the yearly meeting of the Space Frequency Coordination Group (SFCG) in July 2022, IEEE provided information on developments of a standard for RFI assessment in Earth Environmental Sensor Systems (EESS) frequency bands in IEEE Geoscience and Remote Sensing Society (GRSS) Frequency Allocations in Remote Sensing (FARS) Technical Committee. The scope of this Standard under the project number P4006 is:

> *"To define the quantitative assessment of man-made RFI in a given frequency band. Specifically, this standard is intended to be used in RFI impact evaluations and monitoring of frequency bands allocated to space-based remote sensing. The standard will provide a definition of RFI as it relates to space-based remote sensing operations".*

The Group invited Paolo De Matthaeis and Roger Oliva from IEEE to join its meeting in December 2022, in order to learn about their experience developing this standard. TGRFI noted that the approach adopted is based upon processing data on the ground and that no dedicated hardware is being used.

At the same meeting, the Group discussed the monitoring of RFI on the Data Collection Service (DCS). The topic has been addressed at the DCS workshop at the Meteorological Technology World Expo in Paris in October 2022, and at the CGMS WGI Task Group on Data Collection Systems. EUMETSAT explained the use of a DCS interference register used to track messages lost due to interference – NOAA also noted the use of a similar mechanism, also including the platform identification.

2.4 Upcoming activities

The Group's next tasks are to analyse the inputs provided by CMA, EUMETSAT and NOAA, and to look for common approaches. These can then be used as a basis for the establishment of a set of best practices for RFI detection, monitoring, and mapping. Once established, the best practices can be endorsed by CGMS and used to help members implement a standard approach for assessing RFI.

Two intersessional meetings have been scheduled; on 5 October 2023 and 18 January 2024.

3 ACTIONS AND/OR RECOMMENDATIONS FOR CONSIDERATION BY CGMS WORKING GROUP I

Recommendation: Working Group I to instruct TGRFI to pursue the establishment of a set of best practices for the RFI detection, monitoring, and mapping based on the common aspects of the approaches already adopted by members.

4 CONCLUSION

The Task Group on RFI Detection, Monitoring and Mapping began its work in 2022, and since then has collected inputs describing how CGMS members are assessing the impact of RFI. The Group is now in a position to look for common ways of working and use these as a basis for a set of best practices, which can be endorsed by CGMS and used to help members implement a standard approach for assessing RFI.