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## **EUMETSAT PLANS FOR THE FREQUENCY BAND 7750 - 7850/7900 MHZ**

In response to CGMS action 37.23

**In response to CGMS action 37.23, information on EUMETSAT current and future missions planning to use the frequency band 7750 - 7850/7900 MHz is provided.**

**The band 7750 – 7850 MHz is currently used by the EUMETSAT Polar System (EPS) for the downlink of raw instrument data over a single dedicated Earth station in Svalbard (Spitsbergen) at 7800 MHz with a data rate of the 70 Mbps (=63 MHz bandwidth).**

**In the framework of EUMETSAT Polar System Second Generation (EPS-SG) the frequency band 7750 - 7850/7900 MHz is currently under consideration for direct readout services and raw instrument data downlink. However, the frequency selection for EPS-SG, currently in Phase-A of development, is not yet sufficiently mature. Therefore, merely information on the potential concepts under consideration/study within EUMETSAT for the use of the band 7750 - 7850/7900 MHz for EPS-SG can be provided at this stage.**

Recommendation proposed:

*“CGMS members are invited to provide mature information on the planned use of the band 7750 - 7850/7900 MHz, as soon as available, in order to facilitate an early coordination of this band among MetSat operators in the framework of SFCG.”*

## **EUMETSAT plans for the frequency band 7750 - 7850/7900 MHz**

### **1 INTRODUCTION**

The European EUMETSAT Polar System (EPS) with its series of three Metop satellites (Metop-A is operational since October 2006) is using the band 7750 – 7850 MHz for the downlink of the gathered raw instrument data of a full orbit over a single dedicated Earth station in Svalbard (Spitsbergen). It is the European contribution to the Initial Joint Polar-Orbiting Operational Satellite System (IJPS), a joint European-US polar satellite system.

EUMETSAT will have to provide continuity to the current system in the areas of operational meteorology, climate monitoring, and detection of global climatic changes with a follow-on system to EPS referred to as EPS Second Generation (EPS-SG). Furthermore, it also has the objective to provide continuity of the services of EPS, in the framework of the European-US follow-on to IJPS, the Joint Polar System (JPS).

### **2 EUMETSAT MISSIONS USING (OR PLANNING TO USE) THE BAND 7750 - 7850/7900 MHz**

#### **2.1 EUMETSAT Polar System (EPS)**

In the framework of the EUMETSAT Polar System (EPS) the raw instrument data on the series of three Metop satellites (Metop-A in operation since 2006) of a full orbit are gathered and downlinked over a single dedicated Earth station in Svalbard (Spitsbergen) at 7800 MHz with a data rate of the 70 Mbps (=63 MHz bandwidth).

#### **2.2 EUMETSAT Polar System Second Generation (EPS-SG)**

The frequency selection for the Post EUMETSAT Polar System (EPS-SG), currently in Phase-A of development, is in progress but not yet sufficiently mature. Therefore, merely information on the potential concepts under consideration/study within EUMETSAT for the use of the band 7750 - 7850/7900 MHz for EPS-SG can be provided at this stage.

In general, it can be noted that the data rates in the framework of EPS-SG for the downlink of the raw instrument data as well as for direct readout services will significantly increase as compared to the current EPS system.

Thus, due to the lack of sufficient bandwidth, direct readout services of EPS-SG can no longer be accommodated in L-Band as it is currently the case for HRPT within EPS.

Furthermore, the significantly increased data rate for the EPS-SG raw instrument data downlink requires results in an increased effort in terms of data compression and modulation in order to be able to be accommodated in the band 7750 - 7850/7900 MHz.

In light of the above, EUMETSAT is currently considering a direct readout service in the band 7750 - 7850/7900 MHz and is studying two concepts for the downlink of the stored raw instrument data, either in the band 7750 - 7850/7900 MHz (coupled with the

utilisation of higher order modulation schemes and/or data compression to cope with the higher amount of data) or as alternative in the band 25.5 – 27 GHz.

### 3 CONCLUSIONS

The current frequency use of the band 7750 – 7850 MHz is coordinated between CMA, NOAA and EUMETSAT for the systems FY-3, NPOESS/NPP and EPS, with all Metop satellites (A, B, C) using the same frequency at 7800 MHz.

Compatibility of those systems using this band for direct readout services (NPOESS and FY-3) or raw instrument data downlink (Metop) is mainly ensured through different equatorial crossing times and minimisation of frequency overlap between the systems.

For next generation nongeostationary MetSat systems increased bandwidth requirements are expected, potentially in excess of the 100 MHz currently allocated to MetSat. Thus the extension of the MetSat allocation into the band 7850 – 7900 MHz is supported.

This extension of the MetSat allocation will counteract future arising sharing difficulties resulting from the increased spectrum requirements of future MetSat systems due to unavoidable frequency overlap of systems using this band for direct readout applications as well as systems using this band for stored raw instrument data downlinks. These sharing difficulties would be further increased when additional MetSat operators are planning to use this band.

Besides the availability of sufficient overall bandwidth for future MetSat systems, key to a successful coexistence of the future MetSat systems planning to use this band will be the early coordination among all potential operators, given the fact that this band is and will be used for very different modes of operation, i.e. direct readout services and stored raw instrument data downlinks. This coordination would not only have to involve the selection of frequencies and bandwidth, but also other mechanisms to facilitate sharing, such as the coordination/selection of orbits and equator crossing times, operational mechanisms, etc.

Considering the early stage of planning of future MetSat systems such as EPS-SG, a concrete consideration of coordination among those future systems at this point in time is not possible since the plans are not mature enough.

Therefore, it is proposed to continue to monitor within CGMS the progress in the development of future systems in this band 7750 - 7850/7900 MHz and to react at an appropriate point in time by triggering mutual frequency coordination/planning of this band in the framework of SFCG.

In order to keep monitoring the progress in the development of future systems in this band 7750 - 7850/7900 MHz the following Recommendation is proposed:

*“CGMS members are invited to provide mature information on the planned use of the band 7750 - 7850/7900 MHz, as soon as available, in order to facilitate an early coordination of this band among MetSat operators in the framework of SFCG.”*