

Project Team FM PT 48

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**Subject: Proposal for an additional candidate band for
Direct Air-to-Ground Communication (DA2GC)**

Password protection required? (Y/N)¹

Summary

It is proposed to include the 2 GHz MSS bands (1980-2010 / 2170-2200 MHz) into the list of candidate bands for DA2GC. The advantages of these bands for a potential implementation of DA2GC within Europe compared to the candidate bands already under closer investigation - and communicated to other ECC Project Teams - are evaluated.

Proposal

FM PT 48 is invited to include the 2 GHz MSS bands (1980-2010 / 2170-2200 MHz) in the list of candidate bands for DA2GC and to request SE PT 44 to perform the necessary compatibility studies.

Background

The bands 1980-2010 / 2170-2200 MHz are allocated to the MOBILE and the MOBILE SATELLITE SERVICE and are designated in Europe for use by systems in the Mobile Satellite Service. Up to now service delivery has only materialised partly, e.g. MSS downlink only applications. In the case that parts of the 2 GHz MSS spectrum will remain unused, there would be a good opportunity to implement another application that requires similar harmonisation and authorisation conditions like the Mobile Satellite Service.

¹ ECC policy is that in general all documents should be publicly available unless the author of the document requires that it be restricted to ECC family participants only.

Introduction

A number of candidate bands are currently under discussion in FM PT 48, and some of them have been chosen for compatibility studies to be performed in SE PT 44.

However, the existing conditions in all of these bands are challenging for a timely implementation of a pan-European Broadband DA2GC solution, either based on regulatory implications or on compatibility aspects. In order to enhance the choice of potential bands and thus the chance to implement Broadband DA2GC in Europe, it is proposed also to take the 2 GHz MSS bands into account.

Current Situation in the 2 GHz MSS bands

The bands 1980-2010 / 2170-2200 MHz are allocated to the MOBILE and the MOBILE SATELLITE SERVICE and are designated in Europe for the use by systems in the Mobile Satellite Service including those supplemented by a Complementary Ground Component (CGC) by an ECC Decision (ECC/DEC/(06)09 adopted on 1 December 2006).

Moreover, the EU has introduced harmonised usage conditions by a Commission Decision on the implementation of systems providing mobile satellite services (2007/98/EC adopted on 14 February 2007). This Decision provides legal certainty on the availability of radio resources for mobile satellite systems and also supports the use of complementary ground components (CGC). It is complemented by a further Decision (626/2008/EC adopted on 30 June 2008), providing a legal framework for a two-phase selection process which resulted in the selection of two operators: Inmarsat Ventures Limited and Solaris Mobile Limited (2009/449/EC adopted on 13 May 2009).

Up to now, no dedicated MSS services are launched by the two selected operators in the 2 GHz spectrum. According to publicly available announcements the main focus of service provisioning seems to be on mobile broadcast applications, i.e. the MSS uplink band might not be fully used or possibly not used at all.

Opportunity for Broadband DA2GC

In the case that parts of the 2 GHz MSS spectrum will remain unused, there would be a good opportunity to implement another application that requires similar harmonisation and authorisation conditions like the Mobile Satellite Service.

This exactly applies to a terrestrial DA2GC solution for providing broadband services to aircraft over continental Europe. The system proposed in the ETSI System Reference Document TR 103 054 V1.1.1. (2010-07) is able to either operate in FDD mode or in TDD mode.

DA2GC FDD operation within the 2 GHz MSS bands could be considered within a part of the MSS DL and the MSS UL band, respectively, DA2GC TDD operation within a part of one band, e.g. within the MSS UL band. Operation of a DA2GC system on a secondary basis could also be considered. If the spectrum demand for Broadband DA2GC could not be fully satisfied within the bands 1980-2010 / 2170-2200 MHz, a combination with other bands would also be a possible option from a DA2GC system concept point of view.

Relevant criteria for the selection of candidate bands for Broadband DA2GC

Suitable allocation in ITU RR

A suitable allocation (i.e. for the Mobile Service or for the Aeronautical Mobile Service) would ease a timely service implementation and would be necessary anyhow, prior or after the implementation.

European-wide harmonisation

Pan-European harmonisation is essential for the implementation of a BDA2GC system.

Number of existing licenses/users

The less the current number of licenses or users, the less difficult it will be to get access to this band and to achieve compatibility / co-existence with existing services. Also a possible refarming would be much easier to be accomplished.

Bandwidth sufficient to cover BDA2GC demand

If the spectrum demand for BDA2GC can be completely met in one (pair of) candidate band(s) the advantages are twofold, less regulatory effort and easier operational implementation.

Overview of BDA2GC candidate bands pursuant to defined criteria

Frequency band	Suitable allocation in ITU RR	European-wide harmonisation	Number of existing licenses/users	Bandwidth sufficient to cover BDA2GC demand
1452 – 1492 MHz²	MOBILE except aeronautical mobile	Yes, for T-DAB (Maastricht agreement) and S-DAB (ECC Decision).	T-DAB licences in some countries, S-DAB might be launched in the future.	Yes, both FDD and TDD possible. Also combination with another band conceivable.
1670 – 1675 MHz / 1800 – 1805 MHz	MOBILE / MOBILE	Yes, for MSS (S-E) / Not yet, but planned for PMSE.	Unknown. / Varying usages in some countries.	No. Even in combination with other spectrum the 5 MHz blocks are not really suitable.
1980-2010 / 2170-2200 MHz	MOBILE	Yes, for the MSS by a Commission Decision.	Only two pan-European authorisations.	Yes, both FDD and TDD possible. Also combination with another band conceivable.
2400 – 2483.5 MHz	MOBILE 5.430A	Yes, for a number of different applications and for ISM.	Numberless short range devices, RLANS, etc.	Yes.
3400 – 3600 MHz	MOBILE	Yes,	Currently many national licences for BWA. Harmonised frequency arrangements for IMT in CEPT.	Yes, both FDD and TDD possible.
5855 – 5875 MHz	MOBILE	Yes, for a number of different applications and for ISM.	Numerous short range devices, BFWA licenses, etc.	Yes, but only suitable for TDD. A combination with another band is not suitable due to the high frequency separation.

Table 1: Overview of BDA2GC candidate bands pursuant to defined criteria

² This band is mentioned for completeness. It could be subject for discussion in FM PT 48 after the results of the FM PT 50 study aiming at determining which future use(s) of the 1452-1492 MHz band would be the most appropriate for CEPT.

Challenges for BDA2GC in the candidate bands currently under study in SE PT 44

1670 – 1675 MHz / 1800 – 1805 MHz

These two 5 MHz bands are definitively too narrow to cope with the spectrum demand for Broadband DA2GC. A combination with other bands which would result in three or more sub-bands is considered as not suitable from an implementation point of view.

2400 – 2483.5 MHz

Within this band co-existence with the services already in operation is hardly to be achieved. First link budget calculations disclosed severe interference from the DA2GC air-to-ground link into outdoor WLANs operations. Due to the fact that a licence exempt regime is in force, an even more densely utilisation of this band is expected in the future.

3400 – 3600 MHz

The main problem for an introduction of a Broadband DA2GC system is seen in the national licences being awarded for BWA. This might make it impossible to identify 20 MHz of pan-European harmonised spectrum currently not used. Furthermore, the primary allocation for the Mobile Service is restricted to “MOBILE except aeronautical mobile” in almost all European countries by the ITU RR footnote 5.430A. This band is also expected to be licensed for terrestrial mobile applications in the future. Nevertheless, this band is considered as the most promising option among the bands under study in SE PT44.

5855 – 5875 MHz

Within this band co-existence with the services already in operation is hardly to be achieved. The realisation of the DA2GC ground-to-air link is seen as not feasible due to the existing FSS earth-to-space operations. A combination with another band is not suitable because of the high frequency separation.

Summary and conclusions

The 2 GHz MSS bands offer an interesting option for a potential implementation of a Broadband DA2GC system as the regulatory implications seem to be less complex compared to other candidate bands:

- The existing service allocation in the ITU RR is suitable for DA2GC.
- The bands are harmonised European-wide.
- The low number of current authorisations and extent of services in operation offer good conditions for a possible introduction of Broadband DA2GC in a short time frame.
- Due to the close vicinity to the 2 GHz FDD bands with potential LTE deployment, only marginal modification of the RF parts of the DA2GC equipment would be necessary.
- The spectrum demand for BDA2GC could be completely met in the 2 GHz MSS bands. Both FDD and TDD operation would be possible.

Depending on the MSS applications finally introduced in the 2 GHz bands, following operation modes for Broadband DA2GC would be possible:

- FDD operation within 2x10 MHz in the MSS DL and UL bands
- TDD operation within 20 MHz in the MSS UL band
- Other possible combinations within the 2 GHz MSS bands
- Combination of the 2 GHz MSS band with other bands

Based on the good potential for a possible realisation of Broadband DA2GC within the 2 GHz MSS bands, and bearing in mind the challenges for a DA2GC solution in the bands currently under investigation in SE PT 44, it is proposed to include the bands 1980-2010 / 2170-2200 MHz in the list of candidate bands.