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| **WORLD WEATHER WATCH****COMMISSION FOR BASIC SYSTEMS** |  |
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| **Steering Group on Radio Frequency Coordination (SG-RFC)****Boulder, Colorado. USA. 11-13 March 2014.** | **Document SG-RFC/2014-1-13** |
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| STEERING GROUP ON RADIO FREQUENCY COORDINATION (SG-RFC) |
| SG-RFC Focal Point on RADIOSONDES |
| WMO SG-RFC Report on Radiosonde Issues |

**1. Introduction**

This document provides a status update on issues affecting radiosondes (as part of the meteorological aids service) that may be of interest to SG-RFC members.

**2. WRC-15 Agenda Items**

**2.1 Agenda Item 1.1**

WRC-15 Agenda item 1.1 is seeking globally harmonised spectrum to allocate to the Mobile Service (MS) for use by IMT and/or wireless RLAN applications. Radiosondes are typically operated in MetAids service allocations the 400 MHz band (400.15-406 MHz) and 1680 MHz band (1668-1690 MHz). Of these two bands, 1680 MHz is under the greatest risk from the outcomes of AI 1.1, with the 400 MHz band being "protected" to a certain degree by its proximity to the 400-400.15 MHz satellite standard frequency and time signal band, and to the 406-406.1 MHz band used by the COSPAS-SARSAT safety-of-life services. There has been no specific proposal made to the ITU-R to study this portion of the 400 MHz band under AI 1.1. The nearest band to this that has been proposed for study is 410-430 MHz submitted by Brazil to JTG 4-5-6-7 (document 4-5-6-7/324-E, 11 Oct 2013). Subsequently, Argentina has opposed the study of this band for IMT in document 4-5-6-7/445-E submitted on 11 Feb 2014. The main technical obstacle to utilising the 400 MHz band and lower frequencies for IMT applications is designing antennas small enough for portable user equipment such as mobile phones.

The US Government has proposed that co-channel sharing through physical separation is viable between existing meteorological operations (MetSat ground stations) in 1695-1710 MHz portion of the 1680 MHz band, and IMT/mobile broadband applications. If a re-allocation of this part of the band should occur, depending on the band utilisation/channel arrangement, radiosonde operations in the US will be confined to the lower portions of the 1668-1690 MHz band in order to minimise interference due to unwanted emissions from base stations and user equipment operating in the MS, and to minimise the potential for interference to these systems. However, the ongoing use of this band for radiosonde operations in the US is dependent on the outcome of the LightSquared proposal to the FCC as outlined below under Other Radiosonde Issues. Any changes to the 1680 MHz band may be specific to the US, as little or no support has been expressed to date by other countries for the use of this or the wider 1675-1710 MHz band for IMT, mainly due to the relatively small spectral width and lack of an adjacent "paired" band for use in an FDD configuration. This of course does not preclude it from being used under alternate band plans with other wireless broadband services.

**2.3 Agenda Item 9.1.1**

SG-RFC members should note the ongoing work under WRC-15 AI 9.1.1 regarding the protection of satellite uplinks (COSPAS-SARSAT) in 406-406.1 MHz, which has considered possible impacts on the safety service from adjacent services including MetAids/radiosondes. To date, little indication has been given that radiosondes cause any significant problems in this respect.

**2.4 Agenda Item 9.2**

During WRC-12 it was noted that the MetAids service does not have any corresponding definition in the Radio Regulations (No. 1.50) for radio stations. The term radiosonde is included however, but this represents a type of equipment and not a radio station. This issue was carried-over as part of WRC-15 Agenda item 9.2. Canada has been the main contributor to WP7C on this matter, resulting in new definitions for the meteorological aids stations in document 7C/162-E (Draft CPM Text on WRC-15 Agenda Item 9.2, 2 September 2013). This formed the basis of a Liaison Statement (SC-WP/6-E) to the Working Party of the Special Committee (SC-WP) who subsequently sent a Liaison Statement back to WP 7C (7C/199-E, 20 December 2013) requesting it seek advice from the Coordination Committee for Vocabulary to develop the definitions. SC-WP also revised the draft CPM text (Annex 10 to Document Sc-WP/34-E, 9 January 2014) and will develop the regulatory text once they receive the new definitions. Work on this issue will continue at the upcoming WP 7C meeting in May.

**3. Other Radiosonde Issues**

**3.1 LightSquared proposal to use 1675-1680 MHz in the US**

During 2012, LightSquared made a proposal to the FCC to use the 1675-1680 MHz portion of the 1675-1710 MHz MetAids band, coupled with its existing 1670-1675 MHz licence, for downlinks for its 4G-LTE satellite-based broadband internet service. Subsequent discussions between LightSquared, NWS, and the Department of Commerce concluded that the co-channel operation of radiosondes and an LTE network within the 1670-1680 MHz band was not feasible. On 30 January 2014, LightSquared wrote to the FCC and presented a report prepared by Alion Science and Technology Corporation in which they conclude that it is feasible to relocate current US radiosonde operations in the 1675-1683 MHz band, to the 400.15-406 MHz band.

**3.2 Non-GSO Data Collection Platforms in the 401-403 MHz Band**

Two documents have been released relating to the uplink component of Data Collection Platforms (DCPs) to receivers on geosynchronous orbit (GSO) and non-GSO satellites:

1. [[2]](#footnote-2)ITU-R Recommendation SA.2044 (12/2013) - Protection Criteria for non-GSO data collection platforms in the band 401-403 MHz, and

2. SG7 Document 7/BL/5-E, DRAFT NEW RECOMMENDATION ITU-R SA.[EES/METSAT USAGE 401-403 MHz]

Since WRC-97 when the 401-403 MHz band was allocated on a co-primary basis to MetSat (earth-to-space), radiosonde operations and DCP systems such as ARGOS have coexisted in this band with no documented reports (as far as the authors of this document are aware) of interference either from DCP ground stations into radiosonde receivers, or from radiosonde transmitters into DCP receivers on GSO or non-GSO MetSats. In preparation for WRC-97, studies were performed (by EUMETSAT) for these interference scenarios, but apparently only for the case of a DCP receiver on a GSO meteorological satellite and for a DCP ground station with a directional antenna. It is not known if the operation of radiosondes in the 400.15-406 MHz band was taken into account during the development of the protection criteria for non-GSO platforms in document 1. above, or if studies have been performed to assess the potential for interference from the newer generation of DCP transmitters into ground-based radiosonde receivers. In the US, the proliferation of DCPs using the 401-402 MHz frequency range has effectively made it unavailable for radiosonde operations. In some countries such as Australia, radiosonde operations are restricted to using the 400.15-403 MHz sub-band, and are therefore at a greater risk of interference from DCP transmitters. The reduced frequency range means that, even without widespread use of land-based DCPs, frequency planning is made considerably more difficult when allowing for up to three launches from each station in the event of failed or faulty radiosondes, and for radiosondes being carried into reception range of neighboring stations. The use of wider bandwidths (as noted in document 2. above) by newer DCP systems to provide higher data transmission rates may also increase the potential for interference.

The successful sharing of the 401-403 MHz portion of the 400 MHz MetAids band between DCP transmitters and radiosonde receivers would benefit from the development of recommended coordination parameters such as frequency and physical separation. Such parameters would be invaluable for radiosonde users to assess the interference risk from a DCP to be located within line-of-sight of a radiosonde receiver. The development of coordination parameters should take into account the increased risk of interference from DCPs that use low-gain (omnidirectional) antennas to communicate with non-GSO satellites, thereby removing the need to track a satellite as it passes within view.

Even though the protection criteria in document SA.2044 are not mandatory, any demonstrated instances of radiosondes exceeding them could lead to complications with the long-term harmonious sharing of the 400 MHz MetAids band. Similarly, any deployment of DCPs should be coordinated with radiosonde users prior to seeking apparatus license approval from national spectrum regulatory authorities, especially in countries where radiosonde operations are confined to the 400.15-403 MHz sub-band

**4. Action (by SG-RFC) Proposed**

1. Clarify the existence and status of recent or updated sharing studies between radiosonde receivers and DCP transmitters operating in the 400-403 MHz sub-band, and the subsequent development of coordination parameters.

**5. Draft Text for Inclusion in the SG-RFC Meeting Reports or Other Documents**

None

1. \* If restricted access is selected the WMO Document will only be accessible to the WMO WIKI registered users. [↑](#footnote-ref-1)
2. The protection criteria in this document applies only to non-GSO systems operating in the 401-401.69 MHz sub-band. Refer to the document ITU-R SA.[EES/METSAT usage 401-403 MHz] for detailed band partitioning for non-GSO and GSO DCSs.. [↑](#footnote-ref-2)