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| **Radiocommunication Study Groups** |  |
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|  | **Document 4A/368-E** |
| **29 April 2010** |
| **English only** |
| Chairman, Working Party 4A | |
| REPORT ON THE MEETING OF WORKING PARTY 4A | |
| (Bangalore, 24 March - 1 April 2010) | |

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1 PDRR ITU-R S.732 “Method for statistical processing of earth-station antenna side-lobe peaks” (source: Document 4A/TEMP/171)

2 PDRR ITU-R BO.1659 “Mitigation techniques for rain attenuation for broadcasting-satellite service systems in frequency bands between 17.3 GHz and 42.5 GHz” (source: Document 4A/TEMP/204)

3 PDRR ITU-R BO.1776 “Reference power flux-density for the broadcasting‑satellite service in the band 21.4-22 GHz in Regions 1 and 3” (source: Document 4A/TEMP/203)

4 PDRR ITU‑R BO.1785 “Intra-service sharing criteria for GSO BSS systems in the band 21.4‑22.0 GHz in Regions 1 and 3” (source: Document 4A/TEMP/205)

**Part 2 - Preliminary draft new Reports (PDNRep)**

5 PDN Report ITU-R S.[BWA-FSS] “Studies on compatibility of broadband wireless access (BWA) systems and fixed-satellite service (FSS) networks in the 3 400‑4 200 MHz band” (source: Document 4A/TEMP/173)

**Part 3 - Preliminary draft revision of Reports (PDRRep)**

6 PDR Report ITU-R BO.2071 “System parameters of BSS between 17.3 GHz and 42.5 GHz and associated feeder links” (source: Document 4A/TEMP/197)

**Part 4 - Working documents (WD)**

7 Working document towards a PDNR ITU-R BO.[BSS\_ANT\_PATT] “Reference receiving earth station antenna pattern for the broadcasting-satellite service in the band 21.4-22 GHz in Regions 1 and 3” (source: Document 4A/TEMP/172)

8 Working document towards a PDNR ITU‑R [SF].[STATMETH] “Methodology for calculating the interference received by the fixed service from space‑to‑Earth emissions for frequency bands above about 17 GHz” (source: Document 4A/TEMP/174)

9 Working document towards a PDRR ITU-R S.725 “Technical characteristics for very small aperture terminals (VSATs)” (source: Document 4A/TEMP/170)

10 Working document towards a PDN Report ITU-R [SF].[STATMETH] “Example of a possible mathematical implementation of the methodology for statistically calculating the interference received by the fixed service from space-to-Earth emissions for frequency bands above about 17 GHz” (source: Document 4A/TEMP/175)

11 Working document towards a PDN Report ITU-R S.[ASSYM.FSS] “Addressing the inefficiency associated with the asymmetry of existing unplanned FSS uplink/downlink spectrum in the 10-15 GHz band” (source: Document 4A/TEMP/196)

12 Working document towards a possible reduction of the coordination arc applicable to FSS geostationary satellite networks operating in some congested portions of the 4/6 GHz and 14/10/11/12 GHz frequency bands (source: Document 4A/TEMP/167)

13 Working document on methods proposed for WRC-12 Agenda item 1.13 that may be common to issues associated with Resolution **80 (Rev.WRC-07)** (source: Document 4A/TEMP/168)

14 Working document on probability of harmful interference to FS receiving stations from transmitting GSO BSS satellites in the 21.4-22 GHz band (source: Document 4A/TEMP/202)

15 Elements towards draft CPM text on WRC-12 Agenda item 7 “Preliminary views on the averaging bandwidth prescribed in Annex 2 of Appendix **4** to the Radio Regulations” (source: Document 4A/TEMP/166)

16 Working document towards the development of draft CPM text on WRC-12 Agenda item 1.13 (source: Document 4A/TEMP/198)

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# 1 Introduction

This meeting of Working Party 4A (WP 4A), which was the fifth in the 2007-2012 ITU-R study period, included the participation of 135 delegates, representing 29 Administrations, 13 Recognized Operating Agencies, Scientific or Industrial Organizations and other International, Intergovernmental, and Regional Organizations, and the Radiocommunications Bureau. Eighty eight input documents were considered, of which twenty six were incoming liaison statements, many of which addressed WRC-12 Agenda items for which WP 4A is a concerned group, and the remainder were inputs on a variety of topics.

The meeting produced forty one output documents, three of which were agreed to be sent to Study Group 4 (SG 4) for their consideration, including: a draft revision of an existing Recommendation (DRR), and two draft new Reports (DNRep). In addition, the meeting produced: four preliminary draft revision of Recommendations (PDRR), one preliminary draft new Report (PDNRep), one preliminary draft revision of Report (PDRRep), two working documents towards preliminary draft new Recommendations (WD-PDNR), one working document towards a preliminary draft revision of Recommendation (WD-PDRR), two working documents towards preliminary draft new Reports (WD-PDNRep), one working document on draft CPM text for WRC-12 Agenda item 1.13, an update to the survey of submissions in the 21.4-22 GHz band (WRC-12 Agenda item 1.13), an element for draft CPM text on WRC-12 Agenda item 7, seventeen outgoing liaison statements (LS), working documents on reducing the coordination arc, issues associated with Resolution **80 (Rev.WRC-07)** and probability of harmful interference to FS receiving stations from transmitting GSO BSS satellites in the 21.4-22 GHz band, and various elements for the Chairman’s Report.

# 2 Opening of the meeting

The meeting opened with the Chairman welcoming all of the delegates to this fifth meeting of WP 4A in the 2007-2012 study period, and thanking the Administration of India, ISRO and BSNL for hosting this block of SG 4 Working Party meetings. It was noted that the input documents addressed both WRC-12 Agenda item related topics and non-WRC related topics, which continues to demonstrate ongoing interest not only in WRC preparations but in FSS and BSS issues in general. The Chairman highlighted the WRC-12 Agenda items for which WP 4A is either “responsible” or “concerned” and noted that the meeting had inputs on many of those items, and considerable input on WRC-12 Agenda item 1.13.

The opening remarks concluded with the BR Counsellor introducing Document 4A/INFO/10, which contained general information and reminded meeting delegates as to the details of the Sharepoint site which provides “Share Folders” for informal document exchange amongst participants during the meeting. Delegates were also reminded that, as in the past, much of this meeting of WP 4A would be conducted as “electronic only” with the majority of sub-group work being conducted via the shared access folders.

Following these opening remarks the proposed agenda contained in Document 4A/ADM/33 was adopted without change.

In accordance with the agenda, the Chairman next summarized the report of the last meeting of WP 4A. It was pointed out that the report contained 18 “working” annexes (i.e. annexes containing PDNRs, PDRRs, Working Documents, etc.) and the Chairman noted that there were inputs to the current meeting addressing almost every one of these working annexes. Each of these working annexes was attributed to the sub-groups for subsequent consideration by the meeting.

The agenda then called for a report on related activities since the last meeting of WP 4A, the most significant of these being a meeting of SG 4 that immediately followed the last meeting of WP 4A. The Chairman noted that the last WP meeting had agreed to send eight documents to SG 4 for formal approval or action on adoption/approval procedure, as appropriate, and each of these had successfully completed the adoption/approval process. These documents were:

DNR ITU-R S.[CSREF-PATT] (now Recommendation ITU-R S.1855)

DNR ITU-R S.[IMT-PFD] (now Recommendation ITU-R S.1856)

DNR S.[VEHICLE\_E/S] (now Recommendation ITU-R S.1857)

DRR ITU-R S.465-5 (now Recommendation ITU-R S.465-6)

DRR ITU-R S.1001-1 (now Recommendation ITU-R S.1001-2)

DN Report ITU-R S.[ADAP\_ARRAY] (now Report ITU-R S.2150)

DN Report ITU-R S.[REP-1001] (now Report ITU-R S.2151)

SUP Recommendation ITU-R S.727

The agenda then called for a review of liaison with other WPs and in summarizing this activity it was noted that the last meeting of WP 4A had sent a number of liaison statements to various WPs of SG 1, SG 4, SG 5 and SG 7 and to the WP of the Special Committee. Replies had been received at this meeting to all of the liaison statements from which a reply would have been expected and these replies had been attributed to sub-groups for appropriate action.

Next on the agenda were Reports from Rapporteurs and Correspondence Groups. WP 4A does not currently have an active Rapporteur to any other WP, and only three Correspondence Groups are currently in place. It was agreed to maintain the correspondence groups on updating data for Recommendation ITU-R S.1328 and Recommendation ITU-R S.1717, as the databases that are the topic of these Recommendations are periodically updated. The third active correspondence group is that dealing with “Efficient Use of Orbit/Spectrum Resource” and a single contribution (from the Chairman of the group) had been submitted to the meeting and was attributed to the appropriate sub-group.

In reviewing the possibilities for development of draft Recommendations or Reports it was noted that there were input documents to this meeting calling for concluding work on several draft revisions of Recommendations and on a draft new Report, and as such it was believed that there were some definite possibilities for this meeting to produce output for consideration by SG 4 in July 2010.

The meeting then considered the proposed work program contained in Document 4A/ADM/32. It was agreed to follow this work program for the meeting, with the addition of a 5th time slot each day. It was further suggested that should meetings be required over the weekend, effort should be made to avoid any meetings on Saturday.

The meeting considered the establishment of groups and attribution of input documents contained in Document 4A/ADM/34. This basic structure for the meeting was agreed, as was the appointment of Chairs for the two main groups, as discussed in the following sections.

# 3 Structure of the meeting

As in the past, the work of the meeting was divided between two main Groups as follows:

Group 4A-1, Intra-service sharing and other FSS issues

(Chairman: Mr. D. Jansky (USA))

Topics included: BSS and WRC-12 Agenda item 1.13, WRC-12 Agenda items 7 and 8.1.3, Antenna performance issues, Rec. ITU-R S.725 (VSATs), FSS/FSS sharing, Ku-band allocations in Regions 2 and 3, Rec. ITU-R S.1003 (Orbital debris).

Group 4A-2, Inter-service sharing and protection issues

(Chairman: Mrs. E. Neasmith (CAN))

Topics included: WRC-12 Agenda items: 1.2, 1.3, 1.5, 1.11, 1.12, 1.19, 1.20, 1.22 and 1.25, FSS sharing with BWA (3 400-4 200 MHz) and IMT (3 400-3 600 MHz), FSS sharing with FS, Updating of SF Recommendations, other miscellaneous.

# 4 Summary of results

In reviewing the results of the work of the meeting the following abbreviations apply:

– DNQ – Draft new Question.

– DNR – Draft new Recommendation.

– DRR – Draft revision of existing Recommendation.

– DNRep – Draft new Report.

– DRRep – Draft revision of existing Report.

– PDNR – Preliminary draft new Recommendation.

– PDRR – Preliminary draft revision of existing Recommendation.

– PDNRep – Preliminary draft new Report.

– PDRRep – Preliminary draft revision of existing Report.

– WD – Working document towards possible future PDNR, PDRR, PDNRep, PDRRep, etc.

– LS – Liaison statement to another working party or task group, or to the BR or Special Committee.

## 4.1 Group 4A-1, Intra-service sharing and other FSS issues

Group 4A-1 included the topics of: BSS and WRC-12 Agenda item 1.13, WRC-12 Agenda items 7 and 8.1.3, Antenna performance issues and Rec. ITU-R S.725 (VSATs), FSS/FSS sharing, Ku-band allocations in Regions 2 and 3, and Rec. ITU-R S.1003 (Orbital debris).

The WRC-12 Agenda items for which WP 4A is the lead group are 1.13, 7 and parts of 8.1.

### 4.1.1 Agenda item 1.13

As with previous meetings, a significant number of documents associated with BSS in the 21.4‑22 GHz band in Regions 1 and 3 were submitted to the meeting, including contributions proposing revisions to the current version of the draft CPM text that was developed at the last meeting. A considerable amount of time was devoted to discussion of these topics during the meeting, and considerable overall progress was made on these topics at this meeting. As was recognized at the conclusion of the last meeting, one of the key areas of focus at this meeting was on the draft CPM text in Section 5 “Methods to satisfy the Agenda item.” A considerable amount of time was devoted to discussing this section of the draft CPM text and this section, along with Sections 1 to 4, have now been extensively discussed and are considered stable, with agreement on much of this text. Section 6 “Regulatory and Procedural Considerations” has not yet been considered and will be the starting point for discussion of the draft CPM text at the next meeting of WP 4A.

Progress was also made on the revisions of ITU-R Recommendations associated with mitigation techniques for combating rain fading for BSS systems (Rec. ITU-R BO.1659), reference power flux-density for BSS systems (Rec. ITU-R BO.1776), and intra-service sharing criteria for BSS systems (Rec. ITU-R BO.1785) and on the report summarizing technical characteristics of BSS systems (Rep. ITU-R BO.2071). Each of these documents is now in a Preliminary Draft Revision state, and administrations are encouraged to review these documents carefully, and contribute as appropriate, with a view to finalizing the revisions on these documents at the next meeting of WP 4A.

In addition, the BR provided an update to the survey of satellite network filings in the 21.4-22 GHz band, which can be found in Annex 17 to this report, and WP 4A thanks the BR for their efforts in producing this update. In discussing this survey some administrations expressed the view that there appears to be an inconsistency between the number of networks in actual use and the number of networks shown as confirmed as brought into use in this survey.

### 4.1.2 Agenda item 7, parts of Agenda item 8.1

The WP received contributions addressing issues under WRC-12 Agenda item 7. One issue relating to the “averaging bandwidth” referred to in RR Appendix **4** was raised previously and was further discussed at this meeting. Different points of view are now summarized in the document being carried forward, which can be found in Annex 15 to this report, and administrations are encouraged to consider the issues raised in this Annex, realizing that the next meeting of WP 4A will be the last chance to develop draft CPM text on this issue, should the meeting decide that such text is necessary.

A second WRC-12 Agenda item 7 issue brought before the meeting was that of a possible reduction of the coordination arc in certain specific frequency bands. Summary of discussion on this issue can be found in Annex 12 to this report. It should also be noted in that Annex that a specific request of support from the BR was made in terms of compiling statistics on the number of requests for inclusion in coordination that are submitted under RR No. **9.41**.

The third issue under WRC-12 Agenda item 7 was that of the report of the correspondence group on the efficient use of the orbit/spectrum resource. The report was essentially a compilation of the ideas raised at the May 2009 BR Workshop on this topic. At the conclusion of the discussion of these issues the point was raised that it has been some 40 years since the last “space conference” was held and perhaps the best way to address issues that have been raised in the BR Workshop would be to consider convening another such conference to comprehensively address the regulatory aspects of space systems.

An input contribution was received on WRC-12 Agenda item 8.1.3 that proposed further developing the issues identified in the already established Work Plan for this Agenda item (see [Document 4A/361](http://www.itu.int/md/R07-WP4A-C-0361/en)). Unfortunately, due to unforeseen circumstances, the submitting administration was not able to attend the meeting and so a full discussion of the document was not possible. It was agreed to defer discussion of this document until the next meeting of WP 4A.

As part of the discussion of draft CPM text for “Methods to satisfy the Agenda item” under WRC‑12 Agenda item 1.13, it was suggested that some of the issues raised may be viewed as common to issues under Resolution **80 (Rev.WRC-07)**. As such, it was suggested that certain methods proposed for addressing issues under WRC-12 Agenda item 1.13 also be discussed more generally under Resolution **80 (Rev.WRC-07)**. While there was no time for such discussion at this meeting, the methods seen as potentially common to WRC-12 Agenda item 1.13 and Resolution **80 (Rev.WRC-07)** are summarized in Annex 13 to this report.

**4.1.3 Antenna issues**

The WP concluded development of a draft new Report that provides a methodology for modelling earth station antenna gain in the region of the main beam (DNRep ITU-R S.[MAIN-LOBE]) and it was agreed to send this DNRep to SG 4 in July 2010. A possible revision of Recommendation ITU-R S.725 “Technical Characteristics of Very Small Aperture Terminals (VSATs)” was considered with the objective of updating this Recommendation and this possible update is being carried forward for further consideration. A WD-PDNR proposing a reference radiation pattern for BSS networks in the 21.4-22 GHz band was proposed, recognizing the fact that currently there is no agreed radiation pattern to be used for intersystem coordination between such networks. Some measurement results of subscriber type antennas were included in the WD-PDNR and additional measurement results would be welcomed. Finally, the meeting considered a PDRR ITU-R S.732 “Method for statistical processing of earth-station antenna side-lobe peaks.” Considering the fact that a revision of Recommendation ITU-R S.465 has been recently approved and the new Recommendation ITU-R S.1855 has also been recently approved, it is considered important to work toward finalizing any revisions of Recommendation ITU-R S.732 at the next meeting of WP 4A in order to remove any doubt as to how antenna pattern measurements should be made.

### 4.1.4 FSS/FSS Sharing and Ku-band allocation Issues

On the issue of FSS/FSS sharing, the meeting agreed to finalize the previously developed preliminary draft new Report that provides guidelines that may be used by administrations in the design of their systems for assessing the impact of rain attenuation on the carrier to noise plus interference ratios of the FSS Plan allotments (DNRep ITU-R S.[GUIDE\_PLAN]). It was agreed to send this DNRep to SG 4 in July 2010. The meeting also continued to develop the WD on asymmetrical uplink/downlink unplanned FSS frequency allocations in the 10-15 GHz range in Regions 2 and 3. This WD examines the inefficiencies associated with having different amounts of spectrum available for unplanned FSS uplinks and downlinks and contains a work plan for studying this issue further.

### 4.1.5 Orbital Debris

The meeting received a proposed revision of Recommendation ITU-R S.1003-1 “Environmental protection of the geostationary-satellite orbit” and agreed to submit a DRR, based on this input, to SG 4 in July 2010.

### 4.1.6 Tabular summary of the results of Group 4A-1

Table 1 below summarises the work carried out by Group 4A-1 and lists the corresponding input and output documents.

Table 1

Summary of work results from Group 4A-1

| Sub-Group | | Topic | | WP 4A input Documents | | WP 4A output Documents | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TEMP No. | | Status | | Subject/Comments | |
| **4A-1a**  P. Hovstad  (Telenor) | BSS and WRC-12 Agenda item 1.13 | | 4A/278 (Annexes 1, 2, 10, 12, 15, 16), 4A/282, 290, 292, 304, 309, 310, 313, 316, 317, 335, 336, 337, 338, 339, 347, 348, 349, 350, 354, 355, 356, 357, 359, 360 | | 203  198  200  205  199  197  204  201  202 | | PDRR ITU-R BO.1776  WD draft CPM text  LS to WPs 5C, 6B (3M, 4B, 5A, 6A, 7D)  PDRR ITU-R BO.1785  Chairman’s Report Annex  WD PDRRep ITU-R BO.2071  PDRR ITU-R BO.1659  LS to WPs 5A 5C,7A,7B,7C,7D  WD | | Ref. pfd for BSS in band 21.4-22.0 GHz  WRC-12 A.I. 1.13  Status of work on WRC-12 A.I. 1.13  Intra service sharing criteria for GSO BSS in 21.4-22 GHz in Regions 1 & 3  BR Survey of filings in 21.4-22 GHz (WRC‑12 A.I. 1.13)  System parameters of BSS between 17.3 GHz and 42.5 GHz and associate feeder links  Mitigation techniques for rain attenuation for BSS between 17.3 GHz and 42.5 GHz  Potential candidate bands for Feeder links (WRC‑12 A.I. 1.13)  Prob. of harmful interf. to FS from GSO BSS | |
| **4A-1b**  G. Shewan  (Canada) | Antenna Performance & Rec. ITU-R S.725 VSATs | | 4A/278 (Annexes 3, 6, 11), 4A/315, 326, 329, 338 | | 172  171  170  169 | | PDNR ITU-R BO.[BSS\_ANT\_PATT]  PDRR ITU-R S.732  WD PDRR  ITU-R S.725  DNRep ITU-R S.[MAIN-LOBE] | | Ref. ant. patt. for BSS in 21.4-22 GHz  Antenna Model  VSAT Tech. Char.  Modelling of main lobe of antenna pattern | |
| **4A-1c**  J. Wengryniuk  (USA) | WRC-12 Agenda items 7 (Res.86),  8.1.3 (Res.80), FSS/FSS Sharing, 10-15 GHz FSS allocations | | 4A/278 (Annexes 4, 7, 13, 14, 17, 18),  4A/297, 308, 313 (part), 320, 330, 343, 344, 346, 361, 362 | | 196  165  166  167  168 | | WD PDNRep ITU-R S.  [ASSYM.FSS]  DNRep ITU-R S.[GUIDE-PLAN]  Element for draft CPM text on A.I. 7  WD  WD | | Asymmetric FSS bands  in 10-15 GHz  Design guidelines for FSS Plan allotments  Definition of Avg. BW in Annex 2, RR AP 4  Reduction in coord. arc  Methods for Res. 80 | |
| **4A-1Ad Hoc**  D. Jansky  (USA) | Rec. ITU-R S.1003 (Orb. debris) | | 4A/323 | | 195 | | DRR ITU-R S.1003-1 | | Environmental protection of the GSO | |

## 4.2 Group 4A-2, Inter-service sharing and protection issues

Group 4A-2 included the topics of: WRC-12 Agenda items: 1.2, 1.3, 1.5, 1.11, 1.12, 1.19, 1.20, 1.22 and 1.25, FSS sharing with BWA (3 400-4 200 MHz) and IMT (3 400-3 600), FSS sharing with FS, Updating of SF Recommendations, and other miscellaneous.

### 4.2.1 WRC-12 Non-lead Agenda items

#### 4.2.1.1 WRC-12 Agenda item 1.2

WP 4A received a LS summarizing the current status of studies and draft CPM text related to this WRC-12 Agenda item. While WP 4A was not able to review the current draft CPM text in detail, WP 4A did liaise its views back to the responsible WP regarding the allowable impact that any chosen method to resolve this Agenda item could have on the overall interference environment for the services involved.

#### 4.2.1.2 WRC-12 Agenda item 1.3

WP 4A received a LS and an input contribution proposing a draft liaison statement to WP 5B on the use of FSS for unmanned aircraft. As a consequence of discussion of this topic, a LS was sent to WP 5B suggesting that is may be possible for FSS networks to support UAS in spectrum not necessarily designated for AMS(R)S. This could be done through an ITU-R Recommendation. The input contribution to WP 4A, [Document 4A/322](http://www.itu.int/md/R07-WP4A-C-0322/en), included an example PDNR for such purpose, however this PDNR was not discussed during the meeting and should be considered as being carried forward for possible discussion at the next meeting of WP 4A.

#### 4.2.1.3 WRC-12 Agenda item 1.5

WP 4A received four LSs and an input document related to harmonization of spectrum for ENG. As a consequence of discussion at the meeting a LS was sent to WP 5C expressing concerns related to possible overlap of ENG frequency band/tuning ranges with FSS allocations, in particular FSS space-to-Earth allocations.

#### 4.2.1.4 WRC-12 Agenda item 1.11

A number of documents were received in connection with this WRC-12 Agenda item and two LSs were produced as a consequence of the discussion of these documents. One LS was directed to WP 5C and addressed concerns expressed by the FS community in relation to ongoing work under this Agenda item. The second LS was to WP 7B and directly addressed the three specific areas for which WP 7B sought advice from WP 4A.

WP 4A also considered a proposal for a DNQ on inter-satellite service (ISS) links used in non-GSO satellite systems. Some administrations indicated support for the proposal, although a number of administrations indicated the view that a DNQ was not required to begin study of the issue and therefore opposed it. Some administrations expressed the view that such a Question would result in a great deal of study involving several affected Study Groups. WP 4A therefore considered that continuation of such study does not require a new Question.

Subsequent discussion on a LS to another WP identified a lack of technical and operational characteristics for ISS links used in non-GSO satellite systems, which differ from ISS links used primarily for space science applications. It was also pointed out that there are proposals for new MSS and FSS networks using non-GSO orbits that will operate ISS links at frequencies above 20 GHz. WP 4A should therefore further consider a need to develop a PDNR, and invite further contributions on the issue.

#### 4.2.1.5 WRC-12 Agenda item 1.12

WP 4A received one LS related to WRC-12 Agenda item 1.12, however, given that no comments or issues were raised within the WP by this LS, the document was simply noted by the meeting.

#### 4.2.1.6 WRC-12 Agenda item 1.19

WP 4A received one LS and one input document for information related to WRC-12 Agenda item 1.19, however, given that no comments or issues were raised within the WP by these documents, they were simply noted by the meeting.

#### 4.2.1.7 WRC-12 Agenda item 1.20

WP 4A received one LS and two input documents related to WRC-12 Agenda item 1.20, and produced an outgoing LS as a result of discussion of these documents. The LS questions the justification for additional spectrum for HAPS, given that no such systems are operational today in the spectrum already identified for HAPS. The LS also comments on compatibility studies done to date under this Agenda item, and offers draft CPM text for a “Method to satisfy the Agenda item” that it believes adequately resolves this WRC-12 Agenda item.

**4.2.1.8 WRC-12 Agenda item 1.22**

WP 4A received three LSs and one input document related to WRC-12 Agenda item 1.22, and produced an outgoing LS as a result of discussion of these documents. The LS confirms the FSS and BSS protection requirements in Report ITU-R SM.2057, and reiterates WP 4A’s concerns with protection of satellite services from devices that can roam on a global basis. The LS advocates that, should SRDs be deployed in FSS and/or BSS bands, emission masks for these devices should be derived from the appropriate protection requirements.

#### 4.2.1.9 WRC-12 Agenda item 1.25

At the March/April 2010 meeting of WP 4A, a LS from WP 4C (Document [4A/364](http://www.itu.int/md/R07-WP4A-C-0364/en)) was received that provided an updated list of frequency bands that are intended to be studied under WRC-12 Agenda item 1.25. The list is reproduced below:

|  |  |
| --- | --- |
| Frequency band | MSS direction  (DL = downlink, UL = uplink) |
| 5 150-5 250 MHz | DL |
| 7 055-7 250 MHz | DL |
| 8 400-8 500 MHz | UL |
| 10.5-10.6 GHz | DL |
| 13.25-13.4 GHz | DL |
| 15.43-15.63 GHz | UL |

Note that the list of bands still includes two bands that are used by the fixed-satellite service, specifically, the 5 150-5 250 MHz band and the 7 055-7 250 MHz band. In a previous liaison to WP 4C, Document [4C/345](http://www.itu.int/md/R07-WP4C-C-0345/en), WP 4A provided information on the use of these bands. This material has been taken into account in Annexes 11 and 20 to Document [4C/436](http://www.itu.int/md/R07-WP4C-C-0436/en), which are respectively the “Working document towards a preliminary draft new Report ITU-R M.[MSS-SHARING] – Feasibility of MSS operations in certain frequency bands,” and the “Proposed modifications to the draft CPM text on WRC-12 Agenda item 1.25.”

In Document 4A/364, WP 4C has invited additional comments on the material in Annexes 11 and 20 to Document 4C/436. This matter is brought to the attention of the membership of WP 4A in case additional contribution(s) may be required.

#### 4.2.1.10 FSS sharing with BWA (3 400-4 200 MHz) and IMT (3 400-3 600 MHz)

The WP received two LS and two input documents on these topics. On the topic of FSS/BWA sharing, WP 4A received updated information from WP 5A and from other input contributions and this new information has been incorporated into an updated version of the joint WPs 4A/5A preliminary draft new Report on this topic. The meeting also produced a LS to WP 5A detailing the changes to the preliminary draft new Report and expressing the view that the Report has now reached a mature state and that WP 4A will look to upgrade the document from a PDNReport to a DNReport at its next meeting in July 2010.

On the topic of FSS sharing with IMT, WP 4A received a LS from WP 5D on work that is currently under way in WP 5D on the development of a PDNR on techniques to improve the compatibility or sharing between IMT systems and FSS networks in the 3 400-3 600 MHz band. WP 4A carefully reviewed the WP 5D PDNR and provided detailed comments back to WP 5D via a LS.

#### 4.2.1.11 FSS sharing with FS

The WP received several input documents on this topic and produced multiple output documents. The first issue under this topic was that of a methodology for statistically calculating the interference received by the FS from space-to-Earth emissions for frequency bands above about 17 GHz. This is an issue that has been under development within WP 4A for several meetings and, as previously agreed, the output from this work is taking the form of a Recommendation and a Report. At this meeting, both the WD-PDNR and WD-PDNRep had advanced to the stage where it was felt that it was time to share these documents with WP 5C and seek their views. Both documents were sent to WP 5C via an appropriate LS. In addition, as part of the work on this issue, a comparison has been made of cumulative distribution functions (CDFs) of the attenuation calculated on an interference path between a space based interference source and a FS terrestrial

receiver. The compared CDFs were produced using two different methods of calculating the annual distribution of slant path attenuation. The views of WPs 3J and 3M were sought, via a LS, on the methods used to produce these CDFs.

In addition to this ongoing study, another statistical approach to calculating the probability of interference to FS terrestrial stations from GSO BSS in the band 21.4-22 GHz was discussed. The views of WP 5C were sought on this statistical approach and, given the possible implications this could have on WRC-12 Agenda item 1.13, WP 5C was asked to provide its views for the next meeting of WP 4A.

#### 4.2.1.12 Updating of SF Series Recommendations

In Document [4A/298](http://www.itu.int/md/R07-WP4A-C-0298/en) WP 4A received comments from WP 5C concerning the review of certain SF‑Series documents. With regard to Recommendations ITU-R SF.1482, ITU-R SF.1483, ITU-R SF.1484, ITU-R SF.1573, ITU-R SF.765, ITU-R SF.1395, ITU-R SF.1485, ITU‑R SF.1486, ITU-R SF.1572, ITU-R SF.1585 and ITU-R SF.1648, the review has concluded and appropriate action has been taken as detailed in Document 4A/298. With regard to Recommendations ITU-R SF.674 and ITU-R SF.1481 however, WP 4A at its October 2009 meeting sent a liaison statement to WP 5C (see Document [5C/243](http://www.itu.int/md/R07-WP5C-C-0243/en)) informing that WP 4A required further time to consider the draft texts proposed by WP 5C. Unfortunately, no contributions to the March/April 2010 meeting of WP 4A were received on this matter. Furthermore, WP 5C has undertaken some editorial updating of Recommendation ITU-R SF.1602. The revised texts for Recommendations ITU-R SF.674, ITU-R SF.1481, and ITU-R SF.1602 are available in Annex 23 to Document [5C/301](http://www.itu.int/md/R07-WP5C-C-0301/en). WP 4A membership is invited to contribute on these revised texts to the next meeting of WP 4A.

Recommendation ITU-R SF.675 was proposed for suppression in Administrative Circular [CAR/272](http://www.itu.int/md/R00-CAR-CIR-0272/en). Subsequent to publication of the Circular it was discovered that this Recommendation is referred to in Footnote 1 to Tables 1 and 2 of Annex 1 and Footnote 2 to Tables A, B, C and D of Annex 2 of Appendix **4** to the Radio Regulations, and that the content of the Recommendation may still be relevant; therefore the suppression was not approved.

Although Recommendation ITU-R SF.675 remains in force it has not been updated since 1994. Among the October 2009 and the March/April 2010 meetings of WP 4A, six input contributions have been received that propose various ways to deal with Recommendation ITU-R SF.675 (see Documents [4A/226](http://www.itu.int/md/R07-WP4A-C-0226/en), [4A/239](http://www.itu.int/md/R07-WP4A-C-0239/en), [4A/253](http://www.itu.int/md/R07-WP4A-C-0253/en), [4A/266](http://www.itu.int/md/R07-WP4A-C-0266/en), [4A/325](http://www.itu.int/md/R07-WP4A-C-0325/en) and [4A/332](http://www.itu.int/md/R07-WP4A-C-0332/en)). In summary, these contributions propose methods that vary from merging Recommendation ITU-R SF.675 with Recommendation ITU-R SM.328, to specific proposals to edit Recommendation ITU-R SF.675.

Administrations are invited to contribute specific proposals on this matter to the July 2010 meeting of WP 4A, perhaps to provide specific proposals to edit Recommendation ITU-R SF.675, taking into account the content of the above-mentioned six contributions.

It has also been proposed in some of these contributions that Recommendation ITU-R SF.675 be transferred to Study Group 1; however, based on discussions at the March/April 2010 meeting of WP 4A it was decided that the Recommendation should be retained within Study Groups 4 and 5 at this time. This course of action would be consistent with comments in the liaison statement from WP 5C to the March/April 2010 meeting of WP 4A, see Document [4A/293](http://www.itu.int/md/R07-WP4A-C-0293/en).

#### 4.2.1.13 Miscellaneous issues

WP 4A received a LS, for information, from WP 5D that highlighted the intention of WP 3M to prepare a Handbook on the topic of “Radiowave propagation information for predictions for signal levels likely to cause interference and for evaluation of coordination distances.” Given the informational nature of the LS, it was simply noted by the meeting. WP 4A also received a LS from the BR Study Group Department containing comments from SG 6 to SG 4 on the treatment of former WP 6S Recommendations. In that LS WP 4A is identified as a WP that would have interest in Recommendation ITU-R BO.600 titled “Standardized set of test conditions and measurement procedures for the subjective and objective determination of protection ratios for television in the terrestrial broadcasting and the broadcasting-satellite services.” WP 4A concurred with the comments of SG 6, i.e. that the Recommendation needs to be updated to remain relevant, and transmitted those comments back to SG 6 and WP 6A via a LS.

#### 4.2.1.14 Tabular summary of the results of Group 4A-2

Table 2 below summarises the work carried out by Group 4A-2 and lists the corresponding input and output documents.

Table 2

Summary of work results from Group 4A-2

| Sub-Group | Topic | WP 4A Input Documents | **WP 4A Output Documents** | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **TEMP No.** | **Status** | **Subject/Comments** | |
| **4A-2a**  Dr. Fortes  (B) | WRC-12 AI 1.11 (ISS Sharing with SRS) | 4A/278 (Annex 8), 4A/279, 281, 291, 306, 311, 318, 324, 333, 334, 340, 341, 351, 352, 353, 358 | 192Rev1 | LS to WP 7B (copy to WP 5C for info) | Parameters for compatibility studies between NGSO-ISS systems and SRS systems under WRC-12 A.I. 1.11 | |
|  |  | 189Rev1 | LS to WP 5C (copy to WP 7B) | Consideration on protection criteria for NGSO-ISS systems and SRS systems under WRC‑12 A.I. 1.11 | |
|  |  | 179 | Element for Chairman’s Report | Technical and operational characteristics of ISS | |
| **4A-2b**  P. Van Niftrik  (HOL) | IMT and BWA/FSS 3 400-4 200 MHz | 4A/278 (Annex 5), 4A/294, 312, 319, 321 | 177Rev1 | LS to WP 5D | Techniques to improve the compatibility or sharing between IMT systems and FSS networks in the 3.4-3.6 GHz band |
|  |  |  | 176 | LS to WP 5A | Compatibility of broadband wireless access systems and FSS networks in the 3 400‑4 200 MHz band |
|  |  |  | 173 | PDNRep ITU-R S.[BWA-FSS] | Studies on compatibility of BWA systems and FSS networks in the 3 400‑4 200 MHz band |
| **4A-2c**  P. Secher  (LUX) | FSS Sharing with FS | 4A/250, 4A/278 (Annex 9), 317, 327, 328, 331 | 174 | WD PDNR ITU‑R [SF]. [STATMETH] | Methodology for calculating the interference received by the FS from space-to-Earth emissions for frequency bands above about 17 GHz |
|  |  |  | 175 | WD PDNRep ITU‑R [SF]. [STATMETH] | Example of a possible mathematical implementation of the methodology for statistically calculating the interference received by the FS from space-to-Earth emissions for frequency bands above about 17 GHz |
|  |  |  | 191 | LS to WP 5C | Methodology for statistically calculating the interference received by the FS from space-to-Earth emissions for frequency bands above about 17 GHz |
|  |  |  | 190 | LS to WP 5C | Estimation of probability of causing harmful interference to FS terrestrial stations from GSO BSS satellites in the band 21.4-22.0 GHz |
|  |  |  | 188 | LS to WPs 3J and 3M (copy to WP 5C for info) | Comparison of combined attenuation due to fading / enhancement due to scintillation and multipath mechanism and attenuation due to gaseous absorption, with attenuation due to gaseous absorption for interference assessment from space-to-Earth emissions for frequency bands above about 17 GHz |
| **4a-2d**  Y. H. Chan  (AsiaSat) | WRC-12 AI 1.20 (HAPS at C‑Band) | 4A/299, 314, 345 | 185 | LS to WP 5C | Gateway links for HAPS in the frequency band 5 850‑7 075 MHz |
| **Ad Hocs** |  |  |  |  |  |
| D. Jansky  (USA) | WRC-12 AI 1.3 (Reg. provisions for UAS) | 4A/296, 322 | 181 | LS to WP 5B | Use of FSS for unmanned aircraft (WRC-12 A.I. 1.3) |
| J. Lewis,  (Samsung) | WRC-12 AI 1.5 (ENG Spectrum) | 4A/287, 288, 289, 304, 363 | 184 | LS to WP 5C for action (copy to WP 4C for info) | Harmonization of spectrum for use by terrestrial ENG systems (WRC-12 A.I. 1.5) |
| P. Li  (CHN) | WRC-12 AI 1.22 (Protection from SRD)  WRC-12 AI 1.19 (SDR & CRS) | 4A/282, 283, 295, 301  4A/282, 284 | 182  - | LS to WP 1A  Noted | WRC-12 A.I. 1.22 |
| K. Arasteh  (IRN) | WRC-12 AI 1.2 (Res. 951) | 4A/302 | 183 | LS to WP 1B | WRC-12 A.I. 1.2 |
| E. Neasmith  (CAN) | Updating of SF Recs. | 4A/293, 298, 325, 332 | 186 | LS to WP 5C | Revision of Recommendation ITU-R SF.675-3 “Calculation of the maximum power density (averaged over 4 kHz) of an angle modulated carrier” | |
|  |  | 178 | Element for Chairman’s Rpt | Recommendation ITU-R SF.675 | |
|  |  | 194 | LS to WP 5C | Review of certain SF-series Recommendations | |
|  |  | 193 | Element for Chairman’s Rpt | Review of certain SF-series Recommendations | |
| WRC-12 AI 1.12 (Aero MS 37‑38 GHz) | 4A/280 | - | Noted |  | |
| WRC-12 AI 1.25 (Additional MSS allocations) | 4A/282, 364 | 180 | Element for Chairman’s Report | WRC-12 A.I. 1.25 | |
| Liaison with WPs of SG 3 | 4A/285 | - | Noted |  | |
| Proposed treatment of Rec. ITU-R BO.600 | 307, 365 | 187 | LS to SG 6 and WP 6A (copy to WP 4B for info) | Response to comments on the proposed treatment of Recommendations of former WP 6S | |

# 5 Summary

The fifth meeting of WP 4A in the 2007-2012 study period was well attended and successfully addressed the eighty eight input documents submitted to the meeting, while generating forty one output documents. Three of these output documents included draft Recommendations or Reports that were agreed to be sent to SG 4 for their consideration and formal approval or action on adoption/approval procedure, as appropriate:

1) DRR ITU-R S.1003-1 “Environmental protection of the geostationary-satellite orbit”(Document [4/122](http://www.itu.int/md/R07-SG04-C-0122/en), source: Document 4A/TEMP/195);

2) DNRep ITU-R S.[MAIN-LOBE] “Methodology on the modelling of earth station antenna gain in the region of the antenna main-lobe and the transition region between the minimum angle of the reference antenna pattern and the main-lobe” (Document [4/123](http://www.itu.int/md/R07-SG04-C-0123/en), source: Document 4A/TEMP/169);

3) DNRep ITU-R S.[GUIDE\_PLAN] “Guidelines that may be used by administrations in the design of their systems for assessing the impact of rain attenuation on the carrier to noise plus interference ratios of the FSS Plan allotments” (Document [4/124](http://www.itu.int/md/R07-SG04-C-0124/en), source: Document 4A/TEMP/165).

WP 4A was able to make significant progress on the development of draft CPM text for WRC-12 Agenda item 1.13, for which it is responsible, and the meeting considered input contributions for WRC-12 Agenda items 7 and 8.1.3, which are also under its responsibility. A number of documents were also considered related to those Agenda items for which WP 4A is a contributing group.

Other issues within the purview of WP 4A that continue to show progress and interest are those associated with antenna performance, sharing with the FS, including sharing with BWA and IMT, intra-service FSS sharing, and possible additional FSS uplink allocations in the 10-15 GHz range.

The next Working Party 4A meeting is scheduled for 7-15 July 2010 in Geneva, Switzerland, to be immediately followed by a one day meeting of SG 4 on July 16. Administrations are invited to review the progress made at this meeting of the WP and to submit written contributions that advance the successful completion of the work. Such written contributions are essential to the timely and efficient progress of the various studies facing the WP during the limited period of the meeting.

In closing, the Chairman thanks again the government of India, ISRO and BSNL for hosting this block of SG 4 Working Party meetings, and for the excellent facilities and support provided throughout the conduct of the meeting. He thanks all the participants of WP 4A, particularly the main group Chairs and their respective subordinate sub-group Chairs, for their hard work and spirit of cooperation during the meeting. And finally, he would like to thank the ITU Secretariat, especially the WP 4A counsellor, Mr. Nelson Malaguti, for the invaluable support, assistance and guidance provided in preparation for, and during, the meeting.

**Annexes:** 18