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| **Radiocommunication Advisory GroupGeneva, 26-28 April 2017** |  |
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|  | **Addendum 1 to****Document RAG17/1-E** |
| **30 March 2017** |
| **Original: English** |
| Director, Radiocommunication Bureau |
| report TO the twenty-FOURTH meeting of the radiocommunication advisory groupSTUDY GROUPS ACTIVITIES |

# 1 Working methods

Study Group activities were pursued within a stable Study Group (SG) and Working Party (WP) structure according to the work programmes defined in the ITU‑R Operational Plan. Working methods were satisfactorily applied in accordance with Resolution ITU‑R 1 and the associated Working Guidelines.

# 2 Access to meeting documents

In line with the provisions of Resolution ITU‑R 1, meeting documents are posted by SGD staff within one working day “as received” on a webpage established for this purpose, and the official versions are posted on the website within three working days.

# 3 Electronic working facilities

Continuing emphasis has been placed on the use of electronic facilities that have brought considerable benefit to delegates as well as a significant economy in paper.

## 3.1 Sharepoint website

Access to documentation during meetings via a dedicated Sharepoint website is the standard practice. All Study Group and Working Party meetings are now completely paperless.

Sharepoint sites for Correspondence and Rapporteur Groups are also used extensively in the periods between the Working Party meetings.

## 3.2 File synchronization

A file synchronization facility has been implemented for all Study Group/Working Party meetings to facilitate access to the most recent versions of documents during meetings.

## 3.3 Online list of participants

Online versions of the lists of participants for all Study Group and Working Party meetings have been implemented with access to the online version restricted to TIES users. The dynamic list can be searched based on parameters such as name, member and position in the delegation.

## 3.4 Remote participation

Since the last meeting of RAG, audio webcasts of all available languages have been provided during the Plenary sessions of all Study Group and Working Party meetings held in Geneva.

During the Working Party meetings, the possibility of active remote participation using Adobe Connect facilities in English only has been offered. Remote participants wishing to actively participate (e.g. to introduce a contribution) need to register for the meeting beforehand and coordinate their active participation with the responsible Counsellor.

Active remote participation was provided to allow participants in Working Parties to present contributions on only 10 occasions since the last meeting of RAG. The general feedback received has been that such participation has been useful, but that it can be difficult to schedule and that it slows the meeting down.

While the Secretariat will make every effort to facilitate such active participation, it should be recognized that on some occasions this may not be possible due to factors such as the limited number of support staff, availability of equipped rooms, many parallel meetings and the need for the remote participants to have a high-quality Internet and phone connection.

However, remote participation has proven invaluable in the case of Correspondence and Rapporteur Group activities during intersessional periods. Such participation has enabled considerable progress in items relating to WRC-19 agenda items, where expected results are required at specified deadlines. In this regard 18 sessions have been hosted since RAG-16, with on average a duration of one hour each and 5 – 35 participants per session.

## 3.5 Study Group webpages

The ITU is continuing the process of changing the presentation of its webpages to provide an updated and consistent look across the ITU website. All of the main SG and WP pages have been changed to the new format, and associated pages are being changed progressively when they need to be updated.

## 3.6 Further development of the ITU‑R documents database search facility

This activity is reported in Section 8.1.5.2 of the body of this document.

## 3.7 Captioning

Since December 2013, all Study Group meetings have been provided with live captioning in English. Feedback on this facility has been generally positive as an aid to following discussions, however some concerns have been raised on occasion regarding the accuracy of the captioning particularly with respect to frequency bands and radiocommunication acronyms.

# 4 Participation

The figure below shows that there has been a progressive increase in the level of participation in ITU-R Study Group and Working Party meetings since 2003. This is very encouraging, but at the same time it does create some logistical difficulties.

Participation in the largest groups can now exceed 300 – too large to be accommodated in large rooms on the ITU premises (Popov, C). The average participation per meeting is now of the order of 120 participants – too large to be comfortably accommodated in the medium size rooms at ITU (A, C1, C2, Popov 1, Popov 2, H, K). Even the smallest groups now have an average participation exceeding 60 participants, which in turn is too large to be comfortably accommodated in the smaller rooms at ITU (H1, H2, K1, K2, L, M).

# 5 Meeting rooms

The shortage of meeting rooms at ITU Headquarters continues to hinder the effective planning of meetings. This problem has been exacerbated by the following factors:

* the increased number of meetings being arranged by all of the Sectors and the General Secretariat;
* the shortage of meeting rooms with a capacity of more than 120 participants;
* the need to avoid overlap and clashes of meeting dates;
* the limited availability and very long lead times required for bookings in alternative facilities such as CICG.

Consequently, in the coming years an increasing number of meetings will need to be held at other locations outside ITU. To that end, offers from the membership to host Study Group/Working Party meetings during this period will be particularly welcome. In the longer term, the requirements for meeting rooms at ITU will need to be carefully taken into account in the design of the Varembé 2 building.

# 6 Notable activities in the Study Groups

Since the last meeting of the RAG, Study Group activities largely focused on progressing the work on the RA-19 and CPM19-2 preparations and on the development of new or revised Recommendations/Reports associated with the WRC-19 agenda items. Some of the notable activities and other ongoing standardization studies in each Study Group are highlighted below.

## 6.1 Study Group 1

Study Group 1 and Working Parties 1A, 1B and 1C met in June 2016 and additional meetings of Working Parties 1A and 1B were held in November 2016 to progress the work on the WRC-19 agenda items and issues, as well as other urgent topics, under the responsibility of these Working Parties.

The June 2016 meetings developed two new Recommendations, subsequently adopted and approved, which provide guidance on standard methods of testing sensitivity and bearing accuracy of direction finders, and associated reporting of the results, which are of particular importance for regulatory authorities and others who have to locate emitters. Methods for measuring and evaluating the indoor radio environment faced by radiocommunication applications are now also recommended. A new Question was also developed and subsequently approved on electromagnetic field measurements to assess human exposure. It has been assigned to WP 1C.

The meetings approved new ITU-R Reports describing applications of wireless power transmission (WPT) via radio frequency beam and the effects of wind turbines on fixed radio direction finders.

The meetings also approved revised ITU-R Reports to update national information from several countries on economic aspects of spectrum management, as well as information on smart grid utility management systems and on spectrum occupancy measurements and evaluation.

In addition to other activities in preparation for the next SG 1 block of meetings in June 2017, including studies assigned to WP 1A and WP 1B on some WRC-19 agenda items and issues, correspondence studies continued on topics such as:

– the coexistence of wired telecommunication with radiocommunication systems;

– wireless power transmission (WPT) systems, with in particular the identification of draft frequency ranges for operation of non-beam WPT systems;

– regulatory tools to support enhanced shared use of the spectrum;

– harmonization of SRD in response to Resolution ITU‑R 54 with, in particular, the development of draft SRD categories;

– spectrum monitoring evolution;

– measurement techniques and new technologies for satellite monitoring;

– other technical studies related to spectrum monitoring (Storage of I/Q data, DVB-T/T2 coverage measurements and evaluation of planning criteria, essential requirements for developing countries).

## 6.2 Study Group 3

Following the Study Group 3 meeting in June 2016, 12 draft revisions to ITU-R Recommendations and 2 draft revisions to ITU-R Reports in the scope of the Study Group were approved. Study Group 3 continued to give priority to studies dealing with propagation prediction for short-range systems in the frequency range 300 MHz to 450 GHz (Recommendations ITU-R P.1238-8 and ITU‑R P.1411-8), work in relation to building entry loss (Recommendation ITU-R P.2040-1), clutter loss and propagation prediction for interference and sharing studies in particular in relation to contributing preparatory work on WRC-19 agenda items 1.13 and 1.15. Recommendations in the P‑series remain popular and statistics for the period 2016 indicate that they received the highest number of downloads (more than 1 300 000). This is more than twice the number of downloads of the next most popular recommendation series for the same period.

## 6.3 Study Group 4

Study Group 4 Working Parties progressed the preparatory work for WRC-19 under the agenda items for which they are the leading groups as well as for other agenda items for which they are contributing groups.

New and revised Recommendations pertaining to the scope of SG 4 were approved, in particular Recommendations ITU-R S.2099-0 “Allowable short-term error performance for a satellite hypothetical reference digital path”, ITU-R BO.2098-0 “Transmission system for UHDTV satellite broadcasting”, and ITU-R BO.1784-1 “Digital satellite broadcasting system with flexible configuration (television, sound and data) ”.

New and revised reports pertaining to the scope of SG 4 were approved, in particular Reports ITU‑R M.2396-0 “Use of mobile-satellite service systems for flight tracking”, ITU-R BO.2397-0 “Satellite transmissions for UHDTV satellite broadcasting”, ITU-R M.2398-0 “Scenarios and performance of an integrated MSS system operating in frequency bands below 3 GHz” and ITU‑R S.2223-1 “Technical and operational requirements for GSO FSS earth stations on mobile platforms in bands from 17.3 to 30.0 GHz”.

## 6.4 Study Group 5

Six Recommendations and five Reports pertaining to the scope of SG 5 were approved, some of which are in support of the studies carried out in relation to WRC‑19 agenda items.

Working Party 5A produced Report ITU-R M.2395 “Introduction to railway communication systems in certain countries”. It is a technical Report which focuses on a case study of measurement results of radiocommunication characteristics between train and ground stations in the millimetre wave frequency ranges for some railway deployment scenarios. Amongst other aspects, the report examines the impact of future broadband transmission requirements and the impact of high train speeds of more than 300 km/h on current and future railway radiocommunication systems.

Working Party 5D revised, among other texts, Report ITU‑R M.2291 on the use of International Mobile Telecommunications (IMT) for broadband public protection and disaster relief (PPDR) applications. This Report addresses the current and possible future use of IMT in support of broadband PPDR communications as outlined in relevant ITU-R Resolutions. The Report further provides examples for deploying IMT for PPDR communications, case studies and scenarios of IMT systems to support broadband PPDR applications such as data and video. The expanding scope of PPDR capabilities, ranging from narrowband through wideband and broadband, offers greater utility for emergency response operations around the world, including in developing countries.

Working Party 5D also produced several Reports and Recommendations on IMT which were subsequently approved by SG 5.

## 6.5 Study Groups 1 and 5 joint activities

A workshop on Spectrum Management for Internet of Things Deployment was organized jointly by Study Groups 1 and 5. The purpose of the workshop was to provide a high level view on some spectrum management issues related to the deployment of Internet of Things (IoT), noting that studies are on-going on Resolution ITU-R 66: “Studies related to wireless systems and applications for the development of the Internet of Things”; Resolution ITU-R 54-2: “Studies to achieve harmonization for short-range devices”; Resolution 958 (WRC-15), Annex item 3: “Studies on the technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonized use of spectrum to support the implementation of narrowband and broadband machine-type communication infrastructures, in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU Radiocommunication Sector (ITU-R) scope of work”.

## 6.6 Study Group 6

In addition to revision of existing Recommendations and Reports, SG 6 approved a number of key new Recommendations and Reports, namely:

* Recommendation ITU-R BS.2094-0 – Common definitions for the Audio Definition Model
* Recommendation ITU-R BS.2102-0 – Allocation and ordering of audio channels to formats containing 12-, 16- and 32 tracks of audio
* Recommendation ITU-R BT.2095-0 – Subjective assessment of video quality using Expert Viewing Protocol (EVP)
* Recommendation ITU-R BT.2100-0 – Image parameter values for high dynamic range television for use in production and international programme exchange
* Report ITU-R BS.2388-0 – Usage guidelines for the audio definition model and multichannel audio files
* Report ITU-R BT.2389-0 – Guidelines on measurements for digital terrestrial television broadcasting systems
* Report ITU-R BT.2390-0 – High dynamic range television for production and international programme exchange.

Study Group 6 also approved a new Handbook on Digital Terrestrial Television Broadcasting Networks and Systems Implementation. The new Handbook compliments an earlier published ITU‑R Handbook on digital terrestrial television (“Digital terrestrial television broadcasting in the VHF/UHF bands”) as well as the ITU-D “Guidelines for the transition from analogue to digital broadcasting”. The Handbook is available for free download.

On 17 October 2016 SG 6 organized a [Seminar on Virtual Reality and 360 in Broadcasting](http://www.itu.int/en/ITU-R/study-groups/workshops/2016-VR/Pages/default.aspx) in Geneva, on the current state of the industry on Virtual Reality (VR) and 360 technologies which are spreading rapidly throughout both the broadcast and consumer electronics industries.

On 27 October 2016, SG 6 organized a [Joint ITU/EBU/BNE/DVB Workshop on Assistance for DTTB Implementation](http://www.itu.int/en/ITU-R/study-groups/workshops/2016-DTTB/Pages/default.aspx), in Geneva to discuss and share practical experiences related to DTTB implementation, in particular: licensing and business models, network specifications and quality of service, receiving equipment specifications and communications strategies.

Study Group 6 continued providing important assistance to the ITU-D Sector in particular in relation to the digital migration and digital dividend.

## 6.7 Study Group 7

During 2016 the Study Group 7 Working Parties developed 11 revised Recommendations, 1 new Recommendation and 1 new Report which will be considered at the SG 7 meeting in April 2017.

The main areas of current studies are: protection of data collection platforms, spectrum requirements for nano and pico satellites, and development of meteorological satellites systems.

## 6.8 Coordination Committee for Vocabulary

The ITU‑R CCV and ITU‑T SCV meetings continue to be conducted jointly, with extensive use of electronic methods. Work is on-going on improvements to the ITU terminology database.

# 7 Liaison and collaboration with ITU‑D and ITU‑T, and with other organizations

Intersectoral activities have continued throughout the period, particularly concerning ITU’s priority topics of climate change, emergency communications and accessibility.

*Concerning ITU‑D*: BR continues to participate in relevant Rapporteur Group meetings and contributes to the BDT workshops and seminars. These events provide an opportunity to present ITU‑R’s standardization activities and, in turn, to demonstrate their contribution to Resolution 123 (Rev. Busan, 2014) in bridging the standardization gap. The BR participation in some of these meetings also contribute, to the extent possible, to avoiding potential duplication and/or inconsistencies with the on-going ITU-R studies.

*Concerning ITU‑T*:In addition to climate change and emergency communications, topics of mutual interest between ITU‑R and ITU‑T include the effects of human exposure to radio frequencies, power line transmission systems, intelligent transport systems, common patent policy and intellectual property rights and audiovisual media accessibility.

In this context, SG 6 is continuing its work in the three Intersector Rapporteur Groups (IRG's) on Integrated Broadband Broadcasting (IBB) systems, audiovisual media accessibility (IRG‑AVA) and audiovisual quality assessments (IRG-AVQA).

In addition, a joint session of ITU-R WP 5D and ITU-T SG 13 on IMT-2020 was held in February 2017 to present the status of the studies on IMT-2020 in ITU-T and ITU-R.

There continues to be a requirement for close coordination on the various topics being addressed by ITU‑T that impinge on radiocommunication issues to reduce the potential for overlap, duplication and conflict of work undertaken by the two Sectors.

*Concerning other organizations*:Healthy liaison has continued between ITU‑R Study Groups and other organizations, with due reference to Resolution ITU‑R 9, where required. ITU‑R and BR representatives have continued their involvement in the Global Standards Collaboration (GSC), the World Standards Cooperation (WSC), CISPR and IEC. Liaison has also been evident with UN bodies and agencies in various fields, e.g. space weather, climate change and climate monitoring (WMO, UNFCCC, Global Humanitarian Forum, GEO, SFCG, NASA, ESA) and EMF exposure (WHO).

# 8 Other intersectoral activities

BR has actively participated in other intersectoral activities, which are relevant to the work of ITU‑R Study Groups, as described below.

* *Climate Change and Emergency Communications*: Intersectoral activities continue to be coordinated by the ITU Climate Change and Emergency Telecommunications Task Force related to the implementation of Resolution 136 (Rev. Busan, 2014), in which BR has active participation. There are also studies in response to Resolution ITU‑R 60-1 (Reduction of energy consumption for environmental protection and mitigating climate change by use of ICT/radiocommunication technologies and systems. The ITU‑R webpage on climate change has been updated to reflect the latest developments in this field.
* *Accessibility*: ITU-R has been actively participating in the ITU-T JCA-AHF (Joint Coordination Activity on Accessibility and Human Factors). When addressing spectrum related/EMC issues close coordination with the relevant ITU-R groups should be ensured before liaising with external organizations on those issues, particularly where well-established and efficient collaboration between ITU-R and those organizations already exists.
* *Preparation for ITU meetings*: BR is continuing its participation in the activities related to the major recent and forthcoming ITU events, conferences and meetings.

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