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| **Radiocommunication Assembly (RA-15) Geneva, 26-30 October 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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|  | **Document 5/1001-E** |
| **16 September 2015** |
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| Chairman, Study Group 5 | |
| REPORT ON THE STUDY GROUP 5 ACTIVITY | |
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# 1 Introduction

During this study period after the 2012 Radiocommunication Assembly (RA-12), Study Group 5 for “Terrestrial services” has worked under the following structure:

− Working Party 5A: Land mobile service above 30 MHz(\*) (excluding IMT), wireless access in the fixed service, amateur and amateur-satellite services.

− Working Party 5B: Maritime mobile service including Global Maritime Distress and Safety System (GMDSS); aeronautical mobile service and radiodetermination service.

− Working Party 5C: Fixed wireless systems and HF and other systems below 30 MHz in the fixed and land mobile services.

− Working Party 5D: IMT systems.

(\*) Including the exact frequency of 30 MHz.

In addition to the above Working Parties, as a result of the CPM15-1, Joint Task Group 4-5-6-7 was established between the four Study Groups 4, 5, 6 and 7 to deal with sharing studies between the mobile service (IMT systems) and other services under WRC-15 agenda items 1.1 and 1.2.

The entire structure and chairmanship of Study Group 5 are provided in Table A1-1 in Attachment 1.

This Report summarizes the activities of Study Group 5 and its subordinate groups during the study cycle 2012-2015.

# 2 Results of the Study Group 5 meetings

## 2.1 Meetings

Study Group 5 and its subordinate groups has held many meetings as indicated in Table A1-2 in Attachment 1. Through these meetings, a number of new or revised ITU‑R texts were produced as elaborated in the later sections.

## 2.2 Development of new/revised Recommendations

During this study period, Study Group 5 has produced 69 draft Recommendations (13 new and 56 revised), which have been already approved, as shown in Tables A2-1 and A2-2 in Attachment 2.

To this Radiocommunication Assembly, five draft Recommendations (three new and two revised) have been specifically submitted for its consideration, as summarized in sections 2.2.1‑2.2.5 below (see also Table A2-2 in Attachment 2).

Also, Study Group 5 agreed to suppress five Recommendations that were found to be no longer necessary or were obsolete (see Table A2-3 in Attachment 2).

### 2.2.1 Document [5/1005](http://www.itu.int/md/R12-SG05-RP-1005/en) (WP 5B): Draft revision of Recommendation ITU-R M.541-9 – Operational procedures for the use of digital selective-calling equipment in the maritime mobile service

This Recommendation contains the operational procedures for digital selective-calling (DSC) equipment whose technical characteristics are given in Recommendation ITU‑R M.493. The Annexes to this Recommendation describe the provisions and procedures for distress, urgency and safety calls and for routine calls, as well as the operational procedures for ships, for coast stations and man overboard devices.

In this draft revision:

– the procedures are updated to the current status of the Radio Regulations;

– new Annex 5 for man overboard devices using VHF DSC is added;

– other editorial updates, e.g. addition of key words, are made.

The substance of this document was agreed without any objection at the Study Group 5 meeting in July 2015, and the procedure for adoption by a Study Group by correspondence (through [CACE/742](http://www.itu.int/md/R00-CACE-CIR-0742/en)) was successfully finished on 28 September 2015.

Since this is one of the Recommendations incorporated by reference in the Radio Regulations, to which the PSAA cannot be applied, the Study Group meeting decided to seek approval of this draft revision at this Radiocommunication Assembly, in accordance with 10.4.2 of Resolution ITU‑R 1‑6, with the following justification:

This Recommendation related to safety issues needs to be approved as early as possible in conjunction with the approval of the revision of another Recommendation ITU‑R M.493-13 dealing with similar subject. This revision of Recommendation ITU‑R M.493-13 was approved on 30 September 2015.

### 2.2.2 Document [5/1006](http://www.itu.int/md/R12-SG05-RP-1006/en) (WP 5B): Draft new Recommendation ITU‑R M.[AMS-CHAR-15GHz] – Technical characteristics and protection criteria for aeronautical mobile service systems in the frequency range 14.5-15.35 GHz

This draft new Recommendation provides information on the technical characteristics and protection criteria for systems operating in the aeronautical mobile service (AMS), planned to or currently operating in the frequency range 14.5-15.35 GHz for use in sharing and compatibility studies as needed.

For this draft new Recommendation (DNR) which is relating to WRC-15 agenda item 1.6, there was an opposition from one administration at the Study Group 5 meeting in July 2015 as follows:

The Russian Federation objects to consideration of draft new Recommendation ITU‑R M.[AMS-CHAR 15GHz] at the SG 5 meeting and sending this draft for adoption and approval by correspondence because aeronautical telemetry systems with recommended characteristics will impose undue constraints on existing and future systems in the fixed and mobile networks due to unlimited use of retransmissions between aircraft, which creates an ambiguity in the coordination of such systems with other uses in the band. Therefore, it is necessary to further describe and investigate aforementioned usage scenario in WP 5B before considering it for adoption and approval at the future meeting of SG 5.

Therefore, the DNR has been forwarded to this Radiocommunication Assembly for consideration in accordance with 10.2.1.2 item a) of Resolution ITU-R 1-6.

### 2.2.3 Document [5/1007](http://www.itu.int/md/R12-SG05-RP-1007/en) (WP 5B): Draft new Recommendation ITU-R M.[VDES] – Technical characteristics for a VHF data exchange system in the VHF maritime mobile band

This Recommendation provides the technical characteristics of a VHF data exchange system (VDES) which integrates the functions of VHF data exchange (VDE), application specific messages (ASM) and the automatic identification system (AIS) in the VHF maritime mobile band (156.025-162.025 MHz).

For this draft new Recommendation (DNR) which is relating to WRC-15 agenda item 1.16, there was an opposition from one administration at the Study Group 5 meeting in July 2015 as follows:

The Russian Federation states that the draft new Recommendation ITU-R M.[VDES] is developed for new VHF data exchange system (VDES) which integrates the functions of VHF data exchange (VDE), application specific messages (ASM) and the automatic identification system (AIS) in the VHF maritime mobile band (156.025-162.025 MHz). VDE part propose use both terrestrial (maritime) segment over already allocated and identified frequency bands and satellite segment. Channel identification for the satellite part of VDE should be done within (maritime) mobile satellite service allocation, which is still subject to the decisions of WRC-15. Therefore the approval of this Recommendation will prejudge the result of WRC-15 on AI 1.16 and should be postponed until the next SG 5 meeting, taking into account the outcome of WRC-15.

Therefore, the DNR has been forwarded to this Radiocommunication Assembly for consideration in accordance with 10.2.1.2 item a) of Resolution ITU-R 1-6.

### 2.2.4 Document [5/1008](http://www.itu.int/md/R12-SG05-RP-1008/en) (WP 5D): Draft revision of Recommendation ITU-R M.1036 – Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)

This Recommendation provides guidance on the selection of transmitting and receiving frequency arrangements for the terrestrial component of IMT systems as well as the arrangements themselves, in the bands identified for IMT in the RR.

In this draft revision, the frequency arrangements for the bands in section 1 (450-470 MHz), section 2 (694-960 MHz) and section 3 (1 710-2 200 MHz) have been revised. Two *recognizings* have been added to acknowledge the terrestrial and satellite components of IMT in some included bands.

For this draft revision of Recommendation, there were objections from two administrations and support to the approval by several other administrations at the Study Group 5 meeting in July 2015.

Document 5/1008 provides a summary of the discussion on this draft revision at the Study Group 5 meeting and the text of the objection (see also [Document 5/270](http://www.itu.int/md/R12-SG05-C-0270/en): Summary Record of Study Group 5 meeting in July 2015).

The meeting noted that this draft revision included the elements having relevance to WRC-15 agenda item 1.2 in section 2 (694‑960 MHz). Therefore, the draft revision has been forwarded to this Radiocommunication Assembly for consideration in accordance with 10.2.1.2 item a) of Resolution ITU-R 1-6.

### 2.2.5 Document [5/1009](http://www.itu.int/md/R12-SG05-RP-1009/en) (WP 5D): Draft new Recommendation ITU-R M.[BSMS700] – Specific out-of-band emission limit of IMT mobile stations operating in the frequency band 694-790 MHz for protection of existing services in Region 1 in the frequency band below 694 MHz

This Recommendation provides guidance to administrations on specific out-of-band emission (OOBE) level of IMT mobile stations operating in the frequency band 694-790 MHz for the frequency band below 694 MHz (the band 470-694 MHz) in Region 1 for protection of existing services.

For this draft new Recommendation (DNR) which is relating to WRC-15 agenda item 1.2, there were oppositions from three administrations and support to the approval by a number of other administrations at the Study Group 5 meeting in July 2015.

Document 5/1009 provides a summary of the discussion on this draft revision at the Study Group 5 meeting and the text of the objection (see also [Document 5/270](http://www.itu.int/md/R12-SG05-C-0270/en): Summary Record of Study Group 5 meeting in July 2015).

The meeting noted, as in the previous case, that this DNR had relevance to WRC-15 agenda item 1.2. Therefore it has been forwarded to this Radiocommunication Assembly for consideration in accordance with 10.2.1.2 item a) of Resolution ITU-R 1-6.

## 2.3 Development of new/revised Reports

Study Group 5 has approved 59 draft Reports (52 new and 7 revised) as given in Table A2-4 in Attachment 2. Many of them have been based on the Conference-related work, including those developed by Joint Task Group 4-5-6-7.

## 2.4 Review of the ITU‑R Resolutions of specific concern with Study Group 5

Study Group 5 conducted the review of the ITU‑R Resolutions relating to IMT systems. Since the scope of these Resolutions covers both terrestrial and satellite components of IMT, this work was done through joint activity between the concerned Working Parties in Study Groups 4 and 5.

The draft revisions of the Resolutions ITU‑R 50-2, ITU‑R 56-1 and a draft new Resolution ITU‑R [IMT.PRINCIPLES] are provided in Document [5/1004](http://www.itu.int/md/R12-SG05-RP-1004/en).

Study Group 5 has proposed to suppress Resolution ITU‑R 17-2 “Integration of International Mobile Telecommunications (IMT-2000 and IMT-Advanced) with existing networks” with the reason that it has become obsolete. This proposed suppression is also addressed in Document 5/1004.

## 2.5 Review of the Questions

During this study period, review of the Questions has been conducted by the Working Parties as instructed by Resolution ITU‑R 5-5. The work has resulted in the suppression or revision of a fairly large number of Questions, as given in Tables A2-6 and A2-7 in Attachment 2.

Detailed information on the status of the Questions assigned to Study Group 5 is provided in Document [5/1003](http://www.itu.int/md/R12-SG05-RP-1003/en).

# 3 WRC‑related work within Study Group 5

The CPM15-1 meeting held in February 2012 organized the preparatory studies for the WRC‑15 agenda items. Many tasks were assigned to the Working Parties in Study Group 5 as the responsible or a concerned group for a number of agenda items (see Table A2-10 in Attachment 2).

Development of the text for the draft CPM Report was successfully completed by the responsible groups (WP 5A and WP 5B) at their meetings held in May 2014, in time for the deadline identified by the CPM management team.

Also, the Working Parties have finalized the developmental work for the related ITU‑R Recommendations/Reports by the end of their July 2015 meetings. Detailed work carried out by the relevant Working Parties is described in the later sections 4.1.3, 4.2.3, 4.3.3 and 4.4.3.

# 4 Activities of the Working Parties

## 4.1 Working Party 5A

### 4.1.1 Meetings and structure of work

Working Party 5A has held seven meetings, as indicated in Table A1-2 in Attachment 1. All the meetings were chaired by Mr José Costa (Canada), Chairman of Working Party 5A.

Working Party 5A has usually established several Working Groups to carry out its assigned tasks. In this study cycle, the following Working Group structure has been adopted:

− WG 5A1: Amateur services

− WG 5A2: Systems and standards

− WG 5A3: Public protection and disaster relief (PPDR)

− WG 5A4: Interference and sharing

− WG 5A5: New technologies.

In addition, ad hoc groups and correspondence groups have been created, as required, to deal with specific topics (e.g. Correspondence Group on local coverage).

### 4.1.2 Specific outputs

During this study period, great interest has been continuously paid to the activity of Working Party 5A, reflecting recent technology development of the land mobile technologies and applications. These land mobile technology areas include: cognitive radio systems (CRS), intelligent transport systems (ITS), broadband wireless access (BWA) systems for local coverage, and multiple gigabit wireless systems (MGWS). The achievements of these studies have resulted in many new or revised Recommendations, as well as their companion Reports.

In response to Resolution 175 (Rev. Busan, 2014) of the Plenipotentiary Conference to take account of persons with disabilities in the work of ITU, Working Party 5A has developed a new Question ITU-R 254/5 “Operation of short-range radiocommunication public access system supporting hearing aid systems”, and revised Recommendation ITU-R M.1076-0 under collaboration with the relevant group in ITU-T.

Furthermore, Working Party 5A has developed a new Report ITU‑R M.2330-0 on cognitive radio systems (CRS) in the land mobile service, which is the second product on CRS under Question ITU‑R 241/5.

Regarding PPDR issues, Working Party 5A has conducted general studies invited by Resolutions ITU-R 53 and ITU-R 55 or by WRC Resolutions, e.g. Resolution **646 (Rev.WRC‑12)**, which has resulted in the revision of Recommendation ITU-R M.2015-0. In addition, much work for PPDR was performed also for WRC-15 agenda items 1.3, as mentioned in section 4.1.3.

Studies on amateur services have made good progress, producing fruitful outputs, including development of new Recommendation ITU-R M.2034-0 and revision of Recommendation ITU‑R M.1544-0 as well as the work for the WRC‑15 agenda item 1.4 (see section 4.1.3).

### 4.1.3 Work relating to the WRC‑15 preparation

Working Party 5A was nominated as the responsible group for agenda items 1.3, 1.4 and part of 1.18. Furthermore, WP 5A was nominated as a contributing group for a number of other agenda items. In this connection, the new Recommendations and Reports in Table 1 have been developed by Working Party 5A.

Table 1

WRC‑related outputs produced by Working Party 5A

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolutions | Related Recommendation and Reports |
| 1.3 | Resolution **646 (Rev.WRC‑12)**  Resolution **648 (WRC‑12)** | Recommendation ITU-R M.2009-1(\*),  Report ITU-R M.2377(\*\*) |
| 1.4 | Resolution **649 (WRC‑12)** | Report ITU-R M.2281-0, Report ITU-R M.2335-0 |
| 1.6 | Resolutions **151 (WRC-12)** and **152 (WRC-12)** | Recommendation ITU-R M.2068-0 |
| 1.18 | Resolution **654 (WRC‑12)**, *invites ITU-R* iii) | Recommendation ITU-R M.2057-0 |
| (\*) This Recommendation relates also to WRC-15 agenda item 9.1 (issue 9.1.7).  (\*\*) With the approval of this Report, Report ITU-R M.2033 was suppressed. | | |

### 4.1.4 Other related activity

As BR has given an update on the status of the disaster relief activities under Resolution **647 (Rev.WRC‑12)**, WP 5A has encouraged the Member States to respond to the questionnaire, referring to the following webpage: <http://www.itu.int/net/ITU-R/index.asp?category=information&rlink=res647&lang=en>.

During this study cycle, Working Party 5A held the following events to facilitate its activity in the aspects of both technical standard development and Conference preparation:

– [WP5A-WP5B-WP5C workshop on the preparations for WRC-15](http://www.itu.int/ITU-R/go/workshop-wp5abc-wrc15/en), (23 May 2012);

– [79 GHz Workshop (automotive radar)](http://www.itu.int/ITU-R/go/workshop-wp5abc-79ghz/en), (7 November 2012);

– [Wireless World Research Forum Workshop (WWRF)](http://www.itu.int/oth/R0A06000057/en) on Requirements and Technologies for the Next Generation of Mobile Communications, (21 May 2013);

– [WP 5A Seminar on Cognitive Radio Systems and the use of White Spaces](http://www.itu.int/en/ITU-R/seminars/rsg/RWP5A-2013), (18 November 2013).

## 4.2 Working Party 5B

### 4.2.1 Meetings and structure of work

Working Party 5B has held seven meetings as indicated in Table A1-2 in Attachment 1. All the meetings were chaired by Mr John Mettrop (United Kingdom), Chairman of Working Party 5B.

Working Party 5B has established the following four Working Groups, each having a clear scope to carry out its assigned tasks:

− WG 5B1: Radiodetermination service

− WG 5B2: Aeronautical mobile service

− WG 5B3: Maritime mobile service

− WG 5B4: Other issues.

In addition to the above regular WGs, an ad hoc Group or Correspondence Group has been created, as required, to deal with other specific topics.

### 4.2.2 Specific outputs

Under the wide range of its scope, Working Party 5B has been tasked with quite a heavy workload during this study cycle, including Conference-related work. Through its seven meetings, Working Party 5B has developed a number of draft new and revised Recommendations in the areas of radiodetermination, aeronautical mobile and maritime mobile services. These achievements have been produced under both Conference-related work and usual ITU‑R studies.

The former outputs are elaborated in the next section. The latter includes a new Recommendation on characteristics of digital navigational data system for broadcasting maritime safety in the HF frequency band (Recommendation ITU-R M.2058).

Working Party 5B have updated many existing Recommendations, in particular those related to the safety service, to properly reflect the latest references to the ITU documents and/or standards developed by external organizations.

### 4.2.3 The work relating to the WRC‑15 preparation (other than Global Flight Tracking)

Working Party 5B was nominated as the responsible group for five agenda items, i.e. 1.5, 1.15, 1.16, 1.17 and 1.18 (partly under joint responsibility with WP 5A). Furthermore, WP 5B was nominated as a contributing group for a number of other agenda items. Therefore, the workload of this WP for the CPM-15 preparation was very significant. Through its seven meetings, the following outputs in Tables 2-1 and 2-2 were developed.

Table 2-1

WRC‑related outputs produced by Working Party 5B as the responsible group

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolutions | Related Recommendation and Reports |
| 1.15 | Resolution **358 (WRC‑12)** | Recommendation ITU-R M.1174-3  Report ITU‑R M.2287-0 |
| 1.16 | Resolution **360 (WRC‑12)** | Recommendation ITU-R M.1371-5  Draft new Recommendation ITU-R M.[VDES](\*)  Report ITU‑R M.2231-1, Report ITU‑R M.2317-0  Report ITU-R M.2369, Report ITU-R M.2371  Report ITU-R M.2372 |
| 1.17 | Resolution **423 (WRC‑12)** | Recommendation ITU-R M.2059-0  Recommendation ITU-R M.2067-0  Recommendation ITU-R M.2085  Report ITU‑R M.2283-0, Report ITU‑R M.2318-0  Report ITU‑R M.2319-0 |
| 1.18 | Resolution **654 (WRC‑12)** | Report ITU‑R M.2322-0 |
| (\*) This draft new Recommendation is sent to the RA-15 for consideration (see Document [5/1007](http://www.itu.int/md/R12-SG05-RP-1007/en)). | | |

Table 2-2

WRC‑related outputs produced by Working Party 5B as the contributing group

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolutions | Related Recommendation and Reports |
| 1.1 | Resolution **233 (WRC‑12)** | Recommendation ITU-R M.1464-2  Recommendation ITU-R M.1465-2  Report ITU‑R M.2286-0 |
| 1.6 | Resolution **151 (WRC‑12)**  Resolution **152 (WRC‑12)** | Draft new Recommendation ITU-R M.[AMS‑CHAR‑15GHz](\*) |
| 1.7 | Resolution **114 (Rev.WRC‑12)** | Recommendation ITU-R M.1827-1 |
| 1.12 | Resolution **651 (WRC‑12)** | Recommendation ITU-R M.629-2  Recommendation ITU‑R M.1796-2 |
| (\*) This draft new Recommendation is sent to the RA-15 for consideration (see Document [5/1006](http://www.itu.int/md/R12-SG05-RP-1006/en)). | | |

### 4.2.4 The work for the WRC‑15 in relation to Global Flight Tracking

As a result of the Plenipotentiary Conference in November 2014, Working Party 5B has been tasked with the study on the global flight tracking issue in preparation for the WRC-15 based on the request from the Director of the Radiocommunication Bureau (Document [5/132](http://www.itu.int/md/R12-SG05-C-0132/en) = [5B/670](http://www.itu.int/md/R12-WP5B-C-0670/en)).

In response to this request Working Party 5B held an extraordinary meeting during 12‑15 May 2015. The meeting produced a draft note to the Director, which has been completed at the July 2015 meeting and provided three views on this subject for consideration by the Director, to be included in his report to the WRC-15. Furthermore, WP 5B attempted to develop two ITU-R Reports, which have been attached to the WP Chairman’s Report as working documents for further consideration (Annexes 11 and 12 to Document [5B/883](http://www.itu.int/md/R12-WP5B-C-0883/en)).

### 4.2.5 Other related activity

Working Party 5B held [a workshop on the preparations for WRC-15](http://www.itu.int/ITU-R/go/workshop-wp5abc-wrc15/en) on 23 May 2012 jointly with Working Parties 5A and 5C (see **4.1.4**).

Working Party 5B has initiated the work on establishment of a database on the existing and planned oceanographic radars operating in accordance with Resolution **612 (Rev.WRC-12)** to facilitate the coordination activity between neighbouring countries. For this work, Study Group 5 sent the Note to the BR Director to ask the Bureau’s assist to develop and maintain the database. This request has been accepted by BR and the notification on this matter has been conducted to the administrations through the circular letter.

## 4.3 Working Party 5C

### 4.3.1 Meetings and structure of work

Working Party 5C has held seven meetings, as indicated in Table A1-2 in Attachment 1.

All the meetings (except for the third) were chaired by Mr Charles Glass (USA), Chairman of Working Party 5C.

In order to carry out its assigned tasks, Working Party 5C has established the four Working Groups below, each having the following scopes, parts of which are flexibly reviewed during this study cycle:

− WG 5C1: Issues relating to spectrum at or below 30 MHz

− WG 5C2: Issues relating to spectrum above 30 MHz and up to 18 GHz

− WG 5C3: Issues relating to spectrum above 18 GHz and other general issues

− WG 5C4: Review and proposed revisions of Recommendations and Reports not related to WRC-15 agenda items.

In addition to the above WGs, ad hoc groups (including joint ad hoc meeting with Working Party 5A) and Correspondence Groups have been created to deal with specific topics (e.g. development of the Report on fixed service use and future trends).

### 4.3.2 Specific outputs

During the first two years of this study cycle, Working Party 5C made efforts to revise Recommendation ITU-R F.1336-3 on reference radiation patterns of sectoral antennas for the point-to-multipoint (P-MP) systems in the fixed service (FS). Since this Recommendation’s role was important for interference analysis involving not only P-MP systems in the FS but also systems in the land mobile service including IMT, the revision work was conducted under close collaboration with Working Parties 5A and 5D. The new version of this Recommendation has been used in a number of sharing/compatibility studies for WRC-15 agenda items.

Working Party 5C has produced a new Recommendation on deployment scenarios related to statistics for point-to-point fixed wireless systems to be used for sharing and interference studies between these fixed systems and systems in other services (Recommendation ITU-R F.2086).

Under Question 253/5 approved in March 2012, a new Report ITU-R F.2323-0 on fixed service use and future trends has been developed through the work of the correspondence group activity.

Also, revisions or updating of the existing Recommendations have made good progress. Regarding use of the high frequency bands above 40 GHz, Recommendation ITU-R F.758-5 has been revised to include new system parameters in the bands 40.5-43.5 GHz, 59-66 GHz and 71-76/81-86 GHz.

For the study on new applications of the fixed service, Working Party 5C has initiated the study on performance and availability objectives for real point-to-point packet-base radio links under Question ITU-R 255/5. Also, a new Question on the fixed service in the frequency range 275-1 000 GHz has been adopted, expecting technical contributions from administrations in the next study period.

### 4.3.3 Work relating to the WRC‑15 preparation

Since Working Party 5C was nominated to a contributing group of many WRC-15 agenda items, in addition to the following outputs in Table 3, Working Party 5C has contributed to provide FS experts’ views to the responsible groups through liaison statements, in particular for agenda items 1.1, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10 and 1.12.

Table 3

WRC‑related outputs produced by Working Party 5C

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolution | Related Recommendation |
| 1.1 | Resolution **233 (WRC‑12)** | Recommendation ITU‑R F.1336-4 |
| 1.6 | Resolution **151 (WRC‑12)** |
| 1.9 | Resolution **758 (WRC‑12)** |
| 1.12 | Resolution **651 (WRC‑12)** |

### 4.3.4 Other related activity

Working Party 5C held a [workshop on the preparations for WRC-15](http://www.itu.int/ITU-R/go/workshop-wp5abc-wrc15/en) on 23 May 2012 jointly with Working Parties 5A and 5B (see **4.1.4**).

In order to implement a request in Resolution ITU-R 59, Working Party 5C considered and finalized the agreed format of the ENG database for the BR to develop a webpage to consolidate links to administration lists of ENG information. This [database](https://extranet.itu.int/rsg-meetings/sg4/wp4b/eng-sng/SitePages/Home.aspx) has been developed by BR and become available on the ITU webpage.

Furthermore, Working Party 5C held a workshop on millimetre waves on 6 July 2015 during its meeting in Bucharest, Romania, to draw the attention of the membership to fixed-service applications in the millimetre wave frequency bands.

## 4.4 Working Party 5D

### 4.4.1 Meetings and structure of work

Working Party 5D has held ten meetings, as indicated in Table A1-2 in Attachment 1.

All the meetings were chaired by Mr Stephen Blust (AT&T), Chairman of Working Party 5D.

Many meetings of WP 5D were held at the kind invitation of the Member States, which have contributed to wider participation and global understanding of the ITU‑R activity.

Working Party 5D has currently established the following three Working Groups, each conducting its task under the agreed scope:

− WG General Aspects: Issues relating to general aspects of IMT

− WG Spectrum Aspects: Issues relating to spectrum aspects of IMT

− WG Technology Aspects: Issues relating to technology aspects of IMT.

In addition to the above WGs, as its usual practice, an ad hoc group has been created to deal with the work plans.

### 4.4.2 Specific outputs

The main work for Working Party 5D during this study period addresses technology, spectrum and other aspects related to IMT including the current IMT-2000, the development of IMT-Advanced and future development of IMT for 2020 and beyond.

1) General aspect work

In this study period, a significant focus of the work of Working Party 5D was to develop a new Recommendation on the framework and overall objectives of the future development of IMT for 2020 and beyond, including a broad variety of capabilities associated with envisaged usage scenarios. Through ten meetings, Working Party 5D has made efforts to discuss and develop basic requirements and candidate technologies for the radio interface, which could be considered as elements of a new Recommendation. The result of the work was reflected in the development of Recommendation ITU-R M.2083.

Working Party 5D has also developed Report ITU-R M.2291-0 on the use of IMT for broadband PPDR applications, which was related to the study on WRC-15 agenda item 1.3.

As a general aspect work, review of the ITU‑R Resolutions relating to IMT systems was conducted in collaboration with Working Party 4B in Study Group 4. As a result, one new and two revised ITU‑R Resolutions have been developed and one Resolution is proposed for suppression to be considered by this Assembly (see section 2.4).

Furthermore, WP 5D has completed the work (with Sector coordination) on a new Handbook, Global Trends in terrestrial IMT, which provides the technical, operational and spectrum-related aspects of the terrestrial component of IMT including information on the deployment and technical characteristics as well as the services and applications supported.

2) Technology-related work

Following the approval of the Recommendation on detailed specifications of the radio interface for IMT-Advanced, Working Party 5D has contributed to the development of new Recommendations on generic unwanted emission characteristics of IMT-Advanced, which have resulted in the approval of Recommendations ITU-R M.2070-0 and ITU-R M.2071-0.

Other important achievements of Working party 5D in technology aspects included the development of Report ITU-R 2320-0 on future technology trends, Report ITU-R M.2334-0 on passive and active antenna systems for base stations and Report ITU-R M.2376 on technical feasibility of IMT in bands above 6 GHz.

For detailed information on further development of IMT-Advanced, the Radiocommunication Bureau has established the relevant webpage ([http://www.itu.int/ITU‑R/go/rsg5-imt-advanced/](http://www.itu.int/ITU-R/go/rsg5-imt-advanced/)).

In addition to the activity mentioned above, Working Party 5D has conducted a lot of work for further development of IMT-2000 and IMT-Advanced. The new versions of the following Recommendations have been produced:

− Recommendation ITU‑R M.1457 – “Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)”.

− Recommendation ITU‑R M.1580 – “Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000”.

− Recommendation ITU‑R M.1581 – “Generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT-2000”.

− Recommendation ITU‑R M.1579 – “Global circulation of IMT-2000 terrestrial terminals”.

− Recommendation ITU‑R M.2012 – “Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)”.

3) Spectrum-related work

Working Party 5D had significant work on spectrum-related topics for frequency arrangements, sharing studies and other items. In particular for WRC-15 agenda items 1.1 and 1.2, while the CPM15-1 established Joint Task Group 4-5-6-7 as the responsible group for these agenda items, Working Party 5D was also tasked with:

− the spectrum requirements for the mobile service, including suitable frequency ranges;

− specific requirements for IMT;

− channelling arrangements for the mobile service adapted to the frequency band below 790 MHz as referred to in Resolution **232** **(WRC-12)**.

These studies were carried out, and the results have been conveyed to JTG4-5-6-7 before 31 July 2013 as specified in the CPM15-1 Decision.

Including the above WRC-related achievements, the main results of the work on spectrum aspects are as follows:

– revision of Recommendation ITU‑R M.1036-4 “Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)”(\*);

– revision of Recommendation ITU‑R M.1768-0 “Methodology for calculation of spectrum requirements for the terrestrial component of International Mobile Telecommunications”;

– revision of Report ITU‑R M.2039-2 – “Characteristics of terrestrial IMT-2000 systems for frequency sharing/interference analyses”;

– Report ITU‑R M.2289-0 – “Future radio aspect parameters for use with the terrestrial IMT spectrum estimate methodology of Recommendation ITU-R M.1768-1”;

– Report ITU‑R M.2290-0 – “Future spectrum requirements estimate for terrestrial IMT”;

– Report ITU‑R M.2292-0 – “Characteristics of terrestrial IMT-Advanced systems for frequency sharing/interference analyses”.

(\*) This draft revision of Recommendation is sent to the RA-15 for consideration (see Document [5/1008](http://www.itu.int/md/R12-SG05-RP-1008/en)).

### 4.4.3 The work relating to the WRC‑15 preparation

Since Working Party 5D was nominated to a contributing group of several WRC-15 agenda items, the WRC-related outputs could be summarized in Table 4 below.

Table 4

WRC‑related outputs produced by Working Party 5D

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolutions | Related Recommendation and Reports |
| 1.1 | Resolution **233 (WRC‑12)** | Recommendation ITU-R M.1768-1  Report ITU-R M.2289, Report ITU-R M.2290-0 |
| 1.1 & 1.2 | Resolution **233 (WRC‑12)**  Resolution **232 (WRC‑12)** | Report ITU-R M.2039-3, Report ITU-R M.2292-0 |
| 1.2 | Resolution **232 (WRC‑12)** | Draft revision of Recommendation ITU-R M.1036-4(\*)  Draft new Recommendation ITU-R M.[BSMS700](\*\*) |
| 1.3 | Resolution **646 (Rev.WRC‑12)**  Resolution **648 (WRC‑12)** | Report ITU-R M.2291-0 |
| (\*) This draft revision of Recommendation is sent to the RA-15 for consideration (see Document [5/1008](http://www.itu.int/md/R12-SG05-RP-1008/en)).  (\*\*) This draft new Recommendation is sent to the RA-15 for consideration (see Document [5/1009](http://www.itu.int/md/R12-SG05-RP-1009/en)). | | |

### 4.4.4 Other related activity

Working Party 5D held the Workshop on future IMT twice in this study period as follows:

− Research views on IMT Technology Evolution, (Geneva, 16 July 2012).

− Research views on IMT beyond 2020, (Ho Chi Minh City, 12 February 2014).

# 5 The work of Joint Task Group 4-5-6-7

In this study period, Joint Task Group 4-5-6-7 (JTG 4-5-6-7) was established by the first session of the CPM-15 as the responsible group to deal with the studies for the following WRC-15 agenda items 1.1 and 1.2:

− to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC‑12)**;

− to examine the results of ITU‑R studies, in accordance with Resolution **232 (WRC‑12)**, on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures.

The JTG has held 6 meetings as indicated in Table A1-2 in Attachment 1. The first two meetings were chaired by Mr Thomas Ewers (Germany), and the later four meetings were chaired by Mr Martin Fenton (United Kingdom).

Through the six meetings, the JTG received more than 700 inputs from membership as well as the contributing groups in ITU-R. Based on these contributions, the JTG has carried out the task at its 6th meeting in July 2014, completing the draft CPM texts for agenda items 1.1 and 1.2 and developing a number of ITU-R Reports on sharing/compatibility studies.

Table 5

WRC‑related outputs produced by Joint Task Group 4-5-6-7

|  |  |  |
| --- | --- | --- |
| Agenda item | WRC Resolutions | Related Reports |
| 1.1 | Resolution **233 (WRC‑12)** | Report ITU-R BS.2340-0, Report ITU-R BT.2337-0  Report ITU-R F.2326-0, Report ITU-R F.2327-0  Report ITU-R F.2328-0, Report ITU-R F.2331-0  Report ITU-R F.2333-0, Report ITU-R M.2324-0  Report ITU-R RA.2332-0, Report ITU-R RS.2336-0  Report ITU-R S.2367-0, Report ITU-R S.2368-0  Report ITU-R SA.2325-0, Report ITU-R SA.2329-0 |
| 1.2 | Resolution **232 (WRC‑12)** | Report ITU-R BT.2338-0, Report ITU-R BT.2339-0 |

After the role of the JTG was over, it was agreed between the four Study Groups that any future revision of the Reports developed by the JTG should be undertaken jointly by the relevant Study Groups, except for those in F-series and M-series which are sole responsibility of Study Group 5.

# 6 Other issues

## 6.1 Progress of the studies requested by ITU-R Resolutions

During the 19th meeting of the RAG in June 2012, it was requested to Study Group Chairmen to report to the RAG the progress of the studies invited in the ITU-R Resolutions.

Based on this request, Chairman of Study Group 5 has continuously submitted the input to every RAG meeting. The Secretariat has also made effort to develop a specific site on the webpage of Study Group 5 (<http://www.itu.int/go/statusofstudies>) to indicate the status of these studies.

The final updated status in this study period is provided in Table A3-1 in Attachment 3.

## 6.2 Progress of the studies requested by WRC Resolutions/Recommendations

The ITU‑R Study Groups are tasked with the studies requested by a number of WRC Resolutions (or Recommendations) other than those related to WRC‑15 agenda items. Study Group 5 has also made progress in these studies as provided in Attachment 4, which has been prepared for information.

# 7 Future work

The principal objective for future work would be to assess any work that may need to be conducted in support of the preparations for WRC‑19 with respect to those agenda items for which the Working Parties within Study Group 5 are likely to be the responsible group or a concerned group.

Additionally, as normal practice of the Working Parties, the works would be continued in accordance with the ITU‑R Questions assigned to Study Group 5 as well as for the topics requested by WRC Resolutions or ITU-R Resolutions as identified in the Annexes to the following WP Chairman’s Report;

– For Working Party 5A, Document [5A/736](http://www.itu.int/md/R12-WP5A-C-0736/en).

– For Working Party 5B, Document [5B/883](http://www.itu.int/md/R12-WP5B-C-0883/en).

– For Working Party 5C, Document [5C/428](http://www.itu.int/md/R12-WP5C-C-0428/en).

– For Working Party 5D, Document [5D/1042](http://www.itu.int/md/R12-WP5D-C-1042/en).

# 8 Summary

Through the work during the study cycle 2012-2015, Study Group 5 has efficiently carried out its heavy workload.

The Chairman believes that such efficiency is thanks to the following factors:

− sufficient support from the Radiocommunication Bureau, i.e. more than one Counsellors’ excellent assistance;

− leadership of the Chairmen of the Working Parties and their subordinate groups;

− good cooperation of all the meeting participants.

Therefore, the Chairman wishes to express his sincere appreciation to many people for their contributions to Working Parties and Study Group 5 in its entirety. Special thanks should be conveyed to the Chairmen of Working Parties, Dr José Costa, Mr John Mettrop, Mr Charles Glass and Mr Stephen Blust, as well as to the BR Secretariat, Mr Colin Langtry, Head of Study Group Department, the SG 5 Counsellor, Mr Sergio Buonomo, WP 5B Counsellor, Mr Vadim Nozdrin, Mr David Botha, JTG 4-5-6-7 Counsellor and all other BR staff.

Attachment 1

General information on Study Group 5 (Terrestrial Services)

Scope

Systems and networks for the fixed, mobile, radiodetermination, amateur and amateur-satellite services:

*Chairman:* Dr A. HASHIMOTO (Japan)

Vice-Chairmen: Mr E.H. ABDOURAMANE (Cameroon)

Mr A. AL-AMRI (Saudi Arabia)

Mr BUI HA LONG (Viet Nam)

Mr R. CASTAÑEDA ALVAREZ (Mexico)

Dr J. COSTA (Canada)

Mr M. FENTON (United Kingdom)

Mr V. POSKAKUKHIN(\*) (Russian Federation)

Mr G. OSINGA (Netherlands)

Mr W.M. SAYED (Egypt)

Mr I. K. SOUARE (Guinea)

Mr L. SUN (China)

*Counsellor:* Mr S. BUONOMO (ITU‑R)

(\*) Nominated at the Study Group 5 meeting in 2012 as the successor to Mr A. KLYUCHAREV.

Table A1-1

Structure and chairmanship of the Working Parties and Joint Task Group

|  | Scope or terms of reference | Chairman |
| --- | --- | --- |
| Working Party 5A | Land mobile service above 30 MHz(\*) (excluding IMT), wireless access in the fixed service (see also 2.6), amateur and amateur-satellite services | J. Costa (CAN) |
| Working Party 5B | Maritime mobile service including Global Maritime Distress and Safety System (GMDSS), aeronautical mobile service, radiodetermination service | J. Mettrop (UK) |
| Working Party 5C | Fixed wireless systems, HF and other systems below 30 MHz in the fixed and land mobile services | C. Glass (USA) |
| Working Party 5D | IMT systems | S. Blust (AT&T) |
| Joint Task Group 4‑5‑6-7 | − To carry out sharing/compatibility studies between the mobile service (IMT) and other services in accordance with Resolutions 232 (WRC-12) and 233 (WRC-12)  − To develop draft CPM text under WRC‑15 agenda items 1.1 and 1.2 | T. Ewers (D)(\*\*)  M. Fenton (UK)(\*\*\*) |
| (\*) Including the exact frequency of 30 MHz.  (\*\*) From July 2012 to November 2012.  (\*\*\*) From July 2013 to July 2014. | | |

Table A1-2

Meetings of Study Group 5 and its Working Parties including Joint Task Group

|  |  |  |
| --- | --- | --- |
| Meetings | Date | Venue |
| 9th Working Parties block 5A, 5B and 5C | 22 May – 1 June 2012 | Geneva |
| 13th Working Party 5D | 16-20 July 2012 | Geneva |
| 1st Joint Task Group 4-5-6-7 | 23-27 July 2012 | Geneva |
| 14th Working Party 5D | 3-11 October 2012 | Woodland Hills |
| 10th Working Parties block 5A, 5B and 5C | 5-16 November 2012 | Geneva |
| 7th Study Group 5 | 19 November 2012 | Geneva |
| 2nd Joint Task Group 4-5-6-7 | 21-28 November 2012 | Geneva |
| 15th Working Party 5D | 3 January – 6 February 2013 | Geneva |
| 11th Working Parties block 5A, 5B and 5C | 20-31 May 2013 | Geneva |
| 16th Working Party 5D | 10‑17 July 2013 | Sapporo |
| 3rd Joint Task Group 4-5-6-7 | 22-31 July 2013 | East London |
| 17th Working Party 5D | 9-16 October 2013 | Geneva |
| 4th Joint Task Group 4-5-6-7 | 17-25 October 2013 | Geneva |
| 12th Working Parties block 5A, 5B and 5C | 18-29 November 2013 | Geneva |
| 8th Study Group 5 | 2-3 December 2013 | Geneva |
| 18th Working Party 5D | 12-19 February 2014 | Ho Chi Minh |
| 5th Joint Task Group 4-5-6-7 | 20-28 February 2014 | Geneva |
| 13th Working Parties block 5A, 5B and 5C | 19-30 May 2014 | Geneva |
| 19th Working Party 5D | 18-25 June 2014 | Halifax |
| 6th Joint Task Group 4-5-6-7 | 21-31 July 2014 | Geneva |
| 20th Working Party 5D | 15-22 October 2014 | Geneva |
| 14th Working Parties block 5A, 5B and 5C | 27 October – 7 November 2014 | Geneva |
| 9th Study Group 5 | 10-11 November 2014 | Geneva |
| 21st Working Party 5D | 27 January – 4 February 2015 | Auckland |
| Extraordinary meeting of Working Party 5B | 11-15 May 2015 | Geneva |
| 22nd Working Party 5D | 10-18 June 2015 | San Diego |
| 15th Working Parties block 5A, 5B and 5C | 6-17 July 2015 | Bucharest |
| 10th Study Group 5 | 20-21 July 2015 | Geneva |

Attachment 2

Summary of Study Group 5 activities

Table A2-1

New and revised Recommendations (already approved)

|  |  |  |
| --- | --- | --- |
| WP | New (Rec. ITU‑R) | Revised (Rec. ITU‑R) |
| WP 5A | M.2034-0, M.2057-0, M.2068-0, M.2084-0 | F.1763-1  M.1076-1, M.1450-5, M.1544-1, M.1801-2, M.1824-1, M.2003-1, M.2009-1, M.2015-1 |
| WP 5B | M.2058-0, M.2059-0, M.2067-0, M.2069-0, M.2085 | M.493-14, M.585-7, M.629-1, M.690-3, M.824-4, M.1174-3, M.1176-1, M.1371-5, M.1460-2, M.1463-2, M.1463-3, M.1464-2, M.1465-2, M.1638-1, M.1796-2, M.1827-1, M.1841-1, M.1849-1, M.1874-1, M.2008-1 |
| WP 5C | F.2086 | F.339-8, F.383-9, F.386-9, F.557-5, F.635-7, F.758-6, F.1099-5, F.1105-3, F.1247-3, F.1247-4, F.1249-3, F.1249-4, F.1336-4, F.1497-2, F.1509-2, F.1509-3, F.1777-1, F.1778-1  SF.674-3 |
| WP 5D | M.2070-0, M.2071-0, M.2083 | M.1457-11, M.1457-12, M.1579-2, M.1580-5, M.1581-5, M.1768‑1, M.2012-1, M.2012-2 |

Table A2-2

Draft new and revised Recommendations submitted to the RA-15 for consideration

|  |  |  |
| --- | --- | --- |
| WP | New (Draft Rec. ITU‑R) | Revised (Draft revision of Rec. ITU‑R) |
| WP 5B | M.[AMS-CHAR], (Doc. [5/1006](http://www.itu.int/md/R12-SG05-RP-1006/en))  M.[VDES], (Doc. [5/1007](http://www.itu.int/md/R12-SG05-RP-1007/en)) | M.541-9, (Doc. [5/1005](http://www.itu.int/md/R12-SG05-RP-1005/en))(\*) |
| WP 5D | M.[BSMS700], (Doc. [5/1009](http://www.itu.int/md/R12-SG05-RP-1009/en)) | M.1036-4 (Doc. [5/1008](http://www.itu.int/md/R12-SG05-RP-1008/en)) |
| (\*) This draft Recommendation has been adopted by correspondence and sent to the RA-15 for approval. | | |

Table A2-3

Suppressed Recommendations

|  |  |
| --- | --- |
| WP | (Rec. ITU‑R) |
| WP 5A | M.1222, M.1740 |
| WP 5B |  |
| WP 5C | F.760-1, SF.356-4, SF.357-4 |
| WP 5D |  |

Table A2-4

New and revised Reports

|  |  |  |
| --- | --- | --- |
| WP | New (Report ITU‑R) | Revised (Report ITU‑R) |
| WP 5A | M.2264-0, M.2281-0, M.2282-0, M.2330-0, M.2335-0, M.2377, M.2378 | M.2014-2, M.2116-2, M.2117-1, M.2227-1, M.2228-1 |
| WP 5B | M.2283-0, M.2284-0, M.2285-0, M.2286-0, M.2287-0, M.2288-0, M.2316-0, M.2317-0, M.2318-0, M.2319-0, M.2321-0, M.2322-0, M.2369, M.2371, M.2372 | M.2231-1 |
| WP 5C | F.2263-0, F.2323-0, F.2379 |  |
| WP 5D | M.2289-0, M.2290-0, M.2291-0, M.2292-0, M.2320-0, M.2334-0, M.2370, M.2373, M.2374, M.2375, M.2376 | M.2039-3 |
| JTG4-5-6-7 | BS.2340-0, BT.2337-0, BT.2338-0, BT.2339‑0, F.2326-0, F.2327-0, F.2328-0, F.2331-0, F.2333-0, M.2324-0, RA.2332-0, RS.2336-0, S.2367, S.2368, SA.2325-0, SA.2329-0 |  |

Table A2-5

Suppressed Reports

|  |  |
| --- | --- |
| WP | Report ITU‑R |
| WP 5A | M.741-3, M.901-2, M.1051-1, M.2033 |
| WP 5B |  |
| WP 5C | F.2047 |
| WP 5D |  |

Table A2-6

New, revised and maintained Questions

|  |  |  |  |
| --- | --- | --- | --- |
| WP | New (Question ITU‑R) | Revised (Question ITU‑R) | Maintained (Question ITU‑R)(\*) |
| WP 5A | 254-0/5, 256-0/5 | 1-6/5, 48-7/5, 209-5/5, 241-3/5 | 7-7/5, 37-6/5, 101-4/5, 205-5/5, 212-4/5, 215-4/5, 238-2/5, 250-1/5, 254-0/5 |
| WP 5B | 259-0/5 |  | 62-2/5, 235-0/5 |
| WP 5C | 255-0/5, 257-0/5, 258-0/5 | 242-2/5 | 110-3/5, 246-0/5, 247-1/5, 248-0/5, 252-0/5, 253-0/5, 255-0/5 |
| WP 5D |  | 229-4/5 | 77-7/5 |
| (\*) Some of the maintained Questions have been editorially updated in accordance with § 11 of Resolution ITU‑R 1‑6. | | | |

TABLE A2-7

Suppressed Questions

|  |  |
| --- | --- |
| WP | (Question ITU‑R) |
| WP 5A | 230-3/5 |
| WP 5B | 202-3/5, 225/5, 231/5, 240/5, 249/5 |
| WP 5C | 245/5 |
| WP 5D | 251/5 |

Table A2-8

ITU‑R Resolutions of specific concern of Study Group 5   
(submitted to the RA-15 for approval in Document [5/1004](http://www.itu.int/md/R12-SG05-RP-1004/en))

|  |  |
| --- | --- |
| WP | Draft new or revised Resolutions(\*) |
| WP 5D | ITU‑R 50-2, ITU‑R 56-1, ITU-R [IMT.PRINCIPLES] |
|  | Proposed suppression of Resolution |
| WP 5D | ITU‑R 17-4 |
| (\*) The version number of these Resolutions will be updated after their approval (see Document [5/1004](http://www.itu.int/md/R12-SG05-RP-1004/en)) | |

Table A2-9

Suppressed Opinion within Study Group 5

|  |  |
| --- | --- |
| WP | Suppressed Opinions |
| WP 5A, 5B, 5C, 5D | ITU‑R 95 |

Table A2-10

Work on the WRC‑15 agenda items for which Working Parties   
in Study Group 5 are responsible or contributing/interested

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Agenda item | Topic | Resolution | WP 5A | WP 5B | WP 5C | WP 5D |
| 1.1 | Additional bands for IMT | 223 (WRC-12) | C | C | C | C |
| 1.2 | MS use of 694-790 MHz in R1 | 232 (WRC-12) | C | C |  | C |
| 1.3 | Broadband PPDR | 648 (WRC-12) | **R** | C | C | C |
| 1.4 | AS allocation – 5 250-5 450 kHz | 649 (WRC-12) | **R** | C | C |  |
| 1.5 | Use of UAS in the FSS bands | 153 (WRC-12) |  | **R** |  |  |
| 1.6 | Additional bands for FSS | 151 (WRC-12),  152 (WRC-12) | C | C | C |  |
| 1.7 | Use of FSS in 5 091-5 150 MHz | 114 (Rev.WRC-12) | I | C |  |  |
| 1.8 | Review of provisions for ESVs | 909 (WRC-12) | C | C | C |  |
| 1.9.1 | New allocation to FSS | 758 (WRC-12) | C |  | C |  |
| 1.9.2 | New allocation to MMSS | C | C | C |  |
| 1.10 | Additional allocation to MSS 22‑26 GHz | 234 (WRC-12) | C |  | C |  |
| 1.11 | Allocation to EESS 7-8 GHz | 650 (WRC-12) | C |  | C |  |
| 1.12 | Allocation to EESS 9.3-9.9 GHz | 651 (WRC-12) | C | C | C |  |
| 1.13 | Review of SRS operation – 410‑420 MHz | 652 (WRC-12) | C |  | C |  |
| 1.14 | Future UTC | 653 (WRC-12) |  |  |  |  |
| 1.15 | On board MMS in UHF bands | 358 (WRC-12) | C | **R** | C | C |
| 1.16 | New AIS technology | 360 (WRC-12) | C | **R** |  |  |
| 1.17 | Actions to support WAIC | 423 (WRC-12) | C | **R** | C |  |
| 1.18 | Allocation to RLS for Automotive Radar | 654 (WRC-12)  (*invites* i & ii) => (*invites* iii) => | **R** | **R** |  |  |
| 7 | Satellite procedural issues | 86 (Rev.WRC-07) | C |  |  |  |
| 9.1.1 | Protection of MSS in 406-406.1 MHz | 205 (Rev.WRC-12) | C | C | C |  |
| 9.1.6 | Definitions for FS/MS stations | 957 (WRC-12) | C |  | C | C |
| 9.1.8 | Nano/pico-satellites issues | 757 (WRC-12) | I |  |  |  |
| NOTE: **R** = Responsible group, C = Contributing group, I = Interested group. | | | | | | |

Attachment 3

Summary of the status of the studies invited by ITU-R Resolutions

Table A3-1

Summary of the status of the studies invited by ITU-R Resolutions

| Resolution ITU-R | Title | Status of studies | Deliverables |
| --- | --- | --- | --- |
| 17-4 | Integration of International Mobile Telecommunications (IMT-2000 and IMT-Advanced) with existing networks | Study Group 5 has completed the study.  This Resolution is proposed for suppression (see Doc. [5/1004](http://www.itu.int/md/R12-SG05-RP-1004/en)). | Rep. ITU-R M.2320 |
| 50-2 | Role of the Radiocommunication Sector in the ongoing development of IMT | Study Group 5 has conducted the study on IMT taking into account the scope of this Resolution.  The new version of this Resolution has been developed (see Doc. 5/1004). | Rec. ITU-R M.2083-0 |
| 53-1 | The use of radiocommunications in disaster response and relief | Requests for input to database of disaster management frequencies have been published.  Disaster Relief Rapporteur’s progress reports on the work on the database have been provided. | Doc. 5A/46  Docs. 5A/724, 5A/630, 5A/522, 5A/408, 5A/257, 5A/181 |
| 55-1 | ITU studies of disaster prediction, detection, mitigation and relief | Under the scope of this Resolution, Study Group 5 has conducted the studies on the following topics:  − PPDR operation including IMT applications;  − oceanographic radars for tsunami detection;  − transportable fixed equipment; | Rec. ITU-R M.2009-1, Rec. ITU-R M.2015-1, Rep. ITU-R M.2291-0, Rep. ITU-R M.2377, Rec. ITU-R M.1874-1, Rep. ITU-R M.2321-0, Rec. ITU-R F.1105-3 |
| 56-1 | Naming for International Mobile Telecommunications | Study Group 5 has conducted the IMT-related studies under the scope of this Resolution.  The new version of this Resolution has been developed (see Doc. 5/1004). | Typical outputs are as follows:  Rec. ITU-R M.2083-0, Rec. ITU-R M.1457-11, Rec. ITU-R M.1457-12, Rec. ITU-R M.2012-1, Rec. ITU-R M.2012-2. |
| 57-1 | Principles for the process of development of IMT-Advanced | Study Group 5 has conducted the IMT-related studies under the scope of this Resolution.  A new Resolution on the principles for the process to be applied to future development of IMT has been developed (see Doc. 5/1004). |
| 58 | Studies on the implementation and use of cognitive radio systems | In conjunction with Question ITU-R 241/5, Study Group 5 has completed the development of new Report on cognitive radio systems in the land mobile service. | Rep. ITU-R M.2330-0 |
| 59 | Studies on availability of frequency bands and/or tuning ranges for worldwide and/or regional harmonization and conditions for their use by terrestrial electronic news gathering systems | Study Group 5 has updated the relevant Recommendations on ENG characteristics in the fixed and the mobile service, as well as developed a new Report on sharing and compatibility issues between ENG and other systems. | Rec. ITU-R F.1777-1, Rec. ITU-R M.1824-1, Rep. ITU-R F.2379 |
| 60 | Reduction of energy consumption for environmental protection and mitigating climate change by use of ICT/radiocommunication technologies and systems | While there have been no proposal or outputs specifically devoted to this topic, Study Group 5 has incorporated new developments in technology into a number of Reports and Recommendations that could result in reduced energy consumption (see also Note 1). | |
| 62 | Studies related to testing for conformance with ITU‑R Recommendations and interoperability of radiocommunication equipment and systems | Although no specific contribution was received by the WP meetings in Study Group 5, one of the Working Parties, i.e. WP 5B, discussed its relevance to the scope of this Resolution. The result could be summarized as provided in Note 2. | |
| 12-1 | Handbooks and special publications for development of radiocommunication services | Within this study period, the subordinate groups in Study Group 5 has developed the following Handbooks:  − Guidance for bilateral/multilateral discussions on use of frequency range 1 350 MHz-43.5 GHz by fixed mobile systems (WP 5C);  − Global trends in IMT (WP 5D);  − Revised version of amateur and amateur-satellite service Handbook (WP 5A). | |
| NOTE 1:  − Aeronautical and maritime systems are designed to expedite the passage of aircraft and ships from one port to another safely in a manner that reduces the flight/voyage time and hence reduces the fuel burnt in undertaking that flight/voyage. Since this energy saving is significantly greater than any saving that might result from improving the power efficiency of the radio equipment used to facilitate such flights/voyages it is felt more prudent to concentrate on designing systems to further expedite the passage of aircraft/ships rather than on the power efficiency of the radio equipment.  − Where aviation is looking at employing energy efficient systems that are powered through fuel harvesting there is a dilemma because in order to design a robust system that can be powered by such a means spectral efficiency has to be sacrificed.  − In certain cases the introduction of green systems such as wind farms or ships partially powered by kites, additional equipment needs to be installed to either detect the presence of such systems or to mitigate their effects on aeronautical and maritime navigational radio systems.  NOTE 2: The work of WP 5B, within the scope of the maritime and aeronautical mobile services, is closely related to that of the following three UN bodies:  − International Civil Aviation Organization.  − International Maritime Organization.  − World Meteorological Organization.  Due to the global nature of these organizations they are interested in ensuring that their systems are globally interoperable and hence they have well established mechanisms for developing globally harmonized standards and recommended practices. These standards and recommended practices, when addressing radio systems, take into account and ensure conformance of such systems to the ITU Radio Regulations.  Additionally, since these systems are routinely used for ensuring the safety of human life and property there is a significant regulatory framework and conformance testing already carried out to ensure that these standards and recommended practices are adhered to. | | | |

Attachment 4

(For information)

Summary of the status of the studies   
invited by WRC Resolutions/Recommendations   
(excluding those related to WRC‑15 agenda items)

# 1 Resolution 145 (Rev.WRC‑12): Use of the bands 27.9-28.2 GHz and 31‑31.3 GHz by high altitude platform stations in the fixed service

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| invites ITU‑R |
| 1 to continue to carry out studies on the appropriate interference mitigation techniques for the situations referred to in *considering j)*;  2 to develop protection criteria for the mobile service having primary allocations in the frequency bands 27.9-28.2 GHz and 31-31.3 GHz from HAPS in the fixed service |

Since WRC-07, no contributions have been received specifically for these study items. Therefore, there is no progress in the invited studies. However, an input on HAPS systems in general has been submitted to the recent Working Party 5C meeting, which would be carried over to the next study period for further study.

# 2 Resolution 212 (Rev.WRC‑07): Implementation of International Mobile Telecommunications in the bands 1 885-2 025 MHz and 2 110‑2 200 MHz

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| invites ITU‑R |
| to continue its studies with a view to developing suitable and acceptable technical characteristics for IMT that will facilitate worldwide use and roaming, and ensure that IMT can also meet the telecommunication needs of the developing countries and rural areas. |

Under this category of the study, the following ITU-R Recommendations have been developed or revised in relation to suitable and acceptable technical characteristics for IMT that will facilitate and/or ensure the requirements in the Resolution:

− Development of Recommendation ITU‑R M.2070 and ITU-R M.2071 “Generic unwanted emission characteristics of base stations/mobile stations using terrestrial radio interfaces of IMT-Advanced”.

− Revisions of Recommendations ITU‑R M.1457, ITU‑R M.1579, ITU‑R M.1580, ITU‑R M.1581 and ITU-R M.2012.

The study will be continued towards further enhancement of technical characteristics for IMT under the revised Questions ITU‑R 229/5 and ITU‑R 77/5.

# 3 Resolution 221 (Rev.WRC‑07): Use of high altitude platform stations providing IMT in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885‑1 980 MHz and 2 110‑2 160 MHz in Region 2

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| invites ITU‑R |
| to develop, as a matter of urgency, an ITU‑R Recommendation providing technical guidance to facilitate consultations with neighbouring administrations. |

For this topic, there have been no input contributions to the relevant Working Party meetings after WRC-03. Therefore, no progress has been made in these 12 years.

# 4 Resolution 223 (Rev.WRC‑12): Additional frequency bands identified for IMT

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| invites ITU‑R |
| 1 to study the implications of sharing of IMT with other applications and services in the band 2 300‑2 400 MHz and the implementation, sharing and frequency arrangements of IMT in the band 2 300‑2 400 MHz;  2 to develop harmonized frequency arrangements for the 2 300-2 400 MHz band for operation of the terrestrial component of IMT, taking into account the results of the sharing studies;  3 to continue its studies on further enhancements of IMT, including the provision of Internet Protocol (IP)-based applications that may require unbalanced radio resources between the mobile and base stations;  4 to continue providing guidance to ensure that IMT can meet the telecommunication needs of the developing countries and rural areas in the context of the studies referred to above;  5 to include these frequency arrangements and the results of these studies in one or more ITU‑R Recommendations, |

The studies identified in *invites ITU-R* 1, 2 and 5, have already resulted in the frequency arrangement in the 2 300-2 400 MHz band included in Recommendation ITU-R M.1036-4. In addition, the following progress has been made regarding sharing and coexistence studies:

− Revision of Reports ITU-R M.2039 and development of Report ITU-R M.2292, which address characteristics of terrestrial IMT-2000 or IMT-Advanced systems for frequency sharing/interference analyses.

− Development of Report ITU-R M.2374 on coexistence of two TDD networks in the 2 300‑2 400 MHz band.

The study on further enhancements of IMT including IP-based applications, which is identified in *invites ITU-R* 3, has been addressed by the development of new versions of Recommendations ITU‑R M.1457 and ITU-R M.2012.

The study identified in *invites ITU-R* 4 has also made good progress, producing an ITU-R Handbook on Global Trends in IMT under Question ITU‑R 77/5.

# 5 Resolution 224 (Rev.WRC‑12): Frequency bands for the terrestrial component of International Mobile Telecommunications below 1 GHz

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| invites ITU‑R |
| 1 to continue to study the potential use of the band 790-862 MHz in Region 1 and Region 3, the band 698-806 MHz in Region 2 and in those administrations mentioned in No. 5.313A in Region 3 by new mobile and broadcasting applications, including the impact on the GE06 Agreement, where applicable as indicated in *recognizing f)*, and to develop ITU‑R Recommendations on how to protect the services to which these bands are allocated, including the broadcasting service and in particular the GE06 Plan, as updated, and its future developments;  2 in the frequency bands mentioned in *invites ITU‑R* 1, to study compatibility between mobile systems with different technical characteristics and provide guidance on any impact the new considerations may have on spectrum arrangements;  3 to include the results of the studies referred to in *invites ITU‑R* 2, and in particular harmonization measures for IMT, in one or more ITU‑R Recommendations by 2015, |

There have been no input contributions directly linked on this topic to the Working Party 5D meetings after the WRC-07. Therefore, no progress has been made on these invited studies.

# 6 Resolution 229 (Rev.WRC‑12) – Use of the bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz by the mobile service for the implementation of wireless access systems including radio local area networks

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| invites ITU‑R |
| 1 to continue work on regulatory mechanisms and further mitigation techniques to avoid incompatibilities which may result from aggregate interference into the FSS in the band 5 150-5 250 MHz from a possible prolific growth in the number of WAS, including RLANs;  2 to continue studies on mitigation techniques to provide protection of EESS from stations in the mobile service,  3 to continue studies on suitable test methods and procedures for the implementation of dynamic frequency selection, taking into account practical experience. |

There is no progress specifically for the invited study items. As general study under Question ITU‑R 212/5, Recommendation ITU-R M.1450, which is referred to in this Resolution, has been updated.

# 7 Resolution 331 (Rev.WRC‑12): Operation of the Global Maritime Distress and Safety System (GMDSS)

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| invites ITU‑R |
| to monitor the development of and changes to the GMDSS, and to continue to develop techniques and systems relevant for the GMDSS, |

In relation to this topic, Recommendations ITU-R M.1371 and ITU-R M.690 were updated and new versions of these Recommendations have been already published on the ITU website.

In addition, Recommendations ITU-R M.493 and ITU-R M.541 have also been revised.

# 8 Resolution 356 (WRC‑07): ITU maritime service information registration

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| invites ITU‑R |
| to consult with administrations, IMO, the International Civil Aviation Organization (ICAO), the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), and the International Hydrographic Organization (IHO) to identify elements for incorporation in ITU online information systems. |

It was proposed to provide additional functionality in the MARS database to host and search notified identities for handheld VHF transceivers with DSC and global navigation satellite system. The note to Director of the BR for suggestion to take appropriate action has been considered.

# 9 Resolution 359 (WRC-12): Consideration of regulatory provisions for modernization of the Global Maritime Distress and Safety System and studies related to e‑navigation

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| invites ITU‑R |
| to conduct studies, as a matter of urgency, taking into consideration the activities of IMO, in order to determine spectrum requirements to support GMDSS modernization, the implementation of e‑navigation and propose possible regulatory actions, |

No contribution has been received in this WRC study cycle under this Resolution. Therefore, no progress has been made on this topic.

# 10 Resolution 418 (Rev.WRC‑12): Use of the band 5 091-5 250 MHz by the aeronautical mobile service for telemetry applications

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| invites ITU‑R |
| to continue studying the conditions and arrangements stipulated in *noting a)* |

On this topic, some study has been conducted in relation to WRC-15 agenda item 1.7, including revision of Recommendation ITU-R M.1827.

# 11 Resolution 644 (Rev.WRC‑12) – Radiocommunication resources for early warning, disaster mitigation and relief operations

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| resolves |
| 1 that the ITU Radiocommunication Sector (ITU‑R) continue to study, as a matter of urgency, those aspects of radiocommunications/ICT that are relevant to early warning, disaster mitigation and relief operations, such as decentralized means of telecommunications that are appropriate and generally available, including amateur terrestrial and satellite radio facilities, mobile and portable satellite terminals, as well as the use of passive space-based sensing systems;  2 to urge the ITU‑R Study Groups, taking into account the scope of ongoing studies/activities appended to Resolution ITU‑R 55, to accelerate their work, particularly in the areas of disaster prediction, detection, mitigation and relief, |

In order to support the objectives of this Resolution, Study Group 5 has conducted the work under Questions ITU-R 209/5 and ITU-R 248/5, which have been updated and carried over to the next study period. Within this study cycle, the revised version of Recommendation ITU-R F.1105 “Fixed wireless systems for disaster mitigation and relief operations” has been developed under Question ITU-R 248/5.

Also in the IMT system aspect, Report ITU-R M.2291 has been developed (see 4.4.3). In addition, it is noted that external organizations have developed radio interface specifications to support early warning, disaster mitigation and relief operations, which have been included in the new versions of Recommendations ITU-R M.1457 and ITU-R M.2012.

# 12 Resolution 703 (Rev.WRC‑07) – Calculation methods and interference criteria recommended by ITU‑R for sharing frequency bands between space radiocommunication and terrestrial radiocommunication services or between space radiocommunication services

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| resolves |
| 1 that the Director of the Radiocommunication Bureau, in consultation with Study Group Chairmen, shall annually prepare a list identifying the relevant newly approved ITU-R Recommendations relating to sharing between space radiocommunication and terrestrial radiocommunication services, or between space radiocommunication services; |

In relation to sharing between the space radiocommunication services and the fixed service, Study Group 5 has revised the following Recommendations, twice for each Recommendation in 2012 and 2015, respectively:

− Recommendation ITU-R F.1247 “Technical and operational characteristics of systems in the fixed service to facilitate sharing with the space research, space operation and Earth exploration-satellite services operating in the bands 2 025-2 110 MHz and 2 200‑2 290 MHz”;

− Recommendation ITU-R F.1249 “Technical and operational requirements that facilitate sharing between point‑to-point systems in the fixed service and the inter-satellite service in the band 25.25-27.5 GHz”;

− Recommendation ITU-R F.1509 “Technical and operational requirements that facilitate sharing between point‑to‑multipoint systems in the fixed service and the inter-satellite service in the band 25.25-27.5 GHz”.

# 13 Resolution 748 (Rev.WRC-12): Compatibility between the aeronautical mobile (R) service and the fixed-satellite service (Earth-to-space) in the band 5 091-5 150 MHz

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| invites |
| 1 administrations to supply technical and operational criteria necessary for sharing studies for the AM(R)S, and to participate actively in such studies |

In relation to this topic, Study Group 5 developed the new version of Recommendation ITU‑R M.1827 (Guideline on technical and operational requirements for stations of the aeronautical mobile (R) service limited to surface application at airports in the frequency band 5 091-5 150 MHz) in this study cycle (see also the text under Resolution **418 (Rev.WRC-12)**).

# 14 Recommendation 76 (WRC-12): Deployment and use of cognitive radio systems

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| recommends |
| that administrations participate actively in the ITU‑R studies conducted under Resolution ITU‑R 58, taking into account *recognizing a)* and *b)*. |

In accordance with this Recommendation, Study Group 5 has continued its work on cognitive radio systems under Question ITU-R 241-2/5 and developed Report ITU-R [M.2330](http://www.itu.int/pub/R-REP-M/publications.aspx?lang=en&parent=R-REP-M.2330) “Cognitive radio systems (CRSs) in the land mobile service” in this study period.

# 15 Recommendation 206 (WRC-12): Studies on the possible use of integrated mobile‑satellite service and ground component systems in the bands 1 525-1 544 MHz, 1 545‑1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz

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| recommends |
| to invite ITU‑R to conduct studies on the possible use of integrated MSS systems in the bands 1 525‑1 544 MHz, 1 545‑1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz, as appropriate, taking into account the need to protect existing and planned systems, as well as the above considering, recognizing and noting, and in particular *recognizing a)*, *b)* and *c)*, |

There have been no input contributions on this topic to the relevant Working Party meetings after WRC‑07. Therefore, no progress has been made within this study period.

# 16 Recommendation 207 (WRC‑07): Future IMT systems

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| recommends to invite ITU‑R |
| to study as necessary technical, operational and spectrum related issues to meet the objectives of future IMT systems. |

Within this study cycle, the relevant work has been conducted under Question ITU-R 229/5, which has been updated taking into account the future development of IMT (i.e. the future development of IMT for 2020 and beyond).

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