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| **Radiocommunication Study Groups** |  |
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| Source: Document 5A/TEMP/382 | **Annex 4 to**  **Document 5A/976-E** |
| **16 November 2018** |
| **English only** |
| Annex 4 to Working Party 5A Chairman’s Report | |
| Preliminary DRAFT REVISIONS OF the questions  assigned to Working Party 5A | |
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| Num-Rev. | Title | Category | App-Year | Last-Cont | Target-year | WG |  |
| [1-6/5](http://www.itu.int/pub/R-QUE-SG05.1) | Interference protection ratios and minimum field strengths required in the land mobile services | S2 | 2015 | 2018 | 2023 | 4 | MOD |
| [7-7/5](http://www.itu.int/pub/R-QUE-SG05.7) | Characteristics of equipment for the land mobile service between 30 and 6 000 MHz | S2 | 2012 | 2018 | 2023 | 4 | **MOD** |
| [37-6/5](http://www.itu.int/pub/R-QUE-SG05.37) | Digital land mobile systems for specific applications | S2 | 2012 | 2018 | 2023 | 2, 3 | **MOD** |
| [48-7/5](http://www.itu.int/pub/R-QUE-SG05.48) | Techniques and frequency usage in the amateur service and amateur-satellite service | S2 | 2015 | 2018 | 2023 | 1 | **MOD** |
| [101-4/5](http://www.itu.int/pub/R-QUE-SG05.101) | Quality of service requirements in the land mobile service | S2 | 2007 | 2018 | 2023 | 2 | **MOD** |
| [205-5/5](http://www.itu.int/pub/R-QUE-SG05.205) | Intelligent transport systems | S2 | 2012 | 2018 | 2023 | 5 | **MOD** |
| [209-5/5](http://www.itu.int/pub/R-QUE-SG05.209) | Use of the mobile, amateur and amateur satellite services in support of disaster radiocommunications | S2 | 2015 | 2018 | 2023 | 1, 3([[1]](#footnote-1)) | MOD |
| [212-4/5](http://www.itu.int/pub/R-QUE-SG05.212) | Nomadic wireless access systems including radio local area networks | S2 | 2012 | 2018 | 2023 | 2, 4 | **MOD** |
| [215-4/5](http://www.itu.int/pub/R-QUE-SG05.215) | Frequency bands, technical characteristics, and operational requirements for fixed wireless access systems in the fixed and/or land mobile services | S2 | 2012 | 2018 | 2023 | 2, 4 | **MOD** |
| [238-2/5](http://www.itu.int/pub/R-QUE-SG05.238) | Mobile broadband wireless access systems | S2 | 2012 | 2018 | 2023 | 2, 4 | **MOD** |
| [241-3/5](http://www.itu.int/pub/R-QUE-SG05.241) | Cognitive radio systems in the mobile service | S2 | 2015 | 2018 | 2023 | 5 | **MOD** |
| [242-2/5](http://www.itu.int/pub/R-QUE-SG05.242) | Reference radiation patterns of omnidirectional and sectoral antennas for the fixed and mobile services for use in sharing studies | S2 | 2015 | 2018 | 2023 | 4  ([[2]](#footnote-2)) | **MOD** |
| [250-1/5](http://www.itu.int/pub/R-QUE-SG05.250) | Mobile wireless access systems providing telecommunications for a large number of ubiquitous sensors and/or actuators scattered over wide areas as well as machine to machine communications in the land mobile service | S2 | 2012 | 2018 | 2023 | 5 | **MOD** |
| [254/5](http://www.itu.int/pub/R-QUE-SG05.254) | Operation of short-range radiocommunication public access system supporting hearing aid systems | S2 | 2014 | 2018 | 2023 | 2 | **MOD** |
| [256/5](http://www.itu.int/pub/R-QUE-SG05.256) | Technical and operational characteristics of the land mobile service in the frequency range 275-1 000 GHz | S2 | 2015 | 2018 | 2023 | 5 | **MOD** |

QUESTION ITU-R 1-6/5[[3]](#footnote-3)\*

**Interference protection ratios and minimum field strengths  
required in the land mobile services**

(1963-1986-1992-1998-2007-2012-2015)

The ITU Radiocommunication Assembly,

considering

*a)* that for certain kinds of mobile service (MS) systems, partial data relating to interference protection ratios and minimum field strengths required, exist in documents of some ITU Conferences and some ITU-R Recommendations (Note 1), and certain ITU-R Reports (Note 2), *et al.*;

*b)* that such documents, however, do not constitute a complete and consistent set of data relating to protection of the desired transmission signal quality from interference of all kinds from services operating in all frequency ranges, particularly with respect to VHF band and UHF band MS systems, nor do they assure proper and consistent use in predicting interference signal levels in MS systems;

*c)* that consistent methods are needed for various types of information transmission to assure consistent use of parameters and their values for determining system interference protection criteria, especially taking into account the constant evolution of MS technologies and their deployment in an ever broader range of the frequency bands;

*d)* that consistent methods are needed as well for calculating interference due to unwanted emissions to assure protection of the desired signal quality in the necessary bandwidth of a MS system;

*e)* that the Radiocommunication Bureau has requested guidance from Radiocommunication Study Groups on the methods to be employed for the calculation of the interference from the mobile‑satellite service (MSS), to the MS, and on the criteria to be used;

*f)* that consistent methods are needed as well for calculating interference due to spectrum sharing with other services such as MSS, broadcasting or fixed service to assure protection of the desired signal quality in the necessary bandwidth of a MS system;

*g)* that interference prediction parameters and computational methods are also under study in other Radiocommunication Study Groups, in other telecommunications standards organizations, and in frequency coordination organizations,

decides that the following Questions should be studied

1 What are the signal-to-interference protection ratios which define the threshold of harmful interference for mobile services?

2 What are the signal-to-noise ratios and the minimum field strengths required for satisfactory reception of the different classes of emission in the mobile services?

3 What are the appropriate fading allowances in the mobile services?

4 Which combinations of interfering and victim carrier types are covered by ITU-R texts on interference calculation methods?

5 Which combinations of interfering and victim carriers are not currently covered by ITU‑R texts describing interference criteria and/or calculation methods, and what criteria and calculation methods are appropriate for such combinations?

6 What guidance, if any, could be given on circumstances in which the probability of harmful interference between carriers can be considered to be negligible?

further decides

1 that the above studies should be continued simultaneously and with the same urgency;

2 that particular attention should be given to those studies which will assist the further refinement of the technical characteristics of land mobile systems;

3 that the above studies should address not only intra-service interference, but also inter-service sharing interference with other services such as the MSS;

4 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

5 that the above studies should be completed by 2023.

NOTE 1 – See Recommendations, [ITU-R M.478](https://www.itu.int/rec/R-REC-M.478/en), ITU-R [M.1825](https://www.itu.int/rec/R-REC-M.1825/en), ITU-R [M.2068](https://www.itu.int/rec/R-REC-M.2068/en), ITU-R [SM.331](https://www.itu.int/rec/R-REC-SM.331/en), ITU-R [SM.337](https://www.itu.int/rec/R-REC-SM.337/en), ITU-R [SM.852](https://www.itu.int/rec/R-REC-SM.852/en) and ITU-R [SM.1751](https://www.itu.int/rec/R-REC-SM.1751/en).

NOTE 2 – See Reports [ITU-R M.739](https://www.itu.int/pub/R-REP-M.739), ITU-R [M.2116](https://www.itu.int/pub/R-REP-M.2116) and ITU-R [M.2292](https://www.itu.int/pub/R-REP-M.2292).

Category: S2

QUESTION ITU-R 7-7/5[[4]](#footnote-4)\*,[[5]](#footnote-5)\*\*

Characteristics of equipment for the land mobile service  
between 30 and 6 000 MHz

(1956-1966-1970-1974-1990-1992-1997-2007-2012)

The ITU Radiocommunication Assembly,

considering

*a)* that there is a necessity for efficient use of the frequency bands allocated to the land mobile service;

*b)* that an interchange of information on the requirements of administrations concerning the technical characteristics of equipment used in land mobile services between 30 and 6 000 MHz, would be advantageous in the development of those services;

*c)* that an exchange of information among different countries concerning the practices applied to the assignment of channels and the experience gained in the operation of land mobile services between 30 and 6 000 MHz is of value in general;

*d)* that a certain measure of agreement may be desirable on the characteristics of the land mobile equipment that are used in the border areas of neighbouring countries to minimize mutual interference;

*e)* that a certain measure of agreement may also be desirable on the practices governing the allocation and use of channels in land mobile services between 30 and 6 000 MHz in border areas;

*f)* that a degree of standardization is desirable, since the land mobile service connected to   
the national network may form part of an international connection;

*g)* that it is desirable to determine equipment technical characteristics, to facilitate the planning of channel allocation in the land mobile bands;

*h)* that it is also desirable to investigate the relationship between subjective measurement techniques and objective measurement techniques for the various systems operating in the land mobile service,

decides that the following Questions should be studied

1 What are the technical requirements of administrations concerning equipment used in land mobile services between 30 and 6 000 MHz that are of international importance in the development of such services, e.g. transmitter power, antenna characteristics, emission characteristics, frequency tolerance?

2 To what extent would it be desirable to standardize the performance characteristics of land mobile equipment between 30 and 6 000 MHz internationally?

3 What are the equipment characteristics (and/or methods of measurement) for the various land mobile services between 30 and 6 000 MHz?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 37-6/5[[6]](#footnote-6)

Digital land mobile systems for specific applications

(1978-1982-1992-1995-1997-2007-2012)

The ITU Radiocommunication Assembly,

considering

*a)* that the number of radio stations in the land mobile service is increasing very rapidly;

*b)* that in several geographical areas the growing demand for radio channels in the land mobile service has resulted in a serious congestion in the frequency bands allocated to this service;

*c)* that in order to alleviate this congestion as well as that expected in the future, it is desirable for land mobile services to employ spectrum saving techniques;

*d)* that improved spectrum efficiency might be achieved, taking into account essential system characteristics like traffic density, grade of service, etc. and costs:

– by making an increased number of traffic channels available within a given bandwidth;

– by optimizing the size of base station coverage areas, to the traffic demand;

– by combining these techniques and others;

*e)* that the digital technology applied in such systems may require channel widths other than those used in the existing land mobile services;

*f)* that systems based on digital technology offer a high degree of privacy and security;

*g)* that these systems may provide capabilities required by specific user groups, of applications such as, private mobile radio, public access mobile radio, utilities, e-Health, public protection and disaster relief, and machine to machine communications, etc.;

*h)* that, particularly for systems operating in border areas of neighbouring countries, it is desirable to reach international agreement on certain system characteristics in order to come to maximum usage flexibility,

decides that the following Questions should be studied

1 What are, with regard to frequency efficiency, the optimum characteristics of these systems, taking into account factors like needed system capacity to serve a large number of users, base station coverage area, complexity of equipment, propagation factors and performance objectives?

2 How can these systems meet the user demand and what are the operational requirements?

3 What are the capabilities and facilities offered by these systems, which fulfil the requirements of specific user groups, of applications such as private mobile radio, public access mobile radio, utilities, e-Health, public protection and disaster relief, and machine to machine communications, etc.?

4 What are the system parameters on which international agreement is desirable to ensure compatibility between systems and/or operation of differing systems in neighbouring coverage areas?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 48-7/5[[7]](#footnote-7)

**Techniques and frequency usage in the amateur service   
and amateur-satellite service**

(1978-1982-1990-1993-1998-2003-2007-2015)

The ITU Radiocommunication Assembly,

considering

*a)* that the Radio Regulations define an amateur service and an amateur-satellite service, allocate frequencies to them on an exclusive or shared basis, and provide for the cessation of emissions from amateur satellites;

*b)* that the amateur and amateur-satellite services provide benefits of self-training, intercommunication, and technical investigation carried on by amateurs, that is, by duly qualified and authorized persons throughout the world interested in radio techniques solely for the development of personal skills and mutual exchange of information without pecuniary interest;

*c)* that, incidental to their basic purposes, the amateur and amateur-satellite services have pioneered new and novel techniques for radio reception and transmission using inexpensive equipment with relatively small antennas;

*d)* that frequency dependent factors determine to a large extent the effectiveness of radiocommunications in the amateur and amateur-satellite services;

*e)* that the amateur service and the amateur-satellite service continue to make significant contributions to the observation and understanding of propagation phenomena and to techniques which exploit these phenomena;

*f)* that amateur and amateur-satellite station operators continue to contribute to the development and demonstration of spectrum conservation techniques throughout the radio‑frequency spectrum;

*g)* that the amateur and amateur-satellite services provide communications during natural disasters and other catastrophic events when normal communications are temporarily interrupted or inadequate for the needs of human relief operations;

*h)* that the amateur and amateur-satellite services contribute to the training of operators and technical personnel, which is of particular benefit to developing countries,

*decides* that the following Questions should be studied

1 What are the most desirable technical and operational characteristics of future systems for the amateur and amateur-satellite services?

2 What techniques, particularly those which exploit propagation phenomena and conserve spectrum, are being applied or investigated in these services?

3Which of these techniques may be of interest to other services?

4 How can the amateur and amateur-satellite services make greater contributions to training of operators and technicians in developing countries?

5 What are the appropriate criteria for frequency sharing among stations in the amateur and amateur-satellite services and between the amateur, amateur‑satellite and other radiocommunication services?

6 What technical and operational characteristics are most suitable for amateur and amateur‑satellite systems for communications during natural disasters?

7 What modifications, if any, should be considered in the provisions addressing communication, technical characteristics and operator qualifications in the amateur service and amateur-satellite service?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 101-4/5[[8]](#footnote-8)\*

Quality of service requirements in the land mobile service

(1990-1993-1995-2003-2007)

The ITU Radiocommunication Assembly,

considering

*a)* that there is a rapid development in methods for digitization of speech and its transport over IP networks;

*b)* that this development gives new possibilities to obtain higher system flexibility and improved spectrum efficiency in the transmission of speech;

*c)* that digitally encoded speech enables more privacy in speech communication;

*d)* that new systems supporting multimedia telecommunication services with various degrees of performance are being introduced widely;

*e)* that there may be advantages in adopting for the land mobile service standards that are compatible with ITU-T Recommendations relevant to the fixed networks,

decides that the following Questions should be studied

1 Which measures of quality of multimedia services are relevant for different land mobile applications?

2 What delay with respect to delivery of service and delay variation are acceptable for different land mobile applications?

3 What is the proper choice of encoding bit rates for multimedia services taking into account quality requirements, channel coding techniques, efficient frequency usage, and cost?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 205-5/5

**Intelligent transport systems**

(1995-1996-2002-2003-2007-2012)

The ITU Radiocommunication Assembly,

considering

*a)* that there is a need to integrate new technologies including radiocommunications into land transportation systems;

*b)* that many new land transportation systems use intelligence in the land vehicles coupled with advanced management techniques to improve traffic management;

*c)* that the technologies planned for intelligent transport systems (ITS) can be applied to public transportation (transit) systems to make them more efficient and to enhance the integrated use of all forms of surface transport;

*d)* that ITS are being planned and implemented in various Regions by Administrations;

*e)* that a wide variety of applications and services are defined;

*f*) that Vehicle-to-Vehicle, Vehicle-to-Infrastructure and Vehicle-to-Pedestrian radiocommunications for connected and automated vehicles are defined;

*g)* that international standards would facilitate the world-wide applications of ITS and provide for economies of scale in bringing ITS equipment and services to the public;

*h)* that early international harmonization of ITS would have several benefits;

*i)* that world-wide compatibility of ITS may be dependent on common radio spectrum allocations;

*j)* that radio is an essential component of ITS;

*k)* that the International Organization for Standardization (ISO) is standardizing ITS (non‑radio aspects) in ISO/TC204,

recognizing

*a)* Recommendation ITU‑R M.1453 “Intelligent transport systems – Dedicated short range communications at 5.8 GHz”;

*b*) Recommendation ITU-R M.2084 “Radio interface of Vehicle-to-Vehicle and Vehicle‑to-Infrastructure communication for intelligent transport system applications”,

decides that the following Questions should be studied

1 What are the various elements of ITS?

2 What are the overall objectives for ITS with respect to:

– radiocommunication requirements: radio interfaces, reliability, grade of service, etc.;

– improvement factors; congestion reduction, safety, control, quality of life, etc.;

– type of services?

3 What radio-based ITS services and functions might benefit from international standardization?

4 What are the spectrum requirements for each element of ITS including:

– suitable bands;

– spectrum bandwidth needed?

5 What are the interconnect requirements of ITS with the switched telecommunication networks?

6 What are the technical factors that affect sharing between ITS and other users?

7 To what extent can the evolving mobile telecommunications systems be used to deliver ITS services?

8 What are the radiocommunication requirements and technical specifications necessary for the global or regional harmonization of next generation ITS radiocommunications?

9 What is the definition of “telematics” in the context of ITS? In such a context, what are the systems and application requirements of telematics? What are the land mobile communications requirements of telematics?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

question itu-r 209-5/5

**Use of the mobile, amateur and the amateur-satellite services   
in support of disaster radiocommunications**

(1995-1998-2006-2007-2012-2015)

The ITU Radiocommunication Assembly,

considering

*a)* Resolution 136 (Rev. Dubai, 2018);

*b)* Resolution 43 (Rev. Buenos Aires, 2017), which instructs the Director BDT, in close collaboration with the Directors of the Radiocommunication Bureau (BR) and the Telecommunication Standardization Bureau (TSB), as well as the relevant regional telecommunication organizations, to continue encouraging and assisting developing countries to implement IMT systems and future networks, to provide assistance to administrations on the use and interpretation of ITU Recommendations relating to IMT, and future networks adopted by both ITU-R and ITU-T, etc.;

*c)* Resolution **647** **(Rev.WRC-15)** on Radiocommunication aspects, including spectrum management guidelines, for early warning, disaster prediction, detection, mitigation and relief operations relating to emergencies and disasters;

*d)* that the Tampere Convention on the provision of telecommunication resources for disaster mitigation and relief operations by the Intergovernmental Conference on Emergency Telecommunications (ICET-98) came into force on 8 January 2005;

*e)* that in accordance with number **25.3** of the Radio Regulations amateur stations may be used for transmitting international communications on behalf of third parties in case of emergencies or disaster relief. An administration may determine the applicability of this provision to amateur stations under its jurisdiction. (**WRC-03**);

*f)* that in number **25.9A** of the Radio Regulations administrations are encouraged to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief. **(WRC-03)**,

recognizing

*a)* that when a disaster occurs, the disaster relief agencies are usually the first on the scene using their day-to-day communication systems, but that in most cases, other agencies and organizations may also be involved;

*b)* that in times of disasters, if most terrestrial-based networks are destroyed or impaired, other networks in the amateur and amateur-satellite services may be available to provide basic, on‑site communications capability;

*c)* that important attributes of the amateur services include stations distributed throughout the world which have trained radio operators capable of reconfiguring networks to meet the specific needs of an emergency,

decides that the following Question should be studied

What are the technical, operational and related procedural aspects of mobile, amateur and amateur-satellite services in support and improvements of disaster warning, mitigation and relief operations?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023;

3 that the above studies should be coordinated with the other two Sectors.

Category: S2

QUESTION ITU-R 212-4/5[[9]](#footnote-11)\*

**Nomadic wireless access systems including radio local area networks**

(1995-1998-2000-2007-2012)

The ITU Radiocommunication Assembly,

considering

*a)* that there is a need to provide effective communication for moveable, portable and mobile computer based equipment not only within the workplace but also in many public spaces;

*b)* that ITU-R has defined nomadic wireless access in Recommendation ITU‑R F.1399 on vocabulary of terms for wireless access;

*c)* that it is desirable to identify operational and technical characteristics for nomadic wireless access (NWA) systems including radio local area networks (RLAN) applications;

*d)* that NWA systems including RLANs use frequency allocations designated for fixed and/or mobile services dependant on the application;

*e)* that there are RLANs currently in operation and also in development for operation in various frequency bands (e.g. the frequency bands used for ISM applications);

*f)* that in the broadband wired networks basic signal transfer methods based on and internet protocol (IP) are in use;

*g)* that the IP-based LAN using the high clock frequency may impact the design of NWA systems including RLANs as well as utilization of the radio-frequency spectrum;

*h)* that there is a need to identify appropriate frequency bands for NWA systems;

*i)* that technical constraints on NWA systems including RLANs may be needed to facilitate sharing with other services;

j) that the standardization works of NWA systems including RLANs concerning architecture, technical features and spectrum needs are being studied by regional standardization bodies,

decides that the following Questions should be studied

1 What are the operational and technical requirements of NWA systems?

2 What specifications may be recommended for NWA systems?

3 What are the relationships of NWA systems including those based on IP with other radio systems to provide for multiple system operation?

4 What types of system techniques, including multi-hop relay stations, provide for reliable area coverage for NWA applications?

5What are the frequency sharing or compatibility criteria between NWA systems including RLANs and other radio services?

6 What frequency bands are suitable for operation of NWA systems including RLANs considering the required operational and technical characteristics, and sharing compatibility with other services?

7 What amount of frequency spectrum is needed for NWA systems in particular for broadband applications higher than 10 Mbit/s ensuring wireless access from public spaces?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports, or Handbooks;

2 the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 215-4/5

Frequency bands, technical characteristics, and operational requirements for fixed wireless access[[10]](#footnote-14)\* systems in the fixed and/or land mobile services

(1997-2000-2007-2009-2012)

The ITU Radiocommunication Assembly,

considering

*a)* the potential of wireless access to enhance the availability of basic communication services in many countries, particularly developing countries;

*b)* that there is a need for efficient use of the radio-frequency spectrum;

*c)* that wireless access has potential for greater economic and socio-economic benefits than other access media to telecommunication networks (e.g., PSTN);

*d)* that wireless access technologies allow fast and economic deployment of telecommunication facilities;

*e)* that enhanced competition in the provision of services is desirable;

*f)* that fixed wireless access systems may be implemented in frequency bands used by both the fixed and mobile services;

*g)* that a number of ITU-R Recommendations exist on various aspects of fixed wireless access, for example Recommendations ITU-R F.755, ITU-R F.757, ITU-R F.1399, ITU-R F.1400, ITU-R F.1401, ITU-R F.1490, ITU-R F.1499, ITU-R F.1402, ITU-R M.687, ITU-R M.819, ITU‑R M.1033, ITU-R M.1073, and ITU-R M.1801 as well as a Handbook on Land Mobile (including Wireless Access);

*h)* that different wireless access technologies are suitable for different environments;

*i)* that the ongoing studies of IMT in the ITU have highlighted fixed wireless access as an important application;

*j)* that the availability and possible adaptation of mobile technologies for fixed wireless access applications may be advantageous;

*k)* that spectrum sharing between fixed and mobile wireless access applications may improve the spectrum utilization;

*l)* that there is a need to consider:

– both fixed and mobile wireless accessservices in conjunction with each other; and

– the cost-benefits of integration of both types of services;

*m)* that different fixed wireless access environments may require different frequency bands;

*n)* that broadband wireless access, including wireless access to Internet Protocol (IP) core networks is a category of fixed wireless access that continues to be important,

decides that the following Questions should be studied

1 What are the frequency bands suitable for fixed wireless access systems within the terrestrial fixed and/or mobile frequency allocations?

2 What are the frequency bands that might allow compatible operation between wireless access systems and systems of existing radio services within the terrestrial fixed and/or mobile frequency allocations?

3 What are the characteristics and operational requirements of fixed wireless access systems?

4 What are the overall RF and IF bandwidth requirements for fixed wireless access systems within the terrestrial fixed and/or mobile frequency allocations?

5 What are the spectrum sharing criteria for:

– wireless access systems and systems supporting other radio services?

– wireless access systems using different technologies?

6 What are the technologies suitable for wireless access?

7 What techniques need to be considered for fixed wireless access operation to enhance spectrum sharing?

8 What are the interface requirements between wireless access systems and the switched network (e.g., PSTN)?

9 What additional vocabulary should be used with fixed wireless access systems?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 238-2/5[[11]](#footnote-15)\*, [[12]](#footnote-16)\*\*

**Mobile broadband wireless access systems**

(2006-2007-2012)The ITU Radiocommunication Assembly,

considering

*a)* that there is a need to provide broadband wireless access (BWA) in a variety of environments;

*b)* that it is desirable to recommend radio interface standards for mobile broadband wireless access systems;

*c)* that it is desirable to identify the technical and operational requirements for mobile broadband wireless access systems;

*d)* that in today’s terrestrial radiocommunications, mobile “broadband” services provide similar capabilities and experience, with the added benefit of mobility, as is available from widely-deployed wireline networks;

*e)* that there are mobile and fixed systems currently in operation and also in development that provide broadband wireless access in various frequency bands;

*f)* that information transfer methods based on internet protocol (IP) are being used in broadband infrastructure;

*g)* that standardization bodies are addressing the architecture and technical features of broadband wireless access systems,

noting

*a)* that studies on BWA are also performed in the context of IMT systems (see Question ITU‑R 229/5);

*b)* that studies on fixed BWA and nomadic BWA are performed under the scope of Questions ITU‑R 215/5 and ITU-R 212/5, respectively,

decides that the following Questions should be studied

1 What are the technical and operational requirements for mobile broadband wireless access systems in the mobile service?

2 What are the applicable radio interface standards for mobile broadband wireless access systems in the mobile service?

3 What are the applicable antenna systems suitable for mobile broadband wireless access systems in the mobile service?

4What are the frequency sharing and/or compatibility criteria associated with BWA systems operating in the mobile service?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports, or Handbooks;

2 the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 241-3/5

**Cognitive radio systems in the mobile service**

(2007-2007-2012-2015)

The ITU Radiocommunication Assembly,

considering

*a)* that the use of mobile radio systems is growing at a rapid rate globally;

*b)* that more efficient use of spectrum is essential to the continued growth of such systems;

*c)* that cognitive radio systems (CRSs) may facilitate the more efficient use of spectrum in mobile radio systems;

*d)* that cognitive radio systems may offer functional and operational versatility and flexibility in mobile radio systems;

*e)* that considerable research and development is being carried out on cognitive radio systems and related radio technologies;

*f)* that it is beneficial to identify the technical and operational characteristics of a CRS;

*g)* that Report ITU-R SM.2152 contains the ITU-R definition for a CRS;

*h*) that ITU-R Reports and/or Recommendations on cognitive radio systems would be complementary to other ITU-R Recommendations on mobile radio systems;

*i*) that Reports ITU-R M. 2225, M.2242 and M.2330 contain studies related to CRS,

noting

that there are network aspects related to the control of cognitive radio systems,

recognizing

*a)* that CRSs are a collection of technologies, not a radiocommunication service;

*b)* that any radio system implementing CRS technology within any radiocommunication service shall operate in accordance with the provisions of the Radio Regulations applicable for that specific service in the related frequency band,

decides that the following Questions should be studied

1 What are the closely related radio technologies and their functionalities that may be a part of cognitive radio systems?

2What key technical characteristics, requirements, performance improvements and/or other benefits are associated with the implementation of cognitive radio systems?

3What are the potential applications of cognitive radio systems and their impact on spectrum management?

4How can cognitive radio systems facilitate the efficient use of radio resources in the mobile service?

5What are the operational implications (including privacy and authentication) of cognitive radio systems?

6 What are the cognitive capabilities and CRS technologies that could facilitate sharing and compatibility between the mobile service and other services, such as broadcasting, mobile-satellite or fixed, as well as passive services, space services (space‑to-Earth) and safety services, taking into account the specificity of all these services?

7What are the cognitive capabilities and CRS technologies that could facilitate coexistence of the systems in the mobile service?

8 What factors need to be considered for the introduction of CRS technologies in the land mobile service?

further decides

1that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2that the above studies should be completed by the year 2023.

Category: S2

Question ITU-R 242-2/5[[13]](#footnote-18)

**Reference radiation patterns of omnidirectional and sectoral antennas  
for the fixed and mobile services for use in sharing studies**

(1995-2000-2012-2015)

The ITU Radiocommunication Assembly,

considering

*a)* that determination of criteria for frequency sharing between point-to-multipoint systems in the fixed service and systems in other services or between systems in the land mobile service and systems in other services requires a knowledge of radiation patterns of omnidirectional and sectoral antennas along all possible interfering paths;

*b)* that the use of reference radiation patterns for omnidirectional and sectoral antennas would facilitate interference calculations;

*c)* that different reference radiation patterns may be required for the various types of antennas in use,

decides that the following Questions should be studied

1What are the measured radiation patterns in the vertical and horizontal planes for both polarizations of typical omnidirectional and sectoral antennas used in point-to-multipoint systems in the fixed service or land mobile systems?

2 What reference radiation patterns can be defined for use in sharing studies for the different types of antennas?

further decides

1that the results of the above studies should be included in one or more Recommendation(s) or Report(s);

2 that the above studies should be completed by 2023.

NOTE – See Recommendation ITU-R [F.1336](http://www.itu.int/rec/R-REC-F.1336/en).

Category: S2

QUESTION ITU-R 250-1/5[[14]](#footnote-19)

**Mobile wireless access systems providing telecommunications for a large number of ubiquitous sensors and/or actuators scattered over wide   
areas as well as machine to machine communications   
in the land mobile service**

(2009-2012)

The ITU Radiocommunication Assembly,

considering

*a)* that rapid advances are being made in wireless telecommunications to link sensors and/or actuators in various environments;

*b)* that sensors and/or actuators for wireless telecommunications should be simple, small, inexpensive and have low power consumption to realize the ubiquitous network society;

*c)* that there are emerging applications that handle small amounts of data, such as measurement data, location information and object control signals;

*d)* that the application of wireless sensor and/or actuator telecommunications as well as machine to machine communications may provide service to a large coverage area and a large variety of objects on a cell-by-cell basis due to the traffic characteristics of such applications stated in item c) above;

*e)* that mobility should be offered for wireless sensor and/or actuator telecommunications as well as machine to machine communications;

*f)* that wireless sensor and/or actuator telecommunications as well as machine to machine communications can take place in non-line-of-sight conditions;

*g)* that it is desirable to identify the typical characteristics for the mobile wireless access systems used for sensor and/or actuator telecommunications as well as machine to machine communications in the land mobile service;

*h)* that wireless access systems used for sensor and/or actuator telecommunications as well as machine to machine communications may also be used in nomadic and/or fixed applications,

decides that the following Questions should be studied

1 What are the technical and operational characteristics of land mobile wireless access systems that will be used to provide telecommunications to large numbers of sensors and/or actuators scattered over wide areas?

2 What are the technical and operational characteristics of land mobile wireless access systems that will be used to provide machine to machine communications?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

QUESTION ITU-R 254/5**[[15]](#footnote-20)**, [[16]](#footnote-21)

**Operation of short-range radiocommunication public access system   
supporting hearing aid systems**

(2014)

The ITU Radiocommunication Assembly,

considering

*a)* that in certain conditions, e.g. in noisy environments or for persons with impaired hearing it is desirable to operate appropriate radiocommunication hearing aids;

*b)* that many persons have impaired hearing;

*c)* that in such conditions acoustically linked hearing aids do not allow speech to be presented at an optimum level and without environmental noise and distortion;

*d)* that radio emission is a practical means of transferring a signal with a favourable signal‑to-noise ratio from a transmission of a public system to a hearing aid;

*e)* that such a public access system could be designed to assist persons with a hearing loss to listen over distances as are encountered in ordinarily unaided speech;

*f)* that a range of transmission of about 20 metres for a public system would be adequate;

*g)* that certain countries are carrying out research and development into such systems;

*h)* that such a communication system may have wider application;

*i)* that persons with hearing impairments would benefit from using radiocommunication hearing aids when travelling;

*j)* that international harmonization of these devices is desirable,

decides that the following Questions should be studied

1 What are the suitable technical and operational characteristics of a short-range radiocommunication public access system supporting hearing aid systems?

2 What are the:

– frequency ranges in the land mobile service suitable for short-range radiocommunication public access system supporting hearing aid systems?

– conditions that might allow compatible operation of short-range radiocommunication public access systems, supporting hearing aid systems and systems of other radio services within the VHF or UHF band?

3 What are the spectrum sharing criteria for short-range radiocommunication public access system supporting hearing aid systems and systems supporting other radio services?

4 What are the technologies suitable to short-range radiocommunication public access system supporting hearing aid systems?

further decides

1 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

2 that the above studies should be completed by 2023.

Category: S2

question ITU-R 256/5

**Technical and operational characteristics of the land mobile service   
in the frequency range 275-1 000 GHz**

(2015)

The ITU Radiocommunication Assembly,

considering

*a)* that there is a growing demand for high speed and large capacity radiocommunications having data rates of several tens of Gbit/s to over 100 Gbit/s for land mobile service applications;

*b)* that due to progress in the recent terahertz technologies, the integrated devices and circuits operating above 275 GHz can achieve various sophisticated applications;

*c)* that the above devices and circuits could provide such high speed and large capacity radiocommunications for land mobile service systems;

*d)* that standard development organizations such as IEEE are developing standards for terahertz wireless systems which utilize the broadband contiguous bandwidth larger than 50 GHz using the frequency range above 275 GHz;

*e)* that broadband contiguous bandwidths larger than 50 GHz for the land mobile service are not available in the frequency range below 275 GHz;

*f)* that certain parts of the frequency range 275-1 000 GHz are identified in Radio Regulations No. **5.565** for use by administrations for passive service applications;

*g)* that the use of the frequency range 275-1 000 GHz by the passive services does not preclude the use of this range by active services;

*h)* that the technical and operational characteristics of the land mobile service need to be specified for sharing and compatibility studies with the passive service applications indicated in *considering f)*;

*i*) that the frequency range 275-450 GHz has been studied under WRC-19 for use by the land-mobile and fixed services applications,

recognizing

*a)* that Report ITU-R RS.2431 “Technical and operational characteristics of EESS (passive) systems in the frequency range 275-450 GHz” provides the technical and operational characteristics of Earth Observation (passive) sensors in the frequency range 275-450 GHz;

*b*) that Report ITU-R SM.2352 provides the technology trends of active services in the frequency range 275-3 000 GHz;

*c)* that Report ITU-R RA.2189 initiated sharing studies between the radio astronomy service and active services in the frequency range 275-3 000 GHz,

decides that the following Question should be studied

What are the technical and operational characteristics of the land mobile service in the frequency range 275-1 000 GHz?

further decides

1 that sharing studies between the land mobile and passive services, as well as the land mobile and other active services should be carried out, taking into account the characteristics mentioned in *decides* as well as the relevant results of the studies under WRC-19;

2 that the results of studies in the frequency range 275-1 000 GHz should be brought to the attention of the other Study Groups, in particular, Study Group 7;

3 that the results of the above studies should be included in one or more Recommendations, Reports or Handbooks;

4 that the above studies should be completed by 2023.

Category: S2

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1. Also assigned to WP 5D. MSS aspects are addressed in SG 4 under [Question ITU-R 286/4](http://www.itu.int/publ/R-QUE-SG04.286/en). [↑](#footnote-ref-1)
2. Also assigned to WPs 5C and 5D. Jointly developed by WP 5A and WP 5C. [↑](#footnote-ref-2)
3. \* This Question should be brought to the attention of Radiocommunication Study Groups 1, 4, 6   
   and 7. [↑](#footnote-ref-3)
4. \* This Question should be brought to the attention of the International Electrotechnical Commission (IEC) and the Telecommunication Standardization Sector. [↑](#footnote-ref-4)
5. \*\* In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-5)
6. In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-6)
7. In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-7)
8. \* This Question should be brought to the attention of the Telecommunication Standardization   
   Sector Study Groups 2 and 12. [↑](#footnote-ref-8)
9. \* This Question should be brought to the attention of Radiocommunication Study Groups 1, 4 and 7, and to the Telecommunication Standardization Sector. [↑](#footnote-ref-11)
10. \* “Fixed wireless access” is defined in Recommendation ITU-R F.1399. [↑](#footnote-ref-14)
11. \* Broadband wireless access is defined in Recommendation [ITU-R F.1399](https://www.itu.int/rec/R-REC-F.1399/en). [↑](#footnote-ref-15)
12. \*\* This Question should be brought to the attention of ITU-D Study Group 2. [↑](#footnote-ref-16)
13. In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-18)
14. In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-19)
15. Bring to the attention of ITU-T (JCA) and ITU-D Study Groups. [↑](#footnote-ref-20)
16. In the year 2019, Radiocommunication Study Group 5 extended the completion date of studies for this Question. [↑](#footnote-ref-21)