Draft analytical list of the Recommendations (M-series)

Part 1: Land mobile service excluding IMT

# Section 1A Vocabulary, characteristics and general technologies for land mobile service

Section 1A1 Vocabulary

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| No | Title | Scope |
| M.1797 | Vocabulary of terms for the land mobile service (03/2007) | This Recommendation provides a vocabulary of terms and definitions for the land mobile service which may also be applicable to other radiocommunication services. |

Section 1A2 System characteristics of the land mobile service

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| No | Title | Scope |
| M.478-5 | Technical characteristics of equipment and principles governing the allocation of frequency channels between 25 and 3 000 MHz for the FM land mobile service (10/1995) | The rapid development of the different applications of land mobile services in the frequency bands between 25 and 3 000 MHz requires the recommendation of technical characteristics of FM equipment and principles governing the allocation of frequency channels. The analogue and digitized voice transmissions may share the same frequency bands and channels with minimal interference between the systems. The Recommendation gives the preferred technical characteristics for VHF and UHF land mobile equipment using F3E class of emission, including the considerations of the necessary bandwidth, the transmitter, the receiver and the station characteristics. |
| M.1072 | Interference due to intermodulation products in the land mobile service between 25 and 3 000 MHz (11/1993) | None |
| M.1073-3 | Digital cellular land mobile telecommunication systems (03/2012) | This Recommendation recommends the technical and operational characteristics of digital cellular land mobile telecommunication systems for international and regional use. By providing associated references to the specifications for each technology, the Recommendation provides guidance for administrations evaluating various cellular systems for their intended applications. |

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| No | Title | Scope |
| M.1074 | Integration of public mobile radiocommunication systems (11/1993) | Integration of telecommunication systems yields various benefits such as economic savings and operational simplicity. Because of these advantages, a number of considerations have been undertaken, some of which have already been incorporated in commercial systems even in the area of public mobile communication (see Annex 1).This Recommendation gives integration considerations, guidelines and constraints. Section 2 outlines the generic integration model and identifies the applicable systems blocks. Also, it touches upon the integration time constraints and enumerates a number of integration advantages. Section 3 is devoted to technical and operational characteristics to be specified for system integration, while Section 4 illustrates some possible examples of integrated systems, ranging from a simple dual‑mode user terminal to heterogeneous integration with a fixed telephone network. |

Section 1A3 General technologies for the land mobile service

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| No | Title | Scope |
| M.1075 | Leaky feeder systems in the land mobile services (11/1993) | None |
| M.1222 | Transmission of data messages on shared private land mobile radio channels (02/1997) | This Recommendation provides descriptions of channel occupation and access procedures for the transmission of data messages on different categories of private land mobile radio channels. This Recommendation has been developed to standardize the data transmission procedures for users who share an analogue radio channel in order to minimize interference to other users who also operate on the channel. |
| M.1678 | Adaptive antennas for mobile systems (05/2004) | This Recommendation addresses the use of adaptive antenna technology in the mobile service with the objective to improve spectrum efficiency significantly, improve the ability of mobile systems to coexist and facilitate cross-border and adjacent band sharing, and facilitate the deployment of new wireless networks, including broadband wireless access and radio local area network systems. |

# Section 1B Systems for public protection and disaster relief (PPDR)

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| No | Title | Scope |
| M.1042-3 | Disaster communications in the amateur and amateur-satellite services (03/2007) | This Recommendation provides guidance on the development of amateur and amateur-satellite service networks supporting preparedness and radiocommunications during disaster and relief operations. |
| M.1637 | Global cross-border circulation of radiocommunication equipment in emergency and disaster relief situations (06/2003) | This Recommendation addresses issues to be considered in order to facilitate the global circulation of radiocommunications equipment to be used in emergency and disaster relief situations.  |
| M.1746 | Harmonized frequency channel plans for the protection of property using data communication (03/2006) | This Recommendation addresses system interoperability and harmonized frequency channel plans for the protection of property using data communication. |
| M.1826 | Harmonized frequency channel plan for broadband public protection and disaster relief operations at 4 940-4 990 MHz in Regions 2 and 3 (10/2007) | This Recommendation addresses harmonized frequency channel plans in the band 4 940‑4 990 MHz for broadband public protection and disaster relief radiocommunications in Regions 2 and 3. |
| M.2009 | Radio interface standards for use by public protection and disaster relief operations in some parts of the UHF band in accordance with Resolution 646 (WRC-03) (03/2012) | This Recommendation identifies radio interface standards applicable for public protection and disaster relief (PPDR) operations in some parts of the UHF band. The broadband standards included in this Recommendation are capable of supporting users at broadband data rates, taking into account the ITU-R definitions of “wireless access” and “broadband wireless access” found in Recommendation ITU-R F.1399.This Recommendation addresses the standards themselves and does not deal with the frequency arrangements for PPDR systems, for which a separate Recommendation exists: Recommendation ITU-R M.2015. |
| M.2015 | Frequency arrangements for public protection and disaster relief radiocommunication systems in UHF bands in accordance with Resolution 646 (03/2012) | This Recommendation provides guidance on frequency arrangements for public protection and disaster relief radiocommunications in certain regions in some of the bands below 1 GHz identified in Resolution 646 (Rev.WRC-12). Currently, the Recommendation addresses arrangements in the ranges 380‑470 MHz in certain countries in Region 1, 746-806 MHz and 806‑869 MHz in Region 2, and 806‑824/851-869 MHz in some countries in Region 3 in accordance with Resolutions ITU-R 53, ITU‑R 55 and WRC Resolutions 644 (Rev.WRC-07), 646 (Rev.WRC-12), and 647 (WRC-07). |

**Section 1C Wireless access systems including RLANs**

Section 1C1 System general characteristics

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| No | Title | Scope |
| M.1450-4 | Characteristics of broadband radio local area networks (04/2010) | This Recommendation provides the characteristics of broadband radio local area networks (RLANs) including technical parameters, and information on RLAN standards and operational characteristics. Basic characteristics of broadband RLANs and general guidance for their system design are also addressed. |
| M.1651 | A method for assessing the required spectrum for broadband nomadic wireless access systems including radio local area networks using the 5 GHz band (06/2003) | This Recommendation provides a method for assessing the required spectrum for broadband nomadic wireless access (NWA) systems including radio local area networks (RLANs). Annex 1 gives a general description of RLANs, the deployment scenarios, an overview of the method for estimating the required spectrum as well as an example calculation in the 5 GHz band. |
| M.1801-1 | Radio interface standards for broadband wireless access systems, including mobile and nomadic applications, in the mobile service operating below 6 GHz (04/2010) | This Recommendation identifies specific radio interface standards for BWA systems in the mobile service operating below 6 GHz. The standards included in this Recommendation are capable of supporting users at broadband data rates, taking into account the ITU‑R definitions of “wireless access” and “broadband wireless access” found in Recommendation ITU‑R F.1399.This Recommendation is not intended to deal with the identification of suitable frequency bands for BWA systems, nor with any regulatory issues. |

Section 1C2 Requirements and criteria for frequency sharing with other radio services

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| No | Title | Scope |
| M.1454 | E.i.r.p. density limit and operational restrictions for RLANS or other wireless access transmitters in order to ensure the protection of feeder links of non-geostationary systems in the mobile-satellite service in the frequency band 5 150-5 250 MHz (05/2000) | This Recommendation recommends the mean e.i.r.p. density limit and operational restrictions for RLANS or other wireless access transmitters in order to ensure the protection of feeder links of non-geostationary systems in the mobile-satellite service in the frequency band 5 150-5 250 MHz. It includes the methodology and parameters used in the sharing studies and provides suggestions for implementing mitigation techniques to further reduce interference into FSS systems from RLANs. |

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| No | Title | Scope |
| M.1652 | Dynamic frequency selection (DFS) in wireless access systems including radio local area networks for the purpose of protecting the radiodetermination service in the 5 GHz band (06/2003) | This Recommendation recommends mitigation techniques, specifically dynamic frequency selection (DFS), for wireless access systems, including RLANs, in the bands used by radars at 5 GHz to facilitate sharing with radars. This Recommendation also includes specific detection, operational and response requirements, and methodologies for sharing studies. |
| M.1653 | Operational and deployment requirements for wireless access systems including radio local area networks in the mobile service to facilitate sharing between these systems and systems in the Earth exploration-satellite service (active) and the space research service (active) in the band 5 470-5 570 MHz within the 5 460-5 725 MHz range (06/2003) | This Recommendation recommends operational and deployment requirements for wireless access systems including RLANs in the mobile service to facilitate sharing between these systems and systems in the Earth exploration-satellite service (active) and the space research service (active) in the band 5 470-5 570 MHz within the 5 460-5 725 MHz range. This Recommendation also includes methodology and parameters used in sharing studies. |
| M.1739 | Protection criteria for wireless access systems, including radio local area networks, operating in the mobile service in accordance with Resolution 229 (WRC-03) in the bands 5 150-5 250 MHz, 5 250-5 350 MHz and 5 470-5 725 MHz (03/2006) | This Recommendation provides protection criteria for wireless access systems, including radio local area networks (WAS/RLAN), operating in the mobile service in accordance with Resolution 229 (WRC-03), for the purposes of carrying out compatibility studies with services or applications from which WAS/RLAN systems are to be protected. |

# Section 1D Special applications of the land mobile service

Section 1D1 Intelligent transport systems

| No | Title | Scope |
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| M.1307 | Automatic determination of location and guidance in the land mobile services (10/1997) | The ability to automatically determine location and to provide guidance has become increasingly important over at least the last decade and a half. This trend is likely to continue, if not accelerate, in the land mobile services. Further, various automatic determination of location and guidance (ADLG) techniques promise to play a major role in the Transport Information and Control System (TICS). This Recommendation presents a general overview of ADLG as well as technical information and examples of existing systems. |
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| M.1452-1 | Millimetre wave radiocommunication systems for intelligent transport system applications (10/2009)  | This Recommendation provides system requirements, technical and operational characteristics of millimetre wave radiocommunication systems for intelligent transport system applications to be used for system design objectives. The Recommendation covers low power, vehicular collision avoidance radar operating in the 60 to 61 GHz, 76 to 77 GHz and 77 to 81 GHz bands, as well as integrated millimetre wave radiocommunication systems for ITS applications in the 57 to 66 GHz range for vehicle-to-vehicle radiocommunications and radiocommunications between the vehicle and roadside infrastructure. |
| M.1453-2 | Intelligent transport systems – Dedicated short range communications at 5.8 GHz (06/2005) | This Recommendation outlines the technologies and characteristics for dedicated short range communications (DSRC) in the 5.8 GHz band. This Recommendation includes an active (transceiver) method and a backscatter (transponder) method as DSRC technologies available for intelligent transport systems (ITS). This Recommendation further includes a DSRC-application sub‑layer (DSRC-ASL) which allows for multiple DSRC applications and IP‑based (Internet protocol) network applications. The technical and operational characteristics of both methods and the DSRC-ASL are described. |

Section 1D2 Other applications

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| No | Title | Scope |
| M.584-2 | Codes and formats for radio paging (11/1997) | This Recommendation describes codes and formats which may be used to provide radio paging. |
| M.1033-1 | Technical and operational characteristics of cordless telephones and cordless telecommunication systems (02/1997) | This Recommendation describes minimum signal-to-interference protection ratios and frequency separations for various classes of emission in the fixed service below about 30 MHz. |
| M.1076 | Wireless communication systems for persons with impaired hearing (11/1993) | None |
| M.2002 | Objectives, characteristics and functional requirements of wide-area sensor and/or actuator network (WASN) systems (03/2012) | This Recommendation provides the objectives, system characteristics, functional requirements, service applications and fundamental network functionalities for mobile wireless access systems (WAS) providing communications to a large number of ubiquitous sensors and/or actuators scattered over wide areas in the land mobile service. The key objective of wide area sensor and/or actuator network (WASN) systems is to support machine-to-machine service applications irrespective of machine location. |
| M.2003 | Multiple Gigabit Wireless Systems in frequencies around 60 GHz (03/2012) | This Recommendation provides general characteristics and radio interface standards for Multiple Gigabit Wireless Systems in frequencies around 60 GHz. |

# Section 1E Frequency spectrum sharing between land mobile service (excluding wireless access systems including RLANs) and other radio services

Section 1E1 System parameters/characteristics for the land mobile service to be used in sharing studies

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| No | Title | Scope |
| M.1795 | Technical and operational characteristics of land mobile MF/HF systems (03/2007) | This text provides land mobile service characteristics information for use in sharing studies. |
| M.1808 | Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 960 MHz to be used in sharing studies (06/2007) | This Recommendation provides technical and operational characteristics of conventional and trunked land mobile systems to be used in sharing studies. Given the variety of those systems within the mobile service below 869 MHz, a range of parameters and typical values are provided for different analogue as well as digital systems. This Recommendation is not intended to deal with characteristics of digital cellular land mobile systems. |
| M.1823 | Technical and operational characteristics of digital cellular land mobile systems to be used in sharing studies (10/2007) | This Recommendation provides technical and operational characteristics of digital cellular land mobile systems for use in sharing studies. It provides the relevant characteristics for some specific systems used for digital cellular land mobile communications, and complements the information available in Recommendation ITU-R M.1073-2. |
| M.1824 | System characteristics of television outside broadcast (TVOB), electronic news gathering (ENG) and electronic field production (EFP) in the mobile service for use in sharing studies (10/2007) | This Recommendation, dealing with system characteristics of television outside broadcast (TVOB), electronic news gathering (ENG) and electronic field production (EFP) in the mobile service to assist sharing studies, contains the typical operational and technical characteristics of broadcast auxiliary services (BAS), which are required for sharing studies between the BAS in the mobile service and other radiocommunication services. |
| M.1825 | Guidance on technical parameters and methodologies for sharing studies related to systems in the land mobile service (10/2007) | This Recommendation gives guidance to perform sharing studies related to systems in the land mobile service. It establishes a list of parameters, that characterize a system to assist in sharing studies, provides information on the methodologies that can be used for sharing analyses involving the land mobile service and describes mitigation techniques that can improve spectrum sharing. It also contains a list of relevant ITU-R Recommendations, Reports and Handbooks. |

Section 1E2 Frequency sharing criteria and interference evaluation methodology between the land mobile service and other radio services

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| No | Title | Scope |
| M.1039-3 | Co-frequency sharing between stations in the mobile service below 1 GHz and mobile earth stations of non-geostationary mobile- satellite systems (Earth-space) using frequency division multiple access (03/2006) | This Recommendation presents calculation methodologies to deal with the co-frequency sharing between stations in the mobile services below 1 GHz and mobile earth stations of non-geostationary mobile-satellite systems. A quick methodology to give an approximation of the interference is given as well as more precise calculations using detailed statistical methods. |
| M.1388 | Threshold levels to determine the need to coordinate between space stations in the broadcasting-satellite service (sound) and particular systems in the land mobile service in the band 1 452-1 492 MHz (01/1999) | Until such time as additional studies are complete, the power flux-density level specified in this Recommendation may be applied as coordination trigger threshold level to space stations in the broadcasting-satellite service (sound) operating in the frequency band 1 452-1 492 MHz to share this frequency band with particular land mobile systems. |
| M.1634 | Interference protection of terrestrial mobile service systems using Monte Carlo simulation with application to frequency sharing (06/2003) | Sharing studies addressing the compatibility between different systems are often performed. Deterministic calculations, while being simple, do not always provide a complete picture of the interference scenarios that arise. This Recommendation refers readers to sources of information on the use of the Monte Carlo method of analysis and recommends the use of a probabilistic approach when assessing potential interference. |
| M.1767 | Protection of land mobile systems from terrestrial digital video and audio broadcasting systems in the VHF and UHF shared bands allocated on a primary basis (06/2006) | The purpose of this Recommendation is to establish a protection criterion of land mobile systems from terrestrial digital video and audio broadcasting systems in the VHF (174-230 MHz) and UHF (470‑862 MHz) shared bands allocated on a primary basis, where appropriate.It provides the methodology and formulas to assess the maximum allowable field strength of digital terrestrial broadcasting signals into the land mobile system bandwidth, also taking into account the case of potential partial overlap in frequencies between both systems. Some examples are provided to illustrate the use of this methodology. In addition, for some specific types of land mobile systems and specific types of interfering digital television signals, measured values of protection ratios are included. |

Part 2: International Mobile Telecommunications (IMT)

Section 2A Vocabulary, framework, objectives and general requirements for IMT-2000

Section 2A1 Vocabulary

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| No. | Title | Scope |
| M.1224-1 | Vocabulary of terms for International Mobile Telecommunications (IMT) (03/2012) | This Recommendation consists primarily of those terms and definitions that are considered essential to the understanding and application of the principles of IMT. Although these terms may already be defined in other ITU Recommendations, the definitions given here were drawn from the essential Recommendations and Reports related to IMT. Nevertheless, the terms defined below are not necessarily exclusive to IMT, and so far as they are relevant, may also apply to other communication systems and services. |

Section 2A2 Framework and overall objectives

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| No. | Title | Scope |
| M.687-2 | International Mobile Telecommunications-2000 (IMT-2000) (02/1997) | This Recommendation defines the objectives to be met by IMT-2000 and provides the overall IMT‑2000 concepts with particular consideration to achieving worldwide roaming and compatibility.This Recommendation provides a high level statement on the topics of: services, architecture, network aspects, implementation, sharing and operational characteristics. Guidance is provided, for a limited number of possible scenarios, on spectrum bandwidth and band of operation based on critical technical parameters and traffic estimates.It forms a foundation for the subject of IMT‑2000 and for the subsequent work activities and Recommendations. |
| M.816-1 | Framework for services supported on International Mobile Telecommunications‑2000 (IMT-2000) (10/1997) | A phased approach is adopted for the definition of IMT‑2000. In this Recommendation the services required for Phase 1 are described, and an outline of the services for Phase 2 is also given. Phase 1 includes those services supported by user bit rates up to approximately 2 Mbit/s. Phase 2 is envisaged as augmenting Phase 1 with new services, some of which may require higher bit rates. |
| No. | Title | Scope |
| M.1035 | Framework for the radio interface(s) and radio sub-system functionality for International Mobile Telecommunications-2000 (IMT-2000) (11/1993) | The purpose of this Recommendation is to present an overview of the radio subsystem for IMT‑2000 and give guidelines for the development of the structure of the radio sub-system. The radio sub‑system includes the functionalities needed to provide IMT‑2000 services over a radio interface(s) to mobile terminals in all IMT-2000 operating environments, as defined in Recommendation ITU‑R M.1034 on Requirements for the radio interface(s) for International Mobile Telecommunications-2000 (IMT-2000).The Recommendation provides a high-level definition of logical elements and functionalities within the radio sub-system, including the radio interface, channel structure, link control and radio system management functions.In addition, this Recommendation identifies areas which are to be specified in detail in subsequent Recommendations. |
| M.1168 | Framework of International Mobile Telecommunications-2000 (IMT-2000) (10/1995) | The purpose of this Recommendation is to present the conceptual and methodological framework for the definition of the management of IMT-2000.The methodology described in ITU-T Recommendation M.3020 [2] is used to define management requirements, management services, management functions, information models, and management protocols related to the management of IMT-2000.This framework is the initial Recommendation on IMT-2000 management and identifies objectives for IMT-2000 management, and provides guidelines for the specification of Recommendations on IMT-2000 management, particularly a TMN management service on IMT‑2000. Other Recommendations on IMT‑2000 management will be produced by ITU in the near future. |
| M.1311 | Framework for modularity and radio commonality within IMT‑2000 (10/1997) | This Recommendation is primarily based on the principles, requirements and framework of the IMT‑2000 radio interface(s), as outlined in IMT‑2000 Recommendations ITU-R M.687, ITU‑R M.819, ITU‑R M.1034 and ITU‑R M.1035. This Recommendation identifies and describes the modularity and radio commonality principles which should be adopted in the development of the radio-related aspects of IMT‑2000. |

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| No. | Title | Scope |
| M.1645 | Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 (06/2003) | This Recommendation defines the framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 for the radio access network. This framework is based on the global user and technology trends, including the needs of developing countries. The Recommendation recommends the framework and objectives of the future development of IMT‑2000 and systems beyond IMT-2000, specifically addressing:– evolutionary development of IMT‑2000, which refers to the enhancements of its technical capabilities, range of available services and breadth of applications that will be progressively introduced during its lifetime;– systems beyond IMT-2000, for which there may be a need for a new wireless access technology to be developed around the year 2010, capable of supporting high data rates with high mobility, which could be widely deployed around the year 2015 in some countries.The complete ITU framework for the future development of IMT-2000 and systems beyond IMT‑2000 encompasses both the “radio access network” and the “core network”. However, it is recognized that, in the future, the evolution of technologies and the redistribution of traditional functions between radio access networks and core networks in real systems may blur this distinction. The scope of this ITU-R Recommendation is the radio access network, while the core network is addressed in a companion ITU-T Recommendation ITU-T Q.1702. The framework for the future development of the IMT-2000 and systems beyond IMT-2000 radio access networks includes the emerging relationships with other radio access networks (existing and future), and the capabilities required to deliver services to the users of IMT‑2000 and systems beyond IMT-2000. |
| M.1822 | Framework for services supported by IMT (10/2007) | This Recommendation addresses the high-level requirements for telecommunication services and applications to be supported by IMT, including the future development of IMT-2000 and IMT‑Advanced. It includes service parameters and service classifications of IMT. This Recommendation also includes examples of telecommunication services that may be supported by IMT. |

Section 2A3 Requirements for the network performance aspects

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| No. | Title | Scope |
| M.817 | International Mobile Telecommunications-2000 (IMT-2000). Network architectures (03/1992) | The purpose of the Annex in this Recommendation is to present the functional network architectures and some of the resulting network configurations which are possible for IMT-2000. The Annex should form the basis for defining the information flows within IMT-2000.In § 2, some consideration is given to some aspects of IMT-2000 which have implications on the architecture model of IMT-2000. General definitions are included in § 3.In § 4 and 5, the basic functional model of IMT‑2000 is described together with a network functional architecture including network interconnections. In § 6 some examples are given of possible mappings of the functional model onto different physical configurations.NOTE 1 – Throughout the Annex, the term ISDN should be understood to include also broadband ISDN (B-ISDN) unless otherwise stated or implicit from context. |
| M.1034-1 | Requirements for the radio interface(s) for International Mobile Telecommunications-2000 (IMT-2000) (02/1997) | The purpose of this Recommendation is to build on the IMT-2000 concepts contained in Recommendation ITU‑R M.687 and to provide a high-level view of the constraints placed on the radio interface(s) particularly in terms of the system requirements, user requirements, and operational requirements. It takes account of the Recommendations on framework for services (Recommendation ITU-R M.816), adaptation to the needs of developing countries (Recommendation ITU‑R M.819), satellite operation (Recommendation ITU-R M.818), network architecture (Recommendation ITU‑R M.817), security principles (Recommendation ITU‑R M.1078), and speech and voice band data performance requirements (Recommendation ITU-R M.1079) to produce recommendations on the requirements for the IMT‑2000 radio subsystem from an overall system perspective. |
| M.1079-2 | Performance and quality of service requirements for International Mobile Telecommunications-2000 (IMT-2000) access networks (06/2003) | This Recommendation defines the speech/data quality and performance requirements for IMT‑2000 access networks taking into consideration the end-to-end requirements. It also defines the connection/session performance, concerning issues such as call set-up time, delay characteristics and handover probability, to be achieved in the IMT-2000 access network that the user will expect in a network of comparable performance to the fixed network. |

Section 2B Global circulation and deployment of IMT

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| No. | Title | Scope |
| M.819-2 | International Mobile Telecommunications-2000 (IMT-2000) for developing countries (02/1997) | This Recommendation describes the objectives to be met by IMT-2000 to meet the needs of developing countries. The potential of mobile radio technologies, including IMT-2000, to help developing countries “bridge the gap” between their communication capabilities and those in developed countries is given in Annex 1. |
| M.1308 | Evolution of land mobile systems towards IMT-2000 (10/1997) | This Recommendation provides information on the existing set of requirements and objectives specified in other ITU Recommendations for International Mobile Telecommunications-2000 (IMT-2000). This Recommendation provides guidelines for developers of pre-IMT-2000 systems who intend to evolve their systems towards IMT‑2000. |
| M.1579-1 | Global circulation of IMT-2000 terrestrial terminals (07/2002) | It is recognised that the World Customs Organisation (WCO) has developed the Istanbul Convention and the Professional Equipment Convention which is applicable to IMT-2000 terminals. The purpose of this Recommendation is to establish the technical basis for global circulation of IMT‑2000 terrestrial terminals based on terminals not causing harmful interference in any country where they circulate:– by conforming to IMT-2000 terrestrial radio interface specifications; and– by complying with unwanted emission limits for IMT-2000 terrestrial radio interfaces. |

Section 2C Technical characteristics and/or detailed specifications for IMT

| No. | Title | Scope |
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| M.1078 | Security principles for International Mobile Telecommunications-2000 (IMT‑2000) (11/1993) | The scope of this Recommendation is to provide the principles and framework for the security provided by IMT-2000. The Recommendation covers all aspects of security for IMT-2000, and is intended as a basis for more detailed aspects of IMT-2000 security to be integrated in various ITU‑R or ITU-T Recommendations including IMT‑2000 requirements at a later stage.The Recommendation identifies the security requirements for IMT-2000 and defines security features for IMT‑2000. An informative Annex to the Recommendation contains a threat and risk analysis including the justification for the various security features defined. The system requirements on security in this Recommendation do not imply any legal responsibilities of involved parties concerning the security of the communication and associated information as this will be in accordance with a country’s national law. |
| M.1223 | Evaluation of security mechanisms for IMT-2000 (02/1997) | The scope of this Recommendation is to identify classes of security mechanisms appropriate for implementing the IMT‑2000 security features defined in Recommendation ITU-R M.1078 on security principles for IMT-2000, and thus for satisfying the IMT-2000 security requirements identified in the same Recommendation. Annex 1 to this Recommendation describes specific candidate security mechanisms, and assesses their suitability for use in IMT‑2000.This Recommendation is intended to be a starting point for the development of more detailed IMT‑2000 Recommen­dations relevant to security which will be developed by various ITU Study Groups. |
| M.1225 | Guidelines for evaluation of radio transmission technologies for IMT‑2000 (02/1997) | This Recommendation provides guidelines for both the procedure and the criteria to be used in evaluating RTTs for a number of test environments. These test environments, defined herein, are chosen to simulate closely the more stringent radio operating environments. The evaluation procedure is designed in such a way that the impact of the candidate RTTs on the overall performance and economics of IMT-2000 may be fairly and equally assessed on a technical basis. It ensures that the overall IMT-2000 objectives are met.The Recommendation provides, for proponents and developers of RTTs, the common bases for the submission and evaluation of RTTs and system aspects impacting the radio performance.This Recommendation allows a degree of freedom so as to encompass new technologies.The actual selection of the RTTs for IMT-2000 is outside the scope of this Recommendation. It deals only with the methodology for the technical evaluations that should be performed. The results of the evaluation are to be documented in an evaluation report and submitted to the ITU-R. |
| M.1456 | Minimum performance characteristics and operational conditions for high altitude platform stations providing IMT‑2000 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 (05/2000) | This Recommendation addresses minimum performance characteristics and operational conditions for high-altitude platform stations (HAPS) operating as IMT-2000 base stations in frequency bands around 2 GHz identified for use, on a worldwide basis, by administrations wishing to implement IMT-2000.A methodology to assess the level of co-channel interference from HAPS operating as IMT‑000 base stations is described and performance criteria are recommended for HAPS antenna patterns to provide co‑channel protection to other stations. The Recommendation contains pfd limits for HAPS base stations with reference to both co‑hannel and out-of-band interference. |
| M.1457-10 | Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000) (01/2012) | This Recommendation identifies the IMT‑2000 terrestrial radio interface specifications, based on the output of activities outside ITU.These radio interfaces support the features and design parameters of IMT-2000, including the capability to ensure worldwide compatibility, international roaming, and access to high-speed data services. This Recommendation is complemented by other ITU-R Recommendations and Reports on IMT-2000 that provide additional details on a number of aspects including frequency arrangements and unwanted emission characteristics. |
| M.1545 | Measurement uncertainty as it applies to test limits for the terrestrial component of IMT-2000 (08/2001) | This Recommendation describes the application of measurement uncertainty to test limits when devices for terrestrial component of IMT‑2000 are tested for conformance. Consistent with industry practice, it is recommended that the shared risk principle should be used for all tests and that any relaxation of core specification limits should be evaluated on a case‑by‑case basis. |
| M.1580-4 | Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000 (03/2012) | This Recommendation provides the generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT‑2000. Implementation of characteristics of base stations using the terrestrial radio interfaces of IMT-2000 in any of the bands included in this Recommendation is subject to compliance with the Radio Regulations and national regulations. |
| M.1581-4 | Generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT‑2000 (03/2012) | This Recommendation provides the generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT‑2000, suitable for establishing the technical basis for global circulation of IMT-2000 terminals. Implementation of characteristics of mobile stations using the terrestrial radio interfaces of IMT-2000 in any of the bands included in this Recommendation is subject to compliance with the Radio Regulations and national regulations. |
| M.2012 | Detailed specifications of the terrestrial radio interfaces of InternationalMobile Telecommunications-Advanced (IMT-Advanced) (01/2012) | This Recommendation identifies the terrestrial radio interface technologies of International Mobile Telecommunications-Advanced (IMT‑Advanced) and provides the detailed radio interface specifications.These radio interface specifications detail the features and parameters of IMT-Advanced. This Recommendation includes the capability to ensure worldwide compatibility, international roaming, and access to high-speed data services. |

Section 2D Spectrum requirements and radio frequency channel arrangements

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| No. | Title | Scope |
| 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)(03/2012) | 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, with a view to assisting administrations on spectrum-related technical issues relevant to the implementation and use of the terrestrial component of IMT in the bands identified in the RR. The frequency arrangements are recommended from the point of view of enabling the most effective and efficient use of the spectrum to deliver IMT services – while minimizing the impact on other systems or services in these bands – and facilitating the growth of IMT systems.This Recommendation is complemented by other ITU-R Recommendations and Reports on IMT that provide additional details on a number of aspects including unwanted emission characteristics for the bands addressed in this Recommendation and radio interface specifications. |
| M.1390 | Methodology for the calculation of IMT‑2000 terrestrial spectrum requirements (01/1999) | This Recommendation contains a methodology for the calculation of terrestrial spectrum requirement estimates for IMT‑2000. This methodology could also be used for other public land mobile radio systems. It provides a systematic approach that incorporates geographic influences, market and traffic impacts, technical and system aspects and consolidation of spectrum requirement results. The methodology is applicable to both circuit switched and packet switch-based radio transmission technologies and can accommodate services that are characterized by asymmetrical traffic flows. |
| M.1768 | Methodology for calculation of spectrum requirements for the future development of IMT-2000 and systems beyond IMT‑2000 (06/2006) | This Recommendation describes a methodology for the calculation of terrestrial spectrum requirement estimation for the future development of IMT‑2000 and systems beyond IMT-2000. It provides a systematic approach that incorporates service categories (a combination of service type and traffic class), service environments (a combination of service usage pattern and teledensity), radio environments, market data analysis and traffic estimation by using these categories and environments, traffic distribution among radio access technique groups (RATGs), required system capacity calculation and resultant spectrum requirement determination. The methodology is applicable to both circuit switched and packet switch-based traffic and can accommodate multiple services. |

Section 2E Interference evaluation and frequency sharing between IMT and other systems/services

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| No. | Title | Scope |
| M.1635 | General methodology for assessing the potential for interference between IMT‑2000 or systems beyond IMT-2000 and other services (06/2003) | Consideration of the potential for interference between IMT-2000 and systems beyond IMT‑2000 and other services is essential for administrations in planning the use of frequency bands where the mobile service exists on a co‑primary basis with other services.Networks of IMT-2000 and systems beyond IMT‑2000 are likely to accommodate significant numbers of cellular customers and hence networks will require significant transmission capacity, involving the deployment of high-density infrastructures. This needs to be considered in analysis to assess sharing between IMT‑2000 and systems beyond IMT‑2000 and other services.This Recommendation provides recommendations for administrations for a methodology for assessing the potential for interference between IMT‑2000 and systems beyond and other services under co‑frequency as well as adjacent band conditions. |
| M.1641-1 | A methodology for co-channel interference evaluation to determine separation distance from a system using high-altitude platform stations to a cellular system to provide IMT-2000 service (03/2006) | This Recommendation contains a methodology for evaluating co-channel interference and a separation distance between a high-altitude platform stations (HAPS) system as a base station for IMT-2000 and a terrestrial tower‑based cellular system providing IMT-2000 service.Annex 1 describes a methodology for co-channel interference evaluation from a HAPS base station and cellular base stations to a cellular mobile station to provide IMT-2000. The C/I ratio is used as a criterion to set separation distance between a HAPS system and a cellular system. For evaluating the interference within a cellular system, a simplified extended version of Hata’s model is applied. An example of calculation for the separation distance between a HAPS system and a cellular system is contained in Annex 2.Appendices 1 and 2 present the equations for interference calculations used in Annex 1 and the antenna radiation pattern, respectively. |
| M.1646 | Parameters to be used in co-frequency sharing and pfd threshold studies between terrestrial IMT-2000 and BSS (sound) in the 2 630‑2 655 MHz band (03/2006) | In this Recommendation receiving parameters for IMT-2000 mobile stations and base stations are recommended for use when assessing interference from BSS (sound) systems operating in the 2 630‑ 655 MHz band. It is also recommended that interference should be assessed in terms of the level of aggregate interference from BSS (sound) systems against the thermal noise at the IMT‑2000 receiver under study. |

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| No. | Title | Scope |
| M.1654 | A methodology to assess interference from BSS (sound) into terrestrial IMT‑2000 systems intending to use the band 2 630‑2 655 MHz (03/2006) | This Recommendation is an example methodology to assess the interference from BSS (sound) into terrestrial IMT‑2000 systems intending to use the band 2 630‑2 655 MHz and that could be used to determine the impact of BSS (sound) on terrestrial IMT‑2000 in the context of co-frequency sharing through the development of pfd masks, where applicable. This methodology contains an algorithm that can be used to calculate a single entry pfd mask for BSS (sound) satellites for a given scenario to meet an *Isat*/*Nth* criterion within a tolerance of 1 dB at any location on the Earth. Attachment 1 to Annex 1 sets out an example of the application of a methodology assessing the possible impact in terms of a loss of coverage or cell size reduction. It has been recognized that the interference into a cellular network can be assessed in terms of coverage reduction (particularly in noise-limited networks such as in rural areas) as well as in terms of availability reduction (particularly in capacity-limited networks such as in urban areas). These approaches may be complementary, and additional study is required on these further aspects. Further study is required on alternative example methods assessing the possible impact. The use of this Recommendation to calculate pfd values in the context of co-frequency sharing should carefully take into account all parameters including operational constraints on BSS (sound) systems, as well as the likely different IMT‑2000 sharing scenarios. In particular, it should be noted that if this Recommendation is used to derive pfd values to be applied as hard limits, worst-case assumptions are not deemed appropriate. As this Recommendation contains a methodology for assessing multiple satellite interference, its use is not advised in the process of coordination. |

Part 3: Maritime mobile and aeronautical mobile services

Section 3A Radio telegraph systems in the maritime mobile service

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| No. | Title | Scope |
| M.476-5 | Direct-printing telegraph equipment in the maritime mobile service (10/1995) | This Recommendation describes minimum signal-to-interference protection ratios and frequency separations for various classes of emission in the fixed service below about 30 MHz. |
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| M.492-6 | Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service (10/1995) | The Recommendation provides in Annex 1 operational procedures for the use of direct-printing telegraph equipment in communication between a ship and a coast station in the selective ARQ-mode on a fully automated or semi-automated basis and to a number of ship stations or a single ship in the broadcast FEC-mode. It also specifies interworking between equipments in accordance with technical characteristics given in Recommendations ITU-R M.476 and ITU‑R M.625. Appendix 1 contains procedures for setting up of calls. |
| M.540-2 | Operational and technical characteristics for an automated direct-printing telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships (06/1990) | None |
| M.625-4 | Direct-printing telegraph equipment employing automatic identification in the maritime mobile service (03/2012) |  The Recommendation provides in Annex 1 characteristics of direct-printing telegraph equipment employing a 7-unit ARQ method for selective communication, a 7-unit FEC method for broadcast mode and automatic identification. Equipment developed in accordance with this Recommendation provides compatibility with equipment without maritime mobile service identity (MMSI) conforming to Recommendation ITU-R M.476. |
| M.627-1 | Technical characteristics for HF maritime radio equipment using narrow-band phase-shift keying (NBPSK) telegraphy (01/1995) | The Recommendation provides in Annex 1 technical characteristics for narrow-band phase-shift keying (NBPSK) telegraphy equipment used in the HF bands of the maritime-mobile service. |
| M.688 | Technical characteristics for a high frequency direct-printing telegraph system for promulgation of high seas and NAVTEX-type maritime safety information (06/1990) | None |
| M.820-1 | Use of 9-digit identities for narrow-band direct-printing telegraphy in the maritime mobile service (03/2012) |  This Recommendation covers the use of 9-digit identities for narrow-band direct-printing telegraphy in the maritime mobile service. |
| M.1170-1 | Morse telegraphy procedures in the maritime mobile service (03/2012) |  This Recommendation provides the information on the general use of Morse telegraphy, methods of calling, rules on the start and end of working with Morse signals. |

Section 3B Radio telephone systems in the maritime mobile service

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| No. | Title | Scope |
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| M.489-2 | Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz (10/1995) | The Recommendation describes the technical characteristics of VHF radiotelephone transmitters and receivers (or transceivers) used in the maritime mobile service when operating in 25 kHz channels of Appendix S18 [Appendix 18] of the Radio Regulations (RR). It also contains those additional characteristics of transceivers required to operate digital selective calling. |
| M.586-1 | Automated VHF/UHF maritime mobile telephone system (07/1986) | None |
| M.587-1 | Coast station identities and initiation of location registration in an automated VHF/UHF maritime mobile telephone system (07/1986) | None |
| M.689-3 | International maritime VHF radiotelephone system with automatic facilities based on DSC signalling format (03/2012) |  This Recommendation describes the operational requirements for an International maritime VHF radiotelephone system with automatic facilities, which is based upon the digital selective calling (DSC) signalling format. This radiotelephone system is designed to work in the channels detailed in Radio Regulations (RR) Appendix 18. |
| M.1082-1 | International maritime MF/HF radiotelephone system with automatic facilities based on DSC signalling format (10/1997) | This Recommendation provides for a means to establish a fully automatic radiotelephone service for vessels to send and receive calls via the public switched telephone network (PSTN) using MF/HF equipment. The Recommendation contains detailed operational procedures, timing diagrams for call set-up sequences and a description of factors which differ between MF/HF and VHF systems. |
| M.1171 | Radiotelephony procedures in the maritime mobile service (10/1995) | None |
| M.1173-1 | Technical characteristics of single-sideband transmitters used in the maritime mobile service for radiotelephony in the bands between 1 606.5 kHz (1 605 kHz Region 2) and 4 000 kHz and between 4 000 kHz and 27 500 kHz (03/2012) |  This Recommendation provides the technical characteristics for single sideband transmitters used in the MF/HF maritime mobile service bands. |

Section 3C Selecting call systems in the maritime mobile service

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| No. | Title | Scope |
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| M.493-13 | Digital selective-calling system for use in the maritime mobile service (10/2009) | This Recommendation describes the digital selective-calling (DSC) system for use in the maritime mobile service covering general purpose and simplified versions of DSC equipment. A description of a generalized user interface as well as an automated procedure for the operation of shipborne equipment are also included. |
| M.541-9 | Operational procedures for the use of digital selective-calling equipment in the maritime mobile service (05/2004) | The Recommendation contains the operational procedures for digital selective-calling (DSC) equipment whose technical characteristics are given in Recommendation ITU‑R M.493. The Recommendation contains five annexes. In Annexes 1 and 2 the provisions and procedures are described for distress, urgency and safety calls and for routine calls, respectively. In Annexes 3 and 4 the operational procedures for ships and for coast stations are described and Annex 5 lists the frequencies to be used for DSC. |
| M.821-1 | Optional expansion of the digital selective-calling system for use in the maritime mobile service (02/1997) | The Recommendation provides in Annex 1 optional expansion sequences to calls in the digital selective-calling (DSC) system described in Recommendations ITU-R M.493 and ITU‑R M.541. These expansion sequences enable DSC equipment to transmit optional messages of more precise geographic coordinates, the navigation equipment used to derive the position, the datum used for its calculation and the resolution of the fix, ship’s speed, course or alternative ship identification. |
| M.822-1 | Calling-channel loading for digital selective calling (DSC) for the maritime mobile service (11/1993) | None |

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| No. | Title | Scope |
| M.825-3 | Characteristics of a transponder system using digital selective calling techniques for use with vessel traffic services and ship-to-ship identification (10/1998) | Several administrations have requirements for a radio transponder system for the purpose of obtaining information on ships entering and sailing within vessel traffic service (VTS) areas. In addition, there is a need for a system to provide ship-to-ship identification.This Recommendation contains the characteristics of a system which uses digital selective-calling (DSC) techniques, suitable for both applications. The Recommendation is based upon Recommendation ITU-R M.493 and introduces a new message “category” for messages related to VTSs and ship-to-ship identification. It also describes the format, composition and contents of such messages.This Recommendation for a transponder system is not intended to meet the requirements for a universal automatic identification system (AIS) which is under consideration in IMO. |
| M.1080 | Digital selective calling system enhancement for multiple equipment installations (11/1993) | None |

Section 3D General equipment characteristics for the maritime mobile service

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| No. | Title | Scope |
| M.1081-1 | Automatic HF facsimile and data system for maritime mobile users (03/2012) |  This Recommendation provides the automatic HF facsimile and data system for maritime mobile service using digital selective calling (DSC) messages; it specifically describes system characteristics and operational procedures for setting up calls and passing messages.These include the contents of DSC messages used to establish initial contact between the maritime mobile user and gateway, protocols and structures of messages used to pass data over the working channel between the maritime mobile user and the gateway, and the characteristics of DSC and HF modems. |
| M.1174-2 | Technical characteristics of equipment used for on-board vessel communications in the bands between 450 and 470 MHz (05/2004) | This Recommendation describes the technical characteristics for equipment operating in the maritime mobile services in accordance with the provisions of No. 5.287 of the Radio Regulations (RR) for on-board vessel communications. Provision is made for 25 kHz or 12.5 kHz channel spacing. |
| M.1175 | Automatic receiving equipment for radiotelegraph and radiotelephone alarm signals (10/1995) | None |
| M.1371-4 | Technical characteristics for an automatic identification system using time-division multiple access in the VHF maritime mobile band (04/2010) | This Recommendation provides the technical characteristics of an automatic identification system (AIS) using time division multiple access in the VHF maritime mobile band. |
| M.1798-1 | Characteristics of HF radio equipment for the exchange of digital data and electronic mail in the maritime mobile service (04/2010) | This Recommendation describes a MF/HF radio systems and a HF data transfer protocols currently used in the MMS for the exchange of data and electronic mail on frequencies of RR Appendix 17, and on non-RR Appendix 17 frequencies, providing a similar functional capability to narrow-band direct printing (NBDP) and many other features.A method of providing completely transparent user interoperability is also described. |
| M.1842-1 | Characteristics of VHF radio systems and equipment for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels (06/2009) | This Recommendation describes characteristics of VHF radio systems and equipment used for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels. It also provides a guideline on the use of digital technologies by VHF systems of different bandwidth in the maritime mobile service. |

Section 3E Operational aspects including global maritime distress and safety systems (GMDSS)

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| No. | Title | Scope |
| M.585-6 | Assignment and use of identities in the maritime mobile service (01/2012) | This Recommendation provides guidance to administrations for the assignment and conservation of identity resources for the maritime mobile service. The limitations which constrain assignments for ships which utilize the satellite services of the global maritime distress and safety system (GMDSS) are described in this Recommendation. Annex 1 describes formats for maritime mobile service identities (MMSI) of ship stations, coast stations, aircraft participating in search and rescue operations and other safety-related communications, automatic identification system (AIS) aids to navigation, and craft associated with a parent ship. Annex 2 describes formats for identification of other maritime devices, such as handheld VHF transceivers with digital selective calling (DSC) and global navigation satellite system (GNSS), AIS-search and rescue transmitter (AIS-SART), man overboard (MOB) and emergency position indicating radio beacon (EPIRB)-AIS.Annex 3 provides specific guidance to administrations for the assignment, management and conservation of identity resources for the maritime mobile service. This guidance further instructs administrations on methods for the reuse of MMSI assignments, particularly for the reuse of those with three trailing zeroes. |
| M.626 | Evaluation of the quality of digital channels in the maritime mobile service (07/1986) | None |
| M.826 | Transmission of information for updating electronic chart display and information systems (ECDIS) (03/1992) | None |
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| M.1172 | Miscellaneous abbreviations and signals to be used for radiocommunications in the maritime mobile service (10/1995) | None |
| M.1467-1 | Prediction of A2 and NAVTEX ranges and protection of A2 global maritime distress and safety system distress watch channel (03/2006) | Recommendation ITU-R M.1467 provides guidance to administrations for predicting sea area A2 and NAVTEX coverage areas by taking into account variations in the propagation conditions. These coverage areas can be confirmed by measurement. This information is provided for administrations that are upgrading, or planning to upgrade, their shore-based facilities for global maritime distress and safety system (GMDSS) operation in the A2 sea area. |
| M.2010 | Characteristics of a digital system, named Navigational Data for broadcasting maritime safety and security related information from shore-to-ship in the 500 kHz band (03/2012) | The Recommendation describes an MF radio system, named Navigational Data (NAVDAT), for use in the maritime mobile service, operating in the 500 kHz band for digital broadcasting of maritime safety and security related information from shore-to-ship. The operational characteristics and system architecture of this radio system are included in Annexes 1 and 2. The two different modes of broadcasting data are detailed in Annexes 3 and 4. |

Section 3F Use of spectrum and radio channels for the maritime mobile service

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| No. | Title | Scope |
| M.1084-5 | Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service (03/2012) | This Recommendation provides ways to improve efficiency in the used of the band 156‑174 MHz by stations in the maritime mobile service; specifically describes technical characteristics when using channels spaced by 12.5 kHz, migration to narrow-band channels, an example method for implementing interleaved narrow-band channels at 12.5 kHz offset spacing and assignment of channels numbers to interleaved channels and simplex operation of duplex channels. |
| M.1312 | A long-term solution for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service (10/1997) | The long-term requirement within the international maritime mobile community is for an advanced spectrally efficient digital system to provide improved efficiency in the use of the band 156-174 MHz. This Recommendation provides administrations with an example of such a technology which is being implemented for land mobile communications in certain areas. |

Section 3G Aeronautical mobile services

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| No. | Title | Scope |
| M.441-1 | Signal-to-interference ratios and minimum field strengths required in the aeronautical mobile (R) service above 30 MHz (07/1982) | None |
| M.1458 | Use of the frequency bands between 2.8-22 MHz by the aeronautical mobile (R) service for data transmission using class of emission J2D (05/2000) | This Recommendation provides information on digital systems, including technical characteristics, for use in the frequency bands between 2.8-22 MHz that are allocated to the aeronautical mobile (R) service. |
| M.1459 | Protection criteria for telemetry systems in the aeronautical mobile service and mitigation techniques to facilitate sharing with geostationary broadcasting-satellite and mobile-satellite services in the frequency bands 1 452-1 525 MHz and 2 310-2 360 MHz (05/2000) | This Recommendation provides information on the protection criteria required for aeronautical telemetry systems operating in the frequency bands 1 452-1 525 MHz and 2 310- 2 360 MHz and potential mitigation techniques that would facilitate sharing with geostationary broadcasting-satellite and mobile-satellite services. |
| M.1827 | Technical and operational requirements for stations of aeronautical mobile (R) service limited to surface application at airports and for stations of aeronautical mobile service limited to aeronautical security (AS) applications in the band 5 091-5 150 MHz (10/2007) | This Recommendation provides technical and operational requirements for stations of the aeronautical mobile (R) service (AM(R)S) limited to surface applications at airports and the aeronautical mobile service (AMS) limited to aeronautical security (AS) applications in the band 5 091-5 150 MHz that should be used by administrations as a technical guideline for establishing conformance requirements for stations for worldwide use. |
| M.1828 | Technical and operational requirements for aircraft stations of aeronautical mobile service limited to transmission for flight testing in the bands around 5 GHz (10/2007) | This Recommendation provides the technical and operational requirements for aircraft stations of aeronautical mobile service limited to transmissions of telemetry for flight testing that should be used by administrations as a technical guideline for establishing conformance requirements for aircraft stations for worldwide use. |
| M.1841 | Compatibility between FM sound-broadcasting in the band of about 87‑108 MHz and the aeronautical Ground Based Augmentation System (GBAS) in the band 108-117.975 MHz (01/2008) | Resolution 413 (WRC‑03) invited ITU‑R to study any compatibility issues between the broadcasting and aeronautical services operating around 108 MHz and to develop new or revised ITU‑R Recommendations as appropriate. This Recommendation provides technical and operational requirements that may be used by administrations as a technical guideline for establishing the compatibility of the ICAO ground-based augmentation system (GBAS) above 108 MHz and FM broadcasting systems operating up to 108 MHz. |

Part 4: Radiodetermination service

Section 4A Technical characteristics and protection criteria for the radio determination service

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| No. | Title | Scope |
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| M.589-3 | Technical characteristics of methods of data transmission and interference protection for radionavigation services in the frequency bands between 70 and 130 kHz (08/2001) | This Recommendation contains the technical characteristics, methods of data transmission and interference protection for radionavigation services in the frequency bands between 70 and 130 kHz. It specifically encourages information exchange and coordination of technical characteristics between administrations for radionavigation systems in the band 90-110 kHz. It also provides protection criteria for, and the technical characteristic of, transmitting data with Loran‑C/Chayka. |
| M.628-5 | Technical characteristics for search and rescue radar transponders (03/2012) | This Recommendation contains technical characteristics for search and rescue radar transponders (SART). A SART is used for locating a ship or survival craft at sea when it is in distress. A ship or survival craft at sea can use a SART to indicate that it is in distress. The SART can be detected by radars operating in the frequency band 9 200-9 500 MHz. |
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| M.690-2 | Technical characteristics of emergency position-indicating radio beacons operating on the carrier frequencies of 121.5 MHz and 243 MHz (03/2012) | This Recommendation contains technical characteristics to which emergency position-indicating radio beacons (EPIRBs) intended to operate on the carrier frequency of 121.5 MHz and 243 MHz should conform.Additional characteristics for EPIRBs intended for carriage on aircraft are specified in relevant annexes to the Convention on International Civil Aviation. |
| M.693-1 | Technical characteristics of VHF emergency position-indicating radio beacons using digital selective calling (03/2012) |  This document details the technical characteristics of an emergency position-indicating radio beacon. This beacon operates in the VHF band, in allocations exclusive to the maritime mobile service, and uses the digital selective calling (DSC) system as detailed in ITU-R Recommendation M.493. This radio beacon will be referred to by the acronym: VHF EPIRB. |

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| No. | Title | Scope |
| M.823-3 | Technical characteristics of differential transmissions for global navigation satellite systems from maritime radio beacons in the frequency band 283.5-315 kHz in Region 1 and 285-325 kHz in Regions 2 and 3 (03/2006) | Many Administrations have implemented transmissions from radio beacon stations of differential corrections for global navigation satellite systems (GNSS). This Recommendation contains the technical characteristics to which such transmissions should conform for corrections to the GPS and GLONASS Navigation Satellite Systems. The Recommendation also describes the various types of differential correction messages used for those navigation satellite systems and the message format. In addition, it contains details of message transmission schedules. |
| M.824-3 | Technical parameters of radar beacons (racons) (03/2007) | Radar beacons are in common use in the maritime radionavigation service and in limited use in the aeronautical radionavigation service. This Recommendation sets out the technical parameters for:– a general purpose maritime radar beacon,– an aeronautical fixed-frequency radar beacon. |
| M.1176 | Technical parameters of radar target enhancers (10/1995) | Trials of radar target enhancers have indicated that the radar returns from navigation buoys and small craft can be significantly improved by the use of such devices.This Recommendation provides the technical parameters for radar target enhancers operating in the frequency bands 2 900-3 100 MHz and/or 9 320 (9 300 from 1 January, 2001)-9 500 MHz. |
| M.1226 | Technical and operational characteristics of wind profiler radars in bands in the vicinity of 50 MHz (02/1997) | This Recommendation provides technical and operational characteristics of wind profiler radars in frequency bands near 50 MHz. The Recommendation includes representative power to the antenna line, necessary bandwidth, occupied bandwidth, representative antenna side-lobe suppressions and guidance for wind profiler radar sharing considerations. It also contains in Annex 1 representative values and minimum requirements on system performance for wind profiler radars in bands near 50 MHz. |

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| No. | Title | Scope |
| M.1227-2 | Technical and operational characteristics of wind profiler radars in bands in the vicinity of 1 000 MHz (08/2001) | This Recommendation outlines the technical and operational characteristics of wind profiler radars in bands in the vicinity of 1 000 MHz. It asks administrations to adopt the detailed technical characteristics when constructing or operating wind profiler radars in the bands near 1 000 MHz. |
| M.1460-1 | Technical and operational characteristics and protection criteria of radiodetermination radars in the 2 900-3 100 MHz band (03/2006) | This Recommendation provides the technical and operational characteristics and protection criteria for radiodetermination systems operating in the band 2 900-3 100 MHz which is allocated to the radiodetermination service on a primary basis. It was developed with the intention to support sharing studies in conjunction with Recommendation ITU-R M.1461 addressing analysis procedures for determining compatibility between radars operating in the radiodetermination service and other services. |
| M.1462 | Characteristics of and protection criteria for radars operating in the radiolocation service in the frequency range 420-450 MHz (05/2000) | This Recommendation contains the technical and operational characteristics of the radiolocation systems operating in the frequency range 420-450 MHz. The parameters are intended to be used as a guideline in analyzing compatibility between radars operating in the radiodetermination service with systems in other services. |
| M.1463-1 | Characteristics of and protection criteria for radars operating in the radiodetermination service in the frequency band 1 215-1 400 MHz (03/2007) | This Recommendation provides technical and operational characteristics, as well as protection criteria, of operational ground based radars in the bands 1 215-1 400 MHz band. The Recommendation includes representative characteristics on the transmitter, receiver, and antenna components of these radars. |
| M.1464-1 | Characteristics of radiolocation radars, and characteristics and protection criteria for sharing studies for aeronautical radionavigation and meteorological radars in the radiodetermination service operating in the frequency band 2 700-2 900 MHz (06/2003) | This Recommendation should be used for performing analyses between systems operating in the radiodetermination service and systems operating in other services. It should not be used for radar to radar analyses. |
| M.1465-1 | Characteristics of and protection criteria for radars operating in the radiodetermination service in the frequency band 3 100-3 700 MHz (03/2007) | This Recommendation provides technical and operational characteristics, as well as protection criteria, of operational land/ship/air based radars in the 3 100-3 700 MHz band. The Recommendation includes representative characteristics on the transmitter, receiver, and antenna components, as well as deployment information, of these radars. |
| No. | Title | Scope |
| M.1466 | Characteristics of, and protection criteria for radars operating in the radionavigation service in the frequency band 31.8-33.4 GHz (05/2000) | This Recommendation specifies the characteristics of and protection criteria for radars operating in the radionavigation service in the frequency band 31.8-33.4 GHz. These technical and operational characteristics are to be used as a guideline in analyzing compatibility between radars operating in the radiodetermination service with systems in other services. |
| M.1638 | Characteristics of and protection criteria for sharing studies for radiolocation, aeronautical radionavigation and meteorological radars operating in the frequency bands between 5 250 and 5 850 MHz (06/2003) | This Recommendation describes the technical and operational characteristics of, and protection criteria for, radars operating in the frequency band 5 250-5 850 MHz. These characteristics are intended for use when assessing the compatibility of these systems with other services. |
| M.1640 | Characteristics of, and protection criteria for sharing studies for radars operating in the radiodetermination service in the frequency band 33.4-36 GHz (06/2003) | This Recommendation provides the technical characteristics and protection criteria for the radiodetermination systems operating in the band 33.4-36 GHz. The text was developed as a resource document intended to support sharing studies where sharing between the radiodetermination service and other services may be possible. |
| M.1644 | Technical and operational characteristics, and criteria for protecting radars in the radiolocation and radionavigation service operating in the frequency band 13.75-14 GHz (06/2003) | This Recommendation provides the technical and operational characteristics, and criteria for protecting the radiolocation and radionavigation radars operating in the 13.75-14 GHz band. It contains a detailed description of the predominant shipborne radiolocation radar in the band, plus a tabular set of characteristics of all the known shipborne, airborne and ground-based radars operating in the band. |
| M.1730-1 | Characteristics of and protection criteria for the radiolocation service in the frequency band 15.4 ‑17.3 GHz (10/2009) | This Recommendation provides the technical characteristics and protection criteria for the radiolocation systems operating and planned to operate in the band 15.4-17.3 GHz. It was developed as a resource document intended to support sharing studies in conjunction with Recommendation ITU‑R M.1461 addressing analysis procedures for determining compatibility between radars operating in the radiolocation service and other services |

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| No. | Title | Scope |
| M.1796-1 | Characteristics of and protection criteria for terrestrial radars operating in the radiodetermination service in the frequency band 8 500-10 680 MHz (03/2012) | This Recommendation provides the technical and operational characteristics and protection criteria for radiodetermination systems operating in the frequency band 8 500-10 680 MHz. It was developed with the intention to support sharing studies in conjunction with Recommendation ITU‑R M.1461 addressing analysis procedures for determining compatibility between radars operating in the radiodetermination service and other services. |
| M.1802-1 | Characteristics and protection criteria for radars operating in the radiolocation service in the frequency band 30-300 MHz (04/2010) | This Recommendation describes VHF radiodetermination radars and provides technical parameters and protection criteria for some type of radars operating in the band 30-300 MHz. |
| M.1830 | Technical characteristics and protection criteria of aeronautical radionavigation service systems in the 645-862 MHz frequency band (10/2007) | This Recommendation complements the technical characteristics of aeronautical radionavigation systems in the frequency band 645-862 MHz for relations not covered by RRC-06 and can be used by concerned administrations as technical guidelines for bilateral discussion and for estimations of compatibility with other radiocommunication services of administrations not party to the RRC-06 Agreement. |
| M.1849 | Technical and operational aspects of ground-based meteorological radars (06/2009) | This Recommendation addresses the important technical and operational characteristics of meteorological radars, describes the related products provided, highlights their major specificities, discusses the effects of interference on meteorological radars and develops related interference protection criteria. This text is limited to ground-based weather radars and does not include wind profiler radars, also used formeteorological purposes, which are covered in a separate ITU-R Recommendation. |
| M.1874 | Technical and operational characteristics of oceanographic radars operating insub-bands within the frequency range 3-50 MHz(04/2010) | This Recommendation provides technical and operational characteristics of oceanographic radars for use in sharing and compatibility studies and spectrum planning and systems deployment within the 3 to 50 MHz band. It provides the relevant characteristics of short-range, standard range, long-range, very-long range and high-resolution oceanographic measurement systems. |
| M.2007 | Characteristics of and protection criteria for radars operating in the aeronautical radionavigation service inthe frequency band 5 150-5 250 MHz (03/2012) | This Recommendation specifies the characteristics of and protection criteria for radar operating in the aeronautical radionavigation service (ARNS) in the frequency band 5 150-5 250 MHz. The technical and operational characteristics should be used when analysing compatibility between radars operating in the aeronautical radionavigation service with systems in other services. |
| M.2008 | Characteristics and protection criteria for radars operating in the aeronautical radionavigation service in the frequency band 13.25-13.40 GHz (03/2012) | This Recommendation specifies the characteristics and protection criteria of radars operating in the aeronautical radionavigation service (ARNS) in the frequency band 13.25-13.4 GHz. The technical and operational characteristics should be used in analysing compatibility between radars operating in the aeronautical radionavigation service and systems in other services within this frequency band. |
| M.2013 | Technical characteristics of, and protection criteria for non-ICAO aeronautical radionavigation systems, operating around 1 GHz (01/2012) | This Recommendation describes the technical characteristics of, and protection criteria for, non-International Civil Aviation Organisation (ICAO) aeronautical radionavigation service (ARNS) systems operating around 1 GHz for use in compatibility studies. It concerns with non-ICAO ARNS systems operating in countries referred to in RR No. **5.312** and TACAN systems. |

Section 4B Interference evaluation to and from other services

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| No. | Title | Scope |
| M.496-3 | Limits of power flux-density of radionavigation transmitters to protect space station receivers in the fixed-satellite service in the 14 GHz band (03/1992) | None |
| M.1177-3 | Techniques for measurement of unwanted emissions of radar systems (06/2003) | This Recommendation provides two techniques for the measurement of radiated radar unwanted emissions. It should be used to measure the spurious emission limits in Appendix 3 (Section II) of the Radio Regulations (RR), or to measure the level of unwanted emissions falling within the out‑of-band domain. |
| M.1179 | Procedures for determining the interference coupling mechanisms and mitigation options for systems operating in bands adjacent to and in harmonic relationship with radar stations in the radiodetermination service (10/1995) | This Recommendation provides administrations with measurement procedures to identify the interference coupling mechanism(s), receiver front-end overload or radar spurious emissions, and methods to mitigate the interference from radar stations in the radiodetermination service to fixed radio-relay stations and fixed-satellite earth stations. |
| M.1314-1 | Reduction of spurious emissions of radar systems operating in the 3 GHz and 5 GHz bands (06/2005) | This Recommendation provides information on the design factors affecting unwanted emission characteristics of radar transmitters to be taken into account during the design of radars. It also recommends certain types of transmitter output devices that should be used when practicable to minimize unwanted emissions. |
| M.1461-1 | Procedures for determining the potential for interference between radars operating in the radiodetermination service and systems in other services (06/2003) | This Recommendation provides guidance and procedures for determining the potential for interference between radars operating in the radiodetermination service and systems in other services. |
| M.1582 | Method for determining coordination distances, in the 5 GHz band, between the international standard microwave landing system stations operating in the aeronautical radionavigation service and stations of the radionavigation-satellite service (Earth-to-space) (07/2002) | This Recommendation provides the method for determining coordination distances between the international-standard MLS stations operating in the band 5 030-5 150 MHz and stations of the radionavigation-satellite (Earth-to-space) in the 5 000-5 010 MHz band. |
| M.1851 | Mathematical models for radiodetermination radar systems antenna patterns for use in interference analyses (06/2009) | This Recommendation describes radiodetermination radar systems antenna patterns to be used for singleentry and aggregate interference analysis. Given knowledge about antenna 3 dB beamwidth and first peak side-lobe level, the proper set of equations for both azimuth and elevation patterns may be selected. Both peak, for single interferer, and average patterns, for multiple interferers, are defined. |

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| No. | Title | Scope |
| M.1584 | Methodology for computation of separation distances between earth stations of the radionavigation-satellite service (Earth-to-space) and radars of the radiolocation service and the aeronautical radionavigation service in the frequency band 1 300-1 350 MHz (07/2002) | This Recommendation outlines the methodology for computation of separation distances between earth stations of the radionavigation-satellite service (Earth-to-space) and radars of the radiolocation service and the aeronautical radionavigation service in the frequency band 1 300-1 350 MHz. These methodologies are to be taken into account, when selecting the location of RNSS uplink earth stations in the range 1 300-1 350 MHz, in order to compute separation distance between RNSS uplink stations and radiolocation and aeronautical radionavigation radar systems. |
| M.1829 | Method for determining the necessary geographical separation distances, in the 5 GHz band, between the international standard microwave landing system (MLS) stations operating in the aeronautical radionavigation service and transmitters operating in the aeronautical mobile service (AMS) to support telemetry (10/2007) | This Recommendation provides the method for determining the necessary geographical separation distances between international-standard MLS stations operating in the 5 GHz band and telemetry receivers. |

Section 4C Spectrum use of the bands for the radiodetermination service

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| No. | Title | Scope |
| M.629 | Use of the radionavigation service of the frequency bands 2 900‑3 100 MHz, 5 470-5 650 MHz, 9 200-9 300 MHz, 9 300‑9 500 MHz and 9 500-9 800 MHz (07/1986) | None |
| M.1178 | Use of the maritime radionavigation band 283.5-315 kHz (Region 1) and 285‑325 kHz (Regions 2 and 3) (10/1995) | The ITU-R has carried out initial studies of the technical factors, bandwidth, modulation method, protection ratios and sharing criteria of maritime radionavigation systems, including the transmission of differential corrections for Global Navigation Satellite Systems (GNSS), that could coexist with maritime radiobeacons without degrading radiobeacon operations.This Recommendation describes where the necessary information can be found to ensure compatible operation, in this frequency band, of radiobeacons, differential transmissions for GNSS and a hyperbolic maritime radionavigation system. It also recommends that more efficient use could be made of the band by allowing the transmission of maritime navigational information, using narrow-band techniques from stations other than radiobeacons. |
| M.1372-1 | Efficient use of the radio spectrum by radar stations in the radiodetermination services (06/2003) | This Recommendation provides some of the methods that can be used to enhance compatibility between radar systems operating in radiodetermination bands. Several receiver post-detection interference suppression techniques currently used in radionavigation, radiolocation and meteorological radars are addressed along with system performance trade‑offs (limitations), associated with the interference suppression techniques. |

Part 5: Amateur and amateur-satellite services

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| No | Title | Scope |
| M.1041-2 | Future amateur radio systems (FARS) (06/2003) | This Recommendation provides the design objectives and characteristics that should be taken into account when developing future systems in the amateur and amateur-satellite services. It includes general, technical and operational considerations. |
| M.1042-3 | Disaster communications in the amateur and amateur-satellite services (03/2007) | This Recommendation provides guidance on the development of amateur and amateur-satellite service networks supporting preparedness and radiocommunications during disaster and relief operations. |
| M.1043-2 | Use of the amateur and amateur-satellite services in developing countries (06/2003) | This Recommendation is intended to facilitate the amateur and amateur-satellite services to include developing operator skills, training of technicians, and deployment of amateur stations in rural areas and in emergency situations. It encourages the use of volunteers and to accommodate the particular needs of developing countries. |
| M.1044-2 | Frequency sharing criteria in the amateur and amateur-satellite services (06/2003) | This Recommendation lists the radiocommunication services with which the amateur and amateur-satellite services may readily share, and those services with which sharing would be difficult. It states that the amateur services operate with relatively weak signals and provides mitigation procedures that facilitate sharing. |
| M.1544 | Minimum qualifications of radio amateurs (8/2001) | This Recommendation defines minimum levels of operational and technical knowledge for use by administrations when verifying the qualifications of a person wishing to operate a station in the amateur services. |
| M.1677-1 | International Morse code (10/2009) | This Recommendation confirms the International Morse code characters and the operational provisions applying to their use in radiocommunication services. |
| M.1732-1 | Characteristics of systems operating in the amateur and amateur-satellite services for use in sharing studies (03/2012) | This Recommendation documents the technical and operational characteristics of systems used in the amateur service and amateur-satellite services for the purposes of carrying out sharing studies. The systems and their characteristics described in this Recommendation are considered representative of those operating in the frequency bands available to these services ranging from 135.7 kHz through 81.5 GHz. |
| No. | Title | Scope |
| M.1740 | Guide to the application of ITU-R texts related to the amateur and amateur-satellite services (03/2006) | This Recommendation identifies ITU‑R texts in the Radio Regulations (RR) and Recommendations applicable to the amateur and amateur-satellite services. |

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