

SUMMARY OF SPECTRUM USAGE SURVEY RESULTS

(2000)

1 Introduction

A number of administrations have indicated their current and planned spectrum usage of the bands which are considered potentially suitable for IMT-2000 as summarized in this Report. This was originally in response to BR Circular Letter 8/LCCE/54, 11 February 1998 and other ITU-R contributions. Such information complements the ITU-R contribution on Chapter 1.1 of the CPM Report to WRC-2000. Additionally, several administrations are assessing their long-term spectrum requirements for IMT-2000 and have participated in the ITU-R efforts to make that determination. A further step in the process, taking into account additional spectrum requirements is the study of candidate bands which may be suitable for any additional IMT-2000 requirements. The selection process for candidate bands must include consideration of compatibility, coordination and sharing with other primary services.

To aid this process, the ITU-R has developed an estimate of the additional spectrum requirement for IMT-2000, the results of which are included in the CPM Report to WRC-2000. Administrations should continue to identify possible world-wide spectrum for IMT-2000, noting the principles listed below:

- World-wide common frequency bands should be considered as the first choice to enable universal access.
- Recommendation ITU-R M.687 recommends the spectrum range suitable to be considered for any additional spectrum for IMT-2000.
- Sharing issues and regulatory constraints should be analyzed for bands currently in use by other services.
- Preference should be given to options that permit contiguous spectrum.

This Report provides useful information for administrations when considering IMT-2000 spectrum requirements in preparation for WRC-2000.

2 Summary

IMT-2000 defines third generation mobile systems which are scheduled to start service around the year 2000 subject to market considerations. They will provide access, by means of one or more radio links, to a wide range of telecommunication services supported by the fixed telecommunication networks such as public switched telecommunications networks (PSTN) and integrated services digital networks (ISDN), and to other services which are specific to mobile users.

A range of mobile terminal types is encompassed, linking to terrestrial and/or satellite based networks; these terminals may be designed for mobile or fixed use.

Key features of IMT-2000 are:

- high degree of commonality of design worldwide;
- compatibility of services within IMT-2000 and with the fixed networks;
- high quality;
- small terminals for worldwide use;
- worldwide roaming capability;
- capability for multimedia applications and a wide range of services and terminals.

The subject matter of IMT-2000 is complex and its representation in the form of Recommendations and Reports is evolving. To maintain the pace of progress on the subject, it is necessary to produce a sequence of Recommendations and Reports on a variety of aspects. The Recommendations and Reports strive to avoid apparent conflicts between themselves. Future Recommendations and Reports, or revisions, will be used to resolve any discrepancies.

3 Background

3.1 Administrations may consider the following factors that are relevant to the IMT-2000 spectrum:

- a) that IMT-2000 systems are defined by a set of interdependent ITU Recommendations and Reports of which this Report is a part thereof;
- b) that RR No. S5.388 indicates that “the bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a world-wide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-2000 in accordance with Resolution 212 (Rev.WRC-97)”;
- c) that the RR also allocate within these bands the portions 1 980-2 010 MHz and 2 170-2 200 MHz to the MSS on a worldwide basis, potentially for use by the satellite component of IMT-2000, under the provisions of RR No. S5.389A;
- d) that the RR also allocate the bands 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 to the MSS under the provisions of RR Nos. S5.389C, S5.389D and S5.389E;
- e) that portions of the bands identified for the implementation of IMT-2000 are used by existing terrestrial FSs under current allocations;
- f) that the initial implementations of IMT-2000 are expected to commence around the year 2000 subject to market considerations;
- g) that IMT-2000 systems will provide different categories of services in various environments;
- h) that the bands identified in b) above are shared with other systems of the MS, FS and MSS and the band 2 110-2 120 MHz is shared with the space research service, and that many of these systems are in current use;
- j) that these bands are used differently in various countries; even within the same Region;
- k) that the traffic and service mix carried by IMT-2000 systems may vary from country to country, and also within countries; in some parts of the world, additional spectrum may be required whilst in other parts of the world the frequency bands identified in b), c), and d) above could be adequate to meet IMT-2000 services present and future demands;
- l) that the amount of traffic handled by mobile systems as well as the number and diversity of services will continue to grow;
- m) that there is a need to support the operation of IMT-2000 terminals in different regulatory environments;
- n) that use of a worldwide frequency bands will facilitate the global roaming of terrestrial and satellite components;
- o) that future systems may include the use of a range of cell types from small indoor cells to large satellite cells in a given location;

3.2 Administrations may further consider, relative to the terrestrial component:

- a) that Report ITU-R M.2023 concludes that there is a need for 160 MHz of additional spectrum for terrestrial IMT-2000, beyond the terrestrial IMT-2000 spectrum already identified in RR No. S5.388 and beyond the spectrum used in the various Regions for first and second generation mobile systems;
- b) that administrations may choose to permit operators to use frequency bands currently allocated to pre-IMT-2000 mobile service for IMT-2000 usage as a strategy for the evolution from second to third generation mobile systems having IMT-2000 capabilities;
- c) that spectrum requirements for the terrestrial component of IMT-2000 were estimated in Report ITU-R M.1153 prior to WARC-92 at which time the primary service emphasis was on voice services, whereas IMT-2000 systems will provide a variety of wideband data and multimedia services in addition to voice services;
- d) that harmonized worldwide use of frequency bands will facilitate global roaming;

3.3 Administrations may further consider, relative to the satellite component:

- a) that Report ITU-R M.2023 concludes that the total satellite spectrum requirement for the years 2005 and 2010 is 2×31.5 MHz and 2×67 MHz respectively;
- b) that the need for additional spectrum for the MSS in the 1 to 3 GHz range has been stated in the CPM Reports to the last two WRCs. The CPM Report to WRC-95 indicated that a total allocation of between 2×75 MHz and 2×150 MHz would be required by 2005 (Chapter 2, part A.2, 3) and the CPM Report to WRC-97 indicated that 2×250 MHz would be necessary by 2010;
- c) that currently the RR allocate about 2×115 MHz to the MSS in the 1-3 GHz range, with some Regional variations;
- d) that most of these bands are used by other services in most countries, substantially reducing the actual availability of those bands for the MSS, and in many countries they are not available for MSS at all.

4 Survey responses

Annex 1 provides the responses to the survey on spectrum utilization.

ANNEX 1

Response to survey on current and planned spectrum utilization

Current and planned utilization in relation with the terrestrial component

Current and planned utilization	
Terrestrial component	
470-862 MHz	
CEPT ⁽¹⁾	This band is currently used in Europe for analogue broadcasting. With the replacement of analogue television by DVB-T, it is possible that parts of this band may be made available for other services. At present parts of the band are also used for other services (e.g. tactical radio relay links) and demand for these services are likely to continue. CEPT is investigating whether this band may be considered as a candidate band for IMT-2000 expansion
United States of America	470-806 MHz – TV broadcast band and land mobile use. With transition from analogue to digital TV, 24 MHz (764-776/794-806 MHz) has been re-allocated for FS and MS for public safety use. This spectrum would not be suitable for IMT-2000. 36 MHz (746-764/776-794 MHz) has been re-allocated for FS, MS and broadcast service (BS) for commercial use. Transition to digital TV scheduled to be substantially complete by December 31, 2006, an additional 48 MHz of spectrum (698-746 MHz) will be recovered in the long term. Specific usage of the additional spectrum blocks of 36 MHz and 48 MHz is not yet defined, some portions might be suitable for IMT-2000. 608-614 MHz – allocated to radio astronomy in the United States of America. (and many other places worldwide), and heavily used. This band is shared in the United States of America with low power biomedical telemetry devices (data transmission from cardiac monitors to IC units in hospitals)
Malaysia	470-806 MHz – UHF TV BS

Current and planned utilization	
Terrestrial component (<i>cont.</i>)	
470-862 MHz	
Korea	762-780 MHz – possible candidate band 470-752 MHz: UHF-TV 752-762 MHz: FS 762-780 MHz: possible candidate band for IMT-2000 additional 780-806 MHz: FS 752-806 MHz: digital TV transition purpose 806-824 MHz: TRS(T) 824-849 MHz: cellular (T) 849-851 MHz: FS 851-869 MHz: TRS(R)
China	470-566 MHz/606-798 MHz: TV BS 566-606 MHz: FS
Japan	470-770 MHz: TV BS 810-828 MHz, 838-840 MHz and 843-846 MHz: second generation (2G) cellular system
Canada	This band is used in Canada for television broadcasting. The introduction of digital TV in the band and the ultimate phase-out of analogue (NTSC) TV should allow future consideration of other services in spectrum not required for digital TV
Australia	470-520 MHz – heavily used for FS and MS. 520-820 MHz – not available for mobile due to broadcasting use. Transition from analogue broadcasting will make full use of this allocation until 2012 due to the simulcasting requirements. Other services including wireless microphones, biomedical telemetry services and similar low power uses also use the available localised holes in the spectrum used for broadcasting. Requirements for future broadcasting and datacasting requirements will be subject to further reviews
South Africa	470- 854 MHz – reserved for digital TV. 790- 854 MHz – sharing broadcasting with fixed in wireless access (FWA) and FS
Brazil	470-608 MHz/614-806 MHz – these bands are used in Brazil for television broadcasting. Although the introduction of digital television in these bands is not already scheduled, the ultimate phase-out of analogue TV should allow future consideration of other services in parts of the spectrum not required for digital television. 608-614 MHz – this band is allocated to radio astronomy in Brazil
New Zealand	470-494 MHz – MS. Potentially available and suitable for IMT-2000 extension. 494-518 MHz – under review. Potentially unavailable and unsuitable for IMT-2000 extension: – potential interference from existing BS TV in adjacent band. – possible future national allocation for BS TV. 518-806 MHz – BS TV; much of this spectrum is privately owned. Unavailable and unsuitable for IMT-2000 extension

Current and planned utilization	
Terrestrial component (<i>cont.</i>)	
470-862 MHz	
Morocco	470-838 MHz – UHF TV broadcast band 806-866 MHz – MS and FS. Trunk radio systems
806-821/851-866 MHz	
CEPT ⁽¹⁾	See the band 470-862 MHz
United States of America	Currently used for specialized mobile radio (SMR) service, private and public safety systems that substantially limit use for IMT-2000. Some pre-IMT-2000 SMR licensees may choose to evolve to IMT-2000 technologies and services
Malaysia	806-862 MHz: trunk radio service
China	806-821/851-866 MHz: trunk radio systems
Japan	860-885 MHz: 2G cellular system
Canada	These bands are used for mobile radio services, including public safety applications
Australia	806-820 MHz: BS. See comments on the 470-862 MHz band
South Africa	856-900 MHz – FS 864.1-868.1 MHz – CT-2/short-range FWA
Brazil	806-824/851-869 MHz – these bands are used for SMR services, including public safety applications
New Zealand	806-819/851-870 MHz – FS, trunked mobile. Potentially available and suitable for IMT-2000 extension, currently not available
824-849/869-894 MHz	
CEPT ⁽¹⁾	See the bands 470-862 MHz and 880-960 MHz
United States of America	Current United States of America's cellular telephone paired bands. Pre-IMT-2000 cellular system operators may choose to evolve to next generation technologies and services such as IMT-2000
Korea	These bands were assigned for land mobile service (using CDMA system). AMPS will be replaced by 2002
China	825-880 MHz: cellular systems 821-825/866-870 MHz: wireless data transmission system
Japan	860-885 MHz and 893-895 MHz: 2G cellular system
Canada	These bands are used for cellular radiotelephone services
Australia	825-845 MHz and 870-890 MHz: licences have been issued until year 2013 which do allow use of IMT-2000 technology. 850-915 MHz: not available in off-shore areas due to radiolocation use.

Current and planned utilization	
Terrestrial component (<i>cont.</i>)	
824-849/869-894 MHz	
South Africa	824-849/869-894 MHz – FWA systems. 872-905/917-950 MHz – shared band; FWA with other services such as CDMA, TACS, etc. 876-880/921-925 MHz – GSM
Brazil	824-849/869-894 MHz – these bands are used for cellular radiotelephone services. Suitable for IMT-2000 when the use of first generation (1G) and 2G decreases
New Zealand	825-845 MHz – MS, spectrum privately owned. Potentially available and suitable for IMT-2000 extension. 870-915 MHz – MS, spectrum privately owned. Potentially available and suitable for IMT-2000 extension
Morocco	866-880 MHz – MS and FS. Trunk radio systems
880-915/925-960 MHz	
CEPT ⁽¹⁾	This band is currently used extensively in Europe for 2G mobile (GSM 900). Availability of this band for IMT-2000 can only be made progressively in the longer term as GSM use decreases. Times-cales for availability of this band for IMT-2000 may differ on a national basis. On this basis, this band as a whole is considered by CEPT to be a candidate for IMT-2000 expansion
United States of America	902-928 MHz: heavily congested by radiolocation, government fixed and mobile, radio amateur, vehicle location monitoring and low power unlicensed devices. Some defense systems operate on a worldwide basis. Not suitable and not available for IMT-2000. 894-902 MHz and 928-960 MHz: various fixed and mobile applications, parts of this band are not suitable for IMT-2000, 894-896 MHz is used for aeronautical mobile communications and 932-935/941-944 MHz is used for fixed point-to-point microwave systems for federal government agencies. 896-901/935-940 MHz is used for private and SMR systems. Some pre-IMT-2000 SMR operators may choose to evolve to technologies and services such as IMT-2000
Malaysia	880-890 MHz – current AMPS/ETACS use. 925-935 MHz – possible use of two-way paging as well
Korea	These bands were assigned for CT, CT-2, mobile data, broadcasting relay service: 869-894 MHz: cellular (R) 894-898 MHz: FS 898-900 MHz: MS (data communications) (T) 900-910 MHz: FS, MS 910-914 MHz: CT-2 914-915 MHz: CT-1 915-924.55 MHz: FS, MS 924.55-925.45 MHz: paging (T) 925.45-928 MHz: FS, MS 928-930 MHz: FS, MS (wireless microphone) 930-938 MHz: FS, MS 938-940 MHz: MS (data communications) (R) 940-942 MHz: FS, MS 942-959 MHz: FS, MS (auxiliary BS) 959-960 MHz: CT-1