|  |  |  |  |
| --- | --- | --- | --- |
|  | **Radiocommunication Study Groups** | |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** | |  | |
|  | |  | |
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| Annex 15 to Working Party 5A Chairman’s Report | | | |
| working Document toward preliminary draft new report itu-r M.[amateur\_50\_MHz] | | | |
| Spectrum needs for the amateur service in the frequency band 50-54 MHz in Region 1 and sharing with mobile fixed, radiolocation, and broadcasting services | | | |

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# 1 Introduction

Resolution **658** (Geneva, 2015) invites ITU-R to conduct the following studies to support the deliberations of WRC-19 on agenda item 1.1:

*1 to study spectrum needs in Region 1 for the amateur service in the frequency band 50‑54 MHz;*

*2 taking into account the results of the above studies, to study sharing between the amateur service and the mobile, fixed, radiolocation and broadcasting services, in order to ensure protection of these services.*

This Report responds to the invitations of Resolution **658**.

# 2 Use of the frequency band 50-54 MHz by amateur service stations

It is important to note that it is not possible to perform a quantitative analysis of the occupancy of the 50-54 MHz band by amateur service stations using MIFR data, because Administrations do not have amateur service frequency assignments registered by the Bureau.

However, the European Table of Frequency Allocations (ECA TABLE) allocates the frequency band 50-52 MHz to the amateur service on a secondary basis. In all European countries the frequency band is allocated for use by amateur service stations. The permitted maximum power of such stations is mostly 100 W, in some countries there are territorial limitations with regard to power and frequencies.

Table 1 provides a list of Region 1 Administrations and the conditions for using the frequency band 50-54 MHz, as published in the website of the International Amateur Radio Union (IARU).

*Editor’s note: This information needs to be checked for currency and a final decision about which version of Table 1 is to be used or whether to merge.*

Table 1

Conditions for using the 50-52 MHz band, as published in the IARU website as at February 2016

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ADM | used/ not used | Usage condition | ADM | used/ not used | Usage condition | ADM | used/ not used | Usage condition |
| ARM | no | – | E | yes | 600 W PEP, 1 000 W EME and MS outside cities | KAZ | no | – |
| AUT | yes | 50-52 MHz sec, 100 W | EGY | no |  | KEN | no | – |
| AZE | no | – | EST | yes | 50-52 MHz sec | KGZ | no | – |
| BEL | yes | 50-52 MHz sec | FIN | yes | 50-52 MHz sec | NIG | no | – |
| BLR | no | – | GEO | no | – | LVA | yes | 50-52 MHz sec |
| CZE | yes | 50-52 MHz sec | HNG | yes | 50-52 MHz sec, 10 W ERP | MDA | no | - |
| D | yes | 50-52 sec | I | yes | 50-52 MHz sec | SVN | yes | 50-52 MHz prim |
| ADM | used/ not used | Usage condition | ADM | used/ not used | Usage condition |  |  |  |
| NOR | yes | 50-52 MHz sec | TKM | no | - | SUI | yes | 50-52 MHz sec |
| POL | yes | 50-52 MHz sec | UAE | no | - | SVK | yes | 50-52 MHz sec |
| POR | yes | 50-52 MHz sec, 25 W | UKR | yes | Only on limited permission | TJK | no | - |
| S | yes | 50-52 MHz sec, 200 W | UZB | no | - |  |  |  |

*Editor’s note: New Table 1 to replace above*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country | Band | Status | RR | Country | Band | Status | RR | Country | Band | Status | RR | Country | Band | Status | RR |
| AFS | 50-54 | Primary | 5.169 | DNK | 50-52 | Secondary |  | LBR |  | No Info |  | S | 50-52 | Secondary | |
| ALB | 50-52 | Secondary |  | E | 50-52 | Secondary |  | LBY |  | No Info |  | SDN |  | No Info |  |
| ALG | 50-52 | Secondary |  | EGY | NO |  |  | LIE | 50-52 | Secondary |  | SEN | 50-51 | Primary | 5.169 |
| AND | 50-52 | Secondary |  | ERI |  | No Info |  | LSO | 50-54 | Primary | 5.169 | SEY |  | No Info |  |
| ANG |  | No Info |  | EST | 50-52 | Secondary |  | LTU | 50-52 | Secondary |  | SMR | 50-52 | Secondary | |
| ARM | NO |  |  | ETH |  | No Info |  | LUX | 50-52 | Secondary |  | SOM | 50-54 |  |  |
| ARS | NO |  |  | F | 50.2-52 | Secondary |  | LVA | 50-52 | Secondary |  | SRB | 50-51.9 | Secondary | |
| AUT | 50-52 | Secondary |  | FIN | 50-52 | Secondary |  | MAU | NO |  |  | SRL |  | No Info |  |
| AZE | NO |  |  | G | 50-51 | Primary |  | MCO | 50-52 | Secondary |  | SSD |  | No Info |  |
| BEL | 50-52 | Secondary |  |  | 51-52 | Secondary |  | MDA | NO |  |  | STP |  | No Info |  |
| BEN |  | No Info |  | GAB |  | No Info |  | MDG |  | No Info |  | SUI | 50-52 | Secondary | |
| BFA |  | No Info |  | GEO | NO |  |  | MKD | 50-52 | Secondary |  | SVK | 50-52 | Secondary | |
| BHR | 50-50.5 | Primary |  | GHA |  | No Info |  | MLI |  | No Info |  | SVN | 50-52 | Secondary | |
|  | 50.5-52 | Secondary |  | GMB |  | No Info |  | MLT | 50-52 | Secondary |  | SWZ | 50-54 | Primary | 5.169 |
| BIH | 50-52 | Secondary |  | GNE |  | No Info |  | MNE | 50-52 | Secondary |  | SYR |  | No Info |  |
| BLR | NO |  |  | GNB |  | No Info |  | MNG |  | No Info |  | TAN |  | No Info |  |
| BOT | 50-54 | Primary | 5.169 | GRC | 50-52 | Secondary |  | MOZ |  | No Info |  | TCD |  | No Info |  |
| BUL | 50.05-50.2 | Secondary |  | HNG | 50-52 | Secondary |  | MRC |  | No Info |  | TGO |  | No Info |  |
| BUR |  | No Info |  | HOL | 50-52 | Secondary |  | MTN |  | No Info |  | TJK | NO |  |  |
| CAF |  | No Info |  | HRV | 50-51.9 | Secondary |  | MWI | 50-54 | Primary | 5.169 | TKM | NO |  |  |
| CMR |  | No Info |  | I | 50-52 | Secondary |  | NGR |  | No Info |  | TUN |  | No Info |  |
| COD | 50-54 | Primary | 5.169 | IRL | 50-52 | Secondary |  | NIG | NO |  |  | TUR | 50-52 | Secondary | |
| COG |  | No Info |  | IRQ |  | No Info |  | NMB | 50-54 | Primary | 5.169 | UAE |  | No Info |  |
| COM |  | No Info |  | ISL | 50-52 | Secondary |  | NOR | 50-52 | Secondary |  | UGA |  | No Info |  |
| CPV |  | No Info |  | ISR |  | No Info |  | OMA | 50-52 | Secondary |  | UKR |  | No Info |  |
| CTI |  | No Info |  | JOR | 50-51.5 | Secondary |  | POL | 50-52 | Secondary |  | UZB | NO |  |  |
| CVA | 50-52 | Secondary |  | KAZ | NO |  |  | POR | 50-52 | Secondary |  | YEM |  | No Info |  |
| CYP | 50-51 | Secondary |  | KEN | NO |  |  | QAT |  | No Info |  | ZMB | 50-54 | Primary | 5.169 |
| CZE | 50-52 | Secondary |  | KGZ | NO |  |  | ROU | 50-52 | Secondary |  | ZWE | 50-54 | Primary | 5.169 |
| D | 50.08-51 | Secondary |  | KWT |  | No Info |  | RUS |  | No Info |  |  |  |  |  |
| DJI |  | No Info |  | LBN | NO |  |  | RWW | 50-54 | Primary | 5.169 |  |  |  |  |
| **5.169** Alternative allocation: in **Botswana**, **Lesotho**, **Malawi**, **Namibia**, **the Dem. Rep. of the Congo,** **Rwanda, South Africa**, **Swaziland**, **Zambia and Zimbabwe**, the band 50-54 MHz is allocated to the amateur service on a primary basis. In Senegal, the band 50-51 MHz is allocated to the amateur service on a primary basis. (WRC-12) | | | | | | | | | | | | | | | |

The IARU Region 1 Handbook on VHF use (Table 2) contains the following conditions of the recommended use of the frequency band 50-52 MHz (BANDPLAN – is an arrangement of frequency bands usage by type and mode of use agreed by IARU Region 1).

Table 2

IARU Region 1 Band plan:

*Editor’s note: Revised Table 2 inserted*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency | Maximum bandwidth | Mode | Usage |
| **50.000**  **50.100** | **500 Hz** | **Telegraphy exclusive**  **(except Beacon Project)** | 50.000 - 010 Region 1\*   50.010 - 020 Region 2\*   50.020 - 030 Region 3\*   50.050 CW future international center of activity   50.090 Intercontinental  center of activity |
| **50.100**  **50.200** | **2 700 Hz** | **Telegraphy**  **& SSB** | 50.100 - 130   Intercontinental section   50.110   Intercontinental center of activity    50.130 - 200 International section   50.150  International center of activity |
| **50.200**  **50.300** | **2 700 Hz** | **Telegraphy**  **& SSB** | General usage   50.285 for crossband |
| **50.300**  **50.400** | **2 700 Hz** | **MGM**  **Narrowband**  **Telegraphy** | 50.305 PSK Center of activity   50.310 - 320  EME center of activity   50.320 - 380  MS center of activity |
| **50.400**  **50.500** | **1 000 Hz** | **MGM**  **Telegraphy** | BEACONS EXCLUSIVE  50.401 MHz +/- 500Hz WSPR Beacons |
| **50.500**  **52.000** | **12 kHz** | **all mode** | 50.510    SSTV   50.520 - 540  Fimplex FM Internet Voice Gatewas  50.550   Image working frequency  50.600   RTTY (FSK)  50.620 - 750   Digital communications  50.630    Digital Voice (DV) calling  51.210 - 390  FM/DV Repeater Inputs  51.410 - 590  FM/DV Simplex  51.510    FM calling frequency  51.810 - 51.990  FM repeaters output channels |

In many countries in the African part of Region 1 (see footnotes accompanying the ITU frequency allocation table) the 50-54 MHz band is allocated to the Amateur Service on a primary basis.

# 3 Spectrum needs for the amateur service in Region 1

In Regions 2 and 3, and in some countries in Region 1, there is an allocation of 4 MHz (from 50‑54 MHz) to the amateur service.

In accordance with Article **5** of the Radio regulations, in Region 1 the frequency band 50-54 MHz is allocated to the broadcasting service, however there are some Additional and Alternative allocations:

5.164*Additional allocation:*  in Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, Jordan, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Slovakia, Czech Rep., Romania, the United Kingdom, Serbia, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 47‑68 MHz, in South Africa the band 47-50 MHz, and in Latvia the band 48.5-56.5 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations of countries other than those mentioned in connection with the band.     (WRC‑12)

5.165 *Additional allocation:*in Angola, Cameroon, Congo (Rep. of the), Madagascar, Mozambique, Niger, Somalia, Sudan, South Sudan, Tanzania and Chad, the band 47-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.       (WRC‑12)

In addition, in some European countries, the frequency band 50-54 MHz is allocated to the radiolocation service on a secondary basis, and the use of the band is restricted to wind profilers.

A number of African countries have alternatively allocated 50–54 MHz to the amateur service on a primary basis by No. **5.169**:

5.169 Alternative allocation: in Botswana, Lesotho, Malawi, Namibia, the Dem. Rep. of Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 50-54 MHz is allocated to the amateur service on a primary basis. In Senegal, the band 50-51 MHz is allocated to the amateur service on a primary basis.        (WRC‑12)

Full or partial worldwide harmonization of the allocation to the amateur service in the frequency band 50-54 MHz would promote global efficiency and economies of scale in radio amateurs’ efforts to fulfil the purposes of the amateur service, which include self-training, technical investigation, and intercommunication for a variety of purposes, including communication needs in support of disaster relief.

Where allocated to the amateur service, this band is used for local amateur communication on an around-the-clock basis, including point-to-point voice communications, repeater systems, and radio control of objects. Propagation is typically via groundwave, typically via line of sight or just beyond the horizon of the transmitter. While communication over longer distances is possible via tropospheric scatter, meteor scatter, auroral propagation, and sky-wave propagation (principally sporadic-E and occasional F-layer propagation at sunspot maxima), these communications are exceptional, and the field strengths of received signals are such that they cannot be detected in the presence of a strong signal in the vicinity of the receiver.

# 4 Characteristics of amateur stations for sharing studies

There is an existing allocation to the amateur service between 50-54 MHz in ITU Regions 2 and 3, therefore the most recent version of Recommendation ITU-R M.1732, “Characteristics of systems operating in the amateur and amateur-satellite services” for use in sharing studies, contains the current characteristics to be used for the sharing analyses that follow. [Recommendation ITU-R M.1732 is undergoing a revision, which is scheduled for completion by the end of 2016.] A summary of the current characteristics are given in Table 3:

Table 3

Characteristics of amateur systems

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mode of operation | Morse on-off keying | Single side-band (SSB) voice | FM voice | Digital voice |
| Frequency band (MHz) | 50–450 | 50–450 | 50–450 | 50–450 |
| Necessary bandwidth and class of emission (emission designator) | 150HA1A  150HJ2A | 2K70J3E | 11K0F3E 16K0F3E 20K0F3E | 2K70J2E 5k76G1E 8K10F1E |
| Transmitter power (dBW) | 3–31.7 | 3–31.7 | 3–3.,7 | 3–31.7 |
| Transmitter line loss (dB) | 1–2 | 1–2 | 1–2 | 1–2 |
| Transmitting antenna gain (dBi) | 0–26 | 0–23 | 0–26 | 0–26 |
| Typical e.i.r.p. (dBW) | 2–55 | 2–53.7 | 2–55 | 2–55 |
| Antenna polarization | Horizontal | Horizontal, vertical | Horizontal, vertical | Horizontal |
| Receiver IF bandwidth (kHz) | 0.4 | 2.7 | 9 15 | .,7 5,76 8,1 |
| Receiver noise figure (dB) | 0.5–2 | 0.5–2 | 0.5–2 | 50–450 |

*Editor’s note: Table 3 will be updated when Recommendation ITU-R M.1732 revision is complete & column added for higher bandwidth modes.*

# 5 Sharing with other services

## 5.1 Mobile service

[TBD]

Use of the frequency band 50-54 MHz by stations in the land mobile service

According to RR Article **5.164** and the European Table of Frequency Allocations (ECA TABLE), the frequency band 50-52 MHz is allocated to the land mobile service on a primary basis.

However the MIFR contains information only 6 frequency assignments to land mobile stations in Region 1 and about 4 assignments to fixed service stations. The information is presented in Table 4 below.

Table 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ADM | Radio service | Frequency assignments number | Radio service | Frequency assignments number |
| D | FB/ML | 3 |  |  |
| I | FB/ML | 3 | FX | 4 |

## 5.2 Fixed Service

[TBD]

## 5.3 Radiolocation Service

In the frequency band 46-68 MHz, RR No. **5.162A** provides an additional allocation to the radiolocation service on a secondary basis in a number of countries, limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC-97)**.

The MIFR has no information about frequency assignments to wind profilers in the frequency band 50-54 MHz.

## 5.4 Broadcasting Service

Occupancy of the frequency band 50-54 MHz by broadcasting service stations

The frequency band 47‑68 MHz is allocated to the broadcasting service on a primary basis in Region 1.

According to the ITU-R eQry database, there are 353 broadcasting transmitters recorded in the ST61 and GE89 plans are using the frequency band 50-54 MHz.

The MIFR contains 515 broadcasting transmitters in the frequency band 50-54 MHz in Region 1.

It should be noted, however, that the actual occupancy of the frequency band 50-54 MHz in Region 1 by broadcasting service stations may differ from the MIFR data.

WP 6A advised that the following ITU texts are relevant to the sharing analysis:

– Report ITU-R BT. 2387-0 (07/2015) contains information on responses from administrations on use of various frequency bands, including 50-54 MHz for broadcasting.

– Recommendation ITU-R BT.1368 Planning criteria, including protection ratios, for digital terrestrial television services in the VHF/UHF bands.

– Recommendation ITU-R BT.2033 Planning criteria, including protection ratios, for second generation of digital terrestrial television broadcasting systems in the VHF/UHF bands.

– Recommendation ITU-R SM.851 Sharing between the broadcasting service and the fixed and/or mobile services in the VHF and UHF bands.

– Final Acts of the European Broadcasting Conference (Stockholm, 1961 as revised in Geneva, 2006) (“ST61”) in the European Broadcasting Area

– Final Acts of the African Broadcasting Conference (Geneva, 1989 as revised in Geneva, 2006) (“GE89”) in the African Broadcasting Area and neighbouring countries.

[Further work TBD]

# 6 Summary

[TBD]

In view of the above and for better realization on WRC-19 agenda item 1.1 work, it is appropriate to encourage Administrations to provide information on the current occupancy and use of the frequency band 50-54 MHz, the technical characteristics of existing/planned applications of mobile, fixed, radiolocation and broadcasting service stations to ensure protection of those services, as well as other details of the use of stations of various radio services in the frequency band 50-54 MHz and Administrations’ requirements for additional spectrum for the amateur service in the frequency band 50-54 MHz.

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