

## 4.2 50 - 52 MHz BANDPLAN

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 * * Reserved for future Synchronised Beacon Project (b)  50.050 CW future International centre of activity 50.090 CW Intercontinental centre of activity
50.100  50.200 50.200	2700 Hz	SSB Telegraphy	International preferred 50.100 - 130 Intercontinental section 50.110 Intercontinental centre of activity(c)  50.130 - 200 international section 50.150 International centre of activity
50.300 50.300	2700 Hz	SSB Telegraphy	General usage 50.285 for crossband
50.300  50.400 50400	2700 Hz	MGM Narrowband Telegraphy	50.305 PSK Centre of activity  50.310 - 320 EME centre of activity 50.320 - 380 MS centre of activity
50.400 50400  50.500	1000 Hz	MGM Telegraphy	Beacons exclusive
50.500  52.000	12 kHz	All Modes	50.510 SSTV 50.540 - 580 Simplex FM Internet Voice Gateways 50.550 Image frequency 50.600 RTTY 50.620 - 750 Digital communications 50.630 DV calling 51.210 - 390 FM/DV Repeater Inputs, 20 kHz spacing (e) 51.410 - 590 FM/DV Simplex (f) 51.510 FM calling frequency 51.810 - 990 FM repeaters output channels, 20 kHz spacing (e)

DV = Digital Voice

### 4.2.1 Notes: BANDPLAN

This bandplan, first adopted at the IARU Region 1 Conference in Torremolinos (1990) and revised at the 1996 Tel Aviv conference, the 2002 San Marino Conference, and the 2011 Sun City Conference is recommended for use in those countries in the European part of Region 1 which allow amateurs to operate in this part of the radio spectrum. 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. These Countries may refer to the SARL Bandplan.

#### Footnotes:

- a. deleted

#### 4.2.2 Notes: Usage

The following notes are referring to the Usage column in the bandplan. As already set out in the introduction to section 3, in the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the Usage column or from the following notes.

##### Footnotes:

- b. 50.0-50.1MHz is currently shared with Propagation Beacons. See 11.3
- c. The intercontinental DX calling frequency 50.110 MHz should not be used for calling within the European part of Region 1 at any time.
- d. deleted.
- e. For the specification of FM telephony see section 8.2
- f. This segment is for simplex use only with no Digital Voice gateways permitted. Embedded data traffic is allowed along with Digital Voice. DV users should check that the channel is not in use by other modes

For the numbering of FM telephony channels see 4.1

In those countries within the European part of IARU Region 1 where it is allowed to set up FM repeaters on 50 MHz, the indicated channels are recommended in order to establish a commonality.

In those countries where the National Authorities do not permit repeaters to operate with output frequencies above 51 MHz, repeater output frequencies may be 500 kHz below the repeater input frequencies. (Tel Aviv 1996)

\*\*\* N.B. Authorised Frequencies in EI are 70.125 - 70.450 MHz \*\*\*

### 4.3 70.0 - 70.5 MHz BANDPLAN

Frequency (MHz)	Maximum Bandwidth	MODE	Usage
70.000	1000Hz	TELEGRAPHY MGM	Coordinated Beacons(a)
70.090			
70.090	1000Hz	BEACONS	temporary and personal beacons
70.100			
70.100	2700Hz	TELEGRAPHY SSB MGM	70.185 Crossband center of activity 70.200 Telegraphy/SSB calling 70.250 MS calling
70.250			
70.250	12kHz	AM / FM (b)	70.260 AM/FM calling 70.270 MGM centre of activity
70.294			
70.294	12kHz	FM CHANNELS, 12.5 kHz spacing	70.3125 Digital communications 70.3250 Digital communications  70.4500 FM calling 70.4625 70.4750 70.4875 Digital communications
70.500			

The 70MHz band is increasingly recognised as being appropriate for amateur allocations. In the CEPT area this progress is now recognised in the European Table of Frequency Allocations by Footnote EU9 which states:

EU9: **CEPT administrations may authorise all or parts of the band 69.9-70.5 MHz to the amateur service on a secondary basis**

In addition it is worth noting that there is some experimental access on a national basis in the range 69.90 - 70.0MHz in cases where 70MHz is not available.

References:

- [1] European Allocation Table: <http://www.erodocdb.dk/Docs/doc98/official/pdf/ercrep025.pdf>
- [2] <http://www.70MHz.org> has a useful list of current allocations and permits

#### 4.3.1 Notes: BANDPLAN

Footnotes:

- a. Refer to Beacons Chapter for coordination of beacons (Section 11)
- b. Usage by operators may vary due to restrictions on national allocations

#### 4.3.2 Notes: Usage

Footnotes:

#### 4.4 144 - 146 MHz BANDPLAN

Frequency (MHz)	Maximum Bandwidth	MODE	USAGE
144.000	2700Hz	ALL MODE	Satellites (downlinks only) (s) (Varna 2014)
144.025			
144.025	500Hz	Telegraphy (a) EME)	144.050 Centre of activity 144.100 Random MS(m)
144.110			
144.110	500Hz	Telegraphy MGM	144.110–144.160 EME MGM (i) 144.138 PSK31 centre of activity
144.150			
144.150	2700Hz	Telegraphy, SSB, MGM	144.160-144.180 alternative MGM Allocation 144.170 alternative MGM calling frequency
144.180			
144.180	2700Hz	Telegraphy & SSB	144.195-144.205 Random MS SSB (m) 144.300 SSB Centre of activity
144.360			
144.360	2700Hz	Telegraphy, SSB, MGM	144.370 FSK441 Random calling(m)
144.399			
144.400	500Hz	Telegraphy MGM	Beacons exclusive (b)
144.491			
144.500	20kHz	All mode (f)	144.500 Image mode centre (SSTV, Fax,...) 144.600 Data centre of activity(MGM,RTTY,...) 144.750 ATV talk back
144.794			
144.794	12kHz	MGM (h) Digital Communications	144.800 APRS 144.8125 DV Internet voice gateway 144.8250 DV Internet voice gateway 144.8375 DV Internet voice gateway 144.8500 DV Internet voice gateway 144.8625 DV Internet voice gateway
144.9625			

144.975 145.194	12kHz	FM / Digital voice	Repeater Input exclusive (c)
145.194 145.206	12kHz	FM / Digital voice (i)	Space communication (p)
145.206 145.5625	12kHz	FM / Digital voice (i)	145.2375 FM Internet Voice Gateway 145.2875 FM Internet Voice Gateway 145.3375 FM Internet Voice Gateway  145.375 digital voice calling 145.500 FM calling
145.5625 145.5750	12kHz	FM / Digital voice	Repeater Output exclusive (c, d)
145.7935 145.794	12kHz	FM / Digital voice (i)	Space communication (p)
145.794 145.806	12kHz	FM / Digital voice (i)	Space communication (p)
145.806 146.000	12kHz	ALL MODE (e)	Satellite exclusive

#### 4.4.1 Notes: BANDPLAN

The following notes are part of the officially adopted IARU Region 1 bandplan, and all member societies should strongly promote adherence to the recommendations made in these notes.

##### General:

- i. In Europe no input or output channels of telephony repeaters shall be allowed to operate between 144.000 and 144.794 MHz.
- ii. Except in the part of the band allocated to the Amateur Satellite Service and the linear transponders it is not allowed to use input- or output frequencies in the 145 MHz band for repeaters with in- or output in other amateur bands (Miskolc-Tapolca 1978, San Marino 2002).

iii. Deleted (Vienna 2016)

## Footnotes:

- a. Telegraphy is permitted over the whole band, except in the beacon band; Telegraphy exclusive between 144.000 - 144.110 MHz. (except satellite output downlink to earth)
- b. Refer to Beacons Chapter for coordination of beacons in the beacon sub-band Section-11
- c. For technical standards on FM and repeaters see section-8

If there is a real need for more repeater channels (see section-10), it is recommended that Societies or Repeater Groups consider setting up a repeater system on the higher frequency band(s).

Further to this subject the following recommendation was adopted in. De Haan, 1993:

**Deleted (Vienna 2016)**

For the numbering of FM telephony channels, see annex 2 to this section.

- d. Established simplex frequencies on repeater output channels may be retained.
- e. In view of the important public relations aspect of amateur satellite activities, it was decided at the IARU Region 1 Conference in Miskolc Tapolca (1978) that:
  - i. AMSAT will be allowed to use the band 145.8 - 146.0 MHz for amateur satellite activity.
  - ii. This decision was re-confirmed at the IARU Region 1 Conference in Brighton (1981).
  - iii. see also footnote p
- f. No unmanned stations shall use the all-mode segment, except for linear transponders and ARDF beacons. (Tel Aviv 1996, San Marino 2002)
- g. Attention is drawn to section 1.1. point iii of these Bandplan notes!
- h. Unmanned packet radio stations and digital access points are allowed in the segment 144.800 -144.9625 MHz, provided they are fully compatible with 12.5kHz channel spacing. Any other unmanned packet radio outside of this frequency range must cease operation.
- i. This segment is for simplex use only with no Digital Voice gateways. Embedded data traffic is allowed along with digital voice. Digital Voice users should check that the channel is not in use by FM.
- j. Amateur Satellite Linear Transponder down-links. Subject to agreement with Region-2 and Region-3

#### 4.4.2 Notes: Usage

The following notes are referring to the Usage column in the bandplan. As already set out in the introduction to section IIc, in the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the Usage column or from the following notes.

##### Footnotes:

- k. Not used
- l. Not used
- m. See procedures set out in section 7.4
- n. Deleted (Varna 2014)
- o. Not used
- p. For FM voice communications with special stations like manned spacecraft it is recommended to use 145.200 MHz for simplex operation or 145.200/145.800 MHz for split-channel operation (Vienna 1995/Tel Aviv 1996).
- q. It is recognised that in the IARU Region 1 rules for the Championships in Amateur Radio Direction Finding (ARDF) competitions, the frequencies for the unmanned beacons are in the segment 144.500 – 144.900 MHz. These beacons run low power and are on the air only during ARDF events. (Davos 2005)
- r. No transmission shall be made below 144,0025 MHz\* (Varna 2014)  
*\*so that a necessary guard band is provided at the bottom edge*

#### 4.4.3 National usage notes

Some countries have existing use at:

- 144.660-144.690 Linear Transponder Inputs
- 144.630-144.660 Linear Transponder Outputs

## 4.5 430 - 440 MHz BANDPLAN

Frequency MHz	Maximum Bandwidth	MODE	USAGE	
430.000  SUB-REGIONAL (national bandplanning) (d)	20kHz	ALL MODES	430.025 - 430.375	FM repeater output-channel freqs (F/PA/ON), 12,5 kHz spacing, 1.6 MHz shift (f)
			430.400 - 430.575	Digital communication link channels (g) (j)
			430.600 - 430.925	Digital communications repeater channels (g) (j) (l)
			430.925 - 431.025	Multi mode channels (j) (k) (l)
			431.050 - 431.825	Repeater input channel freqs (HB/DL/OE), 25 kHz spacing, 7.6 MHz shift (f)
431.975			431.625 - 431.975	Repeater input channel freqs (F/PA/ON), 12.5 kHz spacing, 1.6 MHz shift (p)
432.000 432.025	500Hz	Telegraphy (a)		EME
432.025	500Hz	Telegraphy (a) MGM	432.050 432.088	Telegraphy centre of activity PSK31 centre of activity
432.100 432.100	2700Hz	Telegraphy SSB MGM	432.200 432.350 432.370	SSB centre of activity Microwave talkback centre of activity FSK441 random calling
432.400 432.490	500Hz	Telegraphy, MGM		Beacons exclusive (b)
432.500  432.975	12kHz	ALL MODES	432.500	NEW APRS FREQUENCY  REPEATER INPUT REGION 1 STANDARD, 25 kHz spacing, 2 MHz shift (Channel freq 432.600 - 432.975MHz)  In the UK repeater OUTPUT channels.
433.000  433.375	12 kHz	FM Digital voice Repeater (p)		REPEATER INPUT REGION 1 STANDARD, 25 kHz spacing, 1.6 MHz shift (Channel freq 433.000--433.375 MHz) I



433.400	12 kHz	FM Digital voice (f) (o)	433.400 433.450 433.500	SSTV(FM/AFSK) digital voice calling FM calling
433.575			SIMPLEX CHANNELS, 25 kHz spacing, ( Channel freq 433.400 -- 433.575 MHz)	
433.600	20kHz	ALL MODES	433.625 - 433.775	Digital communications channels (g) (h) (i)
434.000			434.000	Centre frequency of digital experiments as defined on note (m)
434.000	12kHz (c)	ALL MODES ATV (c)	434.450 - 434.575	Digital communications channels (by exception !! ) (i)
434.594			REPEATER OUTPUT (region 1 system), 25 kHz spacing, 1.6 MHz shift, (Channel freq 434.600 -- 434.975 MHz)	
434.594	12kHz (c)	ALL MODES		In the UK repeater INPUT channels
ATV (c) & FM 434.981				
435.000	20kHz (c)	Satellite service & ATV (c)		
438.000				
438.000	20kHz (c)	ALL MODES	438.025 - 438.175	Digital communications channel frequency (g)
ATV (c) & SUB- REGIONAL (national bandplanning ) (d)			438.200 - 438.525	Digital communications repeater channels (g) (j) (l)
			438.550 - 438.625	Multi-mode (j) (k) (l)
			438.650 - 439.425	Repeater output channels (HB/DL/OE), 25 kHz spacing, 7.6 MHz shift, (f) (p)
440.000			439.800 -- 439.975	Digital communications link channels (g) (j)

#### 4.5.1 Notes: BANDPLAN

The following notes are part of the officially adopted IARU Region 1 bandplan, and all member societies should strongly promote adherence to the recommendations made in these notes.

- a) In Europe no input or output channels of telephony repeaters shall be allowed to operate between 432 and 433 MHz ( From 1-1-2004 those frequencies are between 432.000 and 432.600 MHz )
- b) FM telephony channels and Repeaters are specified in chapter 8.8.4
- c) **ATV Repeater outputs are not permitted in the 435MHz band (Varna 2014)**

## Footnotes

- a. Telegraphy is permitted over the whole narrow-band DX part of the band; Telegraphy exclusive between 432.000 - 432.100 MHz. PSK31, however, can be used as well in this segment
- b. Refer to Beacons Chapter for coordination of beacons in the beacon sub-band  
See Section 11.1.1
- c. ATV operators should be encouraged to use the microwave allocations where available, but may continue to use the 435 MHz band. In case of interference between ATV and the Amateur Satellite Service, the Satellite Service **shall** have priority.

Any remaining legacy wideband ATV usage in the 435MHz band should be phased out in favour of narrower bandwidth, more compatible, modes such as DATV or SATV

For ATV transmissions National societies should provide guidance to their members on the exact frequencies to be used, with due consideration of the interests of other users (Varna 2014)

- d. The words "Sub-regional (national) bandplanning" appearing in IARU Region 1 VHF/UHF/Microwave bandplans mean the following:  
  
In bands and sub-bands not available throughout Region 1, band-planning should be coordinated on a sub-regional basis between the countries where those bands and sub-bands are allocated to the Amateur Service. The words "national bandplanning" refer to bands/segments which are available only in a single country (such as the 70 MHz band allocation), or only in a few widely separated countries.(Torremolinos 1990)
- e. Not used
- f. Embedded data traffic is allowed along with digital voice. Digital Voice users should check that the channel is not in use by other modes

## 4.5.2 Notes: Usage

The following notes are referring to the Usage column in the bandplan. As already set out in the introduction to section IIc, in the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the Usage column or from the following notes ( except where 'exclusive' is mentioned).

## Footnotes

- f. The HB/DL/OE wide-shift repeater system, already in use for a long time, is valuable with a view to a better utilisation of the whole band. Hence IARU Region 1 endorses the system. This also applies for the French repeater channel system, also adopted by the Netherlands and Belgium, which IARU Region 1 supports as a useful measure to fill a hitherto unused part of the band. For the numbering of FM telephony channels see 4.1.
- g. In the Usage section of the 435 MHz bandplan the following frequency segments have been designated for digital communications:
  - i. 430.544 - 430.931 MHz Extension of the 7.6 MHz repeater system input  
for digital communication  
438.194 - 438.531 MHz Output channels for the above
  - ii. 433.619 - 433.781 MHz  
438.019 - 438.181 MHz
  - iii. 430.394 - 430.581 MHz For digital communication links  
439.794 - 439.981 MHz For digital communication links

With due regard to the band allocated to the Amateur Service by the national Administration, the interests of other users, possible interference from e.g. ISM, the specific digital technique or system to be accommodated etc., a sub-regional, or national choice may be made within the above segments.

- h. In those countries where 433.619 - 433.781 MHz is the only segment of the 435 MHz band available for digital communications, modulation techniques requiring a channel separation exceeding 25 kHz should not be used. If different or incompatible use of this part of the frequency spectrum is contemplated in neighbouring countries, this use should be coordinated between the countries concerned with the aim of avoiding harmful interference.
- i. On a temporary basis, in those countries where 433.619 - 433.781 MHz is the only segment of the 435 MHz band available for Digital Communications:
  - i. Channels with centre frequencies 432.500, 432.525, 432.550, 432.575, 434.450, 434.475, 434.500, 434.525, 434.550 and 434.575 may be used for digital communications.
  - ii. Use of these channels must not interfere with linear transponders.
  - iii. Modulation techniques requiring a channel separation exceeding 25 kHz must not be used on these channels. (De Haan, 1993)
- j. At the IARU Region 1 Conference in Torremolinos (1990) the following recommendation was adopted regarding the segments for repeaters and links, shown in footnote g:

For a repeater/link to be installed within 150 km of a national border, the member society should co-ordinate the frequency allocation and the technical (system) data with the member societies in neighbouring countries. Special attention should be paid to the common good practice of using directional antennas and the minimum power necessary.

As a matter of course this agreement is also valid for any link experiments carried out on the multi-mode channels in the segment 438.544--438.631 MHz. (De Haan, 1993).
- k. These multi-mode channels are to be used for experimenting with new transmission technologies (De Haan, 1993)
- l. In the United Kingdom the use of low-power speech repeaters on repeater channels in the segment 438.419--438.581 is allowed. Where necessary, frequencies will be coordinated with neighbouring countries (De Haan, 1993).
- m. Experiments using wide band digital modes may take place in the 435 MHz band in those countries that have the full 10 MHz allocation. These experiments should be in the all modes section around a frequency of 434 MHz, use horizontal polarisation and the minimum power required. (Tel Aviv 1996)
- n. Common frequencies for Simplex (FM) Internet voice gateways are:  
433.950, 433.9625, 433.975, 433.9875, 434.0125, 434.025, 434.0375, 434.050 MHz  
(Cavtat 2008)
- o. All Voice repeater channels may use FM or Digital Voice modes. (Cavtat 2008)