

1.5 430 – 440 MHz

Frequency MHz	Maximum Bandwidth	MODE	USAGE	
430.000 SUB-REGIONAL (national bandplanning) (d)	20kHz	ALL MODES	430.025 - 430.375 430.400 - 430.575 430.600 - 430.925 430.925 - 431.025 431.050 - 431.9875	FM repeater output-channel freqs (F/PA/ON), 12,5 kHz spacing, 1.6 MHz shift (f) Digital communication link channels (g) (j) Digital communications repeater channels (g) (j) (l) Multi mode channels (j) (k) (l) Repeater Input Region 1, 12.5 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
432.000 432.100	500Hz	Telegraphy (a) MGM	432.050 432.088	Telegraphy centre of activity PSK31 centre of activity
432.100 432.400	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)
432.491 432.493	500 Hz	EMGM		Experimental MGM
432.500 432.975	12kHz	ALL MODES	432.500 432.600 - 432.9875	NEW APRS FREQUENCY REPEATER INPUT REGION 1 25 kHz spacing, 2 MHz shift In the UK repeater OUTPUT channels.

IARU-R1

433.000 433.375	12 kHz	FM Digital voice Repeater (p)	433.000 – 433.3875 433.000 – 433.375	Repeater Input Region 1, 12.5 kHz spacing, 1.6 MHz shift (p). Repeater Output only in the UK, 25 kHz spacing, 1.6 MHz shift.
433.400 433.575	12 kHz	FM Digital voice (f) (o)	433.400 433.450 433.500	SSTV(FM/AFSK) digital voice calling FM calling SIMPLEX CHANNELS, 25 kHz spacing, (Channel freq 433.400 -- 433.575 MHz)
433.600 434.000	20kHz	ALL MODES	433.625 - 433.775 434.000	Digital communications channels (g) (h) (i) Centre frequency of digital experiments as defined on note (m) LORA (p)
434.000 434.594	12kHz (c)	ALL MODES ATV (c)	434.450 - 434.575	Digital communications channels (by exception !!) (i) (m)
434.594 ATV (c) & FM 434.981	12kHz (c)	ALL MODES	434.600 – 434.9875 434.600 – 434.975	Repeater Output Region 1, 12.5 kHz spacing, 1.6 or 2.0 MHz shift (p) Repeater Input only in the UK, 25 kHz spacing, 1.6 MHz shift.
435.000 438.000	20kHz (e)	Satellite service & ATV (c)		
438.000 ATV (c) & SUB- REGIONAL (national bandplanning) (d) 440.000	20kHz (e)	ALL MODES	438.025 - 438.175 438.200 - 438.525 438.550 - 438.625 438.650 - 439.5875 439.800 -- 439.975	Digital communications channel frequency (g) Digital communications repeater channels (g) (j) (l) Multi-mode (j) (k) (l) Repeater Output Region 1, 12.5 kHz spacing, 7.6 MHz shift (f). Digital communications link channels (g) (j)

1.5.1 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 7.2.1
- 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 MH. 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 5.1.1
- 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
Embedded data traffic is allowed along with digital voice. Digital Voice users should check that the channel is not in use by other modes

1.5.2 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.
- 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

IARU-R1

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 by staying in the segment. in those countries that have the full 10 MHz allocation.
- 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)
- p. two dial frequencies for LORA APRS:
 - 433.775 LoRa-1 (from Node to Gateway BW 125kHz)
 - 433.900 LoRa-2 (from Gateway to Node , for messages, BW 125kHz)

1.5.3 National usage notes

- q. Some countries have existing use at:

432.500-432.600	Linear	Transponder	Inputs
432.600-432.800	Linear	Transponder	Outputs
439.9875	POCSAG (Paging)		

- r. In countries without access to the full 70 cm band, the following 12,5 kHz repeater channels with a 1.6 MHz separation between uplink and downlink can be implemented:
 - a. Input Frequencies (uplink) 431,225 – 431,600 MHz
 - b. Output Frequencies (downlink) 432,825 – 433,200 MHz

This needs international coordination if necessary

1.5.4 DATV & SATV in the 435 MHz Band (Varna 2014)

As the national 70cm allocations vary considerably, it is not possible in the VHF Handbook to specify exact centre frequencies for DATV/SATV operation – but it should be where its bandwidth is compatible with other uses.

IARU-R1

If the 435-438MHz amateur satellite section is used for ATV, it shall be on the following basis:

- ATV (like Voice) Repeater outputs are not permitted
- ATV Internet gateways are not permitted
- ATV Repeater inputs are permitted (eg for cross band usage)
- ATV Simplex usage is permitted
- Transmission times by ATV users should be as short as possible

Any usage should also be compliant with the Region 1 Technical Recommendations for DATV/SATV and in particular the maximum bandwidth.

Centre frequencies of ATV usage in the amateur satellite section shall be chosen to place its bandwidth at the upper end of the amateur satellite section