

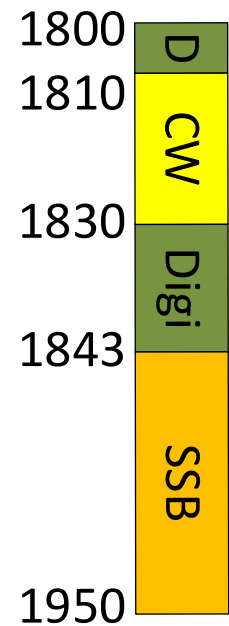
# Amateur radio HF band usage for New Zealand amateurs from 160 metres to 10 metres

Compiled and maintained by [Mark ZL3AB](#) and [Gary ZL2iFB](#)

Updated July 2021

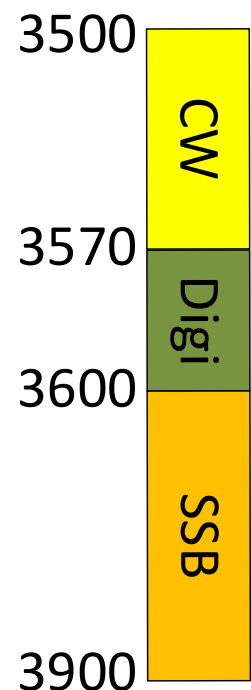
## 1800 to 1950 kHz (known as “160 metres”, “one-sixty” or “topband”)

- 1800-1810** Digimodes (IARU Region 2 DX window)
- 1810-1830** CW
  - 1810 CW QRP
- 1830-1843** Digimodes
  - 1836 QRP
  - 1836.6 WSPR
  - 1838 JT65A
  - 1839 JT9
- 1840-1843** FT8
  - 1842 JS8Call
- 1843-1950** SSB (LSB)
  - 1910 SSB QRP



## 3500 to 3900 kHz (“80 metres”, “eighty” or “seventy-five”)

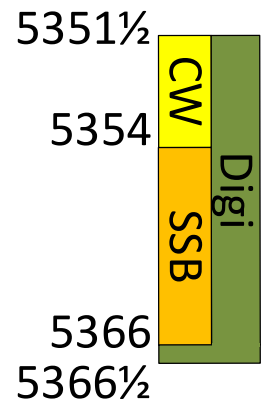
- 3500-3570** CW
  - 3500-3510 CW DX window
  - 3530 IOTA CW
  - 3560 QRP CW
  - 3562 SOTA CW
- 3570-3600** Digimodes
  - 3570 JT65A
  - 3572 JT9
  - 3573 FT8
  - 3575 FT4
  - 3577 Olivia
  - 3578 JS8Call
  - 3579 QRSS
  - 3580 RTTY, PSK
- 3583.25** Olivia
- 3590** RTTY DX



- 3592.6 WSPR
- 3595-3605 Civil emergencies, any mode**
- 3600-3900 SSB (LSB)**
- 3620-3640 VK/ZL digimodes window
- 3690 QRP SSB
- 3730-3740 SSTV (IARU Region 1)
- 3755 IOTA SSB
- 3776-3800 SSB DX window
- 3791 ALE
- 3845 SSTV (IARU Region 2)
- 3885 AM

**5351.5-5366.5 kHz (“60 metres”, “sixty” or “5 megs”)<sup>1</sup>**

- 5351.5-5354 CW and digimodes up to 500 Hz bandwidth except FT8**
- 5352 FSQcall
- 5353 SOTA CW
- 5354-5366 All modes up to 2700 Hz bandwidth, such as SSB (USB)**
- 5357 FT8 (USB)
- 5363 SOTA SSB (USB)
- 5364.7 WSPR
- 5366-5366.5 Weak signal digimodes up to 20 Hz bandwidth**



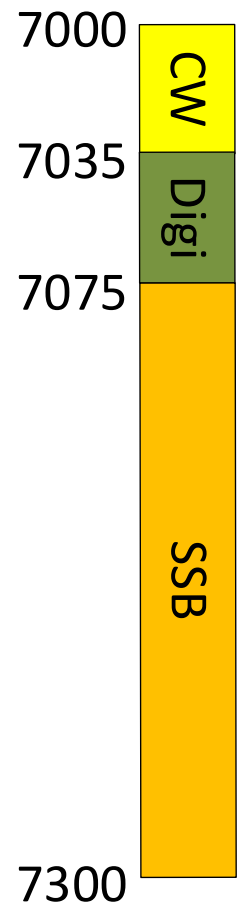
**7000 to 7300 kHz (“40 metres”, “forty” or “7 megs”)**

- 7000-7035 CW**
- 7030 IOTA CW
- 7032 SOTA CW
- 7035-7075 Digimodes**
- 7035-7040 BPSK31 (IARU Regions 1 and 3)
- 7035-7045 RTTY (IARU Regions 1 and 3)
- 7039 JT65A
- 7039 Hellschreiber
- 7040 QRP (IARU Region 2)

<sup>1</sup> The 60m band is available to authorized ZL amateurs as a secondary allocation on an interim/trial basis until May 2022. A sublicence (formal authorization permit from NZART) is required to transmit, with explicit conditions (e.g. no more than 15 watts eirp). [See the NZART website for further details.](#)

[Legitimate emergency communications under the auspices of AREC](#) are also permitted on 5320 and 5395 kHz.

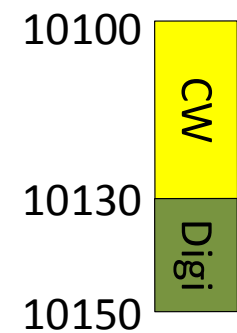
7040	RTTY DX
7042-7044	Olivia
7047.5	FT4
7059.9	QRSS
7070-7075	BPSK31 (IARU Region 2)
7072-7074	Olivia (IARU Region 2)
7074	FT8
<b>7075-7300</b>	<b>SSB (LSB)</b>
7076	JT65A (USB)
7078	JT9, JS8Call
7080	RTTY (IARU Region 2)
7083.6	WSPR
7084	Hellschreiber (IARU Region 1)
7090	SOTA SSB
<b>7105-7115</b>	<b>Civil emergencies, any mode</b>
7171	SSTV
7185.5	ALE
7285	QRP SSB
7290	AM



Although New Zealand is in IARU Region 3, ZL amateurs may also use digimodes on the frequencies allocated to IARU Region 2 (the Americas).

### 10100 to 10150 kHz (“30 metres”, “thirty” or “10 megs”)<sup>2</sup>

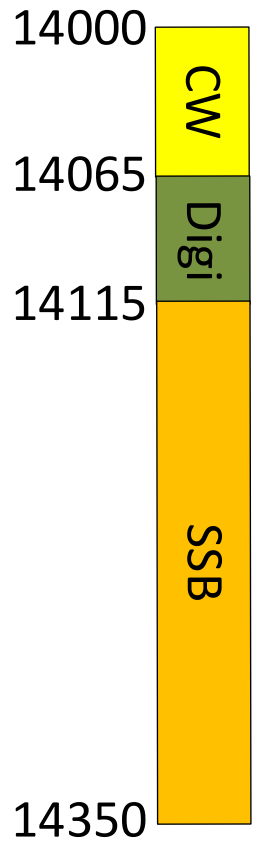
<b>10100-10130</b>	<b>CW</b>
10115	IOTA CW
10116	QRP and SOTA CW
<b>10130-10150</b>	<b>Digimodes</b>
10135-10145	Hellschreiber
10136	FT8
10138	JT65A
10138.7	WSPR
10140	FT4, JT9, PSK and QRSS (!)
10140-10150	RTTY
10141-10144	PSK, Olivia
10147	MFSK16



<sup>2</sup> There’s a lot to squeeze into 50 kHz. Play nicely together.

**14000 to 14350 kHz** (“20 metres”, “twenty” or “14 megs”)

- 14000-14065 CW**
  - 14040 *IOTA CW*
  - 14060 *CW QRP*
  - 14062 *SOTA CW*
- 14065-14115 Digimodes**
  - 14070 *PSK*
  - 14071 *Hellschreiber*
  - 14072.5 *Olivia*
  - 14074 *FT8*
  - 14076 *JT65A*
  - 14078 *JT9*
- 14078-14080 *Throb*
- 14078-14082 *MFSK16*
- 14080 *FT4*
- 14080-14090 *RTTY*
  - 14090 *FT8 DX frequency using fox-and-hounds<sup>3</sup>*
- 14090-14110 *Packet, AMTOR, PACTOR*
  - 14095.6 *WSPR*
  - 14098.9 *QRSS*
  - 14100 **NCDXF International beacon Network (*do not transmit here*)**
  - 14107.5 *Olivia 32/100*
- 14109-14111 *MT63*
- 14115-14350 SSB (USB)**
  - 14170-14220 *SSB DX window*
  - 14227-14236 *SSTV*
    - 14260 *IOTA SSB*
    - 14285 *SSB QRP*
    - 14286 *AM*
  - 14295-14305 **Global emergencies, any mode**
    - 14310 *SOTA SSB*
    - 14346 *ALE*



<sup>3</sup> Foxes (DX stations) may choose other FT8 frequencies, transmitting at about 300 Hz on the waterfall. If you copy them, call them ‘split’ above 1 kHz with hound enabled which shifts you down to their frequency if they respond to you.

**18068 to 18168 kHz** (“17 metres”, “seventeen” or “18 megs”)

**18068-18095 CW**

18090 *IOTA CW*

18092 *SOTA CW*

**18095-18110 Digimodes**

18100 *FT8*

18102 *JT65A*

18102.65 *Olivia*

18103 *PSK*

18104 *JT9, FT4*

18104-18107 *Hellschreiber*

18104.6 *WSPR*

18105 *MFSK16*

18108.9 *QRSS*

18110 **NCDXF International Beacon Network (*do not transmit here*)**

**18110-18168 SSB (USB)**

18117.5 *ALE*

18128 *IOTA SSB*

18140 *SOTA SSB*

18155-18165 **Civil emergencies, any mode**

18068

CW

18095

Digi

18110

SSB

18168

**21000 to 21450 kHz** (“15 metres”, “fifteen” or “21 megs”)

**21000-21065 CW**

21040 *IOTA CW*

21060 *QRP CW*

21062 *SOTA CW*

**21065-21150 Digimodes**

21068 *Hellschreiber*

21070-21074 *PSK*

21072 *Olivia*

21074 *FT8*

21076 *JT65A*

21078 *JT9*

21080 *MFSK16*

21080 *RTTY DX*

21080-21110 *RTTY*

21094.6 *WSPR*

21140 *FT4*

21150 **NCDXF International Beacon Network (*do not transmit here*)**

21000

CW

21065

Digi

21150

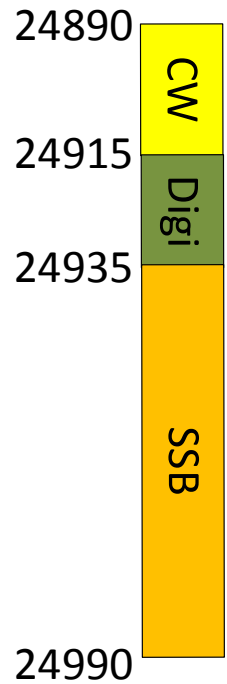
SSB

21450

- 21150-21450 SSB (USB)**
  - 21260 *IOTA SSB*
  - 21262 *SOTA SSB*
  - 21340 *SSTV*
- 21355-21365 Global emergencies, any mode**
  - 21385 *QRP SSB*
  - 21432.5 *ALE*

**24890 to 24990 kHz** (“12 metres”, “twelve” or “24 megs”)

- 24890-24915 CW**
  - 24906 *SOTA CW*
- 24915-24935 Digimodes**
  - 24915 *FT8*
  - 24917 *JT65A*
  - 24919 *JT9, FT4*
- 24920-24925 *PSK*
- 24920-24930 *RTTY*
  - 24922 *Olivia*
  - 24924 *Hellschreiber*
  - 24924.6 *WSPR*
- 24930 NCDXF International Beacon Network (*do not transmit here*)**
- 24932 *ALE*
- 24935-24990 SSB (USB)**
  - 24950 *IOTA SSB*



**28000 to 29700 kHz** (“10 metres”, “ten” or “28 megs”)

- 28000-28065 CW**
  - 28060 *QRP CW*
  - 28062 *SOTA CW*
- 28065-28185 Digimodes**
  - 28065 *Hellschreiber*
  - 28070 *PSK*
  - 28074 *FT8*
  - 28076 *JT65A*
  - 28078 *JT9*
- 28080-28110 *RTTY*
  - 28120 *PSK*
  - 28122 *Olivia*

28124.6	WSPR	28000	CW
28180	FT4		
28190-28300	Beacons ( <i>do not transmit here</i> )		Digi
28200	NCDXF International Beacon Project ( <i>do not transmit here</i> )	28065	
28312.5	ALE	28190	Beacon
28321	QRSS	28300	
28300-29000	SSB (USB)		SSB
28385	QRP SSB		
28460	IOTA SSB		
28560	IOTA SSB		
28590-28610	FM simplex		
28675-28685	SSTV		
28885	Six metre liaison frequency		
29000-29300	AM		
29300-29510	Satellite downlinks ( <i>do not transmit here</i> )		
29520-29700	FM		
29520-29580	FM repeater inputs (duplex, listen 100 kHz higher)		AM
29600	FM simplex calling frequency	29000	
29620-29680	FM repeater outputs (duplex, transmit 100 kHz lower)		
		29300	
			Satellite
		29510	FM
		29700	

**Operating modes**

Morse code	CW
Voice	SSB (USB or LSB), DSB, FM, AM and digitized speech <sup>4</sup>
Digital	JT65A, JT9, MT63, PSK, MFSK, Throb, RTTY, Packet, AMTOR, PACTOR, Clover, OLIVIA, Contestia, DominoEX, ALE, CMSK, FT8, FT4, JS8Call, FSQcall and others including variants and novel/experimental modes
Raster-scanning	Hellschreiber, SSTV

**Notes**

1. **Check your transmitting license for the explicit terms and conditions under New Zealand law.** Through the Ministry of Business, Immigration and Employment’s Radio Spectrum Management business unit, the New Zealand government defines the [General User Radio License](#) terms and conditions for NZ radio amateurs including the band limits and power, under the [Radiocommunications Act \(1989\)](#). This document is advisory, not obligatory, offering suggestions for the common good rather than strict, mandatory rules. The segments shown in this document are based on the [JARU Region 3 bandplans](#) with minor adaptations for NZ law and common practice. The aim is to reduce mutual interference by amateurs, and to coordinate use of specified frequencies (“watering holes”) for particular purposes, globally where possible.

<sup>4</sup> Digitized speech or digital voice may also be classed as a digimode – several in fact.

2. All frequencies shown are dial settings in kilohertz. Apart from the band edges and beacons, most frequencies are approximate, indicating “centres of activity” or “watering holes” around which amateurs using various modes typically congregate. **Always listen carefully for a clear frequency before transmitting** (including when operating split - re-check your transmit frequency from time to time). If a specified frequency is busy when you come to use it, try shifting a little HF or LF to find a clear frequency nearby. In order to prevent your transmissions extending out of band, don't get too close to the band edges, especially on wideband modes such as SSB and FM.
3. The 160, 80, 60, 40<sup>5</sup> and 30 metre bands are shared with other non-amateur radio services with primary rights in New Zealand and various other countries<sup>6</sup>. Do not interfere with them. Accept interference from them. Basically, steer clear.
4. In addition to the specified frequencies, various other frequencies may be used at various times for communications associated with civil emergencies, disaster relief, regular nets *etc.* If a given frequency is already in use, or if you are asked to move, please be considerate and sensible about it. Some things naturally take priority.
5. Stay clear of the beacon and satellite downlink frequencies to avoid interfering with reception of very weak signals. IARU suggests staying at least 500 Hz above or below the listed frequencies.
6. On SSB, use LSB on 40m and lower frequency bands unless otherwise specified; use USB on 20m and above. Digimodes generally use USB on all bands. If you cannot decode a good strength digital signal, try LSB or 'invert', assuming you are using the appropriate digimode and speed! To identify unknown digimodes, the band plan is a clue for the popular modes, while the [Sig ID Wiki](#) has waterfall images and audio clips plus descriptions of most established digimodes.
7. Some of the frequencies and modes in this document are not available to amateurs in other countries, who may therefore be found elsewhere and may be worked cross-band or cross-mode. In particular, 160, 80, 60 and 40 metre allocations vary around the world, and novices often have restricted frequency allocations and low power. **Only transmit on the frequencies for which you are licensed.**
8. For historical reasons, CW is permitted across the entirety of every band but is *usually* found in the lower segments as indicated.
9. The “DX windows” are *intended* to facilitate intercontinental/weak signal DXing rather than re-chewing between locals *etc.*
10. If there are lots of strong signals and no space left on your FT8 waterfall, you might like to take advantage of good propagation by using another mode (*e.g.* FT4, RTTY, CW or SSB). Conversely, if the FT8 waterfall is sparsely populated or empty, consider trying ultra-weak-signal modes such as JT9 or WSPR instead.
11. Monitor and take pride in the quality of your transmissions, avoiding spurious transmissions and overmodulation. On digimodes, keep your soundcard output, microphone input and power levels down, with speech processing or audio shaping turned off. Do not transmit the bleeps, chimes, warnings and other notifications intended for the computer user (if possible, dedicate a separate soundcard/audio device solely for the radio).
12. DXpeditions and rare DX stations usually operate “split”. Listen for the DX operator's instructions or tune around to find other successful callers. Avoid calling on the DX station's transmit frequency (simplex) unless you are sure he is taking callers there. DX stations should keep their pileups under control and within a reasonable band spread.

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<sup>5</sup> On the 40m band, we are primary users below - but secondary users above - 7100 kHz.

<sup>6</sup> For example, the longstanding German commercial meteorological station on 10101 kHz is a convenient band-edge marker and propagation indicator. It transmits 50 baud, 425 Hz shift RTTY around the clock.



13. The 60, 30, 17 and 12 metre bands are known as the [WARC bands](#) since the latter three were initially allocated to the amateur service at a **World Amateur Radio Conference** in 1979, and 60m was added at the **World Radio Conference** in 2015. Contests are not allowed on these bands.
14. Please report pirates and intruders in the amateur bands to the [IARU Monitoring Service](#).
15. **Please report errors, refinements or issues with this document to its authors: [MarkZL3AB@gmail.com](mailto:MarkZL3AB@gmail.com) and [Gary@isect.com](mailto:Gary@isect.com).** If something isn't right or could be better, *please* let us know!

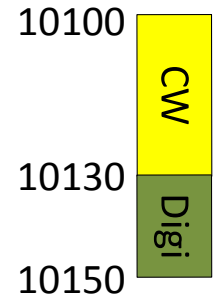
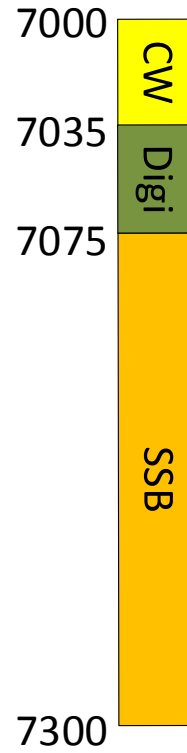
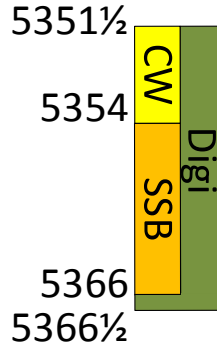
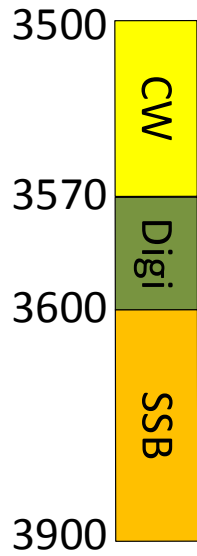
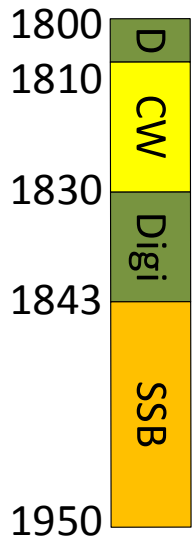
## Glossary with hyperlinks to further information

- ALE [Automatic Link Establishment](#) using MIL-STD 188-141 FED-1045 (8-tone FSK, 2 kHz bandwidth)
- AM [Amplitude Modulation](#) in which information is conveyed by varying the amplitude (strength) of transmission, as opposed to varying its frequency (FM)
- AMTOR [Amateur Telex Over Radio](#)
- AREC **Amateur Radio Emergency Communications**
- CLOVER An [8-tone digimode](#) with FEC
- Contestia A [digimode derived from OLIVIA](#) with twice the speed but reduced robustness
- CMSK [Correlated, Convolved, Chat-mode MSK](#), an experimental weak-signal digimode for LF/MF
- CW [Continuous Wave](#), uses on-off keying of a carrier to send Morse code
- Digimodes **Digital modes** using various encoding/decoding mechanisms to communicate digital data by radio
- DominoEX A digimode designed for [keyboard-to-keyboard chatting](#) on HF
- DSB [Double Sideband](#) suppressed carrier, vanishingly rare since SSB was invented
- Duplex [Communications protocol](#) to transmit on one frequency while simultaneously receiving on another (full-duplex) or alternate between the two frequencies (semi-duplex - also known as 'split')
- eirp **Effective Isotropic Radiated Power** - the power that would theoretically need to be transmitted into a truly isotropic antenna to generate the same signal strength as an actual receiving station located in its strongest direction
- FEC [Forward Error Correction](#), techniques to communicate digital data reliably and accurately over noisy channels subject to interference and fading, using redundant coding
- FM [Frequency Modulation](#) in which information is conveyed by varying the frequencies transmitted, as opposed to modulating the signal amplitude (AM)
- FSK [Frequency-Shift Keying](#), a form of FM used for digital transmissions
- FT8 **Franke-Taylor design, 8-tone FSK, 60 Hz bandwidth**
- IARU [International Amateur Radio Union](#), regulates and represents amateur radio worldwide
- IOTA [Islands On The Air](#), an award scheme for contacts with various islands and island groups
- IARU [International Telecommunications Union](#), regulates the radio frequency spectrum worldwide across three regions: **Region 1** = Europe, Africa and the former USSR; **Region 2** = the Americas, North and South; **Region 3** = Asia and Oceania

JS8Call	A variant of FT8 for relaxed keyboard-to-keyboard chats
JT65A	Joe Taylor digimode, <b>65</b> -tone MFSK, 180 Hz bandwidth
JT9	Joe Taylor digimode, <b>9</b> -tone FSK, 16 Hz bandwidth
LSB	Lower <b>Sideband</b> suppressed carrier
MFSK	<a href="#">Multiple Frequency-Shift Keying</a> , a variation on FSK
MSK	<a href="#">Minimum-Shift Keying</a>
NCDXF	<a href="#">Northern California DX Foundation</a> , responsible for the <a href="#">International Beacon Project</a> in conjunction with the IARU
OLIVIA	A QRP ragchew mode, <a href="#">OLIVIA formats</a> vary in both bandwidth (125 to 2000 Hz) and number of tones (2 to 256). Most common are 125/4, 250/8, 500/16, 1000/32, and 2000/64
Packet	<a href="#">Packet radio</a> (generally TCP/IP using amateur radio as a medium), rare on HF
PACTOR	<a href="#">Packet Telex Over Radio</a> , 100 baud increasing to 200 baud on good links, with several variants most of which are proprietary
PSK	<a href="#">Binary Phase Shift Keying</a> , a keyboard-to-keyboard chat mode mostly with a 31 Hz symbol rate (PSK31) at 60 Hz bandwidth, with some activity on PSK63, PSK125 and occasionally other variants
QRP	Low transmit power (up to 5 watts output)
QRPP	Very low transmit power (less than a watt)
QRL	The frequency is busy (in response to ▼)
QRL?	Is this frequency clear?
QRSS	<a href="#">Very slow speed CW</a> taking several seconds to send each element
Ragchewing	Chatting, lengthy conversations between amateurs
RTTY	<a href="#">Radioteletype</a> using the Baudot code, usually with 170 Hz shift and 45.5 baud in amateur use, occasionally 75 baud
Simplex	Transmit and receive on the same frequency on alternating overs (more accurately known as half-duplex: strictly speaking <a href="#">simplex</a> is a one-way transmission)
SOTA	<a href="#">Summits On The Air</a>
Split	Semi-duplex or half-duplex, alternately transmitting on one frequency then listening for callers on another (typically at least 1 kHz HF)
SSB	Single <b>Sideband</b> suppressed carrier
SSTV	<a href="#">Slow-scan Television</a>
USB	Upper <b>Sideband</b> suppressed carrier
WSPR	<a href="#">Weak Signal Propagation Reporter</a> QRP transmissions use MEPT_JT mode, similar to JT65A but just 6 Hz wide

## Document changes

- July 2021 Added single-page diagrammatic summary at rear. Corrected “3710 kHz CW QRP” to “3690 kHz QRP SSB”. Other minor wording changes.
- May 2021 Added diagrams. Added 60m. Added SOTA, FT4, JS8 and FSQcall frequencies. Adjusted some of the frequencies for rarer modes, and to align with IARU Region 3 and VK plans. Document reformatted.



## ZL suggested HF band usage

