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| **Subject** | Updating 435-438 MHz for Satellites, DATV and Experimental Data | | |
| **Society** | RSGB | **Country:** | UK |
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**Introduction:**

In order to accommodate the ongoing innovative developments in DATV/Data technology and data modes, whilst also enhancing the safeguards for amateur satellite usage, we present a set of proposals that update and clarify the 435-438 MHz range. This section of the band is a vulnerable secondary allocation, but with very valuable and innovative usage. The aims of the paper are:--

* More clearly define 436-438 MHz, as the upper 2MHz range, where DATV currently shares with Amateur Satellites under conditions agreed at Varna-Albena in 2014
* More clearly show that 435-436 MHz is amateur satellite and not other use, which aligns with the IARU coordination of weak-signal mode satellites in this sub-range
* Final retirement of all legacy analogue ATV usage from the 430-440 MHz
* Updating the Varna conditions so that they more clearly refer to DATV (not ATV)
* Using the same conditions to facilitate room for some experimental data development, in a similar manner to the DATV innovation and sharing started in 2014
* Adding a clear statement that any other usage in the 435-438 MHz range such as fixed infrastructure, gateways and DV hot-spots shall not be in this segment in order to minimise satellite interference – which is not currently clear in the VHF Handbook

**Background and Key Points:**

**General:** The 435-438 MHz range is an ITU shared secondary, non-exclusive allocation which is seeing growth from other Primary users including Mobile, high power Radar and other (non-amateur) Satellites. Despite the significant number of amateur satellites, it is a very vulnerable secondary allocation that shows up as pretty empty on terrestrial regulatory spectrum monitoring.

The careful introduction of DATV in the band at Varna in 2014 has helped to create both additional innovation, and also usefully enabled us to demonstrate the terrestrial shared usage as well. The DATV technology in 436-438 MHz has since led to even more advanced RB-DATV, and its successes in assisting 50MHz at WRC-19 and QO-100 usage.

**DATV:** In the 2014 Region-1 Conference at Varna-Albena, a carefully balanced arrangement was agreed so that new DATV could be used within the 435-438 MHz segment, whilst minimising interference to the amateur satellite service.

The relevant VHF Handbook clauses include:-

*1.5.1 (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”*

And

***1.5.4 DATV & SATV in the 435 MHz Band***

*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*

However, the above clauses do not directly define the exact frequency range or bandwidth. That is determined by a DATV recommendation of 2MHz Max BW in Section- 9.4 of the Handbook. The current clause also continues to permit wideband ATV and SATV (a form of analogue), so the ATV wording is ambiguous and is in need of further clarity.

In practice, the highly innovative and successful DATV usage is centred on 437.0 MHz in a 2MHz range (ie 436-438MHz). But it is not clear enough for the casual reader

Digital technology and waveforms have advanced further since 2014, so any multimedia data stream can be equally considered to be DATV or Data in any case. This creates an opportunity to use this provision to create some room for further experimental innovation in a carefully guided manner. This will assist the technical future of amateur radio and help demonstrate that we are making better use of the frequency segment to regulators.

The current conditions are fairly clear regarding controls on ATV-related infrastructure – but say nothing to protect this part of the band from the growth in other digital gateways, repeaters and personal DV hot-spots etc that can create interference to satellites.

**Legacy ATV/SATV**

The legacy provision and very old technical recommendation for 430-440MHz analogue television in the VHF Handbook contributes to confusion and is not a good advert for amateur radio.

We believe the time has now come to fully remove those modes from the band plan and also retire the relevant technical recommendations for both Fastscan sideband TV, Fax and SATV in Section-9 of the Handbook. This would leave the more modern entries for FMATV and DATV.

**Recommendations for Main Frequency Table:**

1. **Remove legacy** ATV & FM notes from the frequency column for 434.594-434.981MHz and 438-440MHz
2. **Split 435-438 MHz row,** into two rows for:-

* 435-436 MHz: Satellite Service
* 436-438 MHz: Satellite Service and DATV/Data - 437MHz DATV/Data centre of activity (c)

**Recommendations for Footnotes**

1. **Update Para 1.5.1** Footnote (c ) to:

As of [1-Jan-2021] Analogue ATV and SATV is no longer permitted in the 430-440 MHz band. ATV operators are encouraged to use the microwave allocations where available, but may use narrower bandwidth DATV modes in the 436-438 MHz band. See 1.5.4 for further guidance for DATV and experimental Data usage. In case of interference between DATV/Data and the Amateur Satellite Service, the Satellite Service shall have priority.

1. **Update Para 1.5.4** to:-

**1.5.4 DATV and Experimental Data usage in the 436-438 MHz Band**

If the 436-438MHz amateur satellite section is used for DATV or other experimental Data developments, it shall be on the following basis:

• DATV (like Voice) Repeater outputs are not permitted

• DATV Internet gateways are not permitted

• DATV Repeater inputs are permitted (eg for cross band usage)

• DATV Simplex usage is permitted

• Transmission times by DATV/Data users should be as short as possible

Any DATV and adhoc simplex Data usage of similar bandwidths to DATV, should be compliant with the Region 1 Technical Recommendations for DATV in Section-9.4 and in particular the maximum bandwidth.

No other fixed infrastructure for nodes, gateways, DV hot-spots or repeaters are permitted in 436-438MHz.

**Recommendations for Technical Recommendations:**

1. Rename Section-9 title to Amateur Television (remove ‘wide band’)
2. Remove Sec 9.1 for AM TV in 435 MHz
3. Remove Sec 9.2 for 435 MHz medium BW ATV
4. Remove 9.4.1 re 435 MHz Fast scan ATV standard
5. Remove 9.4.2 re 435 MHz SATV standard
6. Remove 9.4.3 Fax Standard (also redundant)

**Financial implications:** None