

# ■ Guidance for the >275GHz NoV



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Radio Society of Great Britain

Advancing amateur radio since 1913



# ■ Introduction

- The new NoV enables access to the Terahertz frequency range 275 - 3000 GHz subject to various conditions
- Developments in this range are at the cutting edge of rf technology and a great opportunity for experimentation, innovation, propagation research etc.
- This range is subject to the UK Wireless Telegraphy Act which has an upper limit of 3000 GHz
- The NoV applies to this entire range and refers to
  - ‘the Authorised band’ – Clause 6c
  - ‘the Restricted band’ – Clause 6d
  - several radio astronomy sites

# ■ Background

- The terms of the NoV have been guided by ITU-R footnote RR5.565 which identifies:-
  - A set of sub-bands in the 275-1000 GHz range for passive services
  - A more flexible regime in the 1000-3000 GHz range
- Whilst RR5.565 is not referred to by the NoV, a copy for information is included in the annex for context
- The NoV Tx power limit is 100mW. In practice source powers are much lower, LNAs and PAs are rare, so innovation and collaboration are encouraged

Note: Part of this range is also being studied for WRC-19 under Agenda Item 1.15

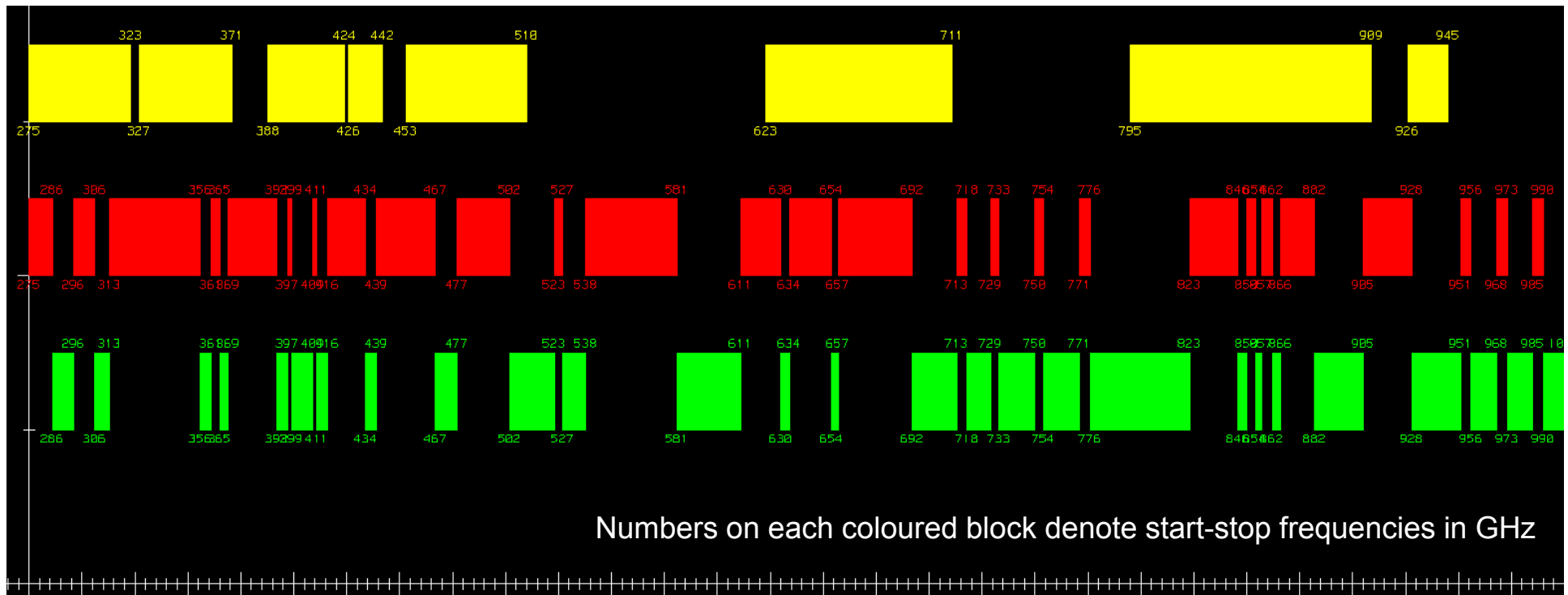
# ■ Key Points

- The Authorised Band is all frequencies in the 275-3000 GHz range except those listed (essentially matching the RR5.565 identification of sub-bands for – Earth exploration-satellite service (EESS) and space research service (SRS) passive applications
- Gaps within the Authorised Range are potentially available to use, provided that they do not cause undue interference to radio astronomy sites...
- The Restricted Band relates to frequencies and sites associated with radio astronomy telescopes
- Usefully, the NoV lists the locations for the key radio astronomy sites (around which 20km radii apply)
  - the RSGB website has an indicative map for these at:  
<https://www.thersgb.org/services/licence-map/telescopes.htm>

# ■ Sub-bands... and Opportunities

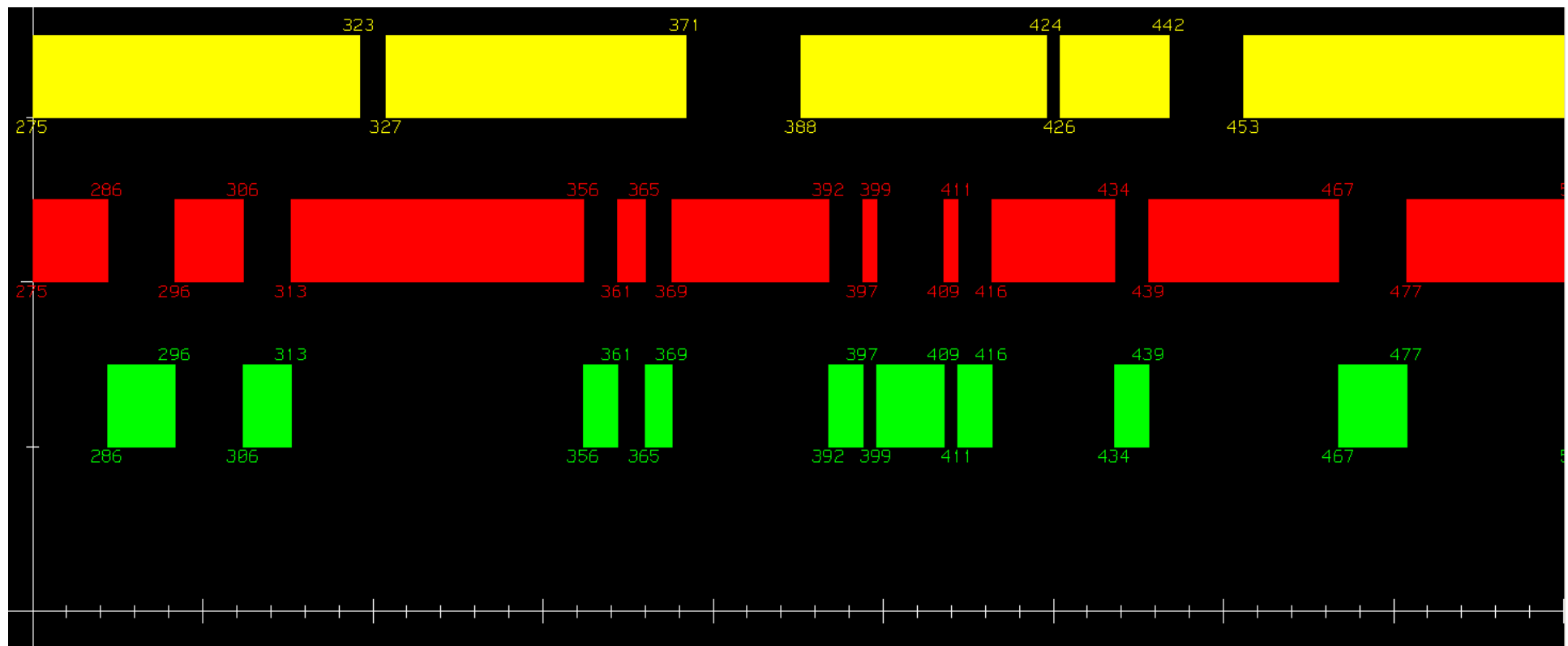
For the 275-1000GHz range, the coloured plot below illustrates:-

- **Red:** Authorised Band ranges where transmissions are not permitted
- **Yellow:** Restricted Band ranges - applicable to radio astronomy sites, as per 5e)
- **Green:** Potential Frequencies within the Authorised Band (subject to potential 20km radii )
- **Examples:**
  - 310 GHz may be used (at least 20km away from a listed radio astronomy site)
  - 603 GHz may be used anywhere (though it is still subject to causing no undue interference)



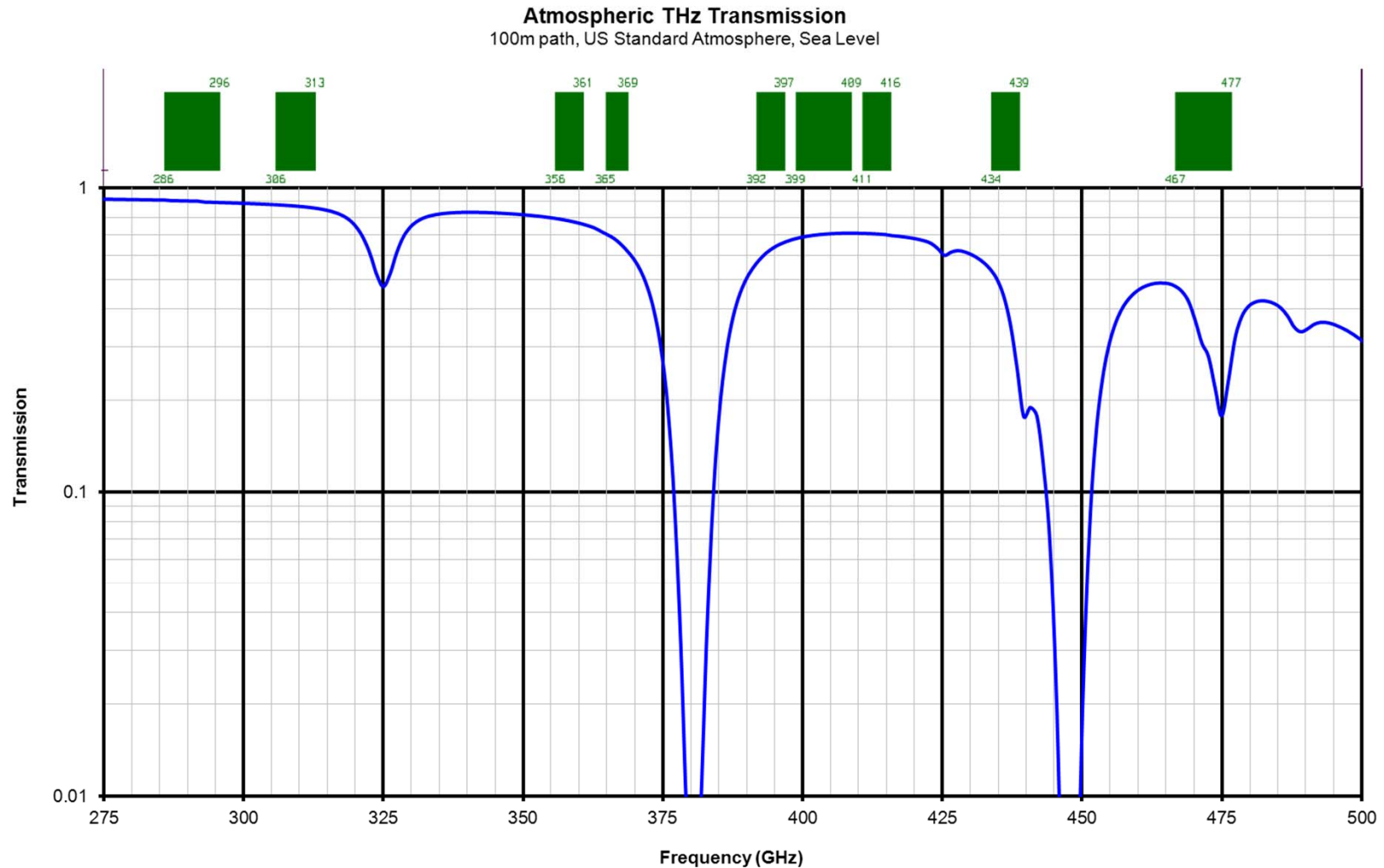
# ■ A Closer look at 275-500 GHz

- Available power, lowest losses and technology availability tends to favour frequencies <500GHz
- However we should not forget atmospheric losses...



# Potential Bands and Atmospheric Losses

- Green potential bands for 275-500 GHz vs atmospheric losses (based on the Hitran molecular database)
- Note some high loss frequencies (due water resonances etc).



# ■ Summary

- **Go forth and innovate!**
- Please ensure you publicise your results
  - so we can provide updates to Ofcom et al



# ■ Annex: What is ITU RR 5.565?

The range 275 – 3000 GHz whilst not formally allocated, is subject to footnote 5.565:-

**5.565** The following frequency bands in the range 275-1 000 GHz are identified for use by administrations for passive service applications:

- radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;
- Earth exploration-satellite service (passive) and space research service (passive): 275-286 GHz, 296-306 GHz, 313-356 GHz, 361-365 GHz, 369-392 GHz, 397-399 GHz, 409-411 GHz, 416-434 GHz, 439-467 GHz, 477-502 GHz, 523-527 GHz, 538-581 GHz, 611-630 GHz, 634-654 GHz, 657-692 GHz, 713-718 GHz, 729-733 GHz, 750-754 GHz, 771-776 GHz, 823-846 GHz, 850-854 GHz, 857-862 GHz, 866-882 GHz, 905-928 GHz, 951-956 GHz, 968-973 GHz and 985-990 GHz.

The use of the range 275-1 000 GHz by the passive services does not preclude use of this range by active services. Administrations wishing to make frequencies in the 275-1 000 GHz range available for active service applications are urged to take all practicable steps to protect these passive services from harmful interference until the date when the Table of Frequency Allocations is established in the above-mentioned 275-1 000 GHz frequency range.

All frequencies in the range 1 000-3 000 GHz may be used by both active and passive services (WRC-12)