

Unlocking the potential of **Terahertz radio spectrum**

An Ofcom Discussion Document published 02 December 2021

Terahertz@ofcom.org.uk

Response of IEEE 802

Paul Nikolich
Chair, IEEE 802 LAN/MAN
Standards Committee
em: IEEE802radioreg@ieee.org

09 February 2022

1 Source information

IEEE 802 LAN/MAN Standards Committee (LMSC) respectfully submits these responses to Ofcom. IEEE 802 is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 420,000 members in about 190 countries and supports the needs and interests of engineers and scientists broadly. In submitting this document, IEEE 802 acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802. Therefore, this submission should not be construed as representing the views of IEEE as a whole¹.

2 Discussion

IEEE 802 thanks Ofcom for initiating the dialogue on the use of Terahertz (THz) Spectrum. IEEE 802 takes the opportunity to provide a brief input on its activities towards the use of spectrum beyond 275 GHz.

IEEE 802 published IEEE Std 802.15.3d™-2017 which provides physical layer (PHY) at the frequency range between 252 GHz and 325 GHz for switched point-to-point links which enable data rates of up to 100 Gb/s using eight different bandwidths between 2.16 GHz and 69.12 GHz. Applications targeted with this standard comprise wireless backhaul/fronthaul links, wireless links in data centers as well as short-range applications such as kiosk downloading, intra-device and close-proximity communication.

Although no spectrum has been allocated beyond 275 GHz for any ITU-R radio service, footnote 5.565 of the radio regulations indicate in a large part of the spectrum between 275 and 1000 GHz passive service need to be protected from harmful interference potentially creating spectrum

¹ This document solely represents the views of the IEEE 802 LAN/MAN Standards Committee and does not necessarily represent a position of either the IEEE, the IEEE Standards Association or IEEE Technical Activities.

fragmentation. As a consequence, using huge bandwidths of 10s of GHz per wireless link to unlock the potential of THz communications is only possible by sharing spectrum with the already existing passive services Radio Astronomy (RA) and Earth-Exploration Satellite Service (EESS).

Since the start of the activities in THz communication in IEEE 802, we have been in close exchange with the stakeholders of passive services. Furthermore, IEEE 802 exchanged liaison statements with ITU-R WP1A² and ITU-R WP5A³ in order to provide input for the sharing studies performed in the framework of the preparation of WRC 2019. The outcome of these sharing studies was that sharing of spectrum with passive services is possible for the largest part of the spectrum covered by IEEE Std 802.15.3dTM-2017. WRC 19 has identified in footnote 5.564A - as a result of these sharing studies - 137 GHz of spectrum between 275 GHz and 450 GHz that can be shared with EESS and RA without severe restrictions and therefore made available for communication applications. This includes 48 GHz of the spectrum supported by IEEE Std 802.15.3d-2017. The remainder (296 to 306 GHz and 313 to 318 GHz) can be used only under the regime of footnote 5.565, where protection of passive service from harmful interference is required. There, new advanced spectrum management approaches as proposed in Ofcom's discussion document are potential means to use this spectrum for communication applications.

Advanced spectrum management techniques may also be an enabler for an efficient use of spectrum, when other active applications like imaging, sensing or radar for example are applying to use spectrum beyond 275 GHz.

IEEE 802 would like to be kept informed and get involved in the dialogue with Ofcom.

Regards,

By: /s/ Paul Nikolich

Paul Nikolich

IEEE 802 LAN/MAN Standards Committee Chairman

em: p.nikolich@ieee.org

² IEEE 802 liaison: <https://mentor.ieee.org/802.18/dcn/20/18-20-0052-05-0000-itu-r-sm-2352-ieee802-thz-input-to-wp1a.docx>

³ IEEE 802 liaison: <https://mentor.ieee.org/802.18/dcn/21/18-21-0027-02-0000-liaison-response-to-itu-r-wp-5a-on-thz-communications-15-thz-sc.docx>