GSA Spectrum Group

UHF issue (AI1.5)

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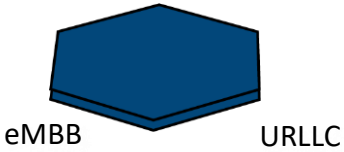
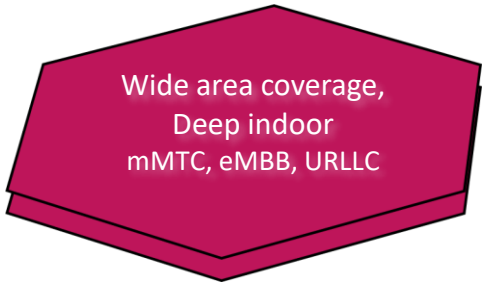
5G Spectrum

Additional low bands upgrades mobile performance in rural and indoors



mMTC (no deep coverage)



High Band e.g. 24.25 – 29.5 GHz | 37.0 – 43.5 GHz etc.

Extreme Capacity

800-1000 MHz spectrum per MNO/Network contiguous from 2020 onwards

Additional High band spectrum may be required for MNOs by 2023/2025

Mid Band e.g. 2.3, 2.6 GHz | 3.3 – 4.2 GHz | 4.4 – 5 GHz etc.

Coverage & Capacity

80-100 MHz spectrum per MNO/Network contiguous from 2020 onwards

Additional Mid band spectrum may be required for MNOs by 2023/2025

Low Band e.g. 600 MHz | 700 MHz etc.

Extended Coverage

Up to 20 MHz channel bandwidth from 2020 onwards

Additional Low band spectrum may be required for MNOs by 2023/2025

Various applications and services require access to spectrum from low, mid and high bands

5G Use Cases – sub 1 GHz

addressing urban and deep rural

Digital equality

Virtual classes in rural areas

Enable business opportunities in rural areas

Remote healthcare for urban and rural Areas

Digitalization – net zero

Smart Agriculture

Urban deep indoors

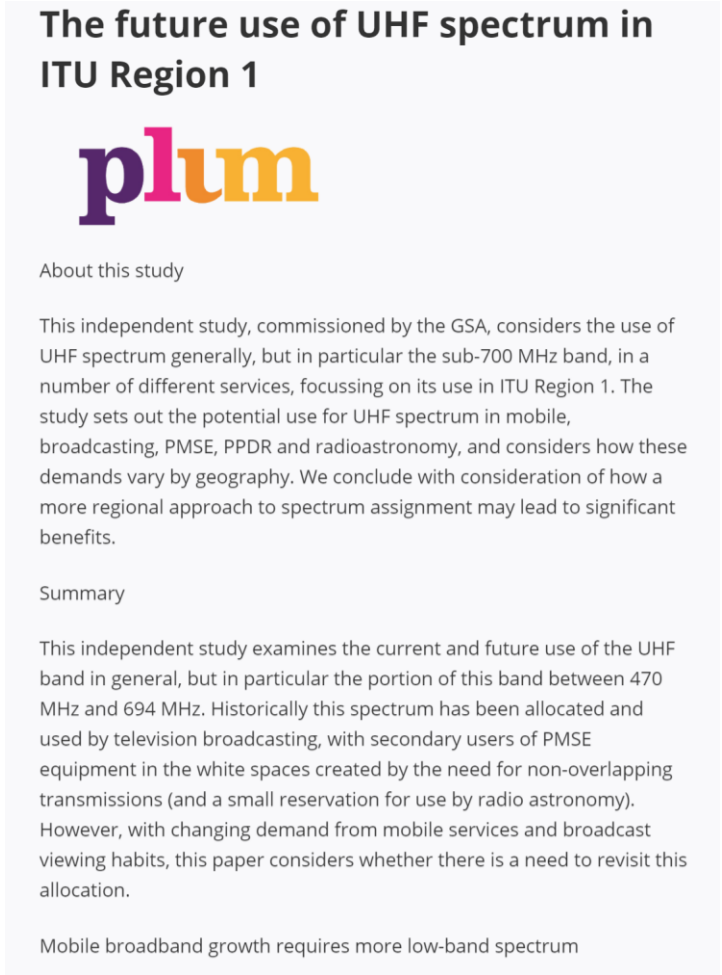
Connected wherever we are

IoT

Child safety - IoT

Study by Plum Consulting

- Significant variations in UHF use and needs by mobile, broadcast, PMSE, PPDR and Radio Astronomy from country to country in Region 1
- Value of choices for administrations towards the future use of 470-694 MHz
- Available at https://gsacom.com/reports/ and https://plumconsulting.co.uk/the-future-use-of-uhf-in-itu-region-1/
- GSA webinar “UHF spectrum – closing the digital divide”, replay available at https://gsacom.com/webinar/uhf-spectrum-closing-the-digital-divide/



The future use of UHF spectrum in ITU Region 1

plum

About this study

This independent study, commissioned by the GSA, considers the use of UHF spectrum generally, but in particular the sub-700 MHz band, in a number of different services, focussing on its use in ITU Region 1. The study sets out the potential use for UHF spectrum in mobile, broadcasting, PMSE, PPDR and radioastronomy, and considers how these demands vary by geography. We conclude with consideration of how a more regional approach to spectrum assignment may lead to significant benefits.

Summary

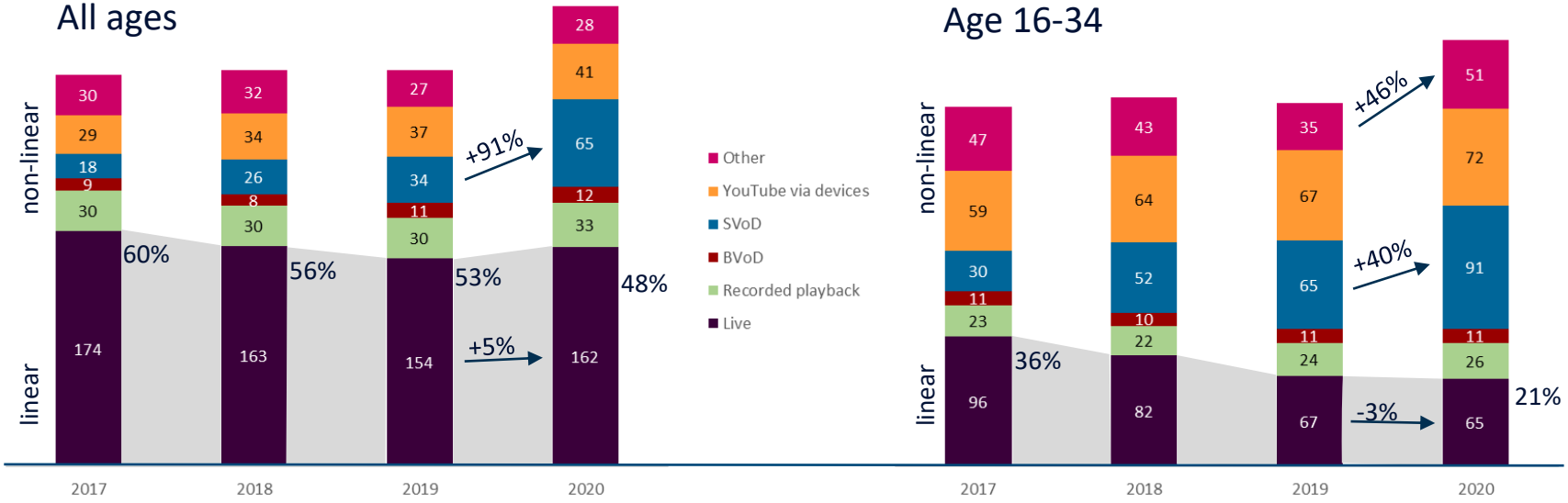
This independent study examines the current and future use of the UHF band in general, but in particular the portion of this band between 470 MHz and 694 MHz. Historically this spectrum has been allocated and used by television broadcasting, with secondary users of PMSE equipment in the white spaces created by the need for non-overlapping transmissions (and a small reservation for use by radio astronomy). However, with changing demand from mobile services and broadcast viewing habits, this paper considers whether there is a need to revisit this allocation.

Mobile broadband growth requires more low-band spectrum

Pandemic accelerated existing video consumption trends (example UK)

Biggest increases in subscribed VoD and other streaming

Total video viewing minutes per person per day

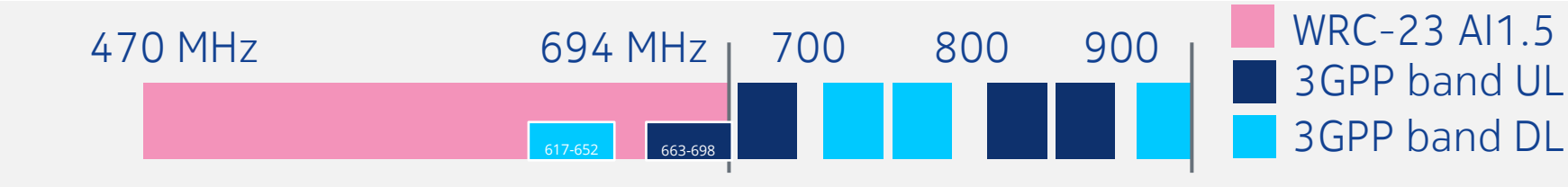


Source: Media Nations UK 2021 https://www.ofcom.org.uk/__data/assets/pdf_file/0023/222890/media-nations-report-2021.pdf

UK linear video consumption times down to 48% all audiences and to 21% younger audiences

Need for choices below 700 MHz in ITU Region 1

- GSA sees a need for additional low band spectrum globally and specifically in ITU Region 1
- Sub-1 GHz spectrum is essential to increase capacity and performance in rural areas and other hard-to-reach places, in a cost effective manner, for digital equality. In urban areas, this spectrum is key for deep indoors penetration
- 600 MHz FDD 3GPP Bands 71 (4G) and n71 (5G) are widely supported in infrastructure and terminals and can allow for immediate cost-efficient deployments of wide area 4G/5G
- The momentum for this band is increasing with more countries allocating (or considering) the band for mobile/nationwide use within Region 1 (e.g. Saudi Arabia) and outside (e.g. India)
- Readiness to release e.g. 600 MHz FDD across regions and sub-regions is very different
- Noting that administrations may have different targets regarding the balance of broadcast and mobile
- Different options need to be studied taking into account regional specificities



GSA recommendations regarding WRC-23

- Broadcast and mobile industries / technology will continue to evolve and may work more closely
- A co-primary mobile allocation at WRC23 keeps the options open
- A co-primary mobile allocation provides future choices for administrations to decide at individual paces what to do with the UHF spectrum taking into account the national needs (broadcast and mobile) and large mobile device ecosystems
- A co-primary mobile allocation also provide additional choices for some administrations to enable mobile technology within a country/sub-region subject to coordination arrangements with neighbours
- IMT identification is of interest in parts of Region 1
- A number of duplex arrangements (FDD, TDD, SDL/DL etc) are possible within the 470-694 MHz band and these should be studied after WRC23 (building on a co-primary mobile allocation / IMT identification agreed at WRC23)

Global mobile Suppliers Association

The Industry Voice of the Global Mobile Ecosystem

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