

ESOA Submission

on South African Draft National Radio Frequency Plan 2021

The EMEA Satellite Operators Association (ESOA) wishes to thank the Independent Communications Authority of South Africa (ICASA) for the opportunity to provide written comments on the draft National Radio Frequency Plan (draft Plan), as published in Government Gazette No. 44803 on 9 July 2021.

ESOA is a non-profit organisation established to serve and promote the common interests of EMEA satellite operators. The Association is the reference point for the European, African and Middle East satellite industry and today represents the interests of 34 members, including satellite operators who deliver both information and critical communication services across the globe as well as EMEA space industry stakeholders and insurance brokers.

The satellite sector provides a whole range of communications services everywhere in the world, including South Africa. Satellite operators provide essential services to key sectors:

- The consumer sector (e.g., TV broadcasting, broadband internet access, advanced video services, as well as mobile satellite communications for those on the move);
- The government sector (e.g., policy goals such as Broadband for All; remote education and medicine; mobile clinics, aviation and maritime sector, border control and monitoring, connectivity in remote or sparsely populated areas, emergency communication); and
- The enterprise sector (e.g., cellular backhaul for 5G/4G/3G/GSM; global data communications services for both the mobile and fixed communities; IoT and M2M communications; redundancy communications for the oil and gas, aeronautical and maritime communities).

Furthermore, fixed and mobile satellite communications provide an invisible and resilient overlay for terrestrial networks, thus helping to realize a society in which millions of connections between people, devices and things will require unprecedented network performance levels that terrestrial networks alone cannot deliver.

In order to respond to all these users' needs, the satellite sector needs to be able to rely on a stable and transparent regulatory regime. ESOA, therefore, welcomes the ICASA initiative to update the frequency spectrum allocation plan for South Africa.

Please find herewith ESOA's written comments, which are confined to those frequency bands of interest to its members. The absence of comments in any frequency band should not be understood to imply that ESOA supports the proposed frequency allocation in such frequency band.

ESOA requests the opportunity to make an oral presentation during the hearings scheduled from 7 to 9 September 2021.

ESOA recognises the importance of the National Radio Frequency Plan in spectrum management, as it is this Plan that provides certainty to all radiocommunication operators and is the basis upon which infrastructure investments and the provision of services worth millions of Rands are made.

A handwritten signature in blue ink, appearing to read 'Aarti Holla-Maini', with a stylized flourish underneath.

Submitted by Aarti Holla-Maini

ESOA Secretary General

ESOA specific comments on the Plan

In this submission, ESOA will confine its comments to those frequency bands of interest to its members but reserves its right to comment further on any aspect of the Plan during the oral hearings.

ITU Region 1 allocations and footnotes	South African allocations and footnotes	Typical Applications	Notes and Comments
<p>1 452-1 492 MHz</p> <p>FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING</p> <p>BROADCASTING-SATELLITE 5.208B</p> <p>5.341 5.342 5.345</p>	<p>1 452-1 492 MHz</p> <p>FIXED NF14 MOBILE except aeronautical mobile 5.346 BROADCASTING</p> <p>BROADCASTING-SATELLITE 5.208B</p> <p>5.341 5.345 NF12</p>	<p>(Sound)(digital audio)</p> <p>(Sound)(digital audio)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>studies called for Resolution 761 (WRC-15) on the “Compatibility of International Mobile Telecommunications and broadcasting-satellite service and take appropriate regulatory and technical studies, to ensure the compatibility of IMT and BSS (sound) are undertaken within the ITU-R ITU-R Res. 223 (Rev.WRC-15)</p> <p>Recommendation ITU-R M.1036-6</p> <p>Digital Sound Broadcasting (DSB) Regulations was published in GG44469 Notice 215 of 2021</p> <p>ITU-R Res. 223 (Rev.WRC-15)</p>

<p>1 492-1 518 MHz</p> <p>FIXED</p> <p>MOBILE except aeronautical mobile 5.341A</p> <p>5.341 5.342</p>	<p>1 492-1 518 MHz</p> <p>FIXED</p> <p>MOBILE except aeronautical mobile 5.341A</p> <p>5.341</p>	<p>Fixed Links (1 492 – 1 517 MHz)</p> <p>Single Frequency Links (1 517 – 1 525 MHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Paired with 1 350 – 1 375 MHz In accordance with Recommendation ITU-R F.1242</p> <p>ITU-R Res. 223 (Rev.WRC-15) (Sharing and Compatibility Studies called for by Resolution 223 (Rev. WRC-15) are underway within the ITU-R)</p> <p>Recommendation ITU-R M.1036-6</p>
<p>1 518-1 525 MHz</p> <p>FIXED</p> <p>MOBILE except aeronautical mobile</p> <p>MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A</p> <p>5.341 5.342</p>	<p>1 518-1 525 MHz</p> <p>FIXED</p> <p>MOBILE except aeronautical mobile</p> <p>MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.351A</p> <p>5.341</p>	<p>IMT Satellite component</p>	<p>The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies.</p> <p>Radio Frequency Spectrum Assignment Plan GG42286 Notice 125 of 2019</p>

<p>1 525-1 530 MHz</p> <p>SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A</p> <p>Earth exploration-satellite Mobile except aeronautical mobile 5.349</p> <p>5.341 5.342 5.350 5.351 5.352A 5.354</p>	<p>1 525-1 530 MHz</p> <p>SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A</p> <p>Earth exploration-satellite Mobile except aeronautical mobile</p> <p>5.341 5.351 5.352A 5.354</p>	<p>GMDSS Maritime satellite (1 525 – 1 544 MHz) Mobile satellite (1544 – 1545 MHz) Aeronautical Mobile satellite (1545 – 1555 MHz) Land Mobile Satellite (1555 – 1559 MHz)</p>	<p>ITU Resolution 212(Rev.WRC-07) and 225 (Rev WRC-07)</p> <p>Paired with 1 626.5 – 1 660.5 MHz The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies.</p>
<p>1 530-1 535 MHz</p> <p>SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A</p> <p>Earth exploration-satellite Fixed Mobile except aeronautical mobile</p> <p>5.341 5.342 5.351 5.354</p>	<p>1 530-1 535 MHz</p> <p>SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A</p> <p>Earth exploration-satellite Fixed Mobile except aeronautical mobile</p> <p>5.341 5.351 5.354</p>	<p>GMDSS Maritime satellite (1 525 – 1 544 MHz) Mobile satellite (1544 – 1545 MHz) Aeronautical Mobile satellite (1545 – 1555 MHz) Land Mobile Satellite (1555 – 1559 MHz)</p>	<p>Paired with 1 626.5 – 1 660.5 MHz The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies. In the band 1530-1544 MHz priority for maritime mobile distress, urgency and safety communications (GMDSS), Res.222 applies.</p>

1 535-1 559 MHz MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A	1 535-1 544 MHz MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A	GMDSS Maritime satellite (1 525 – 1 544 MHz)	Paired with 1 626.5 – 1 660.5 MHz The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies. In the band 1530-1544 MHz priority for maritime mobile distress, urgency and safety communications (GMDSS), Res.222 applies.
	1 544-1 545 MHz MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A	Mobile satellite (1544 – 1545 MHz) (Distress and safety)	The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies.
	1 545-1 555 MHz AERONAUTICAL MOBILE (R) AERONAUTICAL MOBILE (R) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A	Aeronautical Mobile satellite (1545 – 1555 MHz) (Air to air) (Ground to air)	The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies.

<p>5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A</p>	<p>1 555-1 559 MHz MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A</p>	<p>Land Mobile Satellite (1555 – 1559 MHz)</p>	<p>The band 1518-1559 MHz is identified for the satellite component of IMT; Res.225 applies.</p>
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ESOA COMMENTS

MSS is operational in the frequency band 1518-1525 MHz in Africa, and additional satellites are planned. Although compatibility studies in accordance with Res 223 (Rev. WRC-19) are underway in ITU-R WP4C and WP5D, the preliminary study results clearly indicate that IMT in the band 1492-1518 MHz will impact MSS operations in the band above 1518 MHz. Therefore, ICASA should consider implementing a guard band below 1518 MHz for at least 6 MHz in order to protect MSS. In addition, a reduction of IMT OOB emissions will be required to provide protection to critical and safety MSS operations.

ITU Region 1 allocations and footnotes	South African allocations and footnotes	Typical Applications	Notes and Comments
<p>1 970-1 980 MHz</p> <p>FIXED</p> <p>MOBILE 5.388A 5.388B</p> <p>5.388</p>	<p>1 970-1 980 MHz</p> <p>FIXED</p> <p>MOBILE 5.388A NF9</p> <p>5.388 5.388B</p>	<p>IMT2100 MTX (1920 – 1980 MHz)</p> <p>[FIXED (HAPS) (base stations for IMT)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Paired with 2110 – 2170 MHz</p>
<p>1 980-2 010 MHz</p> <p>FIXED</p> <p>MOBILE</p> <p>MOBILE-SATELLITE (Earth-to-space) 5.351A</p> <p>5.388 5.389A 5.389B 5.389F</p>	<p>1 980-2 010 MHz</p> <p>FIXED</p> <p>MOBILE</p> <p>MOBILE-SATELLITE (Earth-to-space) 5.351A</p> <p>5.388 5.389A 5.389F NF13</p>	<p>Fixed links (1980 – 2010 MHz)</p> <p>CGC/ATC fixed systems (1980 – 2010 MHz)</p> <p>IMT-satellite</p> <p>IMT (satellite) (1980-2010 MHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 212 (Rev.WRC-19) applies</p> <p>Paired with 2170 – 2200 MHz</p> <p>The development of satellites for IMT services to be monitored.</p>

ESOA COMMENTS

Under Notes & Comments ADD “Resolution 212 (Rev.WRC-19) applies”

<p>2 170-2 200 MHz</p> <p>FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A</p> <p>5.388 5.389A 5.389F</p>	<p>2 170-2 200 MHz</p> <p>FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A</p> <p>5.388 5.389A 5.389F NF13</p>	<p>Fixed Links (2170 – 2200 MHz) CGC/ATC fixed systems (1980 – 2010 MHz)</p> <p>IMT (satellite) (2170-2200 MHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Paired with 1980 – 2010 MHz</p> <p><u>Resolution 212 (Rev.WRC-19)</u> <u>applies</u></p>
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ESOA COMMENTS

Under Notes & Comments ADD “Resolution 212 (Rev.WRC-19) applies”

<p>3 400-3 600 MHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth)</p> <p>MOBILE except aeronautical mobile 5.430A</p> <p>Radiolocation</p> <p>5.431</p>	<p>3 400-3 600 MHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth)</p> <p>MOBILE except aeronautical mobile 5.430A NF9</p> <p>Radiolocation</p>	<p>IMT3500 TDD (3400 – 3600 MHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>International Mobile Telecommunication Roadmap (GG No.38213) 14 November 2014. Radio Frequency Spectrum Assignment Plan (GG N. 38640) as amended 30 March 2015. Recommendation ITU-R M.1036 The band 3400 -3600 MHz is also used for BFWA in some SADC countries Recommendation ITU-R M.1036-6</p>
<p>3 600-4 200 MHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth)</p> <p>Mobile</p>	<p>3 600-4 200 MHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) NF14</p>	<p>Fixed links (4 GHz) (3600 – 4200 MHz) C-band downlink (VSAT/SNG/PTP links)</p>	<p>The sub-band 3 600-3 800 MHz could be used for BFWA where frequency sharing with FS PTP and/or FSS is feasible. The channelling arrangement for PTP links in this band is based on ITU-R Recommendation F.635 Annex 1. The sub-band 3 600-4 200 MHz is used for medium and high capacity PTP links and FSS. In the band 3 600-3 800 MHz, FS PTP and FSS applications will have to operate on a coordinated basis.</p>

ESOA COMMENTS

While recognising that the frequency band 3 400-3 600 MHz has been identified for IMT use, in terms of the provisions of 5.430A, this identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations.

The frequency band 3 400-3 600 MHz is extremely important for FSS operation in areas of high rainfall and for providing wide-area coverage, including, as noted, the provision of feeder links for critical MSS operations such as GMDSS. ESOA, therefore, respectfully submits that ATU considers reinstating the FSS allocation on a co-primary basis in this frequency band.

With respect to the 3 600 - 3 800 MHz band, the ICASA statement that this band “*..could be used for BFWA where frequency sharing with FS PTP and/or FSS is feasible*” does not provide clarity as to the methods that ICASA will use to determine the conditions under which sharing between BFWA and FSS or FS would be feasible. Most of the receive-only earth stations operating in the C-band are not registered, so it is unclear how a BFWA operator would know there is a need for coordination. Specific sharing criteria must be specified. If the direction of ICASA is only to take registered earth stations into consideration when determining the feasibility of sharing, then it would be important to establish a simplified registration campaign for receive-only earth stations. Such a campaign should allow ample time for all operators of C-band earth stations to register, and this registry should be made available publicly on ICASA’s website.

<p>4 500-4 800 MHz</p> <p>FIXED</p> <p>FIXED-SATELLITE (space-to-Earth) 5.441</p> <p>MOBILE 5.440A</p>	<p>4 500-4 800 MHz</p> <p>FIXED NF14</p> <p>FIXED-SATELLITE (space-to-Earth) 5.441</p> <p>MOBILE NF15</p>	<p>Fixed links (4.8 GHz) (4400 – 5000 MHz)</p> <p>Government services</p> <p>Outside Broadcast links</p> <p>Electronic News Gathering</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Appendix 30B Plan</p> <p>The band 4 500-4 800 MHz is part of the APP30B Plan (FSS space-to-Earth). Refer to Annex B.</p> <p>Recommendation ITU-R M.1036-6</p>
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ESOA COMMENTS

ICASA accurately recognizes that the 4 500-4 800 MHz band is part of the Appendix 30B FSS plan. However, as of WRC-19, there was no IMT identification in the 4 500-4 800 MHz band. Also, Recommendation ITU-R M.1036-6 is not applicable here because it does not contemplate the implantation of IMT in this band. It only deals with IMT implementation in the 4 800-4 990 MHz band. So it appears that the IMT identification shown here is misplaced. It is worth noting that South Africa was listed in 5.441B, which identified the 4 800-4 990 MHz for IMT.

<p>5 725-5 830 MHz</p> <p>FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur</p> <p>5.150 5.451 5.453 5.455</p>	<p>5 725-5 830 MHz</p> <p>FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Fixed NF16</p> <p>5.150 5.453</p>	<p>Fixed links (5725 – 5850 MHz) RTT data (5795 – 5815 MHz) ISM applications (5725 – 5875 MHz) BFWA (5725-5850 MHz) ISM (5725-5875 MHz) RTTT (Road Transport and Traffic Telematics) (5795-5815 MHz) SRD applications (5 725-5 875 MHz) SRD - Transport and information control systems (5 805-5 815 MHz)</p>	<p>Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 38641, 30 March 2015).</p> <p>·</p> <p>BFWA in some SADC countries is limited to below 5850 MHz in order to protect FSS in the band 5850-6425 MHz</p> <p>Common international SRD band; see ITU-R Rec. SM.1896 Transport information and control systems Recommendation ITU-R M.1453</p>
<p>5 830-5 850 MHz</p> <p>FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth)</p> <p>5.150 5.451 5.453 5.455</p>	<p>5 830-5 850 MHz</p> <p>FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) Fixed NF16</p> <p>5.150 5.453</p>	<p>Fixed links BFWA (5725 – 5850 MHz) ISM applications (5725 – 5875 MHz)</p>	<p>Radio Frequency Spectrum Regulations as amended (Annex B) (GG. No. 3417238641, 3130 March 2015).</p> <p>BFWA in some SADC countries is limited to below 5850 MHz in order to protect FSS in the band 5850-6425 MHz</p>

<p>5 850-5 925 MHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) MOBILE</p> <p>5.150</p>	<p>5 850-5 925 MHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) MOBILE</p> <p>5.150</p>	<p><u>PTP</u> C-band uplink (VSAT/SNG/<u>PTP</u> links)</p> <p>ISM applications (5725 – 5875 MHz) Fixed-satellite uplinks (PTP/VSAT/SNG) (5850-6425 MHz) FIXED links (5850-5925 MHz) ISM (5725-5875 MHz)</p>	<p>FS could be used for temporary OB links.</p>
<p>6 429-6700 MHz</p> <p>FIXED 5.457 NF14</p> <p>FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B</p> <p>MOBILE</p> <p>5.458</p>	<p>5 925-6 425 MHz</p> <p>FIXED 5.457 NF14</p> <p>FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE</p> <p>5.149 5.440 5.458</p>	<p>Fixed links - Lower 6 GHz (5925-6425 MHz) and Upper 6 GHz (6425-7110 MHz), BFWA</p> <p>Fixed-satellite uplinks (PTP/VSAT/SNG) (5850-6425 MHz)</p> <p>ESVs (5925 – 6425 MHz)</p>	<p>Channelling Plan for L6 GHz band in accordance with ITU-R Rec. F.383.</p> <p>Channelling Plan for U6 GHz band in accordance with ITU-R Rec. F.384.</p> <p>Earth Station onboard vessels (ESV) are also allowed under FSS.</p> <p>Resolution 150 (WRC-12)</p>
	<p>6 425-6 429 MHz</p> <p>FIXED 5.457 NF14</p>	<p>Upper 6 GHz (6425-7110 MHz), BFWA</p>	<p>Channelling Plan for U6 GHz band in accordance with ITU-R Rec. F.384.</p>

	<p>FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B</p> <p>MOBILE</p> <p>STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (6 427 MHz) (space-to-Earth)</p> <p>5.149 5.440 5.458</p>		<p>Earth Station onboard vessels (ESV) are also allowed under FSS</p> <p>Resolution 150 (WRC-12)</p>
		<p>Upper 6 GHz (6425-7110 MHz), BFWA</p>	<p>Channelling Plan for U6 GHz band in accordance with ITU-R Rec. F.384.</p> <p>Earth Station onboard vessels (ESV) are also allowed under FSS</p> <p>Resolution 150 (WRC-12)</p>
<p>6 700-7 075 MHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441</p> <p>MOBILE</p>	<p>6 700-7 075 MHz</p> <p>FIXED NF14 FIXED-SATELLITE (Earth-to-space)</p> <p>(space-to-Earth) 5.441</p> <p>MOBILE</p>	<p>Fixed Links (U6) (6425 – 7110 MHz)</p> <p>S-DAB feeder links (uplinks)</p> <p>Fixed links - Upper 6 GHz (6425-7110 MHz)</p> <p>Feeder links of non-GSO-satellite systems in the MSS</p>	<p>Channelling Plan for U6 GHz band in accordance with ITU-R Rec. F.384.</p> <p>The band 6 725-7 025 MHz is part of the APP30B Plan (FSS Earth-to-space); refer to Annex B.</p>

5.458 5.458A 5.458B	5.458 5.458A 5.458B		
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ESOA COMMENTS

In the frequency band 5 850-5 925 MHz, PTP links should be listed against the FS and not FSS

<p>17.3-17.7 GHz</p> <p>FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B</p> <p>Radiolocation</p> <p>5.514</p>	<p>17.3-17.7 GHz</p> <p>FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B (non-GSO) (Earth-to-space)</p> <p>Radiolocation</p>	<p>Feeder links of GSO-satellite systems in the BSS</p> <p>[HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>The band 17.3-17.7 GHz is part of the APP30A Plan (Feeder Links for BSS) for many SADC countries; refer to Annex B.</p> <p>The band 17.3-17.7 GHz is identified for HDFSS; Res.143 applies.</p>
<p>17.7-18.1 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516</p> <p>MOBILE</p>	<p>17.7-18.1 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516 (non-GSO) (Earth-to-space) MOBILE</p>	<p>Fixed Links (18 GHz) (17.7 – 19.7 GHz) BSS Feeder Links Feeder links of GSO-satellite systems in the BSS</p>	<p>Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1.</p> <p>Resolution 169 (WRC-19)</p>
<p>18.1-18.4 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A (Earth-to-space) 5.520</p> <p>MOBILE</p>	<p>18.1-18.4 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A (Earth-to-space) 5.520</p> <p>MOBILE</p> <p>METEOROLOGICAL-SATELLITE (GSO) (space-to-Earth)</p>	<p>Fixed Links (18 GHz) (17.7 – 19.7 GHz) BSS Feeder Links</p> <p>Feeder links of GSO-satellite systems in the BSS</p>	<p>Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1.</p> <p>Resolution 169 (WRC-19)</p>

5.519 5.521	5.519		
18.4-18.6 GHz FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A MOBILE	18.4-18.6 GHz FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A MOBILE	Fixed Links (18 GHz) (17.7 – 19.7 GHz)	Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1. Resolution 169 (WRC-19)
18.6-18.8 GHz EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 GHz EARTH EXPLORATION-SATELLITE (passive) FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B (GSO) (space-to-Earth) MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	Fixed Links (18 GHz) (17.7 – 19.7 GHz) System with orbit apogee greater than 20 000 km Passive Sensing	Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1 Resolution 169 (WRC-19) Resolution 143 (WRC-19)
18.8-19.3 GHz FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.523A	18.8-19.3 GHz FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.523A	Fixed Links (18 GHz) (17.7 – 19.7 GHz)	

MOBILE	MOBILE		
19.3-19.7 GHz FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.523B 5.523C 5.523D 5.523E (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE	19.3-19.6 GHz FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.517A 5.523B 5.523C 5.523D 5.523E (Earth-to-space) 5.523B 5.523C 5.523D 5.523E MOBILE	Fixed Links (18 GHz) (17.7–19.7 GHz) BSS Feeder Links Feeder links of non-GSO-satellite systems in the MSS	Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1. Resolution 169 (WRC-19)
	19.6-19.7 GHz FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.523C 5.523D 5.523E (Earth-to-space) 5.523C 5.523D 5.523E MOBILE	Fixed Links (18 GHz) (17.7–19.7 GHz) BSS Feeder Links Feeder links of non-GSO-satellite systems in the MSS	Channelling Plan for 18 GHz band in accordance with ITU-R Rec. F.595 Annex 1. Resolution 169 (WRC-19)
19.7-20.1 GHz FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A	19.7-20.1 GHz FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A	GSO/FSS	Resolution 156 (WRC-15) The band 19.7-20.2 GHz is identified for HDFSS; Res.143 applies.

Mobile-satellite (space-to-Earth) 5.524	Mobile-satellite (space-to-Earth)	[HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]	
20.1-20.2 GHz FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528	20.1-20.2 GHz FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528	[HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]	Resolution 156 (WRC-15) The band 19.7-20.2 GHz is identified for HDFSS; Res.143 applies.
20.2-21.2 GHz FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524	20.2-21.2 GHz FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)		

ESOA COMMENTS

ESOA is very concerned that South Africa is considering a MOBILE allocation in the 17.7-19.7 GHz (18 GHz) bands for their possible usage by terrestrial mobile systems. These bands are essential to broadband satellite services and earth stations in

motion (ESIM) applications, as the Space-to-earth frequencies are paired to the 27.5-29.5 GHz frequencies used for Earth-to-space links (see comments below on the 28 GHz band).

ESOA also wishes to ask clarify on the secondary NGSO Earth-to-space/uplink allocation in the 17.3-18.1 GHz band that is being added for use in the national table, as no such use is listed for the existing ITU Region 1 Table.

Under Notes & Comments ADD, "Resolution 156 (WRC-15) applies."

<p>24.65-24.75 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB</p>	<p>24.65-24.75 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB</p>	<p>Fixed Links (26 GHz) (24.5 – 26.5 GHz) Fixed links - 26 GHz (24.5-26.5 GHz) BFWA (24.5-26.5 GHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Channelling Plan for 26 GHz band in accordance with ITU-R Rec. F.748 Annex 1.</p> <p>Resolution 242 (WRC-19) Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>24.75-25.25 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.532B MOBILE except aeronautical mobile 5.338A 5.532AB</p>	<p>24.75-25.25 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (Earth-to-space) 5.532B MOBILE except aeronautical mobile 5.338A 5.532AB</p>	<p>Fixed Links (26 GHz) (24.5 – 26.5 GHz) Fixed links - 26 GHz (24.5-26.5 GHz) BFWA (24.5-26.5 GHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Channelling Plan for 26 GHz band in accordance with ITU-R Rec. F.748 Annex 1.</p> <p>Resolution 242 (WRC-19) Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>

ESOA COMMENTS

The ITU WRC-19 designated over 17 gigahertz of spectrum for terrestrial IMT/5G in the mm-Wave bands, including the 26 GHz band. ESOA to invite ICASA to take this vast amount of mmWave spectrum into account as part of any review of spectrum for terrestrial IMT/5G services.

The 24.25-27.5 GHz (26 GHz) band (3GPP: n258) is most appropriate for any requirements for the mmWave band for terrestrial IMT/5G. There is little use of mmWave bands for IMT/5G today. With over three gigahertz of globally harmonized spectrum available in the 26 GHz band, South Africa will be able to accommodate any future demand for terrestrial IMT/5G mm-Wave services while also appropriately protecting existing services, including satellite-powered broadband services operating in the adjacent 27.5-29.5 GHz (28 GHz) band.

<p>27.5-28.5 GHz</p> <p>FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539</p> <p>MOBILE</p>	<p>27.5-27.501 GHz</p> <p>FIXED 5.537A NF14 NF18 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 FIXED-SATELLITE (space-to-Earth) MOBILE</p> <p>5.538 5.540</p>	<p>Fixed Links (28 GHz) (27.5–29.5 GHz), LMDS (27.5–28.35) Base to Subscriber Beacon transmission for up-link power control</p> <p>[HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>LMDS (31.000–31.300 MHz) Subscriber to Base Channelling Plan for 28 GHz band in accordance with ITU-R Rec. F.748 Annex 2. The band 27.5-27.82 GHz is identified for HDFSS; Res.143 applies. The band 27.5-30 GHz may be used by the FSS for BSS feeder links.</p> <p>Resolution 169 (WRC-19)</p>
	<p>27.501-27.82 GHz</p> <p>FIXED 5.537A NF14 NF18 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517 A 5.539 MOBILE Fixed-satellite (space to Earth)</p> <p>5.538 5.540</p>	<p>Fixed Links (28 GHz) (27.5–29.5 GHz), LMDS (27.5–28.35) Base to Subscriber Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>LMDS (31.000–31.300 MHz) Subscriber to Base Channelling Plan for 28 GHz band in accordance with ITU-R Rec. F.748 Annex 2. The band 27.5-27.82 GHz is identified for HDFSS; Res.143 applies. The band 27.5-30 GHz may be used by the FSS for BSS feeder links.</p> <p>Resolution 169 (WRC-19)</p>
	<p>27.82-28.45 GHz</p>		

	<p>FIXED 5.537A NF14 NF18 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 MOBILE</p> <p>Fixed-satellite (space-to-Earth) MOBILE</p>	<p>Fixed Links (28 GHz) (27.5 – 29.5 GHz), LMDS (27.5 – 28.35) Base to Subscriber Beacon transmission for up-link power control)</p>	<p>LMDS (31.000 – 31.300 MHz) Subscriber to Base Channelling Plan for 28 GHz band in accordance with ITU-R Rec. F.748 Annex 2. The band 27.5-27.82 GHz is identified for HDFSS; Res.143 applies. The band 27.5-30 GHz may be used by the FSS for BSS feeder links.</p>
<p>5.538 5.540</p>	<p>28.45-28.5 GHz</p> <p>FIXED 5.537A NF14 NF18 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517 5.539 MOBILE Fixed-satellite (space-to-Earth)</p>	<p>Fixed Links (28 GHz) (27.5 – 29.5 GHz), LMDS (27.5 – 28.35) Base to Subscriber Beacon transmission for up-link power control)</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>LMDS (31.000 – 31.300 MHz) Subscriber to Base Channelling Plan for 28 GHz band in accordance with ITU-R Rec. F.748 Annex 2. The band 27.5-27.82 GHz is identified for HDFSS; Res.143 applies. The band 27.5-30 GHz may be used by the FSS for BSS feeder links.</p>
<p>28.5-29.1 GHz</p> <p>FIXED</p>	<p>28.5-28.94 GHz</p> <p>FIXED NF14</p>	<p>Fixed Links (28 GHz) (27.5 – 29.5 GHz)</p>	

<p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539</p> <p>MOBILE</p> <p>Earth exploration-satellite (Earth-to-space) 5.541</p>	<p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539</p> <p>MOBILE</p> <p>Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.540</p>	<p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>Channelling Plan for 28 GHz band in accordance with ITU-R Rec. F.748 Annex 2.</p> <p>Resolution 169 (WRC-19)</p> <p>The band 28.45-28.94 GHz is identified for HDFSS; Res.143 applies.</p> <p>The band 27.5-30 GHz may be used by the FSS for BSS feeder links.</p>
<p>5.540</p>	<p>28.94-29.1 GHz</p> <p>FIXED NF14</p> <p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539</p> <p>MOBILE</p> <p>Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.540</p>	<p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p>	<p>Resolution 169 (WRC-19)</p>
<p>29.1-29.5 GHz</p> <p>FIXED</p>	<p>29.1-29.46 GHz</p> <p>FIXED NF14 NF18</p>		

<p>FIXED-SATELLITE (Earth-to-space) 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A</p> <p>MOBILE Earth exploration-satellite (Earth-to-space) 5.541</p>	<p>FIXED-SATELLITE (Earth-to-space) 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A</p> <p>FIXED-SATELLITE (GSO) (Earth-to-space)</p> <p>MOBILE Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.540</p>	<p>Fixed Links (28 GHz) (27.5 – 29.5 GHz)</p> <p>Feeder links of non-GSO-satellite systems in the MSS</p> <p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p>	<p>Resolution 169 (WRC-19)</p>
<p>5.540</p>	<p>29.46-29.5</p> <p>FIXED NF14 NF18</p> <p>FIXED-SATELLITE (Earth-to-space) 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A</p> <p>FIXED-SATELLITE (GSO) (Earth-to-space)</p> <p>MOBILE Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.540</p>	<p>Feeder links of non-GSO-satellite systems in the MSS</p> <p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>Resolution 169 (WRC-19)</p>
<p>29.5-29.9 GHz</p>	<p>29.5-29.9 GHz</p>		<p>Resolution 156 (WRC-15)</p>

<p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Mobile-satellite (Earth-to-space)</p> <p>5.540 5.542</p>	<p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>Earth exploration-satellite (Earth-to-space) 5.541</p> <p>Fixed-satellite (space-to-Earth)</p> <p>Mobile-satellite (Earth-to-space)</p> <p>5.540</p>	<p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>The band 29.46-30.0 GHz is identified for HDFSS; Res.143 applies.</p>
<p>29.9-30 GHz</p> <p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>MOBILE-SATELLITE (Earth-to-space)</p> <p>Earth exploration-satellite (Earth-to-space) 5.541 5.543</p>	<p>29.9-29.95 GHz</p> <p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>MOBILE-SATELLITE (Earth-to-space)</p> <p>Earth exploration-satellite (Earth-to-space) 5.541 5.543</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.525 5.526 5.527 5.538 5.540</p> <p>29.95-29.999 GHz</p>	<p>Transfer of data between stations</p> <p>Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>Resolution 156 (WRC-15)</p> <p>Resolution 156 (WRC-15)</p>

	<p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>MOBILE-SATELLITE (Earth-to-space)</p> <p>Earth exploration-satellite (Earth-to-space) 5.541 5.543</p> <p>Earth exploration-satellite (space-to-space)</p> <p>Fixed-satellite (space-to-Earth)</p> <p>5.525 5.526 5.527 5.538 5.540</p>	<p>Transfer of data between stations</p> <p>Telemetry, tracking and control</p> <p>Beacon transmission for up-link power control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	
	<p>29.999-30 GHz</p> <p>FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539</p> <p>FIXED-SATELLITE (space-to-Earth)</p> <p>MOBILE-SATELLITE (Earth-to-space)</p> <p>Earth exploration-satellite (Earth-to-space) 5.541 5.543</p> <p>Earth exploration-satellite (space-to-space)</p>	<p>Beacon transmission for up-link power control</p> <p>Transfer of data between stations</p> <p>Telemetry, tracking and control</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>Resolution 156 (WRC-15)</p>

5.525 5.526 5.527 5.538 5.540 5.542	5.525 5.526 5.527 5.538 5.540		
30-31 GHz FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.542	30-31 GHz FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth)		

ESOA COMMENTS

Given the evolution of mobile networks into a 5G/IMT ecosystem, ESOA is very concerned that ICASA is considering a new MOBILE allocation in the 27.5-29.5 GHz (28 GHz) band for the possible usage by any terrestrial mobile systems, including IMT/5G. In line with WRC-15 and WRC-19 outcomes, within ITU-R Region 1, both the Middle East and Europe have taken an unambiguous position against using the 28 GHz band for terrestrial mobile systems including IMT/5G. Instead, they have harmonised this band for broadband satellite services and earth stations in motion (ESIM) applications.

The ITU WRC-19 designated over 17 gigahertz of spectrum for terrestrial IMT/5G in the mm-Wave bands, including the 26 GHz band. ESOA urges ICASA to essentially rely on the vast amount of mm-Wave spectrum made available for terrestrial IMT/5G services.

The 28 GHz band, in which the global satellite industry has invested tens of billions of dollars for the design, manufacture and launch of GSO and non-GSO HTS and VHTS satellites, is being, and will increasingly be, used for a broad portfolio of services across the world, including satellite consumer broadband services, as well as for the ESIM that are already deployed worldwide. These services are also being deployed across Africa and South Africa, and access to the 28 GHz band is critical.

WRC-15 decided not to consider the 28 GHz band as a candidate spectrum for terrestrial IMT/5G under WRC-19. Several African countries have confirmed the decision to prioritise this band for FSS Fixed-satellite Earth-to-space through their 5G plans (e.g. Nigeria and others). The CEPT in Europe also issued a 5G Roadmap that explicitly stated: "... Europe has harmonised the 27.5-29.5 GHz band for broadband satellite and is supportive of the worldwide use of this band for ESIM. This band is therefore not available for 5G."

Further, ESOA wishes to seek clarity on the secondary allocation for FSS Fixed-satellite (space-to-Earth / downlink) is added to the bands between 27.5 and 30.0 GHz in the national table as no such use is listed for the existing ITU Region 1 Table.

ESOA also does not understand the proposed references to the LMDS services in the 27.5-28.5 GHz band segments. The proposal references LMDS services, which are based on a technology that was proposed almost 30 years ago and has been commercially unsuccessful. Such an addition to the Table seems unwarranted, particularly in light of the rapid expansion of satellite broadband services in the band, including ESIM.

<p>37.5-38 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth)</p> <p>5.547</p>	<p>37.5-38 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth)</p> <p>5.547</p>	<p>Fixed Links (38 GHz) (37.0 – 39.5 GHz)</p> <p>FSS Gateways</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>The band 37-40 GHz is identified for HDFS; Res.75 applies. Resolution 770 (WRC-19) Resolution 243 (WRC-19) Channelling Plan for 38 GHz band in accordance with ITU Rec. F.749 Annex 1.</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>38-39.5 GHz</p> <p>FIXED 5.550D</p> <p>FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth)</p> <p>5.547</p>	<p>38-39.5 GHz</p> <p>FIXED 5.550D NF14</p> <p>FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth)</p> <p>5.547</p>	<p>Fixed Links (38 GHz) (37.0 – 39.5 GHz) [FIXED (HAPS)]</p> <p>FSS Gateways</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Channelling Plan for 38 GHz band in accordance with ITU Rec. F.749 Annex 1.</p> <p>The band 37-40 GHz is identified for HDFS; Res.75 applies. Resolution 770 (WRC-19) Resolution 243 (WRC-19) Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>39.5-40 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C</p>	<p>39.5-40 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C</p>		<p>Resolution 770 (WRC-19)</p>

<p>MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth)</p> <p>5.547 5.550E</p>	<p>MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth)</p> <p>5.547 5.550E</p>	<p>FSS Gateways</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 243 (WRC-19) The band 37-40 GHz is identified for HDFSS; Res.75 applies. The band 39.5-40 GHz is identified for HDFSS; Res.143 applies.</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>40-40.5 GHz</p> <p>EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)</p> <p>5.550E</p>	<p>40-40.5 GHz</p> <p>EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)</p> <p>5.550E</p>	<p>Government Services</p> <p>FSS Gateways</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>The band 40-40.5 GHz is identified for HDFSS; Res.143 applies.</p> <p>Resolution 770 (WRC-19) Resolution 243 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>40.5-41 GHz</p>	<p>40.5-41 GHz</p>		

<p>FIXED FIXED-SATELLITE (space-to-Earth) 5.550C BROADCASTING BROADCASTING-SATELLITE LAND MOBILE 5.550B Mobile</p> <p>Aeronautical mobile</p> <p>Maritime mobile</p> <p>5.547</p>	<p>FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.550C BROADCASTING BROADCASTING-SATELLITE LAND MOBILE 5.550B Mobile</p> <p>Aeronautical mobile</p> <p>Maritime mobile</p> <p>5.547</p>	<p>FSS Gateways</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 770 (WRC-19) BFWA or MWS (40.5-43.5 GHz). The band 40.5-43.5 GHz is identified for HDFS; Res.75 applies.</p> <p>Resolution 243 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>41-42.5 GHz</p> <p>FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C BROADCASTING BROADCASTING-SATELLITE Mobile</p> <p>LAND MOBILE 5.550B</p> <p>Aeronautical mobile</p> <p>Maritime mobile</p> <p>5.547 5.551F 5.551H 5.551I</p>	<p>41-42.5 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C BROADCASTING BROADCASTING-SATELLITE</p> <p>LAND MOBILE 5.550B</p> <p>Aeronautical mobile</p> <p>Maritime mobile</p> <p>5.547 5.551F 5.551H 5.551I</p>	<p>FSS Gateways</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 143 (WRC-19) Resolution 770 (WRC-19) BFWA or MWS (40.5-43.5 GHz). The band 40.5-43.5 GHz is identified for HDFS; Res.75 applies.</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>

<p>42.5-43.5 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile 5.550B RADIO ASTRONOMY</p> <p>5.149 5.547 5.551H</p>	<p>42.5-43.5 GHz</p> <p>FIXED NF14 FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile 5.550B RADIO ASTRONOMY</p> <p>5.149 5.547 5.551H</p>	<p>Government Services (43.5-45.5 GHz)</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>BFWA or MWS (40.5-43.5 GHz). The band 40.5-43.5 GHz is identified for HDFS; Res.75 applies.</p> <p>Resolution 243 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
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ESOA COMMENTS

ESOA welcomes ICASA's designation of the 39.5-40.5 GHz band to HD-FSS (Typical Application).

The satellite industry is also developing feeder-links and gateways which will use the entire 37.5-42.5 GHz band, so we invite ICASA to include a designation for FSS Gateways in the third column.

<p>47.2-47.5 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B</p> <p>5.552A</p>	<p>47.2-47.5 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B</p> <p>5.552A</p>	<p>[FIXED (HAPS)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 770 (WRC-19) Resolution 243 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>47.5-47.9 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (space-to-Earth) 5.516B 5.554A MOBILE 5.553B</p>	<p>47.5-47.9 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (GSO) (space-to-Earth) 5.516B 5.554A MOBILE 5.553B</p>	<p>The band 47.5-47.9 GHz is identified for HDFSS; Res.143 applies.</p> <p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 770 (WRC-19)</p> <p>Resolution 243 (WRC-19) Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>47.9-48.2 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B</p> <p>5.552A</p>	<p>47.9-48.2 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B</p> <p>5.552A</p>	<p>[FIXED (HAPS)]</p> <p>(International Mobile Telecommunications (IMT))</p>	<p>Resolution 770 (WRC-19) Resolution 243 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>

<p>48.2-48.54 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE</p>	<p>48.2-48.54 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (GSO) (space-to-Earth) 5.516B 5.554A 5.555B MOBILE</p>	<p>HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]</p>	<p>The band 48.2-48.54 GHz is identified for HDFSS; Res.143 applies. Resolution 770 (WRC-19)</p> <p>Recommendation ITU-R M.1036-6 currently being updated revised within the ITU-R</p>
<p>48.54-49.44 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE</p>	<p>48.54-48.94 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE</p> <p>5.149 5.340 5.555</p>		<p>Resolution 770 (WRC-19)</p>
	<p>48.94-49.04 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE RADIO ASTRONOMY</p> <p>5.149 5.340 5.555</p>		
	<p>49.04-49.44 GHz</p> <p>FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552</p>		<p>Resolution 770 (WRC-19)</p>

5.149 5.340 5.555	MOBILE 5.149 5.340 5.555		
49.44-50.2 GHz FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	49.44-50.2 GHz FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C 5.552 (GSO) (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	HIGH-DENSITY APPLICATIONS IN THE FSS (space-to-Earth)]	Resolution 770 (WRC-19) The band 49.44-50.2 GHz is identified for HDFSS; Res.143 applies.

ESOA COMMENTS

ESOA welcomes ICASA's designations for HD-FSS (Typical Application). In line with CEPT's proposals, we invite ICASA to make clear the designation needs to be for the entire 48.2-50.2 GHz band (and not only for some parts of it).