GLOBAL SATELLITE COALITION

Summary of Salient Points as Input to the DoT on 10 Year Spectrum Planning Exercise

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Mr Secretary – Shri Anshu Prakash,
Wireless Advisor Shri G.K Agrawal,
Distinguished DoT Officials,
Members of the Industry and Friends

All protocols observed

First and foremost, let me thank DoT for their kind invitation to participate in this 10-year spectrum planning exercise.

The satellite industry, as represented here today, both through Global satellite Coalition along with its members present here, Inmarsat, Intelsat, Viasat, SES, One Web, etc., is very much appreciated and welcome this important initiative undertaken by the Secretary to establish a ten-year spectrum plan, with periodic reviews.

Such spectrum plan should take in to account the national requirements of ALL users/communities throughout the country and that ONLY through a mix of technologies together with both spectrum and regulatory certainty that will enable digital transformation and growth for India's 1.3 bn people where ever they happen to live and to bring about socio-economic development for the country.

With this in mind, we urge Mr secretary to take note of the uniqueness and major benefits of satellite technology used today in broadcasting, fixed and mobile environments.

1. **Global Satellite coalition** is a satellite industry body comprising of 7 trade associations spread across the three ITU regions to act as one voice. The main objective of GSC to extend the benefits of satellite innovation and technology to society as a whole, so that digital, education, health & social divides across diverse geographies & economies, on land/sea/air are all bridged, leveraging satellite solutions in synergy with terrestrial communications to support economies of scale, resilience and coverage. GSC has major satellite industry members with national, regional and global operations, with satellite, launchers, terminal manufacturers, applications developers etc.

2. **The satellite sector's demand and growth are** quite evident with India's own Space and Satellite industry that has added enormous value to national development & operations.

    - Satellite Sector continues to invest Billions $bn in National, Regional and Global satellite infrastructure to bridge the digital divide. We welcome GOI open access `space policy' to bring an about greater FDI level into India's satellite sector.
    - Over the last five years, the number of satellites increased by 77 % and launchers by 114%
    - Number of planned satellites `as filed to ITU' is `astronomical with GEOs, MEOs and new generations of LEOs from One Web, SpaceX, Amazon, Telesat etc
    - This means a massive increase in available capacity/bandwidth, reaching over 30 Tbps of space segment capacity by 2024. This also means a massive reduction cost per Mbit down to a fraction of a cent.

3. **Uniqueness and major benefits of satellite technology in broadcasting, fixed and mobile environment** cannot be underestimated, particularly in the country of 1.3bn with such diverse geographies.

- As GOI is well aware – satellite continues to play an important role for the national communications infrastructure, providing nationwide coverage to complement and extend dense terrestrial networks, competitive broadband connectivity directly to households and communities, complementing connectivity for mobile nodes (ships, aeroplanes and trains), emergency/disaster communications, backhauling, uni or multi-casting, broadcasting to homes nationwide etc.

- Today, satellite provides a diverse portfolio of services across India regarding the network, media, and government services. Satellite is very much an integral part of the 5G communications ecosystem.

4. **Current utilization of spectrum by satellite sector** is spread across several bands from below 1GHz for low data rate small sat LEOs/MEOs and GEOs utilizing L, S, Ku and Ka-band for a diverse portfolio of services as already outlined.

- **In the L- band** user links in 1518 to 1559 MHz downlink, 1626.5-1660.5 MHz Uplink. The band is deployed for critical safety services in maritime, aeronautical and the land mobile environments, and disaster relief operations. The d/l band 1518-1559 must remain interference-free from any IMT deployment below 1518 MHz to enable safety services such as GMDSS, GADSS.

- **C-band 3.4 to 4.3 GHz** utilization in India has been critical in serving a diverse range of communities from urban/suburban to rural/remote areas – whereby C-band remains the only lifeline to connect many villages with the rest of the country.
  i. **Within C-band from 3.7 - 4.2 GHz** - more than 900 licensed TV Channels for media distribution across India over the last 20+ years, uplinked from about 100 Teleports. More than 60,000 LCOs receive this C-Band feed for distribution on the last mile cable systems to Indian homes. Under the Digital Addressable system now, more than 6000 digital cable head ends operate on C-Band. These need to be protected as primary users of C-Band.
  ii. **C-band feeder links in bands 3550 -3700 MHz d/l and 6425 – 6575 MHz u/l** are in use to carry safety services traffic between the gateway to/from the space station, and these are under study for WRC-23 under ai 1.2 and 1.3
  iii. **C-band above 3.6 GHz** is heavily used in India, including ISRO satellites, especially for domestic and international broadcasting. There is adequate mid-band spectrum in 3.3-3.6 GHz for 5G in India. Interference mitigation measures will be required to protect FSS above 3.6 GHz from 5G below 3.6 GHz.
  iv. Given the extensive usage within India of C-band, DoT should avoid assigning spectrum in 3600 to 4200 MHz for IMT to preserve the important satellite operations in this band.
  v. Any co-existence between FSS and 5G in adjacent bands below 3.6 GHz must be carefully managed, as in the case of HK and Myanmar guard of 100MHz was implemented.
  vi. In terms of the amount of contiguous C-band spectrum required per MNO for 5G, below 3.6 GHz - UK's Ofcom study found that there was no evidence that 5G could not be delivered with smaller (e.g. 40 MHz blocks) or non-contiguous carriers in other frequency bands (spectrum other than C-band).

- **Ka-band for FSS operations at 27.5 GHz to 30.0 GHz u/l and 17.7 to 20.2 GHz d/l** following outcome from WRC-15 and WRC-19, these bands are specially utilized by High throughput

satellite (HTS), and over 100+ of these satellites are now in operation to provide broadband services to users on land, sea and air.

- Ka-band at 28GHz will continue to be heavily used on all Ka-band satellites worldwide, including ISRO's, SES-12 and O3b. There is no need to jeopardize satellite services in the 28 GHz since there is 3.25 GHz of globally harmonized "high-band" spectrum for 5G in 26 GHz (24.25-27.5 GHz). India can have BOTH broadband satellite (in 28 GHz) AND 5G (in 26 GHz).

- **WRC-19 allocated 17.25 GHz of spectrum in the mmWave bands for IMT2020, based on study report by Fraunhofer institute - 26 GHz (24.25 to 27.5 GHz) was found to be the most suitable band for 5G.**

- **The Ka-band 27.5 to 29.5 GHz was NOT identified for IMT; it is heavily utilized for FSS by the Satellite Operators and should retain its** existing status of FSS allocations in the 27.5-29.5 GHz band in the NFAP with addition of footnote 5.517A to this band and 18 GHz band (17.7-19.7 GHz).

- **Q/V bands (37.5 GHz – 42.5 GHz d/l, 47.2-50.2 & 50.4 -51.4 GHz u/l)** are very much needed to support the growth and take-up of satellite broadband services globally.

5. Future Spectrum Roadmap for Satellite and 5G:

- **Spectrum and technology evolution with multi-standards and multi-bands -** Mobile technology has been evolving over the years from 2G-GSM (at 800/1800 Mhz bands) to HSPA-3G (at 900 / 2 GHz) and then to LTE-4G (at 700 MHz to 2.3/2.6 GHz). Today we have LTE Advance (4.5 GSM), and for each of these standards, different spectrum bands were allocated. Today, with deploying LTE adv -with multiple carrier aggregation – MNOs can offer data speed above 100 Mbps.

- **Evolution of Spectrum use for IMT2020/5G** - This has also meant that where low bands 2G/3G has been deployed, these can be transitioned or re-farmed to 5G at sub 1GHz. Between 1 – 6 GHz, 3G/4G bands can be transitioned or re-farmed to 5G in the mid bands. For the high band requirement, WRC-19 has already allocated some 17.5 GHz of mmWave spectrum. Beyond 2023, Standalone 5G deployments will gradually get access to 4G spectrum in mid to low bands. Almost 1 GHz harmonized spectrum can be made available for 5G in region 3 in low to mid bands.

- Today in total, over 21 GHz spectrum is available for IMT services and this covers both spectrum in low band, mid-band and following WRC19 in the high band above 24 GHz. In India's case, only 500 MHz have been assigned so far based on the study report by LS telecom on `worldwide licensing and use of IMT Spectrum'.

6. To conclude:

- In a country such as India, given the low penetration of fibre (only 8% of the country covered) and its population demographics along with its diverse geographies, connectivity for broadband services remains a `Big' challenge that can only be overcome by effective use of multiple technologies, spectrum and regulatory certainty.

- Substantial Investment in Billions $bn undertaken by Satellite Industry to bridge this digital divide and for Governments to achieve their SDGs
- India & ITU Region 3 has extensive reliance on satellite services & it is growing with increased bandwidth and capacity
- Existing satellite bands such as C band (3.6-4.2 GHz), Ka-band (27.5-29.5 GHz) must be kept for growing Satellite services. Additional new bands Q, V and E are required in the future for user and feeder links
- Satellite services will remain an integral part of India's 5G ecosystem in the coming future.