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1. Introduction:

1.1 It may please be noted that references '5' & '10' are identical indicating both TRAI and DoT emphasize that response needs to be keeping in view the latest NFAP of INDIA and Radio Regulations of ITU.

(i) NFAP2022 has been mentioned in CP as per references '6','7','8' below.

(ii)"(b) **provide any other recommendations deemed fit for the purpose of** spectrum auction in these frequency bands, including the regulatory/technical requirements as enunciated in the relevant provisions of the **latest** NFAP/Radio Regulations of the ITU."[5]

(iii)**"2.52 According to the National Frequency Allocation Plan (NFAP) 2022 issued** by DoT, India, allocation of services in the given frequency ranges is as shown below:**"**[6]

(iv)"Allocation to Radiocommunication Services (NFAP 2022)"[7]

(v)**"Table 2.5: Frequency Allocation in NFAP 2022"**[8]

(vi)"NFAP National Frequency Allocation Plan"[9]

(vii)"(b) provide any other recommendations deemed fit for the purpose of spectrum auction in these frequency bands, including the technical and regulatory requirements as enunciated in the relevant provisions of the latest NFAP/Radio Regulations of the ITU."[10]

2. Comments:

(i) Radio Regulations are contained in FINAL Acts of a WRC and the latest Radio Regulations are available in WRC 23 Final Acts[11].

(ii) There are '23' instances of INDIA in Document WRC Final Acts with the following distribution:

(a) **For the Republic of India** "signed one copy of these Final Acts"**:**

GULAB CHAND

MK PATTANAIK

MPS ALAWA

ANIL KUMAR SONI

VINEETH KURIAN MATHEW

SACHIN KUMAR

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ARUN KUMAR

VIKAS SAHGAL

SUBHASH CHANDRA BERA

(b) India (Republic of) (4, 100) in "*List of countries in alphabetical order giving the number(s) of their declarations and reservations:"* "FINAL PROTOCOL"'.

(c) "**For the Republic of India:**

In signing the Final Acts of the World Radiocommunication Conference (Dubai, 2023), the delegation of the Republic of India reserves for its Government, the right to take such actions, as may be considered necessary, to safeguard its interests, should any administration make reservation and/or not accept the provisions of the Final Acts or fail to comply with one or more provisions of the Final Acts, including those which form a part of the Radio Regulations." "**Declarations and Reservations**"

(d) **For the Republic of India:**

Having taken note of the declarations and reservations made at the World Radiocommunication Conference (Dubai, 2023), the Republic of India reserves for its Government, the right to enter additional reservations and declarations as well as amend its previous reservations and declarations prior to Ratification of the Final Acts of the World Radiocommunication Conference (Dubai, 2023) of the International Telecommunication Union.

(e) One time each in '17' Foot Notes viz; **MOD 5.221,MOD 5.269, ADD 5.314A, MOD 5.330, MOD 5.331.MOD 5.429,MOD 5.429F, MOD 5.433A, MOD 5.453, MOD 5.508A, MOD 5.509A, ADD 5.510A, MOD 5.514, MOD 5.524, MOD 5.536B, MOD 5.542, MOD 5.553B** Art 5.

(iii) NFAP 2022 of INDIA mentioned in **1.**1.1(v),(vi),(vii) where" The latest ITU Regulation 2020 and international best practices have been followed while preparing the document"[12].

(a) Latest ITU Radio Regulations 2024 are now available[13].

(b) Process for revision of NFAP 2022 has already been initiated[14].

(c) The process of revision is likely to be > six months[15].

(iv) Quantum of **SPECTRUM** for **AUCTION:**

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(a) LSA wise spectrum available+ spectrum surrendered by Railways – Spectrum proposed to be administratively assigned to BSNL/MTNL, Railways/NCRTC[16.]

(b) Quantum of administratively assigned spectrum for which authorisation is expiring in 2024[17].

(c) "However,37–37.5 GHz, 37.5–40 GHz and 42.5–43.5 GHz frequency bands are being contemplated for auction in India for the first time"[18].

(d) These frequency bands fall in the frequency band 37-43.5 GHz[19].

"34.2-40 GHz
Allocation to services

Region 1	Region 2	Region 3
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) 5.550C 5.550CA MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547	

MOD
5.550B The frequency band 37-43.5 GHz, or portions thereof, is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). 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. Because of the potential deployment of FSS earth stations within the frequency range 37.5-42.5 GHz and high-density applications in the fixed-satellite service in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions and 40.5-42 GHz in Region 2 (see No. **5.516B**), administrations should further take into account potential constraints to IMT in these frequency bands, as appropriate. Resolution **243 (Rev. WRC-23)**[20].
applies. (WRC-23)"

"MOD
RESOLUTION 243 (REV.WRC-23)
Terrestrial component of International Mobile Telecommunications in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz
The World Radiocommunication Conference (Dubai, 2023),
considering
a) that International Mobile Telecommunications (IMT), including IMT-2000, IMT-Advanced and IMT-2020, is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

b) that adequate and timely availability of spectrum and supporting regulatory provisions are essential to realize the objectives in Recommendation ITU-R M.2083;
c) that there is a need to continually take advantage of technological developments in order to increase the efficient use of spectrum and facilitate spectrum access;
d) that IMT systems are now being evolved to provide diverse usage scenarios and applications such as enhanced mobile broadband, massive machine-type communications and ultra reliable and low-latency communications;
e) that ultra-low latency and very high bit-rate applications of IMT will require larger contiguous blocks of spectrum than those available in frequency bands that are currently identified for use by administrations wishing to implement IMT;
f) that the properties of higher frequency bands, such as shorter wavelength, would better enable the use of advanced antenna systems, including multiple-input and multiple-output (MIMO) and beam-forming techniques, in supporting enhanced broadband;
g) that harmonized worldwide frequency bands for IMT are desirable in order to achieve global roaming and the benefits of economies of scale;
h) that the ITU Radiocommunication Sector (ITU-R) has studied, in preparation for WRC-19, sharing and compatibility with services allocated in the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz and their adjacent frequency bands, based on the characteristics available at that time, and the results may change if these characteristics change;
i) that identification of frequency bands allocated to the mobile service for IMT may change the sharing situation regarding applications of services to which the frequency band is already allocated, and may require regulatory actions;
j) that there is a need to protect existing services and to allow for their continued development;
k) that it is assumed that a very limited number of IMT base stations will be communicating with a positive elevation angle towards IMT indoor mobile stations;
l) that the use of this frequency band by the mobile service for IMT is intended for land mobile service use and sharing studies were conducted based on that assumption,
noting
a) that Recommendation ITU-R M.2083 provides the framework and overall objectives of the future development of IMT for 2020 and beyond;
b) that Report ITU-R M.2320 addresses future technology trends of terrestrial IMT systems;
c) that Report ITU-R M.2370 addresses trends impacting future IMT traffic growth beyond the year 2020 and estimates global traffic demand for the period 2020 to 2030;
d) that Resolution **143 (Rev. WRC-19)** establishes the guidelines for the implementation of high-density applications in the fixed-satellite service (HDFSS) in frequency bands identified for these applications;
e) that Recommendation ITU-R SA.2142 addresses the methodologies for calculating coordination areas around Earth exploration-satellite service (EESS) and space research service (SRS) earth stations to avoid harmful interference from IMT-2020 systems in the frequency bands 25.5-27 GHz and 37-38 GHz;
f) that Recommendation ITU-R M.2161 provides guidelines to assist administrations to mitigate in-band interference from FSS earth stations operating in the frequency bands 24.65-25.25 GHz, 27-27.5 GHz, 42.5-43.5 GHz and 47.2-48.2 GHz into IMT stations,
recognizing

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a) that timely availability of wide and contiguous blocks of spectrum is important to support the development of IMT;
b) Resolutions 176 (Rev. Bucharest, 2022) and 203 (Rev. Bucharest, 2022) of the Plenipotentiary Conference;
c) the identification of HDFSS in the space-to-Earth direction in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions, 40.5-42 GHz in Region 2 and 47.5-47.9 GHz
in Region 1 (see No. **5.516B**);
d) that No. **5.149** applies for the purpose of protecting the radio astronomy service (RAS) in the frequency band 42.5-43.5 GHz, which is allocated on a primary basis;
e) that the frequency band 47.2-48.2 GHz is allocated to the fixed, mobile and fixed-satellite services, including planned non-geostationary-satellite (non-GSO) uplinks,
resolves
1 that administrations wishing to implement IMT consider use of the frequency band 37-43.5 GHz, or portions thereof, and the frequency band 47.2-48.2 GHz, identified for IMT in No. **5.550B** and No. **5.553B**, and the benefits of harmonized utilization of the spectrum for the terrestrial component of IMT taking into account the latest relevant ITU-R Recommendations;
2 that, in order to ensure coexistence between IMT in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz as identified by WRC-19 in Article **5** and other services to which the frequency band is allocated, including the protection of these other services, administrations shall apply the following condition(s):
2.1 in order to protect the EESS (passive) in the frequency band 36-37 GHz, the following unwanted emissions of IMT stations operating in the frequency band 37-40.5 GHz apply as specified
in Table 1 below:

TABLE 1

Frequency band for the EESS (passive)
36-37 GHz
Frequency band for IMT stations
37-40.5 GHz
Unwanted emission mean power for IMT stations[1]
−43 dB(W/MHz) and
−23 dB(W/GHz) within the frequency band 36-37 GHz
Recommended limits for IMT stations[1]
−30 dB(W/GHz)

1 The unwanted emission power level is considered in terms of total radiated power (TRP). The TRP is to be
understood here as the integral of the power transmitted from all antenna elements in different directions
over the entire radiation sphere.

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2.1 in order to protect the EESS (passive) in the frequency band 36-37 GHz, the following unwanted emissions of IMT stations operating in the frequency band 37-40.5 GHz apply as specified in Table 1 below:

TABLE 1

Frequency band for the EESS (passive)	**Frequency band for IMT stations**	**Unwanted emission mean power for IMT stations1**	**Recommended limits for IMT stations1**
36-37 GHz	37-40.5 GHz	−43 dB(W/MHz) and −23 dB(W/GHz) within the frequency band 36-37 GHz, −30 dB(W/GHz)	

1 The unwanted emission power level is considered in terms of total radiated power (TRP). The TRP is to be understood here as the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere.

2.2 protection of SRS earth stations in the frequency band 37-38 GHz and RAS stations in the frequency band 42.5-43.5 GHz from IMT stations should be facilitated through bilateral agreements for cross-border coordination as necessary;

2.3 protection of and coexistence with fixed-satellite service (FSS) earth stations within the frequency ranges 37.5-43.5 GHz and 47.2-48.2 GHz should be facilitated through bilateral agreements for cross-border coordination as necessary;

2.4 take practical measures to ensure the transmitting antennas of outdoor base stations are normally pointing below the horizon, when deploying IMT base stations within the frequency bands 42.5-43.5 GHz and 47.2-48.2 GHz; the mechanical pointing needs to be at or below the horizon;

2.5 as far as practicable, sites for IMT base stations in the frequency bands 42.5-43.5 GHz and 47.2-48.2 GHz employing values of equivalent isotropically radiated power (e.i.r.p.) per beam exceeding 30 dB(W/200 MHz) should be selected so that the direction of maximum radiation of any antenna will be separated from the geostationary-satellite orbit, within line-of-sight of the IMT base station, by ±7.5 degrees;

3 that IMT stations within the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz are used for applications of the land mobile service,

invites administrations

to ensure that, when considering the spectrum to be used for IMT, due attention is paid to the need for spectrum for ubiquitous earth stations at unspecified points, as well as those used for gateways, taking into account spectrum identified in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions, 40.5-42 GHz in Region 2 and 47.5-47.9 GHz in Region 1 for the HDFSS, in accordance with No. **5.516B**,

encourages administrations

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1 to ensure that provisions for the implementation of IMT allow for the continued development of EESS, SRS, FSS and broadcasting-satellite service (BSS) earth stations and RAS stations and their future development;
2 to keep the antenna pattern of IMT base stations within the limits of the approximation envelope according to the most recent version of Recommendation ITU-R M.2101,
encourages administrations of Region 1
to consider implementing IMT in the frequency band 40.5-43.5 GHz in order to better accommodate the needs of other services below 40.5 GHz, taking into account protection of the FSS within the frequency band 37.5-40.5 GHz in Region 1,
invites the ITU Radiocommunication Sector
1 to continue providing guidance to ensure that IMT can meet the telecommunication needs of the developing countries;
2 to develop ITU-R Reports and Recommendations, as appropriate, to assist administrations in ensuring coexistence between IMT and BSS and FSS, including HDFSS in accordance with No. **5.516B**, within the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz, as appropriate;
3 to develop a new ITU-R Recommendation, as appropriate, to provide information and assistance to the concerned administrations on possible coordination and protection measures for the
RAS in the frequency band 42.5-43.5 GHz from IMT deployment;
4 to regularly review, as appropriate, the impact of evolving technical and operational characteristics of IMT systems (including base-station density) and those of systems of space services
on sharing and compatibility, and to take into account the results of these reviews in the development
and/or revision of ITU-R Recommendations/Reports addressing, *inter alia*, if necessary, applicable measures to mitigate the risk of interference into space receivers,
instructs the Director of the Radiocommunication Bureau to bring this Resolution to the attention of relevant international organizations.

"RES685[21]

ADD

RESOLUTION 685 (WRC-23)

Studies towards frequency allocations for the Earth exploration-satellite service (space-to-Earth) within the frequency range [37.5-52.4 GHz]*

The World Radiocommunication Conference (Dubai, 2023),
considering
a) that the frequency band 40-40.5 GHz is allocated worldwide to the Earth exploration satellite service (EESS) (Earth-to-space) on a primary basis;
b) that a frequency allocation to the EESS (space-to-Earth) above 37.5 GHz would allow its use for payload data transmissions in combination with the existing EESS (Earth-to-space) allocation referred to in *considering a)*;
c) that a frequency allocation to the EESS (space-to-Earth) above 37.5 GHz would allow for uplinks and downlinks on the same transponder, increasing efficiency and reducing satellite complexity,
noting

a) that the frequency band 37.5-40.5 GHz is allocated worldwide to the EESS (space-to-Earth) on a secondary basis;
b) that the frequency band 37.5-40.5 GHz is allocated to a number of services on a primary basis,
recognizing
a) the importance of the appropriate regulatory status and certainty to accommodate the requirements of future Earth observation missions;
b) that, in order to meet those requirements, primary allocation to the EESS (space-to-Earth) in certain frequency bands above 37.5 GHz might be required,
resolves to invite the ITU Radiocommunication Sector to complete in time for the 2031 world radiocommunication conference
1 the review of the existing allocation to the EESS (space-to-Earth) in the frequency band [37.5-40.5 GHz], and sharing and compatibility studies as necessary, in order to determine the feasibility of upgrading this frequency allocation to primary status while ensuring the protection of the primary services;

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* The appearance of square brackets around certain frequency bands in this Resolution is understood to mean that
WRC-27 will consider and review the inclusion of these frequency bands with square brackets and decide, as appropriate.
RES685
2 the identification of frequency bands within the frequency range [40.5-52.4 GHz], and sharing and compatibility studies as necessary, in order to determine the feasibility of creating new primary allocations to the EESS (space-to-Earth) in these bands, while ensuring the protection of the primary services,
invites administrations
to participate actively in the studies by submitting contributions to the ITU Radiocommunication Sector,
invites the 2031 world radiocommunication conference
to consider, based on the results of studies, an upgrade of the secondary allocation to the EESS (space-to-Earth) in the frequency band [37.5-40.5 GHz] or possible new worldwide allocations on a primary
basis to the EESS (space-to-Earth) in certain frequency bands within the frequency range [40.5-52.4 GHz],
instructs the Secretary-General to bring this Resolution to the attention of international and regional organizations concerned."

(b) "(i) Bands already been identified by ITU for IMT services, which should be explored for its early availability to the service providers in India.

- 4800-4990 MHz
- **37-43.5 GHz**[22]
- 45.5-47 GHz
- 47.2-48.2 GHz
- 66-71 GHz"

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(v) Multiple reference to "Telecom Regulatory Authority of India (Recommendations on Auction of Spectrum in frequency bands identified for IMT/5G 11th April 2022)"[23] is there in the extant CP[24].

(i) In view of what has been stated just **(v)** above:

CHAPTER-VI: SUMMARY OF RECOMMENDATIONS is extracted below for ready reference[25].

"6.1 The Authority recommends that:
a) Considering the facts that presently
(i) band plan(s) for the frequency range 526-612 MHz is yet to be defined by 3GPP/ITU,
(ii) development of ecosystem for IMT in 526-612 MHz frequency range will take some time and
(iii) MIB is using 526-582 MHz band extensively across the country for TV transmitters; the 526-612 MHz frequency range should not be put to auction in the forthcoming auction.
b) As per the propagation characteristics, lower frequency bands provide wider and deeper coverage, which could be very useful in enhancing terrestrial mobile coverage, particularly for in-building coverage and rural coverage. ITU has already identified this frequency range for IMT services.
Therefore, frequency range 526-612 MHz should be reserved for IMT services.
c) DoT should come out with a plan for refarming 526-582 MHz band to be utilized for IMT deployments. To make 526-582 MHz band available for IMT, DoT should work with MIB to prepare a plan for an early migration from Analogue to Digital Transmission, so that the frequency band from 526-582 MHz can be vacated for IMT services. Considering that ITU has identified spectrum in 470-698 MHz as an IMT band in Region 2 & Region 3, DoT may adopt a holistic approach and review the entire frequency range starting from 470 MHz to 582 MHz.
d) In case, complete refarming of 526-582 MHz frequency range for IMT is not feasible, DoT may explore the possibility of this band being used for IMT as well as for broadcasting by MIB on coexistence basis. Refarming of this frequency range for IMT may be performed in a phased manner so that as and when some frequency carriers are vacated, the same can be auctioned for IMT services.
e) Considering the work going on in the APT to develop a regional band plan for 600 MHz (APT 600) for APT region, portion 612-617 MHz should be included as part of the 600 MHz band.
f) DoT should liaise with the APT, ITU and 3GPP for development of a regional band plan for the band 526-612 MHz and declare the timeline for vacation of this band and adoption of this band for IMT services so that ecosystem starts developing. [Para 2.22]
6.2 The Authority recommends that for 600 MHz frequency range 612-703 MHz, Band Plan APT 600 (Option B1) should be adopted in India. It is also proposed that entire 40 MHz (paired) spectrum [612-652 MHz/663-703 MHz] should be put to auction in the forthcoming auction. [Para 2.47]
6.3 The Authority recommends that unlike FDD band plans where duplex gap is fixed for a given band plan, TDD band plans are flexible; therefore, in frequency range 3300-3670 MHz,

both the band plans i.e., n77 and n78 should be permitted and flexibility be given to the TSPs to adopt any band plan i.e., n77 or n78, based on their business/commercial considerations. [Para 2.61]

6.4 The Authority recommends that:

a) As the IMT emissions in the 3300-3670 MHz may saturate the Low Noise Block (LNB) of the FSS earth station which traditionally operates in the 3400-4200 MHz, there is a need to make use of high-quality bandpass filters operating in 3700-4200 MHz range. Therefore, DoT should ask the Ministry of Information and Broadcasting (MIB) to take appropriate action and sensitize the MSOs, DTH operators, and other users to ensure the use of high-quality bandpass filters operating in 3700-4200 MHz range to avoid interference from IMT stations.

b) In order to avoid unwanted out of band emissions of the IMT stations falling within the FSS operating band 3700-4200 MHz, DoT should prescribe for having a sharp Spectrum Mask for IMT transmitters with an out-of-band PFD limit. [Para 2.64]

6.5 Considering the global trend and 3GPP TDD configuration-based band plans availability, the Authority recommends that TDD based configuration should be adopted for spectrum 24.25 to 28.5 GHz. [Para 2.83]

6.6 The Authority recommends that in frequency range 24.25-28.5 GHz MHz, flexibility be given to the TSPs to adopt any band plan i.e., n257 or n258, based on the frequencies assigned to them and other business/commercial considerations.[Para 2.88]

6.7 The Authority recommends that

a. As mmWave spectrum is going to be used for capacity requirement, its deployment is not likely to be ubiquitous rather it is more likely to be kind of hotspots or urban micro cells. Therefore, IMT Stations and Satellite Earth Stations Gateway (Earth to Space) can co-exist in 27.5-28.5 GHz frequency range. The Satellite Earth Station Gateway should be permitted to be established in frequency range 27.5-28.5 GHz at uninhabited or remote locations on case-to-case basis, where there is less likelihood of 5G IMT services to come up.

b. DoT should prescribe the exclusion zone requirement for coexistence of IMT and satellite earth stations (Earth to space) in 27.5-28.5 GHz frequency range.

c. DoT should create a software defined automated process on a portal having database of coordinates of the IMT base stations in mmWave. The geofencing coordinates of the proposed earth station in 27.5-28.5 GHz can provide the feasibility results through the portal for establishing the earth station.

d. Access to 27.5-28.5 GHz should also be allowed for Earth Stations In Motion (ESIMs) for In-flight and Maritime terminals, with appropriate sharing conditions, as in such cases, the operation would be geographically separated from terrestrial IMT.

e. Spectrum dues for 27.5-28.5 GHz frequency range can be revised on pro-rata basis for the mobile operator holding spectrum in the LSA, in which the permission for establishing earth station is given in the same frequency range, on account of creation of exclusion zone.

f. Provisions of the WRC-19 Resolution 242 to provide protection to Satellite (FSS) receiver and Resolution 750 w.r.t. power limitations to provide protection to EESS (passive), applicable for 24.25-27.5 GHz band, should also be made appropriately applicable for 27.5-28.5 GHz frequency range. [Para 2.102]

6.8 The Authority recommends that considering that with the closure

of CDMA services, 800 MHz band is being utilized for LTE, which does not require separate provision of inter-operator guard band, the channel plan of 800 MHz band be revised from existing channel bandwidth of 1.23 MHz to 1.25 MHz and the provision of guard band should be done away with.[Para 2.114]

6.9 The Authority recommends that a) As regards assignment of the last block from 887.75-889 MHz, DoT should carry out limited field trial to ascertain the interband guard band requirement between 800 & 900 MHz bands. In case, the outcome of the field trial shows that the assignment can be made till 889 MHz without causing any interference to existing users in 900 MHz band, the last block in each LSA can also be put to auction, else the last block with reduced size (considering the guard band requirement) can be put to auction. In case, it is not possible to conduct and conclude the study before forthcoming auction, the forthcoming auction should be conducted considering 15 blocks of 1.25 MHz each as total availability of spectrum in 800 MHz band and later on decision about the last block can be taken and included in the subsequent spectrum auction.

b) DoT should carry out harmonization exercise in 800 MHz band immediately after conducting the auction so that frequencies assigned to the TSPs are in contiguous manner and any vacant spectrum is available towards the end of the spectrum band. Further, the spectrum harmonization exercise should be completed within a time frame of not more than 6 months from the date of conclusion of Auction.[Para 2.122]

6.10 The Authority recommends that DoT should carry out harmonization exercise in 900 MHz band immediately after conducting the auction and such exercise should be completed within a time frame of not more than 6 months from the date of conclusion of Auction.[Para 2.128]

6.11 The Authority recommends that DoT should carry out harmonization exercise in 1800 MHz band immediately after conducting the auction and such exercise should be completed within a time frame of not more than 6 months from the date of conclusion of Auction. [Para 2.133]

6.12 The Authority recommends that DoT should examine whether the guard band of 0.2 MHz provisioned in 1800 MHz band in each LSA, can be done away with and wherever feasible, 0.2 MHz may be included in the forthcoming auction. [Para 2.134]

6.13 Considering that there are certain additional bands which are already identified by ITU for IMT services and few additional bands are under consideration in WRC-23 for IMT identification, the Authority recommends that DoT should explore the possibility to make these bands available for IMT services at the earliest and come out with a spectrum roadmap for opening up of new bands for IMT to meet the future demand. At least a 5-year roadmap on spectrum likely to be made available for IMT in each year and likely date/month of auction should be made public. Such a spectrum roadmap will provide certainty, enable the bidders to take informed decisions and may also encourage new entrants. [Para 2.150]

6.14 The Authority recommends that in 600 MHz (APT 600 Option B1),700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3670 MHz and 24.25-28.5 GHz spectrum bands, the entire available spectrum should be put to auction in the forthcoming auction. The Authority also notes that the Government is already considering assignment of spectrum to BSNL/MTNL for 5G Services.[Para 2.156]

6.15 The Authority recommends that for existing bands the block size and minimum amount of spectrum that a bidder is required to bid for should be prescribed as given below:

Spectrum Band	**Block Size (MHz)**	**Minimum amount of spectrum that a bidder is required to bid for**	
		Existing licensees (MHz)	**New Entrants (MHz)**
700 MHz	**5 (paired)**	**NA**	**5**
800 MHz	**1.25 (Paired)**	**1.25**	**5, 3.75 (where only 3.75 MHz is available), 2.5 (where only 2.5 is available). 1.25 (where only 1.25 is available)**
900MHz	**0.20 (paired)**	**0.2**	**5, 0.2 (where less than 5 MHz is available)**
1800 MHz	**0.20 (paired)**	**0.2**	**5, 0.2 (where less than 5 MHz is available)**
2100 MHz	**5 (paired)**	**5**	**5**
2300 MHz			

10
(unpaired)
10 10
2500
MHz
10
(unpaired)
10 10
[Para 2.174]
6.16 The Authority recommends that considering the global trend and to provide flexibility to the TSPs, block size of 5 MHz should be prescribed for 600 MHz band. [Para 2.183]
6.17 The Authority recommends that for 3300-3670 MHz band block size of 10 MHz should be prescribed. Further, DoT should ensure that if a TSP acquires more than one block, entire spectrum assigned to a TSP is in contiguous form. [Para 2.194]
6.18 The Authority recommends that Block size for 24.25-28.5 GHz band be kept as 50 MHz. Further, DoT should ensure that if a TSP acquires more than one block, entire spectrum assigned to a TSP is in contiguous form.
[Para 2.203]
6.19 The Authority recommends that DoT should take a decision on the TRAI recommendations on "Enabling Unbundling of Different Layers Through Differential Licensing" of August 2021 at the earliest, preferably before conducting the Auction and make suitable provision for Network Service Provider (similar to Access Service providers) in the NIA under eligibility criteria for participating in Auction and other related clauses such as spectrum sharing, spectrum trading, etc. [Para 2.216]
6.20 The Authority recommends that to mitigate inter-operator interference in TDD configuration bands, the following measures should be taken:
a) In case a TSP acquires more than one block, the entire spectrum should be assigned to it in contiguous form.
b) In case a TSP acquires spectrum in more than one LSA, same frequency spots should be assigned to it in all those LSAs, to the extent possible.
c) Interference mitigation be left to the mutual coordination between the TSPs. [Para 2.235]
6.21 The Authority recommends that:
a. As per the NIA 2021 provisions, the requirement of rollout obligation shall be treated as fulfilled once the required number of district headquarters or block headquarters or rural SDCAs are covered by use of any technology in any band by a licensee. Therefore, the licensee is not required to fulfil these roll-out obligations separately in respect of each of these bands. However, for 2100 MHz (Metro LSAs) and 2300/2500 MHz (non-Metro LSAs), the prescribed coverage targets as per the provisions of NIA for 2021 Auction, are specific to the use of respective bands, which seems to be continuing due to oversight. Therefore, DoT should make changes in the roll out obligations for 2100 MHz (Metro LSAs) and 2300/2500 MHz (non-Metro LSAs) to rectify this by removing "using the spectrum in 2100 MHz" and "using 2300/2500 MHz band".
b. To facilitate the new entrants, in respect of roll out obligations for 700 MHz, 800 MHz, 900 MHz and 1800 MHz bands, the time period of 1 year for meeting the MRO for Metros LSAs

(coverage of 90% of the LSA within one year from the effective date of license or the date of assignment of spectrum won in this auction process, whichever is later), should be enhanced to 2 years (40% coverage by the end of 1st year and 90% coverage by the end of 2nd year)
c. Besides the above, the roll-out obligations for 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz as stipulated in the NIA for last auctions held in March 2021 be continued for the forthcoming spectrum auction. [Para 2.247]
6.22 The Authority recommends that the roll-out obligations and associated conditions for 600 MHz band shall be same as that applicable for 700 MHz band. [Para 2.259]
6.23 The Authority recommends that
a. Band specific minimum roll out obligations for 3300-3670 MHz band for all TSPs i.e., existing as well as the new entrants should be specified as under:
(i) Metros LSAs
Time Period Roll Out Obligations
By the end of 1st
year
Commercial launch of services anywhere in the
LSA
By the end of 3rd
Year
Cumulative number of sites to be deployed:
2800
By the end of 5th
Year
Cumulative number of sites to be deployed:
4600
(ii) Non-Metro LSAs
Time Period Roll Out Obligations
By the end of 1st
year
Commercial launch of services in at least 1
city in the LSA
By the end of 3rd
Year
Cumulative number of sites to be deployed:
Category A LSAs: 7000
Category B LSAs: 4600
Category C LSAs: 2600
By the end of 5th
Year
Cumulative number of sites to be deployed
(at least 5% of the sites to be in rural SDCA,
including economic zones):
Category A LSAs: 10000
Category B LSAs: 7000

Category C LSAs: 4700
b. To keep the customers informed, the TSPs should be mandated to publish the network deployment map on their website depicting the areas where the services have been launched using 3300-3670 MHz spectrum band.
c. Since the Minimum Roll Out Obligations will be equally applicable for all the TSPs i.e., existing as well as the new TSPs, the clause 8.1.4 of the NIA for spectrum auction held in March 2021 on 'Rollout obligation using any technology in any band' shall not be applicable for 3300-3670 MHz band.
[Para 2.273]
6.24 The Authority recommends that a. Band specific minimum roll out obligations for 24.25-28.5 GHz band for all TSPs i.e., existing as well as the new entrants should be specified as under:
(i) Metros LSAs
Time Period Roll Out Obligations
By the end of 1st
year
Commercial launch of services anywhere in the
LSA
By the end of 3rd
Year
Cumulative number of sites to be deployed: 900
By the end of 5th
Year
Cumulative number of sites to be deployed:
1500
(ii) Non-Metro LSAs
Time Period Roll Out Obligations
By the end of 1st
year
Commercial launch of services anywhere in the
LSA
By the end of 3rd
Year
Cumulative number of sites to be deployed:
Category A LSAs: 2400
Category B LSAs: 1500
Category C LSAs: 800
By the end of 5th
Year
Cumulative number of sites to be deployed
Category A LSAs: 3300
Category B LSAs: 2300
Category C LSAs: 1500

b. To keep the customers informed, the TSPs should be mandated to publish the network deployment map on their website depicting the areas where the services have been launched using 24.25-28.5 GHz spectrum band.
c. Since the Minimum Roll Out Obligations will be equally applicable for all the TSPs i.e., existing as well as the new TSPs, the clause 8.1.4 of the NIA for spectrum auction held in March 2021 on 'Rollout obligation using any technology in any band' shall not be applicable for 24.25-28.5 GHz band.
[Para 2.283]
6.25 The Authority recommends that while assessing the fulfilment of roll out obligations of Access Network provider, the network elements (such BTS, BSC etc.), created by the attached VNO(s) should also be included.
[Para 2.293]
6.26 The Authority recommends that a Cap of 40% be prescribed on the combined spectrum holding in the sub-1 GHz bands i.e., 600 MHz (APT 600 Option B1), 700 MHz, 800 MHz and 900 MHz bands.[Para 2.310]
6.27 The Authority recommends that for 3300-3670 MHz and 24.25-28.5 GHz bands, band-specific (intra-band) spectrum cap should be kept as 40% (rounded off considering the block size in each of these bands) of the total spectrum put to auction.[Para 2.325]
6.28 The Authority recommends that the overall cap is no longer relevant and therefore, should be removed. However, a separate Cap on the combined spectrum holding in 1800 MHz, 2100 MHz,2300 MHz and 2500 MHz bands be introduced and the spectrum cap for this group of bands be kept as 40%.
[Para 2.341]
6.29 The Authority recommends that in respect of surrender of spectrum, DoT should take an appropriate decision with regard to the issue of interest or principal paid for the post surrender period and accordingly include the decision in the guidelines for surrender of spectrum so that the TSPs can take an informed decision. [Para 2.358]
6.30 The Authority recommends the following for formulating 'Guidelines for Surrender of Spectrum':
a. DoT should come out with "Guidelines for Surrender of Spectrum". The spectrum surrender conditions should be simple and transparent. The process with defined timelines should be clearly specified and be implemented through an online portal-based system.
b. A Telecom Service Provider should be permitted to surrender spectrum after a minimum period of 10 (ten) years from the date of acquisition of spectrum by the TSP through the auctions conducted henceforth.
c. TSP should make a request for surrender of spectrum at least 12 months prior to the proposed date of surrender.
d. DoT should convey in-principle approval or otherwise within a period of sixty days from the date of application for surrender of spectrum.
e. Outstanding spectrum payment till the proposed date of surrender, if any, in respect of proposed quantity of spectrum being surrendered, should be communicated to the TSP along with the in-principle approval. Other payments/dues should not be linked to surrender of the spectrum under consideration.

g. Within a period of three months from date of demand raised by DoT, the TSP shall clear the dues so communicated by DoT.
h. Upon clearance of dues, the final approval to the surrender of spectrum, effective from proposed date of surrender, should be communicated by DoT to the TSP within 15 days.
i. On the proposed date of surrender of spectrum, the TSP should submit a declaration to DoT that the surrendered spectrum has been vacated and is no longer in use.
j. DoT should put to auction the surrendered spectrum immediately, once the final approval to surrender of spectrum (upon clearance of dues up to the proposed date of surrender) is issued. [Para 2.362]
6.31 The Authority recommends that the following conditions may be included in the 'Guidelines for Surrender of Spectrum':
a. In case, a TSP surrenders partial or complete spectrum in a band, it will be barred to take part in the auction of spectrum in that band for a period of 2 years from date of surrender of spectrum.
b. In case, a TSP has acquired some spectrum in a band, a lock in period of 2 years will be applicable, before surrendering the qualifying spectrum in that band acquired earlier.[Para 2.367]
6.32 The Authority recommends that a TSP should be permitted to surrender the spectrum after a minimum period of 10 (ten) years from the date of acquisition of spectrum by the TSP whether acquired through auction, trading or any other permitted means of acquisition. [Para 2.372]
6.33 The Authority recommends that DoT may appropriately examine the possibility for creation of provision for surrender of spectrum for the existing spectrum holding of the TSPs acquired through past auctions.[Para 2.379]
6.34 The Authority recommends that surrender fee should not be kept high to make the provision ineffective. It should be a kind of administrative fee for the purpose of processing of surrender application. Surrender fee may be kept as Rs. 1,00,000 (Rupee One lakh) per spectrum band per LSA.
[Para 2.386]
6.35 The Authority recommends that to enable an early launch of 5G services, Section 2.3 of the NIA of 2021, pertaining to the technology to be deployed, should be suitably modified to include IMT-2020 (5G technology) along with the other already mentioned technologies. [Para 2.392]
6.36 The Authority reiterates its recommendation made in 'Ease of Doing Telecom Business', dated 30th November 2017, that Department of Telecommunications should review the SACFA fee being levied upon the TSPs / other agencies.[Para 2.397]
6.37 The Authority reiterates its recommendation made in 'Ease of Doing Telecom Business', dated 30th November 2017, that the testing fee should be charged only for the sites which are actually tested by LSA unit instead for all sites which are offered for testing. [Para 2.402]
6.38 The Authority is of the view that the Department of Telecommunications should take the decision on the recommendations made in 'Enhancement of Scope of Infrastructure Providers Category-I (IP-I) Registration', dated 13thMarch 2020 at the earliest. [Para 2.415]
6.39 The Authority is of the view that the Department of Telecommunications may take the decision on the recommendations made in 'Roadmap to Promote Broadband Connectivity

and Enhanced Broadband Speed' dated on 31.08.2021 at the earliest for faster rollout of 5G networks and fixed line broadband services.[Para 2.421]

6.40 The Authority recommends that the reserve price of spectrum allocation in case of 30 years should be equal to 1.5 times (one and- a-half times) the reserve price of spectrum allocation for 20 years for the respective band.[Para 3.23]

6.41 The Authority recommends that DoT shall prepare a comprehensive report analysing critically the outcomes of each forthcoming auction to be shared with the Authority within 90 days of conclusion of the auction.
[Para 3.38]

6.42 As there will be regular conduct of spectrum auctions on annual basis (or at shorter intervals), the Authority recommends that (I) For existing bands (including for the bands being put to auction for the first time in the forthcoming auction), a fresh spectrum valuation exercise be conducted once every three years; a suitable reference be made to the Authority by Government for this purpose.
(II) For auctions conducted in the interim period between periodic valuation exercises conducted once every three years, (1) for LSAs where the spectrum put to auction in a previous auction is sold, the auction determined prices (duly indexed using applicable MCLR if more than one year has elapsed since the previous auction) should be used for arriving at the reserve prices for the next auction;
(2) for LSAs, where spectrum remains unsold in previous auctions, past recommended reserve price (without indexation) should be used.
(III) For new spectrum bands, to be put to auction for first time, a reference be sent to the Authority, as per established procedure as and when these bands are proposed to be put to auction.
(IV) However, if required, DoT may seek fresh reserve prices from the Authority for the existing bands, providing a full and reasoned justification for the same. [Para 3.40]

6.43 The Authority recommends that the reserve price for North East and Jammu & Kashmir LSAs in 800 MHz, 900MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz bands should be fixed at a discount of 50% on the reserve price. This discount for the North East and Jammu & Kashmir LSAs will also be applicable while arriving at reserve prices of other spectrum bands as well. [Para 3.138]

6.44 The Authority recommends that the reserve price for the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz bands should be set as follows:
a) At 70% of the average valuation;
b) In the LSAs where spectrum in a band was completely sold in the March, 2021 auction, the reserve price shall be the higher of the two figures – (1) 70% of the average valuation; and (2) auction determined price of the March, 2021 auction, duly indexed.[Para 3.139]338

6.45 Accordingly, the recommended reserve price of 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz spectrum bands for each LSA is tabulated below:

TABLE 3.4: RECOMMENDED RESERVE PRICE PER MHz (PAIRED)
IN 800 MHz BAND (20 years)
(Rs. in crore)

(1)	(2)	(3)	(4)
LSA Category			**Reserve Price**

(as calculated)
Recommended
Reserve Price
(Rounded off)
Delhi Metro 478.79 479
Kolkata Metro 152.61 153
Mumbai Metro 467.70 468
Andhra Pradesh A 292.12 292
Gujarat A 262.17 262
Karnataka A 198.44 198
Maharashtra A 337.73 338
Tamilnadu A 224.77 225
Haryana B 61.57 62
Kerala B 103.16 103
Madhya Pradesh B 136.03 136
Punjab B 101.43 101
Rajasthan B 141.91 142
U. P. (East) B 160.30 160
U.P. (West) B 133.25 133
West Bengal B 88.91 89
Assam C 50.17 50
Bihar C 126.33 126
Himachal Pradesh C 22.27 22
Jammu & Kashmir C 13.82 14
North East C 13.38 13
Orissa C 53.62 54

TABLE 3.5: RECOMMENDED RESERVE PRICE PER MHz (PAIRED) IN 900 MHz BAND (20 years)
(Rs. in crore)
(1) (2) (3) (4)
LSA Category Reserve Price
(as calculated)
Recommended
Reserve Price
(Rounded off)
Delhi Metro 436.02 436
Kolkata Metro 152.79 153
Mumbai Metro 389.15 389
Andhra Pradesh A 288.17 288
Gujarat A 399.11 399
Karnataka A 203.59 204
Maharashtra A 317.27 317
Tamilnadu A 221.78 222
Haryana B 67.69 68

Kerala B 212.93 213
Madhya Pradesh B 155.66 156
Punjab B 104.10 104
Rajasthan B 134.59 135
U. P. (East) B 166.11 166
U.P. (West) B 151.79 152
West Bengal B 98.80 99
Assam C 55.98 56
Bihar C 147.16 147
Himachal Pradesh C 25.83 26
Jammu & Kashmir C 16.38 16
North East C 13.80 14
Orissa C 64.22 64

TABLE 3.6: RECOMMENDED RESERVE PRICE PER MHz (PAIRED) IN 1800 MHz BAND (20 years)
(Rs. in crore)
(1) (2) (3) (4)
LSA Category Reserve Price (as calculated)
Recommended Reserve Price (Rounded off)
Delhi Metro 269.60 270
Kolkata Metro 96.70 97
Mumbai Metro 236.16 236
Andhra Pradesh A 171.57 172
Gujarat A 150.43 150
Karnataka A 120.87 121
Maharashtra A 190.33 190
Tamilnadu A 140.59 141
Haryana B 40.58 41
Kerala B 58.10 58
Madhya Pradesh B 87.94 88
Punjab B 61.16 61
Rajasthan B 74.88 75
U. P. (East) B 91.06 91
U.P. (West) B 86.88 87
West Bengal B 57.57 58
Assam C 31.76 32
Bihar C 81.76 82
Himachal Pradesh C 14.45 14
Jammu & Kashmir C 9.11 9
North East C 8.49 8
Orissa C 35.12 35

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TABLE 3.7: RECOMMENDED RESERVE PRICE PER MHz (PAIRED) IN 2100 MHz BAND (20 years)

(Rs. in crore)

(1) (2) (3) (4)

LSA Category	**Reserve Price (as calculated)**	**Recommended Reserve Price (Rounded off)**
Delhi Metro	223.77	224
Kolkata Metro	80.26	80
Mumbai Metro	196.01	196
Andhra Pradesh A	142.40	142
Gujarat A	124.86	125
Karnataka A	100.32	100
Maharashtra A	157.97	158
Haryana B	33.68	34
Kerala B	48.22	48
Madhya Pradesh B	72.99	73
Punjab B	50.76	51
U.P. (West) B	72.11	72
West Bengal B	37.00	37
Assam C	24.41	24
Bihar C	67.86	68
Himachal Pradesh C	11.99	12
Jammu & Kashmir C	7.56	8
North East C	4.65	5
Orissa C	29.15	29

TABLE 3.8: RECOMMENDED RESERVE PRICE PER MHz (UNPAIRED) IN 2300 MHz BAND (20 years)

(Rs. in crore)

(1) (2) (3) (4)

LSA Category	**Reserve Price (as calculated)**	**Recommended Reserve Price (Rounded off)**
Delhi Metro	104.34	104
Kolkata Metro	32.17	32
Mumbai Metro	103.07	103
Andhra Pradesh A	58.57	59
Karnataka A	63.54	64
Tamilnadu A	81.06	81

TABLE 3.9: RECOMMENDED RESERVE PRICE PER MHz (UNPAIRED) IN 2500 MHz BAND (20 years)
(Rs. in crore)
(1) (2) (3) (4)
LSA Category Reserve Price (as calculated) Recommended Reserve Price (Rounded off)
Delhi Metro 85.87 86
Kolkata Metro 28.17 28
Mumbai Metro 81.05 81
Andhra Pradesh A 50.73 51
Gujarat A 44.13 44
Karnataka A 46.88 47
Maharashtra A 53.39 53
Tamilnadu A 58.10 58
Punjab B 13.95 14
Bihar C 15.07 15
Himachal Pradesh C 2.65 3
Jammu & Kashmir C 1.62 2**[Para 3.140]**

6.46 The Authority recommends that the reserve price of spectrum in the 700 MHz band should be set at 70% of the valuation arrived at. The reserve price of the spectrum in the 600 MHz band should be equal to the reserve price of 700 MHz spectrum band. [Para 3.167]

6.47 Thus, the recommended reserve price of the 600 MHz and 700 MHz spectrum bands for each LSA are:

TABLE 3.12: RECOMMENDED RESERVE PRICE PER MHz (PAIRED) IN THE 600 MHz AND 700 MHz BANDS (20 years)
(Rs. in crore)
(1) (2) (3) (4)
LSA Category Reserve Price (as calculated) Recommended Reserve Price (Rounded off)
Delhi Metro 509.00 509
Kolkata Metro 173.00 173
Mumbai Metro 470.01 470
Andhra Pradesh A 317.63 318
Gujarat A 281.52 282
Karnataka A 220.09 220
Maharashtra A 359.19 359
Tamilnadu A 252.97 253

Haryana B 71.36 71
Kerala B 109.68 110
Madhya Pradesh B 155.96 156
Punjab B 111.87 112
Rajasthan B 145.84 146
U. P. (East) B 171.21 171
U.P. (West) B 153.50 154
West Bengal B 102.03 102
Assam C 56.84 57
Bihar C 144.92 145
Himachal Pradesh C 25.58 26
Jammu & Kashmir C 16.02 16
North East C 15.18 15
Orissa C 61.93 62

[Para 3.168]

6.48 The Authority recommends that the reserve price of spectrum in the 3300-3670 MHz band should be set at 70% of the valuation arrived at.

[Para 3.180]

6.49 Accordingly, the recommended reserve price of the 3300-3670 MHz spectrum band for each LSA is tabulated below:

TABLE 3.14: RECOMMENDED RESERVE PRICE PER MHz IN 3300-3670 MHz BAND (UNPAIRED)
(20 years)
(Rs. in crore)

(1) (2) (3) (4)

LSA	**Category**	**Reserve Price (as calculated)**	**Recommended Reserve Price (Rounded off)**
Delhi Metro		40.44	40
Kolkata Metro		14.50	15
Mumbai Metro		35.42	35
Andhra Pradesh	A	25.74	26
Gujarat	A	22.57	23
Karnataka	A	18.13	18
Maharashtra	A	28.55	29
Tamilnadu	A	21.09	21
Haryana	B	6.09	6
Kerala	B	8.71	9
Madhya Pradesh	B	13.19	13
Punjab	B	9.17	9
Rajasthan	B	11.23	11

U. P. (East) B 13.66 14
U.P. (West) B 13.03 13
West Bengal B 8.64 9
Assam C 4.76 5
Bihar C 12.26 12
Himachal
Pradesh
C 2.17 2
Jammu &
Kashmir
C 1.37 1
North East C 1.27 1
Orissa C 5.27 5
[Para 3.181]

6.50 The Authority recommends that the reserve price of the spectrum in the 24.25 GHz – 28.5 GHz band should be set at 70% of the valuation arrived at. [Para 3.194]

6.51 Accordingly, the recommended reserve price of 24.25 – 28.5 GHz band for each LSA, is tabulated below:

TABLE 3.18: RECOMMENDED RESERVE PRICE PER MHz
IN 24.25 – 28.5 GHz BAND (UNPAIRED)
(20 years)
(in Rs.)
(1) (2) (3) (4)
LSA Category Reserve Price
(as calculated)
Recommended
Reserve Price
(Rounded off)
Delhi Metro 88.97 lakh 89 lakh
Kolkata Metro 31.91 lakh 32 lakh
Mumbai Metro 77.93 lakh 78 lakh
Andhra Pradesh A 56.62 lakh 57 lakh
Gujarat A 49.64 lakh 50 lakh
Karnataka A 39.89 lakh 40 lakh
Maharashtra A 62.81 lakh 63 lakh
Tamilnadu A 46.39 lakh 46 lakh
Haryana B 13.39 lakh 13 lakh
Kerala B 19.17 lakh 19 lakh
Madhya Pradesh B 29.02 lakh 29 lakh
Punjab B 20.18 lakh 20 lakh
Rajasthan B 24.71 lakh 25 lakh
U. P. (East) B 30.05 lakh 30 lakh
U.P. (West) B 28.67 lakh 29 lakh
West Bengal B 19.00 lakh 19 lakh

Assam C 10.48 lakh 10 lakh
Bihar C 26.98 lakh 27 lakh
Himachal Pradesh C 4.77 lakh 5 lakh
Jammu & Kashmir C 3.00 lakh 3 lakh
North East C 2.80 lakh 3 lakh
Orissa C 11.59 lakh 12 lakh **[Para 3.195]**

6.52 The Authority recommends that for collecting the bid amount from the successful bidder in case spectrum is not available in a part of the LSA, the existing methodology, as followed by DoT in the NIA for the March, 2021 auction, be followed in the forthcoming auction as well. [Para 3.199]

6.53 The Authority recommends that the following options be allowed to the buyers for making payments:

a. Option I: Full or part upfront payment of the bid amount within 10 days of declaration of final price;

Where part upfront payment has been made, the buyer shall have the option of availing moratorium for the proportionate number of years for which the upfront payment has been made, and the balance amount shall be payable in equal annual instalments over the remaining period in advance at the beginning of the year, after the period of moratorium if any (duly protecting

the net present value of the bid amount at the applicable rate of interest); the annual instalments shall become due and payable on the same date of each year.

b. Option II: Payment of 30 equal annual instalments of the bid amount (duly protecting the net present value of the bid amount at the applicable rate of interest) in advance at the beginning of the year, the first instalment

becoming payable within 10 days of declaration of final price. The balance 29 instalments shall become due and payable on the same date of each following year.[Para 3.212]

6.54 The Authority recommends that (i) Access Service providers can provide private network as a service to an enterprise by using network resources (such as through network slicing) over its PLMN public network. For the sake of clarity, specific provisions should be made in the License.

(ii) Enabling provisions should be incorporated in the License/Notice Inviting Applications (NIA) for Auction of Spectrum to permit the Access Service Licensee to set-up private network, also known as Non-Public Network (which is isolated from public network), using the IMT spectrum assigned to it for establishing PLMN.

(iii) While creating the above provisions, it should be clearly mentioned that it will be the responsibility of the TSP to ensure that the prescribed QoS to their customers through public network is maintained.[Para 4.37]

6.55 The Authority recommends that the Licensees having Access Spectrum be permitted to lease their access spectrum to enterprises having Captive Wireless Private Network Permission/License for localized Captive wireless private network.[Para 4.60]

6.56 The Authority recommends that for establishing isolated captive wireless private network using IMT spectrum, the entity/enterprise should be provided a Permission/license under Section 4 of the Indian Telegraph Act, 1885. The permission/license may be named as 'Captive Wireless Private Network (CWPN) permission/License'. [Para 4.66]

6.57 The Authority recommends that DoT should come out with the guidelines for grant of permission/License for 'Captive Wireless Private Network' for entities desirous of establishing captive wireless private network using IMT spectrum. The following key elements should be included in the guidelines:

• A company registered under the Companies Act, 2013, will be eligible to apply for the Captive Wireless Private Network permission/license to establish indoor/within premise captive wireless private network using IMT spectrum in localized basis (specified geographic area to be governed through spectrum leasing agreement of the licensed enterprise with the Licensed TSPs and/or spectrum assignment by DoT).

• The process of filing application and processing of application for grant of permission/license should be through online portal based system.

• The permission/license should be granted for a period of 10 years; however, there should be provision for renewal of the same through the online portal.

• The guidelines should clearly specify the required documents and the same should be submitted through online portal only. The portal should accept the application only if all the necessary documents have been uploaded by the applicant. Entire process should be paperless.

• Applicable Processing fee may be specified as Rs. 50,000/-

• No entry fee or permission/license fee should be charged from the permission holder/licensee. However, the spectrum charges will be levied as per policy of the DoT, in case the spectrum is assigned by DoT. As the spectrum assignment by DoT also have eligibility conditions based on networth of the CWPN permission holder/licensee, the applicant should be asked to submit the networth certificate while applying and networth of the permission holder/licensee should be mentioned in the permission/license so granted.

• Timelines for grant of permission/license should be specified and it should not be more than a period of 30 days from the filing of application, if the information/documents submitted by the applicant are found fit.

• Permission /License number should be issued by DoT, which will be used while applying for leasing of spectrum and/or seeking the spectrum earmarked for private captive networks from DoT.

• Any change in the details (such as name of the enterprise, ownership, address, contact details, etc.) provided during obtaining the permission/license, are required to be intimated through the online portal within 15 days of such change.

• For an enterprise operating at more than one location in the country, only one permission/license should be required. Therefore, grant of permission/license should be one time activity and the permission/license should be valid throughout the territory of India. There should be no need to specify the specific geographic area of operation while applying for permission/license. However, while applying for spectrum, the specific details regarding area of operation along with coordinates need to be provided as per specified format. Spectrum is to be obtained separately for each individual geographic unit/ location.

• SACFA clearance requirements and applicable charges should be clearly specified.

• EIRP limits and EMF compliances should be specified.

• The area of operation, that is, the spectrum usage area of the licensee will be the area inside the logical perimeter of the defined premises with clearly specified geo coordinates. World

Geodetic System (WGS84) format of geographic coordinate system or any other suitable geographic coordinate system may be used for mapping geographic coordinates.
• The permission holder /licensee of CWPN shall not offer any commercial telecom service. The permission/license as well as spectrum will be used only for its own captive usage as per the usage declared while applying for spectrum, and the permission holder /licensee shall not use it for any commercial purpose.
• Permission holder/licensee of CWPN will deploy network elements as per TEC standards, wherever made mandatory, else as per relevant standards set by International Standardization bodies.
• Relevant network security conditions and instructions regarding procurement of telecom equipment from trusted sources may be specified.
• CWPN should not be connected to public network in any manner. The public network includes PSTN, PLMN, GMPCS and public internet. However, in case the licensee enterprise wants to have connectivity between its own multiple locations, the same may be permitted through leased line obtained through licensed telecom service providers.
• The Licensor should be having a right to inspect the established CWPN and its bona fide use.[Para 4.67]
6.58 The Authority recommends that Entities holding 'Captive Wireless Private Network Permission/License' should be permitted to obtain IMT spectrum either on lease from Access Service Providers or directly from DoT, as the case may be, for establishing Captive wireless private network.[Para 4.68]
6.59 The Authority recommends that necessary guidelines for leasing of access spectrum by Telecom Service Providers to the Captive Wireless Private Network Permission holder/Licensees should be put in place specifying the terms and conditions and also providing the online process for submission of intimation regarding leasing of spectrum. The key elements to be included in the Access Spectrum leasing guidelines are:
• TSPs will be permitted to lease their spectrum acquired through auction or liberalized spectrum holding to entities having Captive Wireless Private Network Permission/License.
• The 'Captive Wireless Private Network Permission holder/Licensee' should be permitted to take IMT spectrum on lease from one or more than one TSP in an LSA.
• TSP and the Captive Wireless Private Network permission holder/Licensee should give a joint intimation to DoT within 15 days of the effective date of leasing of spectrum. The joint intimation should include details of spectrum band(s), quantum of spectrum in each band, period of lease, geographic area of lease and use of spectrum.
• Use of leased spectrum by the CWPN permission holder/licensee should not cause interference to any public network. Any condition(s) imposed on the TSPs such as network synchronization, frame structure, DL: UL ratio etc. will also be applicable to the CWPN permission holder/licensee.
• It will be the responsibility of the TSP to ensure that prescribed QoS to the customers through public network is maintained, while leasing out the spectrum.
• The spectrum leasing charges shall form part of the AGR of the TSP.
• The leasing agreement should be mutually negotiated between the TSP and the enterprise. [Para 4.94]

6.60 The Authority recommends that certain spectrum be earmarked for Captive Wireless Private Networks to be assigned directly by DoT to Captive Wireless Private Network Permission holders/Licensees.[Para 4.110]

6.61 The Authority recommends that spectrum in such bands where IMT ecosystem is available but are being used for non-IMT services in India and can coexist with indoor/within premise cellular based private captive networks on shared basis, be earmarked for private captive networks. The Authority recommends DoT may consider the possibility of earmarking spectrum for captive wireless private networks in the following bands:

a. 3700-3800 MHz band

(i) DoT may consider the possibility of earmarking some spectrum (at least 40 MHz) in 3700-3800 MHz frequency range for low power indoor use for private captive network.

(ii) The co-existence of private captive network and satellite C-band receive stations can be made possible by creating
an effective exclusion zone around the satellite C-band receive stations.

(iii) For this purpose, a digital map of all the existing satellite C-band receive stations should be created having database of their geo-coordinates with automated software system.

(iv) The location of private network proposed by an applicant to be accommodated on co-existence basis should be analysed and permitted through the automated software system.

(v) The power limits and antenna tilt etc. for private captive network should be prescribed by the government for interference free operation and co-existence.

b. 4800-4990 MHz band

(vi) DoT may also consider identifying the frequency range 4800-4990 MHz for IMT purpose and consider the possibility of carving out some spectrum (at least 40 MHz) in this frequency range for the purpose of earmarking for private captive network.

c. 28.5-29.5 MHz band

(vii) DoT may also consider identifying some spectrum (at least 400 MHz) in the frequency range 28.5-29.5 GHz for the purpose of earmarking for private captive network, which can co-exist with satellite earth stations.

(viii) A software based transparent system should be built to permit the establishment of private networks and Satellite Earth Stations based on the geo-coordinates of the proposed location on interference free co-existence basis.

(ix) DoT should develop a digital map with geographic coordinates of all the existing and future Satellite Earth Stations as well as geographic coordinates of the premises of Private Network locations. Based on this database, permissions for establishment of new installations may be provided to the licensees.[Para 4.148]

6.62 The Authority recommends that for assessment of demand of spectrum for private networks, DoT should create a portal and open it at least for a period of 6 months, seeking demand for spectrum from companies. The following information may be asked to assess the demand:

- **Name of the company**
- **Details of their business, Net Worth, Turnover**
- **Proposed use of spectrum**
- **Requirement of spectrum**
- **Spectrum Band**

• Quantum of Spectrum
• Time Period for which spectrum is required
• Area in sq km with exact location
• Technology proposed to be used

The information so collected by DoT should be accessible only to authorized person in DoT and should not be shared with any unauthorized person.[Para 4.149]

6.63 The Authority recommends that demand assessment will provide the demand factor for direct spectrum assignment from DoT for establishment of private captive network. With such empirical assessment and DoT's decision on the spectrum bands in which spectrum can be earmarked for private networks, the Authority will provide its recommendations on quantum of spectrum, block size, etc.[Para 4.150]

6.64 Considering the outcome of the demand assessment and DoT's decision on (i) spectrum bands in which spectrum can be earmarked for private networks and (ii) the methodology for spectrum assignment, the Authority will provide its recommendations on pricing aspects keeping in view the principles of transparency and appropriately factoring in the market determined price, geographical aspects, etc. [Para 4.187]

6.65 The Authority recommends that in respect of direct spectrum assignment by DoT to Captive Wireless Private Network Permission holders/Licensees, DoT should come out with a guideline detailing the eligibility conditions, spectrum assignment methodology, validity of spectrum, roll out obligations, framework for application process etc. It may be termed as 'Guidelines for Spectrum Assignment to Captive Wireless Private Network Permission holder/Licensee'.[Para 4.192]

6.66 The Authority recommends that the following should be the eligibility conditions for assignment of spectrum directly by DoT to entities for establishment of isolated private captive network:

(i) Applicant should be a company registered under the Companies Act, 2013 and have valid 'Captive Wireless Private Network Permission/License'.

(ii) Captive Wireless Private Network Permission holder/Licensee should be the occupant (either owned or on lease) of the geographical area/property on which spectrum is being sought to be deployed the captive wireless private network.

(iii) The net-worth of the Captive Wireless Private Network Permission holder/Licensee should not be less than Rs. 100 Crores. [Para 4.193]

6.67 The Authority recommends that the spectrum for private network can be assigned administratively to the eligible Captive Wireless Private Network Permission holders/Licensees on demand for specified geography on non-interference basis through a widely publicized online portal-based process in a fair and transparent manner. The assignment process will register the geo-coordinates of the specified geography for which the spectrum is to be assigned. The same spectrum can be reused with multiple assignment to large number of players having different geo coordinates on co-existence basis with FSS services. However, DoT may ascertain that administrative assignment in such cases is legally tenable as per spectrum assignment policy of DoT, before formulating the guidelines for assignment of spectrum for captive wireless private network. [Para 4.194]

6.68 The Authority recommends that to provide flexibility, the spectrum for private networks should be assigned initially for a period up to 5 years with a renewal process for further up to 5 years and so on. The licensee should put to use the spectrum assigned to it within 12 months from the date of assignment. Spectrum assignment can be revoked if use of the spectrum has not begun within one year of the assignment ('use it or lose it' principle), or if the spectrum has not been used for the purpose for which it has been assigned.[Para 4.195]

6.69 The Authority recommends that the entire process of filing of application for spectrum (earmarked for Captive wireless private networks) assignment for captive wireless private networks and its processing should be done through an online portal. Application processing and spectrum allocation should be done in a time bound process.[Para 4.196]

6.70 The Authority recommends that spectrum should be assigned for captive network deployments using 3GPP compliant technology or technology approved by the Government. [Para 4.197]

6.71 The Authority recommends that there are many other key elements which are also required to be included in the proposed guidelines such as:

• A company registered under the Companies Act, 2013 and having valid CWPN permission/License can apply for multiple locations through a single portal. However, documents showing occupancy (either owned or lease) of each of the geographic area will have to be submitted through online portal.

• Prescribed Spectrum charges should be applicable for each location.

• Documents required to be submitted through online portal should be specified so as to make entire process should be paperless.

• It will be the responsibility of the CWPN permission holder/Licensee (enterprise) to ensure that the mobile signals are restricted indoors/within the specified geography. Spectrum cannot be used beyond the assigned geographical area.

• The CWPN permission holder/licensee should be required to ensure efficient and interference-free use of their networks, for instance to design and build their networks in such a way so as to minimize the interference ranges of their spectrum usages. This can be achieved for instance with low transmit powers, low antenna heights and appropriate antenna directional patterns. DoT should prescribe the antenna height, power limits, antenna tilt etc.

• The limits for public exposure to electromagnetic fields from radio equipment must be met.

• Conditions related to no interference to PLMN networks should be prescribed.

• The licensor will have the right to inspect the premises to ascertain the bona fide and legitimate use of spectrum.

• The licensee should be required to submit a compliance certificate annually certifying the compliance to the specified use of spectrum, power limits and any other periodical compliance.

• The licensor should have the rights to revoke the spectrum assignment in case of violation of prescribed terms and conditions.

• As the spectrum earmarked for private network has to coexist with other radio services like FSS stations, to protect these radio services, the licensee should submit the required details of the geo-coordinates of the premises and parameters for the local usages while applying for the spectrum assignment so as to carry out the necessary radio compatibility calculations.

• The area of operation, that is, the spectrum usage area of the licensee will be the area inside the logical perimeter of the defined premises with clearly specified geo coordinates. WGS84 format of geographic coordinate system or any other suitable geographic coordinate system may be used for this purpose.
• The CWPN permission holder/licensee will be responsible for the correctness of the geographic coordinates of the area for which the spectrum assignment is applied for.
• Spectrum should be used in such a way that the spectrum usage is feasible in the assignment area without causing any interference to adjacent spectrum usages and is compatible with other spectrum usages.
• The application for spectrum assignment should also include the following in particular:
• Details of the planned coverage area and a geographical map.
• Type of application planned. (type of industry vertical)
• Planned purpose of use of spectrum. (For example, machine control etc.)
• Quantity of spectrum required for the planned purpose of use.
• Proposed Signal level.
• Details of the technology to be used, network build, number and technical characteristics of base stations etc.
• Measures to be taken to ensure efficient spectrum use.
• Details of the antennas to be used (type, location, height, directional pattern), shielding measures, indoor/outdoor applications.
• Timescale for the network build and network roll-out.
• Period for which spectrum is required. [Para 4.198]
6.72 The Authority recommends that:
a. A 5G-dedicated Inter-Ministerial Working Group (IMWG), under the Chairmanship of Member (Technology), DoT should be formed comprising Ministry of Electronics and Information Technology, Department for Promotion of Industry and Internal Trade, Ministry of Information and Broadcasting, Department of Space, Ministry of Finance, Ministry of Education, Department of Science & Technology, Ministry of Micro, Small and Medium Enterprises (MSME) and Niti Ayog as members, which should be represented by JS Level officers.
b. The IMWG may co-opt officers from other concerned Ministry(ies) / Department(s) as per requirement.
c. The concerned Ministries/Departments shall establish a special dedicated Digital Cell, headed by the JS Level officer nominated as member in IMWG, with dedicated technical manpower to formulate the use of digital technologies like 5G, IoT, M2M, AI etc. and development of relevant and affordable use cases involving start-up companies, entrepreneurs, application providers etc. The scope of the Digital Cell shall include, but not limited to, involving the relevant stakeholders in discussions, framing and monitoring short-term (annual), medium-term (5-year), and long-term (10-year) plans with quantitative targets in respect of sector specific 5G use cases, providing platform and promoting 5G use cases. The Digital Cell may also need to focus on issues relating to digital literacy, connectivity and affordable user devices for their sector.

d. The Ministries/Departments should take up short-term (annual), medium-term (5-year), and long-term (10-year) plans with quantitative targets in respect of sector specific 5G use cases and the same can be considered by IMWG for consistent and coordinated development of use cases and start-up ecosystems to align issues such as connectivity, privacy, data security etc. in the country.
e. The participating members of IMWG should be responsible for outlining strategies, defining targets, and budgetary provisions for achieving defined targets for their respective Ministries /Departments.
f. The IMWG should conduct periodic meetings and discussions, at least once in 3 months, in which progress achieved will be reviewed and outline path for achieving planned objectives will be framed.
g. The IMWG should present consolidated status/proposals to the Department of Telecommunications (DoT) being nodal Ministry, on a regular basis.
h. The progress of digital transformation and implementation of 5G use cases in various verticals should also be monitored and documented by IMWG and be submitted to DoT for perusal and appropriate decision.[Para 5.77]
6.73 The Authority recommends that DoT should take up the matter with Ministry of Micro, Small and Medium Enterprises (MSME) to carry out a study to find out the actual details about the level of acceptance and adoption of 5G based industrial automation and digital technologies by the MSME sector in the country as compared to other industries. Based on the learning from such study, appropriate schemes, including interest subvention scheme, for upgradation of plant and machinery, may be devised to facilitate the micro, small and medium enterprises to overcome various constraints and move towards industrial automation. In this regard, budgetary provisions (if required), may be created by the ministry of MSME.[Para 5.78]
6.74 The Authority recommends that Telecom Innovation Centres, may be formulated in alliance with different academic institutions and ministries. These innovation centres could be specialized for development of innovative solutions for 5G use cases and applications in different verticals / sectors such Agriculture, Medicine, Manufacturing, Infrastructure, Power, Telecom, etc. and be made responsible for desired outcome. DoT should be the nodal ministry to monitor and coordinate the activities of the Telecom Innovation Centres. [Para 5.80]"

(vi) The comments of various stake holders are as per:[26.1. to 26.12.].

(a) Extracts from comments of stake holders are:

TCL:[27]

"Further, there are provisions in the Telecommunication Act, 2023 (notified on 24-12-2023) which provides for administrative allocation of spectrum in case of 19 exceptions. Notably, Radio back haul for telecommunication services is one of the exception listed in the 'The First Schedule' to The Telecommunications Act, 2023.[28]

Q19.[29] What should the payment terms and associated conditions for the assignment of 37 –37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands relating to:
i. Upfront payment
ii. Moratorium period
iii. Total number of instalments to recover deferred payments

iv. Rate of discount in respect of deferred payment and prepayment
Please support your answer with detailed justification.

The auction of natural resource such as spectrum cannot be considered as the best method for allocation. There are several other factors which ought to be considered such as the development of the country, benefit to citizen, multiplier effect on the economy, impact on the well-being of people and creation of jobs, realisation of Goals set up by the country such as Make in India and making the country Atma Nirbhar. The Government has realised this aspect and therefore it has already exempted certain categories of use cases from the auction requirement under the Telecommunication Act, 2023 which has been notified on 24/12/2023.The schedule 1 of the Act contains 19 such exceptions where in the Government can allot the spectrum on administrative basis in order to meet certain objectives and in the interests of General Public. T he nature of the spectrum bands in discussion cannot provide the contiguous/ ubiquitous coverage and it is unlike the access spectrum bands being used to deploy 2G/ 3G/ 4G or 5G services. The allocation of spectrum on administrative basis under these bands would give a huge opportunity for research and development of various use cases, Industry 4.0, Private 5G use cases etc. which will give much needed impetus to the domestic manufacturing industry as well. In many economies, the cost of infrastructure required as an alternative to the scarce natural resource is manifold higher as against the perceived value of natural resource. For example, in the developing economies with low per capita income the cost of setting up telecom infrastructure would be very high as against the cost of spectrum which is to be allocated to set up the telecom network; however, it would be possible only in case when spectrum is assigned on administrative basis. In view of this, we strongly recommend that the spectrum allocation under the spectrum bands in discussion should be done on administrative basis.

AIRTEL:[30]

Adequate information about present/planned locations of SRS/satellite hub stations should be provided and ***co-existence studies between IMT and satellite operations*** *conducted – both prior to auctions.*[31]

The payment terms and associated conditions for the assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands should be as follows:[32]

i. Upfront payment:

During the 2022 auctions, operators opting for moratorium were required to make an upfront payment equal to the spectrum installments of a minimum of 2 years. Making this kind of hefty upfront payment for a resource that is utilised over a period of 20 years causes a strain on the finances of operators. The core tenet of the recent Cabinet Reforms6 was to increase availability of cash with the operators by providing a moratorium on dues. If operators are again forced to make hefty upfront payments for acquiring spectrum in the upcoming auctions, then it will effectively negate the relief provided by the Cabinet decision and adversely impact the financial health of the industry. **Therefore, Airtel recommends that no upfront payment should be required. Operators should be allowed to make payments in the form of annual installments**

Q19. What should the payment terms and associated conditions for the assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands relating to:[32]

i. Upfront payment

ii. Moratorium period

iii. Total number of installments to recover deferred payments
iv. Rate of discount in respect of deferred payment and prepayment
Please support your answer with detailed justification.

Response to TRAI Consultation on *Auction of Frequency Spectrum in 37-37.5 GHz, 37.5-40 GHz, and 42.5-43.5 GHz bands Identified for IMT*

i.only (post a 6-year moratorium), spread over the remaining 14-year spectrum duration period.

ii. Moratorium period:

Please refer to the response to point i. above. No upfront payment should be required. Operators should be allowed to make payments in the form of annual installments only (post a **6-year moratorium**), spread over the remaining 14-year spectrum duration period. As noted above, operating in the telecom sector requires TSPs to make huge investments that have long gestation periods. Any new network takes a time period of at least 4-5 years to monetise. In view of this, huge upfront payments combined with short moratorium periods are likely to cause significant strain on the finances of TSPs over the long run. In the interests of the overall financial health of the industry in the long-term, it is essential to provide a longer moratorium period with no upfront payment requirement.

Therefore, Airtel recommends that a moratorium of at least 6 years be allowed in the forthcoming auctions, with no requirement of upfront payment and annual installments spread over the remaining 14-year spectrum duration period. iii. Total number of installments to recover deferred payments:

Please refer to the response to points i. and ii. No upfront payment should be required. Operators should be allowed to make payments in the form of **annual installments spread over the remaining 14-year spectrum duration period** (post a 6-year moratorium). Recovering the payment for spectrum in 14 installments spread over the period of spectrum can meet the objective of securing revenue for the exchequer while also alleviating the financial burden on TSPs and giving them enough liquidity to invest in the network to ensure maximum utilisation of spectrum for the public good. **Therefore, Airtel recommends that a total of 14 installments, after the 6-year moratorium period, should be fixed to recover the deferred payment, with no requirement of upfront payment.**

iv. Rate of discount with respect to deferred payment and prepayment:

The purpose of allowing deferred payments of spectrum charges is to provide some liquidity to TSPs, to enable them to keep investing in network infrastructure. However, the obligation to pay an additional huge interest on such deferred spectrum payments defeats this objective, since the interest rate burdens the TSPs' finances and impairs their ability to make investments in the network rollout. Hence, to alleviate the financial

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burden on the TSPs, **no interest should be levied on the deferred spectrum installments.** In any case, the purpose of levying interest on deferred payments is not to create an additional source of revenue for the exchequer. Hence, the interest rate, if any, must be such that it is just enough to protect the time value of money and not more – and the repo rate declared by the RBI is the best way to achieve the same. On the other hand, PLR/MCLR are rates at which loans are offered by banks to customers. Accordingly, they involve a business margin over and above the repo rate,

which is as high as 3-4% in some cases. Considering the huge sums involved in spectrum payments, this margin amounts to a significant extra cost for the TSPs. Thus, **in case it is decided to levy interest on deferred payment installments, the interest rate must be lowered to be in line with the repo rate prevailing in the country**, in order to ensure that no unwarranted financial burden is imposed on the TSPs while simultaneously protecting the interests of the exchequer. **Therefore, Airtel recommends the following:**

(i) No interest should be levied on the deferred spectrum installments.

(ii) Without prejudice, if it is decided to charge interest on deferred payment installments, then the interest rate must be lowered to align with the prevailing repo rate in the country".

RJIL:[33]

"Q19. What should the payment terms and associated conditions for the assignment of 37– 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands relating to:

(i) Upfront payment

(ii) Moratorium period

(iii) Total number of installments to recover deferred payments

(iv) Rate of discount in respect of deferred payment and prepayment

Please support your answer with detailed justification.

1. We submit that the Government and the Authority have taken many steps to rationalize the payment terms over the years, however, more steps can be taken to provide greater impetus to the emerging technologies and give sufficient time for laying the networks or additional layers in network.

2. We submit that the upfront payment should be kept only at 10% of the bid amount and thereafter minimum 5-year moratorium without any interest cost should be provided.

3. Further, the deferred payment for auction discovered spectrum price, should be spread over the remaining 15 years by way of annual payments. These annual payments should be charged with the reasonable interest rates of 6.5% as specified by RBI Repo rate, in place of current prohibitive interest rates."[34]

VI:[35]

"4. spectrum road map"[36]

"c. long-term spectrum road map"[37]**.**

VIASAT:[38]

"Reference is to WRC 2019"[39]

STARLINK:[40]

"Reference is to NFAP 2022 STAR"[41]

AMAZON:[42]

"Resolution 176 (Rev. WRC-23)"[43].

ISPAI:[44]

"It is highlighted at the outset that as early as in 2022, the Authority, in its Recommendations 1 related to: the 2022 Auctions (for IMT/5G bands), had itself observed that the frequency ranges 37-40 GHz bands save already been identified for IMT services by ITU, and thus these bands should

made available for IMT services in India at the earliest.***1*** "Auction of Spectrum in frequency bands identified for IMT/5G", 11 April 2022[45].

"The payment terms and associated conditions for the assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands should be as follows:

i. Upfront payment: There should be no requirement of upfront payment.

ii. Moratorium period: At least a 6-year moratorium period should be allowed, in order for TSPs to be able to start realising revenues from the spectrum before they have to make the payments for the same.

iii. Total number of installments to recover deferred payments: A total of 14 annual instalments, after the 6 year moratorium period, should be fixed – with no upfront payment requirement. This will enable TSPs to invest in network rollout.

iv. Rate of discount with respect to deferred payment and prepayment: Huge interest on deferred spectrum payments defeats the purpose of allowing a moratorium. Therefore, no interest should be levied on deferred payments. In case interest has to be levied, it should be at the repo rate, and not the SBI PLR/MCLR, as repo rate is adequate to protect the time value of money. SBI PLR/MCLR imposes unwarranted financial burden on TSPs"[46].

"Further, the Resolution 243 (REV.WRC-23) lists the measures to ensure protect ***It may be noted that India specific co-existence studies have not been carried out.*** Hence, it is recommended that **co-existence studies should be carried out by the Government involving all the concerned stakeholders, before auctioning those bands. This should be done in a time-bound manner, so that these spectrum bands can be put to auction at the earliest"**[???]

1 *See* section 6.7, Recommendations on Auction of Spectrum in frequency bands identified for IMT/5G (11 April
2022), available at https://www.trai.gov.in/sites/default/files/Recommendations_11042022.pdf."

BIF:[47]

"Q19. What should the payment terms and associated conditions for the **assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands relating to: i. Upfront payment ii. Moratorium period iii. Total number of installments to recover deferred payments iv. Rate of discount in respect of deferred payment and prepayment Please support your answer with detailed justification.**

i. **Upfront payment**: There should be no requirement of upfront payment.

ii. **Moratorium period**: At least a 6-year moratorium period should be allowed, in order for TSPs to be able to start realising revenues from the spectrum before they have to make the payments for the same.

iii. **Total number of instalments to recover deferred payments**: A total of 14 annual instalments, after the 6-year moratorium period, should be fixed – with no upfront payment requirement. This will enable TSPs to invest in network rollout.

iv. **Rate of discount in respect of deferred payment and prepayment**:

Huge interest on deferred spectrum payments defeats the purpose of allowing a moratorium. Therefore, no interest should be levied on deferred payments. In case interest has to be levied, it

should be at the repo rate, and not the SBI PLR/MCLR, as repo rate is adequate to protect the time value of money"[48].

IAFI:[49] ***has been working for the last 21 years to encourage the involvement of*** professionals, corporate, public/private sector industries, R&D organizations, academic institutions, and other agencies in the activities of the ITU and APT ***https://www.itu.int/rec/R-REC-M.2161/en***[50]

2 *See* section 6.7, Recommendations on Auction of Spectrum in frequency bands identified for IMT/5G (11 April 2022),

available at https://www.trai.gov.in/sites/default/files/Recommendations_11042022.pdf[51].

IAFI response:

"The payment terms and associated conditions for the assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands should be as follows:

i. Upfront payment: There should be no requirement of upfront payment.

ii. Moratorium period: At least a 6-year moratorium period should be allowed, in order for TSPs to be able to start realising revenues from the spectrum before they have to make the payments for the same.

(iii).**Total number of installments to recover deferred payments**: A total of 14 annual instalments, after the 6 years moratorium period, should be fixed – with no upfront payment requirement. This will enable TSPs to invest in network rollout.

iv. Rate of discount with respect to deferred payment and prepayment:

Huge interest on deferred spectrum payments defeats the purpose of allowing a moratorium. Therefore, no interest should be levied on deferred payments. In case interest has to be levied, it should be at the repo rate, and not the SBI PLR/MCLR, as repo rate is adequate to protect the time value of money. SBI PLR/MCLR imposes unwarranted financial burden on TSPs[52.].

2.ISSUES FOR CONSULTATION

Q1. Whether the entire available spectrum in each of the frequency ranges

(a) 37-37.5 GHz,

(b) 37.5-40 GHz, and

(c) 42.5-43.5 GHz, should be put to auction for IMT? If no, please specify the quantum of spectrum in each frequency range to be put to auction. Kindly justify your response.

Q2. In case you are of the opinion that any of the frequency ranges viz. 37-37.5 GHz, 37.5-40 GHz, and 42.5-43.5 GHz should be put to auction at a later date, what should be the timelines for auctioning of such frequency bands for IMT? Kindly justify your response.

R B Sahajpal
Counter Comments
On
TRAI CP[1]PR[2,3,4]

Q3. Do you agree that TDD-based duplexing configuration should be adopted in the country for the frequency ranges under consideration viz.,

(a) 37 – 37.5 GHz,

b) 37.5 – 40 GHz, and

(c) 42.5 – 43.5 GHz, for IMT?

If yes, considering that there is an overlap of frequencies in the band plans n260 (37-40 GHz) and n259 (39.5-43.5 GHz), how should the band plan(s) along with its frequency range be adopted? Kindly justify your response.

Q4. Whether the spectrum in the frequency ranges under consideration viz.,

(a) 37-37.5 GHz,

(b) 37.5-40 GHz, and

(c) 42.5-43.5 GHz should be assigned for a validity period of 20 years, as prevalent in the existing frequency bands, or for a shorter validity period? In case you are of the opinion that a shorter validity period should be adopted, please suggest the validity period? Kindly provide your response with detailed justifications.

Q5. Whether the spectrum in

(a) 37-37.5 GHz,

(b) 37.5-40 GHz, and

(c) 42.5-43.5 GHz frequency ranges should be assigned for the existing licensed service areas (LSAs) for Access Service (i.e. Telecom Circles/ Metros), or it should be assigned for smaller service areas? In case you are of the opinion that the spectrum in these bands should be assigned for smaller service areas, please suggest the criteria for defining such service areas? Kindly provide your response with detailed justifications.

Q6. What should be the block size, and the minimum quantity for 43.5 GHz frequency ranges? Kindly justify your response.

Q7. What provisions with respect to the spectrum cap per service provider in a licensed service area (LSA) should be made bidding in

(a) 37-37.5 GHz,

(b) 37.5-40 GHz, and

(c) 42.5-43.5) applicable for the frequency ranges under consideration viz.,

(i) 37-37.5 GHz,

(ii) 37.5-40 GHz, and

(iii) 42.5-43.5 GHz for IMT?

Specifically, -

(a) Whether there is a case for a combined spectrum cap for 26 GHz band (24.25-27.5 GHz) and the frequency ranges under consideration? If yes, what should be the spectrum cap? Kindly justify your response.

(b) In case your response to (a) above is in the negative whether spectrum cap should be prescribed separately for each frequency range viz. (i) 37-37.5 GHz, (ii) 37.5-40 GHz, and (iii) 42.5-43.5 GHz, or these frequency ranges should be combined for applicability of spectrum cap? What should be the spectrum cap(s)?

Kindly justify your response.

Q8. What should be the roll-out obligations for the assignment of spectrum in

(a) 37-37.5 GHz,

(b)37.5-40 GHz, and

(c) 42.5-43.5 GHz frequency bands for IMT? Kindly justify your response.

Q9. Whether the eligibility conditions and associated eligibility conditions for participation in the auction for 37-37.5 GHz,37.5-40 GHz, and 42.5-43.5 GHz should be kept analogous to the eligibility conditions and associated eligibility conditions for participation in the auction for spectrum for IMT, as defined in NIA 2024? In case your response is in the negative, suggestions may kindly be made with detailed justification.

Q10. To mitigate inter-operator interference due to TDD-based configuration, whether the approach adopted for 3300-3670 MHz and 26 GHz bands should also be made applicable for the frequency ranges under consideration viz. 37-37.5 GHz,37.5-40 GHz, and 42.5-43.5 GHz, or some other provisions need to be created? In case you are of the opinion that some other provisions are required to be created, suggestions may be made with detailed justification.

Q11. Whether there could be any challenges in sharing of 37.5-40 GHz and 42.5-43.5 GHz spectrum frequency ranges between IMT and Satellite Gateway links? If yes, what challenges do

you foresee and what measures could be adopted to mitigate such challenges? Kindly justify your response.

Q12. In case it is decided to share (i) 37.5-40 GHz, and (ii) 42.5-43.5 GHz spectrum frequency ranges between IMT and Satellite Gateway links,

(i) Whether there is a need to prescribe a protection/ keep off distance between IMT stations and Satellite Earth Station Gateways? If yes, what should be the protection distance?

(ii) What other parameters should be prescribed for the coexistence of IMT and Satellite Gateway links? Suggestions may kindly be made with detailed justification.

Q13. Whether the value of spectrum in 37–37.5 GHz, 37.5–40 GHz and 42.5–43.5 GHz spectrum bands be derived by relating it to the auction determined price/value of spectrum in any other band by using spectral efficiency factor? If yes, with which spectrum band, should these bands be related and what efficiency factor or formula should be used? Please justify your suggestions.

Q14. Should international spectrum prices i.e. the auction determined price/ reserve price of other countries in 37 –37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands serve as a basis for the purpose of valuation of these bands? If yes, what methodology can be followed in this regard? Please provide detailed information.

Q15. Apart from the approaches highlighted above which other valuation approaches should be adopted for the valuation of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands? Please support your suggestions with detailed methodology, related assumptions and other relevant factors, etc.

Q16. Whether the value arrived at by using any single valuation approach for a particular spectrum band should be taken as the appropriate value of that band? If yes, please suggest which single approach/ method should be used. Please support your answer with detailed justification.

Q17. In case your response to the above question is negative, will it be appropriate to take the average valuation (simple mean) of the valuations obtained through the different approaches attempted for valuation of a particular spectrum band, or some other approach like taking weighted mean etc. should be followed? Please support your answer with detailed justification

Q18. What ratio should be adopted between the reserve price for the auction and the valuation of the spectrum in these spectrum bands and why? Please support your answer with detailed justification.

Ans. Q 1. To Q 18. No specific comments. Kindly also refer to **Ans. 20**.

.

Q19. What should the payment terms and associated conditions for the assignment of 37 – 37.5 GHz, 37.5 – 40 GHz and 42.5 – 43.5 GHz spectrum bands relating to:

i. Upfront payment

ii. Moratorium period

iii. Total number of installments to recover deferred payments

iv. Rate of discount in respect of deferred payment and prepayment

Please support your answer with detailed justification.

Ans, 19. Up front payment, Moratorium period, Total number of installments to recover deferred payments presumably **relate** to payment methodology for payment of Bid Amount of a Spectrum Auction..However there is no data is available either in the extant TRAI CP or in the TRAI Recommendation dated 11.04.22 confirming that BID Amount has been realised by the method/methods employed in the past. This information will be helpful in formulating a suitable Payment Framework for payment of BID Amount Spectrum Auction in future. Kindly also refer to **Ans. 20**.

3.Conclusions:

(i). Latest NFAP INDIA based on WRC2023 Final acts is already in the pipe line and may take > six month[53].

(ii) India is signatory to WRC 2023 Final Acts[54].

(a) *declarations and reservations:*[55]

(x) India (Republic of) (4, 100)[56]

(b) "**For the Republic of India:"**[57]

(x)"In signing the Final Acts of the World Radiocommunication Conference (Dubai, 2023), the delegation of the Republic of India reserves for its Government, the right to take such actions, as may be considered necessary, to safeguard its interests, should any administration make reservation and/or not accept the provisions of the Final Acts or fail to comply with one or more provisions of the Final Acts, including those which form a part of the Radio Regulations."[58]

(iii) Regarding Auction of SPECTRUM TRAI in recommendations dated 11.4.2022[59] in para 3.2 has brought to notice that as SC in 2G case the "the State is duty-bound to adopt the method of auction".

(a) However a stake holder TCL[60] has pointed out that "The Government ---------- has already exempted certain categories of use cases from the auction requirement under the Telecommunication Act, 2023[61] which has been notified on 24/12/2023.The schedule 1 of the Act contains 19[62] such exceptions where in the Government can allot the spectrum on administrative basis in order to meet certain objectives and in the interests of General Public".

-x-x-x-x-

THE FIRST SCHEDULE

[*See* sections 4 (*4*), (*5*) and 57(*1*)]

ASSIGNMENT OF SPECTRUM THROUGH ADMINISTRATIVE PROCESS

1. National security and defence.
2. Law enforcement and crime prevention.
3. Public broadcasting services.
4. Disaster management, safeguarding life and property.
5. Promoting scientific research, resource development, and exploration.
6. Safety and operation of roads, railways, metro, regional rail, inland waterways, airports, ports, pipelines, shipping, and other transport systems.
7. Conservation of natural resources and wildlife.
8. Meteorological department and weather forecasting.
9. Internationally recognised dedicated bands for amateur stations, navigation, telemetry, and other like usages.
10. Use by Central Government, State Governments, or their entities or other authorised entities for safety and operations of mines, ports and oil exploration and such other activities where the use of spectrum is primarily for supporting the safety and operations.
11. Public Mobile Radio Trunking Services.
12. Radio backhaul for telecommunication services.

Explanation.—The term "radio backhaul" shall mean the use of radio frequency only to interconnect telecommunication equipment, other than the customer equipment in telecommunication networks.

13. Community Radio Stations.
14. In-flight and maritime connectivity.
15. Space research and application, launch vehicle operations and ground station for satellite control.
16. Certain satellite-based services such as: Teleports, Television channels, Direct To Home, Headend In The Sky, Digital Satellite News Gathering, Very Small Aperture Terminal, Global Mobile Personal Communication by Satellites, National Long Distance, International Long Distance, Mobile Satellite Service in L and S bands.
17.Use by Central Government, State Governments or their authorised agencies for telecommunication services.
18. Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL).
19. Testing, trial, experimental, demonstration purposes for enabling implementation of new technologies, including for creation of one or more Regulatory Sandboxes.

-x-x-x-

1. (*1*) This Act may be called the Telecommunications Act, 2023.
(*2*) It extends to,—
(*i*) the whole of India; and
(*ii*) to any offence committed or contravention made outside India by any person, as provided in this Act.
(*3*) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint and different dates may be appointed for different provisions of this Act and any reference in any such provision to the commencement of this Act shall be construed as a reference to the commencement of that provision[63].

-x-x-x-x

(iii) NFAP 2022 is mentioned on page '2' in reference 26.(6) below. However for present CP the latest NFAP INDIA based on WRC 2023 Final Acts is to be taken into consideration.

Q20. Any other suggestion relevant to the subject, may be submitted with detailed justification.

4.Suggestios:

The following are submitted for kind consideration.

(i) Latest **NFAP INDIA** taking into account the **WRC2023 Final Acts** may be made available in public domain say preferably with in a time frame of say six months from now.

(ii) The following may be kept in view regarding "**A**SSIGNMENT OF SPECTRUM THROUGH ADMINISTRATIVE PROCESS**"**

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(a)the Hon'ble Supreme Court of India judgment dated 2nd February 2012[64].

(b) The schedule 1 of the Telecommunications Act, 2023[65].

(c) The current status of **O F F I C E M E M O R A N D U M**

"**Government of India**

Ministry of Communications
Department of Telecommunications
Wireless Planning & Coordination Wing
Sanchar Bhawan, 20-Ashoka Road, New Delhi-110 001
No. R-11014/15/2012-NT (Pt.) Date: 7th July, 2023
O F F I C E M E M O R A N D U M

It has been decided, as an interim measure, for a period of Six months with effect from 13.07.2023, to continue to make frequency assignments for broadcasting (including community radio), H/V/UHF/SHF fixed/mobile networks (including CMRTS), radars, experimentation, demonstration and satellite based applications (including DTH, Teleport, DSNG, VSAT, NLD, ILD, INMARSAT).
2. The annual spectrum usage charges shall be continued to be levied as per Orders No. P-11014/34/2009-PP(I), (II), (III) & (IV) dated 22nd March, 2012 and VSAT Orders No. R-11014/9/2001-LR dated 16th April, 2003 & J- 19045/03/2018-SAT dated 13th September, 2021 and Inmarsat based Gloabal Satellite Phone Services order No. J-19044/03/2015-SAT dated 28 th June, 2021, unless otherwise amended.
3. The allotment of the spectrum would be made with the following conditions and upon obtaining an undertaking from applicants that they would agree for assignment of frequencies with the following conditions:
i. The allotment of spectrum is provisional and subject to Govt's decision on allotment & pricing of spectrum;
ii. In the event of final decision to allot spectrum only through auction process, the provisional allotment of spectrum shall be withdrawn;
iii. In case the provisional allotment of spectrum is withdrawn, payment made towards spectrum charges or part thereof shall not be refunded;
iv. In case the provisional allotment of spectrum is withdrawn, respective wireless users would obtain Non Dealer Possession Licence (NDPL) for possessing the wireless equipment or return the equipment to a DPL
holder or shall be disposed-off the same as per procedure.
v. The respective wireless users would be required to give an undertaking to pay the revised spectrum charges, as finally determined through market related mechanism or otherwise as may be applicable, from the date of Letter of Intent (LoI) for provisional allotment of spectrum.
3.1. Upon shift/ change in policy from administrative allotment, due notice of 3 months of such change, time to make appropriate arrangements, etc. will be given and the same has to be complied with by the wireless users.
4 . The above conditions in Para 3 and 3.1 will be added in the Letter of Intent (LoI), Decision to grant License (D/L) and the Wireless Operating Licence (WOL) also.

R B Sahajpal
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On
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(Khagendra Singh)
Deputy Wireless Adviser
to the Government of India
Ph- 011 2303 6633

To,
All concerned
Copy for information to:
I. DDG (WPF), Wireless Finance Division.
II. Director, Wireless Monitoring Organisation.
III. JWA WPC (HQ)/ JWA, RLO (WR/ER/NR/SR)/ Sr. DWA, RLO(NE)
IV. All Sr. DWAs, WPC Wing, DoT HQ.
V. Sr. DWA (IT & SACFA), for uploading on DoT's website."[66]

"Government of India

Ministry of Communications
Department of Telecommunications
Wireless Planning & Coordination Wing
Sanchar Bhawan, 20-Ashoka Road, New Delhi-110 001
No. R-11014/15/2012-NT (Pt.) Date: 12.03. 2024
O F F I C E M E M O R A N D U M

It has been decided in continuation of previous O. M. of even no. dt.07.07.2023, as an interim measure, for a period of Six months with effect from 13.01.2024, to continue to make frequency assignments administratively for broadcasting (including community radio), H/V/UHF/SHF fixed/mobile networks (including CMRTS), radars, experimentation, demonstration and satellite based applications (including DTH, Teleport, DSNG, VSAT, NLD, ILD, INMARSAT).

2. The annual spectrum usage charges shall be continued to be levied as per Orders No. P-11014/34/2009-PP(I), (II), (III) & (IV) dated 22nd March, 2012 and VSAT Orders No. R-11014/9/2001-LR dated 16th April, 2003 & J- 19045/03/2018-SAT dated 13th September, 2021, Inmarsat based Global Satellite Phone Services order No. J- 19044/03/2015-SAT dated 28th June, 2021 until 31-03-2024.

2.1 The revised spectrum charging Order No. P-11014/34/2009-PP dated 11.12.2023 shall be applicable with effect from 01.04.2024 onwards.

3. The allotment of the spectrum would be made with the following conditions and upon obtaining an undertaking from applicants that they would agree for assignment of frequencies with the following conditions:

i. The allotment of spectrum is provisional and subject to Govt's decision on allotment & pricing of spectrum;

ii. In the event of final decision to allot spectrum only through auction process, the provisional allotment of spectrum shall be withdrawn;

iii. In case the provisional allotment of spectrum is withdrawn, payment made towards spectrum charges or part thereof shall not be refunded;

iv. In case the provisional allotment of spectrum is withdrawn, respective wireless users would obtain Non Dealer Possession Licence (NDPL) for possessing the wireless equipment or return the equipment to a DPL holder or shall be disposed-off the same as per procedure;

v. The respective wireless users would be required to give an undertaking to pay the revised spectrum charges, as finally determined through market related mechanism or otherwise as may be applicable, from the date of Letter of Intent (LoI) for provisional allotment of spectrum.
4. Upon any shift/ change in allotment policy due notice of 3 months of such change, time to make appropriate arrangements will be given and the same has to be complied with by the wireless users.
5. The above conditions in Para 3 and 4 will become a part of the Letter of Intent (LoI), Decision to grant License (D/L) and the Wireless Operating Licence (WOL).

(A K Patel)
Deputy Wireless Adviser
to the Government of India

To
All concerned
Copy for information to:
a. Director, Wireless Monitoring Organisation.
b. DDG (WPF), Wireless Finance Division.
c. JWA WPC (HQ)/ JWA, RLO (WR/ER/NR/SR)/ Sr. DWA, RLO(NE)
d. All Sr. DWAs, WPC Wing, DoT HQ."[67]

(d) "THE TELECOMMUNICATIONS ACT, 2023 No. 44 OF 2023" does not find a mention in latest

"**The Government of India (Allocation of Business) Rules, 1961 (As amended upto Amendment Series no. 376, dated 3rd April, 2024)"** in[68].

(iii) SPECTRUM proposed for auction is just based on the availability of the same and not on the need for the same. Accordingly:

(a) DoT may put a SPECTRUM Road Map in public domain. The need is clear from:

(a)TRAI:

"**the Authority recommends that DoT should explore the possibility to make these bands available for IMT services at the earliest and come out with a spectrum roadmap for opening up of new bands for IMT to meet the future demand."**

(b) Airtel

"*Adequate information about present/planned locations of SRS/satellite hub stations should be provided and* ***co-existence studies between IMT and satellite operations*** *conducted – both prior to auctions."*

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(c) Vi

"4. spectrum road map"[36]

"c. long-term spectrum road map"[37]

(iv) Taking into account that latest NFAP based on WRC2003 Final Acts in public domain is likely to take a few months, some stake holders have taken NFAP2022,WRC19 Final Acts into consideration and review of present methodology of payment of bid amount of auction for a spectrum

(v). Present methodology of payment of bid amount of auction for a spectrum is not quite transparent:

(a) Is 'Objective' is get to full bid amount (P) equal to as on 'T_0' of time line of payment?

(b) Will discount rate(i) decided at 'T_0' will remain constant throughout the time interval till full and final payment of bid amount as on 'T_0'?

(c) Will "**iii. Total number of installments to recover deferred payments**" (n) remain constant?

(d) Will amount (R) of equal end-of period equal payments remain constant?

and the comments of stake holders are quite involute on the issue

(x) P, i, R, n are related as per the following equation:

$$\mathbf{R= P[i(1+i)^n/(1+i)^n]}$$

Note: Pt0 is not = $Pt^1+Pt^2+Pt^3+Pt^4$----------$+Pt^n$

(xx) Application of 'equation" to specific issues"

If "(i.) Upfront payment"

Then $\mathbf{P_{t0}}$=Bid amount-upfront payment

If "ii. Moratorium period"

Then adjustment in $\mathbf{P_t}$ is needed depending on 'time line' of uniform series payment. As payments are end of time interval payment.

If "iii. Total number of installments to recover deferred payments"

Then 'n' may be evaluated using the equation but keeping in view value of Pt and keeping 'r' decided at **t0**.

If "iv." Rate of discount in respect of deferred payment and prepayment

Then no change may be done in discount rate fixed at t_0 of time line end of uniform periodic payments instead should be made to 'n' keeping 'R' also constant as fixed at 't_0'.

(xx) Some honoured stakeholders have also responded in this regard[69]. There suggestion may also be considered for a possible '**if then'** analysis.

(xxx) Upfront payment of Bid Amount in a Spectrum Auction on payment timeline 't_0' may be accepted either in full from some one offering but at least one **'R'** fixed for deferred payment on 't_0' on timeline for time series payments **from all** as mandatory**.**

(xxx) Moratorium may not be allowed on at least time period '$\mathbf{t_0 - t_1}$' of time line for time series payments.

(vi) There are many loose ends to be tied for consideration of extant CP main being latest NFAP INDIA taking into reckoning WRC2003 Final Acts is likely to be available only after about six months. And there are number of Declarations, Reservations of INDIA as signatory to WRC2023 Final Acts.

(a) Extant CP may be reconsidered in say Jan2025 for /comments/counter comments before TRAI Recommendations to DoT regarding SPECTRUM AUCTION..

(b) Spectrum Auction may be held in last quarter of FY 2024-2025.

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5.References

1. https://trai.gov.in/sites/default/files/CP_04042024.pdf (CP)
2. https://trai.gov.in/sites/default/files/PR_No.17of2024.pdf (PR)
3. https://trai.gov.in/sites/default/files/PR_No.22of2024_0.pdf (PR)
4. https://trai.gov.in/sites/default/files/PR_No.24of2024.pdf (PR)
5. page '4' of supra '1'.

6. page '37' supra '1'.

7. ibid.

8. page '38' supra '1'.

9. page '62' supra '1'.

10. para (b) of page '57' of supra '1'.

11. https://www.itu.int/hub/publication/r-act-wrc-16-2024/ (WRC 2023 Final Acts).

12. page 5/218 of https://itshamradio.com/wp-content/uploads/2022/10/National-Frequency-Allocation-Plan-2022.pdf.

13. supra '11'.

14. https://dms.dot.gov.in/sites/default/files/OM_NFAP%20Review%20Committee.pdf.

15. ibid.

16. Annexure -II page "60/66" of supra'1'.

17. ibid.

18. para '2.26' page '26' supra '1'.

18. para **550.B** of page 149/794 of supra '11'.

19. ibid.

20. page 'page 573/ 794 of sura '11'.

21. page 'page 714/ 794 of sura '11'.

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25. pages 323-363 of supra '23'.

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(1) https://trai.gov.in/sites/default/files/IAFI_27052024.pdf (21)

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(6). https://trai.gov.in/sites/default/files/Starlink_SpaceX_27052024.pdf (6)

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(11) https://trai.gov.in/sites/default/files/TCL_27052024.PDF (10).

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27. supra '26.(11) above.

28. page '3' of supra '26.(11)' above.

29. page '9' of supra '26.(11)' above.

30. supra '26.(10)' above.

31. page '3/29' of supra '26.(10) above.

32. page '22/29' of supra '26.(10) above.

33. supra'26/9' above.

34. page '17/17' of '26/9) above.

35. supra '26.(8) above.

36. para '4' page 18/19 of supra '26/9' above.

37. last para page '19/19' of supra '26/9' above.

38. supra '26'(7)' above.

39. page '1/1' of supra '26(7)' above.

40. supra '26.(6)' above.

41. page '2/6' of supra reference '26.(6)' above.

42. supra reference '26.(5)'.

43. page '2/3' of supra reference '26.(5)' above. {(Resolution 176 (Rev. WRC-23)) https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A0000100001PDFE.pdf }

44. supra reference '26.(3)' above.

45. supra references '21','22' above.

46. page ‘11/12’ of supra reference ‘26.(3)’ above.

47. supra reference ‘26.(2)’ above.

48. page ‘10/15’ of supra reference ‘26.(2)’ above..

49. supra reference ‘26.(1) above.

50. https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2161-0-202312-I!!PDF-E.pdf

51. section ‘6.7’ of supra reference ‘23’ above.

52. page ‘15/21’ of supra reference ‘26.(1) above.

53. supra ‘14’.

54. page ‘25/794’ of sura reference ‘11’ above.

55. *page ‘33/794’ of sura reference ‘11’ above.*

56. page ‘34/794’ of sura reference ‘11’ above.

57. page ‘41/794’ of sura reference ‘11’ above.

58. ibid.

59. supra ‘26.11’.

60. page ‘24/26’ of supra reference ‘29’ above..

61. https://egazette.gov.in/WriteReadData/2023/250880.pdf

62. page ‘24/26’ of https://egazette.gov.in/WriteReadData/2023/250880.pdf.

63. section 1.(3) of https://egazette.gov.in/WriteReadData/2023/250880.pdf.

64. pages ‘10’, ‘56’ of supra reference ‘23’ above.

65. supra reference ‘60’ above.

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68. para A.10. Page 36/198 of https://cabsec.gov.in/writereaddata/allocationbusinessrule/completeaobrules/english/1_Upload_3861.pdf.

69.

1. supra reference ‘27’ above.

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2. supra reference ‘30’ above.

3. supra reference ‘33’ above.

4. supra reference ‘44’ above.

5.supra reference ‘49’ above.

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