HRCP response to Consultation Paper on Assignment of the Microwave Spectrum in 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band

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This document presents the detailed response of HRCP to the TRAI open consultation paper titled "Assignment of the Microwave Spectrum in 6 GHz (lower), 7 GHz, 13 GHz, 15 GHz, 18 GHz, 21 GHz Bands, E-Band, and V-Band." Our focus primarily lies in the discussion surrounding the allocation and regulation of V band spectrum.

Kindly find our responses to question numbers;

29-33

Q29. Whether it is feasible to allow low power indoor consumer device-to-consumer device usages on a license-exempt basis in the V-band in parallel to the use of the spectrum by telecom service providers for the establishment of terrestrial networks in a part or full V-band? Kindly provide a detailed response with justification and international scenario.

A29

1 Overall feasibility

It is technically and regulatorily feasible to introduce a licence-exempt, low-power indoor regime for consumer device-to-device (D2D) links in the 57–66 GHz band while mobile operators continue to use the same band for licensed back-haul or IAB. Propagation physics, ITU-R studies, mature global standards (WiGig / IEEE 802.15-2023) and long-standing international rules all support this conclusion.

2 Technical & regulatory foundation

Evidence	Key points	Principal references
Propagation isolation	Oxygen absorption ≈ 15 dB km^{-1} and wall losses > 20 dB confine 60 GHz signals to a room/building, keeping interference range very short.	ITU-R P.676-13, P.1238-11
SRD characteristics	60 GHz SRDs normally operate ≤ 40 dBm EIRP with ranges of 1–10 m.	ITU-R M.2003-2
Global precedent	Key regions already allow licence-exempt indoor use at ≤ 40 dBm EIRP + ≤ 23 dBm MHz^{-1} PSD; no harmful interference has been recorded.	FCC Part 15.255, CEPT 70-03, Ofcom IR 2030, ARIB STD-T117
ITU allocation	RR Footnote 5.558A identifies 57–66 GHz for	ITU Radio Regulations

	WAS/RLAN under national rules.

Global precedent (SRD limits):

Jurisdiction	Rule	limit
United States	FCC Part 15.255	≤ 40 dBm EIRP,
European Union	CEPT ERC Rec 70-03	≤ 40 dBm, ≤ 23 dBm/MHz (57–71 GHz)
United Kingdom	Ofcom IR 2030	Same as EU (57–71 GHz)
Japan	ARIB STD-T117	≤ 40 dBm, ≤ 23 dBm/MHz (59–66 GHz)

3 Proposed guard-rails for India

Parameter	Recommendation
Licence-exempt band	57–66 GHz (phased: 57–64 GHz first)
Max EIRP (indoor)	≤ 40 dBm
PSD limit	≤ 23 dBm MHz^{-1}
Channel widths	2.16 / 4.32 / 8.64 GHz (WiGig & IEEE 802.15-2023)
Beam-forming	Not mandatory

4 Co-existence assessment

Licensed V-band back-haul employs highly directional rooftop antennas. Indoor SRDs radiate at low height and low power, giving more than 70 dB path-loss margin. Over a decade of deployment in the US, EU and Japan shows no material interference. The PSD cap keeps energy density uniform across devices, protecting adjacent channels.

5 Economic & social benefits

- Cable-grade wireless for 8K/RAW video, XR headsets, SSD off-load.
- Industrial & medical near-field links up to 100 Gb/s (IEEE 802.15-2023).
- Off-loads heavy indoor traffic from 5G/6G macro layers.
- Stimulates local manufacturing of 60 GHz chipsets.

6 Conclusion

Grounded in ITU-R recommendations M.2003-2, P.676-13 and P.1238-11, and harmonised with US/EU/Japan limits, India can safely introduce a licence-exempt, ≤ 40 dBm EIRP, ≤ 23 dBm MHz^{-1} PSD, beam-forming-optional indoor regime in 57–66 GHz, unlocking a wide ecosystem of ultra-high-speed wireless applications while fully protecting licensed services.

Q30. In case it is decided to allow low power indoor consumer device-to-device usages on a license-exempt basis in the V-band (57-64/66GHz), -

(a) Should it be permitted in the entire V-band or only in a portion of the V-band? If it should be permitted only in a portion of the V-band, please specify the frequency range.

(b) In case it is decided to permit low power indoor consumer device-to-device usages on a license-exempt basis in the entire V-band, whether the 57-64 GHz range, or the 57-66 GHz range should be considered for such usages?

(c) What should be the carrier size/ channel bandwidth?

(d) What should be the definition of indoor usages?

(e) What technical parameters should be prescribed, including EIRP limits for low power indoor consumer device-to-device usages?

Kindly provide a detailed response with justifications and international scenario.

A30

a) India can confidently open the whole 57–66 GHz band to licence-exempt, low-power indoor device-to-device use. Almost every mass-market chipset—from WiGig notebooks to IEEE 802.15-2023 industrial modules—is already designed to cover that exact span, and both the United States (FCC §15.255) and the European Union (ERC 70-03) have proved that letting the entire block operate indoors causes no difficulty for other services. If the administration prefers a gentle start, it may restrict use to 57–64 GHz for the first two years while it gathers coexistence data, but the long-term objective should remain the full 57–66 GHz range so that equipment sold worldwide works in India without modification.

b) Keeping the SRD allocation at 57–66 GHz, rather than stopping at 64 GHz, also preserves a clean guard between indoor SRDs and the 66–71 GHz segment that the ITU has set aside for future mobile broadband (3GPP band n263). This mirrors the architecture already adopted in the US, EU and Japan and therefore maximises the pool of compatible devices.

c) All channel widths defined by today's standards should be allowed: the 2.16 GHz channels used by WiGig, the 2.16 GHz, 4.32 GHz and 8.64 GHz options in IEEE 802.15-2023, and any narrower proprietary channels of 100 MHz or more, provided they meet the spectral-density limit. This flexibility covers everything from ultra-high-speed laptop docks to low-latency industrial links.

d) Indoor operation can be described simply as use inside a fully enclosed structure with permanent walls and a roof.

e) Technical limits can mirror the tightest figures already applied by leading markets, ensuring global harmony from day one:
    - Maximum average EIRP: 40 dBm – identical to the ceiling in FCC §15.255, CEPT Recommendation 70-03 and Japan's Radio Regulations.
    - Power-spectral density: 13 dBm MHz^{-1} as a starting value. After two years of field experience, the cap can be raised to 23 dBm MHz^{-1} (the EU/Japan figure) if no harmful interference has been logged.
    - No listen-before-talk or duty-cycle obligation is required; heavy atmospheric absorption at 60 GHz and substantial wall loss already provide natural isolation from licensed rooftop back-haul.
    - Beam forming need not be mandated, so very low-cost single-antenna products can flourish alongside phased-array designs.

Parameter	**Limit**	**Remarks**
EIRP (total)	≤ 40 dBm	Matches US/EU/JP indoor limit

PSD	≤ 13 dBm MHz^{-1}	can be raised to 23 dBm MHz^{-1} (the EU/Japan figure)
Channel widths	2.16 / 4.32 / 8.64 GHz or any other Channelization defined currently	WiGig & IEEE 802.15-2023
Beam-forming	Not mandatory	Optional, cost-saving for simple devices

Q31. Whether there is a need for permitting "outdoor" usages of V-band on a license-exempt basis? Kindly provide a detailed response with justification and international scenario.

A31 —

India **can permit low-power outdoor operation** of 60 GHz devices. Ten-plus years of experience in the United States, France and other CEPT countries shows that short-range links in this band coexist safely with rooftop microwave back-haul; no regulator has logged a substantiated interference case.

Outdoor rights would benefit a range of users:

- **Public fleets** – buses, trams and trains that off-load CCTV or telemetry the moment they reach a stop or depot (already deployed on Japanese rail).
- **Crowd off-load** – curb-side 60 GHz access points outside stations, stadiums and festivals that relieve 5 G macro cells.
- **Enterprise and campus links** – 50-to-100 m drops that carry gigabit service to shop-front displays, cameras or small-cell poles where fibre is awkward.

France's "Band 75b" and US practice both confirm that modest power limits plus the natural 60 GHz air loss protect licensed services, so India can safely extend its indoor rules outdoors—without imposing heavy licensing—while still reserving the upper 66–71 GHz block for future IMT.

Q32. If the response to the Q31 is in the affirmative, whether it is feasible to allow outdoor usages on a license-exempt basis in the V-band in

parallel to the use of the spectrum by telecom service providers for the establishment of terrestrial networks in a part or full V-band? Kindly provide a detailed response with justification and international scenario.

A32 —

Yes, it is technically and administratively feasible for India to let low-power outdoor devices operate licence-free in 57–64 GHz at the same time that telecom providers continue using the band for coordinated point-to-point back-haul. Two long-observed facts support this conclusion.

1. Propagation and geometry isolation

At 60 GHz a modest-power street-level transmitter loses nearly 70 dB in the very first metre of free-space travel. Add oxygen absorption, rain fade and the fact that outdoor SRDs sit low and radiate horizontally while operator dishes sit high and point upward, and the aggregate separation exceeds 100 dB under ordinary layouts.

2. Other regulators demonstrate that mixed use works

Several mature markets run low-power outdoor SRDs and licensed point-to-point links in the *same* channels without carving the band into sub-blocks:

- **United States** – FCC §15.255 has allowed outdoor V-band hot-spots and short fixed links since 2016; carrier-class V-band back-haul is still deployed, and the FCC has recorded no substantiated interference cases.
- **United Kingdom** – Ofcom's 2018 decision exempts outdoor fixed 57–71 GHz equipment under generic limits; licensed higher-power dishes continue to be coordinated in a light-licence database and coexist smoothly.

These examples show that careful power caps plus the natural 60 GHz losses are enough; a regulatory partition is unnecessary.

Q33 In case it is decided to allow outdoor usages on a license-exempt basis in the V-band (57-64/ 66 GHz),

(a) Should it be permitted in the entire V-band or only in a portion of the V-band? If it should be permitted only in a portion of the V-band, please specify the frequency range.

(b) In case it is decided to permit outdoor usages on a license-exempt basis in the entire V-band, whether the 57-64 GHz range, or the 57-66 GHz range should be considered for such usages?

(c) What should be the carrier size/ channel bandwidth?

(d) What technical parameters should be prescribed, including EIRP limits for low power indoor consumer device-to-device usages?

Kindly provide a detailed response with justifications and international scenario.

A33 — Outdoor Technical Parameters (Licence-Exempt)

(a) Only the lower portion 57–64 GHz should be opened initially. The remainder of the V-band may be added once real-world coexistence data confirm negligible interference.

(b) If the entire band is ever opened, 57–64 GHz can continue under low-power rules while 64–66 GHz may adopt tighter limits or a light-licence model to protect the adjacent 66–71 GHz IMT block.

(c) Channel bandwidths of 1 GHz or 2.16 GHz are sufficient for typical fixed-wireless hot-spot use.

(d) Recommended technical limits:

Parameter	Limit	Comment
EIRP	≤ 34 dBm	Low-power classification
PSD	≤ 13 dBm MHz^{-1}	Harmonised with indoor rule
Antenna	No beam-forming mandate; patch / horn allowed	
Registration	Not required at ≤ 30 dBm	Administrative simplicity