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**Date:** 23rd June 2025

**For the attention of:** Shri Akhilesh Kumar Trivedi, Advisor  
(Networks, Spectrum and Licensing), TRAI

**From:** ALPS ALPINE CO., LTD,  
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**Subject:** Feedback and recommendations for the ongoing public  
consultation paper No. 05/2025 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

Dear Mr./Ms. Shri Akhilesh Kumar Trivedi,

It is with great respect that we, ALPSALPINE submits this letter to formally provide our comments and answers to questions 29, 30, 31, 32, 33, 34 of *Consultation Paper No.05/2025 of TRAI (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)* dated 28<sup>th</sup> May 2025.

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## **BACKGROUND**

### **1. ALPSALPINE brief company introduction**

ALPSALPINE is a leading manufacturer of electronic components and automotive infotainment systems since its founding in 1948 and has R&D, production and sales bases located in Japan and across the globe- in the Americas, Europe, India, Southeast Asia, Greater China, and Korea, etc.

### **2. About the V-band low power devices of ALPSALPINE**

ALPSALPINE has strong interest on innovative V-band (57-60GHz) broadband motion sensor (or 57-64GHz broadband low power short range radar sensor, hereinafter referred to as 60GHz SENSORS) technology and plans to market products in India using related technology. These products are developed mainly for safety, security, auto-control applications to improve the quality of life of human beings and have high public benefits.

Specifically, the typical products under mass production plan will operate in the V-band and are designed to focus on the automotive market and will be installed in the ceiling within the vehicle to realize in-cabin passenger monitoring function and/or be installed on the body of the vehicle to help people realize hand-free gesture operation to open trunk and door. These products will be supplied to important global automotive manufacture and marketed worldwide including India.

## **ALPSALPINE feedback & proposal to Consultation Paper**

With the above section in mind, ALPSALPINE would like to take this opportunity to comment and provide detailed answers to questions 29, 30, 31, 32, 33 and 34 of CP No.05/2025 of TRAI as below:

*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.*

**Answer:** In the most industrialized countries like EU countries, US and Japan, the V-band (57-64 GHz in EU and Japan, 57-64 GHz in US) is available on a license exempt basis for both indoor and outdoor SRD (lower power short range devices) usage. Much co-existence studies have been done, and one can find the documents in OET 21-264<sup>1</sup>/ FCC NPRM (New Proposal of Rulemaking) of 47CFR §15.255 and in Report<sup>2</sup> of 60GHz low power radar sensor rulemaking of Japan. Studies show it is possible to allow low power radar sensor usages on licensed-exempt basis in V-band(57-64GHz), in parallel to use of the licensed existing in-band/out-band system, by suitable technical condition setting. The V-band in/outdoor devices have great public interest and potential significant socio-economic gains, especially in case of radar sensor applications. So, the usage should not be limited to indoor applications and should not be limited to consumer device to device communication applications. ALPSALPINE respectively request India government permit the V-band to open to all low power general use SRD devices, including radar sensors.

*Q30. In case it is decided to allow low powered indoor consumer device-to-consumer device usages on license-exempt basis in 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.*

**Answer:** In case of radar sensor applications, the continuous instant bandwidth impacts the distance resolution directly. The performance of both FMCW radar and Pulse modulation Radar depends on the instant bandwidth. So, to permit the radar sensors to use the entire band is most important. For communication applications, because the channel width is less than 2.16GHz (WiGig case), to permit part of the band is also reasonable.

*(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?*

**Answer:** In case of radar sensor applications, the 57-64GHz range is reasonable.

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<sup>1</sup> [ECFS – Filing Search Results \(fcc.gov\)](https://www.fcc.gov/ecfs/filing-search-results)

<sup>2</sup> Report of 60GHz low power system [000730378.pdf \(soumu.go.jp\)](https://www.soumu.go.jp/000730378.pdf)

Because it matches the FCC and EU regulation.

*(d) What should be the definition for indoor use?*

**Answer:** In both US and EU, and also in Japan the license exempt applications are allowed for both indoor and outdoor case. The V-band should open to all low power SRD applications. It's better not to limit the application to indoor use. But for better co-existence performance, to define use and to make different technical condition for different use is a reasonable solution.

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

**Answer:** The newly established FCC 47CFR §15.255(57-71GHz) is a good reference. It reflects the comments from the most important communication companies and also most important radar companies worldwide. For low power radar sensor applications only EIRP and TX-Off Time (or the Duty Cycle) is necessary for technical parameters. By the way, for broad-band low power devices, especially in case of pulse modulated low power radar sensor, the PSD (Power Spectrum Density) is very low, and it is a challenge to evaluate the OBW (Occupied Bandwidth). So, FCC rule uses -10dBc definition OBW. ALPSALPINE suggests the technical parameters below for radar sensor application, based on the concept of international harmonic.

Suggestions of Technical Parameter (Radar Sensor Application)				
Modulation		FMCW		Pulse
Use Case		ALL Radar Sensor		
Frequency Band		57.0-59.4GHz	57.0-64GHz	57.0-64.0GHz
EIRP	Peak	20dBm (indoor) 30dBm(outdoor)	20dBm	< 20dB + Maximum Permitted Average EIRP
	Average			13dBm in 0.3μs time window, <5dBm within 61.5 to 64.0GHz
TX OFF-Time (msec)		None	16.5 per 33msec	
Duty				10% , evaluated in any 0.3μs time window
Pulse Width				≤ 6ns
OBW				7GHz (-10dB below the highest radiated emission)

**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.*

**Answer:** Yes, in Table-1 ALPSALPINE gives the V-Band mm-Wave radar sensor applications. Many applications are for outdoor use.

**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.*

**Answer:** Yes, it is feasible to allow outdoor usage on a license-exempt basis in the V-band, in parallel with its use by telecom service providers for the deployment of terrestrial networks, either in part or across the full band. This approach is technically viable and aligns with international best practices.

<Technical Feasibility:>

The V-band is characterized by high atmospheric absorption, particularly due to oxygen molecules, which significantly limits signal propagation. This natural attenuation reduces the risk of harmful interference between different users of the band.

Low-power SRDs, especially the radar sensors operate at low power levels and short ranges, furthermore, the radar sensors are spectrum spread system. They are unlikely to interfere with high-power, long-range telecom deployments.

<Efficient Spectrum Utilization:>

Allowing license-exempt outdoor use promotes more efficient and dynamic use of the spectrum, enabling innovation in areas not only fixed wireless access, but also smart cities, and industrial automation.

< Coexistence Mechanisms: >

Modern technologies such as beamforming, dynamic frequency selection, and ultra-wide band spectrum spread technologies can facilitate coexistence between these

systems. Regulatory frameworks can define power limits, antenna characteristics, and usage conditions to ensure harmonious operation.

<International Scenario:>

The FCC permits unlicensed radar sensors use of the 57–64GHz band under Part 15 rules, including outdoor applications. This has enabled the deployment of both outdoor high speed communication systems like WiGig devices and out-door radar sensors.

The ETSI standards allow license-exempt radar sensor use (SRD) of the 57–64 GHz band, including outdoor usage, under defined technical conditions.

Japan and South Korea: Both countries have adopted frameworks that allow unlicensed use of parts of the V-band for short-range, low-power applications, including outdoor radar sensor scenarios.

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

**Answer:** The answer is same as to the Answer to Q30.

*Q34: Any other suggestions relevant to assignment of spectrum in E-band (71-76/81-86 GHz) and V-band (57-64 GHz) may kindly be made with detailed justification.*

**Answer:** The V-Band (57-64 GHz) is available in Europe and the corresponding ETSI standard is today implemented in more than 66 countries worldwide. In addition, the FCC has released a new rule on 23rd August 2023. ALPSALPINE respectfully request TRAI consider issuing a V-band rule that consistent with ETSI standards or FCC standards to make sure that all parties can contribute to worldwide harmonization to enable easy access to global markets for all companies, including India automotive companies. This will allow manufacturers greater certainty in developing innovative 60GHz SENSOR technologies in a cost-effective manner.

### **60GHz band use cases and applications worldwide**

ALPSALPINE would like to take this opportunity to provide an overview of the possible applications of radar sensor of V-Band as below.

The worldwide 60GHz SENSORS are mainly designed for the use case of vehicle interior detection to detect vital signs inside of a vehicle, in such case it can protect a child from the vehicular heatstroke and can also provide the feature like intruder alarm and seat belt alarm. Some 60GHz SENSOR are designed for the use case of interactive motion-sensing to detect foot and hand gesture to open trunk and doors of the vehicle, and/or to realize other gesture control functions (like Google Soli), and even to detect obstacle around vehicle before opening trunk and doors.

With its ability of high detect accuracy and strong robustness in harsh environmental conditions such as darkness, extreme bright light, wind, dust, smoke, fog, water vapor and extreme temperature, the 60GHz SENSORS have far more potential applications, such as product line sensors in challenging environments where light sensors can fail. These products may realize many new innovative functions and can bring the public much benefit. Thus, in recent years the 60 GHz SENSORS, with the potential to realize special function and high sensing performance, are highly expected to contribute to public with high society value.

For example, the 60GHz SENSORS with 5-7GHz bandwidth have unprecedented measurement accuracy and distance resolution and is expected to detect human body's micro movements at a distance of 1-3 meters. This ability can be used to detect breathing and heartbeat in in-cabin monitor system. Since the Hot Car Act in the United States requires all car manufacturers to install in-vehicle occupant/child monitoring products on the market in 2025, EU-NCAP in Europe will install in-vehicle child monitoring systems as a plus, in 2023 Vehicles without this system will not receive a five-star safety rating in the next few years. Many international car manufacturers and IC vender have launched variety in-cabin monitor technologies/products based on 60GHz SENSOR technology.

In the healthcare field, the 60GHz SENSORS are also expected to open up a new situation. The high measurement accuracy and high distance resolution characteristics 60GHz SENSORS can be effectively used in application of home-based monitoring of elderly person. Global elderly issue is one of the topics of SGDs. 60GHz SENSORS can play an important role in detecting anomalies of elderly person living alone at home, such as sudden accidents while bathing or using toilet or anomalies during sleep.

In visitor counting applications, 60GHz SENSORS can effectively solve privacy protection issues. Unlike the video surveillance equipment, which be widely used in

shopping malls and convention centers for personnel flow monitoring and customer behavior analysis and have the risk of privacy information leakage, 60GHz SENSORS can realize the same function, greatly reduce the risk of privacy information leakage and reduce the trouble of privacy violation.

Finally, 60GHz SENSORS can also contribute to a low-carbon society. Using 60GHz SENSORS, it can accurately detect the position of person in room, control the angle and volume of airflow of the air conditioner, and intelligently controlling the lighting system, a significant improvement of energy use efficiency can be realized.

Based on the above-mentioned advantages of 60GHz SENSORS, during recent years, demand for new products operating in the 57-64 GHz band has grown tremendously. In below table 1 a famous 60GHz SENSOR technology vender lists a selection of different identified use cases where 60GHz SENSORS IC and Technology venders actively helping customers develop end products. Fig.1 through Fig.3 describes how the 60 GHz SENSORS are to be used in some use case.

**Table 1** Selection of use cases addressed by SRDs in 60 GHz

<b>ID</b>	<b>Use case</b>	<b>Feature</b>
A	Vehicle passenger detection	Presence detection
B	Vehicle seat belt alarm and airbag suppression	Presence detection
C	Vehicle intruder alarm	Presence detection
D	Vehicle access control	Gesture control
E	Autonomous vehicle navigation	Obstacle detection
F	Autonomous vehicle perception	Object classification
G	Infrastructure alarm system	Presence detection
H	Parking space occupancy	Object classification
I	Inventory management	Level measurement
J	Dispense control	Flow rate measurement
K	Interactive sports and gaming	Speed measurement
L	Device control	Gesture control

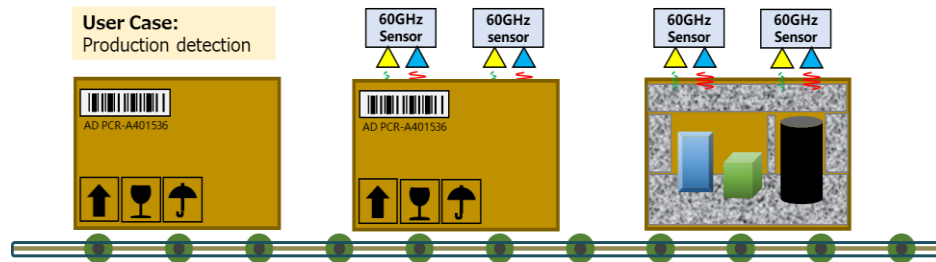


Fig.1 60GHz SENSORS use case of product line detection



Fig.2 60GHz SENSORS use case of gesture operation to open

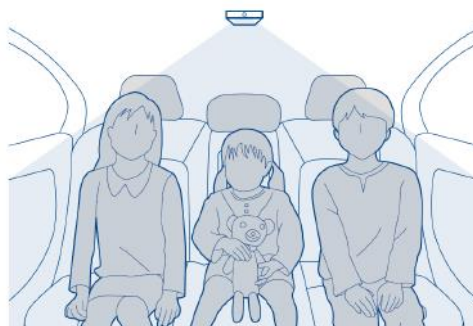


Fig.3 60GHz SENSORS use case of vehicle in-cabin monitoring

Thank you very much for the opportunity to present our comments and answers to the Consultation Paper and we hope you can consider our proposal.

Respectfully submitted,

A handwritten signature in black ink that reads "Y. Sato". The signature is written in a cursive style with a small dot above the 'i' in "Sato".

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Enclosure