Regulatory Framework for Short Range Devices (SRD) & Terrestrial Internet of Things (IoT) Services V1.4

Strategy & Development

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PAKISTAN TELECOMMUNICATION AUTHORITY
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1 Introduction

The Pakistan Telecommunication Authority (PTA) henceforth called as the "Authority" is mandated, under the Pakistan Telecommunication (Re-organization) Act, 1996 (Amendment 2006) here forth referred to as the "Act" and Policies of the Federal Government; to regulate the telecommunications sector in the Country. Clause 3.2 of Rolling Spectrum Strategy 2020-2023 approved by the Federal Cabinet and issued by MoIT&T directed "*PTA/FAB to devise Framework for unlicensed spectrum including Ultra-Wide Band (UWB), Wi-Fi, Short Range Devices (SRD) and IoTs".* Considering the international trends and vision of the Government of Pakistan (GoP), a need is felt to formulate a regulatory framework elaborating requirements for the development of the IoT ecosystem in licensed as well as shared bands in the Country.

The objective of this regulatory framework is to provide regulatory guidelines for the industry, to enable the development of Internet of Things (IoT) eco-system in Pakistan either through unlicensed/shared bands, that may be used for Low Power Wide Area Networks (LPWAN) on non-interference and non-protection basis, or through exclusively assigned /licensed frequency bands. However, the main emphasis of this framework is to elaborate on the requirements and guidelines for the provisioning of IoT services in shared frequency bands.

2 Regulatory Framework for SRD and Terrestrial IoT Services

2.1 Licensing

The SRD and IoT licensing framework for service provisioning is categorized based on the frequency bands utilized for these services, as stated below:

i. **Services provided through licensed/exclusively assigned frequency bands**: This category includes Cellular Mobile Operators (CMOs) as well as other such licensees who have an exclusive assignment of frequencies by PTA/FAB.

ii. **Services provided through shared frequency bands**: It includes the following categories:

   a. Services provided through Short Range Devices-Bands (SRD-bands) and/ or Ultra-Wide Bands (UWB).

   b. Services provided through shared bands for Long Range IoT under the new category of LPWAN License, to be issued by PTA.

2.2 Service Provisioning

The following criteria shall be used for IoT services provisioning:

2.2.1 IoT Service Provisioning through Licensed/Exclusive Frequency Bands

i. CMOs and other Local Access Providers may provide IoT services through their exclusively assigned frequencies under respective license conditions, and/or any other conditions as specified by the Authority from time to time.

ii. Exclusive assignment(s) for IoT in any other frequency band, shall be dealt with on case-to-case basis by PTA/FAB. To this effect, a request for assignment of a specific frequency channel/spot on the prescribed form shall be submitted to PTA for onward submission to FAB for processing, as per procedure in vogue (in accordance with RBS licensing regime or any other regime as specified by the Authority from time to time). However, applicants are encouraged to consider the unlicensed band.

iii. Mission Critical Services shall be offered through exclusively assigned/ licensed frequency bands under the terms and conditions of such license or any other determination/ conditions as specified by the Authority from time to time.

2.2.2 IoT Service Provisioning through Shared/Unlicensed Frequency Bands

i. IoT services through License Exempt Category

IoT, SRD, and UWB devices using the shared spectrum bands identified in **Annex A and B** shall be license-exempted, subject to the following conditions:

a. All devices under this category shall comply with limits/, parameters, allowed applications, general operating conditions, etc. as specified in Annex-A and B.

b. All devices under this category as specified in Annex-A and B shall require type approval as per section 29 of the Act and Type Approval regulations issued by the Authority from time to time.

c. The IoT, SRD, and UWB devices shall be allowed only on "Secondary, Non-Interference, Non Protection" basis as well as shall not cause harmful interference with other authorized radio communication services in overlapping as well as adjacent frequency bands, and be able to tolerate any harmful interference caused by other radio-communication services, electrical or electronic equipment.

d. The devices shall not be constructed with any external or readily accessible

control which permits the adjustment of its operation in a manner that is inconsistent with the specifications and limits as given in Annex A and B.

e. If any IoT, SRD, and UWB device is found, or reported to interfere with any primary service, the device operation must be stopped immediately.

f. UWB applications having the capability to cause harmful interference, in case of wide spread deployments, shall be considered on case-to-case basis. Such applications shall be forwarded to FAB and upon their approval, type approval shall be issued by PTA.

ii. <u>IoT Services through LPWAN License Category</u>

LPWAN License shall be issued by PTA, to those applicants intending to provide IoT services through LPWAN bands, as given in **Annex-C**, and shall be treated under the CVAS licensing regime with the following conditions:

a. All licensees must comply with obligations with regard to clearance of cell sites as per the Standard Operating Procedure of PTA/FAB. In addition to SOP for BTS site clearance, the licensee shall follow "Protection from Health-Related Effects of Radio Base Station Antennas Regulation 2008" and its amendment thereto, while installing and operating radio base station antennas.

b. Shall get each gateway registered as per SOPs notified by PTA, in consultation with FAB, from time to time.

c. Shall provide updated list of operational gateways on bi-annual basis.

d. Shall provide the IoT-specific connectivity through the frequency bands as specified in Annex-C, with strict compliance to respective power limits as defined by the Authority from time to time.

e. Shall use radio frequency on Secondary basis i.e. the networks operating in these bands shall not cause harmful interference to other authorized primary radio communication services.

f. The license is provided on Shared/ non-exclusive basis i.e. the licensee of these networks shall not ask any protection from interference caused by the current or future primary/ secondary users and be able to tolerate any interference caused by other radio-communication services, electrical or electronic equipment.

g. In case of harmful interference to primary services in the overlapping or adjacent bands determined through FAB, the users of such secondary frequency bands shall stop the use with immediate effect, on directions of the Authority.

h. Shall cooperate with PTA and FAB in determining the cause of interference and resolution of same for protecting the primary user(s) through all technical means in order to ensure interference free co-existence. Once the harmful interference is noticed, the same shall be also be shared with FAB.

i. Shall comply with any future update(s) in the frequency plan and the related technical specifications as determined by PTA and FAB from time to time.

j. Shall transport the backend traffic generated through LPWAN network, to the cloud/ internet, or to servers geographically separated from LPWAN base station, through a PTA licensed Local Access Provider.

k. No data shall be stored outside country's geographical boundaries without the approval of the Authority.

l. The licensee shall immediately suspend services if required by PTA due to national security concerns.

m. Shall be obliged to commence the licensed services within one year from the date of grant of the license.

n. The license shall automatically stand cancelled if commencement certificate is not obtained within one year of the effective date. Nevertheless, the license shall remain in force if the licensee`s commencement certificate is under process for approval of the Authority on or before 1st anniversary of the license.

o. Existing licensees shall obtain commencement certificate within one year of issuance of this revised framework. In case of failure, their respective licenses shall stand cancelled.

p. In case of Cellular Mobile and Local Loop Licensees, a separate LPWAN license from PTA shall not be required; however, IoT services using LPWAN bands (as specified in Annex-C) may be provided, subject to prior approval of the Authority.

q. The applicant shall apply and pay applicable fees as defined in **Annex-D**. The duration of a license shall be for Five (05) years, renewable for another term consistent with the policy of the Federal Government.

r. FAB may review the frequency bands for IoT and related technical parameters from time to time, in the light of international best practices, based on the demand and uptake of such services from the industry and recommendations of PTA.

2.3 Research and Development (R&D) - Test and Trial for Non-Commercial purpose

Companies, Academia, Government bodies, and Law Enforcement Agencies (LEA), etc., shall not be required to obtain an IoT LPWAN license for test & trial use of devices/equipment in the IoT LPWAN bands specified in Annex-C, subject to following conditions:

i. Up to a quantity of 10 (ten) devices, for each model/variant, to be used for internal testing purpose on non-interference basis and shall not be sold/used for commercial purpose.

ii. Such applicants may be issued COC/ NOC for a period of 6 x months only, in accordance with Type Approval Technical Standards Regulations, 2021(amended thereto) and/or any other regulations issued by the Authority from time to time. After completion of this period, they shall re-export back to the country of origin under intimation to PTA.

iii. In case such applicants/users of test & trial require to continue with established test & trial setup beyond a period of 6 x months, applicant/users shall be under obligation to get IoT LPWAN license in accordance with licensing procedure available on PTA's website

iv. PTA Enforcement and FAB shall carry out inspections of test & trial setup for compliance of conditions mentioned herein section 2.3.

2.4 General Conditions

i. The devices (Sensors, actuators, aggregators, appliances, etc.), used in the deployment of a network, shall comply with the International Commission on Non-Ionizing Radiation

Protection (ICNIRP) guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields.

ii. The terminal equipment shall have the capability of "reset to the factory settings".

iii. The applicant shall follow the Type Approval Technical Standards Regulations, 2021(amended thereto) issued by the Authority from time to time.

iv. The numbering range shall be used as per the National Numbering Plan. "Number Allocation & Administration Regulations, 2018 shall apply including amendments/modifications made thereto, by the Authority, from time to time. However, the requirements, based on the uptake and growth of IoT applications, shall be reviewed by the Authority from time to time.

v. The suitable IP addressing is permissible, however, migration to IPv6 is highly encouraged.

vi. The licensees providing the IoT services must comply with all the applicable, existing, or future laws, regulations, and requirements issued by PTA or other authorities concerning data management including security, privacy, retention, and protection of data.

vii. Licensees must adhere to all PTA regulations, decisions, guidelines, and instructions issued by the Authority from time to time.

3 Terms & Definitions

The words and expressions shall have the meaning as assigned to them hereunder. However, in the framework. unless the context or subject otherwise requires the words and expressions used but not defined herein, shall have the same meaning as given in the Act, Pakistan Telecommunication Rules, 2000 here forth called as "Rules" and Regulations issued by the Authority from time to time:

i. **Automatic Cruise Control and Collision Warning System -** A short range radar system is a movement and position detection device which is used to give a warning of collision by identifying the delay between a transmitted pulse and a return pulse.

ii. **Ground Penetrating Radar -** (GPR) is defined as a field disturbance sensor that is designed to operate only when in contact with, or within one meter of, the ground for the purpose of detecting or obtaining the images of buried objects or determining the physical properties within the ground. The energy from the GPR is intentionally directed down into the ground for this purpose.

iii. **Induction Loop Communication System -** A system in which the radio frequency energy is conducted or guided along wires or in cables (e.g. Induction loop paging) and the field radiated by wire or cable is limited, giving a typical range between cable and receiving equipment of 30 meters. Induction loop communication systems may be used in a building or limited area of a factory site which is under the control of the system user.

iv. **Internet of Things (IoT):** Global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.[1] The IoT services include but not limited to Machine to Machine (M2M) communication.

v. **IoT Devices:** This is a piece of equipment with the mandatory capabilities of communication and the optional capabilities of sensing, actuation, data capture, data storage, and data processing.[2]

vi. **Indoor:** A single set of premises in single occupation with in a single unbroken boundary (houses, private compounds, educational institutes, etc.).

vii. **Low Power Wide Area Networks (LPWAN):** Wireless wide area network technologies that interconnect low bandwidth, low powered battery-operated devices having low bit rates, over a long range**.**

viii. **Local Access Provider (LAP):** A Local Access Provider can only be a licensed LL, Cellular, Integrated or Satellite licensee, authorized by virtue of its license to provide access to and switching.

ix. **Mission Critical:** Quality or characteristic of a communication activity, application, service or device, that requires low setup and transfer latency, high availability and reliability, ability to handle large numbers of users and devices, strong security and priority and pre-emption handling.

x. **Mission Critical Applications:** Generic communication applications with mission critical characteristics, traditionally encompassing push-to-talk voice (MCPTT), real-time video (MCVideo) and real-time data (MCData).

xi. **Mission Critical Service:** Communication service reflecting enabling capabilities common to two or more Mission Critical Applications and provided to end users from

[1] Y.2060 : Overview of the Internet of things (itu.int)
[2] Y.2060 : Overview of the Internet of things (itu.int)

Mission Critical Organizations and mission critical applications for other businesses and organizations (e.g., **utilities**, railways).

xii. **Outdoor**: Areas located outside the personal premises**. used, happening or located outside rather than in a building.**

xiii. **Radio Detection System:** A movement detection device which is used to give warning of intrusion by activating an alarm or sending a coded signal to a receiving device to identify the source of emission (e.g. field disturbance sensor).

xiv. **Radio Alarm System:** An alarm system which uses radio signals to generate or indicate an alarm condition or to set or unset the system (e.g. short range fire detection & alarm system, anti-theft alarm device).

xv. **Radio Microphone:** A microphone that uses a radio link to convey speech or music to a remote receiver.

xvi. **Short Range Radio Communication Devices (SRDs):** Radio devices operating over short distance i.e. indoor or the range of a maximum of 100m for outdoor connectivity at low power, having little potential to cause interference to other radio equipment, and its communication remains local/standalone and is not connected directly to any public switched telecommunication network.

xvii. **Terrestrial Radio Communication:** Any radio communication other than space radio communication or radio astronomy.

xviii. **Terminal Equipment:** Any apparatus directly or indirectly connected to any network termination point and used for sending, processing, or receiving intelligence.

xix. **Telemetry:** The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument.

xx. **Telecommand:** The use of telecommunication for the transmission of signals to initiate, modify or terminate functions of equipment at a distance (e.g. radio control of models, automatic garage door openers, etc.).

xxi. **Wireless LAN:** A wireless data communication (e.g. wireless LAN) is a radio-communication system used for transmission of data between computers installed within a building.

xxii. **Wireless Video Transmitter:** It is mainly to be used for controlling or monitoring purposes.

xxiii. **Wall Imaging System:** is a field disturbance sensor that is designed to detect the location of objects contained within a "wall" or to determine the physical properties within the "wall." The "wall" is a concrete structure, the side of a bridge, the wall of a mine or another physical structure that is dense enough and thick enough to absorb the majority of the signal transmitted by the imaging system. This category of equipment does not include products such as "stud locators" that are designed to locate objects behind gypsum, plaster or similar walls that are not capable of absorbing the transmitted signal.

4 Changelog

4.1 Regulatory Framework for Short Range Devices (SRD) & Terrestrial Internet of Things (IoT) Services v1.4 November, 2025

New Insertion:

Clause 2.2.2 (ii) **IoT Services through LPWAN License Category**

- Registration of gateways and provision of information to PTA
- Restriction on data storage outside country without prior permission of PTA and requirement of suspension of services due to national security concerns
- Obligations on new and existing licensees to obtain commencement certificate within one year, else automatic cancellation
- Cellular Mobile and Local Loop licensees may provide IoT services on frequency bands mentioned at Annex-C subject to prior approval from PTA

Change:

Clause 3 Terms and Definitions

- Satellite licensee included in definition of Local Access Provider

Annex-D

- Revision in ILF, annual gateway charges and processing fee structure

4.2 Regulatory Framework for Short Range Devices (SRD) & Terrestrial Internet of Things (IoT) Services v1.3 February, 2023

Change:

- Annex-A Radio Frequency Spectrum for Short Range Devices (SRD)
    - Changing in the Allowable Criteria of 76-81GHz Band Approved for SRD including Vehicle Radars

4.3 Regulatory Framework for Short Range Devices (SRD) & Terrestrial Internet of Things (IoT) Services v1.2 May, 2022

New insertion:

- Research and Development (R&D) - Test and Trial for non-commercial purpose
    - Inclusion of LPWAN equipment for Research and Development (R&D) for non-commercial purpose

4.4 Regulatory Framework for Short Range Devices (SRD) & Terrestrial Internet of Things (IoT) Services v1.1 December, 2021

5 Acknowledgements

PTA would like to thank all stakeholders from Industry, Academia and individuals who were involved during consultation process and provided invaluable feedback and input for the development of this framework.



Annex - A

Radio Frequency Spectrum for Short Range Devices (SRD)

S. No	Frequency band	Max Radiated Field Strength/Output	Maximum allowable Range in meters	Applications	Comments/ Remarks
1	9-59.750 KHz	72db µA/m at10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
2	59.750-60.250 KHz	42 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
3	60.250-74.750 KHz	72 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
4	74.750-75.250 kHz	42 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
5	75.250-77.250 kHz	72 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
6	77.250-77.750 kHz	42 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
7	77.750-90 kHz	72 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
8	90-119 KHz	42 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
9	119-128.6 kHz	66 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
10	128.6-129.6 kHz	42 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
11	129.6-135 kHz	66 dBµA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be

					employed
12	135-140 kHz	42 dBμA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
13	140-148.5 kHz	37.7 dBμA/m at 10 meters	10 m	induction loop system SRDs	only loop coil external antennas may be employed
14	148.5- 5 000 kHz	– 15 dBμA/m at 10 meters in any bandwidth of 10 kHz. The total field strength is – 5 dBμA/m at 10 meters for systems operating at bandwidths larger than 10 kHz	10 m	induction loop system SRDs	only loop coil external antennas may be employed
15	5000 kHz - 30 MHz	– 20 dBμA/m at 10 meters in any bandwidth of 10 kHz. The total field strength is – 5 dBμA/m at 10 m for systems operating at bandwidths >10 kHz	10 m	induction loop system SRDs/RFID	only loop coil external antennas may be employed
16	13.533-13.567 MHz	42 db μA/m at10meters, 100mW EIRP	10 m	Induction loop system, Radio detection, alarm system	–
17	26.957-27.283 MHz	42dbμ A/m@10m, 10mW e.r.p	10 m	telemetry	–
18	40.66-40.700 MHz	10 mW ERP	10 m	Telemetry, Telecommand SRDs	–
19	180-200 MHz	≤ 112 db μV/m at 10 meters	indoo r only	Wireless microphone, Hearing/Audio assistance aids	–
20	401-402 MHz	25 μW ERP	indoo r only	Active medical implant devices	Channel spacing: 25 kHz. Individual transmitters may combine adjacent channels for increased bandwidth up to 100 kHz.
21	402-405 MHz	25 μW ERP	indoo r only	Active medical implant	Channel spacing: 25 kHz. Individual transmitters

				devices	may combine adjacent channels for increased bandwidth up to 300 kHz.
22	433.05-434.79 MHz	<100mW ERP	100 m	Radio Telemetry, Telecommand, Alarms', data system & IoT networks	–
23	865-868 MHz	<20mW ERP	10 m	Non-specific short-range devices	In case of interference to primary services (Cellular Mobile) in the overlapping or adjacent bands the users of such secondary frequency bands shall stop the use with immediate effect, on the direction of Authority.
24	920-925 MHz	≤ 200 mW ERP	100 m	Radio Telemetry, Telecommand, RFID systems and IoT networks	In case of interference to primary services (Cellular Mobile) in the overlapping or adjacent bands the users of such secondary frequency bands shall stop the use with immediate effect, on the direction of Authority.
25	2.40-2.5 GHz	≤ 100 mW EIRP	100 m	Wireless video transmitters ,WLANs	For wideband modulations other than FHSS, the maximum e.i.r.p. density is limited to 10 mW/MHz
26	5.150-5.350 GHz	≤ 200 mW EIRP	100 m	WLANs and broadband access	–
27	5.470-5.725GHz	≤ 200 mW EIRP	100 m	WLAN and broadband access	–
28	5.725-5.875 GHz	≤ 1W EIRP		WLANs and broadband access	
29	10.5-10.55 GHz	≤ 117 dbμ V/m at 3 meters	indoo r only	Wireless video transmitters & other SRDs	Radar gun devices not allowed under this provision
30	24.00-24.25GHz	≤ 100 mW EIRP	50 m	Wireless video transmitters & other SRDs	–

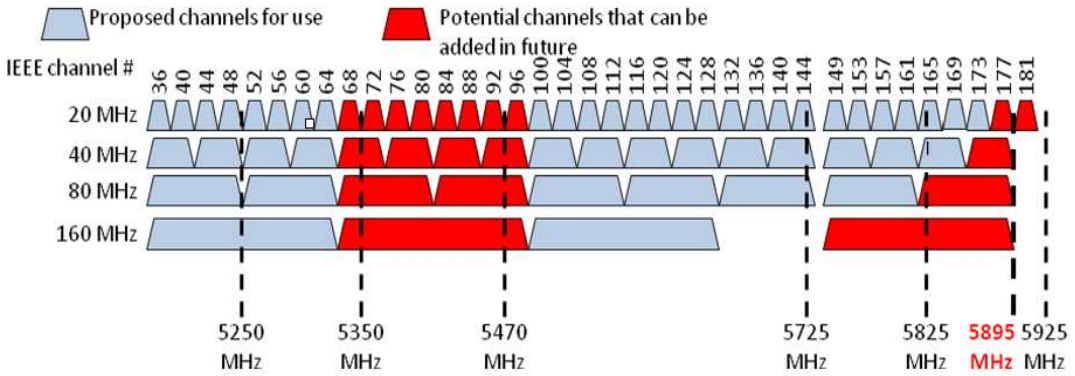
31	57.00- 66.00 GHz	40 dBm EIRP and 13 dBm/MHz EIRP density	100 m	Wideband data transmission devices	–
32	57.00- 64.00 GHz	43 dBm EIRP The power limit applies inside a closed tank and corresponds to a spectral density of -41.3 dBm / MHz EIRP outside a 500 liter test tank.	50 m	Radar pulse level sensors for tanks	–
33	57.00- 64.00 GHz	100 mW e.i.r.p., a maximum transmit power of 10 dBm and a maximum e.i.r.p. power spectral density of 13 dBm/MHz	50 m	telemetry, telecommand, alarms, data transmissions	–
34	76.00 - 77.00 GHz	**For pulsed radars:** Mean output power level ≤ 23.5 dBm EIRP. Peak output power level ≤ 55 dBm EIRP. **For applications other than pulsed radars:** Mean output power level ≤ 50 dBm EIRP. Peak output power level ≤ 55 dBm EIRP.	300m	Transport and Traffic Telematics: Ground Based Vehicle Radar Systems including Automatic Cruise Control and Collision Warning System for vehicles e.g. AEB, etc.	EN 301 091-1 V2.1.1 (2017-01)
35	77.00 - 81.00 GHz	Maximum radiated average power spectral density ≤ -3 dBm/MHz EIRP. Mean output power level ≤ 50 dBm EIRP. Peak output power	100m	Wideband high-precision Short-Range vehicular Radar (SRR) applications	EN 302 264 V2.1.1 (2017-02)

		level ≤ 55 dBm EIRP.			

Channel plans and other parameters for 5 GHz bands at serial number 26, 27 and 28 and 57 – 66 GHz band at serial number 31 are attached at **Annex- A1** and **Annex- A2,** respectively.

Annex - A1

Channel Plan and Additional Conditions for RLANs in 5 GHz bands (5.150-5.350 GHz, 5.470-5.725 GHz and 5.725-5.875 GHz)



BAND	CHANNEL NUMBER	FREQUENCY/ MHZ	PAKISTAN	Maximum mean EIRP	Maximum Mean EIRP Density
Band I 5150-5250	36	5180	Indoors	200 mW	10 mW/MHz
	40	5200	Indoors		
	44	5220	Indoors		
	48	5240	Indoors		
Band II 5250-5350	52	5260	Indoors	200 mW	10 mW/MHz
	56	5280	Indoors / DFS / TPC		
	60	5300	Indoors / DFS / TPC		
	64	5320	Indoors / DFS / TPC		
Band III 5470-5725	100	5500	Indoors / DFS / TPC	200 mW	10 mW/MHz
	104	5520	Indoors / DFS / TPC		
	108	5540	Indoors / DFS / TPC		
	112	5560	Indoors / DFS / TPC		
	116	5580	Indoors / DFS / TPC		
	120	5600	Indoors / DFS / TPC		
	124	5620	Indoor/Outdoor		
	128	5640	Indoor/Outdoor		
	132	5660	Indoor/Outdoor		
	136	5680	Indoor/Outdoor		
	140	5700	Indoor/Outdoor		
Band IV 5725-5875	149	5745	Indoor/Outdoor	1 W for indoor and outdoor use with up to maximum antenna gain of 23 dBi (max EIRP=30dBm+23dBi) as already approved by PTA	50mW/MHz
	153	5765	Indoor/Outdoor		
	157	5785	Indoor/Outdoor		
	161	5805	Indoor/Outdoor		
	165	5825	Indoor/Outdoor		
	169	5845	Indoor/Outdoor		
	173	5865	Indoor/Outdoor		

Annex - A2

Channel Plan for Fixed Services in 57-66 GHz Range in Pakistan

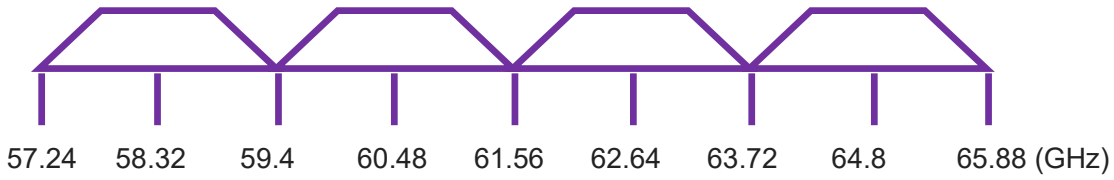
Based on ITU Recommendation F.1497-2, ECC Recommendations (09)01 and (05)02, and international best practices, the band plan (**Annex-A2-i**) is approved in Pakistan for fixed services. All the frequency assignments are to be made on link by link basis. The following emission limitations will be applicable for links operating in the band 57-66 GHz:

- Maximum EIRP: +55 dBm
- Minimum antenna gain: +30 dBi
- Maximum transmitter output power: +10 dBm

For wideband systems (i.e. bandwidth higher than 100 MHz), the transmitter output power density shall be limited to -10dBm/MHz.

Channel Plan for Multiple Gigabit Wireless Systems including RLANs based on IEEE standards in 57-66 GHz Range in Pakistan:

In line with the ITU Recommendation ITU-R M.2003-1 and ETSI standard EN 302 567, the following four channels with 2160 MHz bandwidth each are approved in Pakistan for Multiple Gigabit Wireless Systems:



The abovementioned channels shall be allowed for both Indoor and Outdoor operation of Multiple Gigabit Wireless Systems with the following limitations:

- Maximum EIRP: +40 dBm
- Maximum spectral power density (EIRP): 13 dBm / MHz

Annex- 'A2-i'
Radio Frequency Channel Arrangements in 57-66 GHz Range
This Annex gives basic channel arrangements for both FDD and TDD applications.

Let f_r be the reference frequency of 56950 MHz
f_n be the center frequency of a radio frequency channel in 57-66 GHz range
then the center frequencies of individual basic 50 MHz channels are expressed by the following relationship:

$$f_n = f_r + 25 + 50n \quad \text{MHz}$$

where n = 1,2,3,4,5,…….179

Wider channel operation, up to 2500 MHz, either TDD or FDD, may be derived by basic channel aggregation.

Bands limits (GHz) → (see Note 1)	**57-59**							**59-63**					**63-64**			
50 MHz channel number	**1**	**2**	**3**	**4**	**→ → →**	**39**	**40**	**41**	**42**	**→ → →**	**119**	**120**	**121**	**→ → →**	**140**	
	G	**B**			**→ → →**					**→ → →**				**→ → →**		

50 MHz Basic channel number	**141**	**142**	**143**	**144**	**→ → →**	**177**	**178**	**179**	**50 MHz**

64 000 65 950 66 000

*The separation into four major frequency ranges is indicative only

TDD and FDD systems may use any channel. However, the equipment shall listen for a free channel before transmission to recognize existing transmissions in order to minimize interference problems and to ensure continued operation of existing transmissions.

Channels n = 1, 2 are to be kept as guard band and may only be used for temporary purposes e.g., equipment alignment or propagation tests.

Calculated parameters for 57-66 GHz band are as follows:

***XS* (MHz)**	***n***	***f_1* (MHz)**	***f_{179}* (MHz)**	***Z_1S* (MHz)**	***Z_2S* (MHz)**
50	179	57025	65925	25	75

where

XS: separation between center frequencies of adjacent channels

Z_1S: separation between the lower band edge and the center frequency of the first channel

Z_2S: separation between center frequencies of the final channel and the upper band edge

Annex - B

Radio Frequency Spectrum for Ultra Wide Band Devices (UWB)

S.No	Frequency range in GHz	Maximum mean power (E.I.R.P.) spectral density	Maximum Peak power (E.I.R.P) defined in 50 MHz)
1	$f \leq 1.6$	- 90 dBm/MHz	-50 dBm
2	$1.6 < f \leq 2.7$	- 85 dBm/MHz	-45 dBm
3	$2.7 < f < 3.1$	- 70 dBm/MHz	-36 dBm
4	$3.1 < f \leq 3.4$	-70 dBm/MHz or - 41.3 dBm/MHz using LDC(1) or DAA(2)	- 36 dBm or 0 dBm
5	$3.4 < f \leq 3.8$	-80 dBm/MHz or - 41.3 dBm/MHz using LDC(1) or DAA(2)	-40dBm or 0 dBm
6	$3.8 < f \leq 4.8$	- 70 dBm/MHz or - 41.3 dBm/MHz using LDC(1) or DAA(2)	-30 dBm or 0 dBm
7	$4.8 < f \leq 6$	-70 dBm/MHz	-30 dBm
8	$6 < f \leq 8.5$	-41.3 dBm/MHz	0 dBm
9	$8.5 < f \leq 9$	-65 dBm/MHz or - 41.3 dBm/MHz using DAA(2)	-25 dBm or 0 dBm
10	$9 < f \leq 10.6$	-65 dBm/MHz	-25 dBm
11	$f > 10.6$	-85 dBm/MHz	-45 dBm

1. Within the band 3.1 GHz to 4.8 GHz. The Low duty cycle mitigation technique and its limits as defined/specified in ETSI Standard EN 302 065-1
2. Within the band 3.1 GHz to 4.8 GHz and 8.5 GHz to 9 GHz. The Detect and Avoid mitigation technique and its limits as defined/specified in ETSI Standard EN 302 065-1

Annex - C

Radio Frequency Spectrum for Long Range IoT (LPWAN)

S.No	Frequency Band	Max. Output Power (EIRP)	Remarks
1	433.05-434.79 MHz	1 W Max*	
2	920-925 MHz	1 W Max*	**Protection of primary services operational in adjacent frequency bands shall be ensured.**

***The power limits specified here are subject to approval by FAB. FAB may review allowed Max power from time to time.**

Annex - D

Fee Schedule for LPWAN License

License Type	Application Processing Fee	Initial License Fee	Duration
LPWAN	PKR. 5,000/-	PKR 100,000/-	5 Years

Note:

1. All relevant taxes, fees, levies imposed by Government of Pakistan shall be applicable.
2. LPWAN license/authorization for academic research purpose shall be exempted from above mentioned fee(s), for research purposes only.
3. Annual gateway charges stand abolished w.e.f. 1st July 2025.

Annex - E

Flow Chart for Licensing

Summary Chart of IoT, SRD/UWB regulatory framework reflecting service provisioning, licensing, frequency bands involved and other technical conditions.

