

Regulations for Terrestrial, Mobile, Satellite and Wireless Connectivity Equipment Standards, 2016

In exercise of powers conferred under clause (o) of sub-section (2) of section 5 read with sub-section (2) of section 29 of the Pakistan Telecommunication (Re-organization) Act 1996, the Authority hereby makes the following regulations, namely:

PART – I

Preliminary

1. Short title and Commencement

- (a) These Regulations may be called the ‘Regulations for Terrestrial, Mobile, Satellite and Wireless Connectivity Equipment Standards, 2016’.
- (b) These regulations shall come into force from the date of gazette notification.

2. Definitions. In these regulations, unless there is anything repugnant in the subject or context:

- (a) “**Act**” means the Pakistan Telecommunication (Re-organization) Act, 1996.
- (b) “**Authority**” means the Pakistan Telecommunication Authority established under Section 3 of the Act.
- (c) “**Standard**” is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.
- (d) “**Terminal Equipment**” means any apparatus directly or indirectly connected to any network termination point and used for sending, processing or receiving intelligence.
- (e) “**Telecommunication Equipment**” Section 2(r) of Act defines telecommunication equipment as Switches, equipment, wires, cables, apparatus, poles, structure, ducts, man-holes and other than terminal equipment, comprising any telecommunication system or used in connection with any telecommunication service.
- (f) “**Electromagnetic Compatibility (EMC)**” deal with unintentional generation, propagation and reception of electromagnetic energy which may cause unwanted effects such as Electromagnetic Interference (EMI) or even physical damage in operational equipment.
- (g) “**Type Approval Certificate (Certificate)**” means the approval/recognition by the Authority that a type of terminal equipment conforms to the technical standards determined by the Authority.
- (h) “**Specific Absorption Rate (SAR)**” is a measure of the rate at which energy is absorbed by the human body when exposed to a radio frequency (RF) electromagnetic field.
- (i) “**Radio frequency (RF)**” is a rate of oscillation in the range of around 3 Hz to 300 GHz, which

corresponds to the frequency of radio waves, and the alternating currents which carry radio signals.

- (j) “**Terrestrial Equipment**” Any radio communication other than space radio communication or radio astronomy.

3. Acceptable Technical Standards

The minimum acceptable technical standards for terminal equipment are divided into following categories

- Electromagnetic Compatibility Standards (EMC) – applicable for all terminal devices.
- Health & Safety and SAR Standards- applicable for all terminal devices.
- Radio Frequency (RF) Communication Standards – applicable to equipment falling under the sub-categories identified in section 5.

a) Electromagnetic Compatibility Standards (EMC)

Note: *Electromagnetic Compatibility standards are applicable to all the device and equipment’s listed in the document.*

Standards for EMC	Acceptable Standard			Description
	EN	CISPR	IEC	
Information Technology Equipment	55022	22	-	• Radio disturbance characteristics • Limits and methods of measurement
	55024	24	-	• Immunity characteristics • Limits and methods of measurement
Acceptable Limits/Threshold	61000-3-2	-	61000-3-2	• Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)
	61000-3-3	-	61000-3-3	• Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems • Equipment with rated current <= 75 A and subject to conditional connection
	61000-3-11	-	61000-3-11	• Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems • Equipment with rated current <= 75 A and subject to conditional connection
Other Standards	301 489	-	-	• Electromagnetic compatibility and Radio spectrum Matters (ERM) • Electro Magnetic Compatibility (EMC) standard for radio equipment and services • Various parts as applicable to terminal type
	301489-07	-	-	EMC conditions for mobile and portable radio and ancillary equipment for digital cellular radio telecommunication systems(GSM and DCS) 900/1800 Bands
	61000-6-1	-	61000-6-1	• Immunity for residential, commercial and light-industrial environments
	61000-6-2	-	61000-6-2	• Immunity for industrial environments

	61000-6-3	-	61000-6-3	• Emission standard for residential, commercial and light-industrial environments
	61000-6-4	-	61000-6-4	• Emission standard for industrial environments

Table.1. *Acceptable EMC Standards by the PTA***b) Acceptable Standards for Health & Safety and SAR****Note:** *Health and Safety standards are common to all the devices and equipment's listed in the document.*

Health and Safety standard	Acceptable Standard				Description
	EN	IEC	OHSAS	ISO	
Electrical	60950	60950	-		• Safety of information technology equipment
Health	-	-	18000 18001	45001	• Occupational health and safety quality management
Specific Absorption Rate(SAR)	503601	-	-	-	• Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz -3 GHz)
	50371	-	-	-	• Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz -300 GHz) -General public
	50385	-	-	9001/14 001	• Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless.
	50392 60950 62209-1	-	-	-	• Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz – 300 GHz)
	60215	-	-		• Safety requirements for radio transmitting equipment
Interoperability	301502 301511	-	-		• Harmonized EN for GSM
Optical and laser	60825-1	60825-1	-		• Safety of laser products Part 1: Equipment classification, requirements and user's guide
	60825-2	60825-2	-		• Safety of laser products Part 2: Safety of optical fiber communication systems

Table.2. *Acceptable Health & Safety and SAR Standards by the PTA*

c) Acceptable Radio Frequency (RF) Communication Standards

This Category is divided into five Sub Classes which are as follows for Terminal Equipment

- i. Mobile Devices Communication Standards.
- ii. Terrestrial Devices Standards.
- iii. Satellite Standards.
- iv. Wireless Connectivity Standards.
- v. Miscellaneous Equipment Standards.

i. Mobile Devices Communication Standards

Radio Communication Standards	Acceptable Standard		Description
	EN	IEC	
2G	301489-8 TS 151010-1	-	• Digital cellular telecommunication system (Phase 2+) Mobile Station conformance specification; Part 1: conformance specification (3GPP TS 51.010-1).
3G	301511 301908-1 301908-2	-	• Radio disturbance characteristics • Limits and methods of measurement
4G	TS 36.412 50731	60335-1 60335-2-5	• Methods and limits of measurement and compliance of low power electronic instruments.
GMPCS	301489-1 301489-17	60950-1	• Limit for certain range of frequencies to be operated 1.5/1.6 GHz and 2.4/2.5 GHz
GSM /GPRS Base Stations	301502 301511	301489-1 301489-7	• Digital cellular telecommunication system (Phase 2+) Mobile Station conformance specification; Part 1: conformance specification (3GPP TS 51.010-1).
UMTS Mobile Stations	301908-1 301908-2	60951	• Digital cellular telecommunication system (Phase 2+) Mobile Station conformance specification; Part 1: conformance specification (3GPP TS 51.010-1).
CDMA 2000 Mobile Phones	TIA / EIA 97C	-	-

Table.3. *Acceptable Mobile Devices Communication Standards by the PTA*

ii. Terrestrial Devices Standards

Terrestrial Device Standards	Applicable Sub-section of Framework	Reference Standards for Conformity		Description
		IEC	EN	

Very High Frequency Radio (VHF)		Amateur radio and ancillary equipment	--	301 489-18 303 035-1 303 035-2 301 489-15 301 783-2 300 086-1 300 113-1	<ul style="list-style-type: none"> Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna Connector.
Ultra High Frequency (UHF) Radio	Citizen band Radio (CB)	Citizen band Amateur radio and ancillary equipment of both Double side band (DSB/SSB)	-	300 433-1 300 135-1 300 135-2 301 489-13 300 680-1 300 680-2	<ul style="list-style-type: none"> Angle-modulated Citizens Band radio equipment (CEPT 27 Radio Equipment); Part 1: Technical characteristics and methods of measurement. Land Mobile Service; Radio equipment using integral antennas intended primarily for analogue speech
	Family Radio Service (FRS)	-	-	300 296-1 300 113-1	<ul style="list-style-type: none"> Transmitter and associated encoder and modulator and/or a receiver and associated demodulator and decoder. Base Stations antennas.

Table.4. Acceptable standards for Terrestrial Devices by the PTA

iii. Satellite Standards

Satellite Standards	Applicable Sub-section of Framework	Reference standards for conformity		Description
		IEC	EN	
Marine Time Radio	HF Marine Transceiver	60950 1097-7	300086-1, 300373-3 300296-1,301843-2 301843-6, 301843-5 300373-1, 301178 300698,301025	<ul style="list-style-type: none"> The assessment of Earth Stations on board Vessels (ESVs) transmitting above 3 GHz in the Fixed Satellite Service (FSS).
Marine Time radio	VHF Marine Transceiver	60940	301025-1,301025-2 301025-3,301178-1 301178-2,300698-1 300698-2,300698-3 300162-1,300162-2 300162-3	<ul style="list-style-type: none"> The assessment of Earth Stations on board Vessels (ESVs) transmitting above 3 GHz in the Fixed Satellite Service (FSS).

VSAT (4 GHz and 6 GHz)/VSAT (11 / 12 / 14 GHz))			301 443 61108-1 301428	• Global navigation satellite systems (GNSS). Global positioning system (GPS)
			301926 301721	• Satellite Earth Stations and Systems (SES); Radio Frequency and Modulation Standard for Telemetry, Command and Ranging (TCR) of Geostationary Communications Satellites.
Radar for Radio-navigation	Radar for radio-navigation	-	TBC 302 248 302 194	-

Table.5. Acceptable standards for Satellite by the PTA

iv. Wireless Connectivity Standards

Wireless Connectivity	Frequency Band	Applicable Sub-section of Framework	Reference standards for conformity	Description
			EN	
ISM Band	5.725-.5.875 GHz 2.4735 - 2.4835 GHz	-	301 489-17 301 893	• The assessment of the 2, 4 GHz wideband transmission systems and 5 GHz high performance RLAN (including HIPERLAN 1 and 2 and other) including Broadband Data Transmitting System equipment.
Worldwide Interoperability for Microwave Access (WiMAX)	3.40 - 3.60 GHz	WiMAX equipment	301 753	
Fixed Wireless Access Wireless Local Loop (FWA WLL)	2.3-2.4 GHz 4.8-5.0 GHz	Fixed Wireless Access and ancillary equipment	301 489-4 302 217-2-2 302 217-3 301 489 -1 302 326-2 302 326-3 302 217-4-2	• Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 3: Equipment operating in frequency bands where both frequency coordinated or uncoordinated deployment might be applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
Digital Microwave Radio	3GHz- 30GHz	Point-to-point radio fixed link equipment and antenna		

Table.6. *Acceptable Wireless Connectivity Standards by the PTA.*

Note: - WiMAX must meet the WiMAX forum certification Standards under the following labs for the connectivity

- SIRIM QAS International's WiMAX Testing Laboratory.
- WiGRID Certification.
- MAXWELL Lab.
- Silicon Laboratories

v. Acceptable Standards for Miscellaneous Equipment

Miscellaneous Standards	Applicable Standard		Description
	IEC	EN	
PBX and Key Systems and Analogue Telecommunications Line Equipment	60950	201 168 301 437 55022	• Speech Processing, Transmission and Quality Aspects (STQ) Transmission characteristics of digital Private Branch exchanges (PBXs) for interconnection to private networks, to the public switched network or to IP gateways.
Voice over IP Terminals		ITU-T Rec. G.711	• The Vo/IP terminal equipment shall have an audio codec capable of encoding and decoding speech according to ITU-T Rec. G.711 and capable of transmitting and receiving A-law and μ -law. It may support other codecs (ITU-T Rec. G.726 ADPCM, G.728 LD-CELP, G.729 CS-ACELP, G.729a CS-ACELP, and G.723.1 MPMLQ G.723 ACELP).
		IETF Session Initiation Protocol (RFC3261, RFC3262, RFC3263, RFC3264, and RFC3265).	• If VoIP Terminal Equipment uses SIP
		IETF RFC1933	• For VoIP Terminal Equipment with IPv6 support the equipment shall implement the mechanisms specified in RFC1933 (Transition Mechanisms for IPv6 Hosts and Routers) in order to Maintain compatibility with IPv4.
		ETSI ES 201 168 ITU-T Rec. H.323	• Speech Processing, Transmission and Quality Aspects (STQ); Transmission characteristics of digital Private Branch exchanges (PBXs) for interconnection to private networks, to the public switched network or to IP gateways • If the video codec is provided, it shall comply with requirements given in ITU-T Rec. H.323
		IETF MEGACO IP Phone Media Gateway Standard	• If the Vo/IP terminal equipment is an MEGACO/H.248 based terminal it shall also support IETF MEGACO IP Phone Media Gateway standard.

Table.7. *Acceptable Miscellaneous Equipment's Standards by the PTA.*

4. Miscellaneous

1. To ensure maximum interoperability, standards from following bodies have been adopted by the PTA and revisions from time to time will be done in line with updating of standards by these bodies.
 - a. The ITU Telecommunication Standardization Sector (ITU-T).
 - b. European Standards (EN).
 - c. The International Electro- Technical Commission (IEC) and its International Special Committee on Radio Interference (CISPR).
 - d. The European Committee for Electro Technical Standardization (CENELEC).
 - e. The European Telecommunications Standards Institute (ETSI).
 - f. Occupational Health and Safety Assessment Specification (OHSAS).
 - g. International Organization for Standardization (ISO).

- A. All terminal equipment that are to be in Pakistan must comply with the laid down standards by the above mentioned international bodies and documentary proof for the same may be provided in report format from accredited labs covering following areas where applicable:
 - a. Electromagnetic compatibility Standards (EMC)
 - b. Health & Safety Standards
 - c. Specific Absorption Rate Standards (SAR)
 - d. Effective use of radio spectrum for radio communication equipment (RF)*

**RF Reports are to be submitted for all equipment utilizing Radio Spectrum*

- B. All Terminal devices must also comply with the essential requirements & standards of the bodies defined in clause 5-1.
 - a. Interoperability
 - b. IMEI
 - c. Safety Requirements i.e. Mobile/Handheld devices are required to comply with a Specific Absorption Rate (SAR) limit of 2 watts/Kg of tissue (average over 10 gm) when exposed to a radio frequency (RF) electromagnetic field.
- C. The equipment should be constructed in such a way that:
 - a. The electromagnetic disturbance it generates does not exceed a level allowing the device to operate as intended.
 - b. The equipment has an adequate level of intrinsic immunity of electromagnetic disturbance to enable it to operate as intended and device shall comply with international accepted standards for EMC mentioned below.

References:-

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