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PART II

Statutory Notifications (S.R.O.)

GOVERNMENT OF PAKISTAN

PAKISTAN TELECOMMUNICATION AUTHORITY

NOTIFICATION

Islamabad, the 22nd December, 2020

S.R.O. 1483(I)/2020.—In exercise of powers conferred under clause (o) of sub-section (2) of section 5 of the Pakistan Telecommunication (Re-organization) Act, 1996 (XVII of 1996), the Pakistan Telecommunication Authority is pleased to make the following regulations, namely:—

1. **Short title and commencement.**—(1) These regulations shall be called “**Mobile Phone Repeaters Technical Standards and Operations Regulations, 2020**”.

(2) These Regulations shall come into force from the date of gazette notification of these regulations.

3383 (1—9)

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2. **Definitions.**—(1) In these regulations, unless there is anything repugnant in the subject or context:

- (a) **“Act”** means the Pakistan Telecommunication (Re-organization) Act, 1996 (XVII of 1996);
- (b) **“Authority”** means the Pakistan Telecommunication Authority established under section 3 of the Act;
- (c) **“Mobile Phone Repeater”** means a wireless telegraphy apparatus which amplifies the radio signals;
- (d) **“Applicant”** means an entity/company/corporation that manufacture the Mobile Phone Repeaters or is duly authorized by the manufacturer of the Mobile Phone Repeaters;
- (e) **“dBm”** means decibels of power referenced to one milliWatt;
- (f) **“Downlink Frequencies”** means the frequency bands 869-879 MHz, 925-960 MHz, 1805-1880 MHz, 2110-2150 MHz and any other frequency band duly licensed by the Authority for mobile services in downlink direction;
- (g) **“ETSI”** means the European Telecommunications Standards Institute;
- (h) **“EIRP”** means the Effective Isotropic Radiated Power that is the measured radiated power in a single direction;
- (i) **“GSM system”** means an electronic communications network that complies with standards EN 301 502(3) and EN 301 511(4) published by ETSI for the Global System for Mobile Communications (also known as GSM);
- (j) **“Indoors”** means inside premises which— (i) have a ceiling or a roof; and (ii) except for any doors, windows or passageways, are wholly enclosed;
- (k) **“LTE system”** means an electronic communications network that complies with standards EN 301 908-1(5), EN 301 908-13(6) and EN 301 908-14(7) published by ETSI for the Long Term Evolution telecommunication system (also known as LTE);
- (l) **“Repeater Certificate (Certificate)”** means the certification that a type/model of Mobile Phone Repeater conforms to the technical standards prescribed by the Authority;

- (m) **“TRP”** means Total Radiated Power that is a measure of how much power is radiated by an antenna when the antenna is connected to an actual radio (or transmitter);
- (n) **“UMTS system”** means an electronic communications network that complies with standards EN 301 908-1, 301 908-2(8) and EN 301 908-3(9) published by ETSI for the Universal Mobile Telecommunications System (also known as UMTS);
- (o) **“Uplink Frequencies”** means the frequency bands 824-834 MHz, 880-915 MHz, 1710-1785 MHz and 1920-1960 MHz and any other frequency band duly licensed by the Authority for mobile services in uplink direction;
- (p) **“Vehicular”** means a mechanically propelled vehicle intended or adapted for use on roads.

3. **Operation of Mobile Phone Repeater.—**

- (1) **Compliance of Standards.** A Mobile Phone Repeater shall operate, if it is compliant of relevant ETSI or FCC Standards and any revisions to those standards.
 - (a) Compliance of ETSI Standards.
 - (i) EN 303 609: Global System for Mobile communications (GSM); GSM Repeaters; Harmonized Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU;
 - (ii) EN 301 908-11: Electromagnetic compatibility and Radio Spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 11: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and EUTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive;
 - (iii) EN 301 908-15: IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 15: Evolved Universal Terrestrial Radio Access (E-UTRA FDD) Repeaters.

- (b) Compliance of FCC Standards. A Mobile Phone Repeater in compliance of relevant FCC tests regarding verification of Frequency Bands, Maximum Power, Maximum Power Gain, Oscillation Detection and Noise Figure etc.
- (2) **Mobile Phone Repeater Certificate.** A Mobile Phone Repeater shall operate, if it is certified by the Authority.
- (3) **Interference Protection.** A Mobile Phone Repeater shall operate if it avoids any harmful interference to primary users of frequency bands of operations of mobile services in Pakistan, Azad Jammu & Kashmir and Gilgit Baltistan by complying with following:
 - (a) Network Protection Standards of Part II of these Regulations;
 - (b) All applicable technical rules for the frequency band(s) of operation including but not limited to:
 - (i) Frequency Tolerance;
 - (ii) Effective Radiated Power Limits;
 - (iii) Emission Limitations for Cellular Equipment;
 - (iv) Power and Antenna Height Limits; and
 - (v) Emission Masks.
- (4) The Cellular Mobile Licensee within Six (06) months of issuance of the Regulations, shall publically announce by any means including announcement on its website and give consent that subscribers' may use Authority's approved Mobile Phone Repeaters on its allocated spectrum.
- (5) The subscriber will only operate the Mobile Phone Repeater with approved antennas, cables, and/or coupling devices as specified by the manufacturer of the Mobile Phone Repeater.
- (6) The subscriber may not deactivate any features of the Mobile Phone Repeater which are designed to prevent harmful interference to wireless networks. These features must be enabled and operating at all times the Mobile Phone Repeater is in use.
- (7) **Operation on a Secondary, Non-Interference Basis.** A Mobile Phone Repeater shall operate on a secondary, non-interference basis

to primary services licensed for the frequency bands of their transmission, and to primary services licensed for the adjacent frequency bands that might be affected by their transmissions.

- (a) The operation of Mobile Phone Repeater must not cause harmful interference to the communications of any primary licensed service;
- (b) Upon request of a representative of the Authority or Board on detection or complaint of harmful interference, the subscriber of Mobile Phone Repeater must cooperate in:
 - (i) Determining the source of interference; and
 - (ii) If necessary, deactivate and handover the faulty Mobile Phone Repeater immediately to the representative of the Authority or Board, and replace the faulty Repeater with Authority Certified Repeater; and
 - (iii) In case of non-cooperation, action under Section 31 of the Act shall be initiated against the user.

PART-II

NETWORK PROTECTION STANDARDS

4. Features to Prevent Harmful Interference

- (1) All Mobile Phone Repeaters must incorporate features to prevent harmful interference to mobile networks including but not limited to following:
 - (a) **Frequency Bands.** Mobile Phone Repeaters must be designed and manufactured such that they only operate on the frequencies used for the provision of mobile services in Pakistan, Azad Jammu & Kashmir and Gilgit Baltistan;
 - (b) **Self-Monitoring.** Mobile Phone Repeaters must automatically self-monitor their operation to ensure compliance with applicable noise and gain limits and either self-correct or shut down automatically if their operation exceeds those parameters;
 - (c) **Anti-Oscillation.** Mobile Phone Repeaters must be able to detect and mitigate any unintended oscillations in uplink and downlink bands (such as may result from insufficient isolation between the antennas);

- (d) **Power Down.** Mobile Phone Repeaters must automatically power down or cease amplification as they approach any affected base station;
 - (e) **Interference Avoidance for Wireless Subsystems.** Mobile Phone Repeaters using unlicensed frequency bands for wireless transmissions between donor and server subsystems for their internal operation must employ interference avoidance methods to prevent interference transmitted into other spectrum bands.
- (2) **Technical Requirements.** A Mobile Phone Repeater must meet following technical requirements:
- (a) **Automatic Standby.**
 - (i) **Indoors Use.** When the repeater is no longer serving an active device connection it must, after no more than **5 minutes** reduce any uplink noise power to no more than (**-70 dBm/MHz EIRP**);
 - (ii) **Vehicular Use.** When the repeater is no longer serving an active device connection it must, after no more than **5 minutes**, reduce any uplink noise power to no more than (**-70 dBm/MHz TRP**).
 - (b) **Gain Control.**
 - (i) A Mobile Phone Repeater must have automatic gain control to protect against excessive input signals that would produce output power emissions that would cause interference to a mobile base station;
 - (ii) A Mobile Phone Repeater must adjust its gain in accordance to the strongest signal present in the downlink band of operation so that the noise of the repeater cannot reach the base station;
 - (iii) Gain of a Mobile Phone Repeater must be adjusted so that the uplink noise does not exceed the limit of (**-103dBm/MHz -RSSI**). Where RSSI is the measure of Received Signal Strength (dBm) per band of operation at the port of the device;
 - (iv) A Mobile Phone Repeater must power off if it can no longer meet Gain Control specification.

(c) Maximum Gain

- (i) **Indoors Use.** The uplink and downlink system gain of a repeater referenced to its input and output antennas, shall not exceed **100dB**;
- (ii) **Vehicular Use.** The uplink and downlink system gain of a repeater, referenced to its input and output antennas, shall not exceed **20dB**.

(d) Noise Figure.

- (i) Mobile Phone Repeater Noise Figure shall not exceed **7dB**.

(e) Anti-Oscillation.

- (i) Oscillation detection and mitigation must occur within **0.3 seconds in the uplink band and 1 second in the downlink**;
- (ii) In case of oscillation, the repeater must continue this mitigation for at least one minute before restarting;
- (iii) After five such restarts, the repeater must not resume operation until manually reset.

(f) Transmit Power / Power Density.

- (i) The transmit power is limited to the maximum permitted power of a mobile handset in the uplink and 17 dBm (0.05 Watts) in the downlink;
- (ii) In case of Indoors use, a Mobile Phone Repeaters must comply with Transmit Power/Power Density requirement for following frequency bands of operation:

Band	Technology	Maximum Uplink	Maximum Downlink
800	Technology Neutral	23dBm EIRP	PSD 10dBm/5MHz EIRP
			Total 17dBm EIRP
900	GSM	33dBm EIRP	10dBm EIRP
1800	GSM	30dBm EIRP	10dBm EIRP
900, 1800 & 2100	3G	24dBm EIRP	PSD 10dBm/5MHz EIRP
			Total 17dBm EIRP
900 & 1800	LTE	23dBm EIRP	PSD 10dBm/5MHz EIRP
			Total 17dBm EIRP
2100	Technology Neutral	24dBm EIRP	PSD 10dBm/5MHz EIRP
			Total 17dBm EIRP

- (iii) In case of Vehicular use, a Mobile Phone Repeater must comply with Transmit Power/Power Density requirement for following frequency bands of operation:

Band	Technology	Maximum Uplink	Maximum Downlink
800	Technology Neutral	23dBm TRP	PSD 10dBm/5MHz TRP
			Total 17dBm TRP
900	GSM	33dBm TRP	10dBm TRP
1800	GSM	30dBm TRP	10dBm TRP
900, 1800 & 2100	3G	24dBm TRP	PSD 10dBm/5MHz TRP
			Total 17dBm TRP
900 & 1800	LTE	23dBm TRP	PSD 10dBm/5MHz TRP
			Total 17dBm TRP
2100	Technology Neutral	24dBm TRP	PSD 10dBm/5MHz TRP
			Total 17dBm TRP

PART-III

MISCELLANEOUS

5. Mobile Phone Repeater Certification

- (1) Mobile Phone Repeater Certificate shall be issued to an applicant subject to fulfillment of requirements laid down in Part III of the Regulations.
- (2) Application for Mobile Phone Repeater Certification shall be made on a procedure prescribed in "Type Approval Regulations, 2019".
- (3) The application for certification must satisfy the Authority that the Mobile Phone Repeaters' features are designed to prevent harmful interference, protect wireless networks, cannot be easily defeated and must be enabled at all times.
- (4) The Mobile Phone Repeaters are in compliance with Network Protection Standards of Part-II of the Regulations.

6. Registration of Mobile Phone Repeaters

- (1) Applicant shall establish a registration mechanism and maintain a database containing following information against each Mobile Phone Repeater:
 - (a) Name of the Purchaser;
 - (b) CNIC of the Purchaser;

- (c) Contact Details of the Purchaser;
 - (d) Make, Model, and Serial Number;
 - (e) Location (coordinates) of Use.
- (2) Applicant shall also maintain the Network Management System (NMS) and the same shall be accessible to the Authority.
- (3) Applicant shall also maintain and share the list of sold Mobile Phone Repeaters to Authority on monthly basis.

ERUM LATIF,
Director (Law & Regulations).