

UNITED REPUBLIC OF TANZANIA
TANZANIA COMMUNICATIONS REGULATORY AUTHORITY
ISO 9001: 2015 CERTIFIED



MINIMUM TECHNICAL SPECIFICATIONS

FOR

CELLULAR BASE STATIONS AND REPEATERS

Document Number: [TS006](#)

Version: [2.0](#)

Date: [March 2020](#)

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PART 1: Introduction

Tanzania Communications Regulatory Authority (TCRA), established under the Tanzania Communications Regulatory Authority Act No.12 of 2003, is mandated among other duties, to license communications and broadcasting operators and type approve communication equipment for use in the United Republic of Tanzania

According to Regulation 4(1) of the Electronic and Postal Communications (Electronic Communications Equipment Standards) Regulations, 2018 empowers the Authority to determine standards for Base stations and repeaters in the United Republic of Tanzania and from time to time review them.

The Authority, therefore, wishes to notify all manufactures and importers of Base stations and repeaters and the general public the minimum technical requirements and specifications for cellular base stations and repeaters. Technical Specifications are guidelines for equipment manufacturers and/or suppliers who wish to sell base stations and repeaters aimed at adhering to quality product in Tanzania.

The specifications are predominantly from base stations and repeaters standards, the European Telecommunications Standards Institute (ETSI) standards and the International Telecommunication Union (ITU) Recommendations.

PART 2: Scope and Purpose

This specification shall apply to all producers, manufacturers, importers and retailers who wish to sell radio transmitters and receivers used for transmitting and receiving of voice and data to and from mobile phones in a particular cell. This document shall be used to assess the eligibility of cellular base stations and repeaters to be used in the country.

The present document contains requirements to demonstrate that radio equipment shall be constructed so that it both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

The precise operating frequency range of a base station and repeater shall follow that of the Network Operator from whom the service is obtained.

PART 3: Terms and Definitions

For the purposes of this document unless stated otherwise: -

- **Cellular Mobile Base Station** refers to a wireless communications station installed at a fixed location and used to operate as part of a wireless telecommunications system.
- **Electromagnetic Field (EMF)** refers to a physical entity carrying or storing energy in empty space and manifesting by exerting forces on electric charges.
- **Exposure** refers to a subjection of a person to electric, magnetic, or electromagnetic fields other than those originating from physiological processes in the body and other natural phenomena.
- **Frequency** refers to a number of times per second at which an electromagnetic wave oscillates. It determines the wave's properties and usage. Frequencies are measured in hertz (Hz).
- **ICNIRP** refers to an International Commission on Non-Ionizing Radiation Protection is an independent scientific body which has produced an international set of Procedures and Standards for public exposure to radio frequency waves.
- **Non-ionizing radiations** refers to any type of electromagnetic radiation that does not carry enough energy to ionize living material that is, to completely remove an electron from an atom or molecule.
- **Power Flux-Density (S)** is the power per unit area normal to the direction of electromagnetic wave propagation, usually expressed in units of Watts per square meter (W/m²).

Abbreviations

3GPP	Third Generation Partnership Project
AC	Alternating Current
BS	Base Station
CDMA	Code Division Multiple Access
DC	Direct Current
EDGE	Enhanced Data Rates for GSM Evolution
EMC	Electromagnetic compatibility
ETSI	European Telecommunications Standards Institute
FDD	Frequency Division Duplex
GSM	Global System for Mobile communications
IMT	International Mobile Telecommunications
ITU	International Telecommunication Union
LTE	Long Term Evolution
RF	Radio Frequency

R&TTE	Radio equipment and Telecommunications Terminal Equipment
SELV	Safety Extra Low Voltage
UMTS	Universal Mobile Telecommunications System
UTRA	UMTS Terrestrial Radio Access

PART 4: References

ETSI EN 301 502	Global System for Mobile communications (GSM); Base Station (BS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
ETSI EN 300 609-4	Global System for Mobile communications (GSM); Part 4: Harmonized EN for GSM Repeaters covering the essential requirements of article 3.2 of the R&TTE Directive
ETSI EN 301 908-01	IMT cellular networks; Harmonized Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements
ETSI EN 301 908-03	IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS)
ETSI EN 301 908-11	IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 11: CDMA Direct Spread (UTRA FDD) Repeaters
ETSI EN 301 908-14	IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)
ETSI EN 301 908-15	IMT cellular networks; Harmonised 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
ETSI EN 301 908-24	IMT cellular networks; Harmonised Standard for access to radio spectrum Part 24: New Radio (NR) Base Stations (BS)
ETSI EN 301 908-18	IMT cellular networks; Harmonised EN covering essential requirements of Directive 2014/53/EU; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)
ITU-R M.1036-6	Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations
ITU-R M.1457-13	Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)
ITU-R M.2012-3	Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)
ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
ETSI EN 301 489-2	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 23: Specific conditions for IMT-2000 CDMA, Direct Spread (UTRA and E-UTRA) Base Station (BS) radio, repeater and ancillary equipment
EN 301 489-23	Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 23: Specific conditions for IMT-2000 CDMA,

	Direct Spread (UTRA and E-UTRA) Base Station (BS) radio, repeater and ancillary equipment
ETSI EN 301 489-50	EMC standard for radio equipment and services; Part 50: Specific conditions for Cellular Communication Base Station (BS), repeater and ancillary equipment
ETSI TS 137 141	Digital cellular telecommunication system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Stations (BS) conformance testing con (3GPP TS 37.141 version 13.5.0 Release 13)
3GPP TS 36.104 V16.3.0	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception

PART 5: General Requirements and Technical Specifications

1	General Requirements	
S/N	Feature	Reference/ Details
1.1	Radiation safety requirements	Use of the Base stations and repeaters shall comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz) Compliance with the specified radiation safety standards does not by itself confer immunity from legal obligations and requirements imposed by national health or safety authorities. TCRA may invalidate the equipment registration if so requested by the relevant authority for reasons of safety or hazards that would likely be caused to users.
1.2	Electromagnetic Compatibility and Equipment	For EMC assessment, the base stations and repeaters shall be classified as equipment for fixed use. This equipment classification is used to determine the applicability of the EMC (emission and immunity) testing requirements based on EN 301 489-1 and

	safety requirements	<p>EN 301 489-2</p> <p>Radiated emissions from associated ancillary equipment not incorporated in the Base stations and repeaters shall be measured to Class B requirements defined in EN 301 489-1</p> <p>Conducted emission at the DC power port of the CBS shall be measured to Class B requirements defined in EN 301 489-1</p>
1.3	The following immunity tests shall be performed on the Base stations and repeaters to requirements defined in EN 301 489-1	<p>RF electromagnetic field (80 MHz to 1 GHz and 1.4 GHz to 6 GHz) at the enclosure of equipment. This test assesses the ability of radio equipment and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic field disturbance at the enclosure.</p> <p>Electrostatic discharge at the enclosure of equipment. This test assesses the ability of radio equipment and ancillary equipment to operate as intended in the event of an electrostatic discharge.</p> <p>Fast transients (common mode) at DC power and AC main power ports that have cables longer than 3 m. This test assesses the ability of radio equipment and ancillary equipment to operate as intended in the event of fast transients present on one of the input/output ports.</p> <p>RF common mode 0.15 MHz to 80 MHz at DC power and AC mains power ports that have cables longer than 3 m. This test assesses the ability of radio equipment and ancillary equipment to operate as intended in the presence of a radio frequency electromagnetic disturbance.</p> <p>Voltage dips and interruptions at AC mains power port of equipment with dedicated AC/DC power converter. These tests assess the ability of radio equipment and ancillary equipment to operate as intended in the event of voltage dips and interruptions present on the AC mains power input ports.</p> <p>Surges, common and differential mode at AC mains power port of equipment with dedicated AC/DC power converter. These tests assess the ability of radio equipment and ancillary equipment to operate as intended in the</p>

		<p>event of surges being present at the AC mains power input ports.</p> <p>In addition to EN 301 489-1 base stations and repeaters for IMT-2000 CDMA and Direct Spread (UTRA and E-UTRA) shall conform to the requirements of EN 301 489-23</p>	
1.4	Environmental profile	<p>The technical requirements of this document apply under the environmental profile for the operation of the equipment, which shall be declared by the manufacturer.</p>	
1.5	Equipment safety	<p>Equipment safety testing or assessment shall be performed to requirements defined in IEC 60950-1 or IEC 62368-1 based on the following assumptions</p> <ol style="list-style-type: none"> 1) The base station or Repeater is powered by a dedicated external power supply or AC/DC power converter, and 2) Base Station or Repeater operates with SELV in environments when overvoltage from telecommunication networks may be possible. SELV refers to voltages not exceeding 60 V DC. 	
		<p>For Base Station or Repeater safety assessment performed with the hazard-based approach, the process defined in IEC 62368-1 [15] shall be used:</p> <ol style="list-style-type: none"> 1) Identify the energy sources in the Base Station or Repeater. 2) Clarify energy sources (effect on the body or combustible material e.g. possibility of injury or ignition). 3) Identify safeguards for protection against energy sources; and 	
		<p>Base Station or Repeater shall be assessed for meeting the safety requirements defined in the IEC 60215 [16] for radio transmitting equipment, operating under the responsibility of skilled persons.</p>	
2	RF Requirements		
2.1	Frequency range (The precise operating frequency range of a	Transmit Frequency	Receive Frequency
		758 MHz - 788 MHz	703 MHz - 733 MHz
		925 MHz - 960 MHz	880 MHz - 915 MHz
		791 MHz - 821 MHz	832 MHz - 862 MHz
		1475 MHz - 1518 MHz	1427 MHz - 1470 MHz
		1805 MHz - 1880 MHz	1710 MHz - 1785 MHz

	Base station shall follow that of the Network Operator from whom the service is provided)	2110 MHz - 2170 MHz	1920 MHz - 1980 MHz
		2300 MHz - 2400 MHz	2300 MHz - 2400 MHz
		2570 MHz - 2620 MHz	2570 MHz - 2620 MHz
		2620 MHz - 2690 MHz	2500 MHz - 2570 MHz
		3300 MHz - 3700 MHz	3300 MHz - 3700 MHz
		The precise operating frequency range of a Base Station or Repeater shall follow that of the network operator from whom the service is provided.	
2.2	Mean transmitted RF carrier power	The RF Power requirements shall be as per 3GPP TS 36.104 V16.3.0 (2019-09)	
2.3	Radio Interface Requirement	The cellular base stations and repeaters shall comply with air interface requirements applicable for every Radio Access Technology	
		For GSM technology, Base stations shall comply with requirements specified in ETSI EN 301 502	
		All cellular base stations supporting the IMTs' Radio access technologies shall comply with common requirements for IMT cellular networks specified in the standard ETSI EN 301 908-01	
		In addition to compliance with Common Technical requirements for IMT Cellular networks specified in ETSI EN 301 908-01 , the base stations supporting IMTs' access technologies shall also comply with specific standards for each RAT as described below; <ul style="list-style-type: none"> • UTRA FDD Base stations(BS) shall comply with ETSI EN 301 908-03, and follow specifications as recommended by ITU in recommendation ITU-R M.1457-14 • CDMA Direct Spread (UTRA FDD) Repeaters shall comply with ETSI EN 301 908-11 • (E-UTRA) Base Stations (BS) shall comply with ETSI EN 301 908-14, and follow specifications as recommended in ITU-R M.2012-4 • E-UTRA FDD Repeaters shall comply with ETSI EN 301 908-15 • New Radio (NR) Base Stations (BS) shall comply with ETSI EN 301 908-24 	
3	Power Requirements		
3.1	Power supply	The Base station and repeater may be AC powered or	

		DC powered. For an AC powered equipment, the Specification shall be complied with when operating from an AC mains supply of voltage, 220V ± 10% and frequency, 50Hz ± 1%. Where external power supply is used (e.g. AC/DC power converter), it shall not affect the capability of the equipment to meet the requirements of this Specification.
3.2	Plug Type	D and G

PART 6: Testing and Certification Requirements

The requirements for the test equipment and test conditions under which the tests should be performed along with the required Base Station and Repeater performance levels have been elaborated in **ETSI TS 137 141** and minimum requirements specified in this document.

Manufacturers and importers may include additional features or increased performance compared to the minimum requirements specified in this document.

PART 7: Document Administration

7.1 Amendment

TCRA may from time-to-time, review, and update or modify this document to ensure its continued service and to meet the international and/or national performance requirements as necessary.

7.2 Enforcement

This document is enforced by appropriate provisions of the TCRA Act, 2003, the Electronic and Postal Communications Act, 2010 and the Electronic and Postal Communications (Electronic Communications Equipment Standards) Regulations, 2018 and effective from the date it has been published.

7.3 Publication

This document shall be published on the TCRA website <https://www.tcra.go.tz> for public information, compliance and reference purposes