

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



MINIMUM TECHNICAL SPECIFICATIONS

FOR

INTERNET OF THINGS (IoT) DEVICES

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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 electronic communication equipment for use in the United Republic of Tanzania.

Furthermore, pursuant to Regulation 4(1) of The Electronic and Postal Communications (Electronic Communications Equipment Standards and E-Waste Management) Regulations, 2020 empowers the Authority to determine standards for electronics and communication equipment in the country and review them from time to time.

This document is principally intended to provide Minimum Technical Specifications for Internet of Thing devices.

The Authority, therefore, wishes to notify all manufactures, suppliers and importers of devices and/or equipment the minimum technical requirements and specifications for Internet of Thing devices.

PART 2: Scope and Purpose

This Specification defines the minimum technical requirements for Internet of Things (IoT) devices that use Low Power Wide Area Network (LPWAN) technologies to operate in one of the authorised frequency bands or frequencies stated in this specification.

The IoT devices covered in this Specification are User Equipment (UE) and Base Station (BS) which employ the Narrowband-IoT (NB-IoT) and/or Category M1 technologies defined in 3GPP Release 13 onwards. Technical requirements related to IoT devices which uses other technologies are not included in the present document.

PART 3: Definitions and Abbreviations

3GPP	3rd Generation Partnership Project
AC	Alternating Current
BS	Base Station
CDMA	Code Division Multiple Access
DC	Direct Current
eDRX	Extended Discontinuous Reception
EDGE	Enhanced Data rates for GSM Evolution
EMC	Electromagnetic Compatibility
EN	European Standard
ETSI	European Telecommunications Standards Institute

E-UTRA	Evolved Universal Terrestrial Radio Access (also known as LTE)
GSM	Global System for Mobile Communications
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEC	International Electro technical Commission
IEEE	Institute of Electrical and Electronics Engineers
ITU-R	ITU Radio communication Sector
IMT-2000	International Mobile Telecommunications - 2000
LTE	Long Term Evolution (also known as E-UTRA)
LPWAN	Low Power Wide Area Network
MSR	Multi-Standard Radio
NB-IoT	Narrowband – Internet of Things
PSM	Power Saving Mode
RF	Radio Frequency
SAR	Specific Absorption Rate
UE	User Equipment

PART 4: References

The following referenced documents are necessary for the application of this Specification. References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

1. ETSI TS 136 521-1: LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing
2. ETSI TS 136 101: LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception
3. ITU-T Rec K.52: ITU Recommendation on Guidance on complying with limits for human exposure to electromagnetic fields
4. ETSI EN 301 489-1: EMC standard for radio equipment and services; Harmonized Standard covering essential requirements of article 3.1(b) of the Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU; Part 1: Common technical requirements
5. ETSI EN 301 489-24: EMC standard for radio equipment and services; Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA and E-UTRA) for Mobile and portable (UE) radio and ancillary equipment
6. ETSI TS 136 521-1: LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and

reception; Part 1: Conformance testing (3GPP TS 36.521-1 version 15.5.0 Release 15)

7. IEC 62368-1: Audio/video, information and communication technology equipment – Part 1: Safety requirements
8. IEC/IEEE 62209-1528:2020: Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
9. EN 50360: Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
10. IEC 60215: Safety requirements for radio transmitting equipment – General requirements and terminology
11. ETSI TS 136 141: LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing
12. ETSI TS 137 141: Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing
13. ETSI TS 136 104: LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
14. ETSI TS 137 104: Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception
15. ITU Rec. ITU-T X.1364: Security requirements and framework for narrowband Internet of things.

PART 5: General Requirements

5.1 Power Supply

- a. IoT device (UE) may be AC powered or DC (Battery) powered. For AC powered IoT device (UE), the device shall operate using an AC mains supply of voltage, 220V – 240V, and frequency, 50 Hz \pm 2%.
- b. The battery of an IoT device (UE) shall have a capacity that can support the device operation for longer period of time up to ten years.
- c. For IoT device (BS), the use of any power source shall not affect the capability of the equipment to meet the requirements of this Specification.

5.2 Power Saving Functionality

IoT devices (UE) shall be capable of sleeping for extended periods of time with extended Discontinuous Reception (eDRX) and Power Saving Mode (PSM) functionalities, which greatly reduces device power consumption, and enable the device to send occasional signals for up to 10 years, without a change of battery.

5.3 Radiation Safety Requirements

- a. The use of the IoT device (UE or BS) 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), and ITU Recommendation ITU-T Rec K.52.
- b. Where applicable, IoT (UE or BS) devices shall be tested and certified for conformity with the IEEE and ICNIRP SAR standards limits. The testing should be according to IEC/IEEE 62209-1528:2020 and EN 50360.

5.4 EMC Requirements

IoT devices (UE) shall conform to common technical requirements specified in the standard ETSI EN 301 489-1. The standard ETSI EN 301 489-1 shall be used in conjunction with the standard ETSI EN 301 489-24. For BS, the standard ETSI EN 301 489-50 shall be used for E-UTRA, E-UTRA with NB-IoT, or standalone NB-IoT base stations.

5.5 Equipment safety testing

Equipment safety testing or assessment shall be performed to requirements defined in the standard IEC 60950-1 or IEC 62368-1. E-UTRA, E-UTRA with NB-IoT or standalone NB-IoT BS shall also be assessed for meeting the safety requirements defined in IEC 60215 for radio transmitting equipment, operating under the responsibility of skilled persons.

5.6 Security Requirements

IoT devices shall, where applicable, support security features and capabilities as per requirements specified in the recommendation ITU Rec. ITU-T X.1364 and ITU-T Y.4806.

PART 6: Technical Requirements

6.1 Operating frequency

The IoT device (UE or BS) shall operate within the applicable frequency bands given in Table 1 of this Specification.

6.2 RF requirements for UE

IoT devices that are under UE Category NB1 and/or Category M1 shall be tested as per measurement procedures of conformance testing specified in the Specification ETSI TS 136 521-1. The devices shall also comply to the minimum RF characteristics and minimum performance requirements as specified in the Specification ETSI TS 136 101.

6.3 RF requirements for BS

BS which supports E-UTRA, EUTRA with NB-IoT (in band and/or guard band) or standalone NB-IoT shall be tested as per measurement procedures of conformance testing specified in the Specification ETSI TS 136 141 or ETSI TS 137 141. The devices shall also comply to the minimum RF characteristics and minimum performance requirements as specified in the Specification ETSI TS 136 104 or ETSI TS 137 104.

Table 1: Operating frequency for IoT devices

Downlink(DL) - BS Transmit /UE Receive	Uplink (UL) - BS receive / UE Transmit
758 MHz - 788 MHz	703 MHz - 733 MHz
791 MHz – 821 MHz	832 MHz – 862 MHz
925 MHz - 960 MHz	880 MHz - 915 MHz
1805 MHz - 1880 MHz	1710 MHz - 1785 MHz
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 – 3600 MHz	3300 MHz – 3600 MHz

PART 7: Testing and Certification Requirements

IoT devices shall comply with this minimum technical specification and other national and international standards accepted and adopted in our country.

PART 8: Document Administration

8.1 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.

8.2 Compliance

This document shall comply with appropriate provisions of the TCRA Act, 2003, the Electronic and Postal Communications Act, 2010 and the Electronic and Postal Communications (Electronic Communications Equipment Standards and E-Waste Management) Regulations, 2020 effective from the date it has been published.

8.3 Publication

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