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

MINIMUM TECHNICAL SPECIFICATIONS

FOR

VERY SMALL APERTURE TERMINAL(VSAT)

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Approved by	Title	Signature	Date
Dr. Jabiri K. Bakari	Director General		14/07/2022

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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 Very Small Aperture Terminals (VSAT).

The Authority, therefore, wishes to notify all manufactures, suppliers and importers of devices and/or equipment the minimum technical requirements and specifications for Very Small Aperture Terminals (VSAT).

PART 2: Scope and Purpose

This technical specification applies to stationary and mobile V-SAT with its ancillary equipment. This technical specification defines minimum technical requirements for safety, electromagnetic compatibility, radio frequency, efficient use of radio spectrum and other essential requirements.

The Specification applies specifically to the Very Small Apeture terminals of the following characteristics:

i. VSAT operating in frequency bands; 6/4 GHz, 14/12 GHz, and 30/20 GHz frequency bands

ii. VSAT with antenna diameter that does not exceed 7.3 m or equivalent area for VSAT operating in the 6/4 GHz Band, 3.8m or equivalent area for the VSAT operating in the 14/12 GHz Band, and 1.8 m or equivalent area for the VSAT operating in the 30/20 GHz Band.

iii. VSAT which is either a transmit only; designed for transmission-only of radio-communications signals (earth-to-space) in the frequency bands specified above; or a transmit-and-receive VSAT designed for transmission-and-reception of radio-communications signals in the frequency bands specified above; or a receive-only VSAT designed for reception-only of radio-communications signals in the frequency band (space-to-earth) specified above;

iv. VSAT which are used in relation to applications such as (Data communication(internet), TV and Radio Broadcasting, Sattelite News Gathering

v. VSAT which is either used as Hub/Gateway Earth Station (GES) or in remote/user side.

PART 3: Definitions and Abbreviations

For the purpose of this specification the following abbreviation and definitions applies

CENELEC	European Committee for Electrotechnical Standardization
AC	Alternating Current
DC	Direct Current
EMC	Electro Magnetic Compatibility
ETSI	European Telecommunications Standards Institute
FSS	Fixed Satellite Service
IEC	International Electrotechnical Commission
ITU-R	International Telecommunication Union – Radiocommunication
RF	Radio Frequency
SES	Satellite Earth stations and Systems
SIT	Satellite Interactive Terminals
SUT	Satellite User Terminals
VSAT	Very Small Aperture Terminals

PART 4: References

For the technical requirements captured in this specification, references have been made to the following standards. Where versions are not indicated, implementation of this specification shall be based on current and valid versions of these standards published by the respective standards development organizations;

S/N	Reference No.	Title
1	ETSI EN 301 428	Satellite Earth Stations and Systems (SES); Harmonised Standard for Very Small Aperture Terminal (VSAT); Transmit-only, transmit/receive or receive-only satellite earth stations operating in the 11/12/14 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
2	ETSI EN 301 443	Satellite Earth Stations and Systems (SES); Harmonised Standard for Very Small Aperture Terminal (VSAT); Transmit-only, transmit-and-receive, receive-only satellite

		earth stations operating in the 4 GHz and 6 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU.
3	ETSI EN 301 489-12	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 12: Specific conditions for Very Small Aperture Terminal (VSAT), Satellite Interactive Earth Stations operated in the frequency ranges between 4GHz and 30GHz in the Fixed Satellite Service (FSS).
4	EN 50665	Generic standard for assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)
5	ETSI EN 301 360	Satellite Earth Stations and Systems (SES); Harmonised Standard for Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) transmitting towards satellites in geostationary orbit, operating in the 27,5 GHz to 29,5 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
6	ETSI EN 301 459	Satellite Earth Stations and Systems (SES); Harmonised Standard for Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) transmitting towards satellites in geostationary orbit, operating in the 29,5 GHz to 30,0 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
7	ITU-R S.1855	Alternative reference radiation pattern for earth station antennas used with satellites in the geostationay-satellite orbit for use in coordination and/or interference assessment in the frequency range from 2 to 31 GHz
8	IEC/EN 62311	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)
9	ITU-R S.2278	Report for the use of very small aperture terminals

PART 5: General Requirements

5.1 Power Supply

VSAT Equipment may be AC powered or DC powered. For AC powered VSAT, the equipment shall operate from AC mains supply of voltage in the range 220V – 240V, and frequency of 50 Hz ± 2%. The use of any of these power sources shall not affect the capability of the equipment to meet the requirements of this specification.

5.2 Antenna Diameter

The apertures for VSATs should not exceed 7.3 m for VSAT operating in the 6/4GHz band, 3.8 m for the VSAT operating in the 14/12 GHz band and 1.8 m for the VSAT operating in the 30/20 GHz band; or corresponding equivalent diameters in case of non-circular apertures. In these cases, the equivalent diameter can be calculated using the equation in Recommendation ITU-R S.1855. The actual values of their antenna diameters might vary based on satellite spacing and coordination agreements reached with adjacent satellite operators.

5.3 Security Requirements

VSATs shall, where applicable, ensure transmission security protections are employed to encrypt communications prior to transmission across VSAT links. VSATs hardware and firmware should also be regulary updated and default credentials changed before use.

PART 6: Technical Requirements

6.1 Operating Frequencies

VSATs shall operate within frequency ranges as allocated in the Tanzania National Frequency Allocation Table (NFAT). Table 1 shows the allocated frequency bands in the C, Ku, K and Ka band to be used for VSAT.

Table 1: Uplink and downlink operating frequencies for VSAT

S/N	VSAT Band	Downlink Frequencies (Space to earth Transmission)	Uplink Frequencies(Earth to Space Transmission)
1	6/4 GHz	3800 MHz – 4200 MHz	5850 MHz – 5925 MHz
			5925 MHz – 6425 MHz
2	14/12 GHz	12.5 GHz – 12.75 GHz	14 GHz – 14.5 GHz
3	30/20 GHz	17.3 GHz – 17.7 GHz	27.5 GHz – 27.82 GHz
		19.7 GHz – 20.2 GHz	28.45 GHz – 28.94 GHz
			29.46 GHz – 30 GHz

6.2 RF Requirements

VSATs shall comply with the RF requirements for efficient use of spectrum as specified in the standards **ETSI EN 301 360**, **ETSI EN 301 459**, **ETSI EN 301 428** and **ETSI EN 301 443.** The application of this standards is based on the technology and the operating frequency as indicted in Table 2

Table 2: RF Conformance standards for VSATs operating at different frequencies

S/N	V-SAT Frequency Band	RF Conformance Standard
1	6/4GHz	ETSI EN 301 443
2	14/11-12 GHz	ETSI EN 301 428
3	30/20 GHz	ETSI EN 301 360 and ETSI EN 301 459

6.3 EMC Requirements

Where applicable, the VSAT equipment shall comply to emission and immunity requirements. These requirements shall include common technical requirements for electromagnetic compatibility specified in standard **EN 301 489-1** and specific conditions for Very Small Aperture Terminal (VSAT) and satellite interactive earth stations operated in the frequency ranges between 4GHz and 30GHz in the Fixed Satellite Service (FSS) as specified in the standard **EN 301 489-12**.

6.4 Safety Requirements

i. Electrical Safety

VSAT equipment shall comply with general safety requirements as per standards **IEC/EN 60950-1** or **IEC/EN 62368-1**, and standard **IEC/EN 60950-22** for equipment installed outdoors.

ii. RF Health Exposure

VSAT Equipment shall be assessed as specified by the standards **CENELEC EN 50665** and **IEC/EN 62311** to comply with the RF Health exposure requirements.

iii. Solar Radiation Protection

Where applicable, The surface of the antenna (dishes) shall be treated to avoid focused solar radiation in near field.

PART 7: Testing and Certification Requirements

VSAT 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.

For the purpose of compliance to the stated acts and regulation, this specification, and the form appended as **Annex 1** to this specification may be used from time to time to establish the level of compliance and conformance to technical requirements and standards by VSAT.

8.3 Publication

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

Annex 1

THE UNITED REPUBLIC OF TANZANIA

TANZANIA COMMUNICATIONS REGULATORY AUTHORITY
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VSAT SITE INSPECTION FORM

1. **Licensee's Particulars:**

Name.....

Street /Location.....

City / Town.....

Postal Address.....

Telephone and Fax ...../.....

E-mail: .....

2. **Equipment Details**

i. Indoor unit details

Device	**Item**	**Details**
VSAT Modem	Manufacturer/Make	
	Model	
	Type Approval status	

ii. Outdoors unit details

Device	**Item**	**Details**
VSAT Antenna (dish)	Manufacturer/make	
	Size (diameter)	
ODU Radio Equipment	Manufacturer/Make	
	Model	

	Type approval status	
	Transmit frequency	
	Receive frequency	

iii. Parameters/Requirements for Inspection

S/N	Parameter/Specification		Requirement	Pass	Fail	Remarks
1	Safety	Mechanical Construction	The structure should support the weight of antenna and other components.			
		Electrical Safety	Compliance to the standard EN 60950-1 or EN 62368-1			
		Earthing	The earthing should be done properly			
		RF Radiation protection	Warning notice indicating the region in which RF Radiation level is high			
		Solar radiation Protection	The surface of the antenna(dishes) treated to avoid focused solar radiation near the field			

		Public Safety(Access to the Installations)	Access to public restricted for safety			
2.	Radio Frequency	Uplink Frequency	Frequency range as per clause **6.1**			
		Downlink Frequency	Frequency range as per clause **6.1**			

3. Licensee Inspection Confirmation:

Name.....

Designation.....

Signature.....

Official stamp/seal.....

4. Report confirmation:

S/N	Name	Office	Designation	Signature

Date.....

Remarks:

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