



National Information & Communications Technology Authority

TECHNICAL STANDARD FOR OPERATION OF V-SAT & ANCILLARY EQUIPMENT

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Engineering & Resource Planning

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DOCUMENT REVISION DETAILS

Revision	Date	Who	Details
1		JKARIKO	Adopted ITU-R standards
2	26 th May 2006	JKARIKO	Input from Mr. WAIA (MR E&S) & Mr. AITSI(PERS)
3	4 th September, 2014	BBAIYUPE	Reviewing the document including addition of sections such as; 1. Objectives 2. Abbreviations 3. General Requirements 4. EMC & Safety Requirements 5. Spectrum Allocations 6. References including ITU-R and ETSI standards and also general review of the entire standard.
4	17 th October, 2014	BBAIYUPE	Comments from Mr F.Rupokei, Mr G.Alokaka, Mr G.Kemoi and Mr H.Adeg
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1. Introduction

- 1.1. The National Information and Communications Technology Authority (NICTA) has developed this technical standard under section 30 of the NICT (Radio Spectrum) Regulation, 2010 which mandates NICTA to make or fix minimum requirements and performance standards for ICT equipment to be used in Papua New Guinea. This document is the technical standard for Operation of VSAT and Ancillary Equipment.
- 1.2. This standard defines the technical requirements for VSAT and its ancillary equipment functionality which may be incorporated in a standalone network used to provide voice, data and broadcasting services.
- 1.3. The purpose of this standard is to enable equipment manufacturers, suppliers and/or VSAT service providers to bring in compatible equipment that is in compliance with the requirements outlined in this standard and which will provide good quality and desired end-to-end performance of VSAT services in Papua New Guinea.
- 1.4. The benefits of satellite-based communications such as through VSATs are being realised in every sector of activity in Papua New Guinea, both private and public. From Internet service providers, commercial banks, and mining companies to schools, hospitals, and rural tele-centers, satellite services are also being seized upon to elevate economic, educational, and health standards. They can be deployed fast in just about any geographical location and can accommodate both data and telephony services.
- 1.5. NICTA, in setting the technical standards has adopted ITU recommendations, particularly ITU-R S-series and the ETSI standards on VSAT and outlines within this document the technical standards of operation for VSAT in this country.

2 Scope

- 2.1 This standard sets forth the general operational, technical, performance and compliance requirements of VSAT and ancillary equipment. The technical standard does not cover the licensing aspects of VSAT systems.
- 2.2 The standard does not restrict the type of VSAT technology to be used. It mainly defines the operating frequency bands, emission limits, electromagnetic compatibility and electrical safety requirements and the type approval requirements where relevant.
- 2.3 The VSAT and ancillary equipment is subject to Type Approval regulations for compliance and registration purposes. The Type Approval form can be downloaded from the website <http://www.nicta.gov.pg> for details.
- 2.4 This technical standard does not encompass VSAT systems that are in motion (e.g. on board a vessel, on land a vehicle and on board an aircraft).

3 Objective

The main objectives of this technical standard are basically to;

- ensure that individual VSAT equipment can be interconnected to obtain the desired end-to-end performance.
- ensure compatibility of any VSAT equipment with existing radio infrastructure.
- ensure that quality of service for VSAT systems is accomplished and maintained and is in compliance with international best practices.
- ensure that VSAT equipment complies with appropriate frequency band plans and consequent PNG frequency allocations.
- ensure that efficient use of spectrum resources is attained.
- to prevent or minimize harmful radio interference.
- to protect the health and safety of the end-users.
- to provide a basis for extensive acceptance of VSAT equipment for ease of registration purposes for equipment that complies with the standards outlined below.

4 Abbreviations

ETSI- European Telecommunications Standards Institute

EMC - Electromagnetic Compatibility

EIRP - Effective Isotropic Radiated Power

FEC - Forward Error Correction

ICNIRP - International Commission on Non-Ionizing Radiation Protection

ITU-R - International Telecommunication Union - Radiocommunications

NICT - National Information and Communications Technology

QoS - Quality of Service

VSAT - Very Small Aperture Terminal

5 General Requirements

- 5.1 The VSAT equipment shall operate within the specified frequency band stated in sub-clause 6.3.1 without causing interference to other systems of other networks operating within the limits.
- 5.2 The VSAT and its ancillary equipment when interconnected shall obtain a desired end-to-end performance with minimal latency, jitter and satisfactory FEC during operation.
- 5.3 The VSAT RF antenna shall be installed in a location not readily accessible to children and in a manner that prevents human exposure to potentially harmful levels of radiation to the public.
- 5.4 The VSAT service provider shall comply with the standards set forth in this document while using the assigned radio frequency and must assure the safe exposure of radio emission by the VSAT system.

5.5 The VSAT service provider must make sure that the VSAT systems are capable of providing the required level of QoS to the applications rendered to the users. The service quality shall be in accordance with best international practice.

5.6 The VSAT equipment shall not adversely affect other equipment during its operation.

6 Technical Standards of Operation

The VSAT equipment shall comply with the following international recognized standards or its latest published versions specified in Table 6.1 and 6.2 below. It shall fulfil the relevant requirements on all the allowable frequencies which it is intended to operate.

6.1. Harmonized ETSI EN and ITU standards for VSAT operation:

Item No.	Applicable Standard	Title of the Standard	Remarks
1	ETSI EN 301 428 V1.3.1	Satellite Earth stations and Systems (SES); Harmonised EN 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 essential requirements under article 3.2 of the R&TTE directive.	
2	ETSI EN 301 443 V1.3.1	Satellite Earth stations and Systems (SES); Harmonised EN for Very Small Aperture Terminal (VSAT); Transmit-only, transmit-and receive, receive-only satellite earth stations operating in the 4GHz and 6GHz frequency bands covering essential requirements under article 3.2 of the R&TTE directive.	
3	Draft ETSI EN 301 459 V1.2.6	Satellite Earth stations and Systems (SES); Harmonised EN for Satellite Interactive Terminal (SIT) and Satellite User Terminals (SUT) transmitting towards satellites in geostationary orbit in the 29.5 – 30.0 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE directive.	
4	ETSI EN 301 360 V1.2.1	Satellite Earth stations and Systems (SES); Harmonised EN for Satellite Interactive Terminal (SIT) and Satellite User Terminals (SUT) transmitting towards satellites in geostationary orbit in the 27.5 – 29.5 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE directive.	
Maximum Permissible Level of Spurious Emissions from VSATs.			
1	ITU-R recommendation S.726-1	Maximum permissible level of spurious emissions	Where not explicitly declared by the manufacturer and/or a recognized test house by way of equipment specifications and test reports, NICTA may accept standards that are equivalent to the type approval requirements as mentioned in sub clause 7.1.4.

Cross-Polarization Isolation from VSATs			
1	ITU-R recommendation S.727-1	Cross-polarization isolation from VSATs	Where not explicitly declared by the manufacturer and/or a recognized test house by way of equipment specifications and test reports, NICTA may accept standards that are equivalent to the type approval requirements as mentioned in sub clause 7.1.4.
2	ITU-R recommendation S.1844	Cross polarization reference gain pattern for linearly polarized VSAT for frequencies in the range 2 to 31 GHz.	
Maximum permissible level of off-axis e.i.r.p. density from VSATs			
1	ITU-R recommendation S.728-1	Maximum permissible level of off-axis e.i.r.p. density from VSATs	Where not explicitly declared by the manufacturer and/or a recognized test house by way of equipment specifications and test reports, NICTA may accept standards that are equivalent to the type approval requirements as mentioned in sub clause 7.1.4.
2	ITU-R recommendation S.524-9	Maximum permissible levels of off-axis e.i.r.p. density from earth stations in geostationary-satellite orbit networks operating in the fixed-satellite service transmitting in the 6 GHz, 13 GHz, 14 GHz and 30 GHz frequency bands.	
Control and Monitoring Function of VSATs			
1	ITU-R recommendation S.729	Control and Monitoring functions of VSAT	Where not explicitly declared by the manufacturer and/or a recognized test house by way of equipment specifications and test reports, NICTA may accept standards that are equivalent to the type approval requirements as mentioned in sub clause 7.1.4.

Table 6.1: Harmonized ETSI and ITU standards.

6.2 *Electromagnetic Compatibility (EMC) and Electrical Safety*

Item No	Applicable Standard	Standard Description	Remarks
1	ETSI EN 301 489-1 V1.9.2	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.	
2	ETSI EN 301 489-12 V1.1.1	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, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS).	
3	EN 60950-1	Electrical Safety standard for radio equipment.	
4	IEC CISPR 22	Information technology equipment, Radio disturbance characteristics and Limits and methods of measurement.	
5	ICNIRP	Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz)	

Table 6.2: EMC and Safety Standards

6.3 *Spectrum Allocations*

6.3.1 The VSAT terminal equipment shall operate in the specified frequency bands stated below;

	Frequency Band (GHz)	Transmit Frequency Band (GHz)	Receive Frequency Band (GHz)
1	Extended C-Band (Below 3.7)	3.3 - 3.6 which are allocated to fixed Satellite Stations (space-to-earth).	
2	C-Band (4/6)	6 (5.925-6.425)	4 (3.7-4.2)
3	Ku-Band (12/14)	14 (13.75-14.5)	12 (10.7-12.75)
4	Ka-Band (20/30)	30 (27.5-31)	20 (17.1-21.2)

Note: Frequency allocations for VSAT may change and this information should be checked with NICTA Spectrum Planning Section.

7 **Type Approval Requirements**

7.1.1 The NICT Act, 2009 and the NICT Radio Spectrum Regulation, 2010 require that all radiocommunication equipment to be operated in Papua New Guinea must be type approved prior to sale and/or use.

7.1.2 NICTA may authorize full deployment of VSAT service by a licensed service provider or a radio dealer when all type approval requirements are being met or complied with.

7.1.3 A person or a service provider who wants to deal in, adjust or install VSAT service must hold a Full Radio Dealer's Licence in order to deploy VSAT services in Papua New Guinea.

7.1.4 A VSAT service provider shall satisfy the type approval requirements by clearly and completely filling in section B of the Type Approval application form TT100. This section B will be used to evaluate compliance of the VSAT terminal(s) in accordance to the standards stated in this document and other world standards. The terminal(s) that comply with these standards will be declared type approved.

7.1.5 A person or a service provider who applies for a Type Approval certificate must submit the completed TT100 application form to NICTA for approval purposes.

7.1.6 NICTA may accept test reports from any accredited test laboratory as proof of compliance with the standards listed in this document and other recognised international standards.

7.1.7 NICTA may charge a type approval fee for registration of VSAT equipment at a rate approved by NICTA.

8 Document Revisions

- 8.1 NICTA shall review this document from time to time to ensure its continued service relevance and international service performance requirements as necessary.
- 8.2 NICTA shall inform its licensees and other concerned parties of the revisions of this technical standard in a reasonable manner.

9 Contact Details

Service providers or individuals may lodge their complaints in writing to NICTA regarding the contents of this document or any issues that arise concerning VSAT services and other technical matters to the following address;

Director - Engineering and Resource Planning

NICTA

P.O.BOX 8444, Boroko, NCD

Papua New Guinea

Tel: (675) 303 3210

Facsimile: (675) 300 4825

10 References

This standard is referenced to the following international standards:

ITU-R recommendation S.726-1: Maximum permissible level of spurious emissions.

ITU-R recommendation S.727-1: Cross-polarization isolation from VSATs.

ITU-R recommendation S.728-1: Maximum permissible level of off-axis e.i.r.p. density from VSATs.

ITU-R recommendation S.729 for control and monitoring function.

ITU-R S. 725 - Technical Characteristics of Very Small Aperture Terminals.

ITU-R SM.329-9 - Spurious Emissions.

ITU-R S.2278 (2013) - Use of Very Small Aperture Terminals.

ETSI EN 301 428 V1.3.1

ETSI EN 301 443 V1.3.1

ETSI EN 301 459 V1.2.6

ETSI EN 301 360 V1.2.1

ETSI EN 301 489-1 V1.9.2

ETSI EN 301 489-12 V1.1.1

EN 60950-1: Electrical Safety standard for radio equipment.

IEC CISPR 22 - Information technology equipment, Radio disturbance characteristics and Limits and methods of measurement.