National Information & Communication Technology Authority

TYPE APPROVAL STANDARDS FOR WIRELESS BROADBAND ACCESS (WBA) EQUIPMENT

Doc Ref No: XXXX

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PART 1: GENERAL

1.0 Introduction

1.1 Wireless Broadband Access (WBA) is a technology aimed at providing high-speed wireless access for data, voice and video services to business and residential subscribers. The intended services provide wireless broadband connectivity, both fixed and mobile to subscribers within the coverage areas of the substations.

1.2 The technologies used for implementing Wireless Broadband Access includes cellular and radio & wireless local area networks systems (RLAN and WLAN).

1.3 Wireless Broadband Access systems include Wireless Fidelity (WiFi) systems, Worldwide Interoperability for Microwave Access (WiMax) systems, Code Division Multiple Access (CDMA) systems and others.

1.4 Wireless Broadband Access systems applications may include: point-to-multipoint backhaul (e.g., E1 services for business), point-to-point backhaul (e.g., connecting to Internet backbone), and consumer last mile and portable wireless broadband Internet connection.

1.5 The National Information and Communications Technology Authority (NICTA) has developed this mandatory Type Approval technical instrument for Broadband Wireless Access Equipment under Section 30 of the NICT Radio Spectrum Regulation, 2010. This standard/specification shall be referred to as Document Ref No: XXX.X

1.6 The standard prescribes the general and minimum performance requirements for Wireless Broadband Access (below 11 GHz) also referred to as Wireless Broadband Access equipment usage in Papua New Guinea. It does not include detailed user parameters.

1.7 This Standard should be read in conjunction with the Broadband ICT Systems provision Technical Code Document Ref No: 1258.00 and the Technical Policy for Industrial, Scientific and Medical Band Systems Document Ref No: 1105.01.

1.2 Scope

1.2.1 The Standard defines technical requirements for Wireless Broadband Access (WBA) equipment operating in the frequencies below 11 GHz including the ISM bands of 2.4 GHz and 5.8 GHz. The WBA equipments include WiMAX systems based on the IEEE 802.16 standards, the WiFi systems based on the universal IEEE 802.11 standards and CDMA technology.

1.2.2 The standard does not restrict the type of WBA technology to be employed. It mainly defines the operating frequency bands, emission and output power limits, and electromagnetic compatibility and electrical safety requirements where relevant.

1.2.3 The Standard makes specific references to the interoperable standard that has been created based on the IEEE 802.16d and IEEE 802.16e, the ETSI HIPERMAN standards, the universal IEEE 802.11 Standards and CDMA technology. Other standards will be adopted and referenced in a similar manner and type approval shall comply or adhere to these respective standards.

1.2.4 The Standard does not define network compatibility and equipment interoperability standard. Radio dealers and service providers who sell and or use WBA fixed or mobile equipment are required to ascertain network compatibility and equipment interoperability with all other licensed ICT Operators.

1.3 Abbreviations

For the purpose of this standard, the following abbreviations apply:

AC	Alternating Current
ACMA	Australian Communications and Media Authority
CDMA	Code Division Multiple Access
DC	Direct Current
EMC	Electromagnetic Compatibility
ERM	Electromagnetic Compatibility and Radio spectrum Matters
ETSI HIPERMAN	European Telecommunications Standards Institute **Hi**gh **Per**formance Radio **M**etropolitan **A**rea **N**etwork
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IR	Intentional Radiator
PTMP	Point-To-Multipoint
PTP	Point-To-Point
RALI	Radiocommunications Assignment Licensing Instruction
RLAN	Radio Local Area Network
RSS	Radio Standards Specification
SRSP	Standard Radio System Plan
WAS	Wireless Access Systems
WBA	Wireless Broadband Access
WiFi	Wireless Fidelity
WIMAX	Worldwide Interoperability for Microwave Access
WLAN	Wireless Local Area Network

1.4 Definitions

Intentional Radiator**:** is the transmitter power of the wireless equipment such as a wireless access point, router or bridge.

Mobile Subscriber Station: Under normal operation mode, a subscriber station that could be in a specific location and generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter radiating structure(s) and the body of the user or nearby persons.

Portable Subscriber Station: Under normal operation mode, a subscriber station that could to be used in motion and within 20 centimeters of the body of the user.

WBA Equipment: refers to the Base Stations or Subscriber Stations which provide the broadband wireless connectivity, as well as the fixed or mobile end user devices which require the connectivity.

PART 2: RADIO DEALERS LICENCE

2.1 A supplier or dealer should have a limited radio dealers licence or a full dealers license to deal in, supply, install or maintain WBA equipment.

2.2 As per the Broadband ICT Systems Provisioning Technical Code (Doc. Ref: 1258.00) the sale and/ or use of WBA equipment including equipment designed for ISM band is subject to NICTA's licensing process.

2.3 A licence specifying terms and conditions of sale and/ or use of WBA equipment shall be issued upon full compliance with licensing requirements. All queries regarding licensing can be directed to NICTA's Licensing and Business Relations section.

Contact: Manager Licensing and Business Relations,
Licensing and Enforcement Department,
National Information and Communication Technology Authority
(NICTA), P. O Box 8444, BOROKO.
National Capital District.
Papua New Guinea.

Ph: (675) 303 3200
Fax: (675) 300 4829
Website: www.nicta.gov.pg

PART 3: TYPE APPROVAL APPLICATION PROCEDURES

3.1 As a pre-requisite, WBA equipment including all the accessories intended to be used in the country must be submitted together with a Supplier Declaration of Conformity (SDoC) Form for testing and type approval to NICTA before sale or use of equipment.

3.2 Complete and submit a Type Approval Application Form (TT100) to the Type Approval section. A soft copy of the form can be downloaded from the NICTA website. Please contact NICTA Type Approvals Section (email: typeapprovals@nicta.gov.pg) for further information.

3.3 A compulsory testing fee of K150.00/ apparatus/hour is applicable.

3.4 Submit sample equipment including all the accessories for testing together with copies of the user manual, technical specification and test reports. Copies of compliance certificates and other proofs of compliance with international standards must be submitted as well. Incomplete documentation will not be accepted.

3.5 Approval will be granted to equipment that NICTA determines to be compliant with this Standard.

3.6 NICTA reserves the right to give separate Type Approval to models it considers to be technical variants and the performance of which may differ between models.

PART 4: TYPE APPROVAL REQUIREMENTS

4.1 General Requirements

The Radio Frequency (RF) carrier of the WBA equipment shall be tuned to operate within the allowed limits of frequency spectrum assigned to its WBA operator.

4.2 Power Supply Requirements

4.2.1 The WBA equipment (e.g. base stations) may be AC powered or DC powered. AC mains supply voltage is 240V + 10%, - 6% , frequency 50Hz ±1%.

4.2.2 Where external power supply is used, e.g. AC adaptor, it shall not affect the capability of the equipment to meet this Standard.

4.3 Equipment Labeling and Identification

4.3.1 The WBA equipment shall be mark with the following:

- The supplier/manufacturer's name or identification mark;
- The supplier/manufacturer's model or type reference and serial number; and
- other markings as required by the relevant standards.

4.3.2 The markings shall be legible, indelible and readily visible. All information on the marking shall be in English.

PART 5: TECHNICAL REQUIREMENTS

The WBA equipment shall comply with the ***maximum output power and emission limits, operating within intended frequency bands, electromagnetic compatibility and electrical safety requirements***. It shall fulfill the requirements of this Standard on all the permitted frequencies in which it is intended to operate.

5.1 Radio Frequency Assignments

The WBA equipment shall be tuned or programmed to operate within the frequency spectrum assigned to its WBA operator. Frequency bands and assignments are as shown in Table 1 below:

Table 1: WBA Technology Authorized Frequency Range

WBA Technology	Authorized Frequency Range
WiFi Systems	2400 to 2483.8 MHz (Indoor / Outdoor) 5725 to 5850 MHz (Indoor / Outdoor)
WIMAX Systems	1.5 GHz (1492 to 1525 MHz) 2.3 GHz (2300 to 2400 MHz) 3.5 GHz (3400 to 3800 MHz)
CDMA Fixed Cellular	800 MHz (824 – 835/869 – 880 MHz band)

5.1.1 Power and Emission Limits

The equipment shall comply with output and spurious emission limits as given in Table 2. It shall fulfill the requirements of this Standard on all the permitted frequencies which it is intended to operate.

Table 2: Technical Requirements for Power and Emission Limits

No.	Authorised Frequency Band / Frequencies	Maximum Field Strength /Output Power	Transmitter and Receiver Spurious Emission	Reference Standard/Document
1*	2.400 – 2.4835 GHz	≤ 4 W EIRP	FCC Part 15 § 15.209; or EN 300 328 § 4.3.4 and 4.3.5	FCC Part 15 § 15.247 or EN 300 328
	5.725 – 5.850 GHz	> 1 W EIRP ≤ 4 W EIRP	FCC Part 15 § 15.209; FCC Part 15.109	FCC Part 15 § 15.247 or 15.407
2	1.5 GHz (1492 – 1525 MHz)	Base Station: ≤ 1 W EIRP Subscriber Station ≤ 1 W EIRP	ACMA RALI FX: 3 or ACMA 1.5 GHz Band Plan	ITU-R F 701 or ACMA RALI FX: 3 or ACMA 1.5 GHz Band Plan

	2.3 GHz (2300 – 2400 MHz)	Base Station: ≤ 20 W EIRP Subscriber Station ≤ 2 W EIRP	FCC Rule Part 27, § 27.53 Emission Limits or; PHY profile given in ETSI TS 102 210	FCC Rule Part 27 § 27.50 Power Limits
	3.5 GHz (3400 – 3800 MHz)	Base Station: ≤ 20 W EIRP Subscriber Station: ≤ 10 W EIRP	ETSI EN 302 326-2 or; PHY profile given in ETSI TS 102 210	ETSI HiperMAN
3	800 MHz Base Station (Tx): 824 – 835 MHz Mobile Station (Rx): 869 – 880 MHz	Base Station: ≤ 50 W Mobile station: ≤ 1 W	RSS – 129 or; SRSP – 503 or RSS – 132	TIA/EIA IS – 95 or TIA/EIA IS – 98 or RSS – 129 or; SRSP – 503

5.1.2 **Operation in the 2.4 GHz Band**

The equipment shall operate in the frequency band 2.400 – 2.4835 GHz using a suitable spread spectrum technique, and shall meet the technical requirements according to either one of the following paragraphs:

- ETSI Standard EN 300 328 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive" published by the European Telecommunications Standards Institute (ETSI);

- Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 15 Radio Frequency Devices; Section 15.247; subject to the following conditions :

  (i) If the apparatus is designed for use as a cordless telephone or for data transmission at an aggregate bit rate not greater than 11 Mbps, the peak output power of the transmitter shall not exceed 200 mW EIRP; and

  (ii) The maximum conducted power output is 30 dBm and the maximum EIRP is 36 dBm for point-to-multipoint (PTMP) base station. Point-to-point (PTP) base stations must abide by the same conducted power limit, but the maximum theoretical EIRP is limitless.

(iii) For a PTP base station, the EIRP must be reduced by 1 dB for every 3 dB increase in directional gain of the antenna over 6 dB.

5.1.3 **Operation in the 5 GHz Band**

The apparatus shall meet the technical requirements in one of the following paragraphs:

- The apparatus shall operate in the frequency band 5.725 – 5.850 GHz using an appropriate spread spectrum technique, and meet the technical requirements according to the Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 15 Radio Frequency Devices; Section 15.247;

- The apparatus shall operate in either one or both of the frequency bands 5.15 – 5.35 GHz and 5.725 – 5.825 GHz, using a digital modulation technique, and meet the technical requirements according to the Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 15 Radio Frequency Devices; Subpart E – Unlicensed National Information Infrastructure Devices;

- Fixed point-to-point in the 5.725 – 5.850 GHz band may utilize directional antennas up to 23 dBi gain without any corresponding reduction of the intentional radiator's RF output power. If antennas higher than 23 dBi gain are utilized, a reduction of 1 dB is required for every 1 dB increase in the antenna gain above 23 dBi.

- With point-to-multipoint, for every 1 dB gain over the 6 dB the power of the intentional radiator shall be reduced by 1 dB.

- The system operating in the 5.725 – 5.850 GHz band should employ both Dynamic frequency selection (DFS) and Transmit Power Control (TPC).

5.1.4 **Operation in the 2.3 GHz Band**

- FCC Rule Part 27, § 27.53 Emission limits
  The power of any emissions outside the intended frequency bands shall be attenuated below the transmitter power (P) by a factor not less than 43 + log (P) dB at the channel edge or;

- The relevant PHY profile given in ETSI TS 102 210
  The spurious emissions shall not exceed – 57 dBm in the frequency range 30 MHz to 1 GHz (measurement bandwidth: 100 kHz) and – 50 dBm in the frequency range 1 GHz to 26.5 GHz (measurement bandwidth: 1 MHz);

- Notwithstanding this power limit, base stations shall be set to work in a manner which is safe and does not impair or interfere with the working of any other station or network authorized by NICTA.

5.1.5 **Operation in the 3.5 GHz Band**

- ETSI EN 302 326-2 or;

- The relevant PHY profile given in ETSI TS 102 210
  The spurious emissions shall not exceed – 57 dBm in the frequency range 30 MHz to 1 GHz (measurement bandwidth: 100 kHz) and – 50 dBm in the frequency range 1 GHz to 26.5 GHz (measurement bandwidth: 1 MHz);

- Notwithstanding this power limit, base stations shall be set to work in a manner which is safe and does not impair or interfere with the working of any other station or network authorized by NICTA.

5.1.6 **Operation in the 800 MHz Band**

- Out-of-band emission limits are specified in RSS-129 and RSS-132.

- Receiver spurious emission shall comply with the limits in RSSP – 503

5.2.0 Extreme Temperature and Frequency Stability

- Under normal rated voltage, the frequency shall lie within the operating band under the circumstances in which the temperature varies between -20°C to 80°C. At the temperature of 20°C, the frequency shall lie within the operating band under the circumstances in which the power supply varied between ± 5% of the normal rated voltage.

- For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

5.3.0. Electromagnetic Compatibility and Electrical Safety Requirements

If the WBA equipment is a base station or a subscriber station, it shall comply with EMC emissions from DC power or AC mains power input/output ports defined in the ETSI EN 301 489-1 or IEC CISPR 22. It shall also comply with the safety requirements defined in IEC 60950-1 safety standard.

5.4.0 System Profiles

In implementing HIPERMAN complaint systems, the WBA equipment may use a common HIPERMAN system profile to achieve multi-vendor equipment interoperability.

PART 6: COMPLIANCE WITH TECHNICAL REQUIREMENTS

6.1 Suppliers shall demonstrate that the WBA equipment has been tested to comply with the power and emission limits, and the permitted range of operating frequencies stipulated in PART E § 1.0 and § 2.0 of this Standard. Measurement methods of the testing shall be

defined in FCC Part 27 or ETSI EN 300 440-1, or equivalent methods as specified by the manufacturer.

6.2 If the WBA equipment is a base station or subscriber station, which is directly or indirectly powered by the AC mains, suppliers shall also demonstrate that it has been tested according to measurement methods and limits for:

a) EMC emission from the DC power or AC mains power input/output ports defined in ETSI EN 300 440-1 or IEC CISPR 22; and
b) Electrical safety defined in the IEC 60950-1.

6.3 NICTA reserves a right to conduct further test on the equipment, as and when required after the approval has been granted.

PART 7: REVISIONS AND CONTACT DETAILS

7.1 NICTA shall review this instrument from time to time in keeping up with Government policies and with the trends in the telecommunications industry.

7.2 NICTA shall inform its licensees and other concerned parties of the revisions in a reasonable manner.

7.3 Where individuals or groups have comments regarding the contents of this document and or complaints regarding the use of this technology may forward the same in writing to the following address;

The Executive Director
Engineering and Resource Planning Department
NICTA
P.O. Box 8227
Boroko, NCD, Papua New Guinea

Tel: (675) 303 3200
Facsimile: (675) 300 4829
E-mail: erp@nicta.gov.pg

For the technical requirements captured in this Standard, reference has been made to the following documents:

ACMA 1.5 GHz Band Plan, December 1996

ACMA RALI FX:	Microwave Fixed Services Frequency Coordination
Draft ETSI EN 301 489-1 V1.6.1 (2004-12)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
ETSI EN 300 328	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques; Harmonised EN covering essential requirements under article 3.2 of the R&TTE Directives
ETSI EN 300 440-1 V1.2.1 (2001-03)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods
ETSI EN 302 326-2	Fixed Radio Systems; Multiport Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multiport Radio Equipment
ETSI EN 301 893	Broadband Radio Access Network (BRAN); 5 GHz high performance RLAN; Harmonised EN covering essential requirements of article 3.2 of the R&TTE Directive
ETSI TS 102 177 V1.2.1 (2005-01)	Broadband Radio Access Networks (BRAN); HIPERMAN; Physical (PHY) Layer
ETSI TS 102 178 V1.2.1 (2005-01)	Broadband Radio Access Networks (BRAN); HIPERMAN; Data Link Control (DLC) Layer
ETSI TS 102 210 V1.2.1 (2005-01)	Broadband Radio Access Networks (BRAN); HIPERMAN; System profiles
FCC Part 15 Subpart C § 15.209 § 15.247	Radio Frequency Devices Intentional Radiators Radiated emission limits, general requirements Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5850 MHz

Subpart E -	Unlicensed National Information Infrastructure Devices
§ 15.407	General technical requirements
FCC Part 27 § 27.50 § 27.53	Miscellaneous Wireless Communications Services Power limits Emission limits
IEEE Std.802.11	IEEE Standard for Information technology-Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification.
IEEE Std.802.16 – 2004	IEEE Standard for Telecommunications and Information Exchange between Systems - LAN/MAN Specific Requirements Part 16: Air Interface for Fixed Broadband Wireless Access Systems
IEEE Std.802.16e-2005	Air Interface for Fixed and Mobile Broadband Wireless Access Systems
IEC CISPR 22: 2003-04	Information Technology Equipment – Radio disturbance characteristics – Limits and methods of measurement
IEC 60950-1: 2001-10	Information Technology Equipment – Safety
ITU-R F 701	Radio-frequency channel arrangements for analogue and digital point-to-multipoint radio systems operating in frequency bands in the range 1.350 to 2.690 GHz (1.5, 1.8, 2.0, 2.2, 2.4 and 2.6 GHz)
RSS – 129	800 MHz Dual-Mode CDMA Cellular Telephones
RSS – 132	Cellular Telephones Employing New Technologies Operating in the Bands 824 – 849 MHz and 869 – 894 MHz
SRSP – 503	Technical Requirements for Cellular Radiotelephone Systems Operating in the Bands 824 – 849 MHz and 869 – 894 MHz

TIA/EIA IS-95	Mobile station – Base station compatibility standard for dual-mode wideband spread spectrum cellular system
TIA/EIA IS-98	Recommended minimum performance standards for 800 MHz dual-mode wideband spread spectrum cellular mobile stations