

# TECHNICAL CODE

## SPECIFICATION FOR DIRECT-TO-HOME (DTH) SATELLITE BROADCAST RECEIVING ANTENNA

Developed by



Registered by



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## **SKMM MTSFB TC T005:2013**

### **DEVELOPMENT OF TECHNICAL CODES**

The Communications and Multimedia Act 1998 ('the Act') provides for Technical Standards Forum designated under section 184 of the Act or the Malaysian Communications and Multimedia Commission ('the Commission') to prepare a technical code. The technical code prepared pursuant to section 185 of the Act shall consist of, at least, the requirement for network interoperability and the promotion of safety of network facilities.

Section 96 of the Act also provides for the Commission to determine a technical code in accordance with section 55 of the Act if the technical code is not developed under an applicable provision of the Act and it is unlikely to be developed by the Technical Standards Forum within a reasonable time.

In exercise of the power conferred by section 184 of the Act, the Commission has designated the Malaysian Technical Standards Forum Bhd ('MTSFB') as a Technical Standards Forum which is obligated, among others, to prepare the technical code under section 185 of the Act.

A technical code prepared in accordance with section 185 shall not be effective until it is registered by the Commission pursuant to section 95 of the Act.

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### **Committee Representation**

The Satellite Broadcast Terminal Working Group under the Malaysian Technical Standards Forum Bhd (MTSFB) which developed this Technical Code consists of representatives from the following organisations:

Jaring Communications Sdn Bhd

Measat Broadcast Network Systems Sdn Bhd (ASTRO)

Packet One Networks (Malaysia) Sdn Bhd

SIRIM QAS International Sdn. Bhd.

Telekom Malaysia Berhad

YP Yau Trading

**FOREWORD**

This technical code for the Specification for Direct-to-Home (DTH) Satellite Broadcast Receiving Antenna (‘this Technical Code’) was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standard Forum Berhad (‘MTSFB’) via its Satellite Broadcast Terminal Working Group.

This Technical Code was developed for the purpose of certifying communications equipment under the Communications and Multimedia (Technical Standards) Regulations 2000. .

This Technical Code cancels and replaces the Technical Specification for Satellite Receiving Station - Satellite Broadcast Antenna, RPS 004-01, which was previously saved under Section 275, CMA 1998.

This Technical Code shall continue to be valid and effective until reviewed or cancelled.

**SPECIFICATION FOR DIRECT-TO-HOME (DTH) SATELLITE BROADCAST  
RECEIVING ANTENNA**

**1. Scope**

This Technical Standard defines the minimum technical requirements of Direct-to-Home (DTH) Satellite Receiving Antenna (SRA) for Ku-band reception.

The SRA consists of the following main components:

1. Satellite Dish
2. Feed horn
3. Low Noise Block Down converter (LNB)
4. LNB Arm
5. Cable
6. Antenna Mount

The SRA components are illustrated in Annex A.

The SRA must provide the correct interface to the Direct-to-Home Satellite Receiver (DTH Set-Top Box). *This Technical Standard only defines the SRA and interface requirements between the SRA and the STB.*

**2. Normative References**

The following normative references are indispensable for the application of this Technical Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 1363: Part 1	13A plugs, socket-outlets, adaptors and connection units – Part 1: Specification for rewirable and non-rewirable 13A fused plugs
BS 6500	Electric cables Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments
BS EN 50075	Specification for flat non-wirable two-pole plugs 2.5A 250V, with cord, for the connection of class II-equipment for household and similar purposes
IEC 1114-2	Methods of measurement on Receiving Antennas for Satellite Broadcast Transmission in the 11/12 GHz band – Part 2: Mechanical and environmental test on individual and collecting receiving antennas
IEC 60227-5	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)
IEC 60245-4	Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables
MS 140	Specification for insulated flexible cords and cables
MS 406	Specification for voltages and frequency for alternating current transmission and

distribution systems

- MS 589: Part 1 Specification for 13A plugs, socket outlets, adaptors and connection unit – Part 1: Specification for rewirable and non-rewirable 13A fused plugs
- MS 1578 Specification for flat non-rewirable two-pole plugs, 2.5A, 250V, with cord, for the connection of class II – Equipment for household and similar purposes
- MS IEC 60038 IEC standard voltages
- MS ISO 9227 : Corrosion Tests In Artificial Atmospheres – Salt Spray Tests  
1996

### **3. Abbreviations**

- DTH Direct to Home
- SRA Satellite Receiving Antenna
- LNB Low Noise Block Down converter
- MS Malaysian Standard
- IEC International Electrotechnical Commission
- STB Set-Top Box
- DVB Digital Video Broadcasting

### **4. Requirements**

#### **4.1 General Requirement**

##### **4.1.1 Power Supply Requirements**

The Low Noise Block Down converter (LNB) shall be powered by the satellite receiver or alternatively can be powered via external power adaptor. The external power supply may be AC or DC powered. For AC powered equipment, the operating voltage shall be 240 V +5 %, -10 % and frequency 50 Hz ± 1 % as according to MS 406 or 230 V ± 10 % and frequency 50 Hz ± 1 % as according to MS IEC 60038 whichever is current.

Where an external power supply is used, e.g. AC adaptor, it shall not affect the capability of the equipment to comply with this specification. Adaptor must be pre-approved by the relevant regulatory body before it can be used with the equipment.

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### 4.1.2 Power Supply Cord and Mains Plug

If the external power supply is used, the equipment shall be fitted with a suitable and appropriate approved power supply cord and mains plug. Both are regulated products and must be pre-approved by the relevant regulatory body before it can be used with the equipment.

The power supply cord shall be certified in according to:

- a) MS 140;
- b) BS 6500;
- c) IEC 60227-5; or
- d) IEC 60245-4.

The main plug shall be certified according to:

- a) 13 A fused plugs: MS 589: Part 1 or BS 1363: Part 1; or
- b) 2.5 A, 250 V, flat non-rewirable two-pole plugs: MS 1578 or BS EN 50075.

### 4.1.3 Marking Requirements

The antenna system and/or its component shall be marked with the following information:

- a) supplier/manufacturer's name or identification mark;
- b) supplier/manufacturer's model or type reference; and
- c) other markings as required by the relevant standards referred in this document

The markings shall be legible, indelible and readily visible. All information on the marking shall be either in Bahasa Melayu or English Language.

## 4.2 Technical Requirement

The inputs to the SRA shall be in the range from 10.7 GHz to 12.75 GHz designated for broadcasting satellite service provided by a licensee in the country. Each RF carrier is either using DVB-S or DVB-S2 satellite transmission standard and is an aggregate of multiple digital video, audio, and data channels. The outputs of the SRA are L-Band composite carriers in the frequency range 950 MHz to 2150 MHz.

### 4.2.1 Antenna

The antenna shall be the standard off-set antenna.

The antenna shall meet the following performance specifications as per Table 1:

**Table 1. Performance Specifications for Antenna**

Parameter	Specification
Satellite Dish Size	60 cm -120 cm (diameter)
Operational Wind Speed	72 km/hr (max)



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<b>Parameter</b>	<b>Specification</b>
Survival wind speed	144 km/hr (max)
Output level	-20 dBm to -65 dBm at SBR input port, each carrier
Cable	RG-6F equivalent cable between LNB and SBR
Ambient temperature	0 °C to 50 °C operating, -40 °C to +55 °C non-operating
Relative humidity	95% non-condensing
Gain	at Min 36 dBi at 11.2 GHz (for 60cm)
Beam width	2.6 ° at 3 dB points
Side lobes	5 ° to 20 °, G=29 - 25 log $\theta$ dB or less. 20 ° to 48 °, G=32 - 25 log $\theta$ dB or less. 48 ° to 180 °, G=10 dB or less.
Noise temperature	35 °K (max)
Cross polarization isolation	30 dB (min)
Offset angle	25 °
Altitude (optional)	6500 m

**4.2.2 Feed horn**

The Feed horn shall be designed to provide for mounting to the antenna in an off-set mechanical configuration, and to mount directly to the LNB. The Feed horn shall be capable of receiving both horizontal and vertical polarised signals in the frequency range 10.7 GHz to 12.75 GHz. The Feed horn shall have less than 0.2 dB insertion loss.

**4.2.3 Low Noise Block Down converter (LNB)**

The LNB shall meet the following performance specifications as per Table 2:

**Table 2. Performance Specifications for LNB**

<b>Parameter</b>	<b>Specification</b>
Input frequencies range	10.7 GHz - 12.75 GHz
Polarization	Linear
<b>Parameter</b>	<b>Specification</b>
Supply voltage	Vertical Polarization - 9 to 14 volts

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Parameter	Specification
	Horizontal Polarization - 16 to 20 volts
Insertion loss	<0.2 dB
Cross polarization	20 dB Min
Local oscillator (LO)	For Non Universal LNB 9 GHz to 11.8 GHz  For Universal LNB Dual LO: 9.75 GHz & 10.6 GHz
Local oscillator switching	Should support 22KHz tone switching for dual band LO.
Noise figure	0.5 dB to 0.8 dB
Phase noise	-55 dBc/Hz @ 100Hz -65 dBc/Hz @ 1KHz -80 dBc/Hz @ 10KHz -95 dBc/Hz @ 100KHz -105 dBc/Hz @ 1 MHz
Gain	55 dB to 65 dB
Gain variation	Less than +/- 0.5 dB over any 36 MHz bandwidth.
Third order intermodulation	Less than -50 dBc with two equal tones of -25 dBm each at the output
Image rejection	40 dBc Minimum
Output VSWR	2.0:1 Typical, 75 Ohm
LO frequency stability 9.75 GHz	± 3MHz Max over a temperature range of -20 °C to +60 °C
LO frequency stability 10.60 GHz	± 3MHz Max over a temperature range of -20 °C to +60 °C
Output connector	Type F, 75 Ohm female
Output return loss	9.6 dB maximum

The use of dual LNB (dual output), Quattro and quad LNB (quadruple output) shall be possible provided each output of such dual and quad LNB shall meet the specification stated above.

The use of optical LNB shall be possible provided the converted output shall meet the specification stated above.

#### 4.2.4 Antenna Mounting

A universal antenna mount shall be provided with the SRA.

This universal mount should allow the subscriber or qualified installer to mount the antenna onto wall (vertical) and terrace (horizontal) mounting surface and any in between surface angles.

The universal mount construction should be stable and secure. The mounting base should consist of at least 4 mounting holes distributed evenly for installation and sufficient holes in the centre to allow for heat expansion. The universal mount and all necessary hardware supplied should be galvanized to protect against rusting.

The mount shall not corrode when subjected to salt spray per UNI ISO 9227 for 500 hours, and shall not sustain the growth of fungus.

The mechanical and environmental characteristic shall be compliant to IEC 1114-2.

The Wall Mount Configuration and Universal Foot are illustrated in Annex B.

##### 4.2.4.1 Adjusting Bracket

The adjusting bracket shall have elevation and azimuth scales, marked in degrees, which will allow the adjustment of the antenna over a +/- 10° range in elevation and azimuth to an accuracy of 0.5°. The pointing accuracy shall be maintained within 1° under all operating conditions.

#### 4.2.5 Cabling

Coaxial Cable required to interconnect the SRA to the satellite receiver shall be RG-6 type or equivalent. It shall be provided with type F male connectors.

The impedance of the cable must be 75 Ohm. The performance of the cable shall comply with the attenuation characteristic in Table 3 below.

**Table 3. Attenuation Characteristic**

MHz	dB/100m
860	18.5
1000	21.1
1350	23.8
1750	28.0
2150	31.4

The supplied F male - connector should be screw type with O-ring to protect against rainwater and moisture. LNB arm should have means to secure the cable to the arm.

Annex A

Figure 1. Illustration of Satellite Receiving Antenna (SRA)



Components of Satellite Receiving Antenna (SRA);

1. Satellite Dish
2. Feed horn
3. LNB
4. LNB Arm
5. 75 Ohm Cable
6. Antenna Mount

Annex B

Figure 2. Example of Wall Mount Configuration

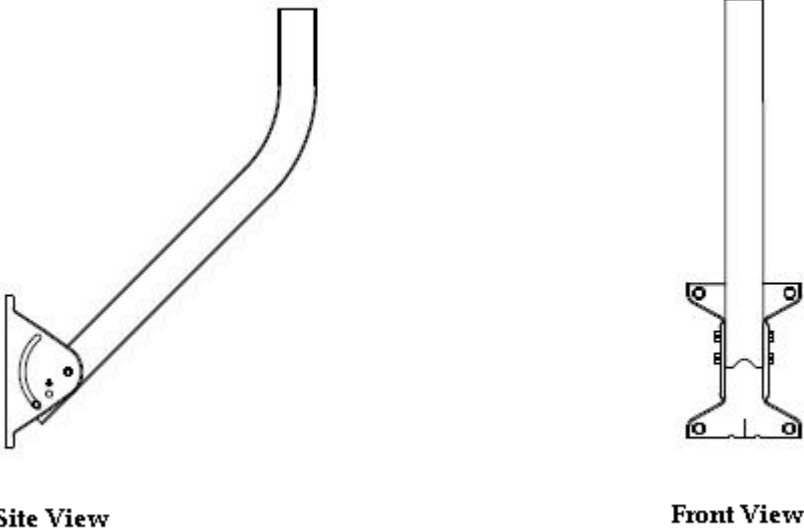
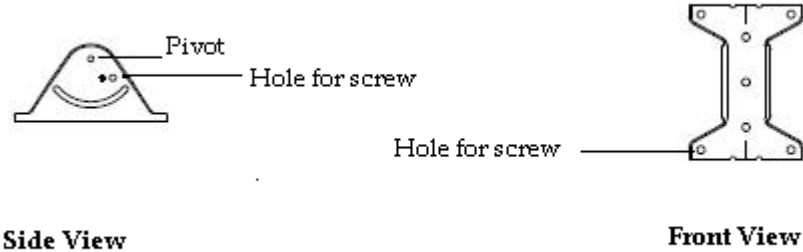


Figure 3. Example of Universal Foot



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### **Acknowledgement**

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