TAOGLAS

Datasheet

PHA.01.A

Description:

UWB 3.7-7GHz Anchor Horn Antenna

Features:

Frequency: 3.7-7GHz 5dB impedance bandwidth,
3.700-4.200GHz UWB Band 2
6.250-6.750GHz UWB Band 5

Peak Gain: 19dBi, and minimum 16dBi

Polarization: Linear with 15dB cross-pol rejection minimum

Dimensions: 200 x 150 x 252 mm

Connector: WR 187 waveguide with CMR-187 Flange to N-Type Female Waveguide to Coax Adapter

RoHS & Reach Compliant

1. Introduction

Ultra-Wideband (also known as UWB) is a low power digital wireless technology for transmitting large amounts of digital data over a wide spectrum of frequency bands typically spanning more than 500MHz with very low power for short distances.

The low power requirements of UWB mean increased battery life of sensors and tags leading to a reduction in overall operational costs. Taoglas has developed various innovative and new-to-market UWB antennas designed for seamless integration with the recently launched Decawave ScenSor DW1000 module and are also compatible with any other UWB sensor modules on the market.

The PHA.01.A is a high gain UWB antenna designed to provide long range coverage at the sensor side and less susceptibility to interference due to low sidelobe rejection, (> 15 dB) relative to peak boresight gain. It is designed to cover UWB band 2 and 5 frequencies and does not excite other higher order modes in its frequency band of operation.

A well-designed time-domain antenna should accurately reproduce the time waveform of the incoming field, thus preserving the amplitude and phase of the incoming signal. In order to provide desirable time-domain fidelity, an antenna must have both a constant amplitude response and a linear phase response in the frequency domain. The PHA.01.A antenna exhibits both high Fidelity Factor, >0.9 and also minimal phase ripple, less than 65 ps, making it ideal for UWB communications.

The TEM horn antenna is designed to introduce minimal waveform distortion by allowing the fields within the structure to remain in the dominant transverse electromagnetic mode. By designing these antennas specifically for use with impulsive time-domain signals and having a broad frequency spectrum, time-domain distortion can be minimized.

This is done by limiting the amount of propagation moding in the antenna and by having a good impedance match design both at the feed-point to the antenna and at the aperture of the antenna. Inside the antenna, the fields should remain in the dominant mode, which for the PHA.01.A antenna is the TEM mode.

For more information, contact your regional Taoglas customer service team.

2. Applications of Pulsed UWB antenna Technology

- Radar - These short pulsed antennas provide very fine range resolution and precision distance and positioning measurement capabilities. UWB signals enable inexpensive high definition radar antennas which find use in automotive sensors, smart airbags, and precision surveying applications amongst many others.

- Home Network Connectivity - Smart home and entertainment systems can take advantage of high data rates for streaming high quality audio and video contents in real time for consumer electronics and computing within a home environment.

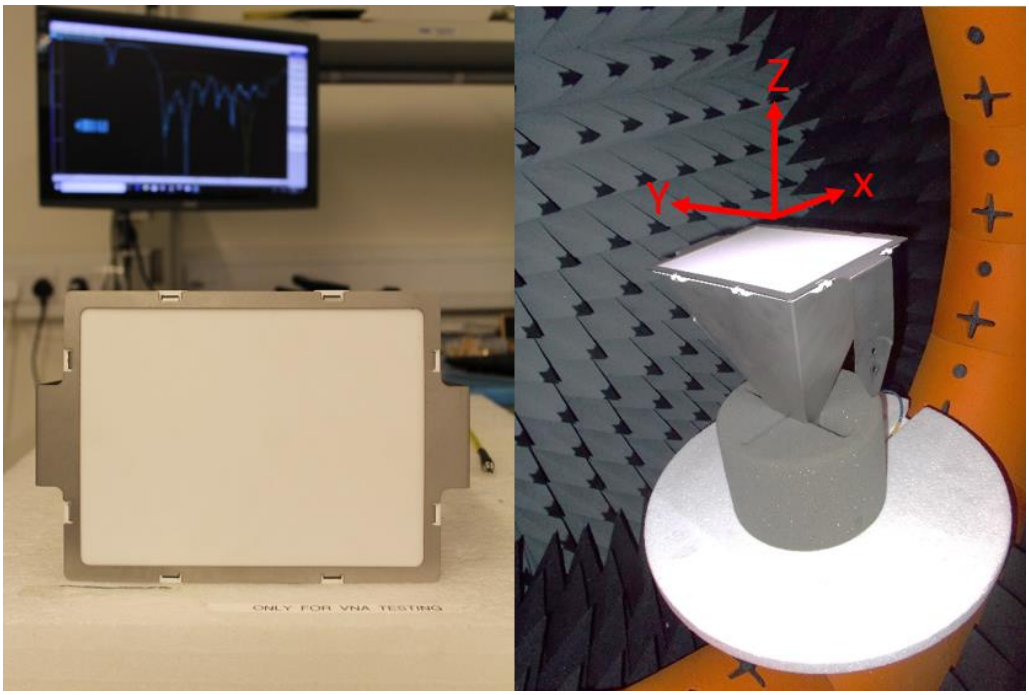
- Position location & Tracking - UWB antennas also find use in Position Location and Tracking applications such as locating patients in case of critical condition, hikers injured in remote areas, tracking cars, and managing a variety of goods in a big shopping mall. UWB offers better noise immunity and better accuracy to within a few cm compared to current localization technologies such as Assisted GPS for Indoors, Wi-Fi and cellular which are at best able to offer meter level precision. Tethered Indoor positioning UWB systems that measure the angles of arrival of ultra-wideband (UWB) radio signals perform triangulation by using multiple sensors to communicate with a tag device.

3. Specifications

Electrical		
Frequency (GHz)	3.700-4.200 GHz UWB Band 2	6.250-6.750 GHz UWB Band 5
Peak Gain (dBi)		
Free Space	16dBi	17dBi
Average Gain (dB)		
Free Space	-1dB	-2dB
Efficiency (%)		
Free Space	>80%	>55%
VSWR	3.5:1	
Return Loss (dB)	<-5	
Radiation Properties	Directional	
Polarization	Linear	
Horizontal HPBW	16.7˚	
Vertical HPBW	18.3˚	
Impedance	50 Ω	
Group Delay Variation	< 65 ps	
Fidelity Factor	>0.9	
Mechanical		
Dimensions (mm)	200 x 150 x 252 mm	
Material	Stainless steel	
Connector	N-Type (female)	
Environmental		
Operation Temperature	-40°C to 85°C	
Storage Temperature	-40°C to 85°C	
Relative Humidity	40% to 95%	

4. Test Setup

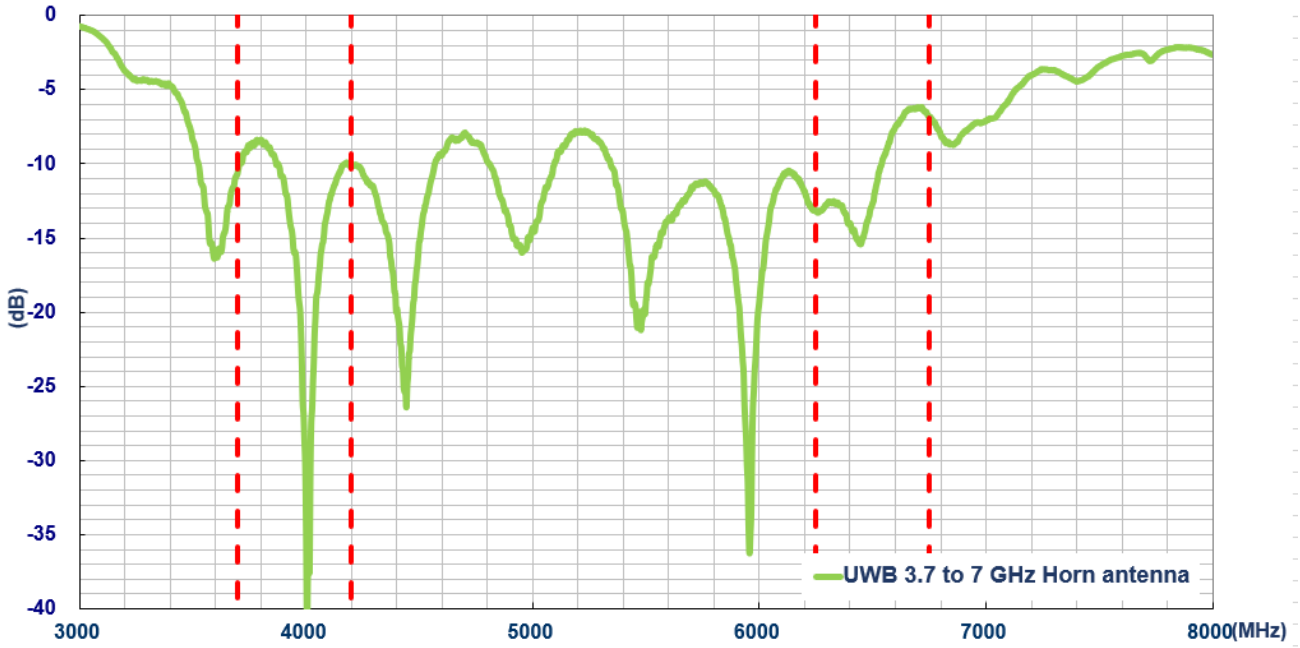
4.1 Test Setup



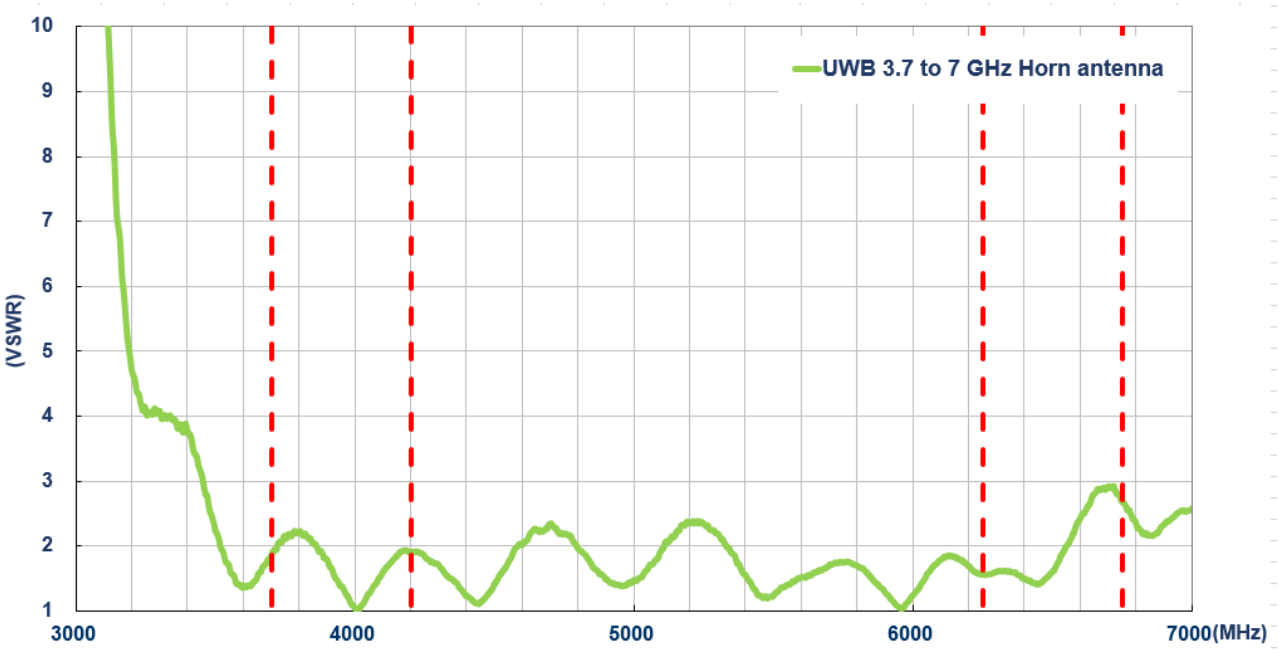
Free Space

5. Antenna Characteristics

5.1 Return Loss

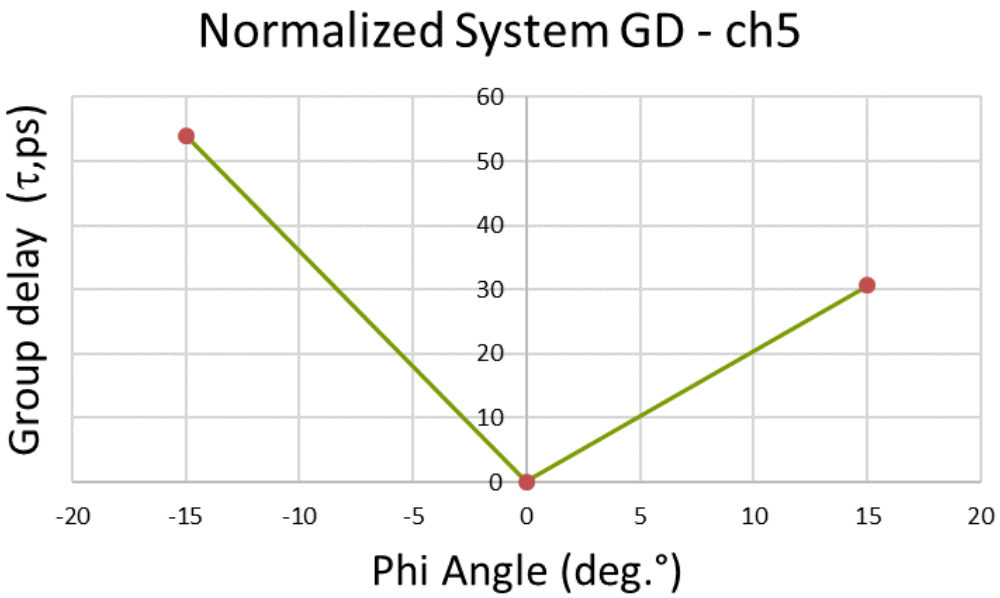


5.2 VSWR

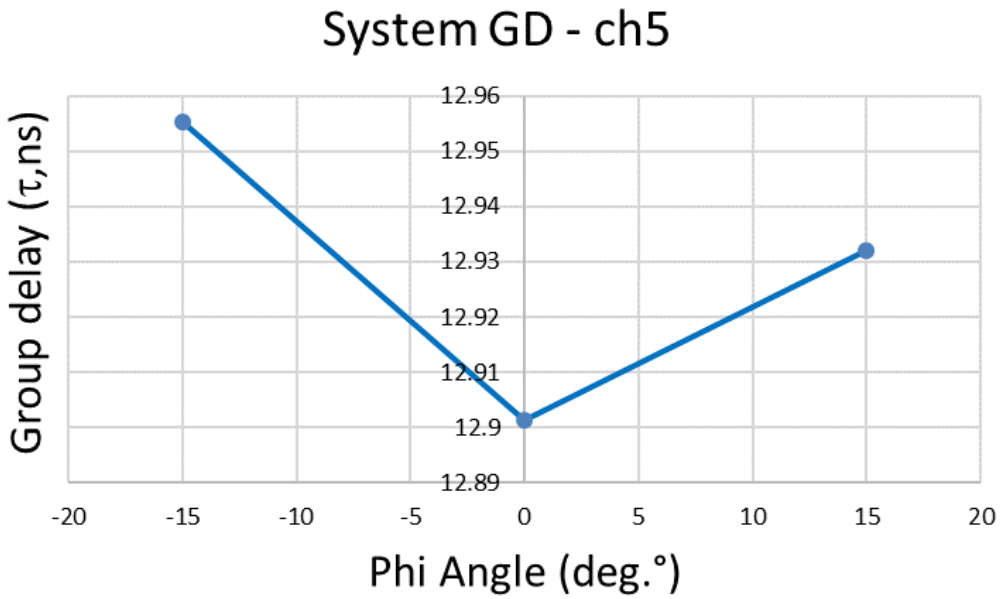


5.3 Group Delay (τ)

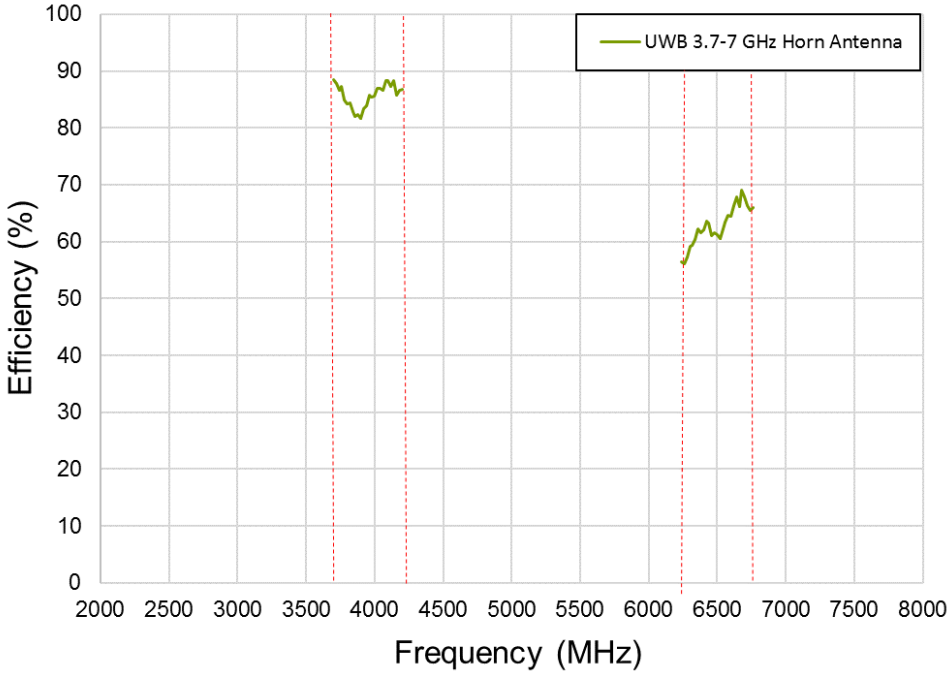
Normalized system group delay



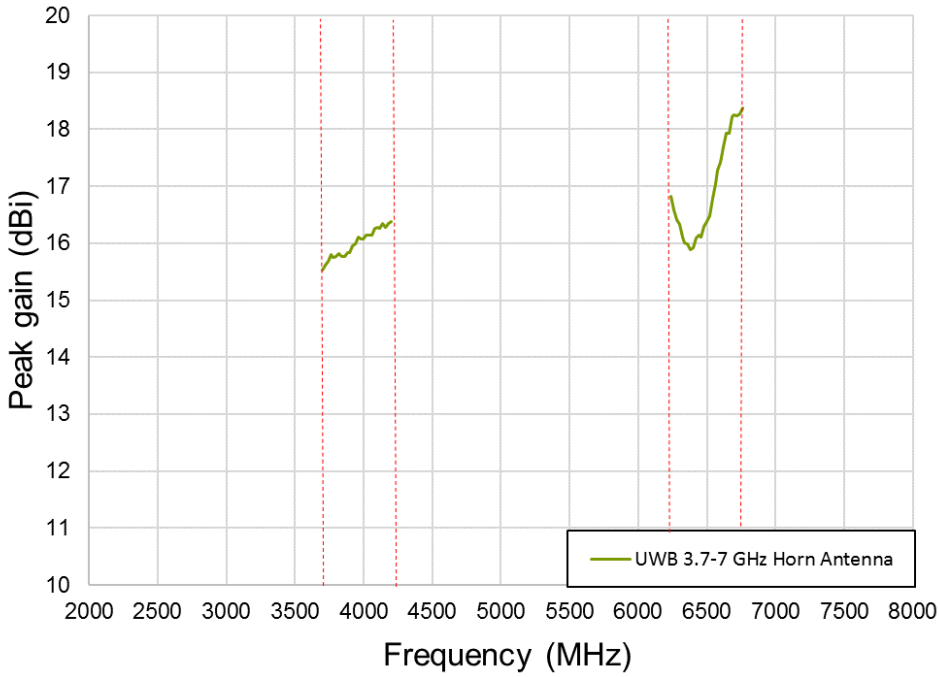
System group delay



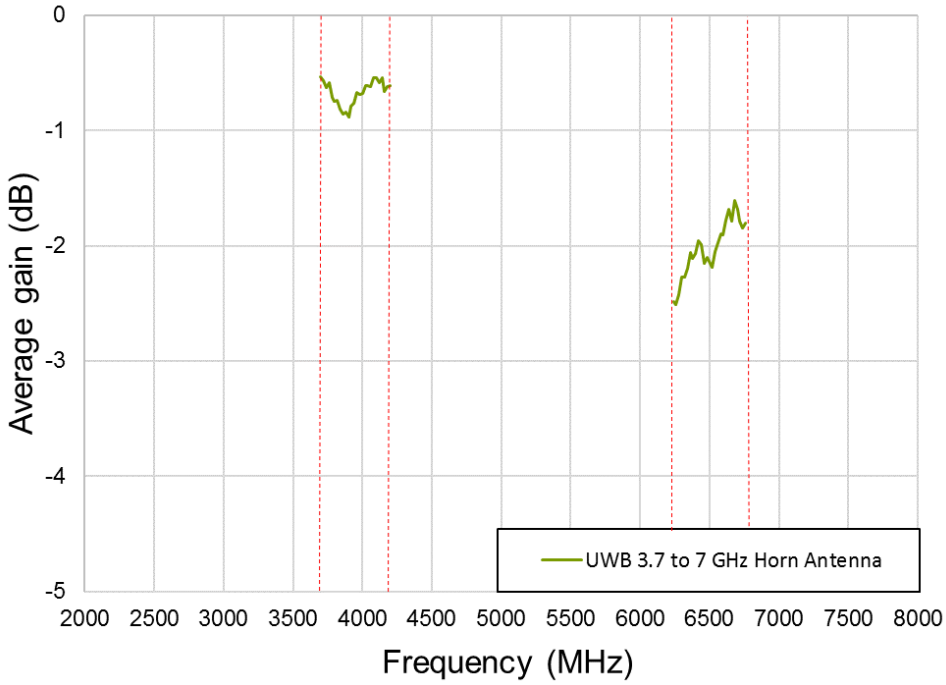
5.4 Efficiency



5.5 Peak Gain



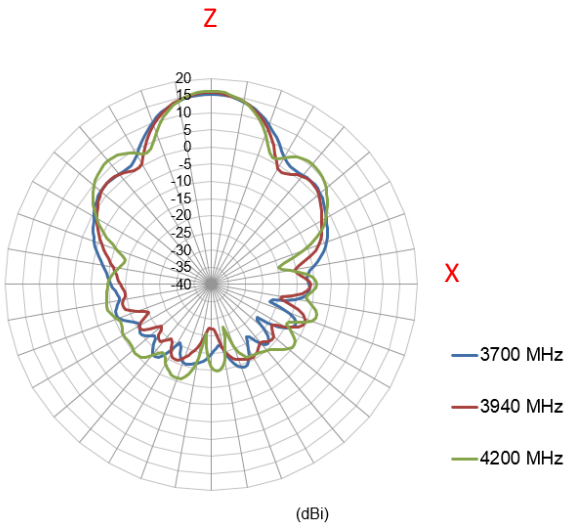
5.6 Average Gain

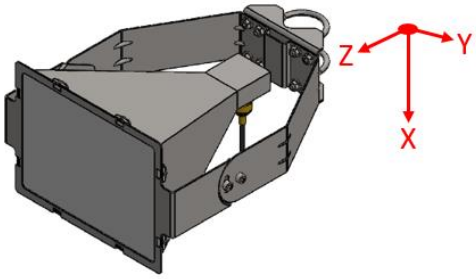


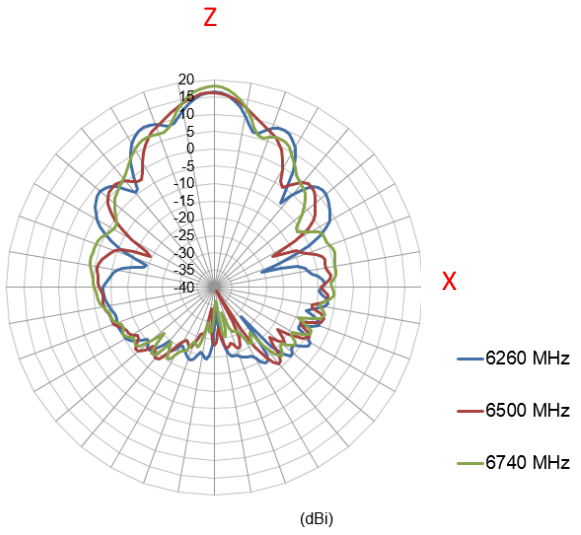
6. 2D Radiation Patterns

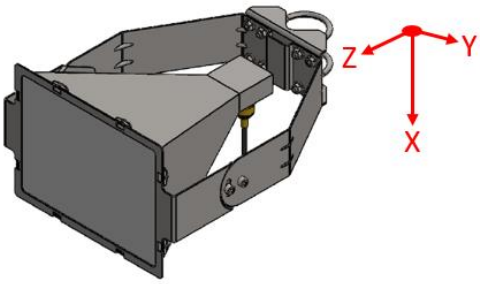
6.1 2D Radiation Pattern

XZ Plane

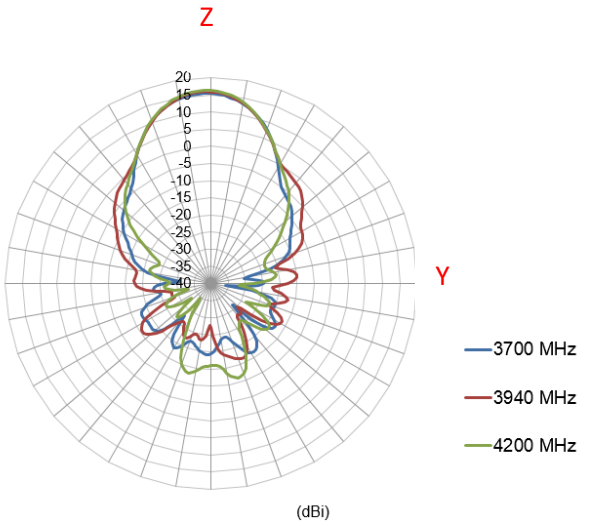


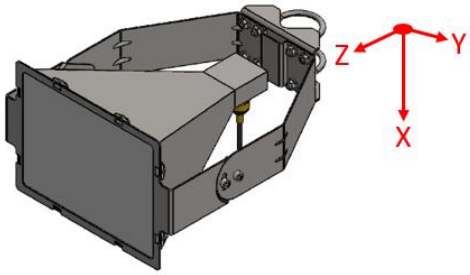


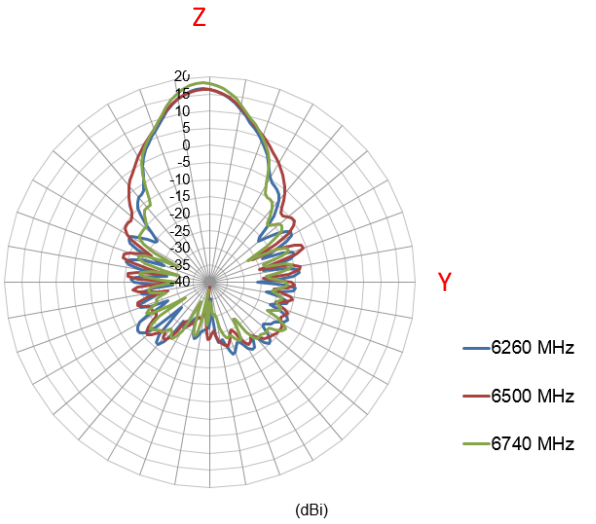


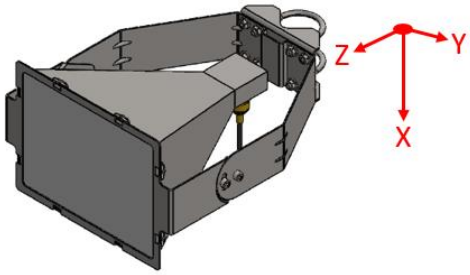


ZY Plane


Z
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Y
3700 MHz
3940 MHz
4200 MHz
(dBi)


Z
Y
X

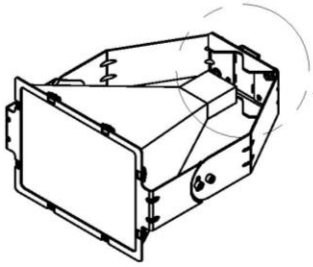

Z
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Y
6260 MHz
6500 MHz
6740 MHz
(dBi)


Z
Y
X

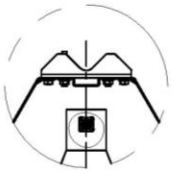
7. Mechanical Drawing (Units: mm)

ISO NO: EDW-18-8-6502 <Release>

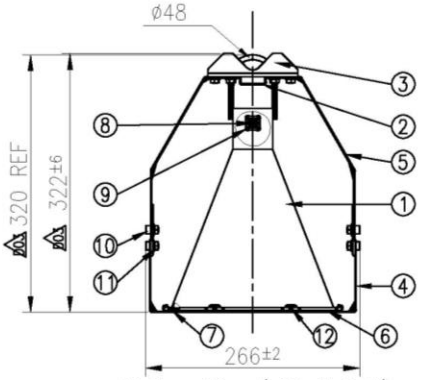
REV	ZONE	DESCRIPTION	ENG	APPROVED	ISSUED DATE
D01	ALL	Initial Design	Rachel	Haley	2018/05/25
D02	ALL	Modify dimensions and BOM	Rachel	Haley	2019/02/18
D03	ALL	Modify BOM & tolerance	Rachel	Joey	2019/04/24



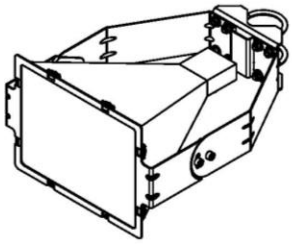
3D View – Wall mount



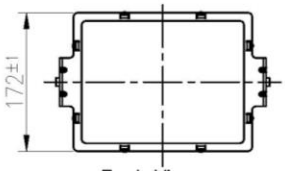
Reveseable bracket



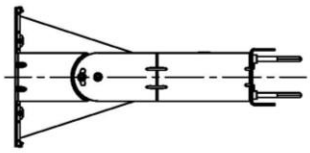
Bottom View (with U Bolt)



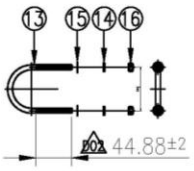
3D View – Pole mount (with U Bolt)



Font View



Side View



	Name	P/N	Material	Finish	QTY
1	Horn housing	000518B010000A	Stainless Steel	N/A	1
2	PIPE_BRACKET REAR BOX SETION	000518B040000A	Stainless Steel	N/A	1
3	PIPE_BRACKET SHEET METAL	000518B050000A	Stainless Steel	N/A	1
4	Horn mounting plate	000518B020000A	Stainless Steel	N/A	1
5	Mounting bracket arm	000518B030000A	Stainless Steel	N/A	2
6	Horn plastic front cover	000118B050000A	Nylon	Black	1
7	Foam Adhesive	001019C030000A	Sponge	Black	1
8	N-Type(F)	001819B220000A	Brass	Ni Plated	1
9	Pan head cross recess screw M3x5	000418C030000A	Stainless Steel	N/A	4
10	Socket head cap screw M6x10	000418C020000A	Stainless Steel	N/A	8
11	Hex flange nut gradea M6	000418C050000A	Stainless Steel	N/A	8
12	Countersunk flat head screw M3x8	000418L080000A	Stainless Steel	N/A	8
13	M6-U-Bolt	000419B040021A	Stainless Steel	Silver	2
14	M6-Spring Washers	000419B020021A	Stainless Steel	Silver	4
15	M6-Flat Washer	000419B000021A	Stainless Steel	Silver	4
16	M6-HEX NUT	000419B030021A	Stainless Steel	Silver	4

UNLESS OTHERWISE SPECFIED TOLERANCES ON: .X± 0.2, XX.± 0.5, .XX± 0.1, X.± 0.3, .XXX± 0.05

THIRD ANGLE PROJECTION

DATE: 2018/05/25 | UNIT: mm | MAT'L: | FINISH: | SCALE: 1/8

TAOGLAS. TW Design Centre

REV D03

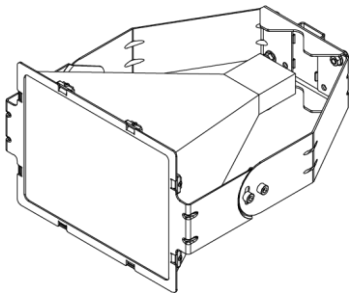
TITLE. : Horn Antenna 250*200*150mm for 3.7–7GHz With N-type female flange connector

PART NO. : PHA.01.A

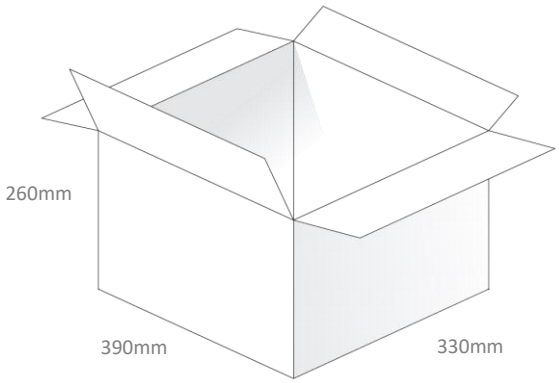
APPROVED BY:	CHECKED BY:	DRAWN BY:	CUSTOMERS SIGNATURE / DATE
Haley	Will	Rachel	

8. Packaging

1pc PHA.01.A
Weight - 2Kg



1pcs PHA.01.A per Carton
Dimensions - 390*260*330mm
Weight – 6Kg



Changelog for the datasheet

SPE-19-8-058 – PHA.01

Revision: B	
Date:	2019-05-28
Changes:	Packaging Details Updated
Changes Made by:	Jack Conroy

Previous Revisions

Revision: A (Original First Release)	
Date:	2019-05-03
Notes:	Initial Datasheet Release
Author:	Yu Kai Yeung