



MA111.C.LB.001

Specification

Part No.	MA111.C.LB.001
Product Name	Ultima MA.111 Ultima Series – 2in1 Super Low Profile Combination GPS/GLONASS and Penta Band Cellular Antenna Screw-mount (Permanent mount)
Feature	Height 19.6mm (0.77") Diameter 55mm (2.17") Heavy duty screw mount UV and vandal resistant ABS housing and thread IP67 compliance Standard is GPS/GLONASS - 3M RG174 SMA(M) Cellular – 3M CFD200 SMA(M) Customizable ROHS Compliant

1. Introduction

The MA.111 Ultima Series 2in1 GPS/GLONASS & Cellular Combination Antenna is an extremely low profile combination high performance GPS/GLONASS and penta-band cellular antenna solution for professional telematics applications.

At only 22 mm height it is the lowest profile antenna in the market, with a diameter of 55 mm.

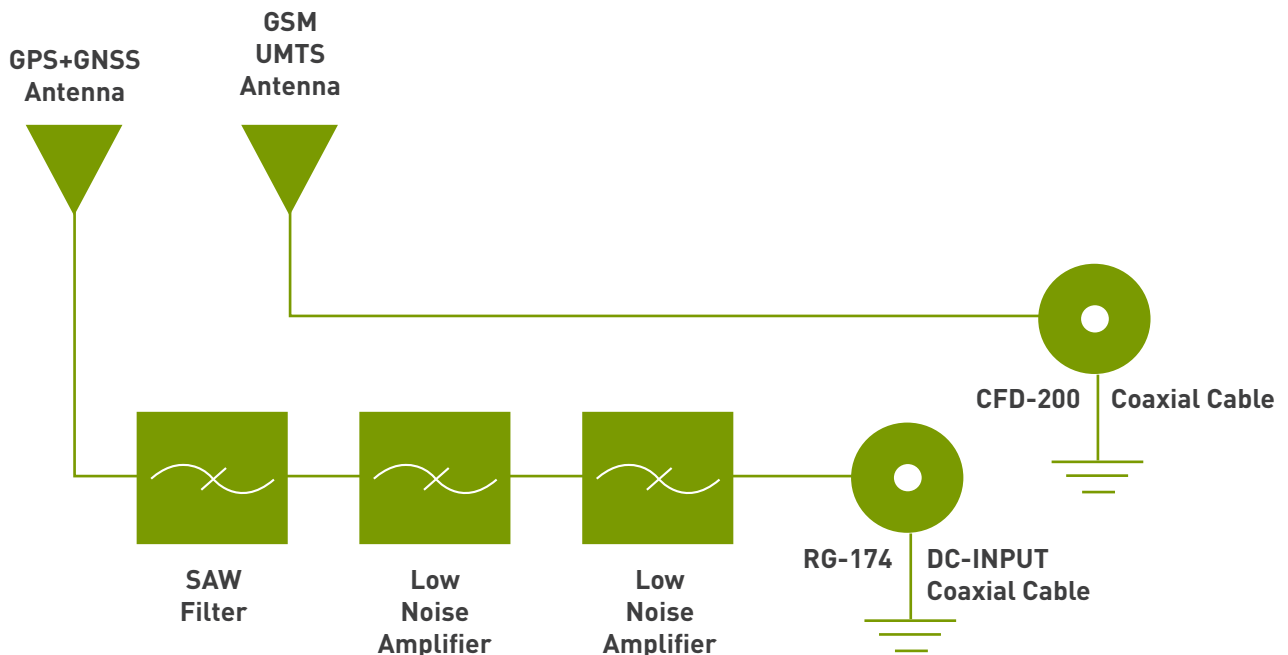
It is designed to be mounted and couple to the metal structures it attaches to radiate. Durable UV ABS housing, thread and nut is resistant to vandalism and direct attack.

The IP67 waterproof robust plastic body makes it extremely light, economical for shipping and minimum weight impact on vehicles. This also makes it ideal for use in humid environments such as water pits

or marine applications as there are no external metal parts to corrode. The closed cell foam with double-sided adhesive provides a permanent waterproof seal and can adjust to different curvatures, stopping water from leaking under the antenna into the mounting hole.

For applications that require mounting on non-metal structures we recommend the Hercules MA.105.

2. System Configuration



2. Specification

Cellular

Frequency (MHz)	824 ~ 896	880 ~ 960	1710 ~ 1880	1850 ~ 1990	1710 ~ 2170
Peak Gain (dBi)	>1.5	> 3.0	> 2.0	> 4.0	>2.5
Average Gain (dBi)	-0.39	-0.39	-0.39	-0.30	-0.45
Efficiency(%)	>40	>40	>40	>50	>35
SWR	< 2.5	< 2.0	< 3.5	< 3.0	< 3.0
Polarization	Linear				
Radiation Pattern	Omni				
Input Power	50Ω				

Electrical GPS/GLONASS

Frequency	1574~1606MHz
Impedance	50Ω
GPS Patch Gain @ Zenith	-1.4dB Passive Gain @ Zenith
GLONASS Patch Gain @ Zenith	-1.3dBi Gain @ Zenith
VSWR	2.0 max
Axial ratio	3.0dB max
Polarization	RHCP
Out Band Rejection	fo = 1575.42MHz, fo ± 30 MHz 5dB Min., fo ± 50 MHz 20dB Min., fo ± 100 MHz 25dB Min.
Input Voltage(V)	Typ. 2.5~5.5V
Total Gain @ Zenith	27dB typical at 3.0V
Current consumption(mA)	10mA typical at 3.0V
Noise figure	1.3dB typical

Mechanical

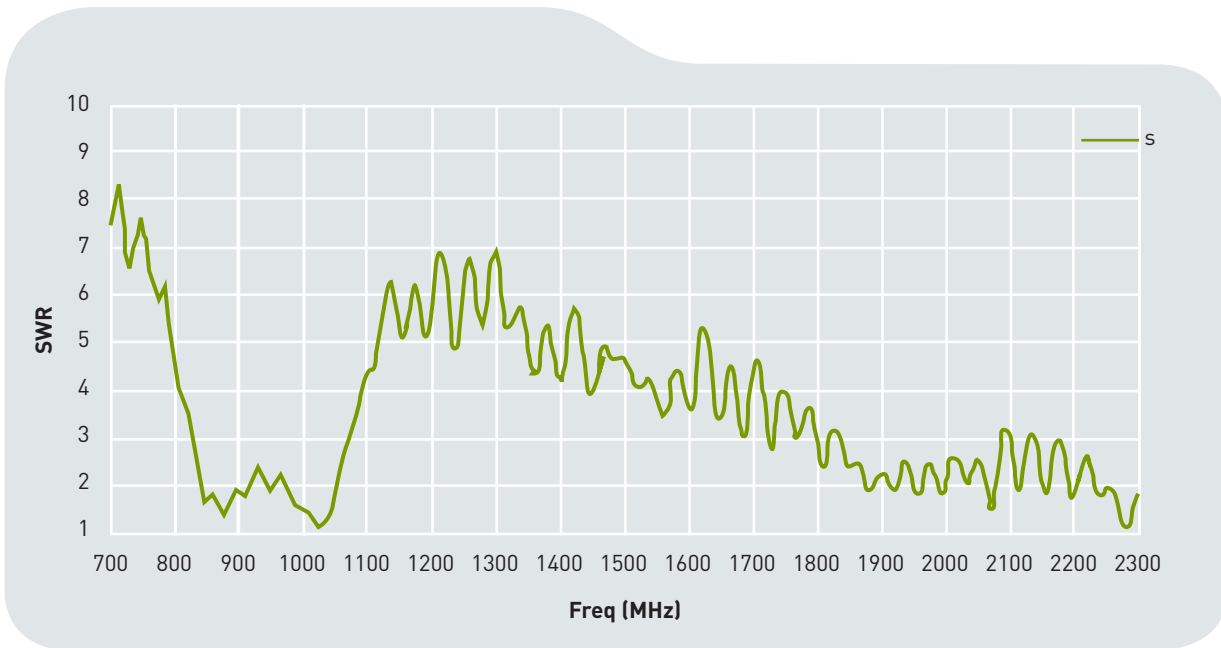
Dimensions	Ø 55±2mm , Height 30±2 mm
Cable type	Cellular : CFD200, GPS/GLONASS : RG174
Cable length	3000±30mm
Casing	ABS
Connector	SMA Male

Environmental

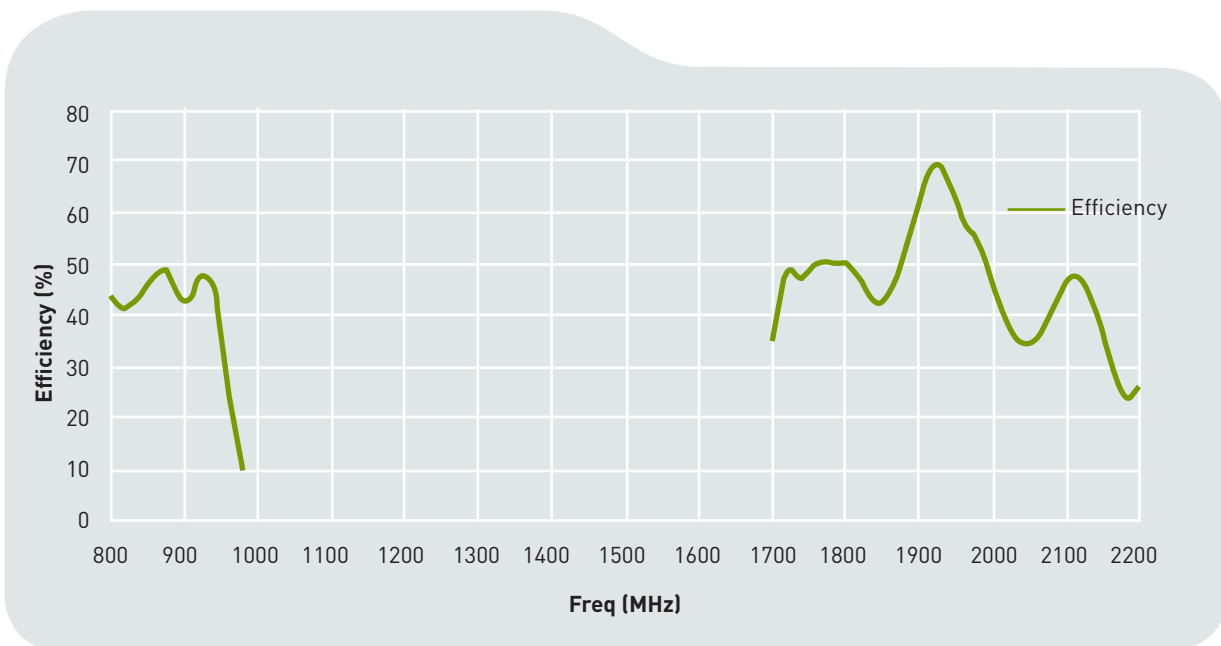
Temperature Range	-40°C to 85°C
Waterproof	IP-67
Thermal Shock	100 cycles -40°C to +80°C
Shock (drop test)	1m drop on concrete 6 axes
Humidity	Non-condensing 65°C 95% RH

4. Antenna Characteristics Cellular

4.1 Cellular antenna Return loss (with 300x300mm Ground plane)

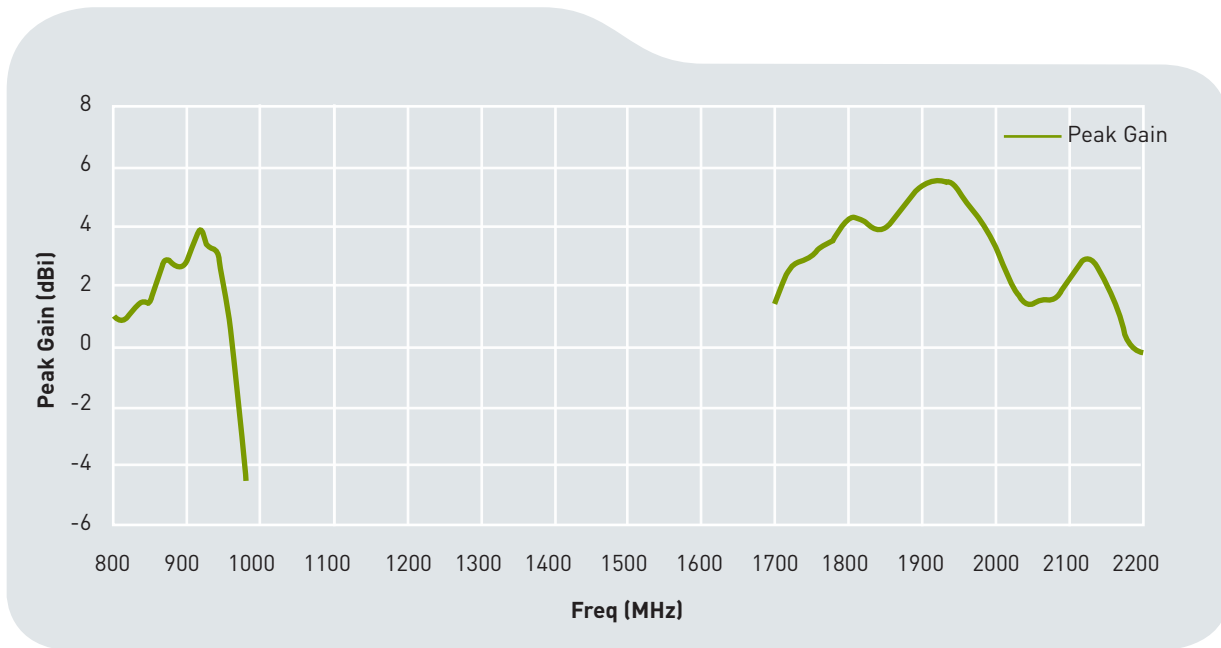


4.2 Antenna Efficiency (with 300x300mm Ground plane)



4. Antenna Characteristics Cellular

4.3 Peak Gain (with 300x300mm Ground plane)



5. Antenna Characteristics GPS/GLONASS

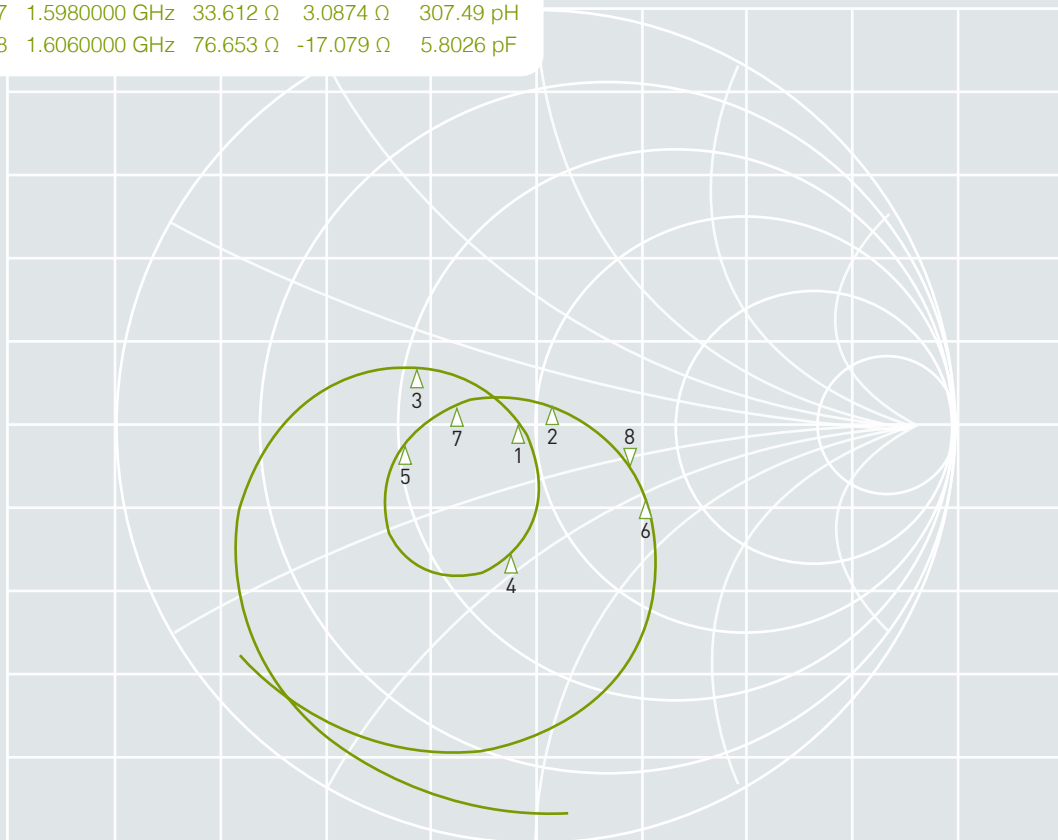
5.1 Return loss



5.2 Smith Chart - Impedance

Tr1 S22 Smith (R+j)(Ω) Scale 1.000U [F1]

1	1.5754200 GHz	46.108 Ω	273.62 m Ω	27.642 pH
2	1.6020000 GHz	53.552 Ω	5.0781 Ω	504.50 pH
3	1.5706687 GHz	26.929 Ω	8.1344 Ω	824.25 pH
4	1.5816559 GHz	36.911 Ω	-25.474 Ω	3.9502 pF
5	1.5950873 GHz	26.081 Ω	-2.7317 Ω	36.526 pF
6	1.6073702 GHz	78.017 Ω	-30.802 Ω	3.2146 pF
7	1.5980000 GHz	33.612 Ω	3.0874 Ω	307.49 pH
>8	1.6060000 GHz	76.653 Ω	-17.079 Ω	5.8026 pF

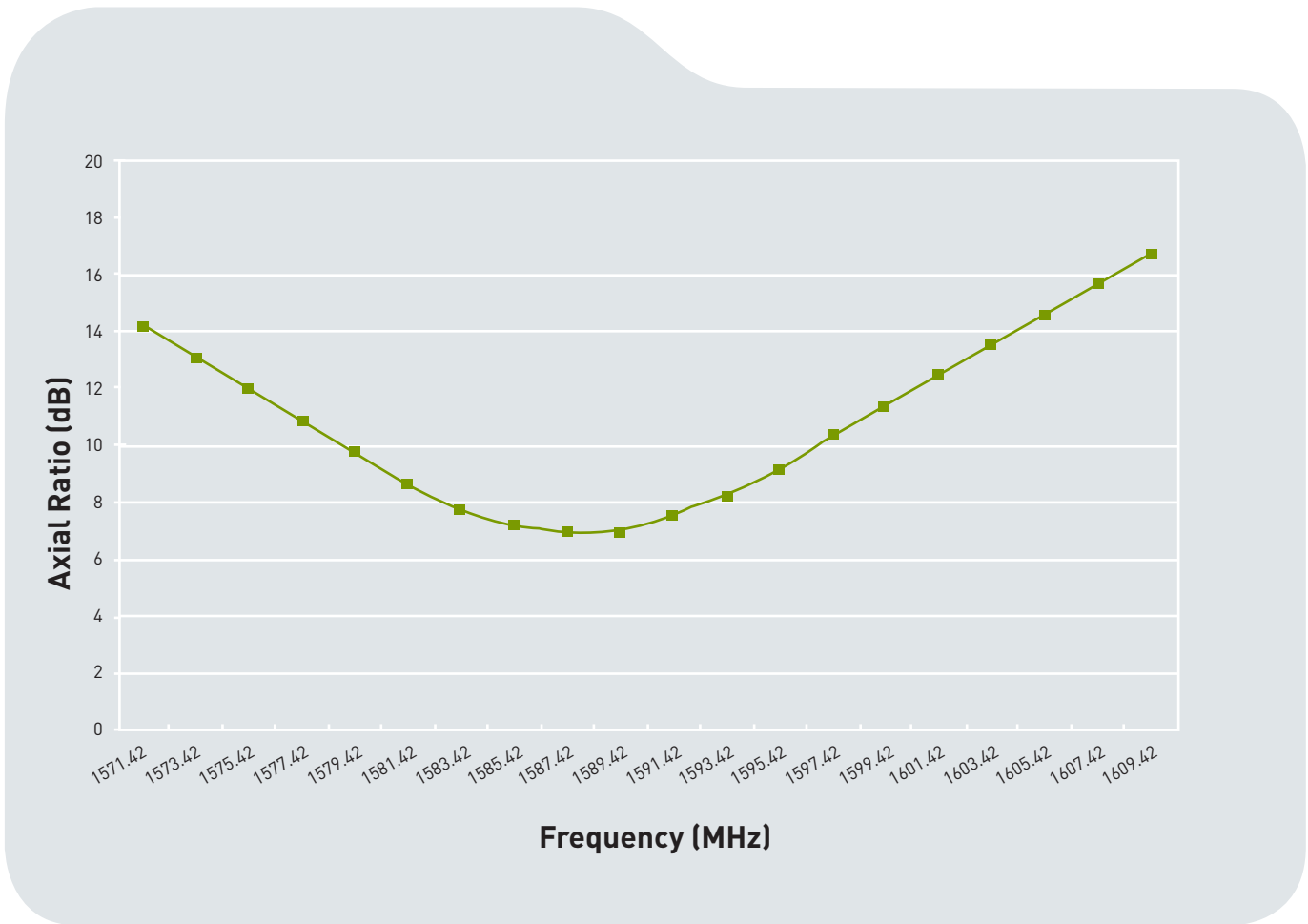


2 Center 1.57542 GHz

IFBW 70 kHz

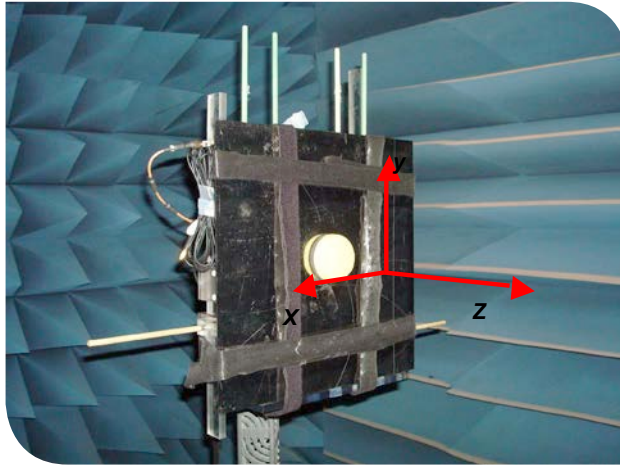
Span 200 MHz C?

5.3 Axial Ratio (AR)



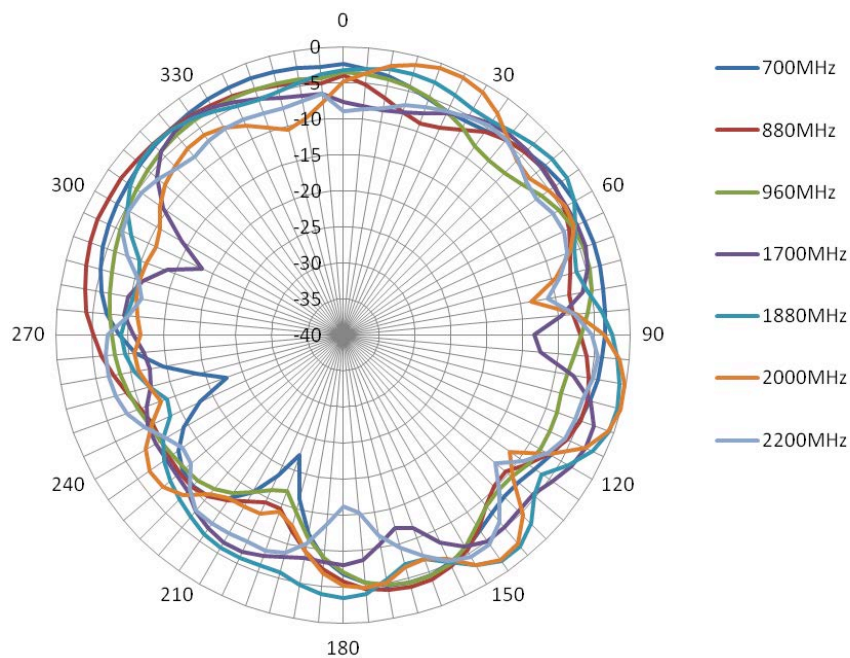
6. Antenna Radiation Pattern-Cellular

6.1 Antenna Setup (cellular)

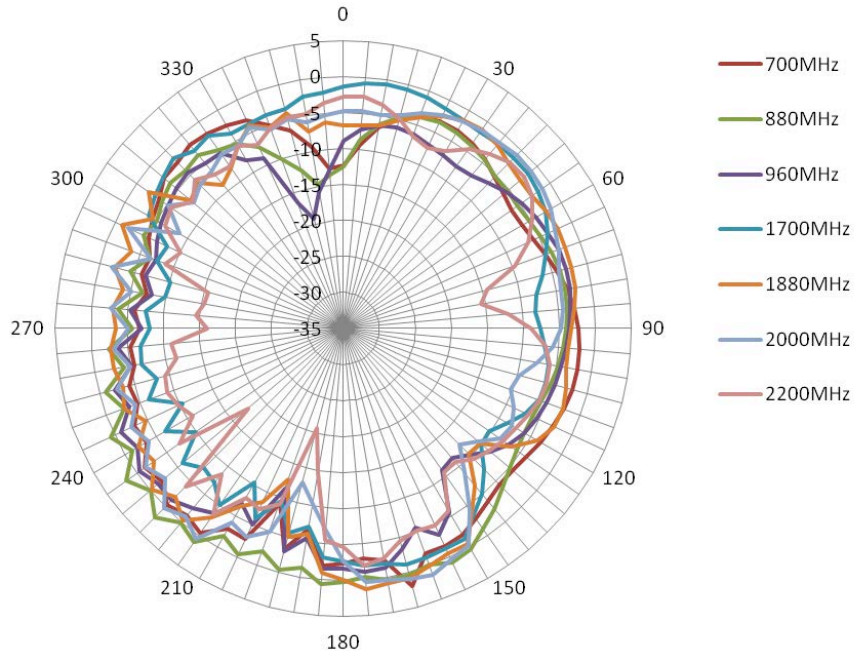


6.2 Radiation Pattern

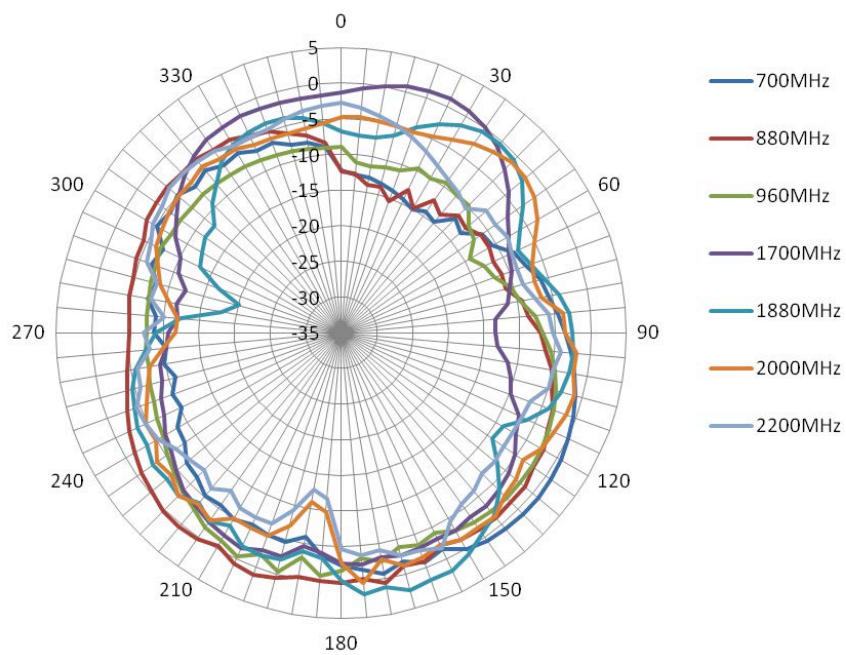
6.2.1 X-Y plane (dBi)



6.2.2 X-Z plane (dBi)



6.2.3 Y-Z plane (dBi)

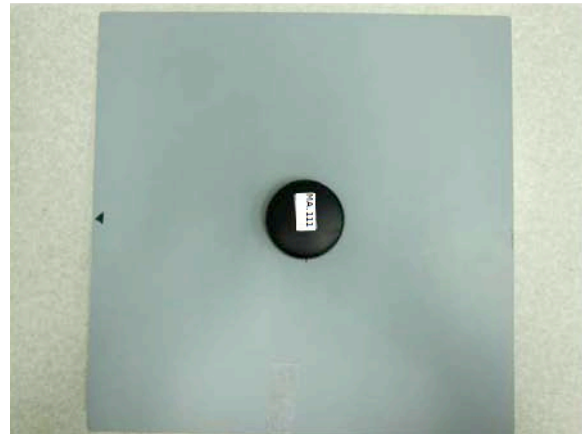


7. Antenna Radiation Pattern – GPS/GLONASS

H-Plane

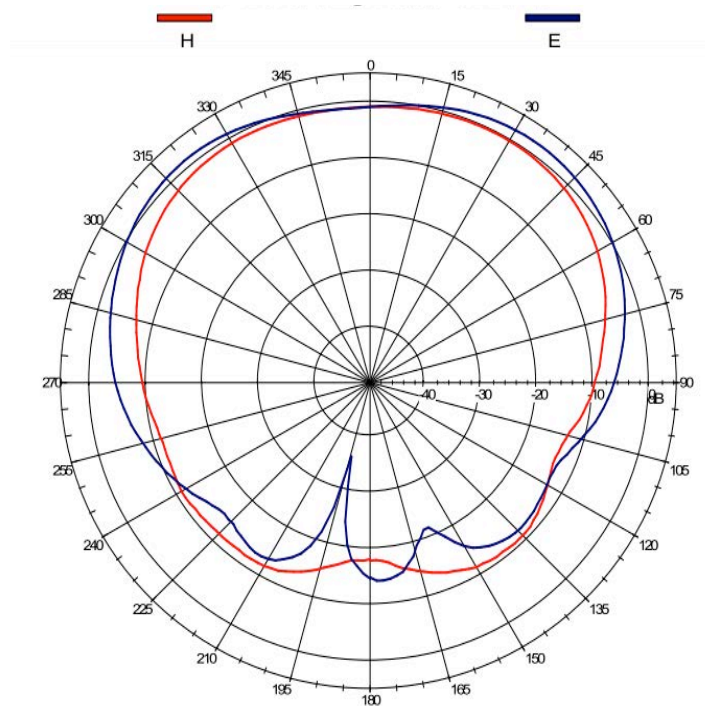


E-Plane



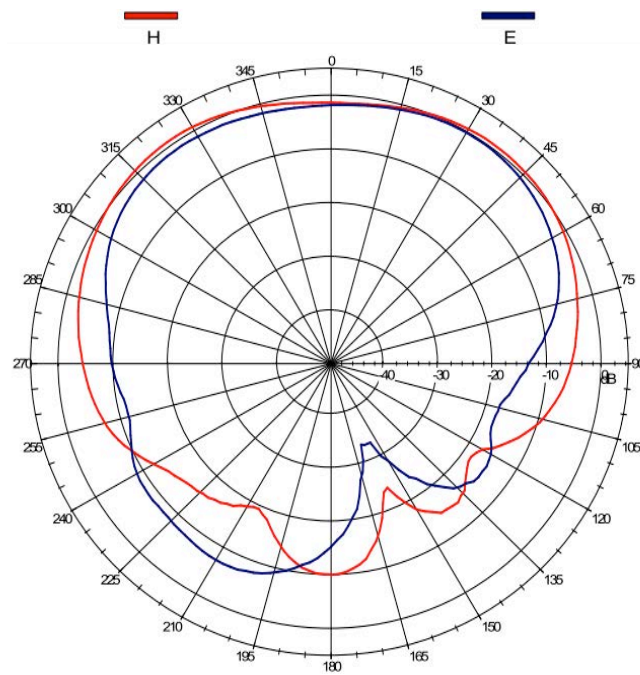
7.1 1575.42MHz

Far-field amplitude of H.nsi



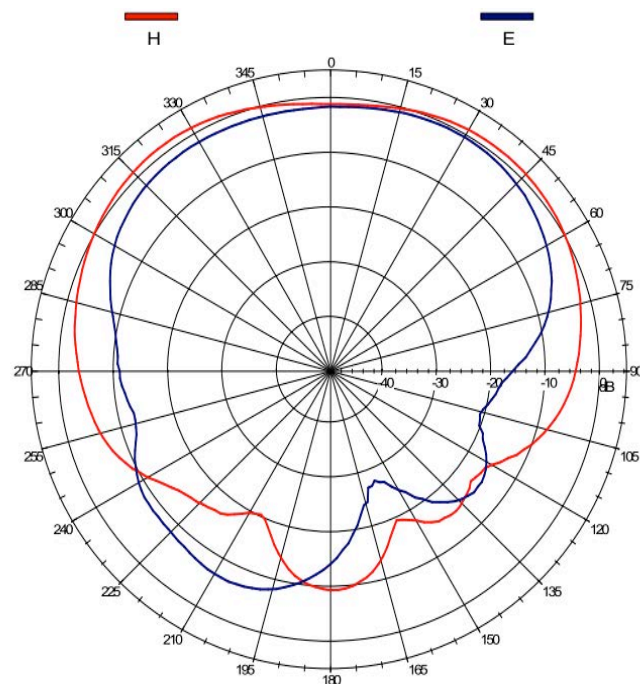
7.2 1598MHz

Far-field amplitude of H.nsi



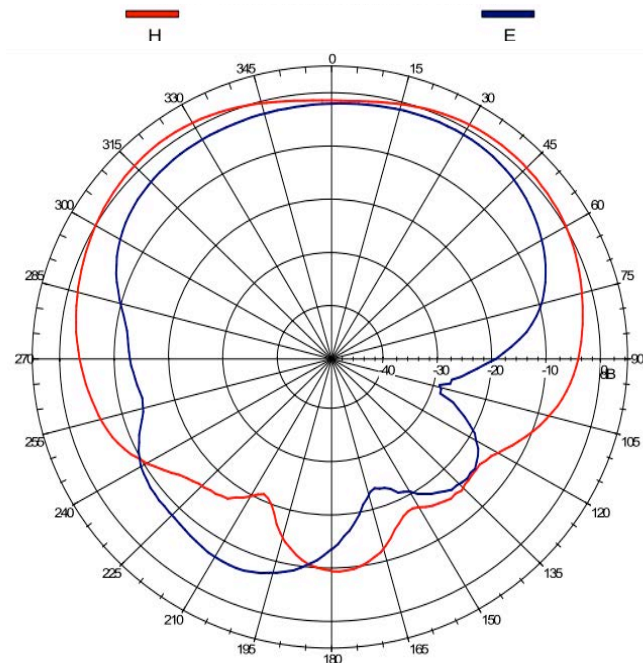
7.3 1602MHz

Far-field amplitude of H.nsi

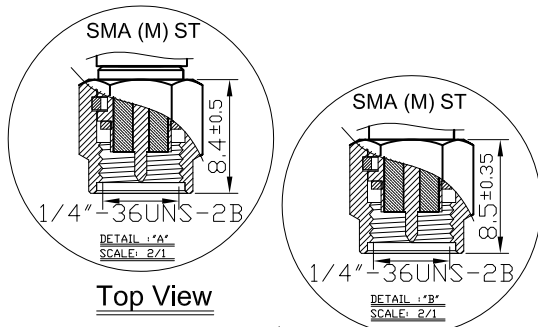


7.4 1606MHz

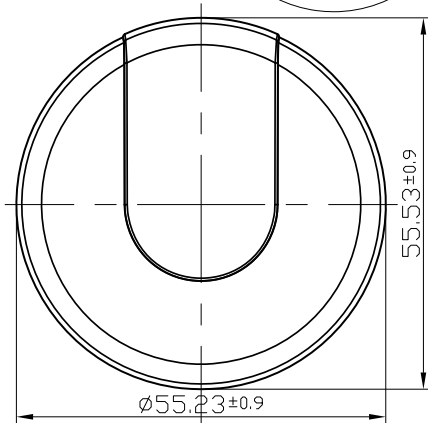
Far-field amplitude of H.nsi



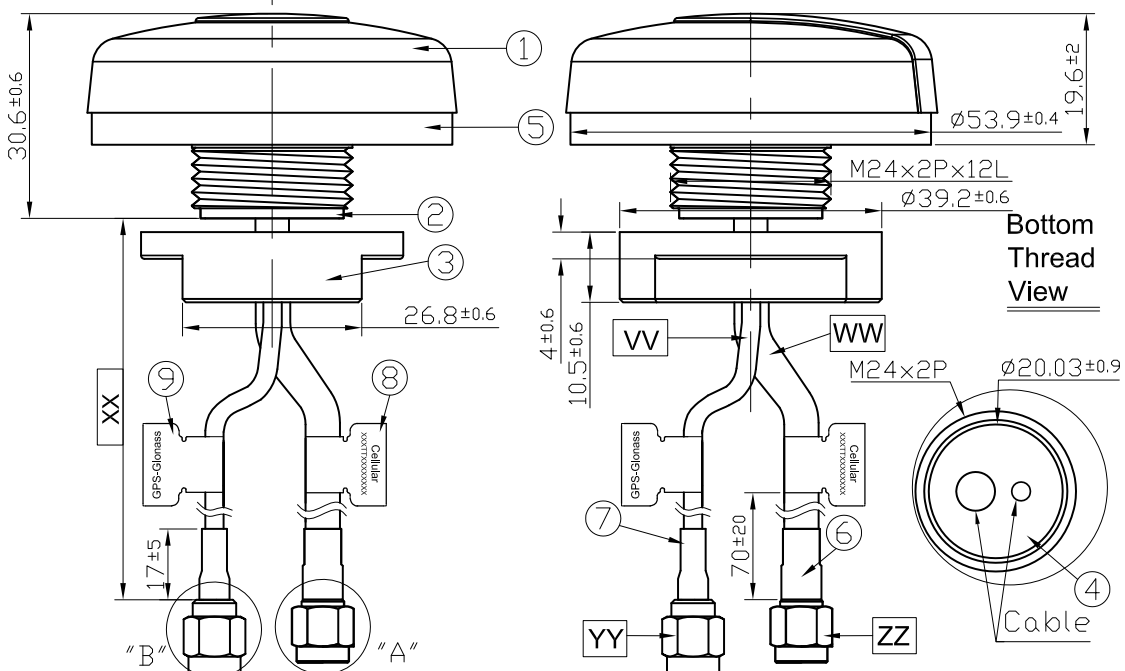
8. Drawing



Top View



Front View



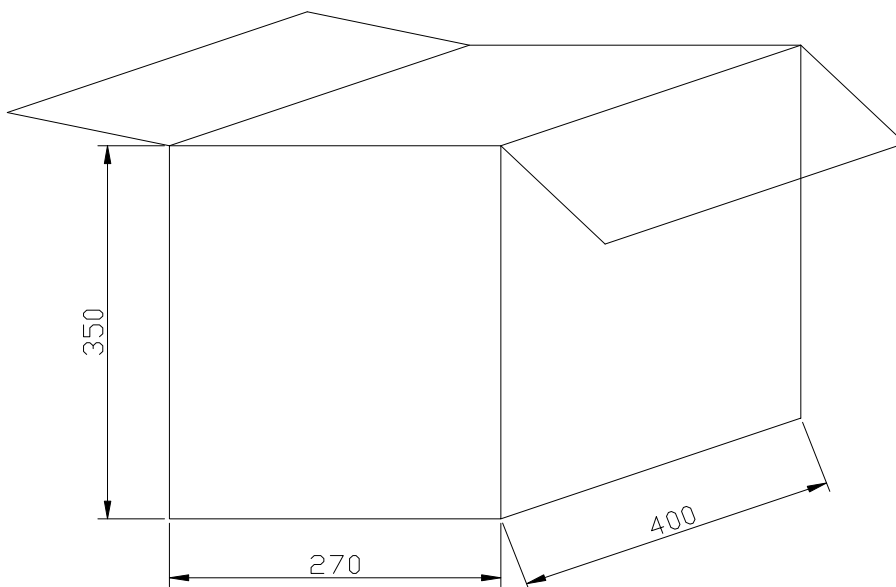
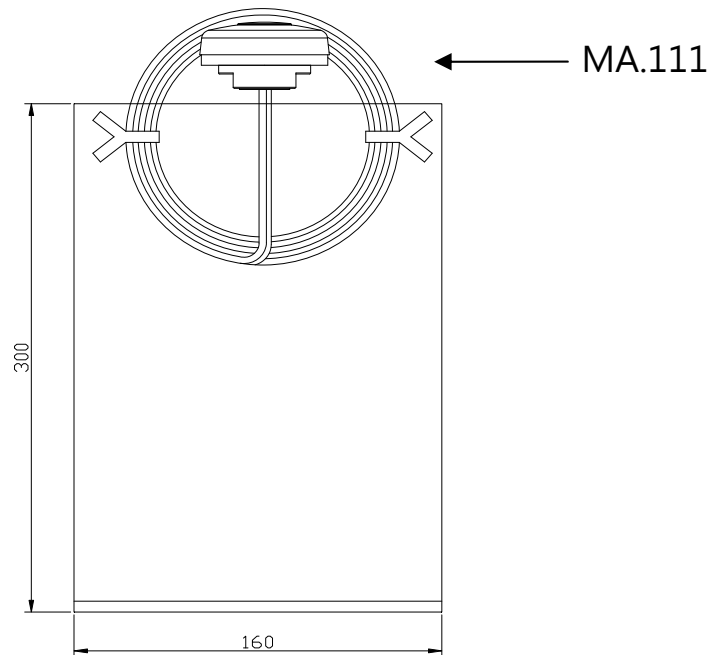
Bottom Thread View

	Name	P/N	Material	Finish	QTY
1	Housing Top	000112A000020A	ABS	Black	1
2	Housing bottom	000112A010020A	ABS	Black	1
3	M20 Nut	000112A020020A	ABS	Black	1
4	Silicon Rubber	000712A000020A	Silicon Rubber	Black	1
5	Foam	001012A000001A	CR4305+3M9448	Black	1
6	Heat Shrink Tube	001311F0100XXA	PE	Black	1
7	Heat Shrink Tube	001311F0100XXA	PE	Black	1
8	Cellular Label	001011F0200XXA	Coated Paper	Blue	1
9	GPS/GLONASS Label	001011F0000XXA	Coated Paper	Orange	1

	Name	P/N	Spec	Finish	QTY
VV	Cable Type	301311L000013A	RG 174	Black	1
WW	Cable Type	301311L000013A	CFD 200	Black	1
XX	Cable Length		3000±60mm		
YY	Connector Type	SMA.M.ST.PLUG.AHCEDK.J	SMA(M)ST	Gold	1
ZZ	Connector Type	SMA.M.ST.PLUG.G.J	SMA(M)ST	Gold	1

9. Packaging

1 pcs antenna per small PC bag
40 small PE bags per box



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