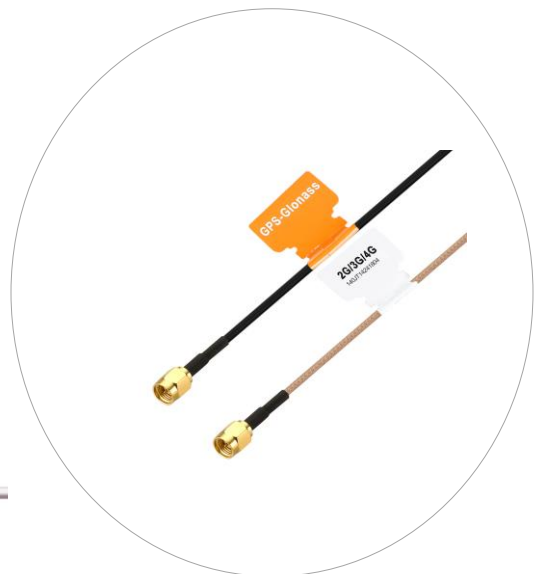


## SPECIFICATION

- Part No. : **MA140.A.LB.001**
- Product Name : Olympian 2in1 LTE 4G/3G/2G and GPS/GLONASS/GALILEO
- LTE 698-960/1710-2700MHz  
1M RG-316 SMA(M)
  - GPS/GALILEO 1575MHz-Glonass  
1602MHz  
1M RG-RG-174 SMA(M)
- Features : 48mm Height/50mm Diameter  
Heavy duty screw mount  
UV and vandal resistant ABS housing and thread.  
IP-67 Waterproof  
Cables and Connectors Customizable  
**RoHS Compliant**



## 1. Introduction

The Olympian MA140 is a high performance combination LTE and GPS/GLONASS/GALILEO screw mount antenna in a compact housing, for external use on vehicles and outdoor assets worldwide. The LTE antenna functions equally well on 2G and 3G. The GPS/GLONASS/GALILEO antenna has stable gain and radiation patterns on both bands.

The antenna can be mounted on metal and plastic structures. Customized cable length and connectors are available.

Durable UV resistant IP67 ABS housing is resistant to vandalism and direct attack. A rubber O-ring is provided under the antenna to prevent water entering under the antenna. If the lower frequency bands are required the antenna functions best when mounted on a metal ground-plane, but can still work well with short cable lengths below 1 meters on plastic structures and is locked from the inside of the structure by a nut. The thread is extra small, allowing for installation in the tightest of environments.

Customized cable length and connectors are available. Taoglas recommends minimum of 1m cable length for stable antenna performance. When mounted on a ground-plane, the antenna can function well at all frequencies up to 3 meters cable length. Generally, antenna efficiency of less than 20% at the connector would lead to unreliable wireless system performance.

For better efficiency, especially on longer cable lengths up to 5 meters, a short 300mm cable can be used as standard, and then add a low loss 5 meter CFD200 extension cable SMA(F) to SMA(M) [CAB.0149].

If your device requires certification for PTCRB or US/Canadian network operators please contact Taoglas USA to check is this antenna suitable.

## 2. Specification

### 2.1 LTE Antenna

ELECTRICAL			
Measurement Environment	In free space		
Standard	4G / 3G / 2G		
Operation Frequency(MHz)	698~960	1710~2170	2500~2800
<b>Peak Gain (dBi)</b>			
30cm Cable Length	2.74	4.39	3.49
1M Cable Length	1.58	2.70	1.11
2M Cable Length	1.79	2.06	1.44
3M Cable Length	1.04	-0.42	-0.97
5M Cable Length	0.59	-1.98	-4.40
<b>Efficiency (%)</b>			
30cm Cable Length	44.39	61.48	52.47
1M Cable Length	30.70	47.06	35.83
2M Cable Length	28.61	36.48	26.16
3M Cable Length	22.44	22.25	19.34
5M Cable Length	22.02	15.21	8.77
<b>Average Gain (dBi)</b>			
30cm Cable Length	-3.57	-2.12	-2.83
1M Cable Length	-6.07	-3.32	-4.47
2M Cable Length	-5.90	-4.40	-5.83
3M Cable Length	-6.79	-6.55	-7.16
5M Cable Length	-7.16	-8.21	-10.58

Measurement Environment	On 30x30 metal ground				
Standard	4G / 3G / 2G				
Operation Frequency(MHz)	698~960	1710~2170	2305~2360	2500~2800	3400~3600
<b>Peak Gain (dBi)</b>					
30cm Cable Length	3.84	3.76		1.42	
1M Cable Length	4.92	2.40		-0.10	
2M Cable Length	4.69	2.05		-0.49	
3M Cable Length	0.34	-0.55		-2.57	
5M Cable Length	1.37	-2.59		-5.67	
<b>Efficiency (%)</b>					
30cm Cable Length	45.11	60.43		41.00	
1M Cable Length	50.13	51.74		32.31	
2M Cable Length	47.54	36.99		21.57	
3M Cable Length	29.03	26.41		15.28	
5M Cable Length	25.50	15.68		7.88	
<b>Average Gain (dBi)</b>					
30cm Cable Length	-3.50	-2.21		-3.89	
1M Cable Length	-3.03	-2.89		-4.92	
2M Cable Length	-3.31	-4.34		-6.68	
3M Cable Length	-5.46	-5.81		-8.16	
5M Cable Length	-5.98	-8.07		-11.04	
VSWR	< 3				
Impedance	< 50ohm				
Polarization	Linear				
Radiation Pattern	Omni-directional				
Max Input Power	5 W				

LTE BANDS			
Band Number	LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA		
	Uplink	Downlink	Covered
1	UL: 1920 to 1980	DL: 2110 to 2170	✓
2	UL: 1850 to 1910	DL: 1930 to 1990	✓
3	UL: 1710 to 1785	DL: 1805 to 1880	✓
4	UL: 1710 to 1755	DL: 2110 to 2155	✓
5	UL: 824 to 849	DL: 869 to 894	✓
7	UL: 2500 to 2570	DL: 2620 to 2690	✓
8	UL: 880 to 915	DL: 925 to 960	✓
9	UL: 1749.9 to 1784.9	DL: 1844.9 to 1879.9	✓
11	UL: 1427.9 to 1447.9	DL: 1475.9 to 1495.9	✗
12	UL: 699 to 716	DL: 729 to 746	✓
13	UL: 777 to 787	DL: 746 to 756	✓
14	UL: 788 to 798	DL: 758 to 768	✓
17	UL: 704 to 716	DL: 734 to 746 (LTE only)	✓
18	UL: 815 to 830	DL: 860 to 875 (LTE only)	✓
19	UL: 830 to 845	DL: 875 to 890	✓
20	UL: 832 to 862	DL: 791 to 821	✓
21	UL: 1447.9 to 1462.9	DL: 1495.9 to 1510.9	✗
22	UL: 3410 to 3490	DL: 3510 to 3590	✗
23	UL: 2000 to 2020	DL: 2180 to 2200 (LTE only)	✓
24	UL: 1625.5 to 1660.5	DL: 1525 to 1559 (LTE only)	✓
25	UL: 1850 to 1915	DL: 1930 to 1995	✓
26	UL: 814 to 849	DL: 859 to 894	✓
27	UL: 807 to 824	DL: 852 to 869 (LTE only)	✓
28	UL: 703 to 748	DL: 758 to 803 (LTE only)	✓
29	UL: -	DL: 717 to 728 (LTE only)	✓
30	UL: 2305 to 2315	DL: 2350 to 2360 (LTE only)	✓
31	UL: 452.5 to 457.5	DL: 462.5 to 467.5 (LTE only)	✗
32	UL: -	DL: 1452 - 1496	✗
35		1850 to 1910	✓
38		2570 to 2620	✓
39		1880 to 1920	✓
40		2300 to 2400	✓
41		2496 to 2690	✓
42		3400 to 3600	✗
43		3600 to 3800	✗

\*Covered bands represent an efficiency greater than 20%

## 2.2 GPS/GLONASS/GALILEO Antenna

GPS-GLONASS-GALILEO	
Center Frequency	GPS/GALILEO:1575.42 MHz GLONASS:1602 MHz
Gain	2dBic ( Zenith )
VSWR	< 1.5
Impedance	50Ω
Polarization	RHCP
Cable	1M RG174 standard, fully customizable
Connector	SMA(M) standard, fully customizable

LNA Electrical Properties	
Center Frequency	GPS/GALILEO:1575.42 MHz GLONASS:1602 MHz
Impedance	50 Ω
VSWR	< 2.0
Ex-band Attenuation	35dB@CF±50MHz/50dB@CF±100MHz
Gain	24±2dB @ DC 3V
DC Power Input	2.2~5V DC
Noise Figure	< 1.5
Power Consumption	5~15mA

**MECHANICAL**

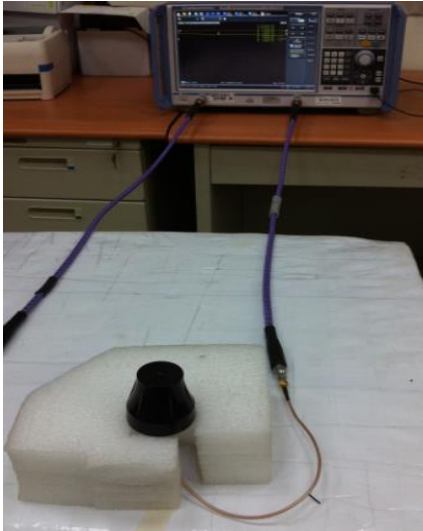
Dimensions (mm)	Height=48mm and Diameter=50mm
Cable	GPS/GLONASS/GALILEO:RG174/1M GSM:RG316/1M
Connector	SMA(M)
Casing	UV Resistant ABS
Mounted Method	Screw
Rec Mounting Torque	2.94N·m
Max Mounting Torque	3.92N·m
Base and Thread	Nickel plated Copper
Nut	Nut M12
Sealant	Rubber Stopper
Weight	160g

**ENVIRONMENTAL**

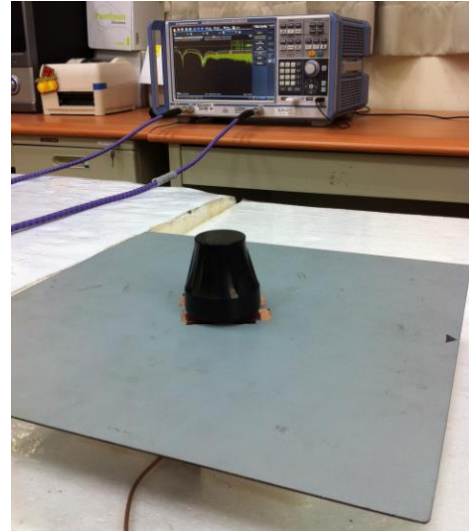
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Humidity	Up to 95%
Ingress Protection	IP67 (exclude cable outlet)
Vibration	10 to 55Hz with 1.5mm amplitude 2hours
Environmentally Friendly	ROHS Compliant
Cable Pull	8Kgf( * 1 meters)

### 3. Antenna Characteristics

#### 3.1 Test setup



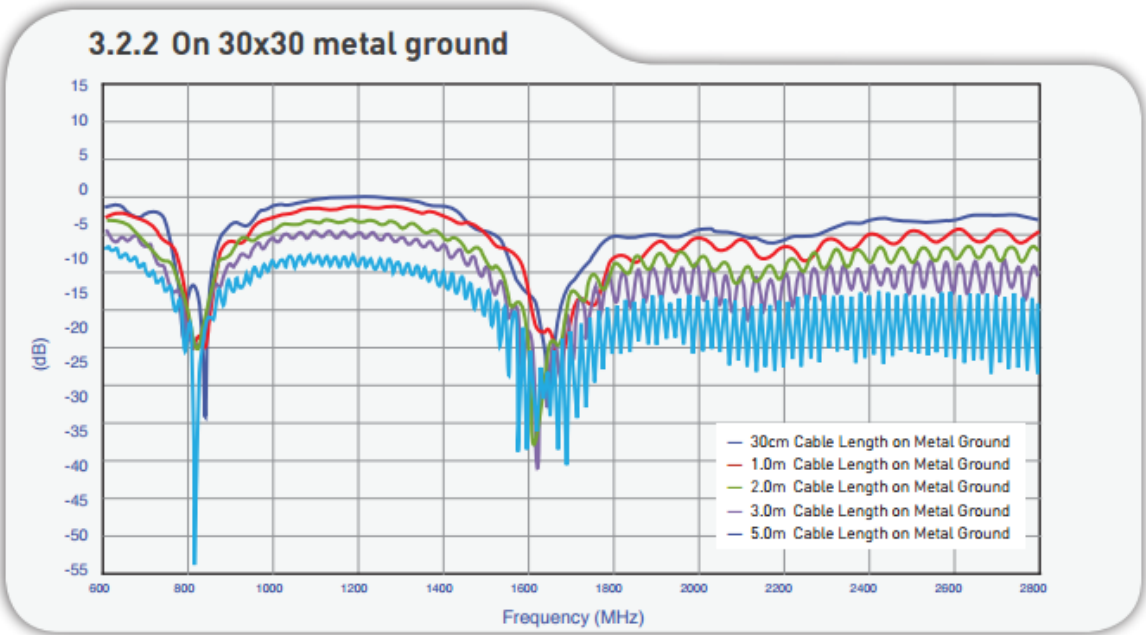
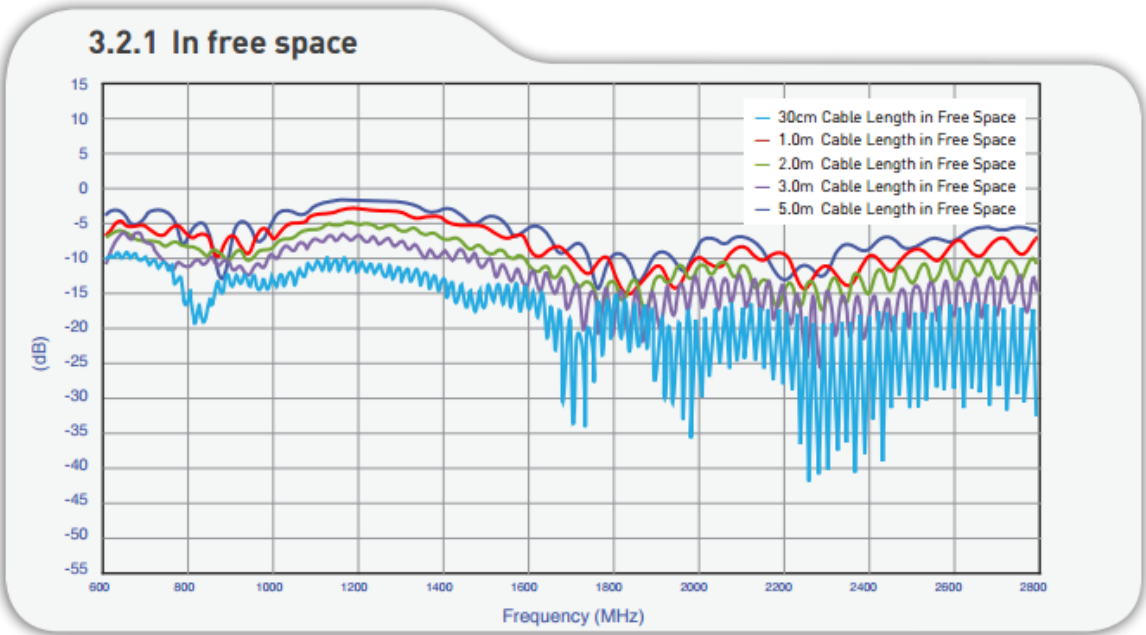
In free space



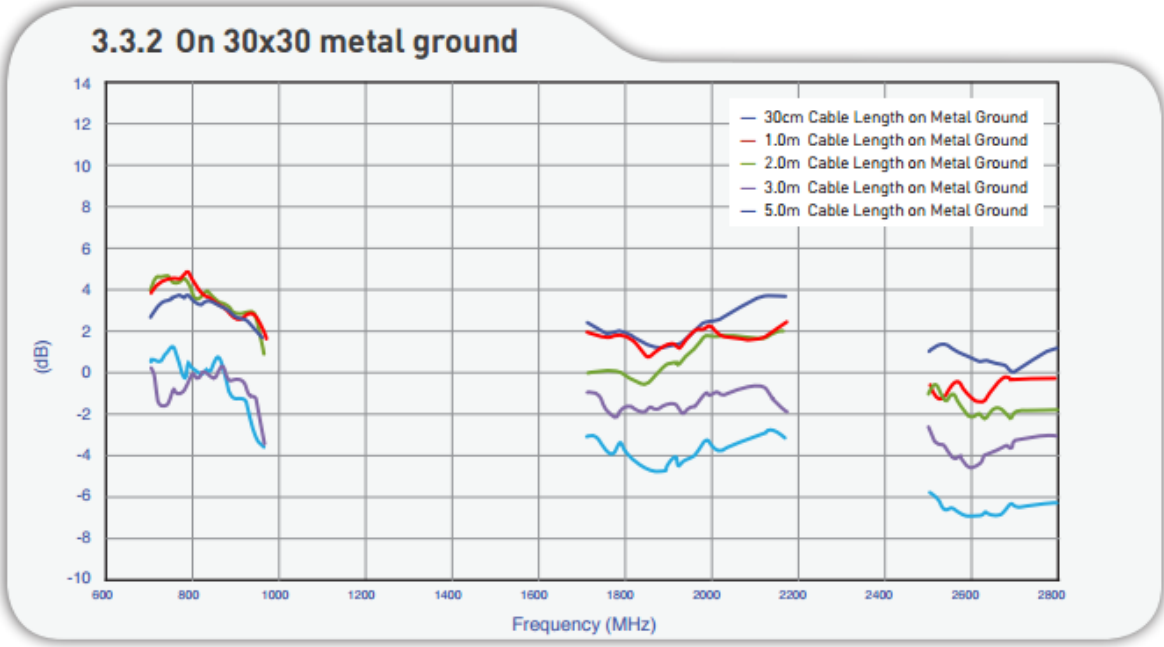
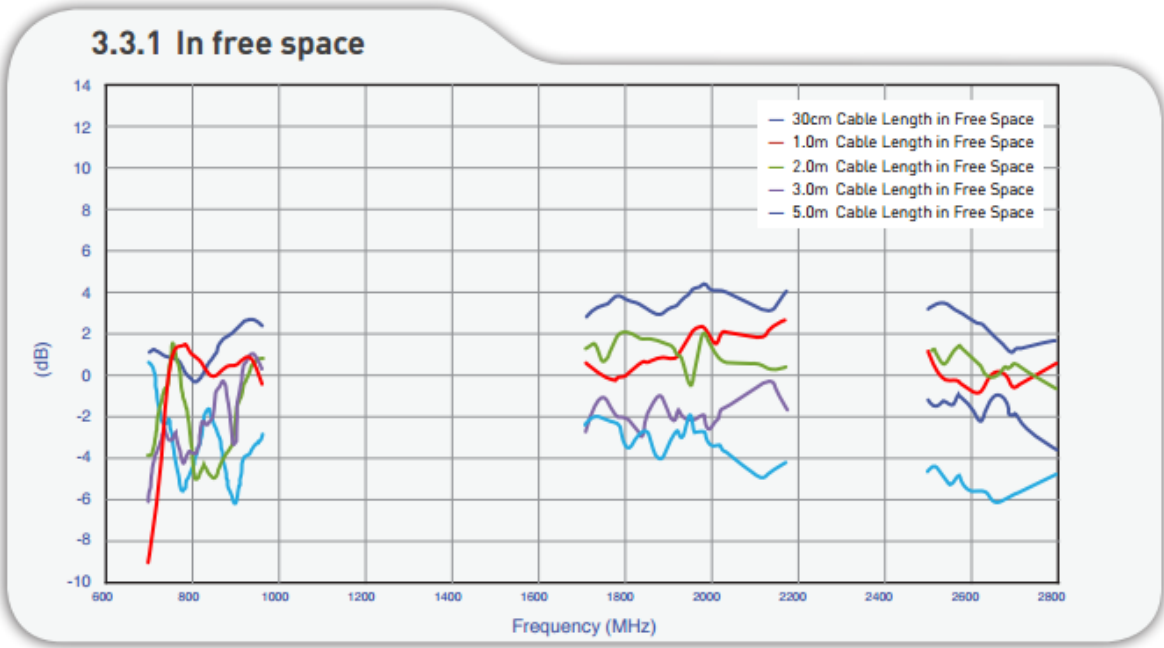
On 30x30 metal ground



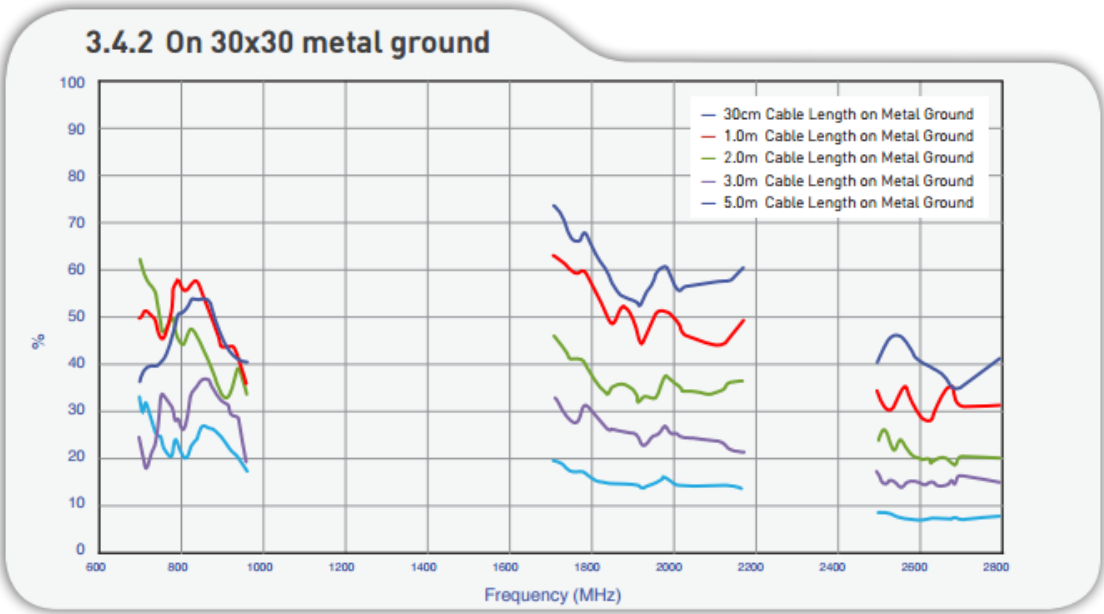
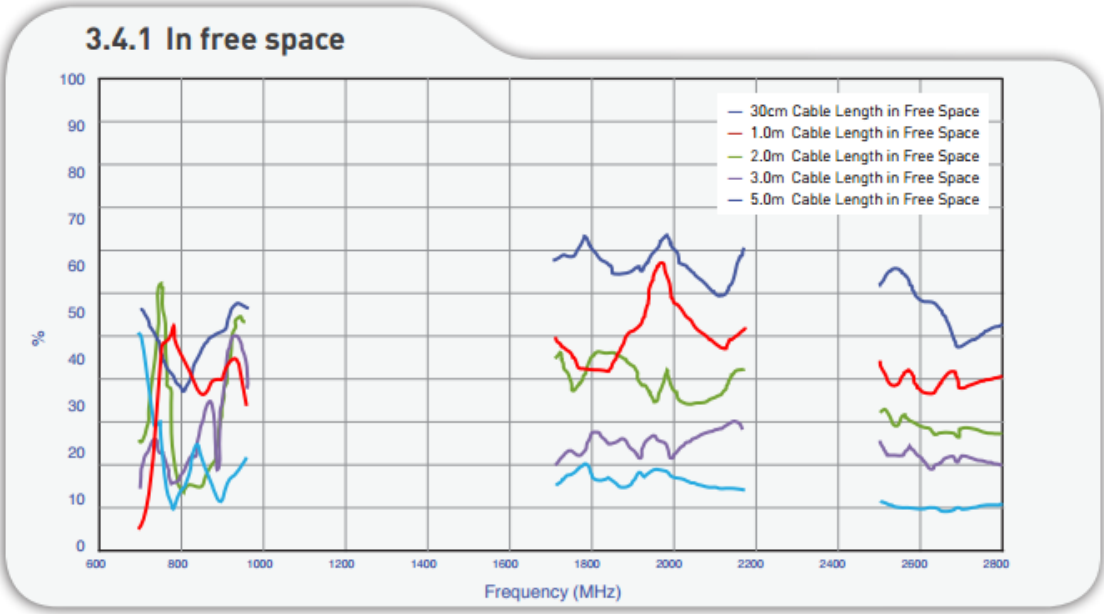
**3.2 Return Loss**



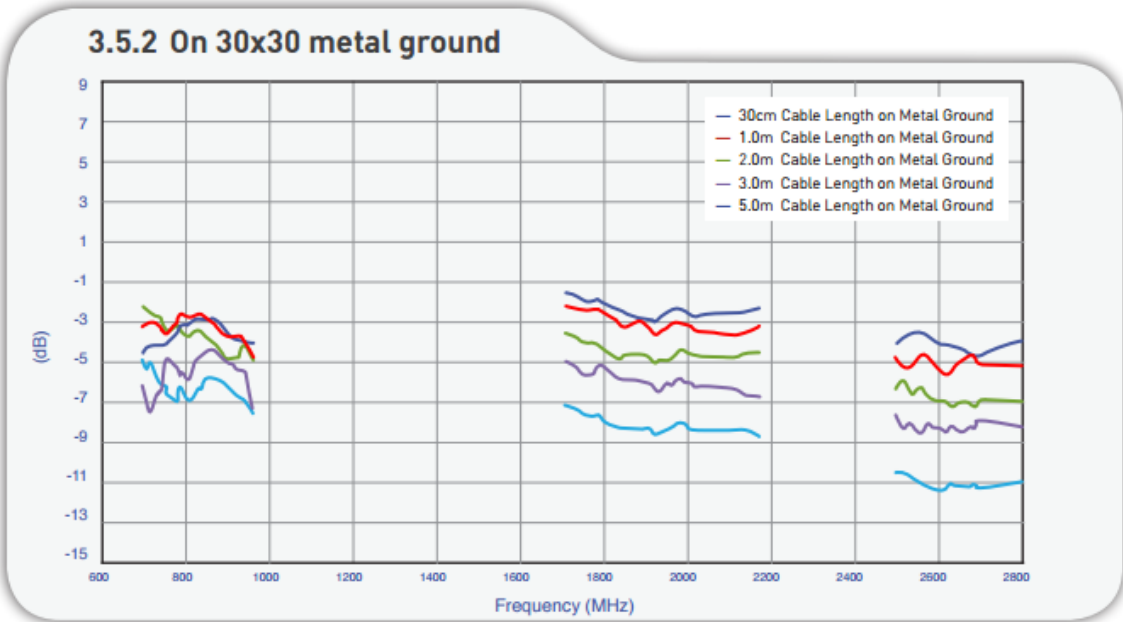
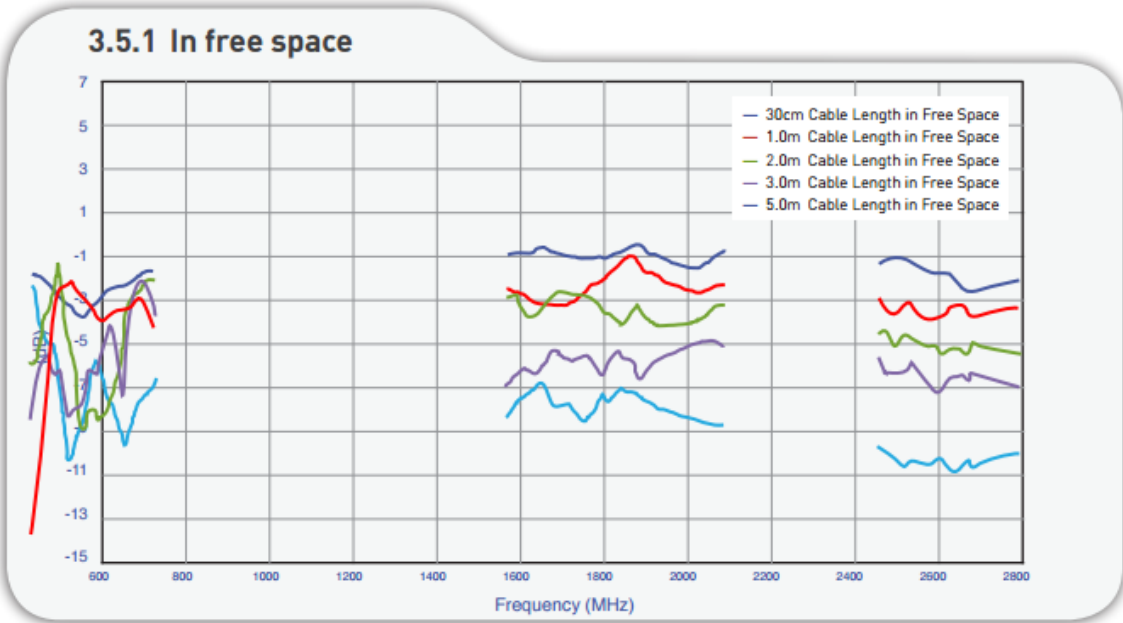
### 3.3 Peak Gain



### 3.4 Efficiency (%)



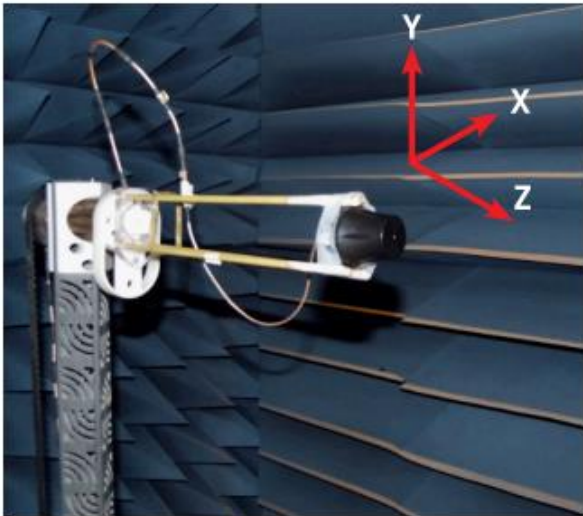
### 3.5 Average Gain



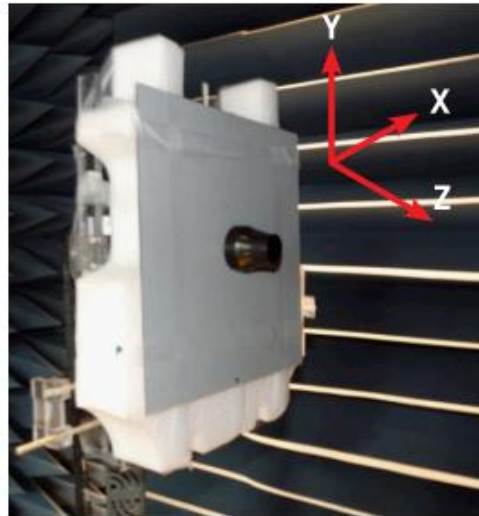
## 4. Antenna Radiation Patterns

### 4.1 Antenna setup

The antenna radiation pattern measurement setup is shown below.



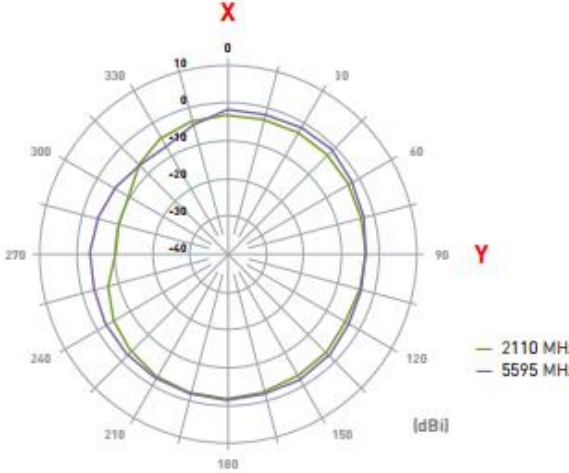
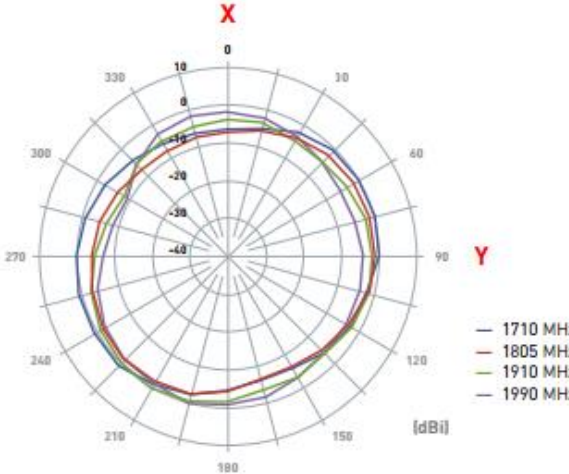
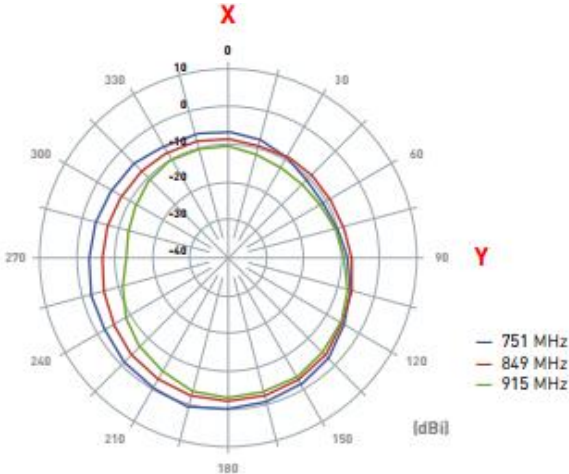
In free space



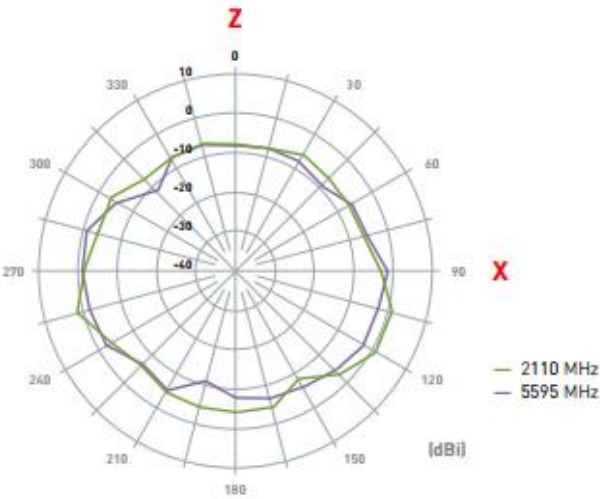
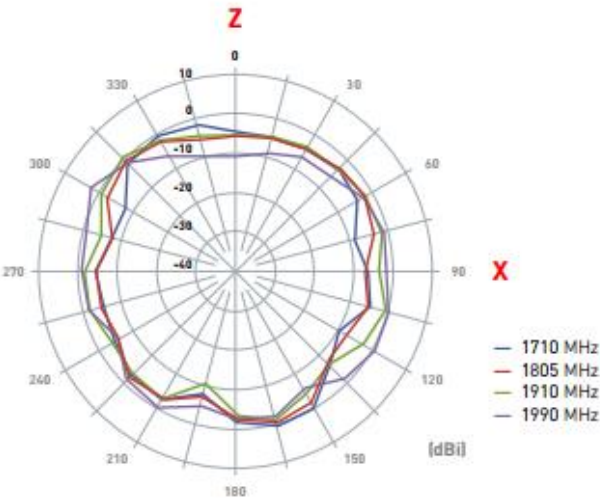
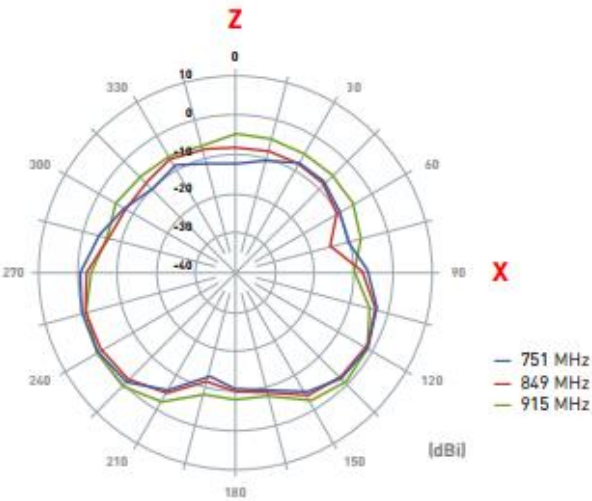
On 30x30 metal ground

**4.2 In free space**

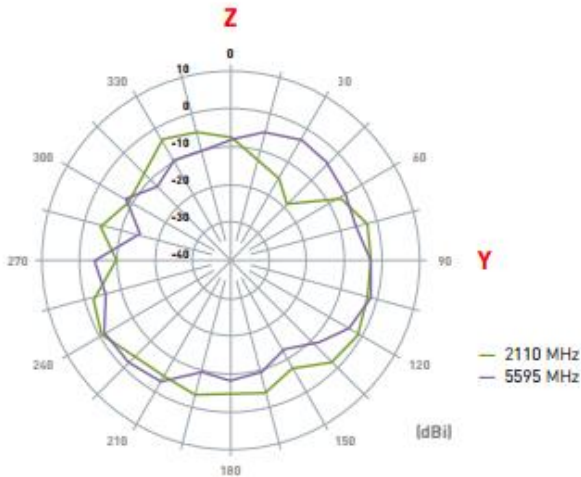
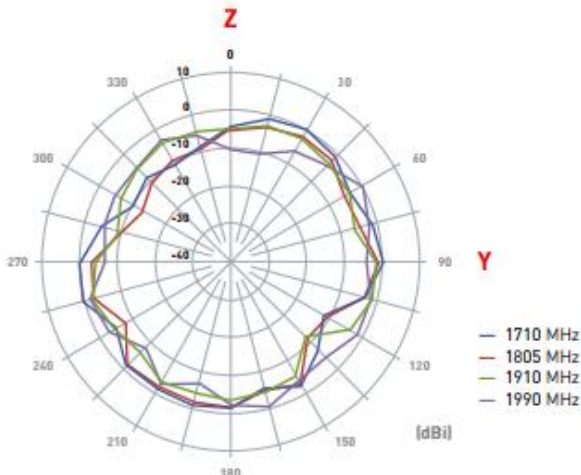
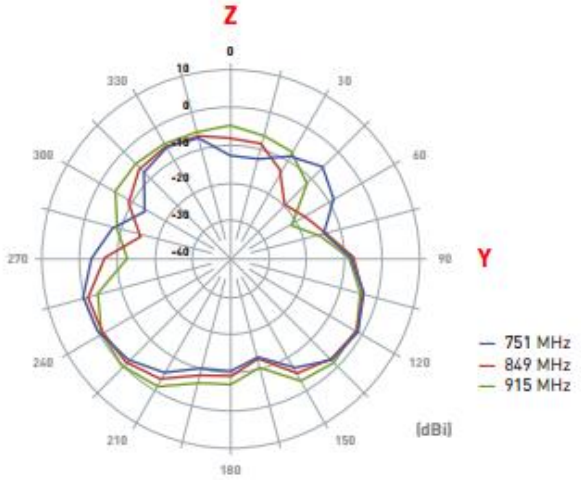
**XY Plane**



**X Z Plane**



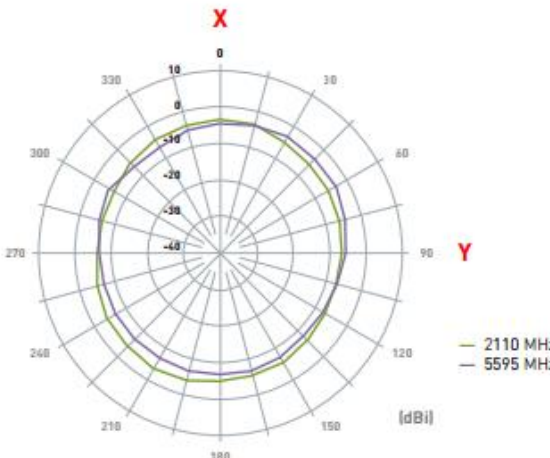
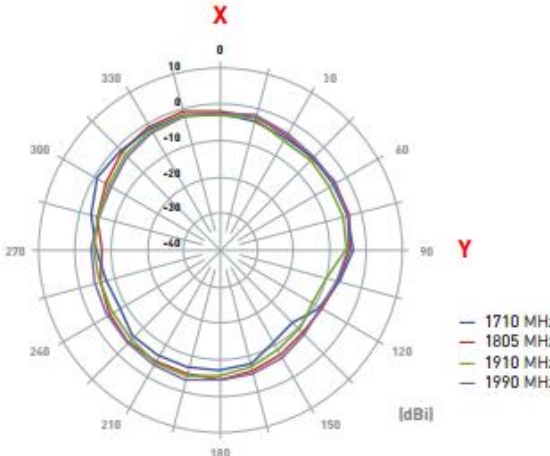
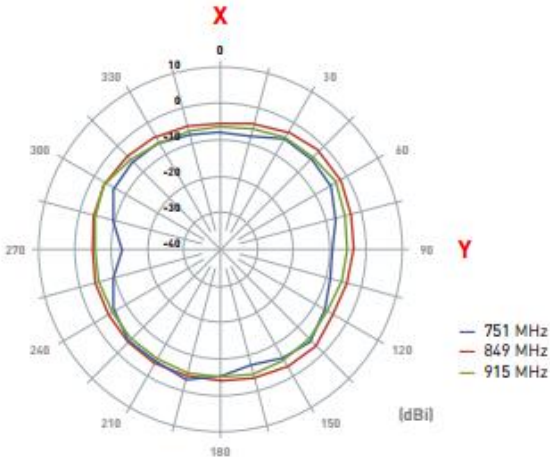
**Y Z Plane**



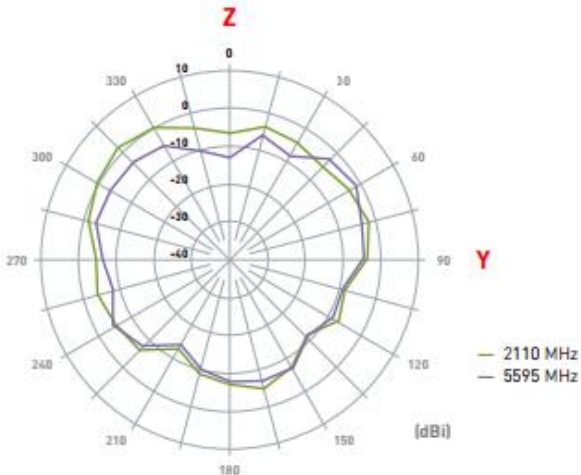
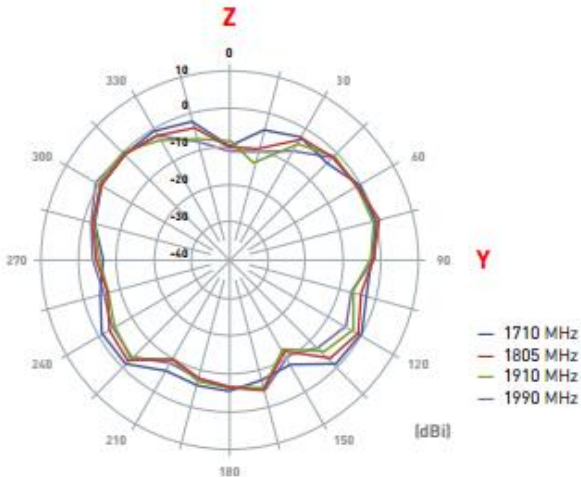
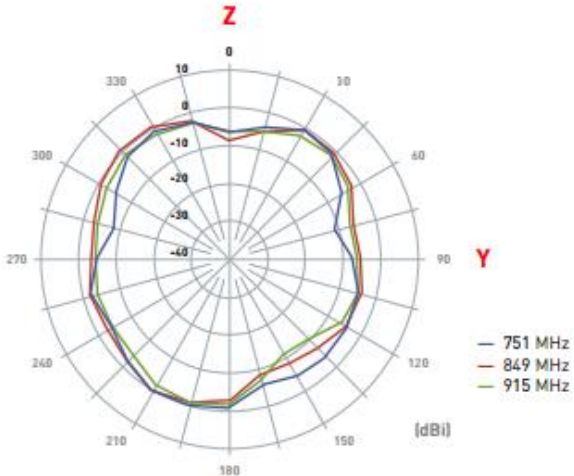


**On 30x30 metal ground**

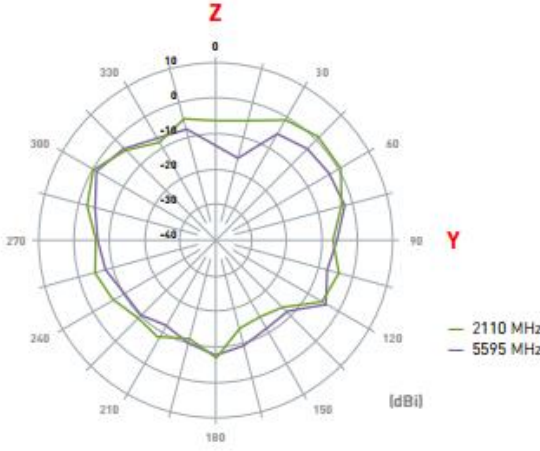
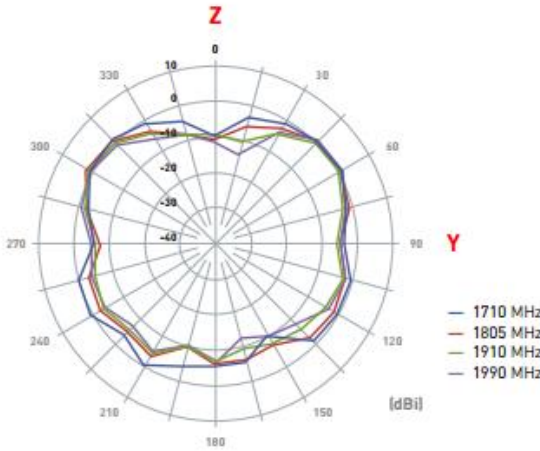
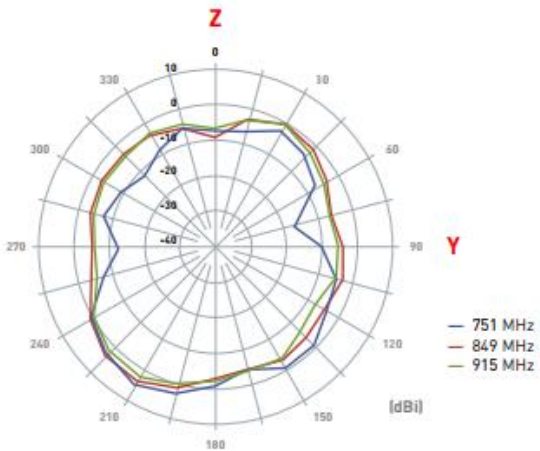
**X Y Plane**



**Y Z Plane**

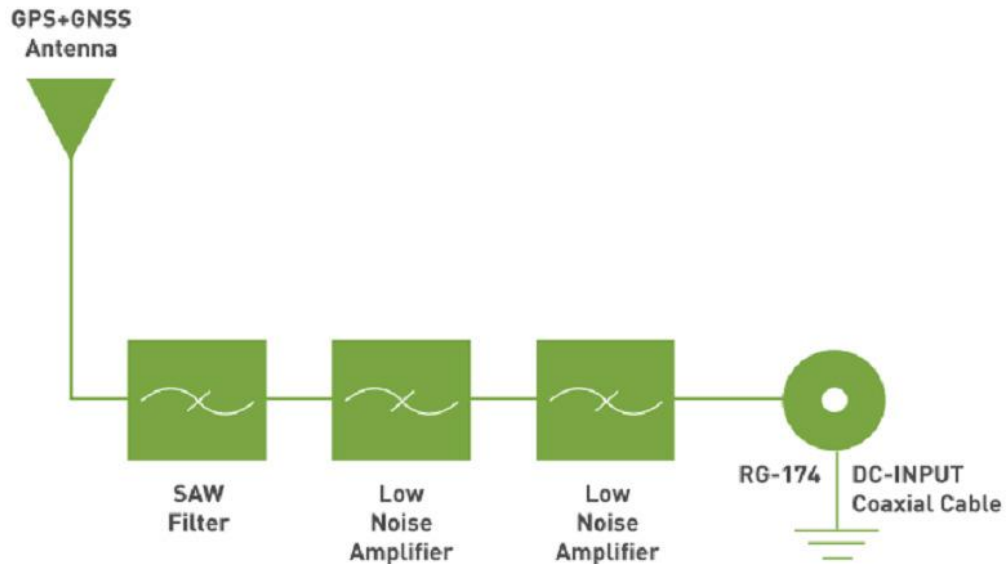


**Y Z Plane**

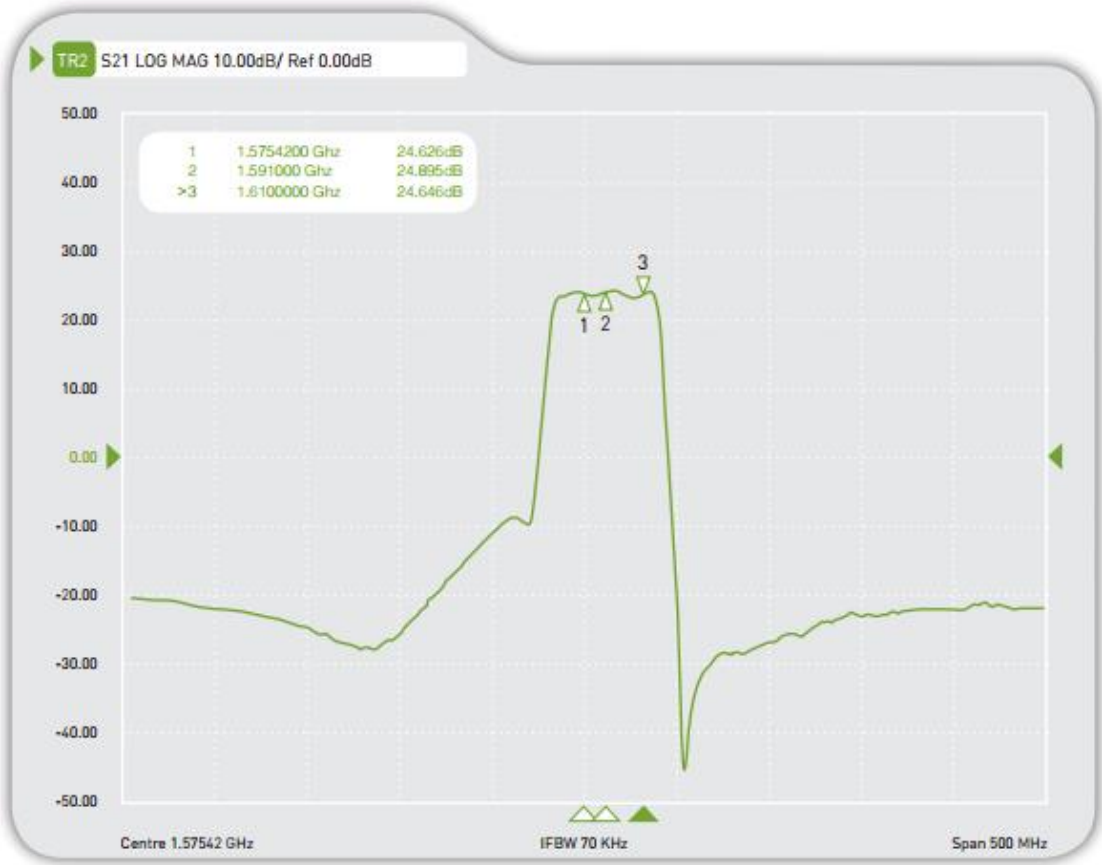


## 5. GPS/GLONASS/GALILEO Antenna

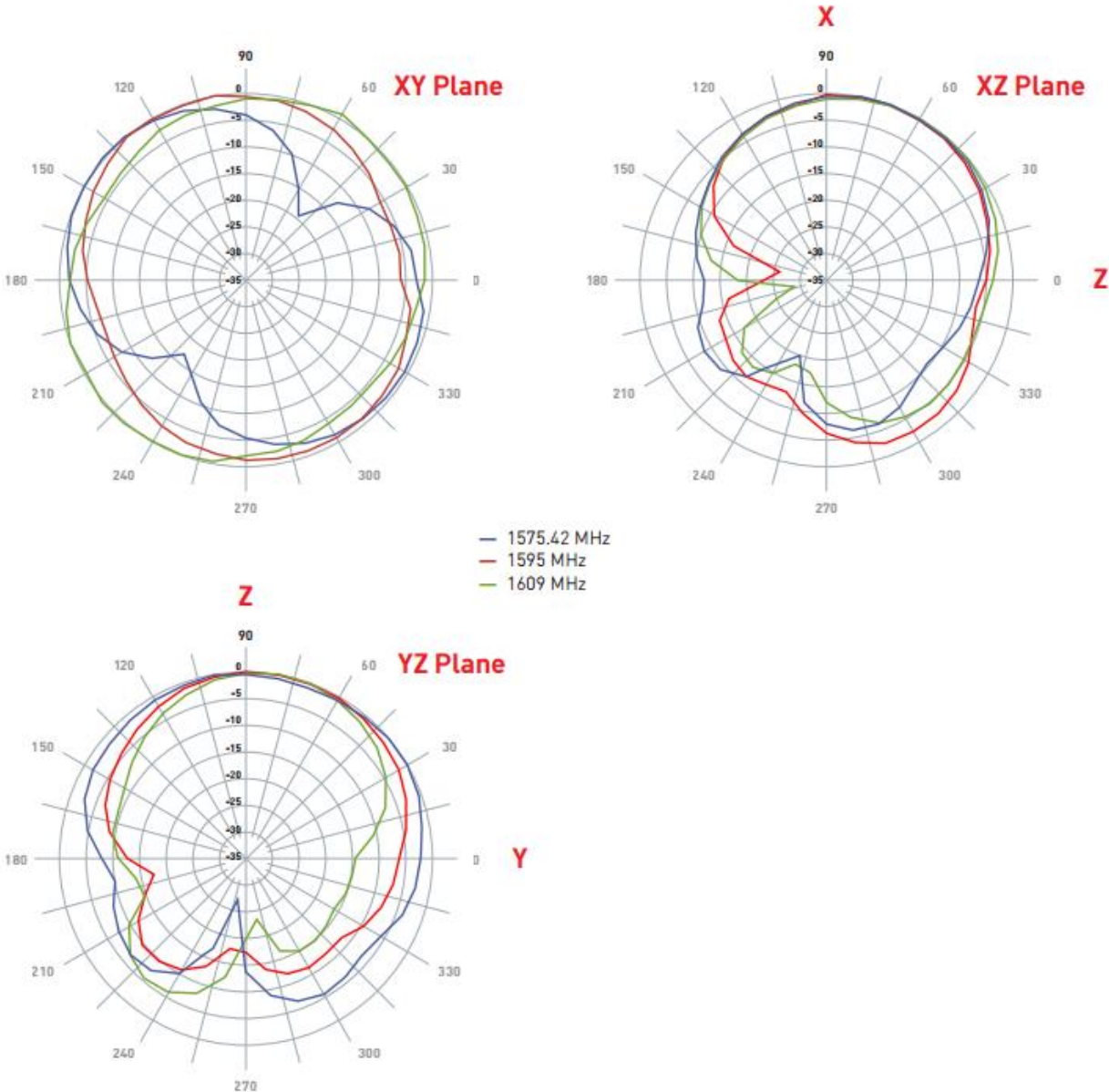
### 5.1 GPS/GLONASS/GALILEO Antenna Block Diagram



**5.2 GPS/GLONASS/GALILEO LNA S21 Parameter Results**

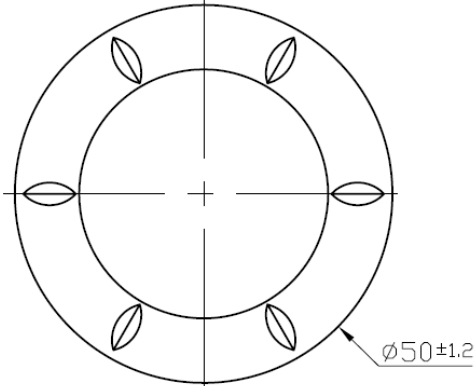


**5.3 GPS/GLONASS/GALILEO LNA S21 Parameter Results**

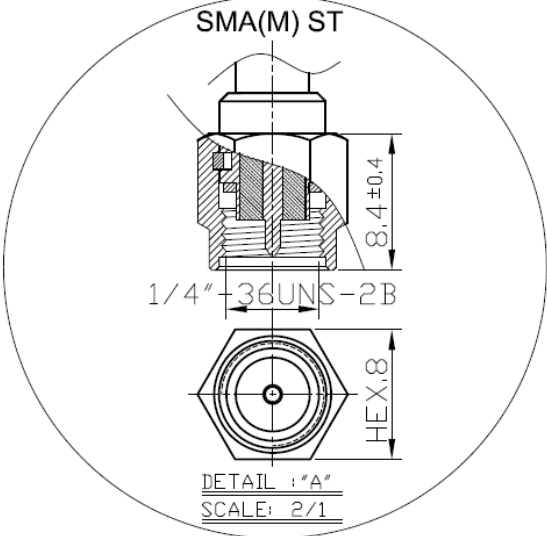
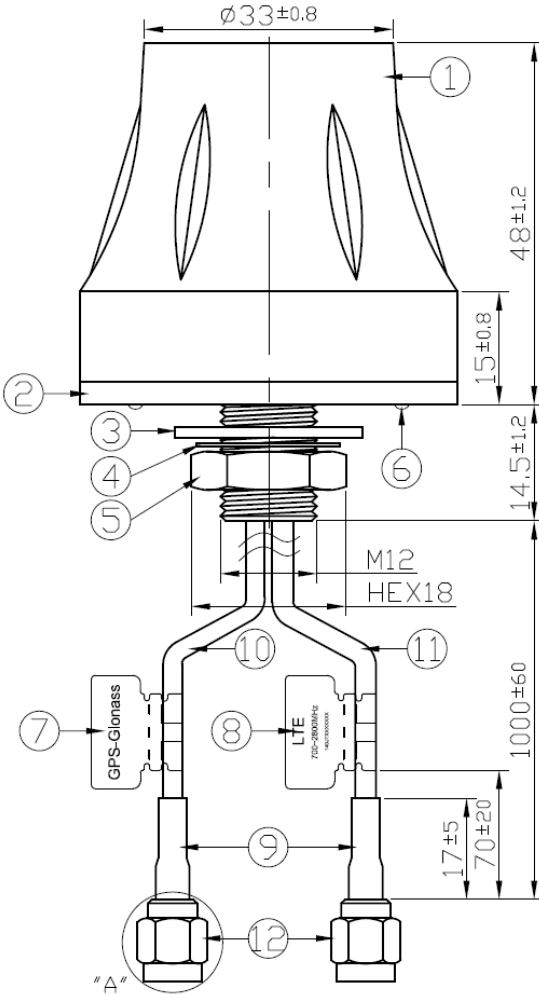


## 6. Drawing

Top view

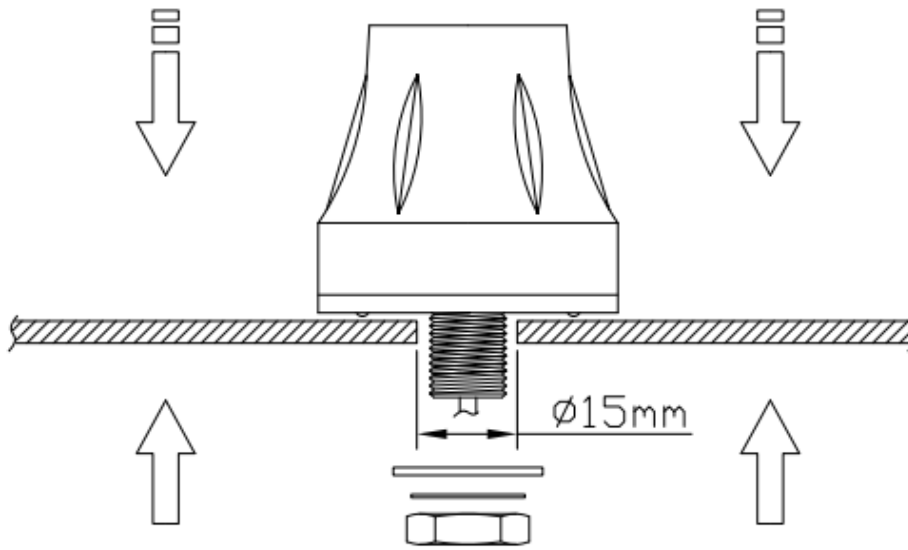


Side view



	Name	Material	Finish	QTY
1	Housing Top	ABS	Black	1
2	Housing Bottom	ABS	Black	1
3	Gasket	POM	Red	1
4	Multi Tooth Washer	Iron	Zinc	1
5	Nut M12	Copper	Nickel	1
6	O-Ring	NBR	Black	1
7	GPS-Glonass Label	Coated Paper	Orange	1
8	LTE Label	PET	White	1
9	Heat Shrink Tube	PE	Black	2
10	RG174	PVC	Black	1
11	RG316	FEP	Brown	1
12	SMA(M) ST	Brass	Gold	2

## 7. Installation

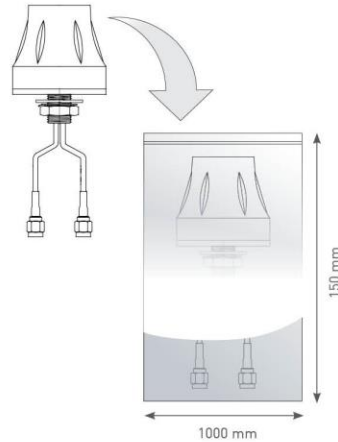


Recommended torque for mounting is 2.94 N·m  
Maximum torque for mounting is 3.92 N·m

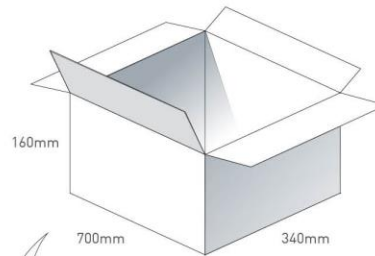


## 8. Packaging

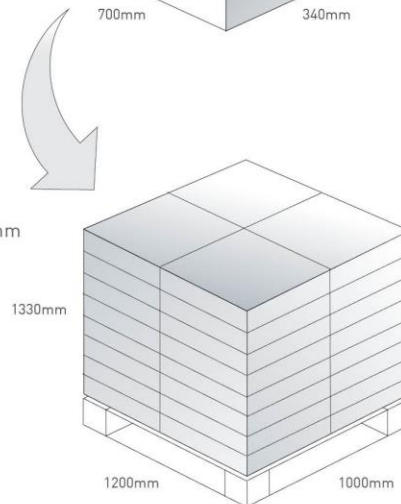
1pc MA140.A.LB.001 per PE bag  
 Carton Dimensions - 150\*100mm  
 Total Weight - 94g



120 pcs MA140.A.LB.001 per carton  
 Carton Dimensions - 700\*340\*160mm  
 Total Weight - 12.1kg



Pallet Dimensions 1200mm\*1000mm\*1330mm  
 32 Cartons per pallet  
 4 Cartons per layer  
 8 Layers



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