SUNNYWAY

SWB012

PN: SW20286EB56



Features

- Antenna with 4×4 MIMO 5G+GNSS.
- 5G antenna frequency range is 600-6000
- GNSS frequency bands is 1559 MHz、1575.42 MHz、1602 MHz
- Maintains high performance on device.
- High gain.
- Impedance 50 Ohm.

Applications:

- Access Points
- Portable Devices
- Game Consoles
- Set-Top-Box
- Network Devices
- MIMO Systemss

Sunnyway Technology

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1. Electrical Specifications

Cable 1 Parameters

Tested with 20cm cable length

Standards	5G&4G&3G&2G		
Frequency range (MHz)	600~960MHz	1400~2700MHz	3000~6000MHz
Peak Gain (dBi)	-0.1~3.1	-1.0~4.1	0.6~3.6
Average Gain (dB)	-4.9~-0.8	-4.3~-2.0	-4.6~-2.0
VSWR	< 3.3	< 3.0	< 2.7
Return Loss(dB)	< -5.6	< -7.0	< -7.0
Efficiency (%)	32.4~84.0	36.9~63.6	34.6~63.8
Polarization mode	Linear	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional	Omni-Directional
Output impedance (Ω)	50	50	50
Max. Input Power(W)	5	5	5

Cable 2 Parameters

Tested with 20cm cable length

Standards	5G&4G&3G&2G		
Frequency range (MHz)	600~960MHz	1400~2700MHz	3000~6000MHz
Peak Gain (dBi)	-2.4~2.8	-2.1~4.1	-0.3~3.8
Average Gain (dB)	-7.4~-1.5	-5.2~-1.0	-5.8~-2.7
VSWR	< 4.6	< 3.5	< 3.0
Return Loss(dB)	< -3.8	< -5.0	< -7.0
Efficiency (%)	18.2~71.1	30.4~78.7	26.1~53.9
Polarization mode	Linear	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional	Omni-Directional
Output impedance (Ω)	50	50	50
Max. Input Power(W)	5	5	5

Cable 3 Parameters

Tested with 20cm cable length

Standards	5G&4G&3G&2G		
Frequency range (MHz)	600~960MHz	1400~2700MHz	3000~6000MHz
Peak Gain (dBi)	-0.9~3.4	-1.3~3.6	0.2~3.2
Average Gain (dB)	-4.6~-1.4	-4.7~-1.2	-5.2~-2.6
VSWR	< 4.6	< 3.0	< 3.0
Return Loss(dB)	< -3.8	< -7	< -7
Efficiency (%)	35.0~72.3	33.6~76.7	30.2~55.3
Polarization mode	Linear	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional	Omni-Directional
Output impedance (Ω)	50	50	50
Max. Input Power(W)	5	5	5

Cable 4 Parameters

Tested with 20cm cable length

Standards	5G&4G&3G&2G		
Frequency range (MHz)	600~960MHz	1400~2700MHz	3000~6000MHz
Peak Gain (dBi)	-1.5~2.1	0.0~4.3	0.5~3.5
Average Gain (dB)	-5.0~-2.0	-3.9~-0.7	-4.5~-2.1
VSWR	< 3.6	< 2.9	< 2.5
Return Loss(dB)	< -4.9	< -6.0	< -8.0
Efficiency (%)	31.4~62.7	40.8~84.4	35.2~61.5
Polarization mode	Linear	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional	Omni-Directional
Output impedance (Ω)	50	50	50
Max. Input Power(W)	5	5	5

Cable 5 Parameters

Tested with 20cm cable length

Standards	GPS&GLONASS&GALILEO&BEIDOU		
Band (MHz)	1559MHz	1575.42MHz	1602MHz
Peak Gain (dBi)	3.24dBi	1.92dBi	2.65dBi
Average Gain (dB)	-1.88dB	-2.71dB	-2.36dB
VSWR	2.40	1.77	1.34
Return Loss	-7.69	-11.08	-16.61
Efficiency (%)	64.8%	53.6%	58.1%
Impedance(Ω)	50	50	50
Polarization	RHCP	RHCP	RHCP
Radiation Pattern	Hemispherical	Hemispherical	Hemispherical
Saw Filter	Pre-Filter	Pre-Filter	Pre-Filter
Active Gain (dB)	28dB	28dB	28dB
Noise-Figure(dB)	1dB(+25°C±10°C)	1dB(+25°C±10°C)	1dB(+25°C±10°C)
Supply Current(mA)	15mA	15mA	15mA
Supply Voltage(V)	1.5v-5.5v	1.5v-5.5v	1.5v-5.5v

2. Mechanical and Environmental Specification

Mounting Type	Screw lock
Cable &Connector Type	RG174+SMA (M)
Antenna size(mm)	99.96 (φ) x 105.8 (H) x 3000 (Line length)
Material	SABIC PC 1414
Cable length(mm)	3000mm (can be customized)
Operating Temperature (˚C)	- 40 ˚C ~ + 85 ˚C
Storage Temperature(˚C)	- 40 ˚C ~ + 85 ˚C

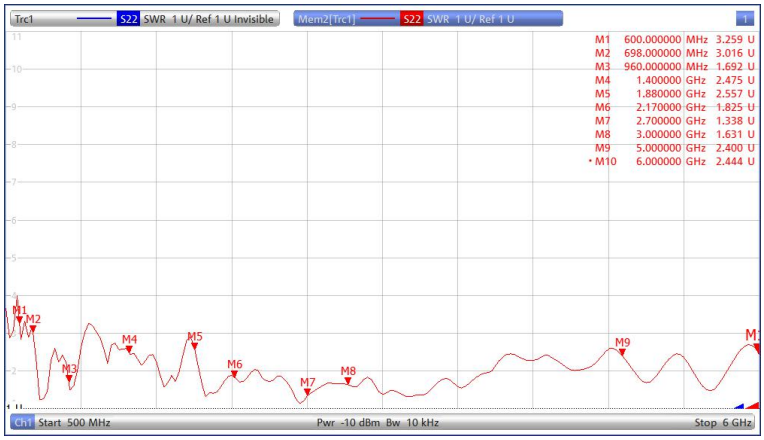
3. Antenna parameters

3.1 Cable 1: 5G&4G&3G&2G

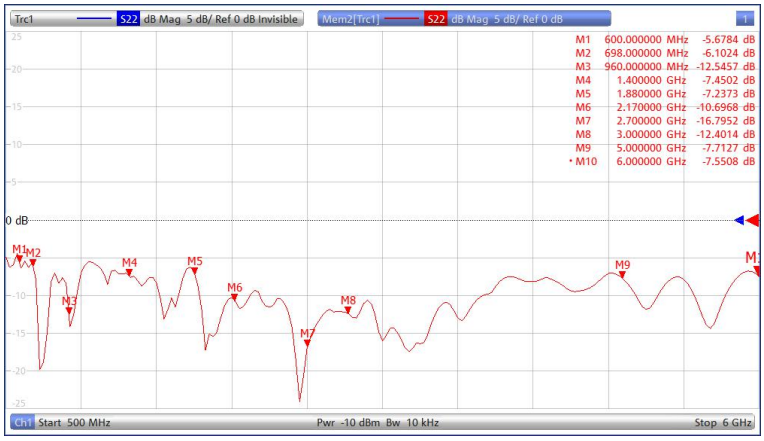
3.1.1 General Data

FRE (MHz)	600	698	960	1400	1880	2170	2700	3000	5000	6000
VSWR	3.3	3.0	1.7	2.5	2.6	1.8	1.3	1.6	2.4	2.4
Return	-5.7	-6.1	-12.5	-7.5	-7.2	-10.7	-16.8	-12.4	-7.7	-7.6
Eff (%)	38.5	82.0	32.4	58.5	43.4	58.5	50.0	56.0	49.7	44.0
Average	-4.2	-0.8	-4.9	-2.3	-3.6	-2.3	-3.1	-2.5	-3.0	-3.6

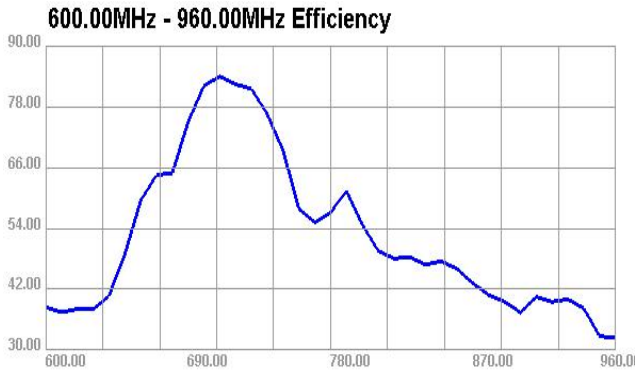
3.1.2 VSWR

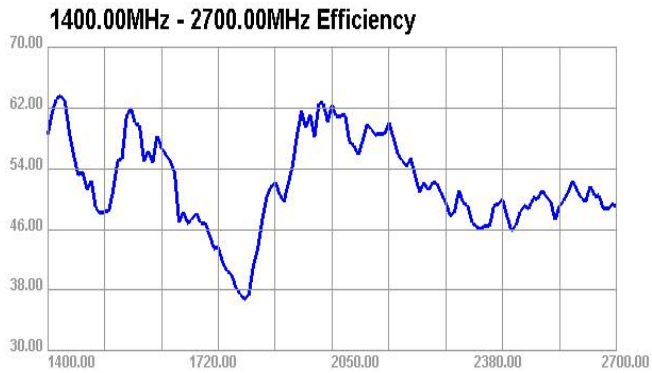


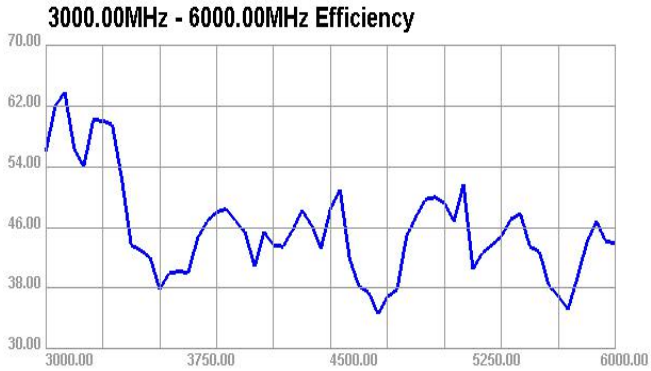
3.1.3 Return Loss



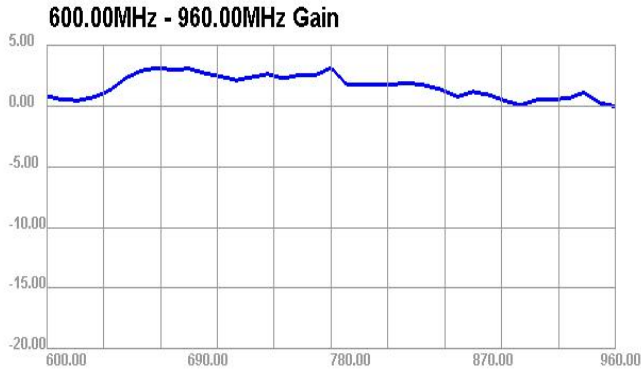
3.1.4 Efficiency

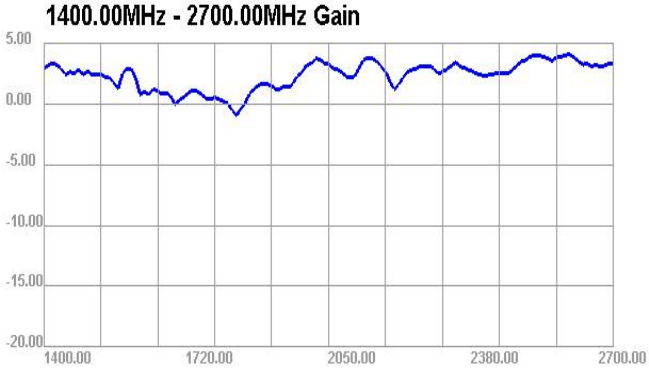


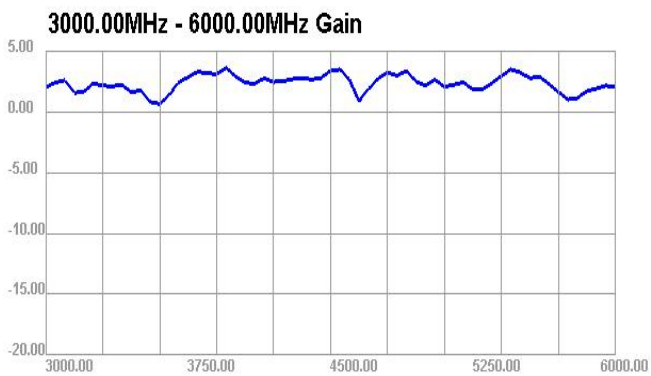




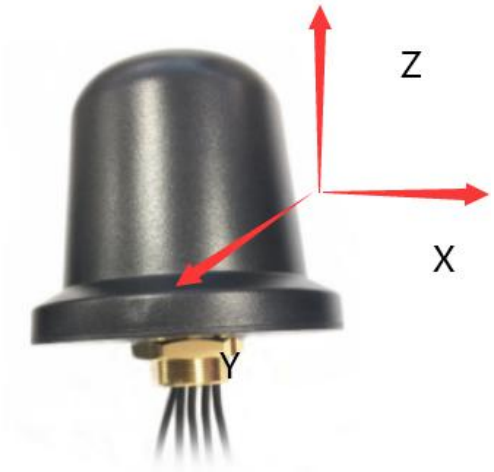
3.1.5 Gain

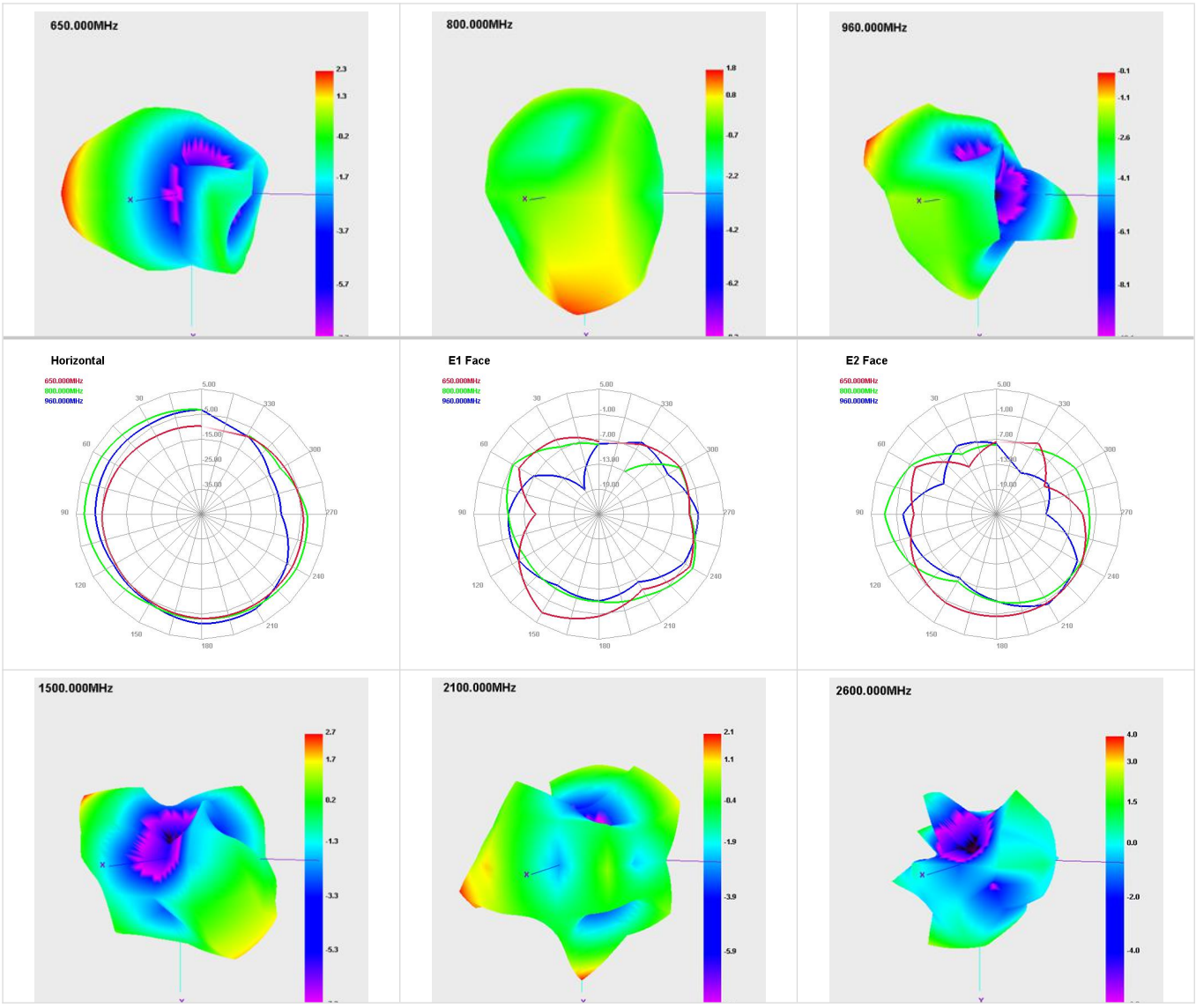


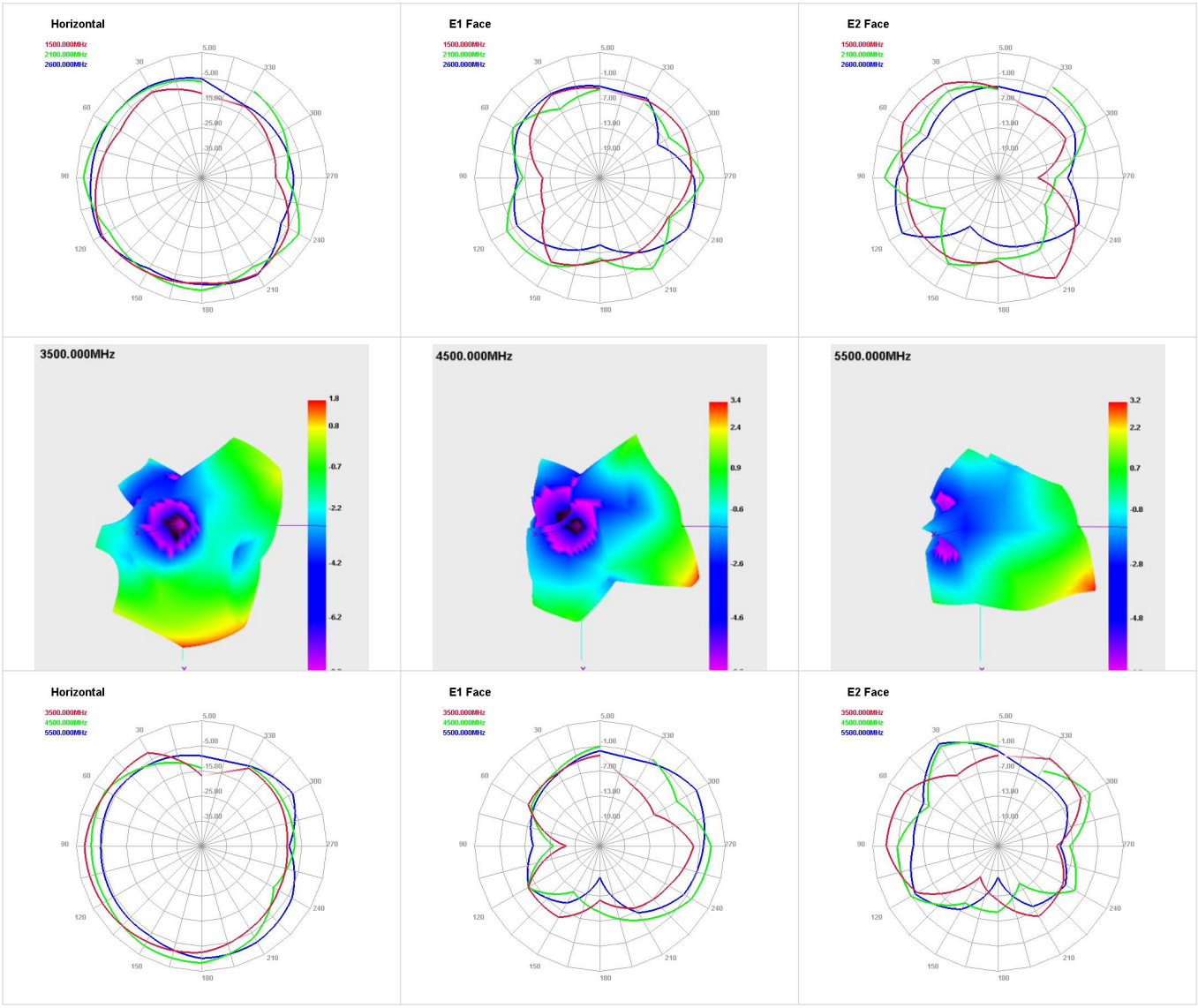




3.1.6 Directional Pattern





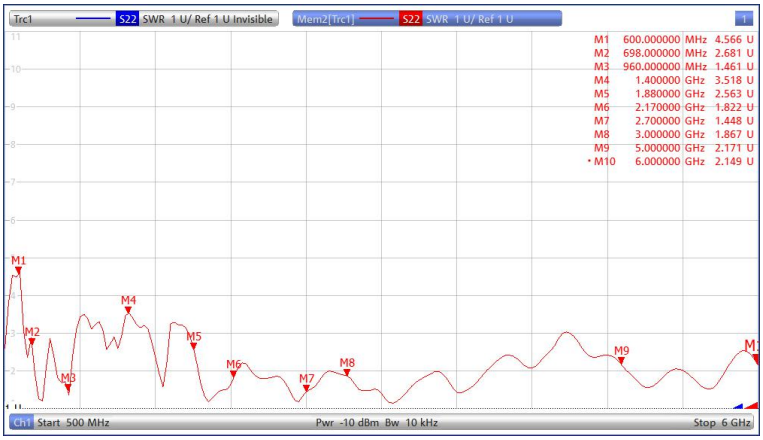


3.2 Cable 2: 5G&4G&3G&2G

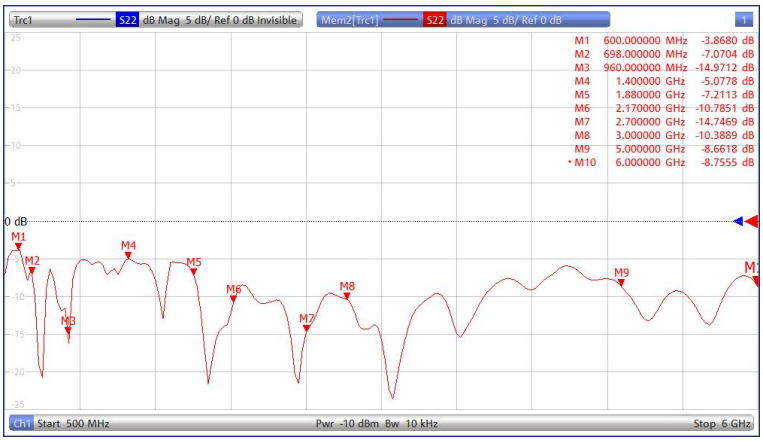
3.2.1 General Data

FRE (MHz)	600	698	960	1400	1880	2170	2700	3000	5000	6000
VSWR	4.6	2.7	1.5	3.5	2.6	1.8	1.4	1.9	2.2	2.1
Return	-3.9	-7.1	-15.0	-5.1	-7.2	-10.8	-14.7	-10.4	-8.7	-8.8
Eff (%)	18.2	59. 0	33.4	51.9	37.0	59.7	47.2	47.6	51.4	39.1
Average	-7.4	-2.3	-4.8	-2.9	-4.3	-2.2	-3.3	-3.2	-2.9	-4.1

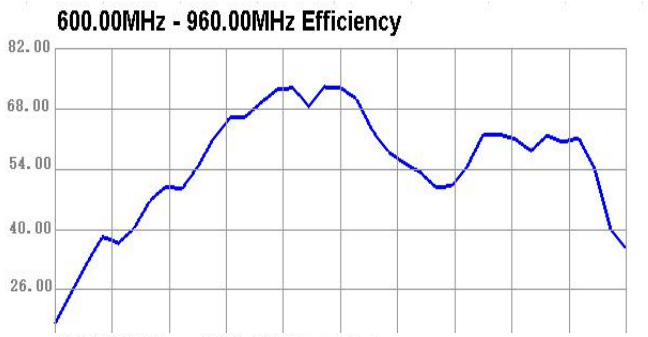
3.2.2 VSWR

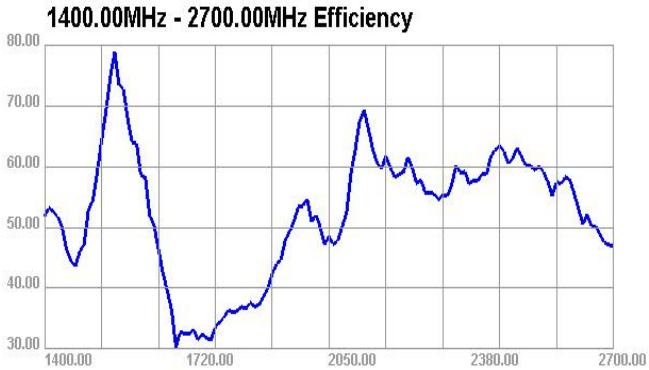


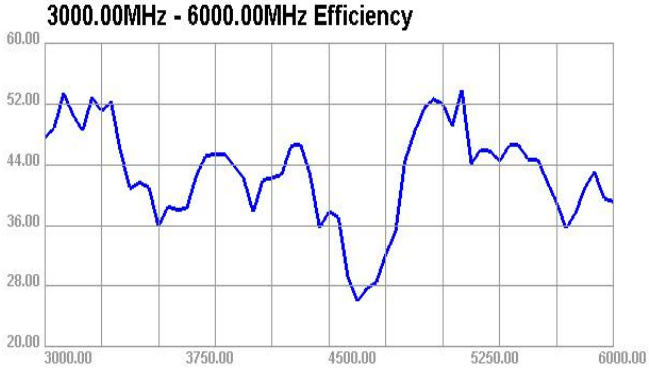
3.2.3 Return Loss



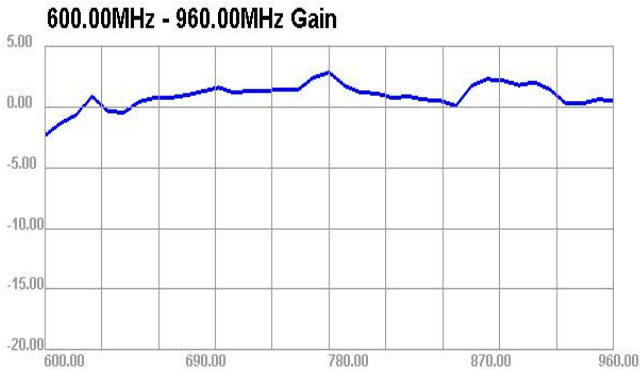
3.2.4 Efficiency

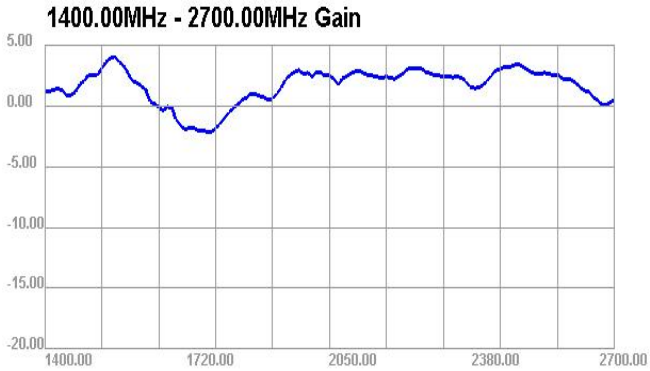


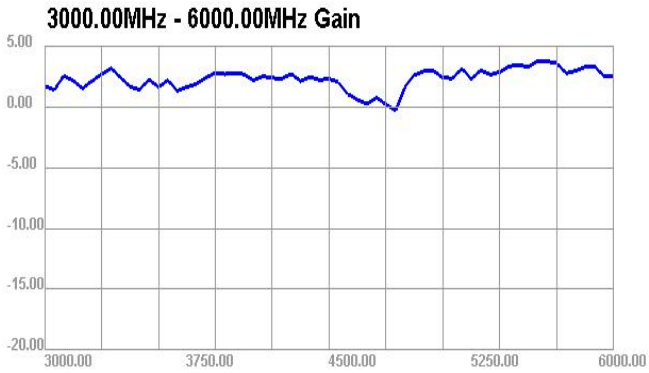




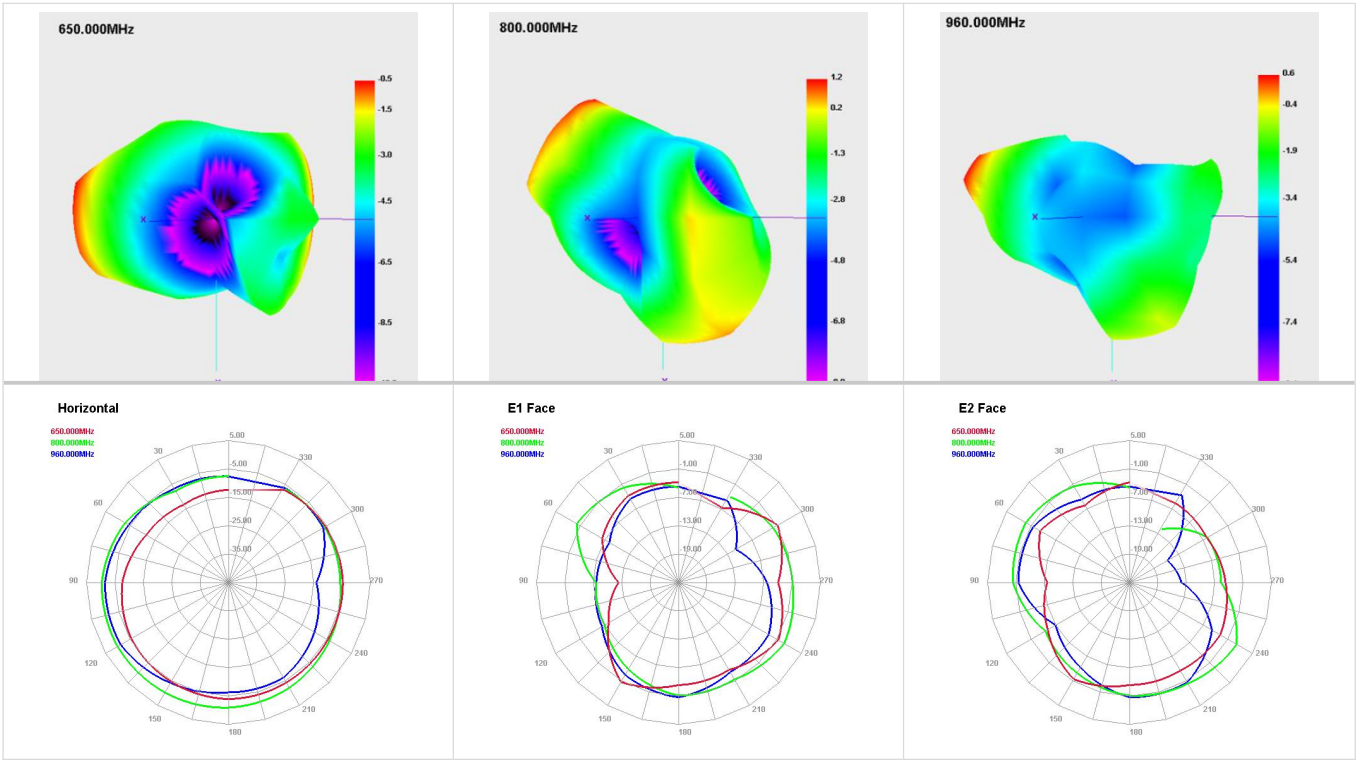
3.2.5 Gain

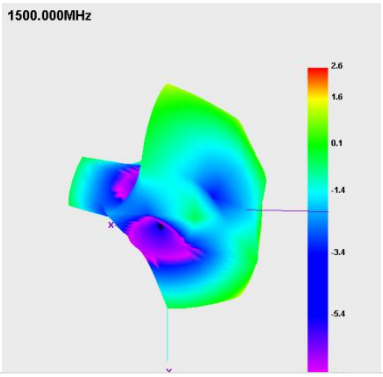


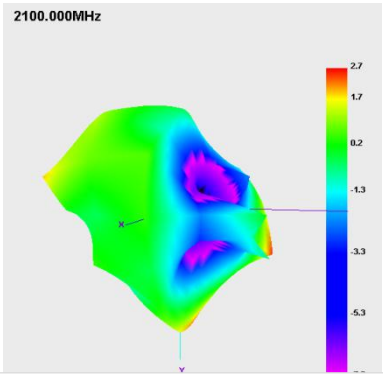


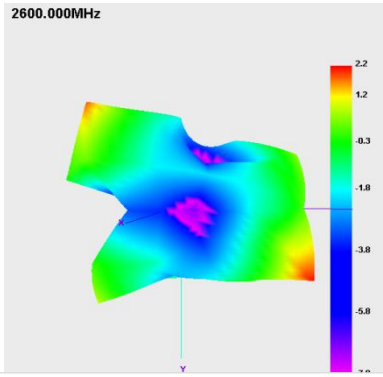


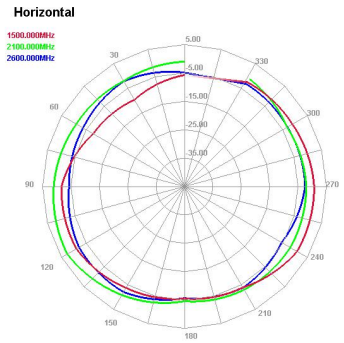
3.2.6 Directional Pattern

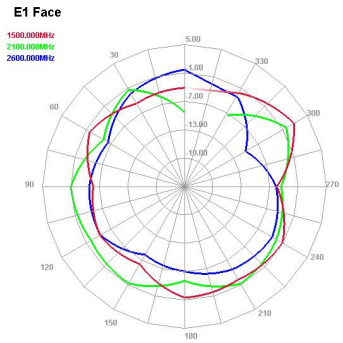


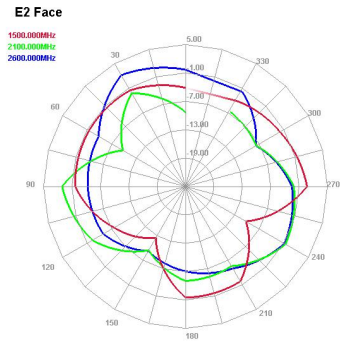

1500.000MHz
2.6
1.6
0.1
-1.4
-3.4
-5.4

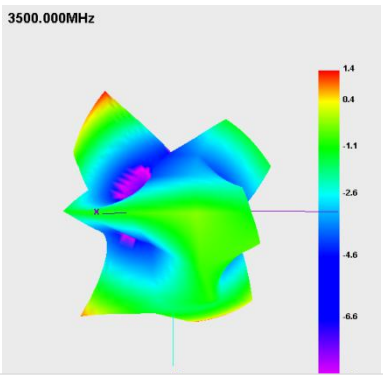

2100.000MHz
2.7
1.7
0.2
-1.3
-3.3
-5.3

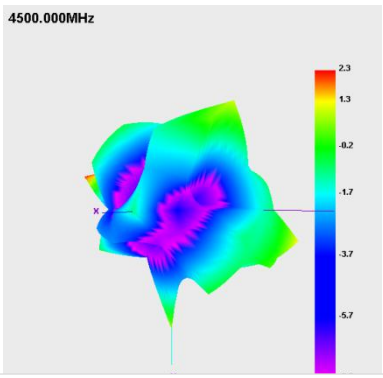

2600.000MHz
2.2
1.2
-0.3
-1.8
-3.8
-5.8

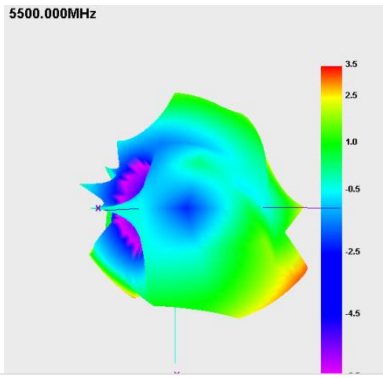

Horizontal
1500.000MHz
2100.000MHz
2600.000MHz

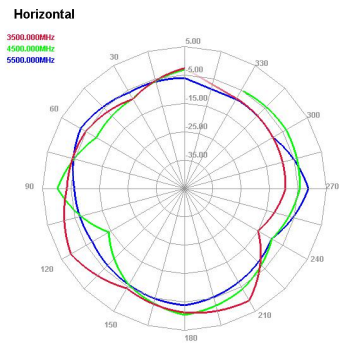

E1 Face
1500.000MHz
2100.000MHz
2600.000MHz

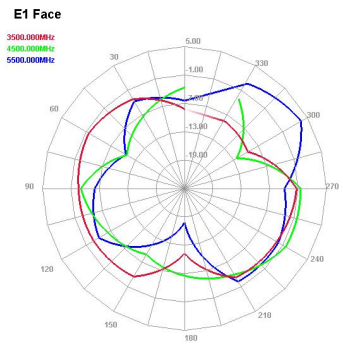

E2 Face
1500.000MHz
2100.000MHz
2600.000MHz

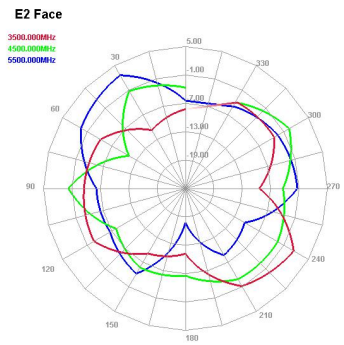

3500.000MHz
1.4
0.4
-1.1
-2.6
-4.6
-6.6


4500.000MHz
2.3
1.3
-0.2
-1.7
-3.7
-5.7


5500.000MHz
3.5
2.5
1.0
-0.5
-2.5
-4.5


Horizontal
3500.000MHz
4500.000MHz
5500.000MHz


E1 Face
3500.000MHz
4500.000MHz
5500.000MHz

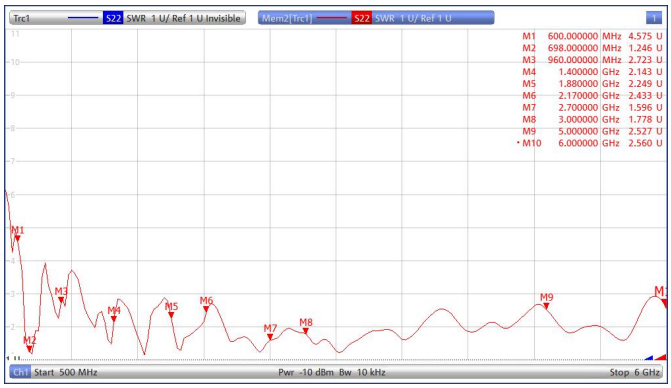

E2 Face
3500.000MHz
4500.000MHz
5500.000MHz

3.3 Cable 3: 5G&4G&3G&2G

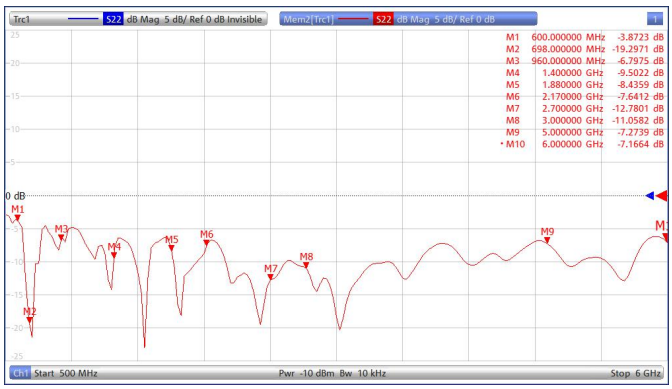
3.3.1 General Data

FRE (MHz)	600	698	960	1400	1880	2170	2700	3000	5000	6000
VSWR	4.6	1.2	2.7	2.1	2.2	2.4	1.6	1.8	2.5	2.6
Return	-3.9	-19.3	-6.8	-9.5	-8.4	-7.6	-12.8	-11.1	-7.3	-7.2
Eff (%)	35.0	65.0	55.3	42.3	41.1	56.5	51.1	49.2	49.1	31.6
Average	-4.6	-2.3	-2.6	-3.7	-3.9	-2.5	-2.9	-3.1	-3.1	-5.0

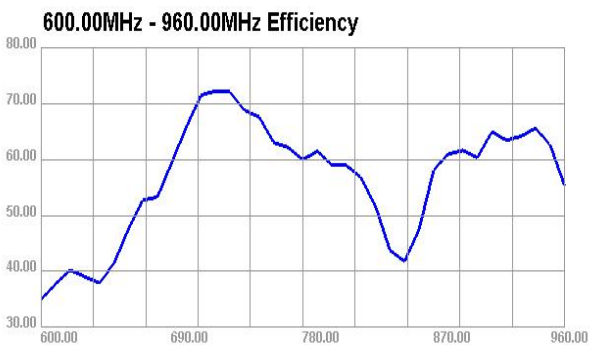
3.3.2 VSWR

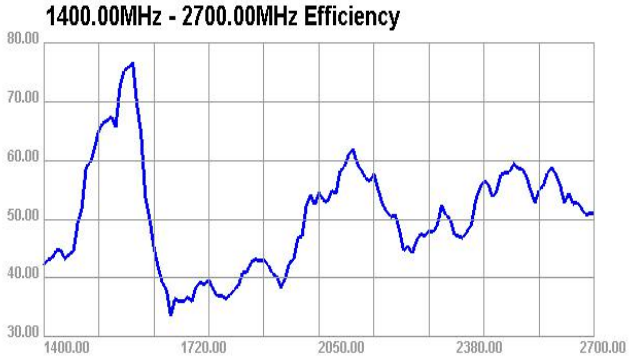


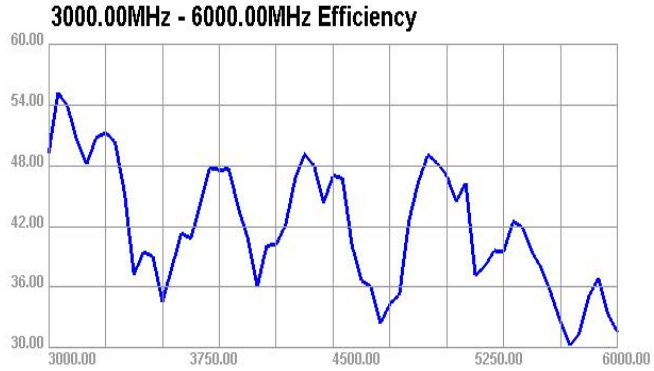
3.3.3 Return Loss



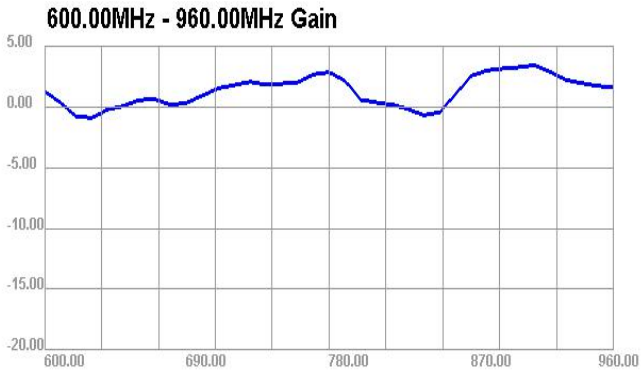
3.3.4 Efficiency

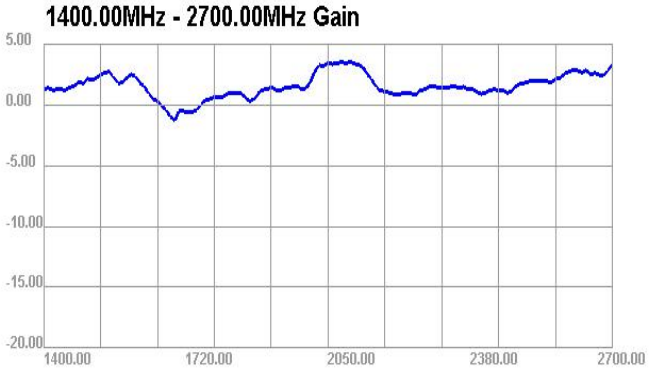


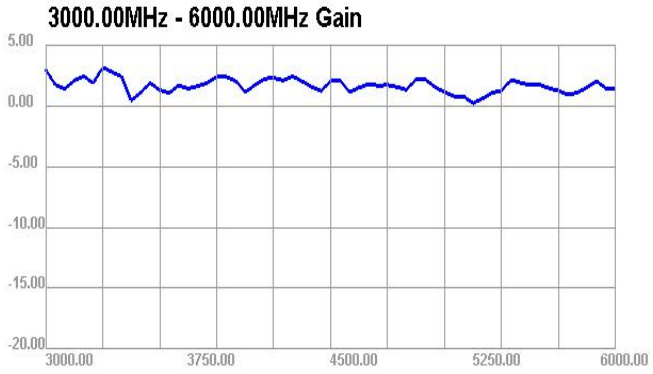



3000.00MHz - 6000.00MHz Efficiency
60.00
54.00
48.00
42.00
36.00
30.00
3000.00
3750.00
4500.00
5250.00
6000.00

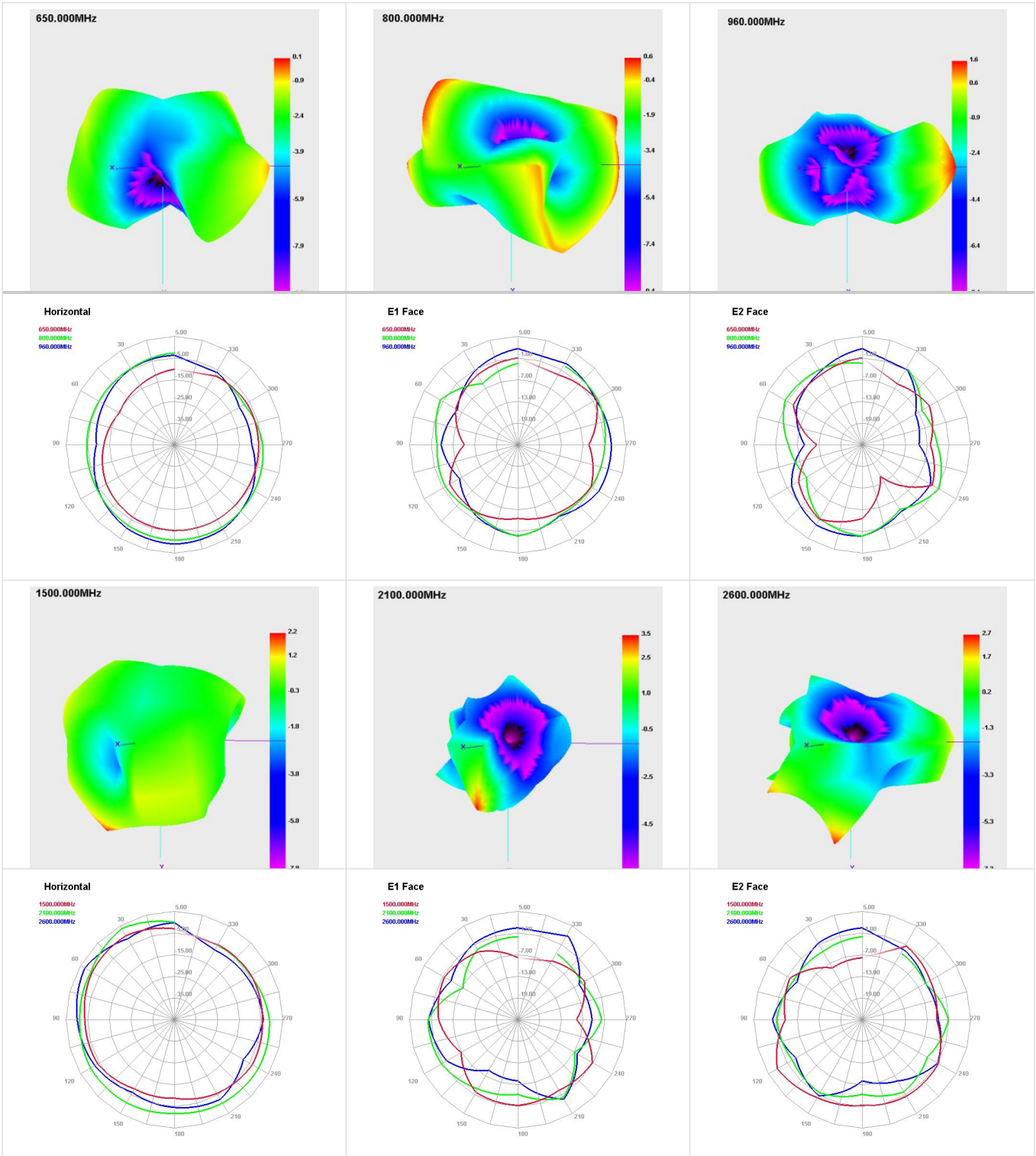
3.3.5 Gain

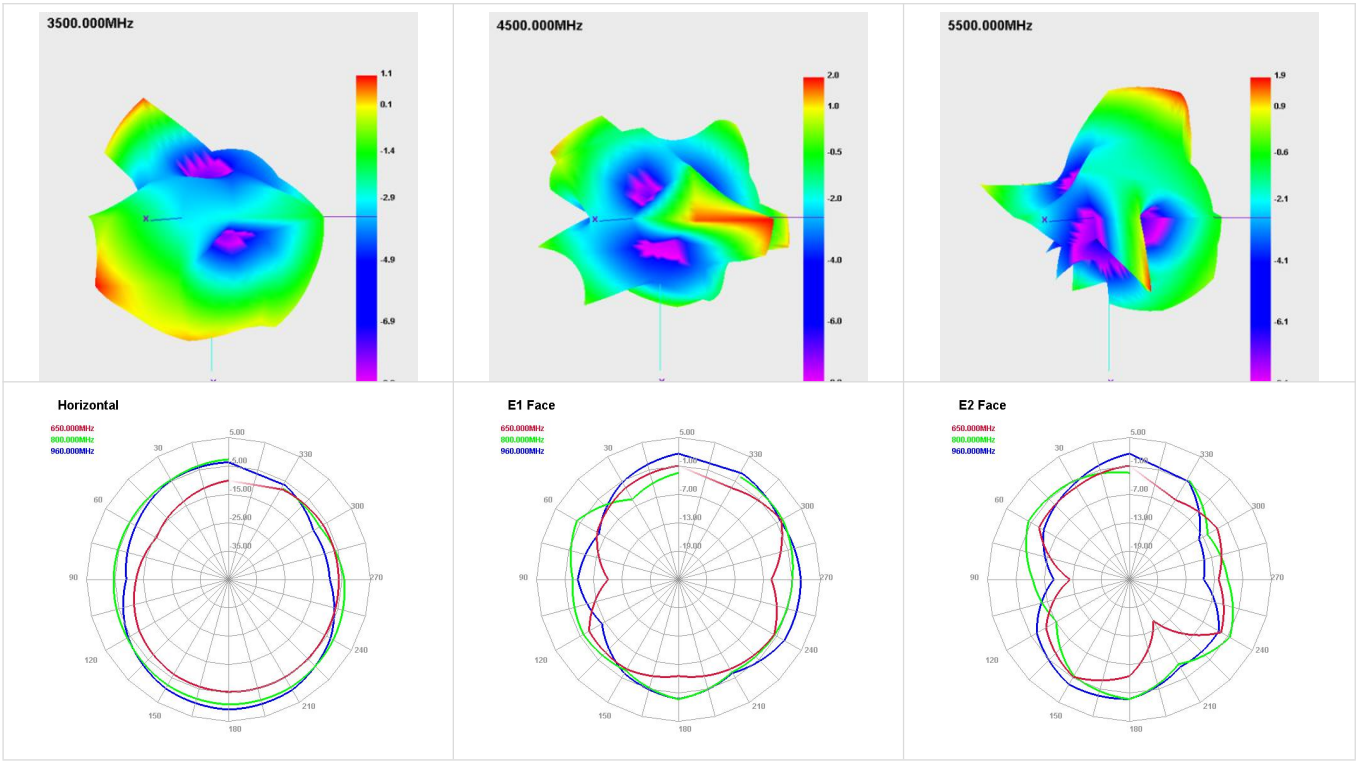

600.00MHz - 960.00MHz Gain
5.00
0.00
-5.00
-10.00
-15.00
-20.00
600.00
690.00
780.00
870.00
960.00


1400.00MHz - 2700.00MHz Gain
5.00
0.00
-5.00
-10.00
-15.00
-20.00
1400.00
1720.00
2050.00
2380.00
2700.00


3000.00MHz - 6000.00MHz Gain
5.00
0.00
-5.00
-10.00
-15.00
-20.00
3000.00
3750.00
4500.00
5250.00
6000.00

3.3.6 Directional Pattern



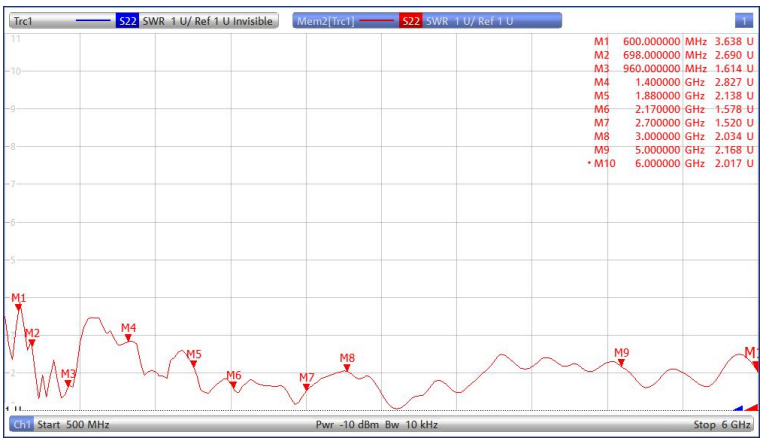


3.4 Cable 4: 5G&4G&3G&2G

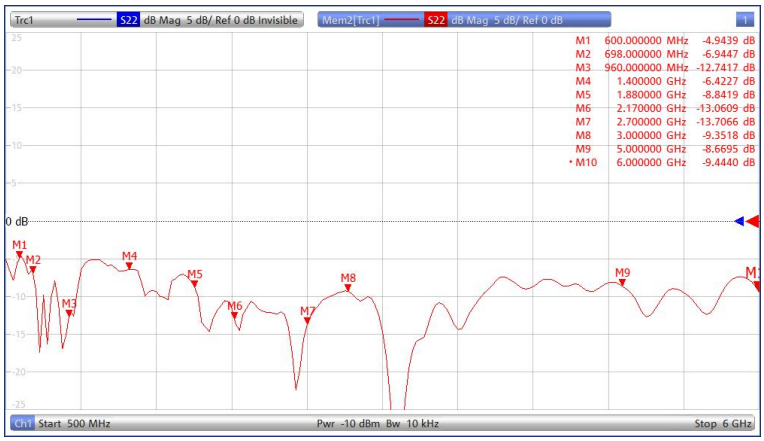
3.4.1 General Data

FRE (MHz)	600	698	960	1400	1880	2170	2700	3000	5000	6000
VSWR	3.6	2.7	1.6	2.8	2.1	1.6	1.5	2.0	2.2	2.0
Return	-4.9	-6.9	-12.7	-6.4	-8.8	-13.1	-13.7	-9.4	-8.7	-9.4
Eff (%)	31.4	57.5	41.5	79.2	40.8	57.3	52.6	48.3	52.9	43.0
Average	-5.0	-2..4	-3.8	-1.0	-3.9	-2.4	-2.8	-3.2	-2.8	-3.7

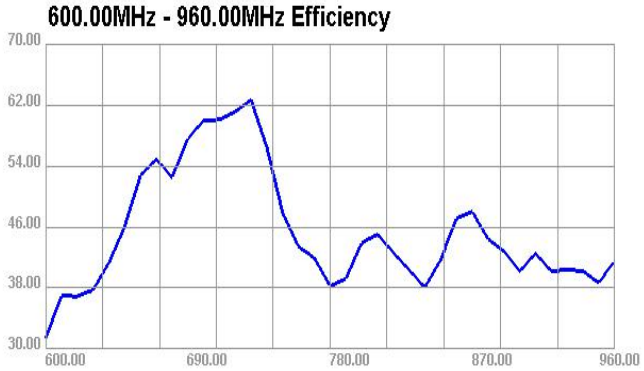
3.4.2 VSWR

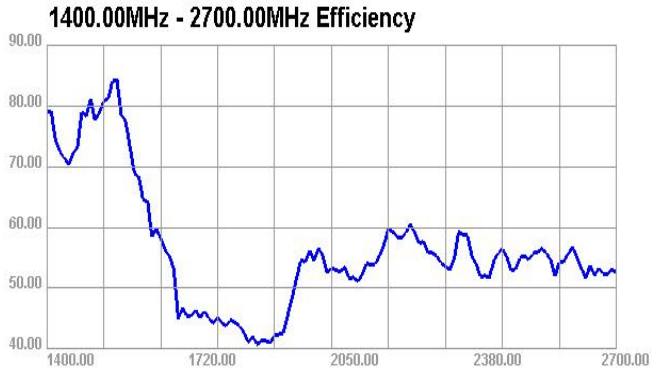


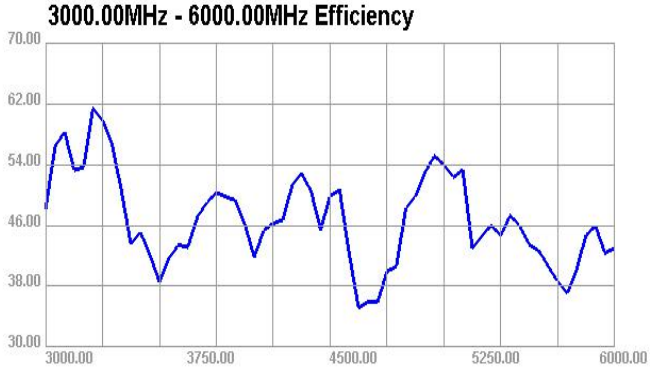
3.4.3 Return Loss



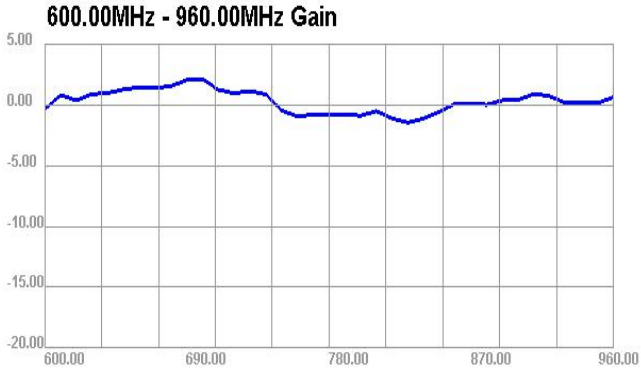
3.4.4 Efficiency

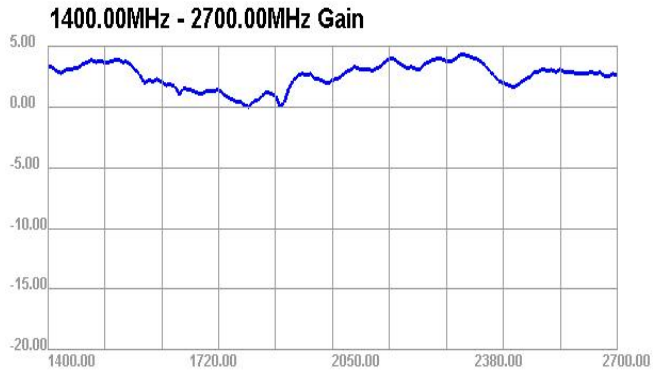


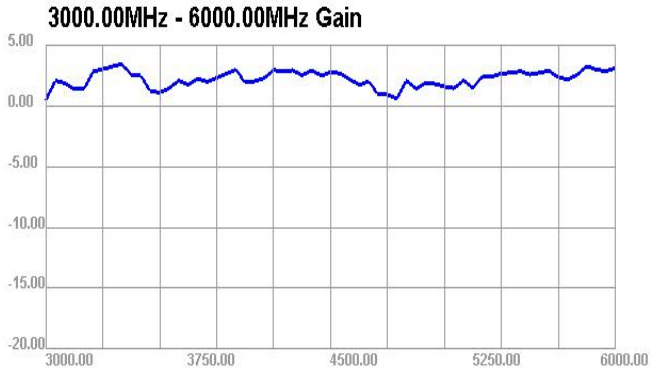




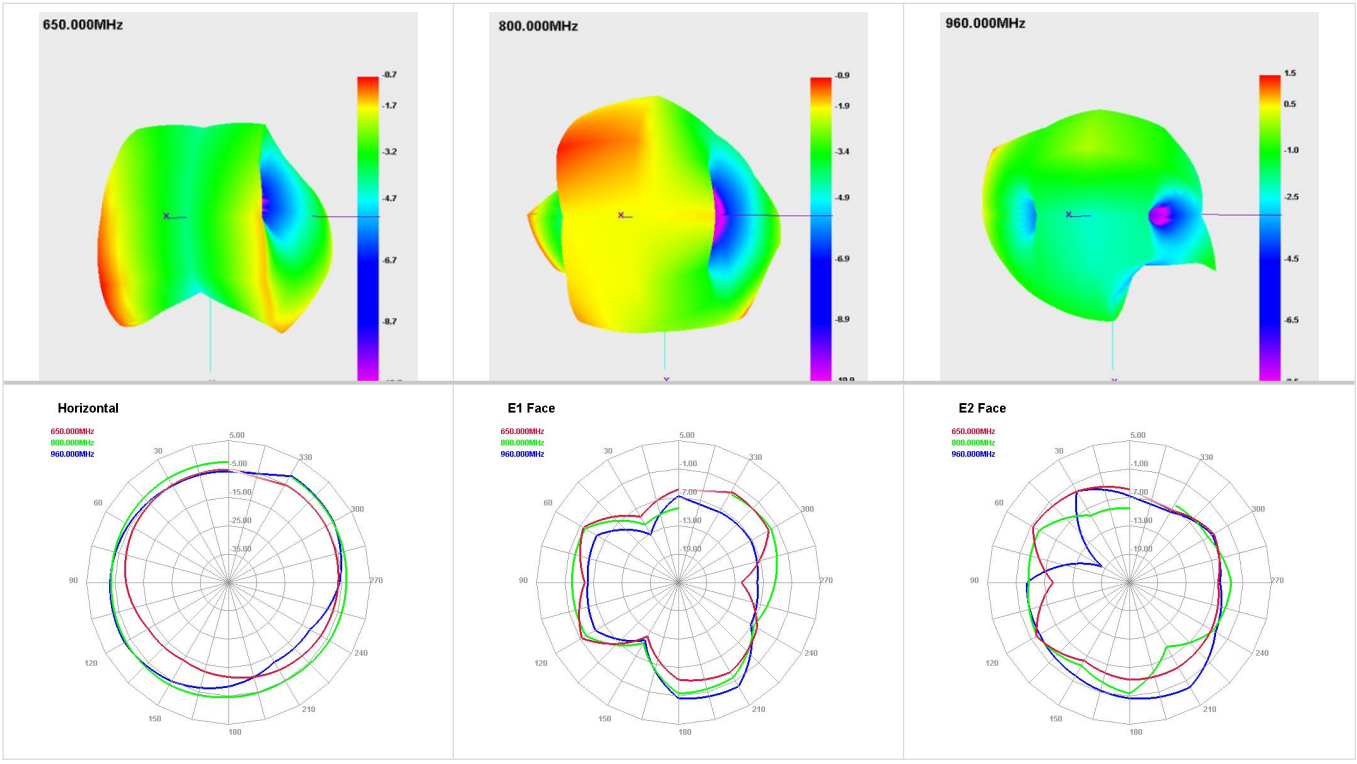
3.4.5 Gain

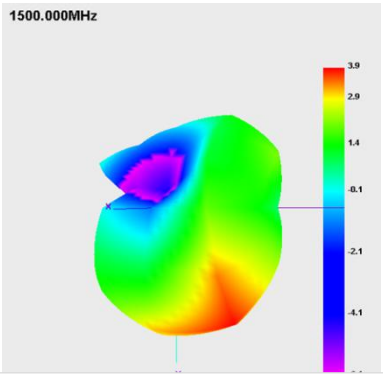


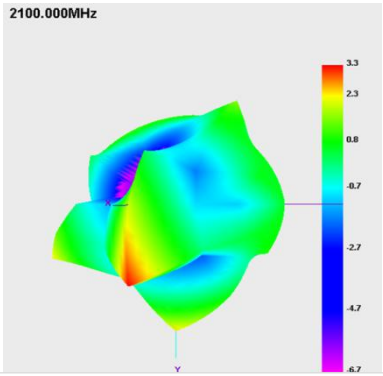


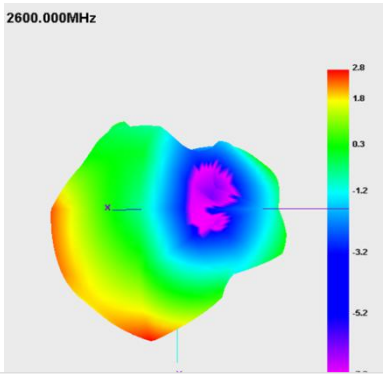


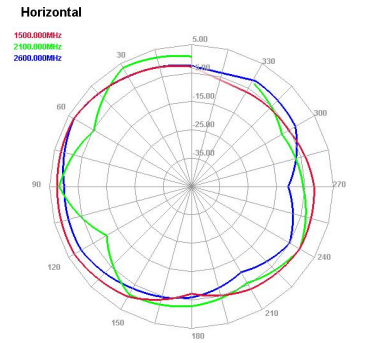
3.4.6 Directional Pattern

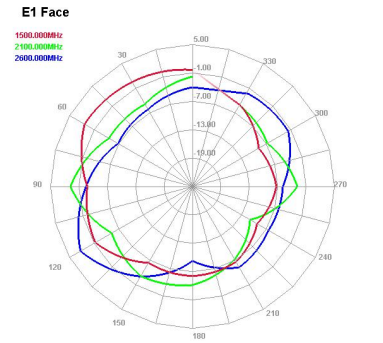


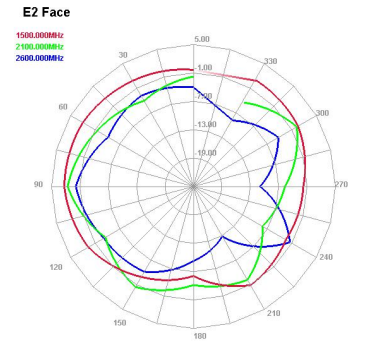

1500.000MHz

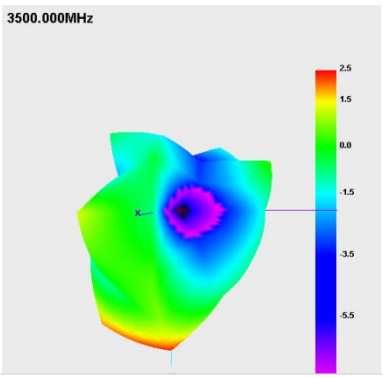

2100.000MHz

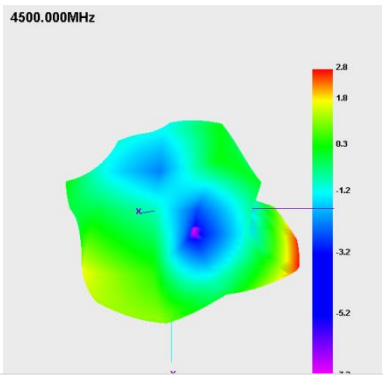

2600.000MHz

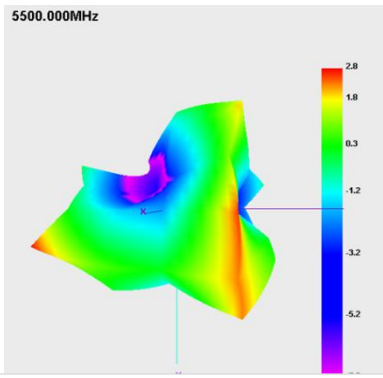

Horizontal
1500.000MHz
2100.000MHz
2600.000MHz

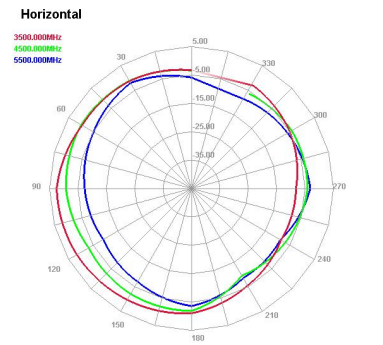

E1 Face
1500.000MHz
2100.000MHz
2600.000MHz

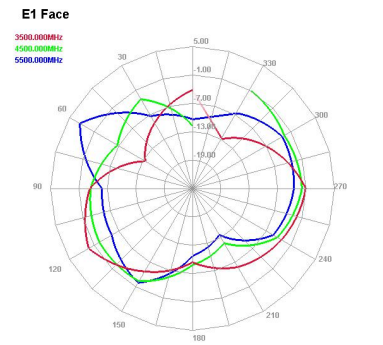

E2 Face
1500.000MHz
2100.000MHz
2600.000MHz

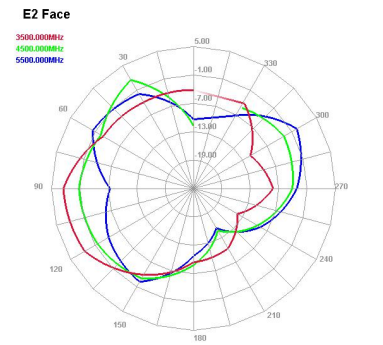

3500.000MHz


4500.000MHz


5500.000MHz

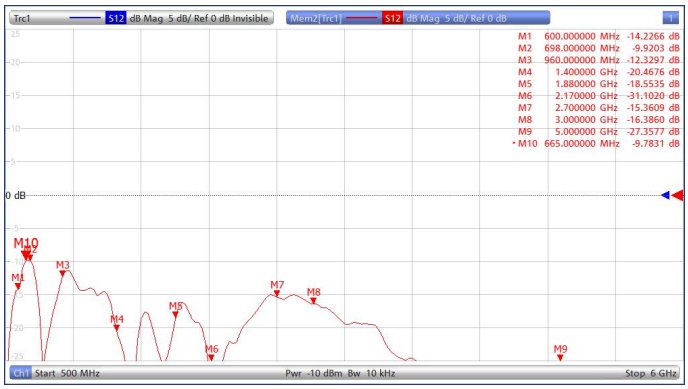

Horizontal
3500.000MHz
4500.000MHz
5500.000MHz


E1 Face
3500.000MHz
4500.000MHz
5500.000MHz

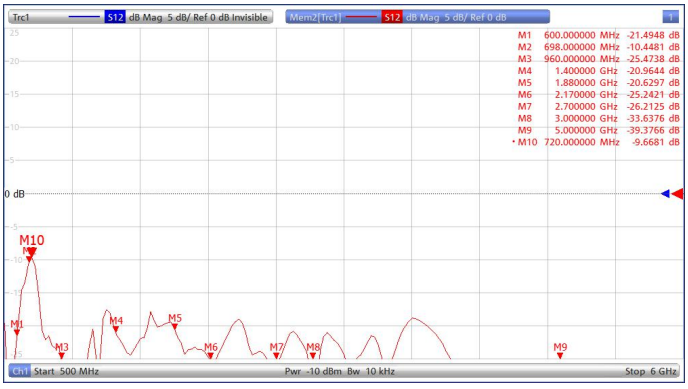

E2 Face
3500.000MHz
4500.000MHz
5500.000MHz

3.5 Isolation

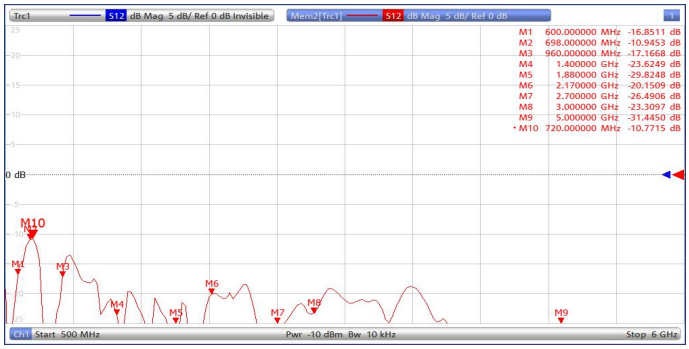
Isolation of cables 1 and 2



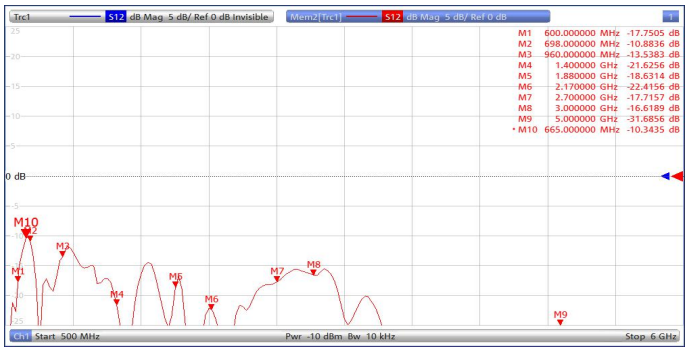
Isolation of cables 1 and 3



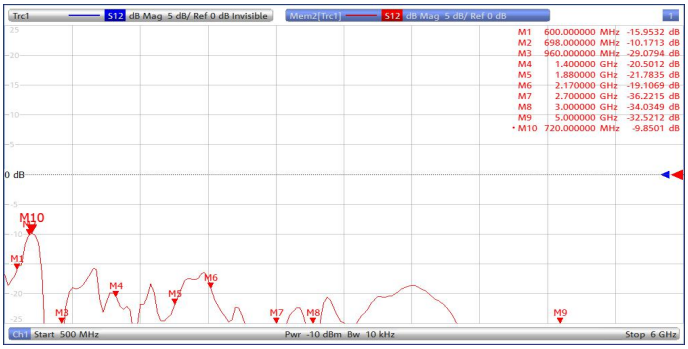
Isolation of cables 1 and 4



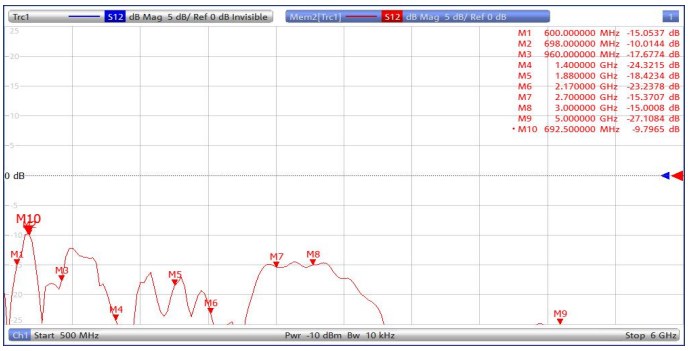
Isolation of cables 2 and 3



Isolation of cables 2 and 4



Isolation of cables 3 and 4

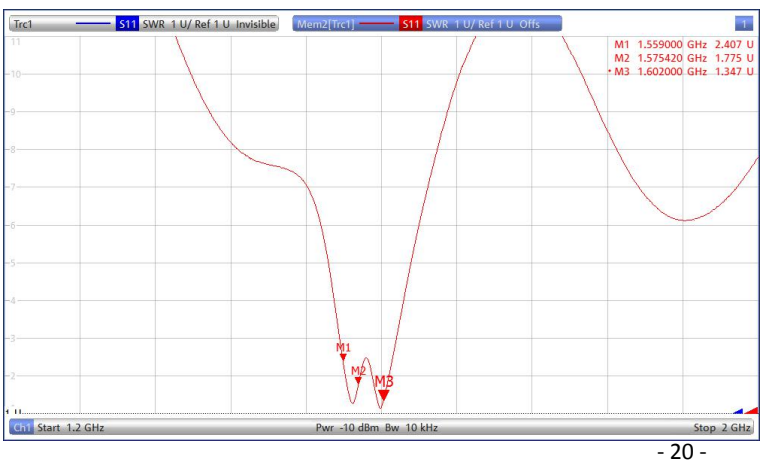


3.6 Cable 5: GNSS

3.6.1 General Data

FRE (MHz)	1559	1575.42	1602
VSWR	2.40	1.77	1.34
Return	-7.69	-11.08	-16.61
Eff (%)	64.8	53.6	58.1
Average	-1.88	-2.71	-2.36

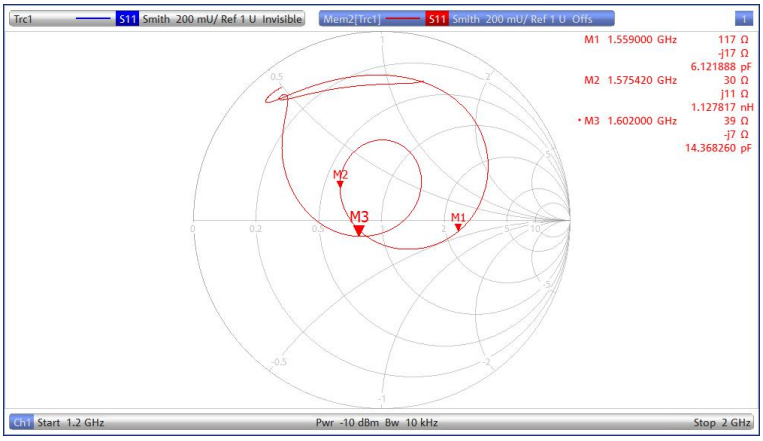
3.6.2 VSWR



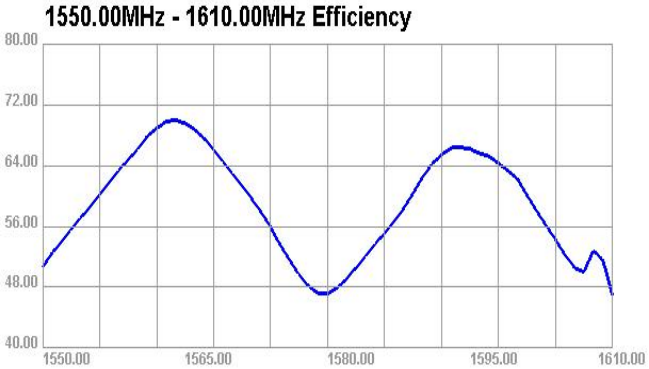
3.6.3 Return Loss



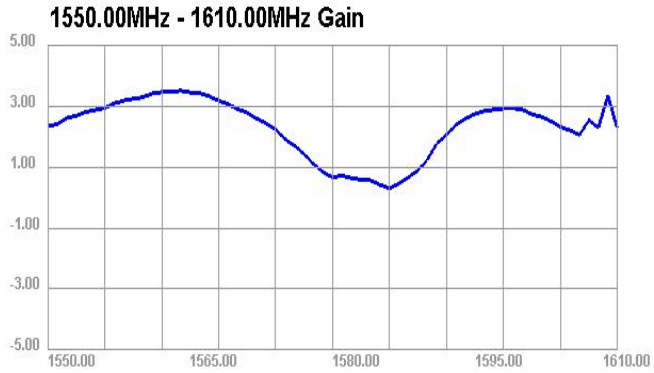
3.6.4 Smith



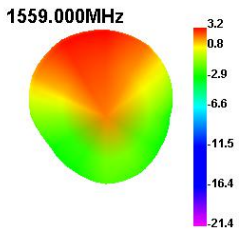
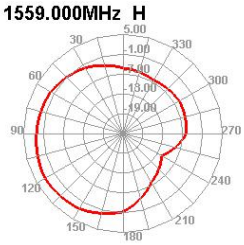
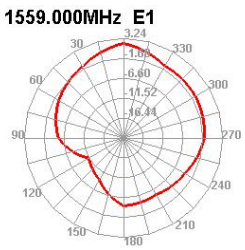
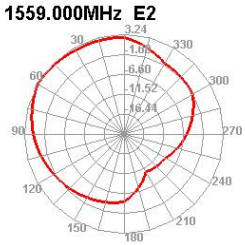
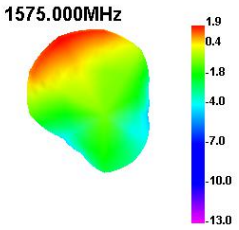
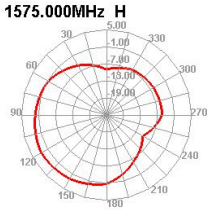
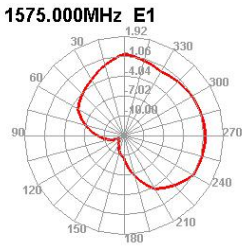
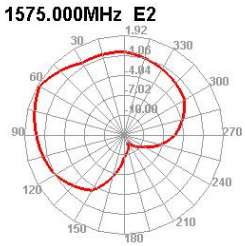
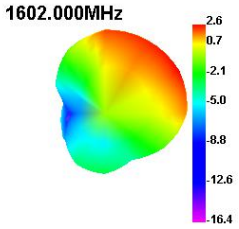
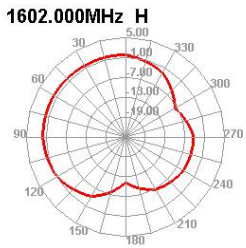
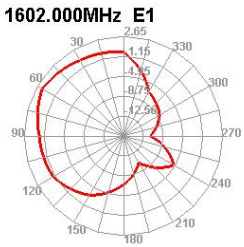
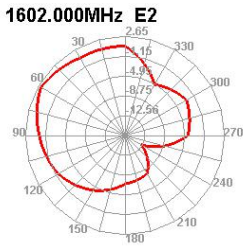
3.6.5 Efficiency



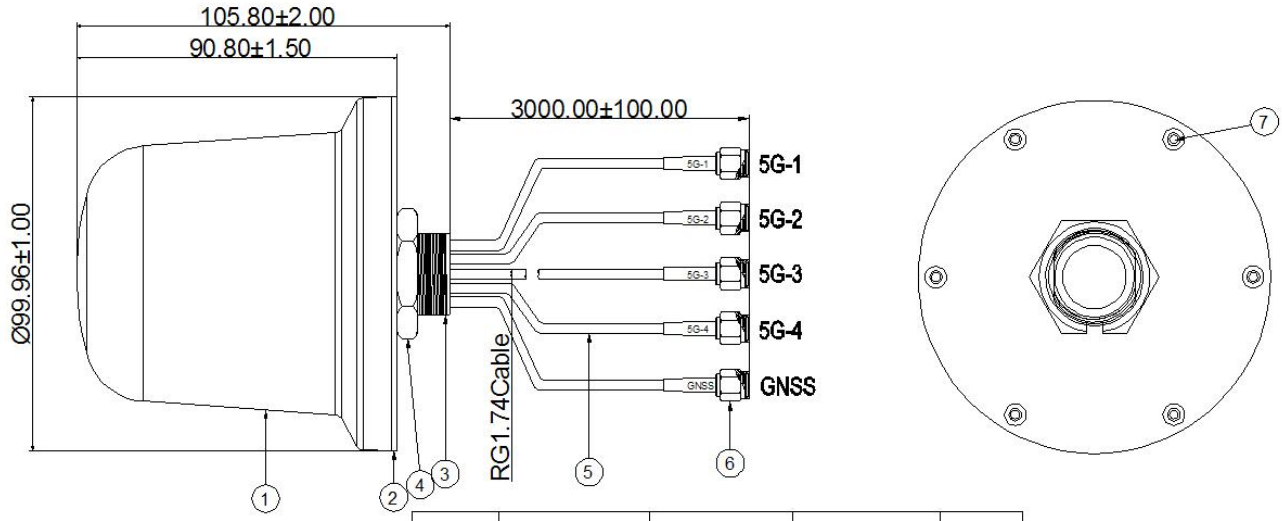
3.6.6 Gain



3.6.7 Directional Pattern

4. Antenna Drawing(Unit:mm)



Series	Component name	Material	Color	Quantity
1	Upper Shell	SABIC PC 1414	black	1
2	Lower Shell	SABIC PC 1414	black	1
3	Screw	brass	Gold	1
4	Nuts	brass	Gold	1
5	Cable	RG174	black	5
6	SMA(M)	brass	Gold	5
7	Screw	M3x5	black	6

Note: Cable Loss

20℃时衰减（允许误差15%） Attenuation constant at 20℃ （Permissible error 15%）	200MHz	dB/100m	39
	400MHz	dB/100m	58
	900MHz	dB/100m	90
	1500MHz	dB/100m	117
	1800MHz	dB/100m	128
	2000MHz	dB/100m	139
	2500MHz	dB/100m	156