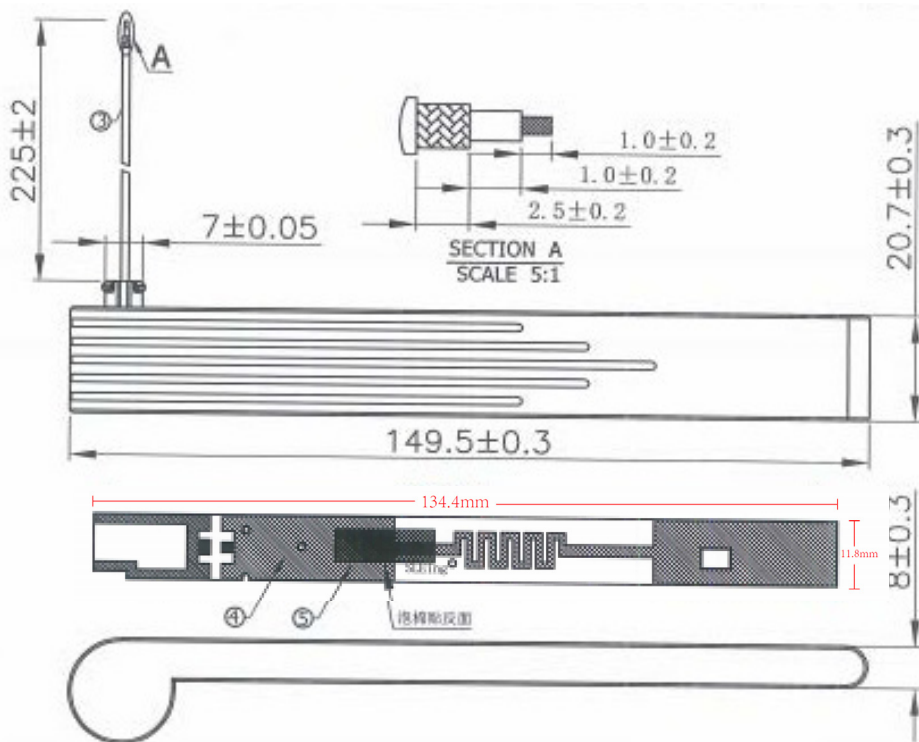


## Antenna Specification

Technical Parameter	Indicator requirements
Antenna type	Monopole
Antenna size	2.4G:134.4*11.8mm(without cable) 5G:110.7*11.1mm(without cable)
Antenna polarization	Vertical polarization
Frequency range	2.4-2.5GHz 5.15-5.85GHz
VSWR	$\leq 10$
Isolation	$\leq 20$
Gain	$5 \pm 0.5\text{dB}$
Efficiency	$> 60\%$
Manufacturer	Dongguan Senling Intelligent Technology Co., Ltd
Address	Room 402, Building 6, Modern Enterprise Accelerator, Dongguan City

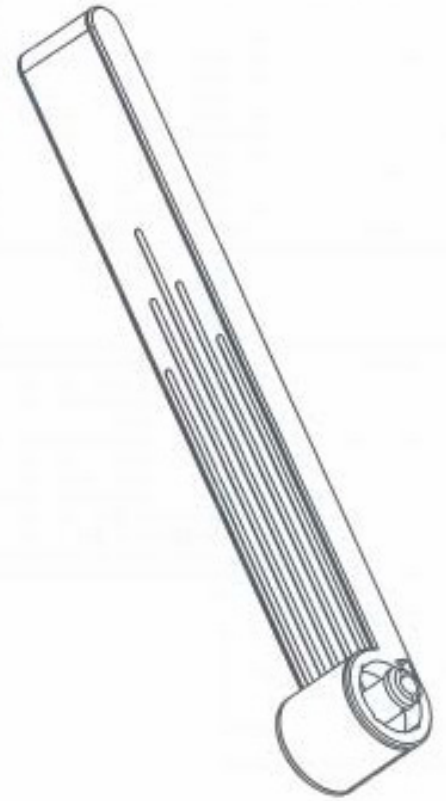
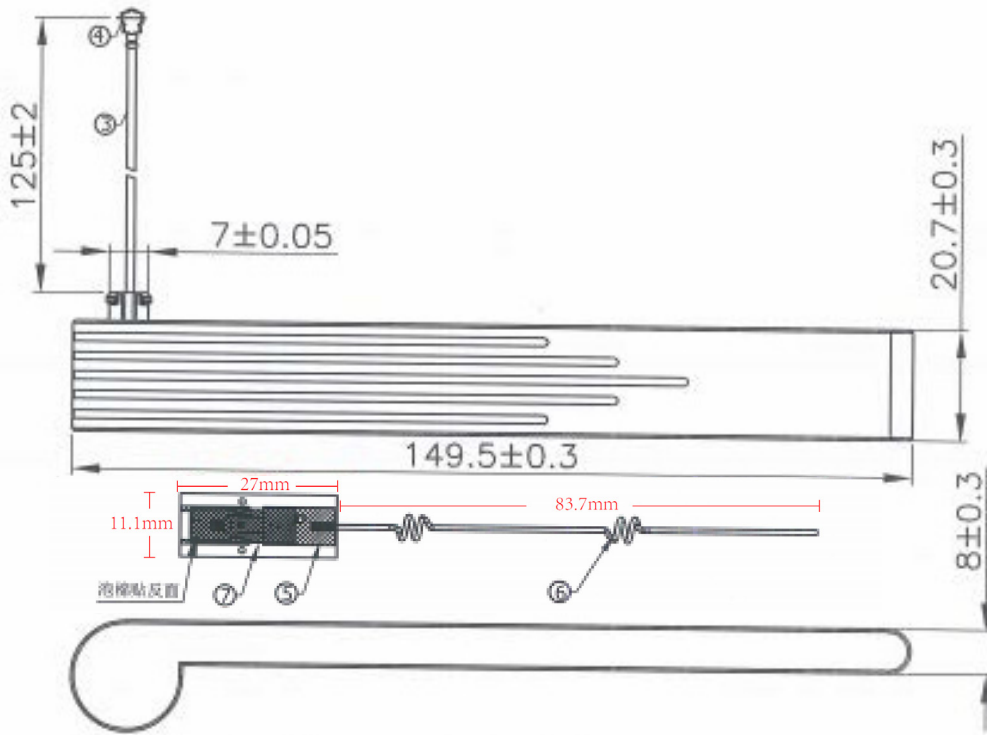
2.4G Antenna

Unit: mm



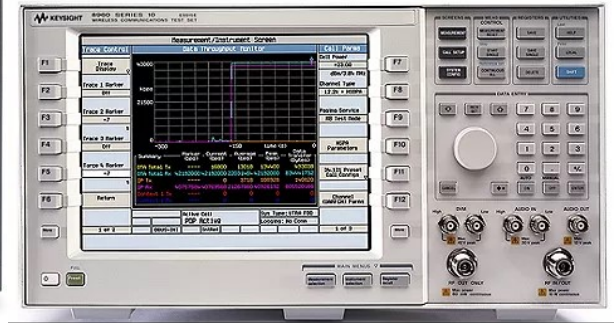
5G Antenna

Unit: mm



## Test equipment and setup

1. Network Analyzers: Keysight E5063A ENA
2. Communications Test Set: Agilent E5515C
3. OTA Test System: 743 far-field method darkroom

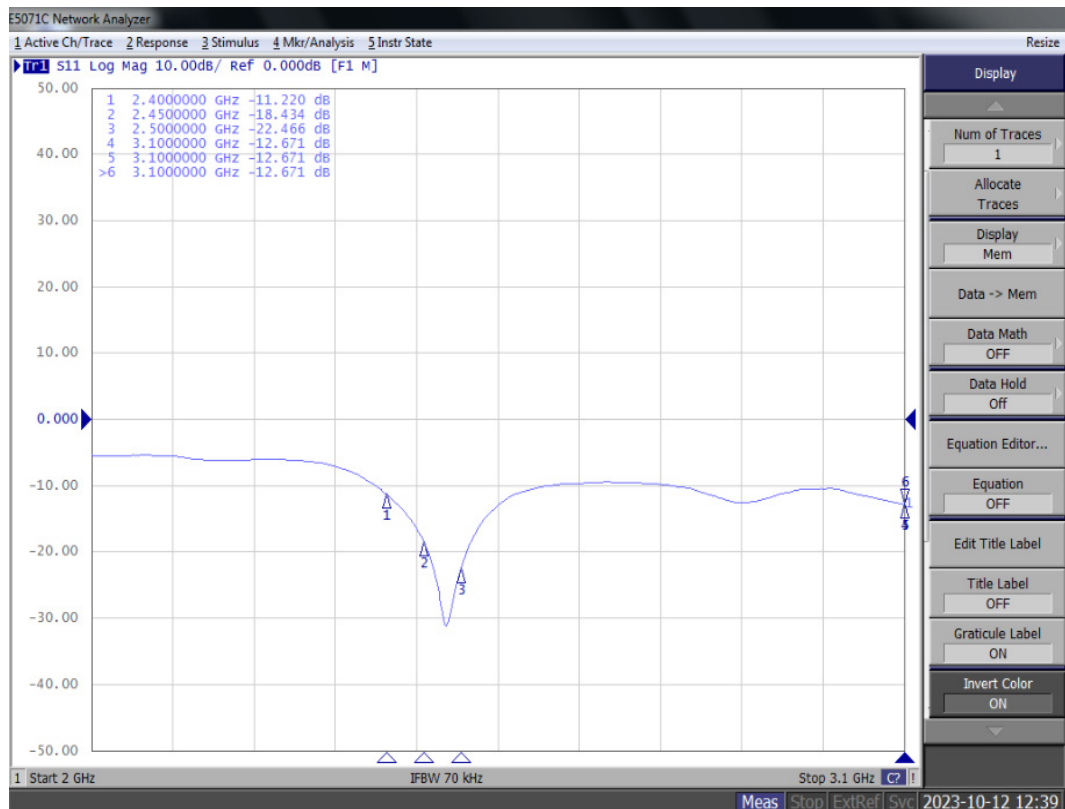


### Test data

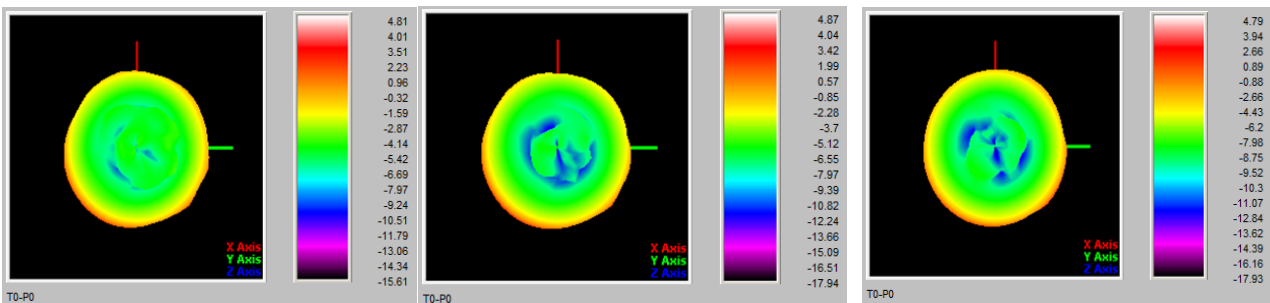
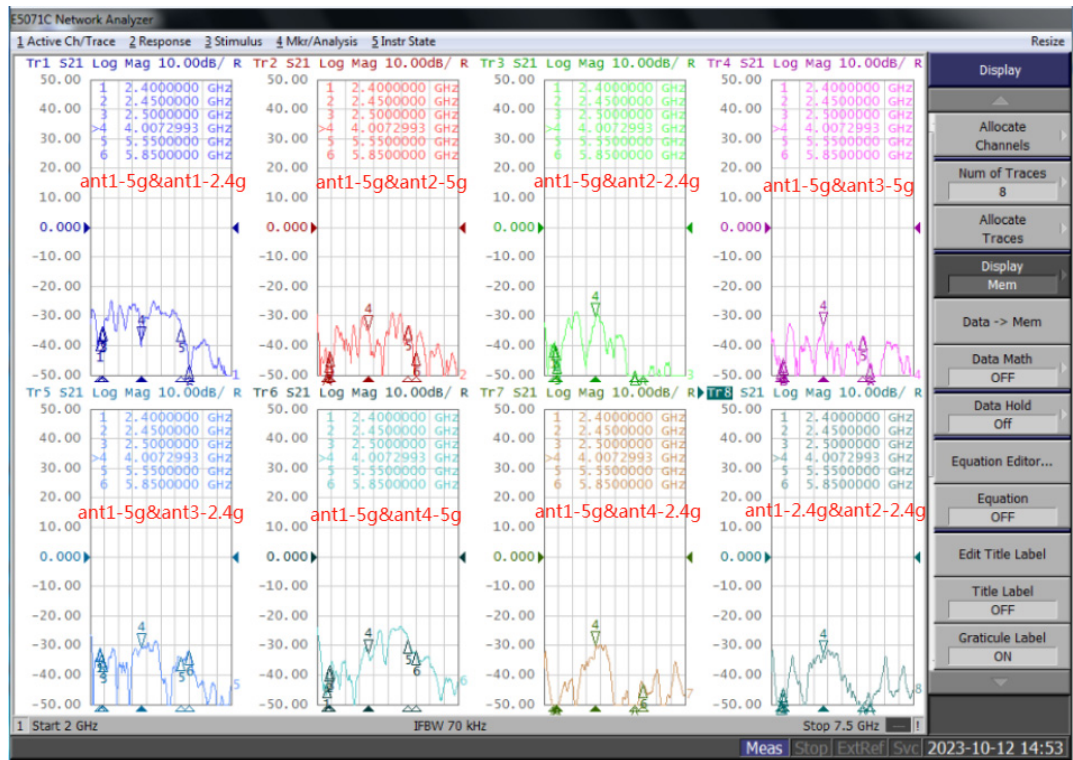
2.4G-1 Antenna: 2400-2500MHz

ANT1	gain	efficiency
Freq. (MHz)		
2400	4.81	65.5
2410	5.04	67.8
2420	5.16	68.6
2430	4.72	69.7
2440	4.69	67.9
2450	4.87	69.9
2460	5.13	70.4
2470	4.91	71.2
2480	4.73	70.5
2490	4.57	72.8
2500	4.79	73.3

### Return Loss Test

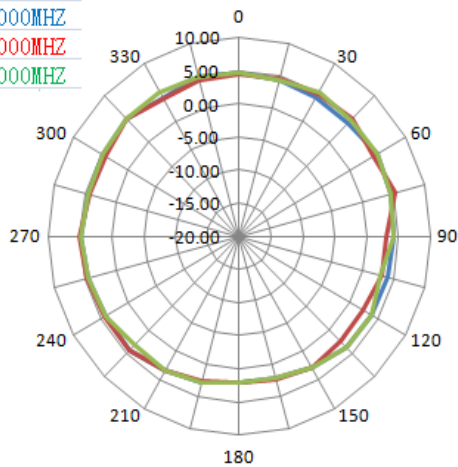


## Isolation testing



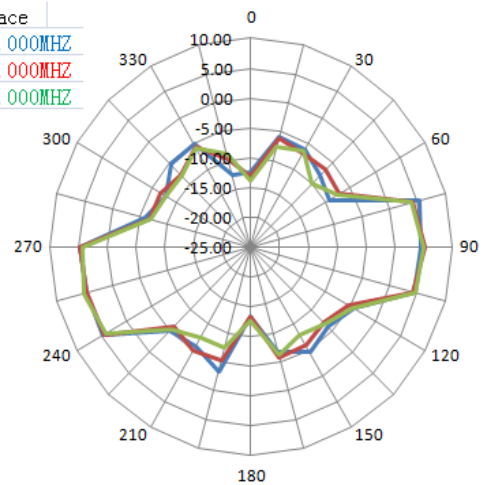
Horizontal

2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



E1 Face

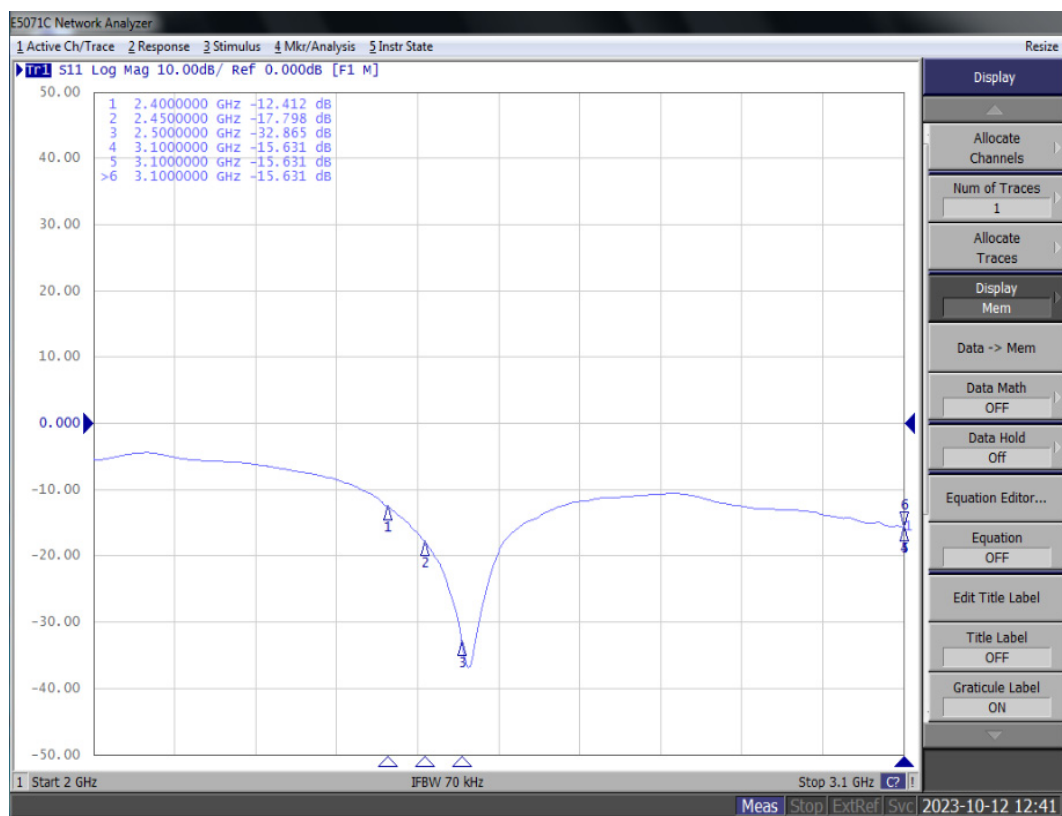
2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



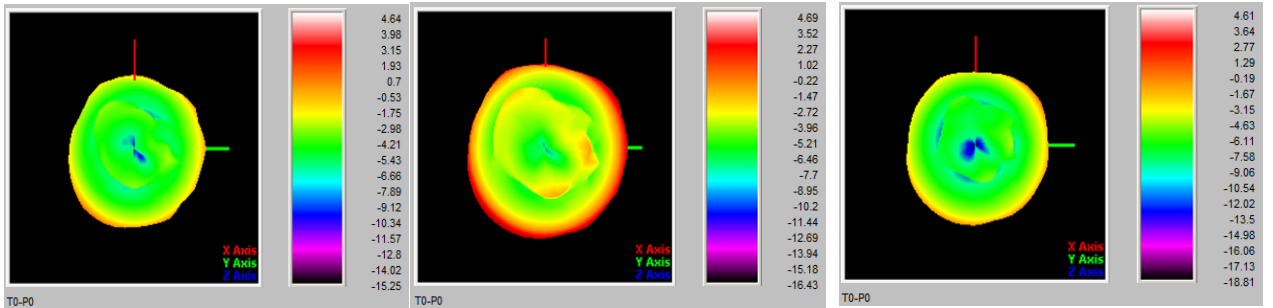
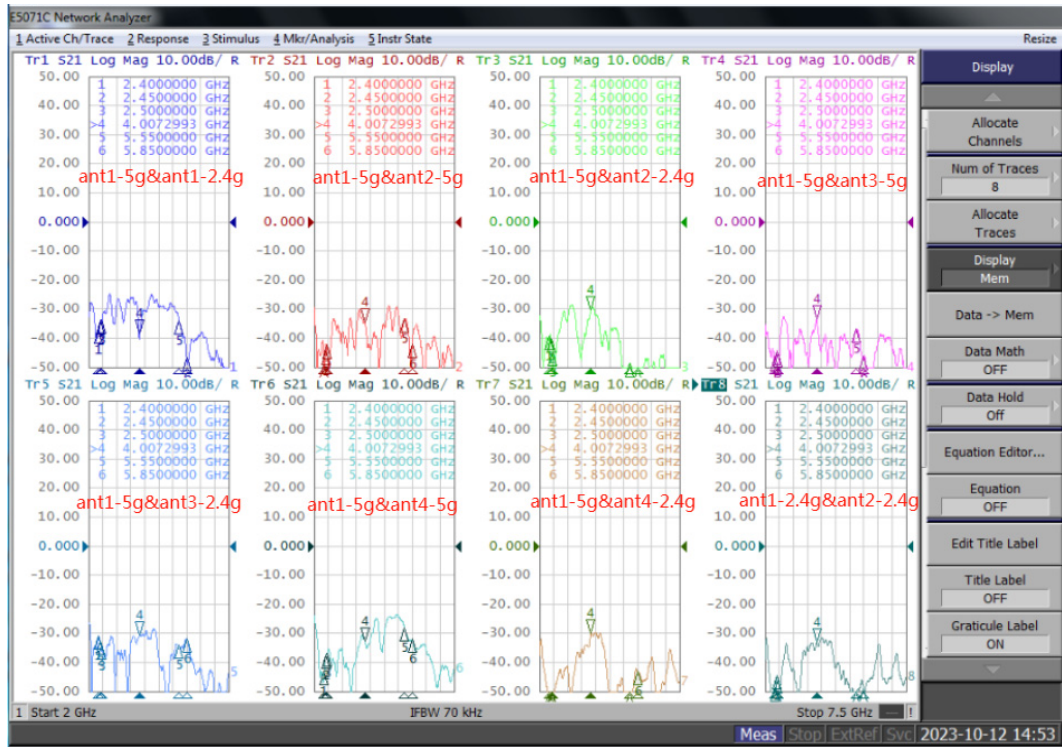
### 2.4G-2 Antenna: 2400-2500MHz

ANT2	gain	efficiency
Freq. (MHz)		
2400	4.64	64.3
2410	4.75	65.1
2420	4.56	66.7
2430	4.83	65.8
2440	4.71	66.9
2450	4.69	68.3
2460	4.53	69.7
2470	4.72	68.2
2480	4.86	69.4
2490	4.54	70.2
2500	4.61	71.8

### Return Loss Test

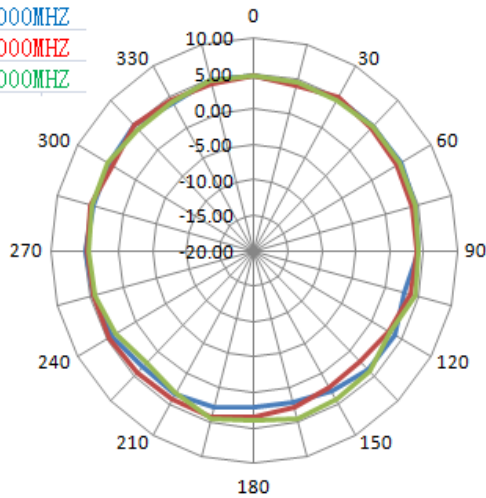


## Isolation testing



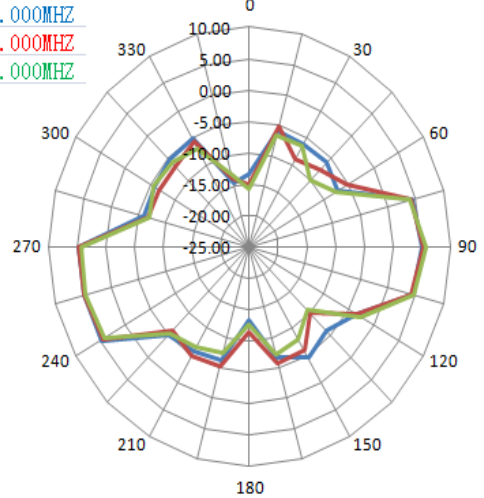
### Horizontal

2400.000MHZ  
2450.000MHZ  
2500.000MHZ



### E1 Face

2400.000MHZ  
2450.000MHZ  
2500.000MHZ

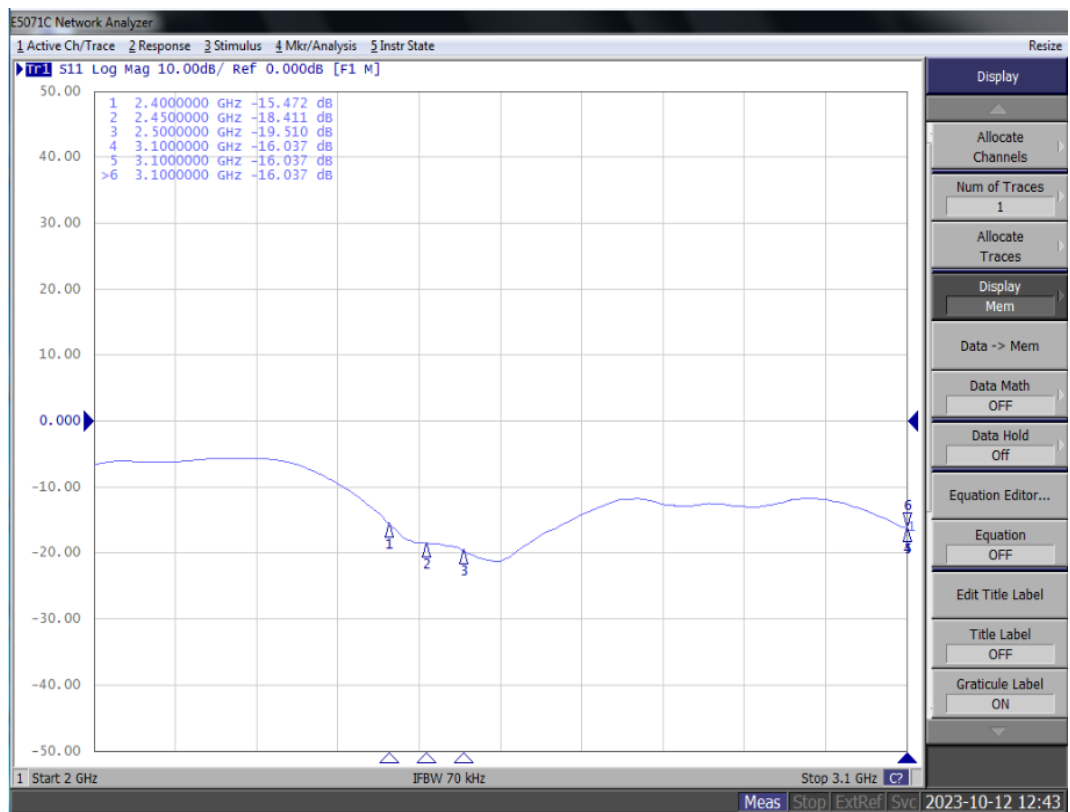




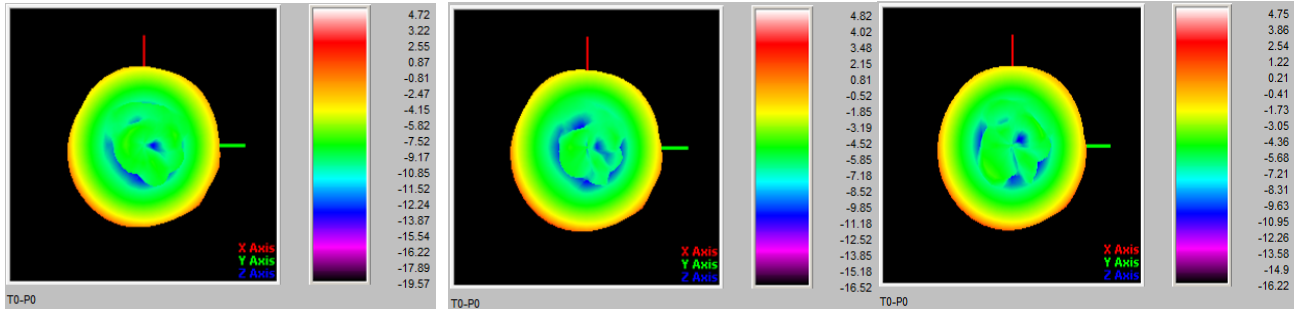
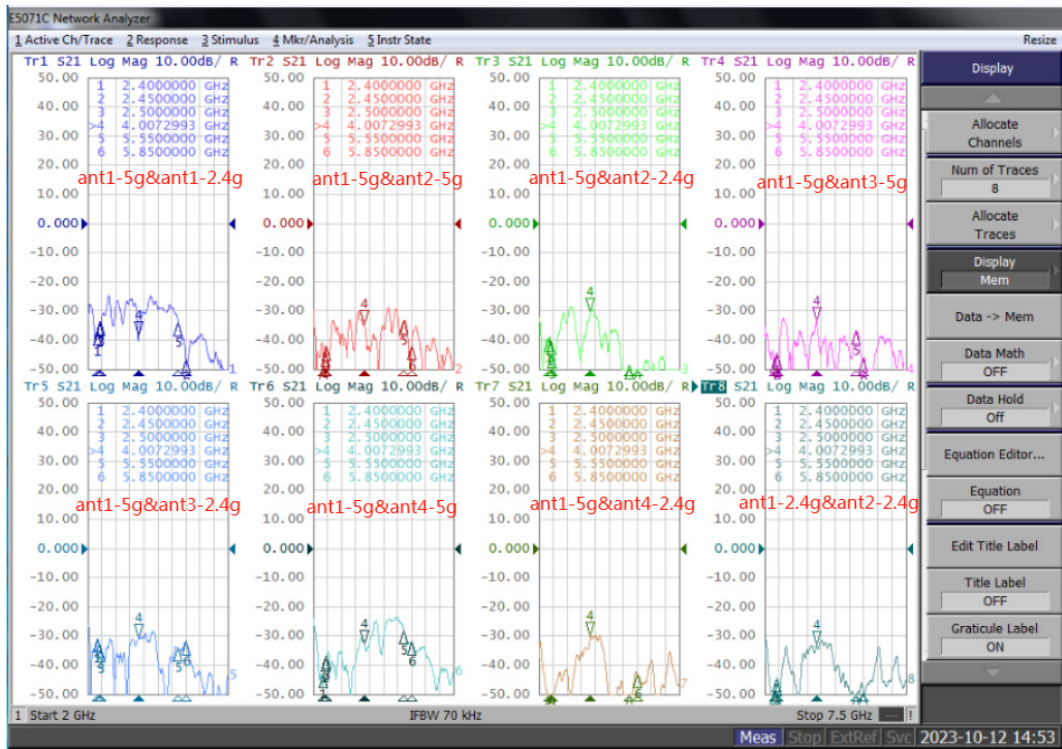
### 2.4G-3 Antenna: 2400-2500MHz

ANT3	gain	efficiency
Freq. (MHz)		
2400	4.72	65.3
2410	4.88	66.9
2420	5.02	67.4
2430	4.91	68.3
2440	4.77	66.7
2450	4.82	68.2
2460	5.05	69.7
2470	4.83	70.5
2480	4.65	69.4
2490	4.94	71.2
2500	4.75	72.1

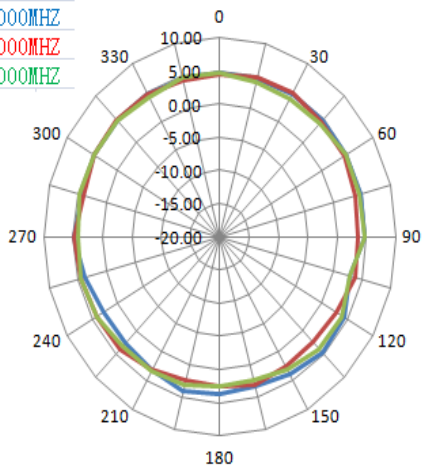
### Return Loss Test



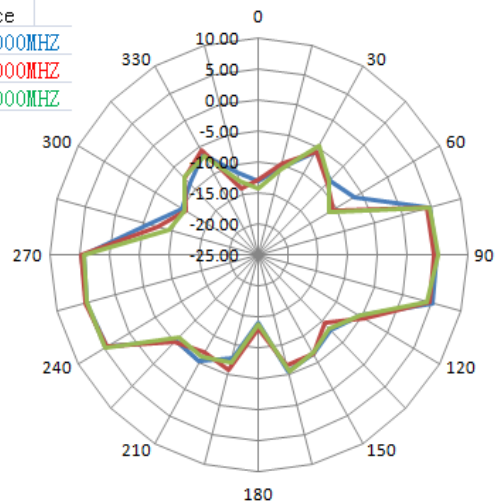
## Isolation testing



Horizontal  
 2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



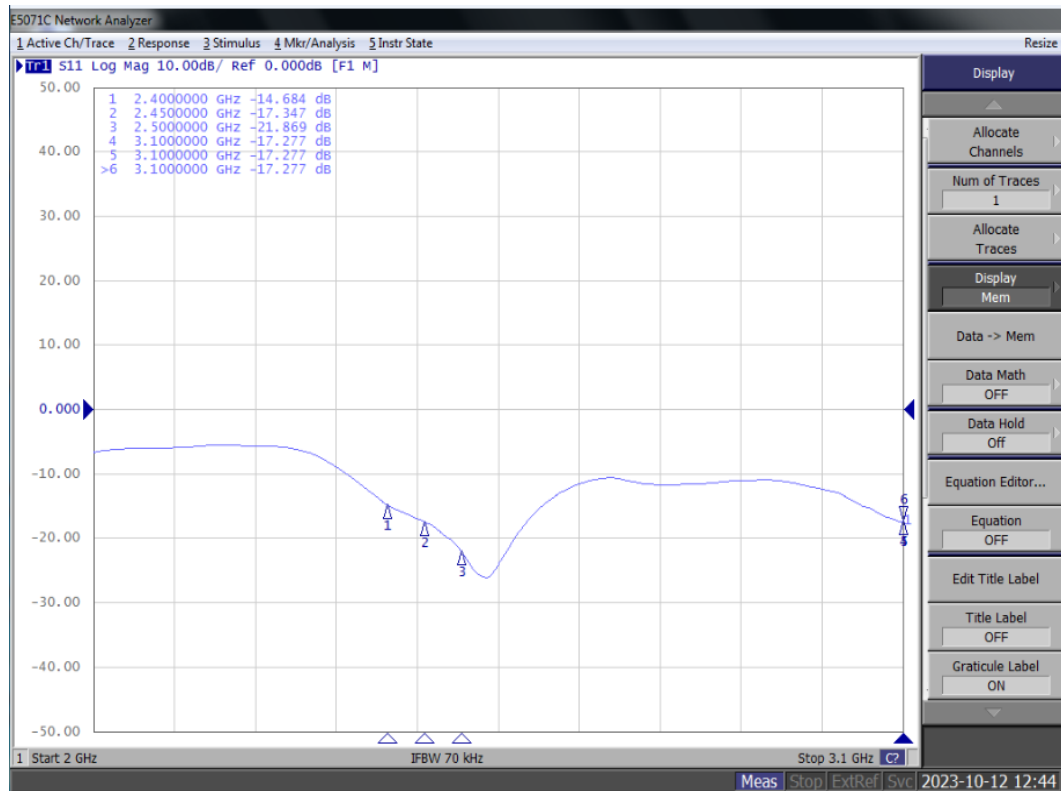
E1 Face  
 2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



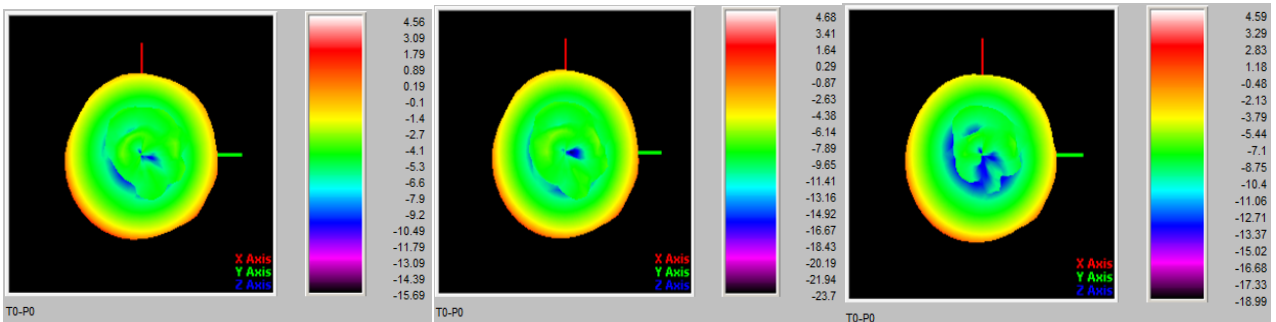
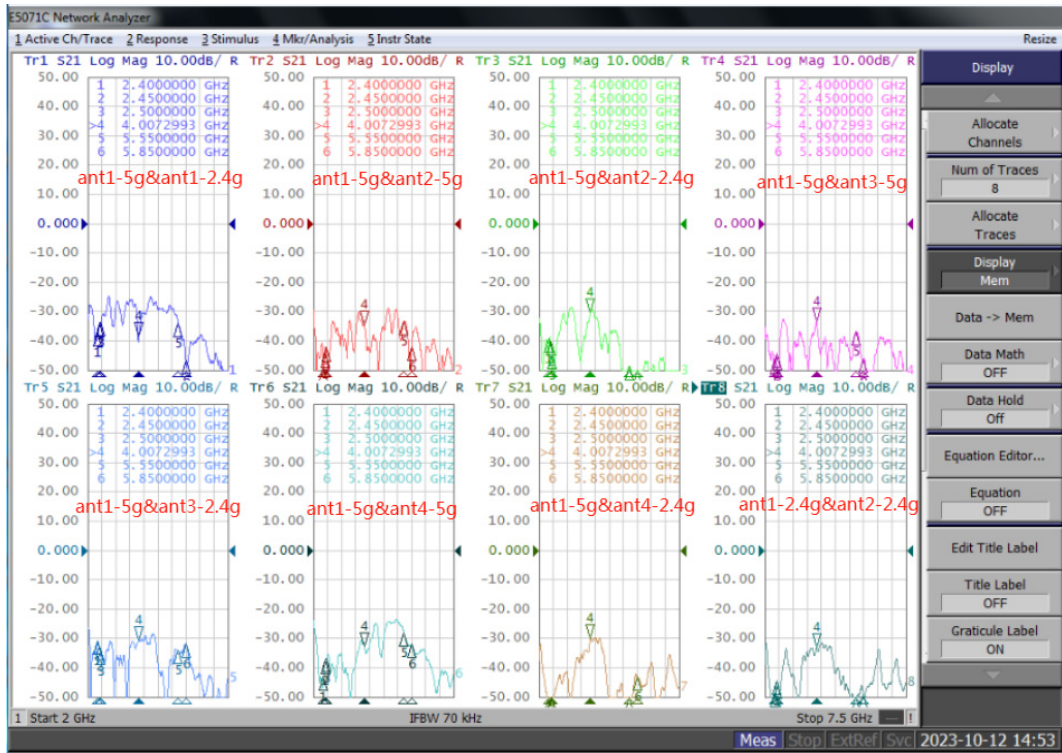
2.4G-4 Antenna: 2400-2500MHz

ANT4	gain	efficiency
Freq. (MHz)		
2400	4.56	65.9
2410	4.78	65.3
2420	4.86	66.7
2430	5.12	67.5
2440	4.94	68.4
2450	4.68	69.1
2460	5.01	71.2
2470	4.68	71.8
2480	4.81	72.5
2490	4.77	73.4
2500	4.59	74.2

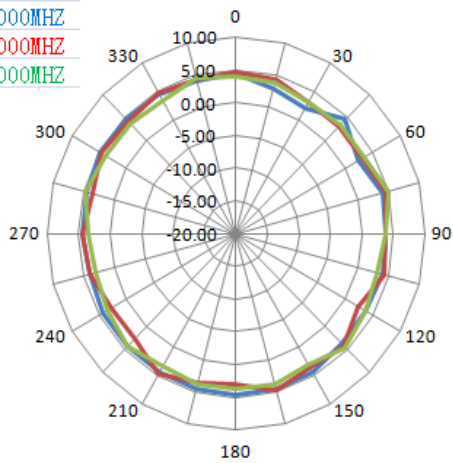
Return Loss Test



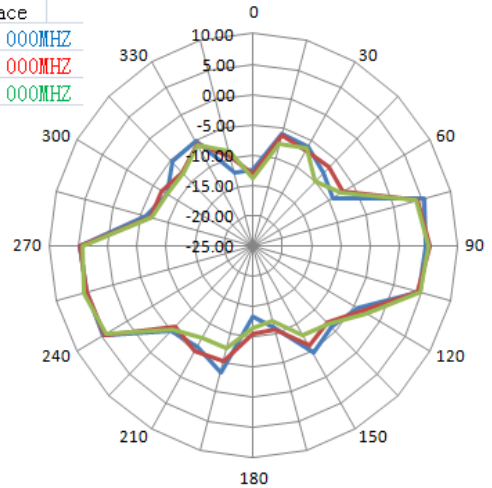
## Isolation testing



Horizontal  
 2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



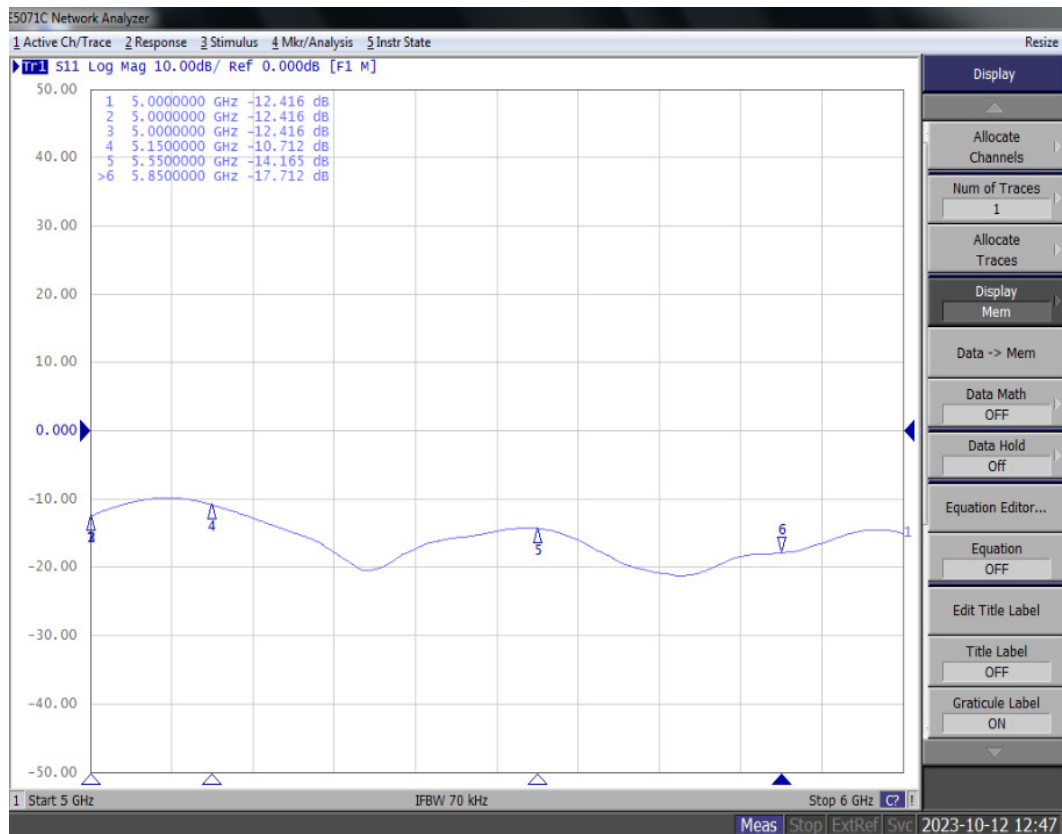
E1 Face  
 2400.000MHZ  
 2450.000MHZ  
 2500.000MHZ



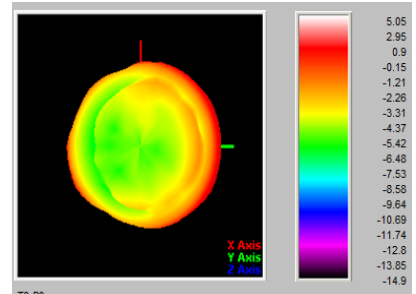
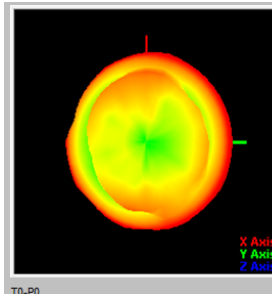
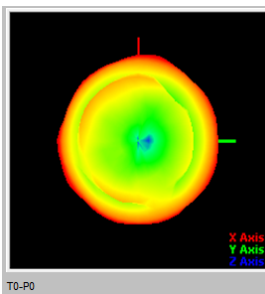
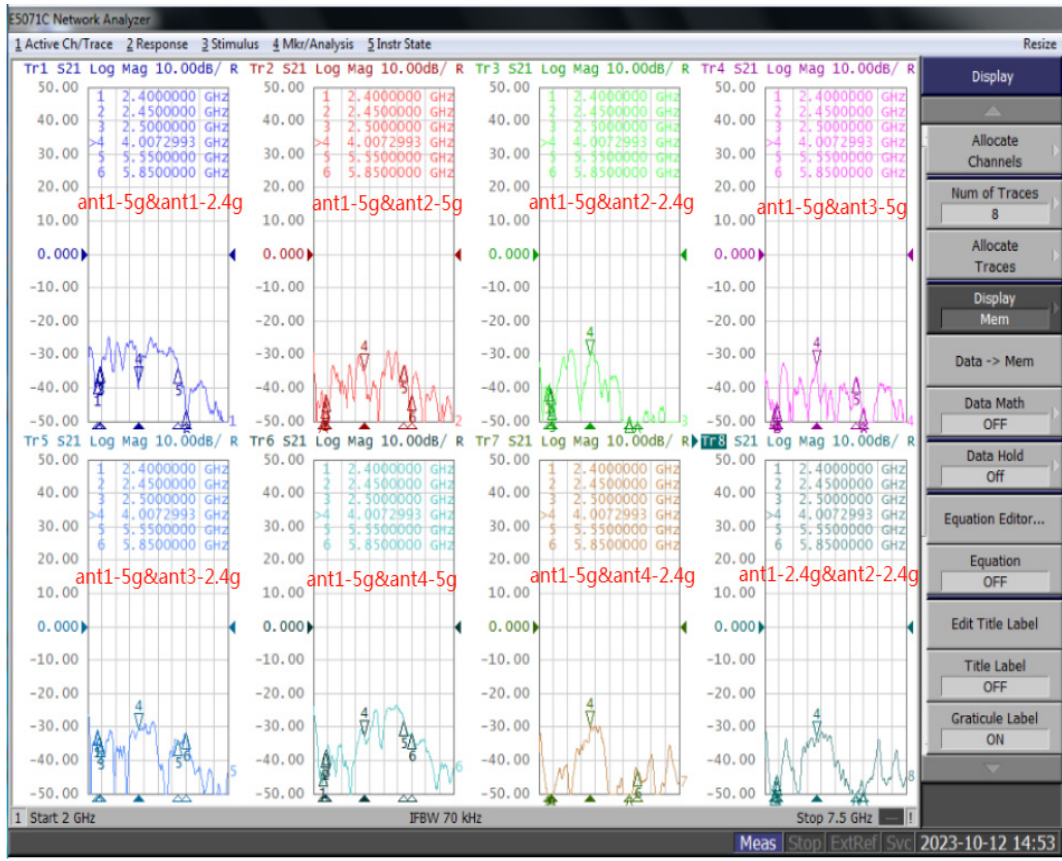
5G-1 Antenna: 5150-5850MHz

ANT1	gain	efficiency
Freq. (MHz)		
5150	5.08	68.5
5200	4.83	67.1
5250	4.92	69.3
5300	5.11	67.2
5350	4.92	65.8
5400	4.81	66.4
5450	5.13	67.2
5500	5.06	69.1
5550	4.78	65.5
5600	4.69	67.9
5650	4.98	68.7
5700	5.09	65.9
5750	4.81	69.2
5800	4.93	67.1
5850	5.05	66.5

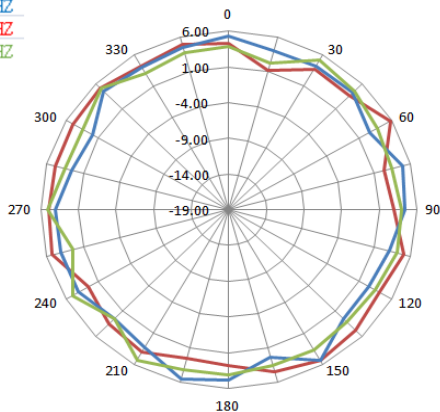
Return Loss Test



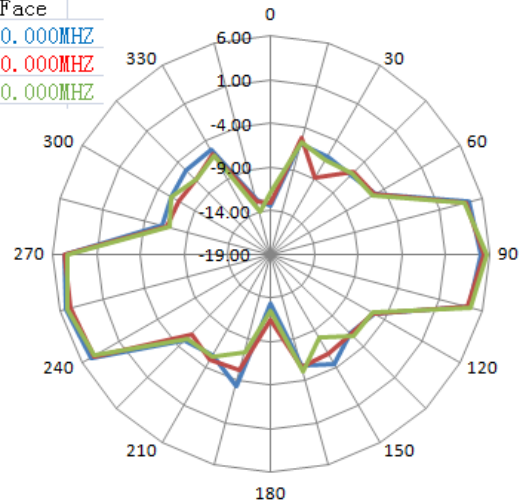
## Isolation testing



Horizontal  
5150.000MHZ  
5500.000MHZ  
5850.000MHZ



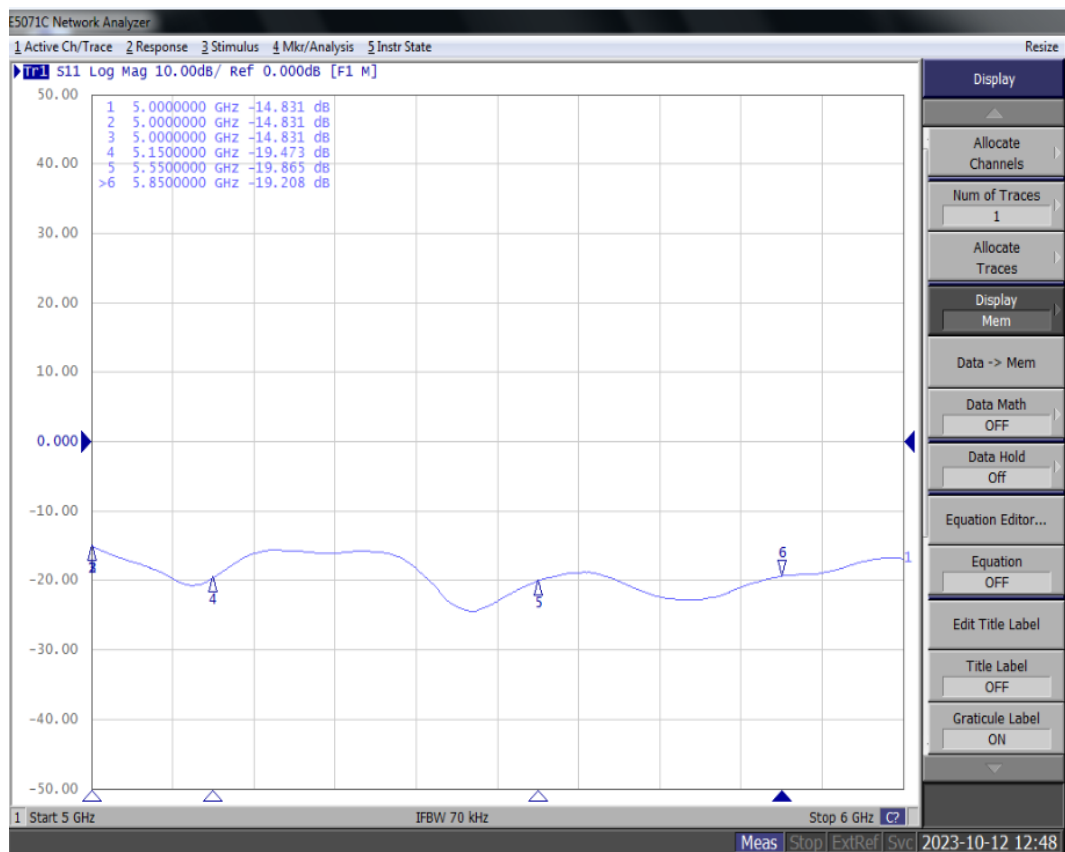
E1 Face  
5150.000MHZ  
5500.000MHZ  
5850.000MHZ



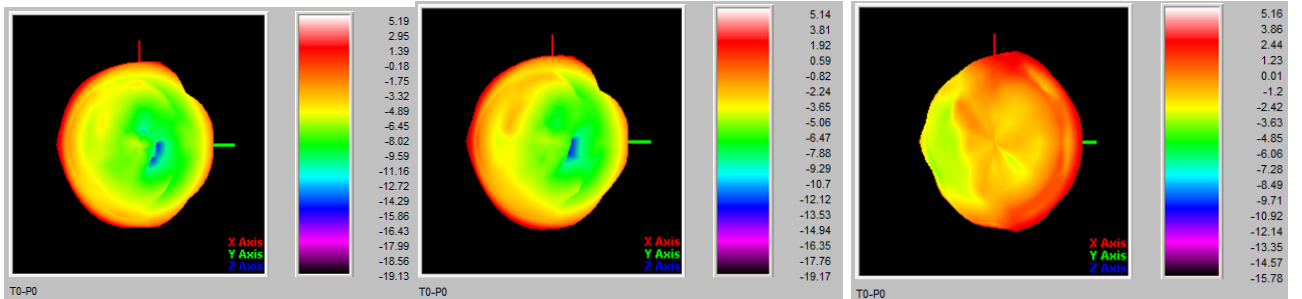
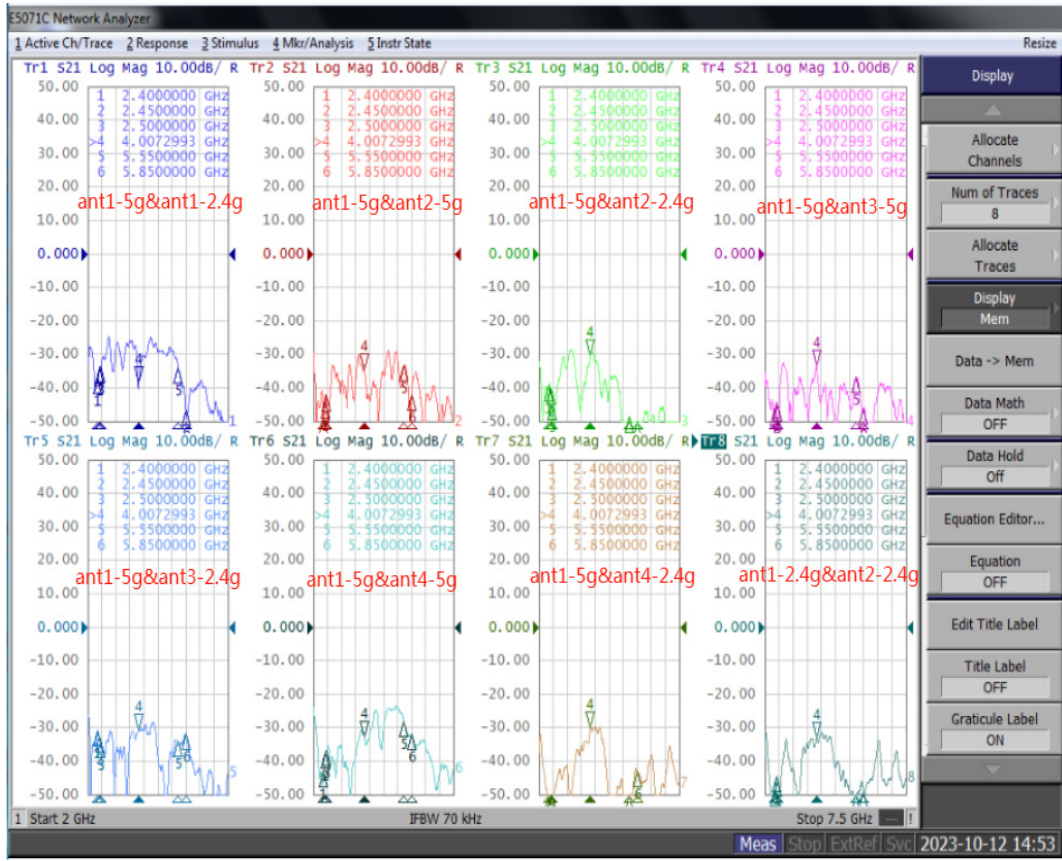
5G-2 Antenna: 5150-5850MHz

ANT2	gain	efficiency
Freq. (MHz)		
5150	5.19	67.2
5200	4.78	65.8
5250	5.12	66.3
5300	4.89	69.1
5350	4.79	67.5
5400	4.93	65.9
5450	5.01	68.4
5500	5.14	67.2
5550	4.94	68.5
5600	4.87	66.8
5650	4.75	67.3
5700	4.89	68.1
5750	4.79	66.9
5800	5.02	65.9
5850	5.16	68.7

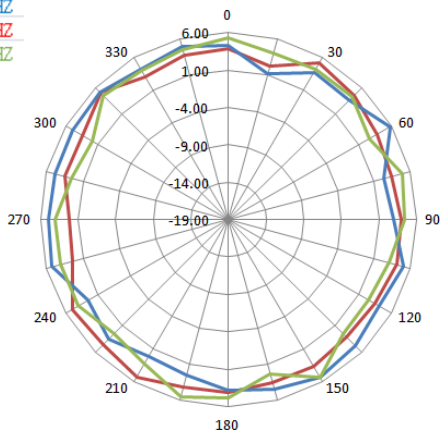
Return Loss Test



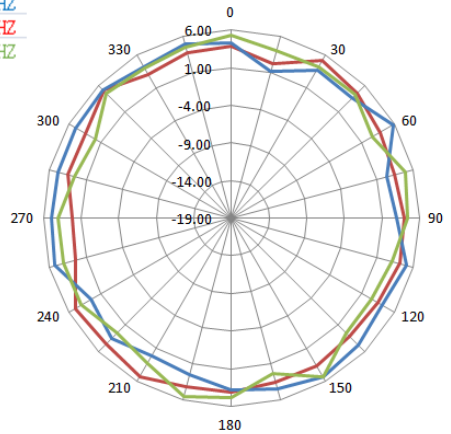
## Isolation testing



Horizontal  
 5150.000MHZ  
 5500.000MHZ  
 5850.000MHZ



Horizontal  
 5150.000MHZ  
 5500.000MHZ  
 5850.000MHZ

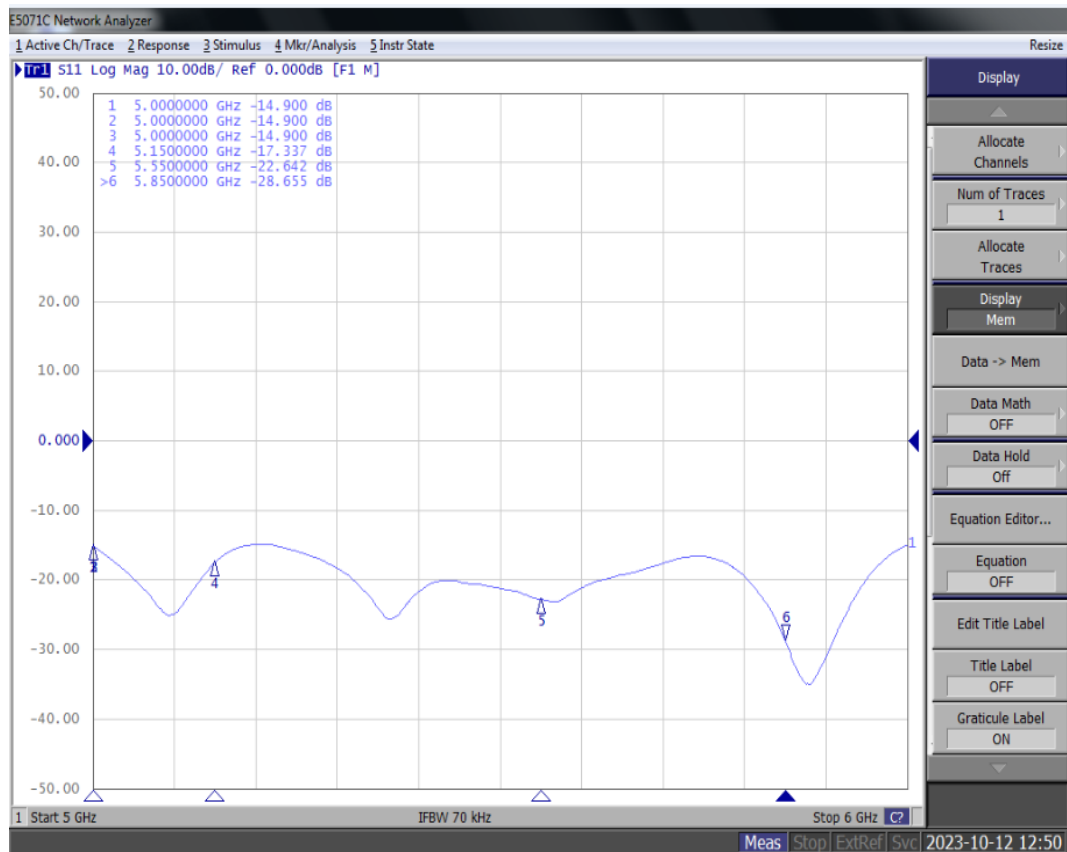




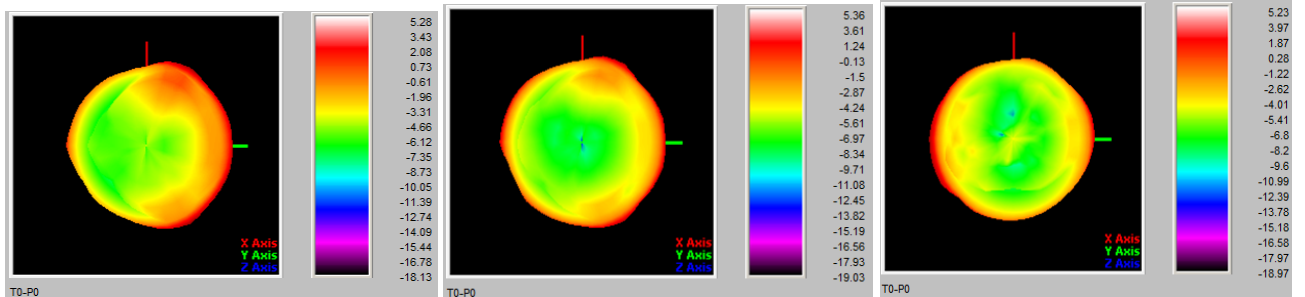
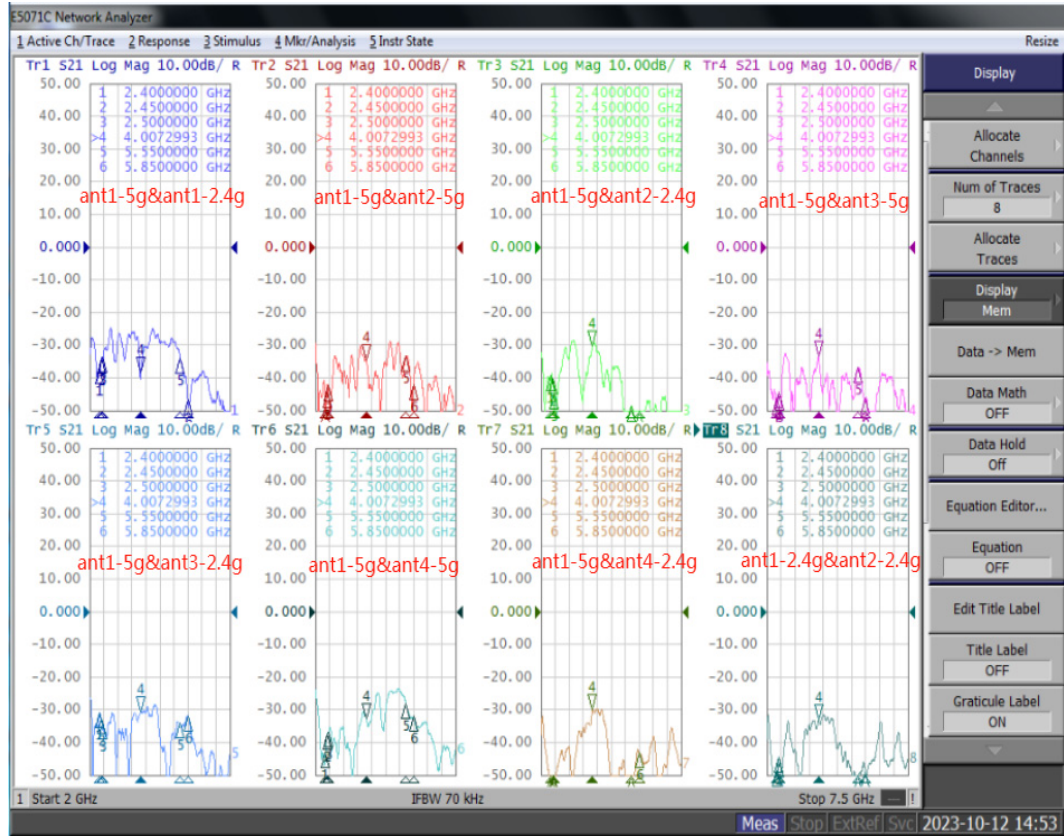
5G-3 Antenna: 5150-5850MHz

ANT3	gain	efficiency
Freq. (MHz)		
5150	5.28	68.9
5200	5.02	66.9
5250	5.13	67.8
5300	5.37	66.5
5350	4.93	69.4
5400	4.75	67.6
5450	5.14	69.1
5500	5.36	67.3
5550	5.15	66.8
5600	4.87	69.9
5650	4.78	65.7
5700	5.17	66.4
5750	4.82	67.8
5800	4.98	66.7
5850	5.23	68.8

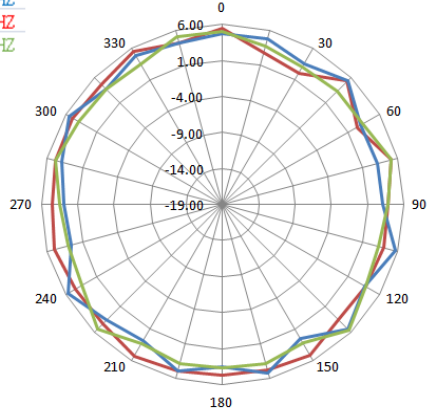
Return Loss Test



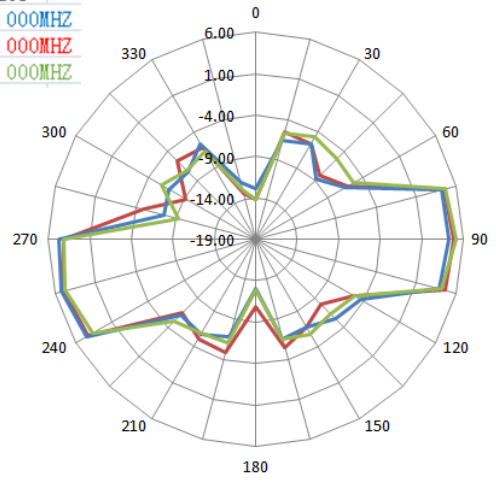
## Isolation testing



Horizontal  
5150.000MHZ  
5500.000MHZ  
5850.000MHZ



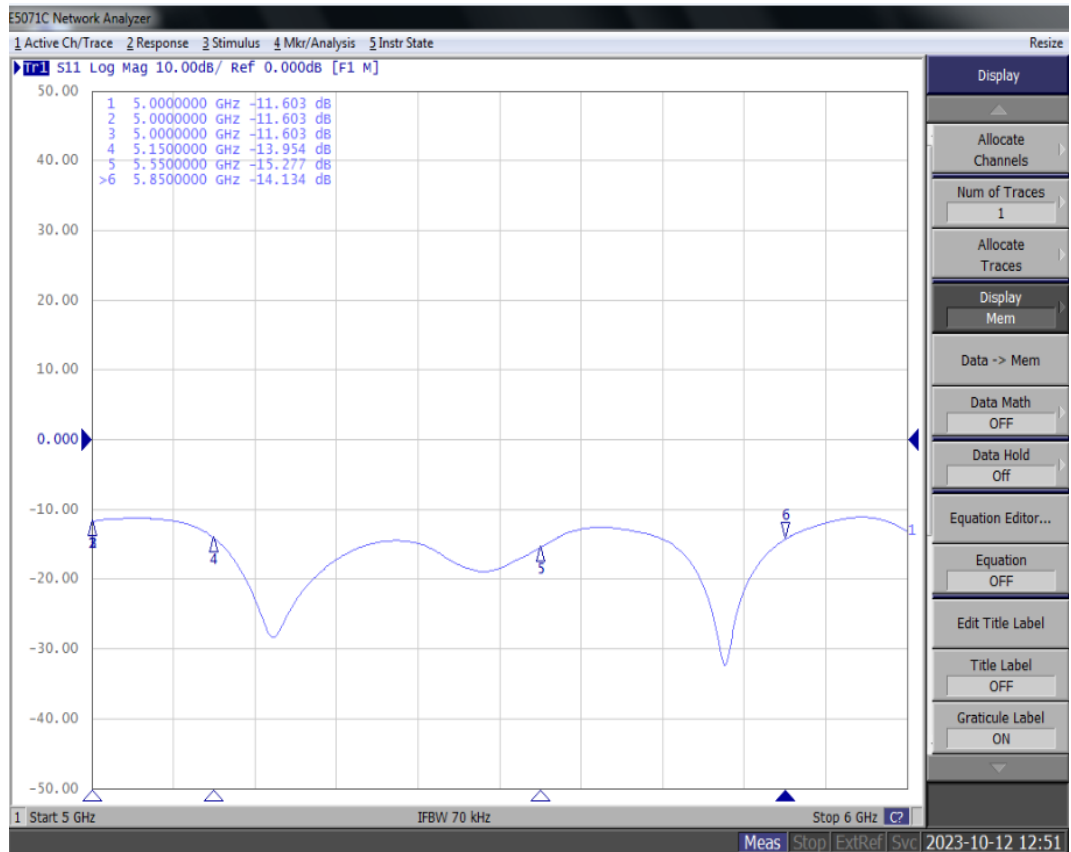
E1 Face  
5150.000MHZ  
5500.000MHZ  
5850.000MHZ



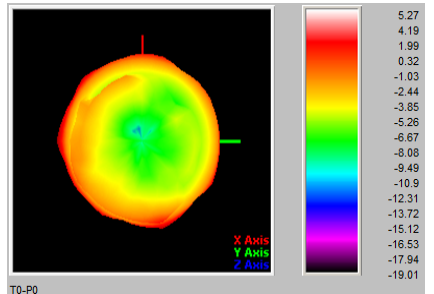
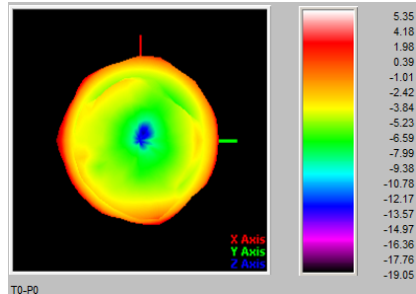
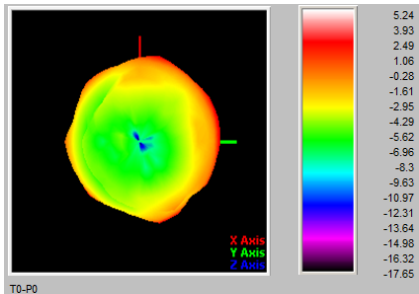
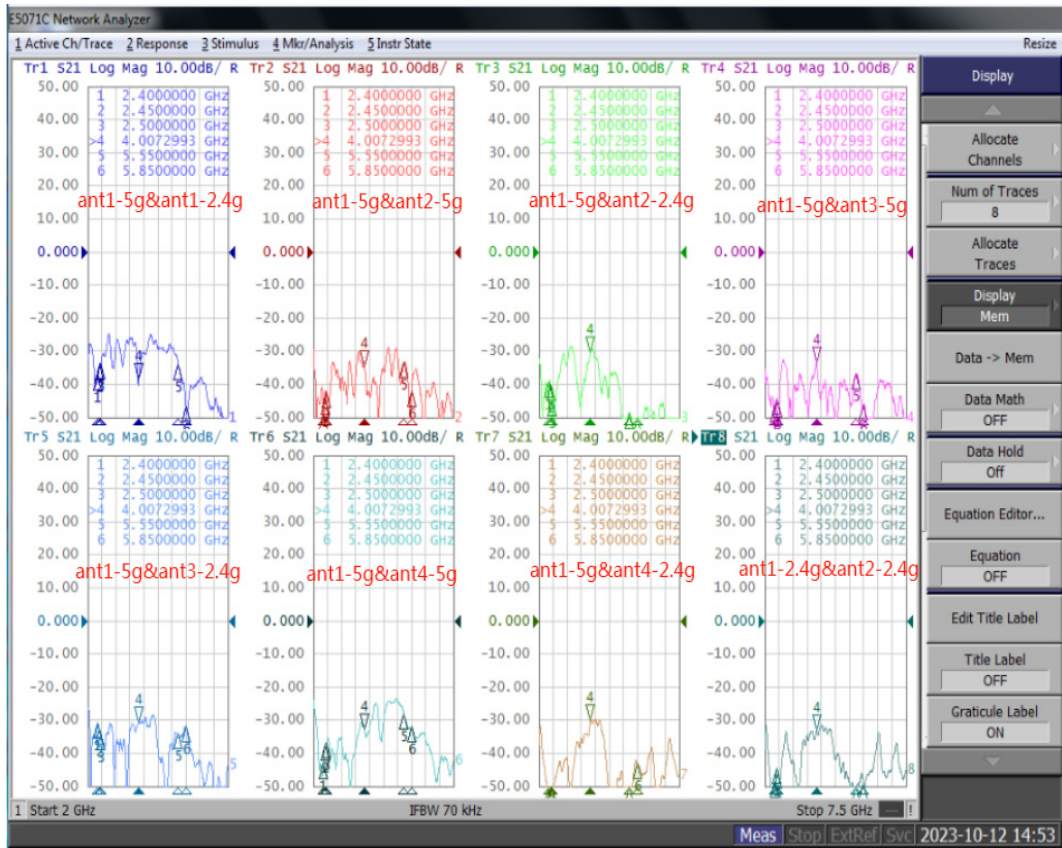
5G-4 Antenna: 5150-5850MHz

ANT4	gain	efficiency
Freq. (MHz)		
5150	5.24	69.2
5200	4.81	66.8
5250	4.98	67.3
5300	5.28	65.7
5350	4.83	69.6
5400	4.97	67.4
5450	5.19	65.2
5500	5.35	66.1
5550	4.88	69.5
5600	4.95	68.8
5650	5.16	67.7
5700	5.29	66.9
5750	4.92	65.2
5800	5.13	69.1
5850	5.27	68.3

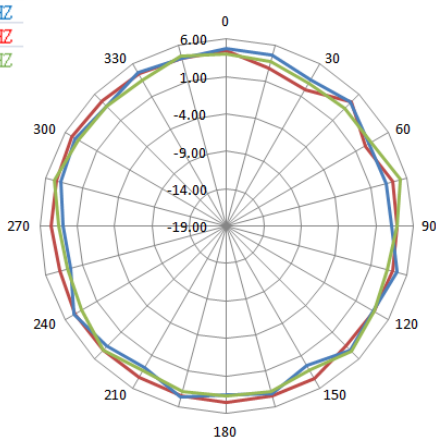
Return Loss Test



## Isolation testing



Horizontal  
 5150.000MHZ  
 5500.000MHZ  
 5850.000MHZ



E1 Face  
 5150.000MHZ  
 5500.000MHZ  
 5850.000MHZ

