

FGA2235

Antenna test report



Version: V 7.1
Released Date:10/10/2023
Prepared By: HU XUCHENG
Reviewed By:

- Revised History
- Device Overview
- Antenna Mockup Placement
- Test Setup for Radiation Pattern Measurement
- Antenna Design Data
 - Return loss
 - Isolation
 - Peak gain, efficiency
 - Radiation pattern

Report History

Date	Version	Remarks
2020-05-13	V1.0	Antenna test report for mockup.
2020-06-11	V2.0	Antenna test report for Lab2.
2020-06-15	V2.1	Update 2G1/2G3 components
2020-07-28	V3.0	Antenna test report for Lab3.
2022-01-25	V4.0	Antenna test report for 5G1&5G2.
2022-07-08	V5.0	Antenna retest report for 5G1&5G2.
2022-07-14	V6.0	Antenna test report for 5G1&5G2 with different matching components.
2023-10-07	V7.0	Change antenna naming, add 2G antenna performances
2023-10-10	V7.1	Coming back to initial antenna naming, Add antenna dimensions and impedance matching circuit Add gain tables

Device Overview

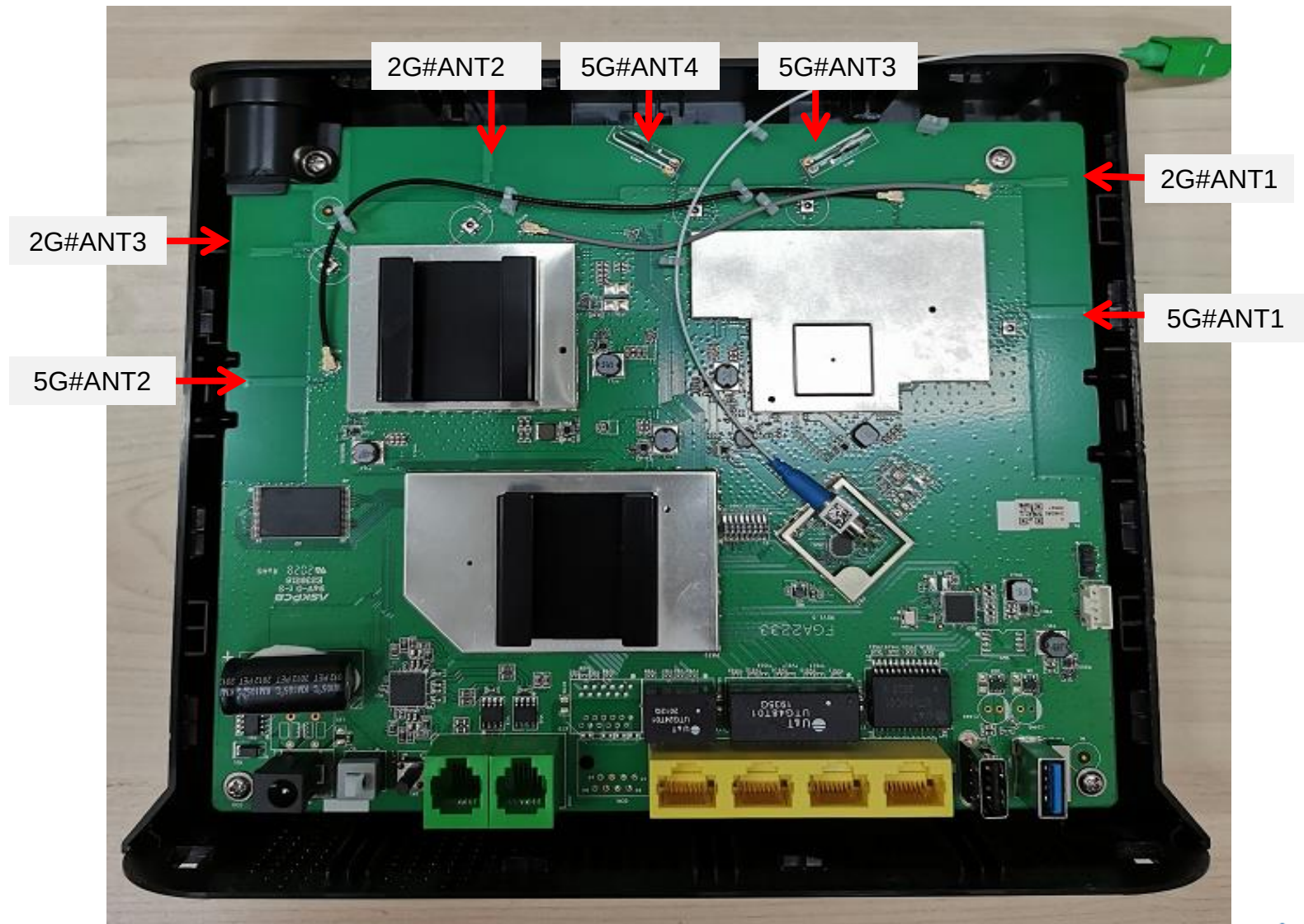


Front view

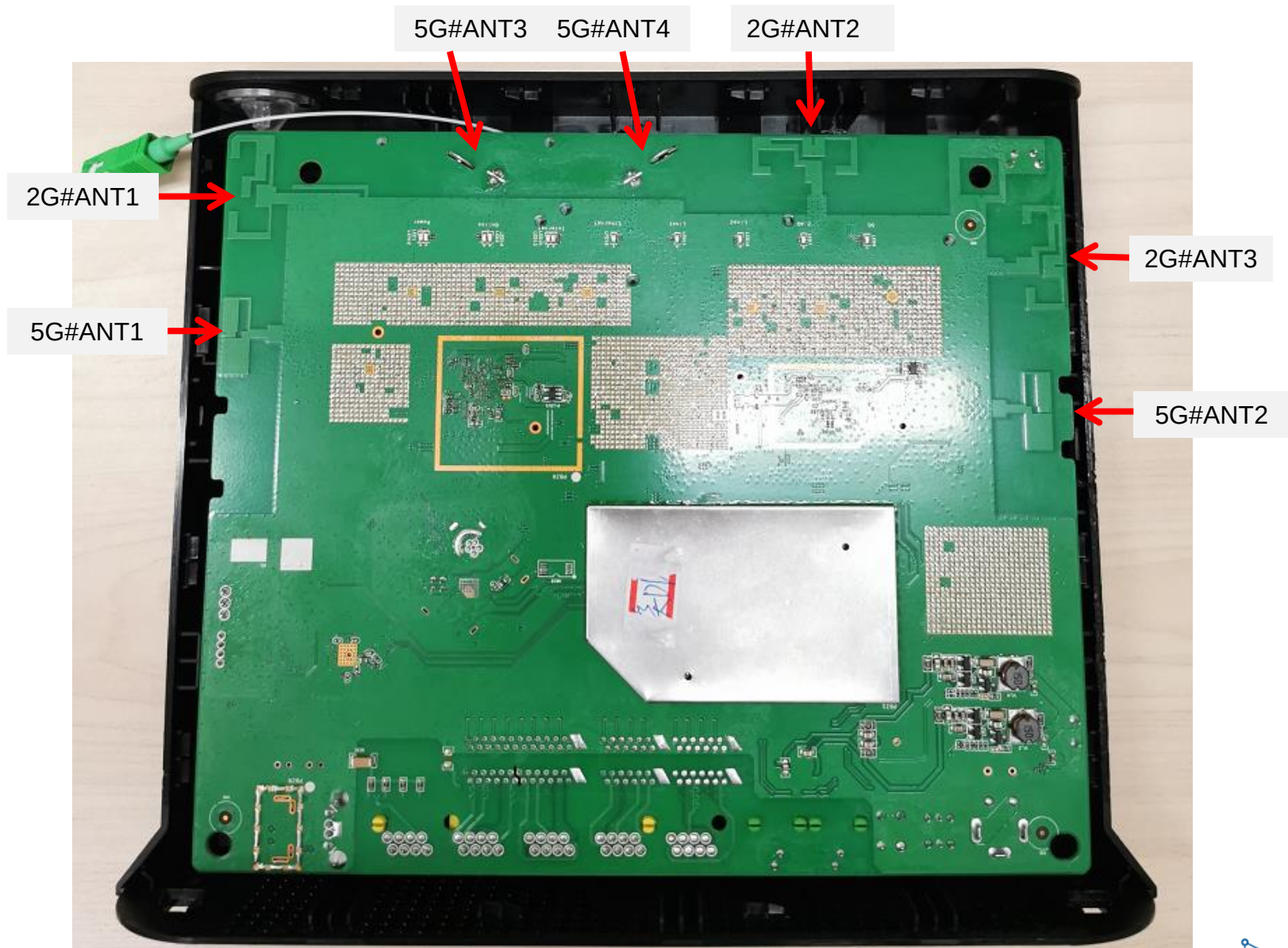


Rear view

Antenna Placement

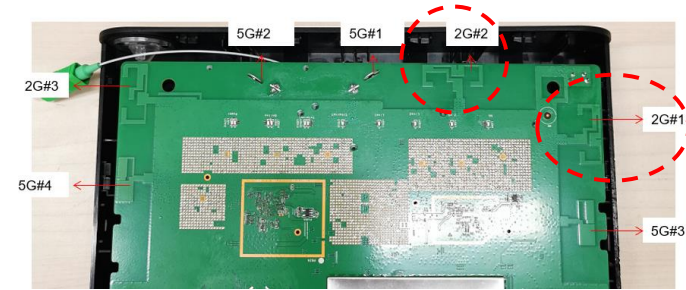
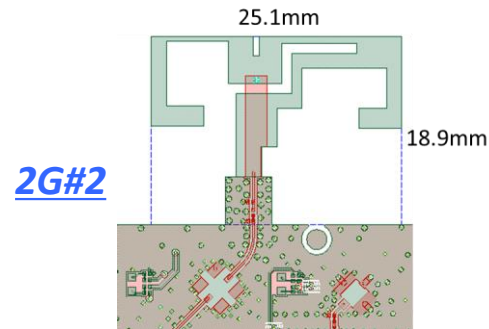
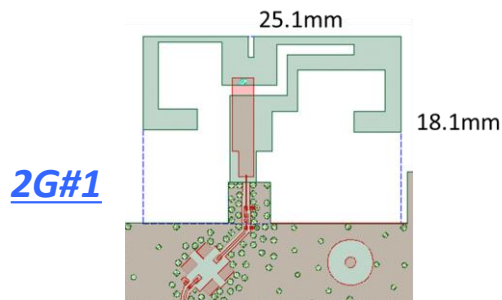


Antenna Placement (bottom side of board)

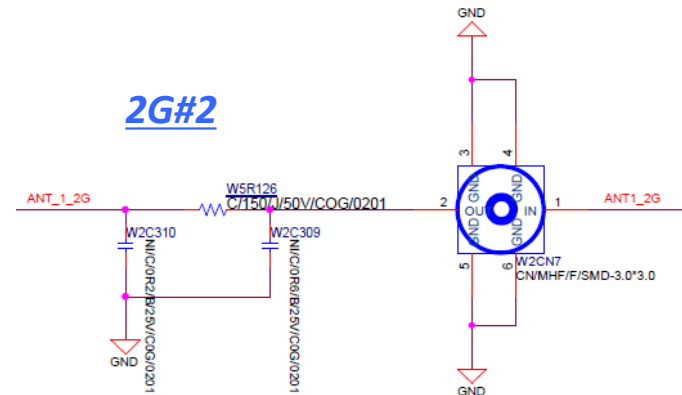
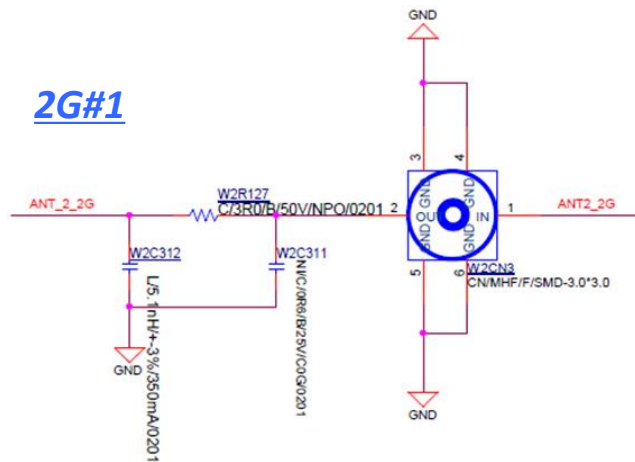


Antenna characteristics: 2G#1, 2G#2

- 2G#1 and 2G#2 are printed dipole type antennas

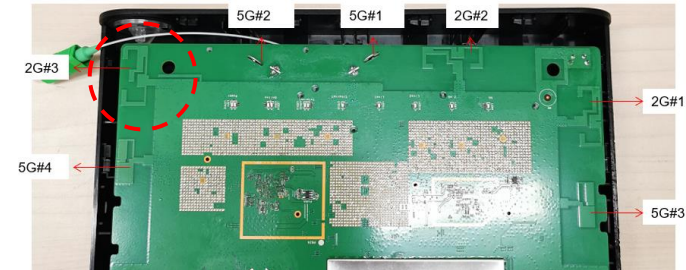
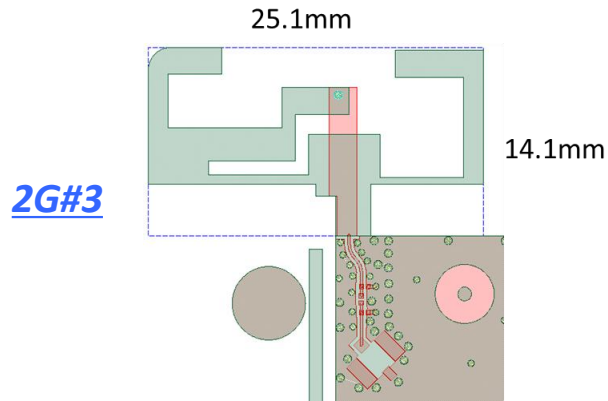


- Impedance matching components

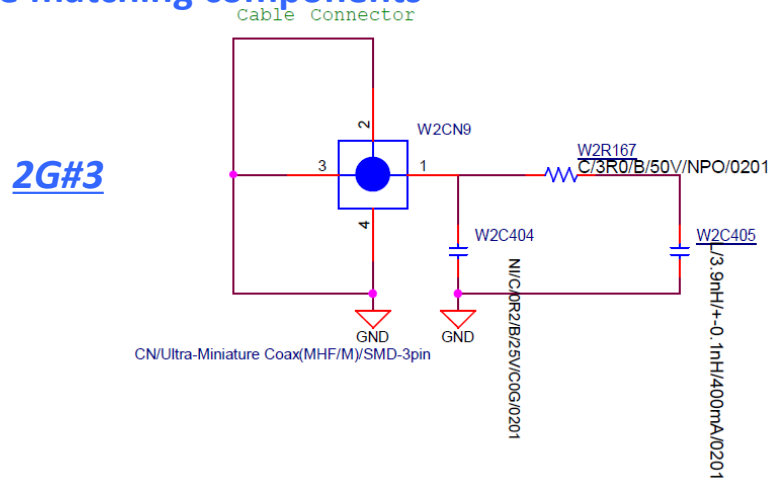


Antenna characteristics: 2G#3

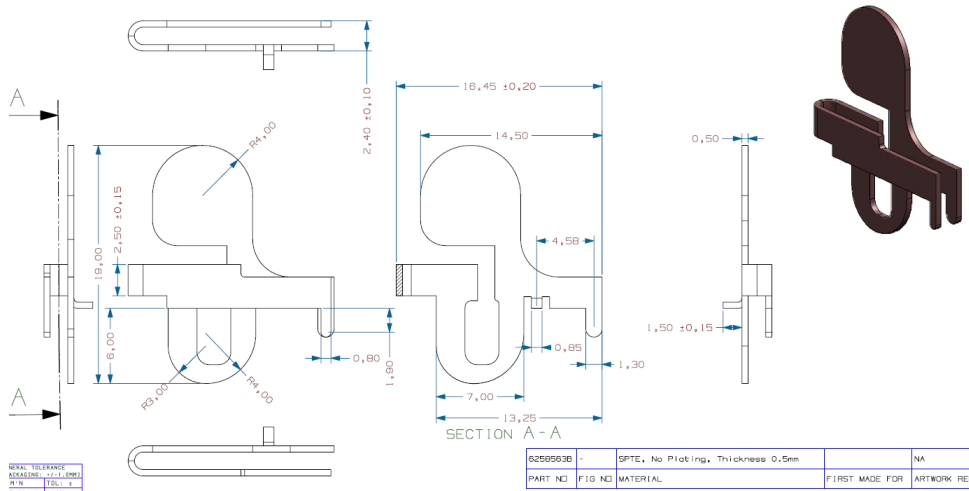
- 2G#3 is a printed dipole type antenna



- Impedance matching components



❑ 5G#1 and 5G#2 are metal dipole type antennas, with IPN=6280138B

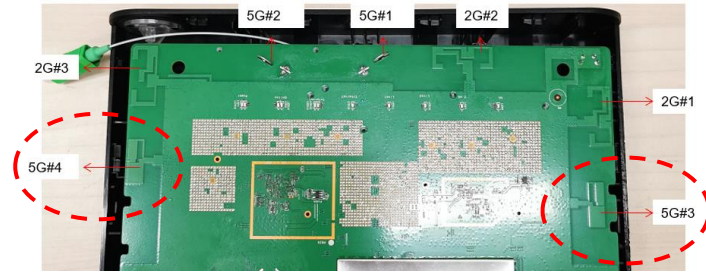
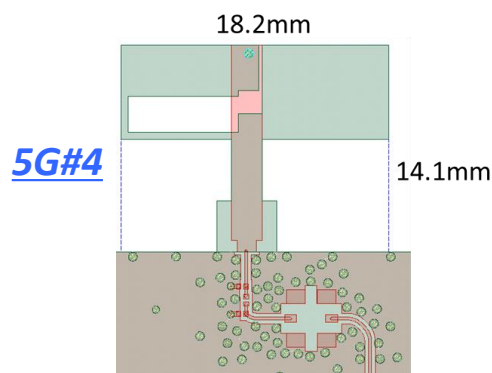
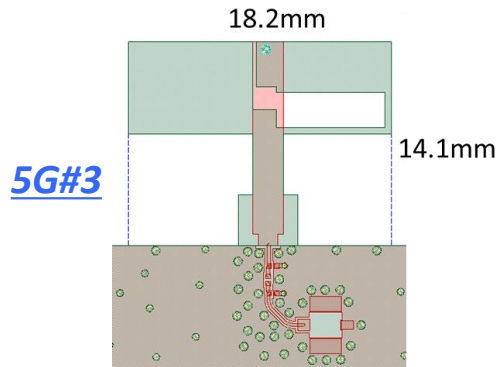


Impedance matching components

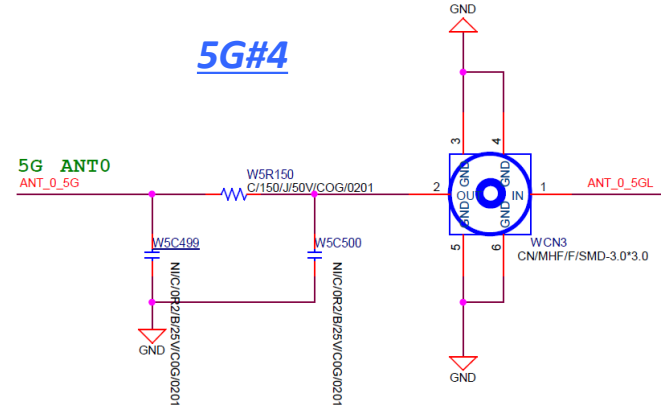
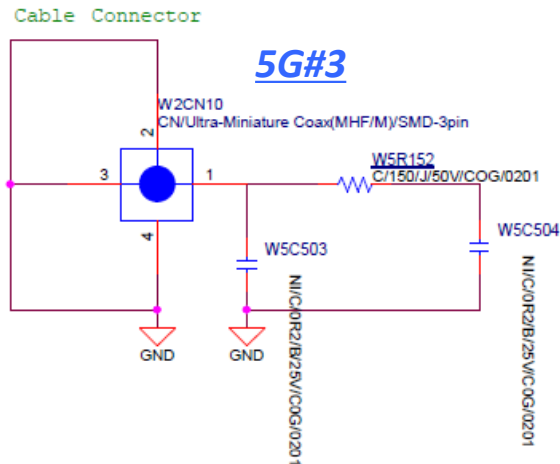


Antenna characteristics: 5G#3, 5G#4

- 5G#3 and 5G#4 are printed dipole type antennas



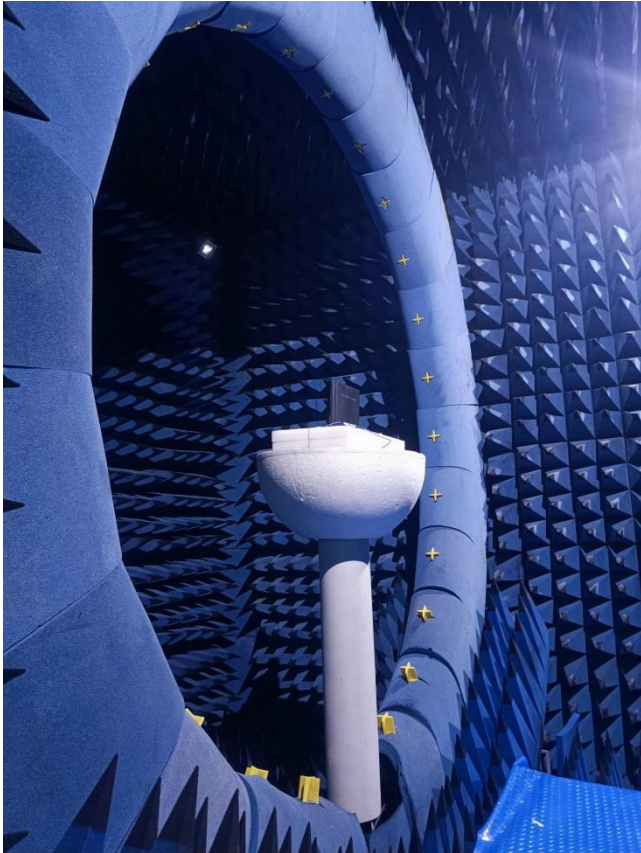
- Impedance matching components



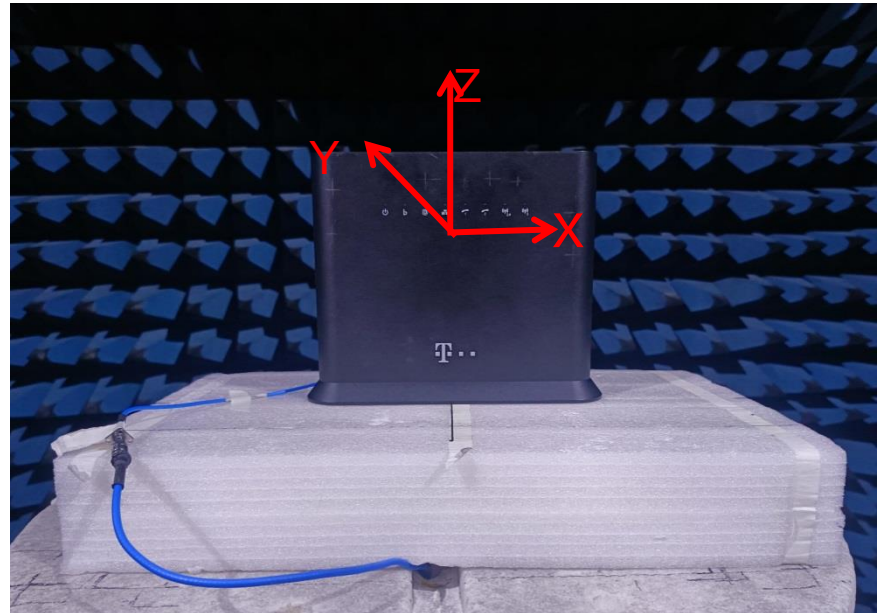
Test Setup for Radiation Pattern Measurement

Chamber	Brand	Model	Location
OTA_LAB_1	SATIMO	SG-24	China KunShan

SATIMO Chamber Information



Test Setup for DUT

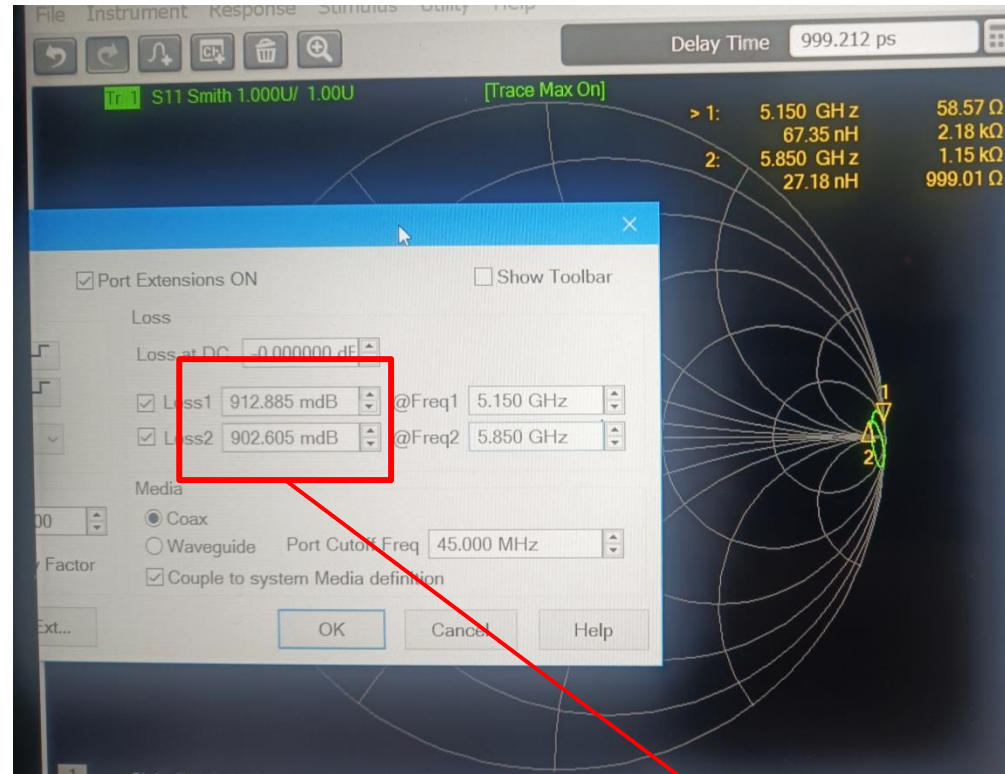


Test Setup for S-parameter Measurement

Equipment	Brand	Model	S/N
Network Analyzer	Keysight	E5071C	B001789



U.FL cable
Length:150 mm

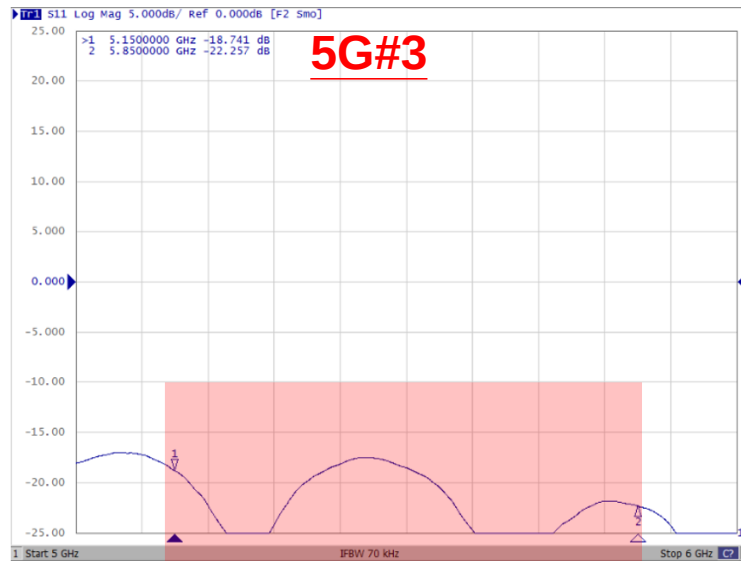
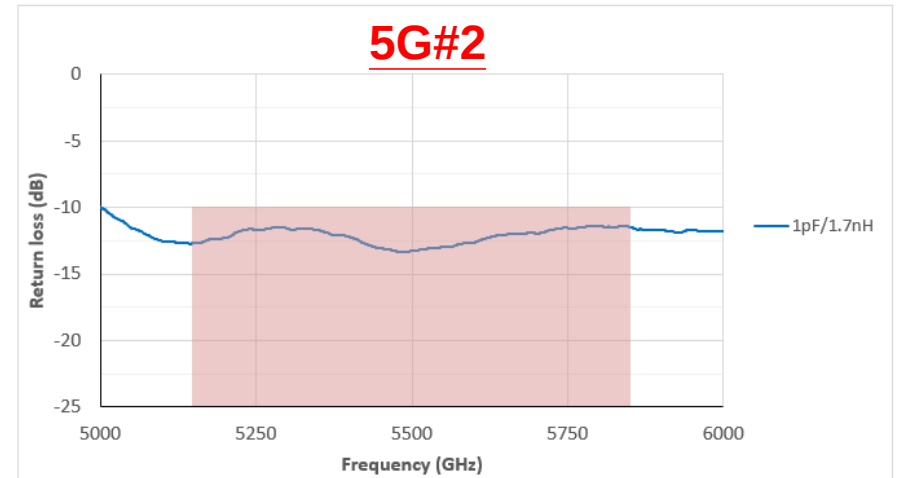
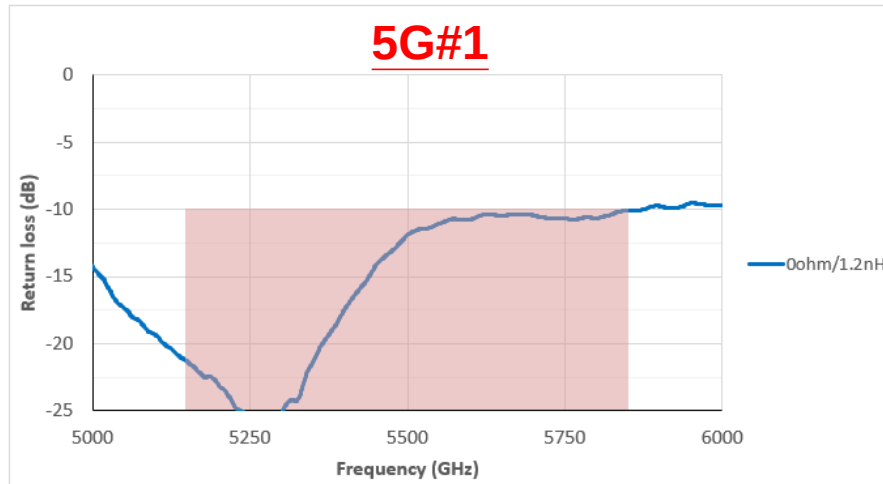


Cable loss:5G is about 0.9 dB loss

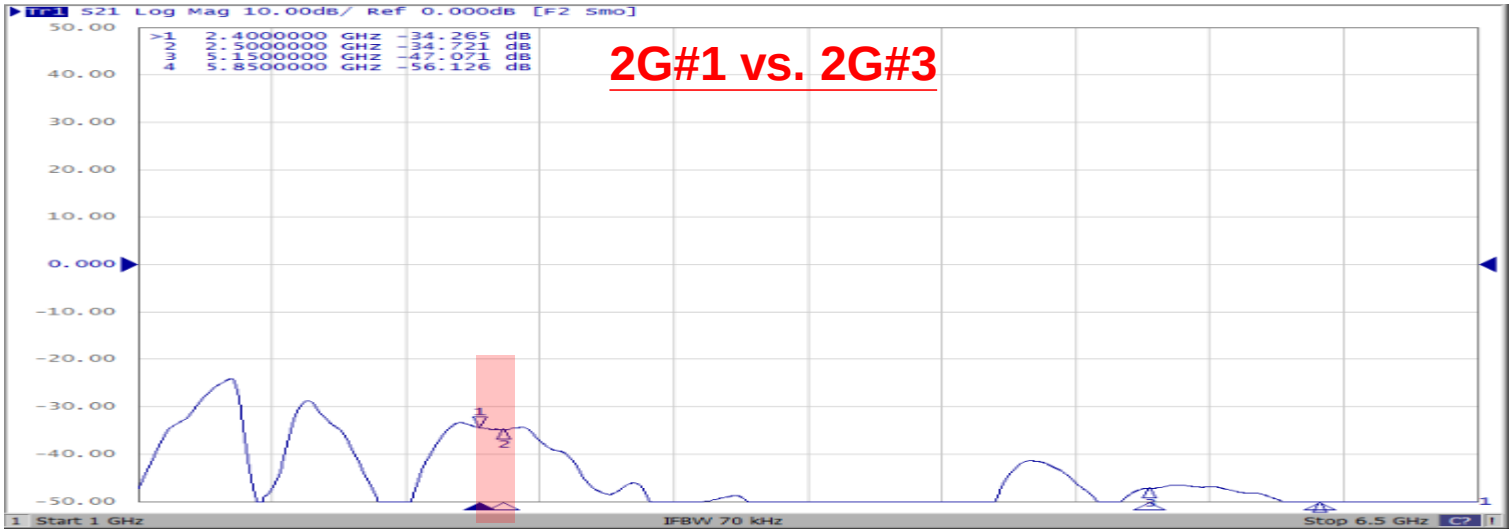
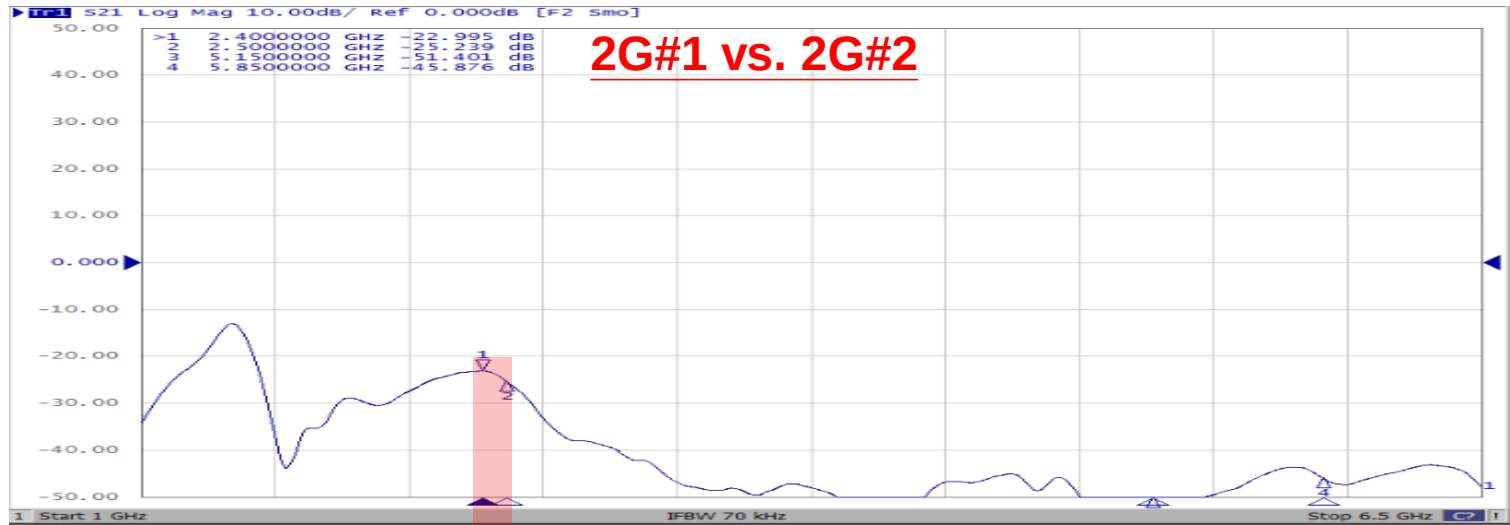
Antenna Return loss: @2.4GHz



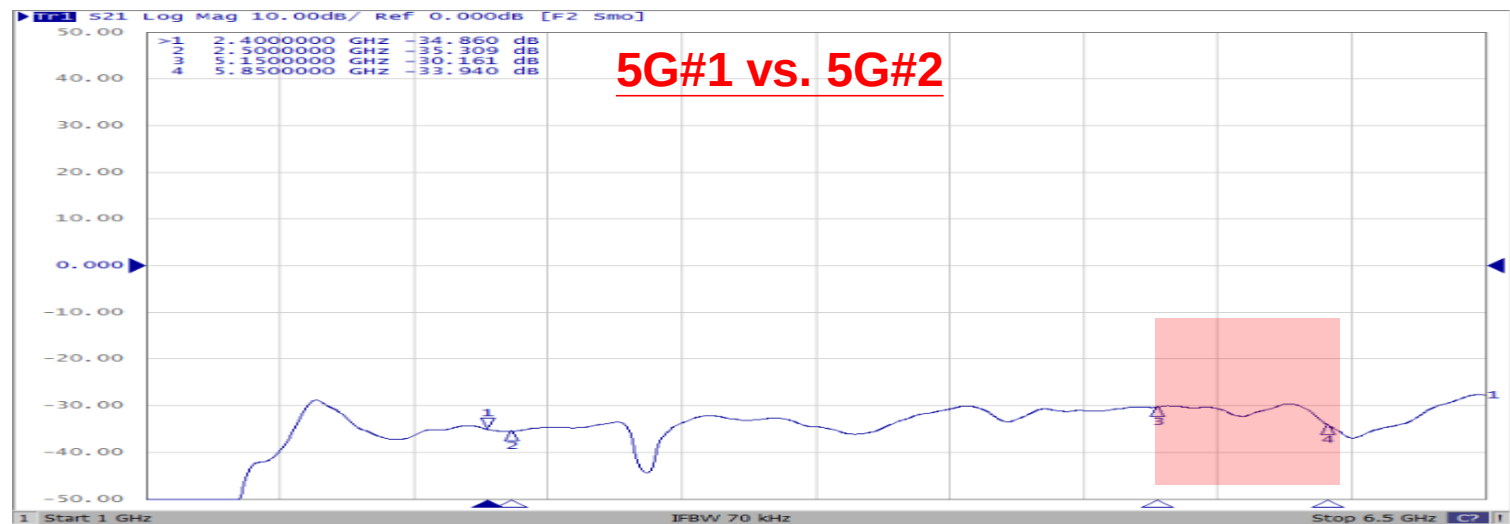
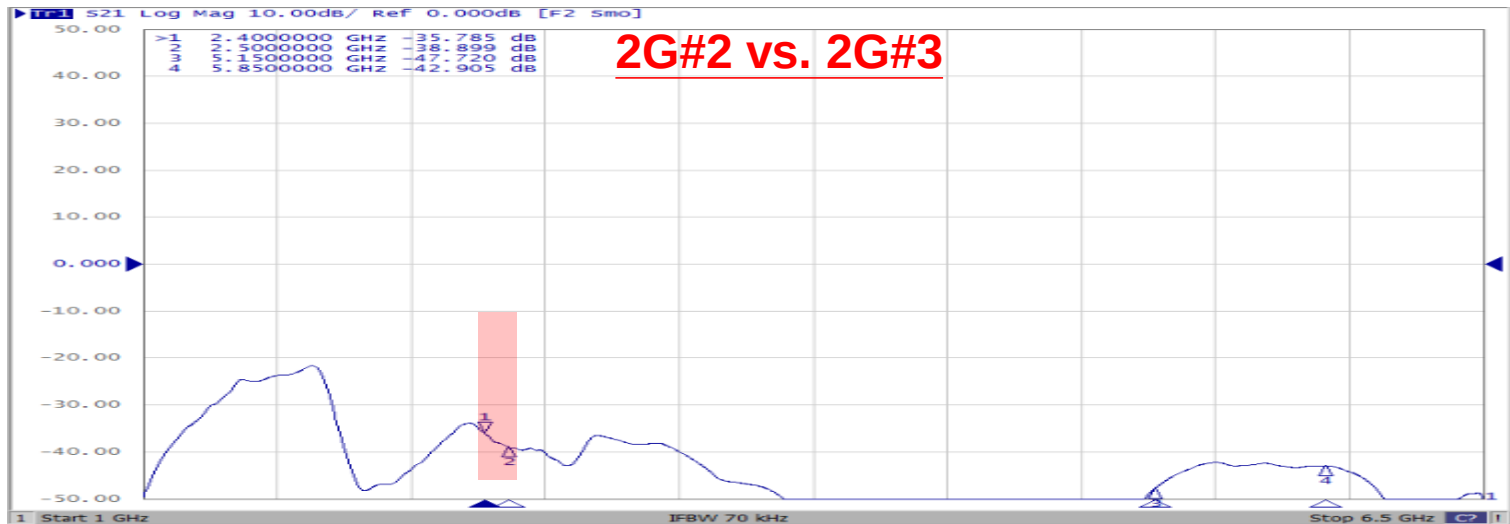
Antenna Return loss: @5GHz



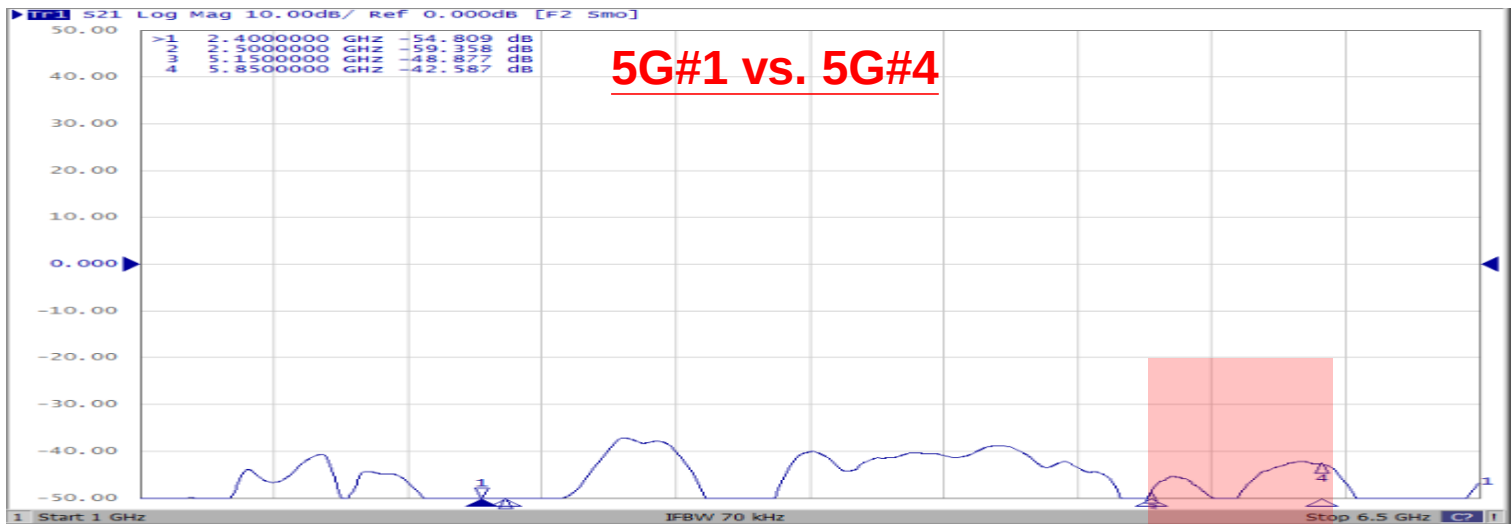
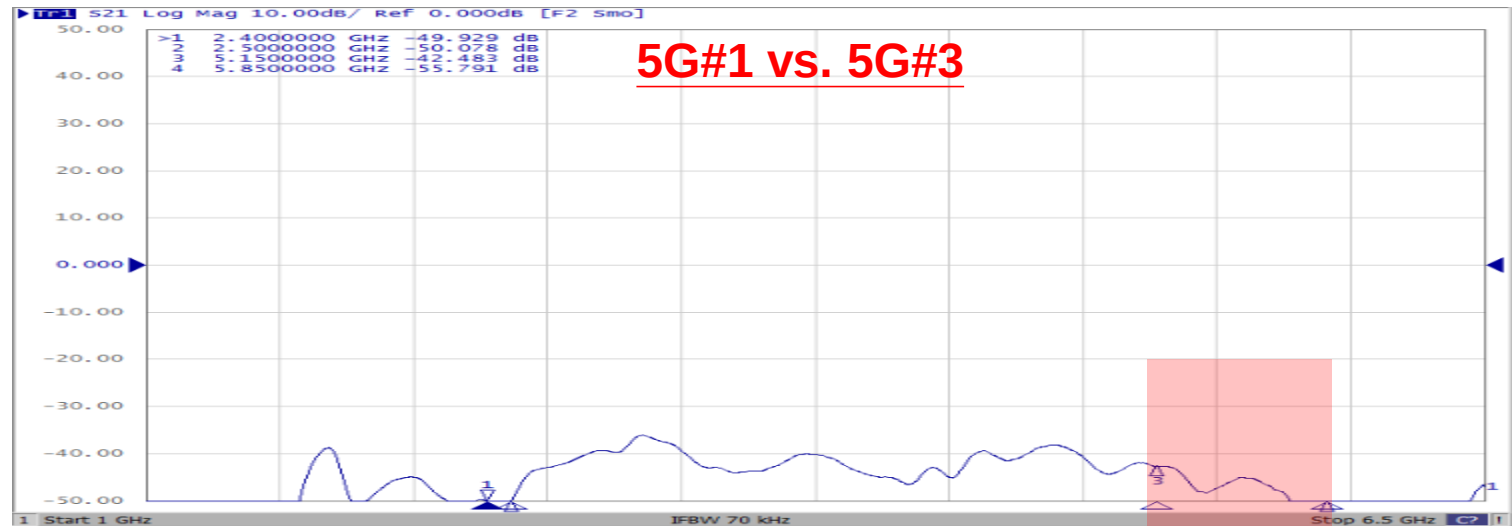
Antenna Isolation



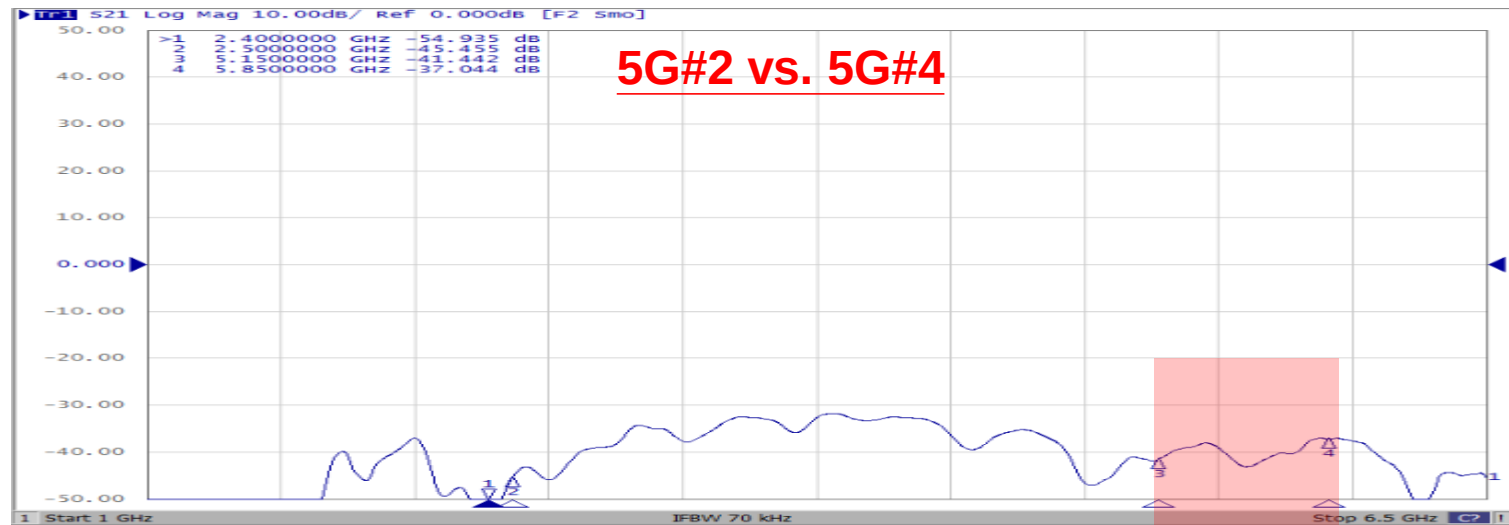
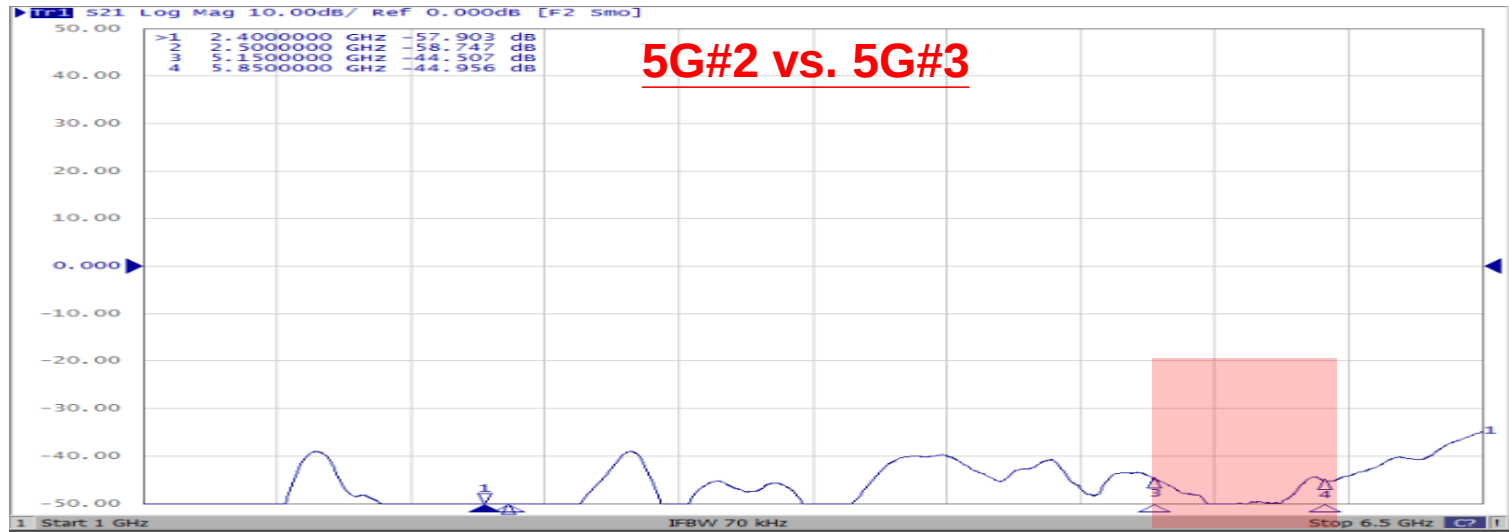
Antenna Isolation



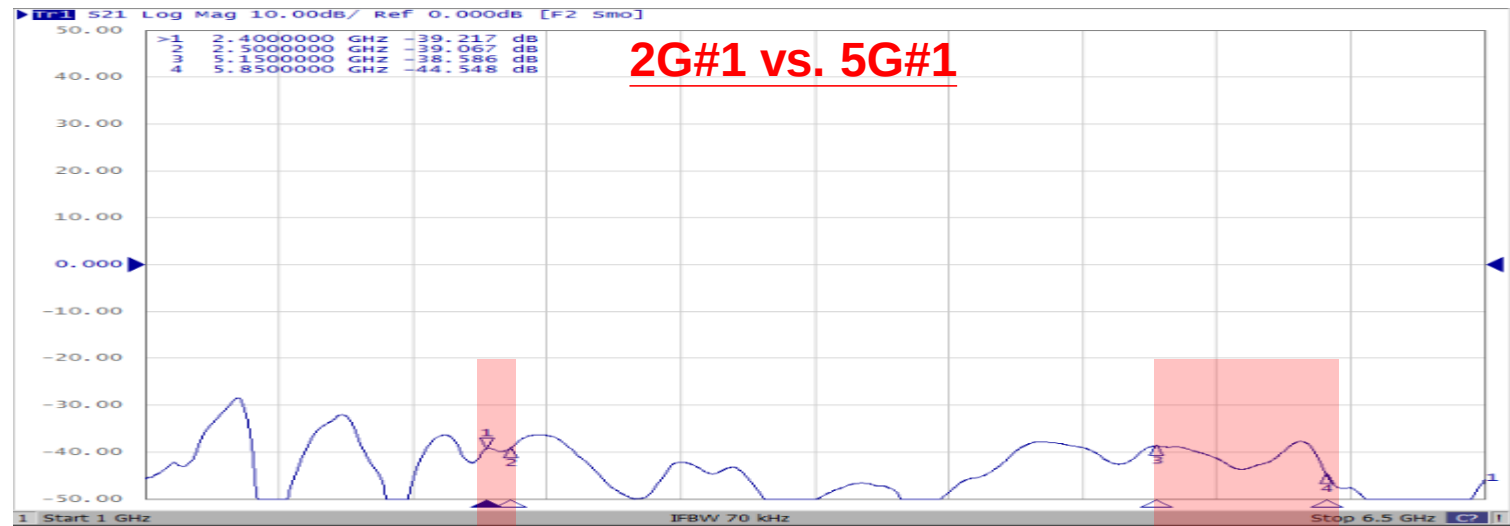
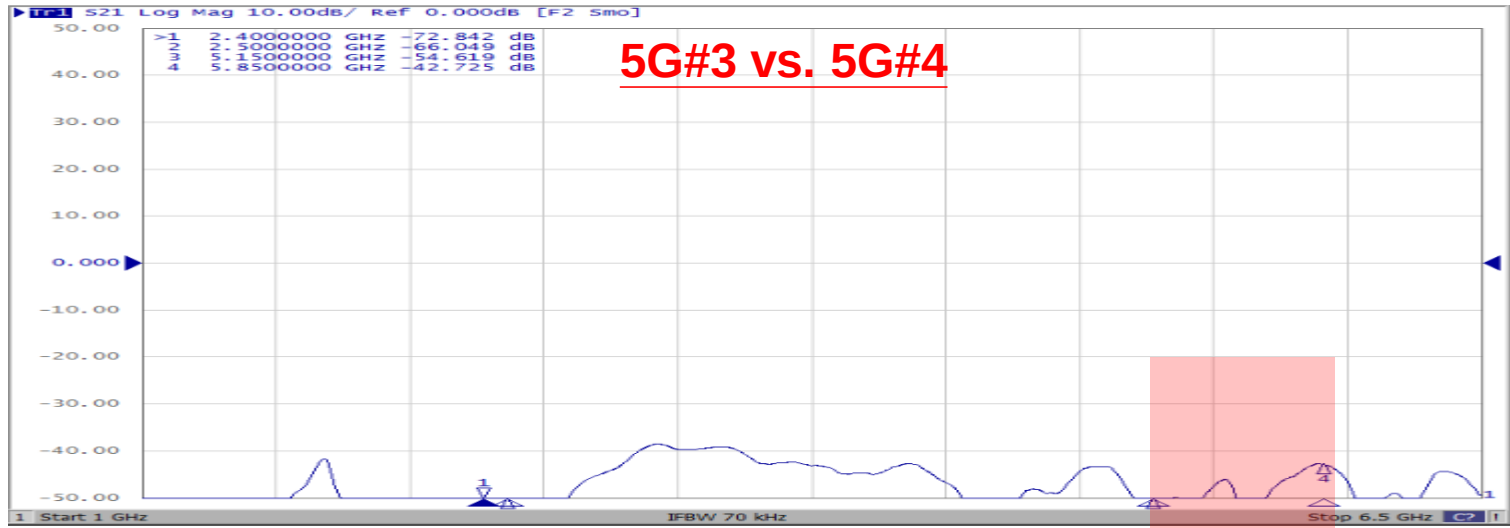
Antenna Isolation



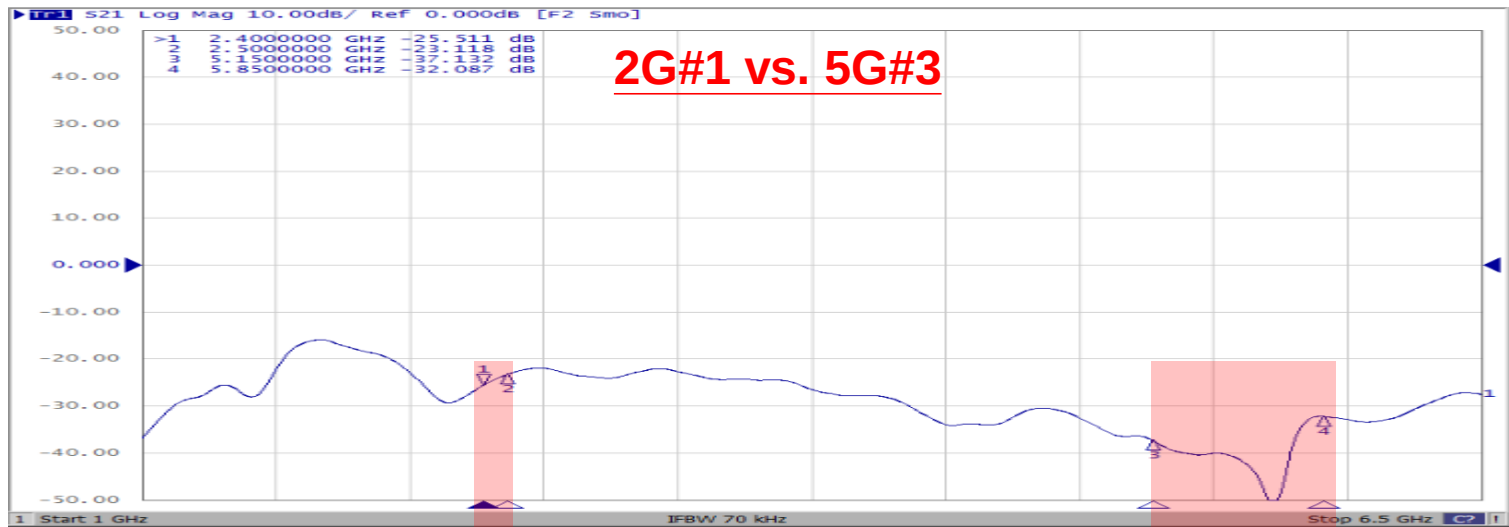
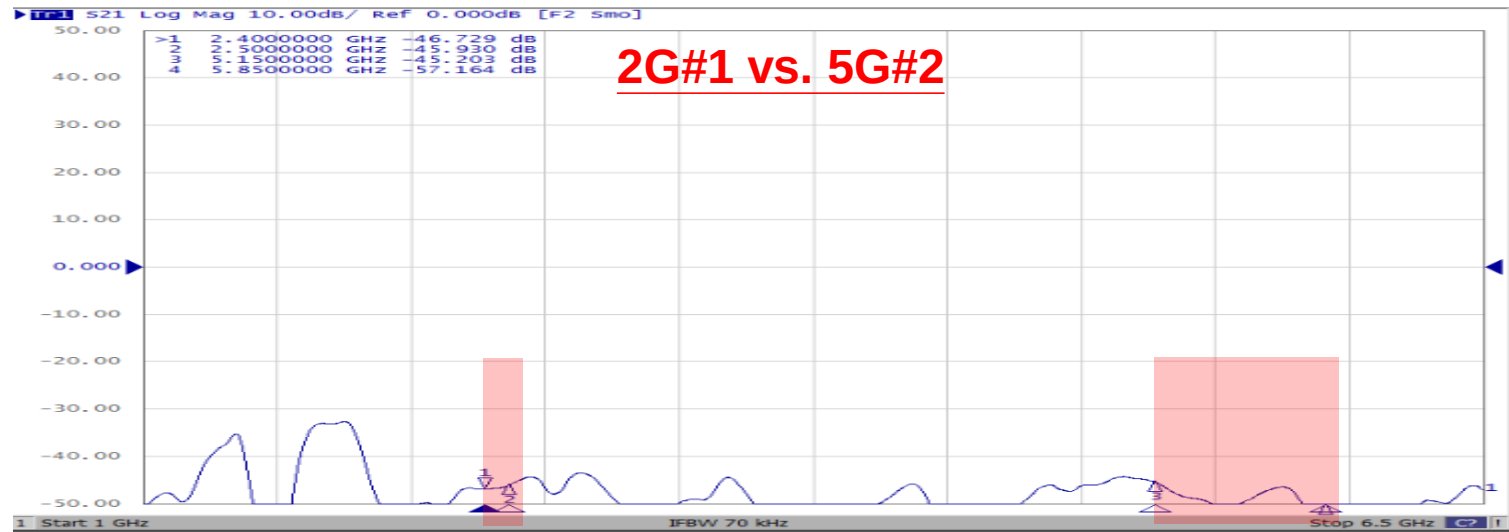
Antenna Isolation



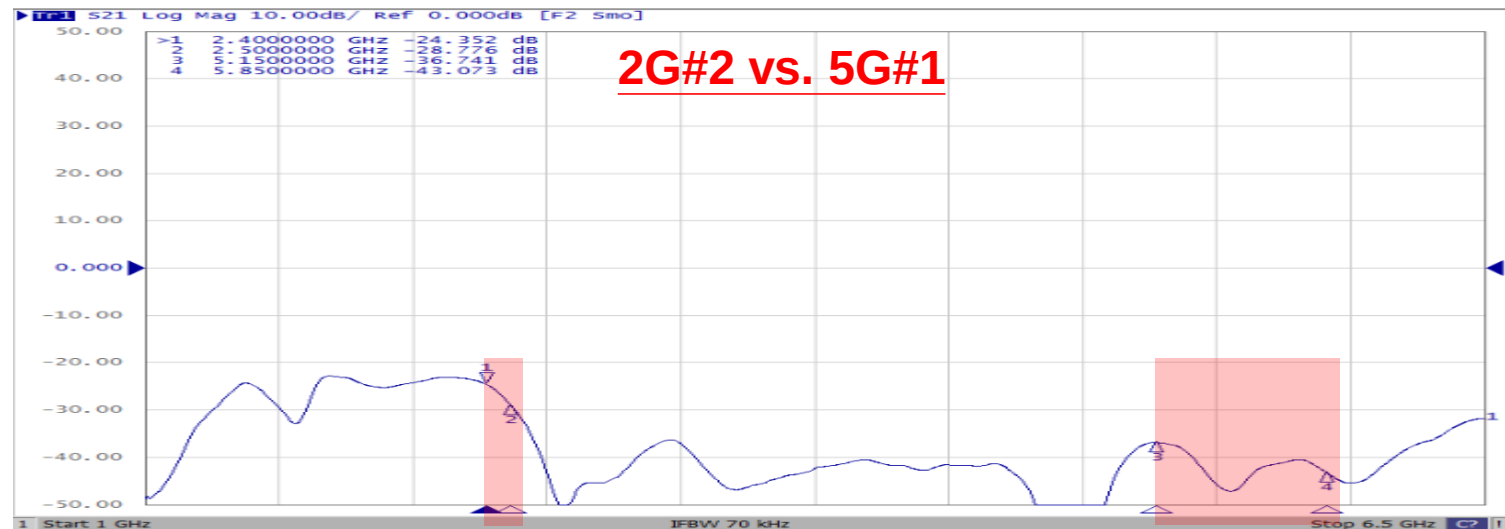
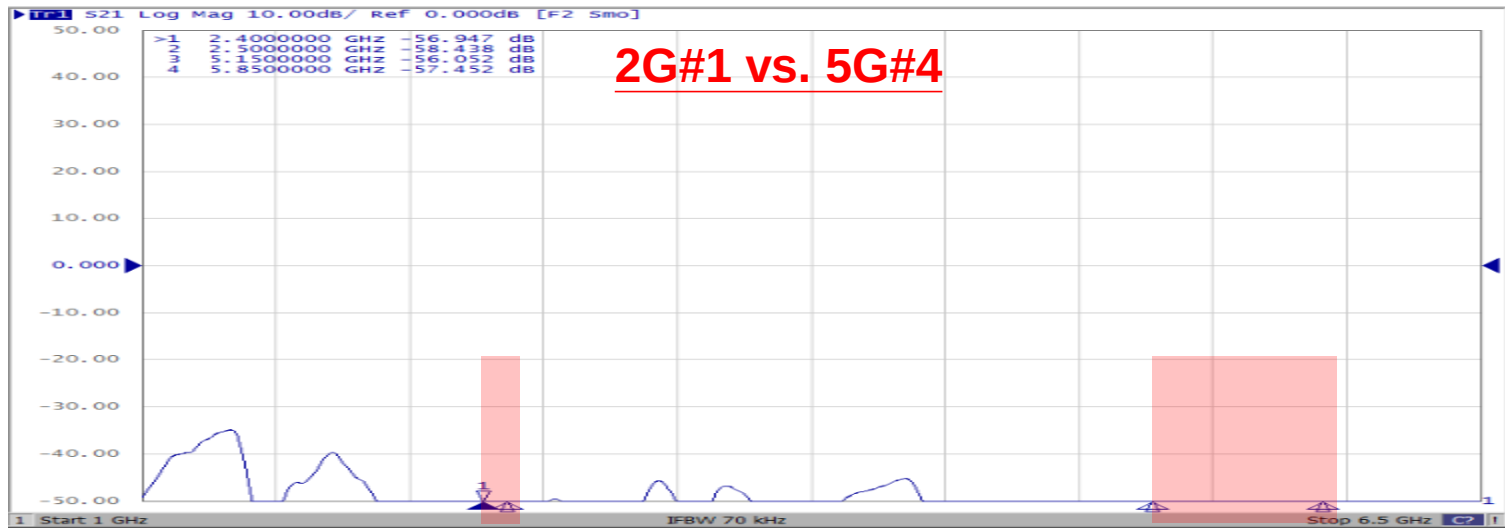
Antenna Isolation



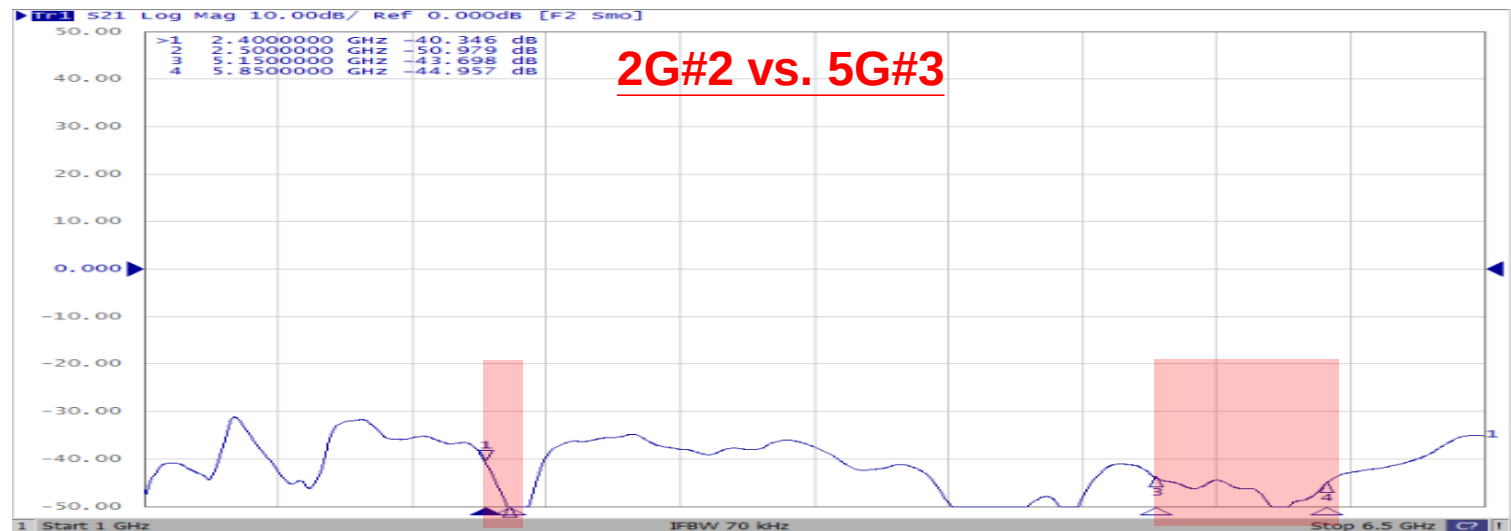
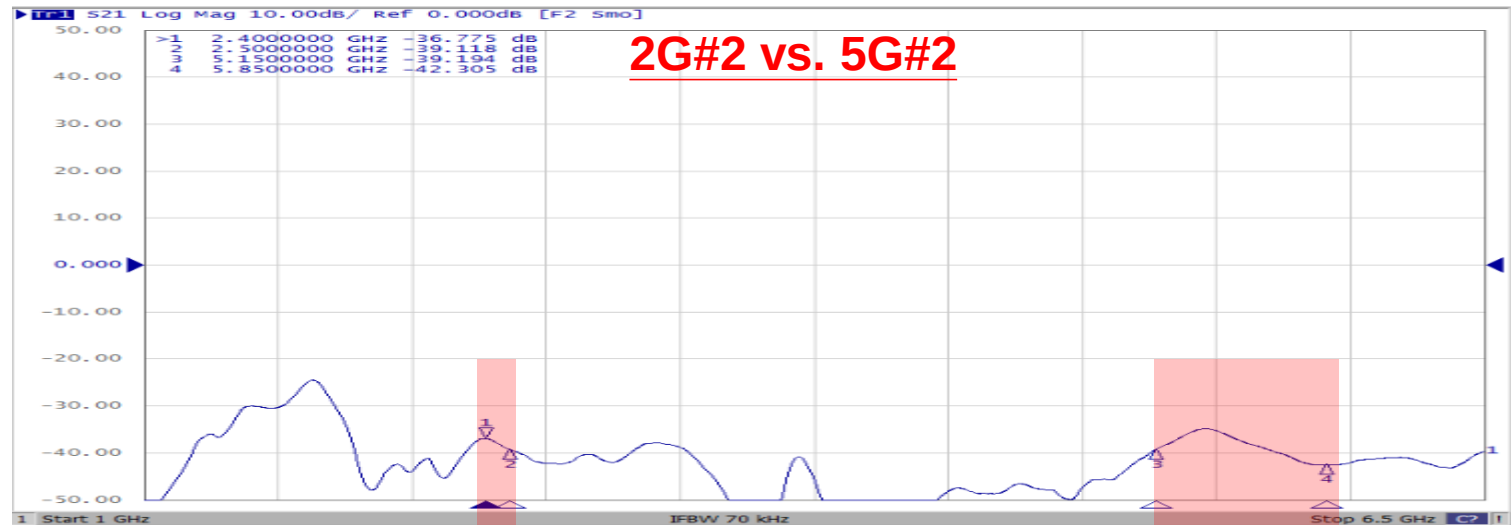
Antenna Isolation



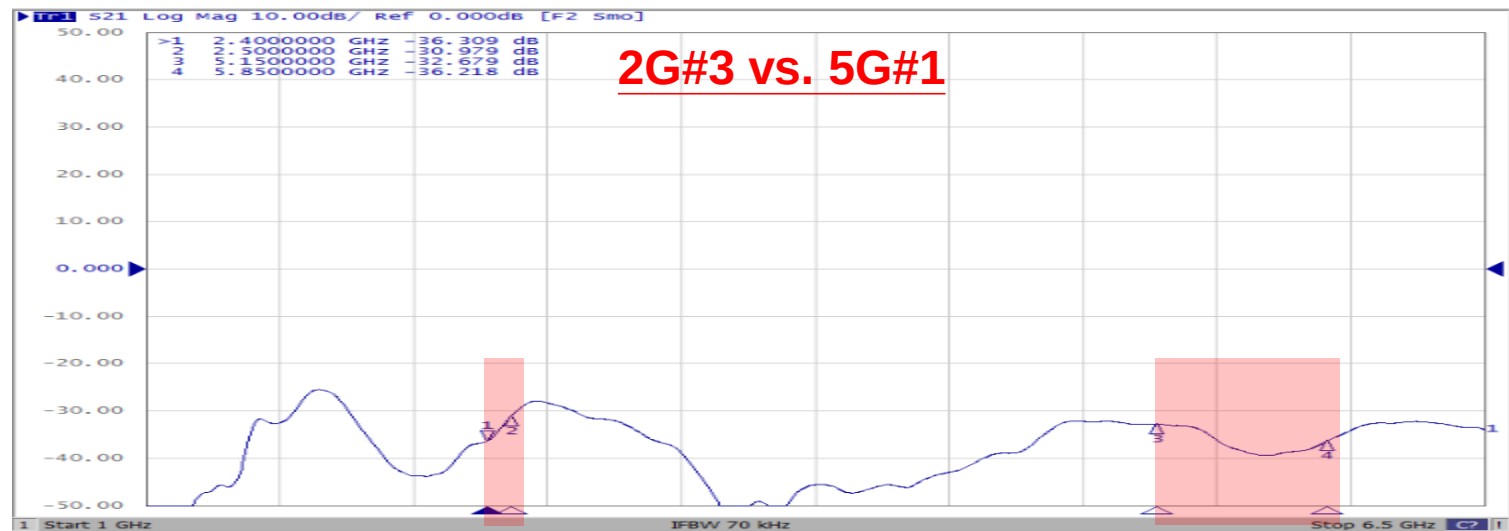
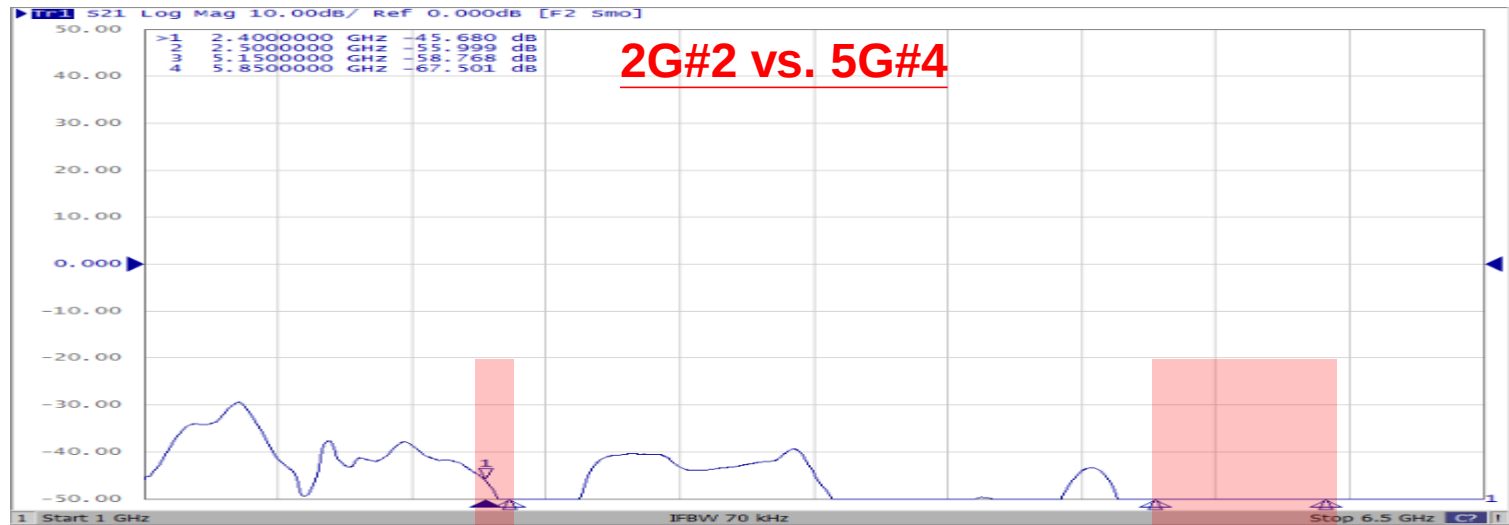
Antenna Isolation



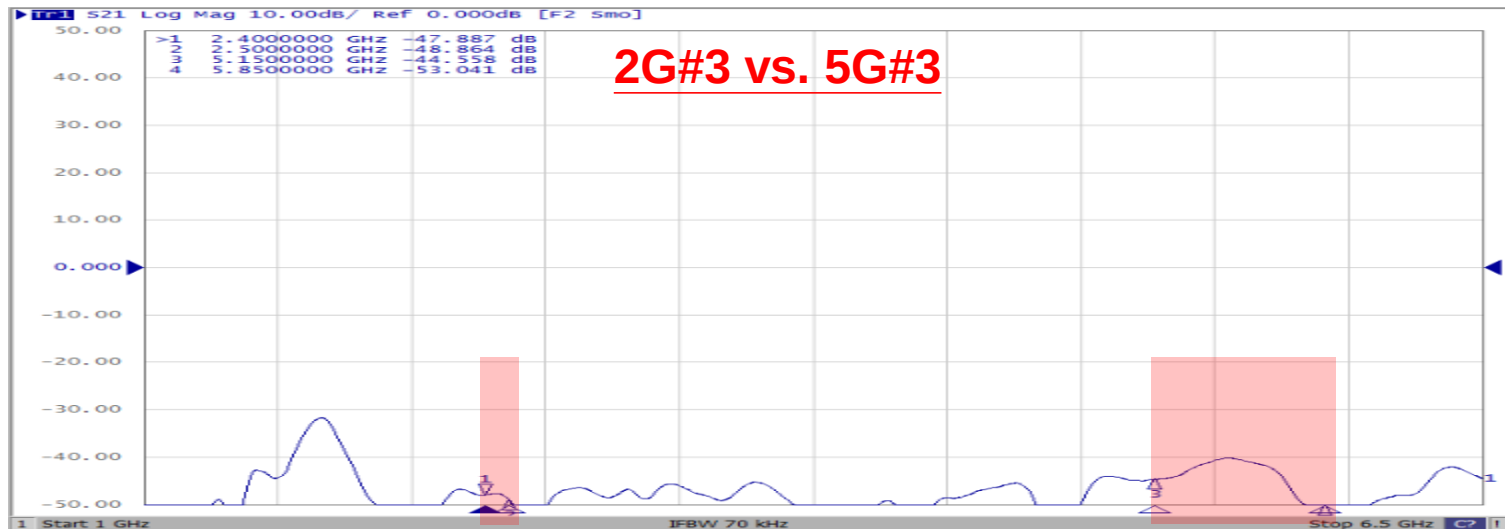
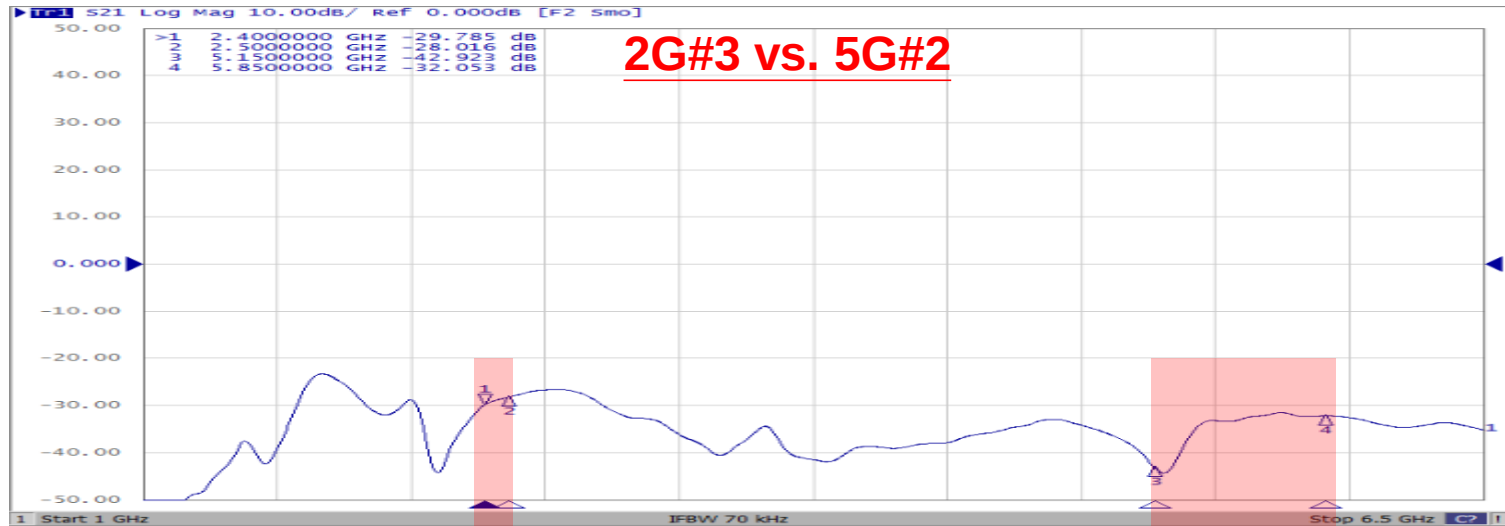
Antenna Isolation



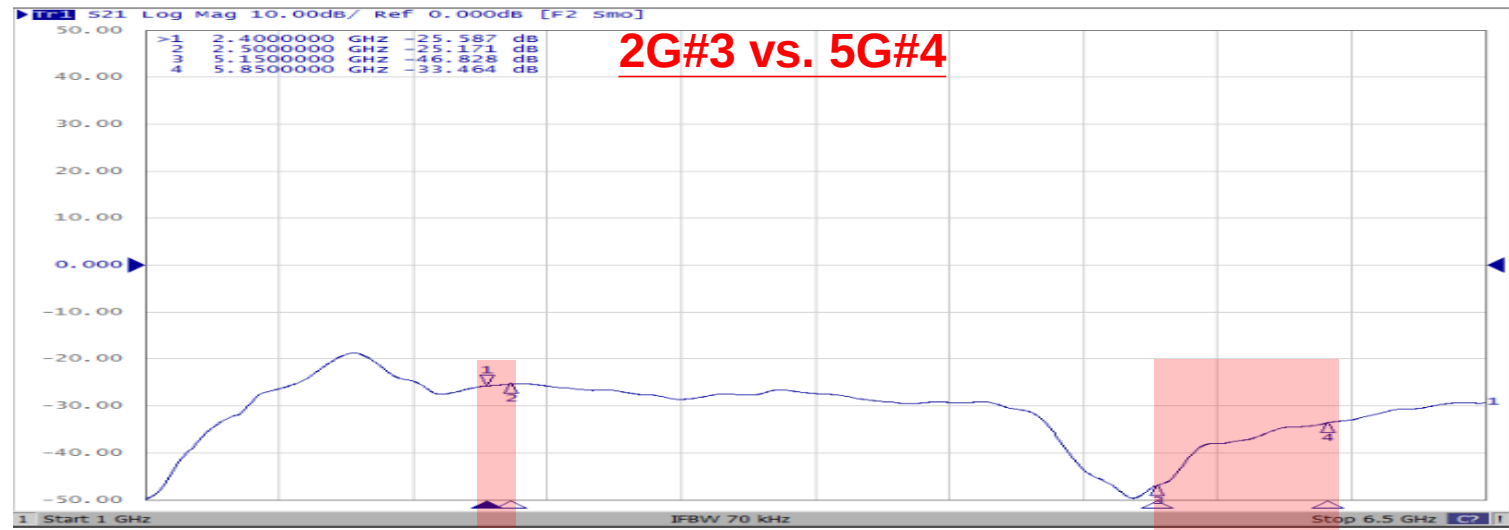
Antenna Isolation



Antenna Isolation

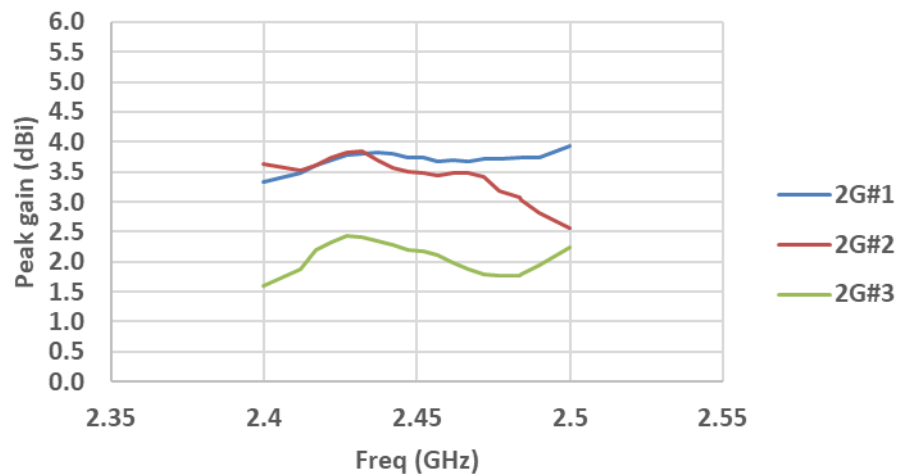


Antenna Isolation

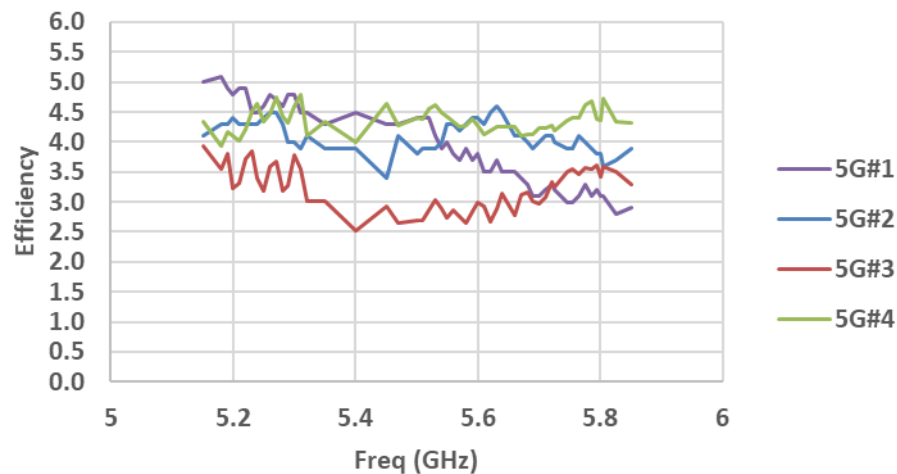


Antenna gain

Peak gain @2.4GHz



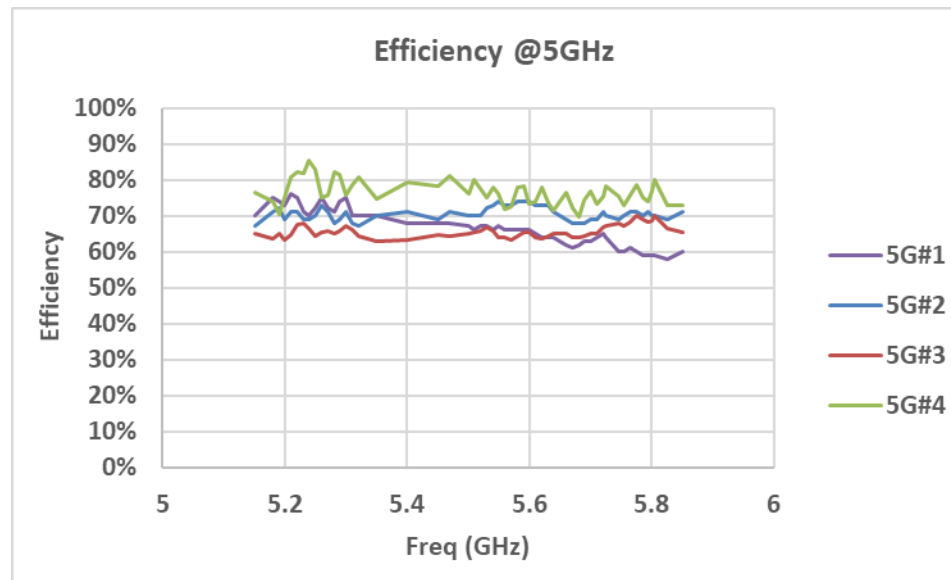
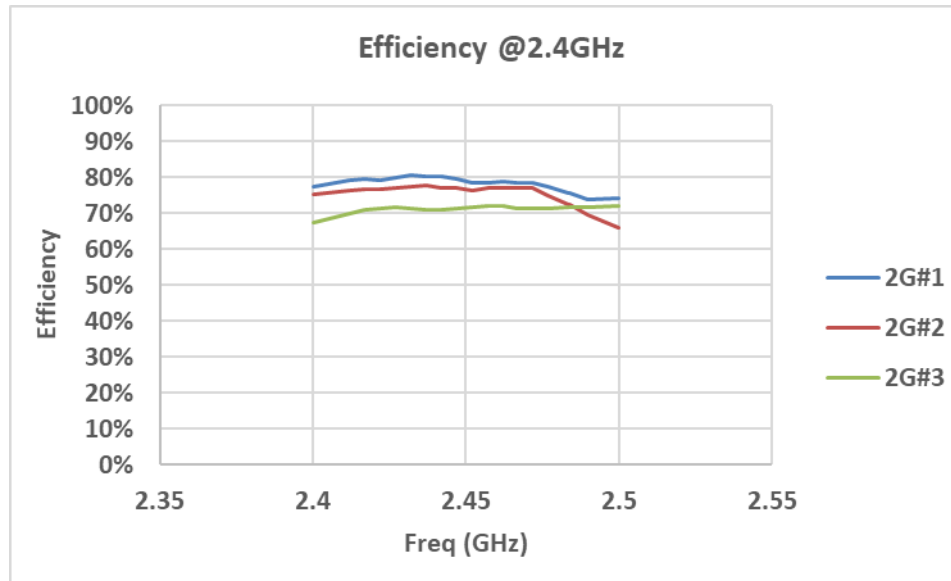
Peak gain @5GHz



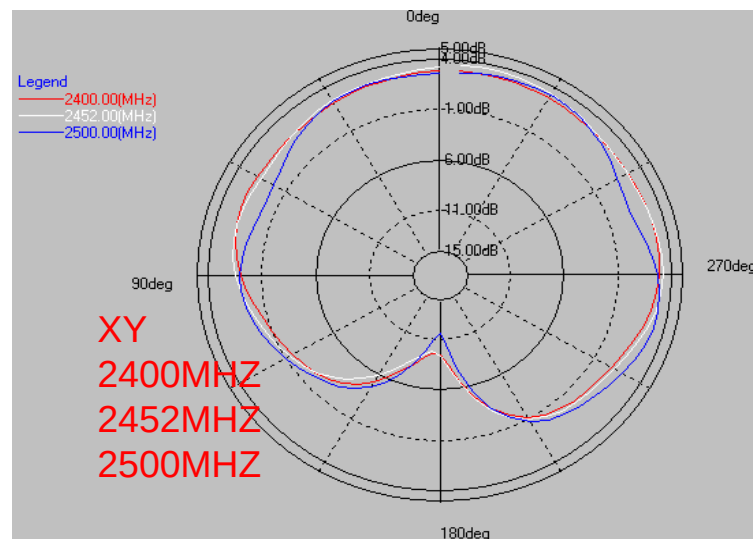
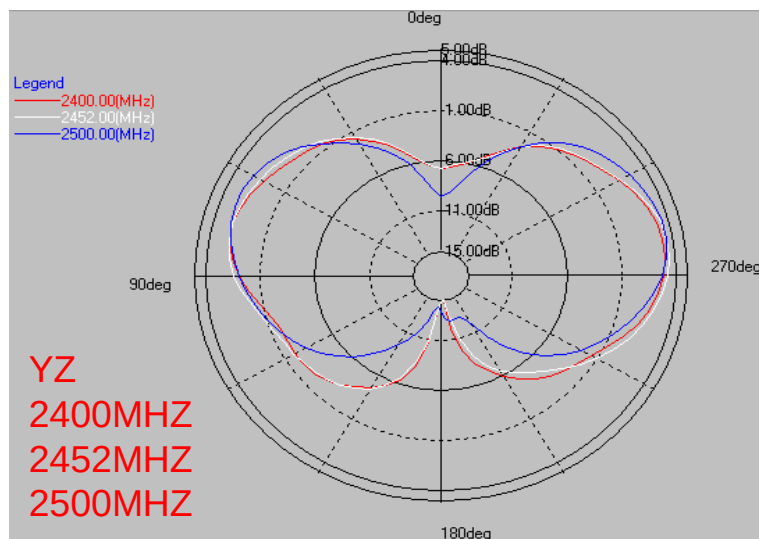
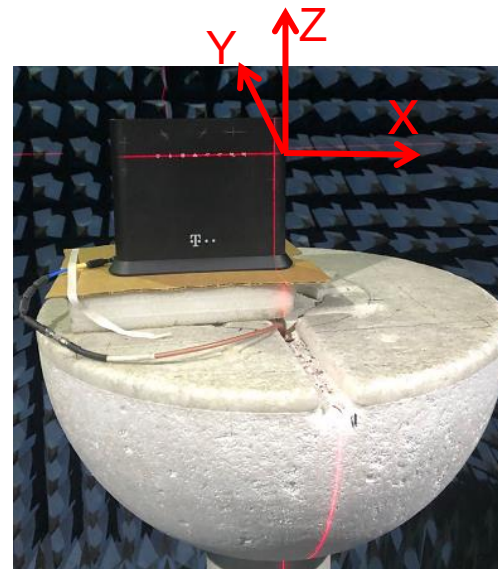
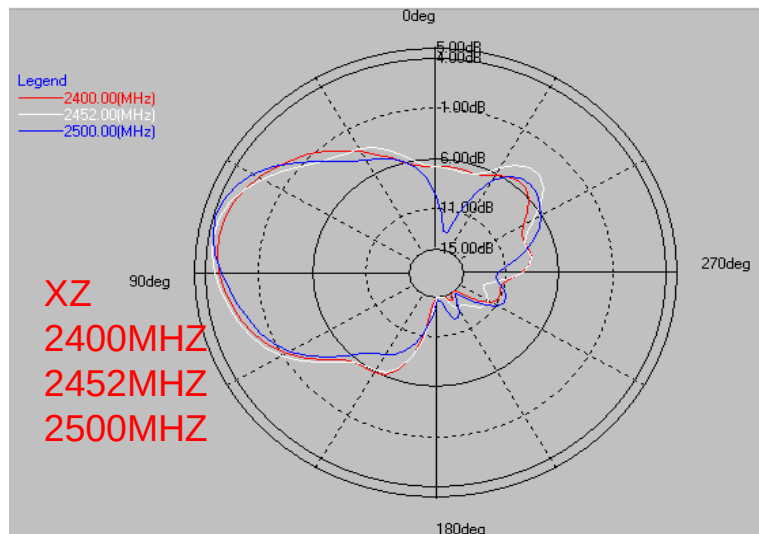
Freq(GHz)	2G#1	2G#2	2G#3
2.4	3.3	3.6	1.6
2.412	3.5	3.5	1.9
2.417	3.6	3.6	2.2
2.422	3.7	3.7	2.3
2.427	3.8	3.8	2.4
2.432	3.8	3.8	2.4
2.437	3.8	3.7	2.4
2.442	3.8	3.6	2.3
2.447	3.7	3.5	2.2
2.452	3.7	3.5	2.2
2.457	3.7	3.4	2.1
2.462	3.7	3.5	2.0
2.467	3.7	3.5	1.9
2.472	3.7	3.4	1.8
2.477	3.7	3.2	1.8
2.4835	3.7	3.1	1.8
2.484	3.7	3.0	1.8
2.49	3.7	2.8	1.9
2.5	3.9	2.6	2.2

Freq(GHz)	5G#1	5G#2	5G#3	5G#4
5.15	5.0	4.1	3.9	4.3
5.18	5.1	4.3	3.6	3.9
5.19	4.9	4.3	3.8	4.2
5.2	4.8	4.4	3.2	4.1
5.21	4.9	4.3	3.3	4.0
5.22	4.9	4.3	3.7	4.2
5.23	4.5	4.3	3.8	4.5
5.24	4.5	4.3	3.4	4.6
5.25	4.6	4.4	3.2	4.3
5.26	4.8	4.5	3.6	4.5
5.27	4.7	4.5	3.7	4.8
5.28	4.6	4.3	3.2	4.4
5.29	4.8	4.0	3.3	4.3
5.3	4.8	4.0	3.8	4.6
5.31	4.5	3.9	3.5	4.8
5.32	4.5	4.1	3.0	4.1
5.35	4.3	3.9	3.0	4.3
5.4	4.5	3.9	2.5	4.0
5.45	4.3	3.4	2.9	4.6
5.47	4.3	4.1	2.7	4.3
5.5	4.4	3.8	2.7	4.4
5.51	4.4	3.9	2.7	4.4
5.52	4.4	3.9	2.9	4.5
5.53	4.1	3.9	3.0	4.6
5.54	3.9	4.0	2.9	4.5
5.55	4.0	4.3	2.7	4.4
5.56	3.8	4.3	2.9	4.3
5.57	3.7	4.2	2.7	4.3
5.58	3.9	4.3	2.6	4.3
5.59	3.7	4.4	2.8	4.4
5.6	3.8	4.4	3.0	4.3
5.61	3.5	4.3	2.9	4.1
5.62	3.5	4.5	2.7	4.2
5.63	3.7	4.6	2.9	4.3
5.64	3.5	4.5	3.1	4.3
5.66	3.5	4.1	2.8	4.2
5.67	3.4	4.1	3.1	4.1
5.68	3.3	4.0	3.2	4.1
5.69	3.1	3.9	3.0	4.1
5.7	3.1	4.0	3.0	4.2
5.71	3.2	4.1	3.1	4.2
5.72	3.3	4.1	3.3	4.3
5.725	3.2	4.0	3.3	4.2
5.745	3.0	3.9	3.5	4.4
5.755	3.0	3.9	3.5	4.4
5.765	3.1	4.1	3.5	4.4
5.775	3.3	4.0	3.6	4.6
5.785	3.1	3.9	3.6	4.7
5.795	3.2	3.8	3.6	4.4
5.8	3.1	3.8	3.4	4.4
5.805	3.1	3.6	3.6	4.7
5.825	2.8	3.7	3.5	4.3
5.85	2.9	3.9	3.3	4.3

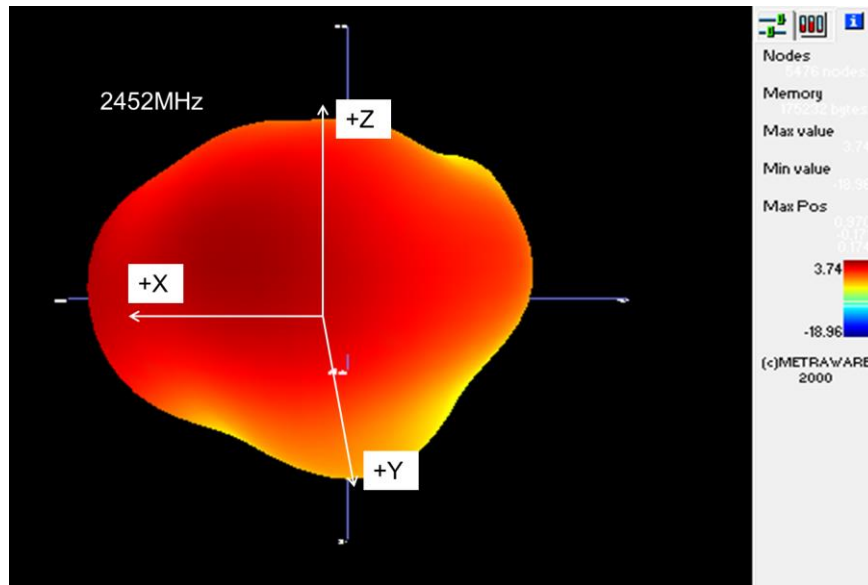
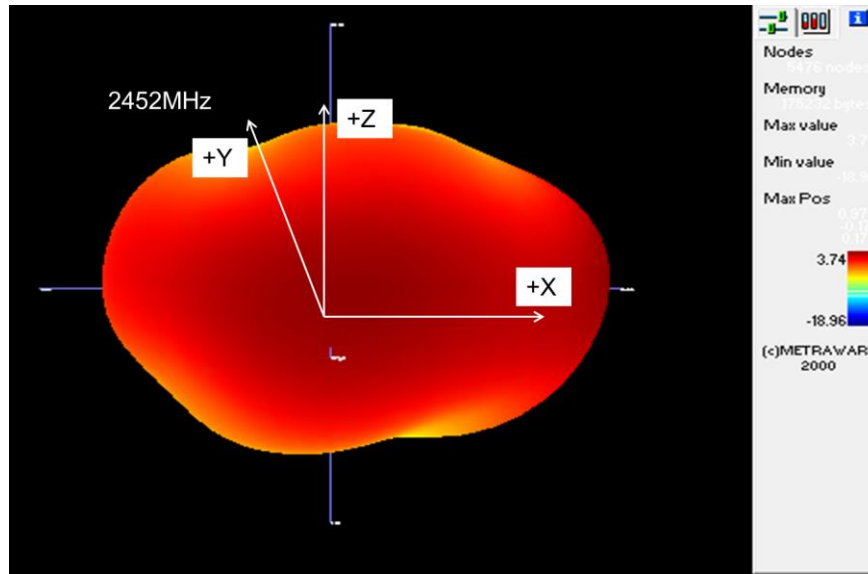
Antenna efficiency



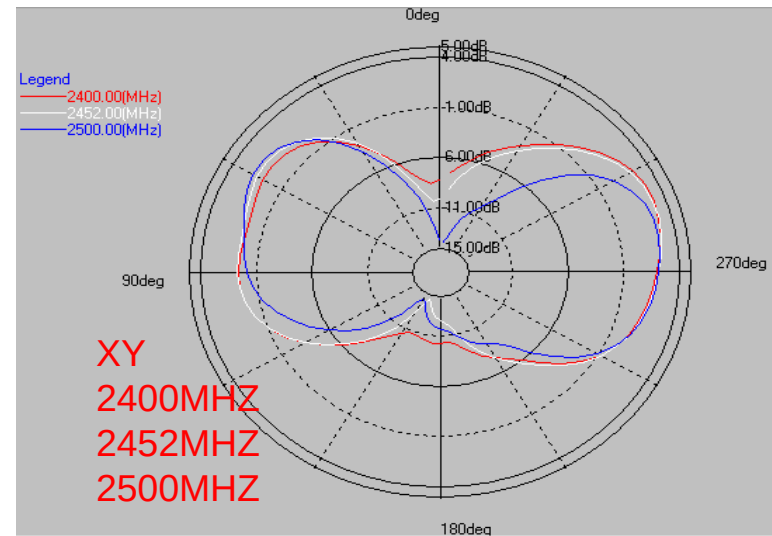
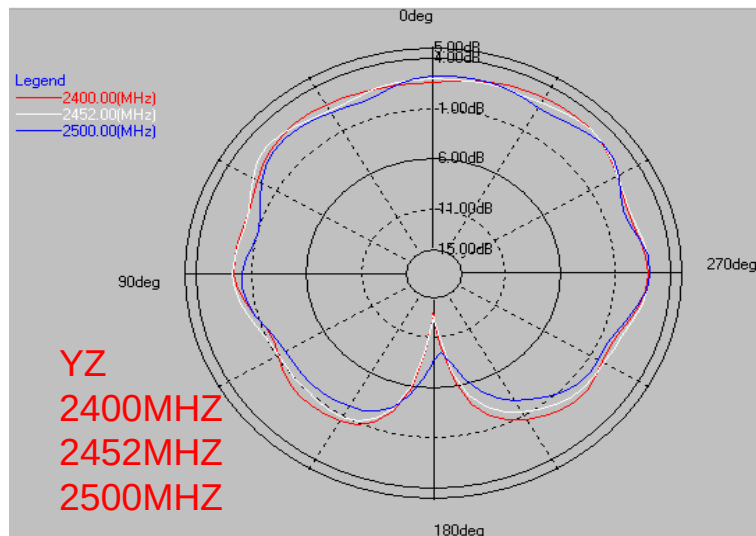
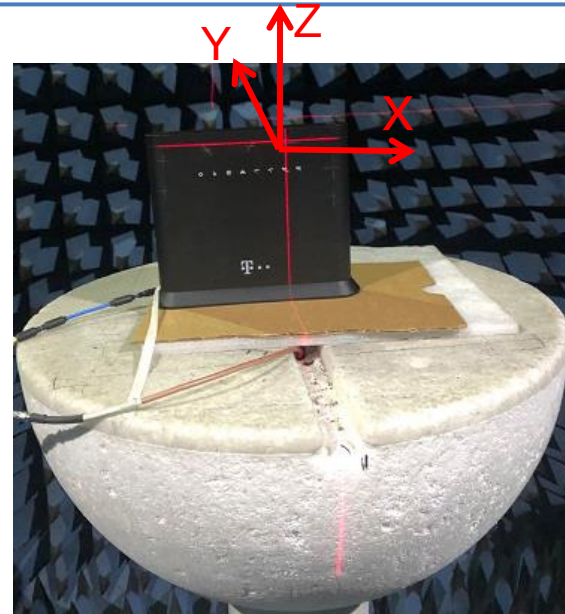
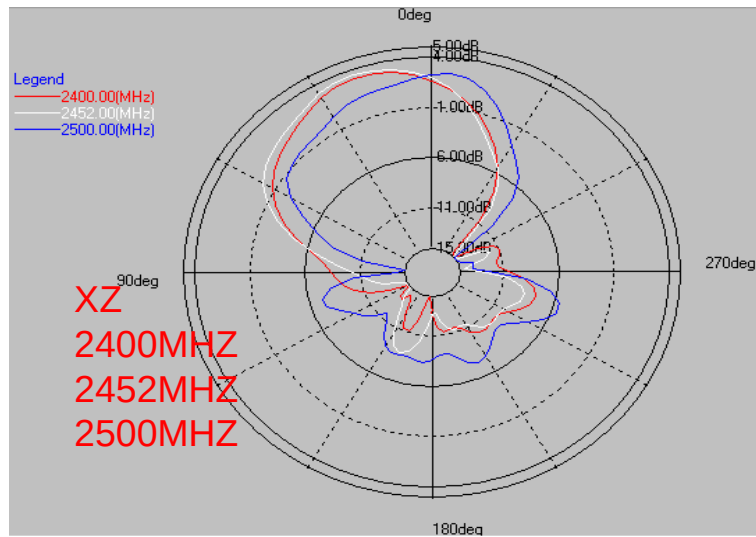
Antenna radiation pattern: 2G#1



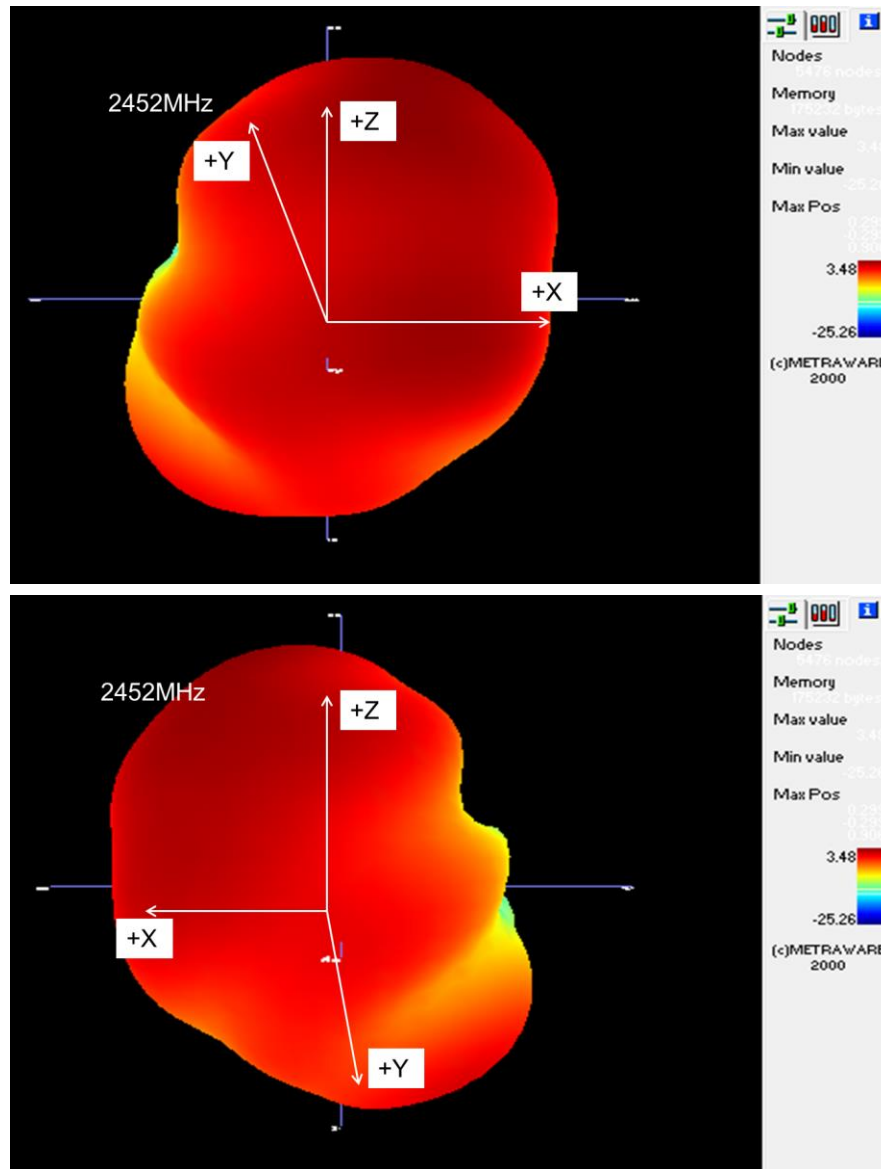
Antenna radiation pattern at 2452MHz: 2G#1



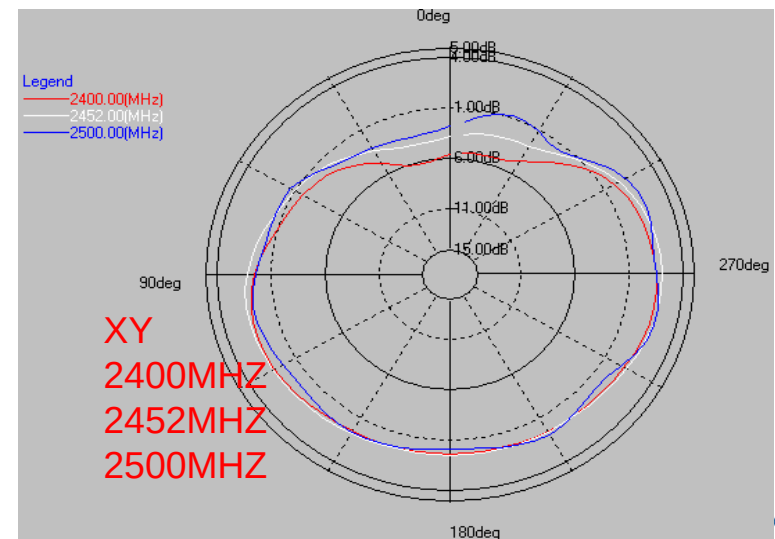
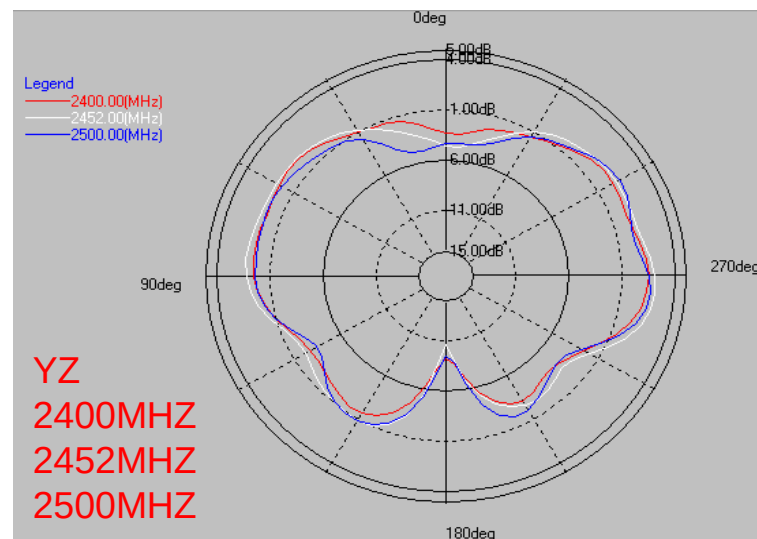
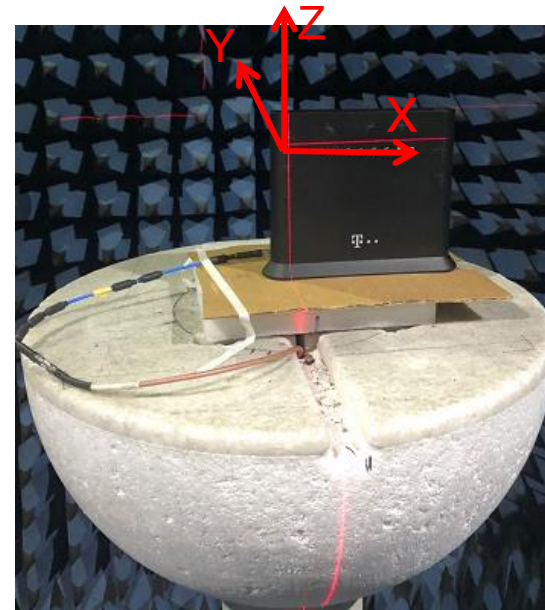
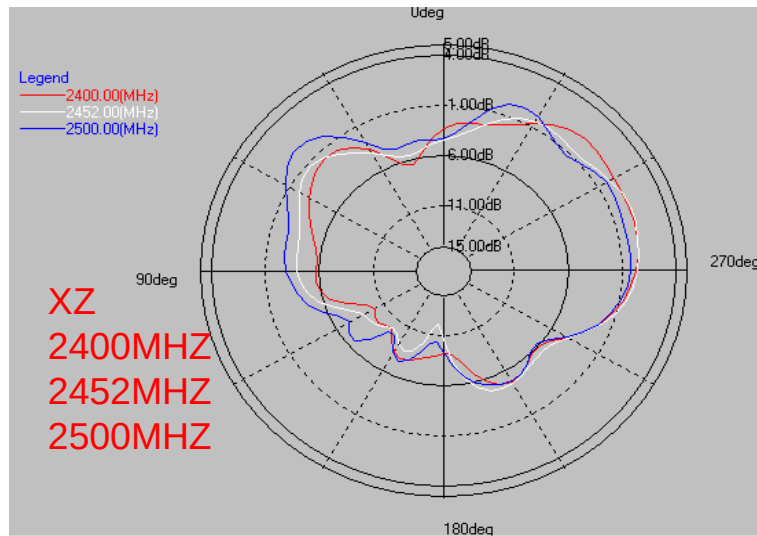
Antenna radiation pattern: 2G#2



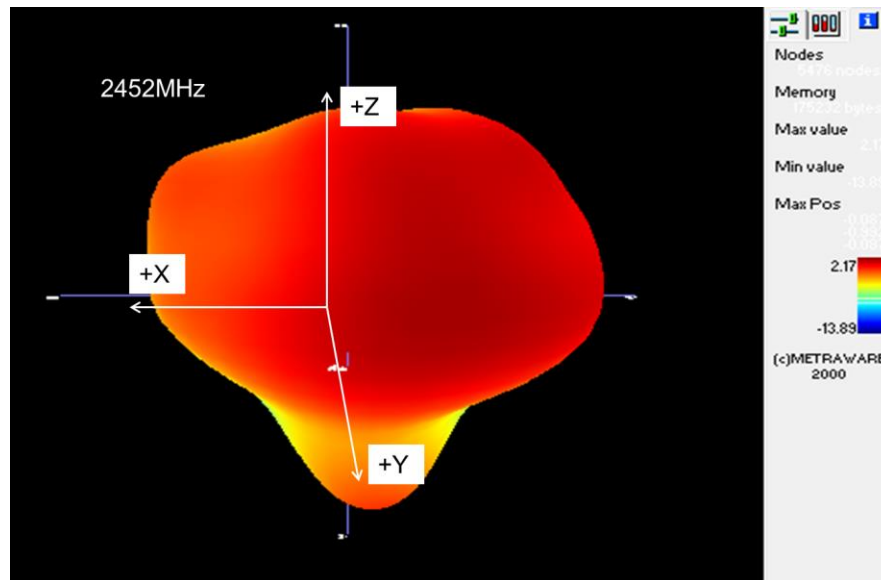
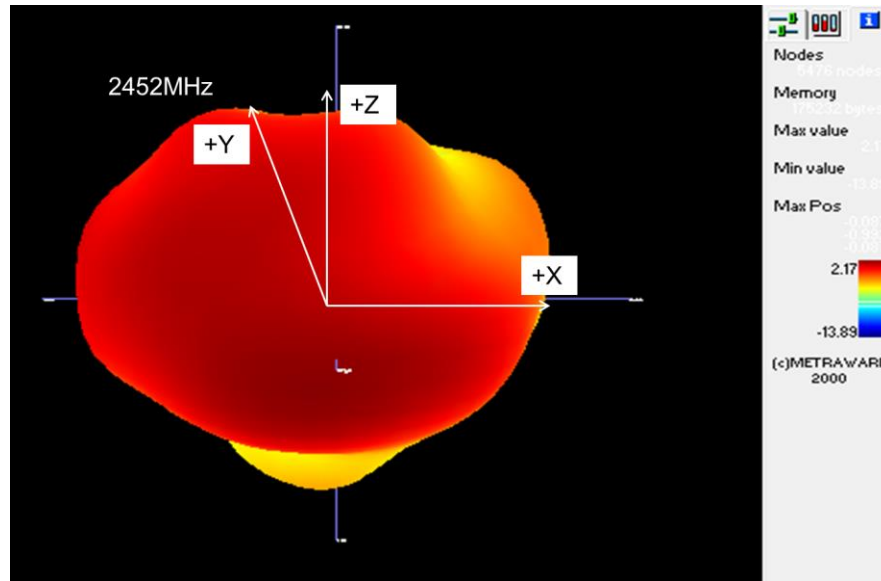
Antenna radiation pattern at 2452MHz: 2G#2



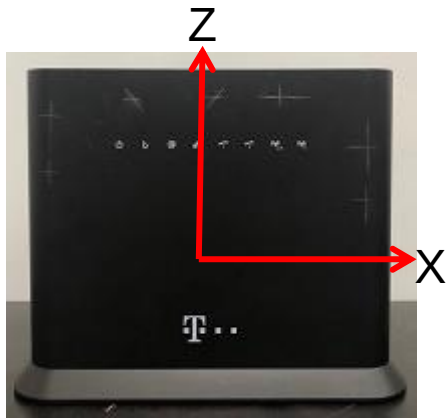
Antenna radiation pattern: 2G#3



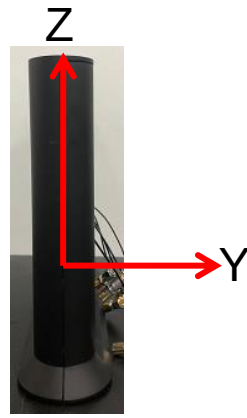
Antenna radiation pattern at 2452MHz: 2G#3



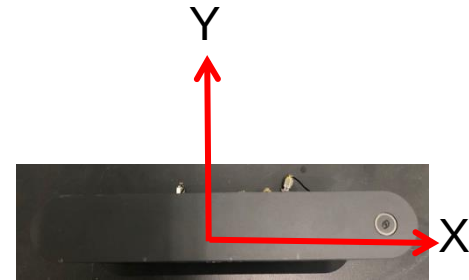
Antenna radiation pattern at 2452MHz: All 2.4GHz antennas



XZ

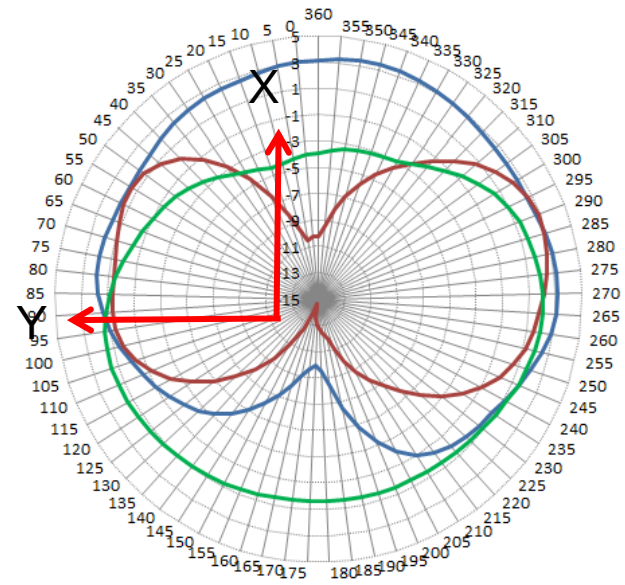
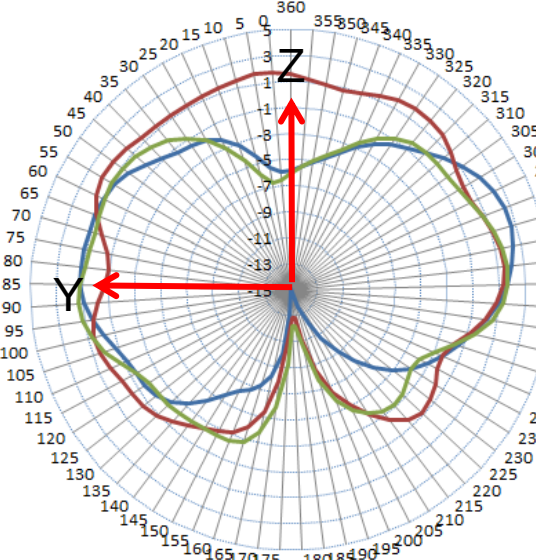
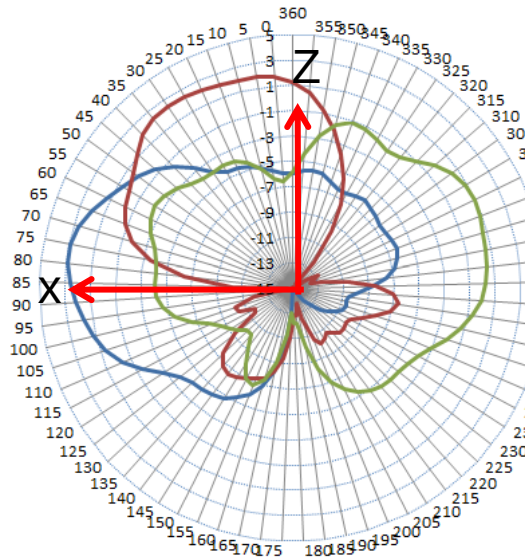


YZ

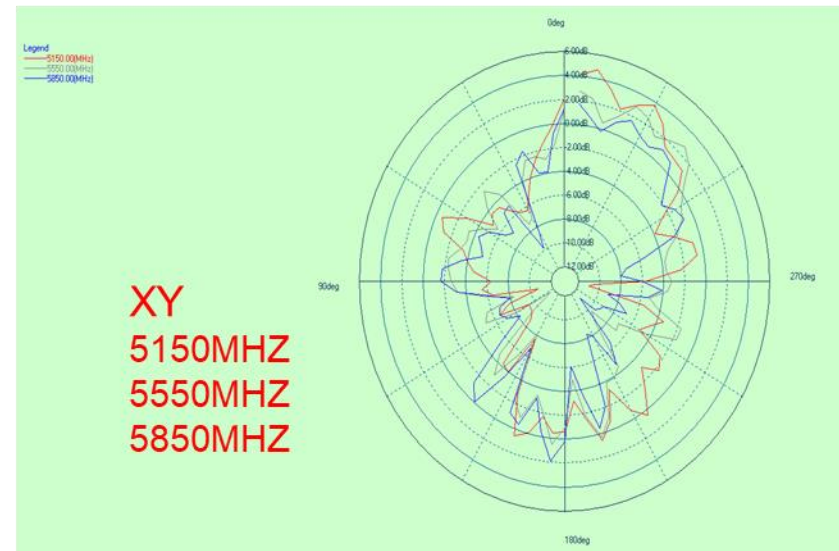
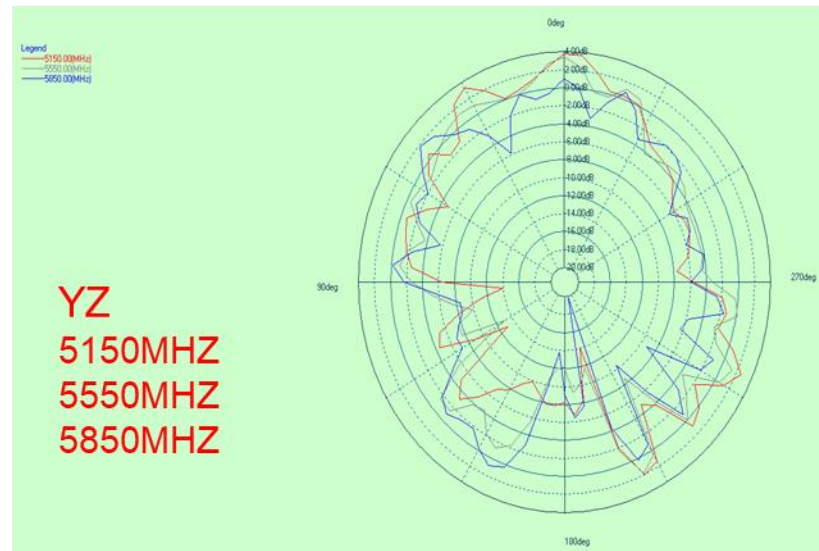
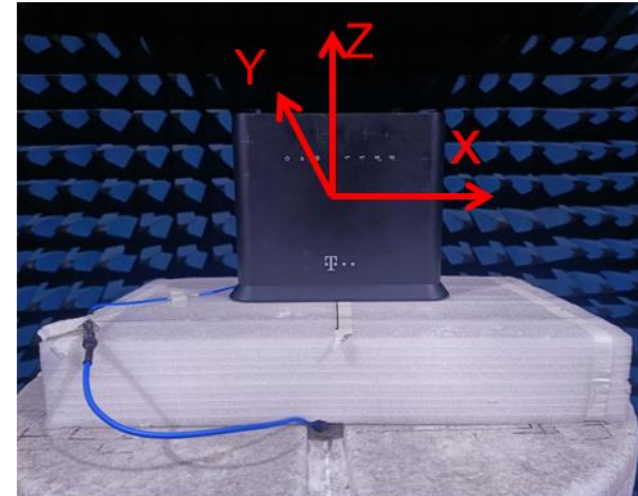
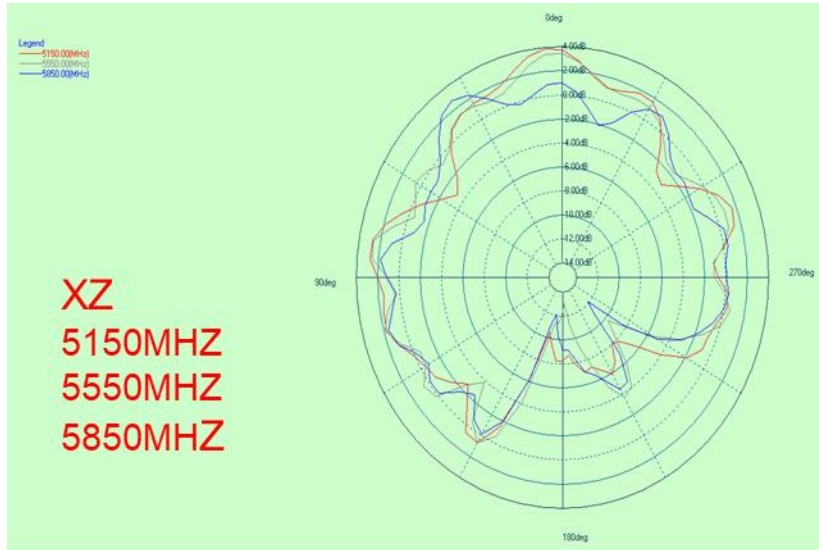


XY

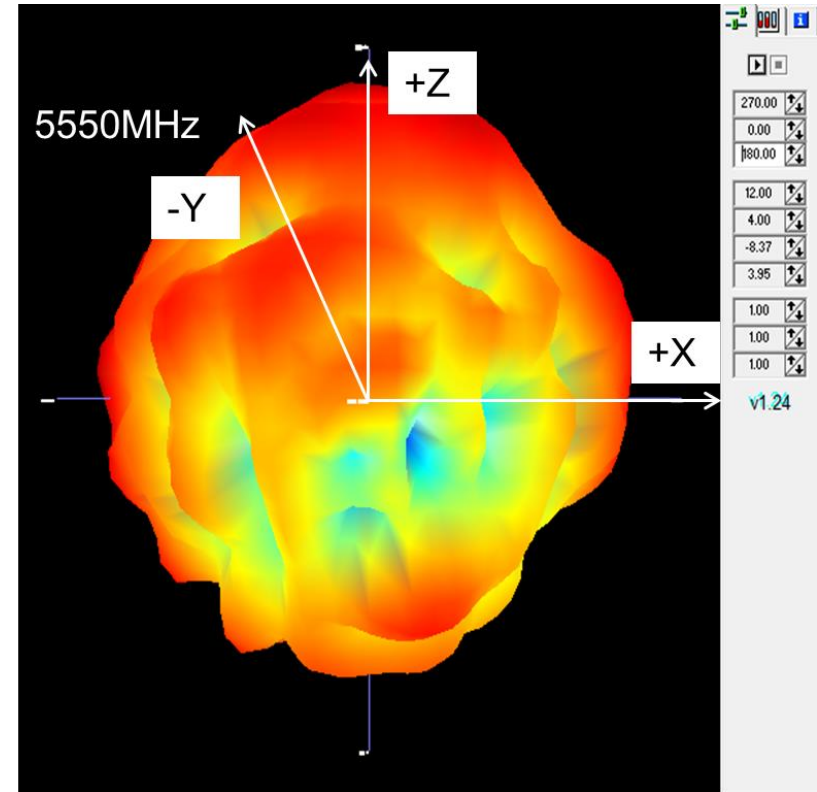
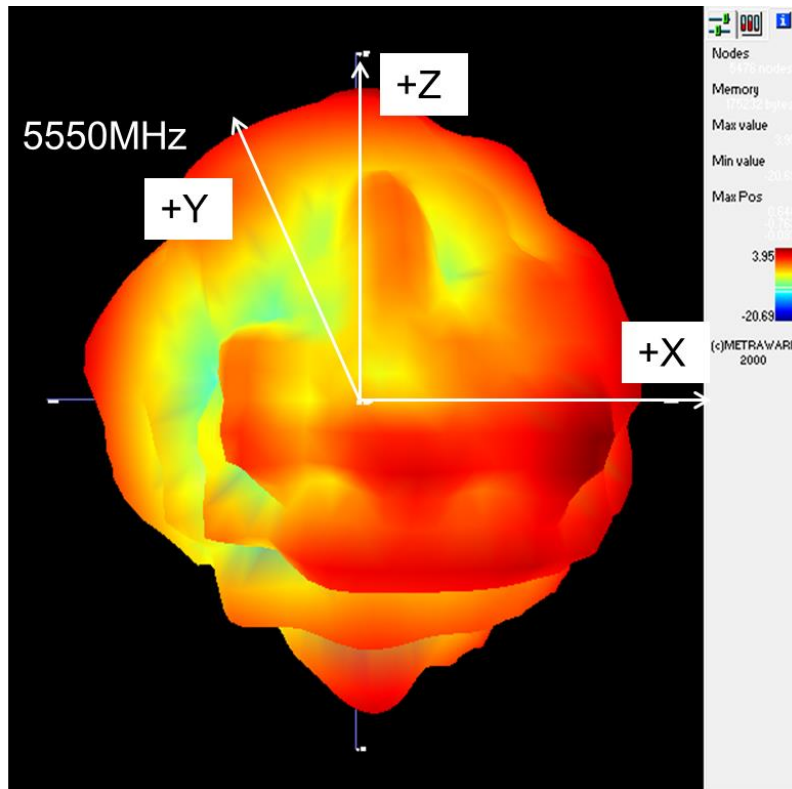
- 2G#1
- 2G#2
- 2G#3



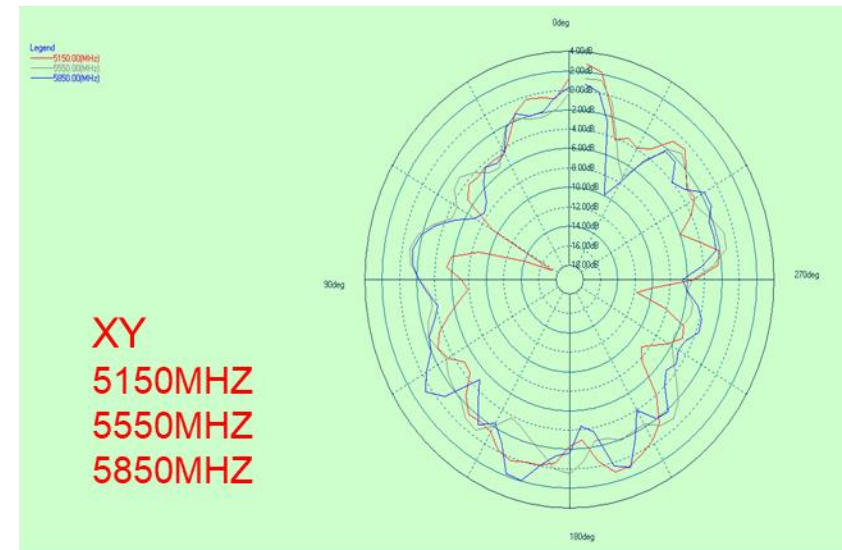
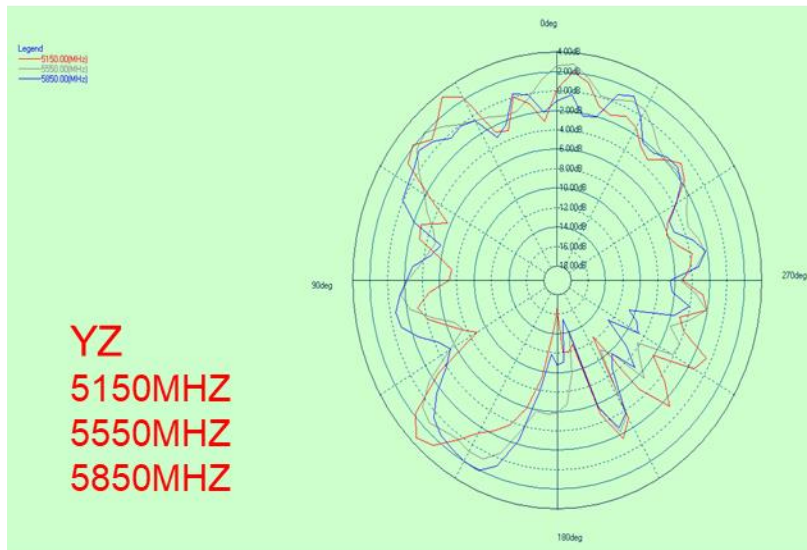
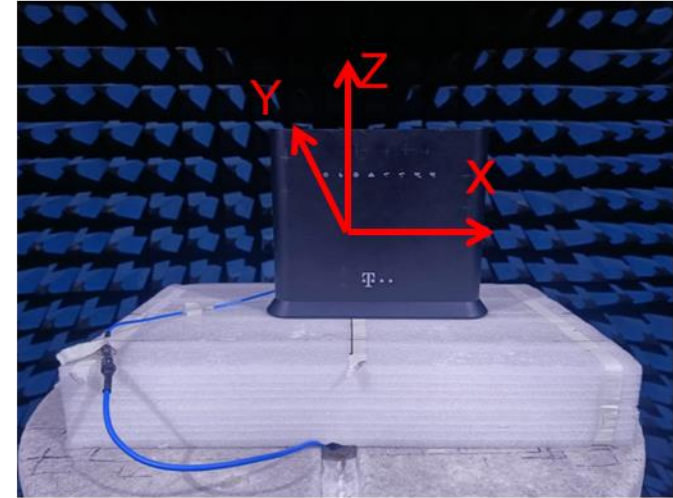
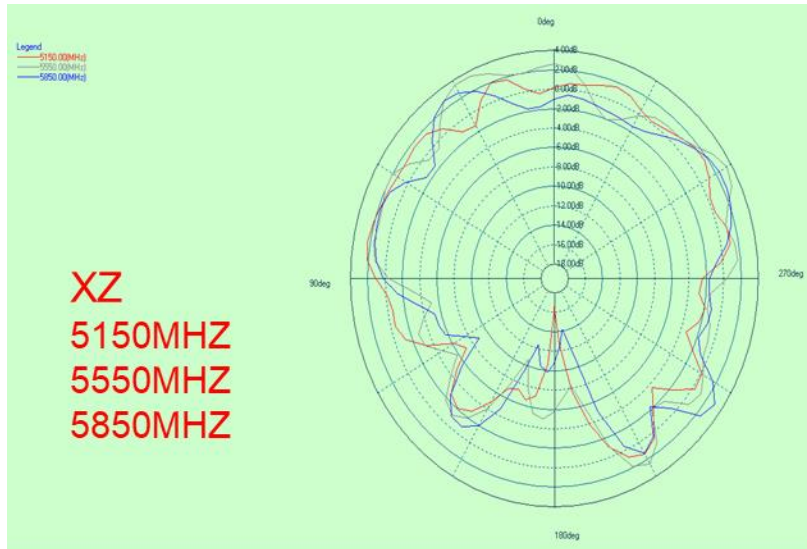
Antenna radiation pattern: 5G#1



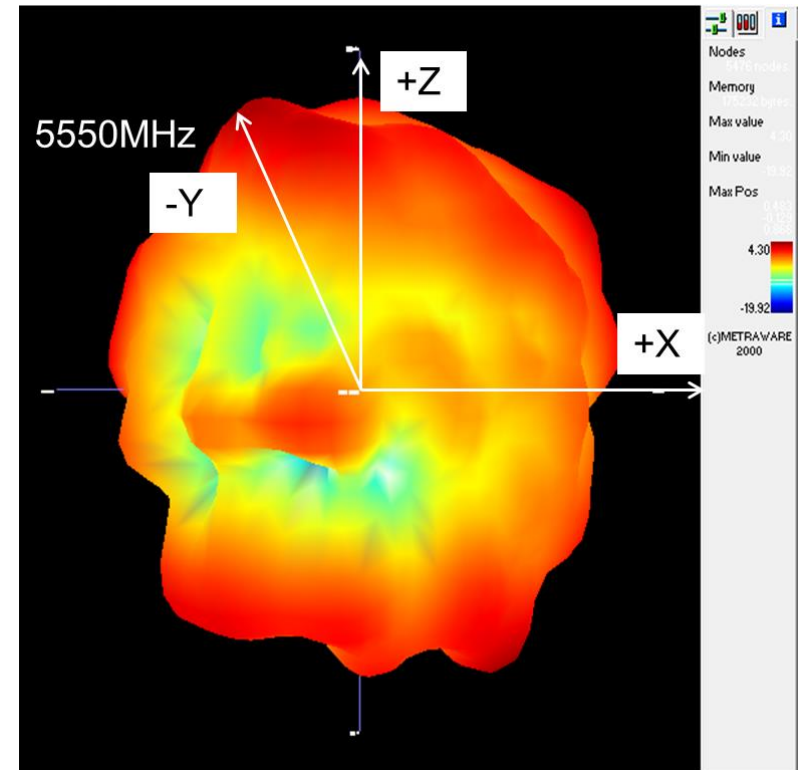
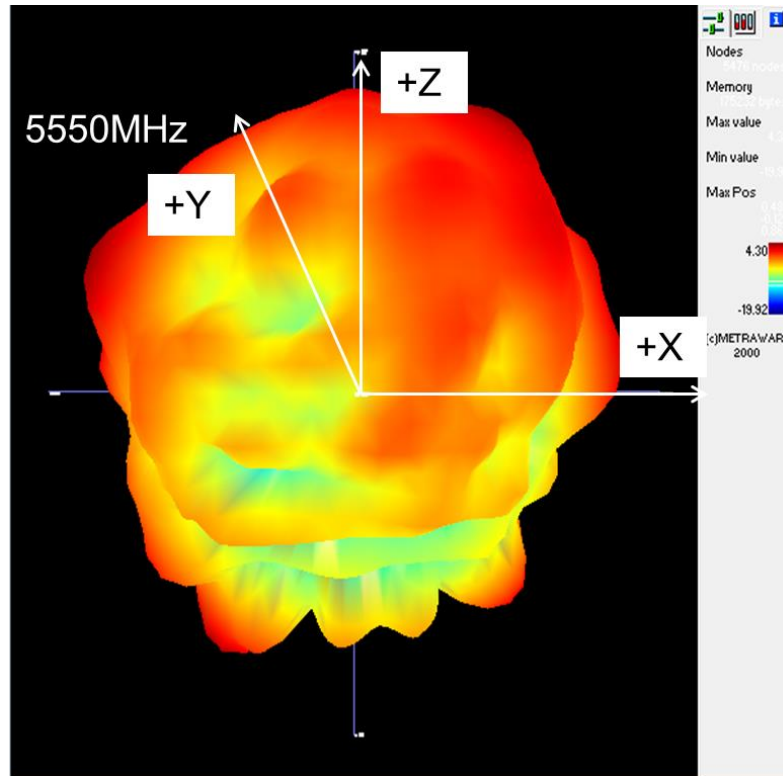
Antenna radiation pattern at 5550MHz: 5G#1



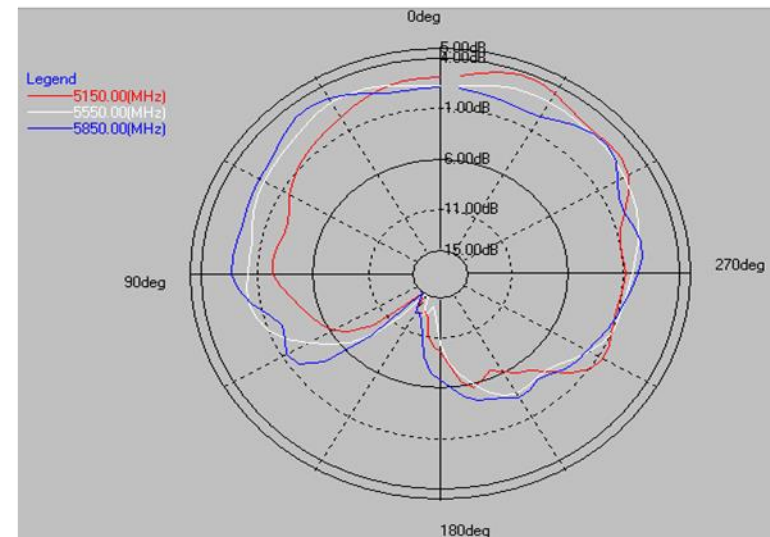
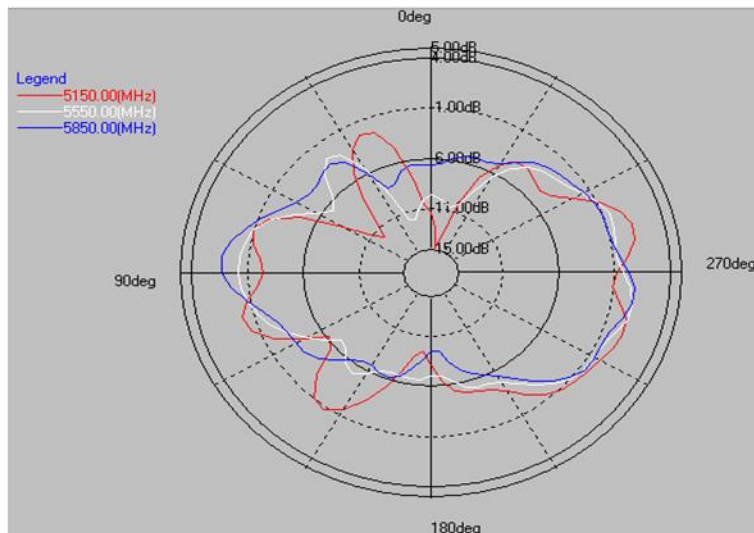
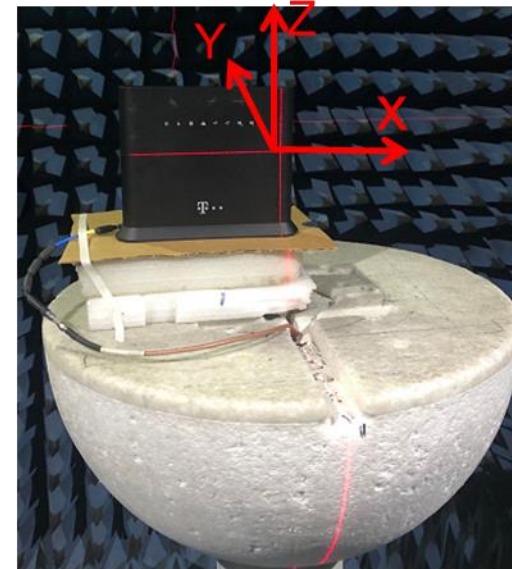
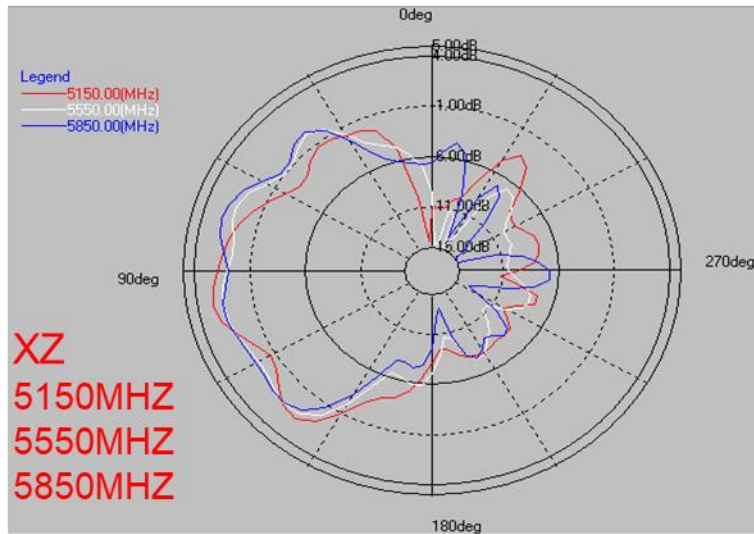
Antenna radiation pattern: 5G#2



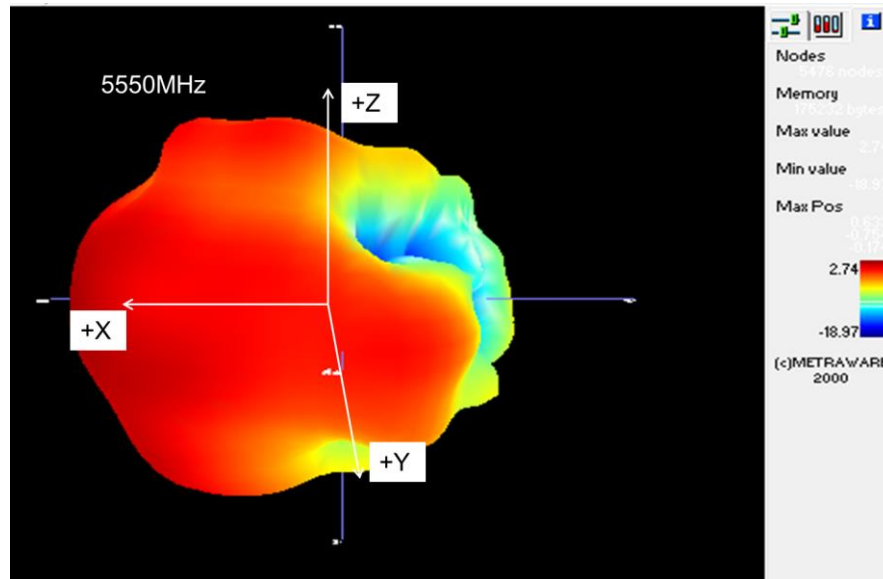
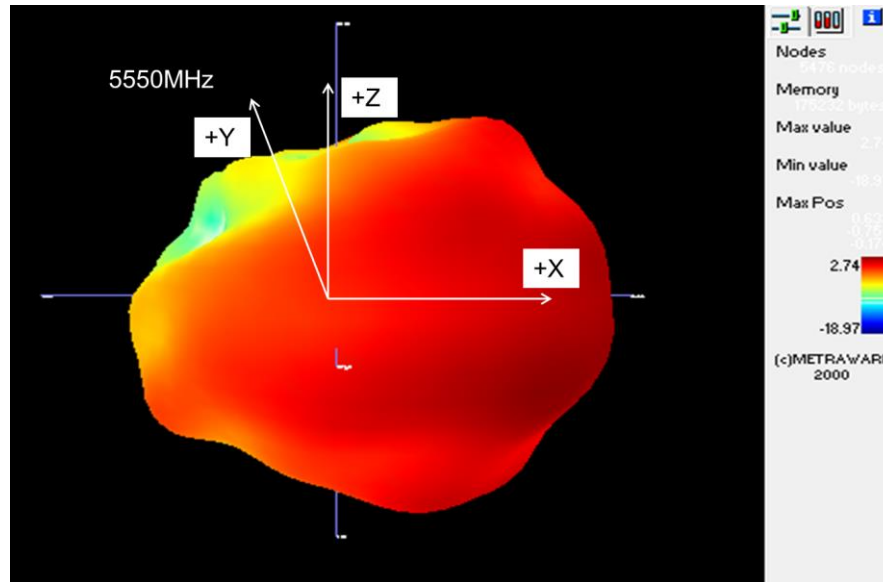
Antenna radiation pattern at 5550MHz: 5G#2



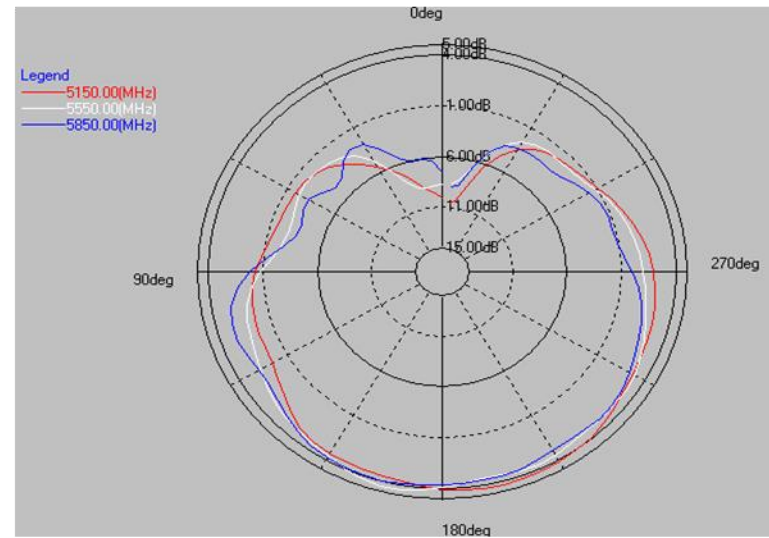
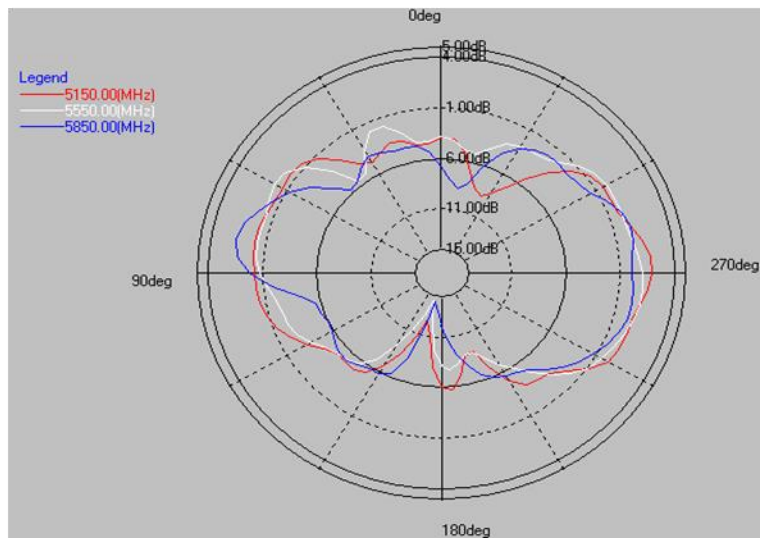
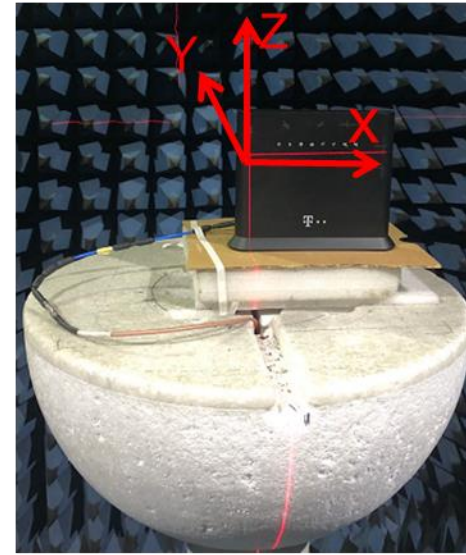
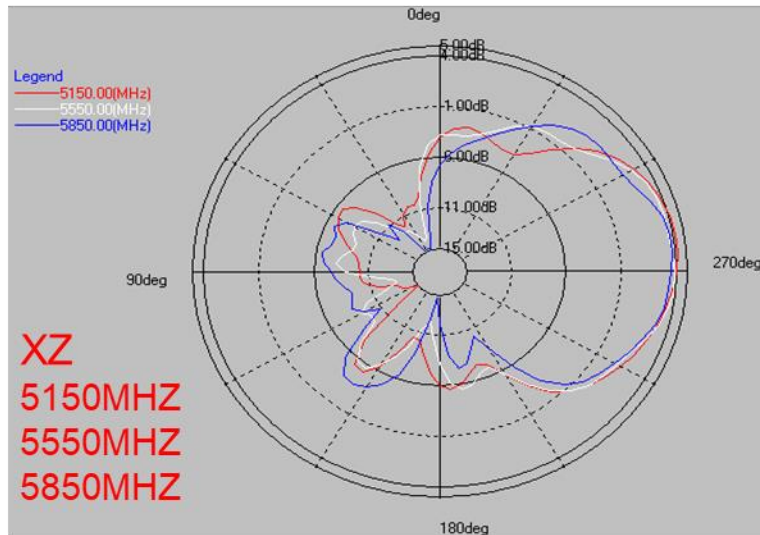
Antenna radiation pattern: 5G#3



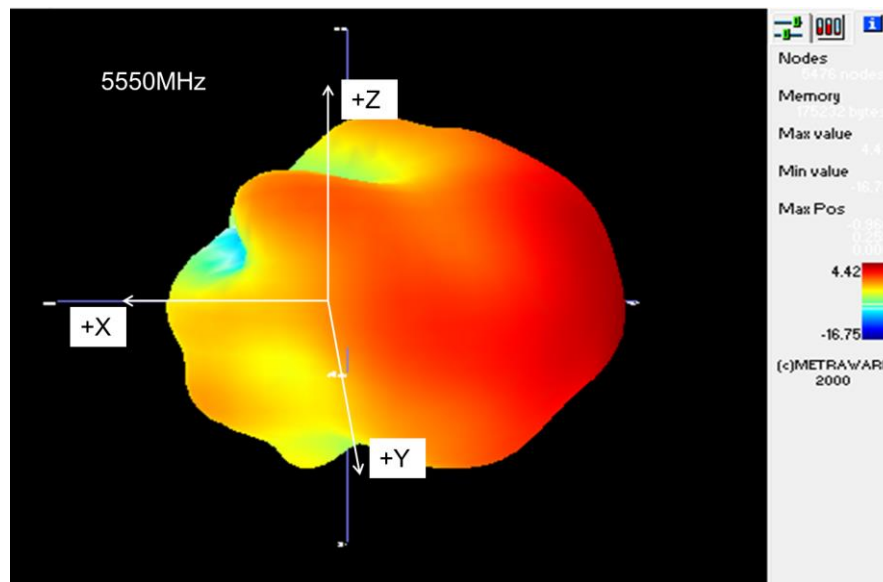
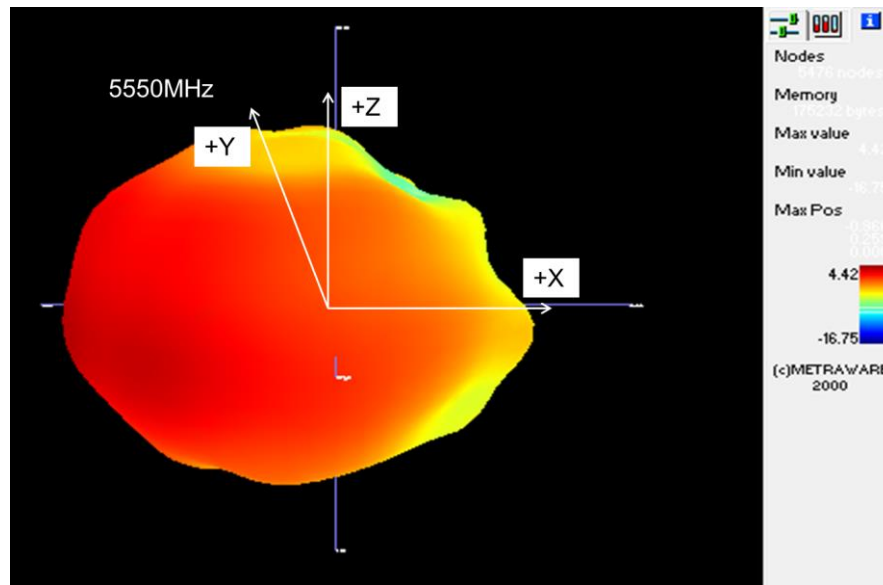
Antenna radiation pattern at 5550MHz: 5G#3



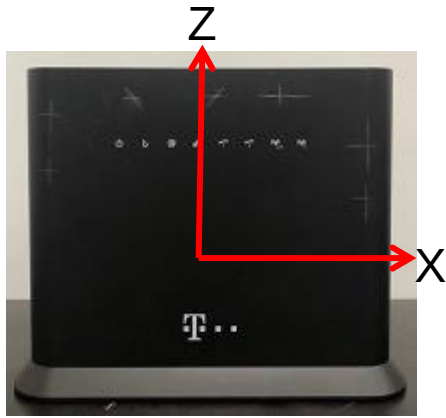
Antenna radiation pattern: 5G#4



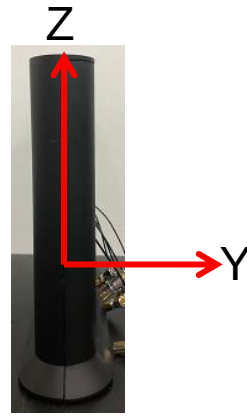
Antenna radiation pattern at 5550MHz: 5G#4



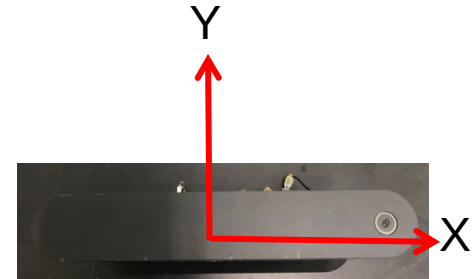
Antenna radiation pattern at 5550MHz: All 5GHz antennas



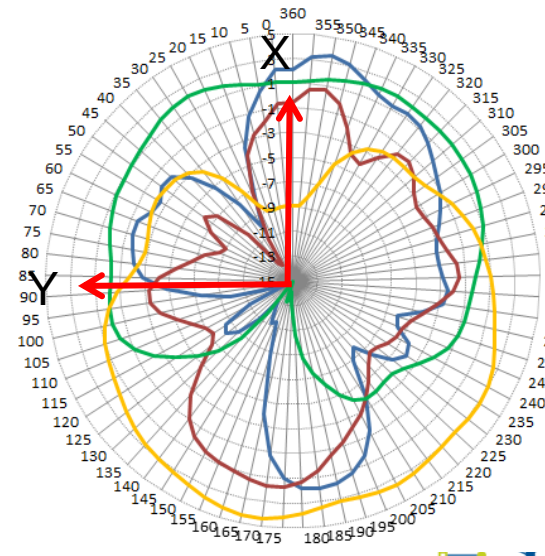
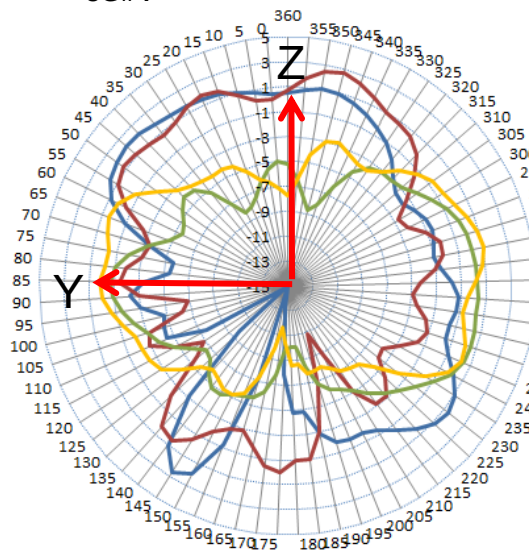
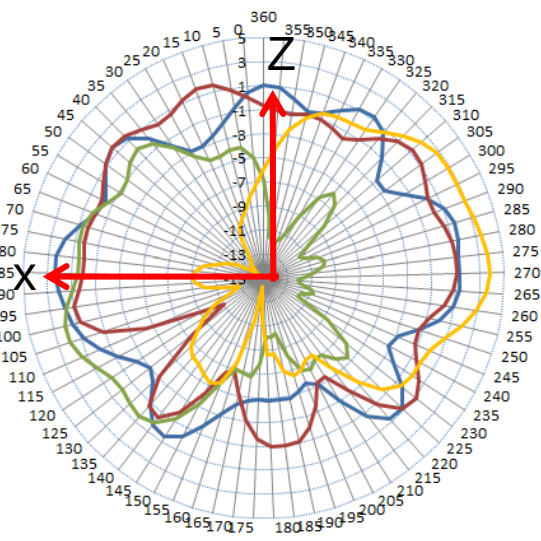
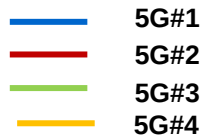
XZ



YZ



XY



Summary of the performances

- Return Loss < -10dB
- Isolation > 20dB
- Peak gain <4dBi @2.4GHz, <5dBi @5GHz
- Efficiency >60%



Smart Link, Bright Future

