



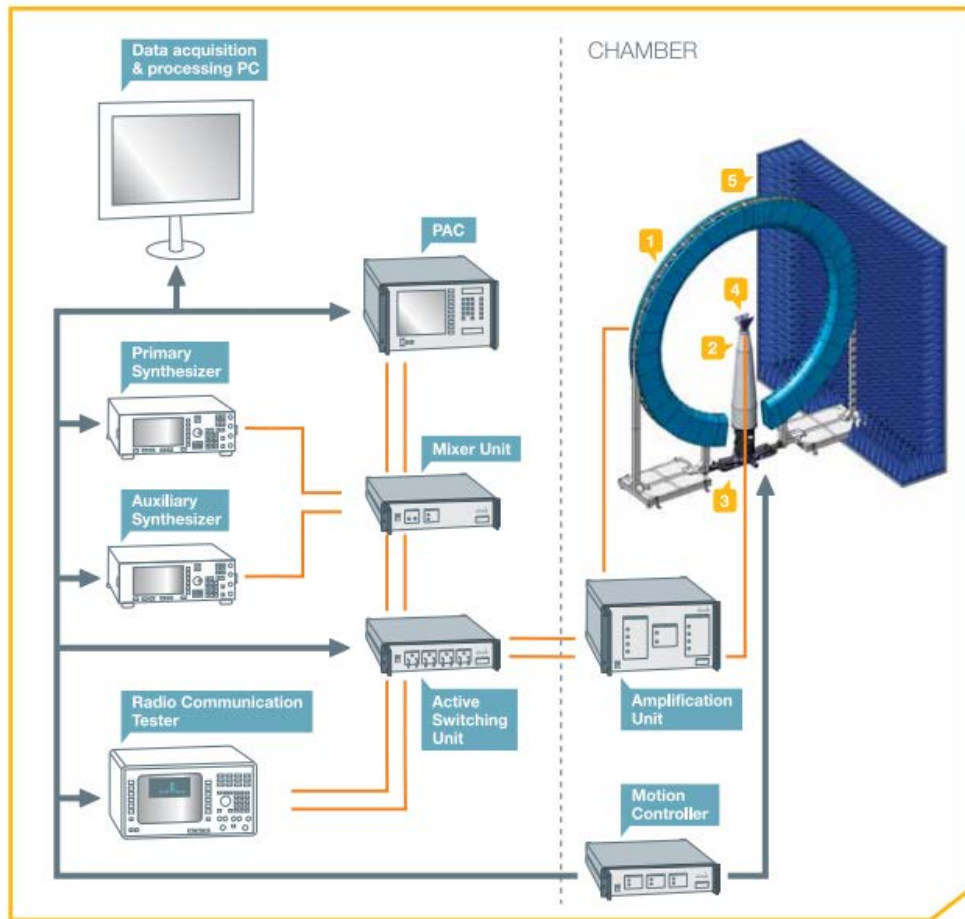
Antenna Test Report for ATKK

Model Name: RANQ-AK18

May. 23. 2023

Rev.01

Test Setup Diagram



SG 64 uses analog RF signal generators to emit EM waves from the probe array to the antenna under test (AUT) or vice versa.

It uses the NPAC as an RF receiver for antenna measurements. The NPAC also drives the electronic scanning of the probe array.

The NPAC includes the fastest and most accurate sources and receivers on the market.

Equipment

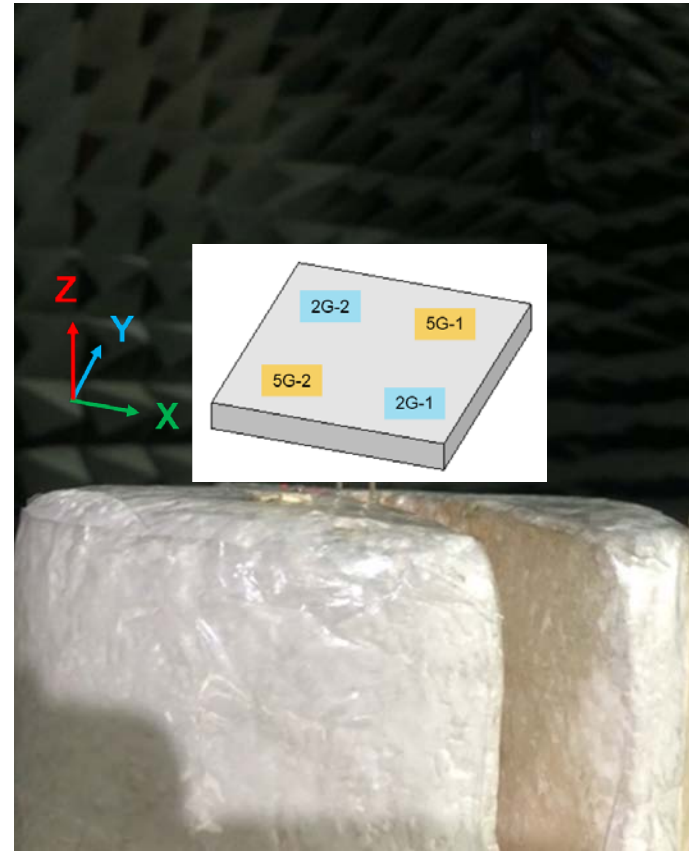
Device	Type/Model	Serial#	Manufacturer	Characteristics	Calibrated Date	Calibrated Until
SG64 Chamber	Standard	SG64	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Turn Table	Customization	-	Machinery Dept.	-	2022/03/30	2023/03/30
New Probe Array Controller	N/A	1102341-4535	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Power Supply Unit	N/A	1103211-13204	MVG	-	2022/03/30	2023/03/30
Active Switching Unit	N/A	1102347-7214	MVG	400MHz~6GHz	2022/03/30	2023/03/30
TX Amplification Unit	N/A	1102527-5909	MVG	400MHz~6GHz	2022/03/30	2023/03/30
RX Amplification Unit	N/A	1102536-3823	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Transfer Switching Unit	N/A	1102183-3351	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Mixer Unit	N/A	1102545-7208	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Power And Control Unit	N/A	1102706-7209	MVG	-	2022/03/30	2023/03/30
Antenna Probe	DP 400-6000	-	MVG	400MHz~6GHz	2022/03/30	2023/03/30
Cable 13.7m - 400MHz to 18GHz	SS402	00100A1F5A1XXS	Woken	-	2022/03/30	2023/03/30
Temperature & Humidity Meter	HTC-01	-	MetraVi	-	2022/03/30	2023/03/30

Note:

1. There are 63 set ANT probes in WNC's SG64 Chamber.
2. This ant. test chamber is located in WNC which address is :
Add: 20 Park Avenue II (or Yuanchiu 2nd Rd.), Hsinchu Science Park, Hsinchu 300, Taiwan
Tel: +886-3-666-7799

Test Setup and Procedure

- Place the device at the center of the chamber.
- Connect the antenna cable to RF cable of the chamber
- Run Satimo test SW (**NPAC Spherical Measurement, v1.5.4 (GIT-E6965664)**).
- Get 3D data in 2.8125 degree step from phi 0°~360° and theta -90°~ +90°, including efficiency, peak gain, 2D & 3D radiation pattern.
- This is passive measurement, which means the device is off and not in any operating mode.



Summary

– **VSWR**

- *Under 2.0 for 2G antennas*
- *Under 2.0 for 5G antennas*

– **Isolation**

- *> 27.8dB 2G radio*
- *> 22.0dB 5G radio*
- *> 30.9dB / 26.5dB (2G/ 5G) for 2G-1 to 5G radio*
- *> 30.8dB / 25.0dB (2G/ 5G) for 2G-2 to 5G radio*

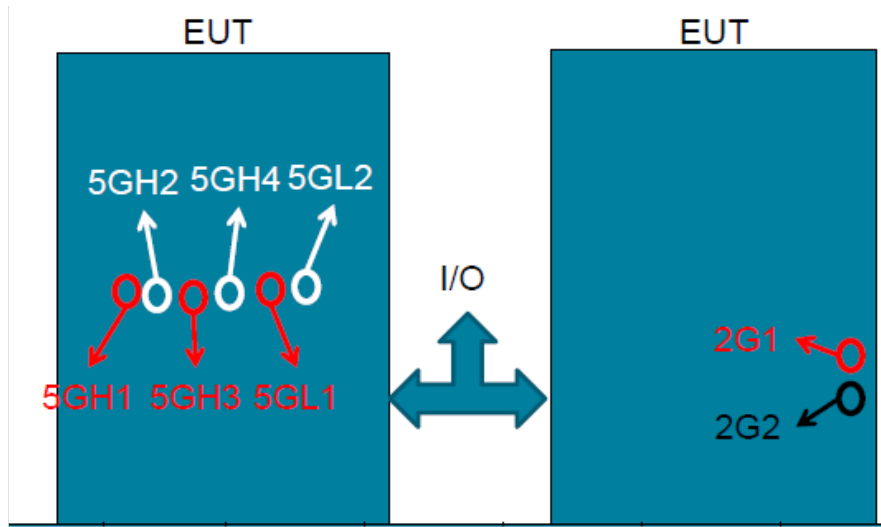
– **Average Radiation efficiency**

- *~ 62.1% for 2G-1*
- *~ 65.4% for 2G-2*
- *~ 68.9% for 5G-1*
- *~ 65.2% for 5G-2*

– **Peak gain**

- *Max 3.37dBi for 2G radio*
- *Max 5.43dBi for 5G radio*

Antenna Configuration

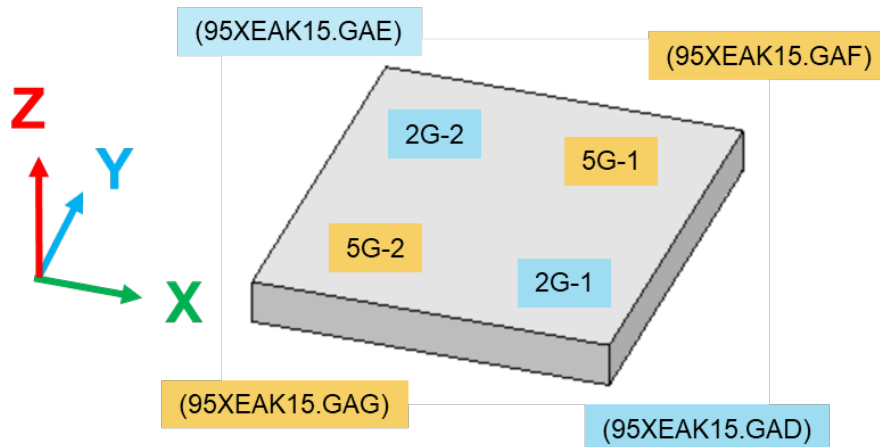


Antenna Spec. 2 x 2G only+ 2 x 5G only

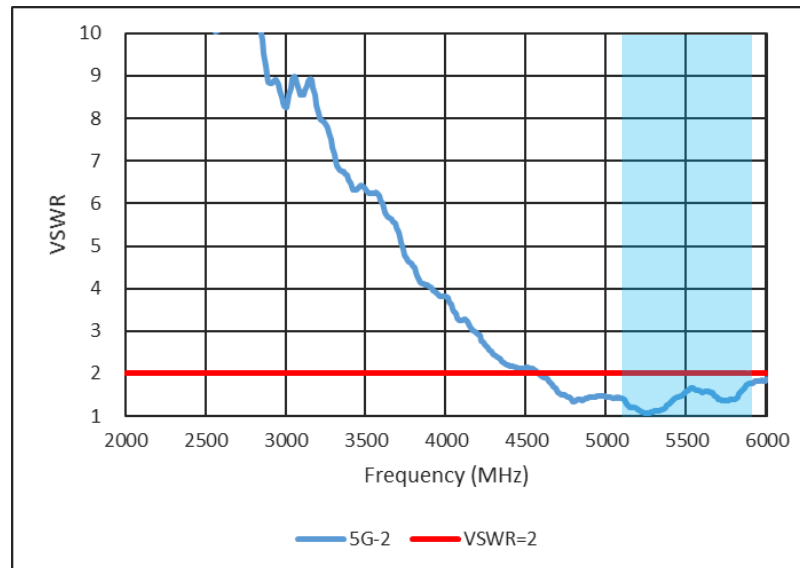
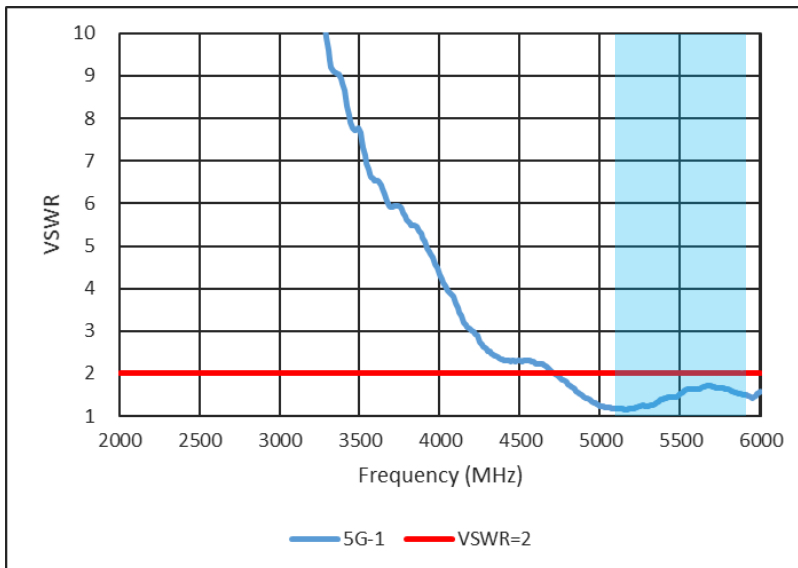
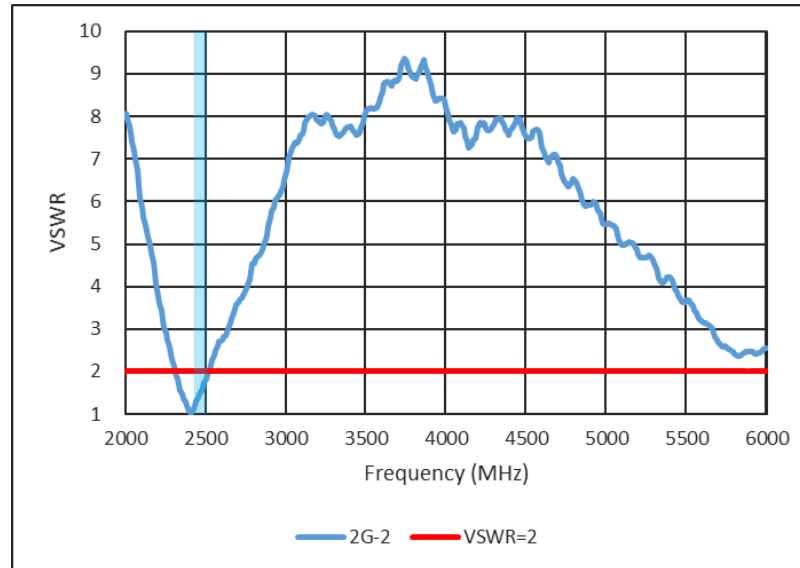
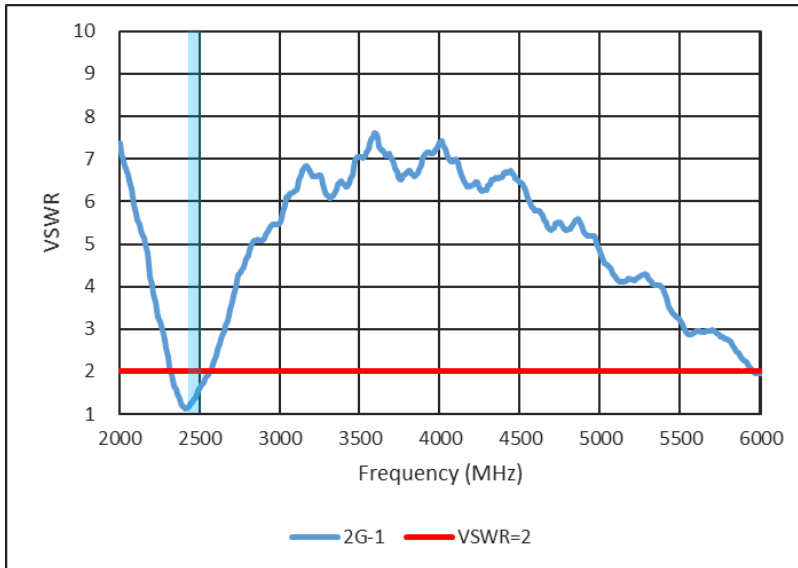
- 2 x Metal antennas for 2G radio
- 2 x Metal antennas for 5G radio

 2G Antenna Size: 30mm x 13.5mm x 8.5mm

 5G Antenna Size: 30mm x 13.5mm x 8.5mm

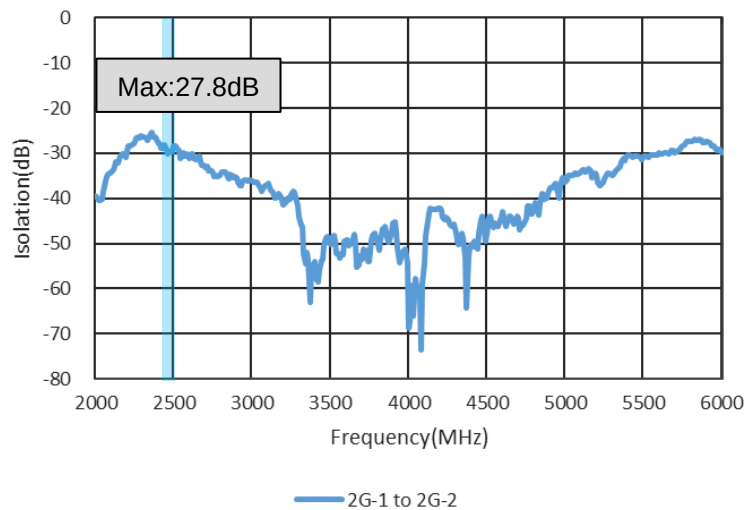


VSWR

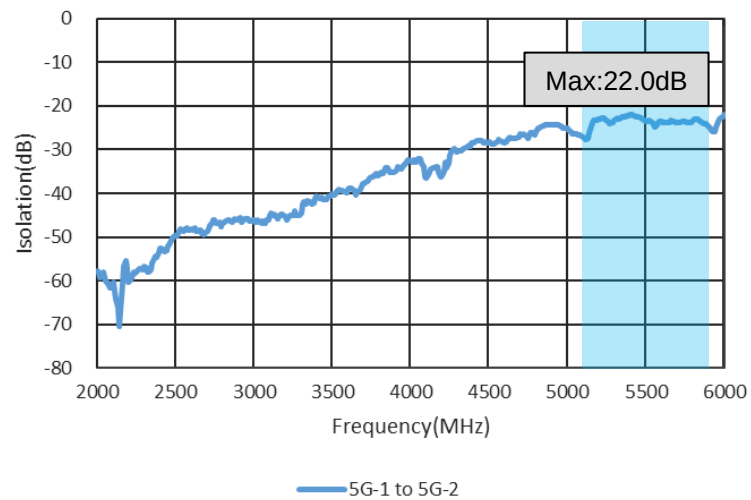


Isolation

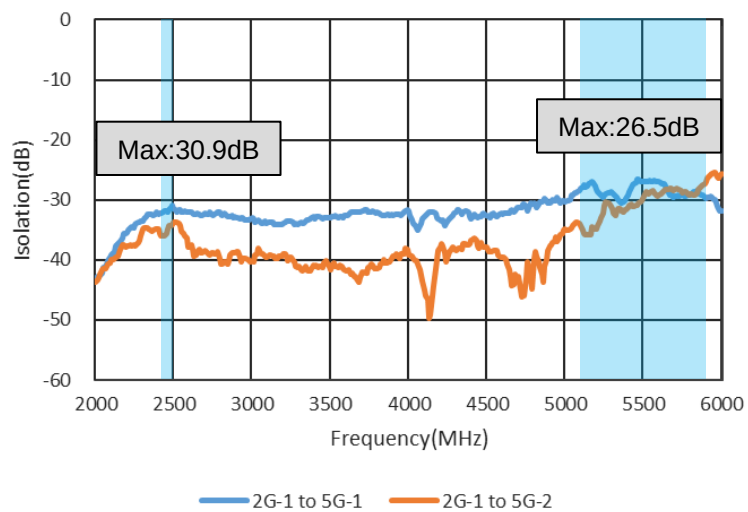
2G group



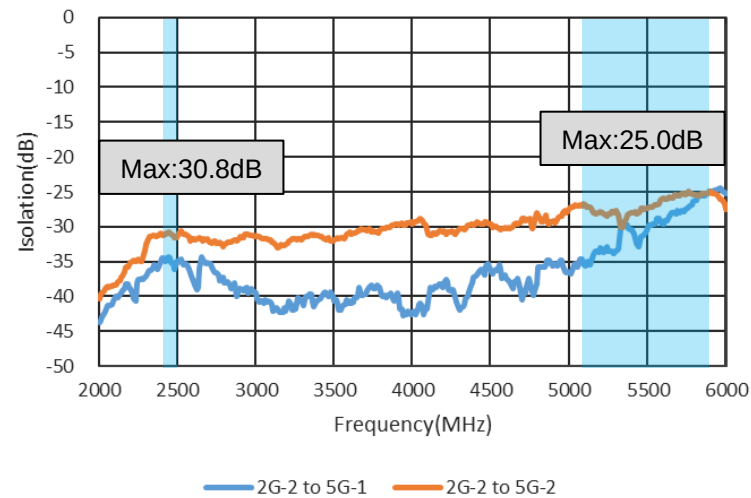
5G group



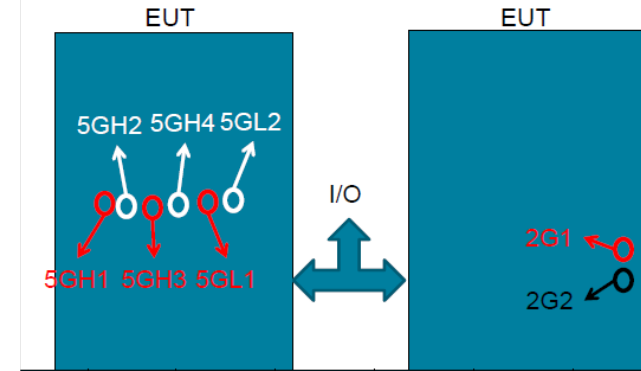
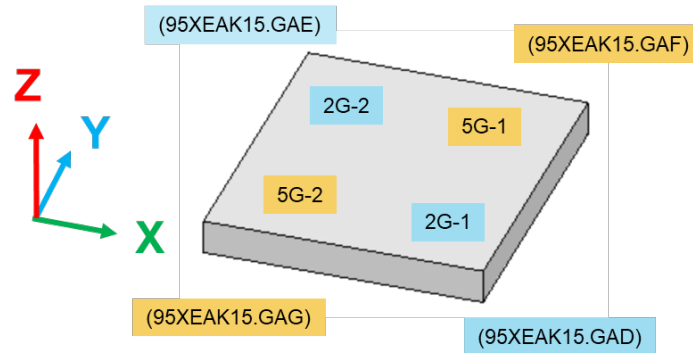
2G-1 to 5G group



2G-2 to 5G group



Peak Gain

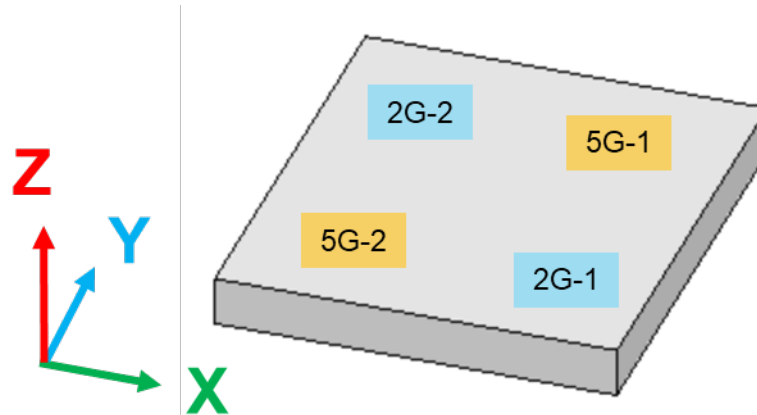


2G-1 (95XEAK15.GAD)	2400	2450	2500
Peak Gain(dBi)	1.49	1.93	1.67
Peak Gain(dBi) @	$\theta=50$; $\phi=101$	$\theta=47$; $\phi=104$	$\theta=47$; $\phi=106$
2G-2 (95XEAK15.GAE)	2400	2450	2500
Peak Gain(dBi)	2.92	3.37	3.10
Peak Gain(dBi) @	$\theta=-56$; $\phi=98$	$\theta=-56$; $\phi=101$	$\theta=-56$; $\phi=104$

5G-1 (95XEAK15.GAF)	5150	5350	5550	5750	5850
Peak Gain(dBi)	4.55	5.10	5.14	4.86	5.38
Peak Gain(dBi) @	$\theta=-61$; $\phi=87$	$\theta=-64$; $\phi=33$	$\theta=-64$; $\phi=33$	$\theta=-70$; $\phi=33$	$\theta=-67$; $\phi=33$
5G-2 (95XEAK15.GAG)	5150	5350	5550	5750	5850
Peak Gain(dBi)	4.16	4.93	4.69	5.43	5.37
Peak Gain(dBi) @	$\theta=73$; $\phi=0$	$\theta=64$; $\phi=39$	$\theta=67$; $\phi=39$	$\theta=70$; $\phi=39$	$\theta=71$; $\phi=39$

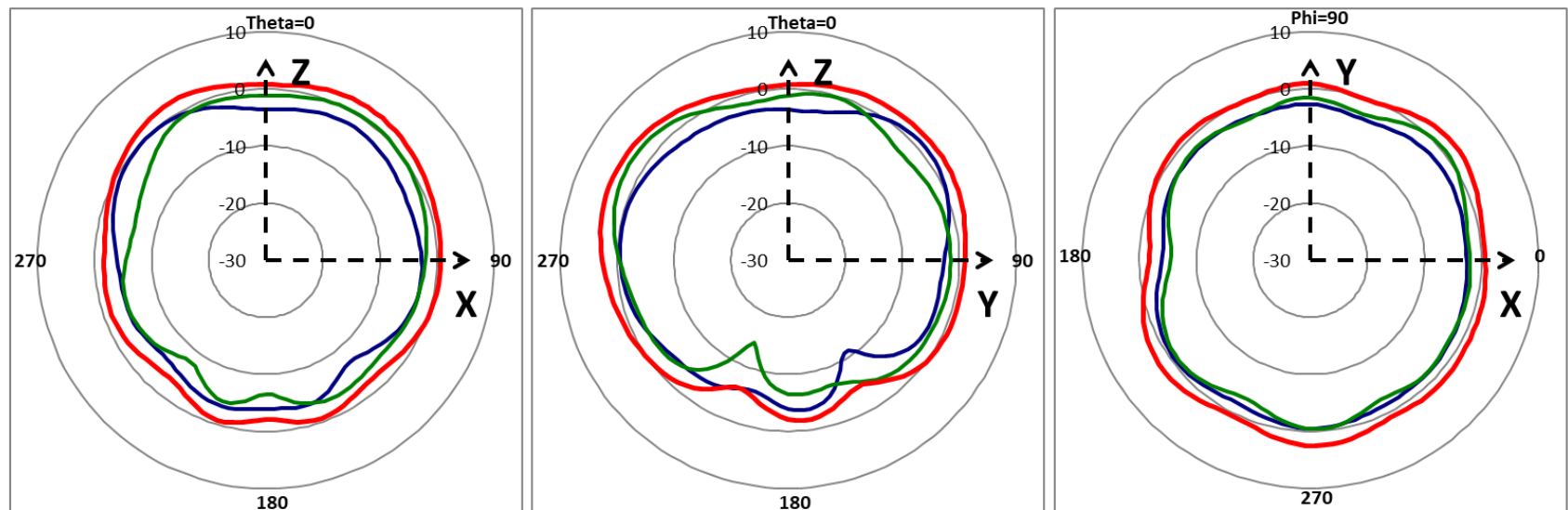
Above Peak Gain = Product antenna peak gain - path loss + Chamber's receiving RX peak gain.

Radiation Pattern for 2G

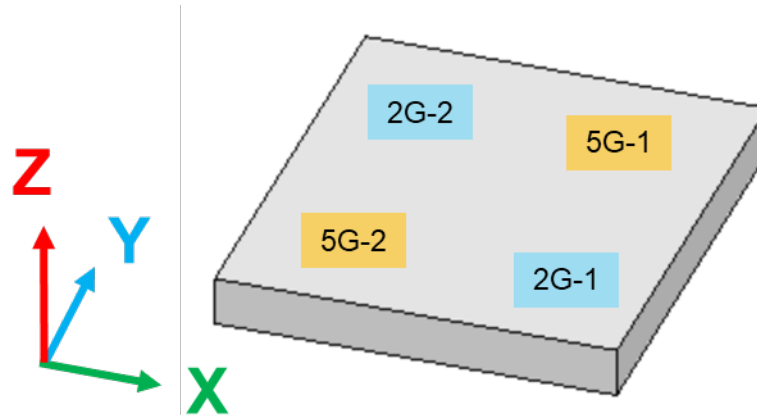


WIFI 2.4G Radiation Pattern

— Directional Gain
— 2G-1
— 2G-2

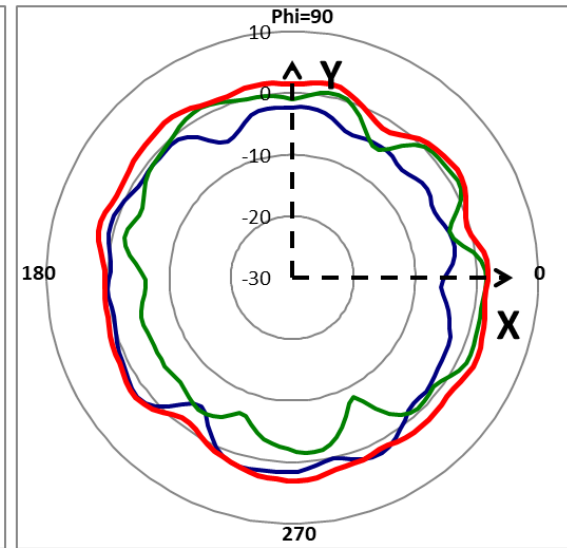
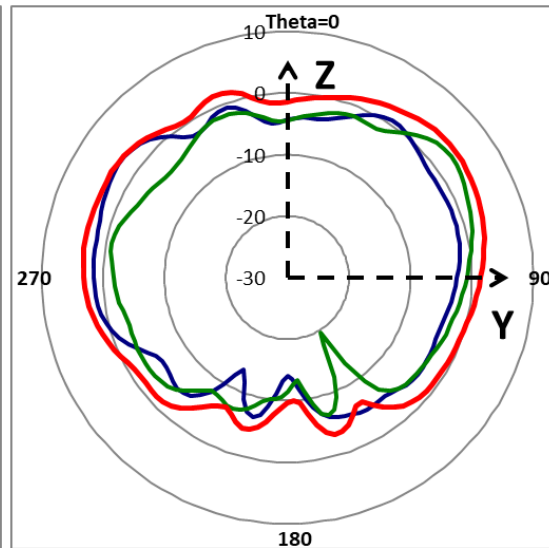
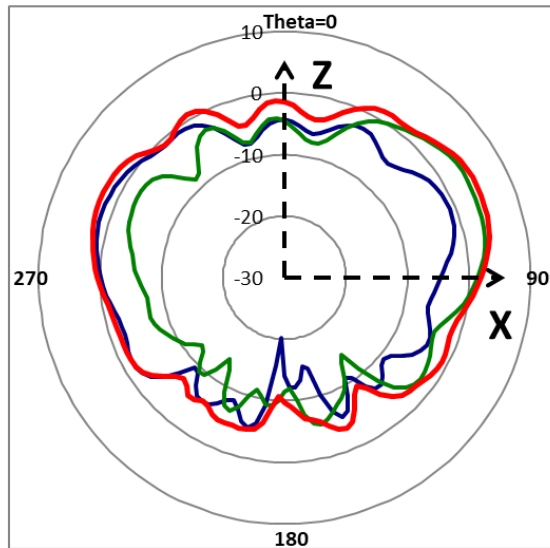


Radiation Pattern for 5G



WIFI 5G Radiation Pattern

— Directional Gain
— 5G-1
— 5G-2



WNC

Wistron NeWeb Corp.

