

The WNC logo is displayed in blue, stylized capital letters on a grey building facade. The background of the entire slide is a photograph of a modern glass skyscraper with a grey concrete section on the left. A large, out-of-focus green leaf is in the foreground, partially obscuring the view. A small white wind turbine is visible on a pole to the right of the building.

WNC

Antenna Test Report for MR86-HW

WNC Wistron NeWeb Corp.

☐ Normal ☐ Internal Use ☒ Confidential ☐ Restricted Confidential



Contents

- **General Information**
- **Test Setup**
 - Diagram
 - Equipment
 - Procedure
- **Test Result**
 - Summary
 - Performance

General Information

■ Antenna Information:

- Brand: WNC

20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan

■ Antenna Type:

– BLE: PIFA (95XKAJ15.G39)

– Scanning: PIFA (95XKAJ15.G38)

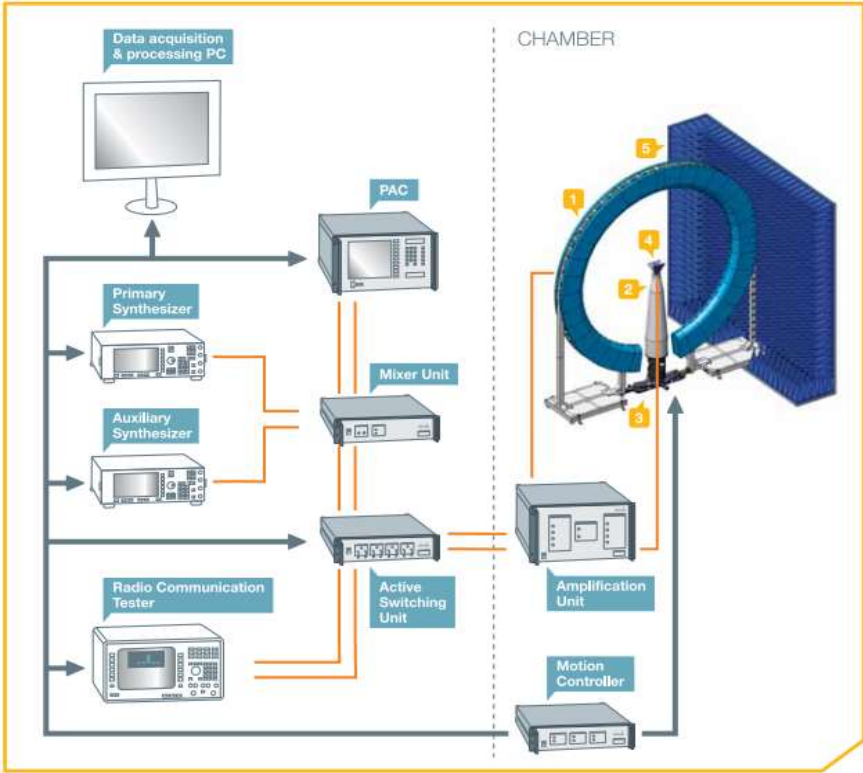
■ Test Date and Member

Date: 2019/ 10/18

Member: Elyse



Test S



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.

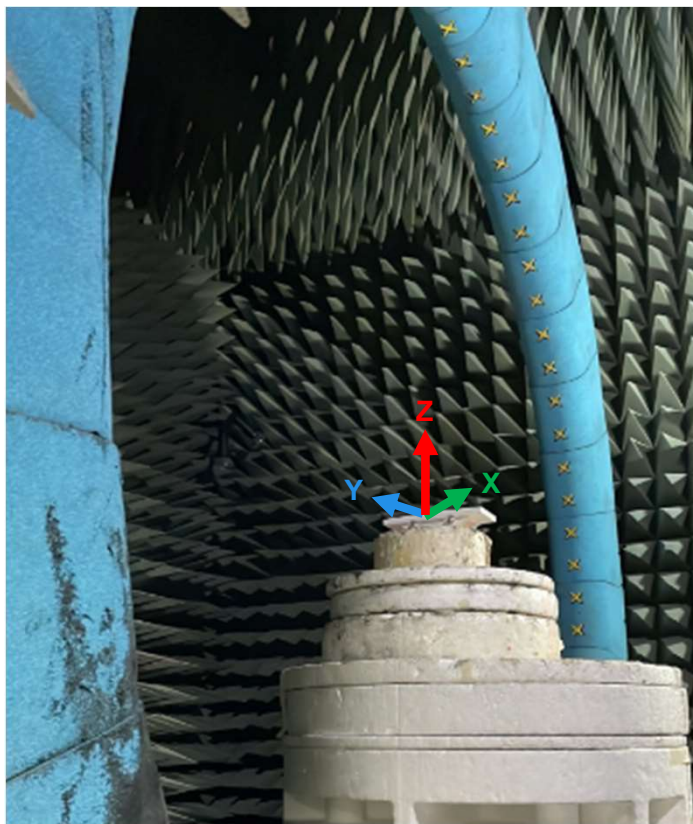
Equipment

Device	Type/Model	Serial#	Manufacturer	Calibrated Date	Calibrated Until
SG64 Chamber	Standard	SG64	MVG	2019/03/30	2024/03/30
Turn Table	Customization	-	Machinery Dept.	2019/03/30	2024/03/30
New Probe Array Controller	N/A	1102341-4535	MVG	2019/03/30	2024/03/30
Power Supply Unit	N/A	1103211-13204	MVG	2019/03/30	2024/03/30
Active Switching Unit	N/A	1102347-7214	MVG	2019/03/30	2024/03/30
TX Amplification Unit	N/A	1102527-5909	MVG	2019/03/30	2024/03/30
RX Amplification Unit	N/A	1102536-3823	MVG	2019/03/30	2024/03/30
Transfer Swtitching Unit	N/A	1102183-3351	MVG	2019/03/30	2024/03/30
Mixer Unit	N/A	1102545-7208	MVG	2019/03/30	2024/03/30
Power And Control Unit	N/A	1102706-7209	MVG	2019/03/30	2024/03/30
Antenna Probe	DP 400-6000	-	MVG	2019/03/30	2024/03/30
Cable 13.7m - 400MHz to 18GHz	SS402	00100A1F5A1XXS	Woken	2019/03/30	2024/03/30
Temperature & Humidity Meter	HTC-01	-	Metravi	2019/03/30	2024/03/30

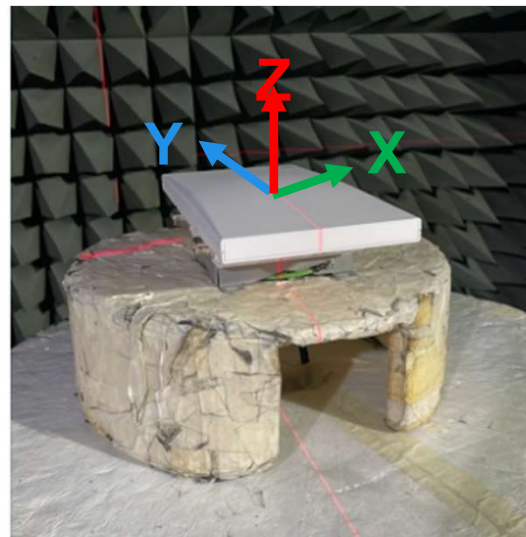
Note:

1. There are 63 set ANT probes in WNC's SG64 Chamber.

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 far field test for **MR86-HW** antenna verification.
- This is passive measurement, which means the device is off and not in any operating mode.

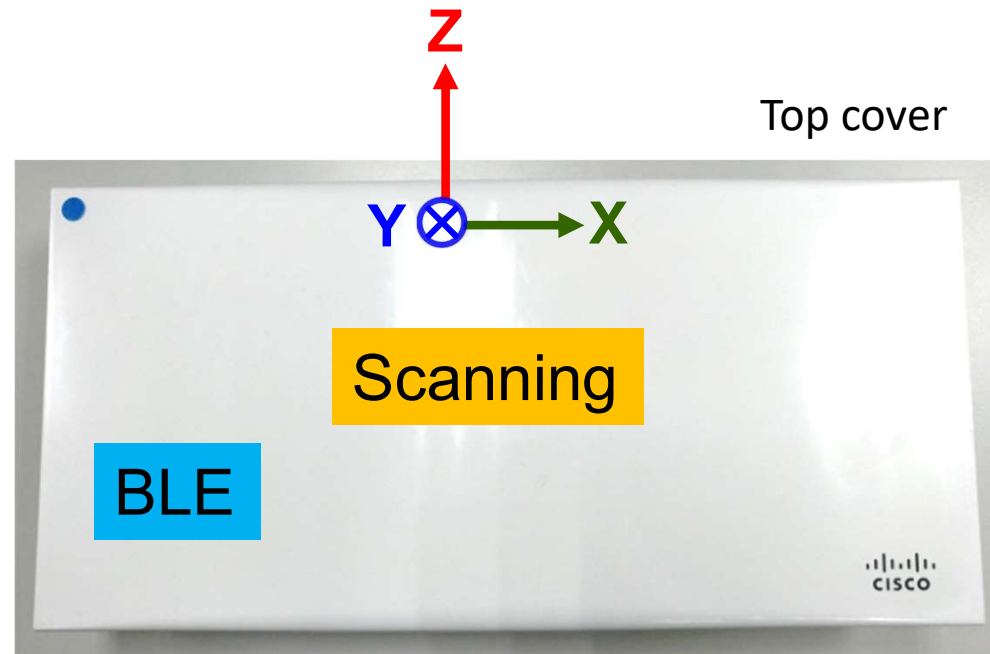
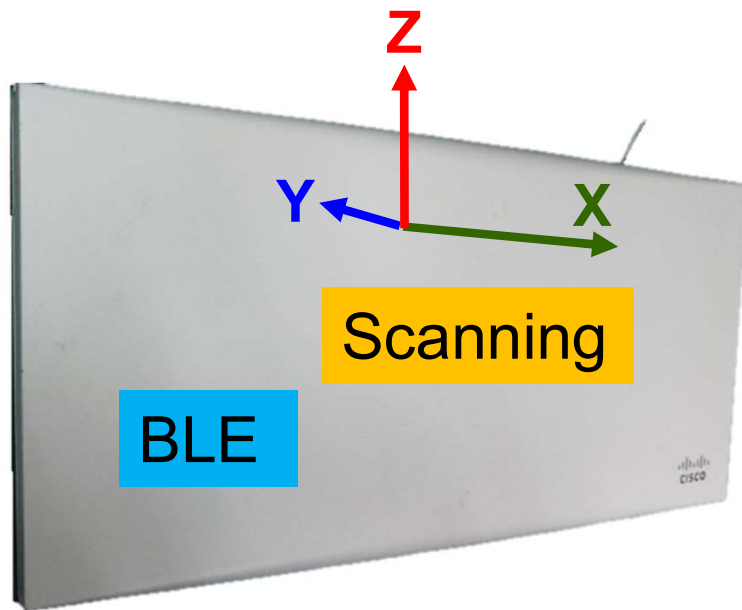


Antenna Performance Summary

- **VSWR**
 - *Under 2 for 2.4GHz and 5GHz application*
- **Isolation**
 - *Above 20 dB between Scanning and BLE antenna*
- **Average Radiation efficiency (excluding cable length loss)**
 - *71% for Scanning 2.4GHz antenna ; 83% for Scanning 5GHz antenna*
 - *71% for BLE antenna*
- **Peak gain**
 - *4.00 dBi for Scanning 2.4G antenna ; 6.63 dBi for Scanning 5G antenna*
 - *4.13 dBi for BLE antenna*

Antenna placement

◆ Scenario: Wall-mounted.



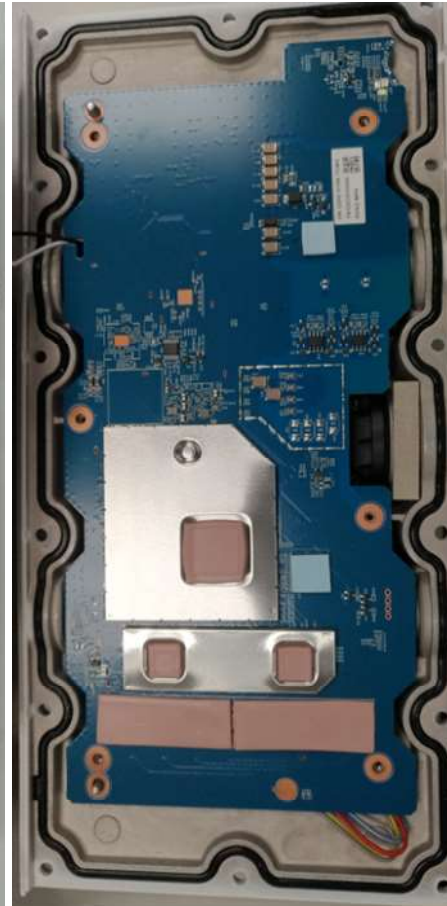
Test Product Specification



Top cover



Reflector



Main-Board



Bottom cover

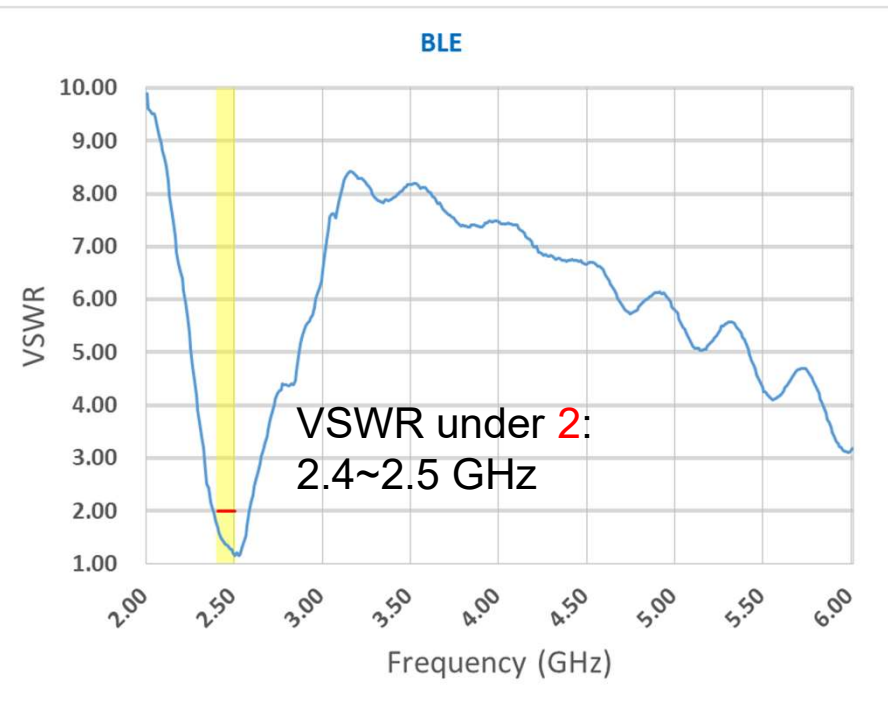
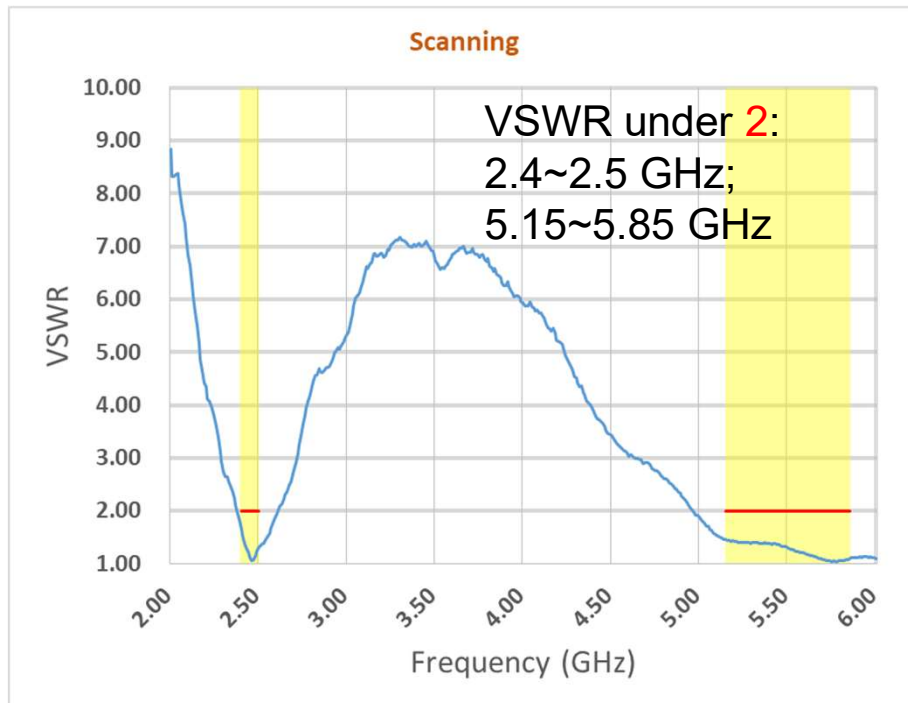
Antenna Efficiency and Peak Gain

	Frequency (MHz)	2400	2450	2500	Avg.	5150	5350	5550	5750	5850	Avg.
Scanning	w/o cable loss Eff.	70%	73%	71%	71%	81%	83%	82%	85%	84%	83%
	Eff.	65%	67%	66%	66%	73%	75%	74%	77%	75%	75%
	Average Gain	-1.87	-1.72	-1.82		-1.37	-1.25	-1.33	-1.16	-1.24	
	Peak Gain (dBi)	3.41	3.99	4.00		6.58	6.63	6.55	6.49	6.53	

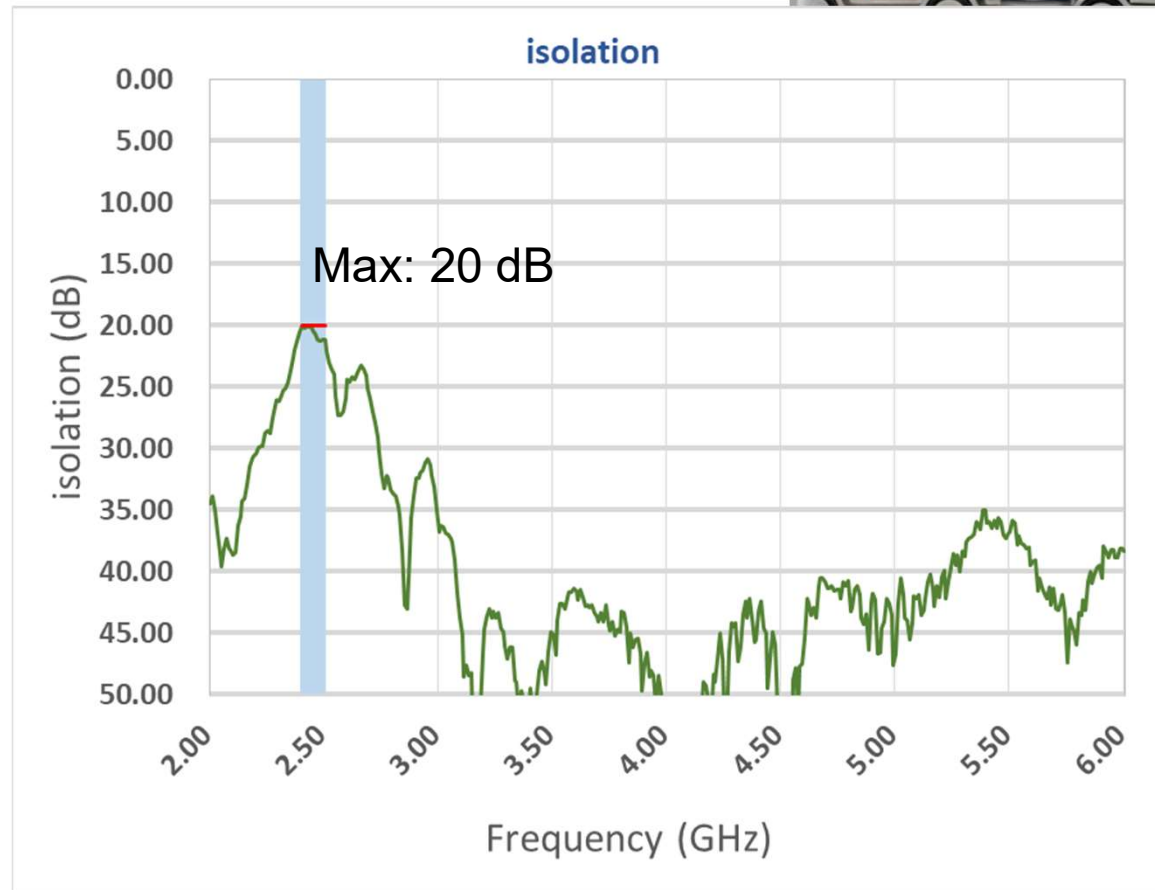
	Frequency (MHz)	2400	2450	2500	Avg.
BLE	w/o cable loss Eff.	70%	72%	72%	71%
	Eff.	61%	63%	62%	62%
	Average Gain	-2.15	-2.03	-2.05	
	Peak Gain (dBi)	3.88	4.12	4.13	



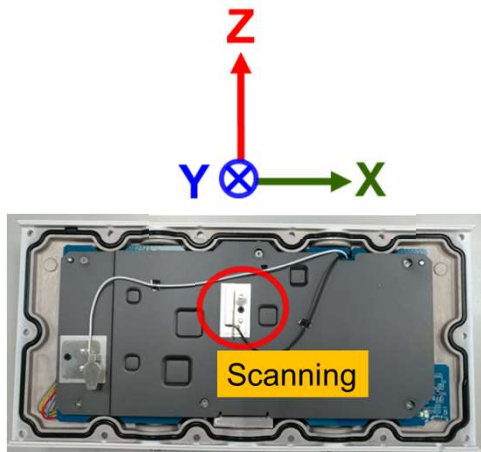
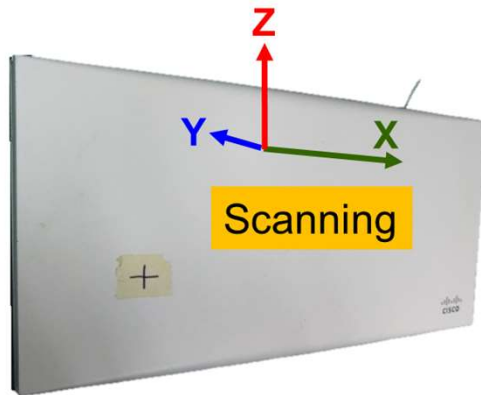
VSWR for Scanning / BLE



Isolation between Scanning and BLE

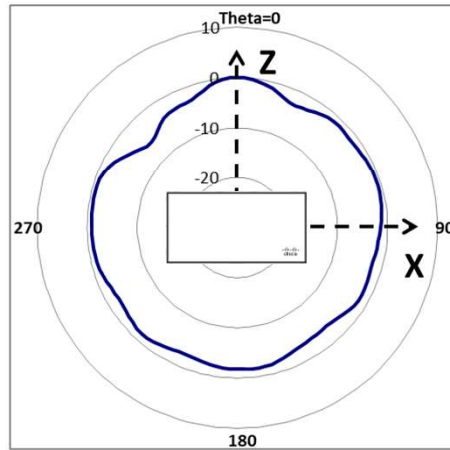


Radiation Pattern for Scanning

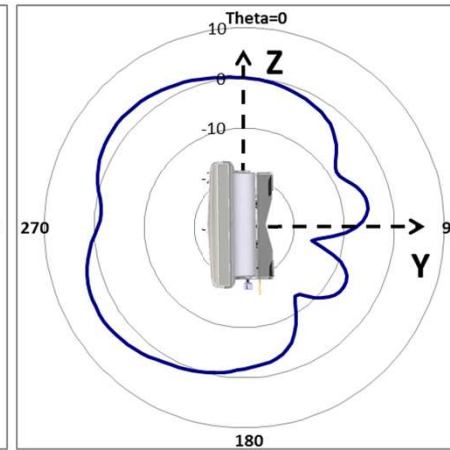


**2G Radio
Radiation Pattern**

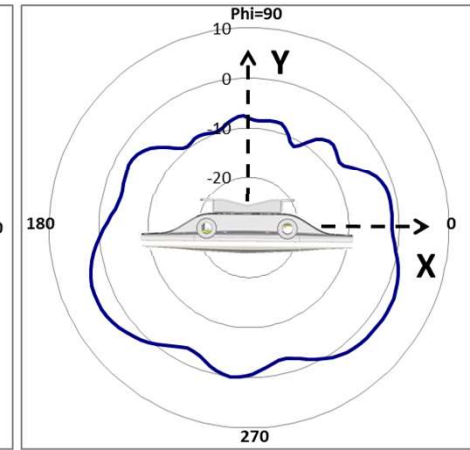
— scanning



XZ-cut



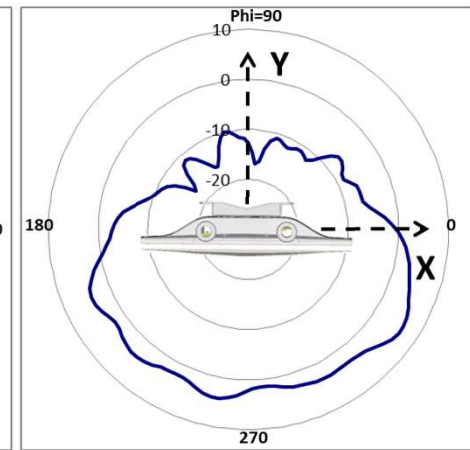
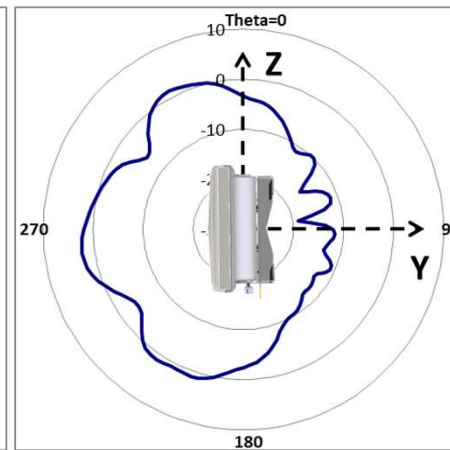
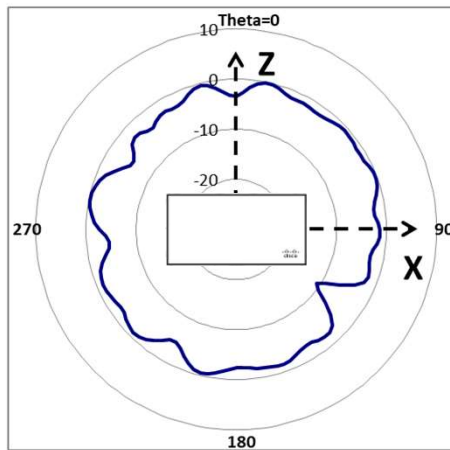
YZ-cut



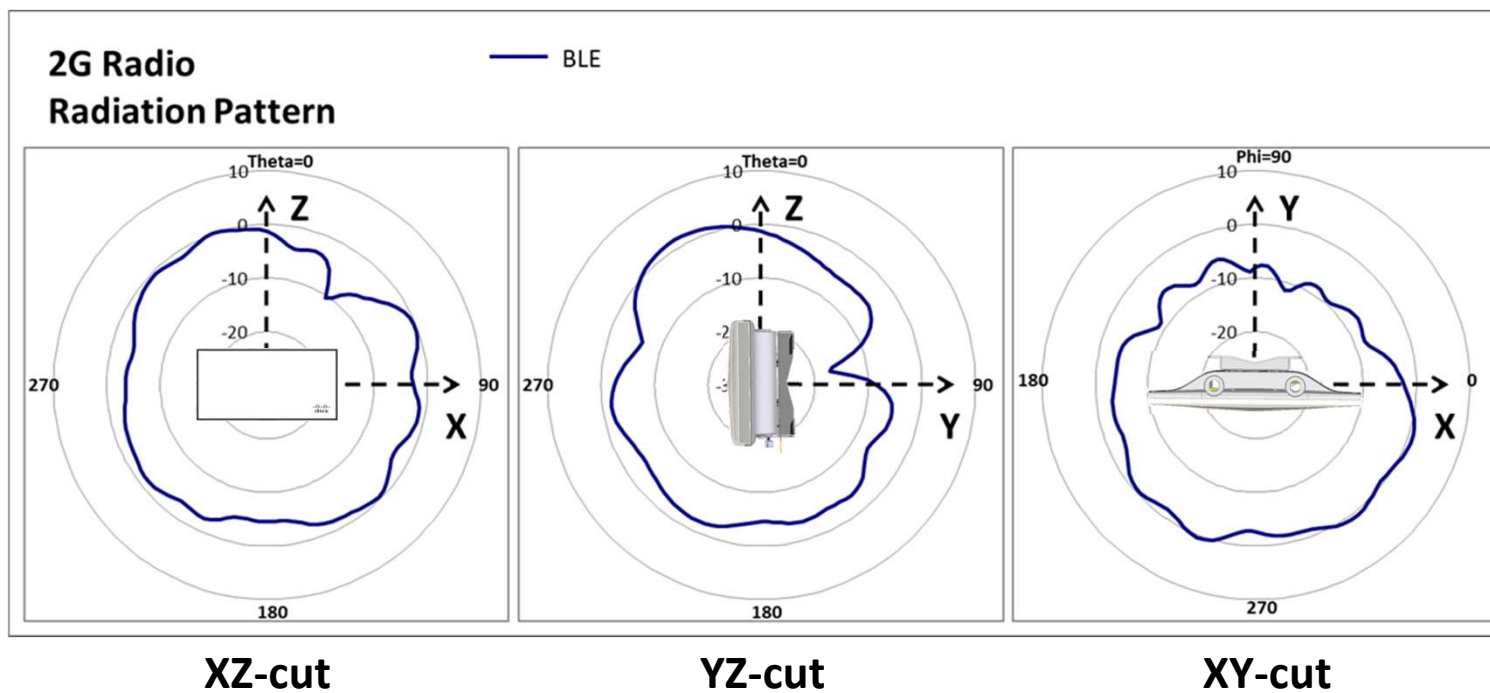
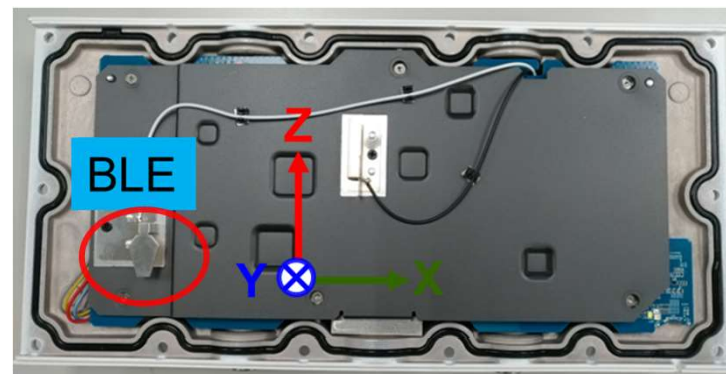
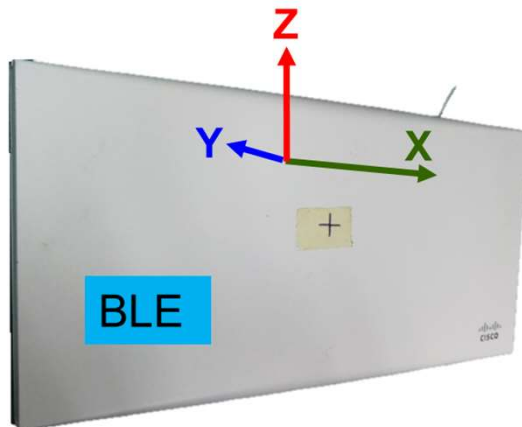
XY-cut

**5G Radio
Radiation Pattern**

— scanning



Radiation Pattern for BLE



WNC

Wistron NeWeb Corp.

