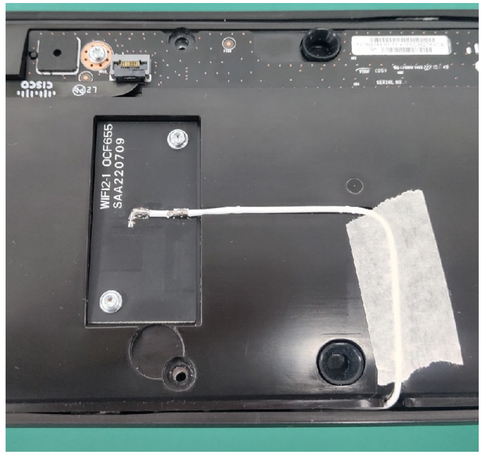
Amphenol | Brooklyn antenna RF report 2022-11-28

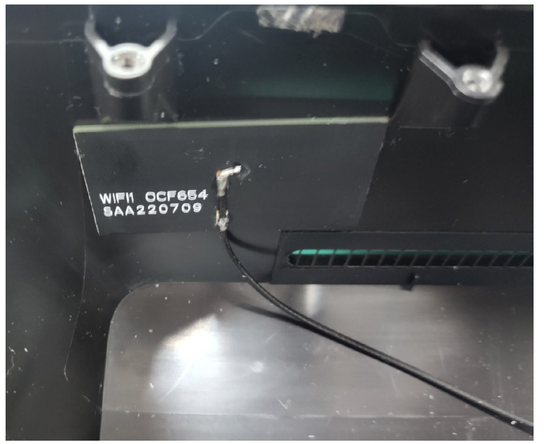
Date	Version	Description
2022.09.22	1.0	Preliminary performance report base on real device.
2022.10.11	1.1	I-PEX receptacle and transmission line impedance Study.
2022.10.21	1.2	Fine-tune antenna performance.
2022.11.28	2.0	Preliminary performance report base on DV unit.

Brooklyn antenna | Device model

BT antenna
(50*25*1mm)



WIFI antenna 2
(50*25*1mm)



WIFI antenna 1
(50*25*1mm)

Brooklyn antenna | Device model

soldered to ground

Brooklyn antenna | Antenna performance spec

Antenna	Frequency ranges (MHz)	Return loss in a working range	Efficiency
WIFI antenna 1	2400-2500/5170-5835/5925-7125	≤ -10 dB	≥ 40% at 5/6GHz, ≥ 50% at 2.4GHz
WIFI antenna 2	2400-2500/5170-5835/5925-7125	≤ -10 dB	≥ 40% at 5/6GHz, ≥ 50% at 2.4GHz
BT antenna	2400-2500	≤ -10 dB	≥ 50%

Isolation between antennas:

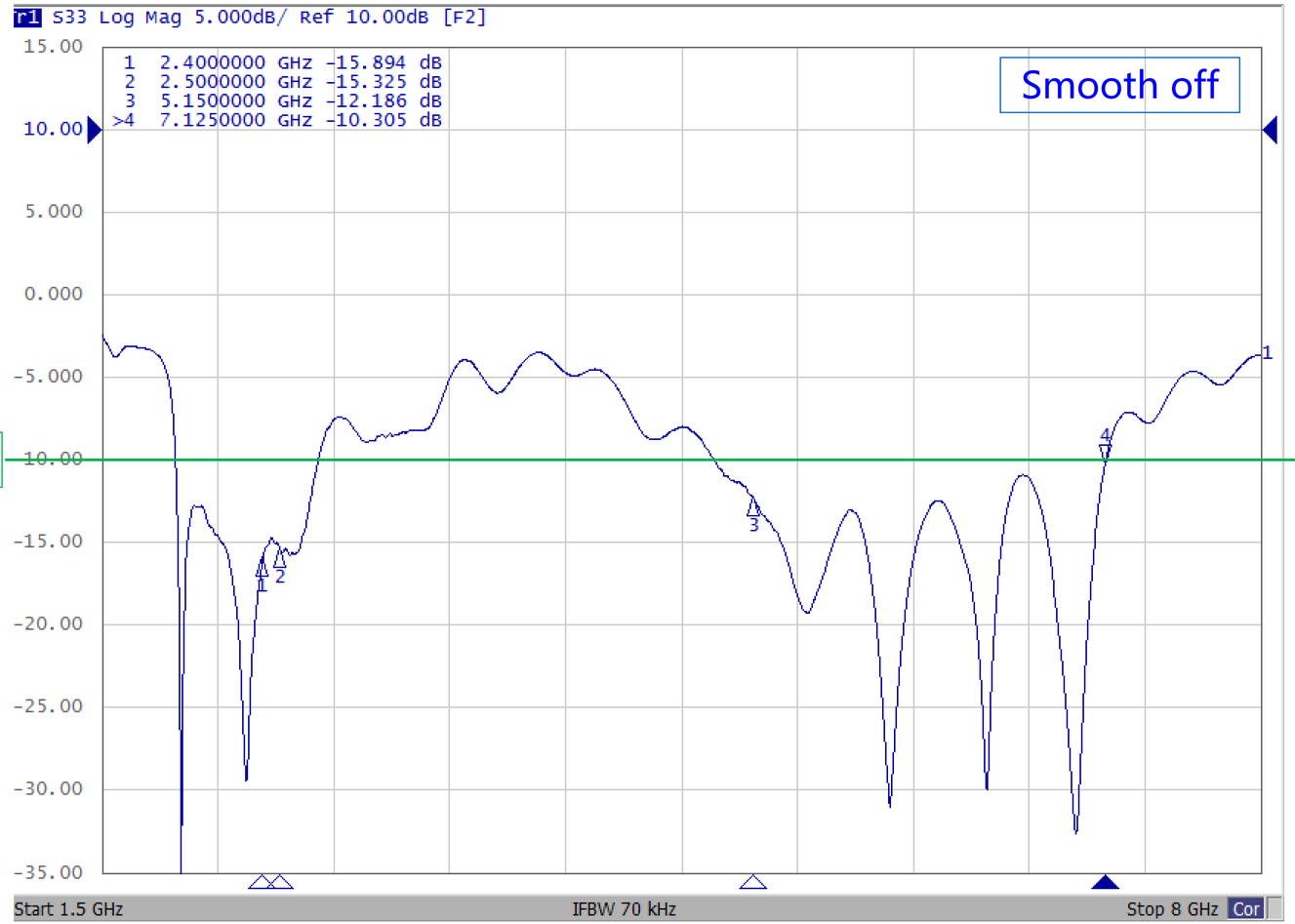
Isolation between WIFI antenna 1 and BT antenna at 2.4GHz band ≥ 35 dB

Isolation between WIFI antenna 2 and BT antenna at 2.4GHz band ≥ 35 dB

Isolation between WIFI antennas at target bands ≥ 20 dB

WIFI antenna 1

Brooklyn antenna | S-parameter & antenna gain

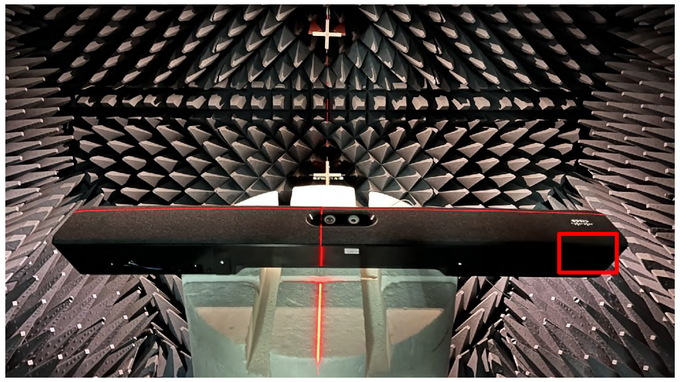


Spec:-10

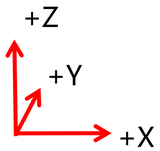
Freq.(MHz)	Effi.(Pcent)	Effi.(dB)	Peak Gain(dB)
2400	67%	-1.8	5.7
2450	65%	-1.9	6.5
2500	69%	-1.6	6.7
AVG	67%	-1.8	6.3
5150	55%	-2.6	5.7
5250	59%	-2.3	5.7
5350	59%	-2.3	4.6
5450	59%	-2.3	4.0
5550	60%	-2.2	4.4
5650	60%	-2.2	4.4
5750	62%	-2.1	3.5
5850	60%	-2.2	4.0
AVG	59%	-2.3	4.5
5950	58%	-2.4	3.9
6050	59%	-2.3	4.1
6150	62%	-2.0	3.8
6250	60%	-2.2	4.1
6350	54%	-2.7	4.3
6450	54%	-2.7	4.7
6550	55%	-2.6	4.8
6650	55%	-2.6	5.2
6750	52%	-2.8	4.9
6850	49%	-3.1	5.3
6950	45%	-3.5	4.3
7050	40%	-4.0	3.3
7150	41%	-3.8	2.8
AVG	53%	-2.8	4.3

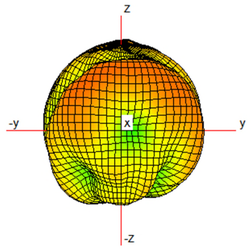
The S-parameter and efficiency can almost meet the spec.

Brooklyn antenna | **Radiation Pattern**

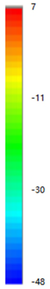


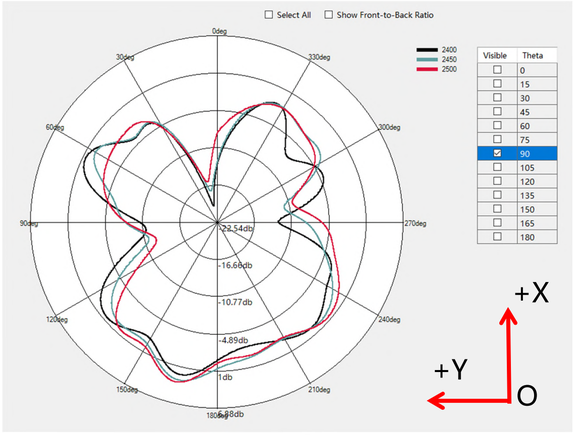
Chamber environment



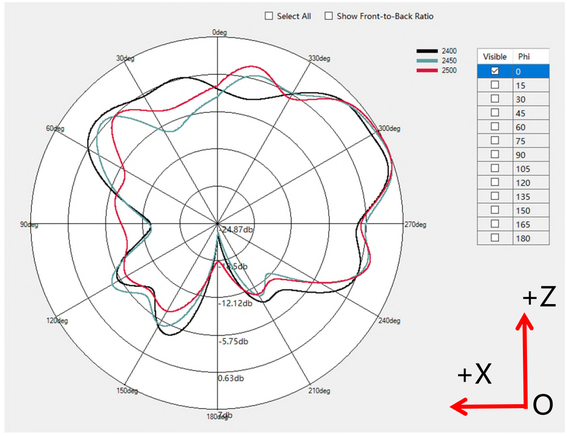


@2.45GHz

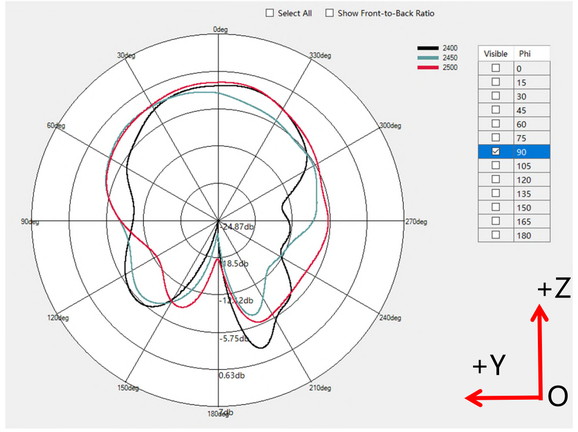




XOY plane



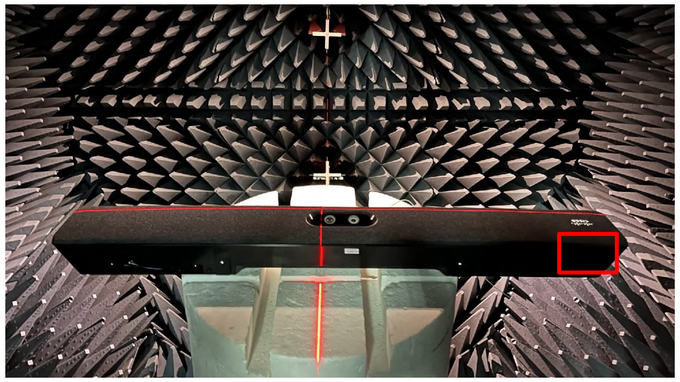
XOZ plane



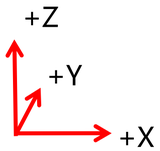
YOZ plane

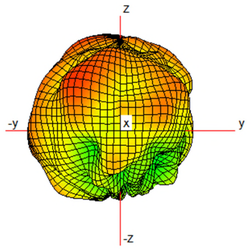
Amphenol SAA Shanghai Amphenol Airwave

Brooklyn antenna | **Radiation Pattern**

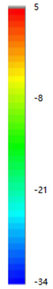


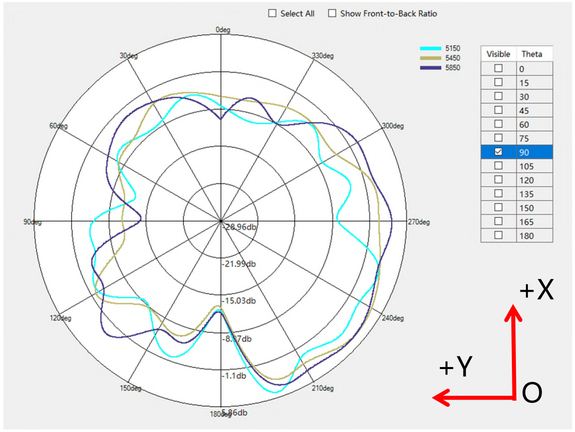
Chamber environment



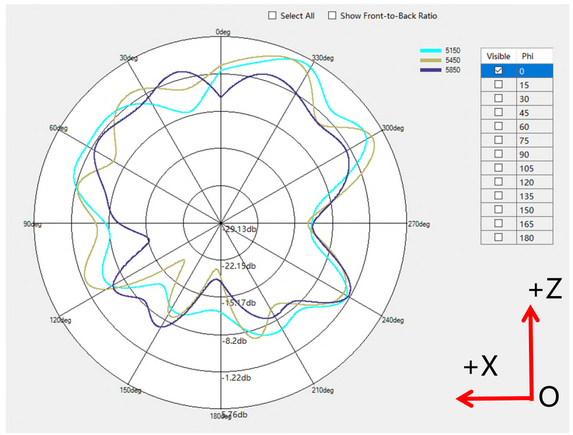


@5.5GHz

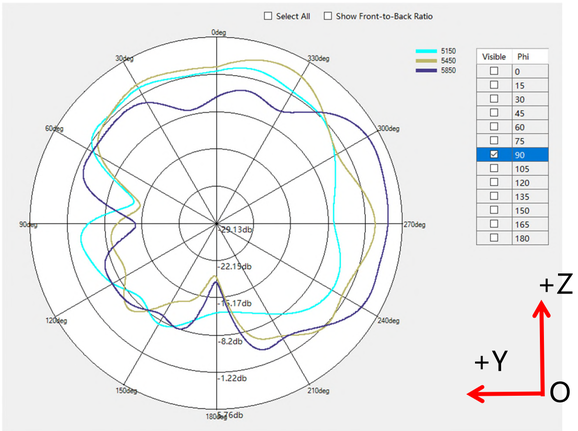




XOY plane



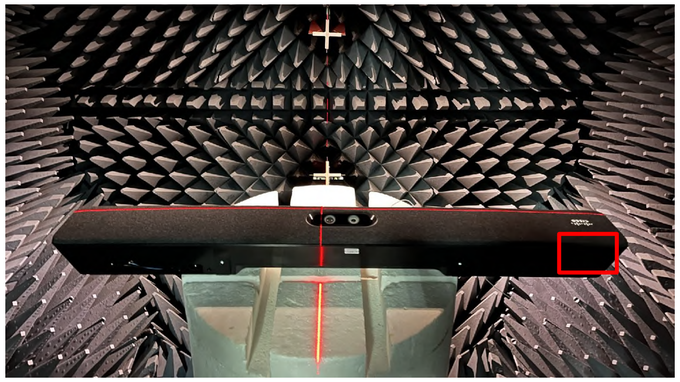
XOZ plane



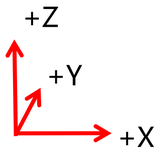
YOZ plane

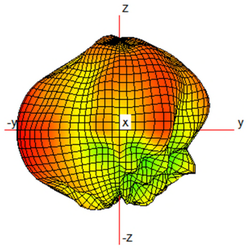
Amphenol SAA Shanghai Amphenol Airwave

Brooklyn antenna | **Radiation Pattern**

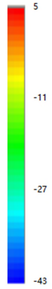


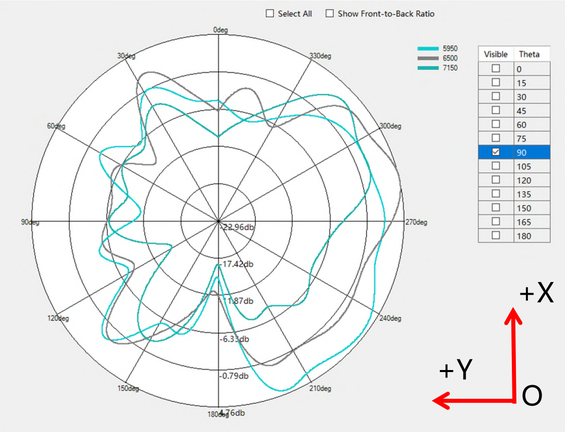
Chamber environment



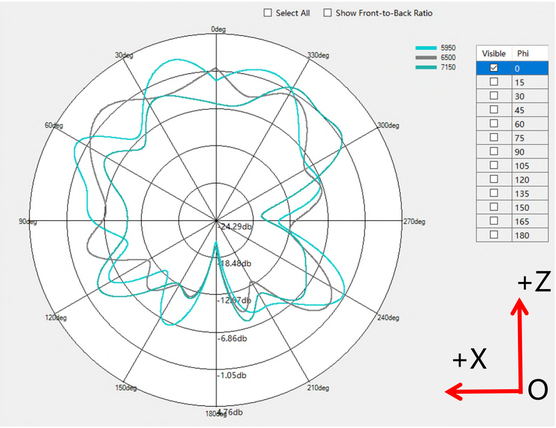


@6.5GHz

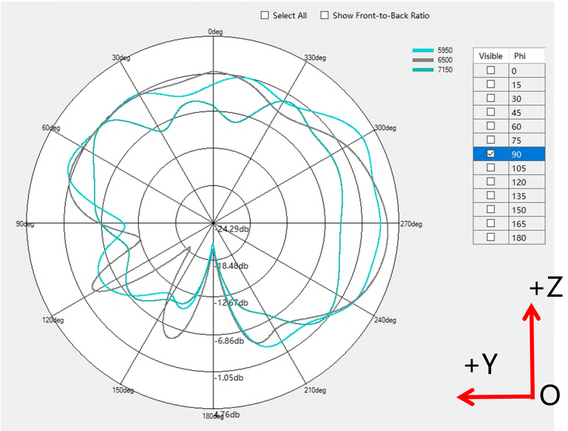




XOY plane



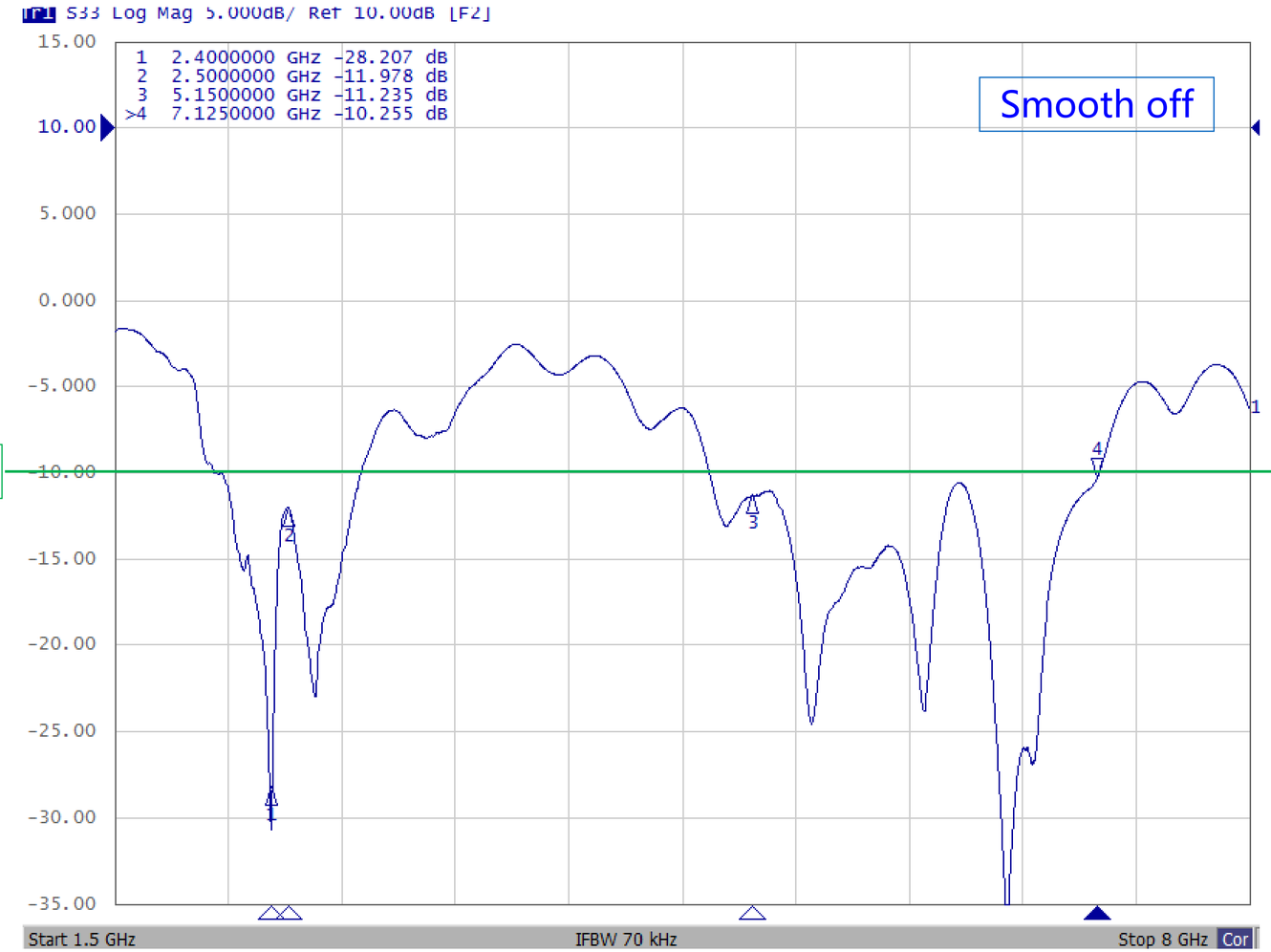
XOZ plane



YOZ plane

WIFI antenna 2

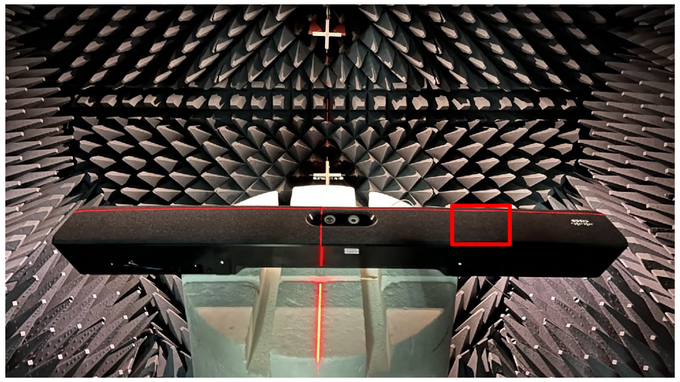
Brooklyn antenna | S-parameter & antenna gain



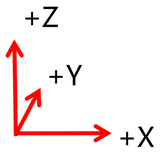
Freq.(MHz)	Effi.(Pcent)	Effi.(dB)	Peak Gain(dB)
2400	68%	-1.7	2.2
2450	67%	-1.8	2.8
2500	68%	-1.7	2.9
AVG	68%	-1.7	2.6
5150	55%	-2.6	3.0
5250	58%	-2.4	3.0
5350	57%	-2.5	2.9
5450	57%	-2.5	3.3
5550	57%	-2.4	3.4
5650	58%	-2.4	3.4
5750	59%	-2.3	3.8
5850	57%	-2.4	4.2
AVG	57%	-2.4	3.4
5950	57%	-2.4	4.1
6050	60%	-2.2	4.3
6150	61%	-2.1	4.7
6250	57%	-2.4	4.3
6350	53%	-2.7	4.2
6450	53%	-2.7	4.0
6550	52%	-2.8	3.9
6650	48%	-3.2	3.7
6750	46%	-3.4	2.8
6850	48%	-3.2	2.9
6950	43%	-3.7	3.7
7050	40%	-3.9	3.7
7150	40%	-4.0	1.6
AVG	51%	-3.0	3.7

The S-parameter and efficiency can almost meet the spec.

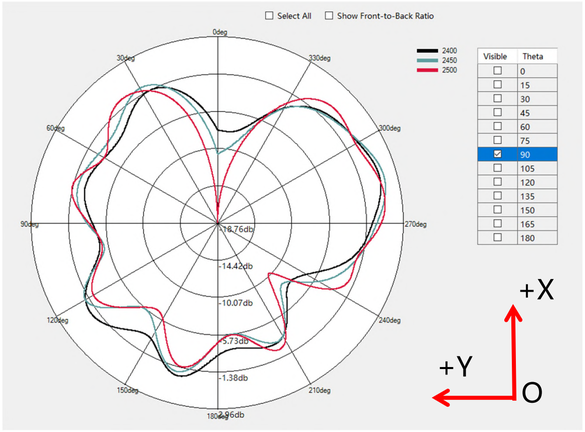
Brooklyn antenna | **Radiation Pattern**



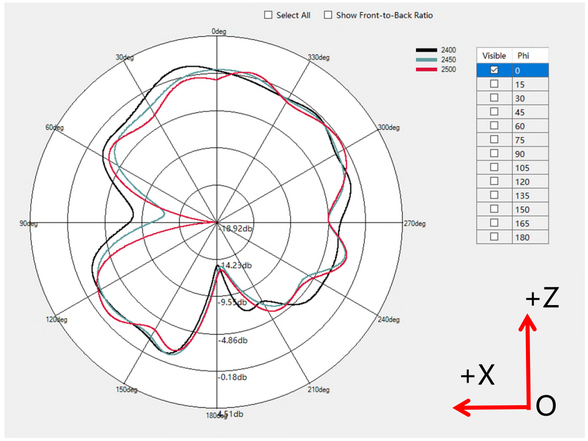
Chamber environment



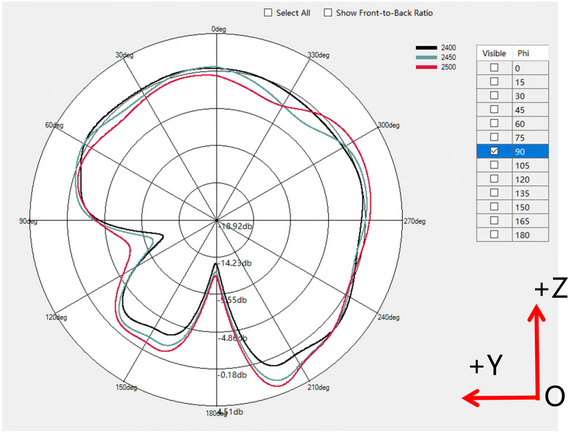
@2.45GHz



XOY plane



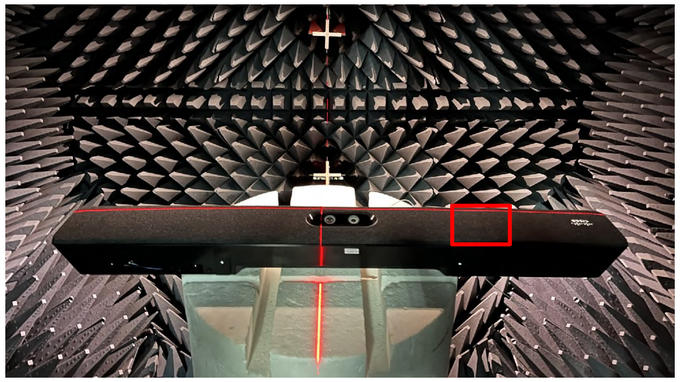
XOZ plane



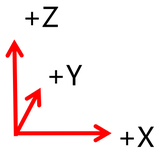
YOZ plane

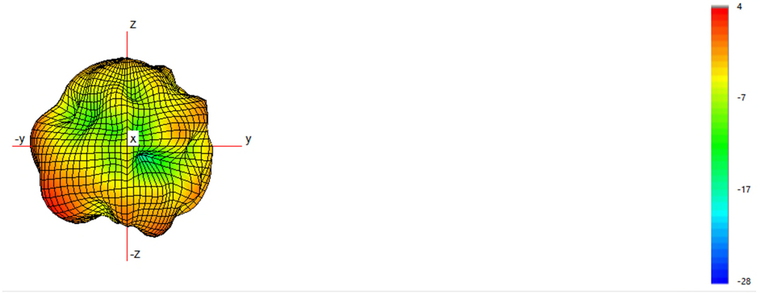
Amphenol SAA Shanghai Amphenol Airwave

Brooklyn antenna | **Radiation Pattern**

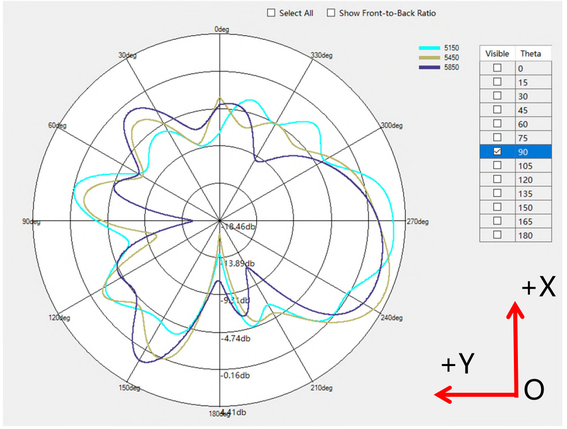


Chamber environment

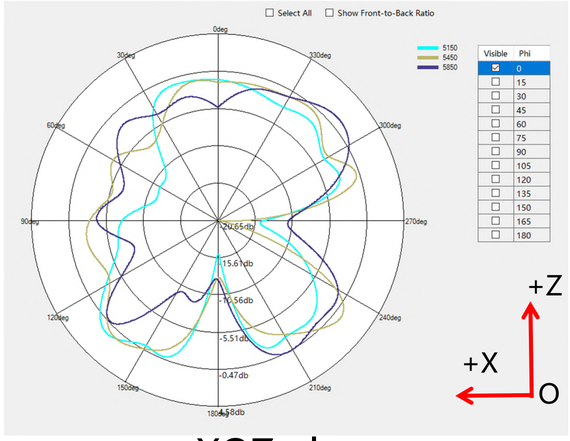




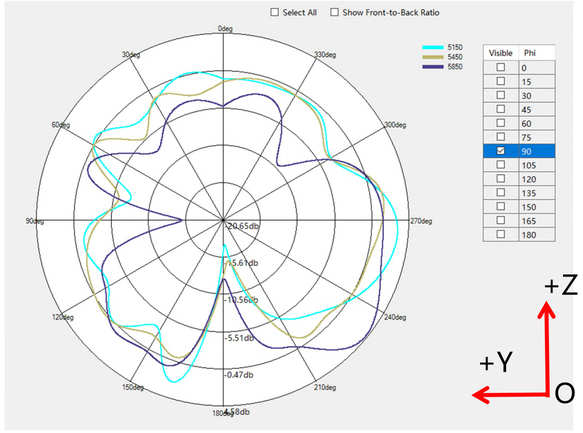
@5.5GHz



XOY plane



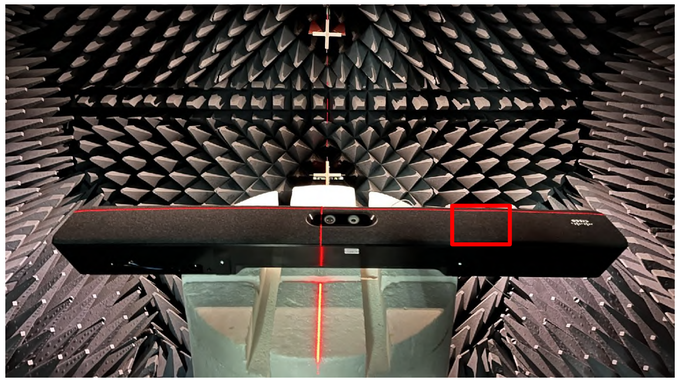
XOZ plane



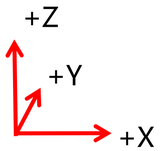
YOZ plane

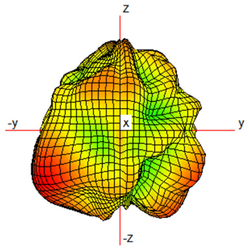
Amphenol SAA Shanghai Amphenol Airwave

Brooklyn antenna | **Radiation Pattern**

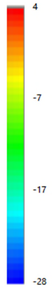


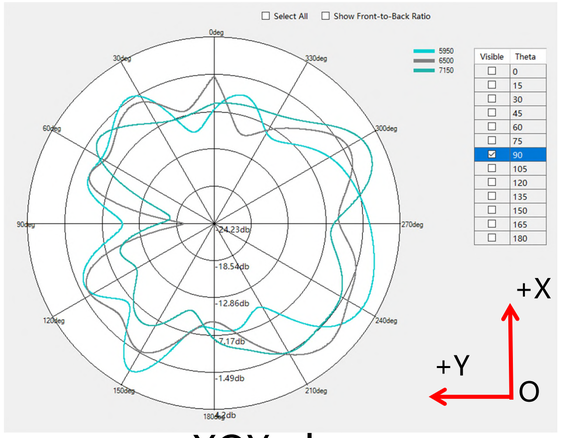
Chamber environment



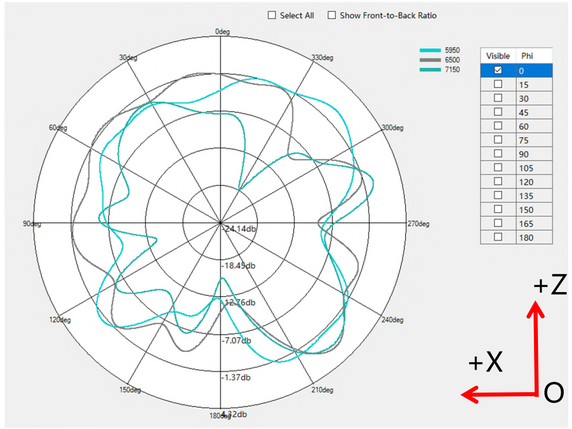


@6.5GHz

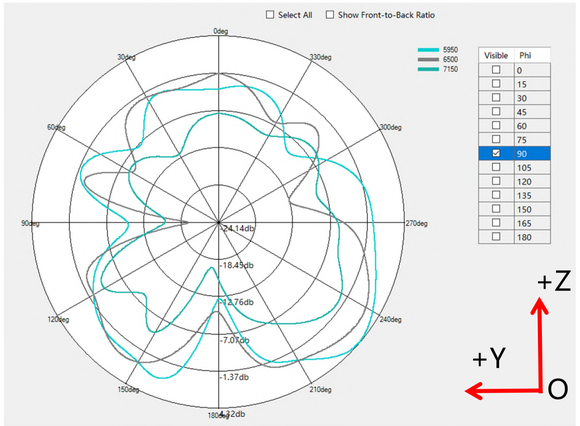




XOY plane



XOZ plane

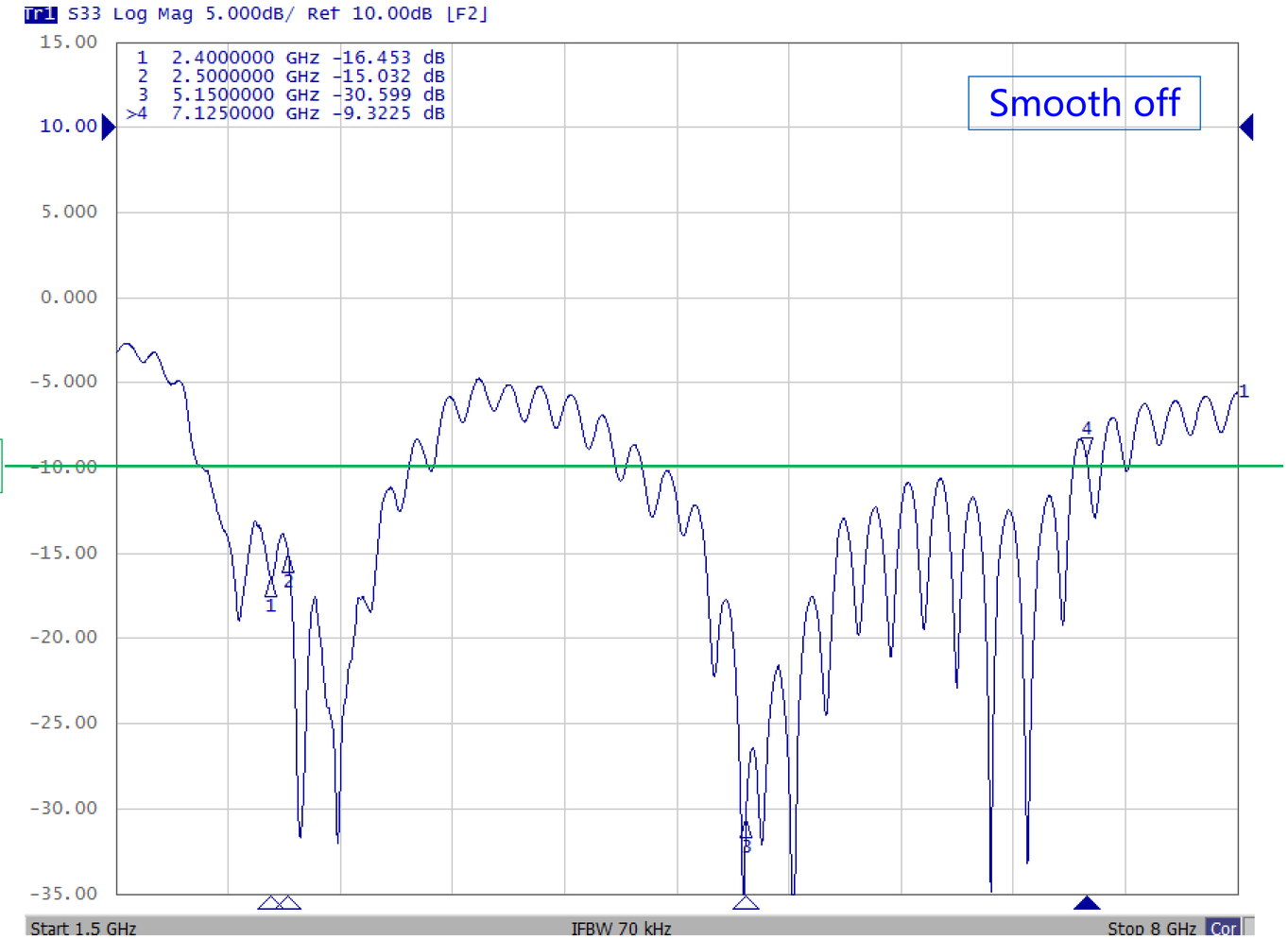


YOZ plane

Amphenol SAA Shanghai Amphenol Airwave

BT antenna

Brooklyn antenna | S-parameter & antenna gain



Freq.(MHz)	Effi.(Pcent)	Effi.(dB)	Peak Gain(dB)
2400	54%	-2.7	2.5
2450	53%	-2.8	2.0
2500	57%	-2.5	2.5
AVG	54%	-2.6	2.3
5150	51%	-3.0	3.3
5250	51%	-2.9	2.8
5350	50%	-3.0	2.7
5450	49%	-3.1	2.6
5550	48%	-3.1	2.1
5650	46%	-3.4	1.7
5750	46%	-3.3	2.6
5850	47%	-3.3	2.1
AVG	49%	-3.1	2.5
5950	46%	-3.3	1.8
6050	47%	-3.3	2.9
6150	48%	-3.2	3.1
6250	46%	-3.4	2.7
6350	43%	-3.7	1.9
6450	42%	-3.8	1.2
6550	43%	-3.7	1.6
6650	38%	-4.1	1.4
6750	37%	-4.4	0.9
6850	34%	-4.6	1.3
6950	27%	-5.6	1.3
7050	24%	-6.2	1.3
7150	25%	-6.0	0.9
AVG	39%	-4.3	1.7

The S-parameter and efficiency can almost meet the spec.