

Antenna Test Report for Ano4G

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Summary

- WNC designed two PCB antennas for LTE and two PCB antennas for Wi-Fi.
- The performance in P2 device is at same level as the performance in P1 device.
 - LTE antennas
 - Efficiency, >40% (most >50%) in Tx band, and the efficiency is good enough for TRP test.
 - Wi-Fi antennas
 - Efficiency, ~60% @2.4GHz/ ~70% @5GHz, the efficiency is good in Wi-Fi band.
 - Radiation pattern, good coverage of the composite (directional) pattern of the two antenna.
- Action Item
 - Antenna team will cooperate with RF team to optimize the performance of Aon4G.

Frequency combination		VSWR	Peak Gain (dBi)	Efficiency (Avg.)	Isolation (within radio)	Isolation (among radio)
WiFi Radio	2.4~2.5GHz	< 2.0	< 4.0	~ 60%	23dB	LTE to Wifi LB:18dB MB/ HB:15dB UHB:21dB
	5.15~5.85GHz	< 2.0	< 5.0	~ 70%	27dB	
LTE Radio	LB: 617~960Mhz	< 4.5	< 2.2	~ 50%	LB:14dB	
	MB/HB: 1445~2700MHz	< 3.0	< 5.8	~ 59%	MB/HB:17dB	
	UHB: 3400~3800MHz	< 2.0	< 5.8	~ 63%	UHB:275dB	



Gain Table for Wi-Fi Antenna

	Freq.(MHz)	2400	2450	2500	5150	5350	5500	5750	5850
Wifi1	Efficiency	56.0%	59.4%	57.1%	69.8%	70.9%	65.5%	69.4%	69.5%
	Peak Gain	3.88dBi	3.99dBi	3.30dBi	4.21dBi	4.23dBi	4.03dBi	4.94dBi	4.24dBi
Wifi2	Efficiency	64.5%	64.7%	55.6%	74.4%	75.1%	72.2%	73.0%	71.5%
	Peak Gain	2.57dBi	2.25dBi	1.32dBi	4.53dBi	3.92dBi	4.02dBi	4.74dBi	4.79dBi



LTE

- **VSWR** [↵]

- 4.5:1 on 617-960 / 3:1 on 1445-2700 / 2:1 on 3300-3800 [↵]

- **Isolation** [↵]

- 14dB on 617-960 / 17dB on 1445-2700 / 25dB on 3300-3800 [↵]

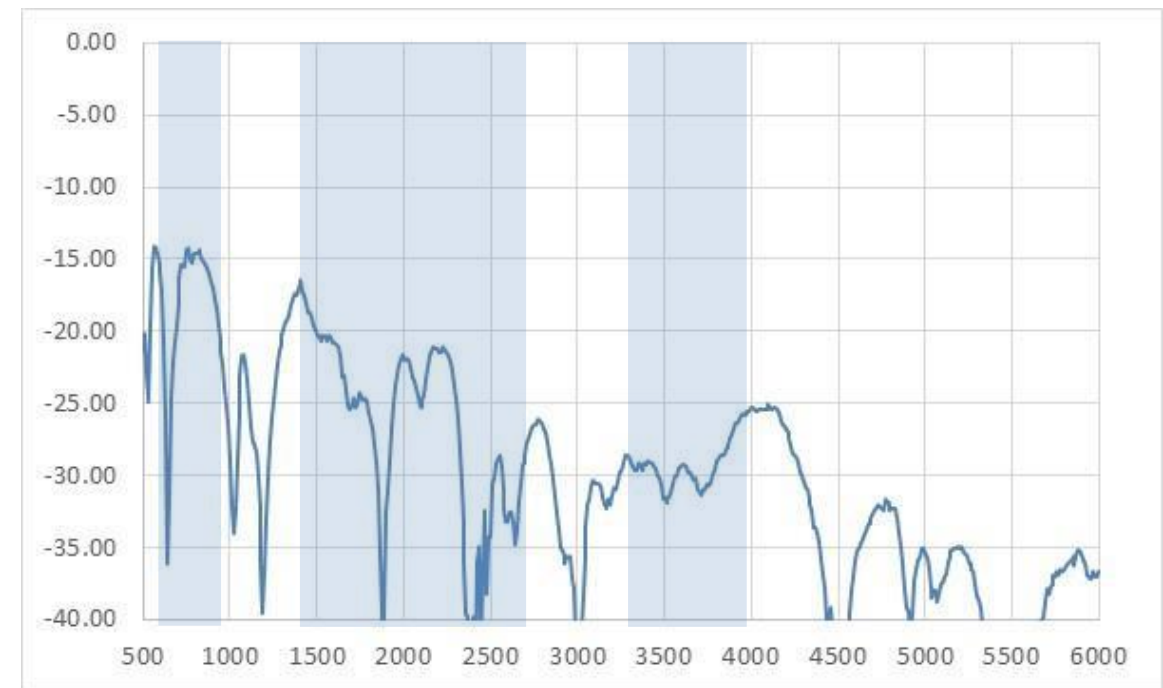
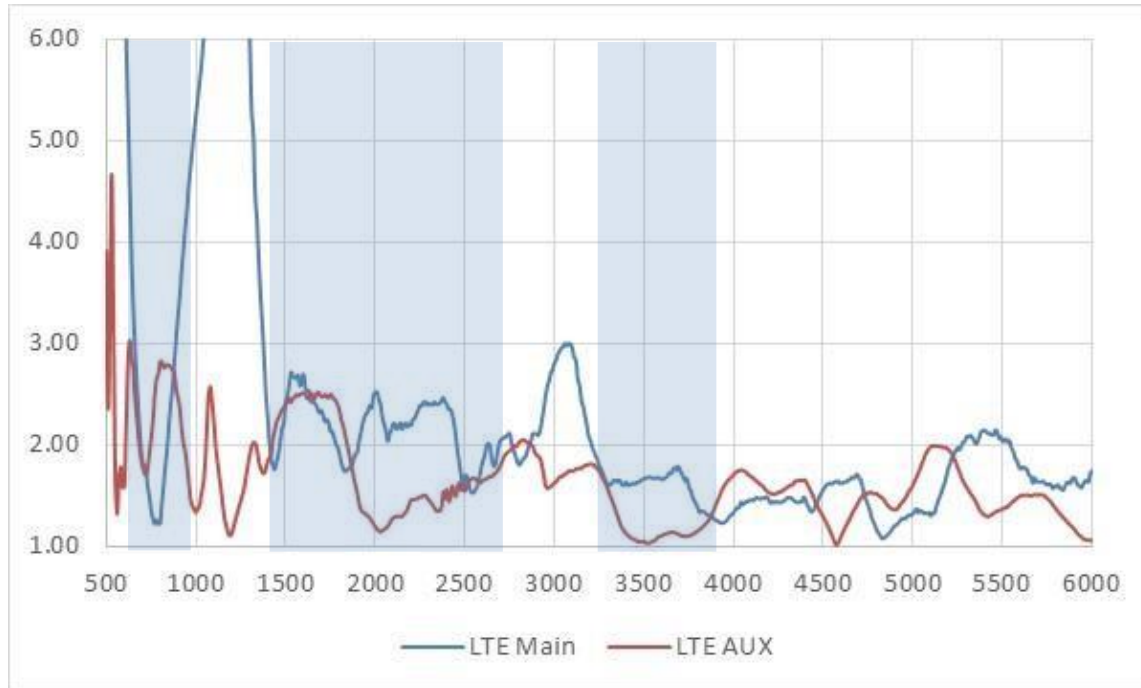
- **Average Efficiency** [↵]

- ~52% on 617-960 / ~57% on 1450-2700 / ~63% on 3300-3800 [↵]

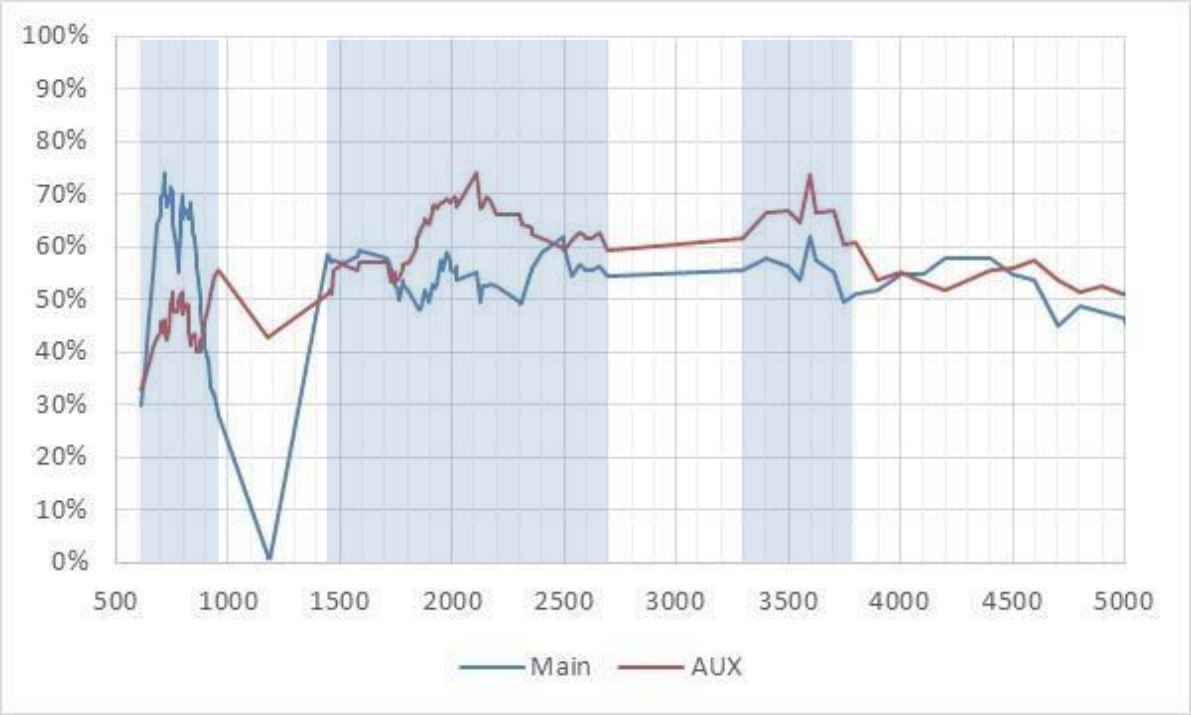
- **Peak Gain** [↵]

- 3.4dBi on 617-960 / 4.7dBi on 1445-2700 / 4.4dBi on 3300-3800 [↵]

VSWR & Isolation LTE Antenna



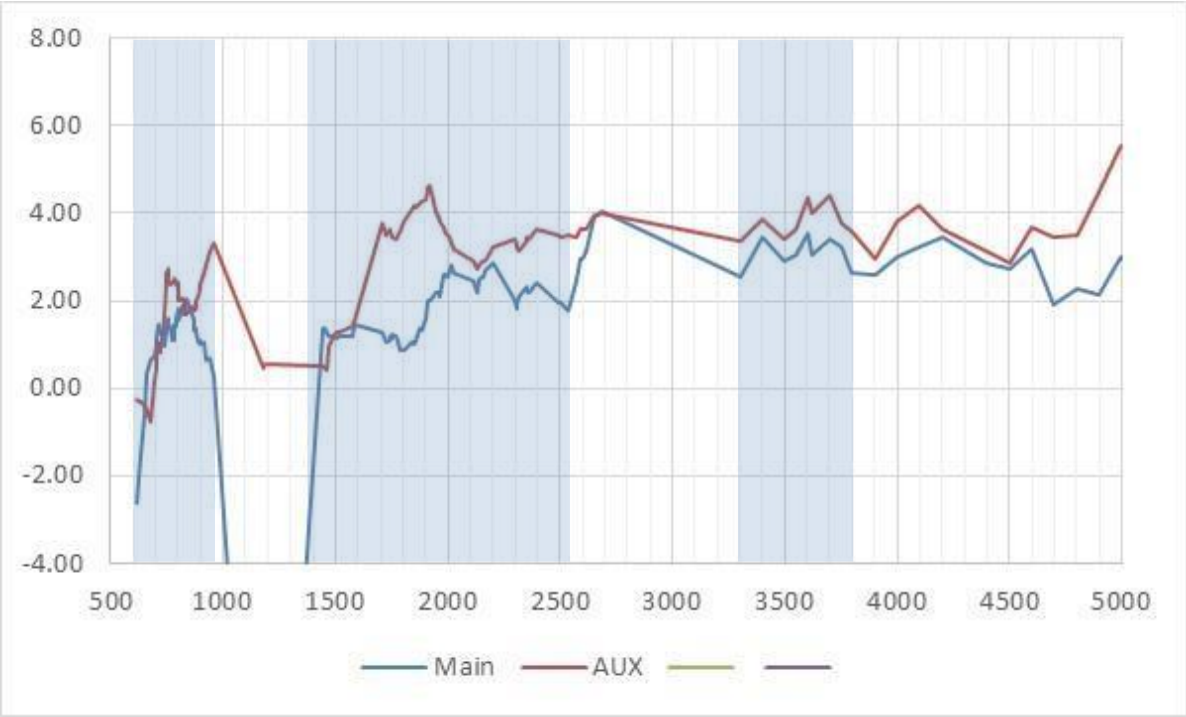
Efficiency LTE Antenna



Freq. (MHz)	Max. (%)		Avg. (%)		Min. (%)	
	LTE Main	LTE AUX	LTE Main	LTE AUX	LTE Main	LTE AUX
617-960	74	55	59	46	30	30
1445-2700	62	74	54	61	48	51
3300-3800	66	72	61	65	54	58



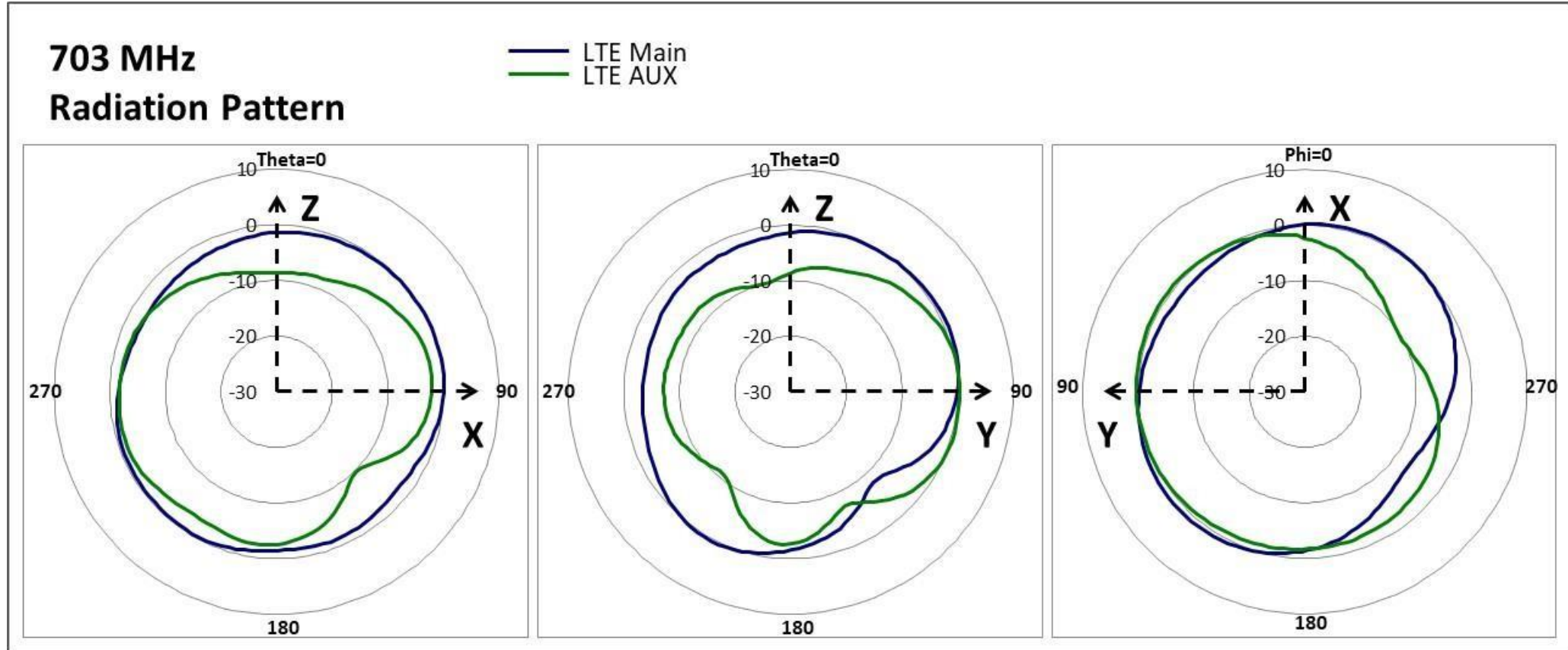
Peak Gain LTE Antenna



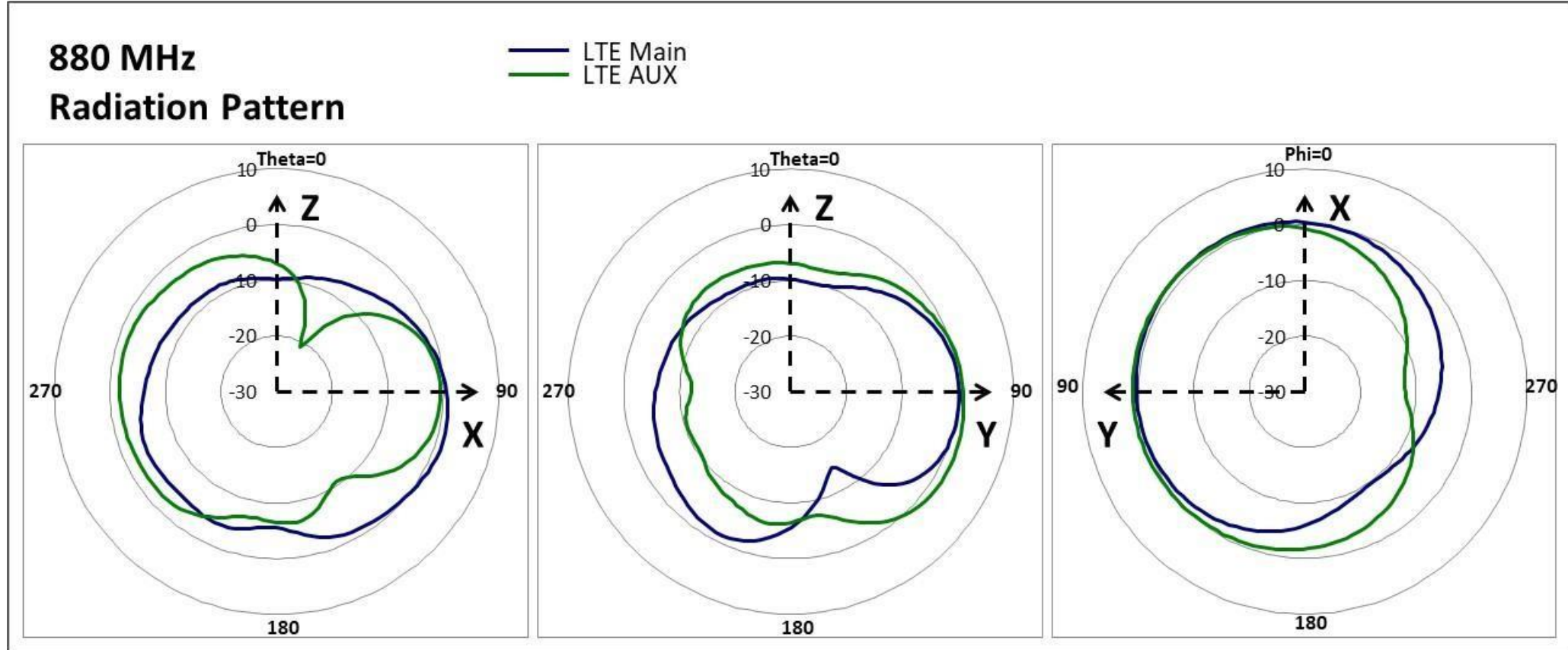
Freq. (MHz)	Max. (dBi)	
	LTE Main	LTE AUX
617-960	2.1	3.4
1445-2700	4.1	4.7
3300-3800	3.6	4.4



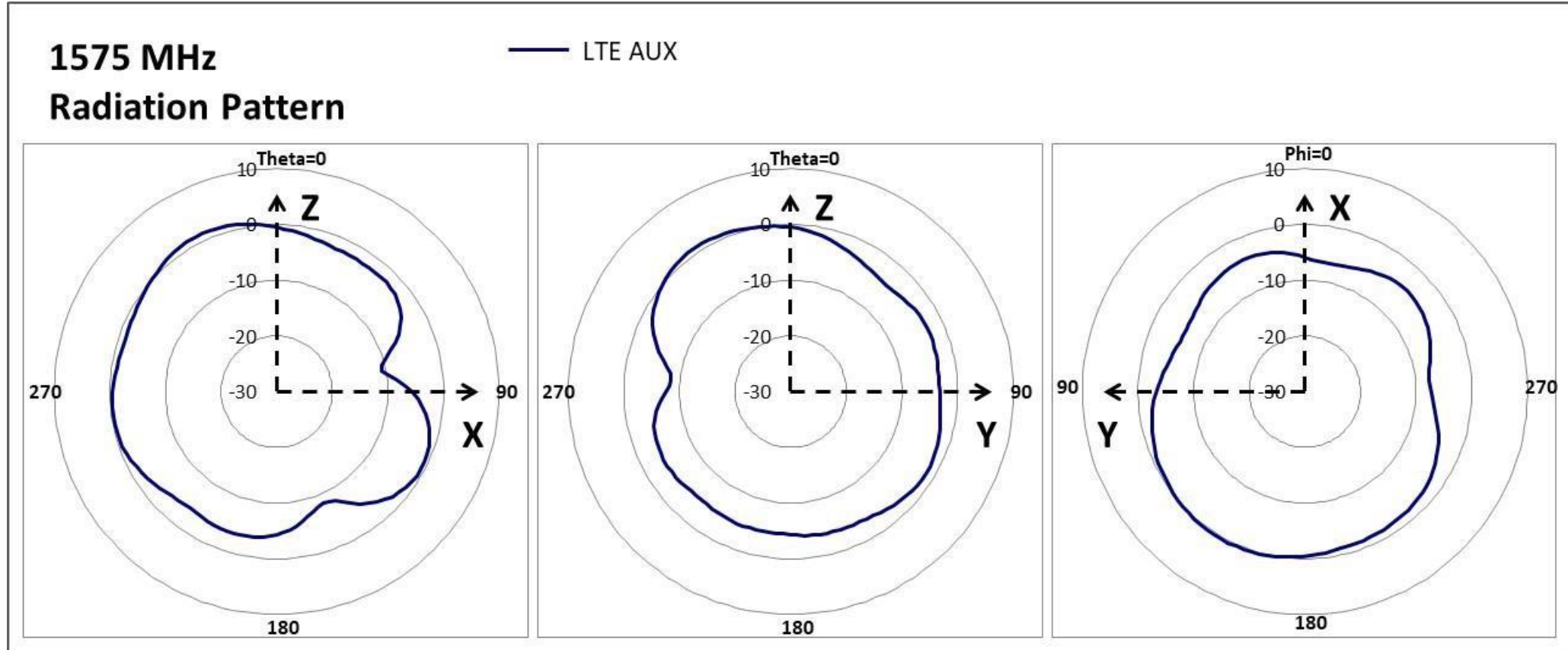
Realized Gain Pattern LTE Antenna @703MHz for Gtotal



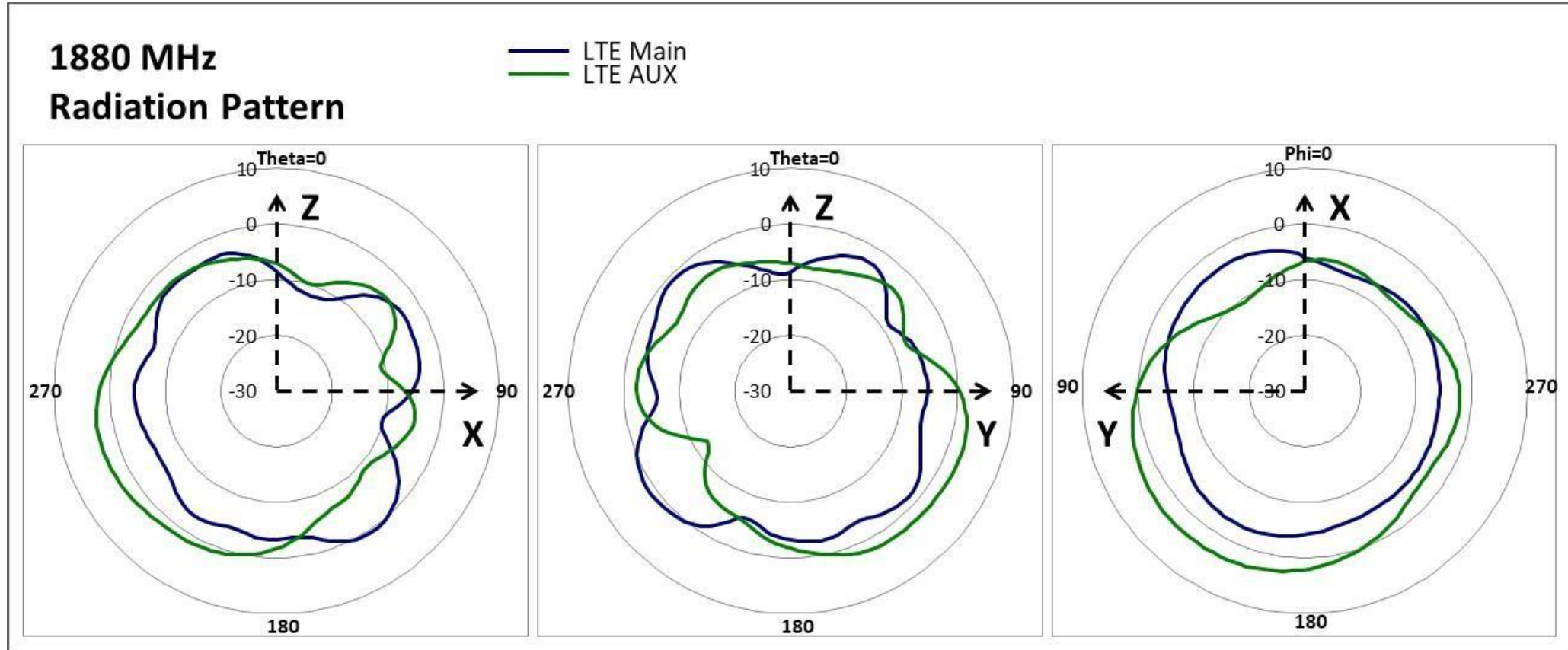
Realized Gain Pattern LTE Antenna @880MHz for Gtotal



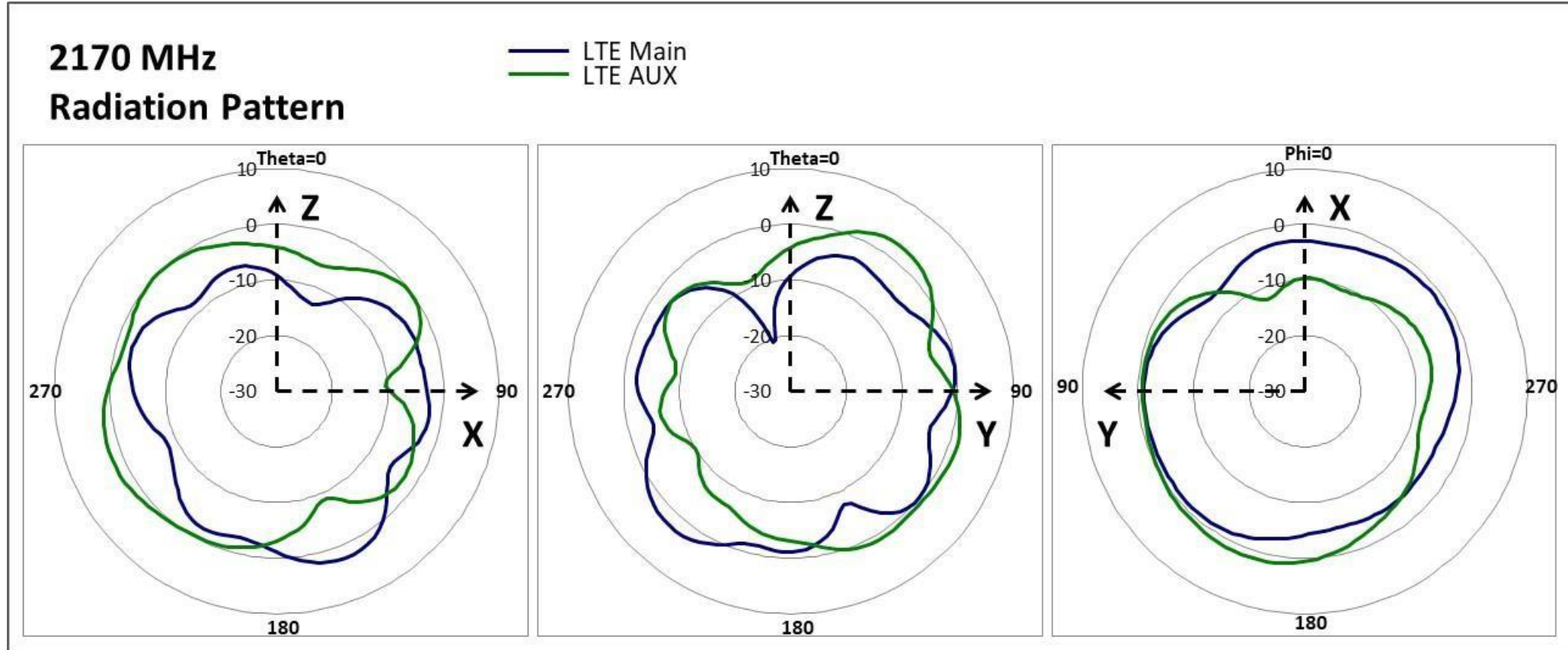
Realized Gain Pattern LTE Antenna @1575MHz for Gtotal



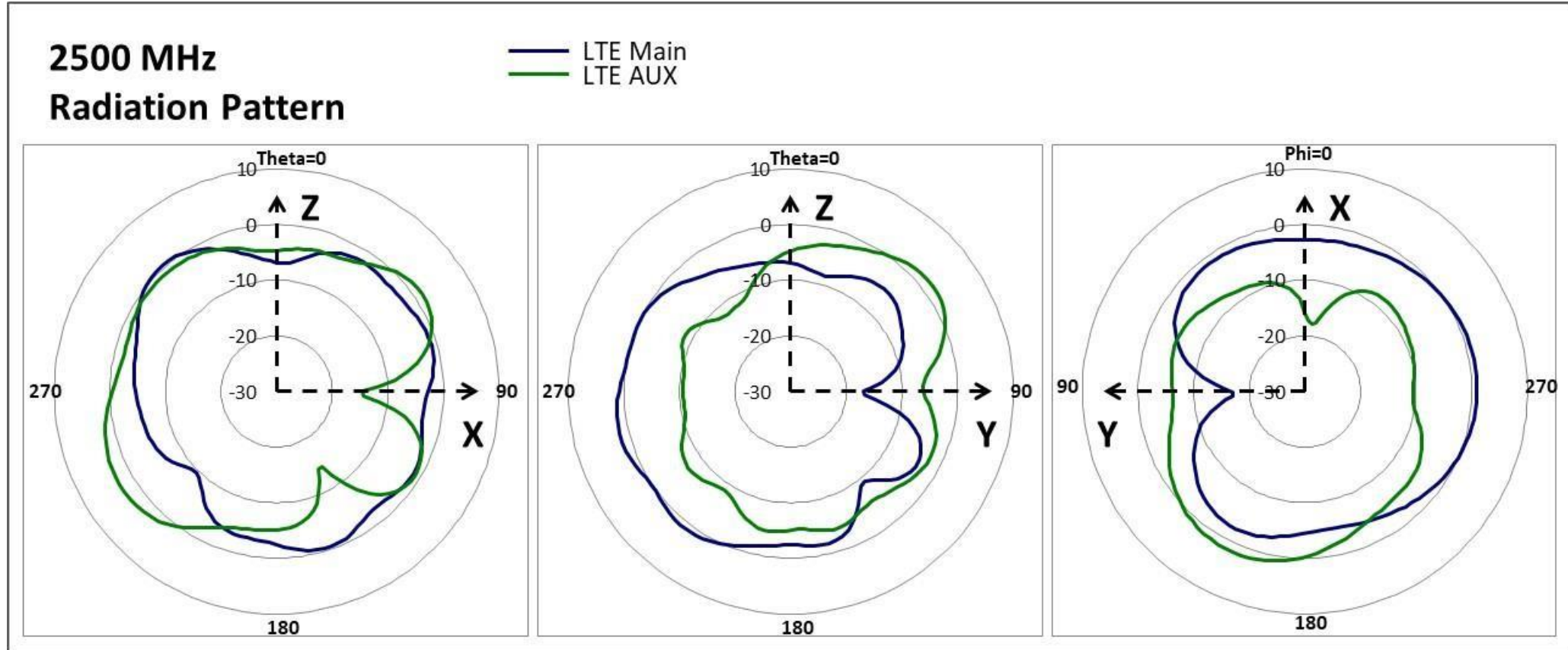
Realized Gain Pattern LTE Antenna @1880MHz for Gtotal



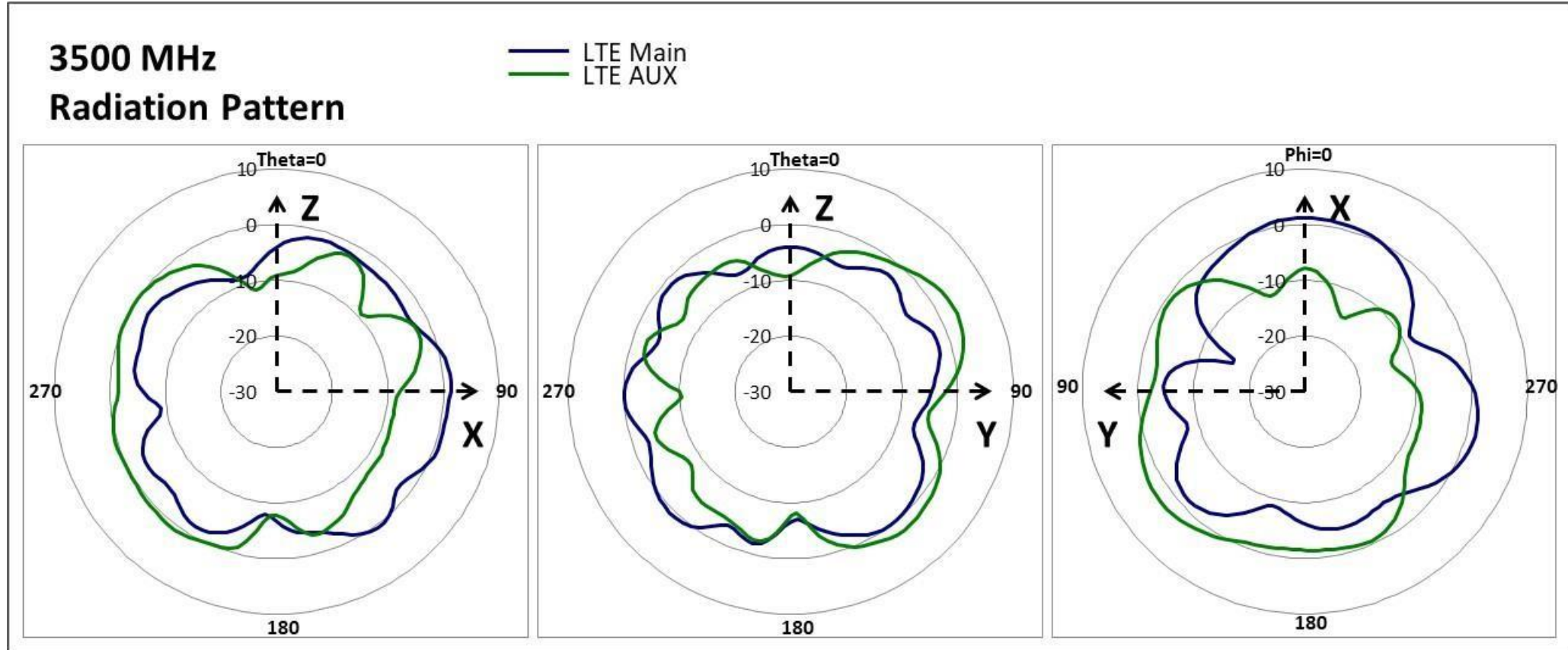
Realized Gain Pattern LTE Antenna @2170MHz for Gtotal



Realized Gain Pattern LTE Antenna @2500MHz for Gtotal



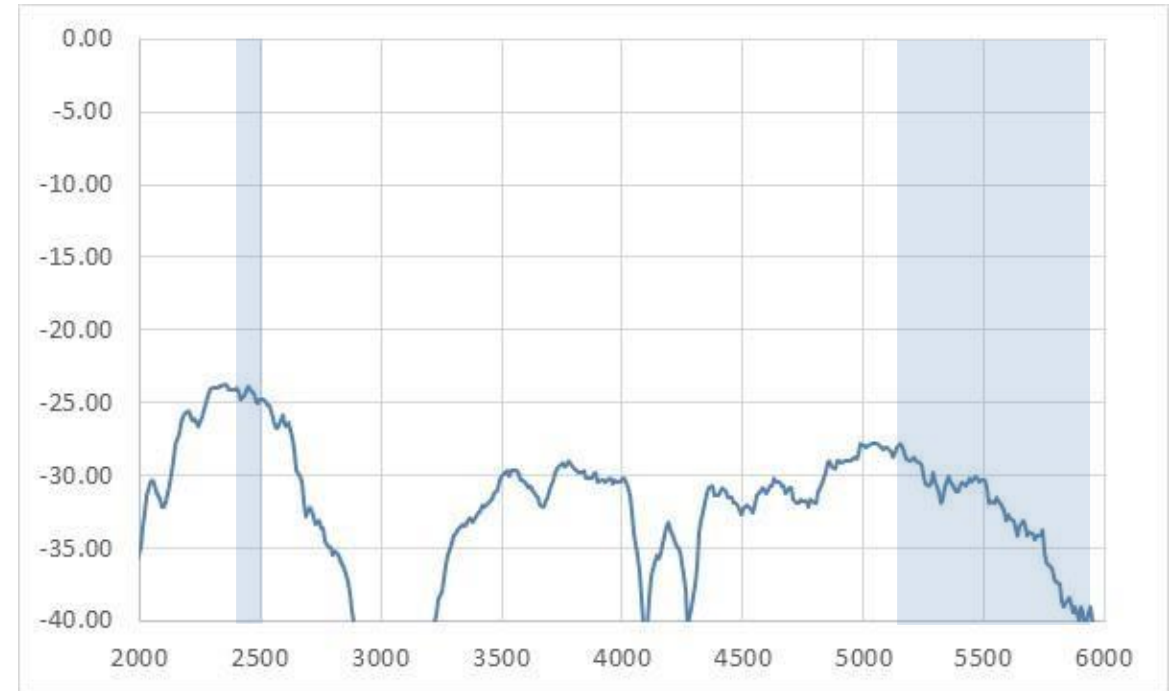
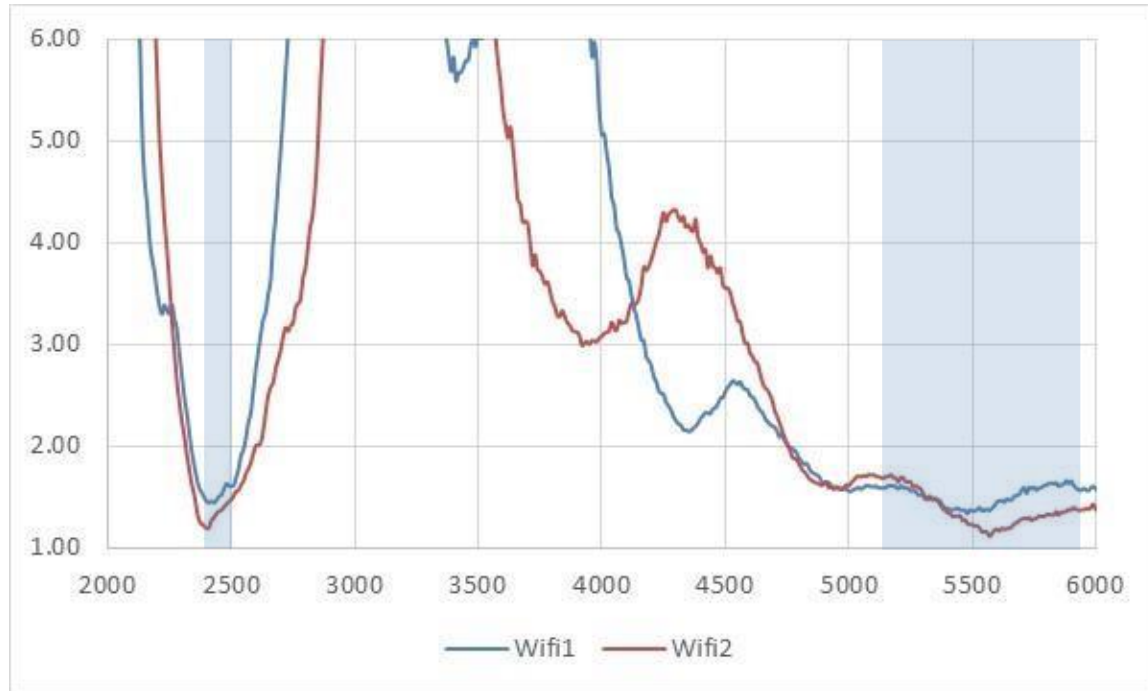
Realized Gain Pattern LTE Antenna @3500MHz for Gtotal



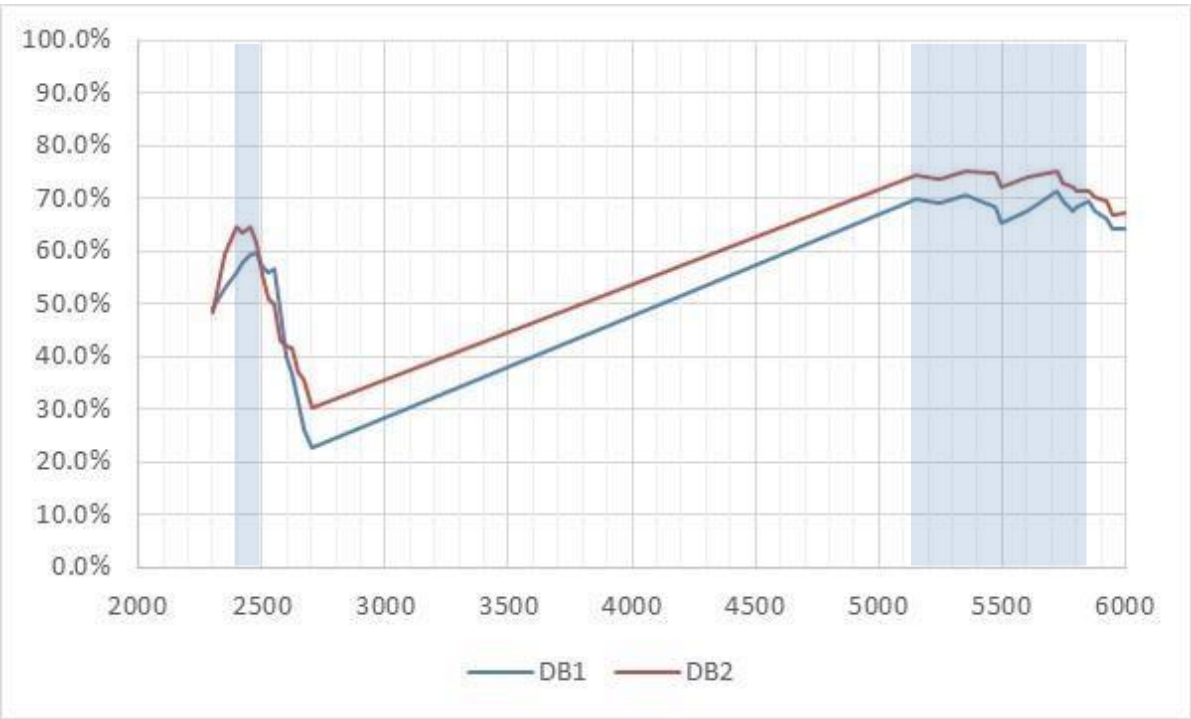
Wi-Fi

- **VSWR** ↵
 - 2:1 on 2.4GHz / 2:1 on 5GHz ↵
- **Isolation** ↵
 - 23dB on 2GHz / 27dB on 5GHz ↵
- **Average Efficiency** ↵
 - ~60% on 2.4GHz / ~70% on 5GHz ↵
- **Peak Gain** ↵
 - 4.0dBi on 2.4GHz / 5.0dBi on 5GHz

VSWR & Isolation Wi-Fi Antenna



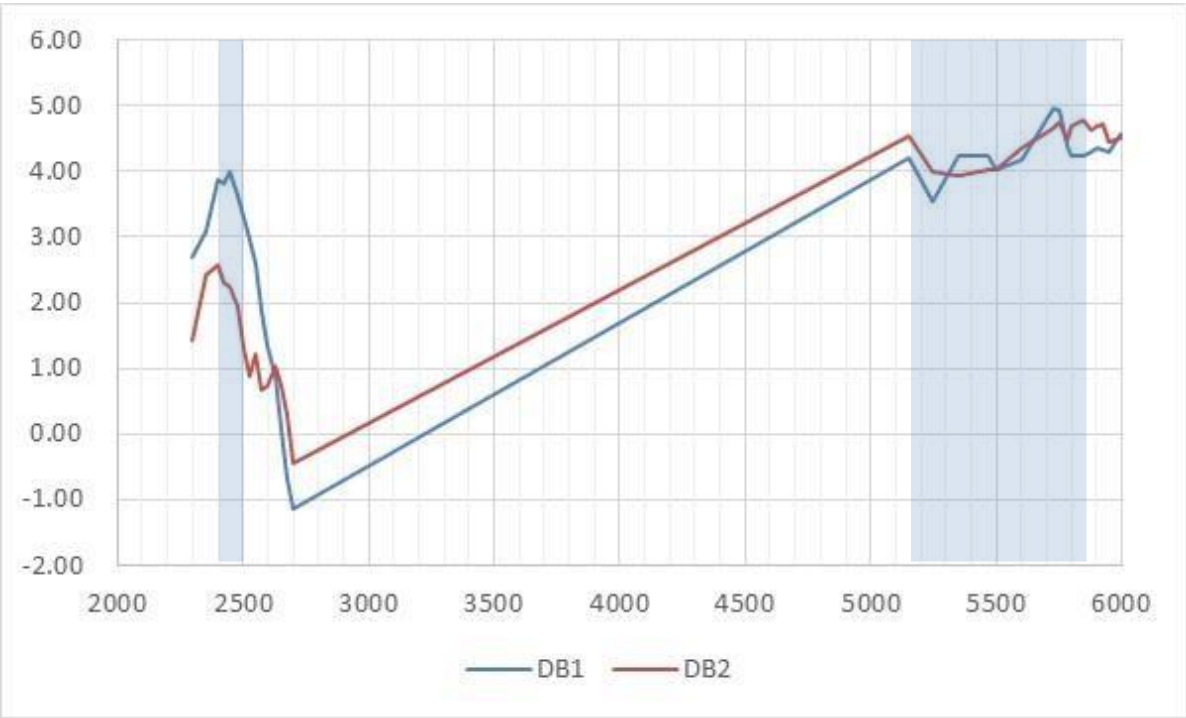
Efficiency Wi-Fi Antenna



Freq. (MHz)	Max. (%)		Avg. (%)		Min. (%)	
	Wifi1	Wifi2	Wifi1	Wifi2	Wifi1	Wifi2
2400-2500	60	65	58	62	56	56
5150-5850	71	75	67	73	65	70



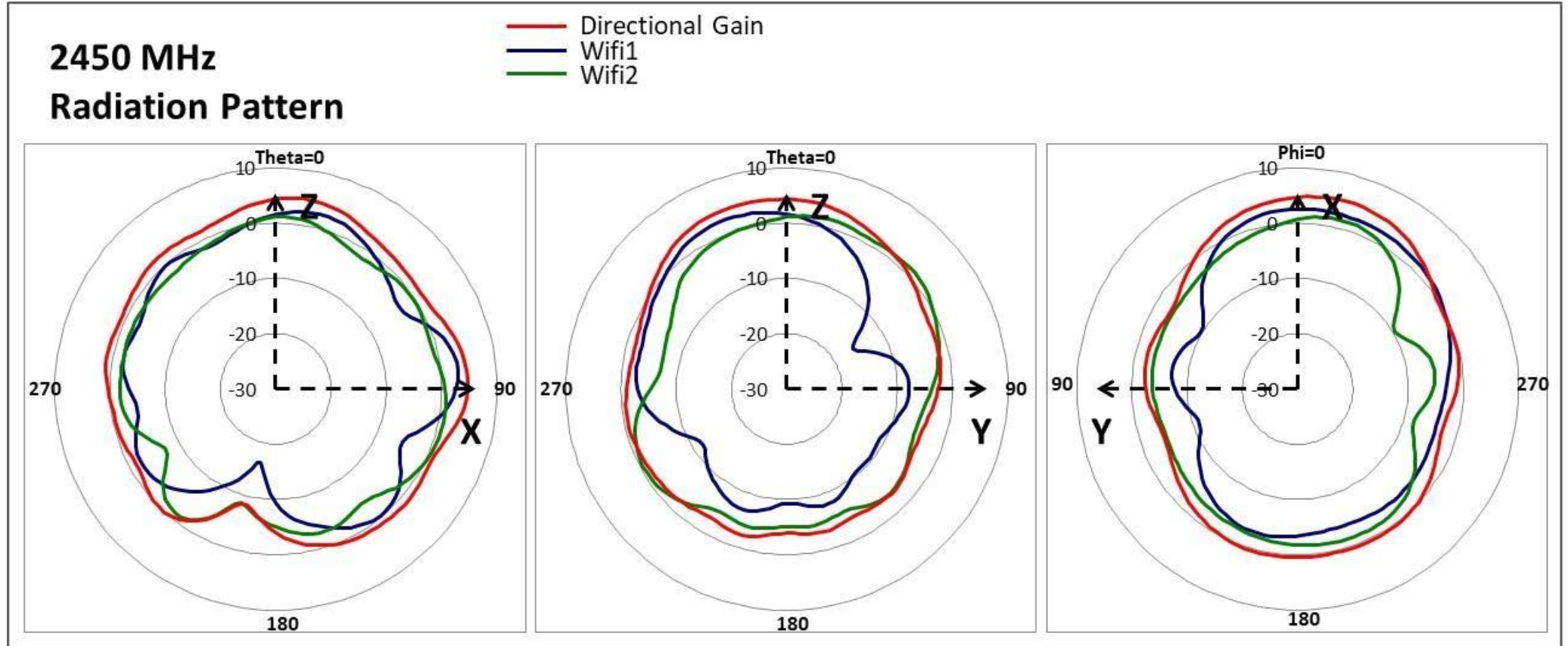
Peak Gain Wi-Fi Antenna



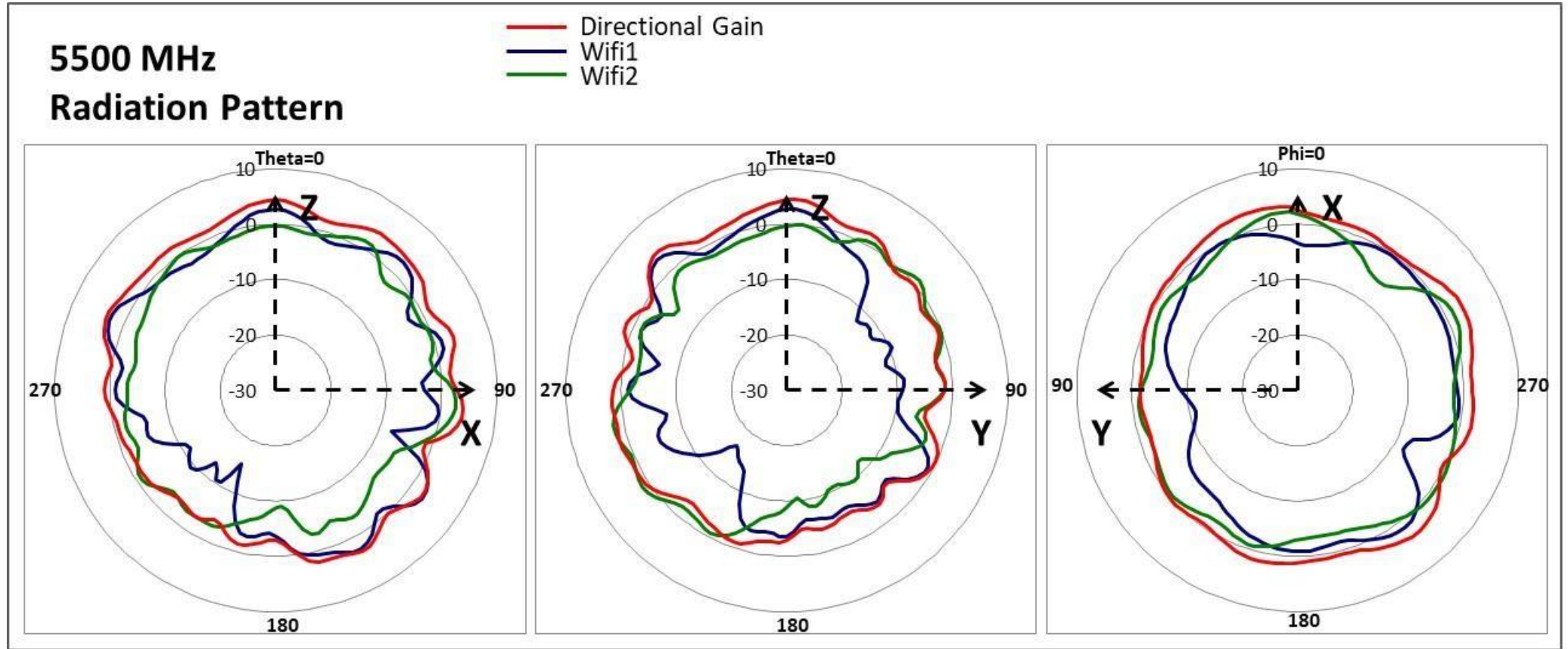
Freq. (MHz)	Max. (dBi)	
	Wifi1	Wifi2
2400-2500	4.0	2.6
5150-5850	5.0	4.8



Realized Gain Pattern Wi-Fi @2450MHz for Gtotal



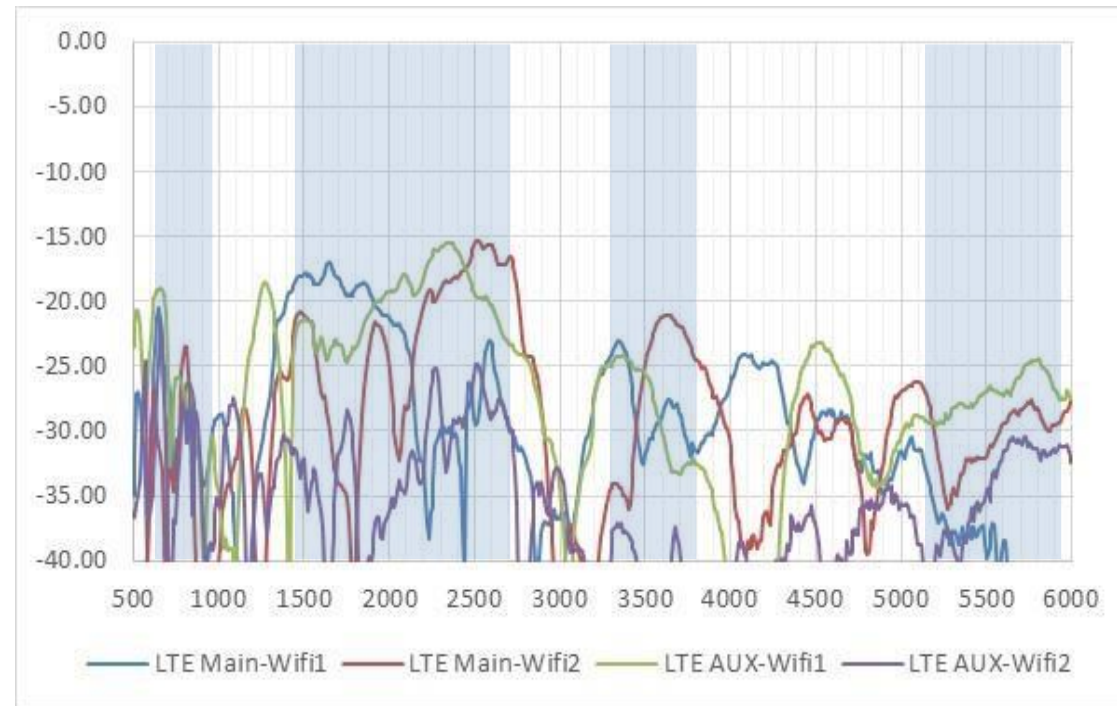
Realized Gain Pattern Wi-Fi @5500MHz for Gtotal



Isolation – LTE to Wi-Fi

– 18dB on LB / 15dB on MB / 21dB on HB / 24dB on LAA

■ Isolation



Isolation LTE to Wi-Fi

