



Machine Q Lora Area Antenna Test Report

May 16 2024

Prepared by: Larry Jiang

8F, No. 3-1, Yuan Qu St., Nan Kang, Taipei 115, Taiwan.

Antenna Brand Model NO.

- **Band : Sercomm**
- **Freq (MHz) /Gain (dB): 2400:4.12,
2450: 4.05, 2500:3.84**

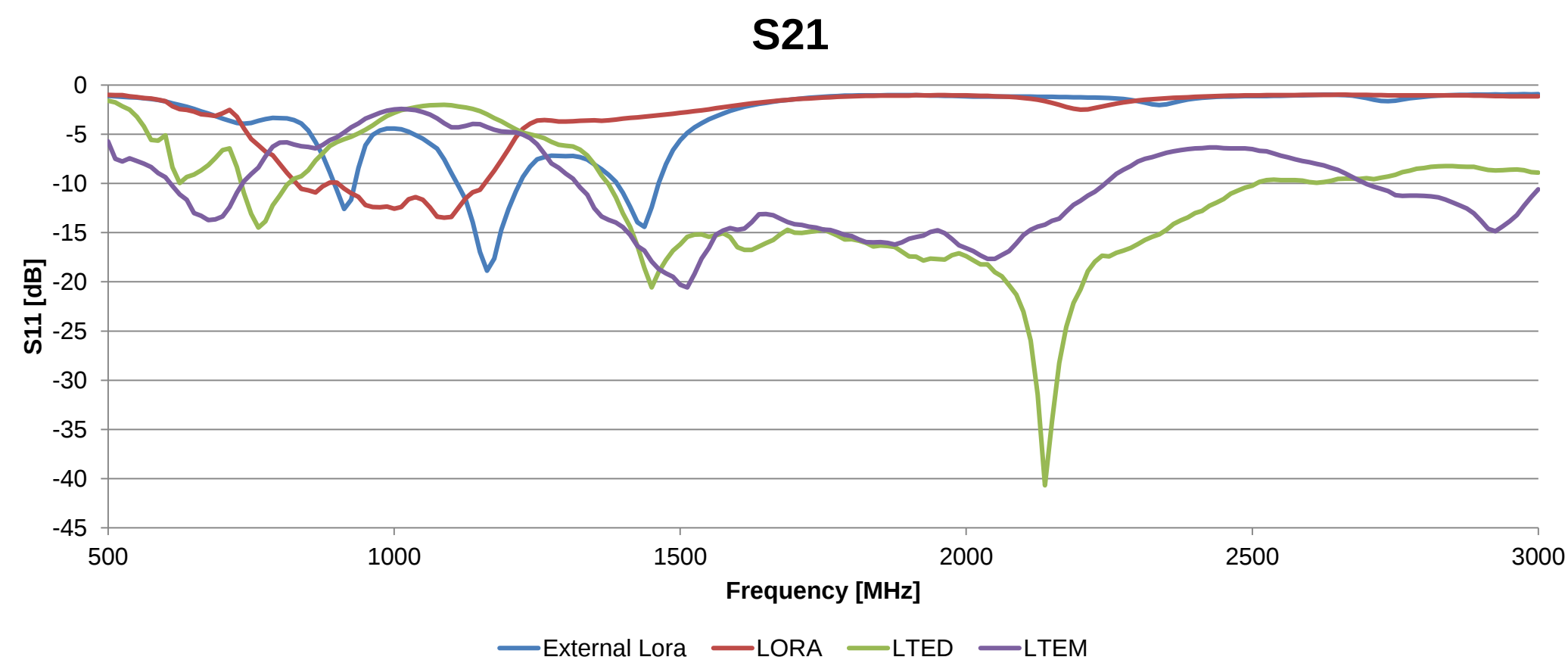
Outline

- Antenna Structure & Placement
- Return Loss & Isolation
- Peak Gain & Efficiency
- 2D Radiation Pattern
 - Each Antenna
- 3D Radiation Pattern And Heatmap For Each Antenna

Antenna Structure & Placement

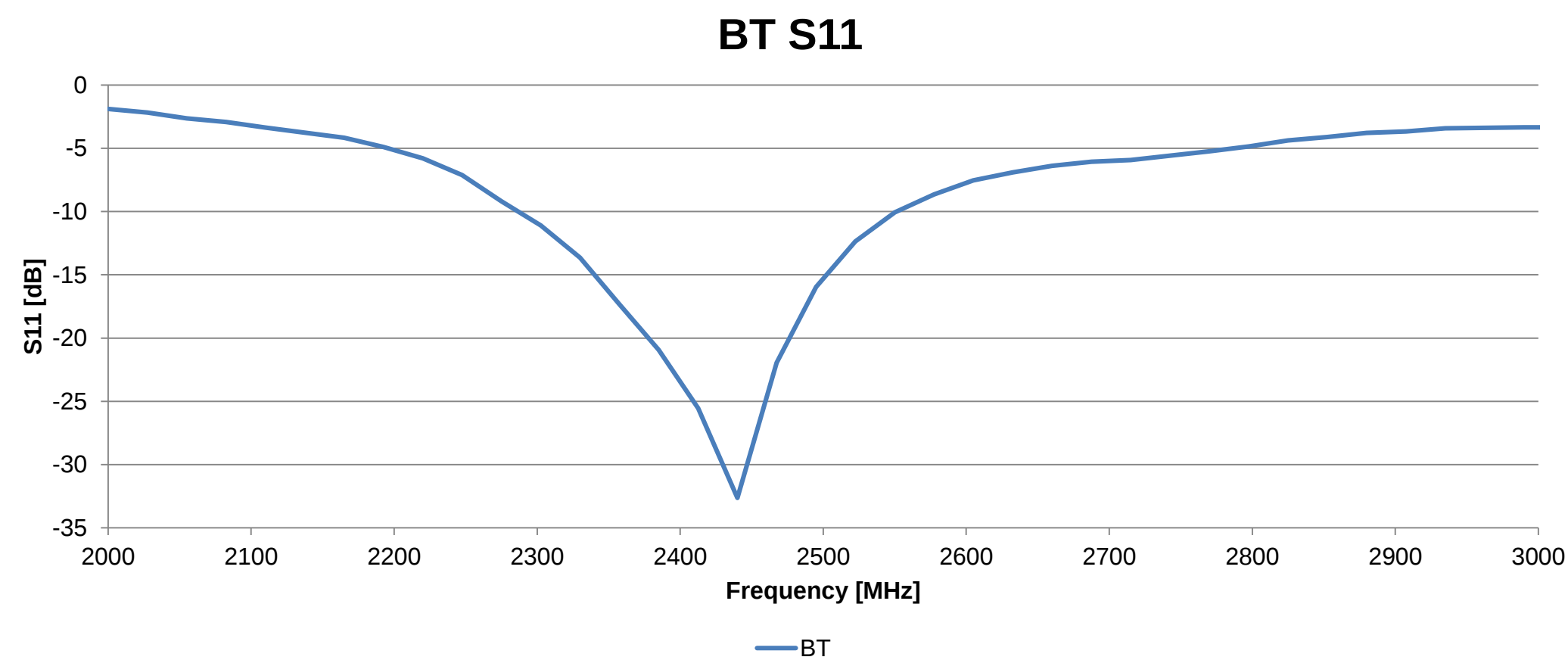
Ant No.	Part number	Function	Operating Band	Type	Material	Feeding	Dimension
Ant 1 LTE Main	6172000GWA	LTE	699 MHz ~ 894 MHz 1710 MHz ~ 2155 MHz	PIFA	Metal	RF Trace	74(L) x 14(W) x 15(H) mm ³
Ant 2 LTE Div.	6172000HWA	LTE	699 MHz ~ 894 MHz 1710 MHz ~ 2155 MHz	PIFA	Metal	RF Trace	74(L) x 14(W) x 15(H) mm ³
Ant 3	61720009WA	LoRa	915 MHz	PIFA	Metal	RF Trace	28(L) x 28(W) x 11.5(H) mm ³
Ant 4	6172003AWA	BT	2400 MHz ~ 2500 MHz	PIFA	PCB	Cable	30(L) x 10(W) x 0.4(T) mm ³
Ant 5	61723000SG	LoRa external	915 MHz	Dipole	Metal	Cable	240(L) x 13(W) x 13(H) mm ³

Return Loss

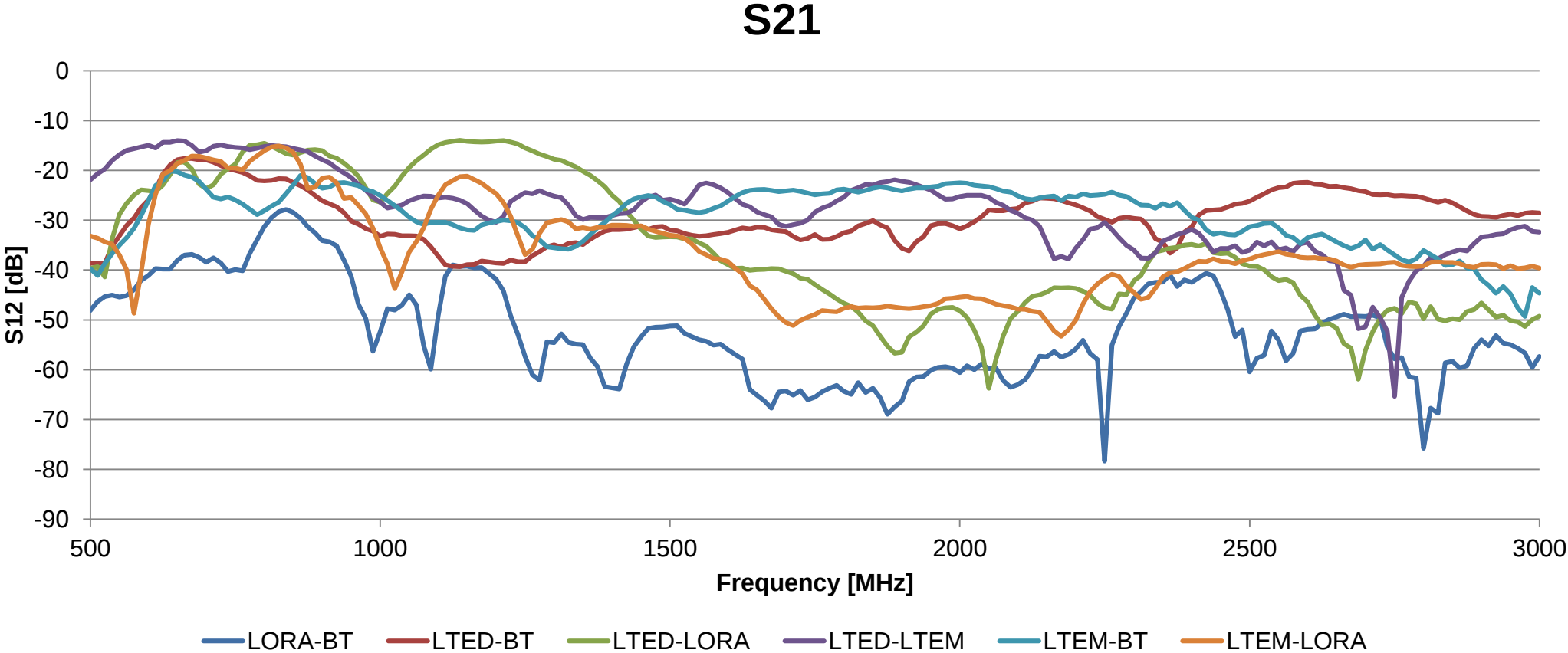


Worst Return Loss (dB)	External LORA	LORA	LTED	LTEM
902~928MHz	-10.1	-10.2	-6.3	-5
699~894MHz				
1710~2155MHz			-9.2	-11

Return Loss



Worst Return Loss (dB)	BT
2.4~2.5GHz	-16.0



Peak Gain & Efficiency

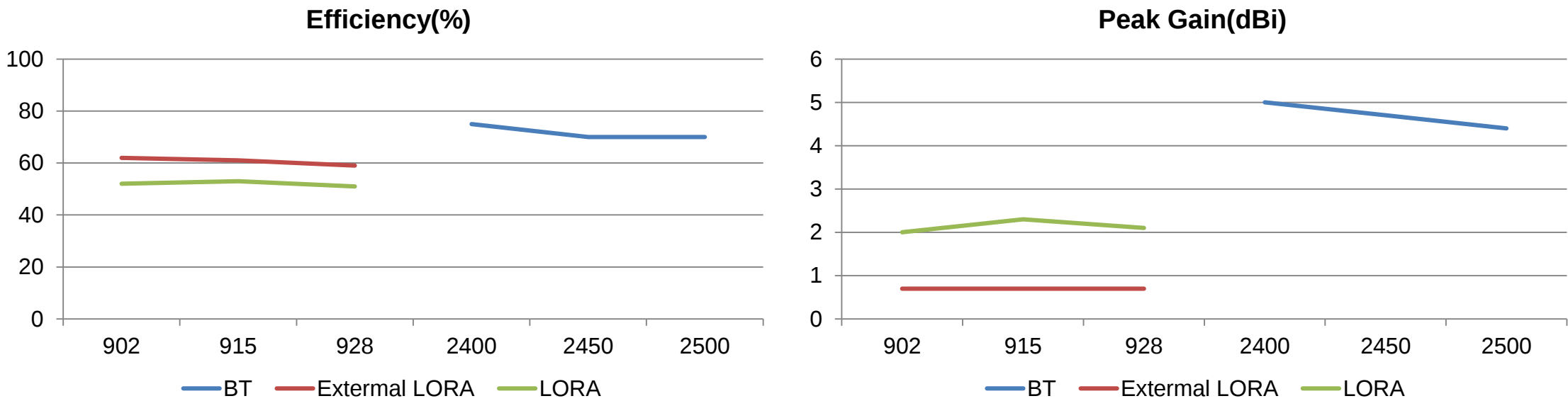


Table 1						
Frequency (MHz)	BT		External LORA		LORA	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
902			62	0.7	52	2.0
915			61	0.7	53	2.3
928			59	0.7	51	2.1
2400	75	5				
2450	70	4.7				
2500	70	4.4				

Peak Gain & Efficiency

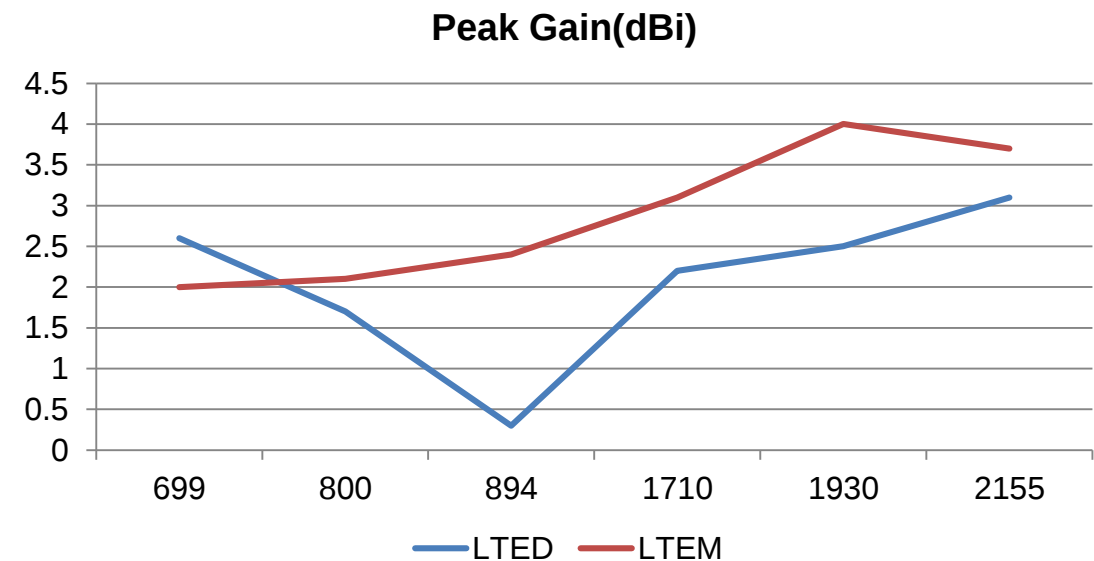
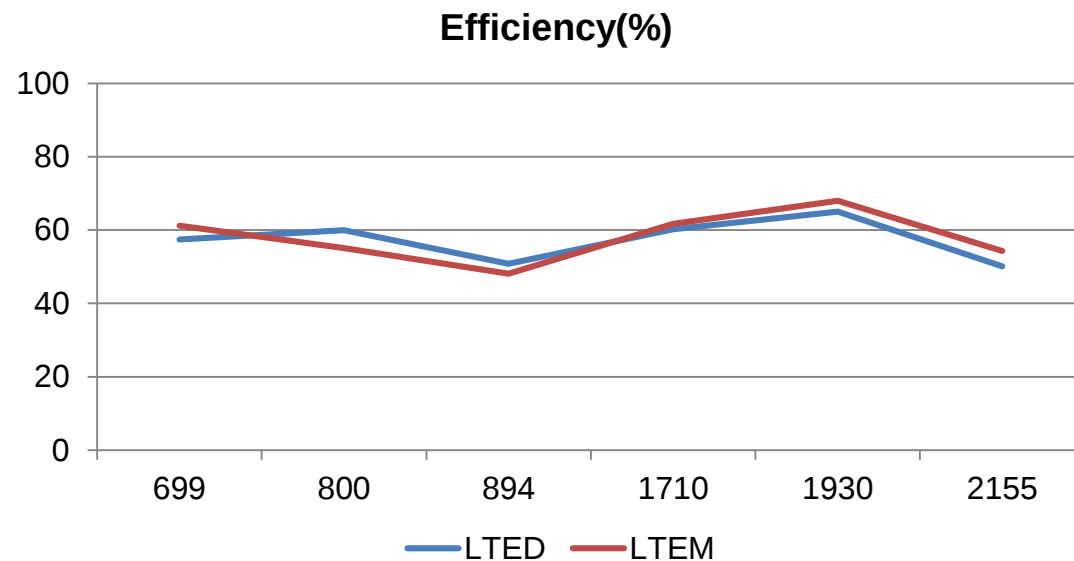


Table 2

Frequency (MHz)	LTED		LTEM	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
699	57.4	2.6	61.2	2
800	60	1.7	55.1	2.1
894	50.8	0.3	48.1	2.4
1710	60.2	2.2	61.7	3.1
1930	65	2.5	68	4
2155	50.1	3.1	54.3	3.7

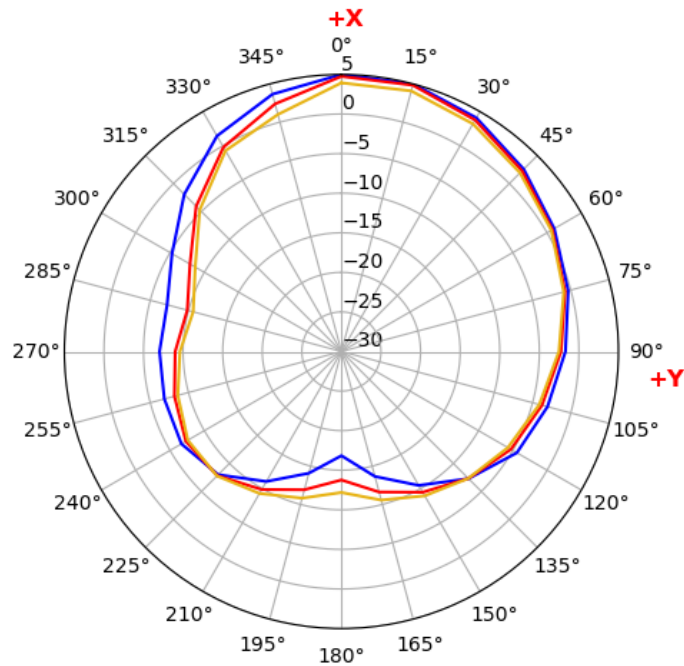
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2D Radiation Pattern - BT

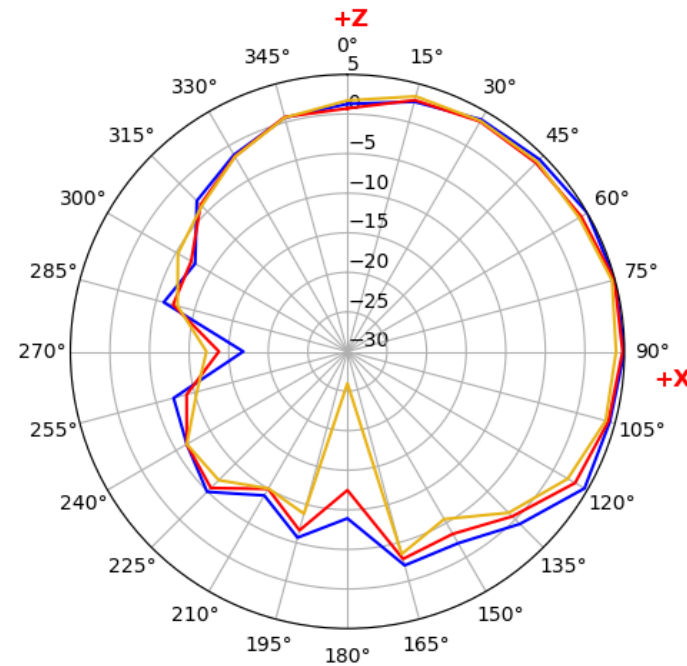
BT_XY plane - Azimuth

— 2400MHz — 2450MHz — 2500MHz



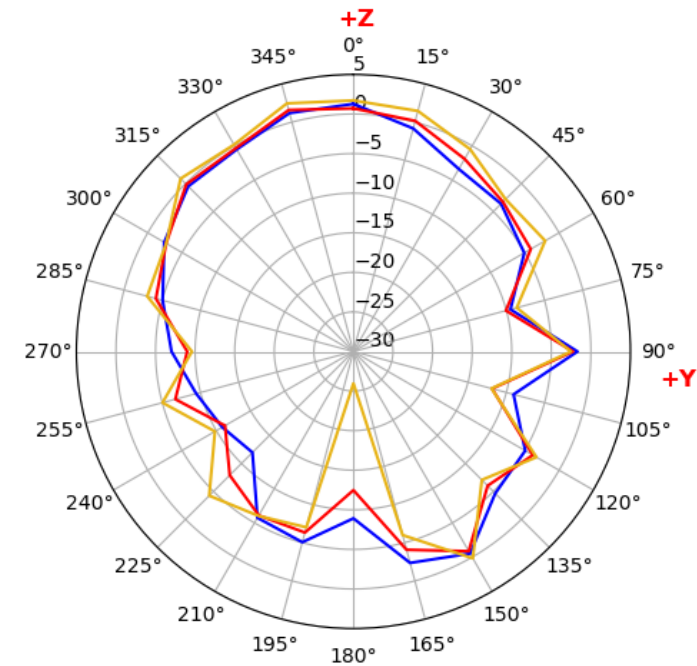
BT_XZ plane - Side to Side

— 2400MHz — 2450MHz — 2500MHz



BT_YZ plane - Front to back

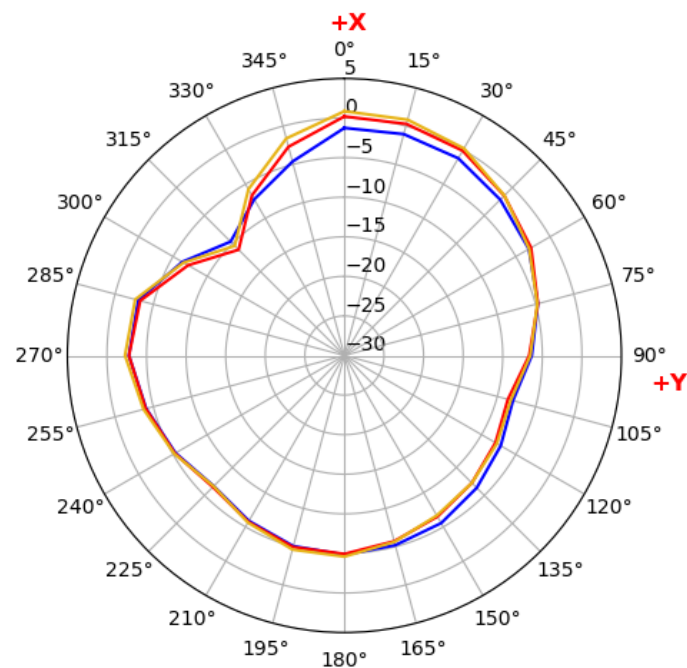
— 2400MHz — 2450MHz — 2500MHz



2D Radiation Pattern - LORA

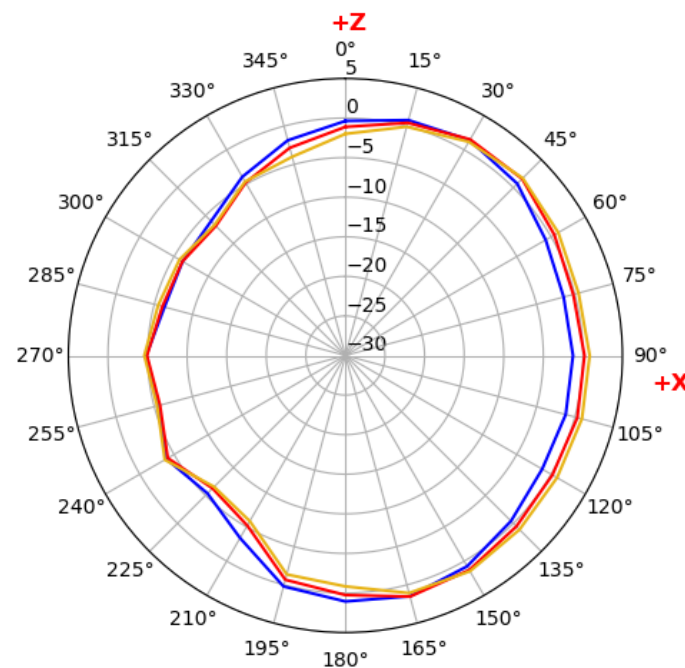
LORA_XY plane - Azimuth

— 902MHz — 915MHz — 928MHz



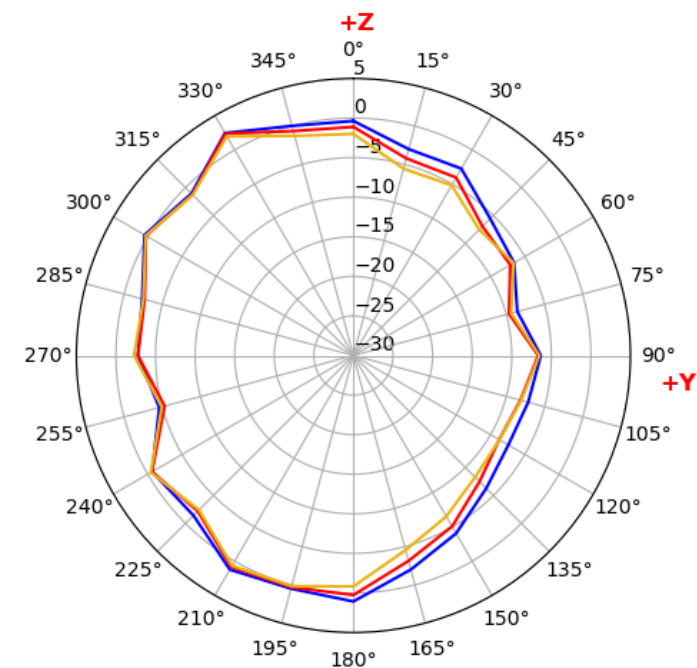
LORA_XZ plane - Side to Side

— 902MHz — 915MHz — 928MHz



LORA_YZ plane - Front to back

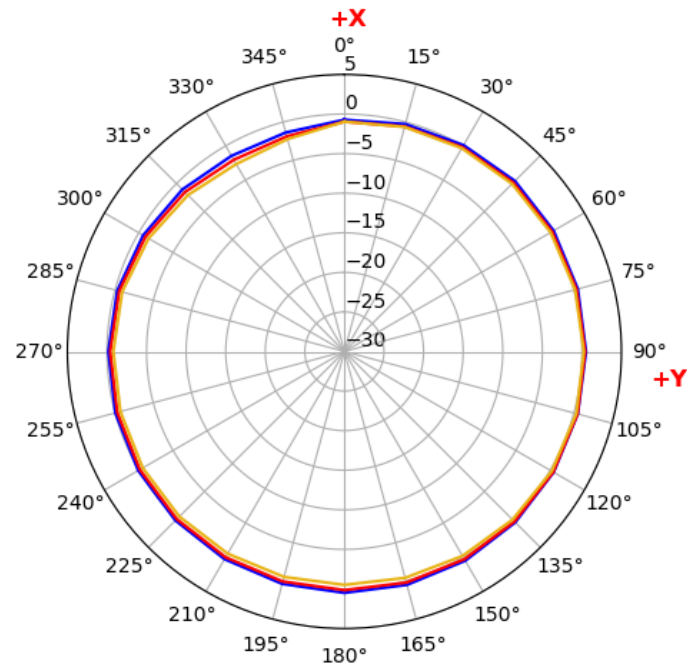
— 902MHz — 915MHz — 928MHz



2D Radiation Pattern - External LORA

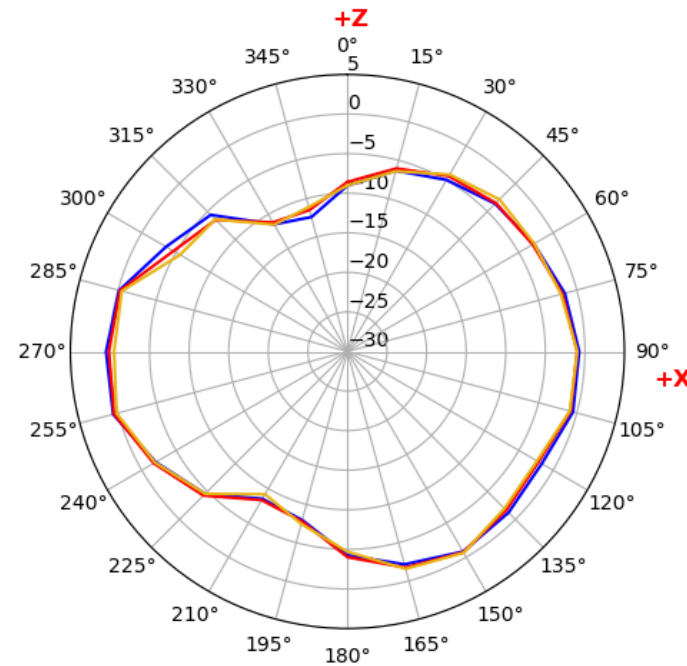
External LORA_XY plane - Azimuth

— 902MHz — 915MHz — 928MHz



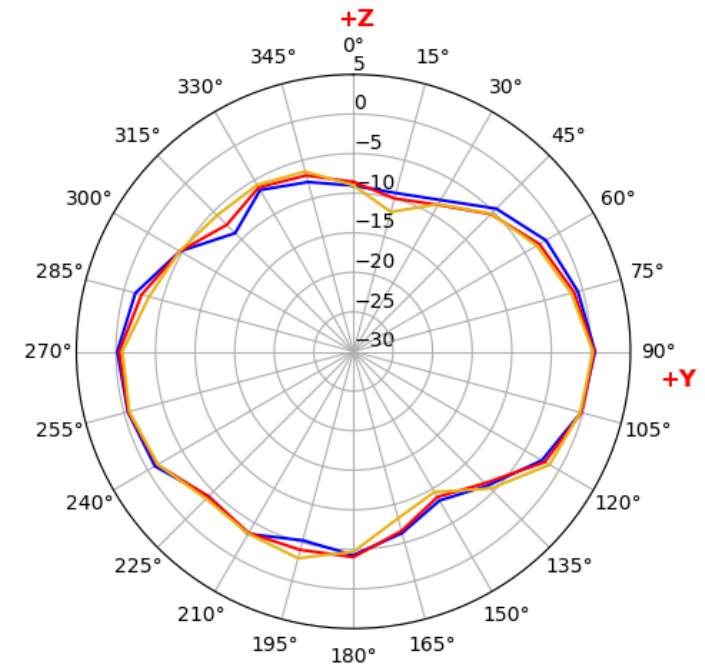
External LORA_XZ plane - Side to Side

— 902MHz — 915MHz — 928MHz



External LORA_YZ plane - Front to back

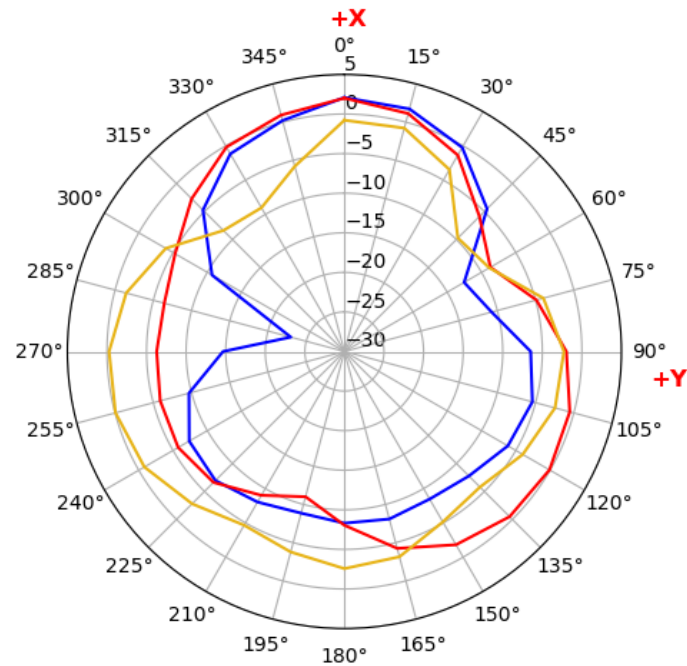
— 902MHz — 915MHz — 928MHz



2D Radiation Pattern - LTED

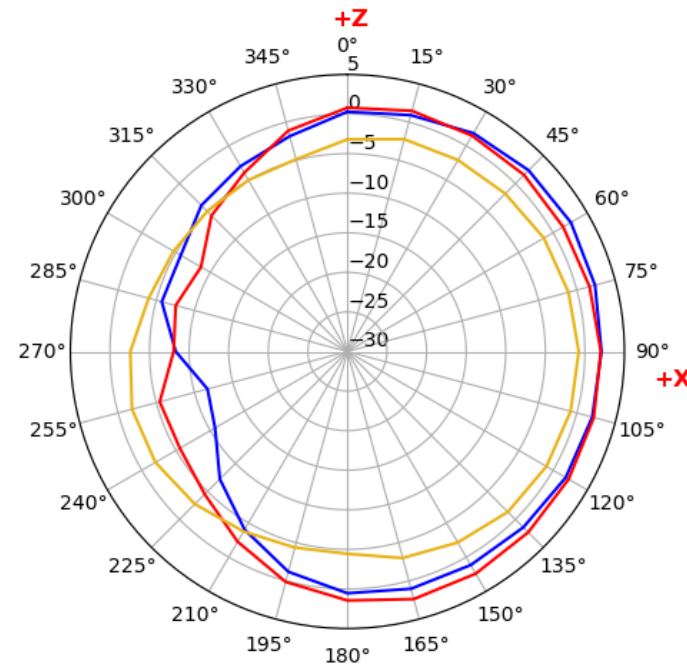
LTED_XY plane - Azimuth

— 699MHz — 800MHz — 894MHz



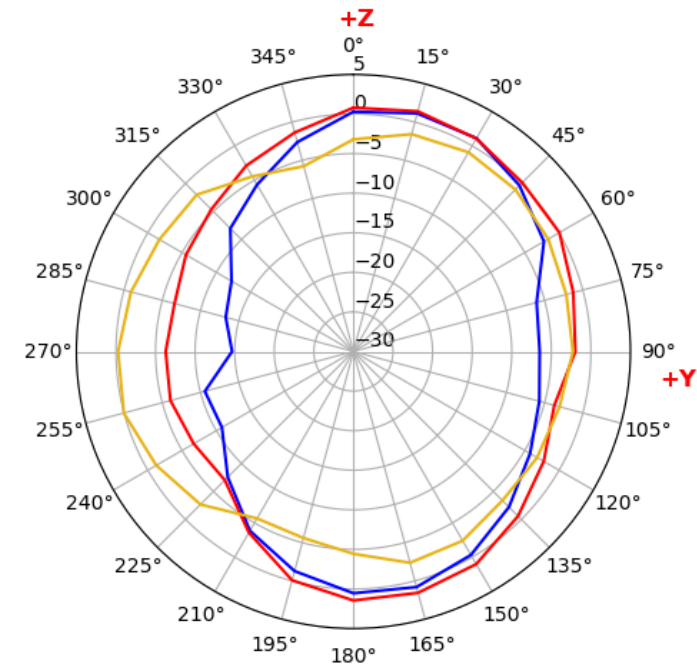
LTED_XZ plane - Side to Side

— 699MHz — 800MHz — 894MHz



LTED_YZ plane - Front to back

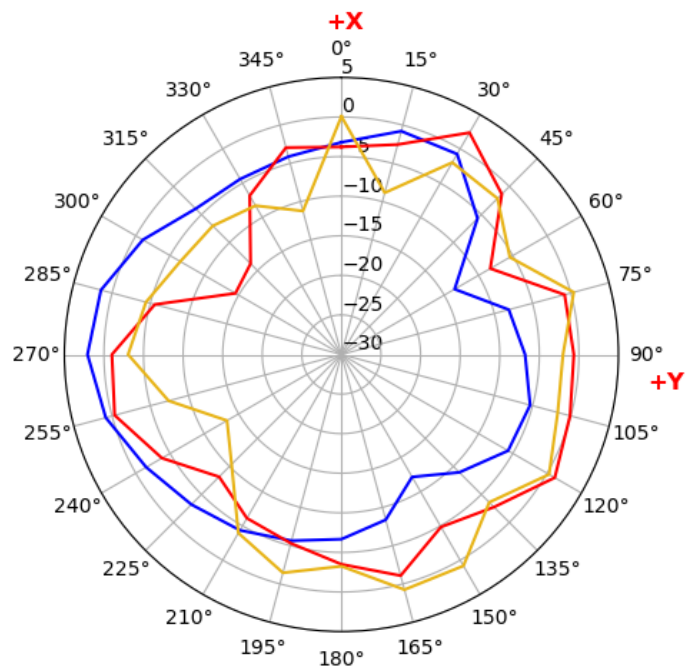
— 699MHz — 800MHz — 894MHz



2D Radiation Pattern - LTED

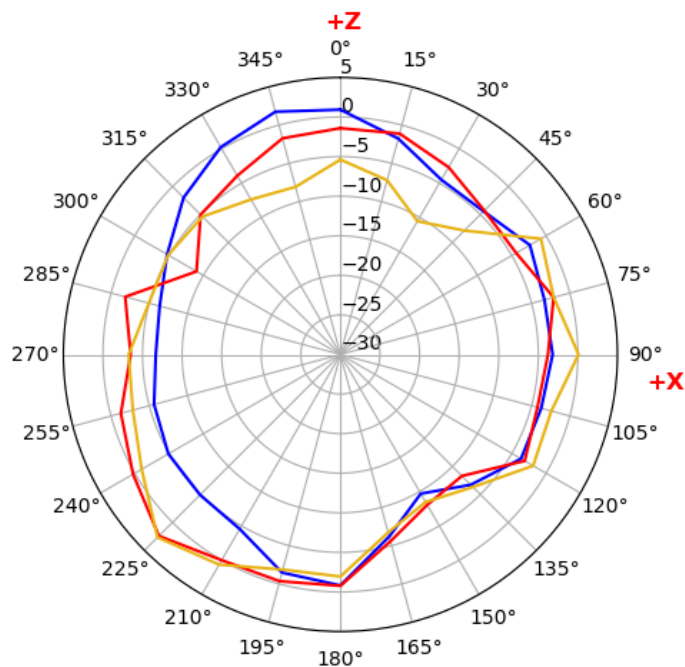
LTED_XY plane - Azimuth

— 1710MHz — 1930MHz — 2155MHz



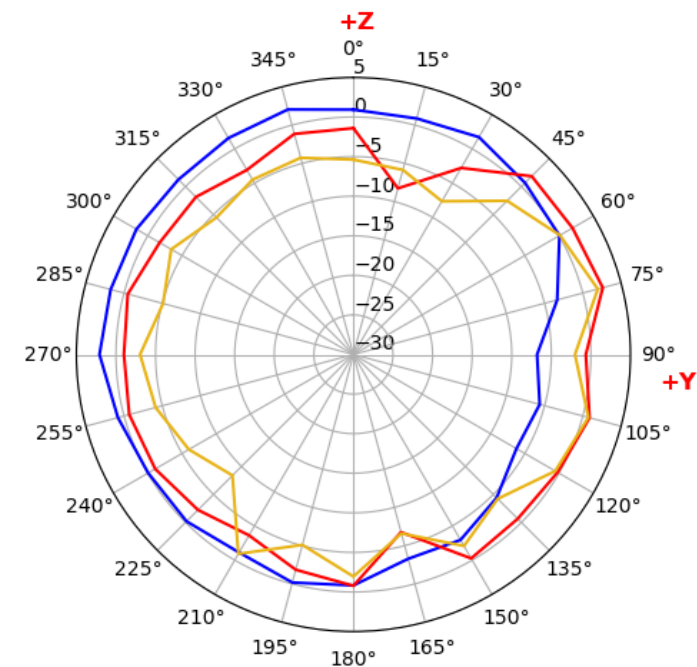
LTED_XZ plane - Side to Side

— 1710MHz — 1930MHz — 2155MHz



LTED_YZ plane - Front to back

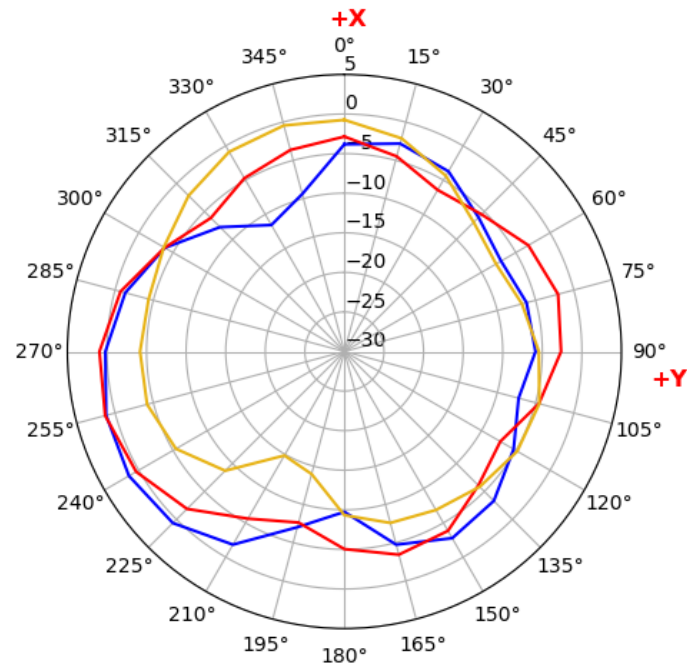
— 1710MHz — 1930MHz — 2155MHz



2D Radiation Pattern - LTEM

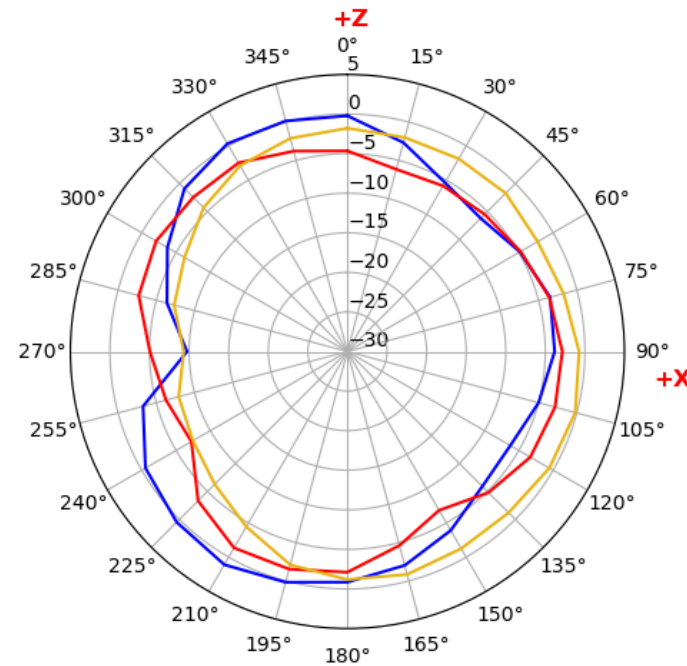
LTEM_XY plane - Azimuth

— 699MHz — 800MHz — 894MHz



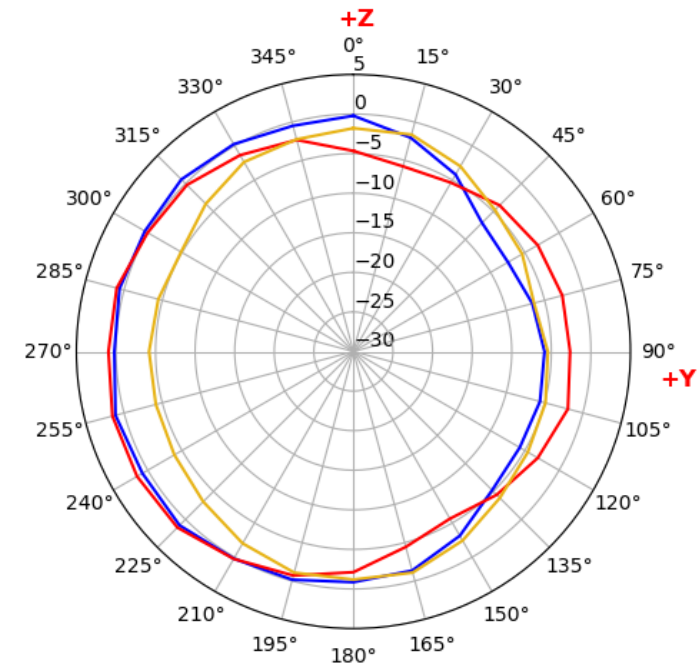
LTEM_XZ plane - Side to Side

— 699MHz — 800MHz — 894MHz



LTEM_YZ plane - Front to back

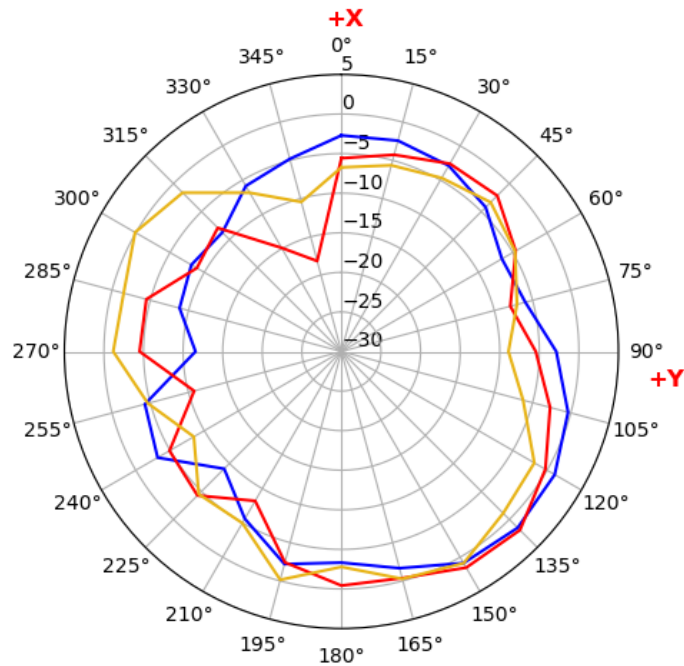
— 699MHz — 800MHz — 894MHz



2D Radiation Pattern - LTEM

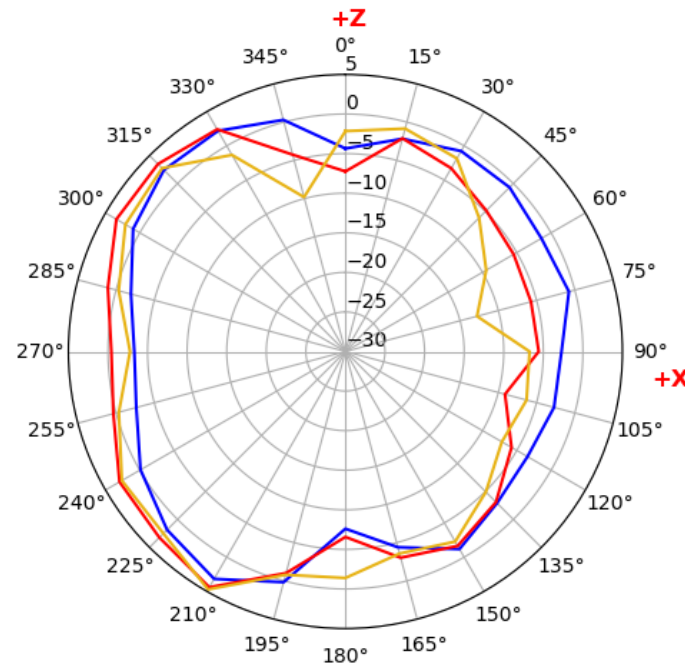
LTEM_XY plane - Azimuth

— 1710MHz — 1930MHz — 2155MHz



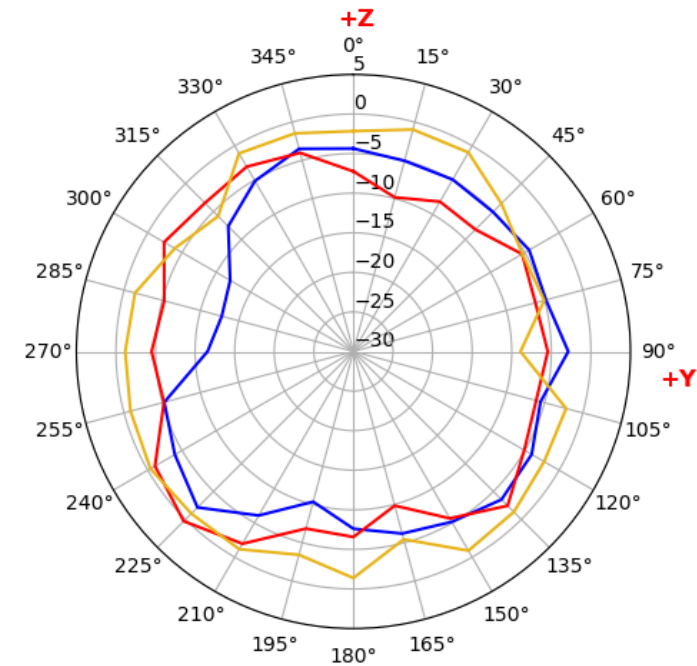
LTEM_XZ plane - Side to Side

— 1710MHz — 1930MHz — 2155MHz



LTEM_YZ plane - Front to back

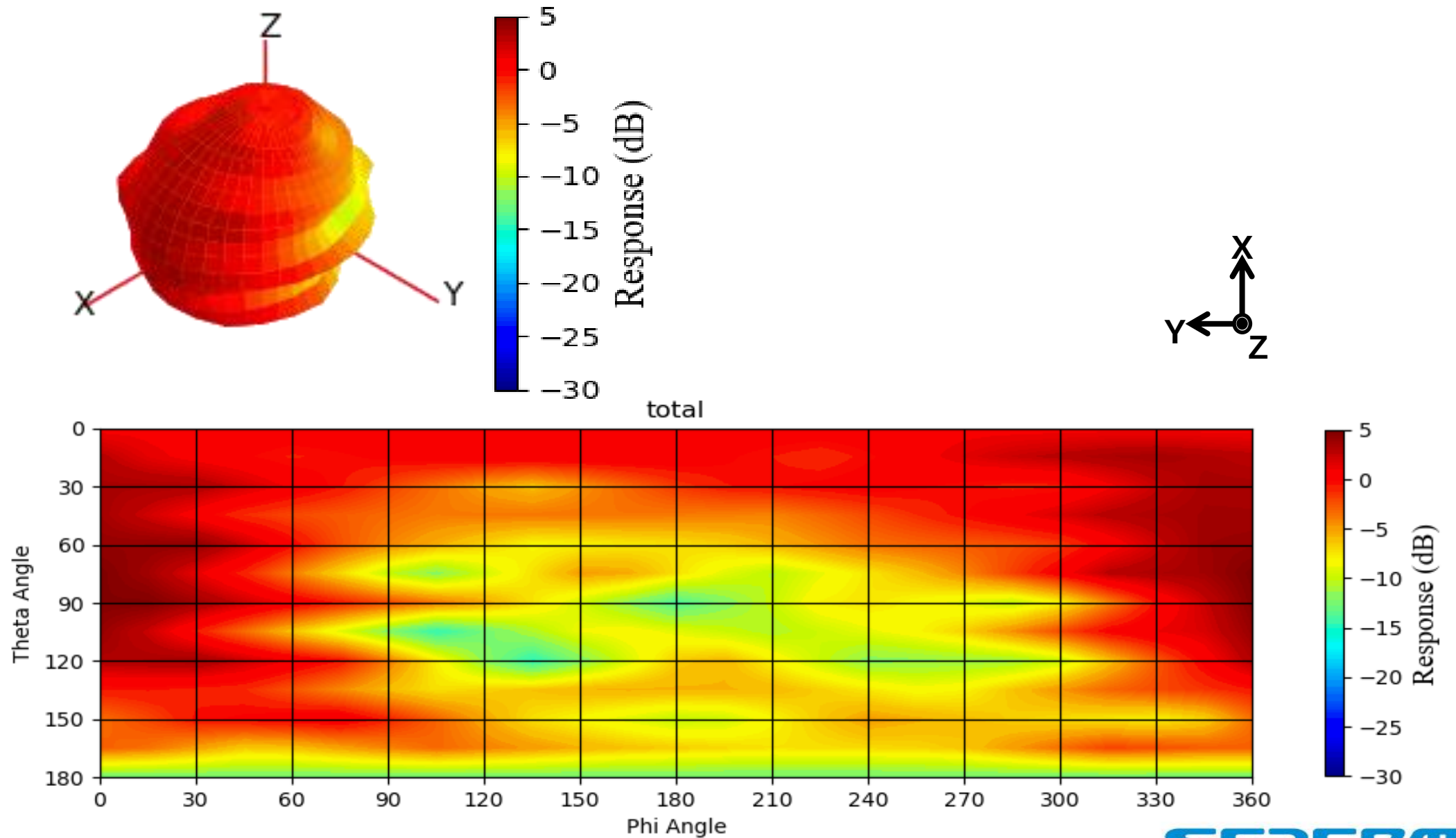
— 1710MHz — 1930MHz — 2155MHz



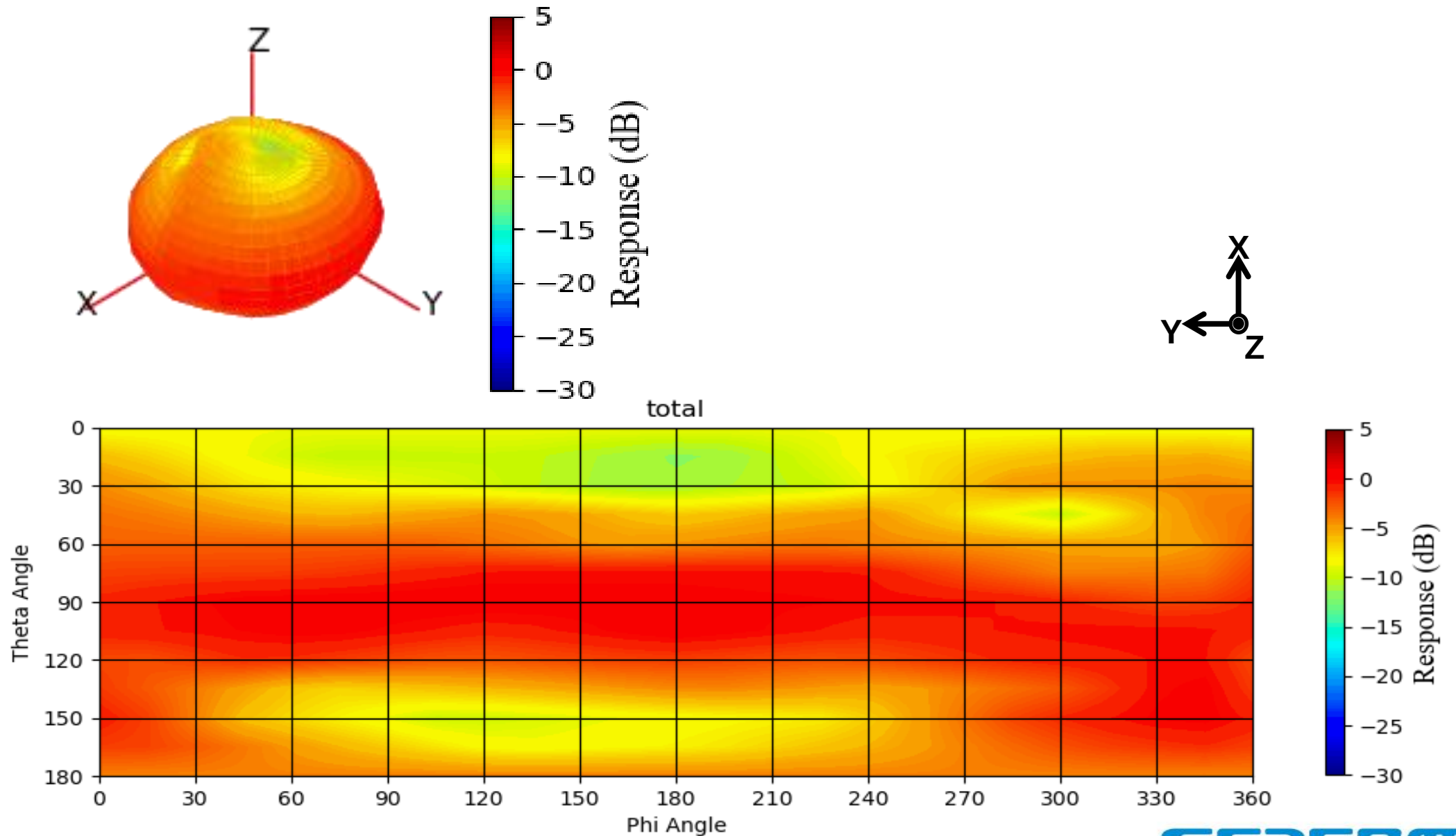
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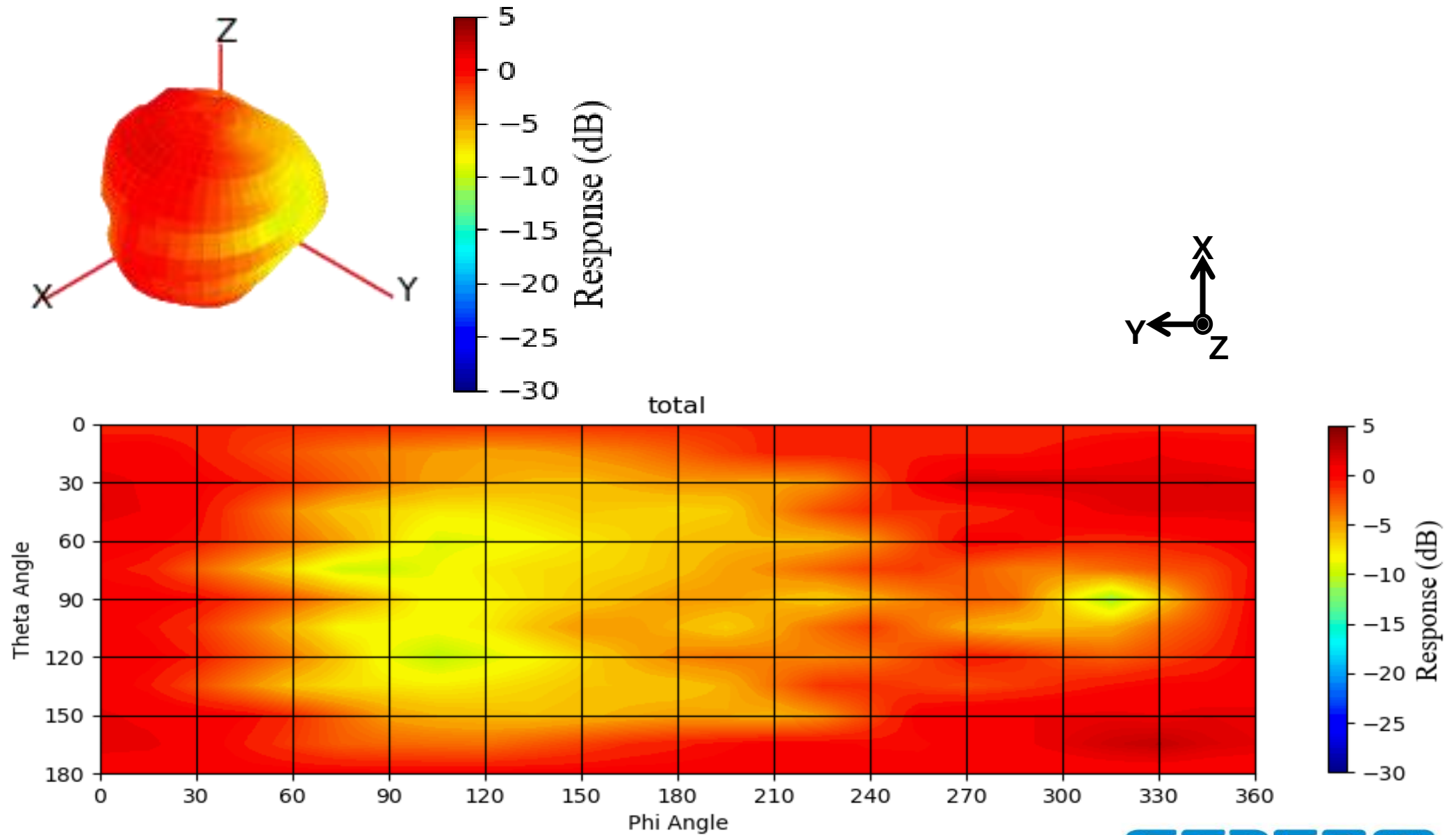
3D Radiation Pattern - BT@2450MHz



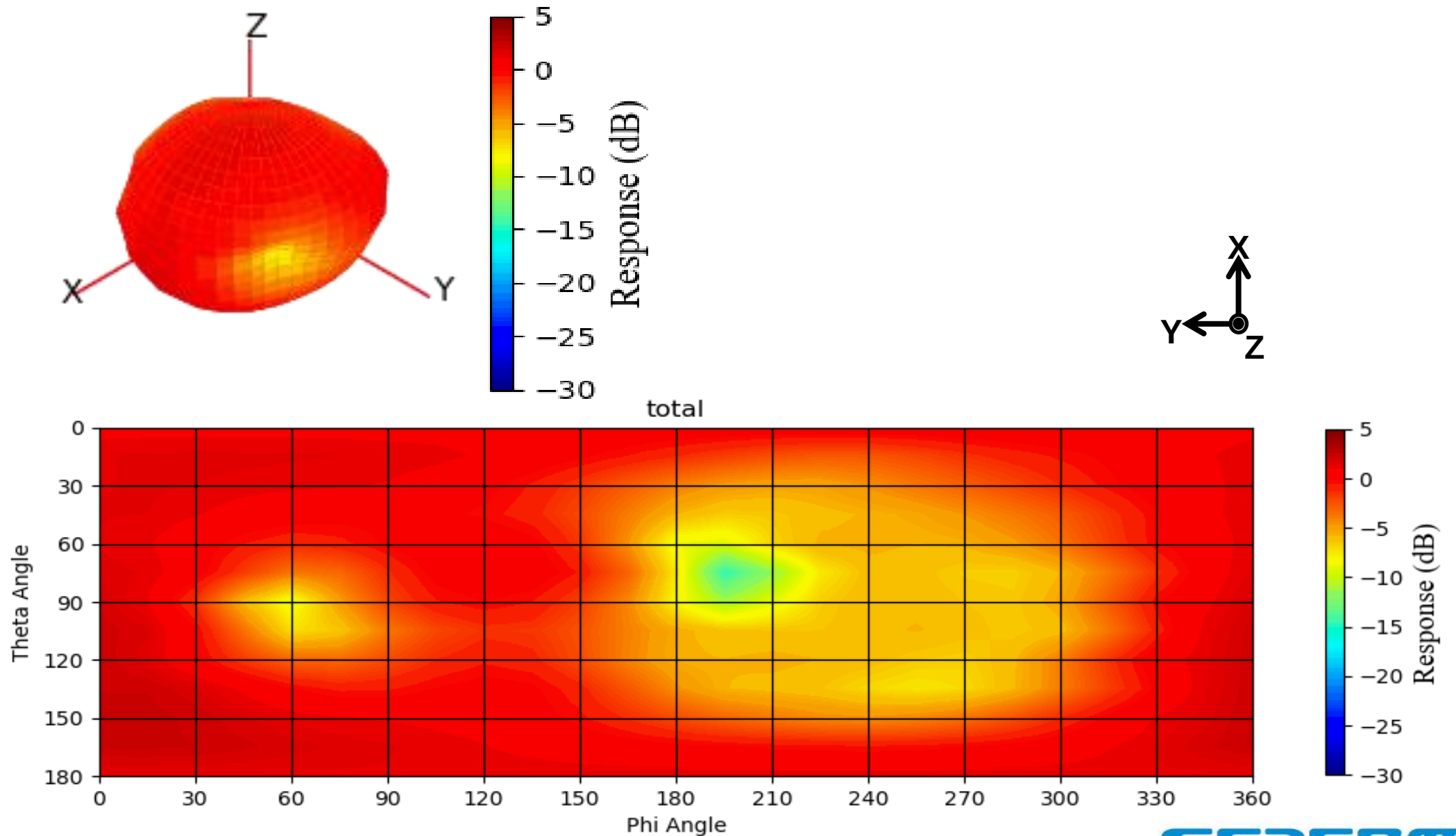
3D Radiation Pattern - External LORA@915MHz



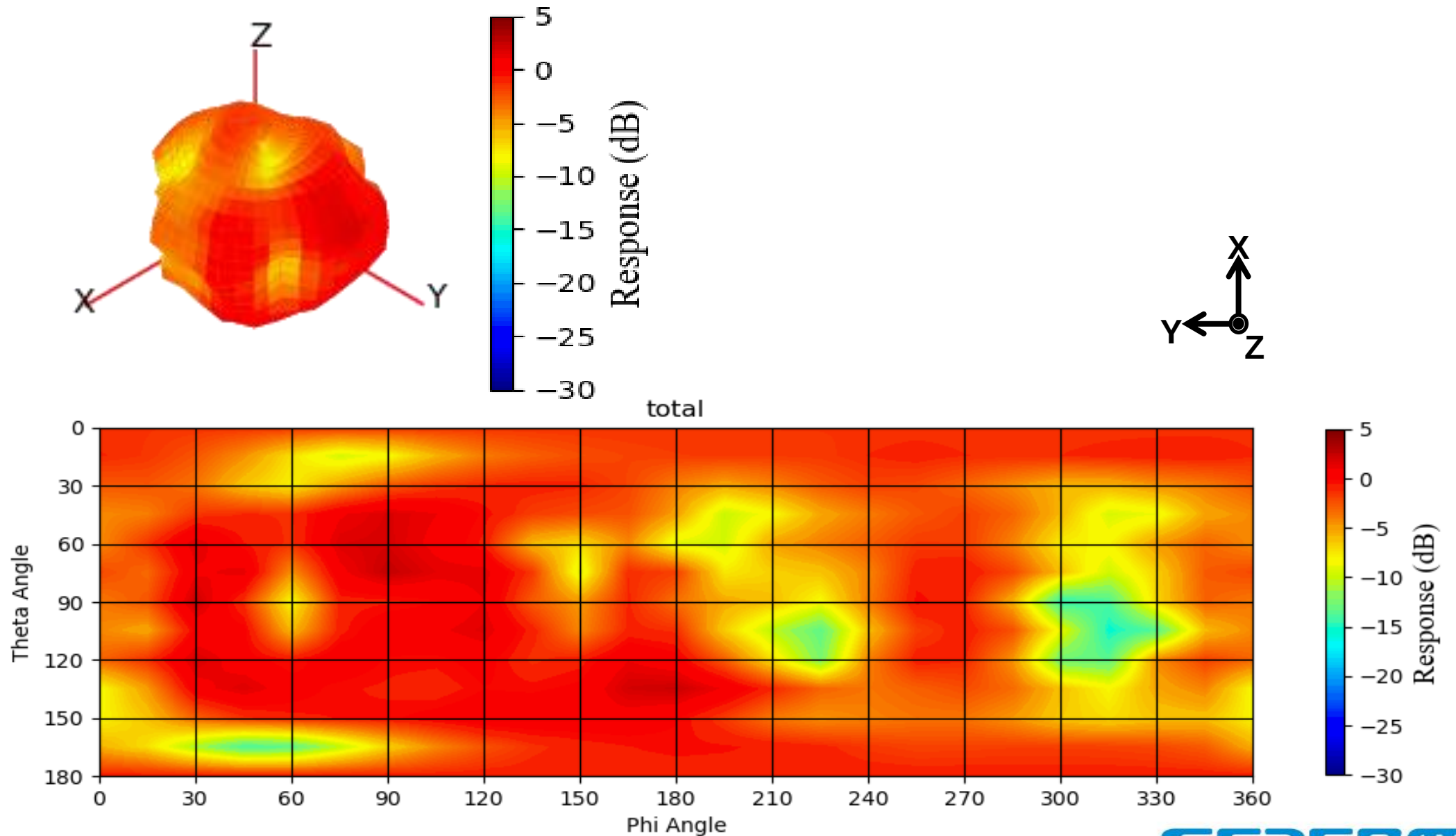
3D Radiation Pattern - LORA@915MHz



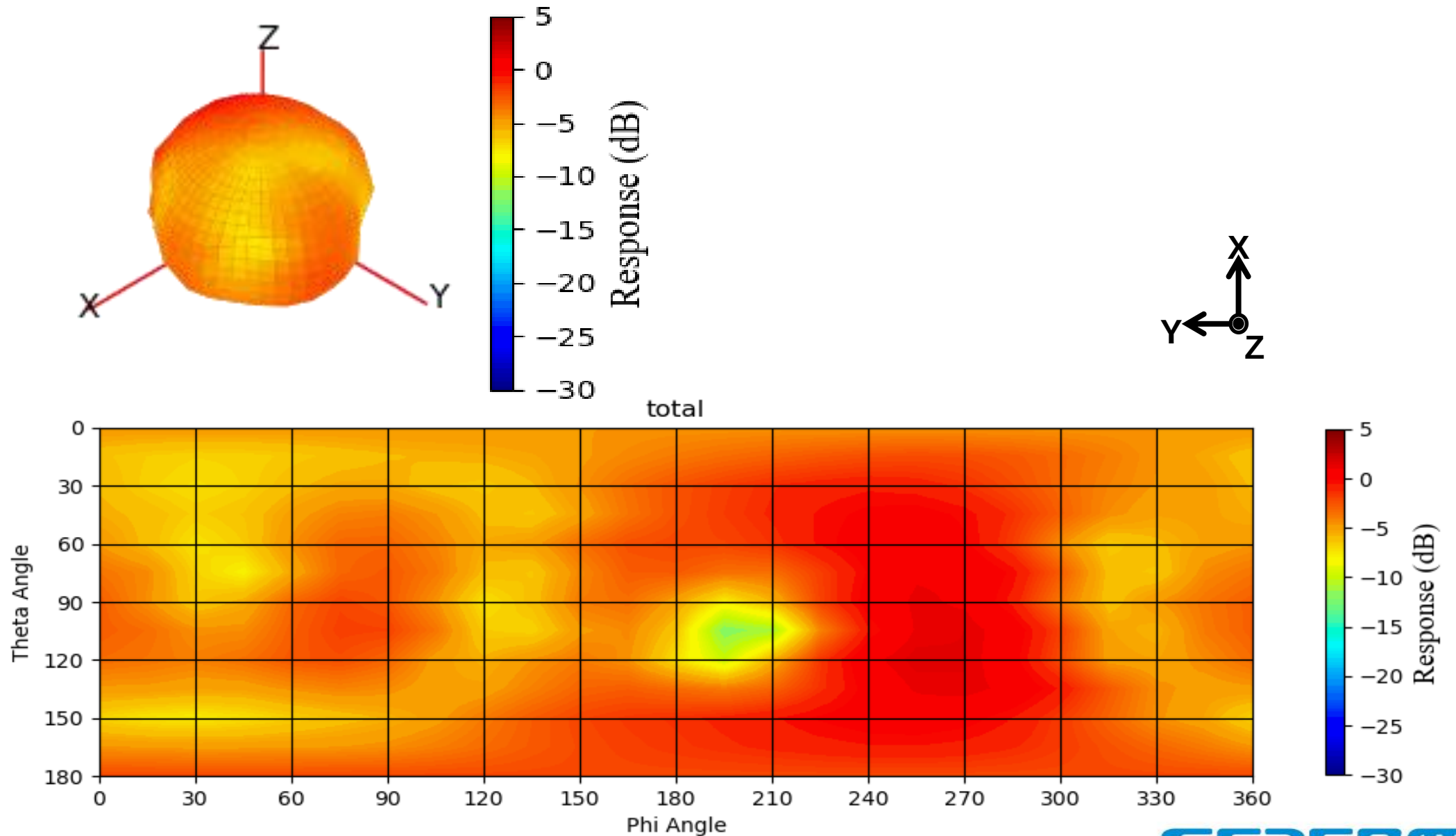
3D Radiation Pattern - LTED@800MHz



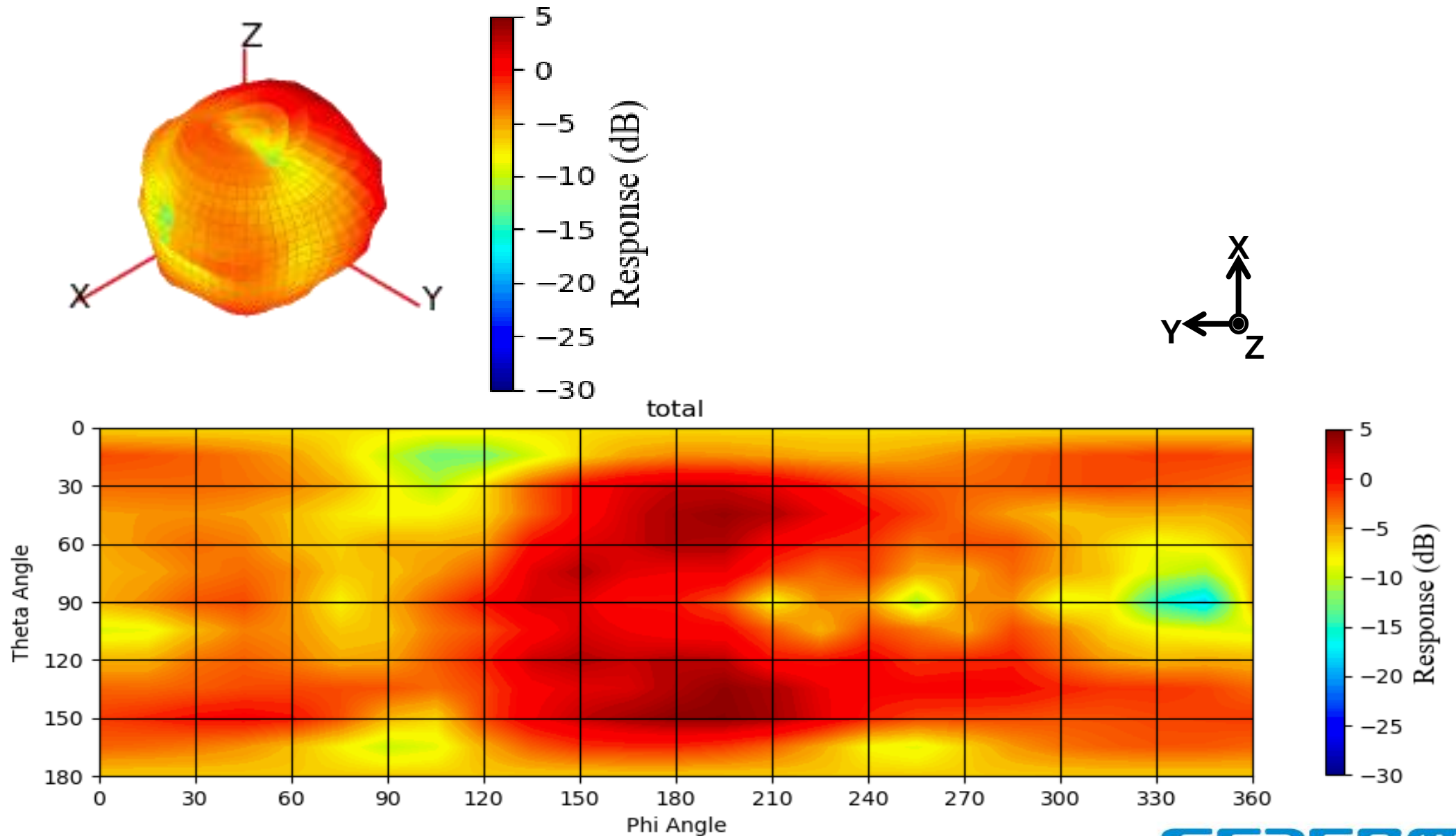
3D Radiation Pattern - LTED@1930MHz



3D Radiation Pattern - LTEM@800MHz



3D Radiation Pattern - LTEM@1930MHz



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