



HL Global Measurement Report for Kayi Enerji Pullcord

HLG Antenna Solution

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Date: 2024-06-25

- Brief Project Description
 - Project Name: Kayi Enerji Pullcord
- Antenna Configuration
 - 1x 915MHz antenna
- Antenna Technology
 - Trace-fed
 - On board
 - Blade PCB type
- This report shows passive measurement results of HLG antenna (factory sample) on the latest bare PCB.

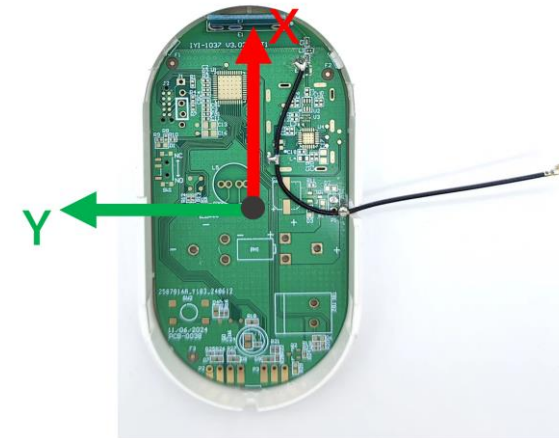


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HL Global Antenna



HLG Antenna Designator	HLG Antenna Part Number	Antenna Dimensions	Revision
Ant_HLG	PC915SB01KE-BZK	16.4mm x 20mm, T=1mm	01

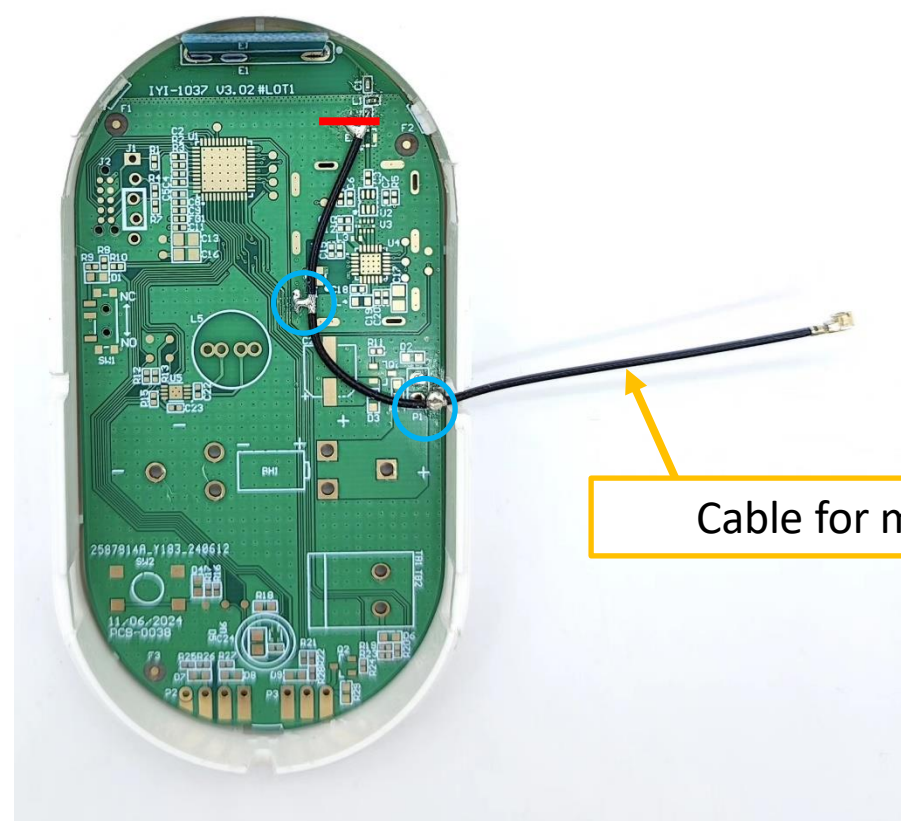


orientation

Notes:

- We used latest bare PCB (receive date: 18th of June 2024) for measurement.
- There is no discernible difference in antenna performance between cases when measured on bare PCB and PCBA.

Measurement Plane

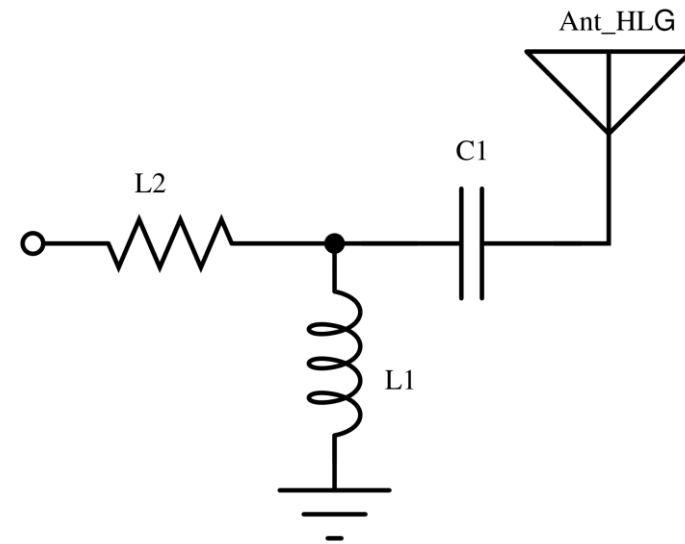
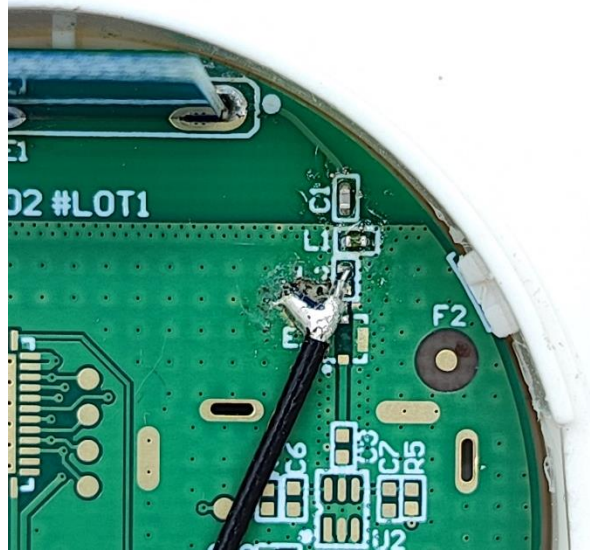


Cable for measurement

— Measurement plane

○ Cable grounded points

Matching Circuit



Antenna Designator	Element Designator	Size	Value	Tolerance	Element PN	Brand
Ant_HLG	C1	0402	3.6pF	$\pm 0.1\text{pF}$	GRM1555C1H3R6BA01D	muRata
	L1	0402	6.8nH	$\pm 3\%$	LQG15HS6N8H02D	muRata
	L2	0402	0 Ω	/	/	/

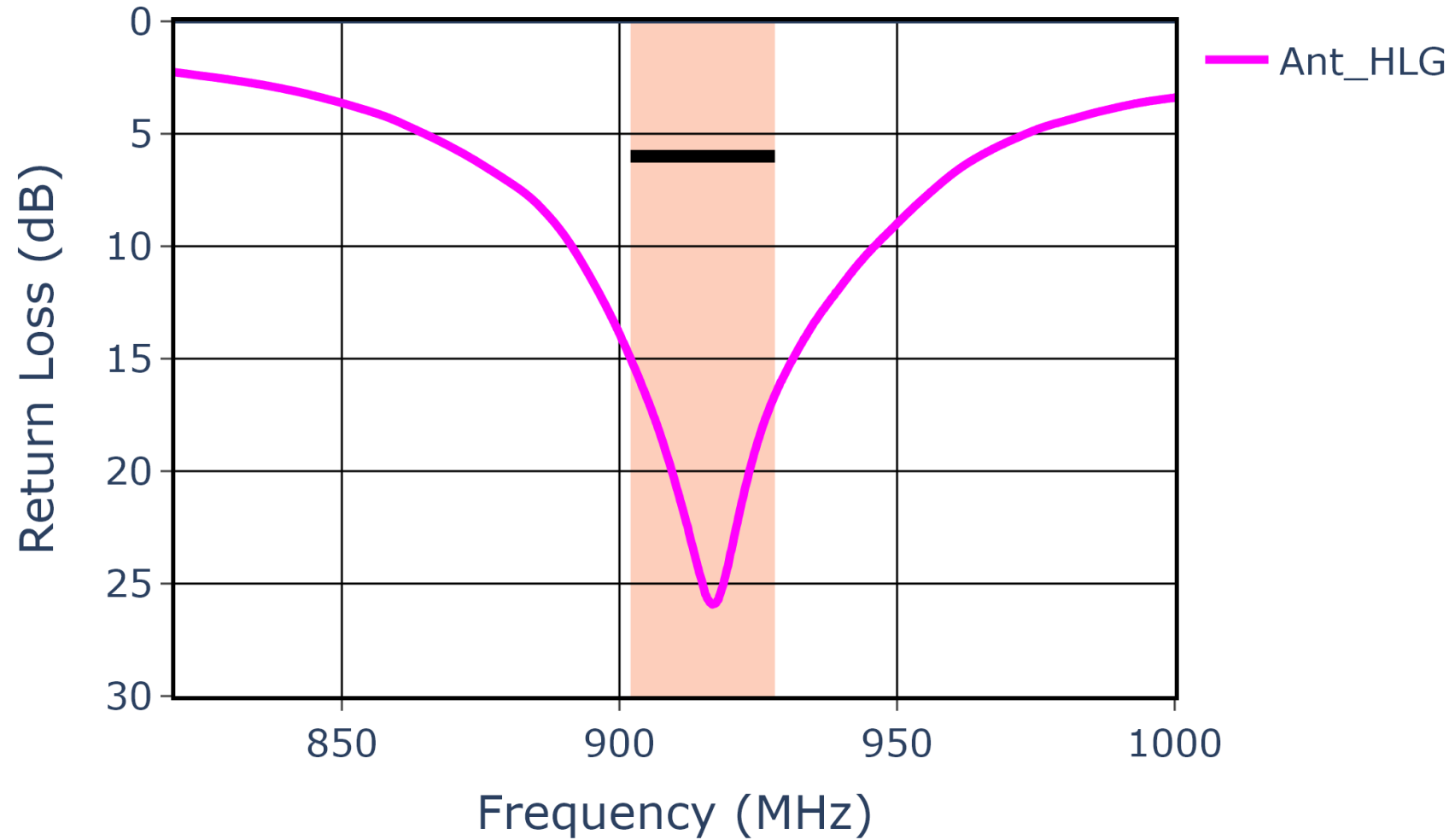
Note: The value of C1 is different from the one in previous report.

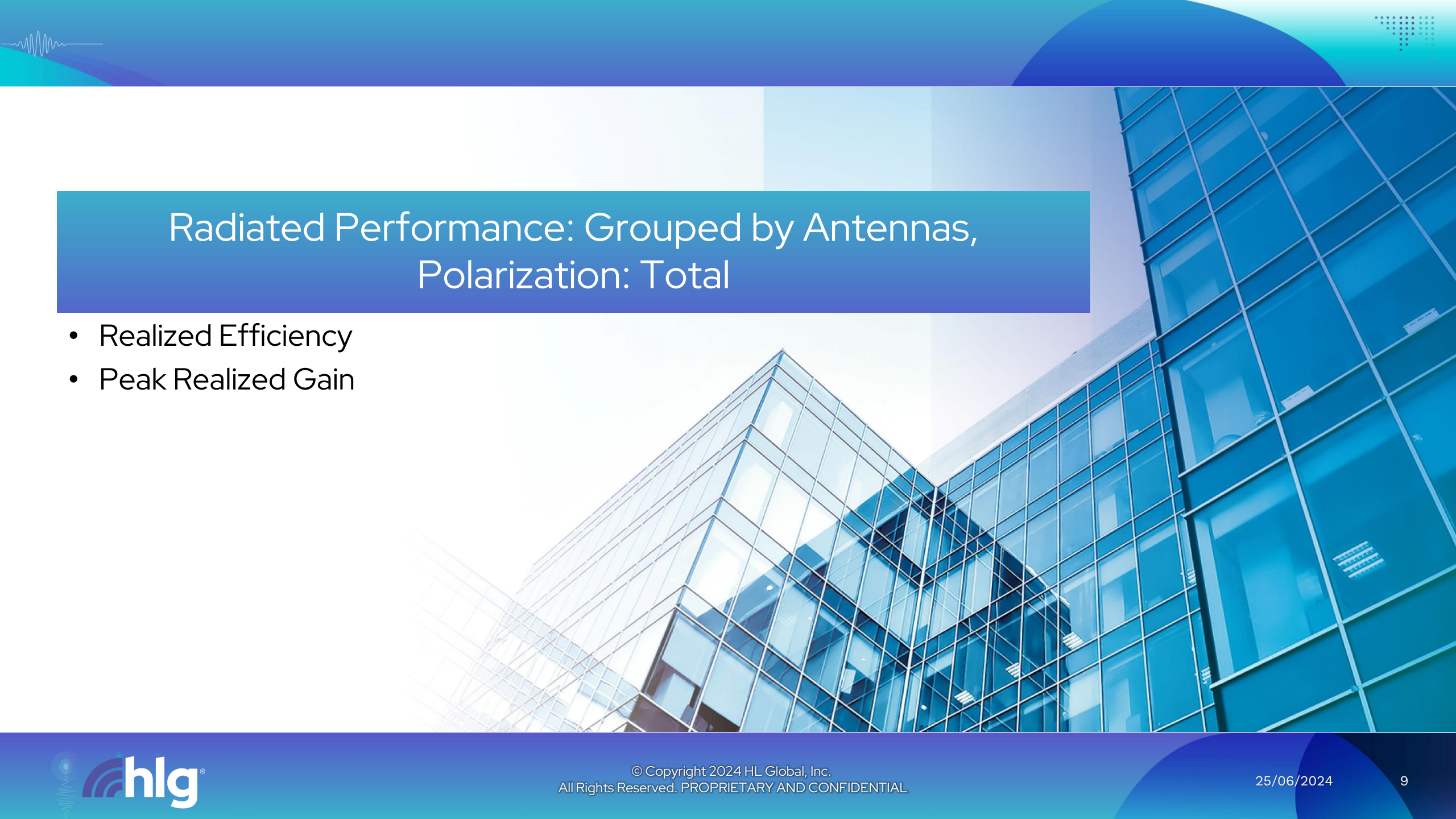


S-parameters

- Return Loss

Return Loss of existing Antenna



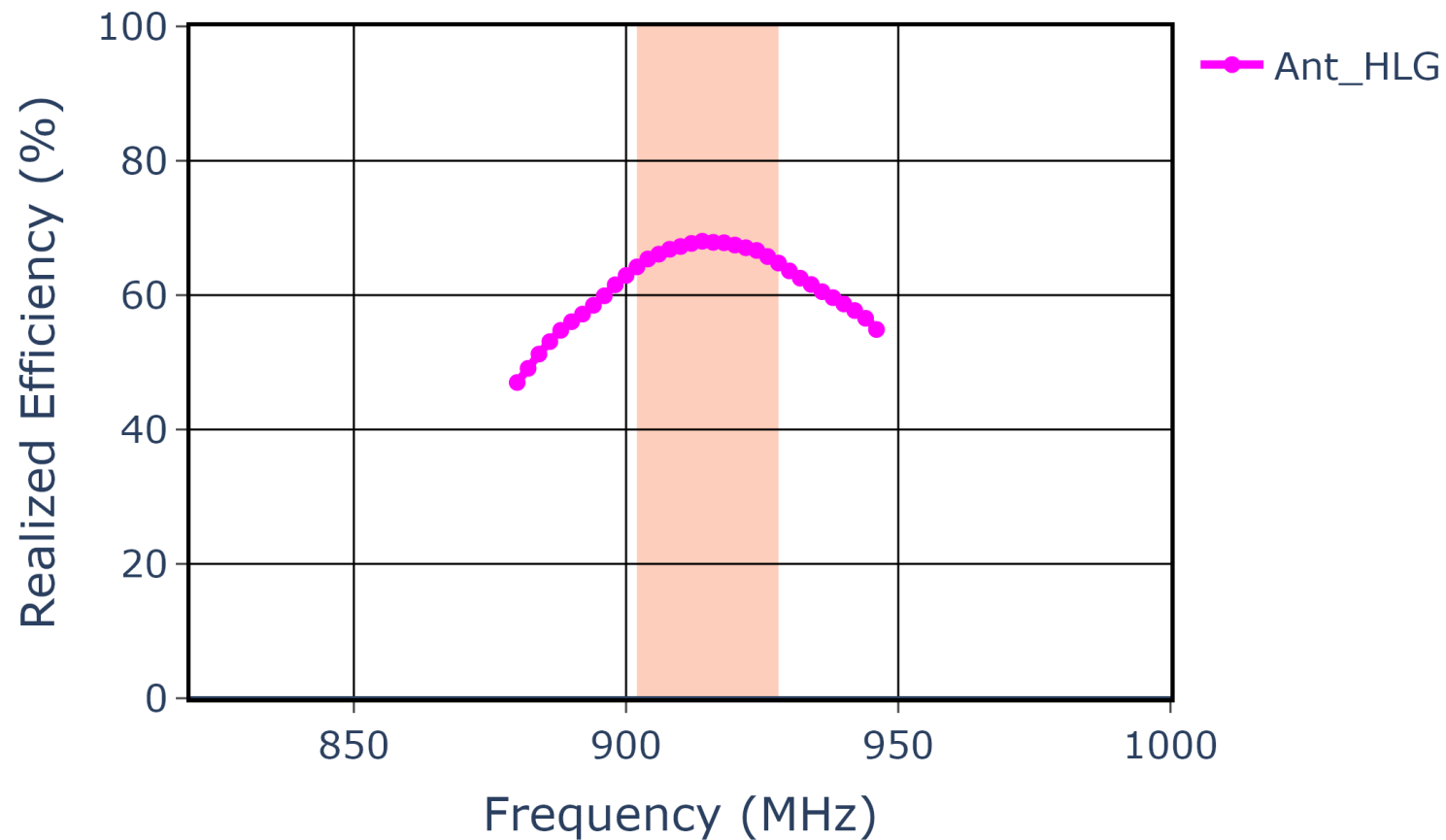


Radiated Performance: Grouped by Antennas, Polarization: Total

- Realized Efficiency
- Peak Realized Gain

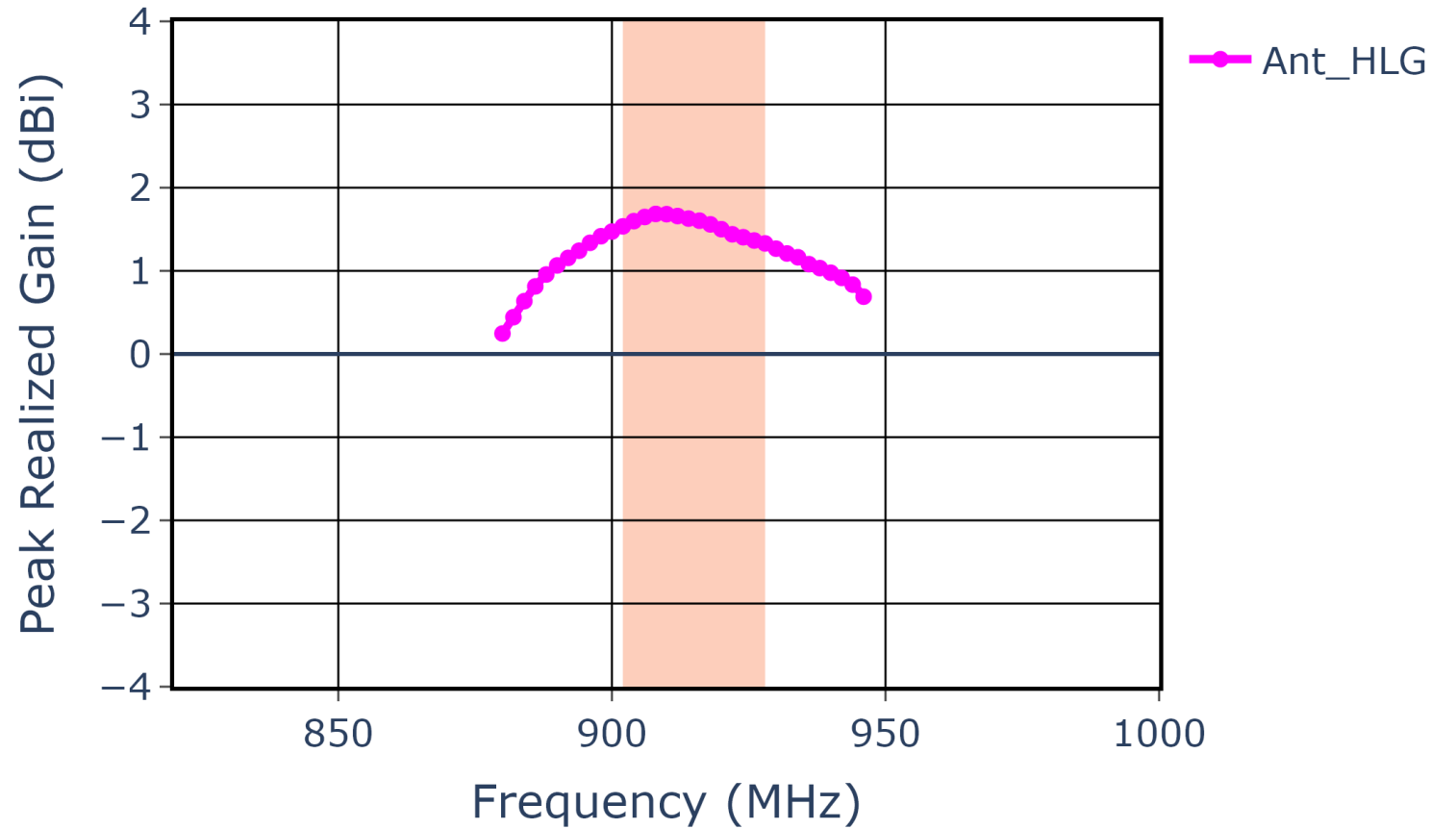
Realized Efficiency of Antennas in 915MHz Band

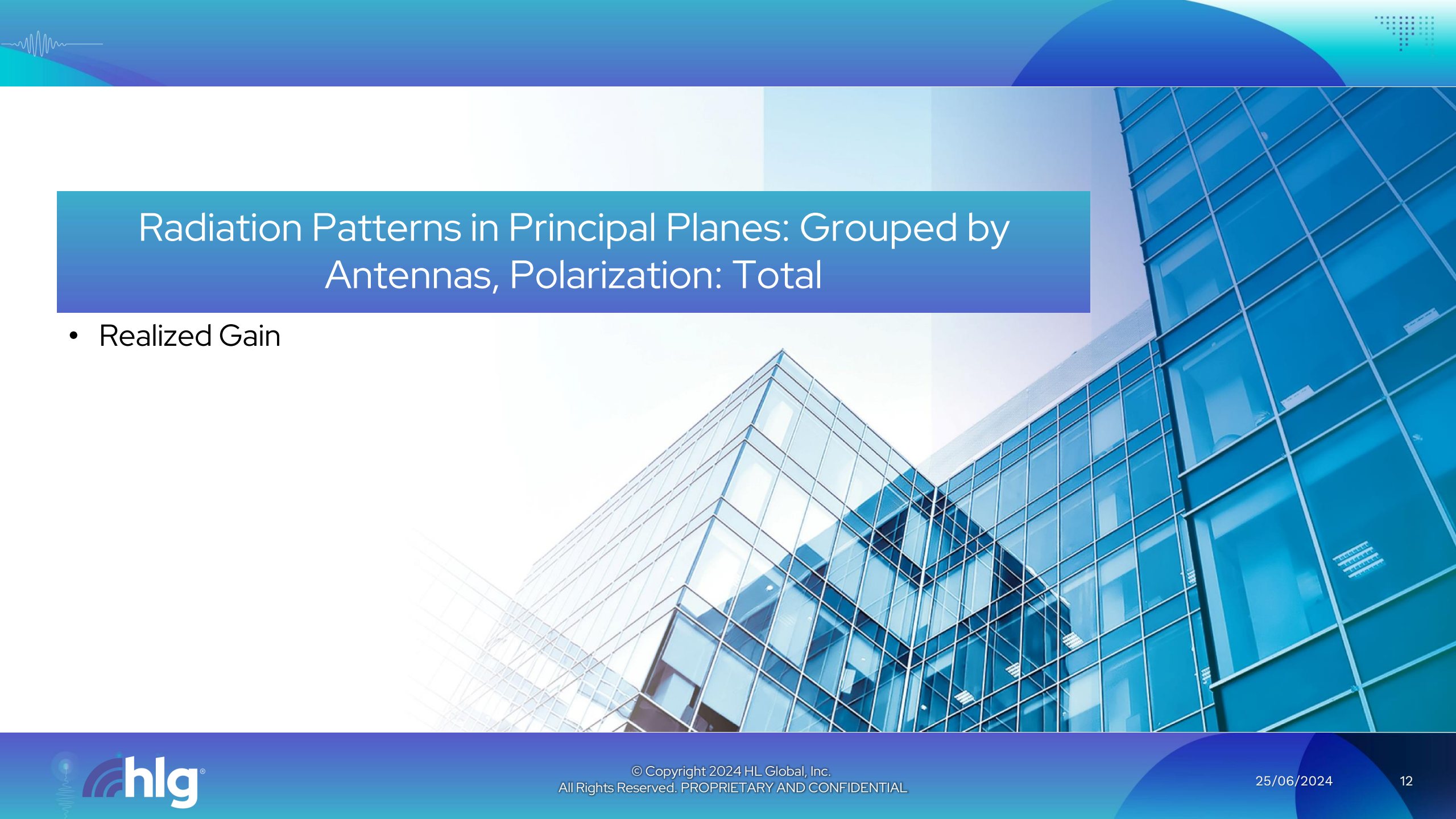
Frequency (MHz)	Ant_HLG (%)
902	64
905	66
908	67
910	67
913	68
915	68
918	68
921	67
923	67
926	66
928	65
Mean	67



Peak Realized Gain of Antennas in 915MHz Band

Frequency (MHz)	Ant_HLG (dBi)
902	1.5
905	1.6
908	1.7
910	1.7
913	1.6
915	1.6
918	1.6
921	1.5
923	1.4
926	1.4
928	1.3
Mean	1.5

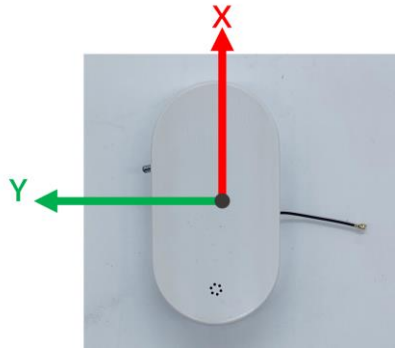




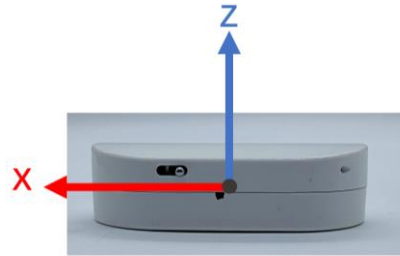
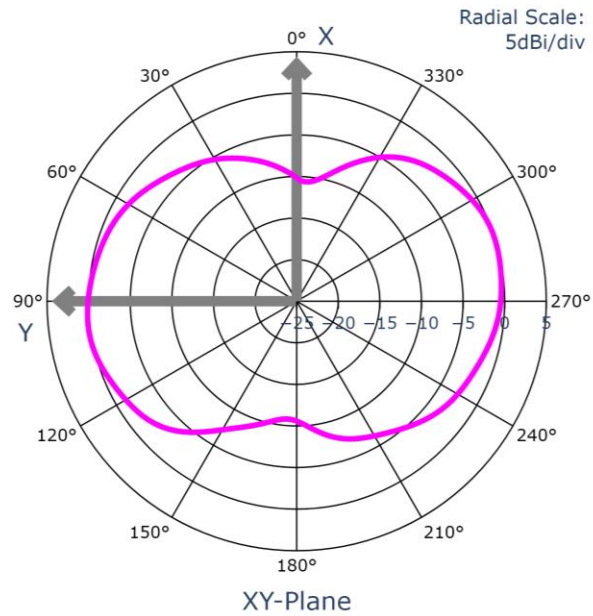
Radiation Patterns in Principal Planes: Grouped by Antennas, Polarization: Total

- Realized Gain

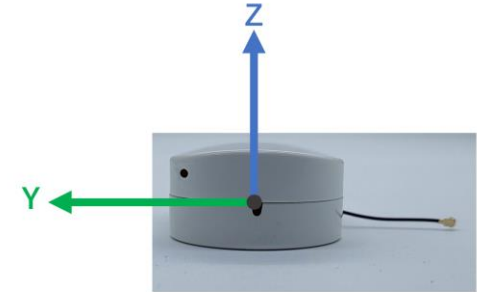
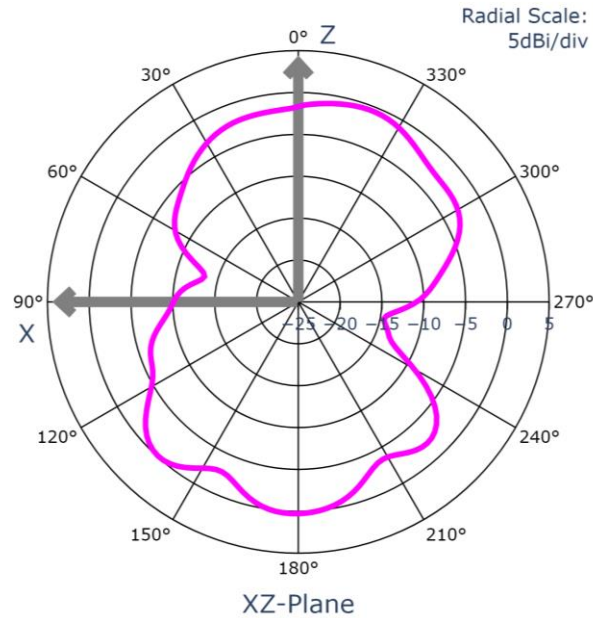
Realized Gain Radiation Patterns of Antennas in 915MHz Band at 902 MHz



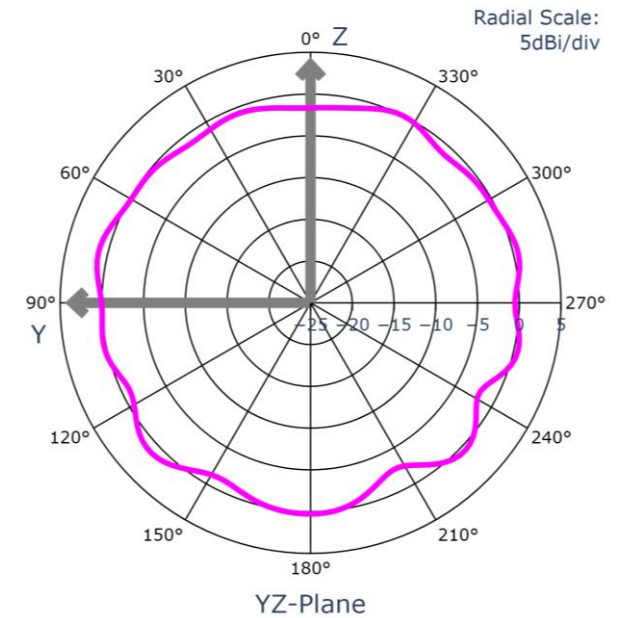
Ant_HLG



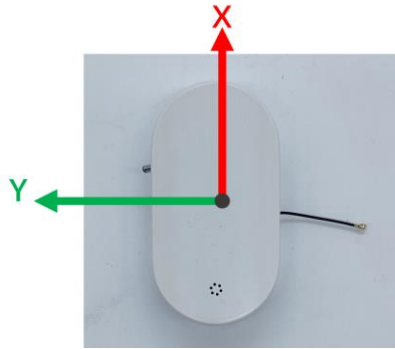
Ant_HLG



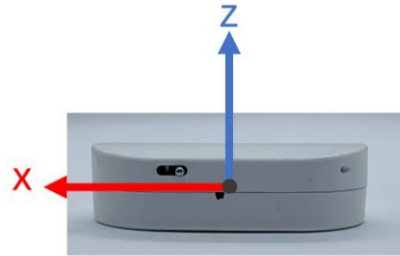
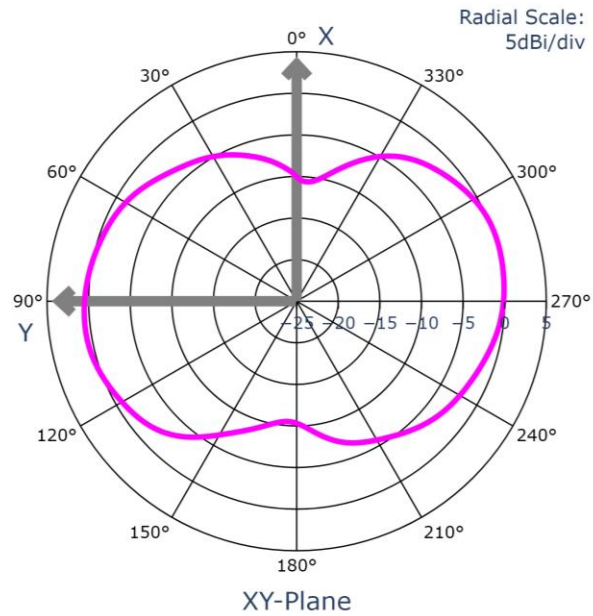
Ant_HLG



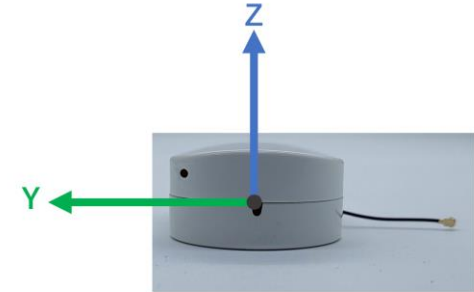
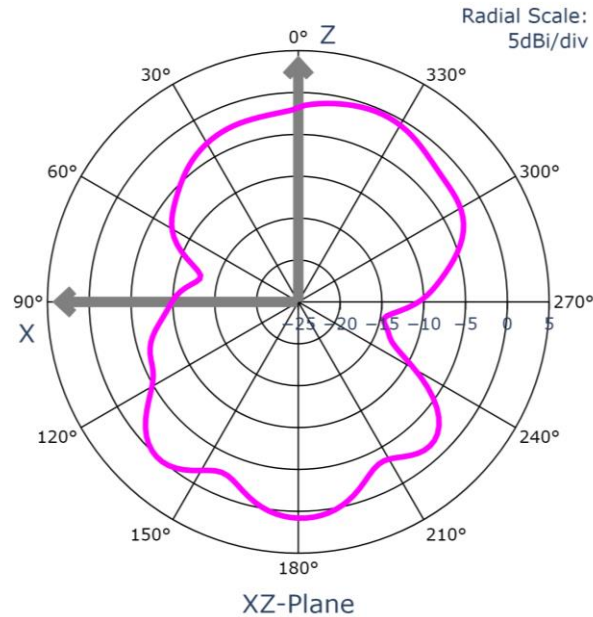
Realized Gain Radiation Patterns of Antennas in 915MHz Band at 916 MHz



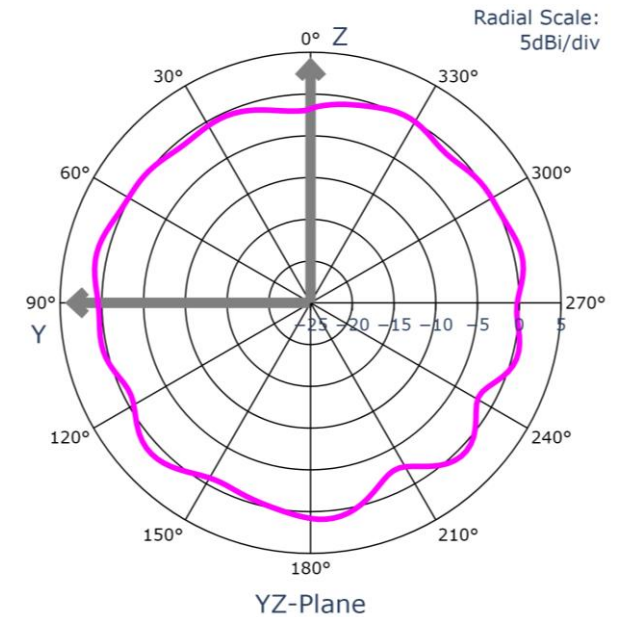
Ant_HLG



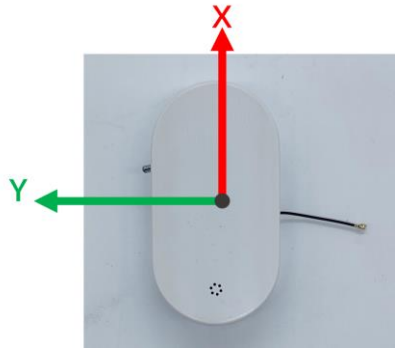
Ant_HLG



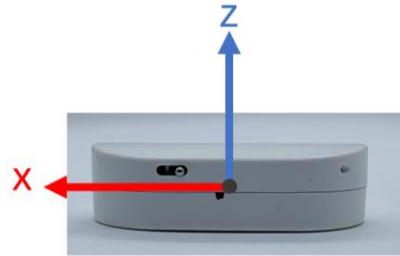
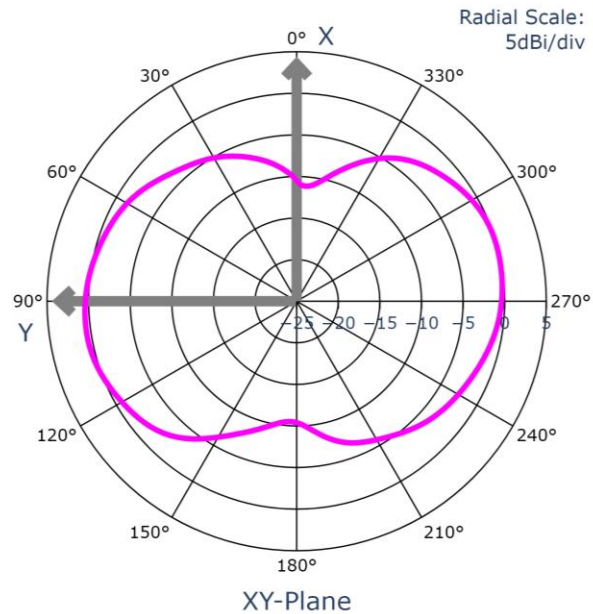
Ant_HLG



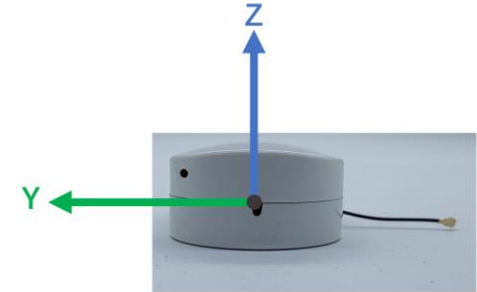
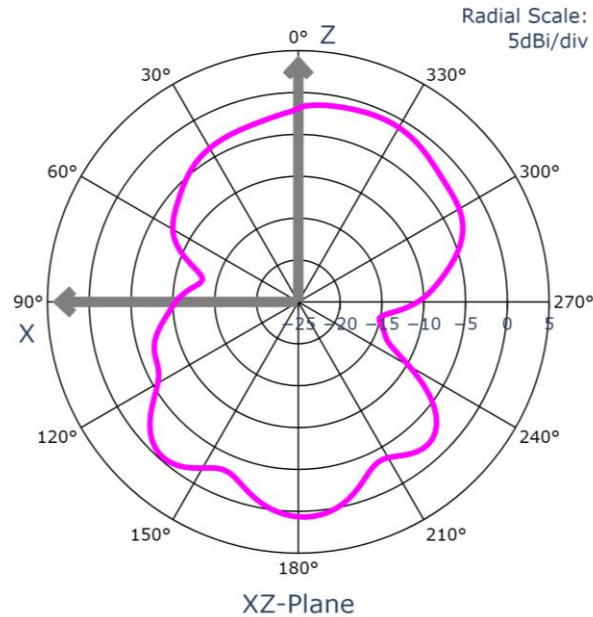
Realized Gain Radiation Patterns of Antennas in 915MHz Band at 930 MHz



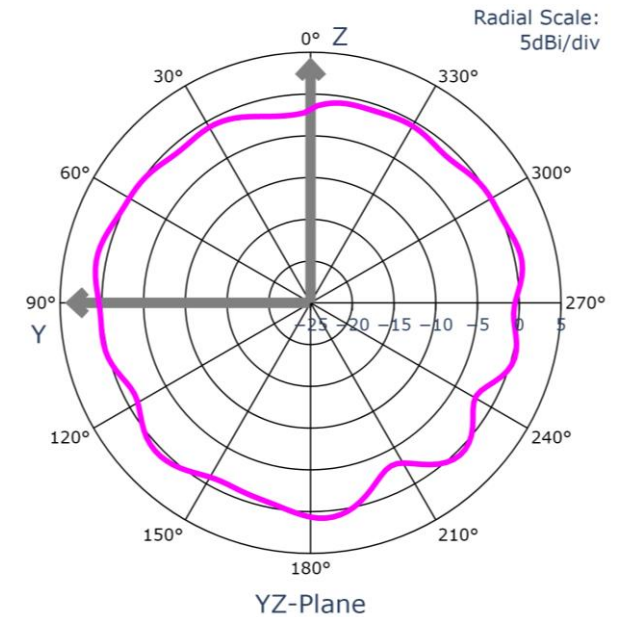
Ant_HLG

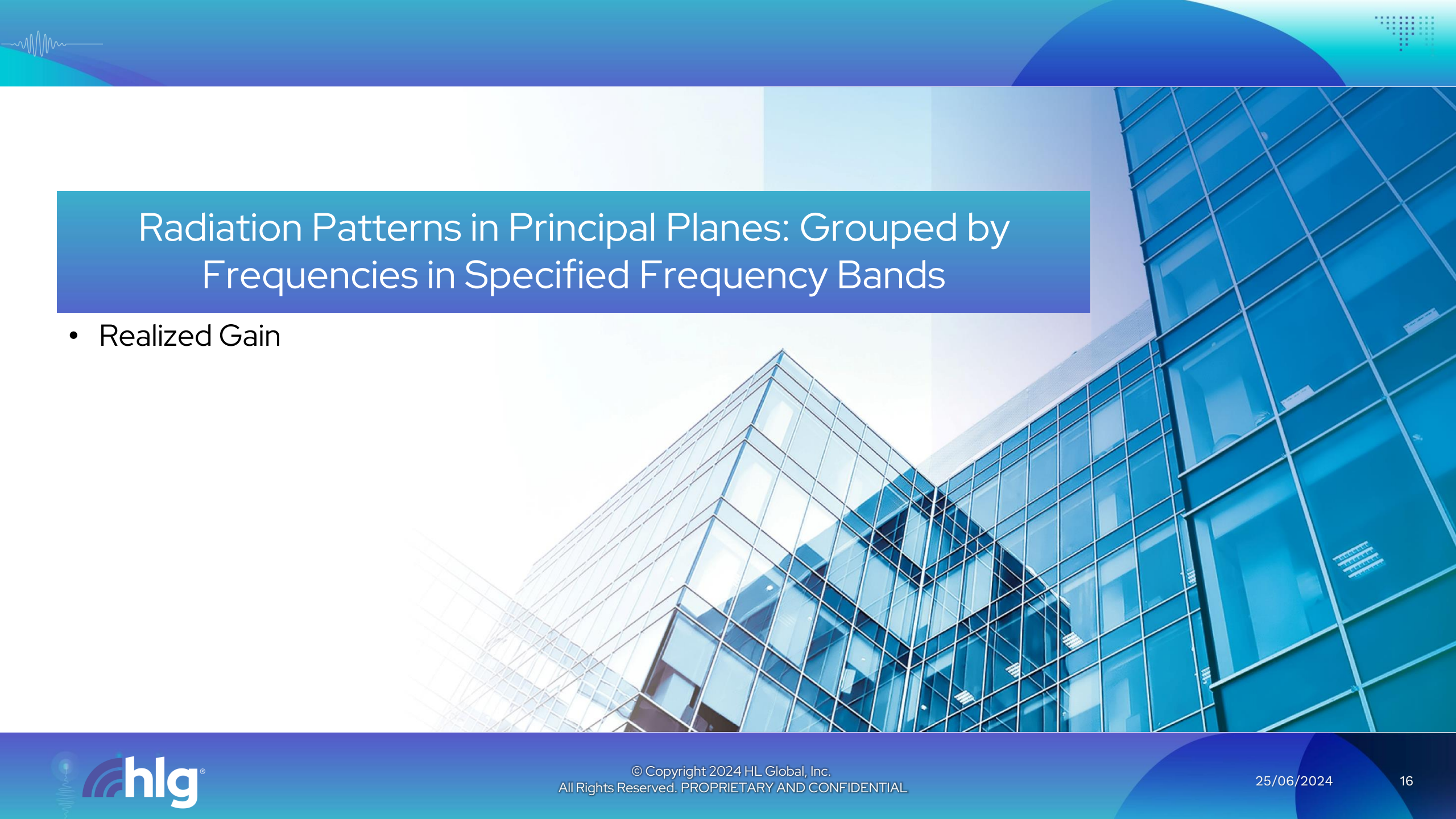


Ant_HLG



Ant_HLG

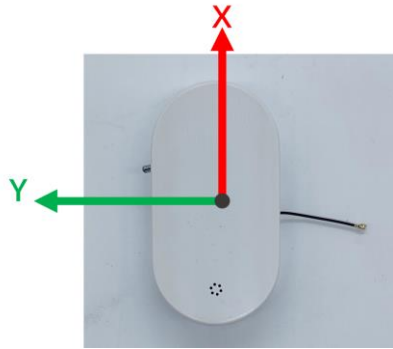




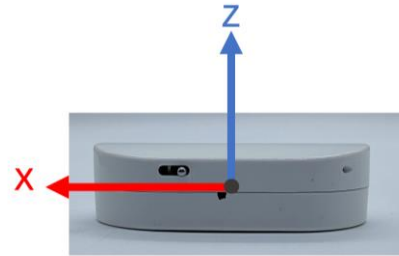
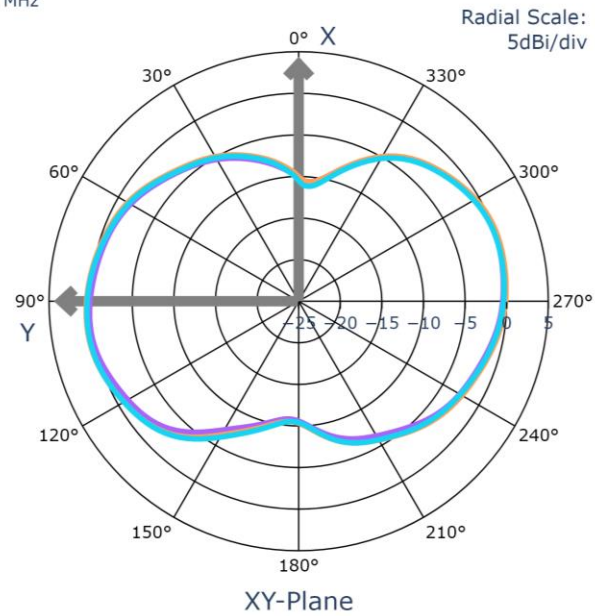
Radiation Patterns in Principal Planes: Grouped by Frequencies in Specified Frequency Bands

- Realized Gain

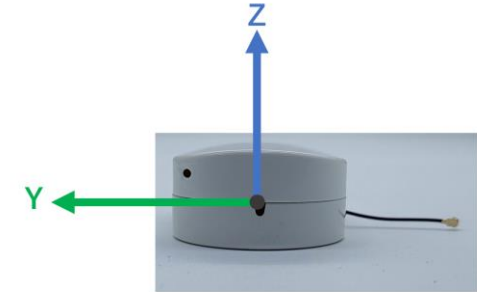
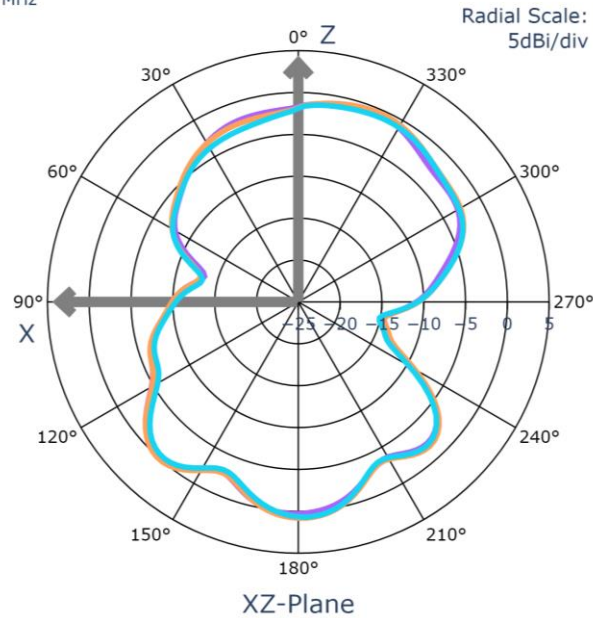
Realized Gain Radiation Patterns of Ant_HLG Antenna in 915MHz Band: Total Polarization



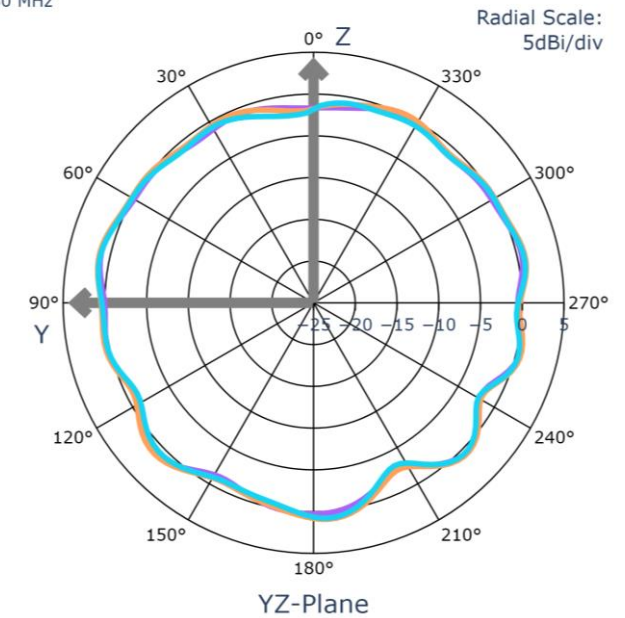
902 MHz
916 MHz
930 MHz

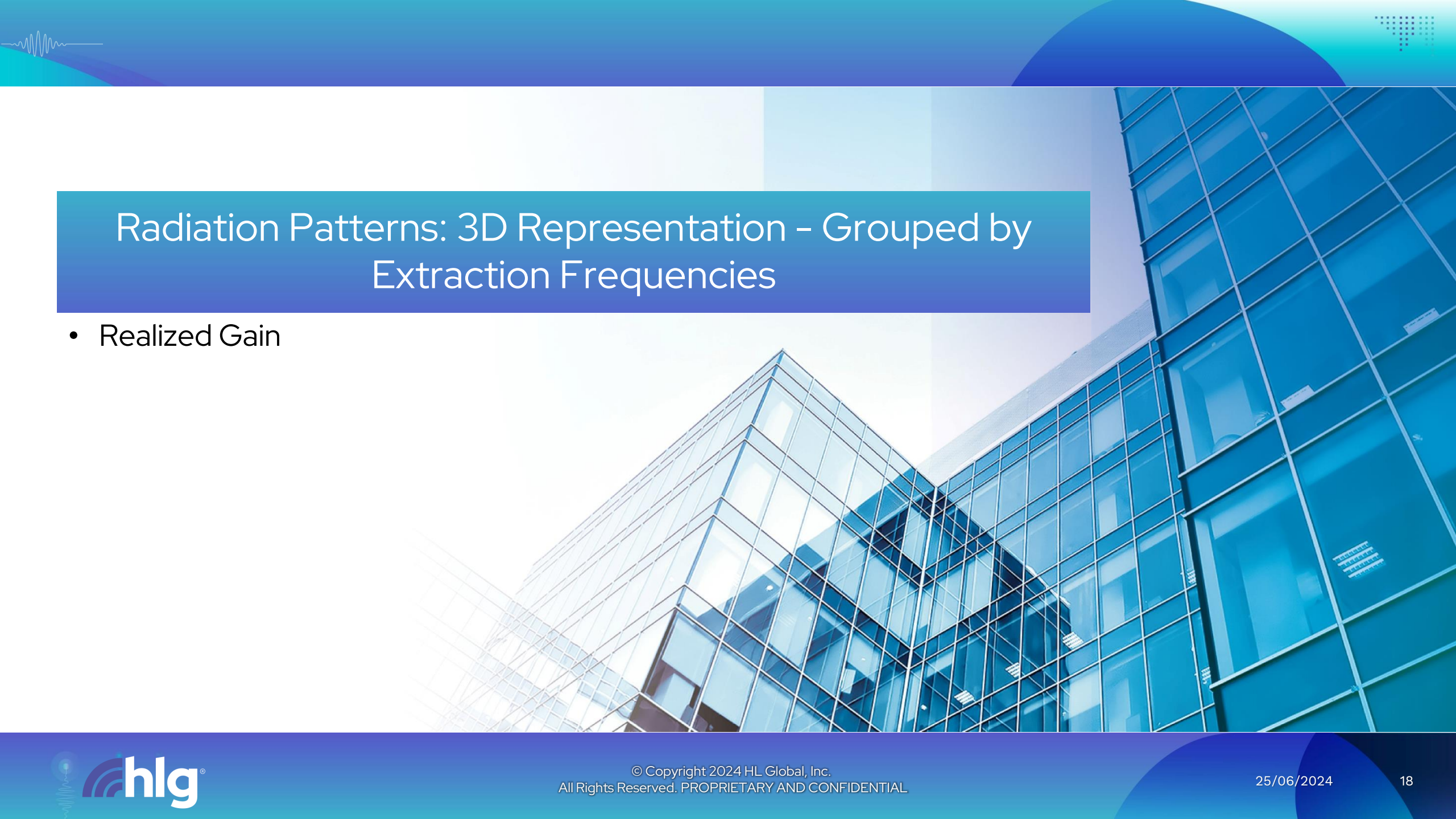


902 MHz
916 MHz
930 MHz



902 MHz
916 MHz
930 MHz





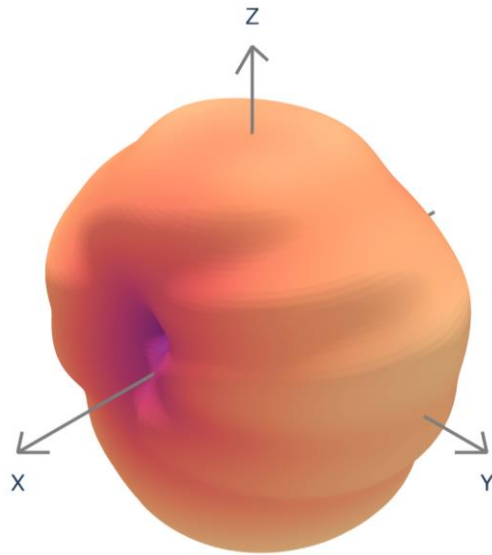
Radiation Patterns: 3D Representation – Grouped by Extraction Frequencies

- Realized Gain

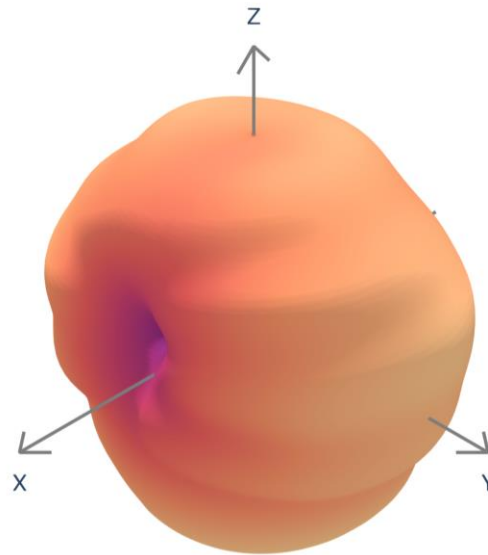
Realized Gain Radiation Patterns of Ant_HLG Antenna in 915MHz Band: Total Polarization



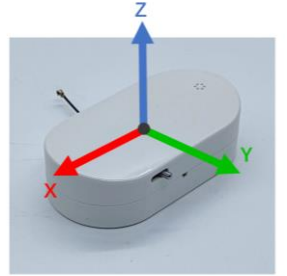
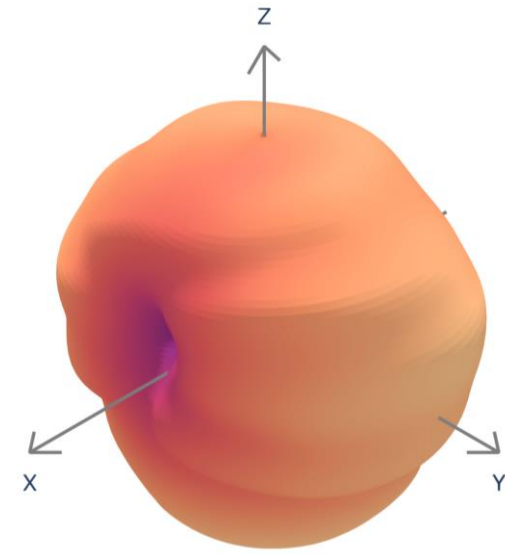
902 MHz



916 MHz



930 MHz



Conclusion

- Measurement results of HLG antenna show well tuned RL and high realized efficiency
- HL Global antenna exhibits
 - Return Loss (RL): $> 15\text{dB}$
 - Realized Efficiency: average 67% (average across the frequency band)
 - Peak Realized Gain: 1.5dBi (average across the frequency band)



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