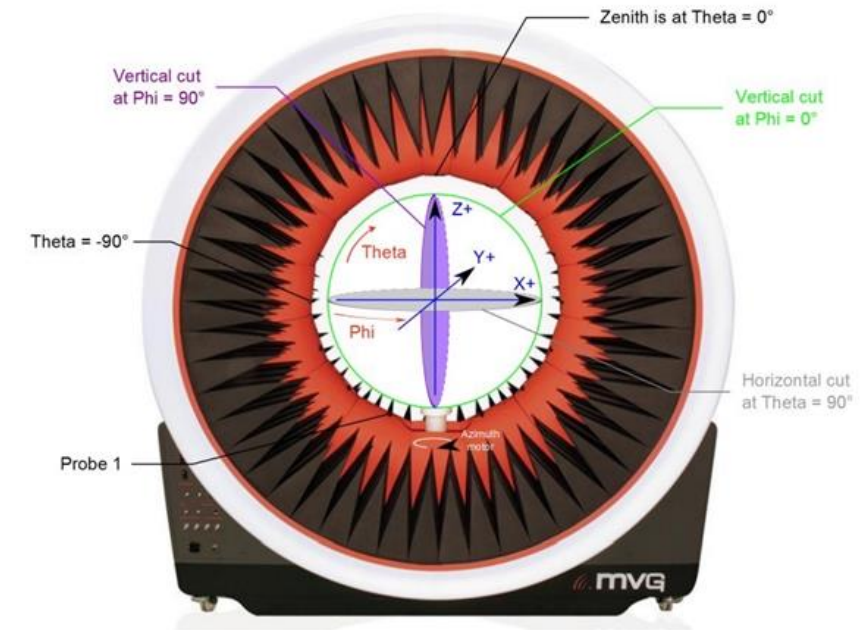


RBE300Y Directional Gain Measurement data

This report provides Wi-Fi antenna passive measurement results which include:

- » General Information
- » Antenna Measurement System Information
- » Test Procedure
- » DUT Information
- » Single Antenna Test Result
- » Directional Gain Result
- » Set-up Photo

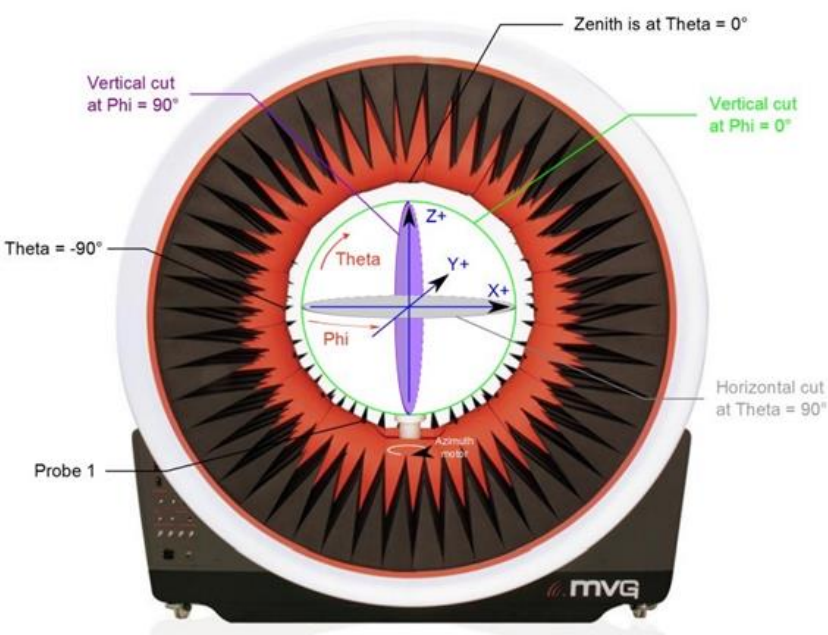
- Antenna Vendor : MVG
- Test Date : 20260119
- Test Engineer : Jason
- Measurement System : StarLab 10GHz version with OTA (Satimo)
- Software Name : WaveStudio
- Software Version : 22.5.6



- Measurement System: StarLab 10GHz version with OTA (Satimo)

Measurement setup:

- Pattern & Gain measurement
 1. MVG chamber: StarLab 10GHz version with OTA (Satimo)
 2. MVG program (WaveStudio)
 3. System overview
- Test item
 1. Antenna passive test: 600MHz~10GHz

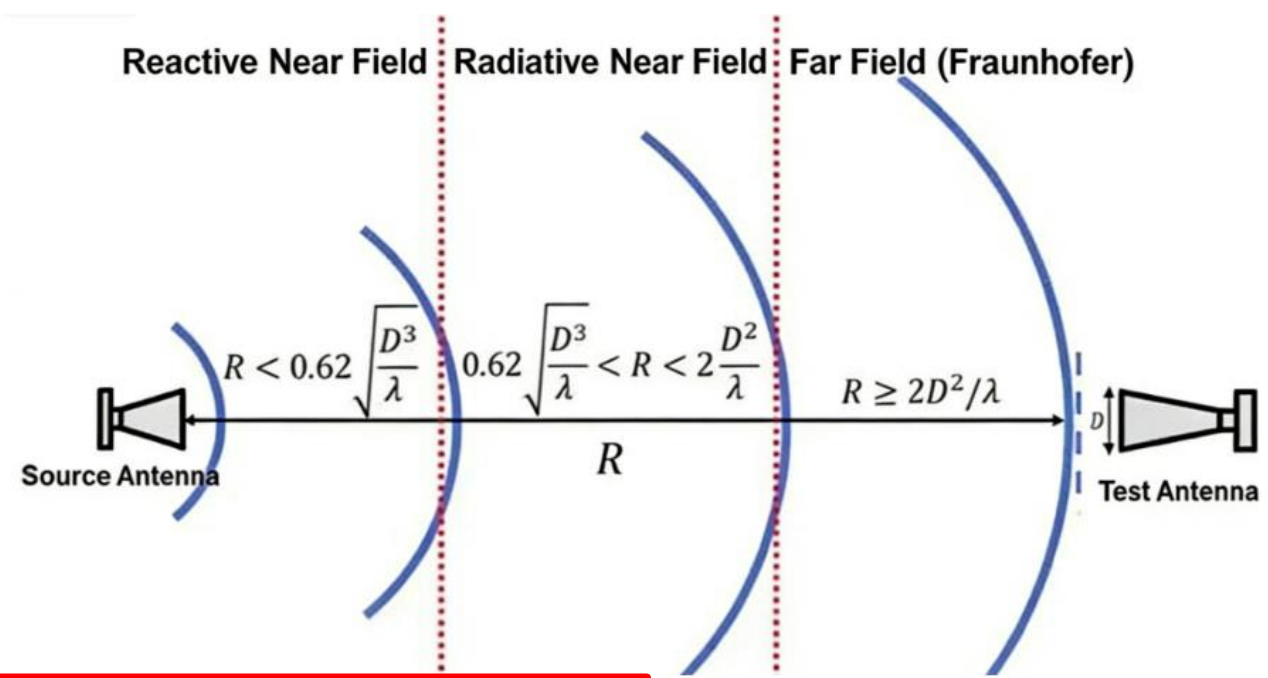


- Calibration Information

Description	Model No.	Serial #	Calibration Date	Calibration Until
Chamber	StarLab	NA	2025/11/22	2026/11/22
Network Analyzer	Keysight E5071C	NA	2025/10/01	2026/10/01

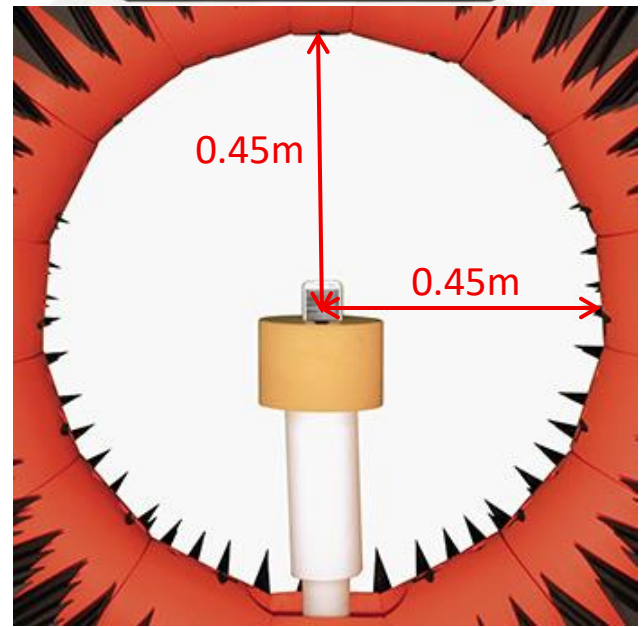
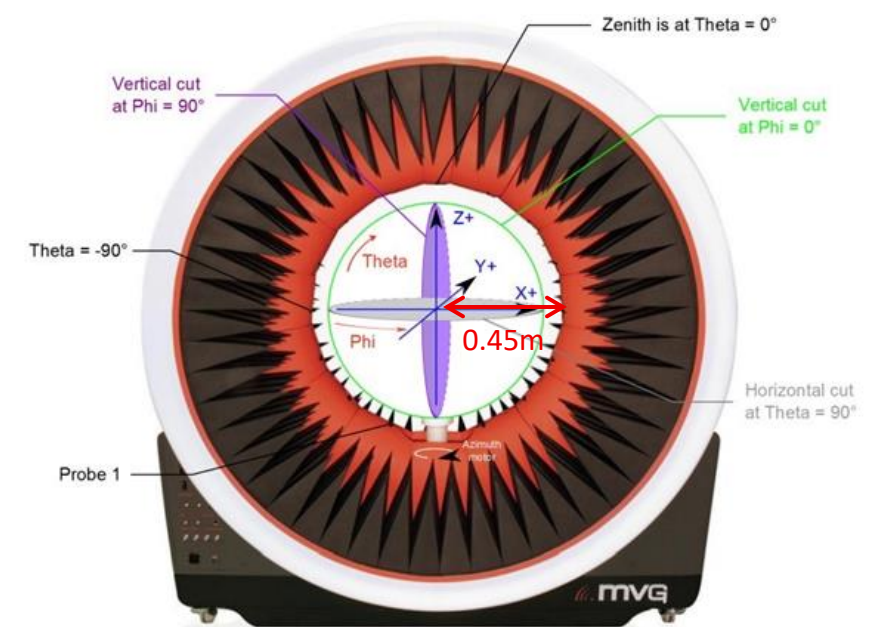
-
- Zenith is at $\Theta = 0^\circ$
- Vertical cut at $\Phi = 90^\circ$
- Vertical cut at $\Phi = 0^\circ$
- $\Theta = -90^\circ$
- Horizontal cut at $\Theta = 90^\circ$
- Probe 1
- Azimuth angle
- Z^+
- Y^+
- X^+
- Θ
- Φ
- mvq**

Test Measurement System Far Field Information



R: Far-field starting distance
 λ : operating wavelength ($\lambda=c/f$)
D: Antenna Size

Frequency (MHz)	Near Field	Far Field	EUT to Measurement antenna distance
2500MHz	R<0.019m	R≥0.039m	R=0.45m
5895MHz	R<0.014m	R≥0.035m	R=0.45m



Support band	TX/RX	Operation mode
2.4G	2TX-2RX	11b/11g/11n/11ax/11be
5G UNII-1	4TX-4RX	11a/11n/11ac/11ax/11be
5G UNII-2a	4TX-4RX	11a/11n/11ac/11ax/11be
5G UNII-2c	4TX-4RX	11a/11n/11ac/11ax/11be
5G UNII-3	4TX-4RX	11a/11n/11ac/11ax/11be
5G UNII-4	4TX-4RX	11a/11n/11ac/11ax/11be

Band	Modulation Mode	CDD mode	Beamforming mode
2.4GHz	802.11b	Nss1	Not Support
	802.11g	Nss1	Not Support
	802.11n (HT20)	Nss1 / Nss2	Nss1 / Nss2
	802.11n (HT40)	Nss1 / Nss2	Nss1 / Nss2
	802.11n (VHT20)	Nss1 / Nss2	Nss1 / Nss2
	802.11n (VHT40)	Nss1 / Nss2	Nss1 / Nss2
	802.11ax (HE20)	Nss1 / Nss2	Nss1 / Nss2
	802.11ax (HE40)	Nss1 / Nss2	Nss1 / Nss2
	802.11be (EHT20)	Nss1 / Nss2	Nss1 / Nss2
	802.11be (EHT40)	Nss1 / Nss2	Nss1 / Nss2
5GHz	802.11a	Nss1	Not Support
	802.11n (HT20)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11n (HT40)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ac (VHT20)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ac (VHT40)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ac (VHT80)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ac (VHT160)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ax (HE20)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ax (HE40)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ax (HE80)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11ax (HE160)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11be (EHT20)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11be (EHT40)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11be (EHT80)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11be (EHT160)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4
	802.11be (EHT240)	Nss1 / Nss2/Nss3/Nss4	Nss1 / Nss2/Nss3/Nss4

Antenna No.	RF Chain No.	Brand	Model	Support Function	Antenna Type	Connector Type
Ant 1	0	LYNwave	ALA25M-221AA0-01	2.4G + 5G	Dipole	I-PEX
Ant 2	1	LYNwave	ALA25M-221AA0-00	2.4G + 5G	Dipole	I-PEX
Ant 3	0	LYNwave	ALA25P-091AA0-01	5G	Dipole	I-PEX
Ant 4	1	LYNwave	ALA25P-091AA0-00	5G	Dipole	I-PEX

Single Antenna Test Result - Antenna Peak Gain

Antenna NO.	Model	Test Frequency (MHz)	Peak Gain (dBi)	Antenna NO.	Model	Test Frequency (MHz)	Peak Gain (dBi)	Antenna NO.	Model	Test Frequency (MHz)	Peak Gain (dBi)	Antenna NO.	Model	Test Frequency (MHz)	Peak Gain (dBi)
Ant 1	ALA25M-221AA0-01	2400	3.10	ANT 2	ALA25M-221AA0-00	2400	2.77	Ant 3	ALA25P-091AA0-01	2400		ANT 4	ALA25P-091AA0-00	2400	
		2450	3.07			2450	3.21			2450				2450	
		2500	3.05			2500	3.77			2500				2500	
		5150	3.32			5150	2.74			5150	4.11			5150	4.15
		5200	2.94			5200	2.87			5200	4.03			5200	4.23
		5250	2.96			5250	3.18			5250	4.07			5250	4.04
		5300	2.96			5300	3.60			5300	4.09			5300	3.85
		5350	2.95			5350	3.84			5350	4.09			5350	3.87
		5470	3.61			5470	4.39			5470	4.05			5470	4.26
		5600	3.84			5600	4.12			5600	3.99			5600	3.65
		5725	3.59			5725	3.81			5725	4.23			5725	3.0
		5785	3.34			5785	3.64			5785	3.85			5785	2.70
		5850	3.0			5850	3.73			5850	3.21			5850	2.64
		5865	3.20			5865	3.81			5865	3.20			5865	2.73
		5895	3.27			5895	3.76			5895	3.06			5895	2.53

- Refer to the attached file: RBE300Y_Single Antenna Test Result - 2D Radiation Pattern

- Refer to the attached file: RBE300Y_Single Antenna Test Result - Raw Data

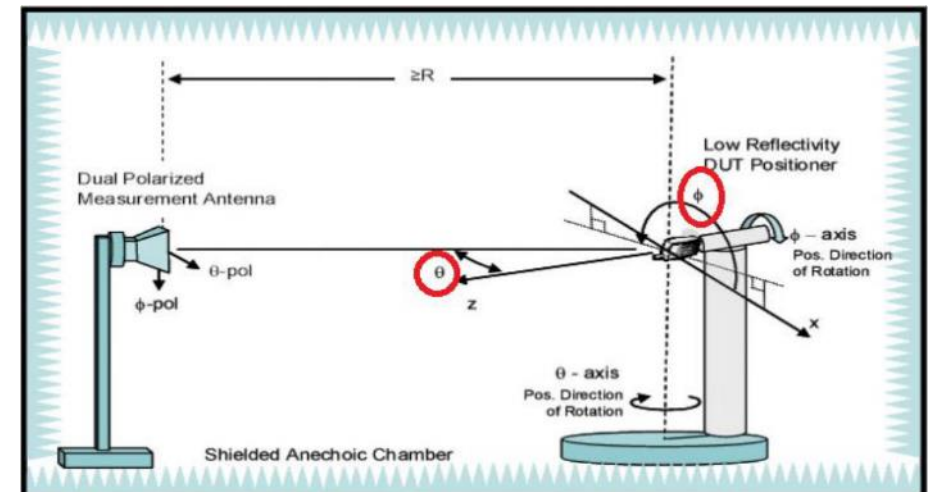
- a) Sub-divide the whole sphere surface into many 2x2 degree subsection.
- b) Measure the gain contributed from each antenna within each subsection position.
- c) Apply the KDB 662911 D01 correlated directional gain formula to calculate directional gain for each subsection.
- d) After all subsections have been evaluated, the largest calculated value among all positions evaluated is picked as the worst-case directional gain for the system and used in RF/EMC test report.

KDB 662911 D01 correlated directional gain formula

d) *Unequal antenna gains, with equal transmit powers.* For antenna gains given by $G_1, G_2, \dots, G_N$ dBi

- (i) If transmit signals are *correlated*, then

Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{\text{ANT}}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]



The definition of (θ, Φ) in antenna raw data.

Directional Gain Result - Summary of Single antenna

Individual Antenna Maximum Peak Gain																
Frequency (MHz)		2400	2450	2500	5150	5200	5250	5300	5350	5470	5600	5725	5785	5850	5865	5895
Ant 1	Max. Gain (dBi)	3.10	3.07	3.05	3.32	2.94	2.96	2.96	2.95	3.61	3.84	3.59	3.34	3.0	3.20	3.27
	Polarization	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta
	Axis: Theta(°)	60	60	75	90	75	45	45	45	75	60	60	60	60	75	75
	Axis: Phi(°)	315	315	255	330	315	300	300	300	315	315	315	315	315	0	0
Ant 2	Max. Gain (dBi)	2.77	3.21	3.77	2.74	2.87	3.18	3.60	3.84	4.39	4.12	3.81	3.64	3.73	3.81	3.76
	Polarization	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta	Theta
	Axis: Theta(°)	75	75	75	90	90	90	75	75	90	90	90	135	135	135	135
	Axis: Phi(°)	225	240	240	15	15	0	150	180	0	0	0	285	285	285	285
Ant 3	Max. Gain (dBi)				4.11	4.03	4.07	4.09	4.09	4.05	3.99	4.23	3.85	3.21	3.20	3.06
	Polarization				Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi
	Axis: Theta(°)				90	90	90	90	90	75	75	75	75	75	75	45
	Axis: Phi(°)				180	180	180	180	180	180	180	180	180	180	180	210
Ant 4	Max. Gain (dBi)				4.15	4.23	4.04	3.85	3.87	4.26	3.65	3.0	2.70	2.64	2.73	2.53
	Polarization				Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi
	Axis: Theta(°)				75	75	75	75	90	90	90	75	75	60	60	60
	Axis: Phi(°)				0	0	0	0	0	0	0	0	0	330	330	330

Directional Gain Result

Directional Gain _ Maximum Gain Value and Positions				
Frequency (MHz)		2400	2450	2500
	Ant1	0.63	1.74	2.97
	Ant2	2.14	3.21	3.77
	Correlated	4.43	5.51	6.39
	Uncorrelated	1.45	2.53	3.39
	Polarization	Theta	Theta	Theta
	Axis: (Theta, Phi)	(75,240)	(75,240)	(75,240)

Directional Gain _ Maximum Gain Value and Positions													
Frequency (MHz)		5150	5200	5250	5300	5350	5470	5600	5725	5785	5850	5865	5895
	Ant1	-4.62	-4.59	-4.81	-3.02	-2.49	-3.18	-3.41	-4.65	-1.81	2.45	-1.41	-0.88
	Ant2	-6.55	-6.05	-5.85	-4.61	-4.84	-4.11	-4.72	-3.35	-7.67	-4.18	-1.1	-1.53
	Ant3	3.34	3.25	3.04	1.41	1.08	2.07	-0.77	-0.18	2.27	0.16	0.85	1.46
	Ant4	3.44	3.62	3.64	3.7	3.87	3.86	3.53	2.23	1.39	-1.95	0.12	-0.56
	Correlated	6.05	6.15	6.07	6.02	6.06	6.33	5.28	4.95	5.34	5.49	5.68	5.72
	Uncorrelated	0.91	0.98	0.9	0.82	0.89	0.89	-0.12	-0.09	-0.12	-0.21	-0.03	-0.1
	Polarization	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi	Phi
	Axis: (Theta, Phi)	(90,165)	(90,165)	(90,165)	(90,0)	(90,0)	(75,0)	(75,0)	(90,0)	(60,345)	(120,240)	(105,0)	(105,0)

Band	Freq Range (MHz)	Antenna Gain @ Worst Angle				Directional Gain (Correlated)
		Ant 1	Ant 2	Ant 3	Ant 4	
2.4G	2400~2483.5	2.97	3.77	--	--	6.39
5G UNII-1	5150~5250	-4.59	-6.05	3.25	3.62	6.15
5G UNII-2a	5250~5350	-4.81	-5.85	3.04	3.64	6.07
5G UNII-2c	5470~5725	-3.18	-4.11	2.07	3.86	6.33
5G UNII-3	5725~5850	2.45	-4.18	0.16	-1.95	5.49
5G UNII-4	5850~5895	-0.88	-1.53	1.46	-0.56	5.72

- Refer to the attached file: RBE300Y_Directional Gain Result – Raw Data