

LBUA5QJ2AB UWB Module Antenna Specification

Revision 3
muRata/SCS UWB Section
2023.9.14



UWB Antennas

No.	Antenna	Peak Gain @CH9 [dBi]
TWR/TDoA①	PCB antenna (Qorvo WB003 , 'Mini-Hoe')	2.8
TWR/TDoA②	PCB antenna (Qorvo WB009, 'CP Wings Ch9')	1.7
TWR/TDoA③	Taoglas UWC.01 SMD Chip Antenna	1.5
TWR/TDoA④	Taoglas UWC.02 SMD Chip Antenna	2.5
TWR/TDoA⑤	PCB antenna (Qorvo WB007, 'Duo-Hoe')	2.0
TWR/TDoA⑥	PCB antenna (Qorvo JL159, 'Jolie-Omini')	2.0
AoA/PDoA①	PCB antenna (Qorvo ML005, 'Mona Lisa Ch_5')	-1.7
AoA/PDoA②	PCB antenna (Qorvo ML009, 'Mona Lisa Ch_9')	2.5
AoA/PDoA③	PCB antenna (Murata JS-1055 2AB-828EVB antenna)	2.7
AoA/PDoA④	PCB antenna (Qorvo JL359, 'Jolie-AoA')	3.0

BLE Antennas

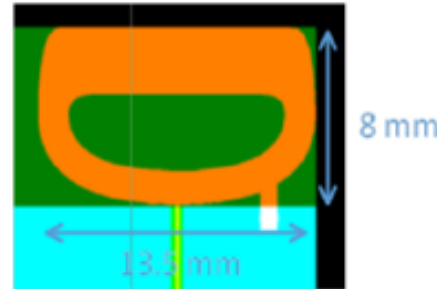
No.	Antenna	Peak Gain @2.4GHz [dBi]
BLE①	PCB antenna (Murata)	-2.8
BLE②	PCB antenna (Murata JS-1055 2AB-828EVB)	-3.8
BLE③	Chip antenna (Abracon, AMCA31-2R450G-S1F-T3)	0.5

●UWB TWR/TDoA ①

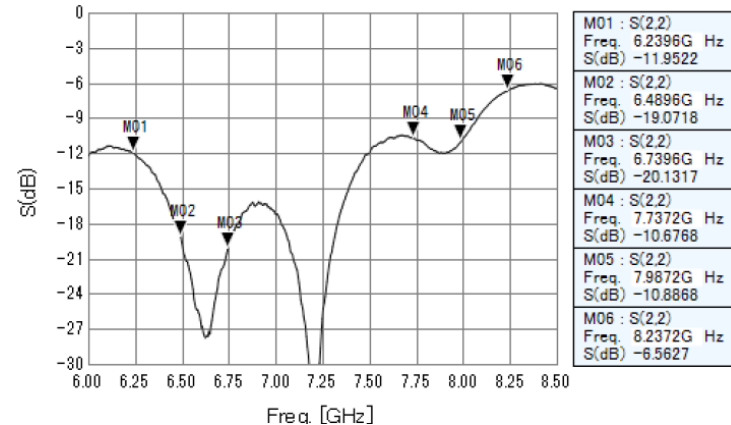
< Appearance >



< Dimension >



< Return Loss >

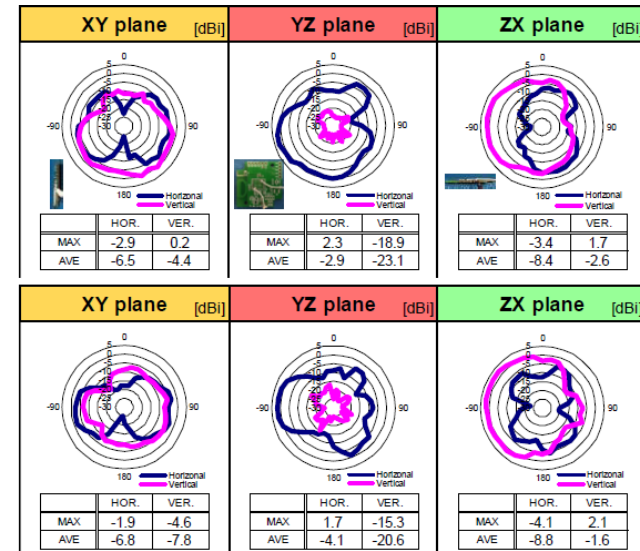


< Efficiency >

Frequency[MHz]	Efficiency[dB]	Peak Gain[dBi]
6239.6	-2.0	2.5
6489.6	-1.3	2.3
6739.6	-0.3	3.9
Ch.5Average	-1.2	-
7737.2	-1.0	2.8
7987.2	-1.5	2.1
8237.2	-2.3	1.1
Ch.9Average	-1.6	-

*Red color shows peak gain

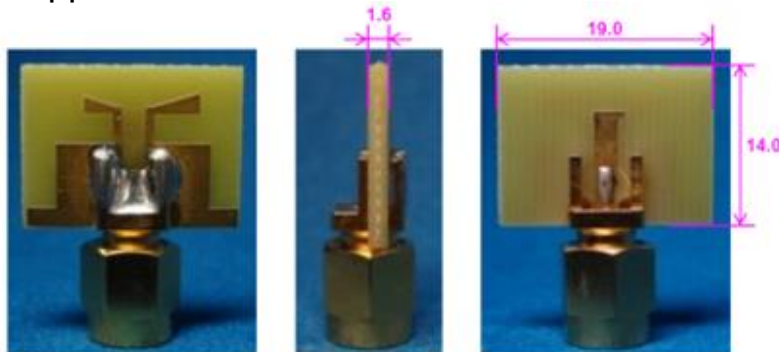
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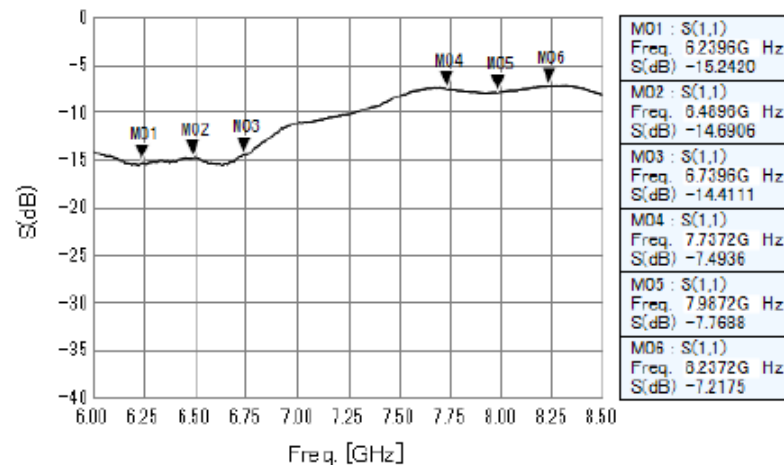
For more information about this antenna, you can download from Decawave website or contact Decawave.
<https://www.decawave.com/uwb-antennae-design-files/>

●UWB TWR/TDoA ②

< Appearance > < Dimension >



< Return Loss >

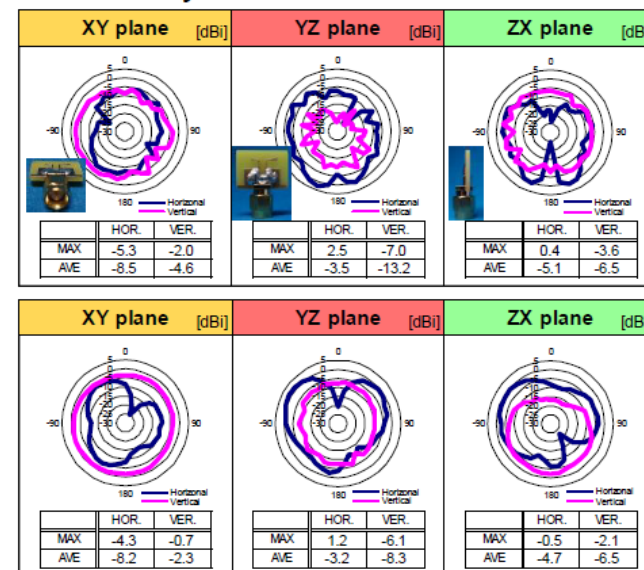


< Efficiency >

Frequency[MHz]	Efficiency[dB]	Peak Gain[dBi]
6239.6	-0.4	3.6
6489.6	-1.4	2.5
6739.6	-1.2	2.8
Ch.5Average	-1.0	-
7737.2	-1.2	1.7
7987.2	-1.5	1.2
8237.2	-2.0	0.6
Ch.9Average	-1.8	-

*Red color shows peak gain

< Directivity >

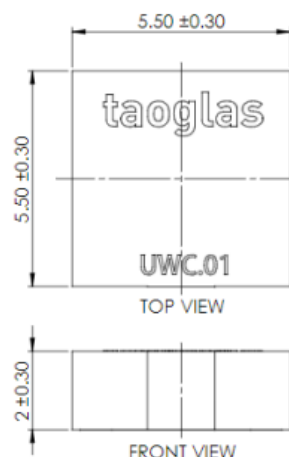


●UWB TWR/TDoA ③

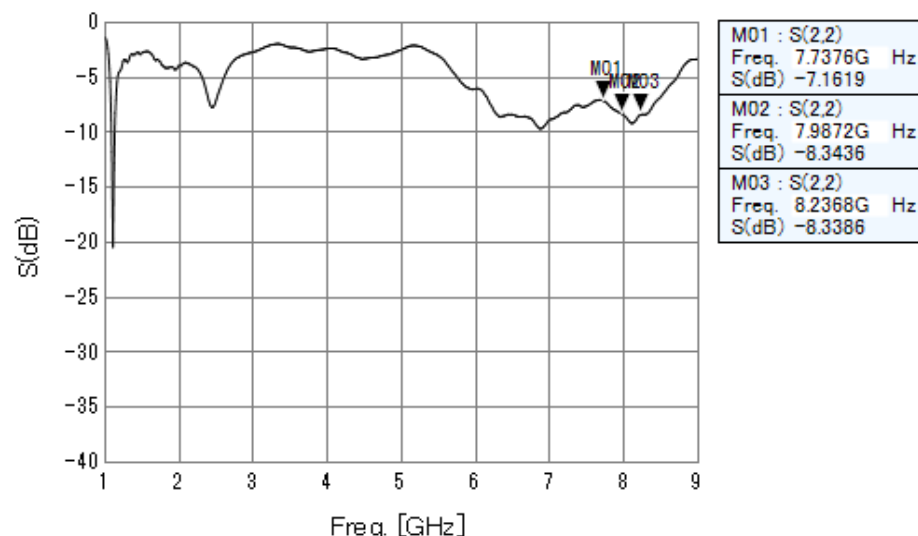
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< Dimension >



< Return Loss >

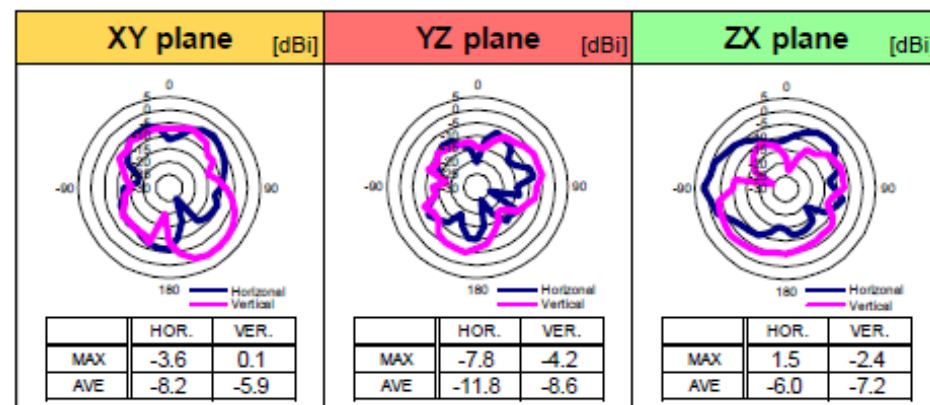


< Efficiency >

		[dBi]						[dB]
LINEAR POLARIZATION		XY-plane		YZ-plane		ZX-plane		Total Efficiency
		hor.	ver.	hor.	ver.	hor.	ver.	
7737.6 MHz	MAX.	-3.7	-0.2	-6.3	-3.0	0.5	-4.8	-4.7
	AVG.	-7.7	-5.4	-10.5	-8.4	-5.6	-8.2	
7987.2 MHz	MAX.	-3.6	0.1	-7.8	-4.2	1.5	-2.4	-4.8
	AVG.	-8.2	-5.9	-11.8	-8.6	-6.0	-7.2	
8236.8 MHz	MAX.	-5.0	-1.1	-6.5	-4.8	-1.3	-3.7	-5.9
	AVG.	-9.8	-7.0	-12.0	-9.5	-7.9	-8.4	

*Red color shows peak gain

< Directivity >



For more information about this antenna, please refer to Taoglas website.

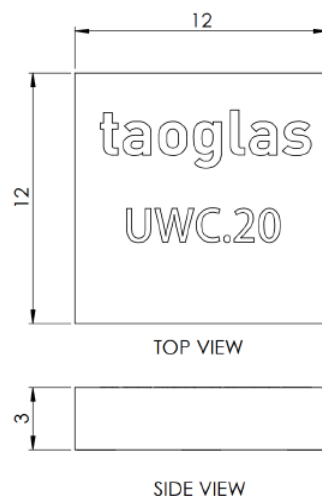
UWC.01 6-8GHz Ultra Wideband SMD Chip Antenna (taoglas.com)

●UWB TWR/TDoA ④

< Appearance >

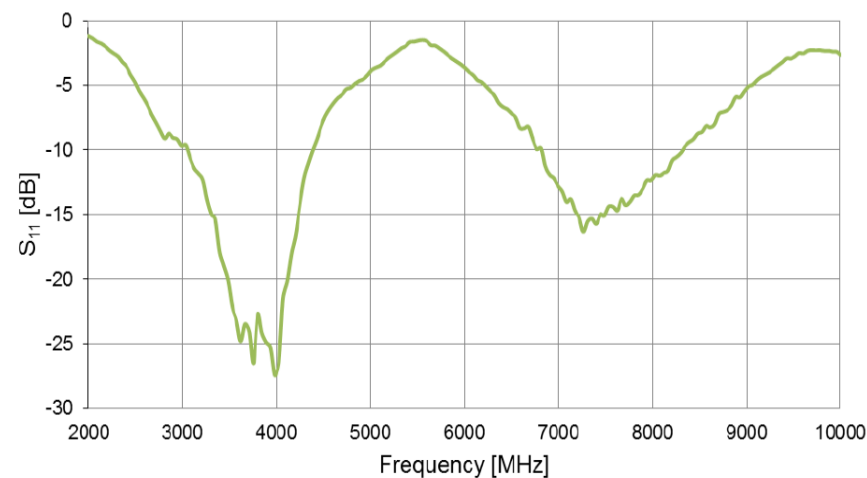


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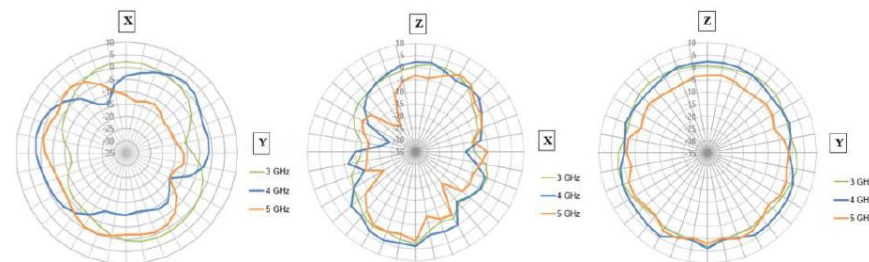


< Return Loss >

3.1 Return Loss



< Directivity>



Electrical			
Standard	USA UWB channels 1-4	EU UWB/ USA UWB channels 5-8	USA UWB channels 9-10
Operation Frequency (GHz)	3.1-5.0	6.2-8.0	8.0-9.0
Return Loss (dB)	-10	-10	-6
Efficiency (%)	80	70	70
Peak Gain (dBi)	6	3.5	2.5
Max VSWR	2:1	2:1	3:1

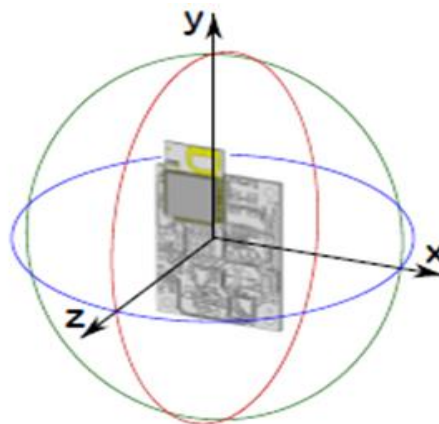
For more information about this antenna, please refer to Taoglas website: [UWC.20.pdf \(taoglas.com\)](https://www.taoglas.com/UWC.20.pdf)

●UWB TWR/TDoA ⑤

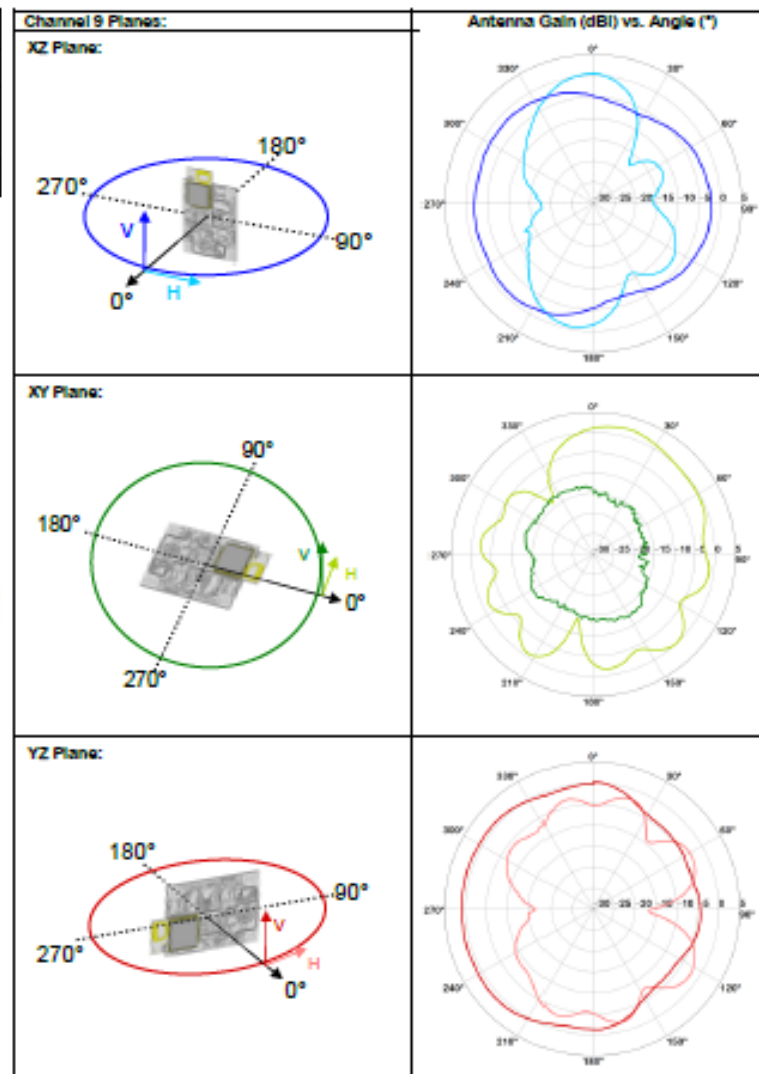
< Brief Spec. >

Antenna Model	WB007 Dual-Hoe
Antenna Type	PCB Trace Monopole Antenna
Peak Gain (Measured on DWM3001CDK)	Ch5: 2.5dBi Ch9: 2.0dBi
Frequency Range	4000 – 9000MHz

< Appearance >



< Directivity >



●UWB TWR/TDoA ⑥

< Brief Spec. >

Operating Channel: 802.15.4 UWB Channel 5 and Channel 9
Center Frequency: 6489.6 MHz and 7987.2 MHz
Bandwidth: 499.2 MHz
Polarization: Linear
Material: FR4, $\epsilon_r = 4.4$
Gain: 2 dBi

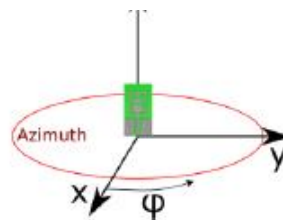
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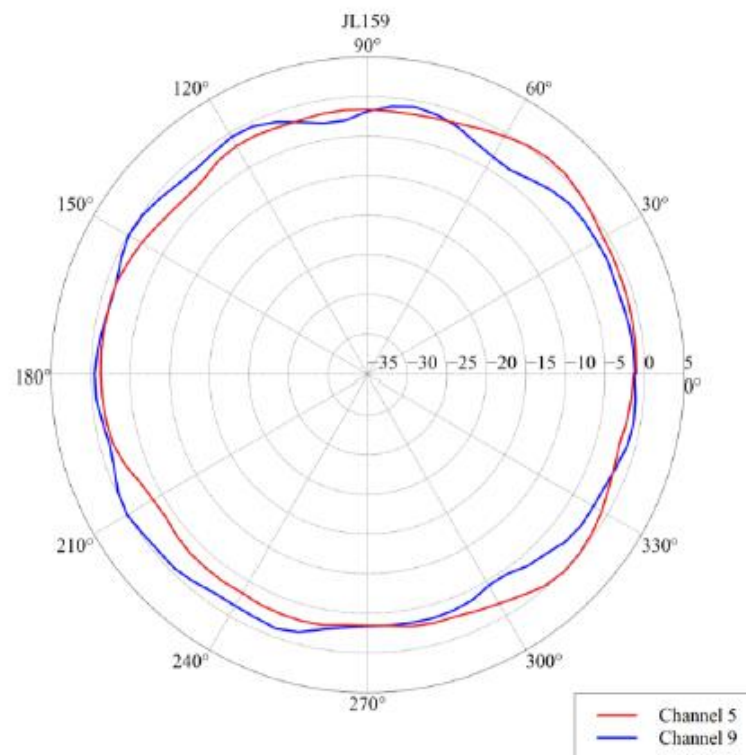
Top Layer



Bottom Layer



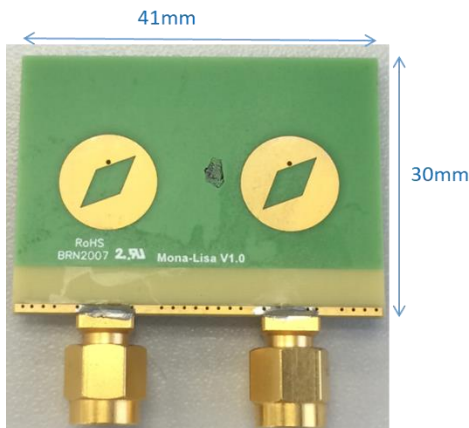
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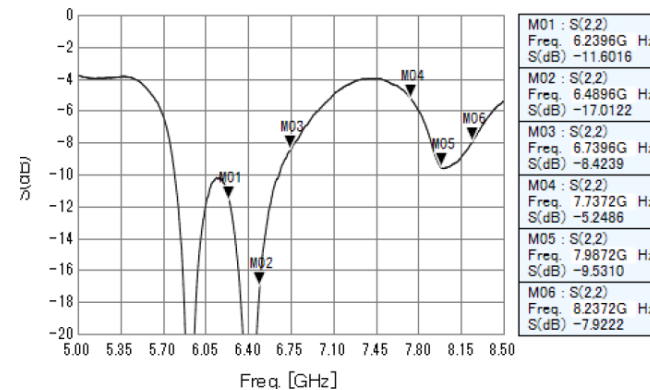
Reference: Qorvo Antenna performance report for Jolie-Omni antenna (JL159)

●UWB AoA/PDoA ①

< Appearance >



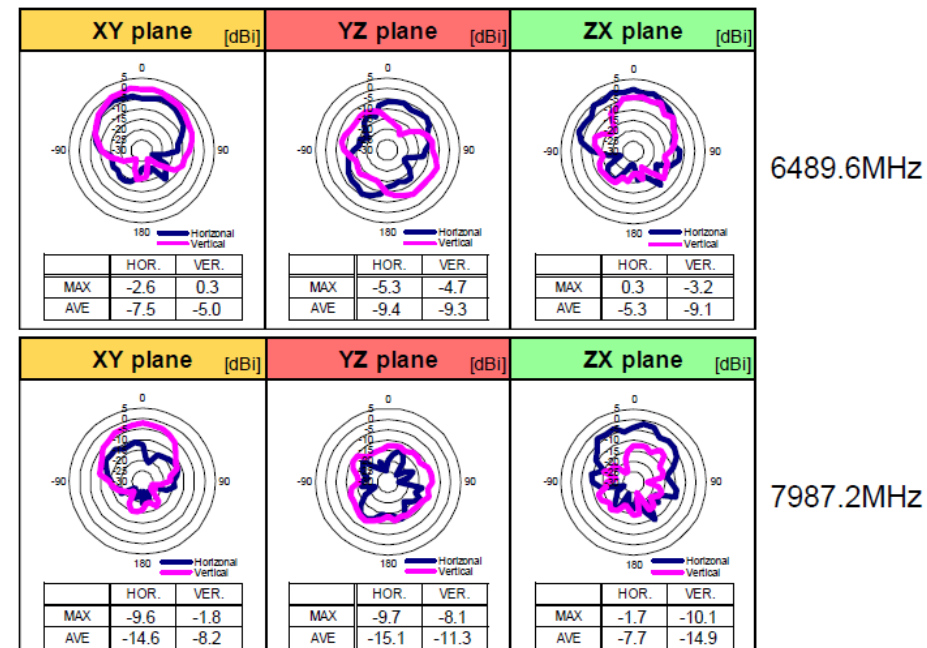
< Return Loss >



< Efficiency >

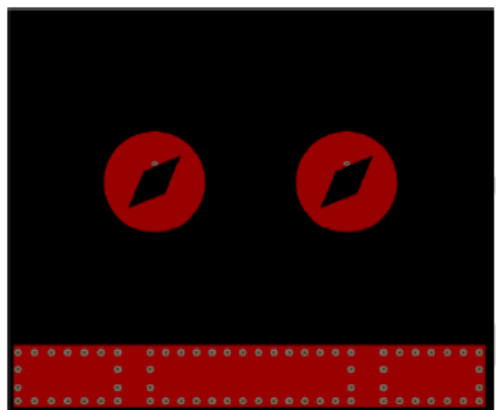
Frequency[MHz]	Efficiency[dB]	Peak Gain[dBi]
6239.6	-4.7	0.8
6489.6	-4.2	0.3
6739.6	-4.4	1.8
Ch.5Average	-4.4	-
7737.2	-7.7	-1.5
7987.2	-7.9	-1.7
8237.2	-7.4	-1.6
Ch.9Average	-7.6	-

< Directivity>



●UWB AoA/PDoA ②

< Appearance >

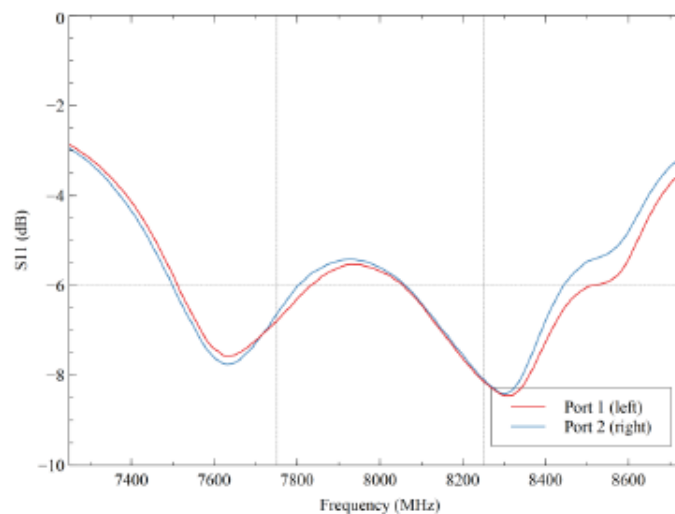


Top, Layer 1

< Efficiency >

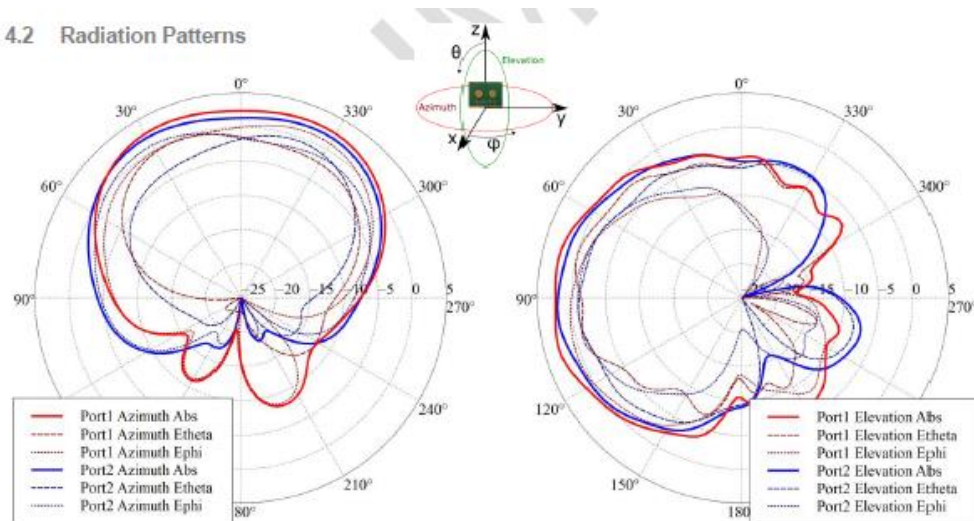
Frequency[MHz]	Peak Gain[dBi]
CH 5	-
CH 9	2.5dBi

< Return Loss >



< Directivity >

4.2 Radiation Patterns

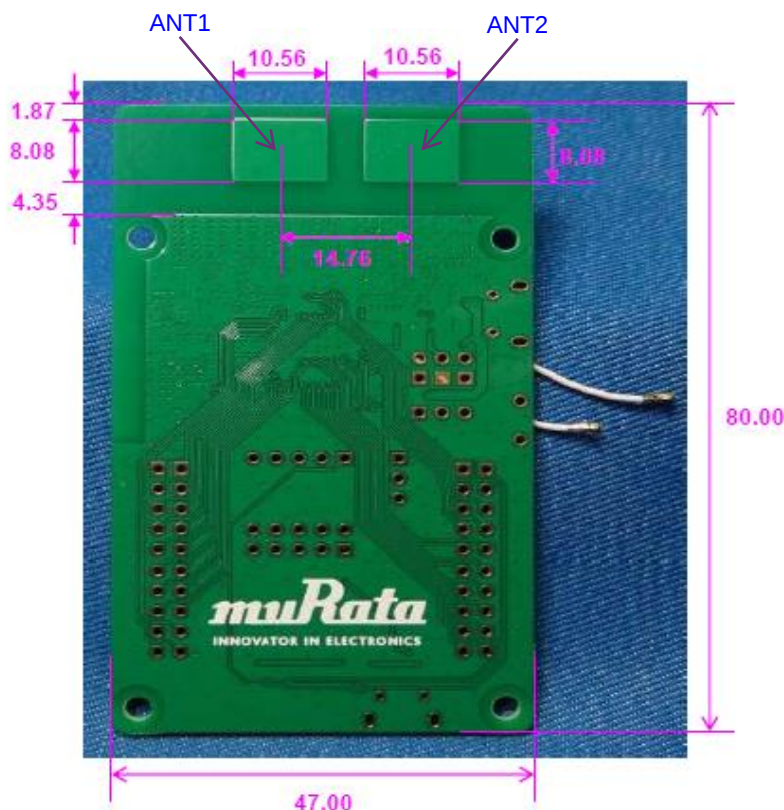


●UWB AoA/PDoA ③

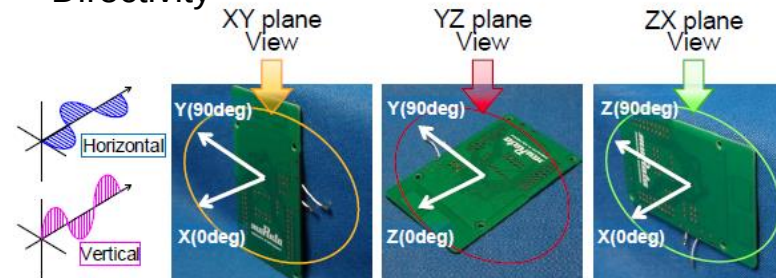
< Efficiency >

ANT	Total efficiency [dB]		Peak gain [dBi]	
	CH.5 (3point Ave.)	CH.9 (3point Ave.)	CH.5 (Max.)	CH.9 (Max.)
1	-5.0	-4.4	0.3	2.7
2	-5.1	-4.7	0.9	2.8

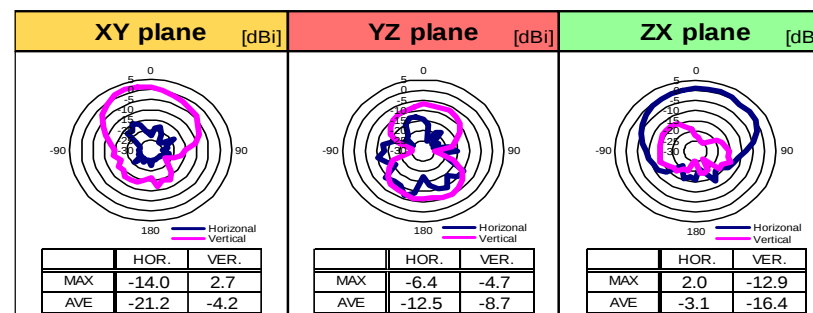
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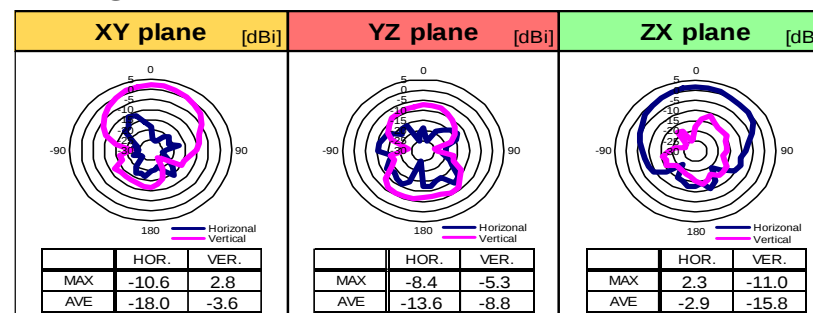
< Directivity >



ANT1 @7987.2MHz



ANT2 @7987.2MHz



●UWB AoA/PDoA ④

< Brief Spec. >

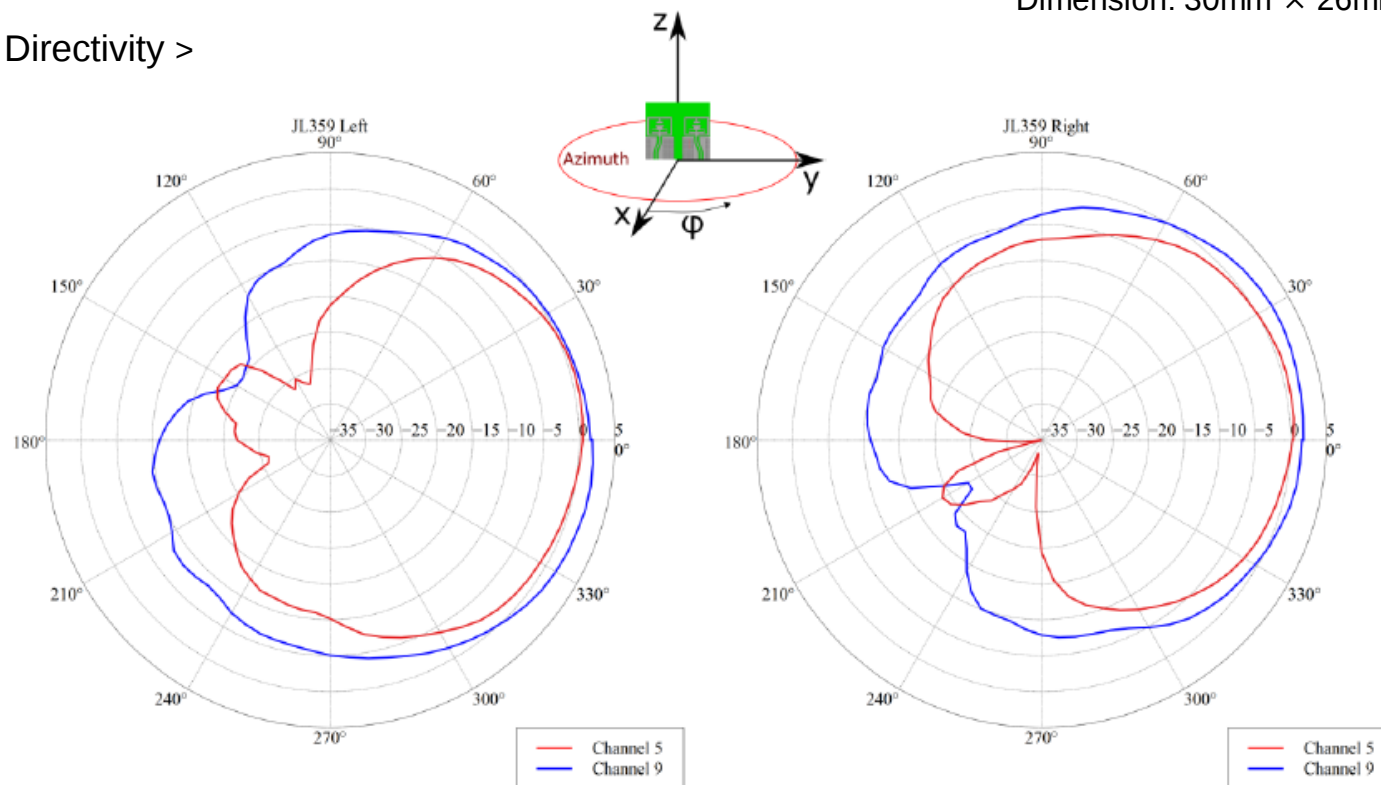
Operating Channel: 802.15.4 UWB Channel 9 and Channel 5
Center Frequency: 6489.6 MHz and 7987.2 MHz
Bandwidth: 499.2 MHz
Polarization: Linear-vertical
Material: FR4
SMA Connector spacing: 20.4 mm
Gain: 3 dBi

< Appearance >



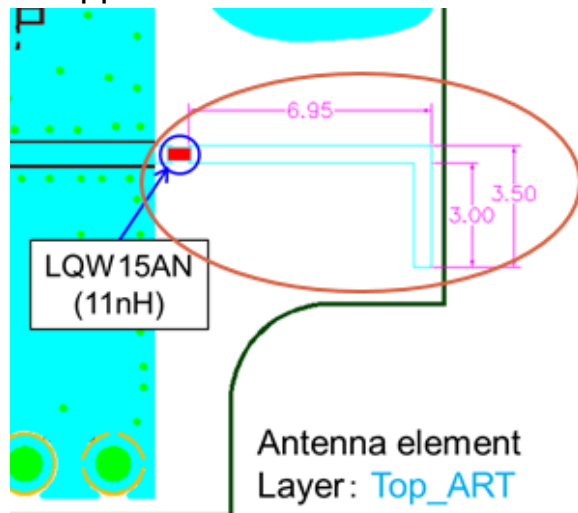
Dimension: 30mm × 26mm

< Directivity >

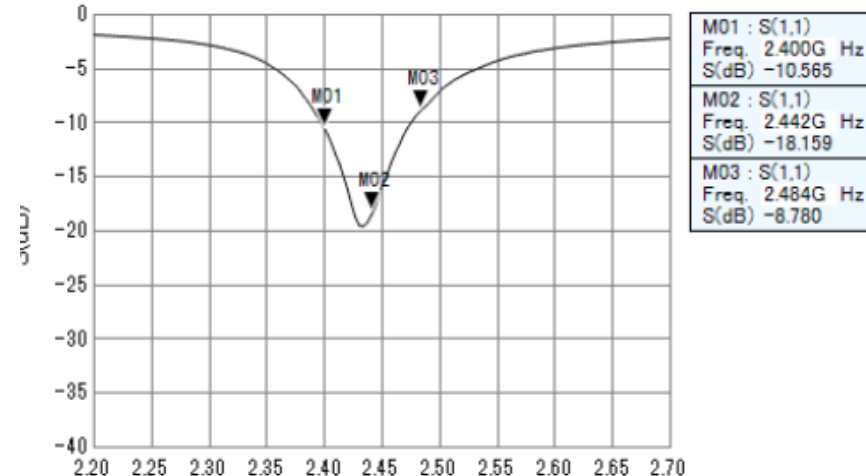


●BLE Antenna ①

< Appearance >



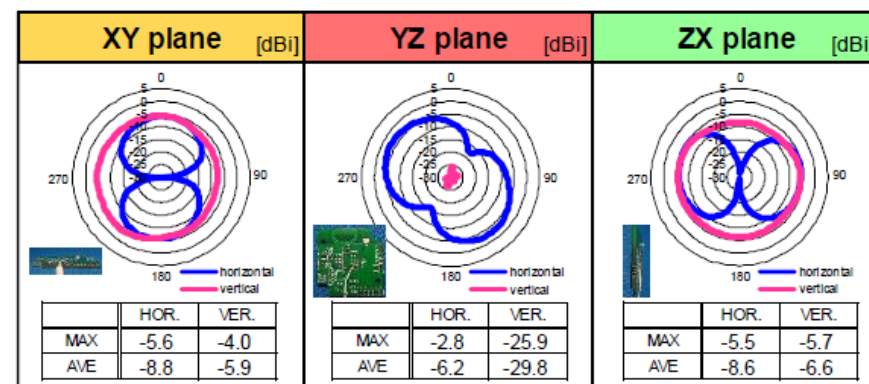
< Return Loss >



< Efficiency >

Frequency[MHz]	Efficiency[dB]	Peak Gain[dBi]
2400	-5.0	-3.1
2442	-4.9	-2.8
2484	-5.9	-3.9
Average	-5.2	-

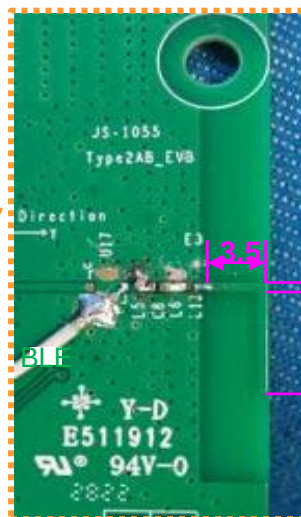
< Directivity > @2442MHz



Please connect the module and antenna area with 50ohm line.
Please apply 1 matching component in antenna area.
Land size for component, please follow your design rule.

●BLE Antenna ②

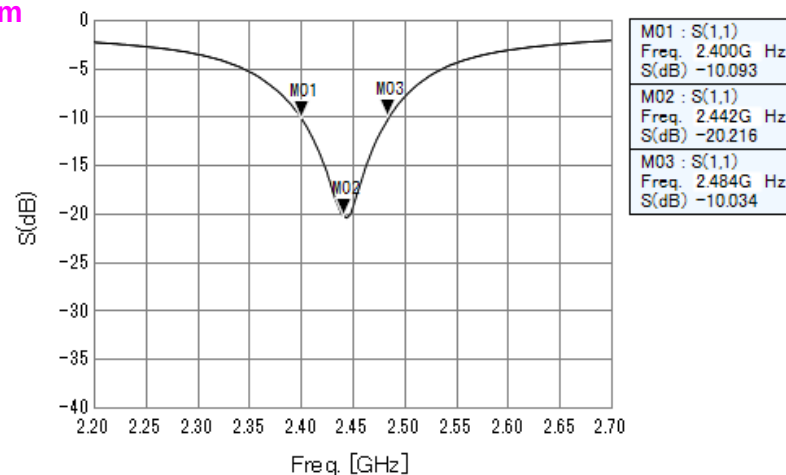
< Appearance >



UNIT : mm

3.5
0.5
6.45

<Return Loss>

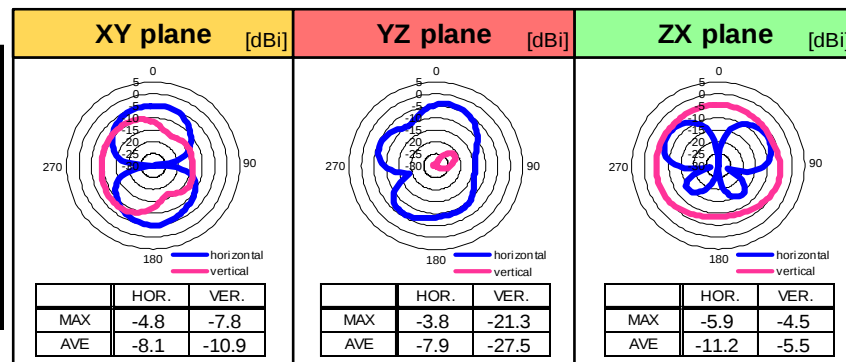


<Efficiency>

LINEAR POLARIZATION		XY-plane		YZ-plane		ZX-plane		Total Efficiency
		hor.	ver.	hor.	ver.	hor.	ver.	
2400 MHz	MAX.	-5.2	-8.1	-4.1	-21.9	-6.6	-4.9	-6.4
	AVE.	-8.7	-11.2	-8.3	-27.8	-11.8	-5.9	
2442 MHz	MAX.	-4.8	-7.8	-3.8	-21.3	-5.9	-4.5	-6.1
	AVE.	-8.1	-10.9	-7.9	-27.5	-11.2	-5.5	
2484 MHz	MAX.	-5.5	-8.3	-4.2	-22.8	-6.3	-4.8	-6.7
	AVE.	-8.8	-11.6	-8.5	-28.4	-11.9	-6.1	

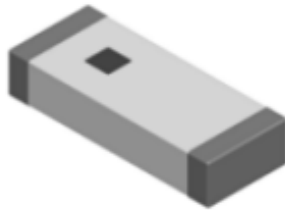
*Red color shows peak gain

< Directivity > @2442MHz



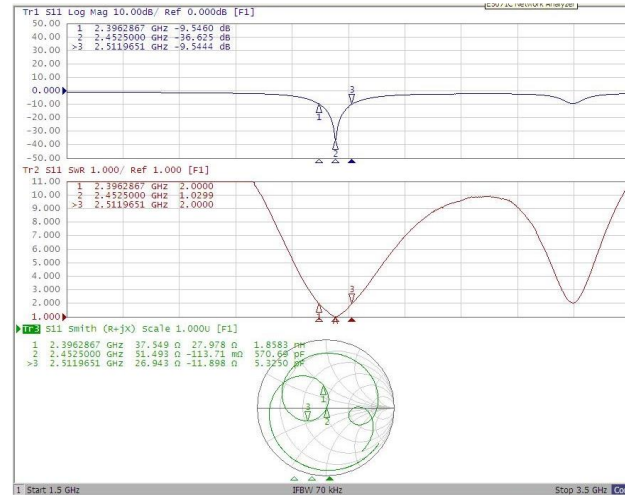
●BLE Antenna ③

< Appearance >



Dimension : 3.2 x 1.6 x 1.2mm

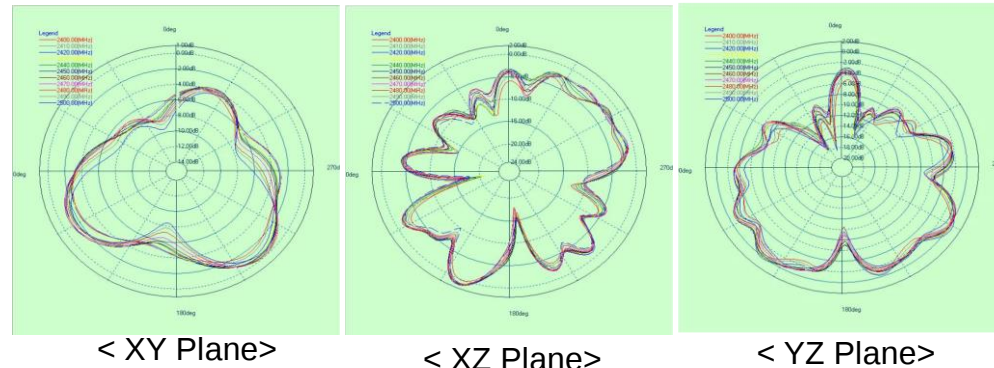
<Return Loss>



<Electrical Specifications>

Parameter	Min.	Typ.	Max.	Units
Frequency		2450		MHz
Bandwidth	100			MHz
Peak Gain		0.5		dBi
Average Gain		-1		dBi
VSWR			2	
Impedance		50		Ω
Power Capability			3	W

< Radiation Pattern and Gain >



Reference: Abracon AMCA31-2R450G-S1F-T3 Datasheet (<https://abracon.com/chip-antenna/AMCA31-2R450G-S1F-T3.pdf>)

Document History

Revision	Date	Description
1	2021.12.1	Initial version for TELEC certification test • 5 UWB TWR/TDoA antennas • 2 UWB AoA/PDoA antennas • 1 BLE antenna
2	2023.6.30	• Remove Molex 2119960300 UWB antenna • Add Qorvo WB007 <i>Dual-Hoe</i> UWB antenna • Add Qorvo JL159 <i>Jolie-Omini</i> UWB antenna • Add Qorvo JL349 <i>Jolie-AoA</i> UWB antenna • Add Murata UWB and BLE antenna for JS-1055 2AB-828EVB • Add Abracon AMCA31-2R450G-S1F-T3 BLE antenna
3	2023.9.14	Revise information of <i>Taoglas UWB.01 antenna</i>