IoT Wireless Vibration / Pressure / Humidity / Temperature sensor module LoRa, BLE ANTENNA

Part Numbers: 2195912-1 (20022844-00)

Manufacturer: TE Connectivity Ltd.
Address:
No. 21 Deshun Bei Road
Huanhai Economic Development Zone
Qingdao 266108
China

FEATURES & BENEFITS

LDS(Laser Direct Structuring) Antenna

- Ability to selectively and repeatable plate 3 dimensionally
- Implementation of two antennas (LoRa & BLE) on one substrate
- Ability to produce thin traces
- Flexibility of pattern design without changing tool

SPECIFICATIONS

	Temperature Sensor		
Frequency Range (MHz)	863 to 870 MHz	902 to 928 MHz	2400 to 2480 MHz
Efficiency	33.6 %	32.6 %	36.8 %
Average Gain	-4.74dBi	-4.88dBi	-4.36dBi
Peak Gain[dBi]	-0.75dBi	-0.66dBi	-1.48dBi
Target Frequency	868 MHz	915 MHz	2450 MHz
Target Frequency Gain	-4.55dBi	-5.06dBi	-4.48dBi
Feed Point Impedance	50 ohms unbalanced		
Polarization	Linear		
Size	Dia. 29.54 mm x 21.50 mm Height		
Weight	< 20.5 g		
Operating Temperature	-40 to +85°C		
Storage Temperature	-40 to +85°C		
Packaging Specification	Box		
Hazardous Materials	A certificate of conformance is available from the product page on TE website.		
Data measured Free Space condition			

Revision updated :

- Rev 1_Oct. 29th. 2021 : Old PCB version of the vibration sensor
- Rev 2_Mar. 22nd .2023 : Modified PCB and Antenna design for the vibration & the pressure sensor
- Rev 3_Jun. 14th .2023 : Additional data of the Humidity sensor
- Rev 4_Sep. 25th .2023 : Additional data of the Temperature sensor

RF DATA – Vibration Sensor condition

3D Chamber : Efficiency Measurement

	1	2	3	4	5	6	7	8
Frequency [MHz]	863	864	865	866	867	868	869	870
Efficiency [dB]	-4.35	-4.29	-4.22	-3.82	-3.77	-3.74	-3.73	-3.72
Efficiency [%]	36.7	37.3	37.9	41.5	42.0	42.3	42.3	42.5
Peak Gain [dB]	-2.12	-2.05	-1.97	-1.58	-1.52	-1.50	-1.49	-1.47

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	902	905	909	912	915	918	922	925	928
Efficiency [dB]	-3.52	-3.52	-3.79	-4.20	-4.22	-4.27	-4.28	-4.36	-4.41
Efficiency [%]	44.5	44.5	41.8	38.0	37.9	37.4	37.3	36.7	36.3
Peak Gain [dB]	-1.22	-1.24	-1.55	-1.97	-2.03	-2.12	-2.13	-2.21	-2.25

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency [dB]	-5.96	-6.24	-6.28	-6.44	-6.67	-6.72	-6.80	-7.03	-7.00
Efficiency [%]	25.4	23.8	23.6	22.7	21.5	21.3	20.9	19.8	19.9
Peak Gain [dB]	-1.61	-1.83	-1.80	-1.92	-2.13	-2.14	-2.16	-2.33	-2.29

RF DATA – Pressure Sensor condition

3D Chamber : Efficiency Measurement

	1	2	3	4	5	6	7	8
Frequency [MHz]	863	864	865	866	867	868	869	870
Efficiency [dB]	-2.56	-2.52	-2.45	-2.08	-2.02	-1.99	-1.97	-1.94
Efficiency [%]	55.4	55.9	56.8	62.0	62.8	63.3	63.6	63.9
Peak Gain [dB]	-0.26	-0.21	-0.14	0.24	0.30	0.33	0.35	0.39

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	902	905	909	912	915	918	922	925	928
Efficiency [dB]	-1.87	-1.86	-2.08	-2.47	-2.46	-2.46	-2.39	-2.40	-2.40
Efficiency [%]	65.0	65.2	61.9	56.6	56.8	56.7	57.6	57.6	57.5
Peak Gain [dB]	0.68	0.68	0.46	0.07	0.08	0.07	0.14	0.13	0.12

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency [dB]	-5.07	-5.30	-5.29	-5.41	-5.67	-5.72	-5.73	-5.96	-5.88
Efficiency [%]	31.1	29.5	29.6	28.8	27.1	26.8	26.7	25.3	25.9
Peak Gain [dB]	0.00	-0.19	-0.16	-0.26	-0.48	-0.51	-0.49	-0.77	-0.68

RF DATA – Humidity Sensor condition

3D Chamber : Efficiency Measurement

	1	2	3	4	5	6	7	8
Frequency [MHz]	863	864	865	866	867	868	869	870
Efficiency [dB]	-1.61	-1.60	-1.58	-1.23	-1.21	-1.21	-1.22	-1.21
Efficiency [%]	69.0	69.2	69.5	75.3	75.7	75.7	75.6	75.6
Peak Gain [dB]	0.65	0.65	0.69	1.04	1.07	1.07	1.07	1.08

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	902	905	909	912	915	918	922	925	928
Efficiency [dB]	-2.15	-2.26	-2.66	-3.16	-3.26	-3.38	-3.47	-3.60	-3.69
Efficiency [%]	60.9	59.4	54.2	48.3	47.2	45.9	45.0	43.7	42.8
Peak Gain [dB]	0.02	-0.12	-0.53	-1.03	-1.15	-1.29	-1.37	-1.51	-1.59

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency [dB]	-4.82	-5.04	-5.03	-5.14	-5.39	-5.42	-5.45	-5.67	-5.61
Efficiency [%]	33.0	31.3	31.4	30.6	28.9	28.7	28.5	27.1	27.5
Peak Gain [dB]	-1.51	-1.66	-1.54	-1.61	-1.74	-1.66	-1.52	-1.57	-1.29

RF DATA – Temperature Sensor condition

3D Chamber : Efficiency Measurement

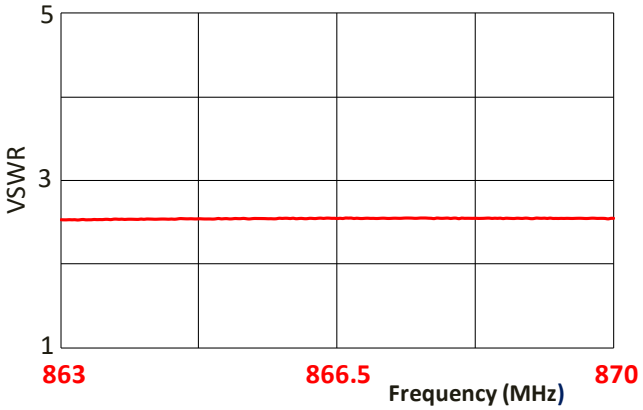
	1	2	3	4	5	6	7	8
Frequency [MHz]	863	864	865	866	867	868	869	870
Efficiency [dB]	-5.12	-5.10	-5.06	-4.68	-4.61	-4.55	-4.50	-4.44
Efficiency [%]	30.8	30.9	31.2	34.1	34.6	35.1	35.5	36.0
Peak Gain [dB]	-1.42	-1.39	-1.35	-0.98	-0.91	-0.84	-0.80	-0.75

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	902	905	909	912	915	918	922	925	928
Efficiency [dB]	-4.23	-4.25	-4.55	-5.00	-5.06	-5.12	-5.15	-5.24	-5.33
Efficiency [%]	37.8	37.6	35.1	31.6	31.2	30.8	30.6	29.9	29.3
Peak Gain [dB]	-0.66	-0.68	-0.97	-1.42	-1.47	-1.55	-1.59	-1.70	-1.82

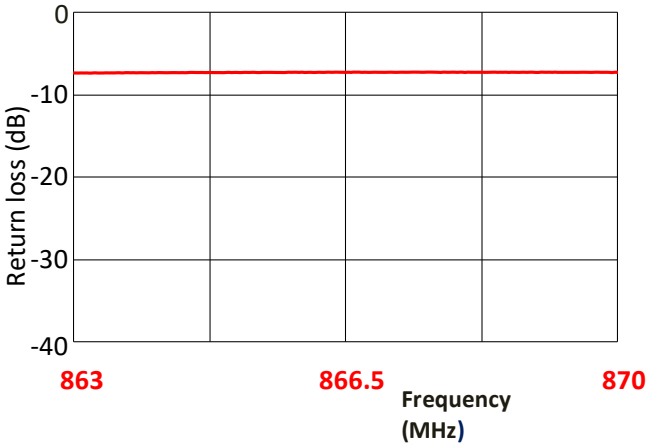
	1	2	3	4	5	6	7	8	9
Frequency [MHz]	2400	2410	2420	2430	2440	2450	2460	2470	2480
Efficiency [dB]	-3.76	-3.99	-4.02	-4.08	-4.39	-4.48	-4.59	-4.92	-4.99
Efficiency [%]	42.0	39.9	39.6	39.1	36.4	35.6	34.8	32.2	31.7
Peak Gain [dB]	-1.48	-1.61	-1.51	-1.50	-1.81	-1.80	-1.73	-1.86	-1.69

RF DATA – Vibration Sensor condition

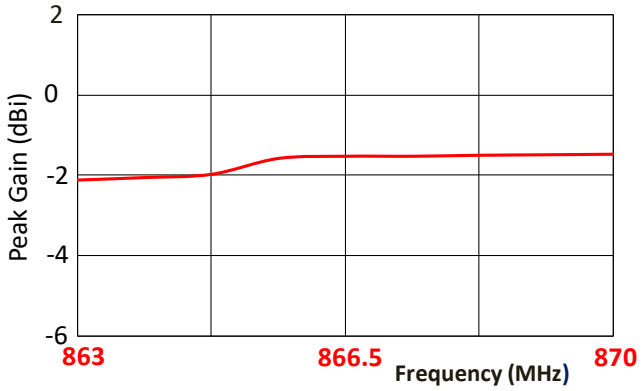
VSWR



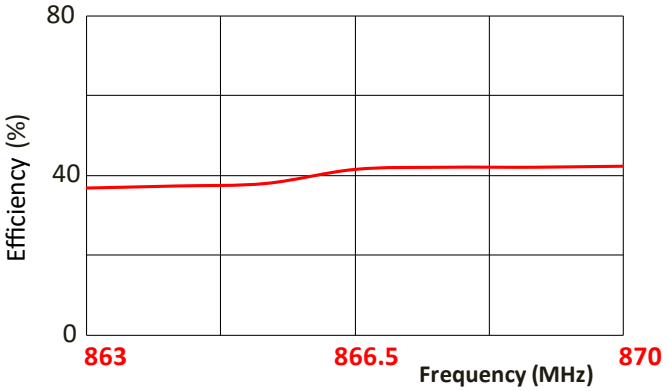
Return Loss



Peak Gain

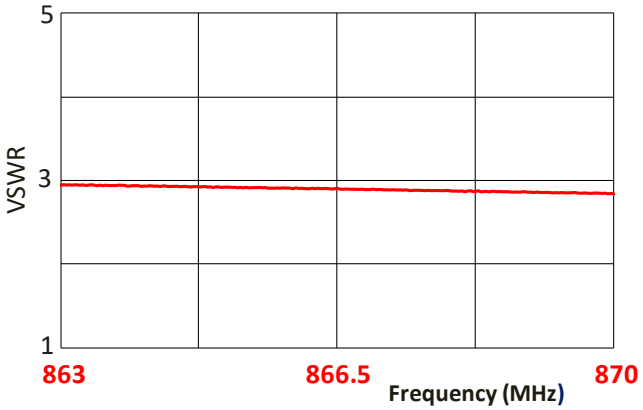


Efficiency

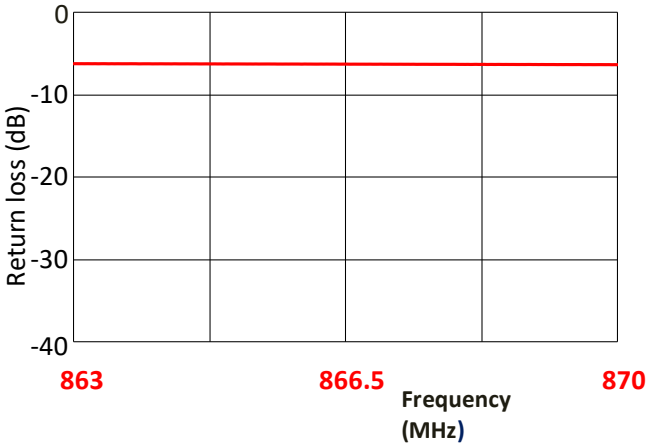


RF DATA – Pressure Sensor condition

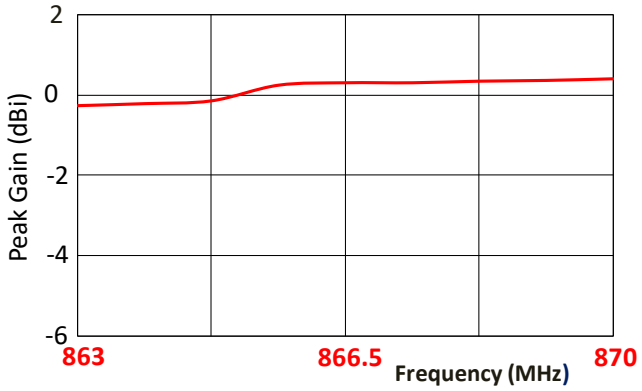
VSWR



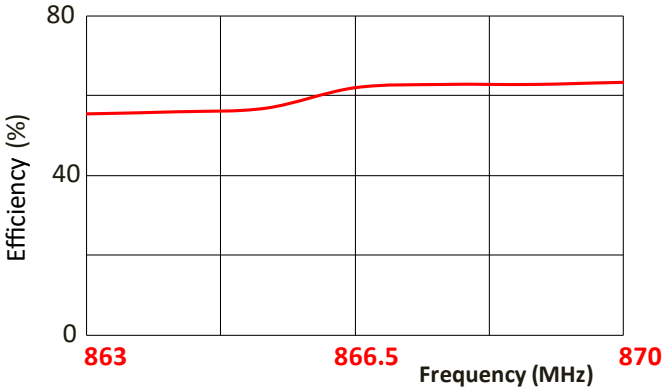
Return Loss



Peak Gain

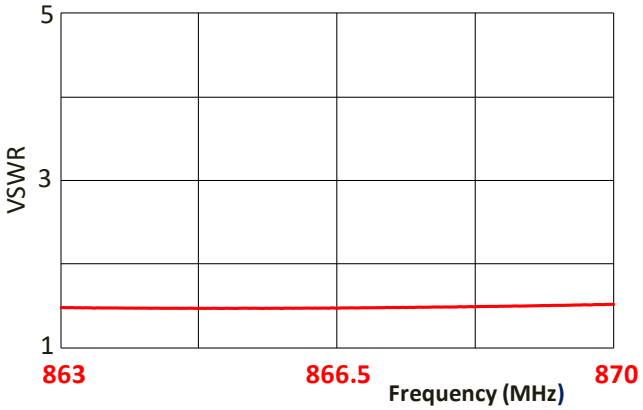


Efficiency

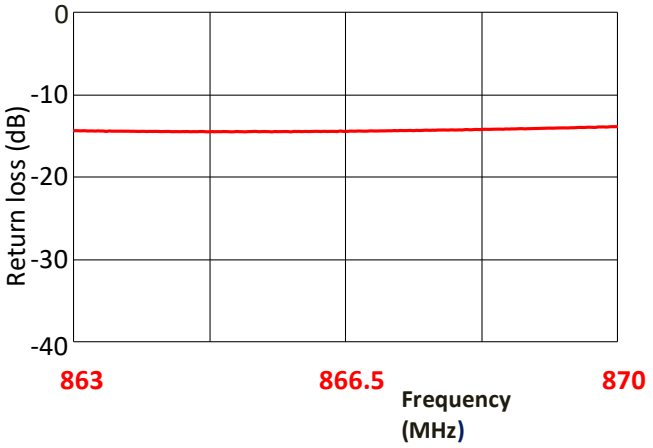


RF DATA – Humidity Sensor condition

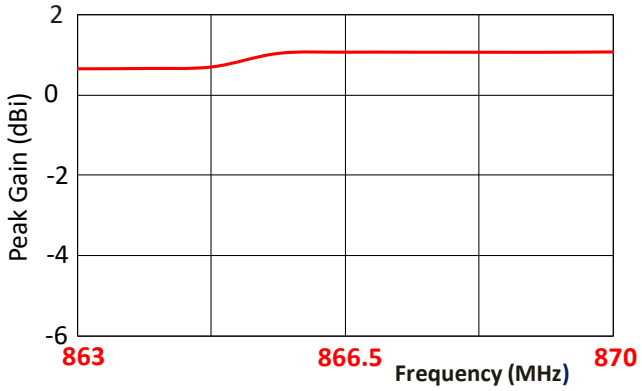
VSWR



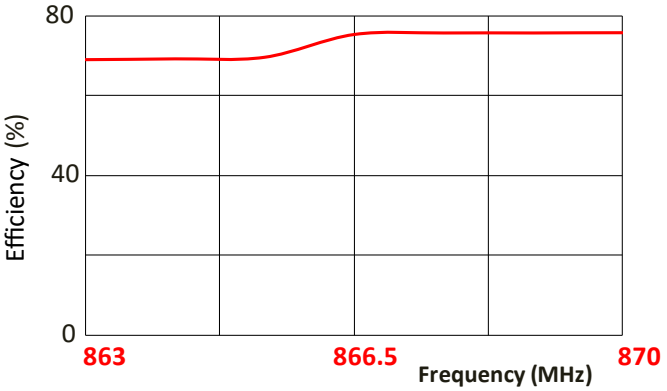
Return Loss



Peak Gain

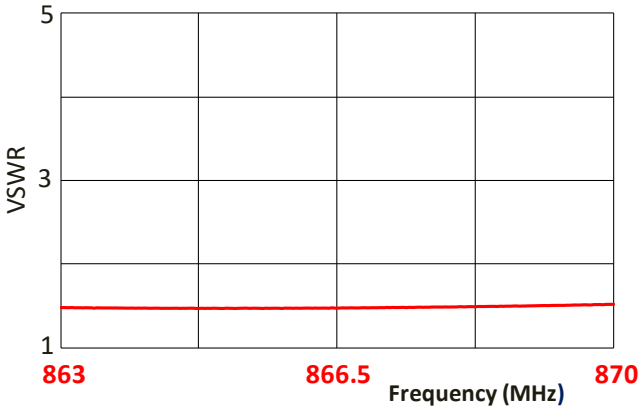


Efficiency

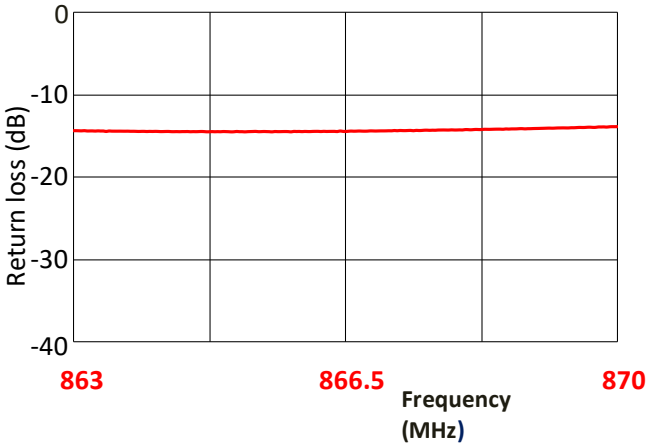


RF DATA – Temperature Sensor condition

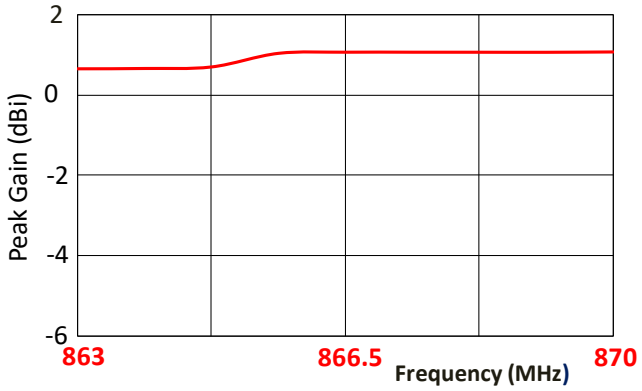
VSWR



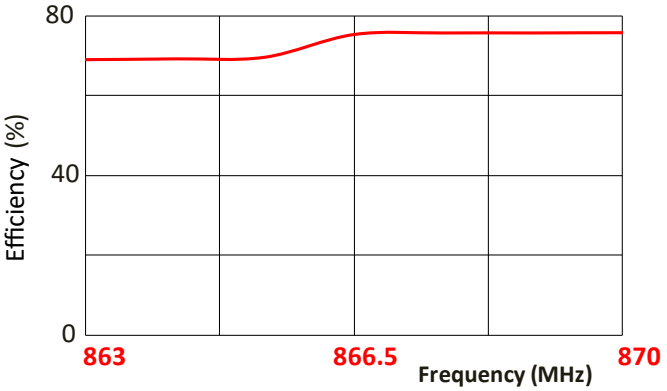
Return Loss



Peak Gain

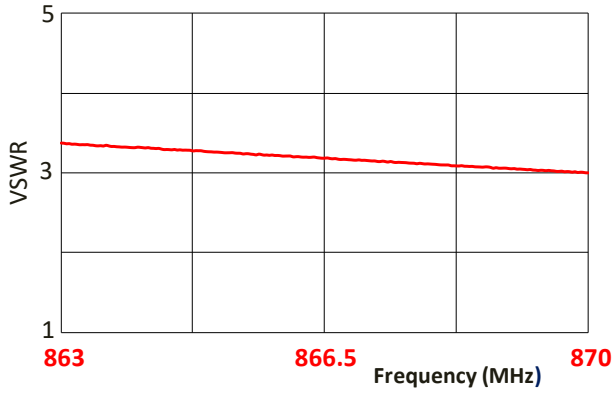


Efficiency

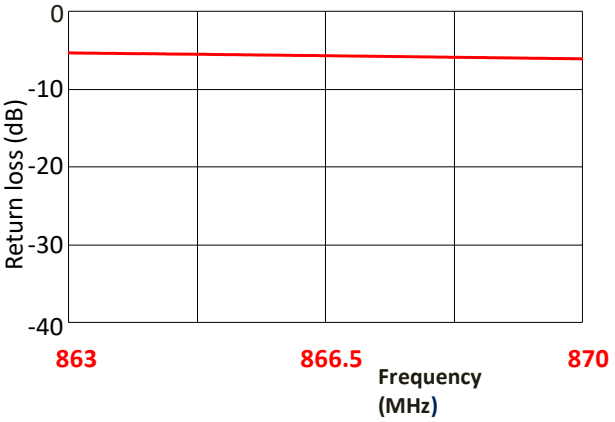


RF DATA – Vibration Sensor condition

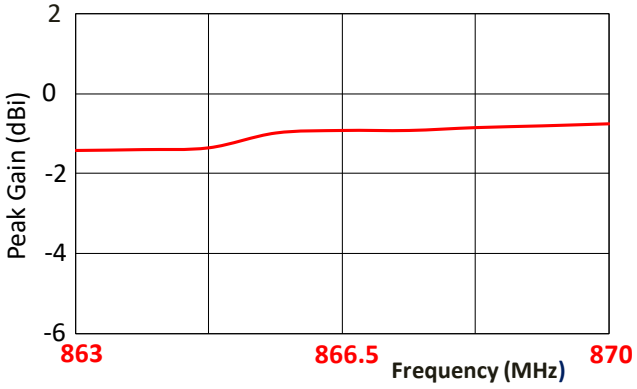
VSWR



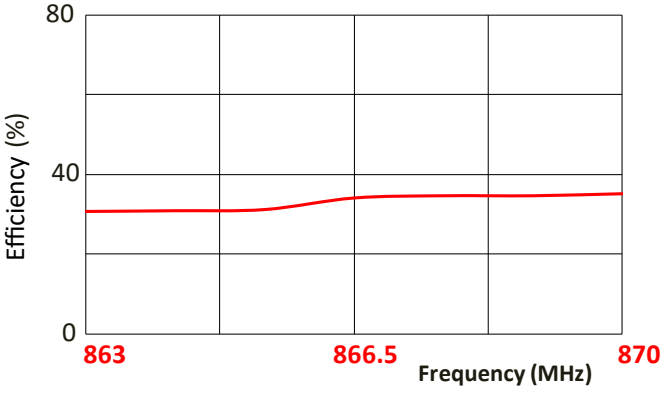
Return Loss



Peak Gain

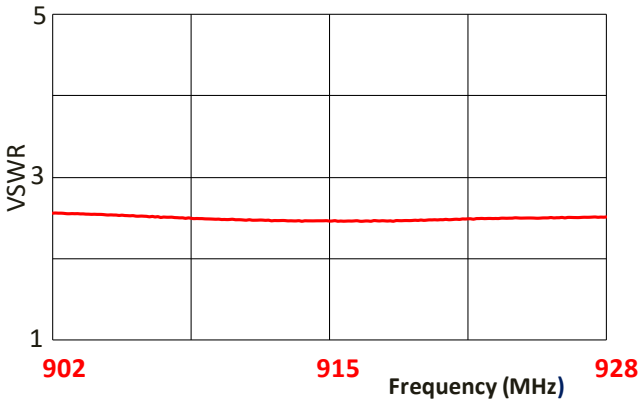


Efficiency

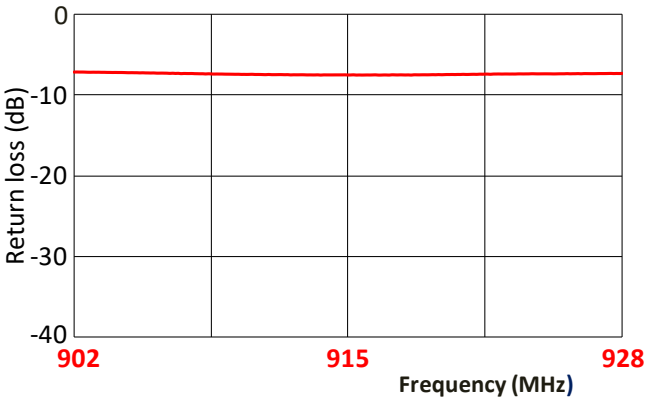


RF DATA – Pressure Sensor condition

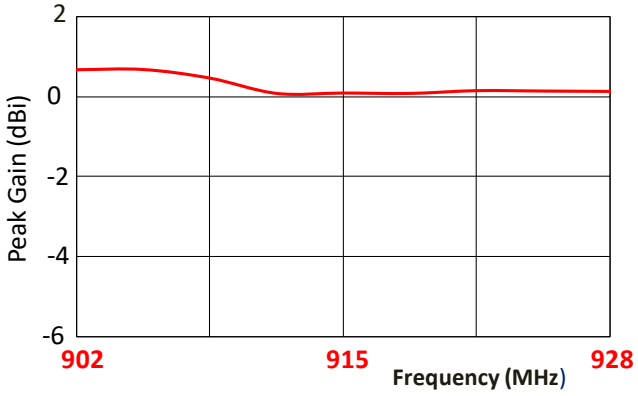
VSWR



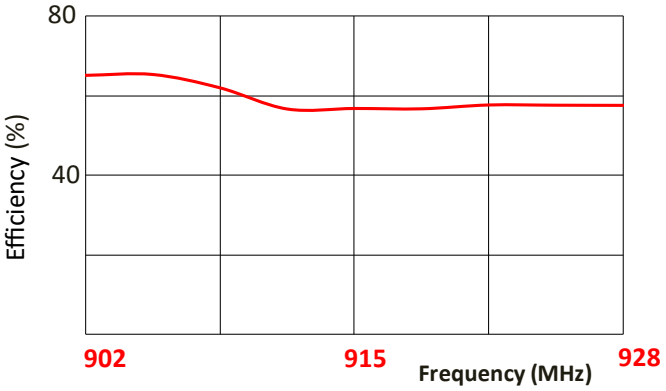
Return Loss



Peak Gain

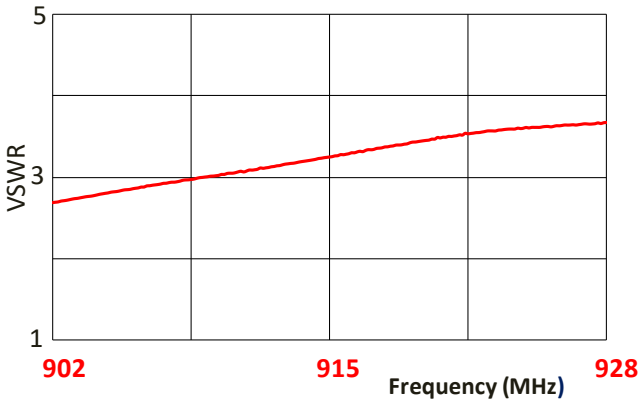


Efficiency

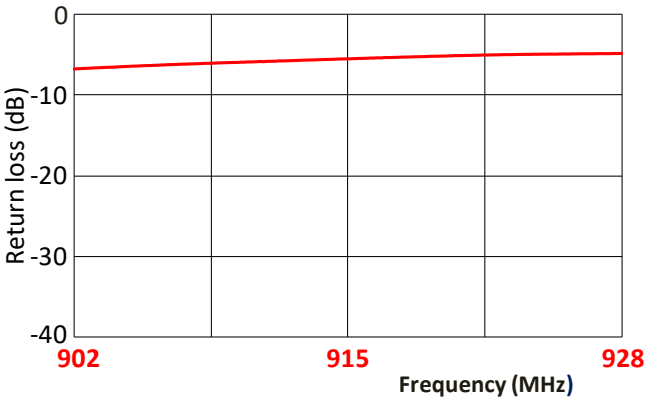


RF DATA – Humidity Sensor condition

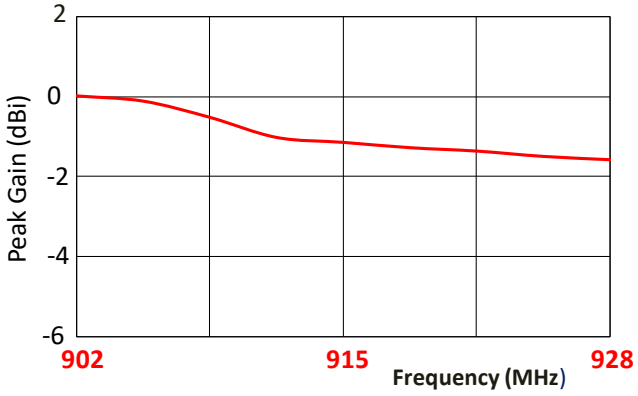
VSWR



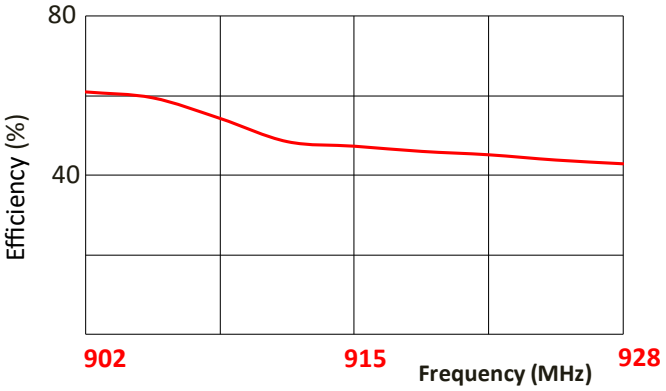
Return Loss



Peak Gain

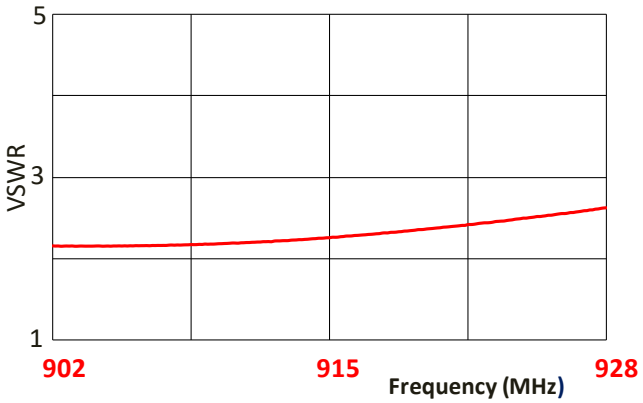


Efficiency

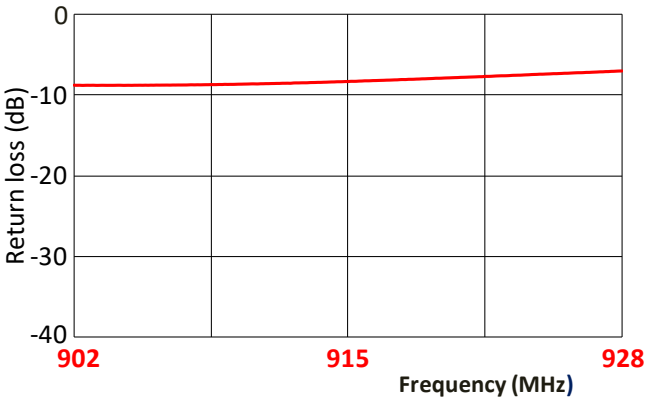


RF DATA – Temperature Sensor condition

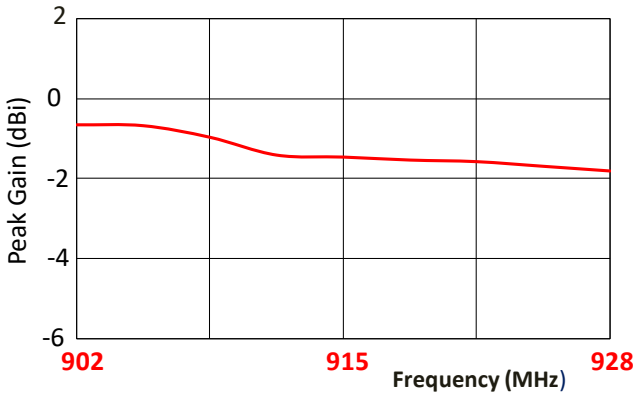
VSWR



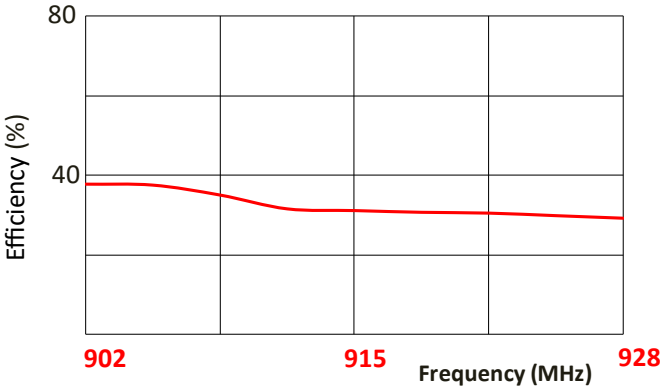
Return Loss



Peak Gain

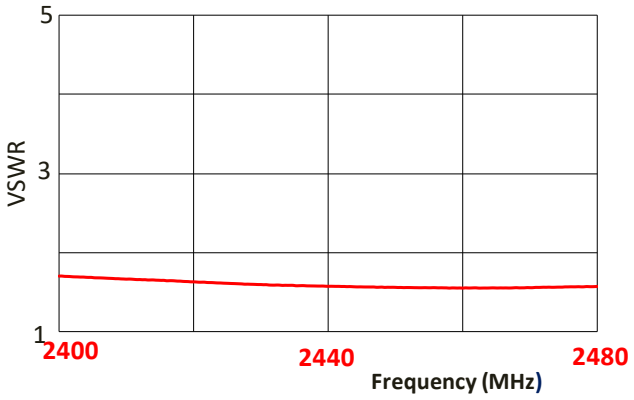


Efficiency

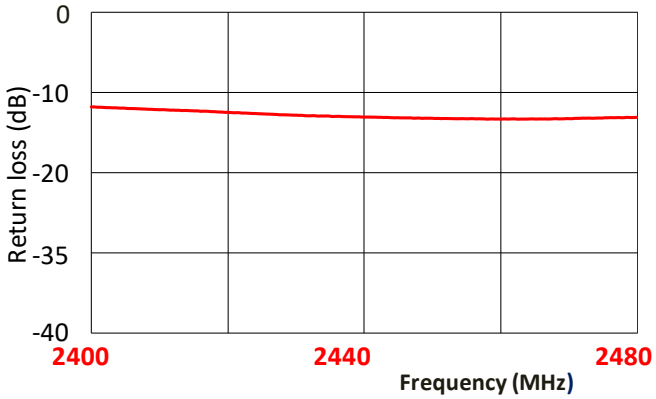


RF DATA – Vibration Sensor condition

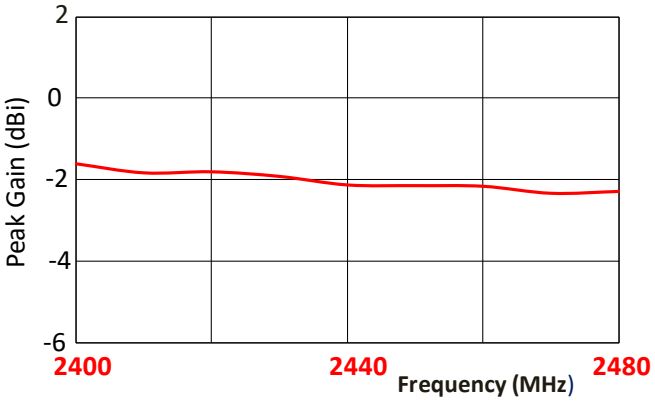
VSWR



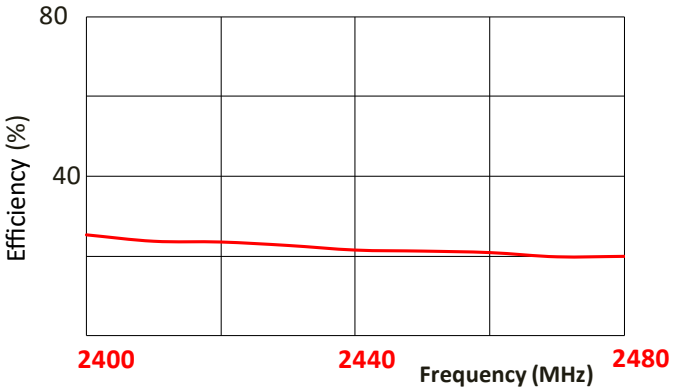
Return Loss



Peak Gain

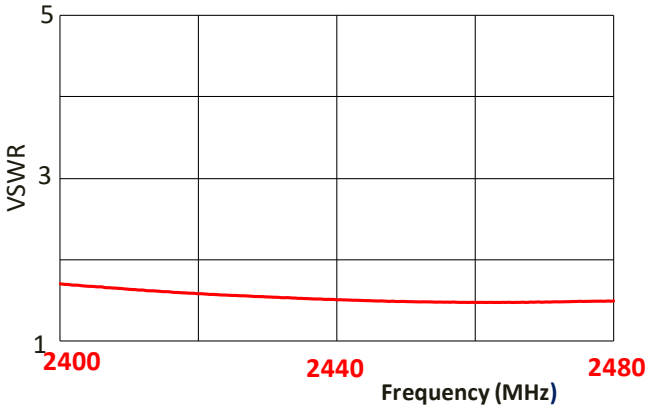


Efficiency

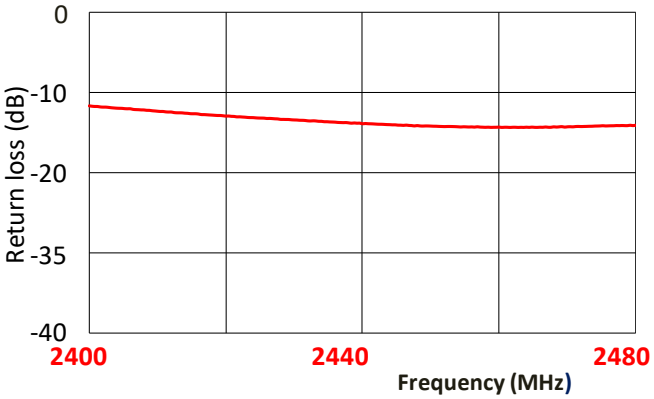


RF DATA – Pressure Sensor condition

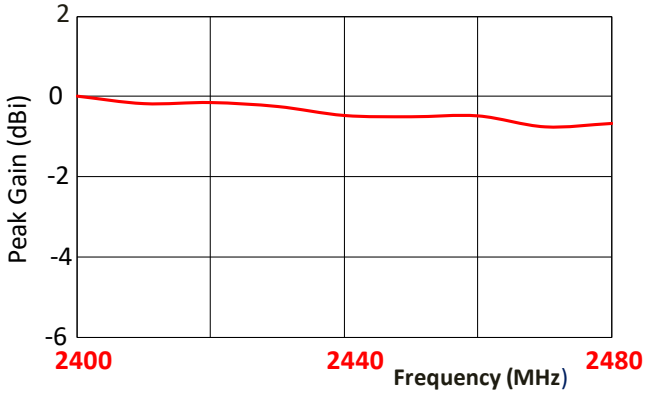
VSWR



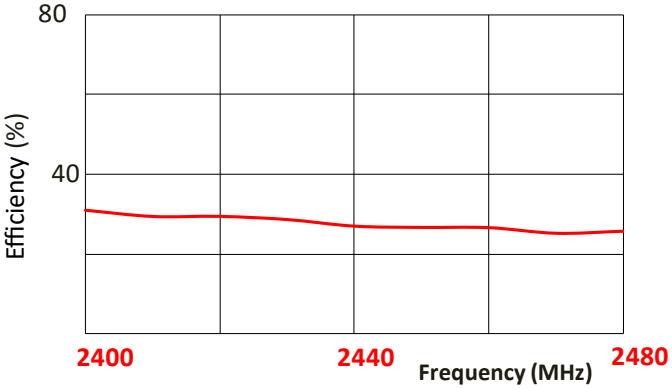
Return Loss



Peak Gain

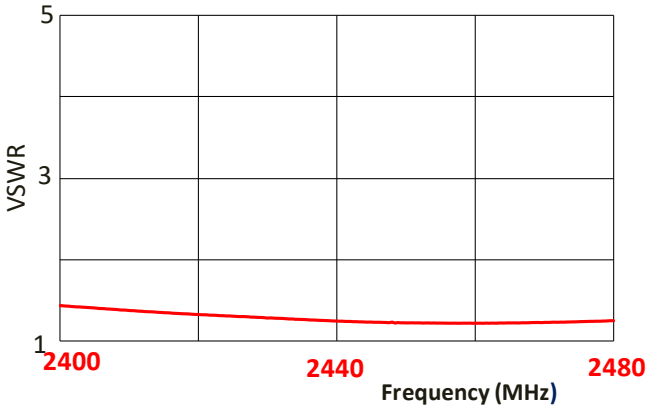


Efficiency

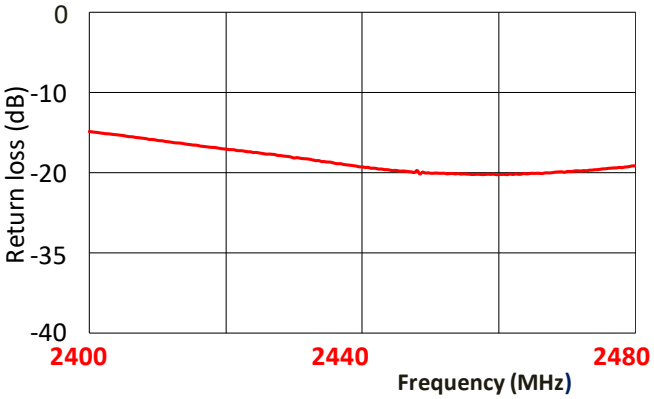


RF DATA – Humidity Sensor condition

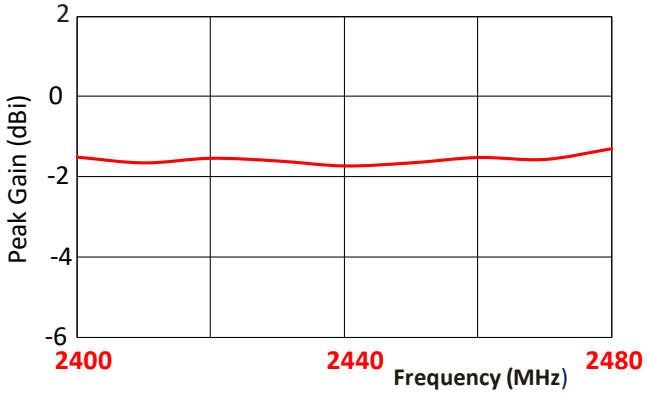
VSWR



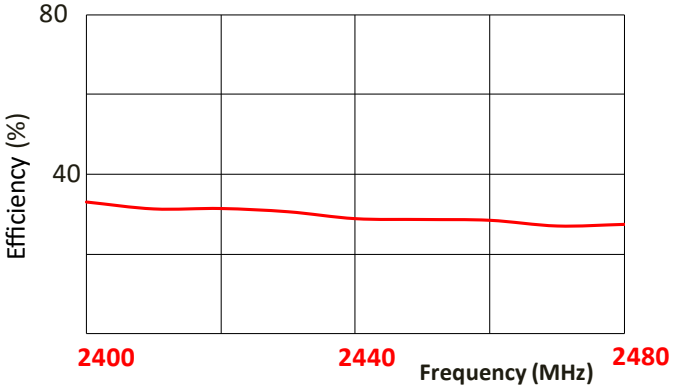
Return Loss



Peak Gain

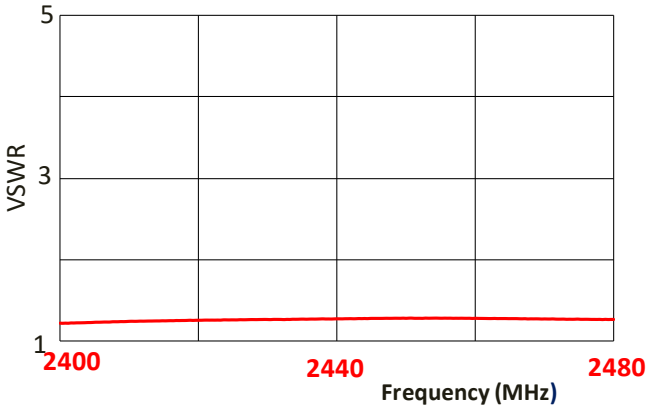


Efficiency

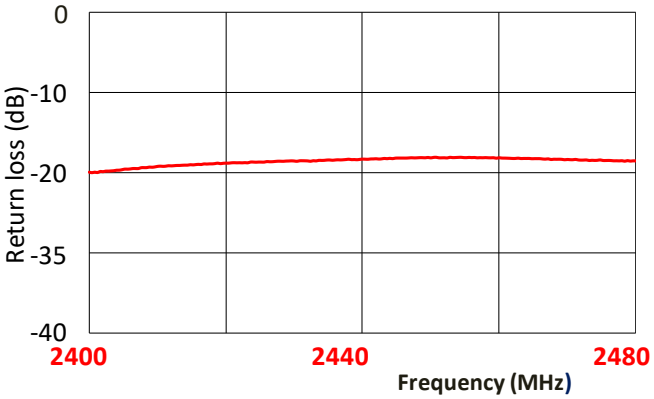


RF DATA – Temperature Sensor condition

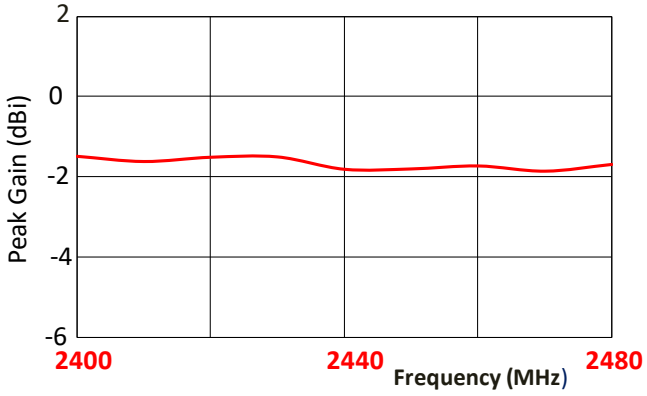
VSWR



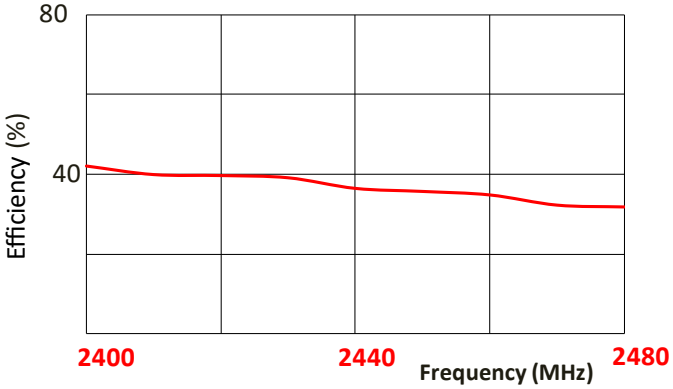
Return Loss



Peak Gain



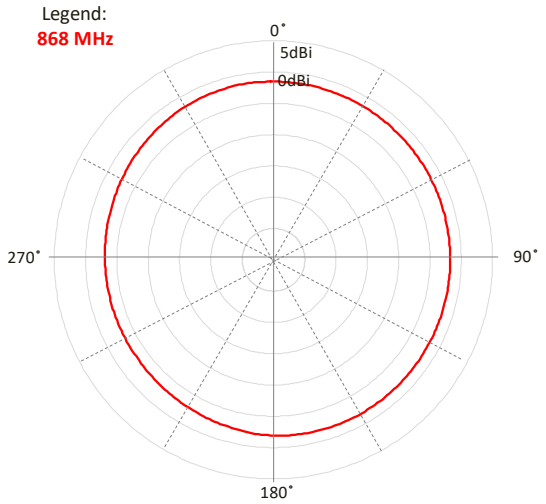
Efficiency



RADIATION PATTERN – Vibration Sensor condition

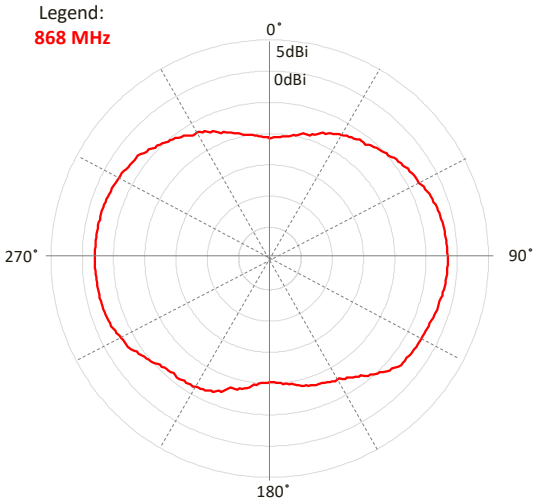
Test setup

Azimuth

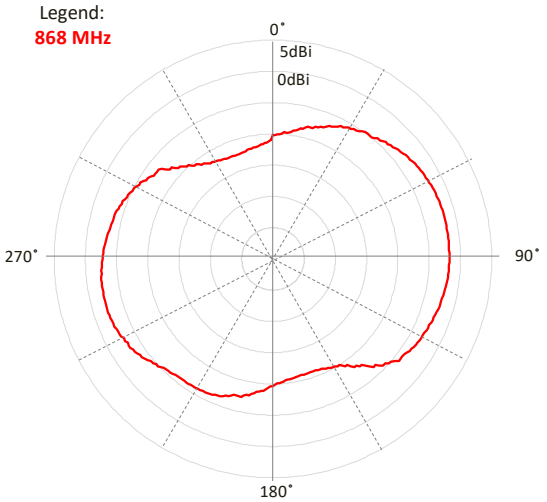


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



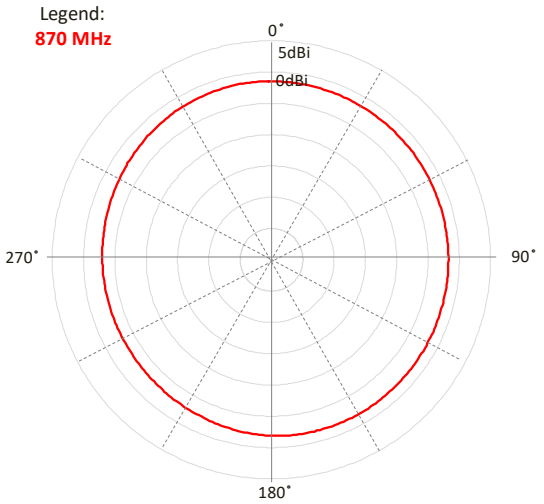
Elevation 2



RADIATION PATTERN – Vibration Sensor condition

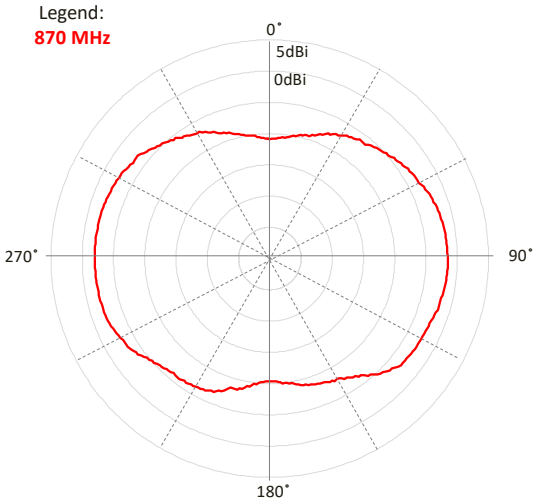
Test setup

Azimuth

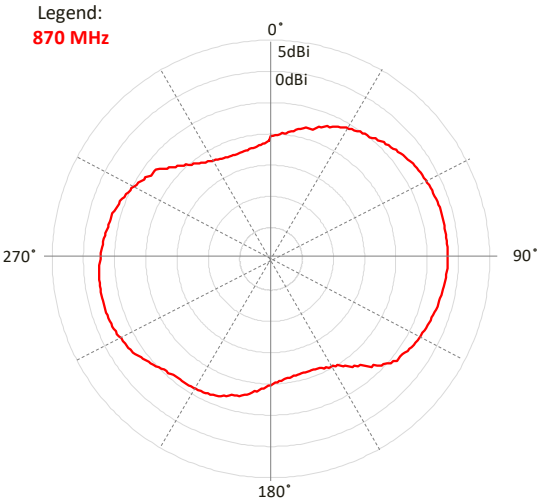


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



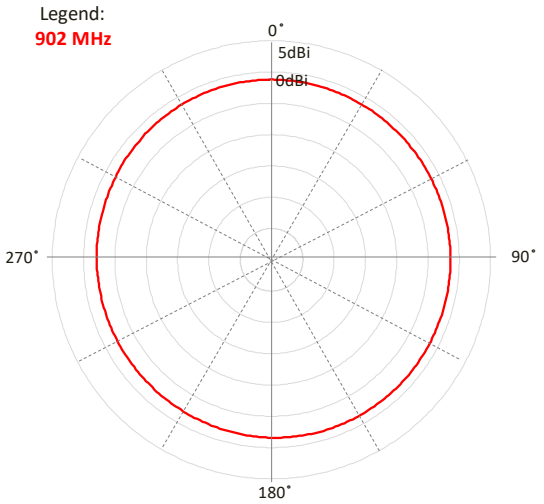
Elevation 2



RADIATION PATTERN – Vibration Sensor condition

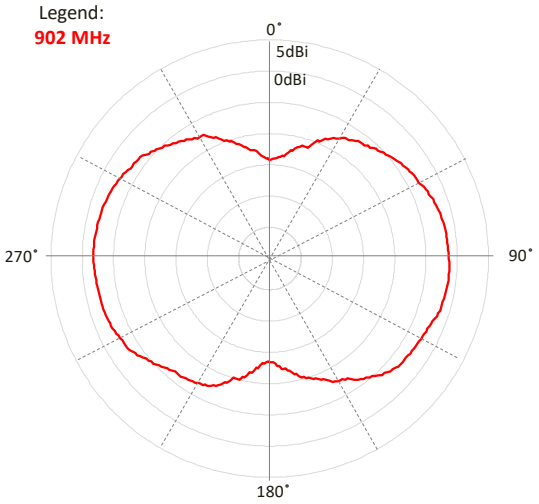
Test setup

Azimuth

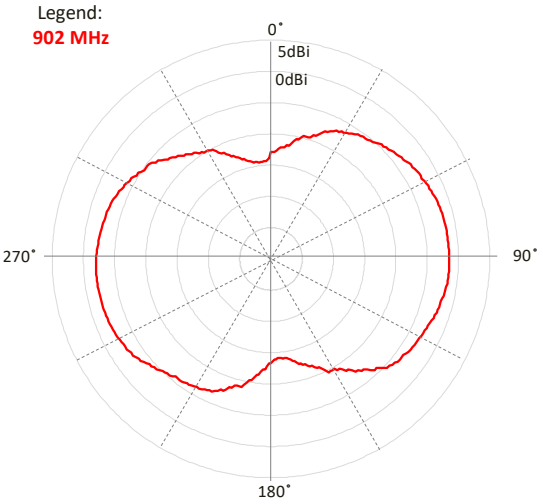


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



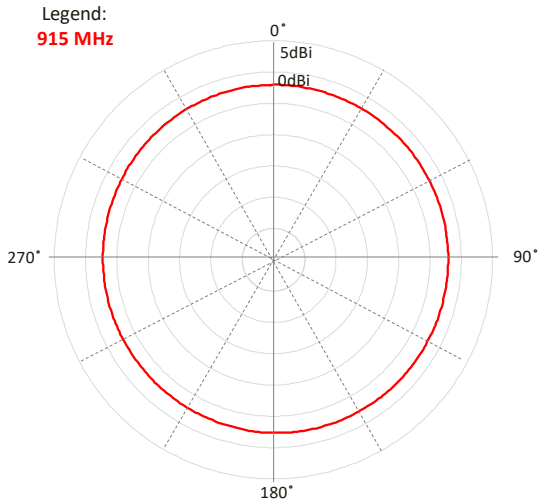
Elevation 2



RADIATION PATTERN – Vibration Sensor condition

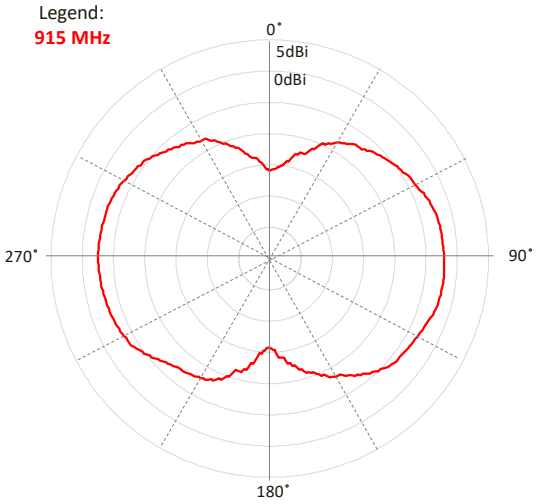
Test setup

Azimuth

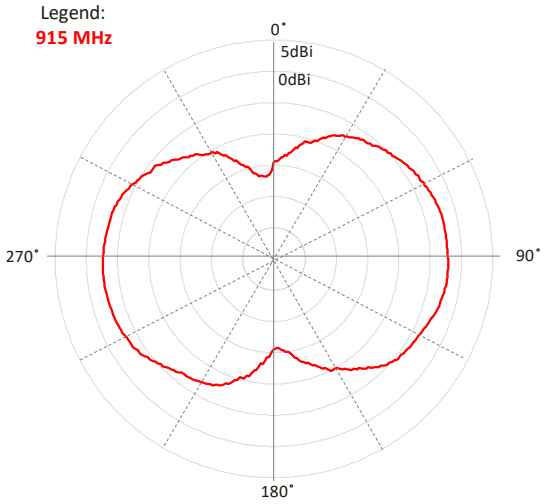


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



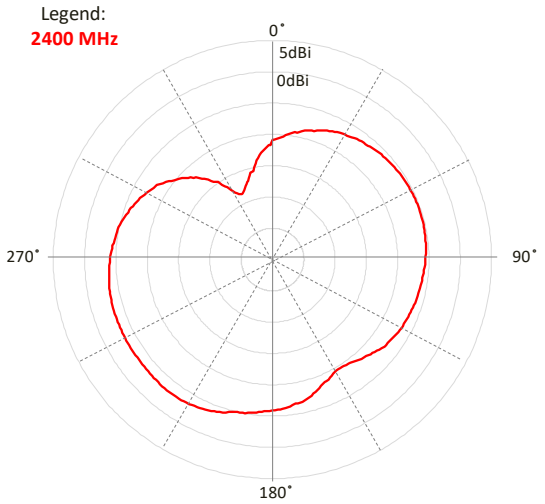
Elevation 2



RADIATION PATTERN – Vibration Sensor condition

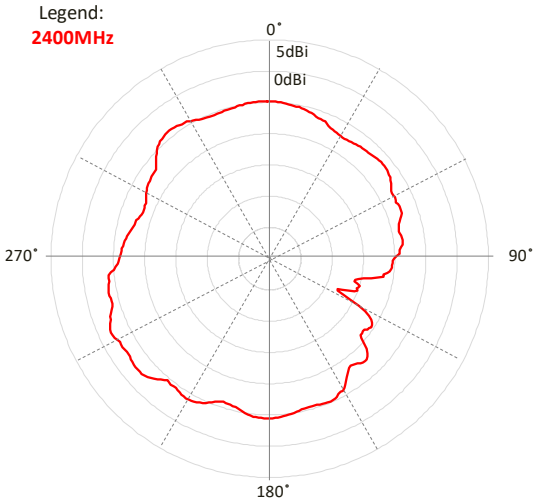
Test setup

Azimuth

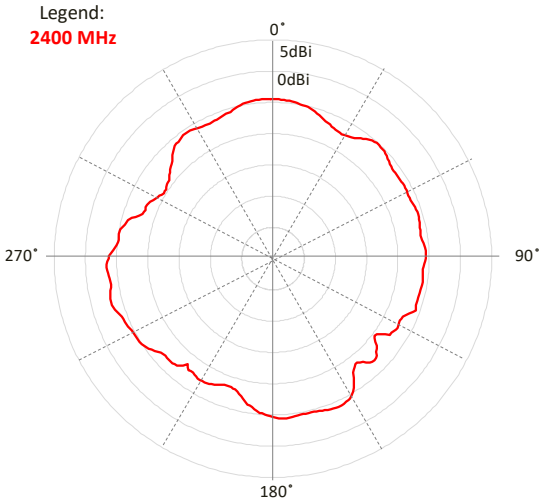


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



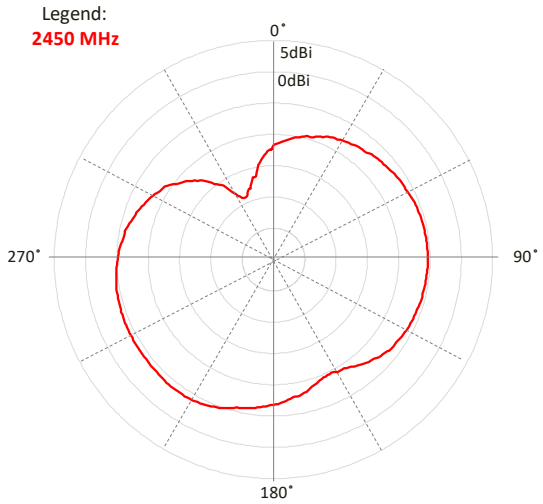
Elevation 2



RADIATION PATTERN – Vibration Sensor condition

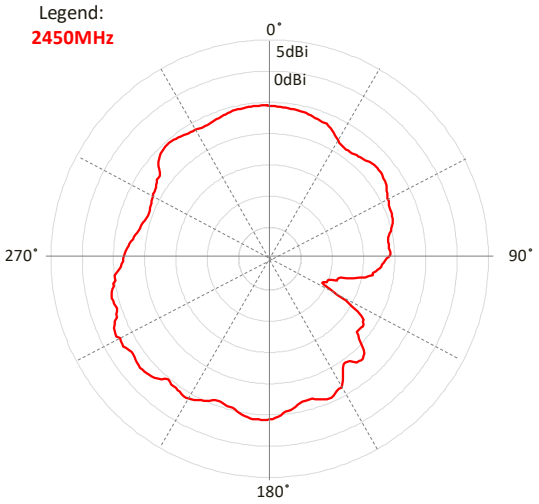
Test setup

Azimuth

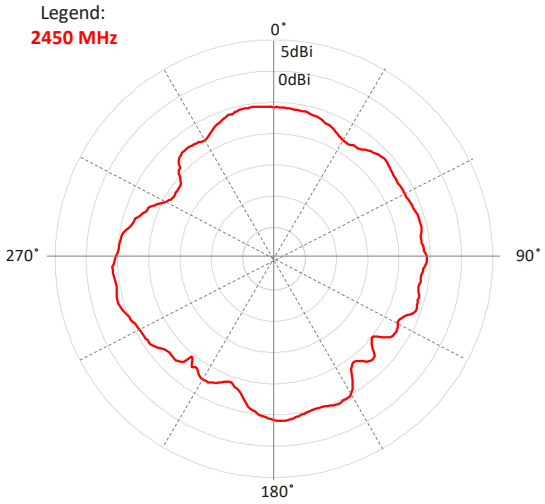


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



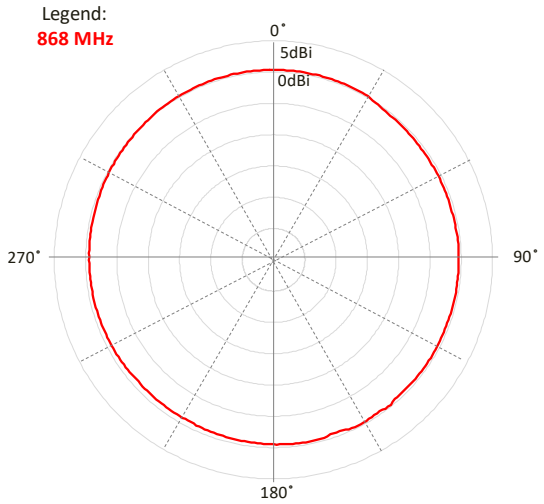
Elevation 2



RADIATION PATTERN – Pressure Sensor condition

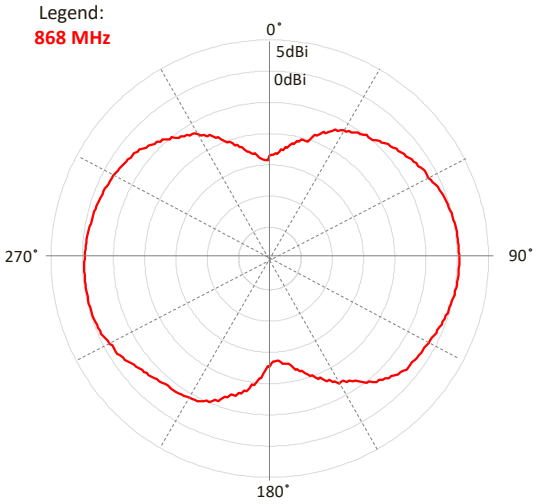
Test setup

Azimuth

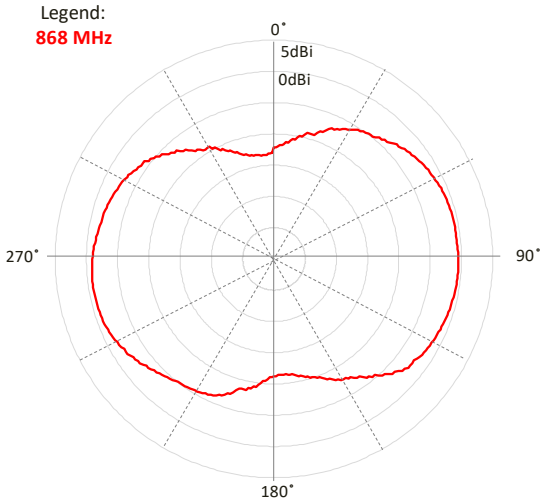


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



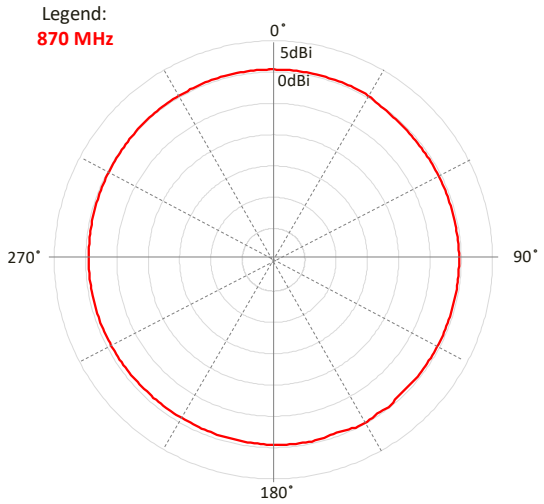
Elevation 2



RADIATION PATTERN – Pressure Sensor condition

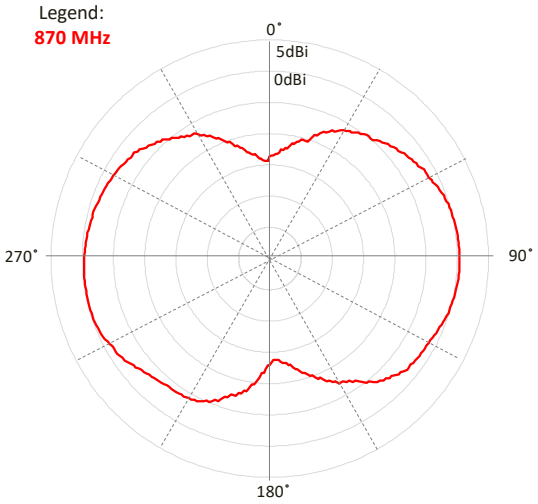
Test setup

Azimuth

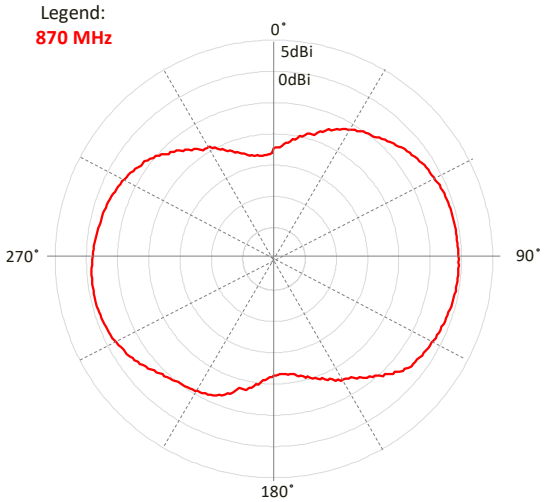


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



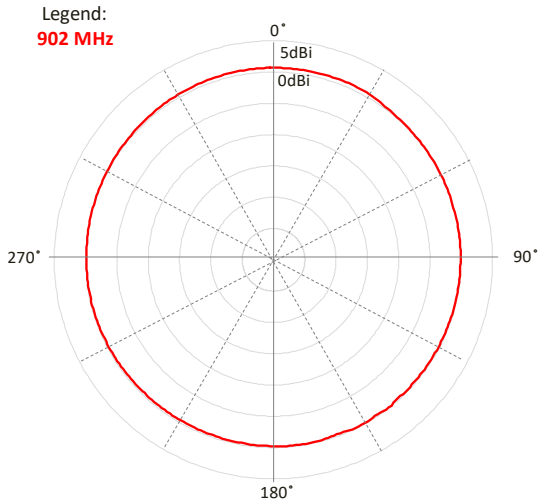
Elevation 2



RADIATION PATTERN – Pressure Sensor condition

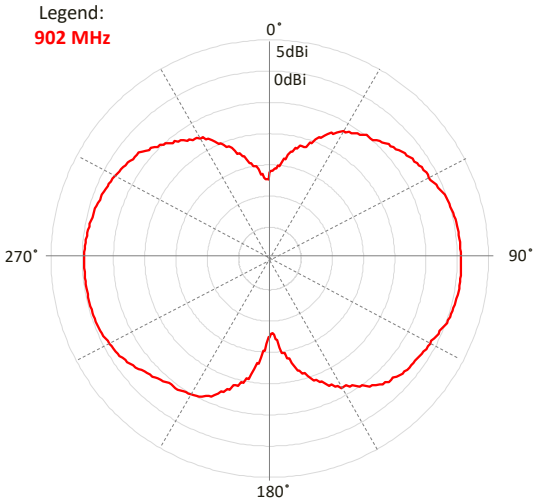
Test setup

Azimuth

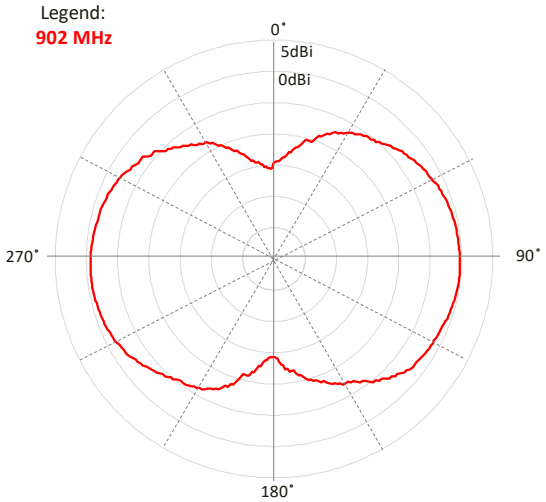


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



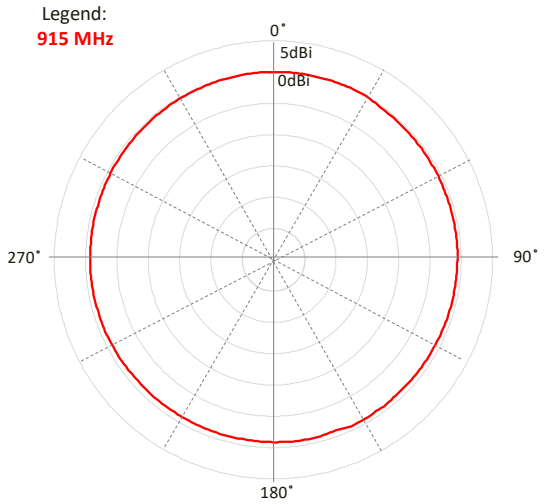
Elevation 2



RADIATION PATTERN – Pressure Sensor condition

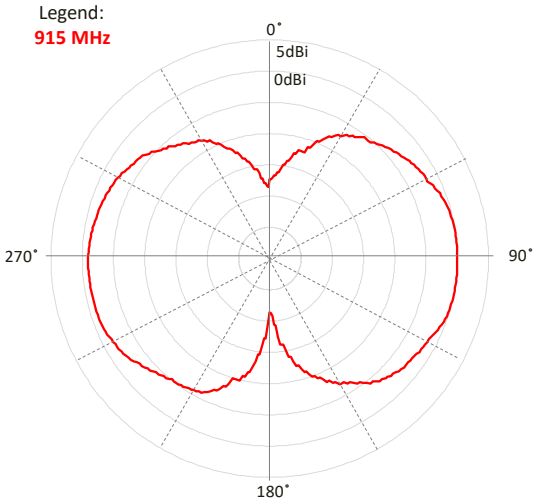
Test setup

Azimuth

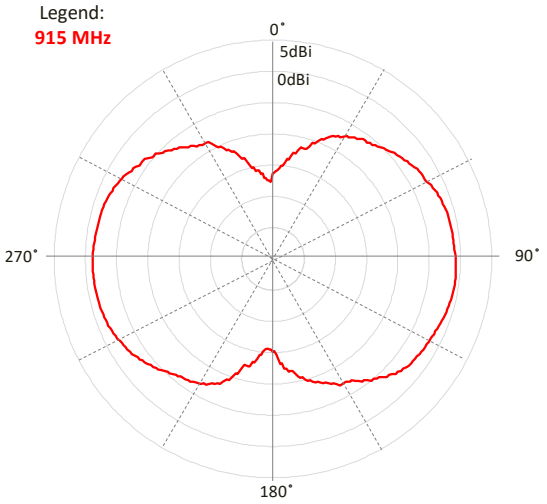


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

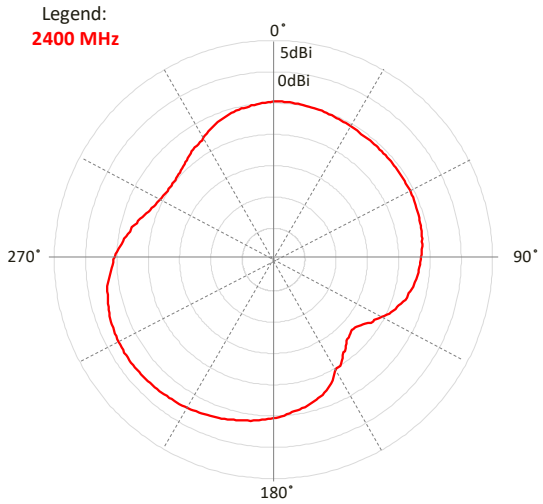


Elevation 2



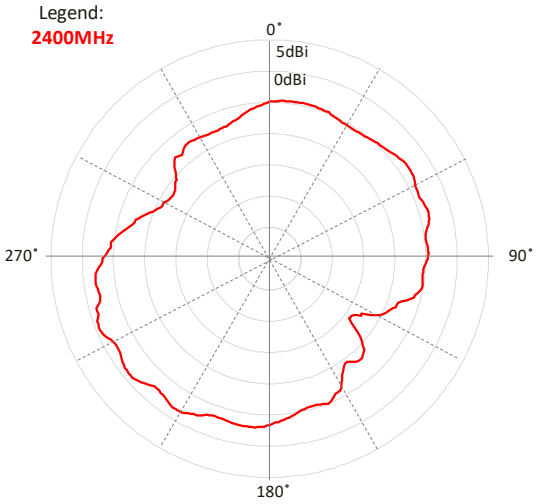
RADIATION PATTERN – Pressure Sensor condition

Azimuth

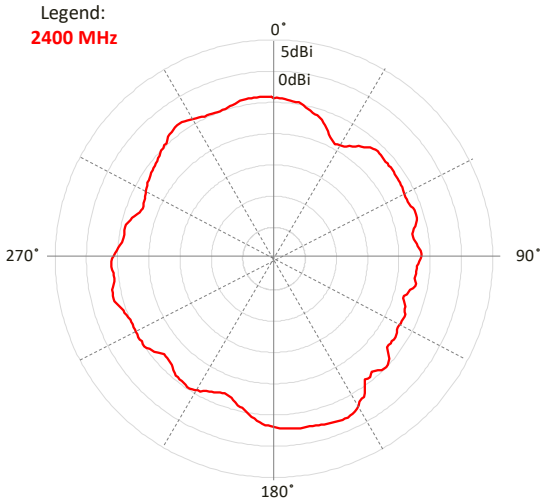


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

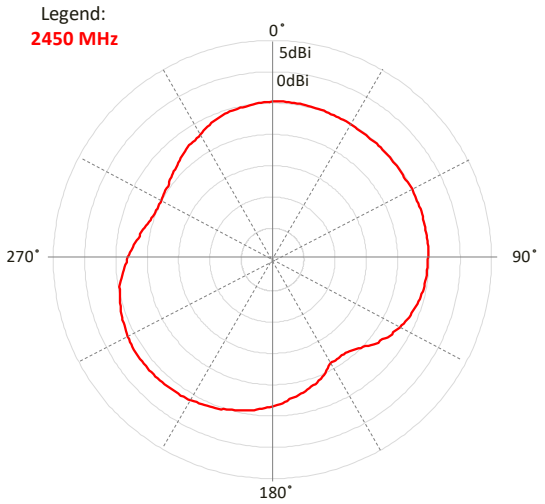


Elevation 2



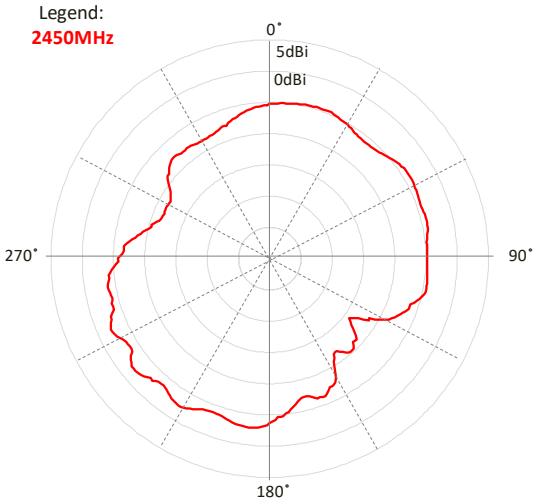
RADIATION PATTERN – Pressure Sensor condition

Azimuth

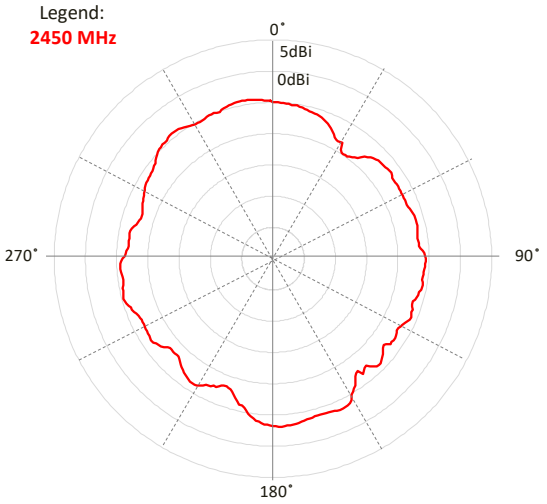


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

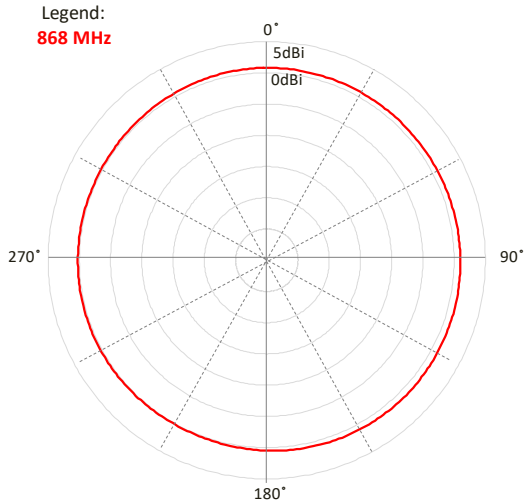


Elevation 2



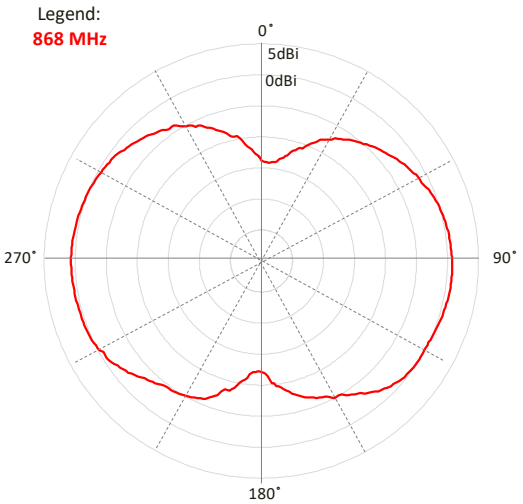
RADIATION PATTERN – Humidity Sensor condition

Azimuth

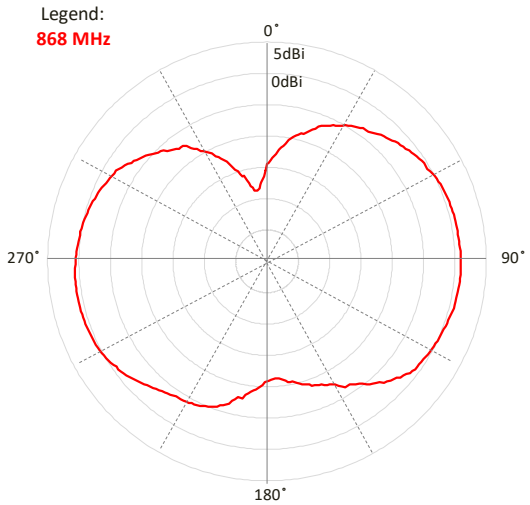


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



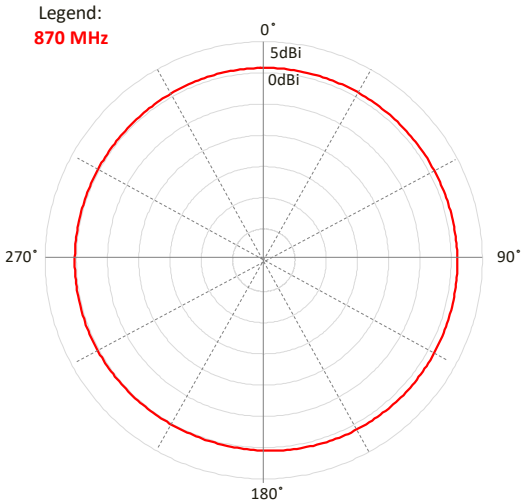
Elevation 2



RADIATION PATTERN – Humidity Sensor condition

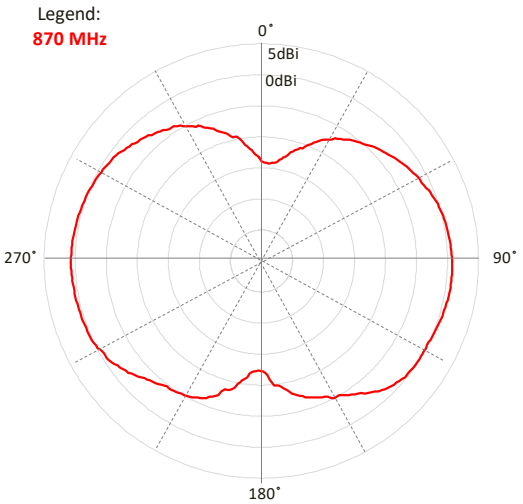
Test setup

Azimuth

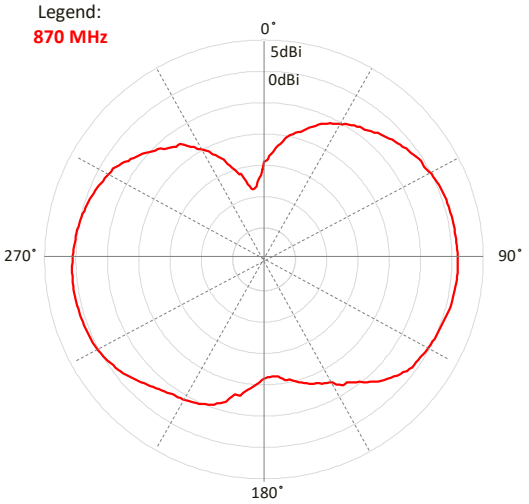


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



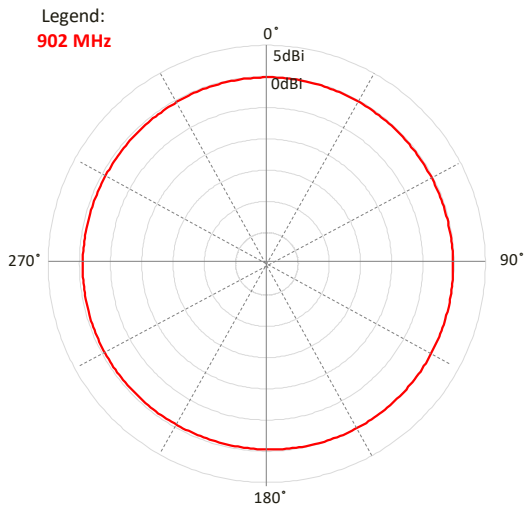
Elevation 2



RADIATION PATTERN – Humidity Sensor condition

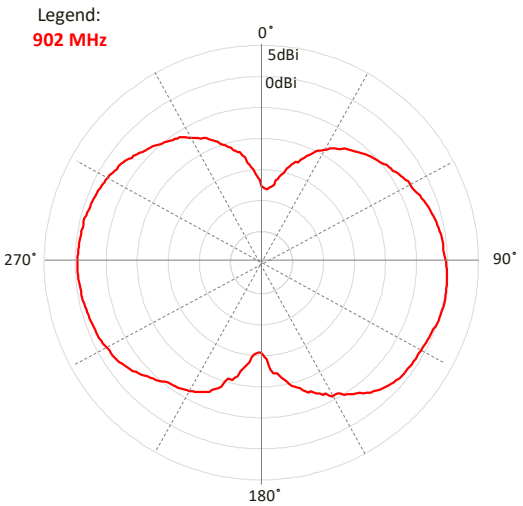
Test setup

Azimuth

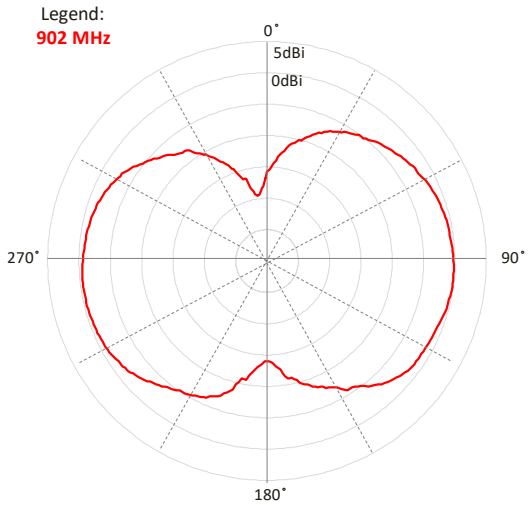


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

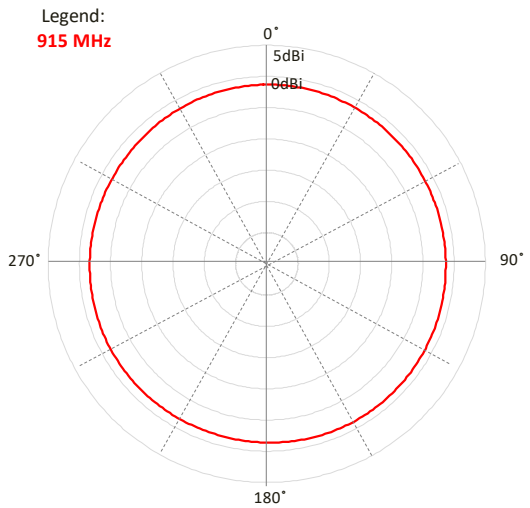


Elevation 2



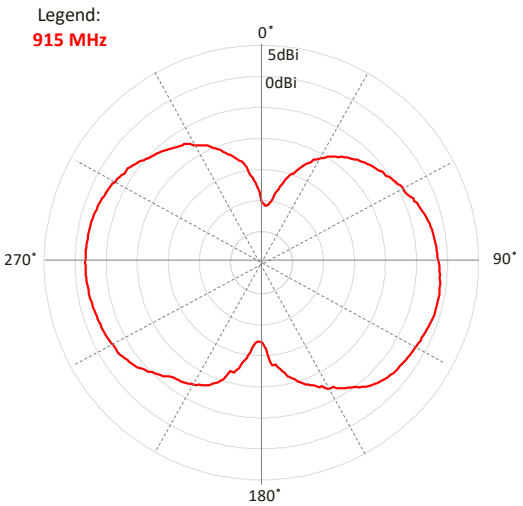
RADIATION PATTERN – Humidity Sensor condition

Azimuth

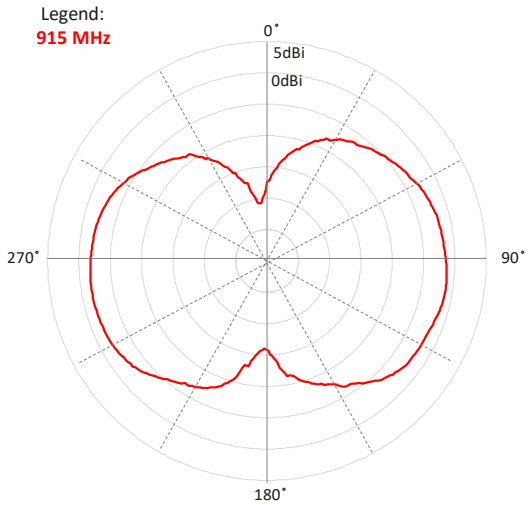


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

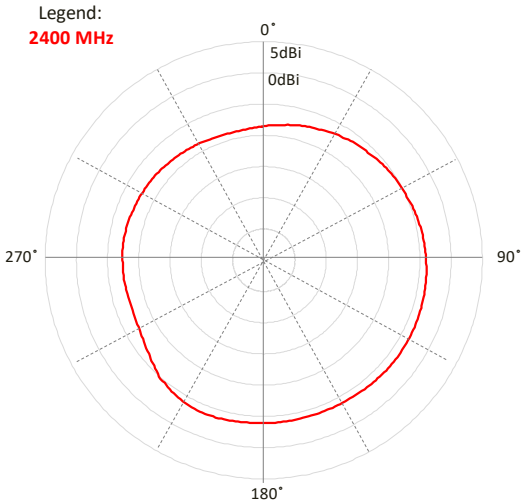


Elevation 2



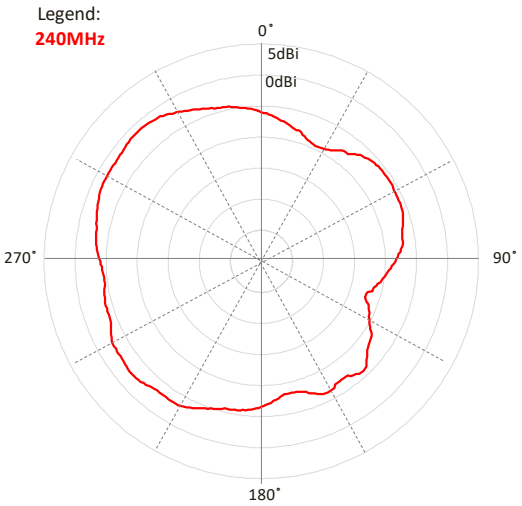
RADIATION PATTERN – Humidity Sensor condition

Azimuth

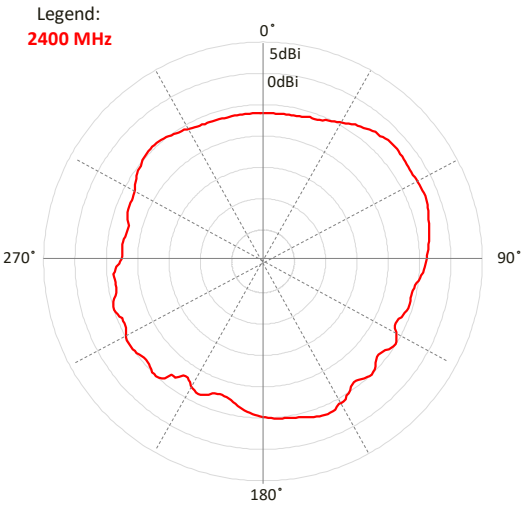


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

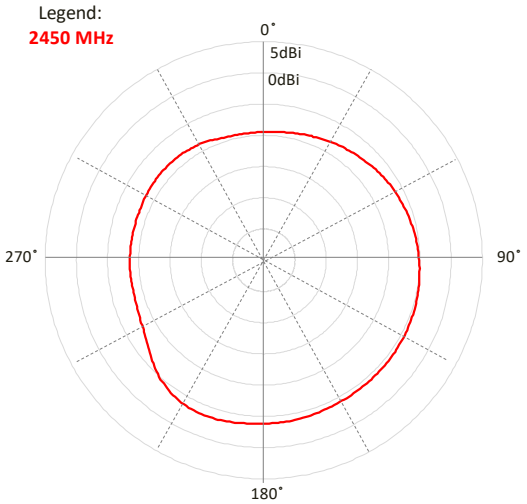


Elevation 2



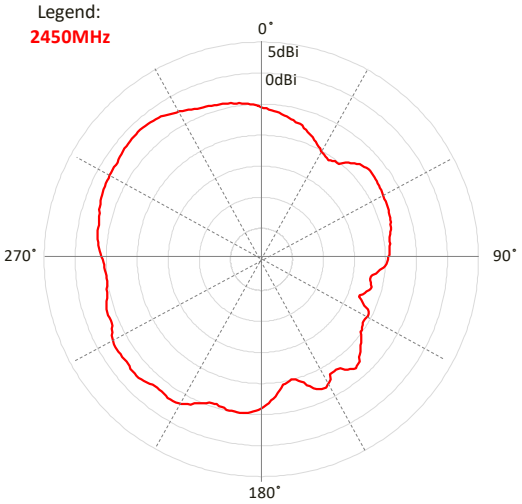
RADIATION PATTERN – Humidity Sensor condition

Azimuth

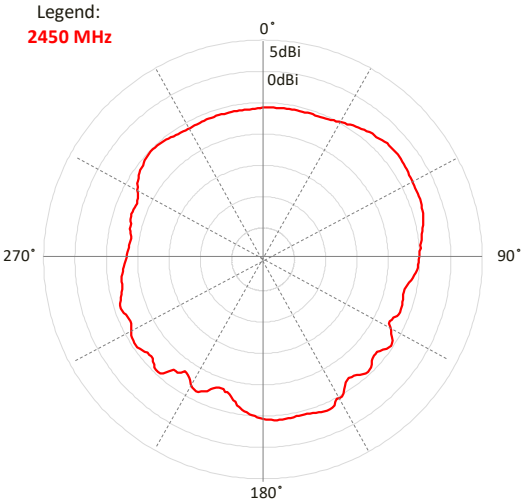


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

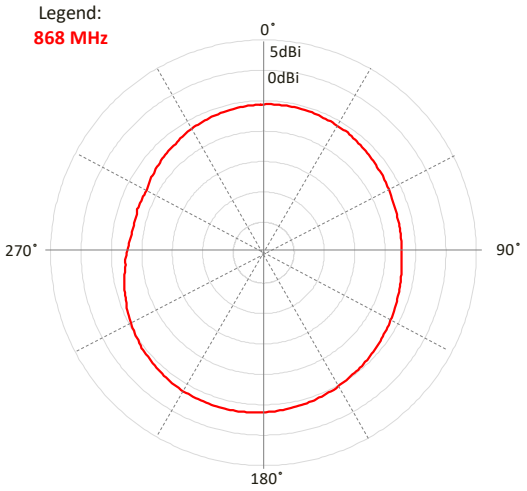


Elevation 2



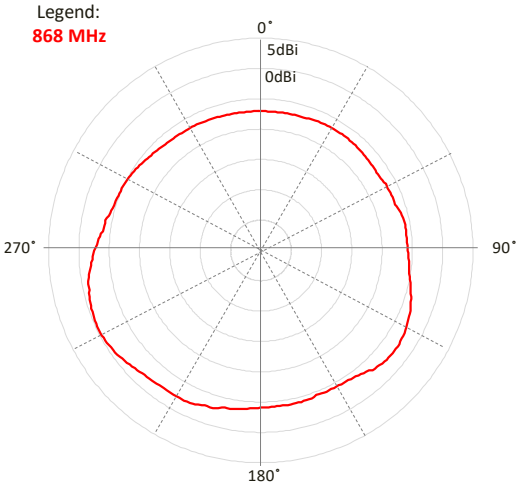
RADIATION PATTERN – Temperature Sensor condition

Azimuth

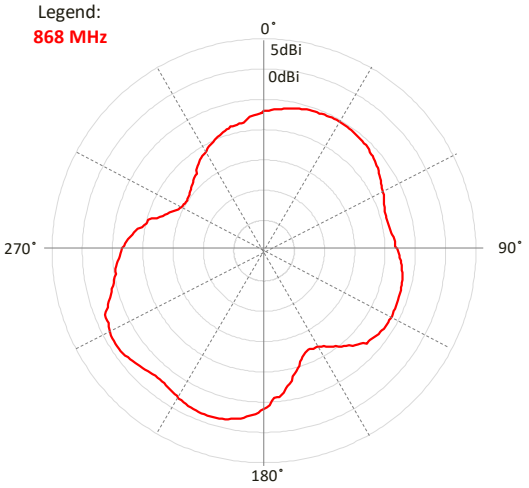


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

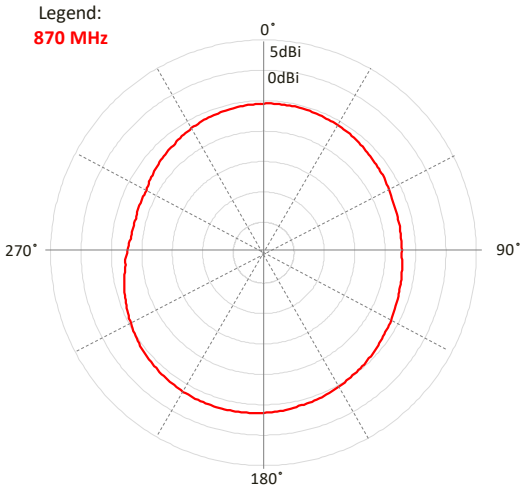


Elevation 2



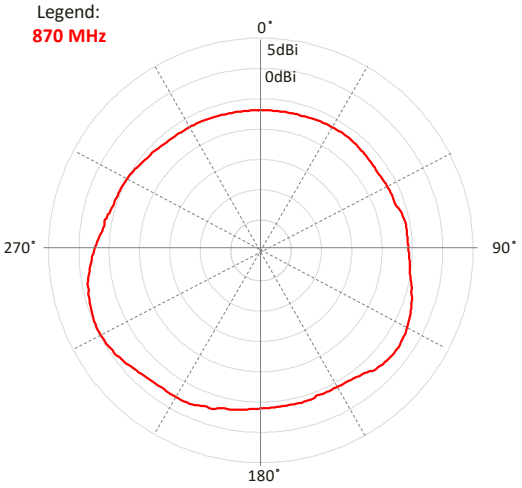
RADIATION PATTERN – Temperature Sensor condition

Azimuth

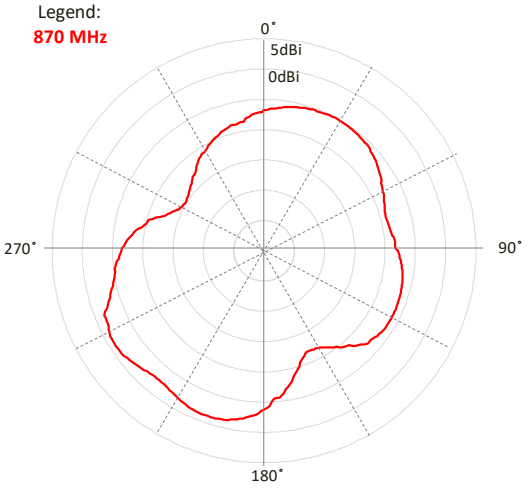


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1

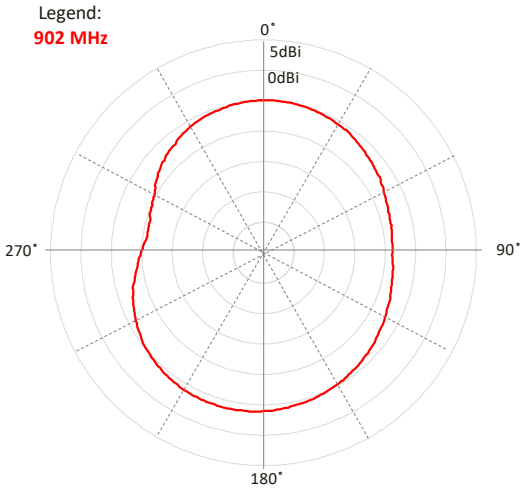


Elevation 2



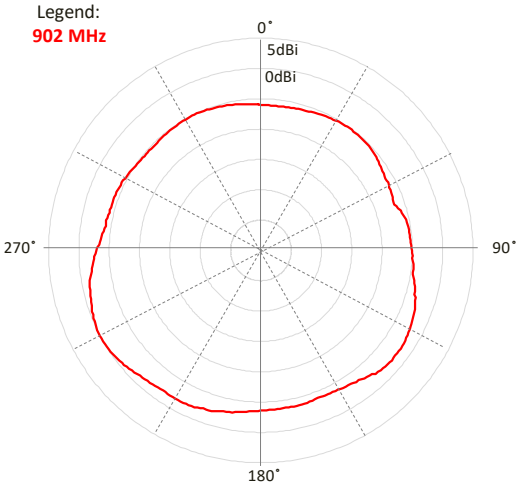
RADIATION PATTERN – Temperature Sensor condition

Azimuth

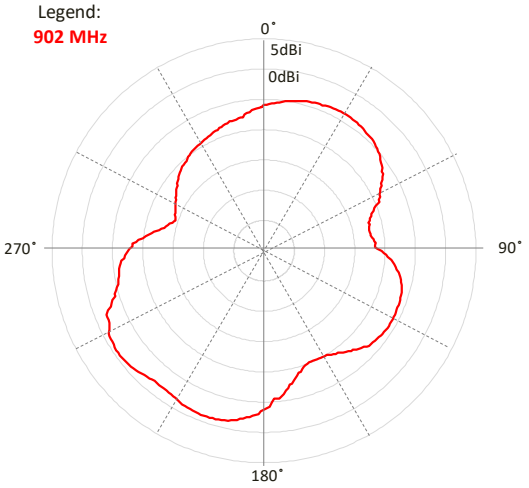


Elevation 1 Plane
Elevation 2 Plane

Elevation 1

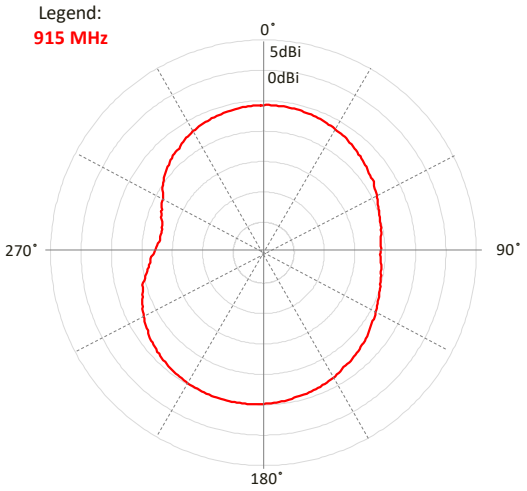


Elevation 2



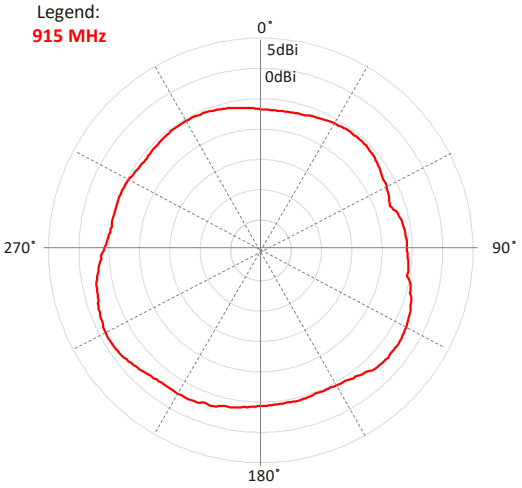
RADIATION PATTERN – Temperature Sensor condition

Azimuth

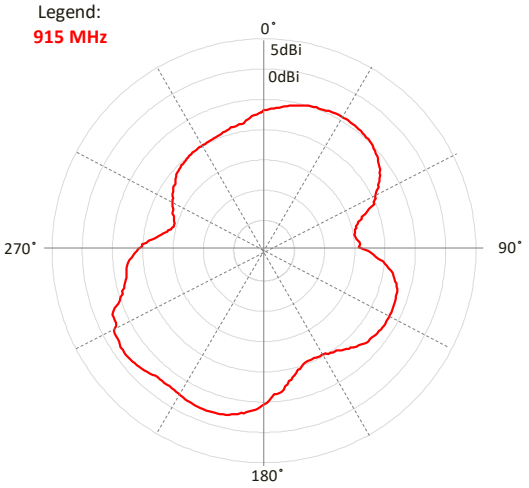


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



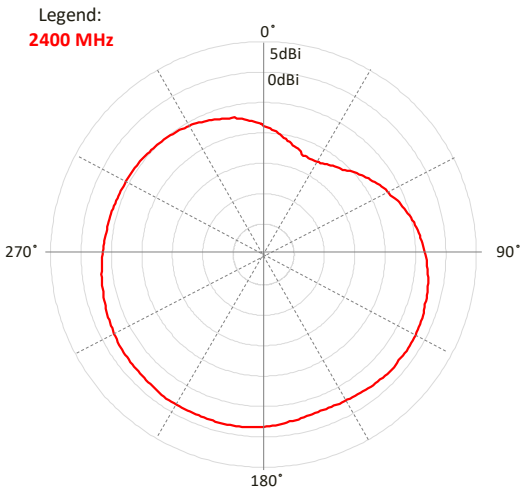
Elevation 2



RADIATION PATTERN – Temperature Sensor condition

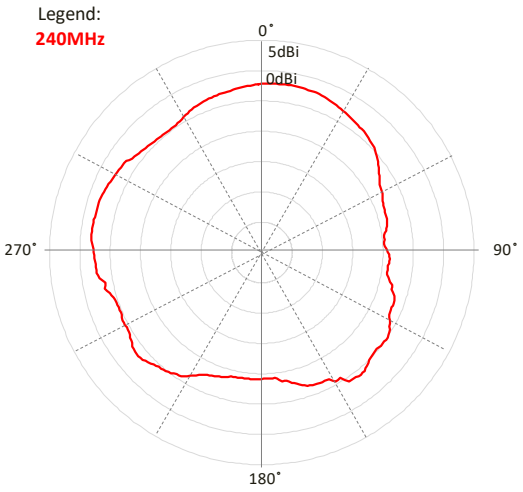
Test setup

Azimuth

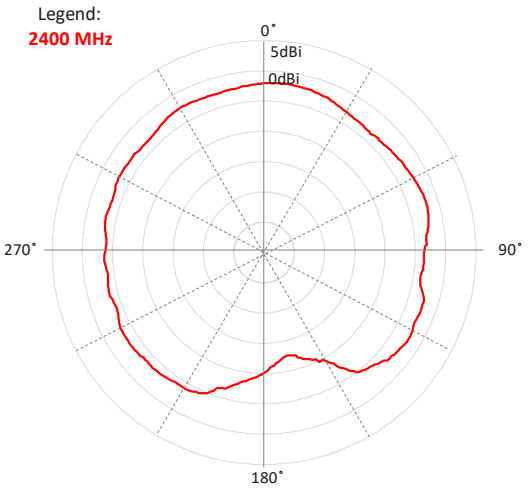


Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



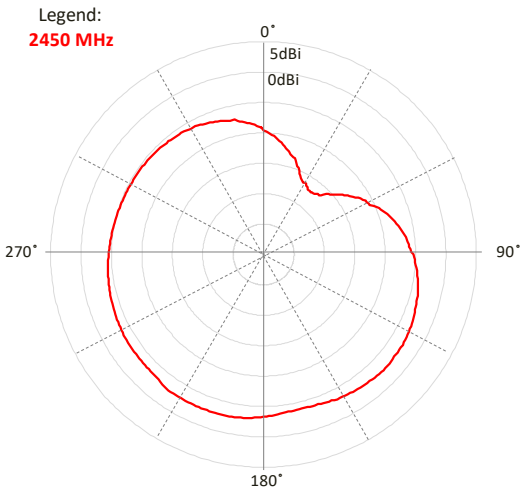
Elevation 2



RADIATION PATTERN – Temperature Sensor condition

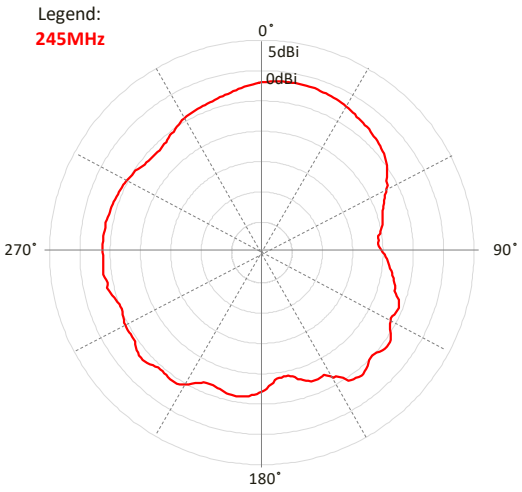
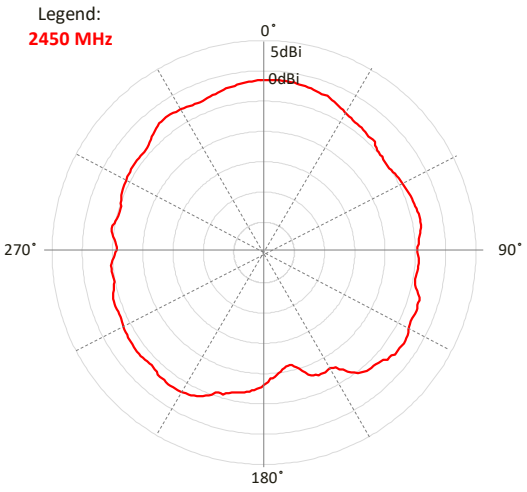
Test setup

Azimuth



Azimuth Plane
Elevation 1 Plane
Elevation 2 Plane

Elevation 1



Elevation 2