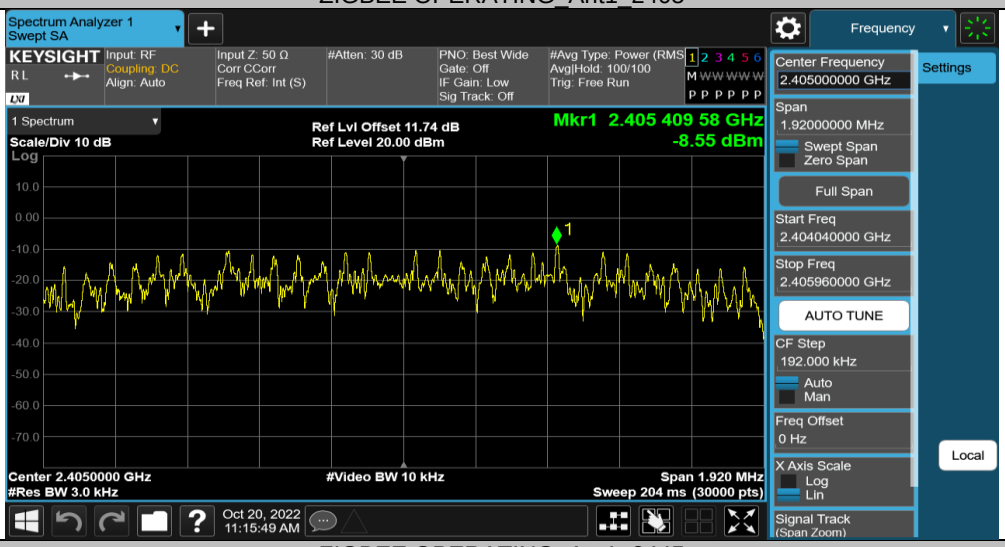
Appendix A: Test Results

APPENDIX A: TEST RESULTS **1**
APPENDIX A.1: TEST RESULTS OF CONDUCTED POWER SPECTRAL DENSITY 2
APPENDIX A.2: TEST RESULTS OF 6DB BANDWIDTH 4
APPENDIX A.3: TEST RESULTS OF 99% BANDWIDTH 6
APPENDIX A.4: TEST RESULTS OF CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH 8
Conducted Spurious Emission *8*
Band Edge *12*
APPENDIX A.5: TEST RESULTS OF RADIATED SPURIOUS EMISSIONS 13
30 MHz to 1GHz *13*
1GHz-18GHz *15*
APPENDIX A.6: TEST RESULTS OF RADIATED EMISSIONS IN RESTRICTED BANDS 27

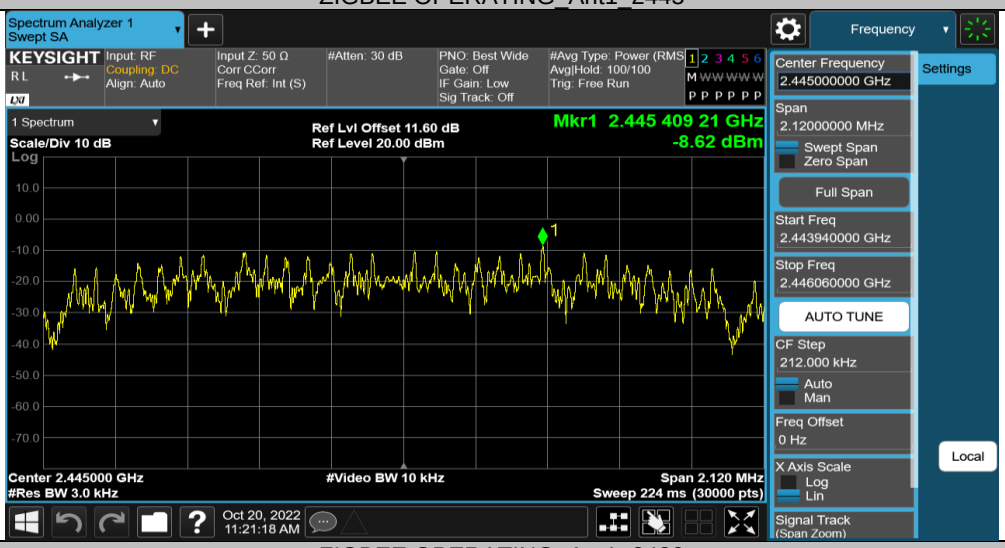
Appendix A.1: Test Results of Conducted Power Spectral Density

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
Zigbee	Ant1	2405	-8.55	≤8.00	PASS
		2445	-8.62	≤8.00	PASS
		2480	-8.88	≤8.00	PASS

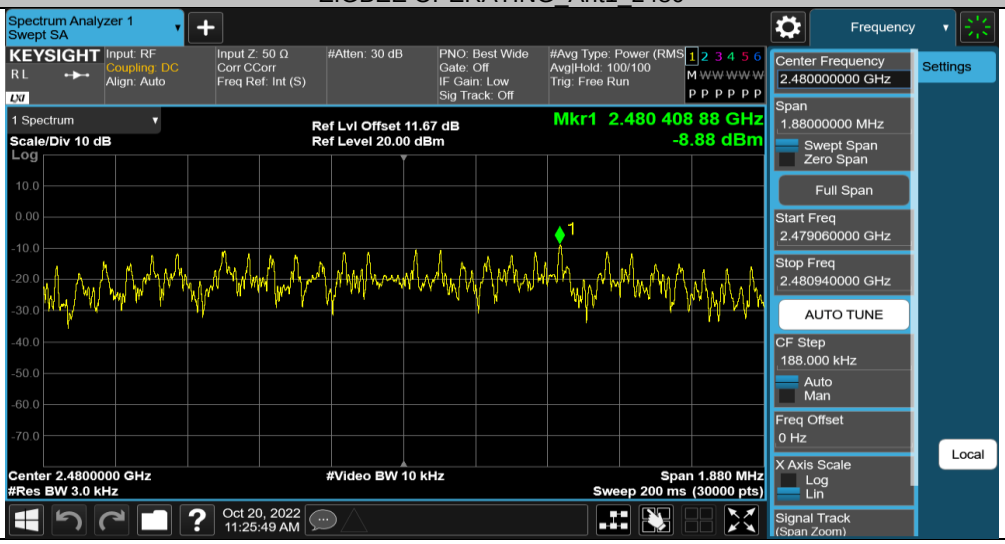
ZIGBEE OPERATING_Ant1_2405



ZIGBEE OPERATING_Ant1_2445



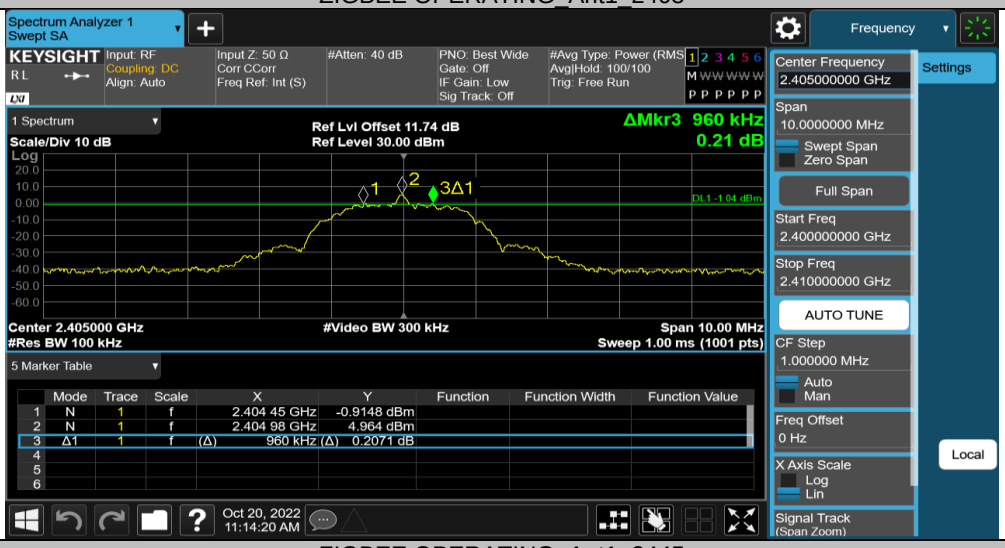
ZIGBEE OPERATING_Ant1_2480



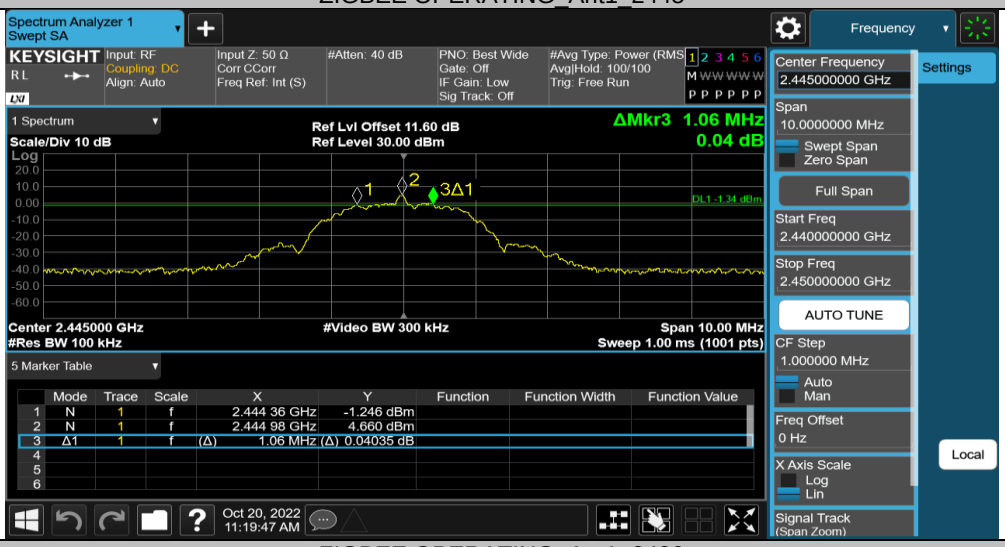
Appendix A.2: Test Results of 6dB Bandwidth

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
Zigbee	Ant1	2405	0.960	2404.450	2405.410	＞0.5	PASS
		2445	1.060	2444.360	2445.420	＞0.5	PASS
		2480	0.940	2479.480	2480.420	＞0.5	PASS

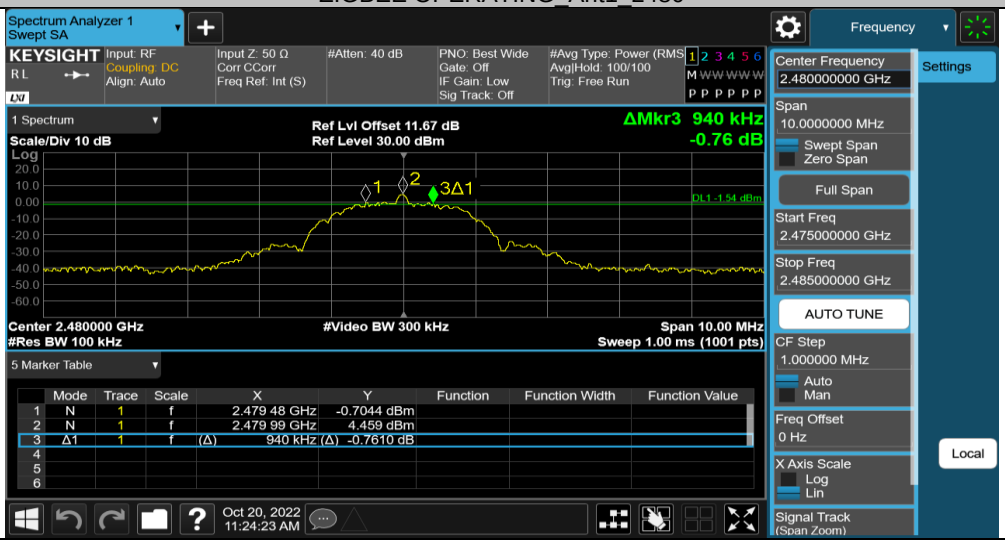
ZIGBEE OPERATING_Ant1_2405



ZIGBEE OPERATING_Ant1_2445



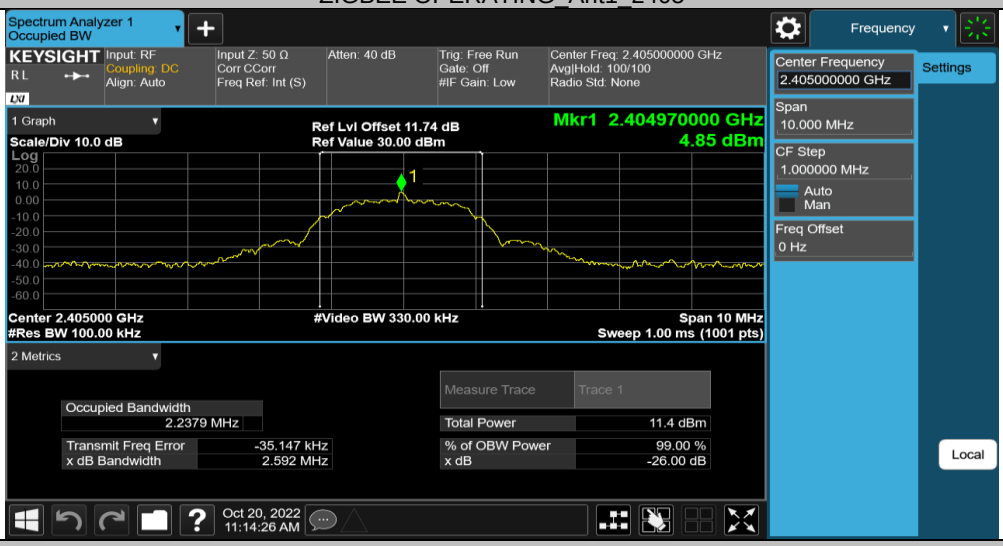
ZIGBEE OPERATING_Ant1_2480



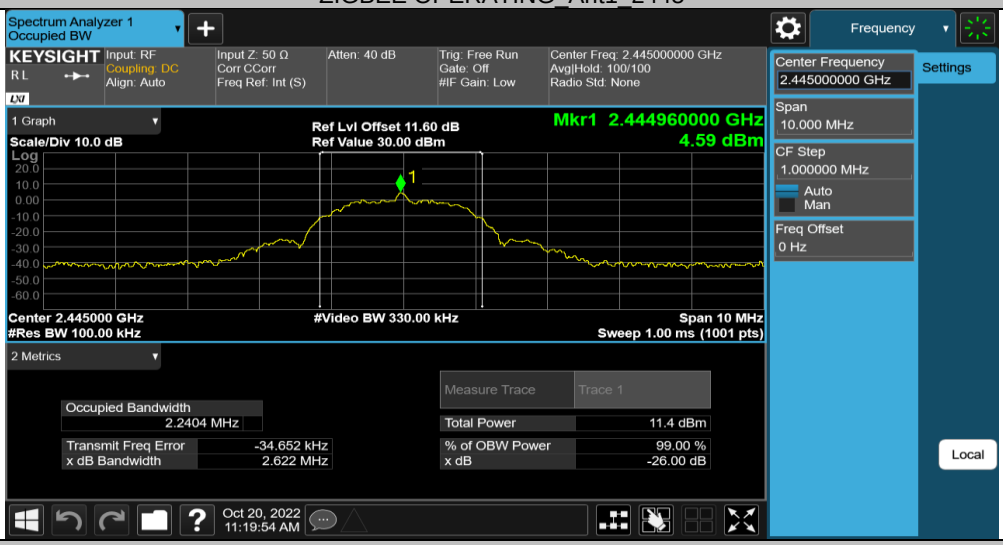
Appendix A.3: Test Results of 99% Bandwidth

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
Zigbee	Ant1	2405	2.2379	2403.8459	2406.0838	---	PASS
		2445	2.2404	2443.8452	2446.0856	---	PASS
		2480	2.2455	2478.8423	2481.0878	---	PASS

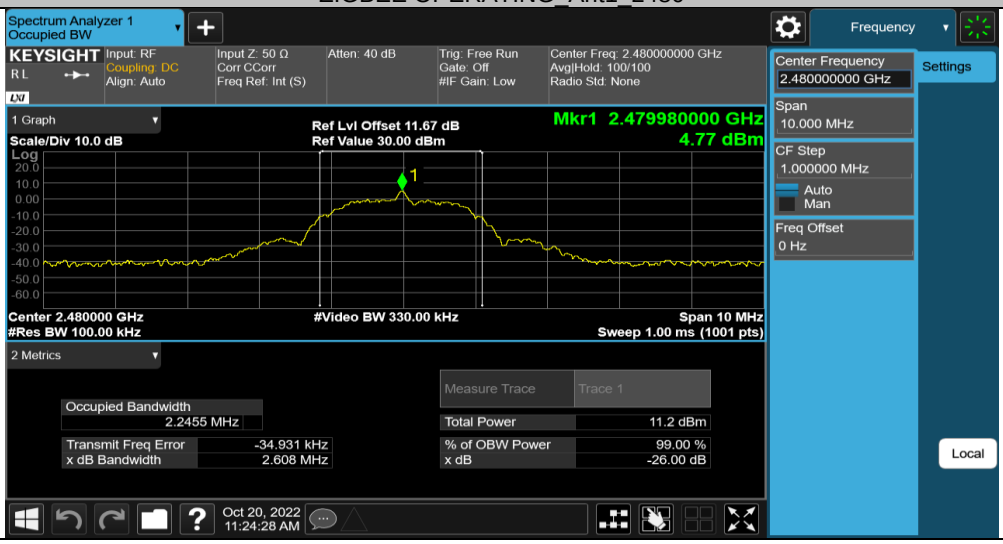
ZIGBEE OPERATING_Ant1_2405



ZIGBEE OPERATING_Ant1_2445



ZIGBEE OPERATING_Ant1_2480



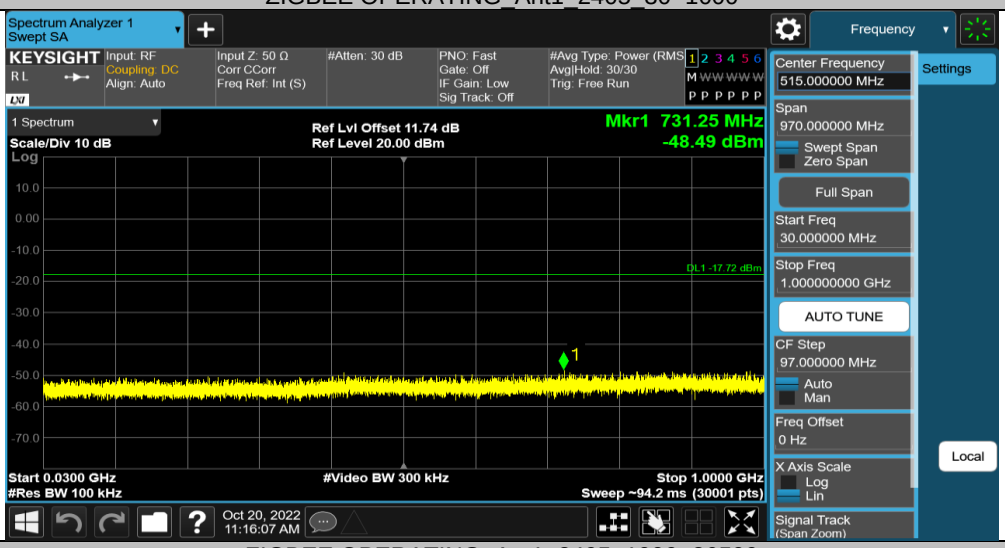
Appendix A.4: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Conducted Spurious Emission

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
Zigbee	Ant1	2405	Reference	2.28	2.28	---	PASS
			30~1000	2.28	-48.5	≤-17.72	PASS
			1000~26500	2.28	-38.88	≤-17.72	PASS
		2445	Reference	-0.75	-0.75	---	PASS
			30~1000	-0.75	-47.89	≤-20.75	PASS
			1000~26500	-0.75	-39.12	≤-20.75	PASS
		2480	Reference	-0.58	-0.58	---	PASS
			30~1000	-0.58	-48.4	≤-20.58	PASS
			1000~26500	-0.58	-39.37	≤-20.58	PASS

ZIGBEE OPERATING_Ant1_2405_0~Reference

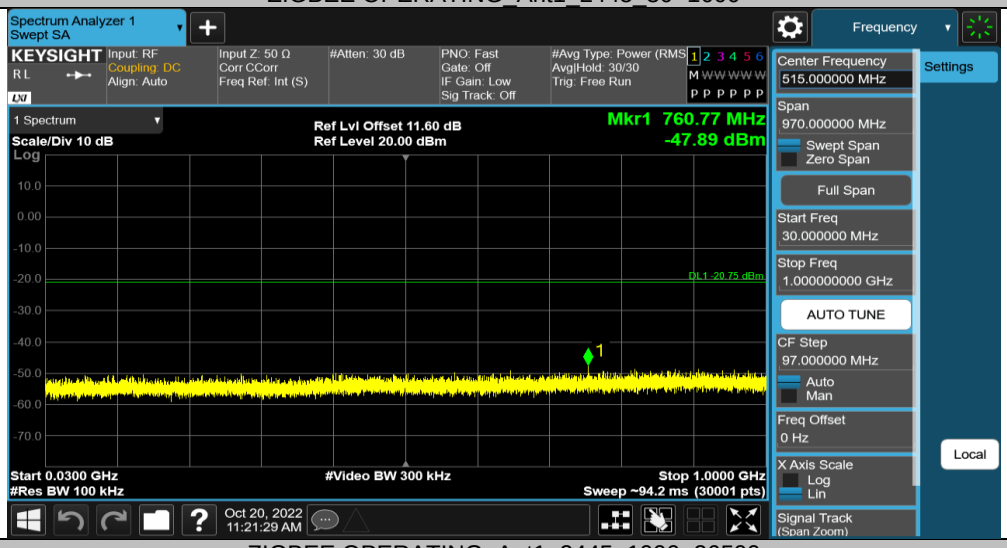
ZIGBEE OPERATING_Ant1_2405_30~1000



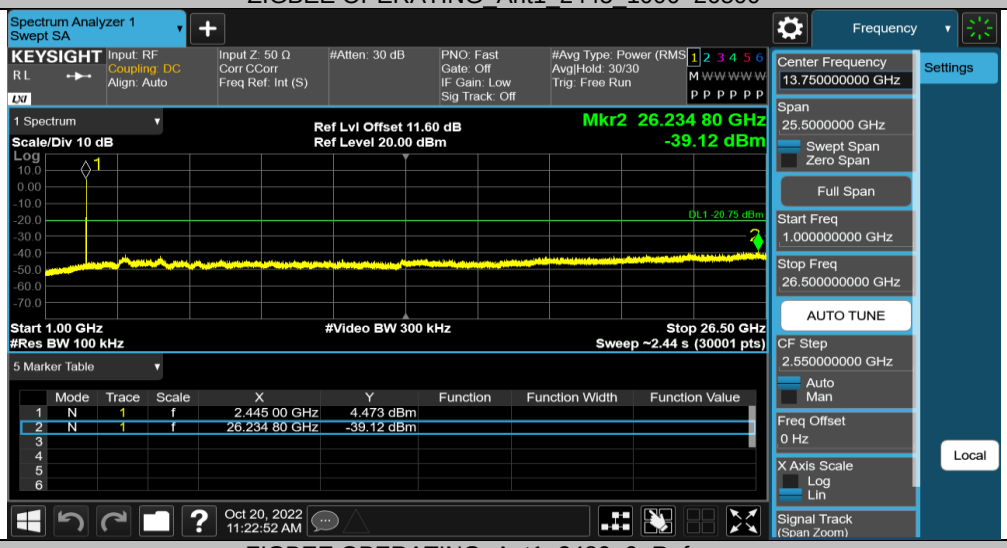
ZIGBEE OPERATING_Ant1_2405_1000~26500

ZIGBEE OPERATING_Ant1_2445_0~Reference

ZIGBEE OPERATING_Ant1_2445_30~1000

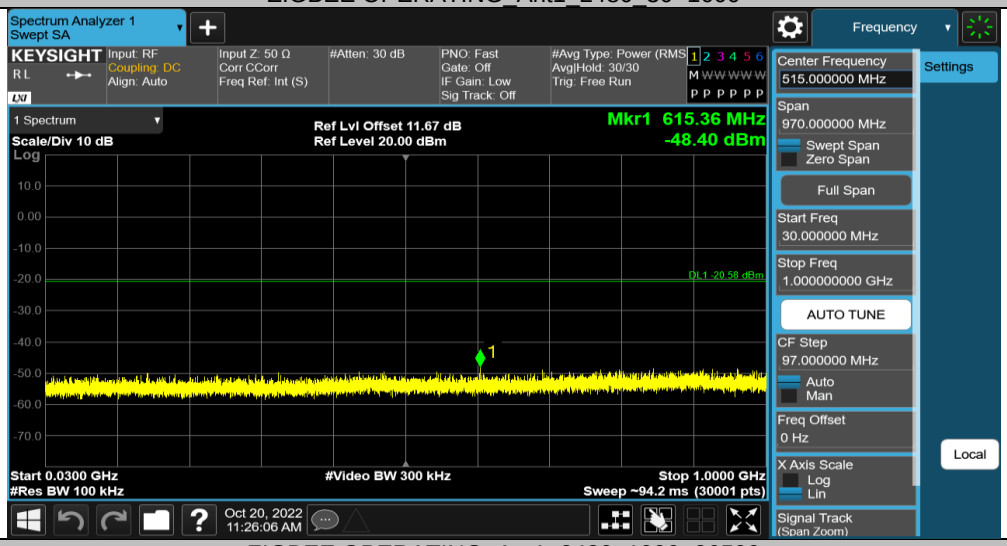


ZIGBEE OPERATING_Ant1_2445_1000~26500

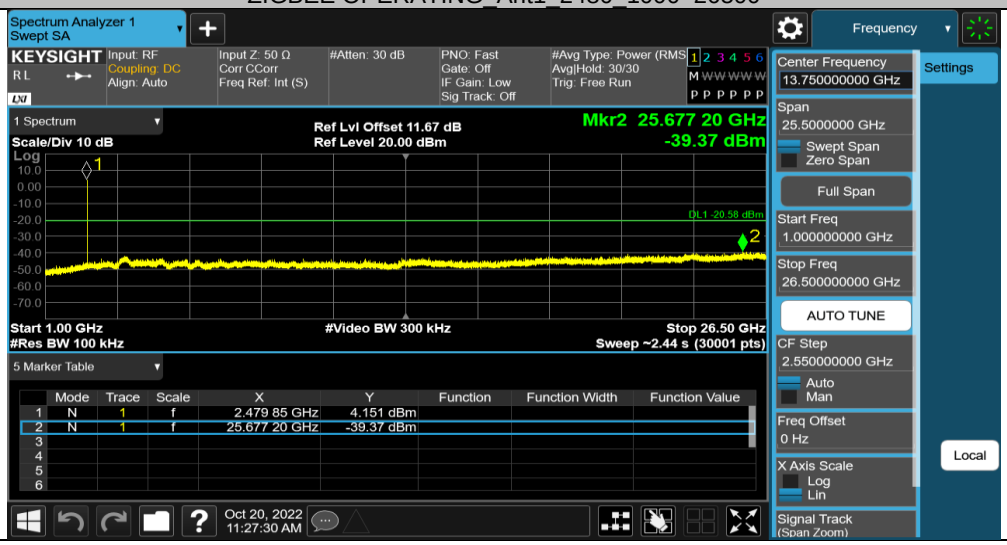


ZIGBEE OPERATING_Ant1_2480_0~Reference

ZIGBEE OPERATING_Ant1_2480_30~1000



ZIGBEE OPERATING_Ant1_2480_1000~26500

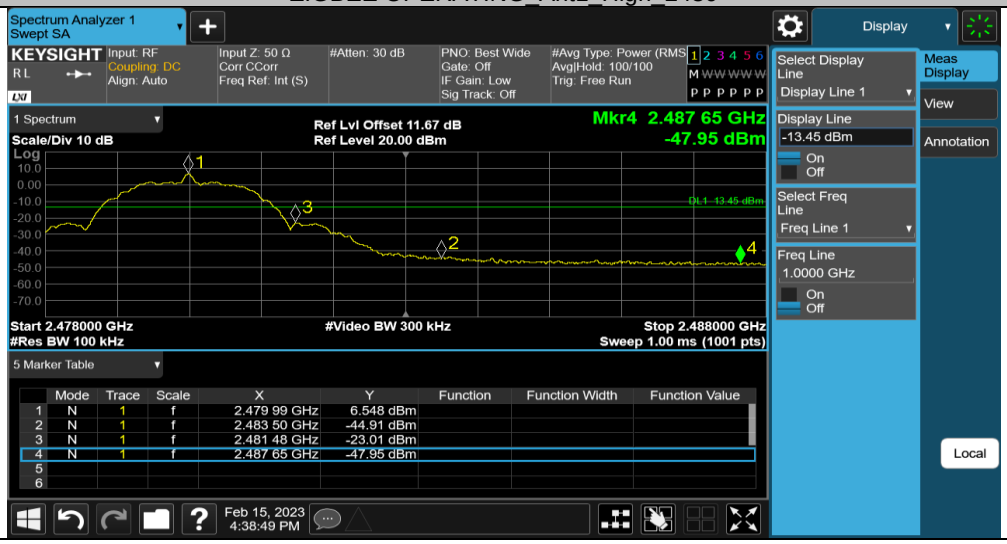


Band Edge

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
Zigbee	Ant1	Low	2405	6.53	-48.29	≤-13.46	PASS
		High	2480	6.54	-47.95	≤-13.45	PASS

ZIGBEE OPERATING_Ant1_Low_2405

ZIGBEE OPERATING_Ant1_High_2480



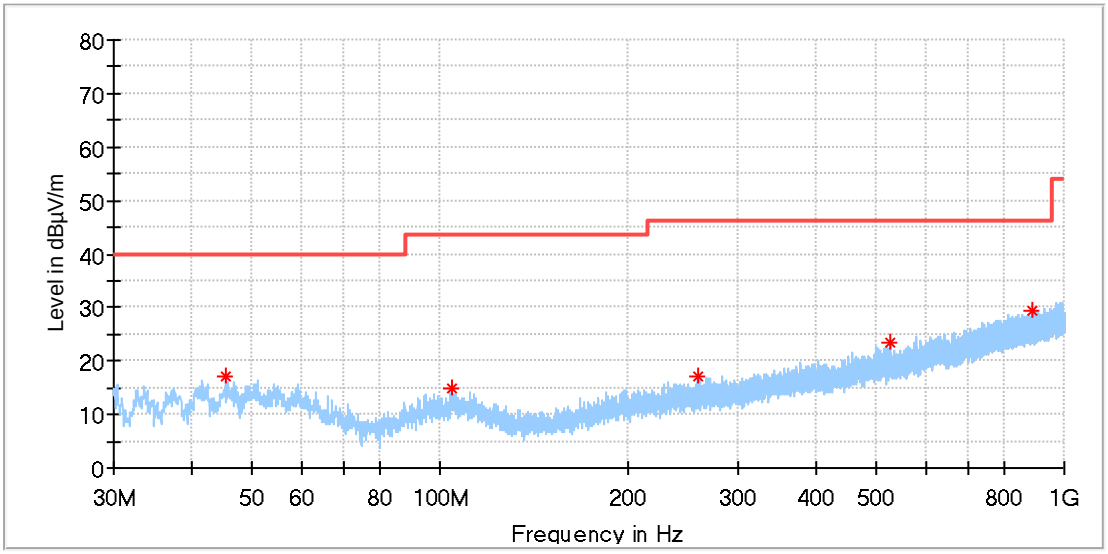
Appendix A.5: Test Results of Radiated Spurious Emissions

Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30 MHz to 1GHz

EUT Information

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

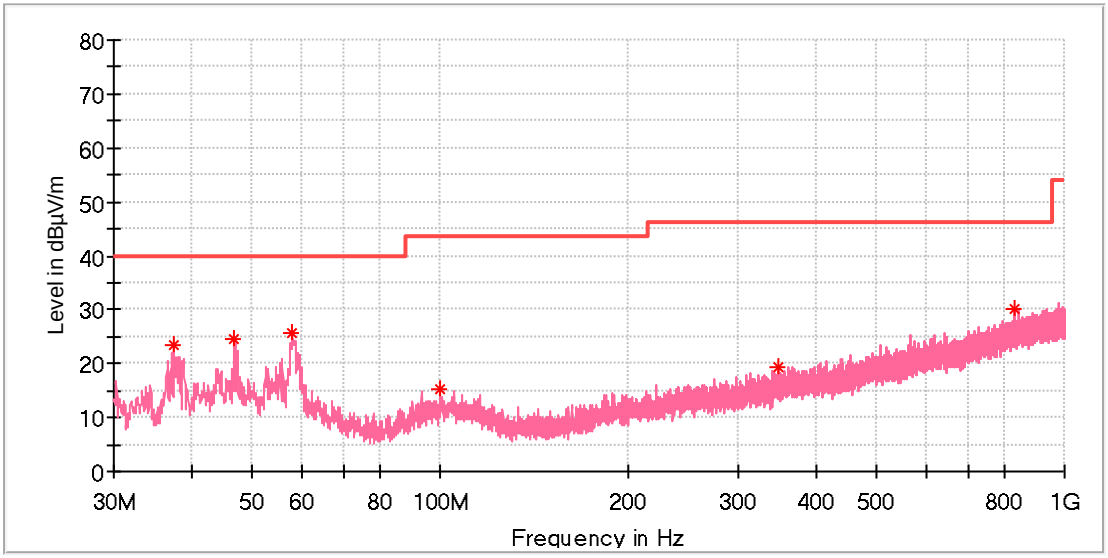
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.374500	17.01	40.00	22.99	100.0	H	121.0	-18.8
104.302000	14.76	43.50	28.74	100.0	H	10.0	-18.8
258.047000	17.17	46.00	28.83	100.0	H	338.0	-17.1
525.864000	23.34	46.00	22.66	100.0	H	0.0	-11.4
891.069000	29.44	46.00	16.56	100.0	H	46.0	-5.1

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.469000	23.45	40.00	16.55	100.0	V	98.0	-21.0
46.878000	24.48	40.00	15.52	100.0	V	42.0	-18.5
57.887500	25.66	40.00	14.34	100.0	V	193.0	-18.8
100.131000	15.29	43.50	28.21	100.0	V	156.0	-19.0
348.790500	19.35	46.00	26.65	100.0	V	15.0	-14.8
831.074500	29.98	46.00	16.02	100.0	V	28.0	-5.8

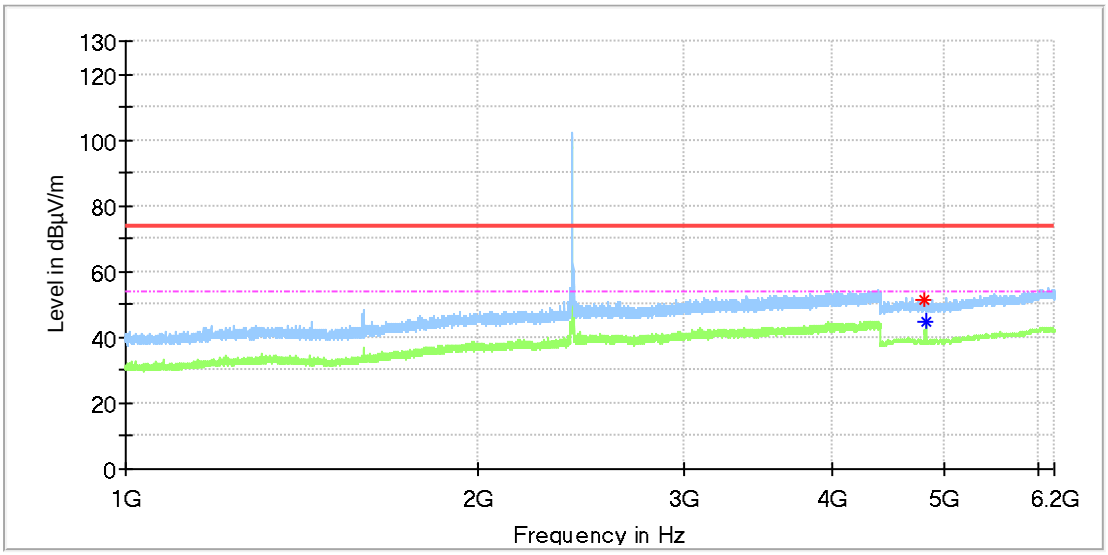
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz-18GHz

Note: The highest waveform in the figure is Zigbee operating Fundamental.

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



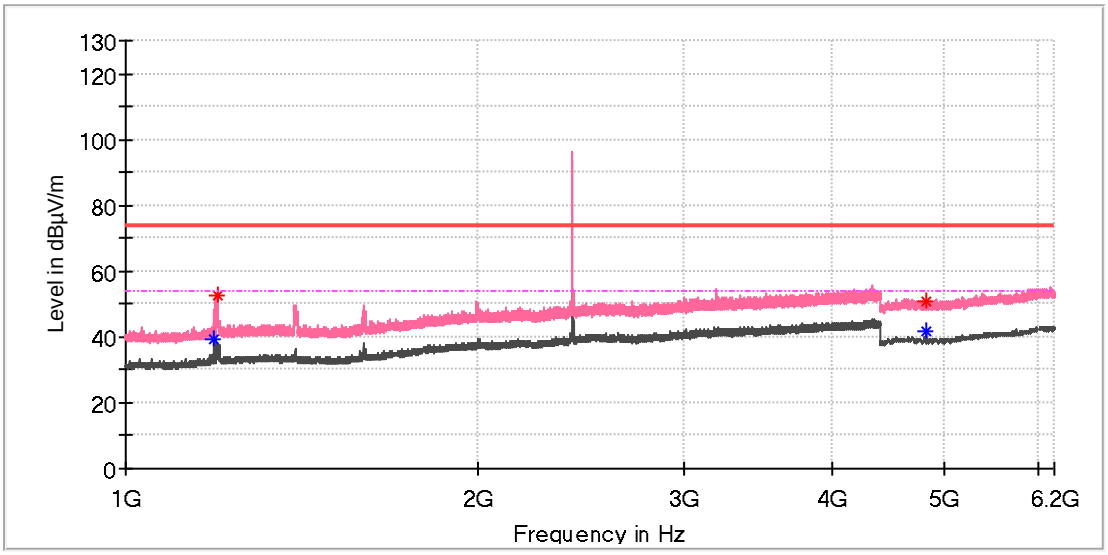
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4811.000000	51.39	---	74.00	22.61	100.0	H	275.0	11.8
4812.500000	---	44.57	54.00	9.43	100.0	H	3.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



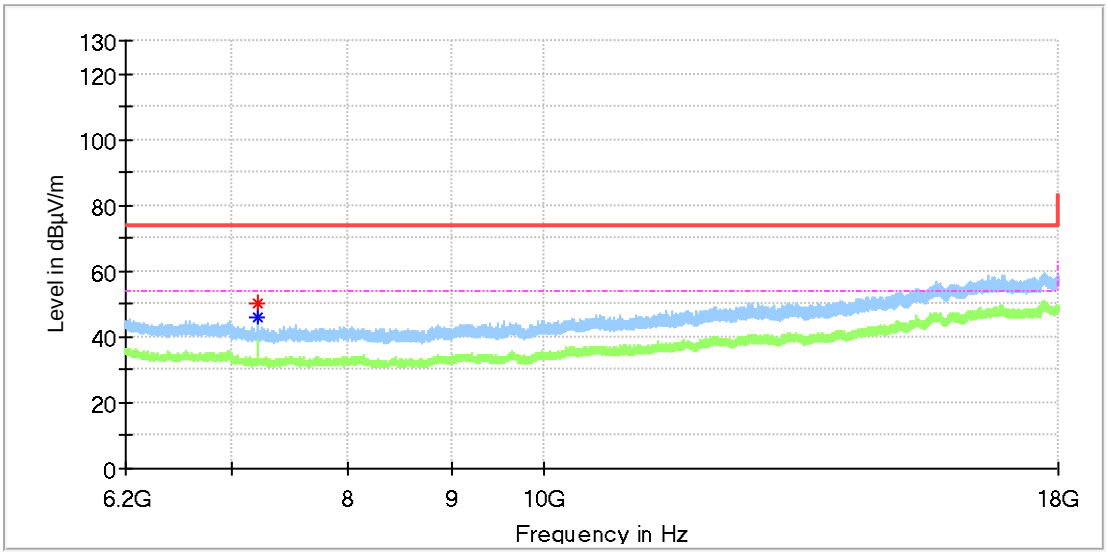
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1191.080000	---	39.29	54.00	14.71	100.0	V	280.0	1.1
1196.350000	52.90	---	74.00	21.10	100.0	V	280.0	1.1
4812.500000	---	41.61	54.00	12.39	100.0	V	90.0	11.8
4812.500000	50.52	---	74.00	23.48	100.0	V	90.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



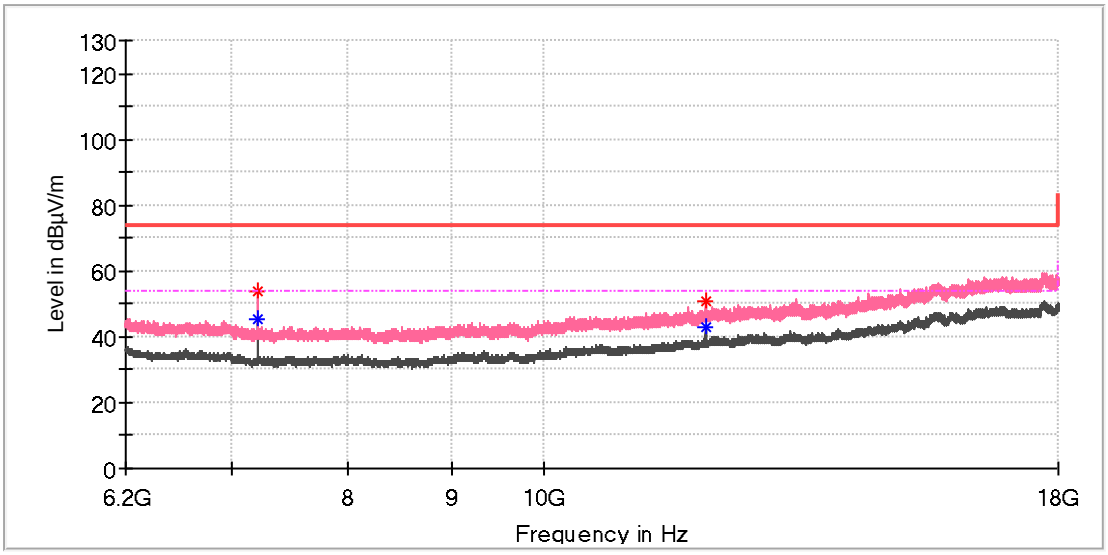
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7214.308333	---	45.77	54.00	8.23	100.0	H	133.0	8.7
7216.766667	50.02	---	74.00	23.98	100.0	H	133.0	8.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



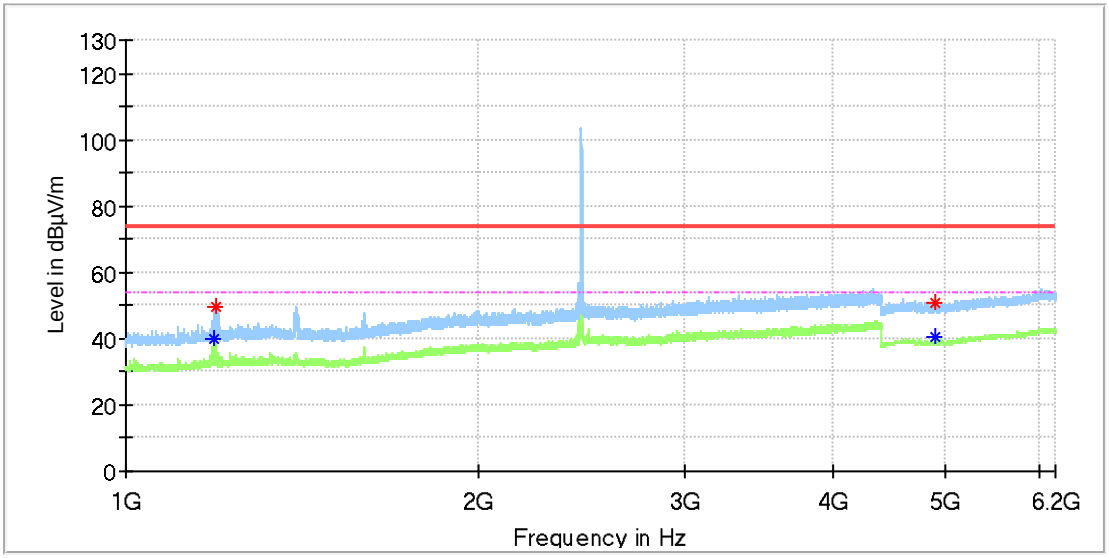
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7215.783333	---	45.12	54.00	8.88	100.0	V	247.0	8.7
7216.275000	53.61	---	74.00	20.39	100.0	V	247.0	8.7
12021.825000	50.67	---	74.00	23.33	100.0	V	71.0	14.0
12021.825000	---	42.88	54.00	11.12	100.0	V	71.0	14.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



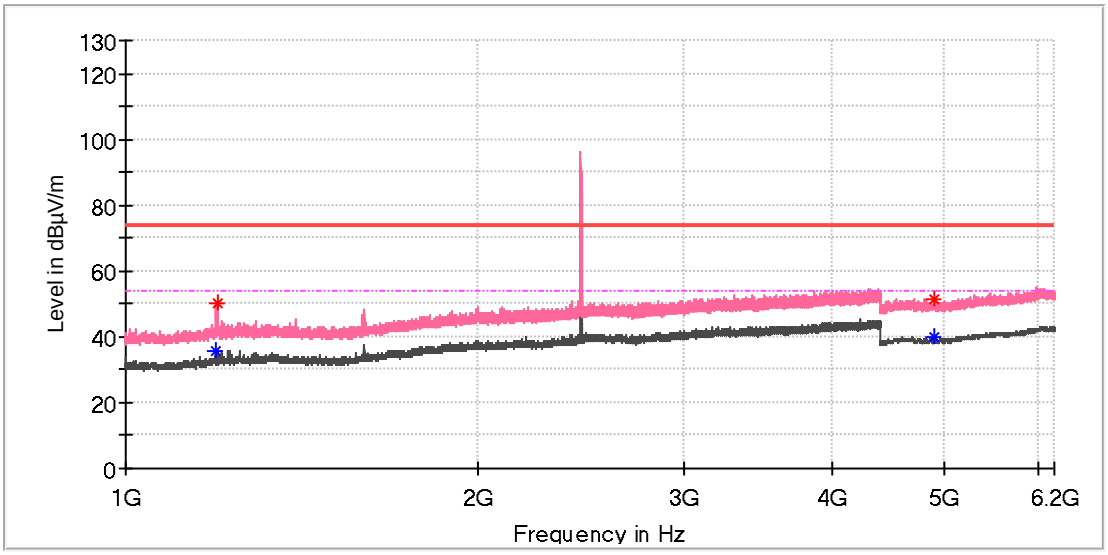
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1190.570000	---	40.06	54.00	13.94	100.0	H	243.0	1.1
1194.650000	49.40	---	74.00	24.60	100.0	H	243.0	1.1
4890.000000	---	40.27	54.00	13.73	100.0	H	277.0	11.8
4890.500000	50.93	---	74.00	23.07	100.0	H	91.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



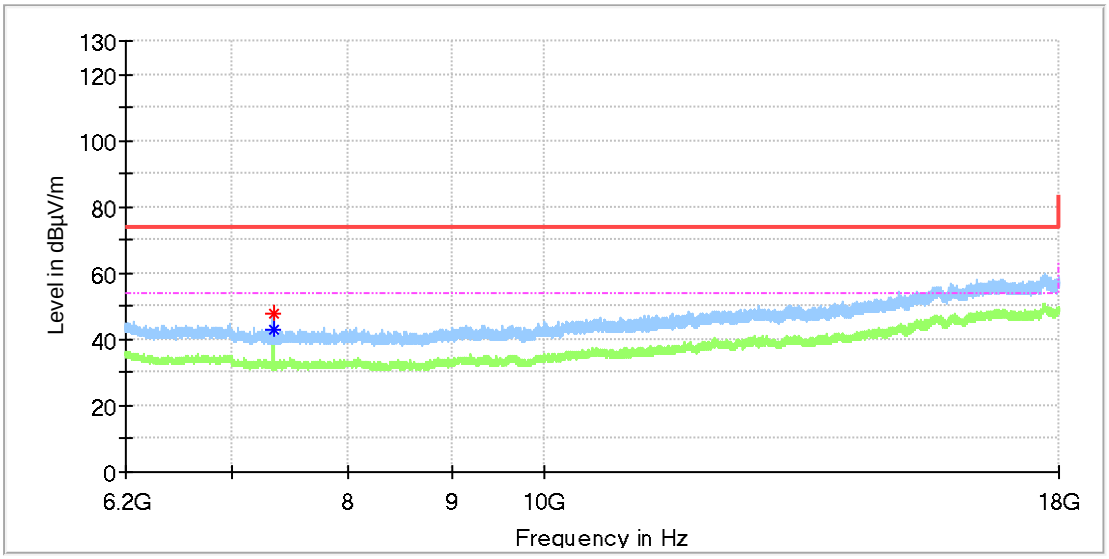
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1195.840000	---	35.53	54.00	18.47	100.0	V	240.0	1.1
1198.730000	49.92	---	74.00	24.08	100.0	V	240.0	1.1
4889.000000	---	39.69	54.00	14.31	100.0	V	282.0	11.8
4891.500000	51.28	---	74.00	22.72	100.0	V	68.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



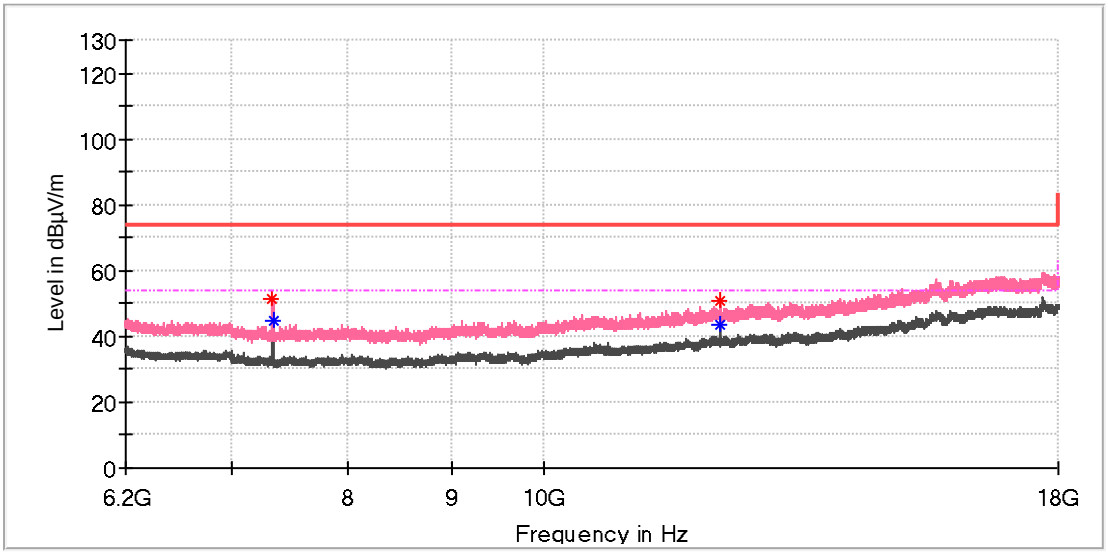
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7335.258333	---	42.96	54.00	11.04	100.0	H	135.0	8.1
7336.241667	48.00	---	74.00	26.00	100.0	H	135.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Mid channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



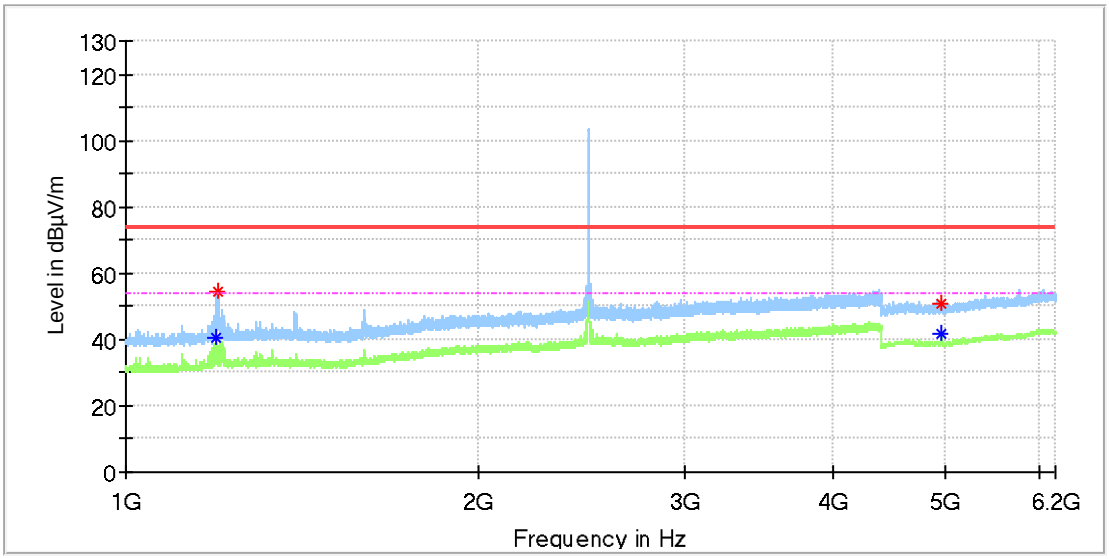
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7333.291667	51.15	---	74.00	22.85	100.0	V	1.0	8.1
7336.241667	---	44.51	54.00	9.49	100.0	V	262.0	8.1
12221.933333	50.90	---	74.00	23.10	100.0	V	69.0	14.7
12222.425000	---	43.67	54.00	10.33	100.0	V	80.0	14.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



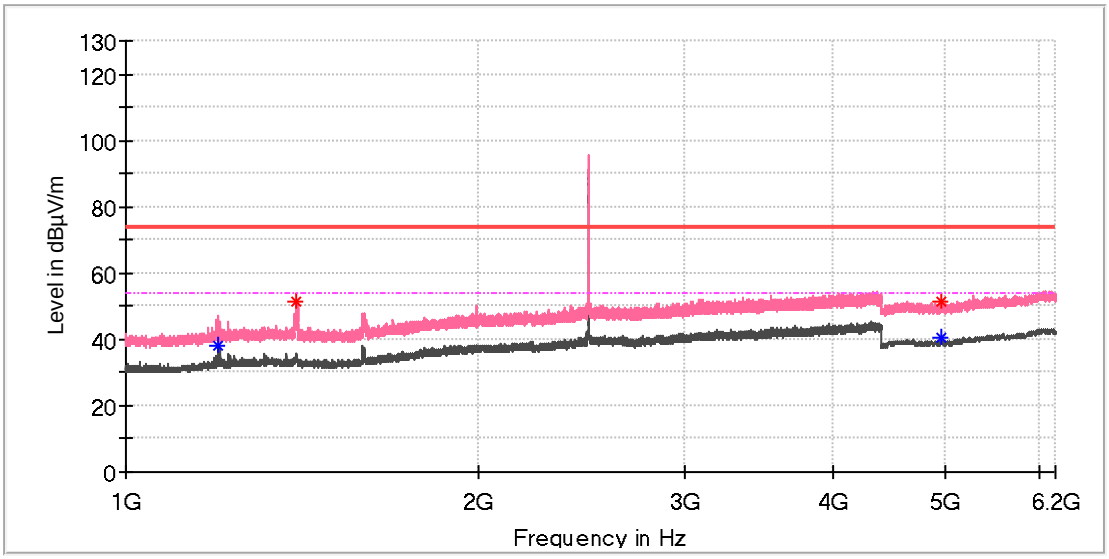
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1193.970000	---	40.42	54.00	13.58	100.0	H	295.0	1.1
1199.410000	54.48	---	74.00	19.52	100.0	H	251.0	1.1
4959.000000	50.67	---	74.00	23.33	100.0	H	85.0	11.8
4962.500000	---	41.70	54.00	12.30	100.0	H	105.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



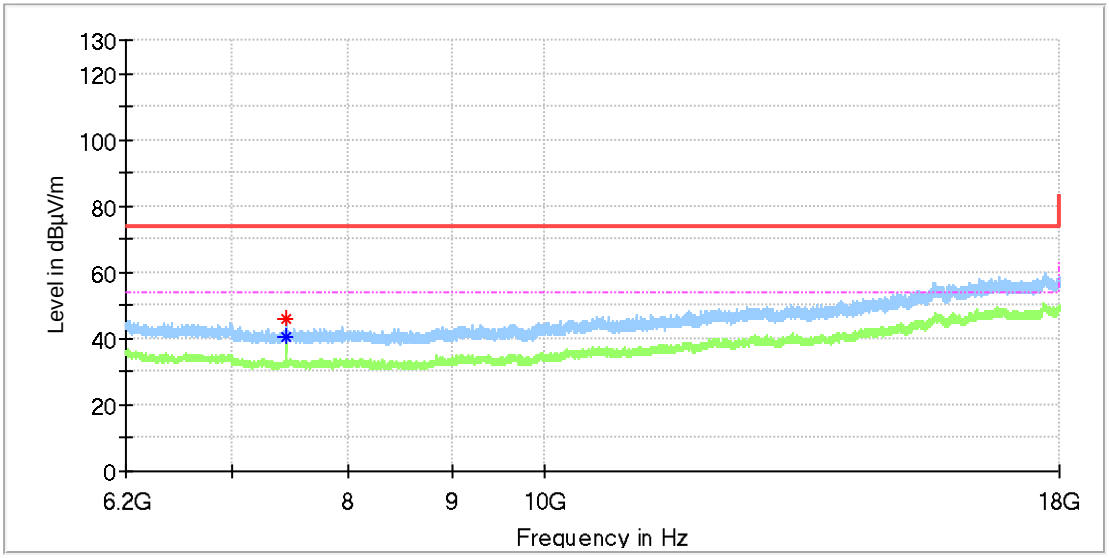
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1198.220000	---	38.18	54.00	15.82	100.0	V	215.0	1.1
1395.420000	51.13	---	74.00	22.87	100.0	V	261.0	1.7
4952.500000	51.19	---	74.00	22.81	100.0	V	112.0	11.8
4959.500000	---	40.41	54.00	13.59	100.0	V	84.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



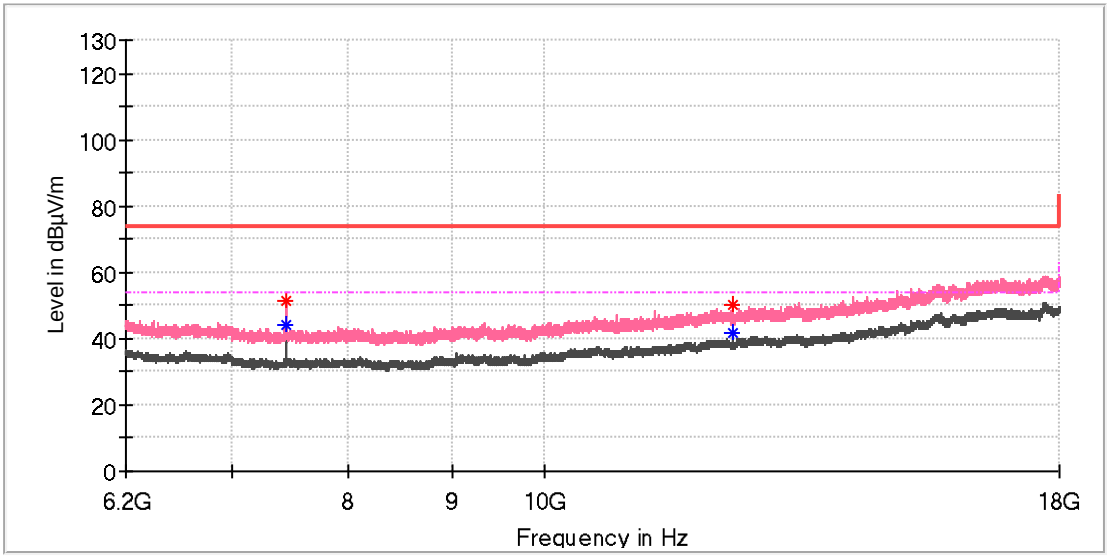
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.983333	---	40.44	54.00	13.56	100.0	H	280.0	8.4
7440.966667	46.01	---	74.00	27.99	100.0	H	70.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7438.016667	---	44.30	54.00	9.70	100.0	V	253.0	8.4
7440.966667	51.30	---	74.00	22.70	100.0	V	253.0	8.4
12397.458333	---	41.87	54.00	12.13	100.0	V	82.0	14.7
12401.883333	50.32	---	74.00	23.68	100.0	V	82.0	14.7

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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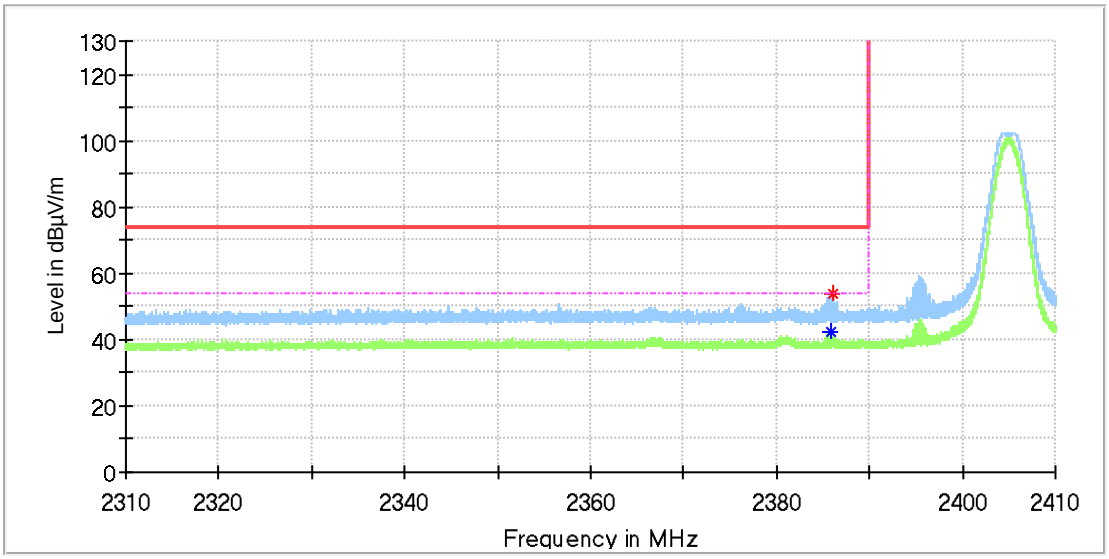
Appendix A.6: Test Results of Radiated Emissions in Restricted Bands

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



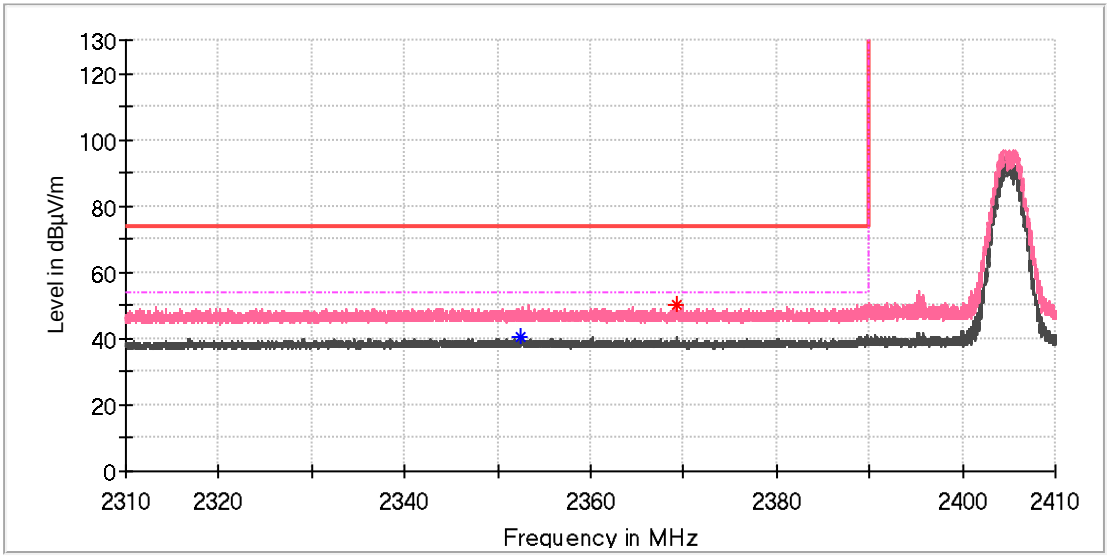
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2385.845000	---	42.58	54.00	11.42	100.0	H	153.0	7.0
2385.980000	53.66	---	74.00	20.34	100.0	H	164.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_Low channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

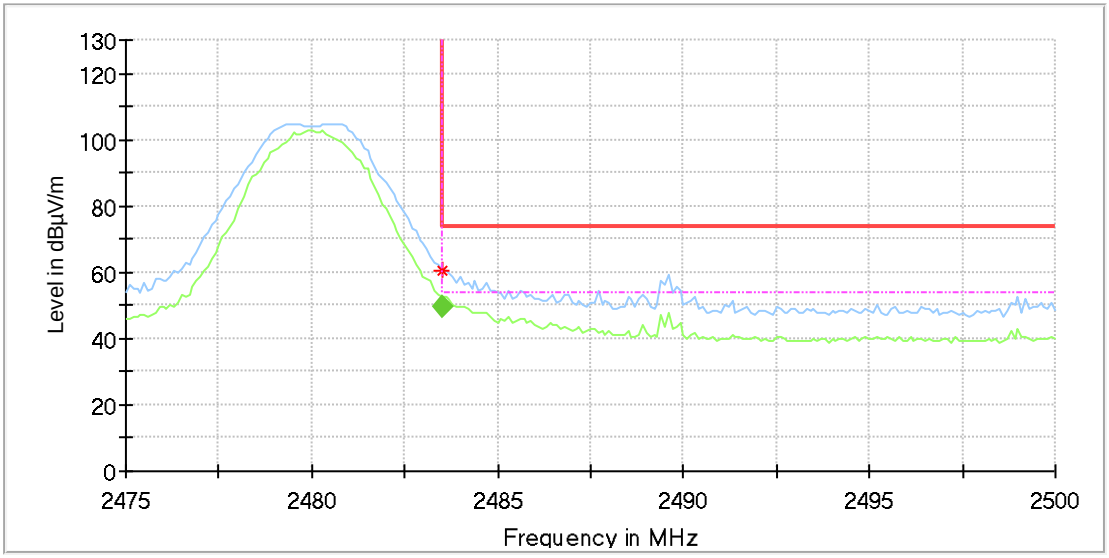
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2352.545000	---	40.23	54.00	13.77	100.0	V	136.0	6.9
2369.285000	50.22	---	74.00	23.78	100.0	V	35.0	6.9

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



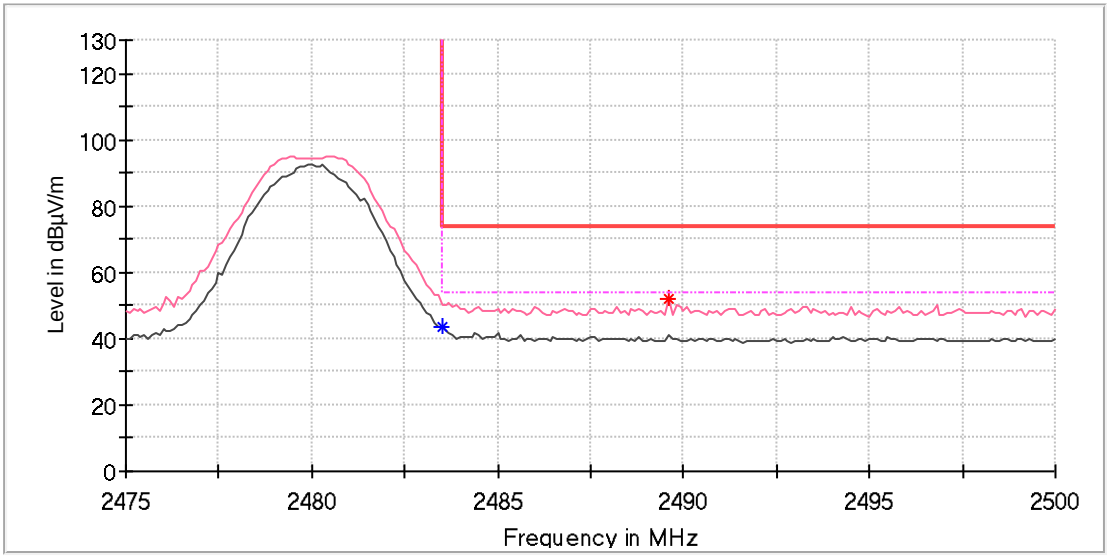
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.500000	60.70	---	74.00	13.30	100.0	H	159.0	7.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.501750	49.71	54.00	4.29	100.0	H	149.0	7.4

EUT Name:	Sensor
Model:	9290035639
Test Mode:	Zigbee_High channel
Order No/Sample No:	168394207/A003349095-005
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.500000	---	43.82	54.00	10.18	100.0	V	283.0	7.4
2489.600000	51.81	---	74.00	22.19	100.0	V	275.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---