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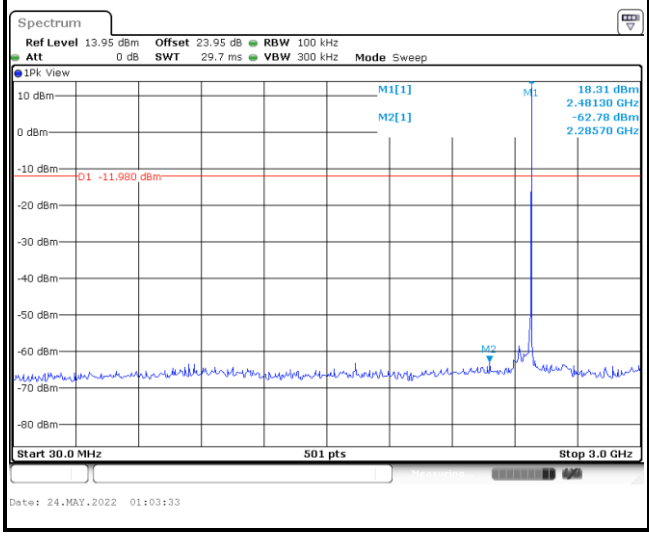	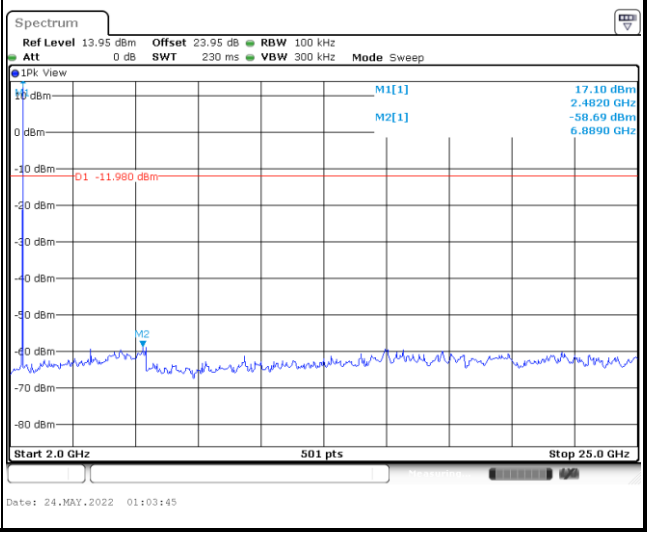

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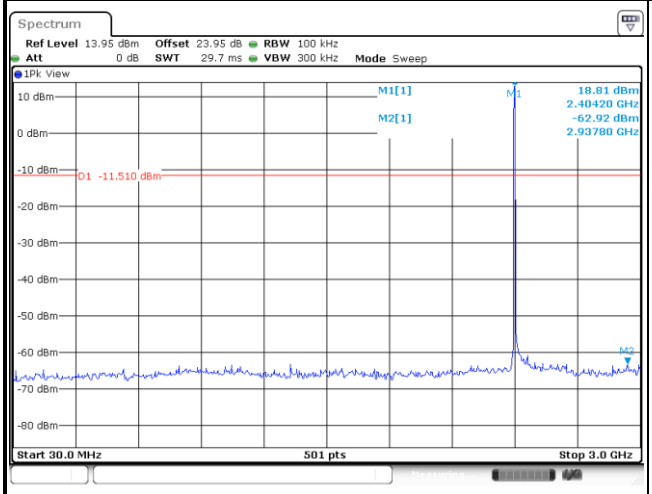	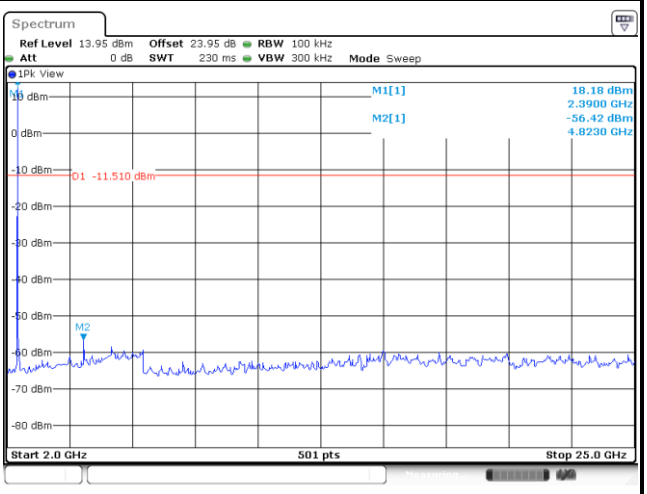
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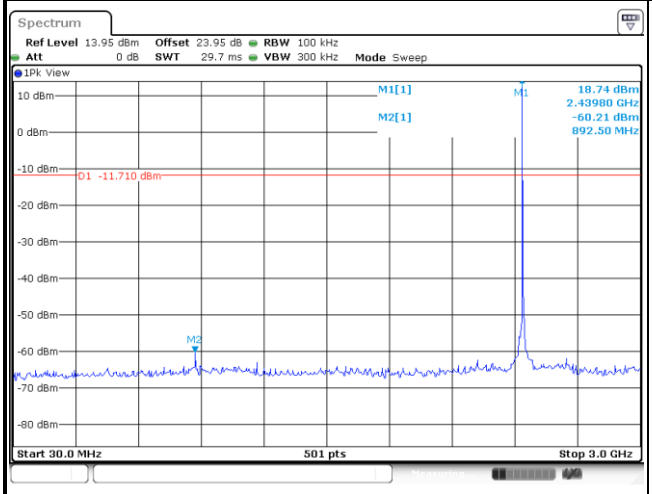	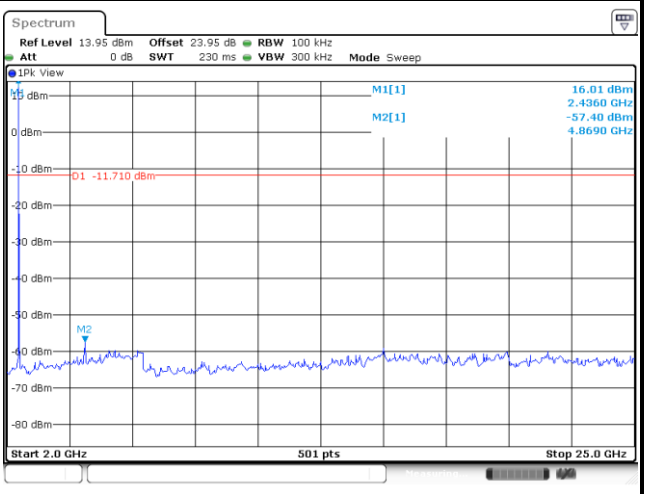

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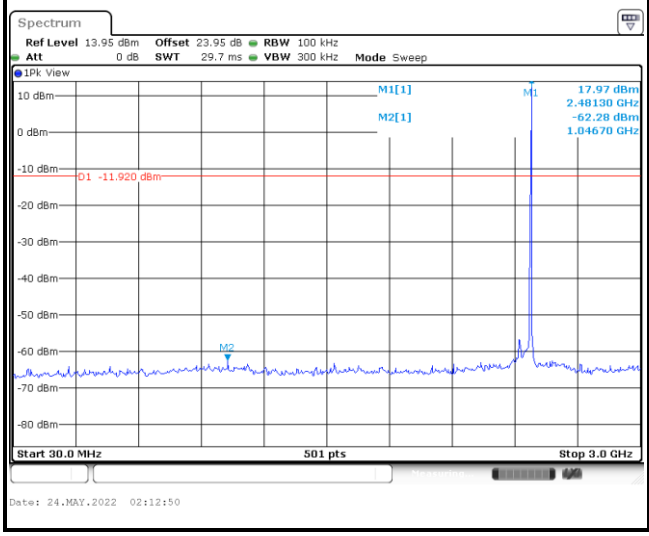	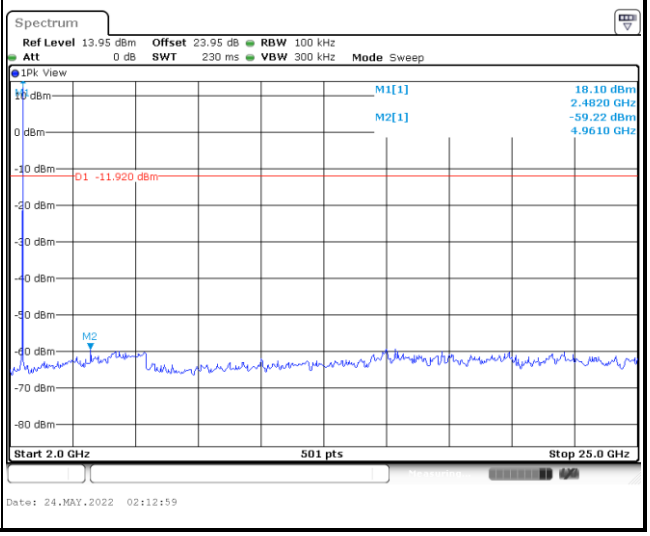

MIMO <Ant. 4>

<1Mbps>

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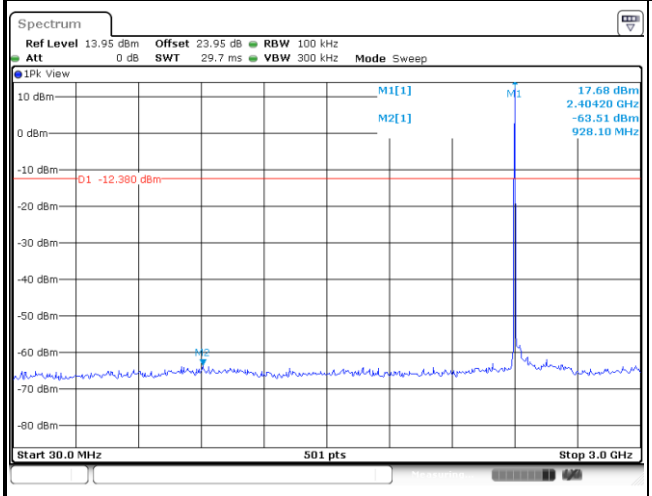	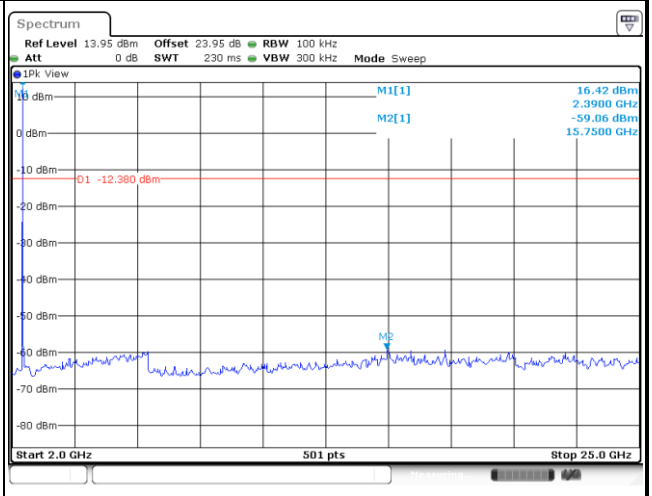
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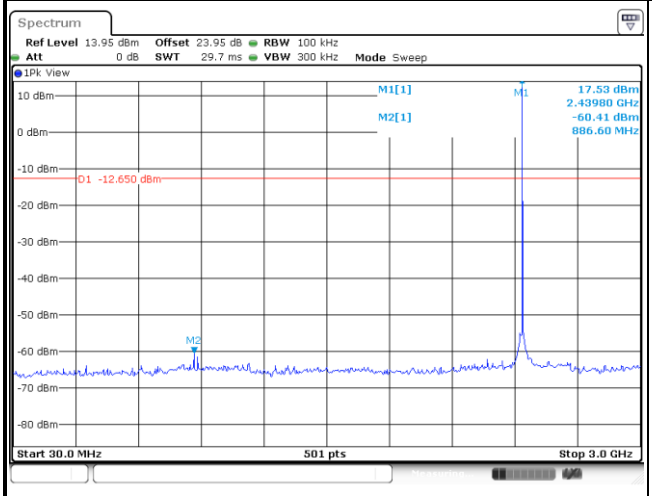
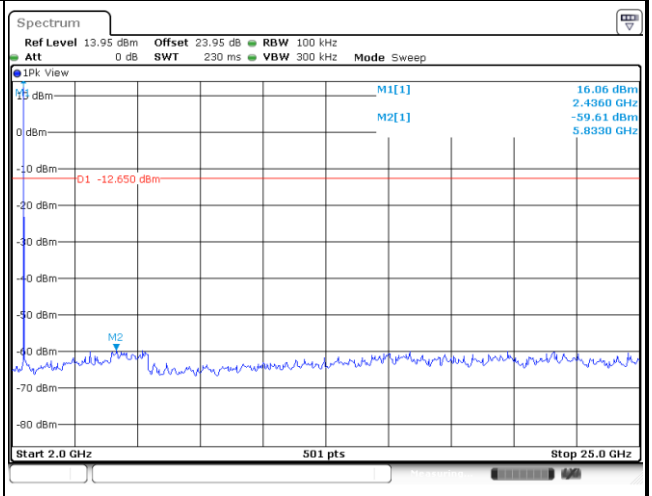
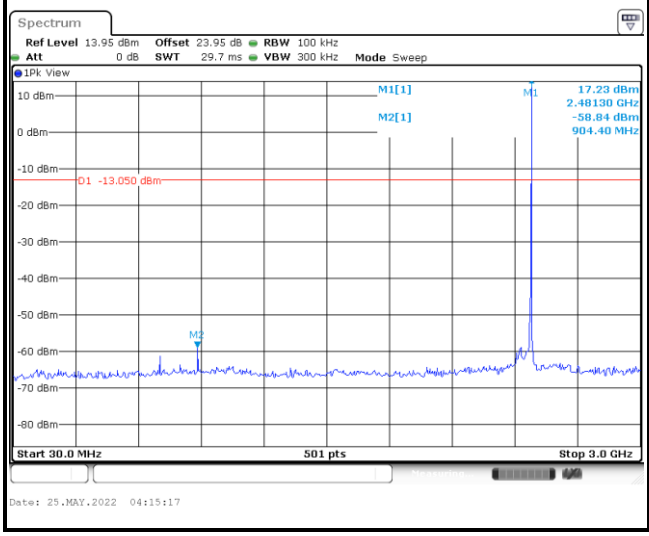
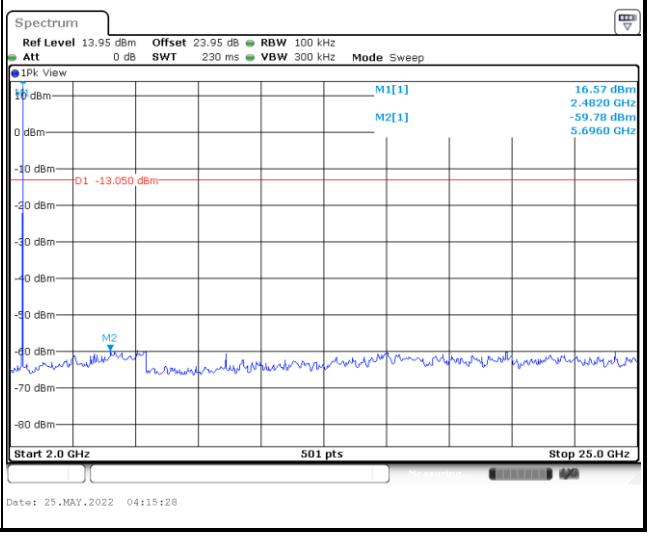
	

Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39	Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39
	

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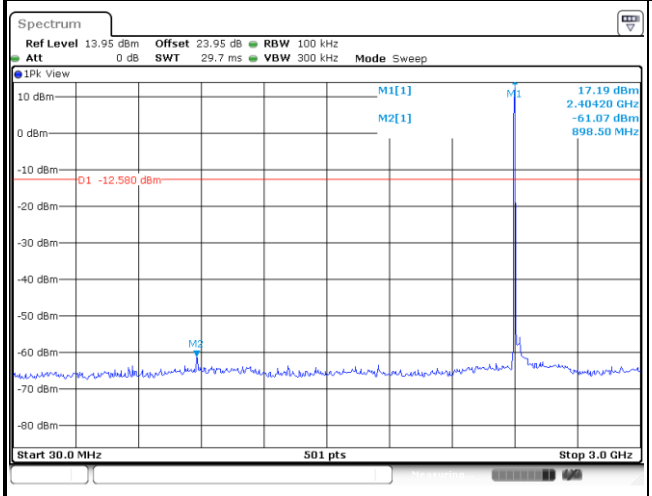
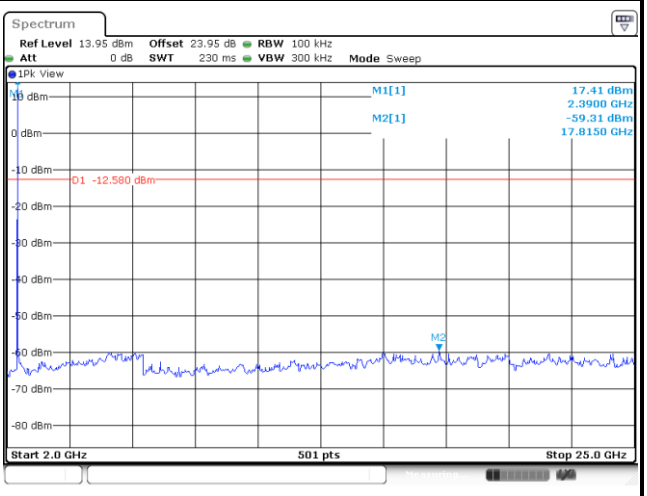
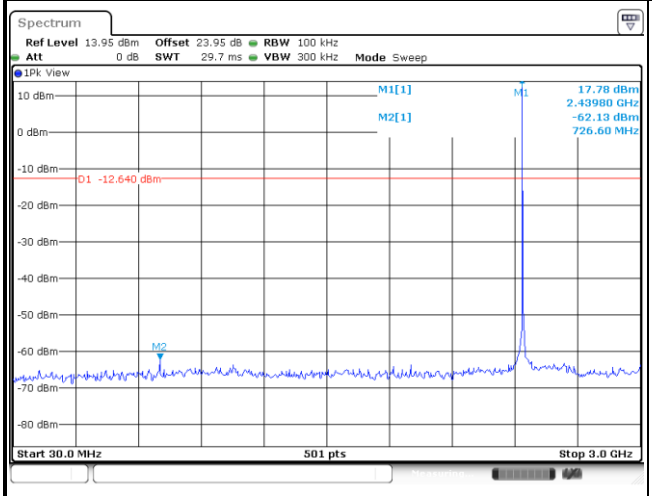
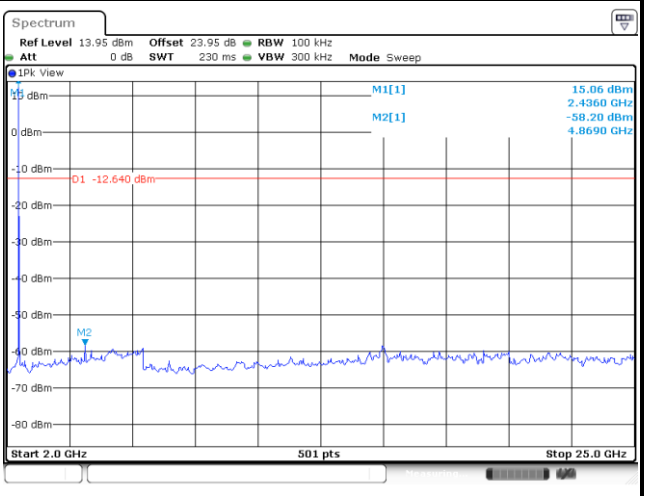
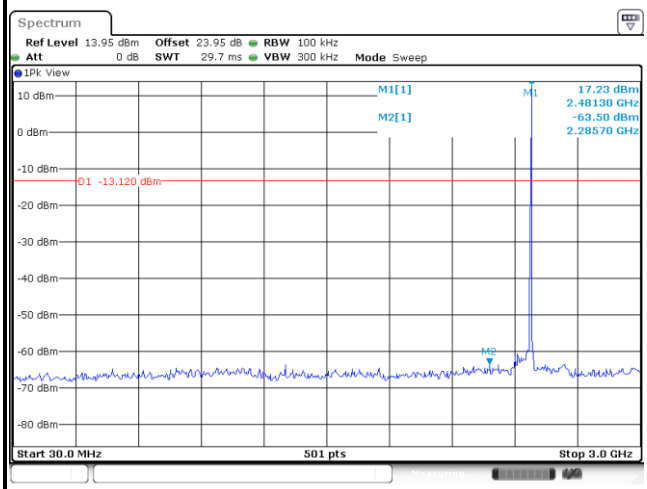
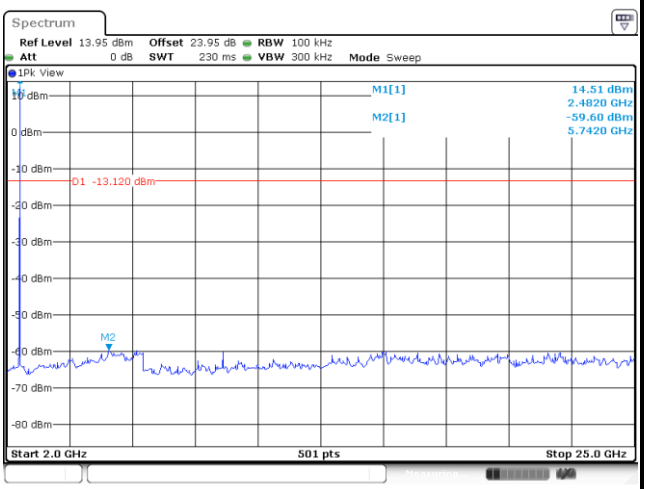
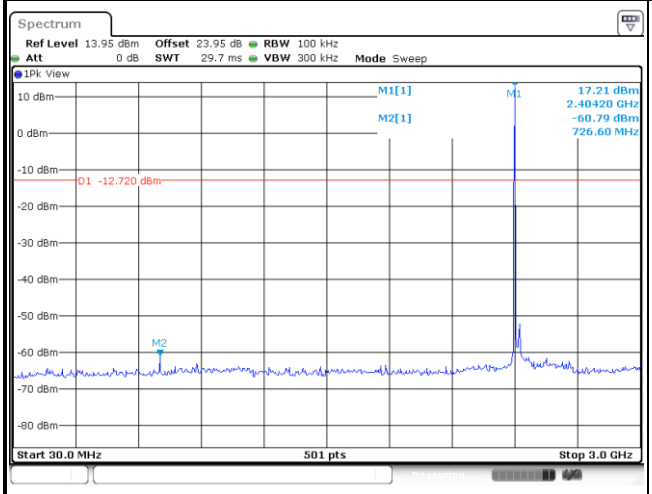
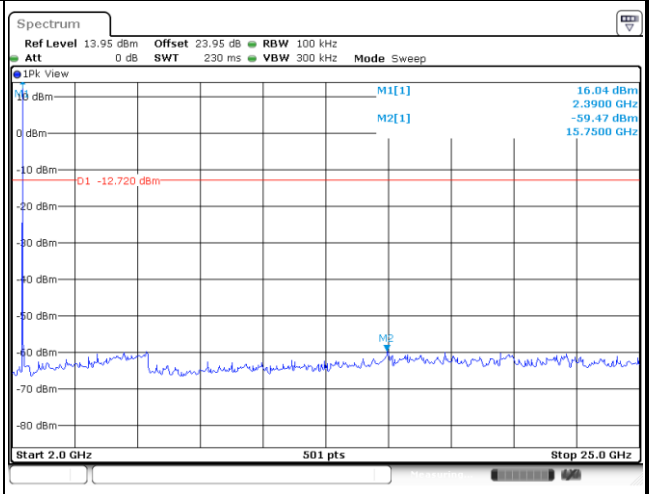
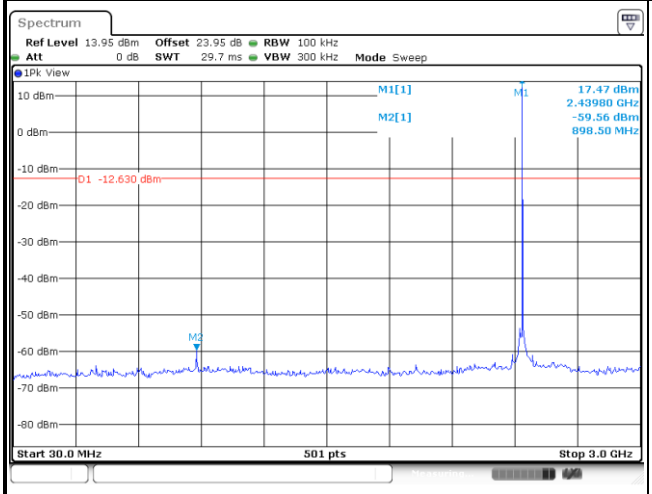
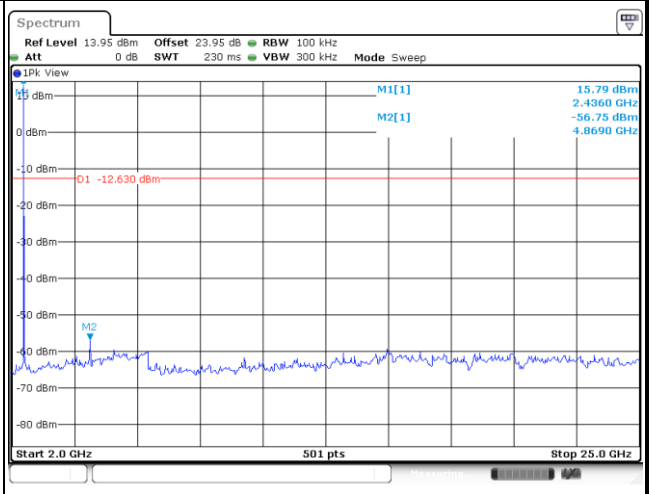
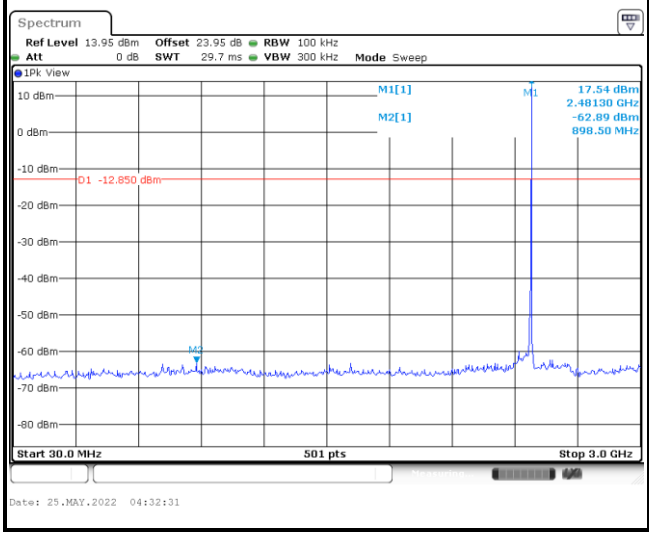
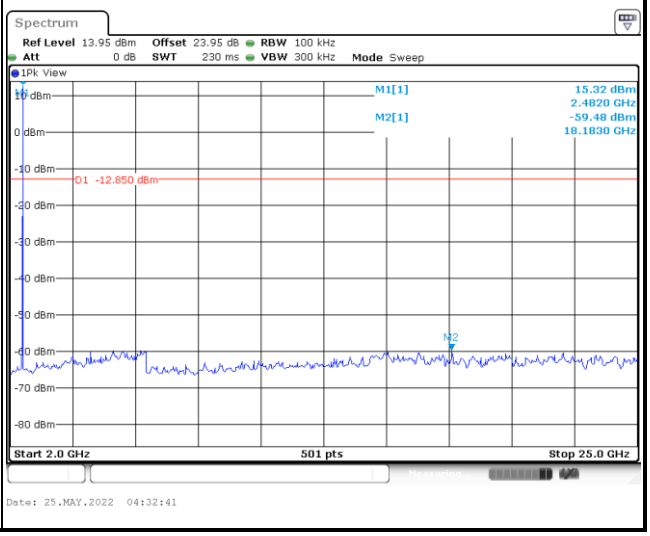
	
Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19	**Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19**
	

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39	Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39
	

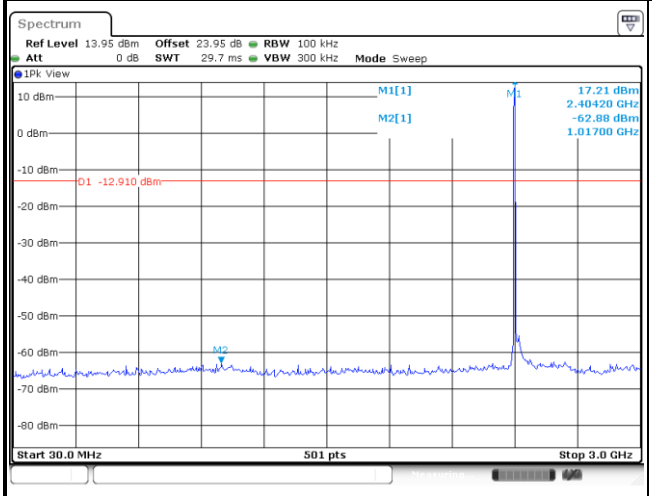
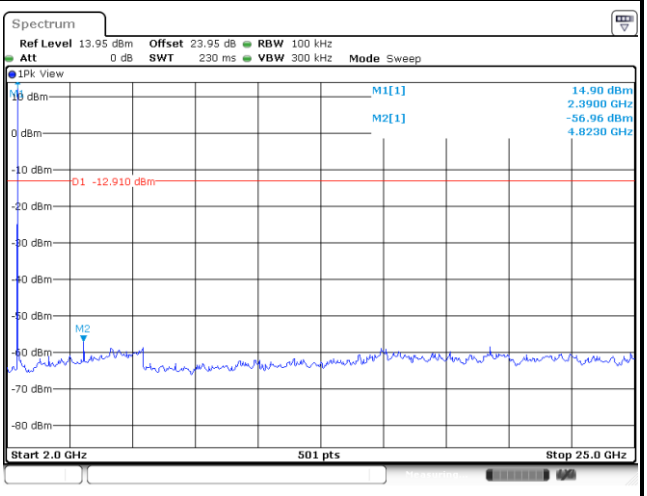
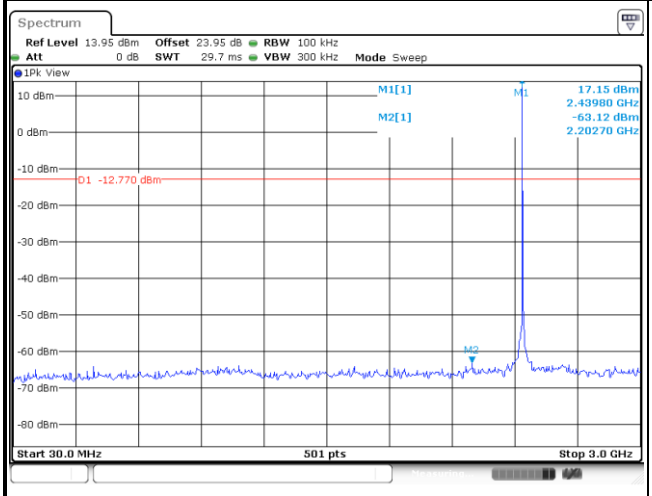
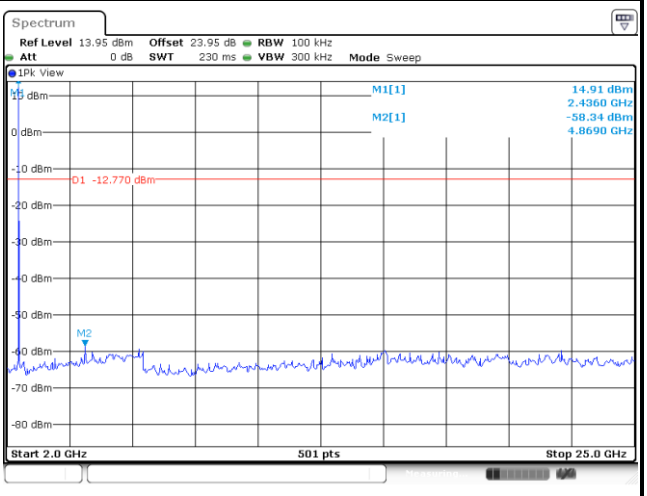
MIMO <Ant. 3>

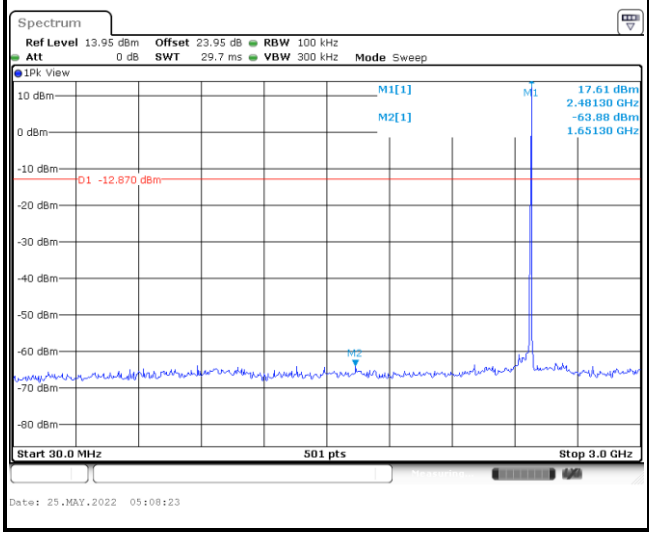
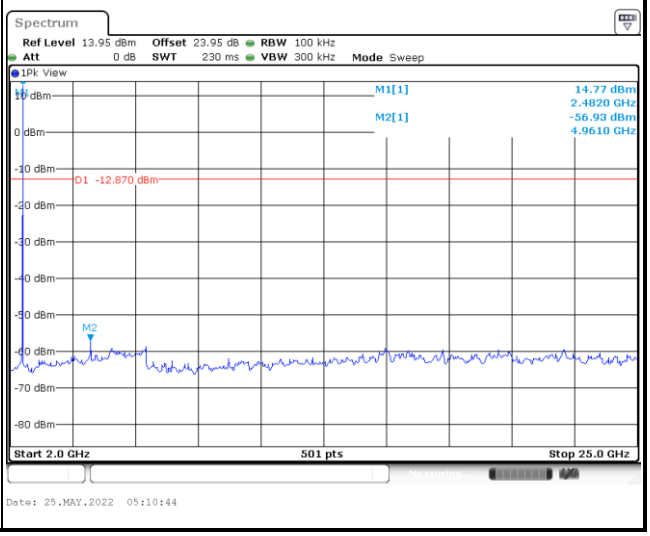
<1Mbps>

Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 00	Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 00
	
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19	**Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19**
	

Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39	Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39
	

<2Mbps>

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 00	Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 00
	
Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19	**Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19**
	

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39	Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39
	

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device is measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

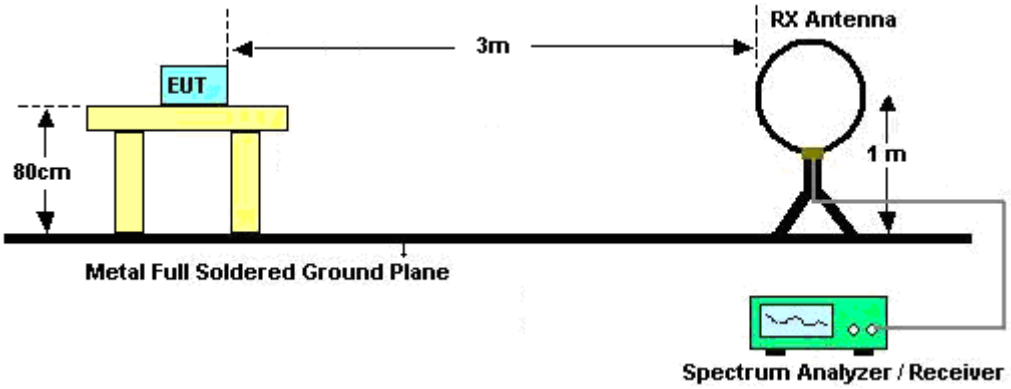
Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

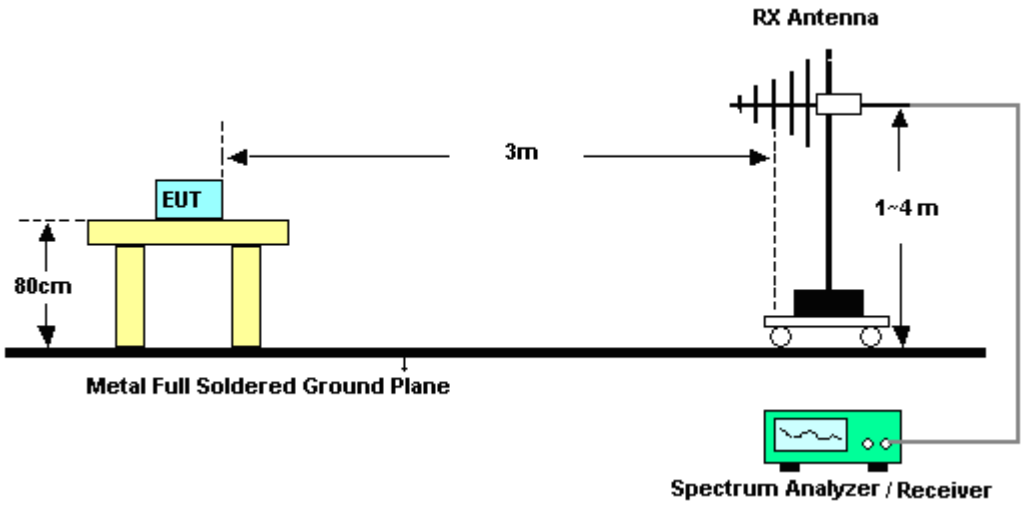
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW = 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW = 3 MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

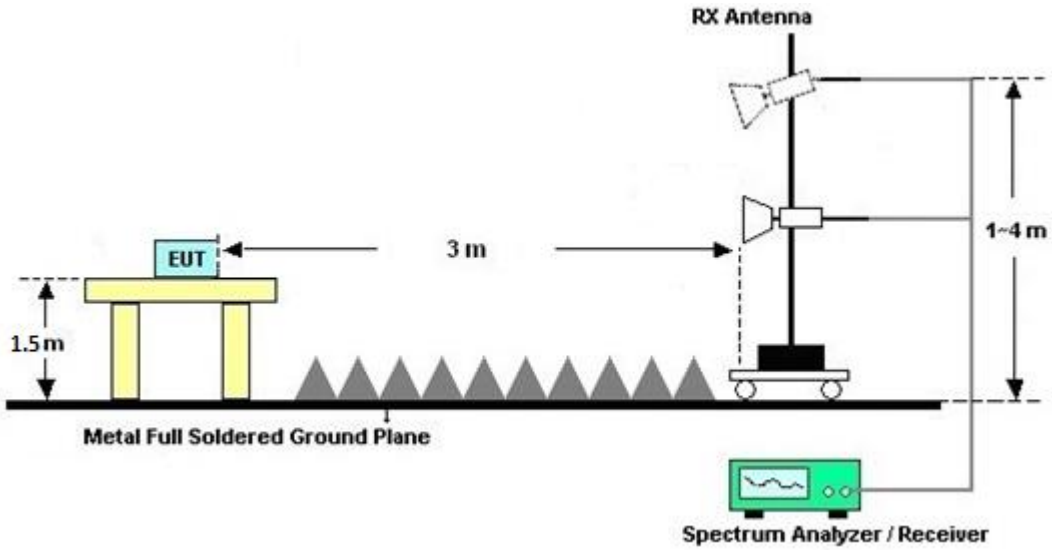
For radiated test below 30MHz



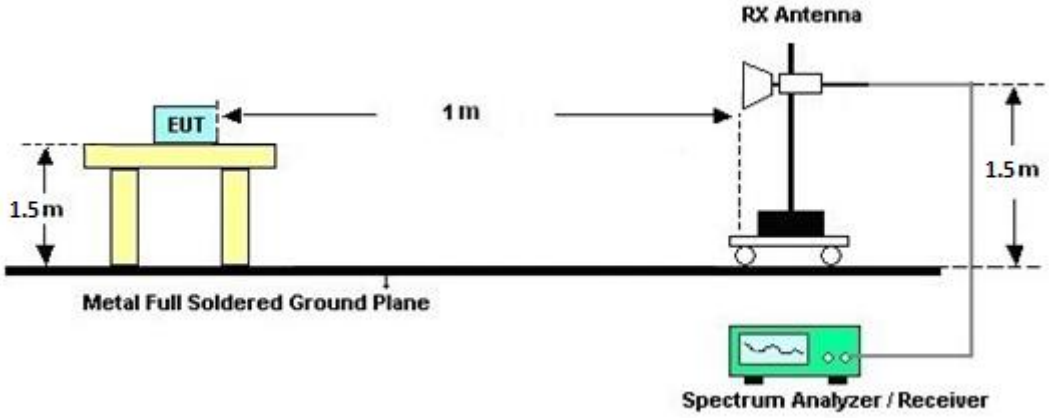
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.5.7 Duty Cycle

Please refer to Appendix E.

3.5.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

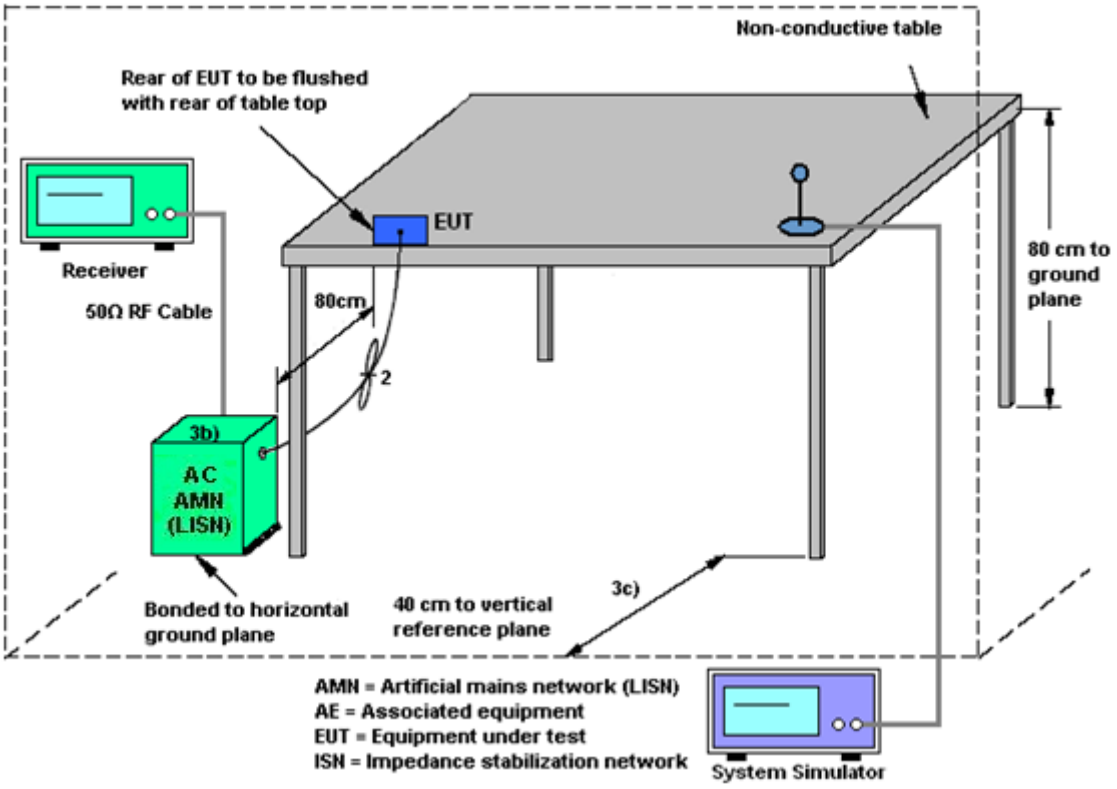
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

For power measurements on IEEE 802.11 devices,

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

G_{ANT} is set equal to the gain of the antenna having the highest gain.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16. 2021	Mar. 29, 2022~ May 25, 2022	Nov. 15. 2022	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12 (NO:113)	10MHz~6GHz	Dec. 16, 2021	Mar. 29, 2022~ May 25, 2022	Dec. 15, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Mar. 29, 2022~ May 25, 2022	Aug. 29, 2022	Conducted (TH05-HY)
Switch Control Mainframe	E-IUSTRUME NT	ETF-1405-0	EC1900067 (BOX7)	N/A	Aug. 12,2021	Mar. 29, 2022~ May 25, 2022	Aug. 11,2022	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	35419 & 03	30MHz~1GHz	Apr. 28, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Apr. 27, 2022	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 03, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Dec. 02, 2022	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 07, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Jan. 06, 2023	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz~18GHz	Apr. 22, 2021	Apr. 19, 2022 ~ Apr. 20, 2022	Apr. 21, 2022	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz~18GHz	Apr. 21, 2022	Apr. 21, 2022 ~ Apr. 24, 2022	Apr. 20, 2023	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 04, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Oct. 03, 2022	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Oct. 04, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Oct. 03, 2022	Radiation (03CH07-HY)
Preamplifier	EMEC	EM18G40G	0600789	18-40GHz	Jul. 23, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Jul. 22, 2022	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Jul. 22, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Jul. 21, 2022	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15682/4	30MHz to 18GHz	Feb. 23, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4	9kHz to 18GHz	Feb. 23, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4	9kHz to 18GHz	Feb. 23, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126	532078/126E	30MHz~18GHz	Sep. 17, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Sep. 16, 2022	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2	18GHz~40GHz	Feb. 23, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801606/2	9KHz ~ 40GHz	Apr. 14, 2022	Apr. 19, 2022 ~ Apr. 24, 2022	Apr. 13, 2023	Radiation (03CH07-HY)
Controller	EMEC	EM1000	N/A	Control Ant Mast	N/A	Apr. 19, 2022 ~ Apr. 24, 2022	N/A	Radiation (03CH07-HY)
Controller	MF	MF-7802	N/A	Control Turn table	N/A	Apr. 19, 2022 ~ Apr. 24, 2022	N/A	Radiation (03CH07-HY)
Antenna Mast	EMEC	AM-BS-4500E	N/A	Boresight mast 1M~4M	N/A	Apr. 19, 2022 ~ Apr. 24, 2022	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Apr. 19, 2022 ~ Apr. 24, 2022	N/A	Radiation (03CH07-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Software	Audix	E3	N/A	N/A	N/A	Apr. 19, 2022 ~ Apr. 24, 2022	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB1148	N/A	Oct. 25, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Oct. 24, 2022	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Nov. 30, 2021	Apr. 19, 2022 ~ Apr. 24, 2022	Nov. 29, 2022	Radiation (03CH07-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Apr. 20, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2021	Apr. 20, 2022	Nov. 30, 2022	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2021	Apr. 20, 2022	Nov. 16, 2022	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 03, 2021	Apr. 20, 2022	Dec. 02, 2022	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Apr. 20, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Jul. 28, 2021	Apr. 20, 2022	Jul. 27, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Apr. 20, 2022	Dec. 29, 2022	Conduction (CO05-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.1 dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.8 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.0 dB**

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu	Temperature:	21~25	°C
Test Date:	2022/3/29~2022/5/25	Relative Humidity:	51~54	%

<Ant.4>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.035	0.710	0.50	Pass
BLE	1Mbps	1	19	2440	1.037	0.720	0.50	Pass
BLE	1Mbps	1	39	2480	1.037	0.720	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	19.25	30.00	-0.50	18.75	36.00	Pass
BLE	1Mbps	1	19	2440	18.95	30.00	-0.50	18.45	36.00	Pass
BLE	1Mbps	1	39	2480	18.75	30.00	-0.50	18.25	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	18.55	3.77	-0.50	8.00	Pass
BLE	1Mbps	1	19	2440	17.96	3.30	-0.50	8.00	Pass
BLE	1Mbps	1	39	2480	18.08	3.48	-0.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.042	1.191	0.50	Pass
BLE	2Mbps	1	19	2440	2.050	1.251	0.50	Pass
BLE	2Mbps	1	39	2480	2.050	1.247	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	19.45	30.00	-0.50	18.95	36.00	Pass
BLE	2Mbps	1	19	2440	19.15	30.00	-0.50	18.65	36.00	Pass
BLE	2Mbps	1	39	2480	18.95	30.00	-0.50	18.45	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	18.65	0.30	-0.50	8.00	Pass
BLE	2Mbps	1	19	2440	17.95	-0.26	-0.50	8.00	Pass
BLE	2Mbps	1	39	2480	17.99	-0.13	-0.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

<Ant.3>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.035	0.716	0.50	Pass
BLE	1Mbps	1	19	2440	1.035	0.720	0.50	Pass
BLE	1Mbps	1	39	2480	1.035	0.720	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	19.45	30.00	-1.50	17.95	36.00	Pass
BLE	1Mbps	1	19	2440	19.15	30.00	-1.50	17.65	36.00	Pass
BLE	1Mbps	1	39	2480	18.95	30.00	-1.50	17.45	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	18.65	3.96	-1.50	8.00	Pass
BLE	1Mbps	1	19	2440	18.45	3.78	-1.50	8.00	Pass
BLE	1Mbps	1	39	2480	18.02	3.42	-1.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.046	1.199	0.50	Pass
BLE	2Mbps	1	19	2440	2.046	1.239	0.50	Pass
BLE	2Mbps	1	39	2480	2.050	1.247	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	19.65	30.00	-1.50	18.15	36.00	Pass
BLE	2Mbps	1	19	2440	19.35	30.00	-1.50	17.85	36.00	Pass
BLE	2Mbps	1	39	2480	19.15	30.00	-1.50	17.65	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	18.49	0.16	-1.50	8.00	Pass
BLE	2Mbps	1	19	2440	18.29	0.04	-1.50	8.00	Pass
BLE	2Mbps	1	39	2480	18.08	-0.12	-1.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

MIMO<Ant. 4+3>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	2	0	2402	1.037	0.702	0.50	Pass
BLE	1Mbps	2	19	2440	1.037	0.716	0.50	Pass
BLE	1Mbps	2	39	2480	1.037	0.718	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power Ant 4 (dBm)	Average Conducted Power Ant 3 (dBm)	Total Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	2	0	2402	17.95	18.15	21.06	30.00	-0.50	17.45	36.00	Pass
BLE	1Mbps	2	19	2440	18.25	18.05	21.16	30.00	-0.50	17.75	36.00	Pass
BLE	1Mbps	2	39	2480	17.55	17.65	20.61	30.00	-0.50	17.05	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	Peak PSD Worst +3.01 (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	2	0	2402	17.62	2.84	5.85	-0.50	8.00	Pass
BLE	1Mbps	2	19	2440	17.35	2.69	5.70	-0.50	8.00	Pass
BLE	1Mbps	2	39	2480	16.95	2.36	5.37	-0.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	2	0	2402	2.042	1.187	0.50	Pass
BLE	2Mbps	2	19	2440	2.046	1.251	0.50	Pass
BLE	2Mbps	2	39	2480	2.050	1.247	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power Ant 4 (dBm)	Average Conducted Power Ant 3 (dBm)	Total Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	2	0	2402	18.05	18.35	21.21	30.00	-0.50	17.55	36.00	Pass
BLE	2Mbps	2	19	2440	17.95	17.95	20.96	30.00	-0.50	17.45	36.00	Pass
BLE	2Mbps	2	39	2480	17.75	17.95	20.86	30.00	-0.50	17.25	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	Peak PSD Worst +3.01 (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	2	0	2402	17.42	-0.94	2.07	-0.50	8.00	Pass
BLE	2Mbps	2	19	2440	17.36	-0.86	2.15	-0.50	8.00	Pass
BLE	2Mbps	2	39	2480	16.88	-1.37	1.64	-0.50	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

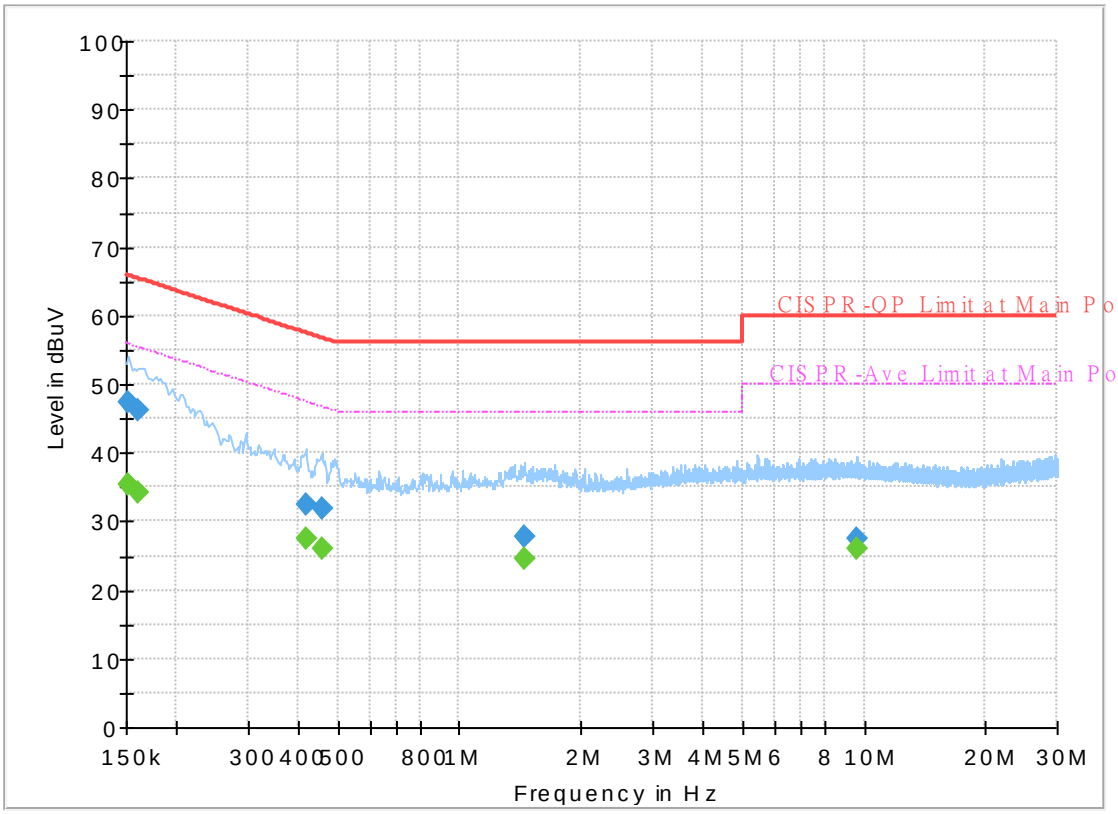
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	**Temperature :**	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO :	1O2843-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



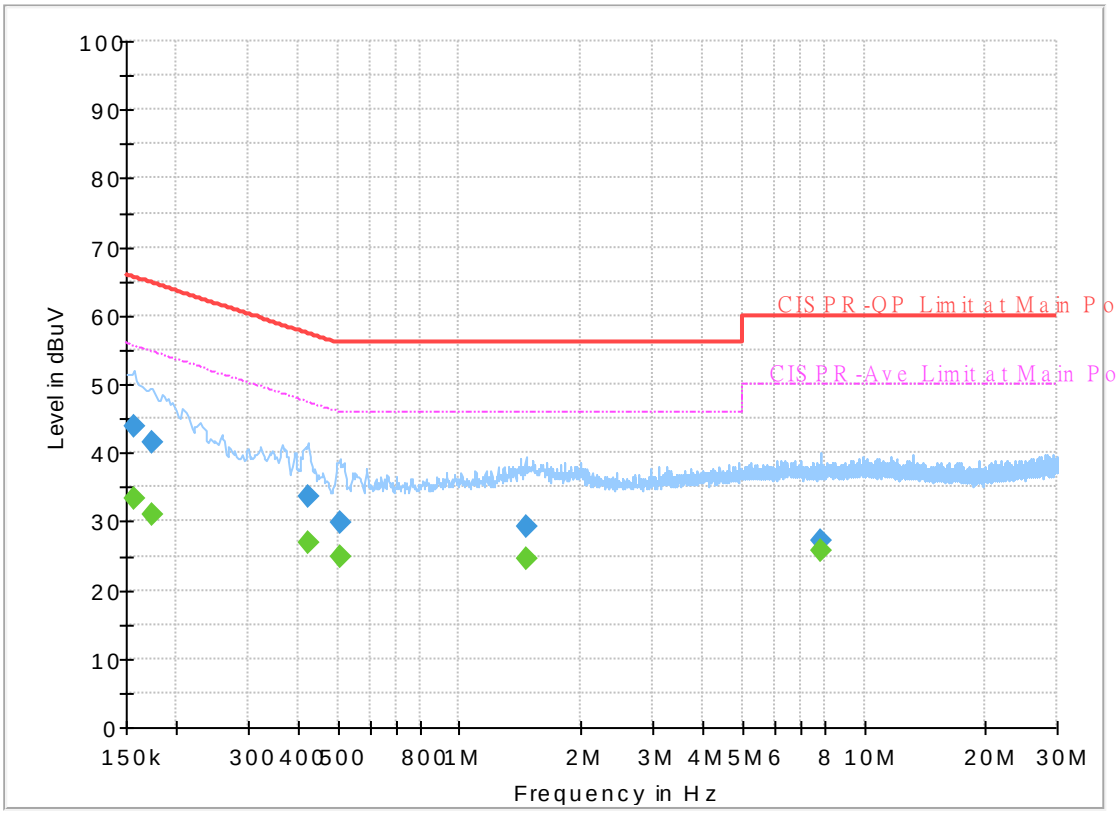
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	35.48	55.88	20.40	L1	OFF	19.6
0.152250	47.46	---	65.88	18.42	L1	OFF	19.6
0.161250	---	34.21	55.40	21.19	L1	OFF	19.6
0.161250	46.10	---	65.40	19.30	L1	OFF	19.6
0.417750	---	27.44	47.49	20.05	L1	OFF	19.6
0.417750	32.48	---	57.49	25.01	L1	OFF	19.6
0.456000	---	26.14	46.77	20.63	L1	OFF	19.6
0.456000	31.83	---	56.77	24.94	L1	OFF	19.6
1.450500	---	24.65	46.00	21.35	L1	OFF	19.7
1.450500	27.73	---	56.00	28.27	L1	OFF	19.7
9.577500	---	25.97	50.00	24.03	L1	OFF	20.1
9.577500	27.45	---	60.00	32.55	L1	OFF	20.1

EUT Information

Report NO :	1O2843-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.156750	---	33.39	55.63	22.24	N	OFF	19.6
0.156750	44.00	---	65.63	21.63	N	OFF	19.6
0.174750	---	31.14	54.73	23.59	N	OFF	19.6
0.174750	41.62	---	64.73	23.11	N	OFF	19.6
0.422250	---	26.79	47.40	20.61	N	OFF	19.6
0.422250	33.59	---	57.40	23.81	N	OFF	19.6
0.505500	---	24.89	46.00	21.11	N	OFF	19.6
0.505500	29.79	---	56.00	26.21	N	OFF	19.6
1.457250	---	24.68	46.00	21.32	N	OFF	19.7
1.457250	29.36	---	56.00	26.64	N	OFF	19.7
7.813500	---	25.70	50.00	24.30	N	OFF	20.0
7.813500	27.24	---	60.00	32.76	N	OFF	20.0

Appendix C. Radiated Spurious Emission

Test Engineer :	Jesse Wang, Stan Hsieh, Ken Wu	**Temperature :**	22.8~24.9°C
		Relative Humidity :	52.6~61.1%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2381.295	54.06	-19.94	74	39.64	31.4	18.43	35.41	100	119	P	H
		2364.705	44.9	-9.1	54	30.53	31.4	18.38	35.41	100	119	A	H
	*	2402	114.06	-	-	99.58	31.42	18.48	35.42	100	119	P	H
	*	2402	113.23	-	-	98.75	31.42	18.48	35.42	100	119	A	H
													H
													H
		2371.845	53.77	-20.23	74	39.39	31.4	18.39	35.41	399	82	P	V
		2338.245	44.84	-9.16	54	30.49	31.45	18.29	35.39	399	82	A	V
	*	2402	112.2	-	-	97.72	31.42	18.48	35.42	399	82	P	V
	*	2402	111.62	-	-	97.14	31.42	18.48	35.42	399	82	A	V
													V
													V
BLE CH 19 2440MHz		2355.5	53.45	-20.55	74	39.1	31.4	18.35	35.4	100	115	P	H
		2378.32	44.84	-9.16	54	30.44	31.4	18.41	35.41	100	115	A	H
	*	2440	112.8	-	-	97.97	31.72	18.54	35.43	100	115	P	H
	*	2440	112.25	-	-	97.42	31.72	18.54	35.43	100	115	A	H
		2493.56	54.69	-19.31	74	39.38	32.15	18.62	35.46	100	115	P	H
		2494.82	45.77	-8.23	54	30.45	32.16	18.62	35.46	100	115	A	H
		2336.6	53.32	-20.68	74	38.97	31.45	18.29	35.39	341	88	P	V
		2376.92	44.99	-9.01	54	30.59	31.4	18.41	35.41	341	88	A	V
	*	2440	111.45	-	-	96.62	31.72	18.54	35.43	341	88	P	V
	*	2440	110.25	-	-	95.42	31.72	18.54	35.43	341	88	A	V
		2495.59	55.4	-18.6	74	40.08	32.16	18.62	35.46	341	88	P	V
		2489.78	45.79	-8.21	54	30.51	32.12	18.61	35.45	341	88	A	V

BLE CH 39 2480MHz	*	2480	111.71	-	-	96.52	32.04	18.6	35.45	100	120	P	H
	*	2480	110.17	-	-	94.98	32.04	18.6	35.45	100	120	A	H
		2486.28	55.08	-18.92	74	39.83	32.09	18.61	35.45	100	120	P	H
		2483.96	45.91	-8.09	54	30.69	32.07	18.6	35.45	100	120	A	H
													H
													H
	*	2480	110.1	-	-	94.91	32.04	18.6	35.45	381	89	P	V
	*	2480	109.38	-	-	94.19	32.04	18.6	35.45	381	89	A	V
		2483.64	55.57	-18.43	74	40.35	32.07	18.6	35.45	381	89	P	V
		2496.52	45.83	-8.17	54	30.5	32.17	18.62	35.46	381	89	A	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE ANT 4	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	42.86	-31.14	74	54.14	34.01	12.7	57.99	-	-	P	H
		14490	46.62	-27.38	74	43.48	39.58	21.65	58.09	-	-	P	H
		15675	47.93	-26.07	74	42.29	40.35	22.4	57.11	-	-	P	H
		17865	49.89	-24.11	74	40.84	41.47	23.64	56.06	-	-	P	H
		17865	39.4	-14.6	54	30.35	41.47	23.64	56.06	-	-	A	H
													H
													H
													H
													H
													H
													H
													H
		4804	41.44	-32.56	74	52.72	34.01	12.7	57.99	-	-	P	V
		14499	47.41	-26.59	74	44.24	39.6	21.66	58.09	-	-	P	V
		16140	47.88	-26.12	74	40.78	41.2	22.68	56.78	-	-	P	V
		17895	49.74	-24.26	74	40.72	41.41	23.65	56.04	-	-	P	V
		17895	39.63	-14.37	54	30.61	41.41	23.65	56.04	-	-	A	V
													V
													V
													V
													V
													V
													V
													V

BLE ANT 4	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4880	42.91	-31.09	74	54.02	34.04	12.75	57.9	-	-	P	H
		7320	41.35	-32.65	74	48.56	35.68	15.03	57.92	-	-	P	H
		14499	47.03	-26.97	74	43.86	39.6	21.66	58.09	-	-	P	H
		15855	47.87	-26.13	74	41.5	40.81	22.51	56.95	-	-	P	H
		17760	49.43	-24.57	74	40.42	41.56	23.57	56.12	-	-	P	H
		17760	39.69	-14.31	54	30.68	41.56	23.57	56.12	-	-	A	H
													H
													H
													H
													H
													H
													H
BLE CH 19 2440MHz		4880	42.08	-31.92	74	53.19	34.04	12.75	57.9	-	-	P	V
		7320	41.61	-32.39	74	48.82	35.68	15.03	57.92	-	-	P	V
		14499	46.84	-27.16	74	43.67	39.6	21.66	58.09	-	-	P	V
		15675	47.43	-26.57	74	41.79	40.35	22.4	57.11	-	-	P	V
		17775	49.96	-24.04	74	40.91	41.57	23.59	56.11	-	-	P	V
		17775	39.57	-14.43	54	30.52	41.57	23.59	56.11	-	-	A	V
													V
													V
													V
													V
													V
													V

BLE ANT 4	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4960	41.42	-32.58	74	52.31	34.1	12.82	57.81	-	-	P	H
		7440	40.51	-33.49	74	47.7	35.82	15.03	58.04	-	-	P	H
		14499	47.09	-26.91	74	43.92	39.6	21.66	58.09	-	-	P	H
		15900	47.62	-26.38	74	41.11	40.9	22.53	56.92	-	-	P	H
		17790	49.72	-24.28	74	40.64	41.59	23.6	56.11	-	-	P	H
		17790	39.82	-14.18	54	30.74	41.59	23.6	56.11	-	-	A	H
													H
													H
													H
													H
													H
													H
BLE CH 39 2480MHz		4960	41.72	-32.28	74	52.61	34.1	12.82	57.81	-	-	P	V
		7440	40.57	-33.43	74	47.76	35.82	15.03	58.04	-	-	P	V
		14499	46.75	-27.25	74	43.58	39.6	21.66	58.09	-	-	P	V
		16140	47.33	-26.67	74	40.23	41.2	22.68	56.78	-	-	P	V
		17805	49.78	-24.22	74	40.69	41.59	23.6	56.1	-	-	P	V
		17805	39.65	-14.35	54	30.56	41.59	23.6	56.1	-	-	A	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.
4. The emission level close to 18GHz is checked that the average emission level is noise floor only.

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2334.36	54.28	-19.72	74	39.93	31.46	18.28	35.39	127	24	P	H
		2334.045	44.87	-9.13	54	30.52	31.46	18.28	35.39	127	24	A	H
	*	2402	112.31	-	-	97.83	31.42	18.48	35.42	127	24	P	H
	*	2402	111.79	-	-	97.31	31.42	18.48	35.42	127	24	A	H
													H
													H
		2365.86	53.8	-20.2	74	39.43	31.4	18.38	35.41	400	118	P	V
		2384.13	44.78	-9.22	54	30.36	31.4	18.43	35.41	400	118	A	V
	*	2402	111.81	-	-	97.33	31.42	18.48	35.42	400	118	P	V
	*	2402	111.23	-	-	96.75	31.42	18.48	35.42	400	118	A	V
													V
													V
BLE CH 19 2440MHz		2335.48	54.43	-19.57	74	40.08	31.46	18.28	35.39	100	25	P	H
		2383.22	45.07	-8.93	54	30.65	31.4	18.43	35.41	100	25	A	H
	*	2440	112.01	-	-	97.18	31.72	18.54	35.43	100	25	P	H
	*	2440	111.47	-	-	96.64	31.72	18.54	35.43	100	25	A	H
		2499.37	54.29	-19.71	74	38.93	32.19	18.63	35.46	100	25	P	H
		2495.8	45.72	-8.28	54	30.39	32.17	18.62	35.46	100	25	A	H
		2324.42	53.63	-20.37	74	39.27	31.5	18.25	35.39	384	118	P	V
		2311.96	44.79	-9.21	54	30.41	31.55	18.21	35.38	384	118	A	V
	*	2440	111.51	-	-	96.68	31.72	18.54	35.43	384	118	P	V
	*	2440	110.81	-	-	95.98	31.72	18.54	35.43	384	118	A	V
		2489.43	55.35	-18.65	74	40.07	32.12	18.61	35.45	384	118	P	V
		2493.42	45.75	-8.25	54	30.44	32.15	18.62	35.46	384	118	A	V

BLE CH 39 2480MHz	*	2480	110.53	-	-	95.34	32.04	18.6	35.45	109	28	P	H
	*	2480	109.47	-	-	94.28	32.04	18.6	35.45	109	28	A	H
		2498.8	55.23	-18.77	74	39.87	32.19	18.63	35.46	109	28	P	H
		2499.76	45.98	-8.02	54	30.61	32.2	18.63	35.46	109	28	A	H
													H
													H
	*	2480	108.99	-	-	93.8	32.04	18.6	35.45	335	122	P	V
	*	2480	108.19	-	-	93	32.04	18.6	35.45	335	122	A	V
		2497.36	54.45	-19.55	74	39.11	32.18	18.62	35.46	335	122	P	V
		2499.6	45.81	-8.19	54	30.44	32.2	18.63	35.46	335	122	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE ANT 3	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	44.48	-29.52	74	55.76	34.01	12.7	57.99	-	-	P	H
		14499	46.33	-27.67	74	43.16	39.6	21.66	58.09	-	-	P	H
		15705	47.93	-26.07	74	42.18	40.42	22.41	57.08	-	-	P	H
		17700	50	-24	74	41.11	41.5	23.55	56.16	-	-	P	H
		17700	39.83	-14.17	54	30.94	41.5	23.55	56.16	-	-	A	H
													H
													H
													H
													H
													H
													H
													H
		4804	41.71	-32.29	74	52.99	34.01	12.7	57.99	-	-	P	V
		14499	46.63	-27.37	74	43.46	39.6	21.66	58.09	-	-	P	V
		16020	47.6	-26.4	74	40.76	41.04	22.62	56.82	-	-	P	V
		17925	49.42	-24.58	74	40.34	41.43	23.67	56.02	-	-	P	V
		17925	39.71	-14.29	54	30.63	41.43	23.67	56.02	-	-	A	V
													V
													V
													V
													V
													V
													V
													V

BLE ANT 3	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4880	42.71	-31.29	74	53.82	34.04	12.75	57.9	-	-	P	H
		7320	41.81	-32.19	74	49.02	35.68	15.03	57.92	-	-	P	H
		14499	46.4	-27.6	74	43.23	39.6	21.66	58.09	-	-	P	H
		15870	47.61	-26.39	74	41.19	40.84	22.52	56.94	-	-	P	H
		17760	50.01	-23.99	74	41	41.56	23.57	56.12	-	-	P	H
		17760	39.82	-14.18	54	30.81	41.56	23.57	56.12	-	-	A	H
													H
													H
													H
													H
													H
													H
BLE CH 19 2440MHz		4880	42.68	-31.32	74	53.79	34.04	12.75	57.9	-	-	P	V
		7320	41.22	-32.78	74	48.43	35.68	15.03	57.92	-	-	P	V
		14499	46.64	-27.36	74	43.47	39.6	21.66	58.09	-	-	P	V
		16125	47.96	-26.04	74	40.87	41.2	22.67	56.78	-	-	P	V
		17910	49.7	-24.3	74	40.66	41.41	23.66	56.03	-	-	P	V
		17910	39.81	-14.19	54	30.77	41.41	23.66	56.03	-	-	A	V
													V
													V
													V
													V
													V
													V

BLE ANT 3	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4960	45.38	-28.62	74	56.27	34.1	12.82	57.81	-	-	P	H
		7440	40.85	-33.15	74	48.04	35.82	15.03	58.04	-	-	P	H
		14499	46.15	-27.85	74	42.98	39.6	21.66	58.09	-	-	P	H
		16125	47.43	-26.57	74	40.34	41.2	22.67	56.78	-	-	P	H
		17805	49.09	-24.91	74	40	41.59	23.6	56.1	-	-	P	H
		17805	39.58	-14.42	54	30.49	41.59	23.6	56.1	-	-	A	H
													H
													H
													H
													H
													H
BLE CH 39 2480MHz													H
		4960	45.39	-28.61	74	56.28	34.1	12.82	57.81	-	-	P	V
		7440	40.49	-33.51	74	47.68	35.82	15.03	58.04	-	-	P	V
		14499	46.25	-27.75	74	43.08	39.6	21.66	58.09	-	-	P	V
		15855	47.81	-26.19	74	41.44	40.81	22.51	56.95	-	-	P	V
		17880	49.92	-24.08	74	40.88	41.44	23.65	56.05	-	-	P	V
		17880	39.67	-14.33	54	30.63	41.44	23.65	56.05	-	-	A	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.
4. The emission level close to 18GHz is checked that the average emission level is noise floor only.

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2340.87	53.87	-20.13	74	39.53	31.44	18.3	35.4	100	110	P	H
		2340.555	44.93	-9.07	54	30.59	31.44	18.3	35.4	100	110	A	H
	*	2402	115.53	-	-	101.05	31.42	18.48	35.42	100	110	P	H
	*	2402	115.1	-	-	100.62	31.42	18.48	35.42	100	110	A	H
													H
													H
		2347.065	54.15	-19.85	74	39.82	31.41	18.32	35.4	350	92	P	V
		2337.09	44.91	-9.09	54	30.56	31.45	18.29	35.39	350	92	A	V
	*	2402	113.47	-	-	98.99	31.42	18.48	35.42	350	92	P	V
	*	2402	112.84	-	-	98.36	31.42	18.48	35.42	350	92	A	V
													V
													V
BLE CH 19 2440MHz		2311.4	54.41	-19.59	74	40.03	31.55	18.21	35.38	100	245	P	H
		2341.08	44.94	-9.06	54	30.6	31.44	18.3	35.4	100	245	A	H
	*	2440	114.57	-	-	99.74	31.72	18.54	35.43	100	245	P	H
	*	2440	113.94	-	-	99.11	31.72	18.54	35.43	100	245	A	H
		2494.75	54.89	-19.11	74	39.57	32.16	18.62	35.46	100	245	P	H
		2499.51	45.84	-8.16	54	30.47	32.2	18.63	35.46	100	245	A	H
		2374.12	54.08	-19.92	74	39.69	31.4	18.4	35.41	385	114	P	V
		2388.68	45	-9	54	30.57	31.4	18.44	35.41	385	114	A	V
	*	2440	114.76	-	-	99.93	31.72	18.54	35.43	385	114	P	V
	*	2440	113.95	-	-	99.12	31.72	18.54	35.43	385	114	A	V
		2486.56	54.28	-19.72	74	39.03	32.09	18.61	35.45	385	114	P	V
		2496.71	45.88	-8.12	54	30.55	32.17	18.62	35.46	385	114	A	V

BLE CH 39 2480MHz	*	2480	112.16	-	-	96.97	32.04	18.6	35.45	130	242	P	H
	*	2480	111.59	-	-	96.4	32.04	18.6	35.45	130	242	A	H
		2483.84	57.59	-16.41	74	42.37	32.07	18.6	35.45	130	242	P	H
		2483.56	45.94	-8.06	54	30.72	32.07	18.6	35.45	130	242	A	H
													H
													H
	*	2480	110.96	-	-	95.77	32.04	18.6	35.45	332	125	P	V
	*	2480	110.38	-	-	95.19	32.04	18.6	35.45	332	125	A	V
		2498.44	55.12	-18.88	74	39.76	32.19	18.63	35.46	332	125	P	V
		2495.32	45.85	-8.15	54	30.53	32.16	18.62	35.46	332	125	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE ANT 4+3	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	43.32	-30.68	74	54.6	34.01	12.7	57.99	-	-	P	H
		14490	47.04	-26.96	74	43.9	39.58	21.65	58.09	-	-	P	H
		16125	47.66	-26.34	74	40.57	41.2	22.67	56.78	-	-	P	H
		17835	49.29	-24.71	74	40.22	41.53	23.62	56.08	-	-	P	H
		17835	39.52	-14.48	54	30.45	41.53	23.62	56.08	-	-	A	H
													H
													H
													H
													H
													H
													H
													H
		4804	42.72	-31.28	74	54	34.01	12.7	57.99	-	-	P	V
		14475	47.46	-26.54	74	44.35	39.55	21.65	58.09	-	-	P	V
		15870	47.97	-26.03	74	41.55	40.84	22.52	56.94	-	-	P	V
		17790	49.28	-24.72	74	40.2	41.59	23.6	56.11	-	-	P	V
		17790	39.79	-14.21	54	30.71	41.59	23.6	56.11	-	-	A	V
													V
													V
													V
													V
													V
													V
													V

BLE ANT 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Margin (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4880	41.81	-32.19	74	52.92	34.04	12.75	57.9	-	-	P	H
		7320	41.26	-32.74	74	48.47	35.68	15.03	57.92	-	-	P	H
		14490	46.61	-27.39	74	43.47	39.58	21.65	58.09	-	-	P	H
		15840	47.42	-26.58	74	41.11	40.78	22.5	56.97	-	-	P	H
		17865	50.25	-23.75	74	41.2	41.47	23.64	56.06	-	-	P	H
		17865	39.99	-14.01	54	30.94	41.47	23.64	56.06	-	-	A	H
													H
													H
													H
													H
													H
													H
BLE CH 19 2440MHz		4880	42.74	-31.26	74	53.85	34.04	12.75	57.9	-	-	P	V
		7320	41.32	-32.68	74	48.53	35.68	15.03	57.92	-	-	P	V
		14499	46.46	-27.54	74	43.29	39.6	21.66	58.09	-	-	P	V
		16140	47.92	-26.08	74	40.82	41.2	22.68	56.78	-	-	P	V
		17715	49.72	-24.28	74	40.81	41.51	23.55	56.15	-	-	P	V
		17715	39.48	-14.52	54	30.57	41.51	23.55	56.15	-	-	A	V
													V
													V
													V
													V
													V
													V

BLE ANT 4+3	Note	Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		4960	44.78	-29.22	74	55.67	34.1	12.82	57.81	-	-	P	H
		7440	40.93	-33.07	74	48.12	35.82	15.03	58.04	-	-	P	H
		14490	46.73	-27.27	74	43.59	39.58	21.65	58.09	-	-	P	H
		15825	47.65	-26.35	74	41.39	40.75	22.49	56.98	-	-	P	H
		17925	49.82	-24.18	74	40.74	41.43	23.67	56.02	-	-	P	H
		17925	39.71	-14.29	54	30.63	41.43	23.67	56.02	-	-	A	H
													H
													H
													H
													H
													H
													H
BLE CH 39 2480MHz		4960	44.17	-29.83	74	55.06	34.1	12.82	57.81	-	-	P	V
		7440	40.37	-33.63	74	47.56	35.82	15.03	58.04	-	-	P	V
		14490	47.06	-26.94	74	43.92	39.58	21.65	58.09	-	-	P	V
		15690	47.96	-26.04	74	42.27	40.38	22.41	57.1	-	-	P	V
		17805	50.22	-23.78	74	41.13	41.59	23.6	56.1	-	-	P	V
		17805	39.87	-14.13	54	30.78	41.59	23.6	56.1	-	-	A	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.
4. The emission level close to 18GHz is checked that the average emission level is noise floor only.

Emission above 18GHz

2.4GHz BLE (SHF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE SHF		23957	41.13	-32.87	74	51.83	38.65	8.78	58.13	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		23971	40.67	-33.33	74	51.35	38.65	8.79	58.12	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
ANT					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		45.66	22.13	-17.87	40	34.62	16.54	1.02	30.05	-	-	P	H
		174.99	23.76	-19.74	43.5	36.2	15.27	2.15	29.86	-	-	P	H
		213.06	23.45	-20.05	43.5	36	14.89	2.37	29.81	-	-	P	H
		692.7	27.94	-18.06	46	27.02	26.12	4.37	29.57	-	-	P	H
		807.5	29.61	-16.39	46	26.42	27.63	4.78	29.22	-	-	P	H
		946.8	32.34	-13.66	46	25.79	30.04	5.17	28.66	-	-	P	H
													H
													H
													H
													H
													H
													H
		30	32.29	-7.71	40	36.86	24.57	0.97	30.11	-	-	P	V
		38.64	23.71	-16.29	40	32.7	20.16	0.92	30.07	-	-	P	V
		55.11	21.57	-18.43	40	38.02	12.46	1.12	30.03	-	-	P	V
		753.6	28.97	-17.03	46	26.13	27.68	4.58	29.42	-	-	P	V
		848.8	30.73	-15.27	46	26.27	28.63	4.89	29.06	-	-	P	V
		943.3	32.73	-13.27	46	26.4	29.84	5.16	28.67	-	-	P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **Margin limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Radiated Spurious Emission Plots

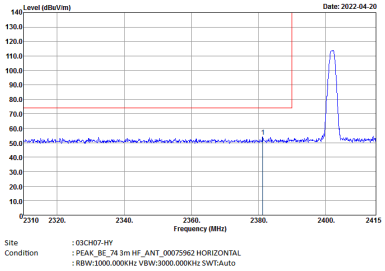
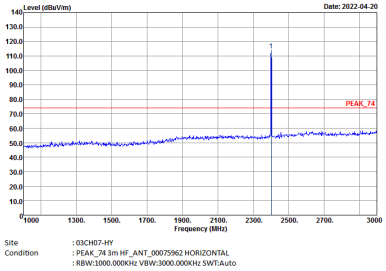
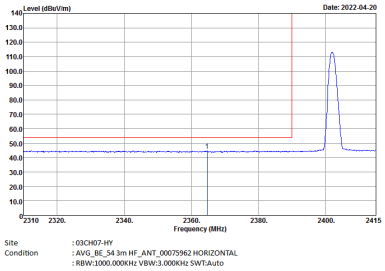
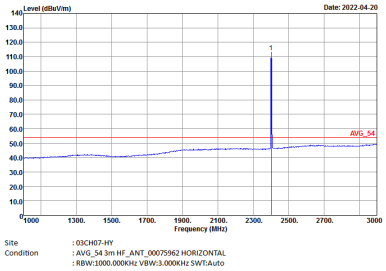
Test Engineer :	Jesse Wang, Stan Hsieh, Ken Wu	**Temperature :**	22.8~24.9°C
		Relative Humidity :	52.6~61.1%

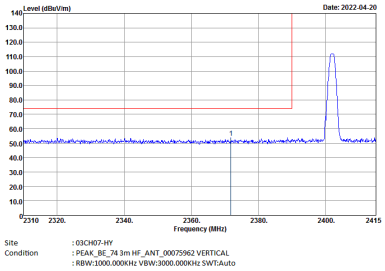
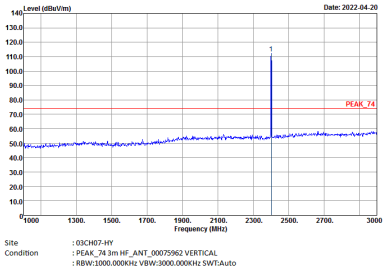
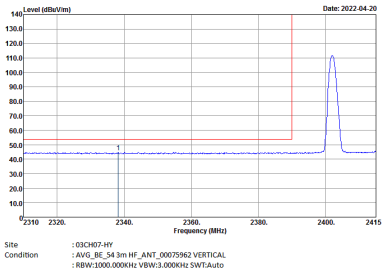
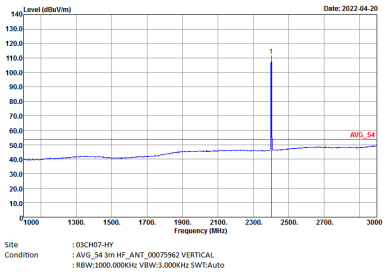
Note symbol

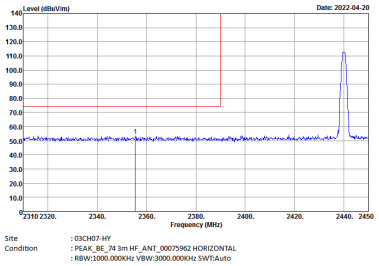
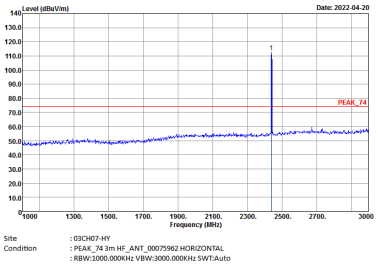
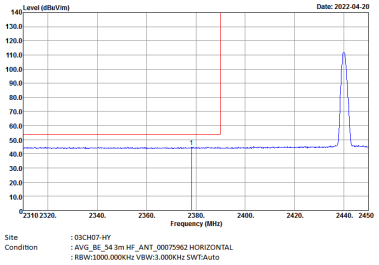
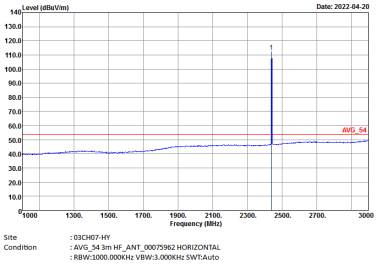
-L	**Low channel location**
-R	**High channel location**

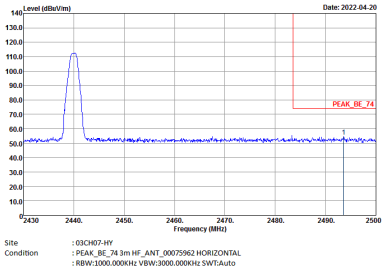
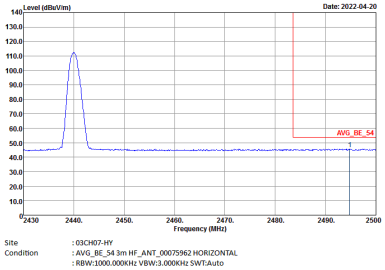
2.4GHz 2400~2483.5MHz

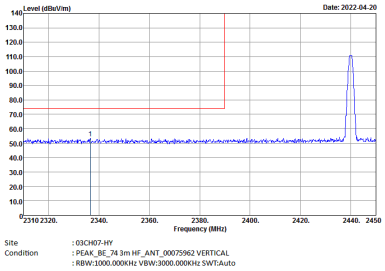
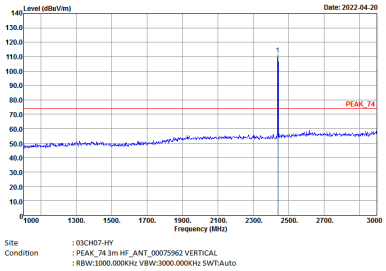
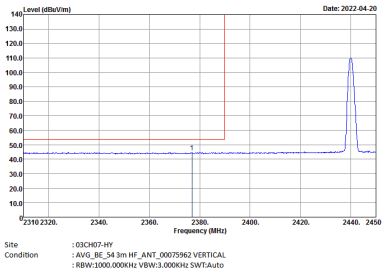
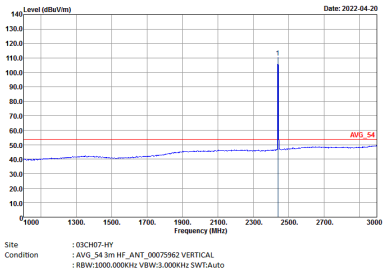
BLE (Band Edge @ 3m)

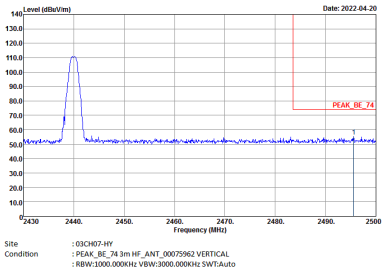
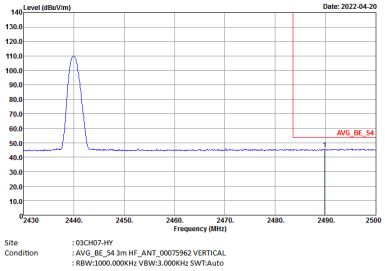
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
4	Horizontal	Fundamental
Peak		
Avg.		

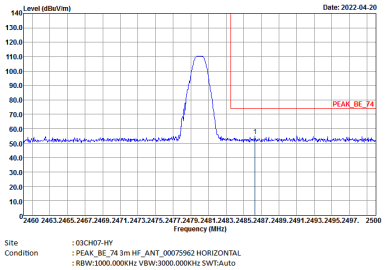
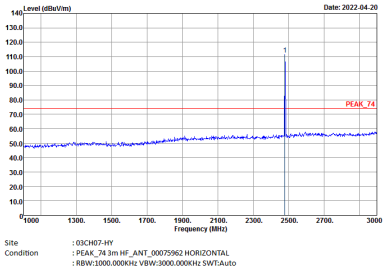
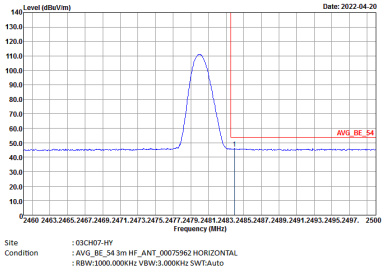
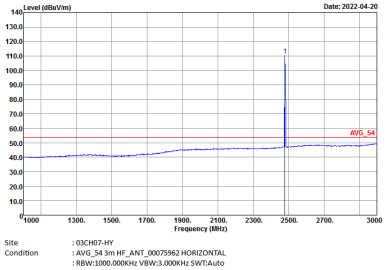
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
4	Vertical	Fundamental
Peak		
Avg		

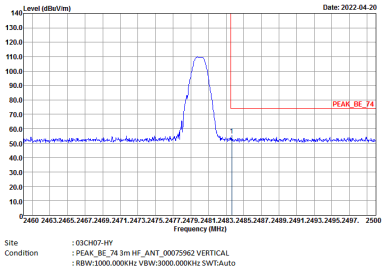
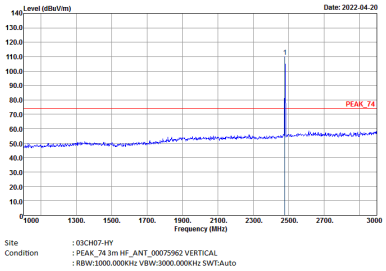
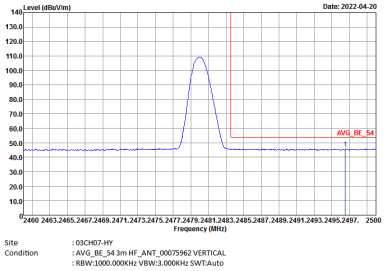
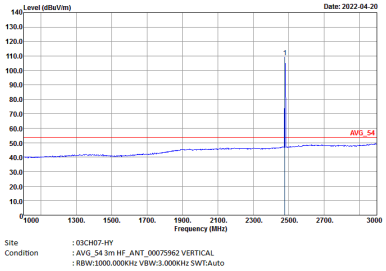
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
4	Horizontal	Fundamental
Peak		
Avg.		

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
4	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
4	Vertical	Fundamental
Peak		
Avg.		

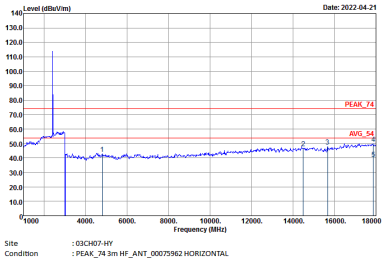
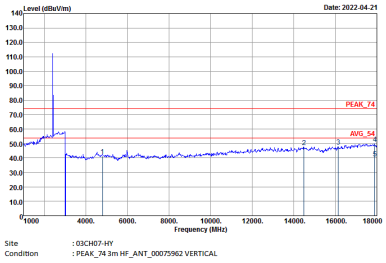
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
4	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

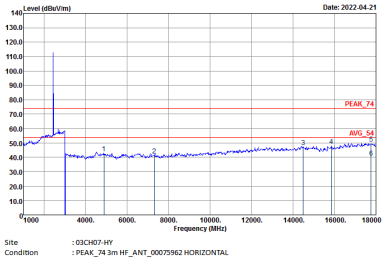
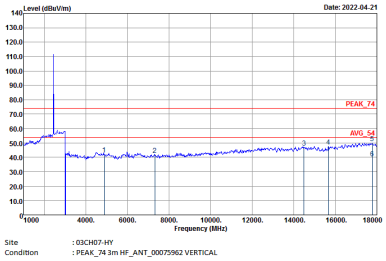
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
4	Horizontal	Fundamental
Peak		
Avg.		

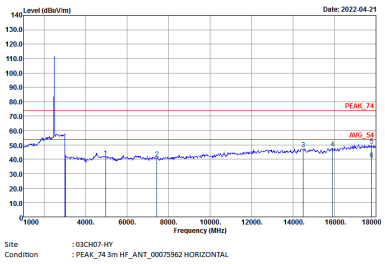
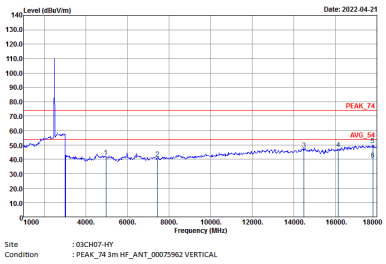
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
4	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

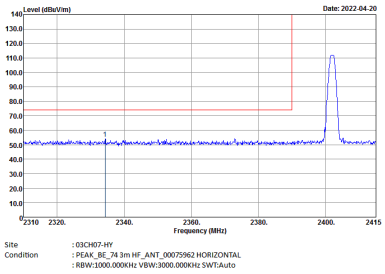
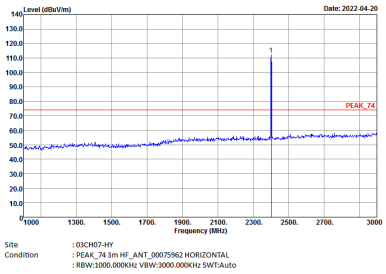
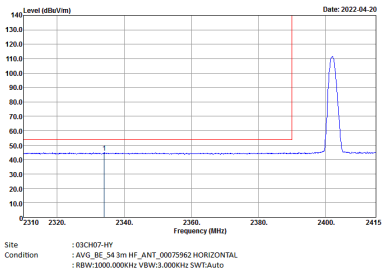
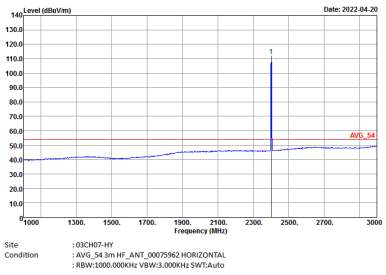
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH00 2402MHz	
4	Horizontal	Vertical
Peak Avg.		

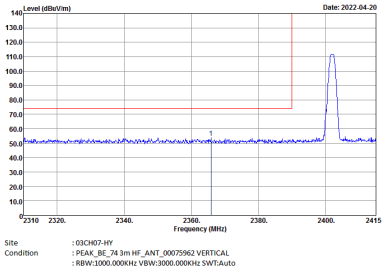
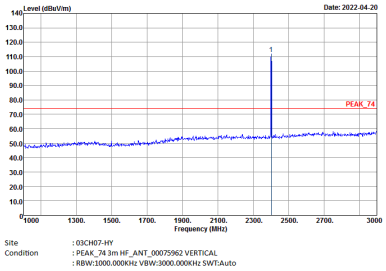
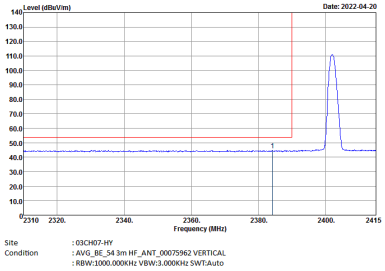
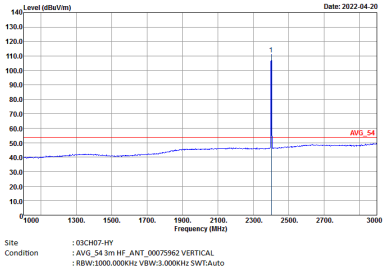
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH19 2440MHz	
4	Horizontal	Vertical
Peak Avg.		

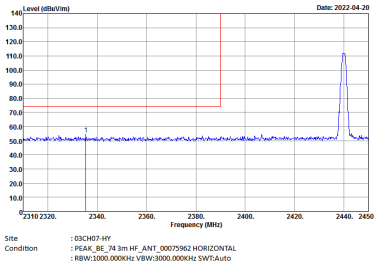
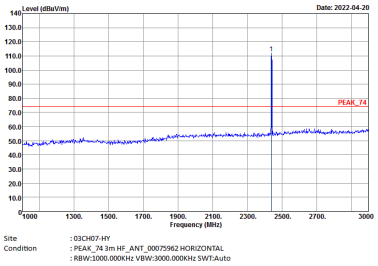
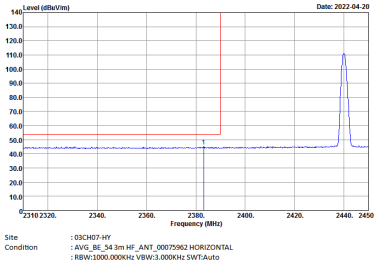
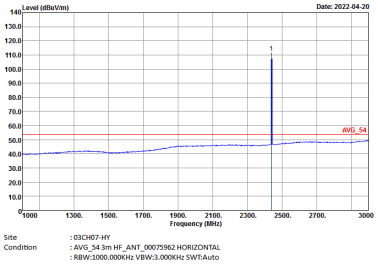
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH39 2480MHz	
4	Horizontal	Vertical
Peak Avg.		

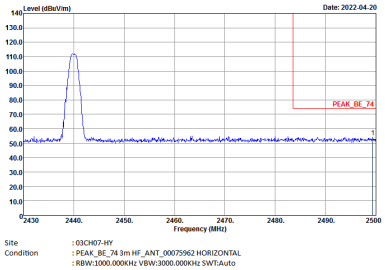
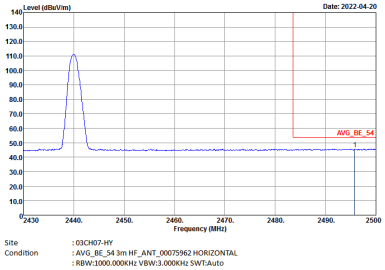
2.4GHz 2400~2483.5MHz

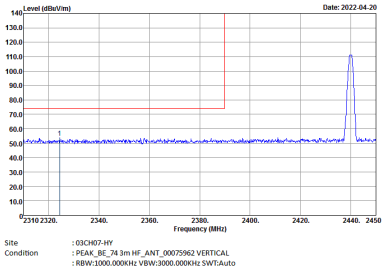
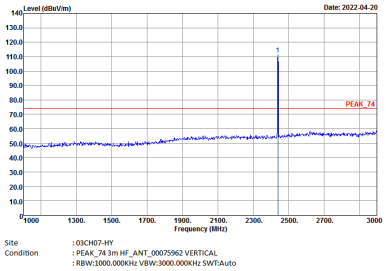
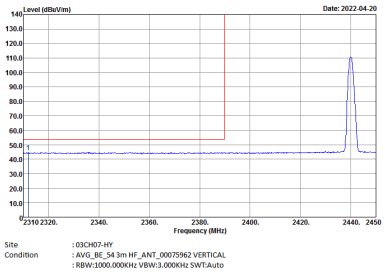
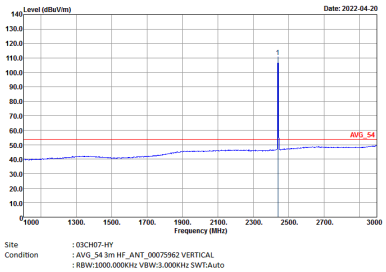
BLE (Band Edge @ 3m)

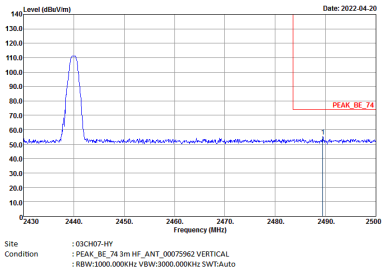
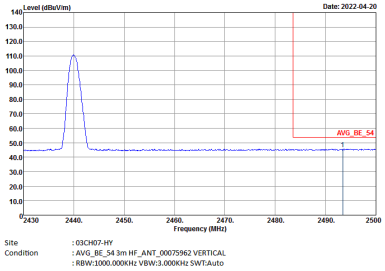
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
3	Horizontal	Fundamental
Peak		
Avg.		

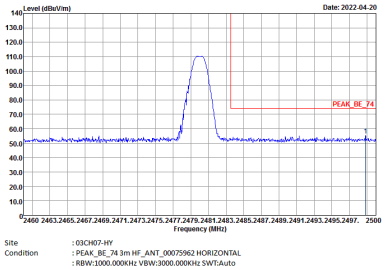
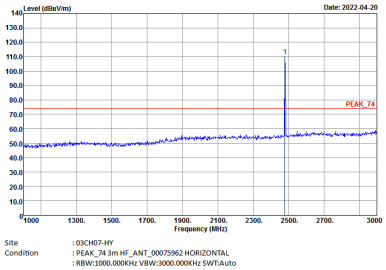
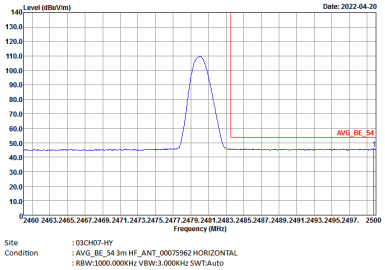
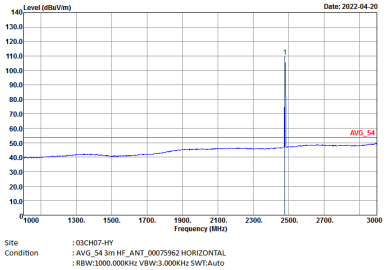
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
3	Vertical	Fundamental
Peak		
Avg		

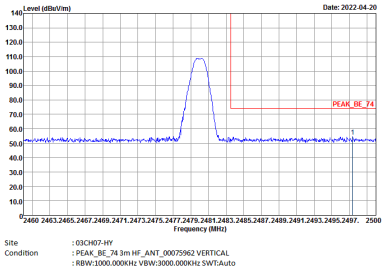
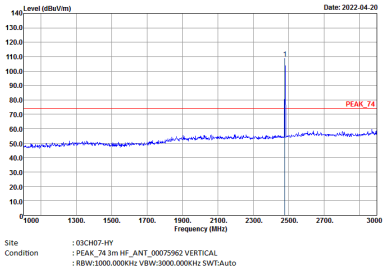
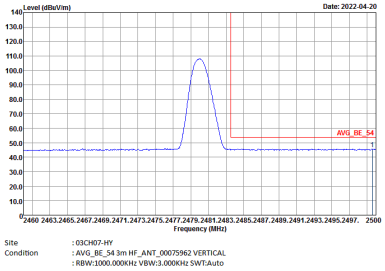
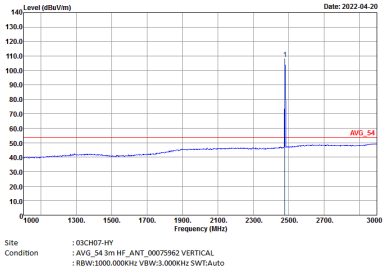
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
3	Horizontal	Fundamental
Peak		
Avg.		

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
3	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
3	Vertical	Fundamental
Peak		
Avg.		

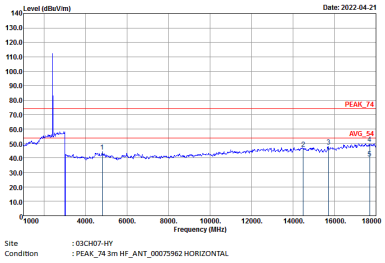
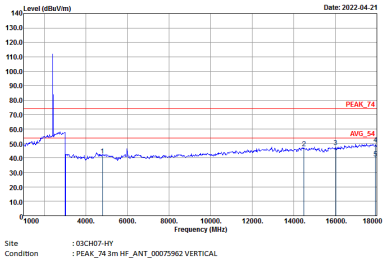
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
3	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

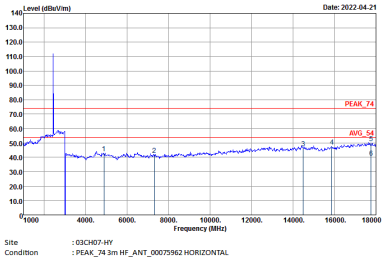
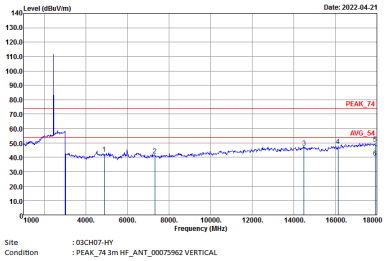
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
3	Horizontal	Fundamental
Peak		
Avg.		

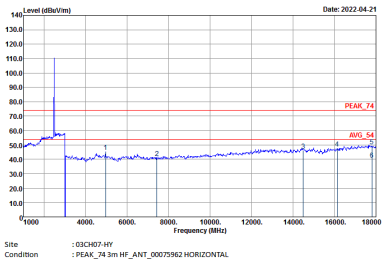
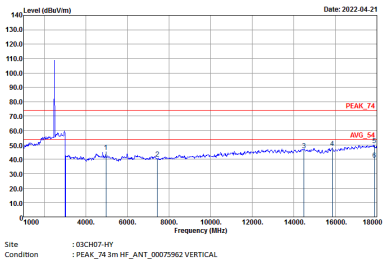
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
3	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

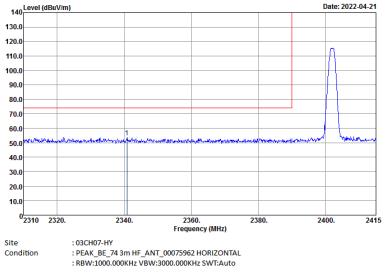
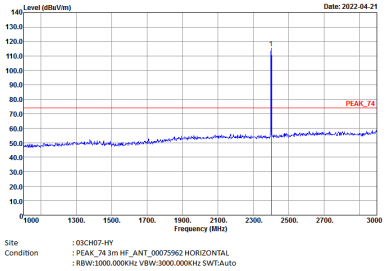
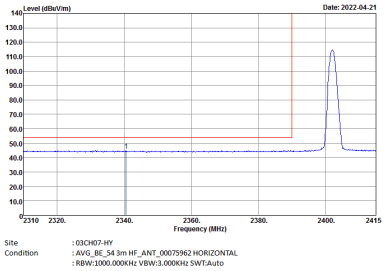
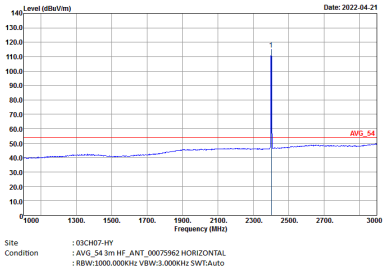
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH00 2402MHz	
3	Horizontal	Vertical
Peak Avg.		

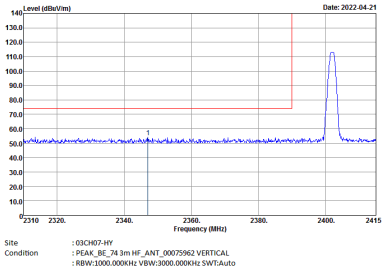
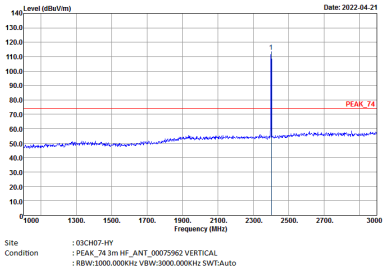
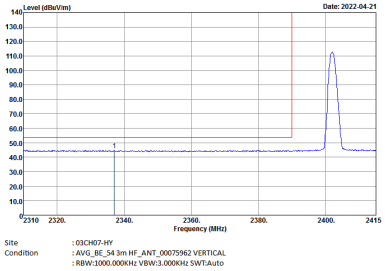
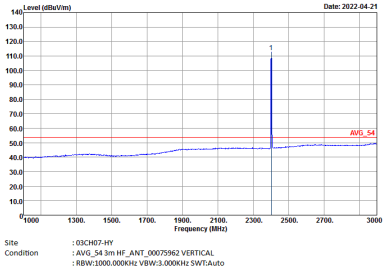
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH19 2440MHz	
3	Horizontal	Vertical
Peak Avg.		

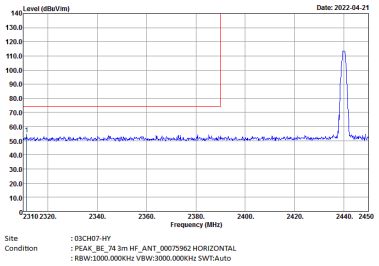
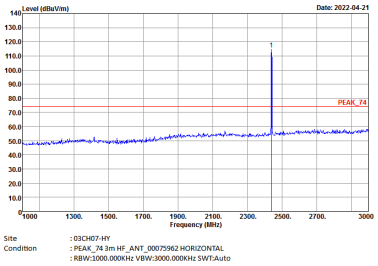
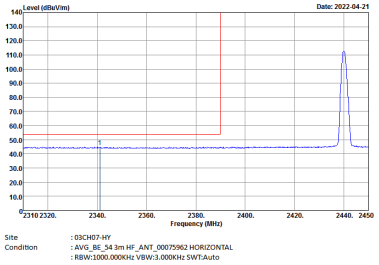
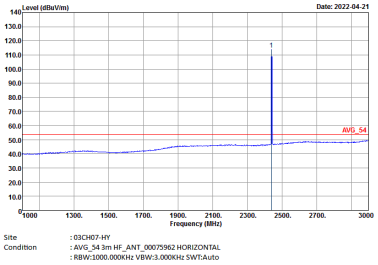
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH39 2480MHz	
3	Horizontal	Vertical
Peak Avg.		

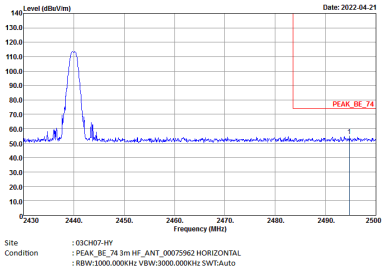
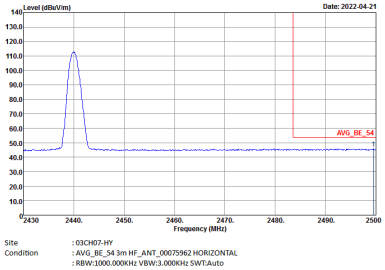
2.4GHz 2400~2483.5MHz

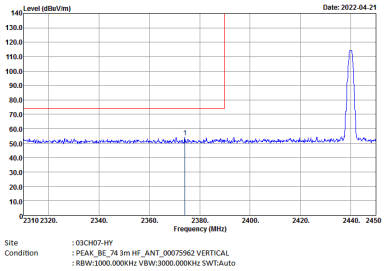
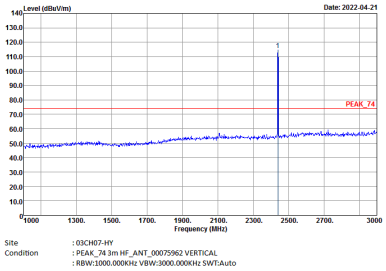
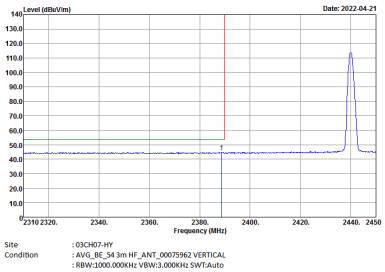
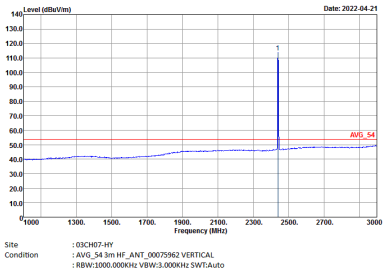
BLE (Band Edge @ 3m)

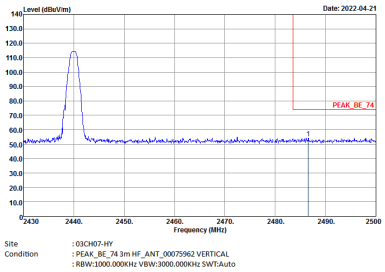
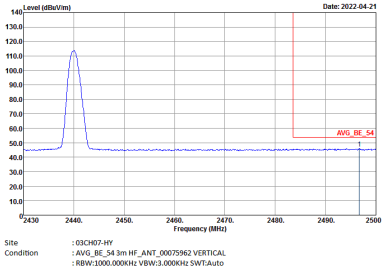
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
4+3	Horizontal	Fundamental
Peak		
Avg.		

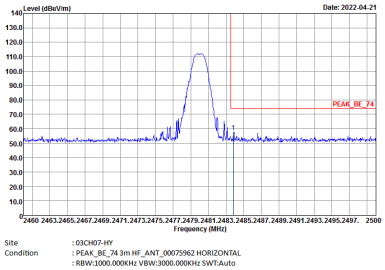
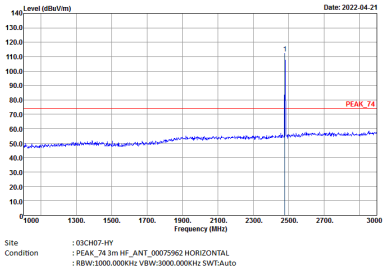
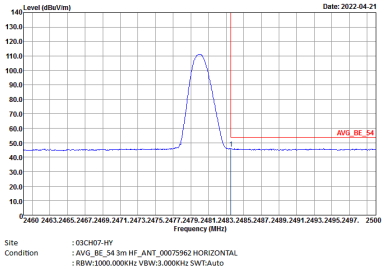
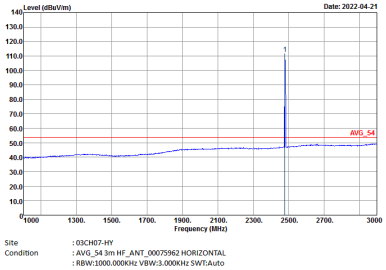
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH00 2402MHz	
4+3	Vertical	Fundamental
Peak		
Avg		

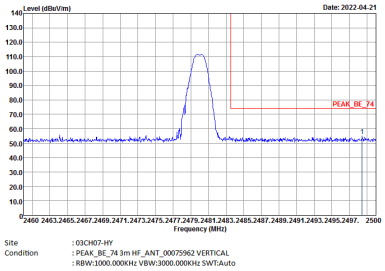
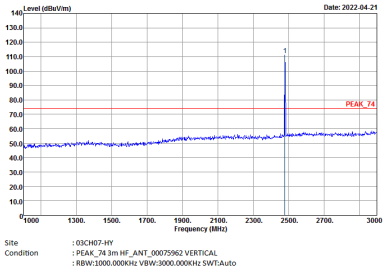
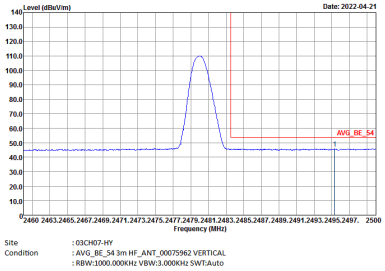
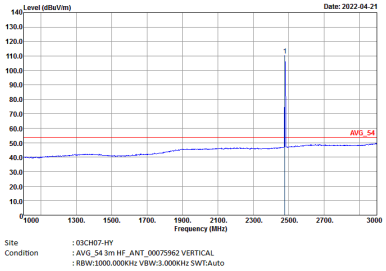
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
4+3	Horizontal	Fundamental
Peak		
Avg.		

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
4+3	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
4+3	Vertical	Fundamental
Peak		
Avg.		

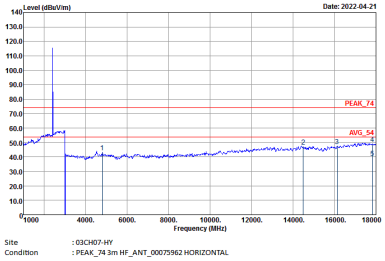
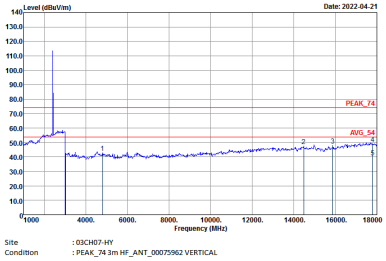
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
4+3	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

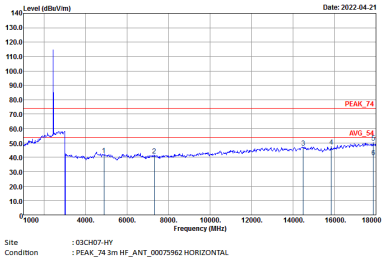
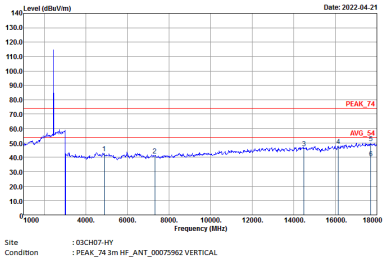
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
4+3	Horizontal	Fundamental
Peak		
Avg.		

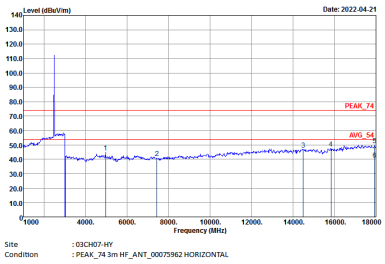
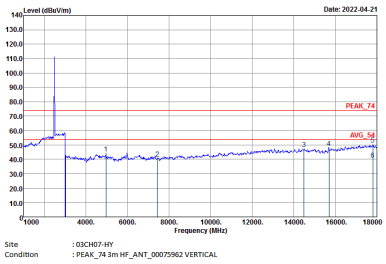
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
4+3	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

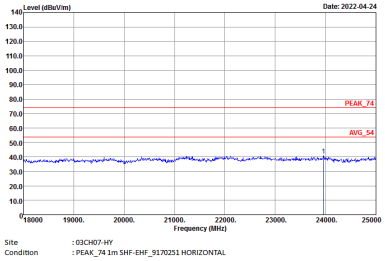
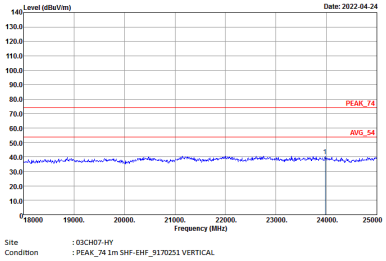
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH00 2402MHz	
4+3	Horizontal	Vertical
Peak Avg.		

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH19 2440MHz	
4+3	Horizontal	Vertical
Peak Avg.		

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH39 2480MHz	
4+3	Horizontal	Vertical
Peak Avg.		

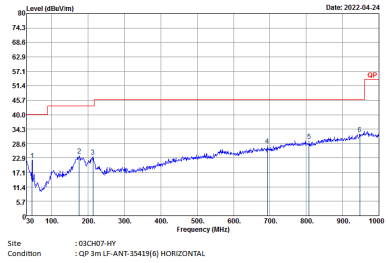
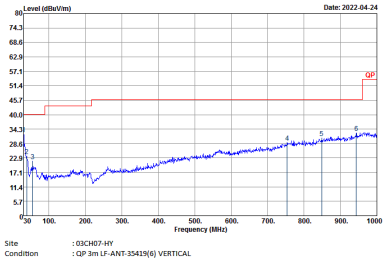
Emission above 18GHz

2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
ANT	BLE SHF	
4+3	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz BLE (LF)

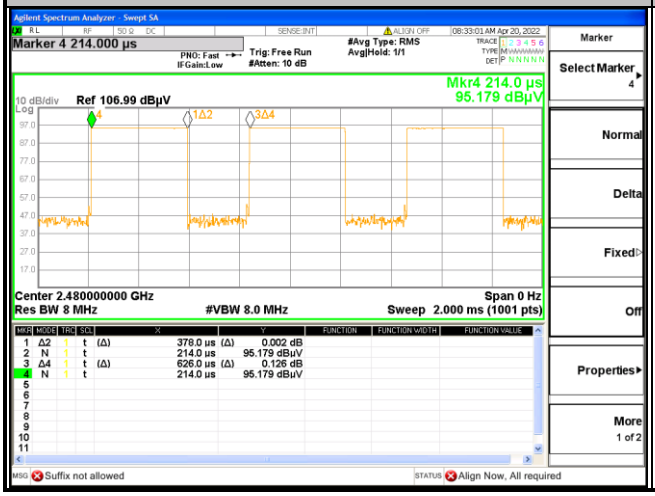
BLE	2.4GHz 2400~2483.5MHz	
ANT	BLE LF	
4+3	Horizontal	Vertical
QP / Peak		

Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
4	Bluetooth - LE for 1Mbps	60.38	378	2.65	3kHz
3	Bluetooth - LE for 1Mbps	60.10	375	2.67	3kHz
4+3	Bluetooth - LE for 1Mbps	60.58	378	2.65	3kHz

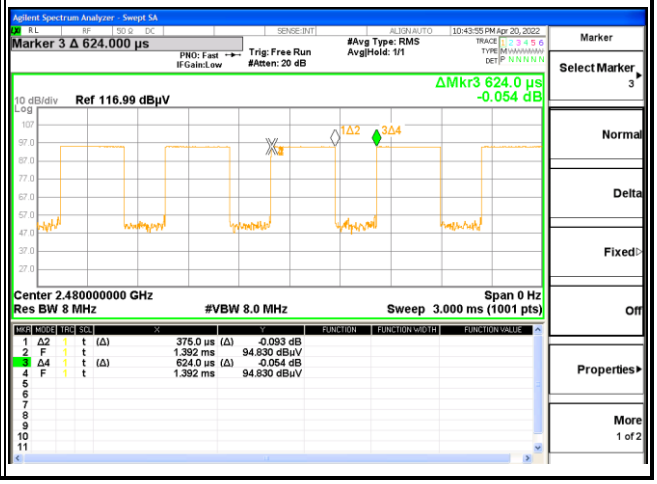
<Ant. 4>

Bluetooth – LE for 1Mbps



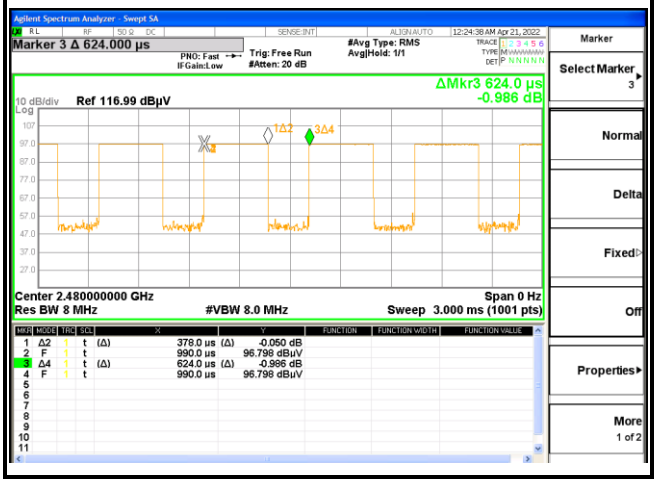
<Ant. 3>

Bluetooth – LE for 1Mbps



MIMO <Ant. 4+3>

Bluetooth – LE for 1Mbps



———THE END———