FCC RADIO TEST REPORT

FCC ID	:	**GKRGWT9R**
Equipment	:	**Wireless Device**
Model Name	:	**GWT9R**
Applicant	:	**Compal Electronics, Inc.** **No. 581-1 & 581, Ruiguang Rd., Nei-hu District, Taipei City 114, TAIWAN (R.O.C.)**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Apr. 28, 2021 and testing was started from May 04, 2021 and completed on Aug. 03, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR142875B	01	Initial issue of report	Aug. 30, 2021
FR142875B	02	1. Revise summary remark 2. Revise support unit used in test configuration and system in section 2.4 3. Revise SHF test data in appendix C and appendix D 4. Revise list of measuring equipment	Dec. 16, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)(3)	Output Power	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	Under limit 8.27 dB at 2499.200 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 13.72 dB at 0.564 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Avis Chuang

Report Producer: Celery Wei

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Wireless Device
Model Name	GWT9R
FCC ID	GKRGWT9R
EUT supports Radios application	WCDMA/HSPA/LTE/NFC(Passive) WLAN 11b/g/n HT20 Bluetooth BR/EDR/LE

Remark: The above EUT's information was declared by manufacturer.

EUT Information List	
S/N	Performed Test Item
14151FQEJXN030	RF Conducted Measurement
14261FQEJSN05H	Radiated Spurious Emission
14121FQEJSN09G	Conducted Emission

1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	40
Carrier Frequency of Each Channel	40 Channel (37 hopping + 3 advertising channel)
Maximum Output Power to Antenna	Bluetooth – LE (1Mbps): 20.50 dBm / 0.1122 W Bluetooth – LE (2Mbps): 20.40 dBm / 0.1096 W
99% Occupied Bandwidth	Bluetooth – LE (1Mbps): 1.053MHz Bluetooth – LE (2Mbps): 2.042MHz
Antenna Type / Gain	IFA Antenna with gain -5.4 dBi
Type of Modulation	Bluetooth LE : GFSK

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH02-HY, CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH13-HY (TAF Code: 3786)
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-

2.2 Test Mode

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). The measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find X plane as worst plane.

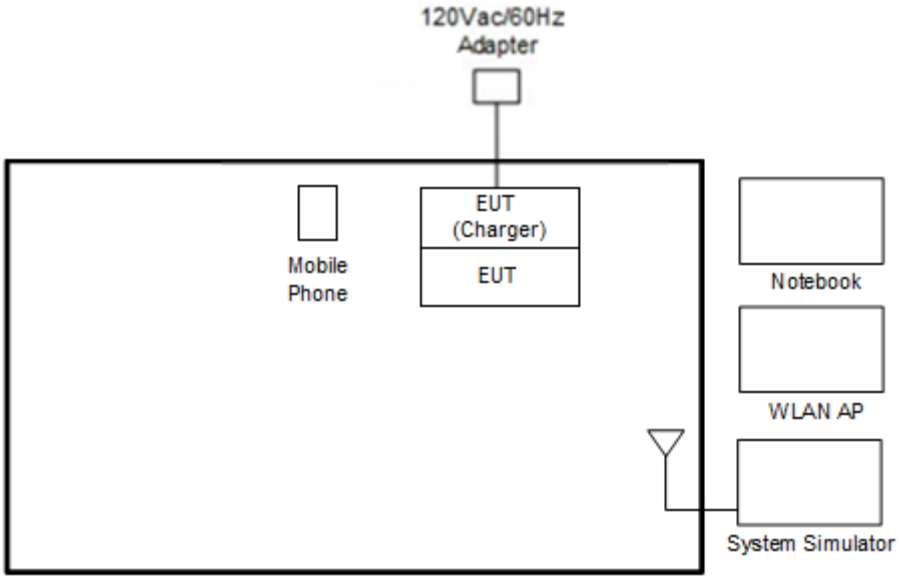
b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Conducted Test Cases	**Bluetooth – LE / GFSK**
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps
Radiated Test Cases	**<EUT with Strap 1>**
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps
	<EUT with Strap 3>
	Mode 7: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 8: Bluetooth Tx CH39_2480 MHz_2Mbps
AC Conducted Emission	Mode 1: LTE Band 5 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Charger (Charging from AC Adapter) + NFC (Passive) On + Charging mode ; Battery <50%

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



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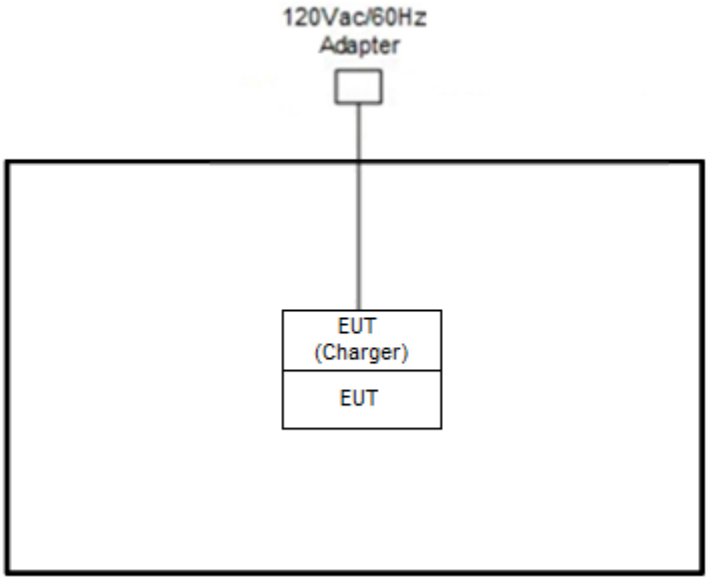


2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,1.8m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P： Unshielded, 1.2m DC O/P： Shielded, 1.8m
4.	Mobile Phone	SAMSUNG	SM-A730F/DS	A3LSMA730F	N/A	N/A
5.	Adapter	N/A	N/A	N/A	N/A	N/A
6.	Wireless Device	N/A	G943M	GKRG943M	N/A	Unshielded, 1.0m

2.5 EUT Operation Test Setup

The RF test items, utility “CMD ver.10.0.18362.1256” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

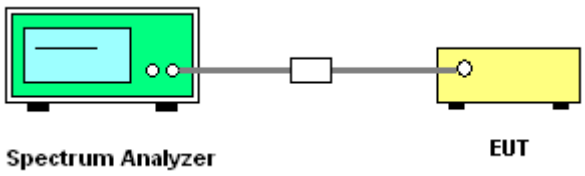
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
6. Measure and record the results in the test report.

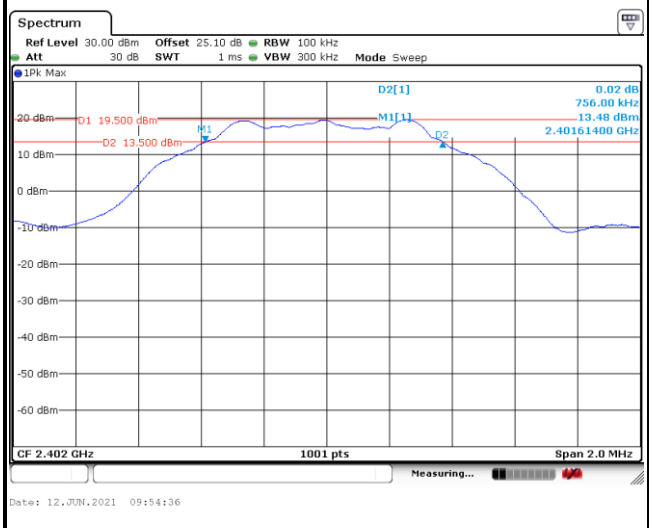
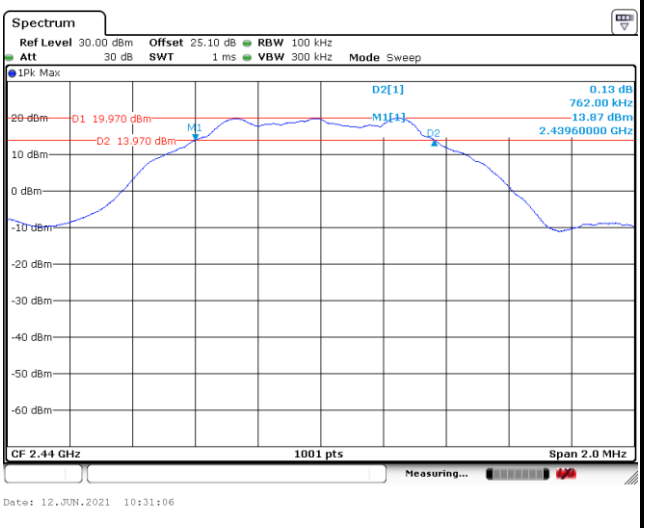
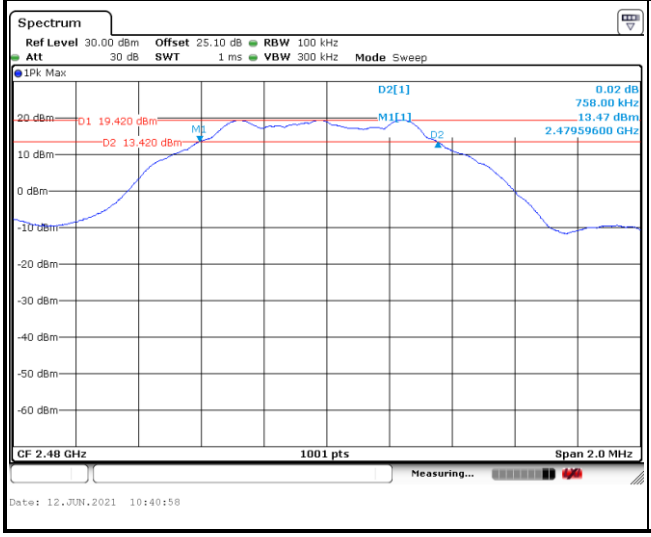
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

<1Mbps>

6 dB Bandwidth Plot on Channel 00	6 dB Bandwidth Plot on Channel 19
	
6 dB Bandwidth Plot on Channel 39	**N/A**
	

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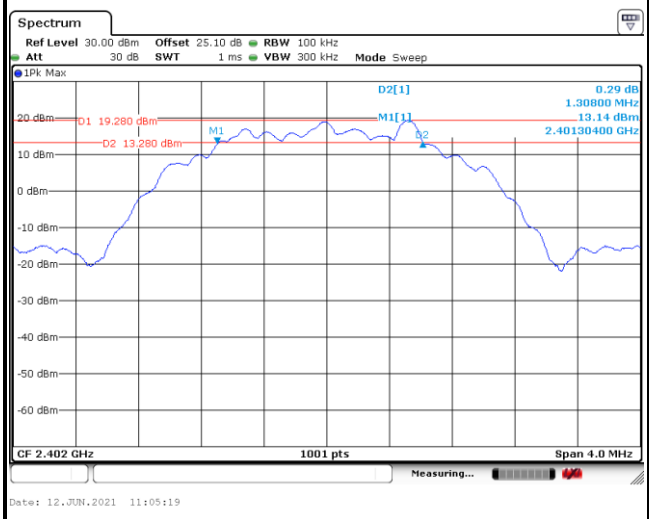
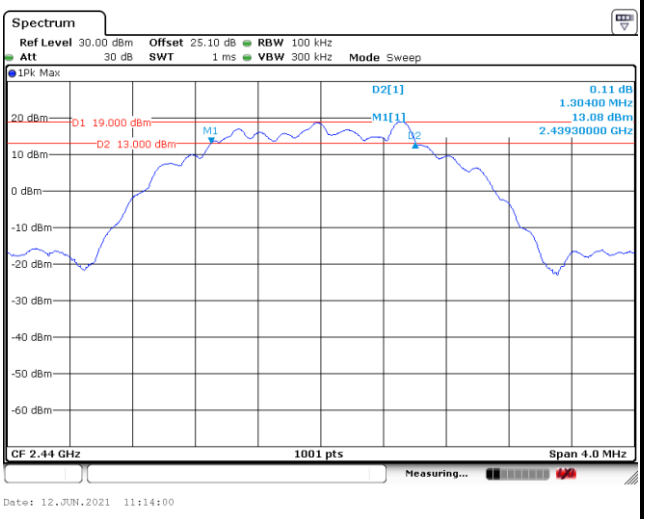
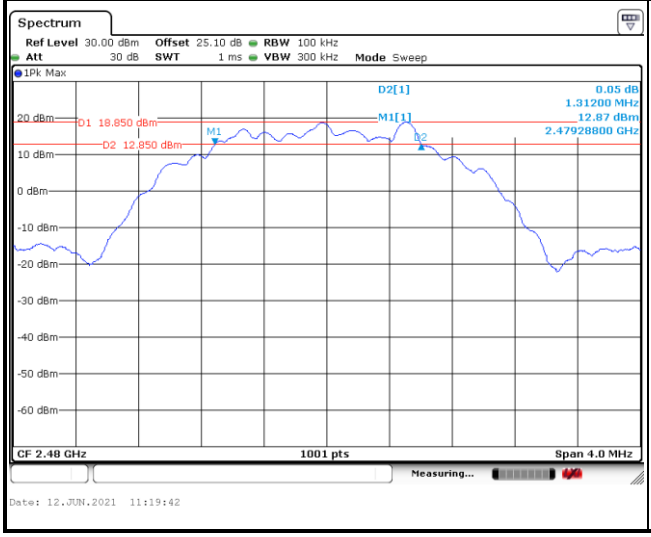
6 dB Bandwidth Plot on Channel 00	6 dB Bandwidth Plot on Channel 19
	
6 dB Bandwidth Plot on Channel 39	**N/A**
	

3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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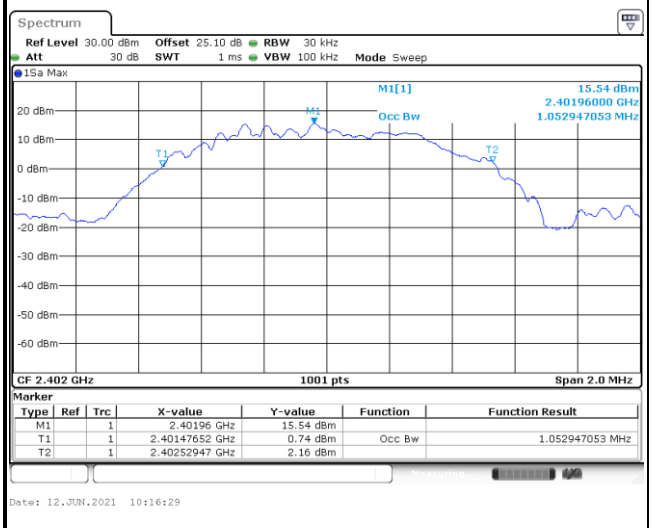
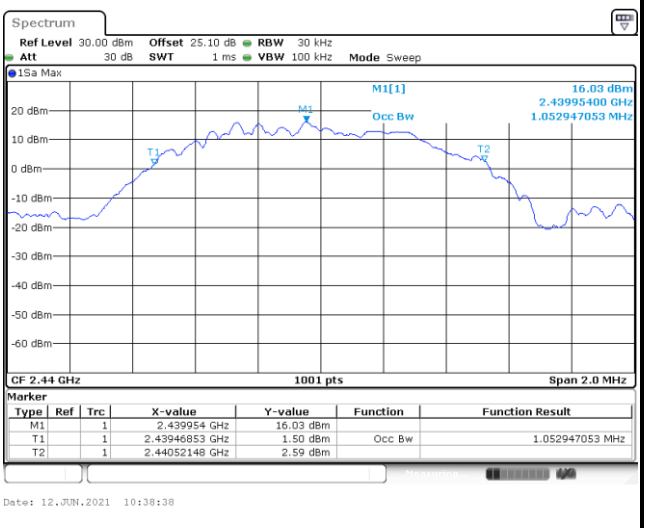
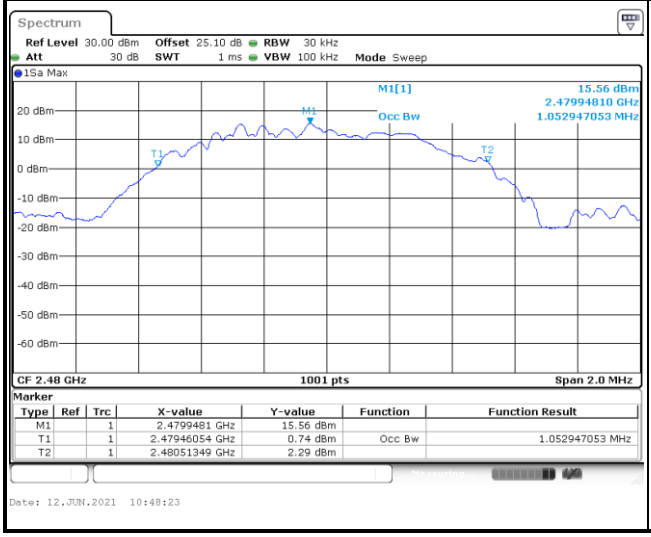
99% Bandwidth Plot on Channel 00	99% Occupied Bandwidth Plot on Channel 19
	
99% Occupied Bandwidth Plot on Channel 39	**N/A**
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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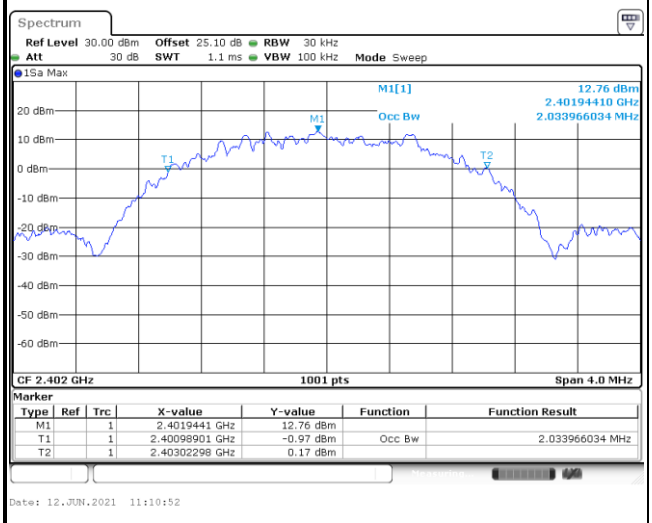
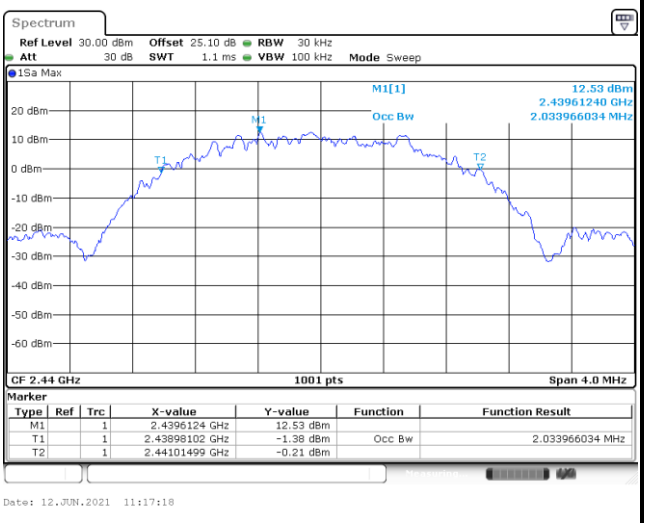
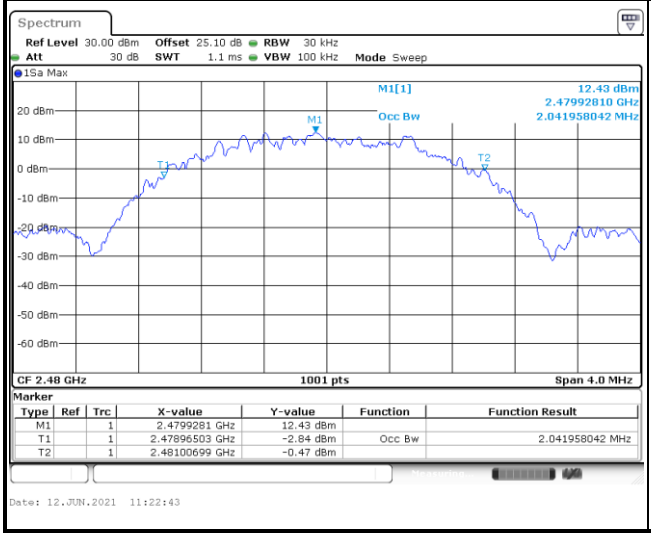
99% Bandwidth Plot on Channel 00	99% Occupied Bandwidth Plot on Channel 19
	
99% Occupied Bandwidth Plot on Channel 39	**N/A**
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

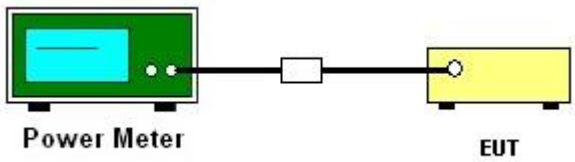
3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT was connected to the power meter by RF cable and attenuator.
3. The path loss was compensated to the results for each measurement.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz. In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100 kHz is a reference level and is used as 20 dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup

3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.3.6 Test Result of Power Spectral Density Plots (100kHz)

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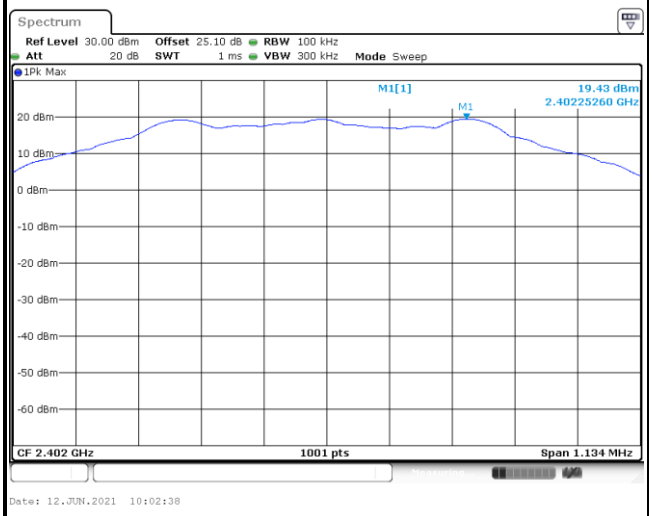
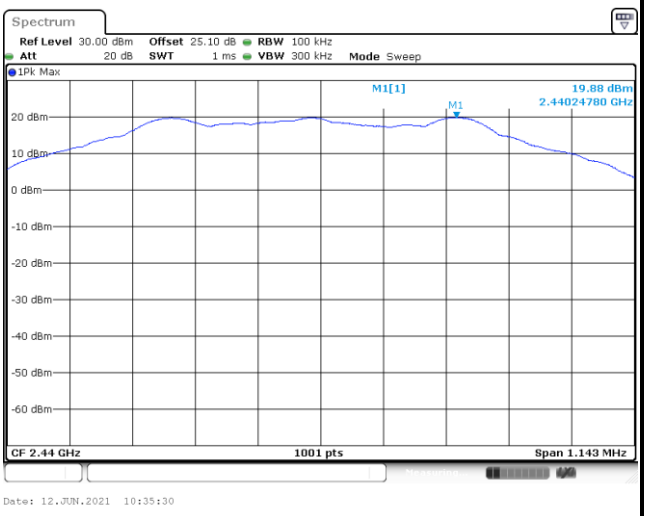
PSD 100kHz Plot on Channel 00	PSD 100kHz Plot on Channel 19
	
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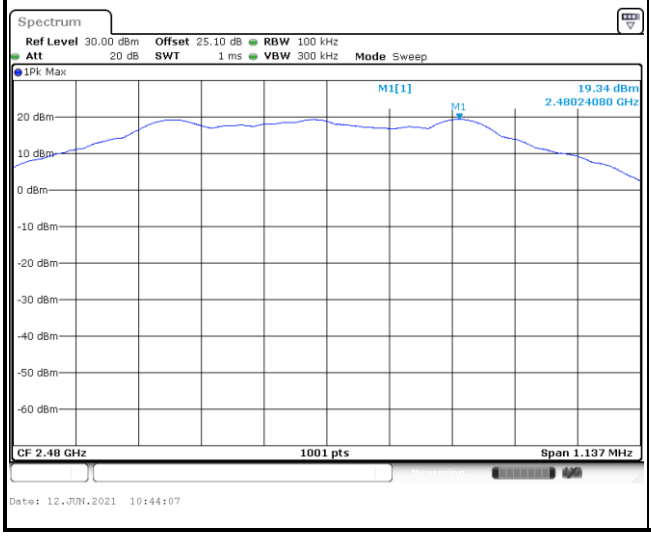	

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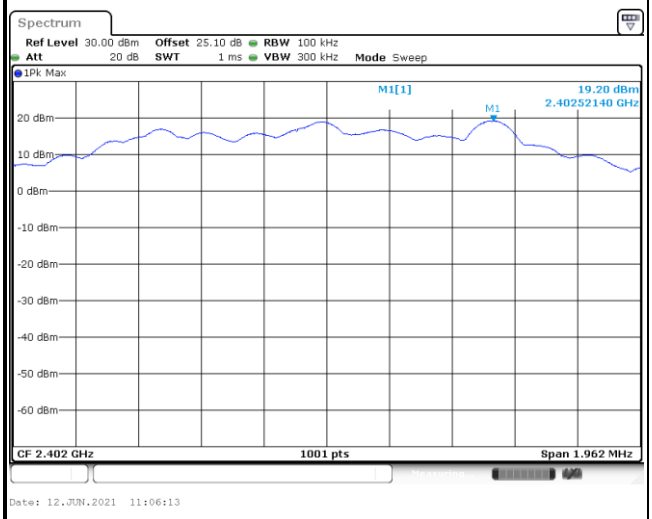
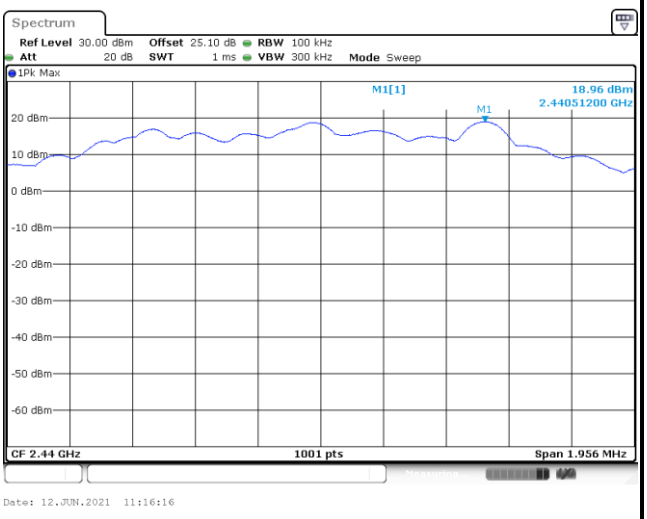
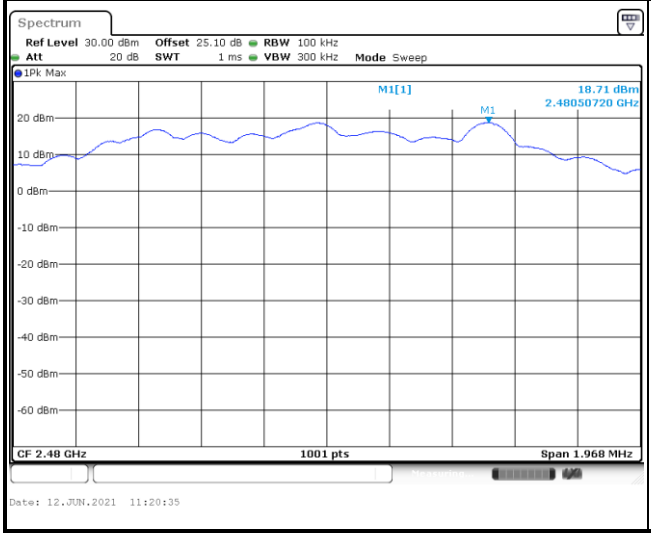
PSD 100kHz Plot on Channel 00	PSD 100kHz Plot on Channel 19
	
PSD 100kHz Plot on Channel 39	**N/A**
	

3.3.7 Test Result of Power Spectral Density Plots (3kHz)

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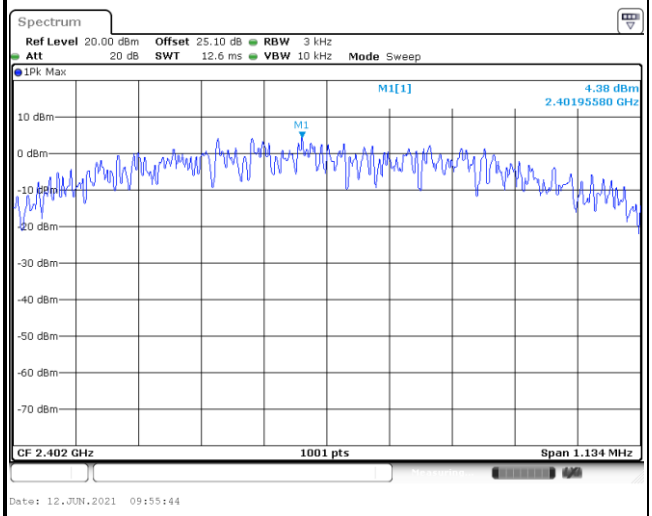	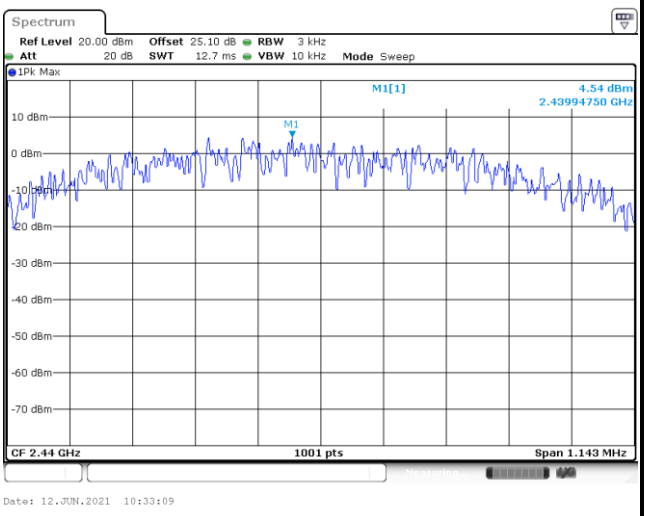
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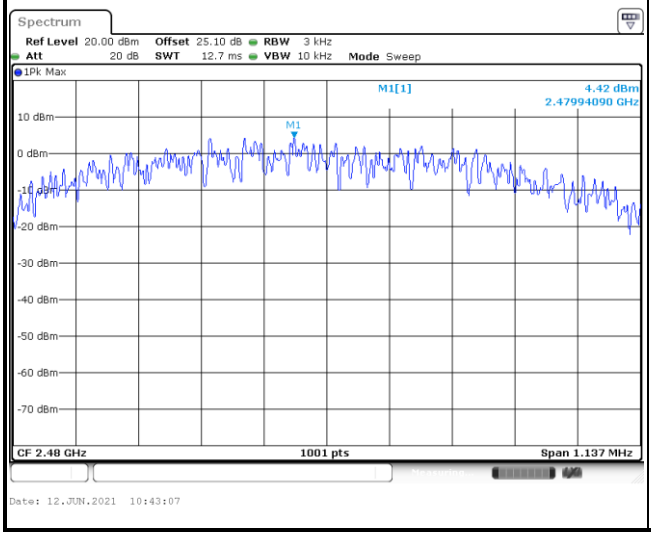
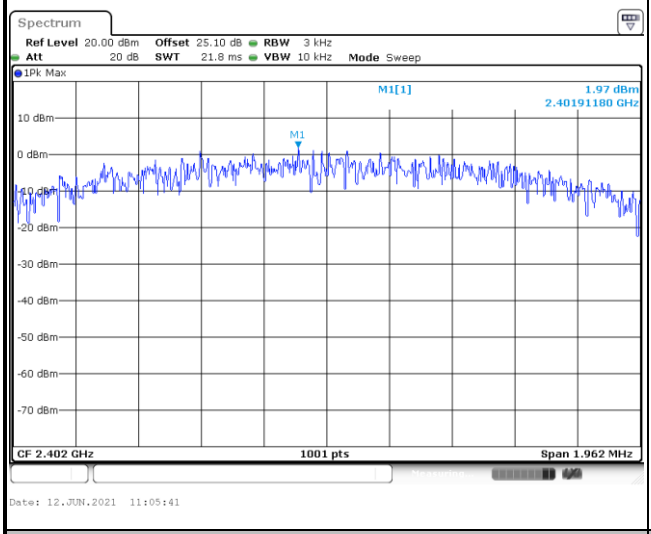
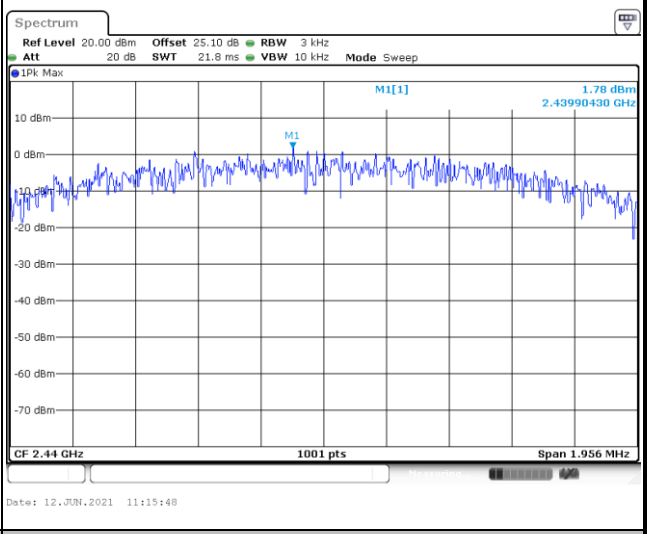
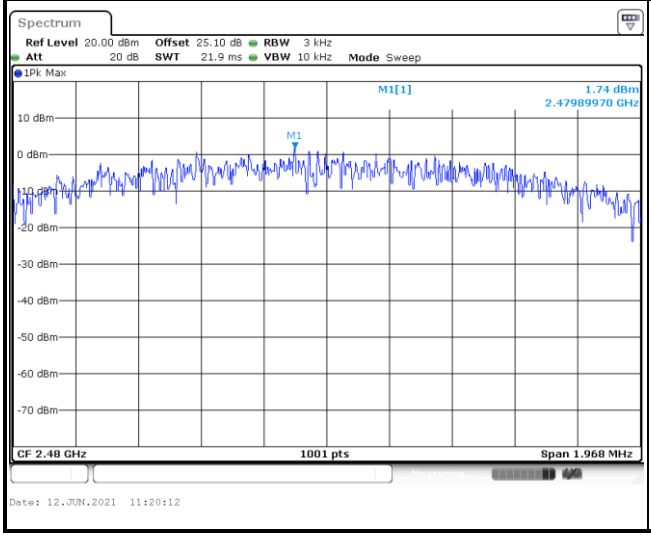
	

<2Mbps>

PSD 3kHz Plot on Channel 00	PSD 3kHz Plot on Channel 19
	
PSD 3kHz Plot on Channel 39	**N/A**
	

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

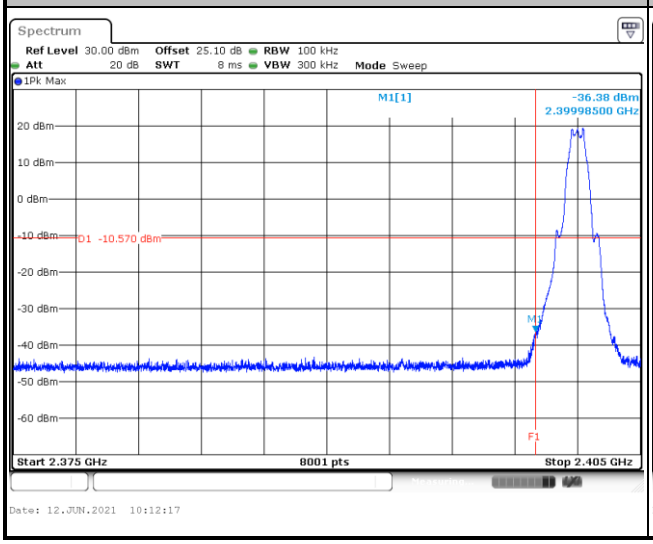
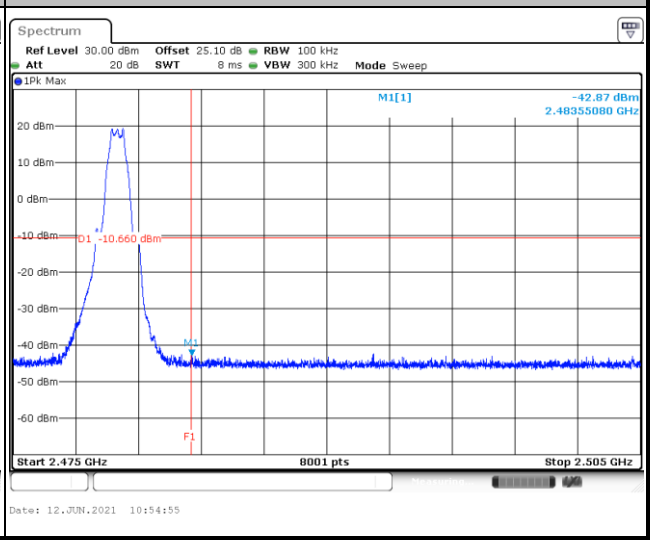
3.4.3 Test Procedure

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

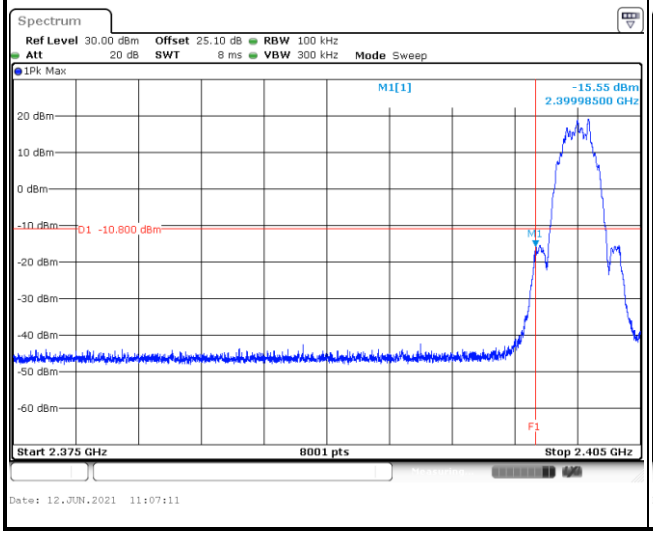
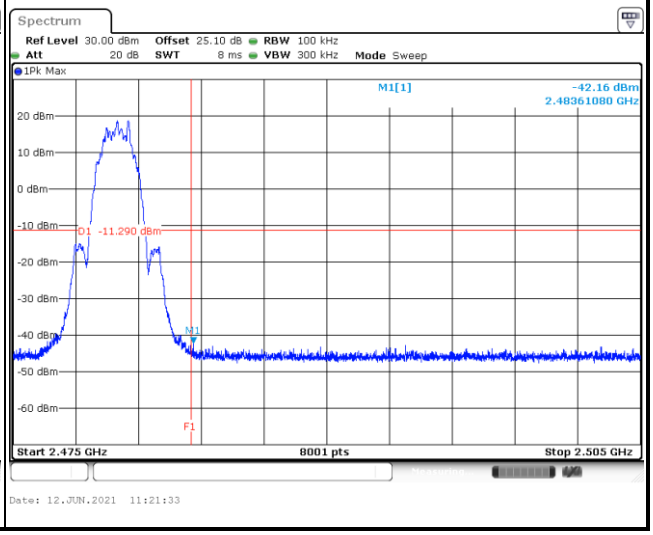
3.4.4 Test Setup

3.4.5 Test Result of Conducted Band Edges Plots

<1Mbps>

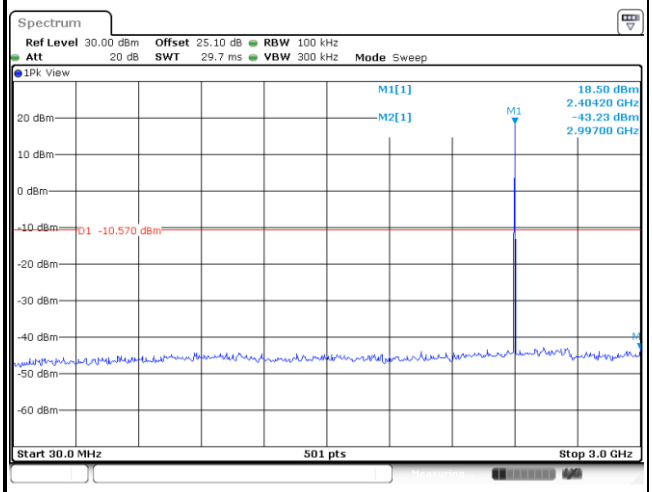
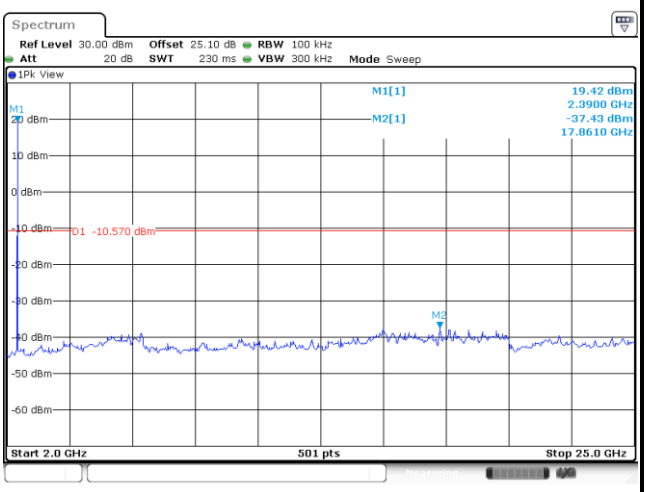
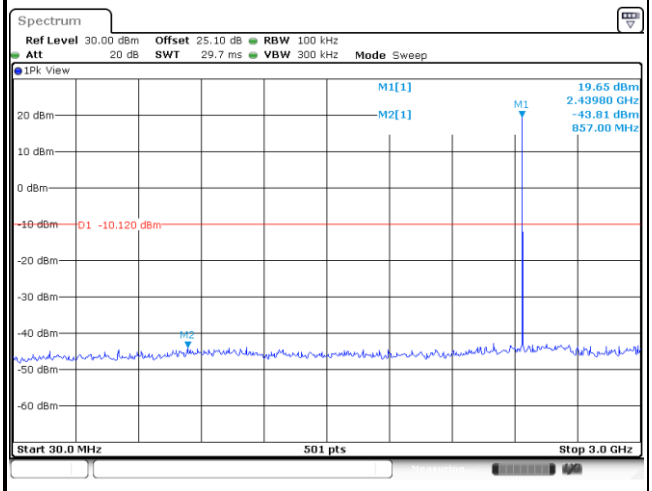
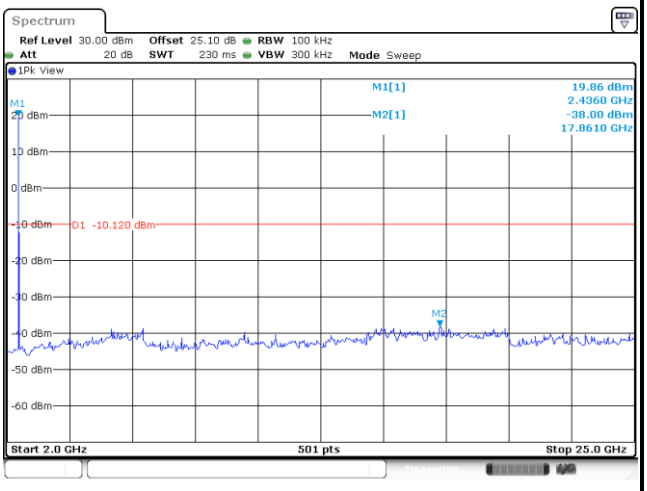
Low Band Edge Plot on Channel 00	High Band Edge Plot on Channel 39
	

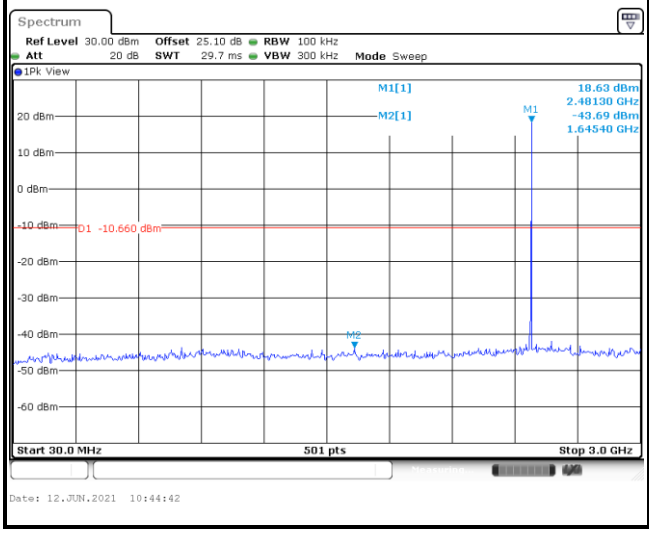
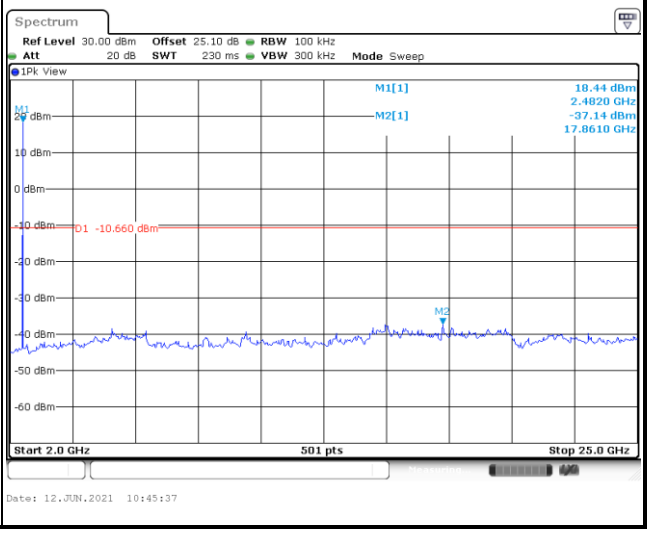
<2Mbps>

Low Band Edge Plot on Channel 00	High Band Edge Plot on Channel 39
	

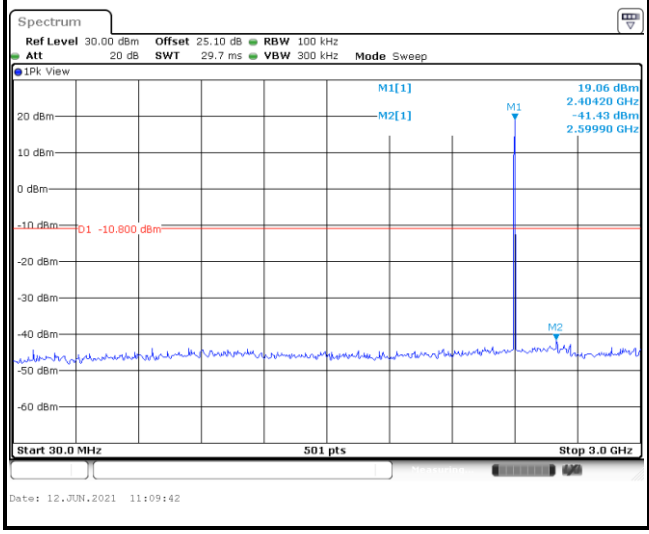
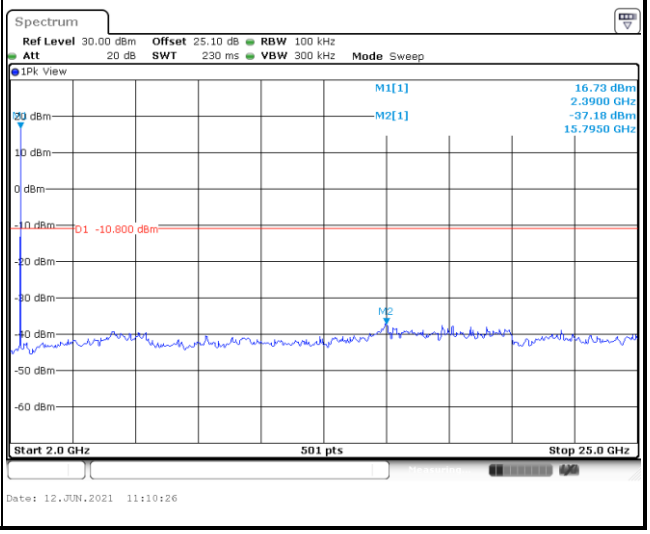
3.4.6 Test Result of Conducted Spurious Emission Plots

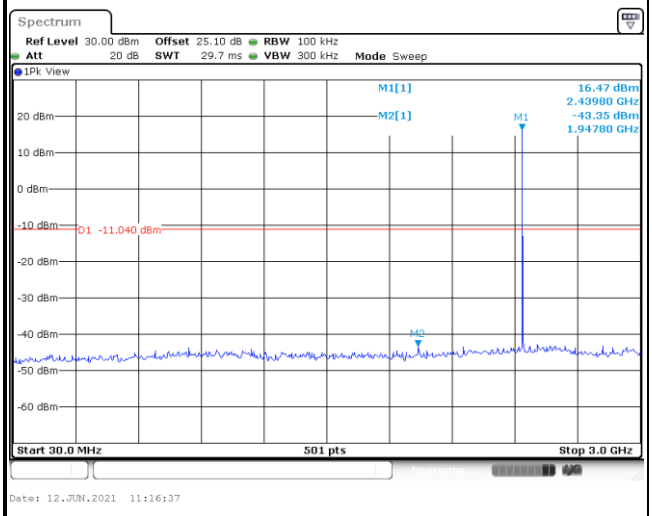
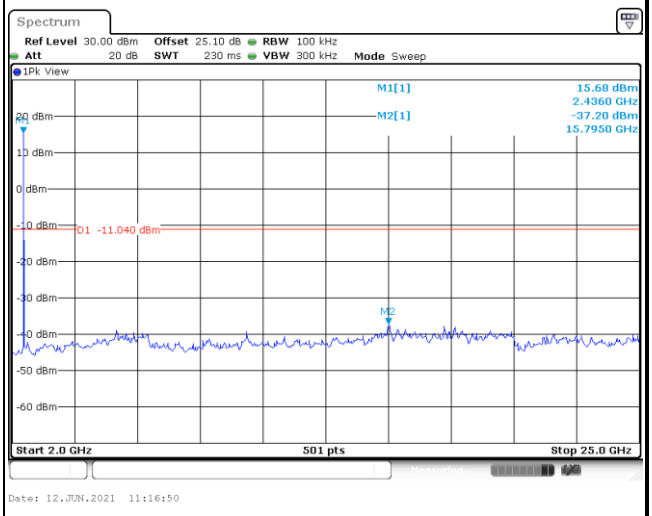
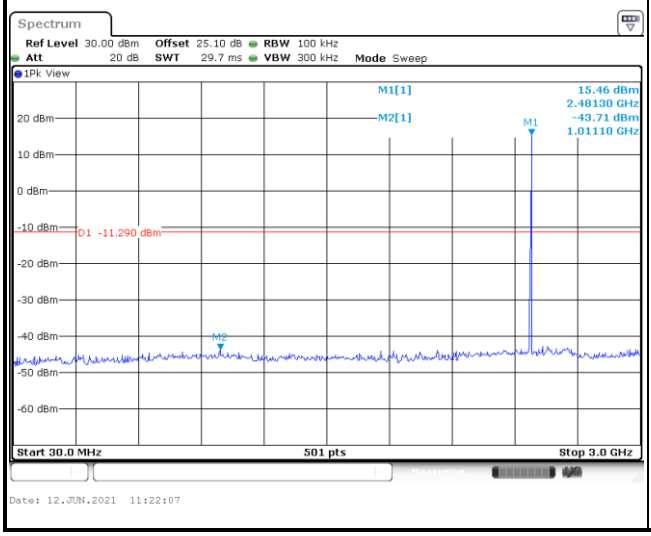
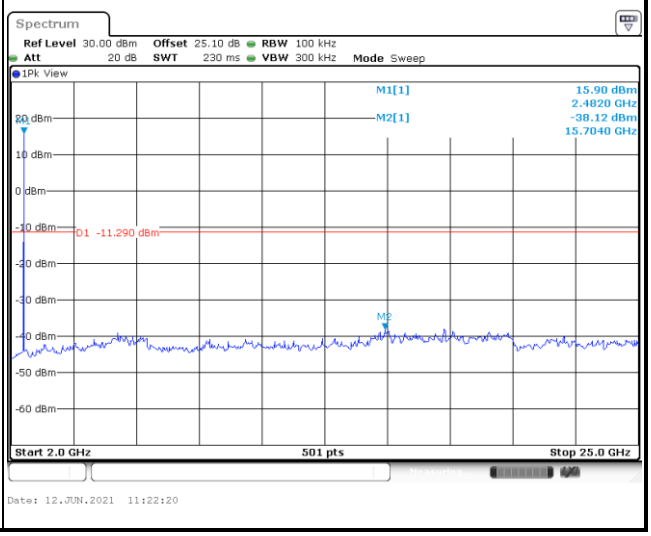
<1Mbps>

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 was 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

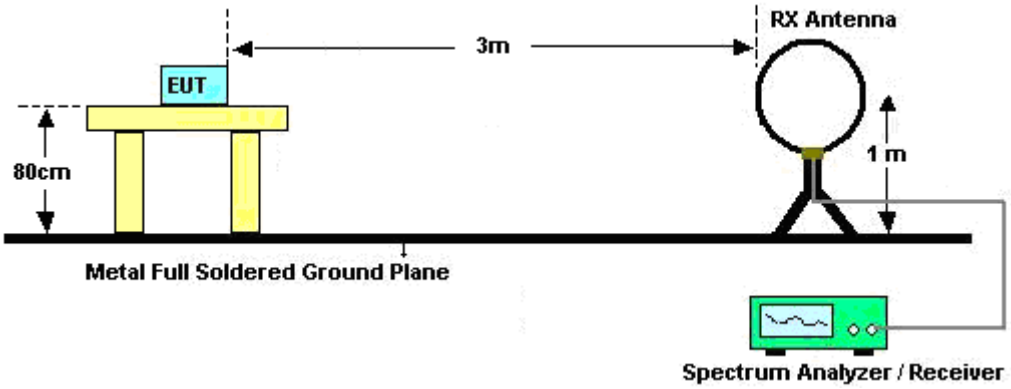
See list of measuring equipment of this test report.

3.5.3 Test Procedures

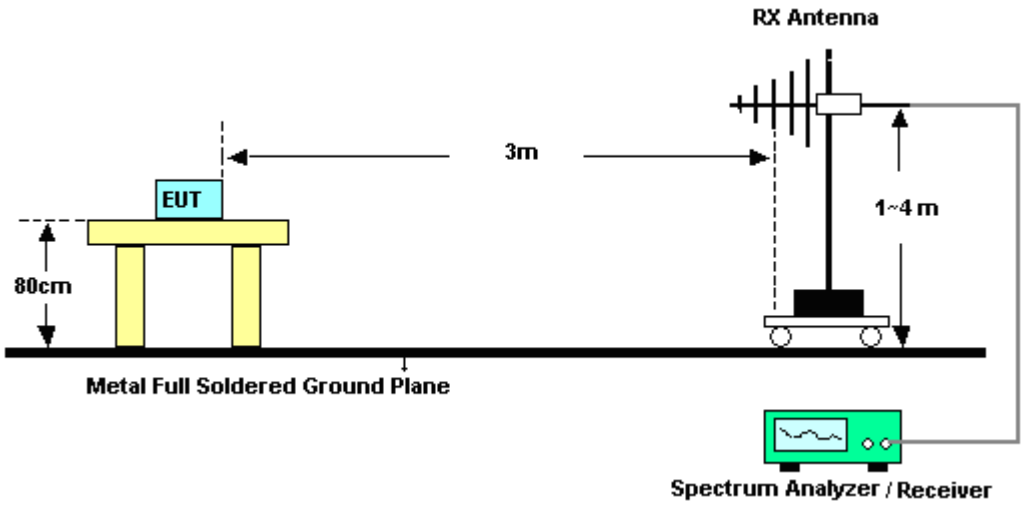
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was 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 was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1 GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and be reported.
7. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and be reported.
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

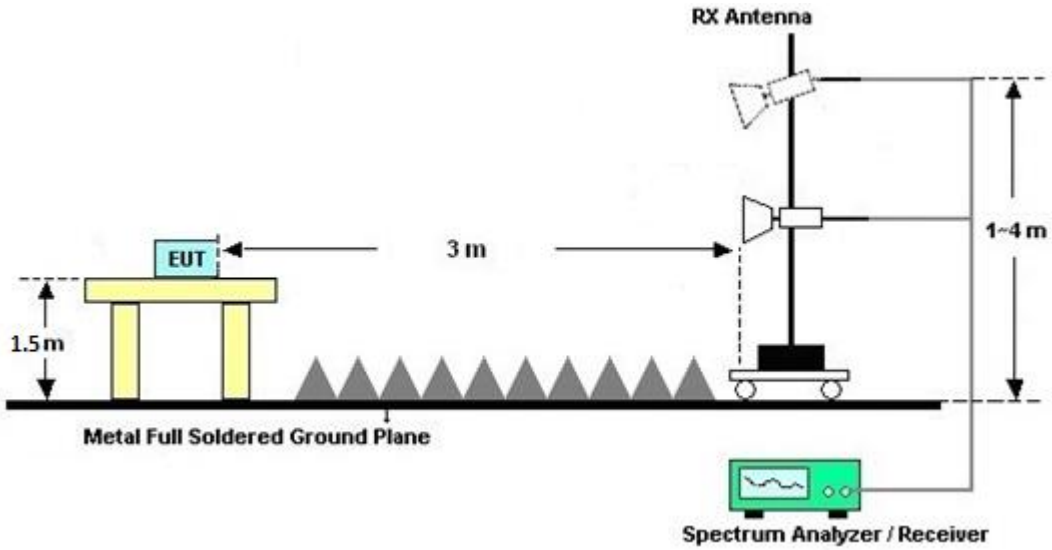
For radiated test below 30MHz



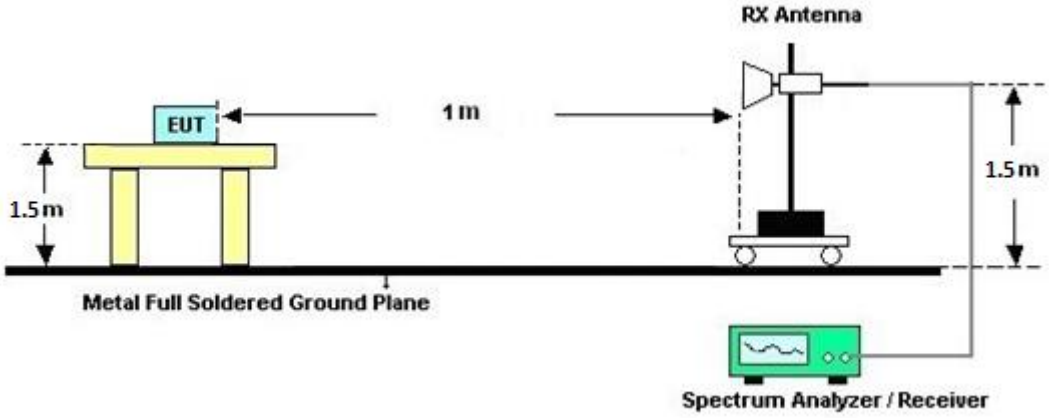
For radiated test from 30MHz to 1GHz



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 started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was 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 came 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.

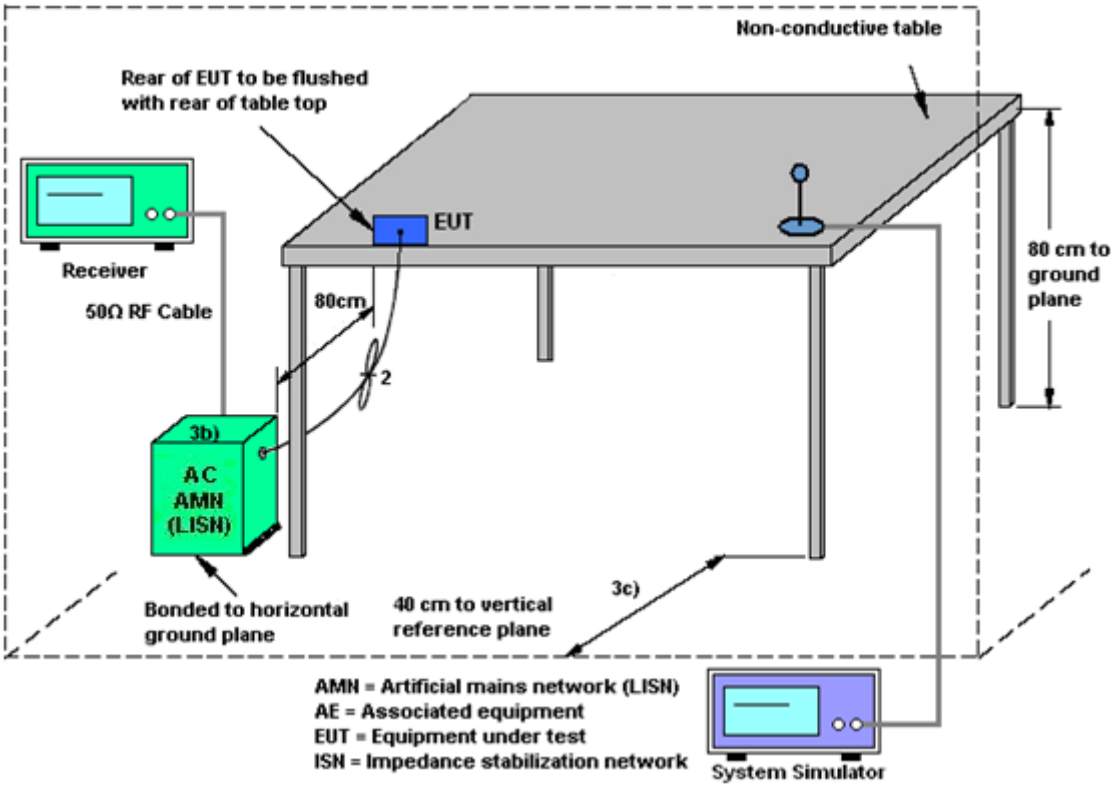
3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was 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 sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) 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

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 16, 2020	Jun. 02, 2021~ Aug. 03, 2021	Dec. 15, 2021	Radiation (03CH13-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	Jun. 02, 2021~ Aug. 03, 2021	Jan. 03, 2022	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	40103&07	30MHz to 1GHz	Apr. 28, 2021	Jun. 02, 2021~ Aug. 03, 2021	Apr. 27, 2022	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jul. 15, 2020	Jun. 02, 2021~ Jul. 13, 2021	Jul. 14, 2021	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jul. 13, 2021	Jul. 13, 2021~ Aug. 03, 2021	Jul. 12, 2022	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 18, 2021	Jun. 02, 2021~ Aug. 03, 2021	May 17, 2022	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 28, 2020	Jun. 02, 2021~ Aug. 03, 2021	Oct. 27, 2021	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 18, 2021	Jun. 02, 2021~ Aug. 03, 2021	Mar. 17, 2022	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 02, 2021~ Aug. 03, 2021	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jun. 02, 2021~ Aug. 03, 2021	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 02, 2021~ Aug. 03, 2021	N/A	Radiation (03CH13-HY)
Software	Audix	E3 6.2009-8-24	RK-000992	N/A	N/A	Jun. 02, 2021~ Aug. 03, 2021	N/A	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 11, 2020	Jun. 02, 2021~ Aug. 03, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Feb. 10, 2021	Jun. 02, 2021~ Aug. 03, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30M-18G	Feb. 10, 2021	Jun. 02, 2021~ Aug. 03, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 22, 2021	Jun. 02, 2021~ Aug. 03, 2021	Feb. 21, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 11, 2021	Jun. 02, 2021~ Aug. 03, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M-18G	Feb. 10, 2021	Jun. 02, 2021~ Aug. 03, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Jun. 02, 2021~ Aug. 03, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00994	18GHz- 40GHz	Nov. 19, 2020	Jun. 02, 2021~ Aug. 03, 2021	Nov. 18, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 15, 2020	Jun. 02, 2021~ Aug. 03, 2021	Sep. 14, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3GHz High Pass Filter	Jul. 13, 2020	Jun. 02, 2021~ Jul. 11, 2021	Jul. 12, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3GHz High Pass Filter	Jul. 12, 2021	Jul. 12, 2021~ Aug. 03, 2021	Jul. 11, 2022	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303A	TP182676	N/A	Nov. 18, 2020	Jun. 02, 2021~ Aug. 03, 2021	Nov. 17, 2021	Radiation (03CH13-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	TR-32	HE17XB2468	N/A	Mar. 09, 2021	May 04, 2021~ Jun. 12, 2021	Mar. 08, 2022	Conducted (TH02-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12	10MHz~6GHz	Dec. 16, 2020	May 04, 2021~ Jun. 12, 2021	Dec. 15, 2021	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz ~ 40GHz	Jul. 22, 2020	May 04, 2021~ Jun. 12, 2021	Jul. 21, 2021	Conducted (TH02-HY)
Programmable Power Supply	GW Instek	PSS-2005	GEO821763	N/A	Sep. 16, 2020	May 04, 2021~ Jun. 12, 2021	Sep. 15, 2021	Conducted (TH02-HY)
Switch Box & RF Cable	Burgeon	ETF058	EC1300484	N/A	Nov. 19, 2020	May 04, 2021~ Jun. 12, 2021	Nov. 18, 2021	Conducted (TH02-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 28, 2021~ Jul. 14, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 30, 2020	May 28, 2021~ Jul. 14, 2021	Nov. 29, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	May 28, 2021~ Jul. 14, 2021	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2020	May 28, 2021~ Jul. 14, 2021	Nov. 30, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	May 28, 2021~ Jul. 14, 2021	N/A	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Feb. 25, 2021	May 28, 2021~ Jul. 14, 2021	Feb. 24, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	May 28, 2021~ Jul. 14, 2021	Dec. 30, 2021	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))	**2.3 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.3 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))	**3.9 dB**

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Mina Liu / Tommy Lee	Temperature:	21~25	°C
Test Date:	2021/5/4~2021/6/12	Relative Humidity:	51~54	%

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	1.053	0.756	0.50	Pass
BLE	1Mbps	1	19	2440	1.053	0.762	0.50	Pass
BLE	1Mbps	1	39	2480	1.053	0.758	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	20.50	30.00	-5.40	15.10	36.00	Pass
BLE	1Mbps	1	19	2440	20.40	30.00	-5.40	15.00	36.00	Pass
BLE	1Mbps	1	39	2480	20.30	30.00	-5.40	14.90	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	19.43	4.38	-5.40	8.00	Pass
BLE	1Mbps	1	19	2440	19.88	4.54	-5.40	8.00	Pass
BLE	1Mbps	1	39	2480	19.34	4.42	-5.40	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	2.034	1.308	0.50	Pass
BLE	2Mbps	1	19	2440	2.034	1.304	0.50	Pass
BLE	2Mbps	1	39	2480	2.042	1.312	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	20.40	30.00	-5.40	15.00	36.00	Pass
BLE	2Mbps	1	19	2440	20.40	30.00	-5.40	15.00	36.00	Pass
BLE	2Mbps	1	39	2480	20.00	30.00	-5.40	14.60	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	19.20	1.97	-5.40	8.00	Pass
BLE	2Mbps	1	19	2440	18.96	1.78	-5.40	8.00	Pass
BLE	2Mbps	1	39	2480	18.71	1.74	-5.40	8.00	Pass

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

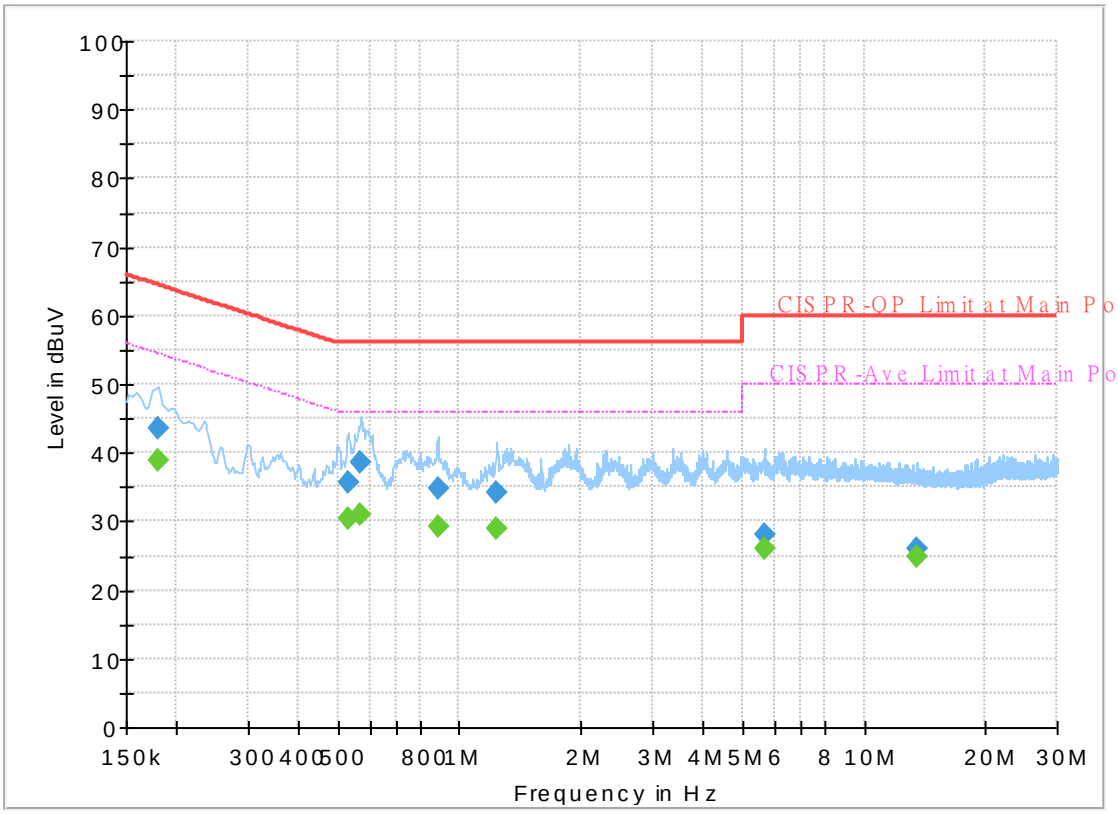
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang and Tom Lee	**Temperature :**	23~26℃
		Relative Humidity :	40~50%

EUT Information

Report NO :	142875
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



Final_Result

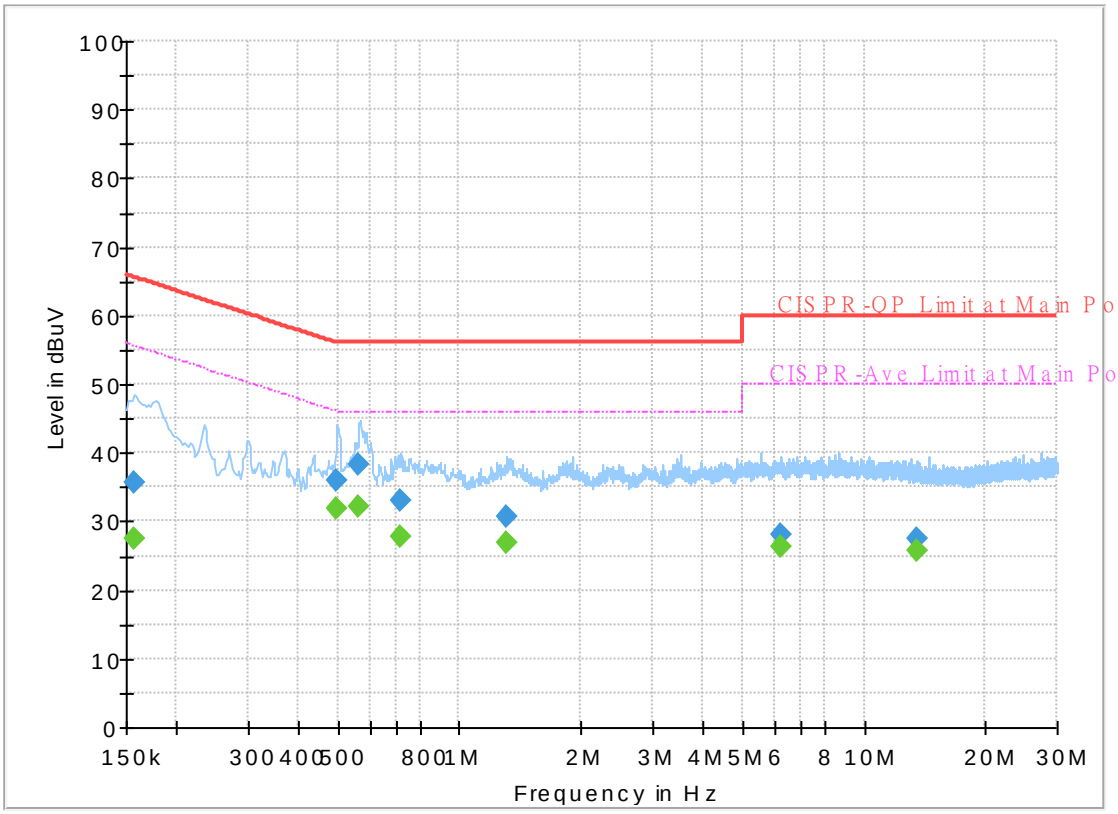
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.179250	---	38.80	54.52	15.72	L1	OFF	19.5
0.179250	43.66	---	64.52	20.86	L1	OFF	19.5
0.530250	---	30.35	46.00	15.65	L1	OFF	19.7
0.530250	35.78	---	56.00	20.22	L1	OFF	19.7
0.570750	---	31.11	46.00	14.89	L1	OFF	19.7
0.570750	38.55	---	56.00	17.45	L1	OFF	19.7
0.883500	---	29.34	46.00	16.66	L1	OFF	20.0
0.883500	34.89	---	56.00	21.11	L1	OFF	20.0
1.239000	---	28.92	46.00	17.08	L1	OFF	20.0
1.239000	34.13	---	56.00	21.87	L1	OFF	20.0
5.660250	---	26.04	50.00	23.96	L1	OFF	19.9
5.660250	28.01	---	60.00	31.99	L1	OFF	19.9
13.560000	---	24.76	50.00	25.24	L1	OFF	20.1
13.560000	26.05	---	60.00	33.95	L1	OFF	20.1

EUT Information

Report NO : 142875

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	---	27.43	55.63	28.20	N	OFF	19.5
0.156750	35.76	---	65.63	29.87	N	OFF	19.5
0.498750	---	31.75	46.02	14.27	N	OFF	19.7
0.498750	35.87	---	56.02	20.15	N	OFF	19.7
0.564000	---	32.28	46.00	13.72	N	OFF	19.8
0.564000	38.34	---	56.00	17.66	N	OFF	19.8
0.717000	---	27.73	46.00	18.27	N	OFF	19.9
0.717000	33.09	---	56.00	22.91	N	OFF	19.9
1.302000	---	26.80	46.00	19.20	N	OFF	20.0
1.302000	30.75	---	56.00	25.25	N	OFF	20.0
6.234000	---	26.26	50.00	23.74	N	OFF	20.0
6.234000	28.03	---	60.00	31.97	N	OFF	20.0
13.560000	---	25.71	50.00	24.29	N	OFF	20.2
13.560000	27.62	---	60.00	32.38	N	OFF	20.2

Appendix C. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Jacky Hong, and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	40~60%

<EUT with Strap 1>
<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBµV/m)	Limit (dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)
BLE CH 00 2402MHz		2333.52	55.03	-18.97	74	41.09	27.73	14.06	27.85	129	232	P	H
		2361.135	45.14	-8.86	54	31.22	27.68	14.09	27.85	129	232	A	H
	*	2402	106.17	-	-	92.28	27.6	14.13	27.84	129	232	P	H
	*	2402	105.31	-	-	91.42	27.6	14.13	27.84	129	232	A	H
													H
		2388.96	54.35	-19.65	74	40.45	27.62	14.12	27.84	353	194	P	V
		2337.195	45.1	-8.9	54	31.15	27.73	14.07	27.85	353	194	A	V
	*	2402	109.02	-	-	95.13	27.6	14.13	27.84	353	194	P	V
	*	2402	108.2	-	-	94.31	27.6	14.13	27.84	353	194	A	V
													V
BLE CH 19 2440MHz		2362.22	55.03	-18.97	74	41.11	27.68	14.09	27.85	100	232	P	H
		2389.52	45.37	-8.63	54	31.47	27.62	14.12	27.84	100	232	A	H
	*	2440	105.22	-	-	91.37	27.52	14.16	27.83	100	232	P	H
	*	2440	104.52	-	-	90.67	27.52	14.16	27.83	100	232	A	H
		2491.39	54.49	-19.51	74	40.61	27.5	14.2	27.82	100	232	P	H
		2499.3	45.5	-8.5	54	31.61	27.5	14.21	27.82	100	232	A	H
		2316.3	55.58	-18.42	74	41.62	27.77	14.05	27.86	302	197	P	V
		2331	45.32	-8.68	54	31.37	27.74	14.06	27.85	302	197	A	V
	*	2440	107.58	-	-	93.73	27.52	14.16	27.83	302	197	P	V
	*	2440	106.74	-	-	92.89	27.52	14.16	27.83	302	197	A	V
		2490.97	54.95	-19.05	74	41.07	27.5	14.2	27.82	302	197	P	V
		2495.45	45.25	-8.75	54	31.36	27.5	14.21	27.82	302	197	A	V

BLE CH 39 2480MHz	*	2480	106.88	-	-	93.01	27.5	14.19	27.82	108	234	P	H
	*	2480	106.01	-	-	92.14	27.5	14.19	27.82	108	234	A	H
		2487.8	55.02	-18.98	74	41.14	27.5	14.2	27.82	108	234	P	H
		2483.52	45.49	-8.51	54	31.61	27.5	14.2	27.82	108	234	A	H
													H
													H
	*	2480	107.98	-	-	94.11	27.5	14.19	27.82	374	17	P	V
	*	2480	107.09	-	-	93.22	27.5	14.19	27.82	374	17	A	V
		2484.92	54.43	-19.57	74	40.55	27.5	14.2	27.82	374	17	P	V
		2499.2	45.73	-8.27	54	31.84	27.5	14.21	27.82	374	17	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	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (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	37.39	-36.61	74	56.86	31.11	6.51	57.09	-	-	P	H
		17985	56.15	-17.85	74	52.02	47.68	13.17	56.72	-	-	P	H
		17985	46.28	-7.72	54	42.15	47.68	13.17	56.72	-	-	A	H
													H
		4804	38.2	-35.8	74	57.67	31.11	6.51	57.09	-	-	P	V
		17985	55.93	-18.07	74	51.8	47.68	13.17	56.72	-	-	P	V
		17985	45.88	-8.12	54	41.75	47.68	13.17	56.72	-	-	A	V
													V
BLE CH 19 2440MHz		4880	37.6	-36.4	74	56.53	31.2	6.83	56.96	-	-	P	H
		7320	44.28	-29.72	74	55.71	36.76	8.73	56.92	-	-	P	H
		18000	56.53	-17.47	74	51.97	48.1	13.18	56.72	-	-	P	H
		18000	46.38	-7.62	54	41.82	48.1	13.18	56.72	-	-	A	H
		4880	37.55	-36.45	74	56.48	31.2	6.83	56.96	-	-	P	V
		7320	47.25	-26.75	74	58.68	36.76	8.73	56.92	-	-	P	V
		18000	56.69	-17.31	74	52.13	48.1	13.18	56.72	-	-	P	V
		18000	46.77	-7.23	54	42.21	48.1	13.18	56.72	-	-	A	V
BLE CH 39 2480MHz		4960	38.29	-35.71	74	56.51	31.42	7.17	56.81	-	-	P	H
		7440	45	-29	74	56.65	36.82	8.7	57.17	-	-	P	H
		17985	55.87	-18.13	74	51.74	47.68	13.17	56.72	-	-	P	H
		17985	45.74	-8.26	54	41.61	47.68	13.17	56.72	-	-	A	H
		4960	39.04	-34.96	74	57.26	31.42	7.17	56.81	-	-	P	V
		7440	46.88	-27.12	74	58.53	36.82	8.7	57.17	-	-	P	V
		18000	55.98	-18.02	74	51.42	48.1	13.18	56.72	-	-	P	V
		18000	45.91	-8.09	54	41.35	48.1	13.18	56.72	-	-	A	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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE SHF		23522	40.4	-33.6	74	57.45	39.93	6.55	53.99	-	-	P	H
													H
													H
													H
		24204	39.88	-34.12	74	56.93	39.34	6.69	53.54	-	-	P	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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE LF		99.84	35.13	-8.37	43.5	50.4	16.02	0.94	32.23	-	-	P	H
		211.39	30.81	-12.69	43.5	46.76	14.91	1.36	32.22	-	-	P	H
		333.61	36.91	-9.09	46	47.23	19.8	1.63	31.75	-	-	P	H
		427.7	30.09	-15.91	46	37.13	22.79	1.82	31.65	-	-	P	H
		569.32	30.61	-15.39	46	35.03	25.85	2.12	32.39	-	-	P	H
		627.52	30.77	-15.23	46	35.21	25.75	2.25	32.44	-	-	P	H
													H
													H
													H
													H
													H
													H
		43.58	33.82	-6.18	40	48	17.46	0.63	32.27	-	-	P	V
		99.84	32.4	-11.1	43.5	47.67	16.02	0.94	32.23	-	-	P	V
		334.58	34.23	-11.77	46	44.52	19.83	1.63	31.75	-	-	P	V
		434.49	30.08	-15.92	46	37.05	22.87	1.84	31.68	-	-	P	V
		632.37	31.81	-14.19	46	36.04	25.93	2.26	32.42	-	-	P	V
		847.71	31.52	-14.48	46	31.45	28.62	2.64	31.19	-	-	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 with sufficient margin against limit line or noise floor only.

<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (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		2353.995	54.98	-19.02	74	41.06	27.69	14.08	27.85	100	234	P	H
		2361.975	44.6	-9.4	54	30.68	27.68	14.09	27.85	100	234	A	H
	*	2402	107.2	-	-	93.31	27.6	14.13	27.84	100	234	P	H
	*	2402	105.03	-	-	91.14	27.6	14.13	27.84	100	234	A	H
													H
													H
		2389.17	54.49	-19.51	74	40.59	27.62	14.12	27.84	304	182	P	V
		2381.295	44.47	-9.53	54	30.56	27.64	14.11	27.84	304	182	A	V
	*	2402	108.88	-	-	94.99	27.6	14.13	27.84	304	182	P	V
	*	2402	106.77	-	-	92.88	27.6	14.13	27.84	304	182	A	V
													V
													V
BLE CH 19 2440MHz		2311.54	55.09	-18.91	74	41.13	27.78	14.04	27.86	100	232	P	H
		2325.68	44.61	-9.39	54	30.65	27.75	14.06	27.85	100	232	A	H
	*	2440	106.3	-	-	92.45	27.52	14.16	27.83	100	232	P	H
	*	2440	104.13	-	-	90.28	27.52	14.16	27.83	100	232	A	H
		2498.32	54.63	-19.37	74	40.74	27.5	14.21	27.82	100	232	P	H
		2495.45	44.31	-9.69	54	30.42	27.5	14.21	27.82	100	232	A	H
		2310.98	54.4	-19.6	74	40.44	27.78	14.04	27.86	300	185	P	V
		2371.04	44.54	-9.46	54	30.63	27.66	14.1	27.85	300	185	A	V
	*	2440	108.31	-	-	94.46	27.52	14.16	27.83	300	185	P	V
	*	2440	106.32	-	-	92.47	27.52	14.16	27.83	300	185	A	V
		2499.65	55.21	-18.79	74	41.32	27.5	14.21	27.82	300	185	P	V
		2491.32	44.44	-9.56	54	30.56	27.5	14.2	27.82	300	185	A	V

BLE CH 39 2480MHz	*	2480	105.93	-	-	92.06	27.5	14.19	27.82	109	220	P	H
	*	2480	103.84	-	-	89.97	27.5	14.19	27.82	109	220	A	H
		2497.92	54.04	-19.96	74	40.15	27.5	14.21	27.82	109	220	P	H
		2483.52	44.65	-9.35	54	30.77	27.5	14.2	27.82	109	220	A	H
													H
													H
	*	2480	107.79	-	-	93.92	27.5	14.19	27.82	373	4	P	V
	*	2480	105.97	-	-	92.1	27.5	14.19	27.82	373	4	A	V
		2498.08	54.83	-19.17	74	40.94	27.5	14.21	27.82	373	4	P	V
		2483.52	45.04	-8.96	54	31.16	27.5	14.2	27.82	373	4	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	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (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	38.05	-35.95	74	57.52	31.11	6.51	57.09	-	-	P	H
		17955	56.62	-17.38	74	53.35	46.84	13.15	56.72	-	-	P	H
		17955	47.94	-6.06	54	44.67	46.84	13.15	56.72	-	-	A	H
													H
		4804	37.74	-36.26	74	57.21	31.11	6.51	57.09	-	-	P	V
		17970	55.89	-18.11	74	52.19	47.26	13.16	56.72	-	-	P	V
		17970	47.34	-6.66	54	43.64	47.26	13.16	56.72	-	-	A	V
													V
BLE CH 19 2440MHz		4880	38.94	-35.06	74	57.87	31.2	6.83	56.96	-	-	P	H
		7320	45.6	-28.4	74	57.03	36.76	8.73	56.92	-	-	P	H
		17895	54.36	-19.64	74	52.75	45.21	13.11	56.71	-	-	P	H
		17895	45.11	-8.89	54	43.5	45.21	13.11	56.71	-	-	A	H
		4880	39.59	-34.41	74	58.52	31.2	6.83	56.96	-	-	P	V
		7320	47.73	-26.27	74	59.16	36.76	8.73	56.92	-	-	P	V
		17940	55.24	-18.76	74	52.4	46.42	13.14	56.72	-	-	P	V
		17940	46.34	-7.66	54	43.5	46.42	13.14	56.72	-	-	A	V
BLE CH 39 2480MHz		4960	39.35	-34.65	74	57.57	31.42	7.17	56.81	-	-	P	H
		7440	48.32	-25.68	74	59.97	36.82	8.7	57.17	-	-	P	H
		17955	55.46	-18.54	74	52.19	46.84	13.15	56.72	-	-	P	H
		17955	46.73	-7.27	54	43.46	46.84	13.15	56.72	-	-	A	H
		4960	38.86	-35.14	74	57.08	31.42	7.17	56.81	-	-	P	V
		7440	50.99	-23.01	74	62.64	36.82	8.7	57.17	400	221	P	V
		7440	43.75	-10.25	54	55.4	36.82	8.7	57.17	400	221	A	V
		17955	55.89	-18.11	74	52.62	46.84	13.15	56.72	-	-	P	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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE SHF		23940	39.79	-34.21	74	56.98	39.43	6.66	53.74	-	-	P	H
													H
													H
													H
		23544	40.52	-33.48	74	57.62	39.86	6.55	53.97	-	-	P	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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE LF		99.84	33.26	-10.24	43.5	48.53	16.02	0.94	32.23	-	-	P	H
		214.3	33.31	-10.19	43.5	49.29	14.87	1.36	32.21	-	-	P	H
		334.58	36.68	-9.32	46	46.97	19.83	1.63	31.75	-	-	P	H
		628.49	30.36	-15.64	46	34.75	25.8	2.25	32.44	-	-	P	H
		738.1	30.45	-15.55	46	32.44	27.35	2.45	31.79	-	-	P	H
		853.53	31.52	-14.48	46	31.29	28.77	2.64	31.18	-	-	P	H
													H
													H
													H
													H
													H
													H
		45.52	33.42	-6.58	40	48.44	16.62	0.64	32.28	-	-	P	V
		100.81	31.58	-11.92	43.5	46.75	16.12	0.94	32.23	-	-	P	V
		332.64	33.69	-12.31	46	44.05	19.77	1.63	31.76	-	-	P	V
		570.29	31.11	-14.89	46	35.53	25.84	2.13	32.39	-	-	P	V
		629.46	30.82	-15.18	46	35.16	25.84	2.25	32.43	-	-	P	V
		885.54	30.92	-15.08	46	30.67	28.65	2.69	31.09	-	-	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 with sufficient margin against limit line or noise floor only.

<EUT with Strap 3>
<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (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 39 2480MHz	*	2480	95.79	-	-	81.8	27.62	14.19	27.82	299	164	P	H
	*	2480	94.94	-	-	80.95	27.62	14.19	27.82	299	164	A	H
		2497.16	54.53	-19.47	74	40.45	27.69	14.21	27.82	299	164	P	H
		2484.88	45.3	-8.7	54	31.28	27.64	14.2	27.82	299	164	A	H
													H
													H
	*	2480	105.82	-	-	91.83	27.62	14.19	27.82	100	327	P	V
	*	2480	104.99	-	-	91	27.62	14.19	27.82	100	327	A	V
		2496.08	54.18	-19.82	74	40.11	27.68	14.21	27.82	100	327	P	V
		2484.16	45.59	-8.41	54	31.57	27.64	14.2	27.82	100	327	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	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (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 39 2480MHz		4960	41.07	-32.93	74	57.69	33.02	7.17	56.81	-	-	P	H
		7440	45.89	-28.11	74	58.14	36.22	8.7	57.17	-	-	P	H
		17955	49.79	-24.21	74	51.87	41.49	13.15	56.72	-	-	P	H
		17955	39.67	-14.33	54	41.75	41.49	13.15	56.72	-	-	A	H
		4960	40.38	-33.62	74	57	33.02	7.17	56.81	-	-	P	V
		7440	47.1	-26.9	74	59.35	36.22	8.7	57.17	-	-	P	V
		17895	50.22	-23.78	74	52.76	41.06	13.11	56.71	-	-	P	V
		17895	40.26	-13.74	54	42.8	41.06	13.11	56.71	-	-	A	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)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE SHF		22906	40.93	-33.07	74	58.22	40.08	6.35	54.18	-	-	P	H
													H
													H
													H
		22862	40.8	-33.2	74	58.1	40.11	6.34	54.21	-	-	P	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.												

<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 39 2480MHz	*	2480	96.51	-	-	82.52	27.62	14.19	27.82	341	96	P	H
	*	2480	93.39	-	-	79.4	27.62	14.19	27.82	341	96	A	H
		2486.6	54.6	-19.4	74	40.57	27.65	14.2	27.82	341	96	P	H
		2485.04	44.52	-9.48	54	30.5	27.64	14.2	27.82	341	96	A	H
													H
													H
	*	2480	106.17	-	-	92.18	27.62	14.19	27.82	100	287	P	V
	*	2480	104.27	-	-	90.28	27.62	14.19	27.82	100	287	A	V
		2494.56	55	-19	74	40.93	27.68	14.21	27.82	100	287	P	V
		2483.52	44.7	-9.3	54	30.69	27.63	14.2	27.82	100	287	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	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (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 39 2480MHz		4960	41.14	-32.86	74	57.76	33.02	7.17	56.81	-	-	P	H
		7440	45.73	-28.27	74	57.98	36.22	8.7	57.17	-	-	P	H
		17985	51.2	-22.8	74	53.06	41.69	13.17	56.72	-	-	P	H
		17985	41.1	-12.9	54	42.96	41.69	13.17	56.72	-	-	A	H
		4960	40.36	-33.64	74	56.98	33.02	7.17	56.81	-	-	P	V
		7440	47.21	-26.79	74	59.46	36.22	8.7	57.17	-	-	P	V
		17955	50.48	-23.52	74	52.56	41.49	13.15	56.72	-	-	P	V
		17955	40.32	-13.68	54	42.4	41.49	13.15	56.72	-	-	A	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)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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)
2.4GHz BLE SHF		24402	40.35	-33.65	74	57.09	39.48	6.7	53.38	-	-	P	H
													H
													H
													H
		22862	39.87	-34.13	74	57.17	40.11	6.34	54.21	-	-	P	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.												

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 **over 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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	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. Over Limit(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. Over Limit(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. Over Limit(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

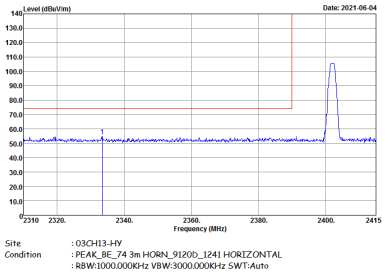
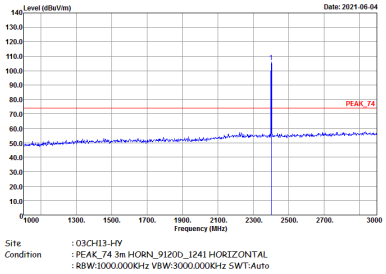
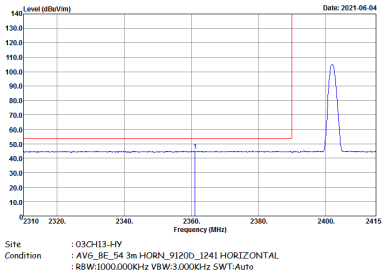
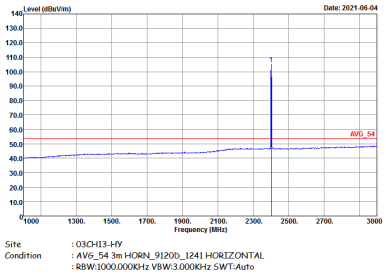
Test Engineer :	Daniel Lee, Jacky Hong, and Wilson Wu	**Temperature :**	20~25°C
		Relative Humidity :	40~60%

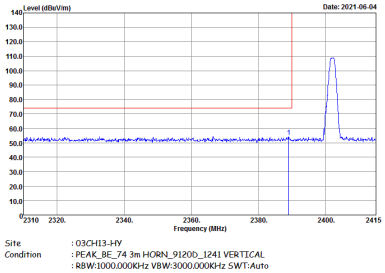
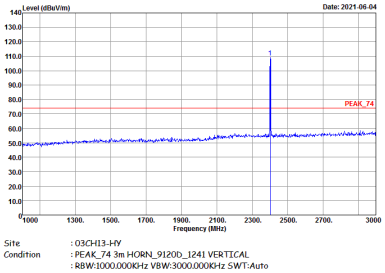
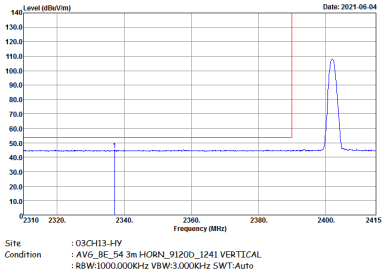
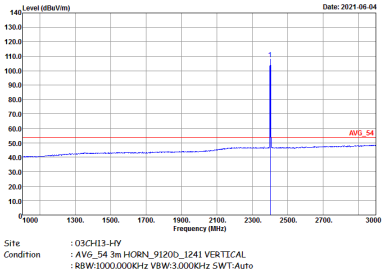
<EUT with Strap 1>

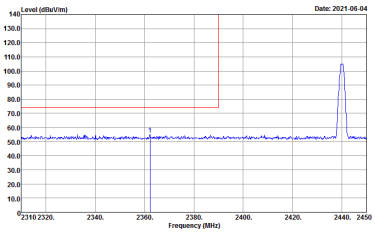
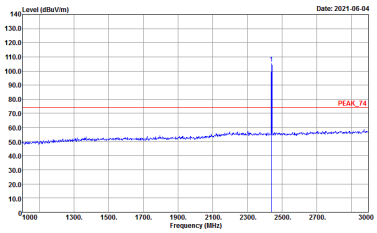
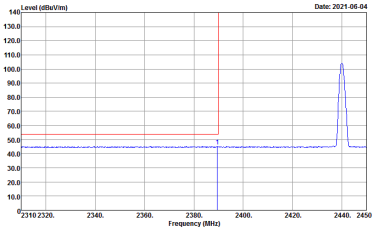
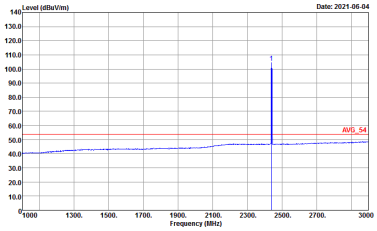
<1Mbps>

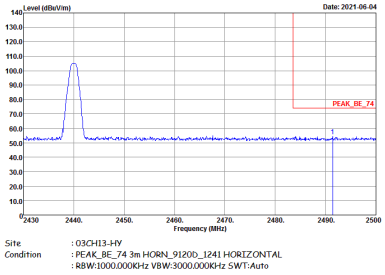
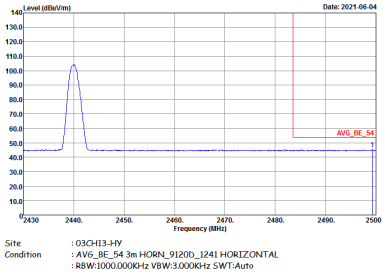
2.4GHz 2400~2483.5MHz

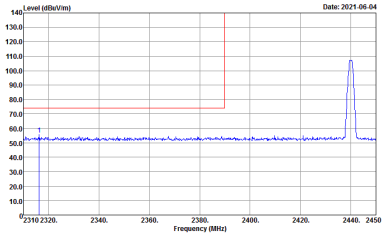
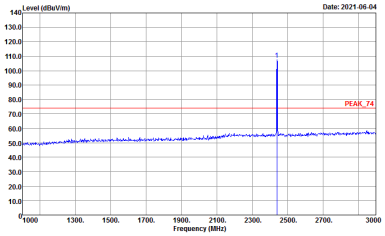
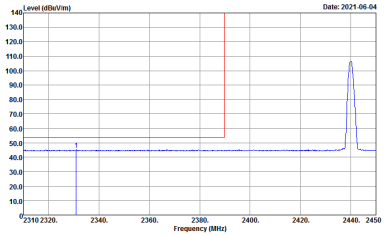
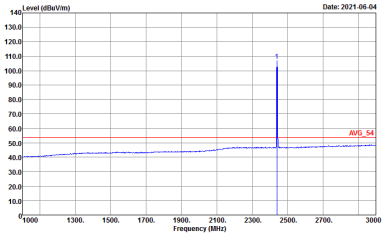
BLE (Band Edge @ 3m)

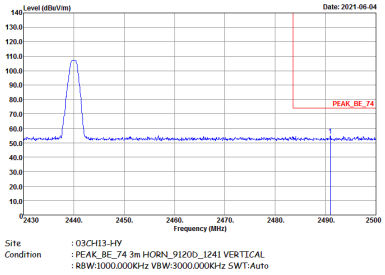
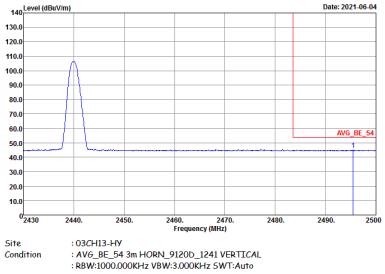
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak		
Avg.		

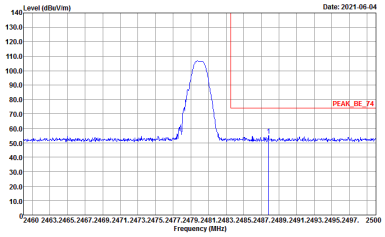
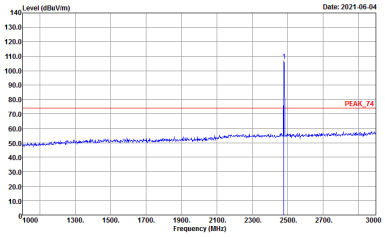
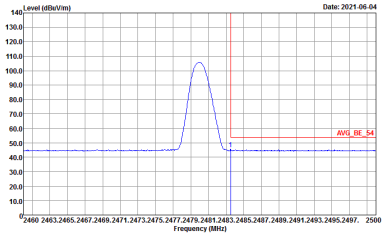
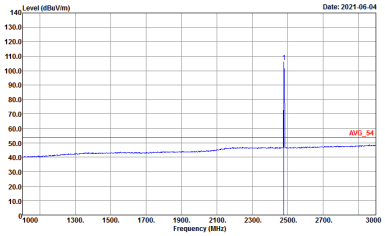
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

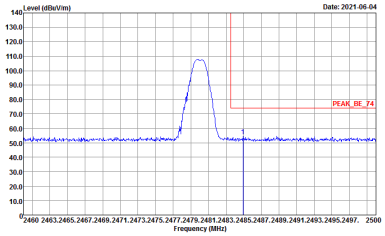
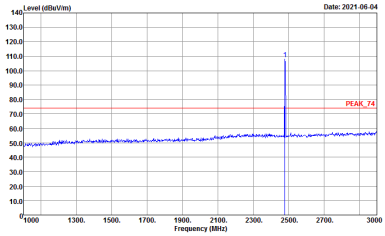
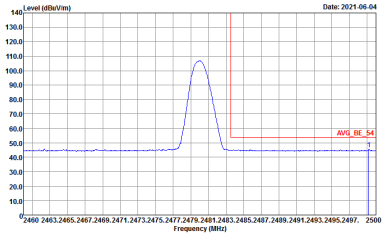
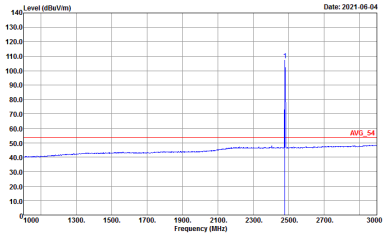
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AV6_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AV6_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

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

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

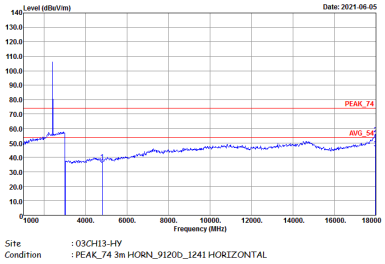
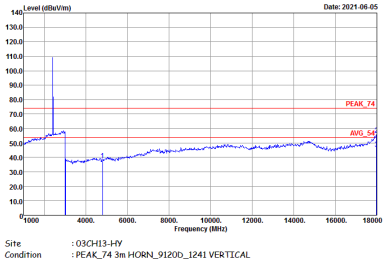
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

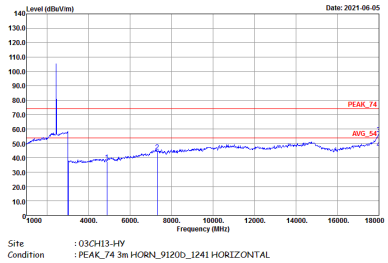
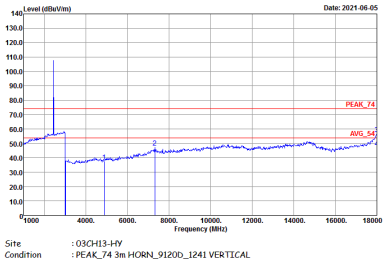
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

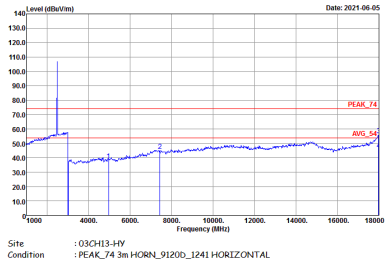
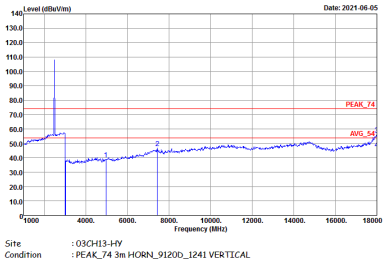
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

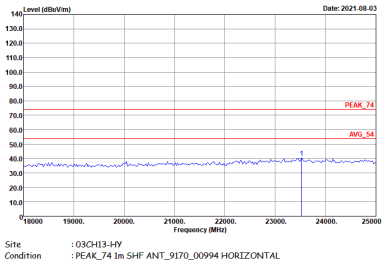
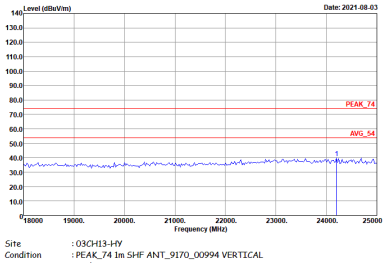
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.		

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

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

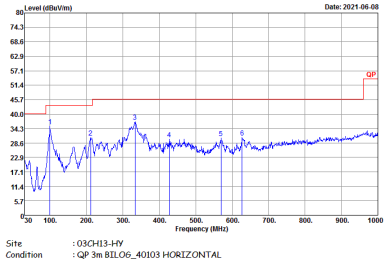
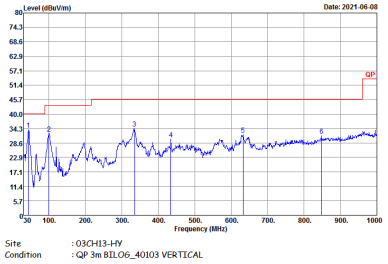
Emission above 18GHz

2.4GHz BLE (SHF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

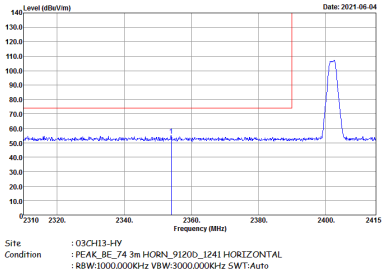
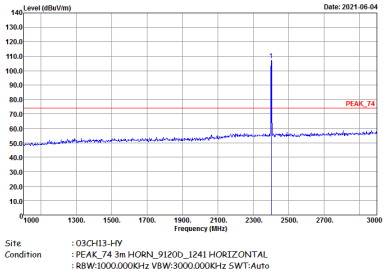
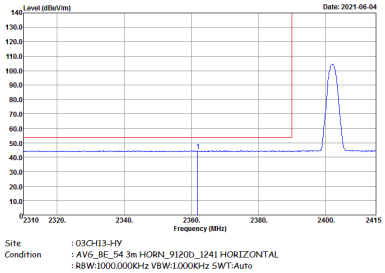
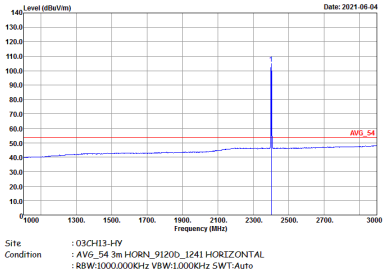
2.4GHz BLE (LF)

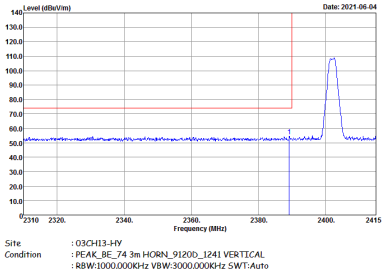
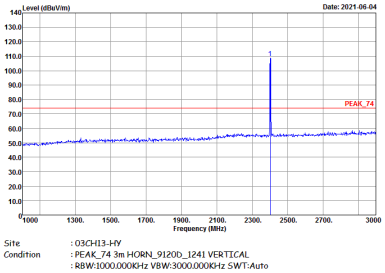
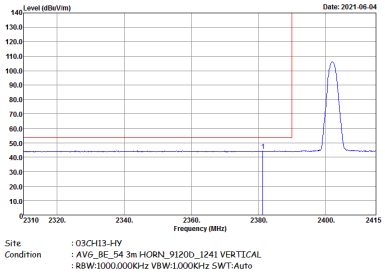
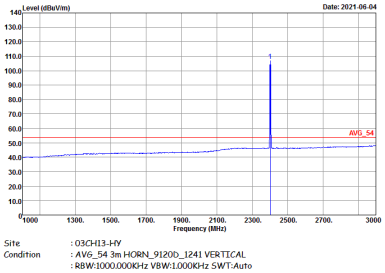
BLE	2.4GHz 2400~2483.5MHz	
ANT	BLE LF	
1	Horizontal	Vertical
QP / Peak		

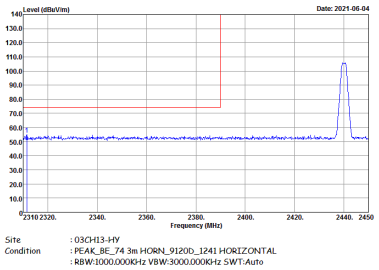
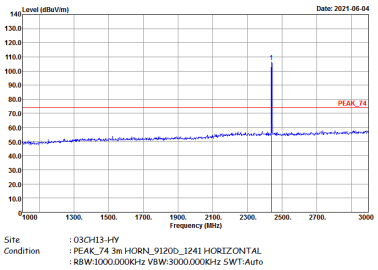
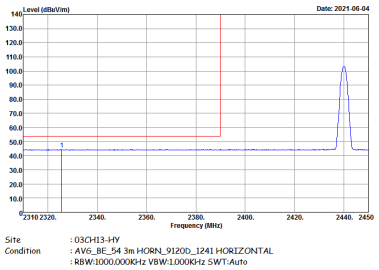
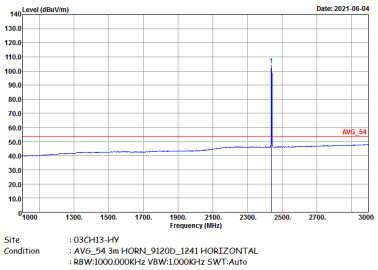
<2Mbps>

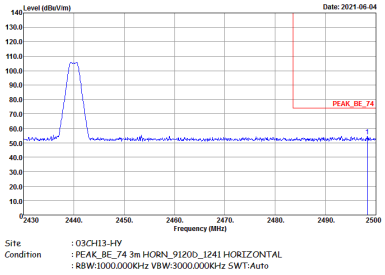
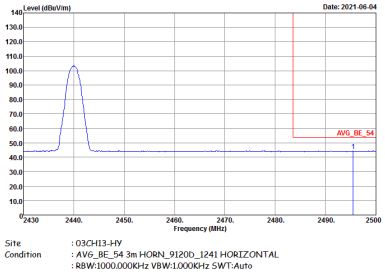
2.4GHz 2400~2483.5MHz

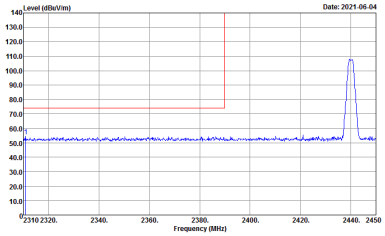
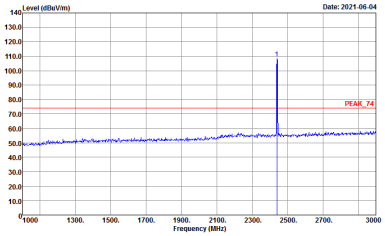
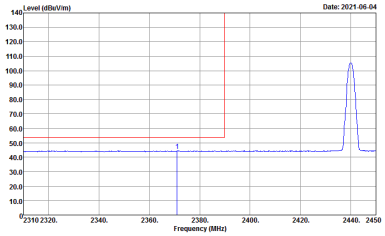
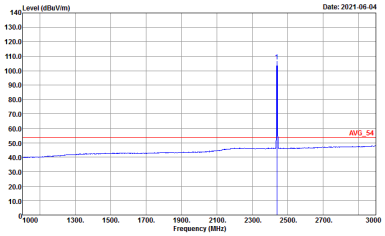
BLE (Band Edge @ 3m)

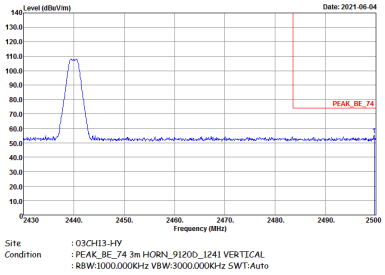
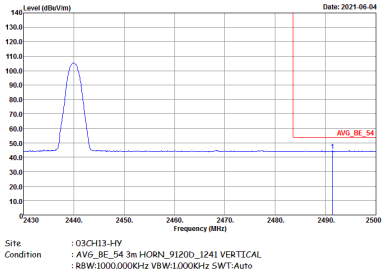
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak		
Avg.		

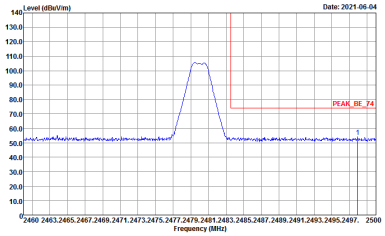
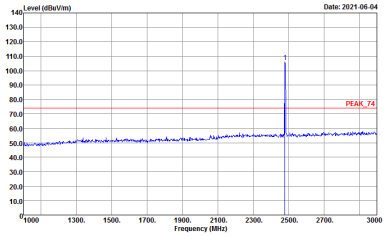
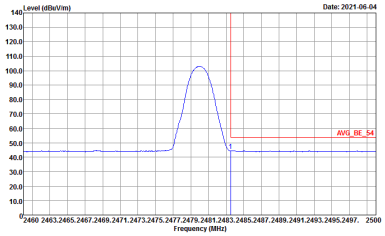
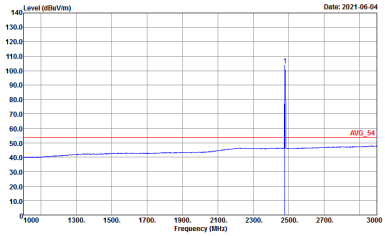
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

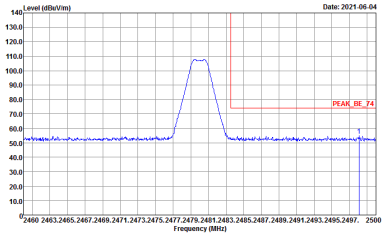
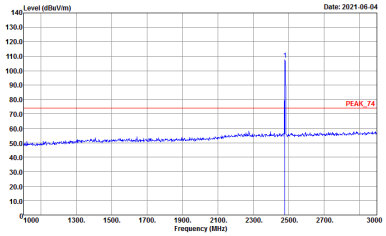
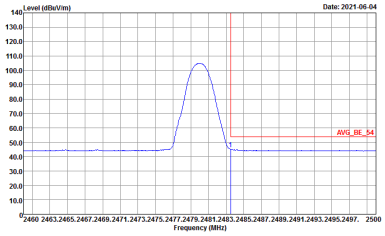
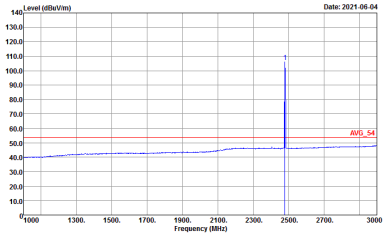
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AV6_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AV6_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

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

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

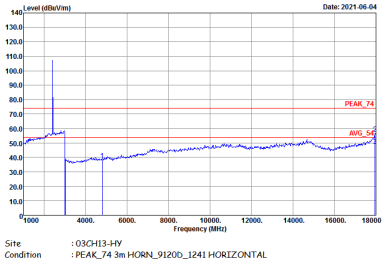
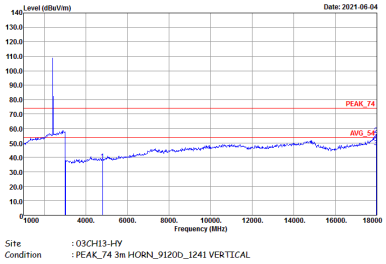
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

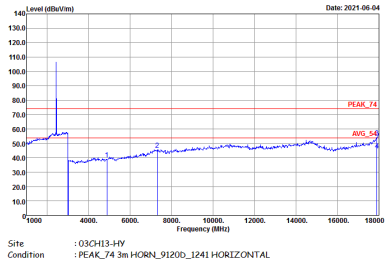
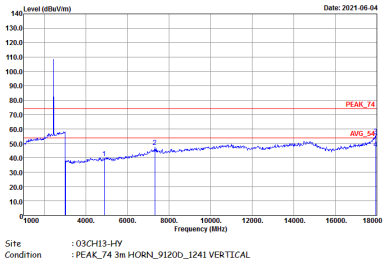
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

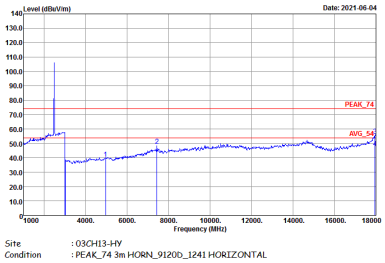
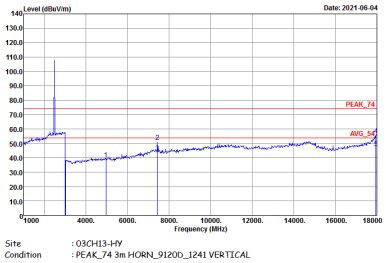
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

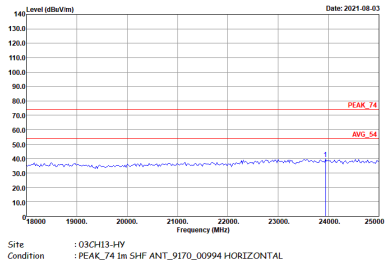
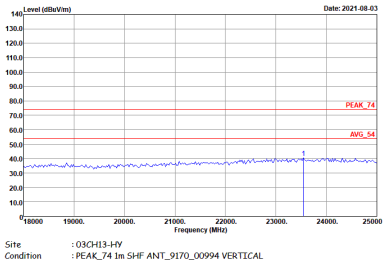
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.		

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

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

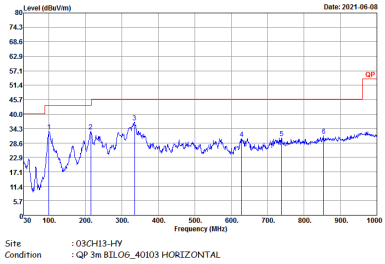
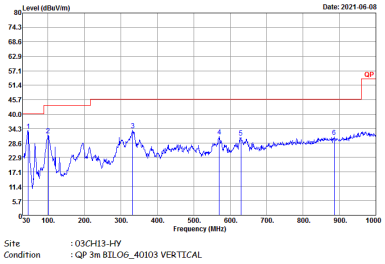
Emission above 18GHz

2.4GHz BLE (SHF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz BLE (LF)

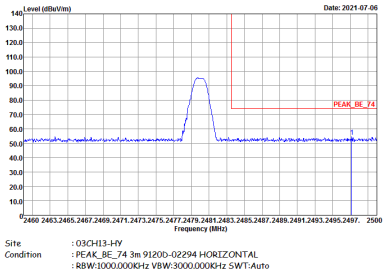
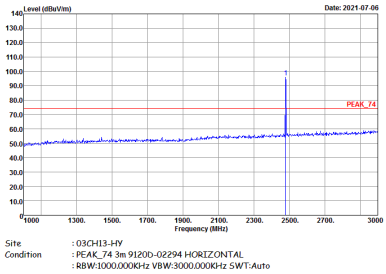
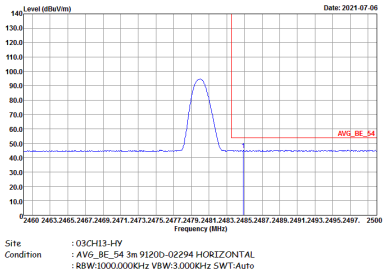
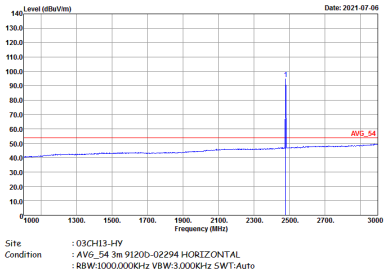
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak		

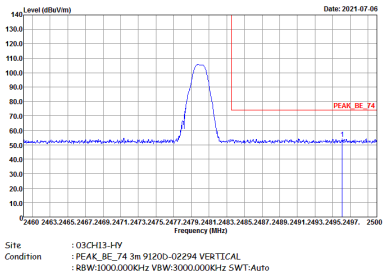
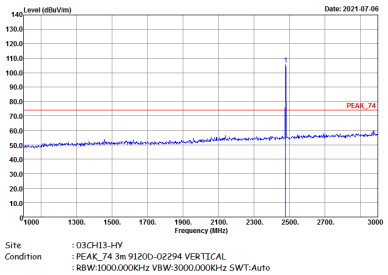
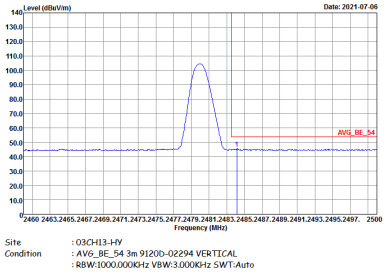
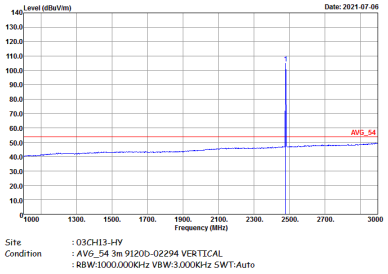
<EUT with Strap 3>

<1Mbps>

2.4GHz 2400~2483.5MHz

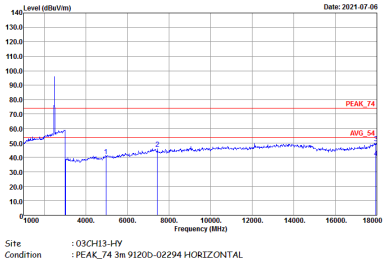
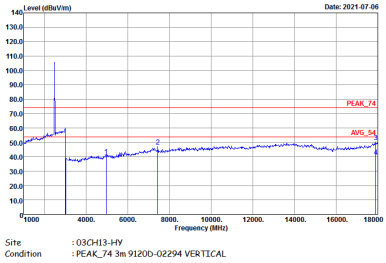
BLE (Band Edge @ 3m)

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

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

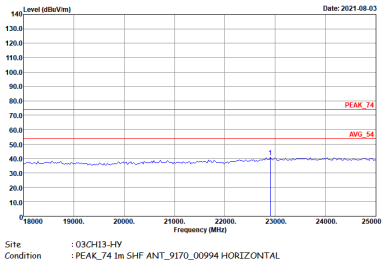
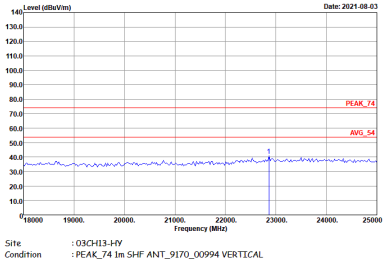
2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

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

Emission above 18GHz

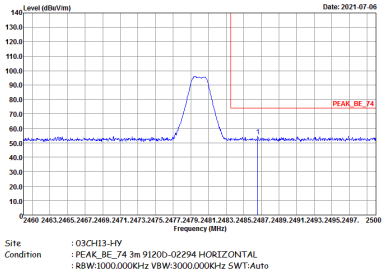
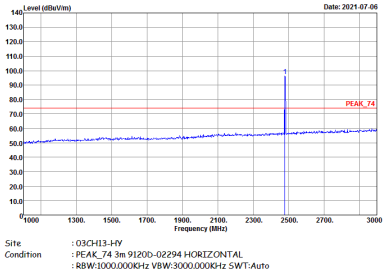
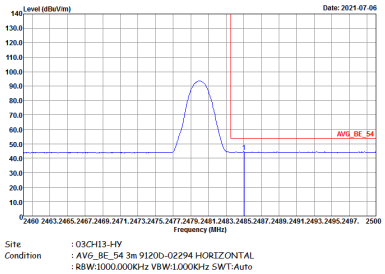
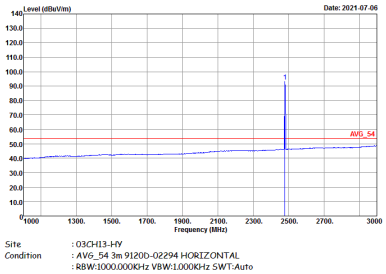
2.4GHz BLE (SHF)

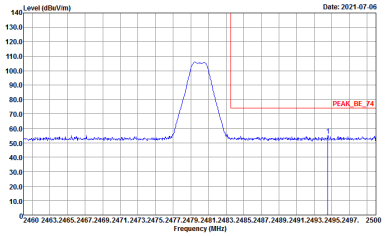
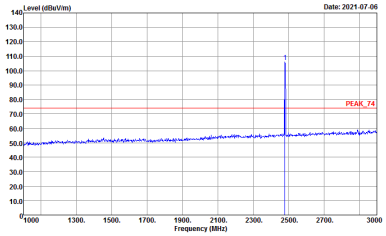
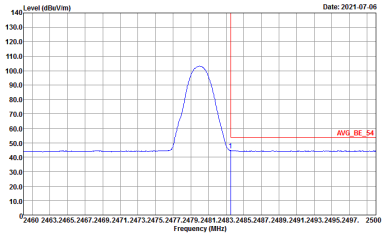
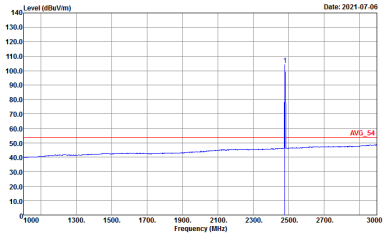
BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.		

<2Mbps>

2.4GHz 2400~2483.5MHz

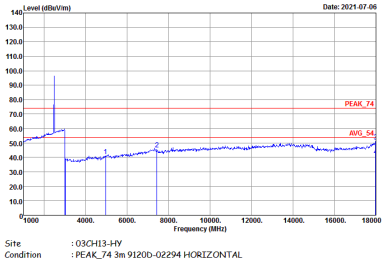
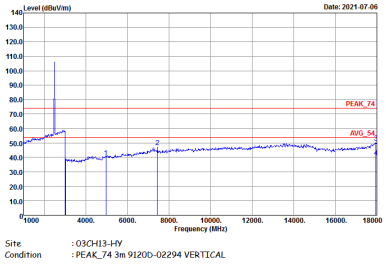
BLE (Band Edge @ 3m)

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

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m 9120D-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH13-HY Condition : PEAK_74 3m 9120D-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m 9120D-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto	 Site : 03CH13-HY Condition : AVG_54 3m 9120D-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto

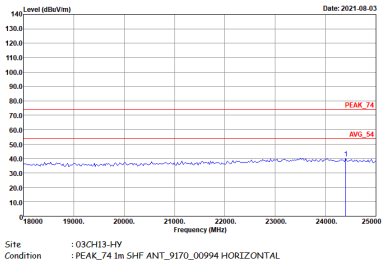
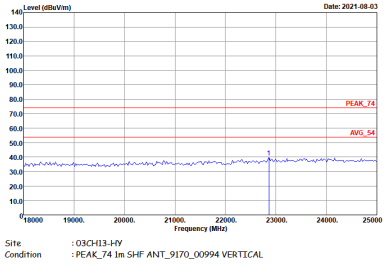
2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

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

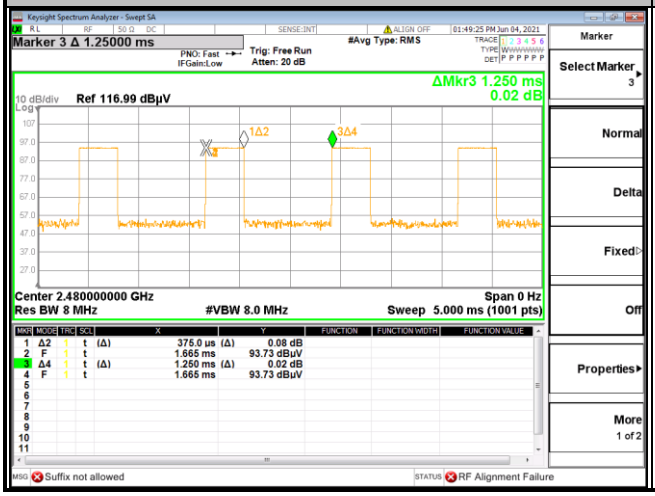
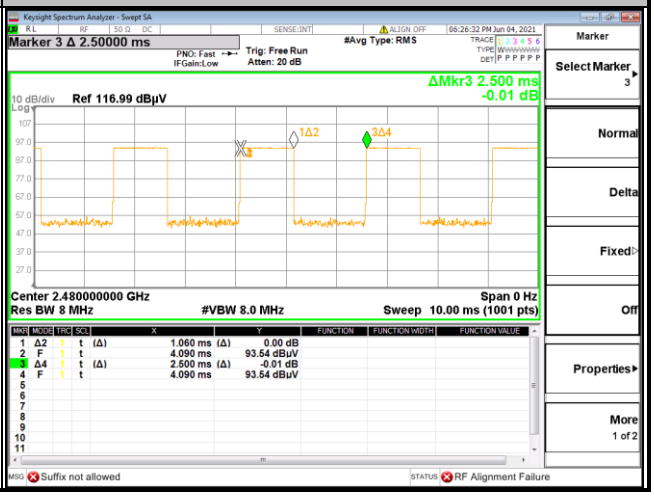
Emission above 18GHz

2.4GHz BLE (SHF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.		

Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth - LE for 1Mbps	30.00	375	2.67	3kHz
Bluetooth - LE for 2Mbps	42.40	1060	0.94	1kHz

Bluetooth – LE for 1Mbps	Bluetooth – LE for 2Mbps
	

————THE END————