



FCC RADIO TEST REPORT

FCC ID : 2A3DW-MZ1000
Equipment : Head-mounted tablet
Brand Name : Moziware
Model Name : MZ1000
Marketing Name : cimo
Applicant : RealWear (Shanghai) Intelligent Technology Co., Ltd.
2F, Block21, No. 55 Chuanhe Road, Pudong New District,
Shanghai, China
Manufacturer : RealWear (Shanghai) Intelligent Technology Co., Ltd.
2F, Block21, No. 55 Chuanhe Road, Pudong New District,
Shanghai, China
Standard : FCC Part 15 Subpart C §15.247

The product was received on Oct. 01, 2021 and testing was started from Oct. 14, 2021 and completed on Oct. 27, 2021. We, Sporton International Inc. Wensan 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. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR193007B	01	Initial issue of report	Nov. 18, 2021
FR193007B	02	Revise description in Section 3.4.1	Nov. 29, 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 7.22 dB at 2483.640 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 13.45 dB at 0.908 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: Sheng Kuo

Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, and Wi-Fi 5GHz 802.11a/n/ac.

Product Specification subjective to this standard		
Antenna Type	WLAN: PIFA Antenna	
	Bluetooth: PIFA Antenna	
Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	0.11

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

1.2 Modification of EUT

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

1.3 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.	
	CO05-HY (TAF Code: 1190)	
Remark	The Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.	

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.	
	TH05-HY, 03CH11-HY	

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

FCC designation No.: TW1190 and TW3786



1.4 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	-	-

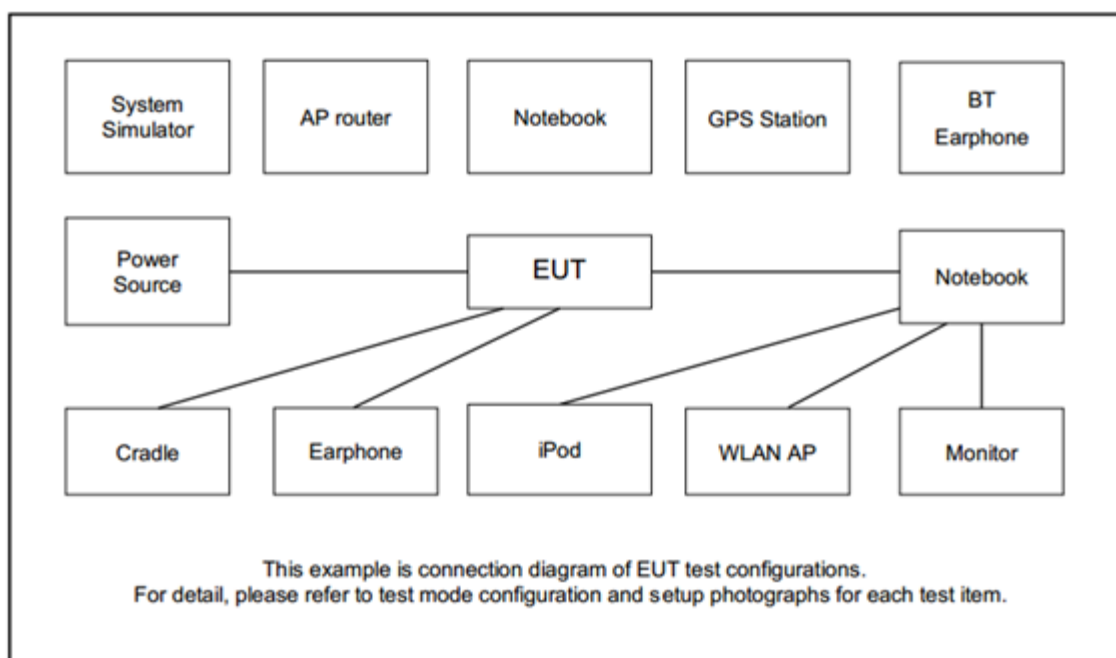
2.2 Test Mode

- 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). For radiated measurement, 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	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
AC Conducted Emission	Mode 1: WLAN (2.4GHz) Link + Bluetooth Link + USB Cable (Charging from Adapter) + Main Camera, LED Light on, Laser Light On + Earphone

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
4.	Earphone	Sony	AG-1100	NA	Unshielded, 1.5m	N/A
5.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	Adapter	DVE	DSA-5PFM-05 FUS 050100	FCC DoC	N/A	N/A
7.	Adapter	Sony	CAA-002016- TW	NA	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT Ver.4.0.00175.0" 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.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

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.

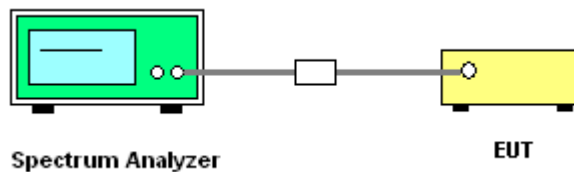
3.1.2 Measuring Instruments

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) $\geq 3 * RBW$.
6. Measure and record the results in the test report.

3.1.4 Test Setup

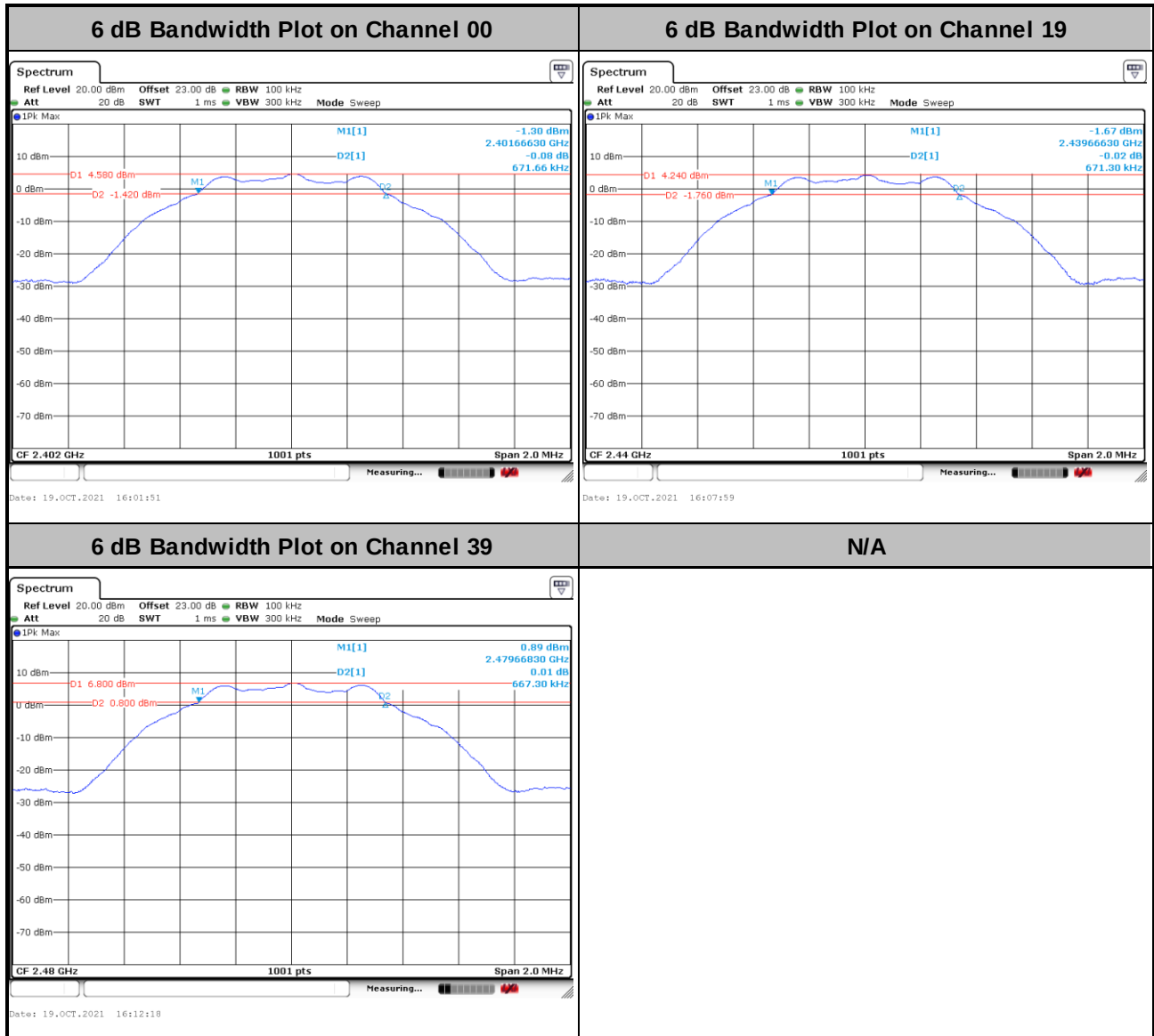




3.1.5 Test Result of 6dB Bandwidth

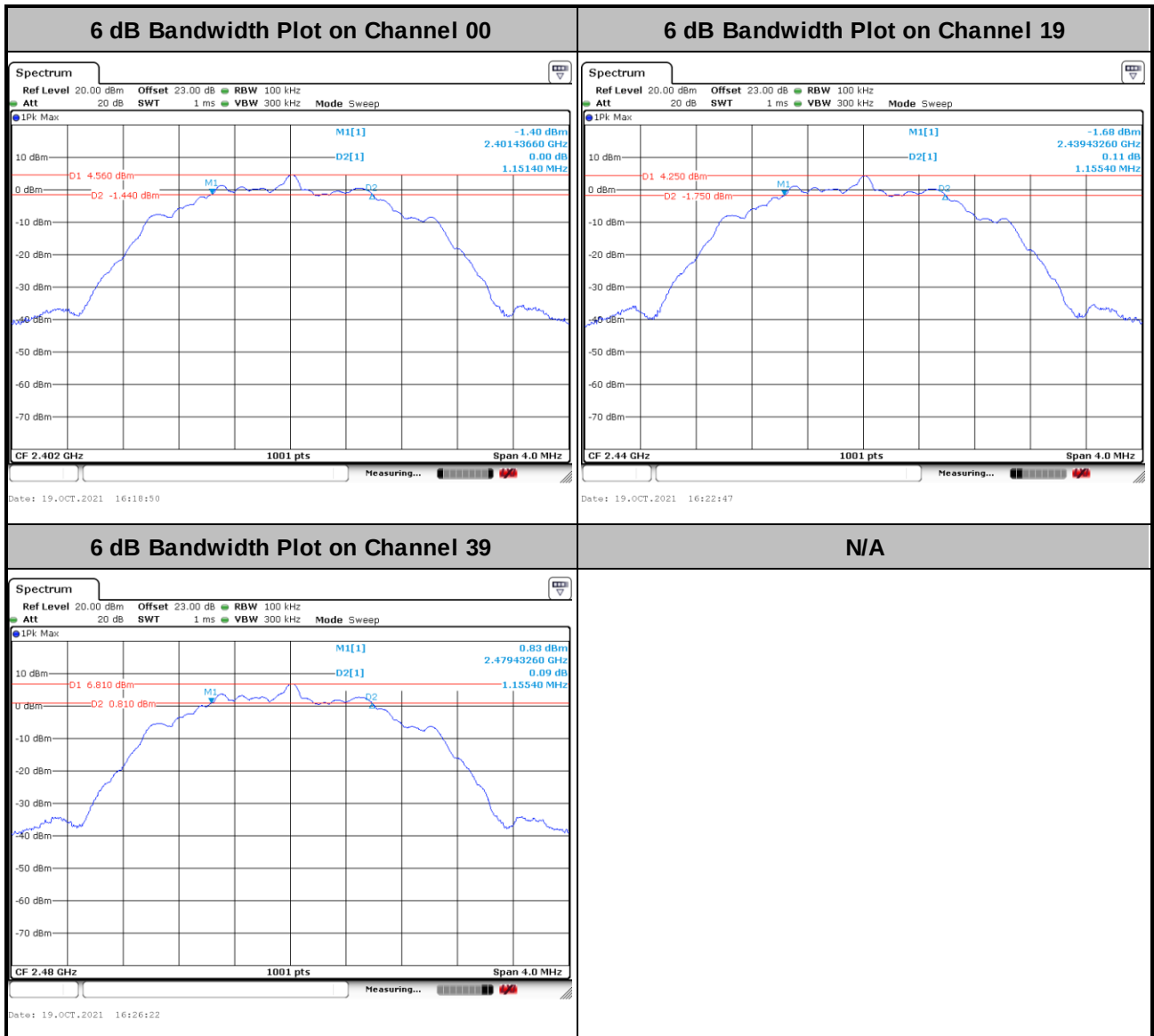
Please refer to Appendix A.

<1Mbps>





<2Mbps>

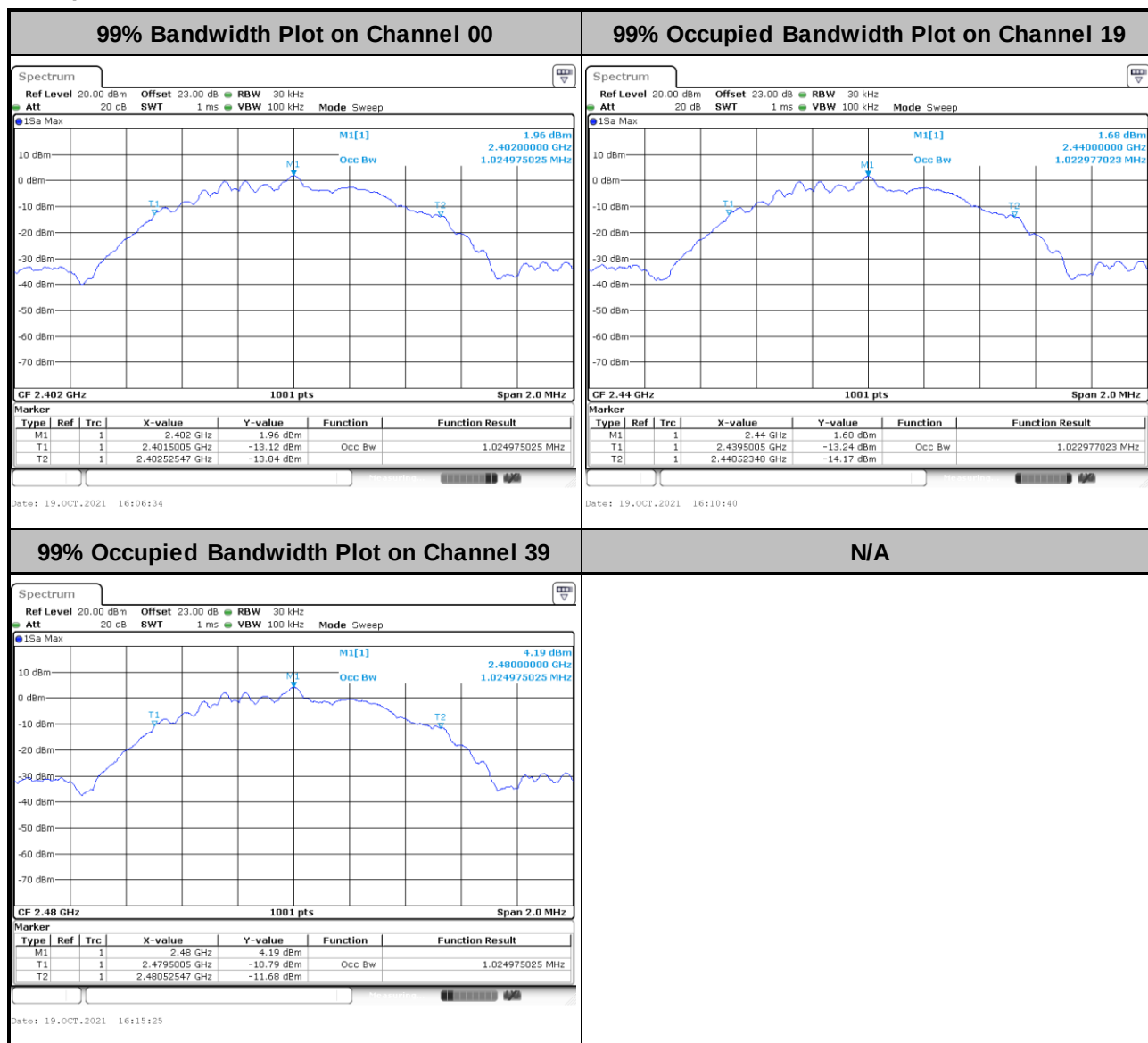




3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

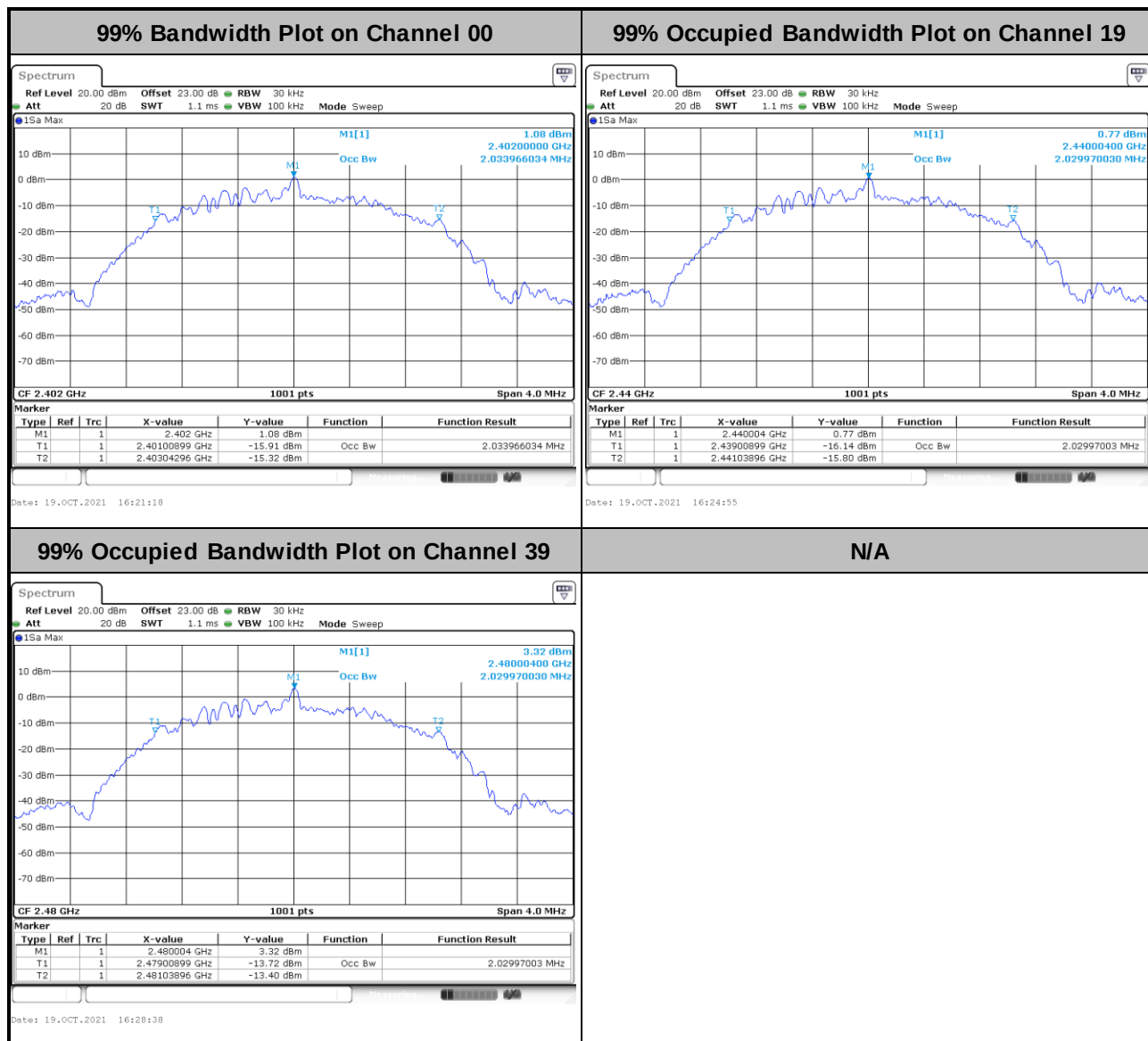
<1Mbps>



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



<2Mbps>



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.

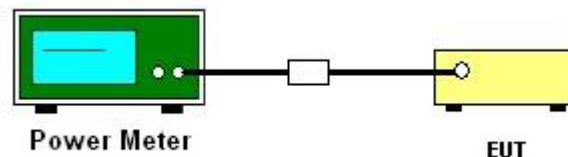
3.2.2 Measuring Instruments

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.

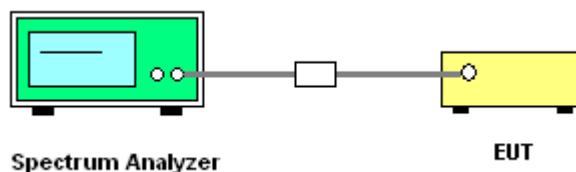
3.3.2 Measuring Instruments

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



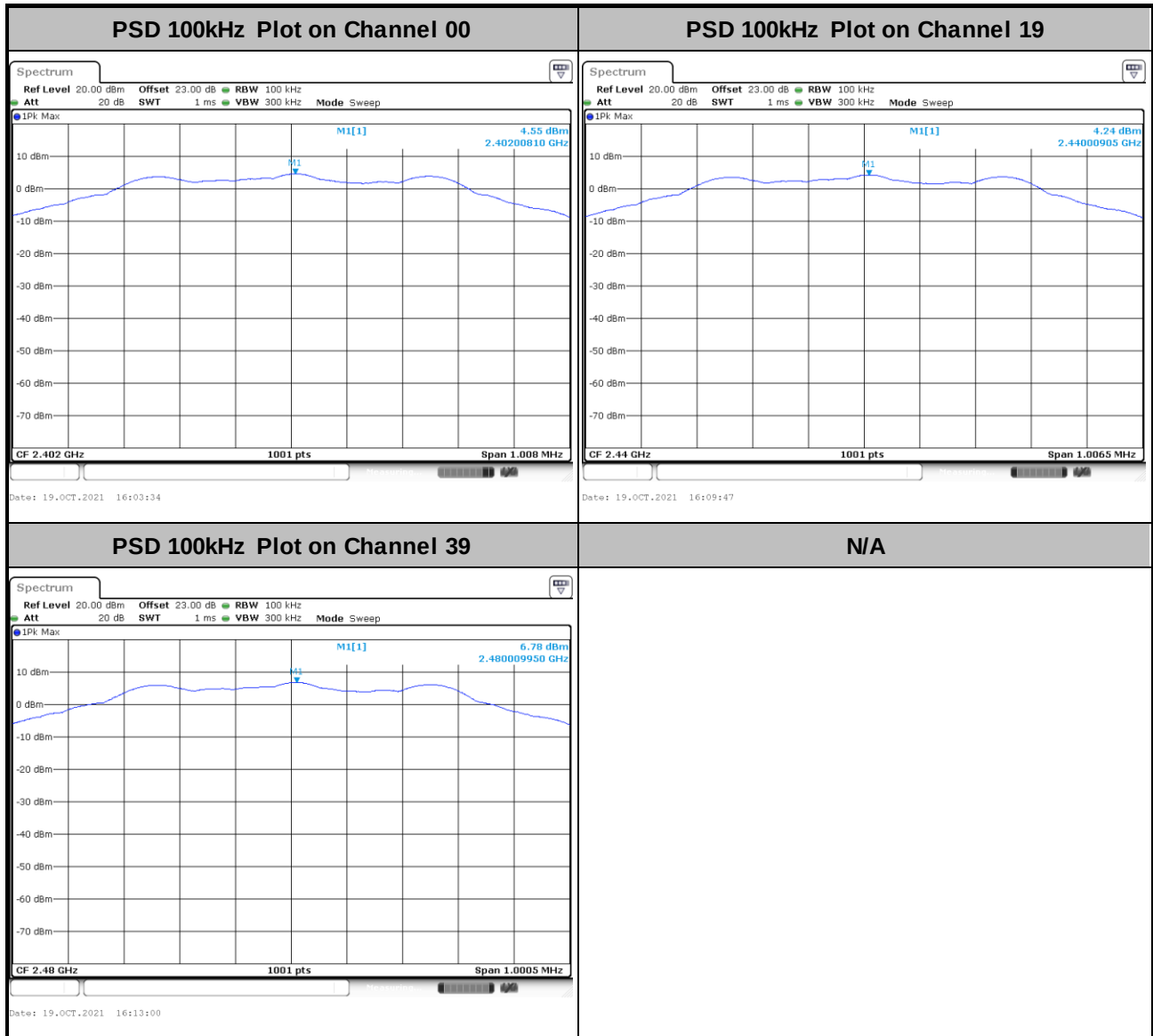
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



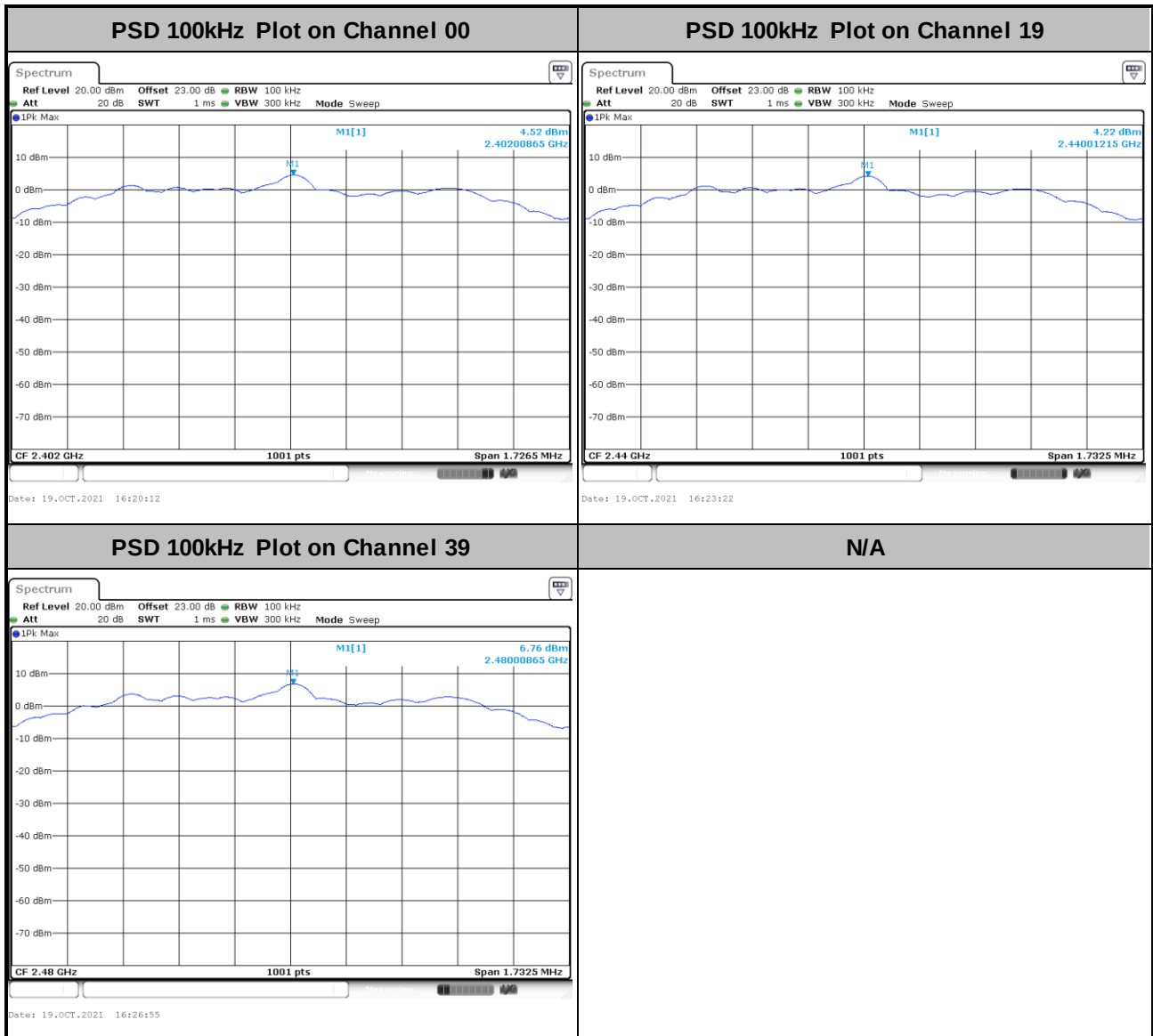
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

<1Mbps>





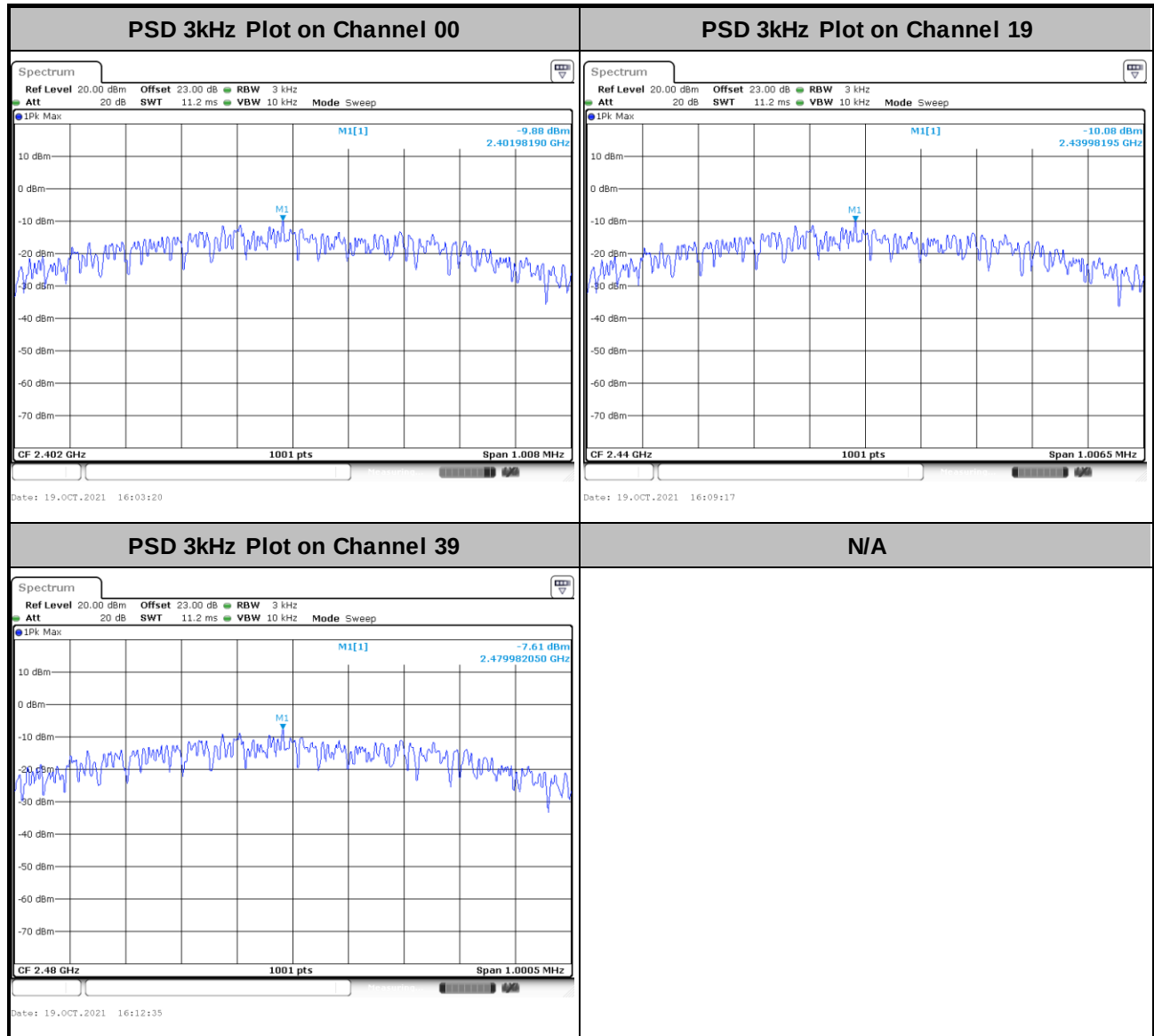
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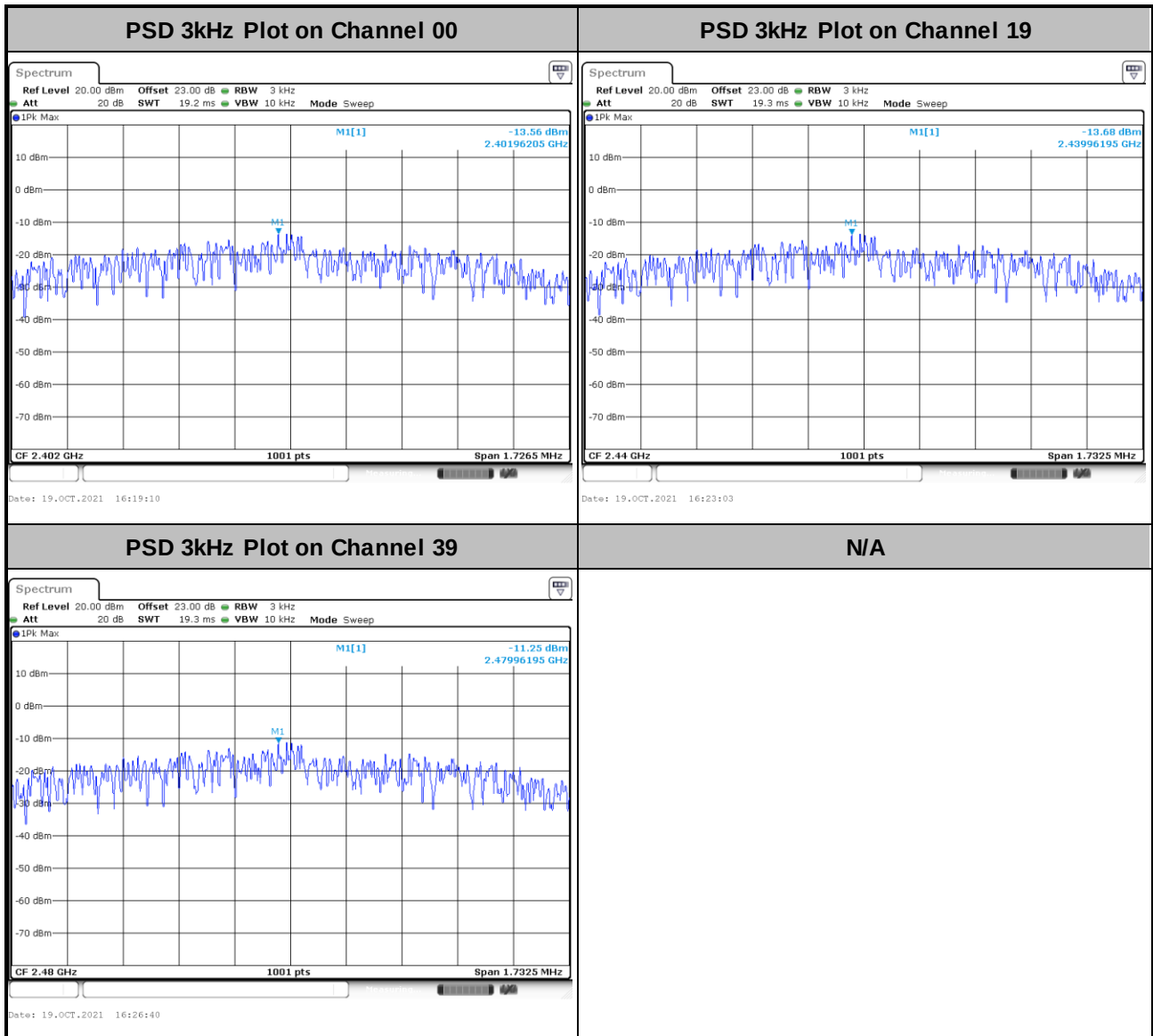
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

<1Mbps>





<2Mbps>



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 30 dB down from the highest emission level within the authorized band.

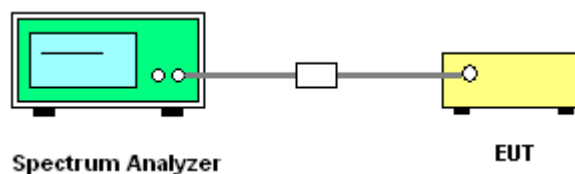
3.4.2 Measuring Instruments

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





The figure consists of two side-by-side spectrum plots. The left plot is titled "Low Band Edge Plot on Channel 00" and the right plot is titled "High Band Edge Plot on Channel 39". Both plots show a spectrum with a blue trace representing the signal. The y-axis is labeled "dBm" and ranges from -80 to 10. The x-axis is labeled "Frequency" and ranges from 2.375 GHz to 2.405 GHz for the left plot, and 2.475 GHz to 2.505 GHz for the right plot. Both plots show a peak at approximately 2.396 GHz (left) and 2.493 GHz (right). The peak is labeled "M1[1]" and has a value of -44.90 dBm. A horizontal red line is drawn at -25.450 dBm (left) and -23.220 dBm (right). A vertical red line is drawn at the peak frequency, labeled "F1". The plots also show a "D1" label at -25.450 dBm (left) and -23.220 dBm (right). The plots are labeled "Start" and "Stop" at the bottom, indicating the frequency range. The left plot shows "Start 2.375 GHz" and "Stop 2.405 GHz". The right plot shows "Start 2.475 GHz" and "Stop 2.505 GHz". Both plots show "8001 pts" and a "Date: 19.OCT.2021 16:05:32".

Low Band Edge Plot on Channel 00

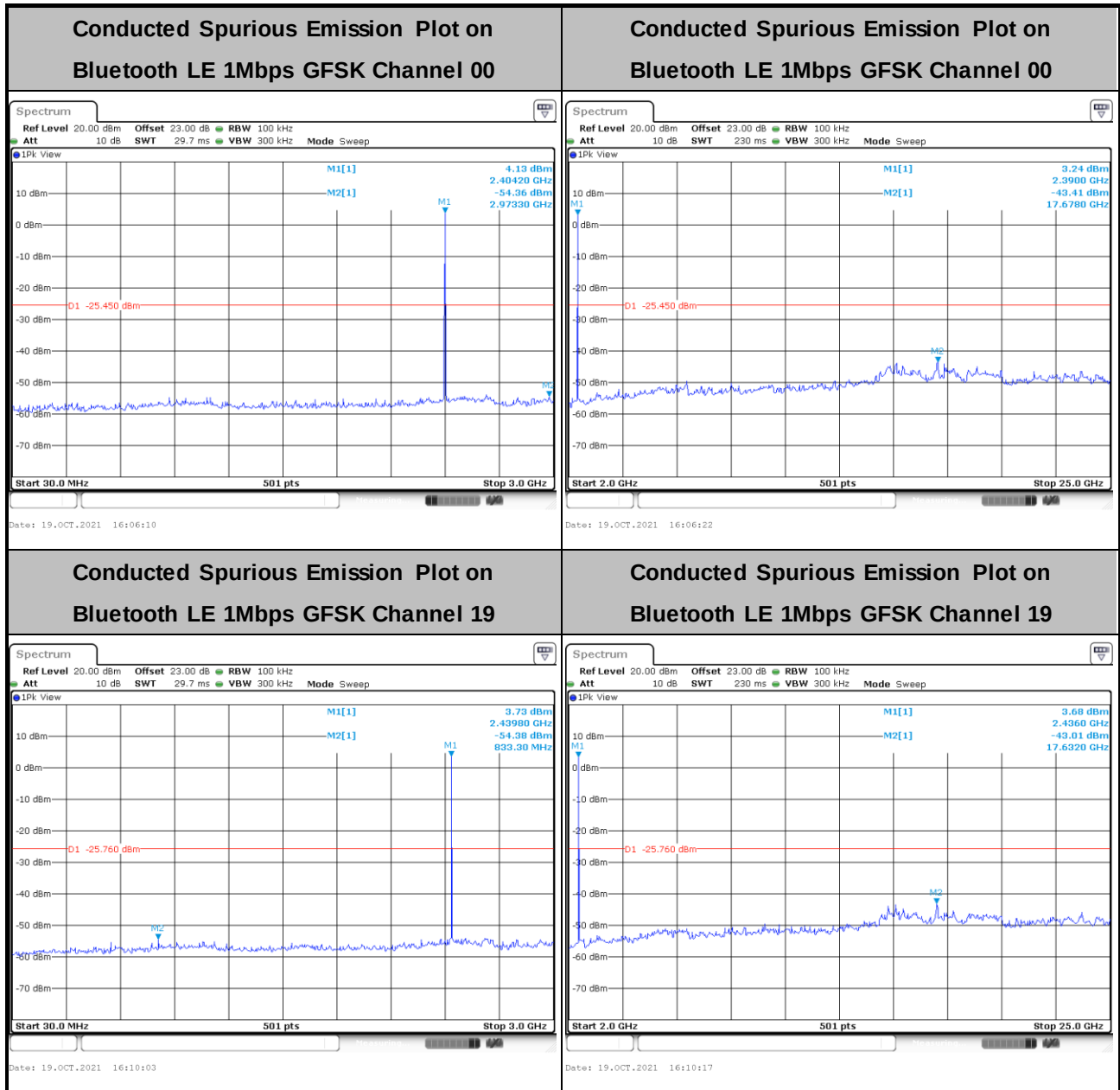
Spectrum
 Ref Level 20.00 dBm Offset 23.00 dB RBW 100 kHz
 Att 20 dB SWI 8 ms VBW 300 kHz Mode Sweep
 1Pk Max
 MI[1]
 -43.27 dBm
 2.39998500 GHz
 D1 -25.480 dBm
 F1
 Start 2.375 GHz 8001 pts Stop 2.405 GHz

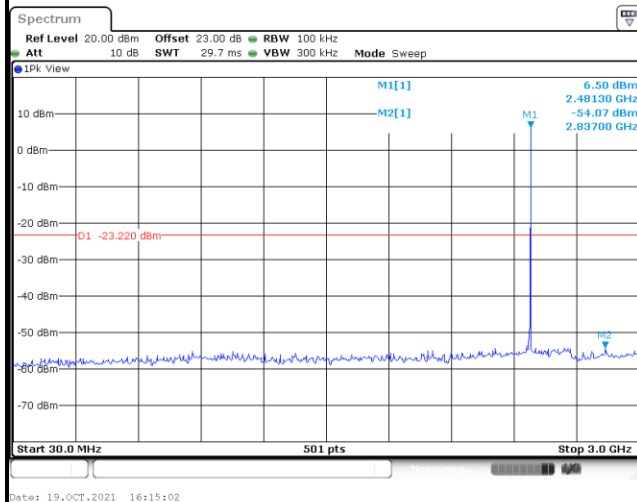
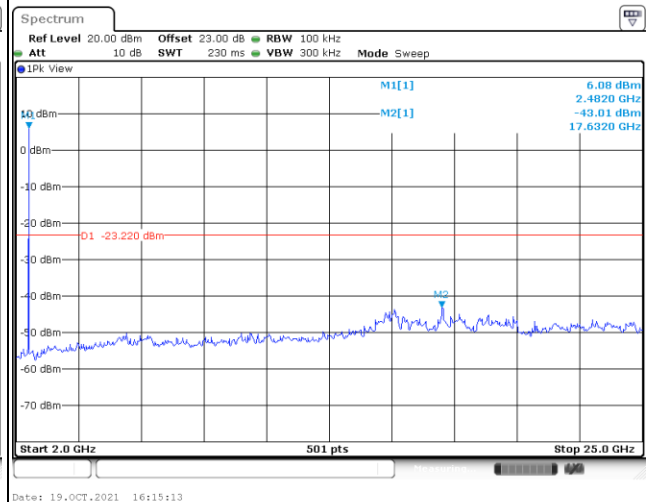
High Band Edge Plot on Channel 39

Spectrum
 Ref Level 20.00 dBm Offset 23.00 dB RBW 100 kHz
 Att 20 dB SWI 8 ms VBW 300 kHz Mode Sweep
 1Pk Max
 MI[1]
 -43.47 dBm
 2.50243340 GHz
 D1 -23.240 dBm
 F1
 Start 2.475 GHz 8001 pts Stop 2.505 GHz

3.4.6 Test Result of Conducted Spurious Emission Plots

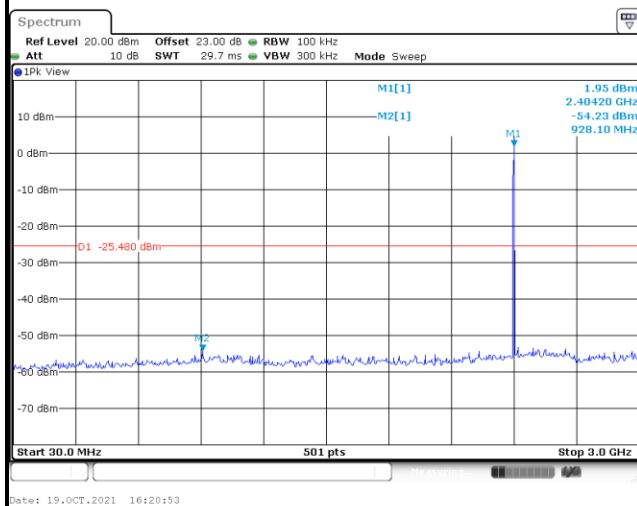
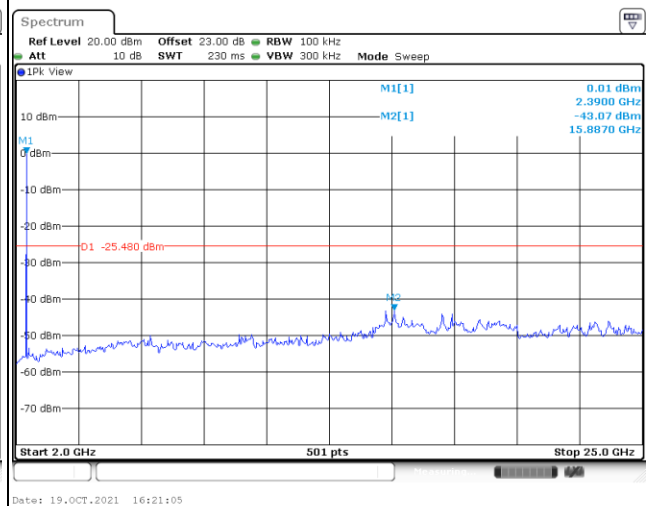
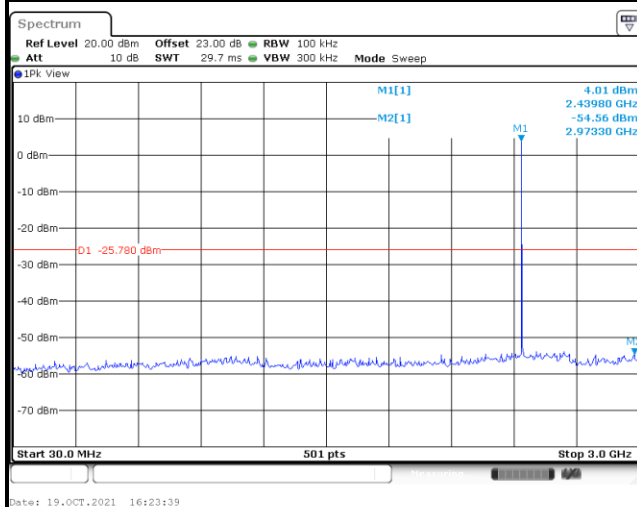
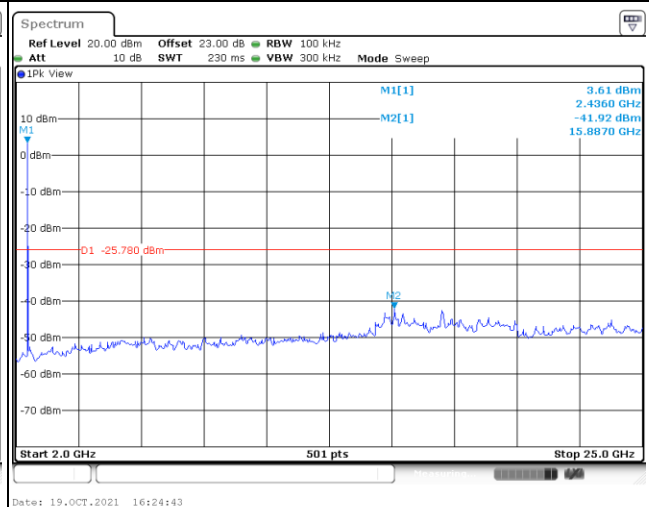
<1Mbps>



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

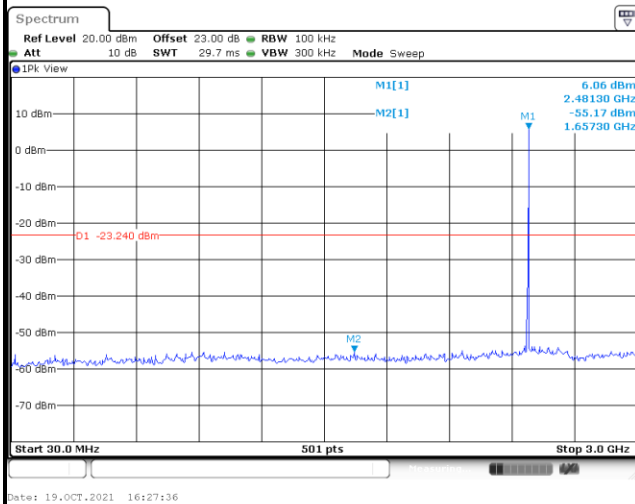


<2Mbps>

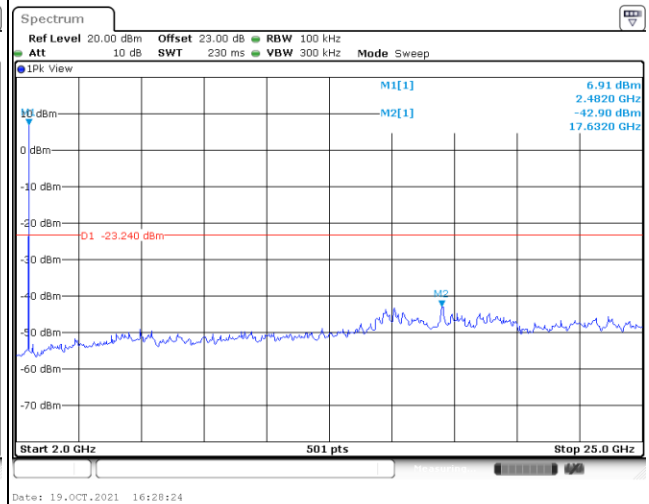
**Conducted Spurious Emission Plot on
Bluetooth LE 2Mbps GFSK Channel 00****Conducted Spurious Emission Plot on
Bluetooth LE 2Mbps GFSK Channel 00****Conducted Spurious Emission Plot on
Bluetooth LE 2Mbps GFSK Channel 19****Conducted Spurious Emission Plot on
Bluetooth LE 2Mbps GFSK Channel 19**



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.

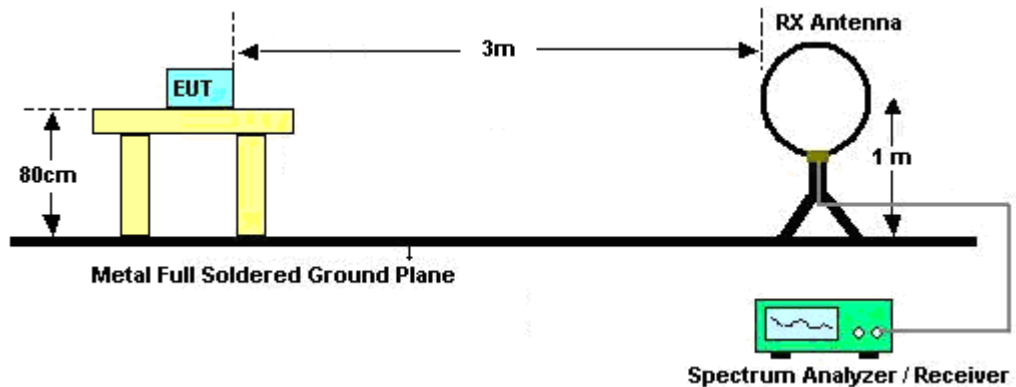


3.5.3 Test Procedures

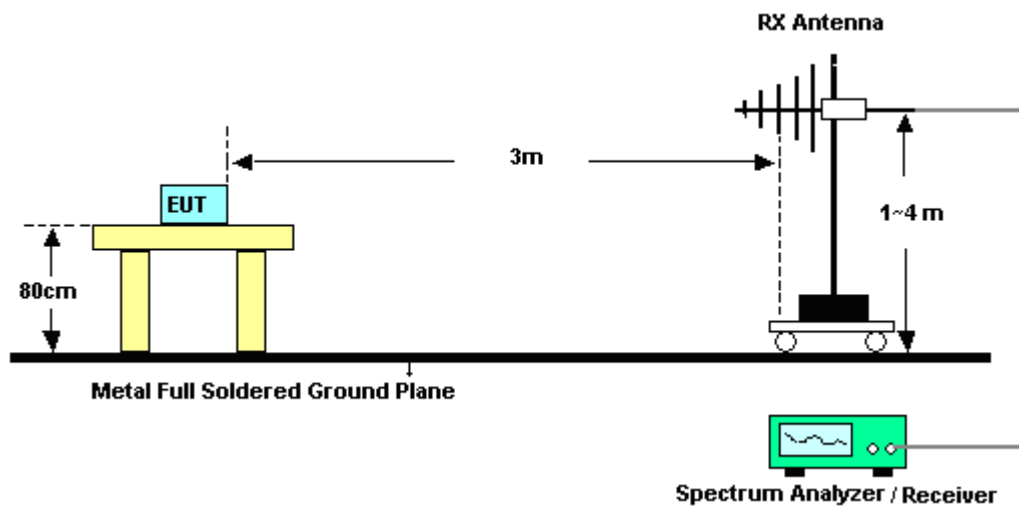
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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. Radiated testing below 1GHz was performed by adjusting the antenna tower from 1m to 4m and by rotating the turn table from 0degree to 360 degree to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6dB margin against QP limit line, the position is marked as “-”.
7. Radiated testing above 1GHz was performed by adjusting the antenna tower from 1m to 4m and by rotating the turn table from 0degree to 360 degree to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6dB margin against average limit line, the position is marked as “-”.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW = 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW = 3 MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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

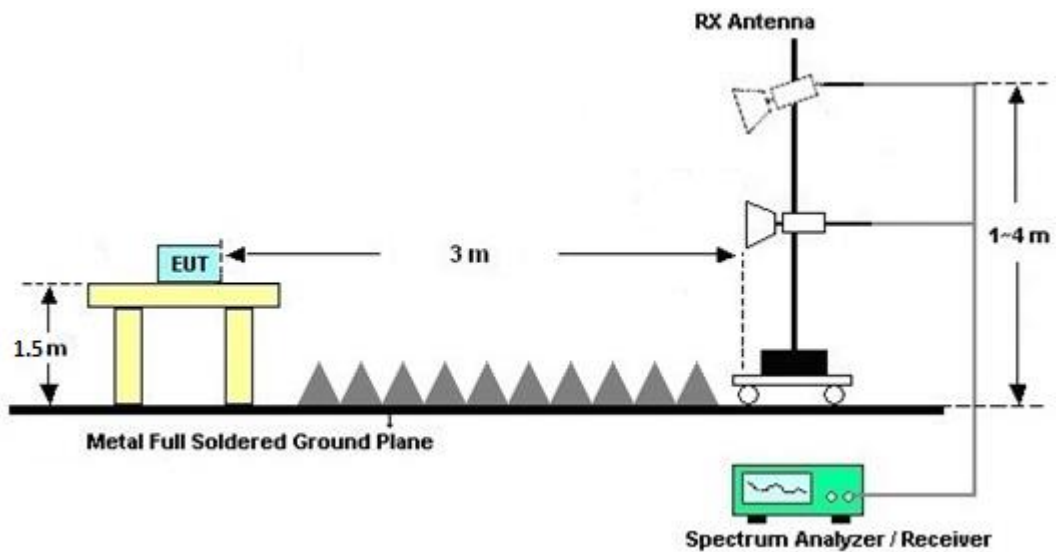
For radiated test below 30MHz



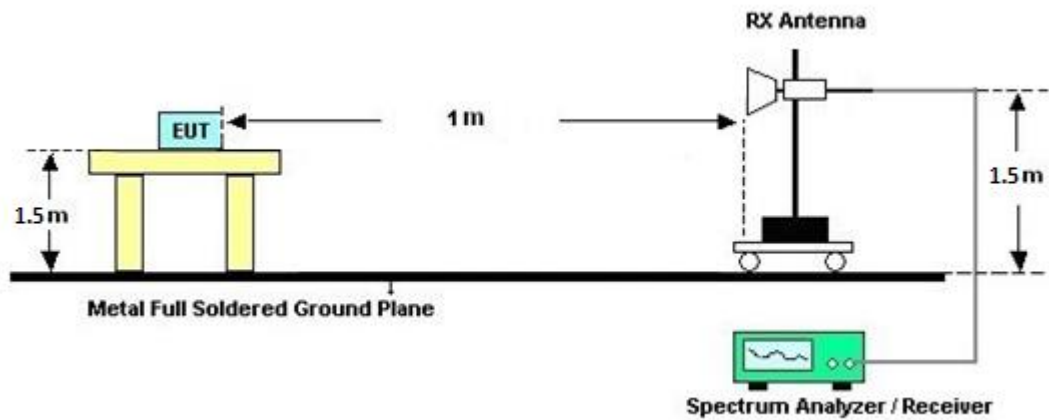
For radiated test from 30MHz to 1GHz



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 (dB μ V)	
	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.

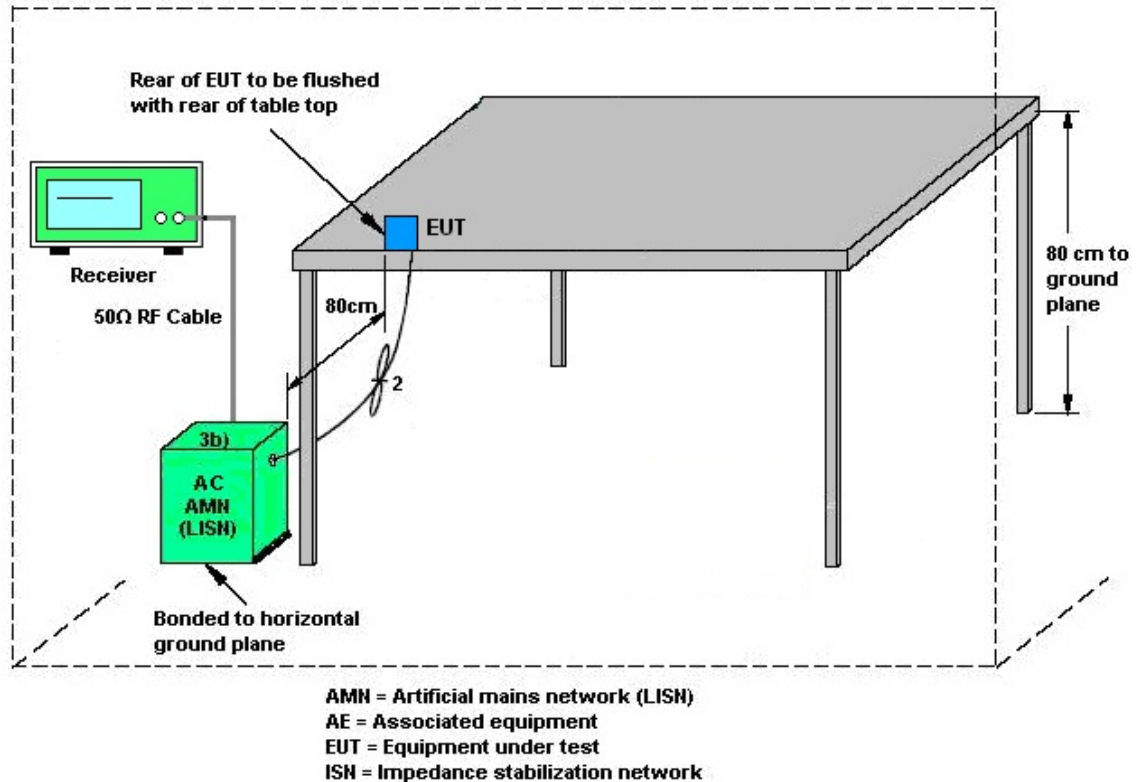
3.6.2 Measuring Instruments

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
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~50 MHz	Sep. 07, 2021	Oct. 20, 2021~ Oct. 26, 2021	Sep. 06, 2022	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	40103 & 07	30MHz~1GHz	Apr. 28, 2021	Oct. 20, 2021~ Oct. 26, 2021	Apr. 27, 2022	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1GHz ~ 18GHz	Aug. 04, 2021	Oct. 20, 2021~ Oct. 26, 2021	Aug. 03, 2022	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz~40GHz	Nov. 19, 2020	Oct. 20, 2021~ Oct. 26, 2021	Nov. 18, 2021	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 02, 2020	Oct. 20, 2021~ Oct. 26, 2021	Dec. 01, 2021	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 12, 2020	Oct. 20, 2021~ Oct. 26, 2021	Nov. 11, 2021	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-303	17100018000 55007	1GHz~18GHz	Jun. 16, 2021	Oct. 20, 2021~ Oct. 26, 2021	Jun. 15, 2022	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Oct. 20, 2021~ Oct. 26, 2021	Jun. 21, 2022	Radiation (03CH11-HY)
Signal Analyzer	Keysight	N9010B	MY60240520	NA	Dec. 02, 2020	Oct. 20, 2021~ Oct. 26, 2021	Dec. 01, 2021	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY55420170	20MHz~8.4GHz	Jul. 15, 2021	Oct. 20, 2021~ Oct. 26, 2021	Jul. 14, 2022	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 20, 2021~ Oct. 26, 2021	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Oct. 20, 2021~ Oct. 26, 2021	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Oct. 20, 2021~ Oct. 26, 2021	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Oct. 20, 2021~ Oct. 26, 2021	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 11, 2021	Oct. 20, 2021~ Oct. 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 11, 2021	Oct. 20, 2021~ Oct. 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	30M-18G	Mar. 11, 2021	Oct. 20, 2021~ Oct. 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11681/4PE	30MHz-18GHz	Mar. 11, 2021	Oct. 20, 2021~ Oct. 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1.53G Low Pass	Sep. 13, 2021	Oct. 20, 2021~ Oct. 26, 2021	Sep. 12, 2022	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN3	3GHz High Pass Filter	Sep. 13, 2021	Oct. 20, 2021~ Oct. 26, 2021	Sep. 12, 2022	Radiation (03CH11-HY)
Hygrometer	TECEP	DTM-303B	TP140325	N/A	Nov. 18, 2020	Oct. 20, 2021~ Oct. 26, 2021	Nov. 17, 2021	Radiation (03CH11-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 01, 2021	Oct. 14, 2021~ Oct. 20, 2021	Feb. 28, 2022	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12	10MHz~6GHz	Dec. 16, 2020	Oct. 14, 2021~ Oct. 20, 2021	Dec. 15, 2021	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101565	10Hz ~ 40GHz	Nov. 13, 2020	Oct. 14, 2021~ Oct. 20, 2021	Nov. 12, 2021	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2021	Oct. 14, 2021~ Oct. 20, 2021	Mar. 16, 2022	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 27, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 30, 2020	Oct. 27, 2021	Nov. 29, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	Oct. 27, 2021	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2020	Oct. 27, 2021	Nov. 30, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	Oct. 27, 2021	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 27, 2021	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	00691	N/A	Jul. 28, 2021	Oct. 27, 2021	Jul. 27, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	Oct. 27, 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% ($U = 2Uc(y)$)	3.1 dB
--	--------

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.4 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.9 dB
--	--------

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Jacob Yu	Temperature:	22.8~24.5	°C
Test Date:	2021/10/14-2021/10/20	Relative Humidity:	52.8~54.7	%

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	1.025	0.672	0.50	Pass
BLE	1Mbps	1	19	2440	1.023	0.671	0.50	Pass
BLE	1Mbps	1	39	2480	1.025	0.667	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	5.30	30.00	0.11	5.41	36.00	Pass
BLE	1Mbps	1	19	2440	5.00	30.00	0.11	5.11	36.00	Pass
BLE	1Mbps	1	39	2480	7.60	30.00	0.11	7.71	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	4.55	-9.88	0.11	8.00	Pass
BLE	1Mbps	1	19	2440	4.24	-10.08	0.11	8.00	Pass
BLE	1Mbps	1	39	2480	6.78	-7.61	0.11	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	1.151	0.50	Pass
BLE	2Mbps	1	19	2440	2.030	1.155	0.50	Pass
BLE	2Mbps	1	39	2480	2.030	1.155	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	5.20	30.00	0.11	5.31	36.00	Pass
BLE	2Mbps	1	19	2440	4.90	30.00	0.11	5.01	36.00	Pass
BLE	2Mbps	1	39	2480	7.50	30.00	0.11	7.61	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	4.52	-13.56	0.11	8.00	Pass
BLE	2Mbps	1	19	2440	4.22	-13.68	0.11	8.00	Pass
BLE	2Mbps	1	39	2480	6.76	-11.25	0.11	8.00	Pass

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



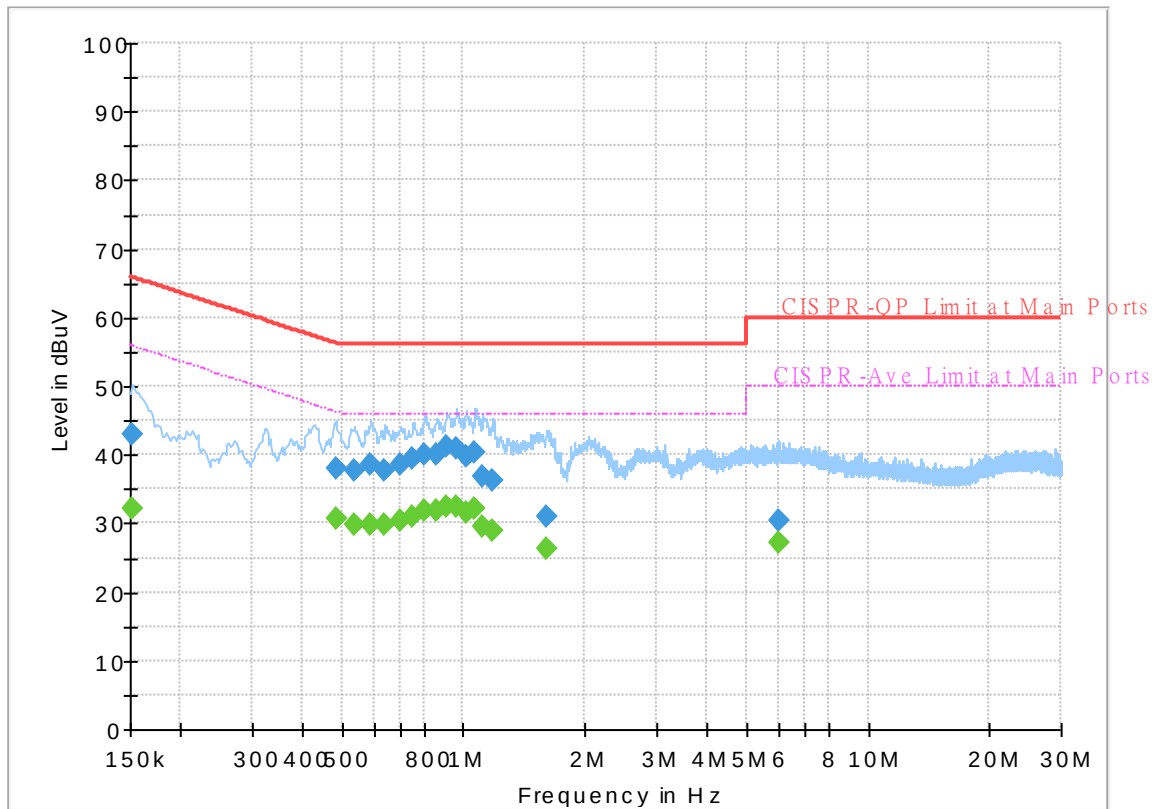
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	Temperature :	23~26°C
		Relative Humidity :	45~55%

EUT Information

Report NO : 193007
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



Final_Result

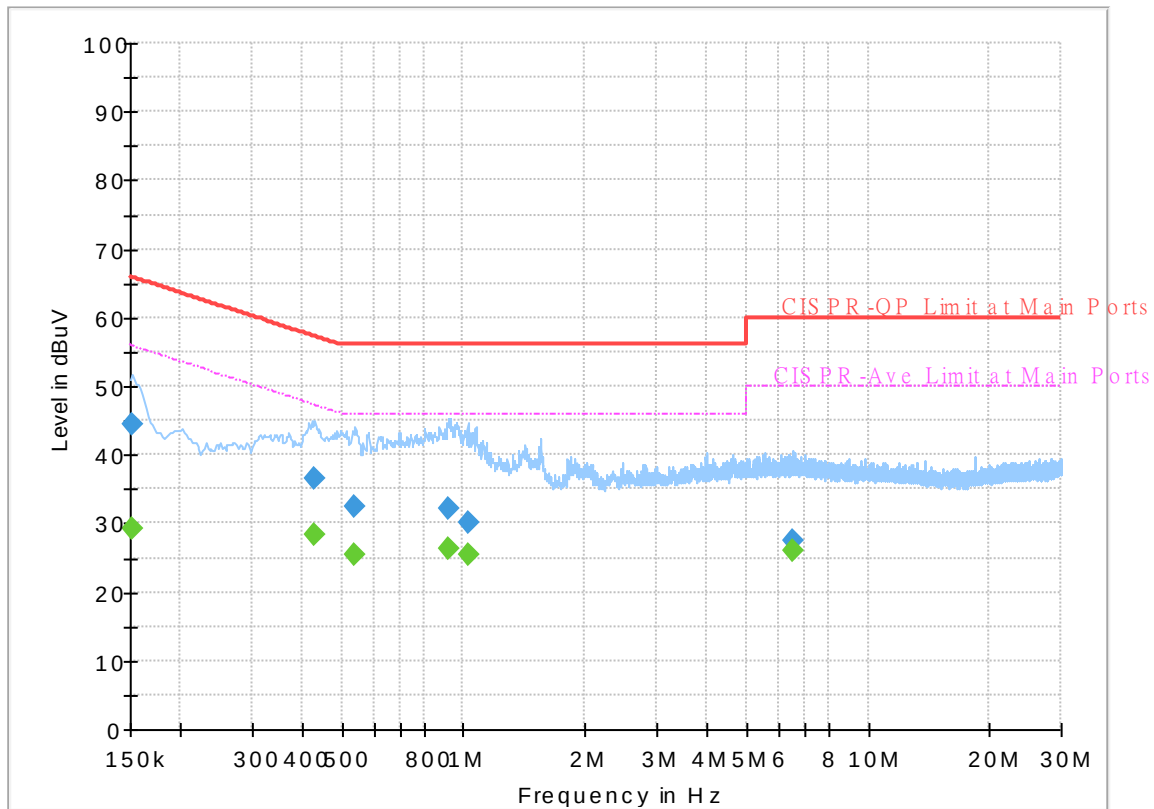
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	32.26	55.88	23.62	L1	OFF	19.7
0.152250	42.90	---	65.88	22.98	L1	OFF	19.7
0.483000	---	30.81	46.29	15.48	L1	OFF	19.8
0.483000	37.94	---	56.29	18.35	L1	OFF	19.8
0.537000	---	29.94	46.00	16.06	L1	OFF	19.9
0.537000	37.59	---	56.00	18.41	L1	OFF	19.9
0.588750	---	29.94	46.00	16.06	L1	OFF	19.9
0.588750	38.57	---	56.00	17.43	L1	OFF	19.9
0.640500	---	29.83	46.00	16.17	L1	OFF	19.9
0.640500	37.84	---	56.00	18.16	L1	OFF	19.9
0.696750	---	30.43	46.00	15.57	L1	OFF	20.0
0.696750	38.65	---	56.00	17.35	L1	OFF	20.0
0.750750	---	31.05	46.00	14.95	L1	OFF	20.0
0.750750	39.40	---	56.00	16.60	L1	OFF	20.0
0.804750	---	31.79	46.00	14.21	L1	OFF	20.1
0.804750	40.00	---	56.00	16.00	L1	OFF	20.1
0.856500	---	31.81	46.00	14.19	L1	OFF	20.1
0.856500	40.04	---	56.00	15.96	L1	OFF	20.1
0.908250	---	32.55	46.00	13.45	L1	OFF	20.1
0.908250	41.11	---	56.00	14.89	L1	OFF	20.1
0.962250	---	32.41	46.00	13.59	L1	OFF	20.2

0.962250	40.86	---	56.00	15.14	L1	OFF	20.2
1.014000	---	31.64	46.00	14.36	L1	OFF	20.2
1.014000	39.82	---	56.00	16.18	L1	OFF	20.2
1.065750	---	32.29	46.00	13.71	L1	OFF	20.2
1.065750	40.36	---	56.00	15.64	L1	OFF	20.2
1.115250	---	29.46	46.00	16.54	L1	OFF	20.2
1.115250	36.99	---	56.00	19.01	L1	OFF	20.2
1.180500	---	29.06	46.00	16.94	L1	OFF	20.2
1.180500	36.36	---	56.00	19.64	L1	OFF	20.2
1.596750	---	26.24	46.00	19.76	L1	OFF	20.2
1.596750	31.10	---	56.00	24.90	L1	OFF	20.2
6.006750	---	27.32	50.00	22.68	L1	OFF	20.0
6.006750	30.46	---	60.00	29.54	L1	OFF	20.0

EUT Information

Report NO : 193007
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.17	55.88	26.71	N	OFF	19.7
0.152250	44.33	---	65.88	21.55	N	OFF	19.7
0.429000	---	28.51	47.27	18.76	N	OFF	19.7
0.429000	36.47	---	57.27	20.80	N	OFF	19.7
0.539250	---	25.41	46.00	20.59	N	OFF	19.9
0.539250	32.32	---	56.00	23.68	N	OFF	19.9
0.919500	---	26.41	46.00	19.59	N	OFF	20.2
0.919500	32.07	---	56.00	23.93	N	OFF	20.2
1.027500	---	25.41	46.00	20.59	N	OFF	20.2
1.027500	30.18	---	56.00	25.82	N	OFF	20.2
6.504000	---	25.97	50.00	24.03	N	OFF	20.1
6.504000	27.51	---	60.00	32.49	N	OFF	20.1



Appendix C. Radiated Spurious Emission

Test Engineer :	Harvey Guo and Fu Chen	Temperature :	23.1 ~ 24.6°C
		Relative Humidity :	64.3 ~ 68.5%

<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 00 2402MHz		2325.33	52.62	-21.38	74	41.96	27.15	17	33.49	100	321	P	H
		2388.12	43.62	-10.38	54	32.67	27.35	17.06	33.46	100	321	A	H
	*	2402	101.84	-	-	90.81	27.41	17.07	33.45	100	321	P	H
	*	2402	101.28	-	-	90.25	27.41	17.07	33.45	100	321	A	H
													H
													H
		2384.34	52.99	-21.01	74	42.05	27.34	17.06	33.46	337	10	P	V
		2371.425	43.3	-10.7	54	32.43	27.29	17.04	33.46	337	10	A	V
	*	2402	104.02	-	-	92.99	27.41	17.07	33.45	337	10	P	V
	*	2402	103.37	-	-	92.34	27.41	17.07	33.45	337	10	A	V
													V
													V
BLE CH 19 2440MHz		2387.44	53	-21	74	42.05	27.35	17.06	33.46	100	325	P	H
		2380.24	43.58	-10.42	54	32.67	27.32	17.05	33.46	100	325	A	H
	*	2440	100.25	-	-	88.99	27.56	17.13	33.43	100	325	P	H
	*	2440	99.74	-	-	88.48	27.56	17.13	33.43	100	325	A	H
		2489.68	53.52	-20.48	74	41.88	27.84	17.21	33.41	100	325	P	H
		2495.44	44.44	-9.56	54	32.75	27.87	17.22	33.4	100	325	A	H
		2373.68	53.27	-20.73	74	42.39	27.29	17.05	33.46	327	13	P	V
		2370.96	43.52	-10.48	54	32.66	27.28	17.04	33.46	327	13	A	V
	*	2440	103.3	-	-	92.04	27.56	17.13	33.43	327	13	P	V
	*	2440	102.82	-	-	91.56	27.56	17.13	33.43	327	13	A	V
		2493.44	53.63	-20.37	74	41.96	27.86	17.21	33.4	327	13	P	V
		2495.92	44.31	-9.69	54	32.61	27.88	17.22	33.4	327	13	A	V



BLE CH 39 2480MHz	*	2480	102.85	-	-	91.29	27.78	17.19	33.41	100	306	P	H
	*	2480	102.26	-	-	90.7	27.78	17.19	33.41	100	306	A	H
		2483.92	54.38	-19.62	74	42.79	27.8	17.2	33.41	100	306	P	H
		2483.76	44.18	-9.82	54	32.59	27.8	17.2	33.41	100	306	A	H
													H
													H
	*	2480	105.35	-	-	93.79	27.78	17.19	33.41	320	357	P	V
	*	2480	104.76	-	-	93.2	27.78	17.19	33.41	320	357	A	V
		2483.56	55.54	-18.46	74	43.95	27.8	17.2	33.41	320	357	P	V
		2484	44.64	-9.36	54	33.05	27.8	17.2	33.41	320	357	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	38.89	-35.11	74	53.87	32.41	11.07	58.46	-	-	P	H
		11205	47.3	-26.7	74	52.44	39.01	17.6	61.75	-	-	P	H
		14580	48.98	-25.02	74	50.32	40.24	21.47	63.05	-	-	P	H
		14580	42.23	-11.77	54	43.57	40.24	21.47	63.05	-	-	A	H
		17970	51.76	-22.24	74	41.69	42.76	23.98	56.67	-	-	P	H
		17970	45.69	-8.31	54	35.62	42.76	23.98	56.67	-	-	A	H
													H
													H
													H
													H
													H
													H
		4804	37.89	-36.11	74	52.87	32.41	11.07	58.46	-	-	P	V
		11295	46.73	-27.27	74	51.71	39.19	17.68	61.85	-	-	P	V
		14580	48.61	-25.39	74	49.95	40.24	21.47	63.05	-	-	P	V
		14580	41.04	-12.96	54	42.38	40.24	21.47	63.05	-	-	A	V
		18000	51.12	-22.88	74	40.71	43	24.01	56.6	-	-	P	V
		18000	45.9	-8.1	54	35.49	43	24.01	56.6	-	-	A	V
													V
													V
													V
													V
													V
													V



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 19 2440MHz		4880	39.66	-34.34	74	54.28	32.62	11.24	58.48	-	-	P	H
		7320	42.01	-31.99	74	50.88	36.76	13.54	59.17	-	-	P	H
		11565	47.78	-26.22	74	53.26	38.8	17.94	62.22	-	-	P	H
		14445	48.78	-25.22	74	50.26	40.4	21.2	63.08	-	-	P	H
		14445	38.86	-15.14	54	40.34	40.4	21.2	63.08	-	-	A	H
		17985	50.57	-23.43	74	40.33	42.88	24	56.64	-	-	P	H
		17985	46.1	-7.9	54	35.86	42.88	24	56.64	-	-	A	H
													H
													H
													H
													H
													H
		4880	38.96	-35.04	74	53.58	32.62	11.24	58.48	-	-	P	V
		7320	41.18	-32.82	74	50.05	36.76	13.54	59.17	-	-	P	V
		12180	47.49	-26.51	74	53.31	38.92	18.51	63.25	-	-	P	V
		14475	48.39	-25.61	74	49.76	40.4	21.26	63.03	-	-	P	V
		14475	39.84	-14.16	54	41.21	40.4	21.26	63.03	-	-	A	V
		17880	50.89	-23.11	74	41.92	41.96	23.9	56.89	-	-	P	V
		17880	45.51	-8.49	54	36.54	41.96	23.9	56.89	-	-	A	V
													V
													V
													V
													V
													V

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	39.41	-34.59	74	53.47	33.02	11.41	58.49	-	-	P	H
		7440	41.46	-32.54	74	50.55	36.22	13.81	59.12	-	-	P	H
		11370	47.25	-26.75	74	52.23	39.2	17.76	61.94	-	-	P	H
		14470	48.03	-25.97	74	49.42	40.4	21.25	63.04	-	-	P	H
		14470	40.62	-13.38	54	42.01	40.4	21.25	63.04	-	-	A	H
		18000	50.86	-23.14	74	40.45	43	24.01	56.6	-	-	P	H
		18000	44.65	-9.35	54	34.24	43	24.01	56.6	-	-	A	H
													H
													H
													H
													H
													H
		4960	40.33	-33.67	74	54.39	33.02	11.41	58.49	-	-	P	V
		7440	41.46	-32.54	74	50.55	36.22	13.81	59.12	-	-	P	V
		11310	47.31	-26.69	74	52.28	39.2	17.7	61.87	-	-	P	V
		14470	48.59	-25.41	74	49.98	40.4	21.25	63.04	-	-	P	V
		14470	41.13	-12.87	54	42.52	40.4	21.25	63.04	-	-	A	V
		17985	50.77	-23.23	74	40.53	42.88	24	56.64	-	-	P	V
		17985	44.8	-9.2	54	34.56	42.88	24	56.64	-	-	A	V
													V
													V
													V
													V
													V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												
	3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												
	4. The emission level close to 18GHz is checked that the average emission level is noise floor only.												



Emission above 18GHz

2.4GHz BLE (SHF)

BLE	Note	Frequency	Level	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		24881	38.39	-29.81	68.2	94.37	0	-2.81	53.17	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		22781	38.92	-35.08	74	96.56	0	-3.21	54.43	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
	Remark	1. No other spurious found.											
2. All results are PASS against limit line.													
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.													

Emission below 1GHz

2.4GHz BLE (LF)

[illegible]



<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl 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 00 2402MHz		2378.775	52.55	-21.45	74	41.64	27.32	17.05	33.46	100	341	P	H
		2374.995	44.87	-9.13	54	33.98	27.3	17.05	33.46	100	341	A	H
	*	2402	101.91	-	-	90.88	27.41	17.07	33.45	100	341	P	H
	*	2402	100.51	-	-	89.48	27.41	17.07	33.45	100	341	A	H
													H
													H
		2384.97	53.08	-20.92	74	42.14	27.34	17.06	33.46	301	360	P	V
		2388.54	44.99	-9.01	54	34.04	27.35	17.06	33.46	301	360	A	V
	*	2402	103.6	-	-	92.57	27.41	17.07	33.45	301	360	P	V
	*	2402	102.01	-	-	90.98	27.41	17.07	33.45	301	360	A	V
													V
													V
BLE CH 19 2440MHz		2384.34	52.91	-21.09	74	41.97	27.34	17.06	33.46	104	15	P	H
		2379.72	45.39	-8.61	54	34.48	27.32	17.05	33.46	104	15	A	H
	*	2440	101.34	-	-	90.08	27.56	17.13	33.43	104	15	P	H
	*	2440	100.04	-	-	88.78	27.56	17.13	33.43	104	15	A	H
		2491.95	53.71	-20.29	74	42.05	27.85	17.21	33.4	104	15	P	H
		2483.9	45.54	-8.46	54	33.95	27.8	17.2	33.41	104	15	A	H
		2336.74	53.06	-20.94	74	42.36	27.17	17.01	33.48	293	3	P	V
		2375.24	45.21	-8.79	54	34.32	27.3	17.05	33.46	293	3	A	V
	*	2440	102.91	-	-	91.65	27.56	17.13	33.43	293	3	P	V
	*	2440	101.66	-	-	90.4	27.56	17.13	33.43	293	3	A	V
		2490.41	53.34	-20.66	74	41.69	27.84	17.21	33.4	293	3	P	V
		2492.02	45.39	-8.61	54	33.73	27.85	17.21	33.4	293	3	A	V



BLE CH 39 2480MHz	*	2480	103.73	-	-	92.17	27.78	17.19	33.41	312	100	P	H
	*	2480	102.51	-	-	90.95	27.78	17.19	33.41	312	100	A	H
		2483.56	56.31	-17.69	74	44.72	27.8	17.2	33.41	312	100	P	H
		2483.52	46.24	-7.76	54	34.65	27.8	17.2	33.41	312	100	A	H
													H
													H
	*	2480	104.57	-	-	93.01	27.78	17.19	33.41	400	11	P	V
	*	2480	103.15	-	-	91.59	27.78	17.19	33.41	400	11	A	V
		2483.68	57.37	-16.63	74	45.78	27.8	17.2	33.41	400	11	P	V
		2483.64	46.78	-7.22	54	35.19	27.8	17.2	33.41	400	11	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	39.49	-34.51	74	54.47	32.41	11.07	58.46	-	-	P	H
		10860	47.99	-26.01	74	53.08	38.96	17.28	61.33	-	-	P	H
		14470	47.51	-26.49	74	48.9	40.4	21.25	63.04	-	-	P	H
		17970	52.06	-21.94	74	41.99	42.76	23.98	56.67	-	-	P	H
		17970	44.59	-9.41	54	34.52	42.76	23.98	56.67	-	-	A	H
													H
													H
													H
													H
													H
													H
													H
		4804	37.88	-36.12	74	52.86	32.41	11.07	58.46	-	-	P	V
		11205	47.19	-26.81	74	52.33	39.01	17.6	61.75	-	-	P	V
		14470	48.44	-25.56	74	49.83	40.4	21.25	63.04	-	-	P	V
		14470	40.13	-13.87	54	41.52	40.4	21.25	63.04	-	-	A	V
		17985	51.05	-22.95	74	40.81	42.88	24	56.64	-	-	P	V
		17985	44.49	-9.51	54	34.25	42.88	24	56.64	-	-	A	V
													V
													V
													V
													V
													V
													V



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 19 2440MHz		4880	38.11	-35.89	74	52.73	32.62	11.24	58.48	-	-	P	H
		7320	41.3	-32.7	74	50.17	36.76	13.54	59.17	-	-	P	H
		12615	46.87	-27.13	74	52.67	38.84	18.9	63.54	-	-	P	H
		14470	48.09	-25.91	74	49.48	40.4	21.25	63.04	-	-	P	H
		14470	40.17	-13.83	54	41.56	40.4	21.25	63.04	-	-	A	H
		17985	51.09	-22.91	74	40.85	42.88	24	56.64	-	-	P	H
		17985	46.75	-7.25	54	36.51	42.88	24	56.64	-	-	A	H
													H
													H
													H
													H
													H
		4880	37.67	-36.33	74	52.29	32.62	11.24	58.48	-	-	P	V
		7320	40.94	-33.06	74	49.81	36.76	13.54	59.17	-	-	P	V
		11325	46.73	-27.27	74	51.71	39.2	17.71	61.89	-	-	P	V
		14470	47.95	-26.05	74	49.34	40.4	21.25	63.04	-	-	P	V
		17970	52.04	-21.96	74	41.97	42.76	23.98	56.67	-	-	P	V
		17970	45.31	-8.69	54	35.24	42.76	23.98	56.67	-	-	A	V
													V
													V
													V
													V
													V
													V

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	39.96	-34.04	74	54.02	33.02	11.41	58.49	-	-	P	H
		7440	40.66	-33.34	74	49.75	36.22	13.81	59.12	-	-	P	H
		11490	46.91	-27.09	74	52.29	38.84	17.87	62.09	-	-	P	H
		14470	48.46	-25.54	74	49.85	40.4	21.25	63.04	-	-	P	H
		14470	41.23	-12.77	54	42.62	40.4	21.25	63.04	-	-	A	H
		18000	50.85	-23.15	74	40.44	43	24.01	56.6	-	-	P	H
		18000	46.03	-7.97	54	35.62	43	24.01	56.6	-	-	A	H
													H
													H
													H
													H
													H
		4960	38.55	-35.45	74	52.61	33.02	11.41	58.49	-	-	P	V
		7440	41.51	-32.49	74	50.6	36.22	13.81	59.12	-	-	P	V
		12540	47.29	-26.71	74	53.36	38.74	18.83	63.64	-	-	P	V
		14470	47.96	-26.04	74	49.35	40.4	21.25	63.04	-	-	P	V
		17985	51.19	-22.81	74	40.95	42.88	24	56.64	-	-	P	V
		17985	45.86	-8.14	54	35.62	42.88	24	56.64	-	-	A	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												
	3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												
	4. The emission level close to 18GHz is checked that the average emission level is noise floor only.												

Emission above 18GHz

2.4GHz BLE (SHF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	Avg.	(H/V)
2.4GHz BLE SHF		23432	38.44	-29.76	68.2	95.5	0	-3.02	54.04	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		20450	38.38	-35.62	74	96.78	0	-3.5	54.9	-	-	P	V
													V
													V
													V
													V
													V
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Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		30	20.22	-19.78	40	27.3	24.57	0.79	32.44	-	-	P	H
		196.84	20.04	-23.46	43.5	35.52	14.93	2.13	32.54	-	-	P	H
		294.81	24.13	-21.87	46	34.46	19.23	2.59	32.15	-	-	P	H
		717.73	27.62	-18.38	46	29.51	26.34	4.02	32.25	-	-	P	H
		891.36	30.68	-15.32	46	28.71	28.68	4.52	31.23	-	-	P	H
		956.35	30.92	-15.08	46	26.44	30.62	4.69	30.83	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		42.61	27.45	-12.55	40	40.99	17.97	1	32.51	-	-	P	V
		130.88	20.73	-22.77	43.5	34	17.5	1.74	32.51	-	-	P	V
		259.89	18.61	-27.39	46	28.91	19.55	2.44	32.29	-	-	P	V
		685.72	26.72	-19.28	46	29.09	26.17	3.92	32.46	-	-	P	V
		850.62	30.05	-15.95	46	28.39	28.66	4.4	31.4	-	-	P	V
		954.41	32.38	-13.62	46	28.04	30.51	4.68	30.85	-	-	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.												



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 :	Harvey Guo and Fu Chen	Temperature :	23.1 ~ 24.6°C
		Relative Humidity :	64.3 ~ 68.5%

Note symbol

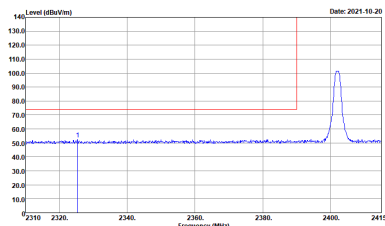
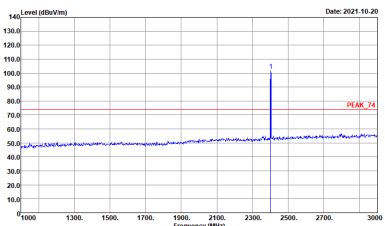
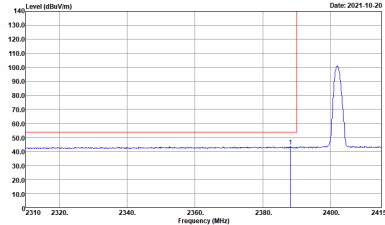
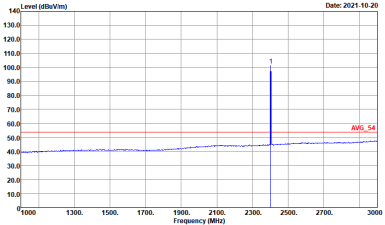
-L	Low channel location
-R	High channel location

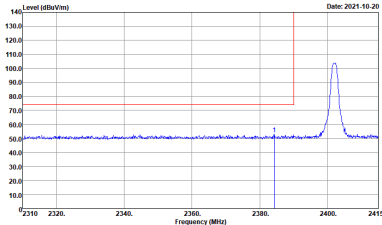
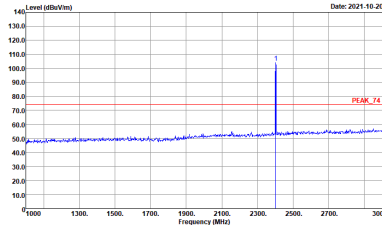
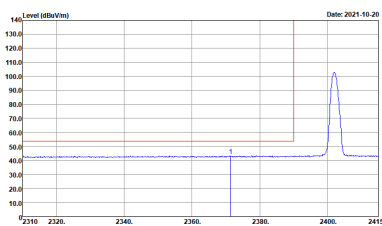
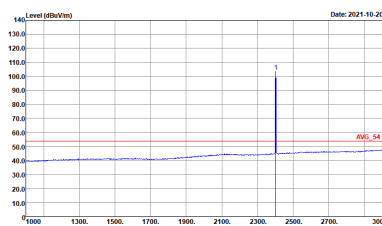


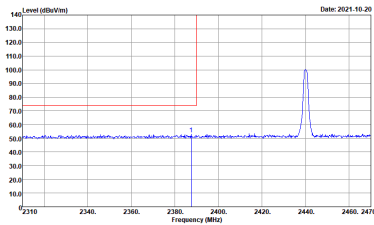
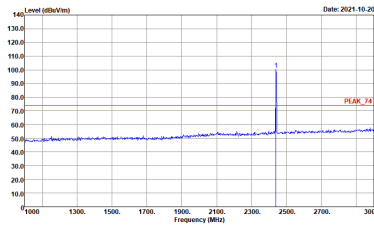
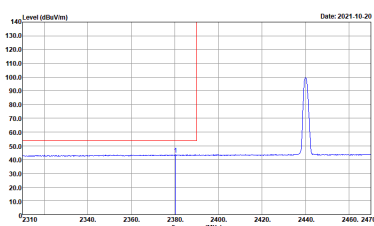
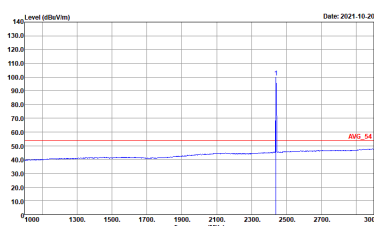
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2.4GHz 2400~2483.5MHz

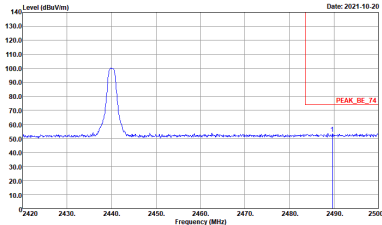
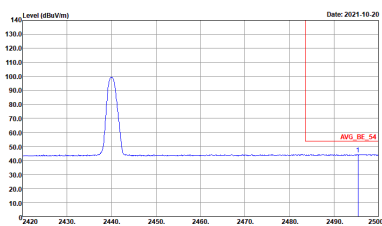
BLE (Band Edge @ 3m)

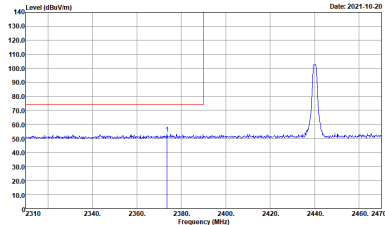
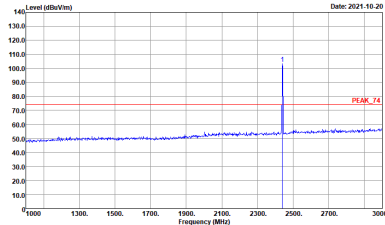
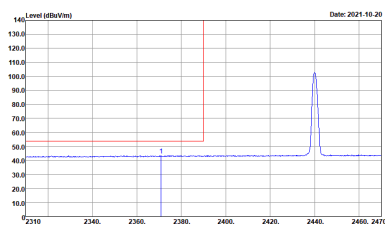
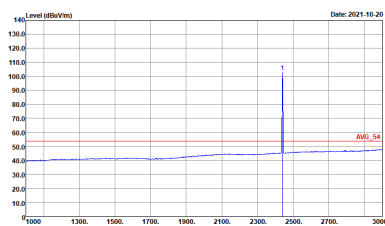
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

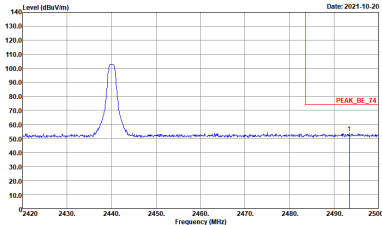
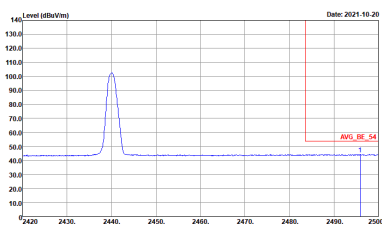
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto

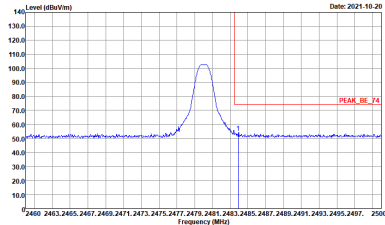
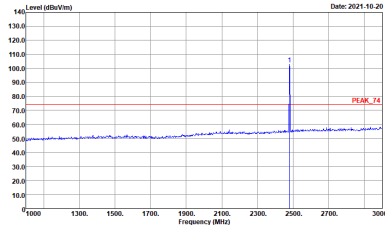
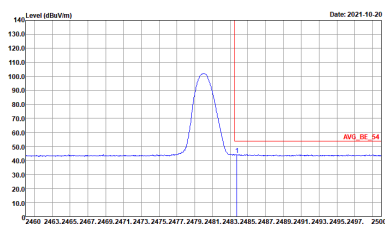
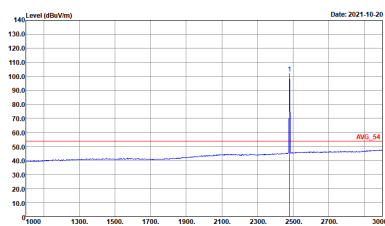


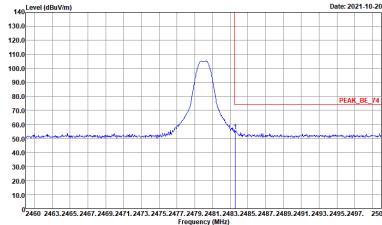
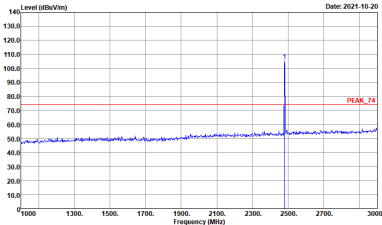
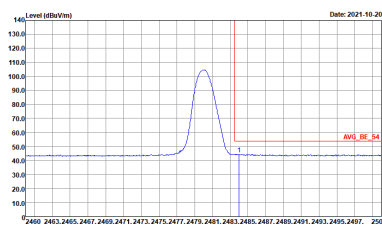
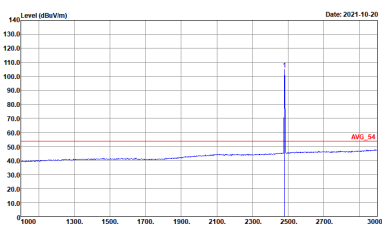
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto	Left blank
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

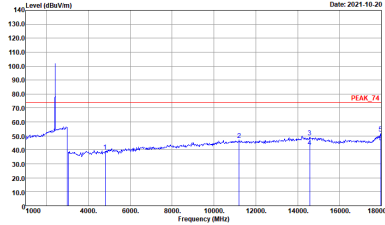
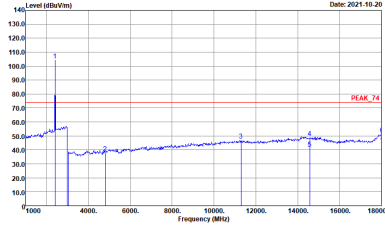


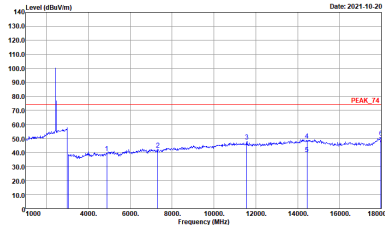
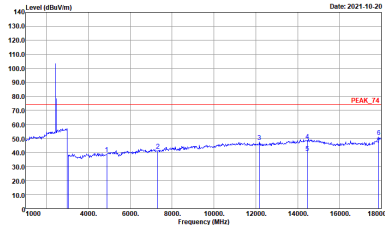
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto	Left blank
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 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 : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto

2.4GHz 2400~2483.5MHz
BLE (Harmonic @ 3m)

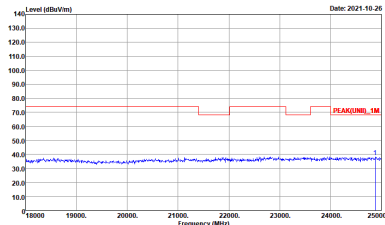
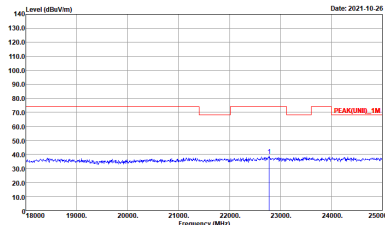
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-4Y Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL Detector : Peak	 Site : 03CH11-4Y Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL Detector : Peak

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-1Y Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL Detector : Peak	 Site : 03CH11-1Y Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL Detector : Peak

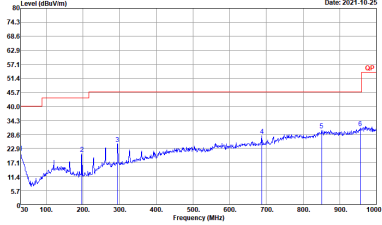
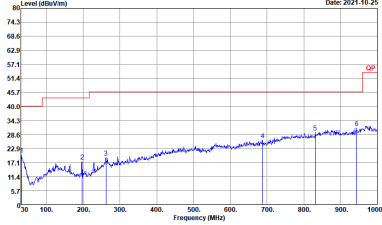


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 Level (dBm/Vm) Date: 2021-10-20 1000 4000 6000 8000 10000 12000 14000 16000 18000 Frequency (MHz) Site : 03CH11-1Y Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL Detector : Peak	140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 Level (dBm/Vm) Date: 2021-10-20 1000 4000 6000 8000 10000 12000 14000 16000 18000 Frequency (MHz) Site : 03CH11-1Y Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL Detector : Peak

Emission above 18GHz
2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UNIT)_1M 1m SHF_BBHA917000993 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UNIT)_1M 1m SHF_BBHA917000993 VERTICAL

Emission below 1GHz
2.4GHz BLE (LF)

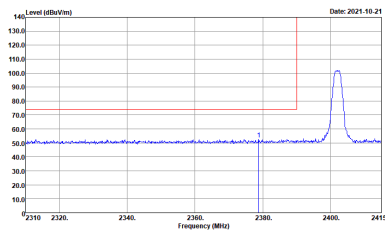
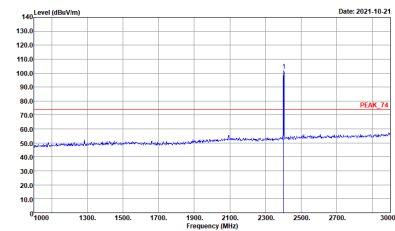
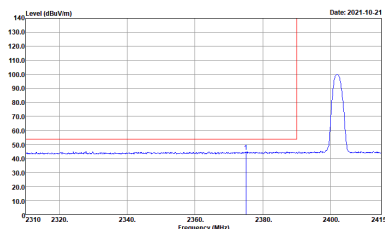
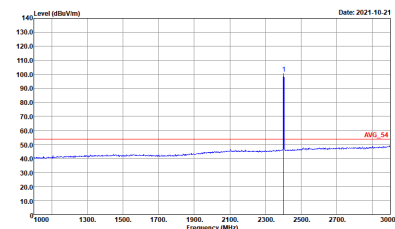
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 40103_210428 HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 40103_210428 VERTICAL

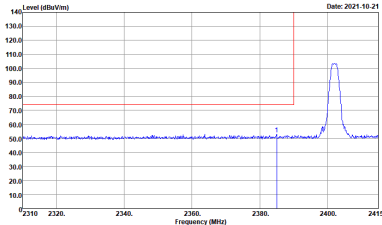
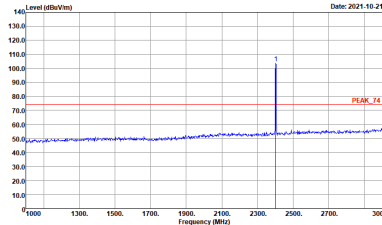
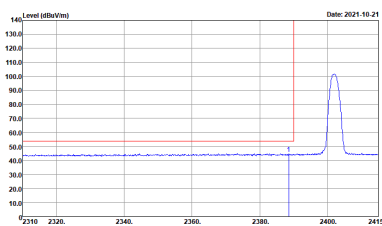
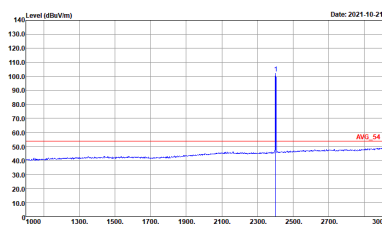


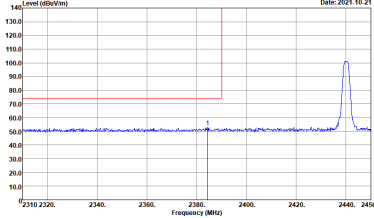
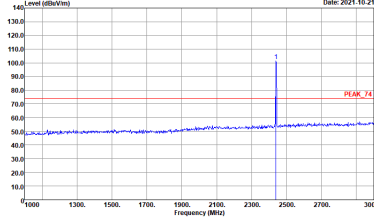
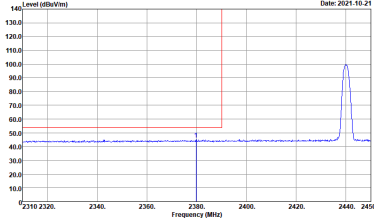
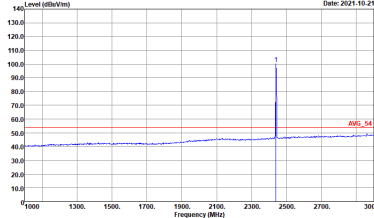
<2Mbps>

2.4GHz 2400~2483.5MHz

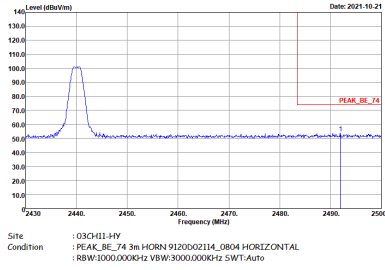
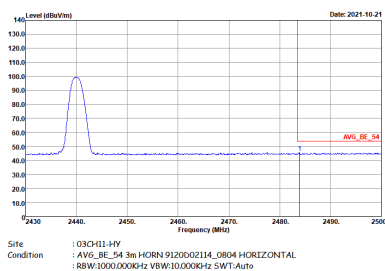
BLE (Band Edge @ 3m)

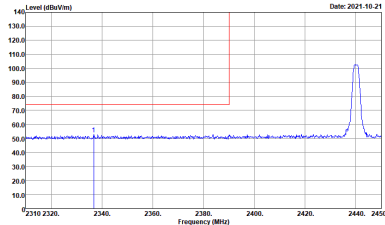
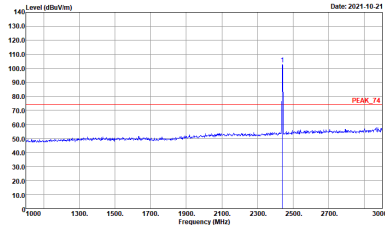
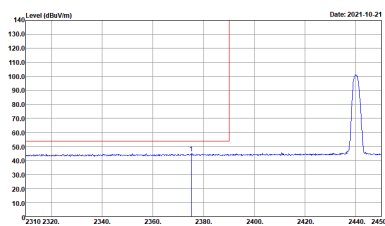
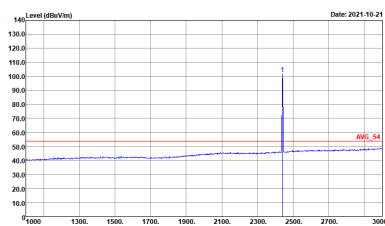
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D02114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto

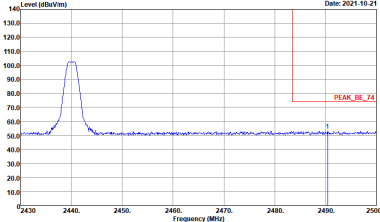
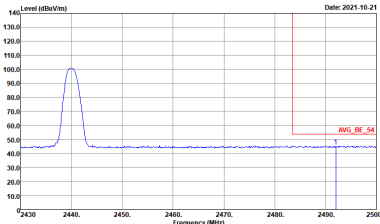
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D02114_0804 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz SWT:Auto

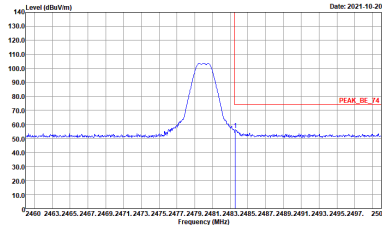
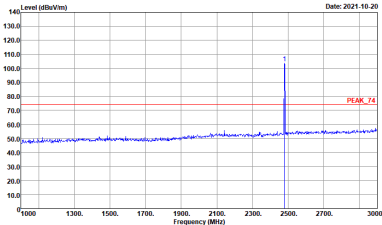
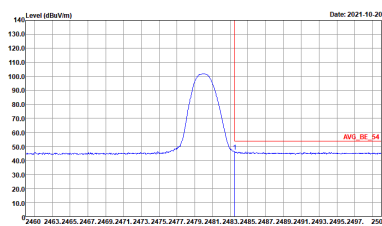
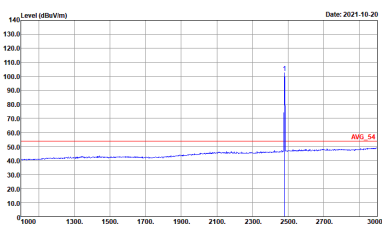


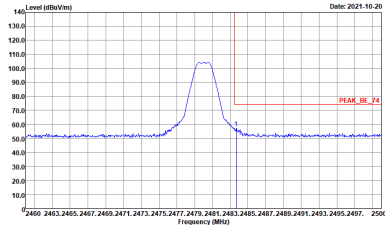
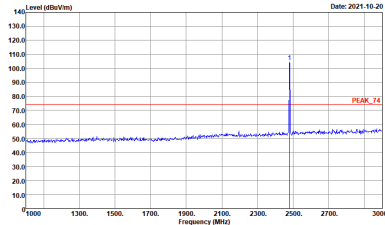
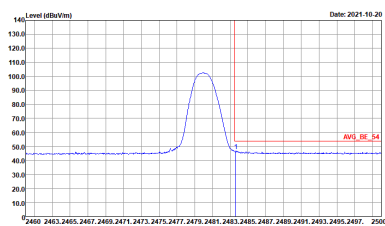
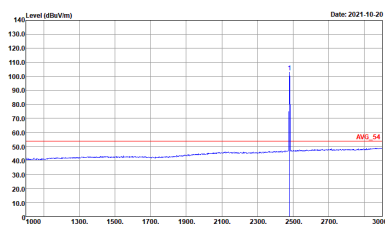
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	Left blank

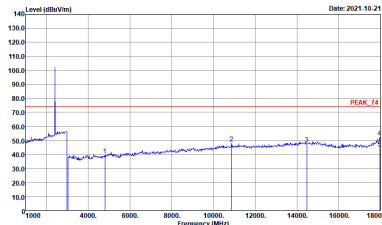
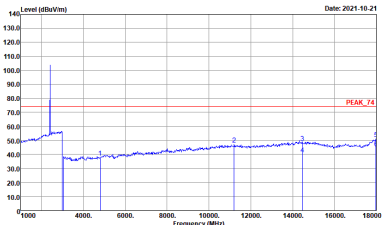
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz SWT:Auto

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120002114_0804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto

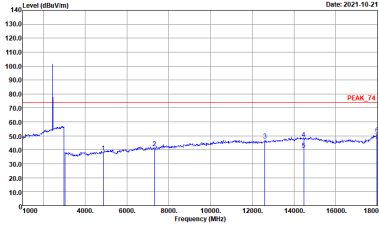
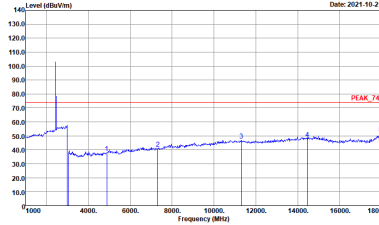


2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_T4 3m HORN 9120D02114_0804 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK_T4 3m HORN 9120D02114_0804 VERTICAL

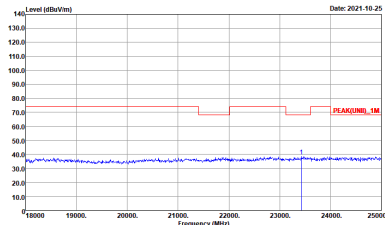
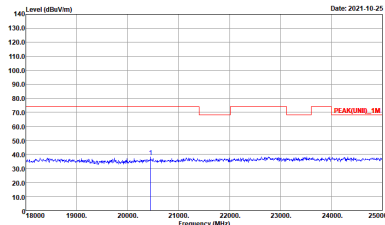


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	Level (dBm/100kHz) 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 1000 4000 6000 8000 10000 12000 14000 16000 18000 Frequency (MHz) Date: 2021-10-20 PEAK_74 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 HORIZONTAL	Level (dBm/100kHz) 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 1000 4000 6000 8000 10000 12000 14000 16000 18000 Frequency (MHz) Date: 2021-10-20 PEAK_74 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D02114_0804 VERTICAL

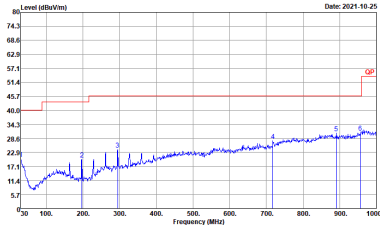
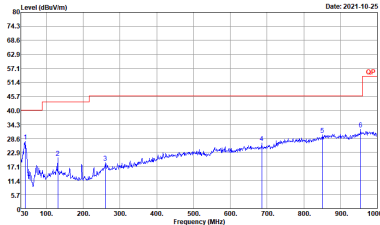
Emission above 18GHz
2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UNIT)_1M 1m SHF_BBHA917000993 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UNIT)_1M 1m SHF_BBHA917000993 VERTICAL



Emission below 1GHz

2.4GHz BLE (LF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 40103_210428 HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 40103_210428 VERTICAL



Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth – LE for 1Mbps	62.30	390	2.56	3kHz
Bluetooth – LE for 2Mbps	33.01	206	4.85	10kHz

