



FCC RADIO TEST REPORT

FCC ID : 2AFZZ116AG
Equipment : Mobile Phone
Brand Name : POCO
Model Name : 21091116AG
Applicant : Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle
Road, Haidian District, Beijing, China, 100085
Manufacturer : Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle
Road, Haidian District, Beijing, China, 100085
Standard : FCC Part 15 Subpart C §15.247

The product was received on Aug. 19, 2021 and testing was started from Aug. 23, 2021 and completed on Sep. 07, 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.

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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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 5.89 dB at 2484.360 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 21.21 dB at 0.152 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: Danny Lee

Report Producer: Cindy Liu



1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE/5G NR, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, FM Receiver, NFC, and GNSS.

Product Specification subjective to this standard	
Sample 1	6G+128GB with Battery 1
Sample 2	4G+64GB with Battery 2
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS / Glonass / BDS / Galileo: PIFA Antenna NFC: FPC Antenna FM: Using Earphone as Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	-2.6

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. 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, 03CH13-HY, CO07-HY

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

FCC designation No.: 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	-	-	



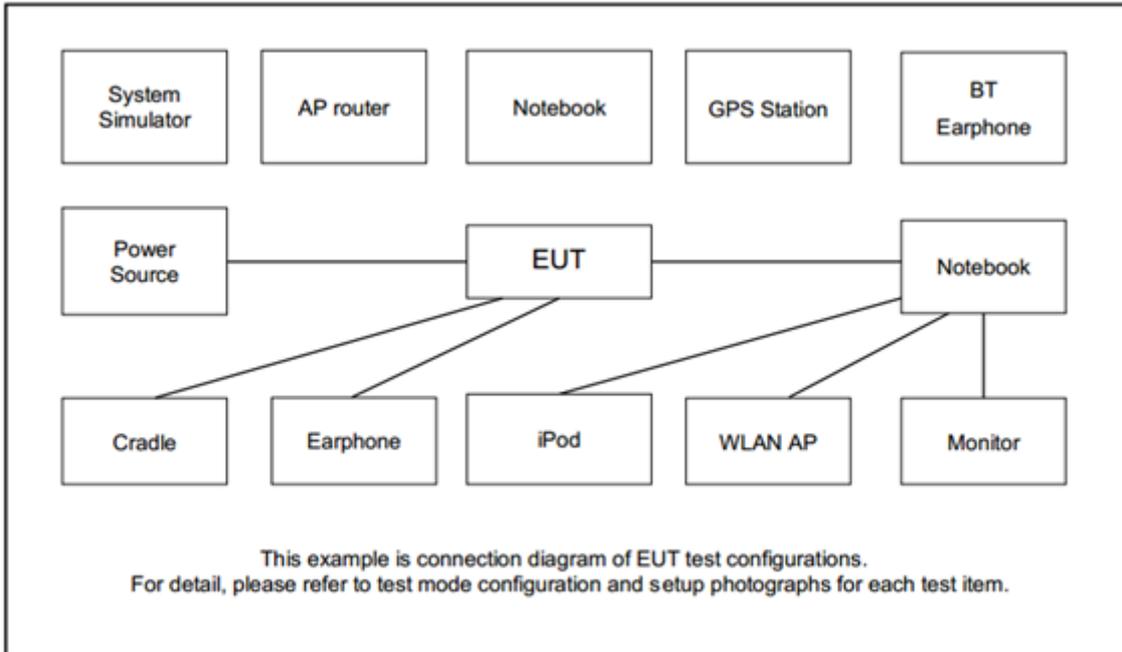
2.2 Test Mode

- 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 Z 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: GSM850 (Middle Channel) Idle + Bluetooth Link + WLAN (2.4GHz) Link + GNSS Rx + Earphone + USB Cable 1 (Data Link with Notebook) for Sample 1
Remark:	
1. For Radiated Test Cases, the tests were performed with USB Cable 2 and Sample 1.	
2. Data transfer with Notebook means data application transferred mode between EUT and Notebook.	

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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
4.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
5.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
6.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
8.	Earphone	MI	EM023	N/A	Unshielded, 1.0m	N/A



2.5 EUT Operation Test Setup

The RF test items, make the EUT (SW: MIUI 12.5 Global 0.0.0) 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.

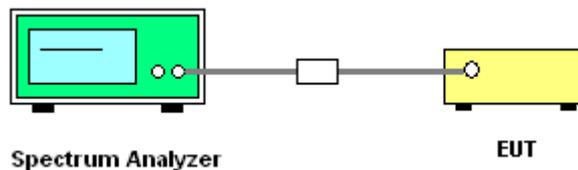
3.1.2 Measuring Instruments

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

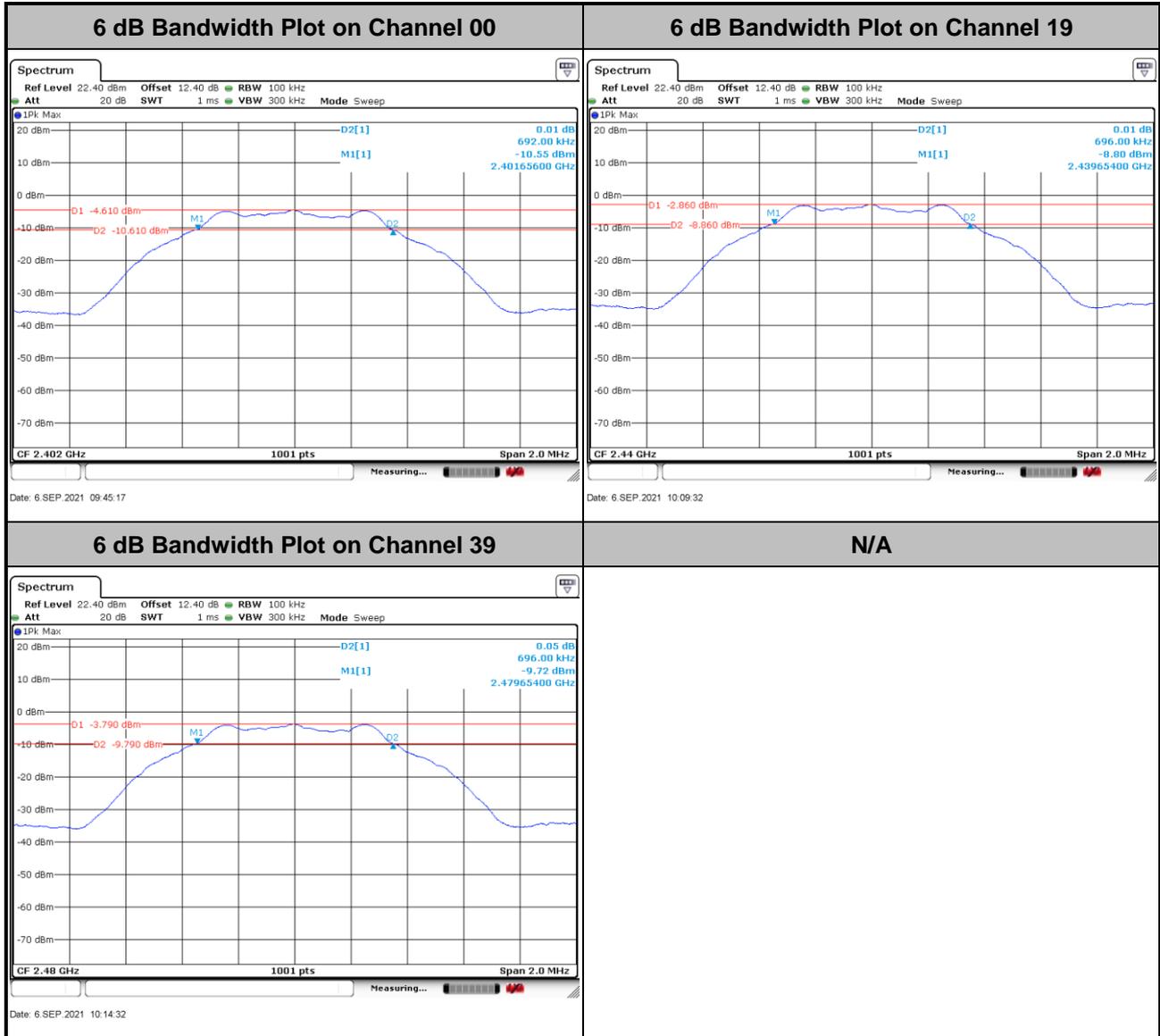




3.1.5 Test Result of 6dB Bandwidth

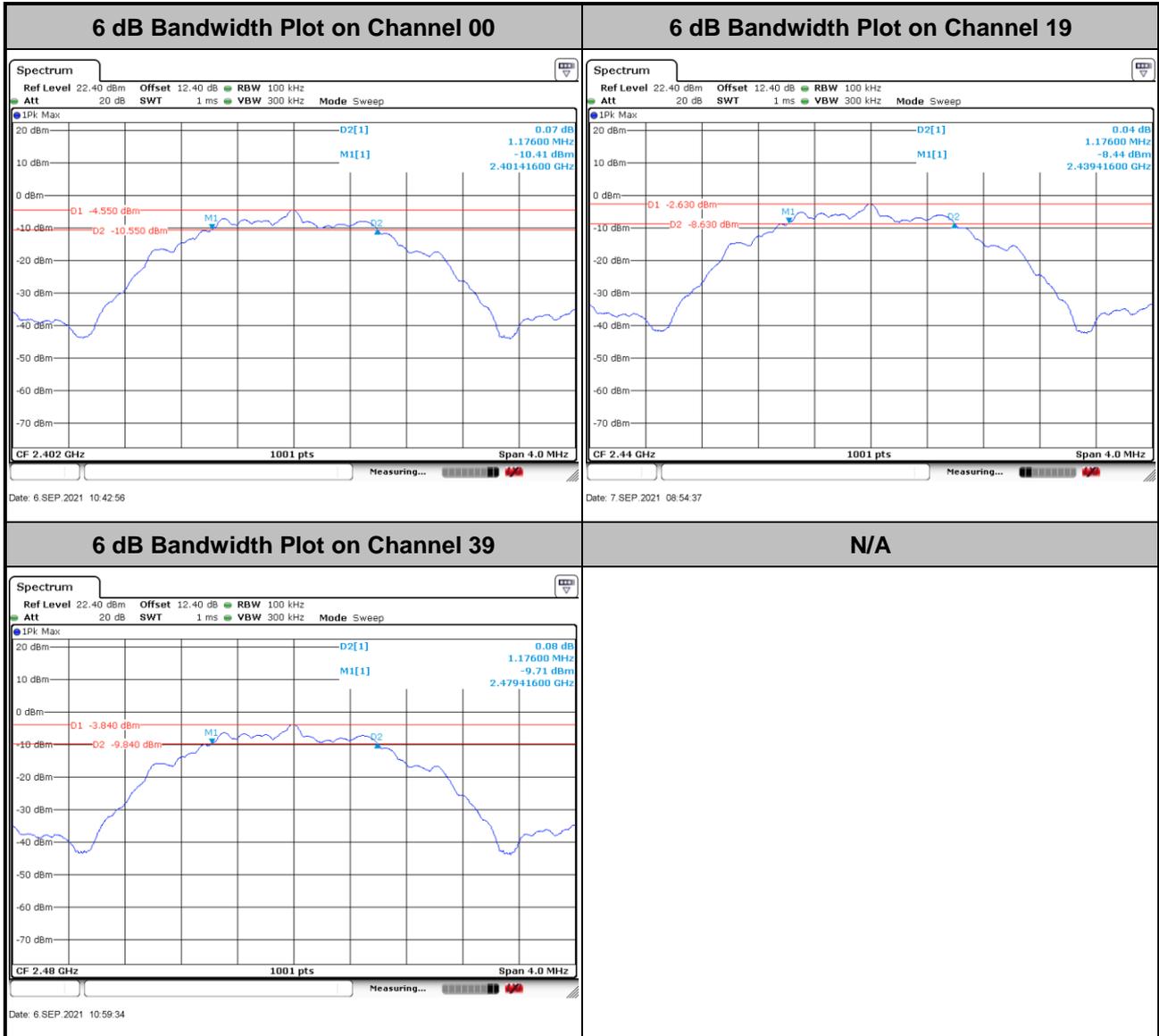
Please refer to Appendix A.

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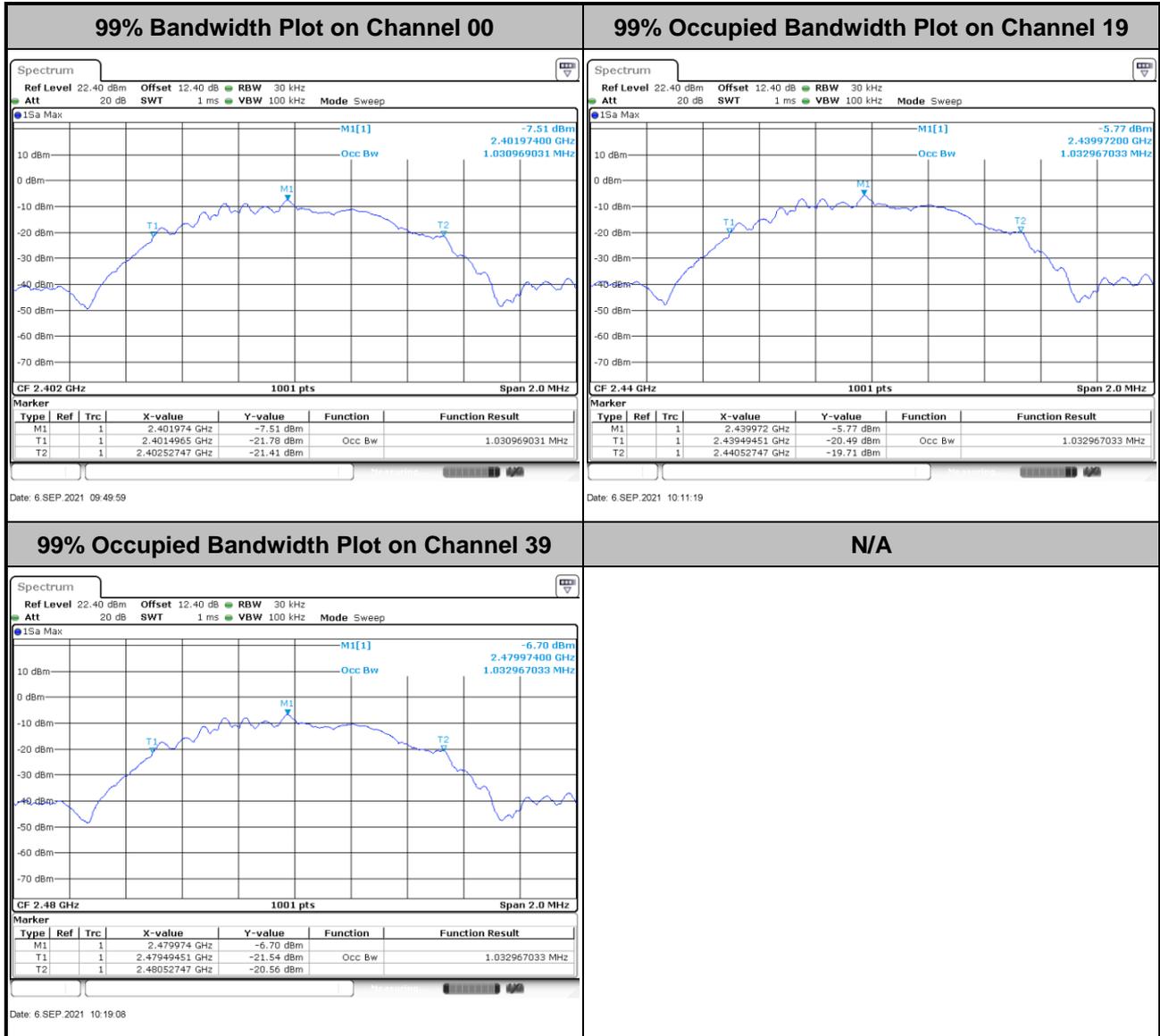




3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

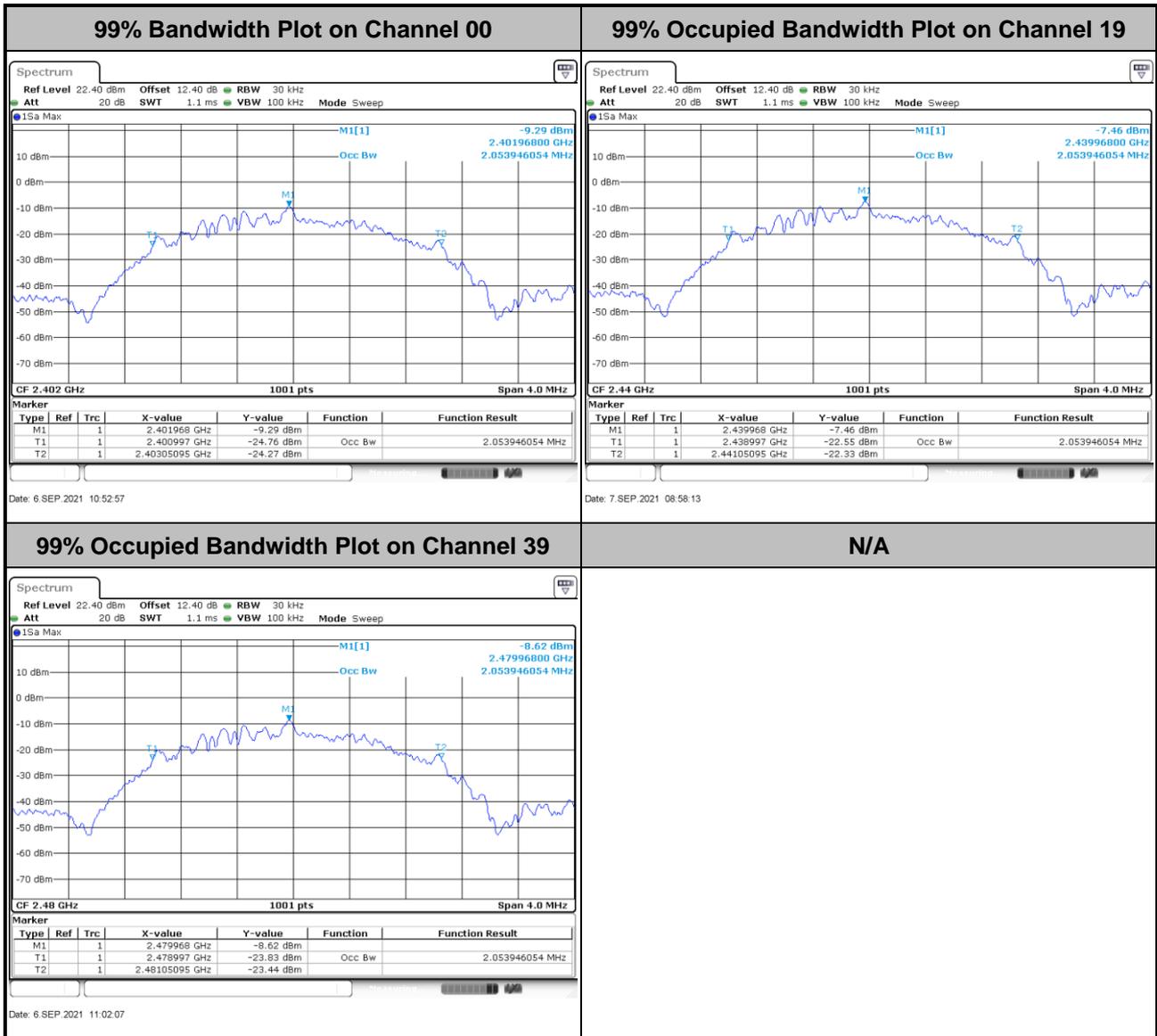
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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



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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.

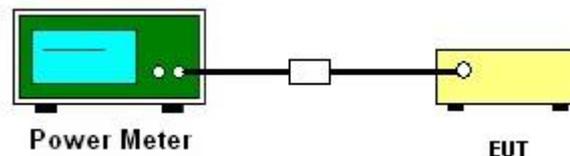
3.2.2 Measuring Instruments

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 AVGP-M-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.

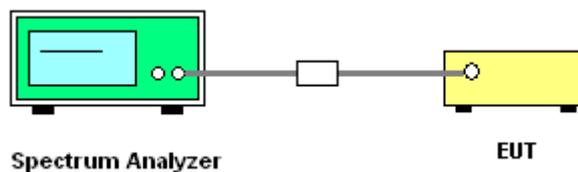
3.3.2 Measuring Instruments

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



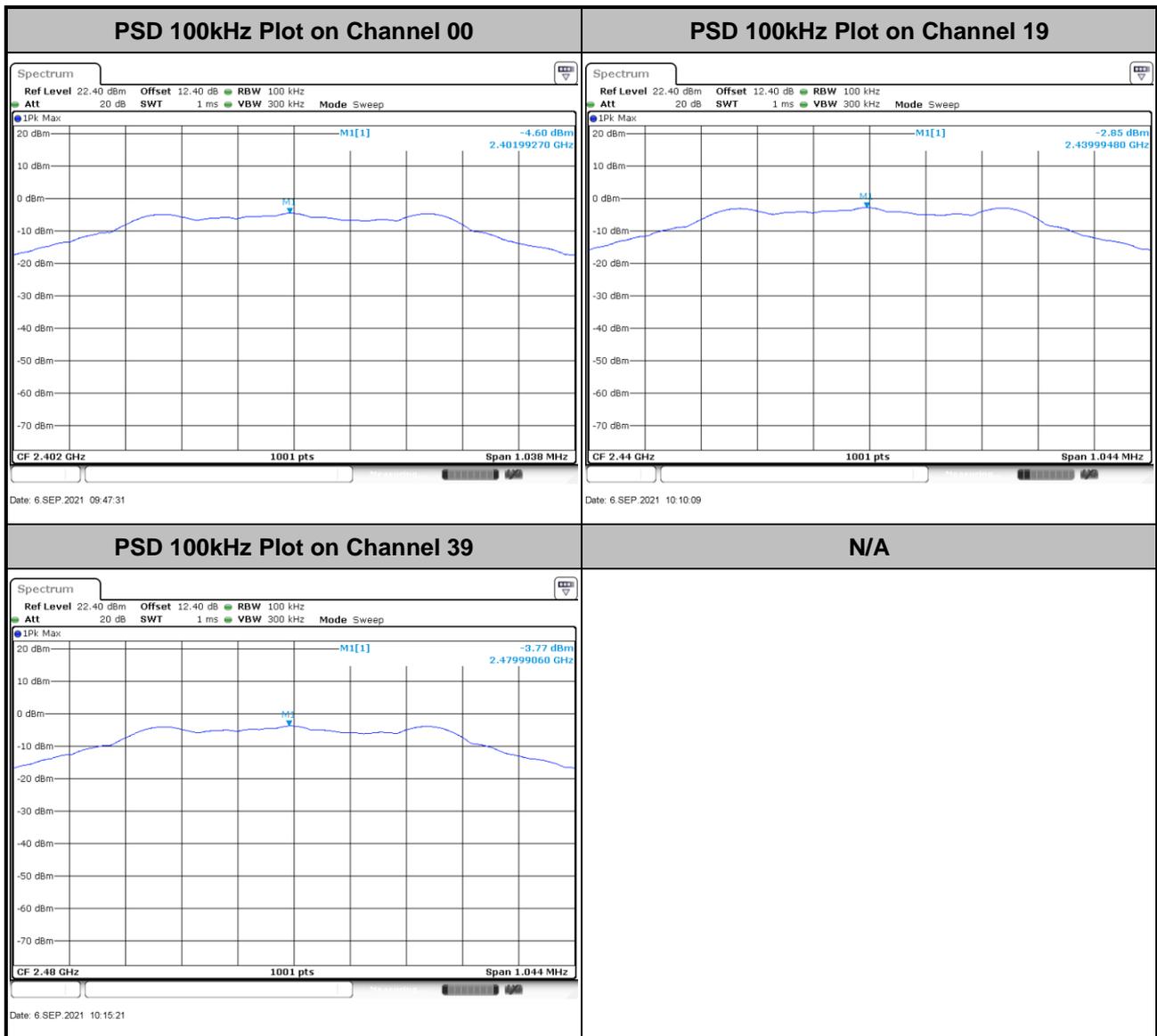
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



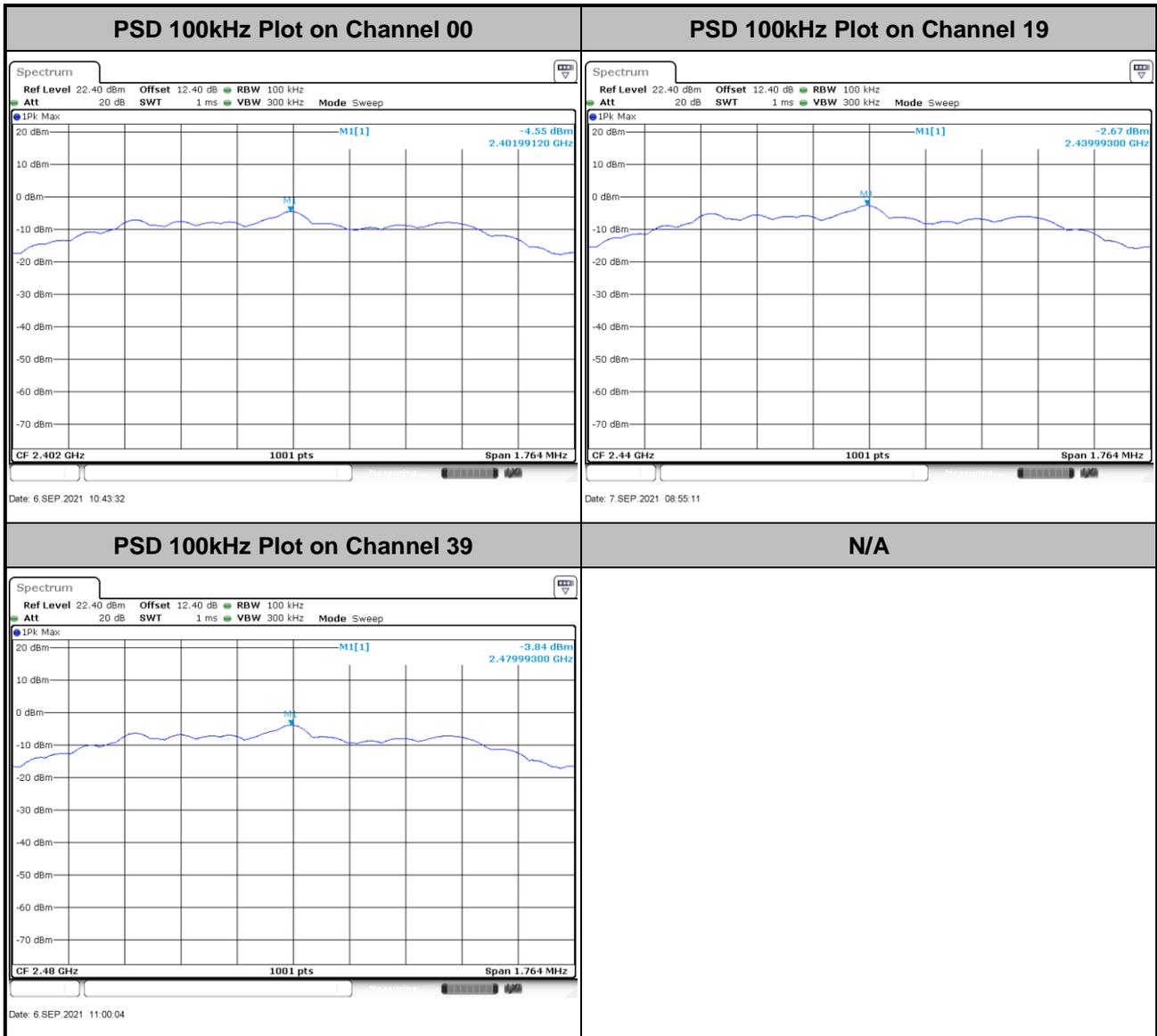
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

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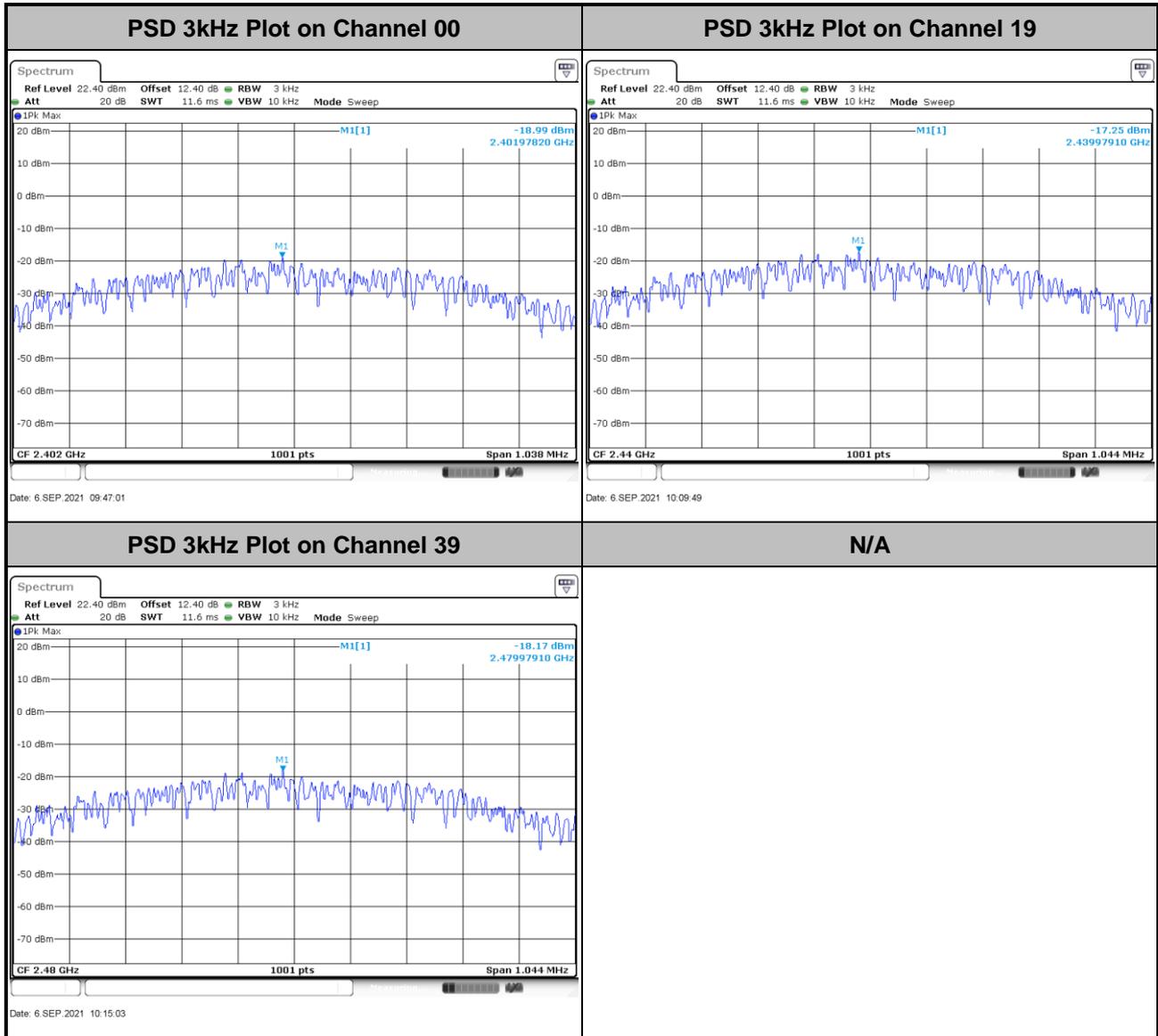
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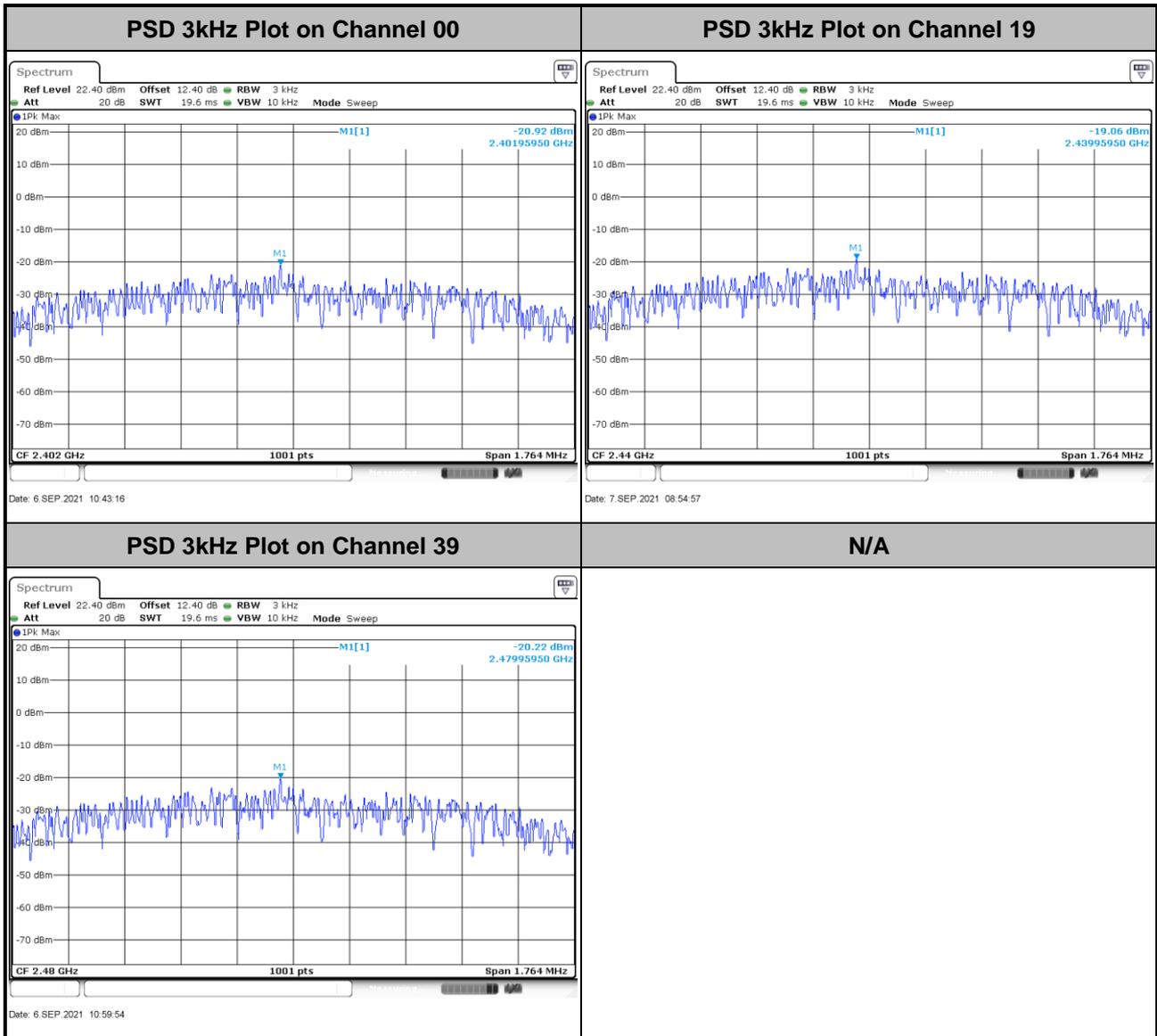
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

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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.

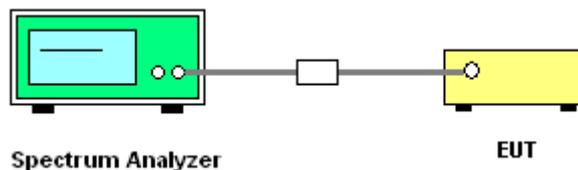
3.4.2 Measuring Instruments

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.

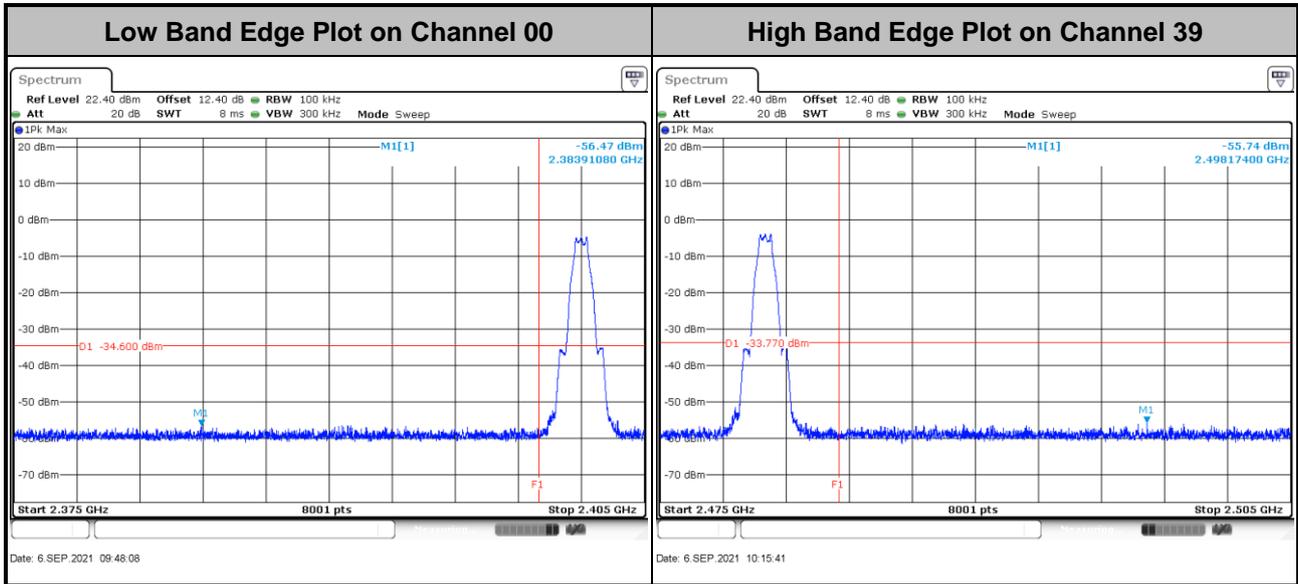
3.4.4 Test Setup



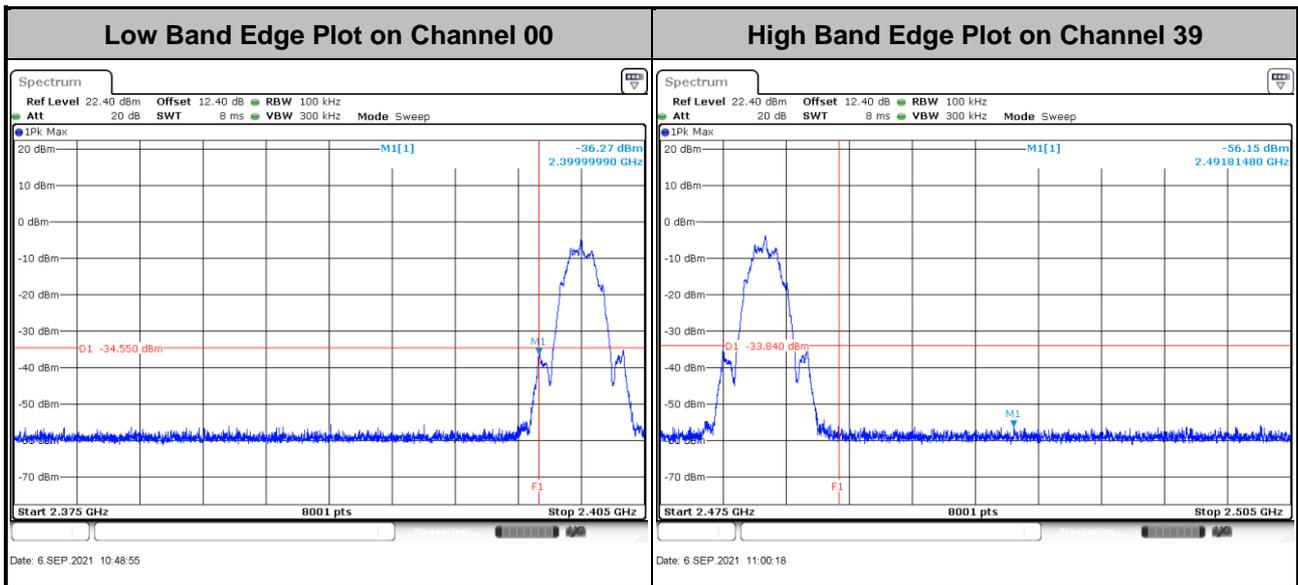


3.4.5 Test Result of Conducted Band Edges Plots

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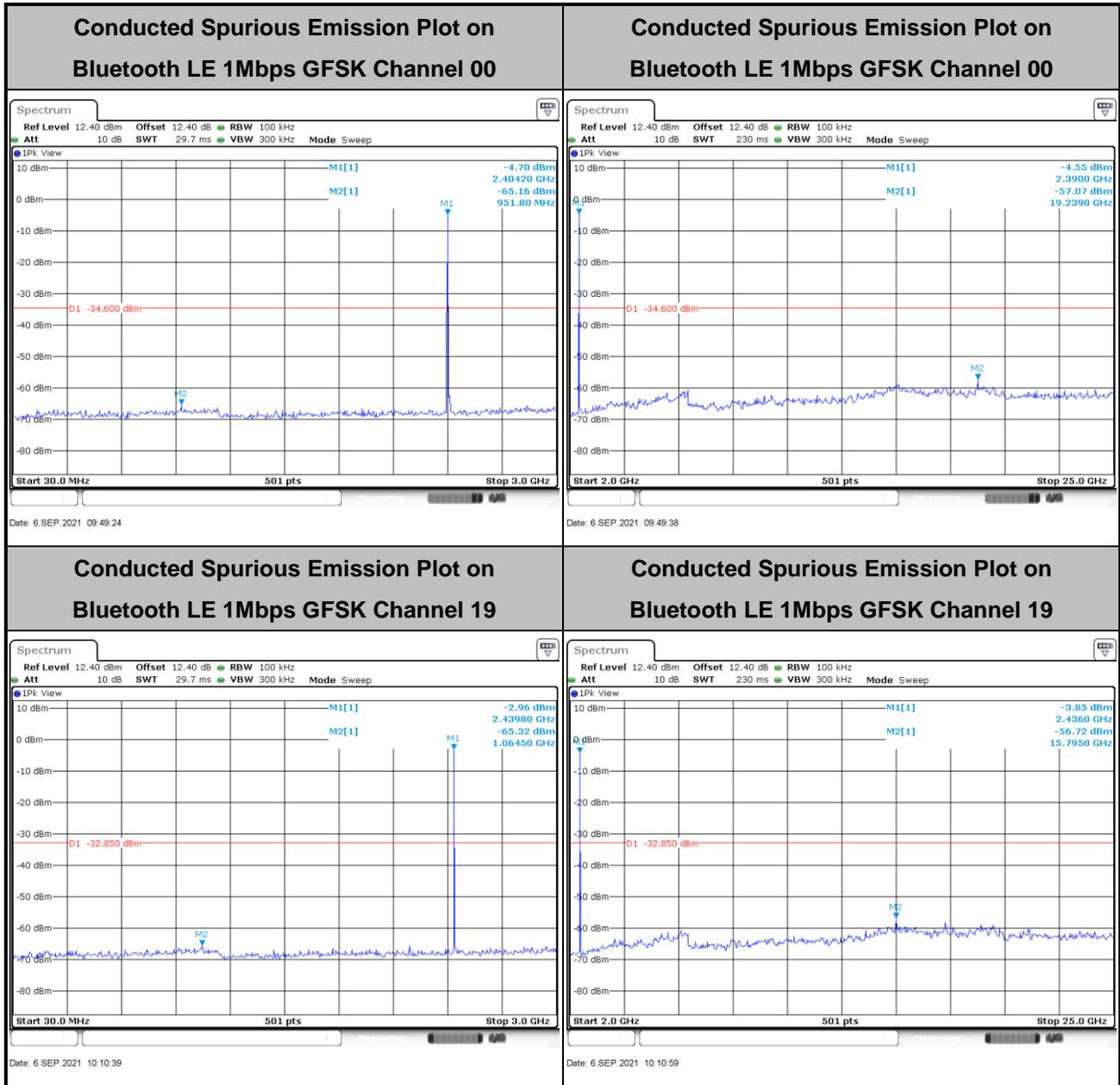
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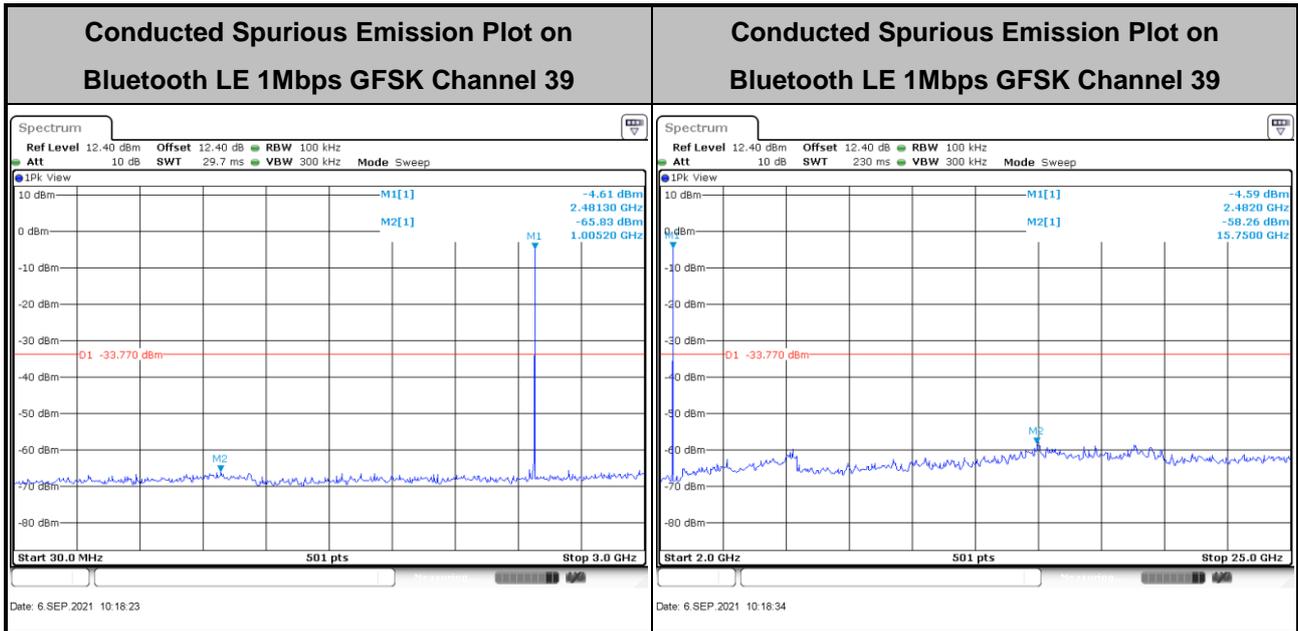




3.4.6 Test Result of Conducted Spurious Emission Plots

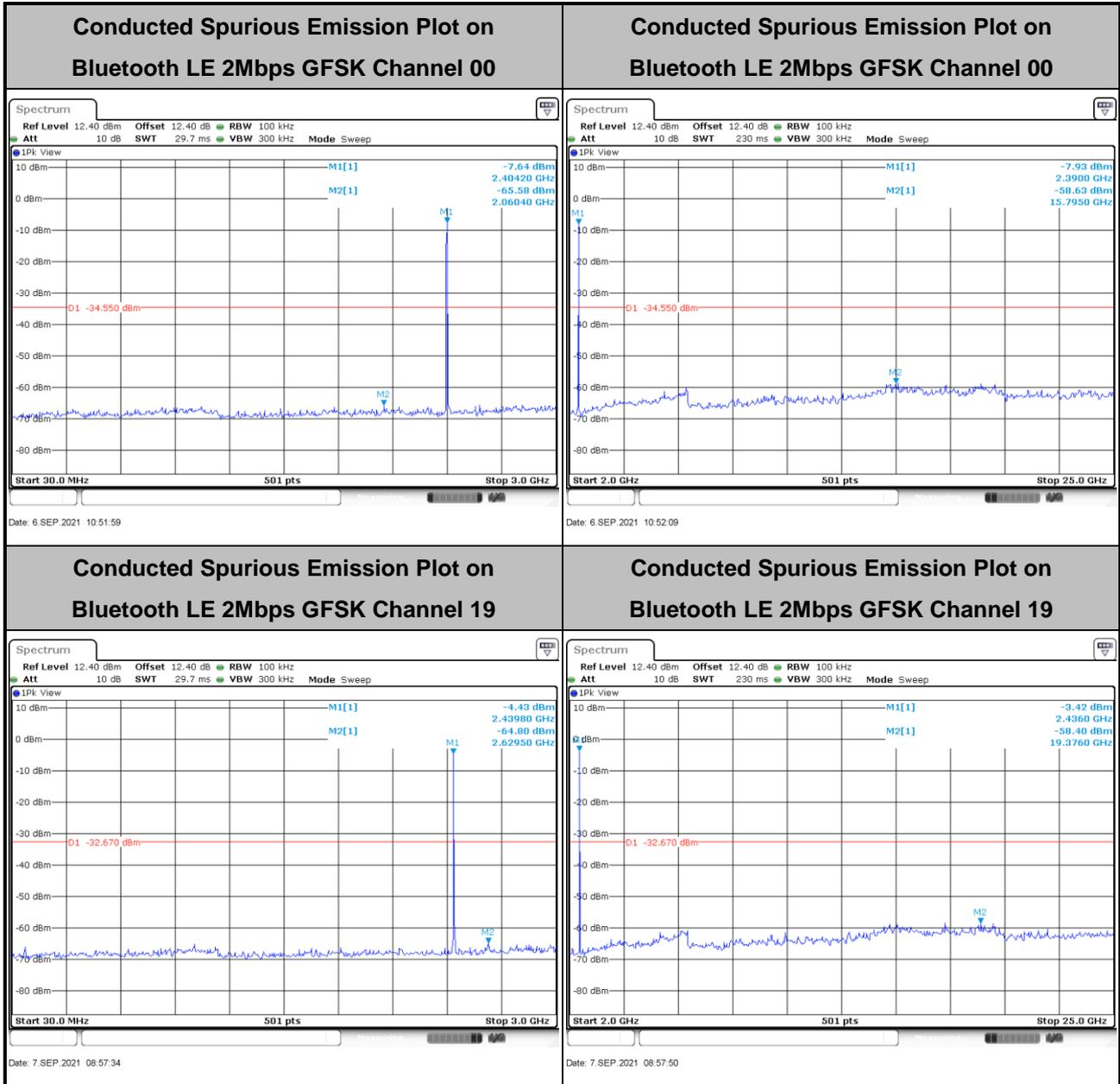
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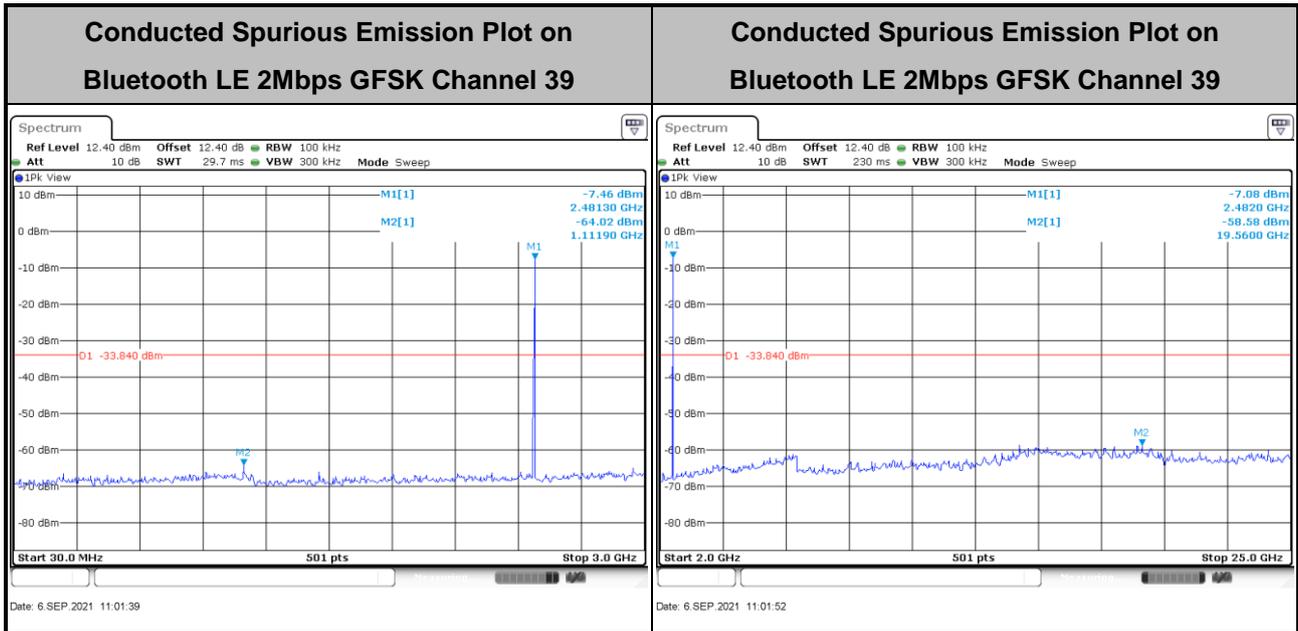






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3.5 Radiated Band Edges and Spurious Emission Measurement

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.

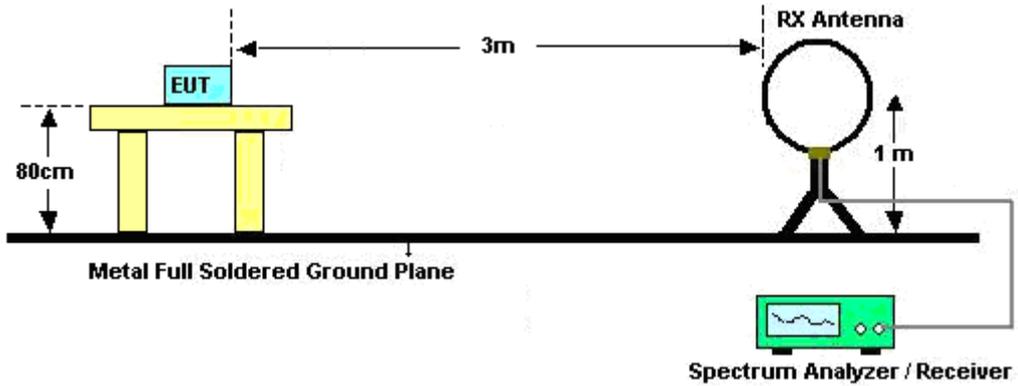


3.5.3 Test Procedures

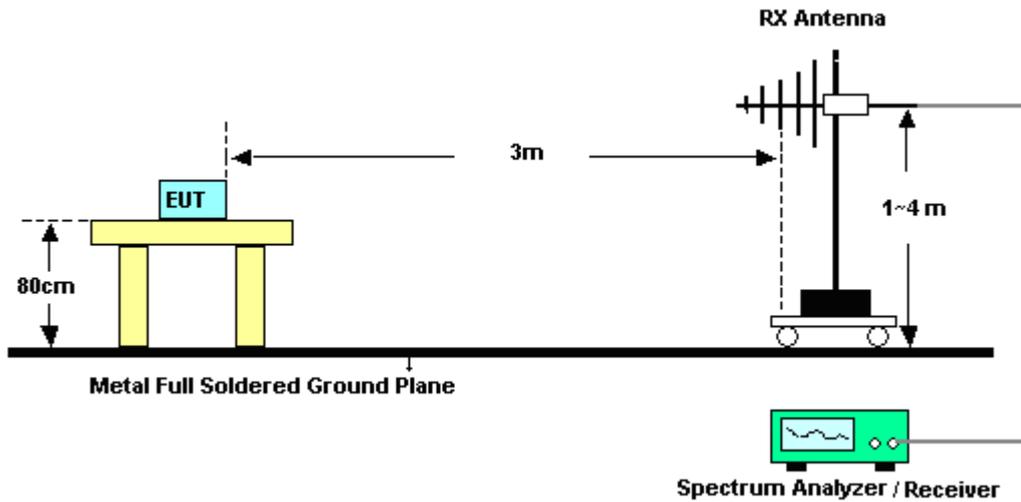
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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 “-”.
- * The ANSI C63.10, Section 6.6.4.3, NOTE 1— where limits are specified by regulations for both average and peak detection, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.
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

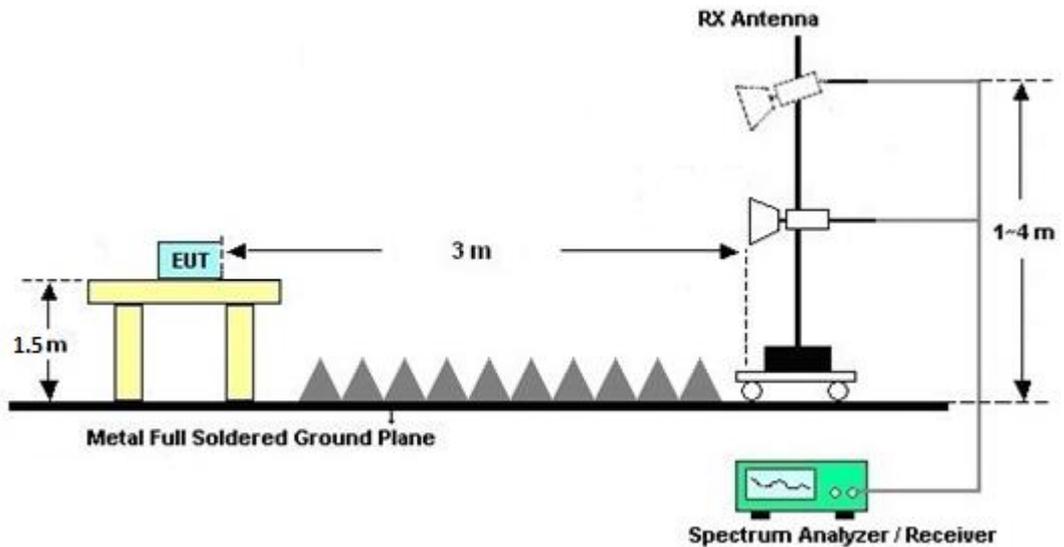
For radiated test below 30MHz



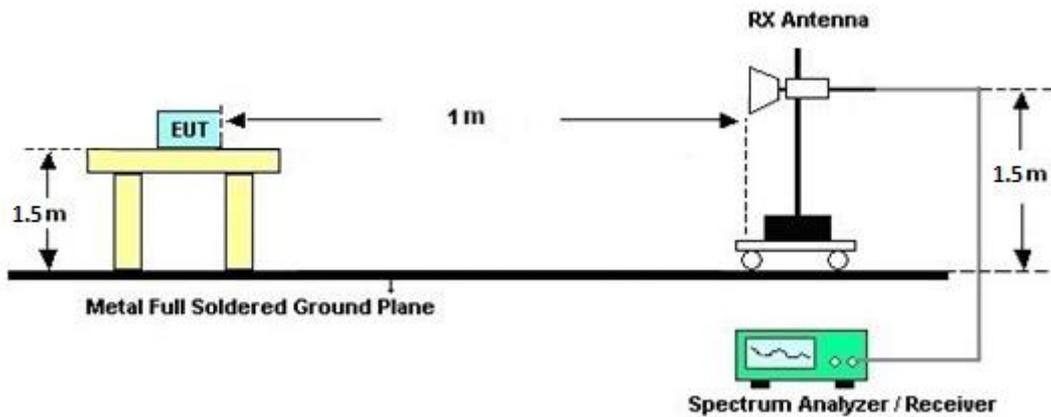
For radiated test from 30MHz to 1GHz



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.

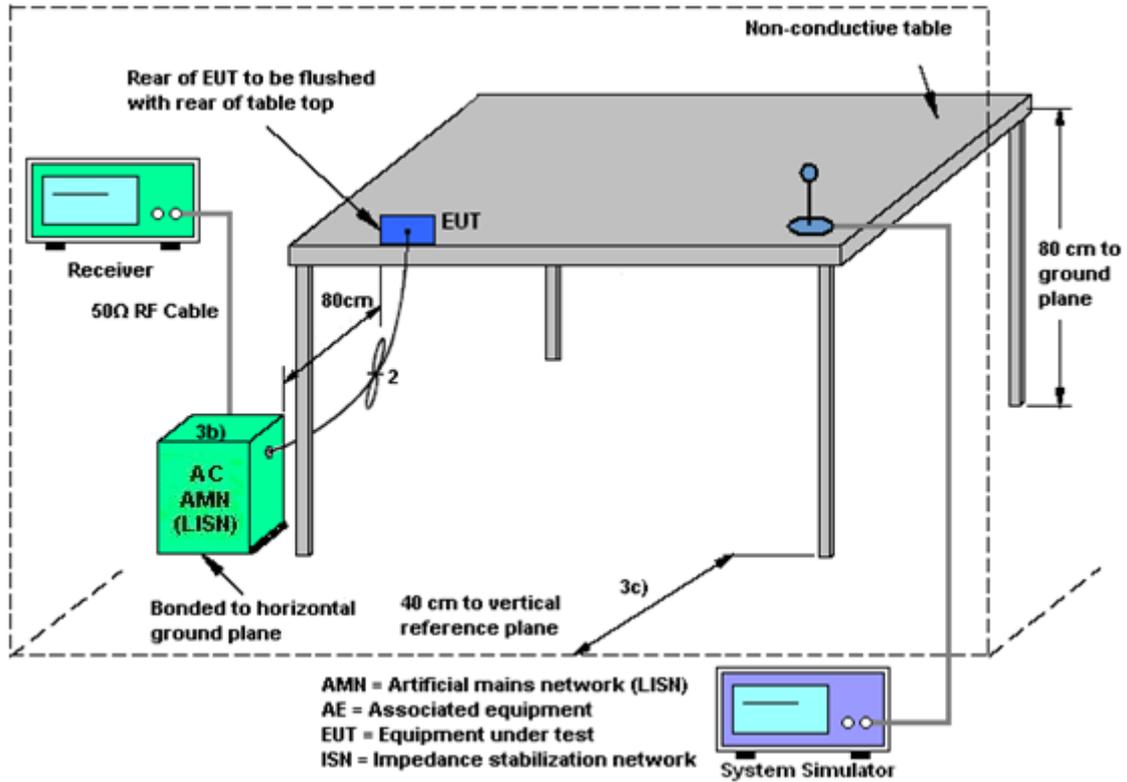
3.6.2 Measuring Instruments

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	100315	9 kHz~30 MHz	Jan. 04, 2021	Aug. 23, 2021~ Aug. 30, 2021	Jan. 03, 2022	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jul. 13, 2021	Aug. 23, 2021~ Aug. 30, 2021	Jul. 12, 2022	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02294	1GHz ~ 18GHz	Jun. 23, 2021	Aug. 23, 2021~ Aug. 30, 2021	Jun. 22, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Dec. 11, 2020	Aug. 23, 2021~ Aug. 30, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 16, 2020	Aug. 23, 2021~ Aug. 30, 2021	Dec. 15, 2021	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 18, 2021	Aug. 23, 2021~ Aug. 30, 2021	May 17, 2022	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 28, 2020	Aug. 23, 2021~ Aug. 30, 2021	Oct. 27, 2021	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 11, 2020	Aug. 23, 2021~ Aug. 30, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 18, 2021	Aug. 23, 2021~ Aug. 30, 2021	Mar. 17, 2022	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Aug. 23, 2021~ Aug. 30, 2021	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Aug. 23, 2021~ Aug. 30, 2021	N/A	Radiation (03CH13-HY)
Software	Audix	E3 6.2009-8-24	RK-000992	N/A	N/A	Aug. 23, 2021~ Aug. 30, 2021	N/A	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Feb. 10, 2021	Aug. 23, 2021~ Aug. 30, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30M-18G	Feb. 10, 2021	Aug. 23, 2021~ Aug. 30, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 22, 2021	Aug. 23, 2021~ Aug. 30, 2021	Feb. 21, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 11, 2021	Aug. 23, 2021~ Aug. 30, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M-18G	Feb. 10, 2021	Aug. 23, 2021~ Aug. 30, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Aug. 23, 2021~ Aug. 30, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 15, 2020	Aug. 23, 2021~ Aug. 30, 2021	Sep. 14, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0SS	SN2	3GHz High Pass Filter	Jul. 12, 2021	Aug. 23, 2021~ Aug. 30, 2021	Jul. 11, 2022	Radiation (03CH13-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Sep. 07, 2021	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Sep. 07, 2021	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Nov. 02, 2020	Sep. 07, 2021	Nov. 01, 2021	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	N/A	Sep. 07, 2021	N/A	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 01, 2021	Sep. 07, 2021	Jan. 31, 2022	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 52	36122	N/A	Feb. 01, 2021	Sep. 07, 2021	Jan. 31, 2022	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Sep. 07, 2021	Sep. 10, 2021	Conduction (CO07-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Sensor	DARE	RPR3006W	16I00054SNO 12	10MHz~6GHz	Dec. 16, 2020	Aug. 26, 2021~ Sep. 06, 2021	Dec. 15, 2021	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101565	10Hz ~ 40GHz	Nov. 13, 2020	Aug. 26, 2021~ Sep. 06, 2021	Nov. 12, 2021	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2021	Aug. 26, 2021~ Sep. 06, 2021	Mar. 16, 2022	Conducted (TH05-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.2 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.3 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.9 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Benny Ku	Temperature:	21~25	°C
Test Date:	2021/8/26~2021/9/6	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	1.031	0.692	0.50	Pass
BLE	1Mbps	1	19	2440	1.033	0.696	0.50	Pass
BLE	1Mbps	1	39	2480	1.033	0.696	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	-4.90	30.00	-2.60	-7.50	36.00	Pass
BLE	1Mbps	1	19	2440	-3.20	30.00	-2.60	-5.80	36.00	Pass
BLE	1Mbps	1	39	2480	-3.80	30.00	-2.60	-6.40	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	-4.60	-18.99	-2.60	8.00	Pass
BLE	1Mbps	1	19	2440	-2.85	-17.25	-2.60	8.00	Pass
BLE	1Mbps	1	39	2480	-3.77	-18.17	-2.60	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	2.054	1.176	0.50	Pass
BLE	2Mbps	1	19	2440	2.054	1.176	0.50	Pass
BLE	2Mbps	1	39	2480	2.054	1.176	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	-4.70	30.00	-2.60	-7.30	36.00	Pass
BLE	2Mbps	1	19	2440	-2.70	30.00	-2.60	-5.30	36.00	Pass
BLE	2Mbps	1	39	2480	-3.70	30.00	-2.60	-6.30	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	-4.55	-20.92	-2.60	8.00	Pass
BLE	2Mbps	1	19	2440	-2.67	-19.06	-2.60	8.00	Pass
BLE	2Mbps	1	39	2480	-3.84	-20.22	-2.60	8.00	Pass

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



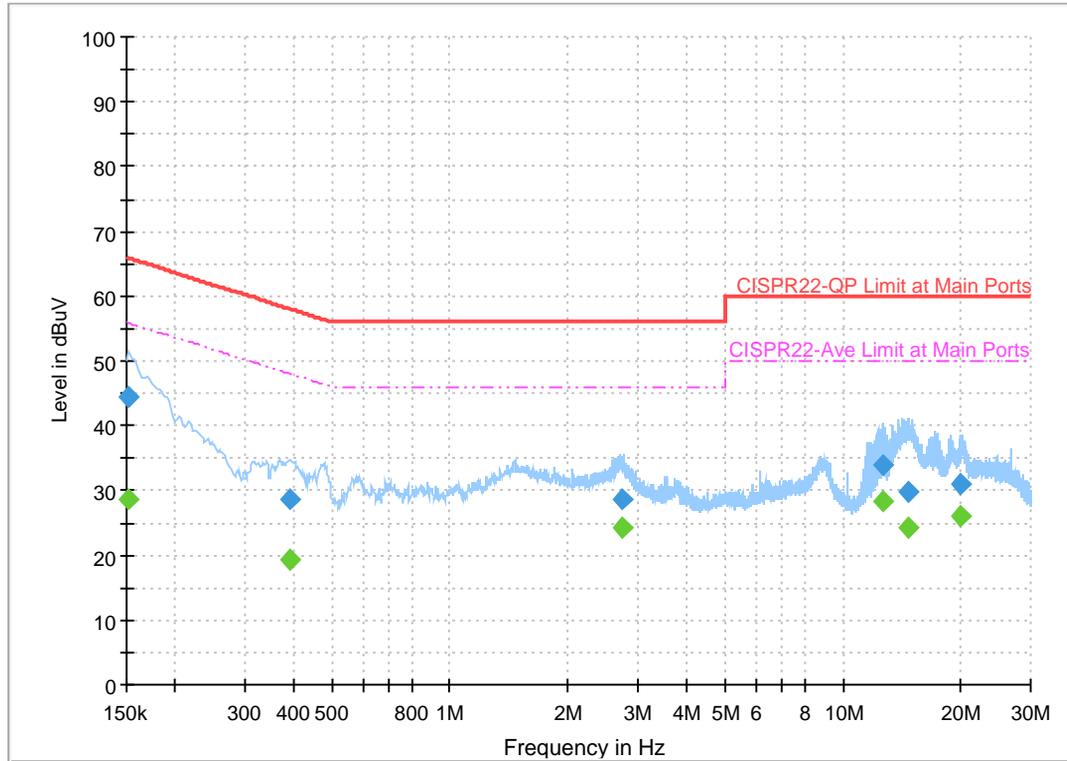
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	Temperature :	23~26°C
		Relative Humidity :	40~50%

EUT Information

Report NO : 181632
 Test Mode : Mode 1
 Test Voltage : Power From System
 Phase : Line

Full Spectrum



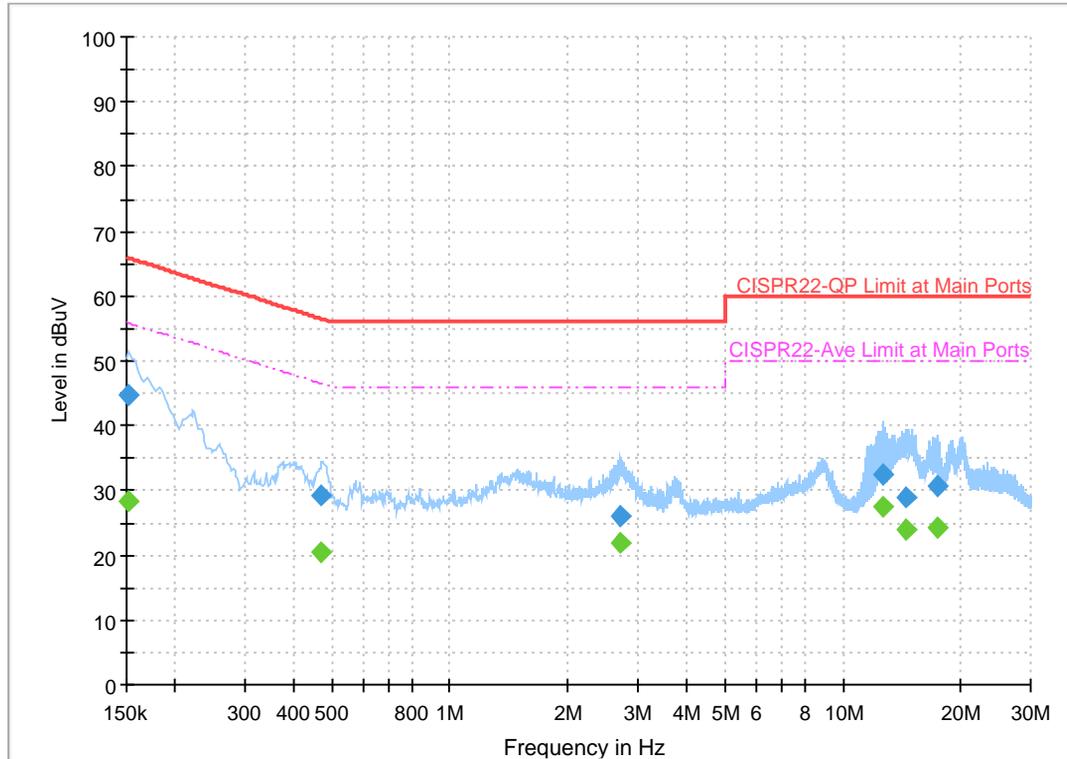
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	44.52	---	65.88	21.36	L1	OFF	20.0
0.152250	---	28.72	55.88	27.16	L1	OFF	20.0
0.390750	28.74	---	58.05	29.30	L1	OFF	20.0
0.390750	---	19.23	48.05	28.82	L1	OFF	20.0
2.733000	28.65	---	56.00	27.35	L1	OFF	20.1
2.733000	---	24.28	46.00	21.72	L1	OFF	20.1
12.574500	33.93	---	60.00	26.07	L1	OFF	20.2
12.574500	---	28.33	50.00	21.67	L1	OFF	20.2
14.705250	29.68	---	60.00	30.32	L1	OFF	20.2
14.705250	---	24.39	50.00	25.61	L1	OFF	20.2
19.961250	30.99	---	60.00	29.01	L1	OFF	20.2
19.961250	---	25.96	50.00	24.04	L1	OFF	20.2

EUT Information

Report NO : 181632
 Test Mode : Mode 1
 Test Voltage : Power From System
 Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	28.49	55.88	27.39	N	OFF	20.0
0.152250	44.67	---	65.88	21.21	N	OFF	20.0
0.469500	---	20.48	46.52	26.05	N	OFF	20.0
0.469500	29.38	---	56.52	27.14	N	OFF	20.0
2.724000	---	21.99	46.00	24.01	N	OFF	20.1
2.724000	26.17	---	56.00	29.83	N	OFF	20.1
12.669000	---	27.43	50.00	22.57	N	OFF	20.2
12.669000	32.56	---	60.00	27.44	N	OFF	20.2
14.401500	---	23.91	50.00	26.09	N	OFF	20.2
14.401500	28.87	---	60.00	31.13	N	OFF	20.2
17.342250	---	24.29	50.00	25.71	N	OFF	20.3
17.342250	30.77	---	60.00	29.23	N	OFF	20.3



Appendix C. Radiated Spurious Emission

Test Engineer :	Yuan Lee, Jacky Hong, and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

<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		2357.46	54.38	-19.62	74	40.35	27.79	14.09	27.85	337	132	P	H	
		2319.45	45.16	-8.84	54	30.93	28.04	14.05	27.86	337	132	A	H	
	*	2402	88.07	-	-	74.08	27.7	14.13	27.84	337	132	P	H	
	*	2402	87.32	-	-	73.33	27.7	14.13	27.84	337	132	A	H	
													H	
			2343.285	54.72	-19.28	74	40.65	27.85	14.07	27.85	102	81	P	V
			2319.975	45.38	-8.62	54	31.15	28.04	14.05	27.86	102	81	A	V
	*		2402	89.49	-	-	75.5	27.7	14.13	27.84	102	81	P	V
	*		2402	88.81	-	-	74.82	27.7	14.13	27.84	102	81	A	V
														V
BLE CH 19 2440MHz		2341.64	54.66	-19.34	74	40.57	27.87	14.07	27.85	324	132	P	H	
		2353.12	45.26	-8.74	54	31.24	27.79	14.08	27.85	324	132	A	H	
	*	2440	90.38	-	-	76.43	27.62	14.16	27.83	324	132	P	H	
	*	2440	89.79	-	-	75.84	27.62	14.16	27.83	324	132	A	H	
			2494.4	54.34	-19.66	74	40.26	27.69	14.21	27.82	324	132	P	H
			2496.08	45.35	-8.65	54	31.27	27.69	14.21	27.82	324	132	A	H
			2378.6	54.53	-19.47	74	40.52	27.74	14.11	27.84	100	81	P	V
			2314.9	45.21	-8.79	54	30.95	28.08	14.04	27.86	100	81	A	V
	*		2440	92.79	-	-	78.84	27.62	14.16	27.83	100	81	P	V
	*		2440	92.07	-	-	78.12	27.62	14.16	27.83	100	81	A	V
			2485.02	54.62	-19.38	74	40.57	27.67	14.2	27.82	100	81	P	V
			2486.77	45.25	-8.75	54	31.2	27.67	14.2	27.82	100	81	A	V



BLE CH 39 2480MHz	*	2480	91.31	-	-	77.28	27.66	14.19	27.82	100	81	P	V
	*	2480	90.68	-	-	76.65	27.66	14.19	27.82	100	81	A	V
		2498.24	54.12	-19.88	74	40.03	27.7	14.21	27.82	100	81	P	V
		2499.6	45	-9	54	30.91	27.7	14.21	27.82	100	81	A	V
													H
													H
	*	2480	88.66	-	-	74.63	27.66	14.19	27.82	359	132	P	H
	*	2480	88.12	-	-	74.09	27.66	14.19	27.82	359	132	A	H
		2491.64	54.29	-19.71	74	40.23	27.68	14.2	27.82	359	132	P	H
		2487.56	45.12	-8.88	54	31.06	27.68	14.2	27.82	359	132	A	H
													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	38.23	-35.77	74	57.43	31.41	6.48	57.09	-	-	P	H
		17895	55.52	-18.48	74	53.61	45.71	12.91	56.71	163	152	P	H
		17895	45.44	-8.56	54	43.53	45.71	12.91	56.71	163	152	A	H
													H
		4804	37.87	-36.13	74	57.07	31.41	6.48	57.09	-	-	P	V
		17940	55.05	-18.95	74	51.95	46.88	12.94	56.72	132	118	P	V
		17940	46.52	-7.48	54	43.42	46.88	12.94	56.72	132	118	A	V
BLE CH 19 2440MHz		4880	39.97	-34.03	74	58.69	31.44	6.8	56.96	-	-	P	H
		7320	44.63	-29.37	74	55.84	37.06	8.65	56.92	-	-	P	H
		17955	56.05	-17.95	74	52.55	47.28	12.94	56.72	159	217	P	H
		17955	46.99	-7.01	54	43.49	47.28	12.94	56.72	159	217	A	H
		4880	39.65	-34.35	74	58.37	31.44	6.8	56.96	-	-	P	V
		7320	45.91	-28.09	74	57.12	37.06	8.65	56.92	-	-	P	V
		17985	55.98	-18.02	74	51.64	48.1	12.96	56.72	108	196	P	V
		17985	47.66	-6.34	54	43.32	48.1	12.96	56.72	108	196	A	V
BLE CH 39 2480MHz		4960	40.15	-33.85	74	58.1	31.72	7.14	56.81	-	-	P	H
		7440	45.3	-28.7	74	56.83	37.02	8.62	57.17	-	-	P	H
		17925	54.91	-19.09	74	52.23	46.47	12.93	56.72	110	195	P	H
		17925	46.07	-7.93	54	43.39	46.47	12.93	56.72	110	195	A	H
		4960	40.23	-33.77	74	58.18	31.72	7.14	56.81	-	-	P	V
		7440	44.76	-29.24	74	56.29	37.02	8.62	57.17	-	-	P	V
		17910	54.21	-19.79	74	51.93	46.07	12.92	56.71	144	139	P	V
		17910	45.46	-8.54	54	43.18	46.07	12.92	56.71	144	139	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 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		2324.385	55.06	-18.94	74	40.87	28	14.05	27.86	123	38	P	H	
		2383.815	47.08	-6.92	54	33.08	27.73	14.11	27.84	123	38	A	H	
	*	2402	86.94	-	-	72.95	27.7	14.13	27.84	123	38	P	H	
	*	2402	85.55	-	-	71.56	27.7	14.13	27.84	123	38	A	H	
													H	
													H	
			2328.795	54.41	-19.59	74	40.23	27.97	14.06	27.85	107	94	P	V
			2344.125	46.84	-7.16	54	32.77	27.85	14.07	27.85	107	94	A	V
	*		2402	89.9	-	-	75.91	27.7	14.13	27.84	107	94	P	V
	*		2402	88.69	-	-	74.7	27.7	14.13	27.84	107	94	A	V
													V	
													V	
BLE CH 19 2440MHz		2356.06	54.93	-19.07	74	40.9	27.79	14.09	27.85	139	38	P	H	
		2341.64	46.85	-7.15	54	32.76	27.87	14.07	27.85	139	38	A	H	
	*	2440	89.88	-	-	75.93	27.62	14.16	27.83	139	38	P	H	
	*	2440	88.52	-	-	74.57	27.62	14.16	27.83	139	38	A	H	
			2498.53	54.11	-19.89	74	40.02	27.7	14.21	27.82	139	38	P	H
			2489.99	46.92	-7.08	54	32.86	27.68	14.2	27.82	139	38	A	H
			2336.46	55.14	-18.86	74	41.01	27.91	14.07	27.85	100	88	P	V
			2318.26	47.76	-6.24	54	33.52	28.05	14.05	27.86	100	88	A	V
	*		2440	92.42	-	-	78.47	27.62	14.16	27.83	100	88	P	V
	*		2440	91.17	-	-	77.22	27.62	14.16	27.83	100	88	A	V
			2494.26	54.17	-19.83	74	40.09	27.69	14.21	27.82	100	88	P	V
			2489.71	47.16	-6.84	54	33.1	27.68	14.2	27.82	100	88	A	V



BLE CH 39 2480MHz	*	2480	89.61	-	-	75.58	27.66	14.19	27.82	358	56	P	H
	*	2480	88.22	-	-	74.19	27.66	14.19	27.82	358	56	A	H
		2484.16	55.12	-18.88	74	41.07	27.67	14.2	27.82	358	56	P	H
		2486.4	47.18	-6.82	54	33.13	27.67	14.2	27.82	358	56	A	H
													H
													H
	*	2480	92.78	-	-	78.75	27.66	14.19	27.82	100	84	P	V
	*	2480	91.37	-	-	77.34	27.66	14.19	27.82	100	84	A	V
		2498.44	55.58	-18.42	74	41.49	27.7	14.21	27.82	100	84	P	V
		2484.36	48.11	-5.89	54	34.06	27.67	14.2	27.82	100	84	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	39.85	-34.15	74	59.05	31.41	6.48	57.09	-	-	P	H
		17895	54.56	-19.44	74	52.65	45.71	12.91	56.71	100	125	P	H
		17895	45.24	-8.76	54	43.33	45.71	12.91	56.71	100	125	A	H
													H
		4804	38.45	-35.55	74	57.65	31.41	6.48	57.09	-	-	P	V
		17910	54.39	-19.61	74	52.11	46.07	12.92	56.71	112	221	P	V
		17910	45.73	-8.27	54	43.45	46.07	12.92	56.71	112	221	A	V
BLE CH 19 2440MHz		4880	39.51	-34.49	74	58.23	31.44	6.8	56.96	-	-	P	H
		7320	44.51	-29.49	74	55.72	37.06	8.65	56.92	-	-	P	H
		17955	55.12	-18.88	74	51.62	47.28	12.94	56.72	106	249	P	H
		17955	47.17	-6.83	54	43.67	47.28	12.94	56.72	106	249	A	H
		4880	39.64	-34.36	74	58.36	31.44	6.8	56.96	-	-	P	V
		7320	45.3	-28.7	74	56.51	37.06	8.65	56.92	-	-	P	V
		17880	55.39	-18.61	74	53.76	45.44	12.9	56.71	151	199	P	V
		17880	45.02	-8.98	54	43.39	45.44	12.9	56.71	151	199	A	V
BLE CH 39 2480MHz		4960	40.15	-33.85	74	58.1	31.72	7.14	56.81	-	-	P	H
		7440	44.46	-29.54	74	55.99	37.02	8.62	57.17	-	-	P	H
		17895	54.44	-19.56	74	52.53	45.71	12.91	56.71	109	114	P	H
		17895	45.43	-8.57	54	43.52	45.71	12.91	56.71	109	114	A	H
		4960	40.84	-33.16	74	58.79	31.72	7.14	56.81	-	-	P	V
		7440	44.69	-29.31	74	56.22	37.02	8.62	57.17	-	-	P	V
		17955	55.58	-18.42	74	52.08	47.28	12.94	56.72	152	255	P	V
		17955	46.96	-7.04	54	43.46	47.28	12.94	56.72	152	255	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 												



Emission above 18GHz
2.4GHz BLE (SHF)

BT	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)
2.4GHz BLE SHF		23467	41.75	-32.25	74	43.08	39.62	12.55	53.5	150	0	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
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													H
													H
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													H
			24237	41.33	-32.67	74	41.66	40.26	12.86	53.45	150	0	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
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													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission level close to 18GHz is checked that the average emission level is noise floor only.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



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.
		(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 :	Yuan Lee, Jacky Hong, and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

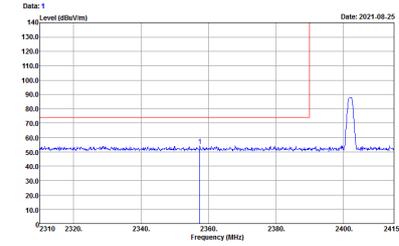
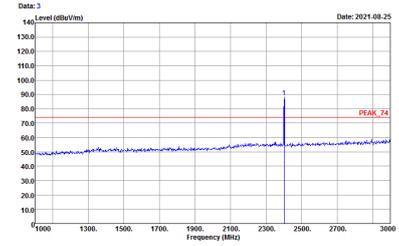
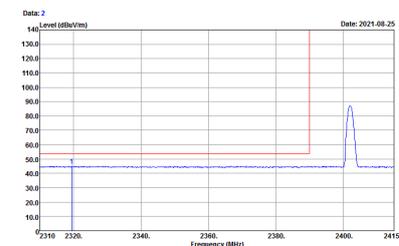
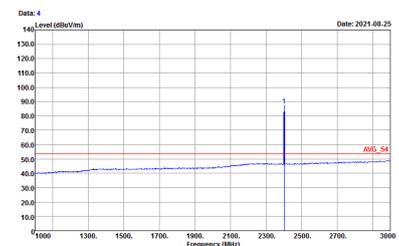
Note symbol

-L	Low channel location
-R	High channel location

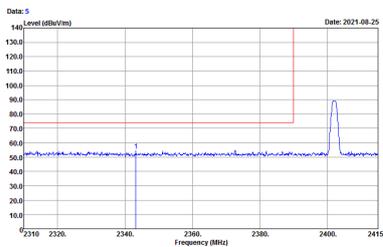
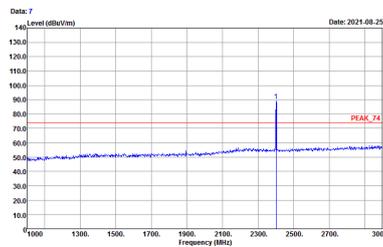
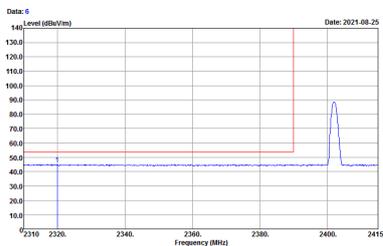
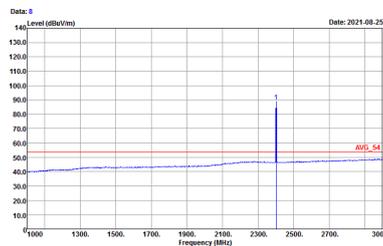


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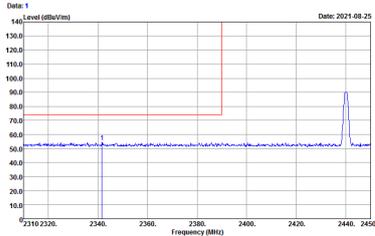
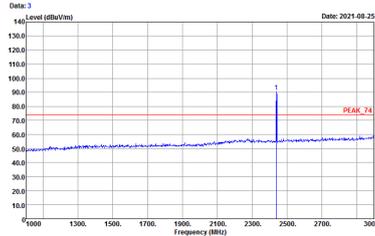
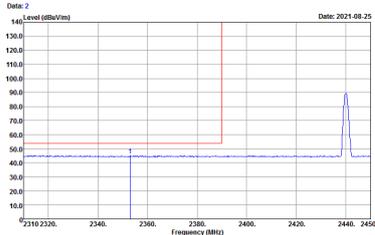
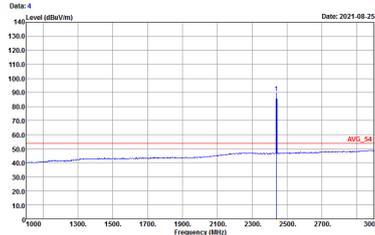
2.4GHz 2400~2483.5MHz
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 7</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 7</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 7</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 7</p>

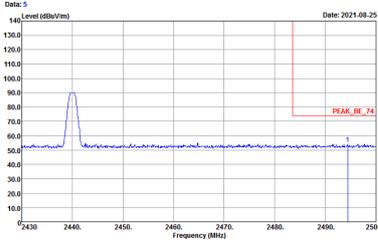
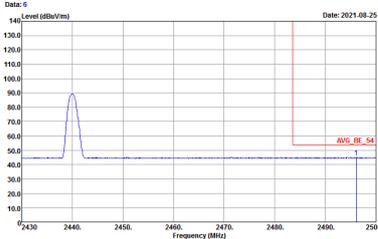


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Vertical		Fundamental
Peak	 <p> Date: 5 Date: 2021.08.25 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 7 </p>	 <p> Date: 7 Date: 2021.08.25 Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 7 </p>
Avg	 <p> Date: 6 Date: 2021.08.25 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 7 </p>	 <p> Date: 8 Date: 2021.08.25 Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 7 </p>

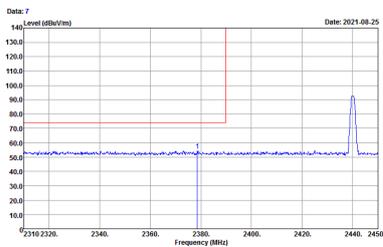
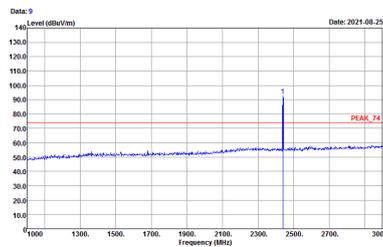
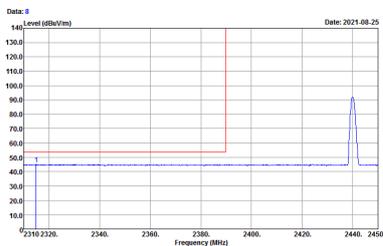
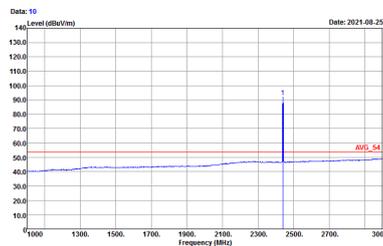


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Horizontal		Fundamental
Peak	 <p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 8</p>	 <p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 8</p>
Avg.	 <p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 8</p>	 <p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 8</p>

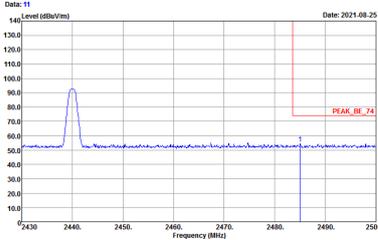
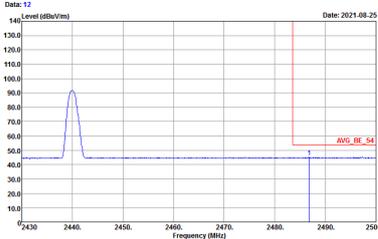


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
Horizontal		Fundamental
Peak	 <p> Date: 5 Level (dBm/1m) Date: 2021.08.25 Frequency (MHz) PEAK_BE_74 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : B </p>	Left blank
Avg.	 <p> Date: 6 Level (dBm/1m) Date: 2021.08.25 Frequency (MHz) AVG_BE_54 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : B </p>	Left blank

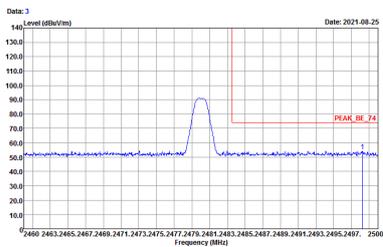
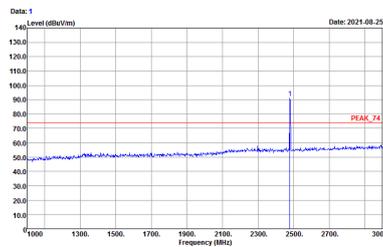
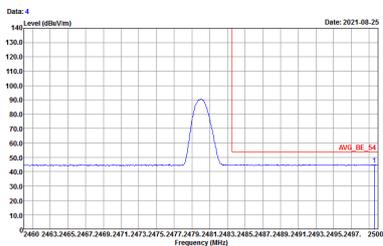
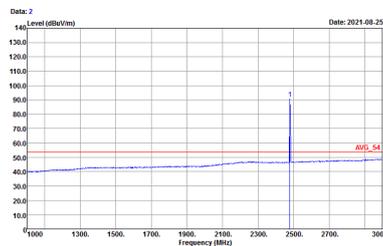


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Vertical		Fundamental
Peak	 <p>Date: 7 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>	 <p>Date: 9 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>
Avg.	 <p>Date: 8 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>	 <p>Date: 10 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>

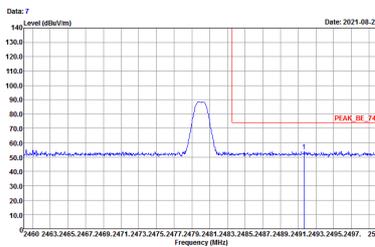
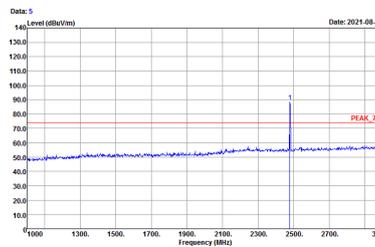
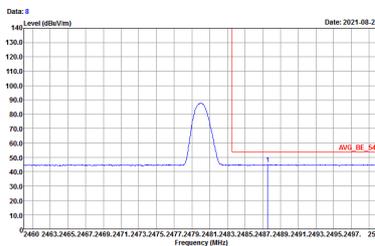
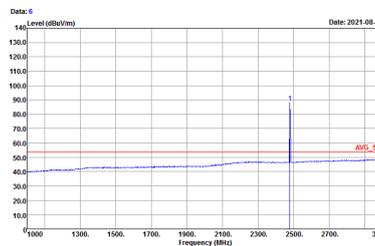


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
Vertical		Fundamental
Peak	 <p>Date: 11 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>	Left blank
Avg.	 <p>Date: 12 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : B</p>	Left blank



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 9</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 9</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 9</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 9</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
Vertical		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 9</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 9</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 9</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 9</p>



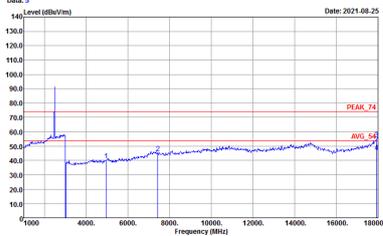
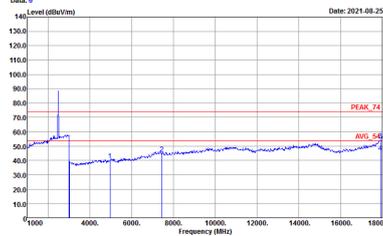
2.4GHz 2400~2483.5MHz
BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 7</p>	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : 7</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 8</p>	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : 8</p>

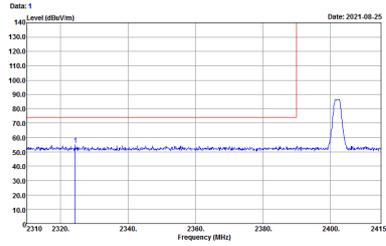
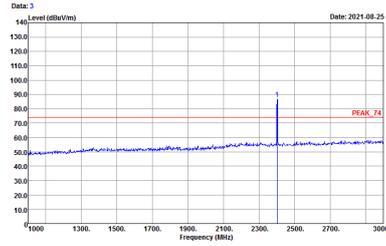
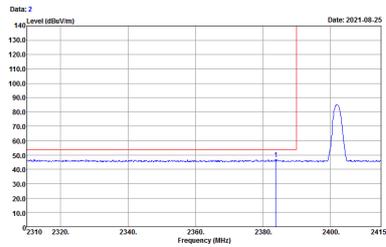
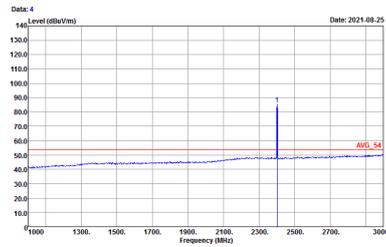


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH39 2480MHz		
Horizontal		Vertical
<p>Peak Avg.</p>	<p>Data: 5 Level (dBuV/m) Date: 2021.08.25</p>  <p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : -9</p>	<p>Data: 6 Level (dBuV/m) Date: 2021.08.25</p>  <p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : -9</p>

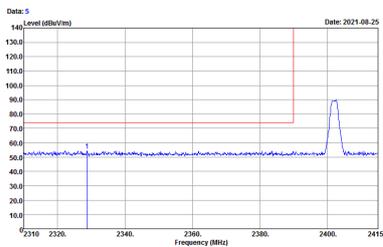
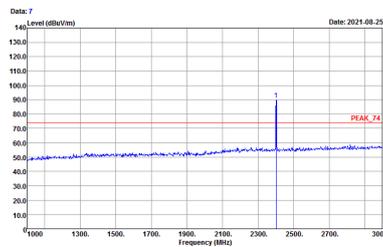
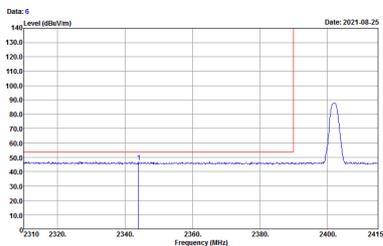
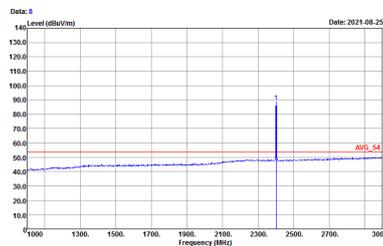


<2Mbps>

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

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 10</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 10</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 10</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 10</p>

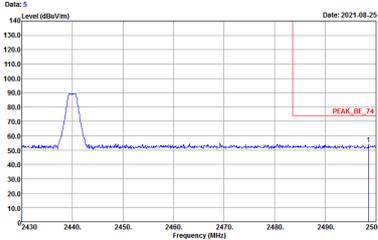
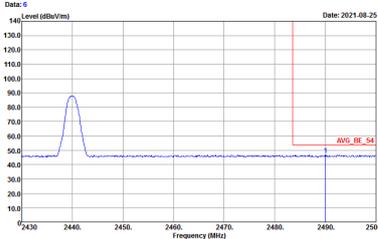


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Vertical		Fundamental
Peak	 <p>Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 10</p>	 <p>Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 10</p>
Avg	 <p>Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 10</p>	 <p>Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 10</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Horizontal		Fundamental
Peak	<p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 11</p>	<p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 11</p>
Avg.	<p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 11</p>	<p>Date: 2021-08-25</p> <p>Site : 03CH13-HV Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 11</p>

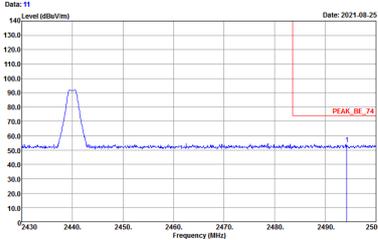
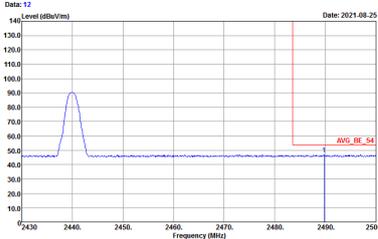


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
Horizontal		Fundamental
Peak	 <p>Date: 5 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 11</p>	Left blank
Avg.	 <p>Date: 6 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 11</p>	Left blank

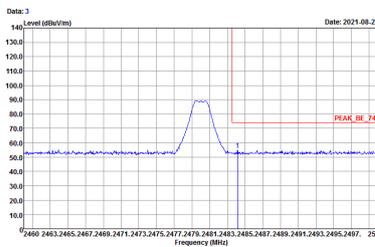
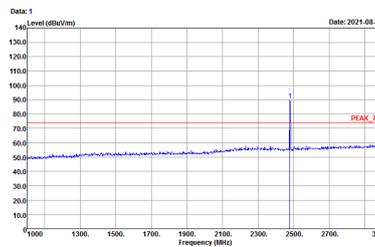
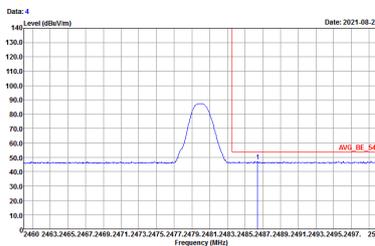
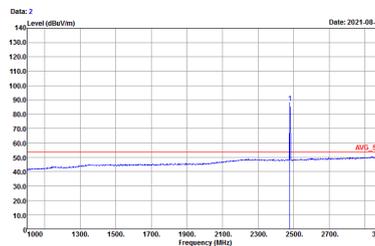


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Vertical		Fundamental
Peak	<p data-bbox="432 488 810 728"> Data: 7 Level (dBm/Vm) vs Frequency (MHz) plot showing a peak at 2440 MHz. </p> <p data-bbox="432 734 702 801"> Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11 </p>	<p data-bbox="906 488 1284 728"> Data: 9 Level (dBm/Vm) vs Frequency (MHz) plot showing a peak at 2440 MHz. </p> <p data-bbox="906 734 1176 801"> Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11 </p>
Avg.	<p data-bbox="432 1167 810 1406"> Data: 8 Level (dBm/Vm) vs Frequency (MHz) plot showing an average level at 2440 MHz. </p> <p data-bbox="432 1413 702 1480"> Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11 </p>	<p data-bbox="906 1167 1284 1406"> Data: 10 Level (dBm/Vm) vs Frequency (MHz) plot showing an average level at 2440 MHz. </p> <p data-bbox="906 1413 1176 1480"> Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11 </p>

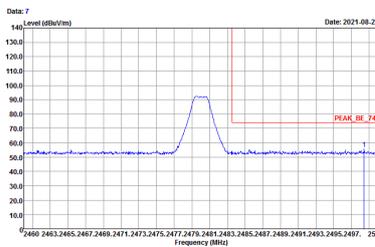
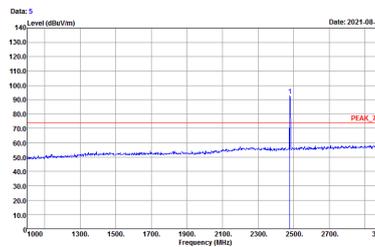
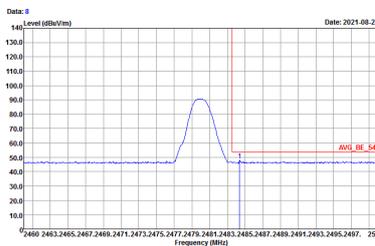
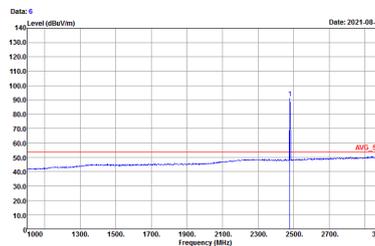


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
Vertical		Fundamental
<p>Peak</p>	 <p>Date: 11 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11</p>	<p>Left blank</p>
<p>Avg.</p>	 <p>Date: 12 Date: 2021.08.25</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11</p>	<p>Left blank</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 12</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 12</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 12</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 HORIZONTAL RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 181632 Mode : 12</p>



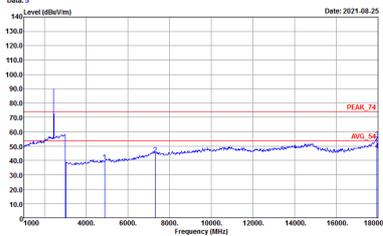
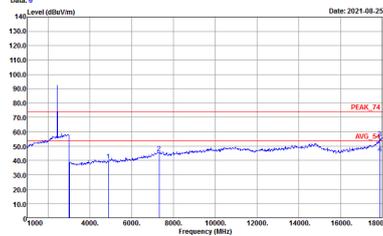
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
Vertical		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 12</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 12</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 12</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m HORN_91200_1241 VERTICAL Detector : Peak Project : 181632 Mode : 12</p>



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

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 10</p>	<p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : 10</p>



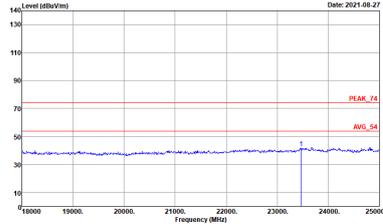
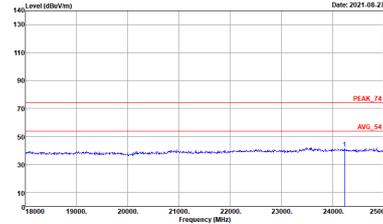
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH19 2440MHz		
Horizontal		Vertical
<p>Peak Avg.</p>	<p>Data: 5 Level (dBuV/m) Date: 2021.08.25</p>  <p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 11</p>	<p>Data: 6 Level (dBuV/m) Date: 2021.08.25</p>  <p>Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : 11</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH39 2480MHz		
	Horizontal	Vertical
Peak	<p data-bbox="432 488 810 728"></p> <p data-bbox="432 734 699 792">Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 181632 Mode : 12</p>	<p data-bbox="908 488 1286 728"></p> <p data-bbox="908 734 1158 792">Site : 03CH13-11Y Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 181632 Mode : 12</p>



Emission above 18GHz
2.4GHz BLE (SHF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak / Avg.	 <p>Site : 03CH13-HY Condition : PEAK_74 1m SHF HORN BBHA9170584 HORIZONTAL Detector : Peak Project : 181632 Mode : 13</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 1m SHF HORN BBHA9170584 VERTICAL Detector : Peak Project : 181632 Mode : 13</p>



Emission below 1GHz
2.4GHz BLE (LF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	<p>Site : 03CHE3-11Y Condition : QP 3m BILLOG_40103 HORIZONTAL Detector : Peak Project : 181632 Mode : 14</p>	<p>Site : 03CHE3-11Y Condition : QP 3m BILLOG_40103 VERTICAL Detector : Peak Project : 181632 Mode : 14</p>



Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth -LE for 1Mbps	60.96	381	2.62	3kHz
Bluetooth -LE for 2Mbps	31.75	200	5.00	10kHz

