

Report No.: FR092923-01B



FCC RADIO TEST REPORT

FCC ID : 2AXW2-3476

Equipment: Digital Media Receiver

Model Name : C76N8S

Applicant : Calcium Crater LLC

DTC QUADRANT

5445 DTC PARKWAY, PENTHOUSE 4

GREENWOOD VILLAGE,

COLORADO, 80111

Standard : FCC Part 15 Subpart C §15.247

The product was received on Dec. 09, 2020 and testing was started from Dec. 09, 2020 and completed on Jan. 07, 2021. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Lunis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

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Report No.	Version	Description	Issued Date
FR092923-01B	01	Initial issue of report	Jan. 26, 2021

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Summary of Test Result

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Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)
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
3.6	15.207	AC Conducted Emission	Pass
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: Wii Chang Report Producer: Ruby Zou

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1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature					
Equipment	Digital Media Receiver				
Model Name	C76N8S				
FCC ID	2AXW2-3476				
	WLAN 11b/g/n HT20				
EUT supports Radios application	WLAN 11a/n HT20/HT40				
EOT Supports Radios application	WLAN 11ac VHT20/VHT40/VHT80				
	Bluetooth BR/EDR/LE				

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1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard				
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz			
Number of Channels	40			
Carrier Frequency of Each Channel	40 Channel (37 hopping + 3 advertising channel)			
Maximum Output Power to Antenna	5.10 dBm (0.0032 W) for 1Mbps			
Maximum Output Fower to Antenna	5.10 dBm (0.0032 W) for 2Mbps			
99% Occupied Bandwidth	1.026 MHz for 1Mbps			
99% Occupied Bandwidth	2.053 MHz for 2Mbps			
Antenna Type / Gain	PCB IFA Antenna type with gain 2.78 dBi			
Type of Modulation	Bluetooth LE : GFSK			

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

1.3 Modification of EUT

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

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1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. TH05-HY, CO05-HY, 03CH07-HY

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

FCC designation No.: TW1190

1.5 Applicable Standards

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

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

Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. The TAF code is not including all the FCC KDB listed without accreditation.

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2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (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 9	2418	29	2460
		2420	30	2462
2400-2483.5 MHz	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	-	-

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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).

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

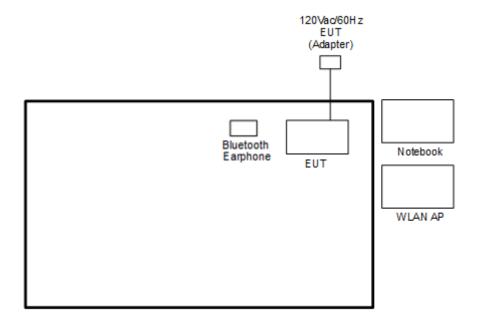
The following summary table is showing all test modes to demonstrate in compliance with the standard.

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				
	Bluetooth – LE / GFSK				
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps				
Conducted	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps				
Test Cases	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps				
rest Cases	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps				
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps				
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps				
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps				
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps				
Radiated	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps				
Test Cases	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	Mode 1 :WLAN (2.4GHz) Link + Bluetooth Link + MPEG4 + AC Adapter (AP23				
Emission G1) (Acbel)					
Remark: For Ra	diated Test Cases, the tests were performed with AC Adapter (AP23 G1) (Acbel)				

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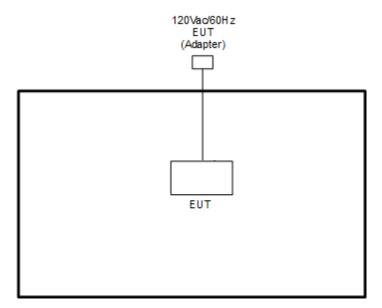
2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



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<Bluetooth - LE Tx Mode>



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2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	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.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

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2.5 EUT Operation Test Setup

The RF test items, utility "Compliance tool 1.0.0.90" 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 10dB attenuator.

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

= 4.2 + 10 = 14.2 (dB)

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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.

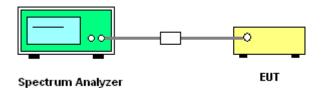
3.1.3 Test Procedures

- 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.

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- 3. Set to the maximum power setting and enable the EUT 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 6 dB bandwidth must be greater than 500 kHz.
- For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
- 6. Measure and record the results in the test report.

3.1.4 Test Setup

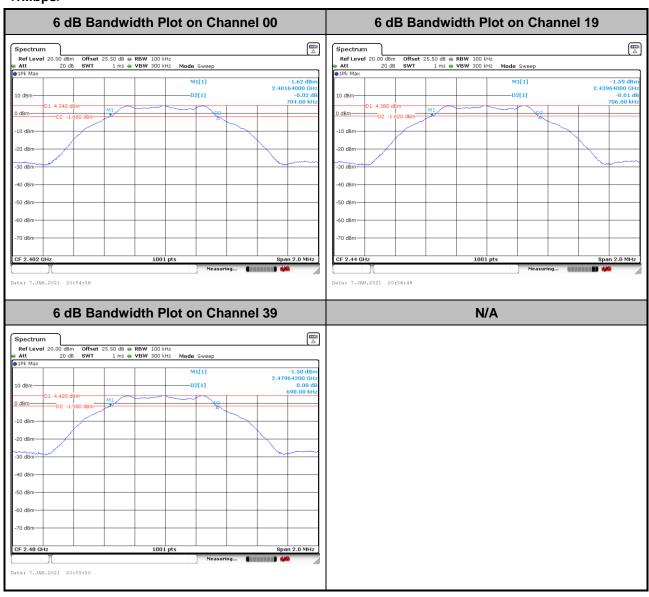


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3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

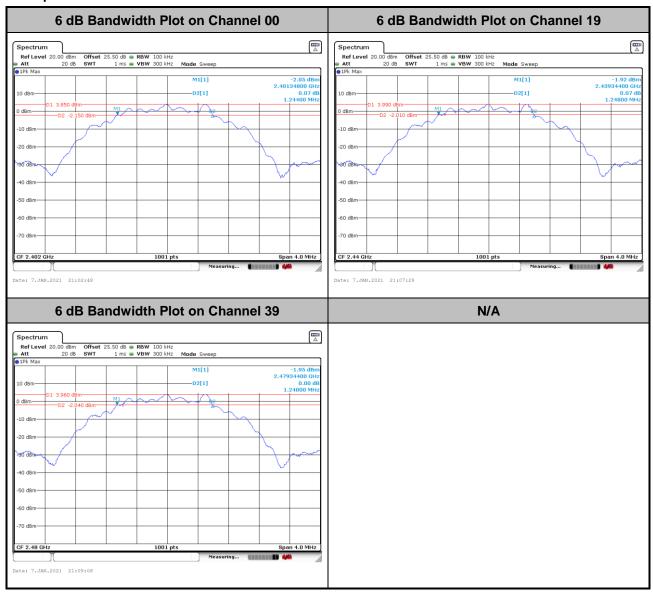
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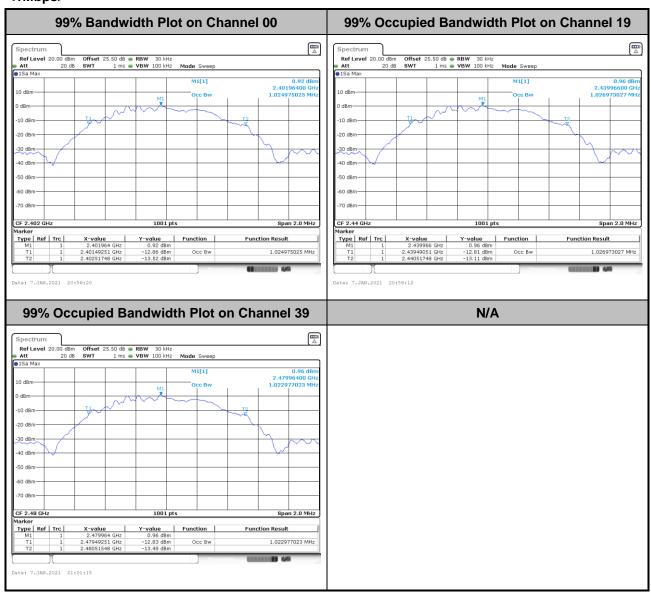
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3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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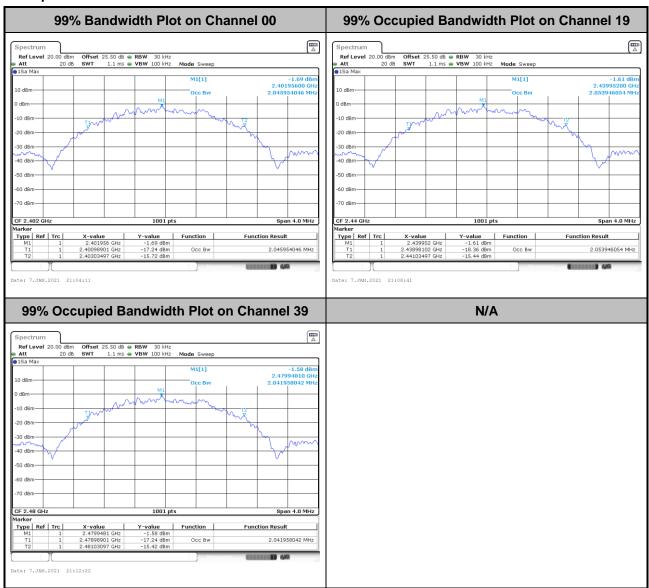


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Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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<2Mbps>



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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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3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi 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 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

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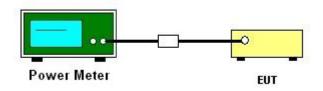
3.2.2 Measuring Instruments

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 to the maximum power setting and enable the EUT 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.

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3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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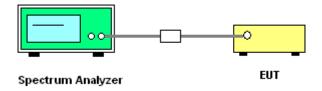
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

- 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 to the maximum power setting and enable the EUT 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)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



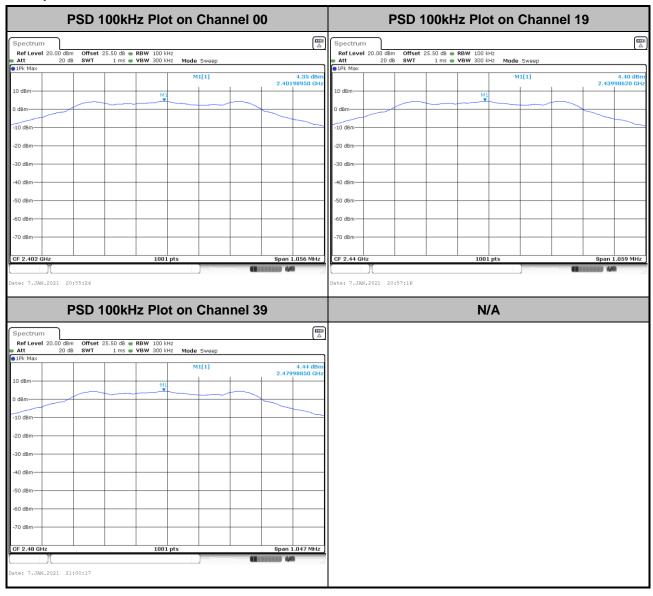
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

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

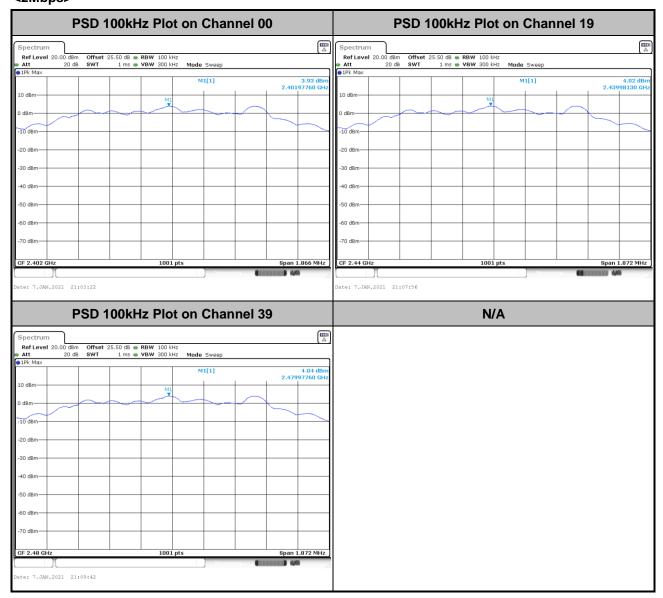
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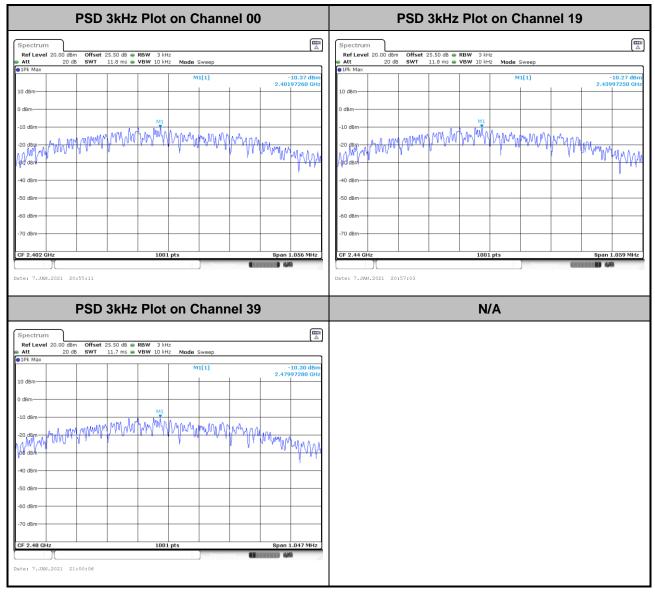


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3.3.7 Test Result of Power Spectral Density Plots (3kHz)

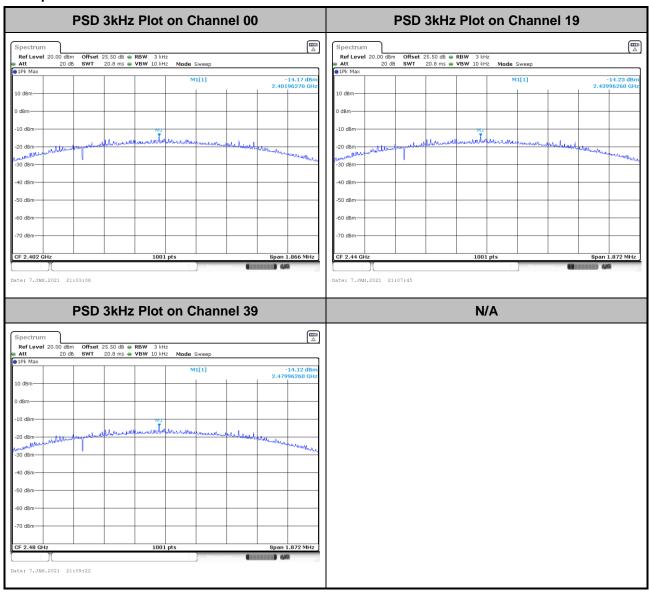
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3.4 Conducted Band Edges and Spurious Emission Measurement

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.

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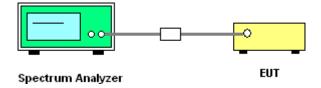
3.4.2 Measuring Instruments

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 to the maximum power setting and enable the EUT 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.

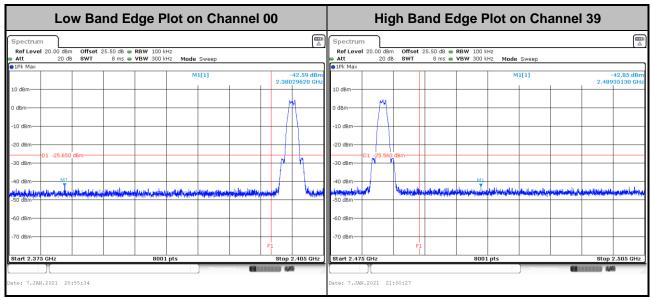
3.4.4 Test Setup



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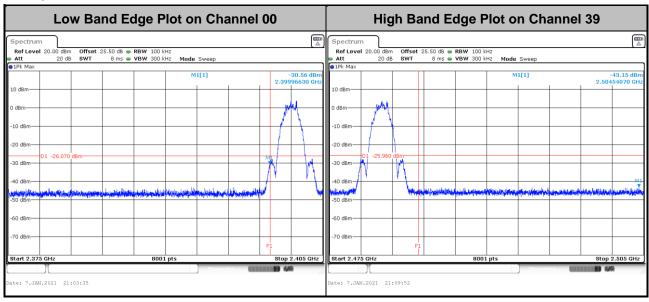
3.4.5 Test Result of Conducted Band Edges Plots

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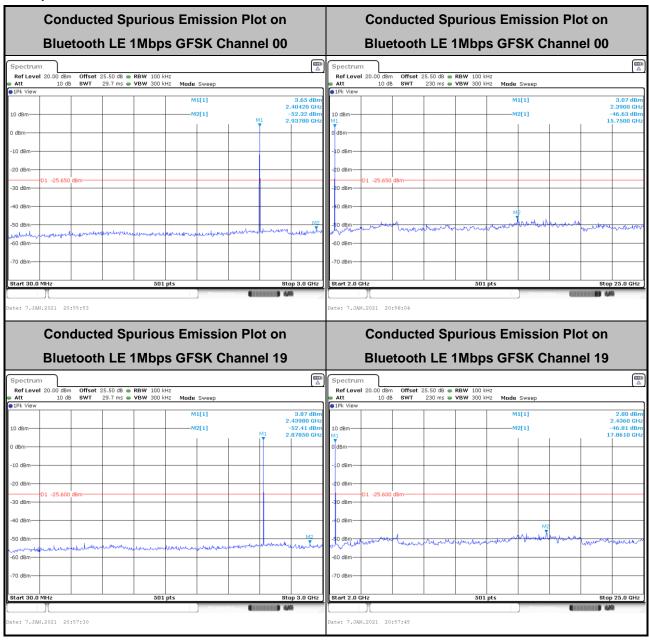
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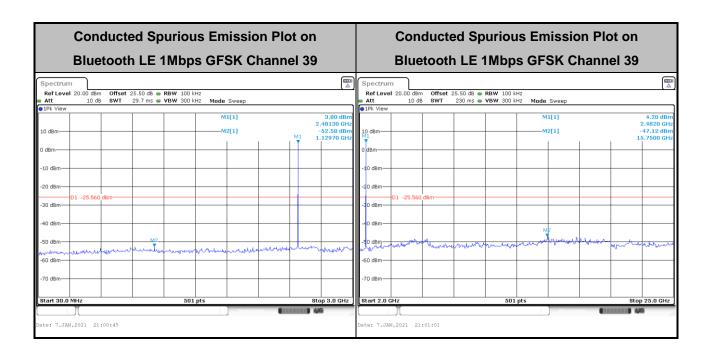
3.4.6 Test Result of Conducted Spurious Emission Plots

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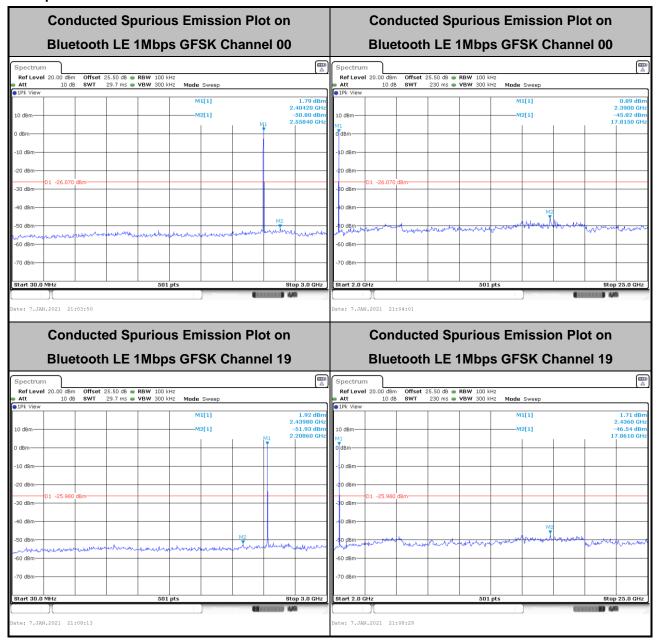
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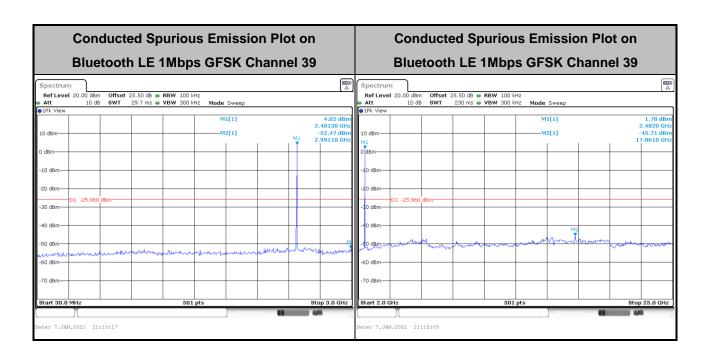
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3.5 Radiated Band Edges and Spurious Emission Measurement

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.

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Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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.

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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.

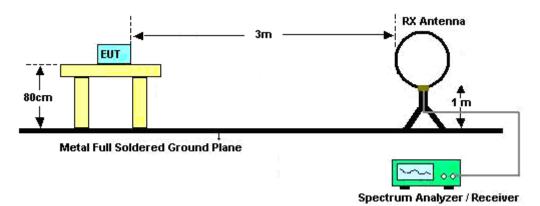
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- 3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
- 7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \ge 1$ GHz for peak measurement. For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

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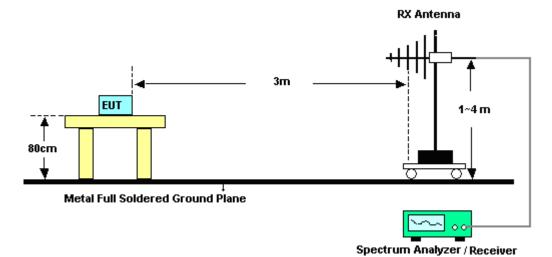
3.5.4 Test Setup

For radiated test below 30MHz

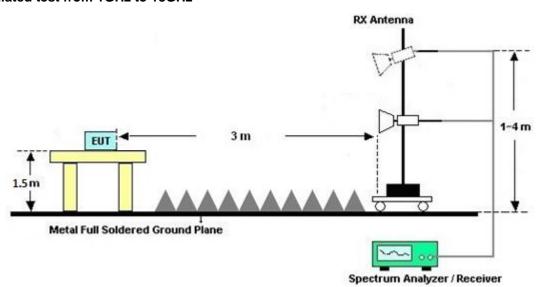


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For radiated test from 30MHz to 1GHz

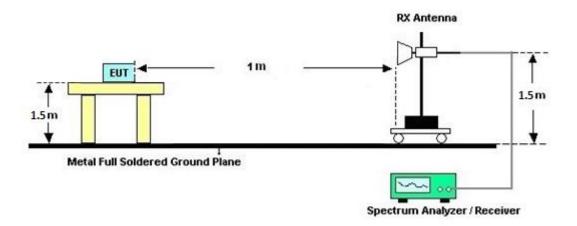


For radiated test from 1GHz to 18GHz



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For radiated test above 18GHz



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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 a comparison data 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 (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

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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.

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Eroquency of emission (MHz)	Conducted limit (dBµV)				
Frequency of emission (MHz)	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

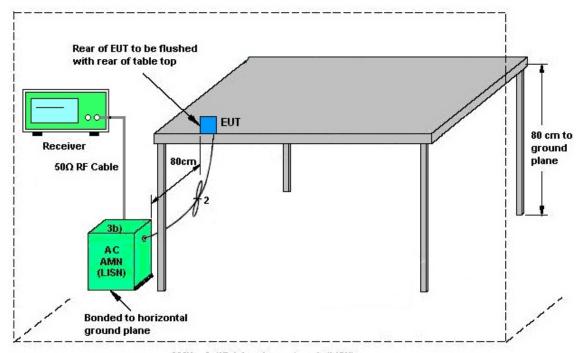
See list of measuring equipment of this test report.

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 should 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.
- 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.

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3.6.4 Test Setup



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AMN = Artificial mains network (LISN)

AE = Associated equipment

EUT = Equipment under test

ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

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3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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.

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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.

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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~30 MHz	Jul. 14, 2020	Dec. 09, 2020~ Jan. 05, 2021	Jul. 13, 2021	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D0 1N-06	35419 & 03	30MHz~1GHz	Apr. 29, 2020	Dec. 09, 2020~ Jan. 05, 2021	Apr. 28, 2021	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 01, 2020	Dec. 09, 2020~ Jan. 05, 2021	Nov. 30, 2021	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917025 1	18GHz~40GHz	Dec. 02, 2020	Dec. 09, 2020~ Jan. 05, 2021	Dec. 01, 2021	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MX E)	MY53290053	20Hz~26.5GHz	May 21, 2020	Dec. 09, 2020~ Jan. 05, 2021	May 20, 2021	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Jun. 09, 2020	Dec. 09, 2020~ Jan. 05, 2021	Jun. 08, 2021	Radiation (03CH07-HY)
Preamplifier	COM-POWE R	PA-103A	161241	10MHz~1GHz	May 19, 2020	Dec. 09, 2020~ Jan. 05, 2021	May 18, 2021	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-001 01800-30-10 P	1590075	1GHz~18GHz	Apr. 23, 2020	Dec. 09, 2020~ Jan. 05, 2021	Apr. 22, 2021	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Oct. 31, 2020	Dec. 09, 2020~ Jan. 05, 2021	Oct. 30, 2021	Radiation (03CH07-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 15, 2020	Dec. 09, 2020~ Jan. 05, 2021	Jun. 14, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2,80 1606/2	18GHz~40GHz	Feb. 25, 2020	Dec. 09, 2020~ Jan. 05, 2021	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4, MY28655/4	9kHz~30MHz	Feb. 25, 2020	Dec. 09, 2020~ Jan. 05, 2021	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 25, 2020	Dec. 09, 2020~ Jan. 05, 2021	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 25, 2020	Dec. 09, 2020~ Jan. 05, 2021	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801606/2	9KHz ~ 40GHz	N/A	Dec. 09, 2020~ Jan. 05, 2021	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Dec. 09, 2020~ Jan. 05, 2021	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Dec. 09, 2020~ Jan. 05, 2021	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	N/A	Dec. 09, 2020~ Jan. 05, 2021	N/A	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	N/A	N/A	N/A	Dec. 09, 2020~ Jan. 05, 2021	N/A	Radiation (03CH07-HY)

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Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 30, 2020	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Dec. 30, 2020	Sep. 10, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	Dec. 30, 2020	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	Dec. 30, 2020	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Dec. 30, 2020	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 02, 2020	Dec. 30, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 02, 2020	Dec. 30, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Dec. 28, 2020~ Jan. 07, 2021	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SN O10	10MHz~6GHz	Dec. 09, 2020	Dec. 28, 2020~ Jan. 07, 2021	Dec. 08, 2021	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz ~ 40GHz	Jul. 22, 2020	Dec. 28, 2020~ Jan. 07, 2021	Jul. 21, 2021	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Dec. 28, 2020~ Jan. 07, 2021	Mar. 16, 2021	Conducted (TH05-HY)

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5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence	2.2
of 95% (U = 2Uc(y))	2.3

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<u>Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	4.7
of 95% (U = 2Uc(y))	4.7

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

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

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

Manager and the second state of the second sta	
Measuring Uncertainty for a Level of Confidence	5 A
of 95% (U = 2Uc(y))	5.0

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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Hank Hsu	Temperature:	21~25	°C
Test Date:	2020/12/28~2021/1/7	Relative Humidity:	51~54	%

TEST RESULTS DATA 6dB and 99% Occupied Bandwidth

Mod.	Data Rate	N⊤x	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.024	0.704	0.50	Pass
BLE	1Mbps	1	19	2440	1.026	0.706	0.50	Pass
BLE	1Mbps	1	39	2480	1.022	0.698	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	5.00	30.00	2.78	7.78	36.00	Pass
BLE	1Mbps	1	19	2440	5.10	30.00	2.78	7.88	36.00	Pass
BLE	1Mbps	1	39	2480	5.10	30.00	2.78	7.88	36.00	Pass

TEST RESULTS DATA Peak Power Density

Mod.	Data Rate	N⊤x	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	4.35	-10.37	2.78	8.00	Pass
BLE	1Mbps	1	19	2440	4.40	-10.27	2.78	8.00	Pass
BLE	1Mbps	1	39	2480	4.44	-10.30	2.78	8.00	Pass

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

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TEST RESULTS DATA 6dB and 99% Occupied Bandwidth

Mod.	Data Rate	N⊤x	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.045	1.244	0.50	Pass
BLE	2Mbps	1	19	2440	2.053	1.248	0.50	Pass
BLE	2Mbps	1	39	2480	2.041	1.248	0.50	Pass

TEST RESULTS DATA Average Power Table

Mod.	Data Rate	N TX	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	5.00	30.00	2.78	7.78	36.00	Pass
BLE	2Mbps	1	19	2440	5.10	30.00	2.78	7.88	36.00	Pass
BLE	2Mbps	1	39	2480	5.10	30.00	2.78	7.88	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	3.93	-14.17	2.78	8.00	Pass
BLE	2Mbps	1	19	2440	4.02	-14.23	2.78	8.00	Pass
BLE	2Mbps	1	39	2480	4.04	-14.12	2.78	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

Toot Engineer	Test Engineer: Tom Lee	Temperature :	23~26 ℃
rest Engineer:	Tom Lee	Relative Humidity :	40~50%

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EUT Information

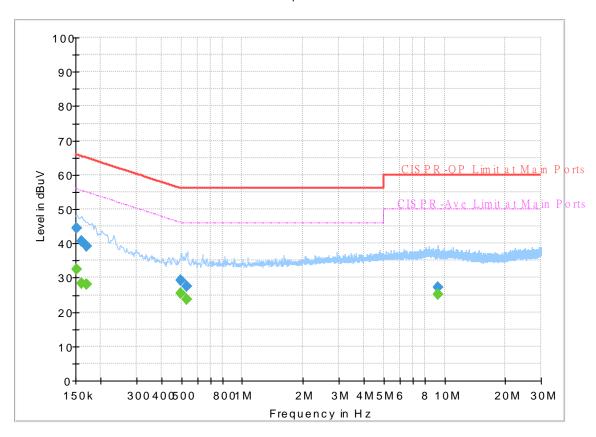
 Report NO :
 092923-01

 Test Mode :
 Mode 1

 Test Voltage :
 120Vac/60Hz

Phase: Line

FullSpectrum



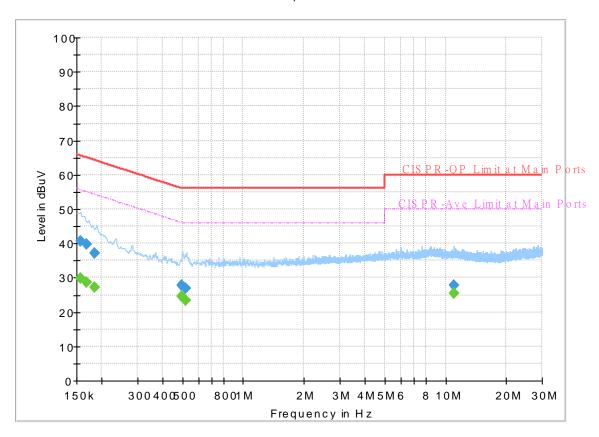
Final Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)			(dB)
0.152250		32.56	55.88	23.32	L1	OFF	19.6
0.152250	44.37	-	65.88	21.51	L1	OFF	19.6
0.161250		28.38	55.40	27.02	L1	OFF	19.6
0.161250	40.60	-	65.40	24.80	L1	OFF	19.6
0.170250		28.13	54.95	26.82	L1	OFF	19.6
0.170250	39.32		64.95	25.63	L1	OFF	19.6
0.498930		25.55	46.02	20.47	L1	OFF	19.5
0.498930	29.21	-	56.02	26.81	L1	OFF	19.5
0.531960		23.70	46.00	22.30	L1	OFF	19.6
0.531960	27.38	-	56.00	28.62	L1	OFF	19.6
9.298500		25.10	50.00	24.90	L1	OFF	20.0
9.298500	27.18		60.00	32.82	L1	OFF	20.0

EUT Information

Report NO: 092923-01
Test Mode: Mode 1
Test Voltage: 120Vac/60Hz
Phase: Neutral

FullSpectrum



Final Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Filter	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)			(dB)
0.156750	40.65		65.63	24.98	N	OFF	19.6
0.156750		29.84	55.63	25.79	N	OFF	19.6
0.168000	39.86		65.06	25.20	N	OFF	19.6
0.168000		28.75	55.06	26.31	N	OFF	19.6
0.183750	37.11		64.31	27.20	N	OFF	19.6
0.183750		27.11	54.31	27.20	N	OFF	19.6
0.498300	27.81		56.03	28.22	N	OFF	19.6
0.498300		24.47	46.03	21.56	N	OFF	19.6
0.519000	26.89		56.00	29.11	N	OFF	19.6
0.519000		23.47	46.00	22.53	N	OFF	19.6
11.031000	27.64		60.00	32.36	N	OFF	20.1
11.031000		25.30	50.00	24.70	N	OFF	20.1

Appendix C. Radiated Spurious Emission

Test Engineer :	Jesse Wang, Stan Hsieh and Ken Wu	Temperature :	20~25°C
rest Engineer.		Relative Humidity :	50~58%

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<1Mbps>

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

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)
		2313.045	52.88	-21.12	74	38.67	31.73	17.86	35.38	164	231	Р	Н
		2382.03	44.19	-9.81	54	29.73	31.87	18	35.41	164	231	Α	Н
DI E	*	2402	104.15	-	-	89.64	31.9	18.03	35.42	164	231	Р	Н
BLE CH 00	*	2402	103.57	-	-	89.06	31.9	18.03	35.42	164	231	Α	Н
2402MHz		2380.245	53.43	-20.57	74	38.97	31.87	18	35.41	355	342	Р	V
2402111112		2356.83	44.3	-9.7	54	29.93	31.83	17.94	35.4	355	342	Α	V
	*	2402	104.43	-	-	89.92	31.9	18.03	35.42	355	342	Р	V
	*	2402	103.77	-	-	89.26	31.9	18.03	35.42	355	342	Α	V
		2382.66	52.47	-21.53	74	38.01	31.87	18	35.41	216	232	Р	Н
		2376.64	44.31	-9.69	54	29.86	31.87	17.99	35.41	216	232	Α	Н
	*	2440	105.04	-	-	90.2	32.2	18.07	35.43	216	232	Р	Н
	*	2440	104.4	-	-	89.56	32.2	18.07	35.43	216	232	Α	Н
		2490.27	53.66	-20.34	74	38.39	32.6	18.12	35.45	216	232	Р	Н
BLE		2485.3	45.05	-8.95	54	29.92	32.47	18.11	35.45	216	232	Α	Н
CH 19 2440MHz		2331.42	53.28	-20.72	74	39.01	31.77	17.89	35.39	320	354	Р	V
2440WITI2		2339.26	44.33	-9.67	54	30.02	31.8	17.91	35.4	320	354	Α	V
	*	2440	105.31	-	-	90.47	32.2	18.07	35.43	320	354	Р	V
	*	2440	104.59	-	-	89.75	32.2	18.07	35.43	320	354	Α	V
		2493.14	53.36	-20.64	74	38.09	32.6	18.13	35.46	320	354	Р	٧
		2491.67	45.48	-8.52	54	30.21	32.6	18.12	35.45	320	354	Α	٧

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	*	2480	105.86	-	-	90.72	32.47	18.12	35.45	274	234	Р	Н
	*	2480	105	-	-	89.86	32.47	18.12	35.45	274	234	Α	Н
		2489.72	54.26	-19.74	74	38.99	32.6	18.12	35.45	274	234	Р	Н
BLE		2483.92	45.73	-8.27	54	30.6	32.47	18.11	35.45	274	234	Α	Н
CH 39 2480MHz	*	2480	105.89	-	-	90.75	32.47	18.12	35.45	299	354	Р	V
2400WITI2	*	2480	105.25	-	-	90.11	32.47	18.12	35.45	299	354	Α	V
		2492.12	53.82	-20.18	74	38.56	32.6	18.12	35.46	299	354	Р	V
		2483.92	45.76	-8.24	54	30.63	32.47	18.11	35.45	299	354	Α	V

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Remark

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[.] No other spurious found.

^{2.} All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

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BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBµV/m)	Limit (dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	
BLE		4804	39.68	-34.32	74	52.8	34	11.82	58.94	100	0	Р	Н
CH 00 2402MHz		4804	39.46	-34.54	74	52.58	34	11.82	58.94	100	0	Р	V
		4880	38.84	-35.16	74	51.47	34.1	12.02	58.75	100	0	Р	Н
BLE		7320	40.63	-33.37	74	48.03	35.6	14.48	57.48	100	0	Р	Н
CH 19 2440MHz		4880	39.3	-34.7	74	51.93	34.1	12.02	58.75	100	0	Р	V
2440WITI2		7320	40.89	-33.11	74	48.29	35.6	14.48	57.48	100	0	Р	V
		4960	39.35	-34.65	74	51.46	34.2	12.24	58.55	100	0	Р	Н
BLE		7440	40.86	-33.14	74	48.23	35.6	14.62	57.59	100	0	Р	Н
CH 39		4960	40.44	-33.56	74	52.55	34.2	12.24	58.55	100	0	Р	V
2480MHz		7440	39.82	-34.18	74	47.19	35.6	14.62	57.59	100	0	Р	V
			ı	1	ı	1			1			1	1

Remark

TEL: 886-3-327-3456 Page Number: C3 of C10

^{1.} No other spurious found.

^{2.} All results are PASS against Peak and Average limit line.

Emission above 18GHz

Report No. : FR092923-01B

2.4GHz BLE (SHF)

ВТ	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		24601	36.67	-37.33	74	44.11	38.97	6.8	53.21	150	0	Р	Н
BLE SHF		24384	36.27	-37.73	74	43.95	39.01	6.7	53.39	150	0	Р	V
Remark		o other spurious		mit line.									

TEL: 886-3-327-3456 Page Number : C4 of C10

Emission below 1GHz

Report No. : FR092923-01B

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		129.09	30.5	-13	43.5	41.13	17.43	1.9	29.96	-	-	Р	Н
		135.84	29.5	-14	43.5	40.01	17.5	1.95	29.96	-	-	Р	Н
		142.86	26.73	-16.77	43.5	37.26	17.42	2	29.95	-	-	Р	Н
		759.2	30.22	-15.78	46	27.3	27.78	4.68	29.54	-	-	Р	Н
0.4011		880.3	31.6	-14.4	46	26.73	28.89	5.06	29.08	-	-	Р	Н
2.4GHz BLE		958.7	33.7	-12.3	46	26.63	30.44	5.28	28.65	100	0	Р	Н
LF		30	32.01	-7.99	40	36.77	24.32	0.93	30.01	100	0	Р	٧
LF		37.29	30.72	-9.28	40	39.22	20.47	1.03	30	-	-	Р	٧
		50.25	25.27	-14.73	40	39.86	14.2	1.2	29.99	-	-	Р	٧
		862.1	32.04	-13.96	46	27.31	28.89	5	29.16	-	-	Р	٧
		920.9	32.43	-13.57	46	27.01	29.11	5.18	28.87	-	-	Р	٧
		954.5	33.49	-12.51	46	26.41	30.48	5.27	28.67	-	-	Р	٧
Remark		o other spurious		mit line.									

TEL: 886-3-327-3456 Page Number : C5 of C10

<2Mbps>

2.4GHz 2400~2483.5MHz

Report No. : FR092923-01B

BLE (Band Edge @ 3m)

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)
		2378.985	52.21	-21.79	74	37.76	31.87	17.99	35.41	296	228	Р	Н
		2382.03	42.65	-11.35	54	28.19	31.87	18	35.41	296	228	Α	Н
DI E	*	2402	102.76	-	-	88.25	31.9	18.03	35.42	296	228	Р	Н
BLE CH 00	*	2402	101.14	-	-	86.63	31.9	18.03	35.42	296	228	Α	Н
2402MHz		2342.655	52.48	-21.52	74	38.16	31.8	17.92	35.4	157	288	Р	V
2402111112		2340.24	42.65	-11.35	54	28.33	31.8	17.92	35.4	157	288	Α	V
	*	2402	103.01	-	-	88.5	31.9	18.03	35.42	157	288	Р	V
	*	2402	101.39	-	-	86.88	31.9	18.03	35.42	157	288	Α	V
		2388.12	53.85	-20.15	74	39.35	31.9	18.01	35.41	313	232	Р	Н
		2387.14	43.48	-10.52	54	28.98	31.9	18.01	35.41	313	232	Α	Н
	*	2440	105.74	-	-	90.9	32.2	18.07	35.43	313	232	Р	Н
	*	2440	104.03	-	-	89.19	32.2	18.07	35.43	313	232	Α	Н
		2485.65	55.17	-18.83	74	40.04	32.47	18.11	35.45	313	232	Р	Н
BLE		2489.71	44.32	-9.68	54	29.05	32.6	18.12	35.45	313	232	Α	Н
CH 19 2440MHz		2352	53.36	-20.64	74	38.99	31.83	17.94	35.4	317	231	Р	V
2440WIFI2		2365.3	43.59	-10.41	54	29.21	31.83	17.96	35.41	317	231	Α	٧
	*	2440	105.67	-	-	90.83	32.2	18.07	35.43	317	231	Р	V
	*	2440	104.12	-	-	89.28	32.2	18.07	35.43	317	231	Α	V
		2489.08	53.64	-20.36	74	38.37	32.6	18.12	35.45	317	231	Р	V
		2493.91	44.3	-9.7	54	29.03	32.6	18.13	35.46	317	231	Α	V

TEL: 886-3-327-3456 Page Number : C6 of C10



	*	2480	103.48	-	-	88.34	32.47	18.12	35.45	295	237	Р	Н
	*	2480	101.77	-	-	86.63	32.47	18.12	35.45	295	237	Α	Н
D. F.		2492.12	53.52	-20.48	74	38.26	32.6	18.12	35.46	295	237	Р	Н
BLE		2483.52	45.41	-8.59	54	30.28	32.47	18.11	35.45	295	237	Α	Н
CH 39 2480MHz	*	2480	102.94	-	-	87.8	32.47	18.12	35.45	157	346	Р	V
2400WIF12	*	2480	101.31		-	86.17	32.47	18.12	35.45	157	346	Α	V
		2485	53.63	-20.37	74	38.5	32.47	18.11	35.45	157	346	Р	V
		2483.52	45.46	-8.54	54	30.33	32.47	18.11	35.45	157	346	Α	V

Report No. : FR092923-01B

Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

TEL: 886-3-327-3456 Page Number : C7 of C10

2.4GHz 2400~2483.5MHz

Report No. : FR092923-01B

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE		4804	39.22	-34.78	74	52.34	34	11.82	58.94	100	0	Р	Н
CH 00													
2402MHz		4804	39.97	-34.03	74	53.09	34	11.82	58.94	100	0	Р	V
		4880	39.97	-34.03	74	52.6	34.1	12.02	58.75	100	0	Р	Н
BLE		7320	41.11	-32.89	74	48.51	35.6	14.48	57.48	100	0	Р	Н
CH 19 2440MHz		4880	39.88	-34.12	74	52.51	34.1	12.02	58.75	100	0	Р	V
2440WII 12		7320	41.07	-32.93	74	48.47	35.6	14.48	57.48	100	0	Р	V
51.5		4960	41.08	-32.92	74	53.19	34.2	12.24	58.55	100	0	Р	Н
BLE		7440	40.98	-33.02	74	48.35	35.6	14.62	57.59	100	0	Р	Н
CH 39		4960	40.38	-33.62	74	52.49	34.2	12.24	58.55	100	0	Р	V
2480MHz		7440	40.24	-33.76	74	47.61	35.6	14.62	57.59	100	0	Р	V
						I			1		I	-	I

Remark

TEL: 886-3-327-3456 Page Number : C8 of C10

^{1.} No other spurious found.

^{2.} All results are PASS against Peak and Average limit line.

Note symbol

Report No. : FR092923-01B

*	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

TEL: 886-3-327-3456 Page Number : C9 of C10

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

Report No.: FR092923-01B

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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	Р	Н
CH 00													
2402MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	Α	Н

- 1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
- 2. Level($dB\mu V/m$) =

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

3. Over Limit(dB) = Level(dB μ V/m) – Limit Line(dB μ V/m)

For Peak Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 54.51(dB\mu V) 35.86 (dB)$
- $= 55.45 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

For Average Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 42.6(dB\mu V) 35.86 (dB)$
- $= 43.54 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

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

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Appendix D. Radiated Spurious Emission Plots

Toot Engineer :	Jesse Wang, Stan Hsieh and Ken Wu	Temperature :	20~25°C	
Test Engineer :		Relative Humidity :	50~58%	

Report No.: FR092923-01B

Note symbol

-L	Low channel location
-R	High channel location

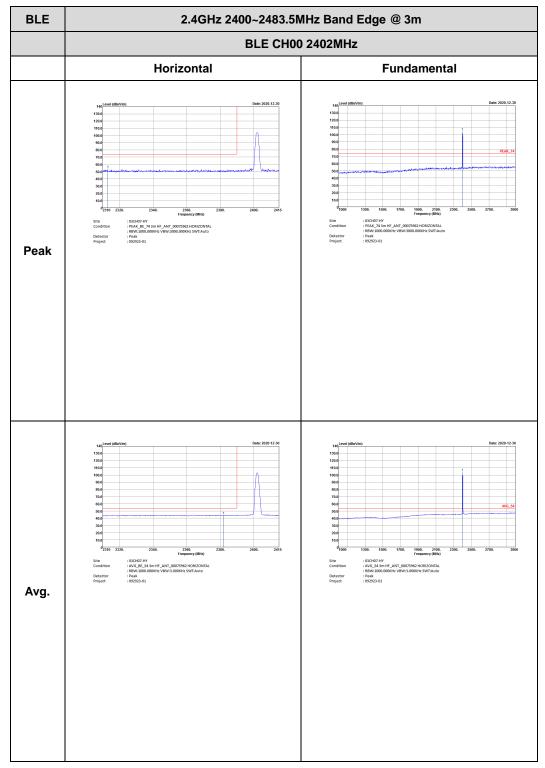
TEL: 886-3-327-3456 Page Number: D1 of D25

<1Mbps>

2.4GHz 2400~2483.5MHz

Report No.: FR092923-01B

BLE (Band Edge @ 3m)

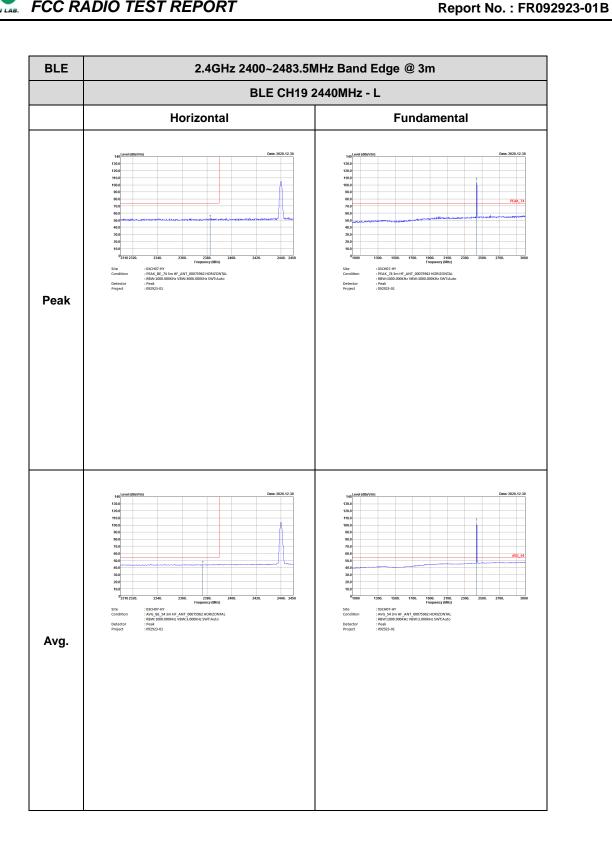


TEL: 886-3-327-3456 Page Number: D2 of D25

Report No.: FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH00 2402MHz Vertical **Fundamental** Peak Avg

TEL: 886-3-327-3456 Page Number : D3 of D25

FCC RADIO TEST REPORT



TEL: 886-3-327-3456 Page Number: D4 of D25

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

Report No.: FR092923-01B

TEL: 886-3-327-3456 Page Number: D5 of D25

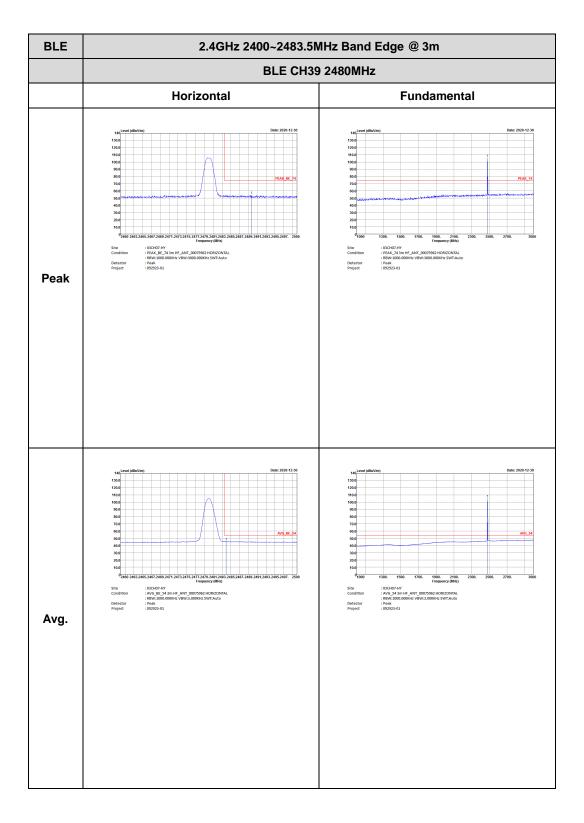
Report No.: FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH19 2440MHz - L Vertical **Fundamental** Peak Avg.

TEL: 886-3-327-3456 Page Number : D6 of D25

Report No.: FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH19 2440MHz - R Vertical **Fundamental** Peak Left blank Left blank Avg.

TEL: 886-3-327-3456 Page Number : D7 of D25

Report No.: FR092923-01B



: D8 of D25 TEL: 886-3-327-3456 Page Number

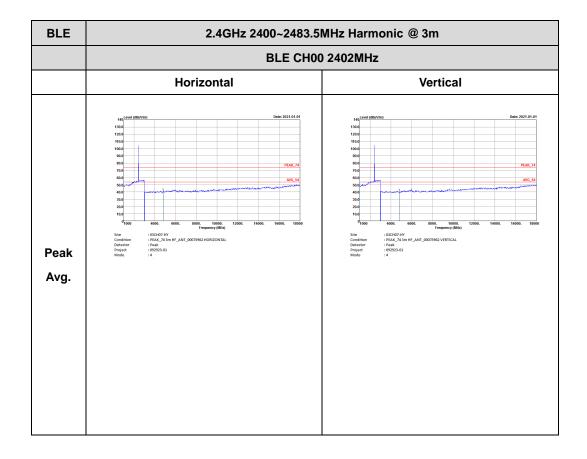
Report No.: FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m **BLE CH39 2480MHz** Vertical **Fundamental** Peak Avg.

TEL: 886-3-327-3456 Page Number : D9 of D25

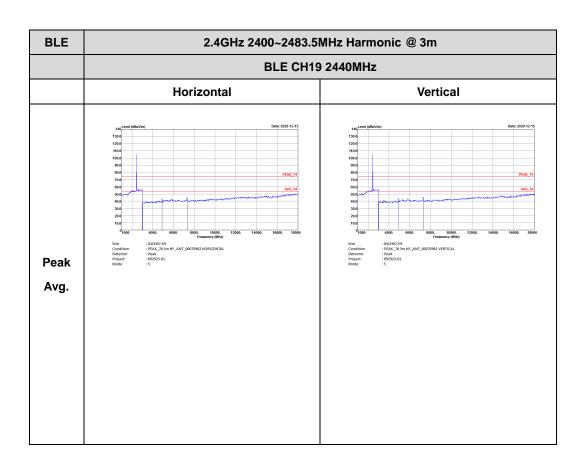
2.4GHz 2400~2483.5MHz

Report No.: FR092923-01B

BLE (Harmonic @ 3m)

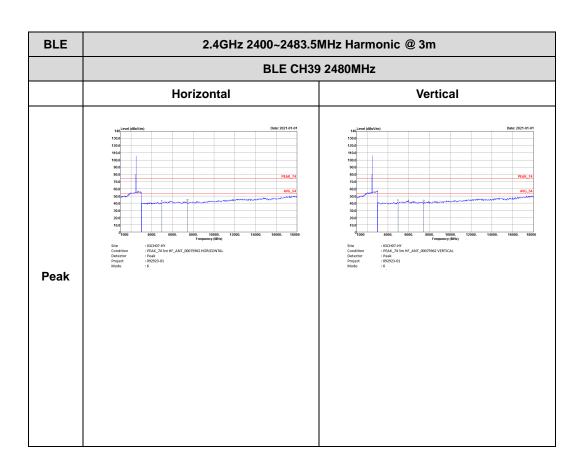


TEL: 886-3-327-3456 Page Number : D10 of D25



Report No.: FR092923-01B

TEL: 886-3-327-3456 Page Number : D11 of D25

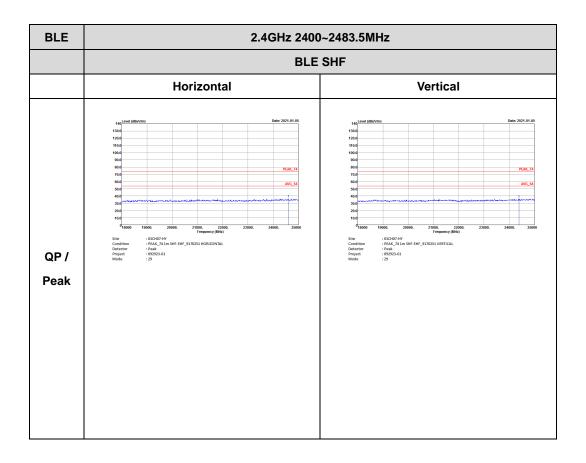


Report No.: FR092923-01B

TEL: 886-3-327-3456 Page Number : D12 of D25

Emission above 18GHz 2.4GHz BLE (SHF)

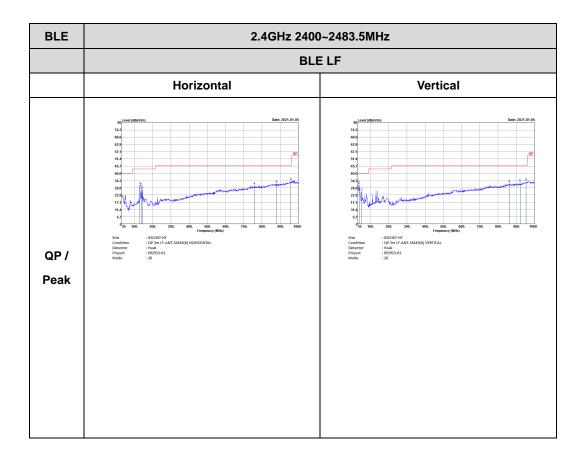
Report No.: FR092923-01B



TEL: 886-3-327-3456 Page Number : D13 of D25

Emission below 1GHz 2.4GHz BLE (LF)

Report No.: FR092923-01B



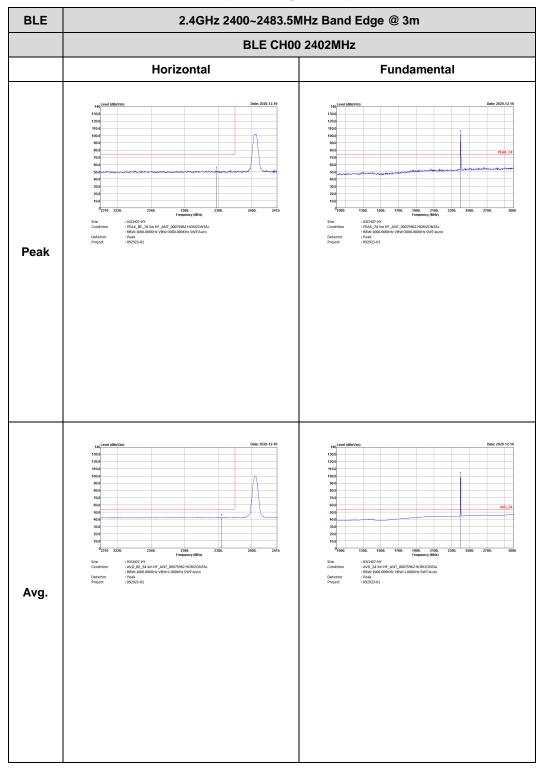
TEL: 886-3-327-3456 Page Number : D14 of D25

<2Mbps>

2.4GHz 2400~2483.5MHz

Report No. : FR092923-01B

BLE (Band Edge @ 3m)

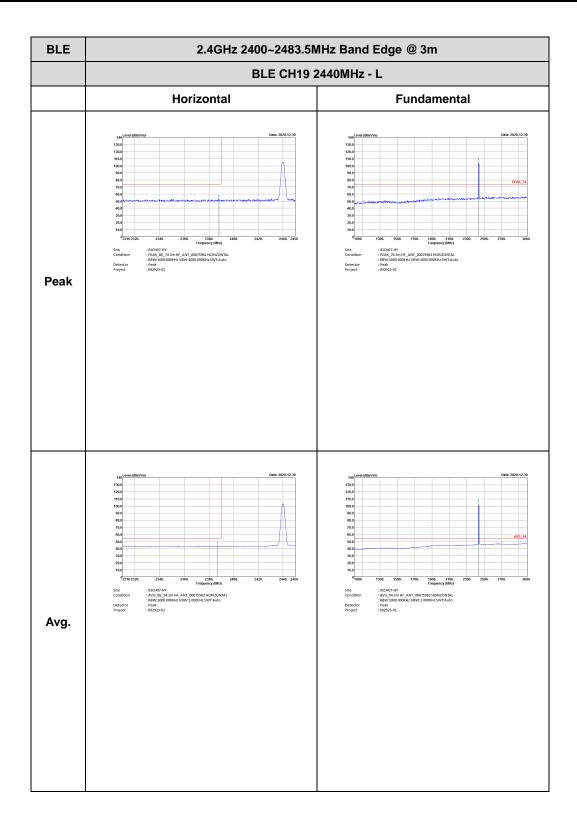


TEL: 886-3-327-3456 Page Number: D15 of D25

Report No. : FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH00 2402MHz Vertical **Fundamental** Peak Avg

TEL: 886-3-327-3456 Page Number : D16 of D25

Report No. : FR092923-01B



: D17 of D25 TEL: 886-3-327-3456 Page Number

Avg.

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

Left blank

Report No. : FR092923-01B

TEL: 886-3-327-3456 Page Number : D18 of D25 FAX: 886-3-328-4978

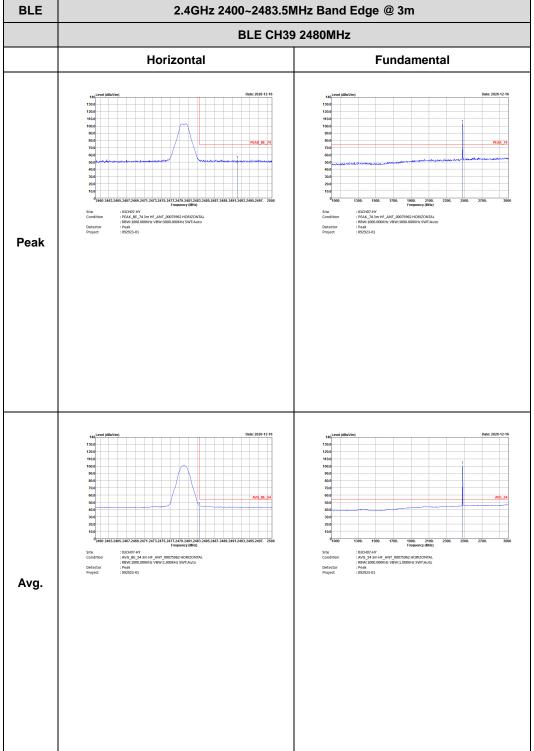
Report No. : FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH19 2440MHz - L Vertical **Fundamental** Peak Avg.

TEL: 886-3-327-3456 Page Number : D19 of D25

Report No. : FR092923-01B BLE 2.4GHz 2400~2483.5MHz Band Edge @ 3m BLE CH19 2440MHz - R Vertical **Fundamental** Peak Left blank Left blank Avg.

TEL: 886-3-327-3456 Page Number : D20 of D25

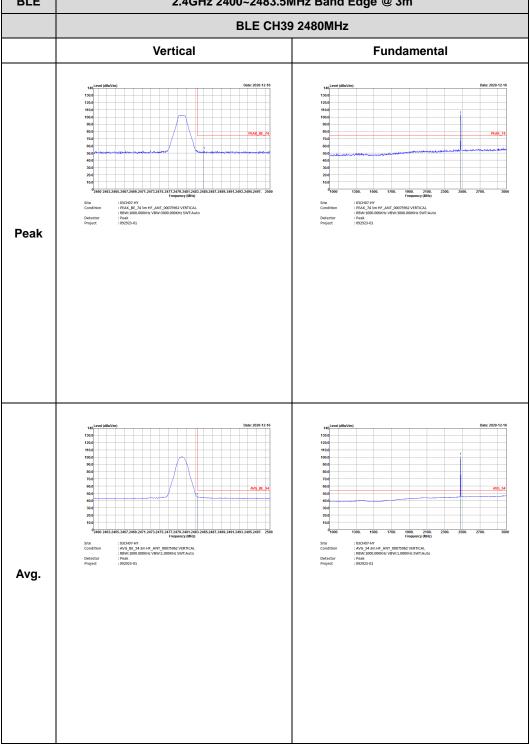
Report No. : FR092923-01B 2.4GHz 2400~2483.5MHz Band Edge @ 3m



TEL: 886-3-327-3456 Page Number : D21 of D25

 FCC RADIO TEST REPORT
 Report No. : FR092923-01B

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

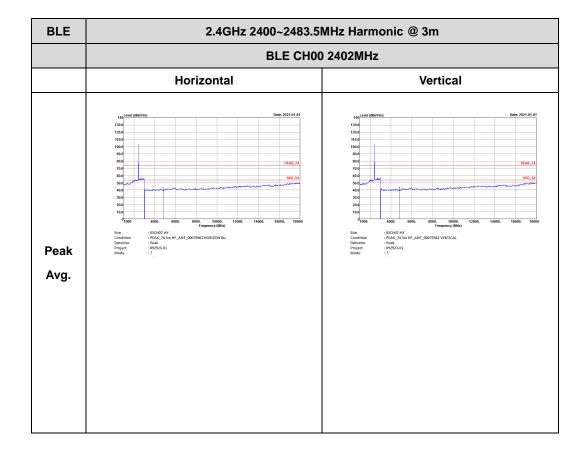


TEL: 886-3-327-3456 Page Number : D22 of D25

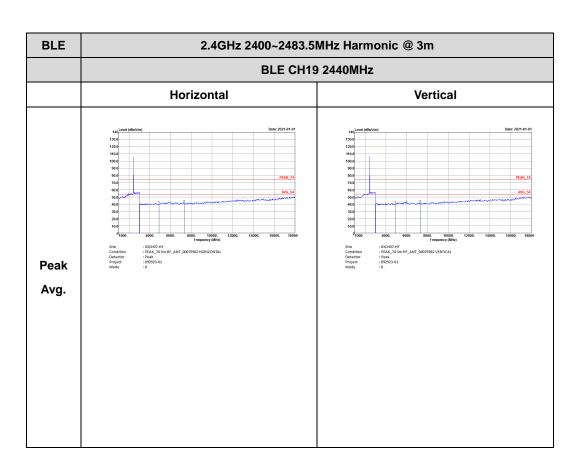
2.4GHz 2400~2483.5MHz

Report No. : FR092923-01B

BLE (Harmonic @ 3m)

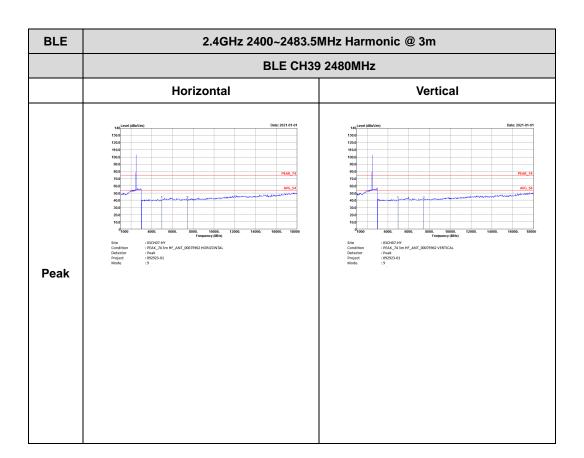


TEL: 886-3-327-3456 Page Number: D23 of D25



Report No. : FR092923-01B

TEL: 886-3-327-3456 Page Number : D24 of D25

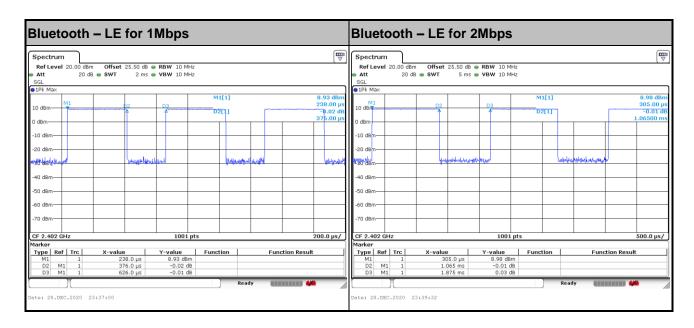


Report No. : FR092923-01B

TEL: 886-3-327-3456 Page Number : D25 of D25

Appendix E. Duty Cycle Plots

Band	Duty Cycle(%) T(us)		1/T(kHz)	VBW Setting	Duty Factor(dB)	
Bluetooth –LE for 1Mbps	60.06	376	2.66	3kHz	2.21	
Bluetooth –LE for 2Mbps	56.8	1065	0.94	1kHz	2.46	





Report No.: FR092923-01B

TEL: 886-3-327-3456 Page Number : E1 of E1