



# FCC RADIO TEST REPORT

**FCC ID** : XRAFB422  
**Equipment** : Wireless Activity Tracker  
**Brand Name** : Fitbit  
**Model Name** : FB422  
**Applicant** : Fitbit, Inc.  
199 Fremont Street, 14th Floor,  
San Francisco, CA 94105 USA  
**Manufacturer** : Fitbit, Inc.  
199 Fremont Street, 14th Floor,  
San Francisco, CA 94105 USA  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on Dec. 23, 2020 and testing was started from Jan. 05, 2021 and completed on Jan. 26, 2021. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

*Louis Wu*

Approved by: Louis Wu

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, 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 2.64 dB at 18000.000 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 12.26 dB at 1.430 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: Wii Chang**

**Report Producer: Ruby Zou**



# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Bluetooth-LE

Product Specification subjective to this standard	
Sample 1	EUT with Battery Highpower
Sample 2	EUT with Battery ATL
Antenna Type	Slot Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	-7.85

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

## 1.2 Modification of EUT

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

## 1.3 Testing Location

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

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

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	<b>Sporton Site No.</b> 03CH15-HY

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

FCC designation No.: TW1190 and TW0007



## **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, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- 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
<b>Conducted Test Cases</b>	<b>Bluetooth – LE / GFSK</b>
	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
<b>Radiated Test Cases</b>	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
<b>AC Conducted Emission</b>	Mode 1: Bluetooth Link with Mobile Phone + Vibrate + Screen Flicker + Heart Rate Meter On + Plastic Strap + USB Cable (Charging with Notebook) for Sample 1
	Mode 2: Bluetooth Link with Mobile Phone + Vibrate + Screen Flicker + Heart Rate Meter On + Metal Strap + USB Cable (Charging with Notebook) for Sample 2
<b>Remark:</b>	
1. The worst case of conducted emission is mode 1; only the test data of it was reported.	
2. For Radiated Test Cases, the tests were performed with Sample 1	



### 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.	Mobile Phone	Apple	MG492TA/A	N/A	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
4.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Notebook	Lenovo	L570	NA	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

### 2.5 EUT Operation Test Setup

The RF test items, utility “Tera Term Version 4.89” 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.

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

### 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 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.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup

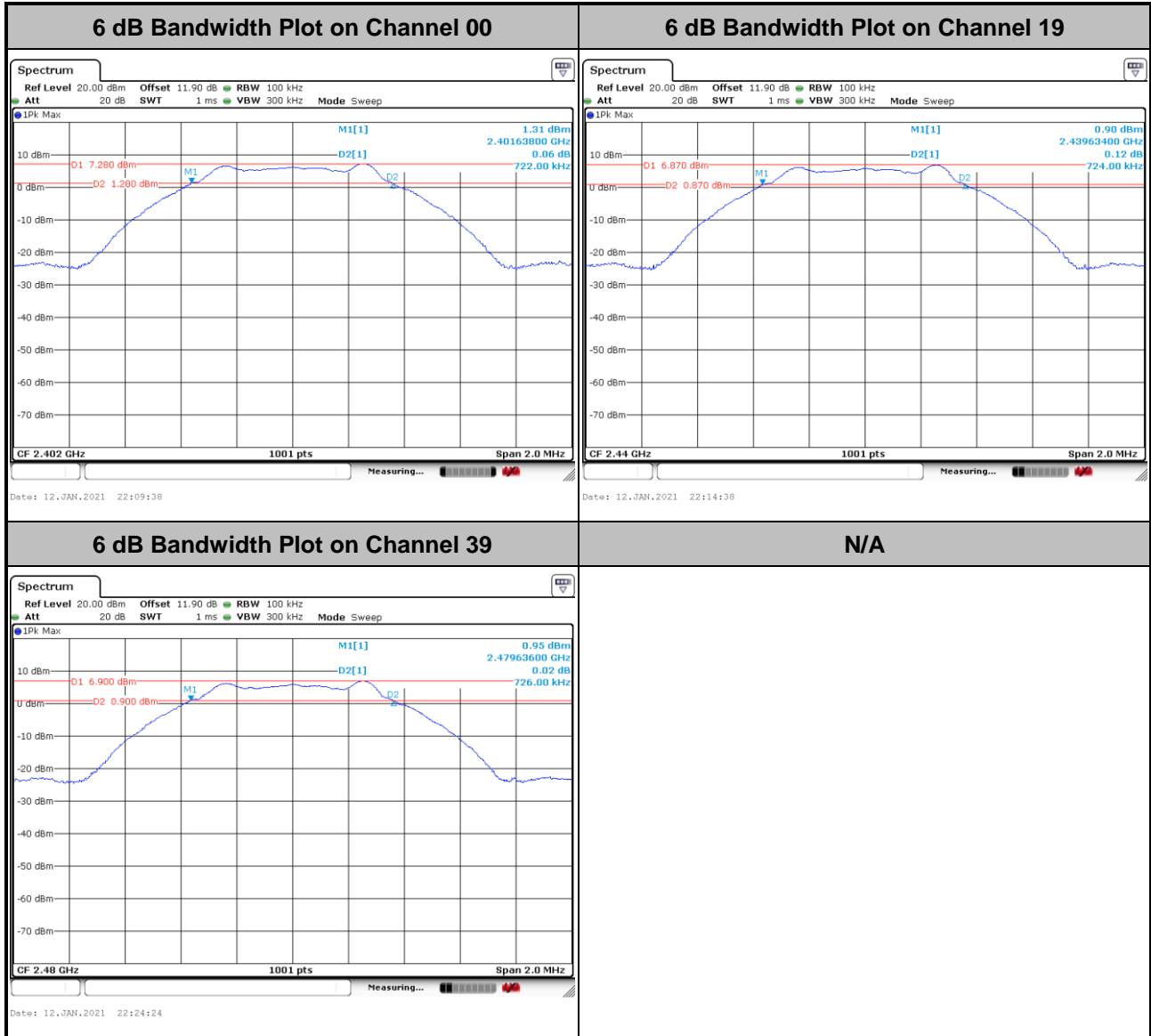




### 3.1.5 Test Result of 6dB Bandwidth

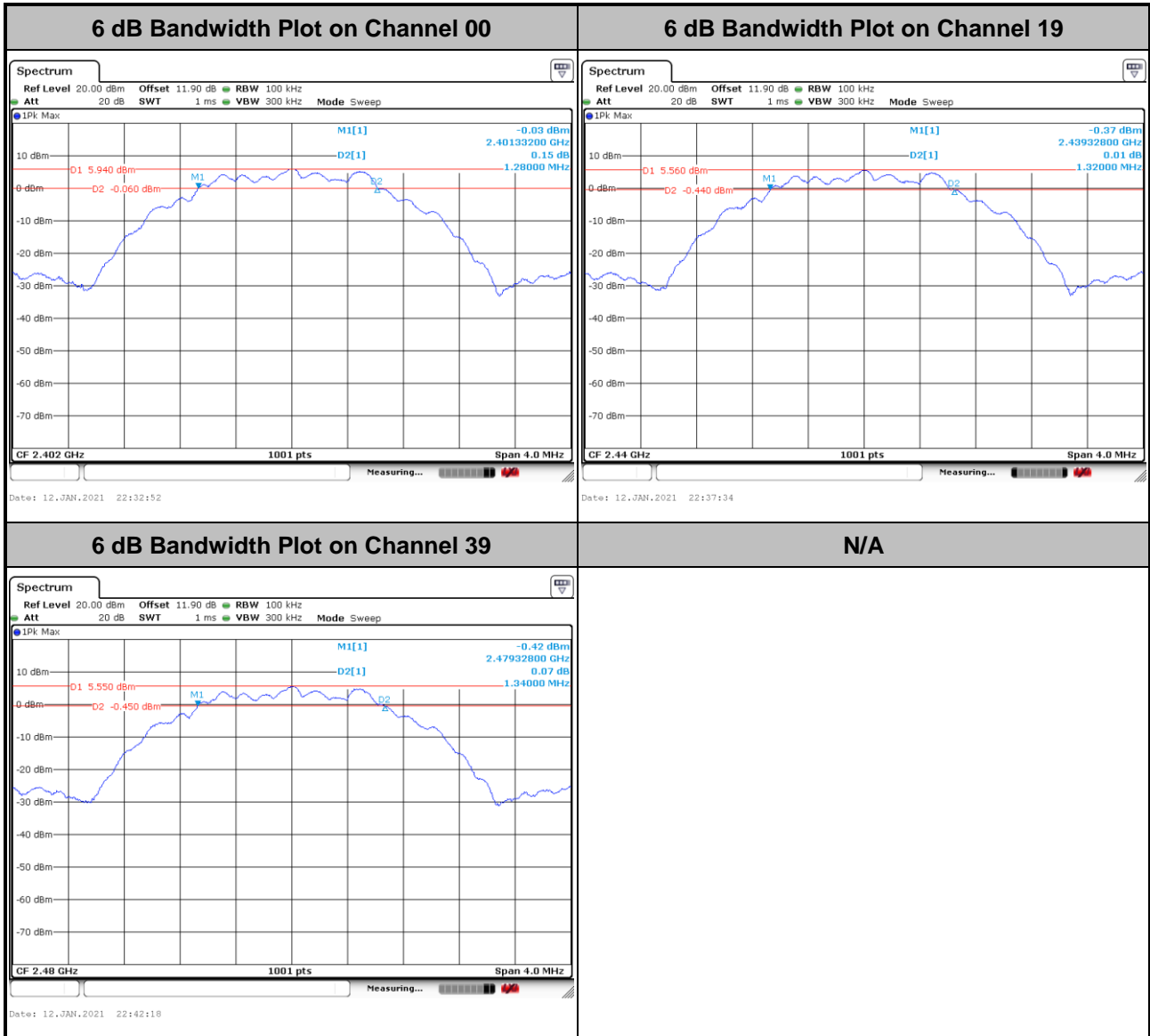
Please refer to Appendix A.

<1Mbps>





<2Mbps>

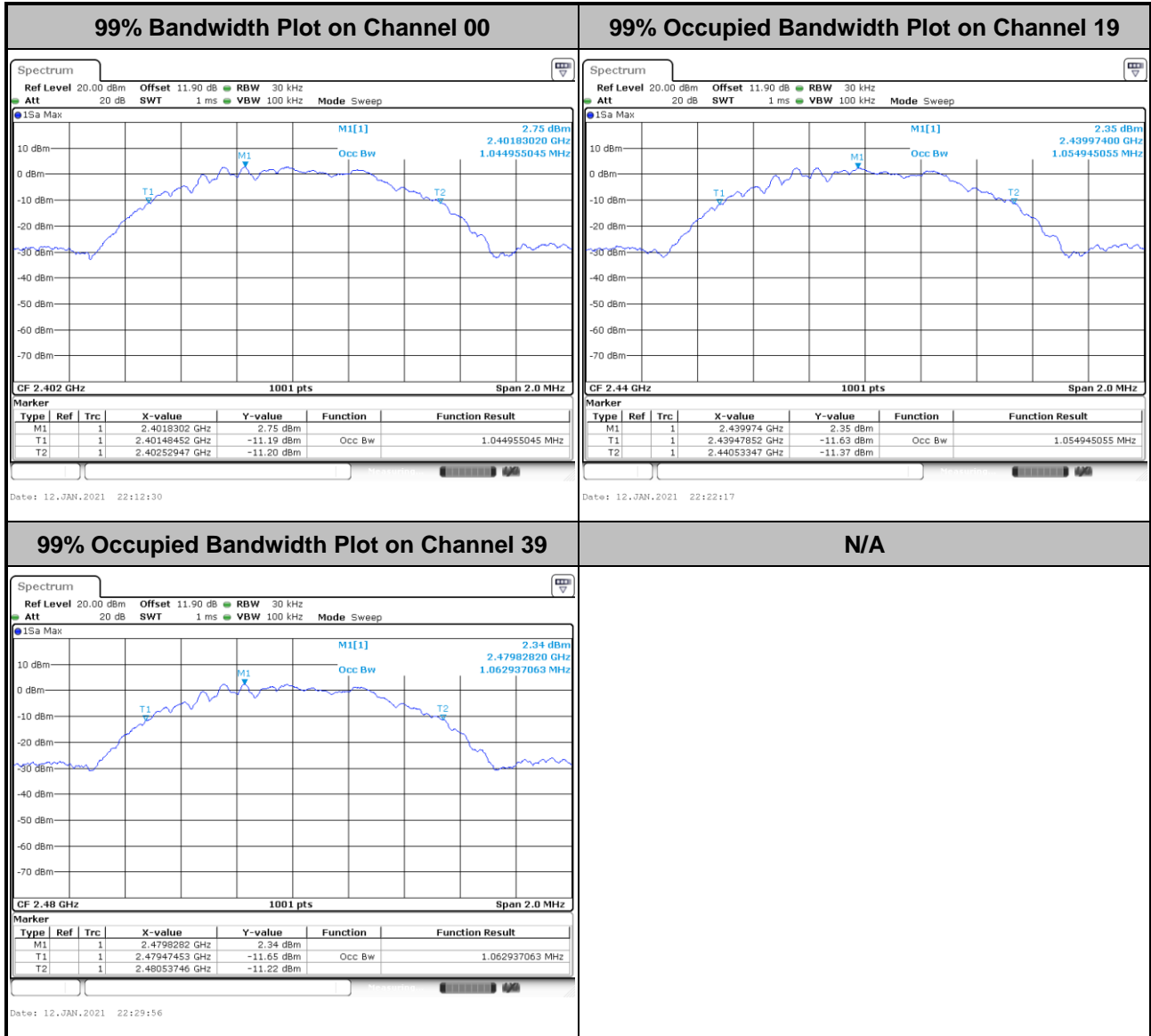




### 3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

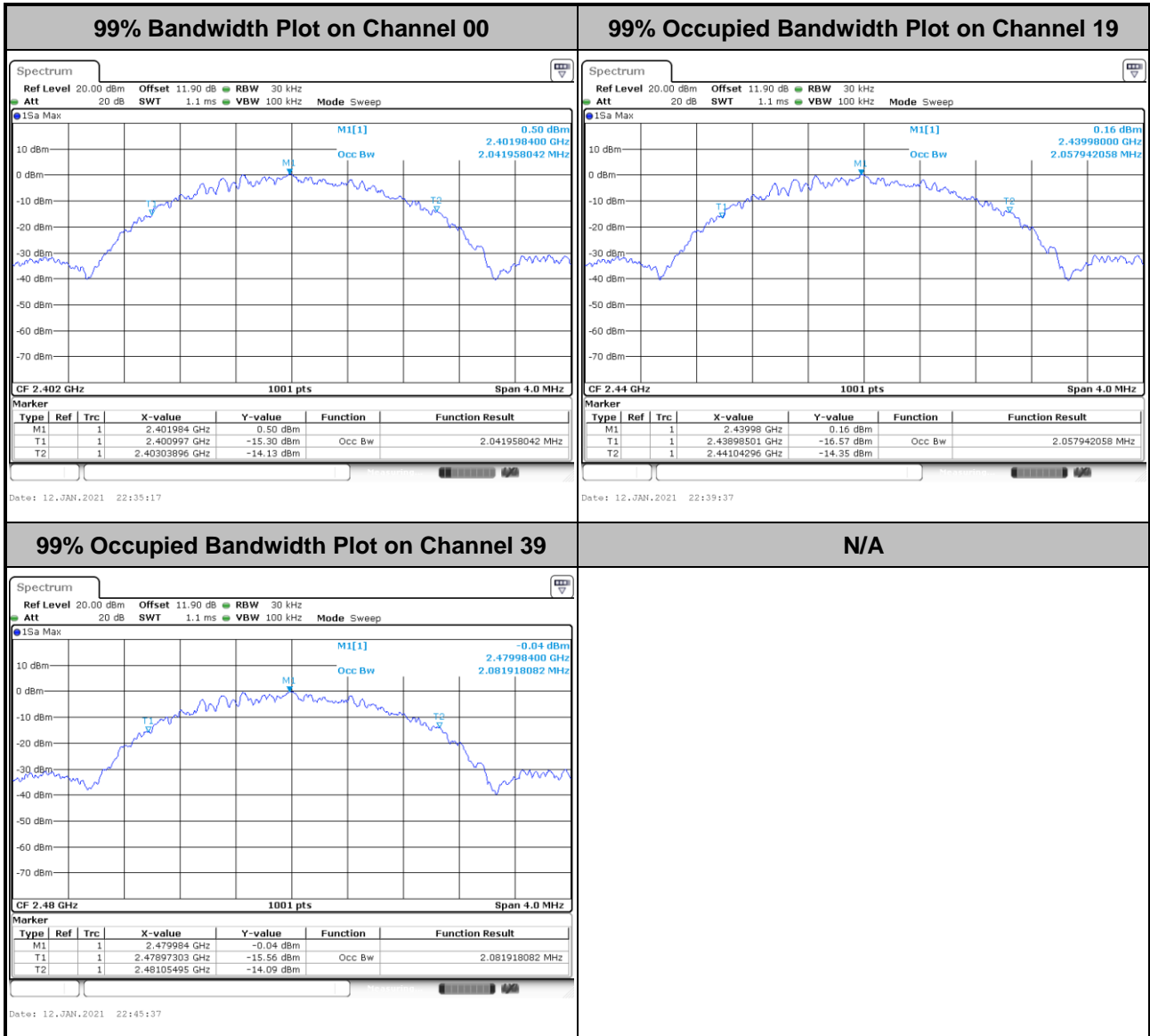
<1Mbps>



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



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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 2400-2483.5MHz, 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.

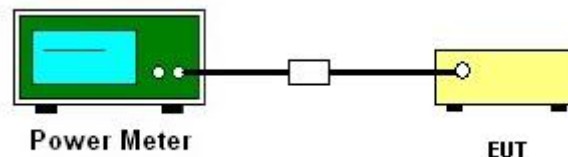
### 3.2.2 Measuring Instruments

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 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.



### 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.

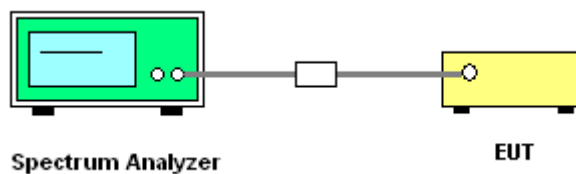
#### 3.3.2 Measuring Instruments

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 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



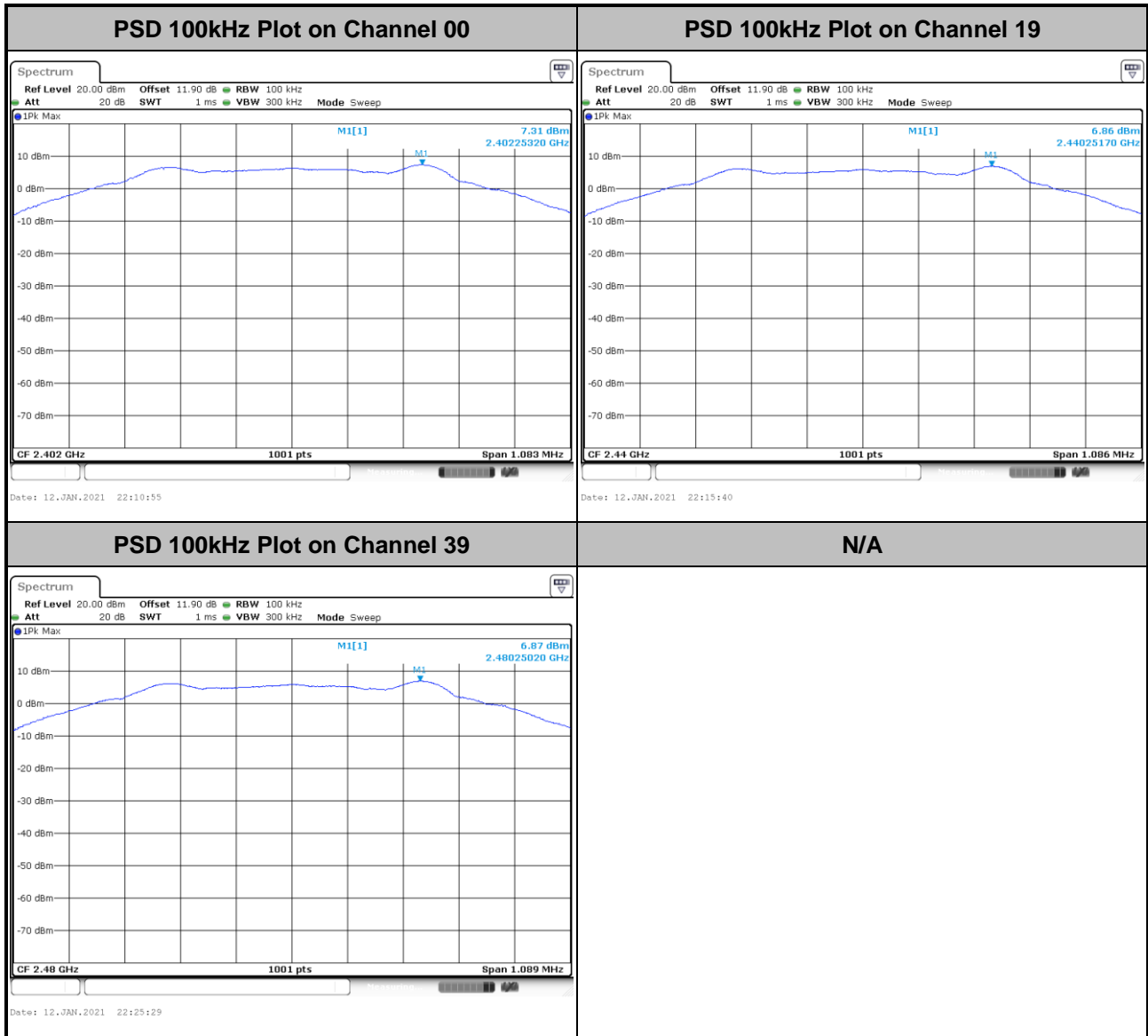
#### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



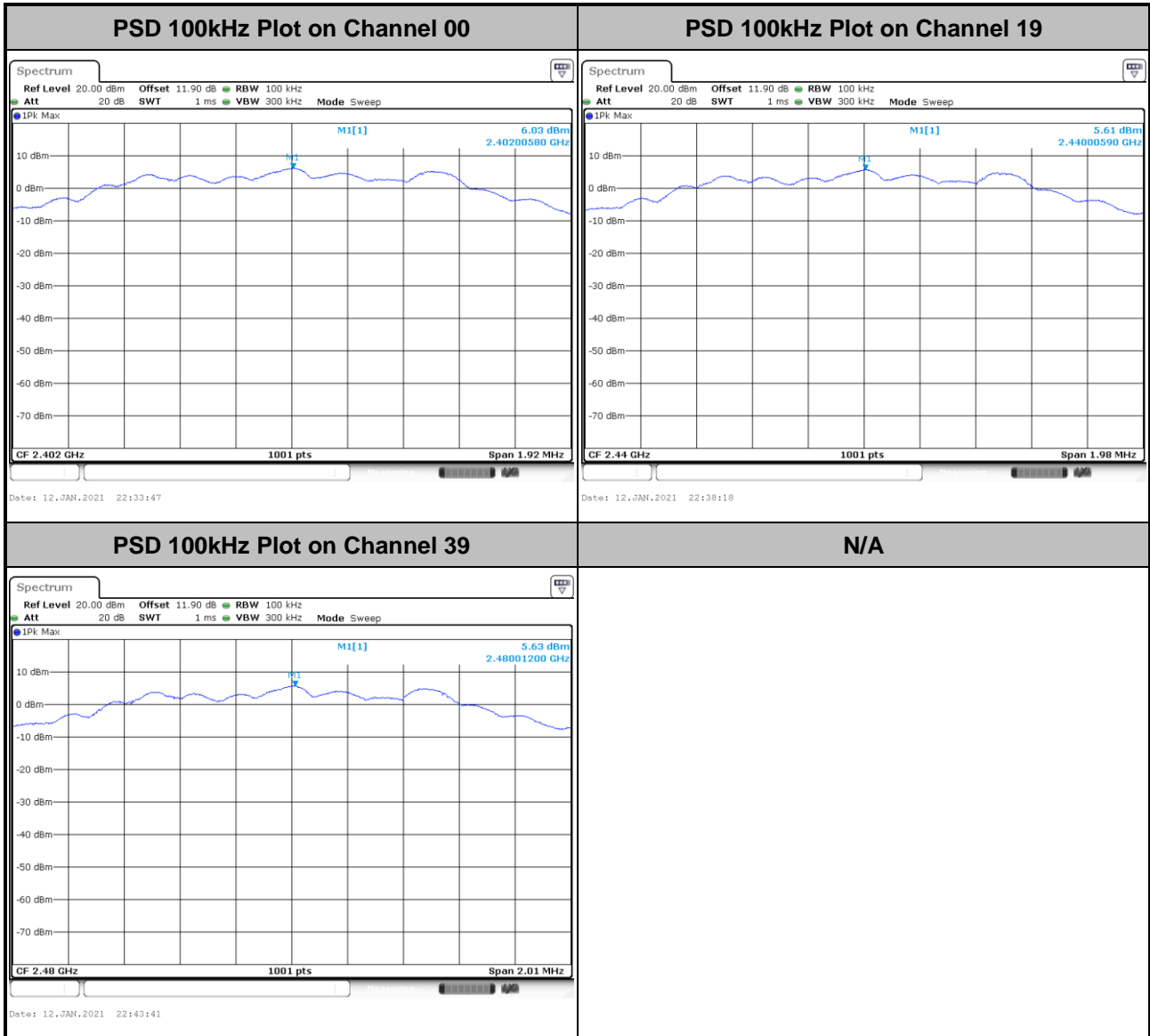
### 3.3.6 Test Result of Power Spectral Density Plots (100kHz)

<1Mbps>





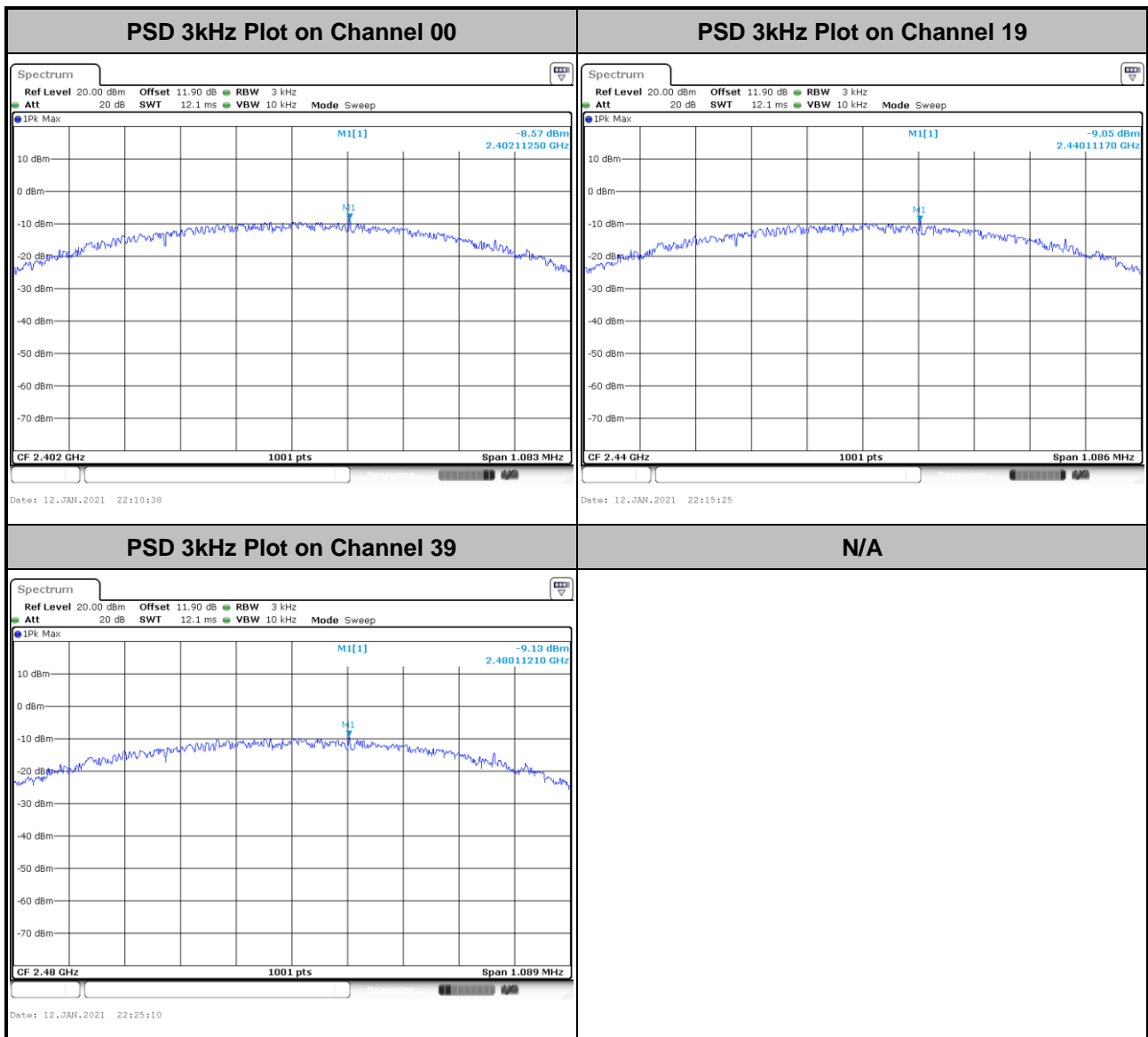
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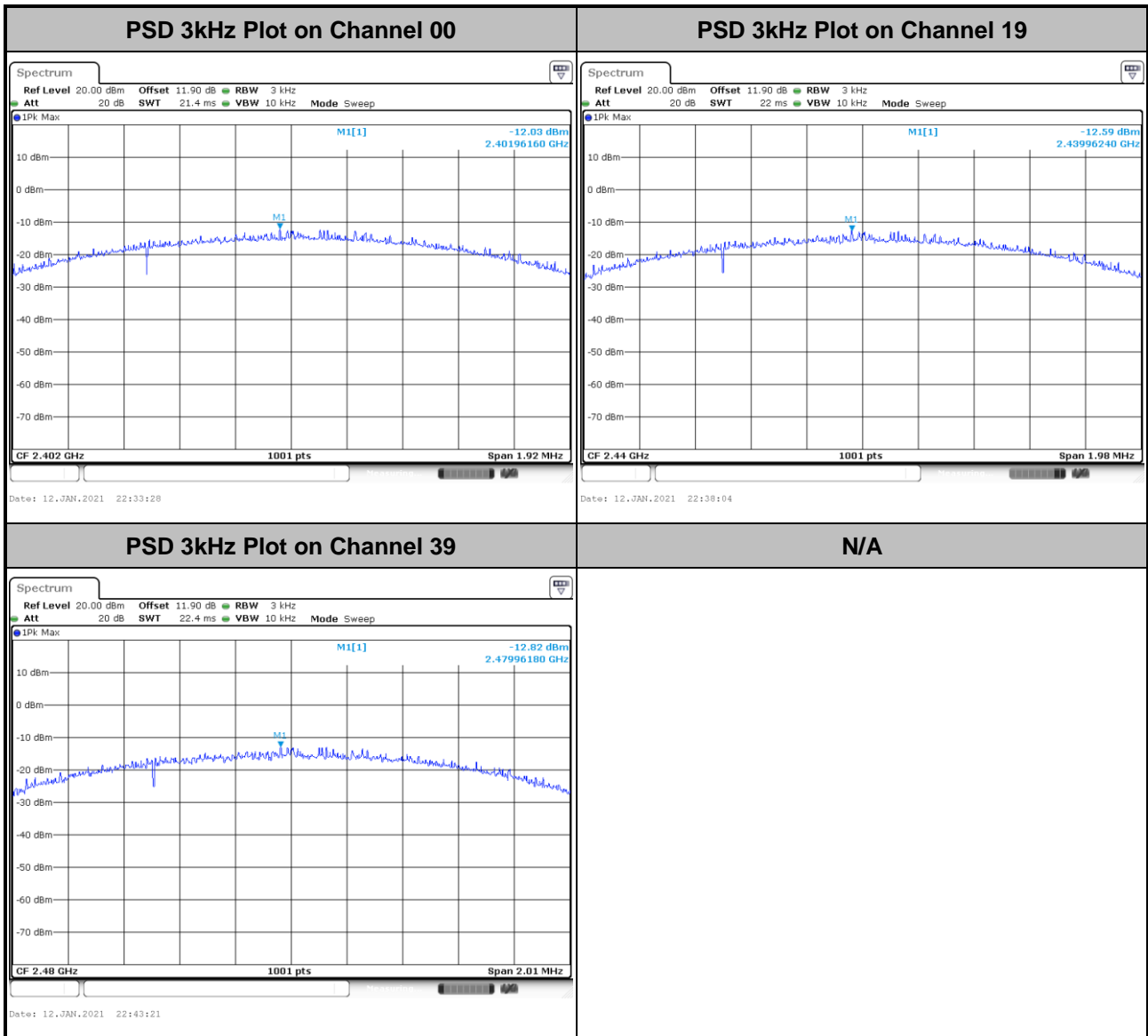
### 3.3.7 Test Result of Power Spectral Density Plots (3kHz)

<1Mbps>





<2Mbps>



## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 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 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.

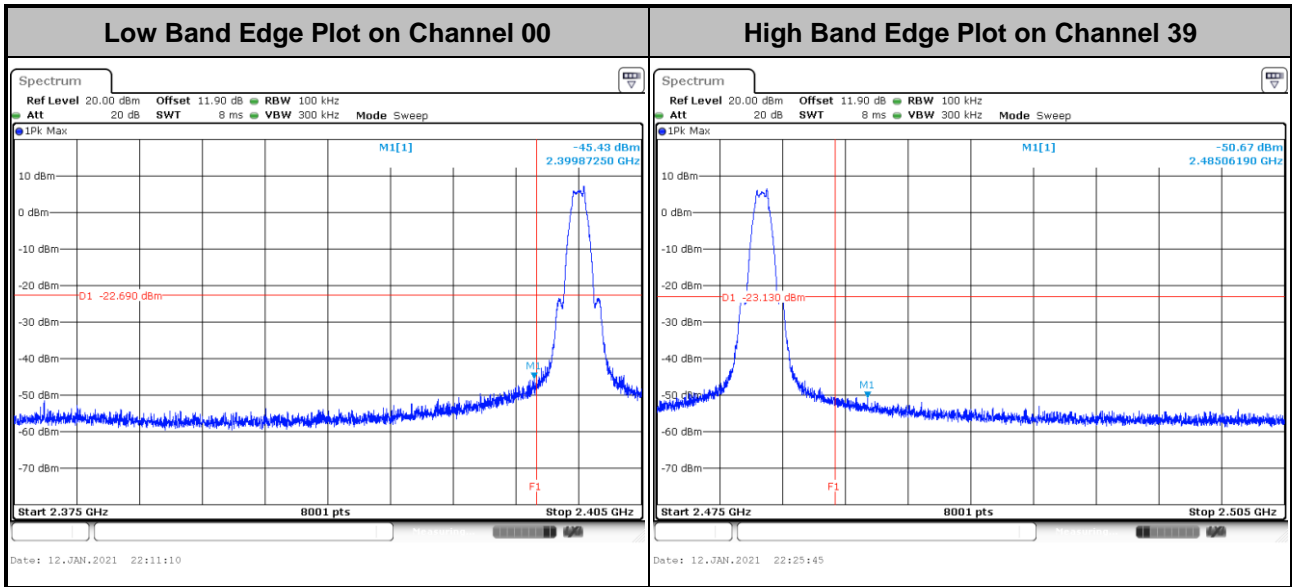
### 3.4.4 Test Setup



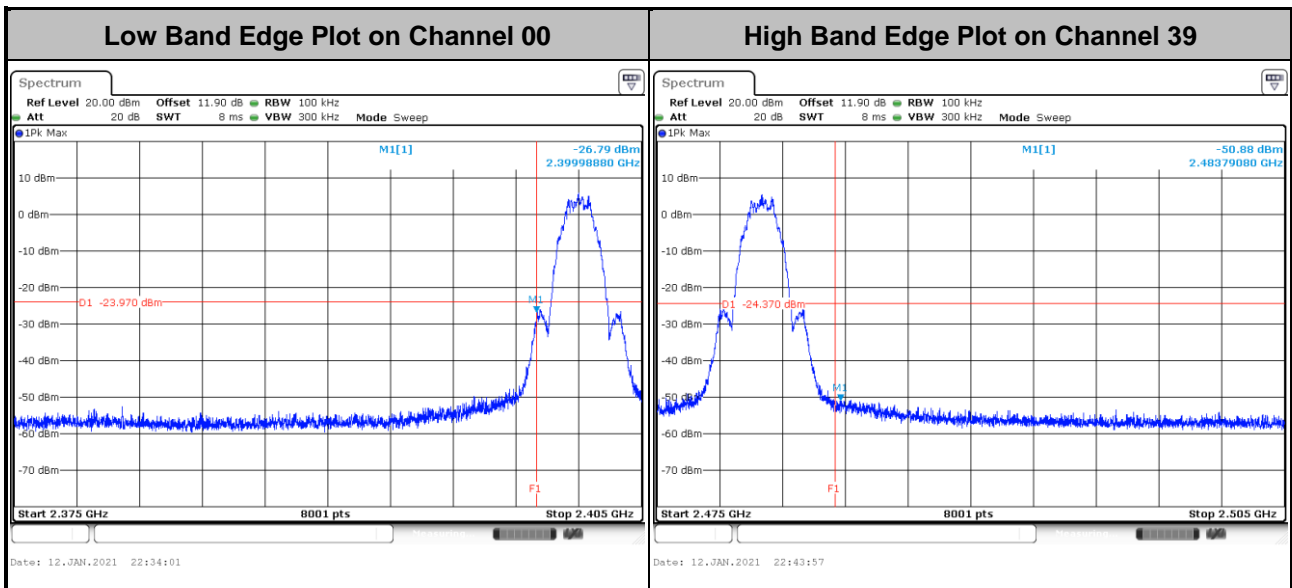


### 3.4.5 Test Result of Conducted Band Edges Plots

<1Mbps>



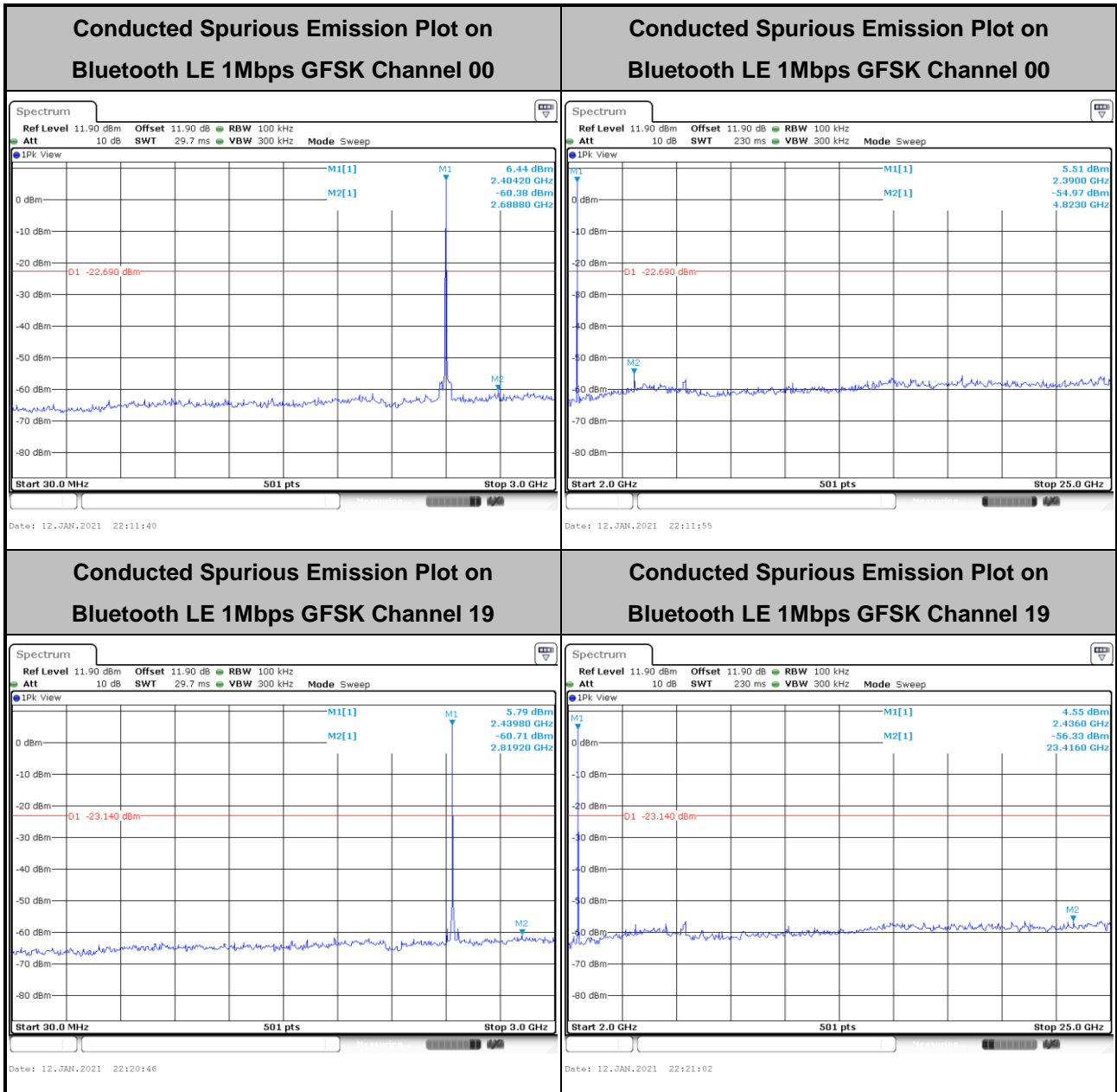
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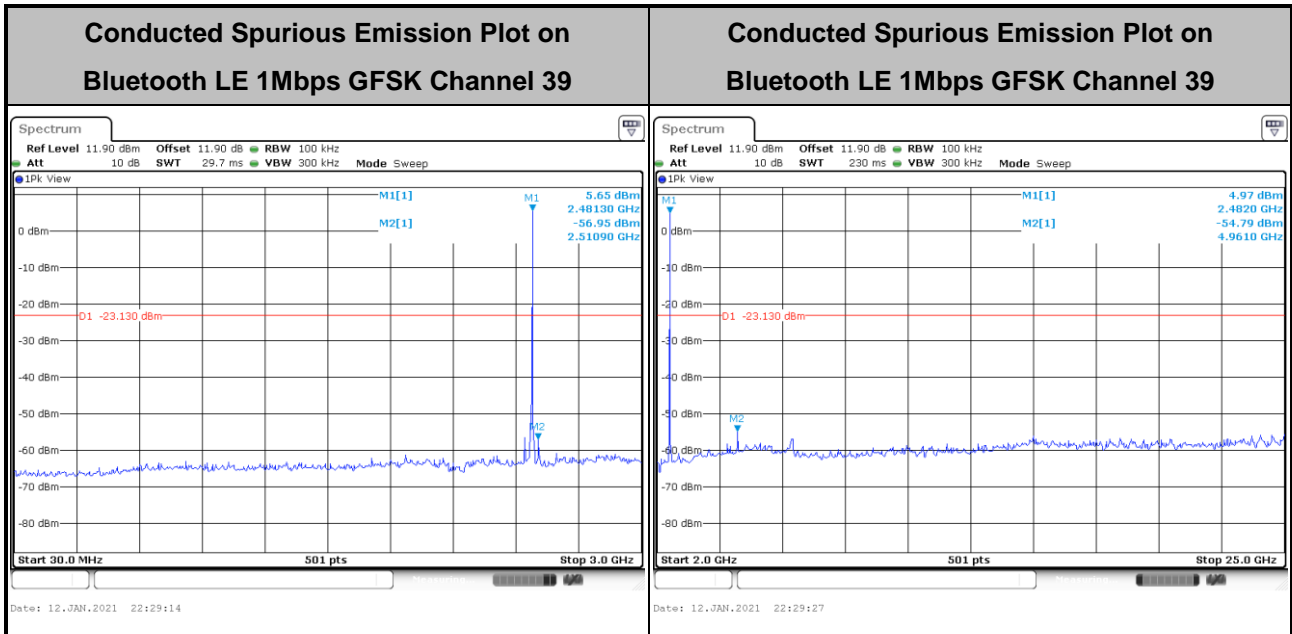


### 3.4.6 Test Result of Conducted Spurious Emission Plots

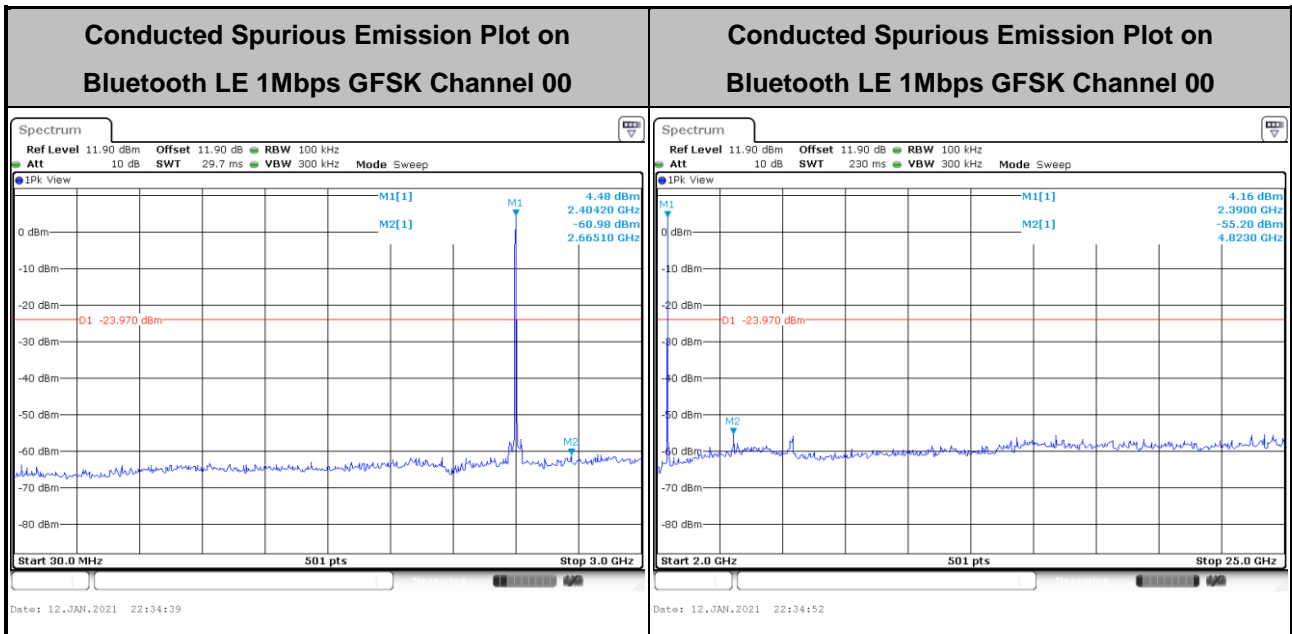
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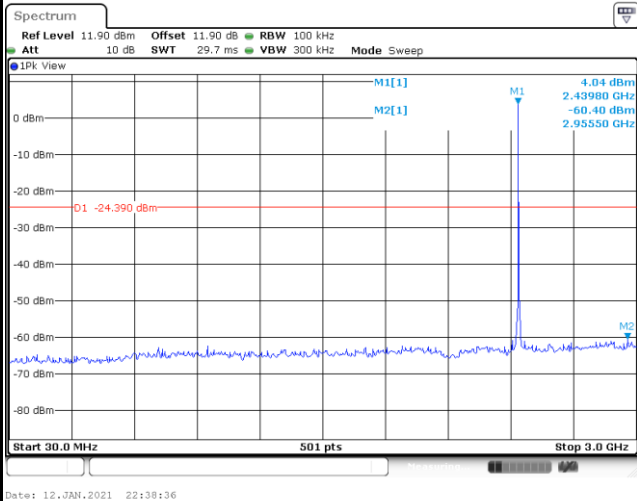


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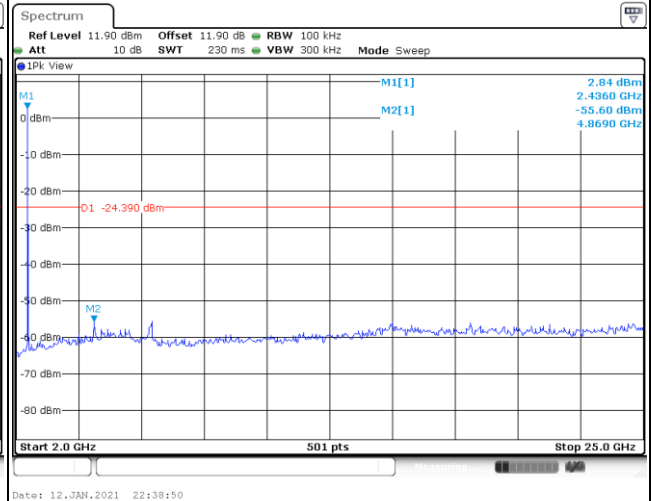




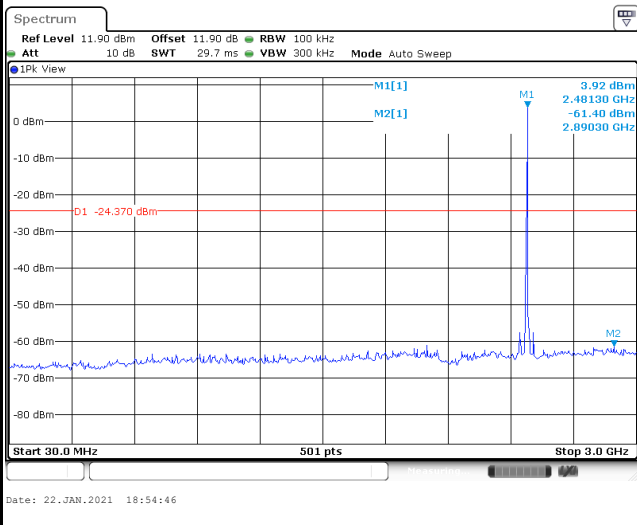
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19



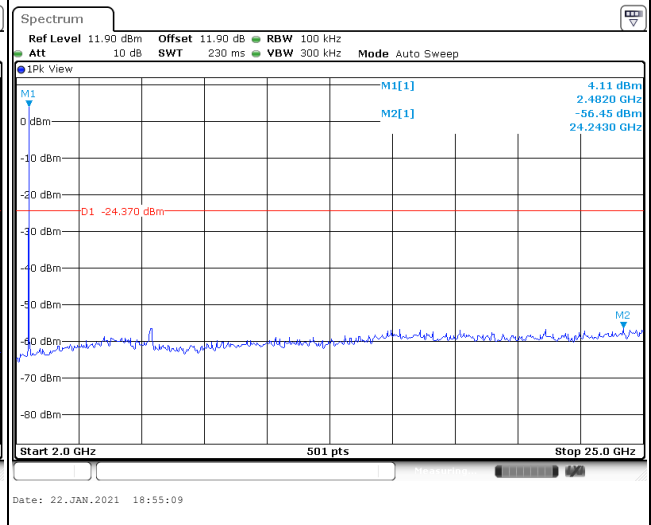
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19



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



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





### 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.

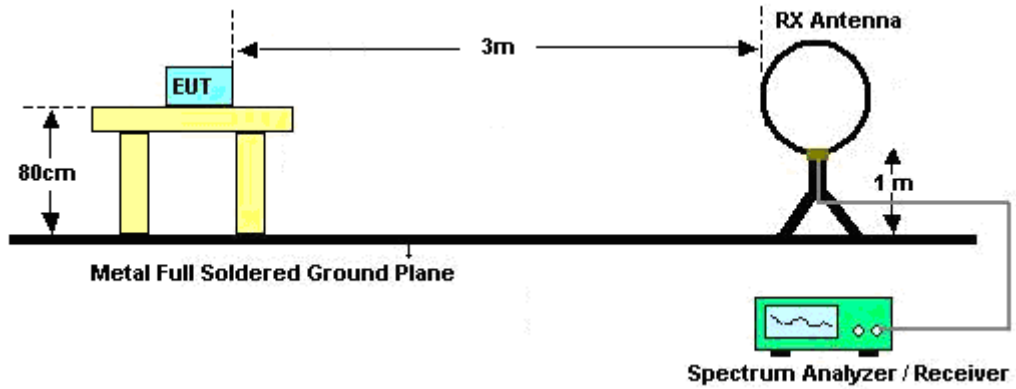


### 3.5.3 Test Procedures

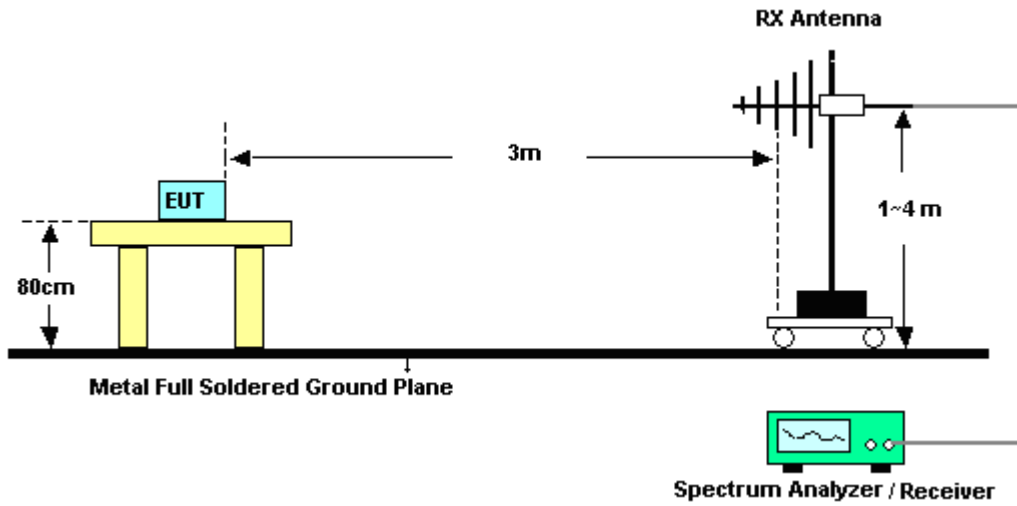
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 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;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz 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

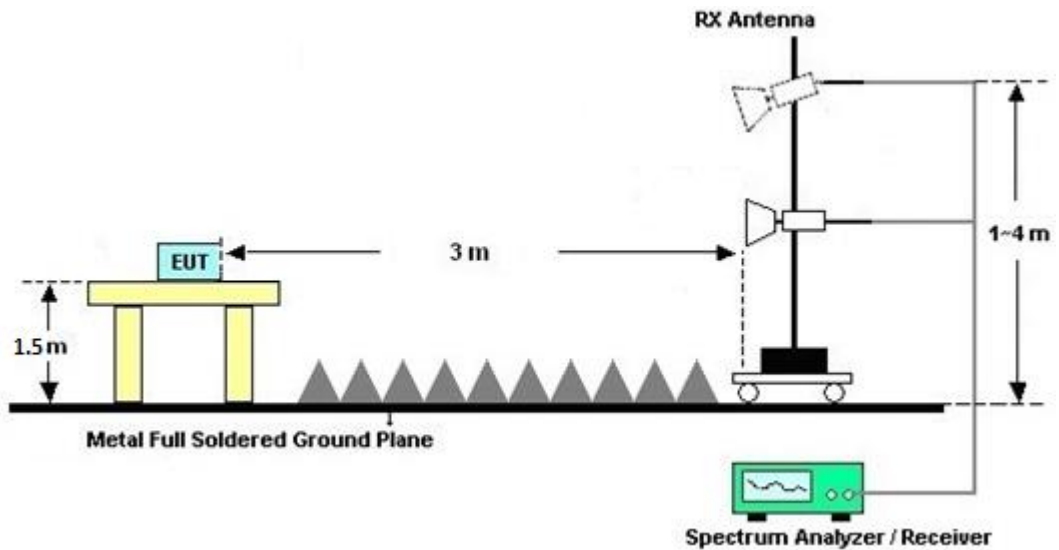
For radiated test below 30MHz



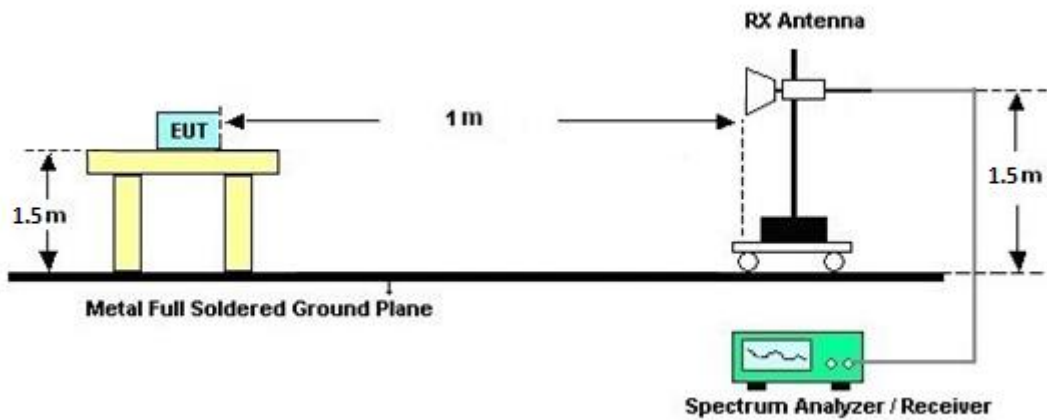
For radiated test from 30MHz to 1GHz



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 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.



### 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 $\mu$ 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.

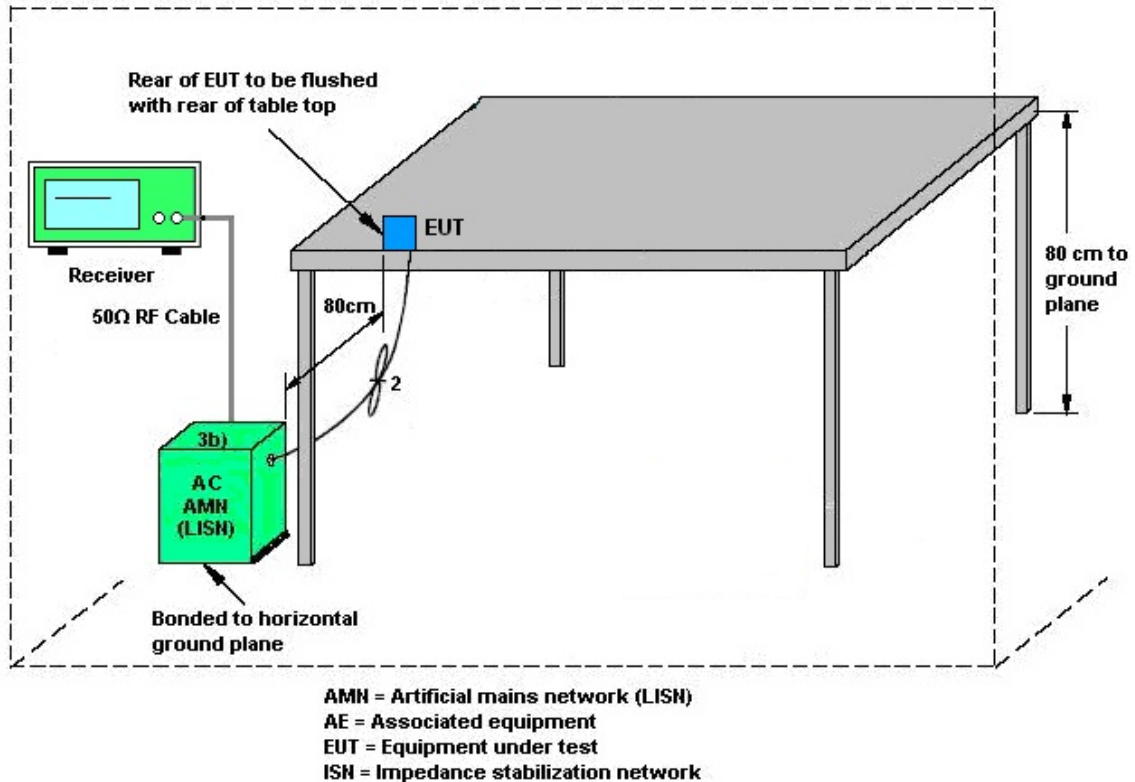
#### 3.6.2 Measuring Instruments

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 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.
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 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.

### **3.7.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.7.3 Antenna Gain**

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



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Jan. 16, 2021~ Jan. 20, 2021	Jul. 13, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	41912 & 05	30MHz~1GHz	Feb. 09, 2020	Jan. 16, 2021~ Jan. 20, 2021	Feb. 08, 2021	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 28, 2020	Jan. 16, 2021~ Jan. 20, 2021	Dec. 27, 2021	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-01620	1GHz~18GHz	Nov. 03, 2020	Jan. 16, 2021~ Jan. 20, 2021	Nov. 02, 2021	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917025 1	18GHz~40GHz	Dec. 02, 2020	Jan. 16, 2021~ Jan. 20, 2021	Dec. 01, 2021	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-30 3	17100018000 55006	1GHz~18GHz	May 07, 2020	Jan. 16, 2021~ Jan. 20, 2021	May 06, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 21, 2020	Jan. 16, 2021~ Jan. 20, 2021	Aug. 20, 2021	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	0600789	18-40GHz	Oct. 27, 2020	Jan. 16, 2021~ Jan. 20, 2021	Oct. 26, 2021	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20MHz~8.4GHz	Nov. 02, 2020	Jan. 16, 2021~ Jan. 20, 2021	Nov. 01, 2021	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	May 04, 2020	Jan. 16, 2021~ Jan. 20, 2021	May 03, 2021	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jan. 16, 2021~ Jan. 20, 2021	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jan. 16, 2021~ Jan. 20, 2021	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24 (k5)	RK-000451	N/A	N/A	Jan. 16, 2021~ Jan. 20, 2021	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104, 102E	MY36980/4, MY9838/4PE, 508405/2E	30MHz~18G	Nov. 16, 2020	Jan. 16, 2021~ Jan. 20, 2021	Nov. 15, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Jan. 16, 2021~ Jan. 20, 2021	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Jan. 16, 2021~ Jan. 20, 2021	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Jan. 16, 2021~ Jan. 20, 2021	Mar. 11, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLJ4-1000-15 30-6000-40ST	SN4	1.53GHz Low Pass Filter	Jul. 03, 2020	Jan. 16, 2021~ Jan. 20, 2021	Jul. 02, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0ST	SN4	3GHz High Pass Filter	Sep. 16, 2020	Jan. 16, 2021~ Jan. 20, 2021	Sep. 15, 2021	Radiation (03CH15-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Jan. 05, 2021~ Jan. 22, 2021	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 10	10MHz~6GHz	Dec. 09, 2020	Jan. 05, 2021~ Jan. 22, 2021	Dec. 08, 2021	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	101566	10Hz-40GHz	Jul. 22, 2020	Jan. 05, 2021~ Jan. 22, 2021	Jul. 21, 2021	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Jan. 05, 2021~ Jan. 22, 2021	Mar. 16, 2021	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jan. 26, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Jan. 26, 2021	Sep. 10, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	Jan. 26, 2021	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2020	Jan. 26, 2021	Nov. 30, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	Jan. 26, 2021	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jan. 26, 2021	N/A	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	Jan. 26, 2021	Dec. 30, 2021	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	ESHVTSD 9561-F N3-Z2	109561-F N003730851	9kHz-200MHz	Nov. 02, 2020	Jan. 26, 2021	Nov. 01, 2021	Conduction (CO05-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.3
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.7
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.3
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.9
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**Appendix A. Test Result of Conducted Test Items**

Test Engineer:	Junyu Zhou	Temperature:	21~25	°C
Test Date:	2021/1/5~2021/1/22	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	1.045	0.722	0.50	Pass
BLE	1Mbps	1	19	2440	1.055	0.724	0.50	Pass
BLE	1Mbps	1	39	2480	1.063	0.726	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	7.40	30.00	-7.85	-0.45	36.00	Pass
BLE	1Mbps	1	19	2440	7.40	30.00	-7.85	-0.45	36.00	Pass
BLE	1Mbps	1	39	2480	7.30	30.00	-7.85	-0.55	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	7.31	-8.57	-7.85	8.00	Pass
BLE	1Mbps	1	19	2440	6.86	-9.05	-7.85	8.00	Pass
BLE	1Mbps	1	39	2480	6.87	-9.13	-7.85	8.00	Pass

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

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.042	1.280	0.50	Pass
BLE	2Mbps	1	19	2440	2.058	1.320	0.50	Pass
BLE	2Mbps	1	39	2480	2.082	1.340	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	7.40	30.00	-7.85	-0.45	36.00	Pass
BLE	2Mbps	1	19	2440	7.40	30.00	-7.85	-0.45	36.00	Pass
BLE	2Mbps	1	39	2480	7.30	30.00	-7.85	-0.55	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	6.03	-12.03	-7.85	8.00	Pass
BLE	2Mbps	1	19	2440	5.61	-12.59	-7.85	8.00	Pass
BLE	2Mbps	1	39	2480	5.63	-12.82	-7.85	8.00	Pass

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



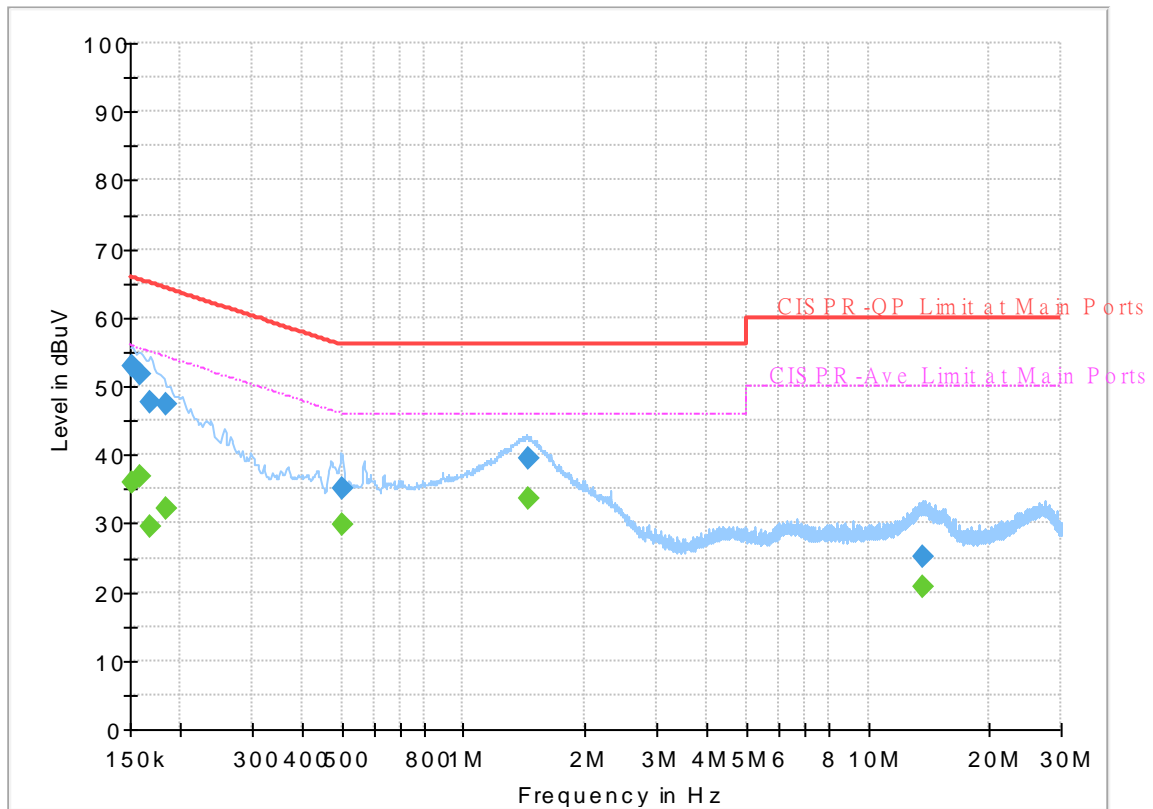
## **Appendix B. AC Conducted Emission Test Results**

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

# EUT Information

Project No : 090716  
 TestMode : Mode 1  
 Test Voltage : Power From System  
 phase : Line

Full Spectrum



## Final\_Result

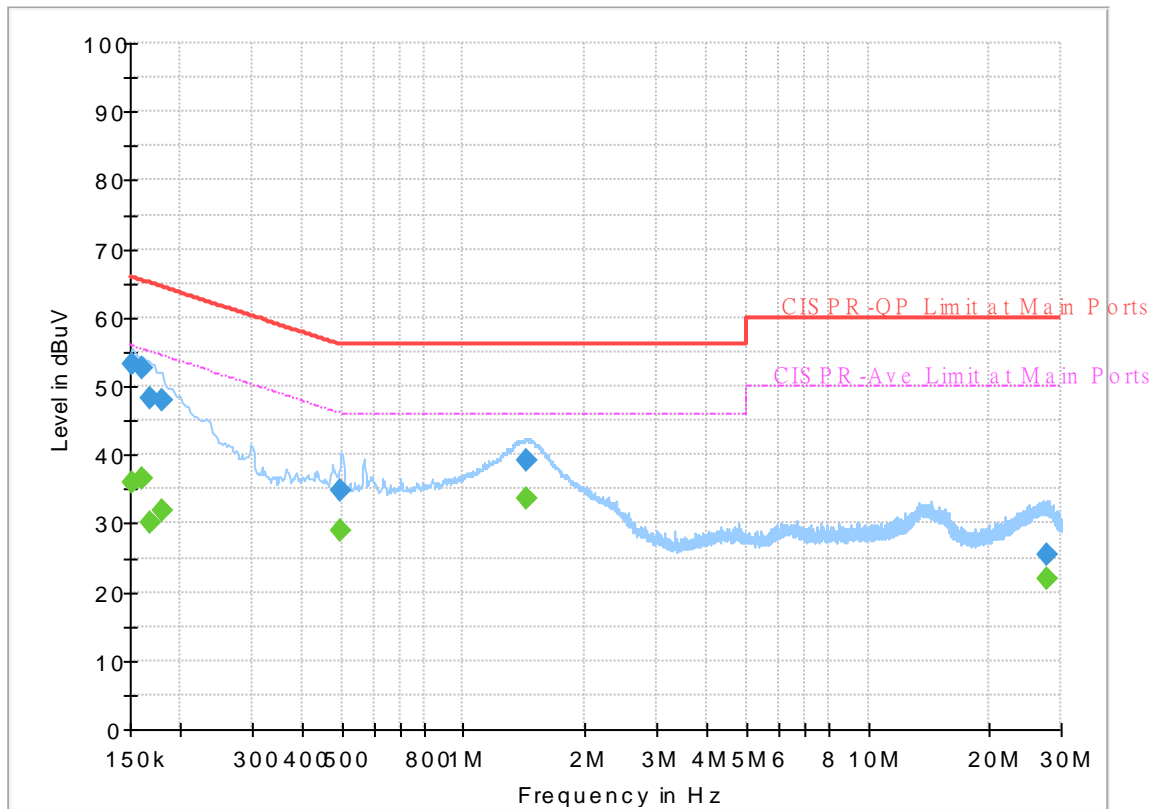
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	53.01	---	65.88	12.87	L1	OFF	19.7
0.152250	---	35.89	55.88	19.99	L1	OFF	19.7
0.159000	51.84	---	65.52	13.68	L1	OFF	19.7
0.159000	---	36.74	55.52	18.78	L1	OFF	19.7
0.168720	47.70	---	65.02	17.32	L1	OFF	19.7
0.168720	---	29.64	55.02	25.38	L1	OFF	19.7
0.183750	47.43	---	64.31	16.88	L1	OFF	19.7
0.183750	---	32.18	54.31	22.13	L1	OFF	19.7
0.501810	35.01	---	56.00	20.99	L1	OFF	19.9
0.501810	---	29.97	46.00	16.03	L1	OFF	19.9
1.440150	39.53	---	56.00	16.47	L1	OFF	20.2
1.440150	---	33.71	46.00	12.29	L1	OFF	20.2
13.690500	25.08	---	60.00	34.92	L1	OFF	20.0
13.690500	---	20.75	50.00	29.25	L1	OFF	20.0



# EUT Information

Report NO : 090716  
 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	---	36.03	55.88	19.85	N	OFF	19.7
0.152250	53.12	---	65.88	12.76	N	OFF	19.7
0.160260	---	36.63	55.45	18.82	N	OFF	19.7
0.160260	52.67	---	65.45	12.78	N	OFF	19.7
0.167820	---	30.20	55.07	24.87	N	OFF	19.7
0.167820	48.12	---	65.07	16.95	N	OFF	19.7
0.180060	---	32.01	54.48	22.47	N	OFF	19.7
0.180060	48.00	---	64.48	16.48	N	OFF	19.7
0.497310	---	28.98	46.05	17.07	N	OFF	19.9
0.497310	34.74	---	56.05	21.31	N	OFF	19.9
1.430250	---	33.74	46.00	12.26	N	OFF	20.2
1.430250	39.24	---	56.00	16.76	N	OFF	20.2
27.636000	---	22.06	50.00	27.94	N	OFF	20.3
27.636000	25.46	---	60.00	34.54	N	OFF	20.3



### Appendix C. Radiated Spurious Emission

Test Engineer :	Leo Lee, Mancy Chou, and Bigshow Wang	Temperature :	22.5 ~ 24.2°C
		Relative Humidity :	45 ~ 57%

<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		2381.925	54.79	-19.21	74	41.59	27.57	16.55	30.92	100	32	P	H
		2324.805	45.55	-8.45	54	32.28	27.75	16.46	30.94	100	32	A	H
	*	2402	84.49	-	-	71.32	27.5	16.58	30.91	100	32	P	H
	*	2402	83.93	-	-	70.76	27.5	16.58	30.91	100	32	A	H
		2313.885	55.14	-18.86	74	41.88	27.77	16.44	30.95	100	353	P	V
		2326.485	45.42	-8.58	54	32.15	27.75	16.46	30.94	100	353	A	V
	*	2402	92.64	-	-	79.47	27.5	16.58	30.91	100	353	P	V
	*	2402	92.15	-	-	78.98	27.5	16.58	30.91	100	353	A	V
BLE CH 19 2440MHz		2363.44	55.2	-18.8	74	41.96	27.65	16.52	30.93	100	59	P	H
		2317.36	45.44	-8.56	54	32.18	27.77	16.44	30.95	100	59	A	H
	*	2440	84.28	-	-	71.04	27.5	16.64	30.9	100	59	P	H
	*	2440	83.69	-	-	70.45	27.5	16.64	30.9	100	59	A	H
		2489.11	55.39	-18.61	74	42.12	27.42	16.72	30.87	100	59	P	H
		2483.71	45.38	-8.62	54	32.12	27.43	16.71	30.88	100	59	A	H
		2340.4	54.9	-19.1	74	41.64	27.72	16.48	30.94	100	350	P	V
		2366.8	45.49	-8.51	54	32.26	27.63	16.53	30.93	100	350	A	V
	*	2440	90.58	-	-	77.34	27.5	16.64	30.9	100	350	P	V
	*	2440	90.04	-	-	76.8	27.5	16.64	30.9	100	350	A	V
		2499.01	55.32	-18.68	74	42.06	27.4	16.73	30.87	100	350	P	V
		2491	45.4	-8.6	54	32.13	27.42	16.72	30.87	100	350	A	V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 39 2480MHz	*	2480	84.7	-	-	71.44	27.44	16.7	30.88	100	249	P	H	
	*	2480	84.07	-	-	70.81	27.44	16.7	30.88	100	249	A	H	
		2497	54.58	-19.42	74	41.31	27.41	16.73	30.87	100	249	P	H	
		2483.52	45.54	-8.46	54	32.28	27.43	16.71	30.88	100	249	A	H	
													H	
														H
	*	2480	91.65	-	-	78.39	27.44	16.7	30.88	100	349	P	V	
	*	2480	91.11	-	-	77.85	27.44	16.7	30.88	100	349	A	V	
		2495.76	55.51	-18.49	74	42.24	27.41	16.73	30.87	100	349	P	V	
		2495.36	45.49	-8.51	54	32.22	27.41	16.73	30.87	100	349	A	V	
														V
														V
	<b>Remark</b>	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	42.68	-31.32	74	60.61	31.1	10.05	59.08	100	0	P	H
		18000	61.38	-12.62	74	51.39	49	18.89	57.9	100	32	P	H
		18000	51.36	-2.64	54	41.37	49	18.89	57.9	100	32	A	H
													H
		4804	39.47	-34.53	74	57.4	31.1	10.05	59.08	100	0	P	V
		18000	60.93	-13.07	74	50.94	49	18.89	57.9	100	20	P	V
		18000	50.81	-3.19	54	40.82	49	18.89	57.9	100	20	A	V
BLE CH 19 2440MHz		4880	42.47	-31.53	74	60.45	31.04	10.11	59.13	100	0	P	H
		7320	45.21	-28.79	74	55.14	36.3	12.32	58.55	100	0	P	H
		18000	59.57	-14.43	74	49.58	49	18.89	57.9	100	33	P	H
		18000	49.43	-4.57	54	39.44	49	18.89	57.9	100	33	A	H
		4880	38.94	-35.06	74	56.92	31.04	10.11	59.13	100	0	P	V
		7320	45.63	-28.37	74	55.56	36.3	12.32	58.55	100	0	P	V
		18000	59.95	-14.05	74	49.96	49	18.89	57.9	100	19	P	V
		18000	49.85	-4.15	54	39.86	49	18.89	57.9	100	19	A	V
BLE CH 39 2480MHz		4960	44.09	-29.91	74	61.88	31.22	10.17	59.18	100	0	P	H
		7440	45.79	-28.21	74	55.48	36.3	12.39	58.38	100	0	P	H
		17985	59.92	-14.08	74	50.23	48.73	18.88	57.92	100	27	P	H
		17985	49.81	-4.19	54	40.12	48.73	18.88	57.92	100	27	A	H
		4960	39.48	-34.52	74	57.27	31.22	10.17	59.18	100	0	P	V
		7440	45.8	-28.2	74	55.49	36.3	12.39	58.38	100	0	P	V
		18000	59.43	-14.57	74	49.44	49	18.89	57.9	100	19	P	V
		18000	49.22	-4.78	54	39.23	49	18.89	57.9	100	19	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission above 18GHz
2.4GHz BLE (SHF)

Table with 14 columns: 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). Rows include test data for 2.4GHz BLE SHF and a Remark section.



Emission below 1GHz  
2.4GHz BLE (LF)

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 )	
2.4GHz BLE LF		80.44	26.71	-13.29	40	44.25	13.7	1.25	32.49	-	-	P	H	
		99.84	30.79	-12.71	43.5	45.63	16.22	1.44	32.5	-	-	P	H	
		331.67	29.39	-16.61	46	39.71	19.7	2.5	32.52	-	-	P	H	
		717.73	37.6	-8.4	46	39.64	26.78	3.63	32.45	-	-	P	H	
		828.31	38.95	-7.05	46	38.98	27.99	3.98	32	100	0	P	H	
		890.39	34.8	-11.2	46	33.85	28.49	4.14	31.68	-	-	P	H	
														H
														H
			35.82	32.43	-7.57	40	43.18	21.05	0.74	32.54	100	27	Q	V
			94.02	26.72	-16.78	43.5	42.39	15.44	1.37	32.48	-	-	P	V
			139.61	27.17	-16.33	43.5	40.4	17.58	1.69	32.5	-	-	P	V
			293.84	25.33	-20.67	46	36.44	18.98	2.39	32.48	-	-	P	V
			721.61	38.31	-7.69	46	40.17	26.95	3.64	32.45	-	-	P	V
			890.39	34.36	-11.64	46	33.41	28.49	4.14	31.68	-	-	P	V
														V
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



<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		2324.49	54.85	-19.15	74	41.58	27.75	16.46	30.94	100	247	P	H	
		2358.3	44.47	-9.53	54	31.22	27.67	16.51	30.93	100	247	A	H	
	*	2402	84.63	-	-	71.46	27.5	16.58	30.91	100	247	P	H	
	*	2402	83.09	-	-	69.92	27.5	16.58	30.91	100	247	A	H	
													H	
														H
			2353.89	55.03	-18.97	74	41.78	27.68	16.5	30.93	207	348	P	V
			2313.99	44.46	-9.54	54	31.2	27.77	16.44	30.95	207	348	A	V
	*		2402	90.28	-	-	77.11	27.5	16.58	30.91	207	348	P	V
	*		2402	88.72	-	-	75.55	27.5	16.58	30.91	207	348	A	V
														V
														V
BLE CH 19 2440MHz		2385.2	54.07	-19.93	74	40.87	27.56	16.56	30.92	100	247	P	H	
		2349.2	44.27	-9.73	54	31	27.7	16.5	30.93	100	247	A	H	
	*	2440	84.22	-	-	70.98	27.5	16.64	30.9	100	247	P	H	
	*	2440	82.68	-	-	69.44	27.5	16.64	30.9	100	247	A	H	
			2493.61	53.93	-20.07	74	40.66	27.41	16.73	30.87	100	247	P	H
			2485.06	44.17	-9.83	54	30.91	27.43	16.71	30.88	100	247	A	H
			2379.28	54.84	-19.16	74	41.63	27.58	16.55	30.92	147	354	P	V
			2381.2	44.3	-9.7	54	31.09	27.58	16.55	30.92	147	354	A	V
	*		2440	91.04	-	-	77.8	27.5	16.64	30.9	147	354	P	V
	*		2440	88.34	-	-	75.1	27.5	16.64	30.9	147	354	A	V
			2489.2	53.91	-20.09	74	40.64	27.42	16.72	30.87	147	354	P	V
			2484.52	44.24	-9.76	54	30.98	27.43	16.71	30.88	147	354	A	V



BLE	Note	Frequency ( MHz )	Level ( dBµV/m )	Over Limit ( dB )	Limit Line ( dBµV/m )	Read Level ( dBµV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 39 2480MHz	*	2480	86	-	-	72.74	27.44	16.7	30.88	100	26	P	H	
	*	2480	84.33	-	-	71.07	27.44	16.7	30.88	100	26	A	H	
		2487.92	54.35	-19.65	74	41.09	27.42	16.72	30.88	100	26	P	H	
		2487.12	44.4	-9.6	54	31.13	27.43	16.72	30.88	100	26	A	H	
													H	
														H
	*	2480	89.98	-	-	76.72	27.44	16.7	30.88	200	220	P	V	
	*	2480	88.3	-	-	75.04	27.44	16.7	30.88	200	220	A	V	
		2492.2	55.35	-18.65	74	42.08	27.42	16.72	30.87	200	220	P	V	
		2489.76	44.58	-9.42	54	31.31	27.42	16.72	30.87	200	220	A	V	
														V
														V
	<b>Remark</b>	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	43.04	-30.96	74	60.97	31.1	10.05	59.08	100	0	P	H
		17970	60.97	-13.03	74	51.58	48.46	18.87	57.94	100	31	P	H
		17970	50.85	-3.15	54	41.46	48.46	18.87	57.94	100	31	A	H
													H
		4804	39.83	-34.17	74	57.76	31.1	10.05	59.08	100	0	P	V
		18000	61.24	-12.76	74	51.25	49	18.89	57.9	100	19	P	V
		18000	51.35	-2.65	54	41.36	49	18.89	57.9	100	19	A	V
BLE CH 19 2440MHz		4880	42.98	-31.02	74	60.96	31.04	10.11	59.13	100	0	P	H
		7320	45.31	-28.69	74	55.24	36.3	12.32	58.55	100	0	P	H
		17985	60.87	-13.13	74	51.18	48.73	18.88	57.92	100	30	P	H
		17985	50.97	-3.03	54	41.28	48.73	18.88	57.92	100	30	A	H
		4880	40.94	-33.06	74	58.92	31.04	10.11	59.13	100	0	P	V
		7320	45.44	-28.56	74	55.37	36.3	12.32	58.55	100	0	P	V
		18000	60.07	-13.93	74	50.08	49	18.89	57.9	100	17	P	V
		18000	49.94	-4.06	54	39.95	49	18.89	57.9	100	17	A	V
BLE CH 39 2480MHz		4960	42.82	-31.18	74	60.61	31.22	10.17	59.18	100	0	P	H
		7440	47.08	-26.92	74	56.77	36.3	12.39	58.38	100	0	P	H
		17985	60.03	-13.97	74	50.34	48.73	18.88	57.92	100	33	P	H
		17985	49.97	-4.03	54	40.28	48.73	18.88	57.92	100	33	A	H
		4960	40.46	-33.54	74	58.25	31.22	10.17	59.18	100	0	P	V
		7440	45.85	-28.15	74	55.54	36.3	12.39	58.38	100	0	P	V
		18000	60.45	-13.55	74	50.46	49	18.89	57.9	100	19	P	V
		18000	50.31	-3.69	54	40.32	49	18.89	57.9	100	19	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission above 18GHz
2.4GHz BLE (SHF)

Table with 14 columns: 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). Rows include data for 2.4GHz BLE SHF and a Remark section.



**Emission below 1GHz**

**2.4GHz BLE (LF)**

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 )	
2.4GHz BLE LF		82.38	27.14	-12.86	40	44.45	13.91	1.27	32.49	-	-	P	H	
		108.57	29.29	-14.21	43.5	43.44	16.88	1.49	32.52	-	-	P	H	
		191.99	27.23	-16.27	43.5	42.67	15.01	2.01	32.46	-	-	P	H	
		327.79	28.78	-17.22	46	39.21	19.6	2.49	32.52	-	-	P	H	
		718.7	38.31	-7.69	46	40.3	26.83	3.63	32.45	100	0	P	H	
		894.27	35.8	-10.2	46	34.74	28.57	4.15	31.66	-	-	P	H	
														H
														H
			34.85	33.53	-6.47	40	43.93	21.41	0.73	32.54	100	1	Q	V
			94.02	29.04	-14.46	43.5	44.71	15.44	1.37	32.48	-	-	P	V
			715.79	37.79	-8.21	46	39.94	26.67	3.63	32.45	-	-	P	V
			733.25	35.2	-10.8	46	36.48	27.49	3.68	32.45	-	-	P	V
			894.27	37.69	-8.31	46	36.63	28.57	4.15	31.66	-	-	P	V
														V
													V	
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against limit line.													



**Note symbol**

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



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 )	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
					( 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	P	H
CH 00		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
2402MHz													

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 :	Leo Lee, Mancy Chou, and Bigshow Wang	Temperature :	22.5 ~ 24.2°C
		Relative Humidity :	45 ~ 57%

**Note symbol**

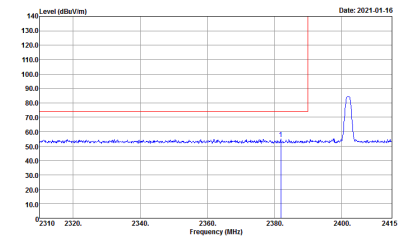
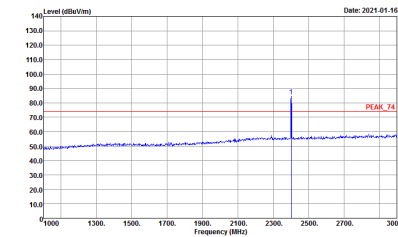
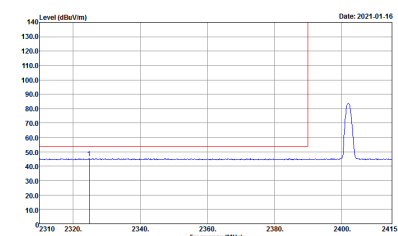
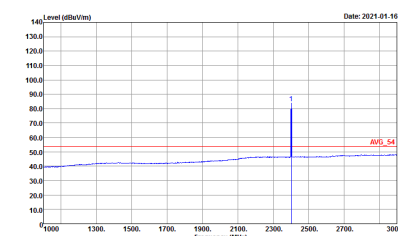
-L	Low channel location
-R	High channel location



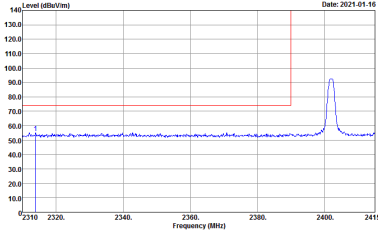
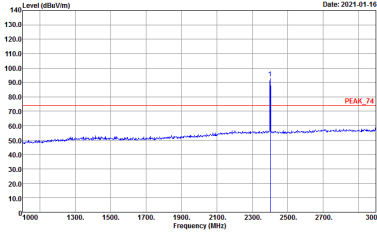
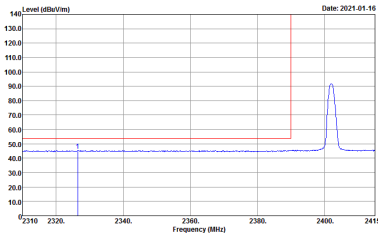
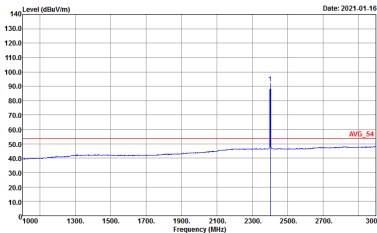
<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg.	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



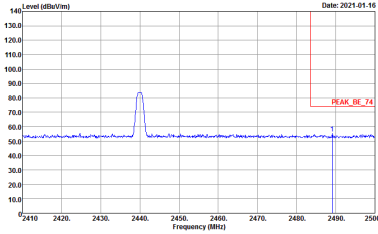
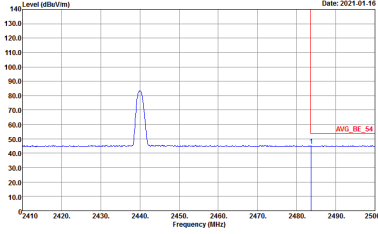
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Vertical		Fundamental
Peak	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



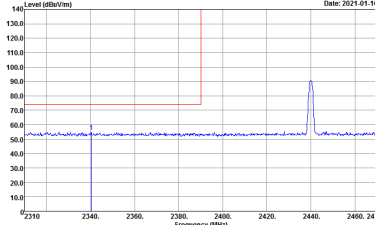
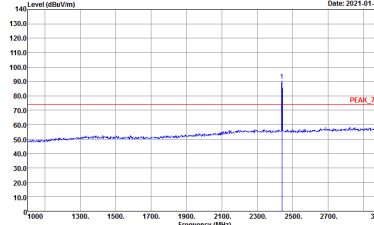
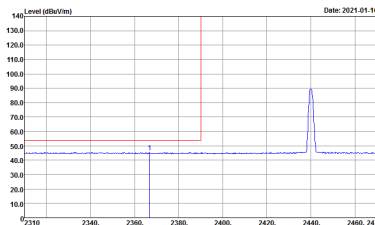
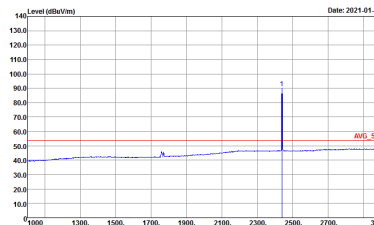


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Horizontal	Fundamental
Peak	<p>           Site : 03CH15-HV            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716         </p>	<p>           Site : 03CH15-HV            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716         </p>
Avg.	<p>           Site : 03CH15-HV            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak            Project : 090716         </p>	<p>           Site : 03CH15-HV            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak            Project : 090716         </p>

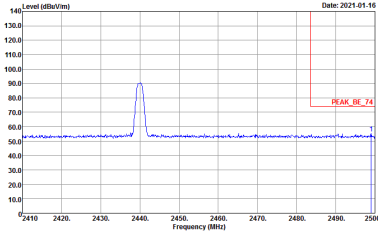
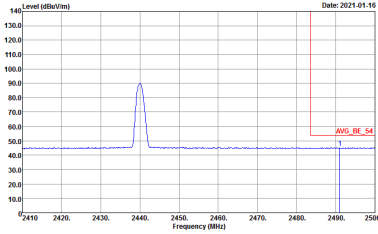


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>

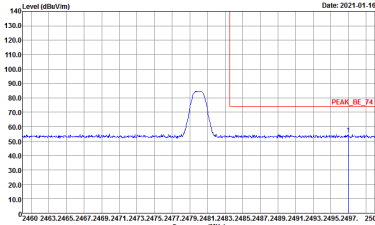
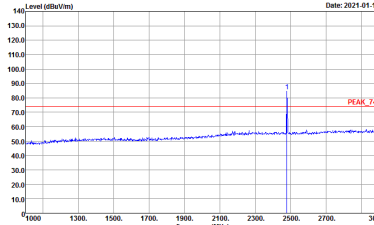
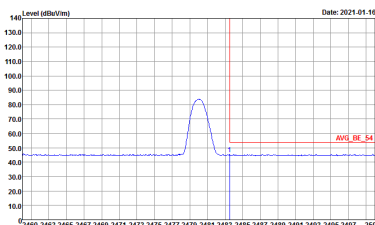
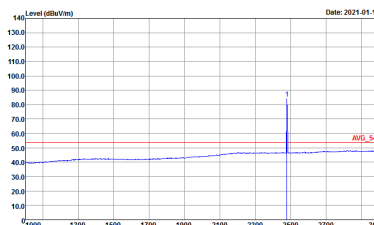


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Vertical	Fundamental
Peak	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg.	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Vertical	Fundamental
<p><b>Peak</b></p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>
<p><b>Avg.</b></p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Vertical	Fundamental
Peak	<p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg.	<p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



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

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 090716</p>





BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
<b>Peak</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 090716</p>

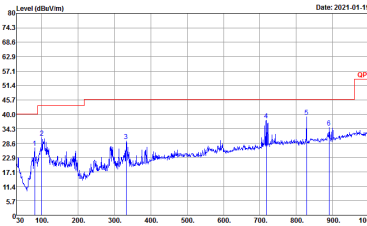
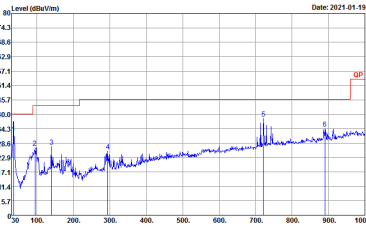


Emission above 18GHz  
2.4GHz BLE (SHF)

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



Emission below 1GHz  
2.4GHz BLE (LF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 HORIZONTAL Detector : Peak Project : 090716</p>	 <p>Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 VERTICAL Detector : Peak Project : 090716</p>



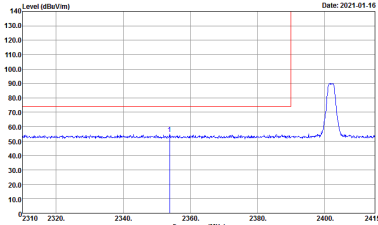
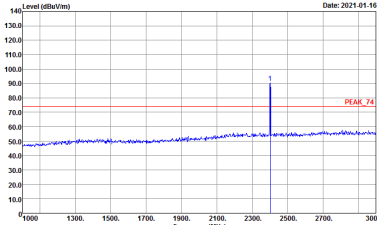
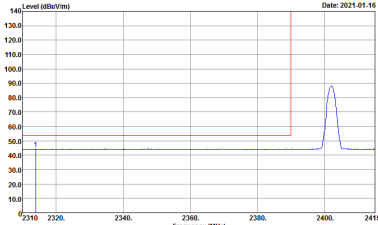
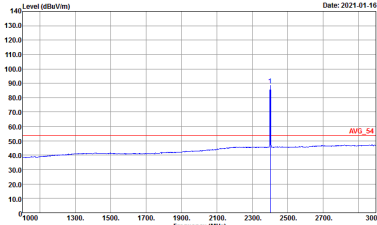
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2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	<p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>
Avg.	<p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>

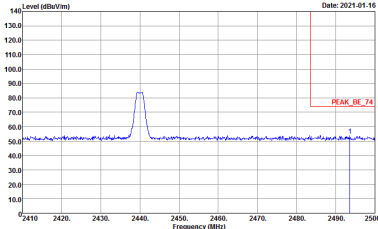
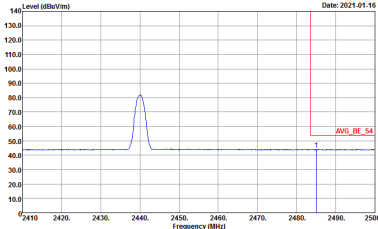


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>

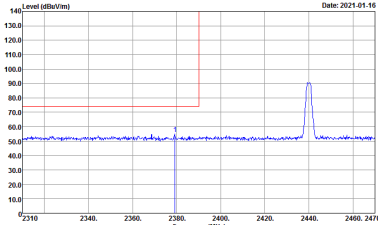
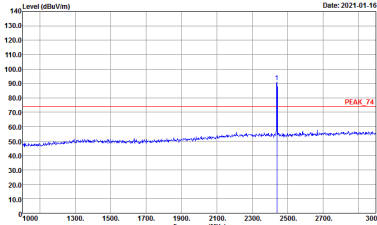
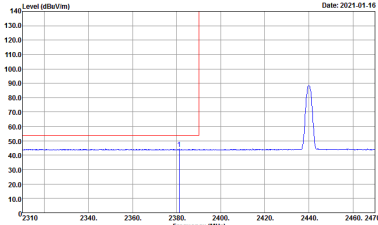
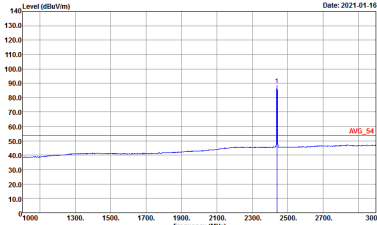


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Horizontal	Fundamental
<p><b>Peak</b></p>	<p>Site : 03CH15-HV            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HV            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
<p><b>Avg.</b></p>	<p>Site : 03CH15-HV            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	<p>Site : 03CH15-HV            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000KHz VBW:1.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



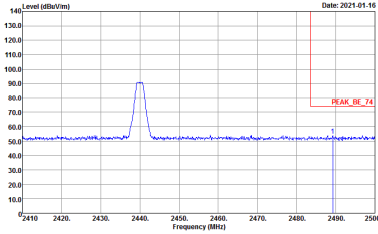
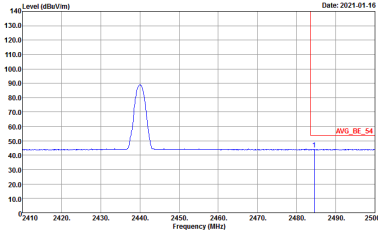
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            RBW:1000.000kHz VBW:3000.000kHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            RBW:1000.000kHz VBW:1.000kHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>



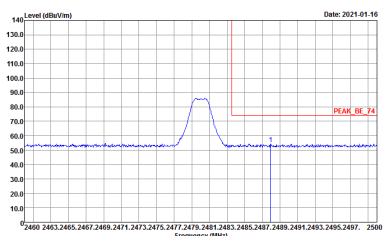
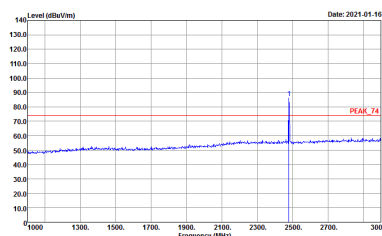
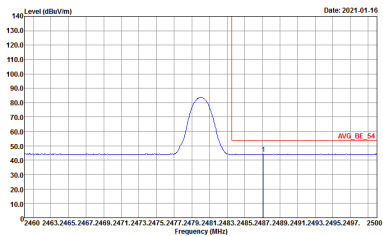
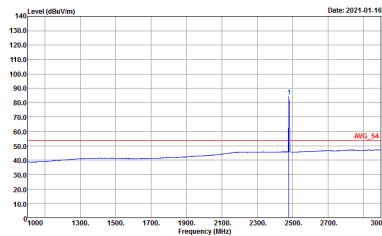
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Vertical	Fundamental
Peak	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:3000.000KHz SWT:Auto            Detector : Peak            Project : 090716</p>
Avg.	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            RBW:1000.000KHz VBW:1000KHz SWT:Auto            Detector : Peak            Project : 090716</p>



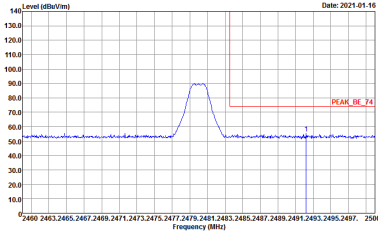
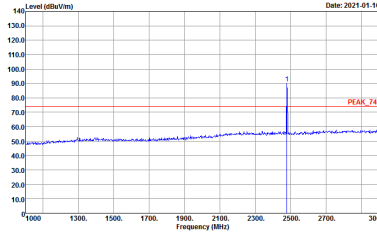
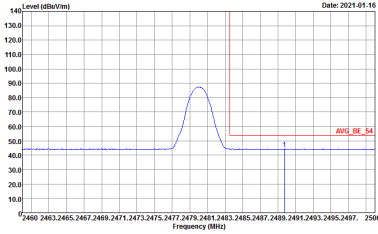
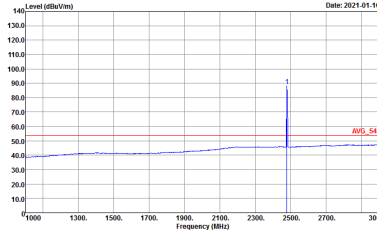


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Vertical	Fundamental
<p><b>Peak</b></p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            : RBW:1000.000KHz VBW:3000.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>
<p><b>Avg.</b></p>	 <p>Date: 2021-01-16</p> <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            : RBW:1000.000KHz VBW:1.000KHz SWF:Auto            Detector : Peak            Project : 090716</p>	<p><b>Left blank</b></p>



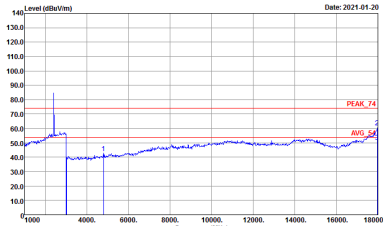
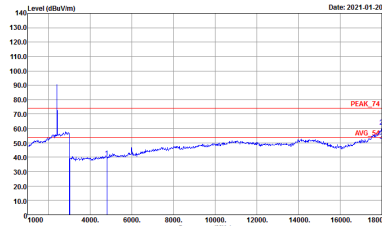
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Horizontal	Fundamental
Peak	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>
Avg.	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 HORIZONTAL            Detector : Peak            Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : PEAK_74 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 090716</p>
Avg.	 <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 090716</p>	 <p>Site : 03CH15-HY            Condition : AVG_54 3m 91200_15_1620 VERTICAL            Detector : Peak            Project : 090716</p>



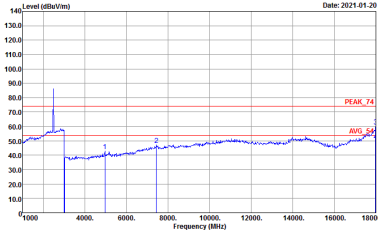
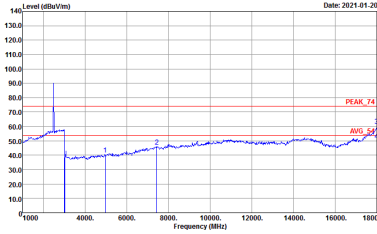
2.4GHz 2400~2483.5MHz  
BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH00 2402MHz		
Horizontal		Vertical
<p><b>Peak</b> <b>Avg.</b></p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 090716</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH39 2480MHz		
	Horizontal	Vertical
Peak	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 HORIZONTAL Detector : Peak Project : 090716</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9120D_15_1620 VERTICAL Detector : Peak Project : 090716</p>



Emission above 18GHz  
2.4GHz BLE (SHF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
QP / Peak	<p>Site : 03CH15-#HY Condition : PEAK_74 In SHF HORN BBHA9170584 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-#HY Condition : PEAK_74 In SHF HORN BBHA9170584 VERTICAL Detector : Peak Project : 090716</p>



Emission below 1GHz  
2.4GHz BLE (LF)

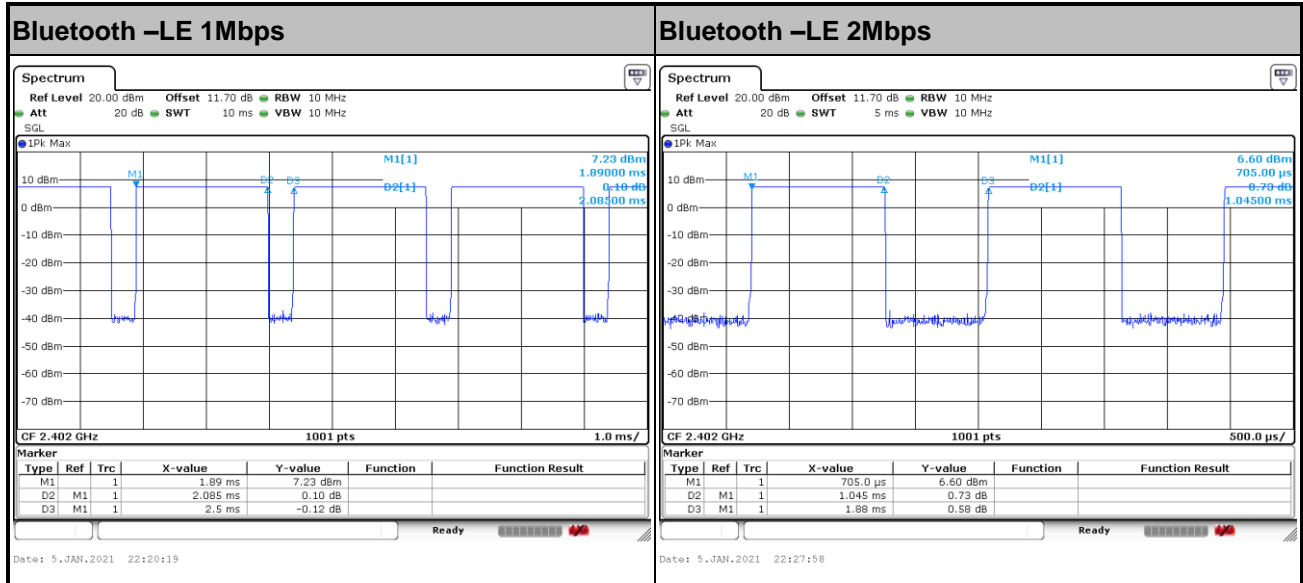
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	<p>Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 HORIZONTAL Detector : Peak Project : 090716</p>	<p>Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 VERTICAL Detector : Peak Project : 090716</p>





## Appendix E. Duty Cycle Plots

Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor (dB)
Bluetooth –LE 1Mbps	83.40	2085.00	0.48	1kHz	0.79
Bluetooth –LE 2Mbps	55.59	1045.00	0.96	1kHz	2.55



————THE END————