



FCC RADIO TEST REPORT

FCC ID : 2AVC9-7448
Equipment : Digital Media Receiver
Model Name : V5S83A
Applicant : BROOKLYN EAST LLC
41 University Drive, Suite 400
Newtown, PA 18940
Standard : FCC Part 15 Subpart C §15.247

The product was received on Feb. 24, 2021 and testing was started from Mar. 01, 2021 and completed on Mar. 26, 2021. We, Sporton International (USA) Inc., 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 (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035

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History of this test report

| Report No. | Version | Description | Issued Date |
|--------------|---------|-------------------------|---------------|
| FR210302003B | 01 | Initial issue of report | Apr. 01, 2021 |
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Summary of Test Result

| 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.

1 General Description

1.1 Product Feature of Equipment Under Test

| Product Feature | |
|---------------------------------|---|
| Equipment | Digital Media Receiver |
| Model Name | V5S83A |
| FCC ID | 2AVC9-7448 |
| EUT supports Radios application | WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE |

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

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 | 9.02 dBm (0.0080 W) for 1Mbps 9.02 dBm (0.0080 W) for 2Mbps |
| 99% Occupied Bandwidth | 1.027 MHz for 1Mbps 2.046 MHz for 2Mbps |
| Antenna Type / Gain | Dipole Antenna type with gain 2.8 dBi |
| Type of Modulation | Bluetooth LE : GFSK |

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

1.3 Modification of EUT

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



1.4 Testing Location

| | |
|---------------------------|---|
| Test Site | Sporton International (USA) Inc |
| Test Site Location | 1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300 |
| Test Site No. | Sporton Site No. TH01-CA, CO01-CA, 03CH02-CA |

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: All test items were verified and recorded according to the standards and without any deviation during the test.

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

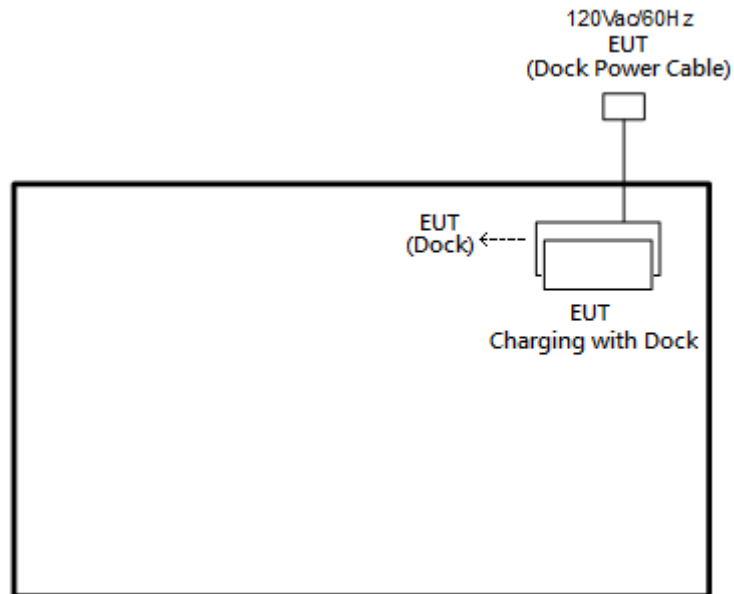
- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X 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.

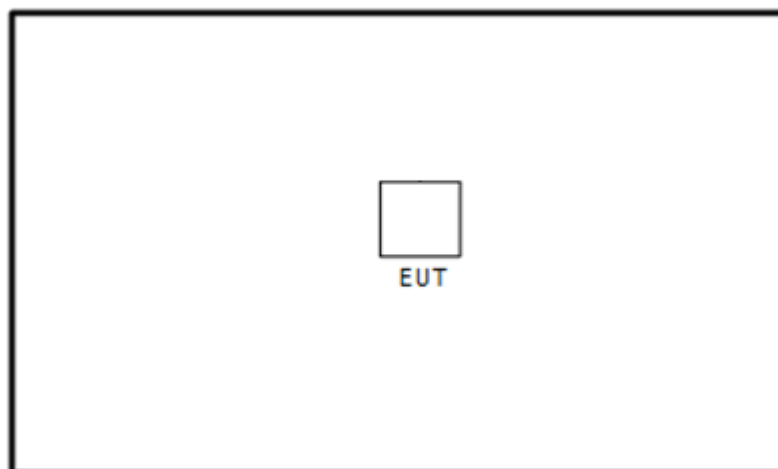
| Summary table of Test Cases | |
|------------------------------|--|
| Test Item | Data Rate / Modulation |
| Conducted Test Cases | Bluetooth – LE / GFSK |
| | Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps |
| | Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps |
| | Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps |
| | Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps |
| | Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps |
| | Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps |
| Radiated Test Cases | Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps |
| | Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps |
| | Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps |
| | Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps |
| | Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps |
| | Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps |
| AC Conducted Emission | Mode 1: WLAN (2.4GHz) Tx + Bluetooth Tx + Dock (Charging from Adapter) |

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<Bluetooth - LE Tx Mode>



2.4 EUT Operation Test Setup

The RF test items, utility “Compliance WiFi-BT-Zigbee V1.0.0.97” 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.

2.5 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

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

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

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

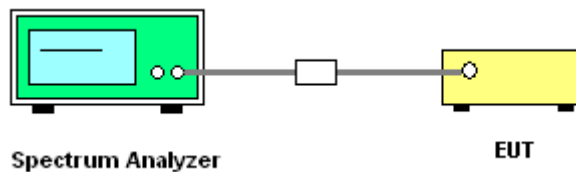
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup

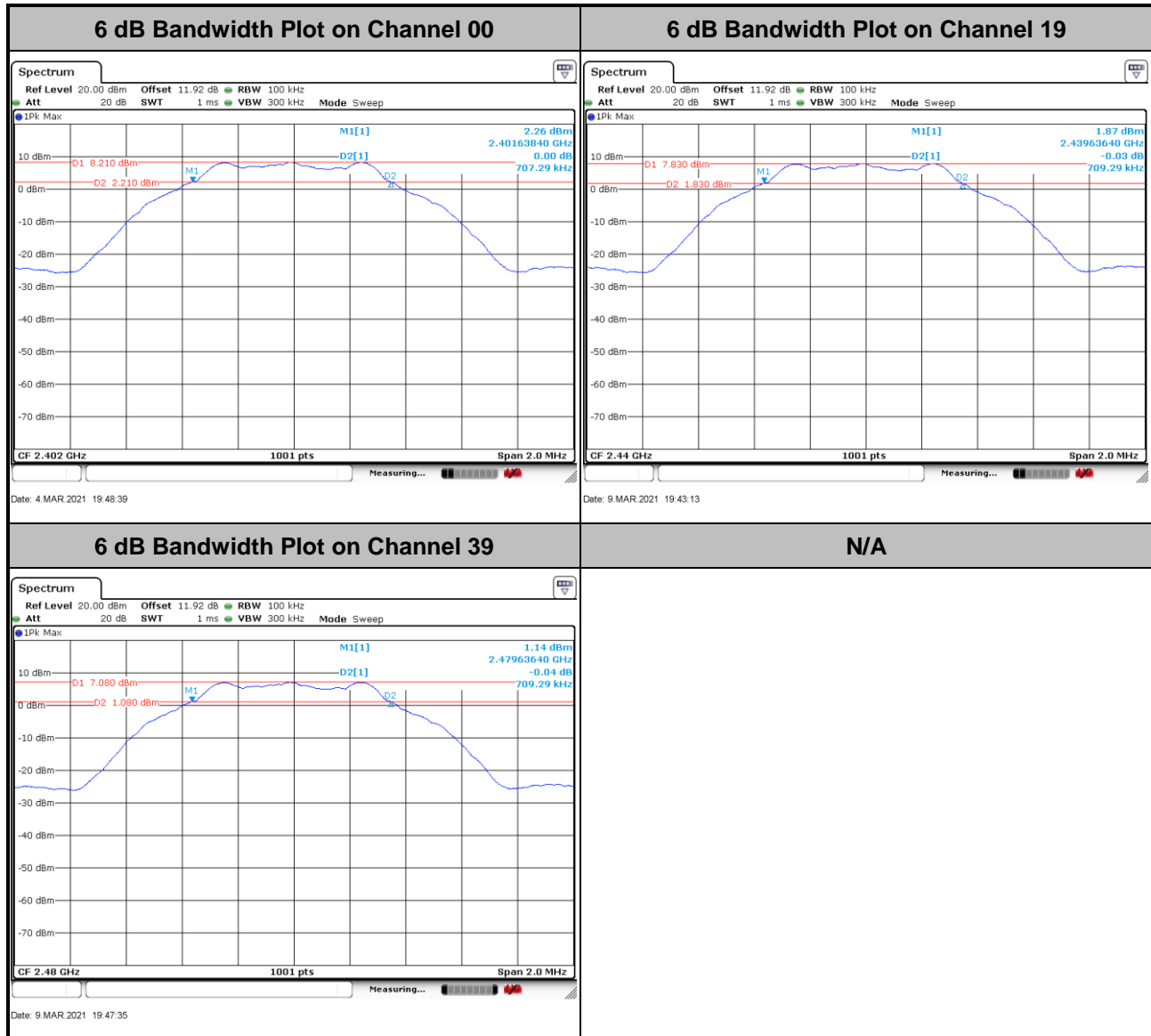




3.1.5 Test Result of 6dB Bandwidth

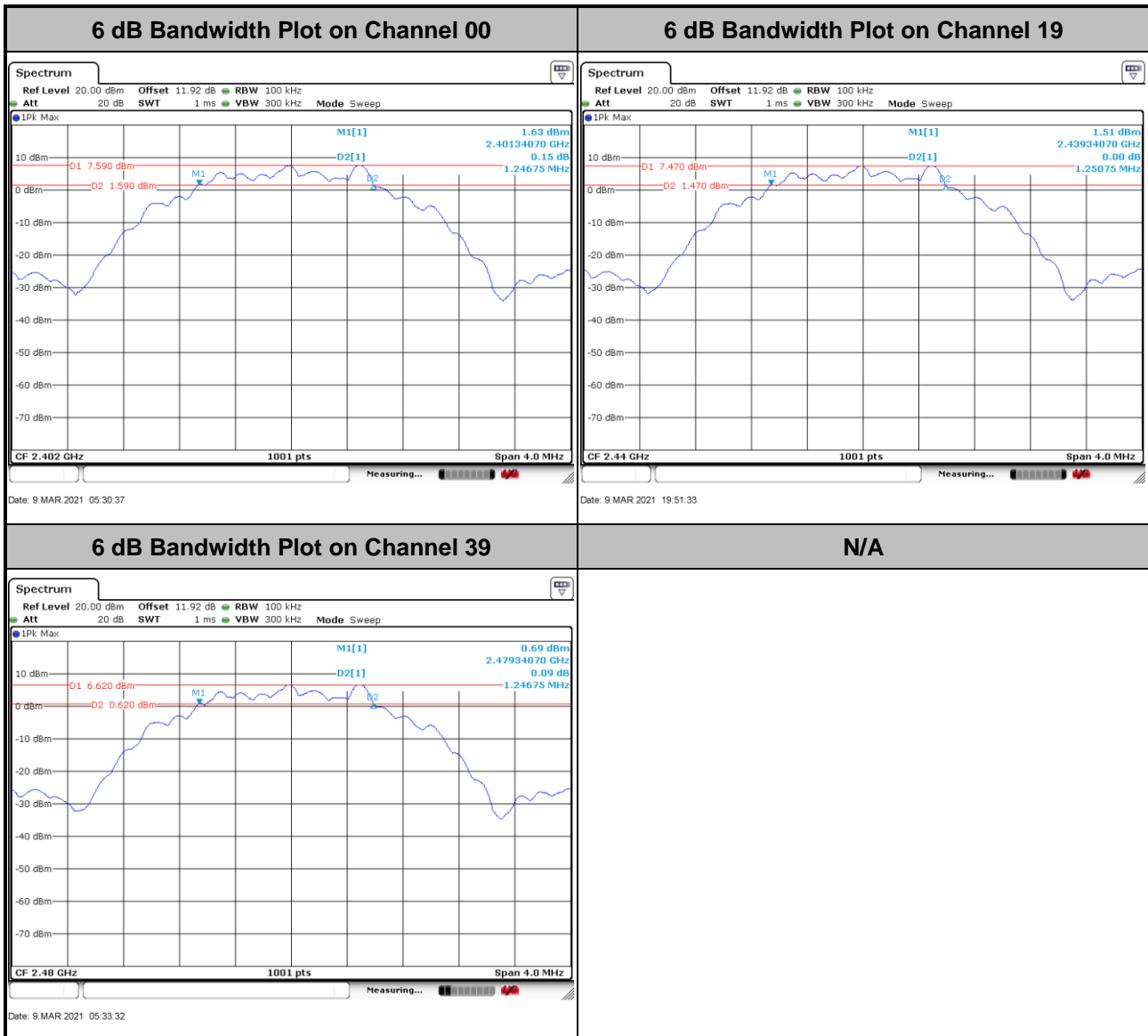
Please refer to Appendix A.

<1Mbps>





<2Mbps>

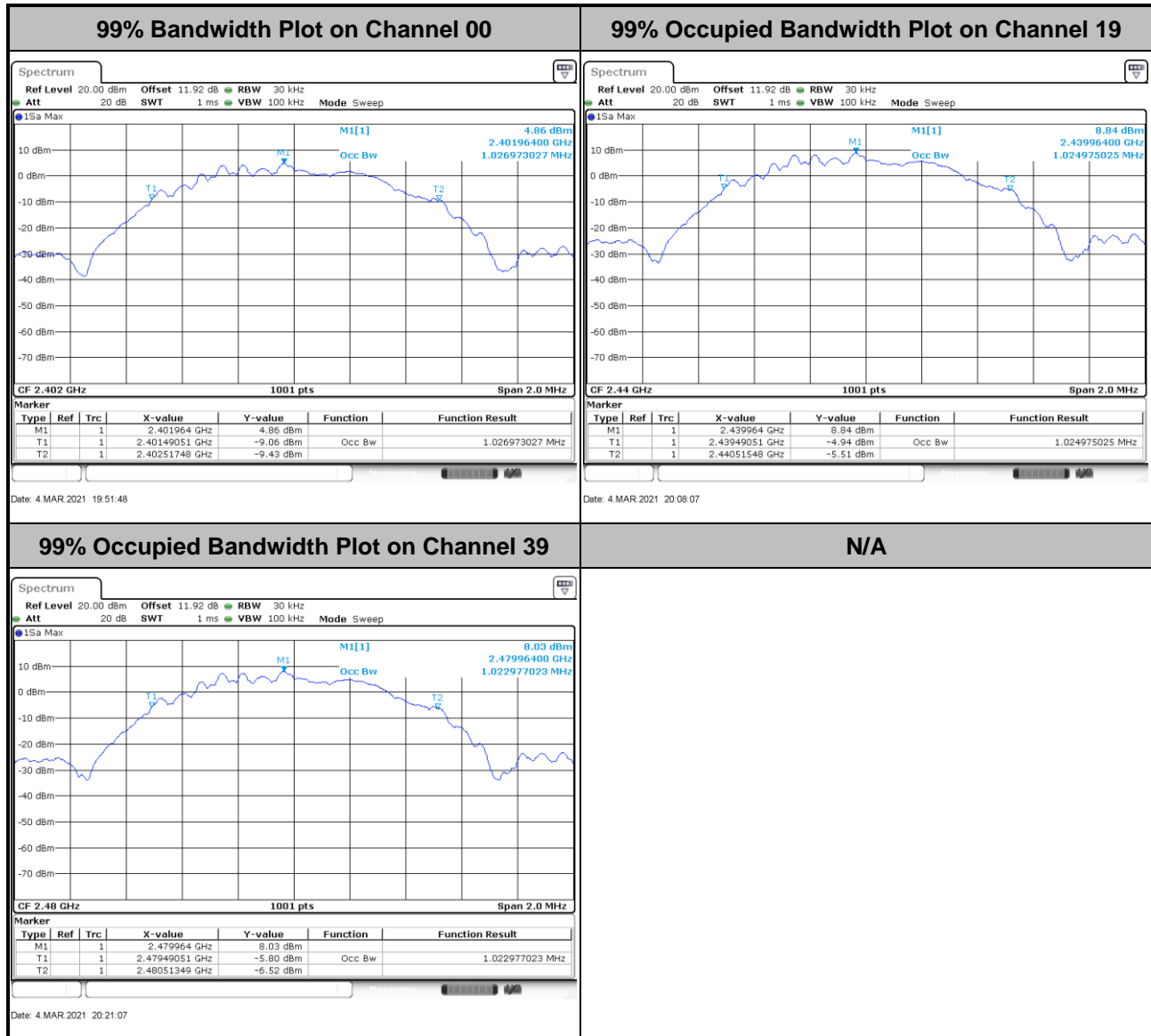




3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

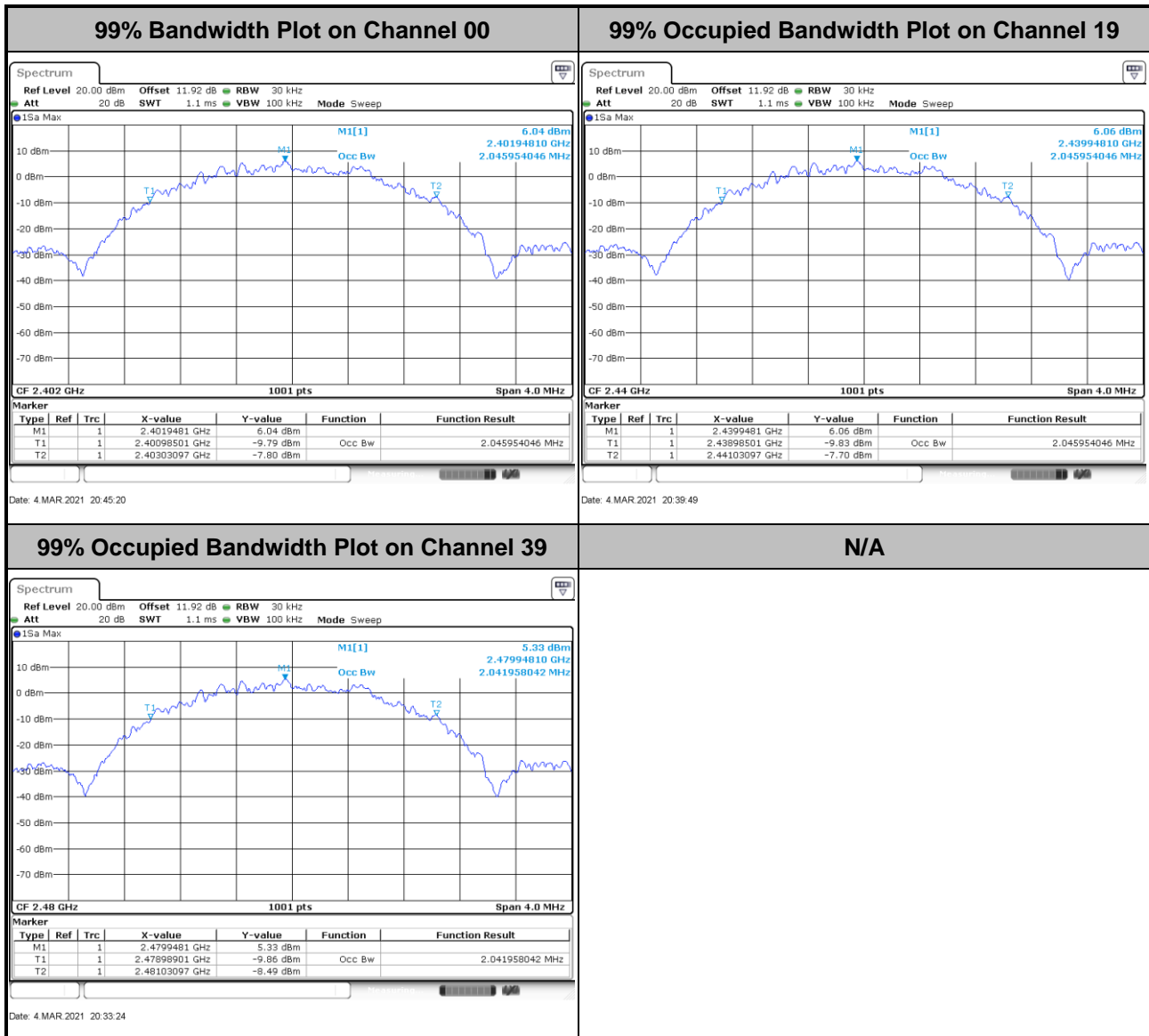
<1Mbps>



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



<2Mbps>



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

3.2 Output Power Measurement

3.2.1 Limit of Output Power

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

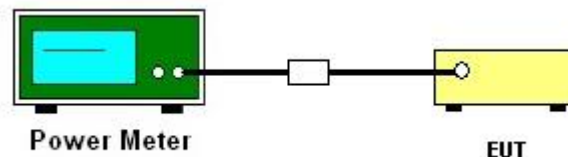
3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

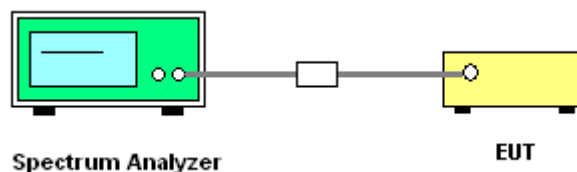
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

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

3.3.4 Test Setup



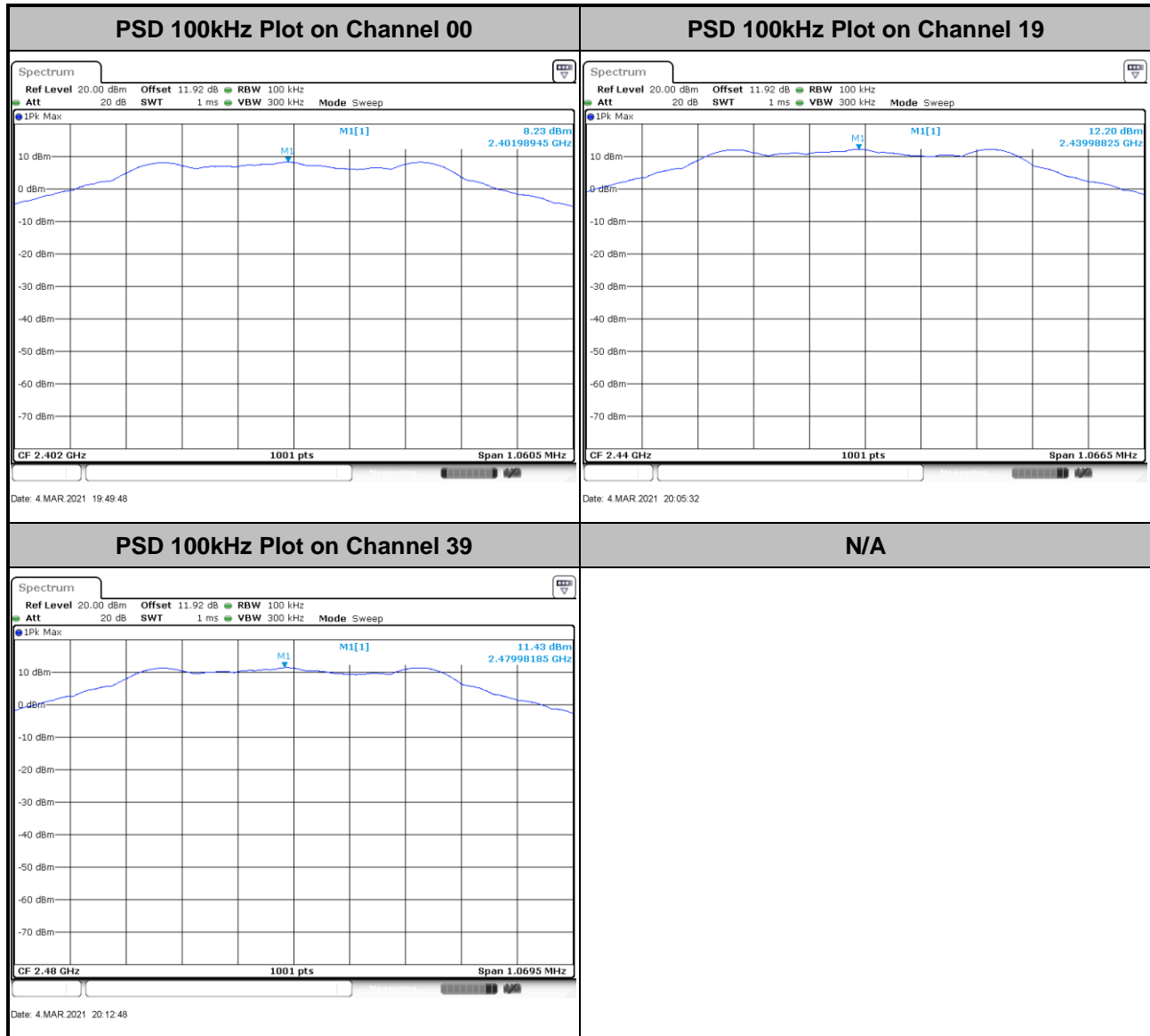
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



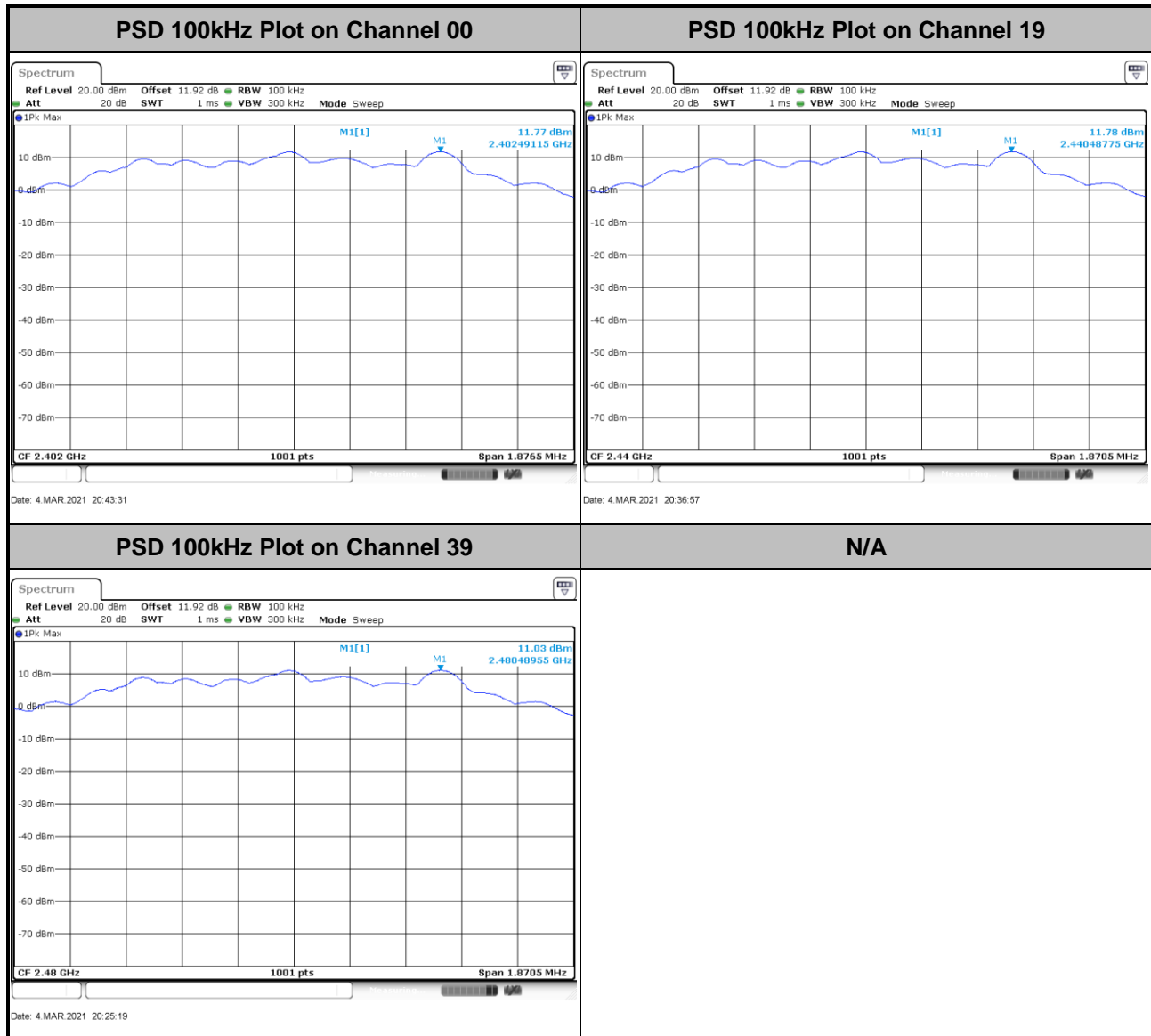
3.3.6 Test Result of Power Spectral Density Plots (100kHz)

<1Mbps>





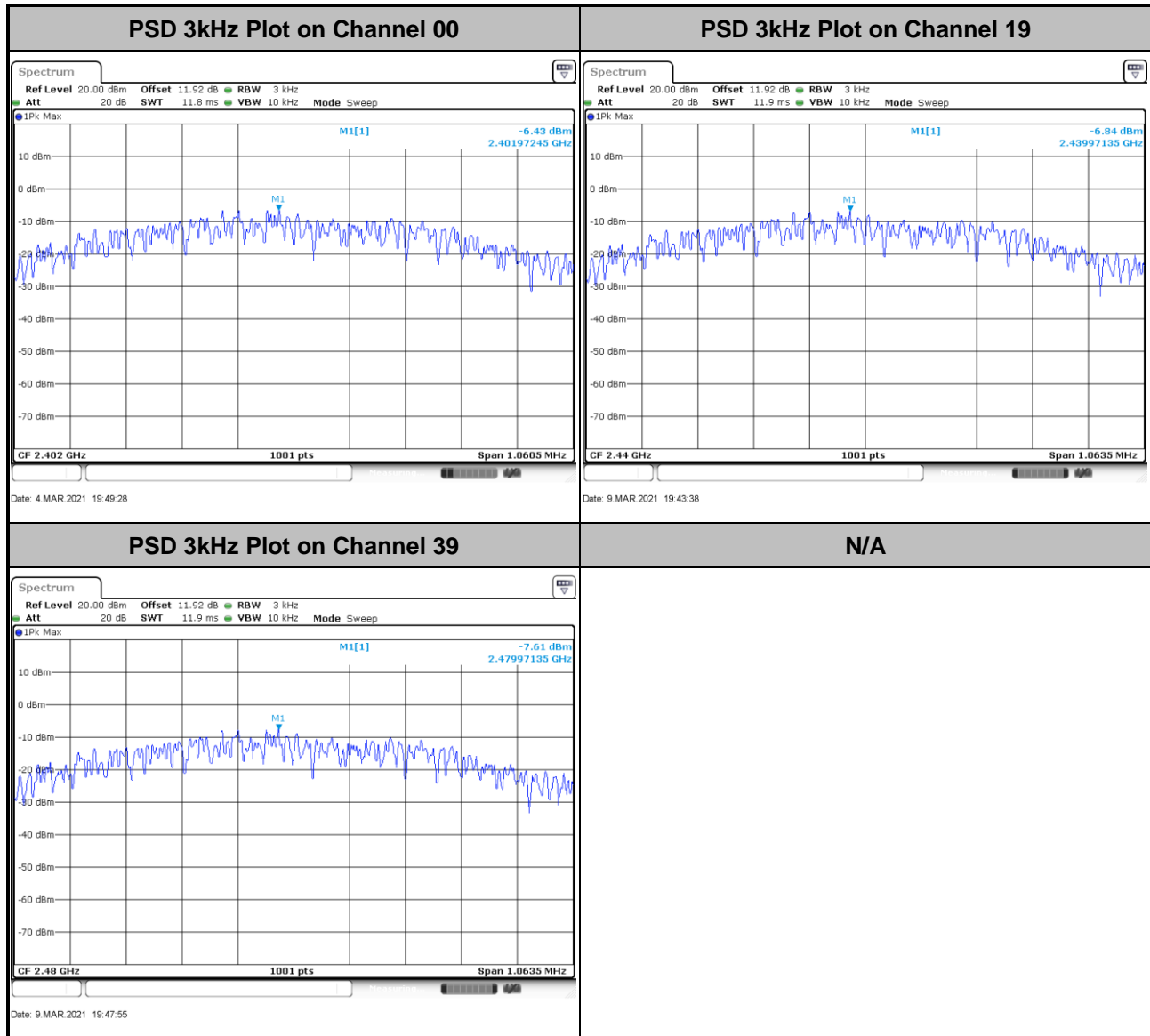
<2Mbps>





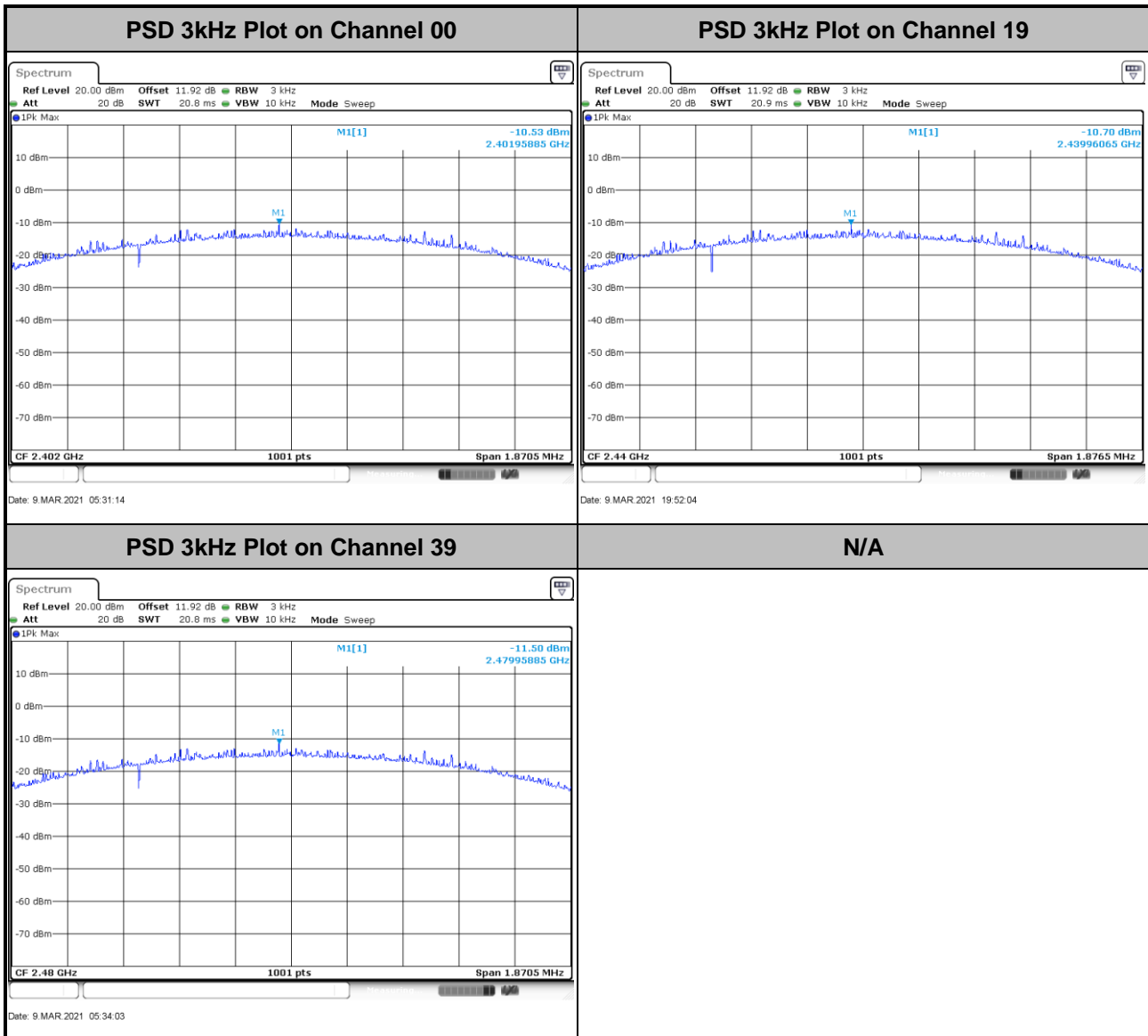
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

<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.

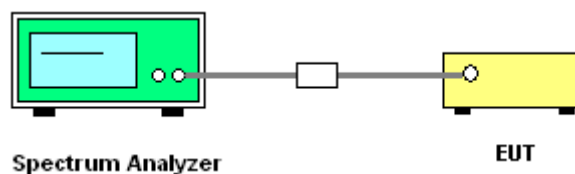
3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedure

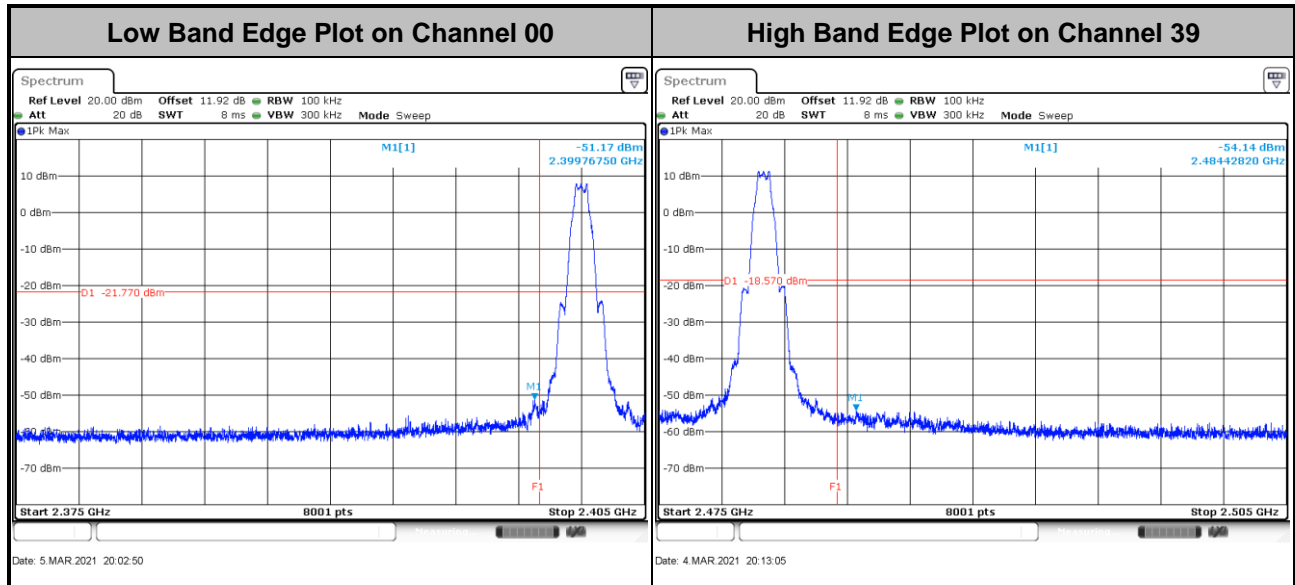
1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit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

3.4.4 Test Setup

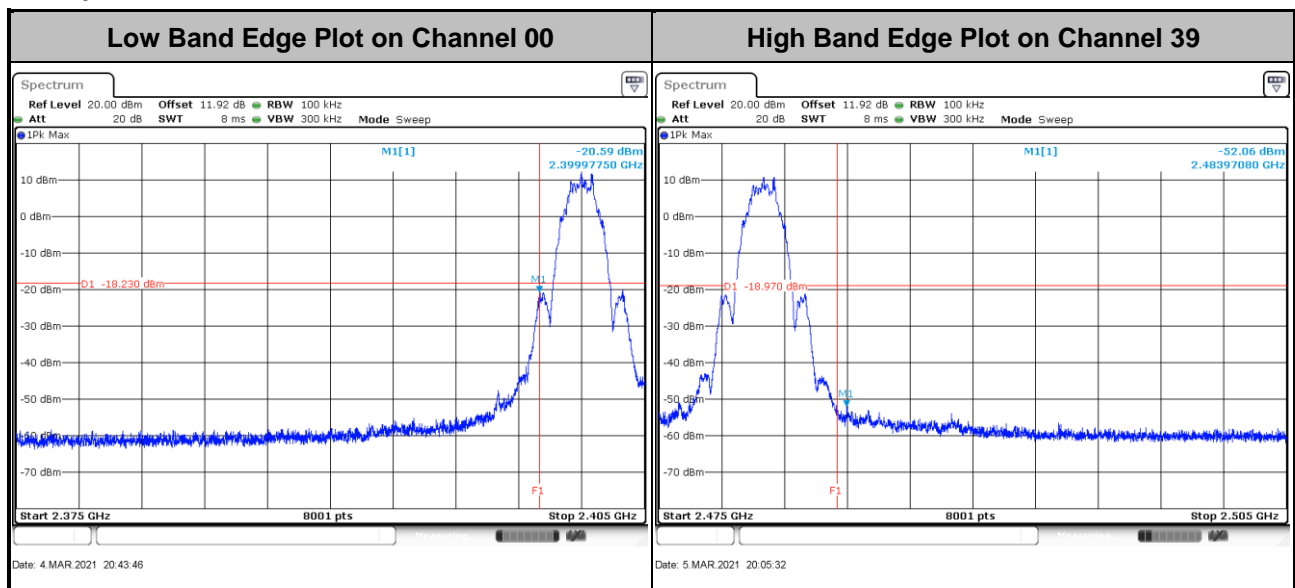


3.4.5 Test Result of Conducted Band Edges Plots

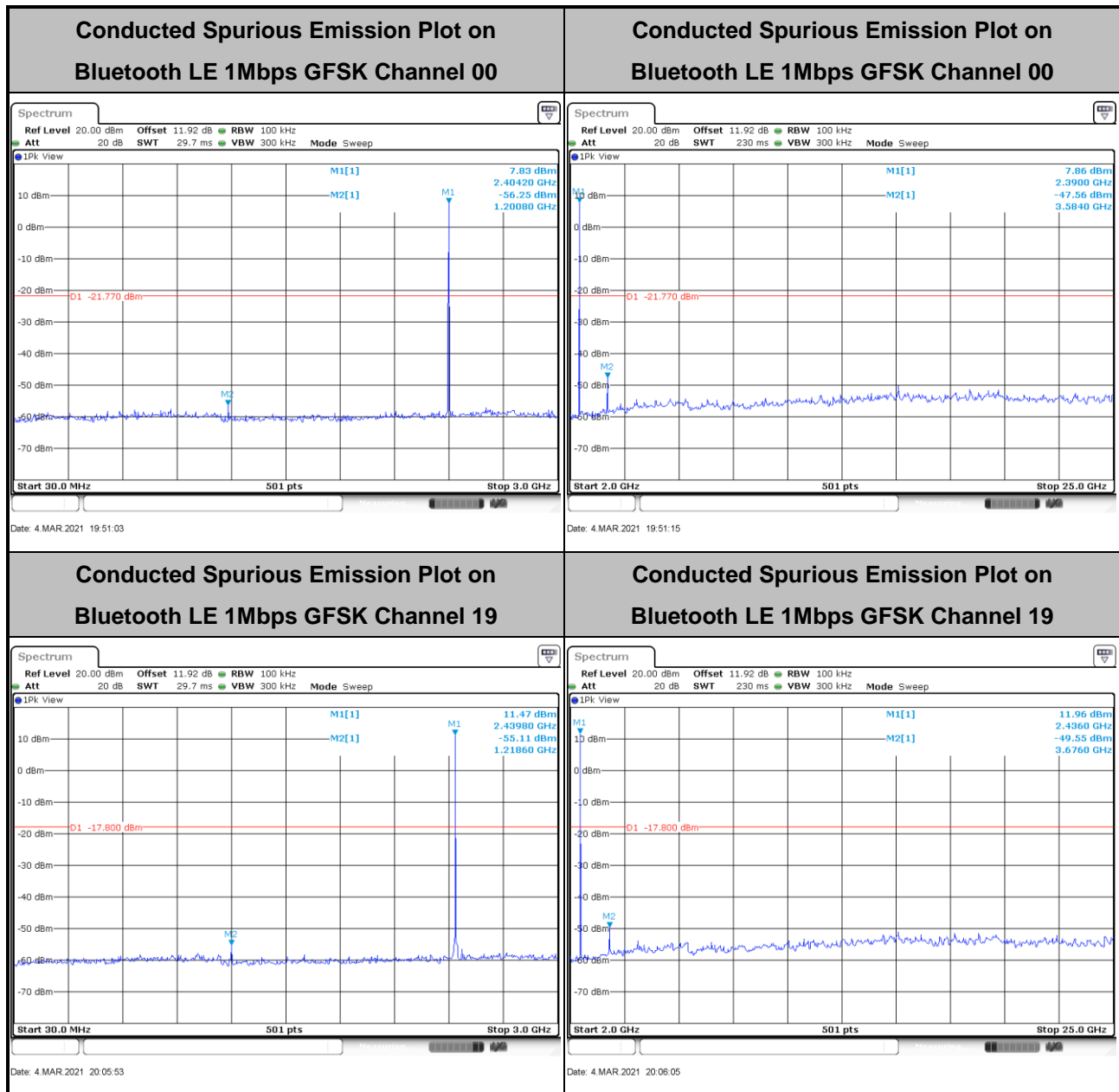
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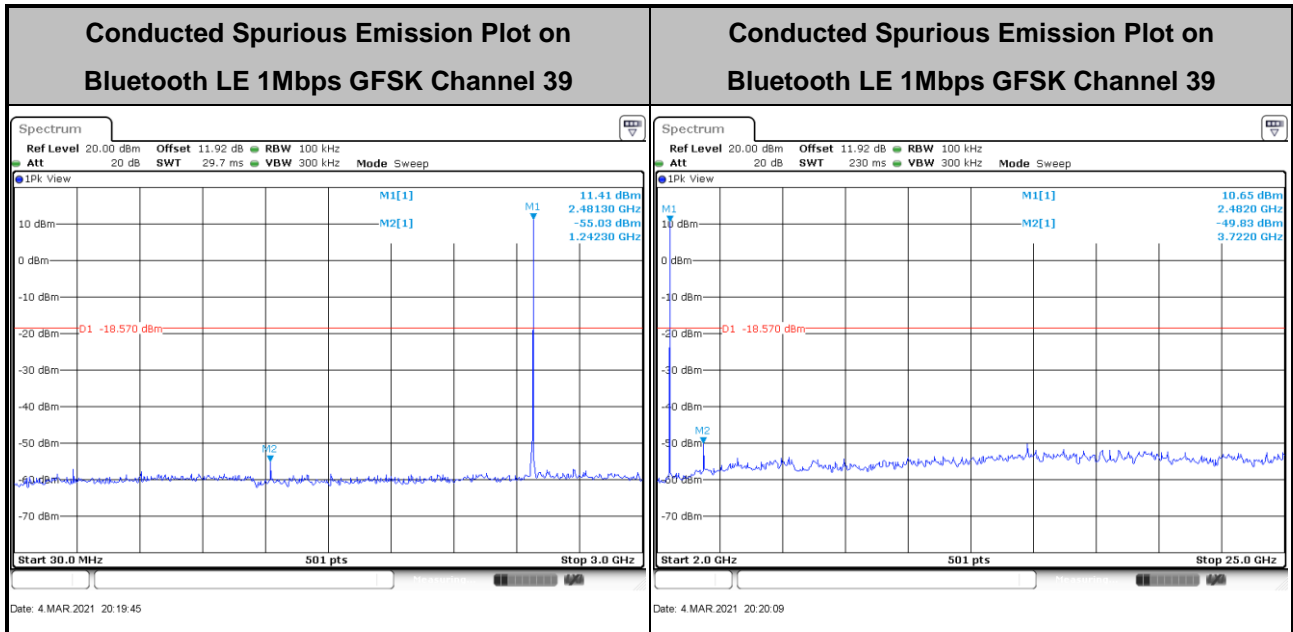


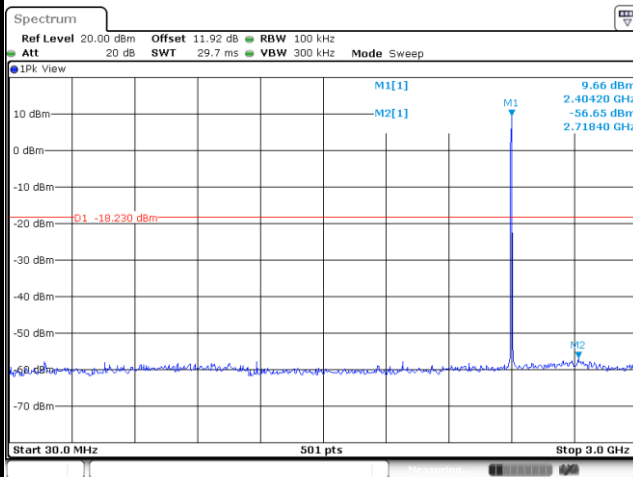
<2Mbps>



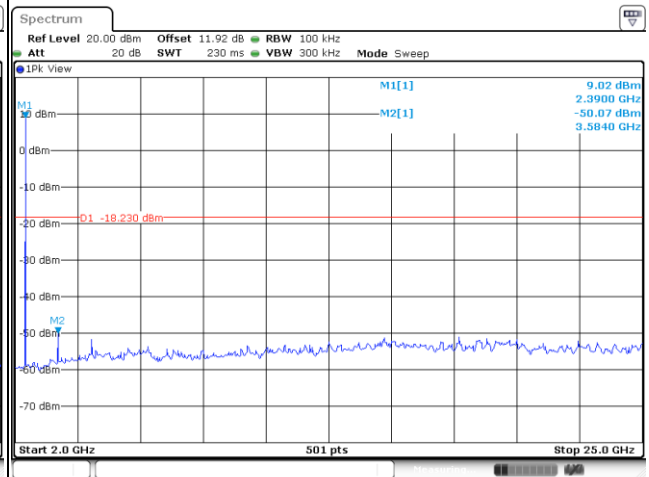
3.4.6 Test Result of Conducted Spurious Emission Plots



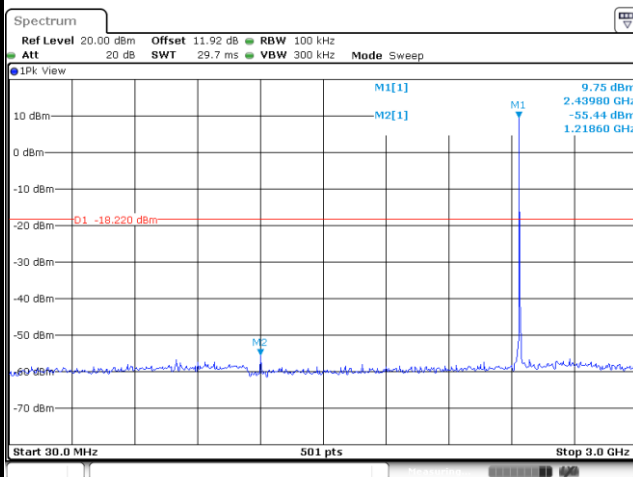


**Conducted Spurious Emission Plot on
Bluetooth LE 2Mbps GFSK Channel 00**


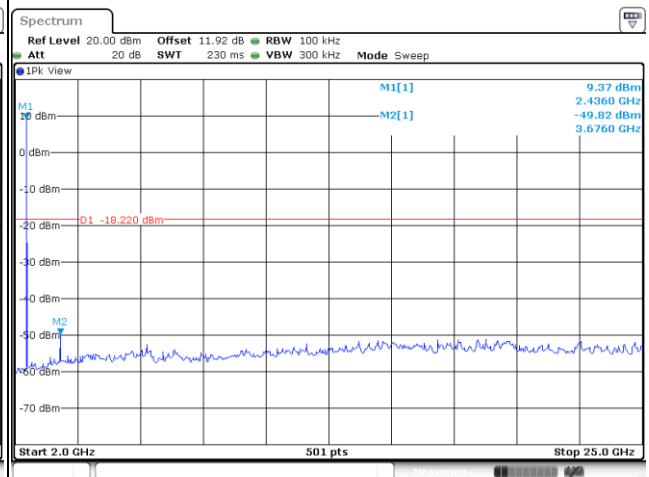
Date: 4 MAR 2021 20:44:28

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


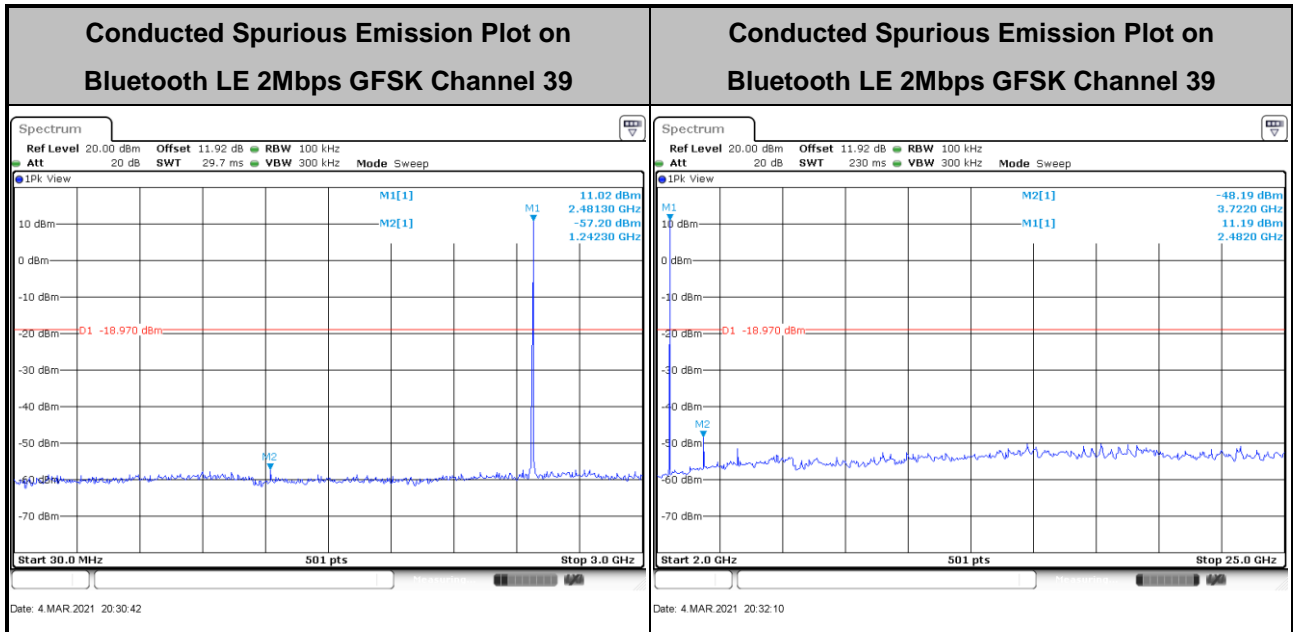
Date: 4 MAR 2021 20:44:54

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


Date: 4 MAR 2021 20:38:09

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


Date: 4 MAR 2021 20:38:07



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------|--------------------------------------|----------------------------------|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 – 88 | 100 | 3 |
| 88 – 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

3.5.2 Measuring Instruments

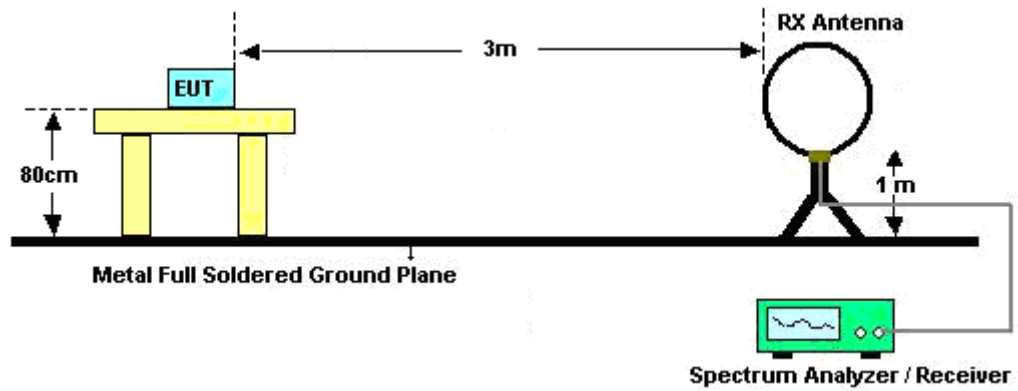
See list of measuring equipment of this test report.

3.5.3 Test Procedures

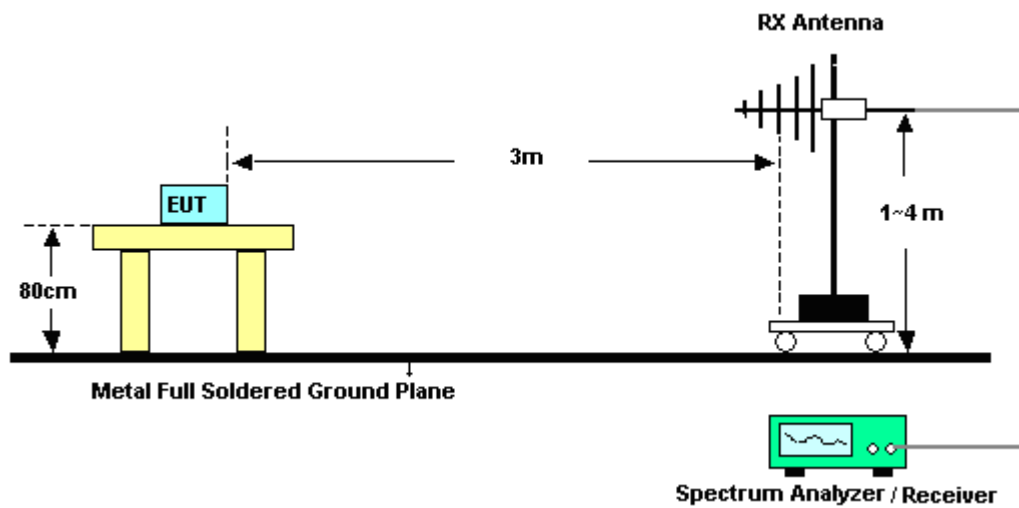
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1 GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and be reported.
7. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and be reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW = 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW = 3 MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

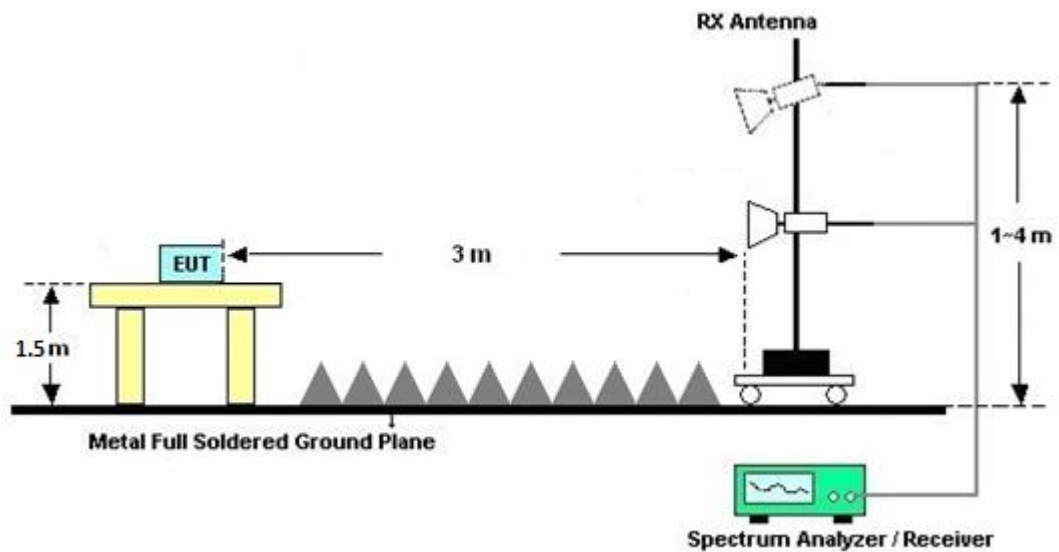
For radiated test below 30MHz



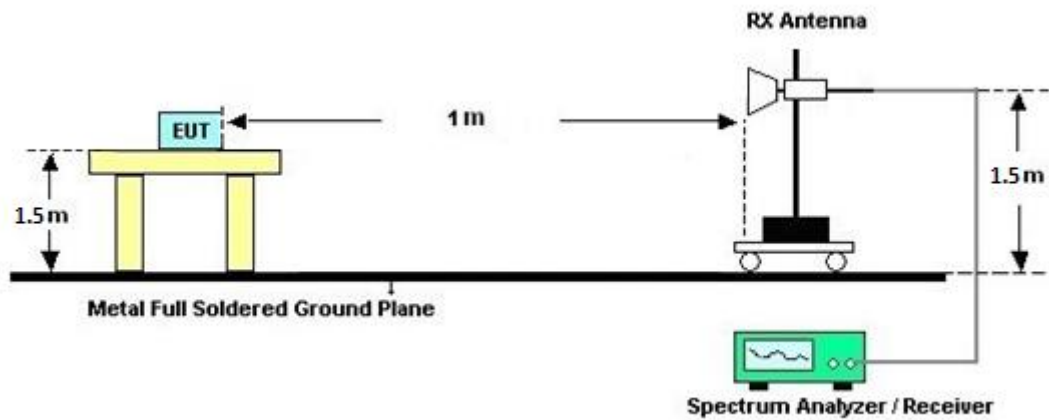
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is 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 (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

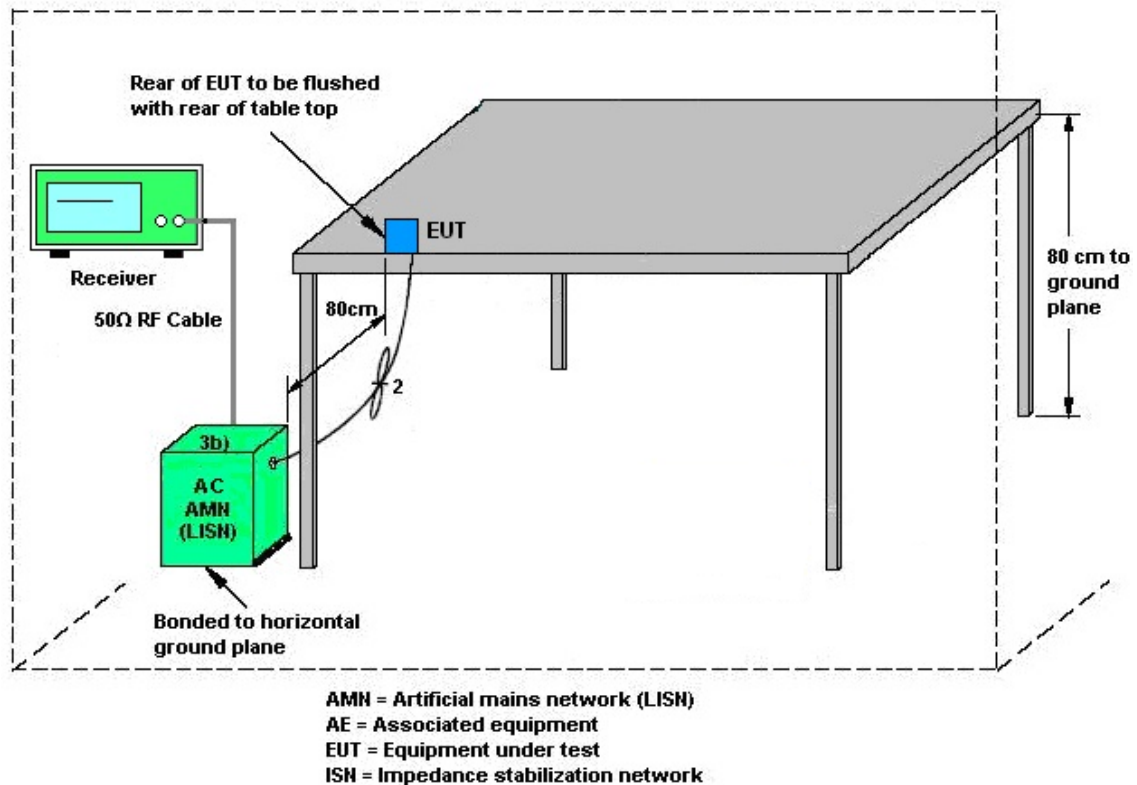
3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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



4 List of Measuring Equipment

| Instrument | Brand Name | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-------------------------|--------------------|--------------------------------------|-------------------|----------------------------------|----------------------------|---------------------------------|----------------------------|--------------------------|
| Loop Antenna | R&S | HFH2-Z2E | 100840 | 9kHz~30MHz | Jun. 16, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jun. 15, 2021 | Radiation (03CH02-CA) |
| Bilog Antenna | TESEQ | 6111D | 50392 | 30MHz~1GHz | Jul. 29, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 28, 2021 | Radiation (03CH02-CA) |
| Horn Antenna | SCHWARZBE CK | BBHA 9120D | 01895 | 1GHz~18GHz | Aug. 28, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Aug. 27, 2021 | Radiation (03CH02-CA) |
| SHF-EHF Horn Antenna | SCHWARZBE CK | BBHA9170 | 00842 | 18GHz~40GHz | Jul. 27, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 26, 2021 | Radiation (03CH02-CA) |
| Amplifier | SONOMA | 310N | 372240 | N/A | Aug. 12, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Aug. 11, 2021 | Radiation (03CH02-CA) |
| Preamplifier | Keysight | 83017A | MY53270321 | 1GHz~26.5GHz | Jul. 28, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 27, 2021 | Radiation (03CH02-CA) |
| Preamplifier | EMEC | EMC18G40 G | 060725 | 18G-40G | Aug. 07, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Aug. 06, 2021 | Radiation (03CH02-CA) |
| Preamplifier | E-instrument | ERA-100M-1 8G-56-01-A7 0 | EC1900251 | 1GHz~18GHz | Nov. 26, 2019 | Mar. 04, 2021~ Mar. 26, 2021 | Nov. 25, 2021 | Radiation (03CH02-CA) |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | 102177 | 9kHz~7GHz | Jul. 16, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 15, 2021 | Radiation (03CH02-CA) |
| Spectrum Analyzer | Keysight | N9010A | MY57420221 | 10Hz~44GHz | Sep. 11, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Sep. 10, 2021 | Radiation (03CH02-CA) |
| Filter | Wainwright | Whkx8-5872 .5-6750-180 00-40ST | SN8 | 6.75G Highpass | Jul. 24, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 23, 2021 | Radiation (03CH02-CA) |
| Filter | Wainwright | WHKX12-27 00-3000-180 00-60ST | SN10 | 3G Highpass | Jul. 24, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 23, 2021 | Radiation (03CH02-CA) |
| Filter | Wainwright | WLK12-1200 -1272-11000 -40SS | SN2 | 1.2G Low Pass | Jul. 24, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Jul. 23, 2021 | Radiation (03CH02-CA) |
| Hygrometer | TESEO | 608-H1 | 45142602 | N/A | Aug. 05, 2020 | Mar. 04, 2021~ Mar. 26, 2021 | Aug. 04, 2021 | Radiation (03CH02-CA) |
| Controller | ChainTek | 3000-1 | N/A | Control Turn table & Ant Mast | N/A | Mar. 04, 2021~ Mar. 26, 2021 | N/A | Radiation (03CH02-CA) |
| Antenna Mast | ChainTek | MBS-520-1 | N/A | 1m~4m | N/A | Mar. 04, 2021~ Mar. 26, 2021 | N/A | Radiation (03CH02-CA) |
| Turn Table | ChainTek | T-200-S-1 | N/A | 0~360 Degree | N/A | Mar. 04, 2021~ Mar. 26, 2021 | N/A | Radiation (03CH02-CA) |
| Software | Audix | E3 | N/A | N/A | N/A | Mar. 04, 2021~ Mar. 26, 2021 | N/A | Radiation (03CH02-CA) |
| Hygrometer | Testo | 608-H1 | 45142595 | N/A | Aug. 05, 2020 | Mar. 01, 2021~ Mar. 10, 2021 | Aug. 04, 2021 | Conducted (TH01-CA) |
| Power Sensor | DARE!! | RPR3006W | RPR6W-190 1026 | 10MHz-6GHz | Jun. 24, 2020 | Mar. 01, 2021~ Mar. 10, 2021 | Jun. 23, 2021 | Conducted (TH01-CA) |
| Spectrum Analyzer | Rohde & Schwarz | FSV40 | 101089 | 10Hz-40GHz | Sep. 14, 2020 | Mar. 01, 2021~ Mar. 10, 2021 | Sep. 13, 2021 | Conducted (TH01-CA) |
| Coupler | WOKEN | 20dB 30W Coupler | CAT7AKW1A 1 | 0.5-18GHz | Calibration from System | Mar. 01, 2021~ Mar. 10, 2021 | Calibration from System | Conducted (TH01-CA) |



| Instrument | Brand Name | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-------------------------------------|------------|-------------------|-------------------|-----------------|------------------|---------------|---------------|----------------------|
| LISN | TESEQ | NNB51 | 47407 | N/A | Jul. 06, 2020 | Mar. 12, 2021 | Jul. 05, 2021 | Conduction (CO01-CA) |
| EMI Test Receiver | R&S | ESR7 | 102177 | 9KHz~7GHz | Jul. 16, 2020 | Mar. 12, 2021 | Jul. 15, 2021 | Conduction (CO01-CA) |
| Pulse limiter with 10dB attenuation | R&S | VTSD 9561-F N | 9561-F- N00412 | N/A | Jul. 08, 2020 | Mar. 12, 2021 | Jul. 07, 2021 | Conduction (CO01-CA) |
| Test Software | R&S | EMC32 V10.30.0 | N/A | N/A | N/A | Mar. 12, 2021 | N/A | Conduction (CO01-CA) |

5 Uncertainty of Evaluation

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

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

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

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 4.5 |
|---|-----|

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

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 6.1 |
|---|-----|

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

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 6.5 |
|---|-----|

Appendix A. Test Result of Conducted Test Items

| | | | | |
|----------------|-----------------------|--------------------|---------|----|
| Test Engineer: | Andy Kao/Kaying Xiong | Temperature: | 17~22.2 | °C |
| Test Date: | 2021/3/1~2021/3/10 | Relative Humidity: | 31~47.5 | % |

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 | 1.027 | 0.707 | 0.50 | Pass |
| BLE | 1Mbps | 1 | 19 | 2440 | 1.025 | 0.709 | 0.50 | Pass |
| BLE | 1Mbps | 1 | 39 | 2480 | 1.023 | 0.709 | 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 | 9.02 | 30.00 | 2.80 | 11.82 | 36.00 | Pass |
| BLE | 1Mbps | 1 | 19 | 2440 | 8.82 | 30.00 | 2.80 | 11.62 | 36.00 | Pass |
| BLE | 1Mbps | 1 | 39 | 2480 | 8.12 | 30.00 | 2.80 | 10.92 | 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 | 8.23 | -6.43 | 2.80 | 8.00 | Pass |
| BLE | 1Mbps | 1 | 19 | 2440 | 12.20 | -6.84 | 2.80 | 8.00 | Pass |
| BLE | 1Mbps | 1 | 39 | 2480 | 11.43 | -7.61 | 2.80 | 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 | 2.046 | 1.247 | 0.50 | Pass |
| BLE | 2Mbps | 1 | 19 | 2440 | 2.046 | 1.251 | 0.50 | Pass |
| BLE | 2Mbps | 1 | 39 | 2480 | 2.042 | 1.247 | 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 | 9.02 | 30.00 | 2.80 | 11.82 | 36.00 | Pass |
| BLE | 2Mbps | 1 | 19 | 2440 | 8.82 | 30.00 | 2.80 | 11.62 | 36.00 | Pass |
| BLE | 2Mbps | 1 | 39 | 2480 | 8.02 | 30.00 | 2.80 | 10.82 | 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 | 11.77 | -10.53 | 2.80 | 8.00 | Pass |
| BLE | 2Mbps | 1 | 19 | 2440 | 11.78 | -10.70 | 2.80 | 8.00 | Pass |
| BLE | 2Mbps | 1 | 39 | 2480 | 11.03 | -11.50 | 2.80 | 8.00 | Pass |

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



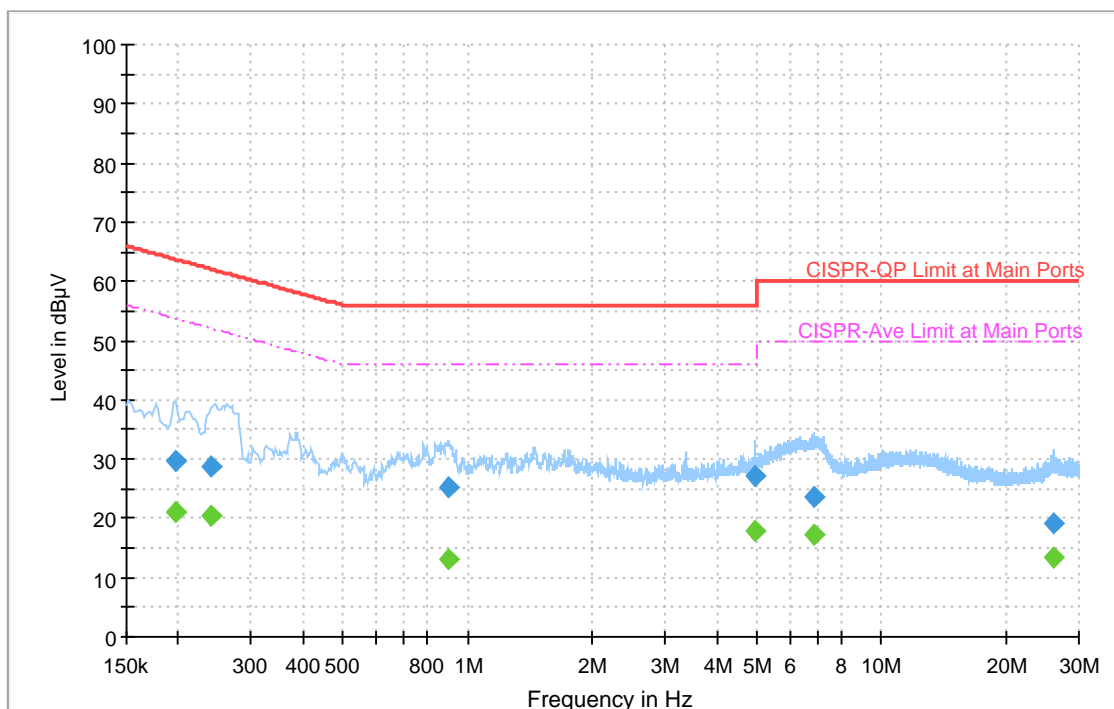
Appendix B. AC Conducted Emission Test Results

| | | | |
|-----------------|----------------|---------------------|------------|
| Test Engineer : | Janssen Wongso | Temperature : | 18~21°C |
| | | Relative Humidity : | 40.6~44.8% |

EUT Information

Site: CO01-CA
Power: 120Vac/60Hz
Model: Vesta
Mode: 1

Full Spectrum



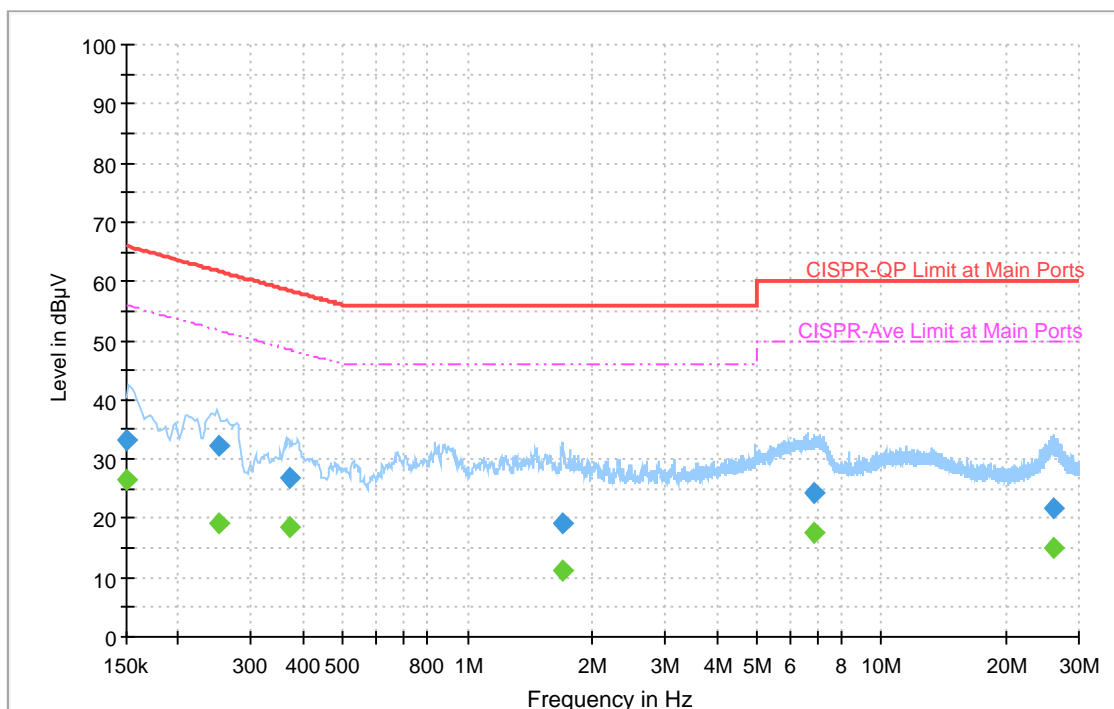
Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.197700 | 29.64 | --- | 63.71 | 34.07 | L1 | OFF | 20.0 |
| 0.197700 | --- | 21.02 | 53.71 | 32.69 | L1 | OFF | 20.0 |
| 0.240000 | 28.79 | --- | 62.10 | 33.31 | L1 | OFF | 20.0 |
| 0.240000 | --- | 20.53 | 52.10 | 31.57 | L1 | OFF | 20.0 |
| 0.904290 | 25.30 | --- | 56.00 | 30.70 | L1 | OFF | 20.0 |
| 0.904290 | --- | 12.96 | 46.00 | 33.04 | L1 | OFF | 20.0 |
| 4.933590 | 27.16 | --- | 56.00 | 28.84 | L1 | OFF | 20.1 |
| 4.933590 | --- | 17.85 | 46.00 | 28.15 | L1 | OFF | 20.1 |
| 6.859500 | 23.66 | --- | 60.00 | 36.34 | L1 | OFF | 20.1 |
| 6.859500 | --- | 17.37 | 50.00 | 32.63 | L1 | OFF | 20.1 |
| 26.133000 | 19.24 | --- | 60.00 | 40.76 | L1 | OFF | 20.6 |
| 26.133000 | --- | 13.52 | 50.00 | 36.48 | L1 | OFF | 20.6 |

EUT Information

Site: CO01-CA
Power: 120Vac/60Hz
Model: Vesta
Mode: 1

Full Spectrum



Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.150203 | --- | 26.37 | 55.99 | 29.62 | N | OFF | 20.0 |
| 0.150203 | 33.38 | --- | 65.99 | 32.61 | N | OFF | 20.0 |
| 0.251250 | --- | 19.09 | 51.72 | 32.63 | N | OFF | 20.0 |
| 0.251250 | 32.38 | --- | 61.72 | 29.34 | N | OFF | 20.0 |
| 0.372750 | --- | 18.69 | 48.44 | 29.75 | N | OFF | 20.0 |
| 0.372750 | 26.77 | --- | 58.44 | 31.67 | N | OFF | 20.0 |
| 1.693860 | --- | 11.32 | 46.00 | 34.68 | N | OFF | 20.0 |
| 1.693860 | 19.06 | --- | 56.00 | 36.94 | N | OFF | 20.0 |
| 6.852210 | --- | 17.68 | 50.00 | 32.32 | N | OFF | 20.1 |
| 6.852210 | 24.19 | --- | 60.00 | 35.81 | N | OFF | 20.1 |
| 26.142000 | --- | 15.07 | 50.00 | 34.93 | N | OFF | 20.6 |
| 26.142000 | 21.79 | --- | 60.00 | 38.21 | N | OFF | 20.6 |



Appendix C. Radiated Spurious Emission

| | | | |
|-----------------|---------------------------|---------------------|-----------|
| Test Engineer : | Calvin Wu and Michael Bui | Temperature : | 19 – 24°C |
| | | Relative Humidity : | 40~46% |

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

| BLE | Note | Frequency | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preampl Factor | Ant Pos | Table Pos | Peak Avg. | Pol. |
|-------------------------|------|-----------|------------|------------|------------|------------|----------------|-----------|----------------|---------|-----------|-----------|---------|
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| BLE CH 00 2402MHz | | 2336.46 | 55.11 | -18.89 | 74 | 41.44 | 27.78 | 17.31 | 31.42 | 223 | 355 | P | H |
| | | 2314.725 | 46.1 | -7.9 | 54 | 32.38 | 27.87 | 17.27 | 31.42 | 223 | 355 | A | H |
| | * | 2402 | 107.25 | - | - | 93.58 | 27.61 | 17.42 | 31.36 | 223 | 355 | P | H |
| | * | 2402 | 106.94 | - | - | 93.27 | 27.61 | 17.42 | 31.36 | 223 | 355 | A | H |
| | | 2384.55 | 54.94 | -19.06 | 74 | 41.27 | 27.65 | 17.4 | 31.38 | 100 | 244 | P | V |
| | | 2314.83 | 46.05 | -7.95 | 54 | 32.36 | 27.84 | 17.27 | 31.42 | 100 | 244 | A | V |
| | * | 2402 | 98.27 | - | - | 84.64 | 27.57 | 17.42 | 31.36 | 100 | 244 | P | V |
| | * | 2402 | 97.89 | - | - | 84.26 | 27.57 | 17.42 | 31.36 | 100 | 244 | A | V |
| BLE CH 19 2440MHz | | 2341.5 | 55.42 | -18.58 | 74 | 41.76 | 27.75 | 17.32 | 31.41 | 216 | 348 | P | H |
| | | 2357.25 | 45.73 | -8.27 | 54 | 32.08 | 27.7 | 17.35 | 31.4 | 216 | 348 | A | H |
| | * | 2440 | 110.99 | - | - | 97.28 | 27.59 | 17.48 | 31.36 | 216 | 348 | P | H |
| | * | 2440 | 110.54 | - | - | 96.83 | 27.59 | 17.48 | 31.36 | 216 | 348 | A | H |
| | | 2490.88 | 54.37 | -19.63 | 74 | 40.58 | 27.56 | 17.57 | 31.34 | 216 | 348 | P | H |
| | | 2485.2 | 45.41 | -8.59 | 54 | 31.64 | 27.56 | 17.56 | 31.35 | 216 | 348 | A | H |
| | | 2362.95 | 55.33 | -18.67 | 74 | 41.62 | 27.75 | 17.36 | 31.4 | 400 | 276 | P | V |
| | | 2337.9 | 45.52 | -8.48 | 54 | 31.8 | 27.82 | 17.31 | 31.41 | 400 | 276 | A | V |
| | * | 2440 | 102.37 | - | - | 88.8 | 27.45 | 17.48 | 31.36 | 400 | 276 | P | V |
| | * | 2440 | 101.91 | - | - | 88.34 | 27.45 | 17.48 | 31.36 | 400 | 276 | A | V |
| | | 2499.44 | 54.39 | -19.61 | 74 | 40.77 | 27.38 | 17.58 | 31.34 | 400 | 276 | P | V |
| | | 2499.44 | 45.23 | -8.77 | 54 | 31.61 | 27.38 | 17.58 | 31.34 | 400 | 276 | A | V |



| | | | | | | | | | | | | | |
|----------------------------------|--|---------|--------|--------|----|-------|-------|-------|-------|-----|-----|---|---|
| BLE CH 39 2480MHz | * | 2480 | 109.89 | - | - | 96.12 | 27.57 | 17.55 | 31.35 | 233 | 346 | P | H |
| | * | 2480 | 109.5 | - | - | 95.73 | 27.57 | 17.55 | 31.35 | 233 | 346 | A | H |
| | | 2486.88 | 56.74 | -17.26 | 74 | 42.97 | 27.56 | 17.56 | 31.35 | 233 | 346 | P | H |
| | | 2484.28 | 47.88 | -6.12 | 54 | 34.11 | 27.56 | 17.56 | 31.35 | 233 | 346 | A | H |
| | * | 2480 | 100.75 | - | - | 87.15 | 27.4 | 17.55 | 31.35 | 100 | 93 | P | V |
| | * | 2480 | 100.35 | - | - | 86.75 | 27.4 | 17.55 | 31.35 | 100 | 93 | A | V |
| | | 2499.84 | 55.02 | -18.98 | 74 | 41.4 | 27.38 | 17.58 | 31.34 | 100 | 93 | P | V |
| | | 2484.88 | 45.73 | -8.27 | 54 | 32.13 | 27.39 | 17.56 | 31.35 | 100 | 93 | A | V |
| Remark | <ol style="list-style-type: none">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 | | 3603 | 56.4 | -17.6 | 74 | 82.69 | 29.26 | 10.92 | 65.6 | 302 | 327 | P | H |
| | | 3603 | 53.33 | -0.67 | 54 | 79.62 | 29.26 | 10.92 | 65.6 | 302 | 327 | A | H |
| | | 4804 | 48.94 | -25.06 | 74 | 72.57 | 31.38 | 11.91 | 66.29 | 100 | 0 | P | H |
| | | 11760 | 57.28 | -16.72 | 74 | 66.91 | 39.35 | 18.27 | 66.7 | 253 | 258 | P | H |
| | | 11760 | 48.07 | -5.93 | 54 | 57.7 | 39.35 | 18.27 | 66.7 | 253 | 258 | A | H |
| | | 18000 | 62.33 | -11.67 | 74 | 59.73 | 48.43 | 22.59 | 67.8 | 226 | 143 | P | H |
| | | 18000 | 50.86 | -3.14 | 54 | 48.26 | 48.43 | 22.59 | 67.8 | 226 | 143 | A | H |
| | | 3603 | 51.44 | -22.56 | 74 | 77.83 | 29.16 | 10.05 | 65.6 | 103 | 237 | P | V |
| | | 3603 | 47.23 | -6.77 | 54 | 73.62 | 29.16 | 10.05 | 65.6 | 103 | 237 | A | V |
| | | 4804 | 45.23 | -28.77 | 74 | 68.85 | 31.39 | 11.28 | 66.29 | 100 | 0 | P | V |
| | | 11760 | 57.04 | -16.96 | 74 | 66.63 | 39.39 | 17.72 | 66.7 | 315 | 338 | P | V |
| | | 11760 | 47.47 | -6.53 | 54 | 57.06 | 39.39 | 17.72 | 66.7 | 315 | 338 | A | V |
| | | 18000 | 62.35 | -11.65 | 74 | 59.7 | 48.48 | 21.97 | 67.8 | 400 | 14 | P | V |
| | | 18000 | 50.81 | -3.19 | 54 | 48.16 | 48.48 | 21.97 | 67.8 | 400 | 14 | A | V |
| BLE CH 19 2440MHz | | 3660 | 46.55 | -27.45 | 74 | 72.89 | 29.25 | 10.07 | 65.66 | 100 | 0 | P | H |
| | | 4880 | 42.23 | -31.77 | 74 | 65.59 | 31.35 | 11.43 | 66.14 | 100 | 0 | P | H |
| | | 7320 | 45.36 | -28.64 | 74 | 60.97 | 36.36 | 13.89 | 65.86 | 100 | 0 | P | H |
| | | 11760 | 56.47 | -17.53 | 74 | 66.1 | 39.35 | 17.72 | 66.7 | 249 | 262 | P | H |
| | | 11760 | 47.91 | -6.09 | 54 | 57.54 | 39.35 | 17.72 | 66.7 | 249 | 262 | A | H |
| | | 18000 | 63.49 | -10.51 | 74 | 60.89 | 48.43 | 21.97 | 67.8 | 305 | 221 | P | H |
| | | 18000 | 51.41 | -2.59 | 54 | 48.81 | 48.43 | 21.97 | 67.8 | 305 | 221 | A | H |
| | | 3660 | 40.84 | -33.16 | 74 | 67.18 | 29.25 | 10.07 | 65.66 | 100 | 0 | P | V |
| | | 4880 | 40.38 | -33.62 | 74 | 63.81 | 31.28 | 11.43 | 66.14 | 100 | 0 | P | V |
| | | 7320 | 44.64 | -29.36 | 74 | 60.19 | 36.42 | 13.89 | 65.86 | 100 | 0 | P | V |
| | | 11760 | 55.62 | -18.38 | 74 | 65.21 | 39.39 | 17.72 | 66.7 | 196 | 72 | P | V |
| | | 11760 | 46.24 | -7.76 | 54 | 55.83 | 39.39 | 17.72 | 66.7 | 196 | 72 | A | V |
| | | 18000 | 63.2 | -10.8 | 74 | 60.55 | 48.48 | 21.97 | 67.8 | 255 | 58 | P | V |
| | | 18000 | 51.16 | -2.84 | 54 | 48.51 | 48.48 | 21.97 | 67.8 | 255 | 58 | A | V |



| | | | | | | | | | | | | | |
|----------------------------------|--|-------|-------|--------|----|-------|-------|-------|-------|-----|-----|---|---|
| BLE CH 39 2480MHz | | 3720 | 46.2 | -27.8 | 74 | 72.41 | 29.41 | 9.32 | 65.72 | 100 | 0 | P | H |
| | | 4960 | 42.66 | -31.34 | 74 | 65.58 | 31.47 | 10.84 | 65.98 | 100 | 0 | P | H |
| | | 7440 | 46.56 | -27.44 | 74 | 61.91 | 36.51 | 13.46 | 65.89 | 100 | 0 | P | H |
| | | 11760 | 55.99 | -18.01 | 74 | 65.62 | 39.35 | 17.17 | 66.7 | 294 | 10 | P | H |
| | | 11760 | 47.23 | -6.77 | 54 | 56.86 | 39.35 | 17.17 | 66.7 | 294 | 10 | A | H |
| | | 18000 | 62.82 | -11.18 | 74 | 60.22 | 48.43 | 21.35 | 67.8 | 321 | 2 | P | H |
| | | 18000 | 51.42 | -2.58 | 54 | 48.82 | 48.43 | 21.35 | 67.8 | 321 | 2 | A | H |
| | | 4960 | 42.83 | -31.17 | 74 | 65.8 | 31.42 | 10.84 | 65.98 | 100 | 0 | P | V |
| | | 7440 | 46.38 | -27.62 | 74 | 61.76 | 36.48 | 13.46 | 65.89 | 100 | 0 | P | V |
| | | 11760 | 55.87 | -18.13 | 74 | 65.46 | 39.39 | 17.17 | 66.7 | 194 | 38 | P | V |
| | | 11760 | 46.44 | -7.56 | 54 | 56.03 | 39.39 | 17.17 | 66.7 | 194 | 38 | A | V |
| | | 18000 | 62.73 | -11.27 | 74 | 60.08 | 48.48 | 21.35 | 67.8 | 181 | 291 | P | V |
| | | 18000 | 51.5 | -2.5 | 54 | 48.85 | 48.48 | 21.35 | 67.8 | 181 | 291 | A | V |

**Emission above 18GHz****2.4GHz BLE (SHF)**

| BT | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|-------------------------------|--|-----------|------------------|--------|------------------|----------------|----------|--------|--------|--------|---------|---------|---------|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | (MHz) | (dB μ V/m) | (dB) | (dB μ V/m) | (dB μ V) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 2.4GHz BLE SHF | | 24937 | 39.51 | -34.49 | 74 | 35.96 | 39.16 | 15.89 | 51.5 | 150 | 0 | P | H |
| | | 22921 | 39.65 | -34.35 | 74 | 37.88 | 38.78 | 14.67 | 51.68 | 150 | 0 | P | V |
| Remark | 1. No other spurious found. 2. All results are PASS against limit line. | | | | | | | | | | | | |

**Emission below 1GHz****2.4GHz BLE (LF)**

| BLE | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|------------------------------|--|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 2.4GHz BLE LF | | 30.97 | 21.75 | -18.25 | 40 | 28.58 | 24.71 | 0.9 | 32.44 | - | - | P | H |
| | | 120 | 38.62 | -4.88 | 43.5 | 51.7 | 17.6 | 1.73 | 32.41 | 288 | 85 | Q | H |
| | | 120 | 40.48 | -3.02 | 43.5 | 53.56 | 17.6 | 1.73 | 32.41 | 288 | 85 | P | H |
| | | 136.7 | 35.21 | -8.29 | 43.5 | 48.1 | 17.6 | 1.92 | 32.41 | - | - | P | H |
| | | 167.74 | 36.71 | -6.79 | 43.5 | 51.09 | 15.93 | 2.1 | 32.41 | - | - | P | H |
| | | 359.8 | 31.7 | -14.3 | 46 | 40.33 | 20.7 | 3.14 | 32.47 | - | - | P | H |
| | | 623.64 | 36.14 | -9.86 | 46 | 38.55 | 26.15 | 4.06 | 32.62 | - | - | P | H |
| | | 33.88 | 21.86 | -18.14 | 40 | 30.29 | 23.06 | 0.95 | 32.44 | - | - | P | V |
| | | 94.02 | 32.06 | -11.44 | 43.5 | 47.4 | 15.4 | 1.68 | 32.42 | - | - | P | V |
| | | 120 | 35.53 | -7.97 | 43.5 | 48.61 | 17.6 | 1.73 | 32.41 | 100 | 0 | P | V |
| | | 136.7 | 34.01 | -9.49 | 43.5 | 46.9 | 17.6 | 1.92 | 32.41 | - | - | P | V |
| | | 251.16 | 30.17 | -15.83 | 46 | 41.27 | 18.72 | 2.59 | 32.41 | - | - | P | V |
| | | 512.09 | 31.74 | -14.26 | 46 | 36.68 | 24 | 3.66 | 32.6 | - | - | P | 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 | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preampl Factor | Ant Pos | Table Pos | Peak Avg. | Pol. |
|-------------------------|------|-----------|------------|------------|------------|------------|----------------|-----------|----------------|---------|-----------|-----------|---------|
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| BLE CH 00 2402MHz | | 2369.22 | 56.25 | -17.75 | 74 | 42.6 | 27.67 | 17.37 | 31.39 | 222 | 352 | P | H |
| | | 2389.065 | 45.5 | -8.5 | 54 | 31.84 | 27.63 | 17.4 | 31.37 | 222 | 352 | A | H |
| | * | 2402 | 108.96 | - | - | 95.29 | 27.61 | 17.42 | 31.36 | 222 | 352 | P | H |
| | * | 2402 | 107.6 | - | - | 93.93 | 27.61 | 17.42 | 31.36 | 222 | 352 | A | H |
| | | 2367.225 | 55.73 | -18.27 | 74 | 42.02 | 27.73 | 17.37 | 31.39 | 100 | 246 | P | V |
| | | 2331.525 | 45.43 | -8.57 | 54 | 31.73 | 27.82 | 17.3 | 31.42 | 100 | 246 | A | V |
| | * | 2402 | 99.59 | - | - | 85.96 | 27.57 | 17.42 | 31.36 | 100 | 246 | P | V |
| | * | 2402 | 98.24 | - | - | 84.61 | 27.57 | 17.42 | 31.36 | 100 | 246 | A | V |
| BLE CH 19 2440MHz | | 2373.84 | 54.61 | -19.39 | 74 | 40.96 | 27.66 | 17.38 | 31.39 | 218 | 349 | P | H |
| | | 2346.48 | 44.74 | -9.26 | 54 | 31.1 | 27.73 | 17.32 | 31.41 | 218 | 349 | A | H |
| | * | 2440 | 111.15 | - | - | 97.44 | 27.59 | 17.48 | 31.36 | 218 | 349 | P | H |
| | * | 2440 | 109.86 | - | - | 96.15 | 27.59 | 17.48 | 31.36 | 218 | 349 | A | H |
| | | 2484.8 | 55.12 | -18.88 | 74 | 41.35 | 27.56 | 17.56 | 31.35 | 218 | 349 | P | H |
| | | 2495.68 | 45.01 | -8.99 | 54 | 31.21 | 27.56 | 17.58 | 31.34 | 218 | 349 | A | H |
| | | 2319.92 | 55.51 | -18.49 | 74 | 41.82 | 27.83 | 17.28 | 31.42 | 400 | 275 | P | V |
| | | 2348.4 | 44.71 | -9.29 | 54 | 30.98 | 27.81 | 17.33 | 31.41 | 400 | 275 | A | V |
| | * | 2440 | 102.71 | - | - | 89.14 | 27.45 | 17.48 | 31.36 | 400 | 275 | P | V |
| | * | 2440 | 101.36 | - | - | 87.79 | 27.45 | 17.48 | 31.36 | 400 | 275 | A | V |
| | | 2489.68 | 54.66 | -19.34 | 74 | 41.04 | 27.39 | 17.57 | 31.34 | 400 | 275 | P | V |
| | | 2494.88 | 44.79 | -9.21 | 54 | 31.16 | 27.39 | 17.58 | 31.34 | 400 | 275 | A | V |



| | | | | | | | | | | | | | |
|----------------------------------|---|---------|--------|--------|----|-------|-------|-------|-------|-----|-----|---|---|
| BLE CH 39 2480MHz | * | 2480 | 110.9 | - | - | 97.13 | 27.57 | 17.55 | 31.35 | 210 | 347 | P | H |
| | * | 2480 | 109.55 | - | - | 95.78 | 27.57 | 17.55 | 31.35 | 210 | 347 | A | H |
| | | 2483.88 | 59.07 | -14.93 | 74 | 45.3 | 27.56 | 17.56 | 31.35 | 210 | 347 | P | H |
| | | 2483.52 | 50.34 | -3.66 | 54 | 36.56 | 27.57 | 17.56 | 31.35 | 210 | 347 | A | H |
| | * | 2480 | 101.84 | - | - | 88.24 | 27.4 | 17.55 | 31.35 | 115 | 92 | P | V |
| | * | 2480 | 100.42 | - | - | 86.82 | 27.4 | 17.55 | 31.35 | 115 | 92 | A | V |
| | | 2490.32 | 54.97 | -19.03 | 74 | 41.35 | 27.39 | 17.57 | 31.34 | 115 | 92 | P | V |
| | | 2483.52 | 45.76 | -8.24 | 54 | 32.16 | 27.39 | 17.56 | 31.35 | 115 | 92 | A | V |
| Remark | 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |



2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

| BLE | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Path Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) |
|-------------------------|------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| BLE CH 00 2402MHz | | 3603 | 56.68 | -17.32 | 74 | 82.97 | 29.26 | 10.05 | 65.6 | 301 | 327 | P | H |
| | | 3603 | 53.14 | -0.86 | 54 | 79.43 | 29.26 | 10.05 | 65.6 | 301 | 327 | A | H |
| | | 4804 | 45.99 | -28.01 | 74 | 69.62 | 31.38 | 11.28 | 66.29 | 100 | 0 | P | H |
| | | 11760 | 56.3 | -17.7 | 74 | 65.93 | 39.35 | 17.72 | 66.7 | 203 | 14 | P | H |
| | | 11760 | 47.28 | -6.72 | 54 | 56.91 | 39.35 | 17.72 | 66.7 | 203 | 14 | A | H |
| | | 18000 | 62.79 | -11.21 | 74 | 60.19 | 48.43 | 21.97 | 67.8 | 189 | 1 | P | H |
| | | 18000 | 51.48 | -2.52 | 54 | 48.88 | 48.43 | 21.97 | 67.8 | 189 | 1 | A | H |
| | | 3603 | 51.87 | -22.13 | 74 | 78.26 | 29.16 | 10.05 | 65.6 | 183 | 237 | P | V |
| | | 3603 | 47.28 | -6.72 | 54 | 73.67 | 29.16 | 10.05 | 65.6 | 183 | 237 | A | V |
| | | 4804 | 44.06 | -29.94 | 74 | 67.68 | 31.39 | 11.28 | 66.29 | 100 | 0 | P | V |
| | | 11760 | 57.17 | -16.83 | 74 | 66.76 | 39.39 | 17.72 | 66.7 | 315 | 337 | P | V |
| | | 11760 | 47.52 | -6.48 | 54 | 57.11 | 39.39 | 17.72 | 66.7 | 315 | 337 | A | V |
| | | 18000 | 62.74 | -11.26 | 74 | 60.09 | 48.48 | 21.97 | 67.8 | 281 | 336 | P | V |
| | | 18000 | 51.43 | -2.57 | 54 | 48.78 | 48.48 | 21.97 | 67.8 | 281 | 336 | A | V |
| BLE CH 19 2440MHz | | 3660 | 51.39 | -22.61 | 74 | 77.73 | 29.25 | 10.07 | 65.66 | 100 | 8 | P | H |
| | | 3660 | 46.79 | -7.21 | 54 | 73.13 | 29.25 | 10.07 | 65.66 | 100 | 8 | A | H |
| | | 4880 | 43.6 | -30.4 | 74 | 66.96 | 31.35 | 11.43 | 66.14 | 100 | 0 | P | H |
| | | 7320 | 46.3 | -27.7 | 74 | 61.91 | 36.36 | 13.89 | 65.86 | 100 | 0 | P | H |
| | | 11760 | 56.48 | -17.52 | 74 | 66.11 | 39.35 | 17.72 | 66.7 | 290 | 9 | P | H |
| | | 11760 | 47.31 | -6.69 | 54 | 56.94 | 39.35 | 17.72 | 66.7 | 290 | 9 | A | H |
| | | 18000 | 62.57 | -11.43 | 74 | 59.97 | 48.43 | 21.97 | 67.8 | 301 | 12 | P | H |
| | | 18000 | 51.38 | -2.62 | 54 | 48.78 | 48.43 | 21.97 | 67.8 | 301 | 12 | A | H |
| | | 3660 | 43.23 | -30.77 | 74 | 69.57 | 29.25 | 10.07 | 65.66 | 100 | 0 | P | V |
| | | 4880 | 41.42 | -32.58 | 74 | 64.85 | 31.28 | 11.43 | 66.14 | 100 | 0 | P | V |
| | | 7320 | 45.13 | -28.87 | 74 | 60.68 | 36.42 | 13.89 | 65.86 | 100 | 0 | P | V |
| | | 11760 | 56.63 | -17.37 | 74 | 66.22 | 39.39 | 17.72 | 66.7 | 314 | 337 | P | V |
| | | 11760 | 47.77 | -6.23 | 54 | 57.36 | 39.39 | 17.72 | 66.7 | 314 | 337 | A | V |
| | | 18000 | 62.64 | -11.36 | 74 | 59.99 | 48.48 | 21.97 | 67.8 | 338 | 259 | P | V |
| | | 18000 | 51.31 | -2.69 | 54 | 48.66 | 48.48 | 21.97 | 67.8 | 338 | 259 | A | V |



| | | | | | | | | | | | | | |
|----------------------------------|---|-------|-------|--------|----|-------|-------|-------|-------|-----|-----|---|---|
| BLE CH 39 2480MHz | | 3720 | 45.66 | -28.34 | 74 | 71.87 | 29.41 | 10.1 | 65.72 | 100 | 0 | P | H |
| | | 4960 | 42.76 | -31.24 | 74 | 65.68 | 31.47 | 11.59 | 65.98 | 100 | 0 | P | H |
| | | 7440 | 46.62 | -27.38 | 74 | 61.97 | 36.51 | 14.03 | 65.89 | 100 | 0 | P | H |
| | | 11760 | 56.34 | -17.66 | 74 | 65.97 | 39.35 | 17.72 | 66.7 | 281 | 9 | P | H |
| | | 11760 | 47.22 | -6.78 | 54 | 56.85 | 39.35 | 17.72 | 66.7 | 281 | 9 | A | H |
| | | 18000 | 63.18 | -10.82 | 74 | 60.58 | 48.43 | 21.97 | 67.8 | 281 | 42 | P | H |
| | | 18000 | 51.37 | -2.63 | 54 | 48.77 | 48.43 | 21.97 | 67.8 | 281 | 42 | A | H |
| | | 4960 | 42.1 | -31.9 | 74 | 65.07 | 31.42 | 11.59 | 65.98 | 100 | 0 | P | V |
| | | 7440 | 45.59 | -28.41 | 74 | 60.97 | 36.48 | 14.03 | 65.89 | 100 | 0 | P | V |
| | | 11760 | 56.2 | -17.8 | 74 | 65.79 | 39.39 | 17.72 | 66.7 | 315 | 337 | P | V |
| | | 11760 | 47.49 | -6.51 | 54 | 57.08 | 39.39 | 17.72 | 66.7 | 315 | 337 | A | V |
| | | 18000 | 62.77 | -11.23 | 74 | 60.12 | 48.48 | 21.97 | 67.8 | 361 | 188 | P | V |
| | | 18000 | 51.31 | -2.69 | 54 | 48.66 | 48.48 | 21.97 | 67.8 | 361 | 188 | 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)**

| BT | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|-------------------------------|--|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 2.4GHz BLE SHF | | 24930 | 39.2 | -34.8 | 74 | 35.65 | 39.16 | 15.89 | 51.5 | 150 | 0 | P | H |
| | | 23635 | 39.98 | -34.02 | 74 | 37.55 | 38.74 | 15.09 | 51.4 | 150 | 0 | P | V |
| Remark | 1. No other spurious found. 2. All results are PASS against limit line. | | | | | | | | | | | | |

**Emission below 1GHz****2.4GHz BLE (LF)**

| BLE | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|------------------------------|--|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 2.4GHz BLE LF | | 30.97 | 21.58 | -18.42 | 40 | 28.41 | 24.71 | 0.9 | 32.44 | - | - | P | H |
| | | 120.21 | 38.16 | -5.34 | 43.5 | 51.24 | 17.6 | 1.73 | 32.41 | 100 | 0 | P | H |
| | | 136.7 | 35.11 | -8.39 | 43.5 | 48 | 17.6 | 1.92 | 32.41 | - | - | P | H |
| | | 167.74 | 36.8 | -6.7 | 43.5 | 51.18 | 15.93 | 2.1 | 32.41 | - | - | P | H |
| | | 400.54 | 31.6 | -14.4 | 46 | 38.76 | 21.85 | 3.49 | 32.5 | - | - | P | H |
| | | 630.43 | 35.88 | -10.12 | 46 | 38.02 | 26.4 | 4.08 | 32.62 | - | - | P | H |
| | | 31.94 | 22.36 | -17.64 | 40 | 29.94 | 23.95 | 0.91 | 32.44 | - | - | P | V |
| | | 94.02 | 31.88 | -11.62 | 43.5 | 47.22 | 15.4 | 1.68 | 32.42 | - | - | P | V |
| | | 120.21 | 34.08 | -9.42 | 43.5 | 47.16 | 17.6 | 1.73 | 32.41 | - | - | P | V |
| | | 136.7 | 34.45 | -9.05 | 43.5 | 47.34 | 17.6 | 1.92 | 32.41 | 100 | 0 | P | V |
| | | 586.78 | 31.77 | -14.23 | 46 | 34.66 | 25.8 | 3.94 | 32.63 | - | - | P | V |
| | | 860.32 | 33.08 | -12.92 | 46 | 31.08 | 29.1 | 4.82 | 31.92 | - | - | P | V |
| Remark | 1. No other spurious found. 2. All results are PASS against limit line. | | | | | | | | | | | | |

Note symbol

| | |
|-----|--|
| * | Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| ! | Test result is over limit line. |
| P/A | P eak or A verage |
| H/V | H orizontal or V ertical |

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

| BLE | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|-------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| BLE CH 00 2402MHz | | 2390 | 55.45 | -18.55 | 74 | 54.51 | 32.22 | 4.58 | 35.86 | 103 | 308 | P | H |
| | | 2390 | 43.54 | -10.46 | 54 | 42.6 | 32.22 | 4.58 | 35.86 | 103 | 308 | A | H |

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

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

For Average Limit @ 2390MHz:

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

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



Appendix D. Radiated Spurious Emission Plots

| | | | |
|------------------------|---------------------------|----------------------------|-----------|
| Test Engineer : | Calvin Wu and Michael Bui | Temperature : | 19 – 24°C |
| | | Relative Humidity : | 40~46% |

Note symbol

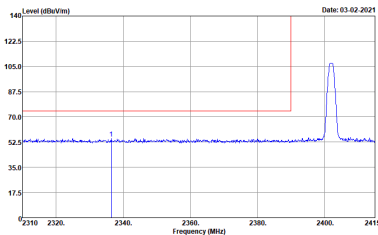
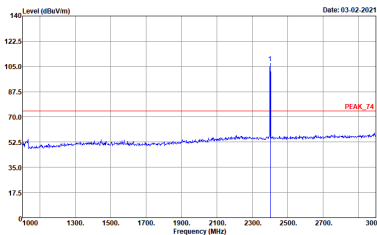
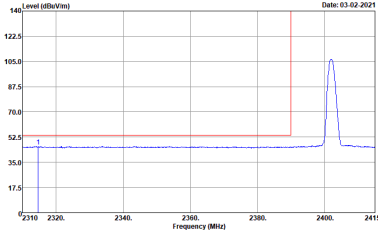
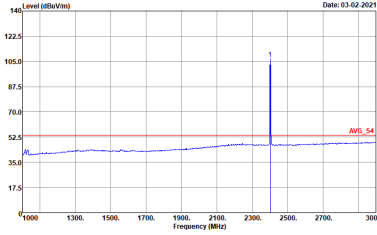
| | |
|----|-----------------------|
| -L | Low channel location |
| -R | High channel location |

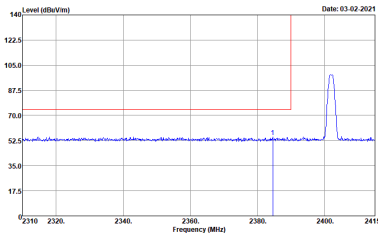
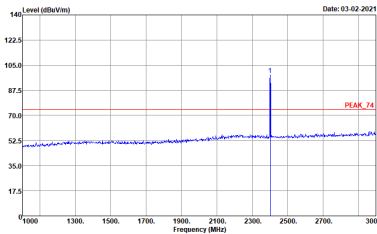
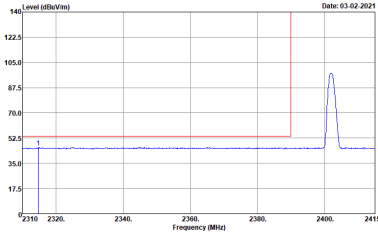
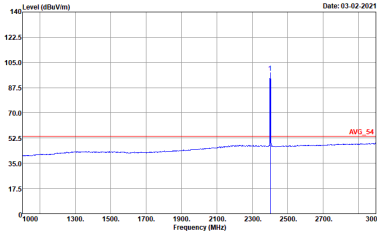


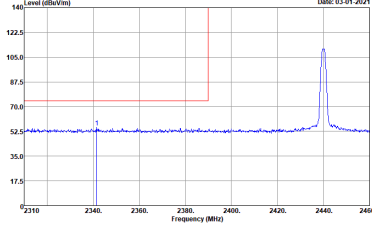
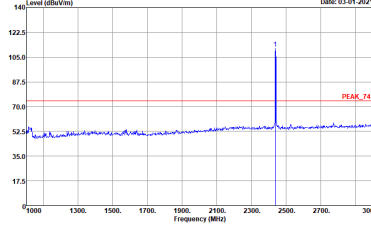
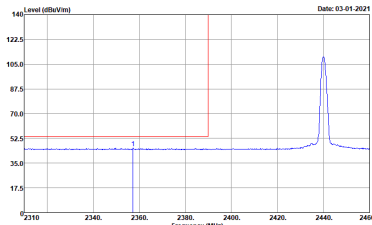
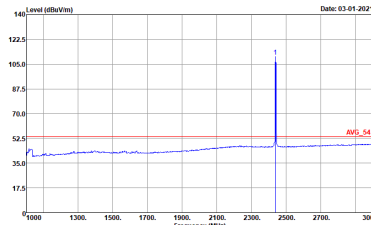
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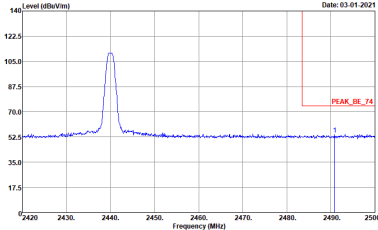
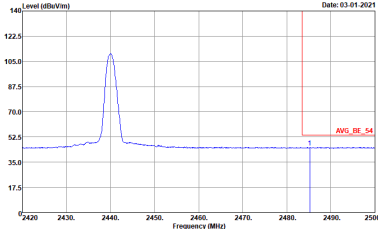
2.4GHz 2400~2483.5MHz

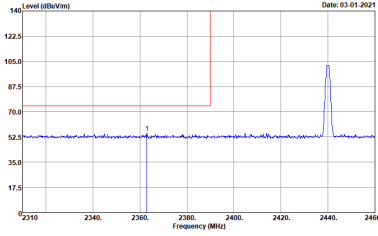
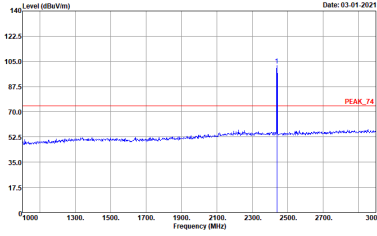
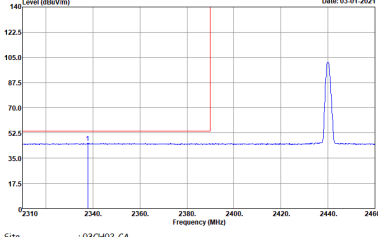
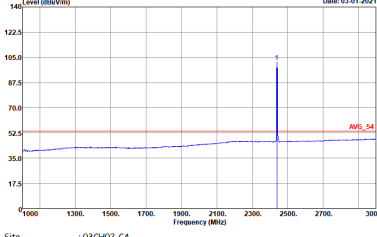
BLE (Band Edge @ 3m)

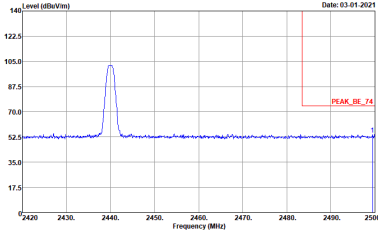
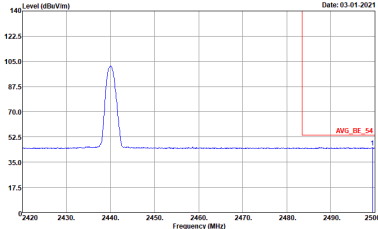
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH00 2402MHz | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 HORIZONTAL</p> |

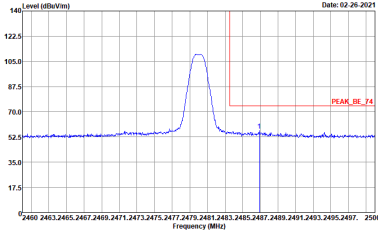
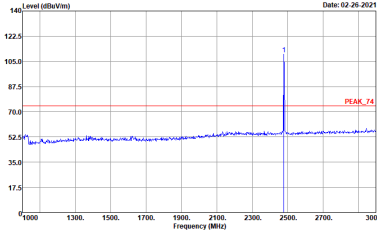
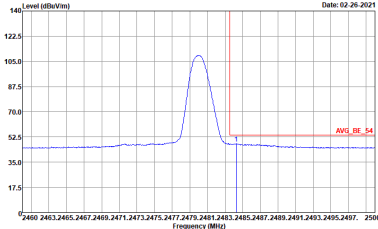
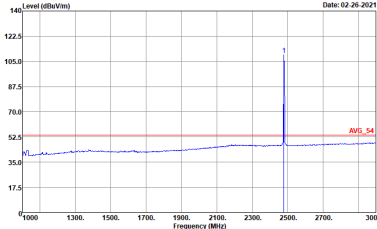
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH00 2402MHz | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 VERTICAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p> |
| Avg |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 VERTICAL</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 VERTICAL</p> |

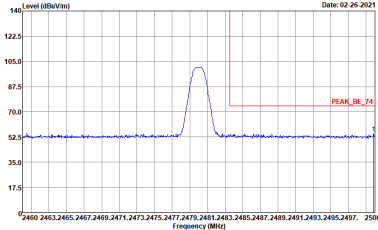
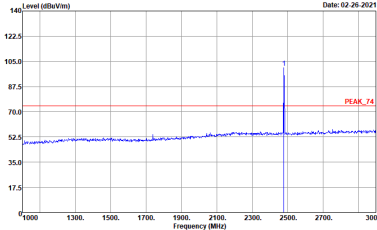
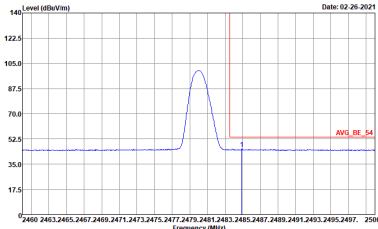
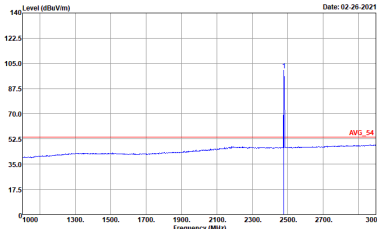
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|--|--|
| | BLE CH19 2440MHz - L | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|-------------|--|-------------|
| | BLE CH19 2440MHz - R | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH19 2440MHz - L | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto</p> |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|-------------|--|-------------|
| | BLE CH19 2440MHz - R | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |

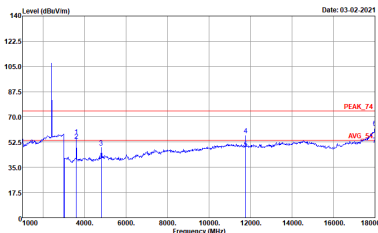
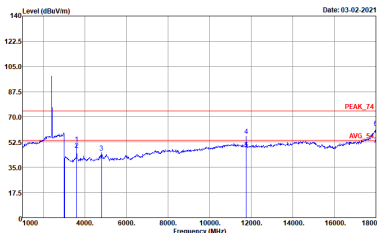
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|--|--|
| | BLE CH39 2480MHz | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH39 2480MHz | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 91200-HF_01895 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto</p> |

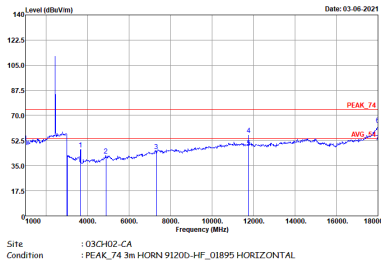
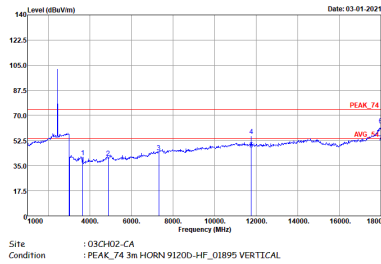


2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
|--------------|---|--|
| | BLE CH00 2402MHz | |
| | Horizontal | Vertical |
| Peak Avg. |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p> |

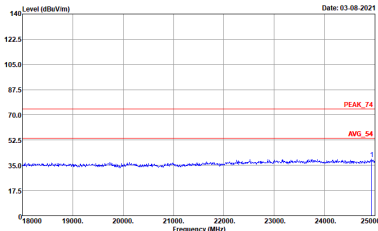
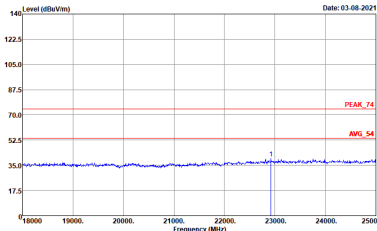


| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
|--------------|---|--|
| | BLE CH19 2440MHz | |
| | Horizontal | Vertical |
| Peak Avg. |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p> |

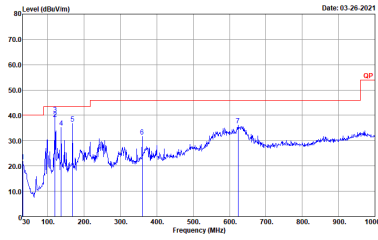
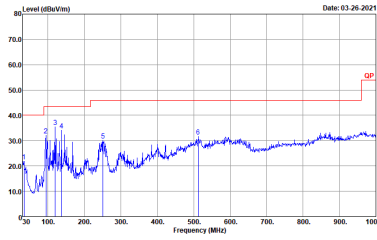


| | | |
|------|--|--|
| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
| | BLE CH39 2480MHz | |
| | Horizontal | Vertical |
| Peak | <div><p>Level (dBuV/m)</p><p>Date: 03-06-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 02-26-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p></div> |

Emission above 18GHz
2.4GHz BLE (SHF)

| BLE | 2.4GHz 2400~2483.5MHz | |
|-----------------------|---|--|
| | BLE SHF | |
| | Horizontal | Vertical |
| AVG / Peak |  <p>Site : 03CH02-CA Condition : PEAK_74 1m HORN 9170-SHF_00842 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 1m HORN 9170-SHF_00842 VERTICAL</p> |
| | | |

Emission below 1GHz
2.4GHz BLE (LF)

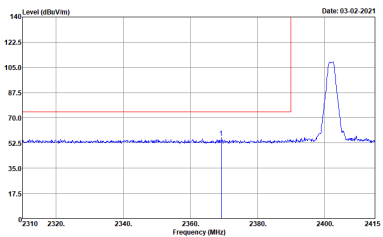
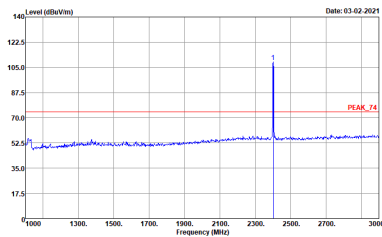
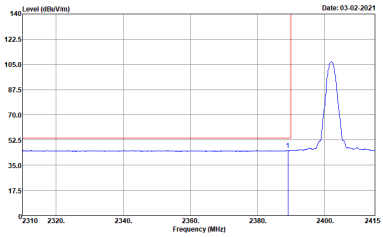
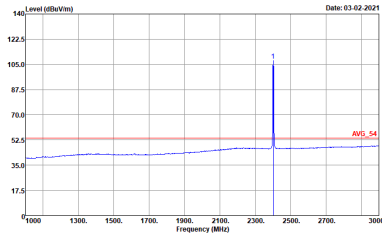
| BLE | 2.4GHz 2400~2483.5MHz | |
|--------------|---|--|
| | BLE LF | |
| | Horizontal | Vertical |
| QP / Peak |  <p>Site : 03CH02-CA Condition : QP 3m BTLO6 6111D-LF_50392 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : QP 3m BTLO6 6111D-LF_50392 VERTICAL</p> |
| | | |

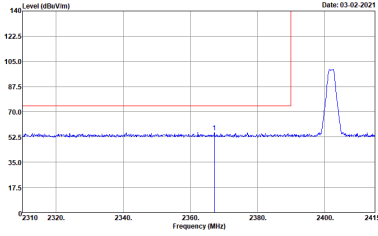
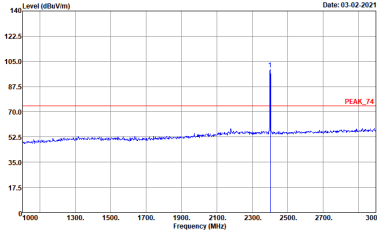
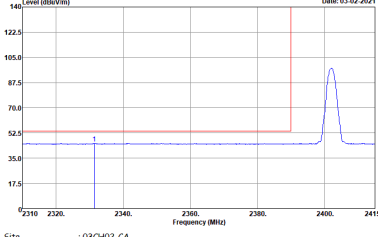
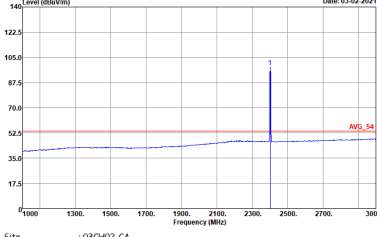


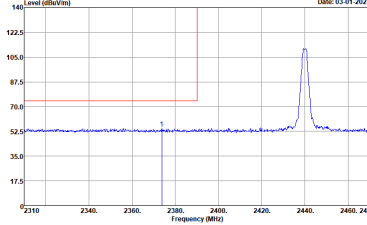
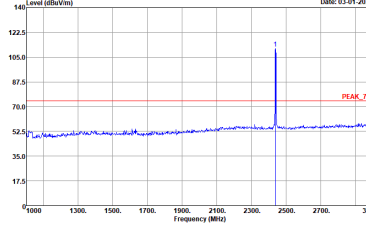
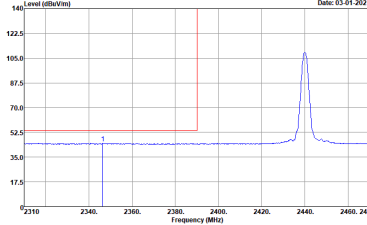
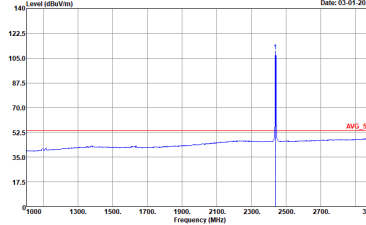
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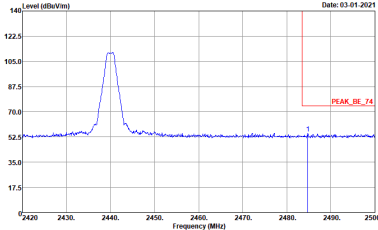
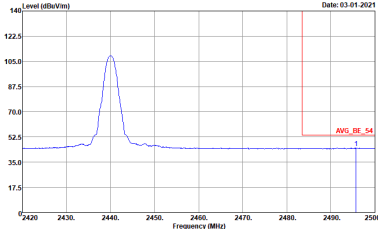
2.4GHz 2400~2483.5MHz

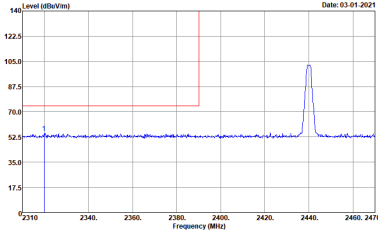
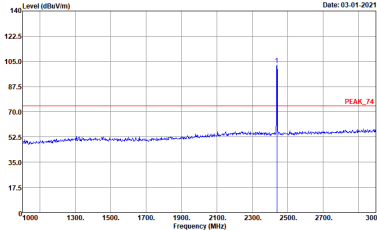
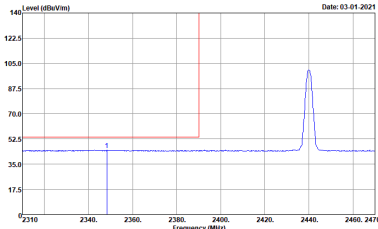
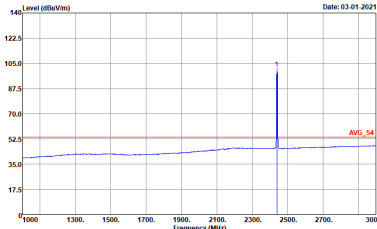
BLE (Band Edge @ 3m)

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH00 2402MHz | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |

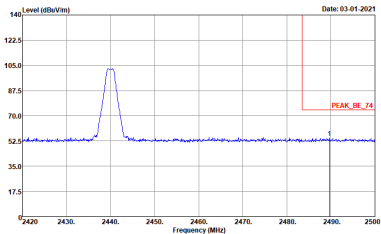
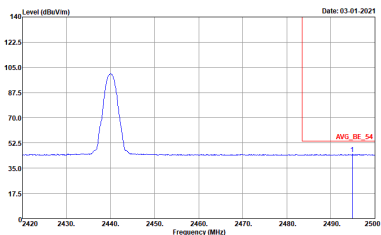
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH00 2402MHz | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 9120D-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |

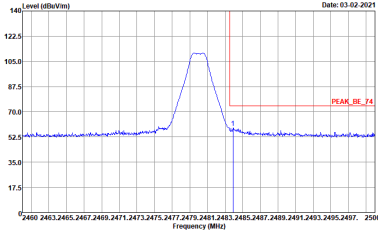
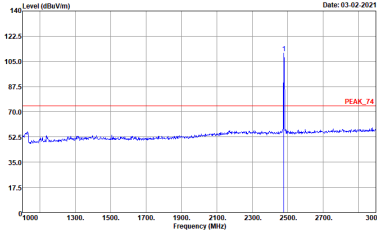
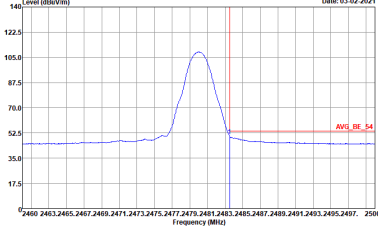
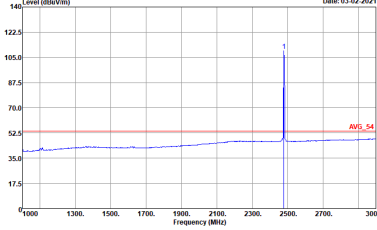
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH19 2440MHz - L | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 91200-HF_01895 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |

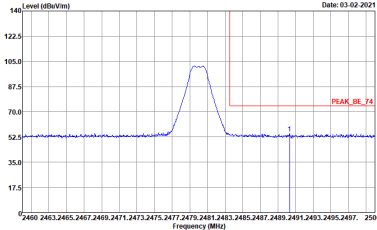
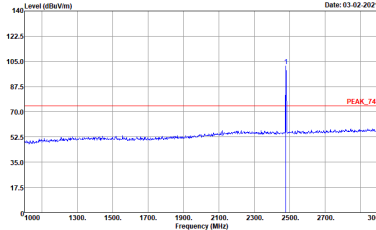
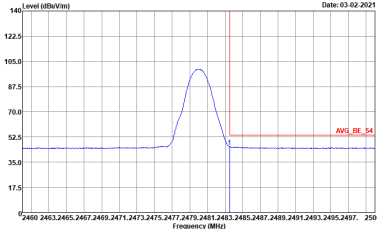
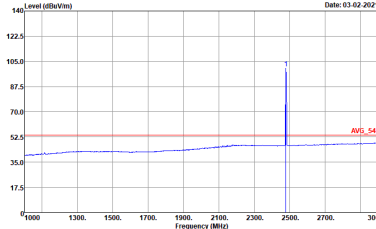
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|-------------|---|-------------|
| | BLE CH19 2440MHz - R | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 9120D-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 9120D-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> | Left blank |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH19 2440MHz - L | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |



| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|-------------|
| | BLE CH19 2440MHz - R | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> | Left blank |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> | Left blank |

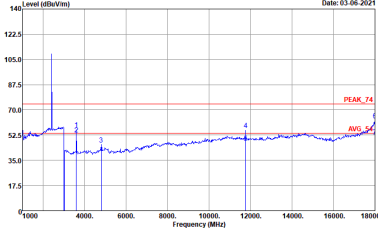
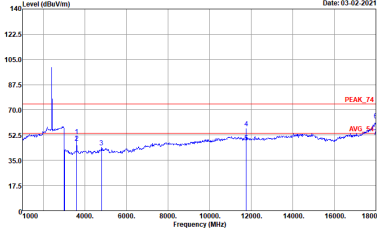
| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH39 2480MHz | |
| | Horizontal | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_F4 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_F4 3m HORN 91200-HF_01895 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto</p> |

| BLE | 2.4GHz 2400~2483.5MHz Band Edge @ 3m | |
|------|---|---|
| | BLE CH39 2480MHz | |
| | Vertical | Fundamental |
| Peak |  <p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p> |
| Avg. |  <p>Site : 03CH02-CA Condition : AVG_BE_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA Condition : AVG_54 3m HORN 91200-HF_01895 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p> |



2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
|--------------|---|--|
| | BLE CH00 2402MHz | |
| | Horizontal | Vertical |
| Peak Avg. |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p> |

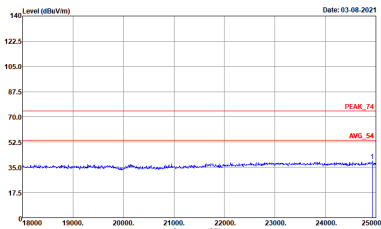
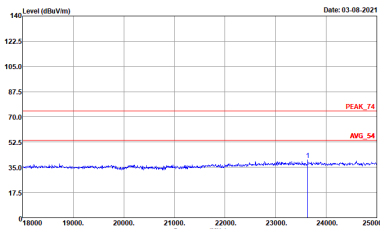


| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
|--------------|--|--|
| | BLE CH19 2440MHz | |
| | Horizontal | Vertical |
| Peak Avg. | <div><p>Level (dBuV/m)</p><p>Date: 03-06-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 03-01-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p></div> |

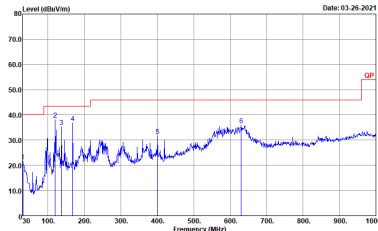
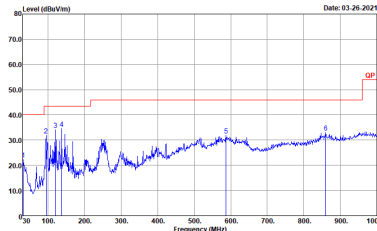


| BLE | 2.4GHz 2400~2483.5MHz Harmonic @ 3m | |
|------|--|--|
| | BLE CH39 2480MHz | |
| | Horizontal | Vertical |
| Peak | <div><p>Level (dBuV/m)</p><p>Date: 03-06-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 HORIZONTAL</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 03-02-2021</p><p>Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01895 VERTICAL</p></div> |

Emission above 18GHz
2.4GHz BLE (SHF)

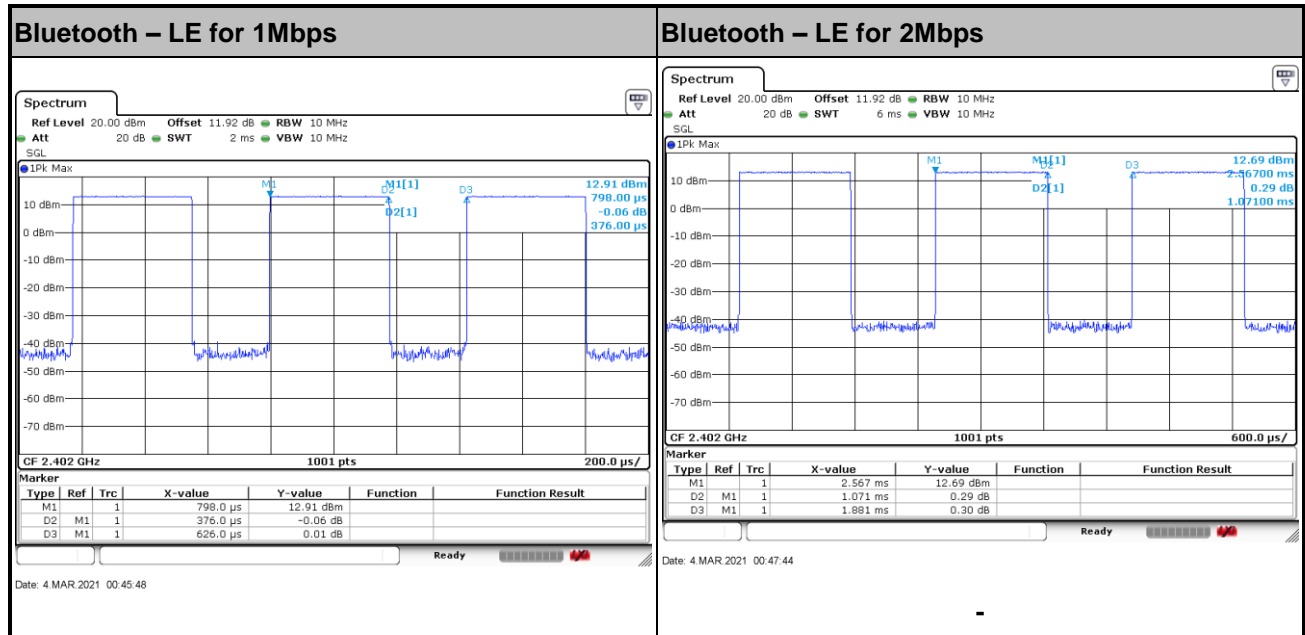
| BLE | 2.4GHz 2400~2483.5MHz | |
|--------------|---|--|
| | BLE SHF | |
| | Horizontal | Vertical |
| QP / Peak |  <p>Site : 03CH02-CA Condition : PEAK_74 1m HORN 9170-SHF_00842 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : PEAK_74 1m HORN 9170-SHF_00842 VERTICAL</p> |
| | | |

Emission below 1GHz
2.4GHz BLE (LF)

| BLE | 2.4GHz 2400~2483.5MHz | |
|--------------|---|--|
| | BLE LF | |
| | Horizontal | Vertical |
| QP / Peak |  <p>Site : 03CH02-CA Condition : QP 3m B1LO6 6111D-LF_50392 HORIZONTAL</p> |  <p>Site : 03CH02-CA Condition : QP 3m B1LO6 6111D-LF_50392 VERTICAL</p> |
| | | |

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 | 56.94 | 1071 | 0.93 | 1kHz | 2.45 |



———THE END———