

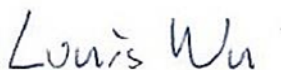


# FCC RADIO TEST REPORT

**Equipment** : CC2340R5 Launchpad™ Development Kit  
**Brand Name** : Texas Instruments  
**Model Name** : LP-EM-CC2340R5  
**Marketing Name** : LP-EM-CC2340R5  
**Applicant** : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
**Manufacturer** : Texas Instruments Incorporated  
12500 TI BLVD., Dallas, Texas, 75243  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on Mar. 16, 2023 and testing was performed from Mar. 24, 2023 to Apr. 20, 2023. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

**Sporton International Inc. Wensan Laboratory**

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



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## History of this test report

Report No.	Version	Description	Issue Date
FR331602	01	Initial issue of report	Apr. 25, 2023

## 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) 15.247(b)(4)	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	1.37 dB under the limit at 12200.000 MHz
3.6	15.207	AC Conducted Emission	Pass	4.57 dB under the limit at 0.175 MHz
3.7	15.203	Antenna Requirement	Pass	-

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Danny Lee**

**Report Producer: Rachel Hsieh**

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Product Feature		
<b>General Specs</b> Bluetooth LE (125 kbps, 500 kbps, 1Mbps, 2Mbps)		
<b>Antenna Type</b> Bluetooth LE: Inverted F PCB Antenna		
Antenna information		
<b>2400 MHz ~ 2483.5 MHz</b>	Peak Gain (dBi)	3.3

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

## 1.2 Modification of EUT

No modifications made to the EUT during the testing.

## 1.3 Testing Location

<b>Test Site</b>	Sporton International Inc. EMC & Wireless Communications Laboratory
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b> CO05-HY (TAF Code: 1190)
<b>Remark</b>	The AC Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory

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

<b>Test Site</b>	Sporton International Inc. Wensan Laboratory
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
<b>Test Site No.</b>	<b>Sporton Site No.</b> TH05-HY, 03CH23-HY

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

FCC designation No.: TW1190 and TW3786



## 1.4 Applicable Standards

According to the specifications declared by 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 15.247 Meas Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ ANSI C63.10-2013

**Remark:**

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



## 2 Test Configuration of Equipment Under Test

### 2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-

## 2.2 Test Mode

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

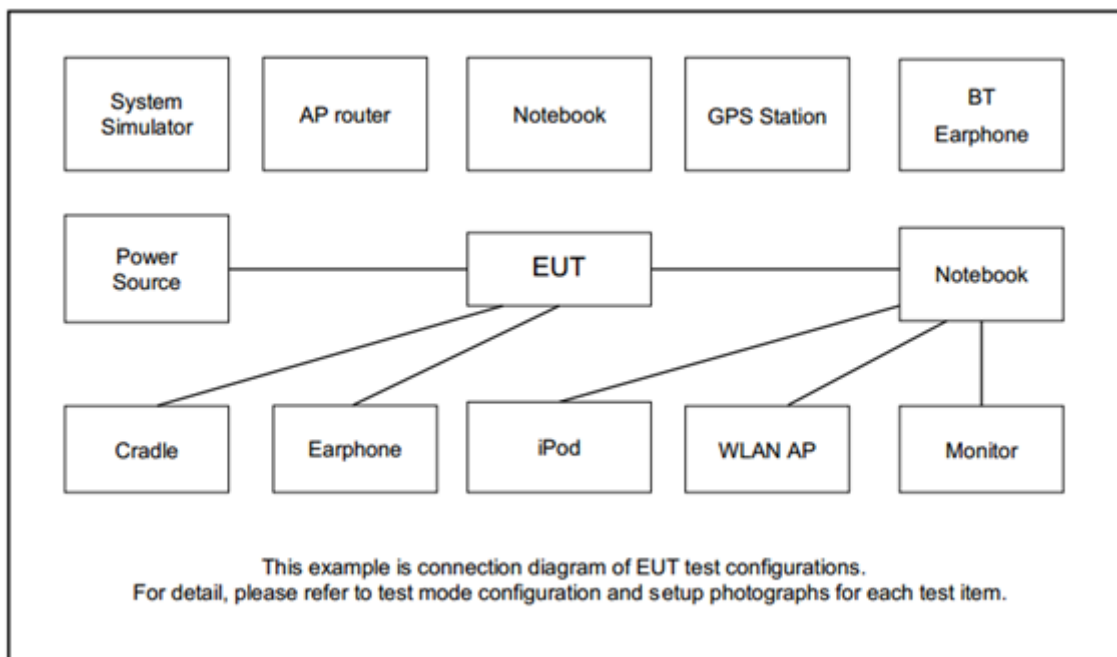
The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	Data Rate / Modulation
<b>Conducted Test Cases</b>	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
	Mode 7: Bluetooth Tx CH00_2402 MHz_125kbps
	Mode 8: Bluetooth Tx CH19_2440 MHz_125kbps
	Mode 9: Bluetooth Tx CH39_2480 MHz_125kbps
	Mode 10: Bluetooth Tx CH00_2402 MHz_500kbps
	Mode 11: Bluetooth Tx CH19_2440 MHz_500kbps
	Mode 12: Bluetooth Tx CH39_2480 MHz_500kbps



Summary table of Test Cases	
Test Item	Data Rate / Modulation
<b>Radiated 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
	Mode 7: Bluetooth Tx CH00_2402 MHz_125kbps
	Mode 8: Bluetooth Tx CH19_2440 MHz_125kbps
	Mode 9: Bluetooth Tx CH39_2480 MHz_125kbps
	Mode 10: Bluetooth Tx CH00_2402 MHz_500kbps
	Mode 11: Bluetooth Tx CH19_2440 MHz_500kbps
	Mode 12: Bluetooth Tx CH39_2480 MHz_500kbps
<b>AC Conducted Emission</b>	Mode 1: Bluetooth - LE TX + USB Cable (Charging from Notebook)
<b>Remark:</b> For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.	

## 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.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	Unshielded, 1.0m	Unshielded, 1.8m
2.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0m	N/A
3.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Notebook	ACER	N18Q13	PD9AX201NG	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 “SmartRF Studio v.0.6.0.123 INTERNAL” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

## 2.6 Measurement Results Explanation Example

**For all conducted test items:**

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

Example :

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

*Offset = RF cable loss + attenuator factor.*

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

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

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

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

##### 3.1.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is 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.

##### 3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

## 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.

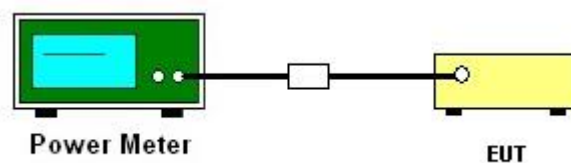
### 3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.2.3 Test Procedures

1. For Peak Power, the testing follows ANSI C63.10 Section 11.9.1.3 PKPM1.
2. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
3. The RF output of EUT is connected to the power meter by RF cable and attenuator.
4. The path loss is compensated to the results for each measurement.
5. Set the maximum power setting and enable the EUT to transmit continuously.
6. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

### 3.2.6 Test Result of Average Output Power (Reporting Only)

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.

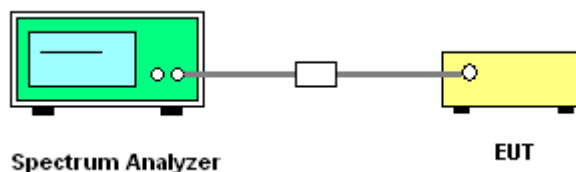
#### 3.3.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is 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. (6 dB 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.

### 3.4 Conducted Band Edges and Spurious Emission Measurement

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

All harmonics/spurious must be at least 30 dB down from the highest emission level within the authorized band.

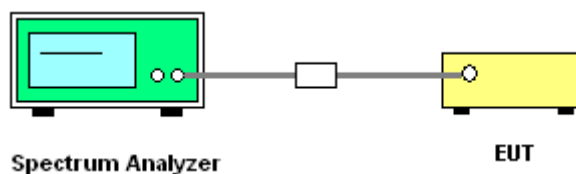
#### 3.4.2 Measuring Instruments

Please refer to the measuring equipment list in 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 is connected to the spectrum analyzer by RF cable and attenuator. The path loss is 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

Please refer to Appendix A.

#### 3.4.6 Test Result of Conducted Spurious Emission Plots

Please refer to Appendix A.

### 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 is 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

Please refer to the measuring equipment list in this test report.



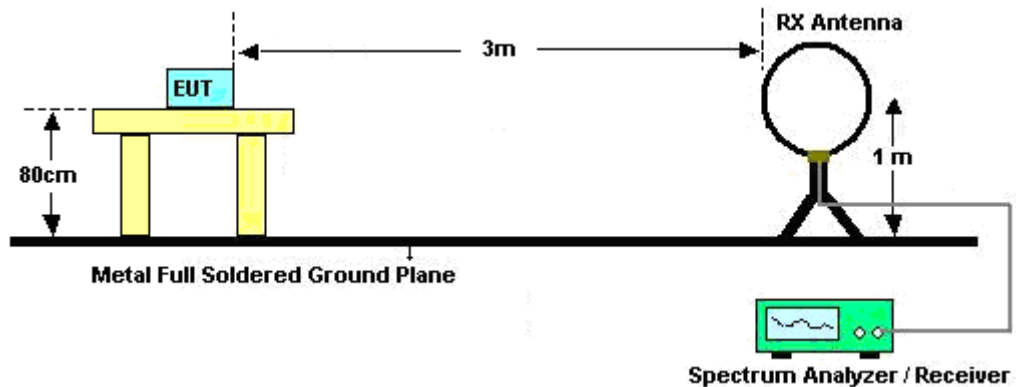


### 3.5.3 Test Procedures

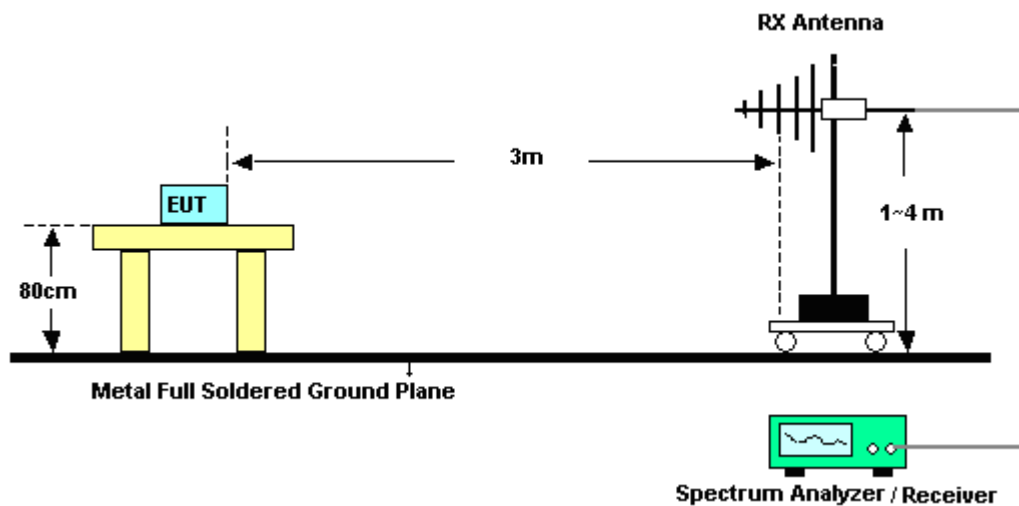
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is 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 is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.
8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW = 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW = 3 MHz for  $f \geq 1$  GHz for peak measurement.For average measurement:
  - VBW = 10 Hz, when duty cycle is no less than 98 percent.
  - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.5.4 Test Setup

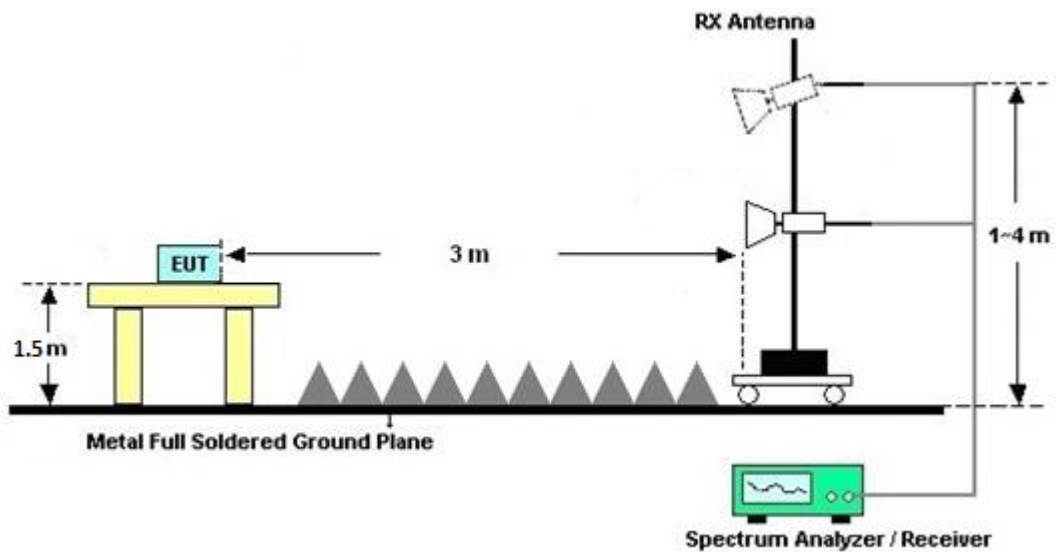
For radiated test below 30MHz



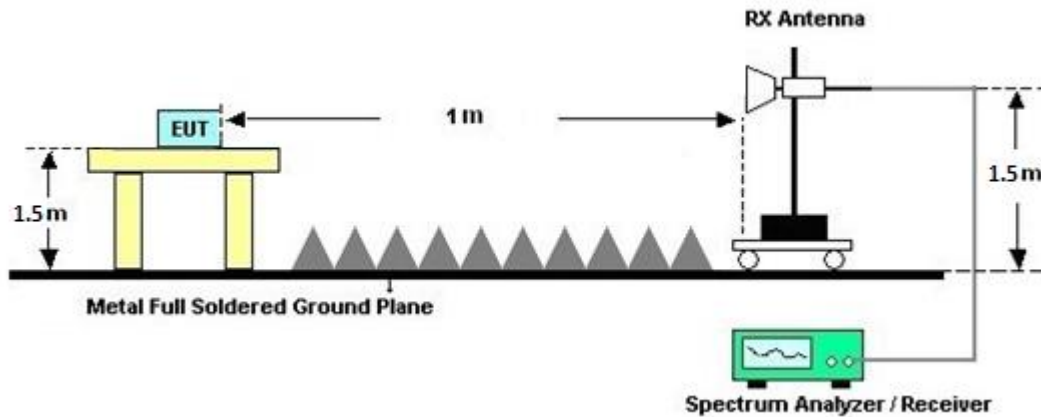
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes 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 $\mu$ 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.

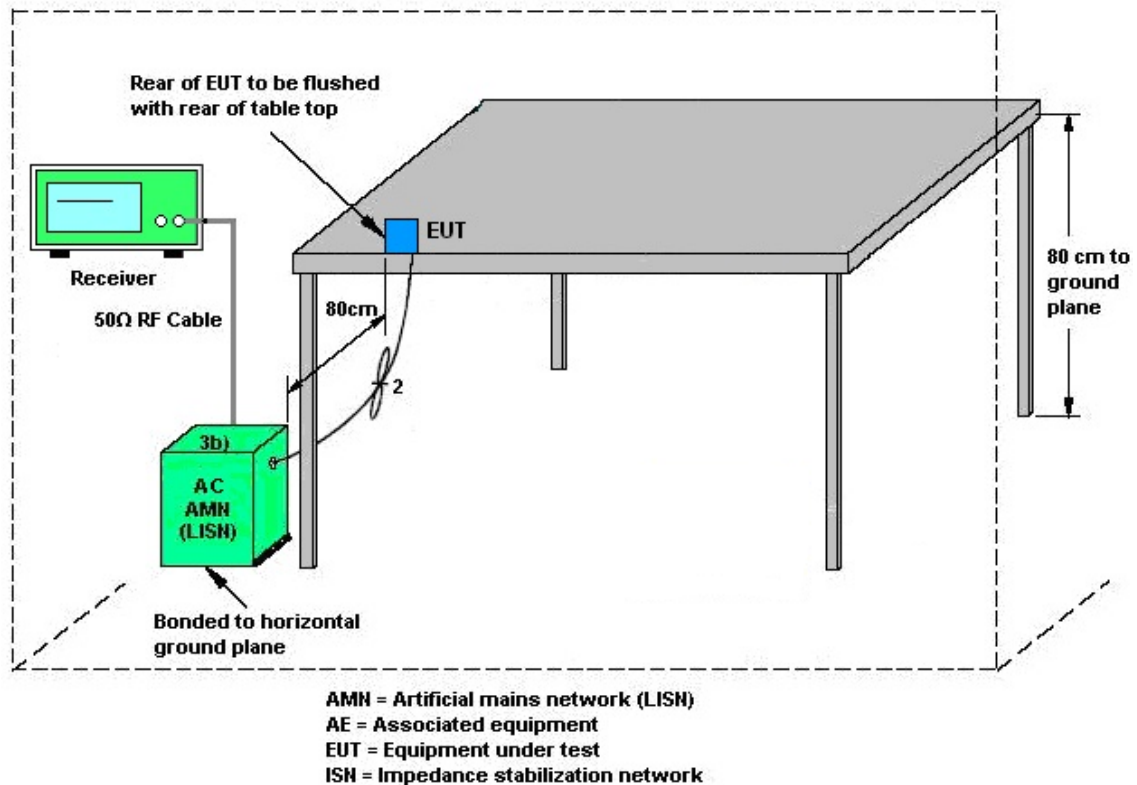
### 3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) 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**

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.



## 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	Sep. 20, 2022	Apr. 10, 2023~ Apr. 20, 2023	Sep. 19, 2023	Radiation (03CH23-HY)
Bilog Antenna with 6dB pad	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	62028 & 003	N/A	Oct. 11, 2022	Apr. 10, 2023~ Apr. 20, 2023	Oct. 10, 2023	Radiation (03CH23-HY)
Amplifier	SONOMA	310N	421582	N/A	Jul. 16, 2022	Apr. 10, 2023~ Apr. 20, 2023	Jul. 15, 2023	Radiation (03CH23-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C05A18E N	1GHz~18GHz	Jul. 06, 2022	Apr. 10, 2023~ Apr. 20, 2023	Jul. 05, 2023	Radiation (03CH23-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA9170	00991	18GHz~40GHz	May 14, 2022	Apr. 10, 2023~ Apr. 20, 2023	May 13, 2023	Radiation (03CH23-HY)
Amplifier	EMEC	EM01G18GA	060877	N/A	Sep. 29, 2022	Apr. 10, 2023~ Apr. 20, 2023	Sep. 28, 2023	Radiation (03CH23-HY)
Preamplifier	EMEC	EM18G40G	060872	18-40GHz	Sep. 28, 2022	Apr. 10, 2023~ Apr. 20, 2023	Sep. 27, 2023	Radiation (03CH23-HY)
Signal Analyzer	Keysight	N9010B	MY62170337	N/A	Sep. 11, 2022	Apr. 10, 2023~ Apr. 20, 2023	Sep. 10, 2023	Radiation (03CH23-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Apr. 10, 2023~ Apr. 20, 2023	N/A	Radiation (03CH23-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Apr. 10, 2023~ Apr. 20, 2023	N/A	Radiation (03CH23-HY)
Software	Audix	E3 6.09824_2019 122	RK-002347	N/A	N/A	Apr. 10, 2023~ Apr. 20, 2023	N/A	Radiation (03CH23-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 07, 2023	Apr. 10, 2023~ Apr. 20, 2023	Mar. 06, 2024	Radiation (03CH23-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804392/2,804 610/2,804613 /2	N/A	Oct. 25, 2022	Apr. 10, 2023~ Apr. 20, 2023	Oct. 24, 2023	Radiation (03CH23-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 12 (NO:113)	10MHz~6GHz	Dec. 13, 2022	Mar. 24, 2023~ Apr. 14, 2023	Dec. 12, 2023	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Aug. 08, 2022	Mar. 24, 2023~ Apr. 14, 2023	Aug. 07, 2023	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GH z	Aug. 08, 2022	Mar. 24, 2023~ Apr. 14, 2023	Aug. 07, 2023	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101905	10Hz - 40GHz	Aug. 03, 2022	Mar. 24, 2023~ Apr. 14, 2023	Aug. 02, 2023	Conducted (TH05-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 28, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Mar. 28, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Mar. 28, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 17, 2022	Mar. 28, 2023	Nov. 16, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Mar. 28, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	00691	N/A	Aug. 01, 2022	Mar. 28, 2023	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Mar. 28, 2023	Dec. 28, 2023	Conduction (CO05-HY)



## 5 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.5 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.8 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.4 dB
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### Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.3 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.2 dB
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**Appendix A. Test Result of Conducted Test Items**

Test Engineer:	Mina Liu	Temperature:	21~25	°C
Test Date:	2023/3/24~2023/4/14	Relative Humidity:	51~54	%

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

Mod.	Data Rate	N <sub>Tx</sub>	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.071	0.736	0.50	Pass
BLE	1Mbps	1	19	2440	1.071	0.722	0.50	Pass
BLE	1Mbps	1	39	2480	1.071	0.714	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

Mod.	Data Rate	N <sub>Tx</sub>	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	8.23	30.00	3.30	11.53	36.00	Pass
BLE	1Mbps	1	19	2440	8.36	30.00	3.30	11.66	36.00	Pass
BLE	1Mbps	1	39	2480	8.25	30.00	3.30	11.55	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
**(Reporting Only)**

Mod.	Data Rate	N <sub>Tx</sub>	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	7.86	30.00	3.30	11.16	36.00	Pass
BLE	1Mbps	1	19	2440	8.01	30.00	3.30	11.31	36.00	Pass
BLE	1Mbps	1	39	2480	7.88	30.00	3.30	11.18	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

Mod.	Data Rate	N <sub>Tx</sub>	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	7.34	-4.71	3.30	8.00	Pass
BLE	1Mbps	1	19	2440	7.17	-5.45	3.30	8.00	Pass
BLE	1Mbps	1	39	2480	7.58	-4.33	3.30	8.00	Pass

**Note:** PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

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

Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.058	1.364	0.50	Pass
BLE	2Mbps	1	19	2440	2.062	1.364	0.50	Pass
BLE	2Mbps	1	39	2480	2.070	1.424	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

Mod.	Data Rate	N <sub>TX</sub>	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	8.18	30.00	3.30	11.48	36.00	Pass
BLE	2Mbps	1	19	2440	8.32	30.00	3.30	11.62	36.00	Pass
BLE	2Mbps	1	39	2480	8.20	30.00	3.30	11.50	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
**(Reporting Only)**

Mod.	Data Rate	N <sub>TX</sub>	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	7.86	30.00	3.30	11.16	36.00	Pass
BLE	2Mbps	1	19	2440	8.02	30.00	3.30	11.32	36.00	Pass
BLE	2Mbps	1	39	2480	7.89	30.00	3.30	11.19	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

Mod.	Data Rate	N <sub>TX</sub>	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	6.47	-6.71	3.30	8.00	Pass
BLE	2Mbps	1	19	2440	6.62	-7.13	3.30	8.00	Pass
BLE	2Mbps	1	39	2480	7.27	-6.32	3.30	8.00	Pass

**Note:** PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

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

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	125kbps	1	0	2402	1.091	0.741	0.50	Pass
BLE	125kbps	1	19	2440	1.091	0.777	0.50	Pass
BLE	125kbps	1	39	2480	1.087	0.761	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	125kbps	1	0	2402	8.16	30.00	3.30	11.46	36.00	Pass
BLE	125kbps	1	19	2440	8.31	30.00	3.30	11.61	36.00	Pass
BLE	125kbps	1	39	2480	8.19	30.00	3.30	11.49	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
**(Reporting Only)**

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	125kbps	1	0	2402	7.87	30.00	3.30	11.17	36.00	Pass
BLE	125kbps	1	19	2440	8.02	30.00	3.30	11.32	36.00	Pass
BLE	125kbps	1	39	2480	7.89	30.00	3.30	11.19	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	125kbps	1	0	2402	4.39	1.42	3.30	8.00	Pass
BLE	125kbps	1	19	2440	4.06	1.15	3.30	8.00	Pass
BLE	125kbps	1	39	2480	4.52	1.50	3.30	8.00	Pass

**Note:** PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

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

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	500kbps	1	0	2402	1.061	0.725	0.50	Pass
BLE	500kbps	1	19	2440	1.047	0.711	0.50	Pass
BLE	500kbps	1	39	2480	1.059	0.713	0.50	Pass

**TEST RESULTS DATA**  
**Peak Power Table**

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	500kbps	1	0	2402	8.17	30.00	3.30	11.47	36.00	Pass
BLE	500kbps	1	19	2440	8.32	30.00	3.30	11.62	36.00	Pass
BLE	500kbps	1	39	2480	8.20	30.00	3.30	11.50	36.00	Pass

**TEST RESULTS DATA**  
**Average Power Table**  
**(Reporting Only)**

Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	500kbps	1	0	2402	7.87	30.00	3.30	11.17	36.00	Pass
BLE	500kbps	1	19	2440	8.03	30.00	3.30	11.33	36.00	Pass
BLE	500kbps	1	39	2480	7.89	30.00	3.30	11.19	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

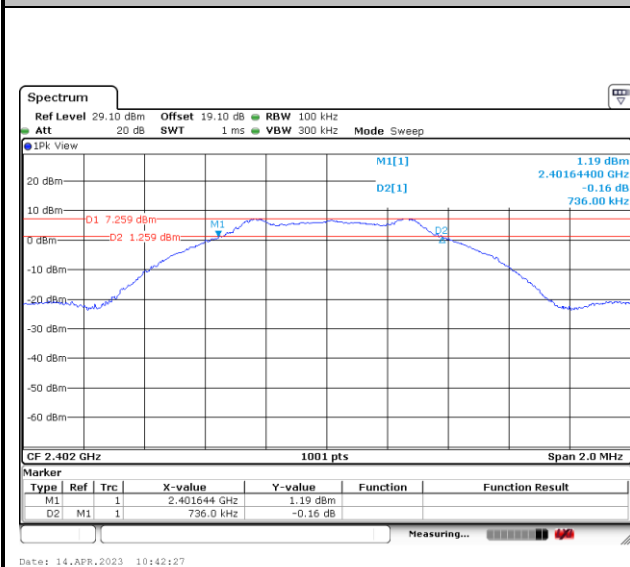
Mod.	Data Rate (bps)	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	500kbps	1	0	2402	7.36	-5.06	3.30	8.00	Pass
BLE	500kbps	1	19	2440	7.10	-4.47	3.30	8.00	Pass
BLE	500kbps	1	39	2480	7.49	-4.47	3.30	8.00	Pass

**Note:** PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

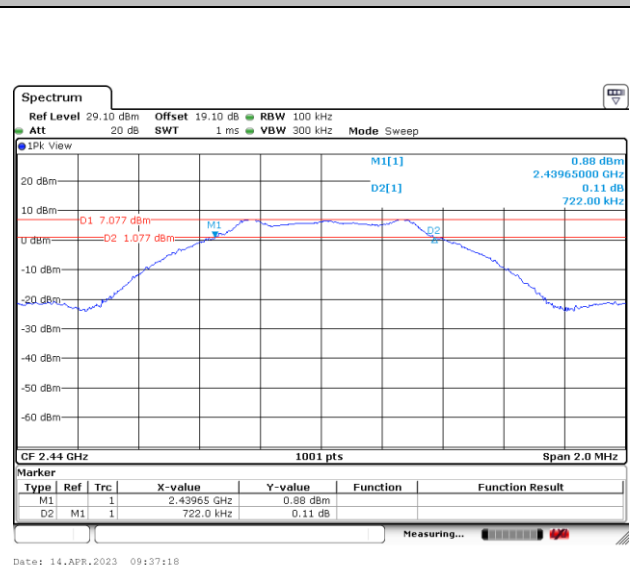
## 6dB Bandwidth

<1Mbps>

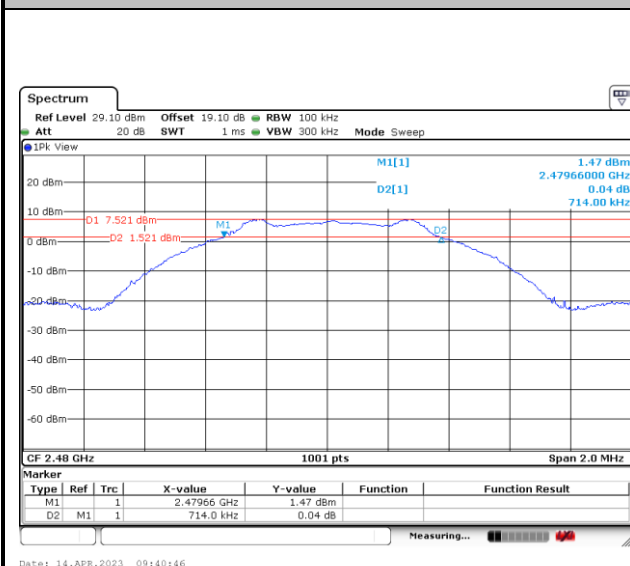
6 dB Bandwidth Plot on Channel 00



6 dB Bandwidth Plot on Channel 19



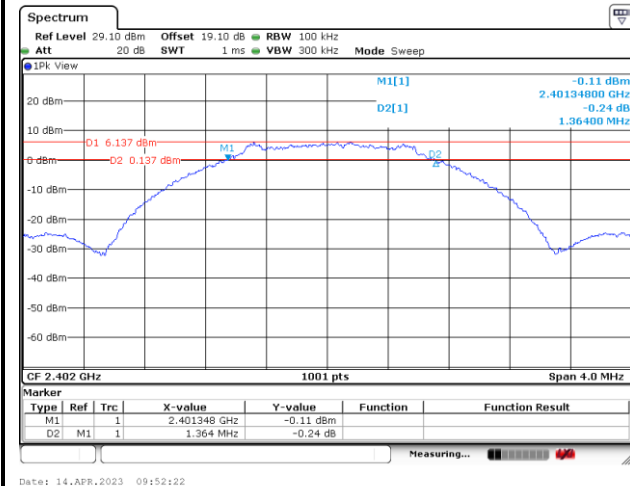
6 dB Bandwidth Plot on Channel 39



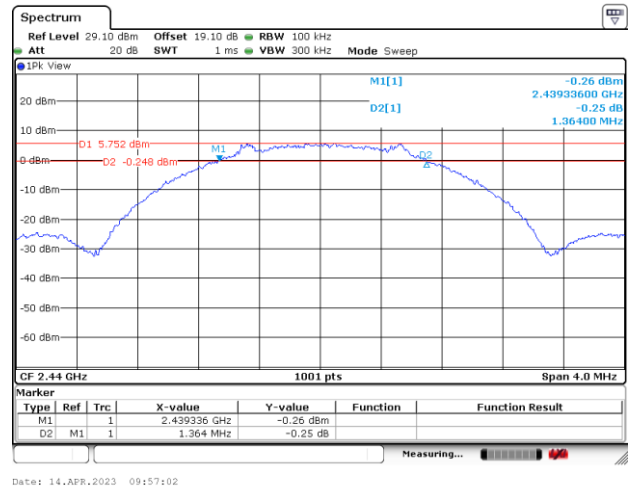


&lt;2Mbps&gt;

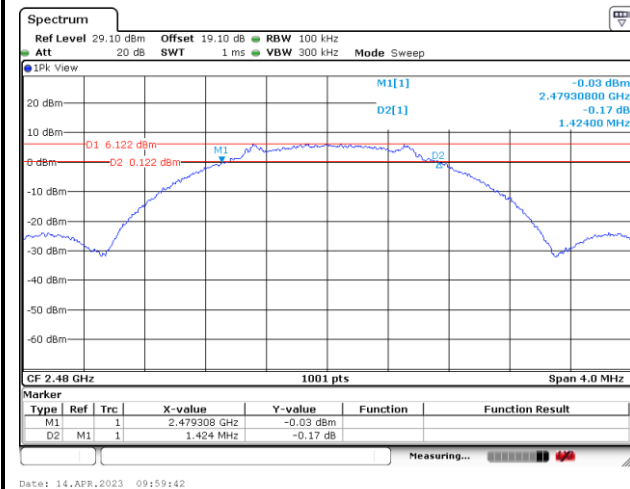
## 6 dB Bandwidth Plot on Channel 00



## 6 dB Bandwidth Plot on Channel 19



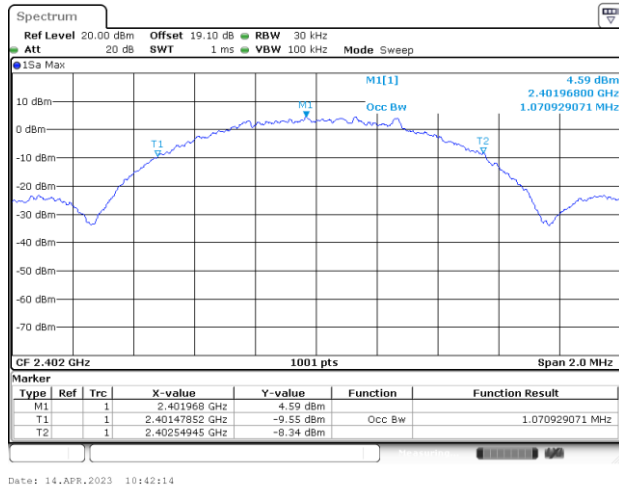
## 6 dB Bandwidth Plot on Channel 39



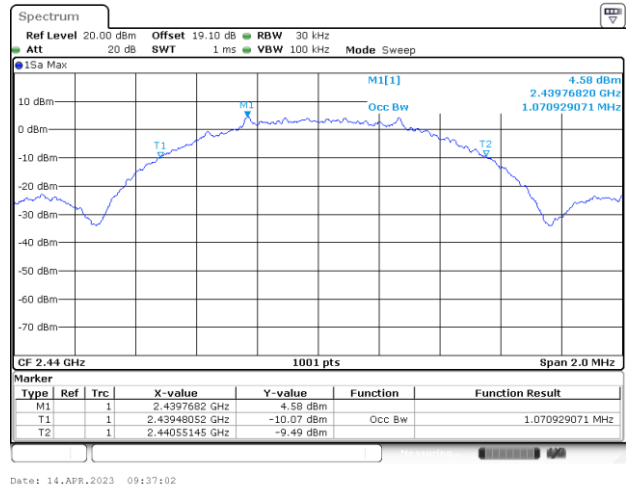
# 99% Occupied Bandwidth

<1Mbps>

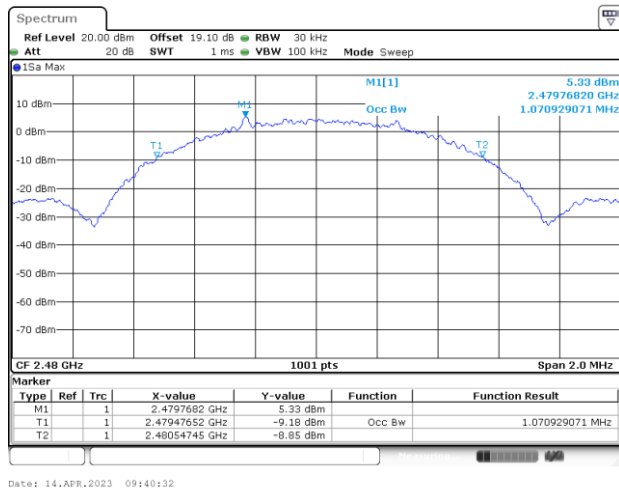
**99% Occupied Bandwidth Plot on Channel 00**



**99% Occupied Plot Bandwidth on Channel 19**



**99% Occupied Bandwidth Plot on Channel 39**



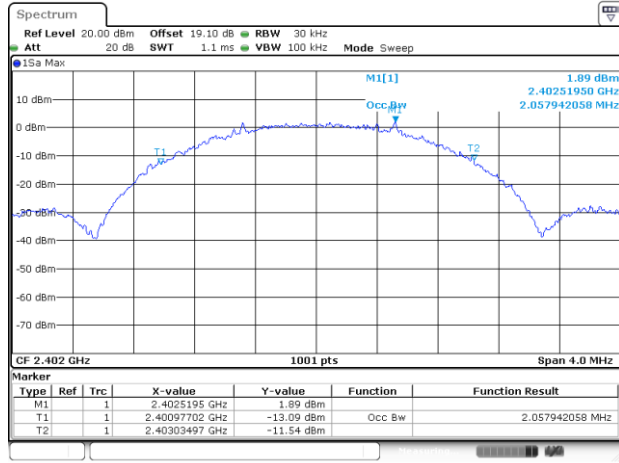
**Note:** The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



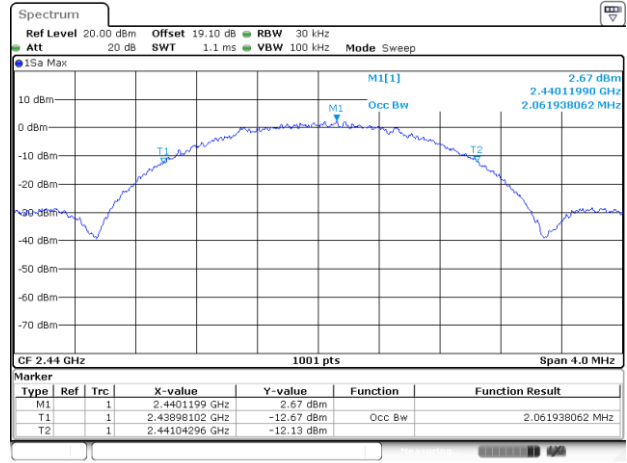


&lt;2Mbps&gt;

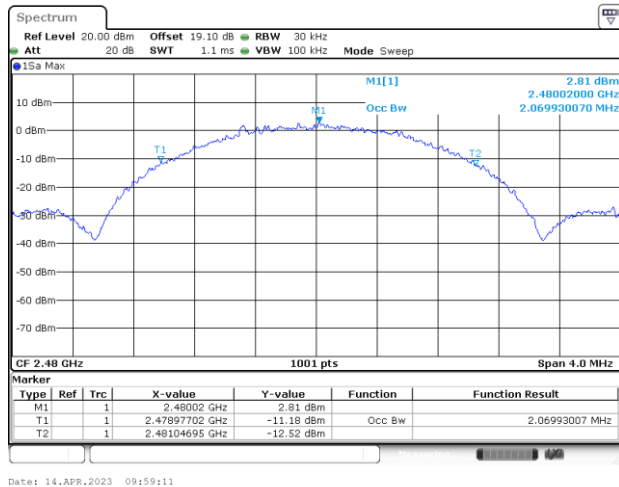
## 99% Occupied Bandwidth Plot on Channel 00



## 99% Occupied Plot Bandwidth on Channel 19



## 99% Occupied Bandwidth Plot on Channel 39

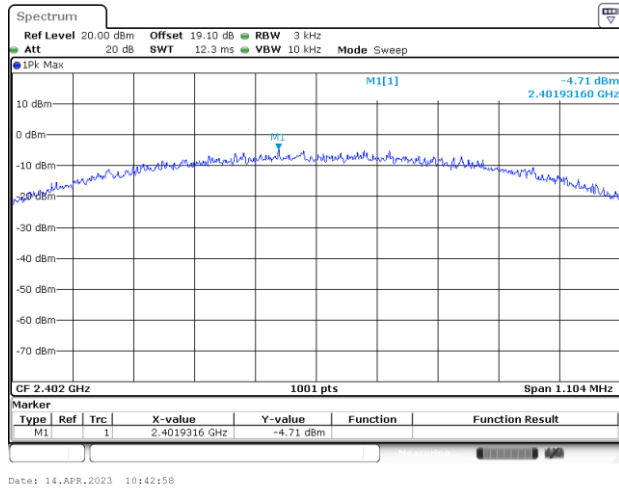




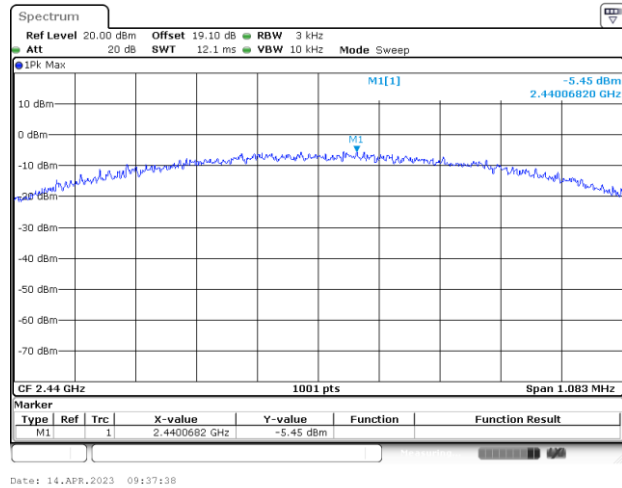
## Power Spectral Density (dBm/3kHz)

&lt;1Mbps&gt;

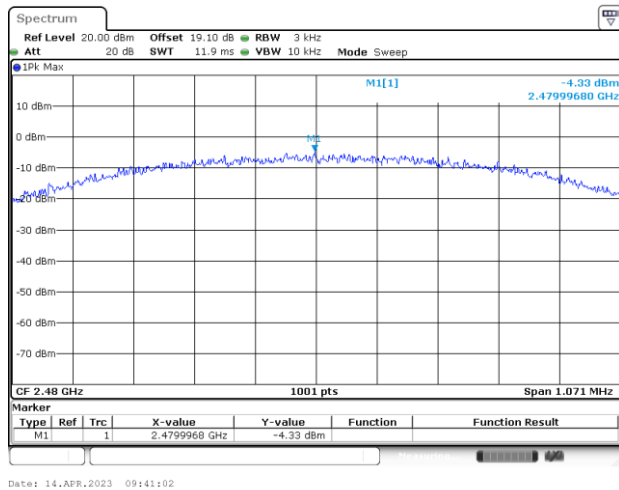
Power Density (dBm/3kHz) Plot Channel 00



Power Density (dBm/3kHz) Plot Channel 19



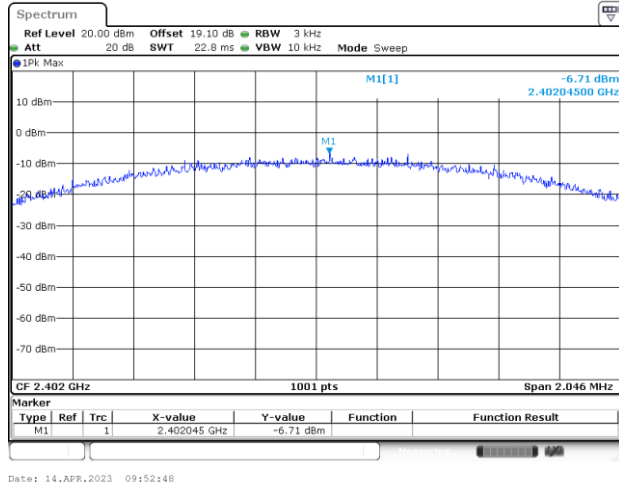
Power Density (dBm/3kHz) Plot Channel 39



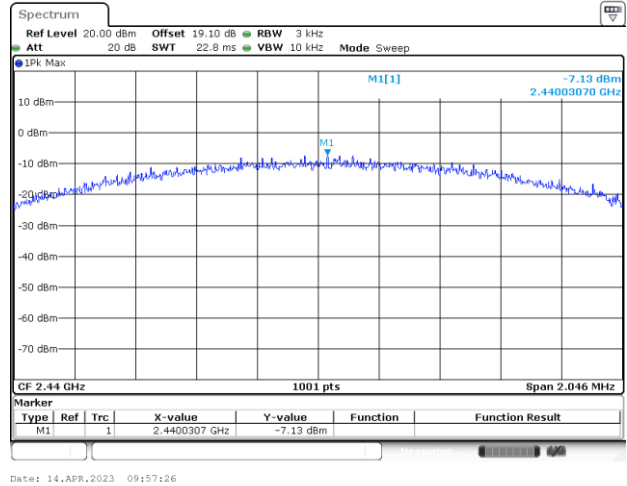


&lt;2Mbps&gt;

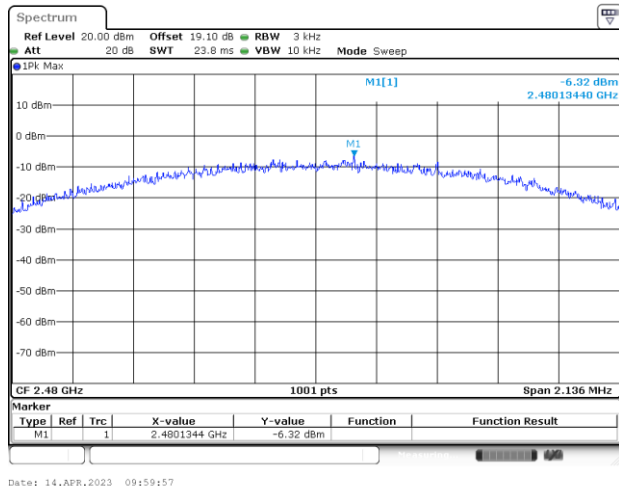
Power Density (dBm/3kHz) Plot Channel 00



Power Density (dBm/3kHz) Plot Channel 19



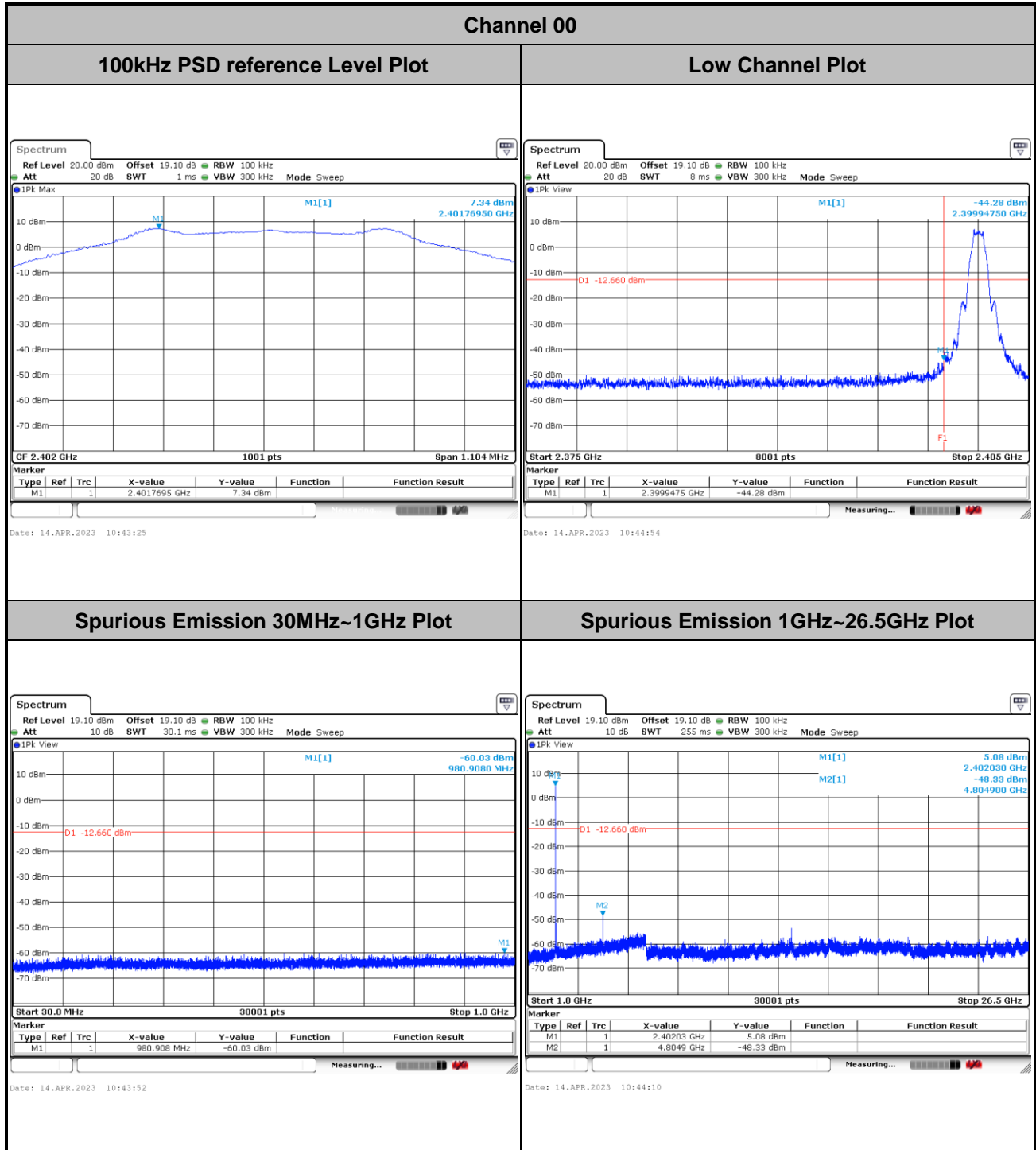
Power Density (dBm/3kHz) Plot Channel 39





## Band Edge and Conducted Spurious Emission

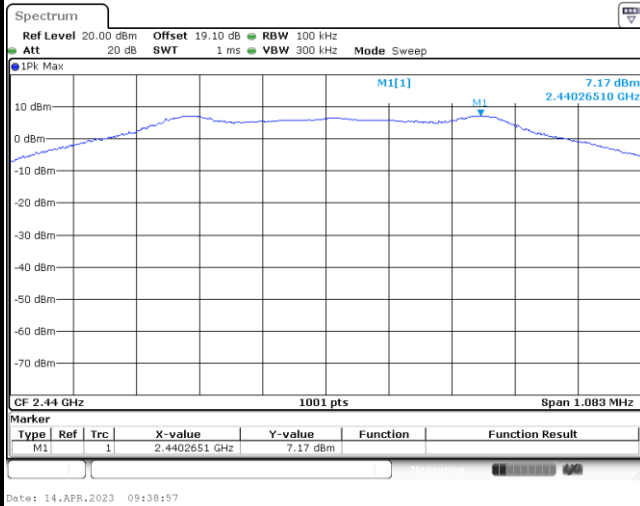
&lt;1Mbps&gt;





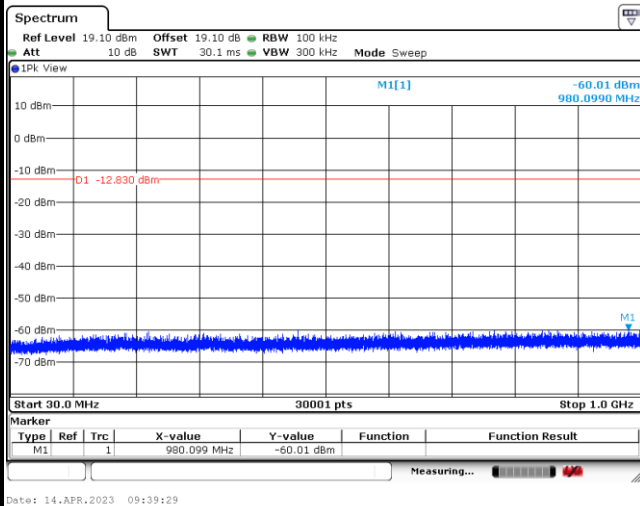
## Channel 19

## 100kHz PSD reference Level Plot

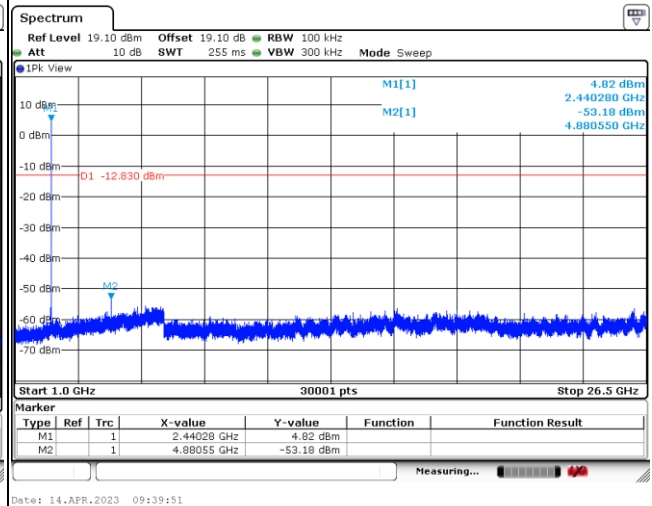


## Low Channel Plot

## Spurious Emission 30MHz~1GHz Plot



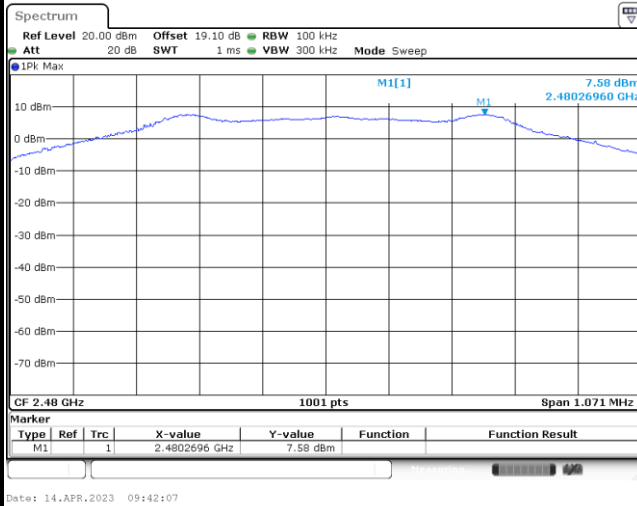
## Spurious Emission 1GHz~26.5GHz Plot



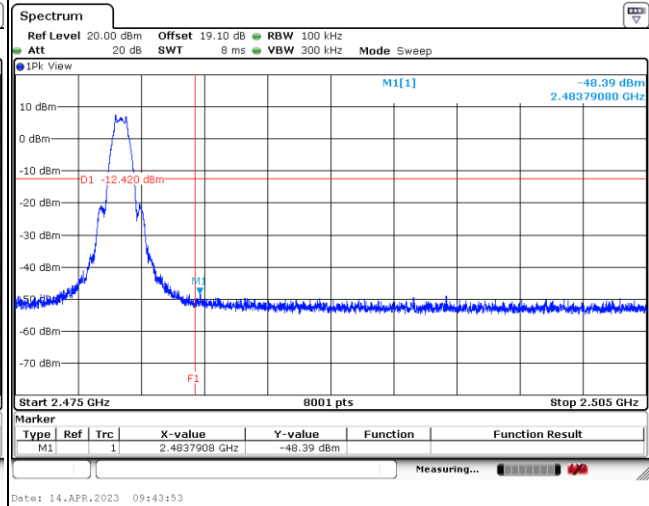


## Channel 39

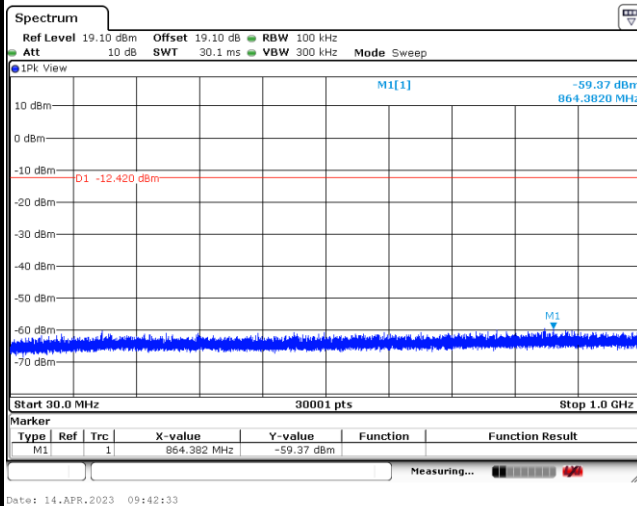
## 100kHz PSD reference Level Plot



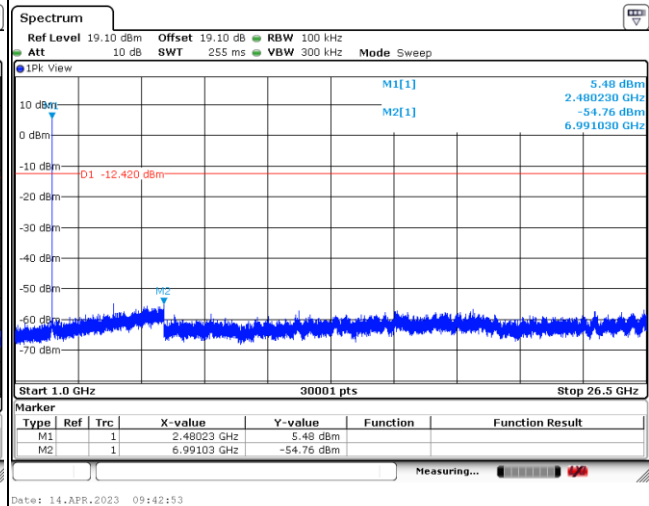
## Low Channel Plot



## Spurious Emission 30MHz~1GHz Plot

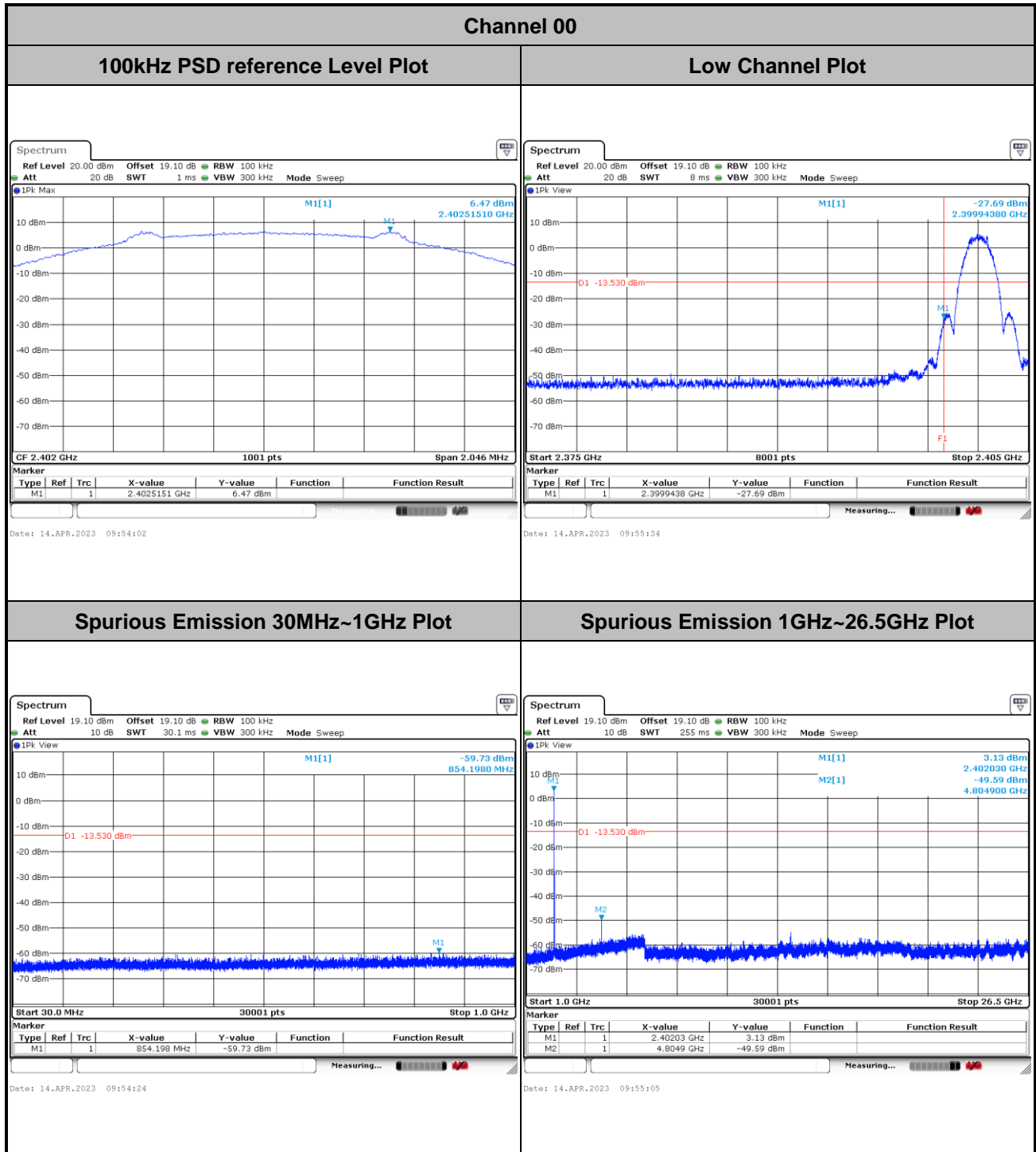


## Spurious Emission 1GHz~26.5GHz Plot





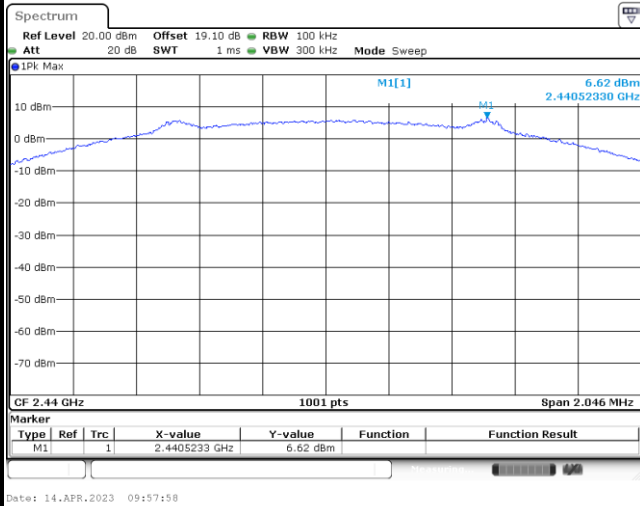
&lt;2Mbps&gt;





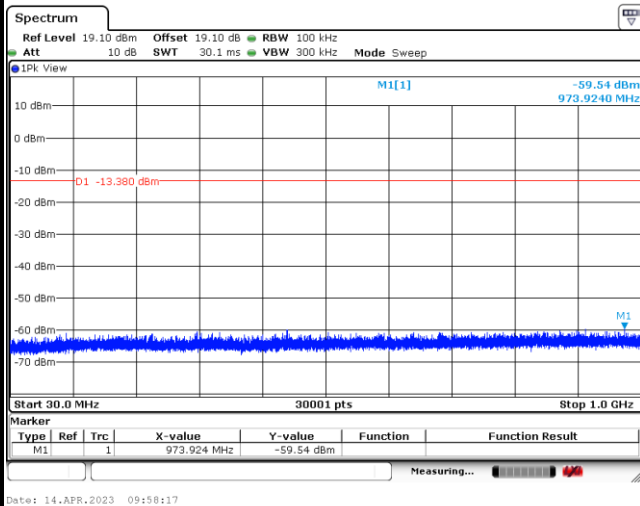
## Channel 19

## 100kHz PSD reference Level Plot

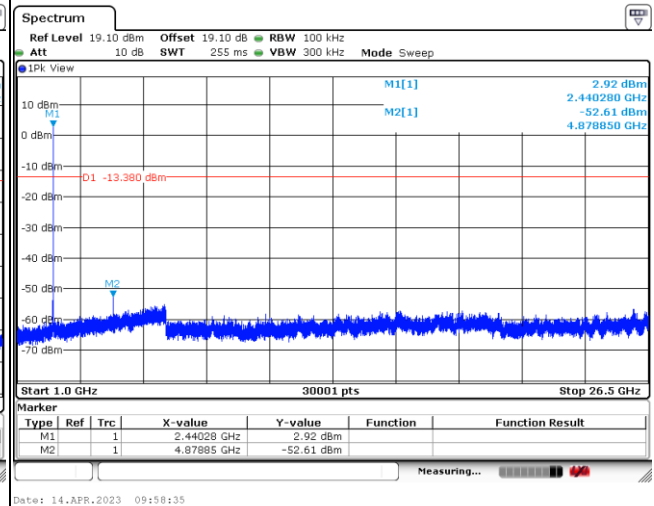


## Low Channel Plot

## Spurious Emission 30MHz~1GHz Plot



## Spurious Emission 1GHz~26.5GHz Plot

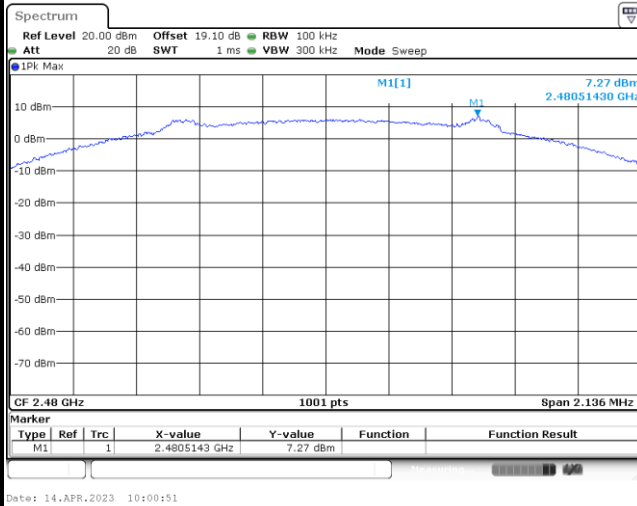




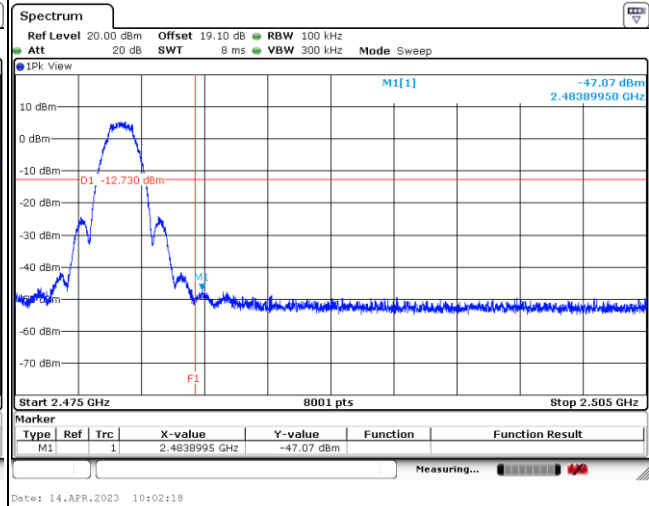


## Channel 39

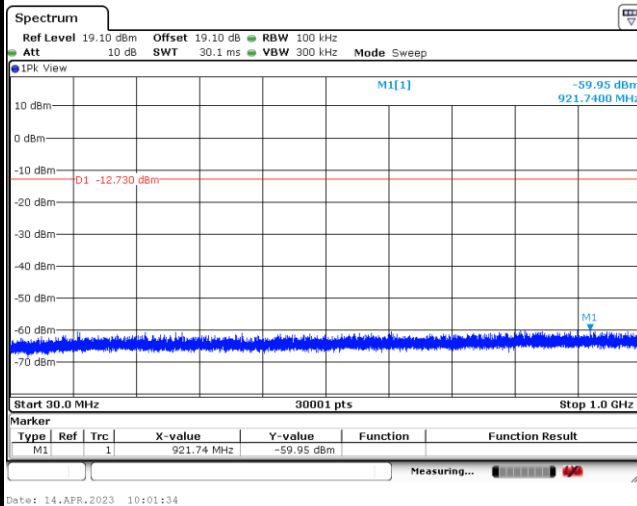
## 100kHz PSD reference Level Plot



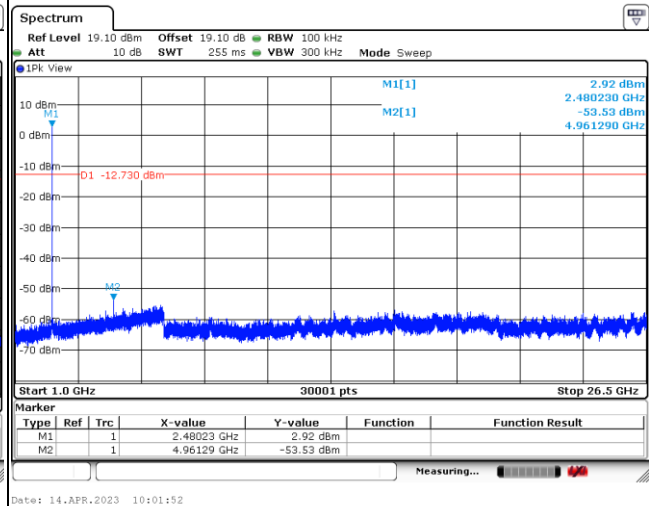
## Low Channel Plot



## Spurious Emission 30MHz~1GHz Plot



## Spurious Emission 1GHz~26.5GHz Plot

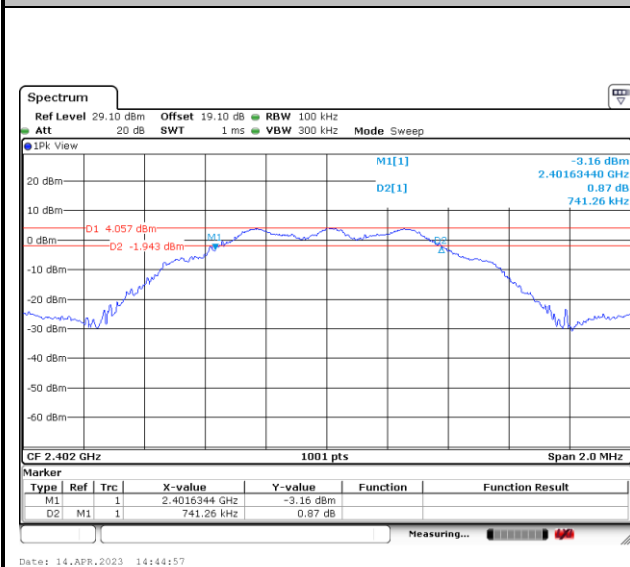




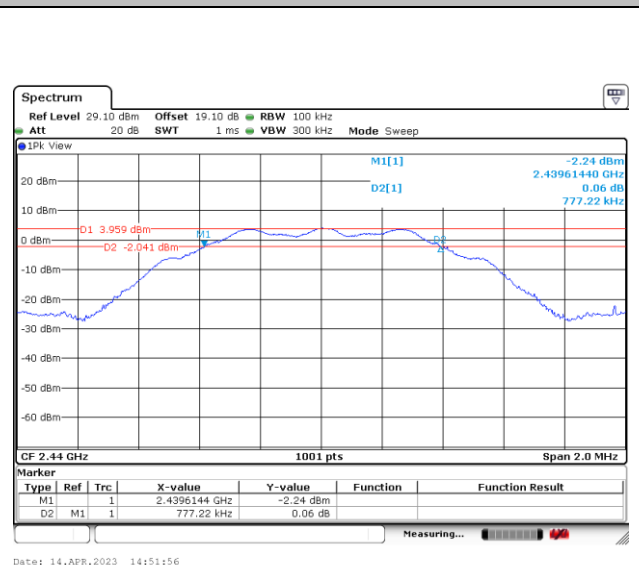
## 6dB Bandwidth

&lt;125kbps&gt;

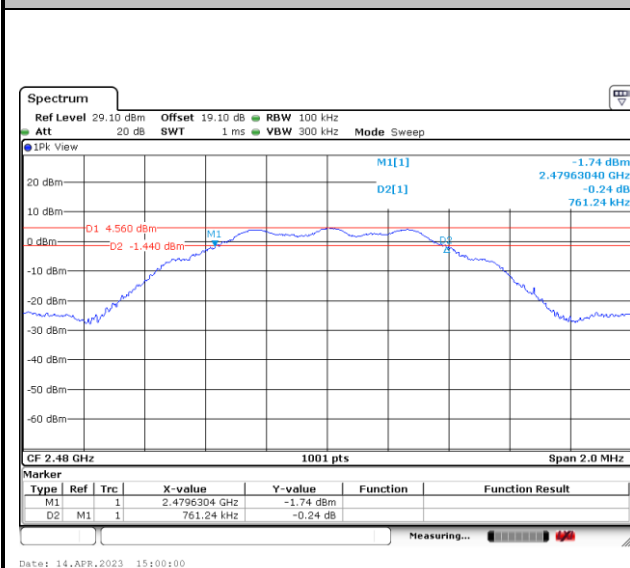
6 dB Bandwidth Plot on Channel 00



6 dB Bandwidth Plot on Channel 19



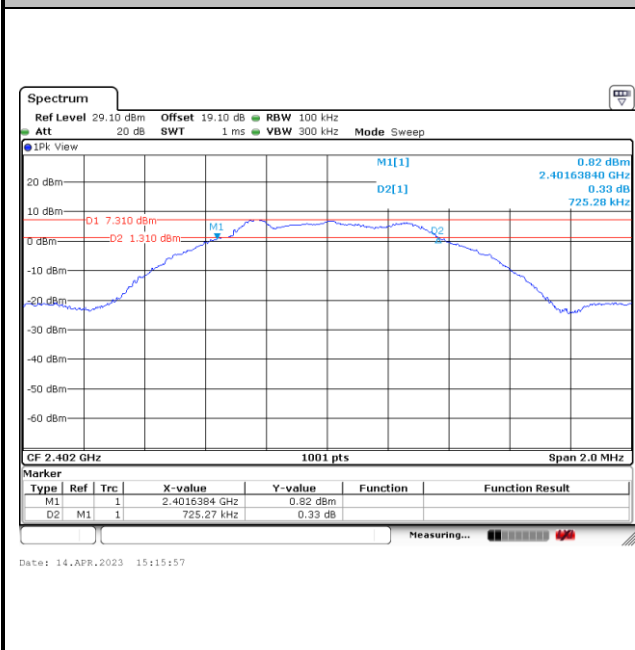
6 dB Bandwidth Plot on Channel 39



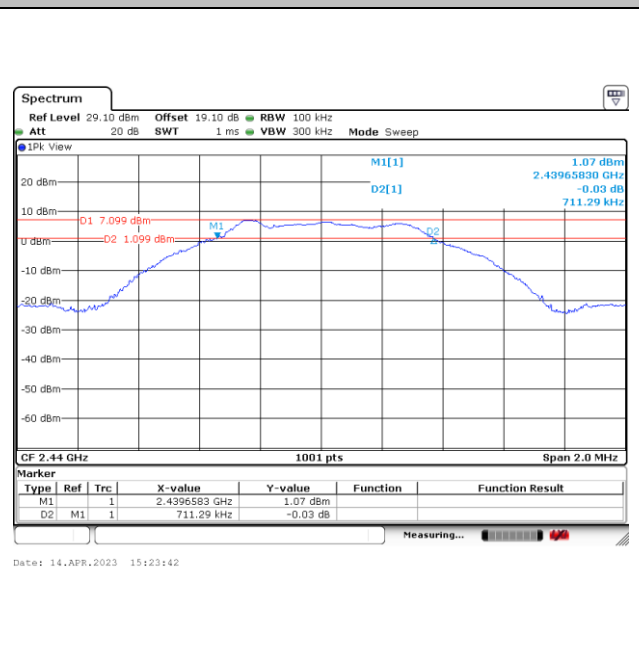


&lt;500kbps&gt;

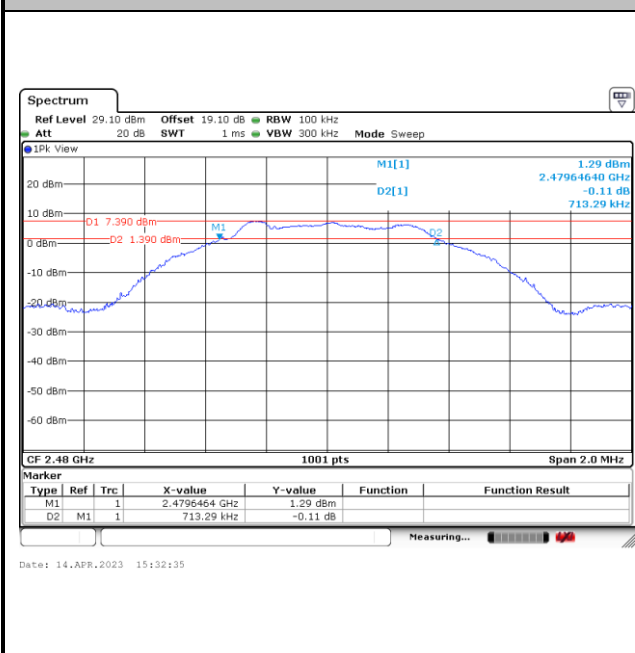
## 6 dB Bandwidth Plot on Channel 00



## 6 dB Bandwidth Plot on Channel 19



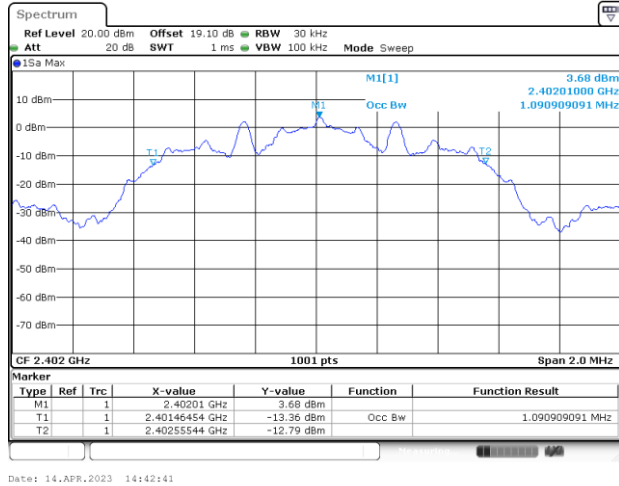
## 6 dB Bandwidth Plot on Channel 39



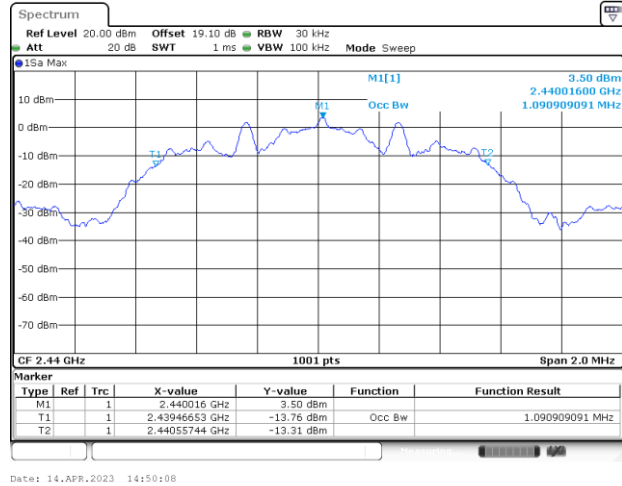
# 99% Occupied Bandwidth

<125kbps>

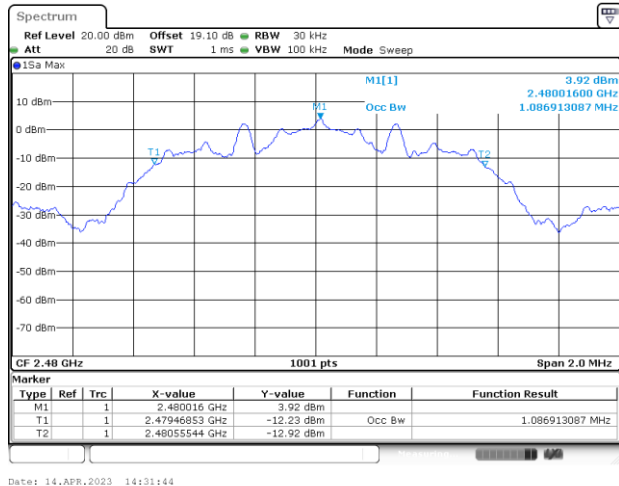
**99% Occupied Bandwidth Plot on Channel 00**



**99% Occupied Plot Bandwidth on Channel 19**



**99% Occupied Bandwidth Plot on Channel 39**

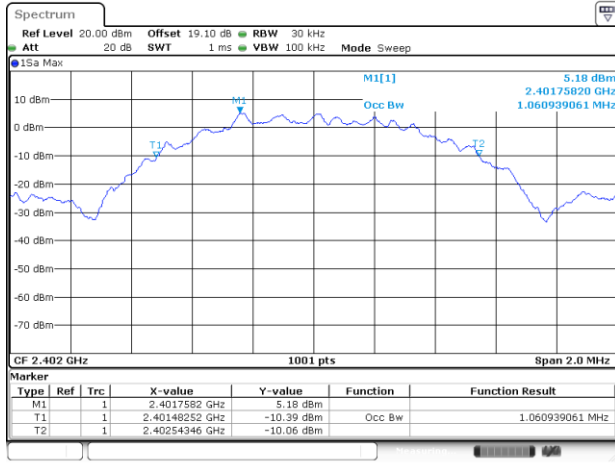


**Note:** The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

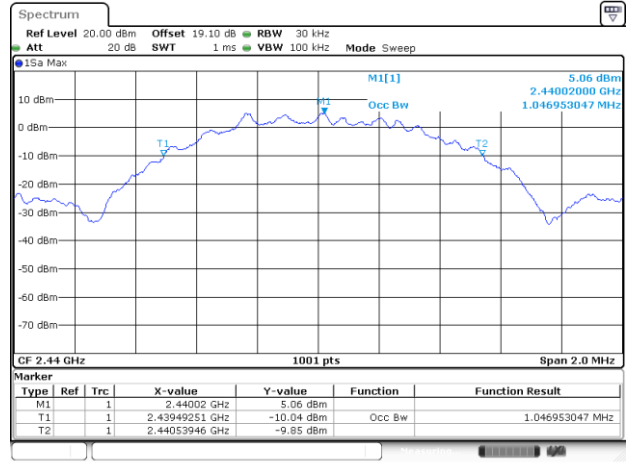


&lt;500kbps&gt;

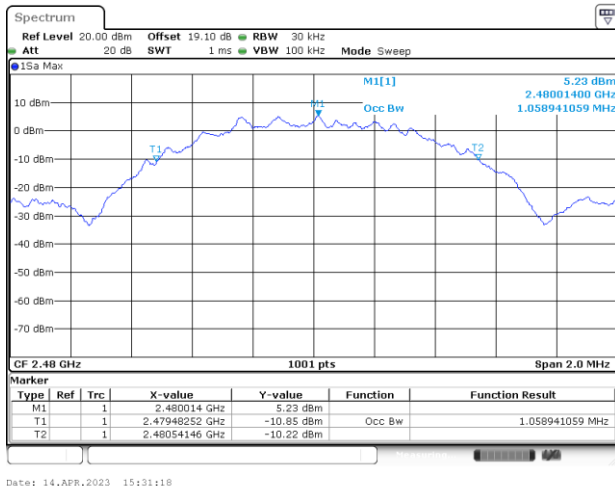
## 99% Occupied Bandwidth Plot on Channel 00



## 99% Occupied Plot Bandwidth on Channel 19

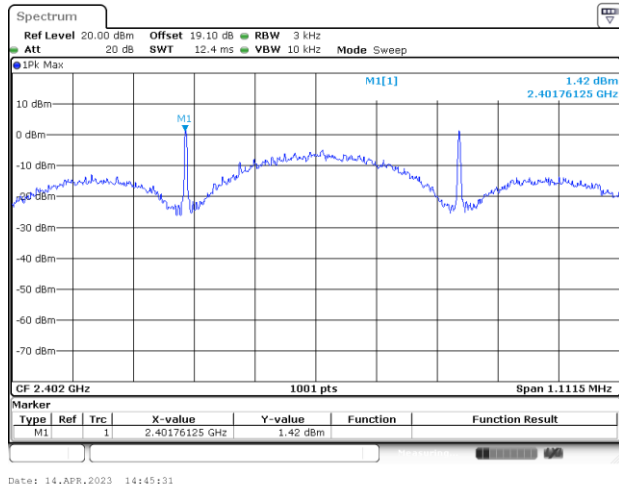
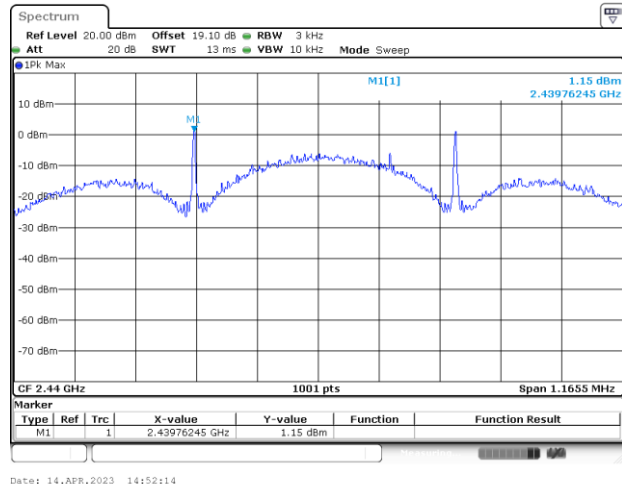
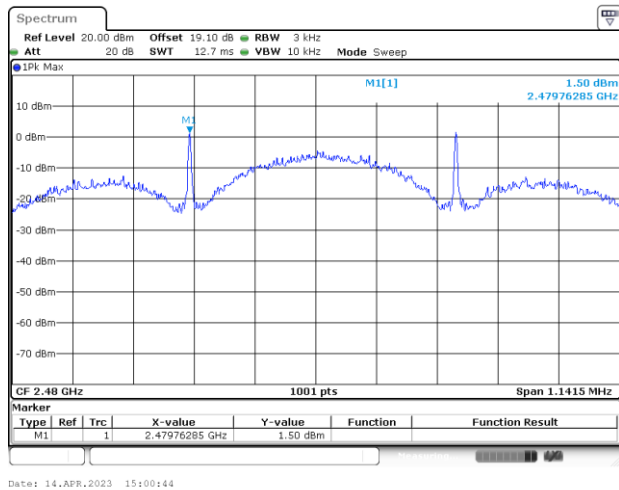


## 99% Occupied Bandwidth Plot on Channel 39



**Power Spectral Density (dBm/3kHz)**

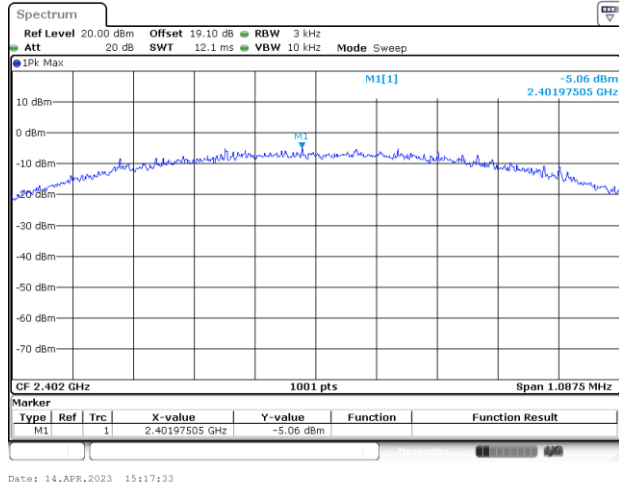
&lt;125kbps&gt;

**Power Density (dBm/3kHz) Plot Channel 00****Power Density (dBm/3kHz) Plot Channel 19****Power Density (dBm/3kHz) Plot Channel 39**

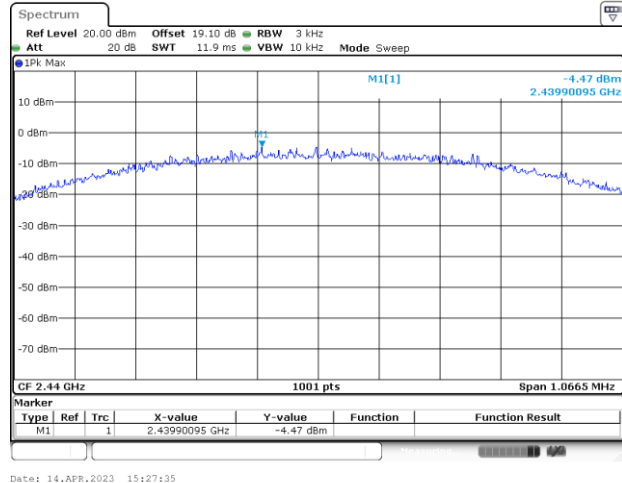


&lt;500kbps&gt;

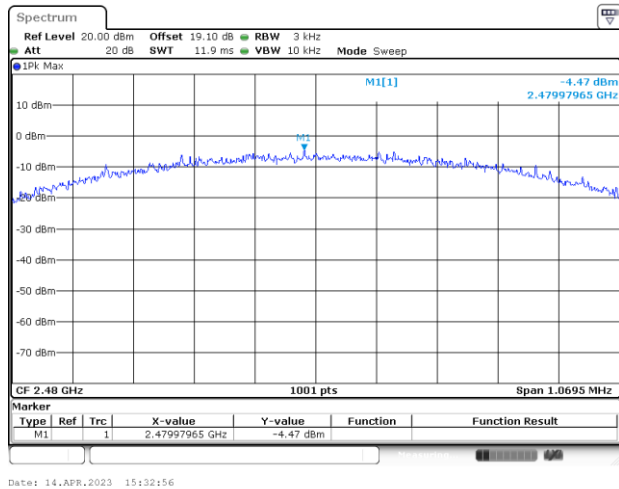
Power Density (dBm/3kHz) Plot Channel 00



Power Density (dBm/3kHz) Plot Channel 19



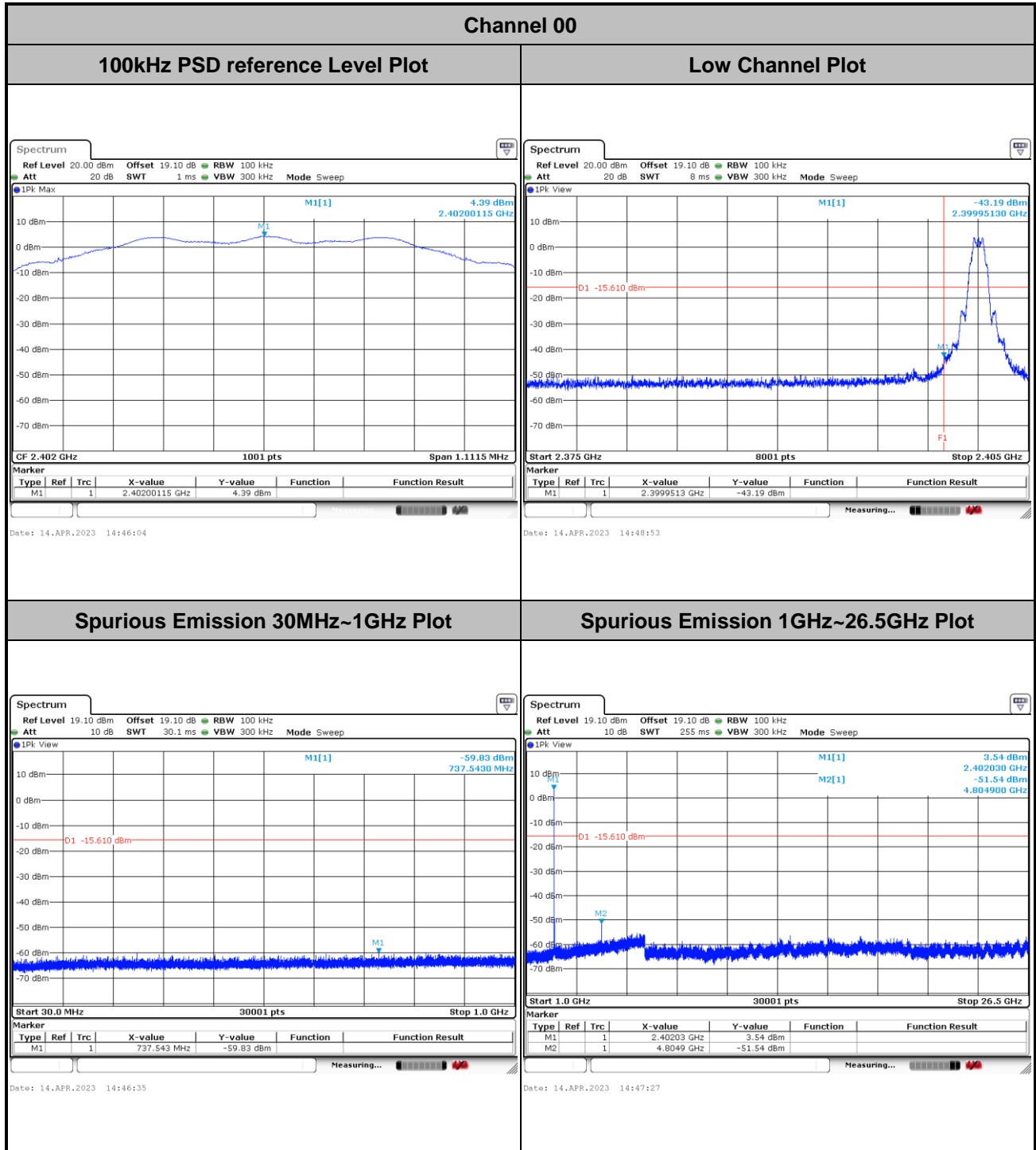
Power Density (dBm/3kHz) Plot Channel 39





## Band Edge and Conducted Spurious Emission

&lt;125kbps&gt;

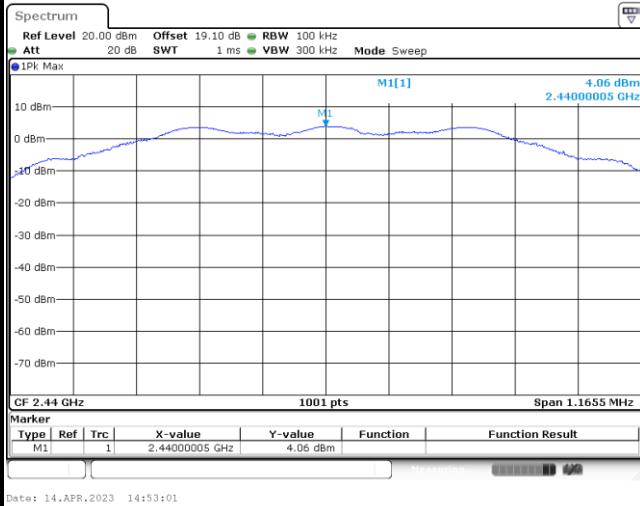






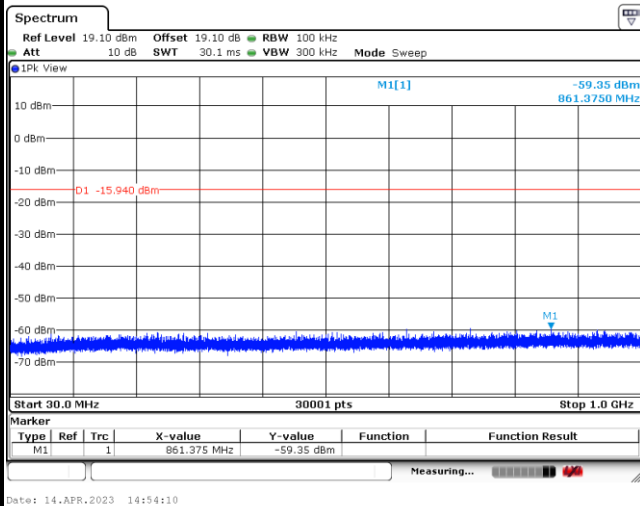
## Channel 19

## 100kHz PSD reference Level Plot

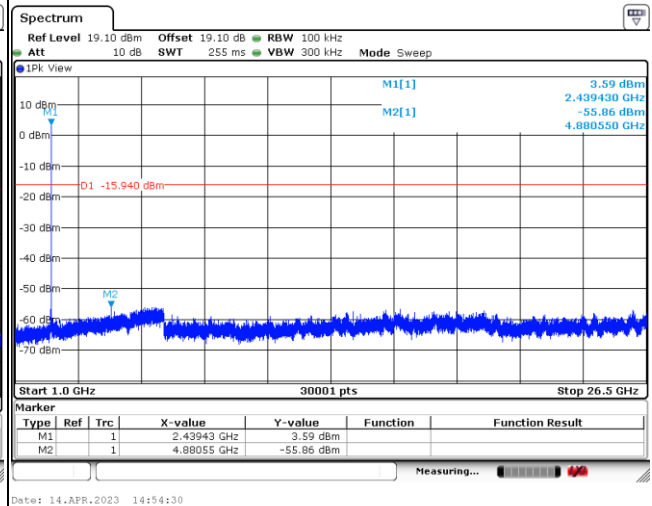


## Low Channel Plot

## Spurious Emission 30MHz~1GHz Plot



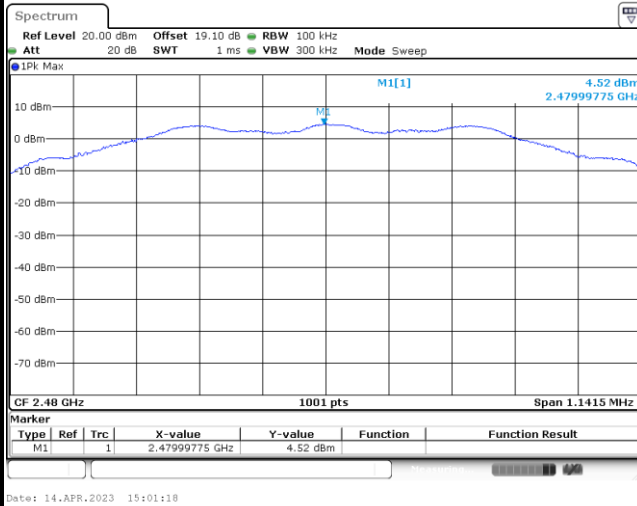
## Spurious Emission 1GHz~26.5GHz Plot



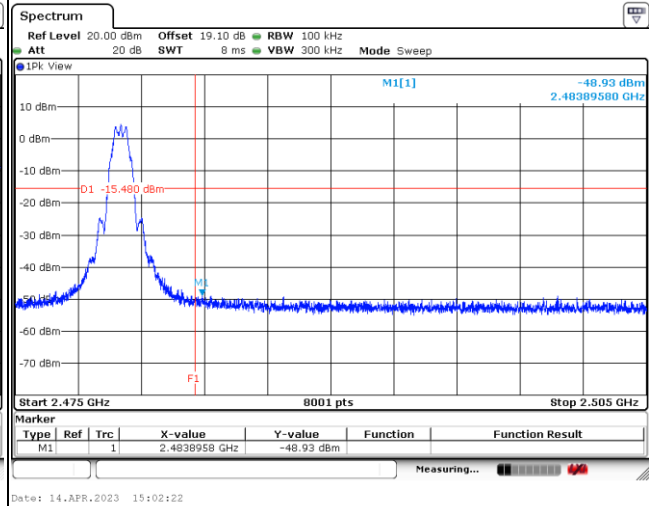


## Channel 39

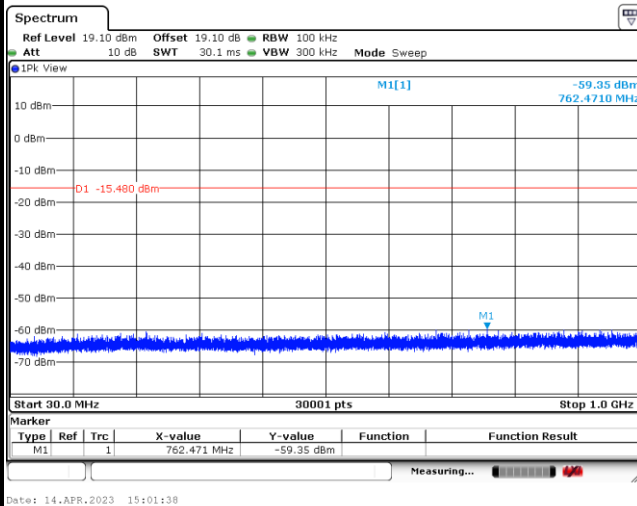
## 100kHz PSD reference Level Plot



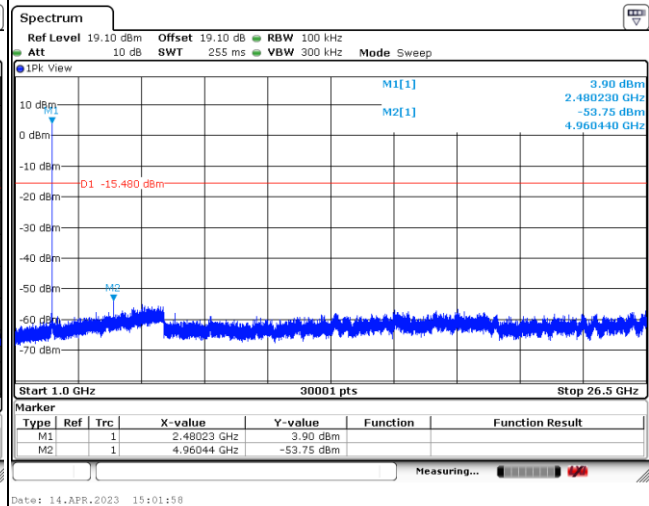
## Low Channel Plot



## Spurious Emission 30MHz~1GHz Plot

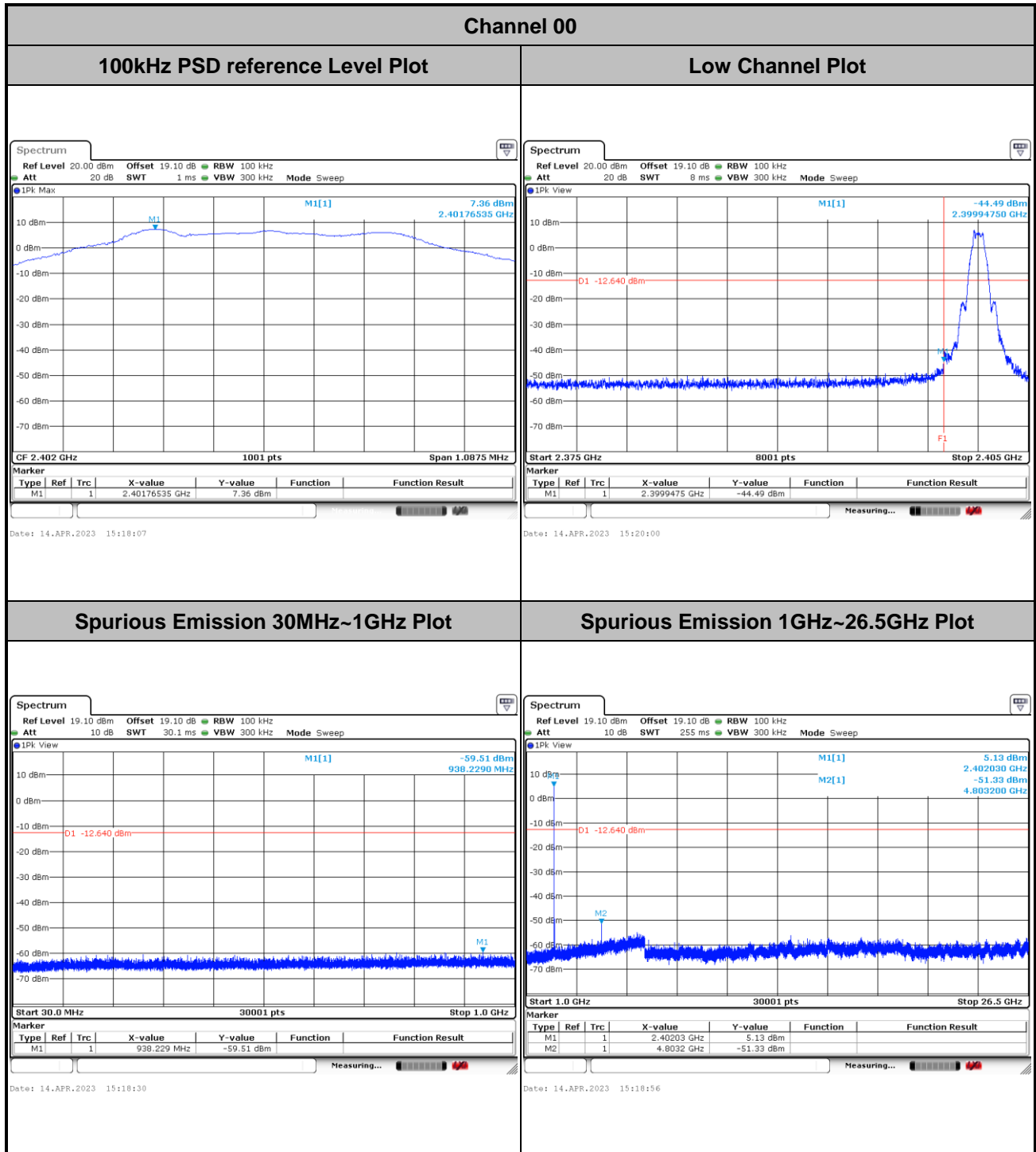


## Spurious Emission 1GHz~26.5GHz Plot





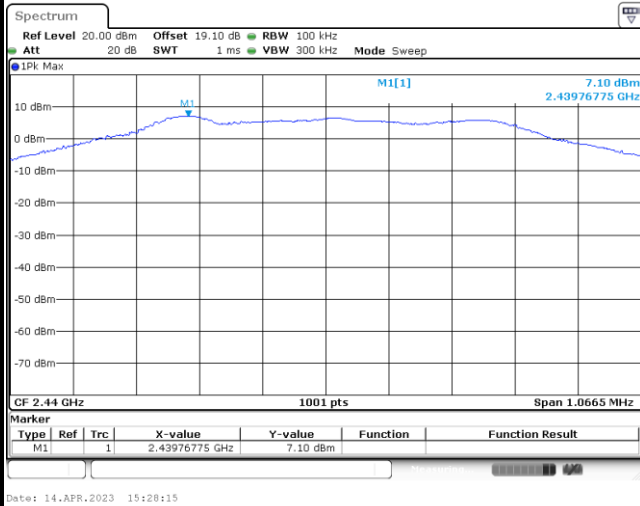
&lt;500Kbps&gt;





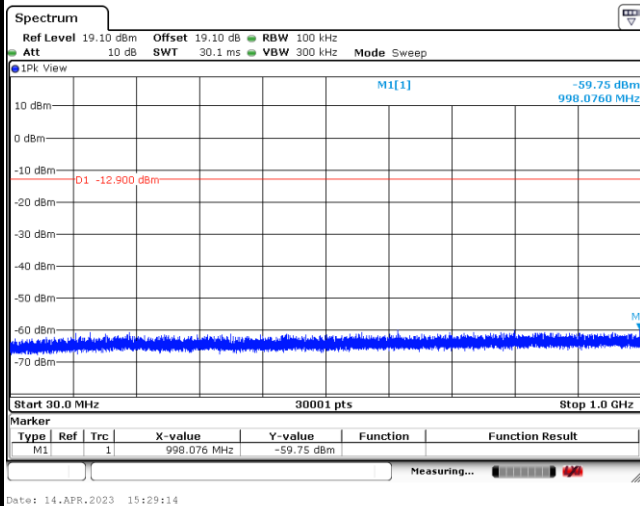
## Channel 19

## 100kHz PSD reference Level Plot

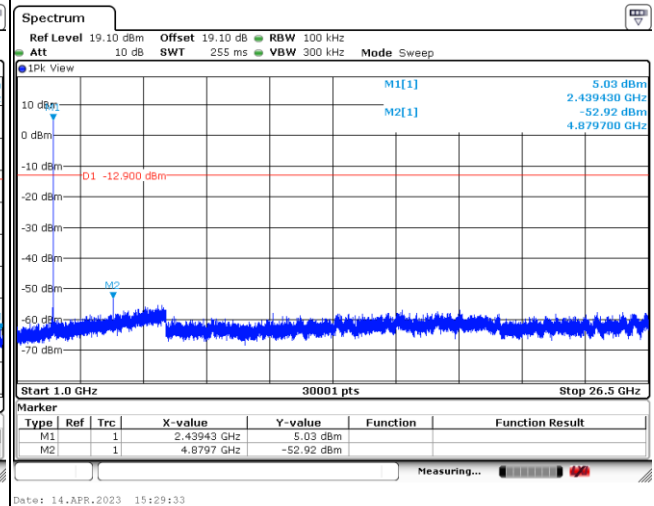


## Low Channel Plot

## Spurious Emission 30MHz~1GHz Plot



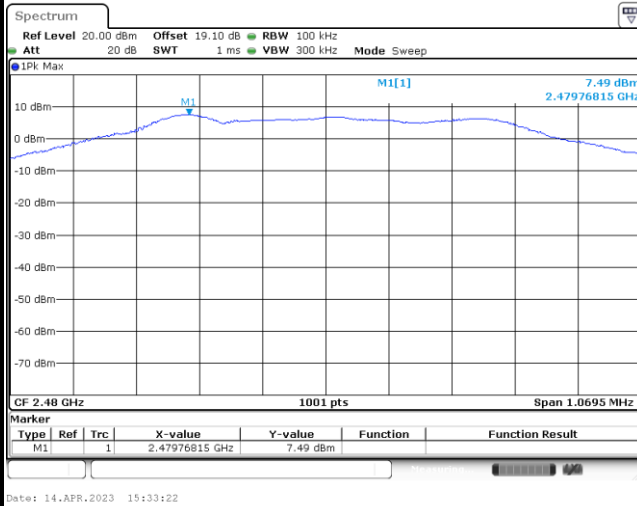
## Spurious Emission 1GHz~26.5GHz Plot



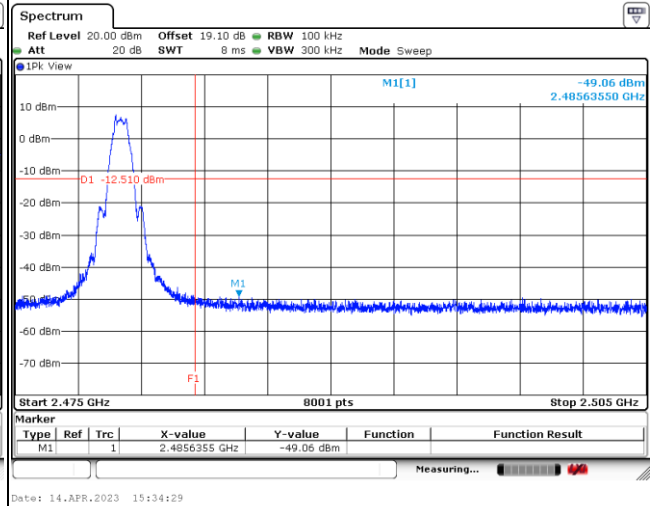


## Channel 39

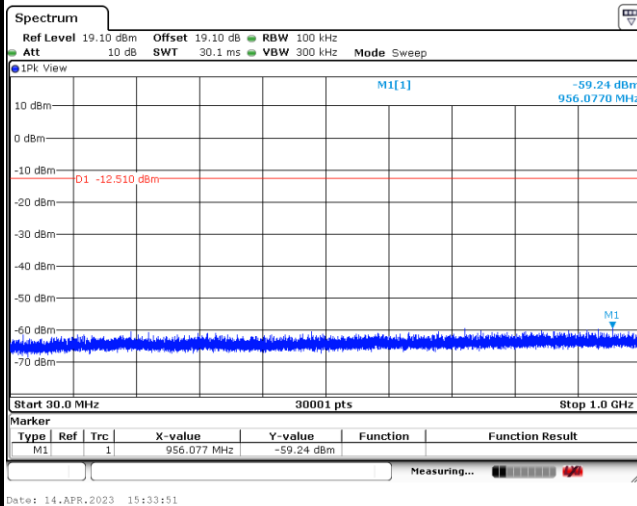
## 100kHz PSD reference Level Plot



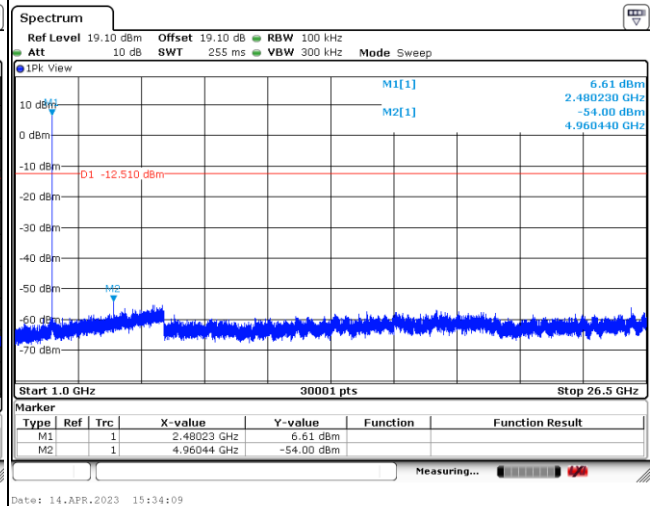
## Low Channel Plot



## Spurious Emission 30MHz~1GHz Plot



## Spurious Emission 1GHz~26.5GHz Plot





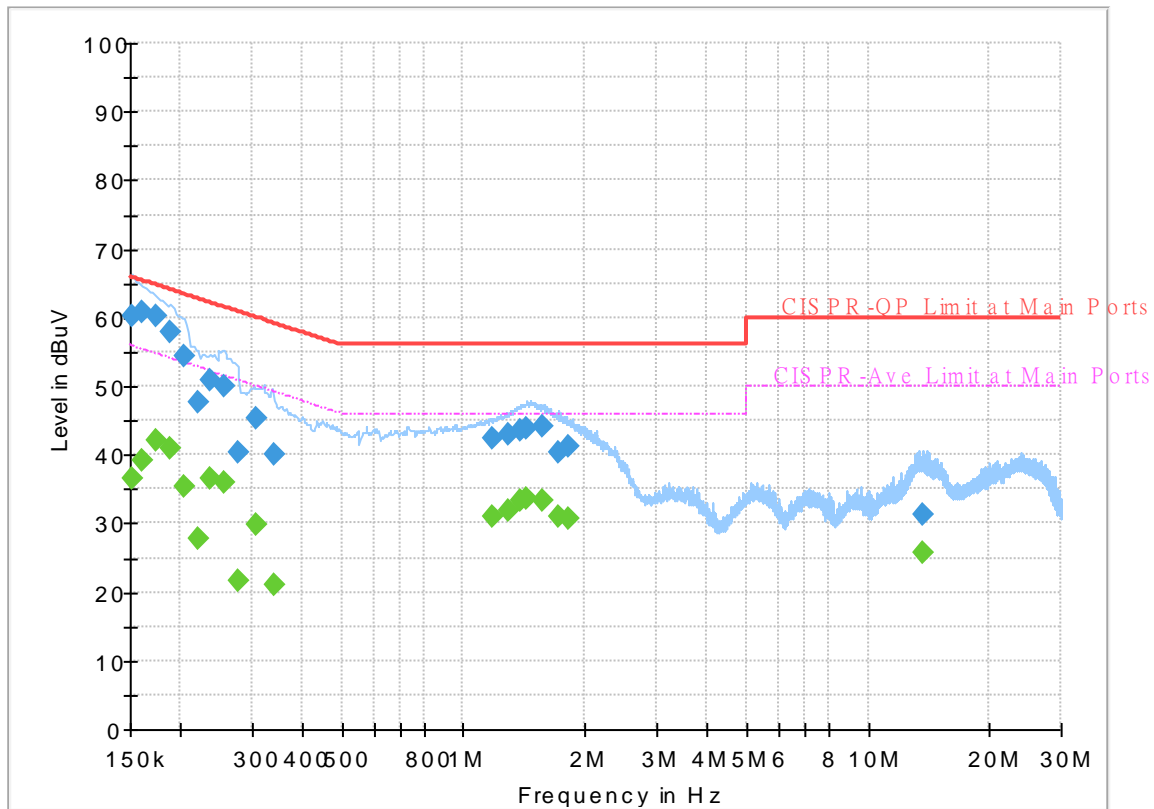
## **Appendix B. AC Conducted Emission Test Results**

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

# EUT Information

Report NO : 331602  
 Test Mode : Mode 1  
 Test Voltage : Power From System  
 Phase : Line

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	36.57	55.88	19.31	L1	OFF	19.8
0.152250	60.16	---	65.88	5.72	L1	OFF	19.8
0.161250	---	39.09	55.40	16.31	L1	OFF	19.8
0.161250	60.75	---	65.40	4.65	L1	OFF	19.8
0.174750	---	42.07	54.73	12.66	L1	OFF	19.8
0.174750	60.16	---	64.73	4.57	L1	OFF	19.8
0.188250	---	40.84	54.11	13.27	L1	OFF	19.8
0.188250	57.88	---	64.11	6.23	L1	OFF	19.8
0.204000	---	35.27	53.45	18.18	L1	OFF	19.8
0.204000	54.50	---	63.45	8.95	L1	OFF	19.8
0.219750	---	27.66	52.83	25.17	L1	OFF	19.8
0.219750	47.63	---	62.83	15.20	L1	OFF	19.8
0.235500	---	36.60	52.25	15.65	L1	OFF	19.8
0.235500	50.97	---	62.25	11.28	L1	OFF	19.8
0.255750	---	36.08	51.57	15.49	L1	OFF	19.8
0.255750	49.87	---	61.57	11.70	L1	OFF	19.8
0.276000	---	21.54	50.94	29.40	L1	OFF	19.8
0.276000	40.29	---	60.94	20.65	L1	OFF	19.8
0.307500	---	29.80	50.04	20.24	L1	OFF	19.8
0.307500	45.23	---	60.04	14.81	L1	OFF	19.8
0.339000	---	21.14	49.23	28.09	L1	OFF	19.8

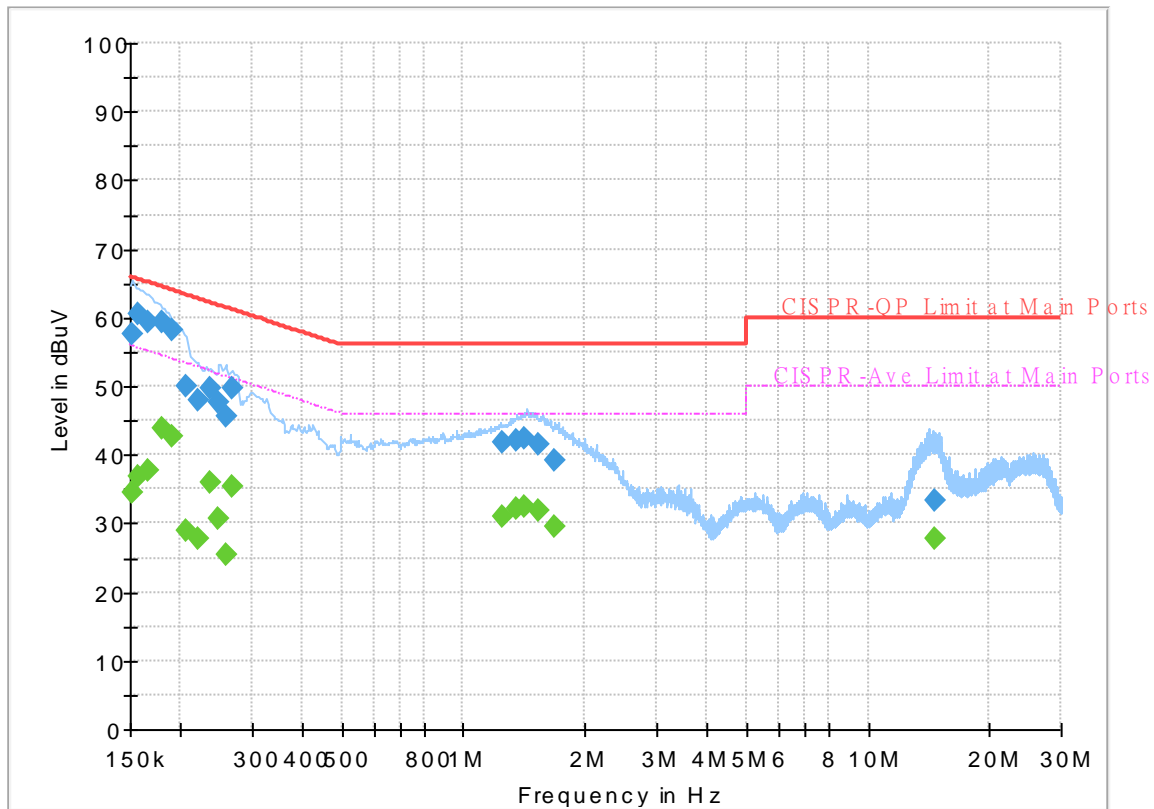
0.339000	40.19	---	59.23	19.04	L1	OFF	19.8
1.180500	---	30.93	46.00	15.07	L1	OFF	19.8
1.180500	42.29	---	56.00	13.71	L1	OFF	19.8
1.290750	---	31.95	46.00	14.05	L1	OFF	19.8
1.290750	43.04	---	56.00	12.96	L1	OFF	19.8
1.378500	---	33.46	46.00	12.54	L1	OFF	19.8
1.378500	43.62	---	56.00	12.38	L1	OFF	19.8
1.439250	---	33.57	46.00	12.43	L1	OFF	19.8
1.439250	43.97	---	56.00	12.03	L1	OFF	19.8
1.576500	---	33.24	46.00	12.76	L1	OFF	19.8
1.576500	44.25	---	56.00	11.75	L1	OFF	19.8
1.713750	---	30.96	46.00	15.04	L1	OFF	19.8
1.713750	40.48	---	56.00	15.52	L1	OFF	19.8
1.819500	---	30.61	46.00	15.39	L1	OFF	19.8
1.819500	41.12	---	56.00	14.88	L1	OFF	19.8
13.609500	---	25.60	50.00	24.40	L1	OFF	20.0
13.609500	31.18	---	60.00	28.82	L1	OFF	20.0



## EUT Information

Report NO : 331602  
 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	---	34.43	55.88	21.45	N	OFF	19.8
0.152250	57.72	---	65.88	8.16	N	OFF	19.8
0.156750	---	36.79	55.63	18.84	N	OFF	19.8
0.156750	60.47	---	65.63	5.16	N	OFF	19.8
0.165750	---	37.68	55.17	17.49	N	OFF	19.8
0.165750	59.25	---	65.17	5.92	N	OFF	19.8
0.179250	---	43.87	54.52	10.65	N	OFF	19.8
0.179250	59.40	---	64.52	5.12	N	OFF	19.8
0.190500	---	42.68	54.02	11.34	N	OFF	19.8
0.190500	58.15	---	64.02	5.87	N	OFF	19.8
0.206250	---	29.02	53.36	24.34	N	OFF	19.8
0.206250	50.05	---	63.36	13.31	N	OFF	19.8
0.222000	---	27.81	52.74	24.93	N	OFF	19.8
0.222000	47.81	---	62.74	14.93	N	OFF	19.8
0.237750	---	36.04	52.17	16.13	N	OFF	19.8
0.237750	49.84	---	62.17	12.33	N	OFF	19.8
0.249000	---	30.74	51.79	21.05	N	OFF	19.8
0.249000	47.72	---	61.79	14.07	N	OFF	19.8
0.258000	---	25.35	51.50	26.15	N	OFF	19.8
0.258000	45.73	---	61.50	15.77	N	OFF	19.8
0.269250	---	35.33	51.14	15.81	N	OFF	19.8

0.269250	49.85	---	61.14	11.29	N	OFF	19.8
1.252500	---	30.88	46.00	15.12	N	OFF	19.8
1.252500	41.68	---	56.00	14.32	N	OFF	19.8
1.356000	---	32.30	46.00	13.70	N	OFF	19.8
1.356000	42.06	---	56.00	13.94	N	OFF	19.8
1.416750	---	32.57	46.00	13.43	N	OFF	19.8
1.416750	42.32	---	56.00	13.68	N	OFF	19.8
1.527000	---	31.84	46.00	14.16	N	OFF	19.8
1.527000	41.45	---	56.00	14.55	N	OFF	19.8
1.686750	---	29.60	46.00	16.40	N	OFF	19.8
1.686750	39.14	---	56.00	16.86	N	OFF	19.8
14.664750	---	27.83	50.00	22.17	N	OFF	20.1
14.664750	33.42	---	60.00	26.58	N	OFF	20.1



## Appendix C. Radiated Spurious Emission

Test Engineer :	Leo Li	Temperature :	18.3~24.5°C
		Relative Humidity :	42.3~68.5%

&lt;1Mbps&gt;

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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		2367.33	52.03	-21.97	74	37.91	27.1	18.83	31.81	300	60	P	H
		2389.59	41.69	-12.31	54	27.54	27.1	18.87	31.82	300	60	A	H
	*	2402	106.83	-	-	92.67	27.1	18.89	31.83	300	60	P	H
	*	2402	106.73	-	-	92.57	27.1	18.89	31.83	300	60	A	H
		2387.385	52.34	-21.66	74	38.19	27.1	18.87	31.82	392	92	P	V
		2390	41.03	-12.97	54	26.88	27.1	18.87	31.82	392	92	A	V
	*	2402	105.35	-	-	91.19	27.1	18.89	31.83	392	92	P	V
	*	2402	105.25	-	-	91.09	27.1	18.89	31.83	392	92	A	V
													V
BLE CH 19 2440MHz		2361.04	51.54	-22.46	74	37.43	27.1	18.81	31.8	303	60	P	H
		2386	40.49	-13.51	54	26.35	27.1	18.86	31.82	303	60	A	H
	*	2440	107.13	-	-	93.01	27.02	18.96	31.86	303	60	P	H
	*	2440	107.04	-	-	92.92	27.02	18.96	31.86	303	60	A	H
		2487.28	51.34	-22.66	74	37.34	26.85	19.04	31.89	303	60	P	H
		2483.76	40.48	-13.52	54	26.47	26.86	19.04	31.89	303	60	A	H
		2361.04	51.53	-22.47	74	37.42	27.1	18.81	31.8	384	94	P	V
		2390	40.43	-13.57	54	26.28	27.1	18.87	31.82	384	94	A	V
	*	2440	105.08	-	-	90.96	27.02	18.96	31.86	384	94	P	V
	*	2440	104.98	-	-	90.86	27.02	18.96	31.86	384	94	A	V
		2496	51.5	-22.5	74	37.52	26.82	19.06	31.9	384	94	P	V
		2488.08	40.29	-13.71	54	26.29	26.85	19.04	31.89	384	94	A	V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	106.72	-	-	92.7	26.88	19.03	31.89	290	67	P	H
	*	2480	106.6	-	-	92.58	26.88	19.03	31.89	290	67	A	H
		2483.72	55.44	-18.56	74	41.42	26.87	19.04	31.89	290	67	P	H
		2483.52	46.11	-7.89	54	32.09	26.87	19.04	31.89	290	67	A	H
													H
													H
	*	2480	103.71	-	-	89.69	26.88	19.03	31.89	400	94	P	V
	*	2480	103.59	-	-	89.57	26.88	19.03	31.89	400	94	A	V
		2483.6	53.43	-20.57	74	39.41	26.87	19.04	31.89	400	94	P	V
		2483.52	43.94	-10.06	54	29.92	26.87	19.04	31.89	400	94	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	51.47	-22.53	74	38.95	32.61	12.95	33.04	116	202	P	H
		4804	47.24	-6.76	54	34.72	32.61	12.95	33.04	116	202	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4804	52.43	-21.57	74	39.91	32.61	12.95	33.04	297	28	P	V
		4804	48.37	-5.63	54	35.85	32.61	12.95	33.04	297	28	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
BLE CH 19 2440MHz		4880	51.57	-22.43	74	38.81	32.76	12.41	33.03	118	220	P	H
		4880	47.42	-6.58	54	34.66	32.76	12.41	33.03	118	220	A	H
		7320	54.83	-19.17	74	37.1	37.44	15.44	35.61	109	313	P	H
		7320	50.71	-3.29	54	32.98	37.44	15.44	35.61	109	313	A	H
		12200	56.39	-17.61	74	36.89	38.9	20.25	40.26	388	323	P	H
		12200	51.27	-2.73	54	31.77	38.9	20.25	40.26	388	323	A	H
													H
													H
													H
													H
													H
													H
		4880	51.34	-22.66	74	38.58	32.76	12.41	33.03	287	31	P	V
		4880	47.15	-6.85	54	34.39	32.76	12.41	33.03	287	31	A	V
		7320	55.96	-18.04	74	38.23	37.44	15.44	35.61	112	333	P	V
		7320	51.64	-2.36	54	33.91	37.44	15.44	35.61	112	333	A	V
		12200	57.26	-16.74	74	37.76	38.9	20.25	40.26	299	68	P	V
		12200	52.45	-1.55	54	32.95	38.9	20.25	40.26	299	68	A	V
													V
													V
													V
													V
													V
													V

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp 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 39 2480MHz		4960	52.97	-21.03	74	40.09	32.78	13.11	33.01	109	226	P	H
		4960	48.75	-5.25	54	35.87	32.78	13.11	33.01	109	226	A	H
		7440	53.77	-20.23	74	36.33	37.12	16.04	35.72	117	328	P	H
		7440	49.6	-4.4	54	32.16	37.12	16.04	35.72	117	328	A	H
		12400	54.9	-19.1	74	35	39.1	21.03	40.23	389	332	P	H
		12400	50.65	-3.35	54	30.75	39.1	21.03	40.23	389	332	A	H
													H
													H
													H
													H
													H
													H
		4960	53.42	-20.58	74	40.54	32.78	13.11	33.01	310	24	P	V
		4960	49.32	-4.68	54	36.44	32.78	13.11	33.01	310	24	A	V
		7440	55.87	-18.13	74	38.43	37.12	16.04	35.72	113	331	P	V
		7440	51.66	-2.34	54	34.22	37.12	16.04	35.72	113	331	A	V
		12400	56.08	-17.92	74	36.18	39.1	21.03	40.23	311	71	P	V
		12400	51.73	-2.27	54	31.83	39.1	21.03	40.23	311	71	A	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



&lt;2Mbps&gt;

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp 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		2383.29	52.8	-21.2	74	38.66	27.1	18.86	31.82	301	61	P	H
		2390	41.51	-12.49	54	27.36	27.1	18.87	31.82	301	61	A	H
	*	2402	106.98	-	-	92.82	27.1	18.89	31.83	301	61	P	H
	*	2402	106.87	-	-	92.71	27.1	18.89	31.83	301	61	A	H
													H
													H
		2388.54	51.71	-22.29	74	37.56	27.1	18.87	31.82	400	96	P	V
		2390	41.08	-12.92	54	26.93	27.1	18.87	31.82	400	96	A	V
	*	2402	105.16	-	-	91	27.1	18.89	31.83	400	96	P	V
	*	2402	105.06	-	-	90.9	27.1	18.89	31.83	400	96	A	V
													V
													V
BLE CH 19 2440MHz		2373.84	52.1	-21.9	74	37.97	27.1	18.84	31.81	301	61	P	H
		2389.36	40.47	-13.53	54	26.32	27.1	18.87	31.82	301	61	A	H
	*	2440	107.18	-	-	93.06	27.02	18.96	31.86	301	61	P	H
	*	2440	107.06	-	-	92.94	27.02	18.96	31.86	301	61	A	H
		2495.6	51.11	-22.89	74	37.13	26.82	19.06	31.9	301	61	P	H
		2483.68	40.36	-13.64	54	26.34	26.87	19.04	31.89	301	61	A	H
		2350.48	51.65	-22.35	74	37.56	27.1	18.79	31.8	400	95	P	V
		2389.68	40.46	-13.54	54	26.31	27.1	18.87	31.82	400	95	A	V
	*	2440	101.78	-	-	87.66	27.02	18.96	31.86	400	95	P	V
	*	2440	101.69	-	-	87.57	27.02	18.96	31.86	400	95	A	V
		2492.08	51.6	-22.4	74	37.61	26.83	19.05	31.89	400	95	P	V
		2485.2	40.33	-13.67	54	26.32	26.86	19.04	31.89	400	95	A	V





BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	107.22	-	-	93.2	26.88	19.03	31.89	292	63	P	H
	*	2480	107.12	-	-	93.1	26.88	19.03	31.89	292	63	A	H
		2483.52	55.95	-18.05	74	41.93	26.87	19.04	31.89	292	63	P	H
		2483.52	46.56	-7.44	54	32.54	26.87	19.04	31.89	292	63	A	H
													H
													H
	*	2480	103.76	-	-	89.74	26.88	19.03	31.89	400	96	P	V
	*	2480	103.63	-	-	89.61	26.88	19.03	31.89	400	96	A	V
		2483.56	53.81	-20.19	74	39.79	26.87	19.04	31.89	400	96	P	V
		2483.52	44.03	-9.97	54	30.01	26.87	19.04	31.89	400	96	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## 2.4GHz 2400~2483.5MHz

## BLE (Harmonic @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	51.93	-22.07	74	39.41	32.61	12.95	33.04	111	222	P	H
		4804	47.81	-6.19	54	35.29	32.61	12.95	33.04	111	222	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4804	52.31	-21.69	74	39.79	32.61	12.95	33.04	317	31	P	V
		4804	48.19	-5.81	54	35.67	32.61	12.95	33.04	317	31	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
BLE CH 19 2440MHz		4880	51.04	-22.96	74	38.28	32.76	13.03	33.03	119	221	P	H
		4880	46.48	-7.52	54	33.72	32.76	13.03	33.03	119	221	A	H
		7320	53.68	-20.32	74	35.95	37.44	15.9	35.61	107	326	P	H
		7320	48.14	-5.86	54	30.41	37.44	15.9	35.61	107	326	A	H
		12195	55.2	-18.8	74	35.7	38.9	20.86	40.26	396	340	P	H
		12195	48.86	-5.14	54	29.36	38.9	20.86	40.26	396	340	A	H
													H
													H
													H
													H
													H
													H
		4880	51.12	-22.88	74	38.36	32.76	13.03	33.03	319	27	P	V
		4880	46.76	-7.24	54	34	32.76	13.03	33.03	319	27	A	V
		7320	55.74	-18.26	74	38.01	37.44	15.9	35.61	105	330	P	V
		7320	51.77	-2.23	54	34.04	37.44	15.9	35.61	105	330	A	V
		12200	57.24	-16.76	74	37.74	38.9	20.86	40.26	300	67	P	V
		12200	52.63	-1.37	54	33.13	38.9	20.86	40.26	300	67	A	V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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 )
<b>BLE CH 39 2480MHz</b>		4960	52.07	-21.93	74	39.19	32.78	13.11	33.01	118	139	P	H
		4960	48.7	-5.3	54	35.82	32.78	13.11	33.01	118	139	A	H
		7440	54.26	-19.74	74	36.82	37.12	16.04	35.72	100	318	P	H
		7440	49.67	-4.33	54	32.23	37.12	16.04	35.72	100	318	A	H
		12400	54.68	-19.32	74	34.78	39.1	21.03	40.23	400	316	P	H
		12400	46.75	-7.25	54	26.85	39.1	21.03	40.23	400	316	A	H
													H
													H
													H
													H
													H
													H
		4960	52.38	-21.62	74	39.5	32.78	13.11	33.01	318	28	P	V
		4960	48.26	-5.74	54	35.38	32.78	13.11	33.01	318	28	A	V
		7440	54.51	-19.49	74	37.07	37.12	16.04	35.72	108	330	P	V
		7440	49.8	-4.2	54	32.36	37.12	16.04	35.72	108	330	A	V
		12400	57.01	-16.99	74	37.11	39.1	21.03	40.23	303	77	P	V
		12400	51.29	-2.71	54	31.39	39.1	21.03	40.23	303	77	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



## Emission above 18GHz

## 2.4GHz BLE (SHF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					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		24713	45.66	-28.34	74	37.14	39.37	19.97	53.27	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		24937	46.27	-27.73	74	36.89	39.7	20.11	53.14	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

## Emission below 1GHz

## 2.4GHz BLE (LF)

[illegible]



&lt;125kbps&gt;

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	51.32	-22.68	74	38.8	32.61	12.95	33.04	116	107	P	H
		4804	45.4	-8.6	54	32.88	32.61	12.95	33.04	116	107	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4804	52.77	-21.23	74	40.25	32.61	12.95	33.04	382	131	P	V
		4804	45.67	-8.33	54	33.15	32.61	12.95	33.04	382	131	A	V
													V
													V
													V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
BLE CH 19 2440MHz		4880	50.45	-23.55	74	37.69	32.76	13.03	33.03	116	107	P	H
		4880	44.16	-9.84	54	31.4	32.76	13.03	33.03	116	107	A	H
		7320	54.09	-19.91	74	36.36	37.44	15.9	35.61	111	322	P	H
		7320	46.31	-7.69	54	28.58	37.44	15.9	35.61	111	322	A	H
		12200	55.3	-18.7	74	35.8	38.9	20.86	40.26	323	123	P	H
		12200	49.09	-4.91	54	29.59	38.9	20.86	40.26	323	123	A	H
													H
													H
													H
													H
													H
													H
		4880	50.7	-23.3	74	37.94	32.76	13.03	33.03	318	23	P	V
		4880	44.19	-9.81	54	31.43	32.76	13.03	33.03	318	23	A	V
		7320	55.57	-18.43	74	37.84	37.44	15.9	35.61	100	329	P	V
		7320	48.48	-5.52	54	30.75	37.44	15.9	35.61	100	329	A	V
		12200	56.98	-17.02	74	37.48	38.9	20.86	40.26	213	245	P	V
		12200	50.85	-3.15	54	31.35	38.9	20.86	40.26	213	245	A	V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp 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 39 2480MHz		4960	52.79	-21.21	74	39.91	32.78	13.11	33.01	279	108	P	H
		4960	47.8	-6.2	54	34.92	32.78	13.11	33.01	279	108	A	H
		7440	49.98	-24.02	74	32.54	37.12	16.04	35.72	100	323	P	H
		7440	38.06	-15.94	54	20.62	37.12	16.04	35.72	100	323	A	H
		12405	54.97	-19.03	74	35.07	39.1	21.03	40.23	321	144	P	H
		12405	47.76	-6.24	54	27.86	39.1	21.03	40.23	321	144	A	H
													H
													H
													H
													H
													H
													H
		4960	51.82	-22.18	74	38.94	32.78	13.11	33.01	101	41	P	V
		4960	45.62	-8.38	54	32.74	32.78	13.11	33.01	101	41	A	V
		7440	49.26	-24.74	74	31.82	37.12	16.04	35.72	400	186	P	V
		7440	38	-16	54	20.56	37.12	16.04	35.72	400	186	A	V
		12405	56.67	-17.33	74	36.77	39.1	21.03	40.23	289	145	P	V
		12405	49.46	-4.54	54	29.56	39.1	21.03	40.23	289	145	A	V
													V
													V
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



&lt;500kbps&gt;

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( 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	52.26	-21.74	74	39.74	32.61	12.95	33.04	106	231	P	H
		4804	46.27	-7.73	54	33.75	32.61	12.95	33.04	106	231	A	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
		4804	51.93	-22.07	74	39.41	32.61	12.95	33.04	337	136	P	V
		4804	46.48	-7.52	54	33.96	32.61	12.95	33.04	337	136	A	V
													V
													V
													V
													V
													V
													V
													V



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
BLE CH 19 2440MHz		4880	50.93	-23.07	74	38.17	32.76	13.03	33.03	302	102	P	H
		4880	44.38	-9.62	54	31.62	32.76	13.03	33.03	302	102	A	H
		7320	54.62	-19.38	74	36.89	37.44	15.9	35.61	100	327	P	H
		7320	46.4	-7.6	54	28.67	37.44	15.9	35.61	100	327	A	H
		12200	55.11	-18.89	74	35.61	38.9	20.86	40.26	298	128	P	H
		12200	47.99	-6.01	54	28.49	38.9	20.86	40.26	298	128	A	H
													H
													H
													H
													H
													H
													H
		4880	50.1	-23.9	74	37.34	32.76	13.03	33.03	317	36	P	V
		4880	43.6	-10.4	54	30.84	32.76	13.03	33.03	317	36	A	V
		7320	55.42	-18.58	74	37.69	37.44	15.9	35.61	100	336	P	V
		7320	48.67	-5.33	54	30.94	37.44	15.9	35.61	100	336	A	V
		12200	57.77	-16.23	74	38.27	38.9	20.86	40.26	326	45	P	V
		12200	50.55	-3.45	54	31.05	38.9	20.86	40.26	326	45	A	V
													V
													V
													V
													V
													V
													V

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp 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 39 2480MHz		4960	52.34	-21.66	74	39.46	32.78	13.11	33.01	102	146	P	H
		4960	46.83	-7.17	54	33.95	32.78	13.11	33.01	102	146	A	H
		7440	55	-19	74	37.56	37.12	16.04	35.72	111	283	P	H
		7440	47.62	-6.38	54	30.18	37.12	16.04	35.72	111	283	A	H
		12400	55.58	-18.42	74	35.68	39.1	21.03	40.23	236	125	P	H
		12400	48.46	-5.54	54	28.56	39.1	21.03	40.23	236	125	A	H
													H
													H
													H
													H
													H
													H
		4960	51.95	-22.05	74	39.07	32.78	13.11	33.01	400	129	P	V
		4960	47.26	-6.74	54	34.38	32.78	13.11	33.01	400	129	A	V
		7440	56.08	-17.92	74	38.64	37.12	16.04	35.72	400	190	P	V
		7440	49.04	-4.96	54	31.6	37.12	16.04	35.72	400	190	A	V
		12400	57.73	-16.27	74	37.83	39.1	21.03	40.23	400	222	P	V
		12400	50.52	-3.48	54	30.62	39.1	21.03	40.23	400	222	A	V
													V
													V
													V
													V
													V
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**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	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					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. Margin(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. Margin(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. Margin(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

<b>Test Engineer :</b>	Leo Li	<b>Temperature :</b>	18.3~24.5°C
		<b>Relative Humidity :</b>	42.3~68.5%

### Note symbol

-L	Low channel location
-R	High channel location



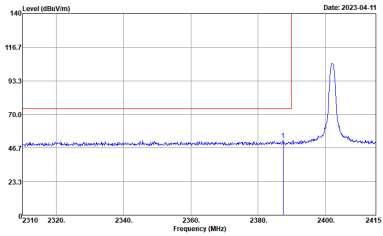
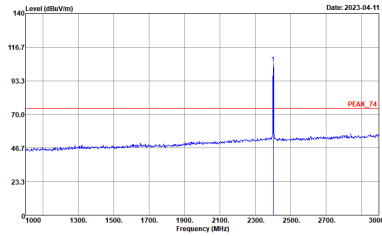
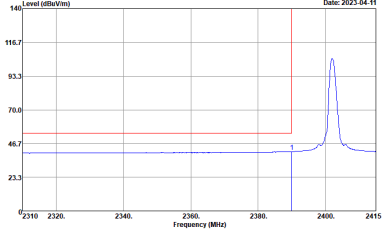
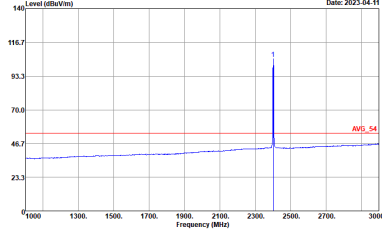
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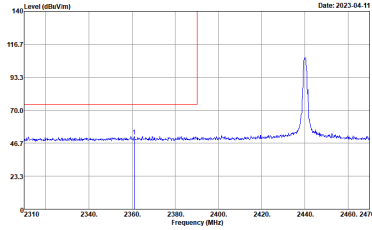
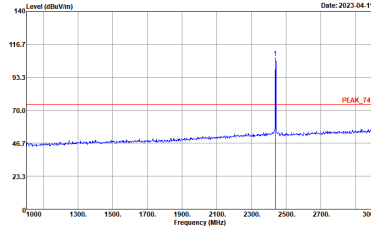
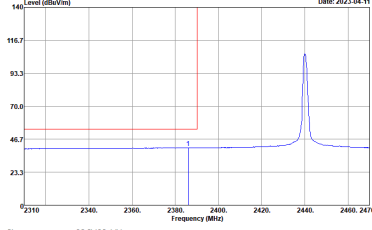
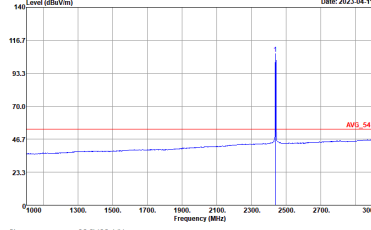
2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

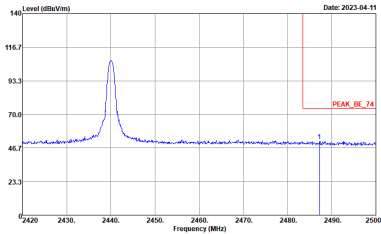
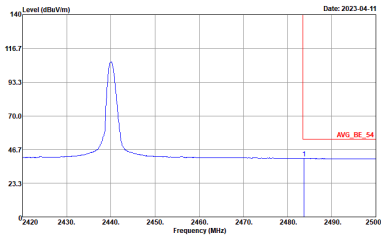
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	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH23-HY Condition : AVG_BE_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : AVG_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

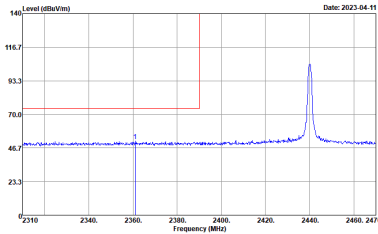
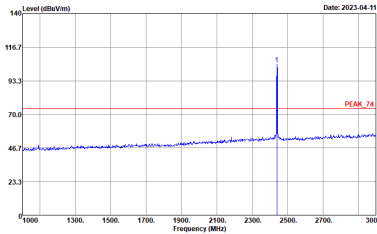
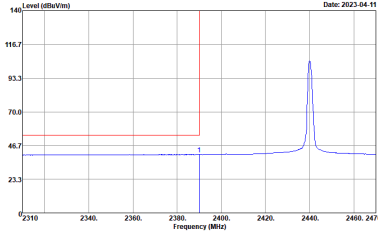
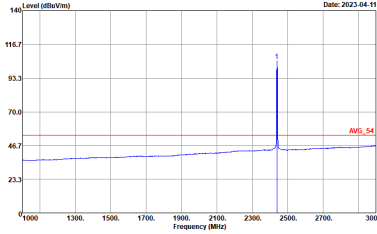


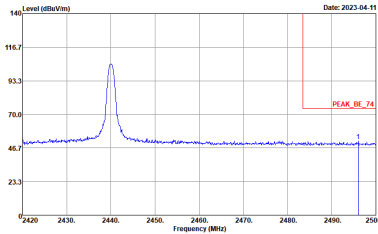
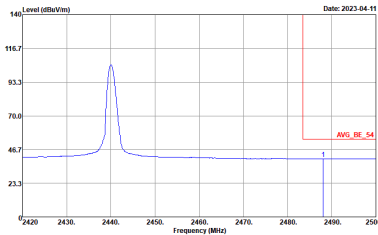
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

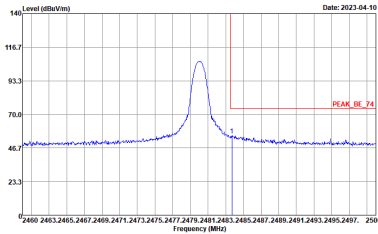
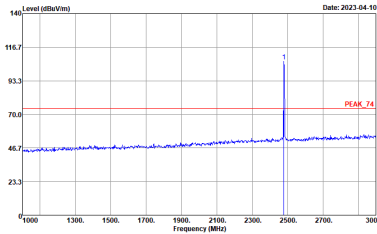
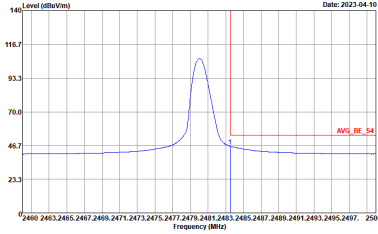
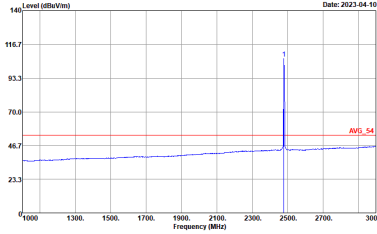
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

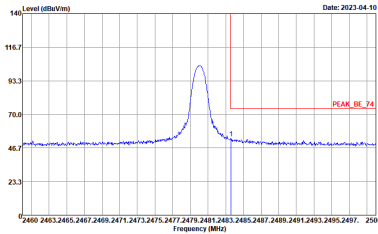
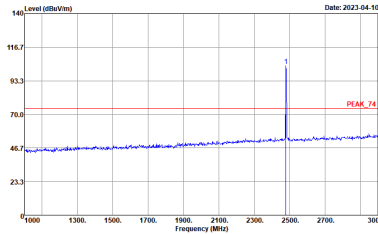
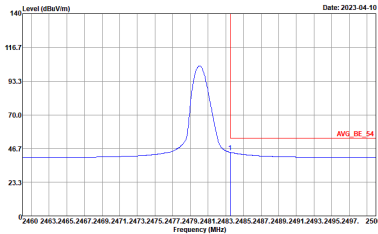
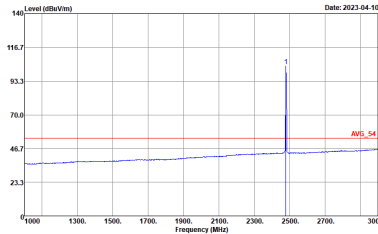


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak	<div><p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZC05A18ENL_230705 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p></div>	Left blank
Avg.	<div><p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZC05A18ENL_230705 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p></div>	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZC05A18ENL_230705 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZC05A18ENL_230705 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p>	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz 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.	<div><p>Level (dBuV/m) <span style="float:right">Date: 2023-04-11</span></p><p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m) <span style="float:right">Date: 2023-04-11</span></p><p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL</p></div>





BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<div><p>Level (dBuV/m) Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m) Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p></div>
17.7G ~18G Avg	<div><p>Level (dBuV/m) Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m) Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL :</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p></div>
17.7G ~18G Avg	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 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: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 HORIZONTAL :-</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 VERTICAL :-</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
17.7G ~18G Avg	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>

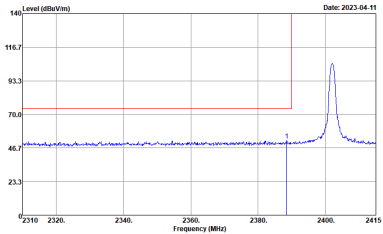
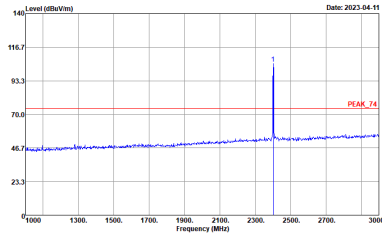
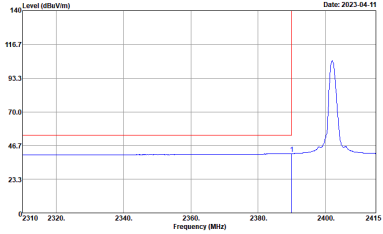
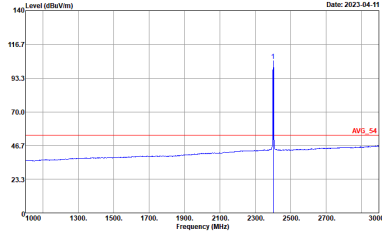


<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH23-HY Condition : AVG_BE_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : AVG_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

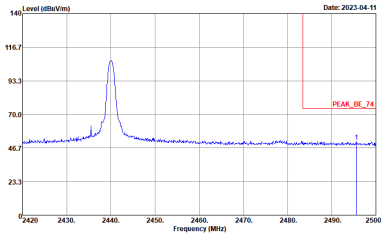
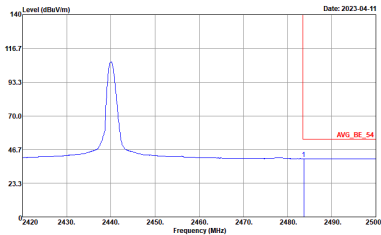
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	<p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH23-HY Condition : AVG_BE_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : AVG_54 3m LE2C05A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



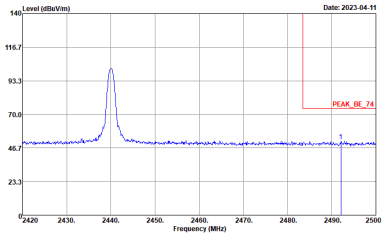
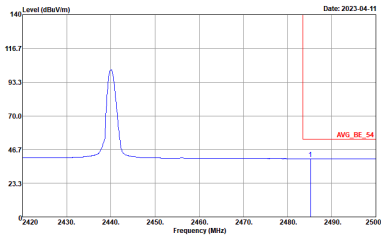


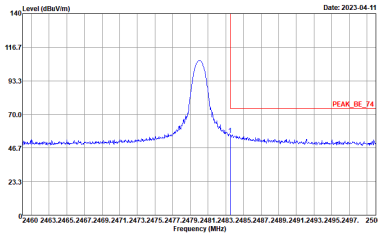
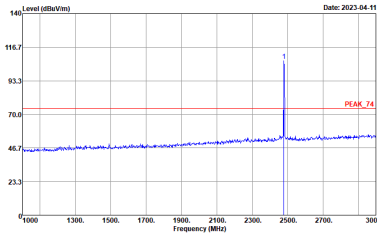
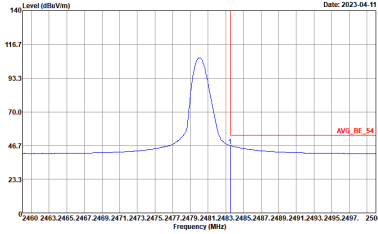
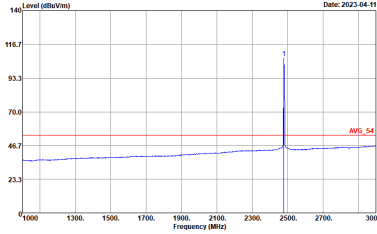
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak	<div><p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZC05A18ENL_230705 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p></div>	Left blank
Avg.	<div><p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZC05A18ENL_230705 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p></div>	Left blank

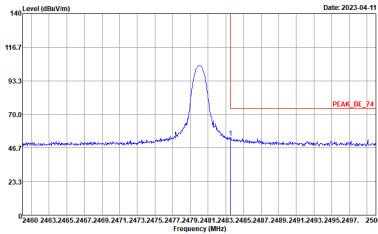
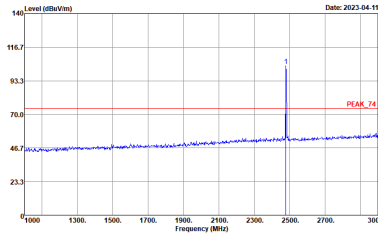
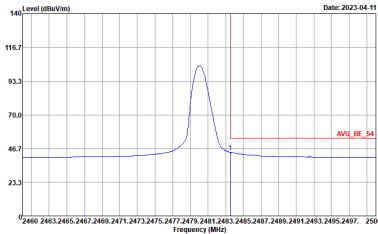
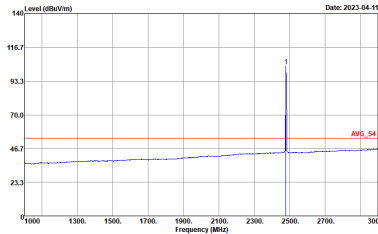


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	<p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	<p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak	<div><p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18ENL_230705 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p></div>	Left blank
Avg.	<div><p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18ENL_230705 VERTICAL RBW:1000.000kHz VBW:0.010kHz SWT:Auto</p></div>	Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 HORIZONTAL : RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH23-HY Condition : PEAK_BE_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : PEAK_74 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH23-HY Condition : AVG_BE_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>	 <p>Site : 03CH23-HY Condition : AVG_54 3m LEZ005A18EN_230705 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto</p>

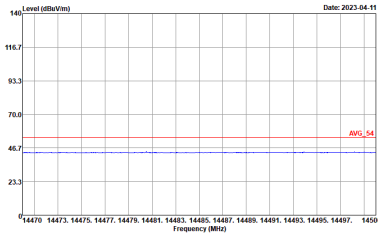
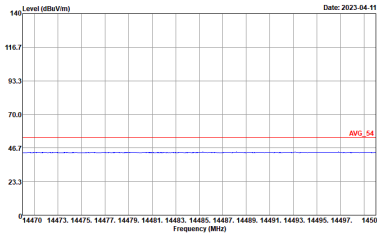
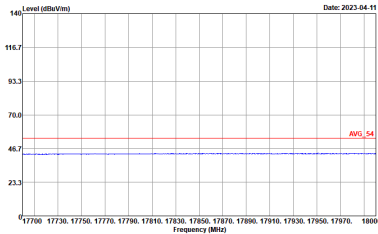
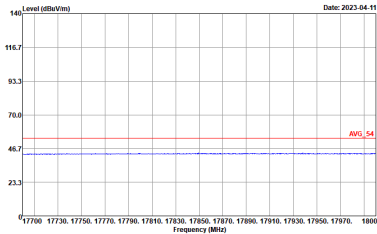


2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	<div><p>Level (dBuV/m) <span style="float:right">Date: 2023-04-11</span></p><p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m) <span style="float:right">Date: 2023-04-11</span></p><p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL :</p>
17.7G ~18G Avg	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 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: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 VERTICAL :</p></div>



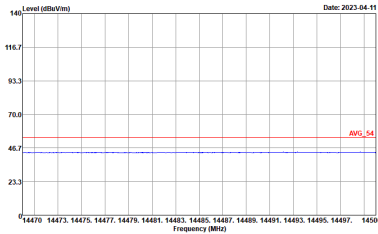
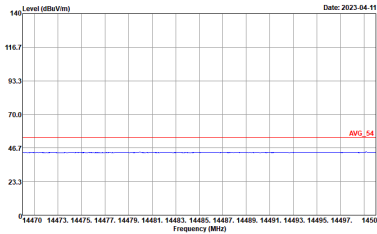
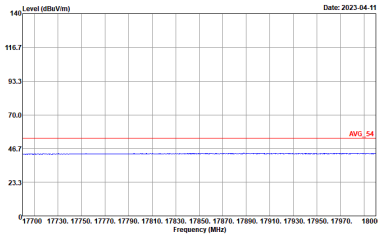
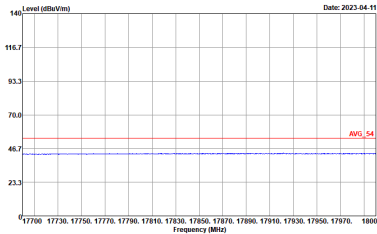


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<p>Level (dBuV/m) vs Frequency (MHz) plot for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The plot is dated 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) plot for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The plot is dated 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
17.7G ~18G Avg	<p>Level (dBuV/m) vs Frequency (MHz) plot for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The plot is dated 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) plot for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The plot is dated 2023-04-11.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 VERTICAL :</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
17.7G ~18G Avg	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>

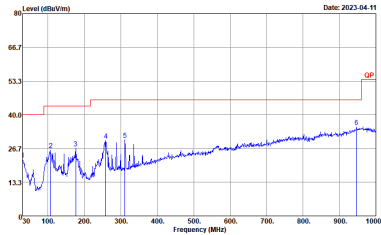
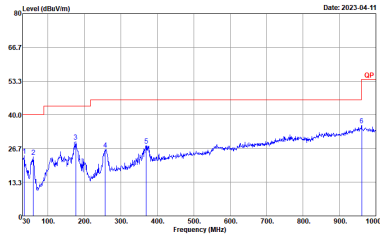


Emission above 18GHz

2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
Peak Avg.	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-1HY Condition : PEAK_74 1m SHF_1223_220705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-11</p><p>Site : 03CH23-1HY Condition : PEAK_74 1m SHF_1223_220705 VERTICAL :</p></div>

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

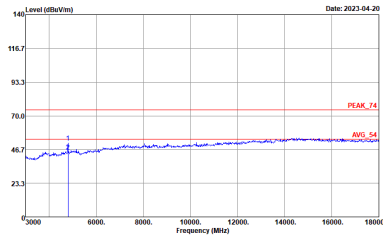
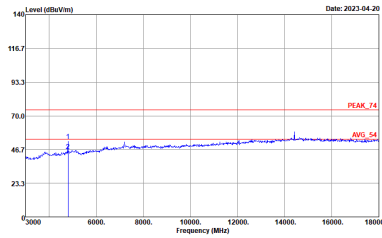
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH23-HY Condition : QP 3m BIL06_62028_231010 HORIZONTAL</p>	 <p>Site : 03CH23-HY Condition : QP 3m BIL06_62028_231010 VERTICAL</p>



<125kbps>

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 : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL</p>	 <p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL</p>



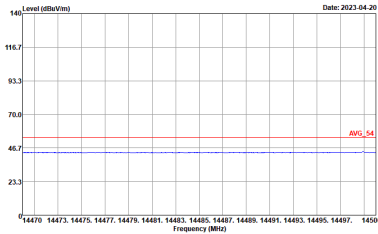
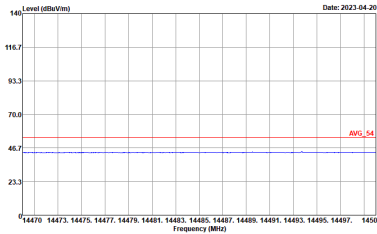
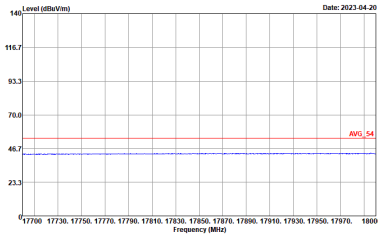
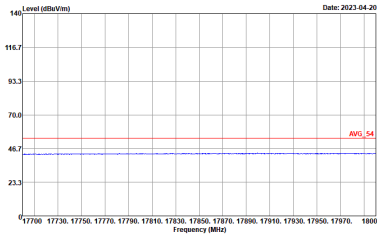
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a red line at approximately 46.7 dBuV/m and a blue line at approximately 23.3 dBuV/m. The x-axis ranges from 14470 to 14500 MHz, and the y-axis ranges from 23.3 to 140 dBuV/m. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a red line at approximately 46.7 dBuV/m and a blue line at approximately 23.3 dBuV/m. The x-axis ranges from 14470 to 14500 MHz, and the y-axis ranges from 23.3 to 140 dBuV/m. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a red line at approximately 46.7 dBuV/m and a blue line at approximately 23.3 dBuV/m. The x-axis ranges from 17700 to 18000 MHz, and the y-axis ranges from 23.3 to 140 dBuV/m. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a red line at approximately 46.7 dBuV/m and a blue line at approximately 23.3 dBuV/m. The x-axis ranges from 17700 to 18000 MHz, and the y-axis ranges from 23.3 to 140 dBuV/m. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 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: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL :</p></div>





BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL :</p>
17.7G ~18G Avg	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p>	 <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL :</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-20</p><p>PEAK_74</p><p>AVG_54</p><p>Site : 03CH23-HY</p><p>Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-20</p><p>PEAK_74</p><p>AVG_54</p><p>Site : 03CH23-HY</p><p>Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL</p></div>



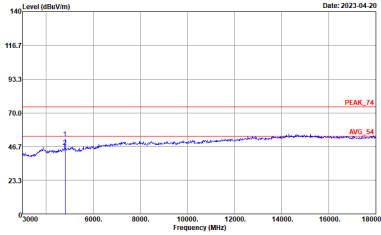
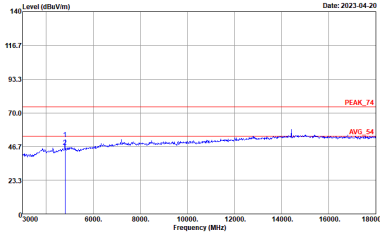
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<p>Level (dBuV/m) vs Frequency (MHz) for Horizontal polarization. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for Vertical polarization. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
	<p>Level (dBuV/m) vs Frequency (MHz) for Horizontal polarization. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for Vertical polarization. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>



<500kbps>

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 : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL :</p>	 <p>Site : 03CH23-1HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL :</p>

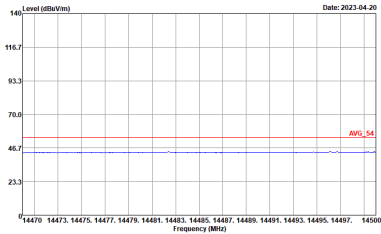
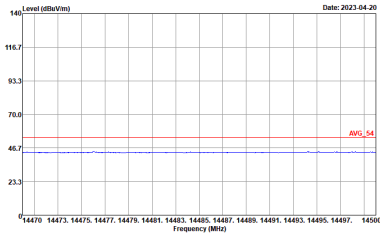
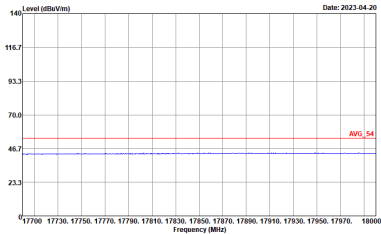
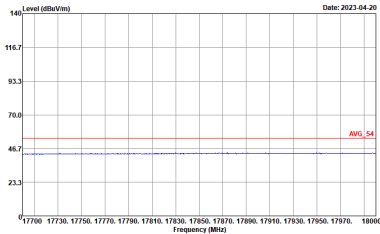


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
<b>14.47G ~14.5G Avg.</b>	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 14.47G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 14470 to 14500 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 14470 to 14500 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p>
	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p>	<p>Level (dBuV/m) vs Frequency (MHz) for 17.7G. The plot shows a flat line at approximately 46.7 dBuV/m across the frequency range 17700 to 18000 MHz. The y-axis ranges from 23.3 to 140 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. The date is 2023-04-20.</p> <p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 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: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 HORIZONTAL :-</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2005A18EN_230705 VERTICAL :-</p></div>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<div><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL</p></div>
17.7G ~18G Avg	<div><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL</p></div>	<div><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 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: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : PEAK_74 3m LE2C05A18EN_230705 VERTICAL :</p></div>



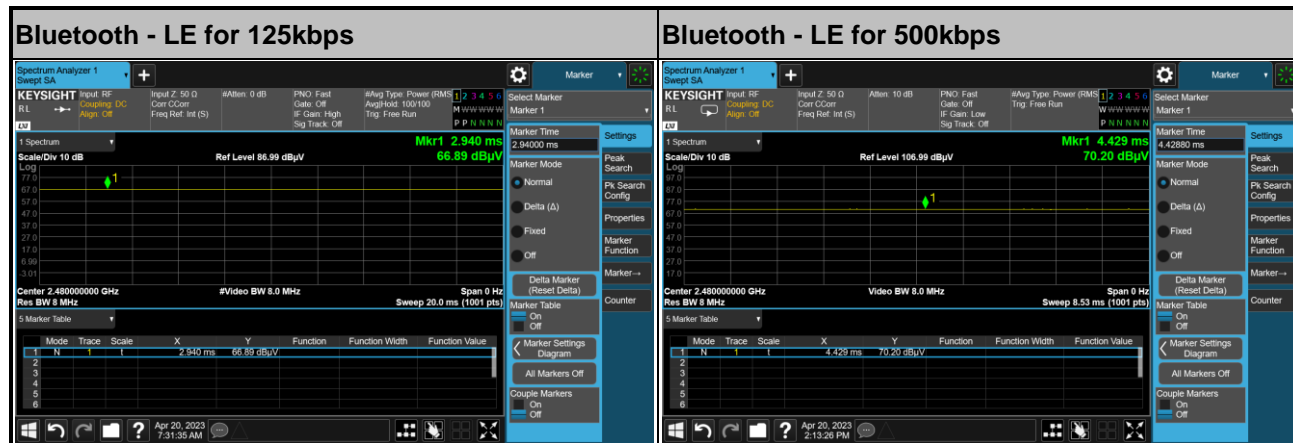
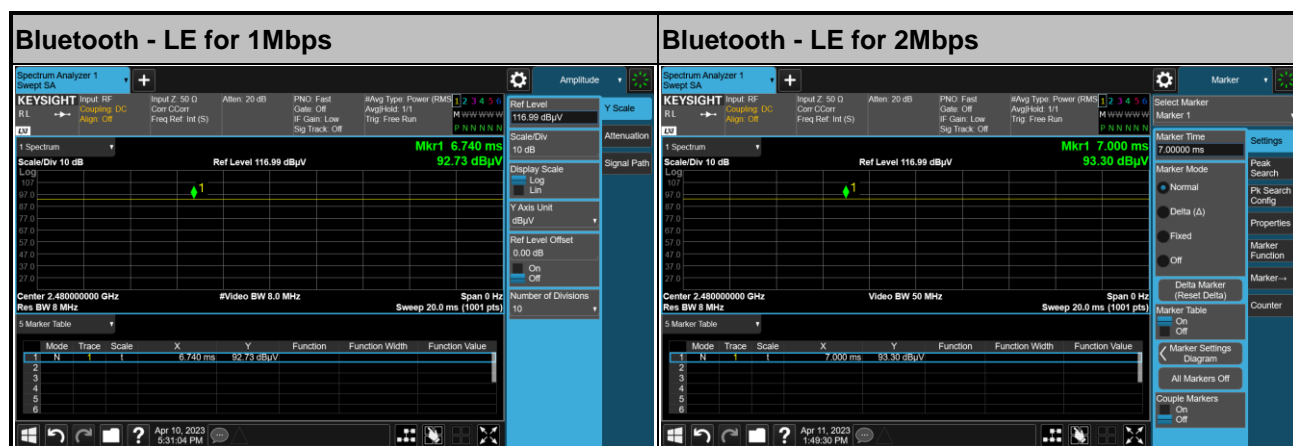


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
14.47G ~14.5G Avg.	<div><p>Level (dBuV/m) Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m) Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL :</p></div>
17.7G ~18G Avg	<div><p>Level (dBuV/m) Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 HORIZONTAL :</p></div>	<div><p>Level (dBuV/m) Date: 2023-04-20</p><p>Site : 03CH23-HY Condition : AV6_54 3m LE2C05A18EN_230705 VERTICAL :</p></div>



## Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth - LE for 1Mbps	100.00	-	-	10Hz
Bluetooth - LE for 2Mbps	100.00	-	-	10Hz
Bluetooth - LE for 125kbps	100.00	-	-	10Hz
Bluetooth - LE for 500kbps	100.00	-	-	10Hz

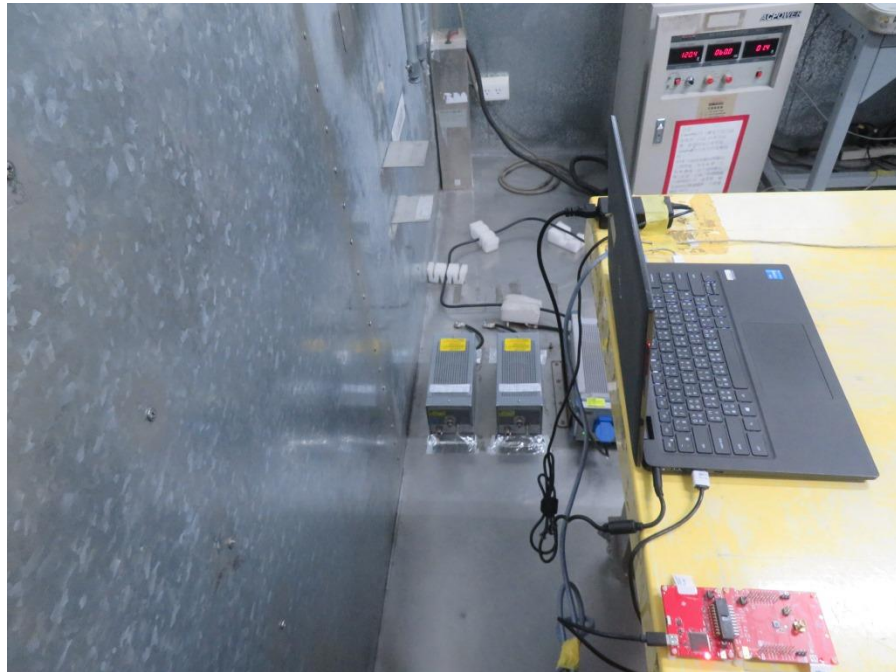


## Appendix F. Setup Photographs

### <Conducted Emission>

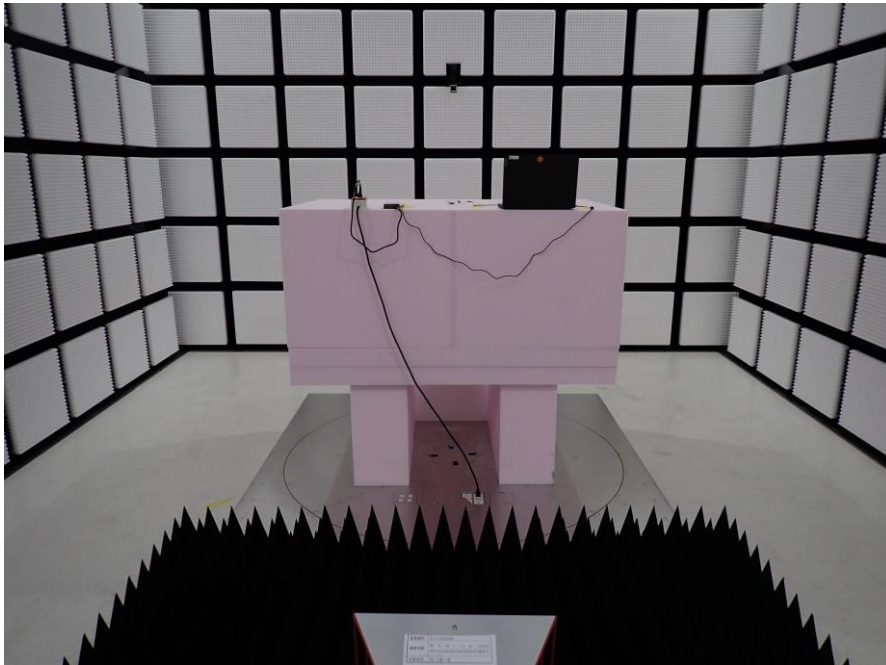
Remote View



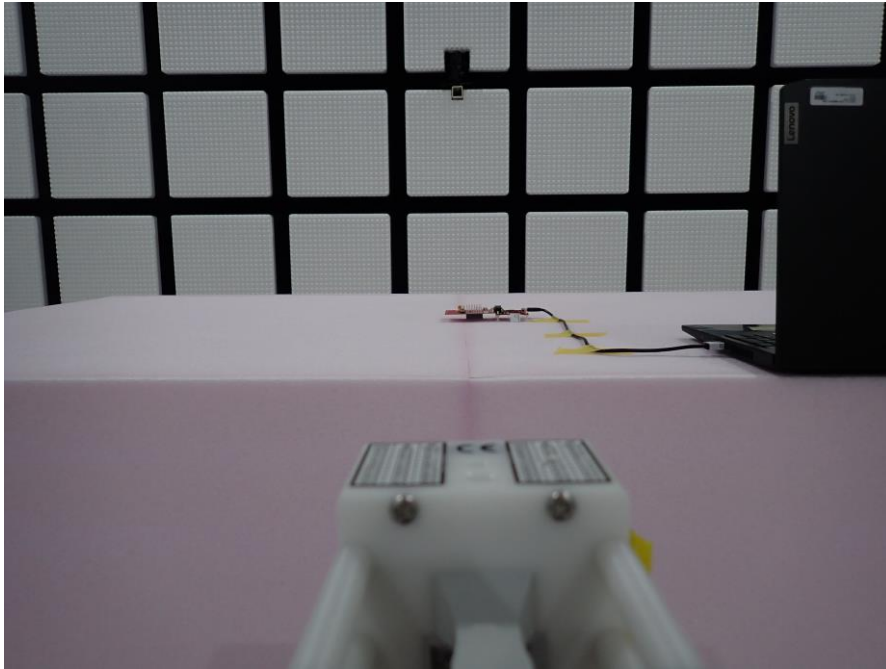


Rear View



**<Radiated Emission>****X Plane with Notebook****LF****HF**

SHF



————THE END————