FCC RF Test Report

APPLICANT	:	GT-tronics HK Limited
EQUIPMENT	:	GT-tronics QCC Bluetooth Module
BRAND NAME	:	GT-tronics
MODEL NAME	:	QC386FNA, QC386FNB, QC581FNA, QC581FNB
FCC ID	:	B4O-QC38XFNX
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System
TEST DATE(S)	:	May 27, 2024 ~ Nov. 28, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.01

Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR440902B	Rev. 01	Initial issue of report	Dec. 11, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report only	-
3.2	15.247(b)(3)	Peak Output Power	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.69 dB at 323.910 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.74 dB at 0.150 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	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/manufacturer 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.

1 General Description

1.1 Applicant

GT-tronics HK Limited
B210, Tonic Industrial Center, 19 Lam Hing Street, Kowloon Bay, Hong Kong

1.2 Manufacturer

GT-tronics HK Limited
B210, Tonic Industrial Center, 19 Lam Hing Street, Kowloon Bay, Hong Kong

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GT-tronics QCC Bluetooth Module
Brand Name	GT-tronics
Model Name	QC386FNA, QC386FNB, QC581FNA, QC581FNB
FCC ID	B4O-QC38XFNX
SN Code	Conducted: F4044C1FE602 for sample 1 Radiated: F4044C1FE600 for sample 1 F4044C1FE601 for sample 2 F4044C1FE602 for sample 3 Conduction: F4044C1FE597 for sample 1
HW Version	v2.2
SW Version	1.0
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The four models name QC386FNA, QC386FNB, QC581FNA, QC581FNB are the same product except model name different for market segment.
3. There are three kinds of Antenna for EUT, as below,

Antenna number	Antenna Type	Antenna Gain
1	Chip	1.80dBi
2	Metal wire	2.71dBi
3	Dipole	5.00dBi

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	40
Carrier Frequency of Each Channel	40 Channel(37 hopping + 3 advertising channel)
Maximum Output Power to Antenna	BLE 1Mbps: 8.93 dBm (0.0078 W) BLE 2Mbps: 8.96 dBm (0.0079 W)
99% Occupied Bandwidth	BLE 1Mbps:1.059MHz BLE 2Mbps:2.114MHz
Antenna Type / Gain	<sample 1>Chip Antenna type with gain 1.80 dBi <sample 2>Metal Wire Antenna Type with gain 2.71 dBi <sample 3>Dipole Antenna type with gain 5.00 dBi
Type of Modulation	Bluetooth LE : GFSK

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

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

2.2 Test Mode

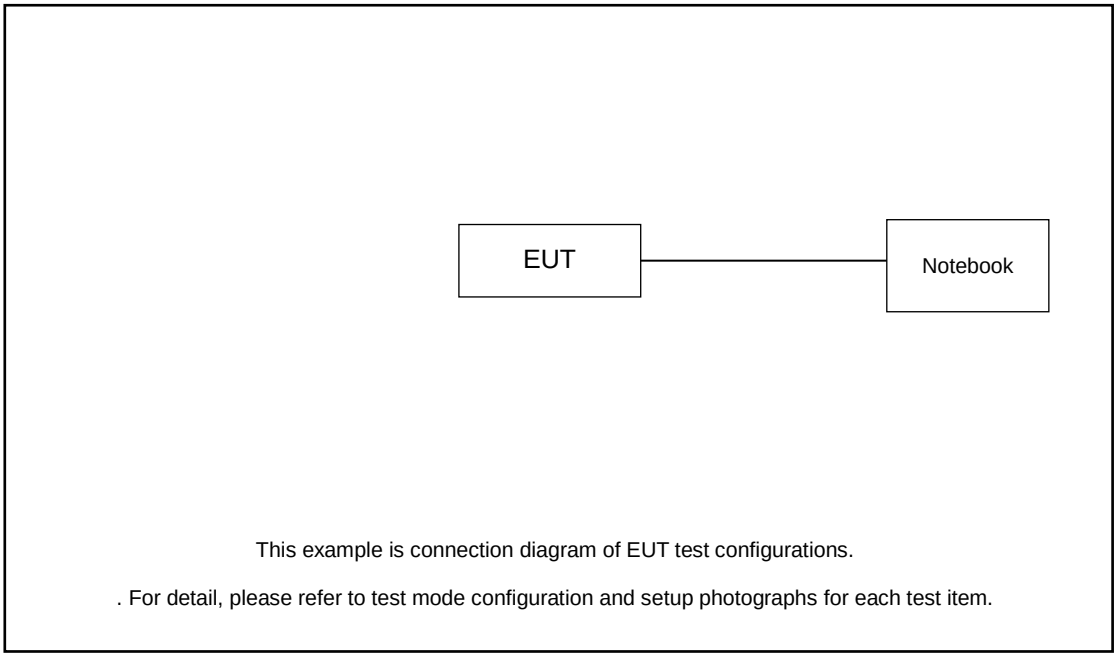
a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental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

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

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

Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
	Bluetooth – LE / GFSK
Conducted TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps Mode 4: Bluetooth Tx CH00_2402 MHz_BLE 2Mbps Mode 5: Bluetooth Tx CH19_2440 MHz_BLE 2Mbps Mode 6: Bluetooth Tx CH39_2480 MHz_BLE 2Mbps
Radiated TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps Mode 4: Bluetooth Tx CH00_2402 MHz_BLE 2Mbps Mode 5: Bluetooth Tx CH19_2440 MHz_BLE 2Mbps Mode 6: Bluetooth Tx CH39_2480 MHz_BLE 2Mbps
AC Conducted Emission	Mode 1: Bluetooth Link + Powered By NB for sample 1

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Wireless Connectivity tester	R&S	CMW 270	N/A	N/A	Unshielded,1.8m
2.	Test Jig	N/A	N/A	N/A	N/A	N/A
3.	Antenna	N/A	N/A	N/A	N/A	N/A
4.	Notebook	DELL	3400	N/A	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
5.	WLAN AP	Dlink	DIR-820L	N/A	N/A	Unshielded,1.8m
6.	iPod	apple	MC69029/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For BLE function, the engineering test program ”BlueTest3” was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with Wireless Connectivity tester.

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 0.8 dB and 10dB attenuator.

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

= 0.8 + 10 = 10.8 (dB)

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.

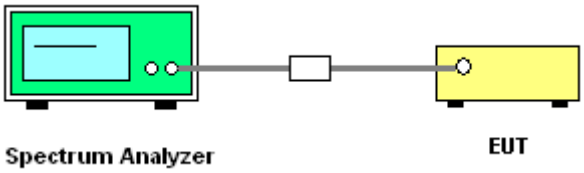
3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the 99% OBW and the VBW is set to 3 times of the RBW.
6. Measure and record the results in the test report.

3.1.4 Test Setup

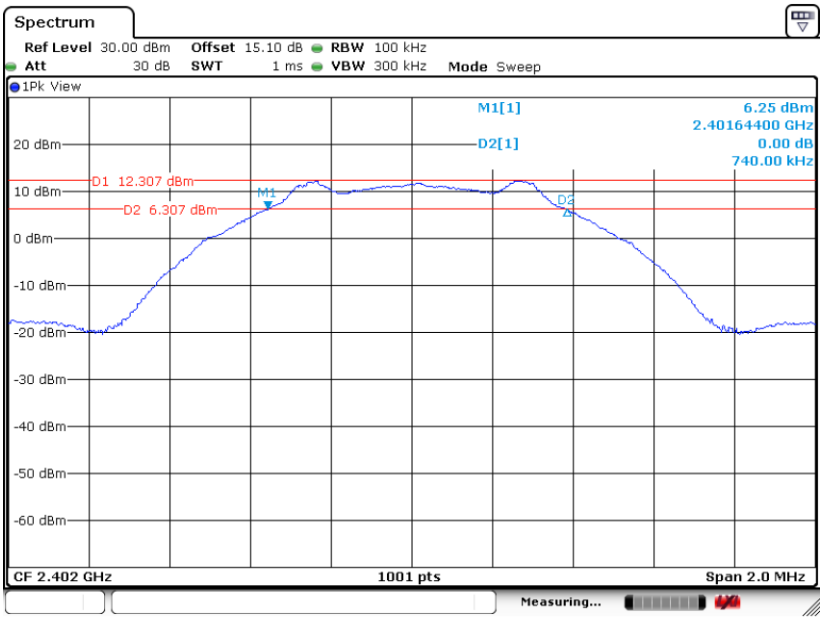


3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

BLE 1Mbps

6 dB Bandwidth Plot on Channel 00



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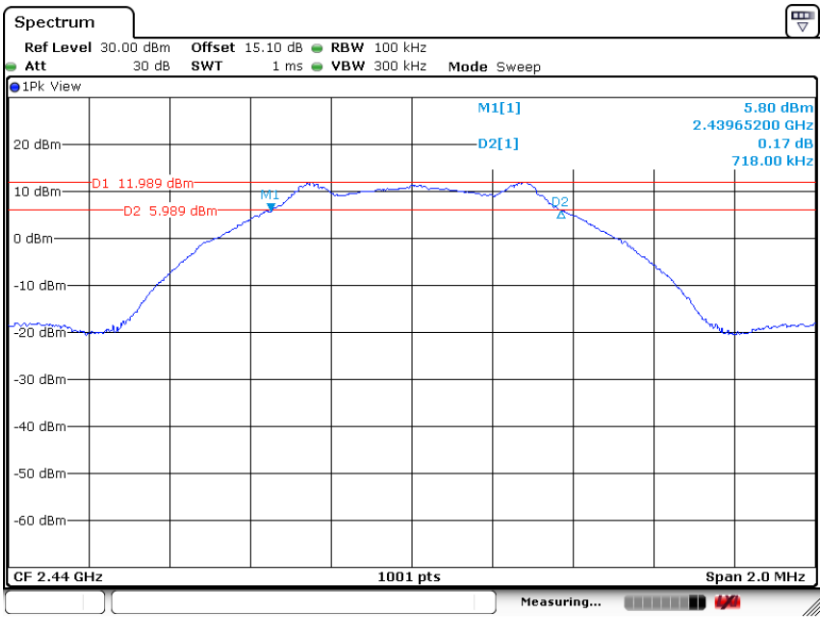
6 dB Bandwidth Plot on Channel 19



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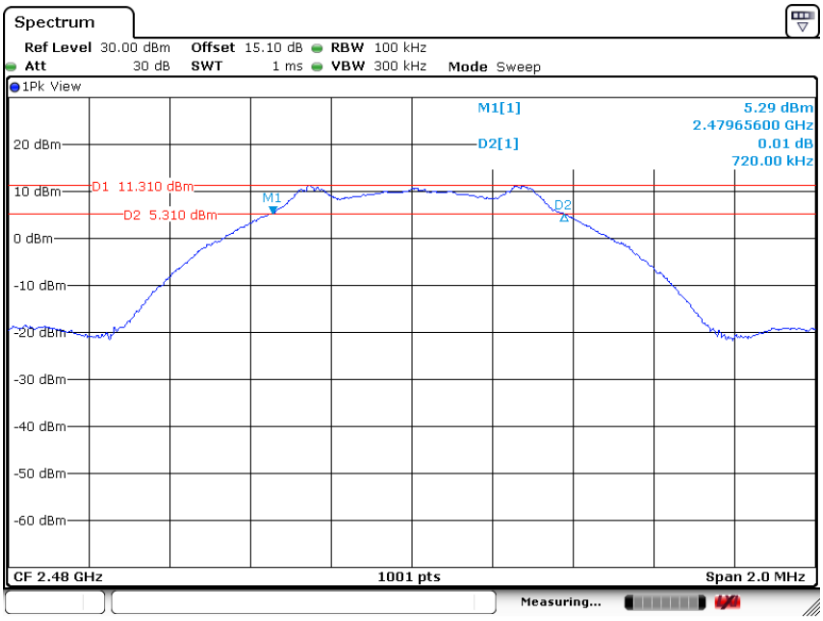
6 dB Bandwidth Plot on Channel 39



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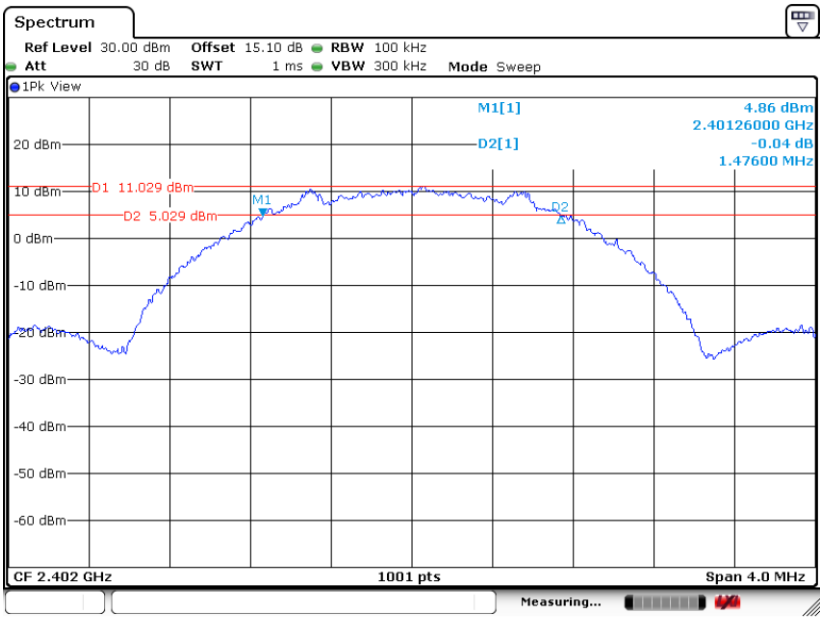
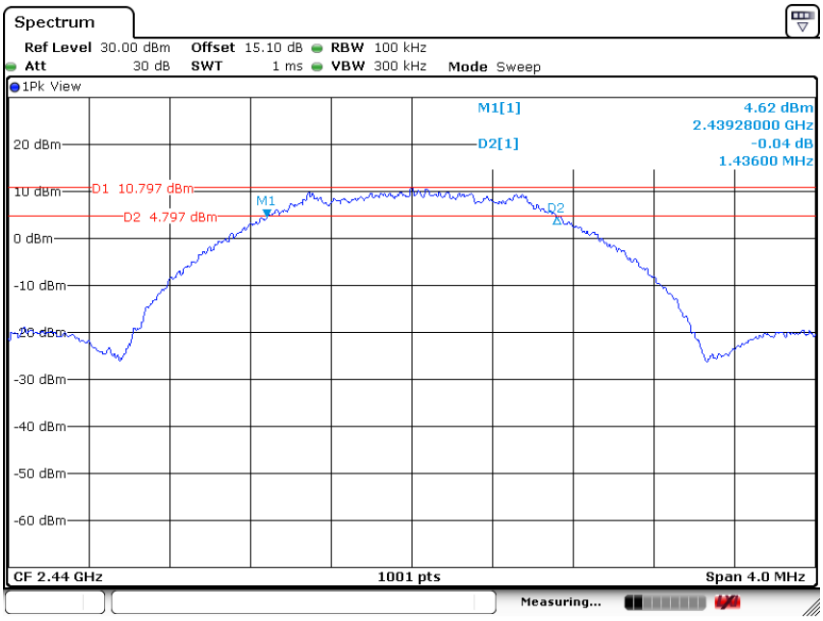
BLE 2Mbps

6 dB Bandwidth Plot on Channel 00



Date: 2.JUL.2024 10:43:15

6 dB Bandwidth Plot on Channel 19



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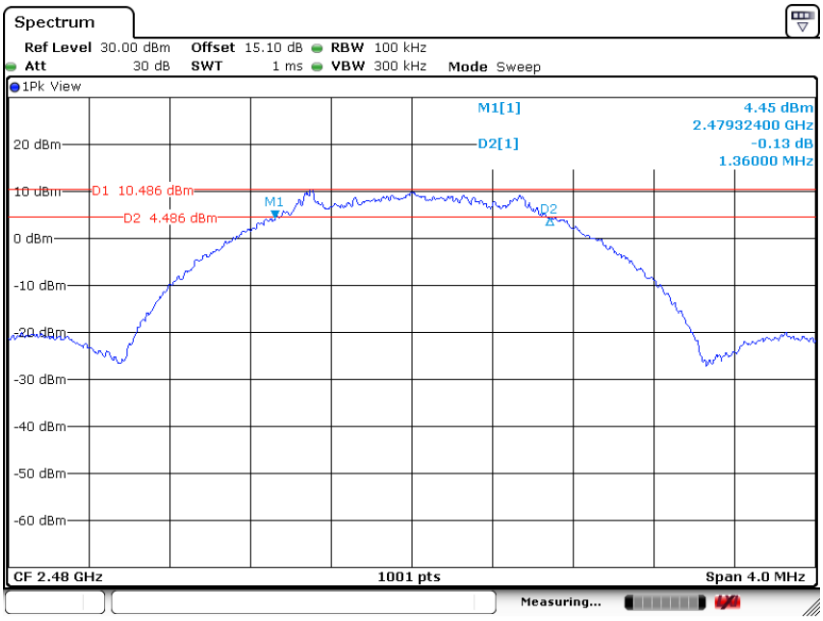
6 dB Bandwidth Plot on Channel 39



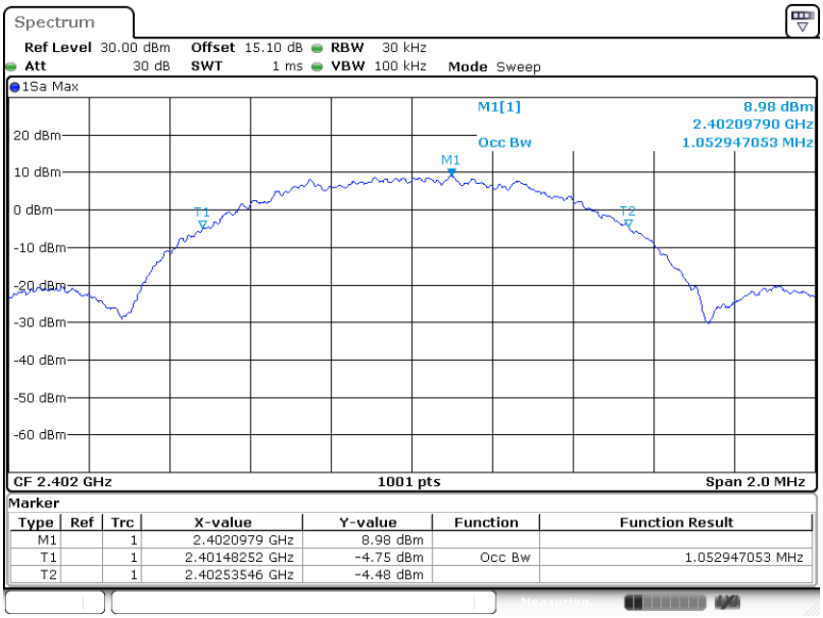
Date: 2.JUL.2024 10:49:25

3.1.6 Test Result of 99% Occupied Bandwidth

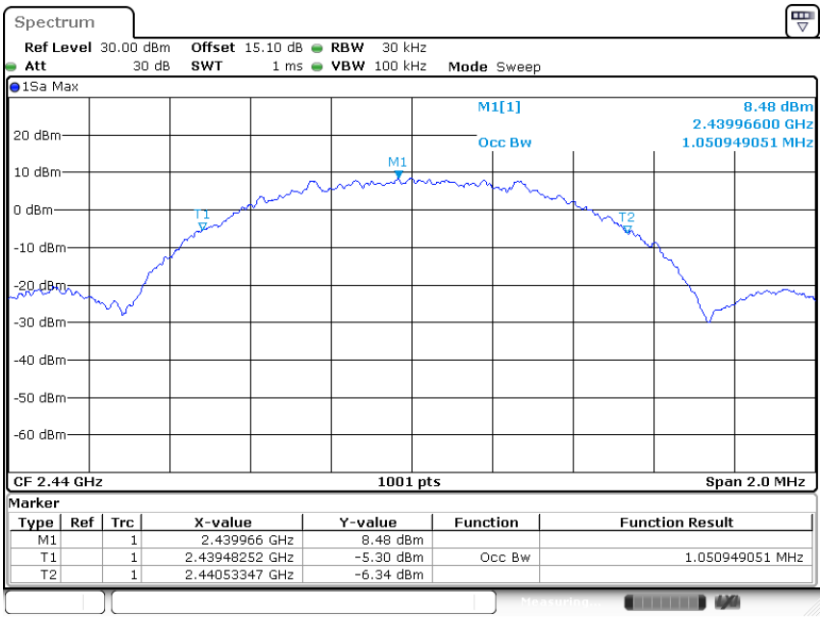
Please refer to Appendix A.

BLE 1Mbps

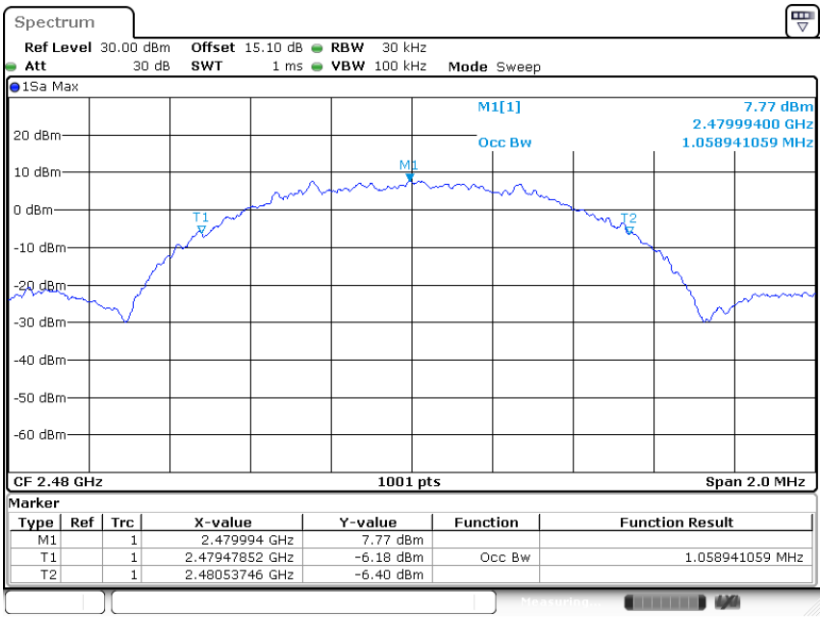
99% Occupied Bandwidth Plot on Channel 00



99% Occupied Bandwidth Plot on Channel 19



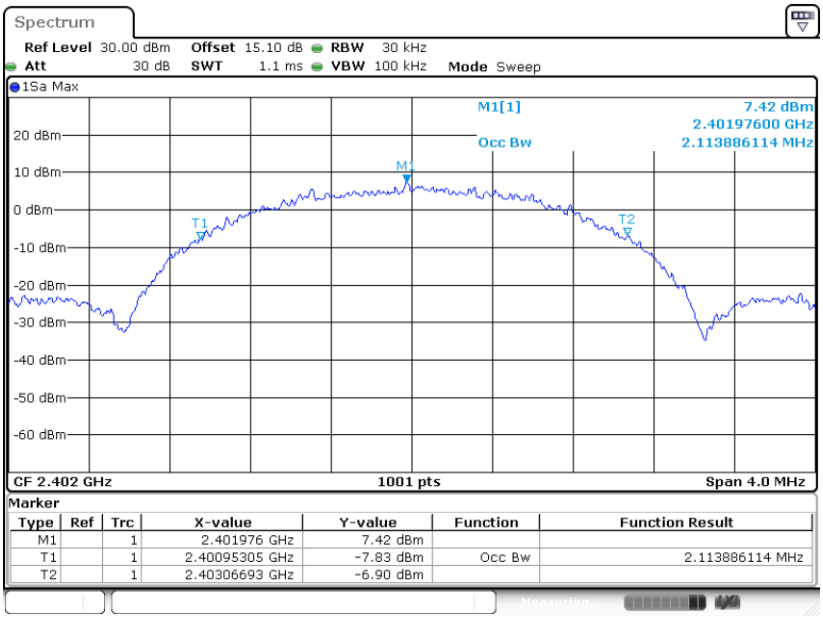
99% Occupied Bandwidth Plot on Channel 39



Date: 2.JUL.2024 10:40:13

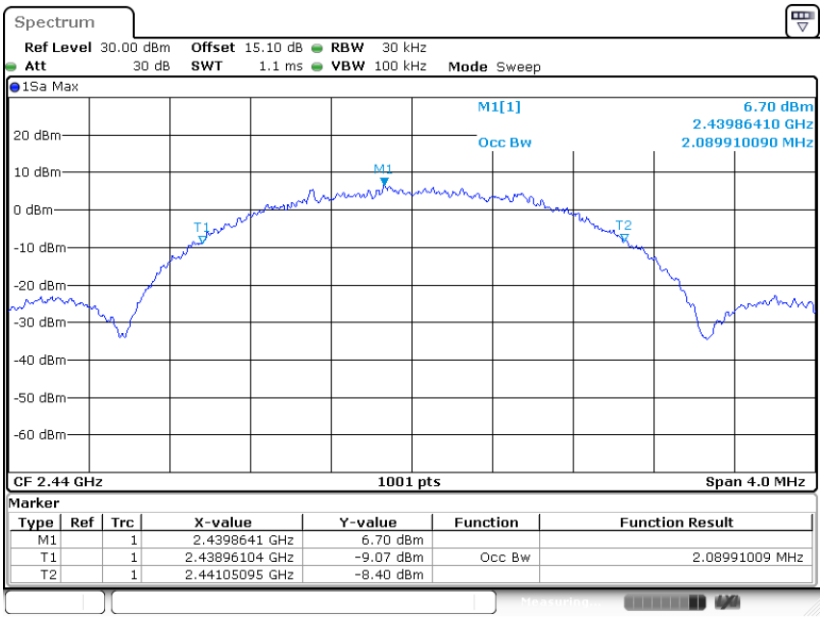
BLE 2Mbps

99% Occupied Bandwidth Plot on Channel 00



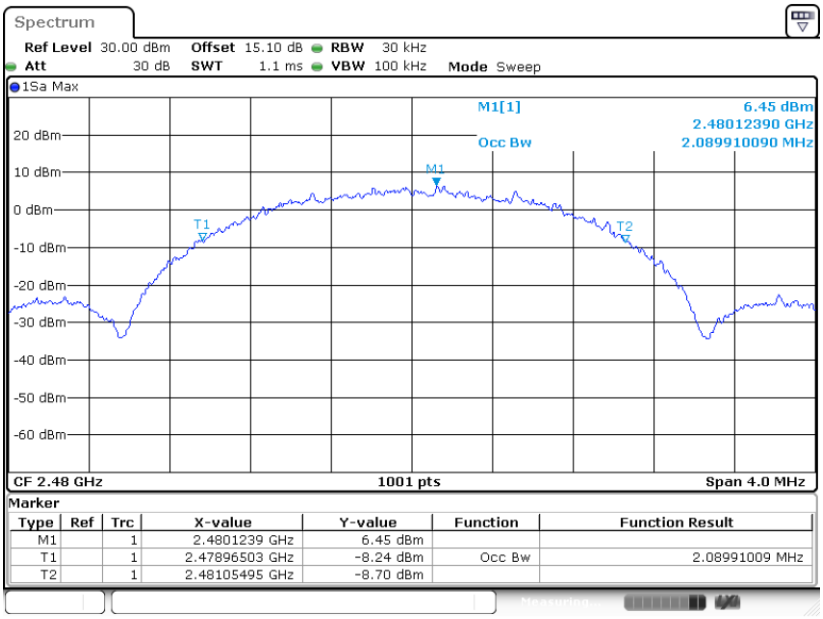
Date: 2.JUL.2024 10:43:00

99% Occupied Bandwidth Plot on Channel 19



Date: 2.JUL.2024 10:45:27

99% Occupied Bandwidth Plot on Channel 39



Date: 2.JUL.2024 10:49:04

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

3.2 Output Power Measurement

3.2.1 Limit of Output Power

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

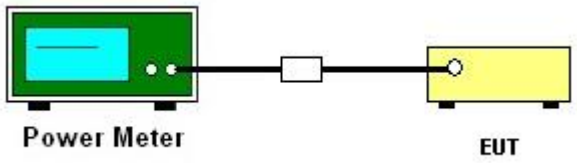
3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. 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 8dBm in any 3kHz band at any time interval of continuous transmission.

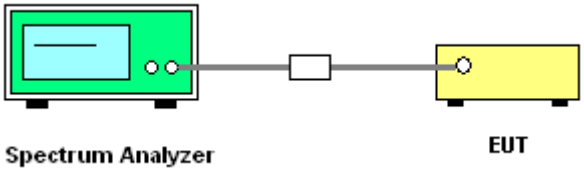
3.3.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



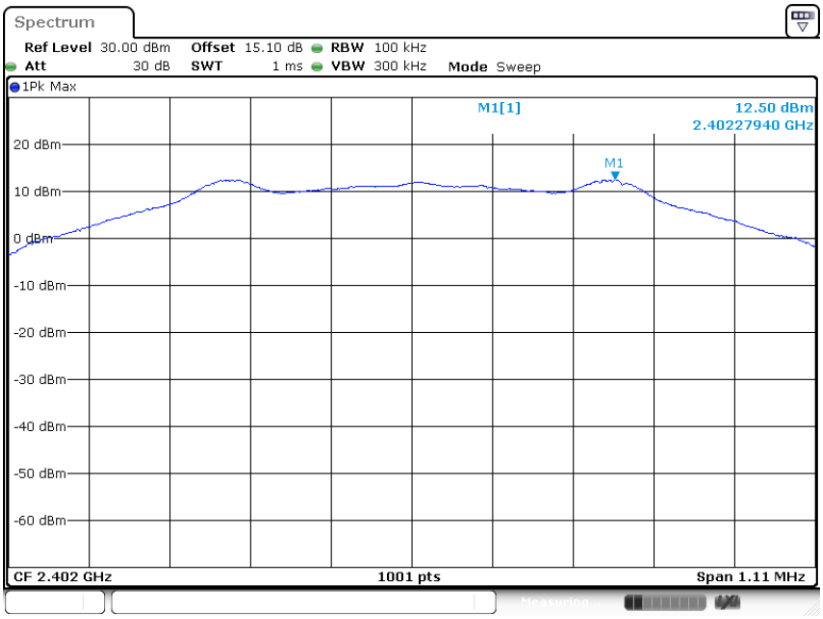
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

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

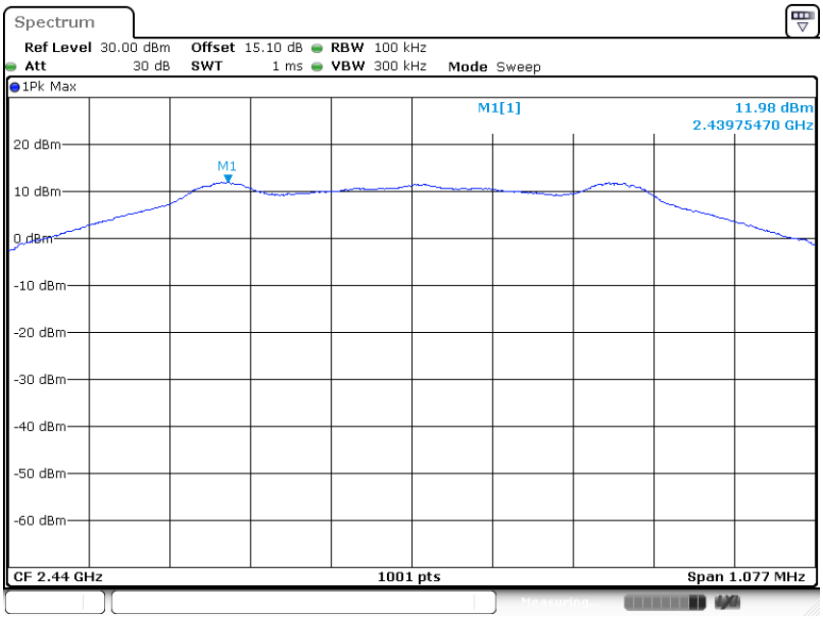
BLE 1Mbps

PSD 100kHz Plot on Channel 00



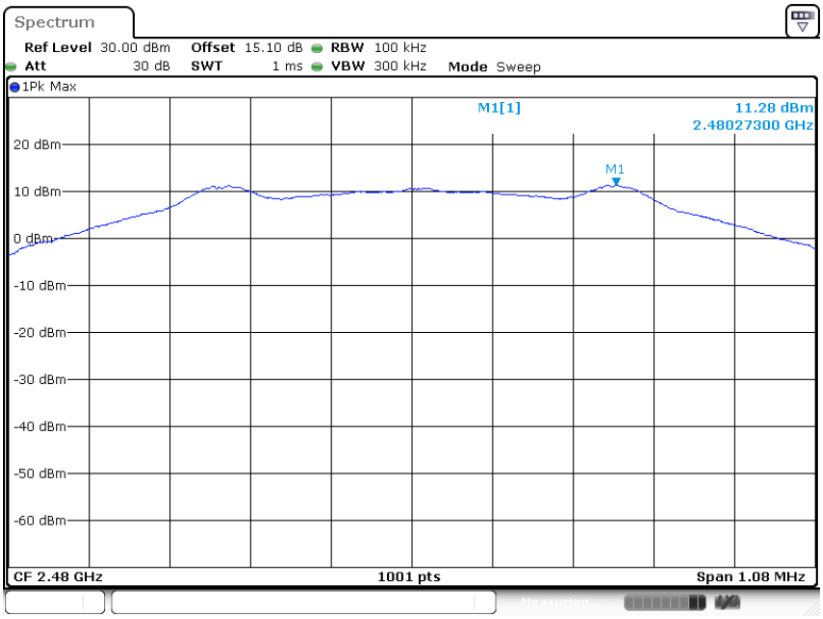
Date: 2.JUL.2024 10:32:59

PSD 100kHz Plot on Channel 19



Date: 2.JUL.2024 10:38:10

PSD 100kHz Plot on Channel 39



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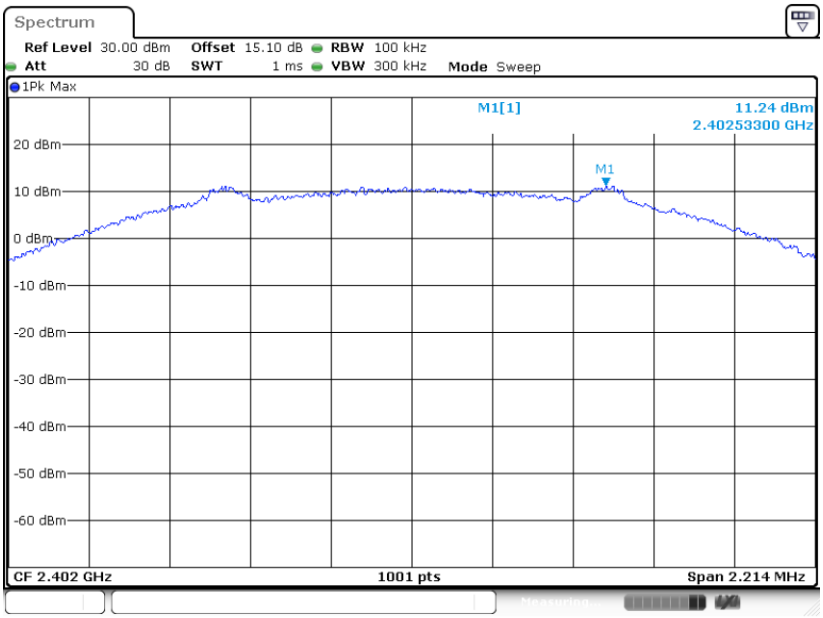
BLE 2Mbps

PSD 100kHz Plot on Channel 00



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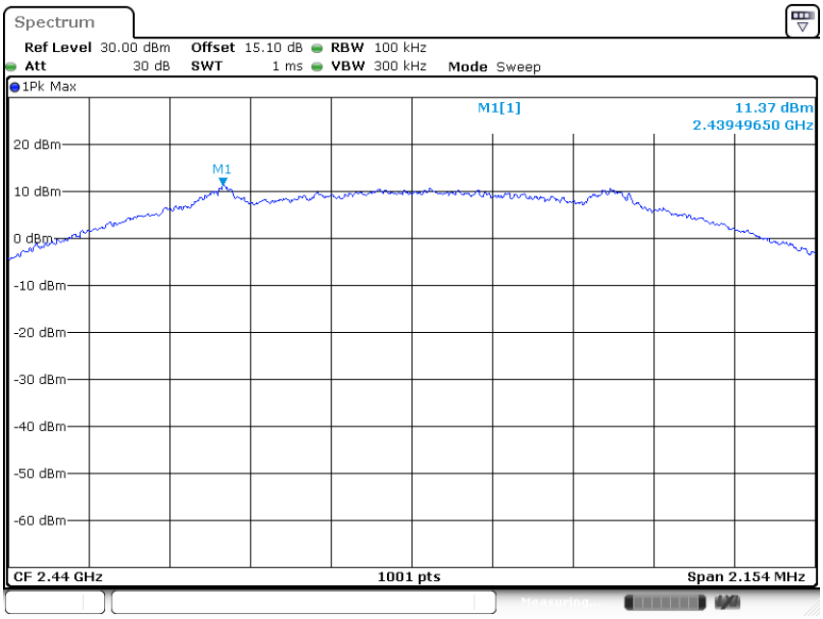
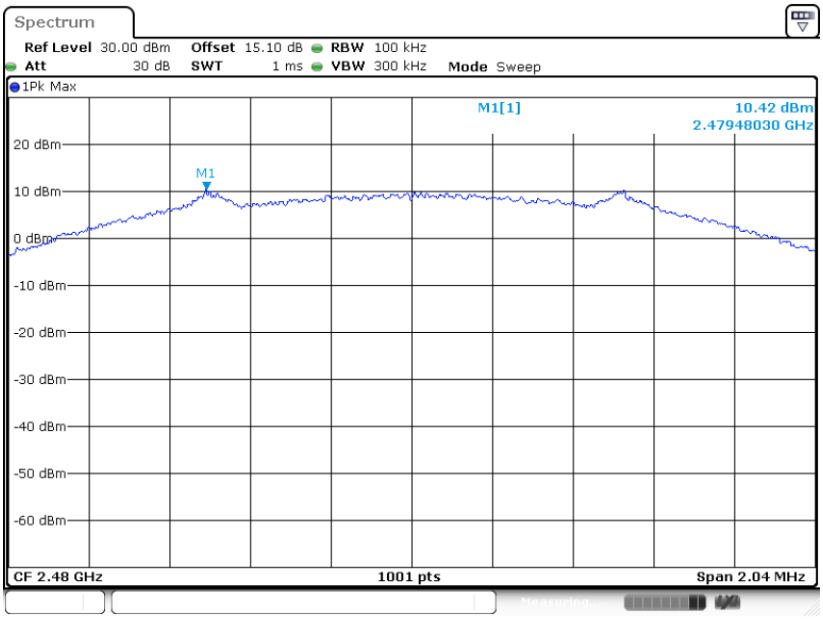
PSD 100kHz Plot on Channel 19



Date: 2.JUL.2024 10:46:13

PSD 100kHz Plot on Channel 39

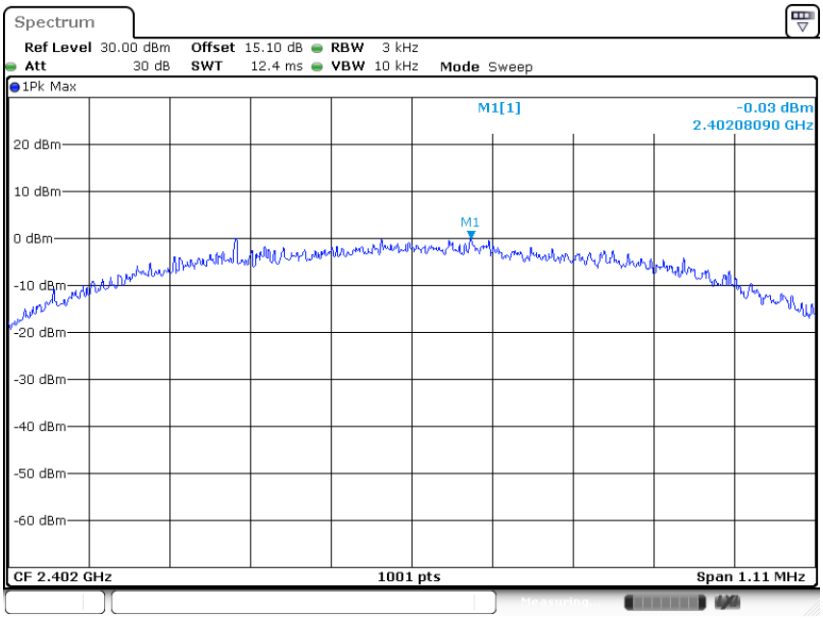


Date: 2.JUL.2024 10:50:18

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

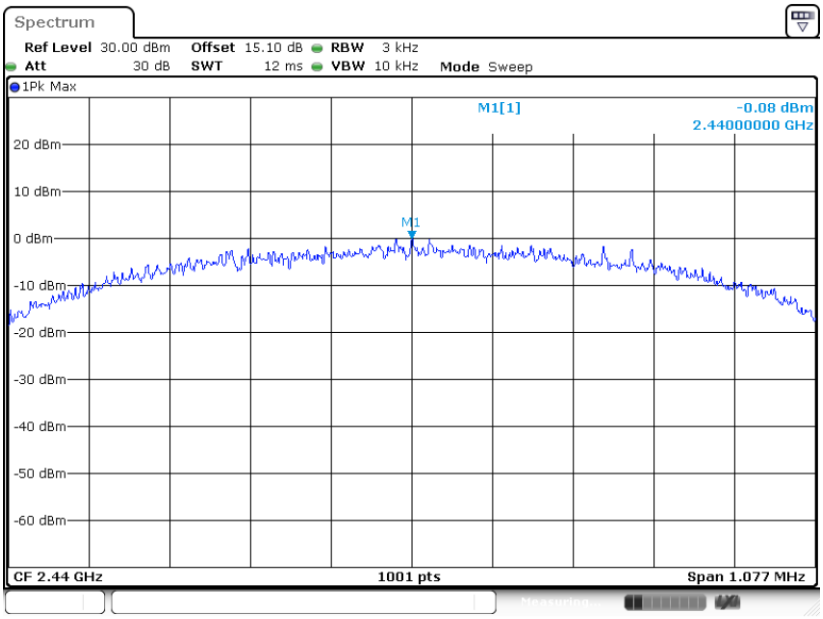
BLE 1Mbps

PSD 3kHz Plot on Channel 00



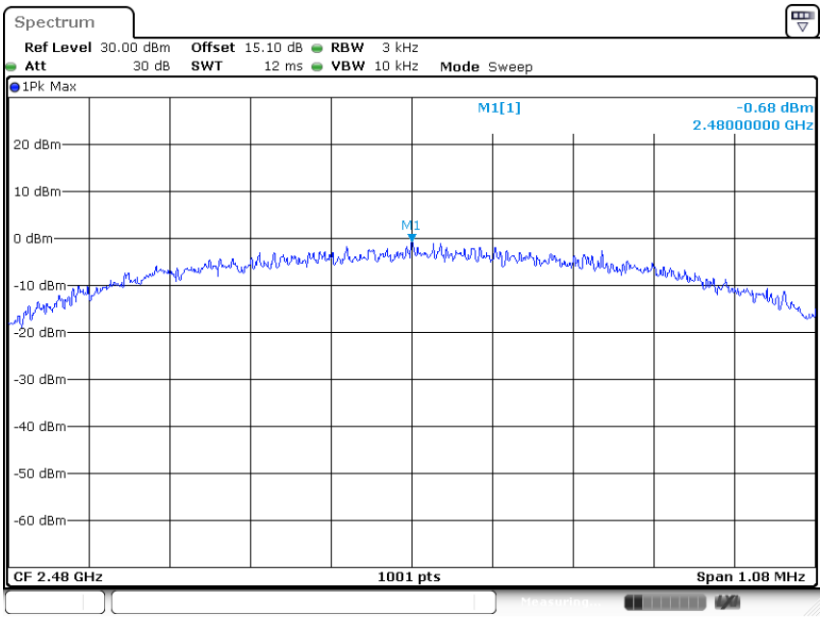
Date: 2.JUL.2024 10:32:40

PSD 3kHz Plot on Channel 19



Date: 2.JUL.2024 10:37:44

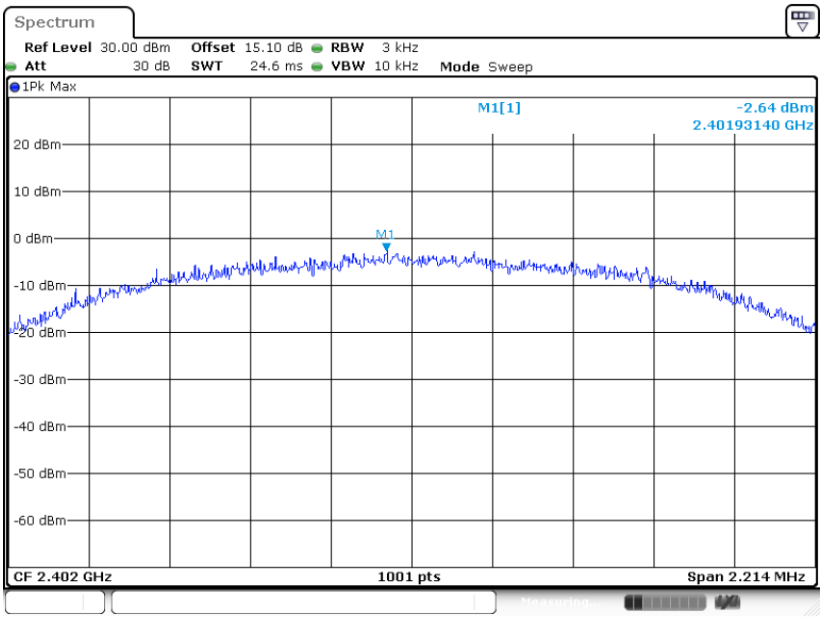
PSD 3kHz Plot on Channel 39



Date: 2.JUL.2024 10:40:39

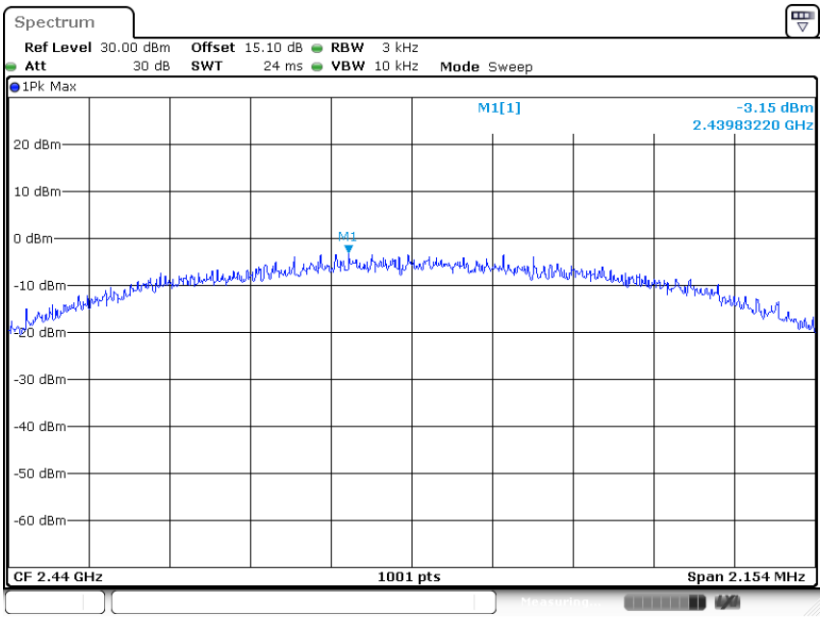
BLE 2Mbps

PSD 3kHz Plot on Channel 00



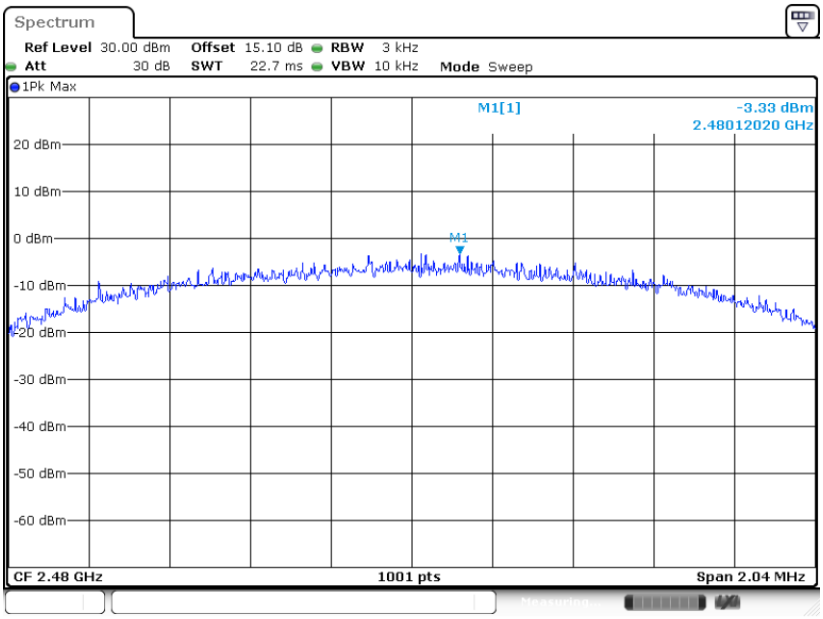
Date: 2.JUL.2024 10:43:33

PSD 3kHz Plot on Channel 19



Date: 2.JUL.2024 10:45:55

PSD 3kHz Plot on Channel 39



Date: 2.JUL.2024 10:49:58

3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

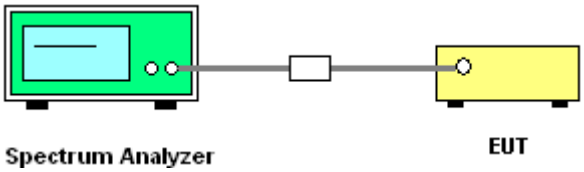
3.4.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.4.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

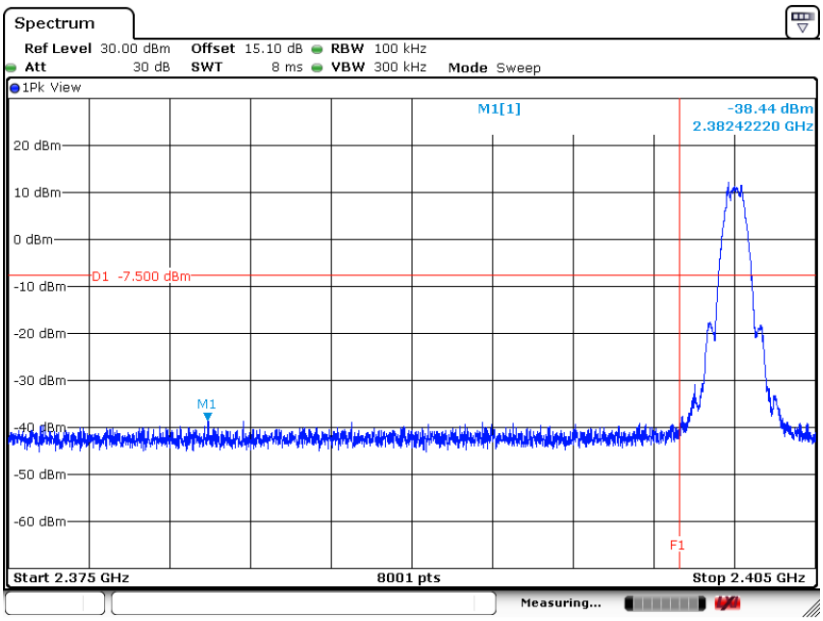
3.4.4 Test Setup



3.4.5 Test Result of Conducted Band Edges Plots

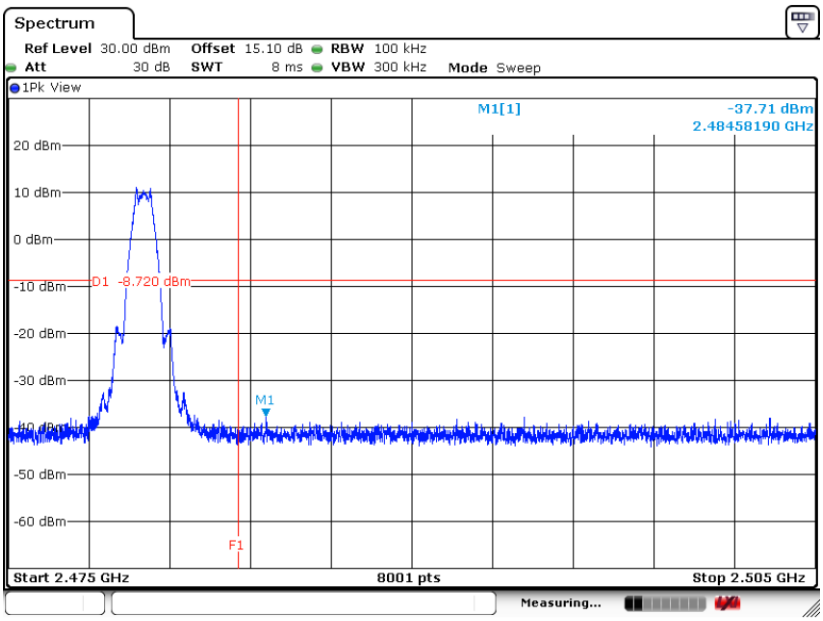
BLE 1Mbps

Low Band Edge Plot on Channel 00



Date: 2.JUL.2024 10:34:06

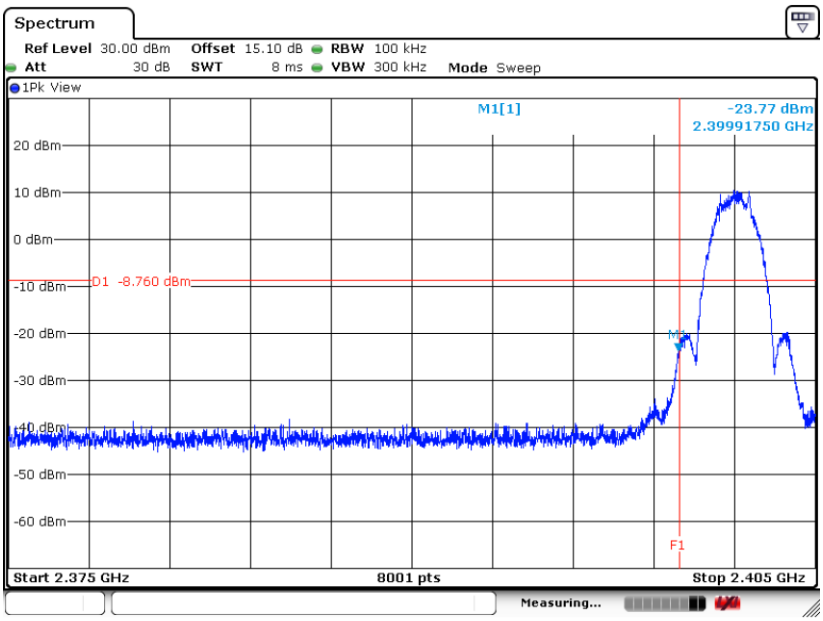
High Band Edge Plot on Channel 39



Date: 2.JUL.2024 10:41:50

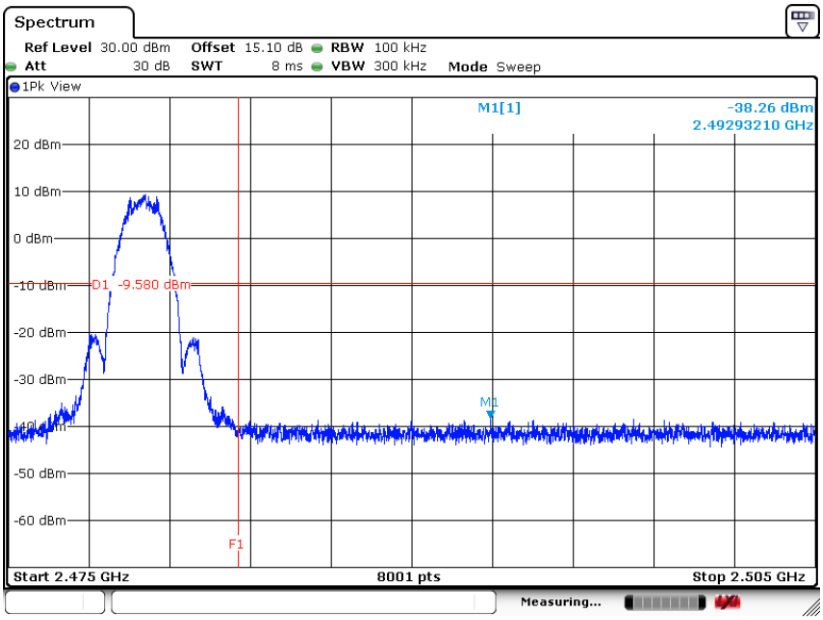
BLE 2Mbps

Low Band Edge Plot on Channel 00



Date: 2.JUL.2024 10:45:00

High Band Edge Plot on Channel 39

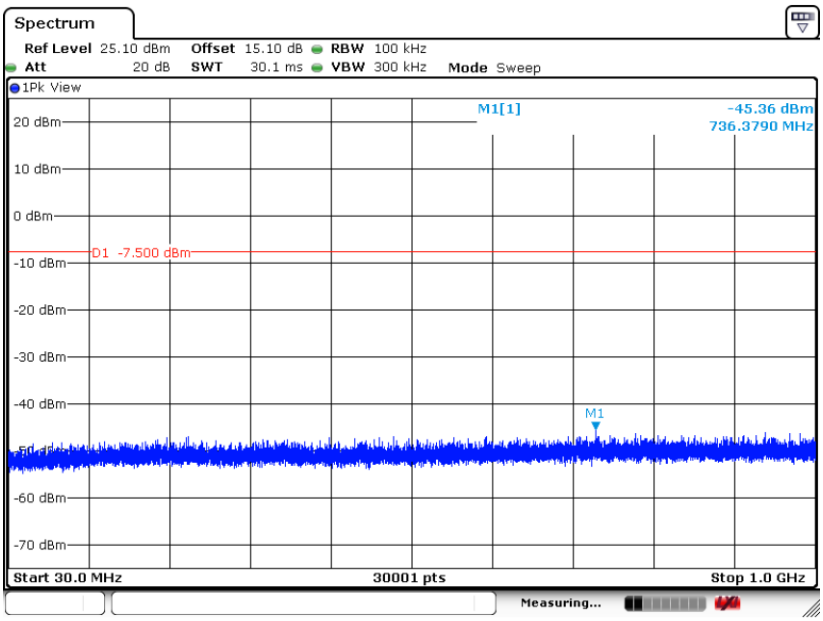


Date: 2.JUL.2024 10:51:20

3.4.6 Test Result of Conducted Spurious Emission Plots

Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

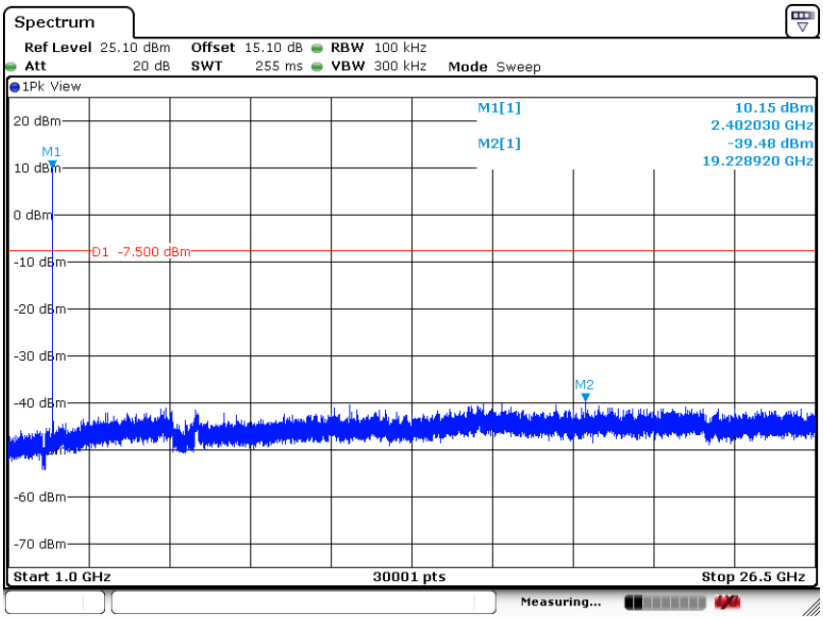
GFSK Channel 00



Date: 2.JUL.2024 10:33:18

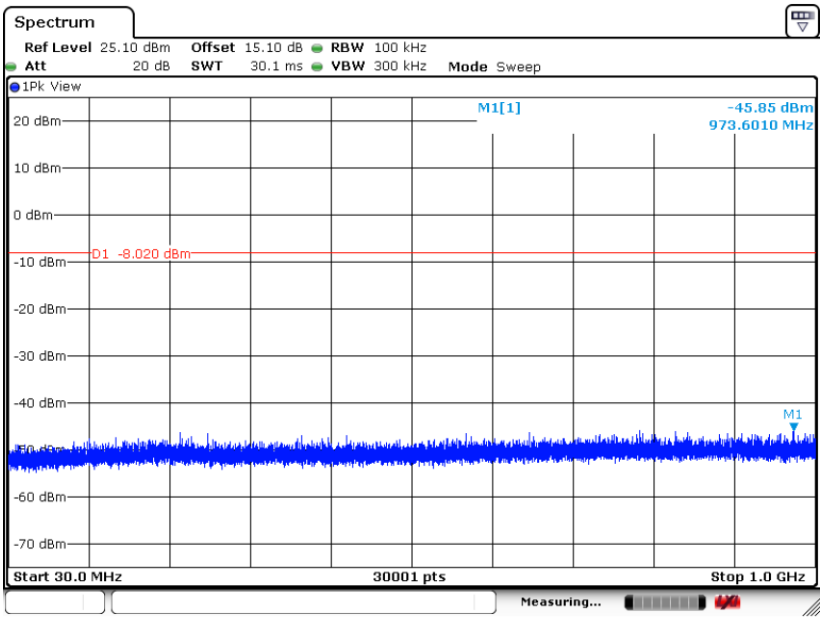
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 00



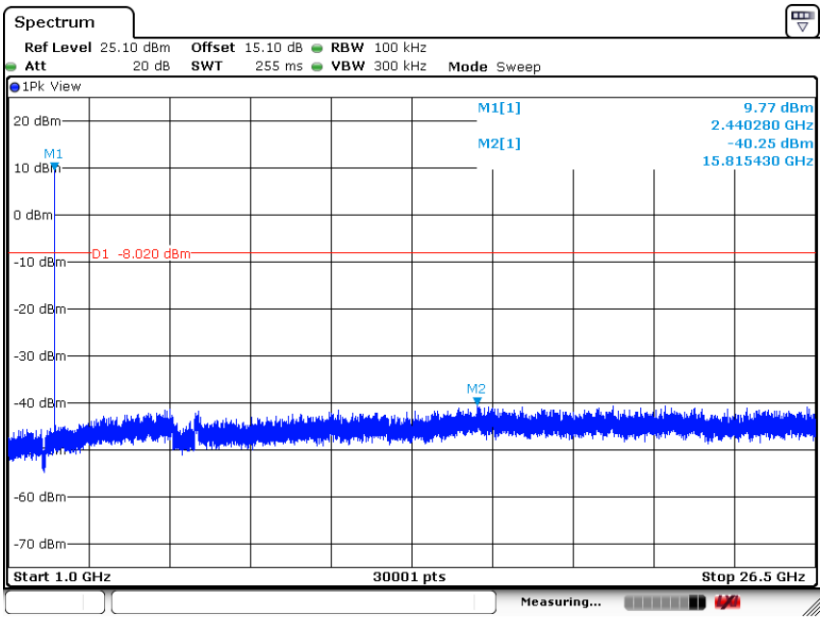
Date: 2.JUL.2024 10:33:35

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



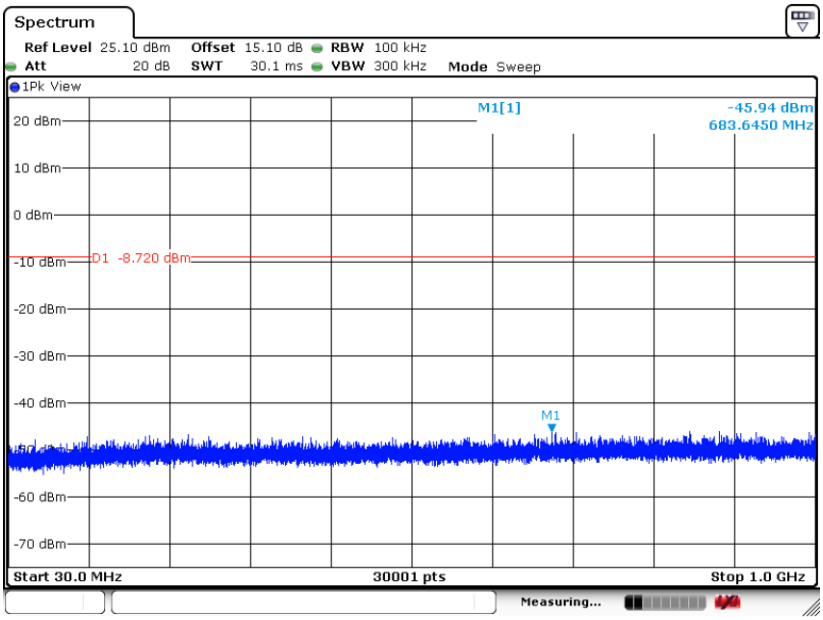
Date: 2.JUL.2024 10:38:29

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



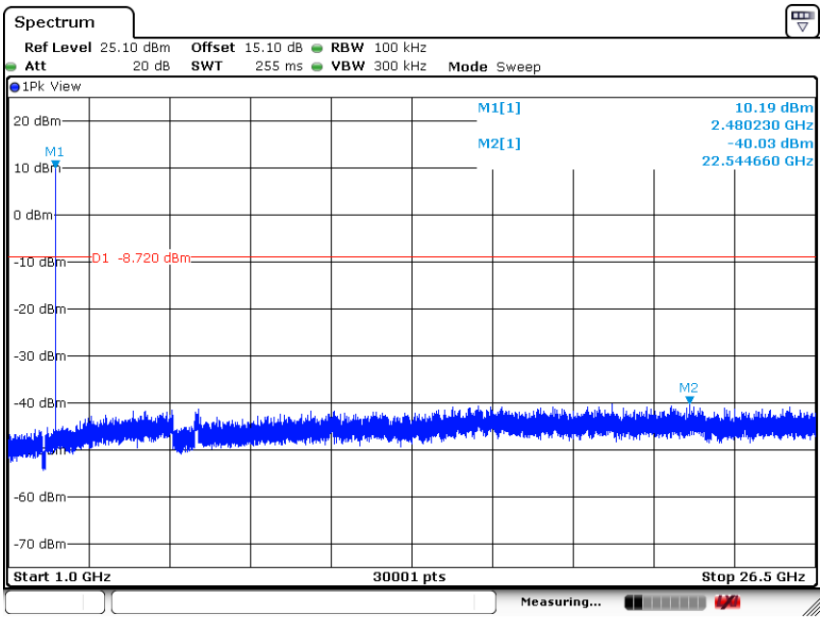
Date: 2.JUL.2024 10:38:47

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



Date: 2.JUL.2024 10:41:20

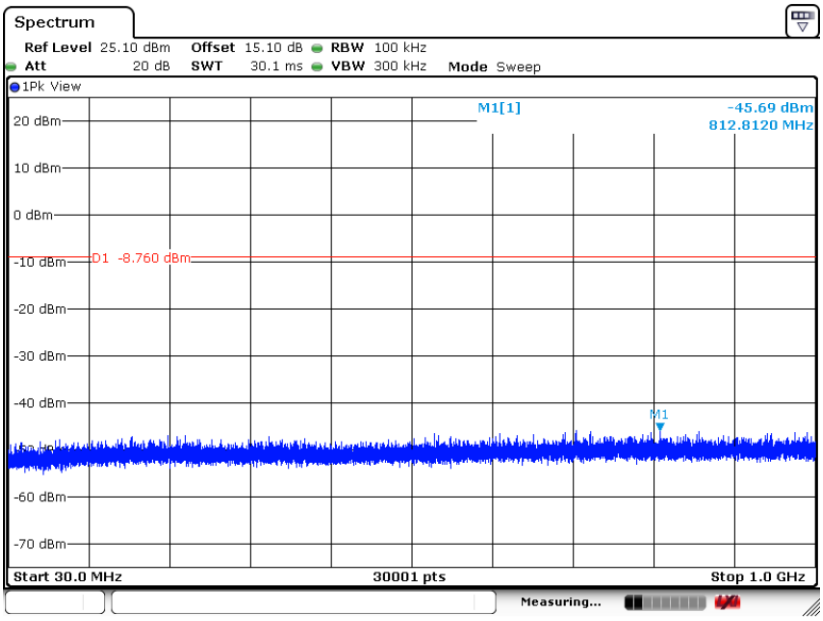
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39



Date: 2.JUL.2024 10:41:36

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

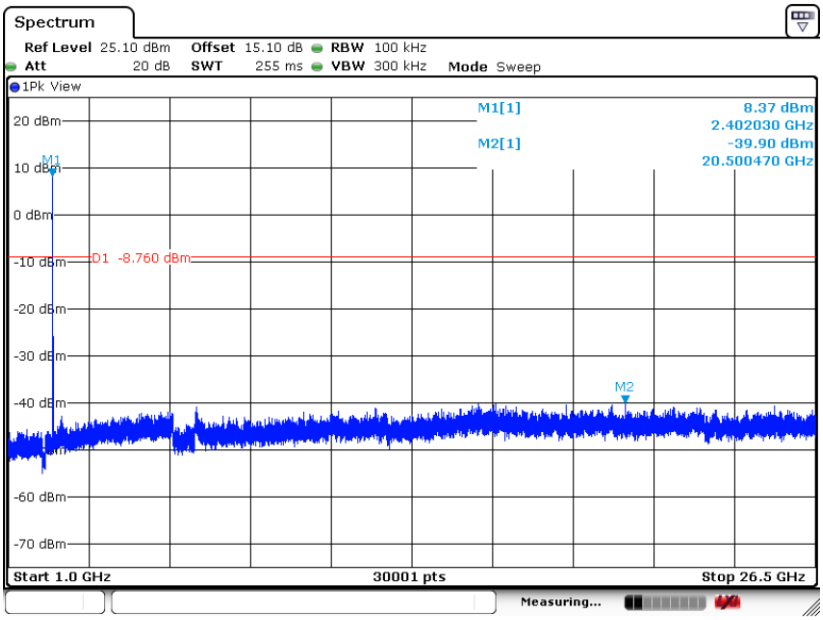
GFSK Channel 00



Date: 2.JUL.2024 10:44:14

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

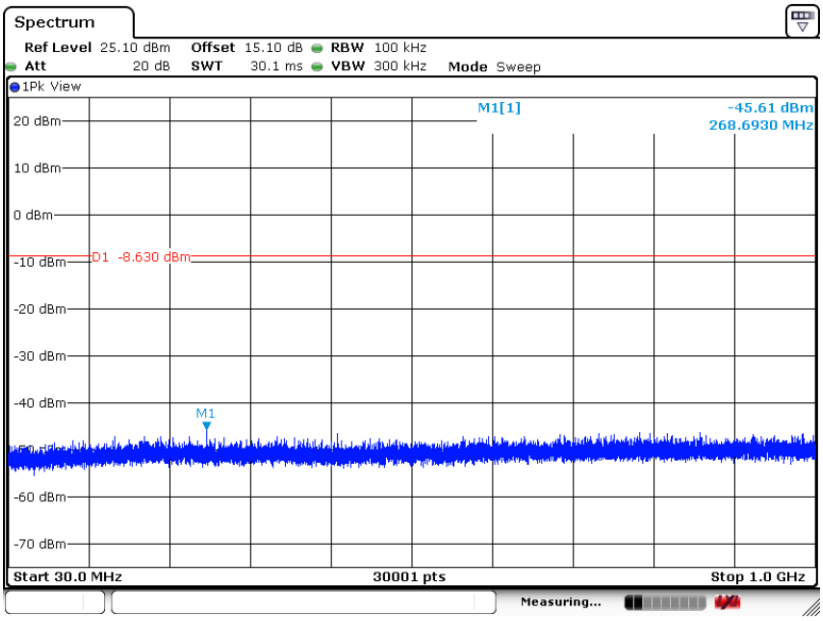
GFSK Channel 00



Date: 2.JUL.2024 10:44:31

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

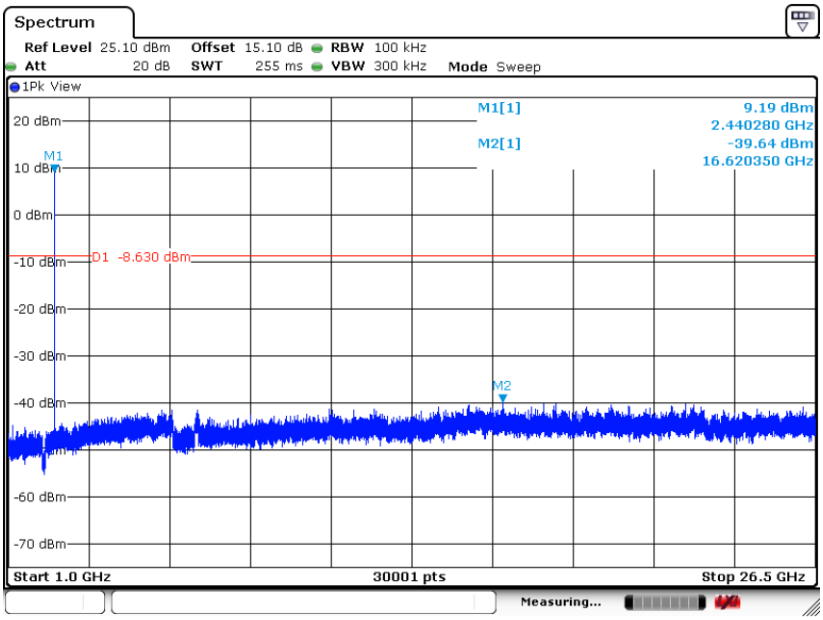
GFSK Channel 19



Date: 2.JUL.2024 10:46:34

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

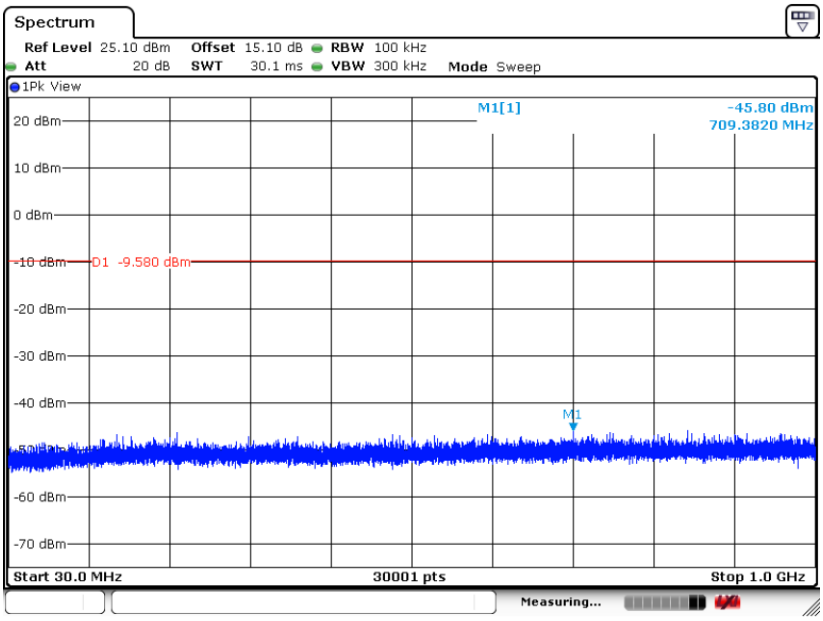
GFSK Channel 19



Date: 2.JUL.2024 10:46:50

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

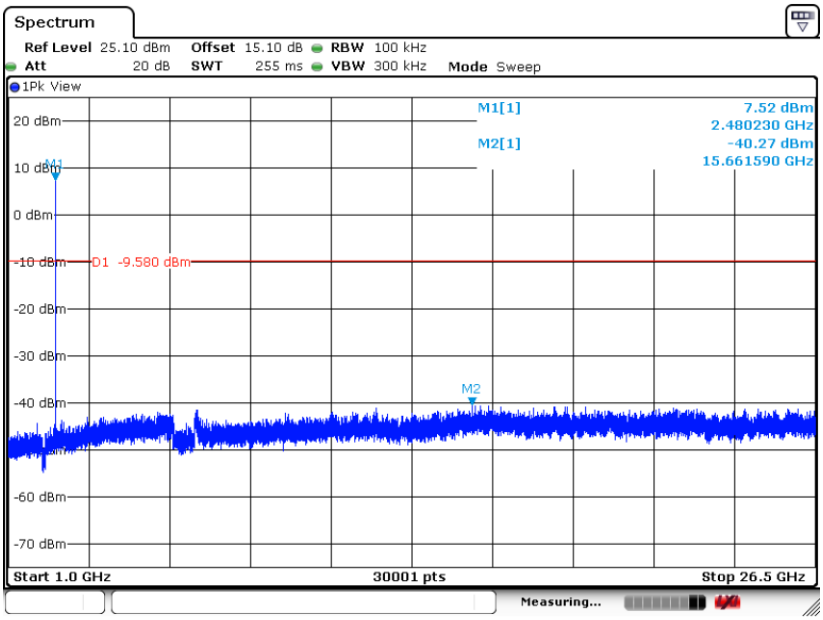
GFSK Channel 39



Date: 2.JUL.2024 10:50:45

Conducted Spurious Emission Plot on Bluetooth LE 2Mbps

GFSK Channel 39



Date: 2.JUL.2024 10:51:02

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

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

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

3.5.2 Measuring Instruments

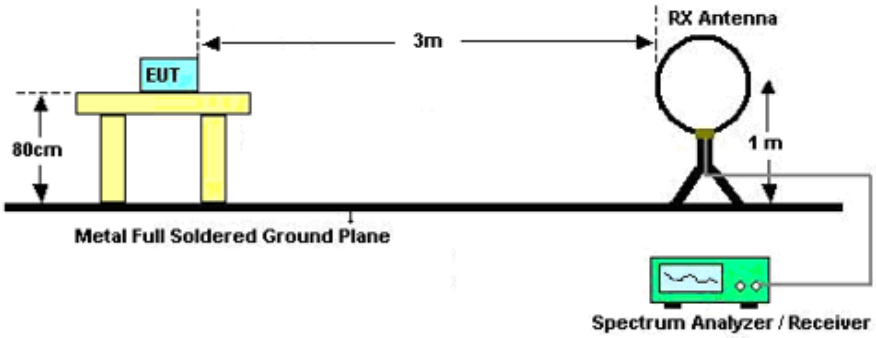
The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.5.3 Test Procedures

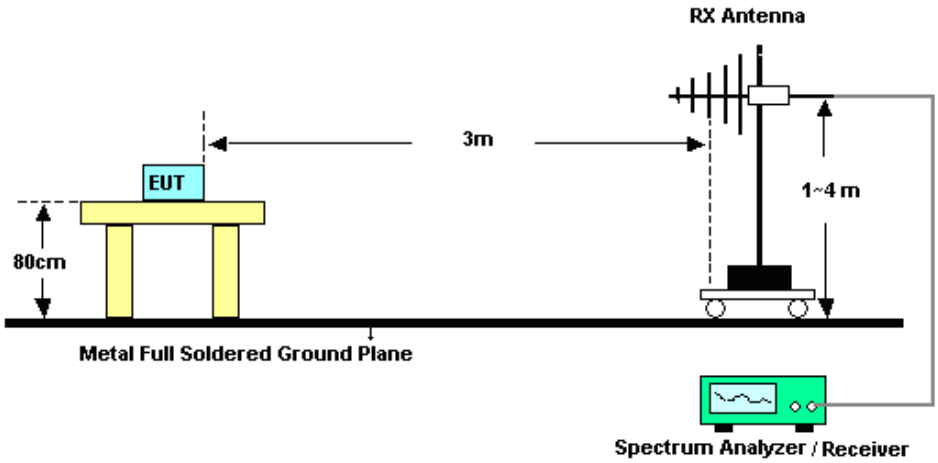
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

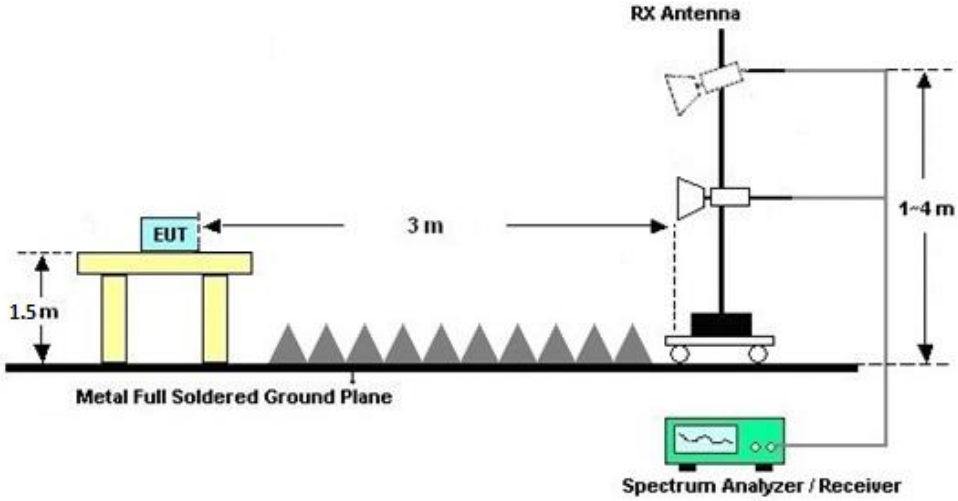
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C

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 (dBμV)	
	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.

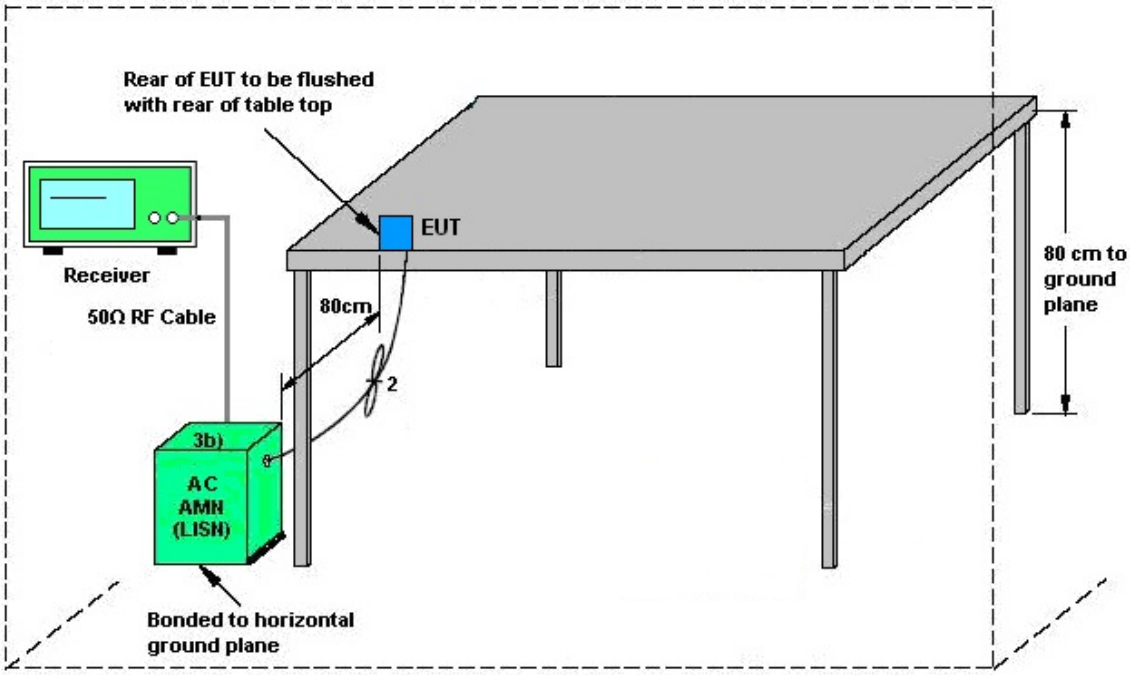
3.6.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.6.3 Test Procedures

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

3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

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

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Jun. 04, 2024 ~Nov. 20, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 29, 2023	Jun. 04, 2024 ~Nov. 20, 2024	Dec. 28, 2024	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA24440A	11707	50MHz-40GHz	Dec. 27, 2023	Jun. 04, 2024 ~Nov. 20, 2024	Dec. 26, 2024	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 14, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Oct. 13, 2025	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 03, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2E	101141	9kHz~30MHz	Dec. 29, 2023	Oct. 25, 2024 ~Nov. 28, 2024	Dec. 28, 2024	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 09, 2024	Oct. 25, 2024 ~Nov. 28, 2024	May 08, 2025	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 07, 2023	Oct. 25, 2024 ~Nov. 28, 2024	Jul. 06, 2025	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 04, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Jul. 03, 2025	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Oct. 17, 2025	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 14, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Oct. 13, 2025	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 03, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY57280136	500MHz~26.5GHz	Jul. 03, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Jul. 02, 2025	Radiation (03CH04-SZ)
AC Power Source	APC	AFV-S-600B	F119050019	N/A	Oct. 14, 2024	Oct. 25, 2024 ~Nov. 28, 2024	Oct. 13, 2025	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Oct. 25, 2024 ~Nov. 28, 2024	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Oct. 25, 2024 ~Nov. 28, 2024	NCR	Radiation (03CH04-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 06, 2023	May 27, 2024	Jul. 05, 2024	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Aug. 21, 2023	May 27, 2024	Aug. 20, 2024	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 16, 2023	May 27, 2024	Oct. 15, 2024	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2023	May 27, 2024	Jul. 06, 2024	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.50dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.10dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.80dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.10dB

---------- THE END ----------

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Pi Shun	Temperature:	21~25	°C
Test Date:	2024/6/4~2024/11/20	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.053	0.740	0.50	Pass
BLE	1Mbps	1	19	2440	1.051	0.718	0.50	Pass
BLE	1Mbps	1	39	2480	1.059	0.720	0.50	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	Data Rate	NTX	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	8.62	30.00	5.00	13.62	36.00	Pass
BLE	1Mbps	1	19	2440	8.69	30.00	5.00	13.69	36.00	Pass
BLE	1Mbps	1	39	2480	8.93	30.00	5.00	13.93	36.00	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	0.00	8.50	7.00	30.00	5.00	13.50	36.00	Pass
BLE	1Mbps	1	19	2440	0.00	8.60	7.00	30.00	5.00	13.60	36.00	Pass
BLE	1Mbps	1	39	2480	0.00	8.80	7.00	30.00	5.00	13.80	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	12.50	-0.03	5.00	8.00	Pass
BLE	1Mbps	1	19	2440	11.98	-0.08	5.00	8.00	Pass
BLE	1Mbps	1	39	2480	11.28	-0.68	5.00	8.00	Pass

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

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Pi Shun	Temperature:	21~25	°C
Test Date:	2024/6/4~2024/11/20	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.114	1.476	0.50	Pass
BLE	2Mbps	1	19	2440	2.090	1.436	0.50	Pass
BLE	2Mbps	1	39	2480	2.090	1.360	0.50	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	Data Rate	NTX	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	8.64	30.00	5.00	13.64	36.00	Pass
BLE	2Mbps	1	19	2440	8.73	30.00	5.00	13.73	36.00	Pass
BLE	2Mbps	1	39	2480	8.96	30.00	5.00	13.96	36.00	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	0.00	8.50	7.00	30.00	5.00	13.50	36.00	Pass
BLE	2Mbps	1	19	2440	0.00	8.60	7.00	30.00	5.00	13.60	36.00	Pass
BLE	2Mbps	1	39	2480	0.00	8.80	7.00	30.00	5.00	13.80	36.00	Pass

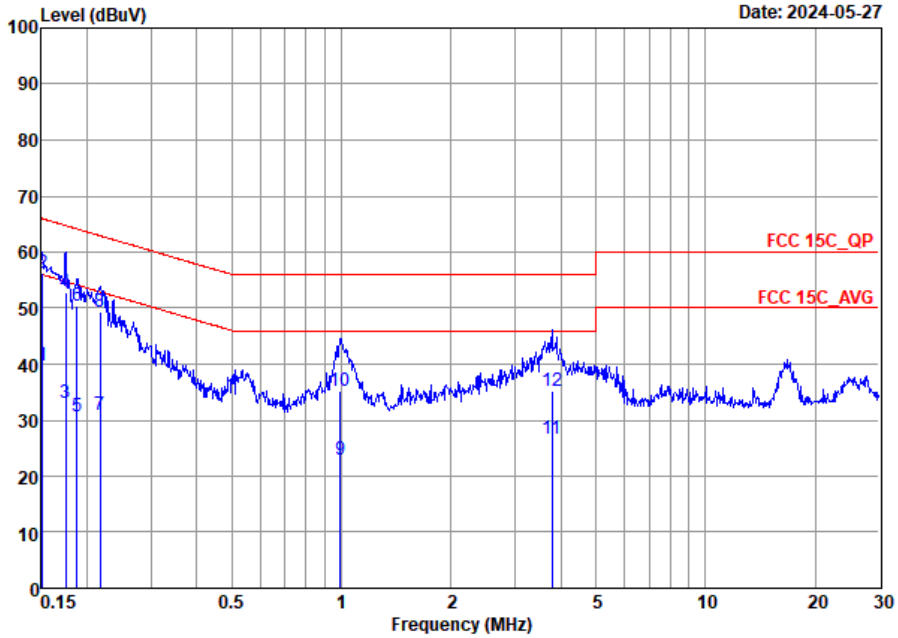
TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	11.24	-2.64	5.00	8.00	Pass
BLE	2Mbps	1	19	2440	11.37	-3.15	5.00	8.00	Pass
BLE	2Mbps	1	39	2480	10.42	-3.33	5.00	8.00	Pass

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

Appendix B. AC Conducted Emission Test Results

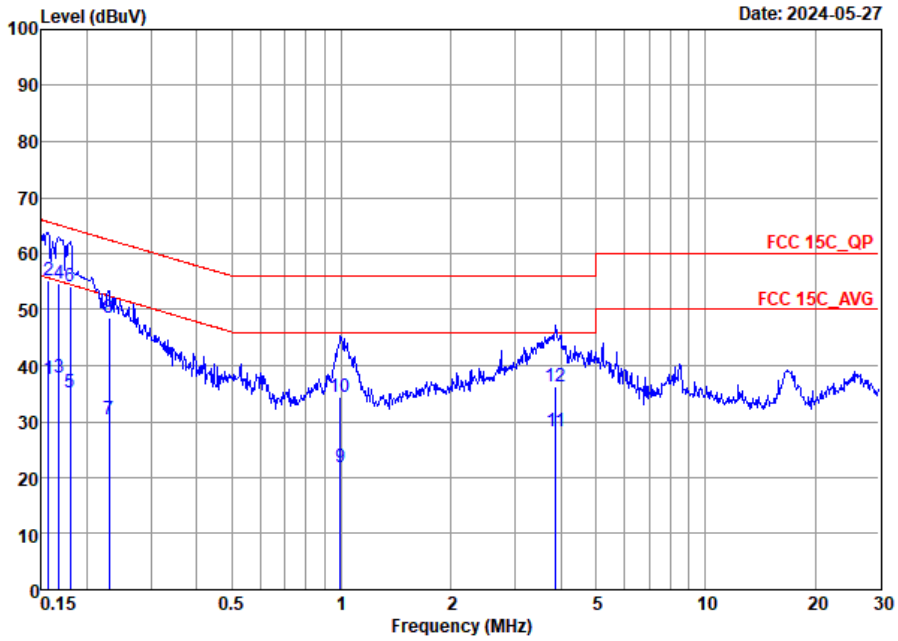
Test Engineer :	Yuki Tang	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C QP AC LISN 100063_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	39.72	-16.24	55.96	19.21	10.38	10.13	Average
2	*	0.15	56.22	-9.74	65.96	35.71	10.38	10.13	QP
3		0.17	33.02	-21.70	54.72	12.61	10.27	10.14	Average
4		0.17	52.92	-11.80	64.72	32.51	10.27	10.14	QP
5		0.19	30.73	-23.42	54.15	10.19	10.39	10.15	Average
6		0.19	50.43	-13.72	64.15	29.89	10.39	10.15	QP
7		0.22	30.90	-22.02	52.92	10.40	10.35	10.15	Average
8		0.22	49.30	-13.62	62.92	28.80	10.35	10.15	QP
9		0.99	22.92	-23.08	46.00	2.50	10.26	10.16	Average
10		0.99	35.12	-20.88	56.00	14.70	10.26	10.16	QP
11		3.78	26.80	-19.20	46.00	6.31	10.18	10.31	Average
12		3.78	35.20	-20.80	56.00	14.71	10.18	10.31	QP

Test Engineer :	Yuki Tang	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C QP AC LISN 100063_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.16	37.59	-18.06	55.65	17.19	10.26	10.14	Average
2		0.16	55.09	-10.56	65.65	34.69	10.26	10.14	QP
3		0.17	37.90	-17.18	55.08	17.30	10.46	10.14	Average
4	*	0.17	54.70	-10.38	65.08	34.10	10.46	10.14	QP
5		0.18	35.17	-19.33	54.50	14.60	10.43	10.14	Average
6		0.18	54.07	-10.43	64.50	33.50	10.43	10.14	QP
7		0.23	30.44	-22.00	52.44	10.10	10.19	10.15	Average
8		0.23	48.64	-13.80	62.44	28.30	10.19	10.15	QP
9		0.99	21.89	-24.11	46.00	1.50	10.23	10.16	Average
10		0.99	34.39	-21.61	56.00	14.00	10.23	10.16	QP
11		3.88	28.30	-17.70	46.00	7.50	10.48	10.32	Average
12		3.88	36.40	-19.60	56.00	15.60	10.48	10.32	QP

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

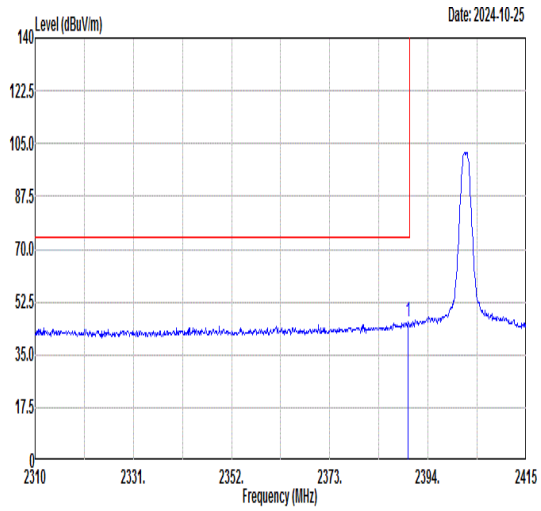
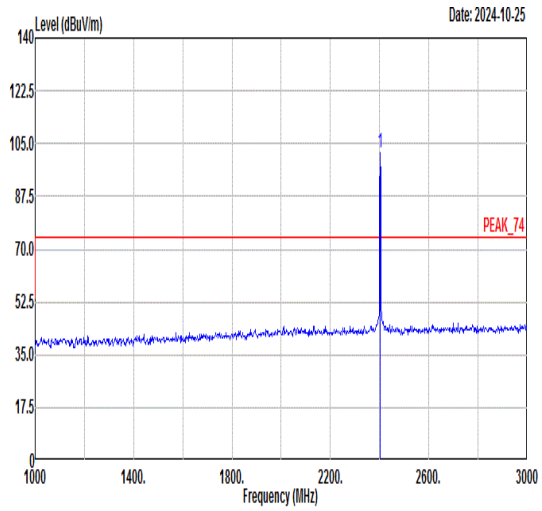
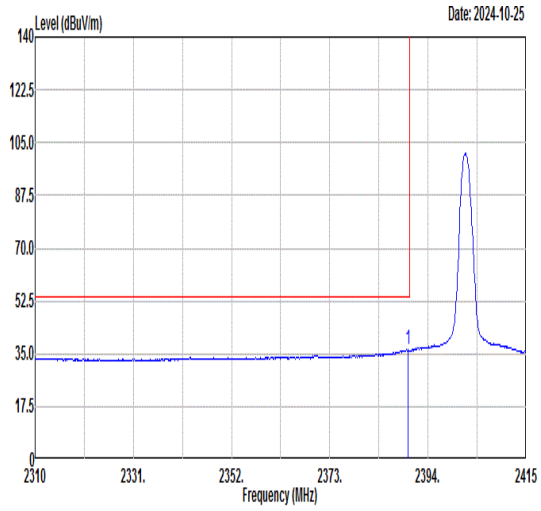
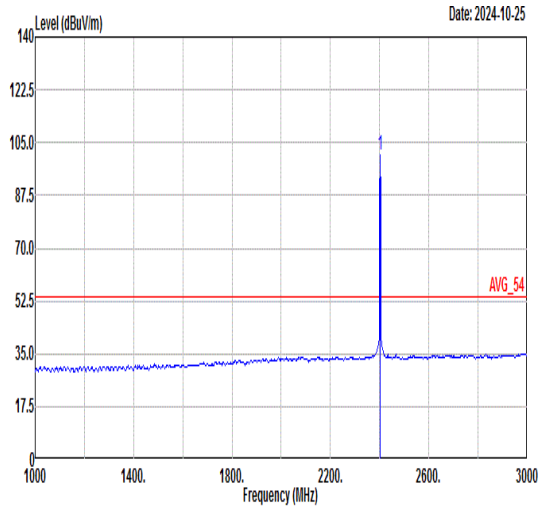
Appendix C. Radiated Spurious Emission Test Data

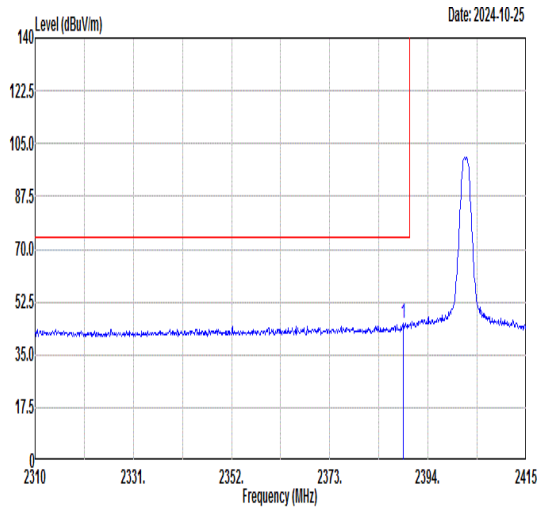
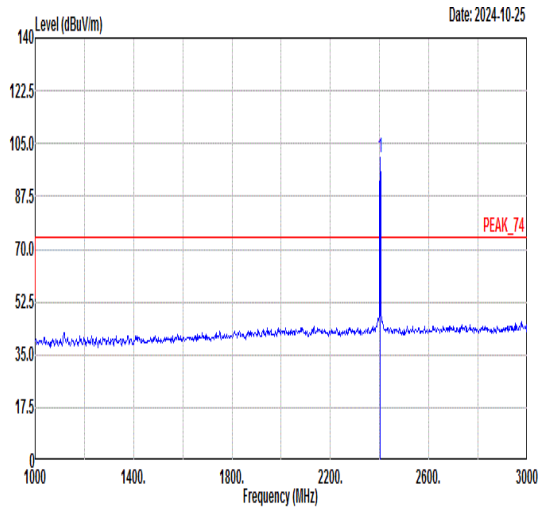
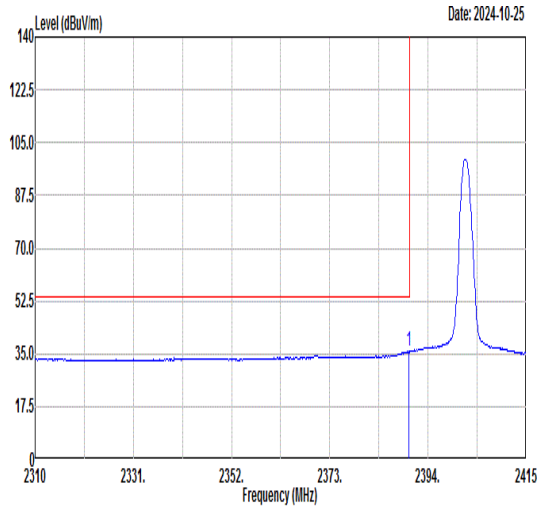
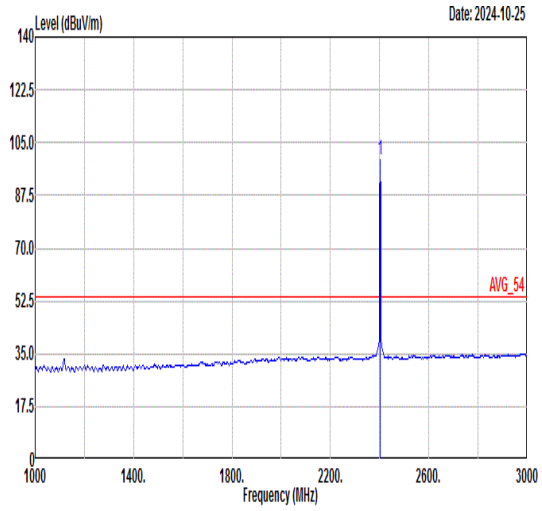
Test Engineer :	Wenbo Xiao	Relative Humidity :	50%
		Temperature :	20℃~22℃

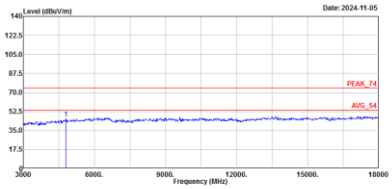
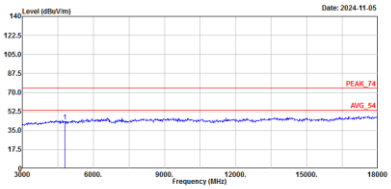
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Sample
Mode 4	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	1Mbps	-	1
Mode 5	2400-2483.5	SISO	Bluetooth-LE_GFSK	19	2440	1Mbps	-	1
Mode 6	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	1Mbps	-	1
Mode 7	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	2Mbps	-	1
Mode 8	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	2Mbps	-	1
Mode 9	2400-2483.5	SISO	Bluetooth-LE_GFSK-LF	39	2480	1Mbps	-	1-LF
Mode 13	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	1Mbps	-	2
Mode 14	2400-2483.5	SISO	Bluetooth-LE_GFSK	19	2440	1Mbps	-	2
Mode 15	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	1Mbps	-	2
Mode 16	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	2Mbps	-	2
Mode 17	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	2Mbps	-	2
Mode 18	2400-2483.5	SISO	Bluetooth-LE_GFSK-LF	39	2480	1Mbps	-	2-LF
Mode 22	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	1Mbps	-	3
Mode 23	2400-2483.5	SISO	Bluetooth-LE_GFSK	19	2440	1Mbps	-	3
Mode 24	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	1Mbps	-	3
Mode 25	2400-2483.5	SISO	Bluetooth-LE_GFSK	00	2402	2Mbps	-	3
Mode 26	2400-2483.5	SISO	Bluetooth-LE_GFSK	39	2480	2Mbps	-	3
Mode 27	2400-2483.5	SISO	Bluetooth-LE_GFSK-LF	19	2440	1Mbps	-	3-LF

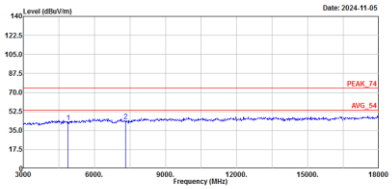
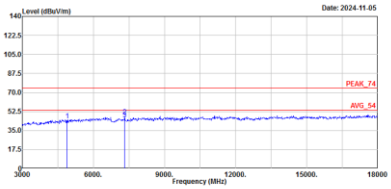
Summary of each worse mode

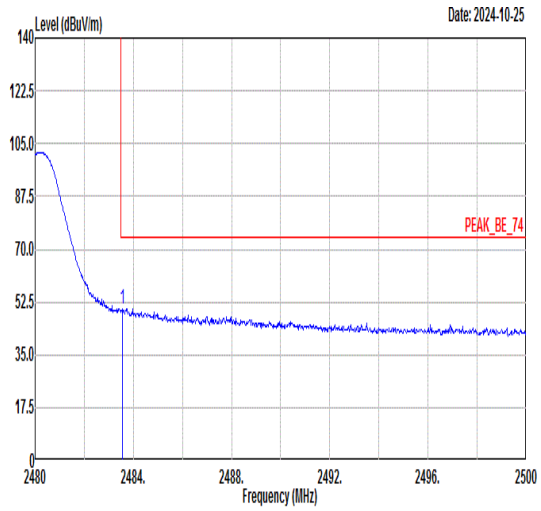
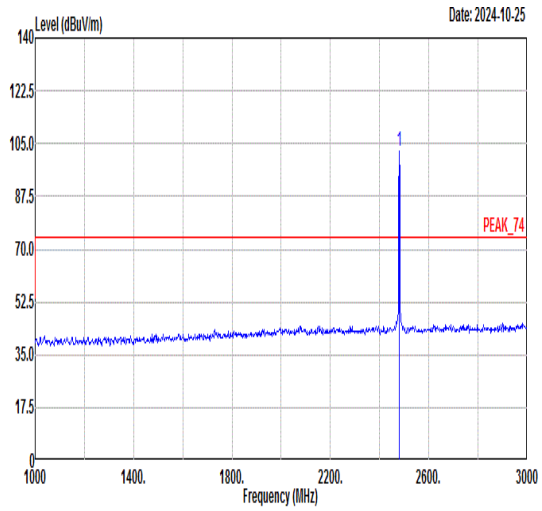
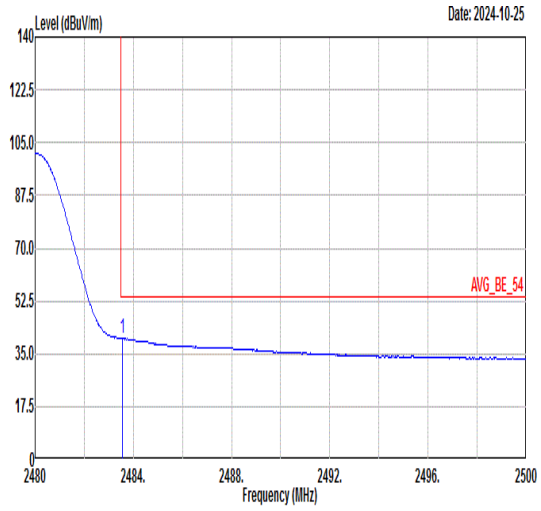
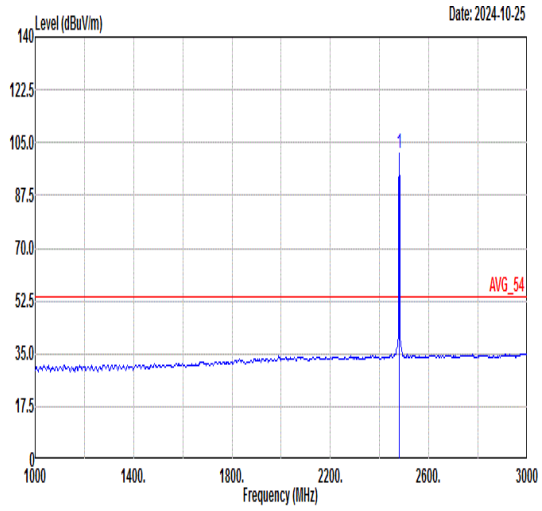
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
4	Bluetooth-LE_GFSK	00	2389.80	36.38	54.00	-17.62	H	AVERAGE	Pass	Band Edge
4	Bluetooth-LE_GFSK	00	4804.00	45.97	74.00	-28.03	H	Peak	Pass	Harmonic
5	Bluetooth-LE_GFSK	19	-	-	-	-	-	-	-	Band Edge
5	Bluetooth-LE_GFSK	19	7320.00	45.39	54.00	-8.61	V	Average	Pass	Harmonic
6	Bluetooth-LE_GFSK	39	2483.54	40.71	54.00	-13.29	V	AVERAGE	Pass	Band Edge
6	Bluetooth-LE_GFSK	39	7440.00	48.17	54.00	-5.83	V	Average	Pass	Harmonic
7	Bluetooth-LE_GFSK	00	2389.49	36.81	54.00	-17.19	V	AVERAGE	Pass	Band Edge
7	Bluetooth-LE_GFSK	00	-	-	-	-	-	-	-	Harmonic
8	Bluetooth-LE_GFSK	39	2483.52	47.92	54.00	-6.08	V	AVERAGE	Pass	Band Edge
8	Bluetooth-LE_GFSK	39	-	-	-	-	-	-	-	Harmonic
9	Bluetooth-LE_GFSK-LF	39	323.91	40.31	46.00	-5.69	H	PEAK	Pass	LF
13	Bluetooth-LE_GFSK	00	2389.59	34.72	54.00	-19.28	H	AVERAGE	Pass	Band Edge
13	Bluetooth-LE_GFSK	00	4804.00	44.15	74.00	-29.85	V	Peak	Pass	Harmonic
14	Bluetooth-LE_GFSK	19	-	-	-	-	-	-	-	Band Edge
14	Bluetooth-LE_GFSK	19	4880.00	44.93	74.00	-29.07	H	Peak	Pass	Harmonic
15	Bluetooth-LE_GFSK	39	2483.58	40.04	54.00	-13.96	H	AVERAGE	Pass	Band Edge
15	Bluetooth-LE_GFSK	39	7440.00	47.59	54.00	-6.41	V	Average	Pass	Harmonic
16	Bluetooth-LE_GFSK	00	2371.95	34.06	54.00	-19.94	V	AVERAGE	Pass	Band Edge
16	Bluetooth-LE_GFSK	00	-	-	-	-	-	-	-	Harmonic
17	Bluetooth-LE_GFSK	39	2483.52	47.47	54.00	-6.53	H	AVERAGE	Pass	Band Edge
17	Bluetooth-LE_GFSK	39	-	-	-	-	-	-	-	Harmonic
18	Bluetooth-LE_GFSK-LF	39	323.91	39.91	46.00	-6.09	H	PEAK	Pass	LF
19	Bluetooth BR_GFSK	00	2388.02	47.42	74.00	-26.58	V	PEAK	Pass	Band Edge
19	Bluetooth BR_GFSK	00	4804.00	44.95	74.00	-29.05	H	Peak	Pass	Harmonic
20	Bluetooth BR_GFSK	39	-	-	-	-	-	-	-	Band Edge
20	Bluetooth BR_GFSK	39	7323.00	51.58	74.00	-22.42	V	Peak	Pass	Harmonic
21	Bluetooth BR_GFSK	78	2483.60	64.43	74.00	-9.57	V	PEAK	Pass	Band Edge
21	Bluetooth BR_GFSK	78	7440.00	49.80	74.00	-24.20	V	Peak	Pass	Harmonic
22	Bluetooth-LE_GFSK	00	2389.59	37.41	54.00	-16.59	V	AVERAGE	Pass	Band Edge
22	Bluetooth-LE_GFSK	00	4804.00	45.44	74.00	-28.56	V	Peak	Pass	Harmonic
23	Bluetooth-LE_GFSK	19	-	-	-	-	-	-	-	Band Edge
23	Bluetooth-LE_GFSK	19	7320.00	46.76	54.00	-7.24	V	Average	Pass	Harmonic
24	Bluetooth-LE_GFSK	39	2483.52	42.65	54.00	-11.35	V	AVERAGE	Pass	Band Edge
24	Bluetooth-LE_GFSK	39	7440.00	45.72	74.00	-28.28	V	Peak	Pass	Harmonic
25	Bluetooth-LE_GFSK	00	2389.80	36.91	54.00	-17.09	V	AVERAGE	Pass	Band Edge
25	Bluetooth-LE_GFSK	00	-	-	-	-	-	-	-	Harmonic
26	Bluetooth-LE_GFSK	39	2483.52	46.65	54.00	-7.35	V	AVERAGE	Pass	Band Edge
26	Bluetooth-LE_GFSK	39	-	-	-	-	-	-	-	Harmonic
27	Bluetooth-LE_GFSK-LF	19	167.71	36.17	43.50	-7.33	H	PEAK	Pass	LF

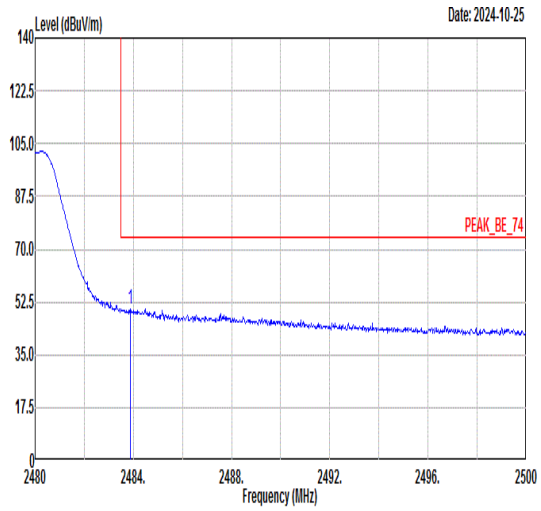
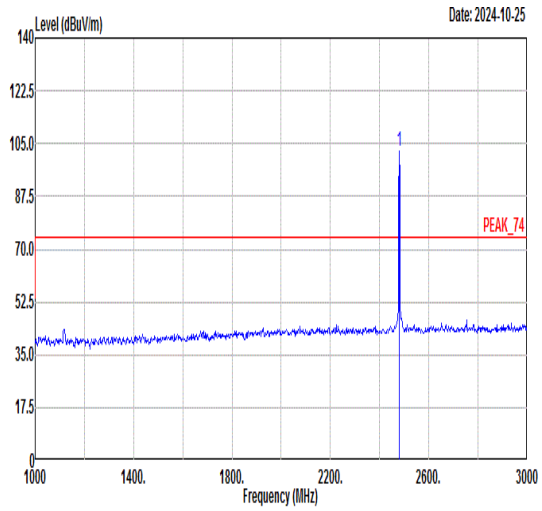
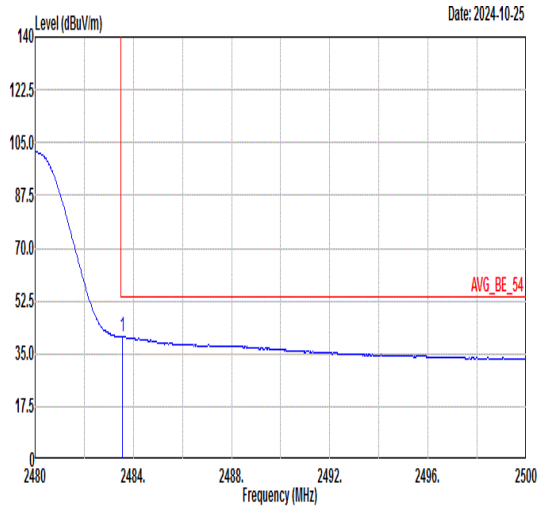
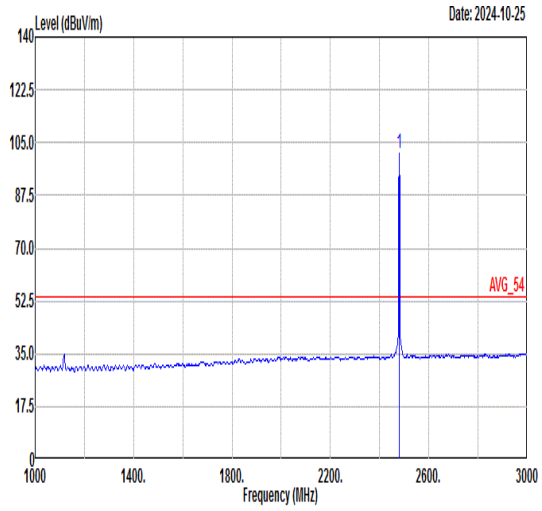
Mode	4	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.80 46.13 74.00 -27.87 43.58 30.72 5.36 33.53 100 195 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 102.17 ------ ------ 99.62 30.72 5.37 33.54 100 195 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.80 36.38 54.00 -17.62 33.83 30.72 5.36 33.53 100 195 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 101.12 ------ ------ 98.57 30.72 5.37 33.54 100 195 AVERAGE

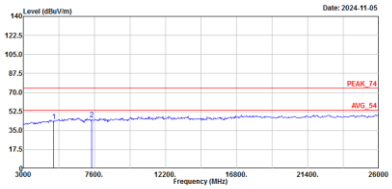
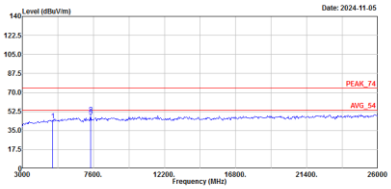
Mode	4	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2388.65 45.34 74.00 -28.66 42.79 30.72 5.36 33.53 358 204 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 100.50 ------ ------ 97.95 30.72 5.37 33.54 358 204 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.91 35.74 54.00 -18.26 33.19 30.72 5.36 33.53 358 204 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 99.48 ------ ------ 96.93 30.72 5.37 33.54 358 204 AVERAGE

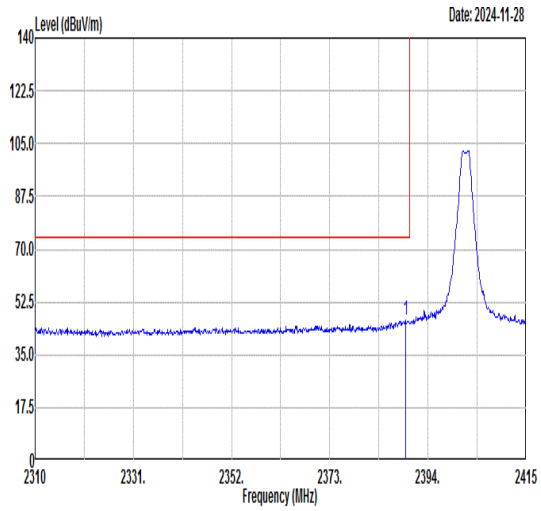
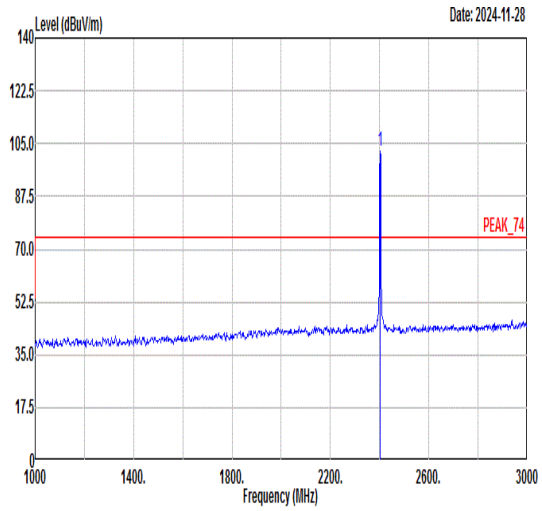
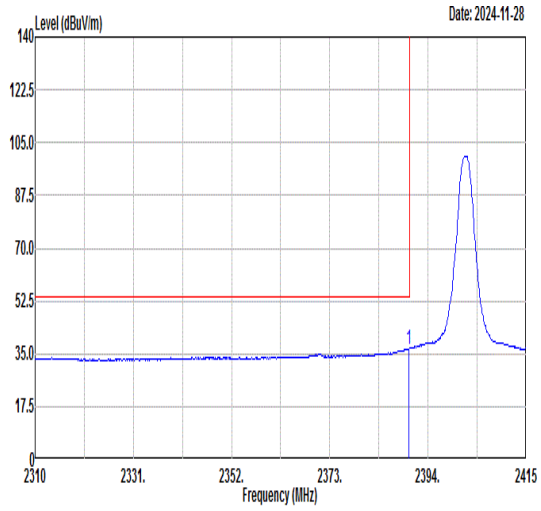
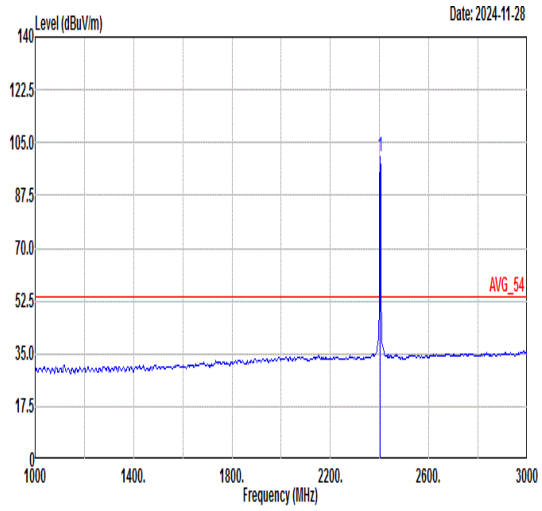
Mode	4	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 45.97 74.00 -28.03 52.88 35.73 8.94 51.58 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 43.09 74.00 -30.91 50.00 35.73 8.94 51.58 --- --- Peak

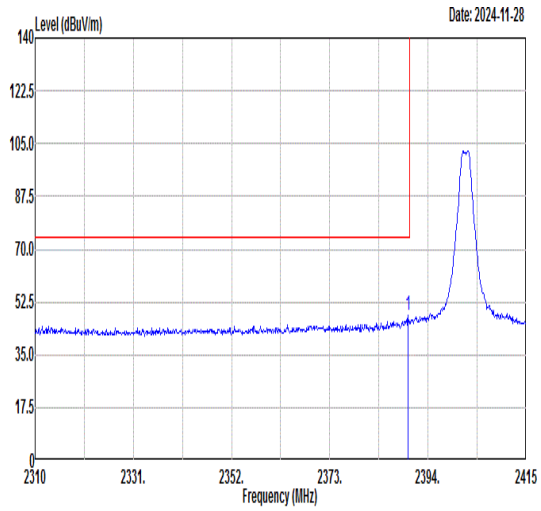
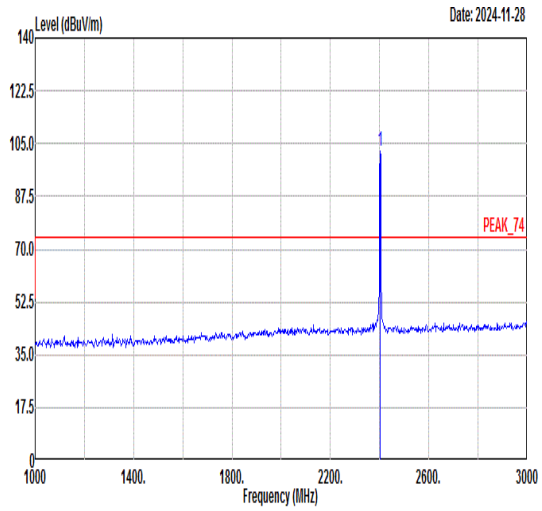
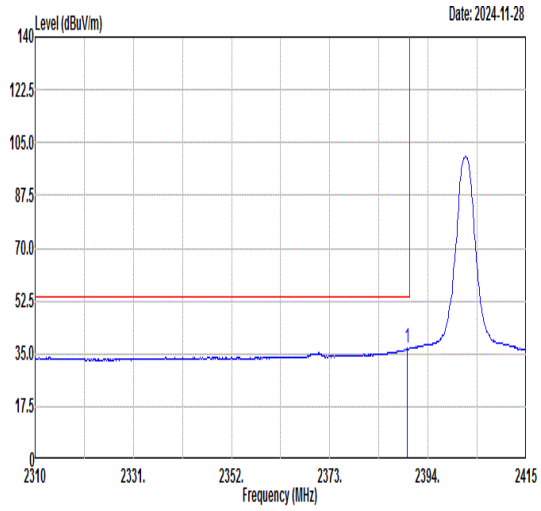
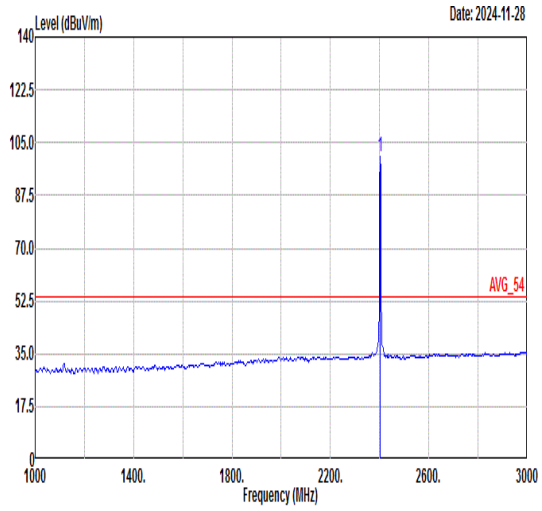
Mode	5	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH19_2440MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 42.98 74.00 -31.02 49.91 35.91 8.71 51.55 --- --- Peak 2 7320.00 43.89 74.00 -30.11 48.00 36.87 10.18 51.16 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 44.12 74.00 -29.88 51.05 35.91 8.71 51.55 --- --- Peak 2 7320.00 48.23 74.00 -25.77 52.34 36.87 10.18 51.16 265 180 Peak 3 7320.00 45.39 54.00 -8.61 49.50 36.87 10.18 51.16 265 180 Average

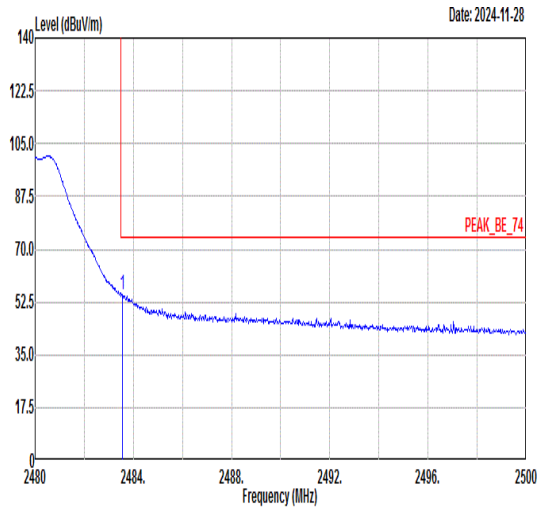
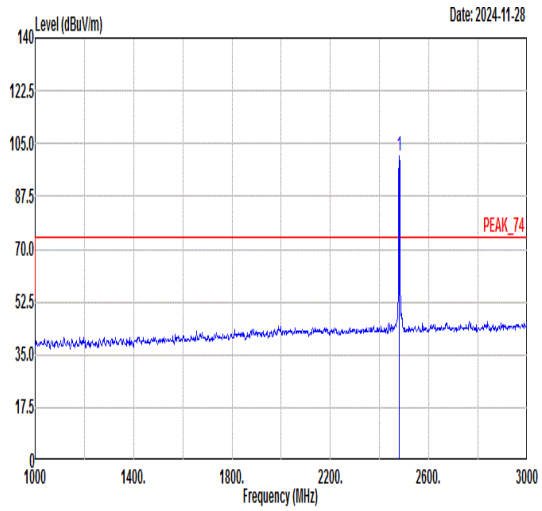
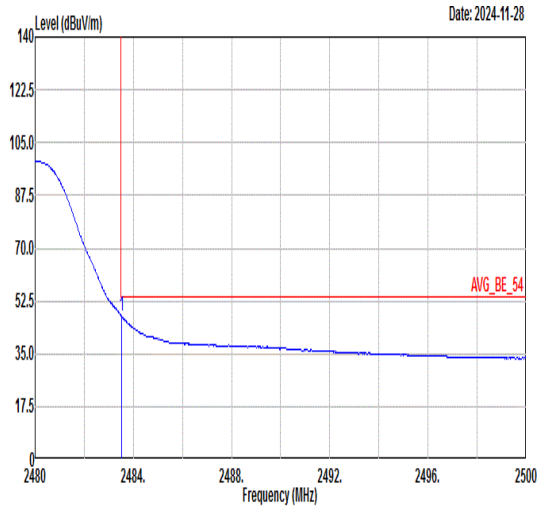
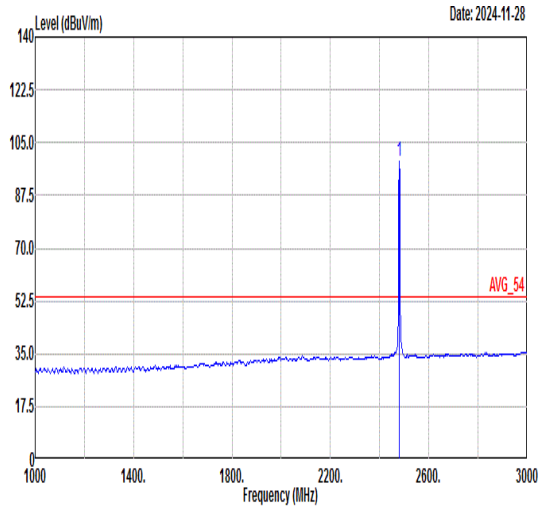
Mode	6	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.54 50.13 74.00 -23.87 47.56 30.70 5.46 33.59 126 194 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 102.26 ------ ------ 99.69 30.70 5.46 33.59 126 194 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.56 40.21 54.00 -13.79 37.64 30.70 5.46 33.59 126 194 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 101.22 ------ ------ 98.65 30.70 5.46 33.59 126 194 AVERAGE

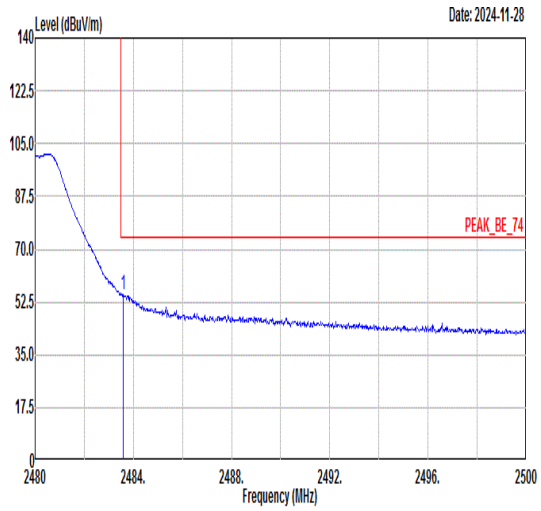
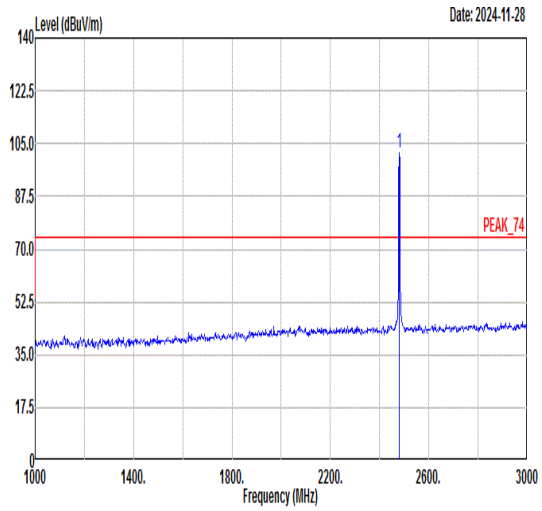
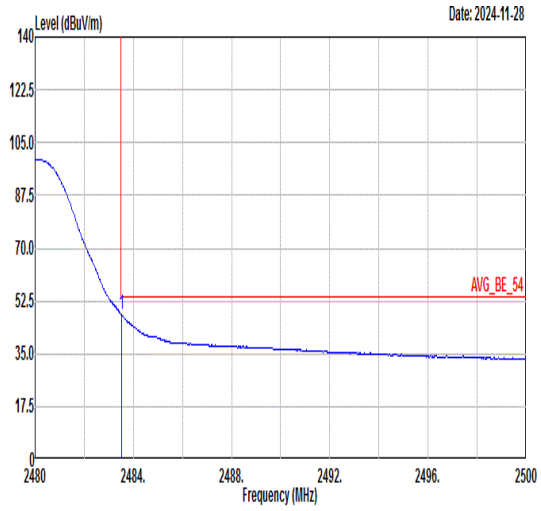
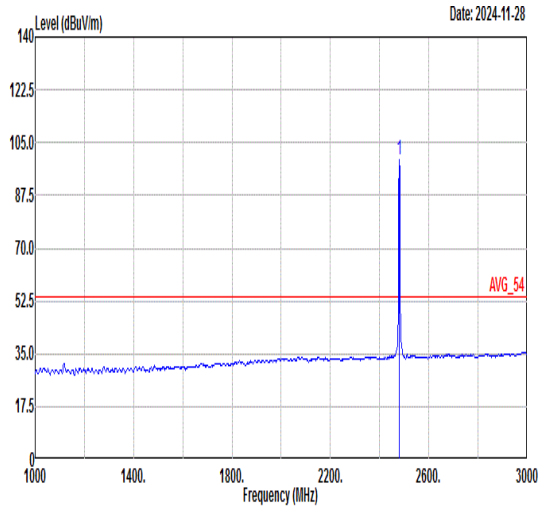
Mode	6	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.88 50.02 74.00 -23.98 47.45 30.70 5.46 33.59 304 166 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 102.66 ------ ------ 100.09 30.70 5.46 33.59 304 166 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.54 40.71 54.00 -13.29 38.14 30.70 5.46 33.59 304 166 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 101.64 ------ ------ 99.07 30.70 5.46 33.59 304 166 AVERAGE

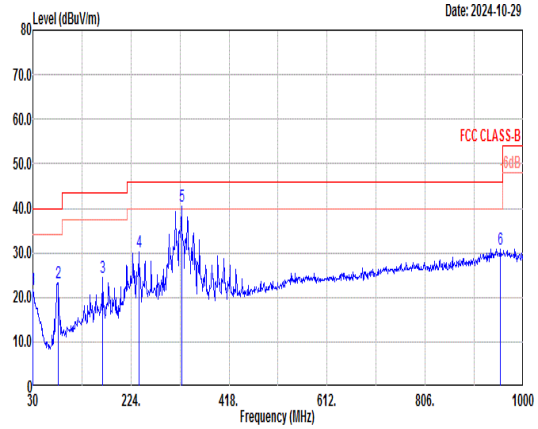
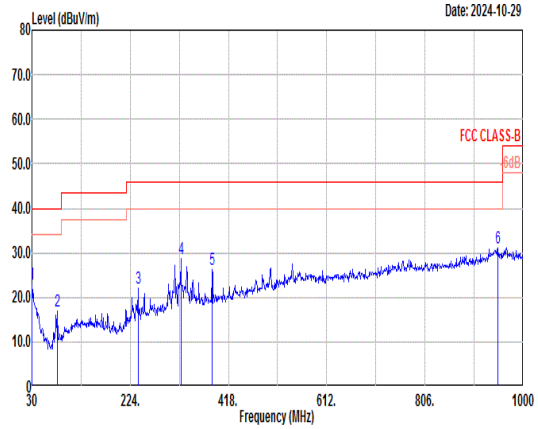
Mode	6	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 43.73 74.00 -30.27 50.69 36.10 8.46 51.52 --- --- Peak 2 7440.00 45.25 74.00 -28.75 49.45 36.82 10.17 51.19 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 44.50 74.00 -29.50 64.84 36.10 8.46 64.90 --- --- Peak 2 7440.00 50.35 74.00 -23.65 68.22 36.82 10.17 64.86 281 180 Peak 3 7440.00 48.17 54.00 -5.83 66.04 36.82 10.17 64.86 281 180 Average

Mode	7	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.28 46.23 74.00 -27.77 43.62 30.78 5.36 33.53 342 169 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 102.75 ------ ------ 100.14 30.78 5.37 33.54 342 169 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.91 36.62 54.00 -17.38 34.01 30.78 5.36 33.53 342 169 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 100.29 ------ ------ 97.68 30.78 5.37 33.54 342 169 AVERAGE

Mode	7	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.70 47.92 74.00 -26.08 45.31 30.78 5.36 33.53 145 217 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 102.61 ------ ------ 100.00 30.78 5.37 33.54 145 217 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.49 36.81 54.00 -17.19 34.20 30.78 5.36 33.53 145 217 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 100.23 ------ ------ 97.62 30.78 5.37 33.54 145 217 AVERAGE

Mode	8	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.54 54.92 74.00 -19.08 52.25 30.80 5.46 33.59 200 166 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 100.92 ------ ------ 98.25 30.80 5.46 33.59 200 166 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.52 47.48 54.00 -6.52 44.81 30.80 5.46 33.59 200 166 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 98.76 ------ ------ 96.09 30.80 5.46 33.59 200 166 AVERAGE

Mode	8	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.58 54.84 74.00 -19.16 52.17 30.80 5.46 33.59 271 217 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 101.84 ------ ------ 99.17 30.80 5.46 33.59 271 217 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.52 47.92 54.00 -6.08 45.25 30.80 5.46 33.59 271 217 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 99.33 ------ ------ 96.66 30.80 5.46 33.59 271 217 AVERAGE

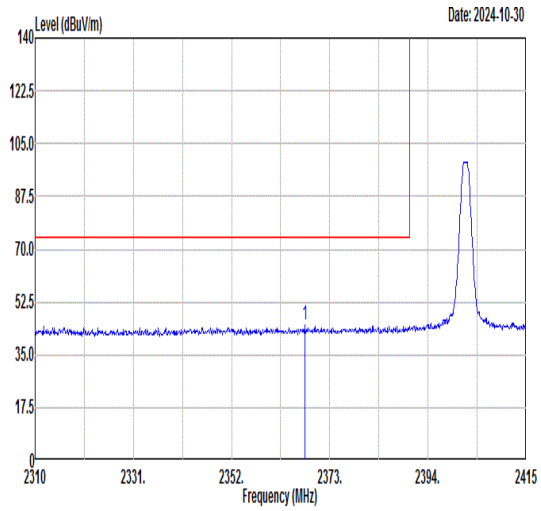
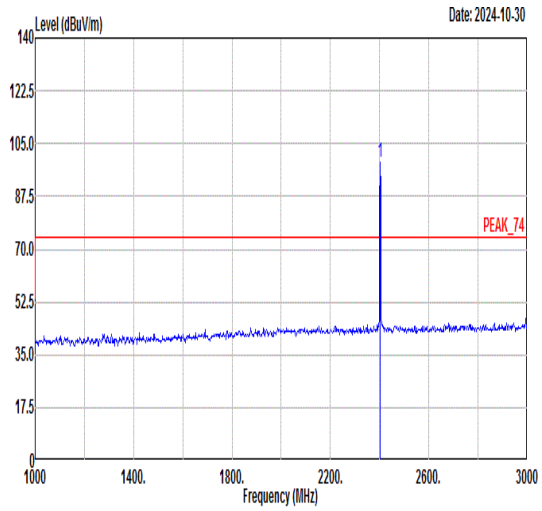
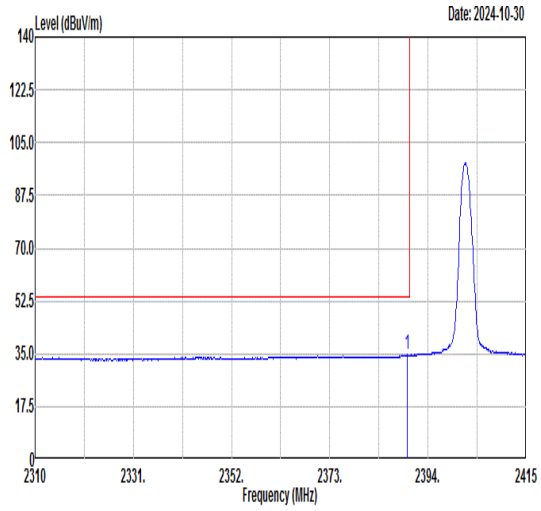
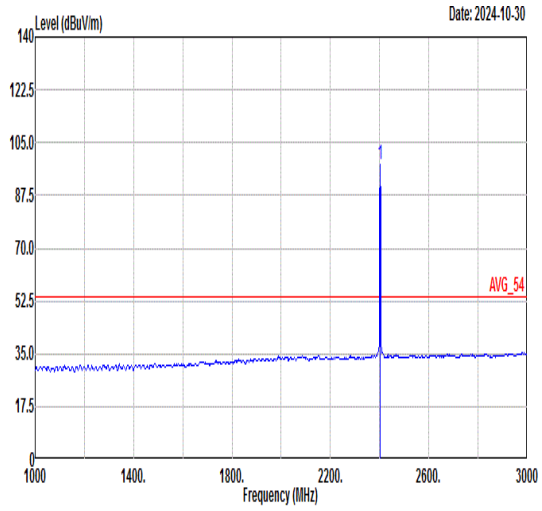
Mode	9	
	LF	
	2400-2483.5_Bluetooth-LE_GFSK-LF _CH39_LF_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
QP/ Peak		

Horizontal:

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	21.85	40.00	-18.15	27.72	25.20	0.53	31.60	---	---	Peak
2	80.44	23.20	40.00	-16.80	40.71	13.40	0.89	31.80	---	---	Peak
3	167.74	24.46	43.50	-19.04	38.90	15.90	1.32	31.66	---	---	Peak
4	239.52	30.23	46.00	-15.77	42.93	17.30	1.60	31.60	---	---	Peak
5	323.91	40.31	46.00	-5.69	50.21	19.66	1.89	31.45	---	---	Peak
6	954.41	30.76	46.00	-15.24	27.28	31.05	3.24	30.81	---	---	Peak

Vertical:

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	23.05	40.00	-16.95	28.92	25.20	0.53	31.60	---	---	Peak
2	80.44	17.00	40.00	-23.00	34.51	13.40	0.89	31.80	---	---	Peak
3	239.52	22.05	46.00	-23.95	34.75	17.30	1.60	31.60	---	---	Peak
4	323.91	28.77	46.00	-17.23	38.67	19.66	1.89	31.45	---	---	Peak
5	385.99	26.19	46.00	-19.81	34.15	21.44	2.07	31.47	---	---	Peak
6	950.53	31.03	46.00	-14.97	27.75	30.85	3.23	30.80	---	---	Peak

Mode	13	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2367.65 44.71 74.00 -29.29 42.16 30.73 5.34 33.52 145 318 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 99.04 ------ ------ 96.49 30.72 5.37 33.54 145 318 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.59 34.72 54.00 -19.28 32.17 30.72 5.36 33.53 145 318 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 97.97 ------ ------ 95.42 30.72 5.37 33.54 145 318 AVERAGE

Mode	13	
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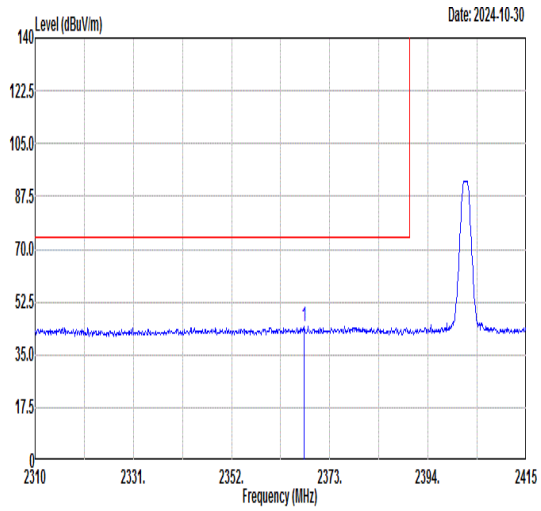
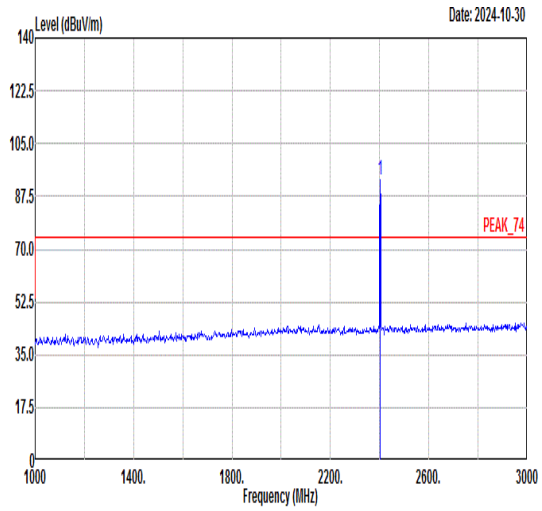
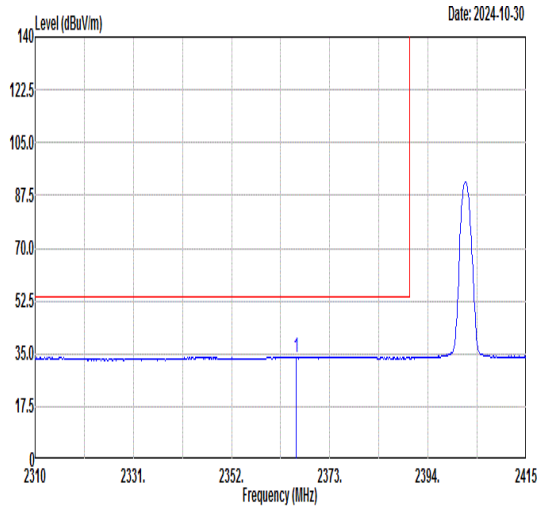
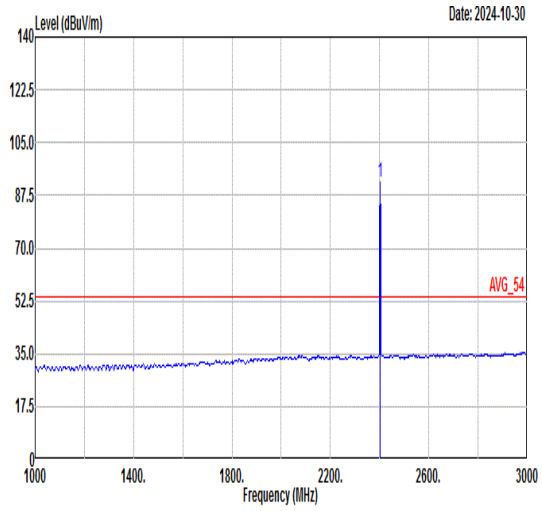
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2367.44 44.61 74.00 -29.39 42.06 30.73 5.34 33.52 393 224 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 92.92 ------ ------ 90.37 30.72 5.37 33.54 393 224 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2365.76 34.05 54.00 -19.95 31.50 30.73 5.34 33.52 393 224 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 91.89 ------ ------ 89.34 30.72 5.37 33.54 393 224 AVERAGE

Mode	13	
	Harmonic	
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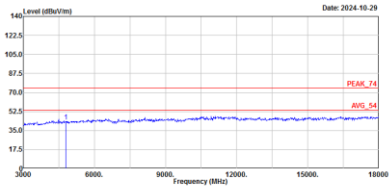
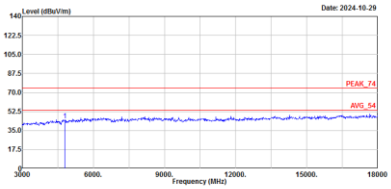
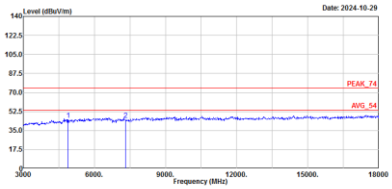
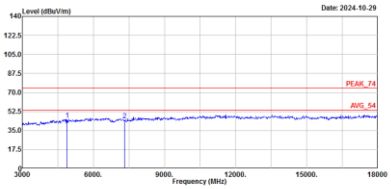
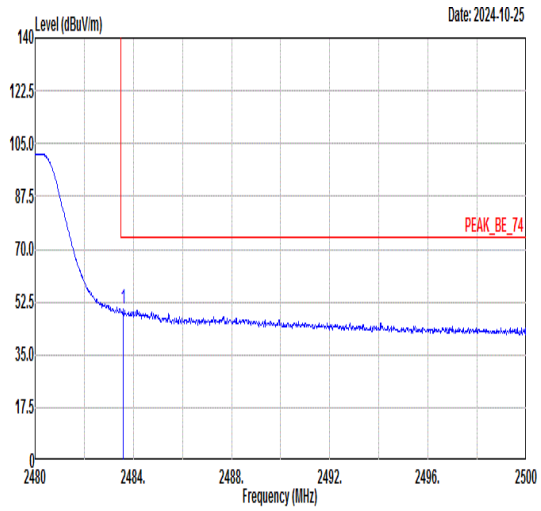
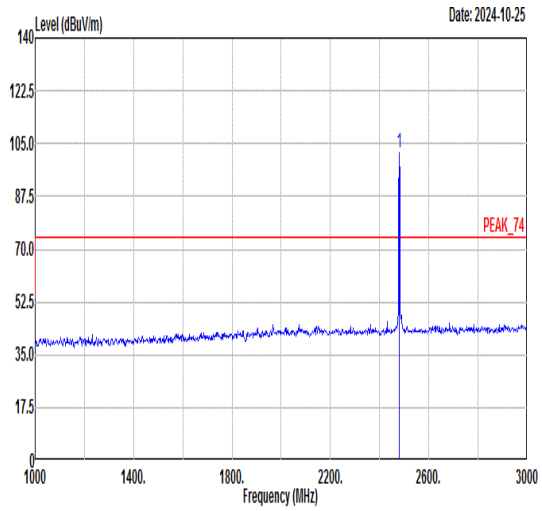
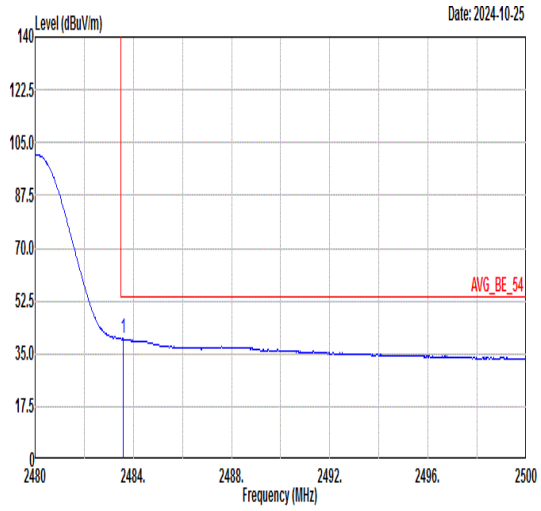
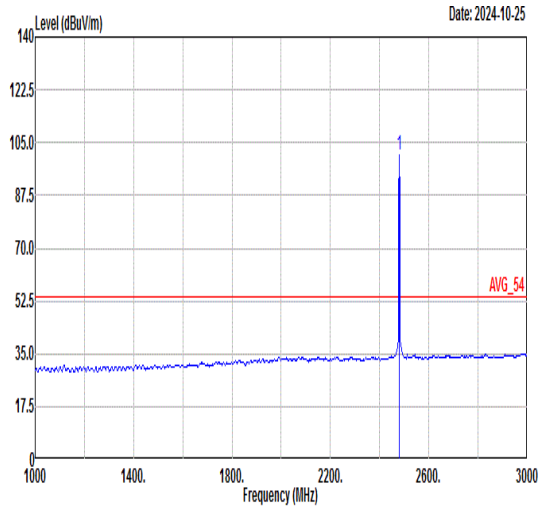
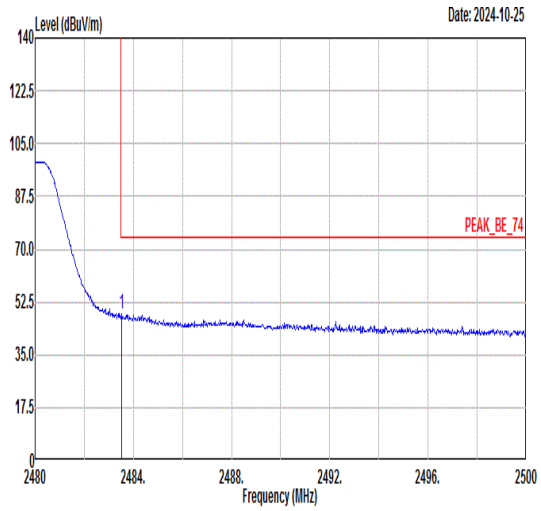
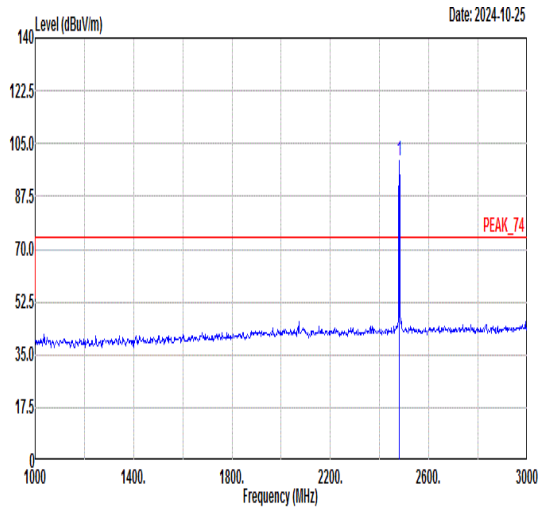
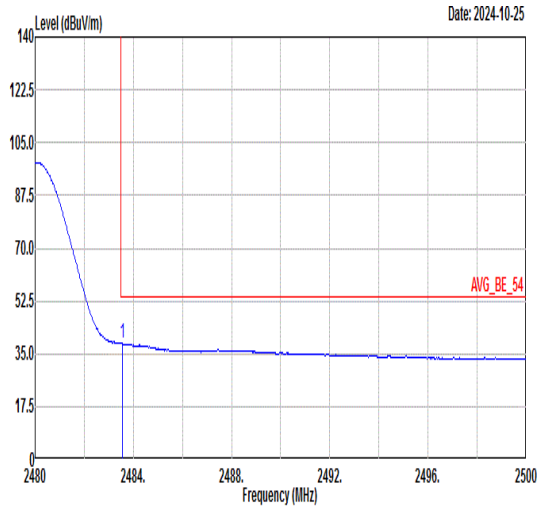
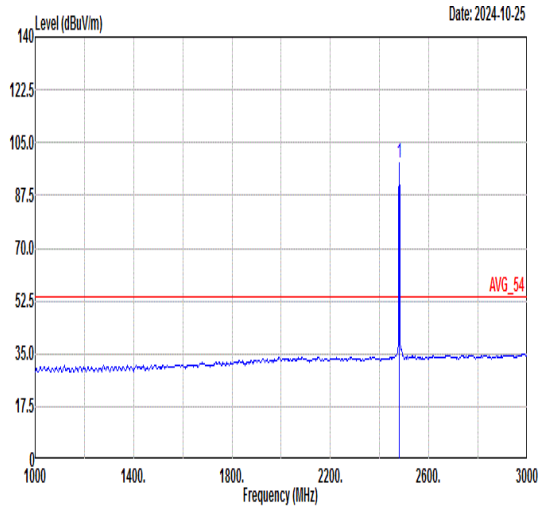
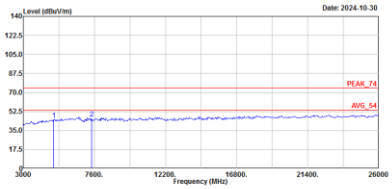
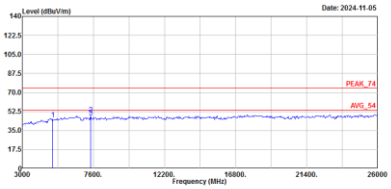
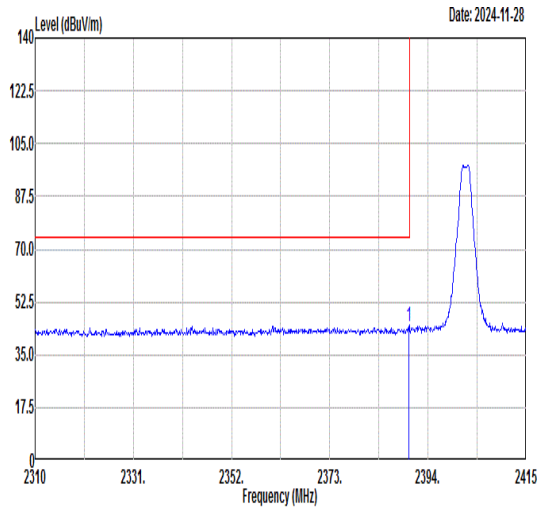
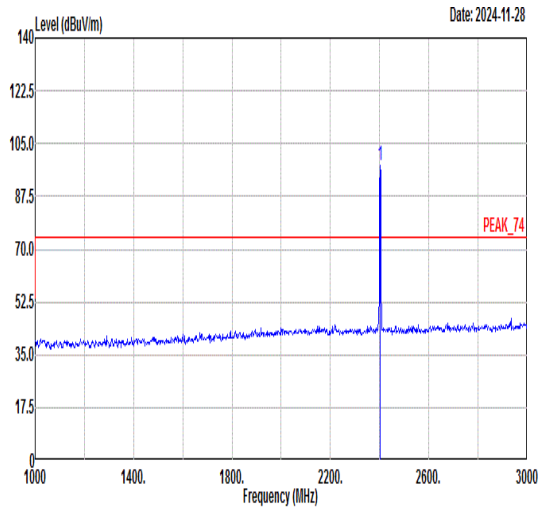
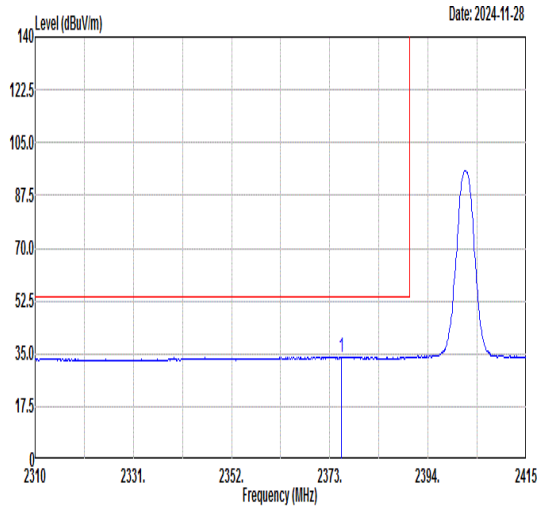
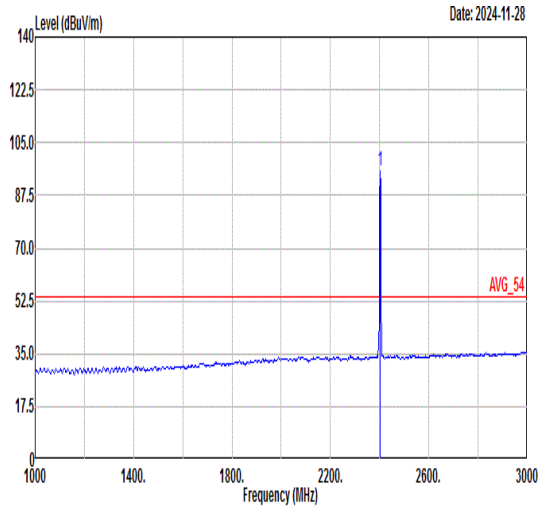
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 43.11 74.00 -30.89 50.02 35.73 8.94 51.58 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 44.15 74.00 -29.85 51.06 35.73 8.94 51.58 --- --- Peak

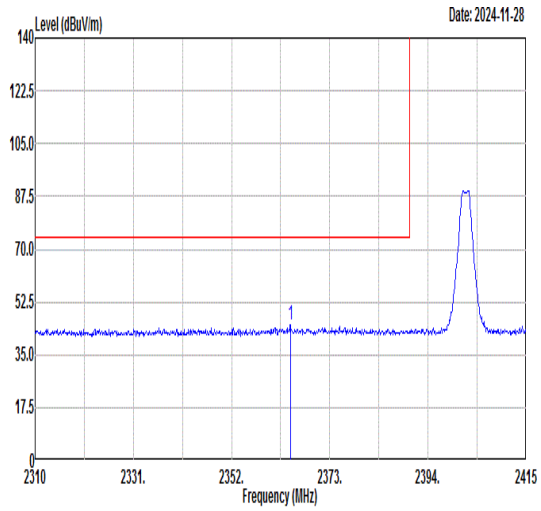
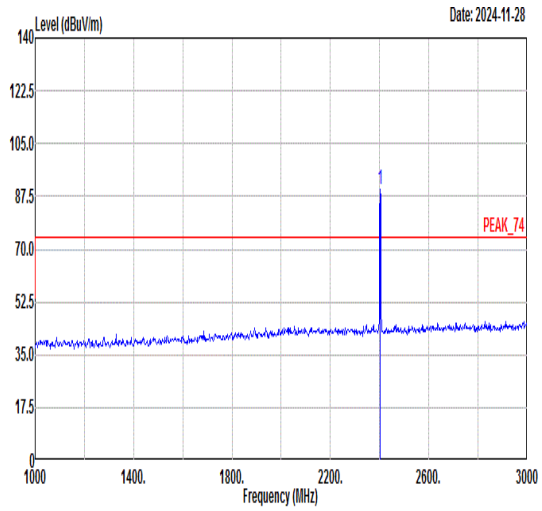
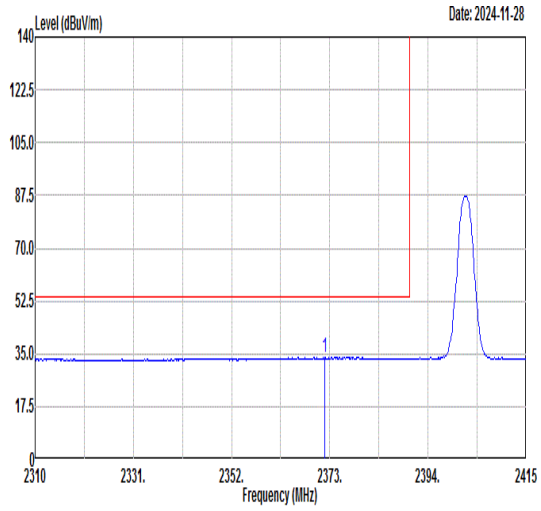
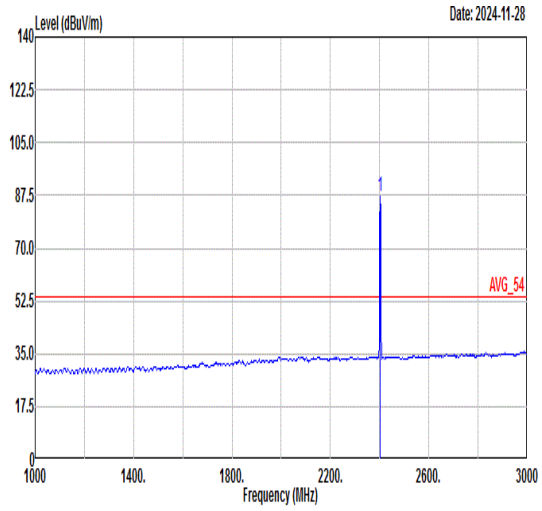
Mode	14	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH19_2440MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 44.93 74.00 -29.07 51.86 35.91 8.71 51.55 --- --- Peak 2 7320.00 44.74 74.00 -29.26 48.85 36.87 10.18 51.16 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 44.87 74.00 -29.13 51.80 35.91 8.71 51.55 --- --- Peak 2 7320.00 44.54 74.00 -29.46 48.65 36.87 10.18 51.16 --- --- Peak

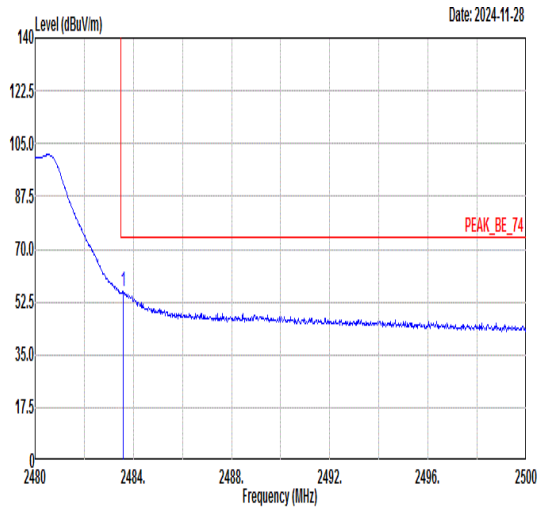
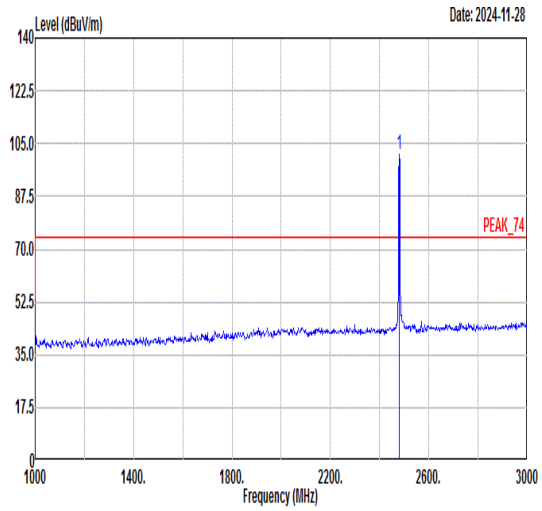
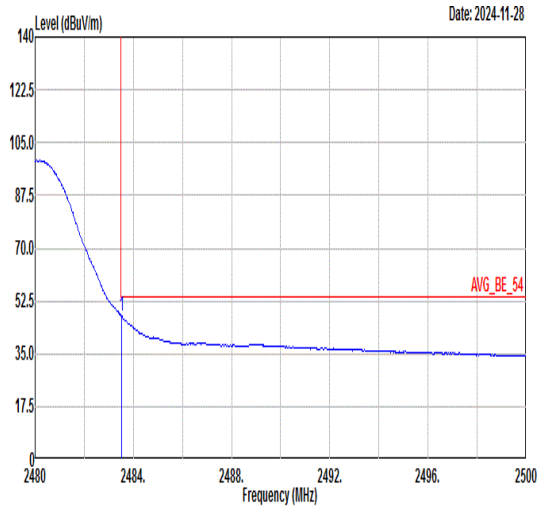
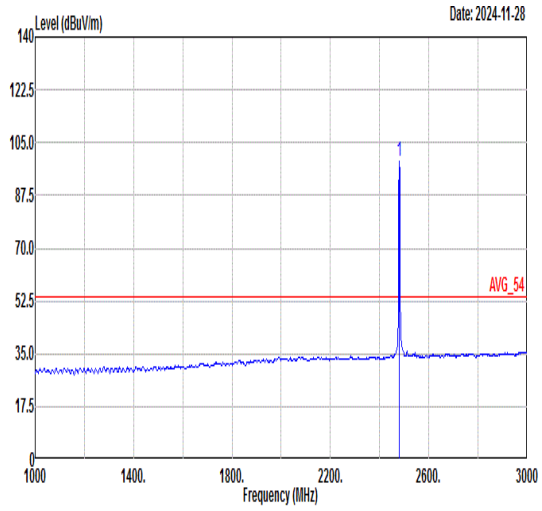
Mode	15	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.58 50.44 74.00 -23.56 47.87 30.70 5.46 33.59 175 192 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 101.85 ------ ------ 99.28 30.70 5.46 33.59 175 192 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.58 40.04 54.00 -13.96 37.47 30.70 5.46 33.59 175 192 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 100.75 ------ ------ 98.18 30.70 5.46 33.59 175 192 AVERAGE

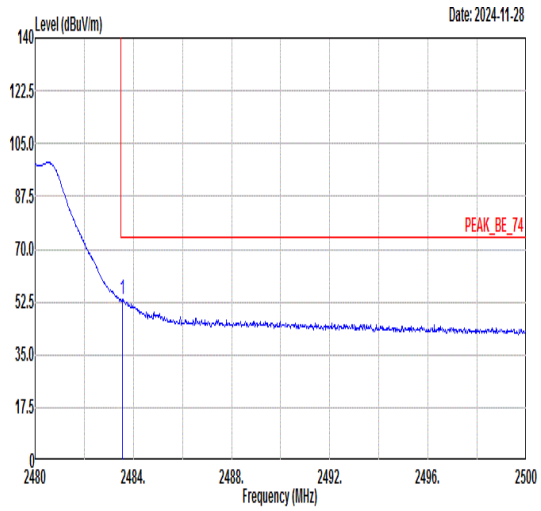
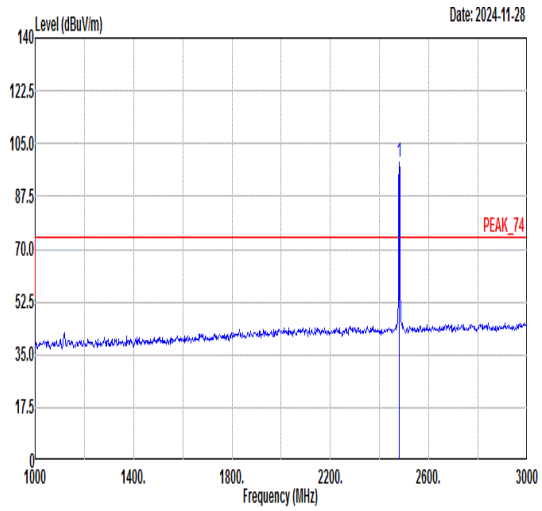
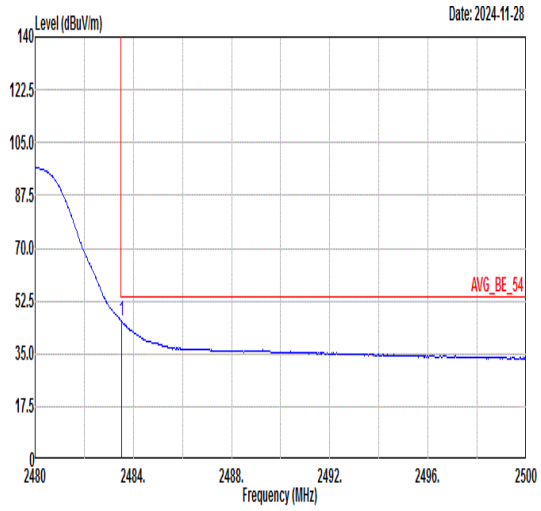
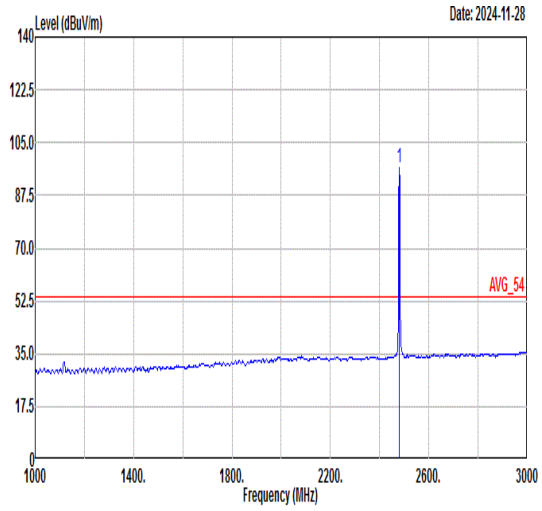
Mode	15	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.52 48.38 74.00 -25.62 45.81 30.70 5.46 33.59 300 279 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 99.28 ------ ------ 96.71 30.70 5.46 33.59 300 279 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.54 38.44 54.00 -15.56 35.87 30.70 5.46 33.59 300 279 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 98.31 ------ ------ 95.74 30.70 5.46 33.59 300 279 AVERAGE

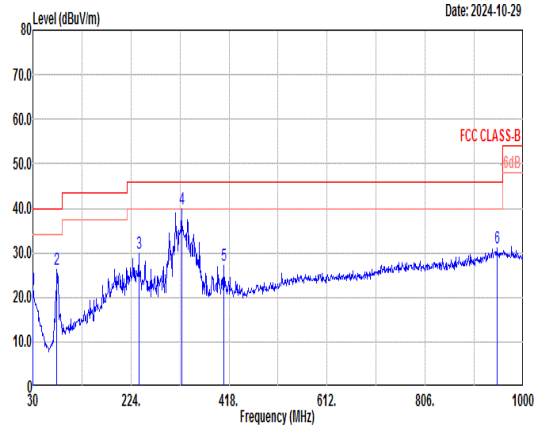
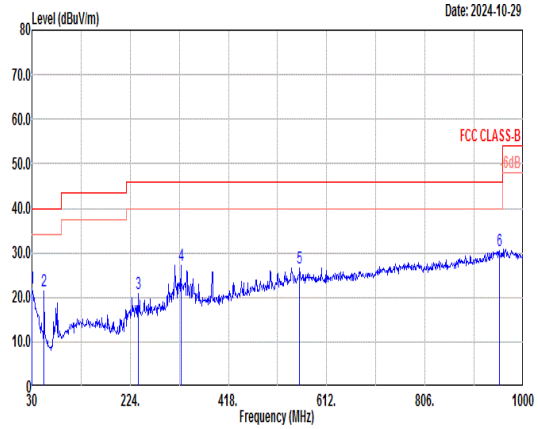
Mode	15	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 44.65 74.00 -29.35 51.61 36.10 8.46 51.52 --- --- Peak 2 7440.00 45.74 74.00 -28.26 49.94 36.82 10.17 51.19 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 45.34 74.00 -28.66 52.30 36.10 8.46 51.52 --- --- Peak 2 7440.00 50.10 74.00 -23.90 54.30 36.82 10.17 51.19 386 158 Peak 3 7440.00 47.59 54.00 -6.41 51.79 36.82 10.17 51.19 386 158 Average

Mode	16	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.91 44.61 74.00 -29.39 42.00 30.78 5.36 33.53 186 258 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 97.90 ------ ------ 95.29 30.78 5.37 33.54 186 258 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2375.42 33.96 54.00 -20.04 31.36 30.78 5.35 33.53 186 258 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 95.49 ------ ------ 92.88 30.78 5.37 33.54 186 258 AVERAGE

Mode	16	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2364.60 45.08 74.00 -28.92 42.49 30.77 5.34 33.52 100 224 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 89.60 ------ ------ 86.99 30.78 5.37 33.54 100 224 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2371.95 34.06 54.00 -19.94 31.47 30.77 5.34 33.52 100 224 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 87.19 ------ ------ 84.58 30.78 5.37 33.54 100 224 AVERAGE

Mode	17	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.58 55.98 74.00 -18.02 53.31 30.80 5.46 33.59 200 189 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 101.34 ------ ------ 98.67 30.80 5.46 33.59 200 189 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.52 47.47 54.00 -6.53 44.80 30.80 5.46 33.59 200 189 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 99.02 ------ ------ 96.35 30.80 5.46 33.59 200 189 AVERAGE

Mode	17	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.56 53.58 74.00 -20.42 50.91 30.80 5.46 33.59 296 215 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 98.78 ------ ------ 96.11 30.80 5.46 33.59 296 215 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.52 45.73 54.00 -8.27 43.06 30.80 5.46 33.59 296 215 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 96.44 ------ ------ 93.77 30.80 5.46 33.59 296 215 AVERAGE

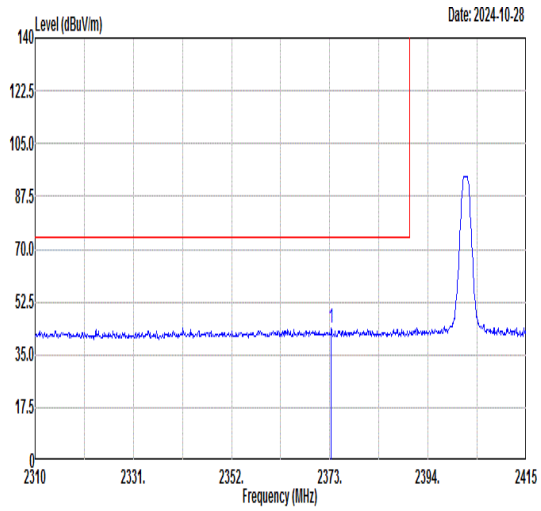
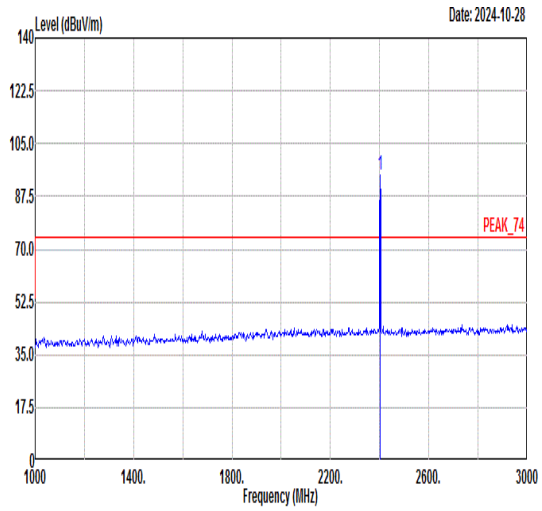
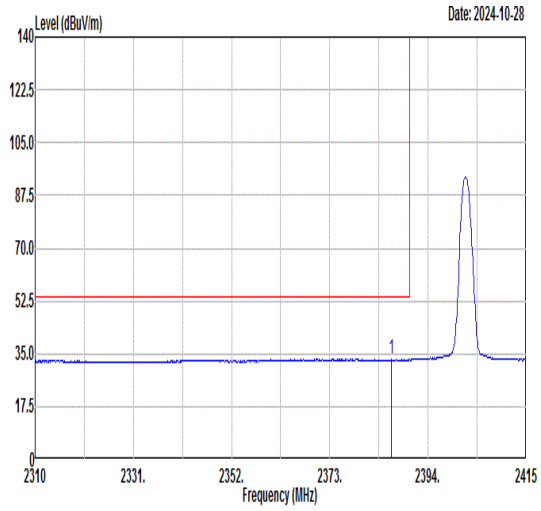
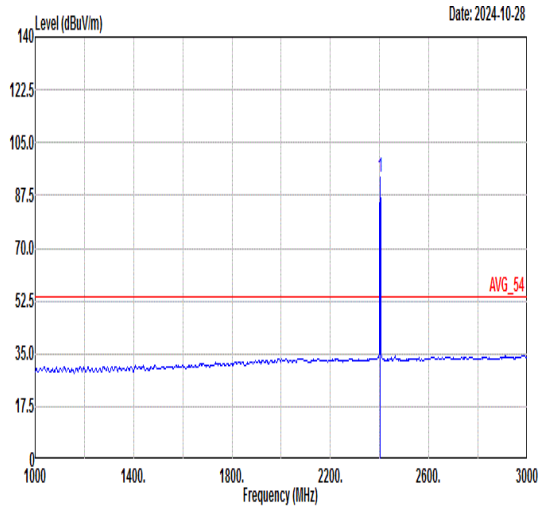
Mode	18	
	LF	
	2400-2483.5_Bluetooth-LE_GFSK-LF _CH39_LF_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
QP/ Peak		

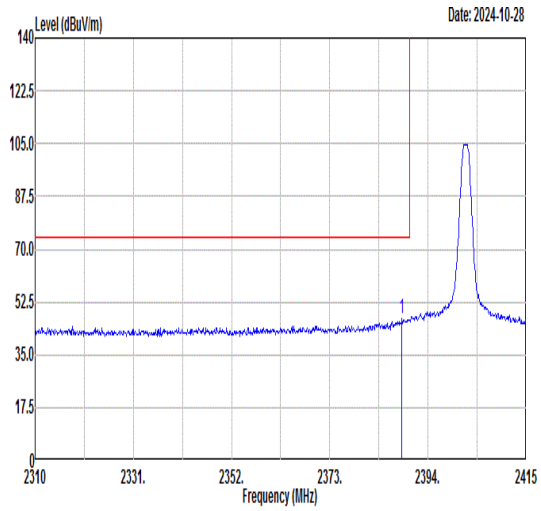
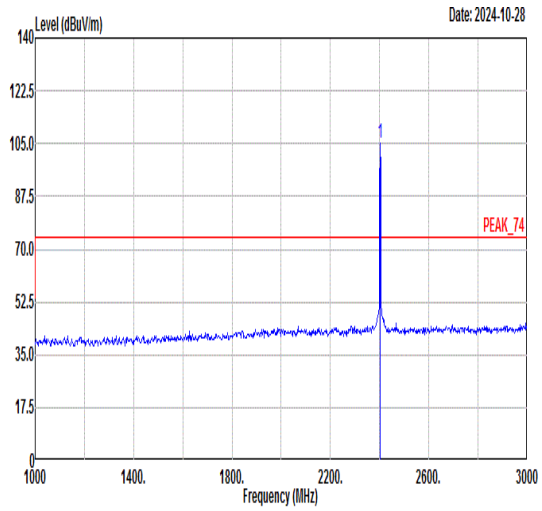
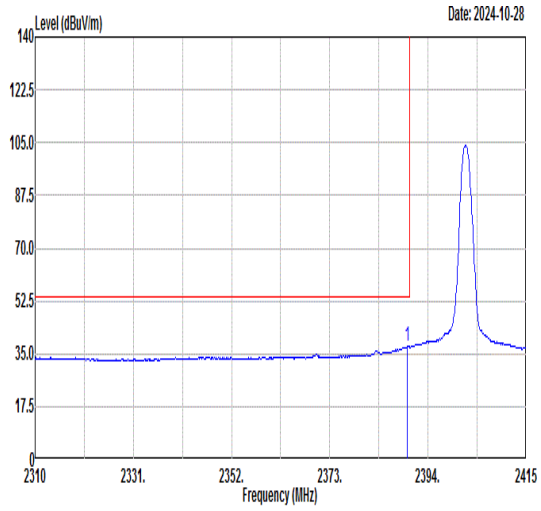
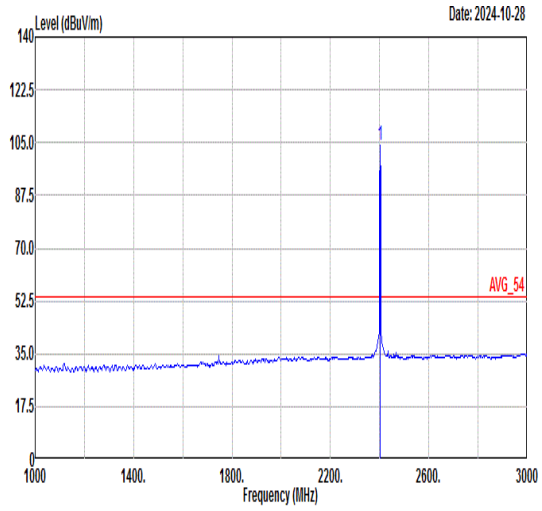
Horizontal:

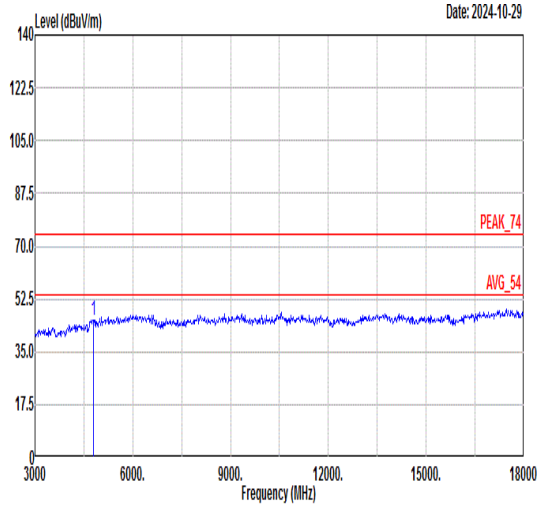
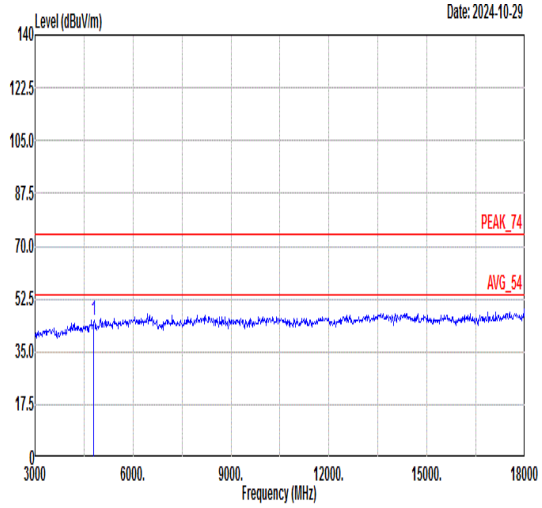
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	21.85	40.00	-18.15	27.72	25.20	0.53	31.60	---	---	Peak
2	77.53	26.30	40.00	-13.70	44.12	13.10	0.88	31.80	---	---	Peak
3	239.52	29.84	46.00	-16.16	42.54	17.30	1.60	31.60	---	---	Peak
4	323.91	39.91	46.00	-6.09	49.81	19.66	1.89	31.45	---	---	Peak
5	408.30	27.30	46.00	-18.70	34.36	22.32	2.12	31.50	---	---	Peak
6	947.62	31.05	46.00	-14.95	27.90	30.72	3.23	30.80	---	---	Peak

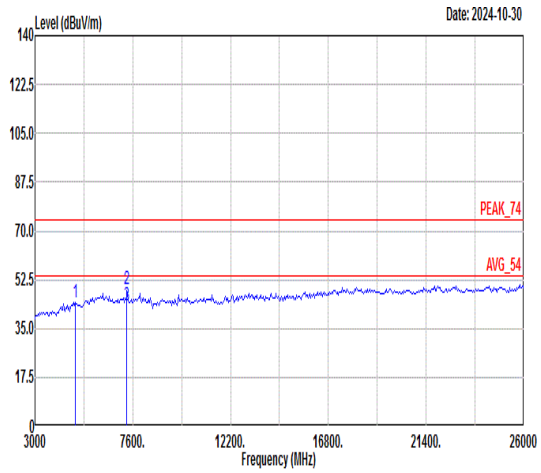
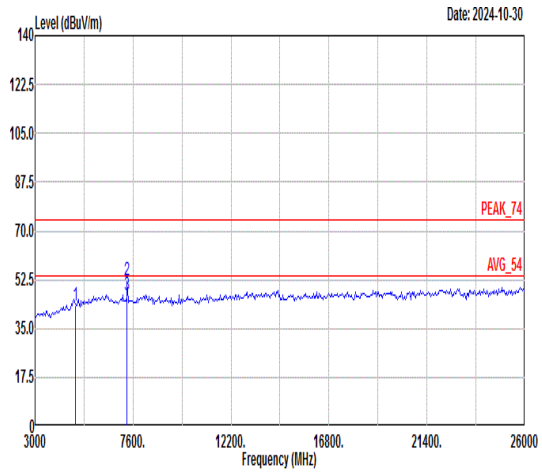
Vertical:

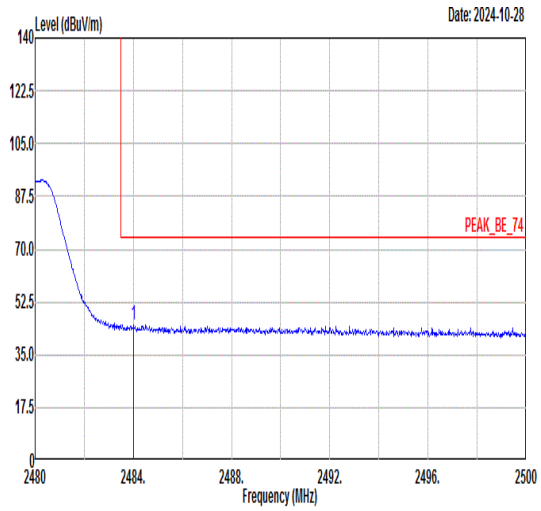
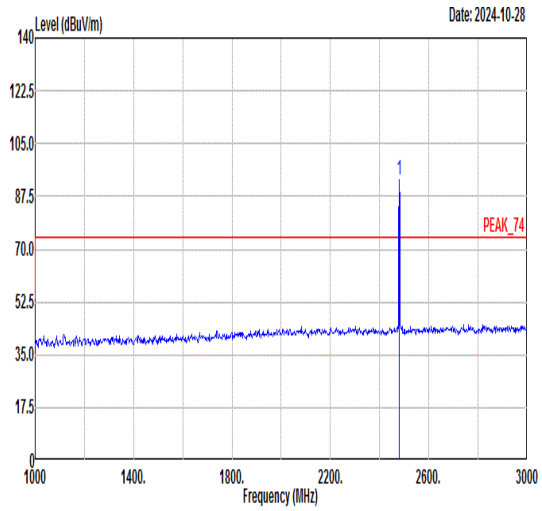
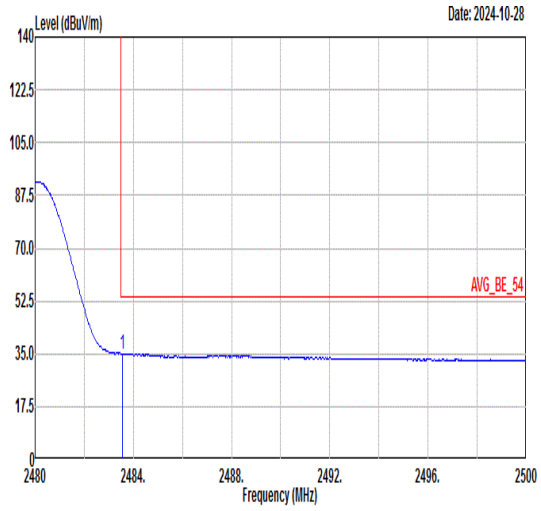
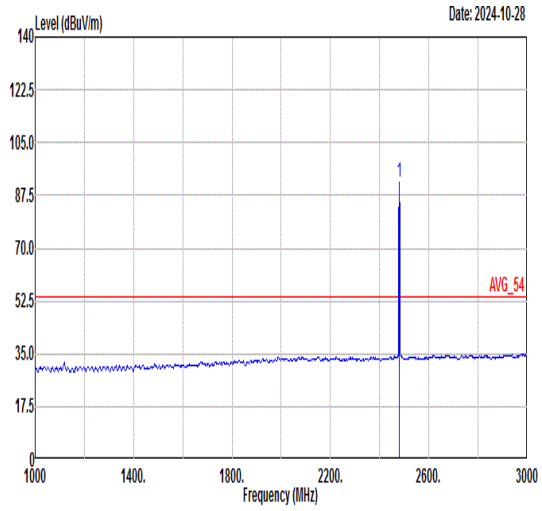
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	22.07	40.00	-17.93	27.94	25.20	0.53	31.60	---	---	Peak
2	54.25	21.36	40.00	-18.64	39.64	12.80	0.73	31.81	---	---	Peak
3	239.52	20.86	46.00	-25.14	33.56	17.30	1.60	31.60	---	---	Peak
4	323.91	27.25	46.00	-18.75	37.15	19.66	1.89	31.45	---	---	Peak
5	558.65	26.56	46.00	-19.44	28.82	26.44	2.48	31.18	---	---	Peak
6	952.47	30.64	46.00	-15.36	27.26	30.95	3.23	30.80	---	---	Peak

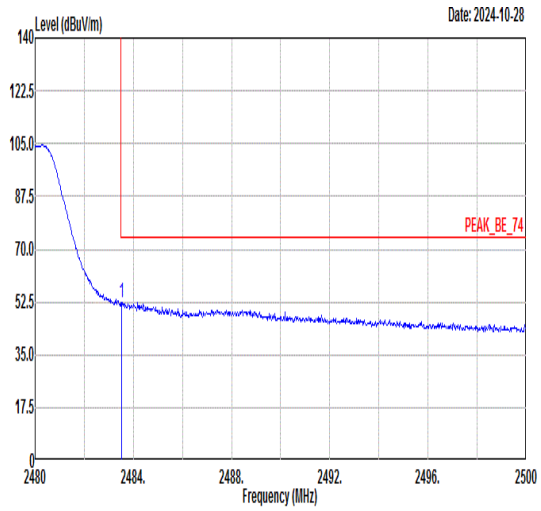
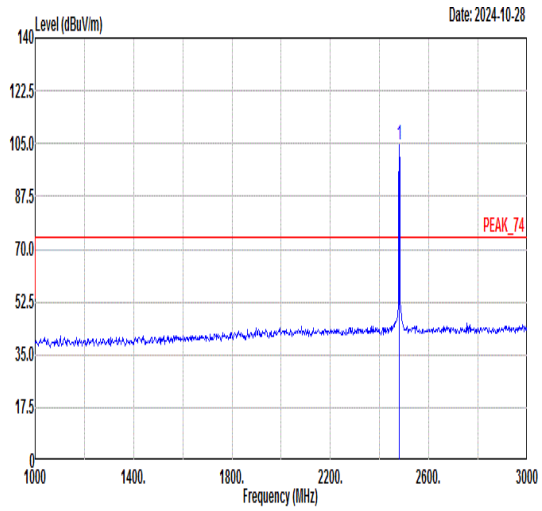
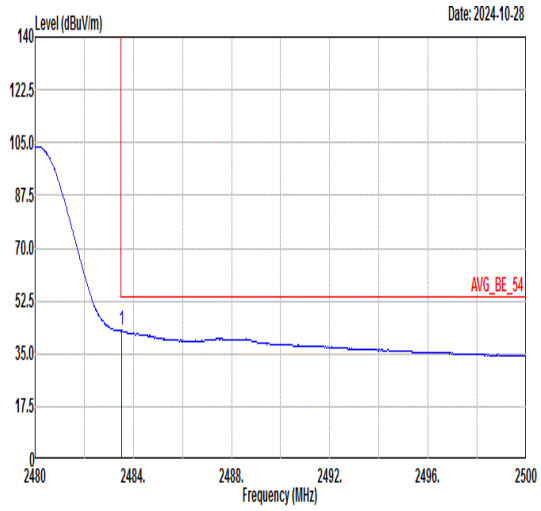
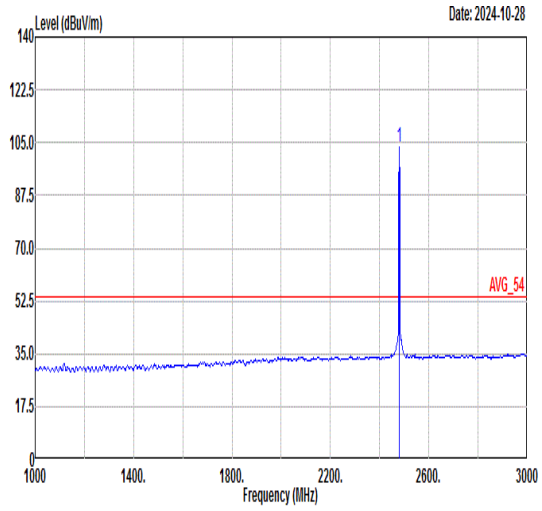
Mode	22	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2373.32 43.97 74.00 -30.03 41.42 30.73 5.34 33.52 278 291 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 94.55 ------ ------ 92.00 30.72 5.37 33.54 278 291 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2386.23 33.17 54.00 -20.83 30.62 30.72 5.36 33.53 278 291 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 93.55 ------ ------ 91.00 30.72 5.37 33.54 278 291 AVERAGE

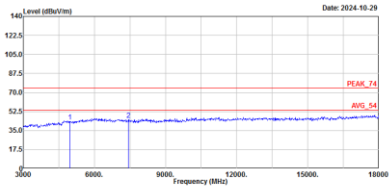
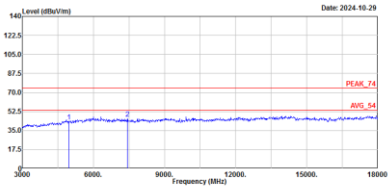
Mode	22	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2388.44 46.86 74.00 -27.14 44.31 30.72 5.36 33.53 188 235 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 104.99 ------ ------ 102.44 30.72 5.37 33.54 188 235 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2389.59 37.41 54.00 -16.59 34.86 30.72 5.36 33.53 188 235 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 103.96 ------ ------ 101.41 30.72 5.37 33.54 188 235 AVERAGE

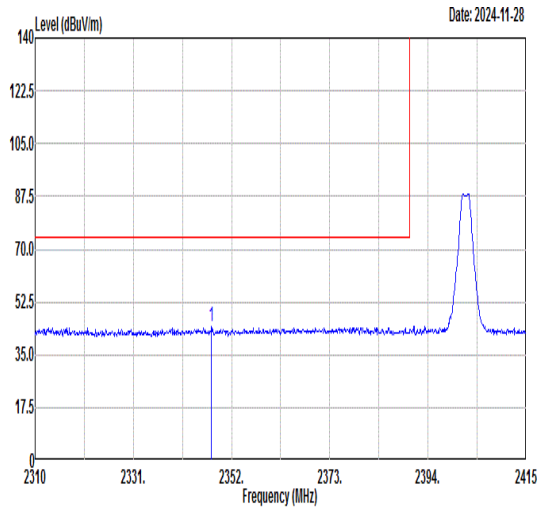
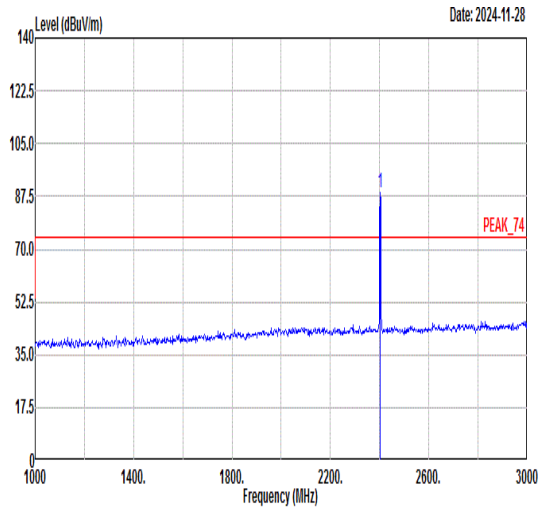
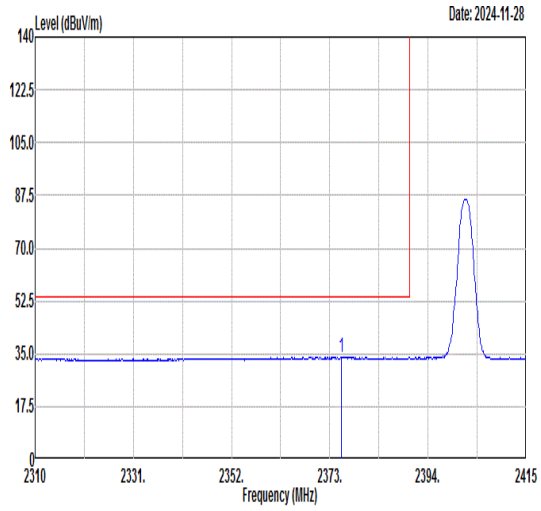
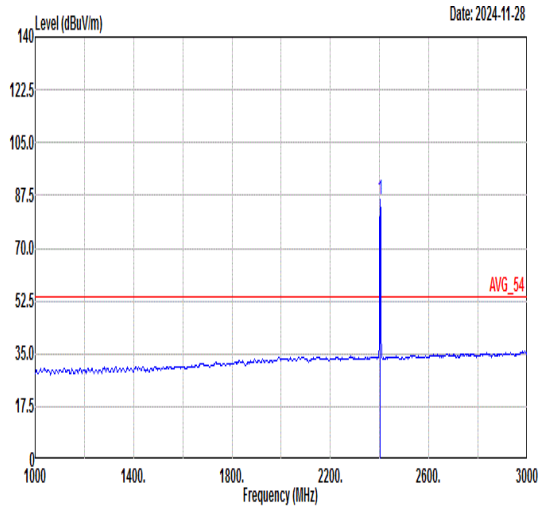
Mode	22	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 45.24 74.00 -28.76 52.15 35.73 8.94 51.58 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 45.44 74.00 -28.56 52.35 35.73 8.94 51.58 --- --- Peak

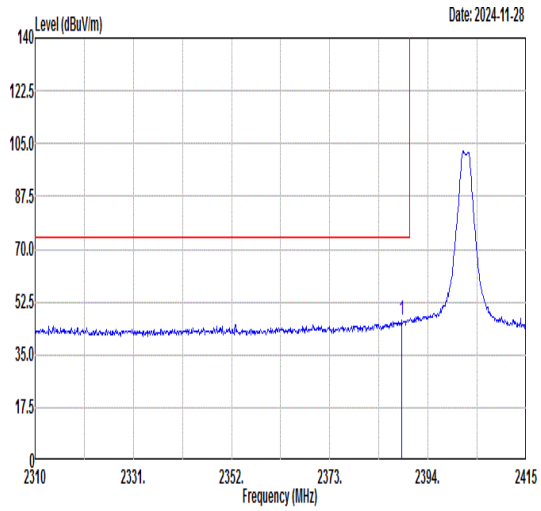
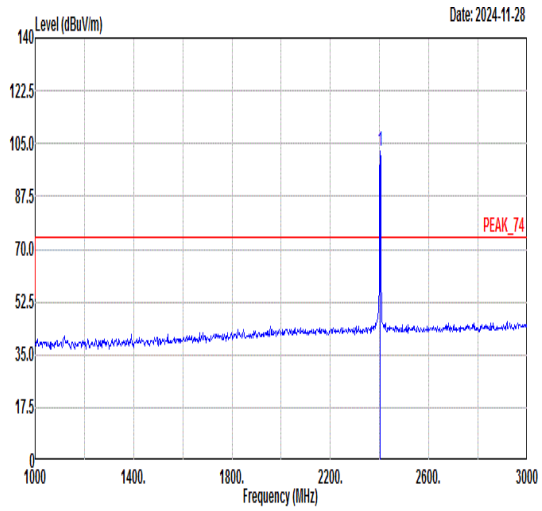
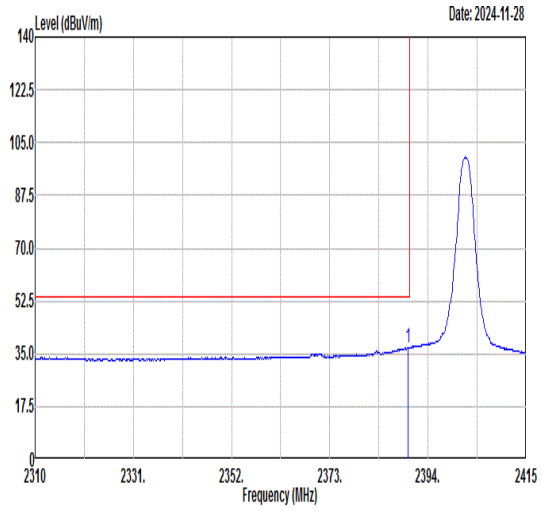
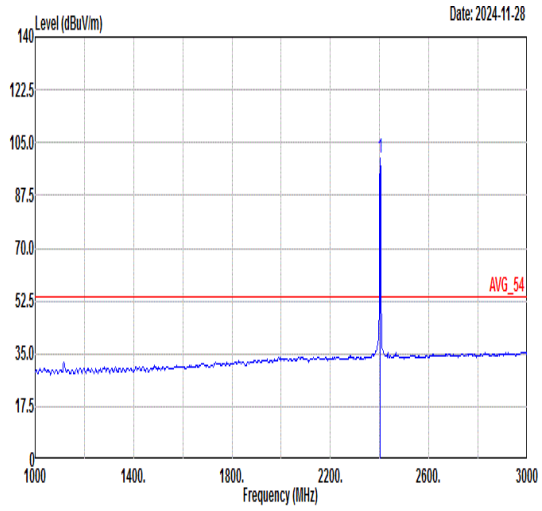
Mode	23	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH19_2440MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 44.30 74.00 -29.70 64.55 35.91 8.71 64.87 --- --- Peak 2 7320.00 49.29 74.00 -24.71 67.10 36.87 10.18 64.86 380 42 Peak 3 7320.00 43.18 54.00 -10.82 60.99 36.87 10.18 64.86 380 42 Average	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4880.00 43.19 74.00 -30.81 63.44 35.91 8.71 64.87 --- --- Peak 2 7320.00 52.09 74.00 -21.91 69.90 36.87 10.18 64.86 400 0 Peak 3 7320.00 46.76 54.00 -7.24 64.57 36.87 10.18 64.86 400 0 Average

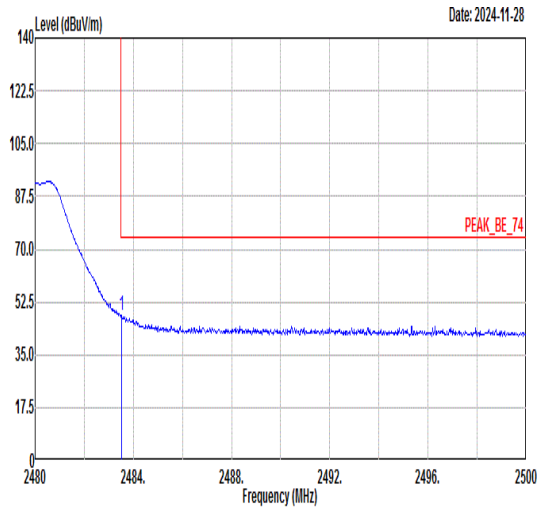
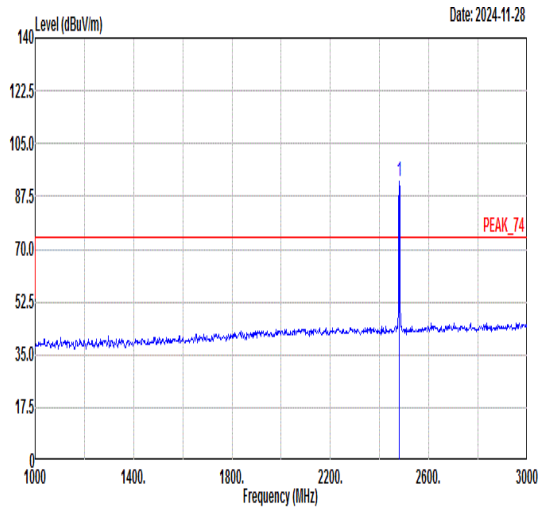
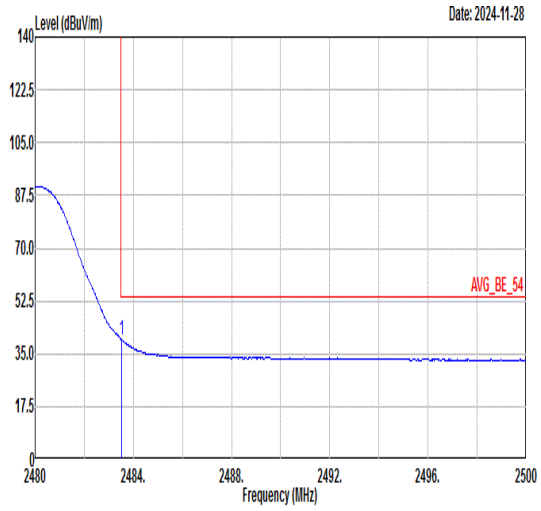
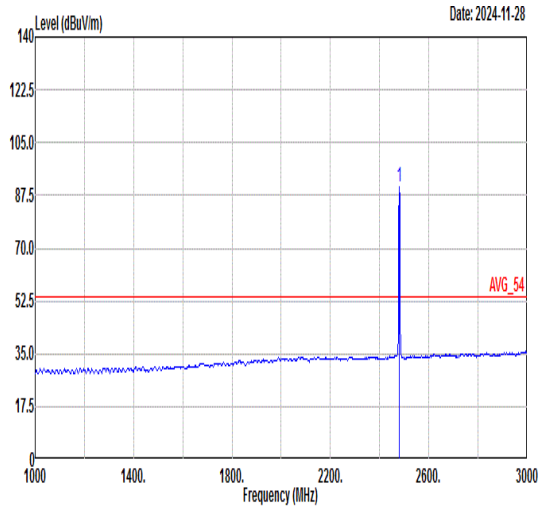
Mode	24	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2484.02 44.87 74.00 -29.13 42.30 30.70 5.46 33.59 121 234 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 92.98 ------ ------ 90.41 30.70 5.46 33.59 121 234 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.54 35.10 54.00 -18.90 32.53 30.70 5.46 33.59 121 234 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 91.99 ------ ------ 89.42 30.70 5.46 33.59 121 234 AVERAGE

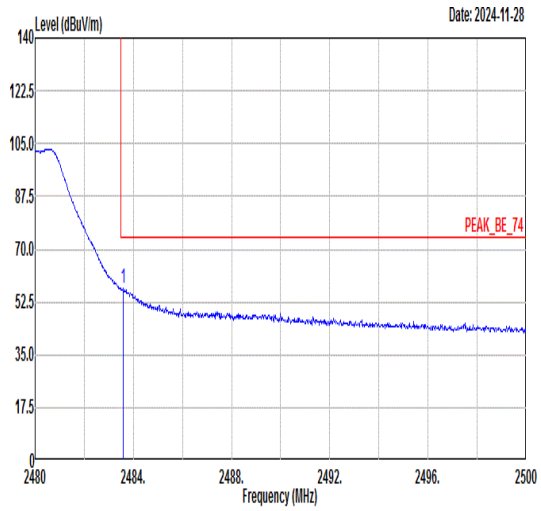
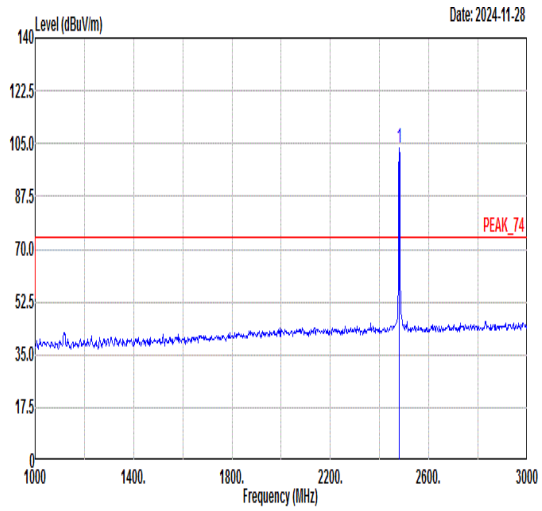
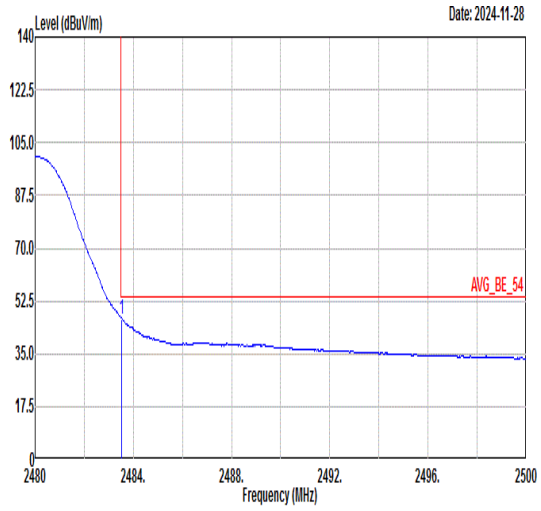
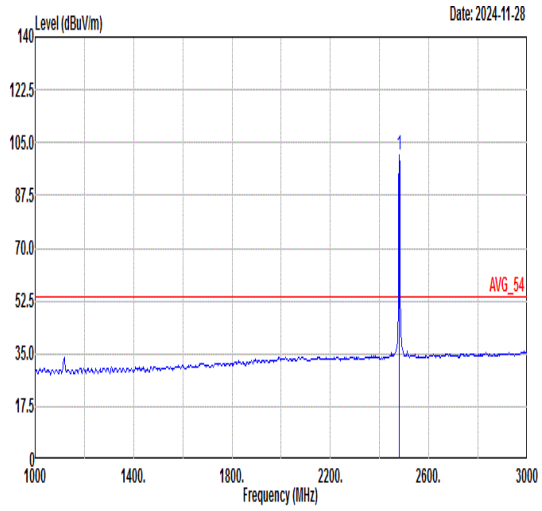
Mode	24	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.52 52.51 74.00 -21.49 49.94 30.70 5.46 33.59 184 236 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 104.68 ------ ------ 102.11 30.70 5.46 33.59 184 236 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2483.52 42.65 54.00 -11.35 40.08 30.70 5.46 33.59 184 236 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2480.00 103.66 ------ ------ 101.09 30.70 5.46 33.59 184 236 AVERAGE

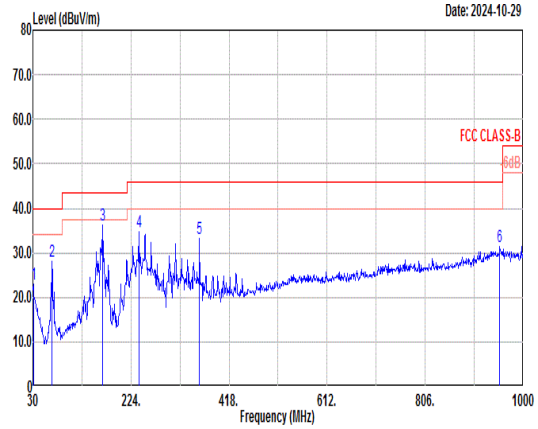
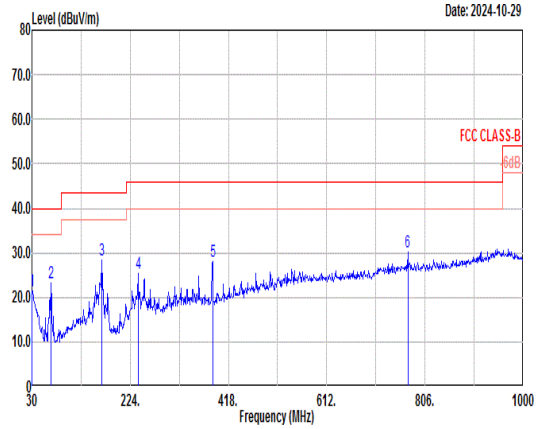
Mode	24	
	Harmonic	
	2400-2483.5_Bluetooth-LE_GFSK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 43.21 74.00 -30.79 63.55 36.10 8.46 64.90 --- --- Peak 2 7440.00 44.82 74.00 -29.18 62.69 36.82 10.17 64.86 --- --- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 43.11 74.00 -30.89 63.45 36.10 8.46 64.90 --- --- Peak 2 7440.00 45.72 74.00 -28.28 63.59 36.82 10.17 64.86 --- --- Peak

Mode	25	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2347.70 44.16 74.00 -29.84 41.58 30.77 5.32 33.51 200 137 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 88.58 ------ ------ 85.97 30.78 5.37 33.54 200 137 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2375.42 33.83 54.00 -20.17 31.23 30.78 5.35 33.53 200 137 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2402.00 86.20 ------ ------ 83.59 30.78 5.37 33.54 200 137 AVERAGE

Mode	25	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2388.44 46.64 74.00 -27.36 44.03 30.78 5.36 33.53 100 156 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2402.00 102.49 ------ ------ 99.88 30.78 5.37 33.54 100 156 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2389.80 36.91 54.00 -17.09 34.30 30.78 5.36 33.53 100 156 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2402.00 100.10 ------ ------ 97.49 30.78 5.37 33.54 100 156 AVERAGE

Mode	26	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.52 47.92 74.00 -26.08 45.25 30.80 5.46 33.59 400 272 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 92.65 ------ ------ 89.98 30.80 5.46 33.59 400 272 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.52 39.74 54.00 -14.26 37.07 30.80 5.46 33.59 400 272 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 90.34 ------ ------ 87.67 30.80 5.46 33.59 400 272 AVERAGE

Mode	26	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GSFK _CH39_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.58 56.93 74.00 -17.07 54.26 30.80 5.46 33.59 106 208 PEAK	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 103.30 ------ ------ 100.63 30.80 5.46 33.59 106 208 PEAK
Avg	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2483.52 46.65 54.00 -7.35 43.98 30.80 5.46 33.59 106 208 AVERAGE	 Freq Level Limit Line Margin (dB) Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark 1 2480.00 101.11 ------ ------ 98.44 30.80 5.46 33.59 106 208 AVERAGE

Mode	27	
	LF	
	2400-2483.5_Bluetooth-LE_GFSK-LF _CH19_LF_2440MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
QP/ Peak		

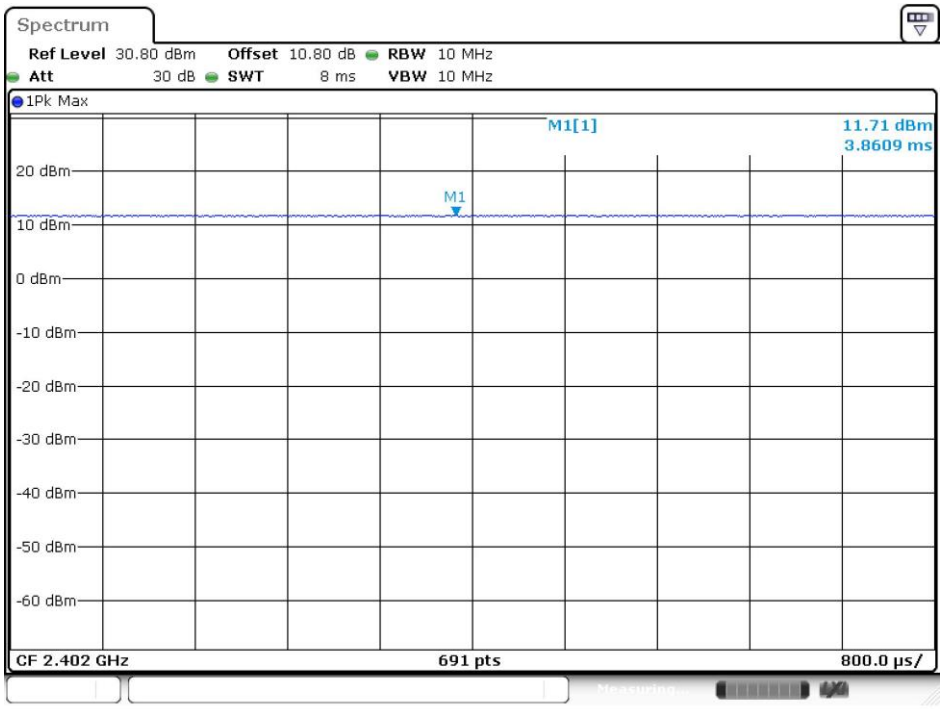
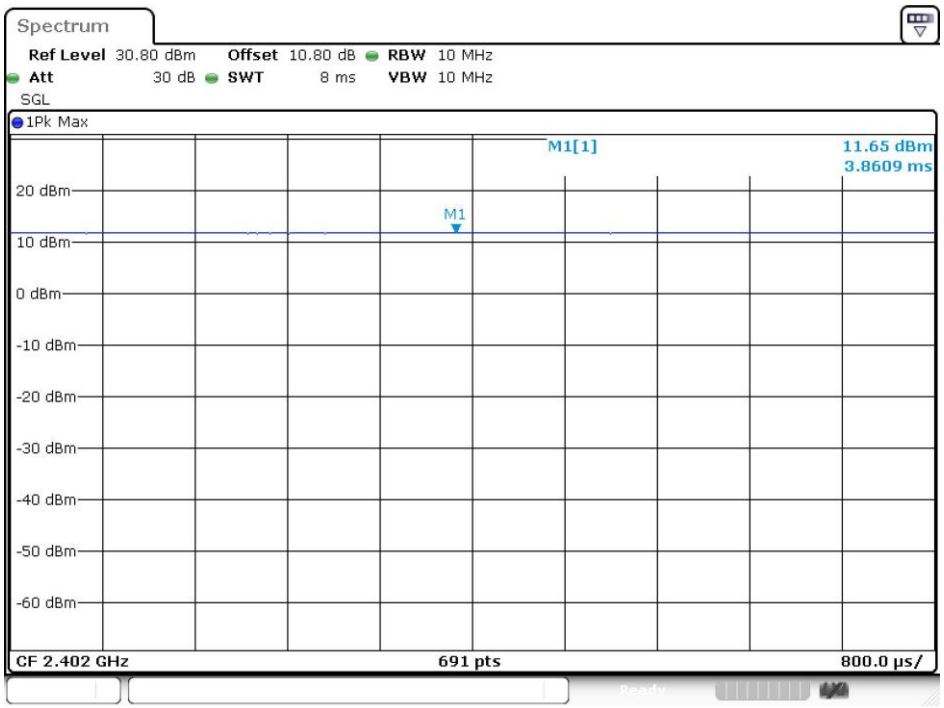
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.97	22.84	40.00	-17.16	29.22	24.70	0.54	31.62	---	---	Peak
2	67.83	27.94	40.00	-12.06	46.62	12.30	0.82	31.80	---	---	Peak
3	167.74	36.17	43.50	-7.33	50.61	15.90	1.32	31.66	---	---	Peak
4	239.52	34.81	46.00	-11.19	47.51	17.30	1.60	31.60	---	---	Peak
5	359.80	33.20	46.00	-12.80	41.82	20.80	2.00	31.42	---	---	Peak
6	953.44	31.28	46.00	-14.72	27.85	31.00	3.24	30.81	---	---	Peak

	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	21.48	40.00	-18.52	27.35	25.20	0.53	31.60	---	---	Peak
2	67.83	23.35	40.00	-16.65	42.03	12.30	0.82	31.80	---	---	Peak
3	167.74	28.38	43.50	-15.12	42.82	15.90	1.32	31.66	---	---	Peak
4	239.52	25.31	46.00	-20.69	38.01	17.30	1.60	31.60	---	---	Peak
5	386.96	28.03	46.00	-17.97	35.95	21.48	2.07	31.47	---	---	Peak
6	772.05	30.05	46.00	-15.95	29.92	28.40	2.89	31.16	---	---	Peak

Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Bluetooth LE 1Mbps	100	-	-	10Hz
Bluetooth LE 2Mbps	100	-	-	10Hz

Bluetooth LE 1Mbps



Bluetooth LE 2Mbps