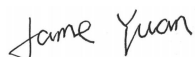




RF MEASUREMENT REPORT

FCC ID: DD4-SC7LW
Applicant: Shure Incorporated
Product: Wireless lavalier microphone
Regulatory Model SC7LW
Number (RMN):
Brand Name: 
FCC Classification: Digital Transmission System (DTS)
FCC Rule Part(s): Part 15 Subpart C (Section 15.247)
Result: Complies
Received Date: 2023-03-08
Test Date: 2023-03-11 ~ 2023-07-25

Reviewed By:



Jame Yuan

Approved By:



Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2303RSU016-U1	V01	Initial Report	2023-07-26	Valid

CONTENTS

Description	Page
1. General Information	5
1.1. Applicant	5
1.2. Manufacturer	5
1.3. Testing Facility	5
1.4. Product Information.....	6
1.5. Radio Specification under Test	6
1.6. Working Frequencies	7
2. Test Configuration	9
2.1. Test Mode.....	9
2.2. Test System Connection Diagram	9
2.3. Test Software	10
2.4. Applied Standards.....	10
2.5. Test Environment Condition	10
3. Antenna Requirements	11
4. Measuring Instrument	12
5. Decision Rules and Measurement Uncertainty	14
5.1. Decision Rules	14
5.2. Measurement Uncertainty	14
6. Test Result.....	15
6.1. Summary	15
6.2. 6dB Bandwidth Measurement.....	16
6.2.1. Test Limit	16
6.2.2. Test Procedure	16
6.2.3. Test Setting	16
6.2.4. Test Setup	16
6.2.5. Test Result	16
6.3. Output Power Measurement	17
6.3.1. Test Limit	17
6.3.2. Test Procedure	17
6.3.3. Test Setting	17
6.3.4. Test Setup	17
6.3.5. Test Result	17
6.4. Power Spectral Density Measurement	18
6.4.1. Test Limit	18
6.4.2. Test Procedure	18

6.4.3.	Test Setting	18
6.4.4.	Test Setup	18
6.4.5.	Test Result	18
6.5.	Conducted Band Edge and Out-of-Band Emissions Measurement	19
6.5.1.	Test Limit	19
6.5.2.	Test Procedure	19
6.5.3.	Test Settintg	19
6.5.4.	Test Setup	19
6.5.5.	Test Result	20
6.6.	Radiated Spurious Emission Measurement.....	21
6.6.1.	Test Limit	21
6.6.2.	Test Procedure	21
6.6.3.	Test Setting	21
6.6.4.	Test Setup	23
6.6.5.	Test Result	24
6.7.	Radiated Restricted Band Edge Measurement	25
6.7.1.	Test Limit	25
6.7.2.	Test Procedure	26
6.7.3.	Test Setting	26
6.7.4.	Test Setup	27
6.7.5.	Test Result	27
6.8.	AC Conducted Emissions Measurement.....	28
6.8.1.	Test Limit	28
6.8.2.	Test Setup	28
6.8.3.	Test Result	28
Appendix A - Test Result.....		29
A.1	Duty Cycle Test Result.....	29
A.2	6dB Bandwidth Test Result	30
A.3	Output Power Test Result	34
A.4	Power Spectral Density Test Result.....	36
A.5	Conducted Band Edge and Out-of-Band Emissions Test Result.....	40
A.6	Radiated Spurious Emission Test Result.....	49
A.7	Radiated Restricted Band Edge Test Result.....	55
A.1	AC Conducted Emissions Test Result	87
Appendix B - Test Setup Photograph		89
Appendix C - EUT Photograph		90

1. General Information

1.1. Applicant

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.2. Manufacturer

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.3. Testing Facility

☒	Test Site – MRT Suzhou Laboratory
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	Laboratory Accreditations
	A2LA: 3628.01 FCC: CN1166 VCCI:
	CNAS: L10551 ISED: CN0001 ☐R-20025 ☐G-20034 ☐C-20020 ☐T-20020 ☐R-20141 ☐G-20134 ☐C-20103 ☐T-20104
☐	Test Site – MRT Shenzhen Laboratory
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 FCC: CN1284
	CNAS: L10551 ISED: CN0105
☐	Test Site – MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: L3261-190725 FCC: 291082, TW3261
	ISED: TW3261

1.4. Product Information

Product Name	Wireless lavalier microphone
Regulatory Model Number (RMN)	SC7LW
EUT Identification No.	23030308Sample#04, 23030610Sample#01 (RF Conducted Testing) 23030320Sample#04 (RF Radiated Testing)
Radio Specification	Bluetooth v5.3 single mode & Proprietary Mode
Working Voltage	By Li-ion battery
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

Radio Frequency	BLE 1Mbps: 2402 ~ 2480MHz BLE 2Mbps: 2404 ~ 2478MHz Proprietary Mode 2Mbps: 2404 ~ 2478MHz Proprietary Mode-1Mbps: 2402 ~ 2480MHz
Channel Number	BLE 1Mbps: 40 BLE 2Mbps: 37 Proprietary Mode 2Mbps: 24 Proprietary Mode 1Mbps: 3
Type of modulation	GFSK
Data Rate	1Mbps & 2Mbps
Antenna Type	Loop Antenna
Antenna Gain	-0.10dBi

1.6. Working Frequencies

BLE-1Mbps & 2Mbps

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

Note: Only BLE 1Mbps use the three advertising channels (2402 / 2426 / 2480 MHz) during the connection establishment.

Proprietary Mode 1Mbps

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2426 MHz	02	2480 MHz

Proprietary Mode 2Mbps

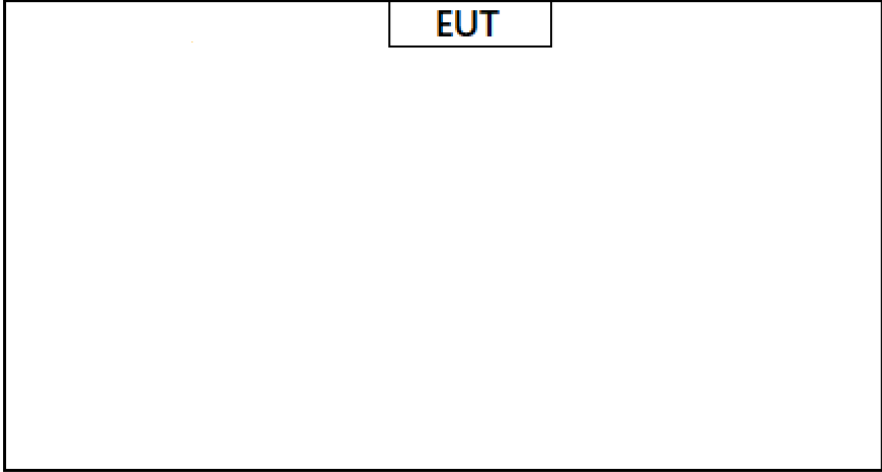
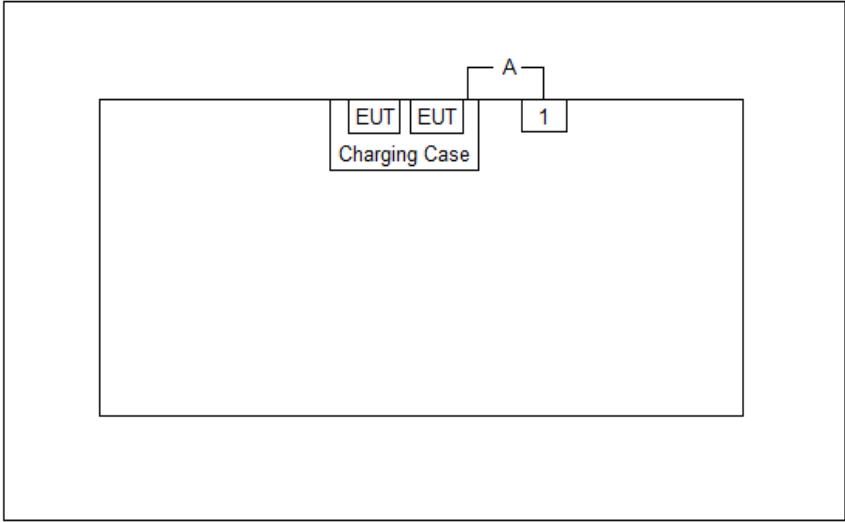
Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2404 MHz	02	2408 MHz	03	2411 MHz
04	2414 MHz	05	2417 MHz	06	2420 MHz
07	2423 MHz	08	2429 MHz	09	2432 MHz
10	2435 MHz	11	2438 MHz	12	2441 MHz
13	2444 MHz	14	2447 MHz	15	2450 MHz
16	2453 MHz	17	2456 MHz	18	2459 MHz
19	2462 MHz	20	2465 MHz	21	2468 MHz
21	2471 MHz	23	2474 MHz	24	2478 MHz

2. Test Configuration

2.1. Test Mode

Mode 1: Transmit by BLE 1Mbps
Mode 2: Transmit by BLE 2Mbps
Mode 3: Transmit by Proprietary Mode 2Mbps
Mode 4: Transmit by Proprietary Mode 1Mbps

2.2. Test System Connection Diagram

Connection Diagram – Radiated Emission testing			
			
Connection Diagram – Conducted Emission testing			
			
No.	Cable Type	Cable Spec.	Length
A	USB Cable	Shielding	0.4m

2.3. Test Software

The test utility software used during testing was “Shure_Control”, and the version was v1.81.

2.4. Applied Standards

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

- FCC Part 15.247
- KDB 558074 D01v05r02
- ANSI C63.10-2013

2.5. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. 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 provisions of this section.”

- The antenna of the device is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2023-05-08	WZ-AC1
				1 year	2024-05-07	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
				1 year	2024-06-09	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
				1 year	2024-04-20	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
				1 year	2024-05-31	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1/WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1/WZ-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2024-01-12	WZ-AC1/WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2024-05-15	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
				1 year	2024-05-23	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2023-05-08	WZ-AC2
				1 year	2024-05-07	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2023-04-21	WZ-AC2
				1 year	2024-04-20	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2023-06-04	WZ-SR5
				1 year	2024-05-23	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2023-06-06	WZ-SR5
				1 year	2024-05-31	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2023-06-04	WZ-SR5
				1 year	2024-05-23	WZ-SR5
Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2024-02-29	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11087	1 year	2023-06-09	WZ
				1 year	2024-06-08	WZ

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Attenuator	MVE	MVE2213	MRTSUE11093	1 year	2023-06-09	WZ
				1 year	2024-06-08	WZ

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable
Controller_MF 7802	1.02	RE Antenna & Turntable
Agilent Power Analyzer/Agilent Power Panel	V R03.09.00	Power

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2.
(Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): Coaxial: 9kHz~30MHz: 2.59dB Coplanar: 9kHz~30MHz: 2.60dB Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~40GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.91dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.3dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.5dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.3dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.2%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.247(a)(2)	6dB Bandwidth	Conducted	Pass
15.247(b)(3)	Output Power		Pass
15.247(e)	Power Spectral Density		Pass
15.247(d)	Band Edge / Out-of-Band Emissions		Pass
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Notes:

1. The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
3. In addition to the output power assessed two power levels, other items assessed high power level.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

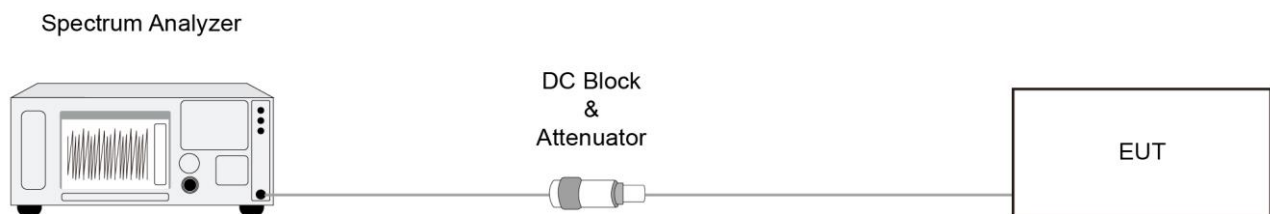
6.2.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. Output Power Measurement

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.9.1.3

ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

PKPM1 Peak Power meter Measurement

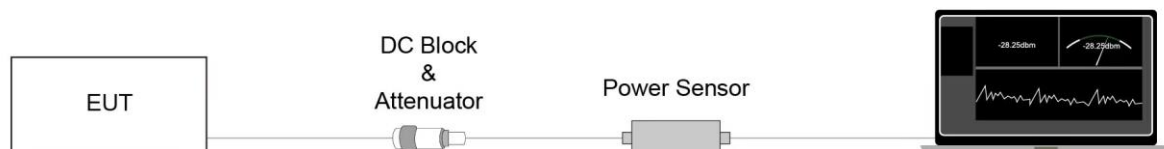
The maximum peak conducted output power may be measured using a broadband peak RF power meter.

The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

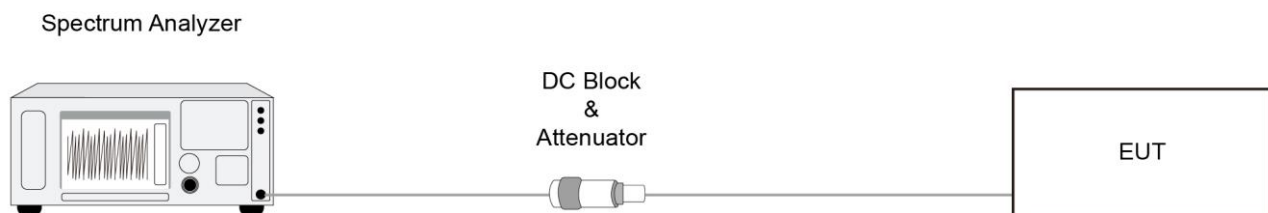
6.4.2. Test Procedure

ANSI C63.10-2013 Section 11.10.2

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Conducted Band Edge and Out-of-Band Emissions Measurement

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Settling

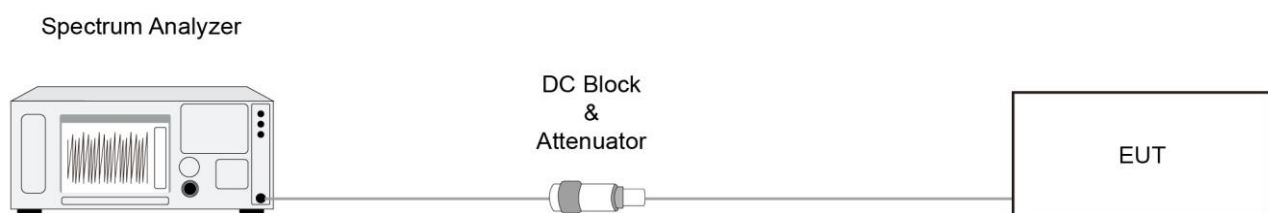
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Radiated Spurious Emission Measurement

6.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.6.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.11 & 11.12

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 - 2013 - Section 6.6 (Standard test method above 1GHz)

6.6.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

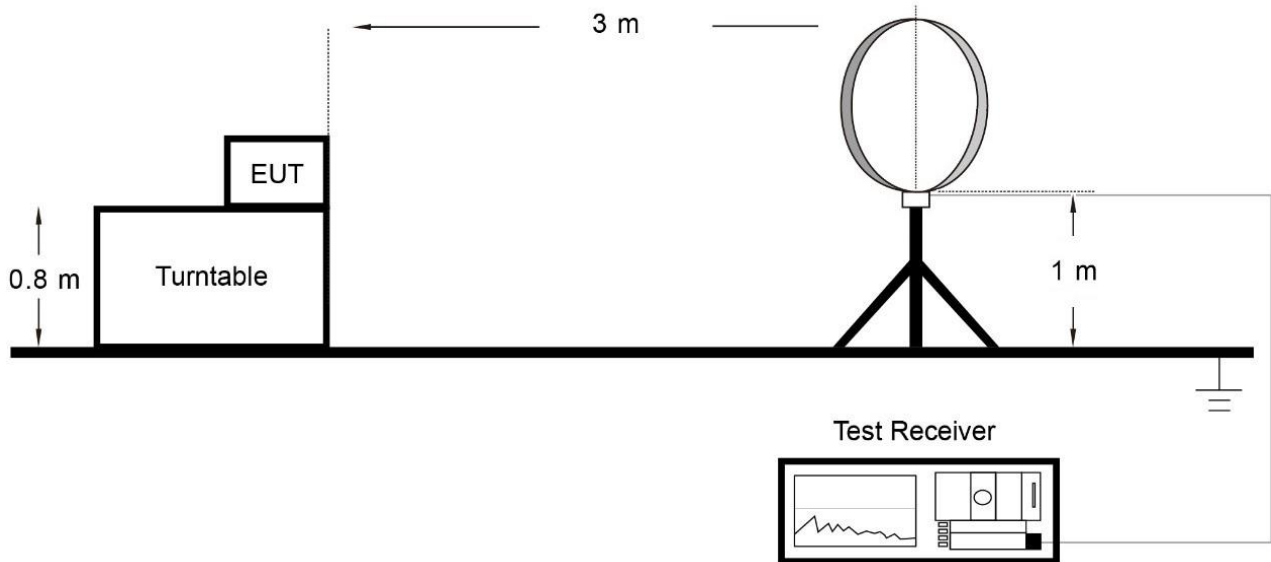
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

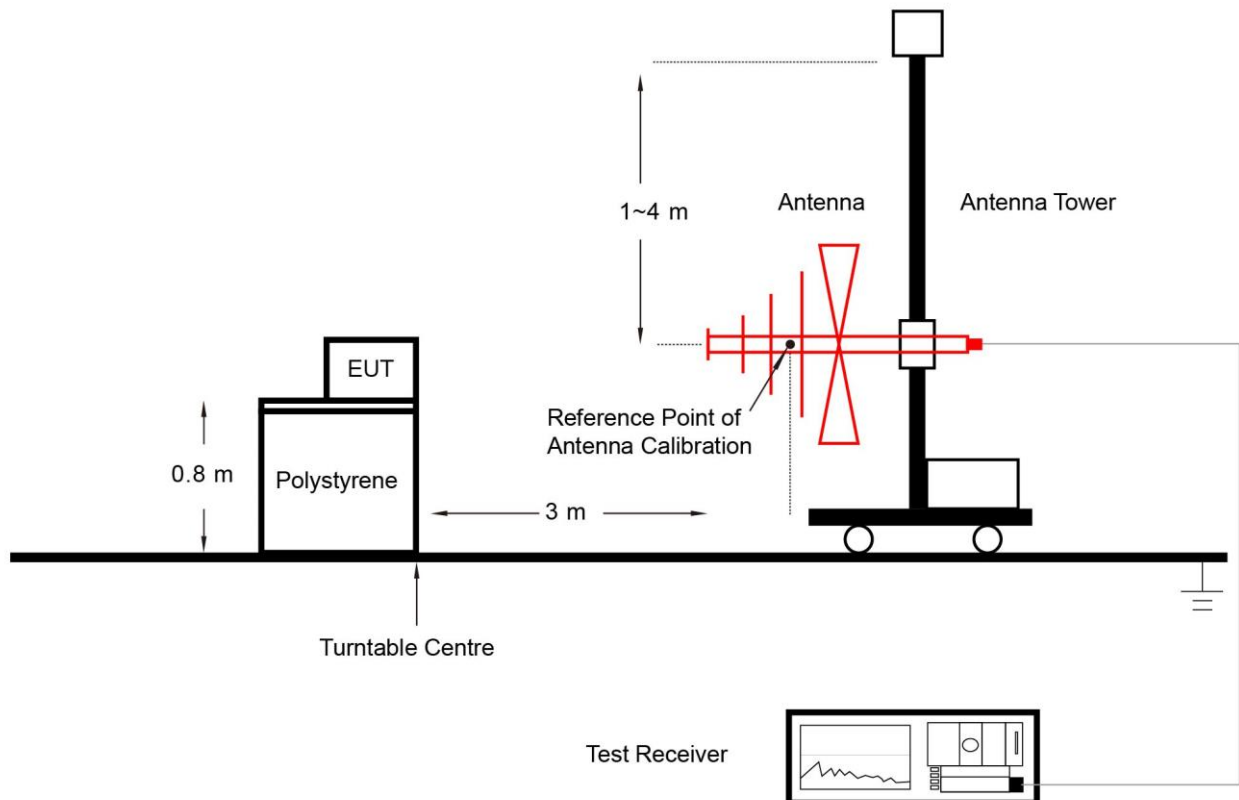
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.4. Test Setup

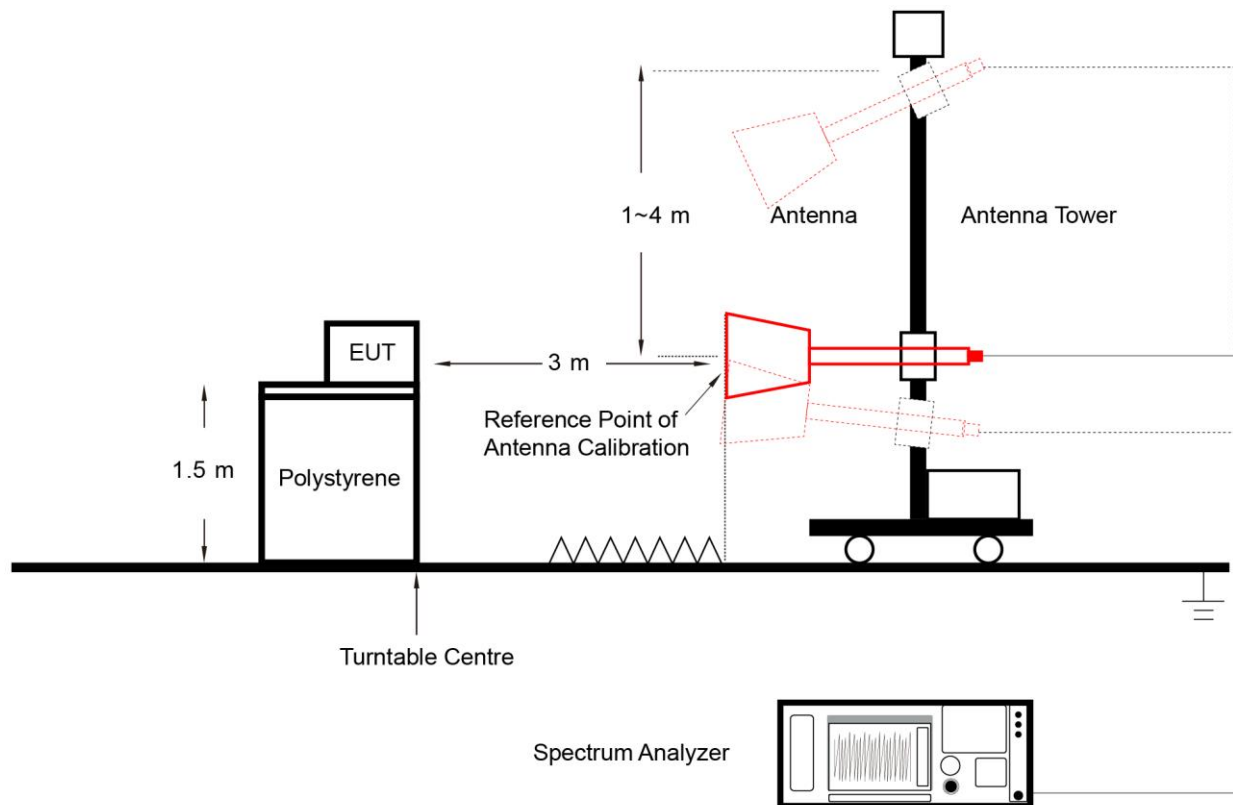
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.6.

6.7. Radiated Restricted Band Edge Measurement

6.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure

ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

6.7.3. Test Setting

Peak Field Strength Measurements

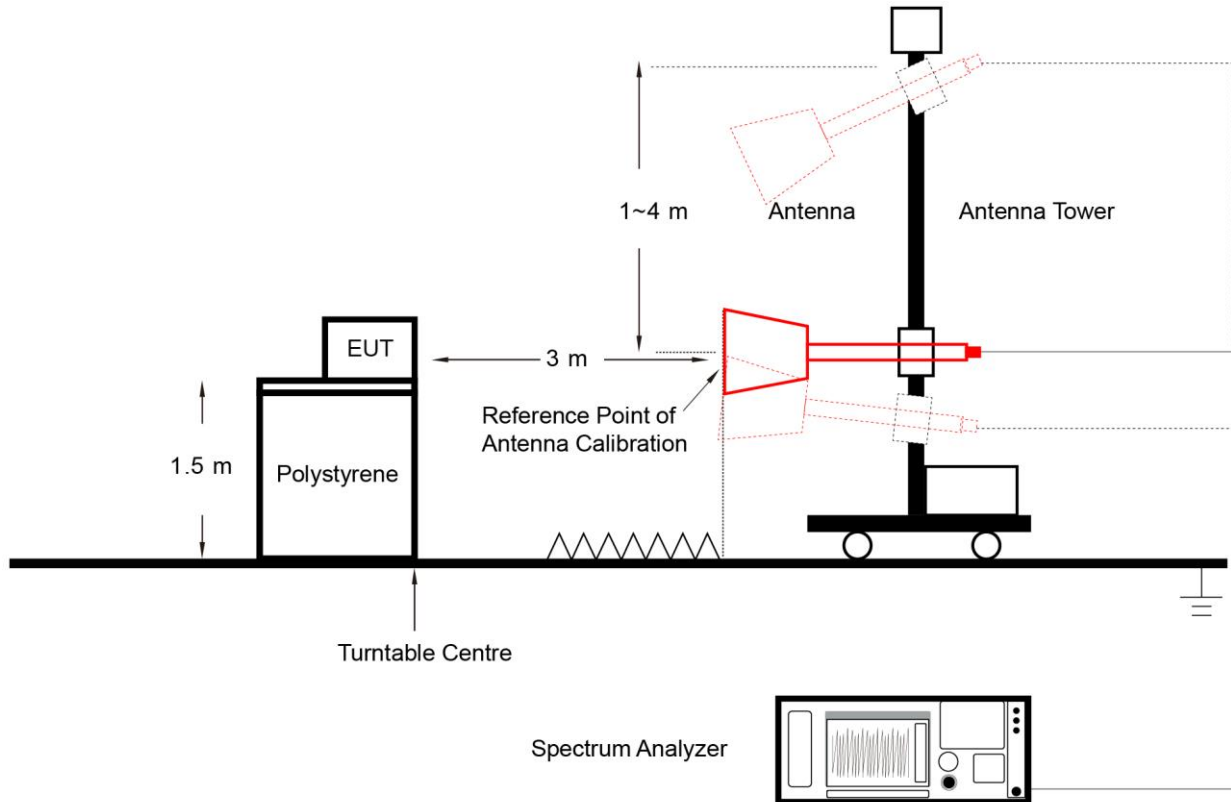
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak

6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.7.4. Test Setup



6.7.5. Test Result

Refer to Appendix A.7.

6.8. AC Conducted Emissions Measurement

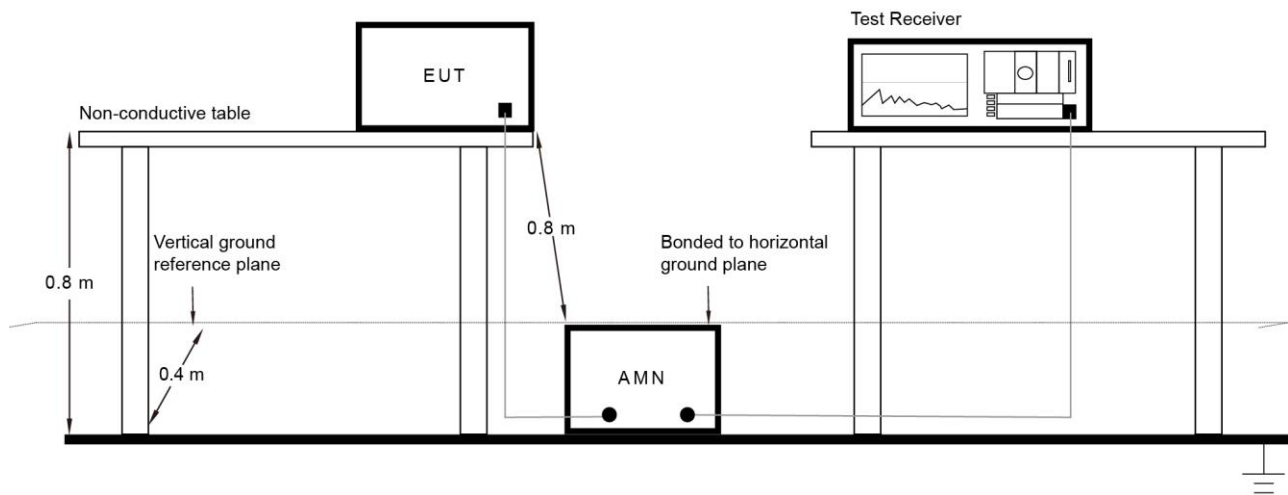
6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.8.2. Test Setup



6.8.3. Test Result

Refer to Appendix A.8.

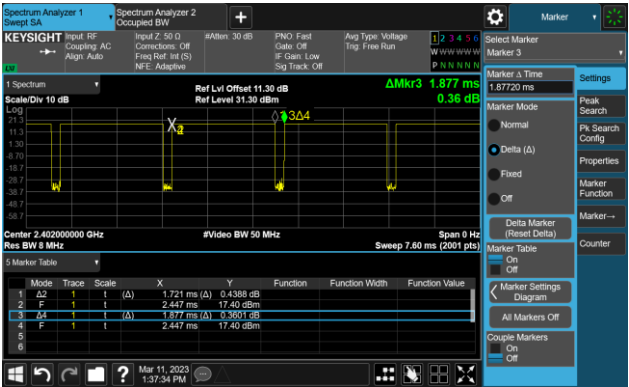
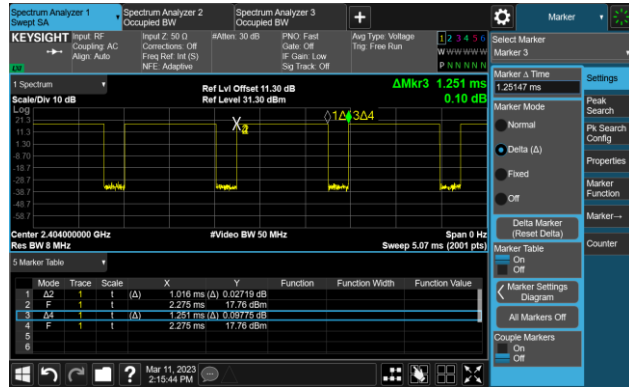
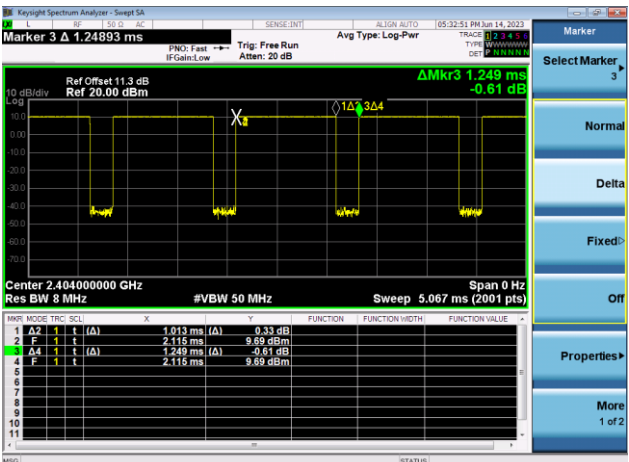
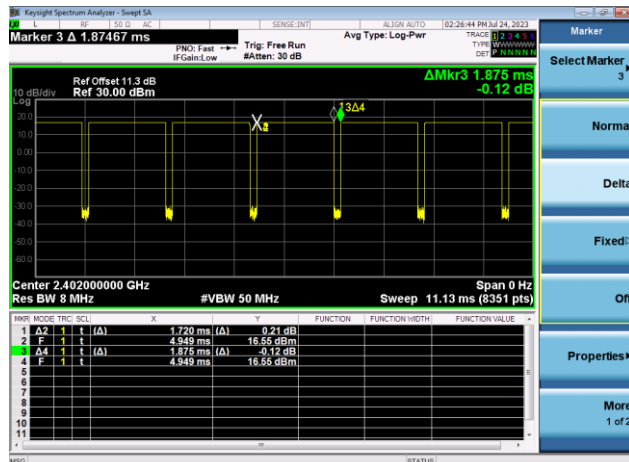
Appendix A - Test Result

A.1 Duty Cycle Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-03-11 & 2023-06-14 & 2023-07-24		

Test Mode	Duty Cycle
BLE 1Mbps	91.69%
BLE 2Mbps	81.22%
Proprietary Mode 2Mbps	81.10%
Proprietary Mode 1Mbps	91.73%

Duty Cycle (T = Transmission Duration)

BLE 1Mbps (T = 1.721ms)	BLE 2Mbps (T = 1.016ms)
	
Proprietary Mode 2Mbps (T = 1.013ms)	Proprietary Mode 1Mbps (T = 1.720ms)
	

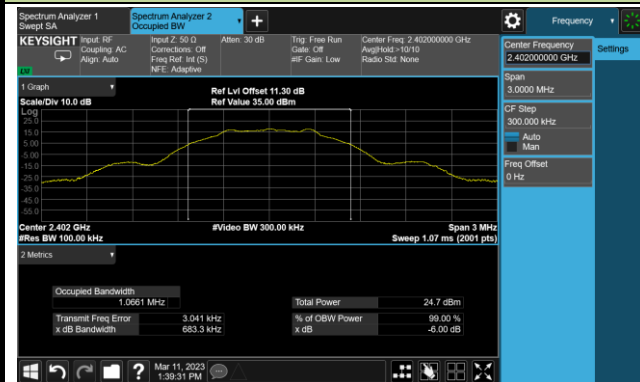
A.2 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-03-11 & 2023-06-14 & 2023-07-24		

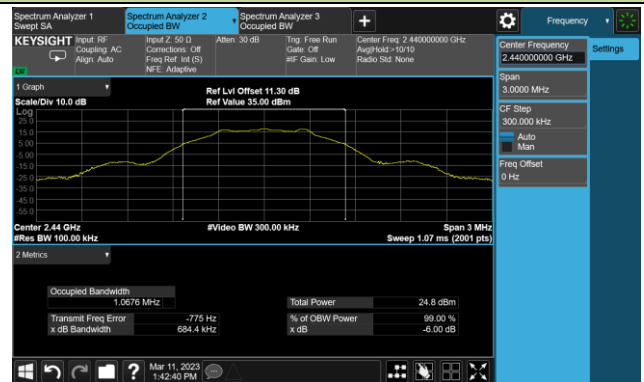
Test Mode	Data Rate	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
BLE	1Mbps	00	2402	0.6833	≥ 0.5
BLE	1Mbps	19	2440	0.6844	≥ 0.5
BLE	1Mbps	39	2480	0.6858	≥ 0.5
BLE	2Mbps	01	2404	1.145	≥ 0.5
BLE	2Mbps	19	2440	1.131	≥ 0.5
BLE	2Mbps	38	2478	1.141	≥ 0.5
Proprietary Mode	2Mbps	01	2404	1.161	≥ 0.5
Proprietary Mode	2Mbps	13	2444	1.152	≥ 0.5
Proprietary Mode	2Mbps	24	2478	1.149	≥ 0.5
Proprietary Mode	1Mbps	00	2402	0.6876	≥ 0.5
Proprietary Mode	1Mbps	01	2426	0.6876	≥ 0.5
Proprietary Mode	1Mbps	02	2480	0.6802	≥ 0.5

BLE 1Mbps 6dB Bandwidth

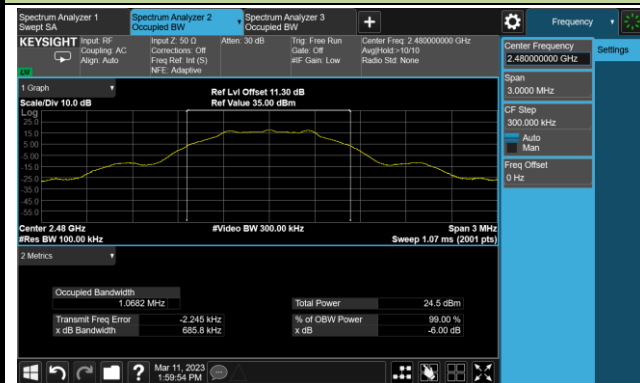
Channel 00 (2402MHz)



Channel 19 (2440MHz)

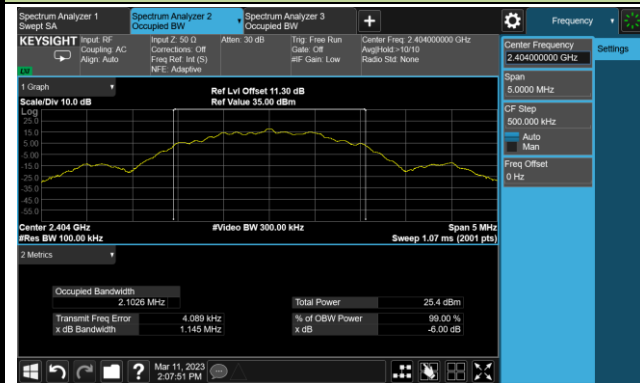


Channel 39 (2480MHz)

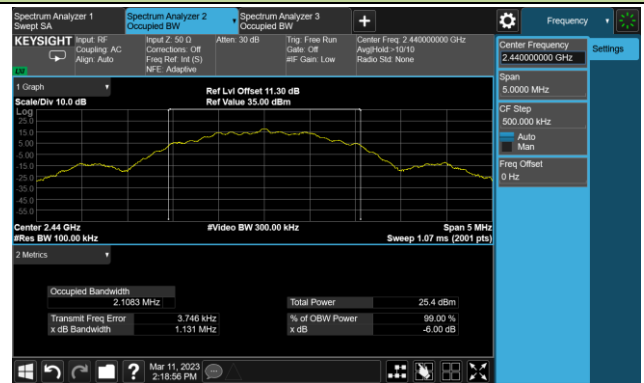


BLE 2Mbps 6dB Bandwidth

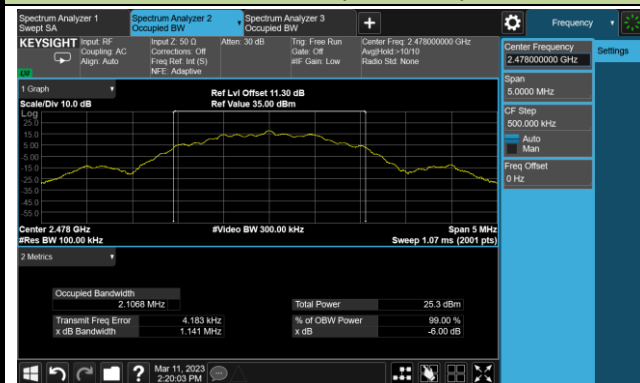
Channel 01 (2404MHz)



Channel 19 (2440MHz)

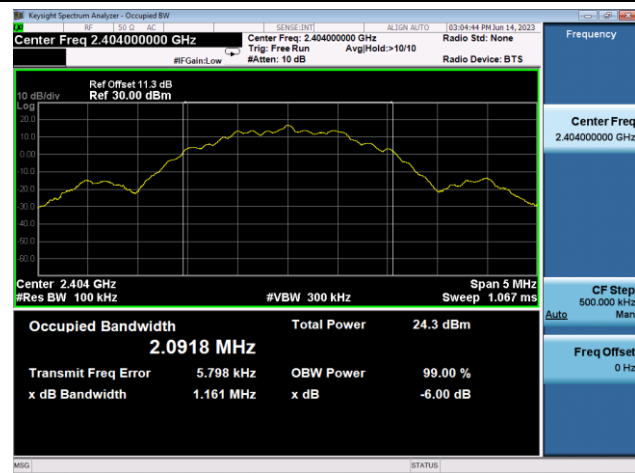


Channel 38 (2478MHz)



Proprietary Mode 2Mbps 6dB Bandwidth

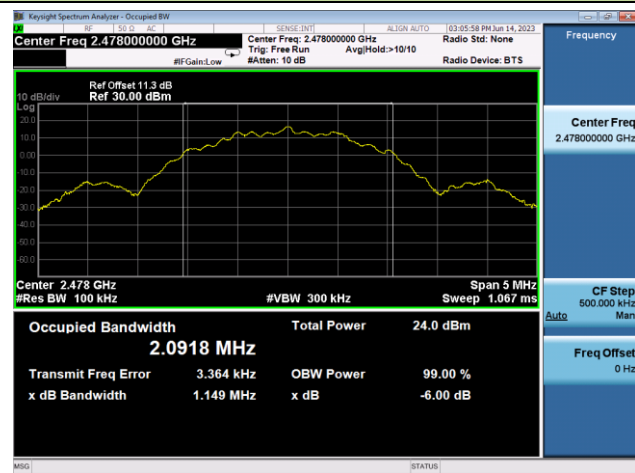
Channel 01 (2404MHz)



Channel 13 (2444MHz)

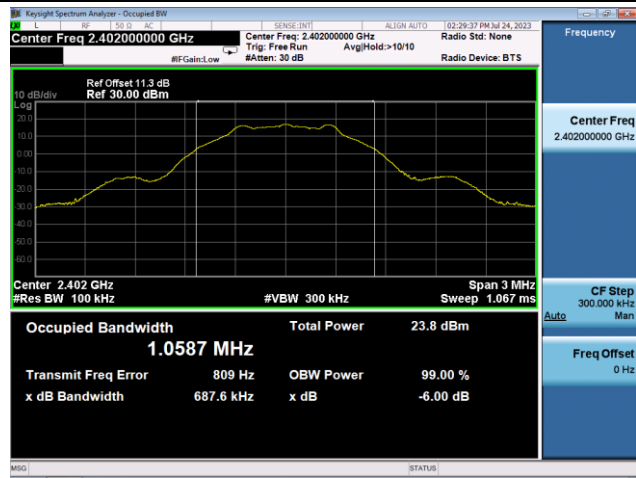


Channel 24 (2478MHz)



Proprietary Mode 1Mbps 6dB Bandwidth

Channel 00 (2402MHz)



Channel 01 (2426MHz)



Channel 02 (2480MHz)



A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-04-07 & 2023-06-14 & 2023-07-24		

Test Result of Peak Output Power (Declared Power = 16dBm)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	16.41	≤ 30.00	Pass
BLE	1Mbps	19	2440	16.39	≤ 30.00	Pass
BLE	1Mbps	39	2480	16.08	≤ 30.00	Pass
BLE	2Mbps	01	2404	16.39	≤ 30.00	Pass
BLE	2Mbps	19	2440	16.36	≤ 30.00	Pass
BLE	2Mbps	38	2478	16.38	≤ 30.00	Pass
Proprietary Mode	2Mbps	01	2404	16.39	≤ 30.00	Pass
Proprietary Mode	2Mbps	13	2444	16.40	≤ 30.00	Pass
Proprietary Mode	2Mbps	24	2478	16.30	≤ 30.00	Pass
Proprietary Mode	1Mbps	00	2402	16.36	≤ 30.00	Pass
Proprietary Mode	1Mbps	01	2426	16.32	≤ 30.00	Pass
Proprietary Mode	1Mbps	02	2480	16.04	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only) (Declared Power = 16dBm)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	16.32	≤ 30.00	Pass
BLE	1Mbps	19	2440	16.30	≤ 30.00	Pass
BLE	1Mbps	39	2480	15.96	≤ 30.00	Pass
BLE	2Mbps	01	2404	16.31	≤ 30.00	Pass
BLE	2Mbps	19	2440	16.27	≤ 30.00	Pass
BLE	2Mbps	38	2478	16.29	≤ 30.00	Pass
Proprietary Mode	2Mbps	01	2404	16.28	≤ 30.00	Pass
Proprietary Mode	2Mbps	13	2444	16.31	≤ 30.00	Pass
Proprietary Mode	2Mbps	24	2478	16.20	≤ 30.00	Pass
Proprietary Mode	1Mbps	00	2402	16.31	≤ 30.00	Pass
Proprietary Mode	1Mbps	01	2426	16.29	≤ 30.00	Pass
Proprietary Mode	1Mbps	02	2480	15.95	≤ 30.00	Pass

Test Result of Peak Output Power (Declared Power = 10dBm)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	9.80	≤ 30.00	Pass
BLE	1Mbps	19	2440	9.88	≤ 30.00	Pass
BLE	1Mbps	39	2480	9.64	≤ 30.00	Pass
BLE	2Mbps	01	2404	9.79	≤ 30.00	Pass
BLE	2Mbps	19	2440	9.87	≤ 30.00	Pass
BLE	2Mbps	38	2478	9.70	≤ 30.00	Pass
Proprietary Mode	2Mbps	01	2404	9.79	≤ 30.00	Pass
Proprietary Mode	2Mbps	13	2444	9.85	≤ 30.00	Pass
Proprietary Mode	2Mbps	24	2478	9.70	≤ 30.00	Pass
Proprietary Mode	1Mbps	00	2402	9.79	≤ 30.00	Pass
Proprietary Mode	1Mbps	01	2426	9.85	≤ 30.00	Pass
Proprietary Mode	1Mbps	02	2480	9.62	≤ 30.00	Pass

Test Result of Average Output Power (Reporting Only) (Declared Power = 10dBm)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	9.62	≤ 30.00	Pass
BLE	1Mbps	19	2440	9.73	≤ 30.00	Pass
BLE	1Mbps	39	2480	9.51	≤ 30.00	Pass
BLE	2Mbps	01	2404	9.65	≤ 30.00	Pass
BLE	2Mbps	19	2440	9.73	≤ 30.00	Pass
BLE	2Mbps	38	2478	9.51	≤ 30.00	Pass
Proprietary Mode	2Mbps	01	2404	9.65	≤ 30.00	Pass
Proprietary Mode	2Mbps	13	2444	9.72	≤ 30.00	Pass
Proprietary Mode	2Mbps	24	2478	9.51	≤ 30.00	Pass
Proprietary Mode	1Mbps	00	2402	9.61	≤ 30.00	Pass
Proprietary Mode	1Mbps	01	2426	9.72	≤ 30.00	Pass
Proprietary Mode	1Mbps	02	2480	9.49	≤ 30.00	Pass

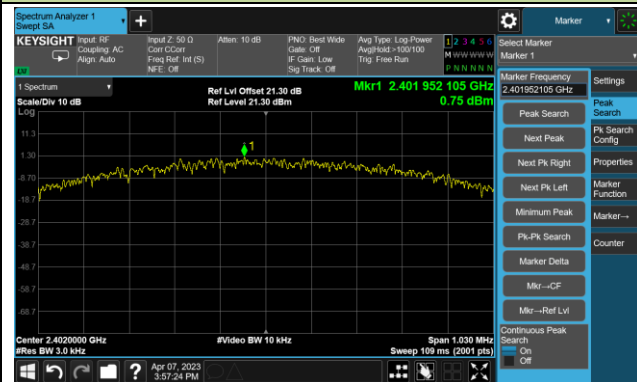
A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-04-07 & 2023-06-15 & 2023-07-24		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1Mbps	00	2402	0.75	≤ 8.00	Pass
BLE	1Mbps	19	2440	0.70	≤ 8.00	Pass
BLE	1Mbps	39	2480	0.49	≤ 8.00	Pass
BLE	2Mbps	01	2404	-1.18	≤ 8.00	Pass
BLE	2Mbps	19	2440	-1.00	≤ 8.00	Pass
BLE	2Mbps	38	2478	-1.12	≤ 8.00	Pass
Proprietary Mode	2Mbps	01	2404	-1.01	≤ 8.00	Pass
Proprietary Mode	2Mbps	13	2444	-0.80	≤ 8.00	Pass
Proprietary Mode	2Mbps	24	2478	-1.05	≤ 8.00	Pass
Proprietary Mode	1Mbps	00	2402	0.98	≤ 8.00	Pass
Proprietary Mode	1Mbps	01	2426	0.95	≤ 8.00	Pass
Proprietary Mode	1Mbps	02	2480	0.73	≤ 8.00	Pass

BLE 1Mbps PSD

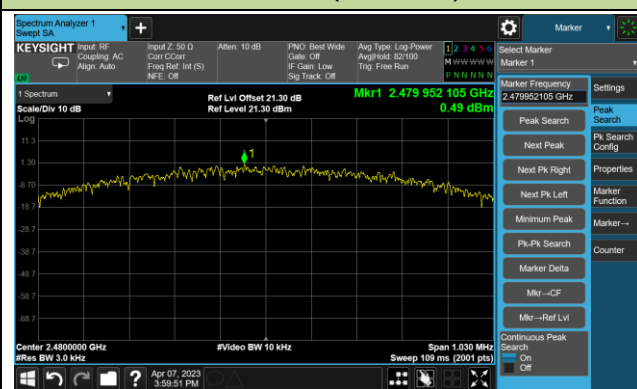
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)

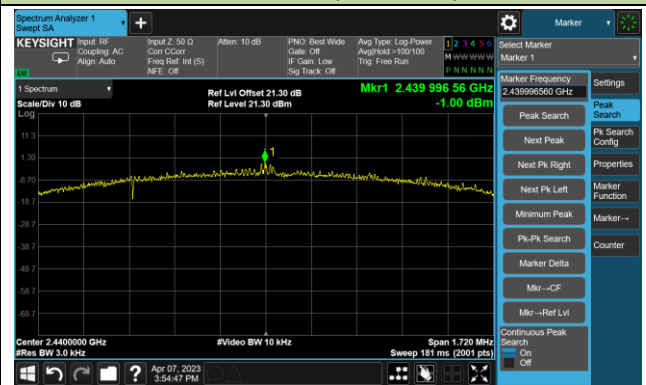


BLE 2Mbps PSD

Channel 01 (2404MHz)



Channel 19 (2440MHz)

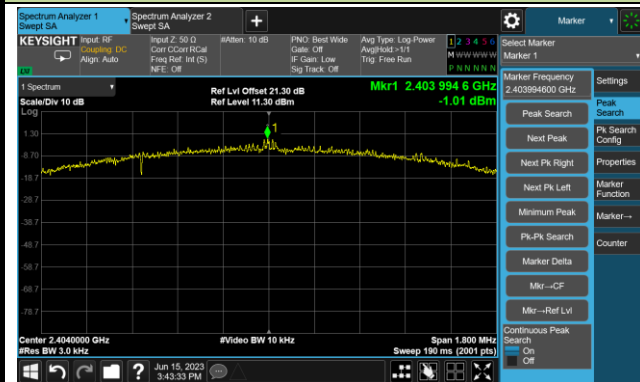


Channel 38 (2478MHz)

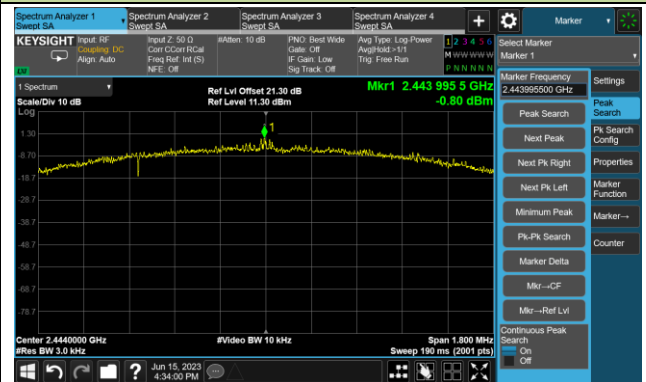


Proprietary Mode 2Mbps PSD

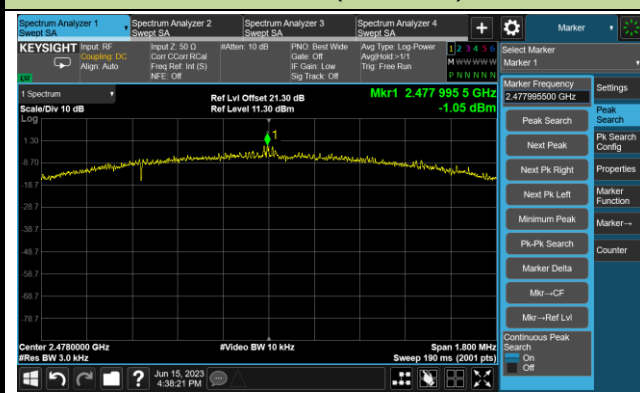
Channel 01 (2404MHz)



Channel 13 (2444MHz)



Channel 24 (2478MHz)



Proprietary Mode 1Mbps PSD

Channel 00 (2402MHz)



Channel 01 (2426MHz)



Channel 02 (2480MHz)



A.5 Conducted Band Edge and Out-of-Band Emissions Test Result

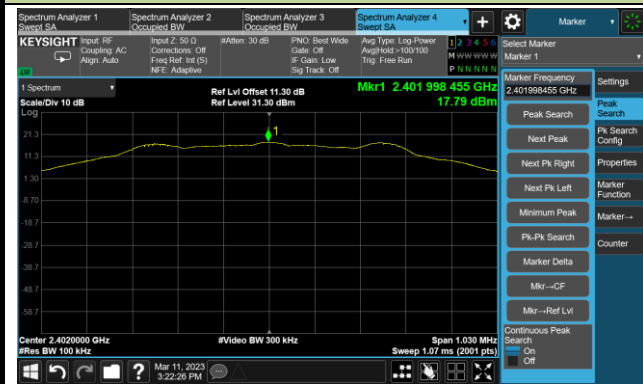
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-03-11 & 2023-06-15 & 2023-07-24		

Test Mode	Data Rate / Mbps	Channel No.	Frequency (MHz)	Limit (dBc)	Result
BLE	1	00	2402	20	Pass
BLE	1	19	2440	20	Pass
BLE	1	39	2480	20	Pass
BLE	2	01	2404	20	Pass
BLE	2	19	2440	20	Pass
BLE	2	38	2478	20	Pass
Proprietary Mode	2	01	2404	20	Pass
Proprietary Mode	2	13	2444	20	Pass
Proprietary Mode	2	24	2478	20	Pass
Proprietary Mode	1	00	2402	20	Pass
Proprietary Mode	1	01	2426	20	Pass
Proprietary Mode	1	02	2480	20	Pass

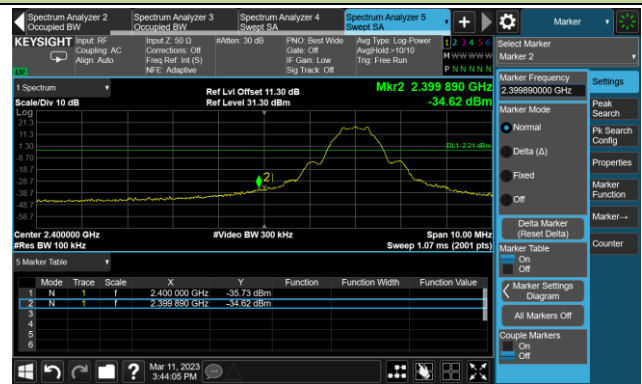
BLE 1Mbps Out-of-Band Emissions

Channel 00 (2402MHz)

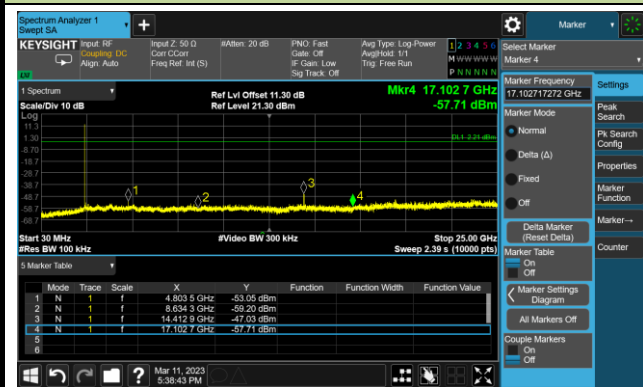
100kHz PSD Reference Level



Low Band Edge

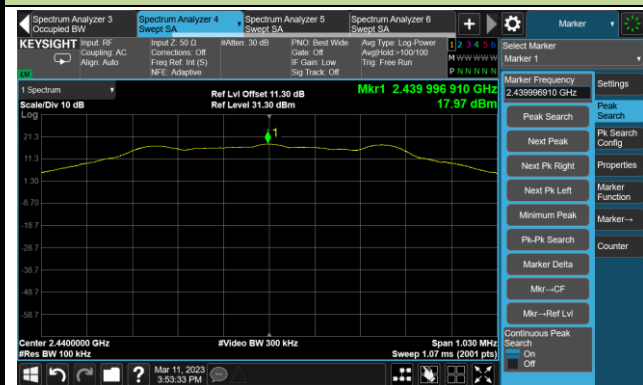


Spurious Emission 30MHz ~ 25GHz

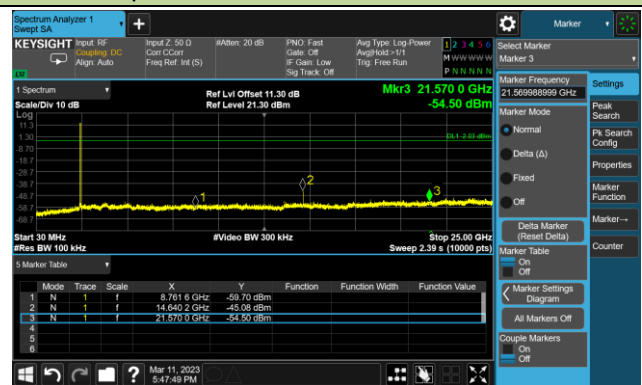


Channel 19 (2440MHz)

100kHz PSD Reference Level

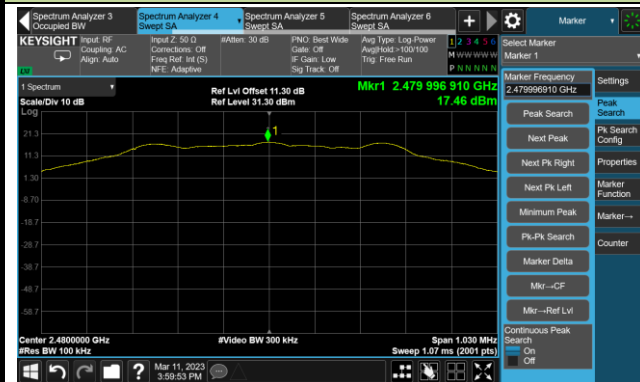


Spurious Emission 30MHz ~ 25GHz

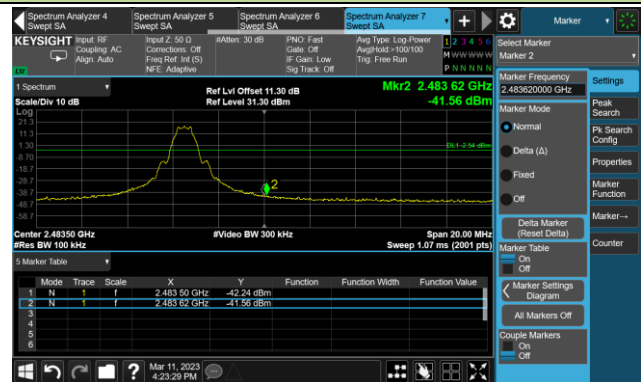


Channel 39 (2480MHz)

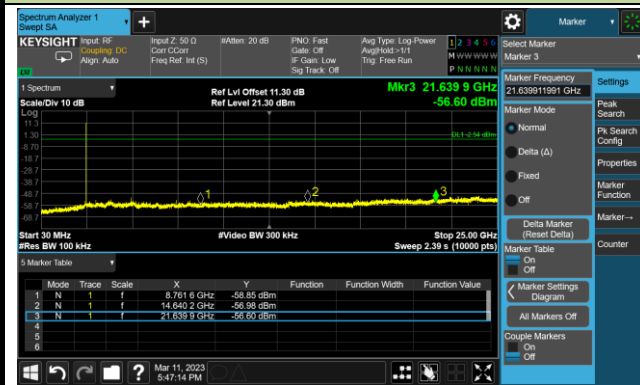
100kHz PSD Reference Level



High Band Edge



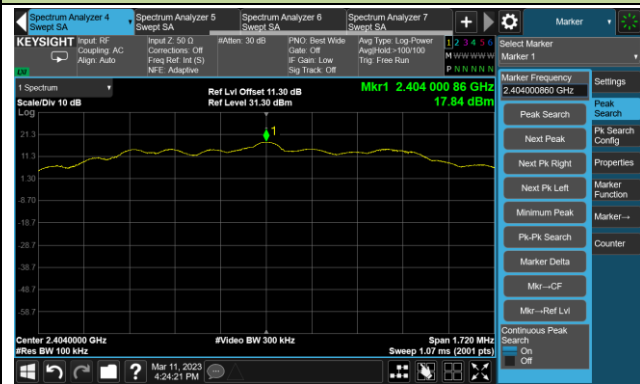
Spurious Emission 30MHz ~ 25GHz



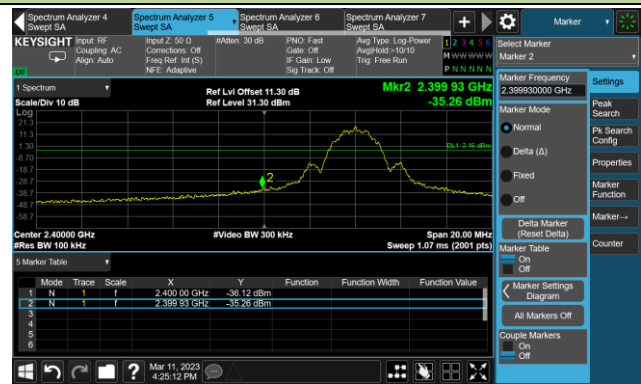
BLE 2Mbps Out-of-Band Emissions

Channel 01 (2404MHz)

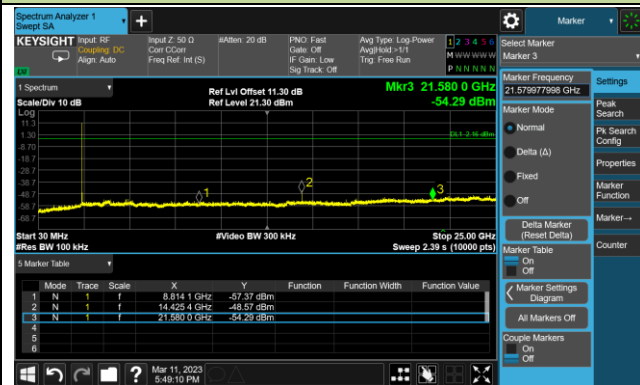
100kHz PSD Reference Level



Low Band Edge

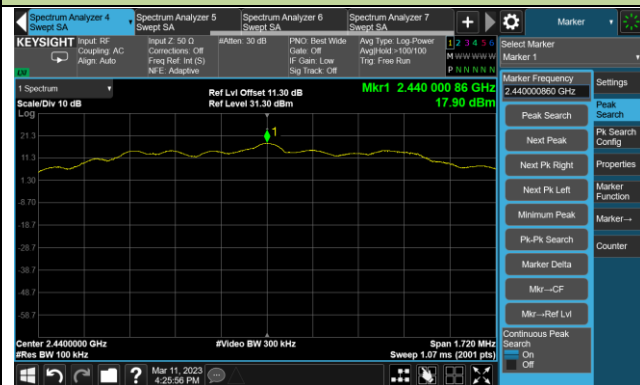


Spurious Emission 30MHz ~ 25GHz



Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz

