Microtest
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Test Report

Report No.:	MTi240828003-01E2
Date of issue:	2024-11-28
Applicant:	Changsha Sonicake Technology Co., LTD
Product name:	Multi-Effects Processor
Model(s):	QME-10, QME-XXXX(X: any capital letter or number, could be omitted)
FCC ID:	2A7J4-QME10

Shenzhen Microtest Co., Ltd.

http://www.mtitest.cn

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Instructions

1. This test report shall not be partially reproduced without the written consent of the laboratory.

2. The test results in this test report are only responsible for the samples submitted

3. This test report is invalid without the seal and signature of the laboratory.

4. This test report is invalid if transferred, altered, or tampered with in any form without authorization.

5. Any objection to this test report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

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Test Result Certification	
Applicant:	Changsha Sonicake Technology Co., LTD
Address:	Room 601A16, Enterprise Building, Hunan University National Science Park, No.186, Guyuan Road, High-tech Zone, ChangshaCity, Hunan Province, P.R China
Manufacturer:	Changsha Hotone Audio Co., LTD
Address:	Room 207, East Block, Hunan University Science Park, No.186, Guyuan Road, High-tech Zone Changsha, Hunan Province, China
Product description	
Product name:	Multi-Effects Processor
Trademark:	Sonicake
Model name:	QME-10
Series Model(s):	QME-XXXX(X: any capital letter or number, could be omitted)
Standards:	47 CFR Part 15.247
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2020
Date of Test	
Date of test:	2024-09-14 to 2024-09-24
Test result:	Pass

Test Engineer	:	Yanice Xie
		(Yanice.Xie)
Reviewed By	:	David. Lee
		(David Lee)
Approved By	:	Leon chen
		(Leon Chen)

1 General Description

1.1 Description of the EUT

Product name:	Multi-Effects Processor
Model name:	QME-10
Series Model(s):	QME-XXXX(X: any capital letter or number, could be omitted)
Model difference:	All the models are the same circuit and module, except the model name and color.
Electrical rating:	Input: DC 5V Battery: DC 3.7V 1000mAh
Accessories:	Cable: USB-A to Type-C cable (1.2m)*1
Hardware version:	V1.0
Software version:	V1.0
Test sample(s) number:	MTi240828003-01S1001
RF specification	
Bluetooth version:	V5.0
Operating frequency range:	2402~2480MHz
Channel number:	40
Modulation type:	GFSK
Antenna(s) type:	PCB Antenna
Antenna(s) gain:	3.37 dBi

1.2 Description of test modes

No.	Emission test modes
Mode1	TX -GFSK

1.2.1 Operation channel list

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

Test Channel List
Operation Band:

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
2	2402	2440	2480

Note: The test software provided by manufacturer is used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

Test Software:
For power setting, refer to below table.

Test software:	MV FrequencyTools v0.3.2		
Mode	2402MHz	2440MHz	2480MHz
1M	default	default	default

1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C ~ 35°C
Humidity:	20% RH ~ 75% RH
Atmospheric pressure:	98 kPa ~ 101 kPa

1.4 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
Adapter	18W	/	HUAWEI
Support cable list			
Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Occupied channel bandwidth	±3 %
RF output power, conducted	±1 dB
Power Spectral Density, conducted	±1 dB
Unwanted Emissions, conducted	±1 dB
Radiated spurious emissions (above 1GHz)	±5.3dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 Summary of Test Result

No.	Item	Requirement	Result
1	Antenna requirement	47 CFR 15.203	Pass
2	Conducted Emission at AC power line	47 CFR 15.207(a)	Pass
3	Occupied Bandwidth	47 CFR 15.247(a)(2)	Pass
4	Maximum Conducted Output Power	47 CFR 15.247(b)(3)	Pass
5	Power Spectral Density	47 CFR 15.247(e)	Pass
6	RF conducted spurious emissions and band edge measurement	47 CFR 15.247(d), 15.209, 15.205	Pass
7	Band edge emissions (Radiated)	47 CFR 15.247(d), 15.209, 15.205	Pass
8	Radiated emissions (below 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass
9	Radiated emissions (above 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass

3 Test Facilities and accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573
IC Registration No.:	21760
CABID:	CN0093

4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Conducted Emission at AC power line						
1	EMI Test Receiver	Rohde&schwarz	ESCI3	101368	2024-03-20	2025-03-19
2	Artificial mains network	Schwarzbeck	NSLK 8127	183	2024-03-21	2025-03-20
3	Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100263	2024-03-20	2025-03-19
Occupied Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2024-03-20	2025-03-19
2	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2024-03-21	2025-03-20
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2024-03-21	2025-03-20
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2024-03-21	2025-03-20
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2024-03-21	2025-03-20
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2024-03-21	2025-03-20
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2024-03-20	2025-03-19
9	DC Power Supply	Agilent	E3632A	MY40027695	2024-03-21	2025-03-20
Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	2278	2023-06-17	2025-06-16
3	Amplifier	Agilent	8449B	3008A01120	2024-03-20	2025-03-19
4	MXA signal analyzer	Agilent	N9020A	MY54440859	2024-03-21	2025-03-20
5	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
6	Horn antenna	Schwarzbeck	BBHA 9170	00987	2023-06-17	2025-06-16
7	Pre-amplifier	Space-Dtronics	EWLAN1840 G	210405001	2024-03-21	2025-03-20
Emissions in frequency bands (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2024-03-23	2025-03-22
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2024-03-20	2025-03-19

5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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.

5.1.1 Conclusion:

The antenna of the EUT is permanently attached. The EUT complies with the requirement of FCC PART 15.203.

6 Radio Spectrum Matter Test Results (RF)

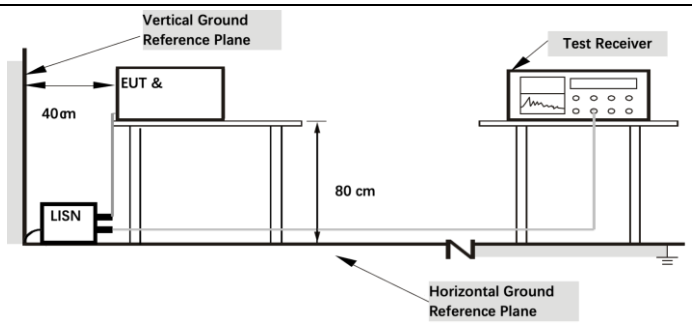
6.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator 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, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	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.
Test Method:	ANSI C63.10-2020 section 6.2
Procedure:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices

6.1.1 E.U.T. Operation:

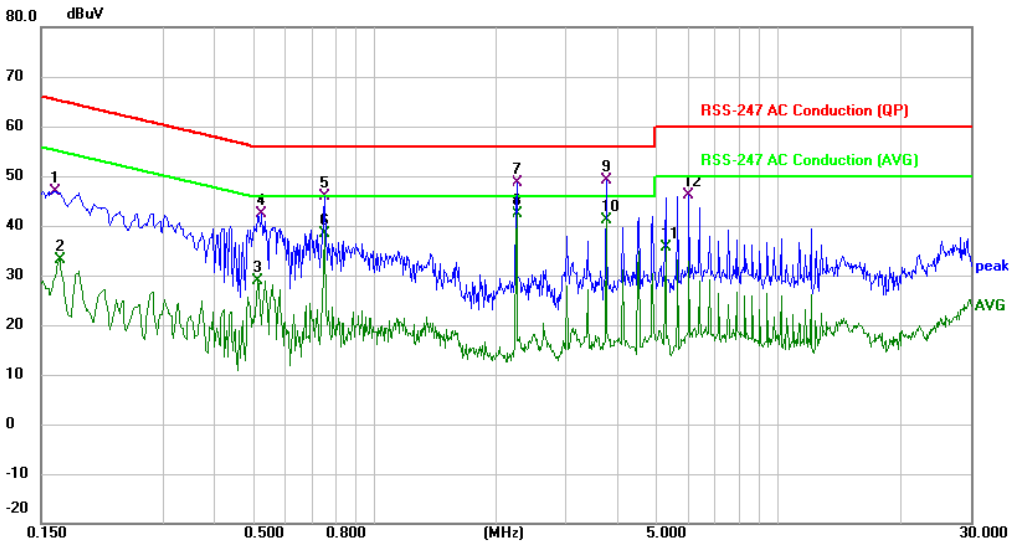
Operating Environment:					
Temperature:	25.9 °C	Humidity:	44 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

6.1.2 Test Setup Diagram:



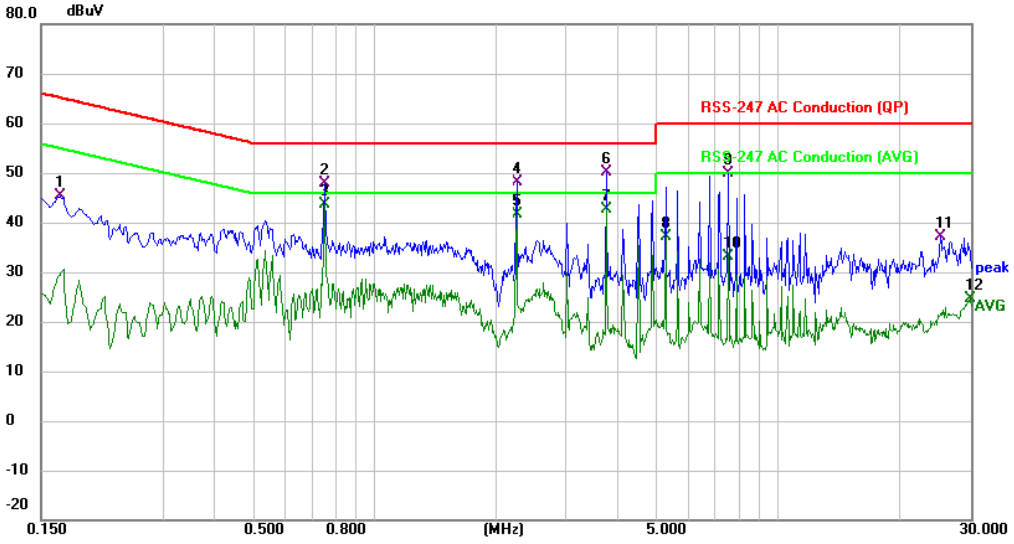
6.1.3 Test Data:

Mode1 / Line: Line / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	36.65	10.30	46.95	65.36	-18.41	QP	
2		0.1660	22.83	10.30	33.13	55.16	-22.03	AVG	
3		0.5140	18.38	10.43	28.81	46.00	-17.19	AVG	
4		0.5260	31.93	10.43	42.36	56.00	-13.64	QP	
5		0.7539	35.35	10.49	45.84	56.00	-10.16	QP	
6		0.7539	27.77	10.49	38.26	46.00	-7.74	AVG	
7		2.2620	38.08	10.56	48.64	56.00	-7.36	QP	
8	*	2.2620	31.85	10.56	42.41	46.00	-3.59	AVG	
9		3.7700	38.67	10.57	49.24	56.00	-6.76	QP	
10		3.7700	30.62	10.57	41.19	46.00	-4.81	AVG	
11		5.2819	25.01	10.58	35.59	50.00	-14.41	AVG	
12		6.0377	35.60	10.60	46.20	60.00	-13.80	QP	

Mode1 / Line: Neutral / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1660	34.97	10.30	45.27	65.16	-19.89	QP	
2		0.7539	37.38	10.49	47.87	56.00	-8.13	QP	
3	*	0.7539	33.20	10.49	43.69	46.00	-2.31	AVG	
4		2.2620	37.54	10.56	48.10	56.00	-7.90	QP	
5		2.2620	31.02	10.56	41.58	46.00	-4.42	AVG	
6		3.7740	39.63	10.57	50.20	56.00	-5.80	QP	
7		3.7740	32.05	10.57	42.62	46.00	-3.38	AVG	
8		5.2819	26.47	10.58	37.05	50.00	-12.95	AVG	
9		7.5500	39.36	10.63	49.99	60.00	-10.01	QP	
10		7.5500	22.60	10.63	33.23	50.00	-16.77	AVG	
11		25.2340	26.16	10.97	37.13	60.00	-22.87	QP	
12		29.8780	13.79	10.84	24.63	50.00	-25.37	AVG	

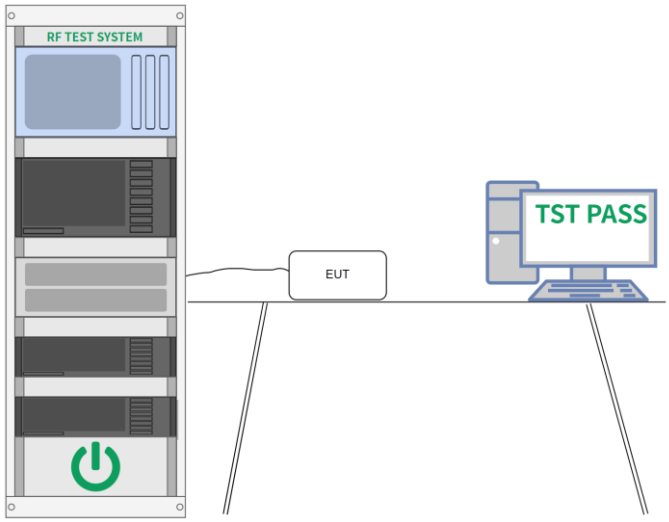
6.2 Occupied Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2020, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW >= [3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	21.1 °C	Humidity:	45.2 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

6.2.2 Test Setup Diagram:



6.2.3 Test Data:

Please Refer to Appendix for Details.

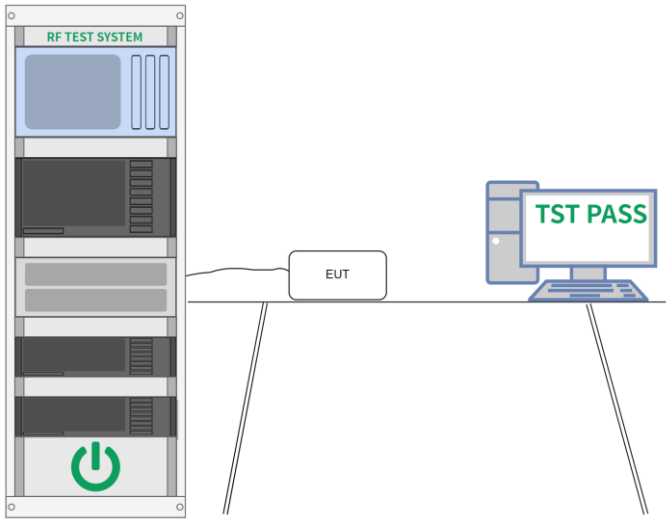
6.3 Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2020 section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020, section 11.9.1 Maximum peak conducted output power

6.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	21.1 °C	Humidity:	45.2 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

6.3.2 Test Setup Diagram:



6.3.3 Test Data:

Please Refer to Appendix for Details.

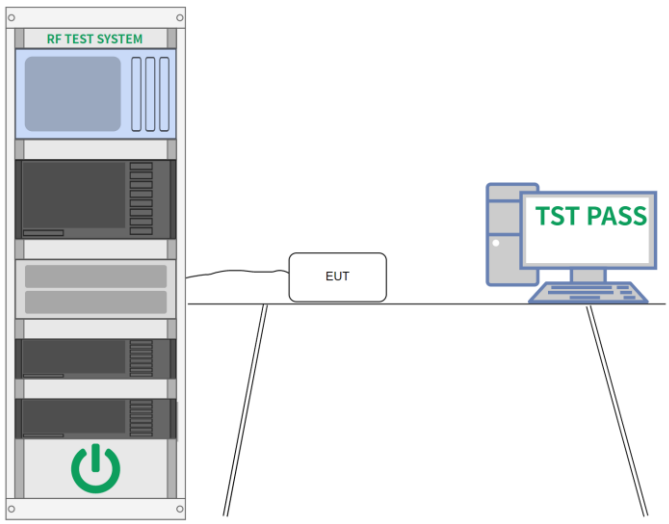
6.4 Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2020, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020, section 11.10, Maximum power spectral density level in the fundamental emission

6.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	21.1 °C	Humidity:	45.2 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

6.4.2 Test Setup Diagram:



6.4.3 Test Data:

Please Refer to Appendix for Details.

6.5 Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	

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

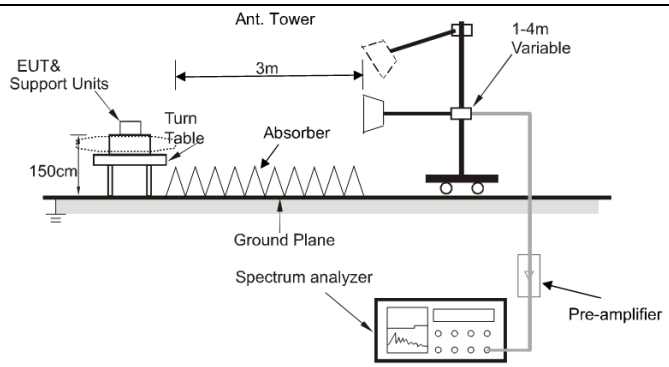
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.10.5.2

6.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				
Note: The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported.					

6.5.2 Test Setup Diagram:



6.5.3 Test Data:

Mode1 / Polarization: Horizontal / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2310.000	50.33	-4.83	45.50	74.00	-28.50	peak
2		2310.000	39.67	-4.83	34.84	54.00	-19.16	AVG
3		2390.000	49.98	-4.31	45.67	74.00	-28.33	peak
4	*	2390.000	39.80	-4.31	35.49	54.00	-18.51	AVG

Mode1 / Polarization: Vertical / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2310.000	49.29	-4.83	44.46	74.00	-29.54	peak
2		2310.000	39.06	-4.83	34.23	54.00	-19.77	AVG
3		2390.000	49.95	-4.31	45.64	74.00	-28.36	peak
4	*	2390.000	39.08	-4.31	34.77	54.00	-19.23	AVG

Mode1 / Polarization: Horizontal / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2483.500	50.41	-4.21	46.20	74.00	-27.80	peak
2	*	2483.500	39.80	-4.21	35.59	54.00	-18.41	AVG
3		2500.000	49.58	-4.10	45.48	74.00	-28.52	peak
4		2500.000	39.49	-4.10	35.39	54.00	-18.61	AVG

Mode1 / Polarization: Vertical / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2483.500	48.59	-4.21	44.38	74.00	-29.62	peak
2		2483.500	39.15	-4.21	34.94	54.00	-19.06	AVG
3		2500.000	50.30	-4.10	46.20	74.00	-27.80	peak
4	*	2500.000	39.25	-4.10	35.15	54.00	-18.85	AVG

6.6 Radiated emissions (below 1GHz)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	

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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

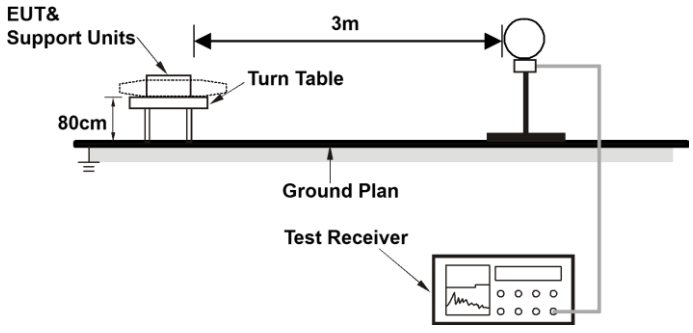
Test Method:	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.6.4

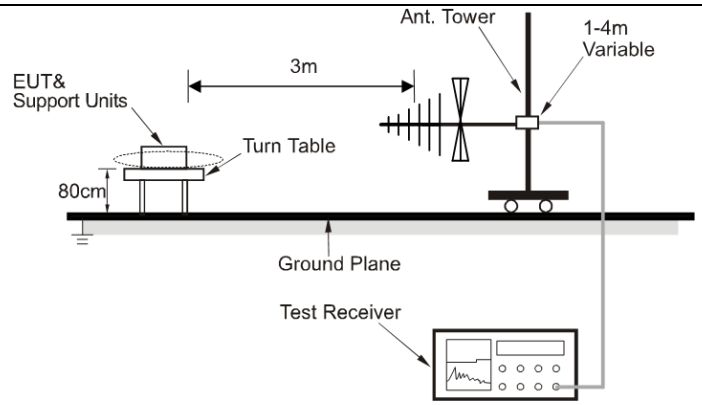
6.6.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

Note:
The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported.
All modes of operation of the EUT were investigated, and only the worst-case results are reported.
There were no emissions found below 30MHz within 20dB of the limit.

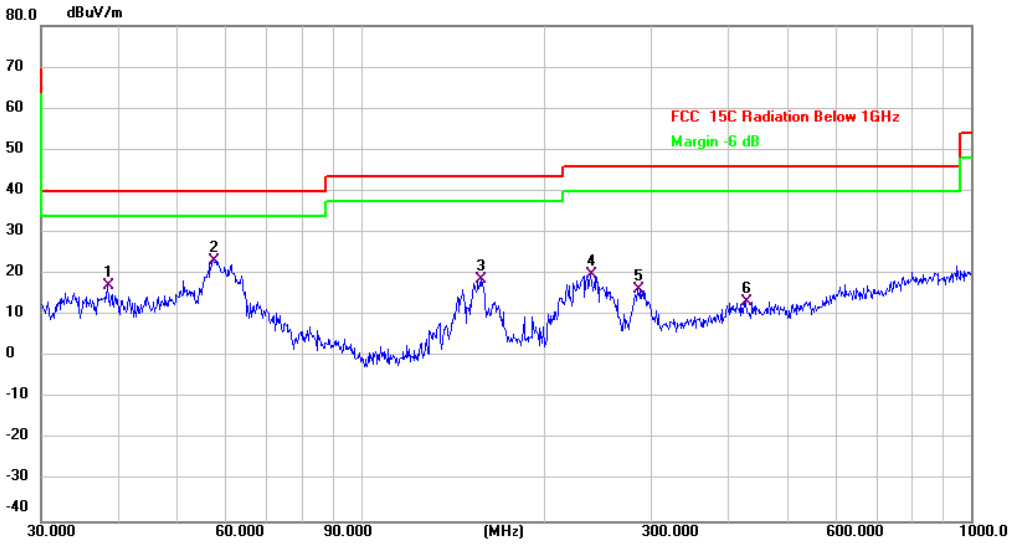
6.6.2 Test Setup Diagram:




Ant. Tower
1-4m
Variable
3m
EUT&
Support Units
Turn Table
80cm
Ground Plane
Test Receiver

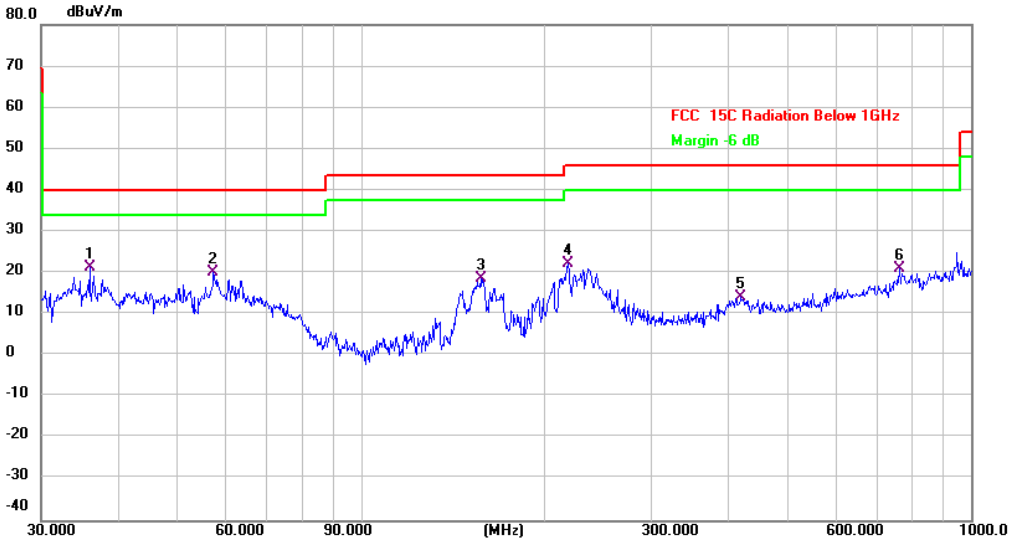
6.6.3 Test Data:

Mode1 / Polarization: Horizontal / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		38.4809	31.35	-14.16	17.19	40.00	-22.81	QP	
2	*	57.3923	39.45	-16.15	23.30	40.00	-16.70	QP	
3		157.0074	39.48	-20.87	18.61	43.50	-24.89	QP	
4		238.3102	34.66	-14.79	19.87	46.00	-26.13	QP	
5		284.9767	32.32	-15.98	16.34	46.00	-29.66	QP	
6		428.0193	26.79	-13.44	13.35	46.00	-32.65	QP	

Mode1 / Polarization: Vertical / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	36.0007	46.06	-24.71	21.35	40.00	-18.65	QP	
2		57.3923	41.39	-21.36	20.03	40.00	-19.97	QP	
3		157.0074	36.25	-17.61	18.64	43.50	-24.86	QP	
4		219.0753	43.03	-20.91	22.12	46.00	-23.88	QP	
5		420.5803	28.46	-14.37	14.09	46.00	-31.91	QP	
6		763.3757	29.58	-8.50	21.08	46.00	-24.92	QP	

6.7 Radiated emissions (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	

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

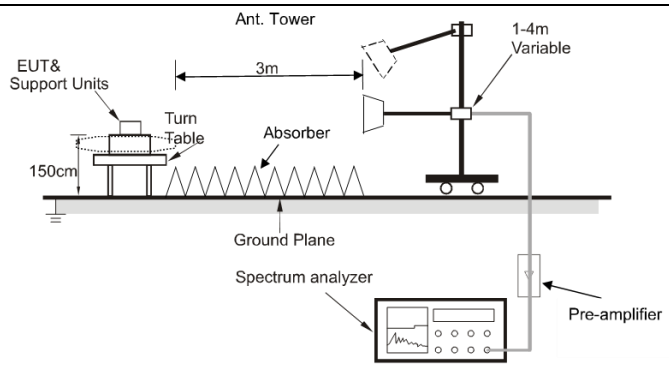
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.6.4

6.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				
Note: Test frequency are from 1GHz to 25GHz, the amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. All modes of operation of the EUT were investigated, and only the worst-case results are reported.					

6.7.2 Test Setup Diagram:



6.7.3 Test Data:

Mode1 / Polarization: Horizontal / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4804.000	54.55	0.53	55.08	74.00	-18.92	peak
2	*	4804.000	50.47	0.53	51.00	54.00	-3.00	AVG
3		7206.000	42.80	7.90	50.70	74.00	-23.30	peak
4		7206.000	38.69	7.90	46.59	54.00	-7.41	AVG
5		9608.000	43.22	8.85	52.07	74.00	-21.93	peak
6		9608.000	39.72	8.85	48.57	54.00	-5.43	AVG

Mode1 / Polarization: Vertical / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4804.000	51.24	0.53	51.77	74.00	-22.23	peak
2	*	4804.000	47.05	0.53	47.58	54.00	-6.42	AVG
3		7206.000	42.95	7.90	50.85	74.00	-23.15	peak
4		7206.000	38.74	7.90	46.64	54.00	-7.36	AVG
5		9608.000	42.59	8.85	51.44	74.00	-22.56	peak
6		9608.000	38.53	8.85	47.38	54.00	-6.62	AVG

Mode1 / Polarization: Horizontal / CH: M

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4880.000	49.95	0.56	50.51	74.00	-23.49	peak
2		4880.000	45.82	0.56	46.38	54.00	-7.62	AVG
3		7320.000	42.62	7.54	50.16	74.00	-23.84	peak
4		7320.000	38.78	7.54	46.32	54.00	-7.68	AVG
5		9760.000	43.42	9.33	52.75	74.00	-21.25	peak
6	*	9760.000	39.29	9.33	48.62	54.00	-5.38	AVG

Mode1 / Polarization: Vertical / CH: M

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4880.000	48.65	0.56	49.21	74.00	-24.79	peak
2		4880.000	44.61	0.56	45.17	54.00	-8.83	AVG
3		7320.000	41.98	7.54	49.52	74.00	-24.48	peak
4		7320.000	38.08	7.54	45.62	54.00	-8.38	AVG
5		9760.000	43.14	9.33	52.47	74.00	-21.53	peak
6	*	9760.000	39.03	9.33	48.36	54.00	-5.64	AVG

Mode1 / Polarization: Horizontal / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4960.000	47.61	0.66	48.27	74.00	-25.73	peak
2		4960.000	43.91	0.66	44.57	54.00	-9.43	AVG
3		7440.000	42.36	7.94	50.30	74.00	-23.70	peak
4		7440.000	38.38	7.94	46.32	54.00	-7.68	AVG
5		9920.000	43.95	9.69	53.64	74.00	-20.36	peak
6	*	9920.000	39.98	9.69	49.67	54.00	-4.33	AVG

Mode1 / Polarization: Vertical / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4960.000	45.37	0.66	46.03	74.00	-27.97	peak
2		4960.000	41.48	0.66	42.14	54.00	-11.86	AVG
3		7440.000	42.75	7.94	50.69	74.00	-23.31	peak
4		7440.000	38.41	7.94	46.35	54.00	-7.65	AVG
5		9920.000	43.83	9.69	53.52	74.00	-20.48	peak
6	*	9920.000	39.98	9.69	49.67	54.00	-4.33	AVG

Photographs of the test setup

Refer to Appendix - Test Setup Photos

Photographs of the EUT

Refer to Appendix - EUT Photos

Appendix

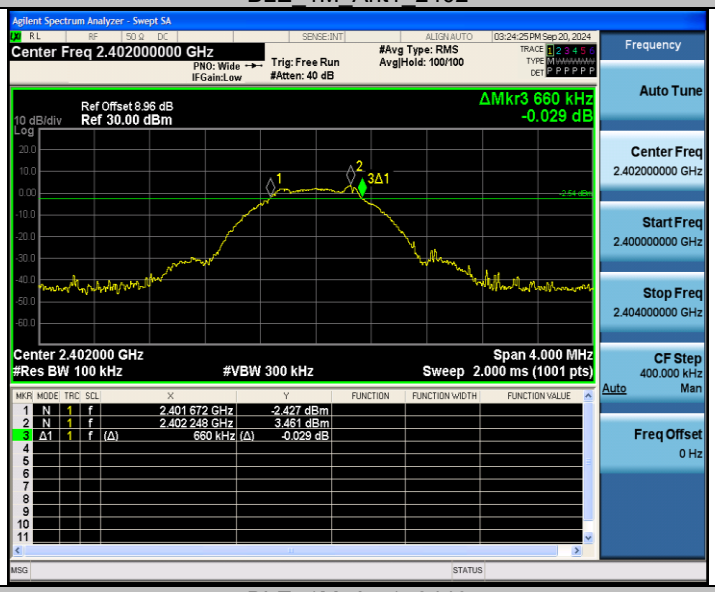
Appendix A: DTS Bandwidth

Test Result

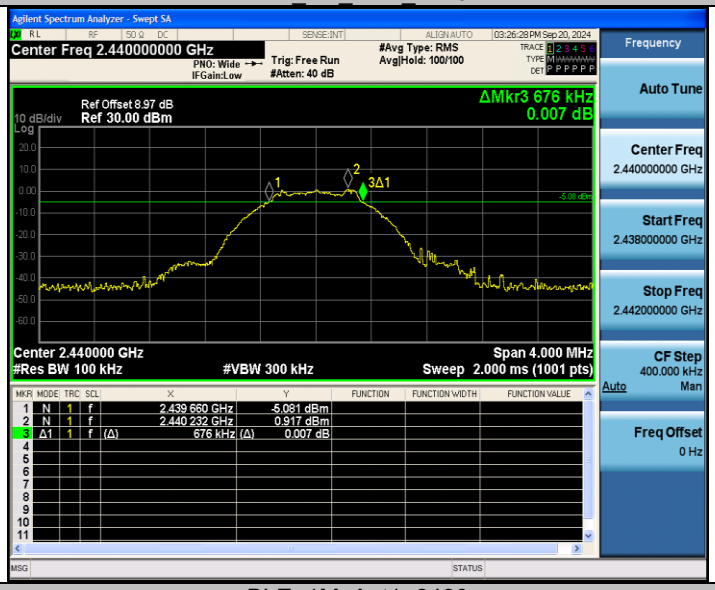
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	0.660	0.5	PASS
		2440	0.676	0.5	PASS
		2480	0.656	0.5	PASS

Test Graphs

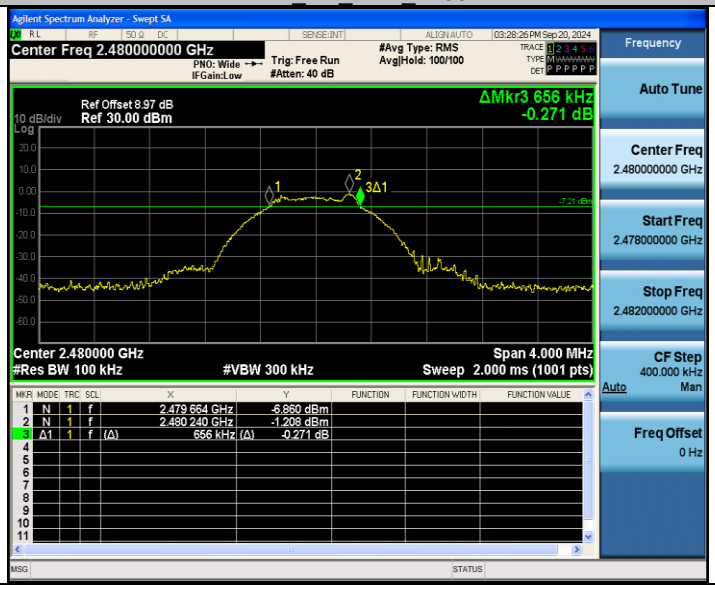
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



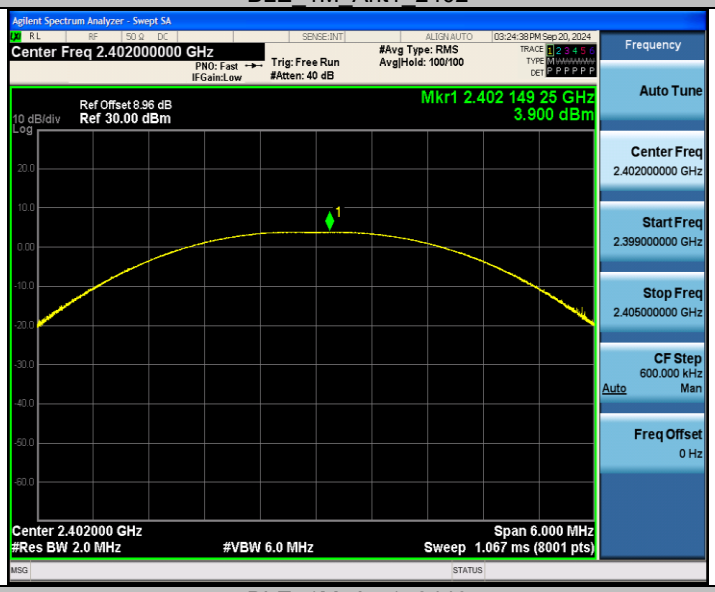
Appendix B: Maximum conducted output power

Test Result-Peak

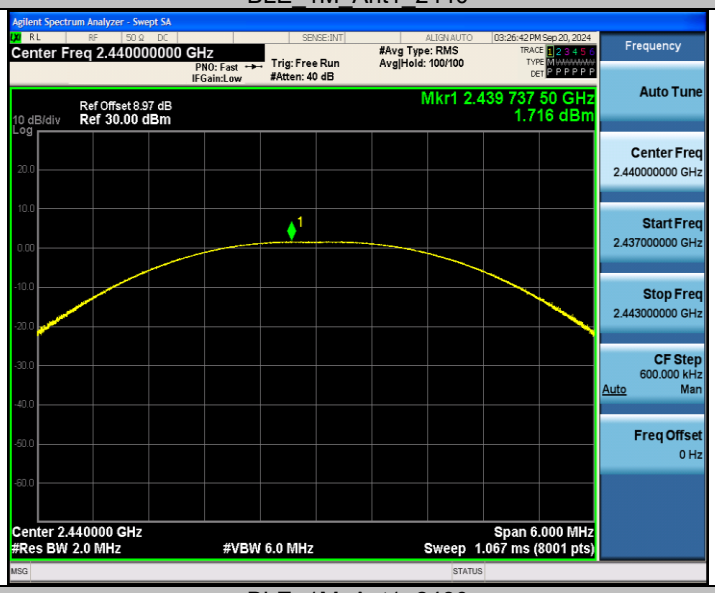
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	3.90	≤30	PASS
		2440	1.72	≤30	PASS
		2480	-0.68	≤30	PASS

Test Graphs

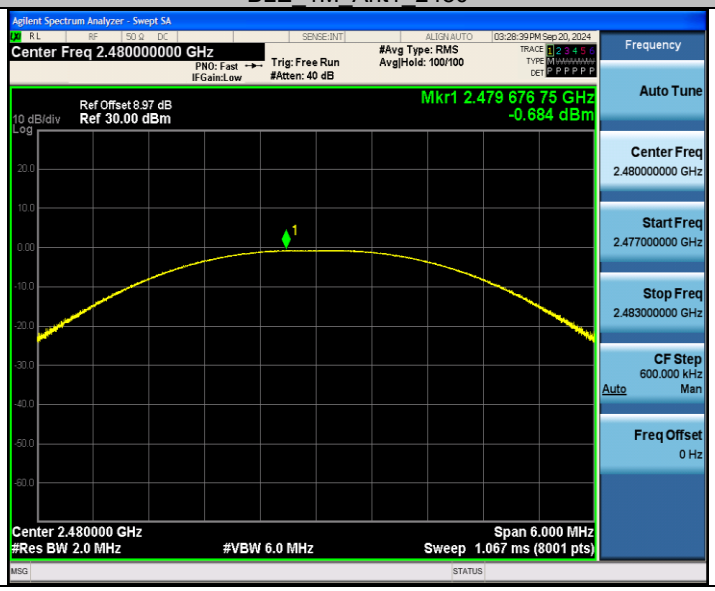
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



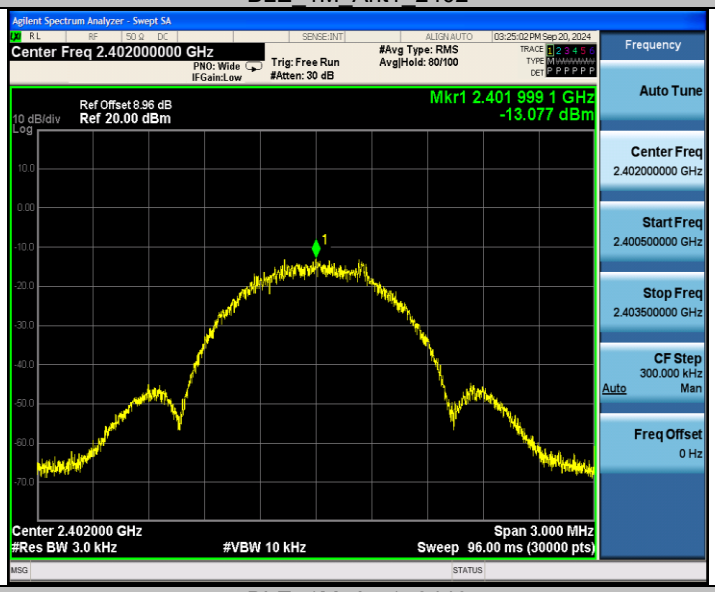
Appendix C: Maximum power spectral density

Test Result

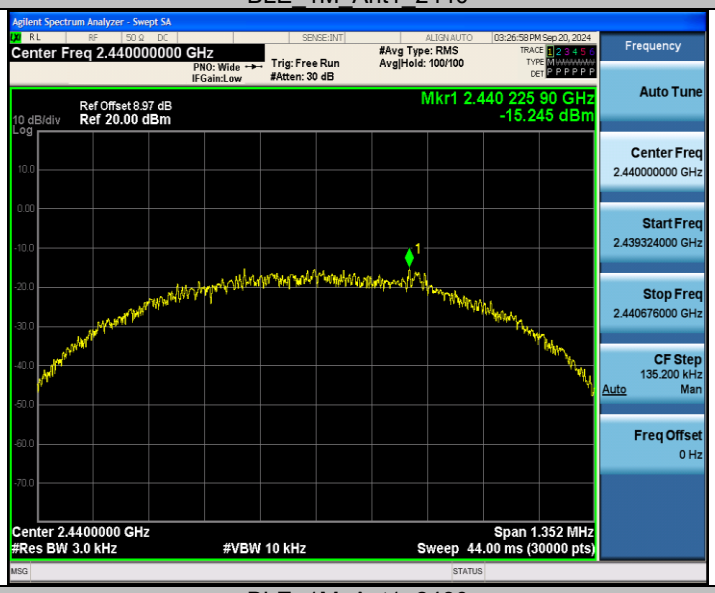
Test Mode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-13.08	≤8.00	PASS
		2440	-15.25	≤8.00	PASS
		2480	-17.74	≤8.00	PASS

Test Graphs

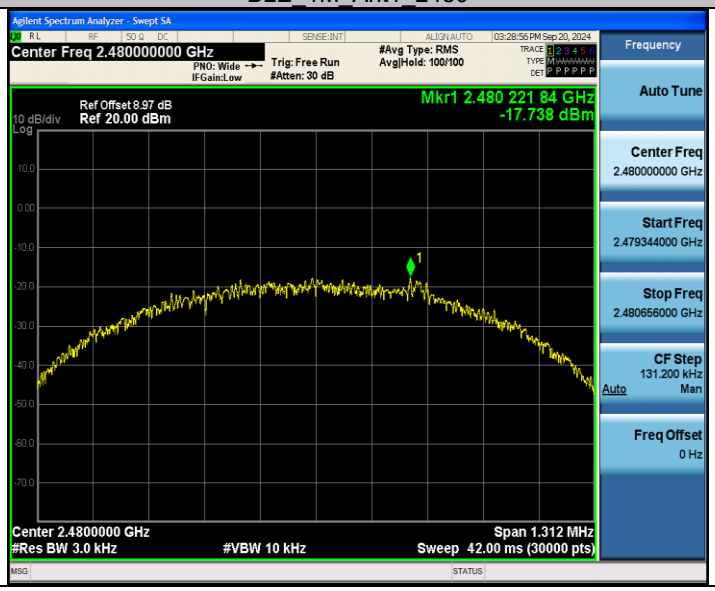
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



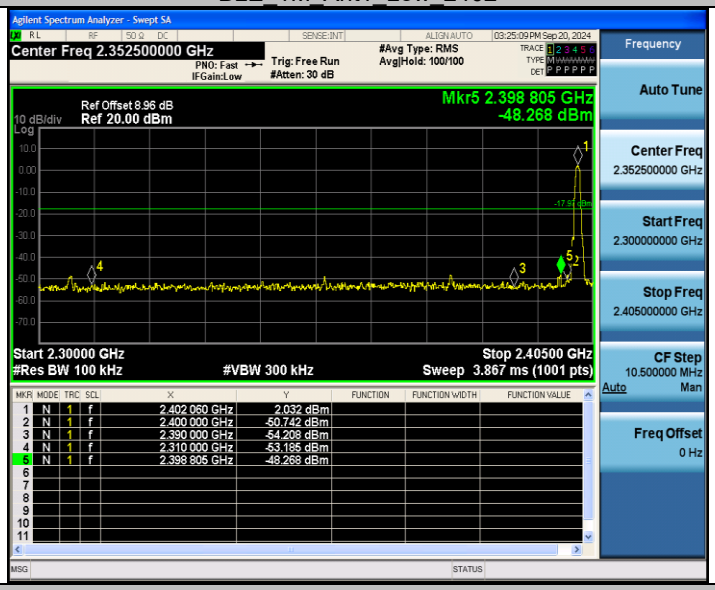
BLE_1M_Ant1_2480



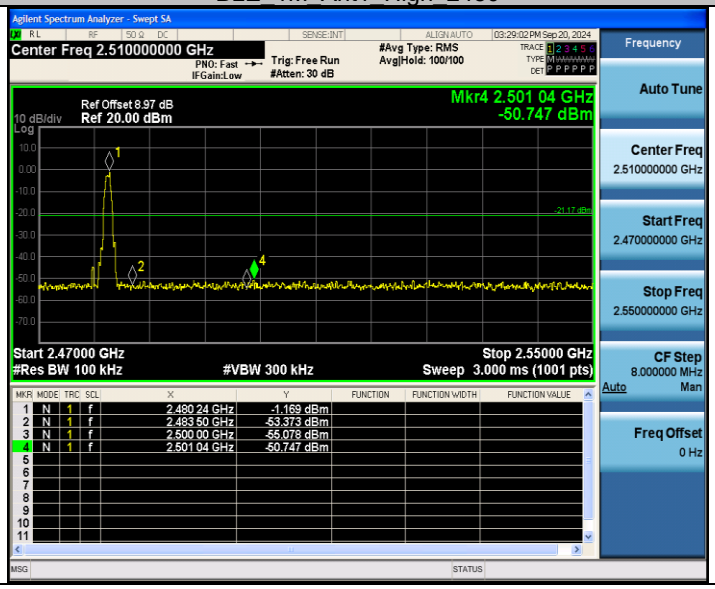
Appendix D: Band edge measurements

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480

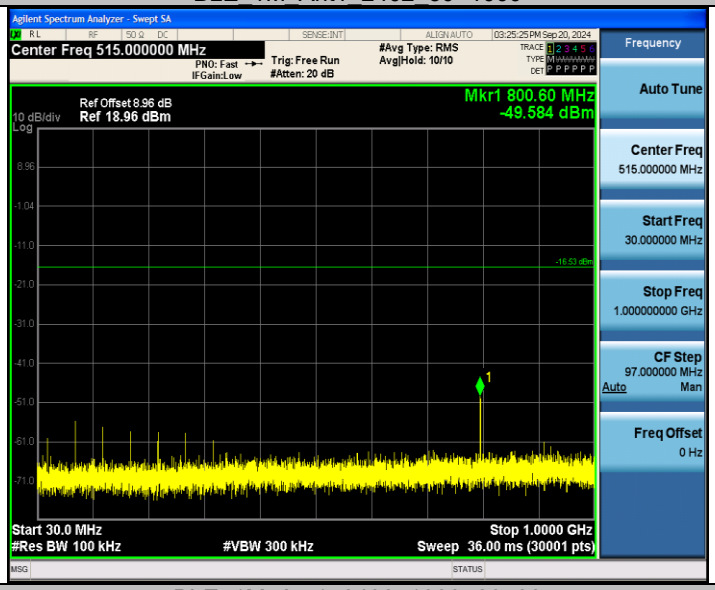


Appendix E: Conducted Spurious Emission

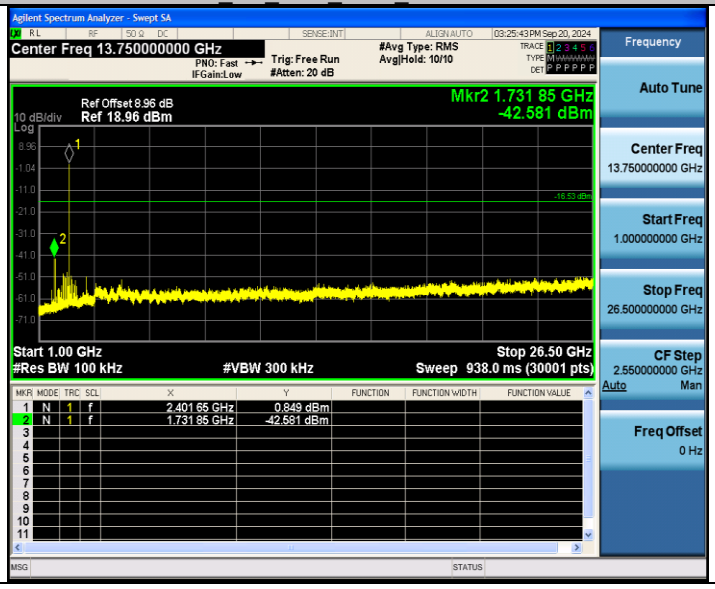
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

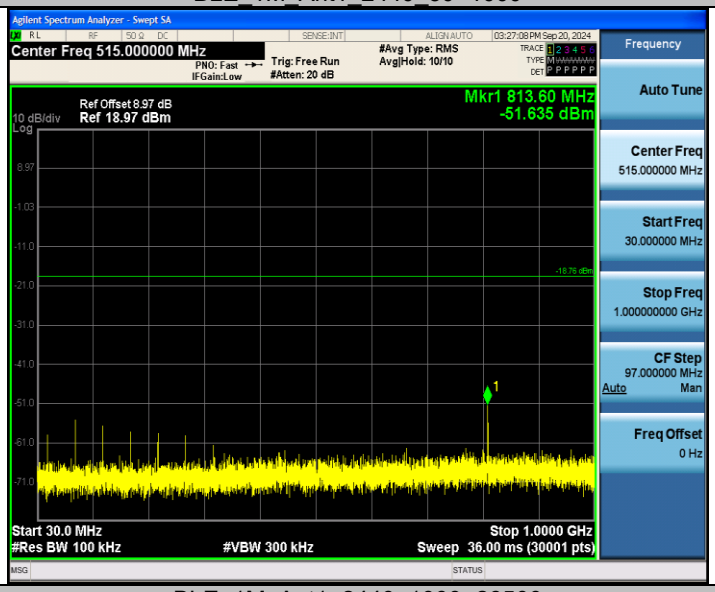


BLE_1M_Ant1_2402_1000~26500

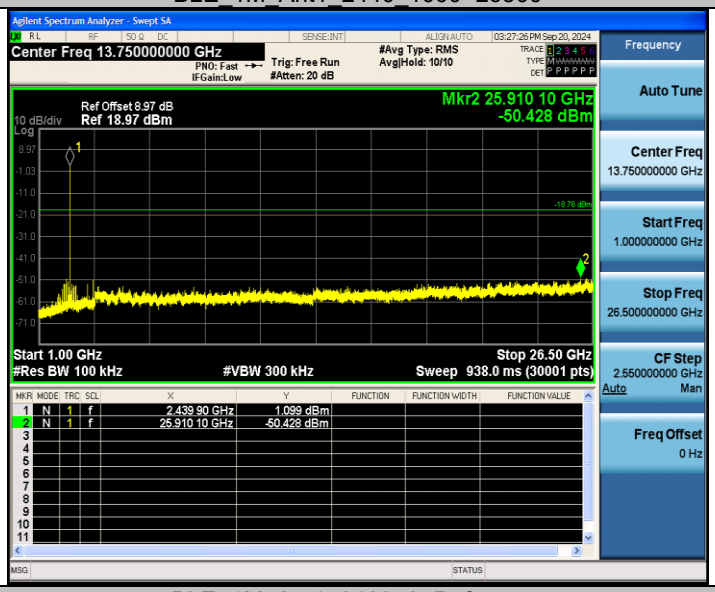


BLE_1M_Ant1_2440_0~Reference

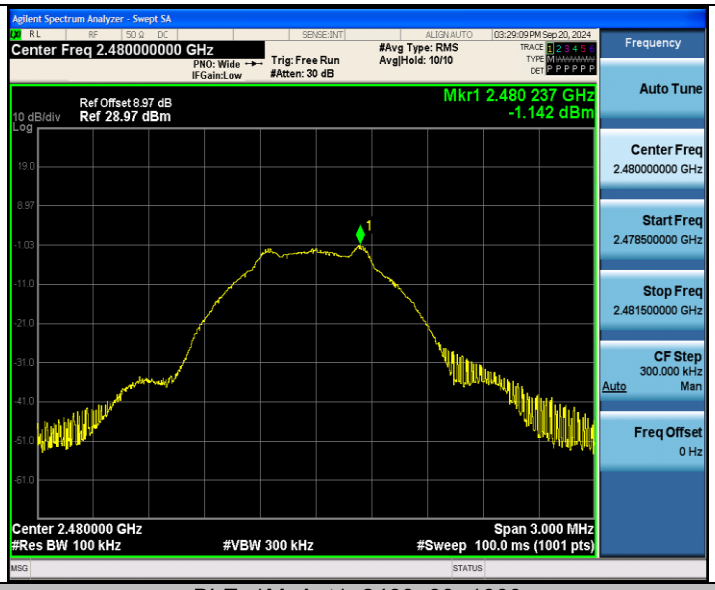
BLE_1M_Ant1_2440_30~1000



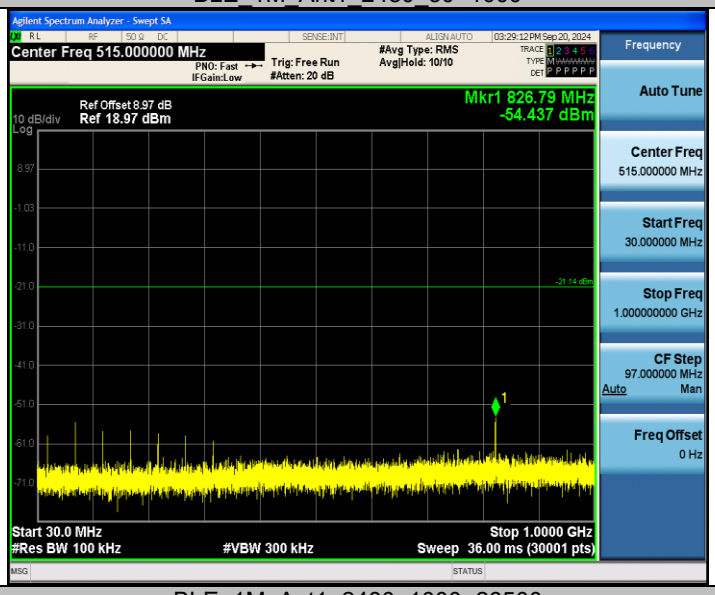
BLE_1M_Ant1_2440_1000~26500



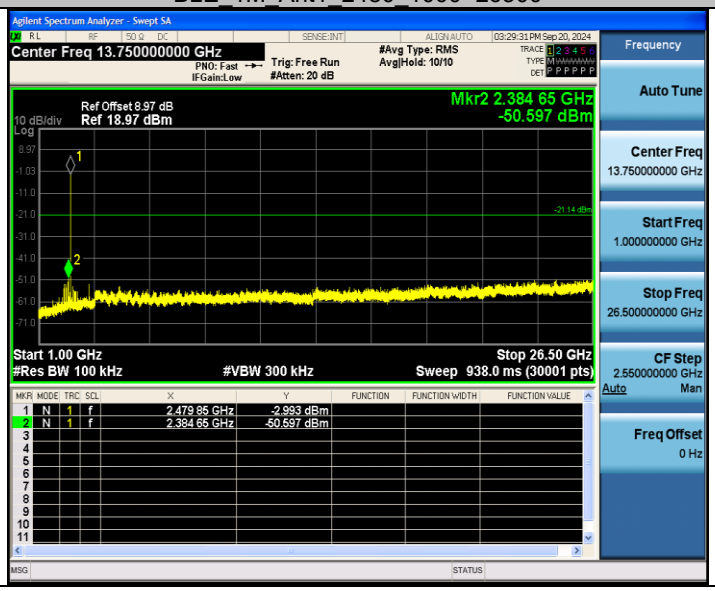
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



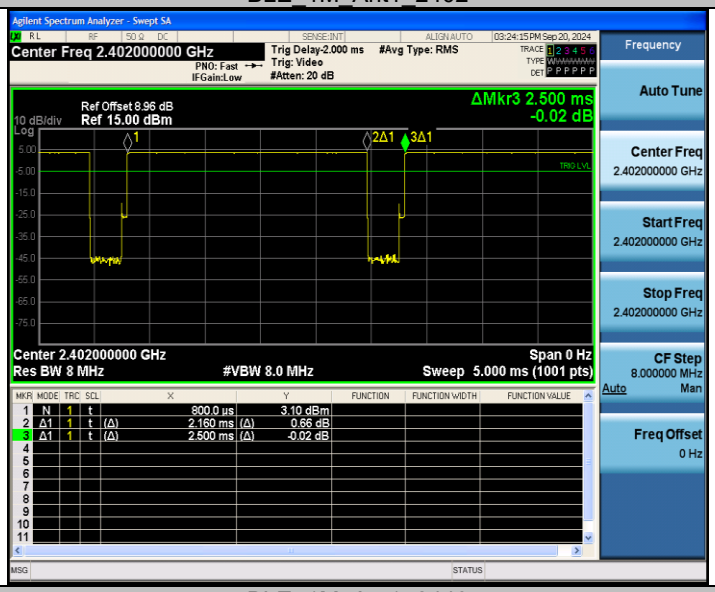
Appendix F: Duty Cycle

Test Result

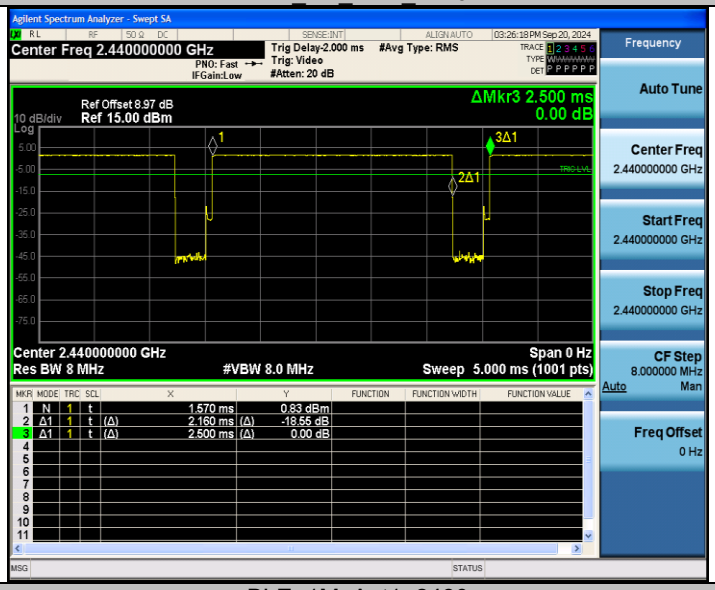
Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	2.16	2.50	86.40	0.63
		2440	2.16	2.50	86.40	0.63
		2480	2.17	2.50	86.80	0.61

Test Graphs

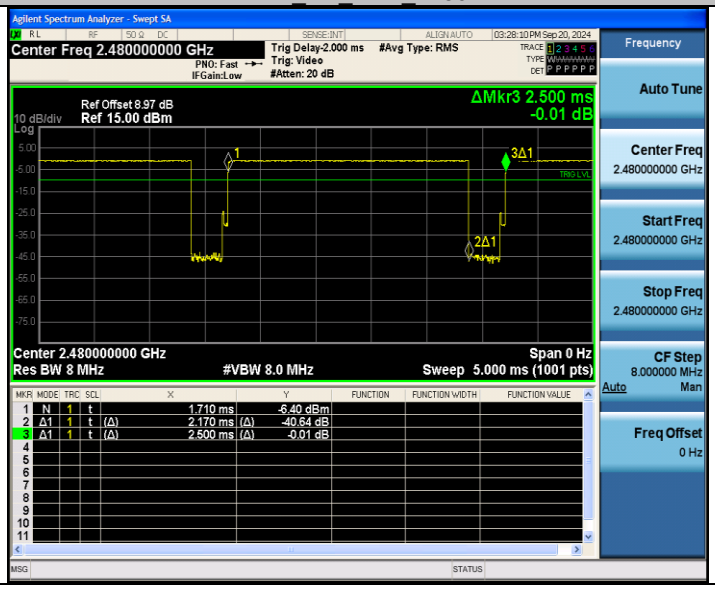
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



----End of Report----