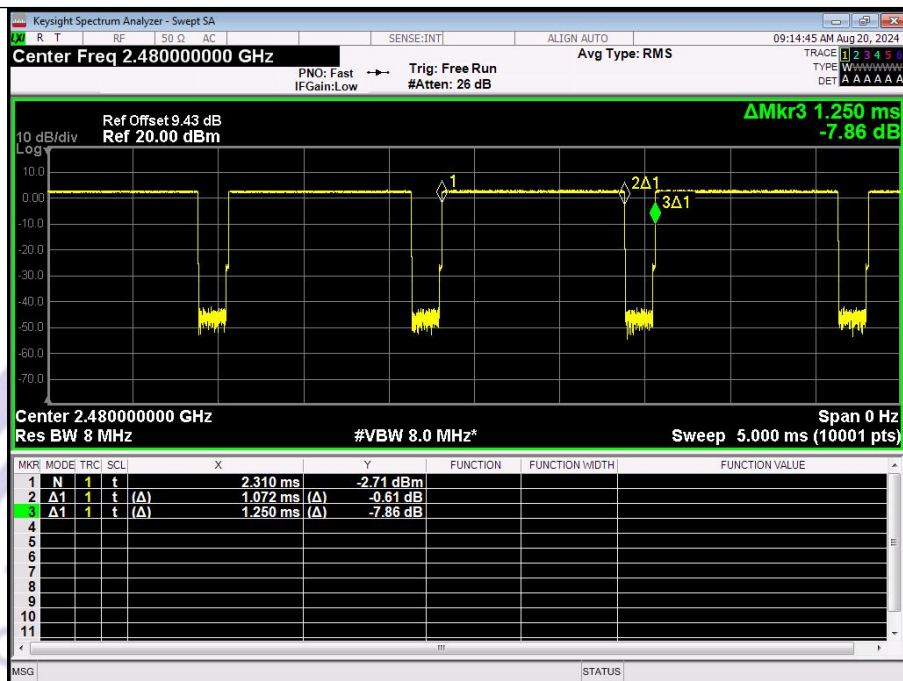




BLE 2M_Channel 39

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance} / \text{test distance})$ (dB);
Limit line = Specific limits (dBuV) + distance extrapolation factor.

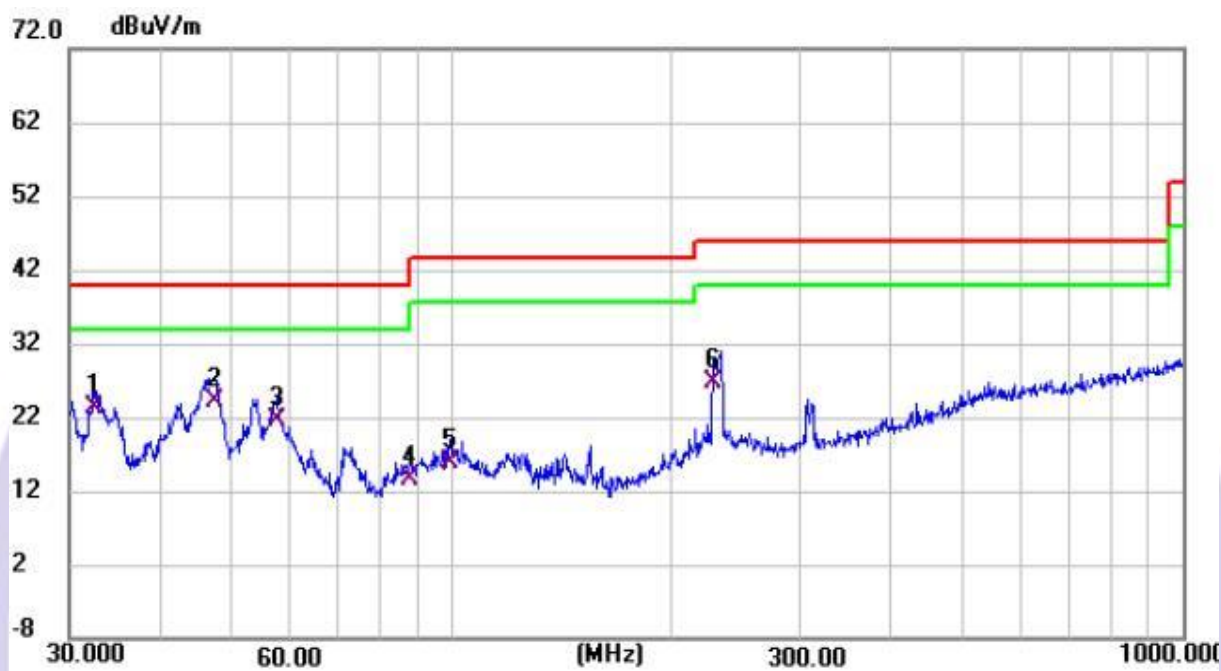
Test Frequency: 30MHz ~ 1GHz

Pass.

Please refer to the following test plots for the worst test mode (GFSK (2LE CH00: 2480MHz)).

Model: Classic B65A

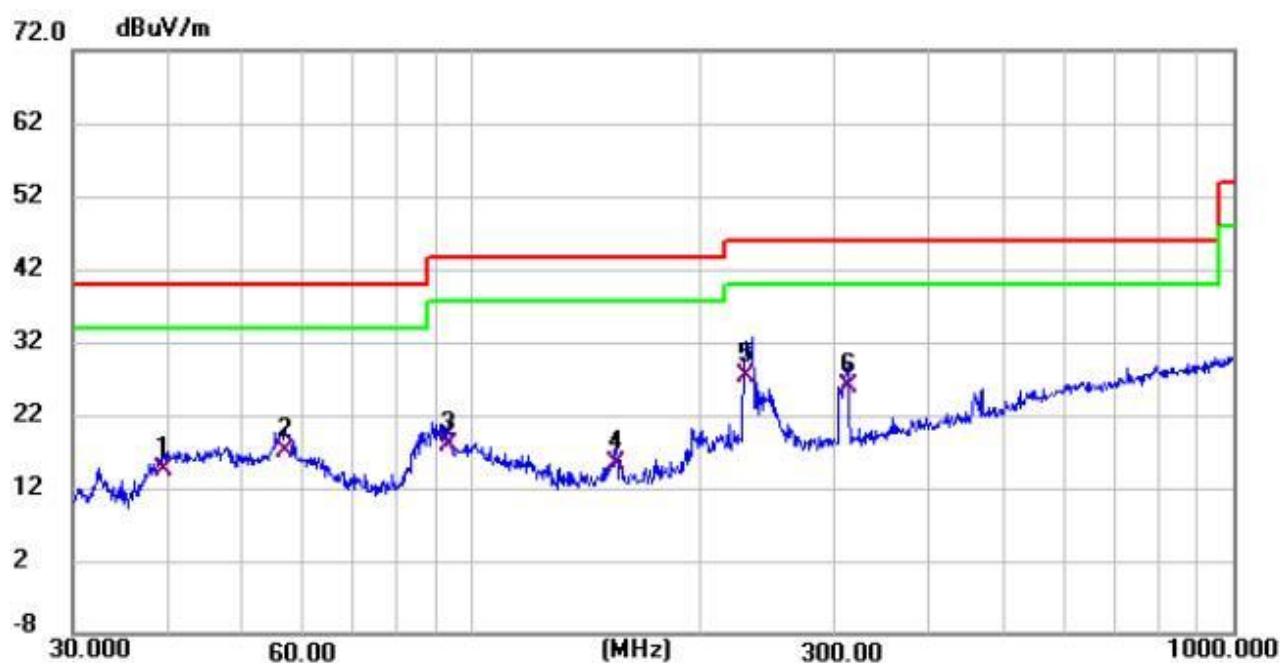
Test plot for Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.406	11.53	11.62	23.15	40.00	-16.85	QP
2 *	47.492	11.84	12.38	24.22	40.00	-15.78	QP
3	57.594	9.76	11.94	21.70	40.00	-18.30	QP
4	87.725	3.08	10.40	13.48	40.00	-26.52	QP
5	99.528	2.28	13.71	15.99	43.50	-27.51	QP
6	227.691	14.68	12.11	26.79	46.00	-19.21	QP

Remark: Emission Level = Reading + Factor

Test plot for Vertical

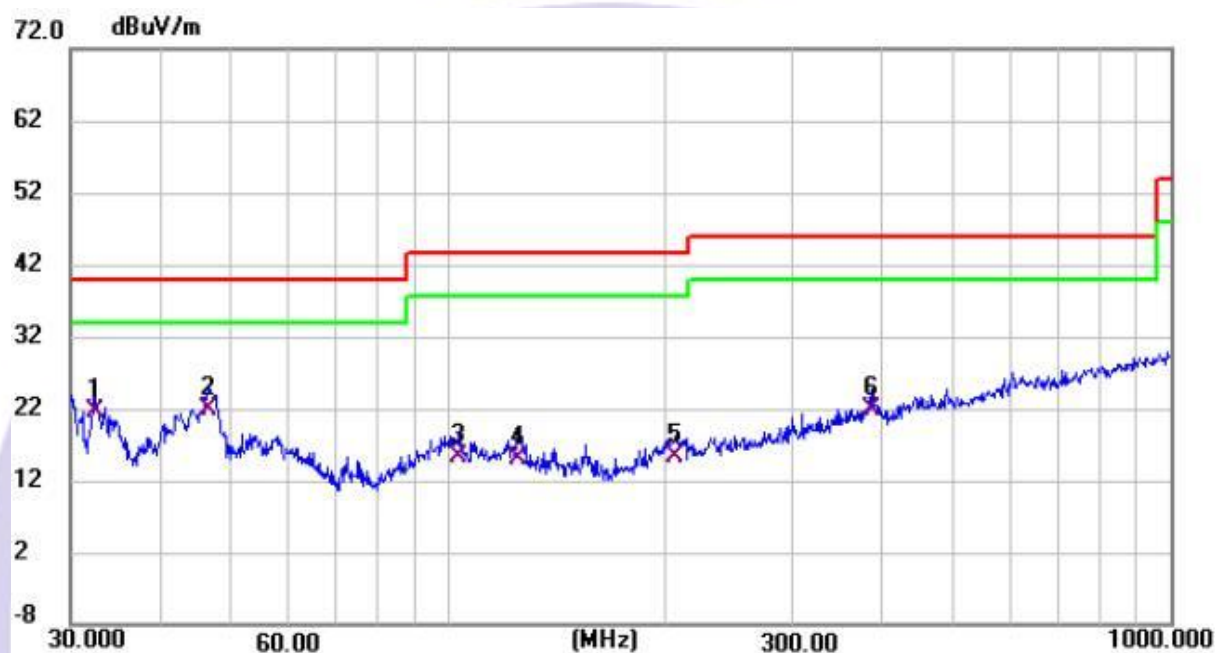


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	39.576	2.12	12.21	14.33	40.00	-25.67	QP
2	56.991	5.17	11.97	17.14	40.00	-22.86	QP
3	93.440	6.07	11.89	17.96	43.50	-25.54	QP
4	155.364	6.97	8.41	15.38	43.50	-28.12	QP
5 *	229.293	15.15	12.17	27.32	46.00	-18.68	QP
6	312.179	11.48	14.49	25.97	46.00	-20.03	QP

Remark: Emission Level = Reading + Factor

Model: Classic B40A

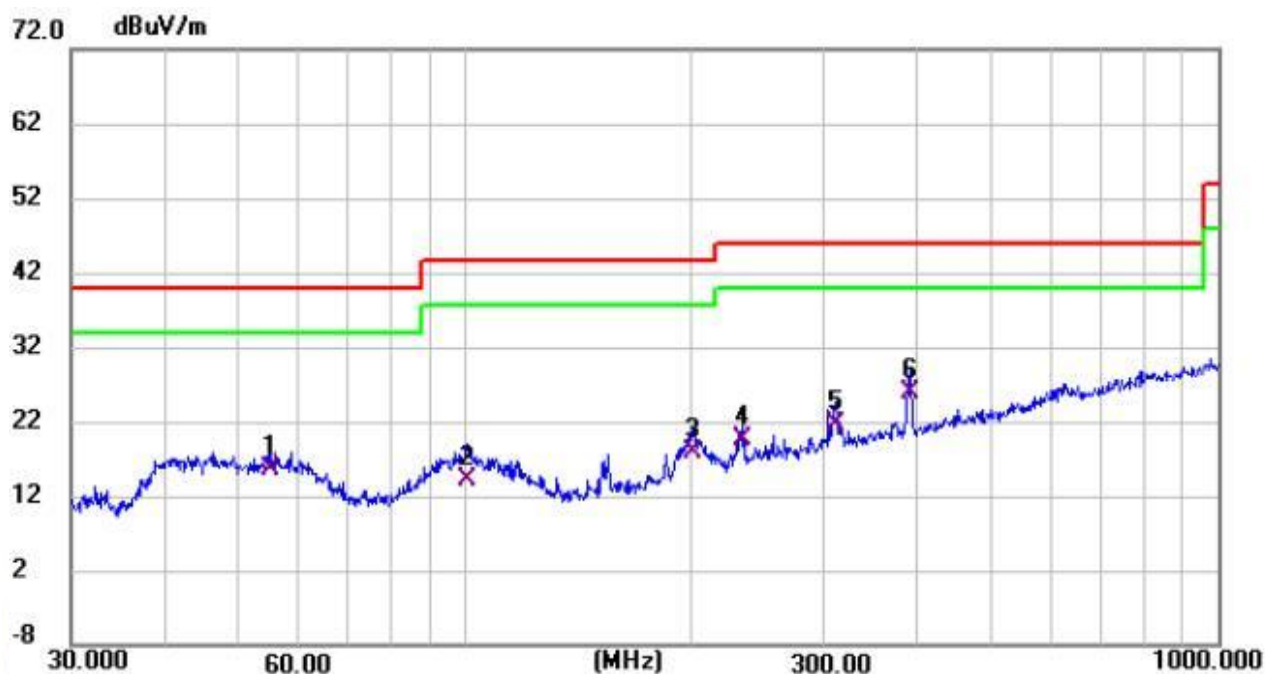
Test plot for Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.406	10.03	11.62	21.65	40.00	-18.35	QP
2 *	46.503	9.43	12.41	21.84	40.00	-18.16	QP
3	103.442	2.31	13.01	15.32	43.50	-28.18	QP
4	125.007	5.08	10.06	15.14	43.50	-28.36	QP
5	205.675	3.97	11.21	15.18	43.50	-28.32	QP
6	386.634	5.45	16.36	21.81	46.00	-24.19	QP

Remark: Emission Level = Reading + Factor

Test plot for Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	55.221	3.61	12.05	15.66	40.00	-24.34	QP
2	100.934	0.86	13.15	14.01	43.50	-29.49	QP
3	200.688	6.99	11.00	17.99	43.50	-25.51	QP
4	234.168	7.24	12.38	19.62	46.00	-26.38	QP
5	311.087	7.13	14.45	21.58	46.00	-24.42	QP
6 *	390.723	9.47	16.47	25.94	46.00	-20.06	QP

Remark: Emission Level = Reading + Factor

Please refer to the following test plots for the worst test mode (GFSK 2LE).

Test Frequency 1GHz-25GHz:

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2402MHz									
V	4804.00	54.84	30.55	5.77	24.66	54.72	74	-19.28	Pk
V	4804.00	46.21	30.55	5.77	24.66	46.09	54	-7.91	AV
V	7206.00	54.22	30.33	6.32	24.55	54.76	74	-19.24	Pk
V	7206.00	44.30	30.33	6.32	24.55	44.84	54	-9.16	AV
V	9608.00	51.19	30.85	7.45	24.69	52.48	74	-21.52	Pk
V	9608.00	43.30	30.85	7.45	24.69	44.59	54	-9.41	AV
V	12010.00	48.83	31.02	8.99	25.57	52.37	74	-21.63	Pk
V	12010.00	40.48	31.02	8.99	25.57	44.02	54	-9.98	AV
H	4804.00	54.97	30.55	5.77	24.66	54.85	74	-19.15	Pk
H	4804.00	44.56	30.55	5.77	24.66	44.44	54	-9.56	AV
H	7206.00	53.58	30.33	6.32	24.55	54.12	74	-19.88	Pk
H	7206.00	42.23	30.33	6.32	24.55	42.77	54	-11.23	AV
H	9608.00	50.38	30.85	7.45	24.69	51.67	74	-22.33	Pk
H	9608.00	41.94	30.85	7.45	24.69	43.23	54	-10.77	AV
H	12010.00	49.71	31.02	8.99	25.57	53.25	74	-20.75	Pk
H	12010.00	40.10	31.02	8.99	25.57	43.64	54	-10.36	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2440MHz									
V	4880.00	54.31	30.55	5.77	24.66	54.19	74	-19.81	Pk
V	4880.00	45.15	30.55	5.77	24.66	45.03	54	-8.97	AV
V	7320.00	52.47	30.33	6.32	24.55	53.01	74	-20.99	Pk
V	7320.00	43.50	30.33	6.32	24.55	44.04	54	-9.96	AV
V	9760.00	50.96	30.85	7.45	24.69	52.25	74	-21.75	Pk
V	9760.00	42.07	30.85	7.45	24.69	43.36	54	-10.64	AV
V	12200.00	50.82	31.02	8.99	25.57	54.36	74	-19.64	Pk
V	12200.00	40.21	31.02	8.99	25.57	43.75	54	-10.25	AV
H	4880.00	53.64	30.55	5.77	24.66	53.52	74	-20.48	Pk
H	4880.00	44.60	30.55	5.77	24.66	44.48	54	-9.52	AV
H	7320.00	53.17	30.33	6.32	24.55	53.71	74	-20.29	Pk
H	7320.00	45.29	30.33	6.32	24.55	45.83	54	-8.17	AV
H	9760.00	51.87	30.85	7.45	24.69	53.16	74	-20.84	Pk
H	9760.00	43.54	30.85	7.45	24.69	44.83	54	-9.17	AV
H	12200.00	51.47	31.02	8.99	25.57	55.01	74	-18.99	Pk
H	12200.00	41.85	31.02	8.99	25.57	45.39	54	-8.61	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:2480MHz									
V	4960.00	55.72	30.55	5.77	24.66	55.60	74	-18.40	Pk
V	4960.00	44.88	30.55	5.77	24.66	44.76	54	-9.24	AV
V	7440.00	51.93	30.33	6.32	24.55	52.47	74	-21.53	Pk
V	7440.00	43.69	30.33	6.32	24.55	44.23	54	-9.77	AV
V	9920.00	49.24	30.85	7.45	24.69	50.53	74	-23.47	Pk
V	9920.00	39.73	30.85	7.45	24.69	41.02	54	-12.98	AV
V	12400.00	48.16	31.02	8.99	25.57	51.70	74	-22.30	Pk
V	12400.00	39.91	31.02	8.99	25.57	43.45	54	-10.55	AV
H	4960.00	54.55	30.55	5.77	24.66	54.43	74	-19.57	Pk
H	4960.00	44.67	30.55	5.77	24.66	44.55	54	-9.45	AV
H	7440.00	52.07	30.33	6.32	24.55	52.61	74	-21.39	Pk
H	7440.00	42.92	30.33	6.32	24.55	43.46	54	-10.54	AV
H	9920.00	51.51	30.85	7.45	24.69	52.80	74	-21.20	Pk
H	9920.00	41.25	30.85	7.45	24.69	42.54	54	-11.46	AV
H	12400.00	48.38	31.02	8.99	25.57	51.92	74	-22.08	Pk
H	12400.00	39.78	31.02	8.99	25.57	43.32	54	-10.68	AV

Note: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Please refer to the following test plots for the worst test mode (GFSK 2LE).

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Detec tor Type	Result
GFSK	Low Channel: 2402MHz									
	H	2390.00	55.90	30.22	4.85	23.98	54.51	74	PK	PASS
	H	2390.00	47.69	30.22	4.85	23.98	46.30	54	AV	PASS
	H	2400.00	54.66	30.22	4.85	23.98	53.27	74	PK	PASS
	H	2400.00	46.39	30.22	4.85	23.98	45.00	54	AV	PASS
	V	2390.00	57.29	30.22	4.85	23.98	55.90	74	PK	PASS
	V	2390.00	44.70	30.22	4.85	23.98	43.31	54	AV	PASS
	V	2400.00	54.89	30.22	4.85	23.98	53.50	74	PK	PASS
	V	2400.00	46.58	30.22	4.85	23.98	45.19	54	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	55.47	35.11	3.56	27.75	51.67	74	PK	PASS
	H	2483.50	46.55	35.11	3.56	27.75	42.75	54	AV	PASS
	H	2500.00	57.40	35.1	3.57	27.8	53.67	74	PK	PASS
	H	2500.00	46.56	35.1	3.57	27.8	42.83	54	AV	PASS
	V	2483.50	55.86	35.11	3.56	27.75	52.06	74	PK	PASS
	V	2483.50	55.74	35.11	3.56	27.75	51.94	54	AV	PASS
	V	2500.00	56.83	35.1	3.57	27.8	53.10	74	PK	PASS
	V	2500.00	46.87	35.1	3.57	27.8	43.14	54	AV	PASS
Remark:										
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit										

7 Conduct Band Edge And Spurious Emissions Measurement

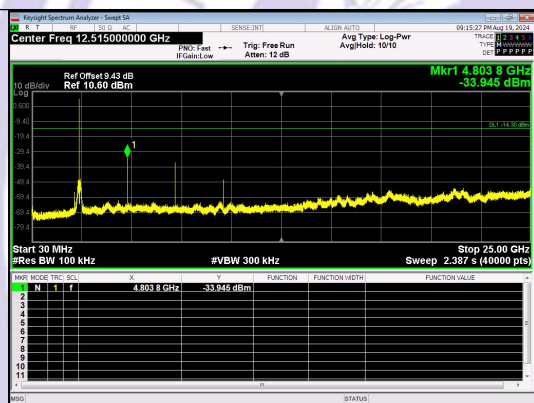
- Test Requirement : Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
- Test Method : ANSI C63.10:2013
- Test Limit : Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).

7.1 Test Procedure

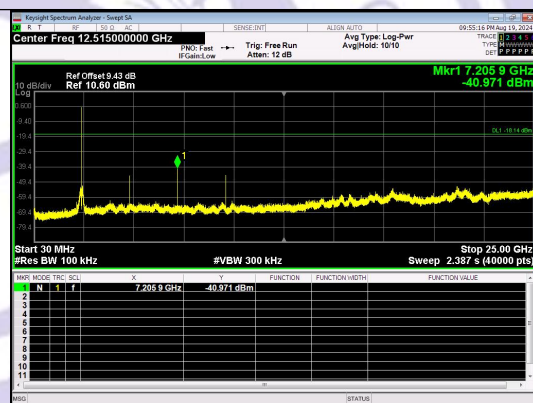
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

7.2 Test Result

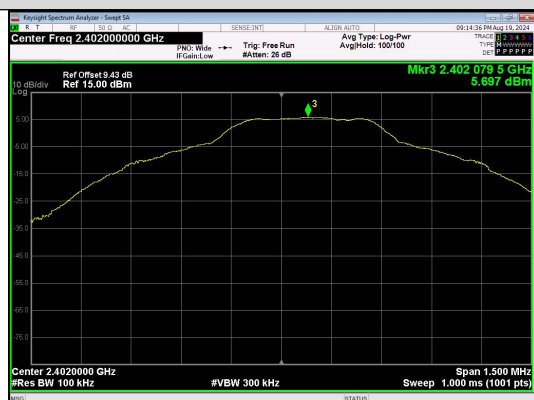
Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
BLE 1M	0	2390.44	-47.653	-14.3	-33.353	PASS
		2400.00	-49.705	-14.3	-35.405	PASS
		4803.80	-33.945	-14.3	-19.645	PASS
	19	7320.17	-38.903	-17.39	-21.513	PASS
		2483.50	-52.624	-17.67	-34.954	PASS
		7440.03	-42.720	-17.67	-25.050	PASS
BLE 2M	0	2400.00	-31.787	-18.14	-13.647	PASS
		7205.93	-40.971	-18.14	-22.831	PASS
	19	7320.17	-42.682	-18.62	-24.062	PASS
		2483.50	-51.591	-18.97	-32.621	PASS
	39	7440.03	-43.239	-18.97	-24.269	PASS



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 0



30.0 MHz - 25000.0 MHz
BLE 2M_Channel 0

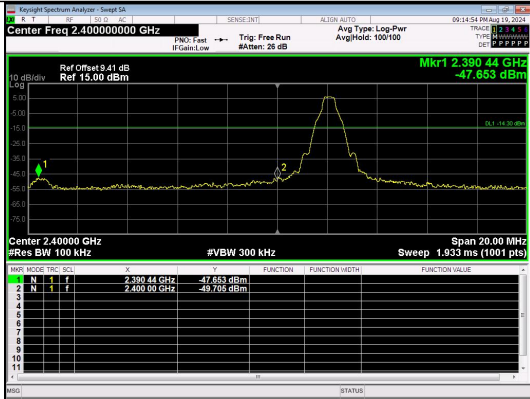


In-Band Reference Level

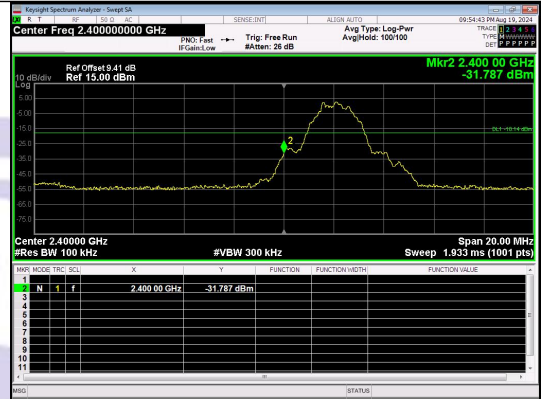


In-Band Reference Level

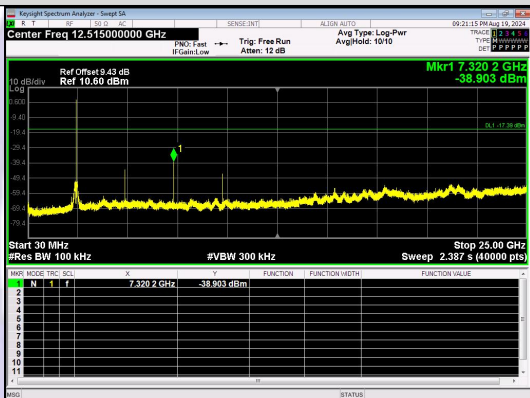
BLE 1M_Channel 0



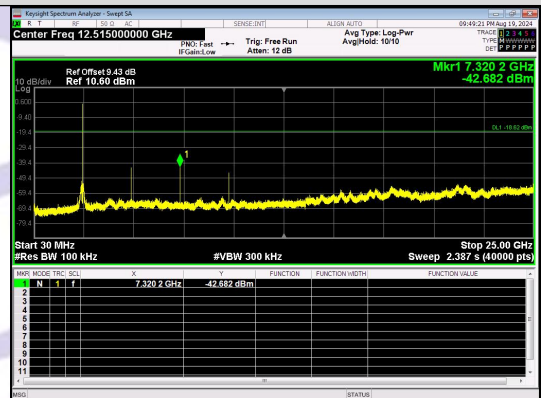
BLE 2M_Channel 0



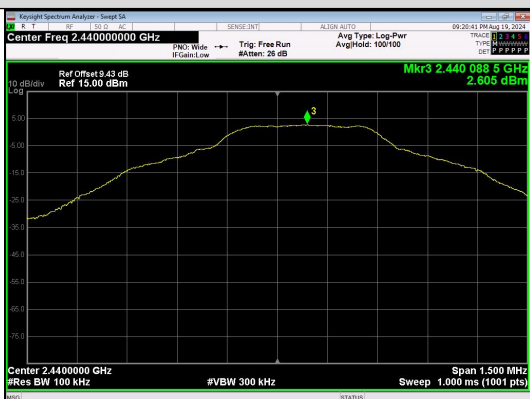
Out Of Band Emission BLE 1M_Channel 0



Out Of Band Emission BLE 2M_Channel 0



30.0 MHz - 25000.0 MHz BLE 1M_Channel 19

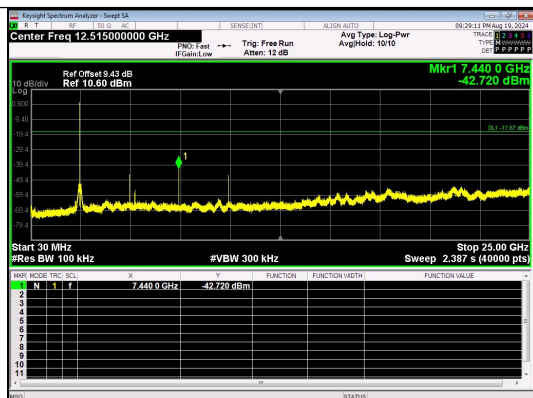


30.0 MHz - 25000.0 MHz BLE 2M_Channel 19

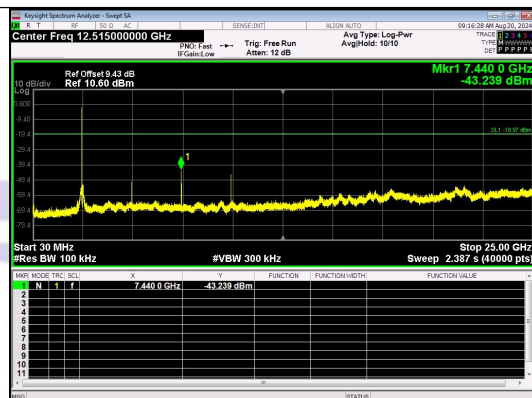


In-Band Reference Level BLE 1M_Channel 19

In-Band Reference Level BLE 2M_Channel 19



30.0 MHz - 25000.0 MHz
BLE 1M_Channel 39



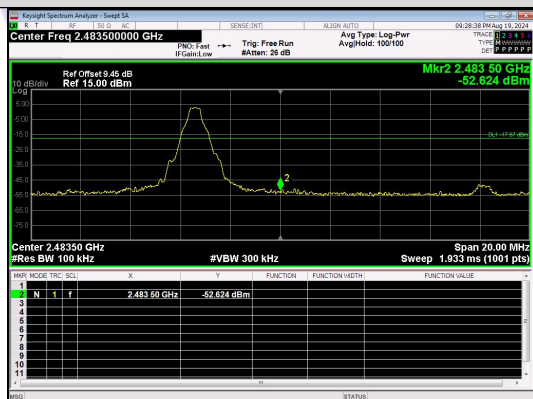
30.0 MHz - 25000.0 MHz
BLE 2M_Channel 39



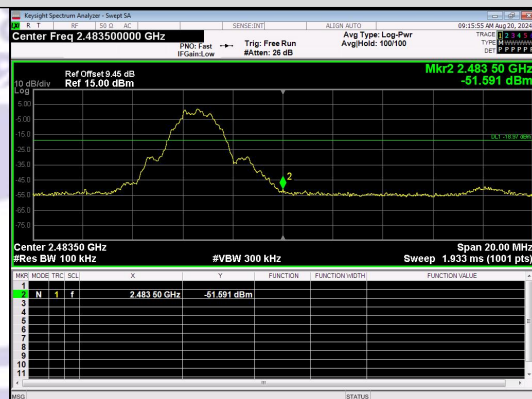
In-Band Reference Level
BLE 1M_Channel 39



In-Band Reference Level
BLE 2M_Channel 39



Out Of Band Emission
BLE 1M_Channel 39



Out Of Band Emission
BLE 2M_Channel 39

8 6dB Bandwidth Measurement & 99% OCB Test

Test Requirement : FCC CFR47 Part 15 Section 15.247 (a)(2)

Test Method : ANSI C63.10:2013

Test Limit
Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

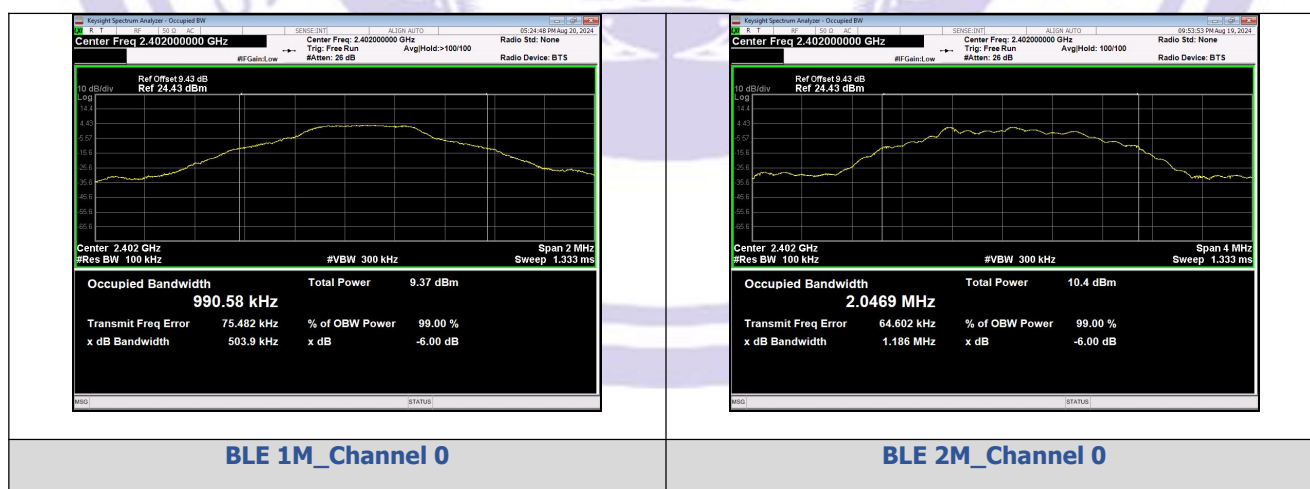
8.1 Test Procedure

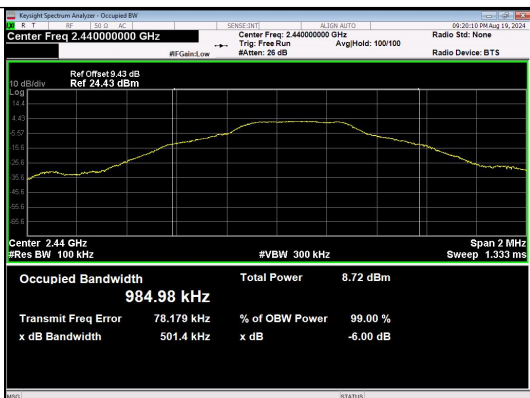
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz(For 6dB bandwidth)
3. Set the spectrum analyzer: RBW = 20kHz, VBW = 62kHz(For LE 99% bandwidth)
4. Set the spectrum analyzer: RBW = 30kHz, VBW = 91kHz(For 2LE 99% bandwidth)

8.2 Test Result

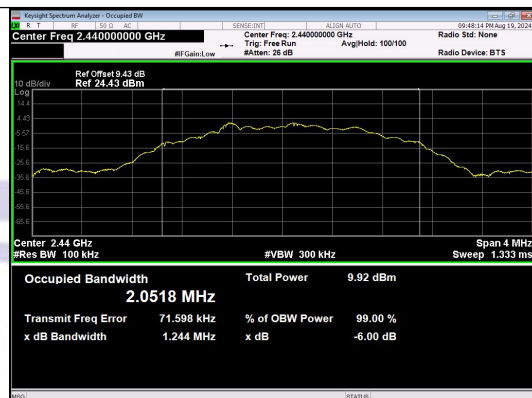
Mode	Channel number	Channel frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6dB BW Required Limit (KHz)	Result
LE	00	2402	0.5039	0.89867	>500	Pass
	19	2440	0.5014	0.91827	>500	
	39	2480	0.5012	0.91002	>500	
2LE	00	2402	1.186	2.0674	>500	Pass
	19	2440	1.244	2.0697	>500	
	39	2480	1.239	2.0678	>500	

6dB Bandwidth

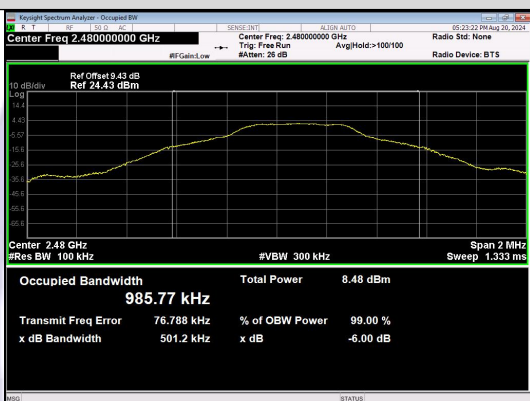




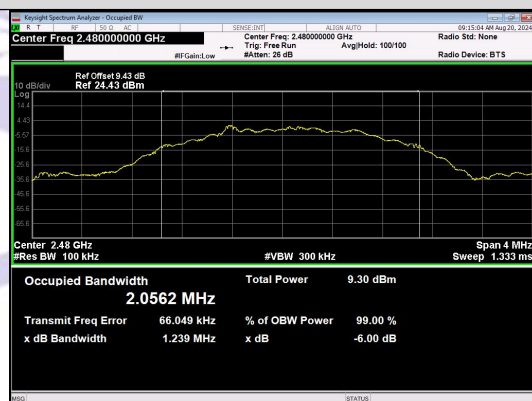
BLE 1M_Channel 19



BLE 2M_Channel 19

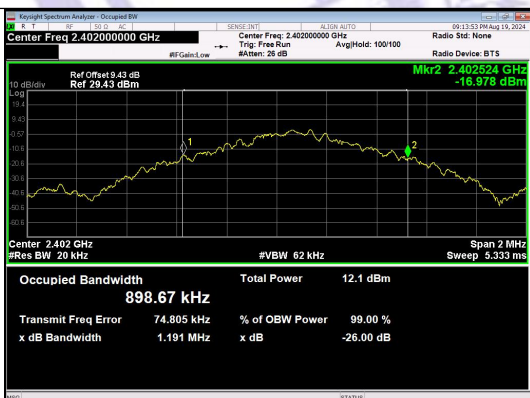


BLE 1M_Channel 39

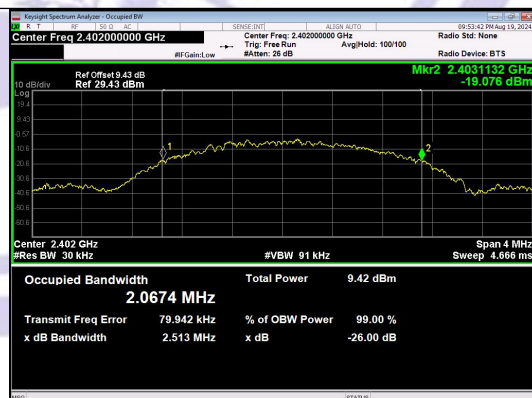


BLE 2M_Channel 39

99% Bandwidth



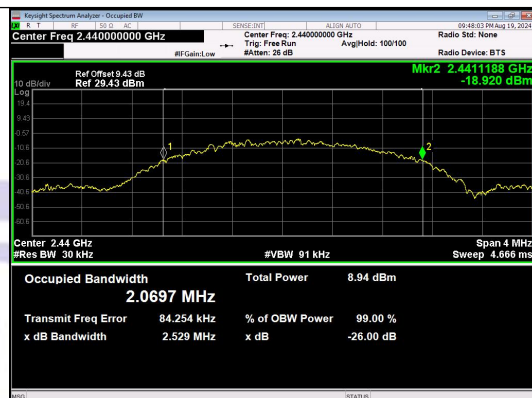
BLE 1M_Channel 0



BLE 2M_Channel 0



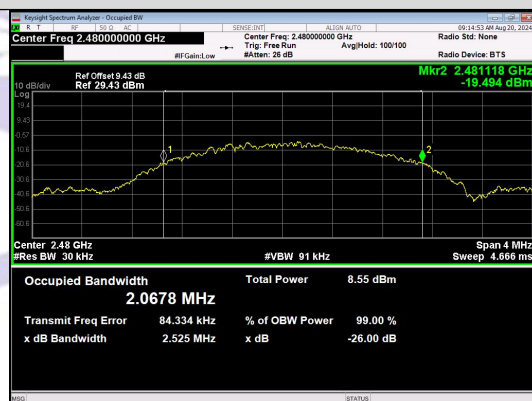
BLE 1M_Channel 19



BLE 2M_Channel 19



BLE 1M_Channel 39



BLE 2M_Channel 39

9 Maximum Peak Output Power

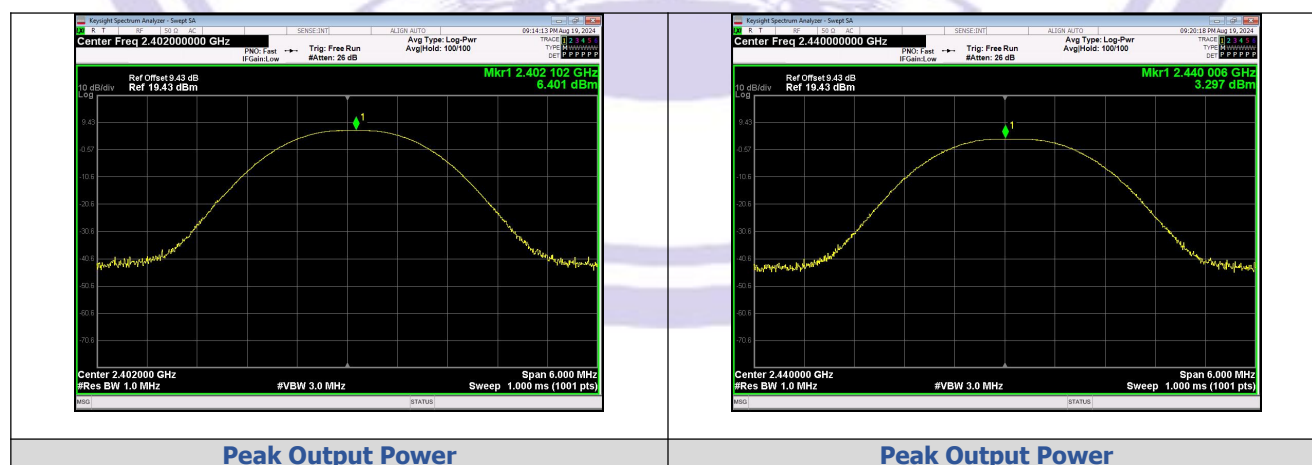
Test Requirement	:	FCC CFR47 Part 15 Section 15.247 (b)(3)
Test Method	:	ANSI C63.10:2013
Test Limit	:	Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

9.1 Test Procedure

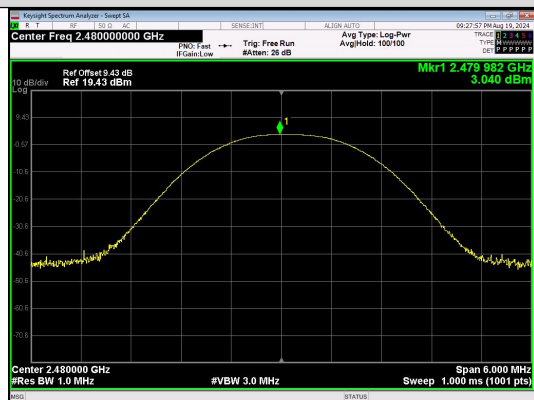
1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Measure the conducted output power and record the results in the test report.

9.2 Test Result

Mode	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Max. Avg. Power (dBm)	Limit (dBm)	Result
LE	0	6.401	4.37	None	30	PASS
	19	3.297	2.14	None	30	PASS
	39	3.040	2.01	None	30	PASS
2LE	0	3.731	2.36	None	30	PASS
	19	3.248	2.11	None	30	PASS
	39	2.910	1.95	None	30	PASS



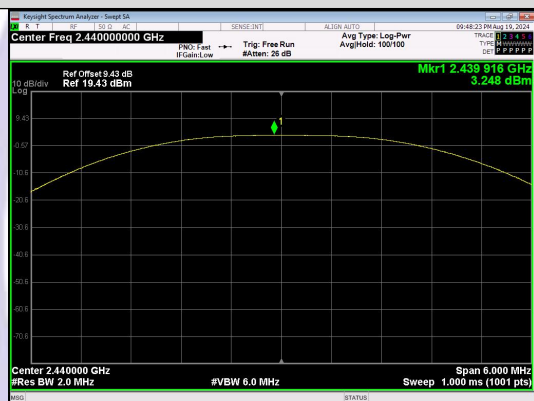
BLE 1M_Channel 0



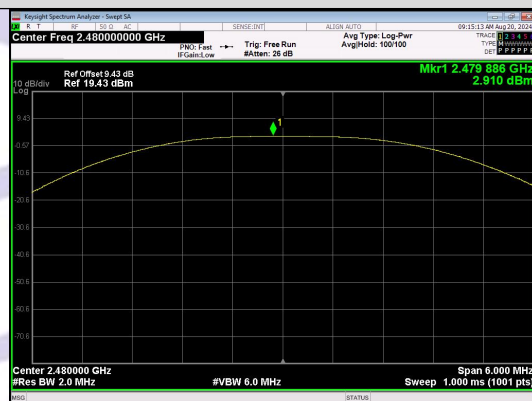
BLE 1M_Channel 19



Peak Output Power
BLE 1M_Channel 39



Peak Output Power
BLE 2M_Channel 0



Peak Output Power
BLE 2M_Channel 19

Peak Output Power
BLE 2M_Channel 39

10 Power Spectral density

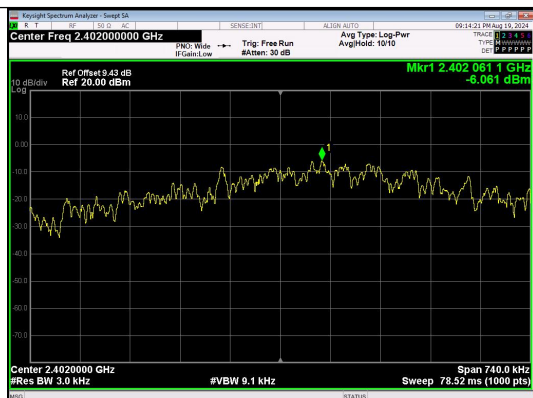
Test Requirement	: FCC CFR47 Part 15 Section 15.247 (e)
Test Method	: ANSI C63.10:2013
Test Limit	: Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

10.1 Test Procedure

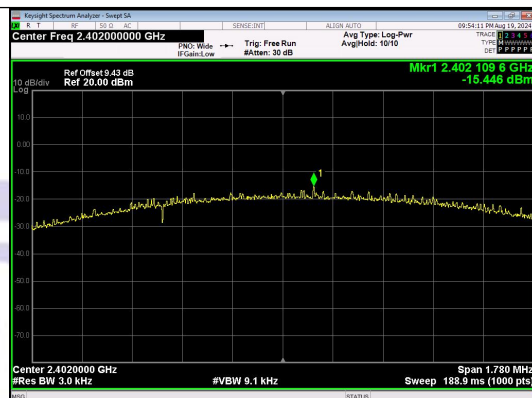
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 9.1kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

10.2 Test Result

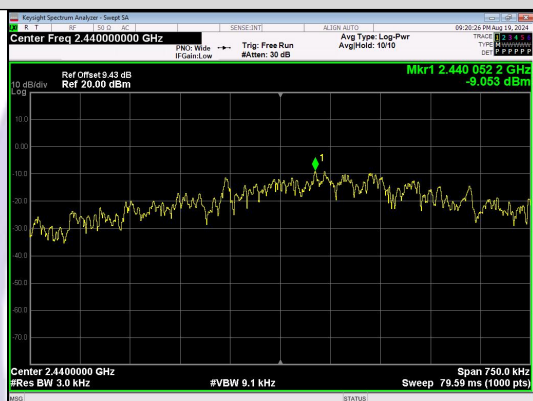
Mode	Channel number	Channel frequency (MHz)	Measurement level (dBm)	Required Limit (dBm/3kHz)	Pass/Fail
			PSD/3kHz		
LE	00	2402	-6.061	8	PASS
	19	2440	-9.053	8	PASS
	39	2480	-10.183	8	PASS
2LE	00	2402	-15.446	8	PASS
	19	2440	-16.044	8	PASS
	39	2480	-16.592	8	PASS



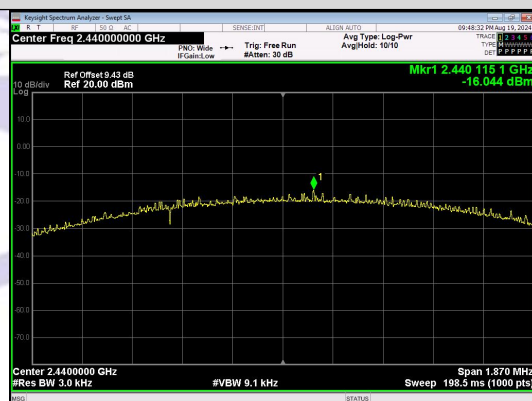
BLE 1M_Channel 0



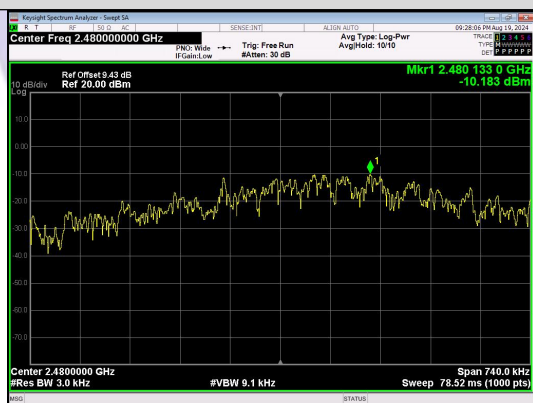
BLE 2M_Channel 0



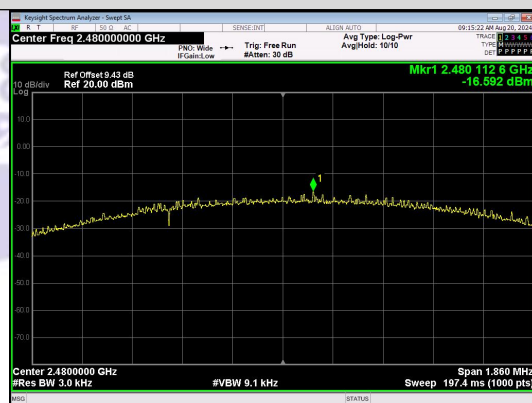
BLE 1M_Channel 19



BLE 2M_Channel 19



BLE 1M_Channel 39



BLE 2M_Channel 39

11 Antenna Application

11.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2 Result

The antenna is PCB antenna, the best case gain of the antennas is -1.06 dBi, reference to the appendix II for details

12 Test Setup

Please see the attachment for details.



13 EUT Photos

Please see the attachment for details.

*****THE END REPORT*****

