

TEST REPORT

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Applicant : Shenzhen UniStrong Science & Technology Co.,Ltd.
Address of Applicant : B,4-4Factory, Zhengcheng Road, Fuyong Baoan District, Shenzhen, China

Product Name : Rugged Smart Tablet
Model No. : UT30P
Sample No. : E19020010-05#01
FCC ID : 2AOPD-UT30P
ISED Number : 11546A-UT30P

Standards : FCC CFR47 Part 15, Subpart C
RSS-Gen (Issue 5, March 2019)
RSS-247 (Issue 2, February 2017)

Date of Receipt : 2020-2-10
Date of Test : 2020-2-10 ~ 2020-5-7
Date of Issue : 2020-5-7

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by:

Jennifer Zhou
(Jennifer Zhou)

Reviewed by:

Jesse
(Jesse)

Approved by:

Guoyou Chi
(Authorized signatory: Guoyou Chi)

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Revision Record			
Version	Date	Revisions	Revised By
1.0	2019-10-31	Original	--

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1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	155 Pingbei Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Company Name	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address	B,4-4Factory, Zhengcheng Road, Fuyong Baoan District, Shenzhen, China
Contact Person	Lili Zheng
Telephone	+86-21-54467182
Email	ll.zheng@unistrong.com

1.3 Details of EUT

Product Name	Rugged Smart Tablet
Brand Name	Unistrong
Model No.	UT30P
FCC ID	2AOPD-UT30P
ISED Number	11546A-UT30P
Mode of Operation	Bluetooth BLE
Frequency Range	2400MHz ~ 2483.5MHz
Number of Channels	40 (at intervals of 2 MHz)
Modulation Type	GFSK
Antenna Type	Internal Antenna
Antenna Gain	2.84 dBi
Extreme Temperature Range	-20°C ~ +55°C
Test Voltage	DC 3.8V

1.4 Test Methodology

47 CFR Part 15, Subpart C (10-1-16 Edition)	Miscellaneous Wireless Communications Services
KDB Publication 558074 D01 v05r02	DTS Meas Guidance.
RSS-Gen (Issue 5, March 2019)	General Requirements for Compliance of Radio Apparatus
RSS-247	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs)

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(Issue 2, February 2017)	and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

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2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2020-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2020-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2020-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	2021-02-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2020-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2020-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2020-07-26
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2020-06-26
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2020-08-28
Test Software	BL	BL410_E	N/A	N/A

2.3 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

Channel	Frequency
The lowest channel(CH0)	2402MHz
The middle channel(CH19)	2440MHz
The Highest channel(CH39)	2480MHz

The basic operation modes are:

- A. On
 - 1. BLE mode
 - a. Transmitting
 - i. Low Channel
 - ii. Middle Channel
 - iii. High Channel
 - b. Receiving
 - 2. Normal working with Bluetooth on
- B. Standby
- C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT

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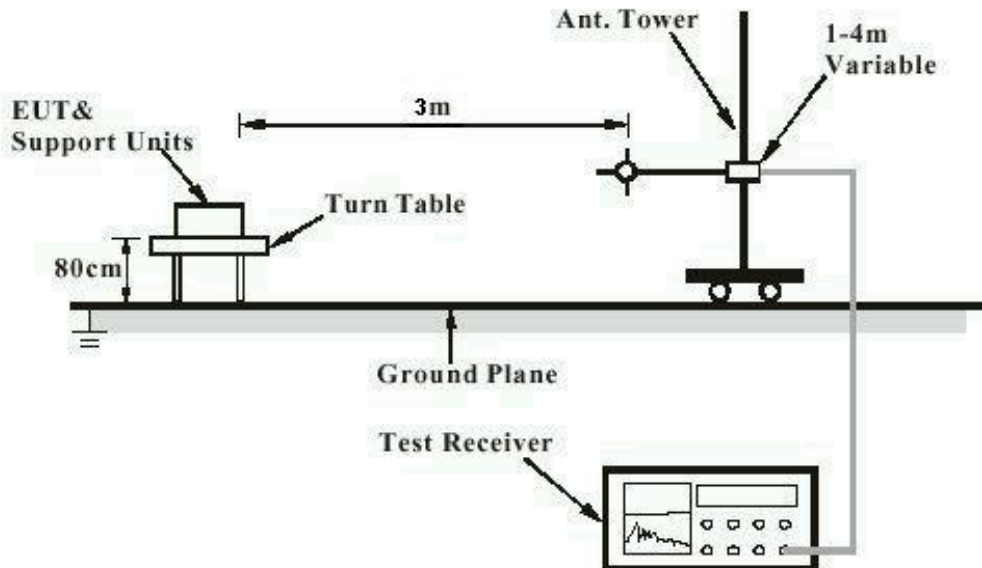
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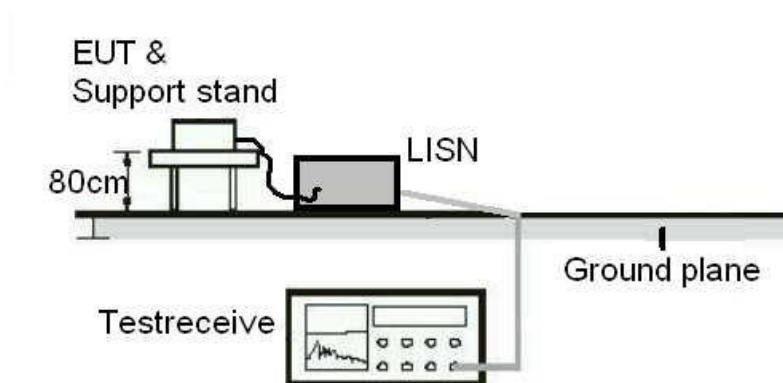
3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Conduction Measurement



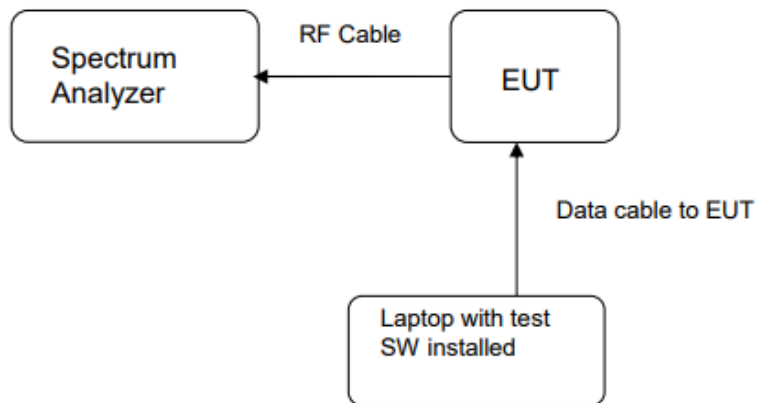
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Diagram of Measurement Equipment Configuration for Transmitter Measurement



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4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT:

PASS

Test standard : FCC Part 15.247(b)(4), Part 15.203
RSS-247 5.4(6)

Requirement : The use of approved antennas only with directional
gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a gain of 2.84 dBi. The antenna is an antenna with no possibility of replacement with a non-approved antenna by the end-user

Therefore, the EUT is considered to comply with this provision.

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4.1.2 Peak Output Power and E.I.R.P

RESULT:

PASS

Test standard : FCC Part 15.247(b)(3)
RSS-247 5.4(4)
Requirement : ANSI C63.10-2013, KDB 558074
Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
Operation Mode : A.1.a
Ambient temperature : 25°C
Relative humidity : 52%

Table 1: Peak Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
BLE	2402	0.42	1.10	< 1
	2440	1.46	1.40	
	2480	1.16	1.31	

Table 2: E.I.R.P

Test Mode	Test Channel (MHz)	E.I.R.P		Limit (W)
		(dBm)	(mW)	
BLE	2402	3.26	2.12	< 4
	2440	4.3	2.69	
	2480	4	2.51	

Note: BT BLE antenna peak gain is 2.84

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Figure 1: Peak Output Power, 2402MHz

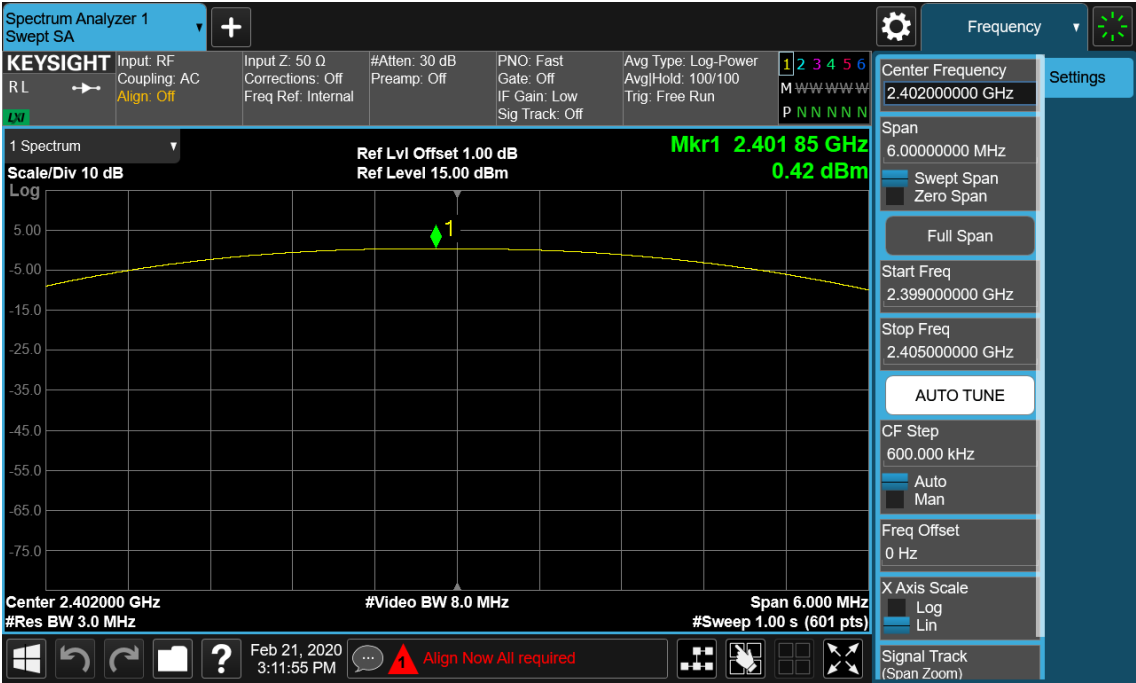
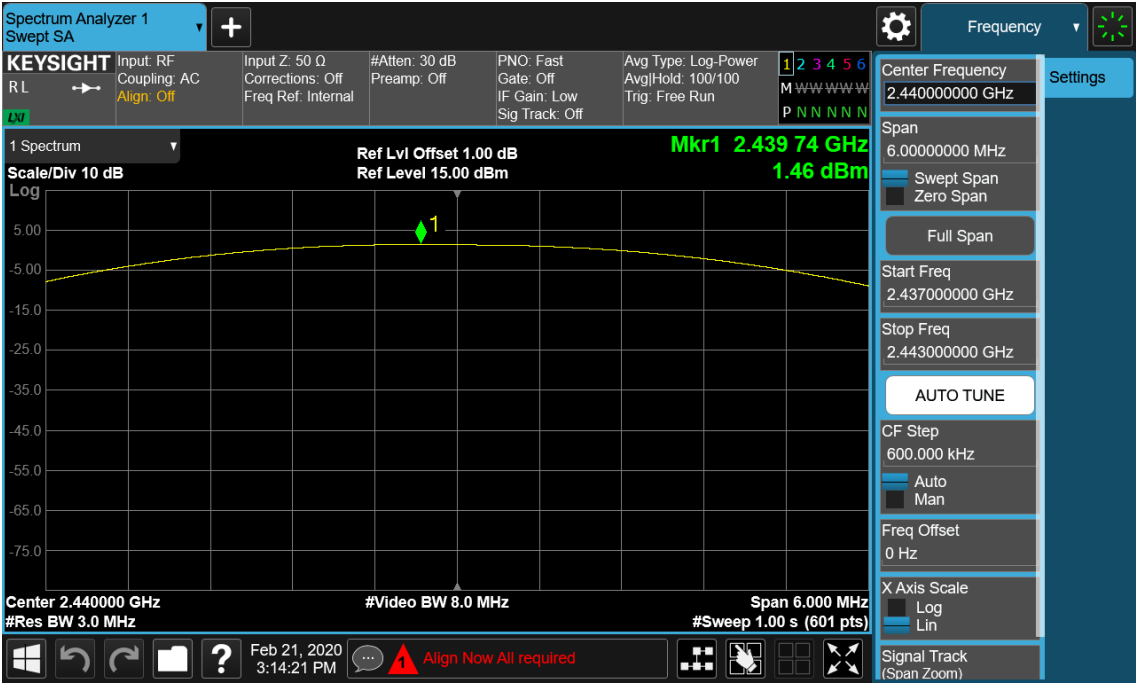


Figure 2: Peak Output Power, 2440MHz



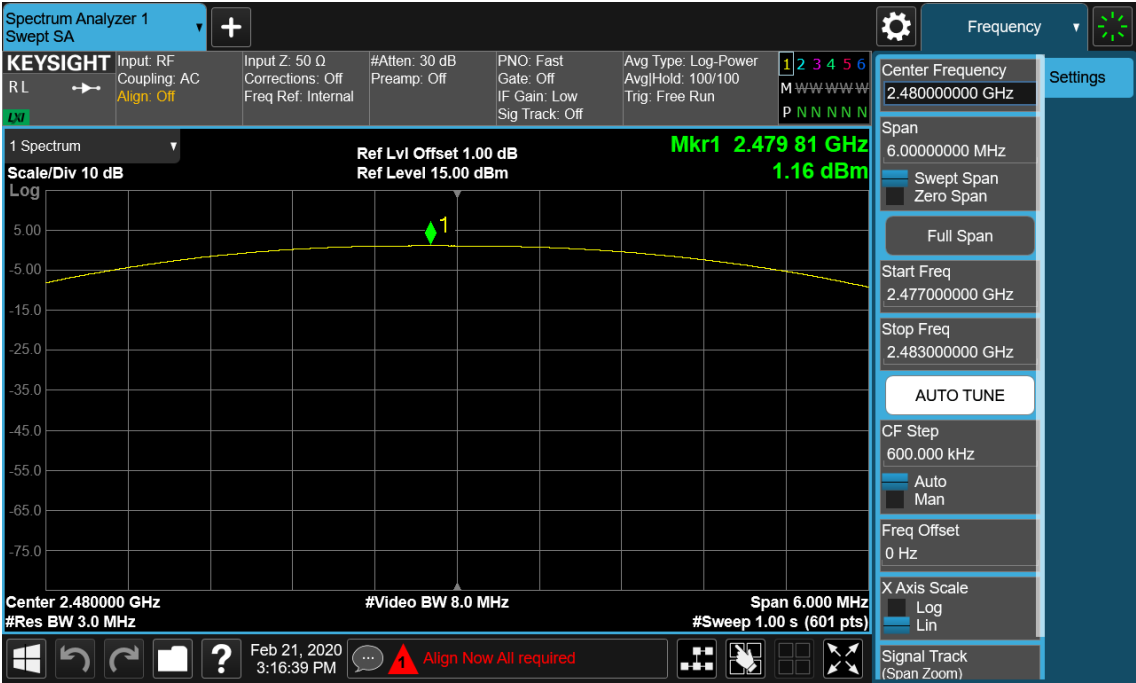
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Figure 3: Peak Output Power, 2480MHz



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4.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.247(a)(2)
RSS-247 5.2(1)
RSS-Gen 6.6
Requirement : ANSI C63.10-2013, KDB 558074
Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
Operation Mode : A.1.a
Ambient temperature : 25°C
Relative humidity : 52%

Table 3: 6dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6dB Bandwidth Limit
BLE	2402	518.5	1.1029	0.5 MHz
	2441	507.9	1.1024	
	2480	508.8	1.1023	

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Figure 4: 6dB Bandwidth and 99% Bandwidth, 2402MHz



Figure 5: 6dB Bandwidth and 99% Bandwidth, 2440MHz



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Figure 6: 6dB Bandwidth and 99% Bandwidth, 2480MHz



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4.1.4 Power Spectral Density

RESULT:

PASS

Test standard : FCC Part 15.247(e)
RSS-247 5.2(2)
Requirement : ANSI C63.10-2013, KDB 558074
Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
Operation Mode : A.1.a
Ambient temperature : 25°C
Relative humidity : 52%

Table 4: Power Spectral Density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
BLE	2402	-0.74	8
	2440	0.03	
	2480	-0.11	

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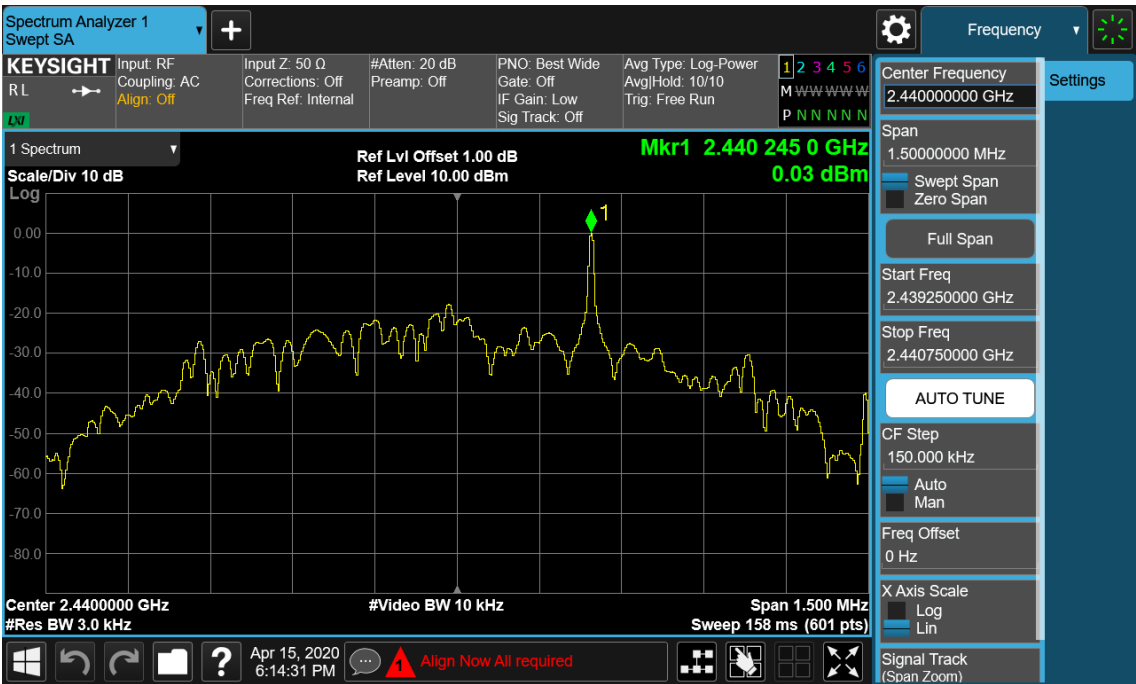
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Figure 7: Power Spectral Density, 2402MHz



Figure 8: Power Spectral Density, 2440MHz



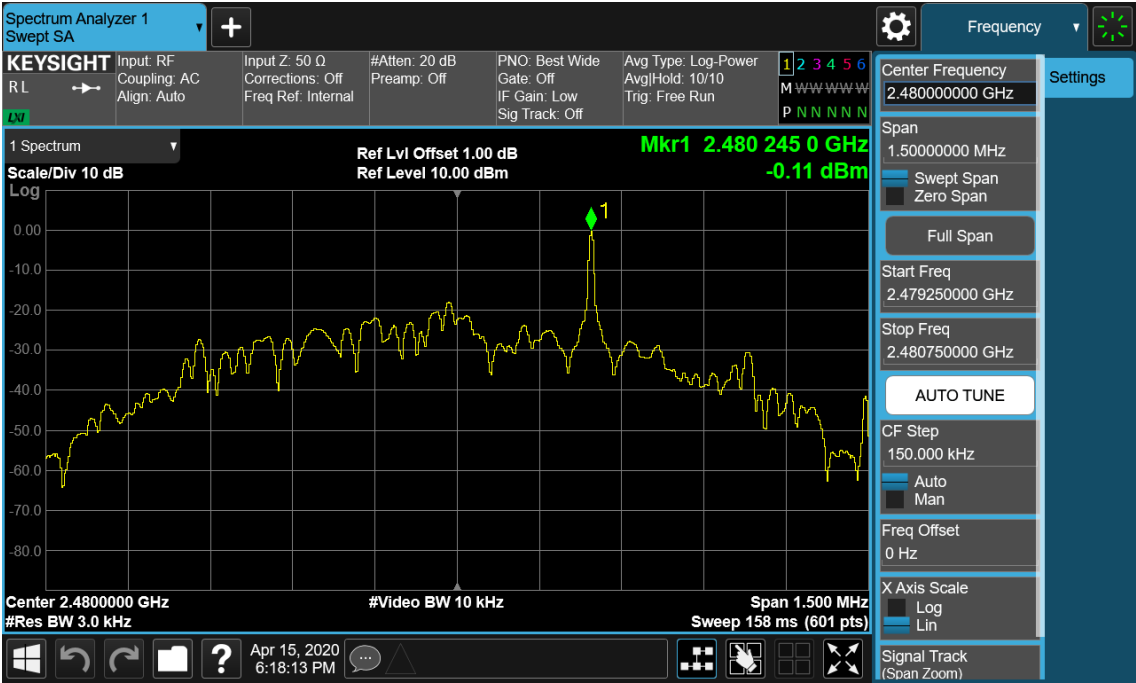
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Figure 9: Power Spectral Density, 2480MHz



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4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT:

PASS

Test standard	: FCC Part 15.247(d) RSS-247 5.5
Requirement	: ANSI C63.10-2013, KDB 558074
Kind of test site	: Shielded room

Test setup

Test Channel	: Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	: A.1.a
Ambient temperature	: 25°C
Relative humidity	: 52%

For details refer to following test plot.

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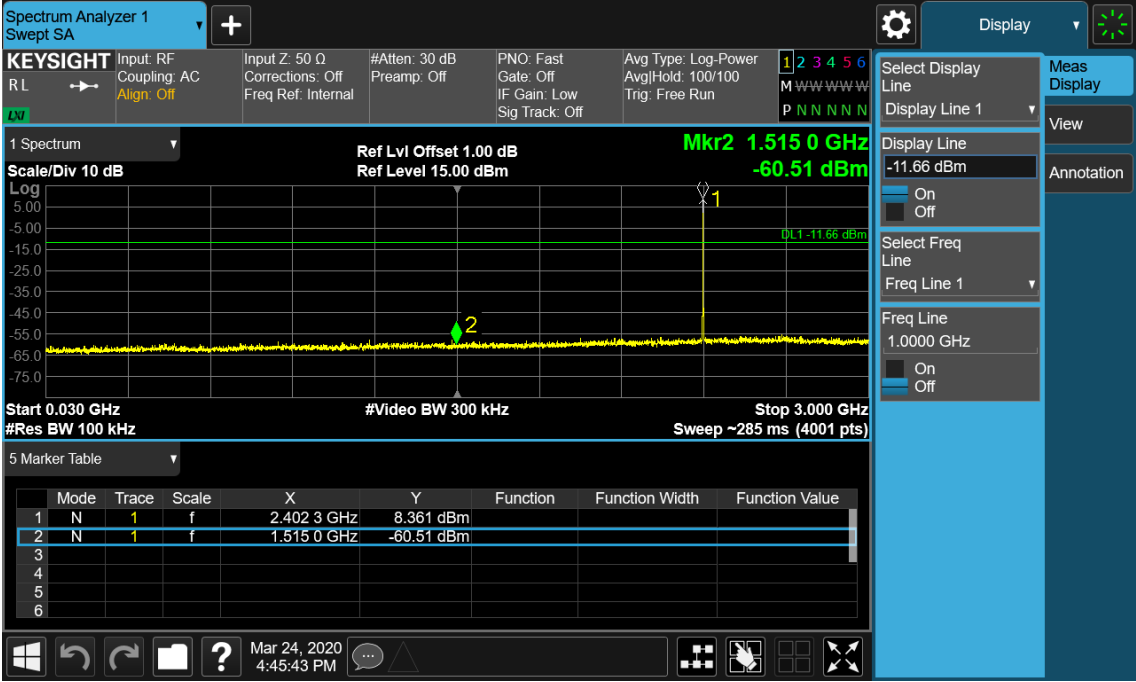
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Figure 10: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE Carrier Level



Band Edge



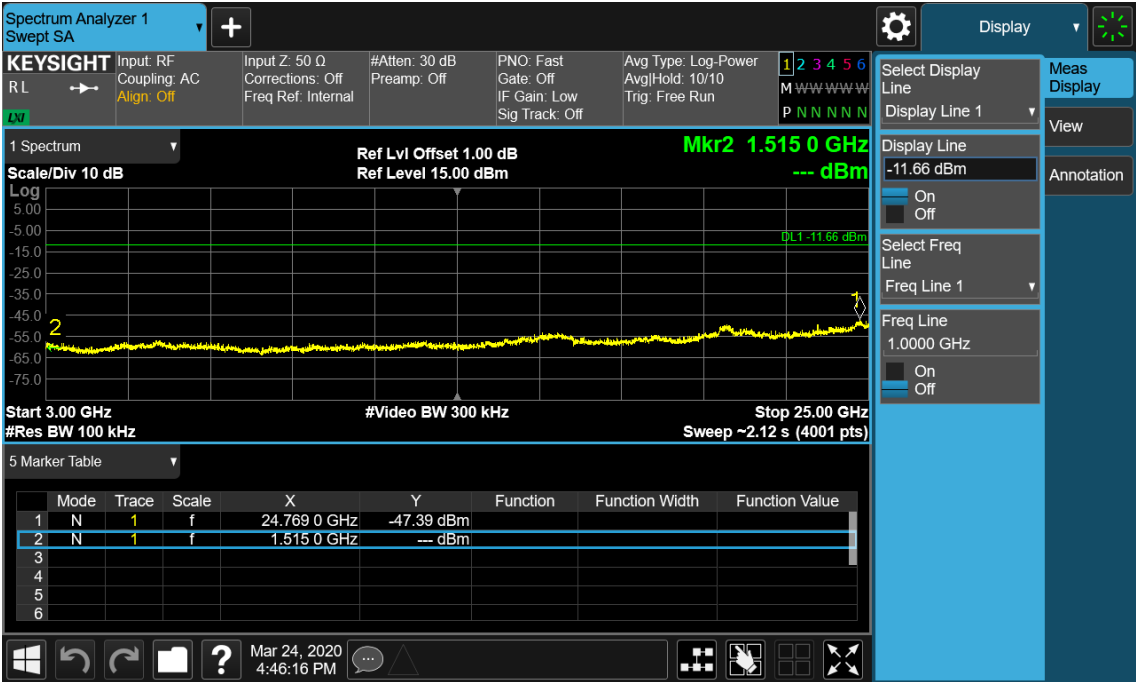
Conducted spurious emissions 30MHz-25GHz

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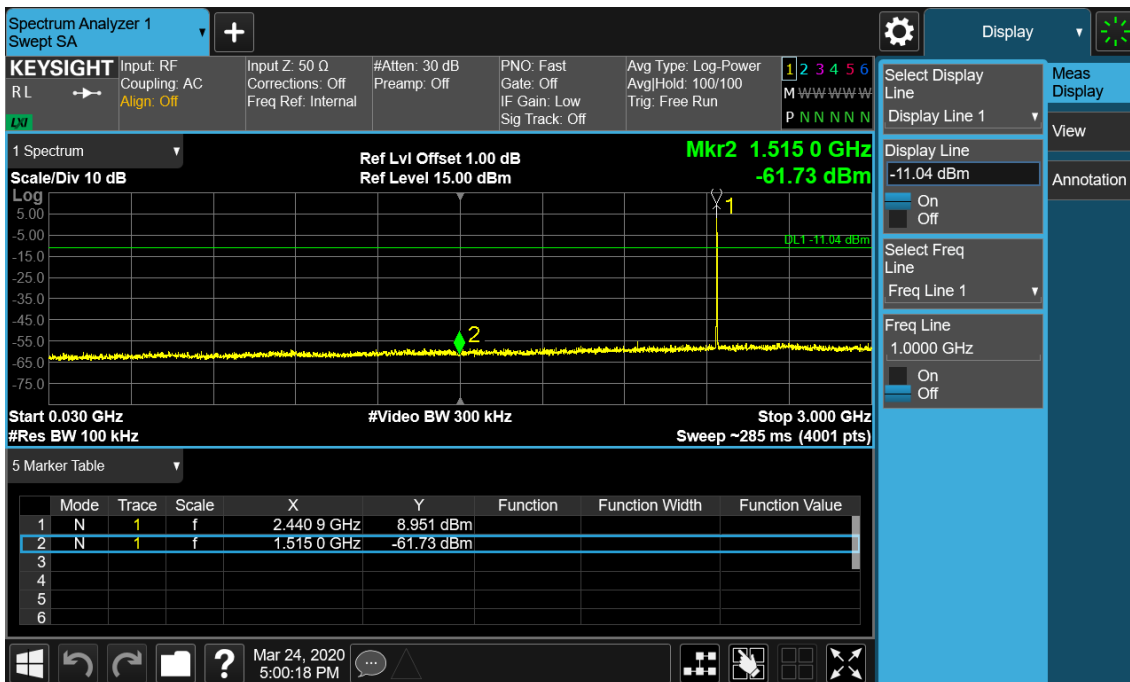
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Figure 11: Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE Carrier Level



Conducted spurious emissions 30MHz-25GHz

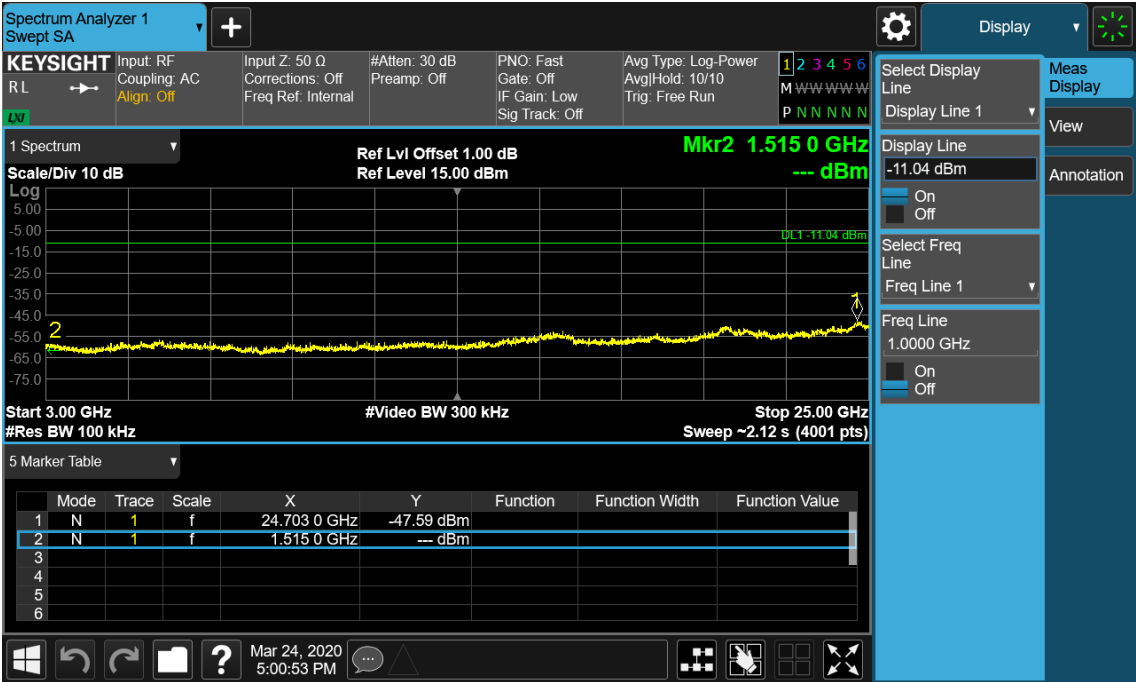


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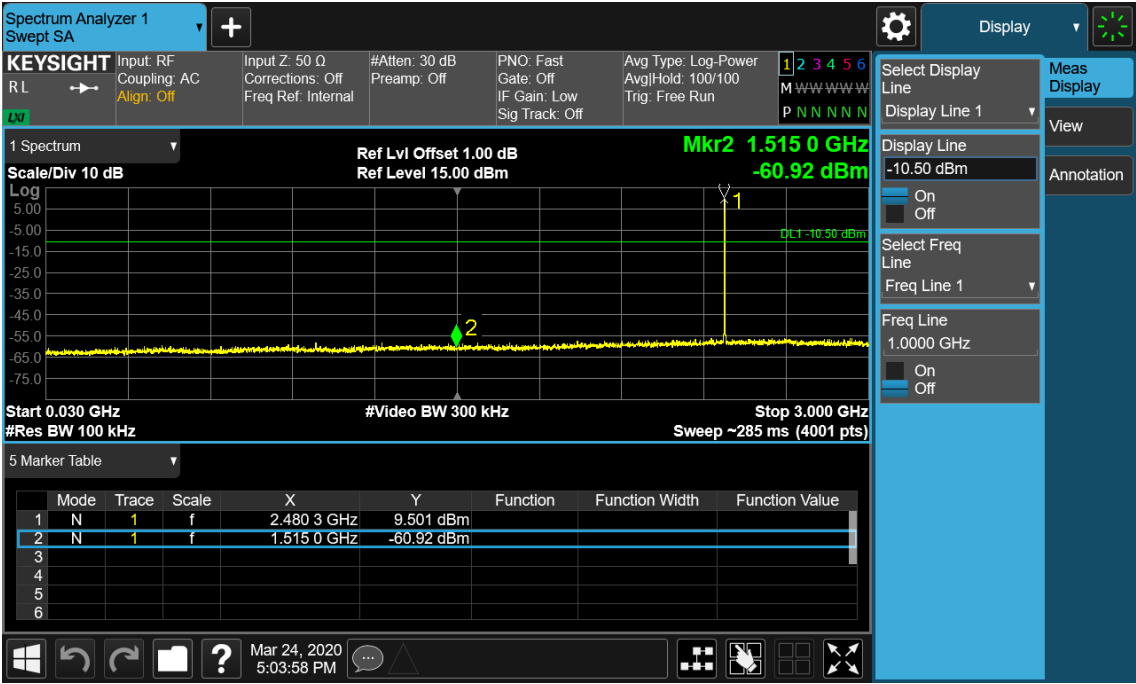
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Figure 12: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE Carrier Level



Band Edge



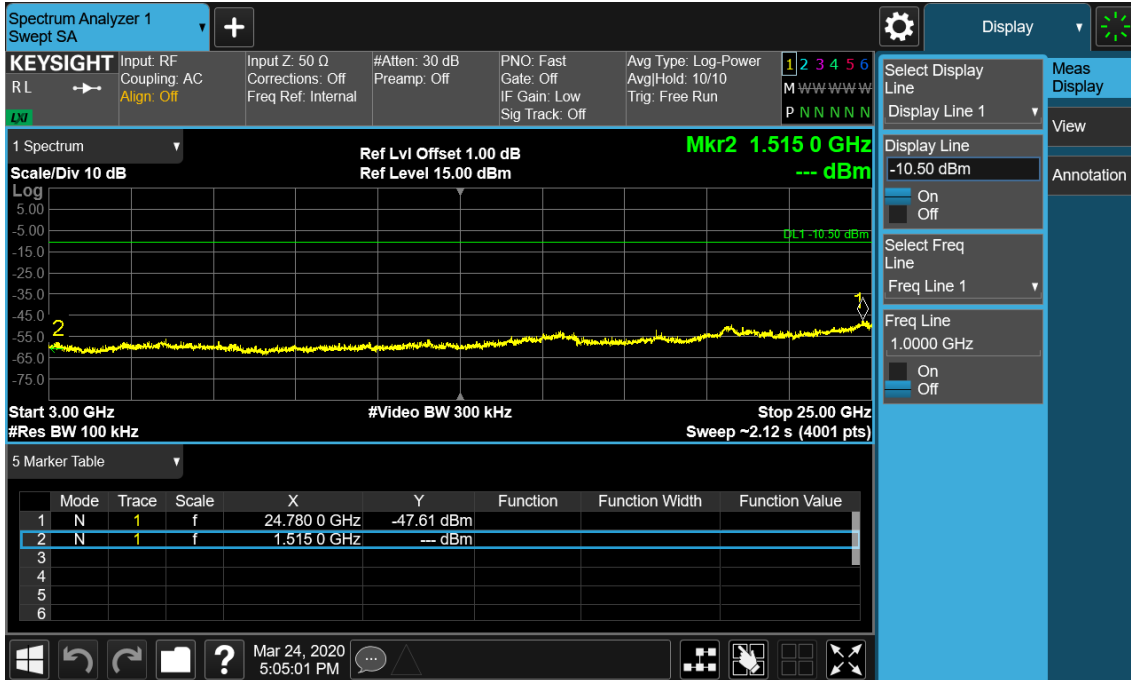
Conducted spurious emissions 30MHz-25GHz

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4.1.6 Spurious Emission

RESULT:

PASS

Test standard	: FCC Part 15.247(d), 15.205, 15.209 RSS-247 5.5
Requirement	: ANSI C63.10-2013, KDB 558074
Kind of test site	: 3m Semi-Anechoic Chamber

Test setup

Test Channel	: Low/Middle/High
Operation Mode	: A
Ambient temperature	: 25°C
Relative humidity	: 52%

For details refer to following test plot.

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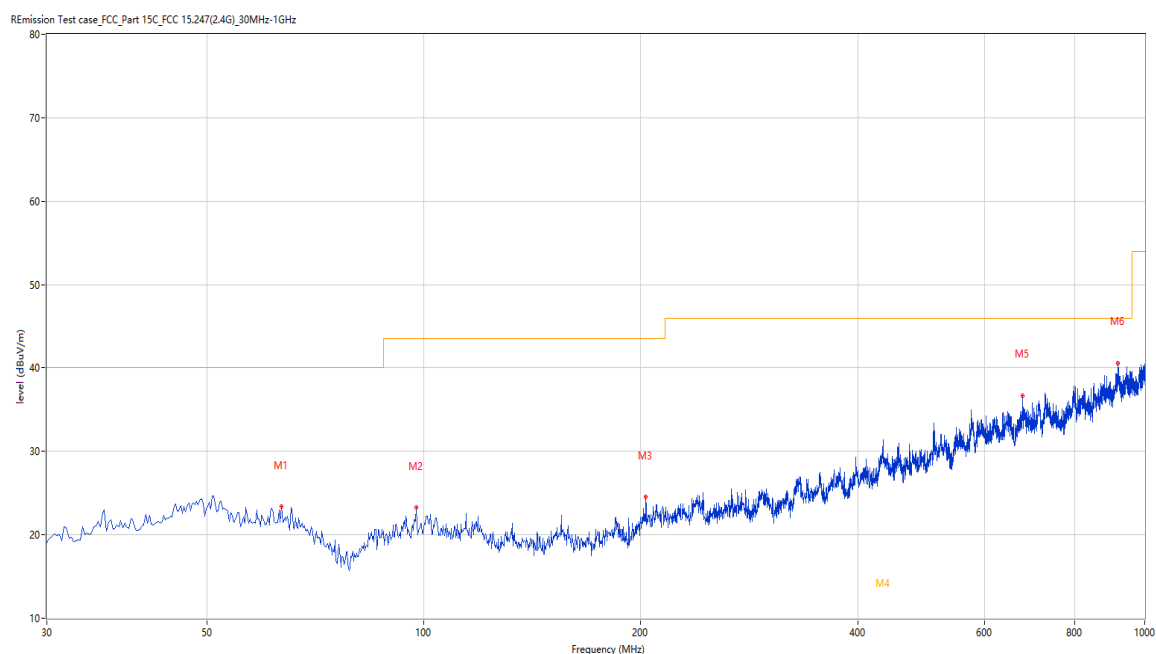
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Notes:

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. The EUT is working in the Normal link mode below 1 GHz.

Figure 13: Spurious Emission, 30MHz – 1GHz, Normal Link Mode

30MHz-1GHz, Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.457	23.37	-25.81	40.0	-16.63	Peak	0.00	200	Horizontal	Pass
2	97.641	23.26	-26.71	43.5	-20.24	Peak	0.00	200	Horizontal	Pass
3	203.344	24.55	-26.53	43.5	-18.95	Peak	270.30	200	Horizontal	Pass
4	433.771	16.25	-19.42	46.0	-29.75	Peak	57.00	172	Horizontal	Pass
4*	433.771	9.18	-19.42	46.0	-36.82	QP	57.00	172	Horizontal	Pass
5	676.586	36.70	-14.92	46.0	-9.30	Peak	100.20	100	Horizontal	Pass
6	917.328	40.58	-10.13	46.0	-5.42	Peak	0.00	200	Horizontal	Pass

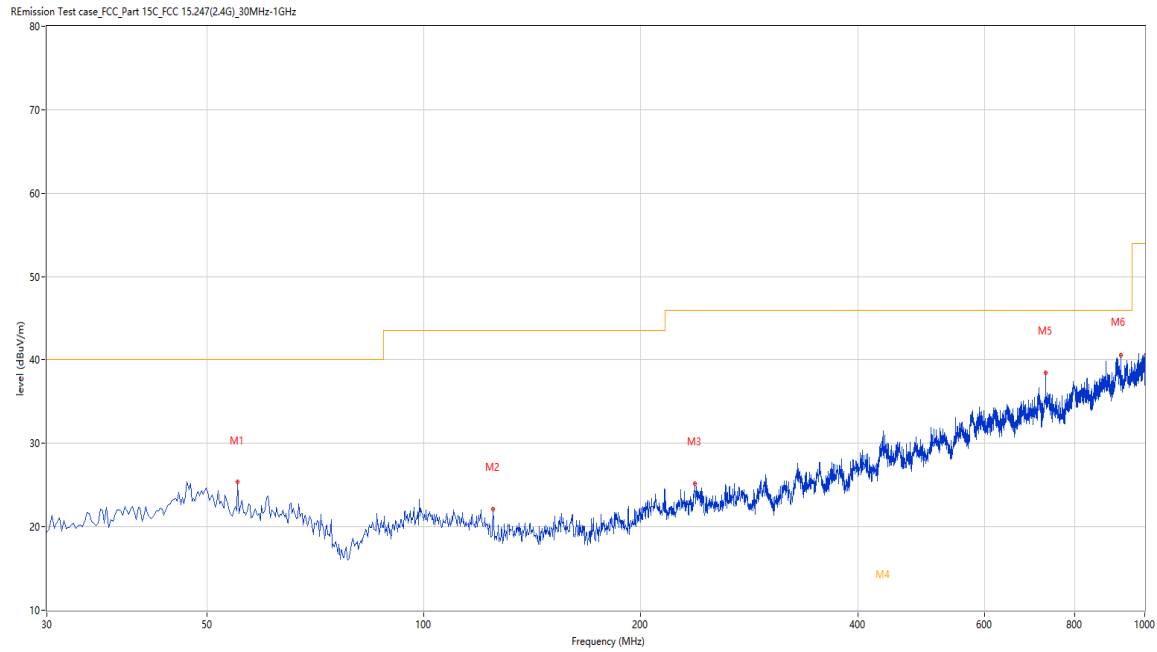
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30MHz-1GHz, Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.214	25.35	-25.46	40.0	-14.65	Peak	360.00	200	Vertical	Pass
2	124.794	22.15	-28.76	43.5	-21.35	Peak	0.20	200	Vertical	Pass
3	237.528	25.21	-25.12	46.0	-20.79	Peak	360.00	200	Vertical	Pass
4	433.595	16.24	-19.39	46.0	-29.76	Peak	124.50	258	Vertical	Pass
4*	433.595	9.33	-19.39	46.0	-36.67	QP	124.50	258	Vertical	Pass
5	729.195	38.49	-14.36	46.0	-7.51	Peak	207.20	200	Vertical	Pass
6	927.268	40.62	-11.32	46.0	-5.38	Peak	360.00	200	Vertical	Pass

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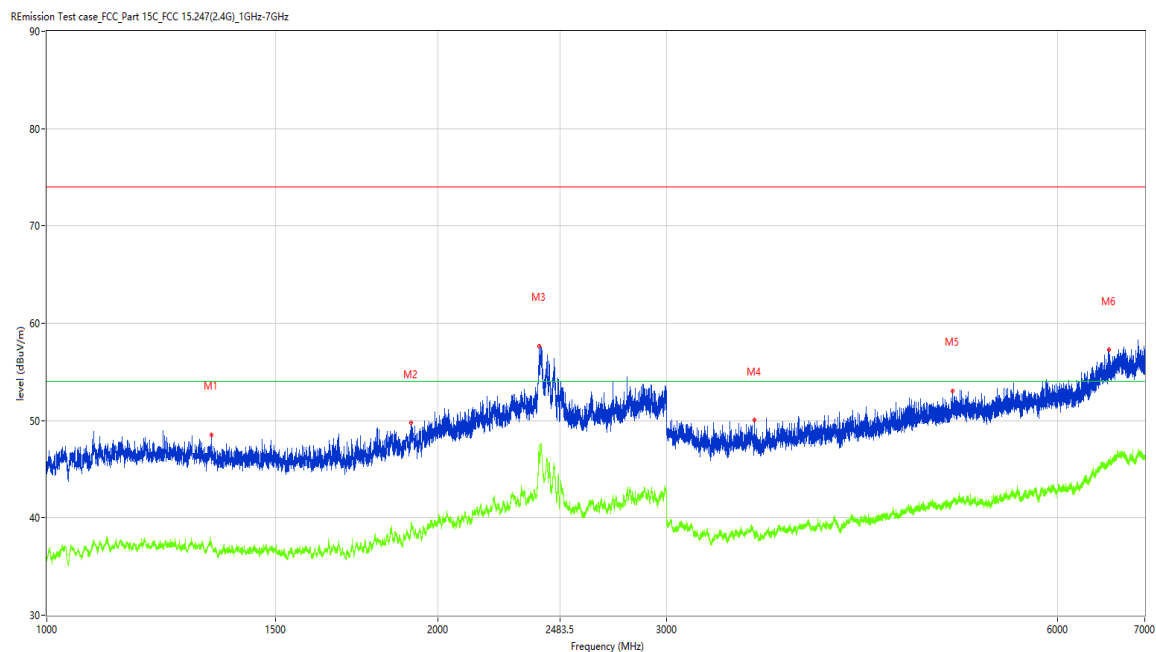
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Figure 14: Spurious Emission, 1GHz – 10th Harmonic, 2402MHz, GFSK

1GHz-7GHz, Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1338.958	48.54	-4.47	74.0	-25.46	Peak	69.60	100	Horizontal	Pass
1**	1338.958	37.15	-4.47	54.0	-16.85	AV	69.60	100	Horizontal	Pass
2	1907.887	49.79	-2.84	74.0	-24.21	Peak	358.40	100	Horizontal	Pass
2**	1907.887	39.54	-2.84	54.0	-14.46	AV	358.40	100	Horizontal	Pass
3	2392.076	57.69	5.32	74.0	-16.31	Peak	310.30	100	Horizontal	Pass
3**	2392.076	46.81	5.32	54.0	-7.19	AV	310.30	100	Horizontal	Pass
4	3504.937	50.04	-1.23	74.0	-23.96	Peak	346.10	100	Horizontal	Pass
4**	3504.937	38.10	-1.23	54.0	-15.90	AV	346.10	100	Horizontal	Pass
5	4981.252	53.07	1.59	74.0	-20.93	Peak	73.30	100	Horizontal	Pass
5**	4981.252	41.76	1.59	54.0	-12.24	AV	73.30	100	Horizontal	Pass
6	6574.053	57.26	4.84	74.0	-16.74	Peak	273.10	100	Horizontal	Pass
6**	6574.053	45.99	4.84	54.0	-8.01	AV	273.10	100	Horizontal	Pass

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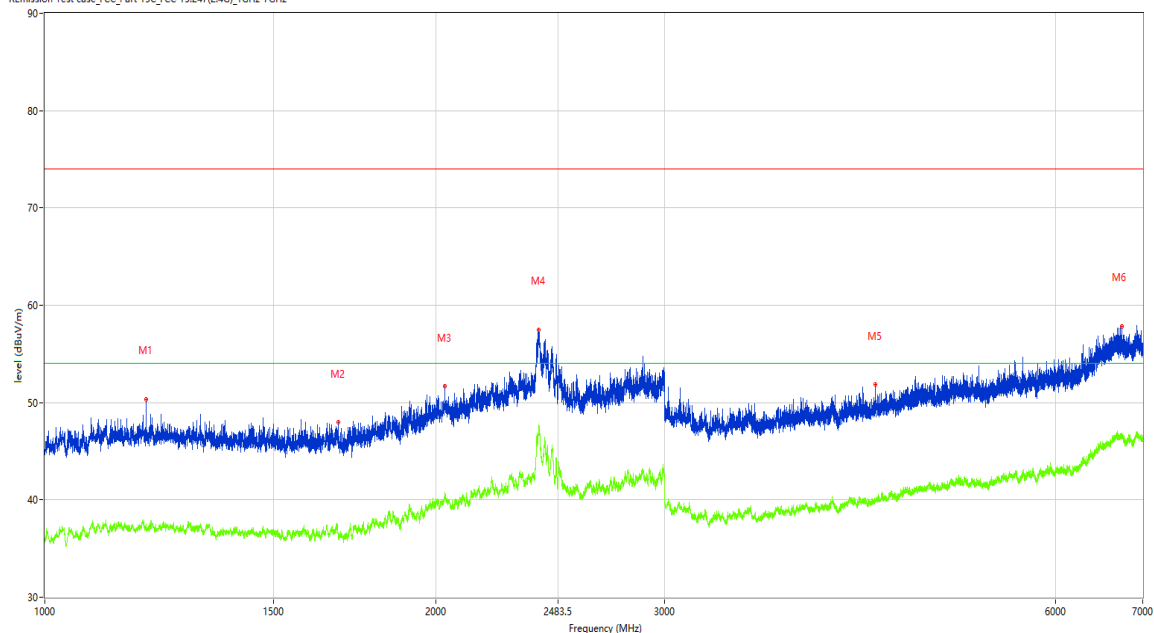
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1GHz-7GHz, Vertical

REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1196.225	50.37	-4.37	74.0	-23.63	Peak	359.90	100	Vertical	Pass
1**	1196.225	37.44	-4.37	54.0	-16.56	AV	359.90	100	Vertical	Pass
2	1681.915	47.96	-5.42	74.0	-26.04	Peak	32.00	100	Vertical	Pass
2**	1681.915	36.42	-5.42	54.0	-17.58	AV	32.00	100	Vertical	Pass
3	2031.121	51.66	-1.71	74.0	-22.34	Peak	227.40	100	Vertical	Pass
3**	2031.121	40.24	-1.71	54.0	-13.76	AV	227.40	100	Vertical	Pass
4	2401.075	57.49	5.33	74.0	-16.51	Peak	36.90	100	Vertical	Pass
4**	2401.075	47.31	5.33	54.0	-6.69	AV	36.90	100	Vertical	Pass
5	4358.330	51.87	0.19	74.0	-22.13	Peak	96.20	100	Vertical	Pass
5**	4358.330	39.95	0.19	54.0	-14.05	AV	96.20	100	Vertical	Pass
6	6745.032	57.83	5.70	74.0	-16.17	Peak	211.20	100	Vertical	Pass
6**	6745.032	46.31	5.70	54.0	-7.69	AV	211.20	100	Vertical	Pass

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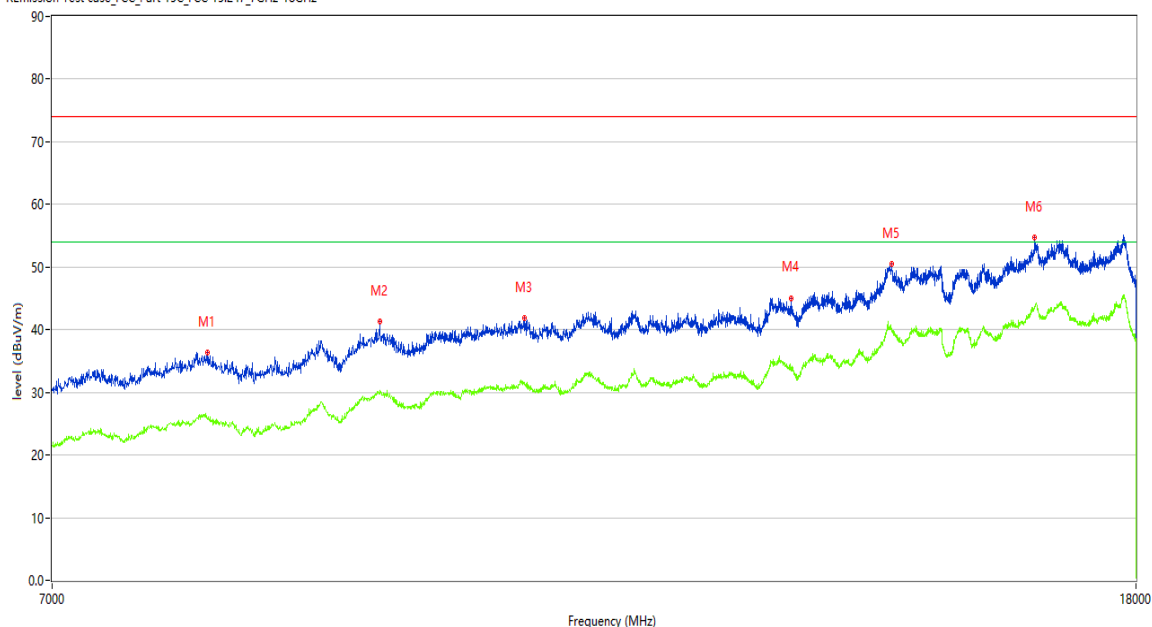
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7GHz-18GHz, Horizontal

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8011.747	36.40	5.61	74.0	-37.60	Peak	0.00	100	Horizontal	Pass
1**	8011.747	25.75	5.61	54.0	-28.25	AV	0.00	100	Horizontal	Pass
2	9312.172	41.29	9.28	74.0	-32.71	Peak	334.50	100	Horizontal	Pass
2**	9312.172	30.23	9.28	54.0	-23.77	AV	334.50	100	Horizontal	Pass
3	10563.109	41.82	9.96	74.0	-32.18	Peak	186.10	100	Horizontal	Pass
3**	10563.109	31.59	9.96	54.0	-22.41	AV	186.10	100	Horizontal	Pass
4	13323.419	45.06	12.73	74.0	-28.94	Peak	289.20	100	Horizontal	Pass
4**	13323.419	33.75	12.73	54.0	-20.25	AV	289.20	100	Horizontal	Pass
5	14549.613	50.46	16.92	74.0	-23.54	Peak	279.90	100	Horizontal	Pass
5**	14549.613	40.01	16.92	54.0	-13.99	AV	279.90	100	Horizontal	Pass
6	16479.630	54.64	20.40	74.0	-19.36	Peak	51.00	100	Horizontal	Pass
6**	16479.630	43.78	20.40	54.0	-10.22	AV	51.00	100	Horizontal	Pass

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7GHz-18GHz, Vertical

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	9353.412	40.12	9.83	74.0	-33.88	Peak	151.80	100	Vertical	Pass
1**	9353.412	29.33	9.83	54.0	-24.67	AV	151.80	100	Vertical	Pass
2	10576.856	42.07	10.04	74.0	-31.93	Peak	155.90	100	Vertical	Pass
2**	10576.856	31.01	10.04	54.0	-22.99	AV	155.90	100	Vertical	Pass
3	12152.212	43.76	11.00	74.0	-30.24	Peak	76.70	100	Vertical	Pass
3**	12152.212	32.64	11.00	54.0	-21.36	AV	76.70	100	Vertical	Pass
4	14500.125	51.05	17.10	74.0	-22.95	Peak	248.60	100	Vertical	Pass
4**	14500.125	40.35	17.10	54.0	-13.65	AV	248.60	100	Vertical	Pass
5	16452.137	54.00	19.84	74.0	-20.00	Peak	359.70	100	Vertical	Pass
5**	16452.137	43.24	19.84	54.0	-10.76	AV	359.70	100	Vertical	Pass
6	17813.047	55.11	20.61	74.0	-18.89	Peak	311.50	100	Vertical	Pass
6**	17813.047	45.17	20.61	54.0	-8.83	AV	311.50	100	Vertical	Pass

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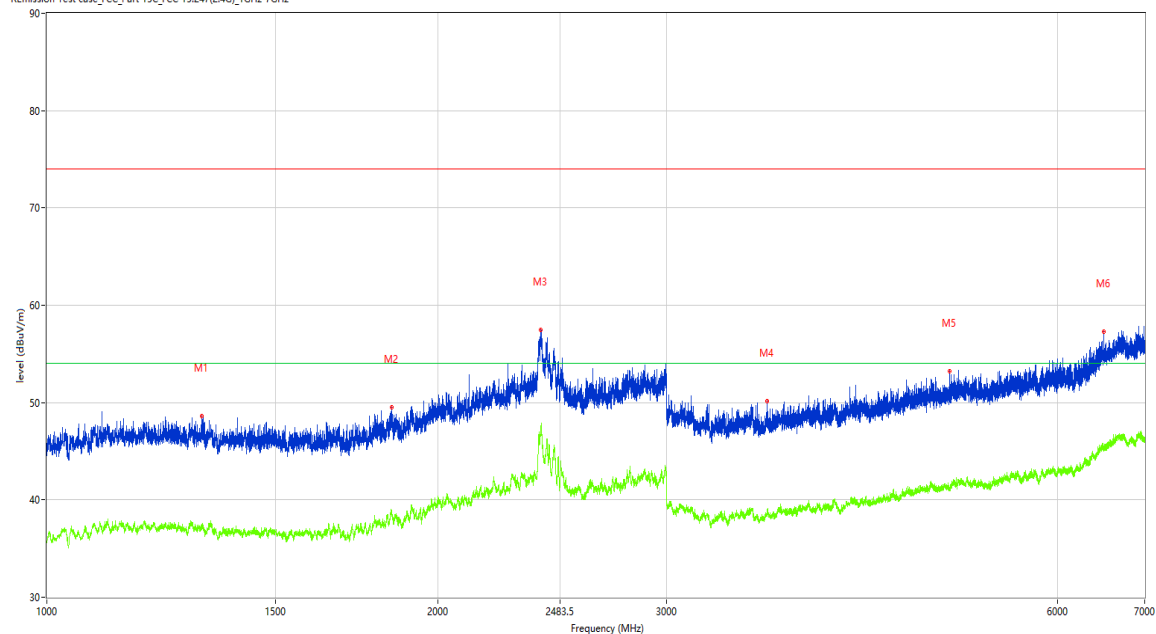
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Figure 15: Spurious Emission, 1GHz – 10th Harmonic, 2440MHz, GFSK

1GHz-7GHz, Horizontal

REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1315.961	48.58	-4.60	74.0	-25.42	Peak	92.50	100	Horizontal	Pass
1**	1315.961	37.26	-4.60	54.0	-16.74	AV	92.50	100	Horizontal	Pass
2	1842.145	49.50	-3.45	74.0	-24.50	Peak	189.90	100	Horizontal	Pass
2**	1842.145	38.72	-3.45	54.0	-15.28	AV	189.90	100	Horizontal	Pass
3	2400.325	57.45	5.36	74.0	-16.55	Peak	88.00	100	Horizontal	Pass
3**	2400.325	47.36	5.36	54.0	-6.64	AV	88.00	100	Horizontal	Pass
4	3584.927	50.14	-0.99	74.0	-23.86	Peak	23.30	100	Horizontal	Pass
4**	3584.927	39.02	-0.99	54.0	-14.98	AV	23.30	100	Horizontal	Pass
5	4955.756	53.20	1.48	74.0	-20.80	Peak	55.60	100	Horizontal	Pass
5**	4955.756	41.16	1.48	54.0	-12.84	AV	55.60	100	Horizontal	Pass
6	6511.061	57.32	4.85	74.0	-16.68	Peak	298.30	100	Horizontal	Pass
6**	6511.061	45.44	4.85	54.0	-8.56	AV	298.30	100	Horizontal	Pass

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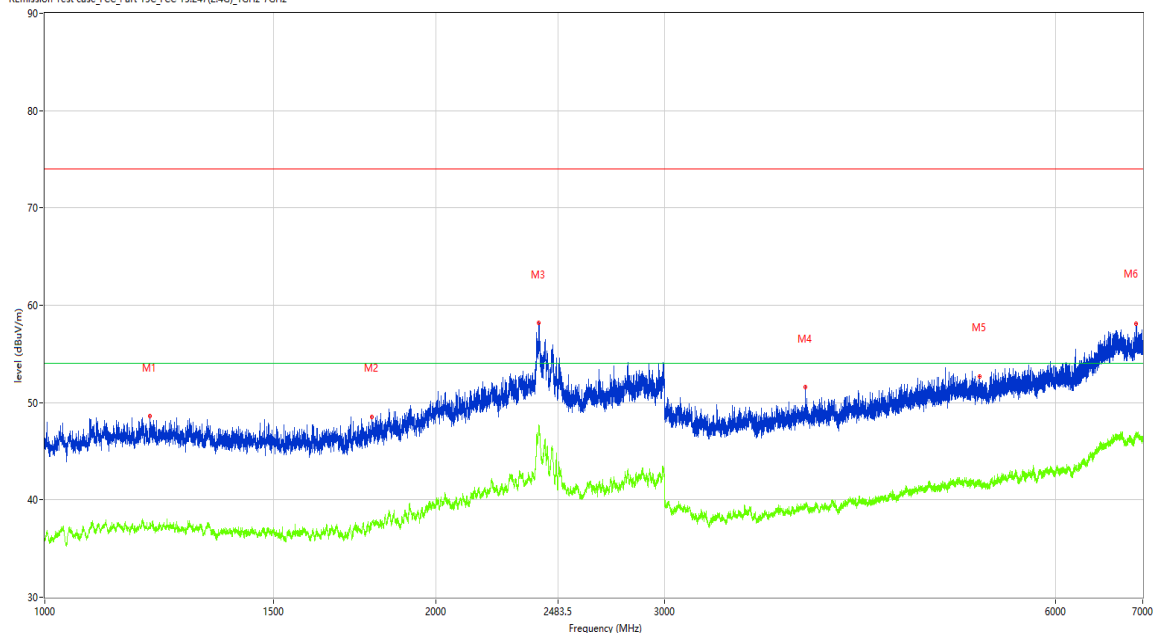
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1GHz-7GHz, Vertical

REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1205.224	48.58	-4.33	74.0	-25.42	Peak	229.80	100	Vertical	Pass
1**	1205.224	37.61	-4.33	54.0	-16.39	AV	229.80	100	Vertical	Pass
2	1784.902	48.56	-4.51	74.0	-25.44	Peak	94.10	100	Vertical	Pass
2**	1784.902	37.49	-4.51	54.0	-16.51	AV	94.10	100	Vertical	Pass
3	2399.825	58.18	5.38	74.0	-15.82	Peak	98.60	100	Vertical	Pass
3**	2399.825	47.73	5.38	54.0	-6.27	AV	98.60	100	Vertical	Pass
4	3850.894	51.59	-0.54	74.0	-22.41	Peak	153.20	100	Vertical	Pass
4**	3850.894	39.39	-0.54	54.0	-14.61	AV	153.20	100	Vertical	Pass
5	5240.220	52.71	1.58	74.0	-21.29	Peak	233.90	100	Vertical	Pass
5**	5240.220	42.01	1.58	54.0	-11.99	AV	233.90	100	Vertical	Pass
6	6918.510	58.12	5.73	74.0	-15.88	Peak	67.50	100	Vertical	Pass
6**	6918.510	46.78	5.73	54.0	-7.22	AV	67.50	100	Vertical	Pass

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7GHz-18GHz, Horizontal

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	9160.960	39.78	8.03	74.0	-34.22	Peak	90.00	100	Horizontal	Pass
1**	9160.960	28.48	8.03	54.0	-25.52	AV	90.00	100	Horizontal	Pass
2	10513.622	42.34	9.93	74.0	-31.66	Peak	11.90	100	Horizontal	Pass
2**	10513.622	31.09	9.93	54.0	-22.91	AV	11.90	100	Horizontal	Pass
3	11627.093	43.68	11.16	74.0	-30.32	Peak	11.90	100	Horizontal	Pass
3**	11627.093	33.25	11.16	54.0	-20.75	AV	11.90	100	Horizontal	Pass
4	14494.626	49.84	16.95	74.0	-24.16	Peak	16.00	100	Horizontal	Pass
4**	14494.626	40.07	16.95	54.0	-13.93	AV	16.00	100	Horizontal	Pass
5	16826.043	53.96	20.22	74.0	-20.04	Peak	232.60	100	Horizontal	Pass
5**	16826.043	43.71	20.22	54.0	-10.29	AV	232.60	100	Horizontal	Pass
6	17802.049	54.97	21.02	74.0	-19.03	Peak	184.90	100	Horizontal	Pass
6**	17802.049	45.58	21.02	54.0	-8.42	AV	184.90	100	Horizontal	Pass

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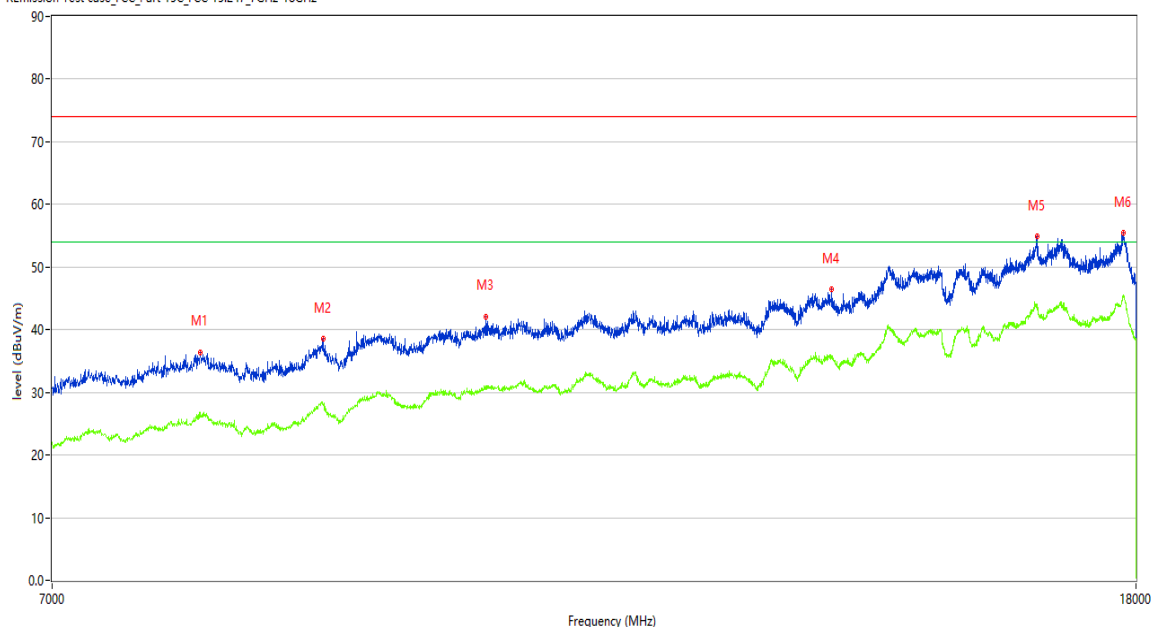
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7GHz-18GHz, Vertical

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	7962.259	36.43	4.93	74.0	-37.57	Peak	281.80	100	Vertical	Pass
1**	7962.259	26.62	4.93	54.0	-27.38	AV	281.80	100	Vertical	Pass
2	8864.034	38.54	7.26	74.0	-35.46	Peak	15.70	100	Vertical	Pass
2**	8864.034	27.94	7.26	54.0	-26.06	AV	15.70	100	Vertical	Pass
3	10211.197	42.14	10.55	74.0	-31.86	Peak	268.40	100	Vertical	Pass
3**	10211.197	30.54	10.55	54.0	-23.46	AV	268.40	100	Vertical	Pass
4	13804.549	46.38	13.39	74.0	-27.62	Peak	349.10	100	Vertical	Pass
4**	13804.549	35.76	13.39	54.0	-18.24	AV	349.10	100	Vertical	Pass
5	16515.371	54.84	20.19	74.0	-19.16	Peak	60.40	100	Vertical	Pass
5**	16515.371	43.70	20.19	54.0	-10.30	AV	60.40	100	Vertical	Pass
6	17799.300	55.43	21.10	74.0	-18.57	Peak	29.10	100	Vertical	Pass
6**	17799.300	45.14	21.10	54.0	-8.86	AV	29.10	100	Vertical	Pass

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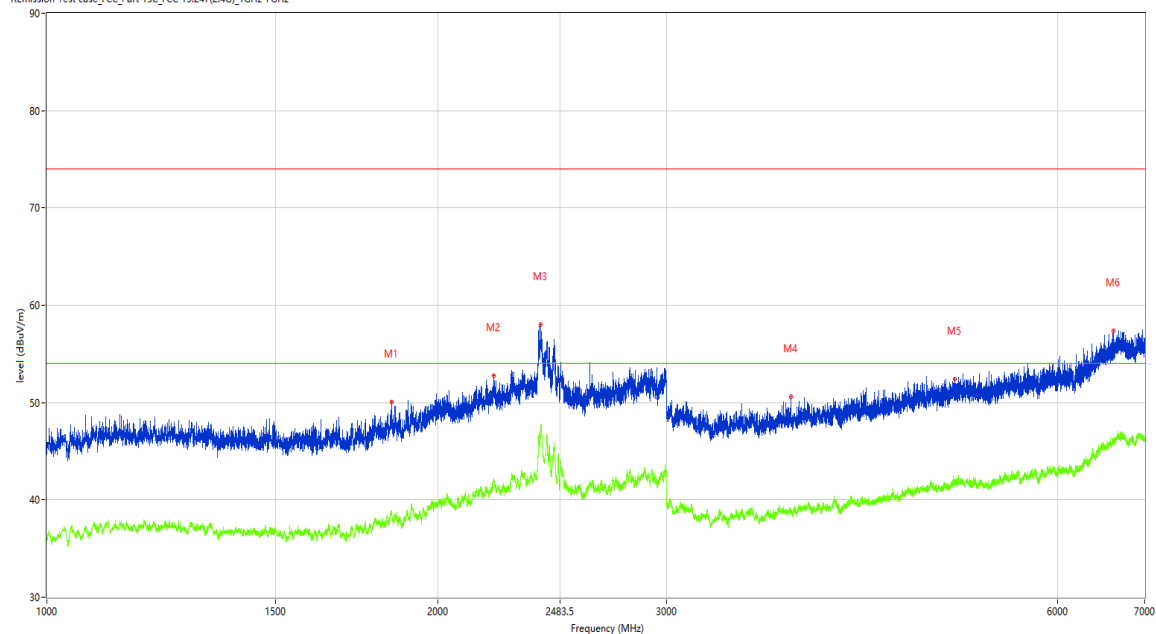
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Figure 16: Spurious Emission, 1GHz – 10th Harmonic, 2480MHz, GFSK

1GHz-7GHz, Horizontal

REmission Test case_FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1842.895	50.06	-3.41	74.0	-23.94	Peak	139.60	100	Horizontal	Pass
1**	1842.895	38.76	-3.41	54.0	-15.24	AV	139.60	100	Horizontal	Pass
2	2206.849	52.78	-0.01	74.0	-21.22	Peak	129.90	100	Horizontal	Pass
2**	2206.849	41.79	-0.01	54.0	-12.21	AV	129.90	100	Horizontal	Pass
3	2400.825	58.01	5.34	74.0	-15.99	Peak	88.20	100	Horizontal	Pass
3**	2400.825	47.72	5.34	54.0	-6.28	AV	88.20	100	Horizontal	Pass
4	3739.408	50.59	-0.74	74.0	-23.41	Peak	327.70	100	Horizontal	Pass
4**	3739.408	38.84	-0.74	54.0	-15.16	AV	327.70	100	Horizontal	Pass
5	5000.750	52.37	1.66	74.0	-21.63	Peak	118.90	100	Horizontal	Pass
5**	5000.750	41.77	1.66	54.0	-12.23	AV	118.90	100	Horizontal	Pass
6	6623.047	57.36	5.09	74.0	-16.64	Peak	273.40	100	Horizontal	Pass
6**	6623.047	45.79	5.09	54.0	-8.21	AV	273.40	100	Horizontal	Pass

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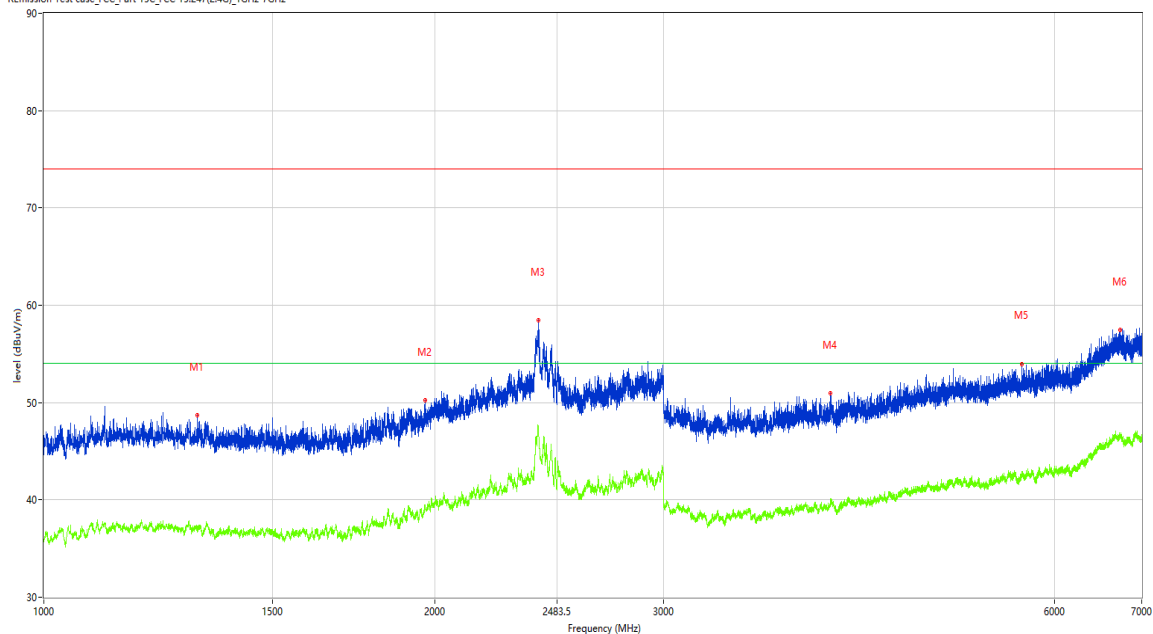
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1GHz-7GHz, Vertical

REmission Test case FCC_Part 15C_FCC 15.247(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1312.211	48.71	-4.70	74.0	-25.29	Peak	71.10	100	Vertical	Pass
1**	1312.211	37.30	-4.70	54.0	-16.70	AV	71.10	100	Vertical	Pass
2	1964.629	50.24	-2.72	74.0	-23.76	Peak	9.00	100	Vertical	Pass
2**	1964.629	39.39	-2.72	54.0	-14.61	AV	9.00	100	Vertical	Pass
3	2401.575	58.43	5.31	74.0	-15.57	Peak	280.30	100	Vertical	Pass
3**	2401.575	47.32	5.31	54.0	-6.68	AV	280.30	100	Vertical	Pass
4	4029.871	50.94	-0.11	74.0	-23.06	Peak	128.60	100	Vertical	Pass
4**	4029.871	39.54	-0.11	54.0	-14.46	AV	128.60	100	Vertical	Pass
5	5663.167	53.94	2.12	74.0	-20.06	Peak	166.50	100	Vertical	Pass
5**	5663.167	42.94	2.12	54.0	-11.06	AV	166.50	100	Vertical	Pass
6	6737.533	57.51	5.75	74.0	-16.49	Peak	45.60	100	Vertical	Pass
6**	6737.533	46.49	5.75	54.0	-7.51	AV	45.60	100	Vertical	Pass

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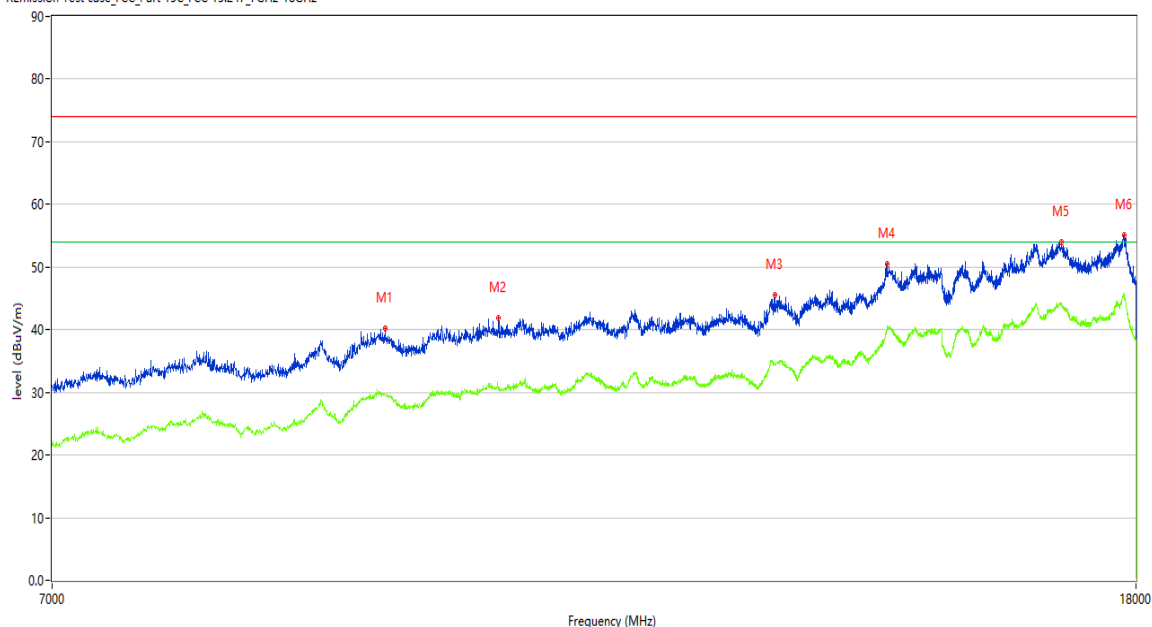
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7GHz-18GHz, Horizontal

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	9356.161	40.16	9.84	74.0	-33.84	Peak	166.30	100	Horizontal	Pass
1**	9356.161	29.35	9.84	54.0	-24.65	AV	166.30	100	Horizontal	Pass
2	10329.418	41.84	10.76	74.0	-32.16	Peak	319.90	100	Horizontal	Pass
2**	10329.418	30.73	10.76	54.0	-23.27	AV	319.90	100	Horizontal	Pass
3	13144.714	45.55	12.17	74.0	-28.45	Peak	269.70	100	Horizontal	Pass
3**	13144.714	34.50	12.17	54.0	-19.50	AV	269.70	100	Horizontal	Pass
4	14489.128	50.47	16.79	74.0	-23.53	Peak	112.40	100	Horizontal	Pass
4**	14489.128	40.10	16.79	54.0	-13.90	AV	112.40	100	Horizontal	Pass
5	16867.283	54.00	20.32	74.0	-20.00	Peak	67.00	100	Horizontal	Pass
5**	16867.283	44.30	20.32	54.0	-9.70	AV	67.00	100	Horizontal	Pass
6	17813.047	55.02	20.61	74.0	-18.98	Peak	43.60	100	Horizontal	Pass
6**	17813.047	45.67	20.61	54.0	-8.33	AV	43.60	100	Horizontal	Pass

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7GHz-18GHz, Vertical

REmission Test case_FCC_Part 15C_FCC 15.247_7GHz-18GHz



No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8850.287	38.41	7.55	74.0	-35.59	Peak	128.70	100	Vertical	Pass
1**	8850.287	28.76	7.55	54.0	-25.24	AV	128.70	100	Vertical	Pass
2	11143.214	42.84	10.80	74.0	-31.16	Peak	106.40	100	Vertical	Pass
2**	11143.214	32.44	10.80	54.0	-21.56	AV	106.40	100	Vertical	Pass
3	14500.125	50.23	17.10	74.0	-23.77	Peak	160.30	100	Vertical	Pass
3**	14500.125	40.68	17.10	54.0	-13.32	AV	160.30	100	Vertical	Pass
4	16498.875	54.76	20.80	74.0	-19.24	Peak	66.60	100	Vertical	Pass
4**	16498.875	44.32	20.80	54.0	-9.68	AV	66.60	100	Vertical	Pass
5	16798.550	54.36	19.89	74.0	-19.64	Peak	7.20	100	Vertical	Pass
5**	16798.550	43.71	19.89	54.0	-10.29	AV	7.20	100	Vertical	Pass
6	17785.554	54.92	21.17	74.0	-19.08	Peak	84.10	100	Vertical	Pass
6**	17785.554	44.88	21.17	54.0	-9.12	AV	84.10	100	Vertical	Pass

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4.1.7 Band Edge (Restricted-band band-edge)

RESULT:

PASS

Test standard	: FCC Part 15.247(d), 15.205, 15.209 RSS-247 5.5
Requirement	: ANSI C63.10-2013, KDB 558074
Kind of test site	: 3m Semi-Anechoic Chamber

Test setup

Test Channel	: Low/Middle/High
Operation Mode	: A.1
Ambient temperature	: 25°C
Relative humidity	: 52%

For details refer to following test plot.

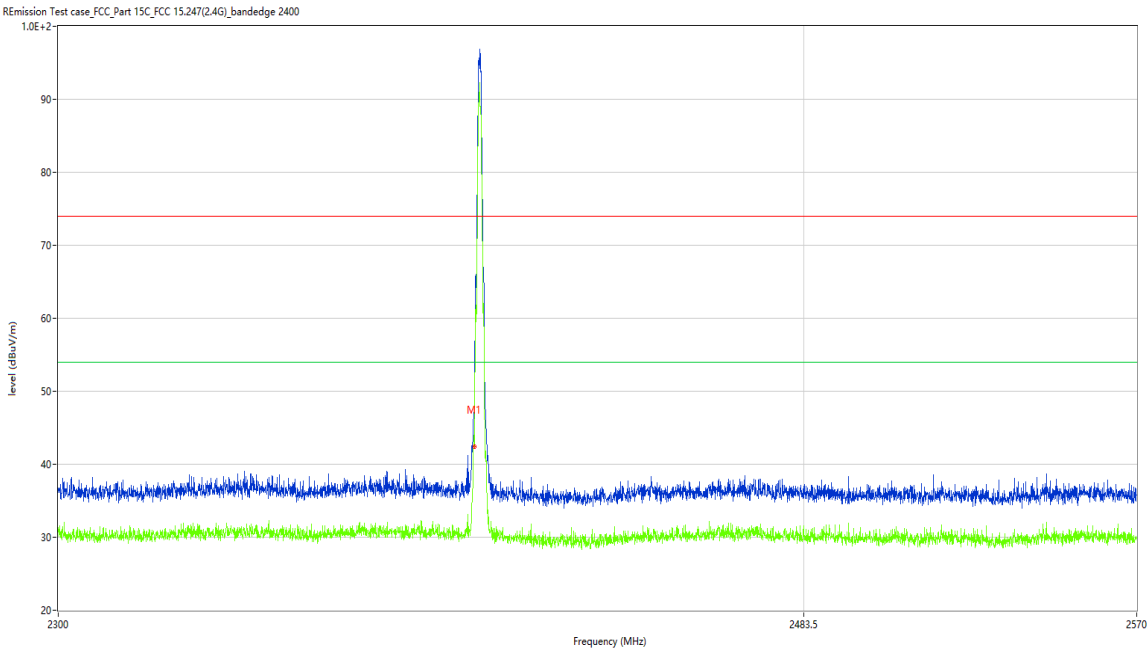
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Figure 17: Band Edge (Restricted-band band-edge), 2402MHz, GFSK
Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	42.34	-4.18	74.0	-31.66	Peak	204.08	100	H	Pass
1**	2400.000	33.96	-4.18	54.0	-20.04	AV	204.08	100	H	Pass

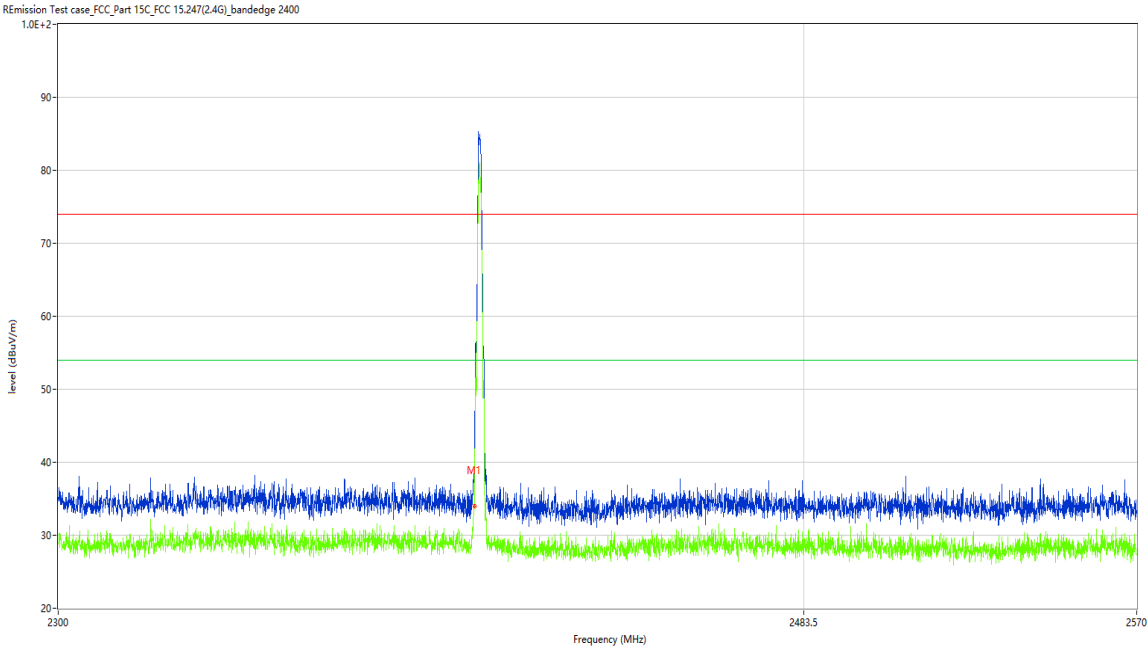
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Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	33.82	-4.18	74.0	-40.18	Peak	358.70	100	V	Pass
1**	2400.000	28.77	-4.18	54.0	-25.23	AV	358.70	100	V	Pass

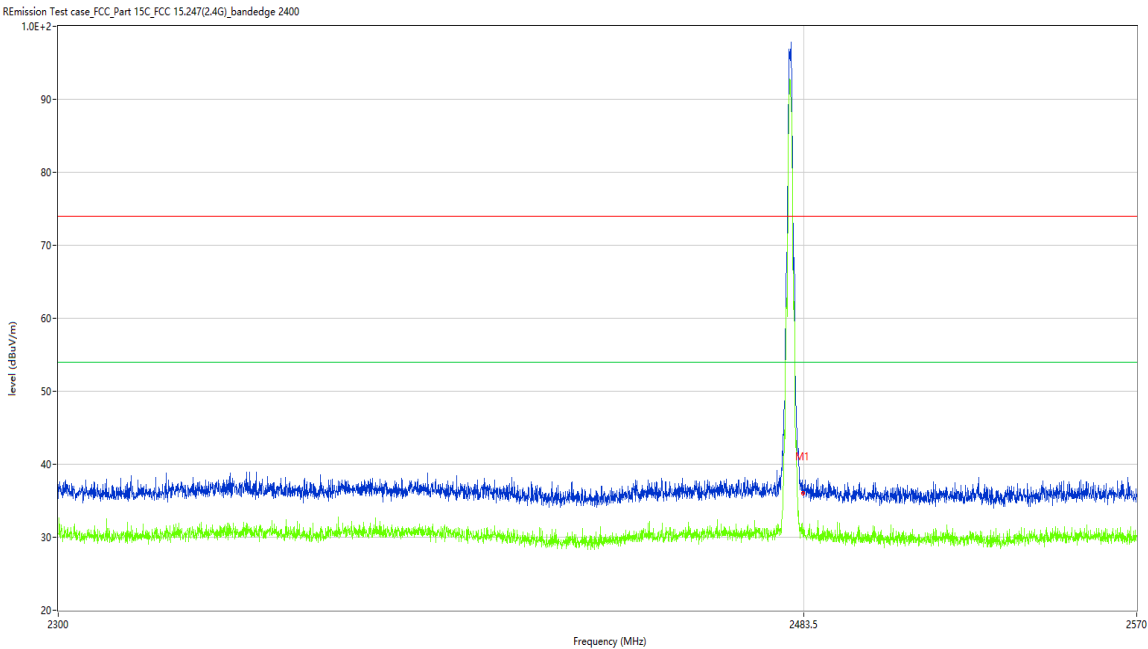
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Figure 18: Band Edge (Restricted-band band-edge), 2480MHz, GFSK
Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	36.08	-3.87	74.0	-37.92	Peak	87.48	100	H	Pass
1**	2483.500	30.17	-3.87	54.0	-23.83	AV	87.48	100	H	Pass

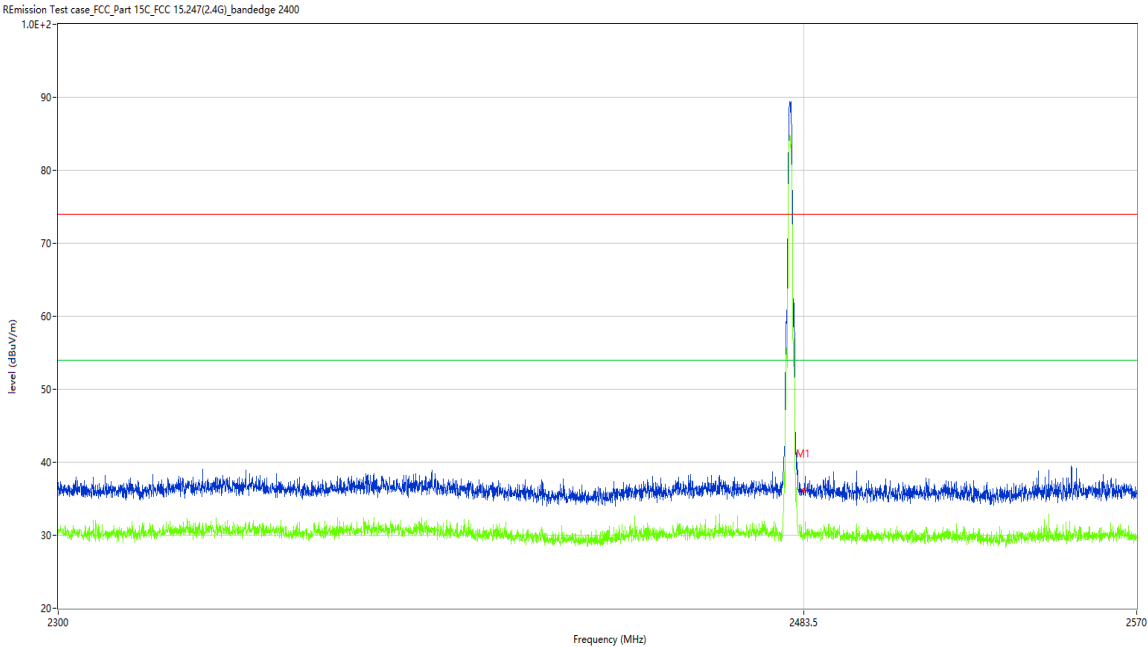
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Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	36.19	-3.87	74.0	-37.81	Peak	257.67	100	V	Pass
1**	2483.500	29.98	-3.87	54.0	-24.02	AV	257.67	100	V	Pass

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4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT:

PASS

Test standard	: FCC Part 15.207(a) RSS-Gen 8.8
Requirement	: ANSI C63.10-2013
Kind of test site	: Shielded room

Test setup

Input Voltage	: AC 120V, 60Hz; AC 240V, 50Hz
Operation Mode	: A.2
Earthing	: Not Connected
Ambient temperature	: 25°C
Relative humidity	: 52%

For details refer to following test plot.

TEST REPORT

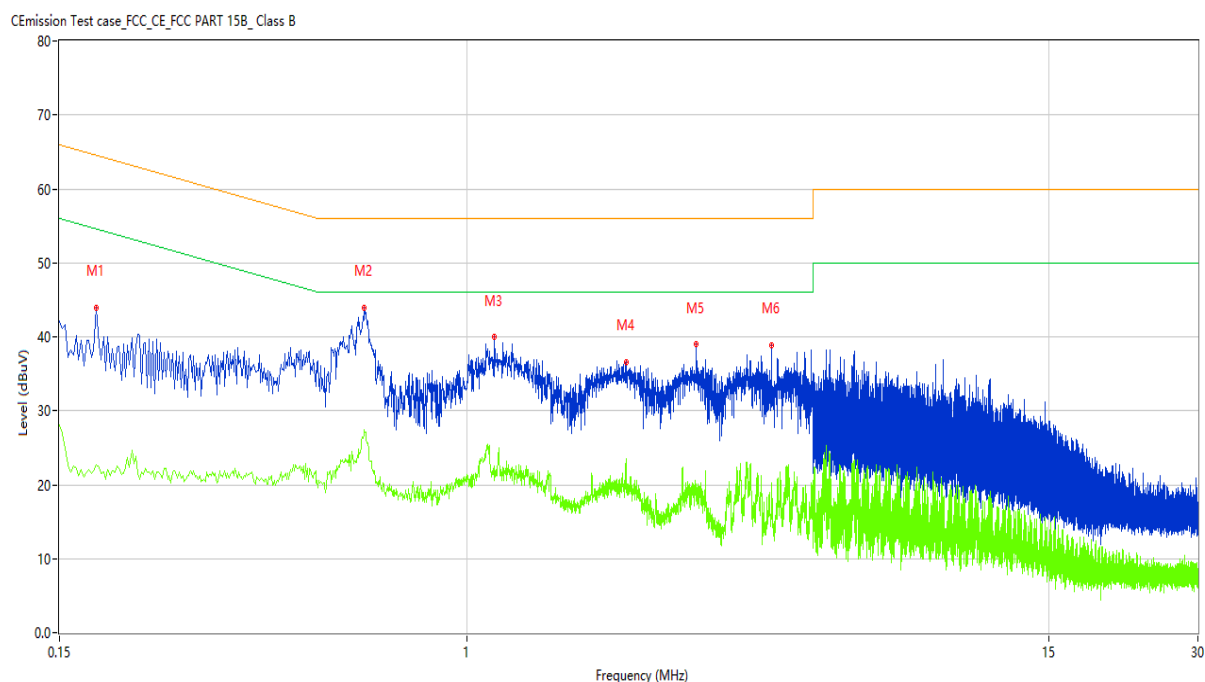
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Note: The all configurations were tested respectively, but only the worst configuration shown here.

Figure 19: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.178	49.43	10.15	64.58	-15.15	Peak	L	Pass
1*	0.178	35.03	10.15	64.58	-29.55	QP	L	Pass
1**	0.178	22.63	10.15	54.58	-31.95	AV	L	Pass
2	0.620	45.08	10.15	56.00	-10.92	Peak	L	Pass
2*	0.620	38.86	10.15	56.00	-17.14	QP	L	Pass
2**	0.620	27.36	10.15	46.00	-18.64	AV	L	Pass
3	1.136	40.07	10.16	56.00	-15.93	Peak	L	Pass
3*	1.136	32.29	10.16	56.00	-23.71	QP	L	Pass
3**	1.136	22.52	10.16	46.00	-23.48	AV	L	Pass
4	2.096	39.36	10.18	56.00	-16.64	Peak	L	Pass
4*	2.096	31.85	10.18	56.00	-24.15	QP	L	Pass
4**	2.096	23.48	10.18	46.00	-22.52	AV	L	Pass
5	2.908	41.28	10.21	56.00	-14.72	Peak	L	Pass
5*	2.908	32.60	10.21	56.00	-23.40	QP	L	Pass
5**	2.908	19.40	10.21	46.00	-26.60	AV	L	Pass
6	4.122	37.86	10.25	56.00	-18.14	Peak	L	Pass
6*	4.122	29.01	10.25	56.00	-26.99	QP	L	Pass
6**	4.122	20.26	10.25	46.00	-25.74	AV	L	Pass

TEST REPORT

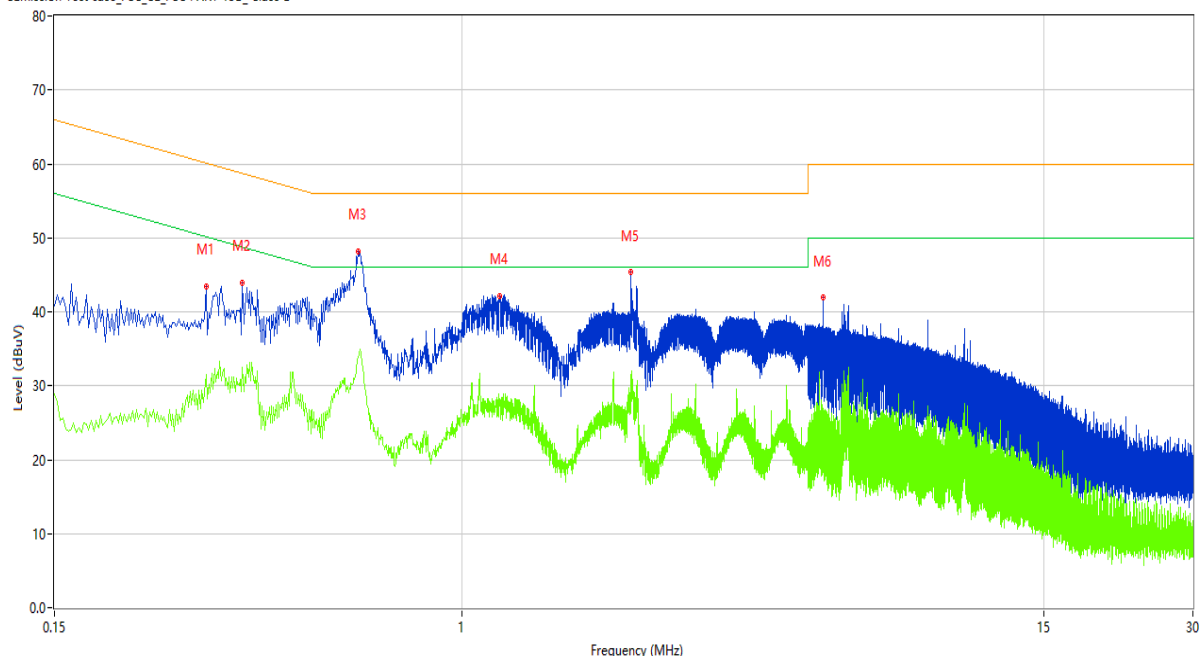
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Figure 20: Conducted Emission on AC Mains, N Phase

CEmission Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.304	42.46	10.14	60.13	-17.67	Peak	N	Pass
1*	0.304	34.88	10.14	60.13	-25.25	QP	N	Pass
1**	0.304	31.54	10.14	50.13	-18.59	AV	N	Pass
2	0.360	45.02	10.14	58.73	-13.71	Peak	N	Pass
2*	0.360	36.14	10.14	58.73	-22.59	QP	N	Pass
2**	0.360	32.42	10.14	48.73	-16.31	AV	N	Pass
3	0.616	53.12	10.15	56.00	-2.88	Peak	N	Pass
3*	0.616	43.93	10.15	56.00	-12.07	QP	N	Pass
3**	0.616	33.90	10.15	46.00	-12.10	AV	N	Pass
4	1.192	44.81	10.16	56.00	-11.19	Peak	N	Pass
4*	1.192	36.95	10.16	56.00	-19.05	QP	N	Pass
4**	1.192	28.27	10.16	46.00	-17.73	AV	N	Pass
5	2.192	48.21	10.18	56.00	-7.79	Peak	N	Pass
5*	2.192	37.40	10.18	56.00	-18.60	QP	N	Pass
5**	2.192	31.45	10.18	46.00	-14.55	AV	N	Pass
6	5.372	43.80	10.26	60.00	-16.20	Peak	N	Pass
6*	5.372	35.79	10.26	60.00	-24.21	QP	N	Pass
6**	5.372	26.09	10.26	50.00	-23.91	AV	N	Pass

End of the report