



# TEST REPORT

No. I23N00746-BLE

for

**Guilin Zhishen Information Technology Co., Ltd.**

**CRANE 4**

**Model Name: CR122**

with

**Hardware Version: V1.0**

**Software Version: V1.75**

**FCC ID: 2AIHFZYCR122**

**ISED Number: 29921-ZYCR122**

**Issued Date: 2023-05-30**

**Designation Number: CN1210**

**ISED Assigned Code: 23289**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I23N00746-BLE	Rev.0	1st edition	2023-05-30

Note: the latest revision of the test report supersedes all previous versions.



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## 1. Summary of Test Report

### 1.1. Test Items

Description	CRANE 4
Model Name	CR122
Applicant's name	Guilin Zhishen Information Technology Co., Ltd.
Manufacturer's Name	Guilin Zhishen Information Technology Co., Ltd.

### 1.2. Test Standards

FCC Part15-2021; ANSI C63.10-2013; RSS-247 Issue 2; RSS-Gen Issue 5 A2.

### 1.3. Test Result

**Pass**

Please refer to 5.2 Test Results.

### 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

### 1.5. Project data

Testing Start Date:	2023-05-08
Testing End Date:	2023-05-18

### 1.6. Signature

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Lin Kanfeng  
(Prepared this test report)

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An Ran  
(Reviewed this test report)

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Zhang Bojun  
(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Guilin Zhishen Information Technology Co., Ltd.  
Address: 09 Huangtong Road, Tieshan Industrial Zone, Qixing District, Guilin, Guangxi, China.  
Contact Person: /  
E-Mail: zouj@zhiyun-tech.com  
Telephone: 13066932837  
FAX: /

### **2.2. Manufacturer Information**

Company Name: Guilin Zhishen Information Technology Co., Ltd.  
Address: 09 Huangtong Road, Tieshan Industrial Zone, Qixing District, Guilin, Guangxi, China.  
Contact Person: /  
E-Mail: zouj@zhiyun-tech.com  
Telephone: 13066932837  
FAX: /



### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	CRANE 4
Model Name	CR122
Frequency Range	2400MHz~2483.5MHz
Equipment type	Bluetooth® Low Energy
Type of Modulation	GFSK
RF PHY	LE 1M/2M
Number of Channels	40
Antenna Type	Integrated
Antenna Gain	2.0 dBi
Power Supply	14.8V DC by Battery
FCC ID	2AIHFZYCR122
IC	29921-ZYCR122
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>	<b>Date of Receipt</b>
UT01aa	/	V1.0	V1.75	2023-04-26
UT03aa	/	V1.0	V1.75	2023-04-26

\*EUT ID: is used to identify the test sample in the lab internally.

\*UT01aa is used for Conduction test; UT03aa is used for radiation test and AC Power line Conducted Emission test.

#### **3.3. Internal Identification of AE used during the test**

<b>AE No.</b>	<b>Description</b>	<b>AE ID*</b>
AE1	Polymer Li-ion Battery	/
AE2	Charger	Aa01
AE3	Data Cable	Ca01
AE1		
Model	ZY-CR122	
Manufacturer	Dongguan Howell Energy Co., Ltd.	
Capacity	2600mAh	
Nominal Voltage	14.8V	
AE2		
Model	/	
Manufacturer	/	
AE3		



No. I23N00746-BLE

Model XL01077  
Manufacturer Guilin Zhishen Information Technology Co.,Ltd.

\*AE ID: is used to identify the test sample in the lab internally.

### **3.4. General Description**

The Equipment under Test (EUT) is a model of CR122 with integrated antenna and battery.

It consists of normal options: Battery and Cable.

Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the client.



#### **4. Reference Documents**

##### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

##### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz	2021
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
RSS-247	Spectrum Management and Telecommunications Radio Standards Specification Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	Issue 2 February, 2017
RSS-Gen	Spectrum Management and Telecommunications Radio Standards Specification General Requirements for Compliance of Radio Apparatus	Issue 5 A2 February, 2021





## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Sub-clause of IC	Verdict
0	Antenna Requirement	15.203	/	<b>P</b>
1	Maximum Peak Output Power	15.247 (b)	RSS-247 section 5.4	<b>P</b>
2	Peak Power Spectral Density	15.247 (e)	RSS-247 section 5.2	<b>P</b>
3	6dB Bandwidth	15.247 (a)	RSS-247 section 5.2	<b>P</b>
4	Band Edges Compliance	15.247 (d)	RSS-247 section 5.5	<b>P</b>
5	Transmitter Spurious Emission - Conducted	15.247 (d)	RSS-247 section 5.5/ RSS-Gen section 6.13	<b>P</b>
6	Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	RSS-247 section 5.5/ RSS-Gen section 6.13	<b>P</b>
7	AC Power line Conducted Emission	15.107, 15.207	RSS-Gen section 8.8	<b>P</b>
8	99% Occupied Bandwidth	/	RSS-Gen section 6.7	<b>/</b>

See **ANNEX A** for details.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

## 6. Test Equipments Utilized

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2023-12-28	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2023-12-28	1 year
3	Data Acquisition	U2531A	TW55443507	Keysight	/	/
4	Shielding Room	S81	CT000986-1344	ETS-Lindgren	2026-09-12	5 years

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Test Receiver	ESR7	101676	Rohde & Schwarz	2023-11-23	1 year
2	BiLog Antenna	3142E	0224831	ETS-Lindgren	2024-05-27	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2025-04-17	3 years
4	Anechoic Chamber	FACT3-2.0	1285	ETS-Lindgren	2023-05-29	2 years
5	Spectrum Analyzer	FSV40	101192	Rohde & Schwarz	2024-01-11	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2025-05-12	3 years
7	Horn Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2026-02-01	3 years
8	Test Receiver	ESCI	100702	Rohde & Schwarz	2024-01-11	1 year
9	LISN	ENV216	102067	Rohde & Schwarz	2023-09-06	1 year

### Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal. The EUT was programmed to be in continuously transmitting mode.

### Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

## 7. Laboratory Environment

### Shielded room

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

### Anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

## 8. Measurement Uncertainty

Test Name	Uncertainty ( $k=2$ )	
1. Maximum Peak Output Power	1.32dB	
2. Peak Power Spectral Density	1.32dB	
3. 6dB Bandwidth	4.56kHz	
4. Band Edges Compliance	1.92dB	
5. Transmitter Spurious Emission - Conducted	30MHz $\leq$ f<1GHz	1.41dB
	1GHz $\leq$ f<7GHz	1.92dB
	7GHz $\leq$ f<13GHz	2.31dB
	13GHz $\leq$ f $\leq$ 26GHz	2.61dB
6. Transmitter Spurious Emission - Radiated	9kHz $\leq$ f<30MHz	1.79dB
	30MHz $\leq$ f<1GHz	4.86dB
	1GHz $\leq$ f<18GHz	4.82dB
	18GHz $\leq$ f $\leq$ 40GHz	2.90dB
7. AC Power line Conducted Emission	150kHz $\leq$ f $\leq$ 30MHz	2.62dB
8. 99% Occupied Bandwidth	4.56kHz	

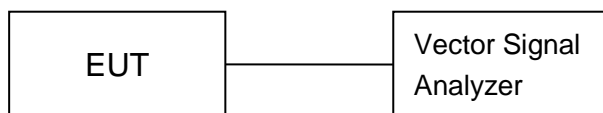
## **ANNEX A: Detailed Test Results**

### **Test Configuration**

The measurement is made according to ANSI C63.10.

#### **1) Conducted Measurements**

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the spectrum analyzer to start measurement.
5. Record the values.



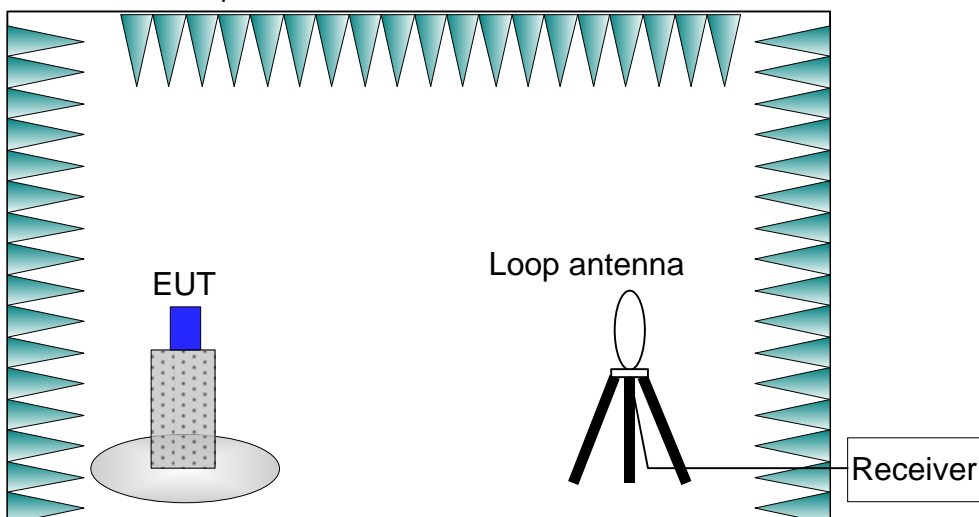
#### **2) Radiated Measurements**

##### **Test setup:**

##### **9kHz-30MHz:**

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below.

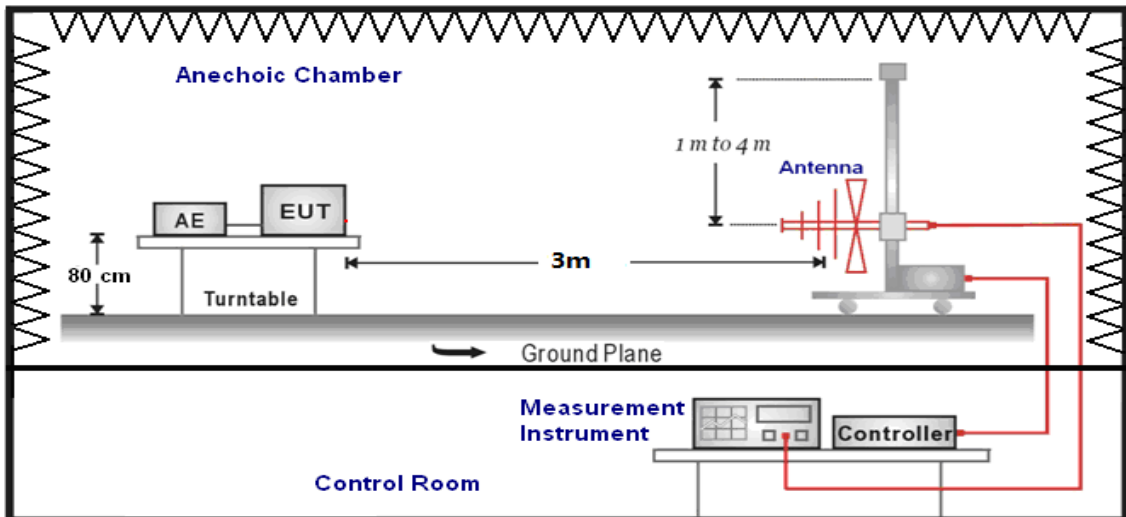
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



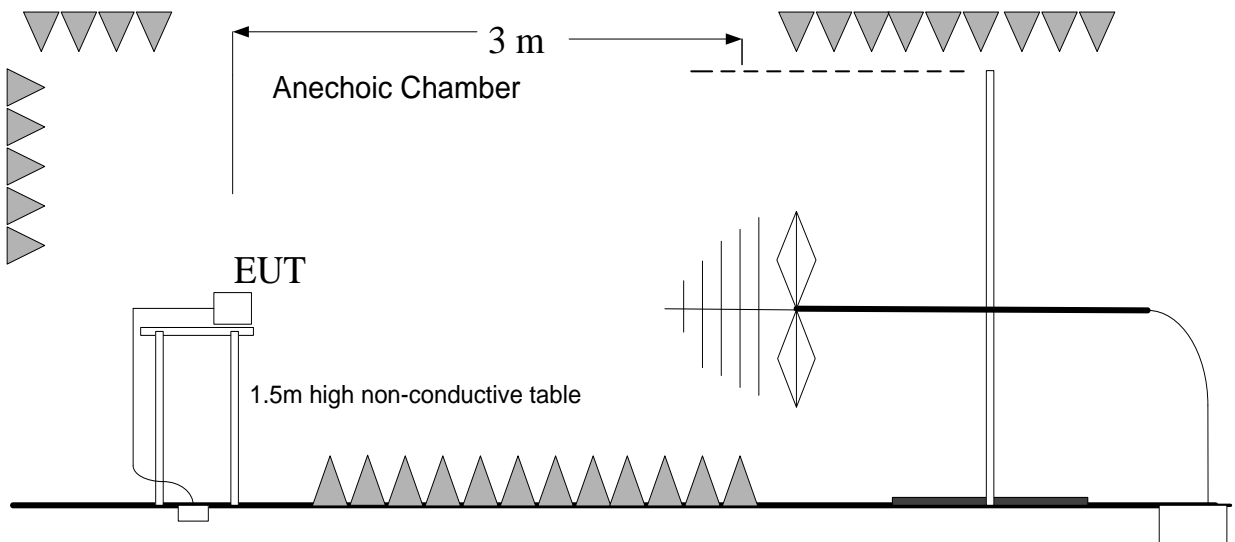
**30MHz-26.5GHz:**

The EUT are measured in an anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

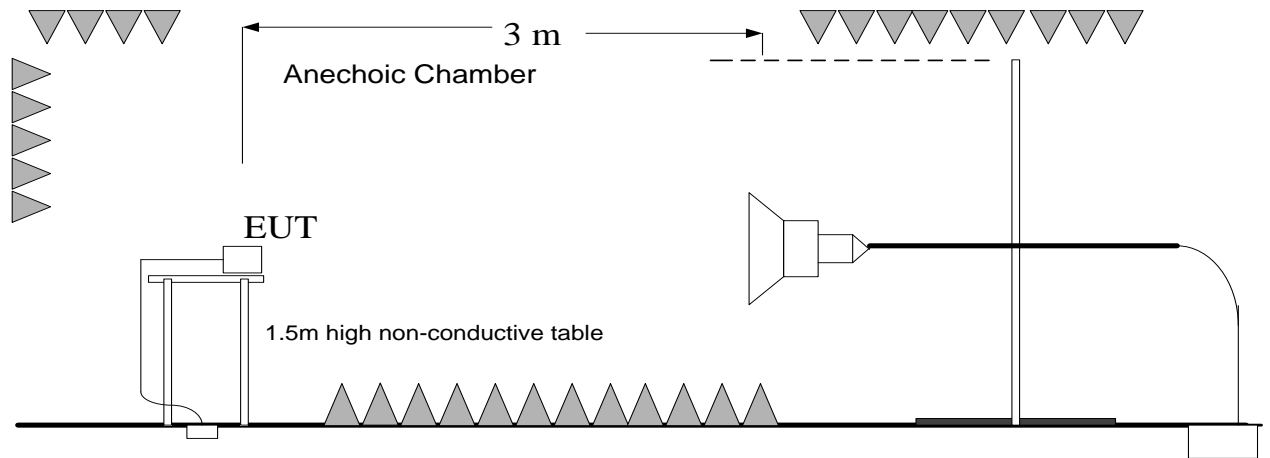
**30MHz-1GHz:**



**1GHz-3GHz:**

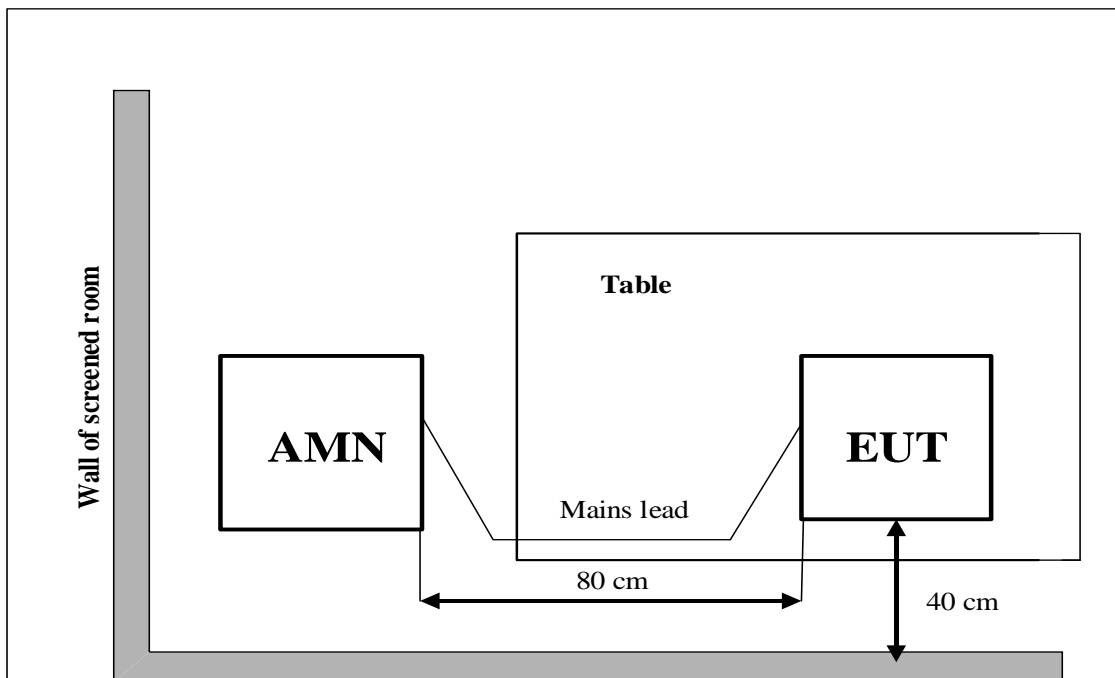


**3GHz-26.5GHz:**



**3) AC Power line Conducted Emission Measurement**

For Bluetooth LE, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.





### A.0 Antenna requirement

**Measurement Limit:**

Standard	Requirement
FCC CRF 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

**Conclusion: The Directional gains of antenna used for transmitting is 2.0dBi.**

**The RF transmitter uses an integrate antenna without connector.**





**A.1 Maximum Peak Output Power**

**Method of Measurement: See ANSI C63.10-clause 11.9.1.3**

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

**Measurement Limit:**

Standard	Limit (dBm)	E.I.R.P Limit (dBm)
FCC CRF Part 15.247 (b) & RSS-247 section 5.4	< 30	< 36

**Measurement Results:**

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)	E.I.R.P (dBm)	Conclusion
LE-1M	2402 (CH0)	-1.33	0.67	<b>P</b>
	2440 (CH19)	-1.33	0.67	<b>P</b>
	2480 (CH39)	-1.56	0.44	<b>P</b>
LE-2M	2402 (CH0)	-1.30	0.70	<b>P</b>
	2440 (CH19)	-1.28	0.72	<b>P</b>
	2480 (CH39)	-1.53	0.47	<b>P</b>

Note: E.I.R.P value = Conducted values (with conducted samples) + Antenna Gain.

**Conclusion: Pass**



**A.2 Peak Power Spectral Density**

Method of Measurement: See ANSI C63.10-clause 11.10.2

Measurement Limit:

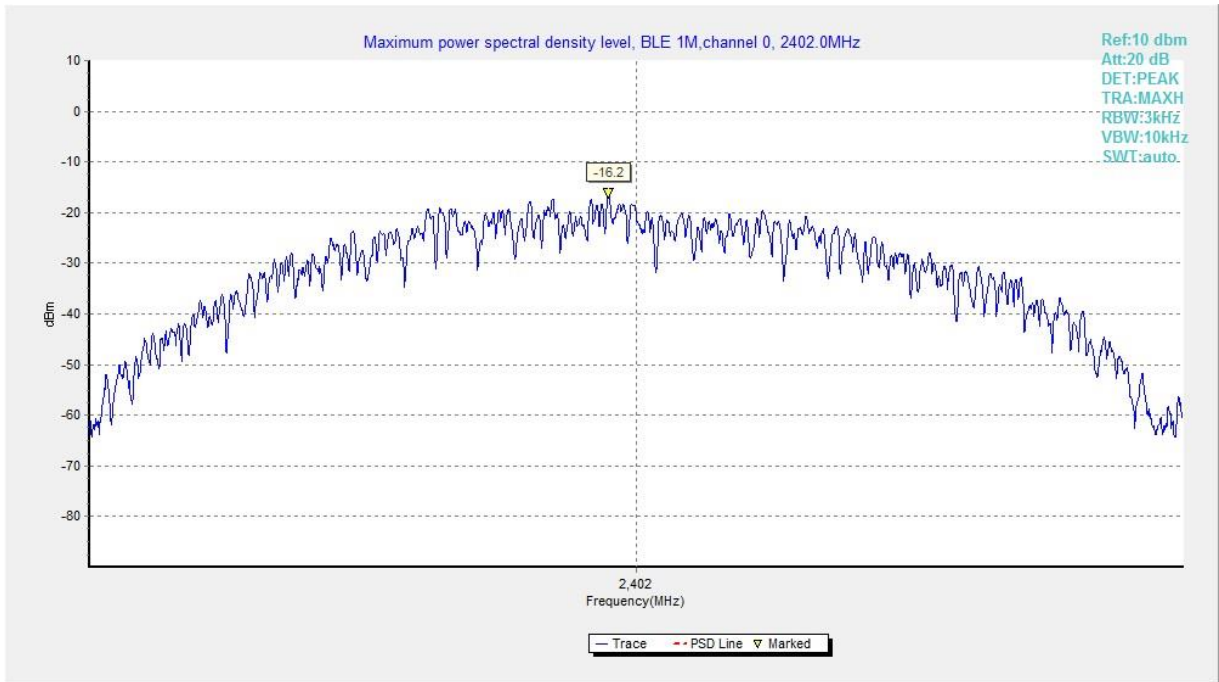
Standard	Limit
FCC CRF Part 15.247 (e) & RSS-247 section 5.2	< 8 dBm/3 kHz

**Measurement Results:**

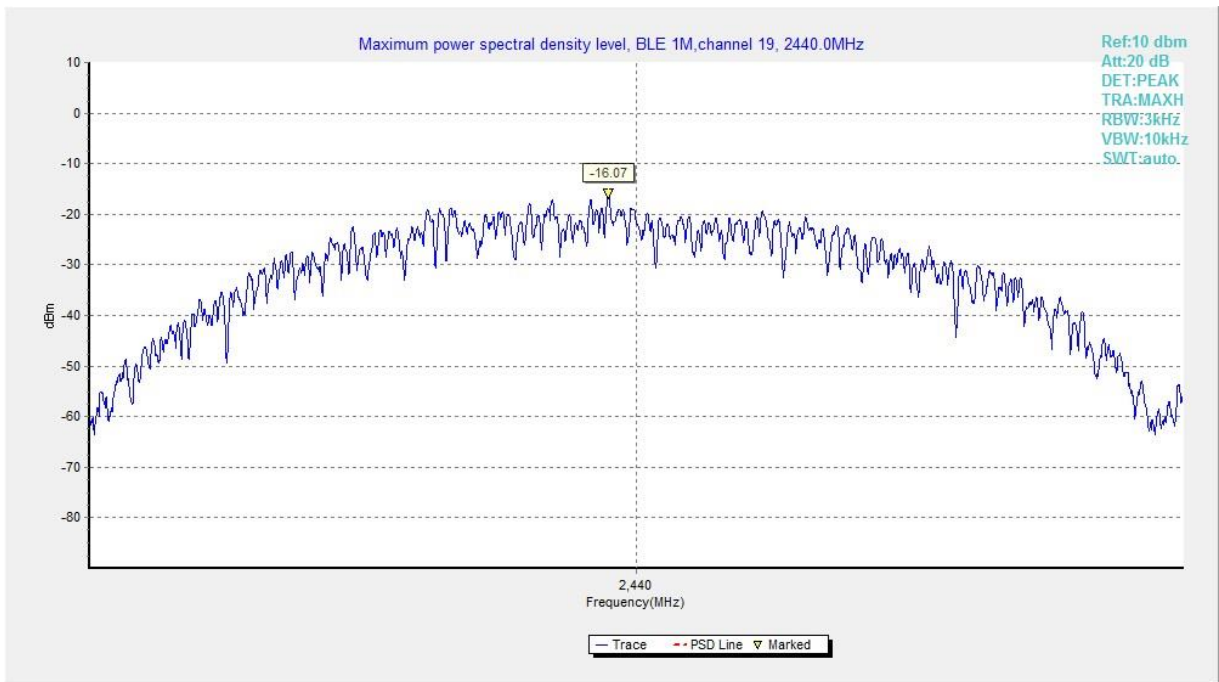
Mode	Frequency (MHz)	Peak Power Spectral Density (dBm)	Conclusion	
LE-1M	2402 (CH0)	Fig.1	-16.20	<b>P</b>
	2440 (CH19)	Fig.2	-16.07	<b>P</b>
	2480 (CH39)	Fig.3	-16.18	<b>P</b>
LE-2M	2402 (CH0)	Fig.4	-18.82	<b>P</b>
	2440 (CH19)	Fig.5	-19.01	<b>P</b>
	2480 (CH39)	Fig.6	-19.58	<b>P</b>

See below for test graphs.

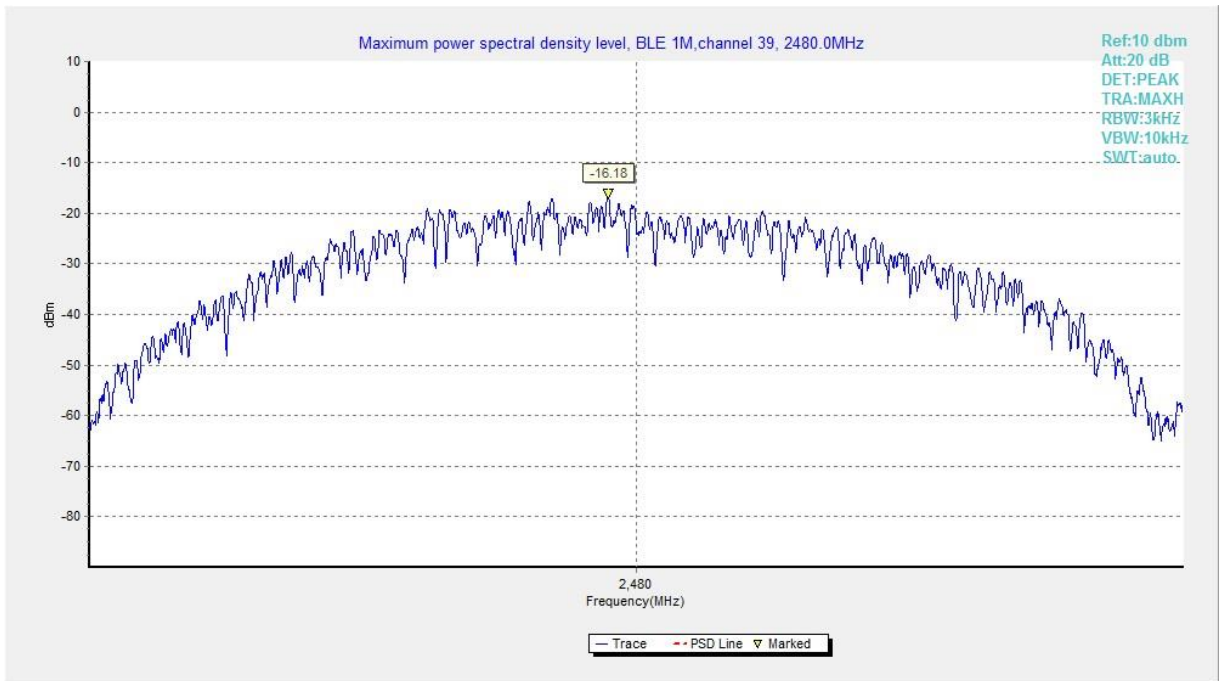
Conclusion: **PASS**



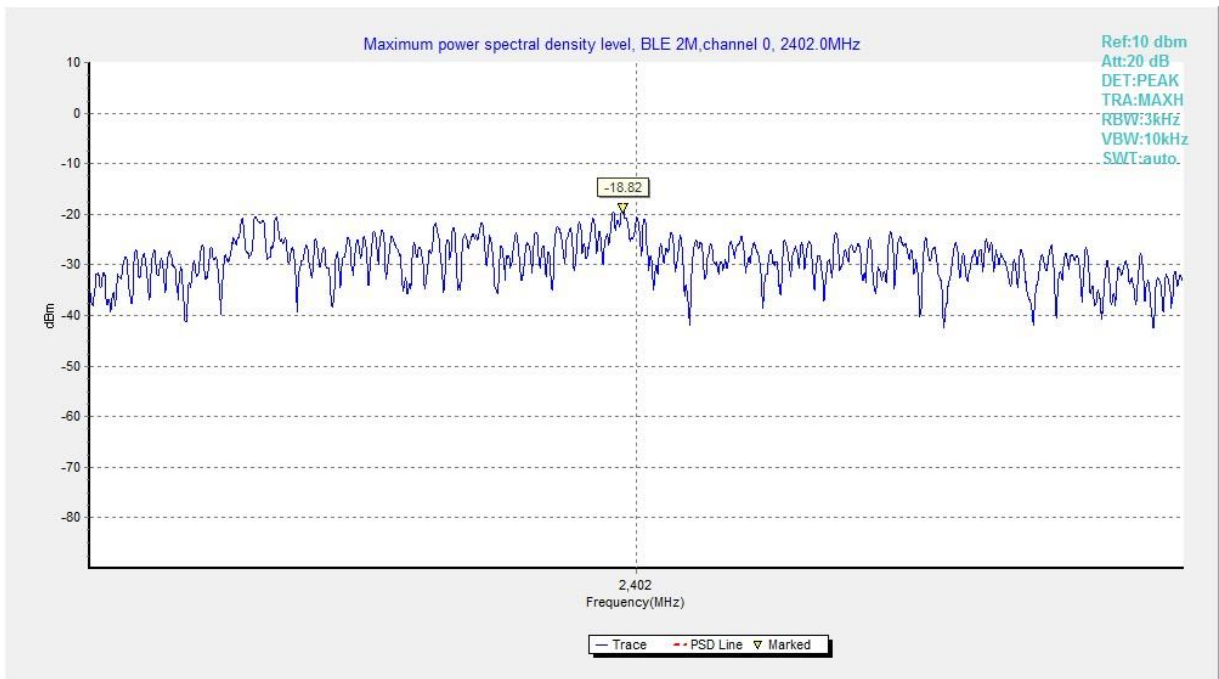
**Fig.1 Power Spectral Density (Ch 0), LE 1M**



**Fig.2 Power Spectral Density (Ch 19), LE 1M**



**Fig.3 Power Spectral Density (Ch 39), LE 1M**



**Fig.4 Power Spectral Density (Ch 0), LE 2M**

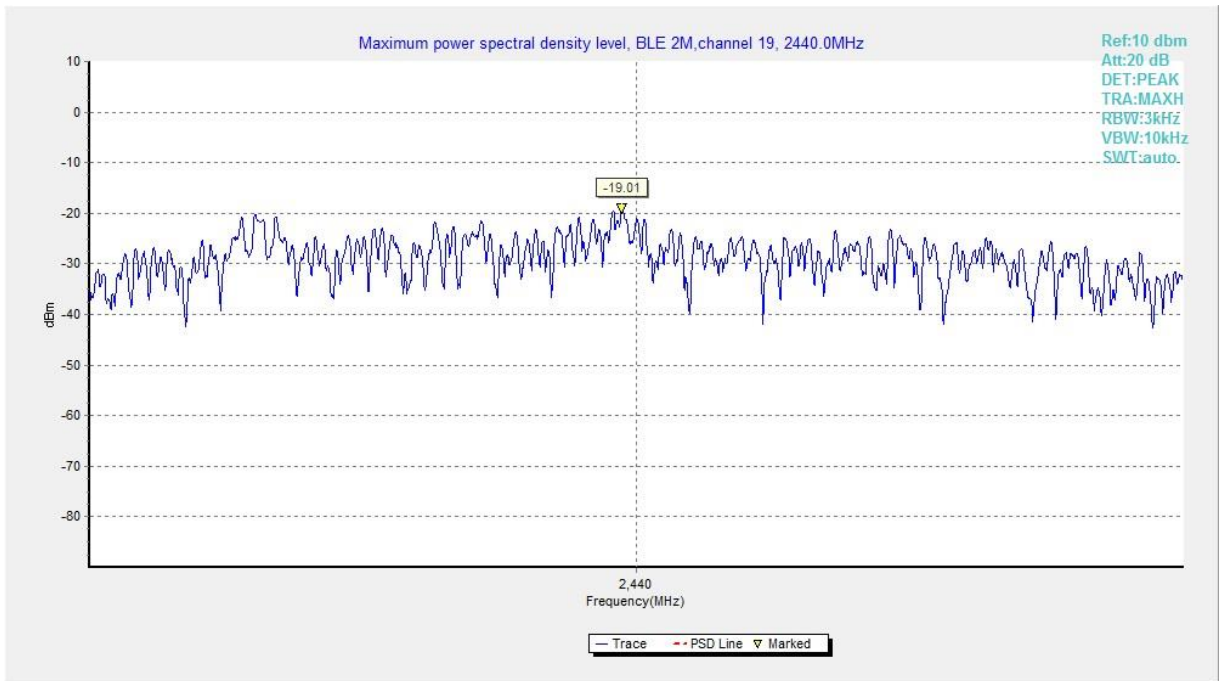


Fig.5 Power Spectral Density (Ch 19), LE 2M

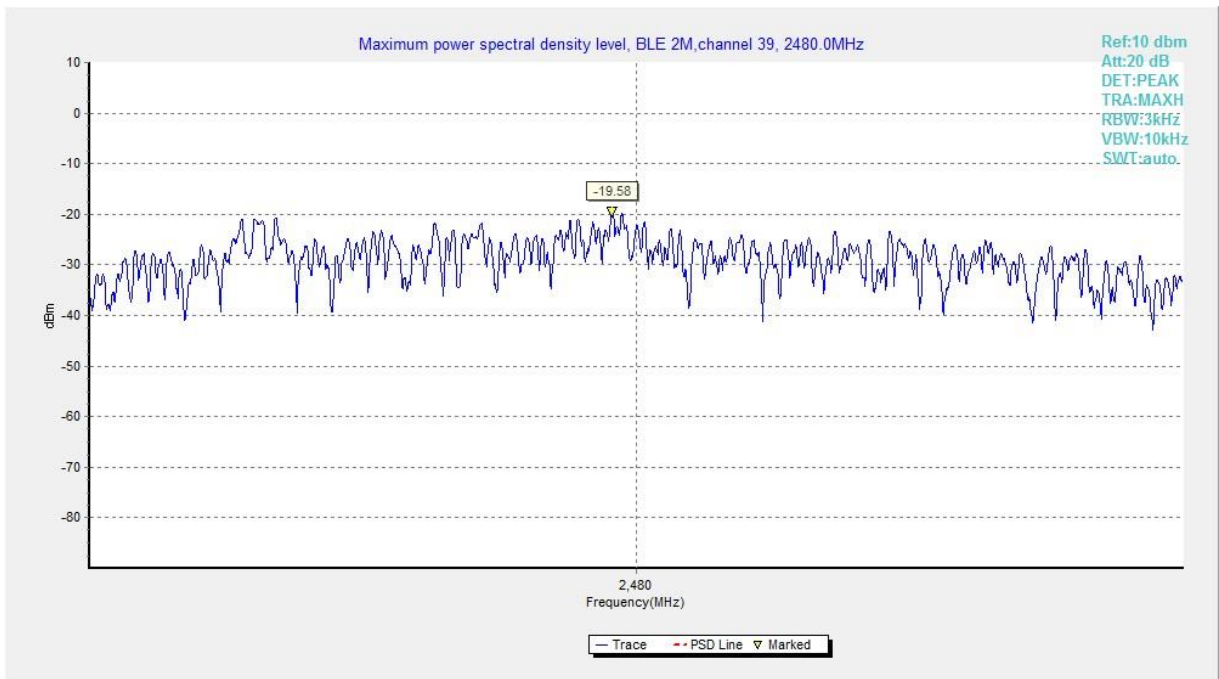


Fig.6 Power Spectral Density (Ch 39), LE 2M



### A.3 6dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 11.8.2

Measurement Limit:

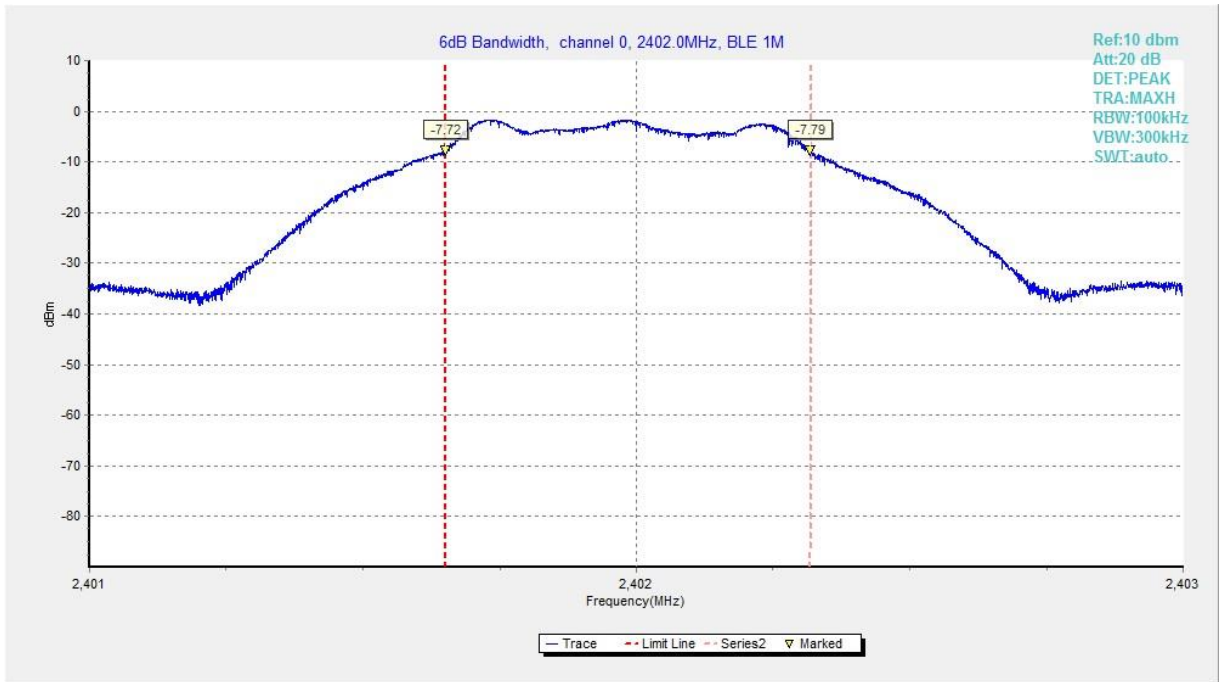
Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a) & RSS-247 section 5.2	≥ 500

Measurement Result:

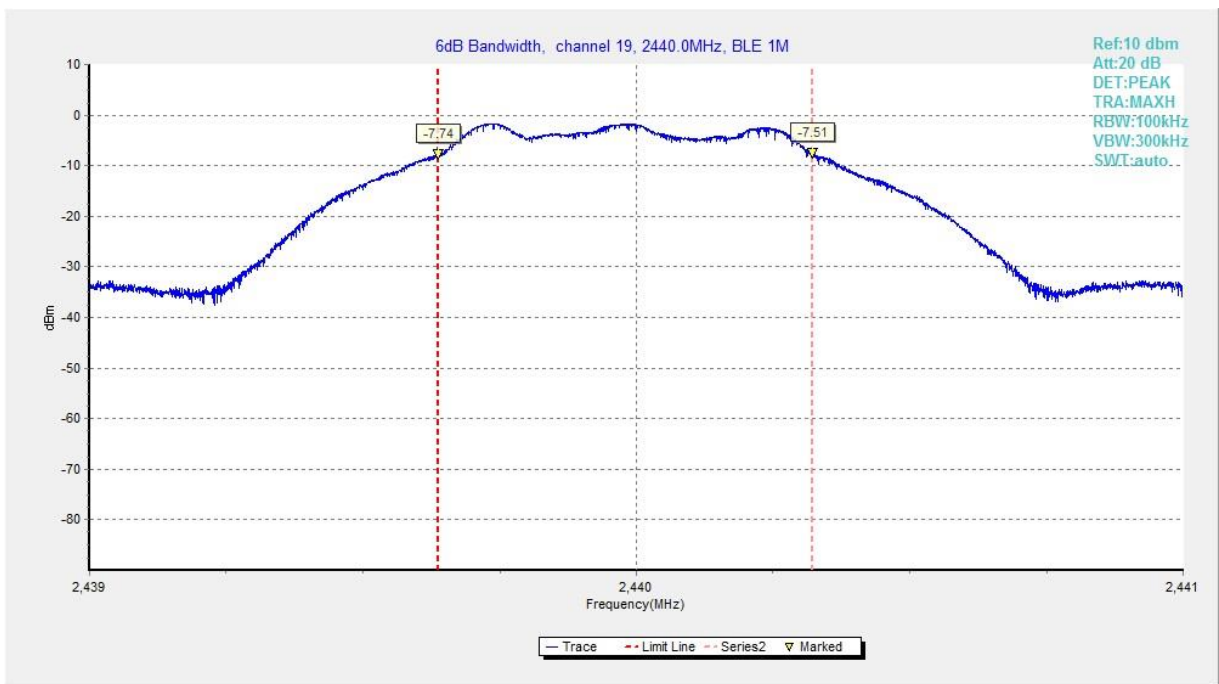
Mode	Frequency (MHz)	Test Results (kHz)		Conclusion
LE-1M	2402 (CH0)	Fig.7	667.50	<b>P</b>
	2440 (CH19)	Fig.8	684.50	<b>P</b>
	2480 (CH39)	Fig.9	677.50	<b>P</b>
LE-2M	2402 (CH0)	Fig.10	1162.00	<b>P</b>
	2440 (CH19)	Fig.11	1175.50	<b>P</b>
	2480 (CH39)	Fig.12	1168.00	<b>P</b>

See below for test graphs.

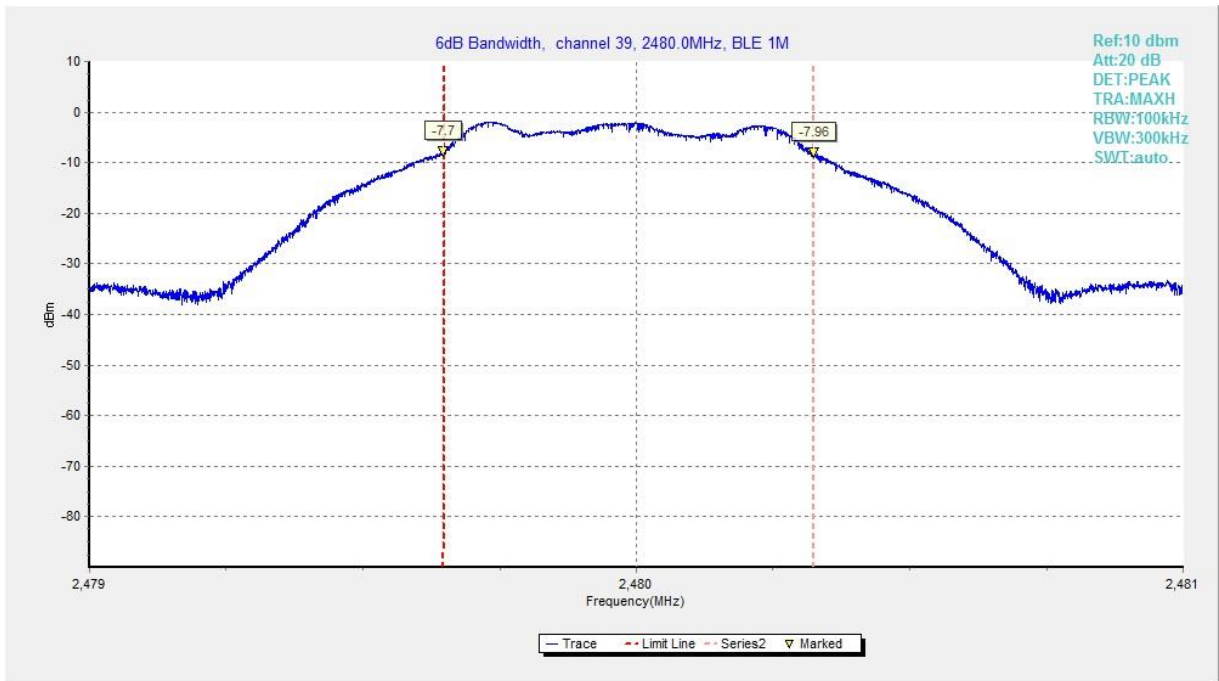
Conclusion: **PASS**



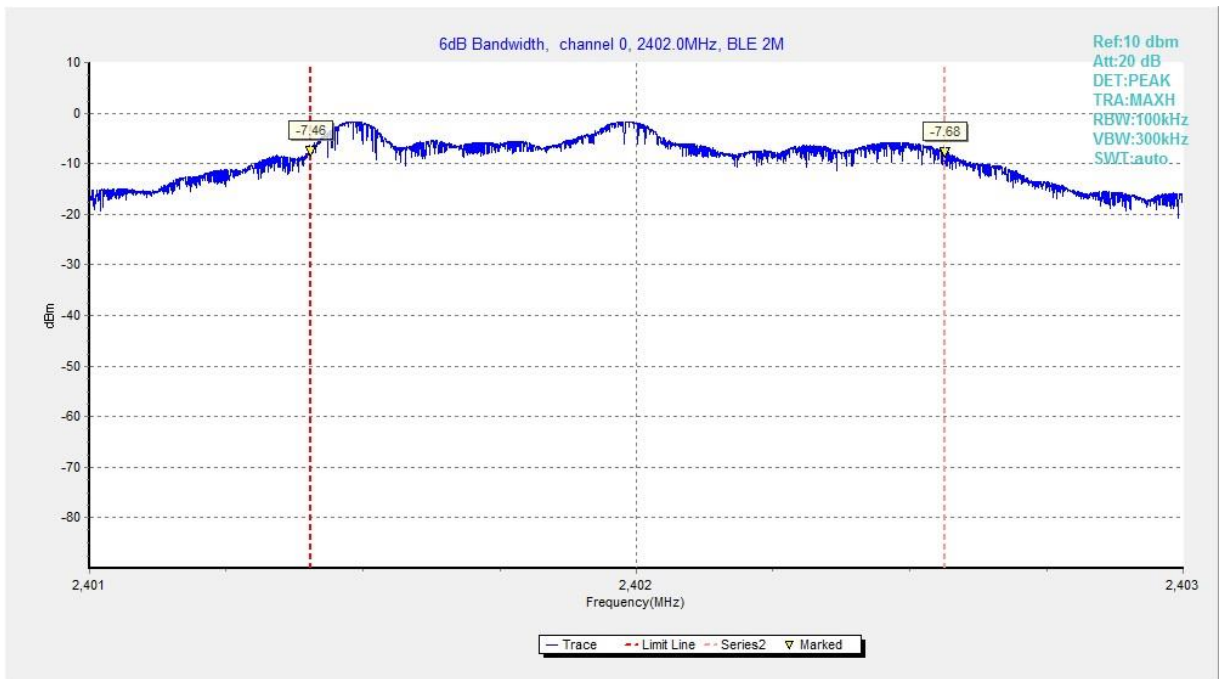
**Fig.7 6dB Bandwidth (Ch 0), LE 1M**



**Fig.8 6dB Bandwidth (Ch 19), LE 1M**



**Fig.9 6dB Bandwidth (Ch 39), LE 1M**



**Fig.10 6dB Bandwidth (Ch 0), LE 2M**



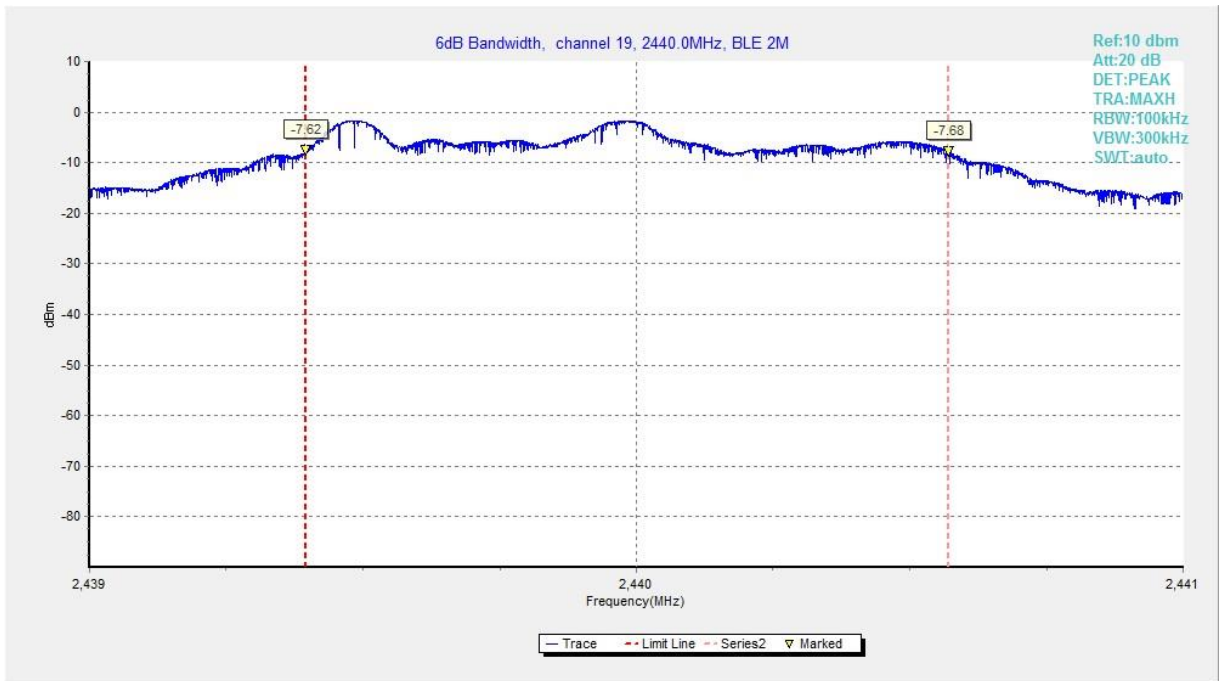


Fig.11 6dB Bandwidth (Ch 19), LE 2M

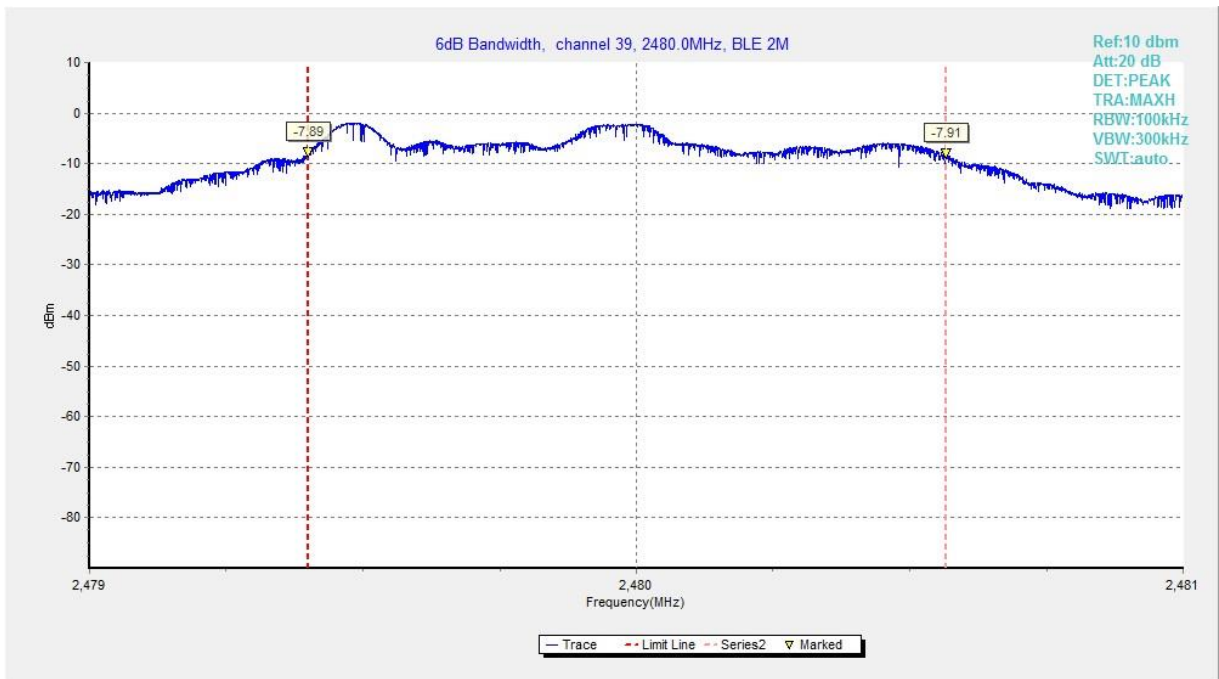


Fig.12 6dB Bandwidth (Ch 39), LE 2M



#### A.4 Band Edges Compliance

**Method of Measurement:** See ANSI C63.10-clause 11.13.3.2

**Measurement Limit:**

Standard	Limit (dB)
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5	> 20

**Measurement Result:**

Mode	Frequency (MHz)	Test Results (dB)		Conclusion
LE-1M	2402 (CH0)	Fig.13	31.88	<b>P</b>
	2480 (CH39)	Fig.14	31.64	<b>P</b>
LE-2M	2402 (CH0)	Fig.15	32.11	<b>P</b>
	2480 (CH39)	Fig.16	32.13	<b>P</b>

See below for test graphs.

**Conclusion: Pass**

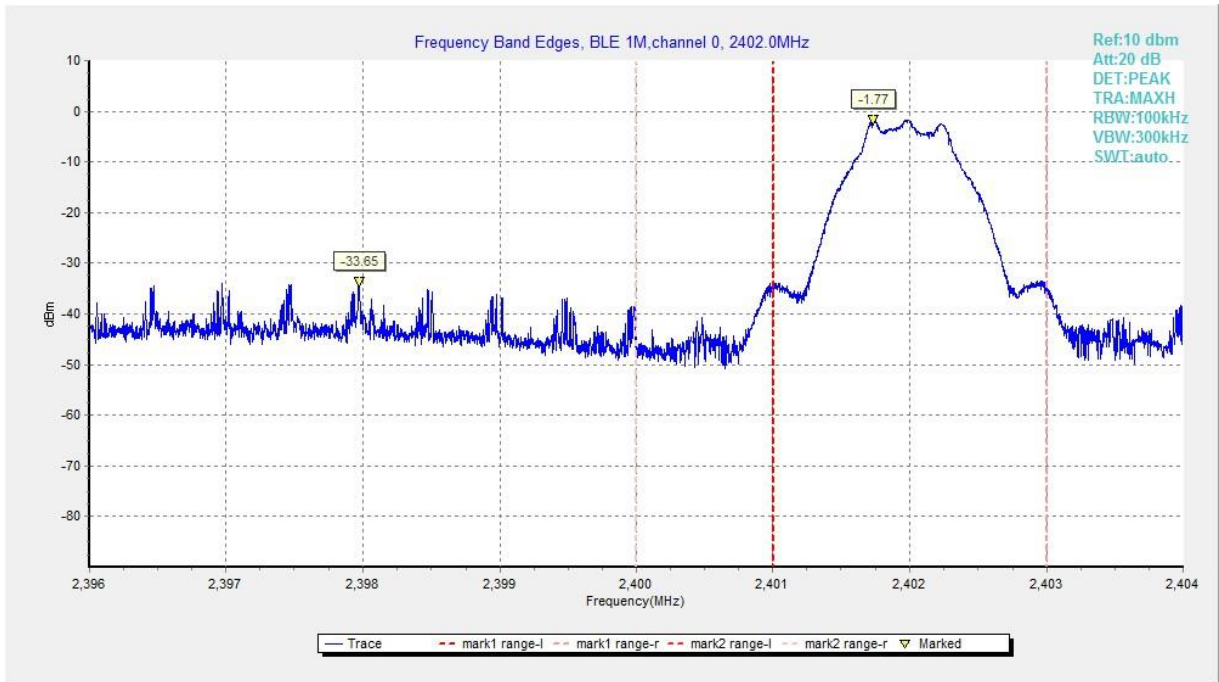


Fig.13 Band Edges (Ch 0), LE 1M

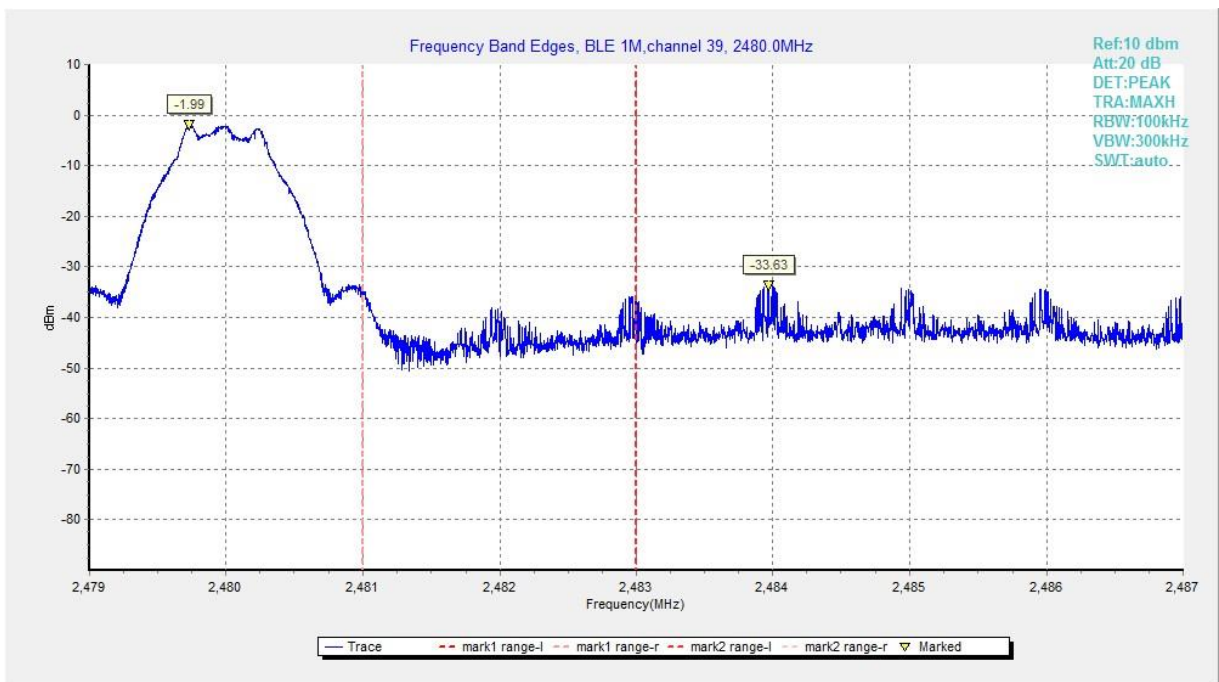


Fig.14 Band Edges (Ch 39), LE 1M

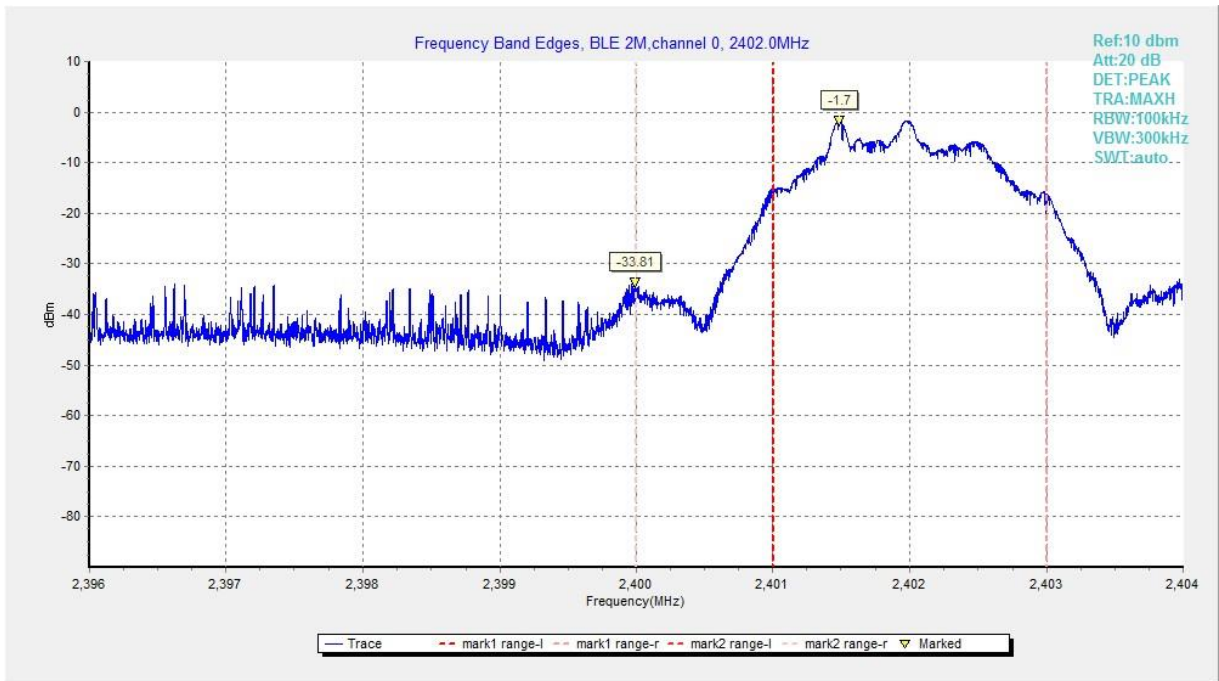


Fig.15 Band Edges (Ch 0), LE 2M

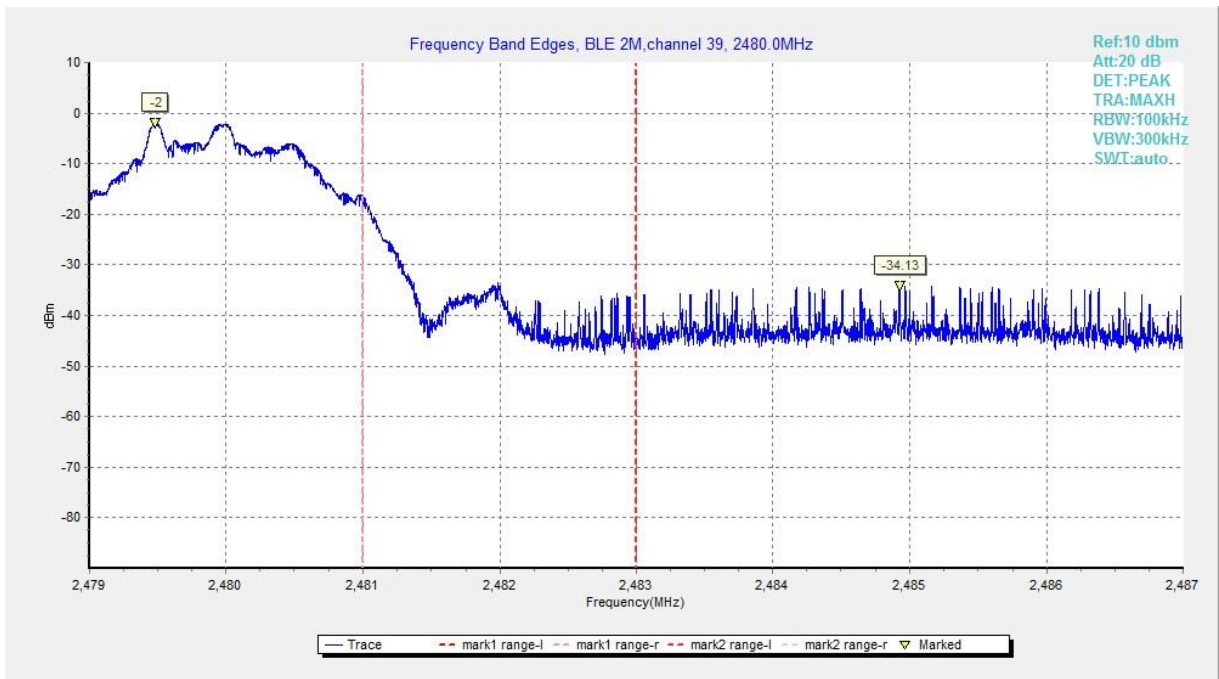


Fig.16 Band Edges (Ch 39), LE 2M



**A.5 Transmitter Spurious Emission - Conducted**

**Method of Measurement: See ANSI C63.10-clause 11.11.2&11.11.3**

**Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5/RSS-Gen section 6.13	20dB below peak output power in 100kHz bandwidth

**Measurement Results:**

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
LE-1M	2402 (CH0)	1 GHz ~ 3 GHz	Fig.17	P
		3 GHz ~ 10 GHz	Fig.18	P
	2440 (CH19)	1 GHz ~ 3 GHz	Fig.19	P
		3 GHz ~ 10 GHz	Fig.20	P
	2480 (CH39)	1 GHz ~ 3 GHz	Fig.21	P
		3 GHz ~ 10 GHz	Fig.22	P
	All channels	30 MHz ~ 1 GHz	Fig.23	P
		10 GHz ~ 26 GHz	Fig.24	P
LE-2M	2402 (CH0)	1 GHz ~ 3 GHz	Fig.25	P
		3 GHz ~ 10 GHz	Fig.26	P
	2440 (CH19)	1 GHz ~ 3 GHz	Fig.27	P
		3 GHz ~ 10 GHz	Fig.28	P
	2480 (CH39)	1 GHz ~ 3 GHz	Fig.29	P
		3 GHz ~ 10 GHz	Fig.30	P
	All channels	30 MHz ~ 1 GHz	Fig.31	P
		10 GHz ~ 26 GHz	Fig.32	P

**See below for test graphs.**

**Conclusion: Pass**

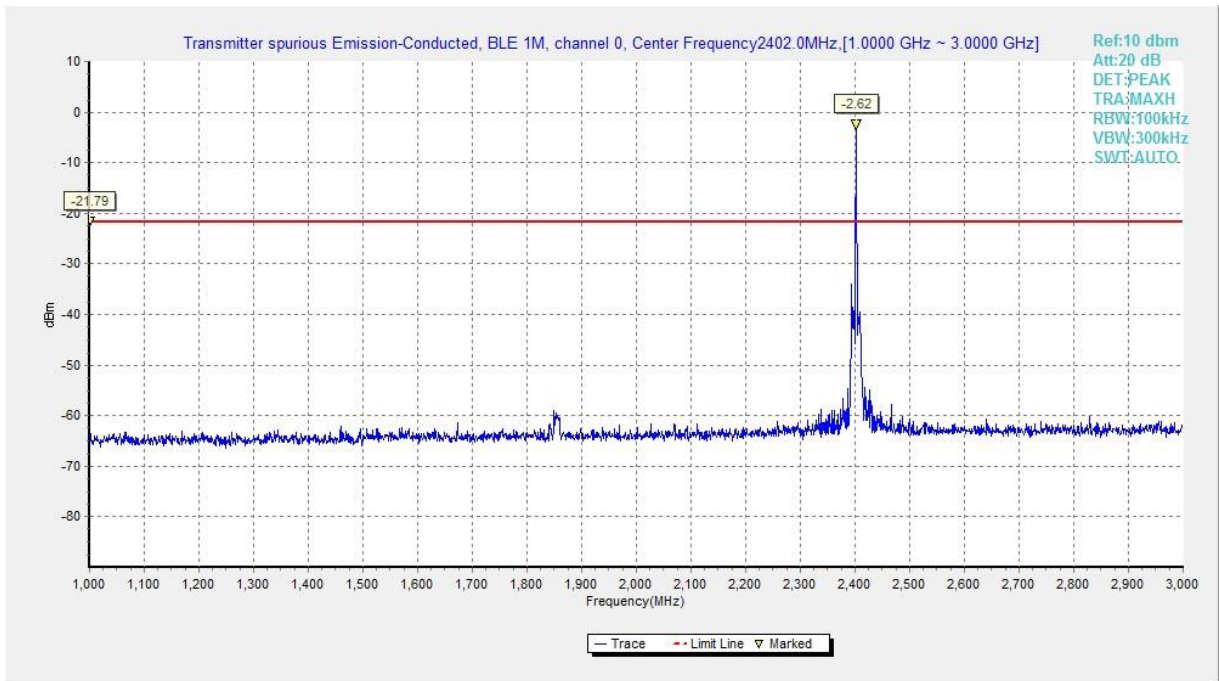


Fig.17 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE 1M

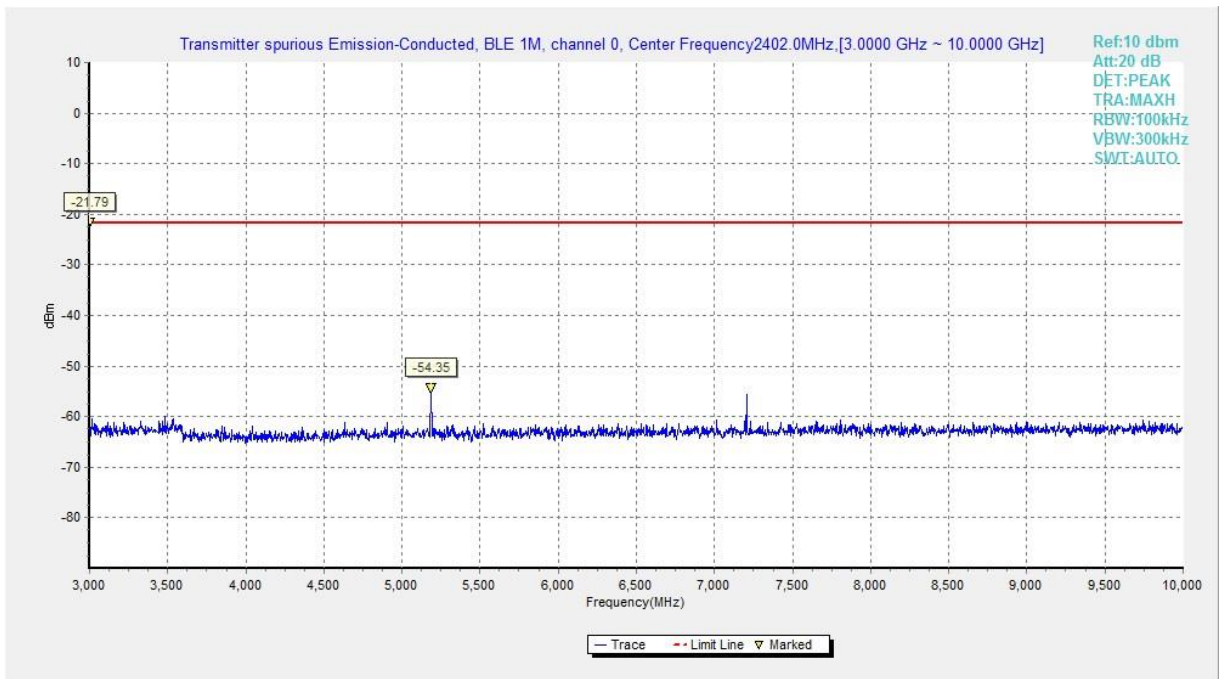


Fig.18 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE 1M



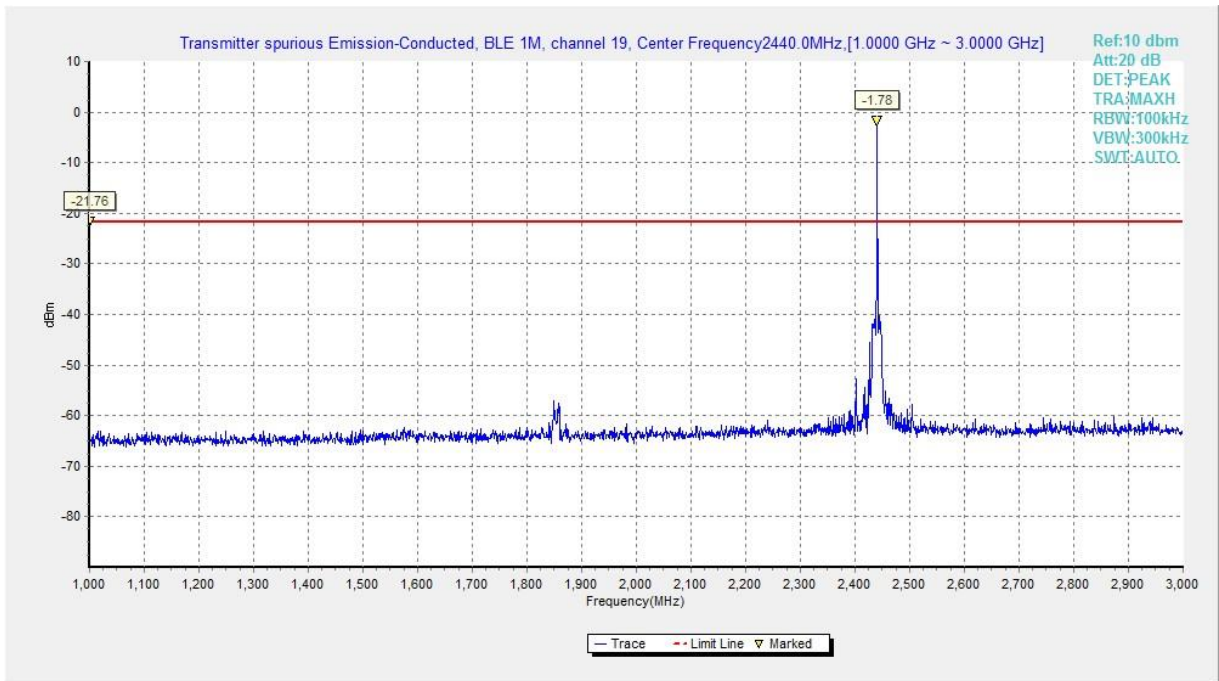


Fig.19 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE 1M

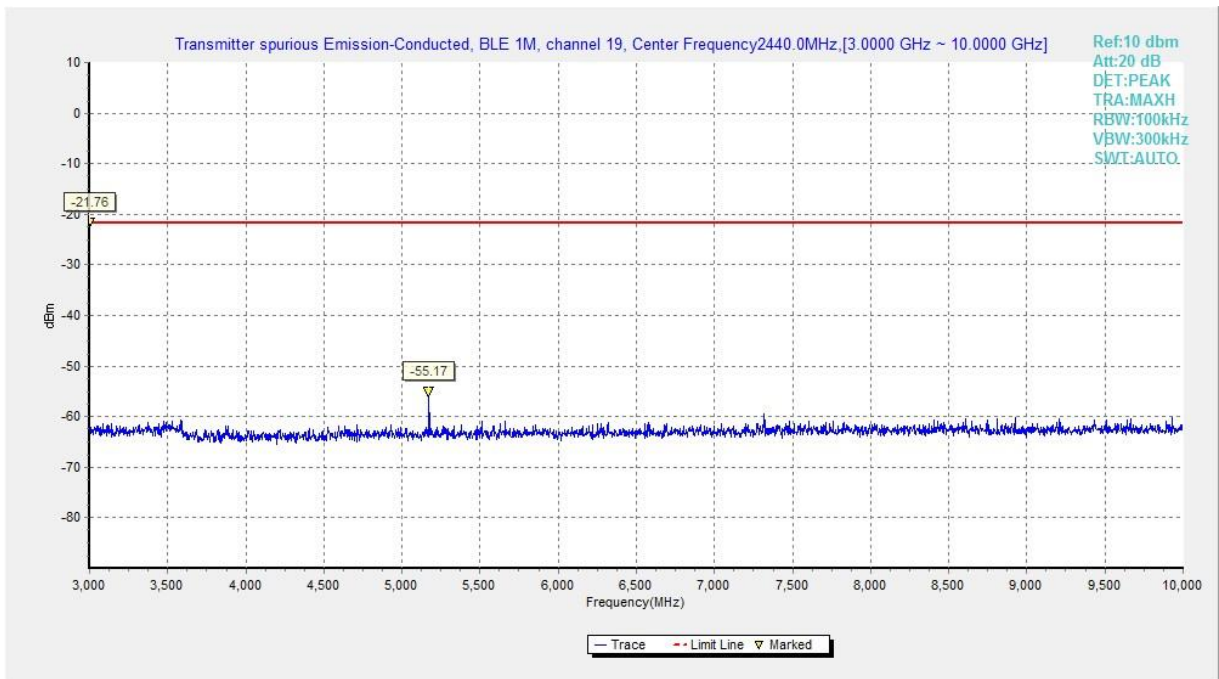


Fig.20 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE 1M

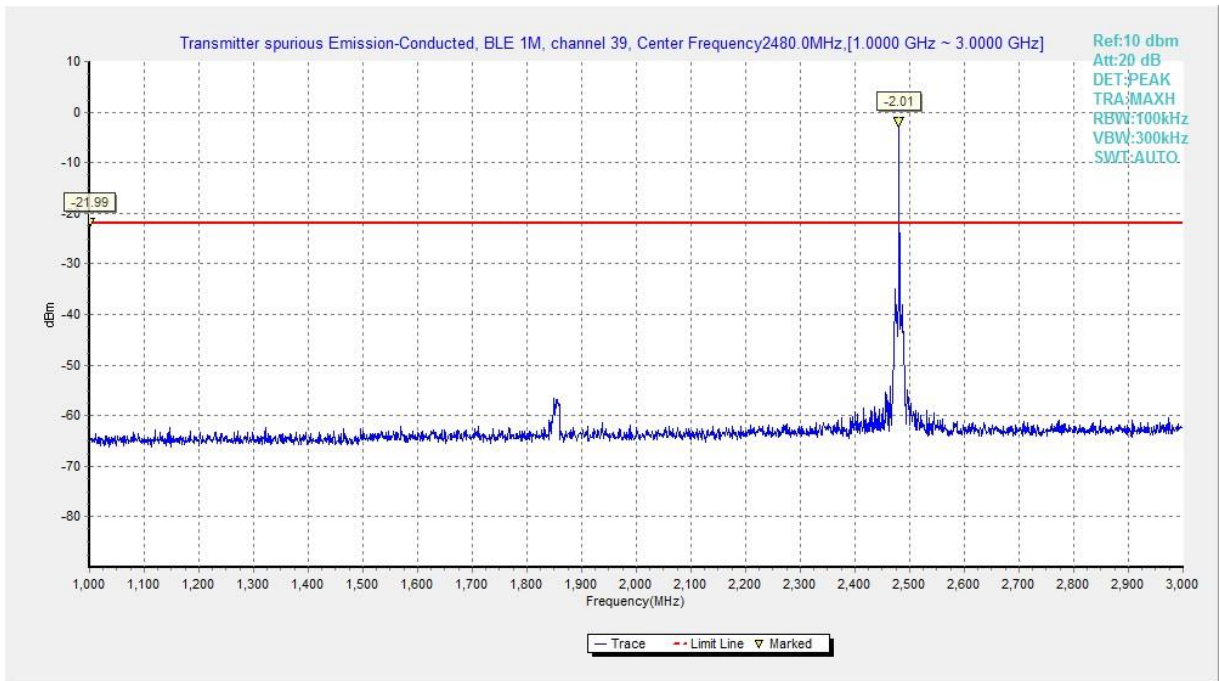


Fig.21 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 1M

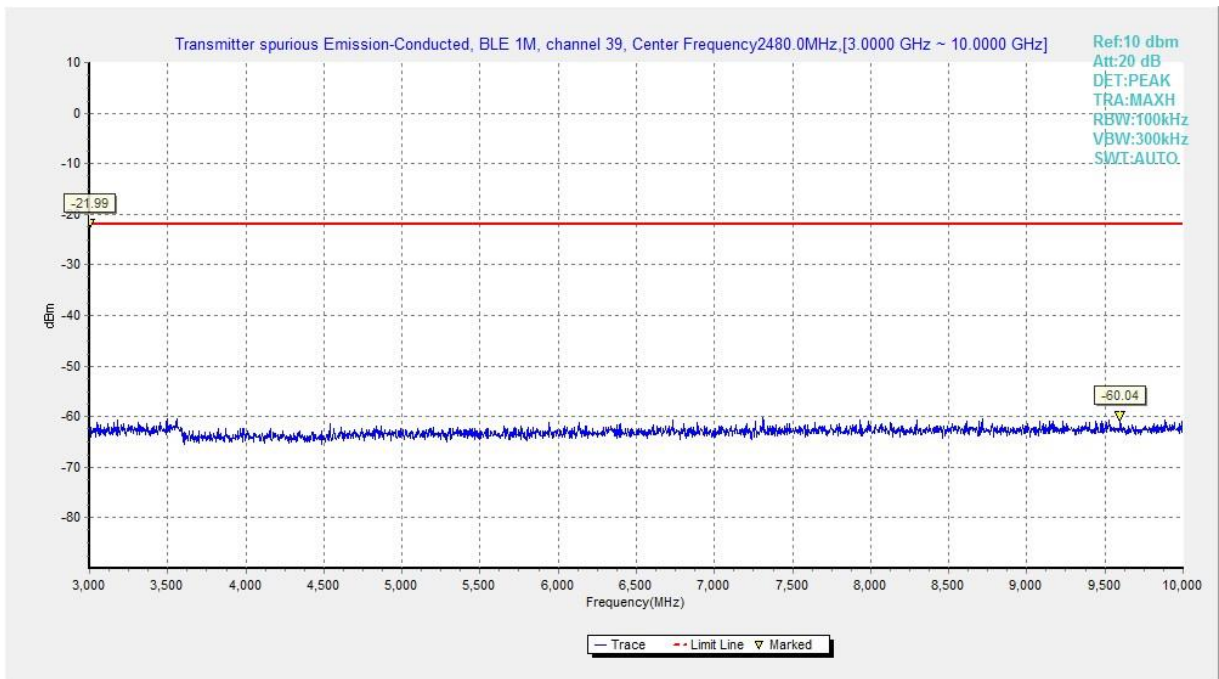


Fig.22 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 1M



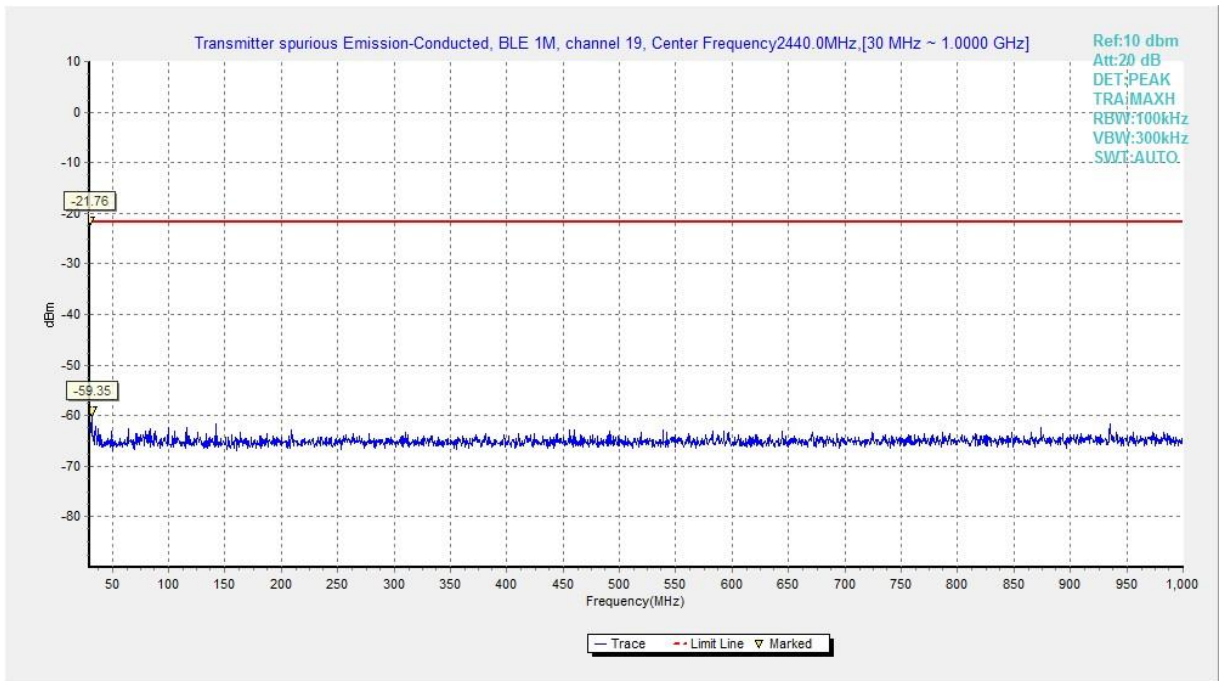


Fig.23 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 1M

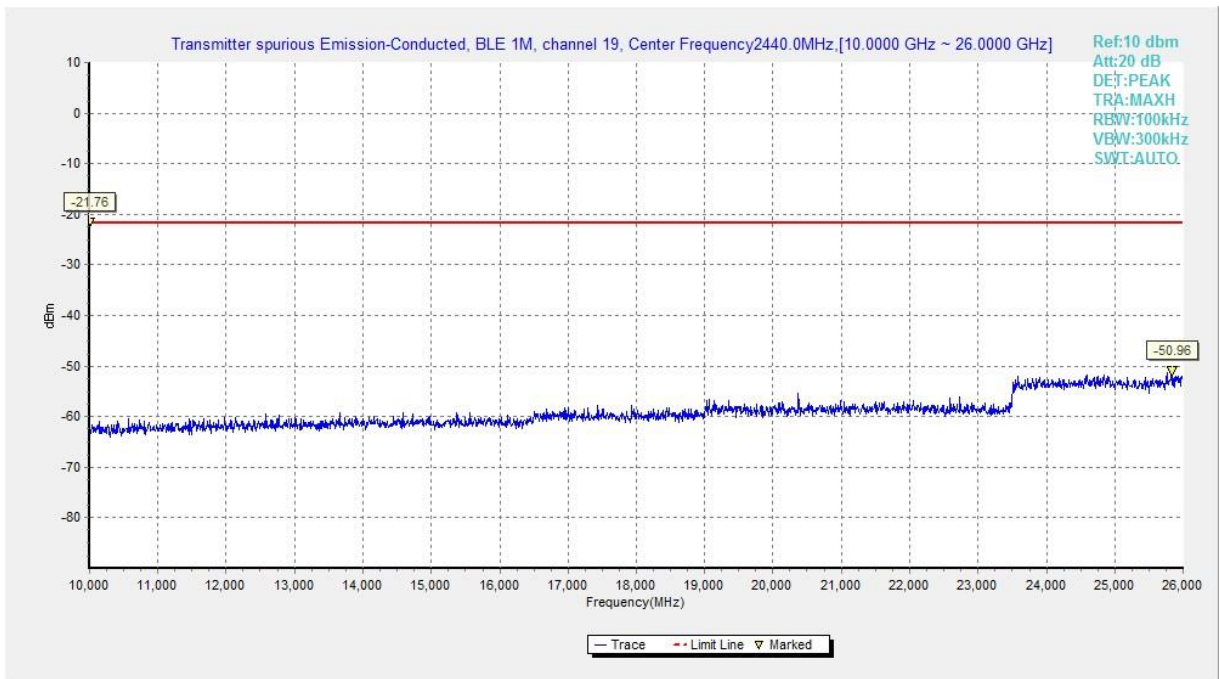
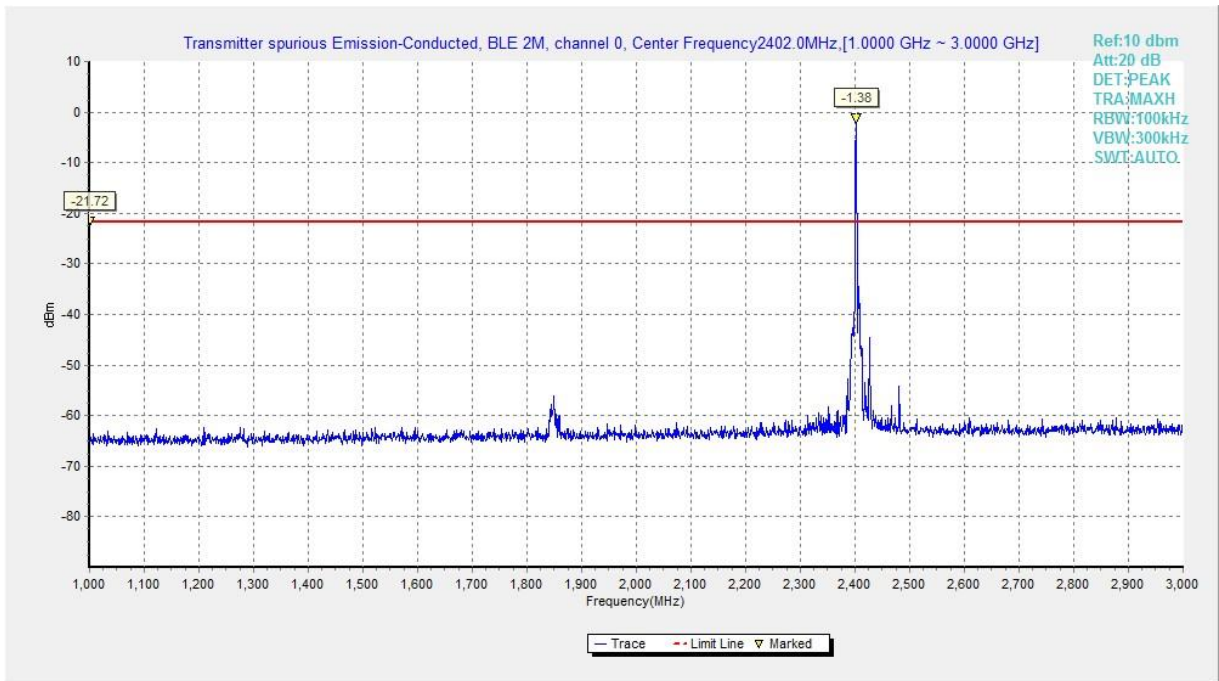
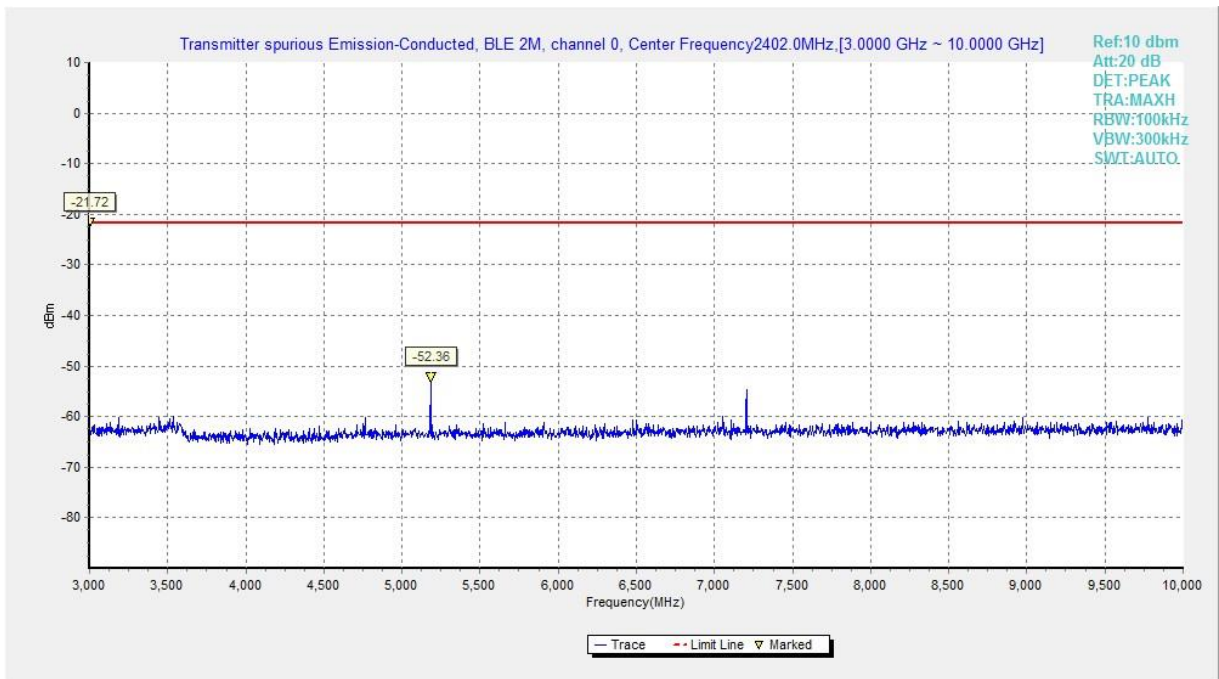


Fig.24 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 1M



**Fig.25 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE 2M**



**Fig.26 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE 2M**

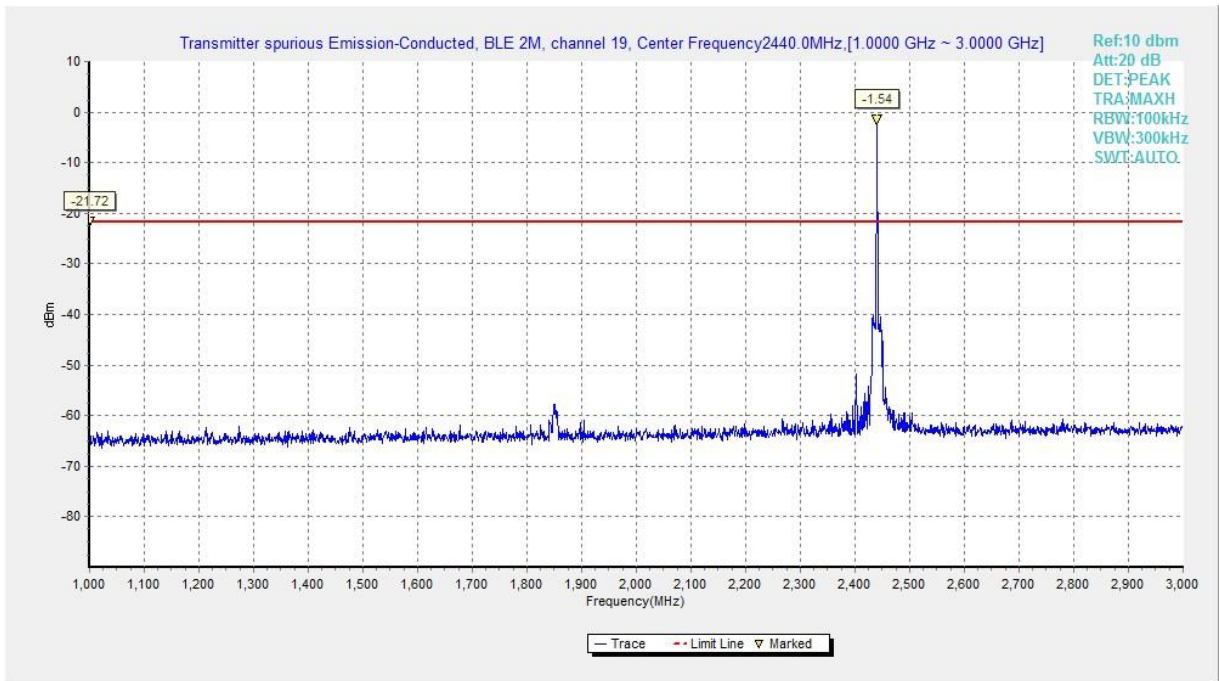


Fig.27 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE 2M

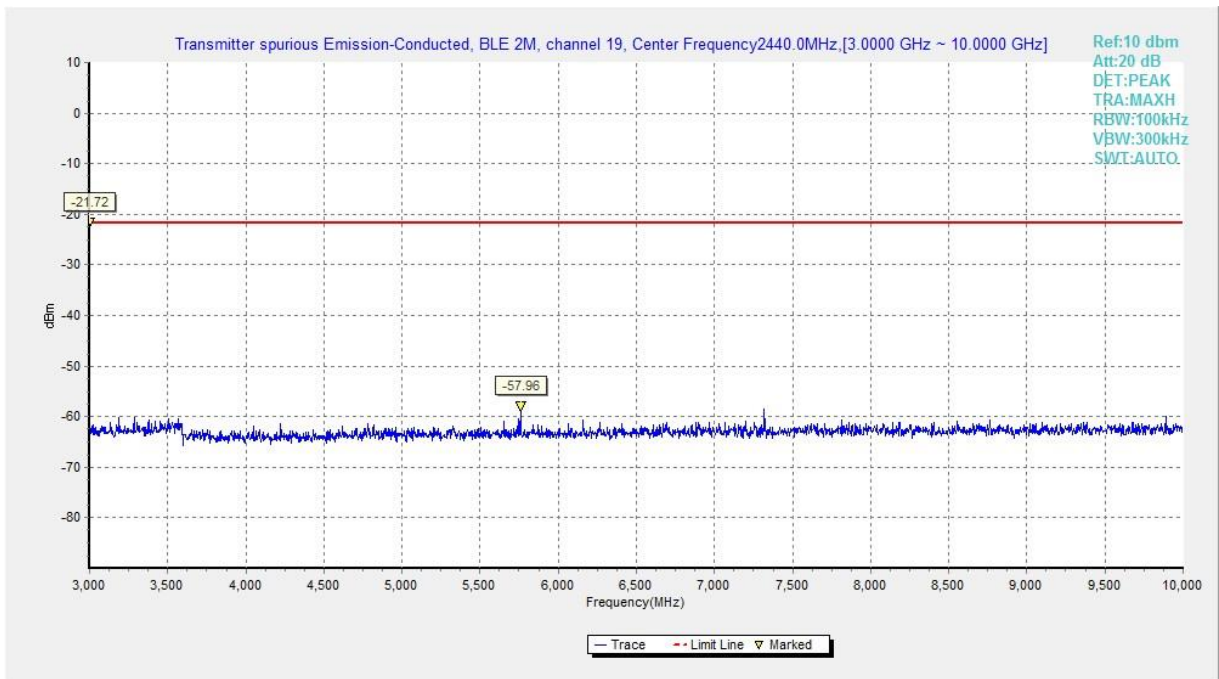
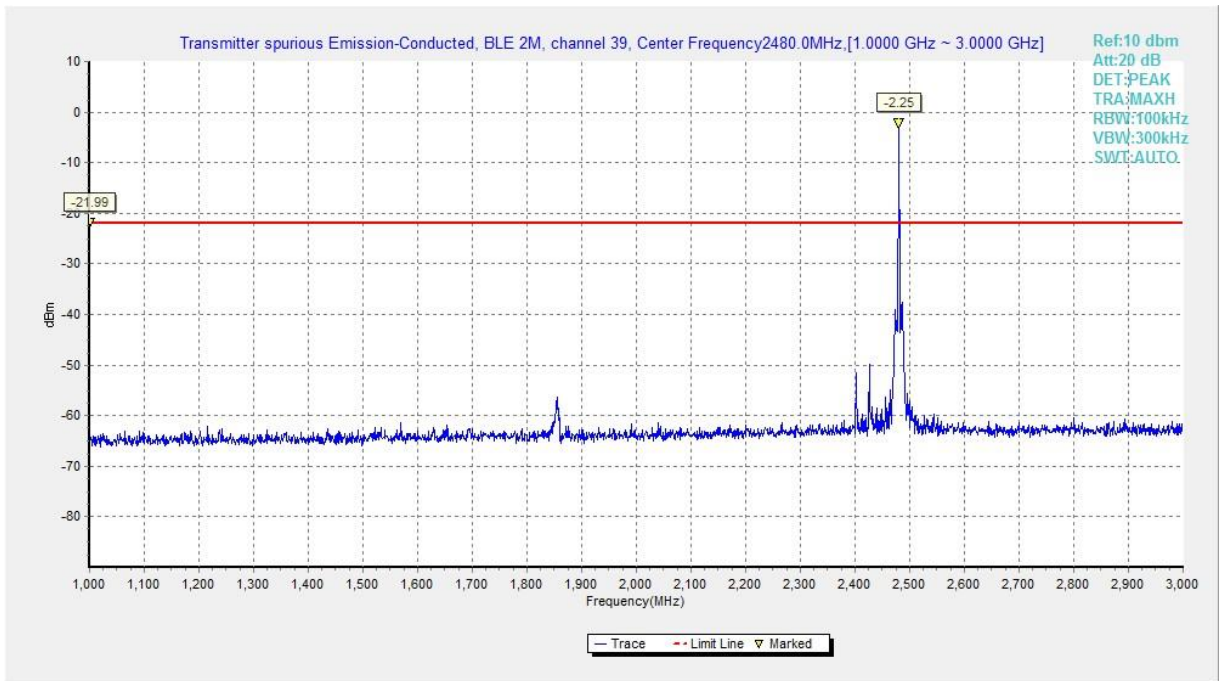
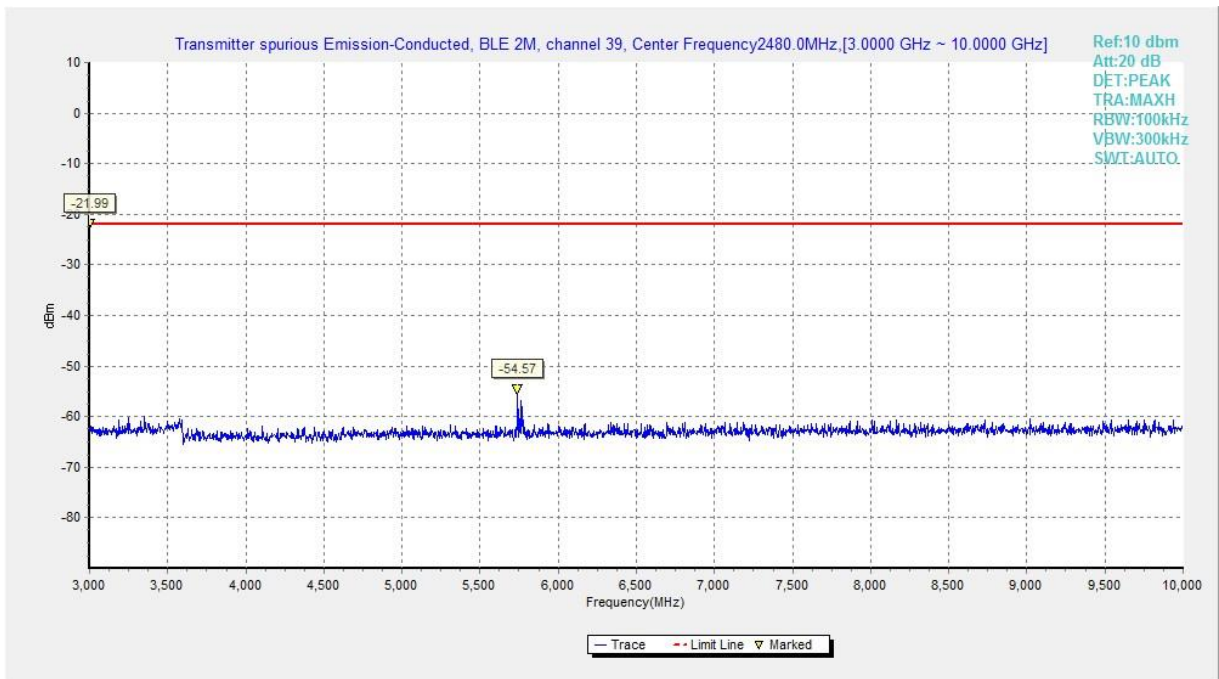


Fig.28 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE 2M



**Fig.29 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 2M**



**Fig.30 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 2M**



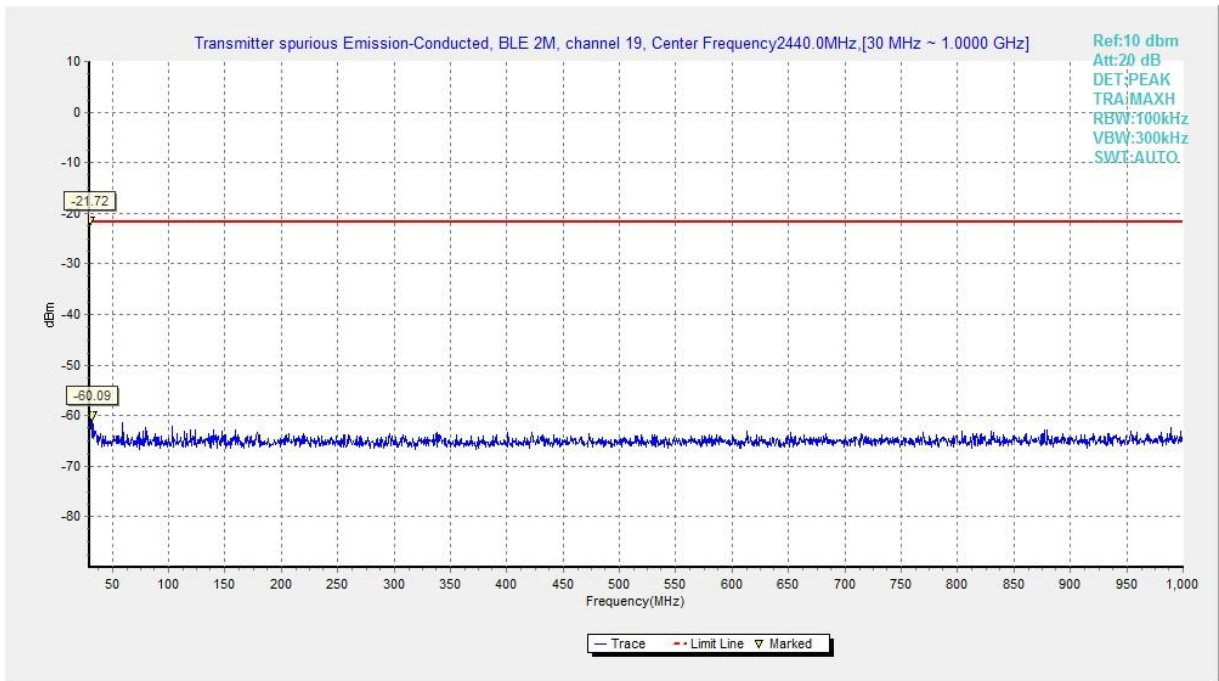


Fig.31 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 2M

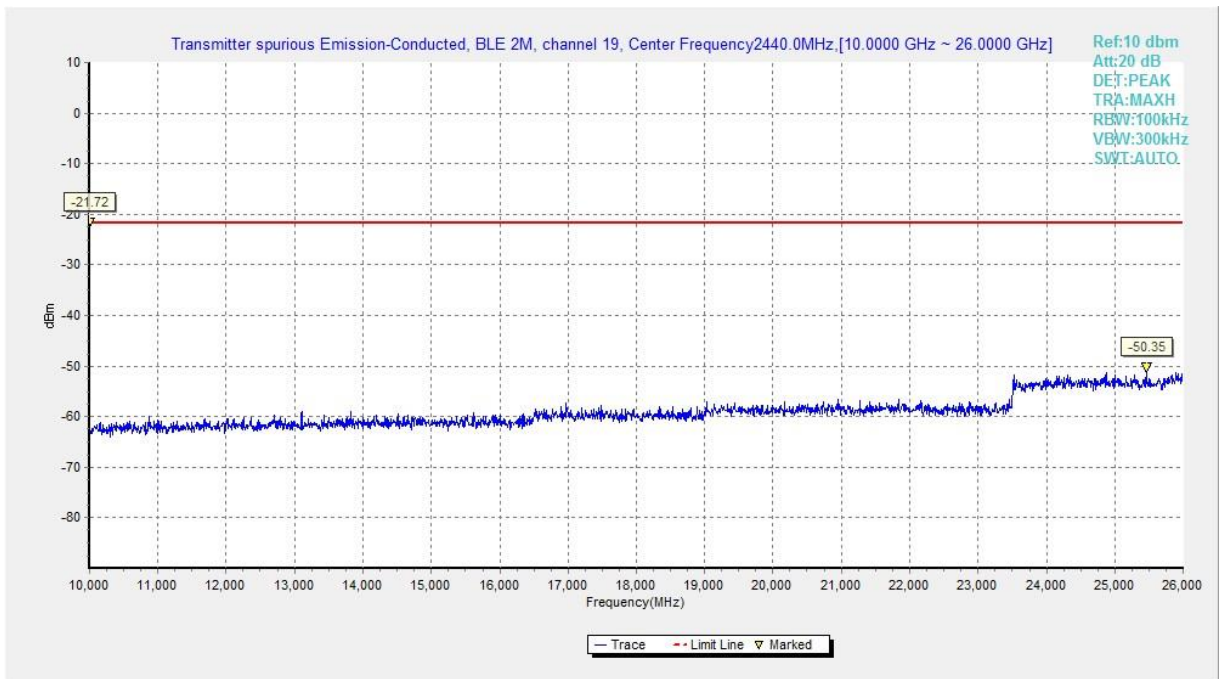


Fig.32 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 2M



**A.6 Transmitter Spurious Emission - Radiated**

**Method of Measurement: See ANSI C63.10-clause 11.11&11.12.**

**Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13	20dB below peak output power

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)).

**Limit in restricted band:**

Frequency of emission (MHz)	Field strength (µV/m)	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

**Test Condition:**

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements.



**Measurement Results:**

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
LE-1M	2402(CH0)	1 GHz ~ 18 GHz	Fig.33	<b>P</b>
	2440(CH19)	9 kHz ~ 30 MHz	Fig.34	<b>P</b>
		30 MHz ~ 1 GHz	Fig.35	<b>P</b>
		1 GHz ~ 18 GHz	Fig.36	<b>P</b>
		18 GHz ~ 26.5 GHz	Fig.37	<b>P</b>
	2480(CH39)	1 GHz ~ 18 GHz	Fig.38	<b>P</b>
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.39	<b>P</b>
Restricted Band (CH39)	2.45 GHz ~ 2.5 GHz	Fig.40	<b>P</b>	
LE-2M	2402(CH0)	1 GHz ~ 18 GHz	Fig.41	<b>P</b>
	2440(CH19)	9 kHz ~ 30 MHz	Fig.42	<b>P</b>
		30 MHz ~ 1 GHz	Fig.43	<b>P</b>
		1 GHz ~ 18 GHz	Fig.44	<b>P</b>
		18 GHz ~ 26.5 GHz	Fig.45	<b>P</b>
	2480(CH39)	1 GHz ~ 18 GHz	Fig.46	<b>P</b>
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.47	<b>P</b>
Restricted Band (CH39)	2.45 GHz ~ 2.5 GHz	Fig.48	<b>P</b>	

See below for test graphs.

Conclusion: Pass

**Worst Case Result**

**LE-1M CH19 (1-18GHz)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4881.750000	48.55	74.00	25.45	H	-0.1
12389.200000	47.21	74.00	26.79	H	8.4
14181.600000	46.55	74.00	27.45	V	8.3
15339.200000	48.50	74.00	25.50	V	10.0
16603.600000	52.18	74.00	21.82	V	13.8
16939.200000	51.55	74.00	22.45	V	14.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4881.750000	40.80	54.00	13.20	H	-0.1
12389.200000	36.69	54.00	17.31	H	8.4
14181.600000	36.87	54.00	17.13	V	8.3
15339.200000	39.02	54.00	14.98	V	10.0
16603.600000	41.29	54.00	12.71	V	13.8
16939.200000	40.71	54.00	13.29	V	14.2



**LE-2M CH19 (1-18GHz)**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
4882.500000	48.22	74.00	25.78	H	-0.1
7322.800000	42.50	74.00	31.50	H	2.4
9511.600000	46.22	74.00	27.78	V	4.2
15198.400000	49.37	74.00	24.63	V	9.8
16603.600000	51.37	74.00	22.63	H	13.8
17880.400000	52.10	74.00	21.90	V	15.7

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
4882.500000	42.92	54.00	11.08	H	-0.1
7322.800000	34.07	54.00	19.93	H	2.4
9511.600000	33.62	54.00	20.38	V	4.2
15198.400000	38.54	54.00	15.46	V	9.8
16603.600000	40.96	54.00	13.04	H	13.8
17880.400000	41.55	54.00	12.45	V	15.7

**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss.  $P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor} - \text{Gain of the preamplifier}$$



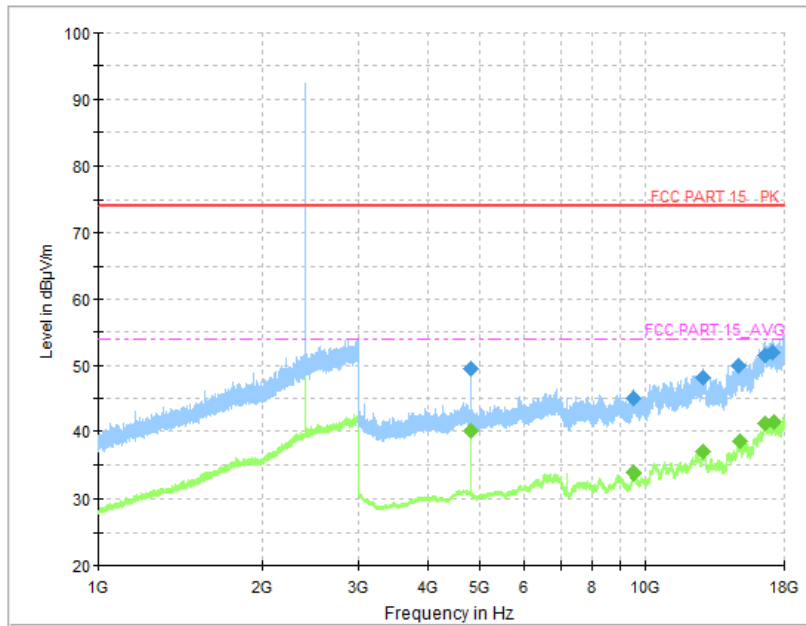


Fig.33 Radiated Spurious Emission (Ch0, 1 GHz - 18 GHz), 1M

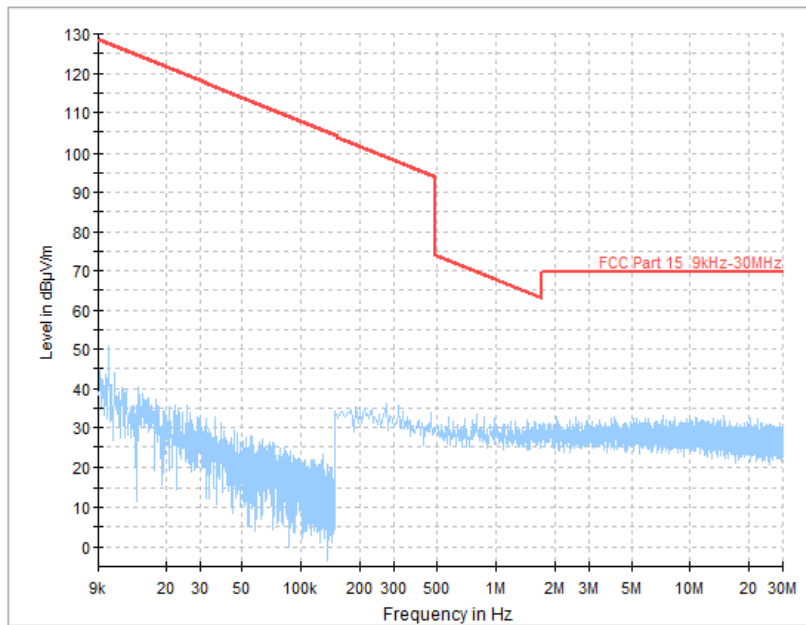


Fig.34 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), 1M

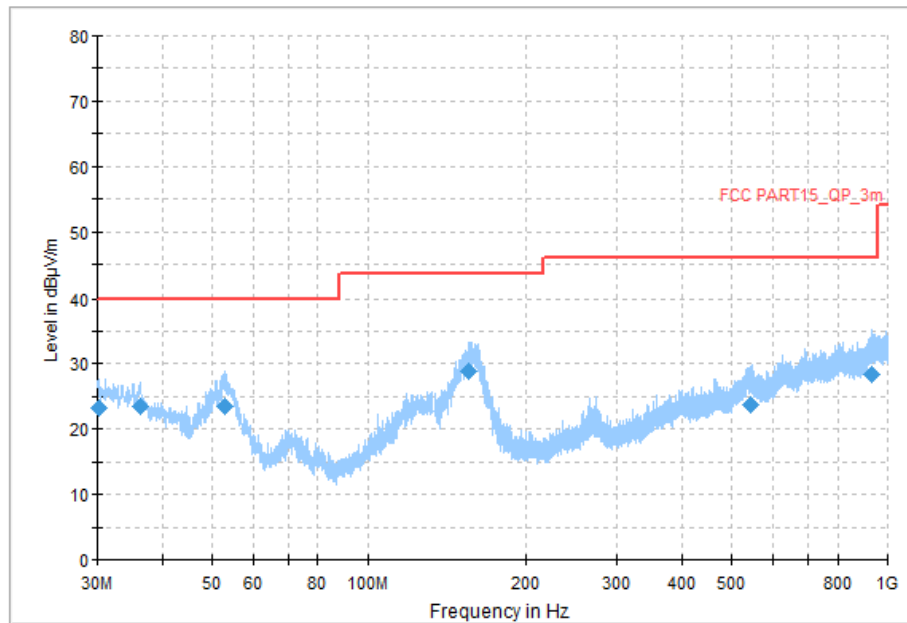


Fig.35 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), 1M

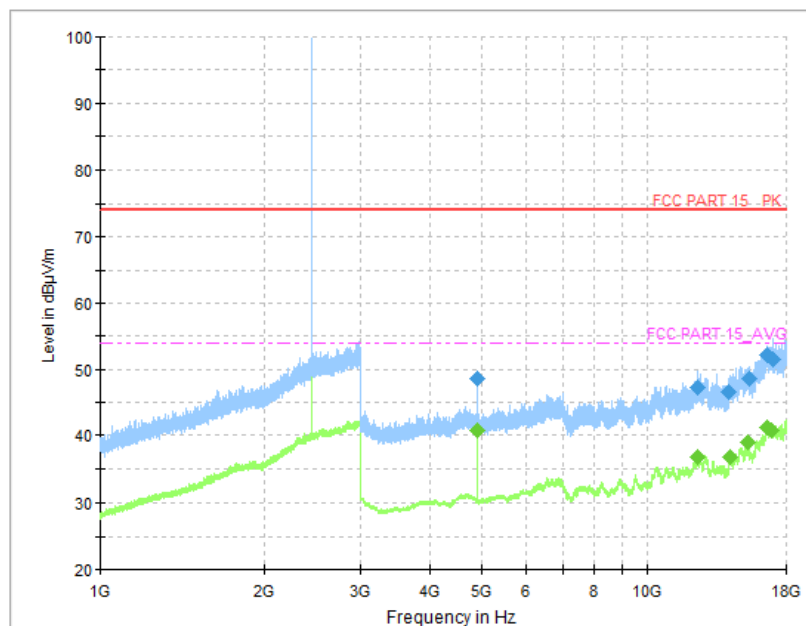


Fig.36 Radiated Spurious Emission (Ch19, 1 GHz - 18 GHz), 1M

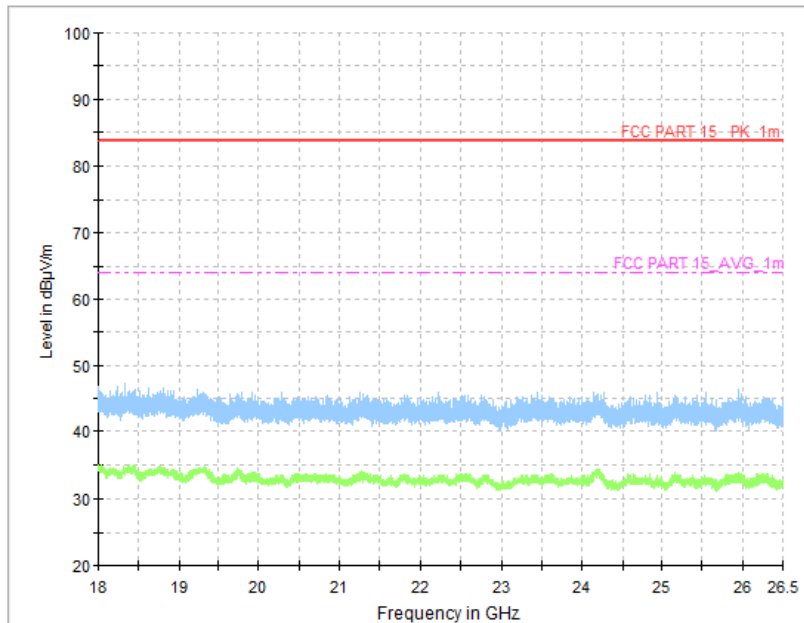


Fig.37 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), 1M

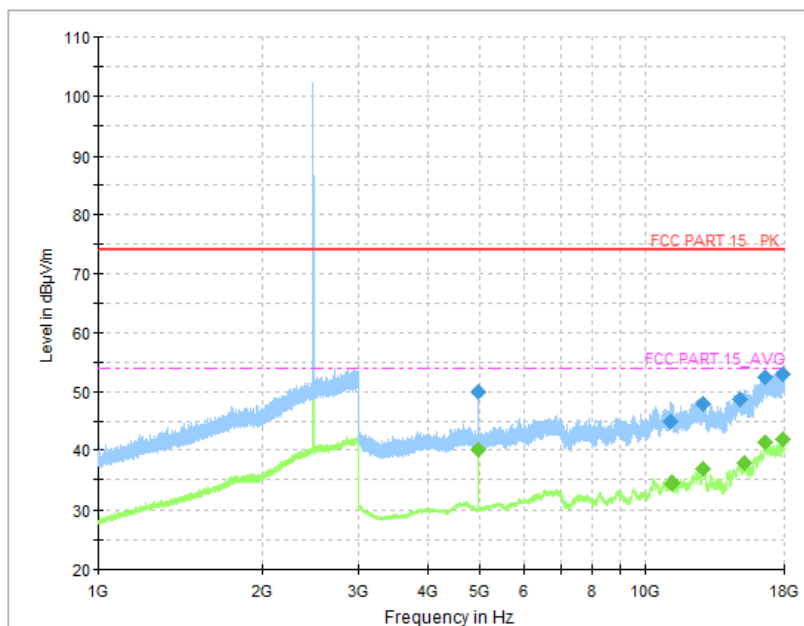
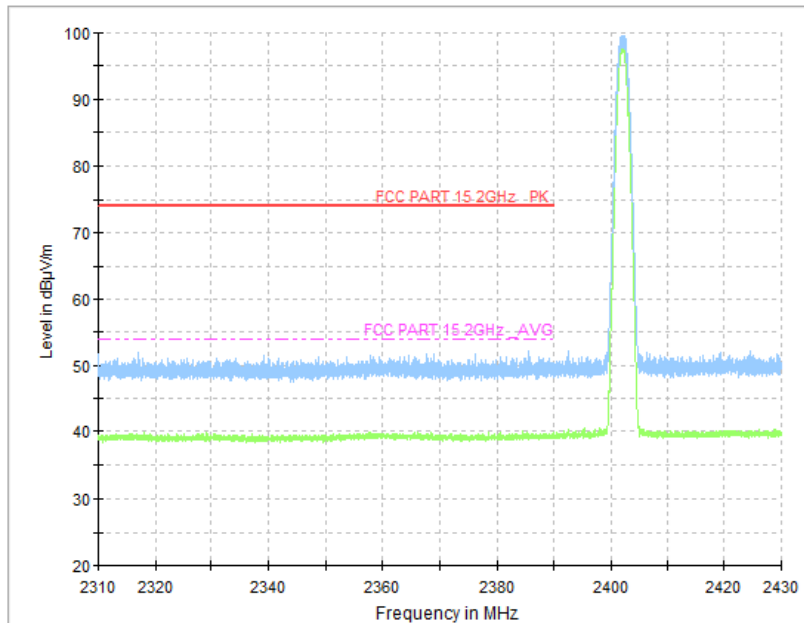
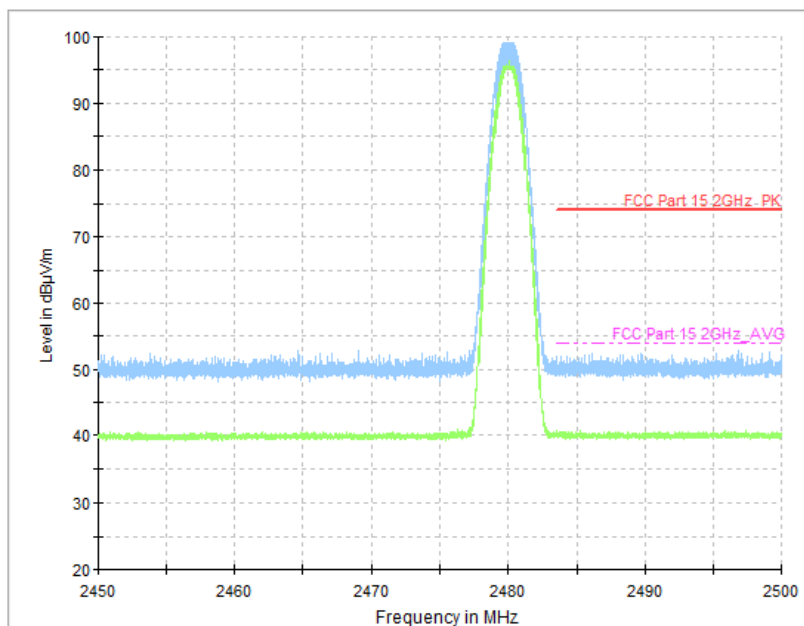


Fig.38 Radiated Spurious Emission (Ch39, 1 GHz - 18 GHz), 1M



**Fig.39 Radiated Band Edges (Ch0, 2.380GHz - 2.450GHz), 1M**



**Fig.40 Radiated Band Edges (Ch39, 2.450GHz - 2.500GHz), 1M**

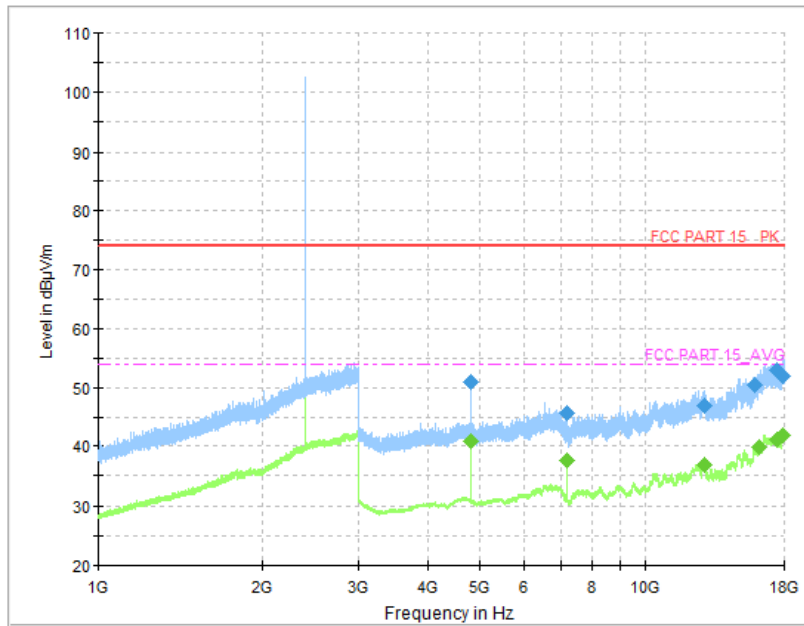


Fig.41 Radiated Spurious Emission (Ch0, 1 GHz - 18 GHz), 2M

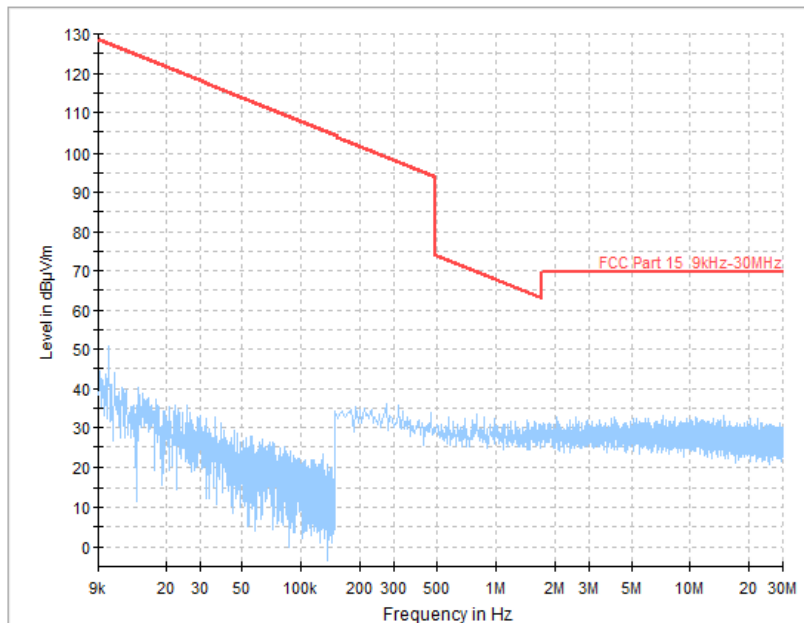


Fig.42 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), 2M

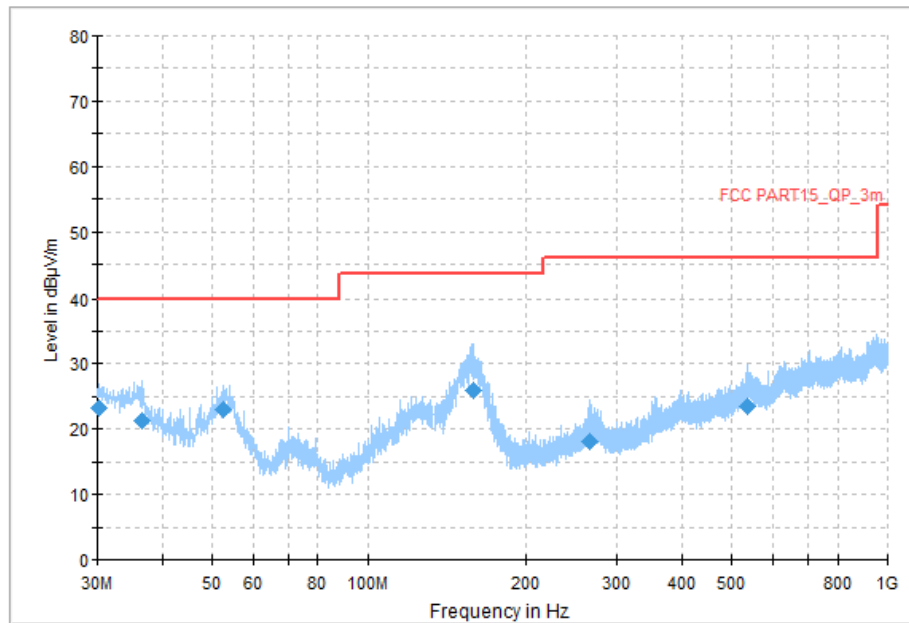


Fig.43 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), 2M

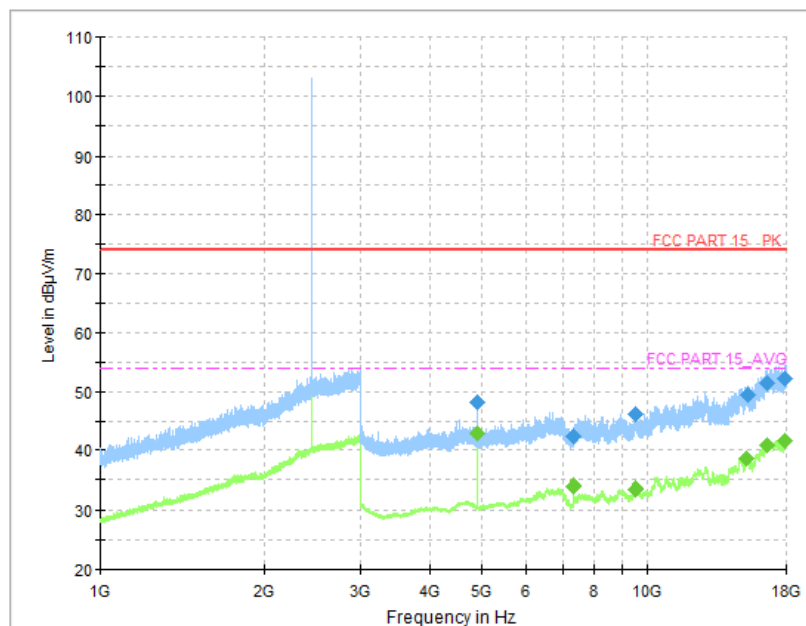


Fig.44 Radiated Spurious Emission (Ch19, 1 GHz - 18 GHz), 2M

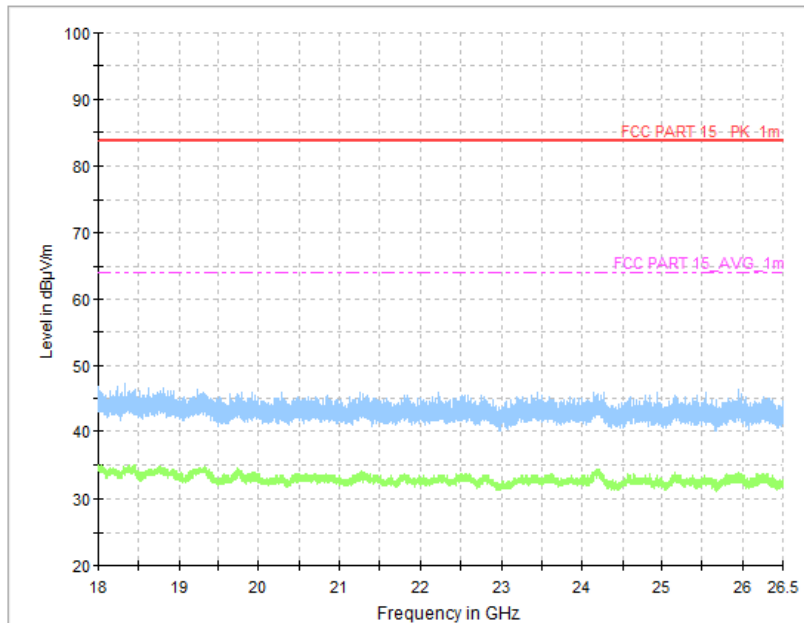


Fig.45 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), 2M

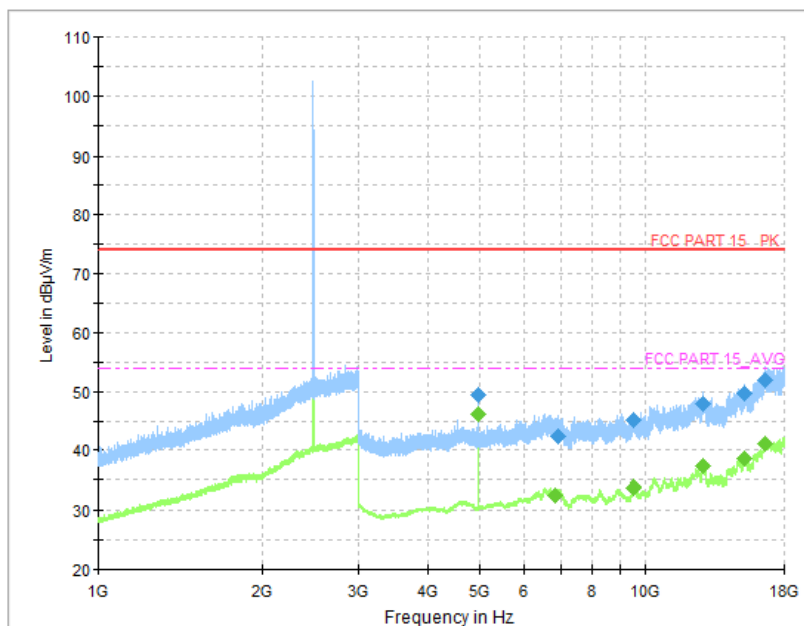


Fig.46 Radiated Spurious Emission (Ch39, 1 GHz - 18 GHz), 2M

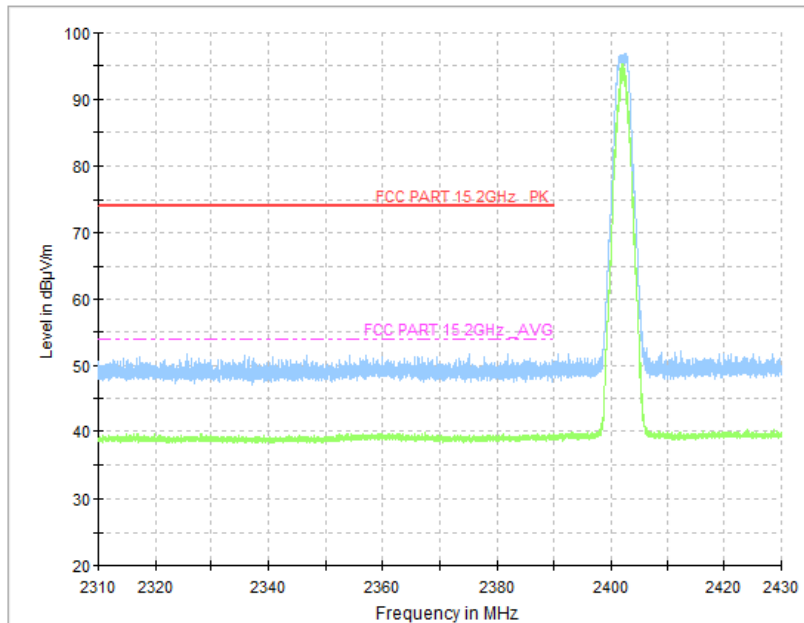


Fig.47 Radiated Band Edges (Ch0, 2.380GHz - 2.450GHz), 2M

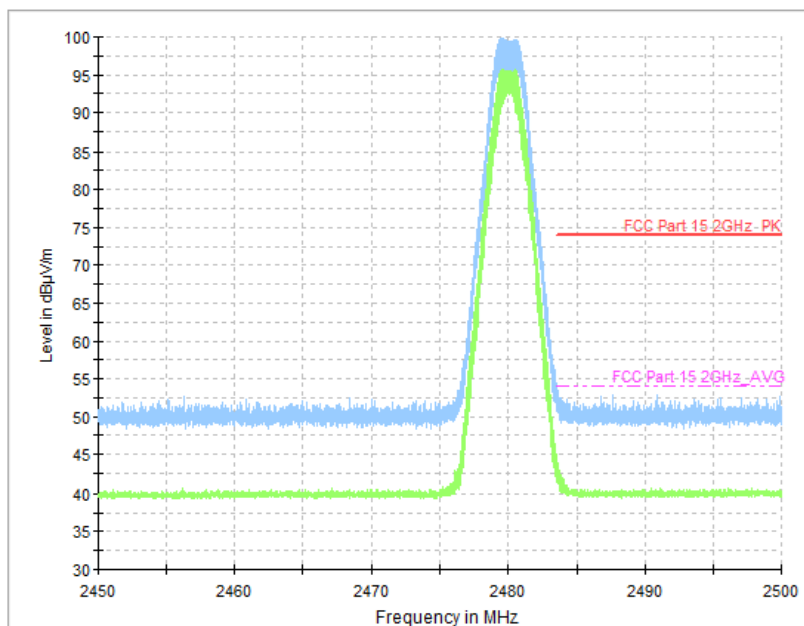


Fig.48 Radiated Band Edges (Ch39, 2.450GHz - 2.500GHz), 2M





### A.7 AC Power line Conducted Emission

Method of Measurement: See ANSI C63.10-clause 6.2.

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Average-peak Limit (dBµV)	Result (dBµV)		Conclusion
			Traffic	Idle	
0.15 to 0.5	66 to 56	56 to 46	Fig.49	Fig.50	<b>P</b>
0.5 to 5	56	46			
5 to 30	60	50			

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

Note: The measurement results include the L1 and N measurements.

See below for test graphs.

Conclusion: Pass

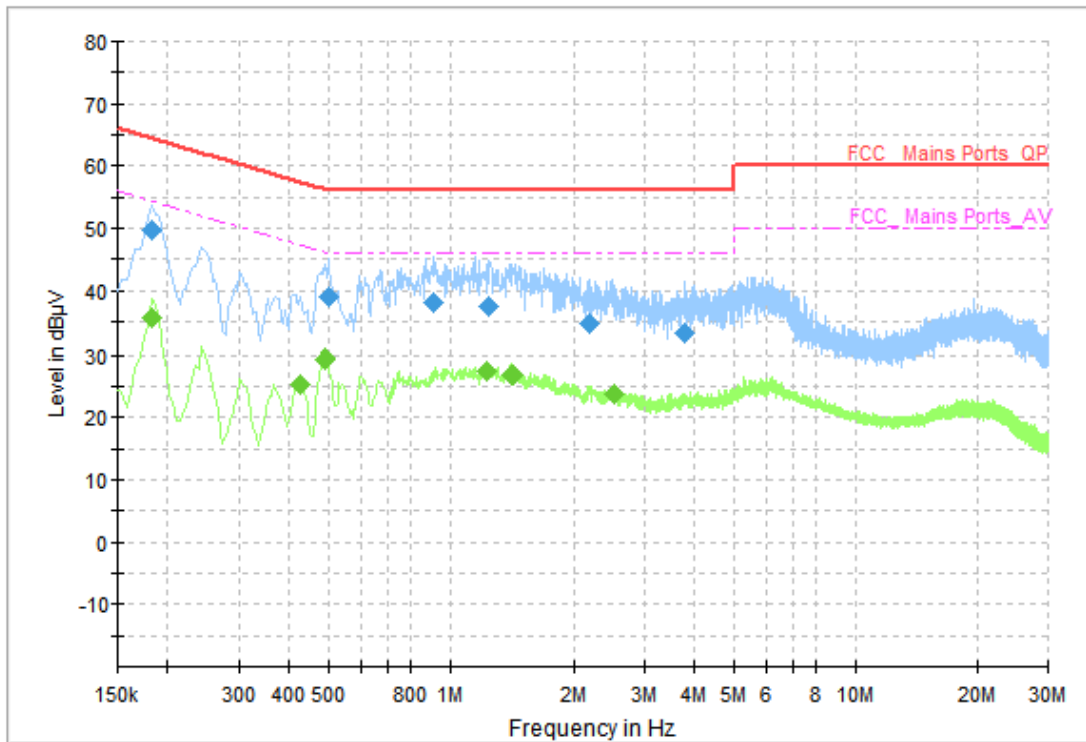


Fig.49 AC Power line Conducted Emission (Traffic, 120V), 1M

**Measurement Results: Quasi Peak**

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	49.66	64.39	14.73	N	ON	10
0.498000	38.97	56.03	17.06	N	ON	10
0.914000	37.96	56.00	18.04	N	ON	10
1.250000	37.40	56.00	18.60	N	ON	10
2.202000	34.67	56.00	21.33	N	ON	10
3.770000	33.09	56.00	22.91	N	ON	10

**Measurement Results: Average**

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	35.79	54.39	18.61	N	ON	10
0.426000	25.24	47.33	22.09	L1	ON	10
0.490000	29.18	46.17	16.99	N	ON	10
1.230000	27.39	46.00	18.61	N	ON	10
1.426000	26.68	46.00	19.32	N	ON	11
2.526000	23.70	46.00	22.30	N	ON	10

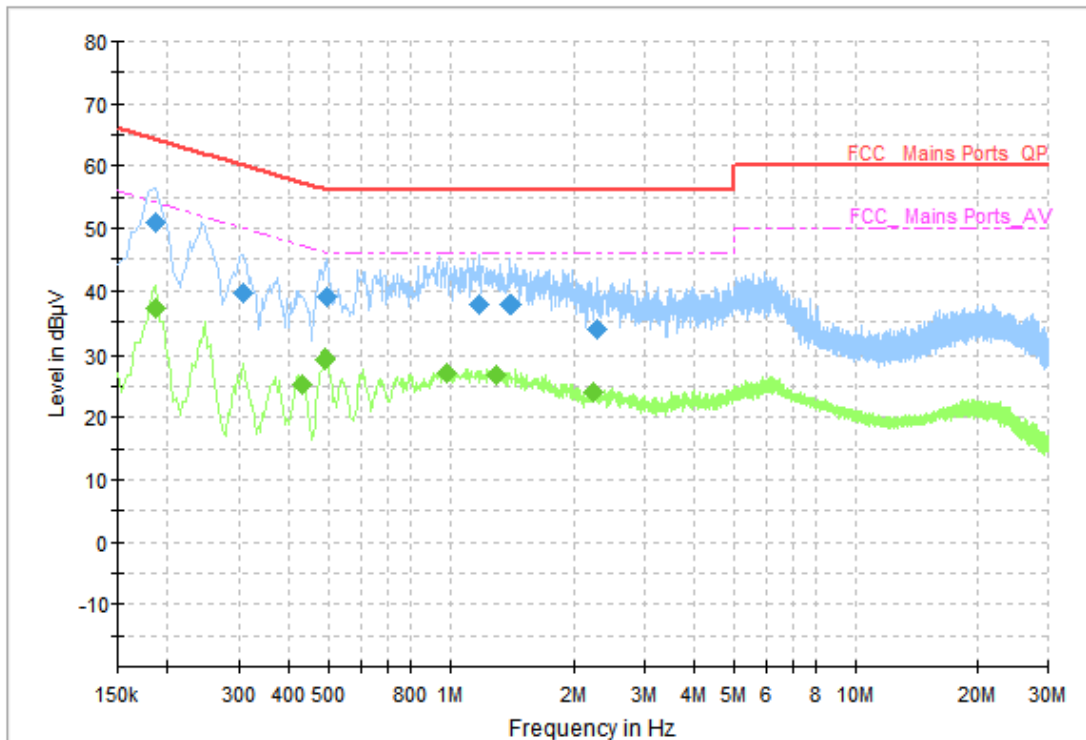


Fig.50 AC Power line Conducted Emission (Idle, 120V), 1M

**Measurement Results: Quasi Peak**

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	50.94	64.21	13.27	N	ON	10
0.306000	39.53	60.08	20.55	N	ON	10
0.494000	39.05	56.10	17.05	N	ON	10
1.182000	37.67	56.00	18.33	N	ON	10
1.402000	37.67	56.00	18.33	N	ON	10
2.294000	33.93	56.00	22.07	N	ON	10

**Measurement Results: Average**

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	37.28	54.21	16.93	N	ON	10
0.430000	25.13	47.25	22.13	L1	ON	10
0.490000	29.10	46.17	17.07	N	ON	10
0.986000	27.24	46.00	18.76	N	ON	10
1.302000	26.88	46.00	19.12	N	ON	11
2.242000	23.89	46.00	22.11	N	ON	10

### A.8 99% Occupied Bandwidth

Method of Measurement: See RSS-Gen Issue 5-clause 6.7.

Measurement Limit:

Standard	Limit
RSS-Gen section 6.7	/

Measurement Result:

Mode	Frequency (MHz)	Test Results (kHz)		Conclusion
LE-1M	2402 (CH0)	Fig.51	1024.00	<b>P</b>
	2440 (CH19)	Fig.52	1029.00	<b>P</b>
	2480 (CH39)	Fig.53	1029.00	<b>P</b>
LE-2M	2402 (CH0)	Fig.54	2032.00	<b>P</b>
	2440 (CH19)	Fig.55	2042.00	<b>P</b>
	2480 (CH39)	Fig.56	2023.00	<b>P</b>

See below for test graphs.

Conclusion: **PASS**

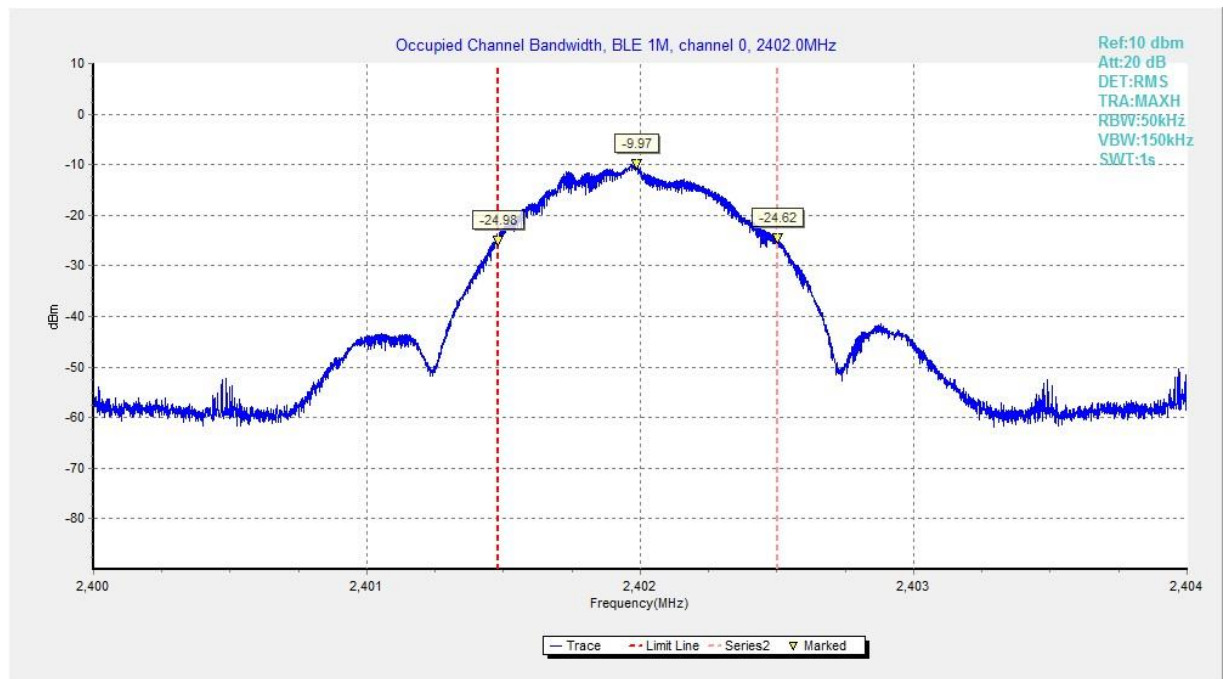


Fig.51 99% Occupied Bandwidth (Ch 0), LE 1M



Fig.52 99% Occupied Bandwidth (Ch 19), LE 1M

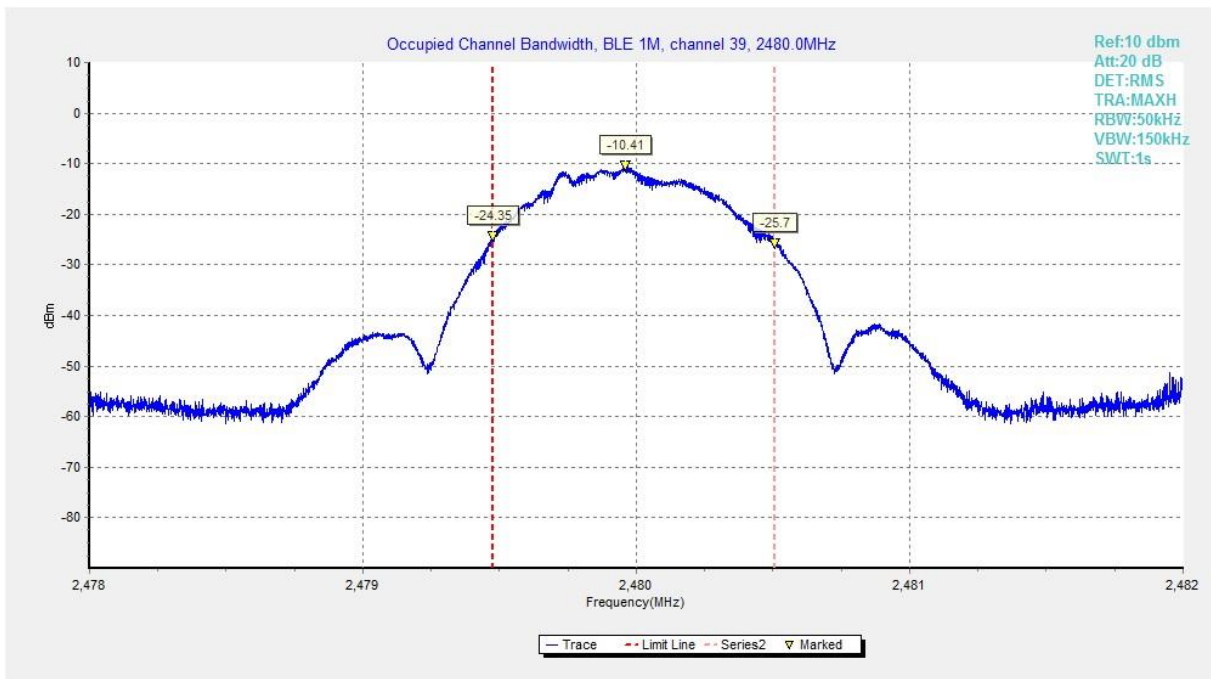


Fig.53 99% Occupied Bandwidth (Ch 39), LE 1M

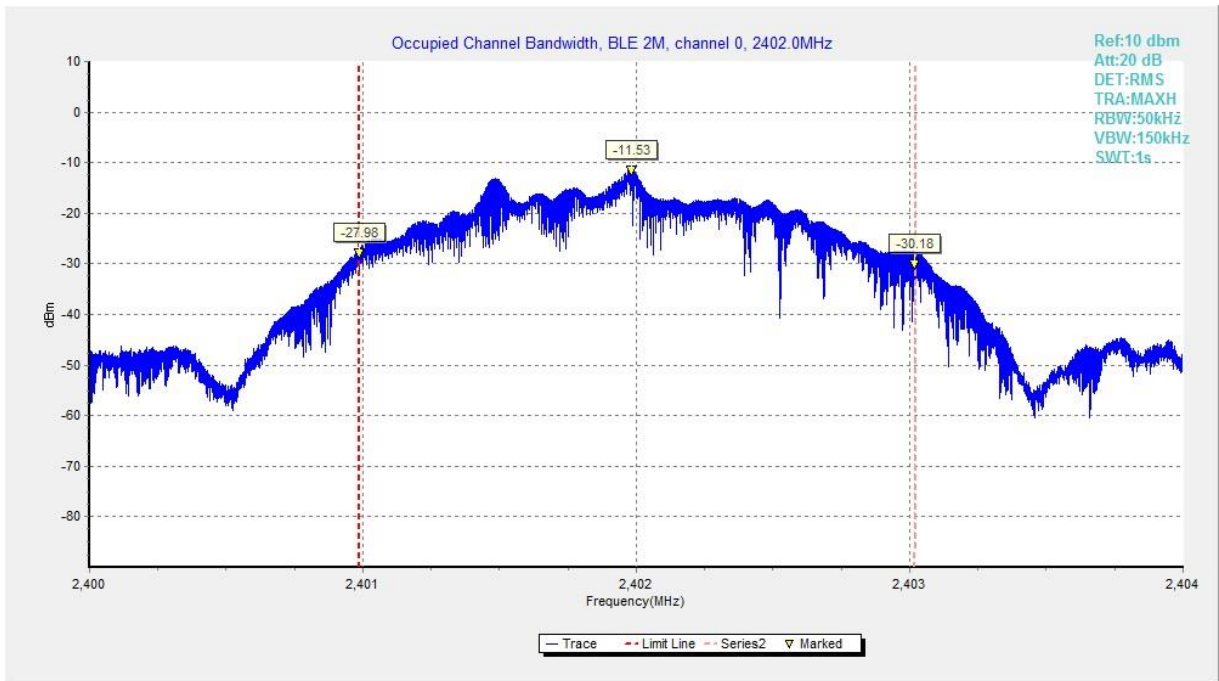


Fig.54 99% Occupied Bandwidth (Ch 0), LE 2M

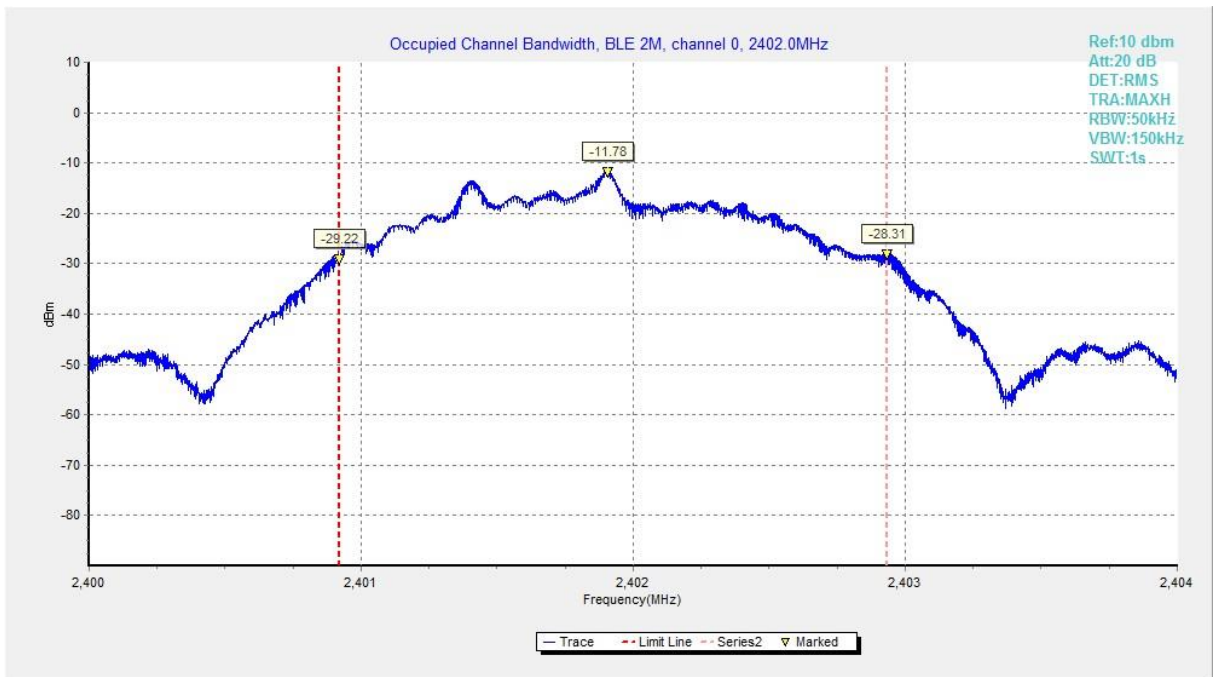


Fig.55 99% Occupied Bandwidth (Ch 19), LE 2M

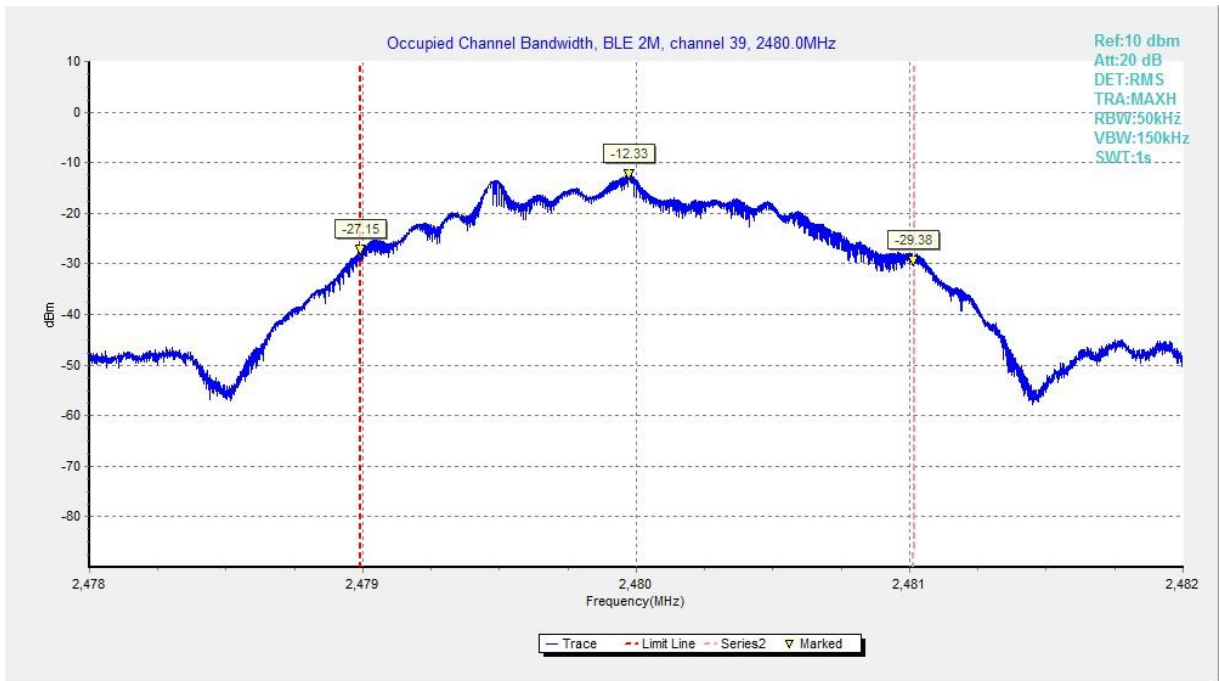


Fig.56 99% Occupied Bandwidth (Ch 39), LE 2M

\*\*\*END OF REPORT\*\*\*