TEST REPORT

No. I20N03206-BLE

for

TCL Communication Ltd.

LTE/WCDMA/GSM mobile phone

Model Name: 4063F/4163F

with

Hardware Version: V1.0

Software Version: 8K16

FCC ID: 2ACCJB143

Issued Date: 2021-01-27

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.

Test Laboratory:

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1. Summary of Test Report

1.1. Test Items

Description	LTE/WCDMA/GSM mobile phone
Model Name	4063F/4163F
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

FCC Part15-2019; ANSI C63.10-2013

1.3. Test Result

Pass

1.4. Testing Location

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

1.5. Project data

Testing Start Date:	2020-12-14
Testing End Date:	2020-01-21

1.6. Signature

Lin Zechuang

(Prepared this test report)

Tang Weisheng

(Reviewed this test report)

Zhang Bojun

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	LTE/WCDMA/GSM mobile phone
Model Name	4063F/4163F
Frequency Range	2400MHz~2483.5MHz
Type of Modulation	GFSK
Number of Channels	40
Antenna Type	Integrated
Antenna Gain	-1.0dBi
Power Supply	3.85V DC by Battery
FCC ID	2ACCJB143
Condition of EUT as received	No abnormality in appearance

Note1: According to the customer's description, 4063F/4163F is a variant of 4063A.
The differences between them are as follows:

Model	4063A	4063F/4163F
Memory	32GB+1GB	32GB+2GB
Rear camera	8M	13M+2M

These differences do not affect the following test cases. All results were from the initial model. The initial model report number is I20N03205-BLE.
Note2: 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

EUT ID*	IMEI	HW Version	SW Version	Receive Date
UT08aa	351656200001042	V1.0	8K16	2020-12-14
UT01aa	351656200001158	V1.0	8K16	2020-12-15
UT03aa	351656200001166	V1.0	8K16	2020-12-15

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Battery	CAB2880000C7
AE2	Charger	/
AE3	Date Cable	/
AE4	Headset	/

AE1

Model	TLi028C7
Manufacturer	VEKEN
Capacity	2880mAh

Nominal Voltage	3.85V
AE2	
Model	UC11US
Manufacturer	puan
AE3	
Model	CDA3122005C2
Manufacturer	SHENGHUA
AE4	
Model	CCB0046A15C1
Manufacturer	DALIN

*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 LTE/WCDMA/GSM mobile phone with integrated antenna and battery.

It consists of normal options: Lithium Battery, Charger, USB Cable and Headset.

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.

Reference	Title	Version
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	2019
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

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	Verdict
0	Antenna Requirement	15.203	**P**
1	Maximum Peak Output Power	15.247 (b)	**P**
2	Peak Power Spectral Density	15.247 (e)	**P**
3	Occupied 6dB Bandwidth	15.247 (a)	**P**
4	Band Edges Compliance	15.247 (d)	**P**
5	Transmitter Spurious Emission - Conducted	15.247 (d)	**P**
6	Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	**P**
7	AC Power line Conducted Emission	15.107, 15.207	**P**

See **ANNEX A** for details.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer 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.

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	2021-12-30	1 year
2	Test Receiver	ESCI	100701	Rohde & Schwarz	2021-08-09	1 year
3	LISN	ENV216	102067	Rohde & Schwarz	2021-07-16	1 year

Radiated emission test system

NO.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 years
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2021-05-17	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 years
4	Test Receiver	ESR7	101676	Rohde & Schwarz	2021-11-25	1 year
5	Spectrum Analyser	FSV40	101192	Rohde & Schwarz	2021-01-14	1 year
6	Chamber	FACT3-2.0	1285	ETS-Lindgren	2021-07-19	2 years
7	Horn Antenna	QSH-SL-18-26-S-20	17013	Q-par	2023-01-06	3 years

Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	8.53.0
3	EMC32	Rohde & Schwarz	10.01.00

The path loss value of conduction test is automatically compensated by the test system.
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

Semi-anechoic chambe

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	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz

Shielded room

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

Fully-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	> 2MΩ
Ground system resistance	< 4 Ω
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. RF Output Power - Conducted	1.32dB	
2.Power Spectral Density - Conducted	2.32dB	
3.Occupied channel bandwidth - Conducted	66Hz	
4 Transmitter Spurious Emission - Conducted	30MHz≤f≤1GHz	1.41dB
	1GHz≤f≤7GHz	1.92dB
	7GHz≤f≤13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
5. Transmitter Spurious Emission - Radiated	9kHz≤f≤30MHz	1.74dB
	30MHz≤f≤1GHz	4.84dB
	1GHz≤f≤18GHz	4.68dB
	18GHz≤f≤40GHz	3.76dB
6. AC Power line Conducted Emission	150kHz≤f≤30MHz	3.00dB

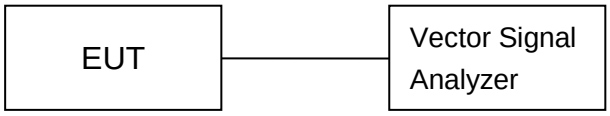
ANNEX A: Detailed Test Results

Test Configuration

The measurement is made according to ANSI C63.10.

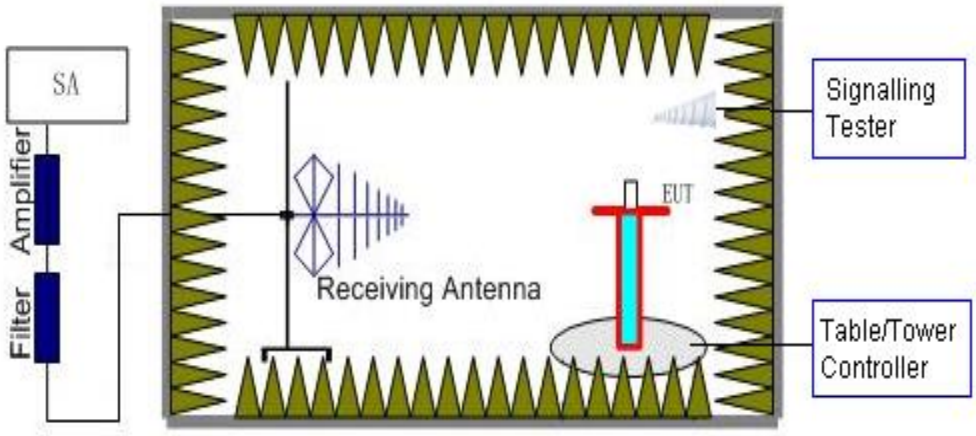
1) Conducted Measurements

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.



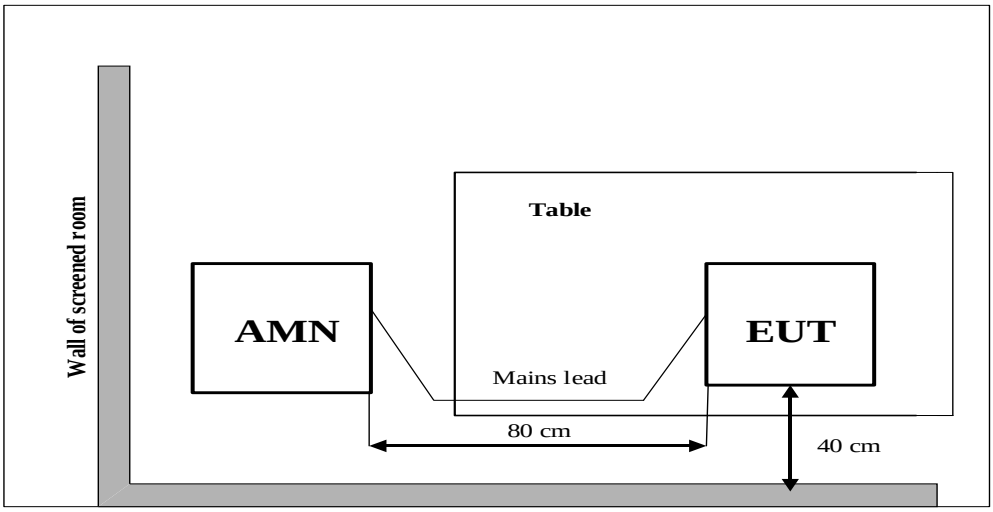
2) Radiated Measurements

Test setup: EUT was placed on a 1.5 meter high non-conductive table at a 3 meter test distance from the receive antenna. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiving antenna polarization.



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 -1.0dBi.

The RF transmitter uses an integrate antenna without connector.

A.1 Maximum Peak Output Power

Method of Measurement: See ANSI C63.10-clause 11.9.1.1

Use the following spectrum analyzer settings:

a) Set the RBW = 3 MHz.

b) Set VBW = 10 MHz.

c) Set span = 10 MHz.

d) Sweep time = auto couple.

e) Detector = peak.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use peak marker function to determine the peak amplitude level.

Measurement Limit:

Standard	Limit (dBm)
FCC 47 CRF Part 15.247(b)	< 30

Measurement Results:

Mode	Frequency (MHz)	Peak Conducted Output Power（dBm）		Conclusion
LE 1M	2402(CH0)	Fig.1	-4.10	**P**
	2440(CH19)	Fig.2	-3.70	**P**
	2480(CH39)	Fig.3	-3.36	**P**
LE 2M	2402(CH0)	Fig.4	-4.19	**P**
	2440(CH19)	Fig.5	-3.85	**P**
	2480(CH39)	Fig.6	-3.44	**P**

See below for test graphs.

Conclusion: Pass

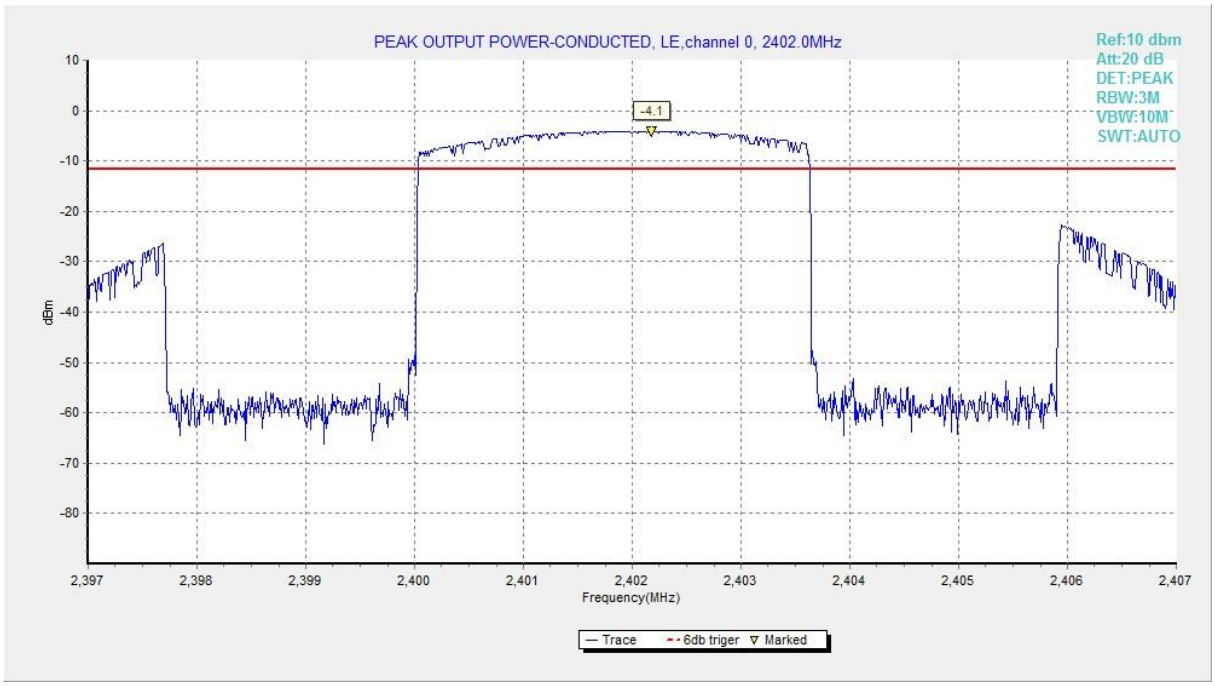


Fig.1 Peak Conducted Output Power (Ch 0), LE 1M

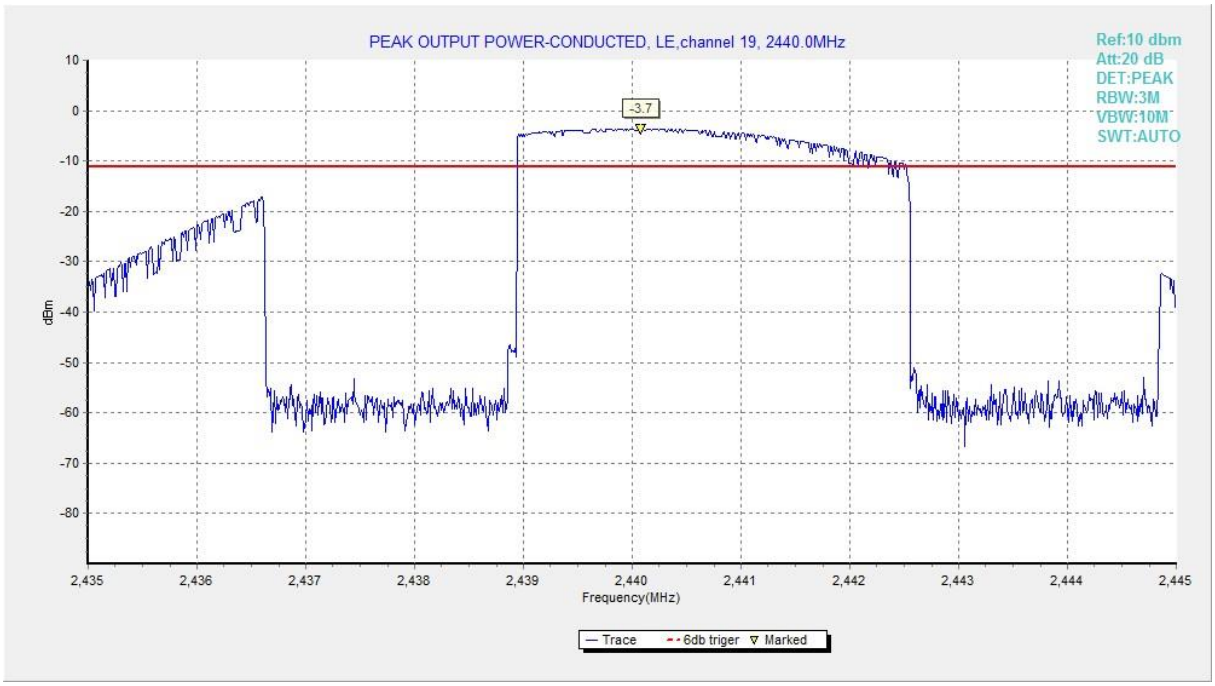


Fig.2 Peak Conducted Output Power (Ch 19), LE 1M

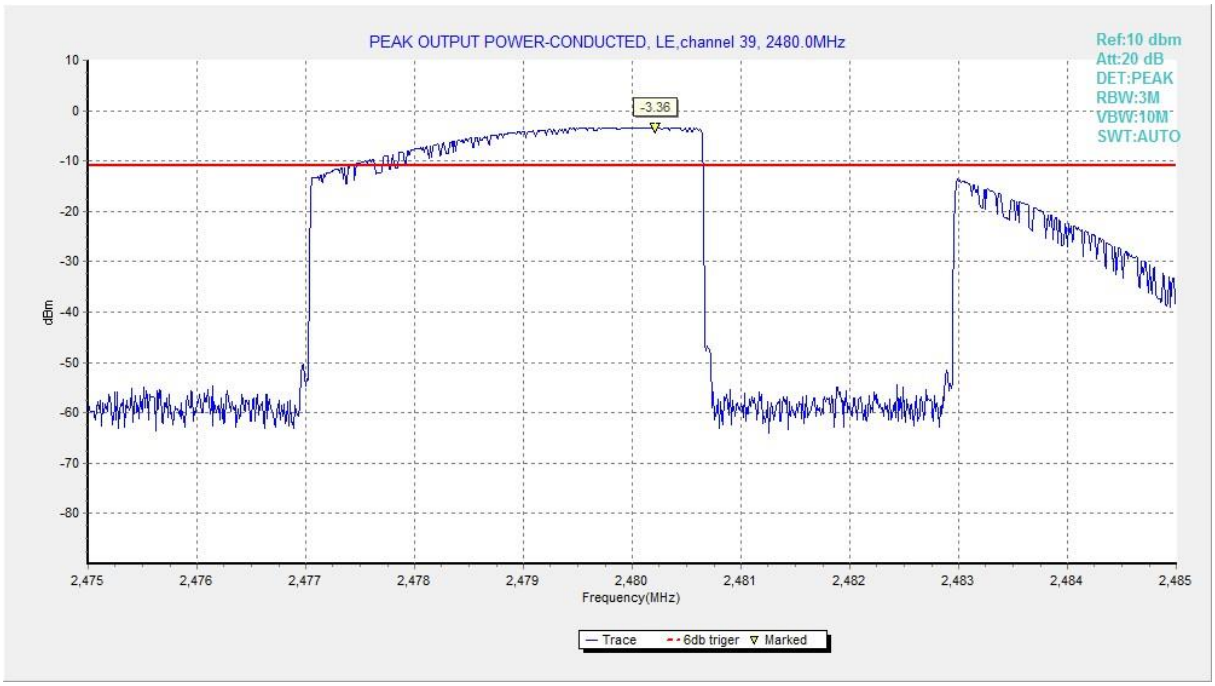


Fig.3 Peak Conducted Output Power (Ch 39), LE 1M

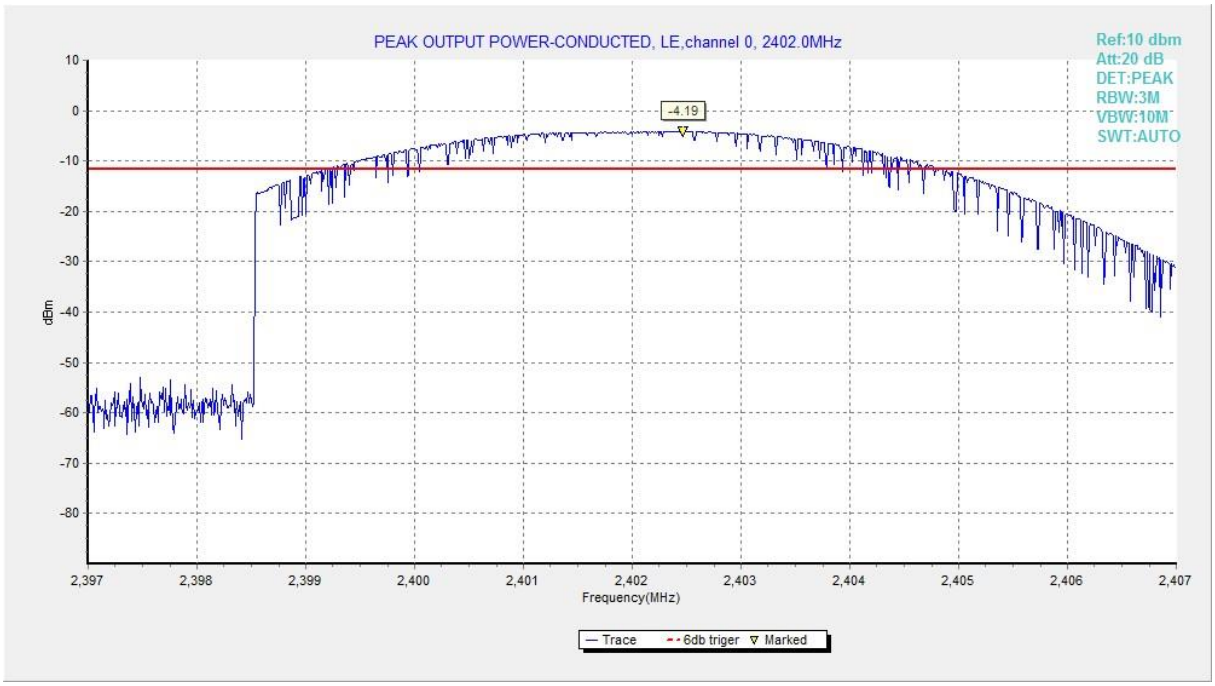


Fig.4 Peak Conducted Output Power (Ch 0), LE 2M

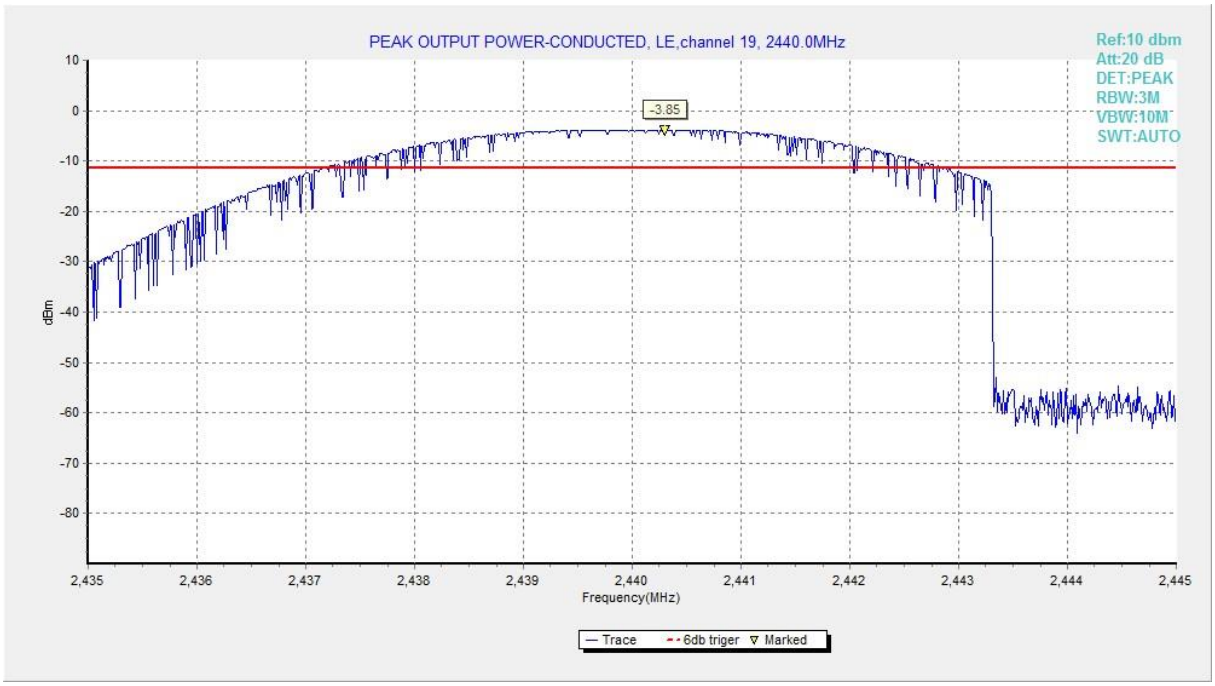


Fig.5 Peak Conducted Output Power (Ch 19), LE 2M

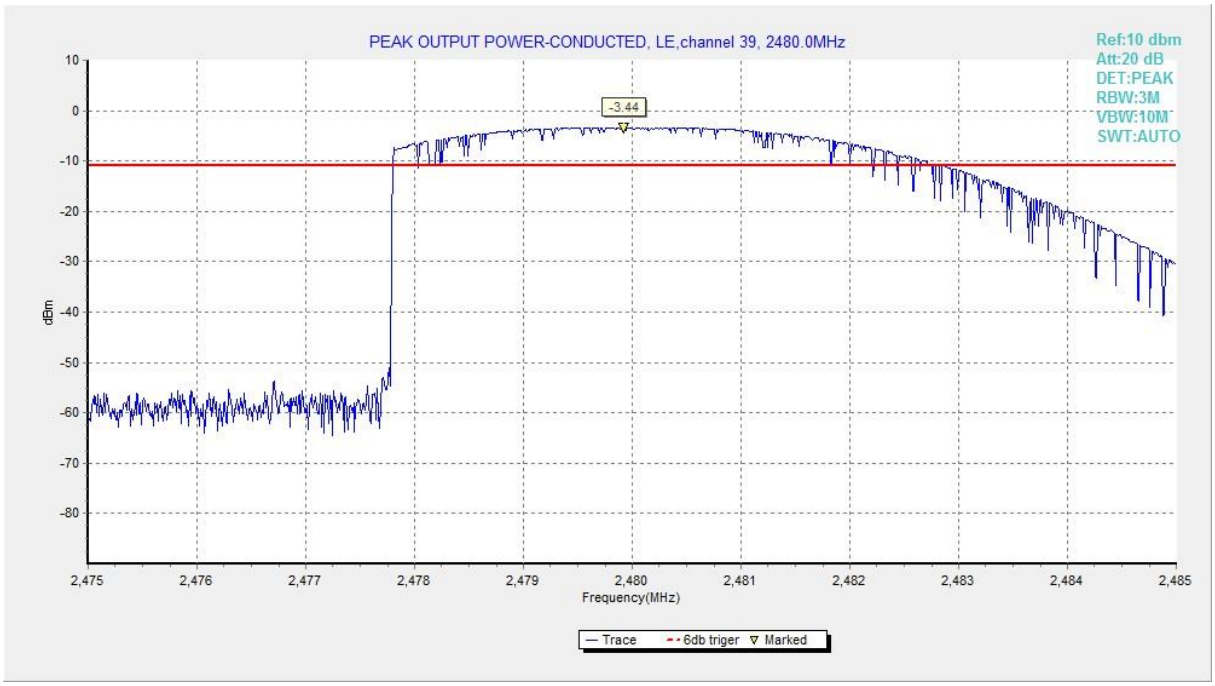


Fig.6 Peak Conducted Output Power (Ch 39), LE 2M

A.2 Peak Power Spectral Density

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

Measurement Limit:

Standard	Limit
FCC 47 CRF Part 15.247(e)	< 8 dBm/3 kHz

Measurement Results:

Mode	Frequency (MHz)	Peak Power Spectral Density（dBm）		Conclusion
LE 1M	2402(CH0)	Fig.7	-19.09	**P**
	2440(CH19)	Fig.8	-18.72	**P**
	2480(CH39)	Fig.9	-18.35	**P**
LE 2M	2402(CH0)	Fig.10	-22.90	**P**
	2440(CH19)	Fig.11	-22.54	**P**
	2480(CH39)	Fig.12	-22.16	**P**

See below for test graphs.
Conclusion: PASS

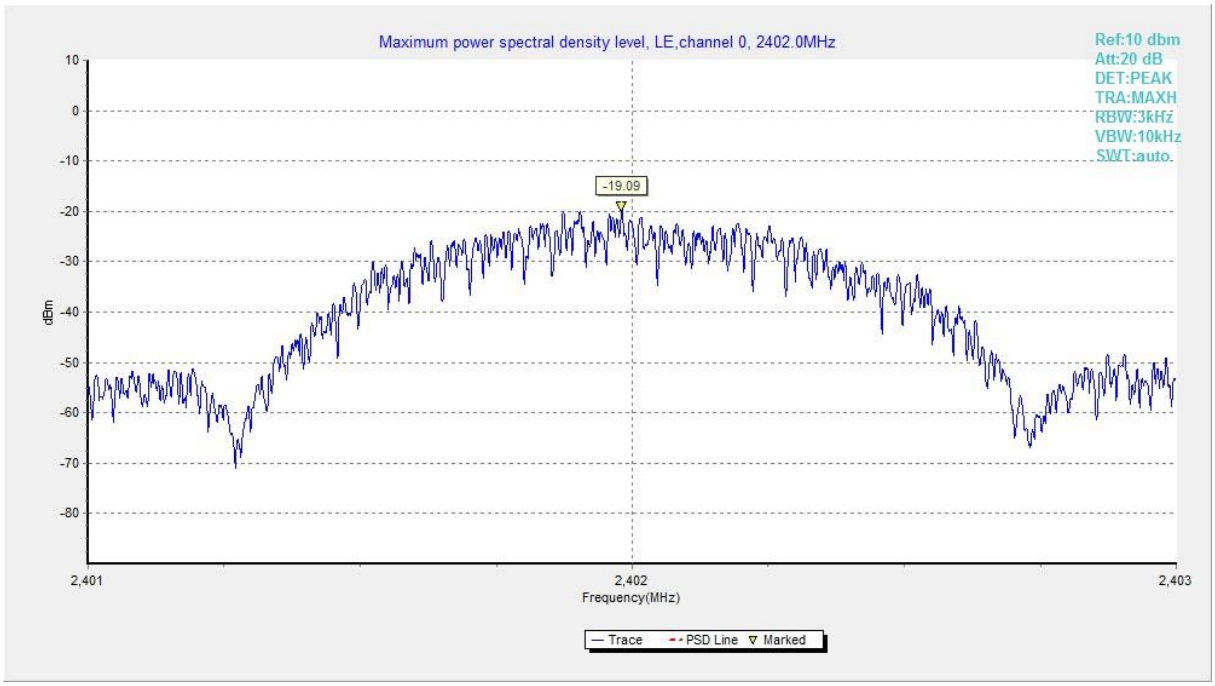


Fig.7 Power Spectral Density (Ch 0), LE 1M

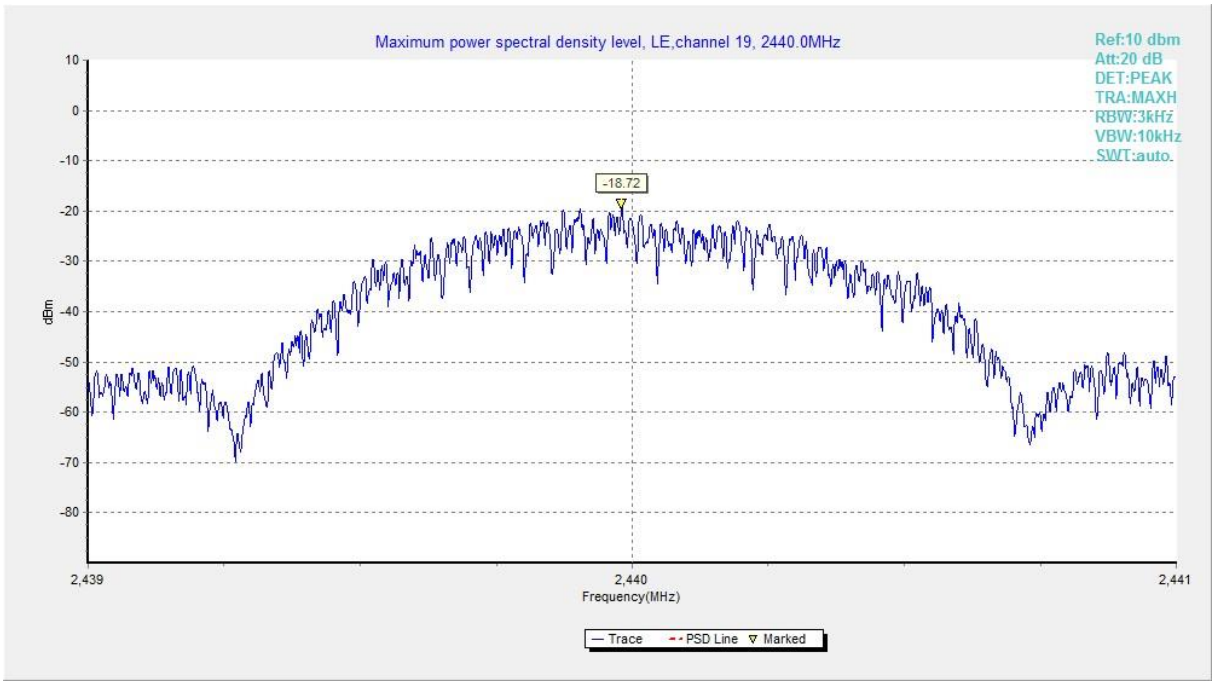


Fig.8 Power Spectral Density (Ch 19), LE 1M

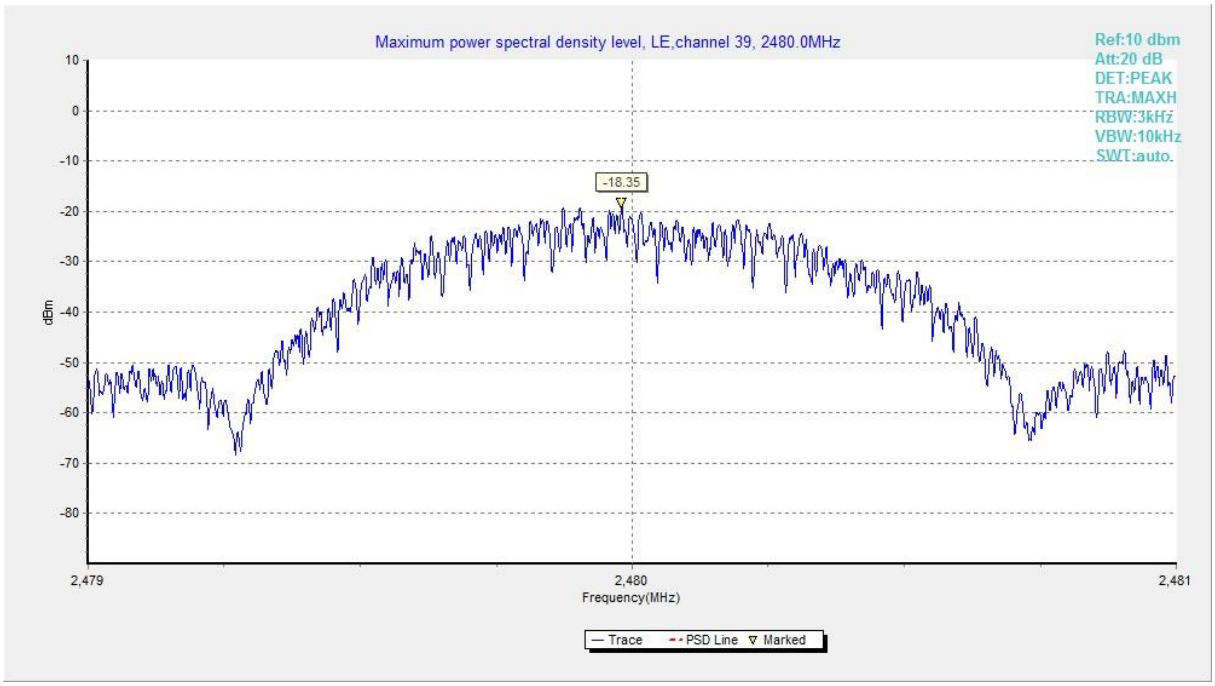


Fig.9 Power Spectral Density (Ch 39), LE 1M

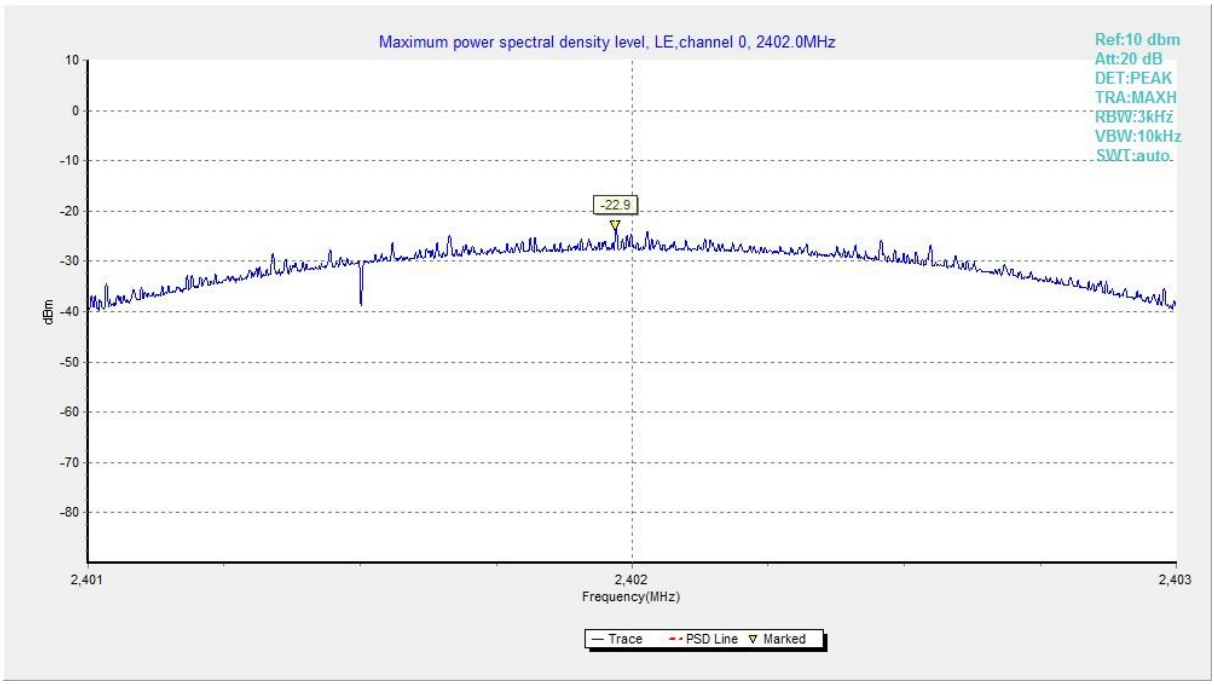


Fig.10 Power Spectral Density (Ch 0), LE 2M

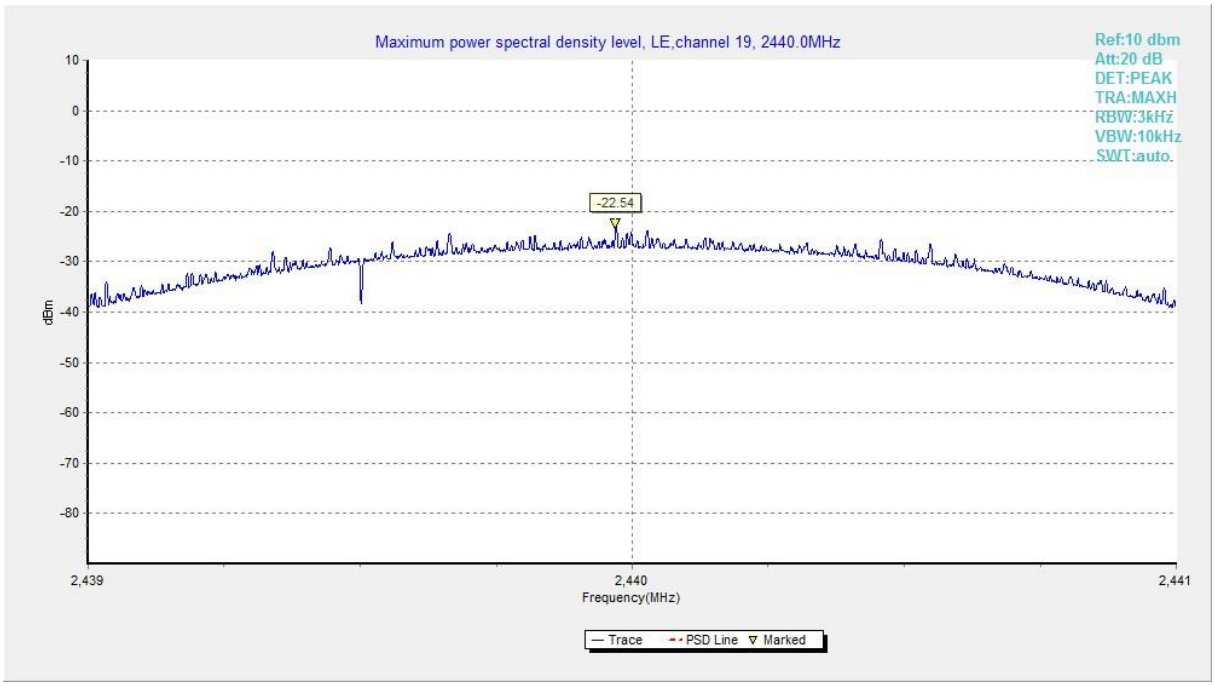


Fig.11 Power Spectral Density (Ch 19), LE 2M

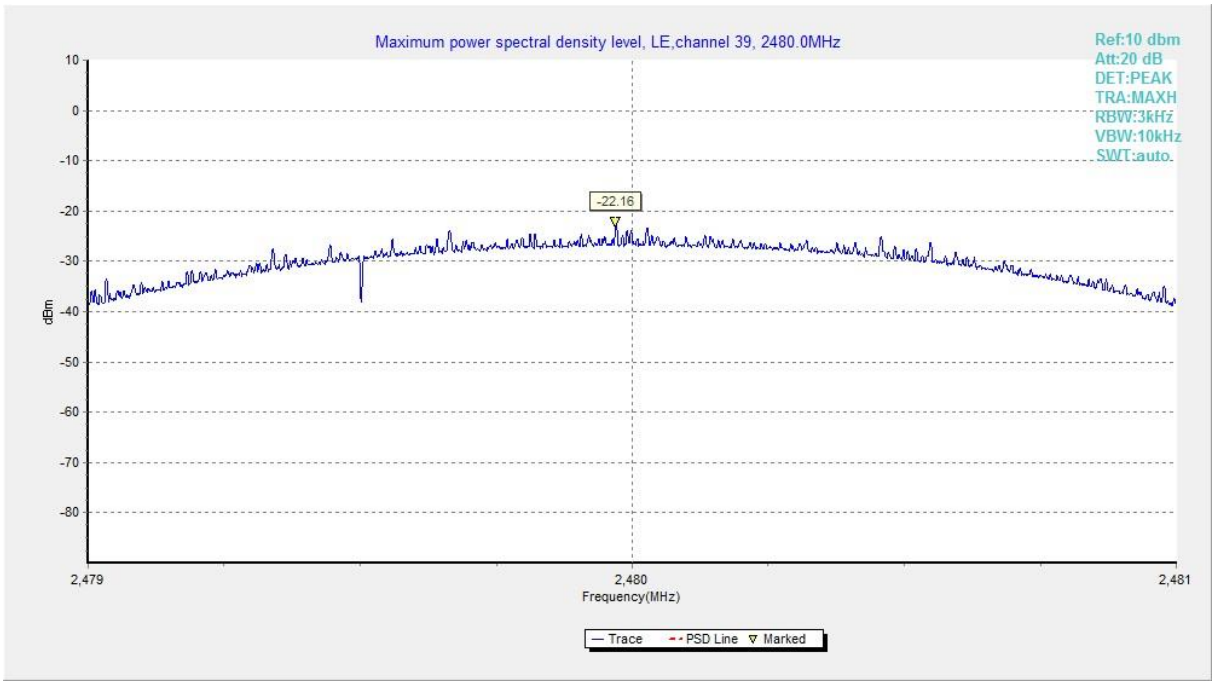


Fig.12 Power Spectral Density (Ch 39), LE 2M

A.3 6dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

Measurement Result:

Mode	Frequency (MHz)	Test Results (kHz)		Conclusion
LE 1M	2402(CH0)	Fig.13	696.00	**P**
	2440(CH19)	Fig.14	702.50	**P**
	2480(CH39)	Fig.15	697.50	**P**
LE 2M	2402(CH0)	Fig.16	1158.50	**P**
	2440(CH19)	Fig.17	1162.00	**P**
	2480(CH39)	Fig.18	1162.50	**P**

See below for test graphs.
Conclusion: PASS

Fig.13 6dB Bandwidth (Ch 0), LE 1M

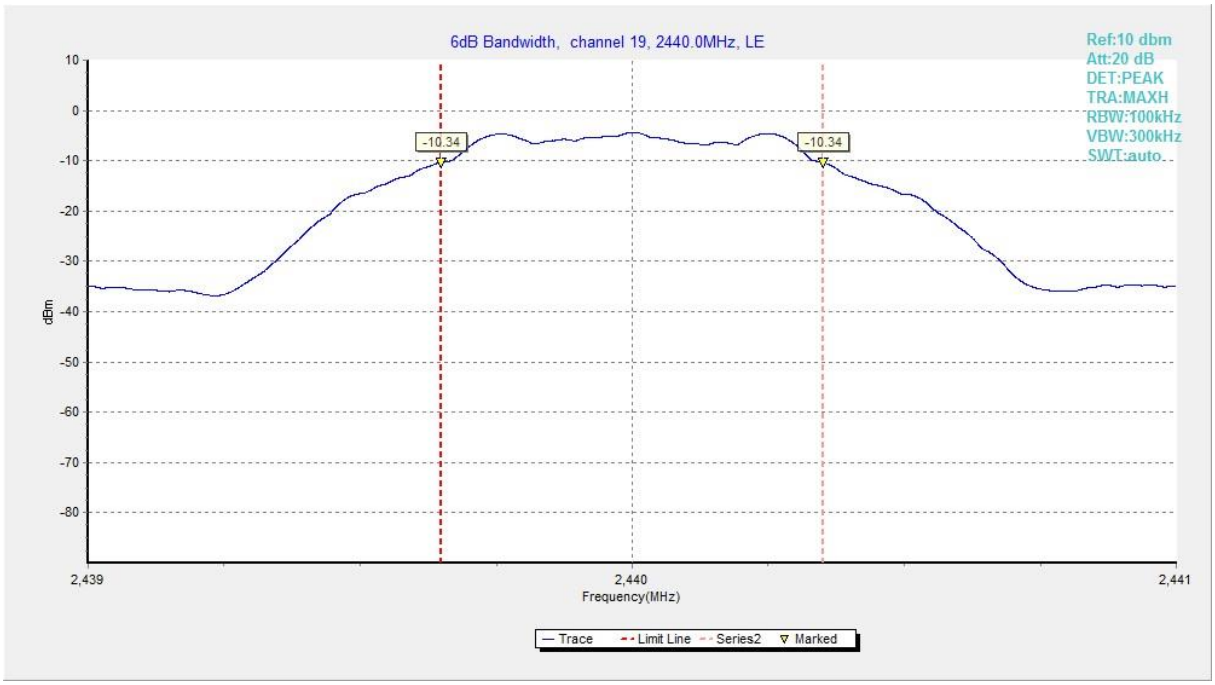


Fig.14 6dB Bandwidth (Ch 19), LE 1M

Fig.15 6dB Bandwidth (Ch 39), LE 1M

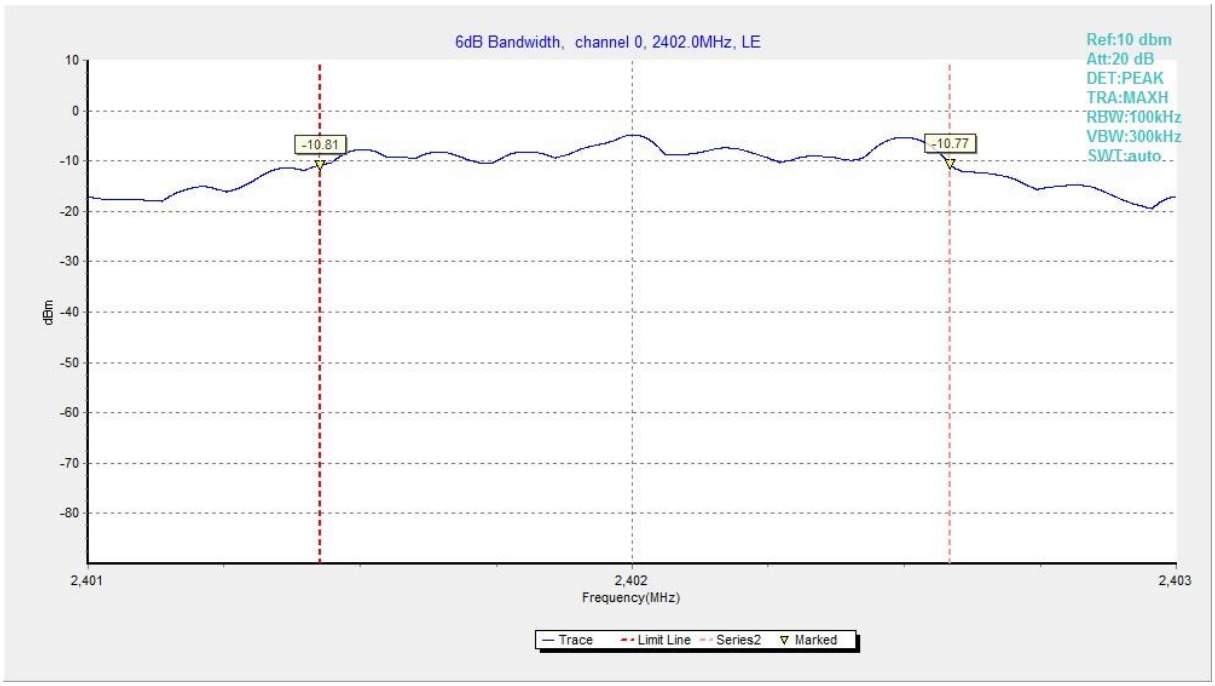


Fig.16 6dB Bandwidth (Ch 0), LE 2M

Fig.17 6dB Bandwidth (Ch 19), LE 2M

Fig.18 6dB Bandwidth (Ch 39), LE 2M

A.4 Band Edges Compliance

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

Measurement Result:

Mode	Frequency (MHz)	Test Results (dBc)		Conclusion
LE 1M	2402(CH0)	Fig.19	58.34	**P**
	2480(CH39)	Fig.20	61.12	**P**
LE 2M	2402(CH0)	Fig.21	31.18	**P**
	2480(CH39)	Fig.22	56.73	**P**

See below for test graphs.

Conclusion: PASS

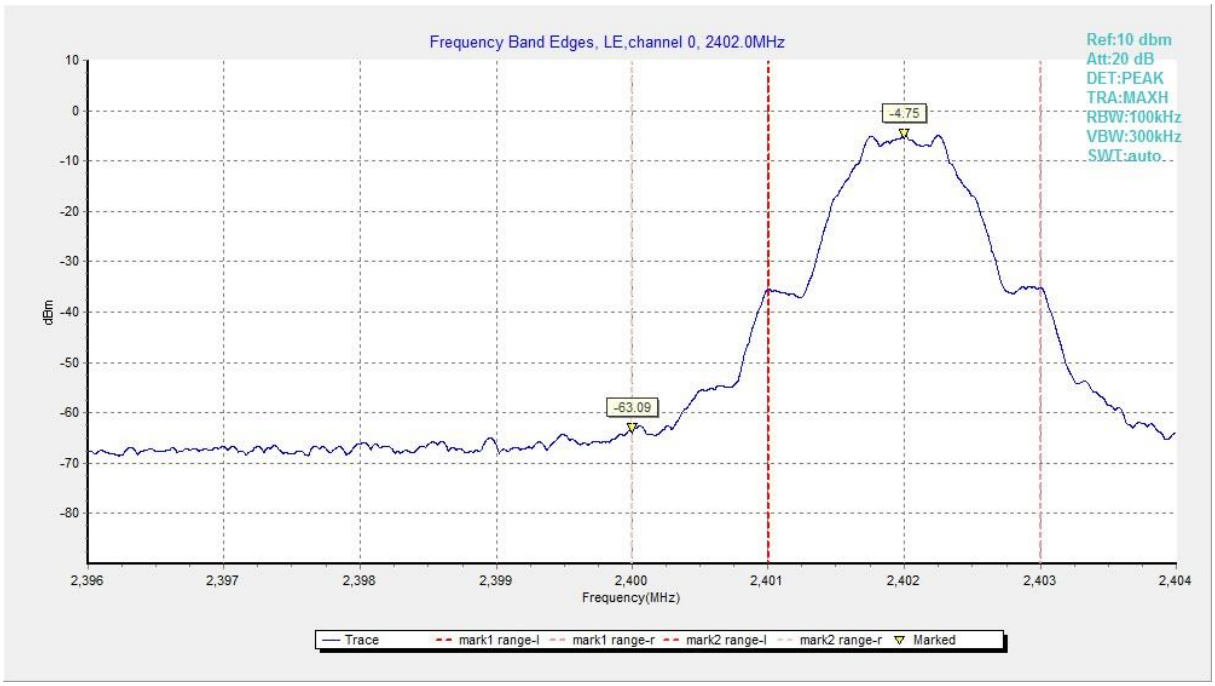


Fig.19 Band Edges (Ch 0), LE 1M

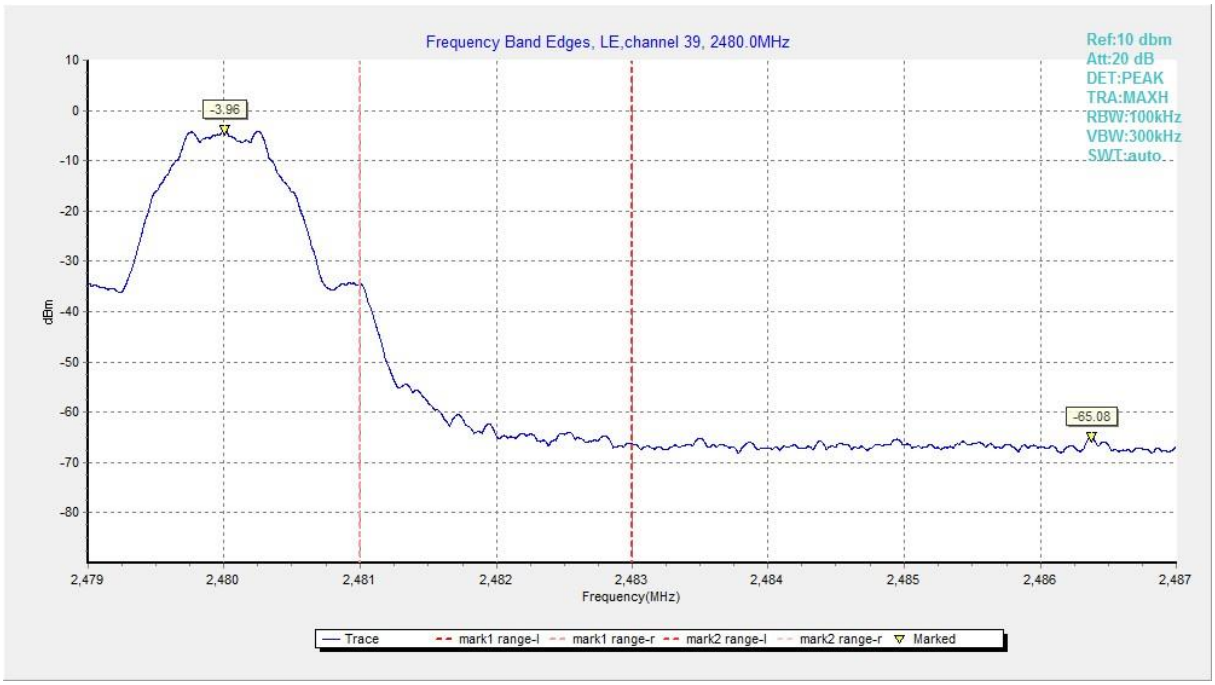


Fig.20 Band Edges (Ch 39), LE 1M

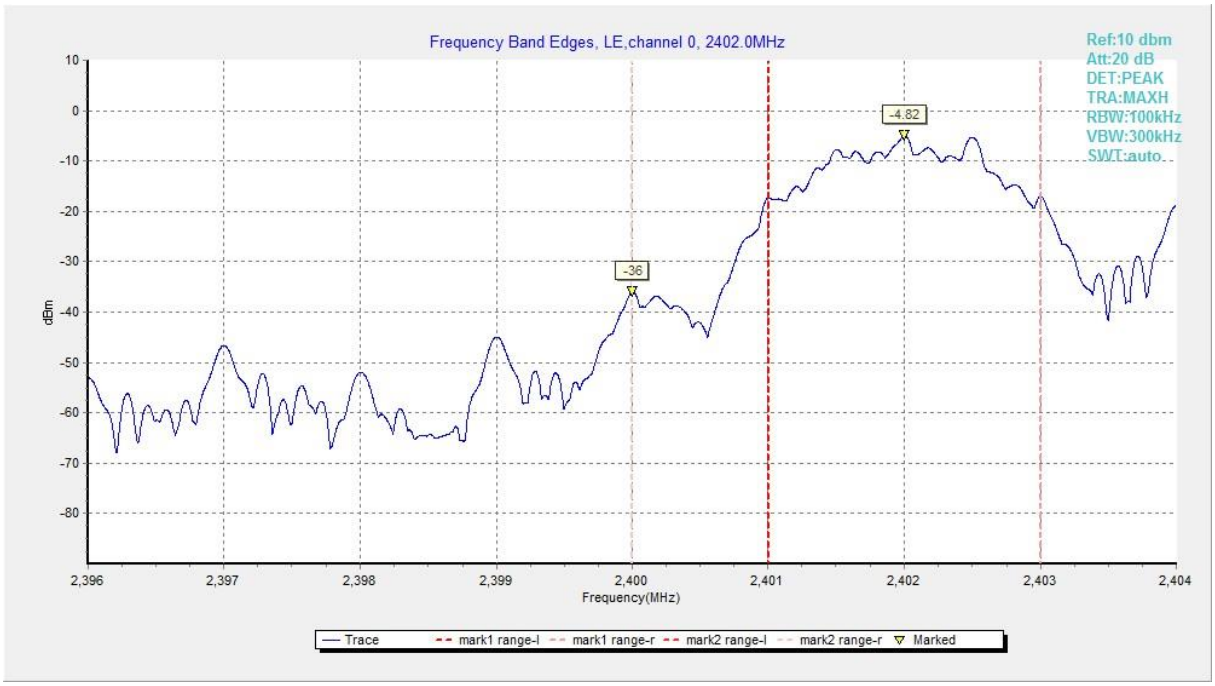


Fig.21 Band Edges (Ch 0), LE 2M

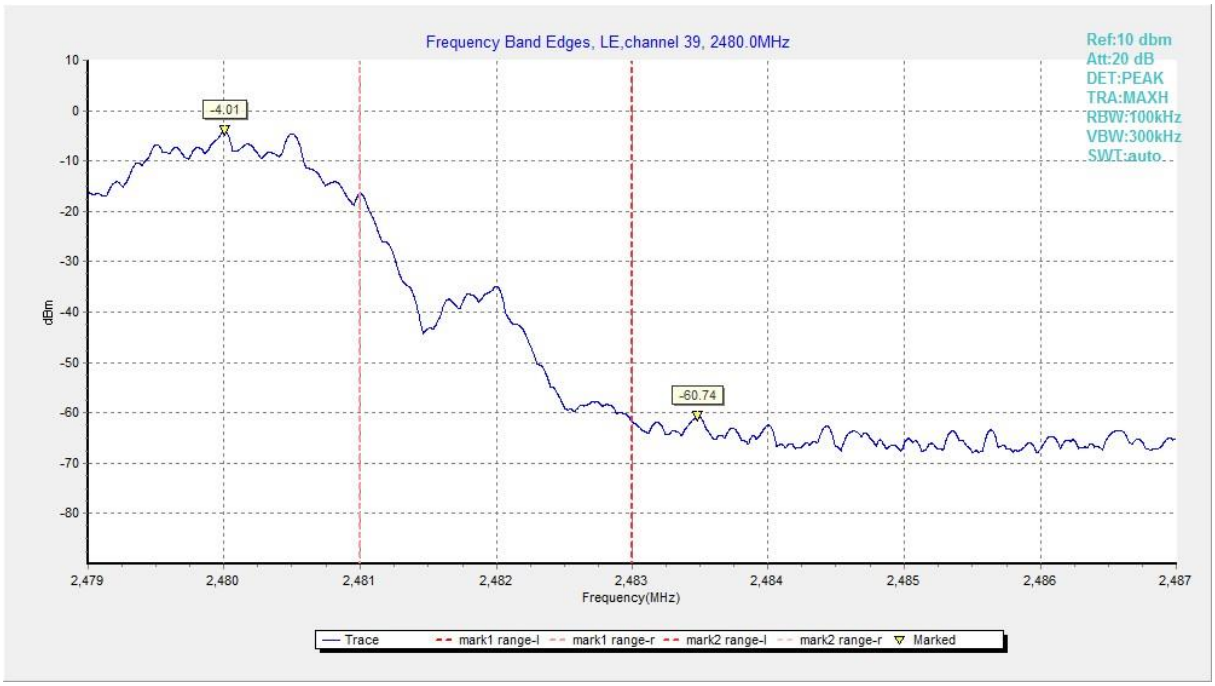


Fig.22 Band Edges (Ch 39), LE 2M

A.5 Transmitter Spurious Emission - Conducted

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

Measurement Results:

MODE	Channel	Frequency Range	Test Results	Conclusion
LE 1M	0	2.402 GHz	Fig.23	**P**
		1GHz -3GHz	Fig.24	**P**
		3GHz-10GHz	Fig.25	**P**
	19	2.440 GHz	Fig.26	**P**
		1GHz -3GHz	Fig.27	**P**
		3GHz-10GHz	Fig.28	**P**
	39	2.480 GHz	Fig.29	**P**
		1GHz -3GHz	Fig.30	**P**
		3GHz-10GHz	Fig.31	**P**
	All channels	30MHz-1GHz	Fig.32	**P**
		10GHz-26GHz	Fig.33	**P**
LE 2M	0	2.402 GHz	Fig.34	**P**
		1GHz -3GHz	Fig.35	**P**
		3GHz-10GHz	Fig.36	**P**
	19	2.440 GHz	Fig.37	**P**
		1GHz -3GHz	Fig.38	**P**
		3GHz-10GHz	Fig.39	**P**
	39	2.480 GHz	Fig.40	**P**
		1GHz -3GHz	Fig.41	**P**
		3GHz-10GHz	Fig.42	**P**
	All channels	30MHz-1GHz	Fig.43	**P**
		10GHz-26GHz	Fig.44	**P**

See below for test graphs.

Conclusion: Pass

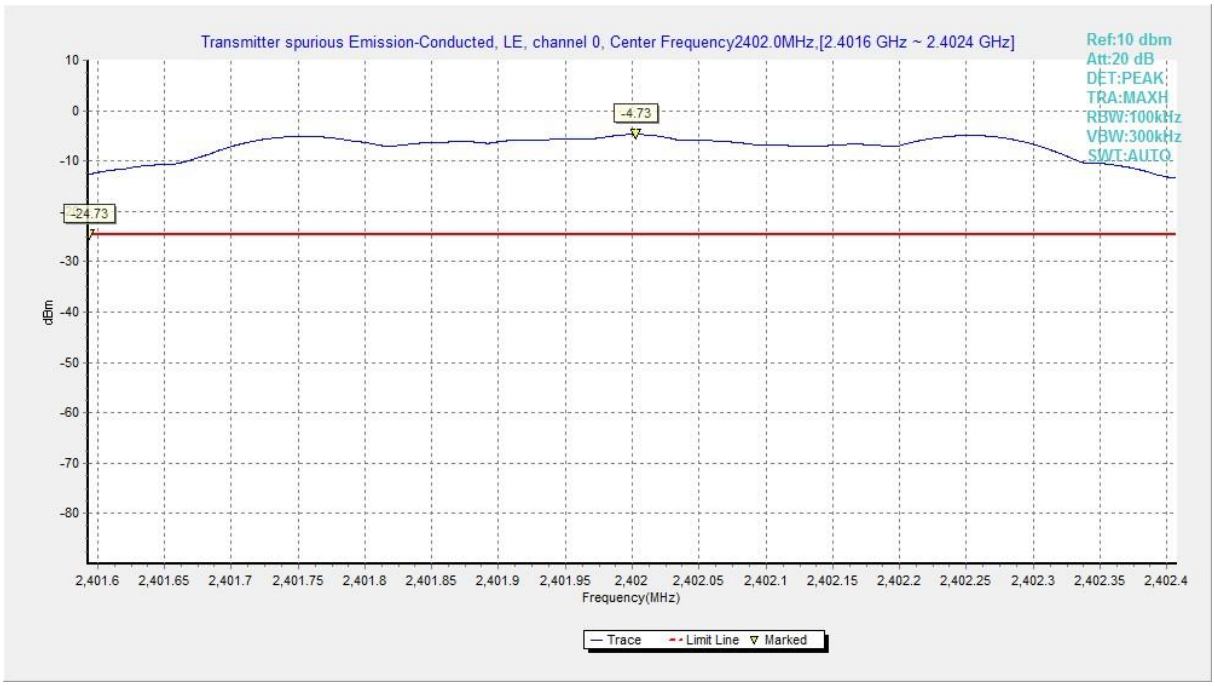


Fig.23 Conducted Spurious Emission (Ch0, Center Frequency), LE 1M

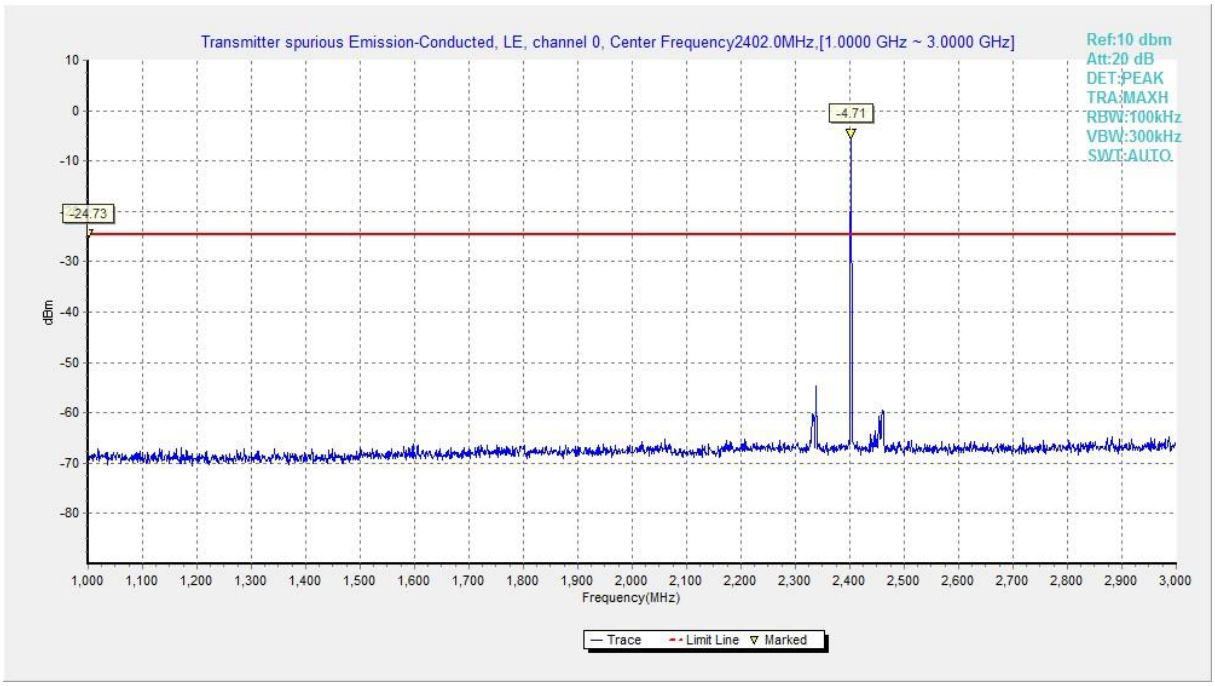


Fig.24 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE 1M

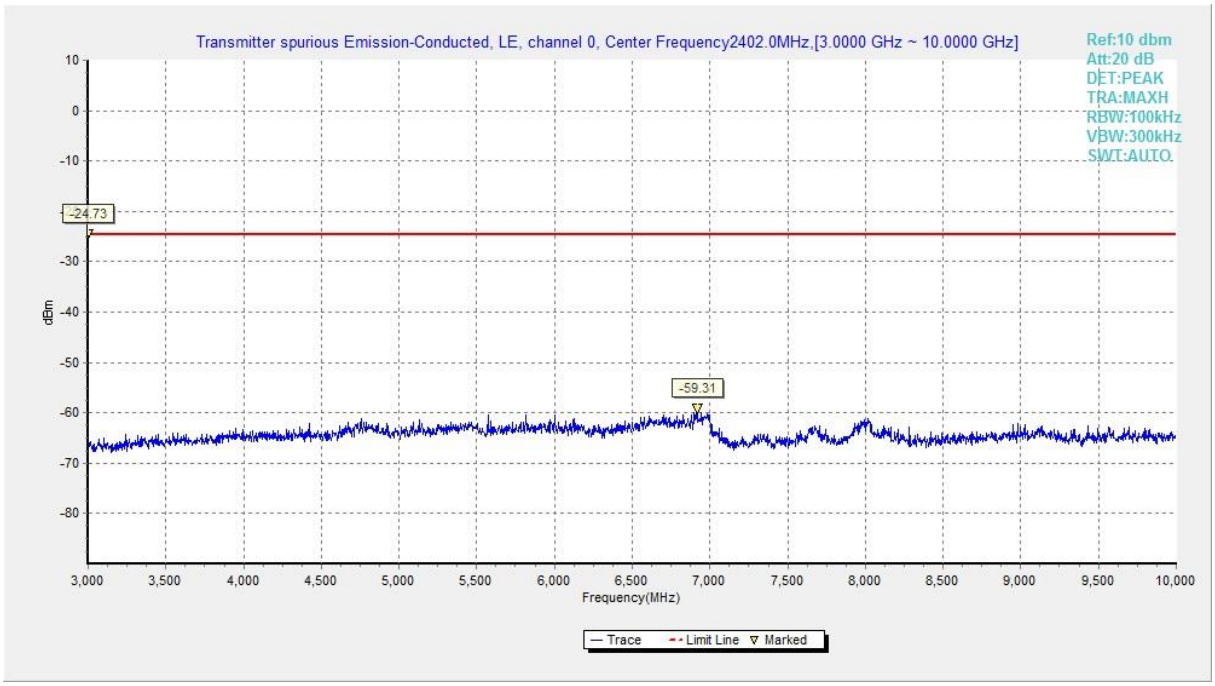


Fig.25 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE 1M

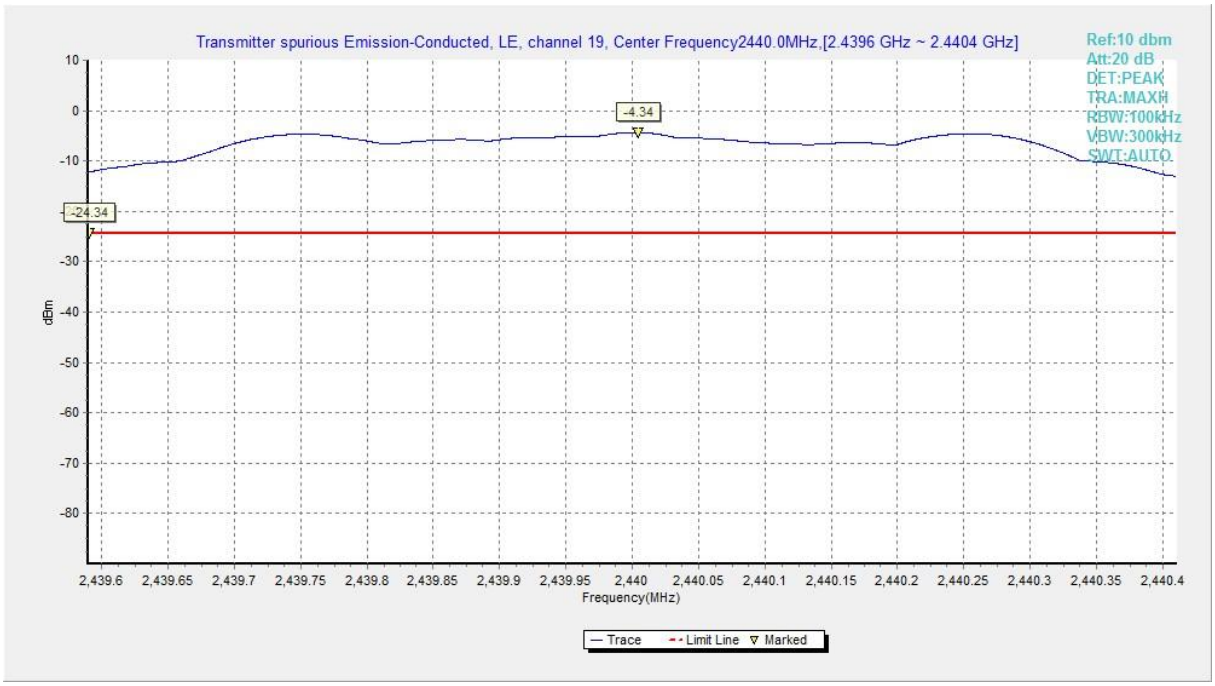


Fig.26 Conducted Spurious Emission (Ch19, Center Frequency), LE 1M

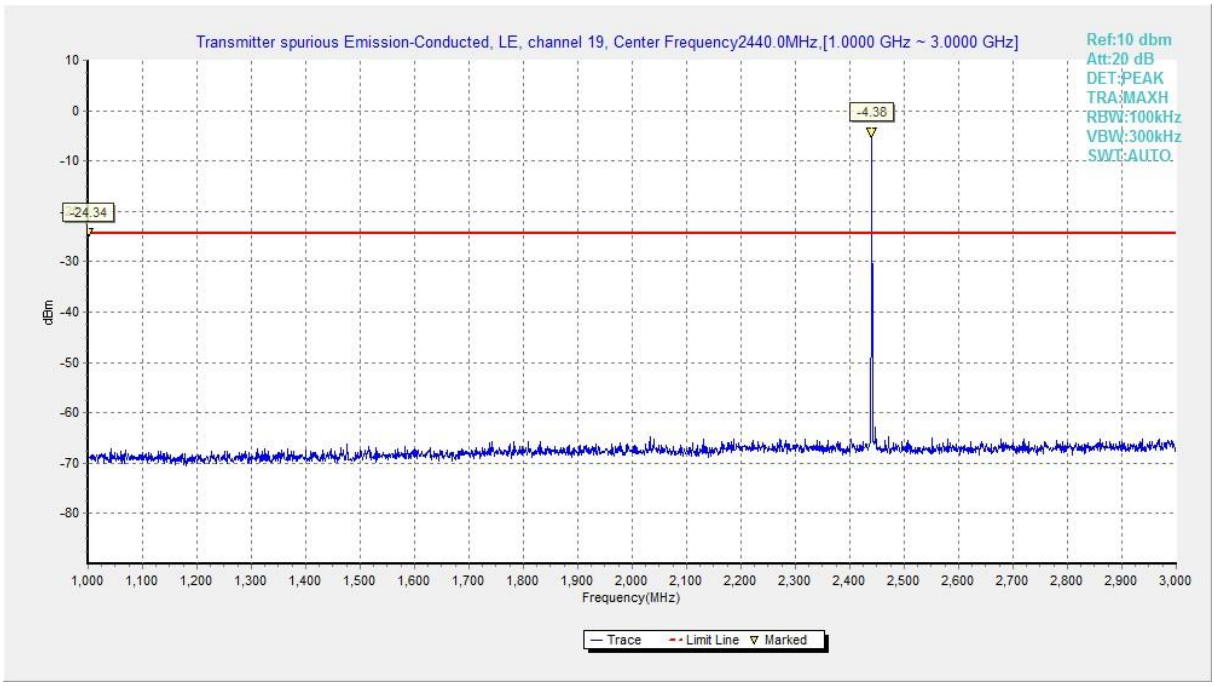


Fig.27 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE 1M

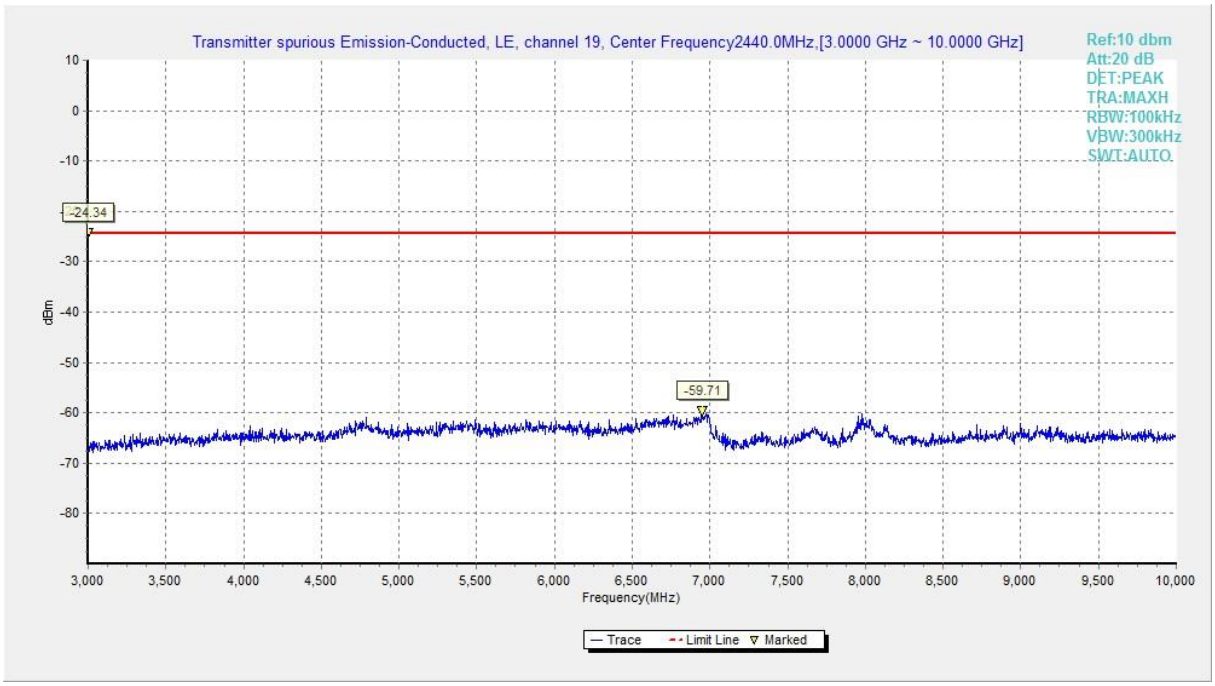


Fig.28 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE 1M

Fig.29 Conducted Spurious Emission (Ch39, Center Frequency), LE 1M

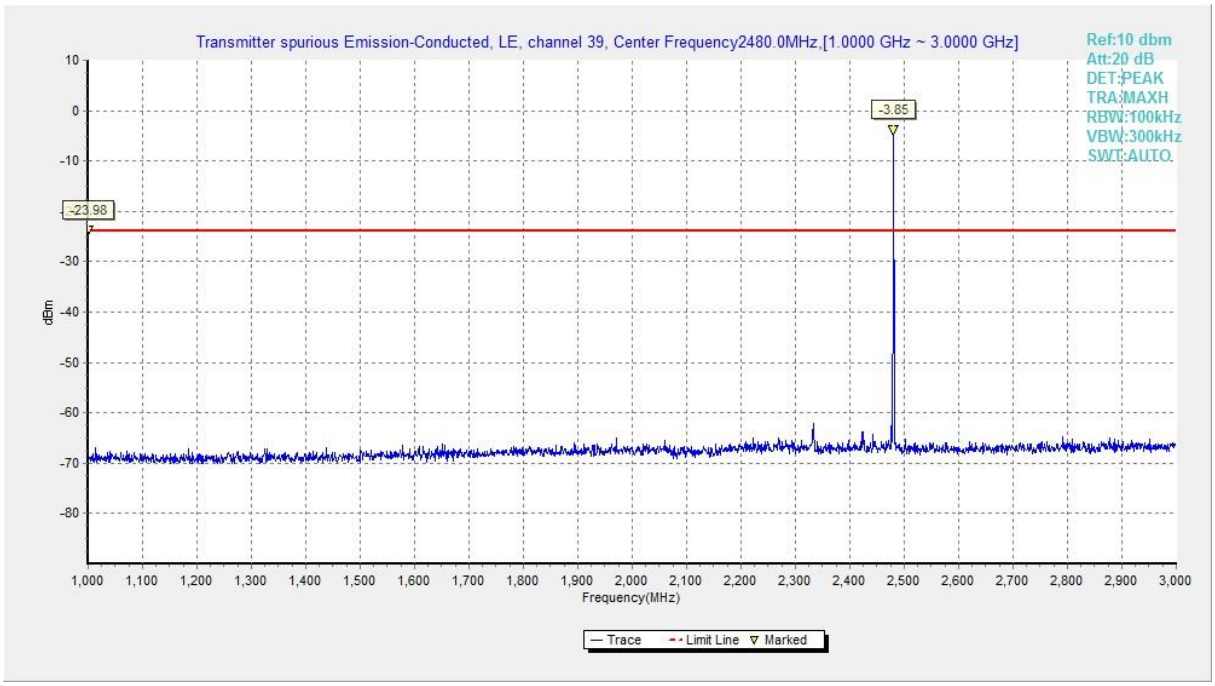


Fig.30 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 1M

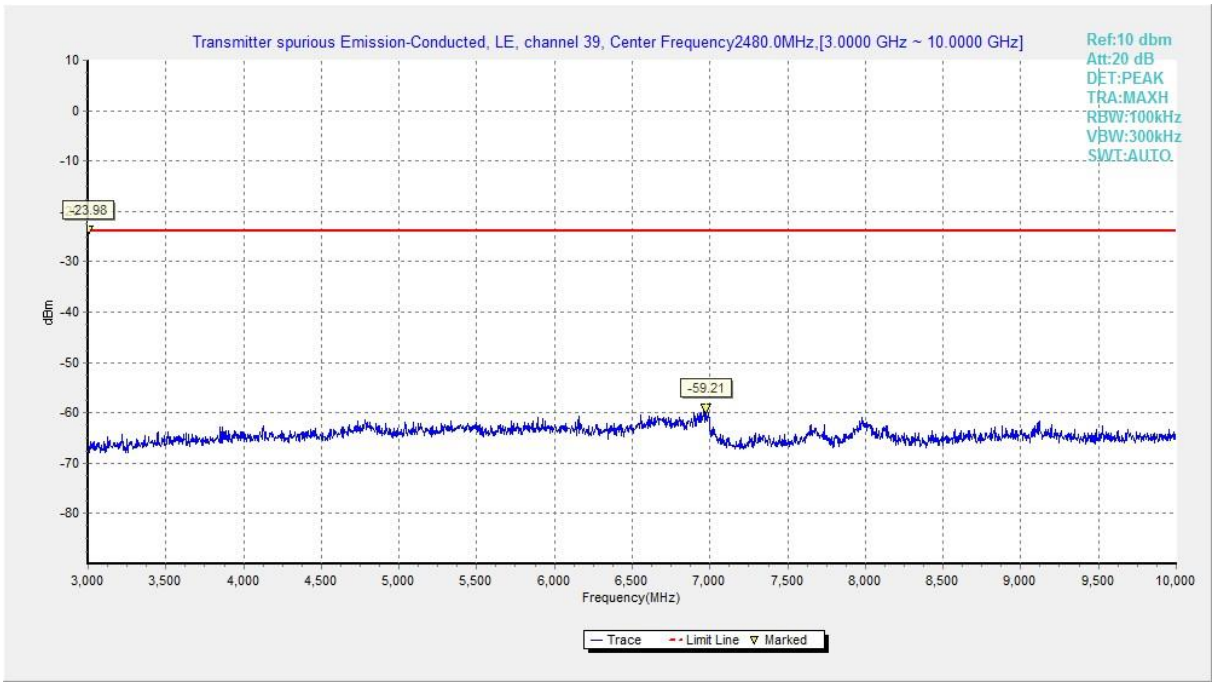


Fig.31 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 1M

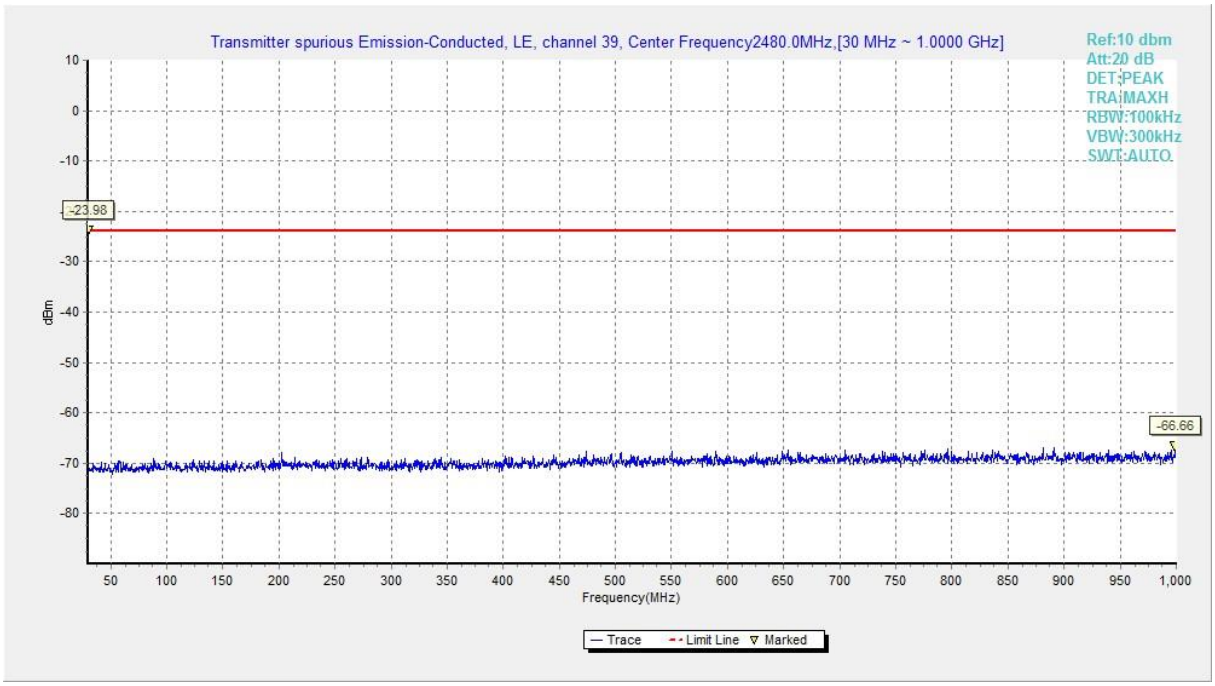


Fig.32 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 1M

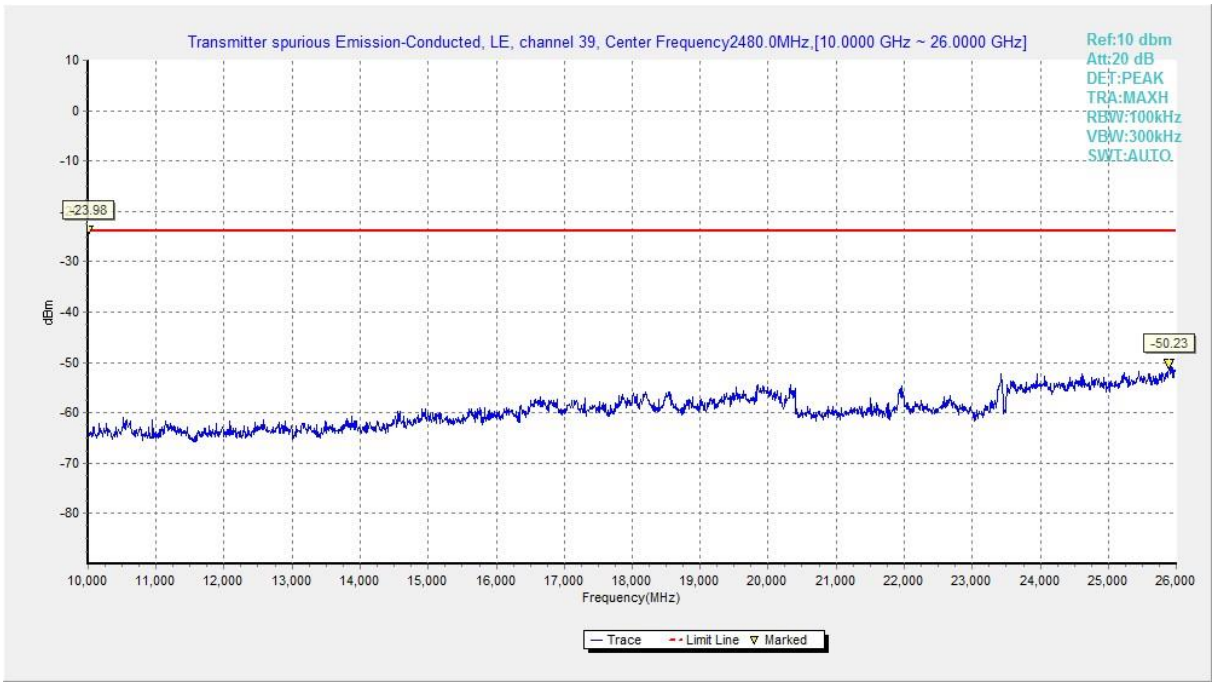


Fig.33 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 1M

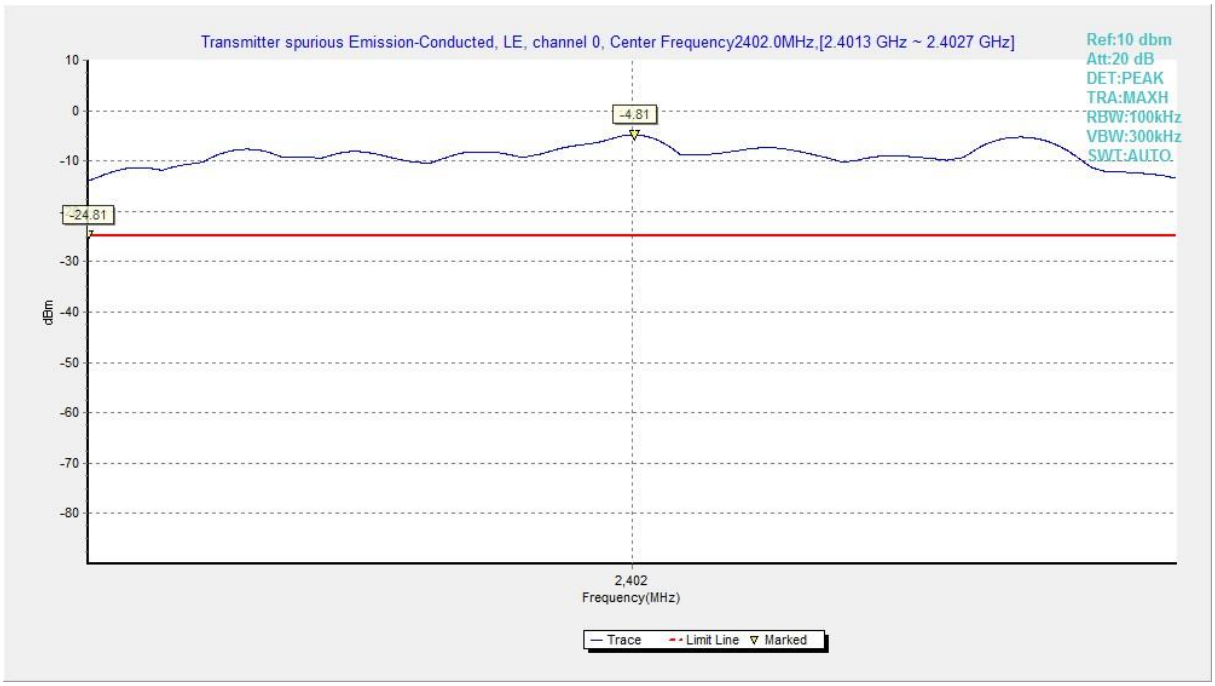


Fig.34 Conducted Spurious Emission (Ch0, Center Frequency), LE 2M

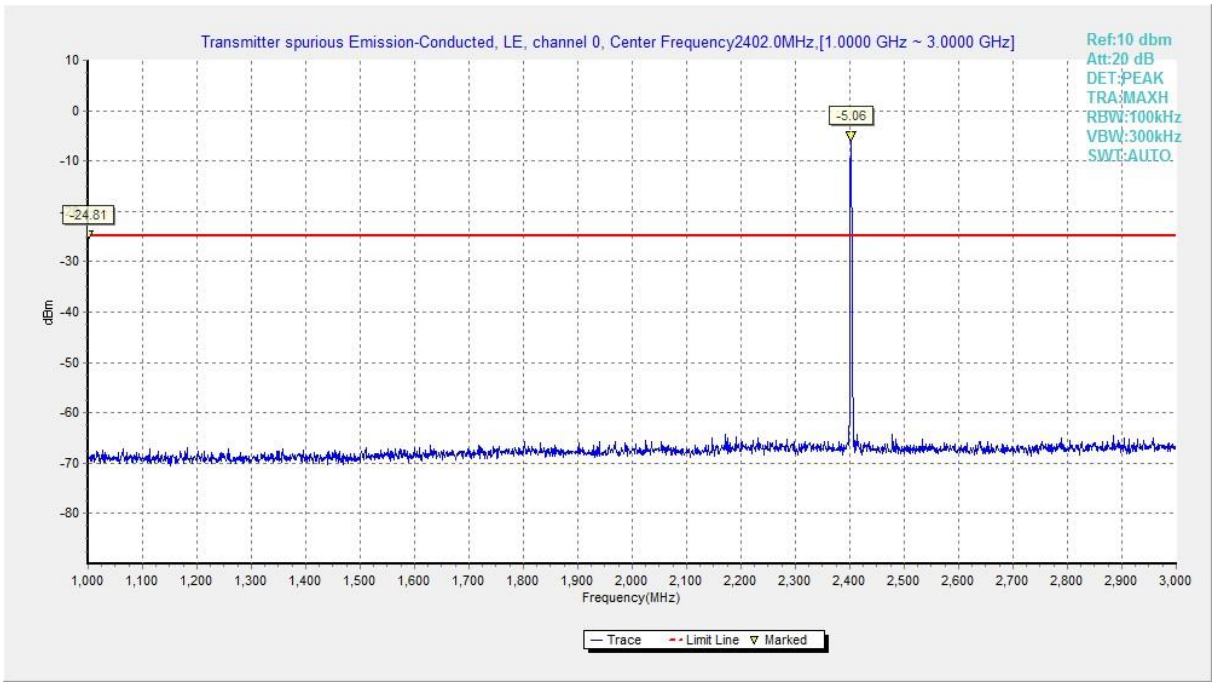


Fig.35 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE 2M

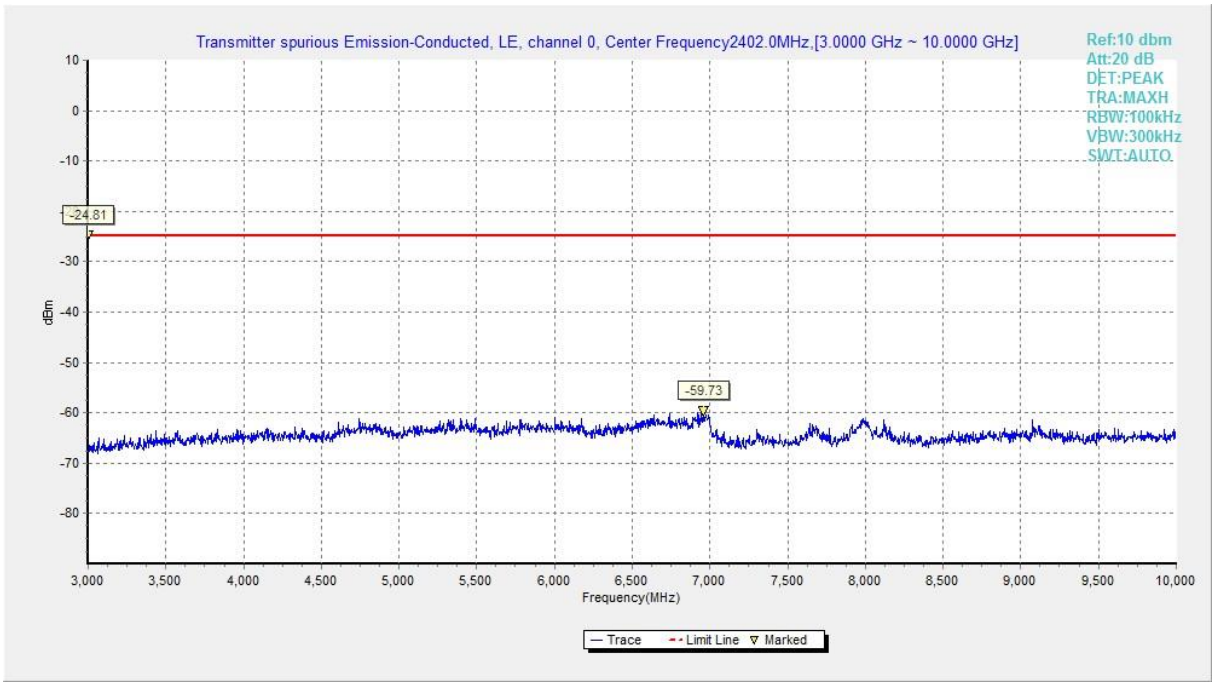


Fig.36 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE 2M

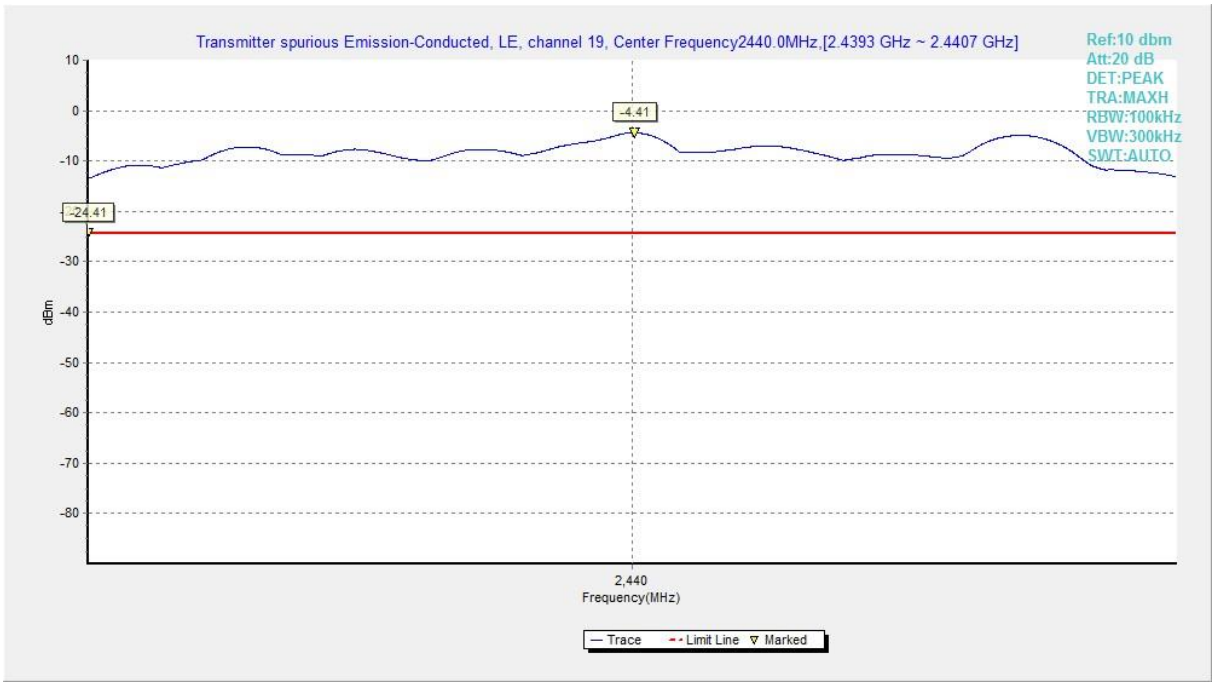


Fig.37 Conducted Spurious Emission (Ch19, Center Frequency), LE 2M

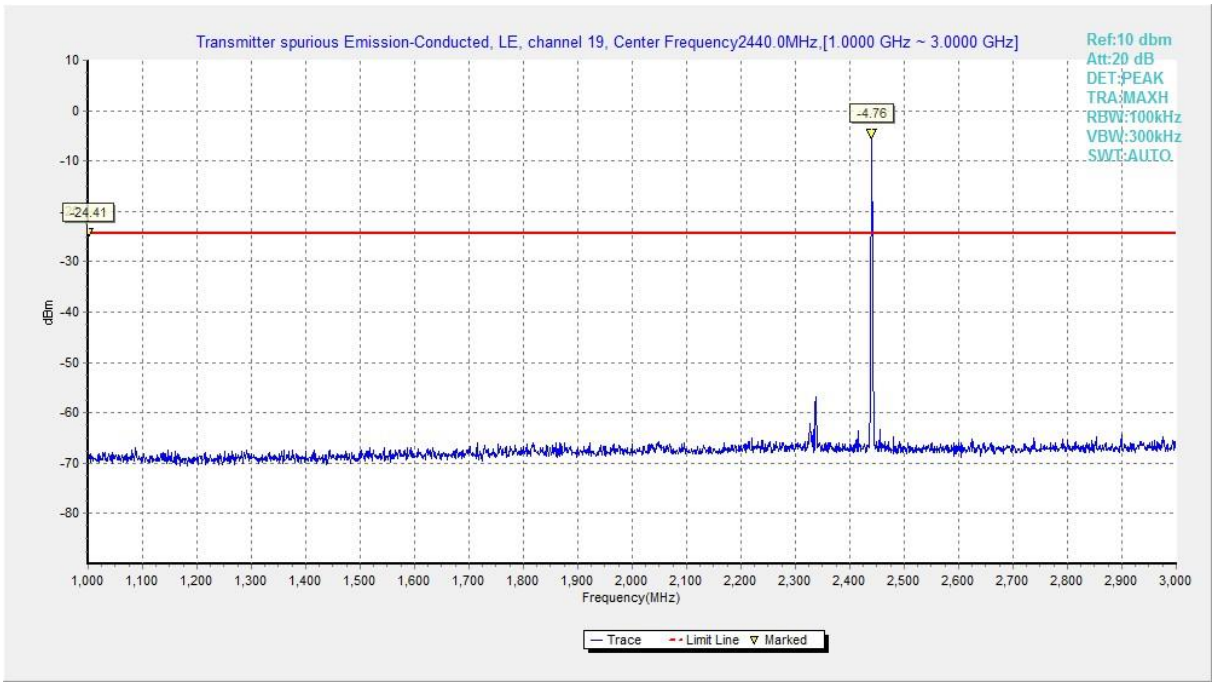


Fig.38 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE 2M

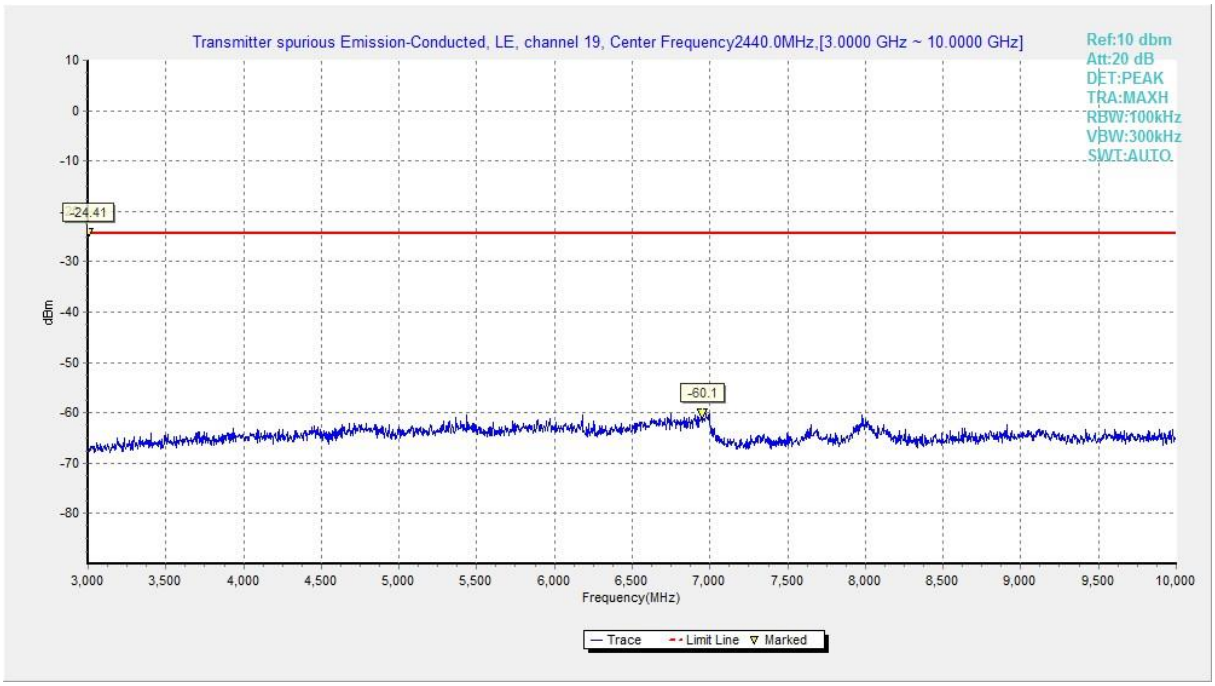


Fig.39 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE 2M

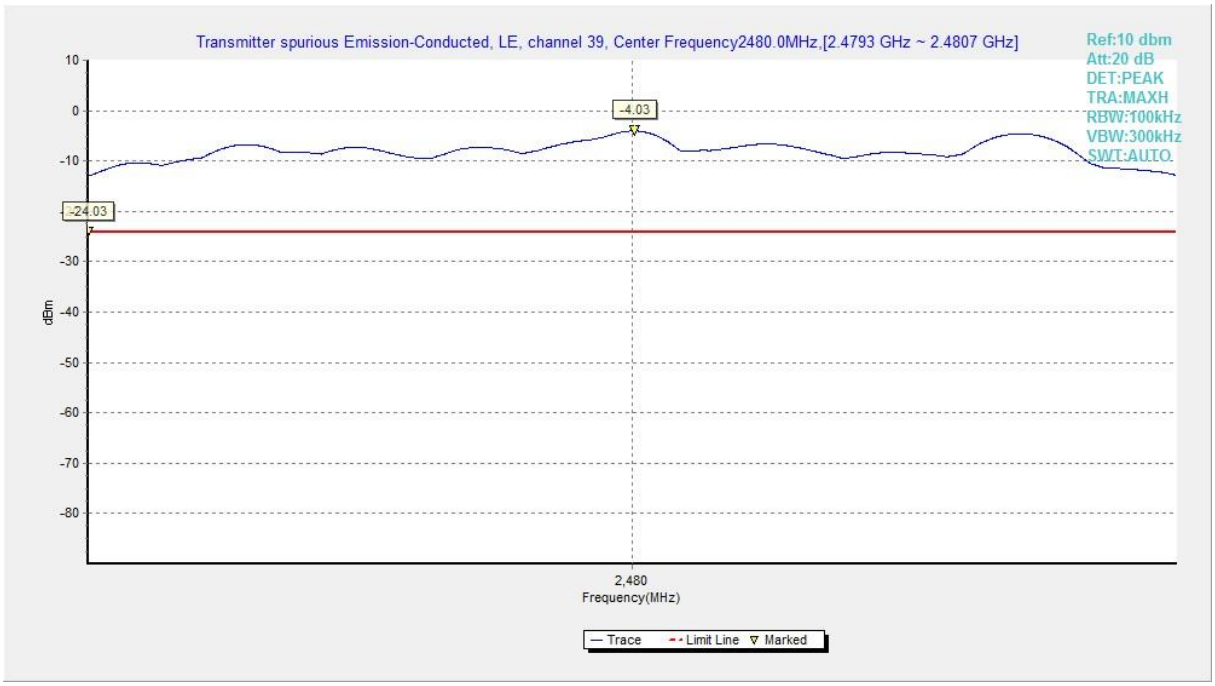


Fig.40 Conducted Spurious Emission (Ch39, Center Frequency), LE 2M

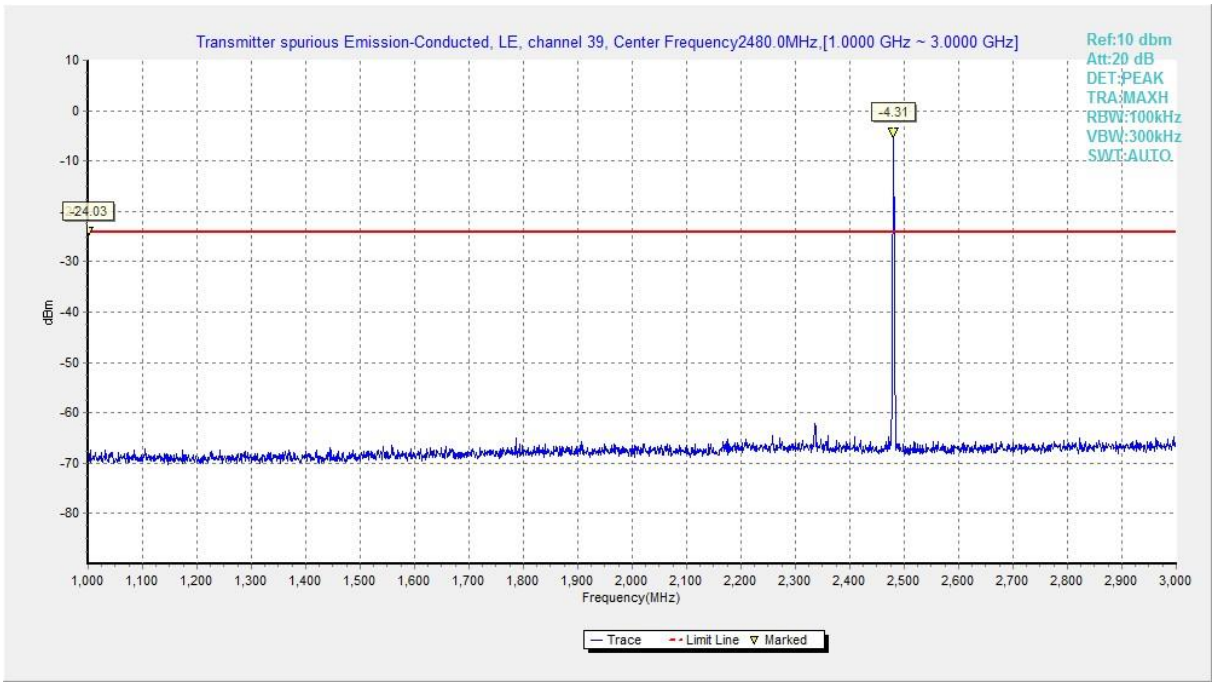


Fig.41 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 2M

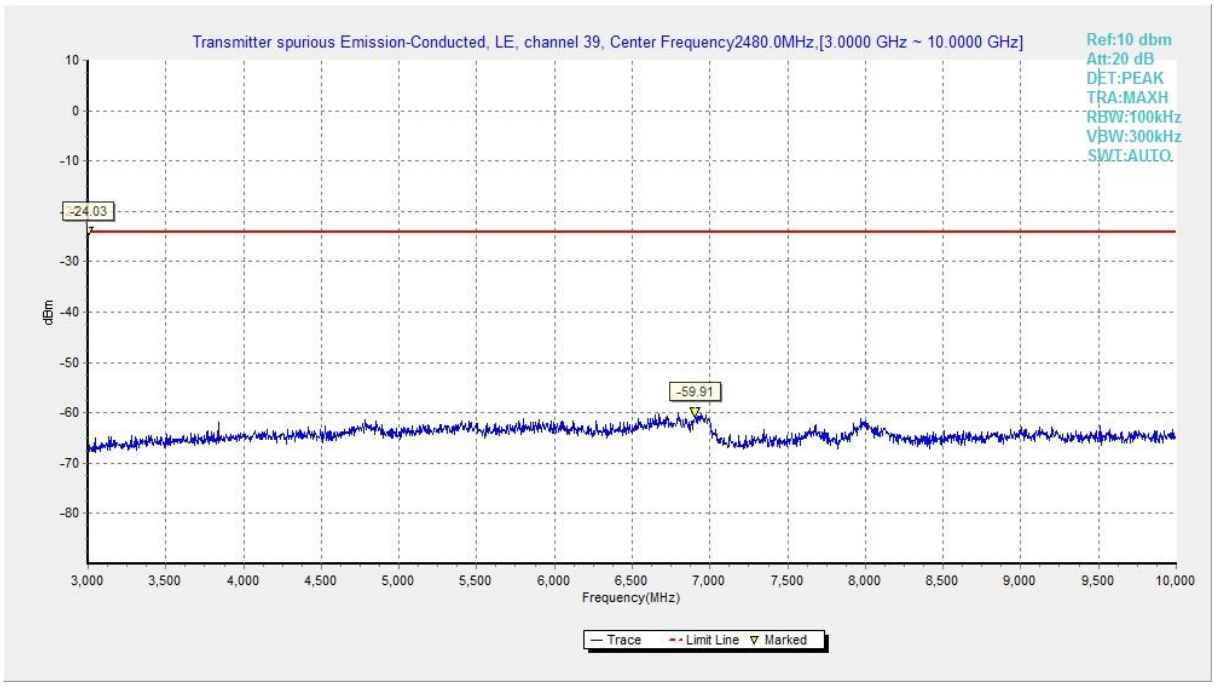


Fig.42 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 2M

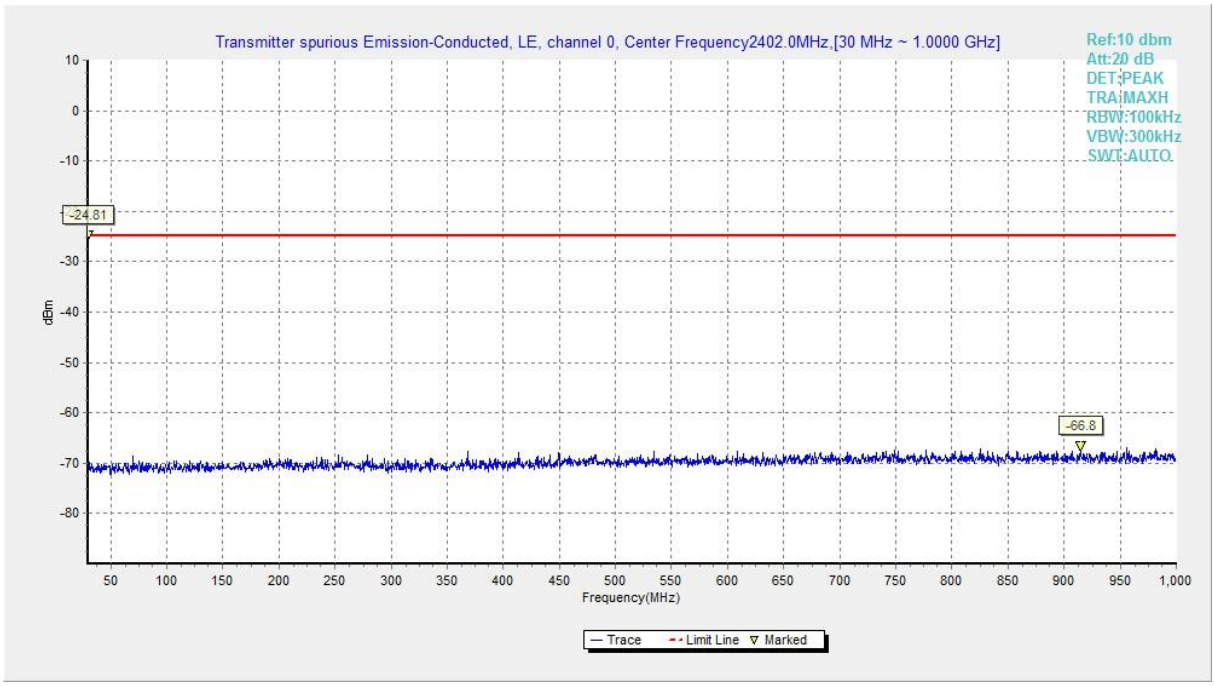


Fig.43 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 2M

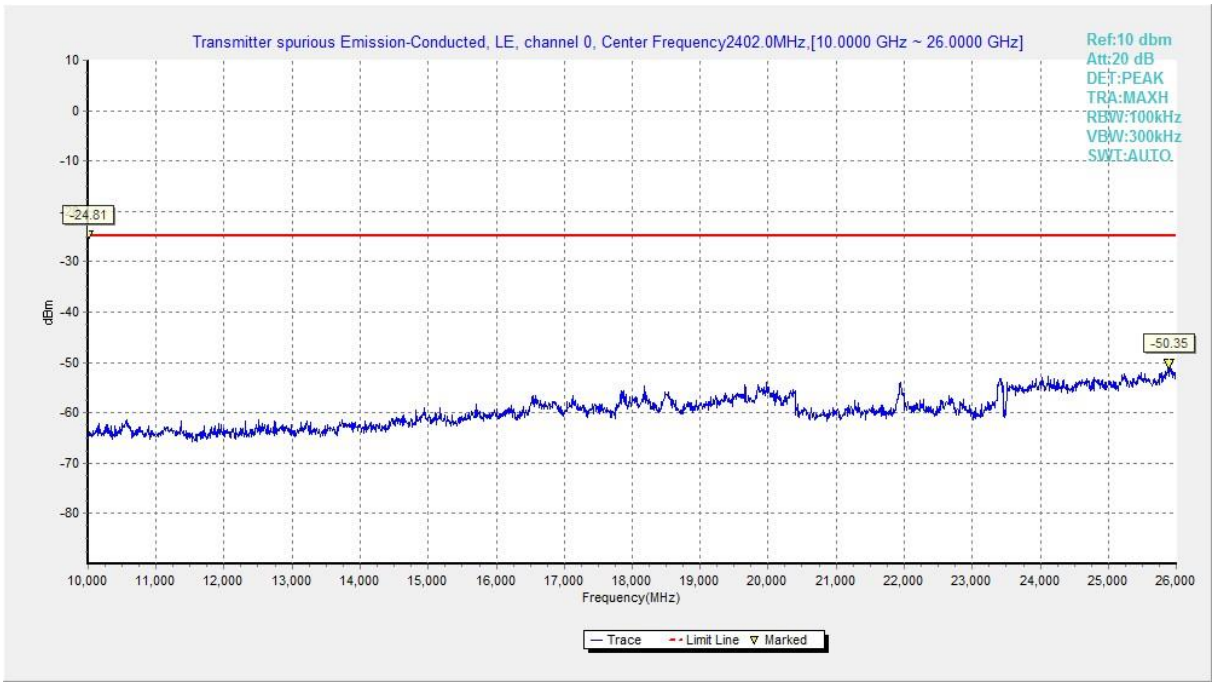


Fig.44 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 2M

A.6 Transmitter Spurious Emission - Radiated

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	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	Channel	Frequency Range	Test Results	Conclusion
LE 1M	0	1 GHz ~18 GHz	Fig.45	**P**
	19	1 GHz ~18 GHz	Fig.46	**P**
	39	1 GHz ~18 GHz	Fig.47	**P**
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.48	**P**
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.49	**P**
	All channels	9 kHz ~30 MHz	Fig.50	**P**
		30 MHz ~1 GHz	Fig.51	**P**
		18 GHz ~ 26.5 GHz	Fig.52	**P**
LE 2M	0	1 GHz ~18 GHz	Fig.53	**P**
	19	1 GHz ~18 GHz	Fig.54	**P**
	39	1 GHz ~18 GHz	Fig.55	**P**
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.56	**P**
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.57	**P**
	All channels	9 kHz ~30 MHz	Fig.58	**P**
		30 MHz ~1 GHz	Fig.59	**P**
		18 GHz ~ 26.5 GHz	Fig.60	**P**

Worst Case Result

For LE 1M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4428.500000	48.20	74.00	25.80	V	12.8
5095.500000	49.17	74.00	24.83	V	14.6
6234.000000	52.56	74.00	21.44	H	18.6
12362.462500	46.79	74.00	27.21	V	11.4
14378.812500	48.52	74.00	25.48	V	13.0
16835.812500	49.75	74.00	24.25	V	16.1

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4401.500000	37.36	54.00	16.64	H	12.8
5038.500000	38.51	54.00	15.49	H	14.2
6192.000000	41.67	54.00	12.33	H	18.9
12488.237500	35.80	54.00	18.20	V	11.4
14465.000000	37.08	54.00	16.92	H	13.0
16990.687500	39.54	54.00	14.46	V	16.5

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5168.500000	48.49	74.00	25.51	H	14.6
6201.000000	51.58	74.00	22.42	H	18.8
12545.212500	46.55	74.00	27.45	H	11.5
14454.500000	47.53	74.00	26.47	H	13.0
15832.625000	47.37	74.00	26.63	V	14.8
16746.562500	48.25	74.00	25.75	V	15.9

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5099.500000	37.88	54.00	16.12	V	14.6
6196.000000	41.19	54.00	12.81	H	18.9
12416.212500	35.47	54.00	18.53	V	11.4
14423.875000	36.78	54.00	17.22	H	13.0
15762.625000	38.22	54.00	15.78	H	14.5
16977.125000	39.21	54.00	14.79	H	16.5

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5731.000000	50.19	74.00	23.81	V	15.9
6148.000000	51.01	74.00	22.99	V	18.4
13510.375000	47.12	74.00	26.88	H	12.5
14444.875000	47.60	74.00	26.40	V	13.0
15673.375000	48.55	74.00	25.45	H	14.1
16935.125000	50.11	74.00	23.89	V	16.3

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5648.500000	38.60	54.00	15.40	H	15.6
6196.000000	41.55	54.00	12.45	H	18.9
13429.437500	36.45	54.00	17.55	H	12.6
14510.937500	37.25	54.00	16.75	V	13.0
15675.562500	38.13	54.00	15.87	H	14.1
17307.000000	39.73	54.00	14.27	H	16.9

For LE 2M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5072.000000	50.25	74.00	23.75	H	14.5
6196.500000	54.11	74.00	19.89	V	18.9
13321.812500	47.23	74.00	26.77	V	12.6
14519.687500	47.29	74.00	26.71	V	13.0
15739.875000	48.87	74.00	25.13	V	14.4
17151.250000	52.31	74.00	21.69	V	17.1

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5110.500000	39.77	54.00	14.23	V	14.6
6204.500000	42.44	54.00	11.56	V	18.8
13393.125000	37.71	54.00	16.29	V	12.6
14456.250000	37.93	54.00	16.07	V	13.0
15717.562500	38.88	54.00	15.12	V	14.3
17144.687500	40.64	54.00	13.36	V	17.1

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5085.500000	48.48	74.00	25.52	V	14.6
6189.500000	52.42	74.00	21.58	H	18.9
13405.812500	47.42	74.00	26.58	H	12.6
14417.312500	47.88	74.00	26.12	V	13.0
15726.312500	48.30	74.00	25.70	V	14.3
17121.500000	51.16	74.00	22.84	H	17.0

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5051.000000	38.44	54.00	15.56	H	14.3
6190.000000	41.99	54.00	12.01	V	18.9
13446.500000	36.49	54.00	17.51	H	12.6
14455.812500	37.10	54.00	16.90	H	13.0
15763.500000	38.60	54.00	15.40	V	14.5
17140.750000	40.52	54.00	13.48	H	17.1

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5171.000000	49.45	74.00	24.55	V	14.6
6247.000000	51.75	74.00	22.25	V	18.5
12464.050000	46.13	74.00	27.87	V	11.4
14489.937500	47.37	74.00	26.63	V	13.0
15732.437500	48.12	74.00	25.88	V	14.3
17268.937500	50.06	74.00	23.94	V	16.9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5193.000000	38.25	54.00	15.75	H	14.7
6151.000000	40.93	54.00	13.07	V	18.4
12554.350000	36.20	54.00	17.80	H	11.5
14402.000000	37.10	54.00	16.90	V	13.0
15732.437500	38.14	54.00	15.86	V	14.3
17166.125000	40.09	54.00	13.91	V	17.0

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:

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

See below for test graphs.

Conclusion: Pass

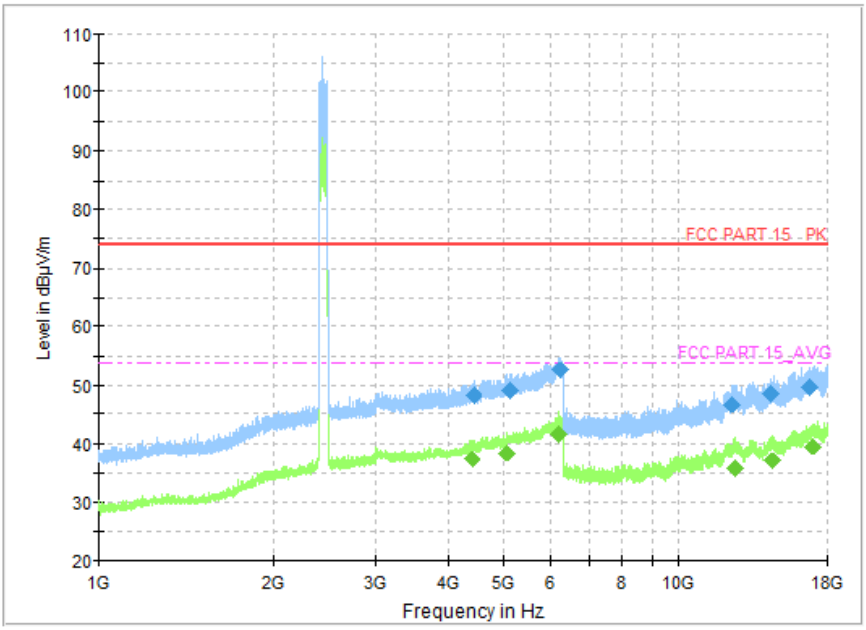


Fig.45 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 1M

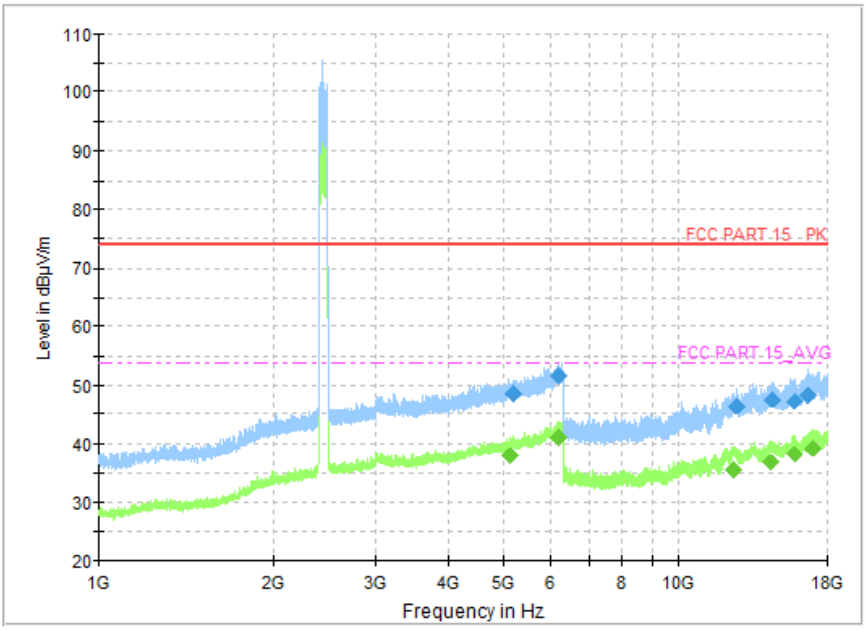


Fig.46 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 1M

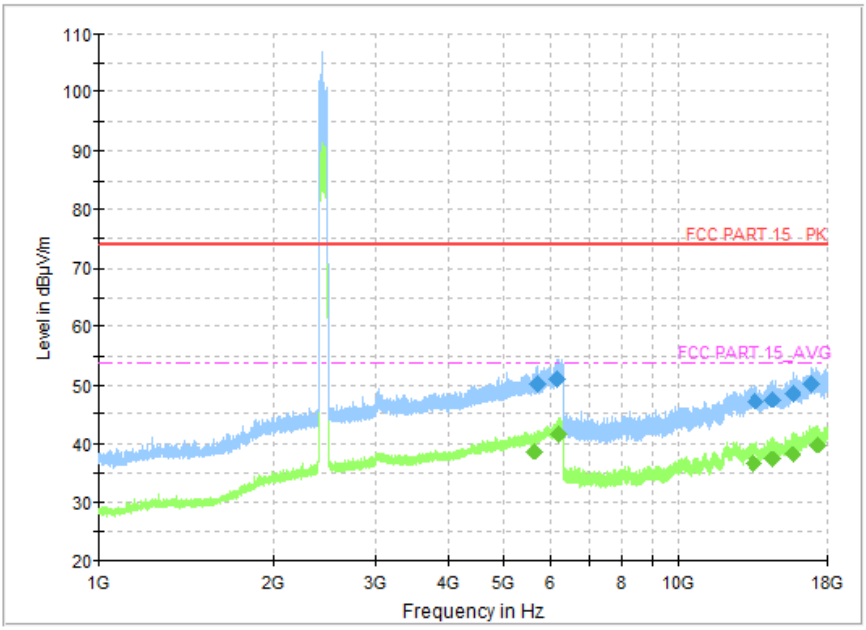


Fig.47 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 1M

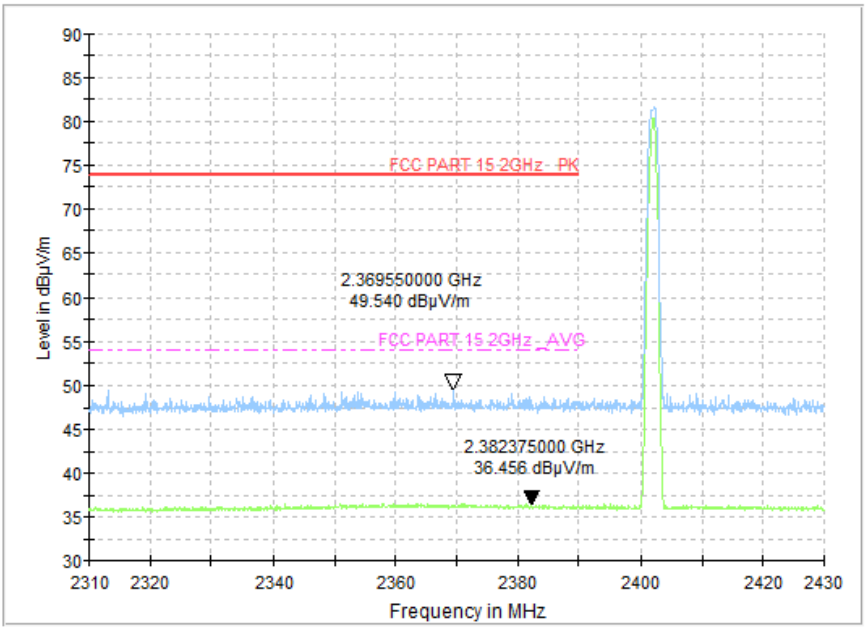


Fig.48 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 1M

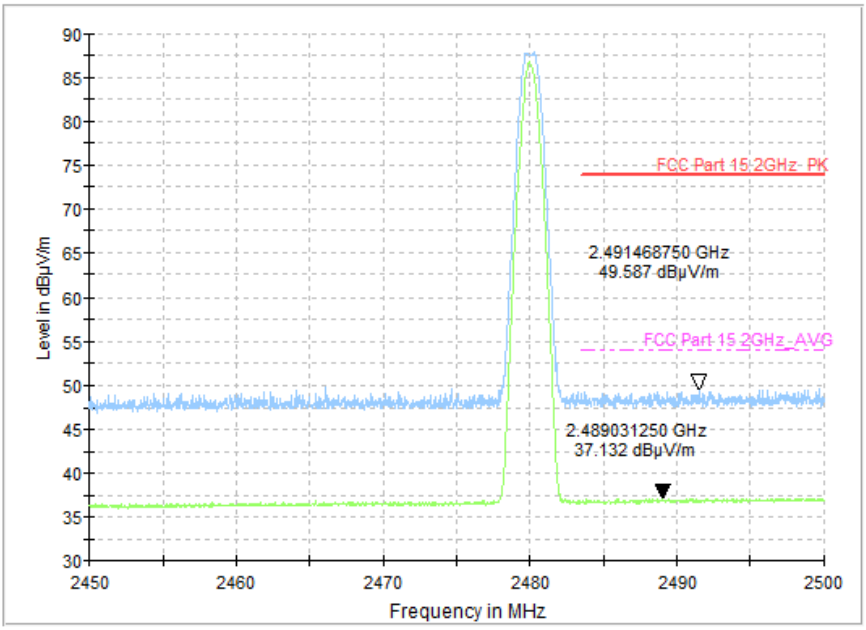


Fig.49 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 1M

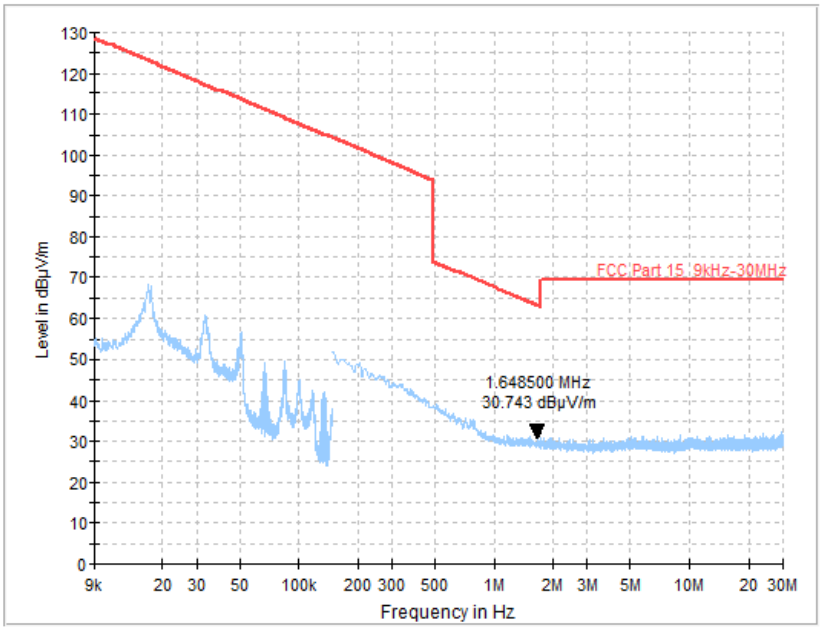


Fig.50 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 1M

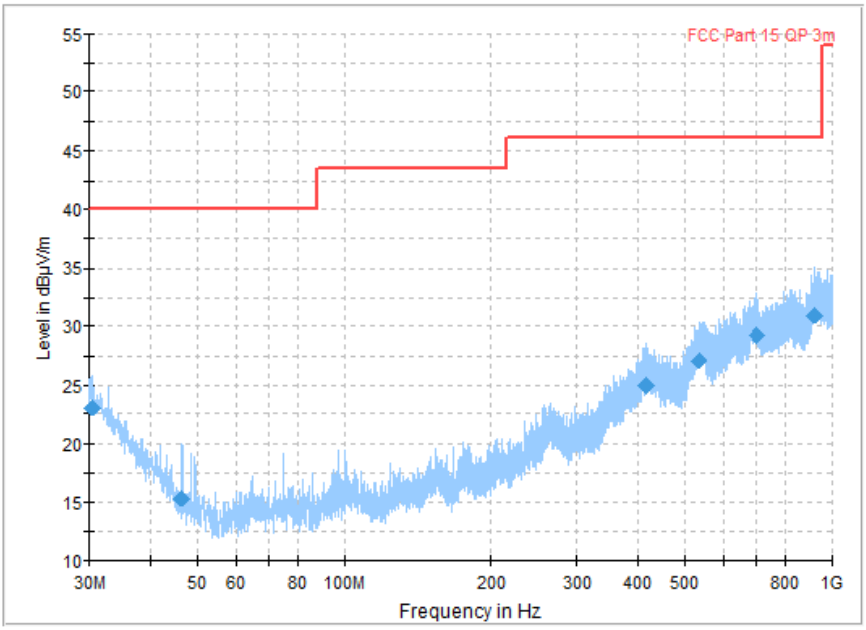


Fig.51 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 1M

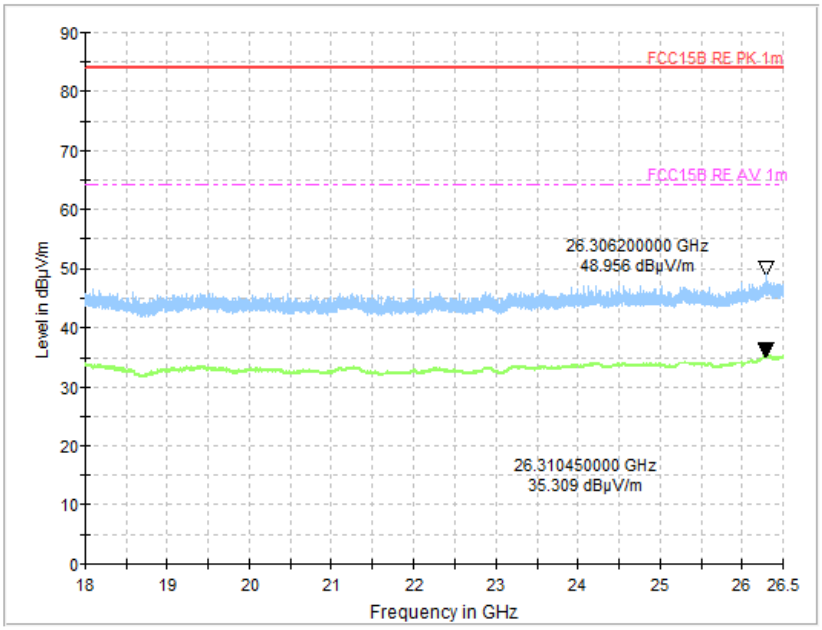


Fig.52 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 1M

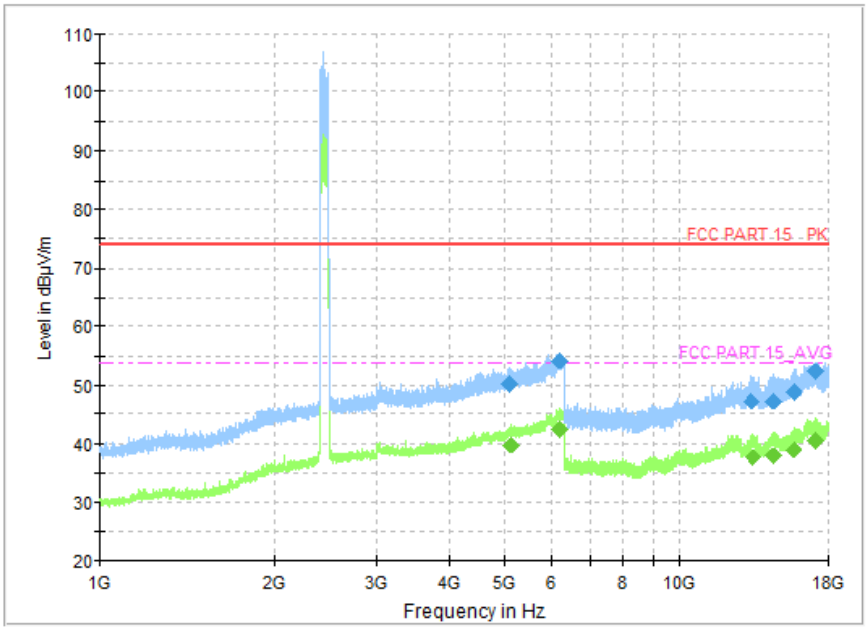


Fig.53 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 2M

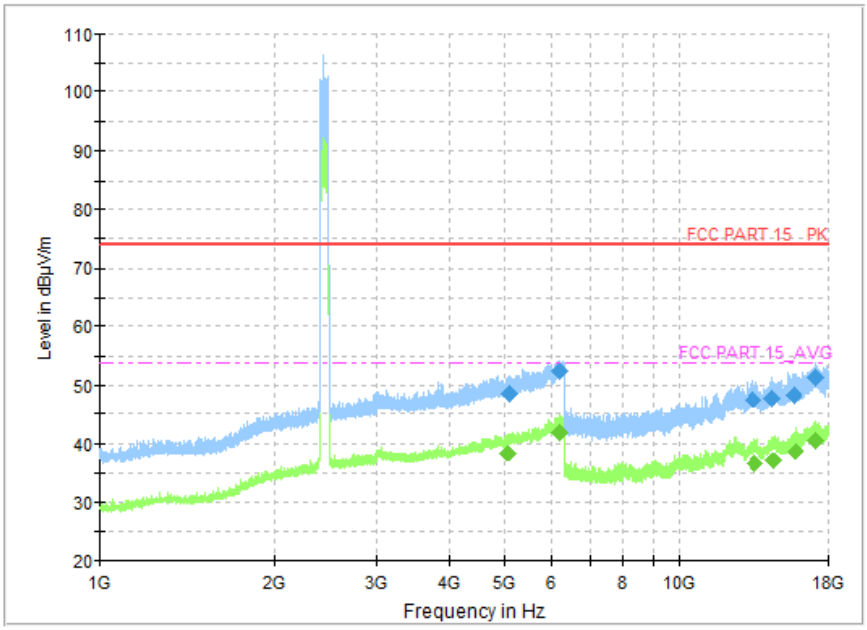


Fig.54 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 2M

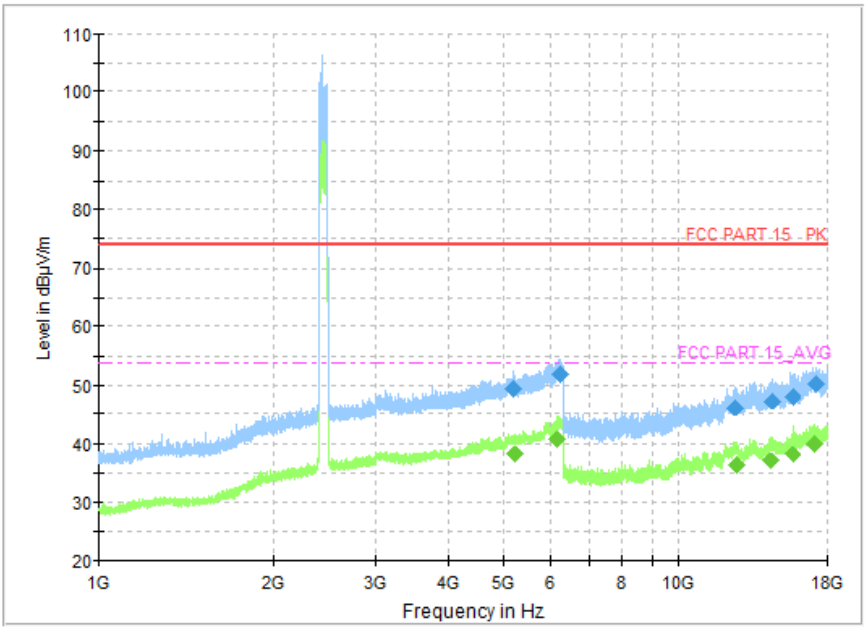


Fig.55 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 2M

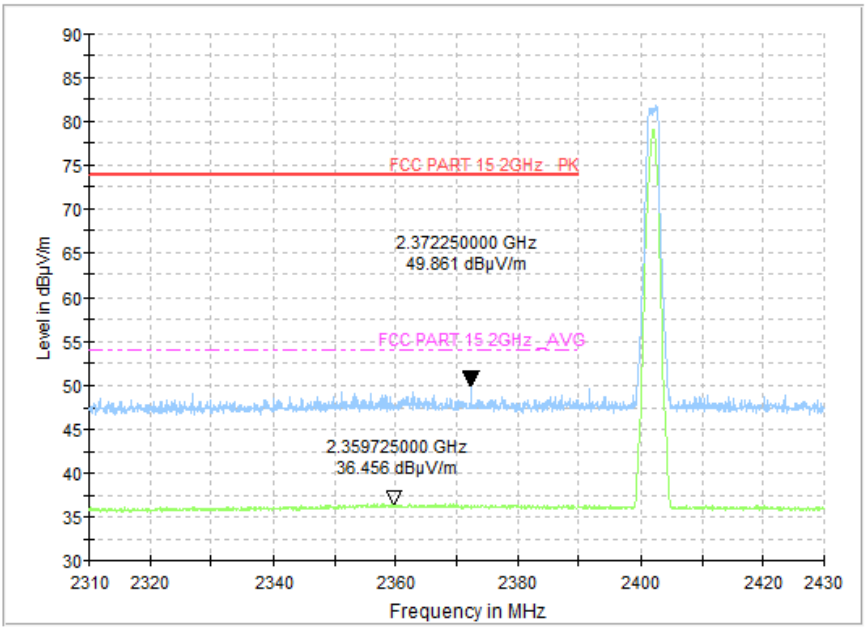


Fig.56 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 2M

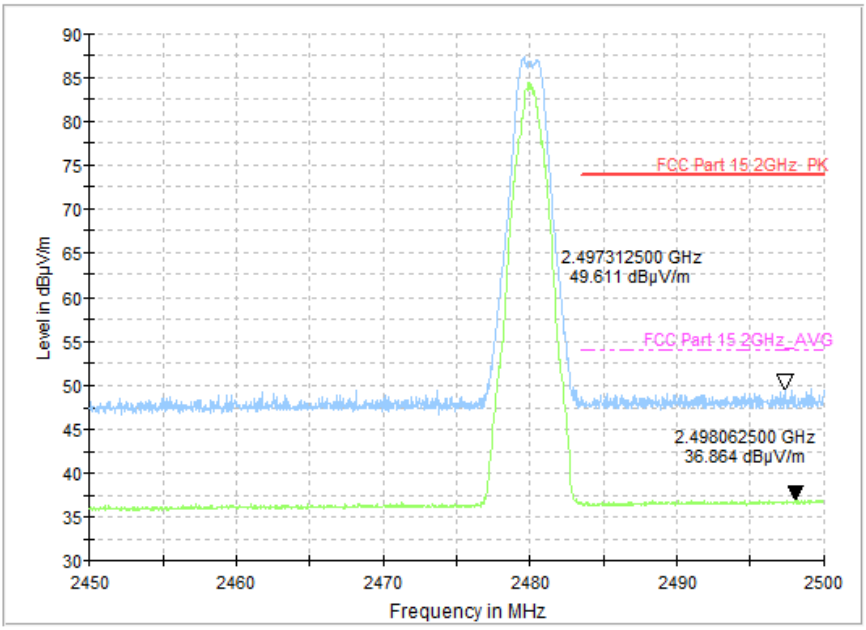


Fig.57 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 2M

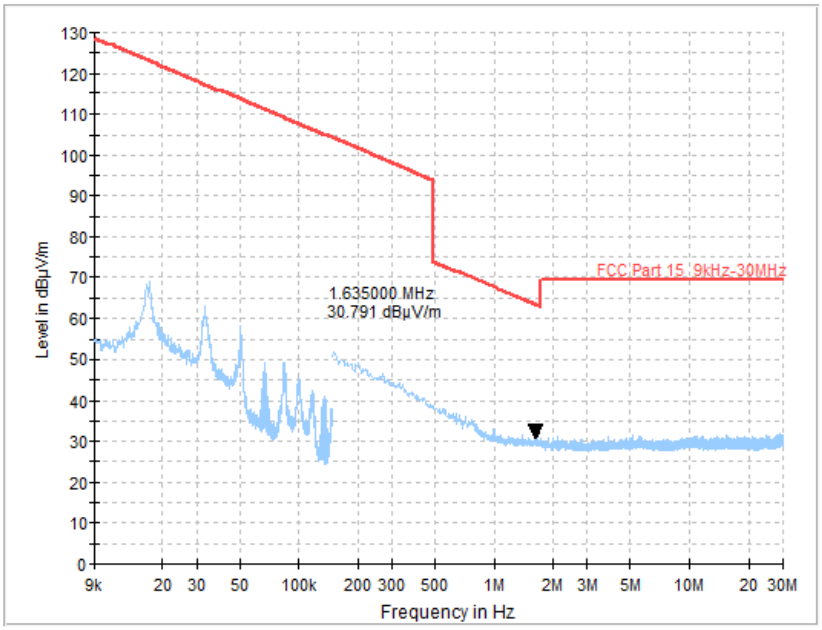


Fig.58 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 2M

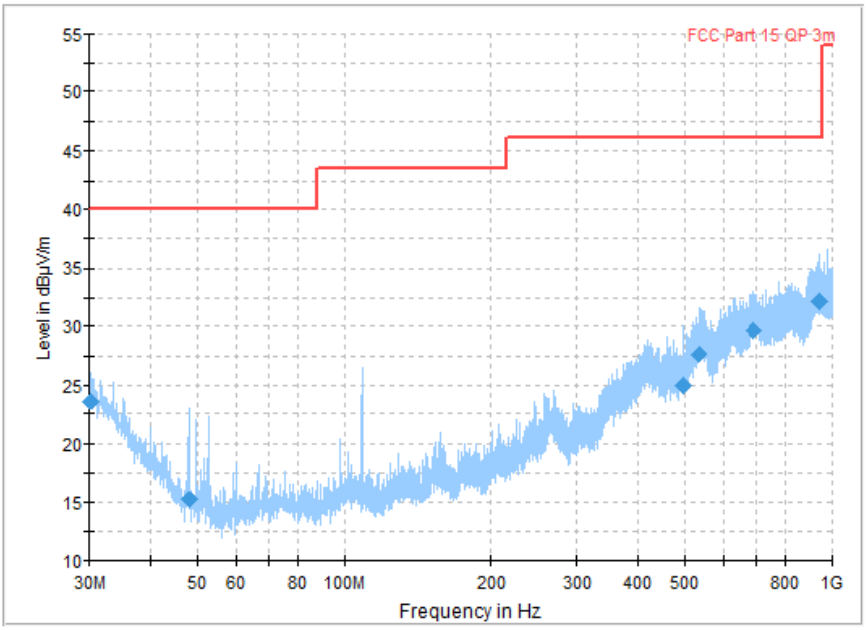


Fig.59 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 2M

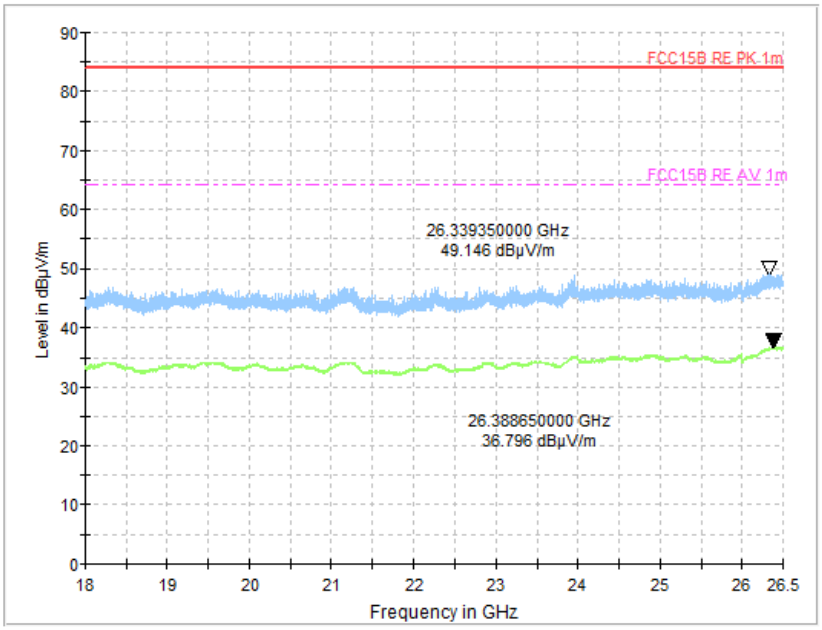


Fig.60 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 2M

A.7 AC Power line Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

For LE 1M:

BLE (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.61	Fig.62	**P**
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

BLE (Average Limit)

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.61	Fig.62	**P**
0.5 to 5	46			
5 to 30	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.

For LE 2M:

BLE (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.16 to 0.5	66 to 56	Fig.63	Fig.64	**P**
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

BLE (Average Limit)

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.63	Fig.64	**P**
0.5 to 5	46			
5 to 30	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

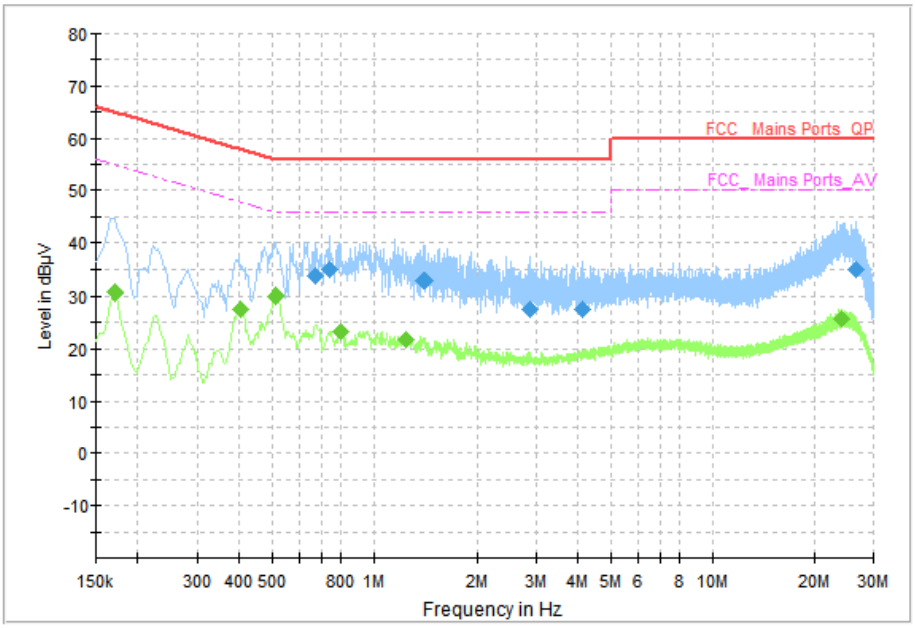


Fig.61 AC Power line Conducted Emission (Traffic, LE 1M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.674000	33.58	56.00	22.42	N	ON	10
0.738000	34.74	56.00	21.26	N	ON	10
1.410000	32.74	56.00	23.26	N	ON	10
2.862000	27.48	56.00	28.52	N	ON	10
4.126000	27.55	56.00	28.45	N	ON	10
26.722000	34.88	60.00	25.12	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	30.75	54.96	24.22	L1	ON	10
0.402000	27.42	47.81	20.39	L1	ON	10
0.514000	29.94	46.00	16.06	L1	ON	10
0.798000	23.19	46.00	22.81	N	ON	10
1.250000	21.72	46.00	24.28	N	ON	10
24.050000	25.85	50.00	24.15	N	ON	10

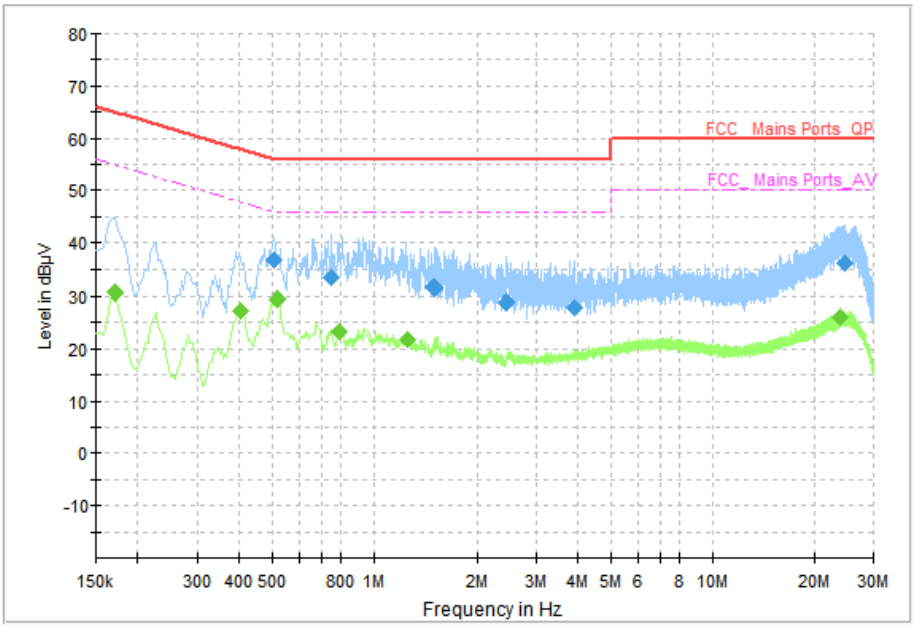


Fig.62 AC Power line Conducted Emission (Idle, LE 1M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.506000	36.70	56.00	19.30	N	ON	10
0.750000	33.28	56.00	22.72	N	ON	10
1.506000	31.50	56.00	24.50	N	ON	10
2.442000	28.83	56.00	27.17	N	ON	10
3.886000	28.00	56.00	28.00	N	ON	10
24.590000	36.19	60.00	23.81	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	30.76	54.96	24.20	L1	ON	10
0.402000	27.35	47.81	20.46	L1	ON	10
0.518000	29.48	46.00	16.52	L1	ON	10
0.794000	23.31	46.00	22.69	N	ON	10
1.258000	21.80	46.00	24.20	N	ON	10
23.946000	25.90	50.00	24.10	N	ON	10

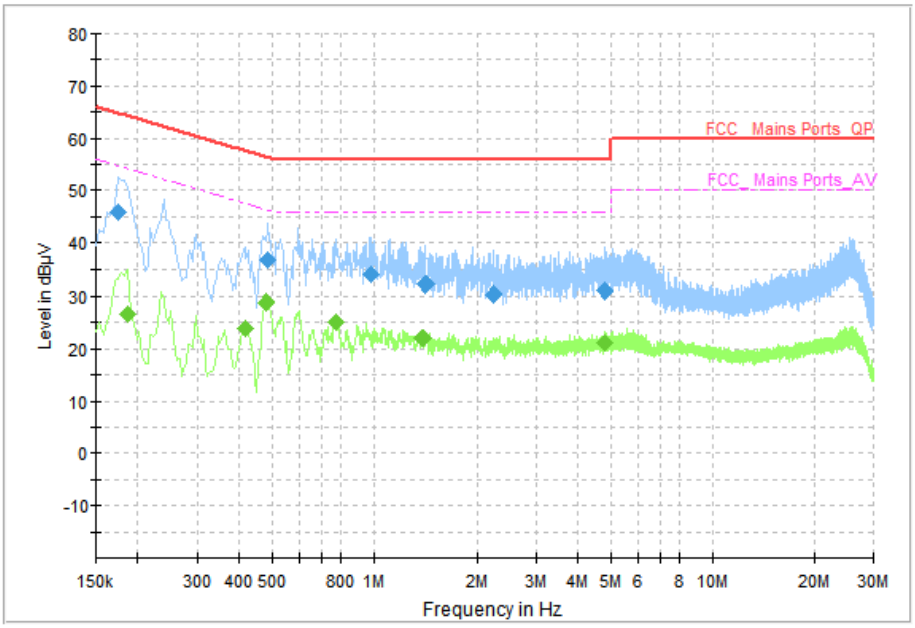


Fig.63 AC Power line Conducted Emission (Traffic, LE 2M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174000	45.83	64.77	18.93	N	ON	10
0.486000	36.56	56.24	19.68	L1	ON	10
0.986000	33.88	56.00	22.12	L1	ON	10
1.418000	32.20	56.00	23.80	L1	ON	10
2.242000	30.41	56.00	25.59	L1	ON	10
4.794000	30.79	56.00	25.21	L1	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	26.69	54.21	27.53	N	ON	10
0.418000	23.91	47.49	23.58	L1	ON	10
0.478000	28.78	46.37	17.60	L1	ON	10
0.770000	25.15	46.00	20.85	L1	ON	10
1.382000	21.94	46.00	24.06	L1	ON	10
4.794000	21.23	46.00	24.77	L1	ON	10

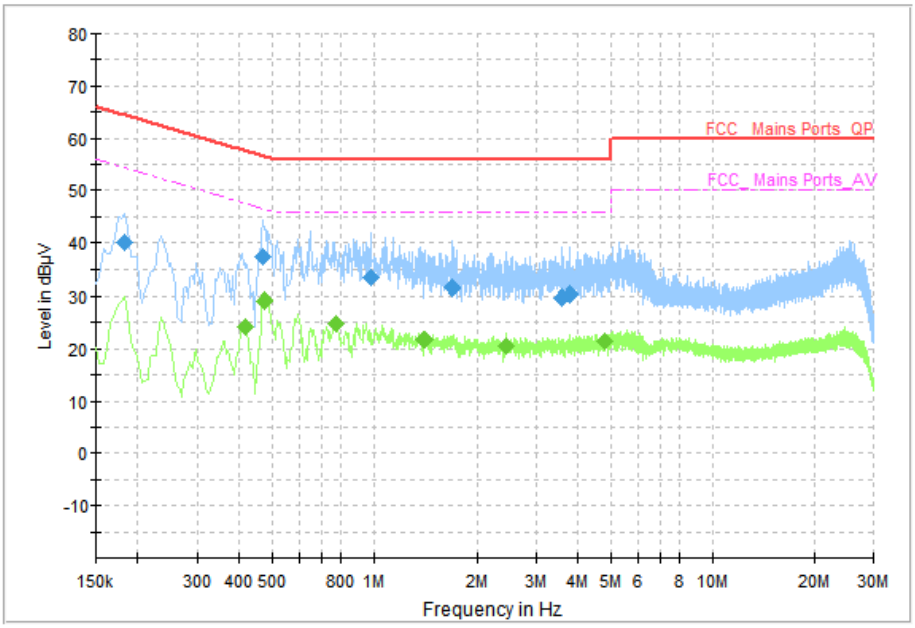


Fig.64 AC Power line Conducted Emission (Idle, LE 2M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	40.19	64.39	24.21	N	ON	10
0.470000	37.35	56.51	19.16	L1	ON	10
0.978000	33.47	56.00	22.53	L1	ON	10
1.698000	31.62	56.00	24.38	L1	ON	10
3.582000	29.58	56.00	26.42	L1	ON	10
3.774000	30.16	56.00	25.84	L1	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.414000	24.31	47.57	23.26	L1	ON	10
0.474000	29.05	46.44	17.39	L1	ON	10
0.774000	24.90	46.00	21.10	L1	ON	10
1.402000	21.88	46.00	24.12	L1	ON	10
2.454000	20.49	46.00	25.51	L1	ON	10
4.814000	21.34	46.00	24.66	L1	ON	10

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