



**FCC PART 15C
TEST REPORT
No. I19N02247-BLE**

For

Doro AB

LTE phone

Model Name: DSB-0230

With

Hardware Version: 1031

Software Version:

MAGIC01A-S10A_DSB0230_123_USERDEBUG_190925

FCC ID: WS5DSB0230

Issued Date: 2019-11-19

Designation Number: CN1210

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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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19N02247-BLE	Rev.0	1st edition	2019-11-19

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1. Test Laboratory

1.1. Testing Location

Location: Shenzhen Academy of Information and Communications Technology
Address: Building G, Shenzhen International Innovation Center, No.1006
Shennan Road, Futian District, Shenzhen, Guangdong Province, China
Postal Code: 518026
Telephone: +86(0)755-33322000
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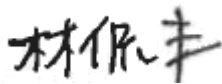
1.2. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2019-10-08
Testing End Date: 2019-10-25

1.4. Signature



Lin Kanfeng
(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: Doro AB
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2.2. Manufacturer Information

Company Name: CK TELECOM LTD.
Address: Technology Road. High-Tech Development Zone. Heyuan,
Guangdong, P.R.China
Contact: mourong xie
Email: mourong.xie@ck-telecom.com
Telephone: 0755-26739100 ext.8514
Fax: 0755-26739600

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

3.1. About EUT

Description	LTE phone
Model Name	DSB-0230
Brand Name	Doro
Frequency Range	2400MHz~2483.5MHz
Type of Modulation	GFSK
Number of Channels	40
Antenna Type	Integrated
Antenna Gain	0.7dBi
Power Supply	3.85V DC by Battery
FCC ID	WS5DSB0230
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer.

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	358707100008323	1031	MAGIC01A-S10A_DSB0230_1 23_USERDEBUG_190925	2019-10-08

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

3.3. Internal Identification of AE

AE ID*	Description	Mode	Manufacturer
AE1	Battery	DBV 3000A	Dongguang HongDe Battery Co.,Ltd
AE2	Charger	UT-133E-5100BY	Shenzhen BaiJunDa Electronic Co., LTD
AE3	Charger	A806A-050100U-UK1	Dongguan Aohai Power 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 LTE phone with integrated antenna and battery.

It consists of normal options: travel charger, USB cable and Phone.

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	2018
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Results

5.1. Summary of 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.

5.2. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.1 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

5.3. Terms used in the result table

Terms used in Verdict column

P	Pass
NA	Not Available
F	Fail

Abbreviations

AC	Alternating Current
AFH	Adaptive Frequency Hopping
BW	Band Width
E.I.R.P.	equivalent isotropic radiated power
ISM	Industrial, Scientific and Medical
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
Tx	Transmitter

5.4. Laboratory Environment

Semi-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014 MHz - 1 MHz, > 60 dB; 1 MHz - 1000 MHz, > 90 dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3m/10m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielded room

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

Fully-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014 MHz - 1MHz, > 60dB; 1 MHz - 1000 MHz, > 90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3m distance

6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2020-01-16	1 year
2	Power Sensor	U2021XA	MY55430013	Agilent	2020-01-16	1 year
3	Data Acquisition	U2531A	TW55443507	Agilent	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	LISN	ESH2-Z5	100196	R&S	2020-01-03	1 year
2	Test Receiver	ESCI	100701	R&S	2020-08-06	1 year
3	Loop Antenna	HLA6120	35779	TESEQ	2022-05-01	3 year
4	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2020-02-17	3 year
5	Horn Antenna	3117	00066585	ETS-Lindgren	2022-03-04	3 year
6	Test Receiver	ESR7	101675	R&S	2020-07-18	1 year
7	Spectrum Analyzer	FSP 40	100378	R&S	2019-12-13	1 year
8	Chamber	FACT5-2.0	4166	ETS-Lindgren	2021-05-12	3 year
9	Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2020-01-15	3 year
10	Antenna	QSH-SL-2 6-40-K-20	17014	Q-par	2020-01-11	3 year

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

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. Measurement Uncertainty

Test Name	Uncertainty	
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	$30\text{MHz} \leq f \leq 1\text{GHz}$	±1.41dB
	$1\text{GHz} \leq f \leq 7\text{GHz}$	±1.92dB
	$7\text{GHz} \leq f \leq 13\text{GHz}$	±2.31dB
	$13\text{GHz} \leq f \leq 26\text{GHz}$	±2.61dB
5. Transmitter Spurious Emission - Radiated	$9\text{kHz} \leq f \leq 30\text{MHz}$	±1.84dB
	$30\text{MHz} \leq f \leq 1\text{GHz}$	±4.90dB
	$1\text{GHz} \leq f \leq 18\text{GHz}$	±5.12dB
	$18\text{GHz} \leq f \leq 40\text{GHz}$	±4.66dB
6. AC Power line Conducted Emission	$150\text{kHz} \leq f \leq 30\text{MHz}$	±3.10dB

ANNEX A: Detailed Test Results

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.

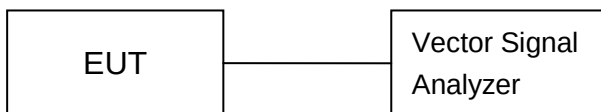
Conclusion: The Directional gains of antenna used for transmitting is 0.7dBi. The RF transmitter uses an integrate antenna without connector.

A.1 Test Configuration

A.1.1 Conducted Measurements

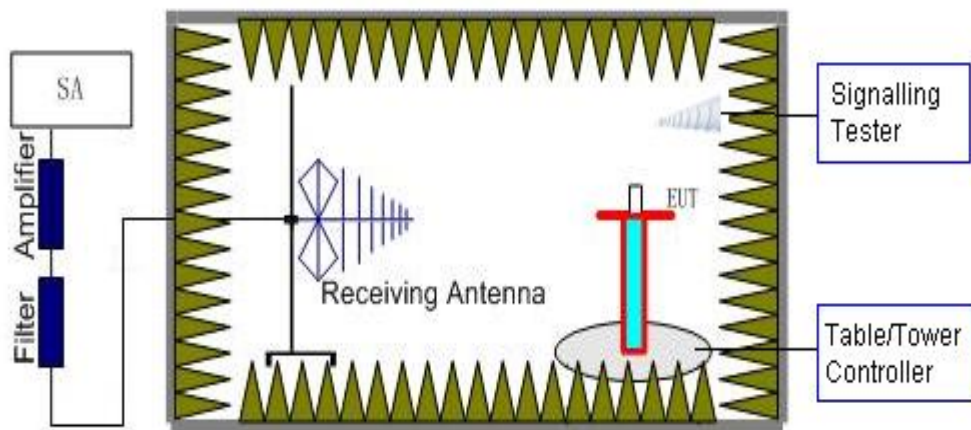
The measurement is made according to ANSI C63.10.

- 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.



A.1.2 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.



A.2 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)	< 30	< 36

Measurement Results:

LE-1M

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)	E.I.R.P (dBm)	Conclusion
GFSK	2402 (CH0)	1.79	2.49	P
	2440 (CH19)	1.30	2.00	P
	2480 (CH39)	1.02	1.72	P

Conclusion: Pass

A.3 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:

LE-1M

Mode	Frequency (MHz)	Peak Power Spectral Density (dBm)		Conclusion
GFSK	2402 (CH0)	Fig.1	-13.20	P
	2440 (CH19)	Fig.2	-13.73	P
	2480 (CH39)	Fig.3	-14.18	P

See below for test graphs.

Conclusion: PASS

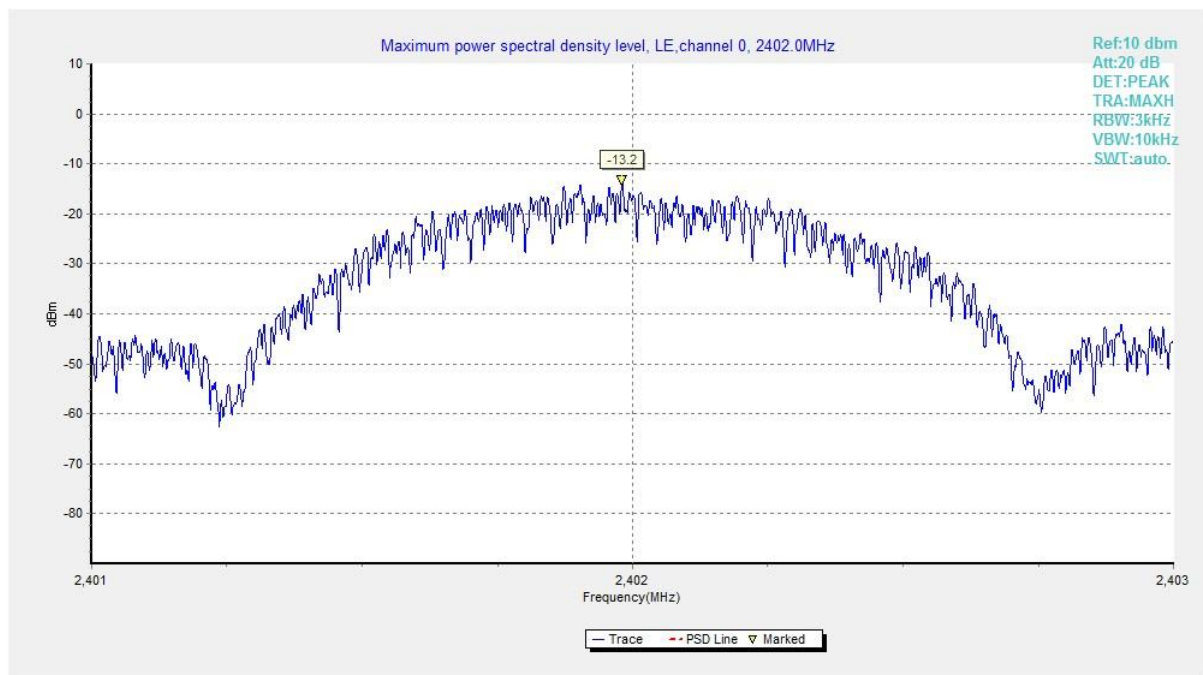


Fig.1 Power Spectral Density (Ch 0), 1M

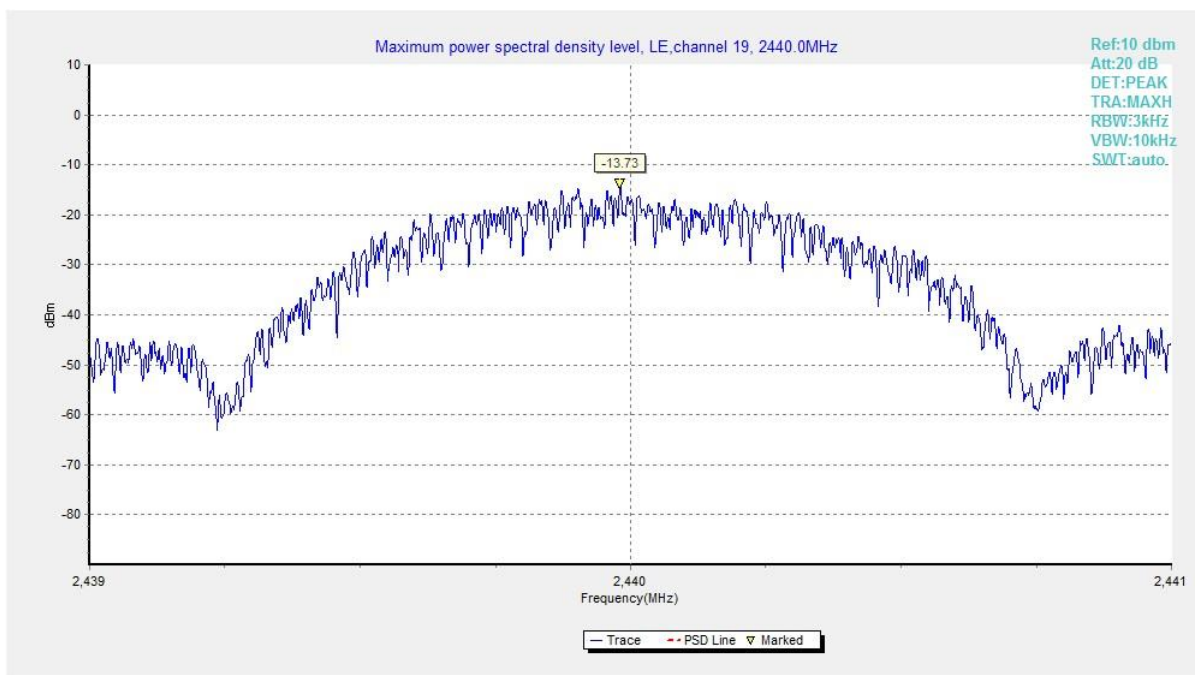


Fig.2 Power Spectral Density (Ch 19), 1M

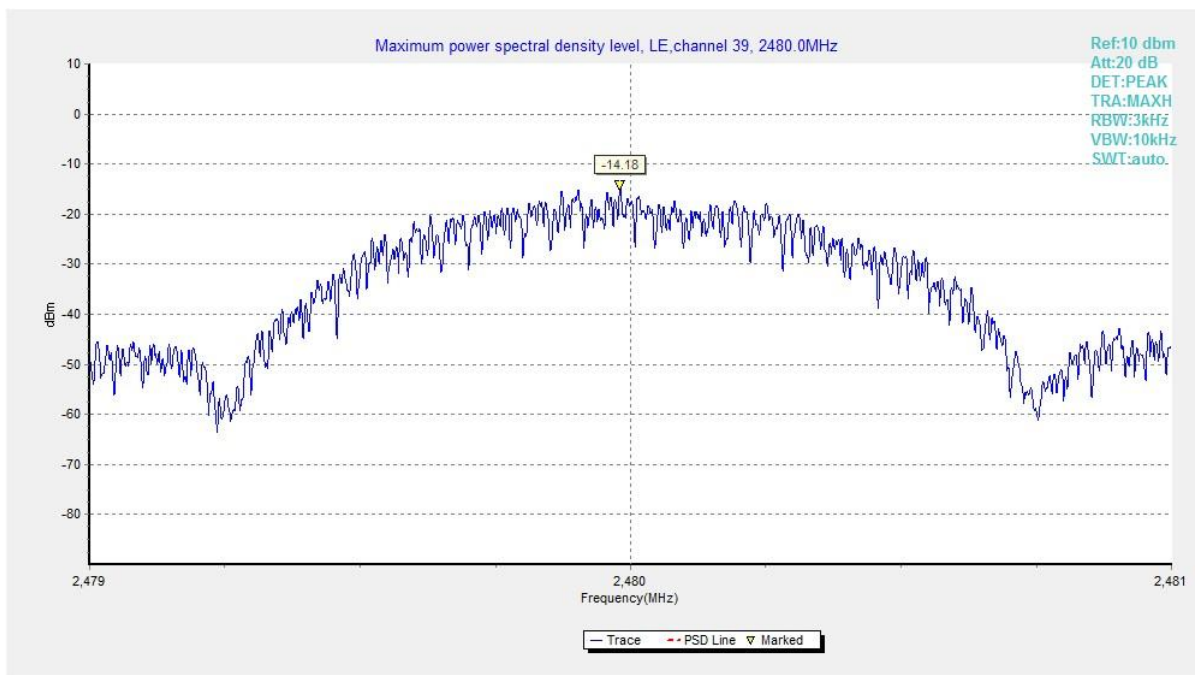


Fig.3 Power Spectral Density (Ch 39), 1M

A.4 6dB Bandwidth

Measurement Limit:

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

Measurement Result:

LE-1M

Mode	Frequency (MHz)	Test Results (kHz)		Conclusion
GFSK	2402 (CH0)	Fig.4	669.50	P
	2440 (CH19)	Fig.5	670.50	P
	2480 (CH39)	Fig.6	680.50	P

See below for test graphs.

Conclusion: PASS

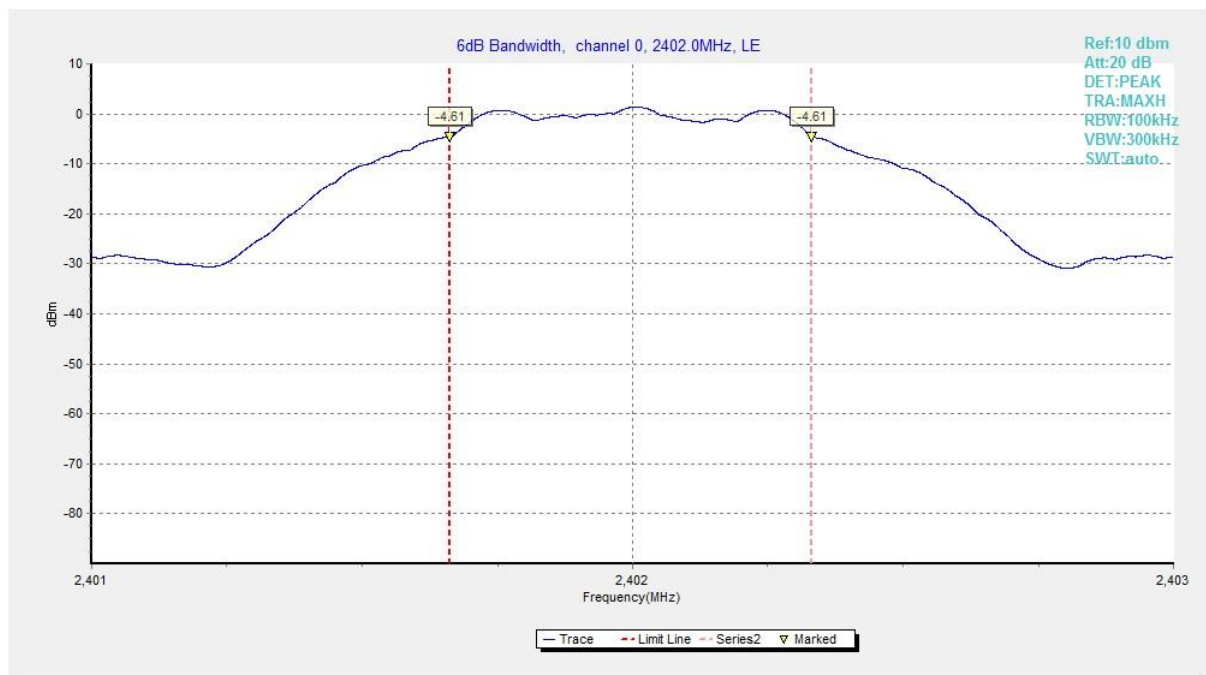


Fig.4 6dB Bandwidth (Ch 0), 1M

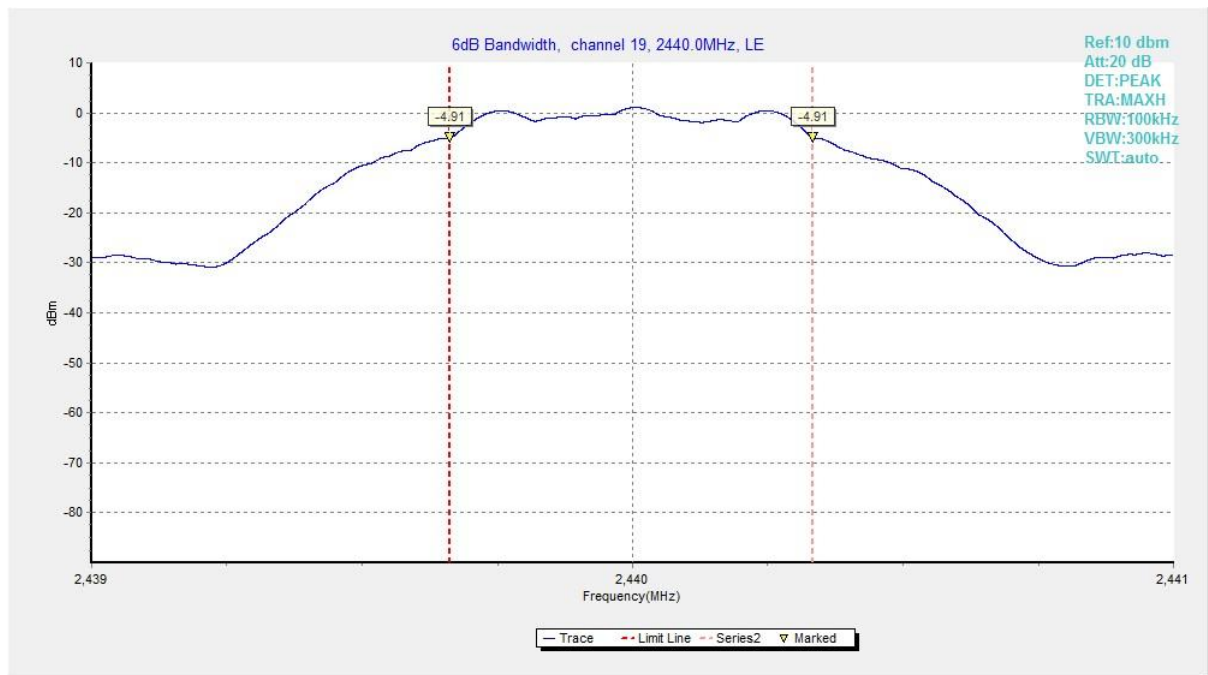


Fig.5 6dB Bandwidth (Ch 19), 1M



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

A.5 Band Edges Compliance

Measurement Limit:

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

Measurement Result:

LE-1M

Mode	Frequency (MHz)	Test Results		Conclusion
GFSK	2402(CH0)	Fig.7	56.00	P
	2480(CH39)	Fig.8	61.71	P

See below for test graphs.

Conclusion: Pass

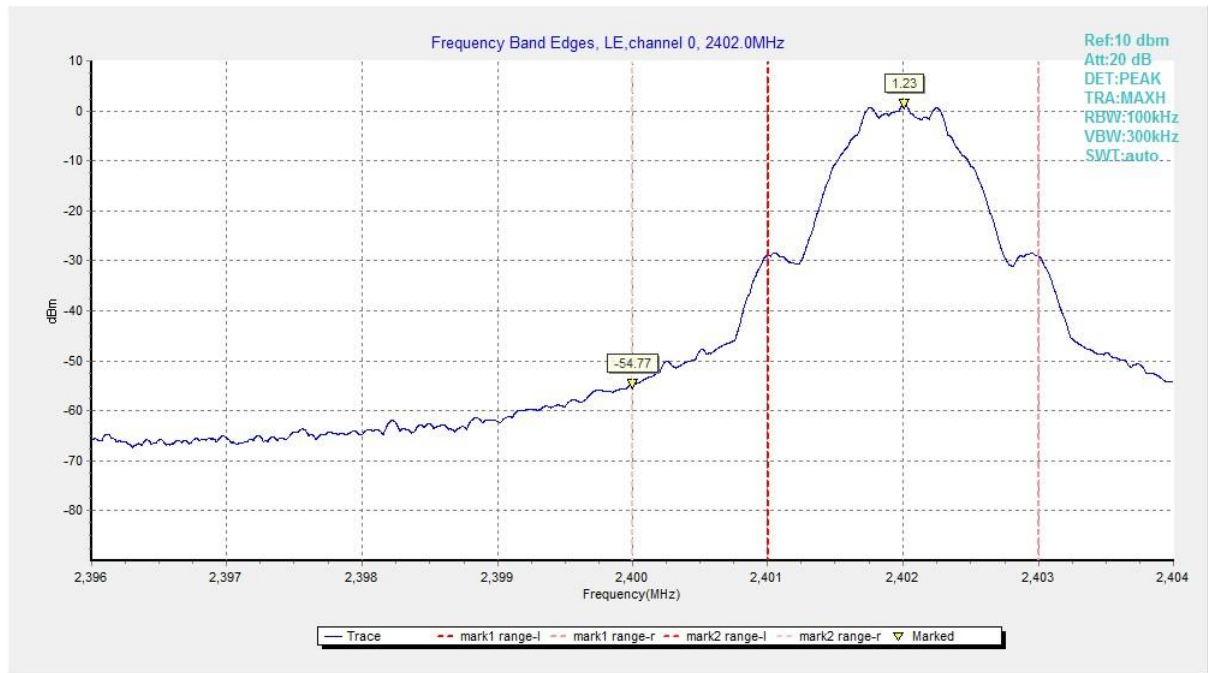


Fig.7 Band Edges (Ch 0), 1M

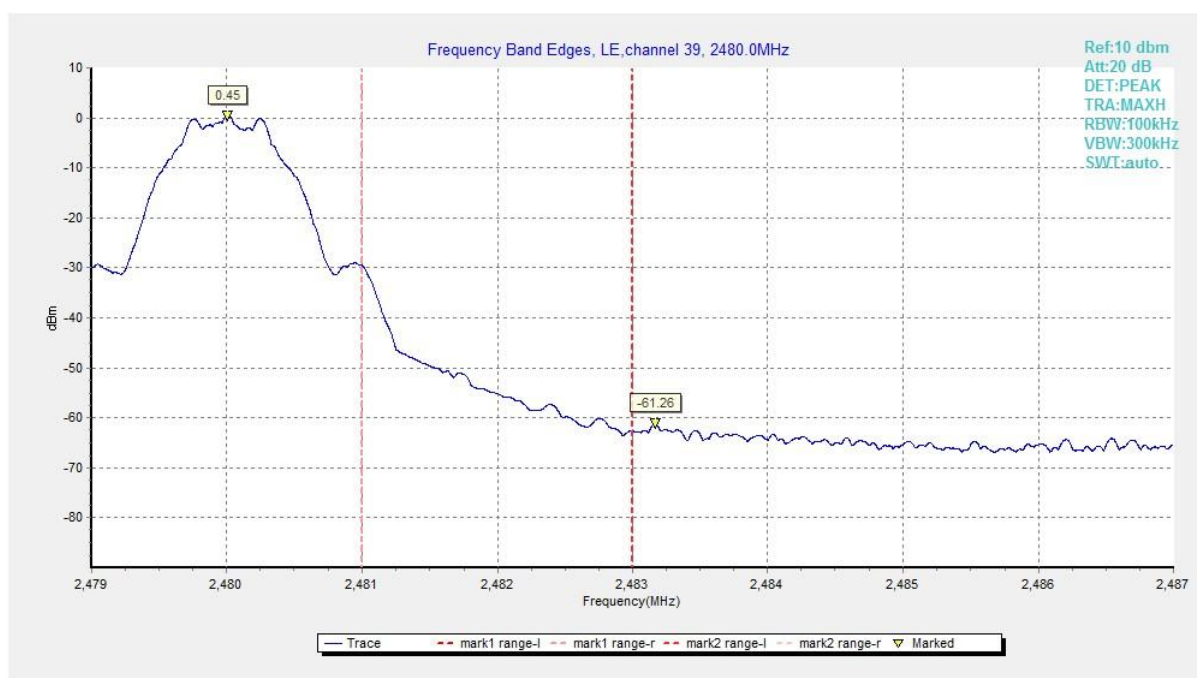


Fig.8 Band Edges (Ch 39), 1M

A.6 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:

LE-1M

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.402 GHz	Fig.9	P
		1GHz -3GHz	Fig.10	P
		3GHz-10GHz	Fig.11	P
	19	2.440 GHz	Fig.12	P
		1GHz -3GHz	Fig.13	P
		3GHz-10GHz	Fig.14	P
	39	2.480 GHz	Fig.15	P
		1GHz -3GHz	Fig.16	P
		3GHz-10GHz	Fig.17	P
	All channels	30MHz-1GHz	Fig.18	P
		10GHz-26GHz	Fig.19	P

See below for test graphs.

Note: Peak above the limit line is the carrier frequency.

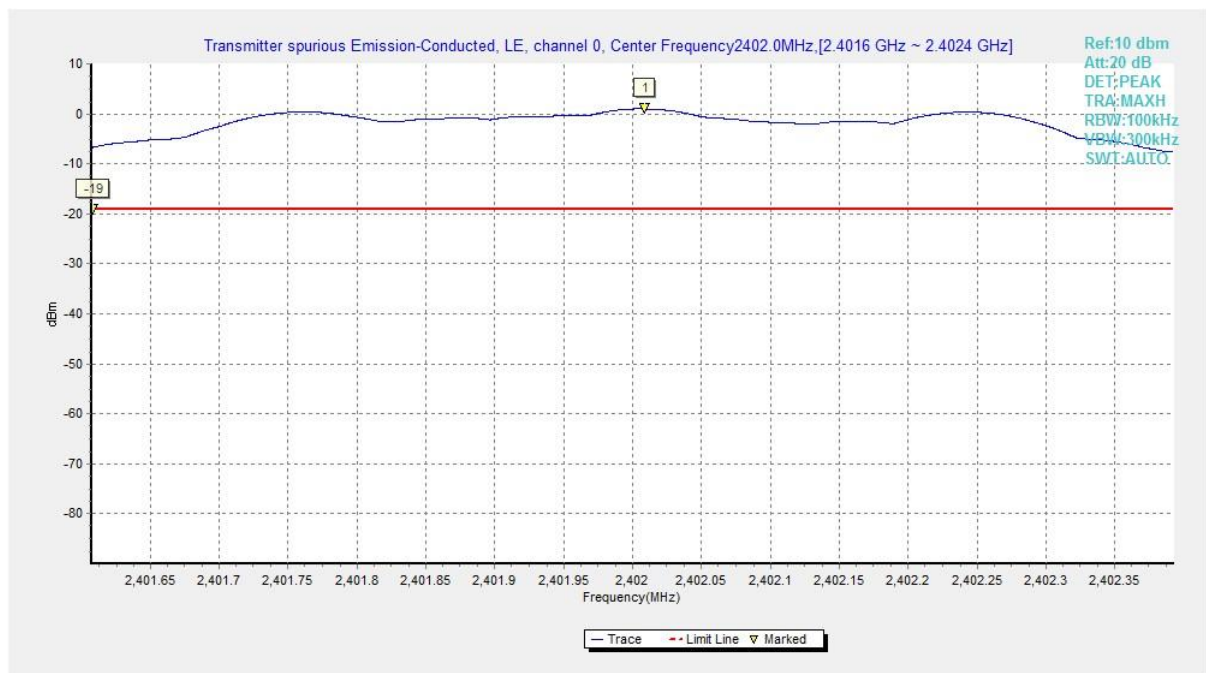


Fig.9 Conducted Spurious Emission (Ch0, Center Frequency), 1M

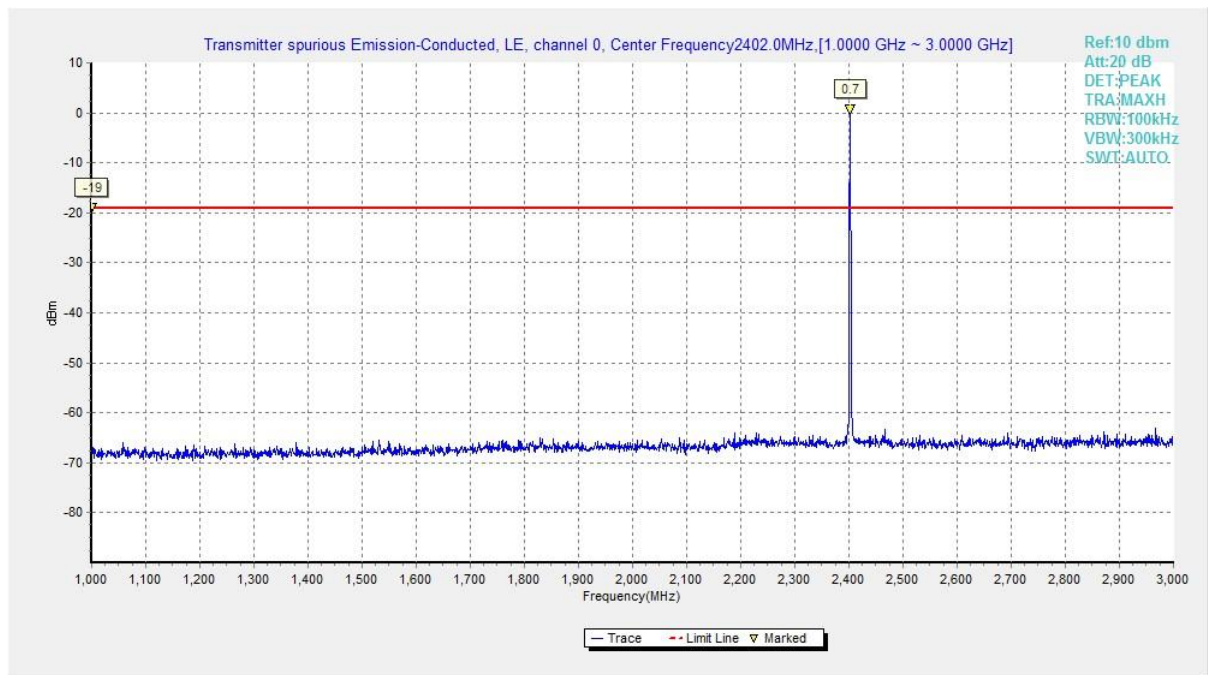


Fig.10 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), 1M

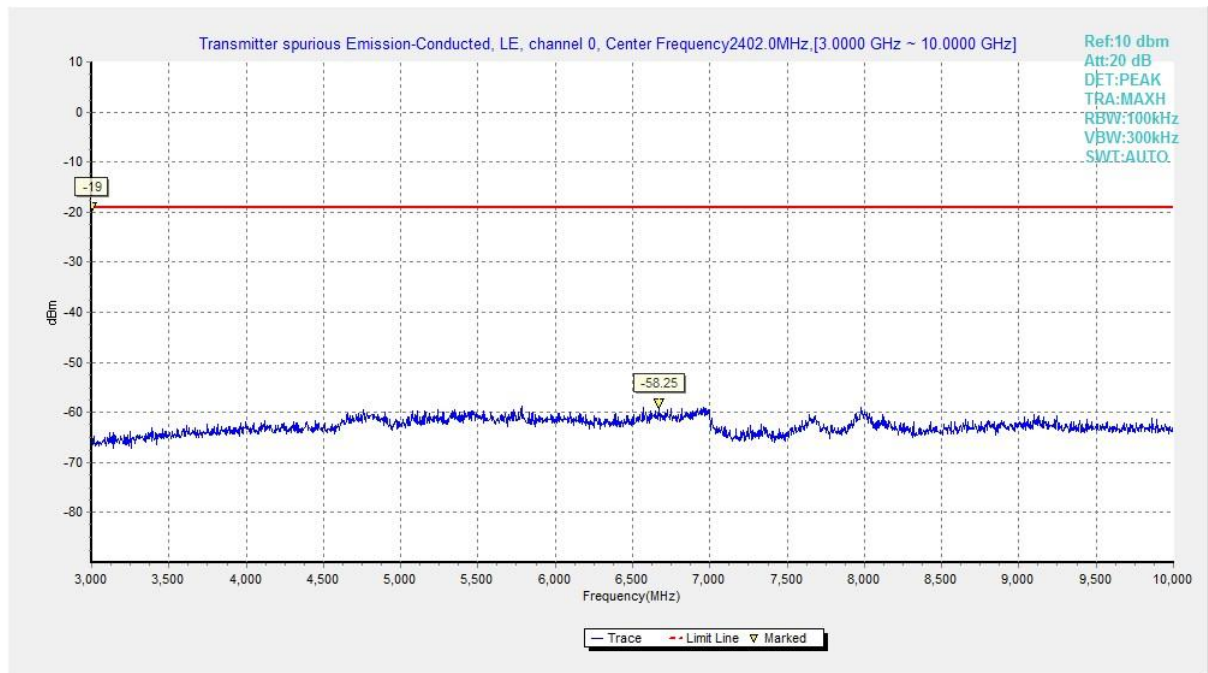


Fig.11 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), 1M

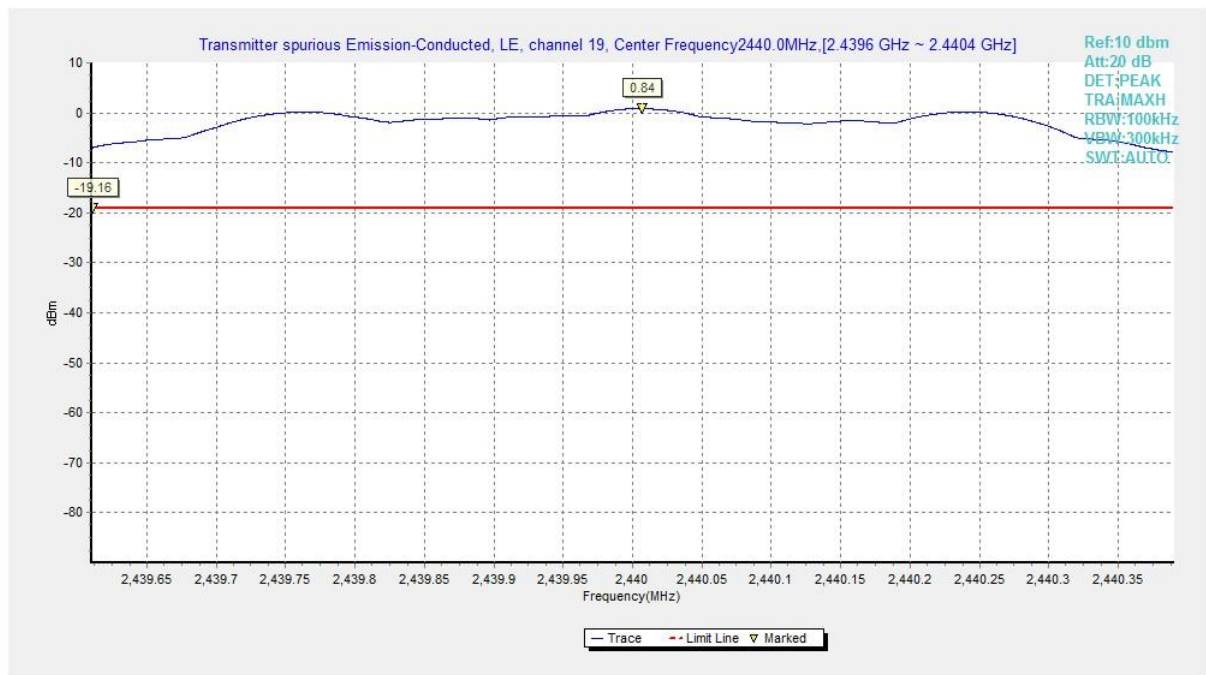


Fig.12 Conducted Spurious Emission (Ch19, Center Frequency), 1M

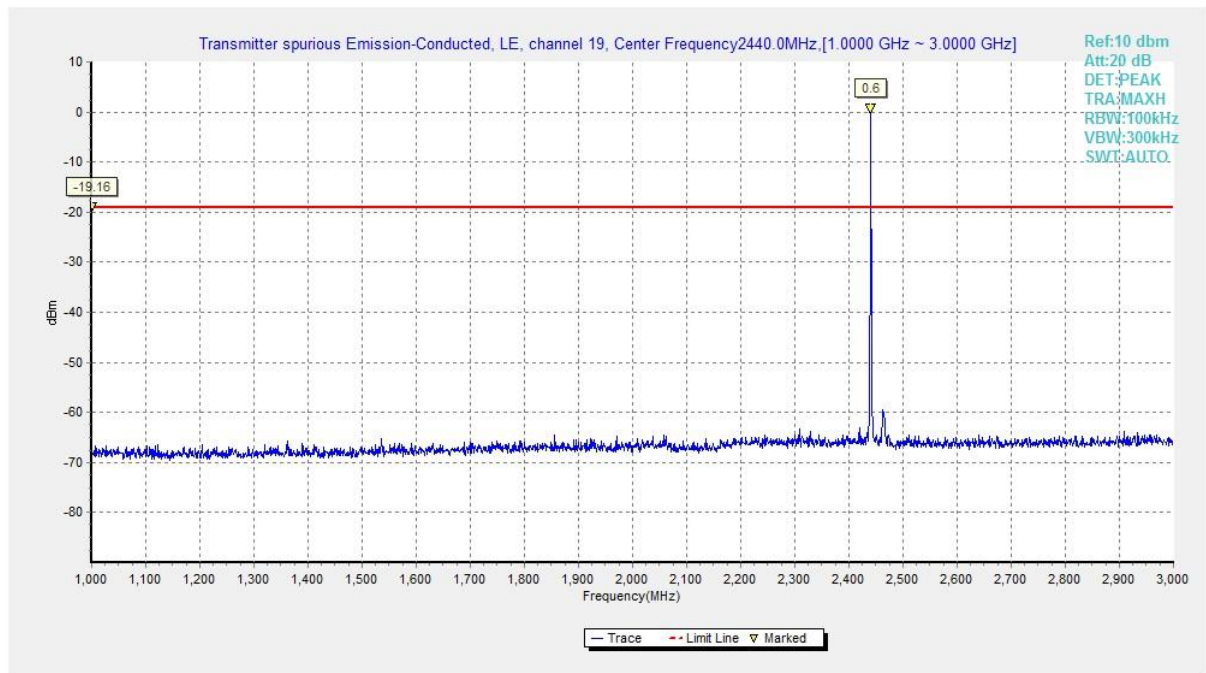


Fig.13 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), 1M

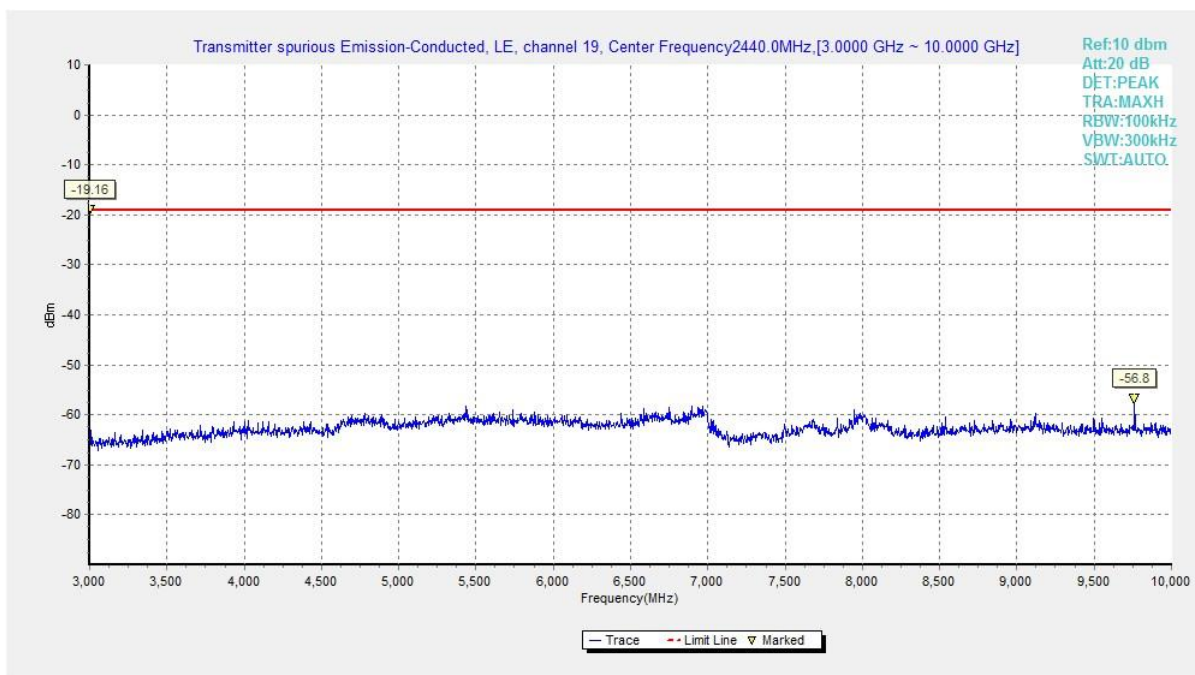


Fig.14 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), 1M



Fig.15 Conducted Spurious Emission (Ch39, Center Frequency), 1M

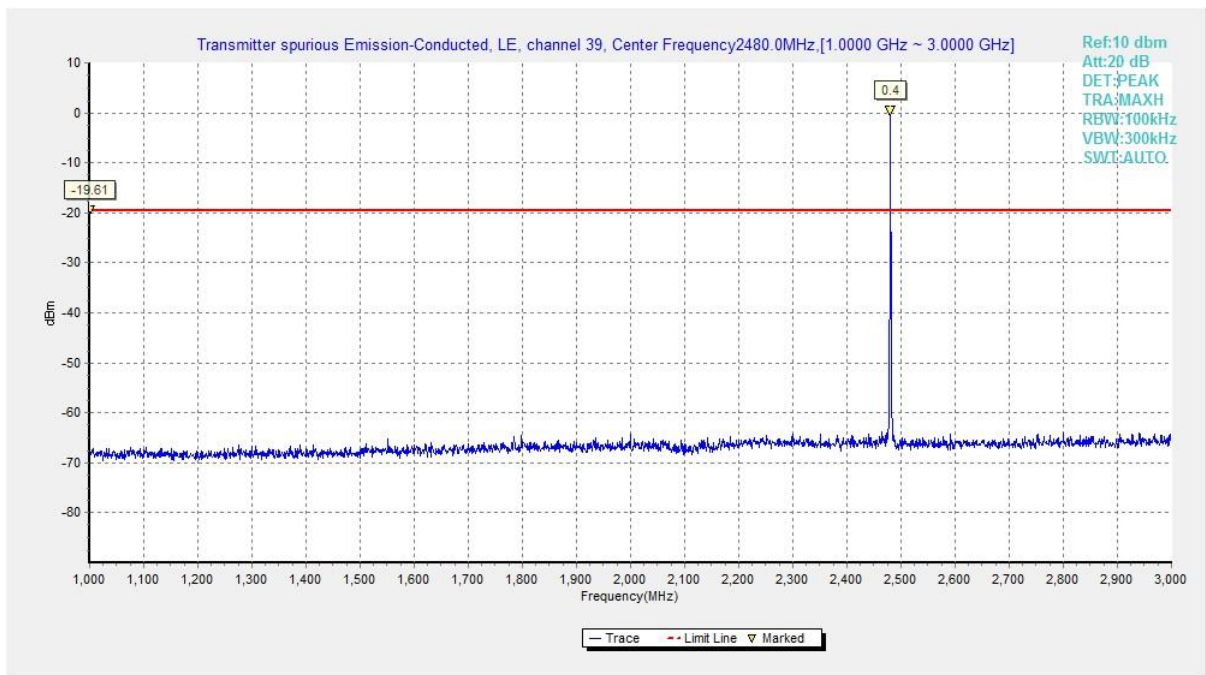


Fig.16 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), 1M

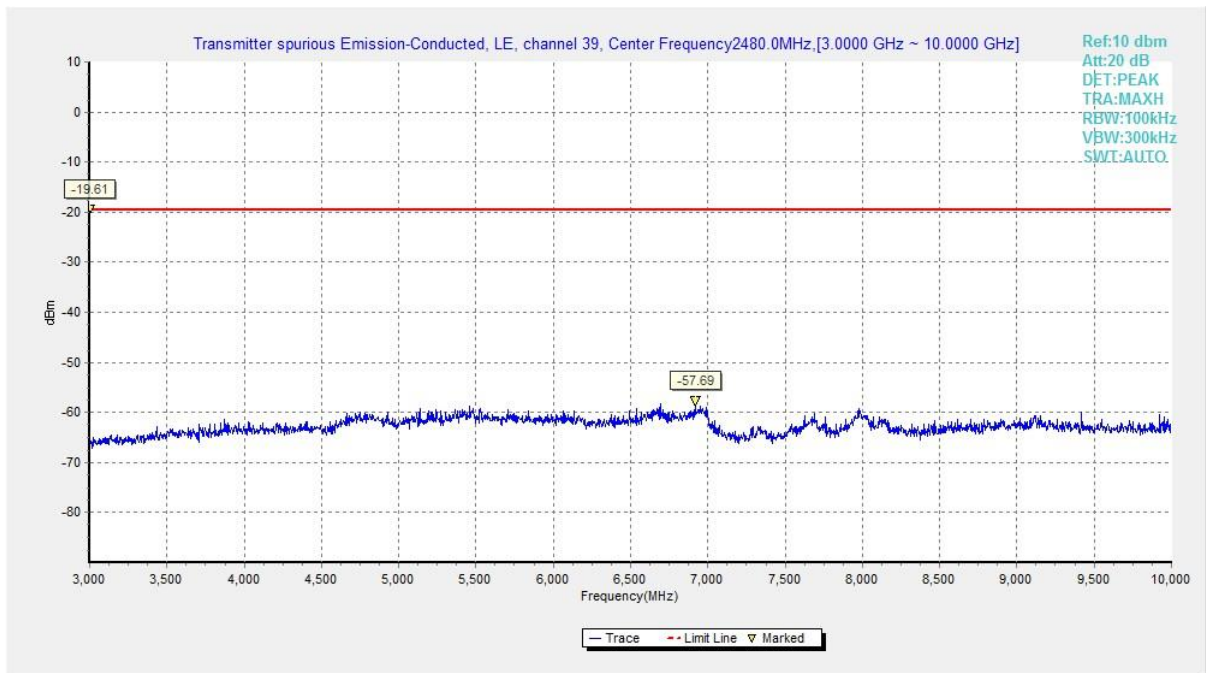


Fig.17 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), 1M

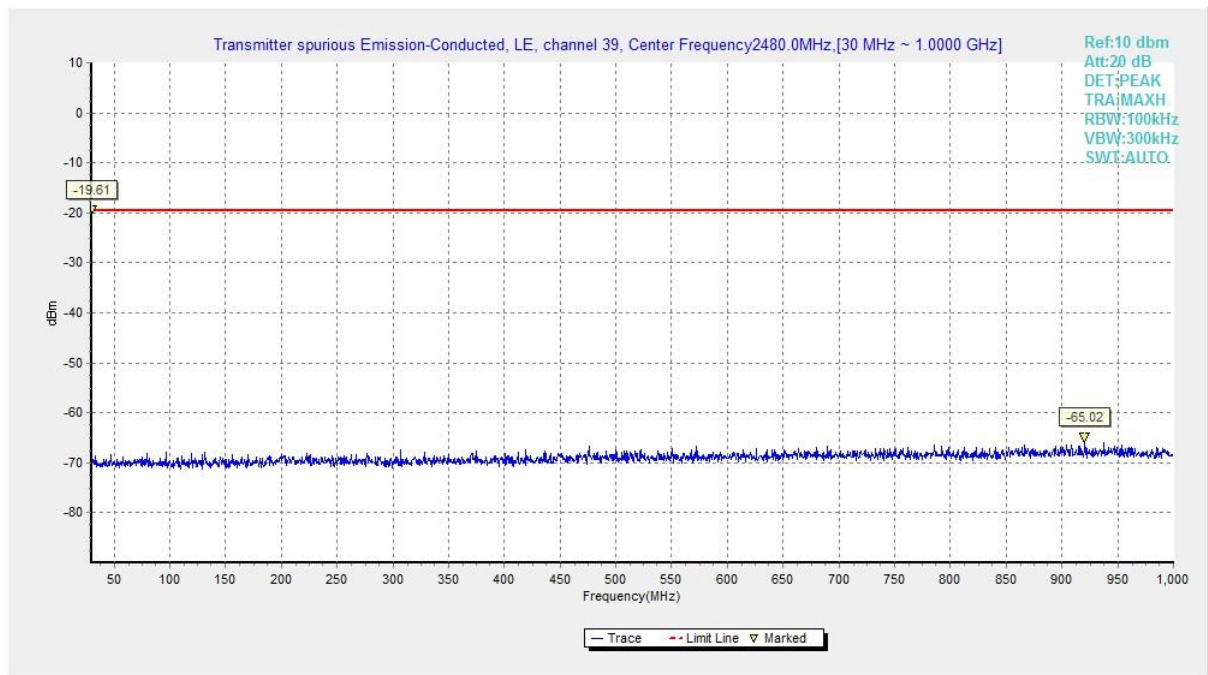


Fig.18 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), 1M

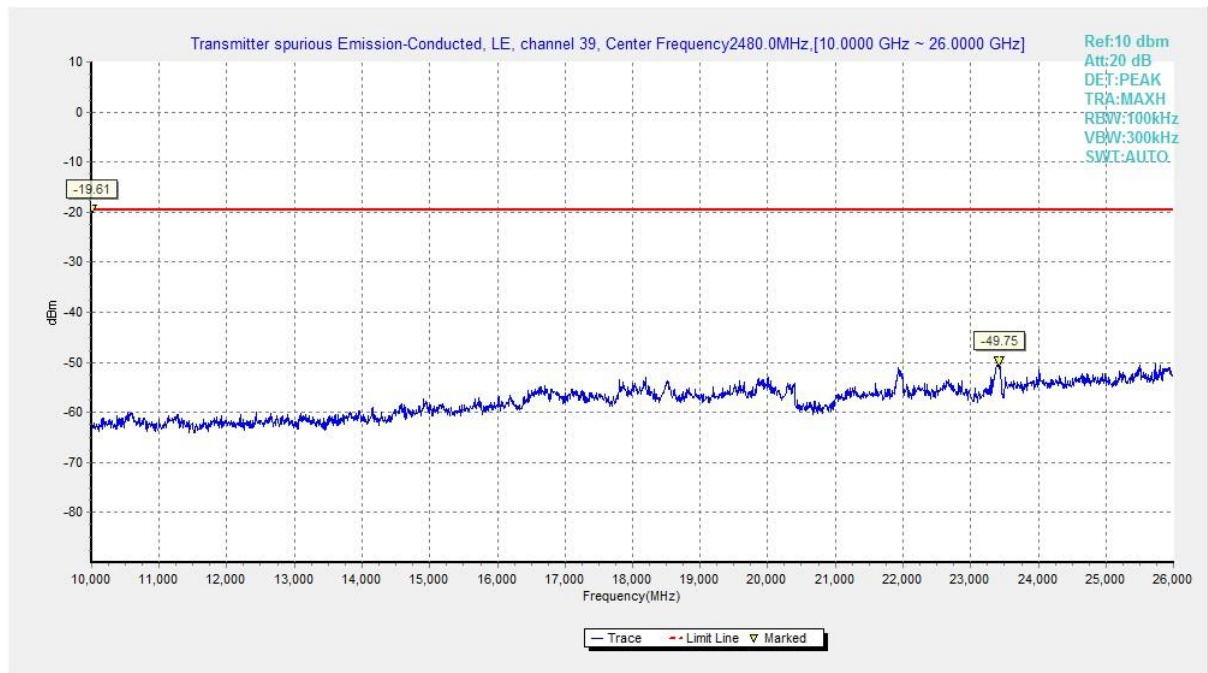


Fig.19 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), 1M

A.7 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($\mu\text{V/m}$)	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:

LE-1M

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	1 GHz ~ 18 GHz	Fig.20	P
	19	9 kHz ~ 30 MHz	Fig.21	P
		30 MHz ~ 1 GHz	Fig.22	P
		1 GHz ~ 18 GHz	Fig.23	P
		18 GHz ~ 26.5 GHz	Fig.24	P
	39	1 GHz ~ 18 GHz	Fig.25	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.26	P
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.27	P

See below for test graphs.

Conclusion: Pass

Note: Peak above the limit line is the carrier frequency.

LE-1M

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13852.500000	54.84	74.00	19.16	H	18.1
14537.000000	55.59	74.00	18.41	V	19.0
15575.500000	57.23	74.00	16.77	H	20.8
15668.500000	58.28	74.00	15.72	H	21.3
16586.000000	59.19	74.00	14.81	V	23.1
17903.000000	58.16	74.00	15.84	V	25.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13954.500000	42.75	54.00	11.25	V	18.1
14680.500000	43.64	54.00	10.36	V	18.9
15566.000000	44.99	54.00	9.01	H	20.7
15681.500000	45.29	54.00	8.71	V	21.3
16608.500000	45.61	54.00	8.39	V	23.1
17700.000000	45.85	54.00	8.15	H	23.7

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13925.000000	55.09	74.00	18.91	H	18.3
14563.000000	55.30	74.00	18.70	V	19.0
15545.500000	56.85	74.00	17.15	V	20.4
16181.000000	58.11	74.00	15.89	V	22.6
16661.500000	58.51	74.00	15.49	H	22.5
17700.500000	57.42	74.00	16.58	V	23.7

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13951.500000	42.87	54.00	11.13	V	18.2
14543.500000	43.45	54.00	10.55	H	19.0
15573.000000	45.00	54.00	9.00	V	20.7
15661.000000	45.40	54.00	8.60	H	21.3
16648.500000	45.66	54.00	8.34	H	22.7
17700.500000	45.97	54.00	8.03	H	23.7

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13979.000000	54.82	74.00	19.18	V	18.0
14576.500000	55.23	74.00	18.77	H	19.0
15573.500000	57.01	74.00	16.99	H	20.8
15702.000000	58.23	74.00	15.77	H	21.4
17036.500000	58.79	74.00	15.21	H	22.8
17700.000000	57.75	74.00	16.25	V	23.7

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13955.000000	42.78	54.00	11.22	V	18.1
14559.000000	43.45	54.00	10.55	V	19.0
15577.000000	45.05	54.00	8.95	V	20.8
15684.000000	45.46	54.00	8.54	V	21.3
16648.000000	45.79	54.00	8.21	V	22.7
17703.500000	45.91	54.00	8.09	V	23.7

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:

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

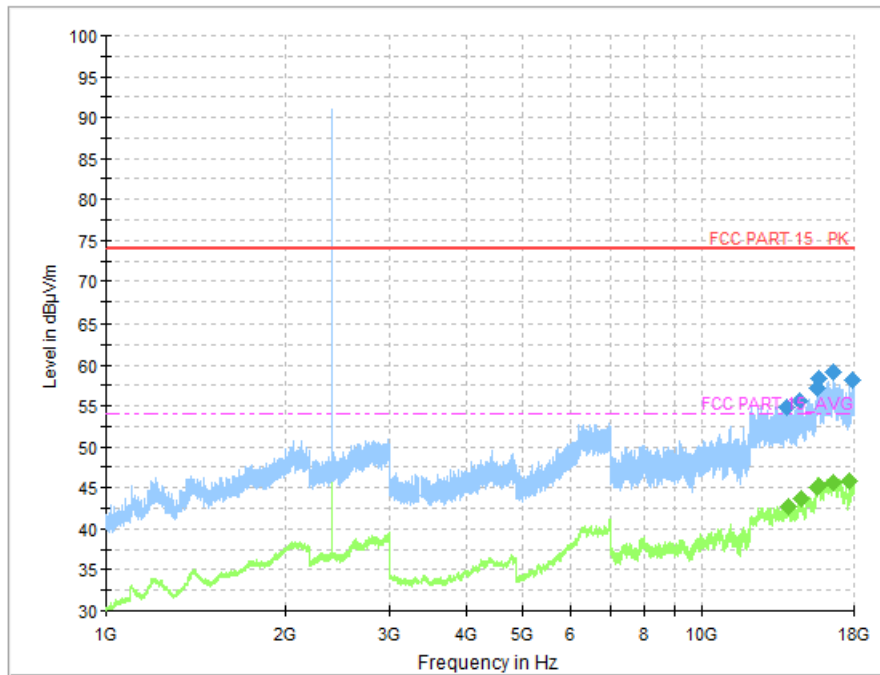


Fig.20 Radiated Spurious Emission (Ch0, 1 GHz - 18 GHz), 1M

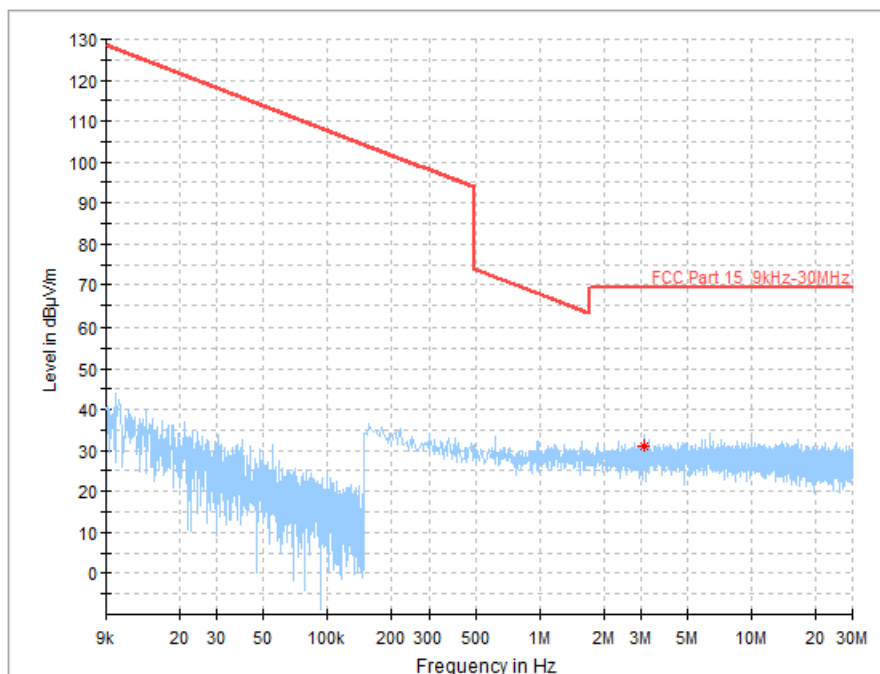


Fig.21 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), 1M

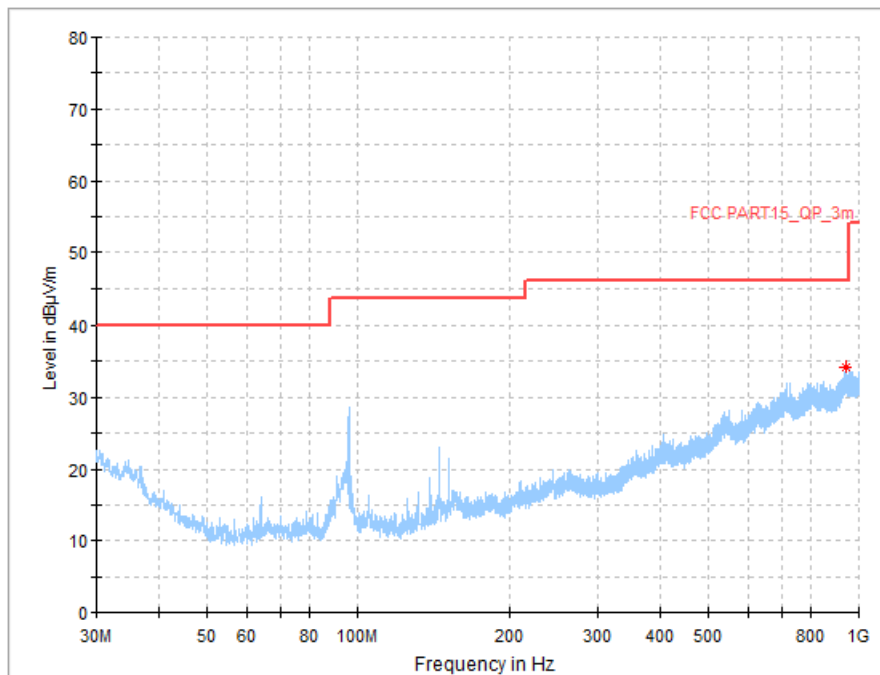


Fig.22 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), 1M

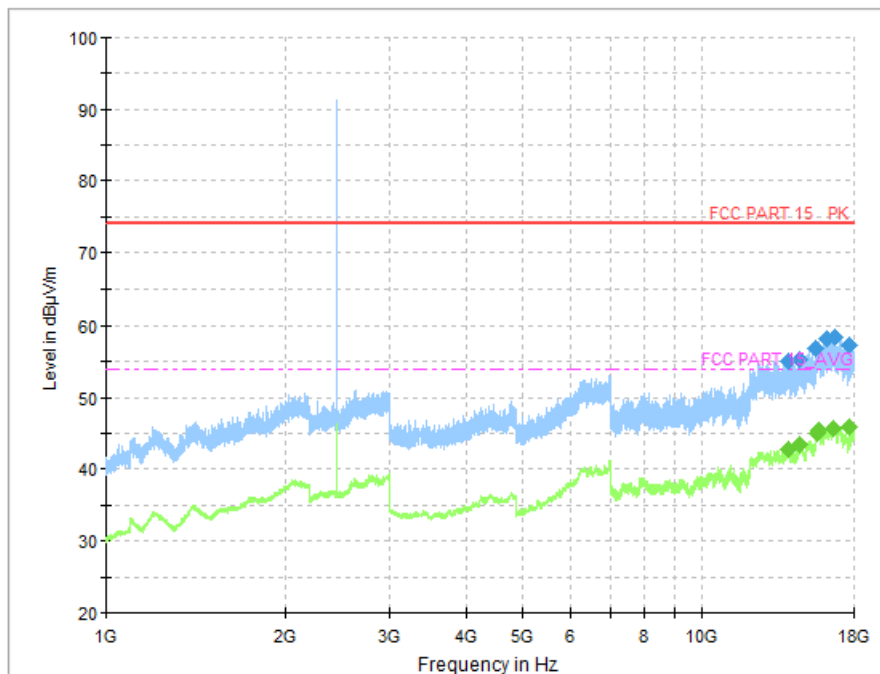


Fig.23 Radiated Spurious Emission (Ch19, 1 GHz - 18 GHz), 1M

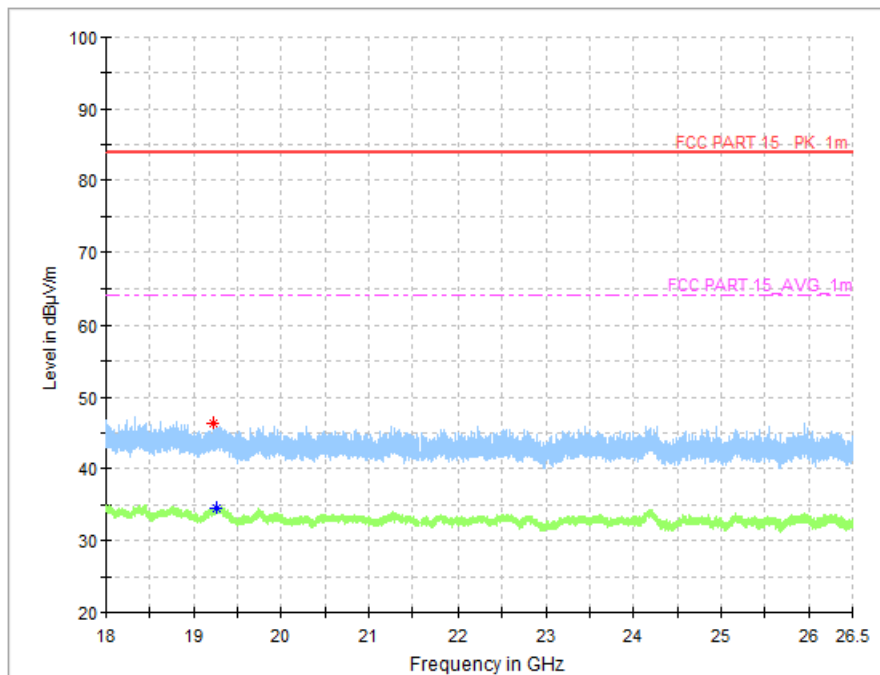


Fig.24 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), 1M

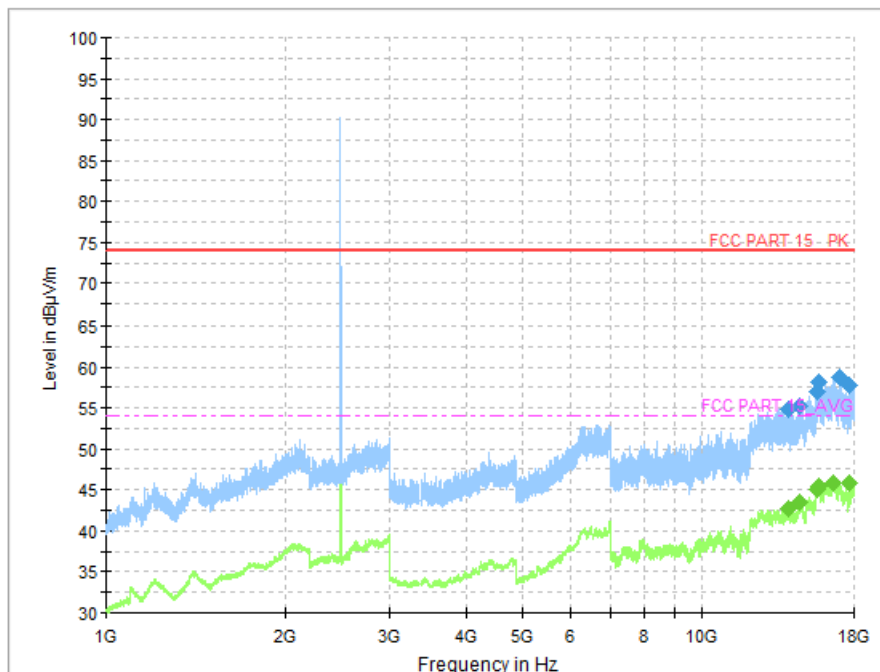


Fig.25 Radiated Spurious Emission (Ch39, 1 GHz - 18 GHz), 1M

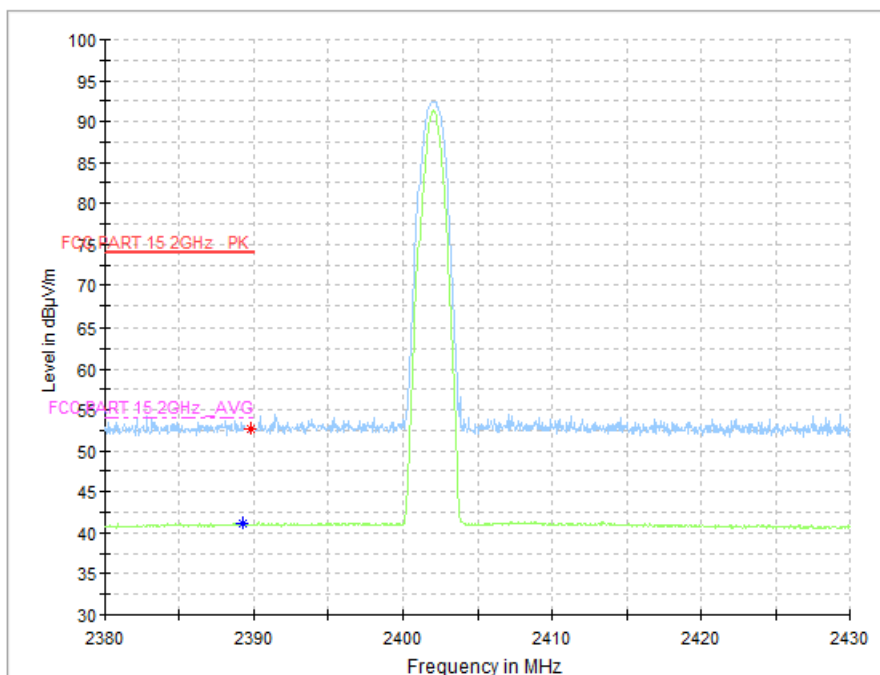


Fig.26 Radiated Band Edges (Ch0, 2380GHz - 2450GHz), 1M

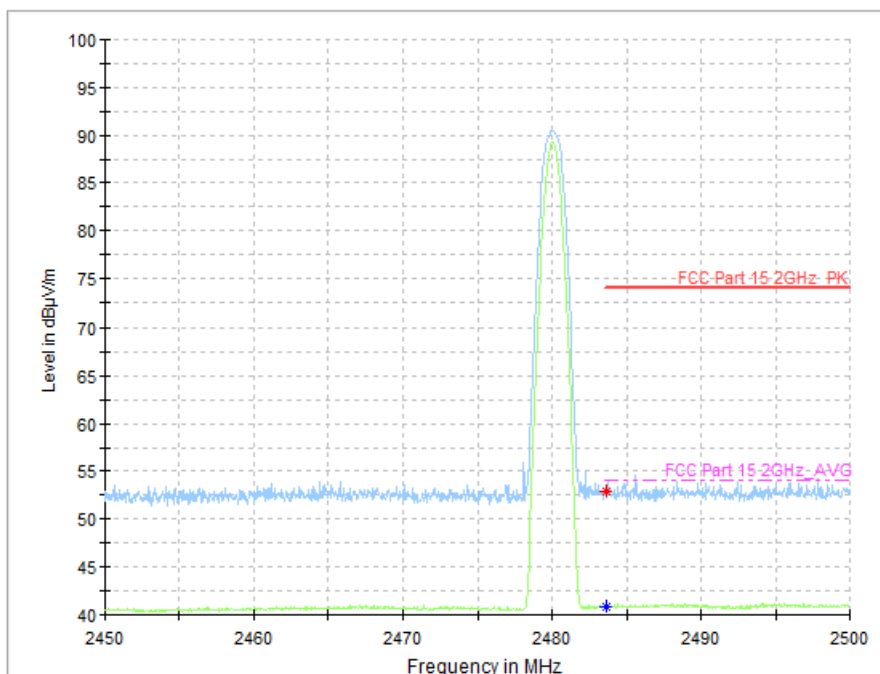


Fig.27 Radiated Band Edges (Ch39, 2450GHz - 2500GHz), 1M

A.8 AC Power line Conducted Emission

Test Condition:

Voltage(V)	Frequency(Hz)
120	60

Measurement Result and limit:

LE-1M

BLE (Quasi-peak Limit) - AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.28	Fig.29	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) - AE2

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.31	Fig.32	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.				

BLE (Quasi-peak Limit) - AE3

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.30	Fig.31	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) - AE3

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.33	Fig.34	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.				

Test Condition:

Voltage(V)	Frequency(Hz)
240	60

Measurement Result and limit:

LE-1M

BLE (Quasi-peak Limit) - AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.32	Fig.33	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) - AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.35	Fig.36	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.

BLE (Quasi-peak Limit) - AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.34	Fig.35	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) - AE3

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.37	Fig.38	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

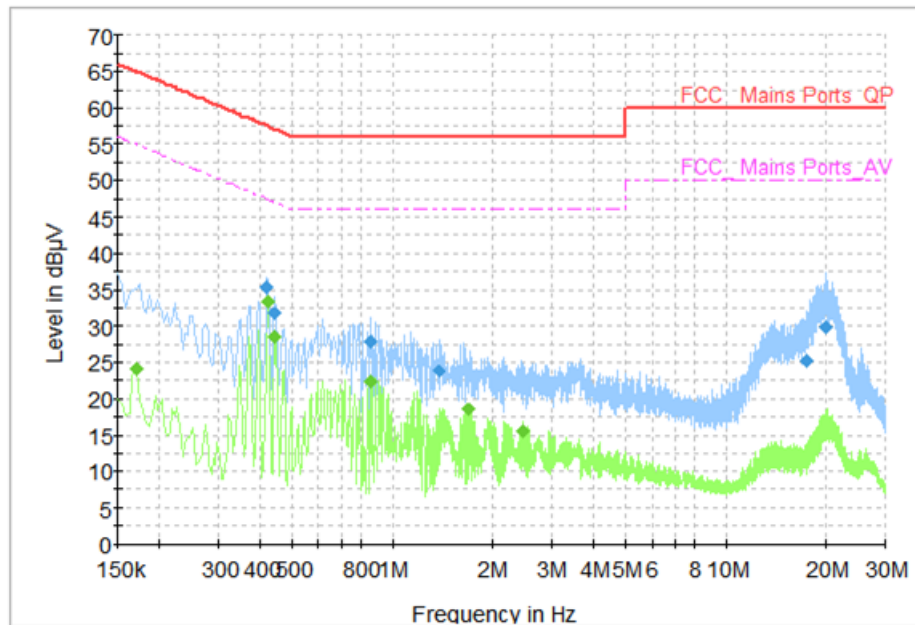


Fig.28 AC Power line Conducted Emission (Traffic, AE2, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	35.32	57.49	22.17	L1	ON	9.7
0.442000	31.72	57.02	25.30	L1	ON	9.7
0.862000	27.79	56.00	28.21	L1	ON	9.7
1.378000	23.72	56.00	32.28	L1	ON	9.7
17.466000	25.27	60.00	34.73	N	ON	10.2
19.974000	29.81	60.00	30.19	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	24.11	54.96	30.85	N	ON	9.6
0.422000	33.41	47.41	14.00	L1	ON	9.7
0.442000	28.50	47.02	18.52	L1	ON	9.7
0.862000	22.45	46.00	23.55	N	ON	9.7
1.678000	18.49	46.00	27.51	L1	ON	9.7
2.466000	15.47	46.00	30.53	L1	ON	9.7

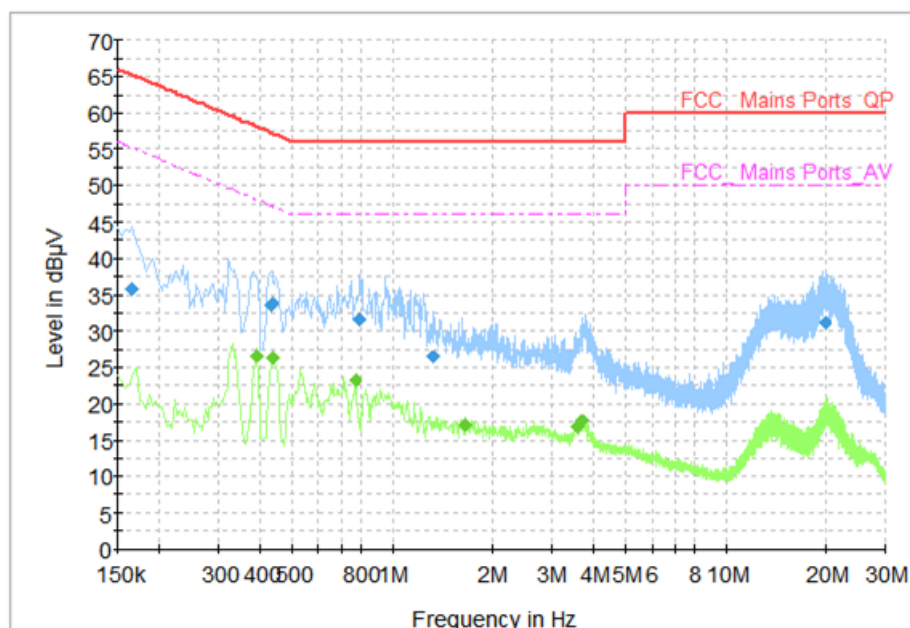


Fig.29 AC Power line Conducted Emission (Idle, AE2, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	35.79	65.16	29.37	L1	ON	9.7
0.430000	33.58	57.25	23.68	N	ON	9.7
0.434000	33.84	57.18	23.34	N	ON	9.7
0.794000	31.55	56.00	24.45	N	ON	9.7
1.322000	26.45	56.00	29.55	N	ON	9.7
19.718000	31.13	60.00	28.87	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.390000	26.69	48.06	21.37	L1	ON	9.7
0.438000	26.33	47.10	20.77	N	ON	9.7
0.770000	23.19	46.00	22.81	N	ON	9.7
1.662000	17.09	46.00	28.91	N	ON	9.7
3.586000	16.71	46.00	29.29	N	ON	9.7
3.694000	17.55	46.00	28.45	N	ON	9.7

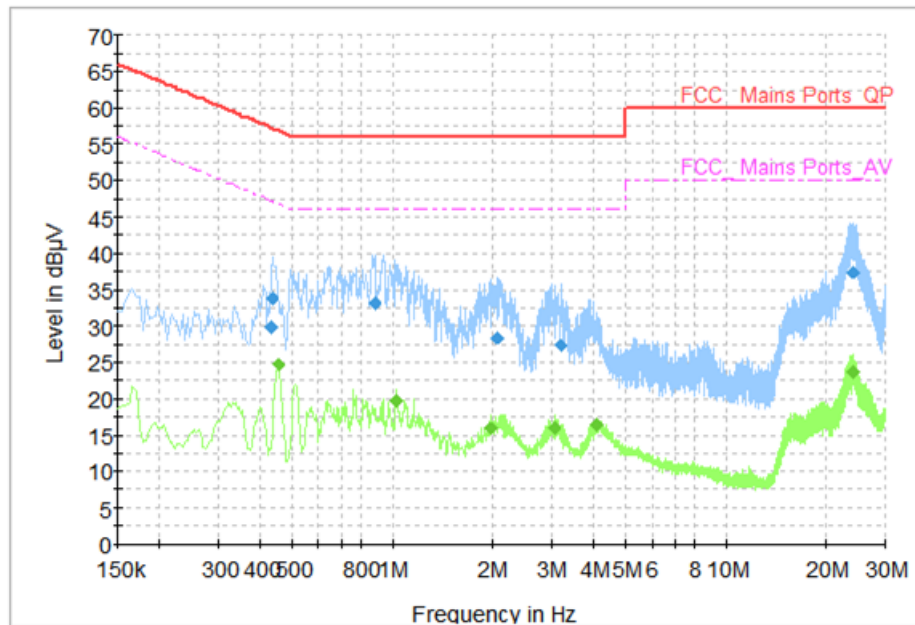


Fig.30 AC Power line Conducted Emission (Traffic, AE3, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.430000	29.75	57.25	27.50	N	ON	9.7
0.434000	33.83	57.18	23.34	N	ON	9.7
0.882000	33.14	56.00	22.86	N	ON	9.7
2.062000	28.36	56.00	27.64	N	ON	9.7
3.202000	27.31	56.00	28.69	N	ON	9.7
24.094000	37.31	60.00	22.69	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.454000	24.60	46.80	22.20	L1	ON	9.7
1.026000	19.78	46.00	26.22	N	ON	9.7
1.970000	15.93	46.00	30.07	N	ON	9.7
3.046000	15.98	46.00	30.02	N	ON	9.7
4.086000	16.31	46.00	29.69	L1	ON	9.7
24.030000	23.59	50.00	26.41	N	ON	10.3

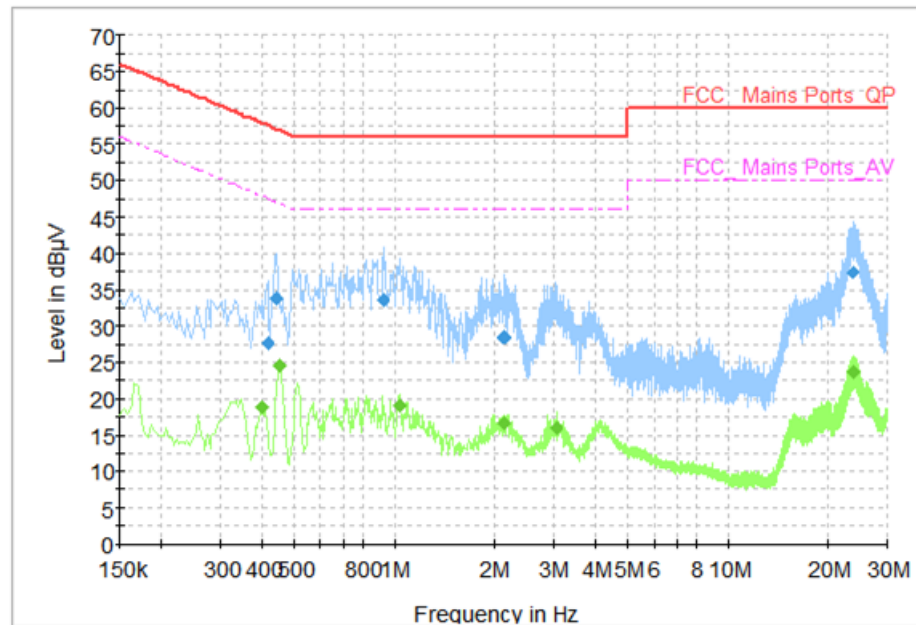


Fig.31 AC Power line Conducted Emission (Idle, AE3, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.414000	27.77	57.57	29.80	N	ON	9.7
0.442000	33.80	57.02	23.22	N	ON	9.7
0.922000	33.55	56.00	22.45	N	ON	9.7
2.118000	28.56	56.00	27.44	N	ON	9.7
2.130000	28.35	56.00	27.65	N	ON	9.7
23.586000	37.36	60.00	22.64	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	18.93	47.81	28.88	L1	ON	9.7
0.450000	24.44	46.88	22.43	L1	ON	9.7
1.034000	19.00	46.00	27.00	N	ON	9.7
2.114000	16.50	46.00	29.50	N	ON	9.7
3.062000	16.01	46.00	29.99	N	ON	9.7
23.858000	23.70	50.00	26.30	N	ON	10.3

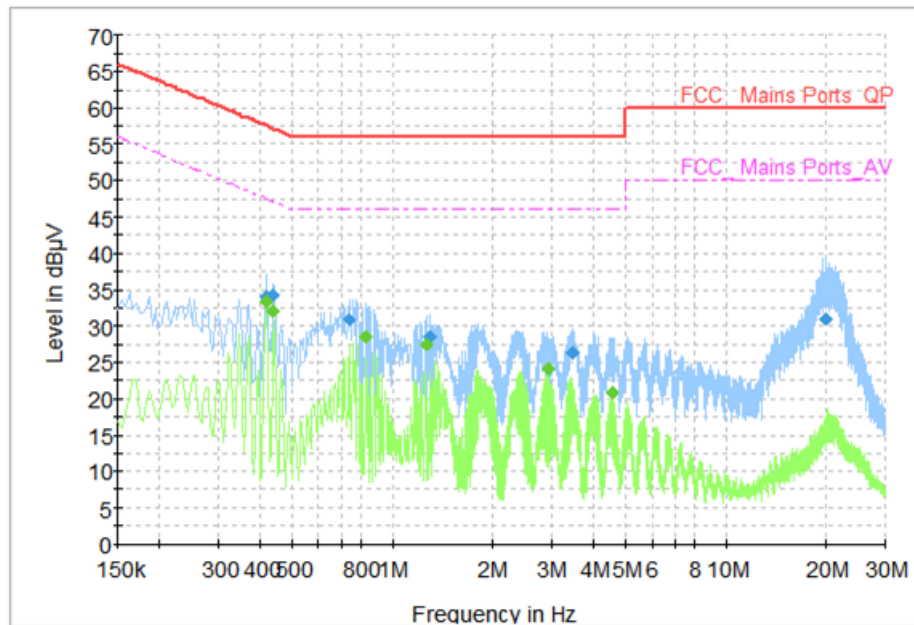


Fig.32 AC Power line Conducted Emission (Traffic, AE2, 240V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	34.07	57.49	23.42	L1	ON	9.7
0.438000	34.19	57.10	22.91	L1	ON	9.7
0.738000	30.78	56.00	25.22	L1	ON	9.7
1.294000	28.60	56.00	27.40	L1	ON	9.7
3.462000	26.20	56.00	29.80	N	ON	9.7
20.006000	31.09	60.00	28.91	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	33.30	47.49	14.18	L1	ON	9.7
0.438000	32.08	47.10	15.01	L1	ON	9.7
0.830000	28.48	46.00	17.52	L1	ON	9.7
1.270000	27.45	46.00	18.55	L1	ON	9.7
2.910000	24.10	46.00	21.90	L1	ON	9.7
4.550000	20.72	46.00	25.28	L1	ON	9.8

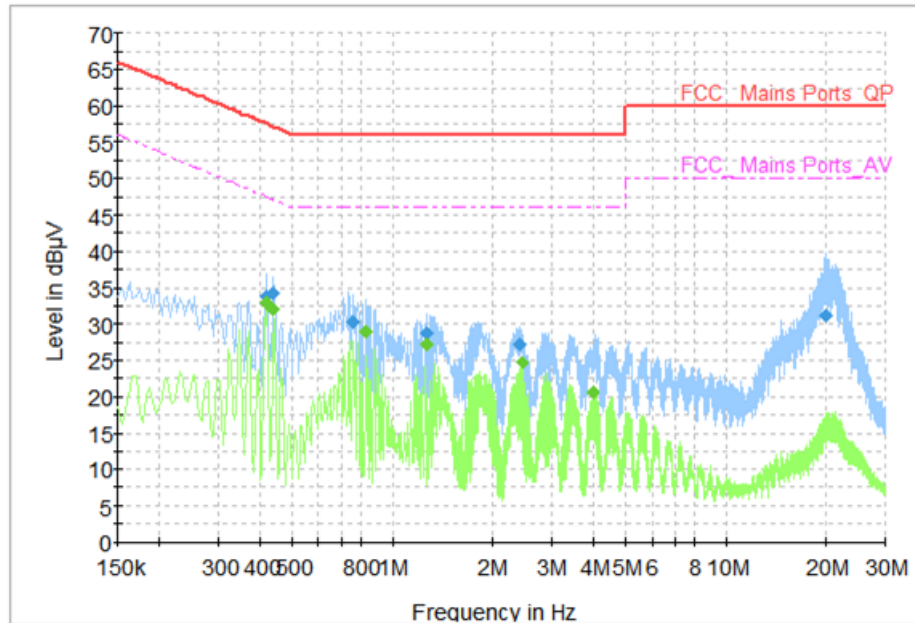


Fig.33 AC Power line Conducted Emission (Idle, AE2, 240V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	33.83	57.49	23.66	L1	ON	9.7
0.438000	34.16	57.10	22.94	L1	ON	9.7
0.758000	30.41	56.00	25.59	L1	ON	9.7
1.270000	28.80	56.00	27.20	L1	ON	9.7
2.398000	27.08	56.00	28.92	L1	ON	9.7
19.886000	31.13	60.00	28.87	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	32.95	47.49	14.53	L1	ON	9.7
0.438000	32.11	47.10	14.99	L1	ON	9.7
0.830000	28.83	46.00	17.17	L1	ON	9.7
1.270000	27.15	46.00	18.85	L1	ON	9.7
2.446000	24.71	46.00	21.29	L1	ON	9.7
3.990000	20.63	46.00	25.37	L1	ON	9.7

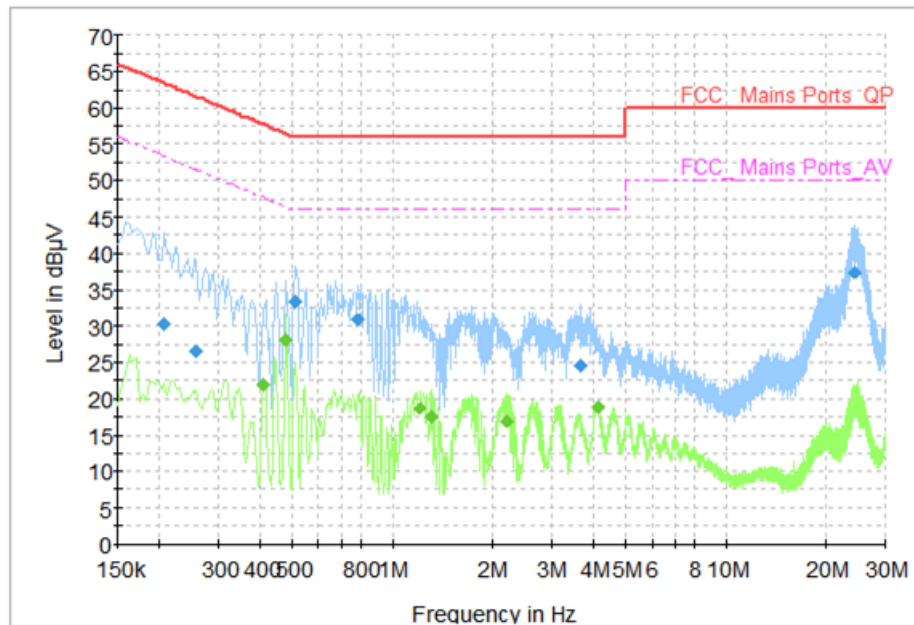


Fig.34 AC Power line Conducted Emission (Traffic, AE3, 240V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.206000	30.27	63.37	33.09	N	ON	9.6
0.258000	26.38	61.50	35.12	N	ON	9.6
0.510000	33.30	56.00	22.70	N	ON	9.7
0.786000	30.80	56.00	25.20	N	ON	9.7
3.674000	24.46	56.00	31.54	N	ON	9.7
24.330000	37.45	60.00	22.55	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	21.88	47.65	25.77	L1	ON	9.7
0.478000	28.00	46.37	18.38	L1	ON	9.7
1.206000	18.68	46.00	27.32	L1	ON	9.7
1.298000	17.51	46.00	28.49	L1	ON	9.7
2.190000	17.00	46.00	29.00	L1	ON	9.7
4.122000	18.89	46.00	27.11	L1	ON	9.7

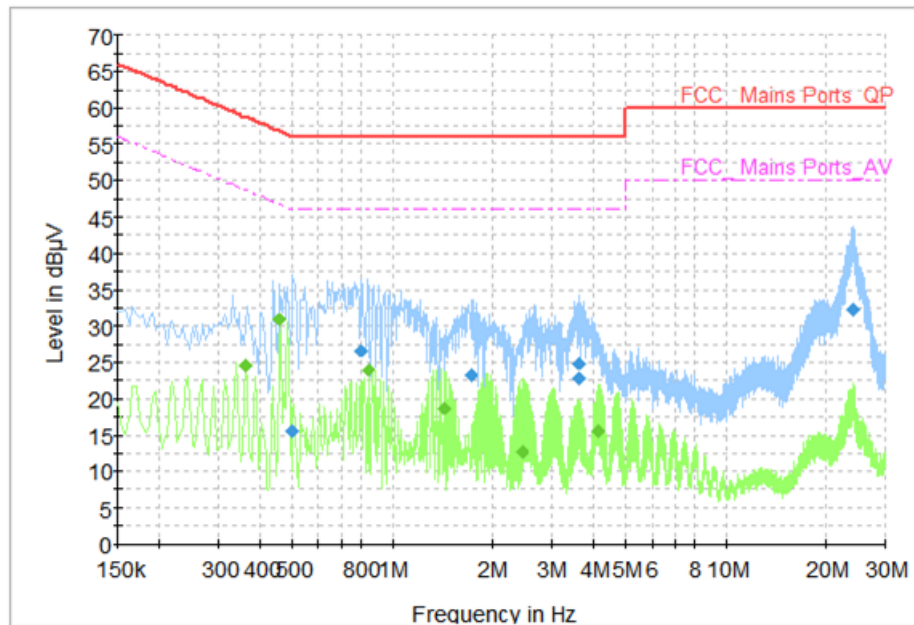


Fig.35 AC Power line Conducted Emission (Idle, AE3, 240V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.502000	15.59	56.00	40.41	N	ON	9.7
0.802000	26.70	56.00	29.30	N	ON	9.7
1.714000	23.31	56.00	32.69	N	ON	9.7
3.602000	24.93	56.00	31.07	N	ON	9.7
3.606000	22.78	56.00	33.22	N	ON	9.7
24.134000	32.34	60.00	27.66	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.362000	24.57	48.68	24.11	L1	ON	9.7
0.458000	30.80	46.73	15.92	L1	ON	9.7
0.846000	24.01	46.00	21.99	L1	ON	9.7
1.422000	18.61	46.00	27.39	L1	ON	9.7
2.434000	12.72	46.00	33.28	L1	ON	9.7
4.126000	15.44	46.00	30.56	L1	ON	9.7

END OF REPORT