FCC PART 15C
TEST REPORT

No. B17N001023-BLE

For

Huawei Technologies Co., Ltd.

Smart Phone

Model Name: SLA-L23

With

Hardware Version: HL1SLAM

Software Version: SLA-L23C900B121

FCC ID: QISSLA-L23

Issued Date: 2017-07-13

Test Laboratory:

FCC 2.948 Listed: No.342690

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 CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT.

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
B17N001023-BLE	Rev.0	1st edition	2017-07-13

CONTENTS

1. Test Laboratory

1.1. Testing Location

Location: CTTL(South Branch)

Address: TCL International E city, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China 518000

1.2. Testing Environment

Normal Temperature: 15-35℃

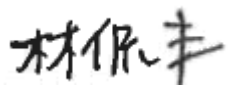
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-06-16

Testing End Date: 2017-07-10

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:	Huawei Technologies Co., Ltd.
Address:	Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0086-0755-28970299
Fax:	0086-0755-89650226

2.2. Manufacturer Information

Company Name:	Huawei Technologies Co., Ltd.
Address:	Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0086-0755-28970299
Fax:	0086-0755-89650226

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

3.1. About EUT

Description	Smart Phone
Model Name	SLA-L23
Market Name	/
Frequency Band	2402MHz~2480MHz
Type of Modulation	GFSK
Number of Channels	40
FCC ID	QISSLA-L23

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	865548030007878	HL1SLAM	SLA-L23C900B121	2017-06-16

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Charger	/
AE2	Charger	/
AE3	Charger	/

AE1

Model	HW-050100U01
Manufacturer	HUIZHOU BYD ELECTRONIC CO., LTD.

AE2

Model	HW-050100U01
Manufacturer	PHIHONG TECHNOLOGY CO., LTD.

AE3

Model	HW-050100U01
Manufacturer	SHENZHEN HUNTKEY ELECTRONIC CO.,LTD.

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

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	Nov,2015
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices	Jun,2013

5. Test Results

5.1. Summary of Test Results

No	Test cases	Sub-clause of Part15C	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 Powerline Conducted Emission	15.107, 15.207	**P**

See **ANNEX A and ANNEX B** for details.

5.2. Statements

CTTL has evaluated the test cases requested by the applicant/manufacturer 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 did not exceed following limits along the EMC testing

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

Shielded room did not exceed following limits along the EMC testing

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Voltage Standing Wave Ratio (VSWR)	≤6dB, 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	2018-01-18	1 year
2	Data Acquisition Unit	U2531A	TW55443507	Agilent	/	/
3	Power Sensor	U2021XA	MY55430013	Agilent	2018-01-18	1 year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	LISN	ESH2-Z5	100196	R&S	2018-01-05	1 year
2	Test Receiver	ESCI	100701	R&S	2017-08-09	1 year
3	Loop Antenna	HLA6120	35779	TESEQ	2019-05-02	3 years
4	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2020-02-17	3 years
5	Horn Antenna	3117	00066585	ETS-Lindgren	2019-03-05	3 years
6	Test Receiver	ESR7	101675	R&S	2017-07-21	1 year
7	Spectrum Analyzer	FSP 40	100378	R&S	2017-12-15	1 year
8	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018-05-13	3 years

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

ANNEX A: MEASUREMENT RESULTS FOR RECEIVER

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 Average Output Power

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)(1)	< 30

Measurement Results:

Mode	Channel	Maximum Peak Output Power（dBm）	Conclusion
GFSK	0	0.62	P
	19	0.91	P
	39	-0.51	P

See ANNEX B for test graphs.

Conclusion: Pass

A.2 Peak Power Spectral Density

Measurement Limit:

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

Measurement Results:

Mode	Channel	Peak Power Spectral Density（dBm）		Conclusion
GFSK	0	Fig.1	-15.32	P
	19	Fig.2	-13.75	P
	39	Fig.3	-16.59	P

See ANNEX B for test graphs.

Conclusion: PASS

A.3 Occupied 6dB Bandwidth

Measurement Limit:

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

Measurement Result:

Mode	Channel	Test Results (kHz)		conclusion
GFSK	0	Fig.4	682.5	P
	19	Fig.5	682.5	P
	39	Fig.6	680.0	P

See ANNEX B for test graphs.

Conclusion: PASS

A.4 Band Edges Compliance

Measurement Limit:

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

Measurement Result:

Mode	Channel	Test Results	Conclusion
GFSK	0	Fig.7	P
	39	Fig.8	P

See ANNEX B for test graphs.

Conclusion: Pass

A.5 Transmitter Spurious Emission

A.5.1 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
GFSK	0	2.402 GHz	Fig.9	P
		30 MHz-3 GHz	Fig.10	P
		3GHz-18GHz	Fig.11	P
	19	2.440 GHz	Fig.12	P
		30 MHz-3 GHz	Fig.13	P
		3GHz-18GHz	Fig.14	P
	39	2.480 GHz	Fig.15	P
		30 MHz-3 GHz	Fig.16	P
		3GHz-18GHz	Fig.17	P
/	All channels	18GHz-26GHz	Fig.18	P

See ANNEX B for test graphs.

Conclusion: Pass

A.5.2 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:

GFSK	0	1 GHz ~18 GHz	Fig.19	P
	19	9 kHz ~30 MHz	Fig.20	P
		30 MHz ~1 GHz	Fig.21	P
		1 GHz ~18 GHz	Fig.22	P
		18 GHz~ 26.5 GHz	Fig.23	P
	39	1 GHz ~18 GHz	Fig.24	P
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.25	P
	Power(CH39)	2.45 GHz ~ 2.5 GHz	Fig.26	P

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14533.00000	56.33	74.00	17.67	V	11.9
14771.50000	57.40	74.00	16.60	H	11.9
15739.50000	58.91	74.00	15.09	H	12.8
16196.50000	59.71	74.00	14.29	V	13.1
16881.00000	59.51	74.00	14.49	V	14.0
17367.00000	59.61	74.00	14.39	H	14.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14545.00000	45.27	54.00	8.73	V	11.9
15168.50000	45.94	54.00	8.06	V	12.1
15755.50000	47.24	54.00	6.76	H	12.8
16198.50000	47.65	54.00	6.35	H	13.1
16728.00000	47.99	54.00	6.01	V	13.8
17295.50000	47.72	54.00	6.28	H	13.9

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
13989.00000	55.89	74.00	18.11	H	10.8
15039.00000	56.19	74.00	17.81	V	12.1
15838.50000	58.68	74.00	15.32	V	12.9
16221.50000	58.96	74.00	15.04	H	13.1
16800.50000	59.73	74.00	14.27	H	13.9
17516.00000	59.14	74.00	14.86	V	14.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14397.00000	44.42	54.00	9.58	V	11.5
14924.50000	44.71	54.00	9.29	H	12.0
15771.50000	46.84	54.00	7.16	V	12.8
16285.00000	47.18	54.00	6.82	H	13.3
16805.50000	48.11	54.00	5.89	V	13.9
17414.50000	47.41	54.00	6.59	H	14.0

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14192.50000	56.52	74.00	17.48	H	11.3
15114.00000	56.73	74.00	17.27	H	12.1
15769.50000	58.80	74.00	15.20	V	12.8
16246.00000	59.36	74.00	14.65	V	13.2
16837.50000	60.94	74.00	13.06	V	13.9
17407.50000	60.26	74.00	13.74	V	14.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14185.50000	44.65	54.00	9.35	H	11.2
15152.50000	45.44	54.00	8.56	V	12.1
15770.00000	47.34	54.00	6.66	H	12.8
16224.00000	47.86	54.00	6.14	H	13.1
16798.00000	48.47	54.00	5.53	H	13.9
17296.00000	48.09	54.00	5.91	V	13.9

See ANNEX B for test graphs.

Conclusion: Pass

Note: A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, 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} + A_{Rpl} = P_{Mea} + Cable Loss + Antenna Factor

A.6 AC Powerline Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

BLE (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	66 to 56	Fig.27	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)-AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.27	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)-AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.28	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)-AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV) Idle	Conclusion
0.15 to 0.5	56 to 46	Fig.28	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)-AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	66 to 56	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) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.29	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)-AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.30	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) Idle	Conclusion
0.15 to 0.5	56 to 46	Fig.30	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) Traffic	Conclusion
0.15 to 0.5	66 to 56	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) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.31	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) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.32	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) Idle	Conclusion
0.15 to 0.5	56 to 46	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.			

Test Condition:

Voltage（V）	Frequency（Hz）
240	60

Measurement Result and limit:

BLE (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	66 to 56	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)-AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.33	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)-AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.34	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)-AE1

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

BLE (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	66 to 56	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)-AE2

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.35	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)-AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.36	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) Idle	Conclusion
0.15 to 0.5	56 to 46	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 (dBμV)	Result (dBμV) Traffic	Conclusion
0.15 to 0.5	66 to 56	Fig.37	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) Traffic	Conclusion
0.15 to 0.5	56 to 46	Fig.37	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) Idle	Conclusion
0.15 to 0.5	66 to 56	Fig.38	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) Idle	Conclusion
0.15 to 0.5	56 to 46	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 ANNEX B for test graphs.

Conclusion: Pass

ANNEX B: TEST FIGURE LIST

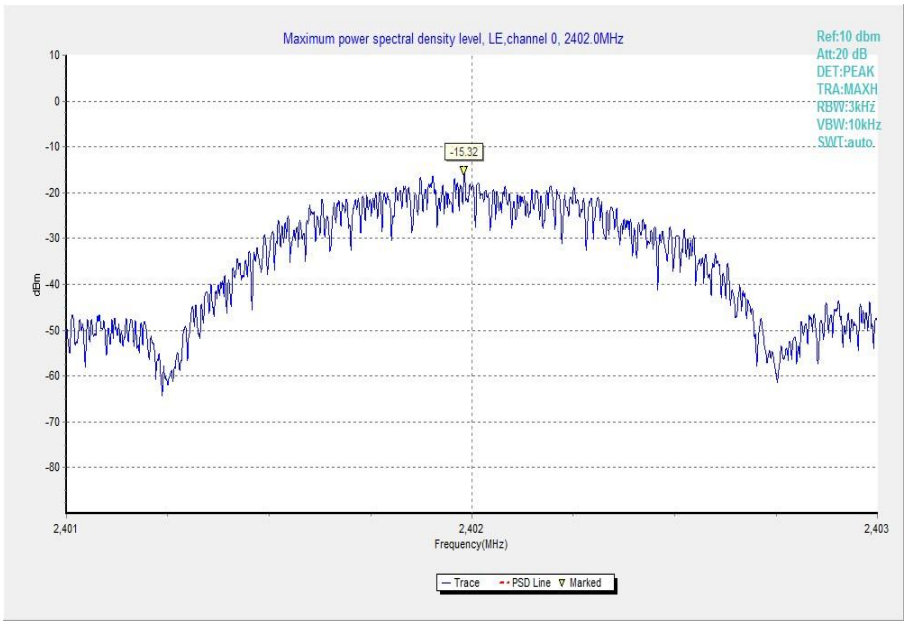


Fig.1 Power Spectral Density (Ch 0)

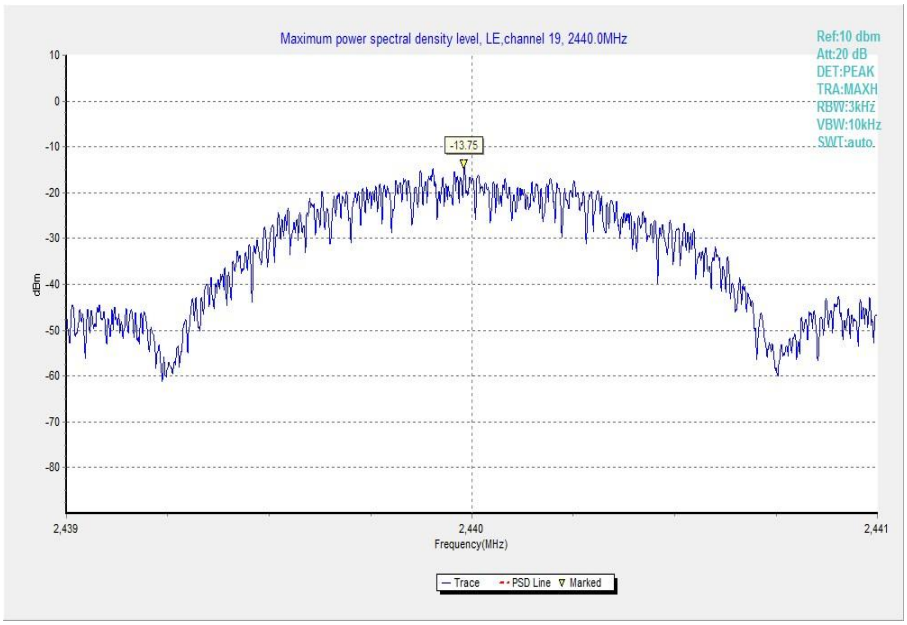


Fig.2 Power Spectral Density (Ch 19)

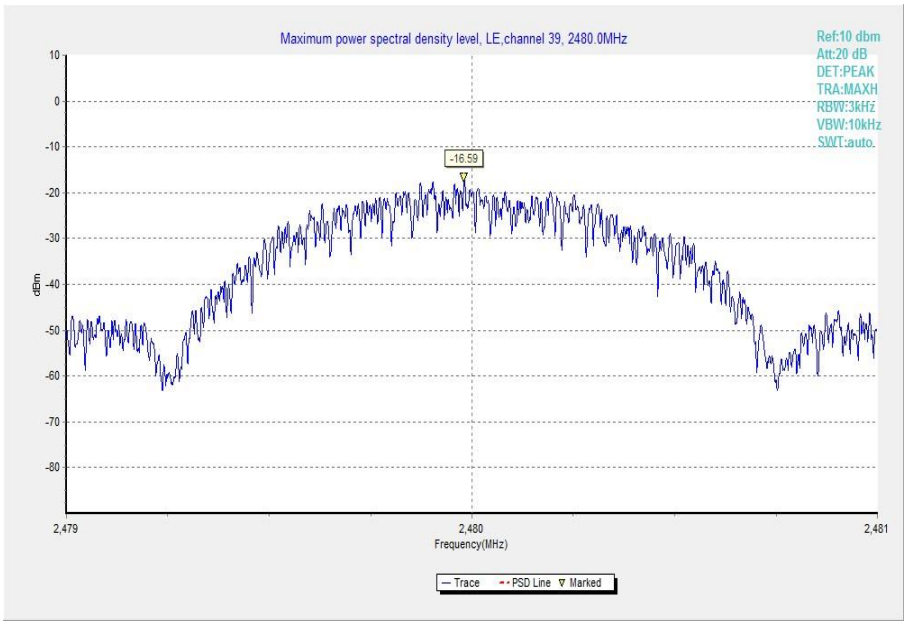


Fig.3 Power Spectral Density (Ch 39)

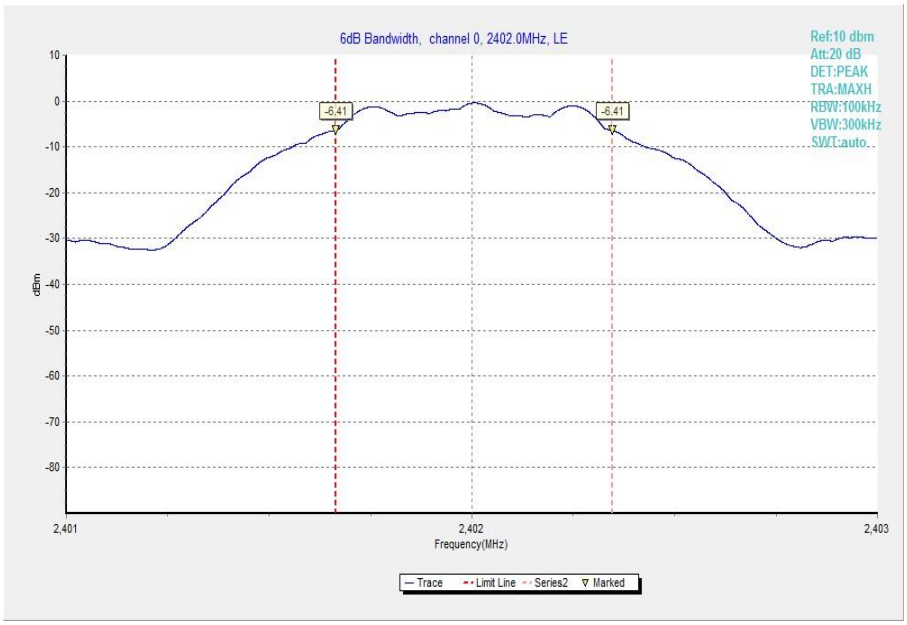


Fig.4 Occupied 6dB Bandwidth (Ch 0)

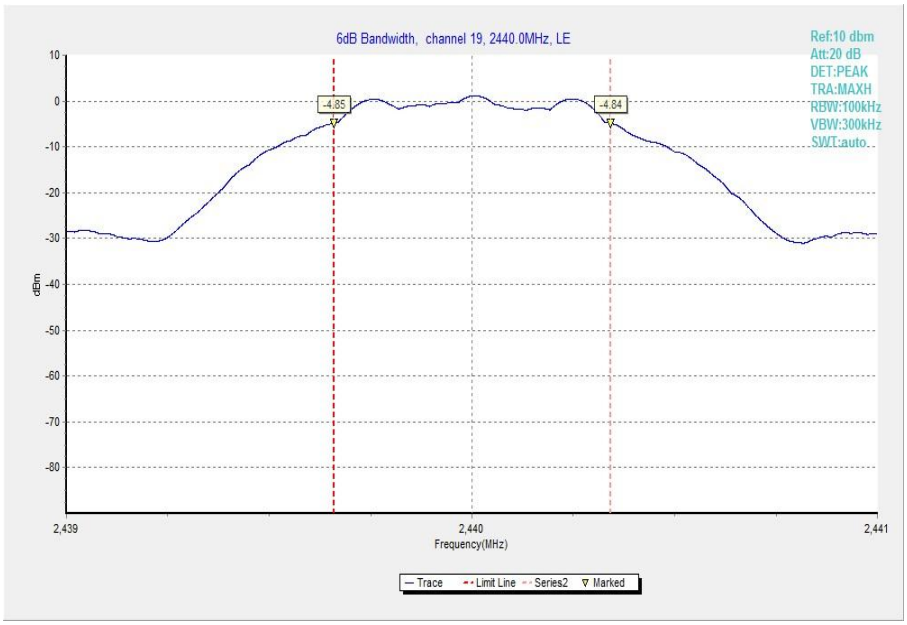


Fig.5 Occupied 6dB Bandwidth (Ch 19)

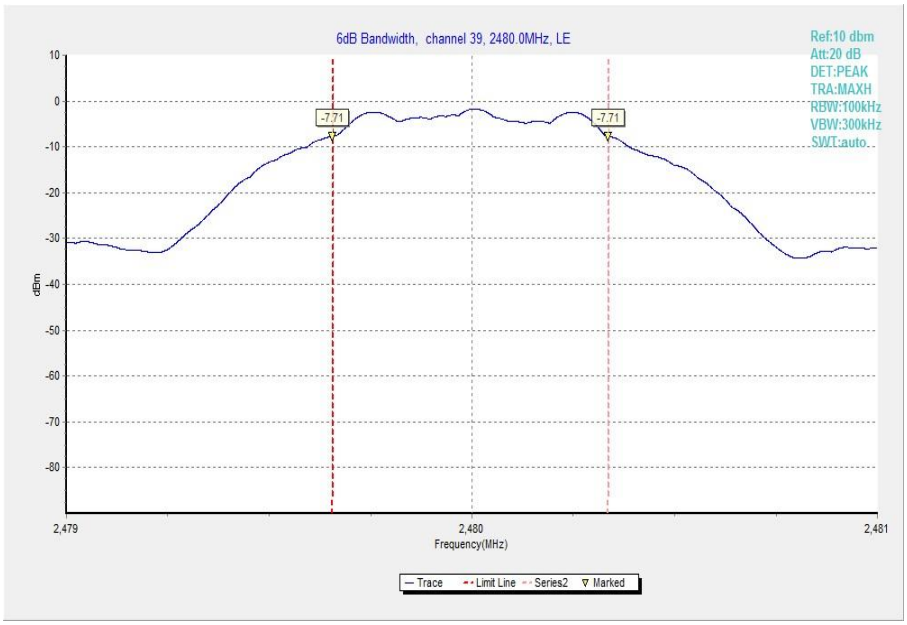


Fig.6 Occupied 6dB Bandwidth (Ch 39)

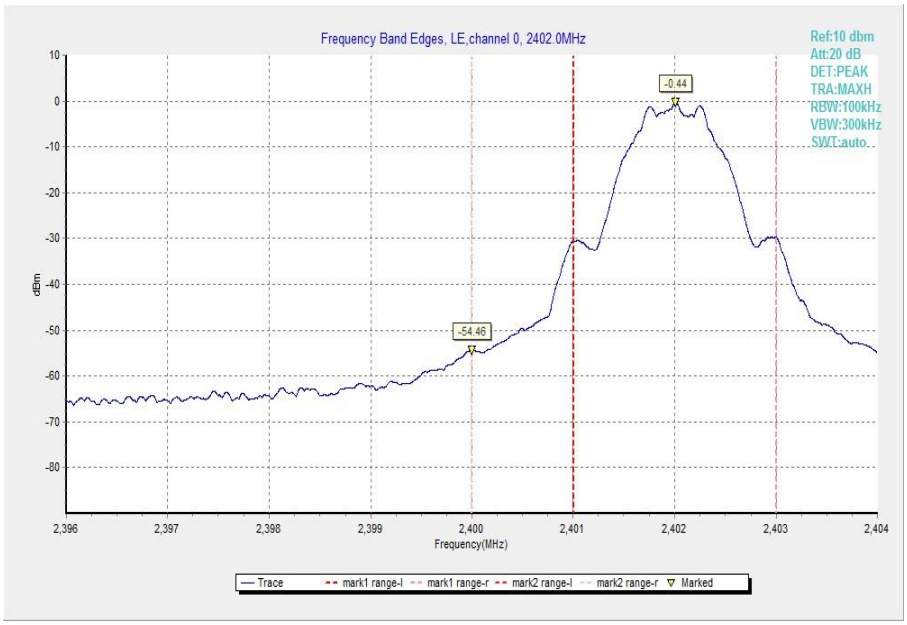


Fig.7 Band Edges (Ch 0)

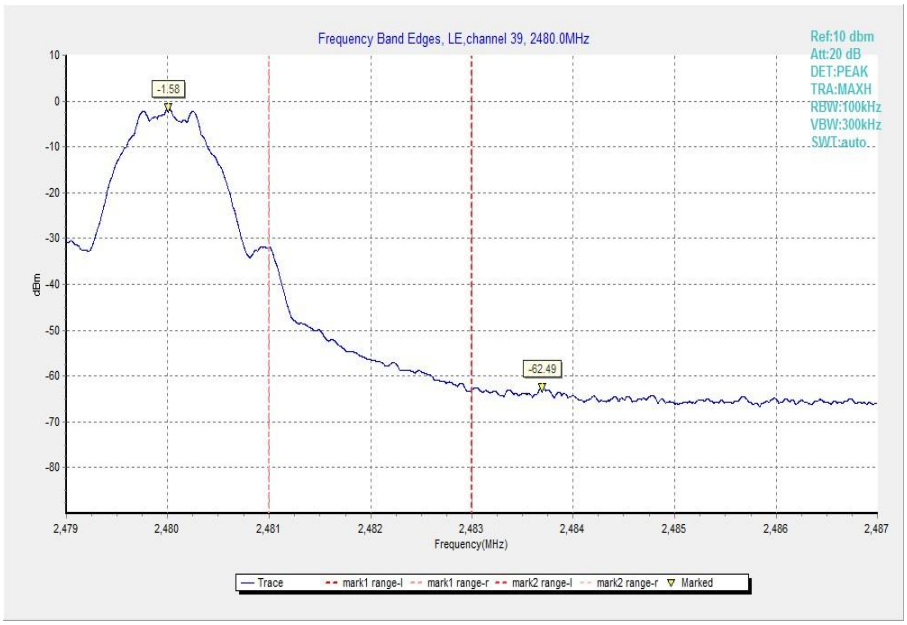
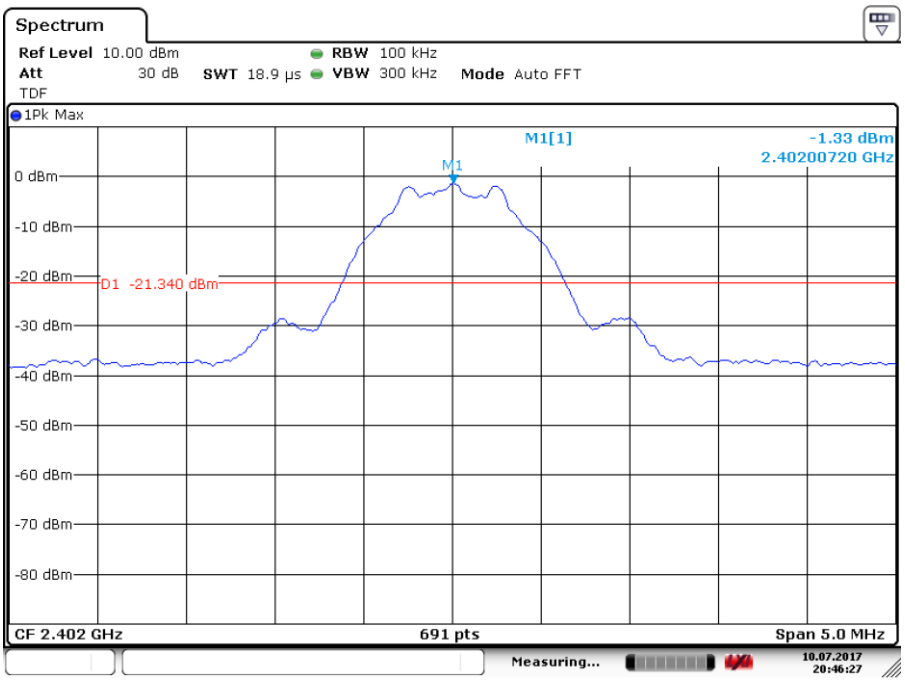


Fig.8 Band Edges (Ch 39)



Date: 10.JUL.2017 20:46:27

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

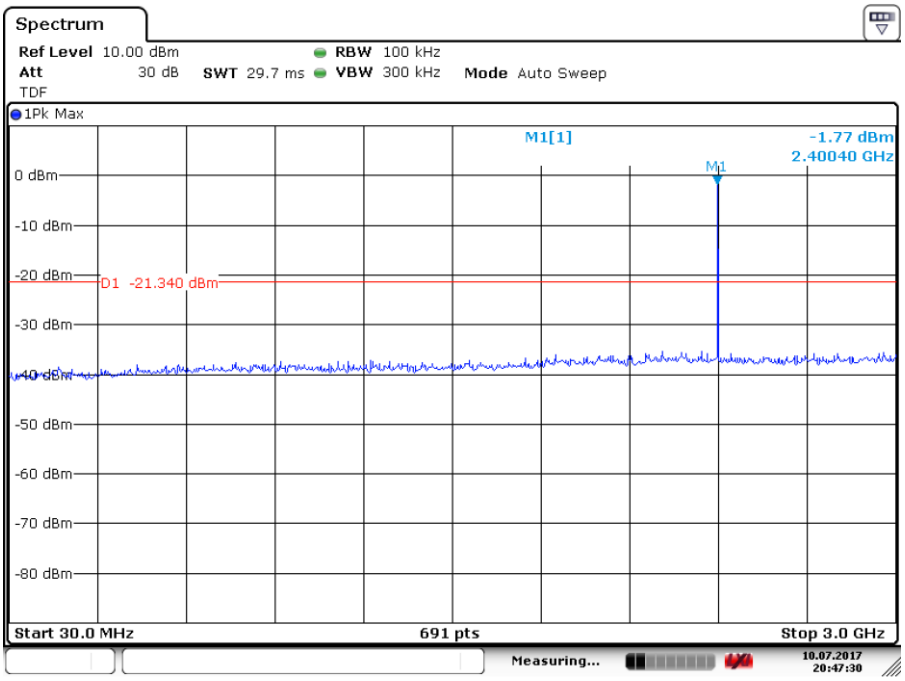


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Fig.10 Conducted Spurious Emission (Ch0, 30 MHz-3 GHz)

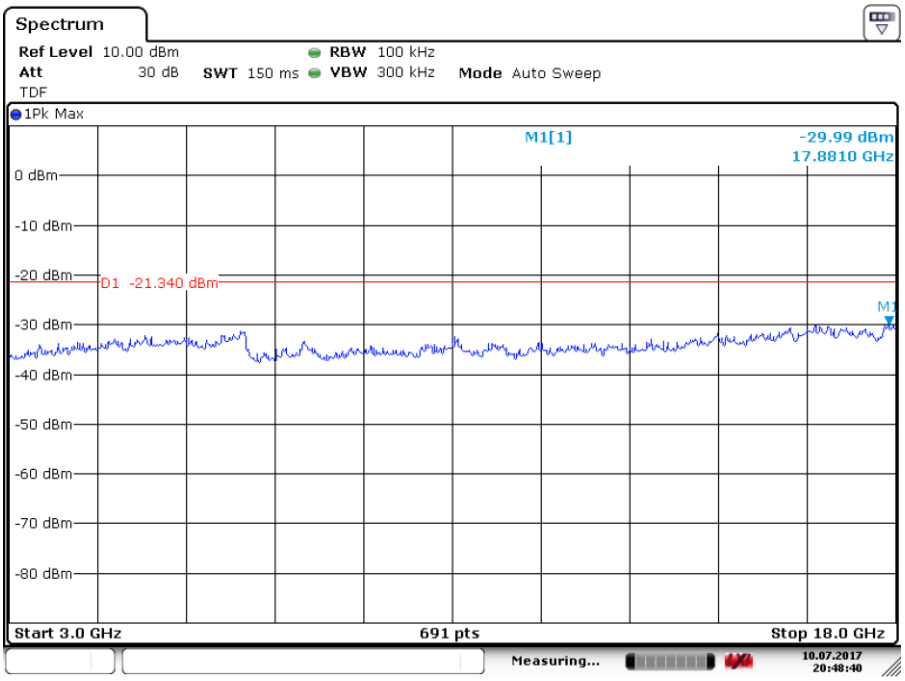

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Fig.11 Conducted Spurious Emission (Ch0, 3 GHz-18 GHz)

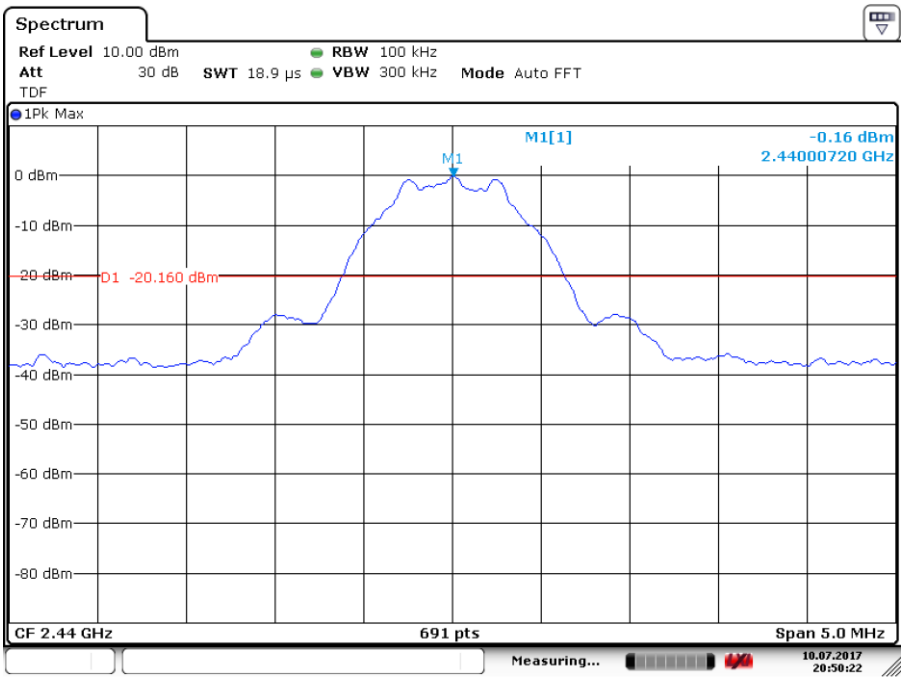

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Fig.12 Conducted Spurious Emission (Ch19, Center Frequency)

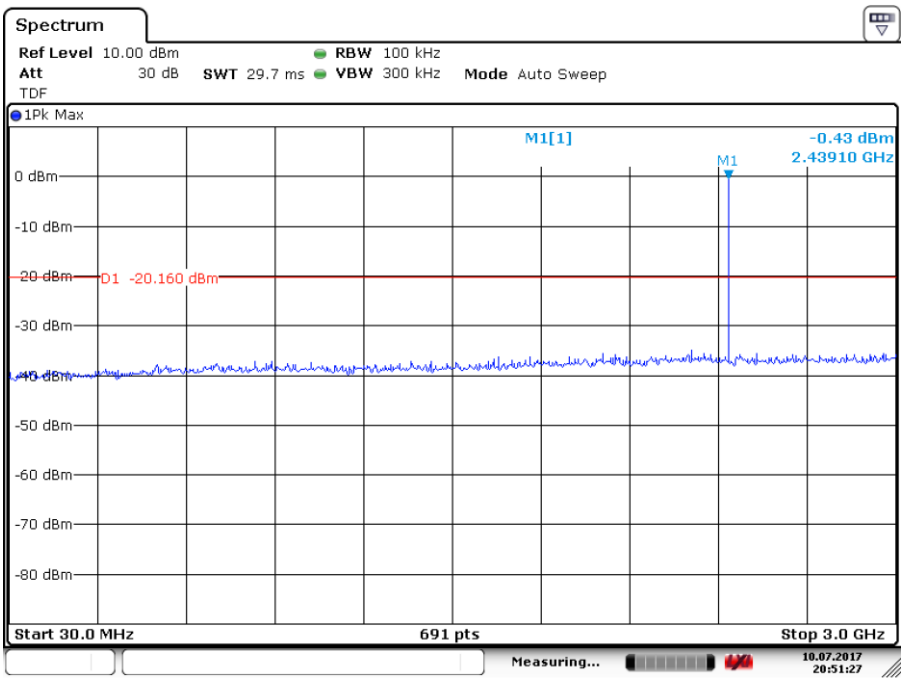

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Fig.13 Conducted Spurious Emission (Ch19, 30 MHz-3 GHz)

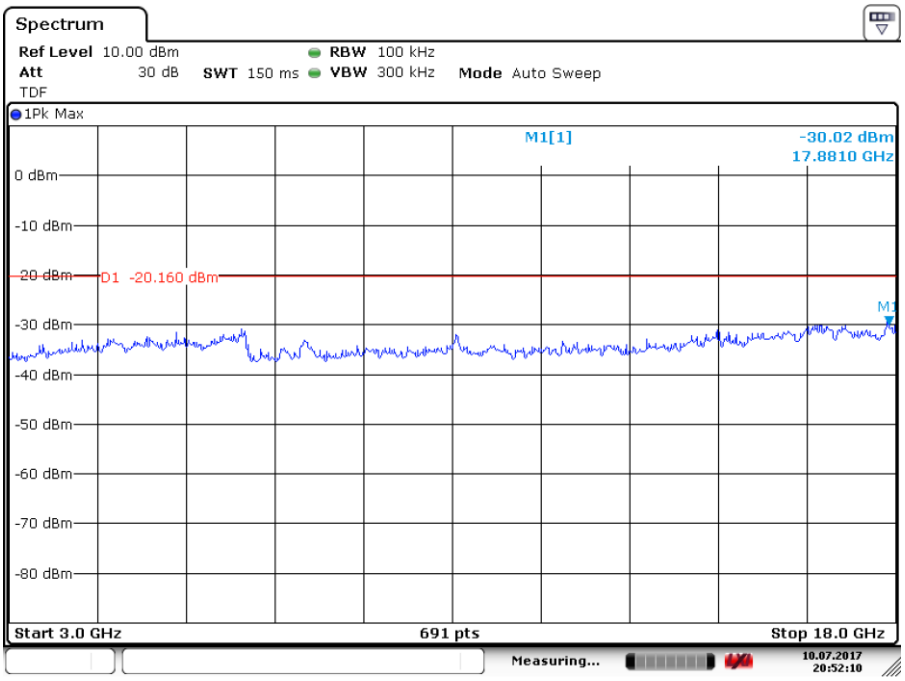

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Fig.14 Conducted Spurious Emission (Ch19, 3 GHz-18 GHz)

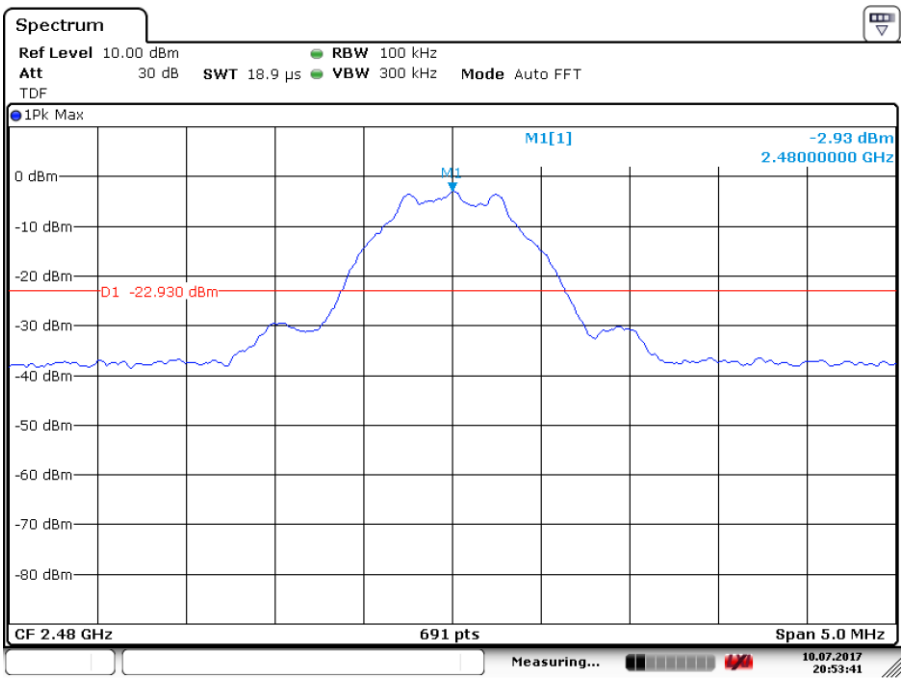

Fig.15 Conducted Spurious Emission (Ch39, Center Frequency)

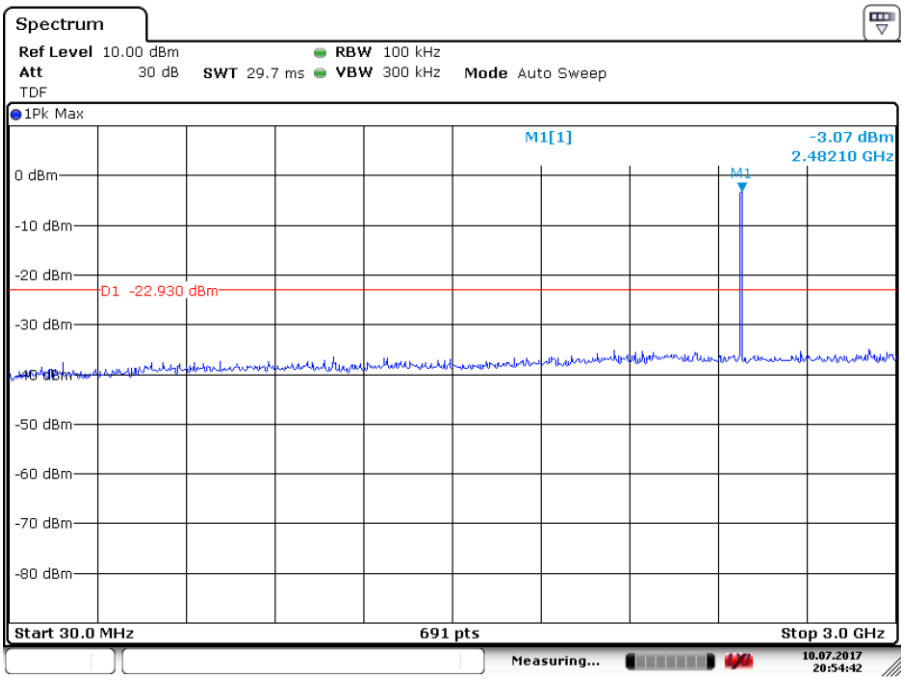

Fig.16 Conducted Spurious Emission (Ch39, 30 MHz-3 GHz)

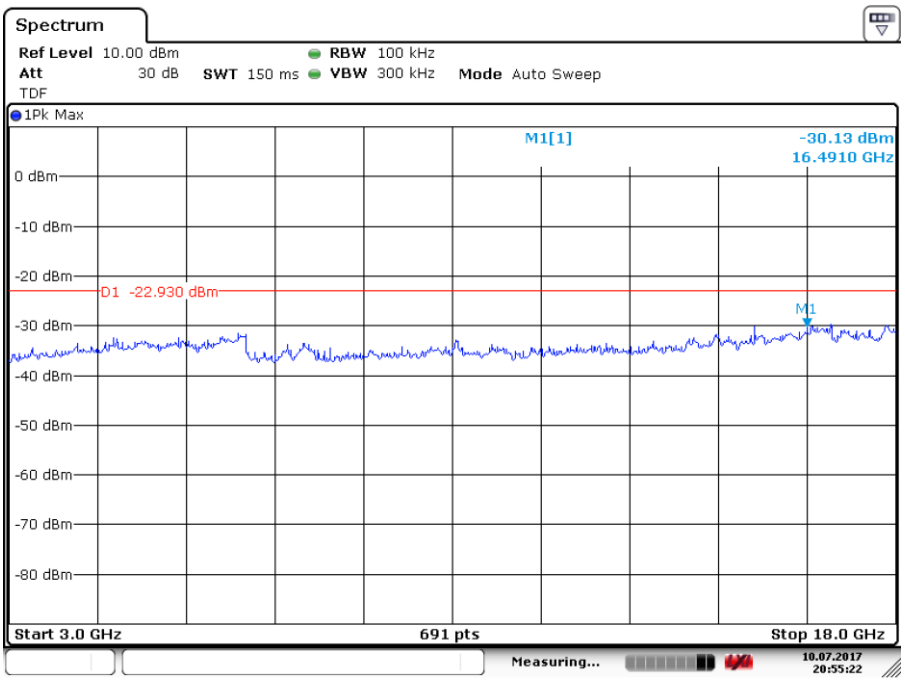

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Fig.17 Conducted Spurious Emission (Ch39, 3 GHz-18 GHz)

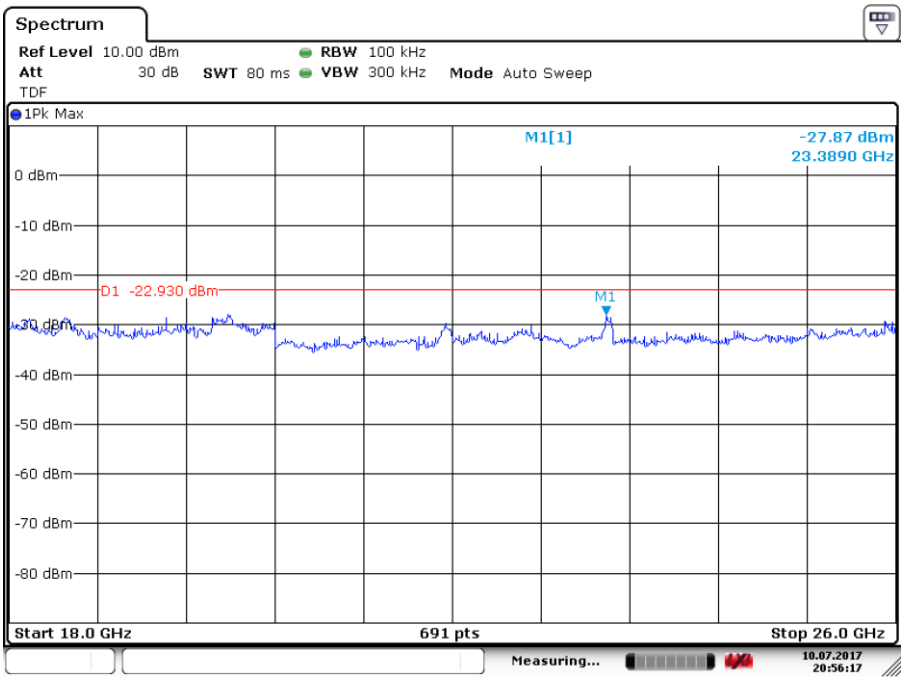

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Fig.18 Conducted Spurious Emission (All channels, 18 GHz-26 GHz)

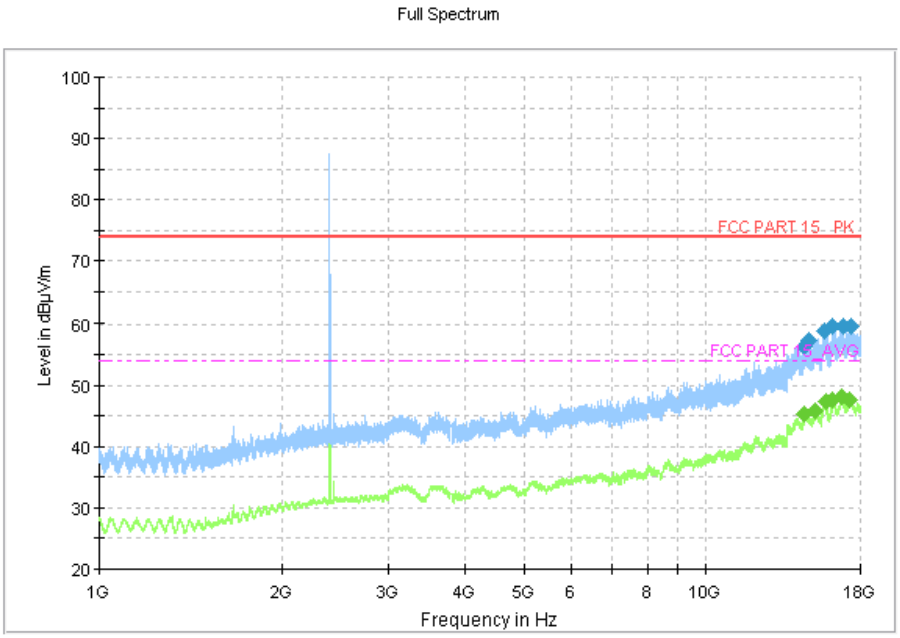

Fig.19 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz)

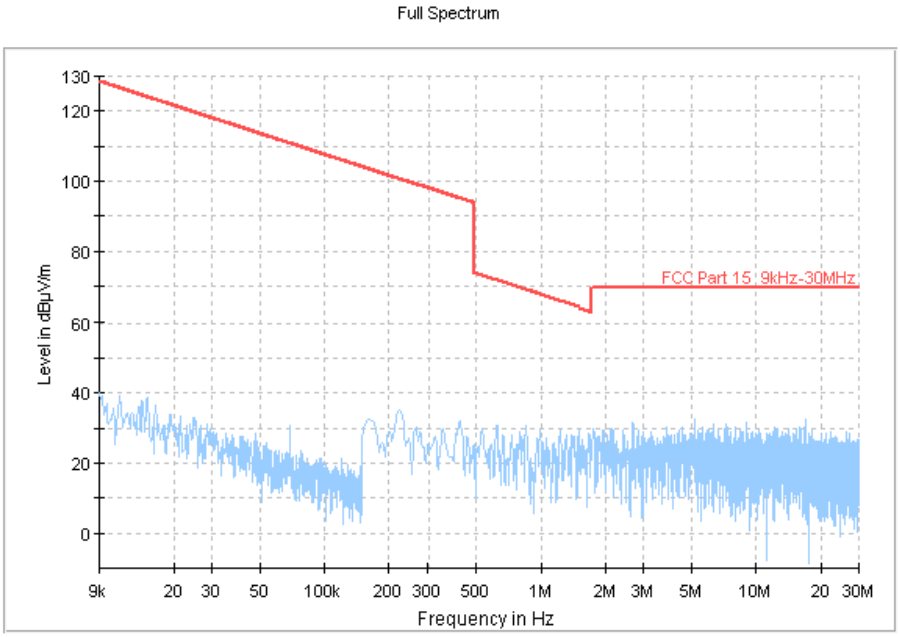

Fig.20 Radiated Spurious Emission (Ch19, 9 kHz-30 MHz)

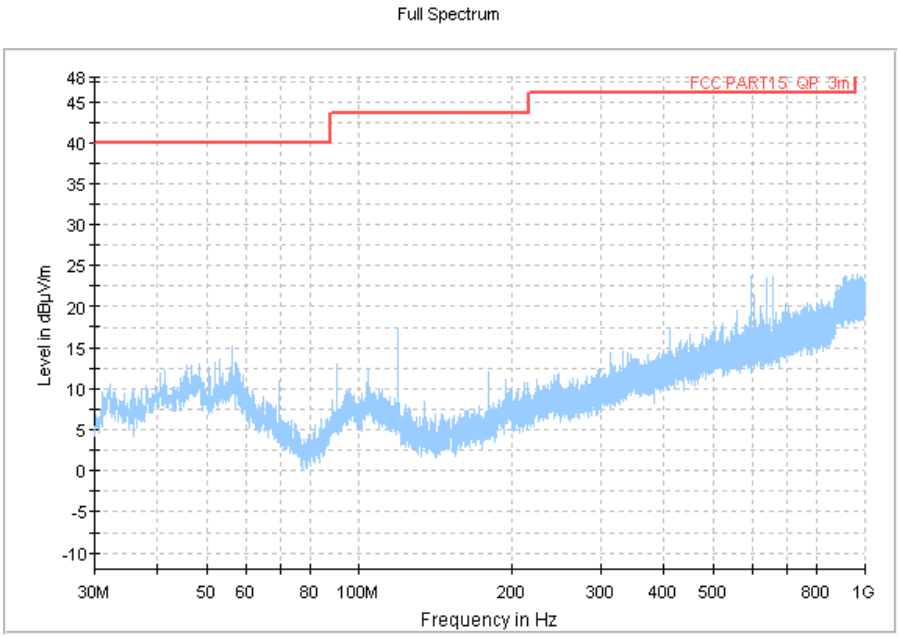

Fig.21 Radiated Spurious Emission (Ch19, 30 MHz-1 GHz)

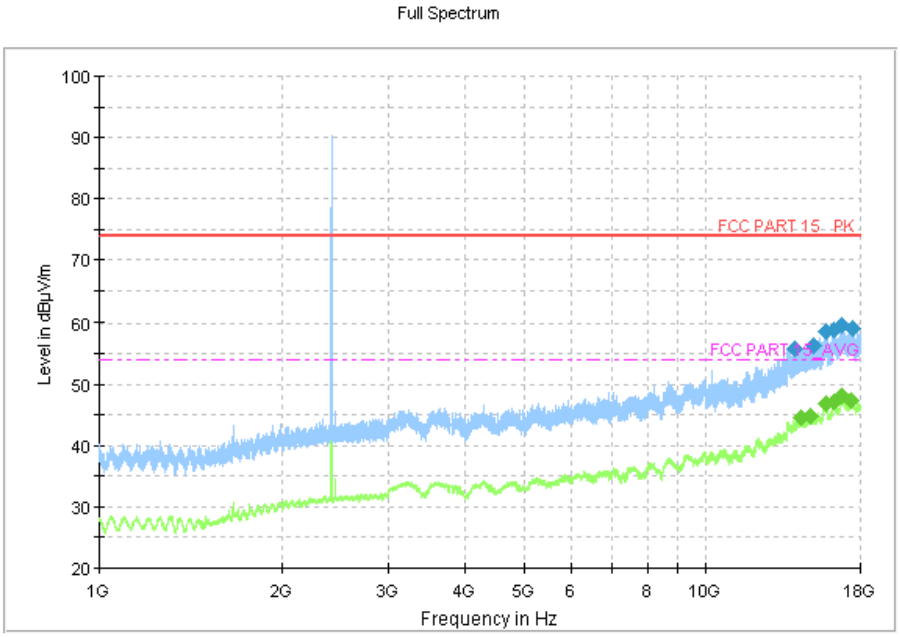

Fig.22 Radiated Spurious Emission (Ch19, 1 GHz- 18 GHz)

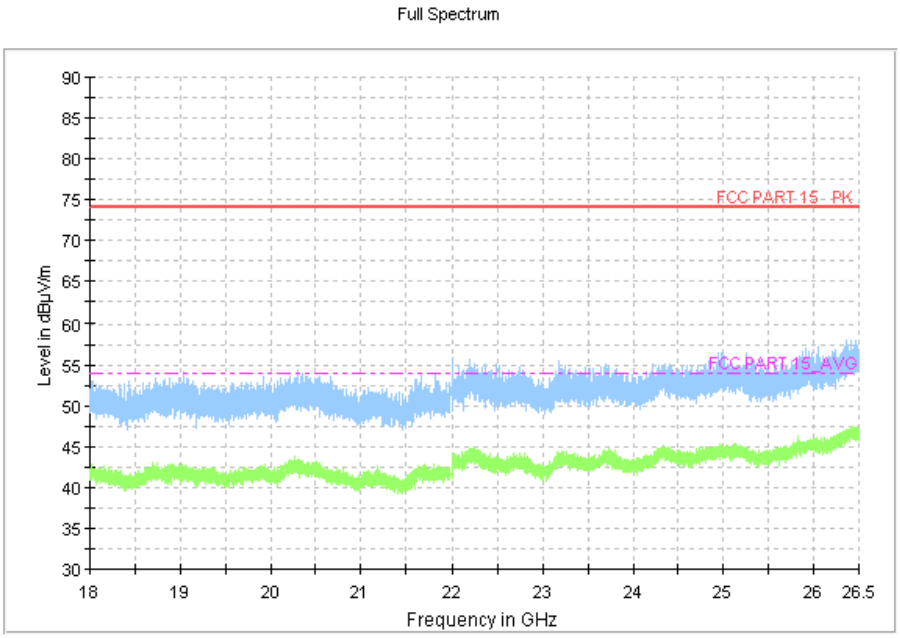

Fig.23 Radiated Spurious Emission (Ch19, 18 GHz-26.5 GHz)

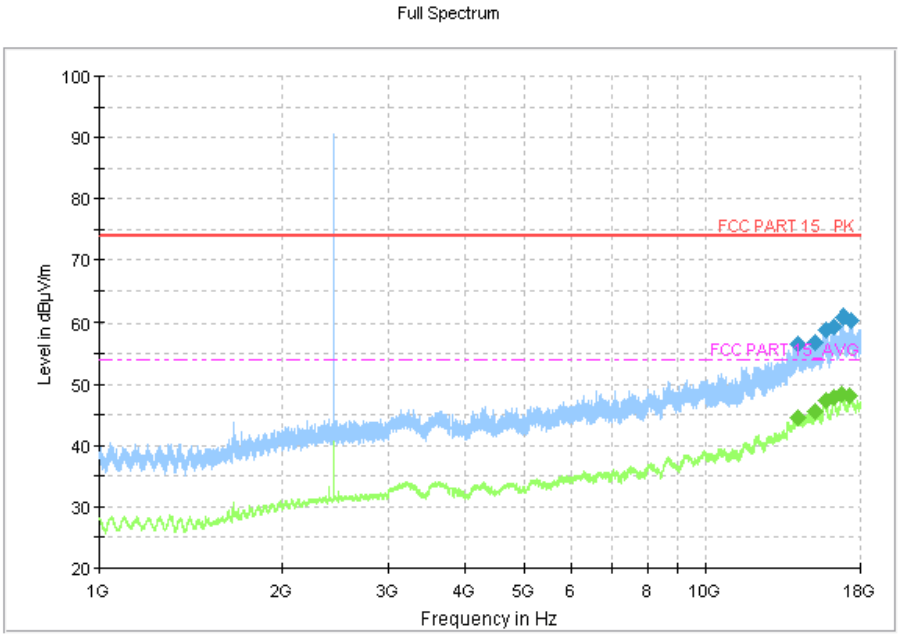

Fig.24 Radiated Spurious Emission (Ch39, 1 GHz-18 GHz)

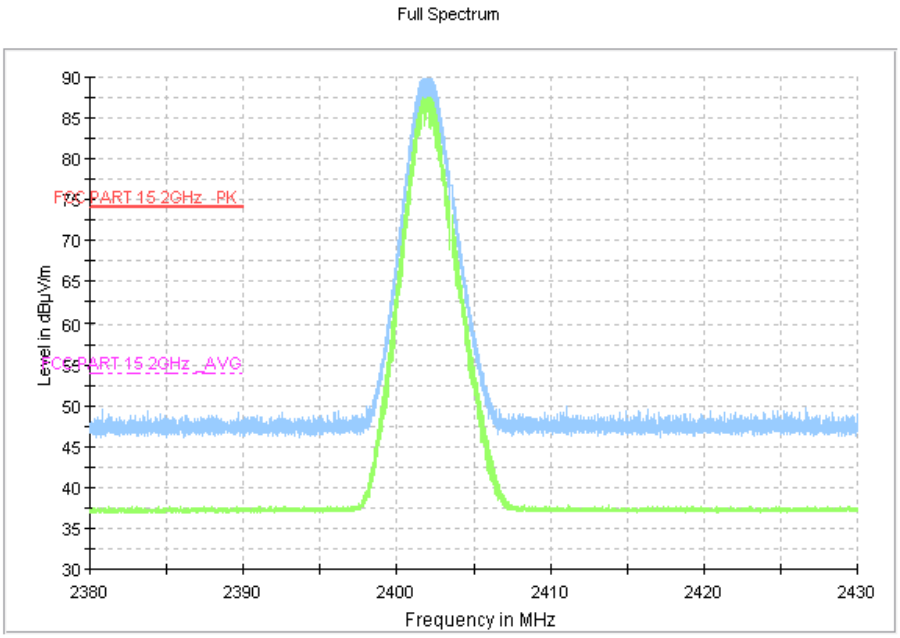

Fig.25 Radiated Emission Power (GFSK, Ch0, 2380GHz~2450GHz)

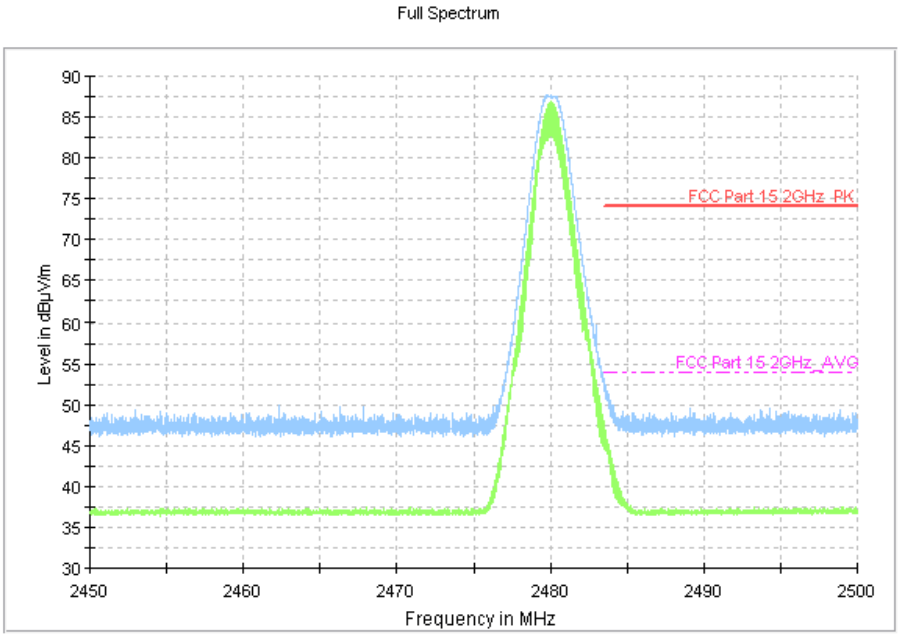

Fig.26 Radiated Emission Power (GFSK, Ch39, 2450GHz~2500GHz)

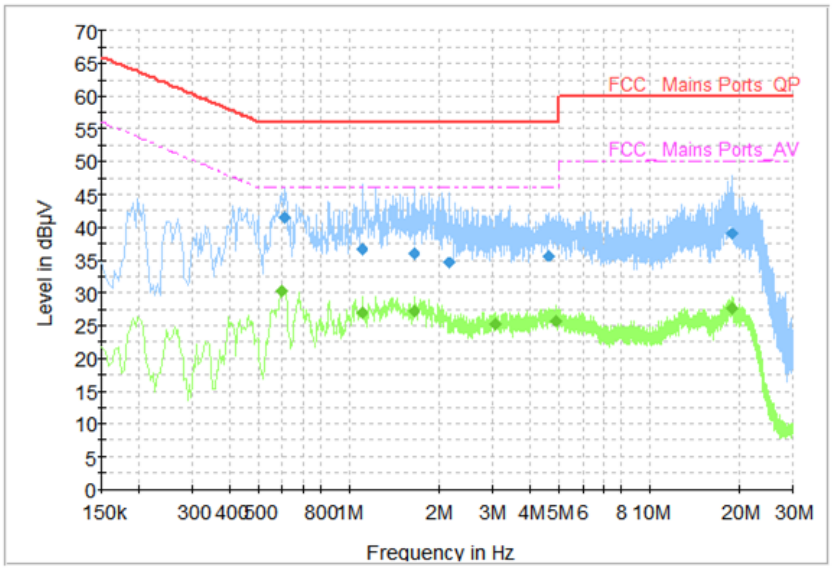

Fig.27 AC Powerline Conducted Emission (Traffic, AE1, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.606000	41.39	56.00	14.61	L1	ON	9.7
1.106000	36.69	56.00	19.31	L1	ON	9.7
1.634000	36.05	56.00	19.95	L1	ON	9.7
2.154000	34.64	56.00	21.36	L1	ON	9.7
4.630000	35.66	56.00	20.34	L1	ON	9.8
18.722000	38.97	60.00	21.03	L1	ON	10.2

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.598000	30.34	46.00	15.66	L1	ON	9.7
1.106000	26.95	46.00	19.05	L1	ON	9.7
1.634000	27.22	46.00	18.78	L1	ON	9.7
3.078000	25.22	46.00	20.78	L1	ON	9.7
4.886000	25.66	46.00	20.34	L1	ON	9.8
18.686000	27.69	50.00	22.31	L1	ON	10.2

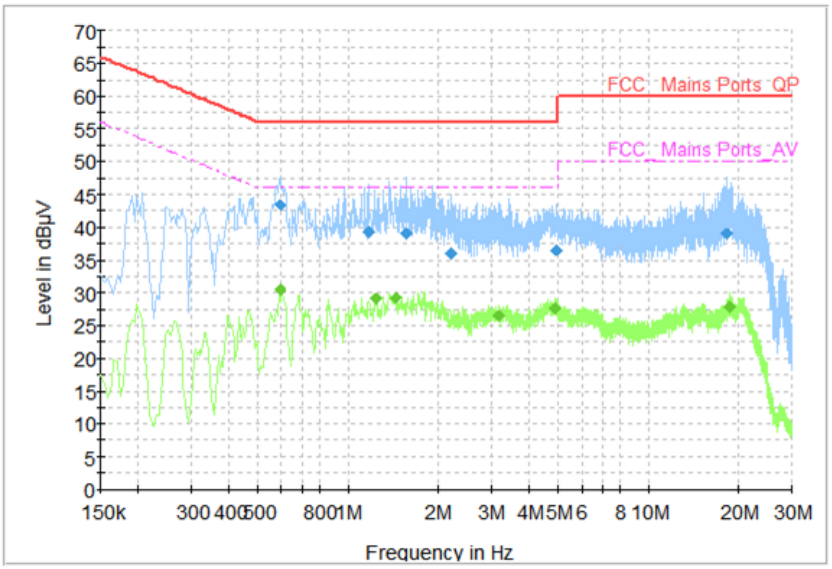

Fig.28 AC Power line Conducted Emission (Idle, AE1, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.594000	43.41	56.00	12.59	L1	ON	9.7
1.170000	39.26	56.00	16.74	L1	ON	9.7
1.558000	38.91	56.00	17.09	L1	ON	9.7
2.202000	35.91	56.00	20.09	L1	ON	9.7
4.934000	36.48	56.00	19.52	L1	ON	9.8
18.302000	38.93	60.00	21.07	L1	ON	10.1

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.594000	30.47	46.00	15.53	L1	ON	9.7
1.238000	29.15	46.00	16.85	L1	ON	9.7
1.442000	29.26	46.00	16.74	L1	ON	9.7
3.154000	26.51	46.00	19.49	L1	ON	9.7
4.858000	27.60	46.00	18.40	L1	ON	9.8
18.622000	27.93	50.00	22.07	L1	ON	10.2

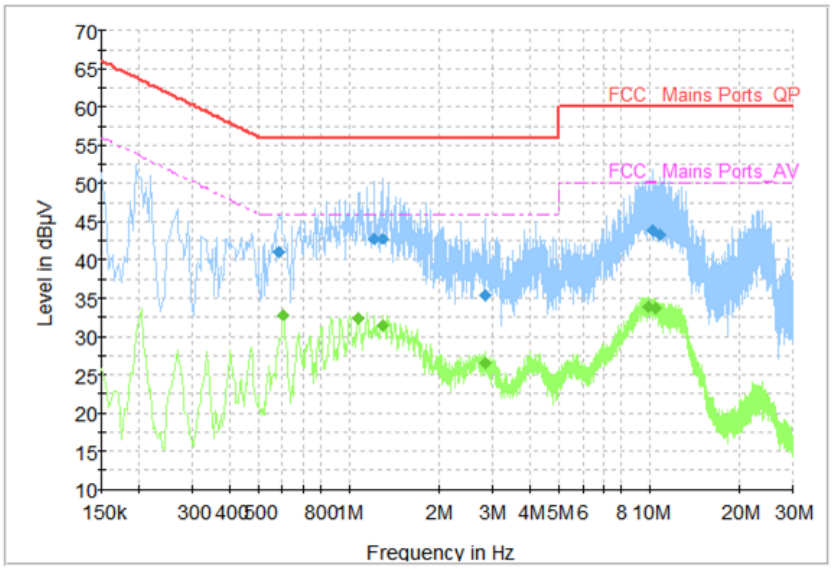

Fig.29 AC Powerline Conducted Emission (Traffic, AE2, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.582000	41.06	56.00	14.94	L1	ON	9.7
1.218000	42.79	56.00	13.21	L1	ON	9.7
1.286000	42.73	56.00	13.27	L1	ON	9.7
2.838000	35.37	56.00	20.63	L1	ON	9.7
10.190000	43.92	60.00	16.08	L1	ON	9.9
10.822000	43.31	60.00	16.69	L1	ON	9.9

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.602000	32.81	46.00	13.19	N	ON	9.7
1.070000	32.30	46.00	13.70	L1	ON	9.7
1.286000	31.51	46.00	14.49	L1	ON	9.7
2.838000	26.46	46.00	19.54	L1	ON	9.7
9.910000	33.83	50.00	16.17	L1	ON	9.8
10.490000	33.80	50.00	16.20	L1	ON	9.9

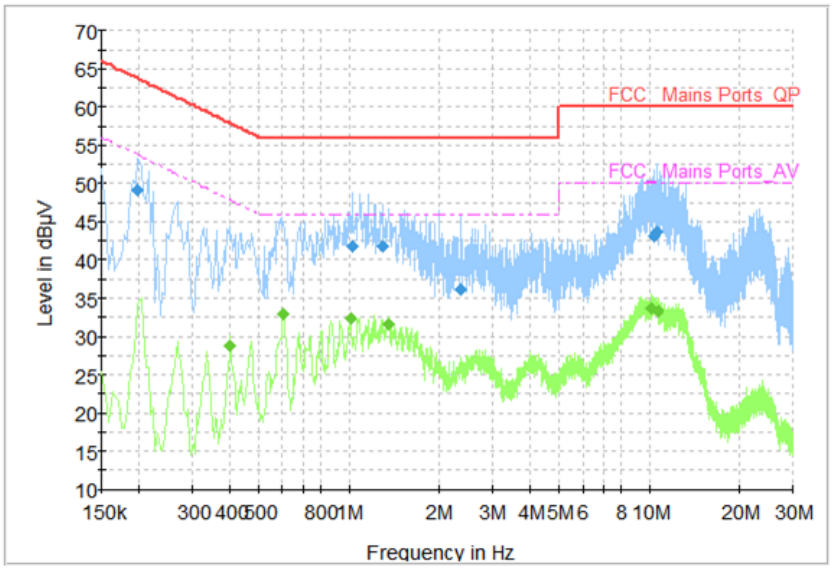

Fig.30 AC Power line Conducted Emission (Idle, AE2, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.198000	49.20	63.69	14.49	N	ON	9.6
1.026000	41.72	56.00	14.28	L1	ON	9.7
1.286000	41.79	56.00	14.21	L1	ON	9.7
2.350000	36.20	56.00	19.80	L1	ON	9.7
10.318000	43.17	60.00	16.83	L1	ON	9.9
10.506000	43.64	60.00	16.36	L1	ON	9.9

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	28.78	47.81	19.03	N	ON	9.6
0.602000	33.01	46.00	12.99	N	ON	9.7
1.010000	32.31	46.00	13.69	L1	ON	9.7
1.346000	31.67	46.00	14.33	L1	ON	9.7
10.130000	33.76	50.00	16.24	L1	ON	9.8
10.682000	33.25	50.00	16.75	L1	ON	9.9

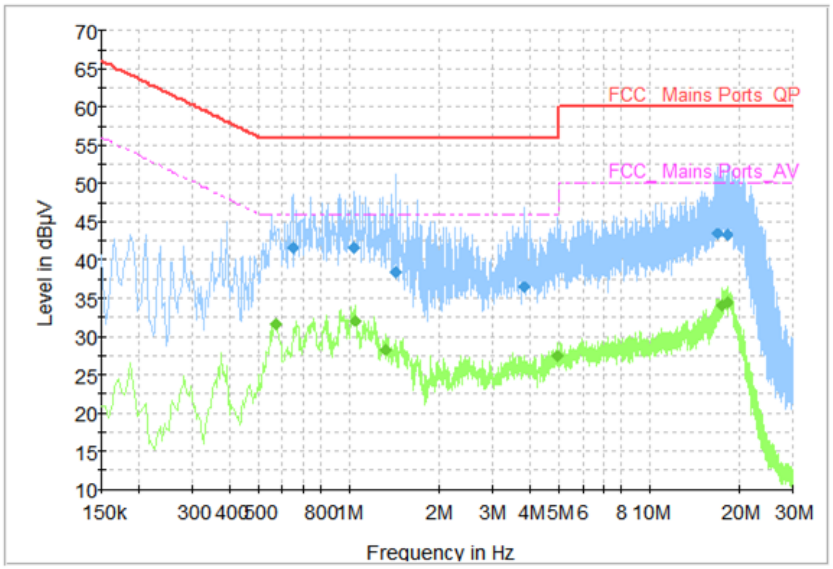

Fig.31 AC Powerline Conducted Emission (Traffic, AE3, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.646000	41.65	56.00	14.35	L1	ON	9.7
1.038000	41.65	56.00	14.35	L1	ON	9.7
1.422000	38.35	56.00	17.65	L1	ON	9.7
3.834000	36.46	56.00	19.54	L1	ON	9.7
16.866000	43.33	60.00	16.67	L1	ON	10.1
18.058000	43.32	60.00	16.68	L1	ON	10.1

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.574000	31.63	46.00	14.37	L1	ON	9.7
1.042000	32.11	46.00	13.89	L1	ON	9.7
1.326000	28.23	46.00	17.77	L1	ON	9.7
4.906000	27.35	46.00	18.65	L1	ON	9.8
17.486000	34.05	50.00	15.95	L1	ON	10.1
18.058000	34.46	50.00	15.54	L1	ON	10.1

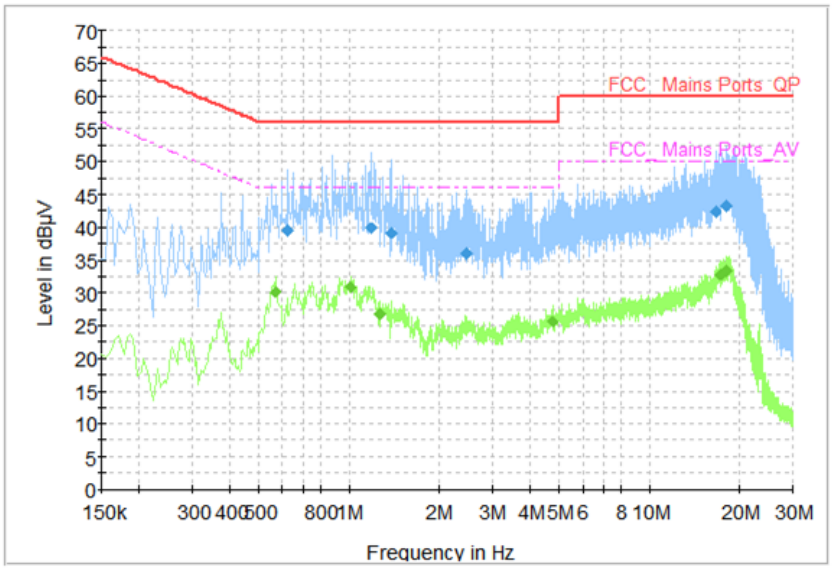

Fig.32 AC Power line Conducted Emission (Idle, AE3, 120V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.626000	39.45	56.00	16.55	L1	ON	9.7
1.178000	39.86	56.00	16.14	L1	ON	9.7
1.386000	39.15	56.00	16.85	L1	ON	9.7
2.470000	35.93	56.00	20.07	L1	ON	9.7
16.634000	42.31	60.00	17.69	L1	ON	10.1
17.990000	43.27	60.00	16.73	L1	ON	10.1

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.566000	30.07	46.00	15.93	L1	ON	9.7
1.010000	30.83	46.00	15.17	L1	ON	9.7
1.270000	26.87	46.00	19.13	L1	ON	9.7
4.742000	25.56	46.00	20.44	L1	ON	9.8
17.218000	32.76	50.00	17.24	L1	ON	10.1
17.918000	33.36	50.00	16.64	L1	ON	10.1

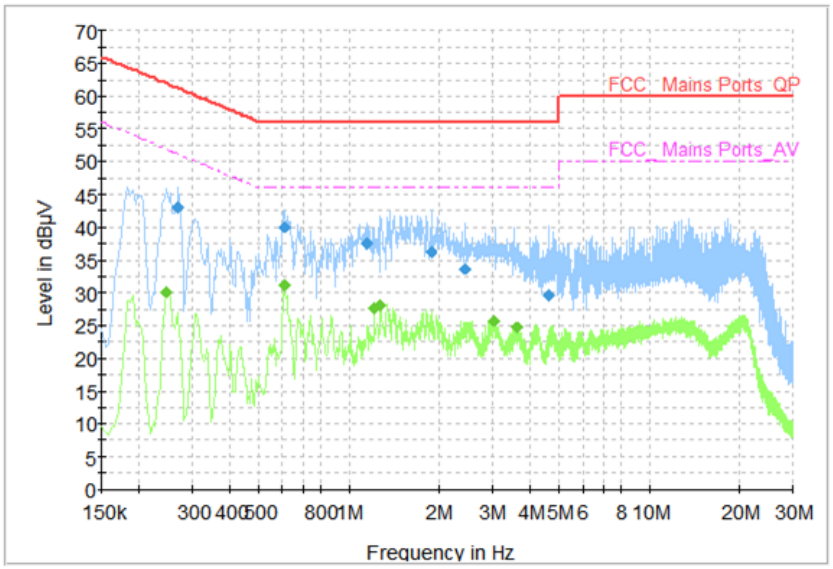

Fig.33 AC Powerline Conducted Emission (Traffic, AE1, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.270000	43.08	61.12	18.03	L1	ON	9.7
0.606000	39.96	56.00	16.04	L1	ON	9.7
1.142000	37.49	56.00	18.51	L1	ON	9.7
1.882000	36.21	56.00	19.79	L1	ON	9.7
2.418000	33.68	56.00	22.32	L1	ON	9.7
4.606000	29.68	56.00	26.32	L1	ON	9.8

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.246000	30.20	51.89	21.69	L1	ON	9.7
0.606000	31.29	46.00	14.71	L1	ON	9.7
1.210000	27.71	46.00	18.29	L1	ON	9.7
1.274000	28.07	46.00	17.93	L1	ON	9.7
3.018000	25.80	46.00	20.20	L1	ON	9.7
3.618000	24.74	46.00	21.26	L1	ON	9.7

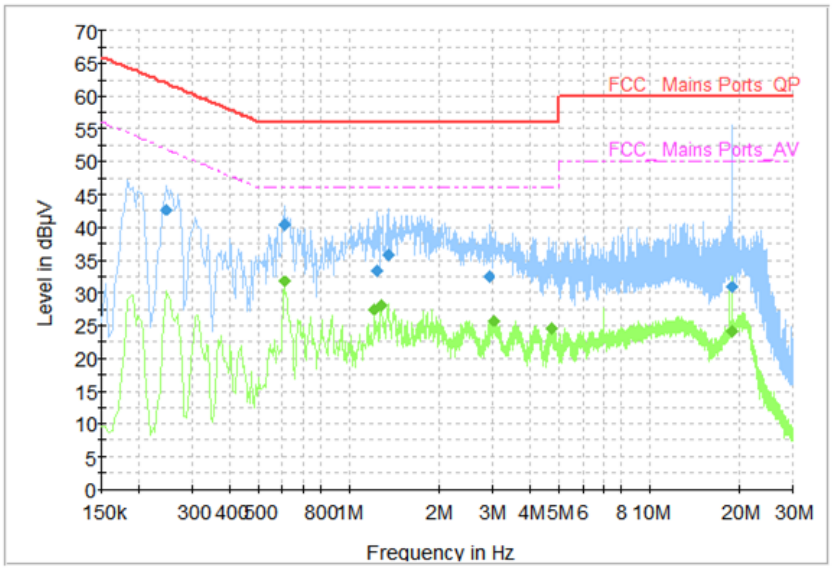

Fig.34 AC Power line Conducted Emission (Idle, AE1, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.246000	42.70	61.89	19.19	L1	ON	9.7
0.606000	40.40	56.00	15.60	L1	ON	9.7
1.234000	33.29	56.00	22.71	L1	ON	9.7
1.350000	35.82	56.00	20.18	L1	ON	9.7
2.922000	32.49	56.00	23.51	L1	ON	9.7
18.818000	30.79	60.00	29.21	L1	ON	10.2

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.606000	31.67	46.00	14.33	L1	ON	9.7
1.214000	27.52	46.00	18.48	L1	ON	9.7
1.278000	27.95	46.00	18.05	L1	ON	9.7
3.022000	25.78	46.00	20.22	L1	ON	9.7
4.702000	24.58	46.00	21.42	L1	ON	9.8
18.818000	24.23	50.00	25.77	L1	ON	10.2

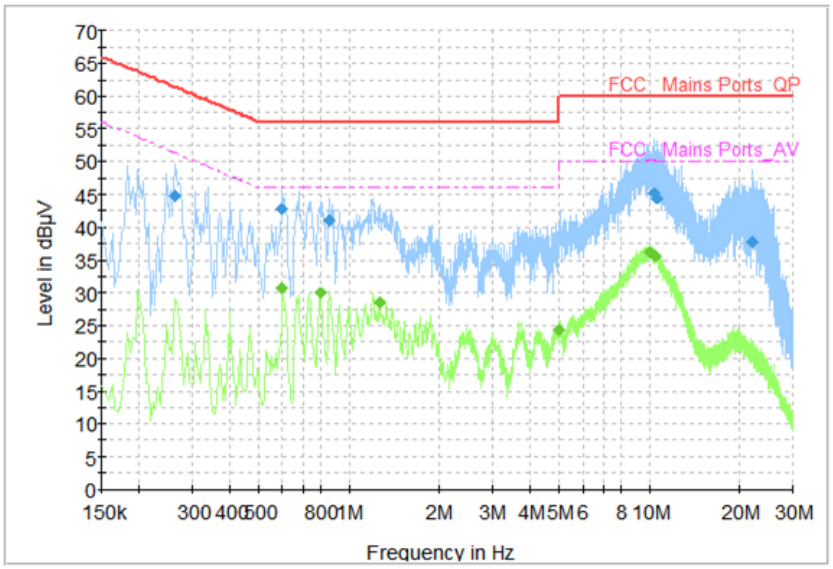

Fig.35 AC Powerline Conducted Emission (Traffic, AE2, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.262000	44.71	61.37	16.66	L1	ON	9.7
0.598000	42.93	56.00	13.07	L1	ON	9.7
0.858000	41.01	56.00	14.99	L1	ON	9.7
10.366000	45.21	60.00	14.79	L1	ON	9.9
10.562000	44.49	60.00	15.51	L1	ON	9.9
21.938000	37.80	60.00	22.20	L1	ON	10.1

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.598000	30.61	46.00	15.39	L1	ON	9.7
0.798000	29.97	46.00	16.03	L1	ON	9.7
1.262000	28.49	46.00	17.51	L1	ON	9.7
4.994000	24.38	46.00	21.62	L1	ON	9.8
9.982000	36.09	50.00	13.91	L1	ON	9.8
10.446000	35.62	50.00	14.38	L1	ON	9.9

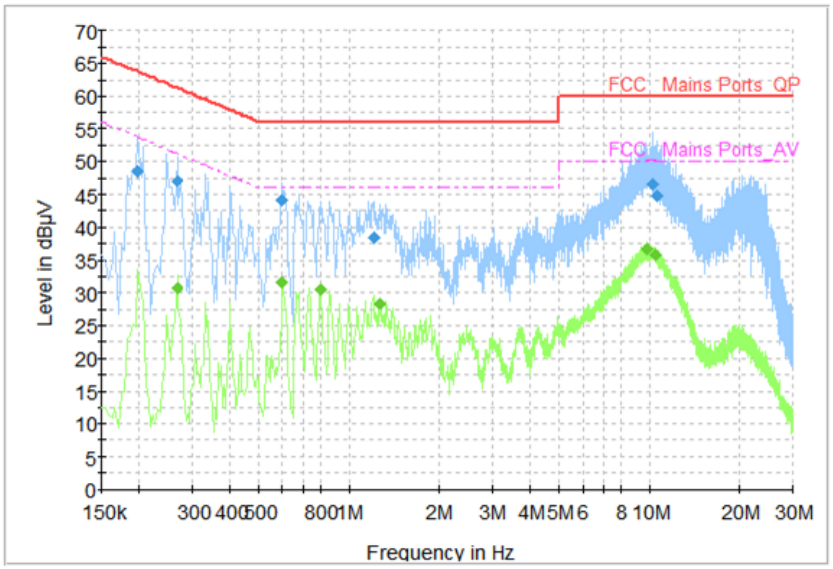

Fig.36 AC Power line Conducted Emission (Idle, AE2, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.198000	48.45	63.69	15.25	L1	ON	9.7
0.266000	47.14	61.24	14.11	L1	ON	9.7
0.598000	44.00	56.00	12.00	L1	ON	9.7
1.214000	38.43	56.00	17.57	L1	ON	9.7
10.242000	46.51	60.00	13.49	L1	ON	9.9
10.538000	44.83	60.00	15.17	L1	ON	9.9

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.266000	30.71	51.24	20.53	L1	ON	9.7
0.598000	31.53	46.00	14.47	L1	ON	9.7
0.798000	30.58	46.00	15.42	L1	ON	9.7
1.266000	28.30	46.00	17.70	L1	ON	9.7
9.834000	36.59	50.00	13.41	L1	ON	9.8
10.426000	35.76	50.00	14.24	L1	ON	9.9

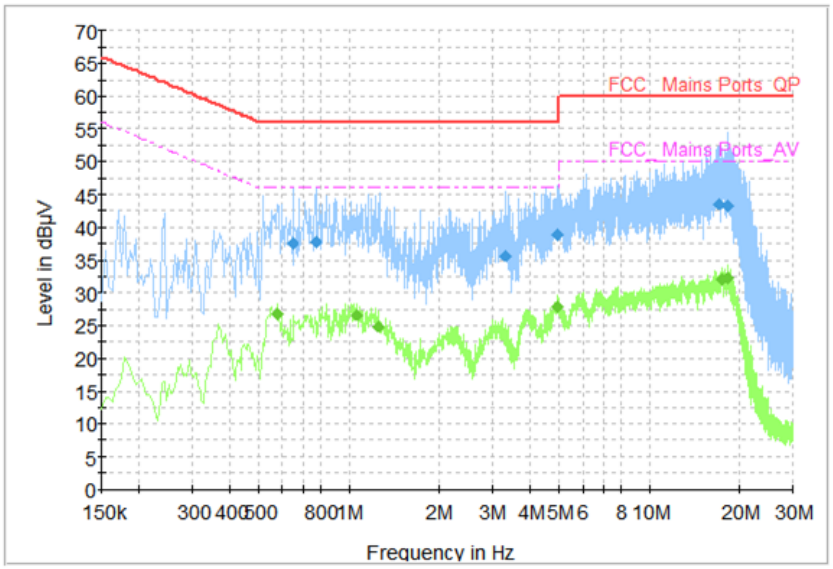

Fig.37 AC Powerline Conducted Emission (Traffic, AE3, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.650000	37.50	56.00	18.50	L1	ON	9.7
0.770000	37.74	56.00	18.26	L1	ON	9.7
3.294000	35.54	56.00	20.46	L1	ON	9.7
4.918000	38.83	56.00	17.17	L1	ON	9.8
17.030000	43.49	60.00	16.51	L1	ON	10.2
18.230000	43.11	60.00	16.89	L1	ON	10.1

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.578000	26.77	46.00	19.23	L1	ON	9.7
1.066000	26.63	46.00	19.37	L1	ON	9.7
1.250000	24.84	46.00	21.16	L1	ON	9.7
4.918000	27.83	46.00	18.17	L1	ON	9.8
17.498000	32.12	50.00	17.88	L1	ON	10.1
18.206000	32.20	50.00	17.80	L1	ON	10.1

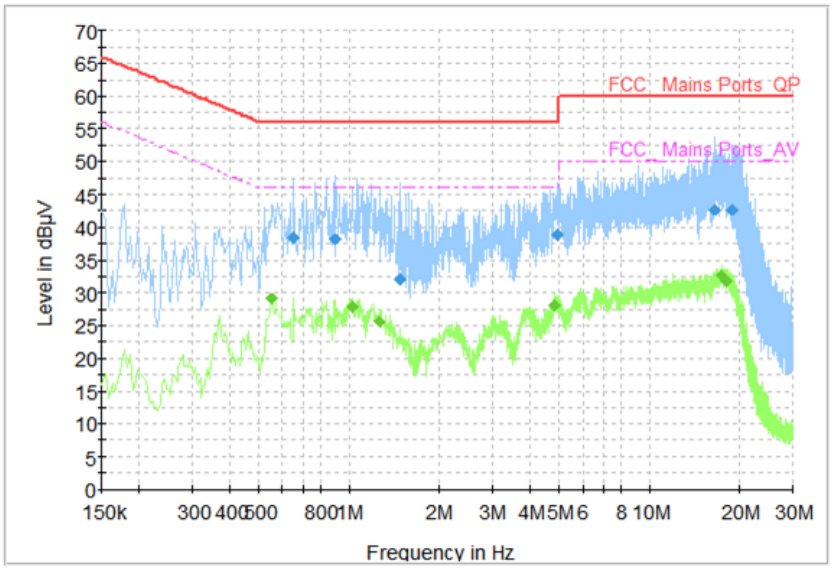

Fig.38 AC Power line Conducted Emission (Idle, AE3, 240V)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.654000	38.45	56.00	17.55	L1	ON	9.7
0.902000	38.11	56.00	17.89	L1	ON	9.7
1.474000	32.04	56.00	23.96	L1	ON	9.7
4.926000	38.77	56.00	17.23	L1	ON	9.8
16.442000	42.67	60.00	17.33	L1	ON	10.1
18.790000	42.64	60.00	17.36	L1	ON	10.2

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.554000	29.03	46.00	16.97	L1	ON	9.7
1.022000	27.84	46.00	18.16	L1	ON	9.7
1.254000	25.65	46.00	20.35	L1	ON	9.7
4.854000	28.12	46.00	17.88	L1	ON	9.8
17.254000	32.56	50.00	17.44	L1	ON	10.1
17.990000	31.79	50.00	18.21	L1	ON	10.1

ANNEX C: Persons involved in this testing

Test Name	Tester
Maximum Peak Output Power	Lin Kanfeng, Tang Weisheng
Peak Power Spectral Density	Lin Kanfeng, Tang Weisheng
Occupied 6dB Bandwidth	Lin Kanfeng, Tang Weisheng
Band Edges Compliance	Lin Kanfeng, Tang Weisheng
Transmitter Spurious Emission - Conducted	Lin Kanfeng, Tang Weisheng
Transmitter Spurious Emission - Radiated	Lin Kanfeng, Tang Weisheng
AC Powerline Conducted Emission	Lin Kanfeng, Tang Weisheng

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