FCC PART 15C
TEST REPORT
No. B17N00162-BLE

for

Huawei Technologies Co., Ltd.

Smart Watch

Model Name: LEO-DLXXE

With

Hardware Version: EA1LEOUM

Software Version: sawshark-userdebug7.1.1NFF47

FCC ID: QISLEO-DLXX

Issued Date: 2017-02-27

Test Laboratory:

FCC 2.948 Listed: No.342690

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
B17N00162-BLE	Rev.0	1st edition	2017-02-27

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℃

Extreme Temperature: -10/+55℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-02-23

Testing End Date: 2017-02-24

1.4. Signature

An Ran

(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:	Administration Building，Huawei Base, Bantian, Longgang District, Shenzhen
City:	Shenzhen
Postal Code:	518129
Country:	China
Telephone:	0755-36376815
Fax:	/

2.2. Manufacturer Information

Company Name:	Huawei Technologies Co., Ltd
Address:	Administration Building, Huawei Base, Bantian, Longgang District, Shenzhen
City:	Shenzhen
Postal Code:	518129
Country:	China
Telephone:	0755-36376815
Fax:	/

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

3.1. About EUT

Description	Smart Watch
Model Name	LEO-DLXXE
Market Name	/
Frequency Band	2402MHz~2480MHz
Type of Modulation	GFSK
Number of Channels	40
FCC ID	QISLEO-DLXX

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	/	EA1LEOUM	sawshark-userdebug7.1.1NFF47	2017-02-23

*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	DONGGUAN PHITEK ELECTRONICS CO.,LTD.

AE2

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

AE3

Model	HW-050100U01
Manufacturer	HUIZHOU BYD 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 B and ANNEX C** 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	2017-03-21	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 330	Schwarzbeck	2017-04-22	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 -5dBi.
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	Fig.1	7.74	P
	19	Fig.2	8.37	P
	39	Fig.3	8.29	P

See ANNEX C 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.4	-5.50	P
	19	Fig.5	-5.11	P
	39	Fig.6	-5.09	P

See ANNEX C 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.7	725.0	P
	19	Fig.8	724.0	P
	39	Fig.9	725.5	P

See ANNEX C 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.10	P
	39	Fig.11	P

See ANNEX C 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.12	P
		30 MHz-3 GHz	Fig.13	P
		3GHz-18GHz	Fig.14	P
	19	2.440 GHz	Fig.15	P
		30 MHz-3 GHz	Fig.16	P
		3GHz-18GHz	Fig.17	P
	39	2.480 GHz	Fig.18	P
		30 MHz-3 GHz	Fig.19	P
		3GHz-18GHz	Fig.20	P
/	All channels	18GHz-26GHz	Fig.21	P

See ANNEX C 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 ~3 GHz	Fig.22	P
		3 GHz ~18 GHz	Fig.23	P
	19	9 kHz ~30 MHz	Fig.24	P
		30 MHz ~1 GHz	Fig.25	P
		1 GHz ~3 GHz	Fig.26	P
		3 GHz ~18 GHz	Fig.27	P
		18 GHz~ 26.5 GHz	Fig.28	P
	39	1 GHz ~3 GHz	Fig.29	P
		3 GHz ~18 GHz	Fig.30	P
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.31	P
	Power(CH39)	2.45 GHz ~ 2.5 GHz	Fig.32	P

GFSK CH0 (1-3GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2742.000000	49.07	74.00	24.93	21.1	V
2756.333333	49.66	74.00	24.34	21.2	V
2780.833333	50.48	74.00	23.52	20.9	V
2848.833333	50.40	74.00	23.60	21.4	V
2871.500000	50.85	74.00	23.15	21.9	V
2886.666667	50.72	74.00	23.28	21.9	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2746.500000	40.53	54.00	13.47	21.2	V
2761.666667	40.30	54.00	13.70	21.0	V
2779.500000	40.35	54.00	13.65	20.9	V
2861.333333	41.50	54.00	12.50	21.5	V
2880.333333	41.70	54.00	12.30	21.9	V
2893.500000	41.44	54.00	12.56	21.9	V

GFSK CH0 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
16372.50000	49.62	74.00	24.38	15.3	V
16691.50000	49.26	74.00	24.74	16.2	H
17015.50000	50.26	74.00	23.74	16.4	V
17240.00000	49.68	74.00	24.32	16.2	V
17554.50000	50.29	74.00	23.71	16.7	V
17904.00000	50.11	74.00	23.89	17.5	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
16353.00000	43.75	54.00	10.25	15.3	V
16637.00000	43.55	54.00	10.45	16.3	H
16885.50000	43.81	54.00	10.19	16.3	V
17044.00000	44.55	54.00	9.45	16.2	V
17296.00000	44.28	54.00	9.72	16.3	V
17455.50000	44.71	54.00	9.29	16.5	V

GFSK CH19 (1-3GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2665.833333	49.55	74.00	24.45	20.6	V
2678.500000	50.55	74.00	23.45	20.5	V
2684.500000	50.35	74.00	23.65	20.4	V
2713.500000	48.67	74.00	25.33	20.3	V
2740.166667	49.49	74.00	24.51	21.0	V
2779.666667	49.05	74.00	24.95	20.9	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2673.166667	40.39	54.00	13.61	20.6	V
2698.000000	39.62	54.00	14.38	20.4	V
2727.333333	39.77	54.00	14.23	20.6	V
2753.500000	40.95	54.00	13.05	21.2	V
2783.833333	39.89	54.00	14.11	20.9	V
2784.015640	39.88	54.00	14.12	20.9	V

GFSK CH19 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
15871.00000	50.06	74.00	23.94	14.7	H
16397.00000	49.57	74.00	24.43	15.4	H
16649.00000	50.36	74.00	23.64	16.0	H
16936.00000	49.70	74.00	24.30	16.2	V
17429.50000	50.22	74.00	23.78	16.7	V
17709.50000	49.58	74.00	24.42	16.9	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
16206.50000	43.78	54.00	10.22	15.4	H
16556.00000	43.69	54.00	10.31	16.0	H
16731.50000	44.47	54.00	9.53	16.2	V
16989.50000	44.03	54.00	9.97	16.5	V
17208.50000	43.74	54.00	10.26	16.2	V
17478.00000	44.87	54.00	9.13	16.5	H

GFSK CH39 (1-3GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2938.166667	48.61	74.00	25.39	22.2	V
2948.833333	49.46	74.00	24.54	22.5	V
2959.166667	50.25	74.00	23.75	22.7	V
2966.666667	50.92	74.00	23.08	22.6	V
2971.166667	51.70	74.00	22.30	22.6	V
2980.000000	50.14	74.00	23.86	22.5	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
2924.833333	42.03	54.00	11.97	22.1	V
2940.333333	41.30	54.00	12.70	22.3	V
2948.500000	41.81	54.00	12.19	22.5	V
2960.500000	41.85	54.00	12.15	22.7	V
2967.833333	41.95	54.00	12.05	22.6	V
2975.000000	41.68	54.00	12.32	22.5	V

GFSK CH39 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
14468.50000	48.42	74.00	25.58	12.7	V
15384.50000	48.60	74.00	25.40	13.9	V
15908.50000	48.22	74.00	25.78	14.9	H
16191.50000	49.85	74.00	24.15	15.5	H
16326.00000	48.59	74.00	25.41	15.3	V
16654.00000	49.74	74.00	24.26	16.1	V

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Corr. (dB)	Pol
14486.00000	40.72	54.00	13.28	12.7	H
15100.50000	41.43	54.00	12.57	13.4	H
15752.50000	42.20	54.00	11.80	14.4	V
16162.50000	43.10	54.00	10.90	15.3	H
16438.50000	43.17	54.00	10.83	15.5	H
16668.00000	43.43	54.00	10.57	16.0	H

See ANNEX C 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.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.			

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.39	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.39	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.40	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.40	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.41	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.41	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.42	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.42	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.43	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.43	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.44	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.44	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 C for test graphs.

Conclusion: Pass

ANNEX B: TEST FIGURE LIST

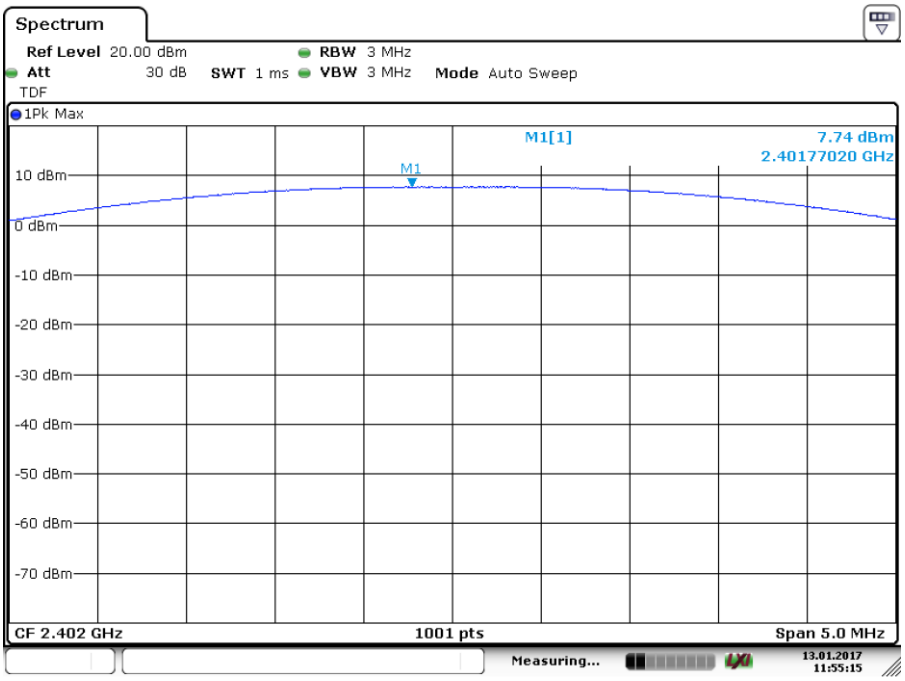


Fig.1 Maximum Peak Output Power(GFSK, Ch 0)

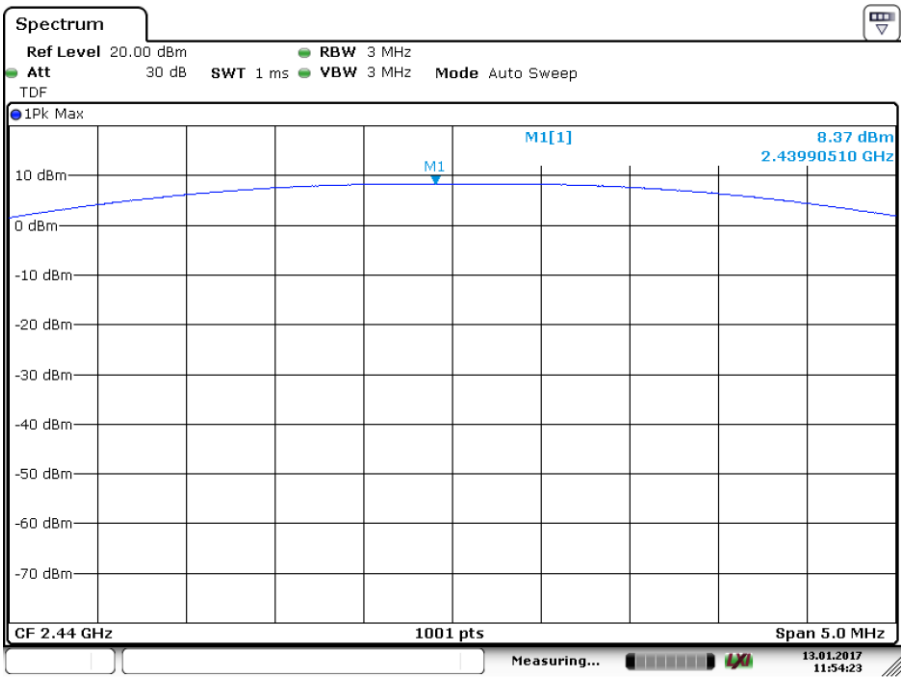


Fig.2 Maximum Peak Output Power(GFSK, Ch 19)

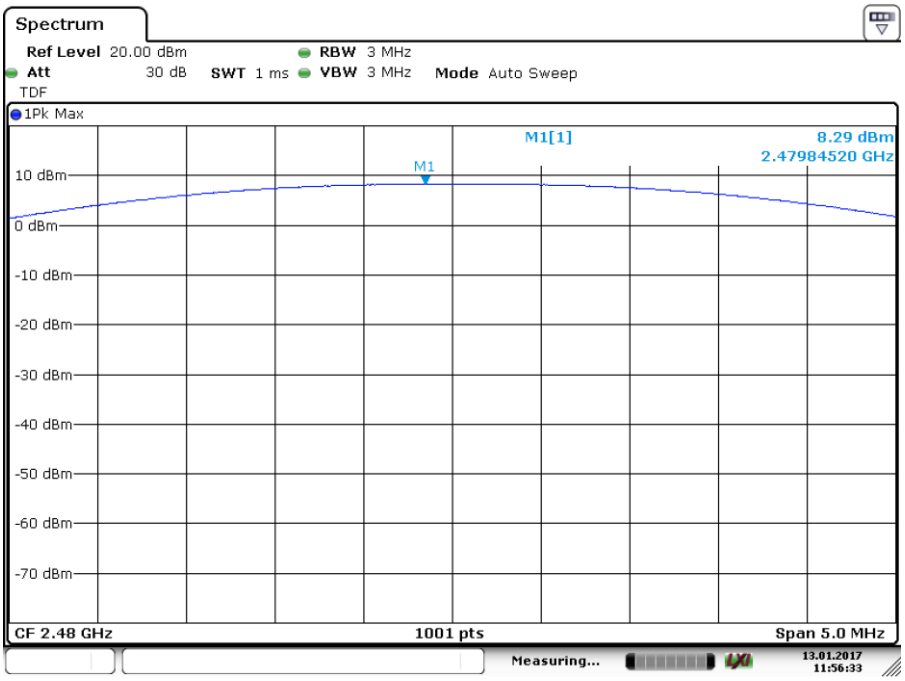


Fig.3 Maximum Peak Output Power(GFSK, Ch 39)

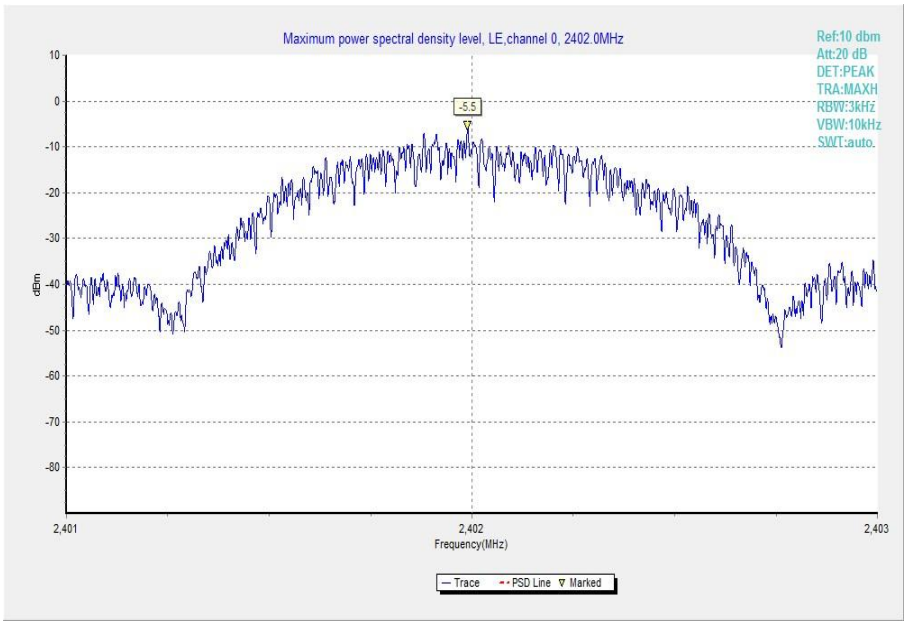


Fig.4 Power Spectral Density (Ch 0)

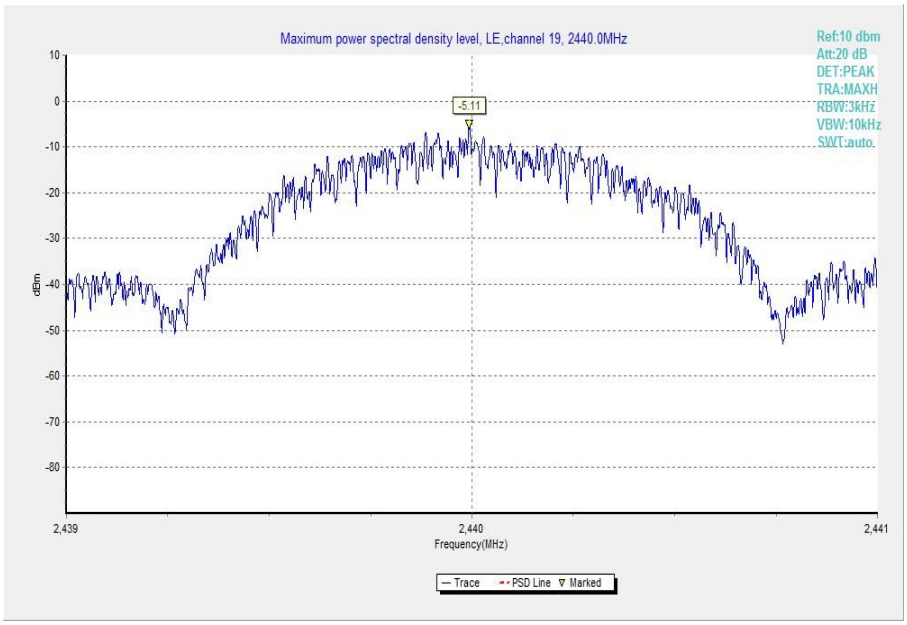


Fig.5 Power Spectral Density (Ch 19)

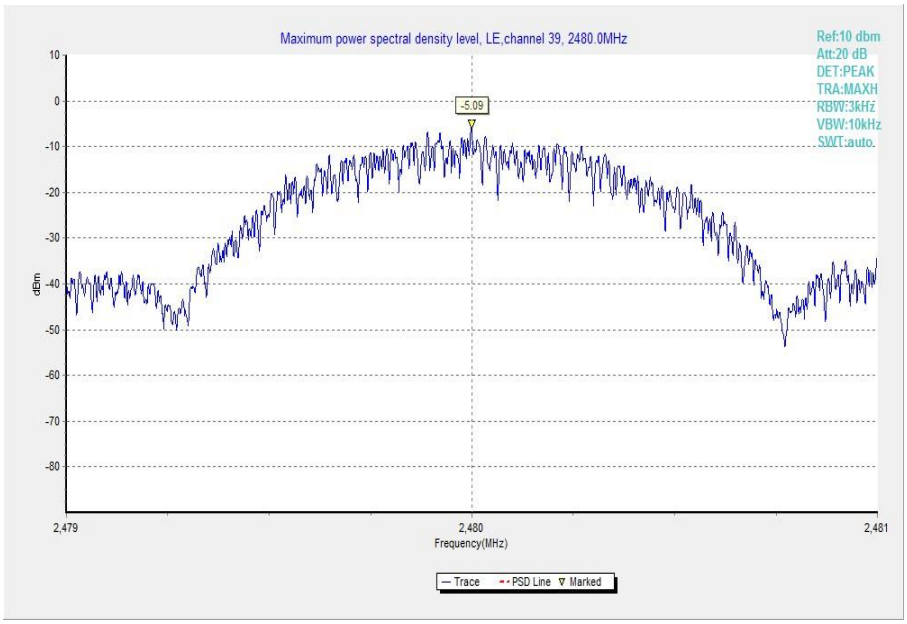


Fig.6 Power Spectral Density (Ch 39)

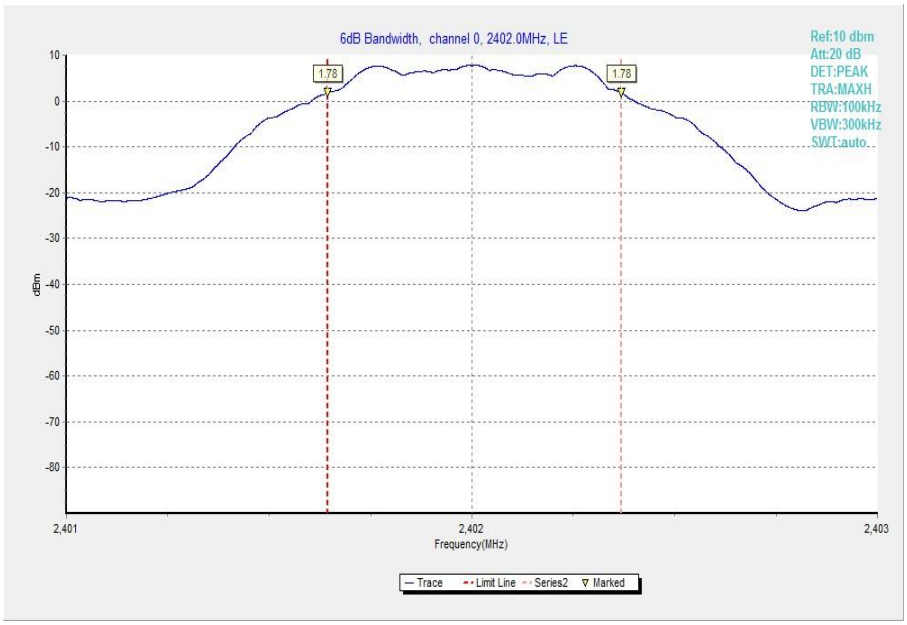


Fig.7 Occupied 6dB Bandwidth (Ch 0)

Fig.8 Occupied 6dB Bandwidth (Ch 19)

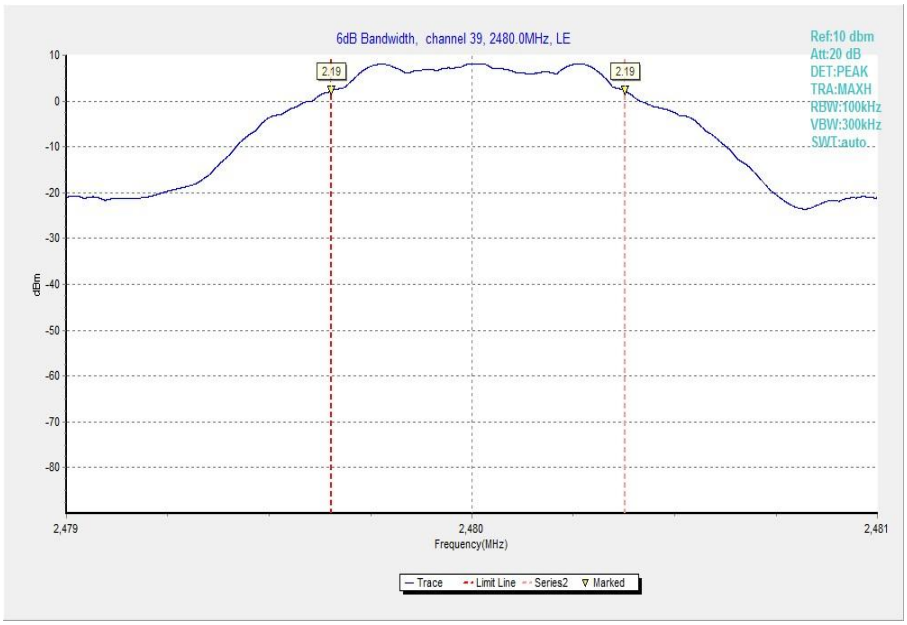


Fig.9 Occupied 6dB Bandwidth (Ch 39)

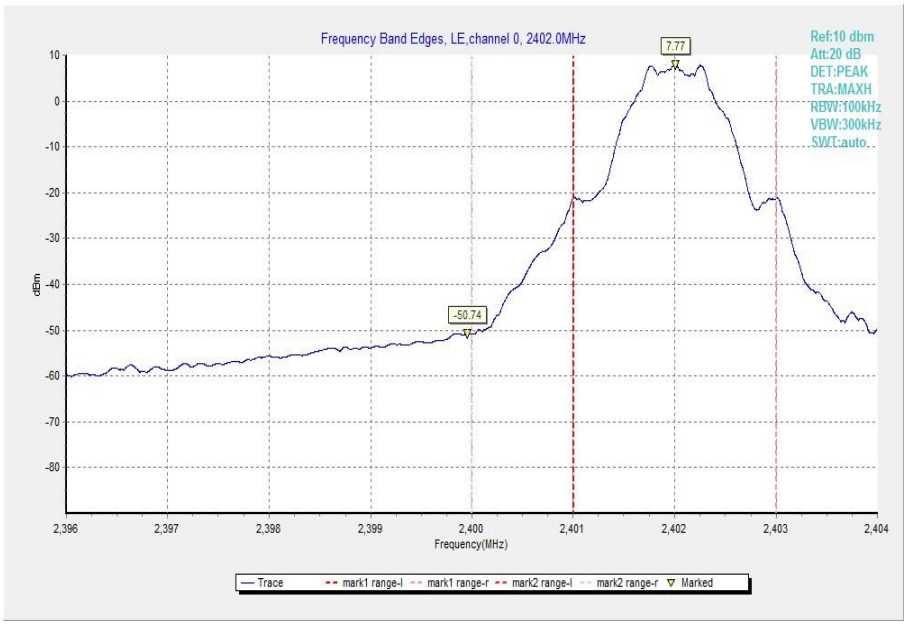


Fig.10 Band Edges (Ch 0)

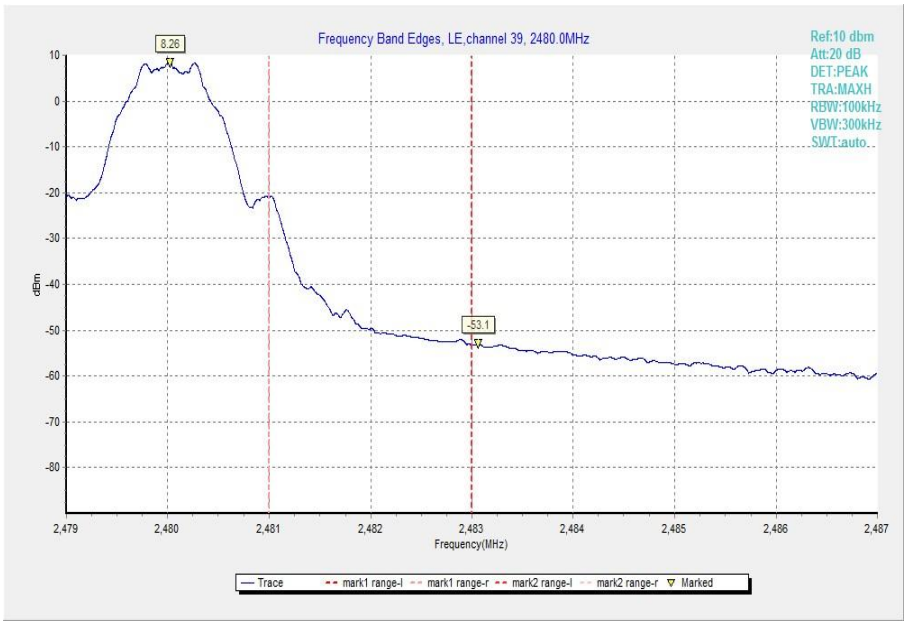


Fig.11 Band Edges (Ch 39)

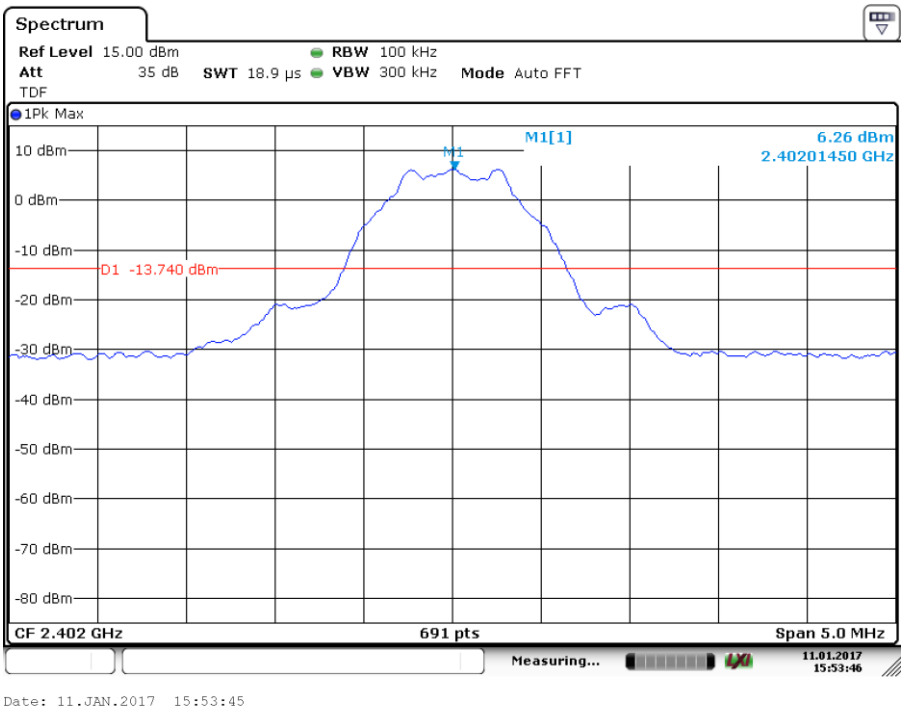
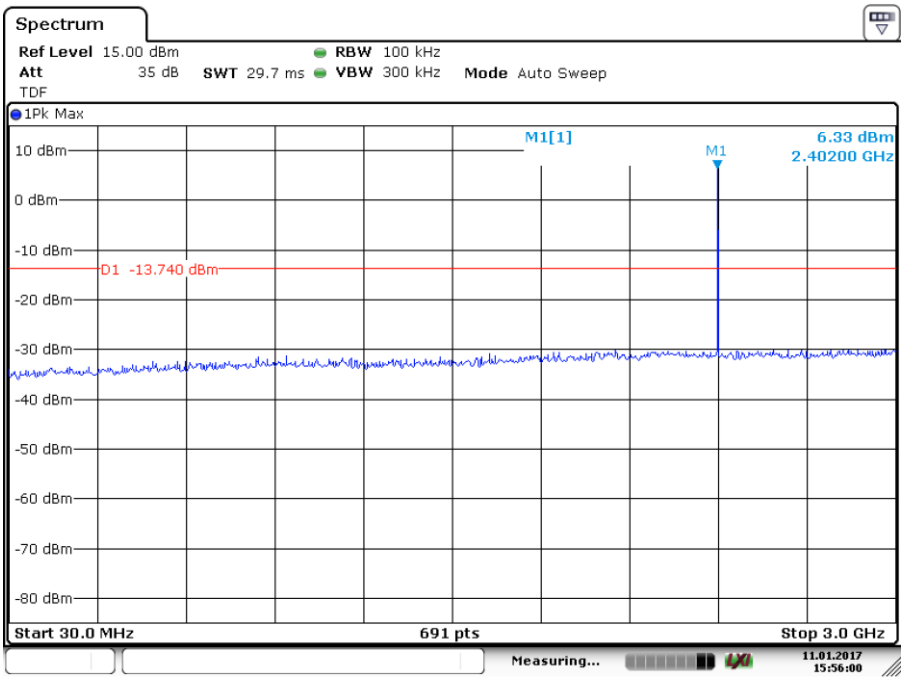
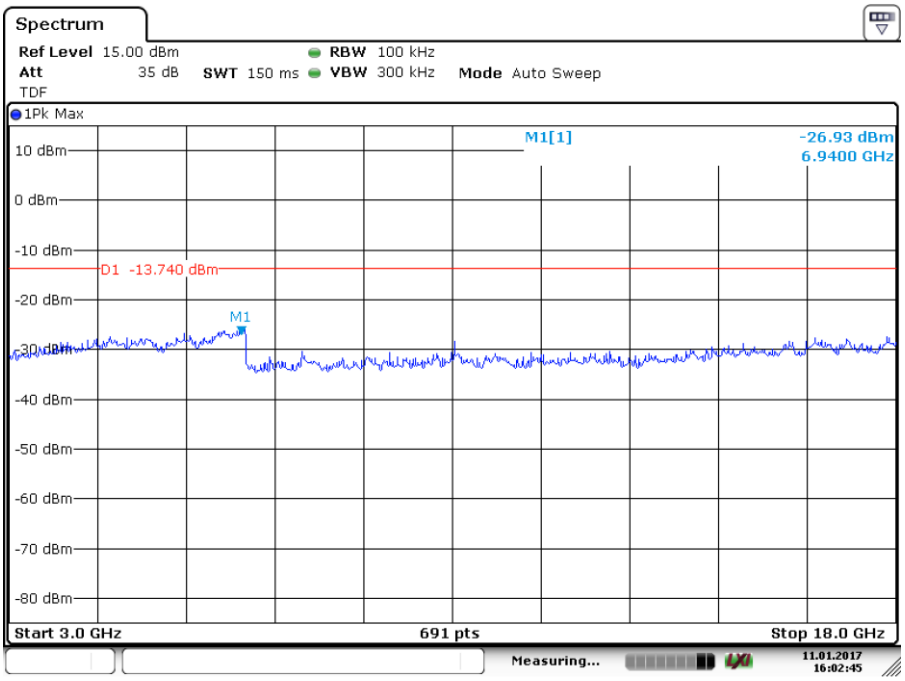


Fig.12 Conducted Spurious Emission (Ch0, Center Frequency)



Date: 11.JAN.2017 15:56:00

Fig.13 Conducted Spurious Emission (Ch0, 30 MHz-3 GHz)



Date: 11.JAN.2017 16:02:45

Fig.14 Conducted Spurious Emission (Ch0, 3 GHz-18 GHz)

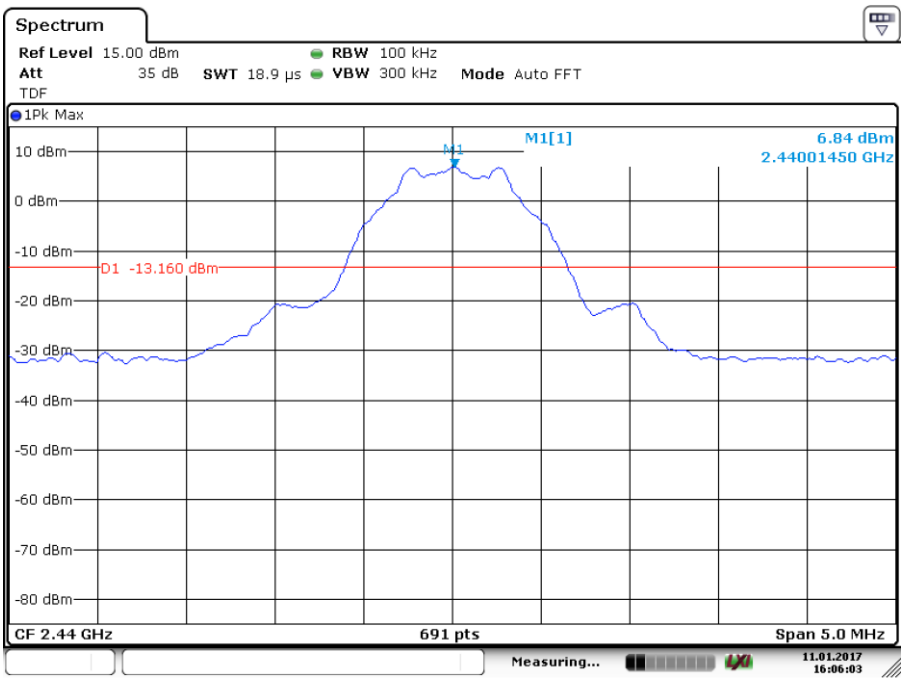


Fig.15 Conducted Spurious Emission (Ch19, Center Frequency)

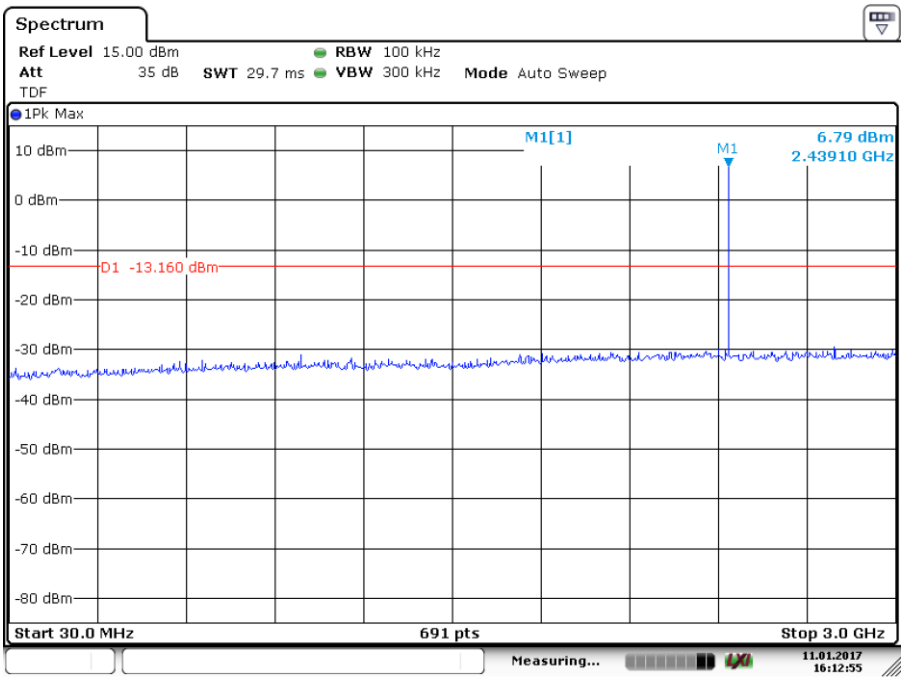
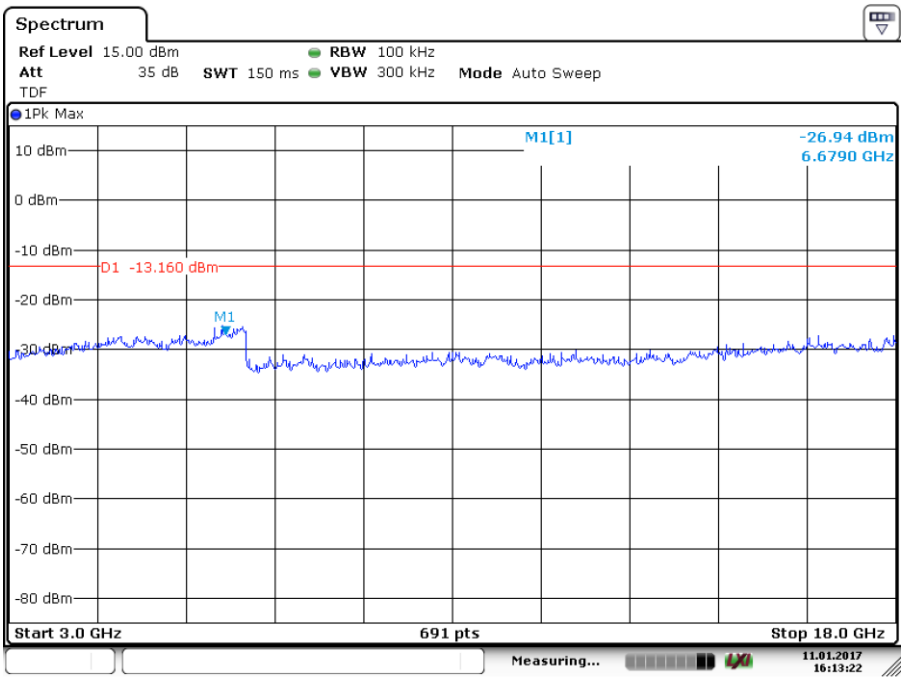
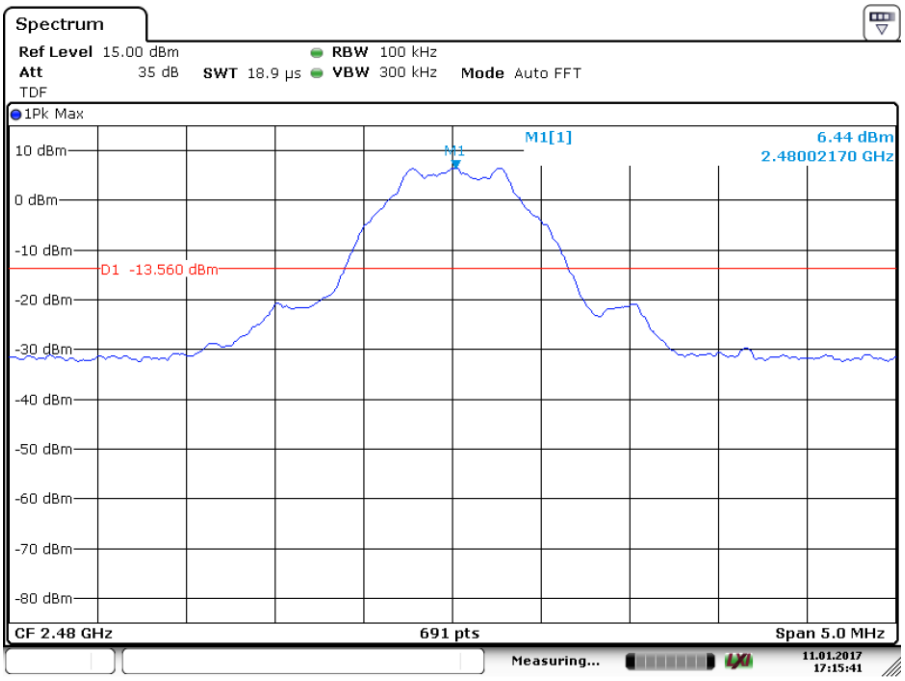


Fig.16 Conducted Spurious Emission (Ch19, 30 MHz-3 GHz)



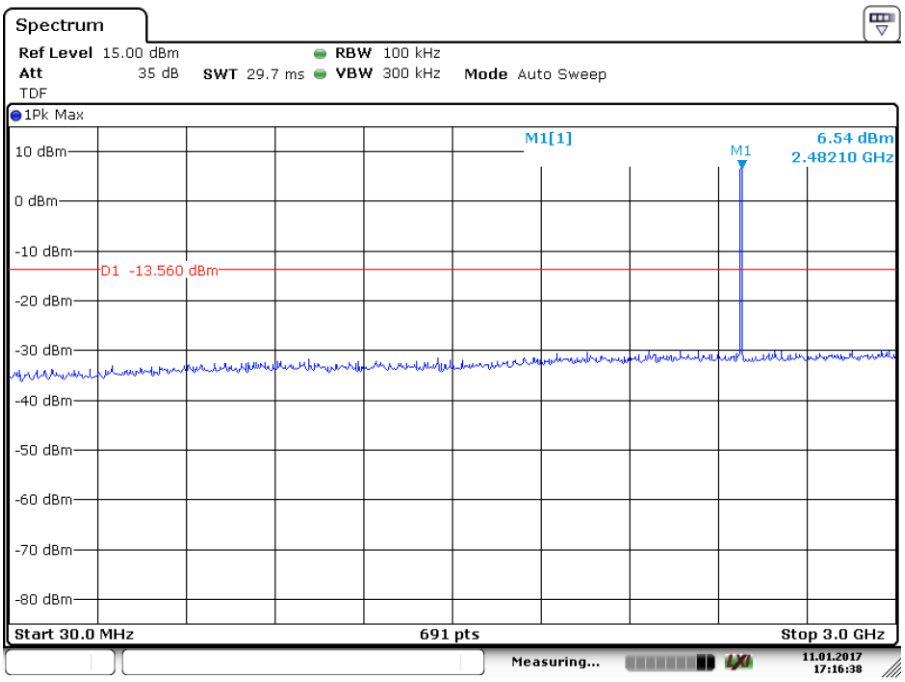
Date: 11.JAN.2017 16:13:22

Fig.17 Conducted Spurious Emission (Ch19, 3 GHz-18 GHz)



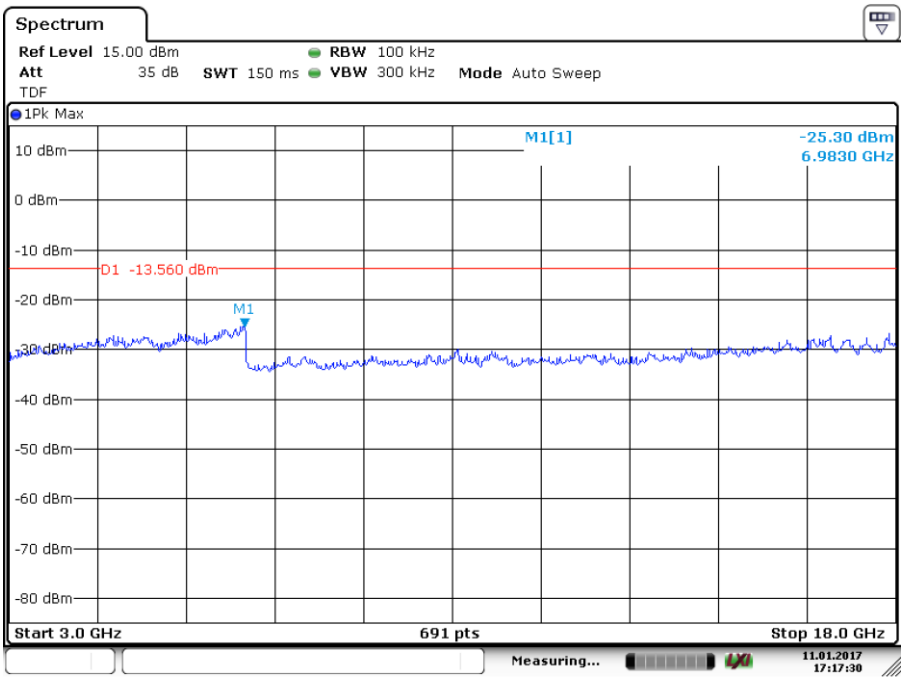
Date: 11.JAN.2017 17:15:40

Fig.18 Conducted Spurious Emission (Ch39, Center Frequency)



Date: 11.JAN.2017 17:16:38

Fig.19 Conducted Spurious Emission (Ch39, 30 MHz-3 GHz)



Date: 11.JAN.2017 17:17:29

Fig.20 Conducted Spurious Emission (Ch39, 3 GHz-18 GHz)

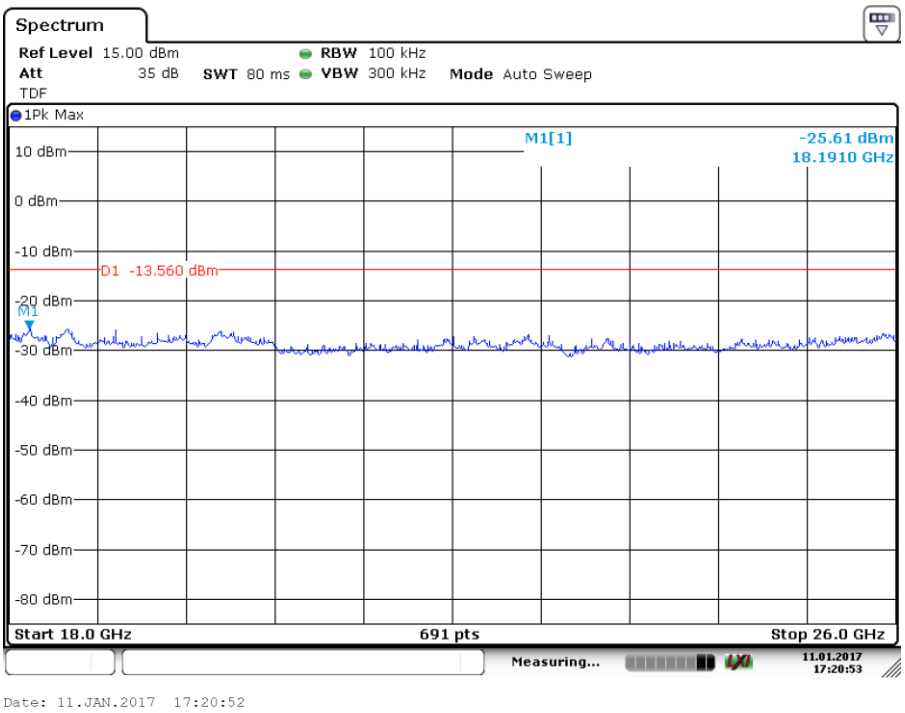


Fig.21 Conducted Spurious Emission (All channels, 18 GHz-26 GHz)

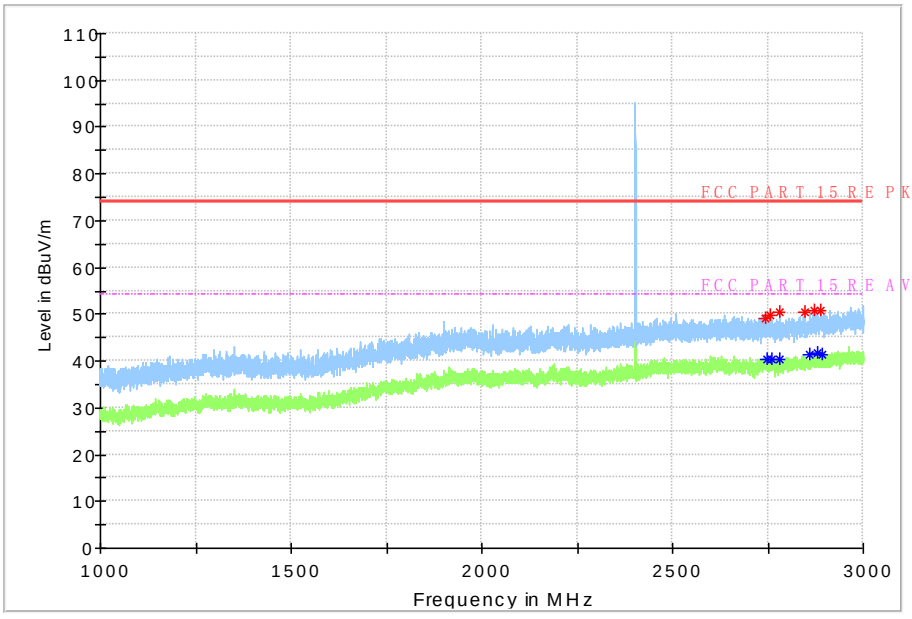


Fig.22 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~3 GHz)

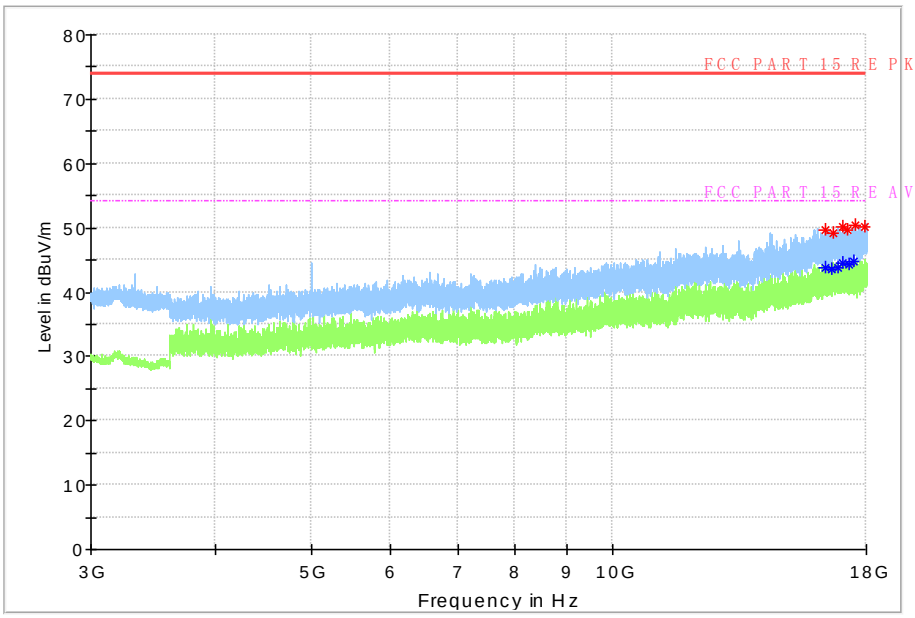


Fig.23 Radiated Spurious Emission (GFSK, Ch0, 3 GHz ~18 GHz)

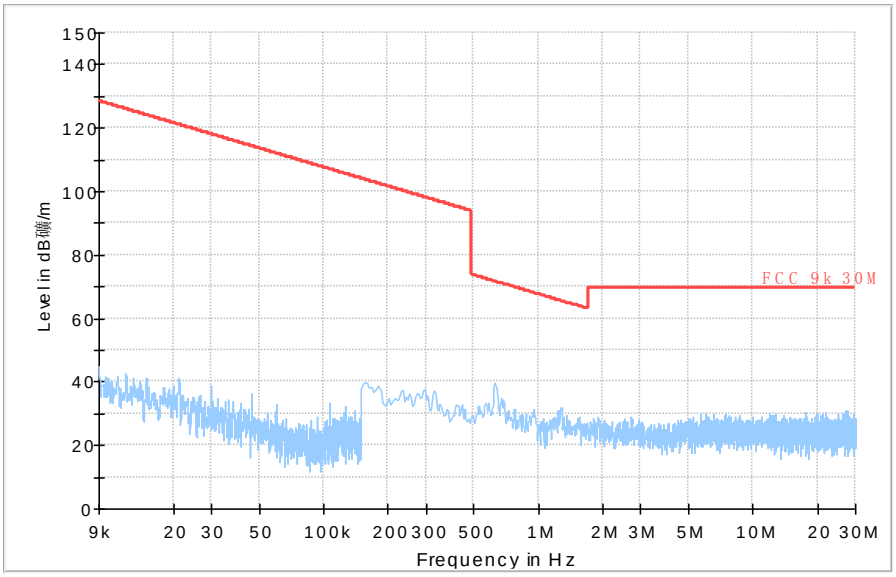


Fig.24 Radiated Spurious Emission (Ch19, 9 kHz-30 MHz)

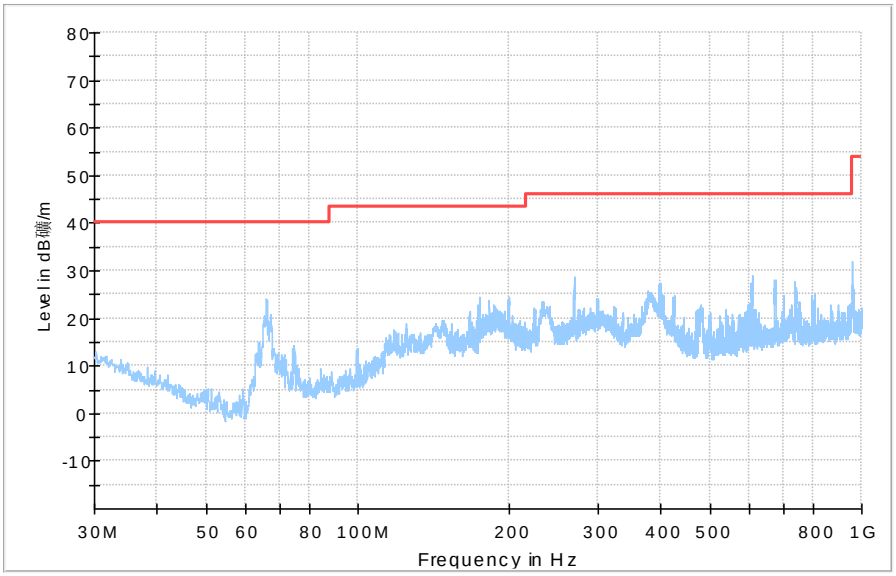


Fig.25 Radiated Spurious Emission (Ch19, 30 MHz-1 GHz)

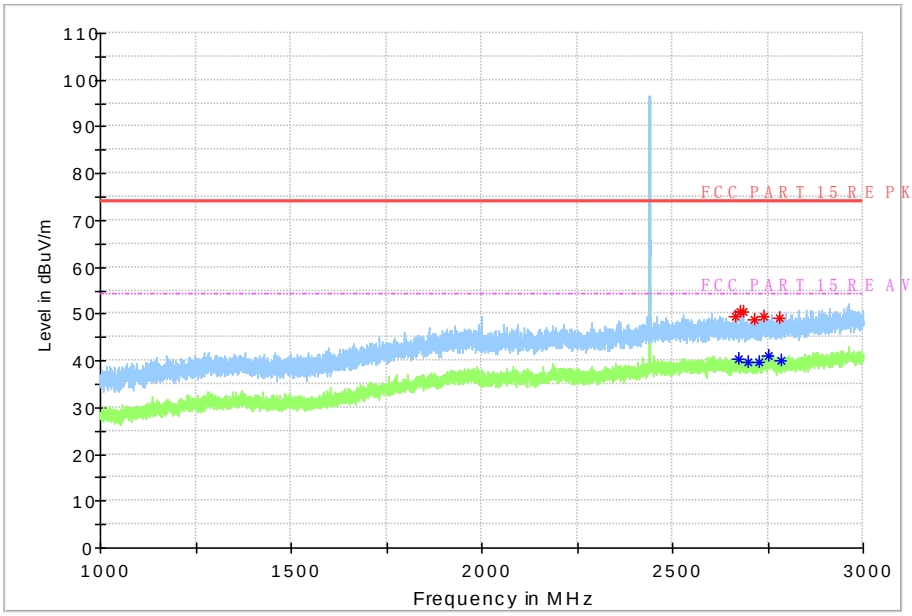


Fig.26 Radiated Spurious Emission (Ch19, 1 GHz- 3 GHz)

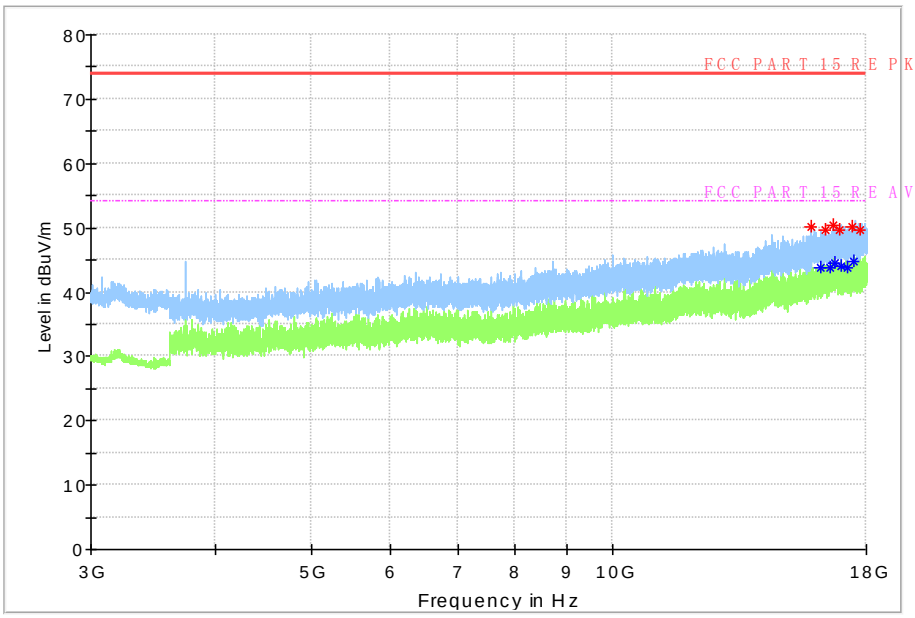


Fig.27 Radiated Spurious Emission (Ch19, 3 GHz- 18 GHz)

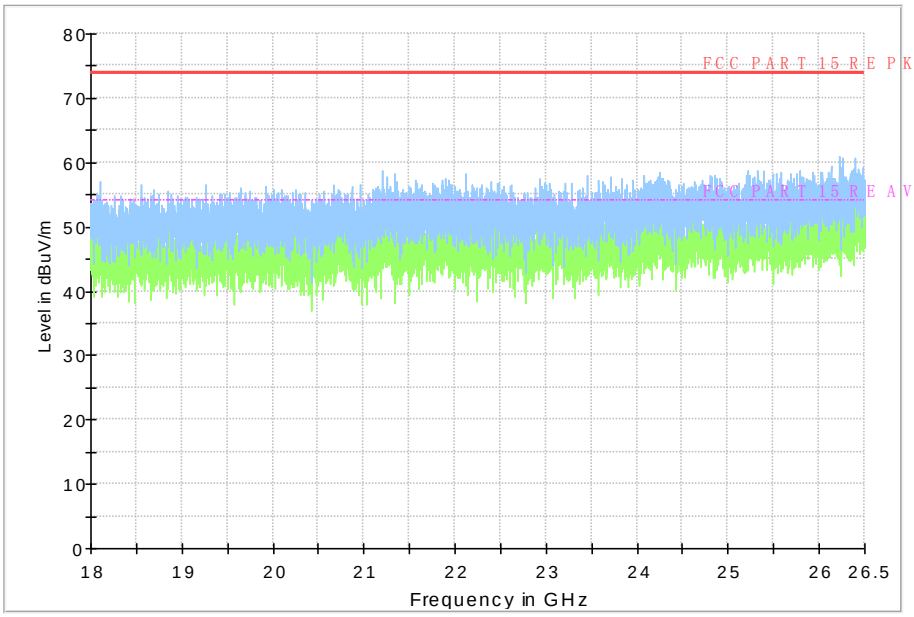


Fig.28 Radiated Spurious Emission (Ch19, 18 GHz-26.5 GHz)

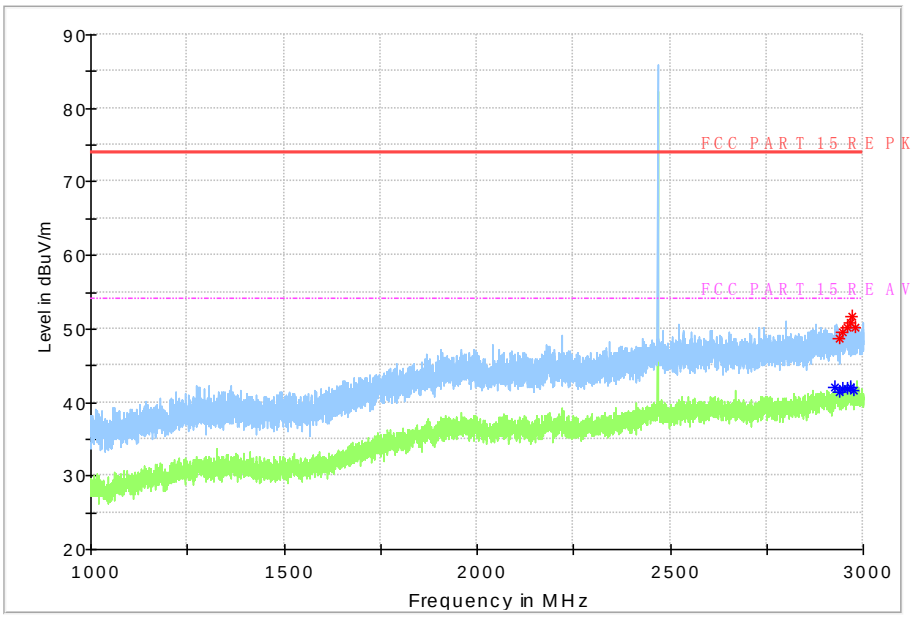


Fig.29 Radiated Spurious Emission (Ch39, 1 GHz-3 GHz)

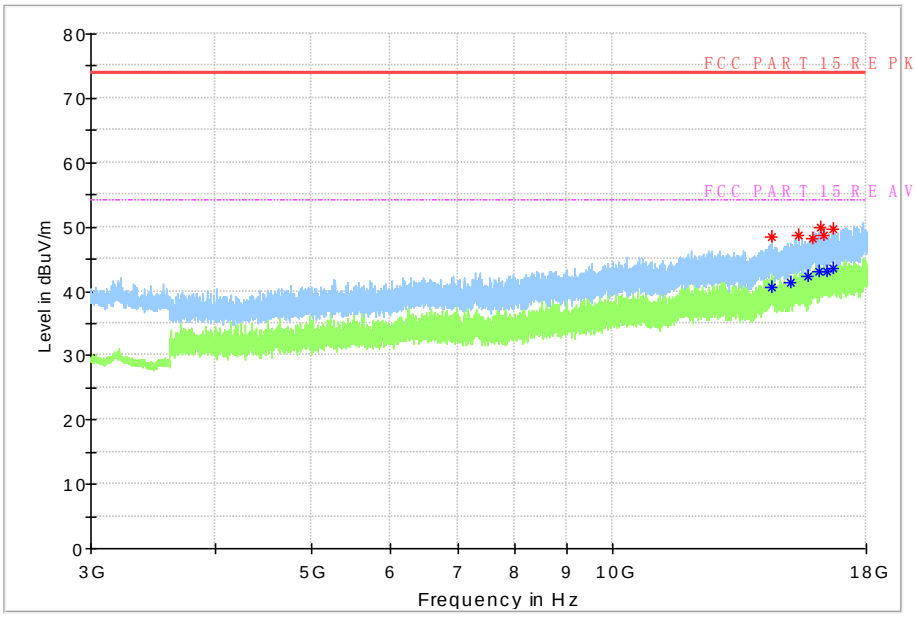


Fig.30 Radiated Spurious Emission (Ch39, 3 GHz-18 GHz)

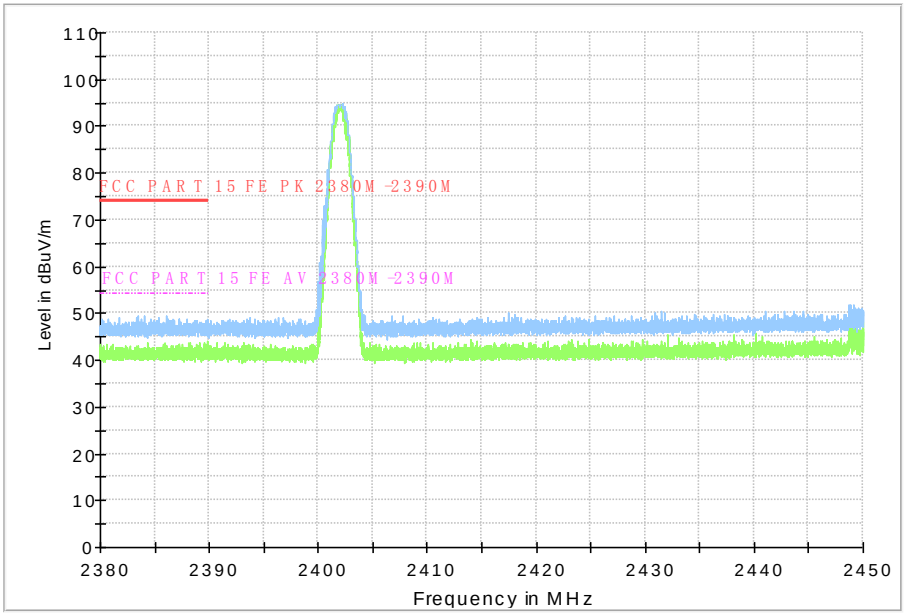


Fig.31 Radiated Emission Power (GFSK, Ch0, 2380GHz~2450GHz)

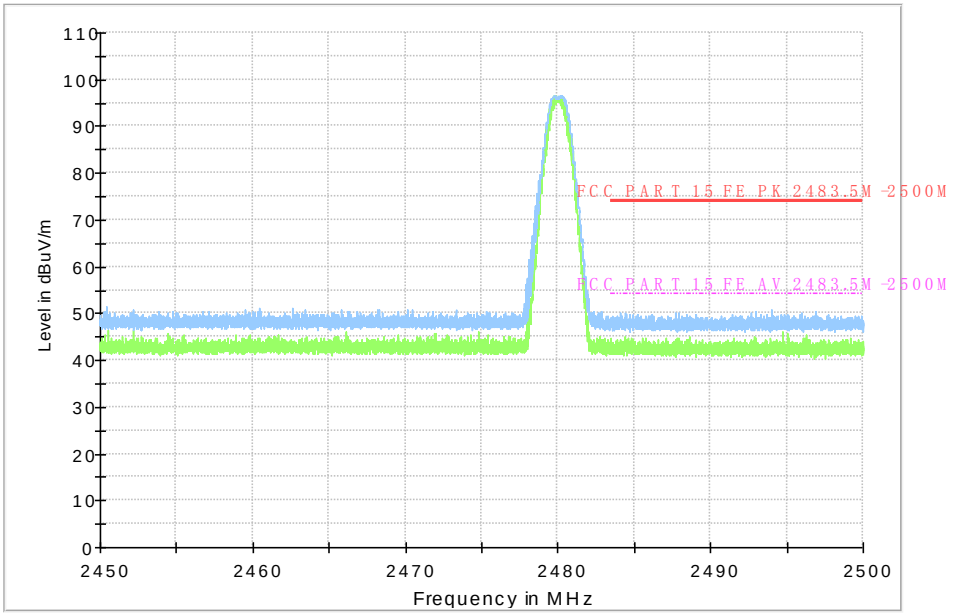


Fig.32 Radiated Emission Power (GFSK, Ch39, 2450GHz~2500GHz)

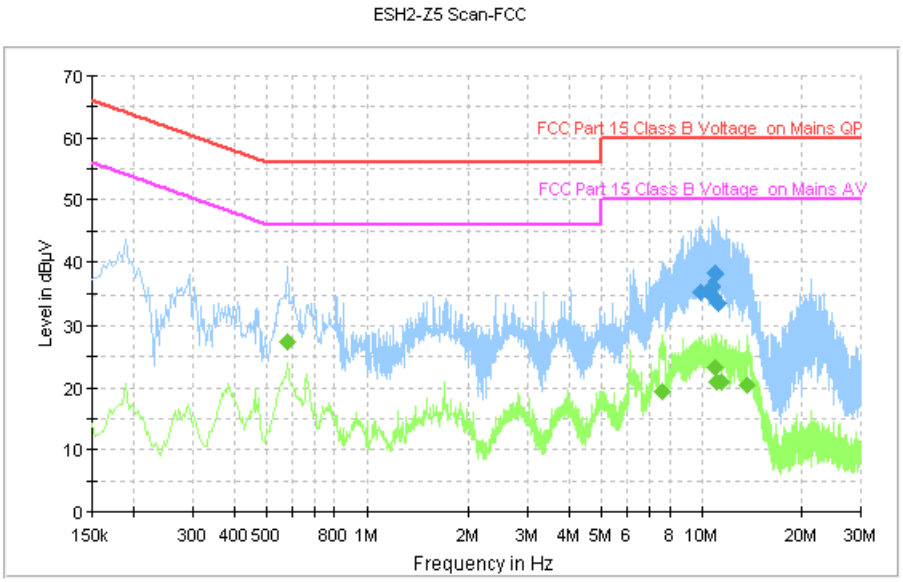


Fig.33 AC Powerline Conducted Emission (Traffic, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
9.886000	35.5	GND	N	9.9	24.5	60.0
10.766000	36.1	GND	N	9.9	23.9	60.0
10.782000	34.8	GND	N	9.9	25.2	60.0
10.882000	34.7	GND	N	9.9	25.3	60.0
11.018000	38.3	GND	N	9.9	21.7	60.0
11.186000	33.7	GND	N	9.9	26.3	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.578000	27.4	GND	N	9.6	18.6	46.0
7.630000	19.4	GND	N	9.8	30.6	50.0
11.018000	23.3	GND	N	9.9	26.7	50.0
11.050000	21.0	GND	N	9.9	29.0	50.0
11.518000	20.8	GND	N	9.9	29.2	50.0
13.662000	20.3	GND	N	9.9	29.7	50.0

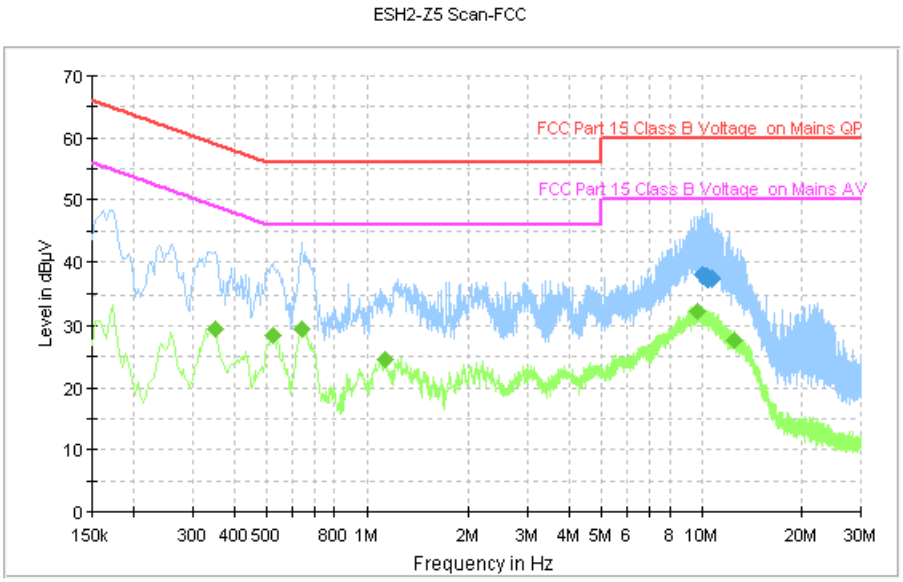


Fig.34 AC Power line Conducted Emission (Idle, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
10.026000	38.0	GND	N	9.8	22.0	60.0
10.278000	37.6	GND	N	9.9	22.4	60.0
10.334000	37.4	GND	N	9.9	22.6	60.0
10.410000	37.7	GND	N	9.9	22.3	60.0
10.514000	37.5	GND	N	9.9	22.5	60.0
10.706000	37.5	GND	N	9.9	22.5	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.350000	29.6	GND	N	9.6	19.4	49.0
0.522000	28.5	GND	N	9.7	17.5	46.0
0.638000	29.4	GND	N	9.6	16.6	46.0
1.130000	24.5	GND	N	9.6	21.5	46.0
9.722000	32.2	GND	N	9.9	17.8	50.0
12.490000	27.5	GND	N	9.9	22.5	50.0

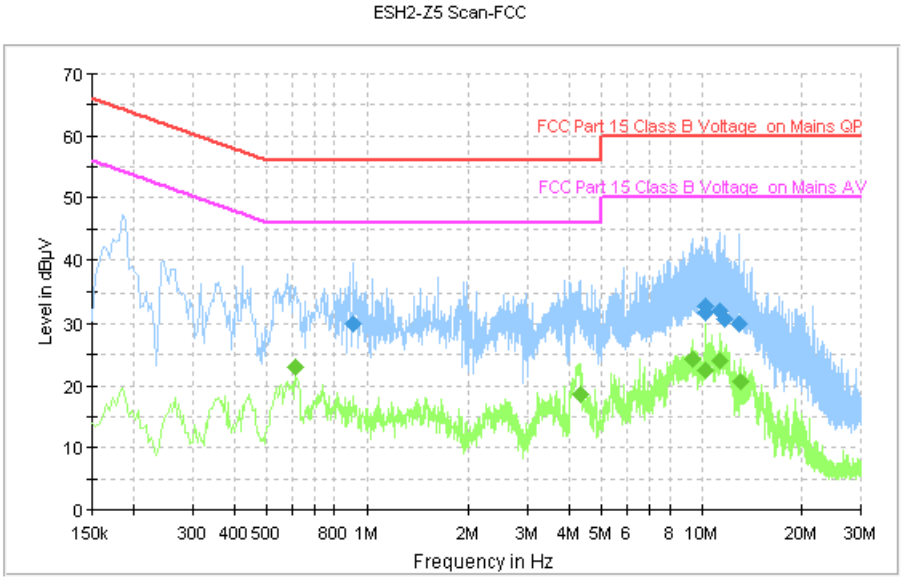


Fig.35 AC Powerline Conducted Emission (Traffic, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.914000	30.0	GND	N	9.6	26.0	56.0
10.262000	31.8	GND	N	9.9	28.2	60.0
10.278000	32.9	GND	N	9.9	27.1	60.0
11.318000	32.1	GND	N	9.9	27.9	60.0
11.710000	30.6	GND	N	9.9	29.4	60.0
12.990000	30.1	GND	N	9.9	29.9	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.614000	23.0	GND	N	9.6	23.0	46.0
4.314000	18.5	GND	N	9.6	27.5	46.0
9.402000	24.2	GND	N	9.8	25.8	50.0
10.262000	22.6	GND	N	9.9	27.4	50.0
11.386000	24.0	GND	N	9.9	26.0	50.0
13.090000	20.6	GND	N	9.9	29.4	50.0

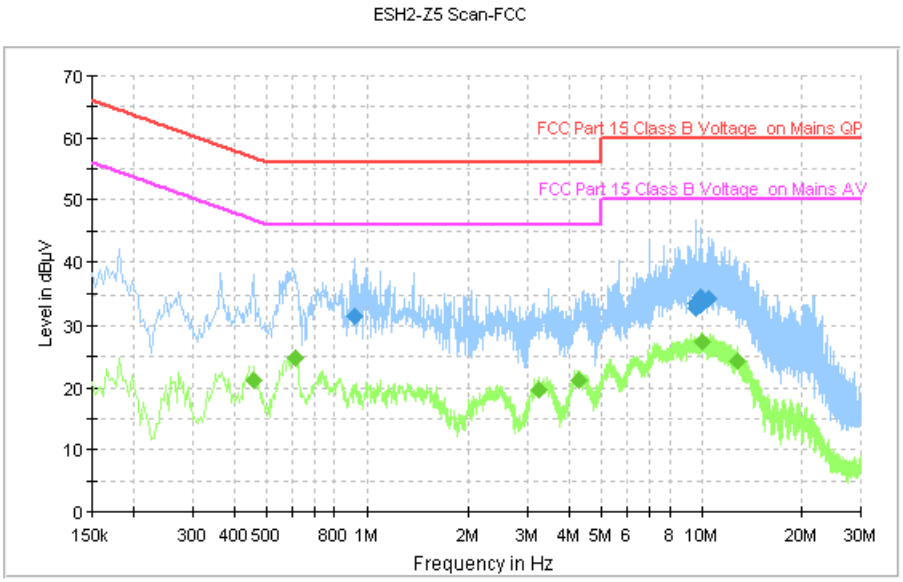


Fig.36 AC Power line Conducted Emission (Idle, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.918000	31.5	GND	N	9.6	24.5	56.0
9.610000	32.8	GND	N	9.9	27.2	60.0
9.646000	33.6	GND	N	9.9	26.4	60.0
9.954000	33.4	GND	N	9.9	26.6	60.0
9.970000	34.6	GND	N	9.9	25.4	60.0
10.458000	34.4	GND	N	9.9	25.6	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.458000	21.2	GND	N	9.7	25.5	46.7
0.610000	24.8	GND	N	9.6	21.2	46.0
3.258000	19.6	GND	N	9.6	26.4	46.0
4.302000	21.1	GND	N	9.6	24.9	46.0
9.994000	27.3	GND	N	9.9	22.7	50.0
12.830000	24.3	GND	N	9.9	25.7	50.0

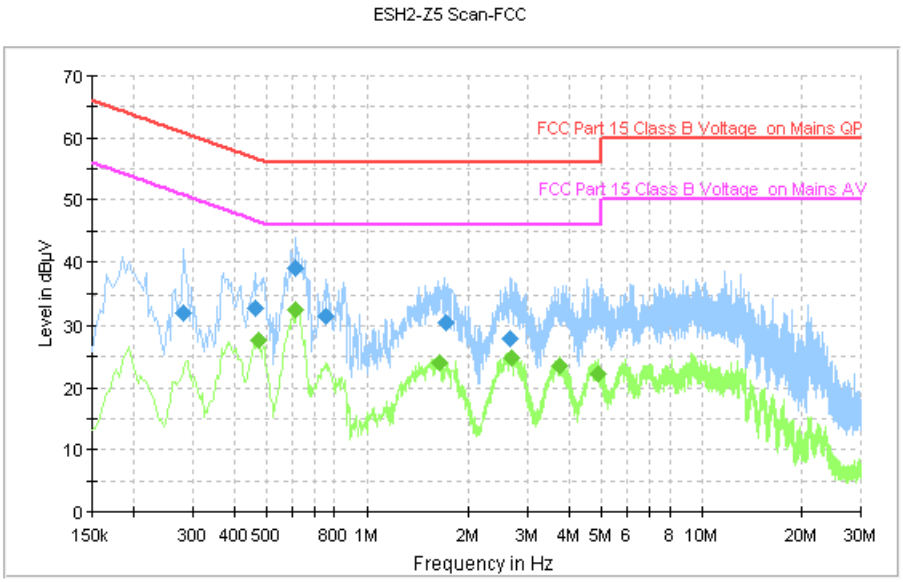


Fig.37 AC Powerline Conducted Emission (Traffic, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.282000	32.0	GND	N	9.6	28.7	60.8
0.462000	32.8	GND	N	9.7	23.8	56.7
0.614000	39.1	GND	N	9.6	16.9	56.0
0.754000	31.6	GND	N	9.6	24.4	56.0
1.702000	30.6	GND	N	9.6	25.4	56.0
2.654000	28.0	GND	N	9.6	28.0	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.474000	27.6	GND	N	9.7	18.8	46.4
0.614000	32.6	GND	N	9.6	13.4	46.0
1.630000	23.9	GND	N	9.6	22.1	46.0
2.678000	24.9	GND	N	9.6	21.1	46.0
3.754000	23.5	GND	N	9.6	22.5	46.0
4.874000	22.3	GND	N	9.6	23.7	46.0

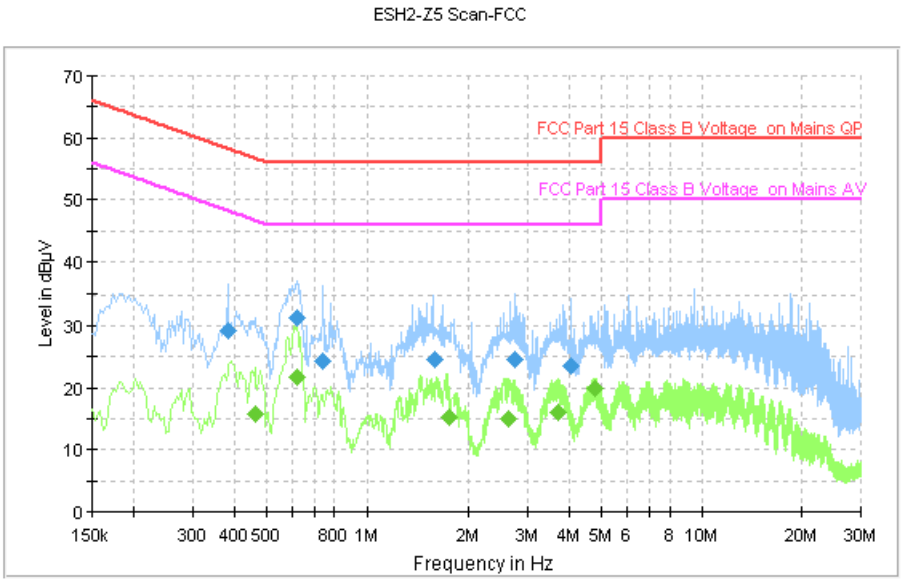


Fig.38 AC Power line Conducted Emission (Idle, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.382000	29.2	GND	N	9.6	29.1	58.2
0.618000	31.2	GND	N	9.6	24.8	56.0
0.738000	24.4	GND	N	9.5	31.6	56.0
1.574000	24.6	GND	N	9.6	31.4	56.0
2.766000	24.6	GND	N	9.6	31.4	56.0
4.042000	23.6	GND	N	9.6	32.4	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.462000	15.7	GND	N	9.7	31.0	46.7
0.618000	21.6	GND	N	9.6	24.4	46.0
1.746000	15.1	GND	N	9.6	30.9	46.0
2.618000	15.0	GND	N	9.6	31.0	46.0
3.718000	15.9	GND	N	9.6	30.1	46.0
4.762000	19.8	GND	N	9.6	26.2	46.0

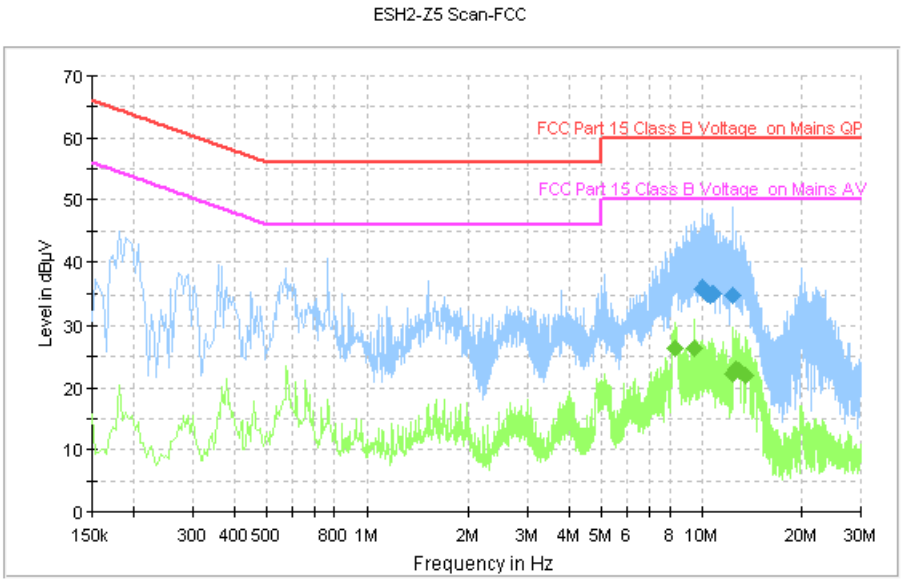


Fig.39 AC Powerline Conducted Emission (Traffic, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
10.066000	36.0	GND	N	9.8	24.0	60.0
10.430000	35.1	GND	N	9.9	24.9	60.0
10.598000	34.8	GND	N	9.9	25.2	60.0
10.698000	35.1	GND	N	9.9	24.9	60.0
10.822000	35.1	GND	N	9.9	24.9	60.0
12.366000	35.0	GND	N	9.9	25.0	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
8.286000	26.4	GND	N	9.8	23.6	50.0
9.502000	26.2	GND	N	9.9	23.8	50.0
12.366000	22.3	GND	N	9.9	27.7	50.0
12.694000	23.1	GND	N	9.9	26.9	50.0
12.878000	22.6	GND	N	9.9	27.4	50.0
13.490000	22.0	GND	N	9.9	28.0	50.0

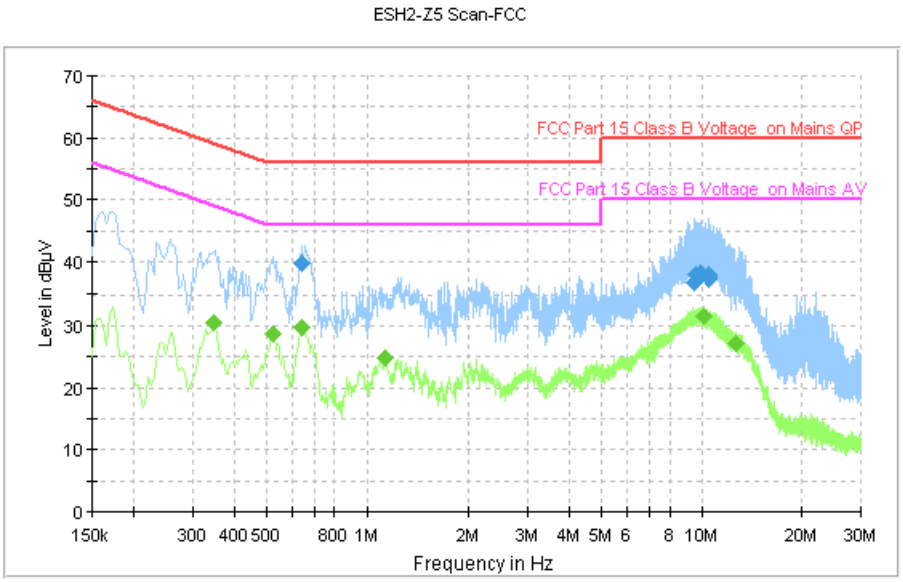


Fig.40 AC Power line Conducted Emission (Idle, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.638000	39.8	GND	N	9.6	16.2	56.0
9.542000	36.9	GND	N	9.9	23.1	60.0
9.578000	38.0	GND	N	9.9	22.0	60.0
9.906000	38.2	GND	N	9.9	21.8	60.0
10.478000	37.9	GND	N	9.9	22.1	60.0
10.510000	37.4	GND	N	9.9	22.6	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.346000	30.4	GND	N	9.6	18.7	49.1
0.522000	28.8	GND	N	9.7	17.2	46.0
0.638000	29.7	GND	N	9.6	16.3	46.0
1.134000	24.8	GND	N	9.6	21.2	46.0
10.154000	31.6	GND	N	9.8	18.4	50.0
12.622000	27.2	GND	N	9.9	22.8	50.0

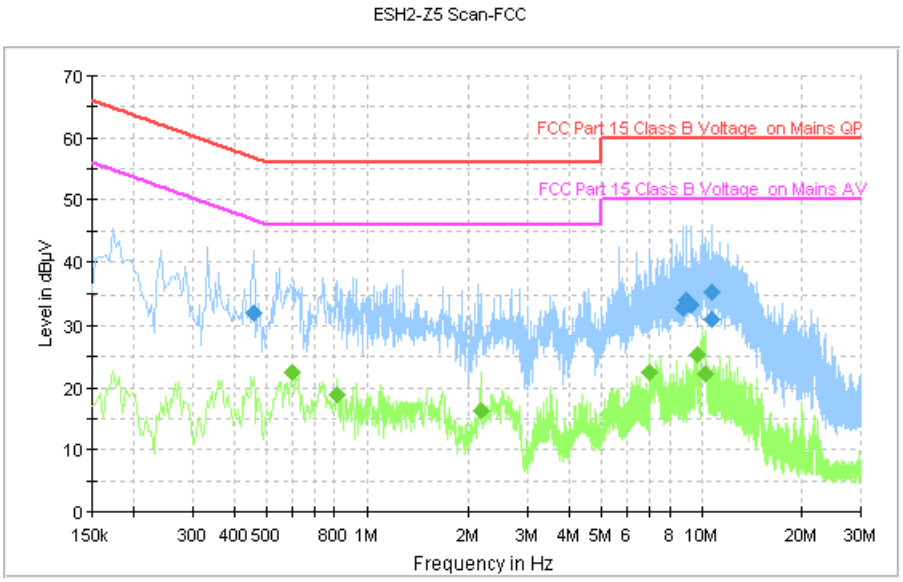


Fig.41 AC Powerline Conducted Emission (Traffic, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.458000	32.0	GND	N	9.7	24.7	56.7
8.822000	32.9	GND	N	9.8	27.1	60.0
8.946000	34.2	GND	N	9.8	25.8	60.0
9.330000	33.3	GND	N	9.8	26.7	60.0
10.682000	30.9	GND	N	9.9	29.1	60.0
10.718000	35.5	GND	N	9.9	24.5	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.598000	22.4	GND	N	9.6	23.6	46.0
0.818000	18.9	GND	N	9.6	27.1	46.0
2.174000	16.2	GND	N	9.6	29.8	46.0
6.986000	22.3	GND	N	9.7	27.7	50.0
9.670000	25.2	GND	N	9.9	24.8	50.0
10.262000	22.3	GND	N	9.9	27.7	50.0

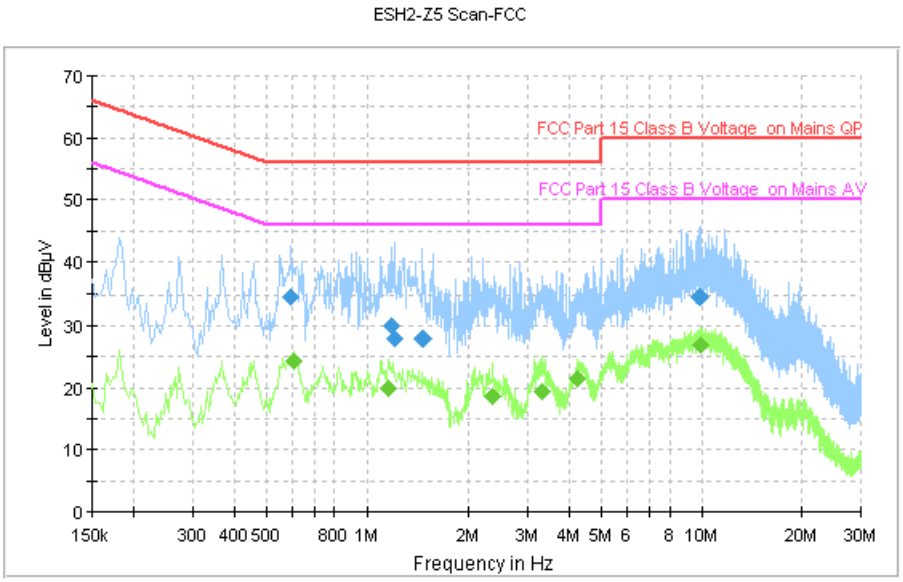


Fig.42 AC Power line Conducted Emission (Idle, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.594000	34.7	GND	N	9.6	21.3	56.0
1.186000	30.0	GND	N	9.5	26.0	56.0
1.210000	28.0	GND	N	9.5	28.0	56.0
1.466000	27.8	GND	N	9.5	28.2	56.0
9.778000	34.5	GND	N	9.9	25.5	60.0
9.914000	34.7	GND	N	9.9	25.3	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.606000	24.3	GND	N	9.6	21.7	46.0
1.158000	20.0	GND	N	9.5	26.0	46.0
2.350000	18.7	GND	N	9.6	27.3	46.0
3.302000	19.5	GND	N	9.6	26.5	46.0
4.246000	21.5	GND	N	9.6	24.5	46.0
9.962000	26.9	GND	N	9.9	23.1	50.0

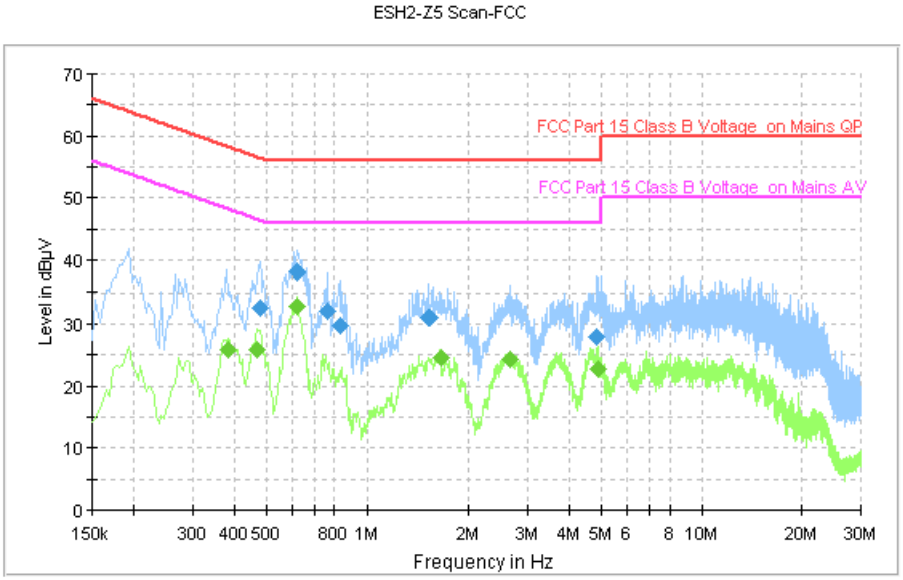


Fig.43 AC Powerline Conducted Emission (Traffic, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.478000	32.6	GND	N	9.7	23.8	56.4
0.618000	38.3	GND	N	9.6	17.7	56.0
0.762000	32.0	GND	N	9.6	24.0	56.0
0.830000	29.8	GND	N	9.5	26.2	56.0
1.526000	31.0	GND	N	9.6	25.0	56.0
4.822000	27.9	GND	N	9.6	28.1	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.386000	25.9	GND	N	9.6	22.2	48.1
0.470000	25.8	GND	N	9.7	20.8	46.5
0.618000	32.7	GND	N	9.6	13.3	46.0
1.646000	24.6	GND	N	9.5	21.4	46.0
2.674000	24.4	GND	N	9.6	21.6	46.0
4.874000	22.8	GND	N	9.6	23.2	46.0

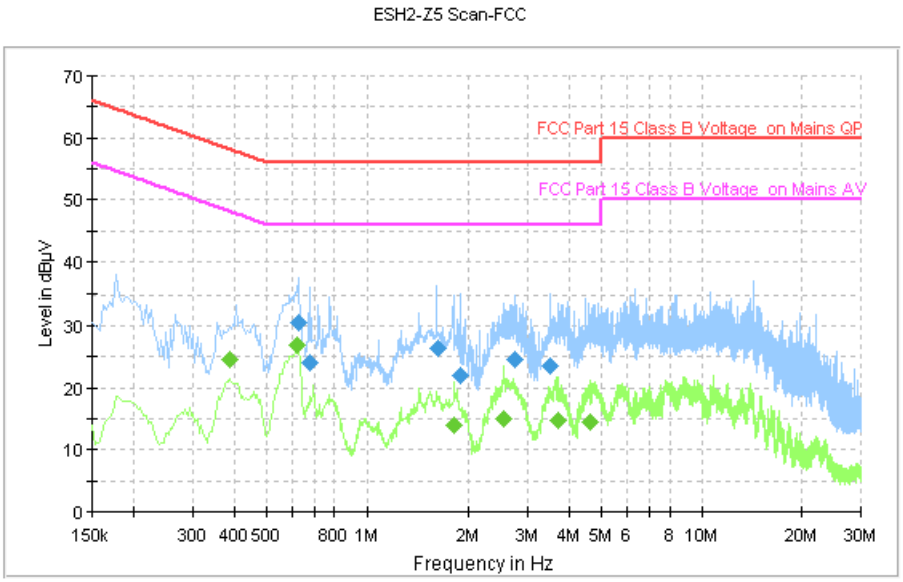


Fig.44 AC Power line Conducted Emission (Idle, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.622000	30.5	GND	N	9.6	25.5	56.0
0.674000	24.0	GND	N	9.5	32.0	56.0
1.622000	26.3	GND	N	9.6	29.7	56.0
1.882000	21.9	GND	N	9.6	34.1	56.0
2.766000	24.5	GND	N	9.6	31.5	56.0
3.494000	23.6	GND	N	9.6	32.4	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.390000	24.4	GND	N	9.6	23.6	48.1
0.618000	26.8	GND	N	9.6	19.2	46.0
1.802000	14.0	GND	N	9.5	32.0	46.0
2.550000	15.0	GND	N	9.6	31.0	46.0
3.718000	14.8	GND	N	9.6	31.2	46.0
4.638000	14.4	GND	N	9.6	31.6	46.0

ANNEX C: Persons involved in this testing

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

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