



**FCC PART 15C
TEST REPORT
No. I16N00975-WLAN**

for

OnePlus Technology(Shenzhen) Co., Ltd.

Mobile Phone

Model Name: ONEPLUS A3000

With

Hardware Version: 28

Software Version: oxygen 3.5.1

FCC ID: 2ABZ2-A3000

Issued Date: Nov. 14th, 2016

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.

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REPORT HISTORY

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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°C

Extreme Temperature: -20/+55°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-04-06

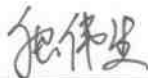
Testing End Date: 2016-11-01

1.4. Signature



An Ran

(Prepared this test report)



Tang Weisheng

(Reviewed this test report)



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(Approved this test report)



2. Client Information

2.1. Applicant Information

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Country: China
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2.2. Manufacturer Information

Company Name: OnePlus Technology(Shenzhen) Co., Ltd.
Address: 18/F, Tower C, Tai Ran Building, No.8 Tai Ran Road, Shenzhen, China
City: Shenzhen
Postal Code: /
Country: China
Telephone: 0755 61898696 EXT 7023
Fax: /



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

3.1. About EUT

Description	Mobile Phone
Model Name	ONEPLUS A3000
Market Name	/
RF Protocol	IEEE 802.11b/g/n20
Operating Frequency	2412MHz~2462MHz
FCC ID	2ABZ2-A3000

*Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	860046030164299	28	oxygen 3.5.1	2016-04-06

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

3.3. Internal Identification of AE

AE ID*	Description	Type	SN
AE1	Power Supply Unit	HK0504	HC1608500001
AE2	Power Supply Unit	DC0504A5	H11619000004
AE3	Power Supply Unit	DC0504B5GB	LCYYWWWSSSSSS

*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	Standard Sub-clause	Verdict
0.	Antenna Requirement	15.203	P
1.	Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	P
2.	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 isotropical 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

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018-05-13	3 years
2	Test Receiver	ESCI	100701	Rohde & Schwarz	2017-08-09	1 year
3	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017-01-20	3 years
4	Horn Antenna	3117	00066585	ETS-Lindgren	2019-03-05	3 years
5	Spectrum Analyser	FSP40	100378	Rohde & Schwarz	2016-12-18	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2019-05-10	3 years
7	Test Receiver	ESCI	100702	Rohde & Schwarz	2017-06-26	1 year
8	LISN	ESH2-Z5	100196	Rohde & Schwarz	2017-01-12	1 year

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 -3.5 dBi.
The RF transmitter uses an integrate antenna without connector.**

A.1 Transmitter Spurious Emission

A.1.1 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(μ 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 below 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic.

The measurement results include the horizontal polarization and vertical polarization measurements.

Measurement Results:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	1 GHz ~18 GHz	Fig.1	P
	6	9 kHz ~30 MHz	Fig.2	P
		30 MHz ~1 GHz	Fig.3	P
		1 GHz ~18 GHz	Fig.4	P
	11	1 GHz ~18 GHz	Fig.5	P
	Power(CH1)	2.38 GHz ~ 2.45 GHz	Fig.6	P
	Power(CH11)	2.45 GHz ~ 2.5 GHz	Fig.7	P
802.11g	1	1 GHz ~18 GHz	Fig.8	P
	6	9 kHz ~30 MHz	Fig.9	P
		30 MHz ~1 GHz	Fig.10	P
		1 GHz ~18 GHz	Fig.11	P
	11	1 GHz ~18 GHz	Fig.12	P
	Power(CH1)	2.38 GHz ~ 2.45 GHz	Fig.13	P
	Power(CH11)	2.45 GHz ~ 2.5 GHz	Fig.14	P

802.11n mode

802.11n	1	1 GHz ~18 GHz	Fig.15	P
	6	9 kHz ~30 MHz	Fig.16	P
		30 MHz ~1 GHz	Fig.17	P
		1 GHz ~18 GHz	Fig.18	P
	11	1 GHz ~18 GHz	Fig.19	P
	Power(CH1)	2.38 GHz ~ 2.45 GHz	Fig.20	P
	Power(CH11)	2.45 GHz ~ 2.5 GHz	Fig.21	P
/	All channels	18 GHz~ 26.5 GHz	Fig.22	P

802.11b CH1 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
14098.000000	56.2	H	11.1	17.8	74.0
15142.000000	56.7	V	12.1	17.3	74.0
15681.000000	58.0	V	12.6	16.0	74.0
16234.500000	58.5	V	13.1	15.5	74.0
16868.500000	59.1	V	14.0	14.9	74.0
17386.500000	59.0	V	14.0	15.0	74.0



Frequency (MHz)	Average-ClearWrite (dB μ V/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
14521.000000	44.1	H	11.8	9.9	54.0
15167.500000	45.0	V	12.1	9.0	54.0
15739.500000	46.7	H	12.8	7.3	54.0
16224.500000	46.9	H	13.1	7.1	54.0
16740.000000	47.7	H	13.9	6.3	54.0
17324.500000	47.2	H	14.0	6.8	54.0

802.11b CH 6(1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dB μ V/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
14526.000000	56.0	H	11.8	18.0	74.0
15132.000000	56.8	H	12.1	17.2	74.0
15790.000000	58.0	H	12.8	16.0	74.0
16208.000000	58.5	H	13.1	15.5	74.0
16769.500000	59.4	V	13.9	14.6	74.0
17386.500000	59.5	H	14.0	14.5	74.0

Frequency (MHz)	Average-ClearWrite (dB μ V/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
14153.500000	43.9	H	11.2	10.1	54.0
15179.500000	44.8	H	12.2	9.2	54.0
15681.500000	46.6	H	12.6	7.4	54.0
16222.500000	47.1	H	13.1	6.9	54.0
16787.000000	47.8	H	13.9	6.2	54.0
17346.500000	47.2	V	14.0	6.8	54.0

802.11b CH11 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14151.500000	55.8	V	11.2	18.2	74.0
15140.000000	56.8	V	12.1	17.2	74.0
15820.000000	58.0	V	12.8	16.0	74.0
15851.500000	58.7	H	12.9	15.3	74.0
16699.000000	59.6	V	13.8	14.4	74.0
17272.000000	58.6	V	13.9	15.4	74.0

Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14553.500000	44.2	V	11.9	9.8	54.0
15175.000000	45.2	V	12.1	8.8	54.0
15669.000000	46.5	H	12.6	7.5	54.0
16218.500000	46.7	H	13.1	7.3	54.0
16745.000000	47.4	H	13.9	6.6	54.0
17283.000000	46.9	H	13.9	7.1	54.0

802.11g CH1 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14112.500000	56.2	H	11.1	17.8	74.0
15155.500000	56.7	H	12.1	17.3	74.0
15785.000000	59.8	V	12.8	14.2	74.0
16260.500000	58.3	V	13.2	15.7	74.0
16794.500000	59.4	H	13.9	14.6	74.0
17460.000000	59.7	H	14.0	14.3	74.0



Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14551.000000	44.0	V	11.9	10.0	54.0
15173.000000	45.1	H	12.1	8.9	54.0
15755.500000	46.6	V	12.8	7.4	54.0
16203.500000	47.0	V	13.1	7.0	54.0
16778.500000	47.6	V	13.9	6.4	54.0
17301.000000	47.3	V	13.9	6.7	54.0

802.11g CH6 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14167.000000	56.2	H	11.2	17.8	74.0
15069.000000	56.6	H	12.1	17.4	74.0
15684.500000	58.5	H	12.6	15.5	74.0
16231.000000	58.3	H	13.1	15.7	74.0
16788.000000	59.1	V	13.9	14.9	74.0
17323.500000	59.6	V	14.0	14.4	74.0

Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14517.500000	43.8	V	11.8	10.2	54.0
15154.000000	44.9	H	12.1	9.1	54.0
15725.500000	46.4	H	12.7	7.6	54.0
16248.000000	47.2	V	13.2	6.8	54.0
16790.500000	47.6	V	13.9	6.4	54.0
17281.000000	47.0	H	13.9	7.0	54.0

802.11g CH11 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14551.500000	56.3	V	11.9	17.7	74.0
15170.000000	57.0	V	12.1	17.0	74.0
15682.000000	58.1	H	12.6	15.9	74.0
16219.500000	58.8	V	13.1	15.2	74.0
16668.000000	59.7	V	13.8	14.3	74.0
17788.000000	58.5	H	13.9	15.5	74.0

Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14540.500000	44.2	V	11.9	9.8	54.0
15138.000000	45.1	V	12.1	8.9	54.0
15752.000000	46.4	V	12.8	7.6	54.0
16208.500000	47.0	H	13.1	7.0	54.0
16744.500000	47.5	V	13.9	6.5	54.0
17280.500000	47.2	V	13.9	6.8	54.0

802.11n-20MHz CH1 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14472.000000	55.7	V	11.7	18.3	74.0
14653.500000	56.6	H	11.9	17.4	74.0
15680.500000	57.9	V	12.6	16.1	74.0
16179.000000	58.6	V	13.1	15.4	74.0
16702.000000	59.2	V	13.8	14.8	74.0
17435.500000	58.5	H	14.0	15.5	74.0



Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14537.500000	44.1	V	11.9	9.9	54.0
15147.500000	45.0	V	12.1	9.0	54.0
15775.000000	46.4	H	12.8	7.6	54.0
16226.500000	46.8	H	13.1	7.2	54.0
16737.000000	47.3	H	13.8	6.7	54.0
17294.500000	46.8	H	13.9	7.2	54.0

802.11n-20MHz CH6 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14541.000000	55.6	H	11.9	18.4	74.0
15170.000000	56.8	V	12.1	17.2	74.0
15674.500000	58.4	H	12.6	15.6	74.0
16221.000000	58.8	V	13.1	15.2	74.0
16810.500000	59.3	H	13.9	14.7	74.0
17289.500000	59.2	H	13.9	14.8	74.0

Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14168.000000	43.9	H	11.2	10.1	54.0
15180.500000	44.9	V	12.2	9.1	54.0
15693.000000	46.3	H	12.7	7.7	54.0
16197.000000	46.8	V	13.1	7.2	54.0
16718.500000	47.6	V	13.8	6.4	54.0
17343.000000	47.0	H	14.0	7.0	54.0

802.11n-20MHz CH11 (1-18GHz)

Frequency (MHz)	MaxPeak-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14165.000000	55.5	H	11.2	18.5	74.0
15124.500000	56.4	H	12.1	17.6	74.0
15694.500000	59.2	H	12.7	14.8	74.0
16255.000000	58.5	V	13.2	15.5	74.0
16767.000000	59.2	V	13.9	14.8	74.0
17259.500000	58.8	V	13.9	15.2	74.0

Frequency (MHz)	Average-ClearWrite (dBμV/m)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
14531.000000	43.9	H	11.8	10.1	54.0
15185.500000	45.0	V	12.2	9.0	54.0
15741.500000	46.5	H	12.8	7.5	54.0
16221.500000	47.0	H	13.1	7.0	54.0
16759.500000	47.7	V	13.9	6.3	54.0
17351.500000	47.2	H	14.0	6.8	54.0

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:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

A.2 AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	66 to 56	Fig.23	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.

WLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	56 to 46	Fig.23	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.

WLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	66 to 56	Fig.24	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.

WLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	56 to 46	Fig.24	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:

WLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	66 to 56	Fig.25	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.

WLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	56 to 46	Fig.25	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.

WLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	66 to 56	Fig.26	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.

WLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	56 to 46	Fig.26	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)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Average Limit)-AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

WLAN (Average Limit)-AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

Test Condition:

Voltage (V)	Frequency (Hz)
240	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Average Limit)-AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

WLAN (Average Limit)-AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)-AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Average Limit)-AE3

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

WLAN (Average Limit)-AE3

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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:

WLAN (Quasi-peak Limit)-AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Average Limit)-AE3

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
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.

WLAN (Quasi-peak Limit)-AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

WLAN (Average Limit)-AE3

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
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.

See ANNEX C for test graphs.

Conclusion: PASS

ANNEX B: TEST LAYOUTS

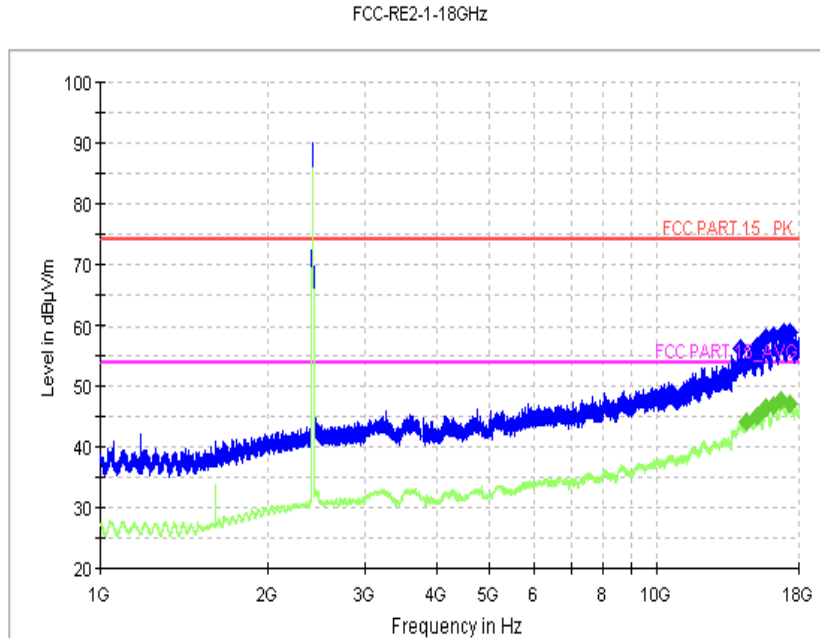


Fig.1 Radiated Spurious Emission (802.11b, Ch1, 1 GHz-18GHz)

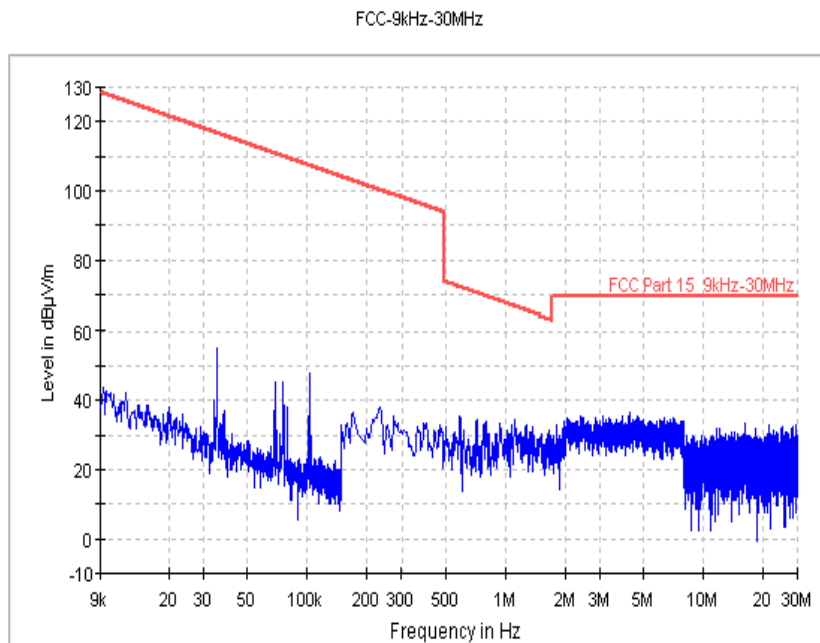


Fig.2 Radiated Spurious Emission (802.11b, Ch6, 9kHz-30MHz,AE1)

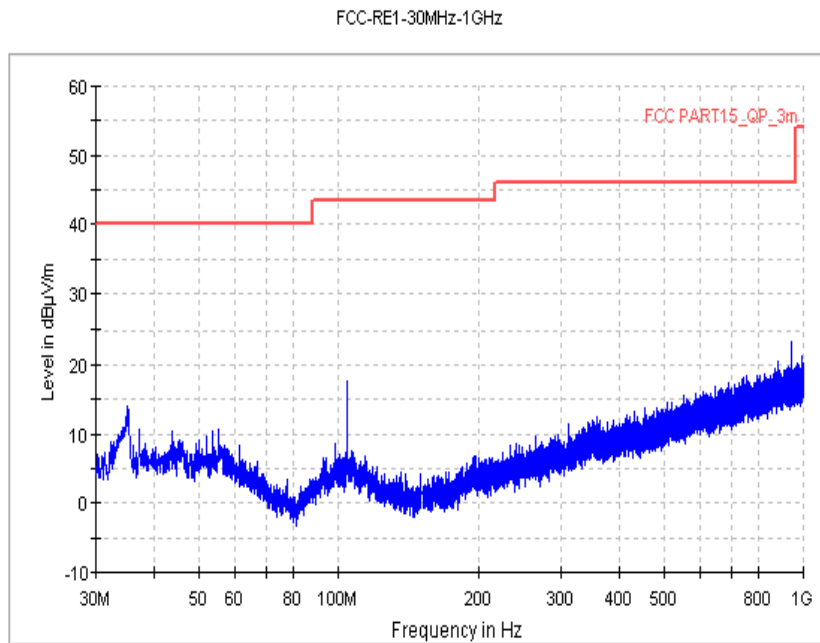


Fig.3 Radiated Spurious Emission (802.11b, Ch6, 30MHz-1 GHz,AE1)

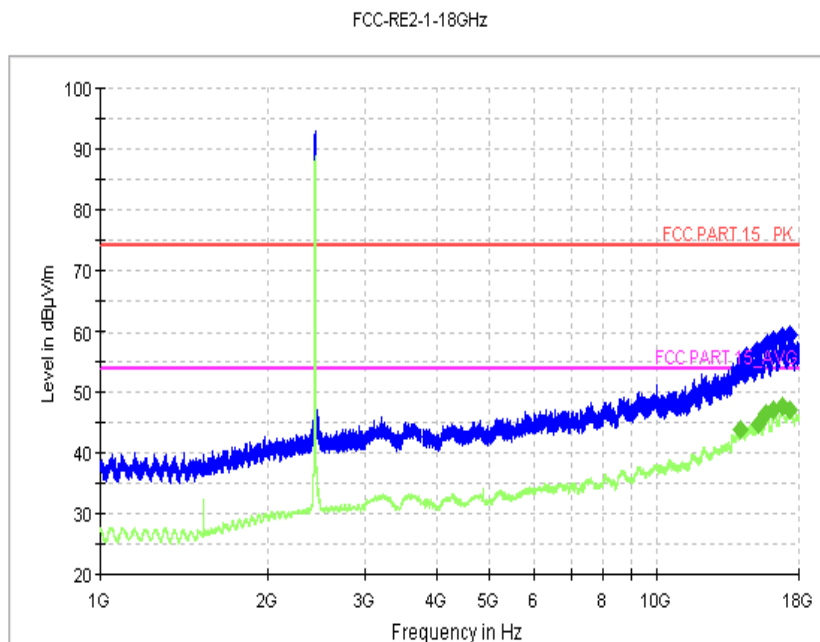


Fig.4 Radiated Spurious Emission (802.11b, Ch6, 1 GHz-18GHz)

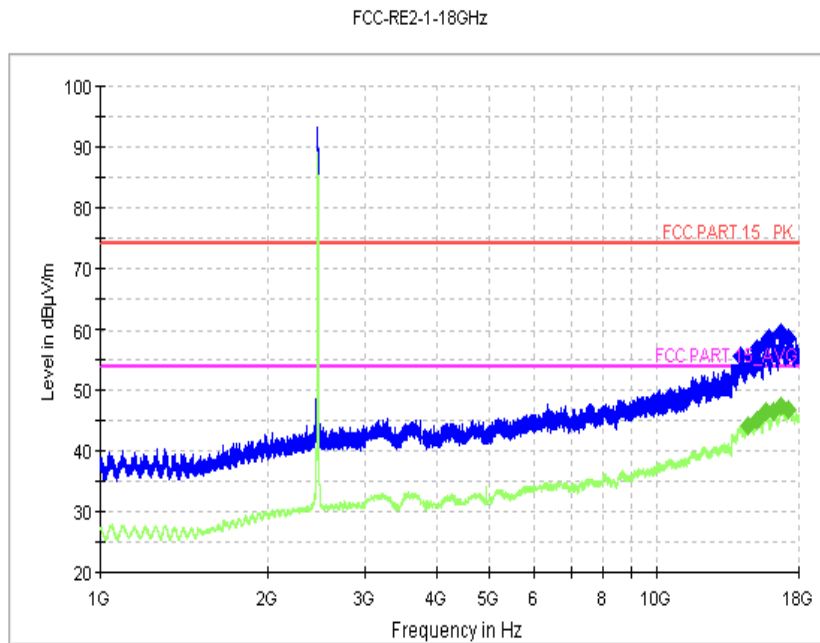


Fig.5 Radiated Spurious Emission (802.11b, Ch11, 1 GHz-18GHz)

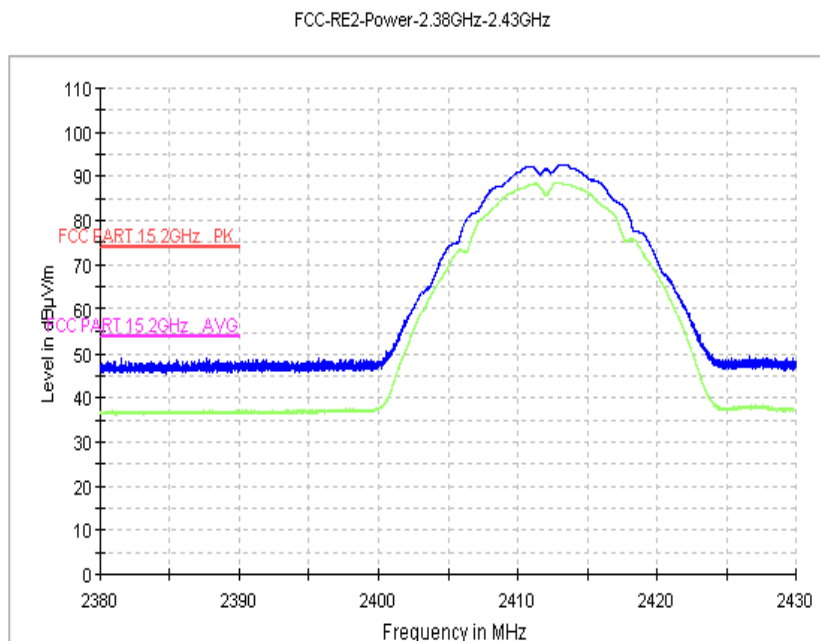


Fig.6 Radiated Emission Power (802.11b, Ch1, 2380GHz~2450GHz)

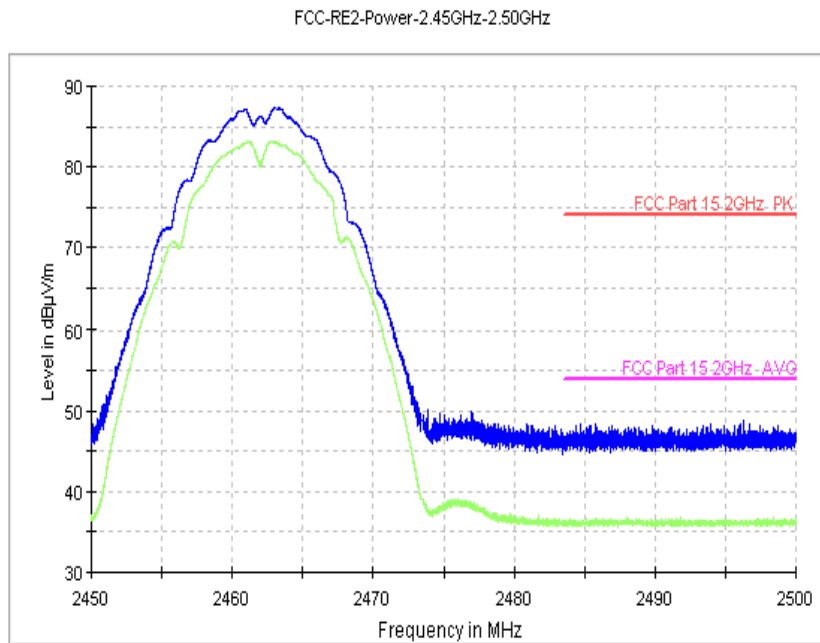


Fig.7 Radiated Emission Power (802.11b, Ch11, 2450GHz~2500GHz)

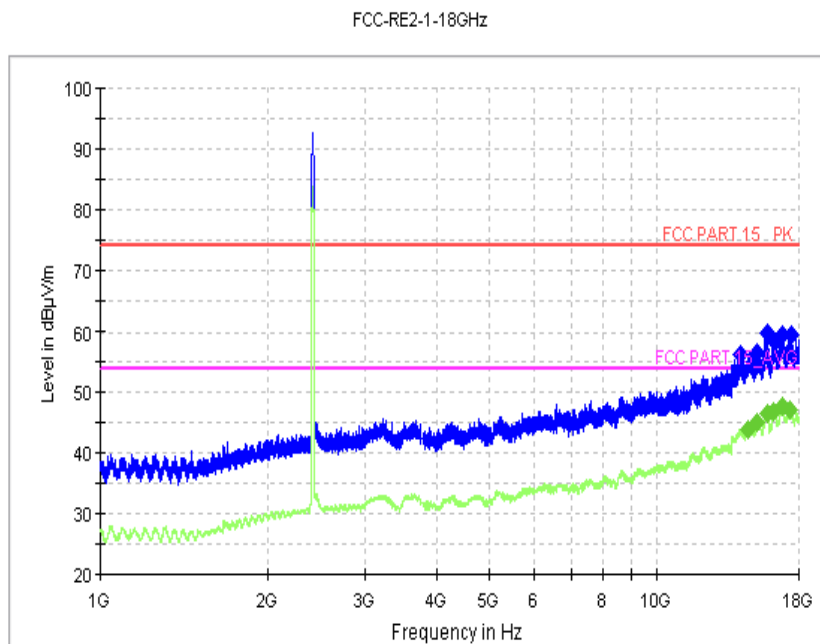


Fig.8 Radiated Spurious Emission (802.11g, Ch1, 1 GHz-18 GHz)

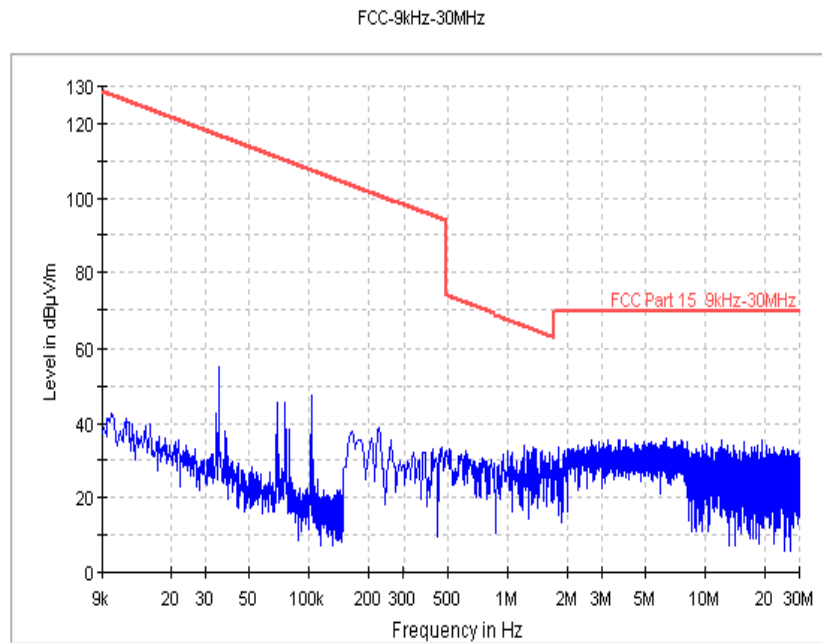


Fig.9 Radiated Spurious Emission (802.11g, Ch6, 9kHz-30MHz)

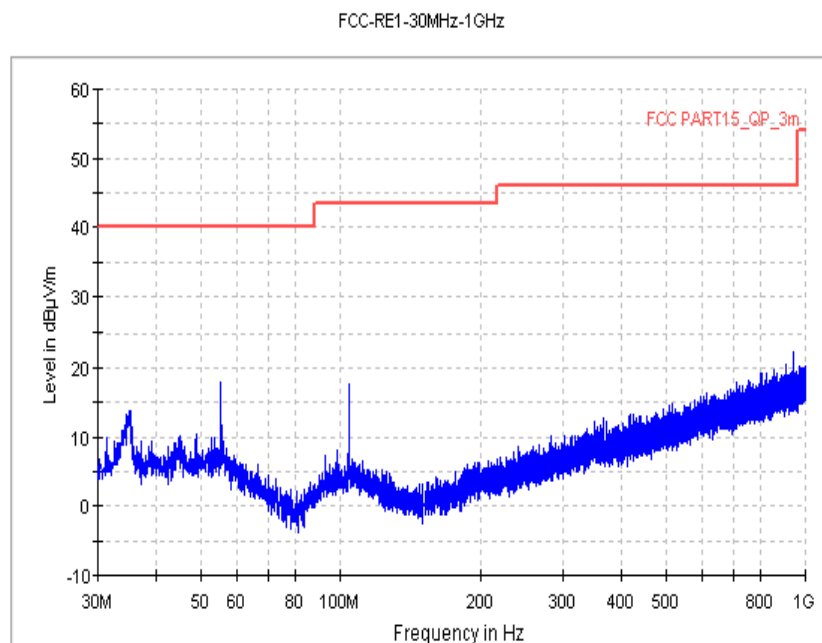


Fig.10 Radiated Spurious Emission (802.11g, Ch6, 30MHz-1 GHz)

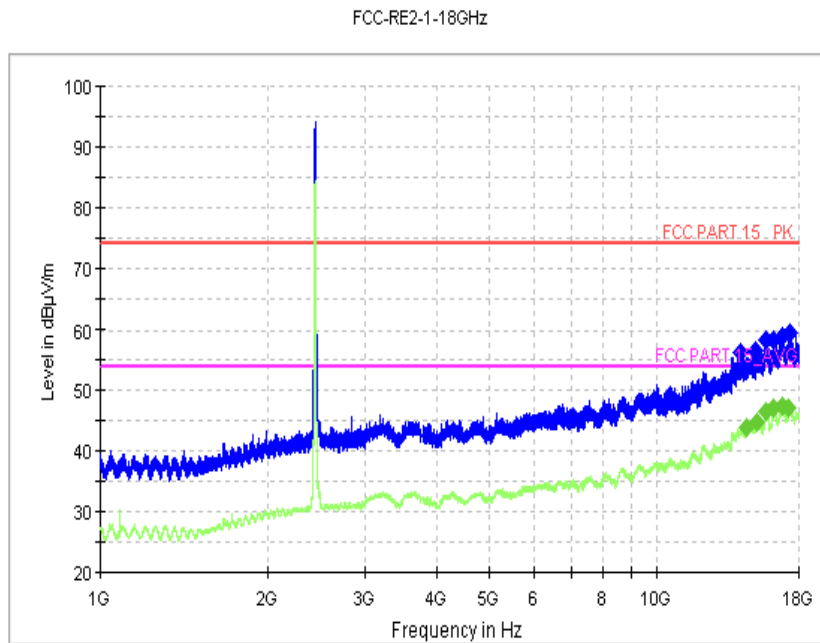


Fig.11 Radiated Spurious Emission (802.11g, Ch6, 1 GHz-18 GHz)

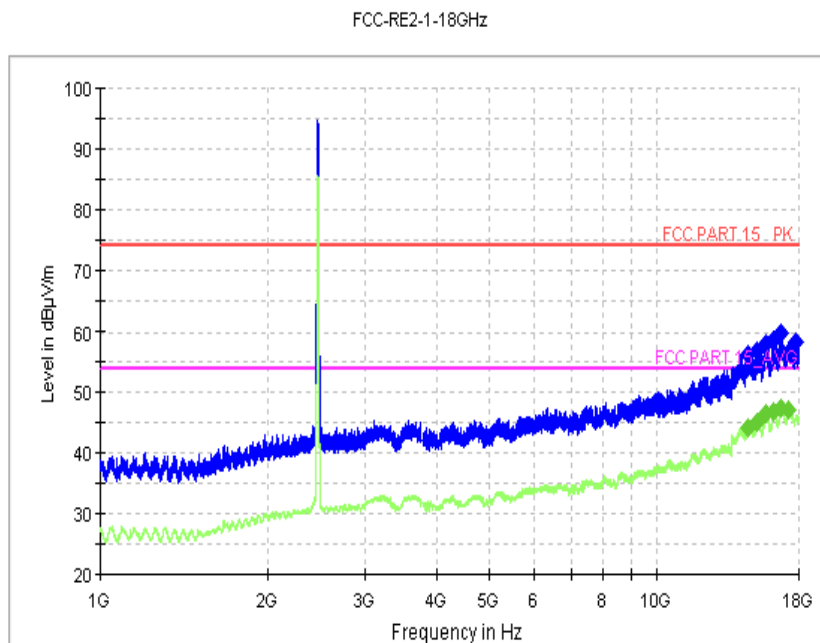


Fig.12 Radiated Spurious Emission (802.11g, Ch11, 1 GHz-18 GHz)

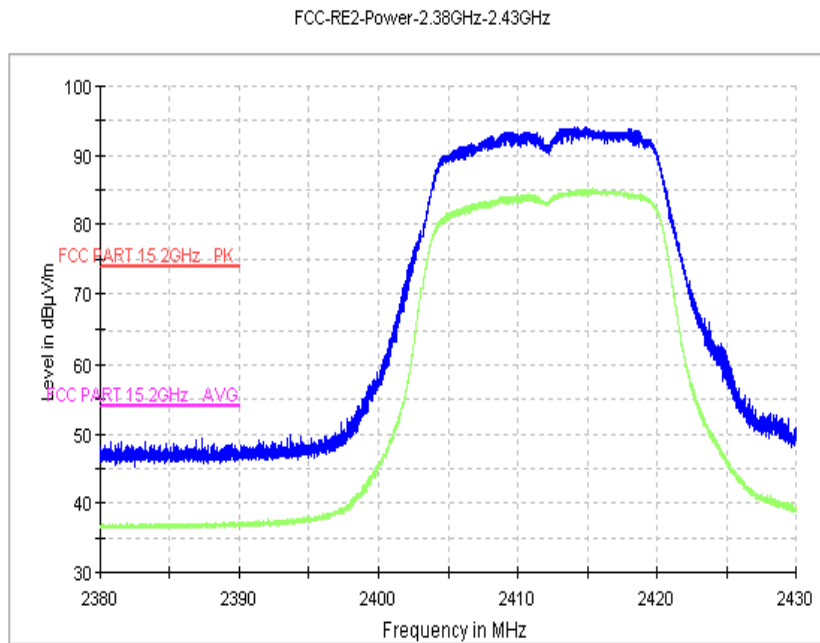


Fig.13 Radiated Emission Power (802.11g, Ch1, 2380GHz~2450GHz)

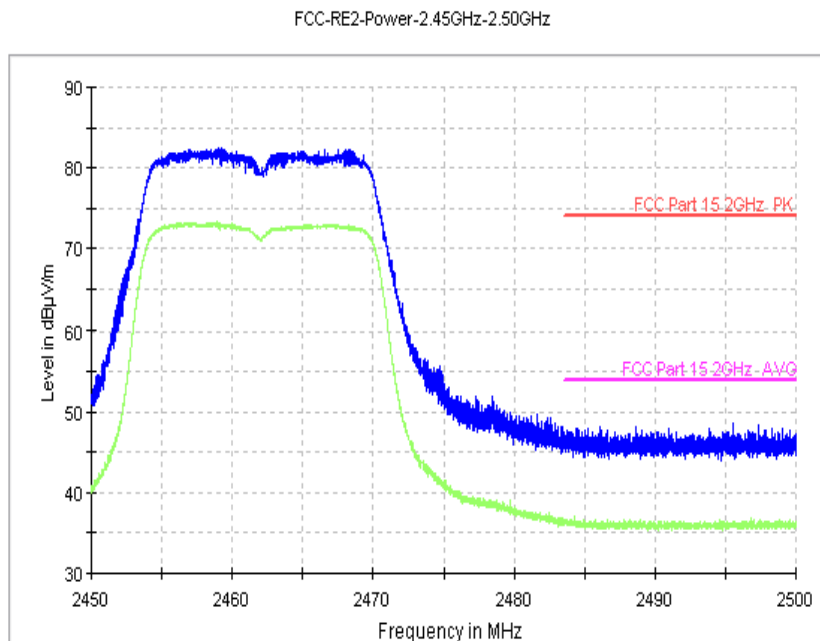


Fig.14 Radiated Emission Power (802.11g, Ch11, 2450GHz~2500GHz)

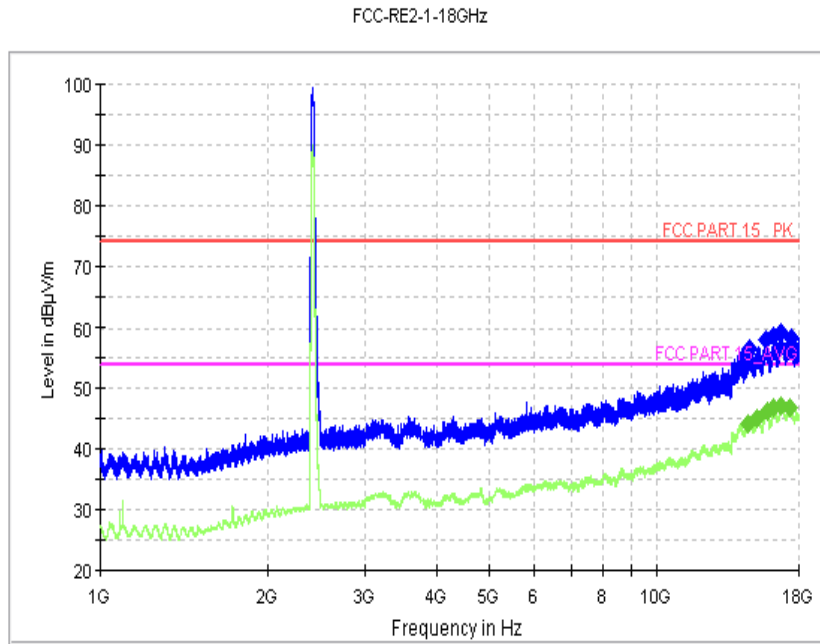


Fig.15 Radiated Spurious Emission (802.11n-20M, Ch1, 1 GHz-18 GHz)

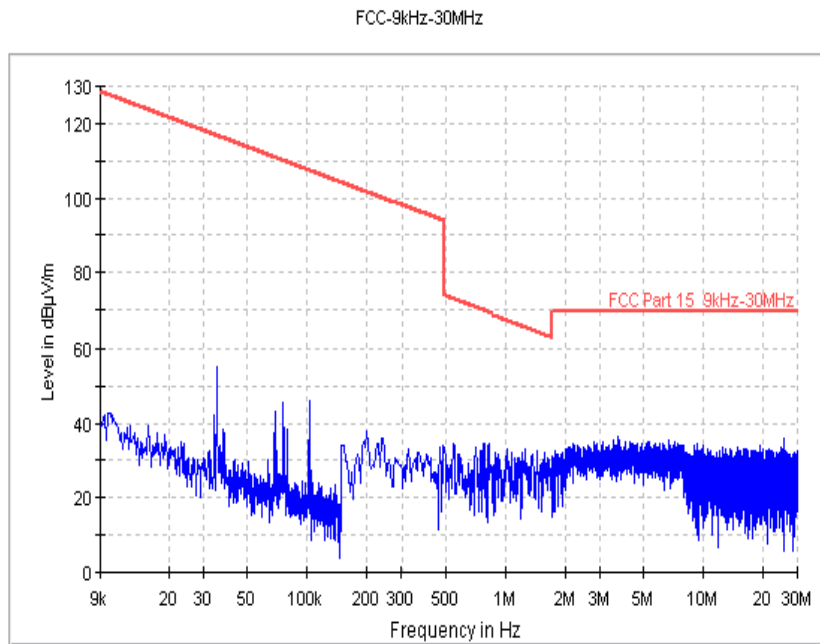


Fig.16 Radiated Spurious Emission (802.11n-20M, Ch6, 9kHz-30MHz)

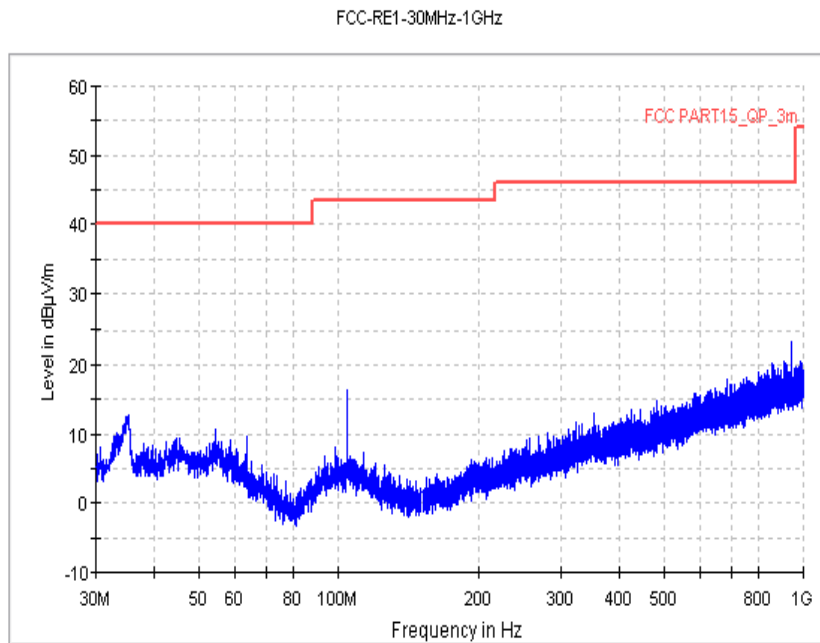


Fig.17 Radiated Spurious Emission (802.11n-20M, Ch6, 30MHz-1 GHz)

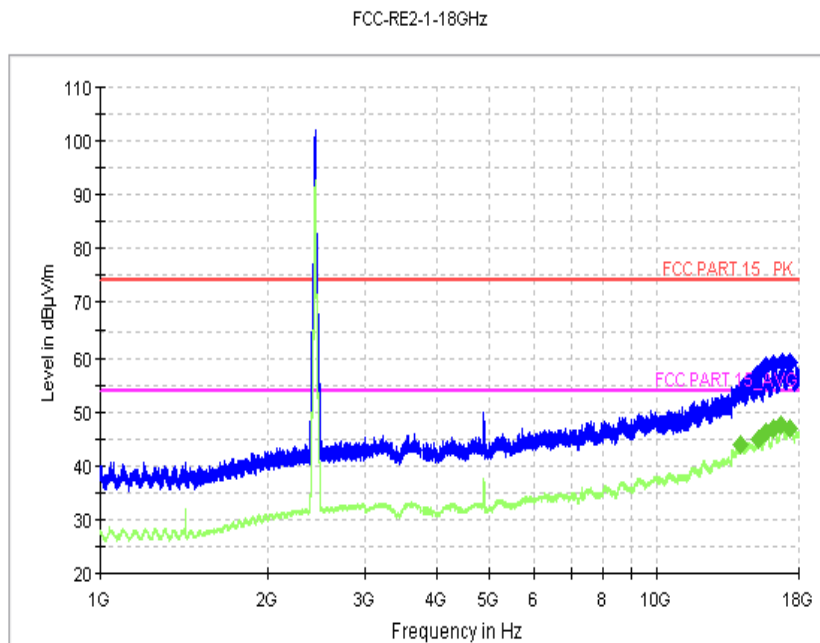


Fig.18 Radiated Spurious Emission (802.11n-20M, Ch6, 1 GHz-18 GHz)

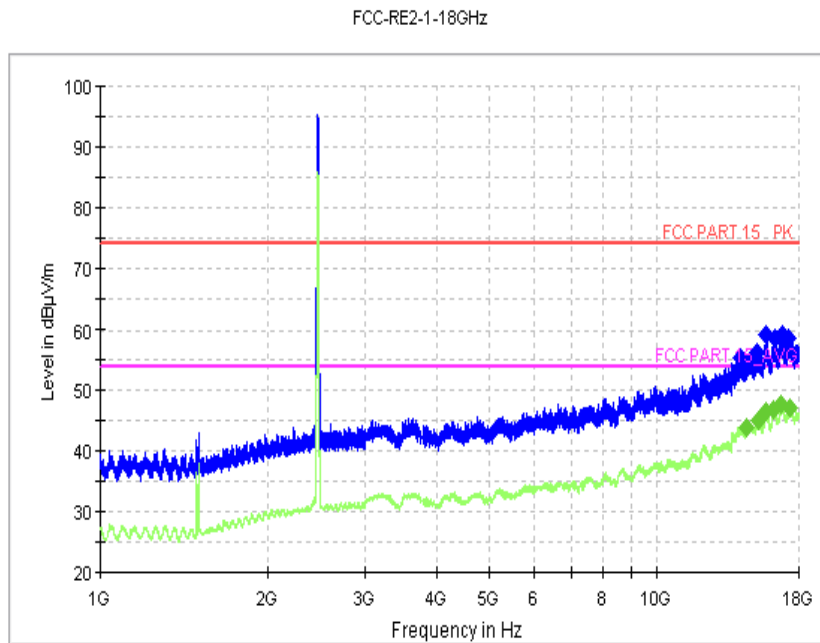


Fig.19 Radiated Spurious Emission (802.11n-20M, Ch11, 1 GHz-18 GHz)

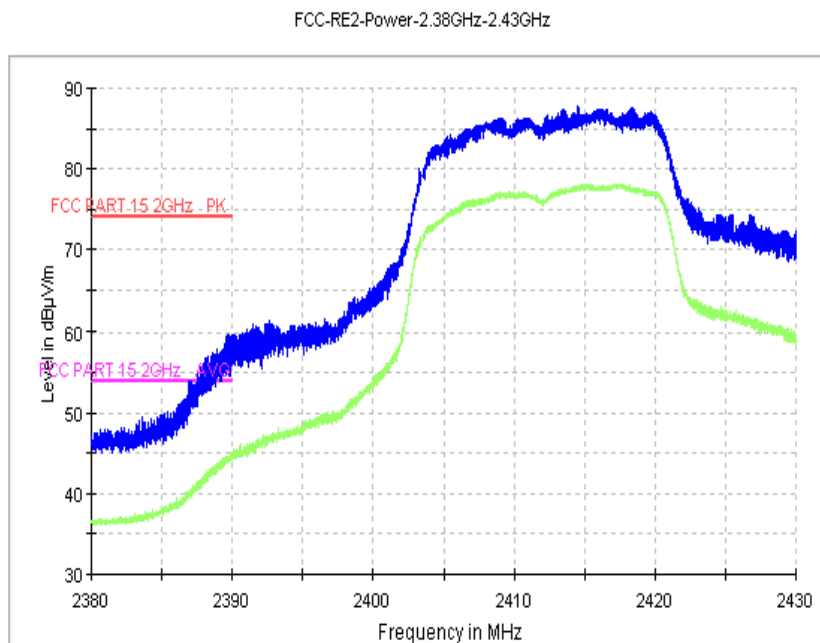


Fig.20 Radiated Emission Power (802.11n-20M, Ch1, 2380GHz~2450GHz)

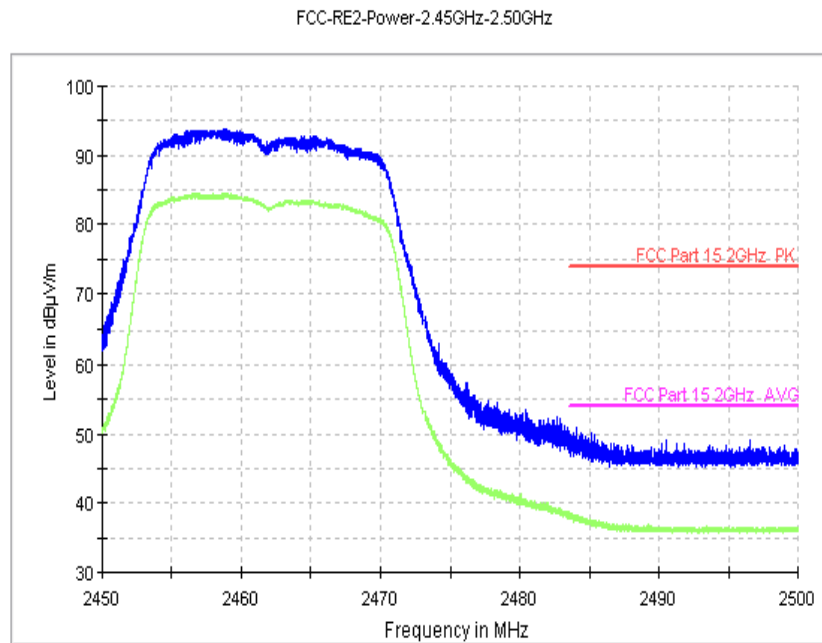


Fig.21 Radiated Emission Power (802.11n-20M, Ch11, 2450GHz~2500GHz)

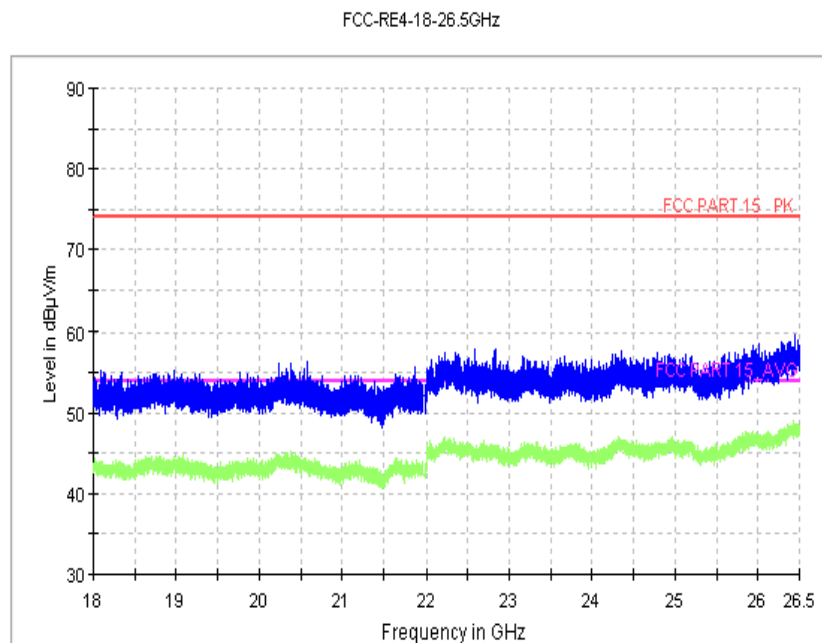


Fig.22 Radiated emission: 18 GHz – 26.5 GHz

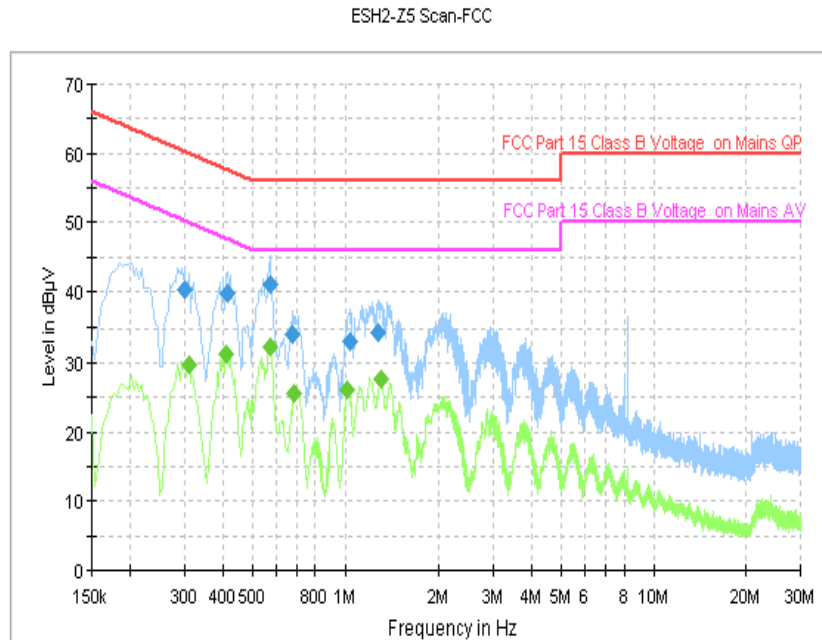


Fig.23 AC Powerline Conducted Emission (Traffic, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.302000	40.2	GND	L1	9.8	20.0	60.2
0.414000	39.8	GND	L1	9.8	17.8	57.6
0.570000	41.0	GND	L1	9.8	15.0	56.0
0.678000	34.2	GND	L1	9.8	21.8	56.0
1.038000	33.1	GND	L1	9.8	22.9	56.0
1.286000	34.3	GND	L1	9.8	21.7	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.310000	29.8	GND	L1	9.8	20.2	50.0
0.410000	31.4	GND	L1	9.8	16.3	47.6
0.570000	32.4	GND	L1	9.8	13.6	46.0
0.686000	25.6	GND	L1	9.8	20.4	46.0
1.022000	26.1	GND	L1	9.8	20.0	46.0
1.306000	27.7	GND	L1	9.8	18.3	46.0

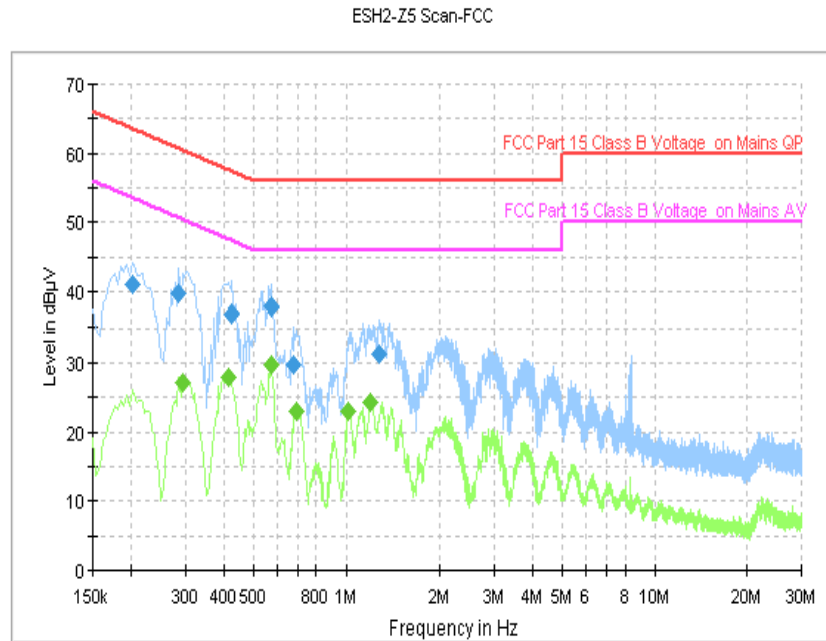


Fig.24 AC Power line Conducted Emission (Idle, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.202000	41.2	GND	L1	9.8	22.3	63.5
0.286000	39.8	GND	L1	9.8	20.8	60.6
0.426000	37.0	GND	N	9.7	20.4	57.3
0.570000	38.1	GND	L1	9.8	17.9	56.0
0.678000	29.8	GND	N	9.5	26.2	56.0
1.286000	31.3	GND	L1	9.8	24.7	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.294000	27.1	GND	L1	9.8	23.3	50.4
0.414000	27.9	GND	L1	9.8	19.7	47.6
0.570000	29.6	GND	L1	9.8	16.4	46.0
0.690000	23.1	GND	L1	9.8	22.9	46.0
1.022000	22.9	GND	L1	9.8	23.1	46.0
1.206000	24.2	GND	L1	9.8	21.8	46.0

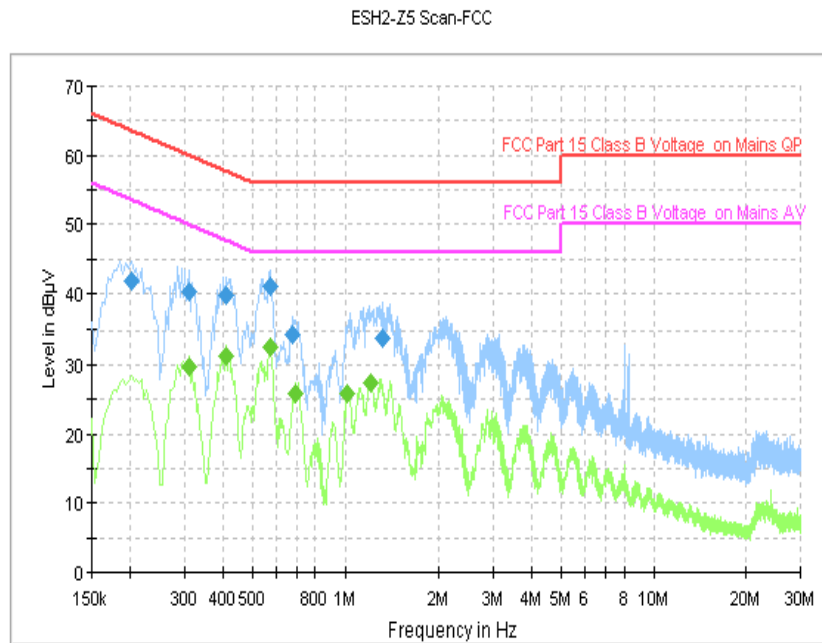


Fig.25 AC Powerline Conducted Emission (Traffic, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.202000	41.8	GND	L1	9.8	21.7	63.5
0.310000	40.4	GND	L1	9.8	19.6	60.0
0.410000	39.8	GND	L1	9.8	17.9	57.6
0.570000	41.0	GND	L1	9.8	15.0	56.0
0.678000	34.2	GND	L1	9.8	21.8	56.0
1.326000	33.9	GND	L1	9.8	22.1	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.310000	29.7	GND	L1	9.8	20.2	50.0
0.410000	31.2	GND	L1	9.8	16.5	47.6
0.570000	32.6	GND	L1	9.8	13.4	46.0
0.694000	25.9	GND	L1	9.8	20.1	46.0
1.022000	25.8	GND	L1	9.8	20.2	46.0
1.210000	27.3	GND	L1	9.8	18.7	46.0

ESH2-Z5 Scan-FCC

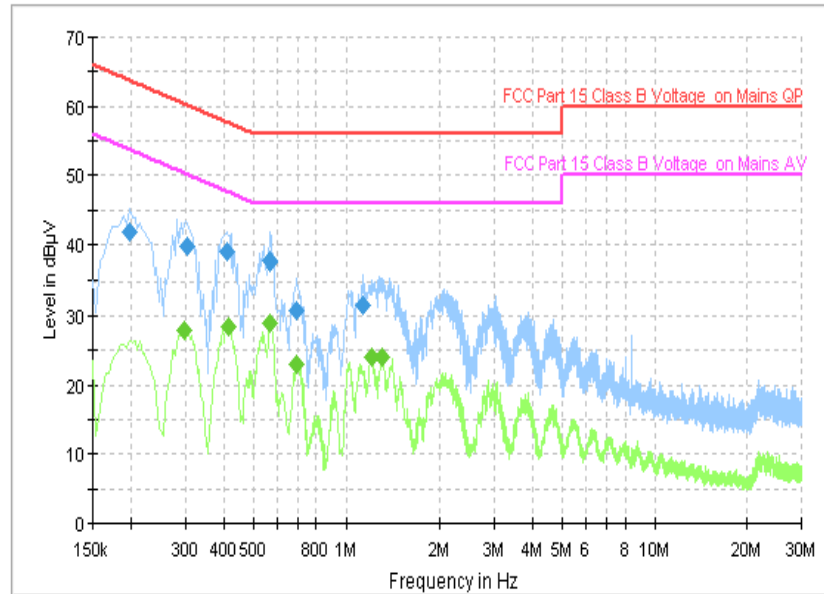


Fig.26 AC Power line Conducted Emission (Idle, AE1)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.198000	41.9	GND	L1	9.8	21.8	63.7
0.306000	39.8	GND	L1	9.8	20.3	60.1
0.410000	39.0	GND	N	9.7	18.7	57.6
0.566000	37.6	GND	L1	9.8	18.4	56.0
0.694000	30.8	GND	N	9.5	25.2	56.0
1.138000	31.6	GND	L1	9.8	24.4	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.298000	28.0	GND	L1	9.8	22.3	50.3
0.414000	28.4	GND	L1	9.8	19.2	47.6
0.566000	29.0	GND	L1	9.8	17.0	46.0
0.690000	23.1	GND	L1	9.8	22.9	46.0
1.210000	24.1	GND	L1	9.8	21.9	46.0
1.306000	23.9	GND	L1	9.8	22.1	46.0

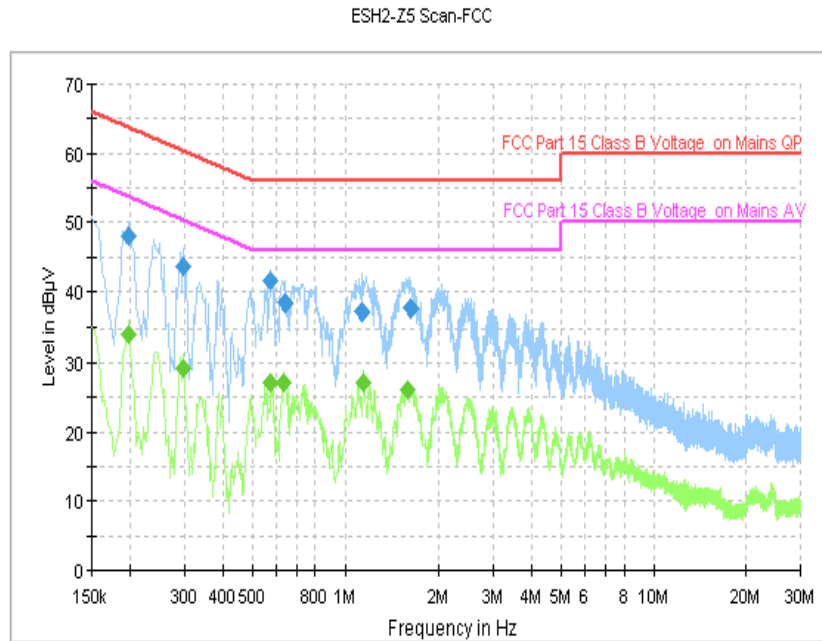


Fig.27 AC Powerline Conducted Emission (Traffic, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	48.1	GND	L1	9.8	15.6	63.7
0.298000	43.6	GND	L1	9.8	16.7	60.3
0.574000	41.5	GND	L1	9.8	14.5	56.0
0.642000	38.6	GND	L1	9.8	17.4	56.0
1.134000	37.2	GND	L1	9.8	18.8	56.0
1.614000	37.6	GND	L1	9.8	18.4	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.198000	34.1	GND	L1	9.8	19.6	53.7
0.298000	29.2	GND	L1	9.8	21.1	50.3
0.574000	27.1	GND	L1	9.8	18.9	46.0
0.634000	27.2	GND	L1	9.8	18.8	46.0
1.150000	27.2	GND	L1	9.8	18.8	46.0
1.590000	26.0	GND	L1	9.8	20.0	46.0

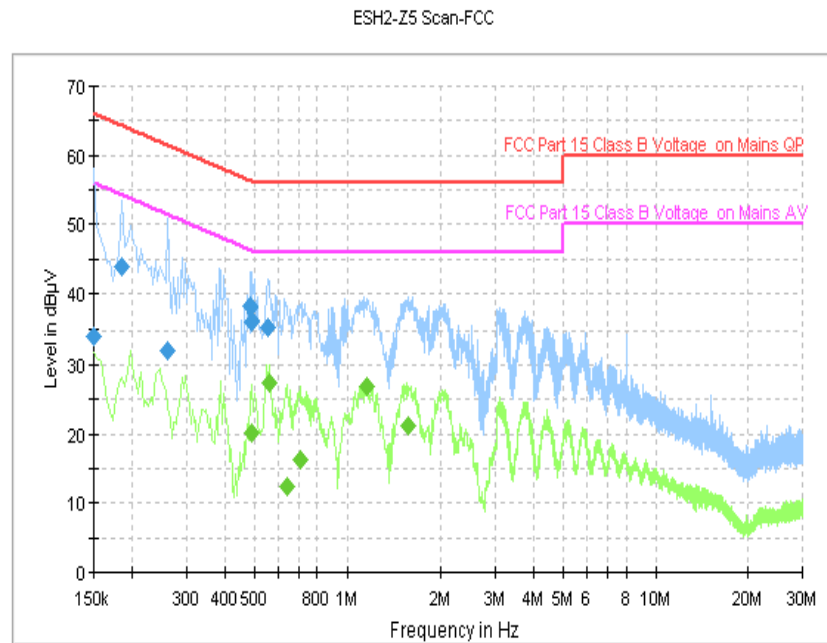


Fig.28 AC Power line Conducted Emission (Idle, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	34.2	GND	N	9.6	31.8	66.0
0.186000	43.8	GND	N	9.6	20.4	64.2
0.262000	32.0	GND	N	9.6	29.4	61.4
0.482000	38.3	GND	N	9.7	18.0	56.3
0.490000	36.3	GND	N	9.7	19.9	56.2
0.554000	35.4	GND	L1	9.8	20.6	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.490000	20.3	GND	N	9.7	25.9	46.2
0.558000	27.3	GND	L1	9.8	18.7	46.0
0.642000	12.5	GND	L1	9.8	33.5	46.0
0.706000	16.3	GND	L1	9.8	29.7	46.0
1.158000	27.0	GND	L1	9.8	19.0	46.0
1.562000	21.2	GND	L1	9.8	24.8	46.0

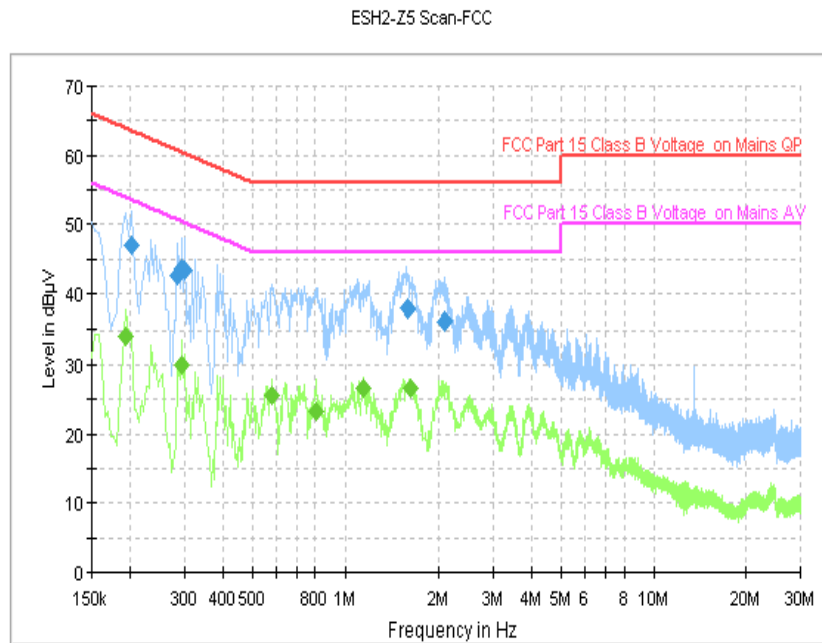


Fig.29 AC Powerline Conducted Emission (Traffic, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.202000	46.9	GND	L1	9.8	16.6	63.5
0.286000	42.5	GND	L1	9.8	18.1	60.6
0.294000	43.7	GND	L1	9.8	16.7	60.4
0.302000	43.4	GND	L1	9.8	16.8	60.2
1.586000	37.9	GND	L1	9.8	18.1	56.0
2.086000	36.1	GND	L1	9.8	19.9	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.194000	34.1	GND	L1	9.8	19.7	53.9
0.294000	29.9	GND	L1	9.8	20.6	50.4
0.578000	25.6	GND	L1	9.8	20.4	46.0
0.802000	23.2	GND	L1	9.8	22.8	46.0
1.154000	26.7	GND	L1	9.8	19.3	46.0
1.610000	26.6	GND	L1	9.8	19.4	46.0

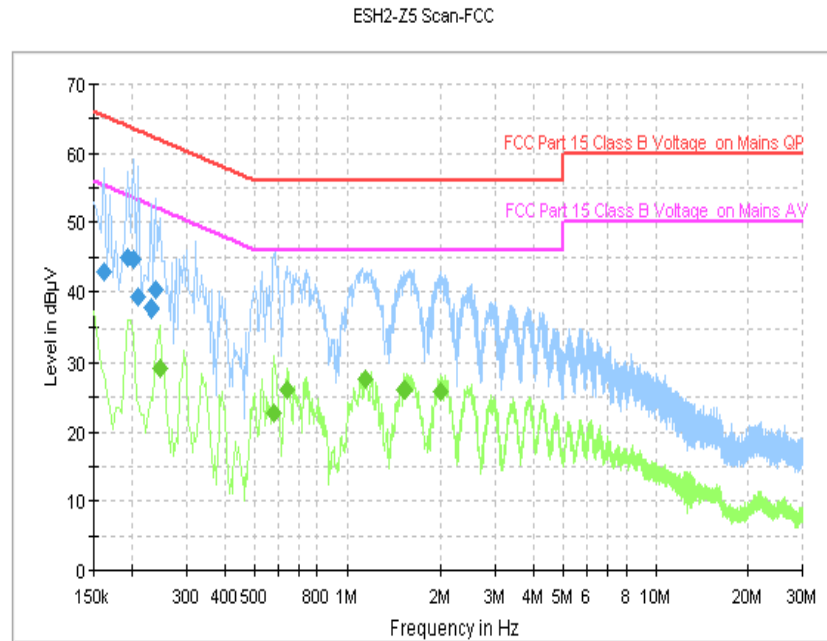


Fig.30 AC Power line Conducted Emission (Idle, AE2)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.162000	42.8	GND	L1	9.8	22.6	65.4
0.194000	44.8	GND	L1	9.8	19.0	63.9
0.202000	44.8	GND	L1	9.8	18.8	63.5
0.210000	39.2	GND	L1	9.8	24.0	63.2
0.230000	37.7	GND	L1	9.8	24.8	62.4
0.238000	40.2	GND	L1	9.8	22.0	62.2

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.246000	29.2	GND	L1	9.8	22.7	51.9
0.578000	22.7	GND	L1	9.8	23.3	46.0
0.638000	26.1	GND	L1	9.8	19.9	46.0
1.154000	27.7	GND	L1	9.8	18.3	46.0
1.534000	26.0	GND	L1	9.8	20.0	46.0
2.006000	25.8	GND	L1	9.8	20.2	46.0

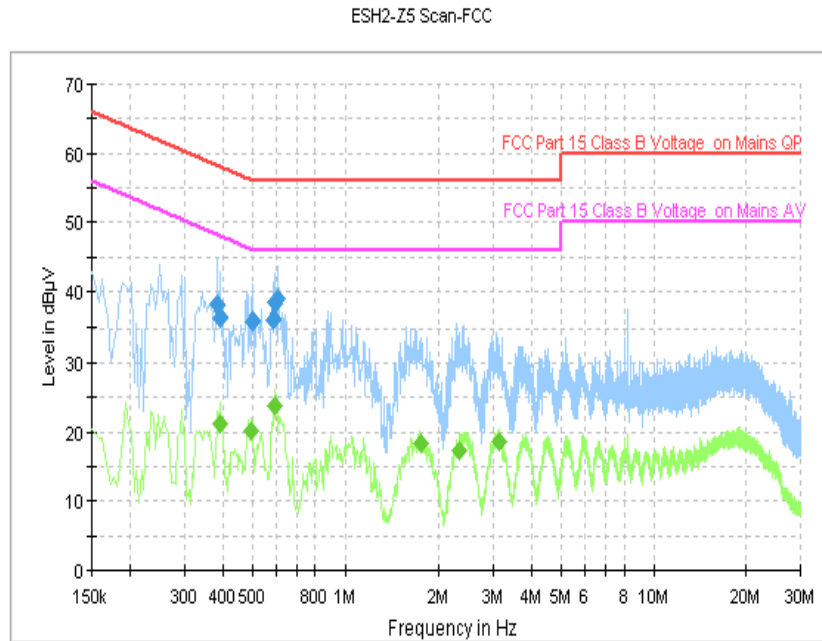


Fig.31 AC Powerline Conducted Emission (Traffic, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.386000	38.3	GND	N	9.6	19.9	58.1
0.394000	36.4	GND	L1	9.8	21.6	58.0
0.502000	35.8	GND	N	9.7	20.2	56.0
0.586000	36.1	GND	N	9.6	19.9	56.0
0.594000	38.5	GND	N	9.6	17.5	56.0
0.602000	39.0	GND	N	9.6	17.0	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.394000	21.1	GND	L1	9.8	26.8	48.0
0.494000	20.0	GND	L1	9.8	26.1	46.1
0.594000	23.8	GND	L1	9.8	22.2	46.0
1.742000	18.3	GND	L1	9.8	27.7	46.0
2.342000	17.4	GND	L1	9.8	28.6	46.0
3.154000	18.7	GND	L1	9.8	27.3	46.0

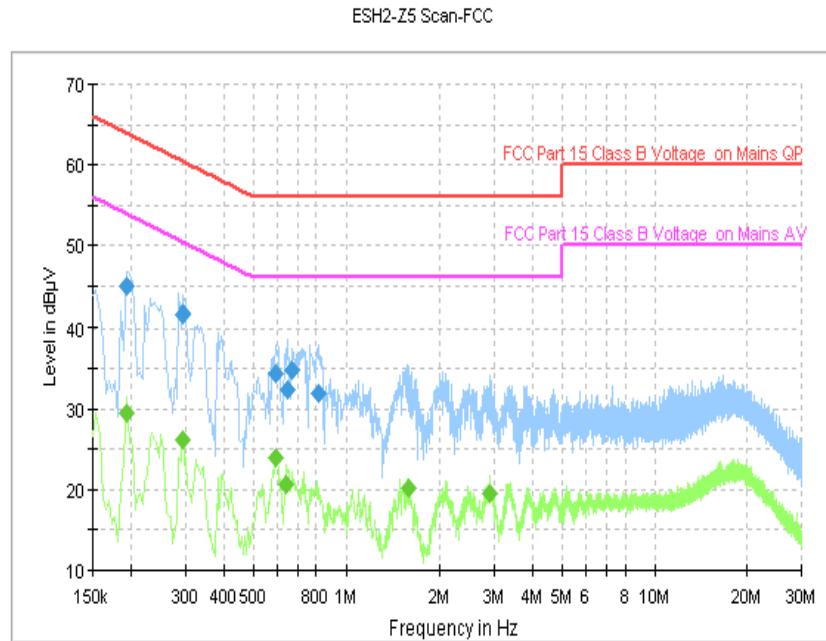


Fig.32 AC Power line Conducted Emission (Idle, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.194000	44.9	GND	N	9.6	19.0	63.9
0.294000	41.6	GND	N	9.6	18.8	60.4
0.594000	34.2	GND	L1	9.8	21.8	56.0
0.646000	32.3	GND	L1	9.8	23.7	56.0
0.670000	34.8	GND	L1	9.8	21.2	56.0
0.818000	31.9	GND	L1	9.8	24.1	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.194000	29.6	GND	L1	9.8	24.3	53.9
0.294000	26.1	GND	L1	9.8	24.3	50.4
0.594000	24.0	GND	L1	9.8	22.0	46.0
0.642000	20.7	GND	L1	9.8	25.3	46.0
1.590000	20.1	GND	L1	9.8	25.9	46.0
2.902000	19.6	GND	L1	9.8	26.4	46.0

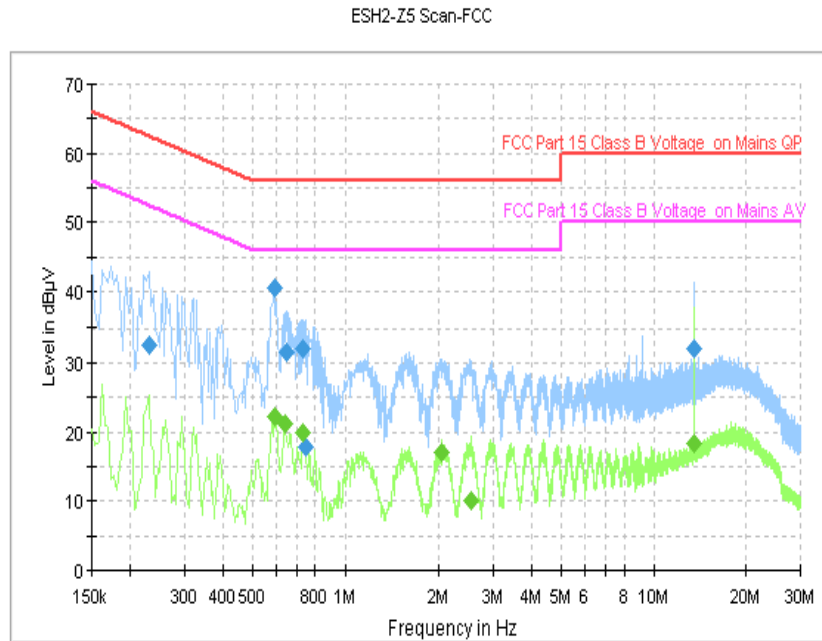


Fig.33 AC Powerline Conducted Emission (Traffic, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.230000	32.6	GND	N	9.6	29.8	62.4
0.590000	40.5	GND	N	9.6	15.5	56.0
0.646000	31.6	GND	L1	9.8	24.4	56.0
0.730000	32.1	GND	L1	9.8	23.9	56.0
0.746000	17.8	GND	N	9.6	38.2	56.0
13.562000	32.0	GND	N	9.9	28.0	60.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.594000	22.3	GND	L1	9.8	23.7	46.0
0.638000	21.2	GND	L1	9.8	24.8	46.0
0.730000	19.9	GND	L1	9.8	26.1	46.0
2.030000	17.0	GND	L1	9.8	29.0	46.0
2.534000	10.0	GND	L1	9.8	36.0	46.0
13.562000	18.2	GND	N	9.9	31.8	50.0

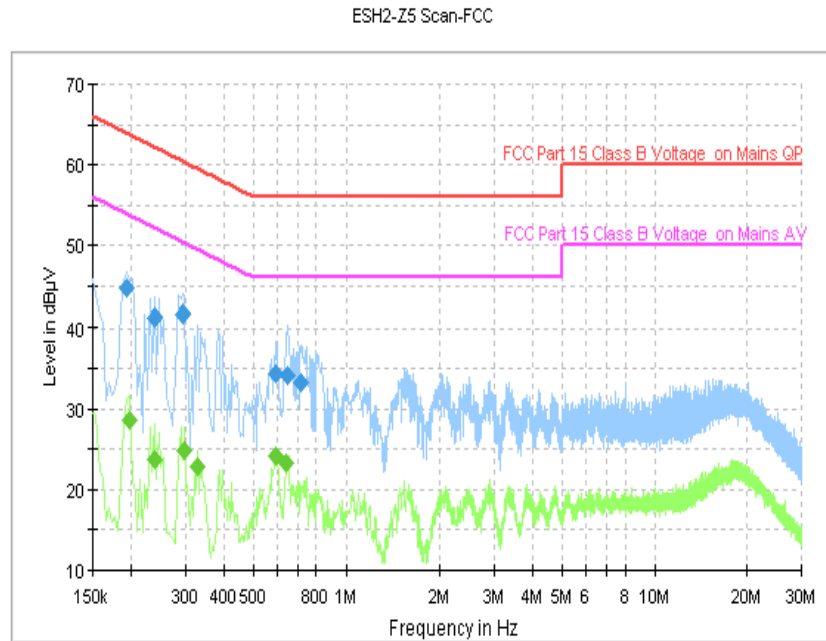


Fig.34 AC Power line Conducted Emission (Idle, AE3)

MEASUREMENT RESULT: " QuasiPeak "

Frequency (MHz)	QuasiPeak (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.194000	44.7	GND	N	9.6	19.1	63.9
0.238000	41.2	GND	N	9.6	20.9	62.2
0.294000	41.6	GND	N	9.6	18.8	60.4
0.590000	34.3	GND	L1	9.8	21.7	56.0
0.646000	34.1	GND	N	9.6	21.9	56.0
0.710000	33.3	GND	L1	9.8	22.7	56.0

MEASUREMENT RESULT: " Average "

Frequency (MHz)	Average (dBuV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.198000	28.6	GND	L1	9.8	25.1	53.7
0.238000	23.8	GND	N	9.6	28.4	52.2
0.298000	24.8	GND	L1	9.8	25.5	50.3
0.330000	22.9	GND	L1	9.8	26.5	49.5
0.590000	24.3	GND	L1	9.8	21.7	46.0
0.642000	23.3	GND	L1	9.8	22.7	46.0



ANNEX C: Persons involved in this testing

Test Name	Tester
Transmitter Spurious Emission - Radiated	An Ran, Tang Weisheng
AC Powerline Conducted Emission	An Ran, Tang Weisheng

END OF REPORT