TEST REPORT

No. B20N00193-WLAN

TCL Communication Ltd.

GSM/UMTS/LTE Mobile phone

Model Name: 5002S/5002L

with

Hardware Version: 01

Software Version: 3C7D

FCC ID: 2ACCJH120

Issued Date: 2020-03-02

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

Test Laboratory:

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1. Summary of Test Report

1.1. Test Items

Description	GSM/UMTS/LTE Mobile phone
Model Name	5002S/5002L
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

FCC Part15-2018; ANSI C63.10-2013

1.3. Test Result

Pass

1.4. Testing Location

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

1.5. Project data

Testing Start Date:	2020-02-03
Testing End Date:	2020-02-26

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

2.2. Manufacturer Information

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

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

3.1. About EUT

Description	GSM/UMTS/LTE Mobile phone
Model Name	5002S/5002L
Brand Name	/
RF Protocol	IEEE 802.11 b/g/n-HT20
Operating Frequency	2412MHz~2462MHz
Number of Channels	11
Antenna Type	Integrated
Antenna Gain	-5.0dBi
Power Supply	3.8V DC by Battery
FCC ID	2ACCJH120
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	015650000020589	01	3C7D	2020-01-20
EUT2	015650000020597	01	3C7D	2020-01-20

*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	Battery	/

AE1

Model	CBA0058AGAC5
Manufacturer	MOU,PUAN

AE2

Model	CBA0058AGAC7
Manufacturer	MOU,CHENYANG

AE3

Model	CAB2880001C1
Manufacturer	BYD
Capacitance	3000mAh

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

3.4. General Description

The Equipment under Test (EUT) is a model of GSM/UMTS/LTE Mobile phone with integrated antenna and battery.

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

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz	2018
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Results

5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Verdict
0	Antenna Requirement	15.203	**P**
1	Maximum Output Power	15.247 (b)	**P**
2	Peak Power Spectral Density	15.247 (e)	**P**
3	6dB Bandwidth	15.247 (a)	**P**
4	Band Edges Compliance	15.247 (d)	**P**
5	Conducted Emission	15.247 (d)	**P**
6	Radiated Emission	15.247, 15.205, 15.209	**P**
7	AC Power line Conducted	15.107, 15.207	**P**

See **ANNEX A** for details.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

6. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2021-01-15	1 year
2	Power Sensor	U2021XA	MY55430013	Agilent	2021-01-15	1 year
3	Data Acquisiton	U2531A	TW55443507	Agilent	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Calibration Period
1	LISN	ESH2-Z5	100196	R&S	2021-01-02	1 year
2	Test Receiver	ESCI	100701	R&S	2020-08-06	1 year
3	Loop Antenna	HLA6120	35779	TESEQ	2022-05-01	3 year
4	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2021-02-16	3 year
5	Horn Antenna	3117	00066585	ETS-Lindgren	2022-03-04	3 year
6	Test Receiver	ESR7	101675	R&S	2020-07-18	1 year
7	Spectrum Analyzer	FSP 40	100378	R&S	2020-12-12	1 year
8	Chamber	FACT5-2.0	4166	ETS-Lindgren	2021-05-12	3 year
9	Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2021-01-14	3 year
10	Antenna	QSH-SL-2 6-40-K-20	17014	Q-par	2021-01-10	3 year

Test software

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

EUT is engineering software provided by the customer to control the transmitting signal.
The EUT was programmed to be in continuously transmitting mode.

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

7. Laboratory Environment

Semi-anechoic chambe

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz

Shielded room

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

Fully-anechoic chamber

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 18 GHz， 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

8. Measurement Uncertainty

Test Name	Uncertainty (*k*=2)	
1. RF Output Power - Conducted	1.32dB	
2. Power Spectral Density - Conducted	2.32dB	
3. Occupied channel bandwidth - Conducted	66Hz	
4. Transmitter Spurious Emission - Conducted	30MHz≤f≤1GHz	1.41dB
	1GHz≤f≤7GHz	1.92dB
	7GHz≤f≤13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
5. Transmitter Spurious Emission - Radiated	9kHz≤f≤30MHz	1.70dB
	30MHz≤f≤1GHz	4.90dB
	1GHz≤f≤18GHz	4.60dB
	18GHz≤f≤40GHz	4.10dB
6. AC Power line Conducted Emission	150kHz≤f≤30MHz	3.00dB

ANNEX A: Detailed Test Results

A.0 Antenna requirement

Measurement Limit:

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Conclusion: The Directional gains of antenna used for transmitting is -5.0 dBi. The RF transmitter uses an integrate antenna without connector.

A.1 Maximum Output Power

Measurement of method :See ANSI C63.10-Clause 11.9.2.3.2

Method AVGPM-G is a measurement using a gated RF average power meter.

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Measurement Limit:

Standard	Limit (dBm)	E.I.R.P Limit (dBm)
FCC CRF Part 15.247(b)	< 30	< 36

Measurement Results:

Mode	Channel	Frequency (MHz)	Average Conducted Power (dBm)	E.I.R.P (dBm)	Conclusion
802.11b	CH 1	2412	16.20	11.20	**P**
	CH 6	2437	16.76	11.76	**P**
	CH 11	2462	16.33	11.33	**P**
802.11g	CH 1	2412	15.22	10.22	**P**
	CH 6	2437	15.56	10.56	**P**
	CH 11	2462	15.35	10.35	**P**
802.11n HT20	CH 1	2412	13.16	8.16	**P**
	CH 6	2437	13.79	8.79	**P**
	CH 11	2462	13.45	8.45	**P**

Note: E.I.R.P value = Conducted values (with conducted samples) + Antenna Gain.

Note: Worst-case data rates as provided by the client were: 1Mbps (802.11b), 6Mbps (802.11g), MCS0 (802.11n). The following cases and test graphs are performed with this condition. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

A.2 Peak Power Spectral Density

Measurement Limit:

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

Measurement Results:

Mode	Channel	Frequency (MHz)	Test Results (dBm)		Conclusion
802.11b	CH 1	2412	Fig.1	-7.42	**P**
	CH 6	2437	Fig.2	-7.06	**P**
	CH 11	2462	Fig.3	-7.81	**P**
802.11g	CH 1	2412	Fig.4	-11.37	**P**
	CH 6	2437	Fig.5	-10.46	**P**
	CH 11	2462	Fig.6	-11.44	**P**
802.11n HT20	CH 1	2412	Fig.7	-13.54	**P**
	CH 6	2437	Fig.8	-12.76	**P**
	CH 11	2462	Fig.9	-13.63	**P**

See below for test graphs.

Conclusion: PASS

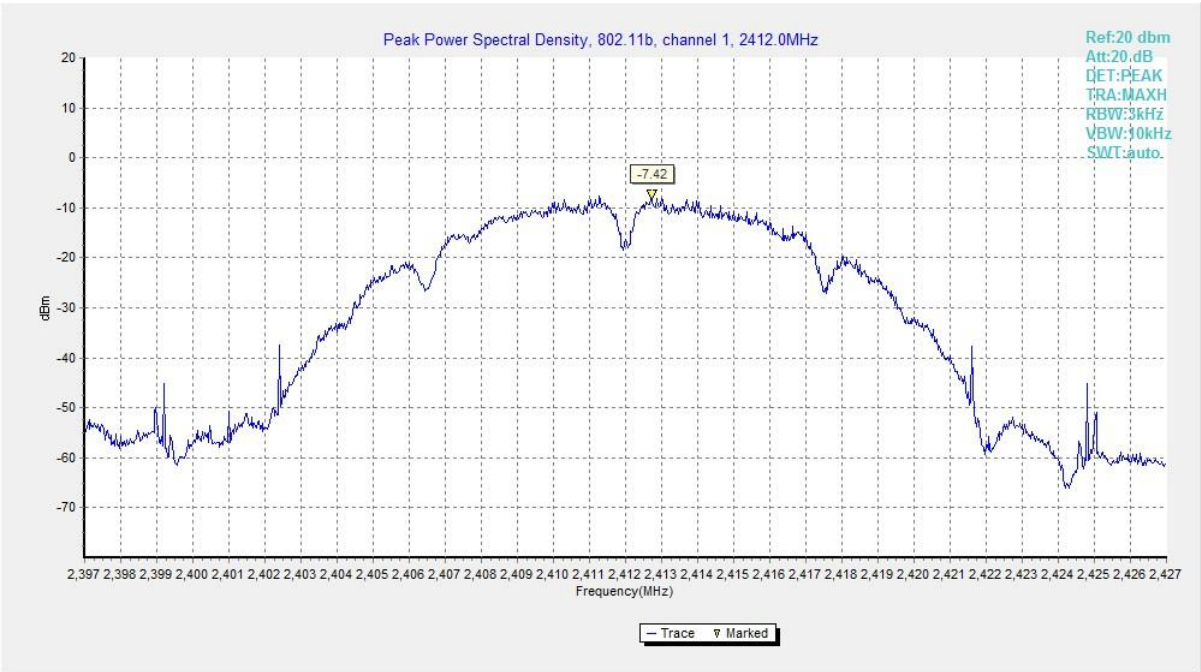

Fig.1 Power Spectral Density (802.11b, CH 1)

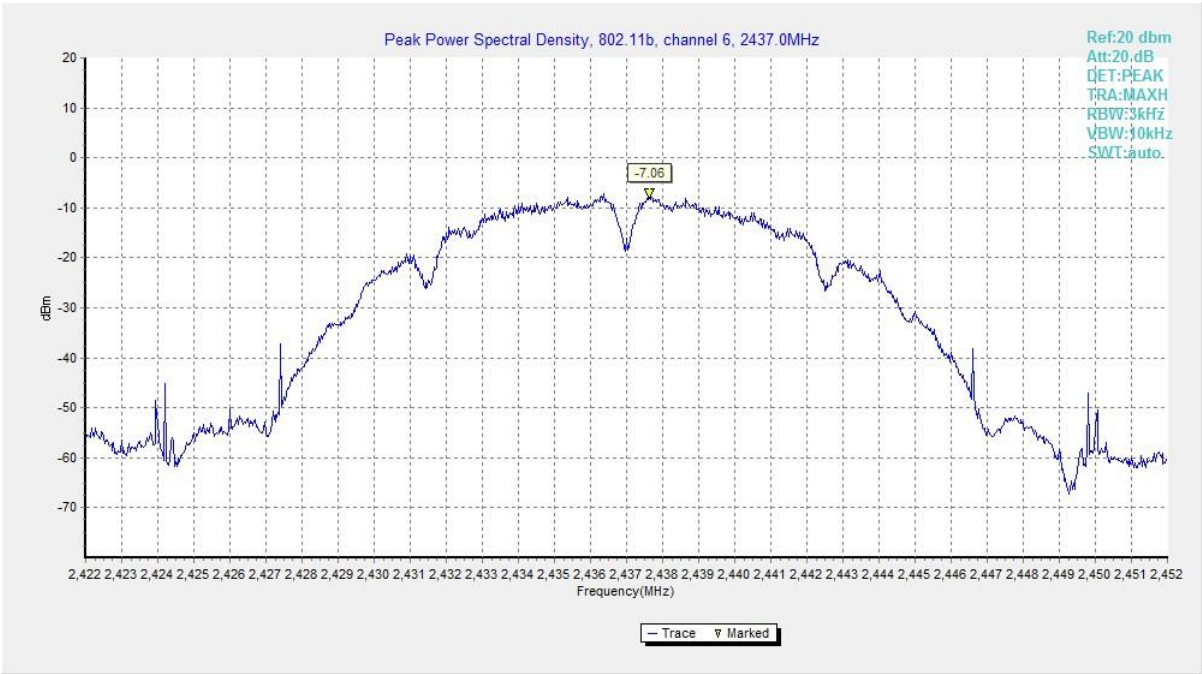

Fig.2 Power Spectral Density (802.11b, CH 6)

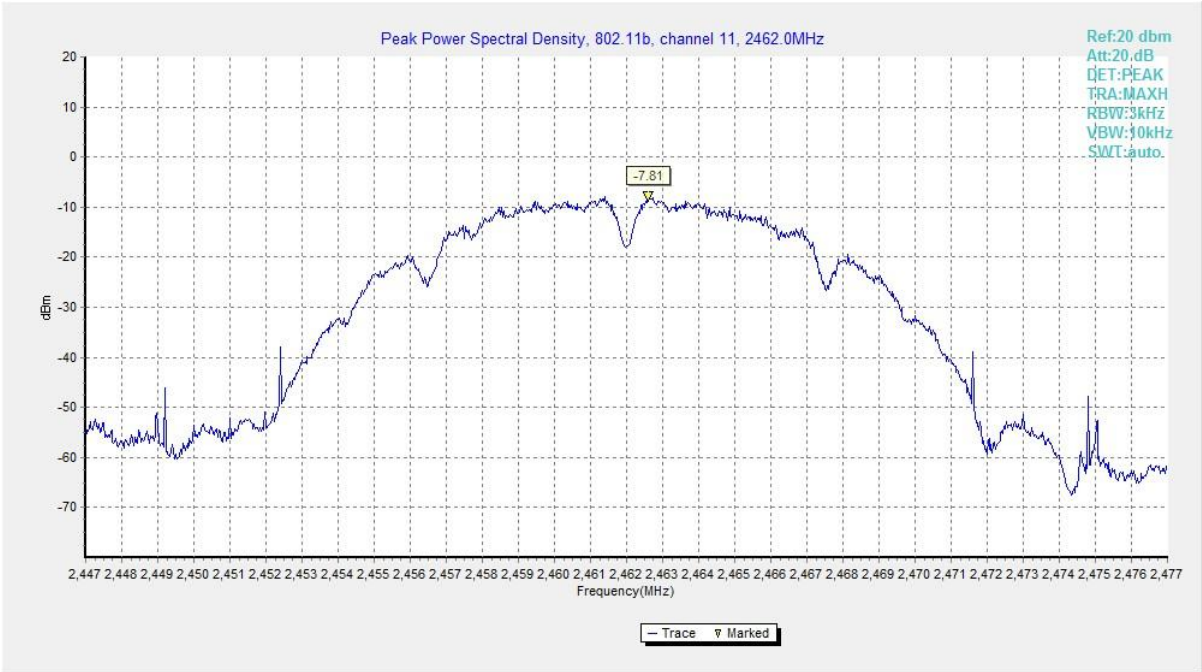

Fig.3 Power Spectral Density (802.11b, CH 11)

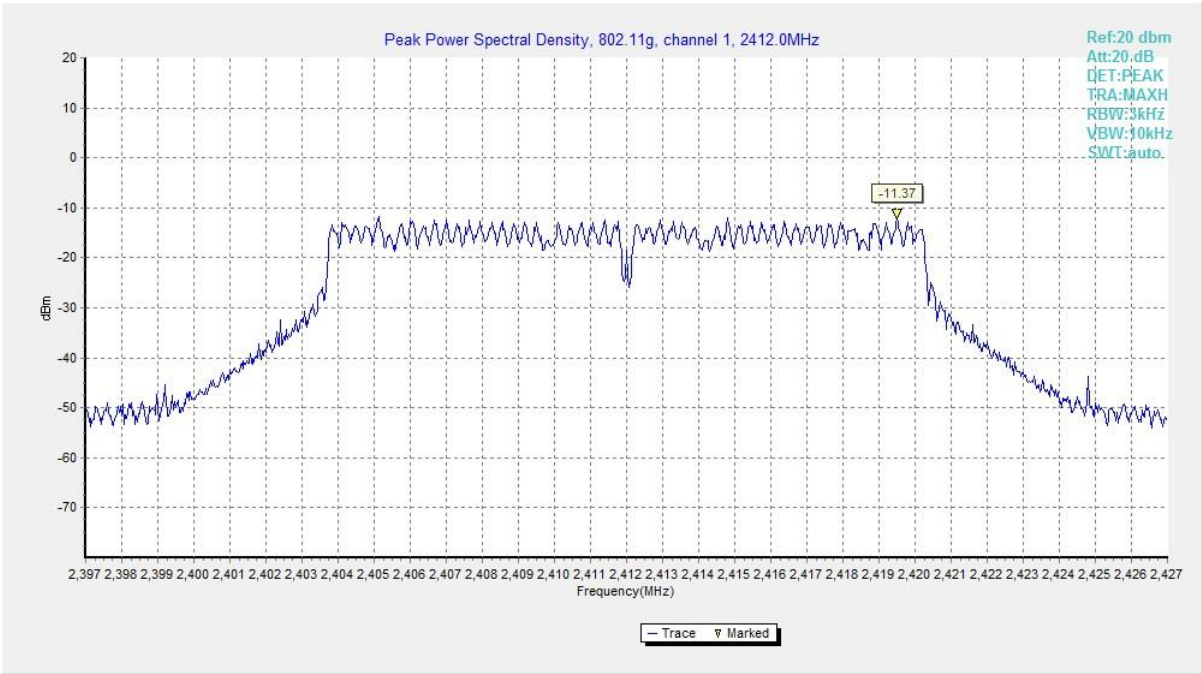

Fig.4 Power Spectral Density (802.11g, CH 1)

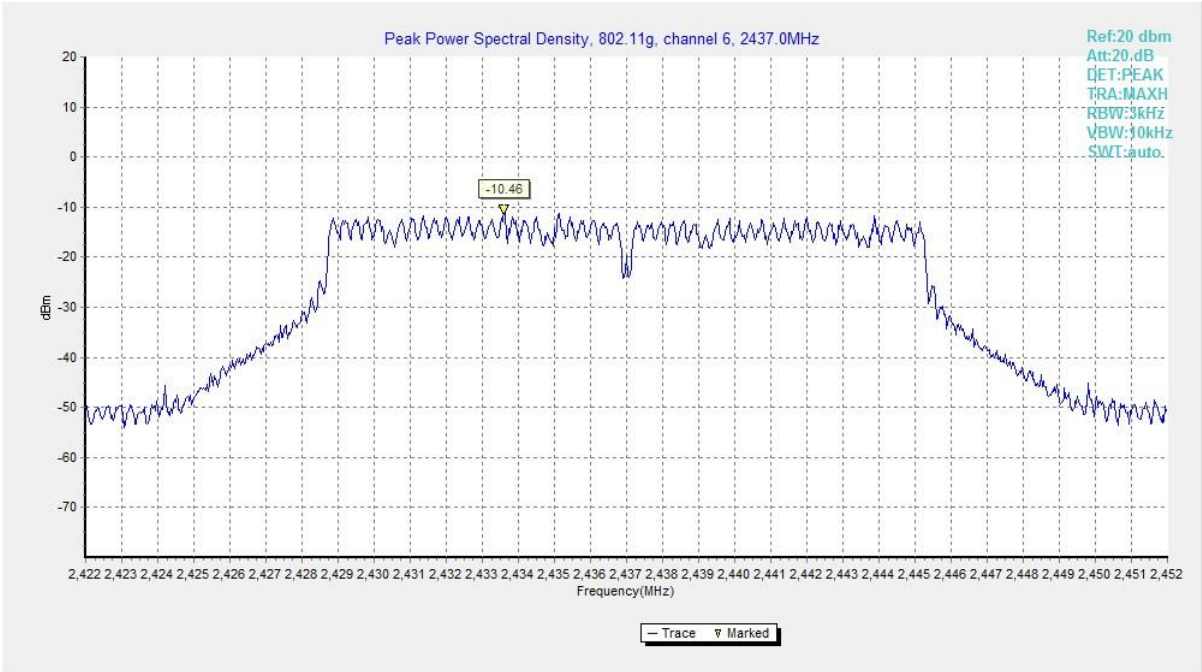

Fig.5 Power Spectral Density (802.11g, CH 6)

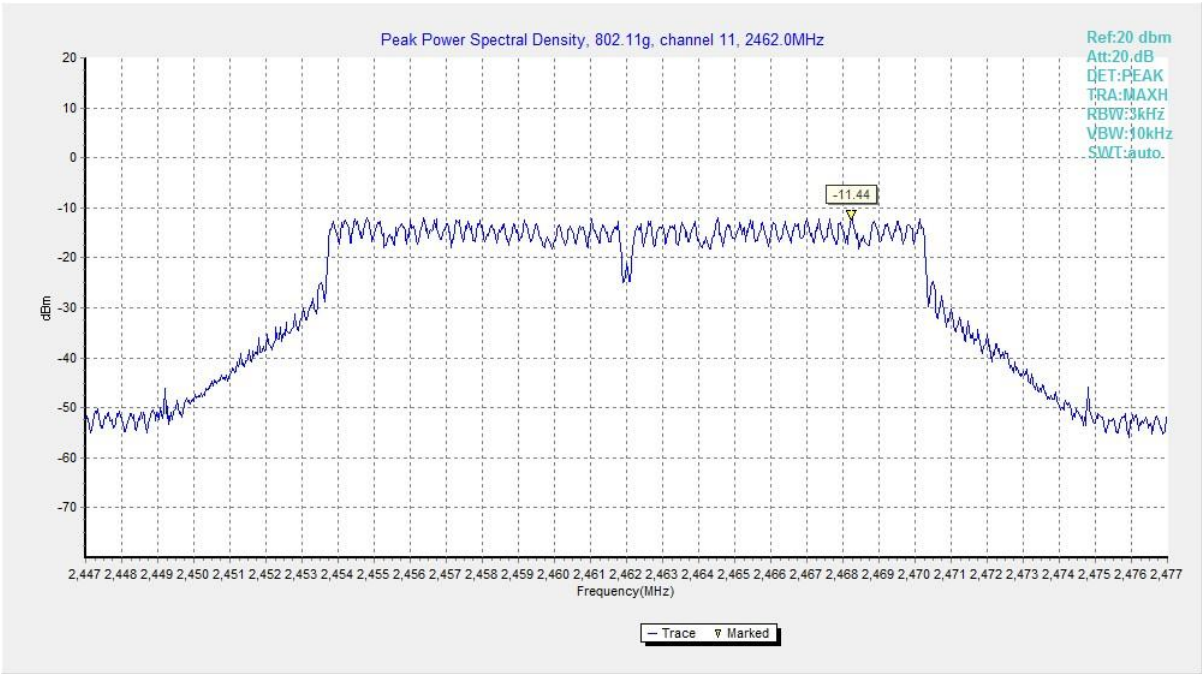

Fig.6 Power Spectral Density (802.11g, CH 11)

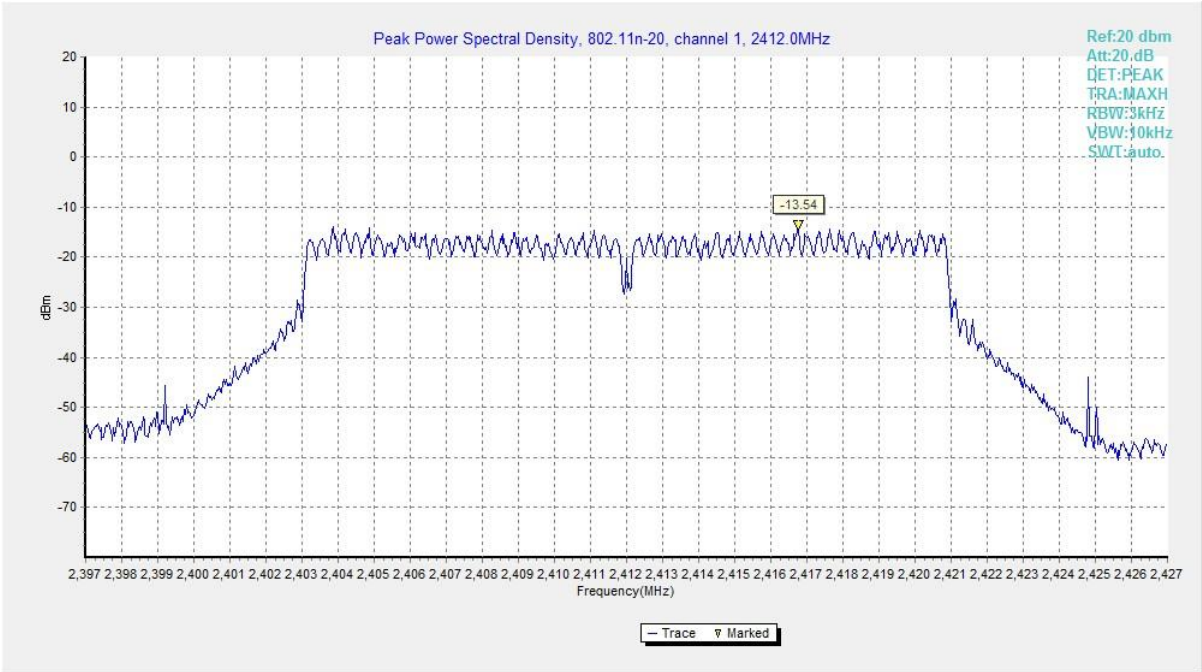

Fig.7 Power Spectral Density (802.11n HT20, CH 1)

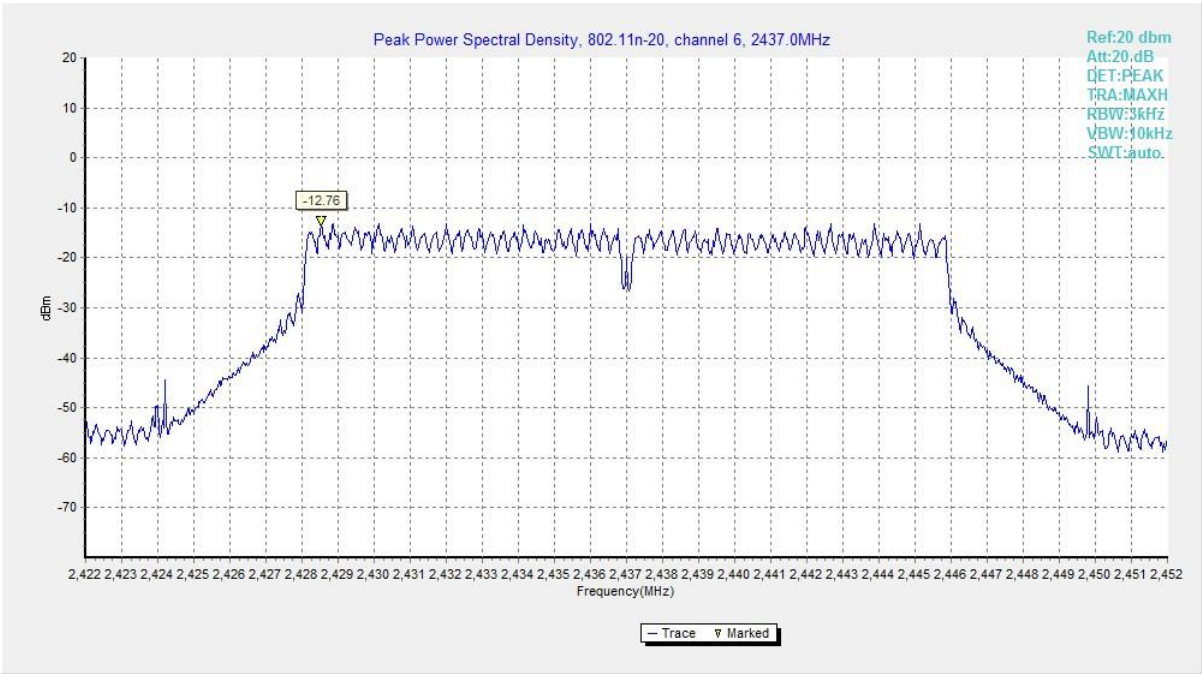

Fig.8 Power Spectral Density (802.11n HT20, CH 6)

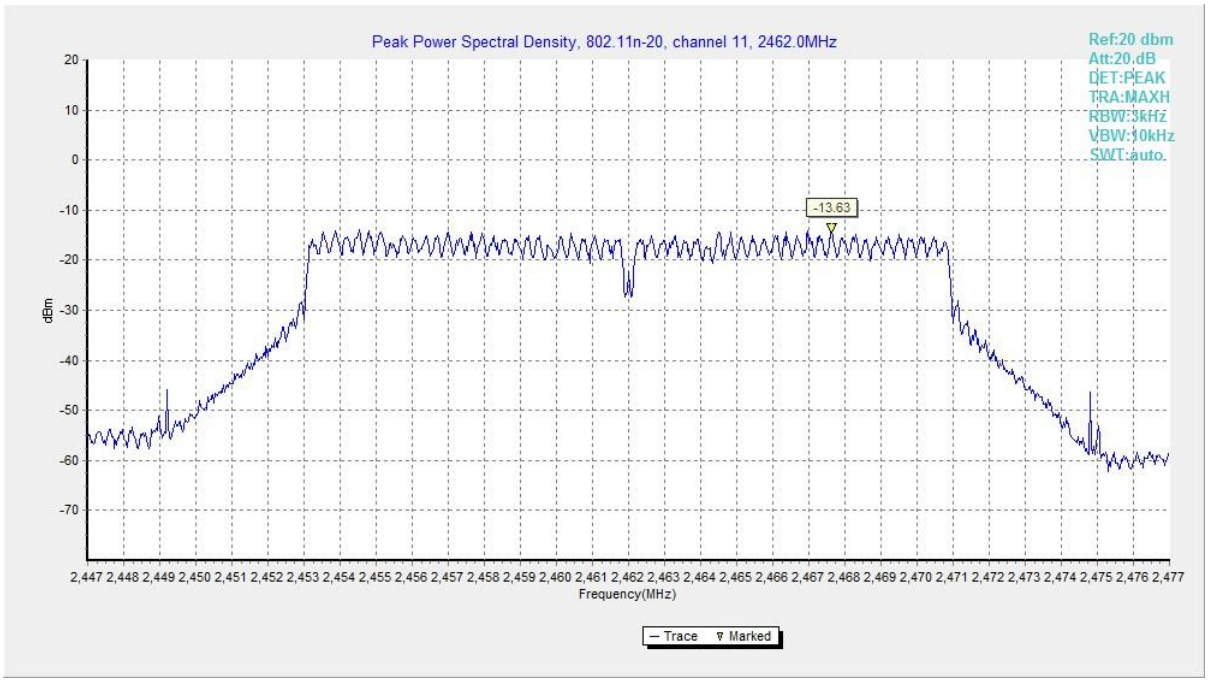

Fig.9 Power Spectral Density (802.11n HT20, CH 11)

A.3 6dB Bandwidth

Measurement Limit:

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

Measurement Result:

Mode	Channel	Frequency (MHz)	Test Results (kHz)		Conclusion
802.11b	CH 1	2412	Fig.10	8500	**P**
	CH 6	2437	Fig.11	8550	**P**
	CH 11	2462	Fig.12	8050	**P**
802.11g	CH 1	2412	Fig.13	16350	**P**
	CH 6	2437	Fig.14	16350	**P**
	CH 11	2462	Fig.15	16350	**P**
802.11n HT20	CH 1	2412	Fig.16	17550	**P**
	CH 6	2437	Fig.17	17600	**P**
	CH 11	2462	Fig.18	17600	**P**

See below for test graphs.

Conclusion: PASS

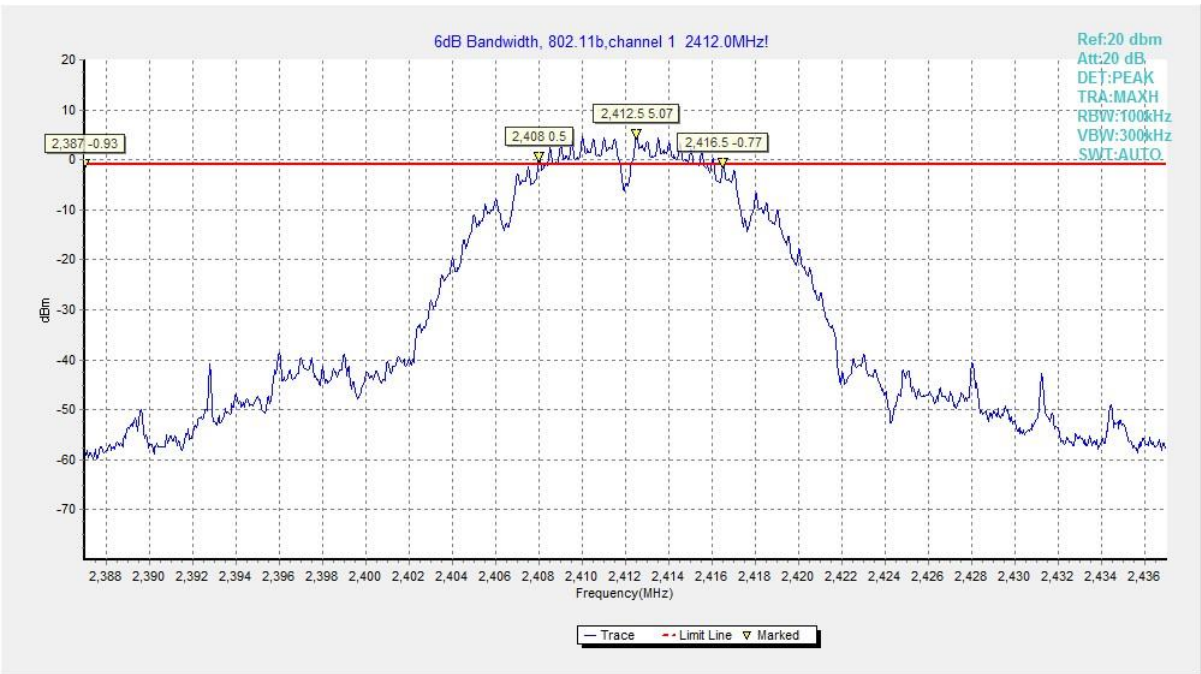

Fig.10 6dB Bandwidth (802.11b, CH 1)

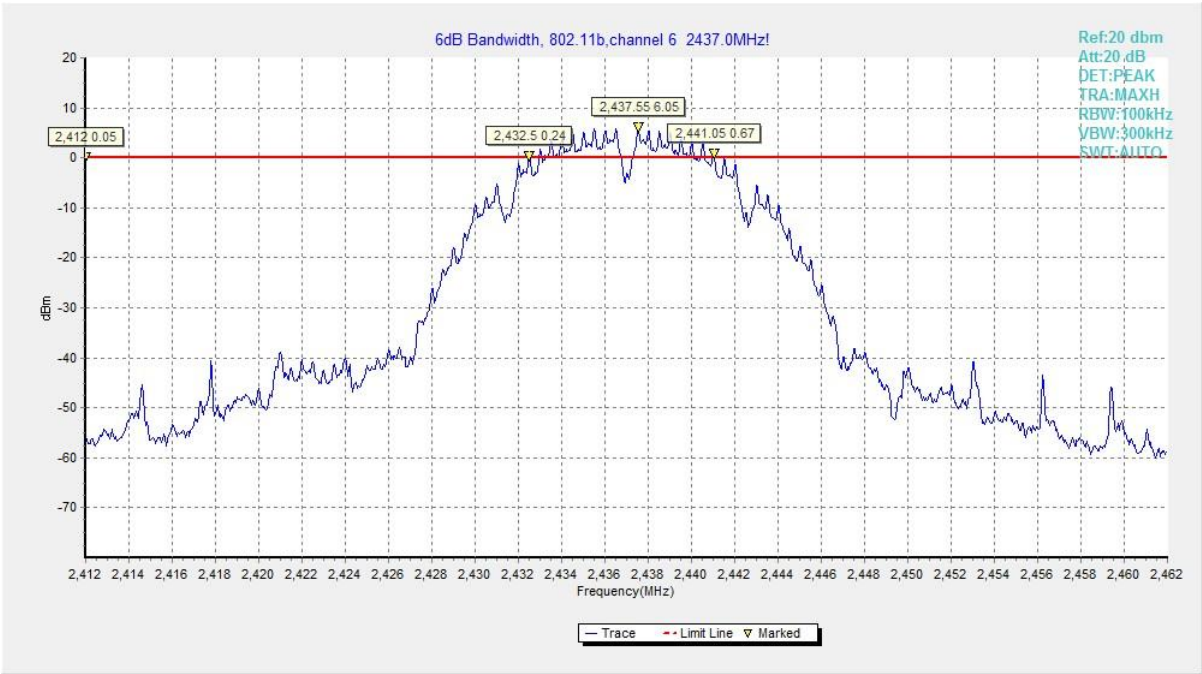

Fig.11 6dB Bandwidth (802.11b, CH 6)

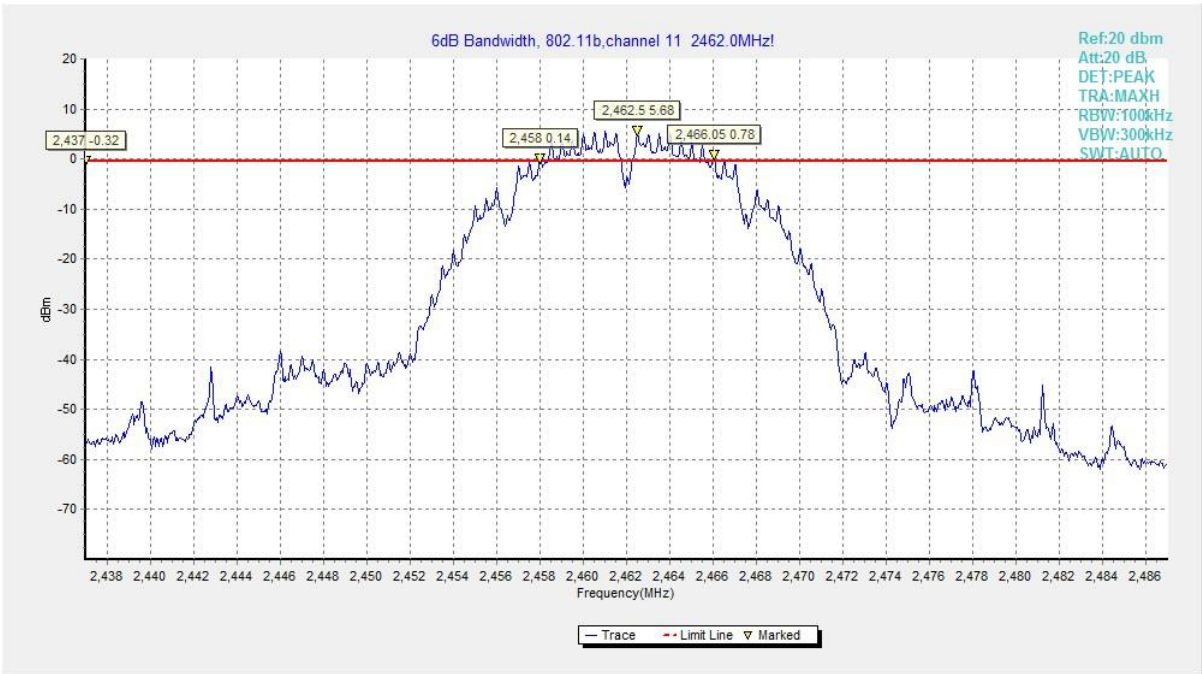

Fig.12 6dB Bandwidth (802.11b, CH 11)

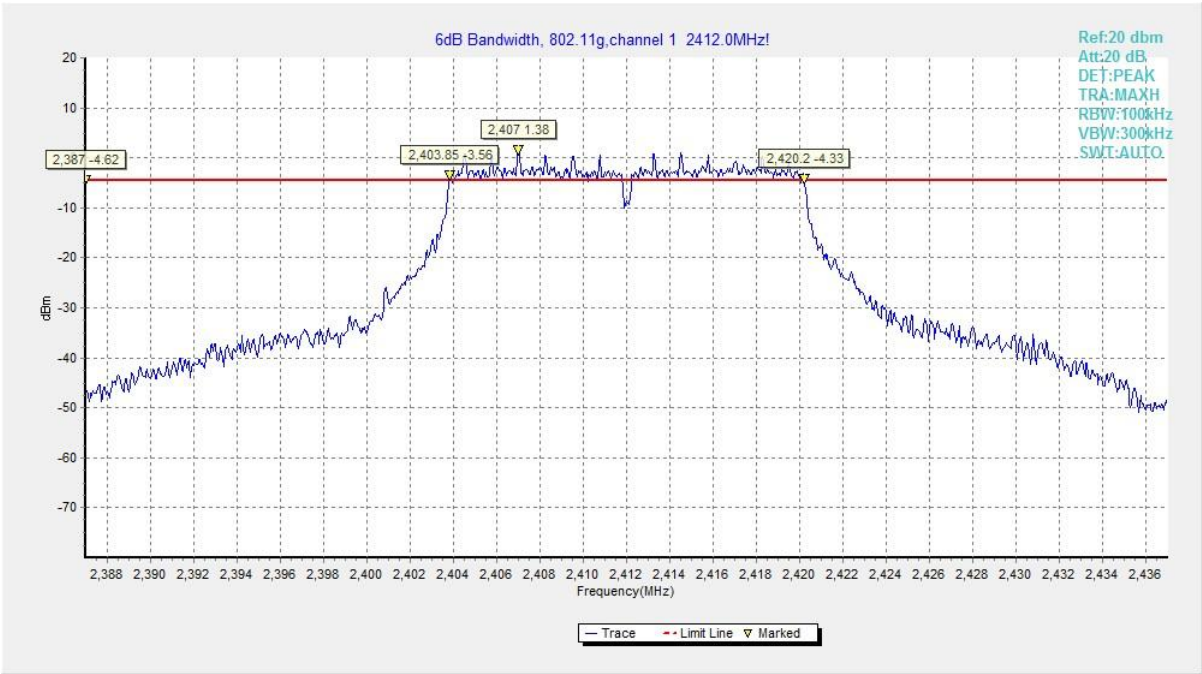

Fig.13 6dB Bandwidth (802.11g, CH 1)

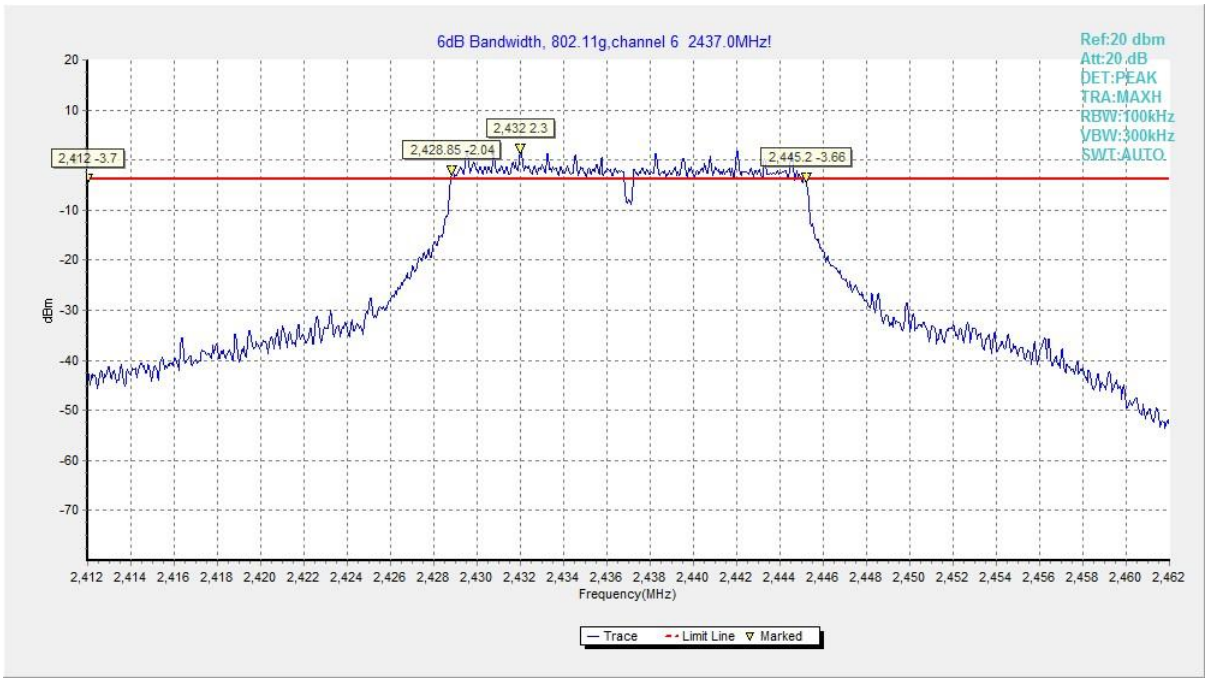

Fig.14 6dB Bandwidth (802.11g, CH 6)

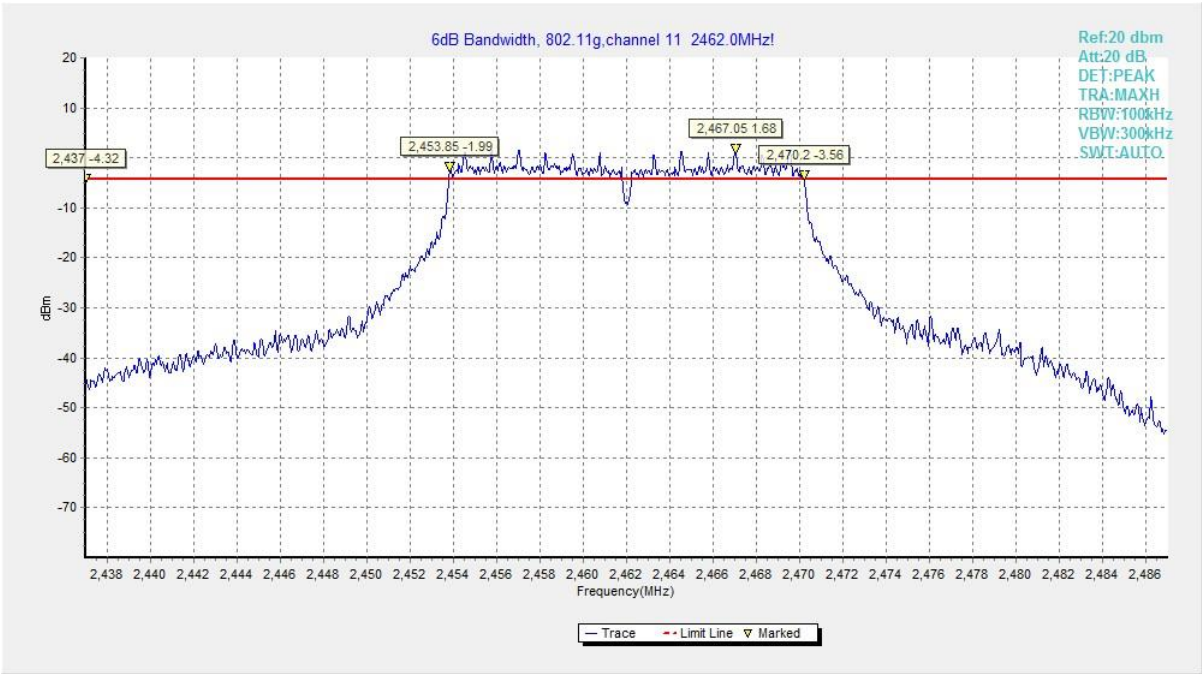

Fig.15 6dB Bandwidth (802.11g, CH 11)

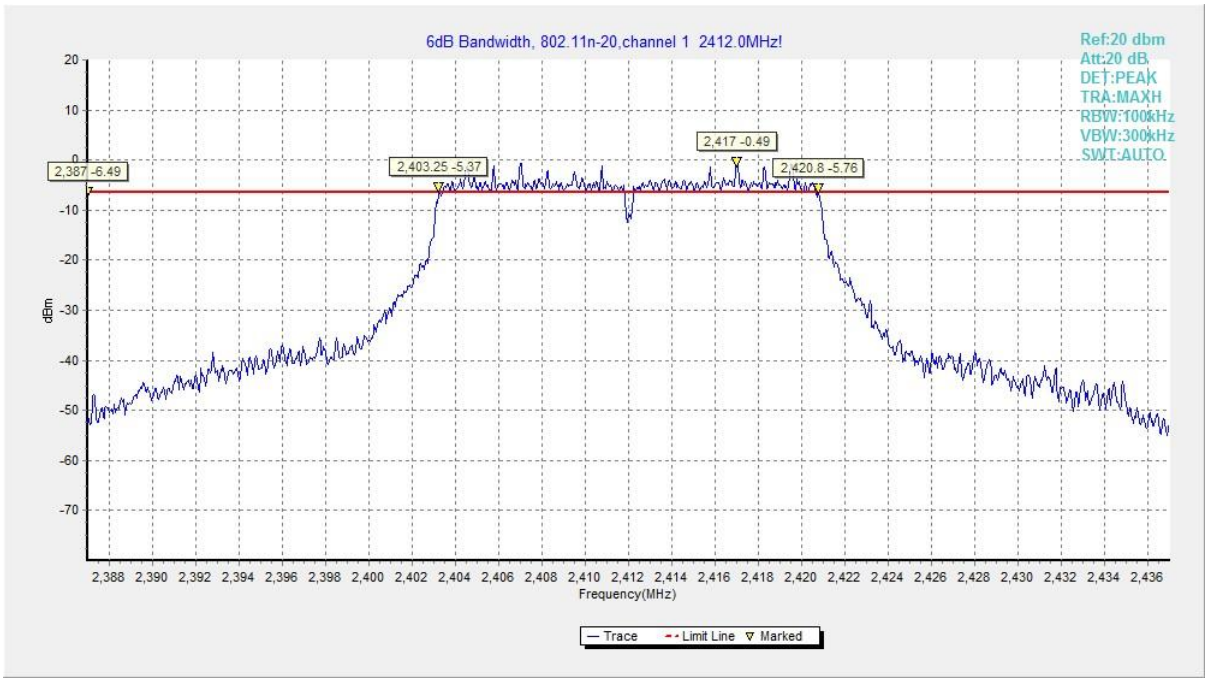

Fig.16 6dB Bandwidth (802.11n HT20, CH 1)

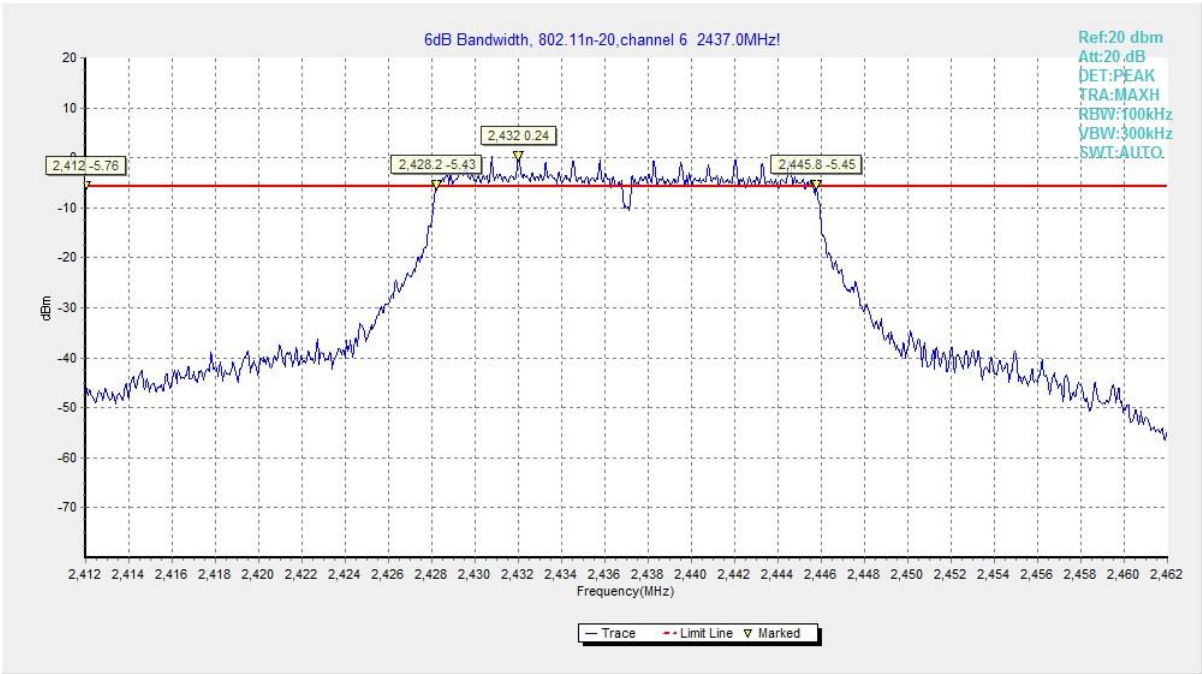

Fig.17 6dB Bandwidth (802.11n HT20, CH 6)

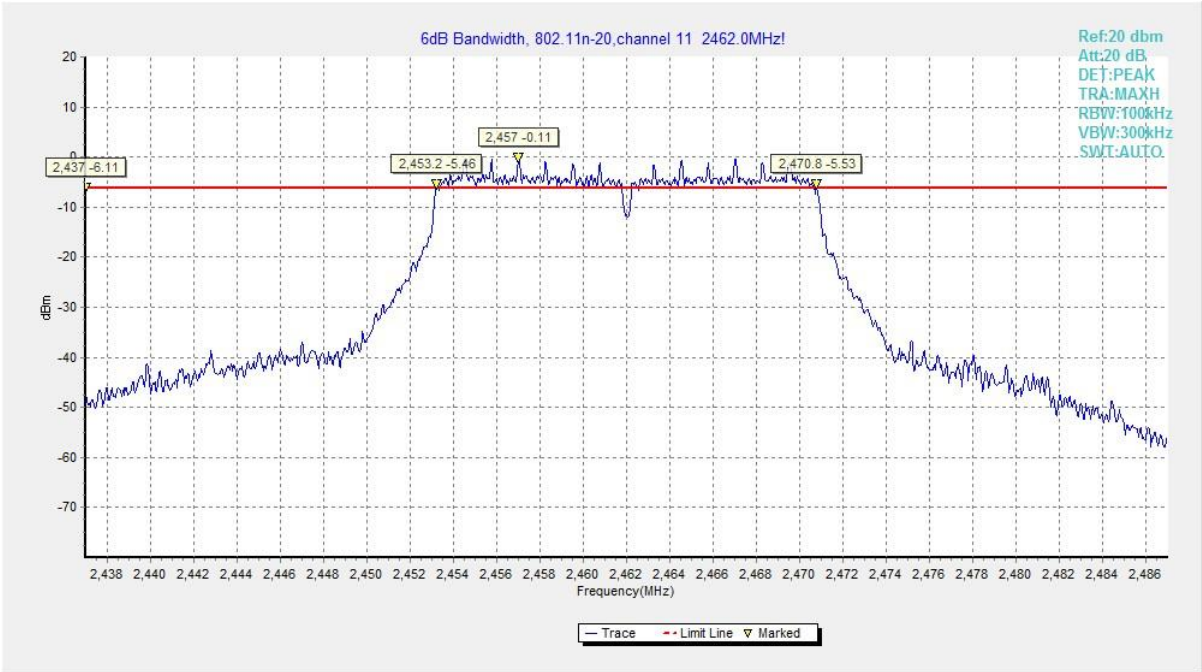

Fig.18 6dB Bandwidth (802.11n HT20, CH 11)

A.4 Band Edges Compliance

Measurement Limit:

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

Measurement Result:

Mode	Channel	Frequency (MHz)	Test Results (dB)		Conclusion
802.11b	CH1	2412	Fig.19	46.82	**P**
	CH11	2462	Fig.20	63.92	**P**
802.11g	CH1	2412	Fig.21	34.18	**P**
	CH11	2462	Fig.22	45.85	**P**
802.11n HT20	CH1	2412	Fig.23	35.35	**P**
	CH11	2462	Fig.24	49.03	**P**

See below for test graphs.
Conclusion: PASS

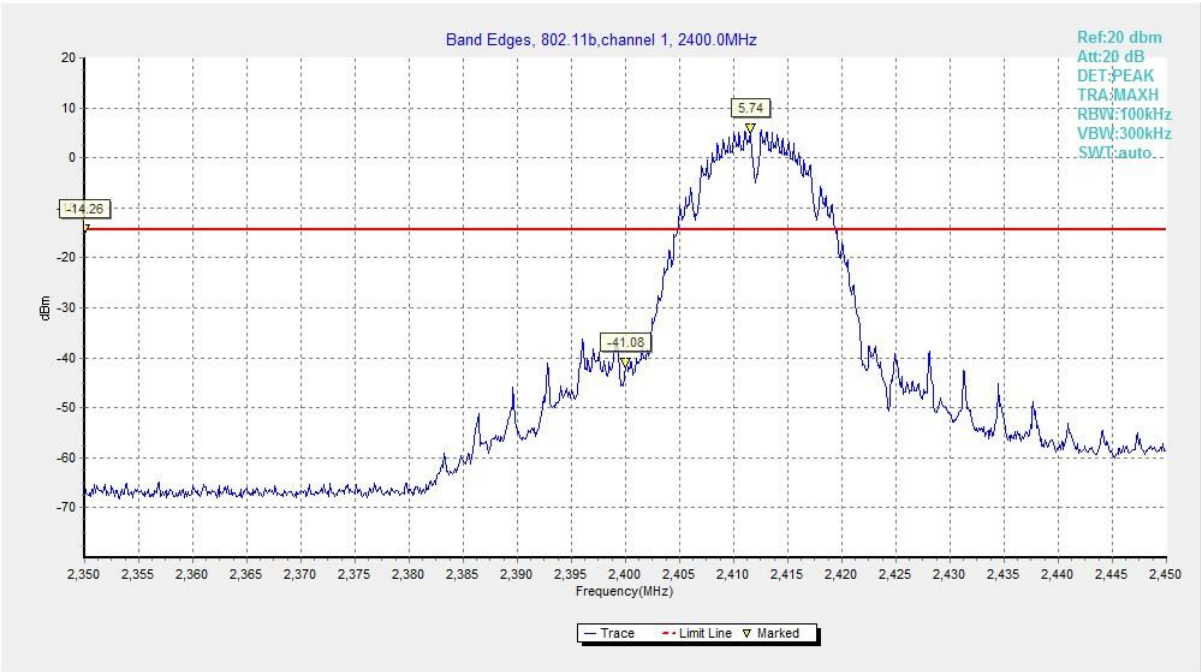

Fig.19 Band Edges (802.11b, CH 1)

Fig.20 Band Edges (802.11b, CH 11)

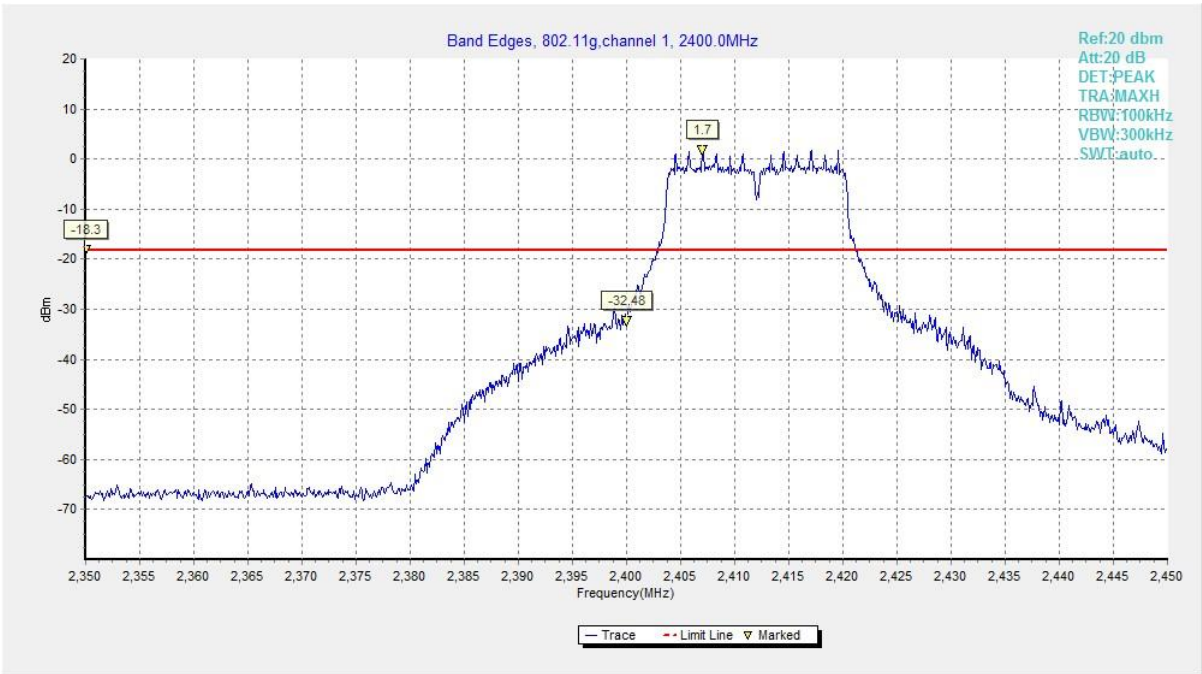

Fig.21 Band Edges (802.11g, CH 1)

Fig.22 Band Edges (802.11g, CH 11)

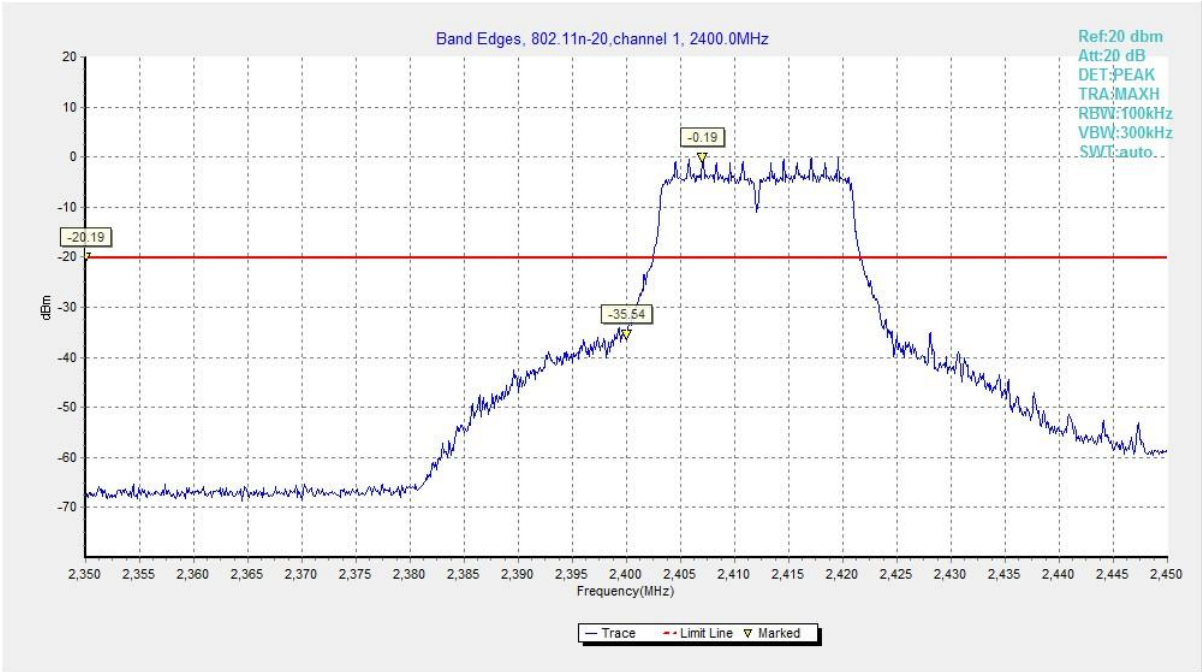

Fig.23 Band Edges (802.11n HT20, CH 1)

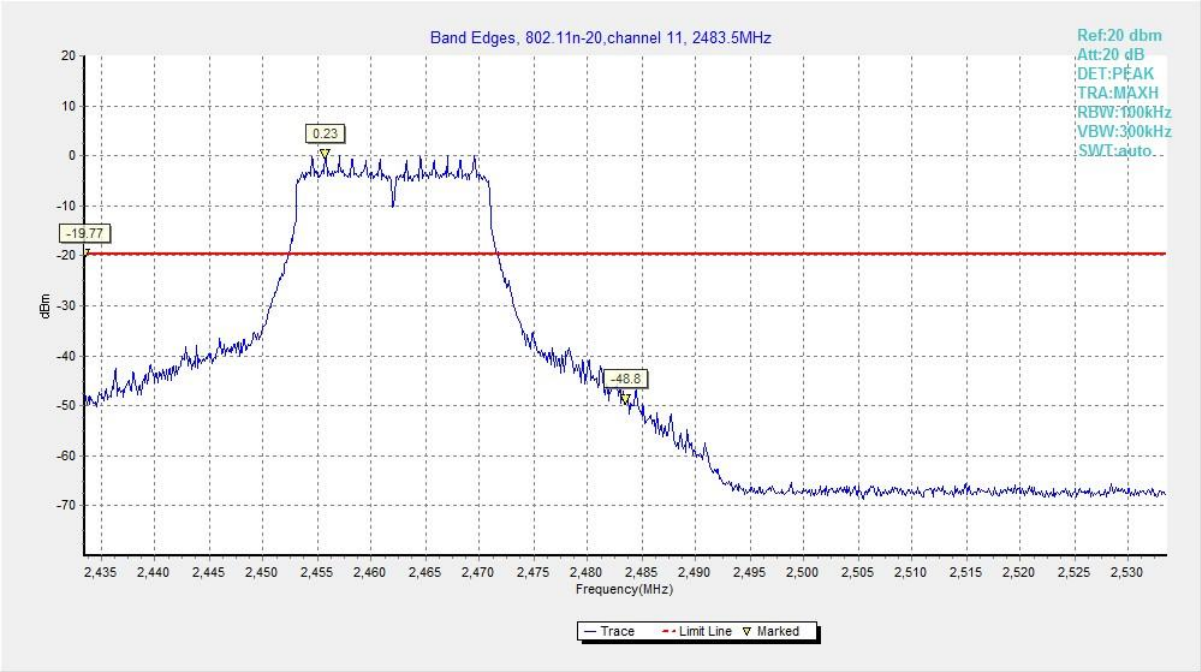

Fig.24 Band Edges (802.11n HT20, CH 11)

A.5 Conducted Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	30dB below peak output power in 100kHz bandwidth

Measurement Results:

Mode	Channel	Frequency (MHz)	Frequency Range	Test Results	Conclusion
802.11b	CH 1	2412	30MHz-26GHz	Fig.25	**P**
	CH 6	2437	30MHz-26GHz	Fig.26	**P**
	CH 11	2462	30MHz-26GHz	Fig.27	**P**
802.11g	CH 1	2412	30MHz-26GHz	Fig.28	**P**
	CH 6	2437	30MHz-26GHz	Fig.29	**P**
	CH 11	2462	30MHz-26GHz	Fig.30	**P**
802.11n HT20	CH 1	2412	30MHz-26GHz	Fig.31	**P**
	CH 6	2437	30MHz-26GHz	Fig.32	**P**
	CH 11	2462	30MHz-26GHz	Fig.33	**P**

See below for test graphs.

Conclusion: PASS

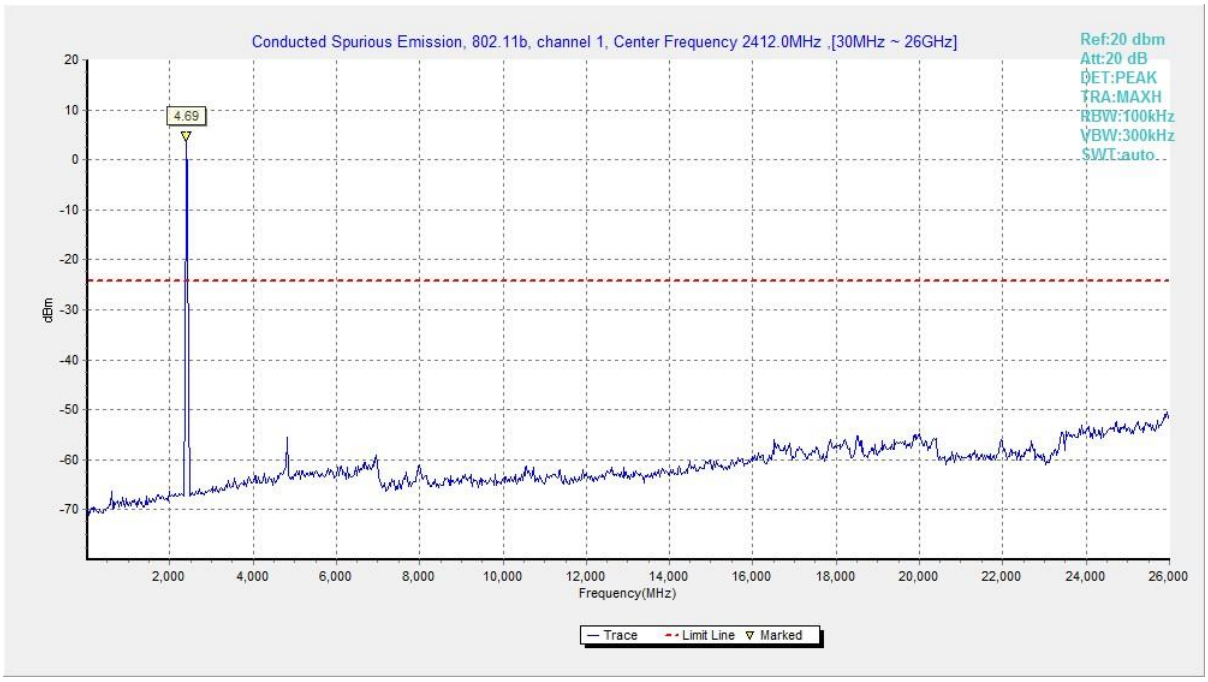

Fig.25 Conducted Spurious Emission (802.11b, CH1)

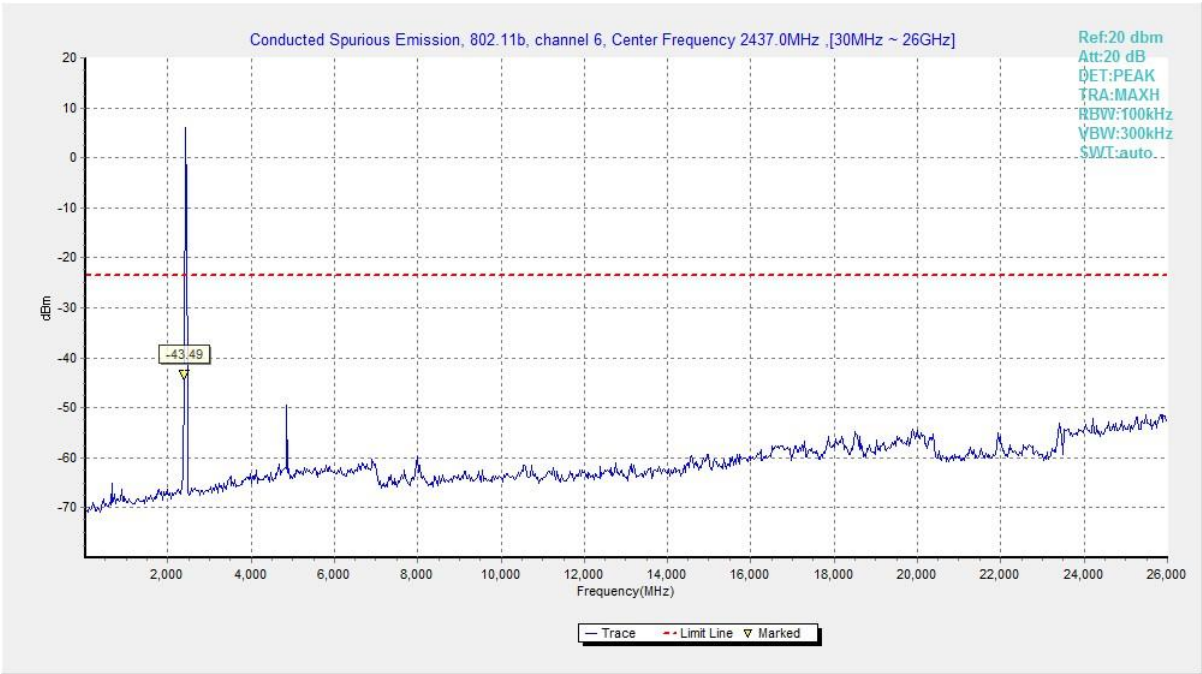

Fig.26 Conducted Spurious Emission (802.11b, CH6)

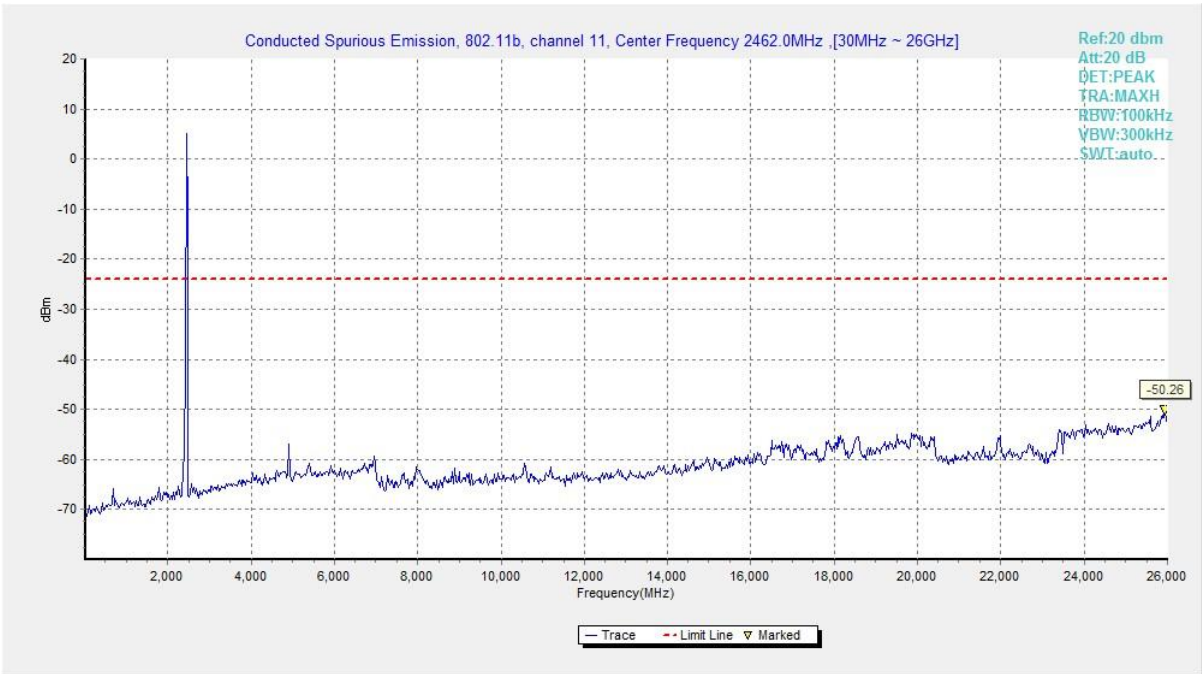

Fig.27 Conducted Spurious Emission (802.11b, CH11)

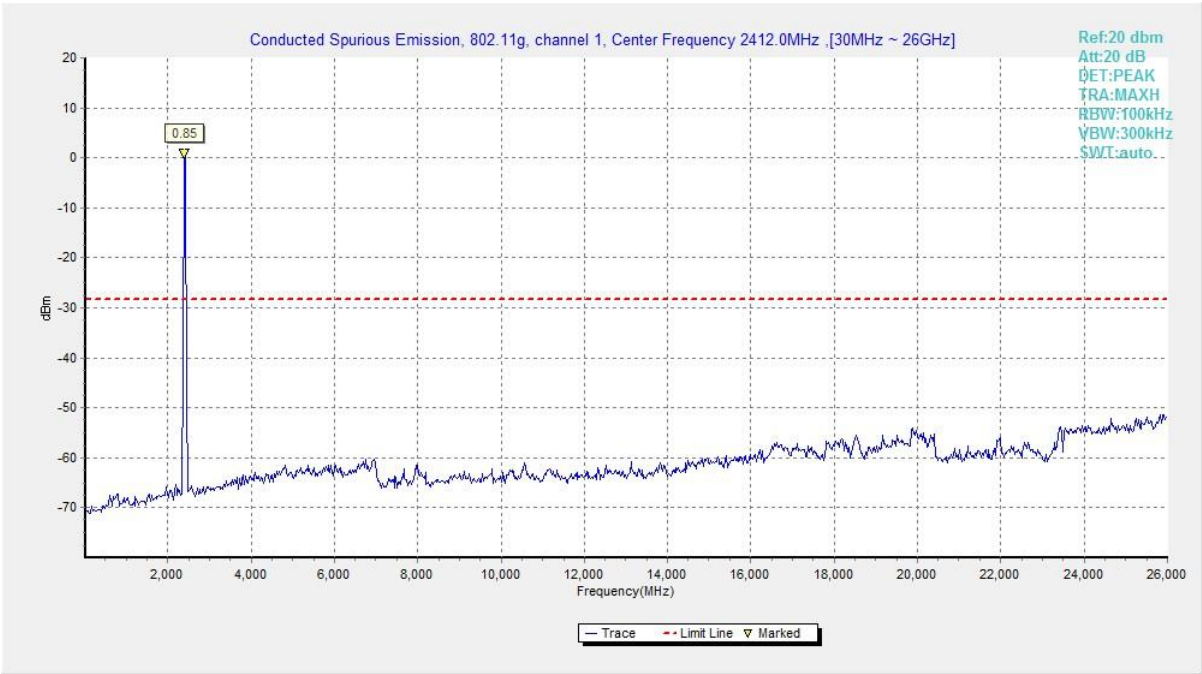

Fig.28 Conducted Spurious Emission (802.11g, CH1)

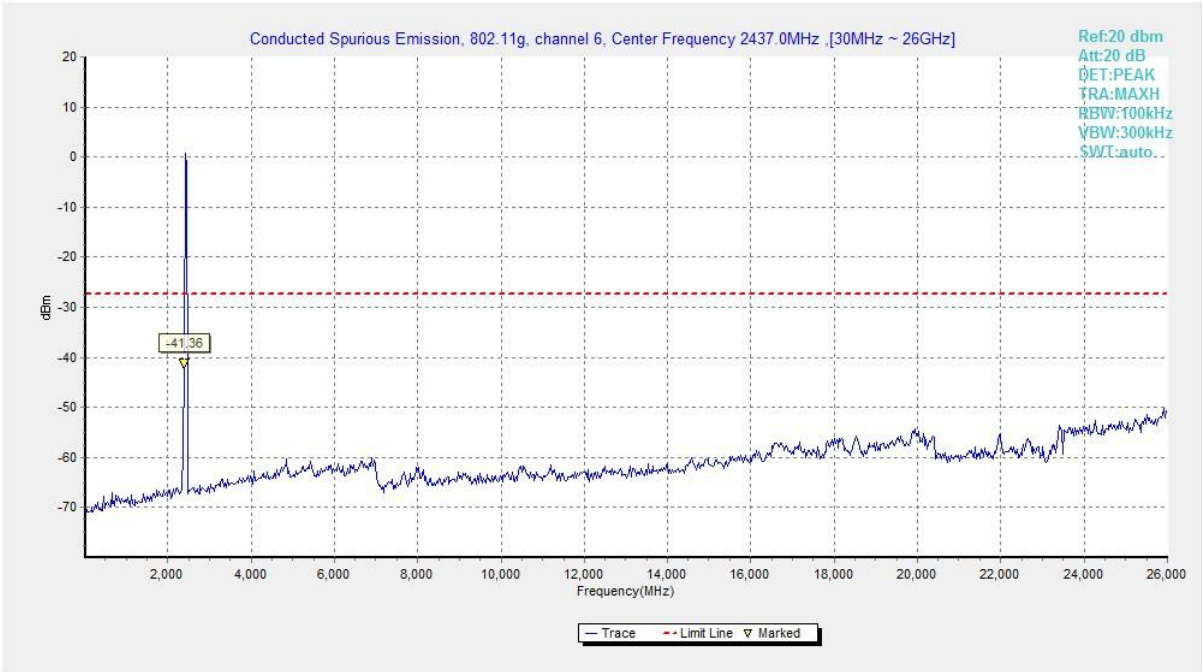

Fig.29 Conducted Spurious Emission (802.11g, CH6)

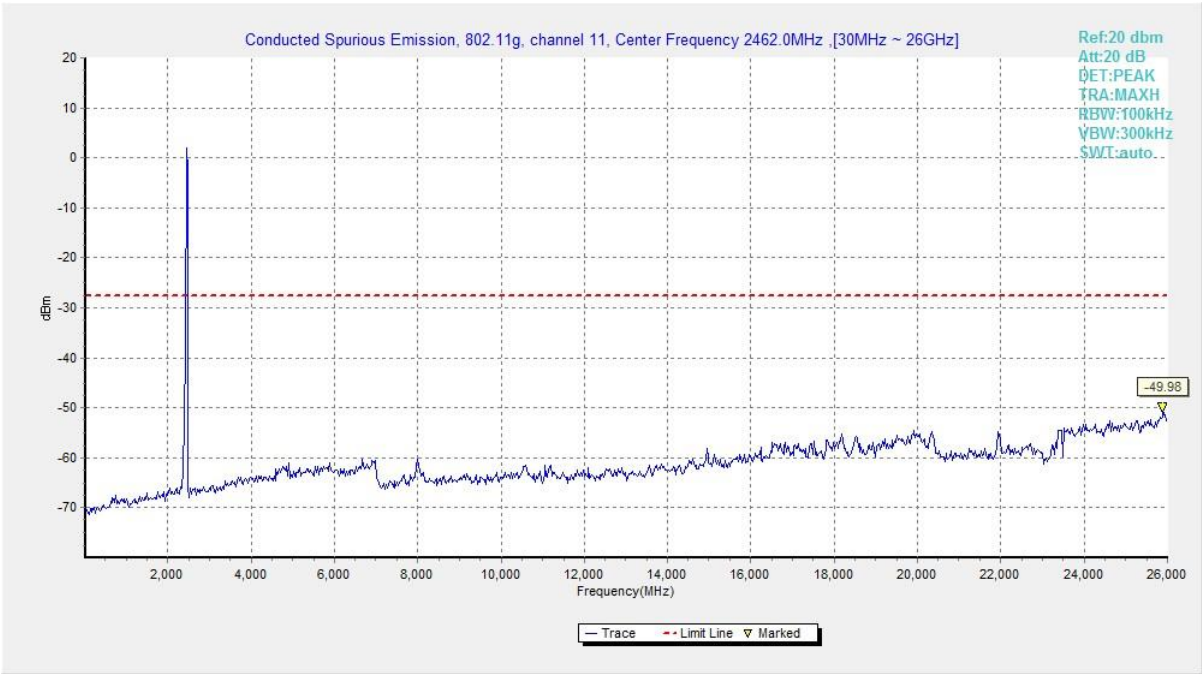

Fig.30 Conducted Spurious Emission (802.11g, CH11)

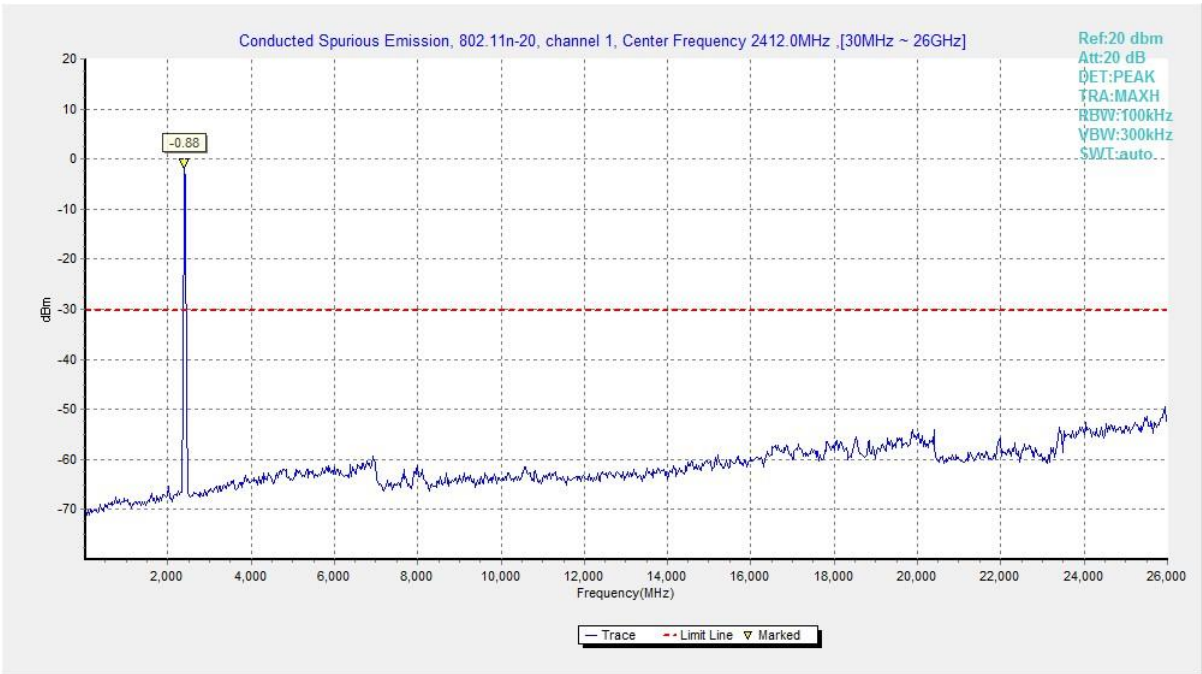

Fig.31 Conducted Spurious Emission (802.11n HT20, CH1)

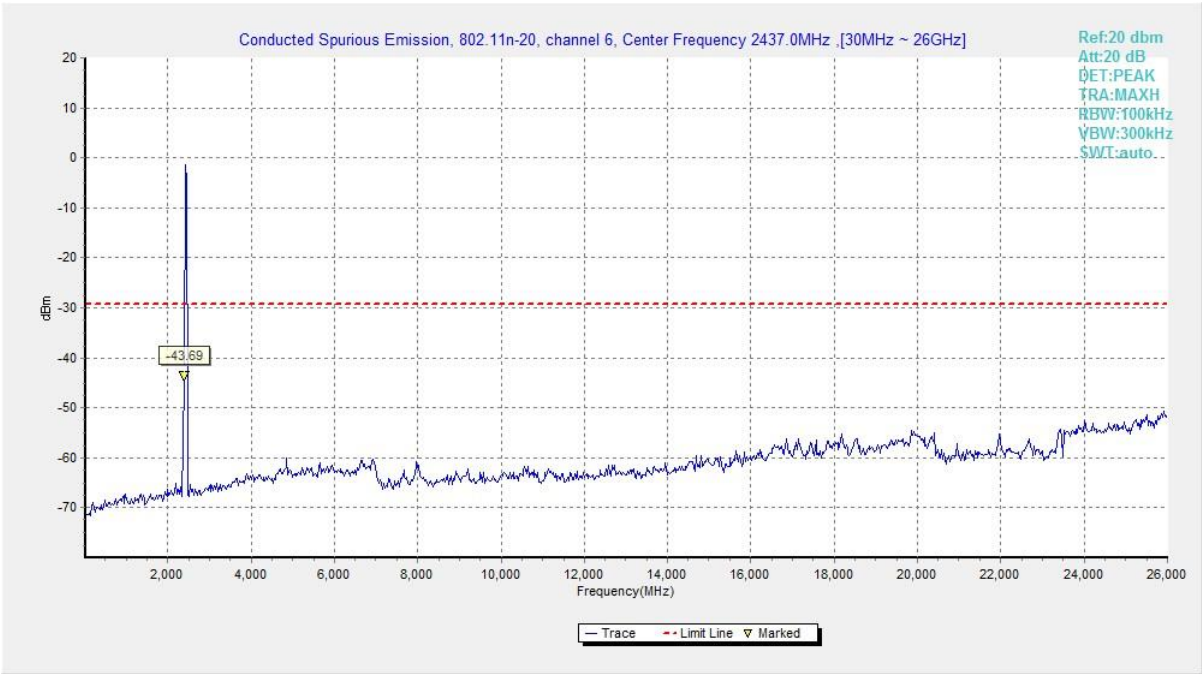

Fig.32 Conducted Spurious Emission (802.11n HT20, CH6)

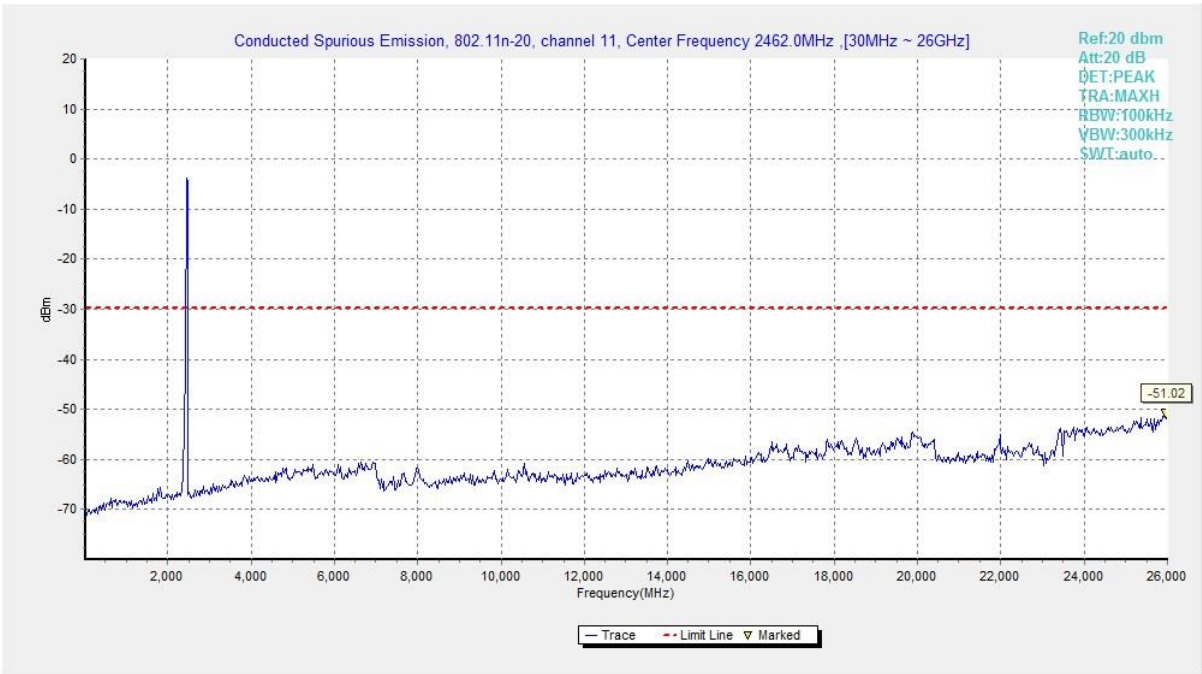

Fig.33 Conducted Spurious Emission (802.11n HT20, CH11)

A.6 Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (μV/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition:

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements.

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	CH 1	1 GHz ~ 3 GHz	Fig.34	**P**
		3 GHz ~ 18 GHz	Fig.35	**P**
	CH 6	1 GHz ~ 3 GHz	Fig.36	**P**
		3 GHz ~ 18 GHz	Fig.37	**P**
	CH 11	1 GHz ~ 3 GHz	Fig.38	**P**
		3 GHz ~ 18 GHz	Fig.39	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.40	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.41	**P**
802.11g	CH 1	1 GHz ~ 3 GHz	Fig.42	**P**
		3 GHz ~ 18 GHz	Fig.43	**P**
	CH 6	1 GHz ~ 3 GHz	Fig.44	**P**
		3 GHz ~ 18 GHz	Fig.45	**P**
	CH 11	1 GHz ~ 3 GHz	Fig.46	**P**
		3 GHz ~ 18 GHz	Fig.47	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.48	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.49	**P**
802.11n HT20	CH 1	1 GHz ~ 3 GHz	Fig.50	**P**
		3 GHz ~ 18 GHz	Fig.51	**P**
	CH 6	1 GHz ~ 3 GHz	Fig.52	**P**
		3 GHz ~ 18 GHz	Fig.53	**P**
	CH 11	1 GHz ~ 3 GHz	Fig.54	**P**
		3 GHz ~ 18 GHz	Fig.55	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.56	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.57	**P**
/	All Channels	9 kHz ~ 30 MHz	Fig.58	**P**
		30 MHz ~ 1 GHz	Fig.59	**P**
		18 GHz ~ 26.5 GHz	Fig.60	**P**

Worst-Case Result:

802.11b CH6 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13395.500000	53.52	74.00	20.48	V	17.0
13896.500000	53.60	74.00	20.40	V	17.4
14683.500000	54.29	74.00	19.71	V	17.8
15662.000000	56.78	74.00	17.22	H	20.1
16596.000000	59.13	74.00	14.87	V	22.3
17707.000000	57.39	74.00	16.61	V	23.1

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
4874.00	46.31	54.00	7.69	V	-0.9
9748.00	36.76	54.00	17.24	H	4.0
12086.00	35.60	54.00	18.40	H	7.4
14499.00	37.81	54.00	16.19	H	11.4
16731.50	38.98	54.00	15.03	H	14.9
17907.00	39.95	54.00	14.05	H	16.3

802.11g CH6 (3GHz-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
4875.50	46.24	74.00	27.76	V	-0.9
13268.50	47.34	74.00	26.66	H	8.7
12119.50	47.61	74.00	26.39	V	7.3
14478.00	49.06	74.00	24.94	V	11.3
17965.00	51.22	74.00	22.78	V	16.1
16741.00	51.39	74.00	22.61	V	14.9

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
4876.00	34.80	54.00	19.20	V	-0.9
9748.00	36.90	54.00	17.10	H	4.0
12540.50	35.38	54.00	18.62	H	8.0
14492.50	37.33	54.00	16.67	H	11.4
17117.00	39.41	54.00	14.59	V	15.0
17918.50	39.74	54.00	14.26	V	16.2

802.11n HT20 CH6 (3GHz-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
4876.00	44.20	74.00	29.80	V	-0.9
10602.00	46.00	74.00	28.00	V	4.9
12505.00	47.40	74.00	26.60	H	8.0
14452.00	48.81	74.00	25.19	H	11.1
17845.00	50.92	74.00	23.08	H	16.2
16725.00	51.37	74.00	22.63	H	14.9

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
9748.00	37.36	54.00	16.64	V	4.0
12078.50	34.73	54.00	19.27	V	7.4
12967.50	35.15	54.00	18.85	H	8.5
14543.00	37.07	54.00	16.93	V	11.4
16735.50	39.03	54.00	14.97	V	14.9
17913.00	39.70	54.00	14.30	V	16.3

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

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

See below for test graphs.

Conclusion: PASS

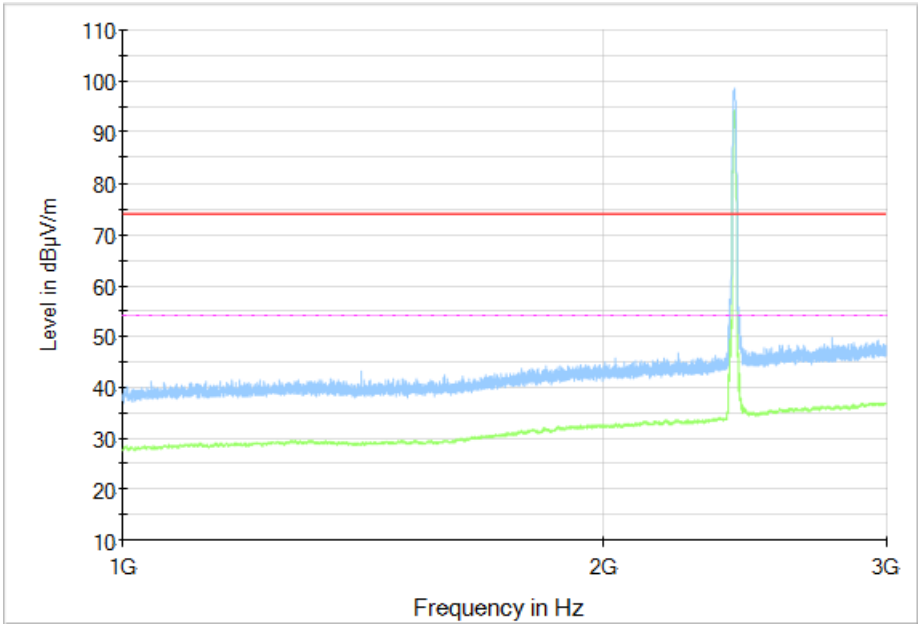

Fig.34 Radiated Spurious Emission (802.11b, CH1, 1GHz-3GHz)

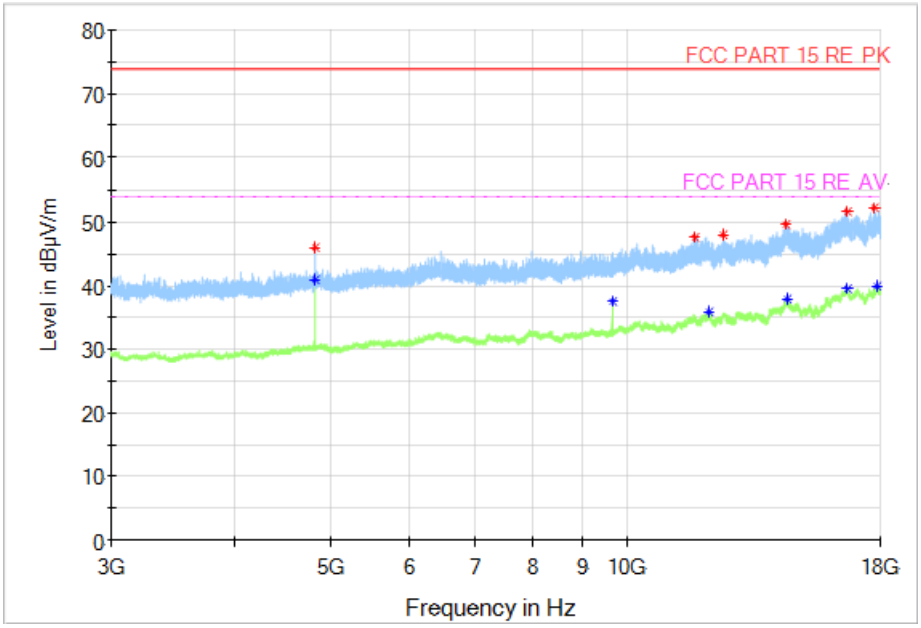

Fig.35 Radiated Spurious Emission (802.11b, CH1, 3GHz-18GHz)

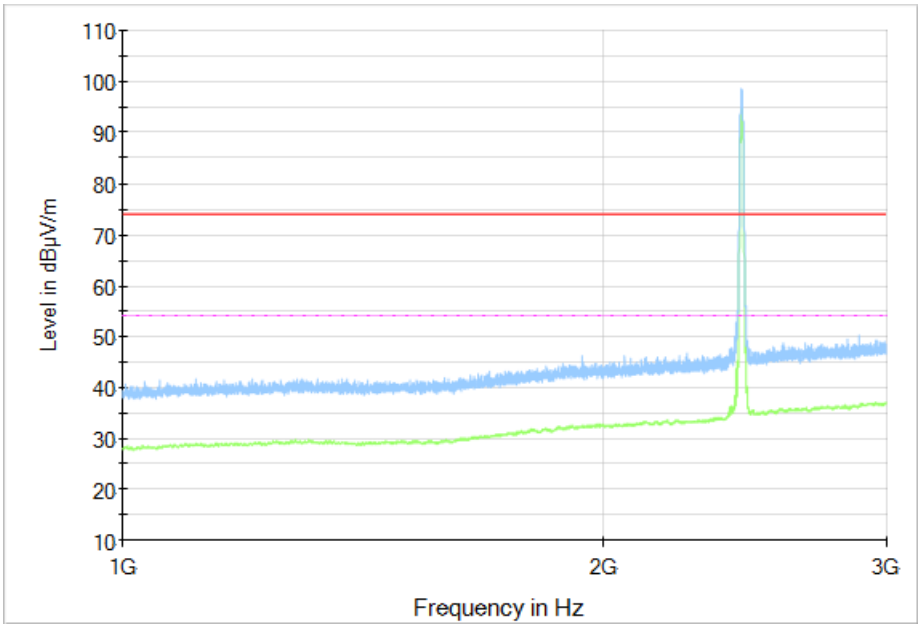

Fig.36 Radiated Spurious Emission (802.11b, CH6, 1GHz-3GHz)

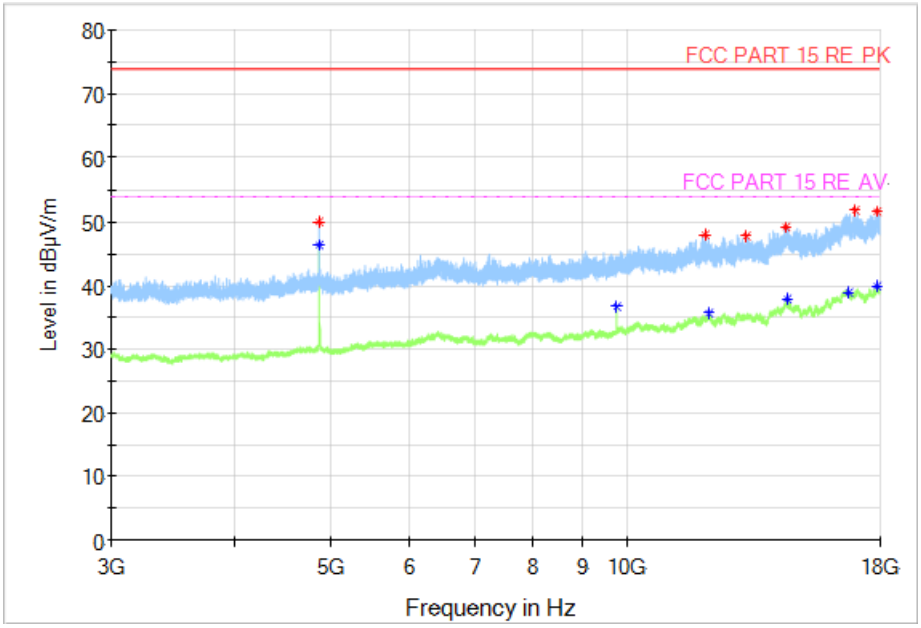

Fig.37 Radiated Spurious Emission (802.11b, CH6, 3GHz-18GHz)

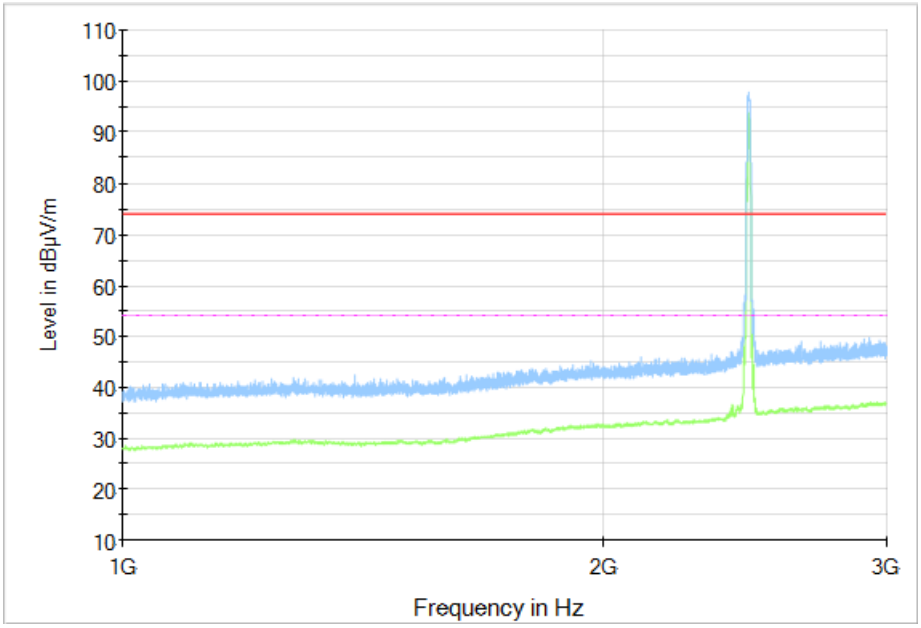

Fig.38 Radiated Spurious Emission (802.11b, CH11, 1GHz-3GHz)

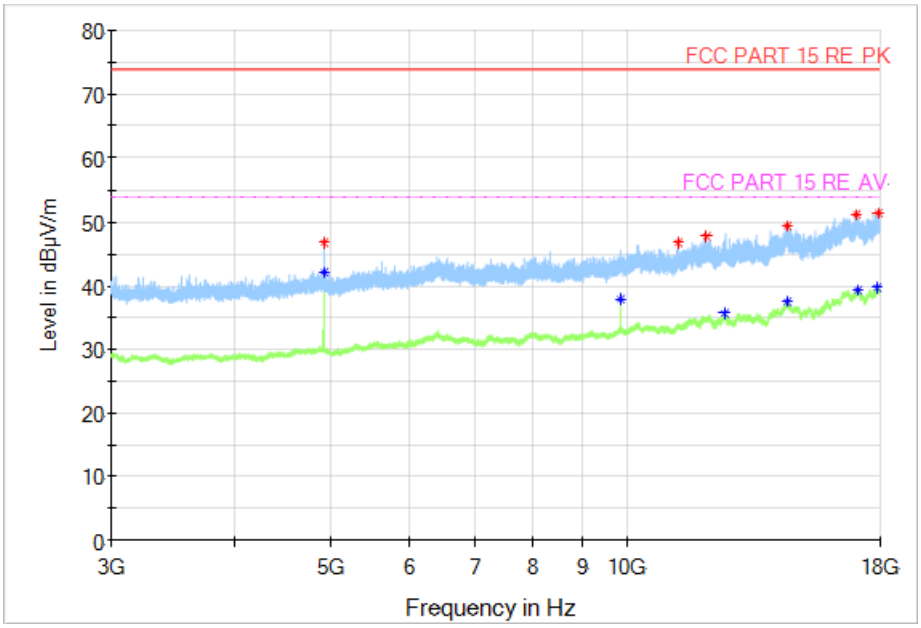

Fig.39 Radiated Spurious Emission (802.11b, CH11, 3GHz-18GHz)

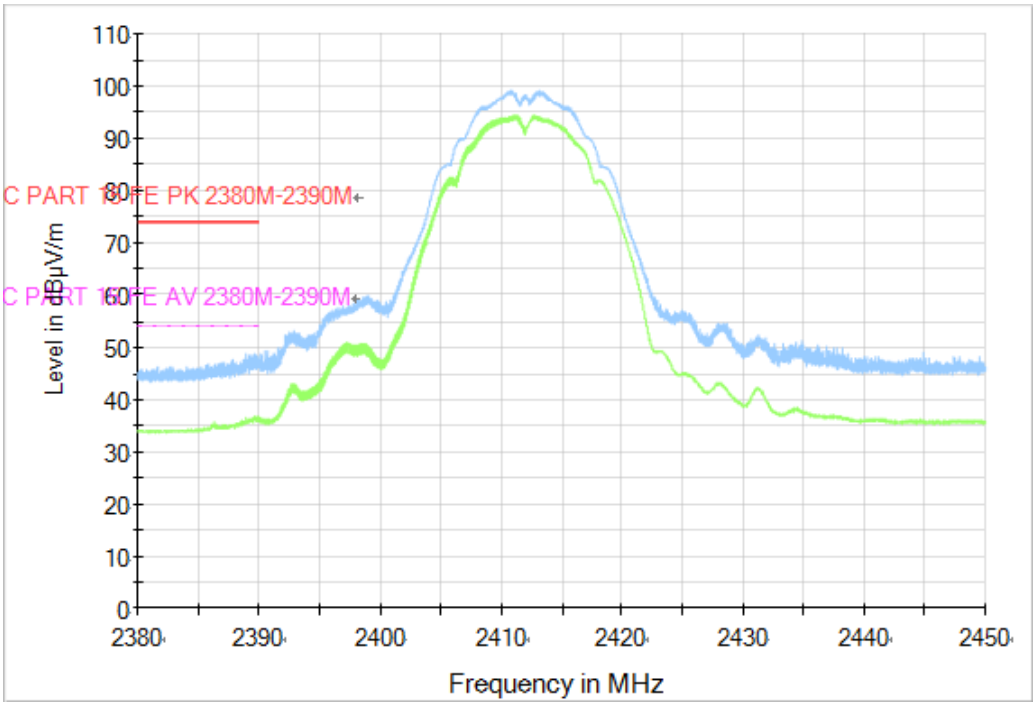

Fig.40 Radiated Restricted Band (802.11b, CH1, 2.38GHz~2.45GHz)

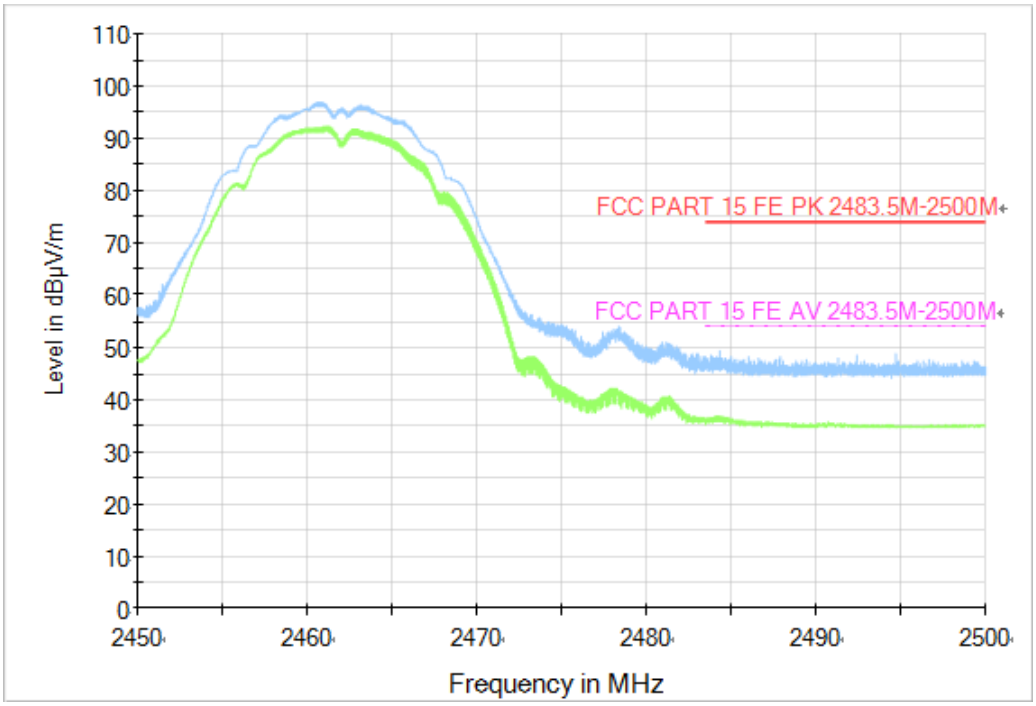

Fig.41 Radiated Restricted Band (802.11b, CH11, 2.45GHz~2.5GHz)

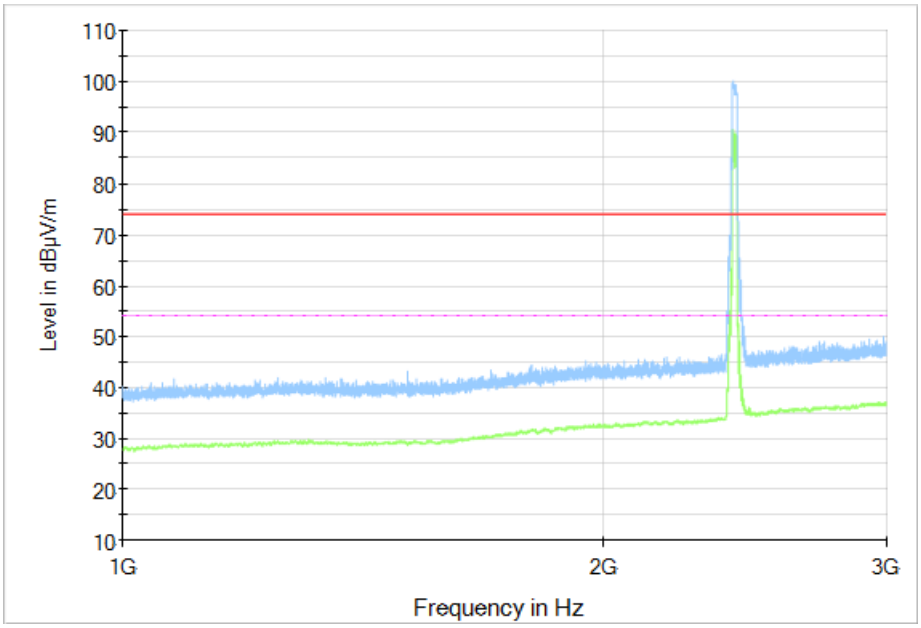

Fig.42 Radiated Spurious Emission (802.11g, CH1, 1GHz-3GHz)

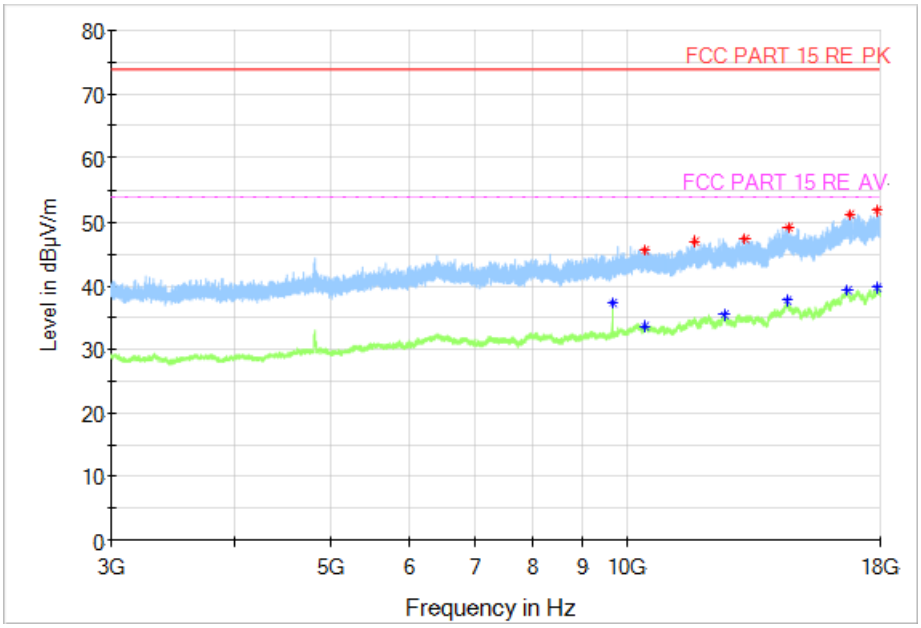

Fig.43 Radiated Spurious Emission (802.11g, CH1, 3GHz-18GHz)

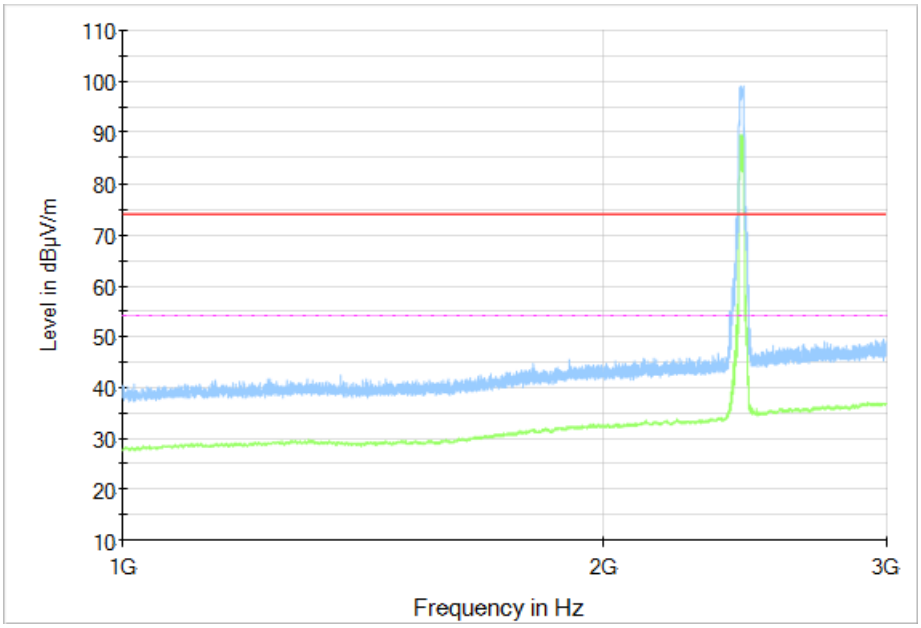

Fig.44 Radiated Spurious Emission (802.11g, CH6, 1GHz-3GHz)

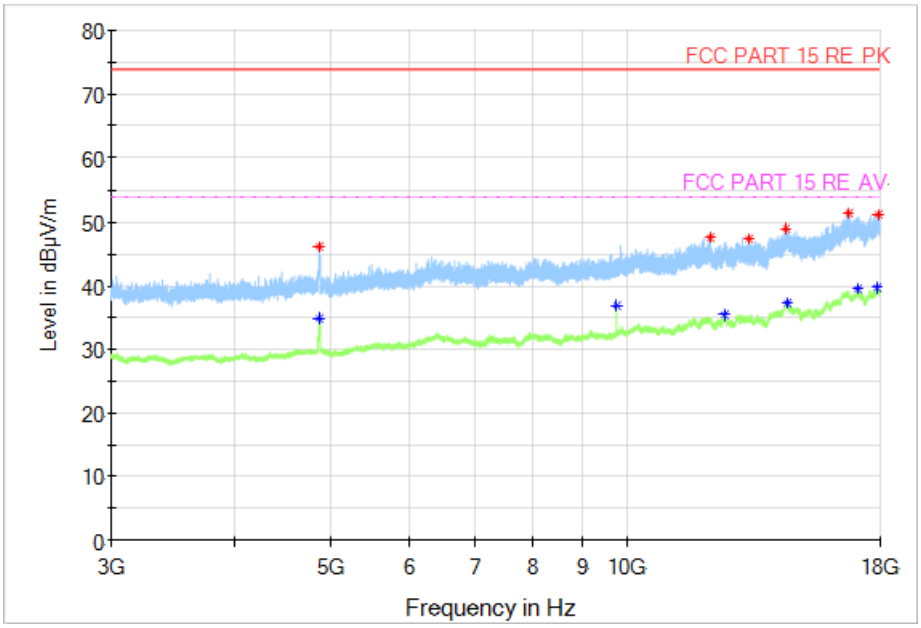

Fig.45 Radiated Spurious Emission (802.11g, CH6, 3GHz-18GHz)

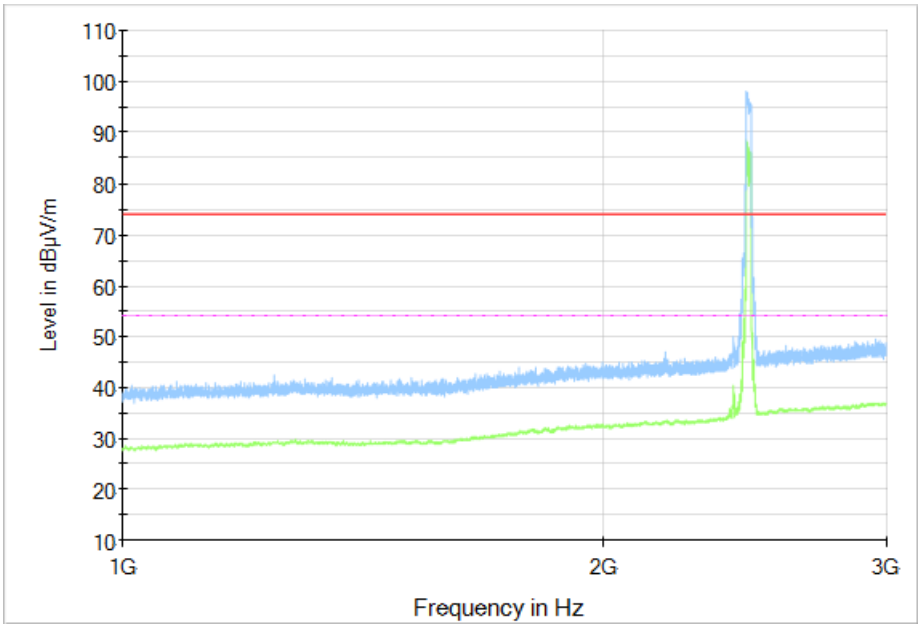

Fig.46 Radiated Spurious Emission (802.11g, CH11, 1GHz-3GHz)

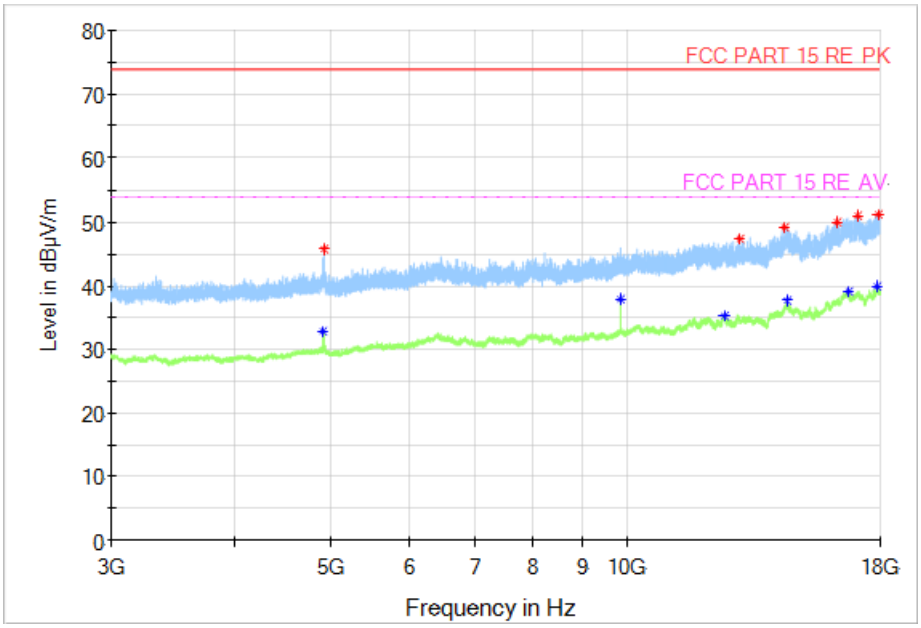

Fig.47 Radiated Spurious Emission (802.11g, CH11, 3GHz-18GHz)

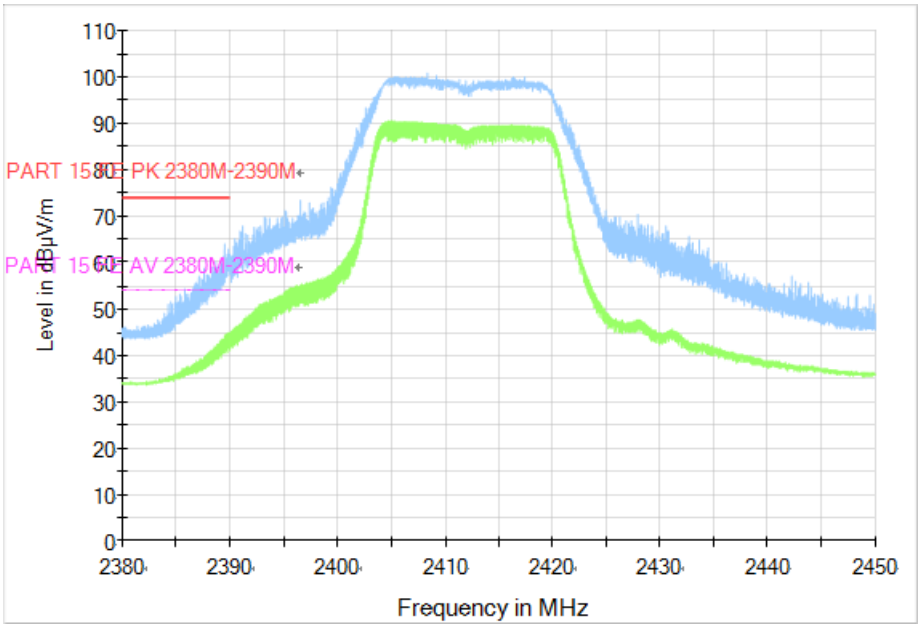

Fig.48 Radiated Restricted Band (802.11g, CH1, 2.38GHz~2.45GHz)

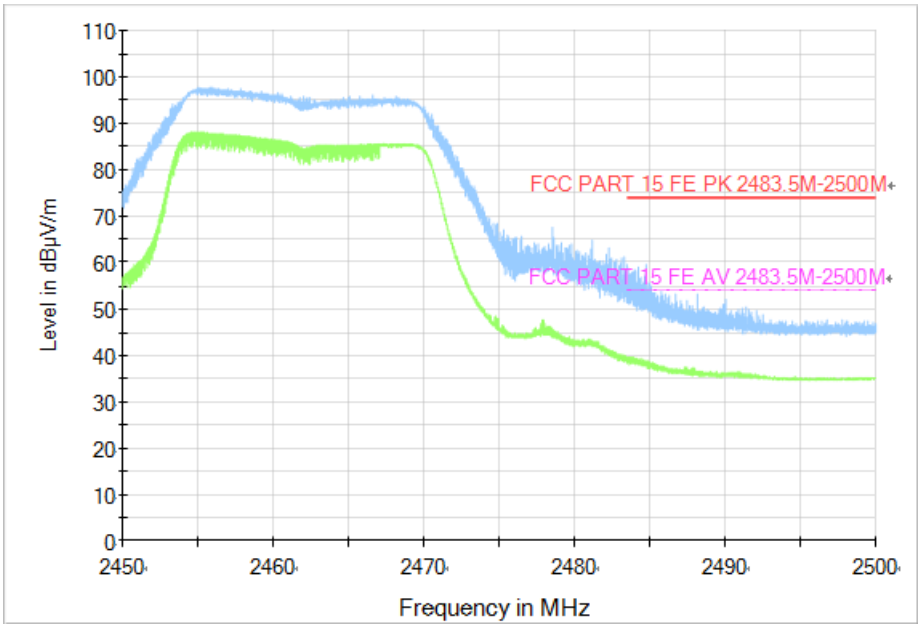

Fig.49 Radiated Restricted Band (802.11g, CH11, 2.45GHz~2.5GHz)

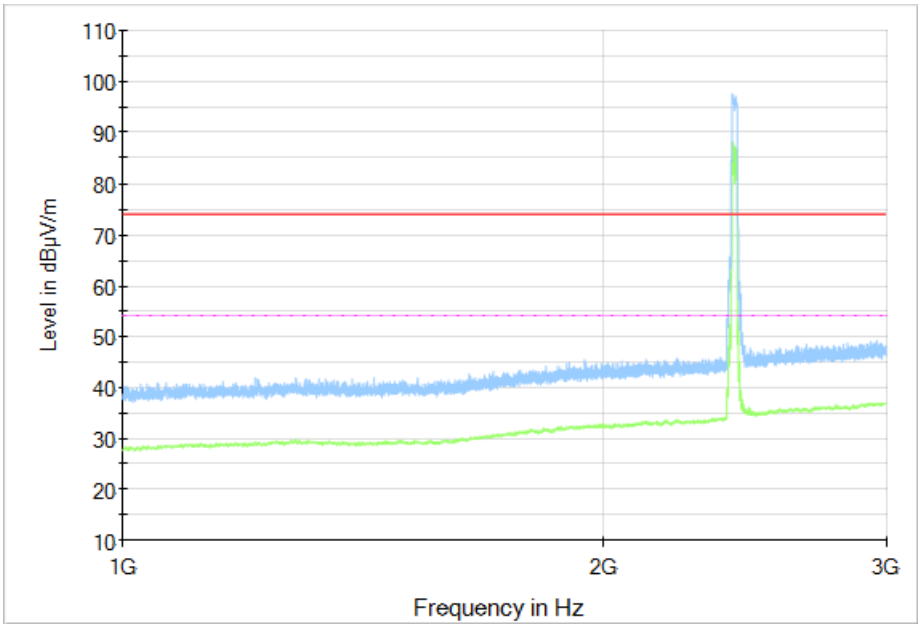

Fig.50 Radiated Spurious Emission (802.11n HT20, CH1, 1GHz-3GHz)

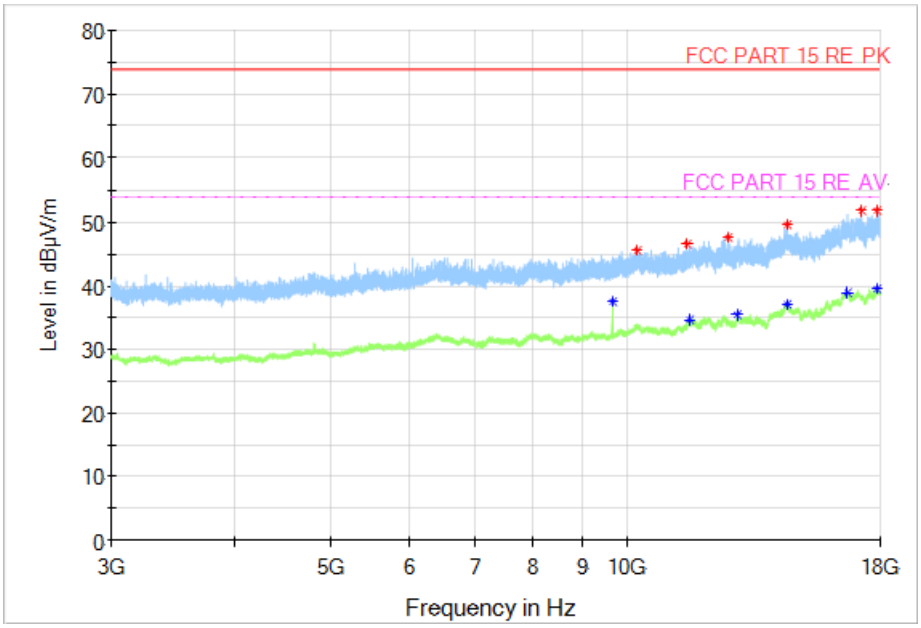

Fig.51 Radiated Spurious Emission (802.11n HT20, CH1, 3GHz-18GHz)

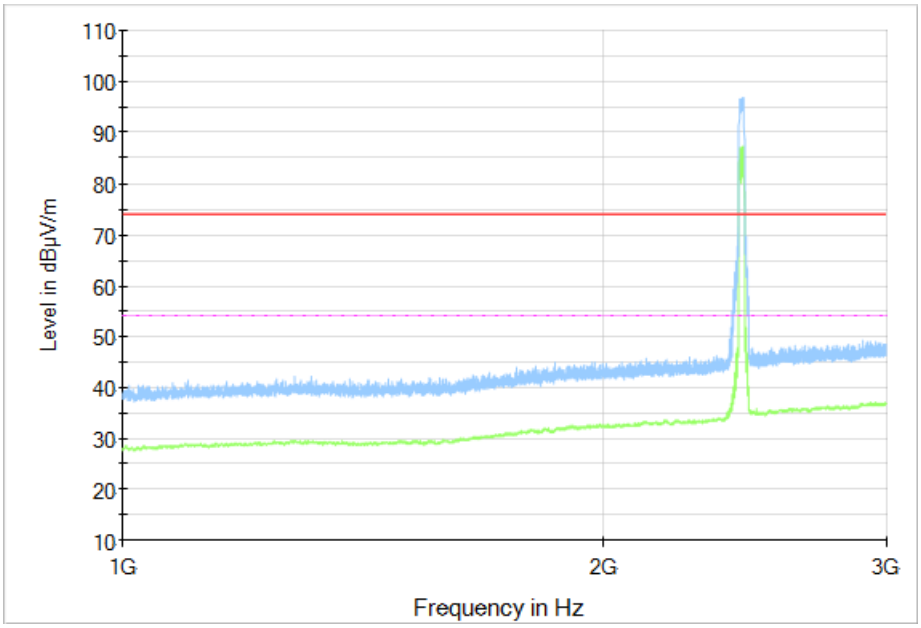

Fig.52 Radiated Spurious Emission (802.11n HT20, CH6, 1GHz-3GHz)

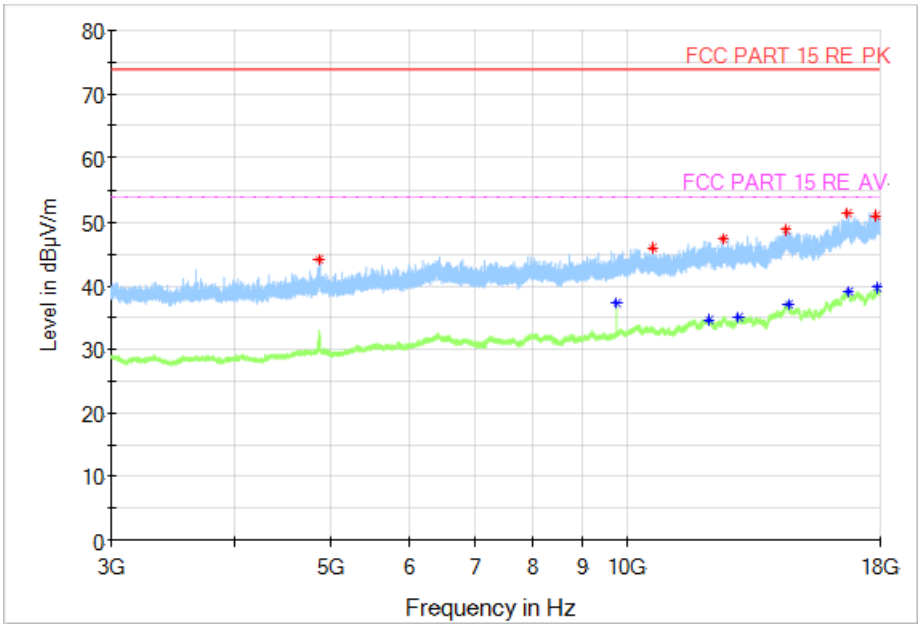

Fig.53 Radiated Spurious Emission (802.11n HT20, CH6, 3GHz-18GHz)

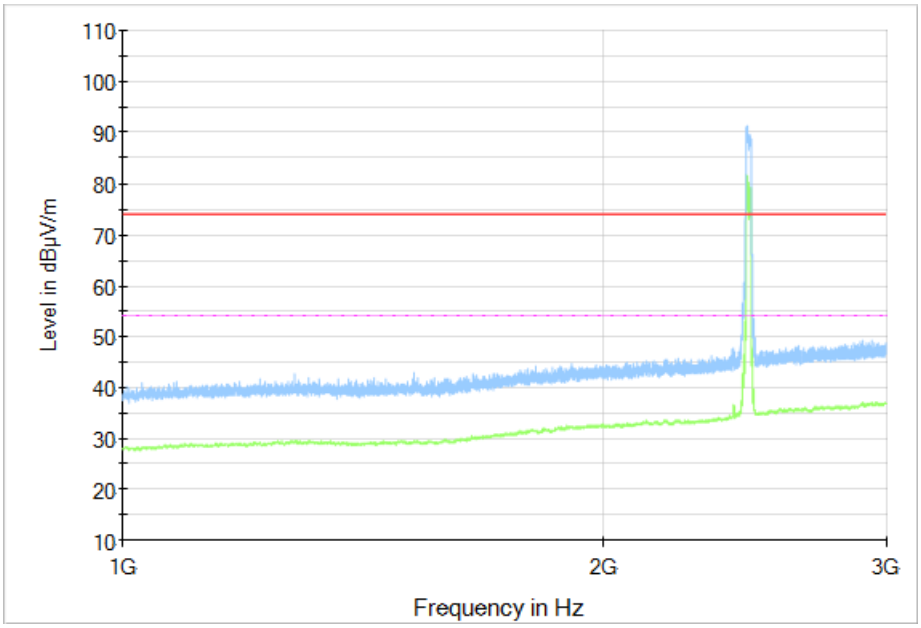

Fig.54 Radiated Spurious Emission (802.11n HT20, CH11, 1GHz-3GHz)

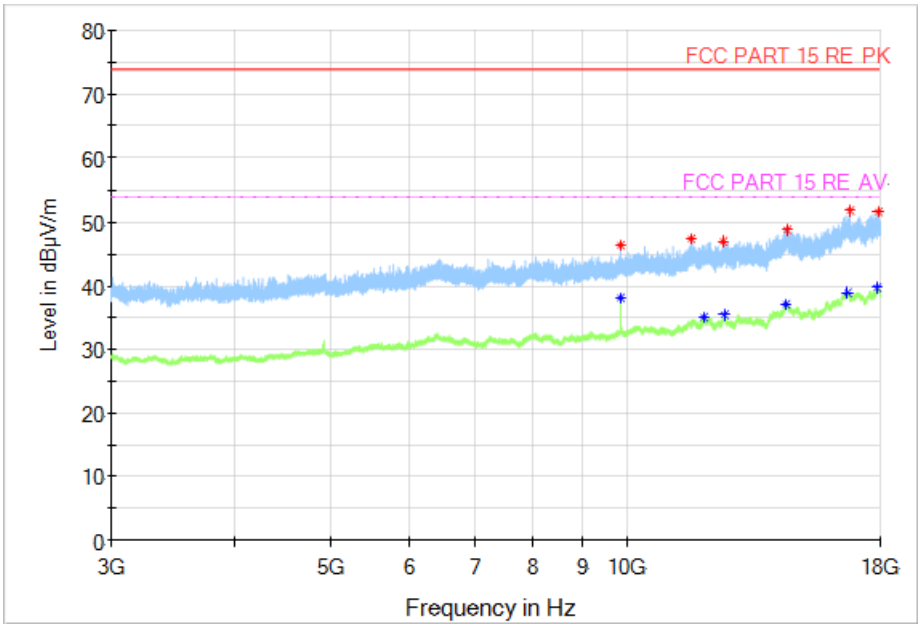

Fig.55 Radiated Spurious Emission (802.11n HT20, CH11, 3GHz-18GHz)

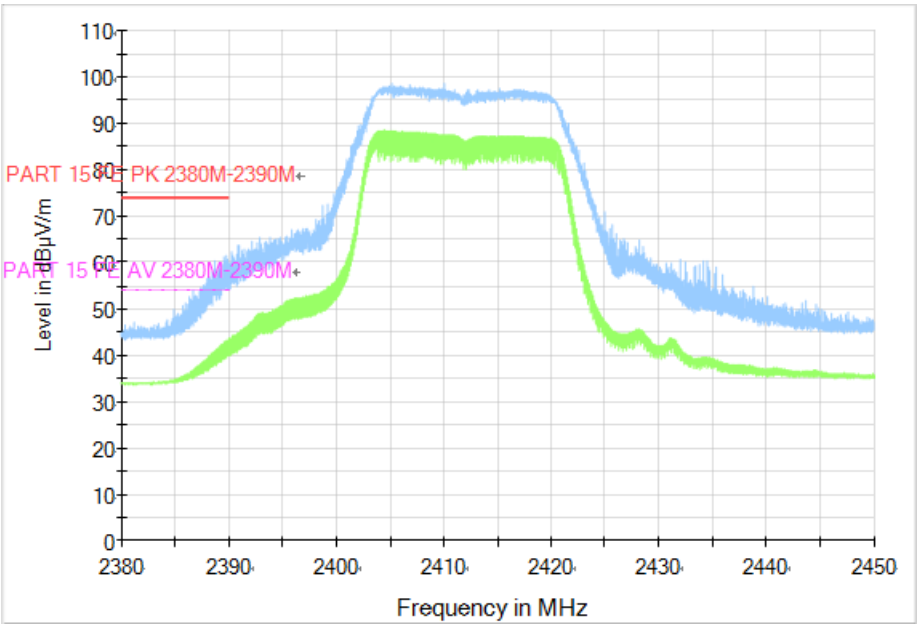

Fig.56 Radiated Restricted Band (802.11n HT20, CH1, 2.38GHz~2.45GHz)

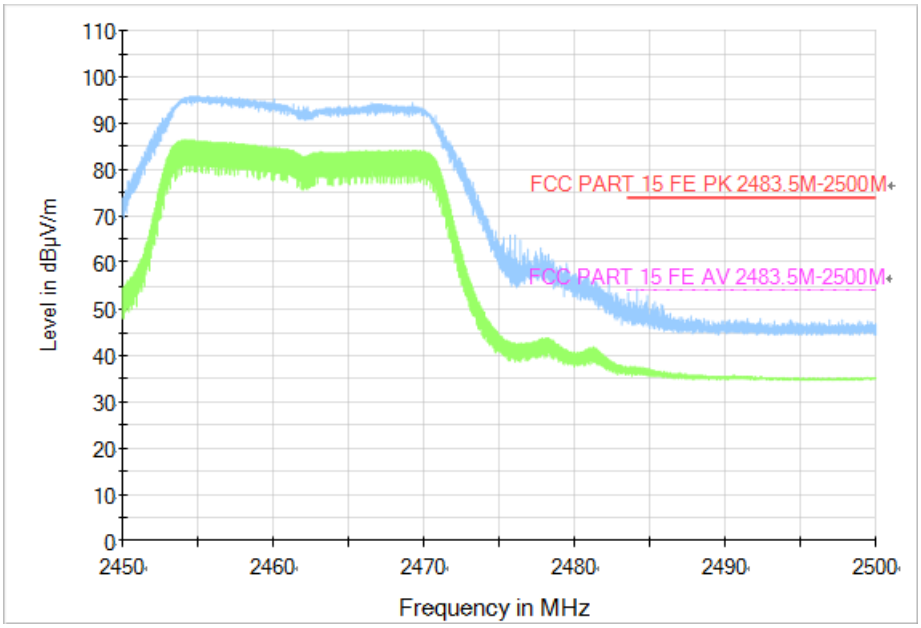

Fig.57 Radiated Restricted Band (802.11n HT20, CH11, 2.45GHz~2.5GHz)

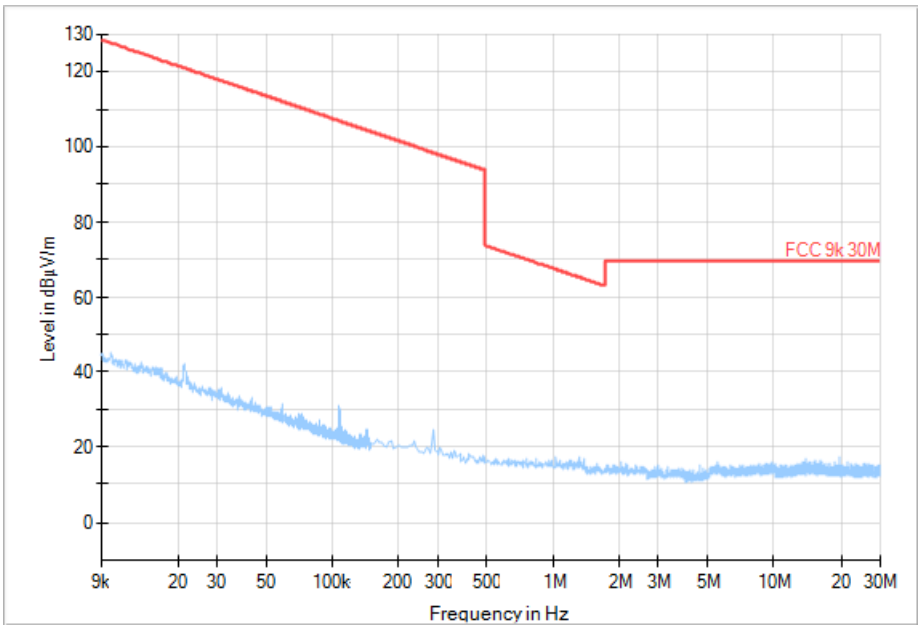

Fig.58 Radiated Spurious Emission (All Channels, 9KHz-30MHz)

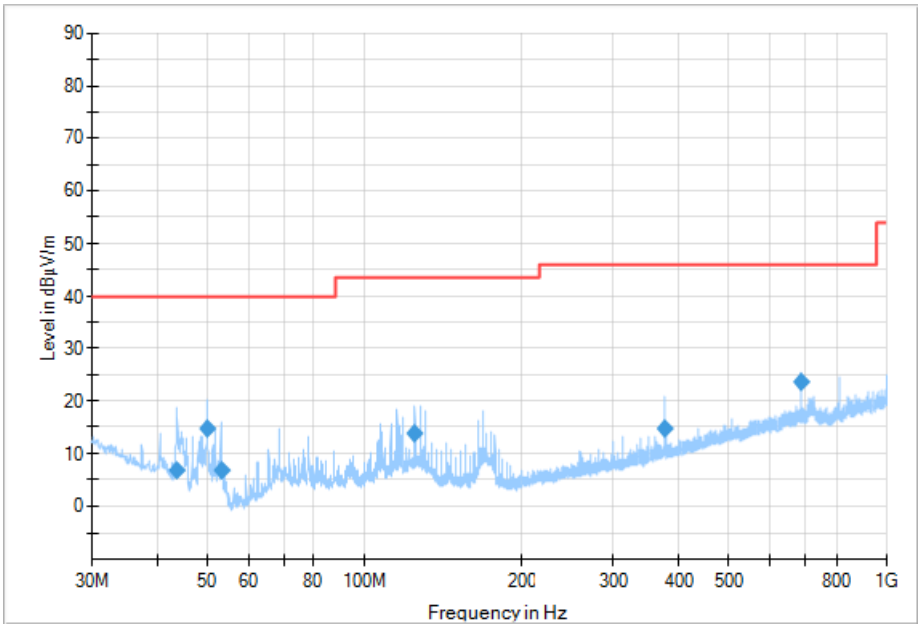

Fig.59 Radiated Spurious Emission (All Channels, 30MHz-1GHz)

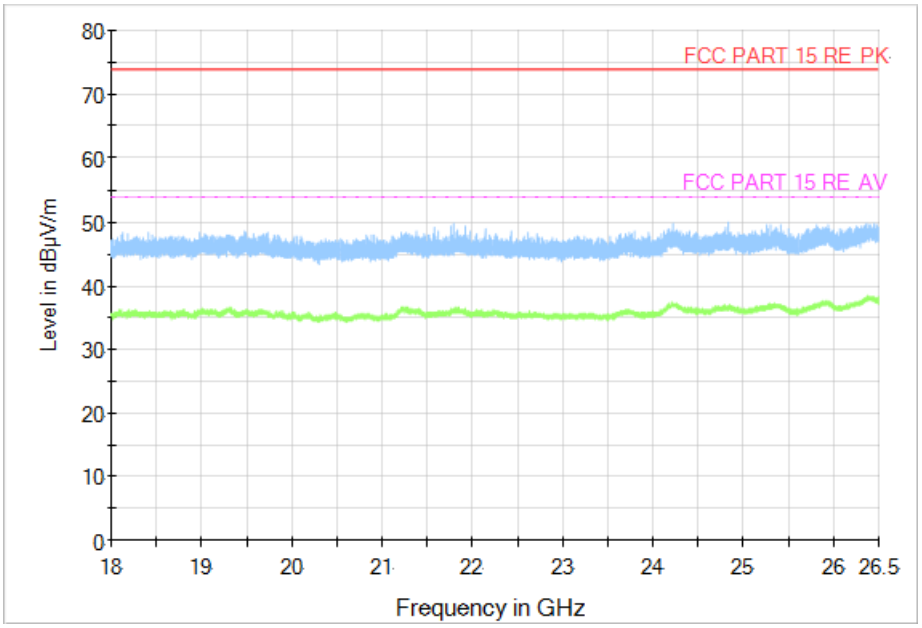

Fig.60 Radiated Spurious Emission (All Channels, 18GHz-26.5GHz)

A.7 AC Power line 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 (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.61	Fig.62	P
0.5 to 5	56			
5 to 30	60			
Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit) - AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.61	Fig.62	P
0.5 to 5	46			
5 to 30	50			
Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Quasi-peak Limit) - AE2

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

WLAN (Average Limit) - AE2

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.63	Fig.64	P
0.5 to 5	46			
5 to 30	50			
Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Test Condition:

Voltage (V)	Frequency (Hz)
240	60

Measurement Result and limit:

WLAN (Quasi-peak Limit) - AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.65	Fig.66	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 (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.65	Fig.66	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 (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.67	Fig.68	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 (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.67	Fig.68	P
0.5 to 5	46			
5 to 30	50			
Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note: The measurement results include the L1 and N measurements.

See below for test graphs.

Conclusion: PASS

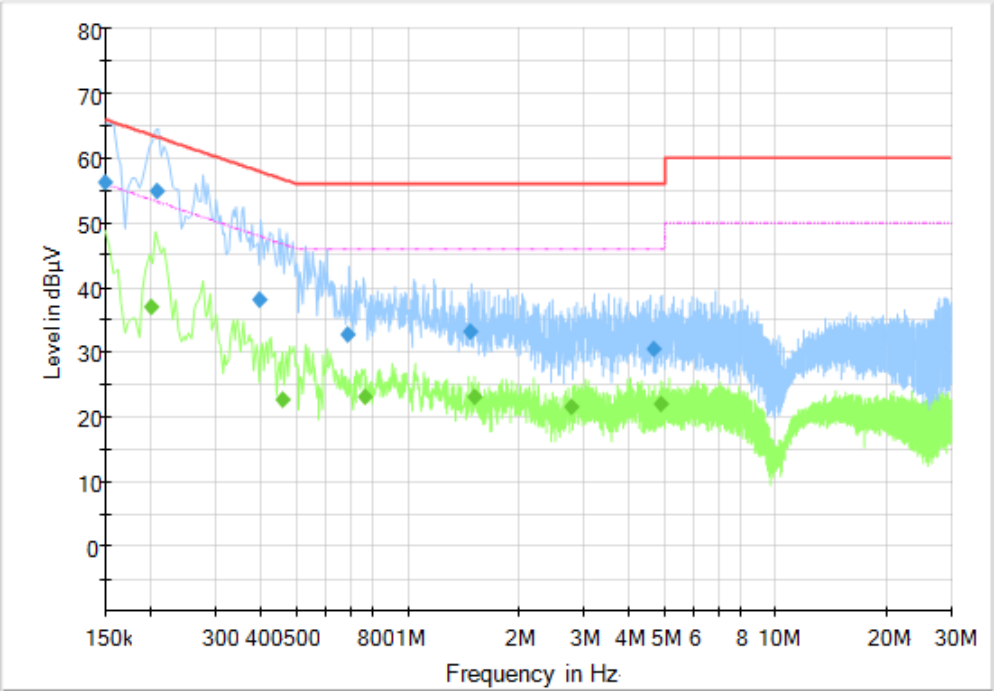

Fig.61 AC Power line Conducted Emission (Traffic, AE1, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
4.648	30.52	56.00	25.48	L1	ON	9.7
0.688	32.87	56.00	23.13	N	ON	9.6
1.476	33.29	56.00	22.71	L1	ON	9.7
0.396	38.15	57.94	19.79	N	ON	9.7
0.208	54.91	63.29	8.37	N	ON	9.6
0.150	56.19	66.00	9.81	N	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.456	22.76	46.77	24.01	L1	ON	9.6
0.200	36.94	53.61	16.67	N	ON	9.6
0.764	23.16	46.00	22.84	N	ON	9.6
1.512	23.20	46.00	22.80	L1	ON	9.7
2.788	21.55	46.00	24.45	L1	ON	9.7
4.872	21.92	46.00	24.08	L1	ON	9.7

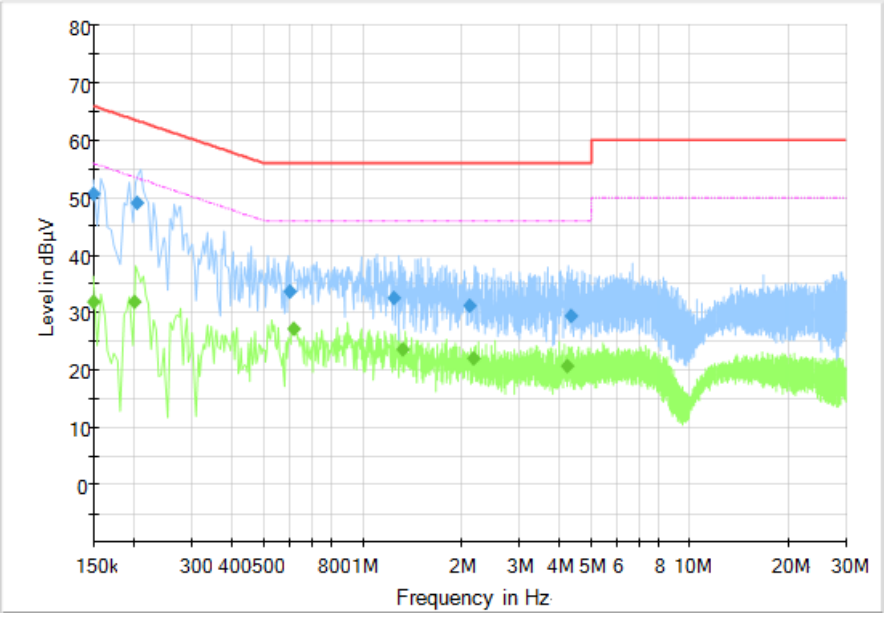

Fig.62 AC Power line Conducted Emission (Idle, AE1, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
4.316	29.48	56.00	26.52	L1	ON	9.7
2.116	31.15	56.00	24.85	L1	ON	9.7
1.240	32.64	56.00	23.36	L1	ON	9.7
0.596	33.67	56.00	22.33	L1	ON	9.6
0.204	49.01	63.45	14.44	L1	ON	9.6
0.150	50.69	66.00	15.31	L1	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150	31.90	56.00	24.10	N	ON	9.6
0.616	27.08	46.00	18.92	N	ON	9.6
4.236	20.59	46.00	25.41	L1	ON	9.7
1.320	23.47	46.00	22.53	L1	ON	9.7
0.200	31.77	53.61	21.84	L1	ON	9.6
2.184	21.95	46.00	24.05	L1	ON	9.7

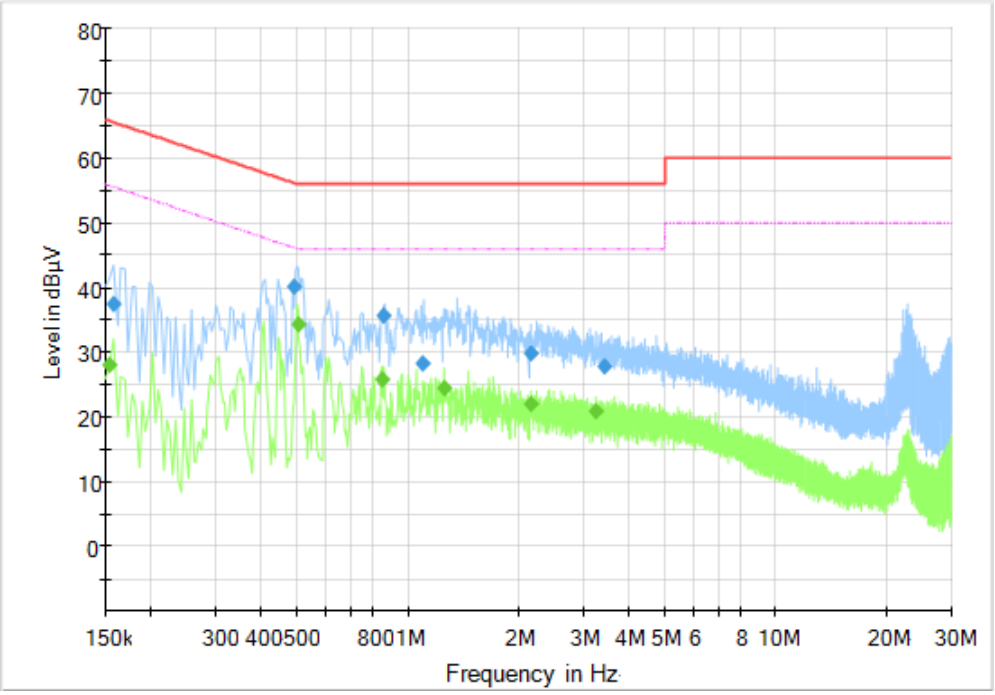

Fig.63 AC Power line Conducted Emission (Traffic, AE2, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
3.440	27.84	56.00	28.16	L1	ON	9.7
1.100	28.25	56.00	27.75	N	ON	9.7
2.160	29.93	56.00	26.07	L1	ON	9.7
0.860	35.76	56.00	20.24	L1	ON	9.7
0.158	37.53	65.57	28.04	N	ON	9.6
0.492	40.15	56.13	15.98	L1	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
1.260	24.51	46.00	21.49	L1	ON	9.7
0.848	25.75	46.00	20.25	L1	ON	9.7
0.504	34.28	46.00	11.72	L1	ON	9.6
2.160	21.93	46.00	24.07	L1	ON	9.7
3.248	20.81	46.00	25.19	L1	ON	9.7
0.154	27.96	55.78	27.82	L1	ON	9.6

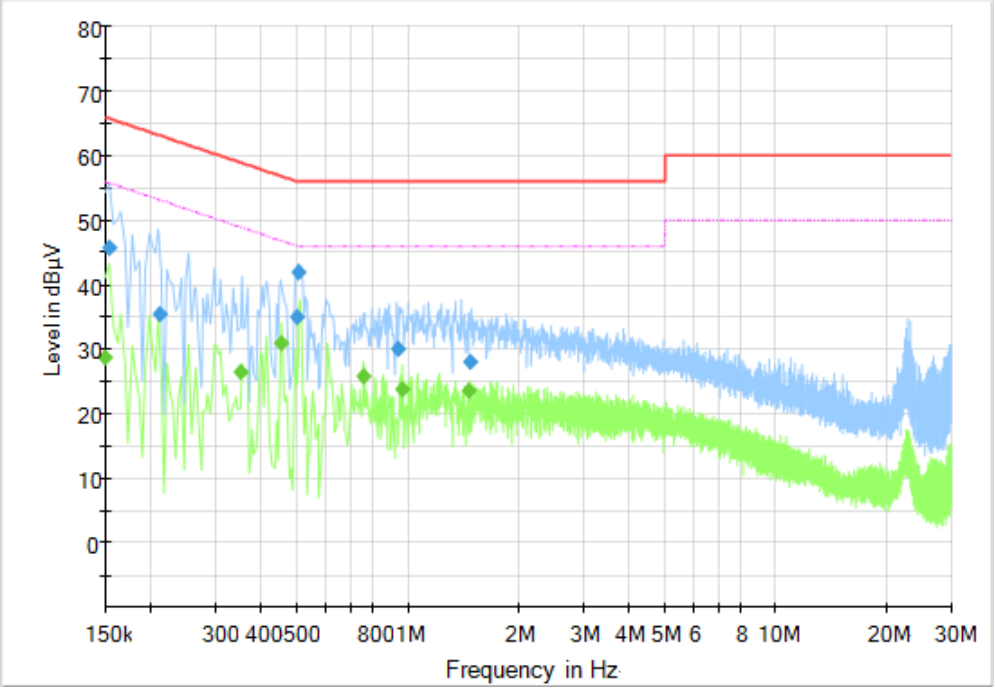

Fig.64 AC Power line Conducted Emission (Idle, AE2, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
1.476	27.97	56.00	28.03	N	ON	9.7
0.936	30.09	56.00	25.91	N	ON	9.7
0.500	34.95	56.00	21.05	N	ON	9.6
0.212	35.41	63.13	27.71	N	ON	9.6
0.504	41.84	56.00	14.16	L1	ON	9.6
0.154	45.74	65.78	20.04	N	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.352	26.40	48.92	22.51	L1	ON	9.6
0.452	31.07	46.84	15.77	L1	ON	9.6
0.150	28.83	56.00	27.17	N	ON	9.6
0.756	25.86	46.00	20.14	L1	ON	9.6
1.464	23.54	46.00	22.46	L1	ON	9.7
0.964	23.84	46.00	22.16	L1	ON	9.7

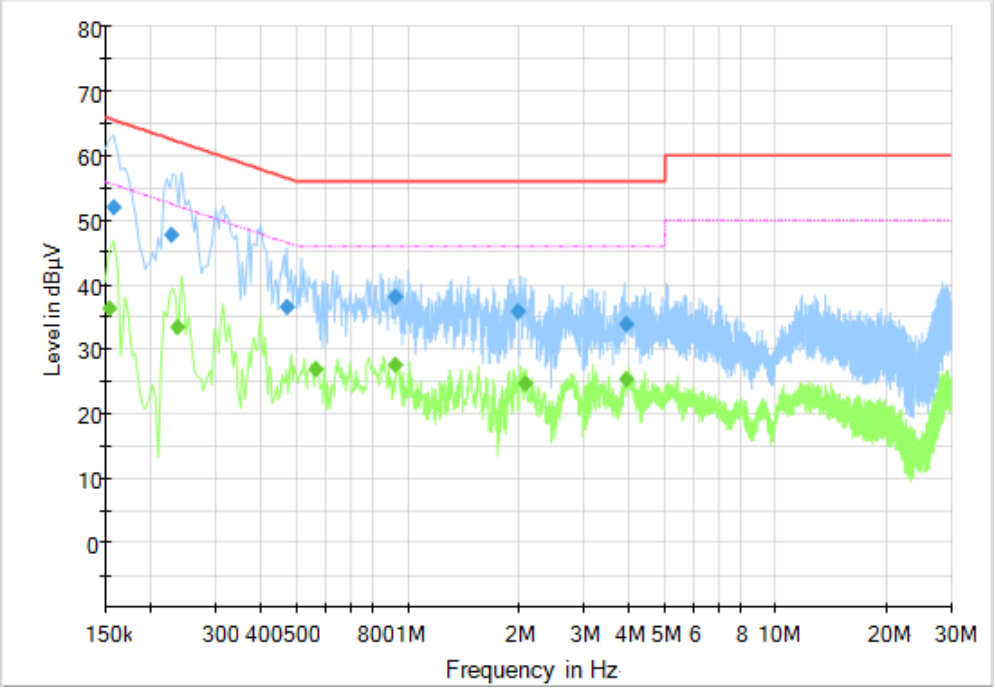

Fig.65 AC Power line Conducted Emission (Traffic, AE1, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
3.928	33.88	56.00	22.12	L1	ON	9.7
2.000	35.79	56.00	20.21	L1	ON	9.7
0.468	36.62	56.55	19.93	L1	ON	9.6
0.924	38.10	56.00	17.90	L1	ON	9.7
0.228	47.72	62.52	14.80	L1	ON	9.6
0.158	52.06	65.57	13.51	N	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.236	33.34	52.24	18.90	N	ON	9.6
0.560	27.01	46.00	18.99	N	ON	9.6
0.154	36.29	55.78	19.49	N	ON	9.6
0.924	27.64	46.00	18.36	L1	ON	9.7
3.932	25.42	46.00	20.58	N	ON	9.7
2.084	24.79	46.00	21.21	L1	ON	9.7

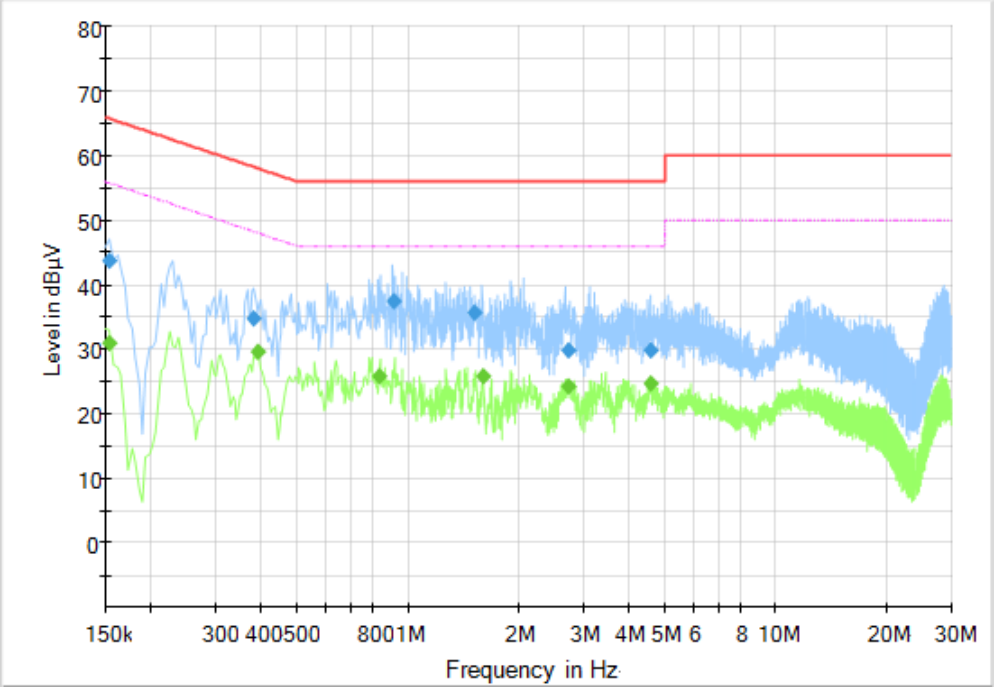

Fig.66 AC Power line Conducted Emission (Idle, AE1, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
2.724	29.86	56.00	26.14	L1	ON	9.7
4.580	29.92	56.00	26.08	L1	ON	9.7
0.380	34.71	58.28	23.56	N	ON	9.6
1.520	35.56	56.00	20.44	L1	ON	9.7
0.916	37.50	56.00	18.50	L1	ON	9.7
0.154	43.67	65.78	22.11	L1	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
4.584	24.67	46.00	21.33	N	ON	9.7
0.836	25.78	46.00	20.22	L1	ON	9.6
0.392	29.56	48.02	18.46	N	ON	9.7
1.604	25.72	46.00	20.28	N	ON	9.7
2.724	24.21	46.00	21.79	N	ON	9.7
0.154	30.86	55.78	24.92	N	ON	9.6

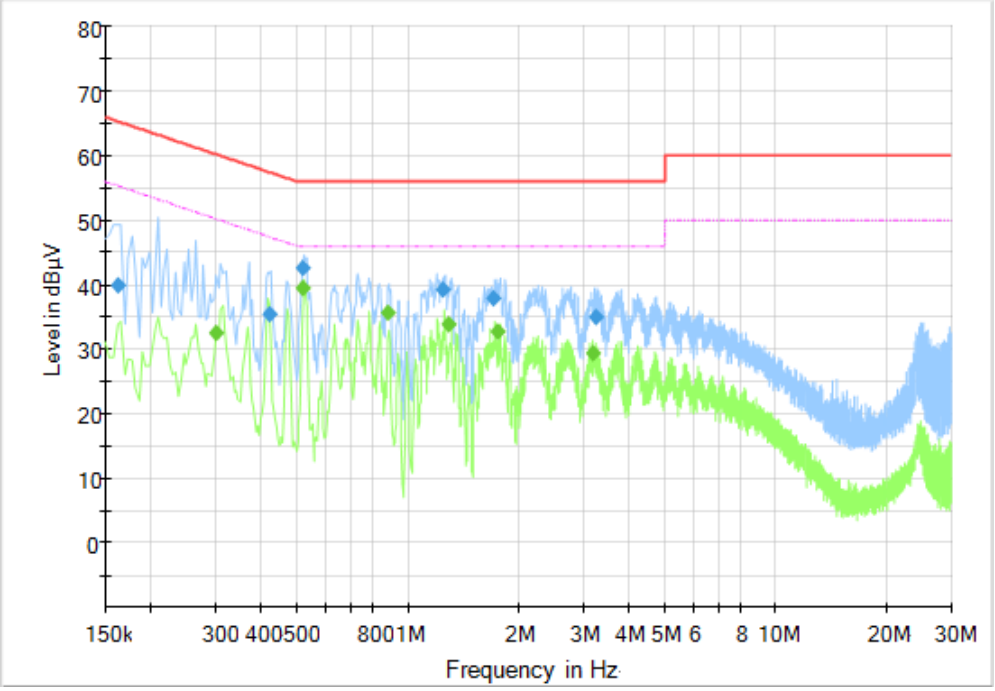

Fig.67 AC Power line Conducted Emission (Traffic, AE2, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
3.240	35.09	56.00	20.91	L1	ON	9.7
0.420	35.48	57.45	21.97	N	ON	9.7
1.708	37.91	56.00	18.09	L1	ON	9.7
1.244	39.23	56.00	16.77	L1	ON	9.7
0.162	39.96	65.36	25.40	N	ON	9.6
0.516	42.68	56.00	13.32	L1	ON	9.6

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.520	39.43	46.00	6.57	L1	ON	9.6
0.880	35.56	46.00	10.44	L1	ON	9.7
3.192	29.34	46.00	16.66	L1	ON	9.7
1.292	33.94	46.00	12.06	L1	ON	9.7
0.300	32.62	50.24	17.62	L1	ON	9.6
1.760	32.86	46.00	13.14	L1	ON	9.7

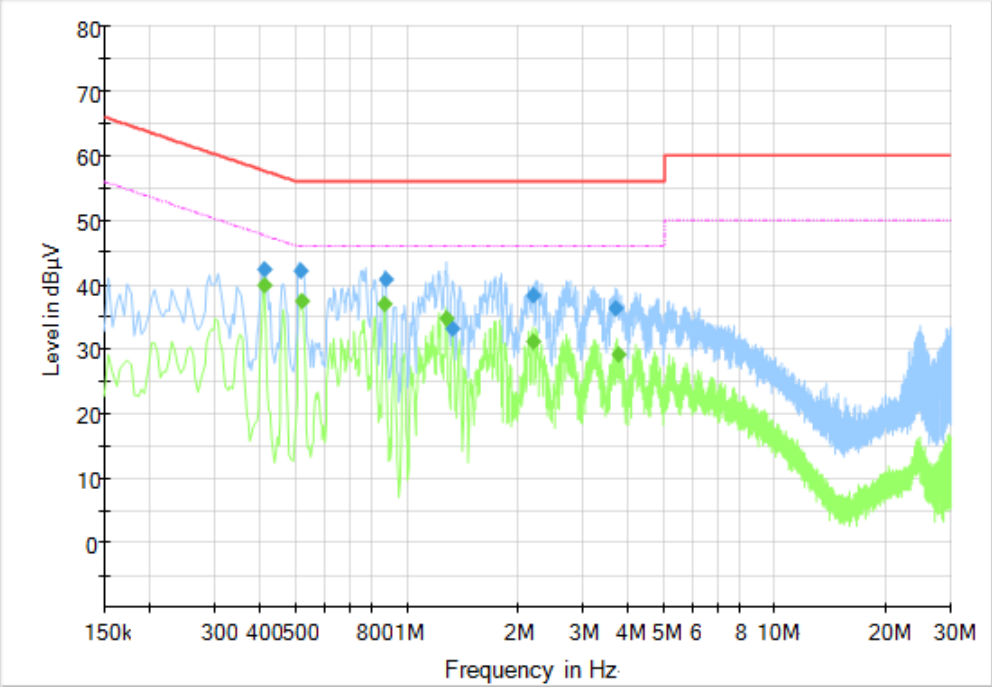

Fig.68 AC Power line Conducted Emission (Idle, AE2, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
1.328	33.13	56.00	22.87	N	ON	9.7
3.672	36.30	56.00	19.70	L1	ON	9.7
2.192	38.31	56.00	17.69	L1	ON	9.7
0.872	40.89	56.00	15.11	L1	ON	9.7
0.512	42.12	56.00	13.88	L1	ON	9.6
0.408	42.33	57.69	15.36	L1	ON	9.7

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
3.760	29.09	46.00	16.91	L1	ON	9.7
0.868	37.01	46.00	8.99	L1	ON	9.7
0.516	37.54	46.00	8.46	L1	ON	9.6
2.192	31.16	46.00	14.84	L1	ON	9.7
1.280	34.75	46.00	11.25	L1	ON	9.7
0.408	39.98	47.69	7.71	L1	ON	9.7

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