Full

TEST REPORT

No. 2014WL0011

For

Client : AsiaTelco Technologies Co.

Production : Wireless Energy Controller

Model Name : EC-P11

FCC ID: XYOEC-P11

Hardware Version: P1

Software Version ECP-11_S1.0.2

Issued date: 2014-02-12

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 ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn.

CONTENTS

1. General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

1.2 Statements

The product EC-P11, supporting WLAN, manufactured by AsiaTelco Technologies Co. is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

1.3 Test Laboratory

1.3.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	86-21-63843300
Fax:	86-21-63843301
FCC Registration NO.:	489729

1.3.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	N/A
Relative Humidity:	20-75%

1.3.3. Project data

Project Leader:	Gong Yujuan
Testing Start Date:	Jan,19,2014
Testing End Date:	Jan,22,2014

1.3.4. Signature

Wang Daming
(Prepared this test report)

Liu kai
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

1.4 Details of applicant or manufacturer

1.4.1. Applicant Information

Company Name:	AsiaTelco Technologies Co.
Address /Post:	Building-8, 3F, #289 Bisheng Road, Zhangjiang Hi-Tech Park, Pudong, Shanghai, China
Country:	China

1.4.2. Manufacturer Information

Company Name:	AsiaTelco Technologies Co.
Address /Post:	Building-8, 3F, #289 Bisheng Road, Zhangjiang Hi-Tech Park, Pudong, Shanghai, China
Country:	China

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

2.1. About EUT

EUT Description	Wireless Energy Controller
Model name	EC-P11
WLAN Frequency	2412MHz-2462MHz
WLAN Channel	Channel1-Channel11
WLAN type of modulation	802.11b:DSSS 802.11g/n: OFDM
Nominal Voltage	277 V
Extreme High Voltage	110 V
Extreme Low Voltage	480 V

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

2.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	----	P1	ECP-11_S1.0.2	2014-01-19

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

2.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---
AE2	---	---

3. Reference Documents

3.1. Reference Documents for testing

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

Reference	Title
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, 2400-2483.5MHz, and 5725-5850MHz.
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices

4. Summary of Test Results

A brief summary of the tests carried out is shown as following.

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247(a)	/	P
Peak Power Spectral Density	15.247(e)	/	P
Occupied 6dB Bandwidth	15.247(d)	/	P
Band Edges Compliance	15.247(b)	/	P
Transmitter Spurious Emission-Conducted	15.247	/	P
Transmitter Spurious Emission-Radiated	15.247,15.209,	/	P
AC Powerline Conducted Emission	15.107,15.207	/	P

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	22℃
Voltage	Vnom	277V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

5. Test result

5.1. Maximum Output Power

Measurement Limit and method:

Standard	Limit(dBm)
FCC CRF 15.247(a)	< 30

The measurement is according to ANSI C63.10, and power output option 1 (RBW=20MHz) is used for the test. EUT is operated in continuous transmitting mode.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

5.1.1. Maximum Peak Output Power-conducted

Measurement Results:

Vnom = 277 V

802.11b/g mode

Mode	Data Rate(Mbps)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	1	19.88	/	/
	2	19.92	/	/
	5.5	19.95	/	/
	11	19.96	19.58	19.66
802.11g	6	23.56	/	/
	9	23.64	23.43	23.86
	12	23.49	/	/
	18	23.49	/	/
	24	22.10		
	36	22.39	/	/
	48	21.04	/	/
	54	21.83	/	/

The data rate 11Mbps and 9Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n mode

Mode	Data Rate(Index)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(20MHz)	MCS0	23.81	23.88	23.22
	MCS1	23.69	/	/
	MCS2	23.44	/	/
	MCS3	23.22	/	/
	MCS4	22.10	/	/
	MCS5	22.48	/	/
	MCS6	20.52	/	/
	MCS7	20.95	/	/
802.11n(40MHz)	MCS0	/	/	/
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

The data rate MCS0 is selected as worse condition, and the following case are performed with this condition.

Vmin = 110 V

Mode	Data Rate(Mbps/ Index)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	11	19.92	19.55	19.62
802.11g	9	23.58	23.40	23.81
802.11n(20MHz)	MCS0	23.78	23.85	23.18

Vmax = 480 V

Mode	Data Rate(Mbps/ Index)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	11	19.88	19.49	19.53
802.11g	9	23.56	23.35	23.74
802.11n(20MHz)	MCS0	23.77	23.80	23.14

Note: from the above data we can see the value of transmitter power test by normal voltage (277V) is max, so we choose it as worst case and apply it as below testing.

5.1.2. Maximum Average Output Power-conducted

802.11b/g mode

Mode	Test Result(dBm)		
	2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	16.75	16.47	16.43
802.11g	16.61	16.41	16.40

802.11n mode

Mode	Test Result(dBm)		
	2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(20MHz)	16.65	16.45	16.38
802.11n(40MHz)	/	/	/

Conclusion: PASS

5.2. Peak Power Spectral Density

Measure Limit:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

The measurement is according to ANSI C63.10.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Test procedures:

1. Connect the EUT to spectrum analyzer.
2. Set RBW=3KHz, VBW=10KHz,span more than 1.5 times channel bandwidth.

3. Detector =peak, sweep time=auto couple, trace mode=max hold.

Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11b	1	Fig.1	-8.49	P
	6	Fig.2	-6.39	P
	11	Fig.3	-6.92	P
802.11g	1	Fig.4	-10.86	P
	6	Fig.5	-11.49	P
	11	Fig.6	-11.54	P

802.11n mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11n(20MHz)	1	Fig.7	-11.04	P
	6	Fig.8	-11.69	P
	11	Fig.9	-12.41	P
802.11g(40MHz)	1	/	/	P
	6	/	/	P
	11	/	/	P

Conclusion: PASS

Test graphs as below:

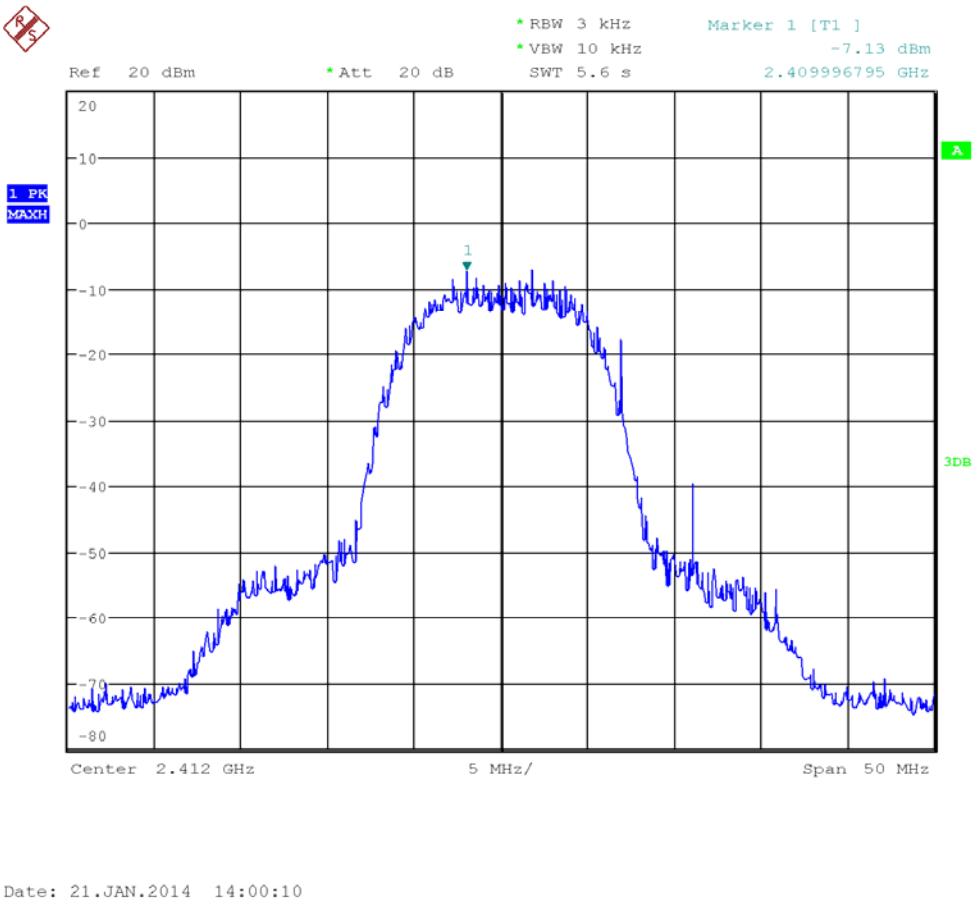


Fig.1 Power Spectral Density (802.1b,Ch1)

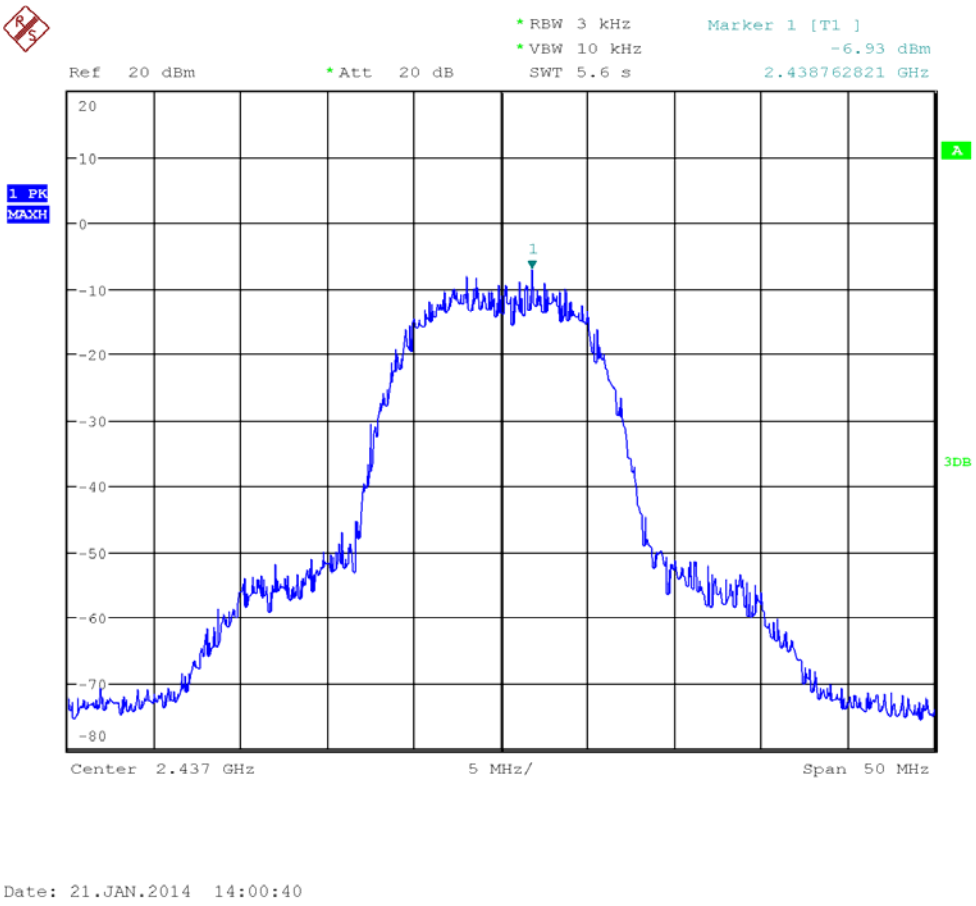


Fig.2 Power Spectral Density (802.1b,Ch6)

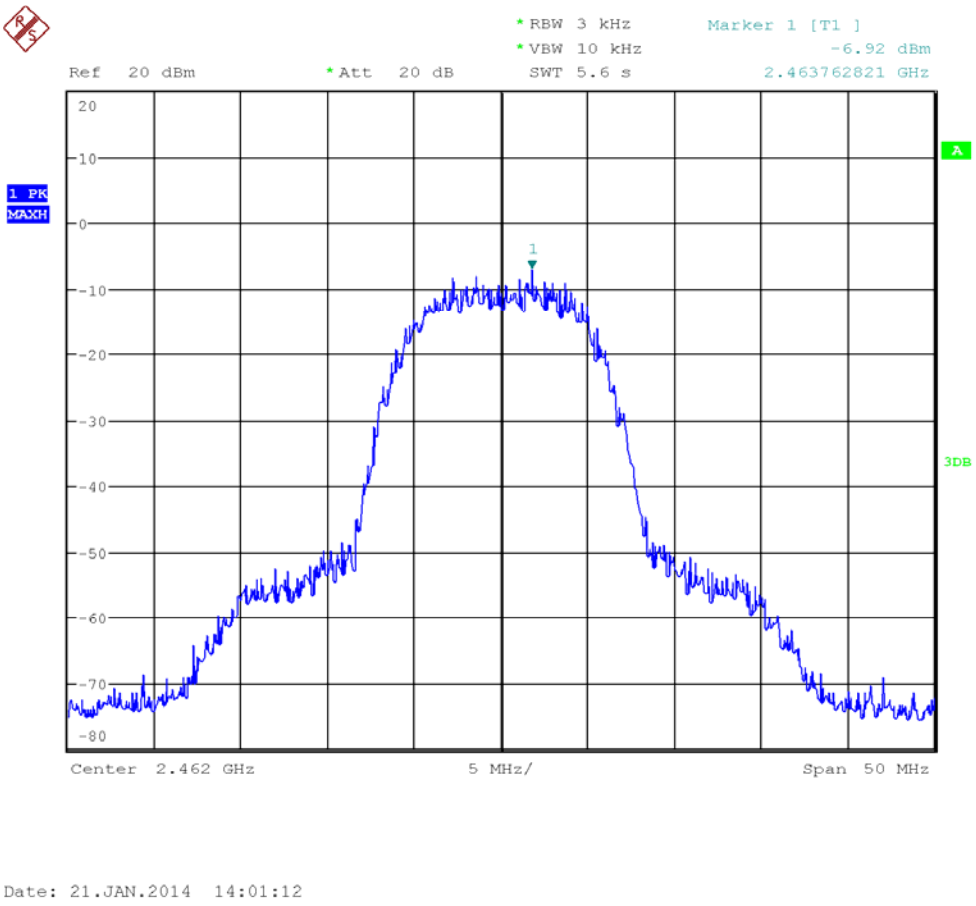


Fig.3 Power Spectral Density (802.1b,Ch11)

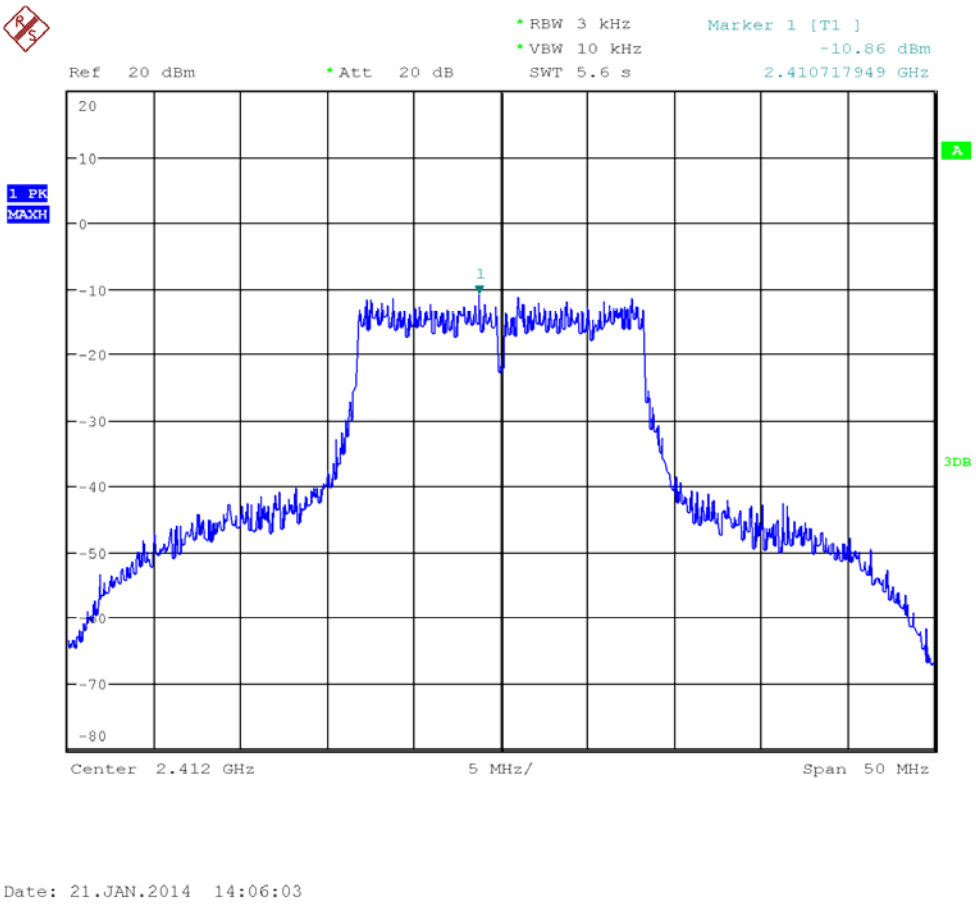


Fig.4 Power Spectral Density (802.1g,Ch1)

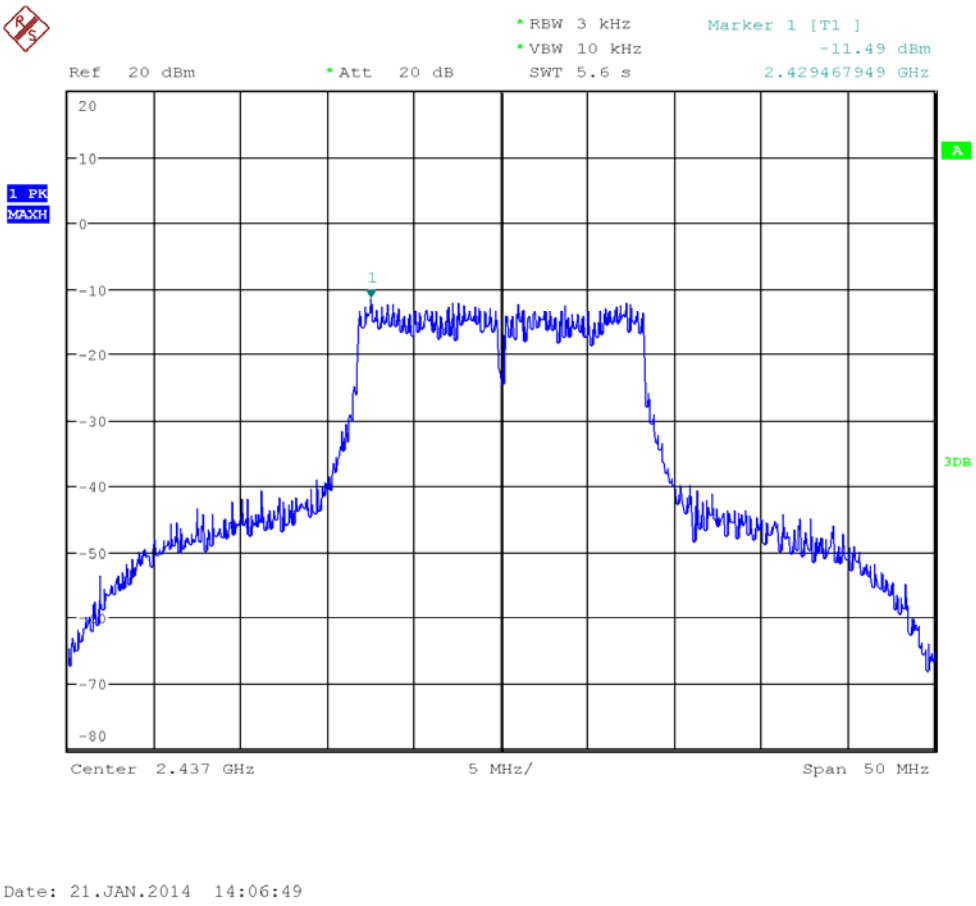


Fig.5 Power Spectral Density (802.1g,Ch6)

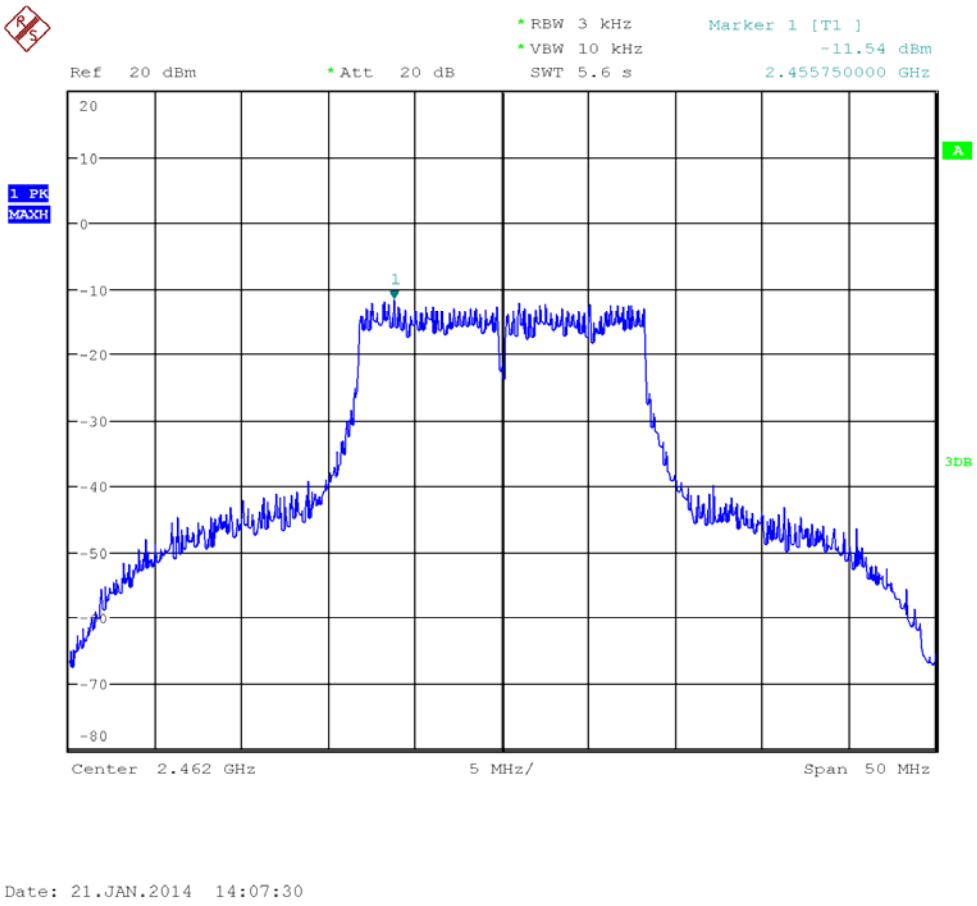


Fig.6 Power Spectral Density (802.1g,Ch11)

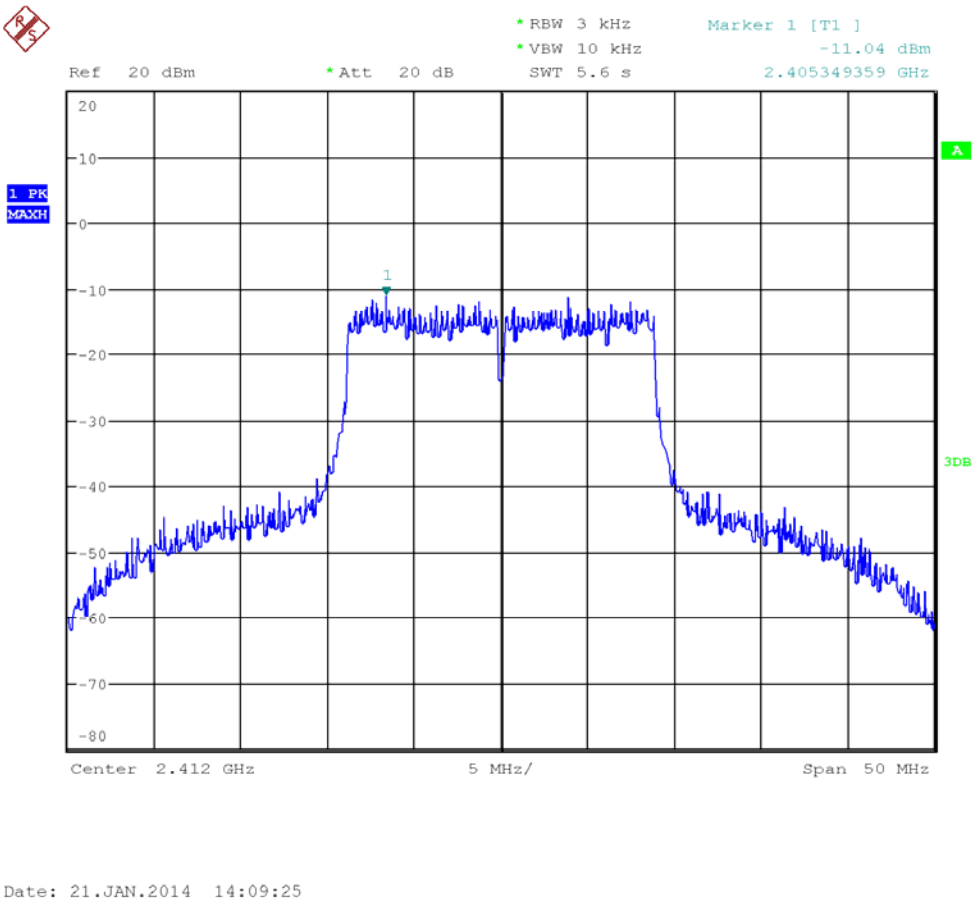


Fig.7 Power Spectral Density (802.1n-20MHz,Ch1)

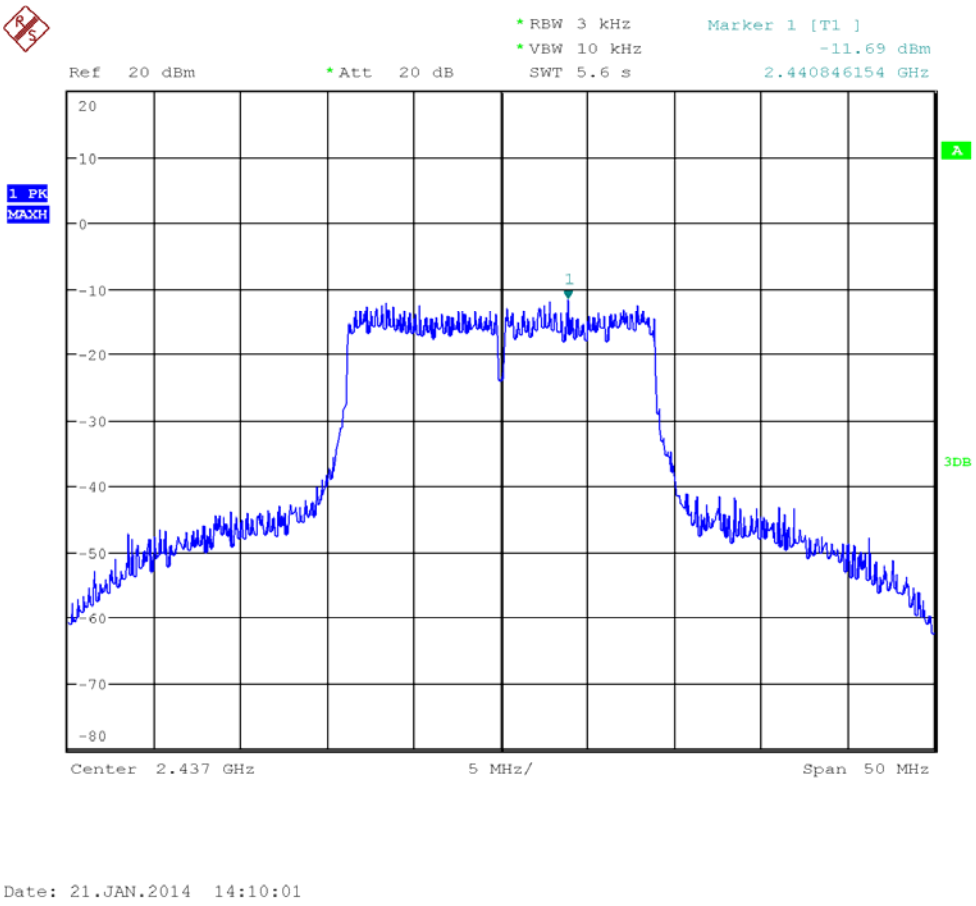


Fig.8 Power Spectral Density (802.1n-20MHz,Ch6)

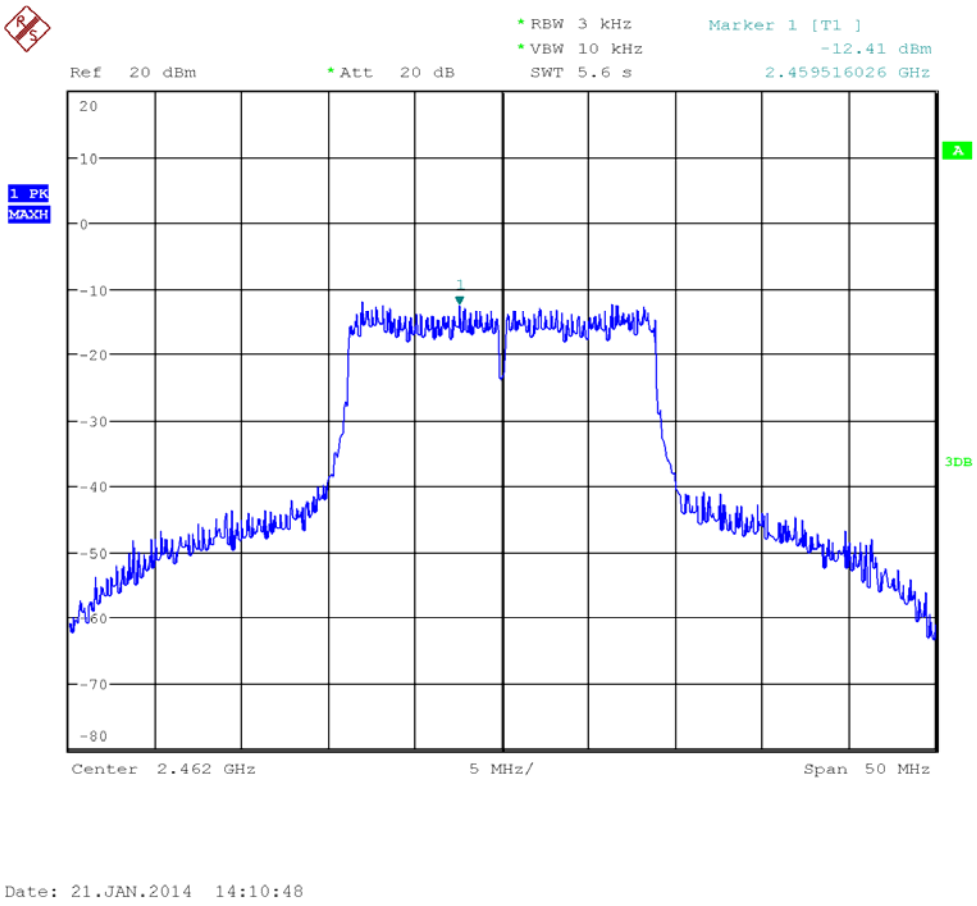


Fig.9 Power Spectral Density (802.1n-20MHz,Ch11)

5.3. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is according to ANSI C63.10.

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

Test procedures:

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz,span more than 1.5 times channel bandwidth.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth(MHz)	Conclusion

802.11b	1	Fig.10	8.975	P
	6	Fig.11	8.975	P
	11	Fig.12	8.975	P
802.11g	1	Fig.13	16.506	P
	6	Fig.14	16.585	P
	11	Fig.15	16.585	P

802.11n mode

Mode	Channel	Occupied 6dB Bandwidth(KHz)		Conclusion
802.11n(20MHz)	1	Fig.16	16.507	P
	6	Fig.17	16.507	P
	11	Fig.18	16.346	P
802.11n(40MHz)	1	/		P
	6	/		P
	11	/		P

Conclusion: PASS

Test graphs as below:

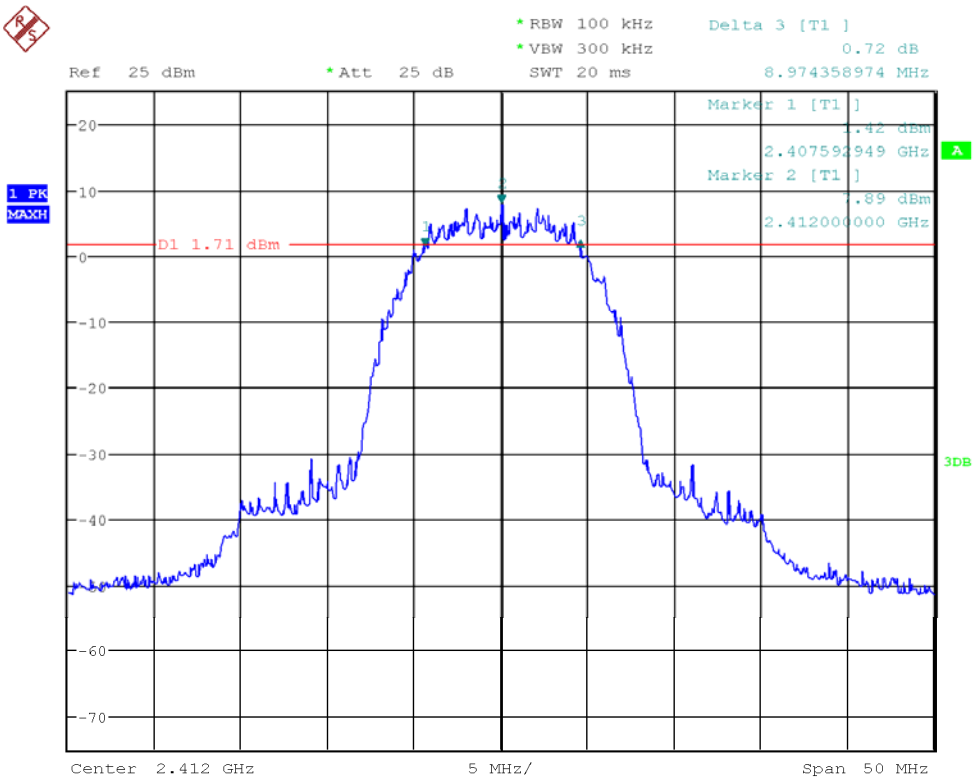


Fig.10 Occupied 6dB Bandwidth (802.11b, Ch1)

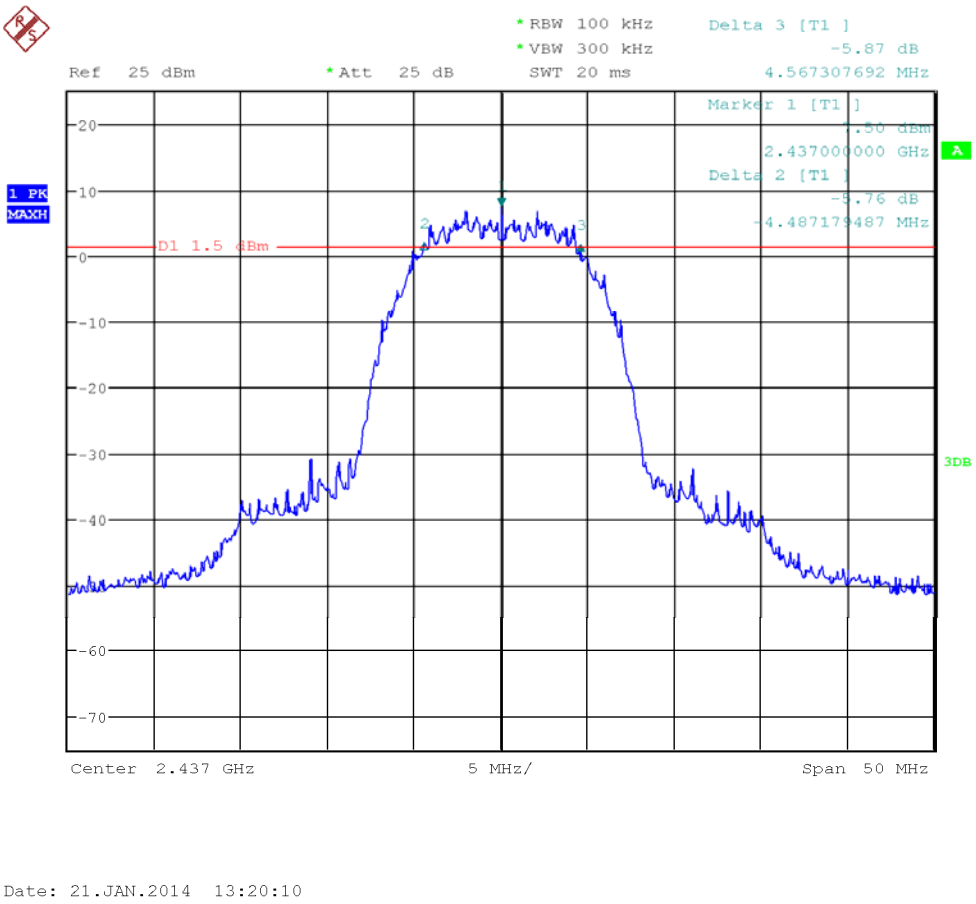


Fig.11 Occupied 6dB Bandwidth (802.11b, Ch6)

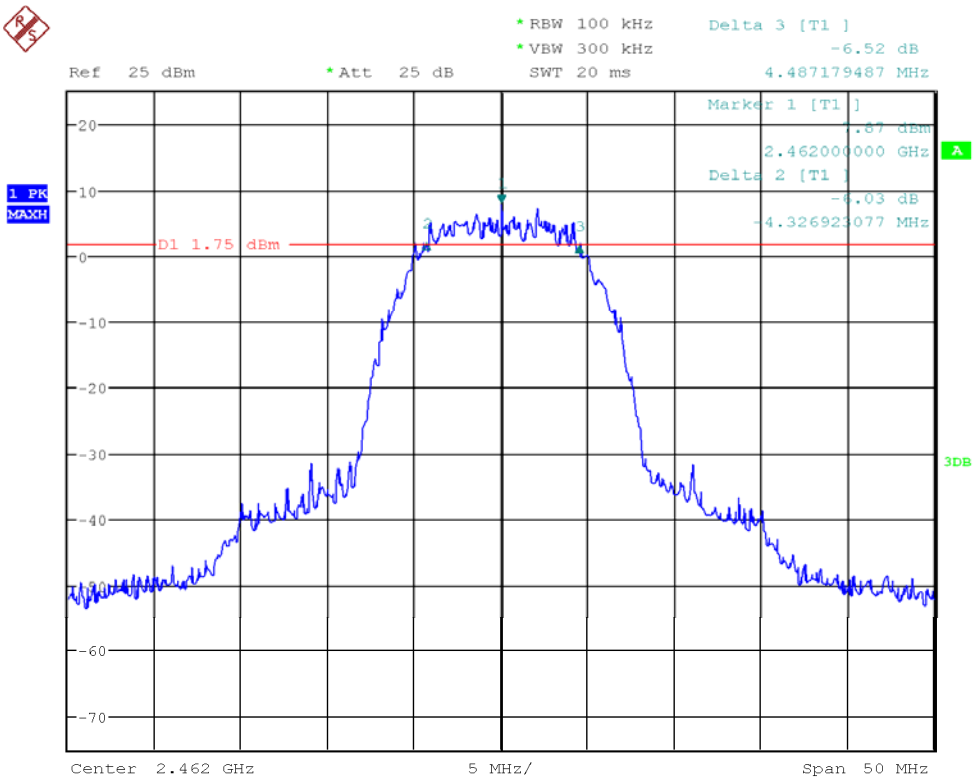


Fig.12 Occupied 6dB Bandwidth (802.11b, Ch11)

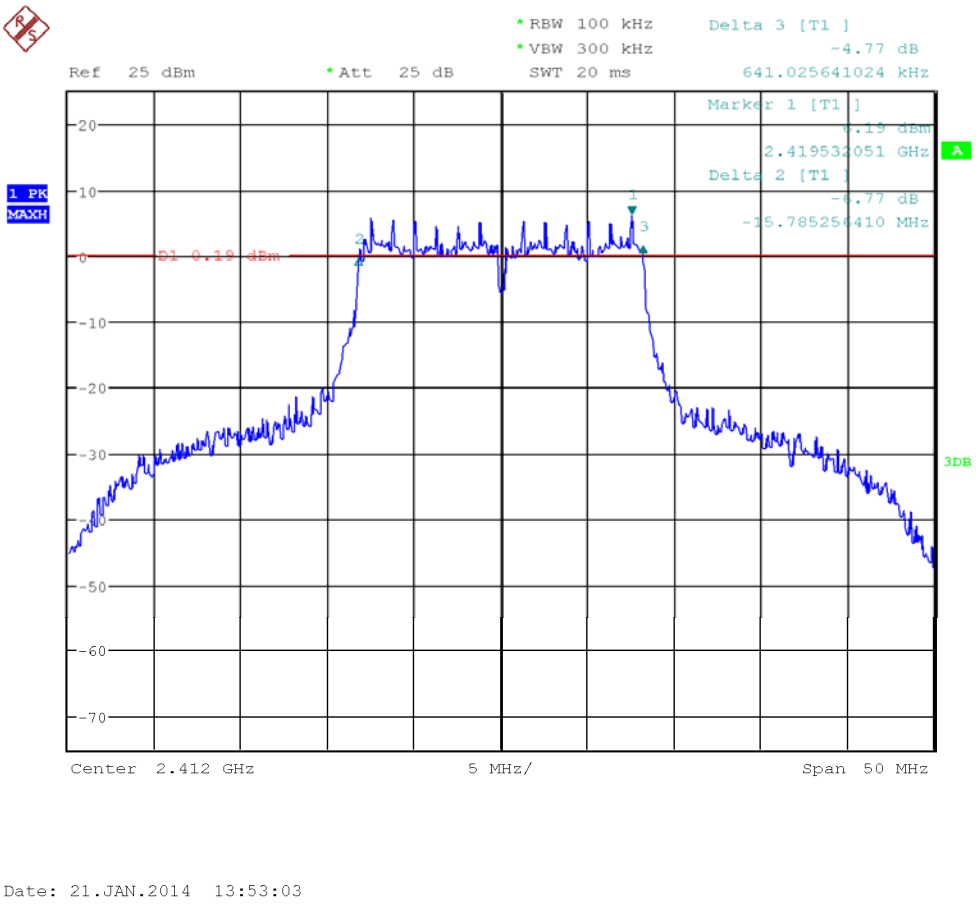


Fig.13 Occupied 6dB Bandwidth (802.11g, Ch1)

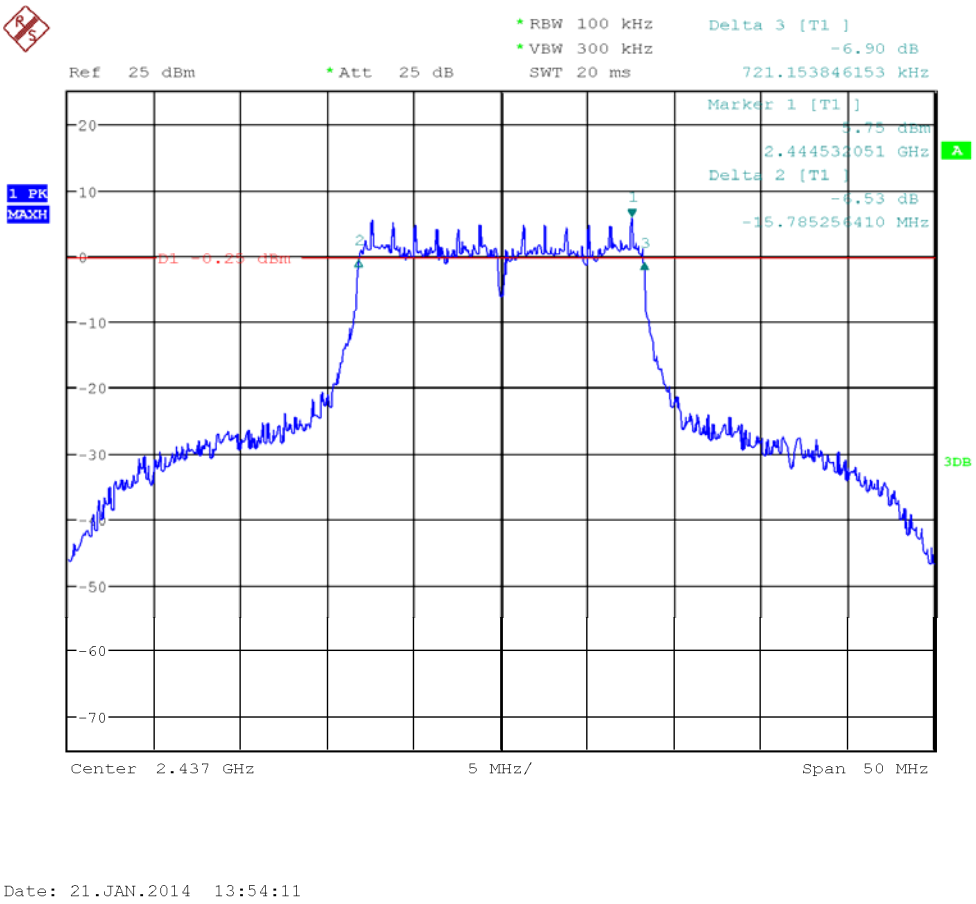


Fig.14 Occupied 6dB Bandwidth (802.11g, Ch6)

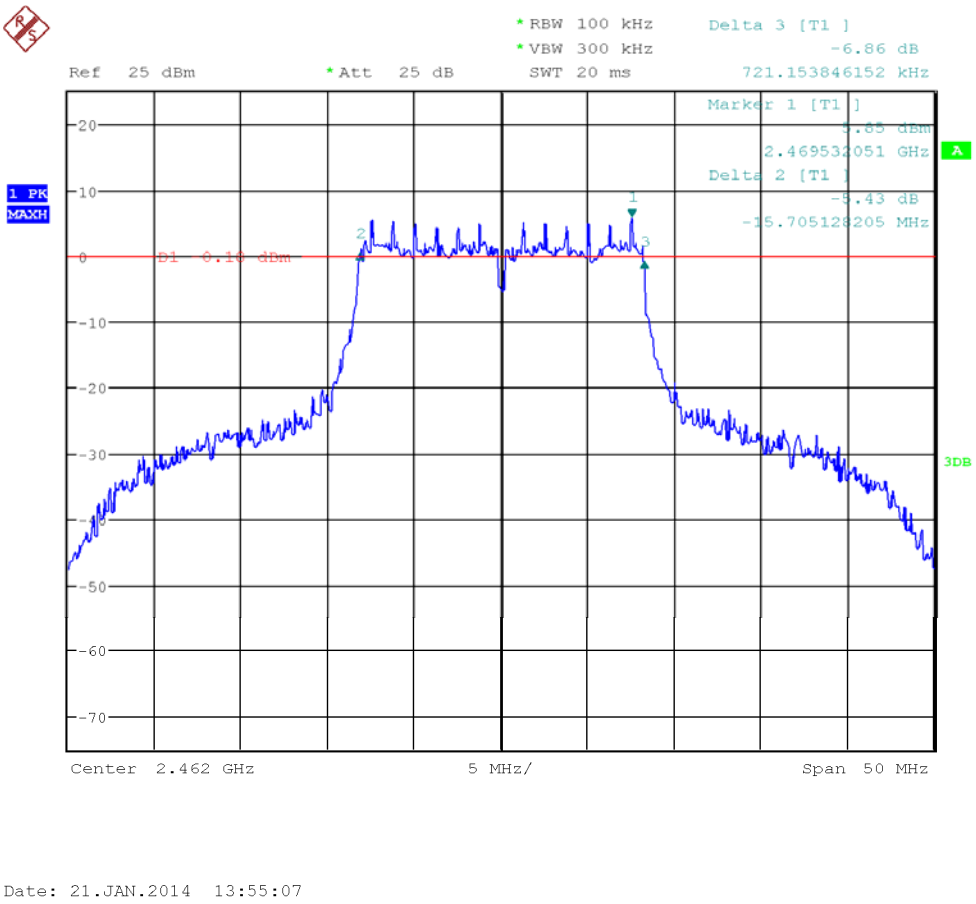


Fig.15 Occupied 6dB Bandwidth (802.11g, Ch11)

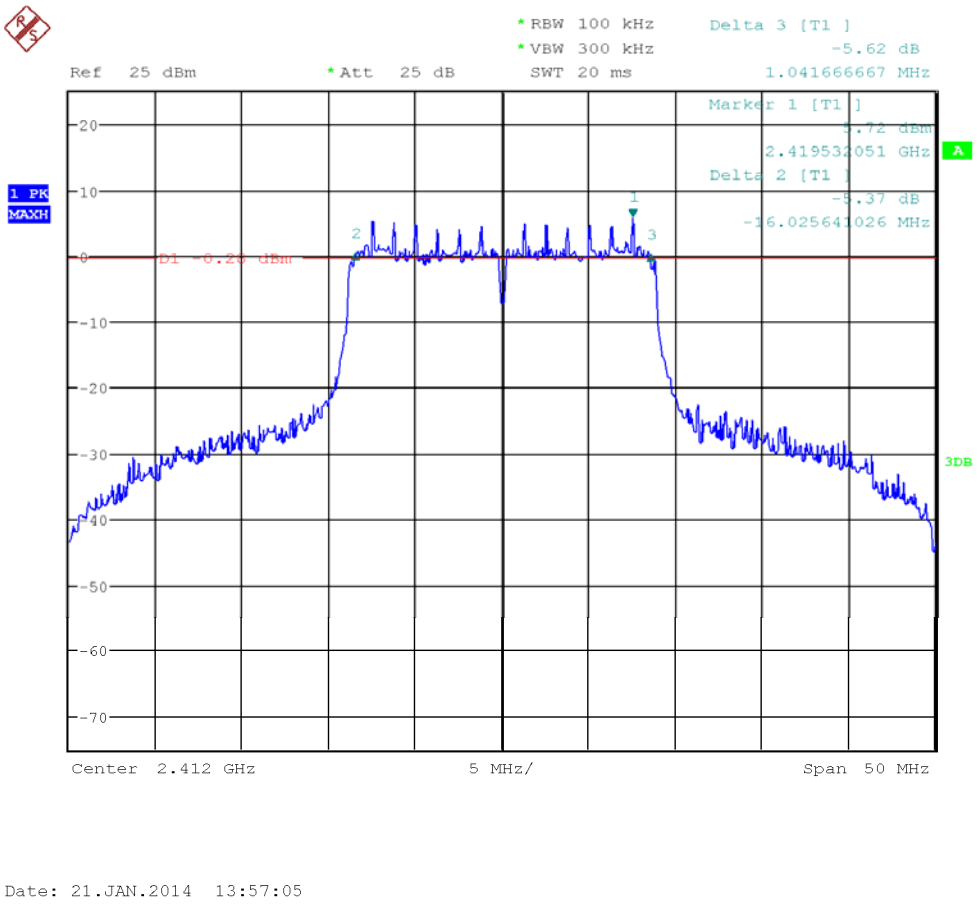


Fig.16 Occupied 6dB Bandwidth (802.11n-20MHz, Ch1)

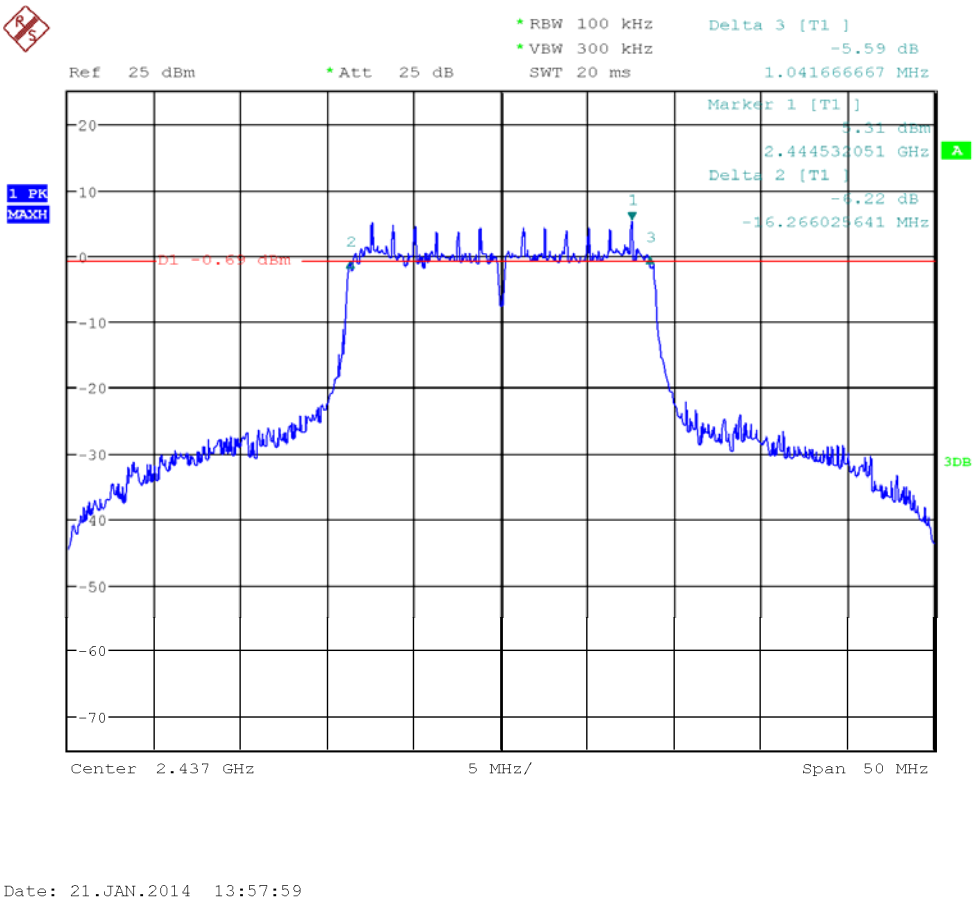


Fig.17 Occupied 6dB Bandwidth (802.11n-20MHz, Ch6)

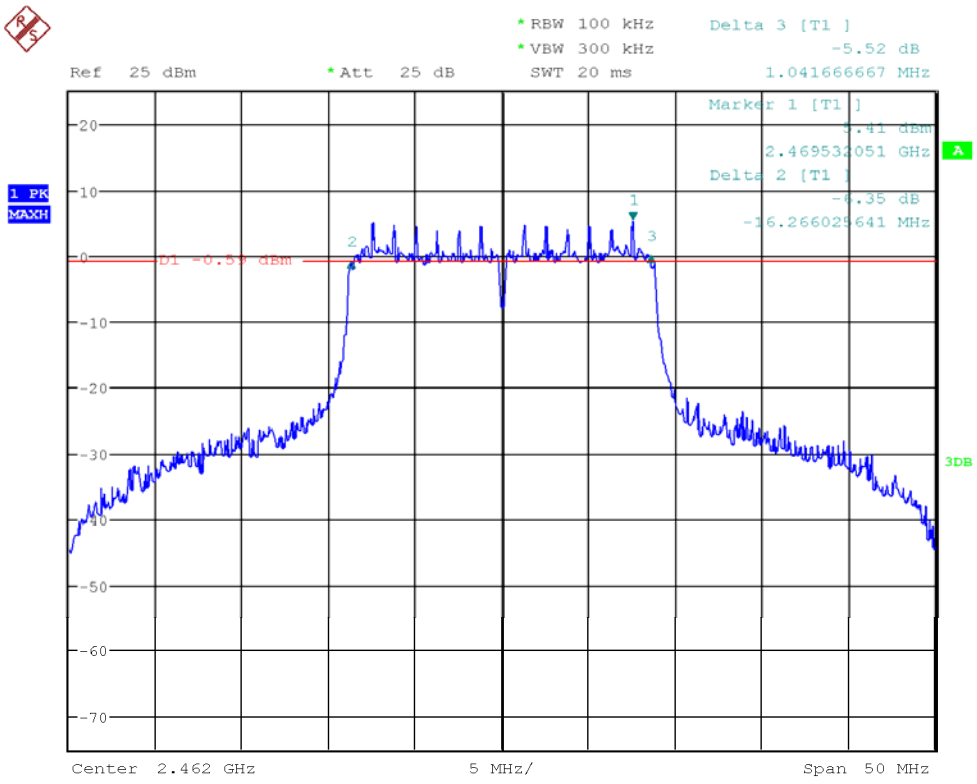


Fig.18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch11)

5.4. Band Edges Compliance

Measurement Limit:

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

The measurement is according to ANSI C63.10.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Test procedures:

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

802.11b/g mode

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.19	P

	11	Fig.20	P
802.11g	1	Fig.21	P
	11	Fig.22	P

802.11n mode

Mode	Channel	Test Results	Conclusion
802.11n(20MHz)	1	Fig.23	P
	11	Fig.24	P
802.11(40MHz)	/	/	/
	/	/	/

Conclusion: PASS

Test graphs as blew:

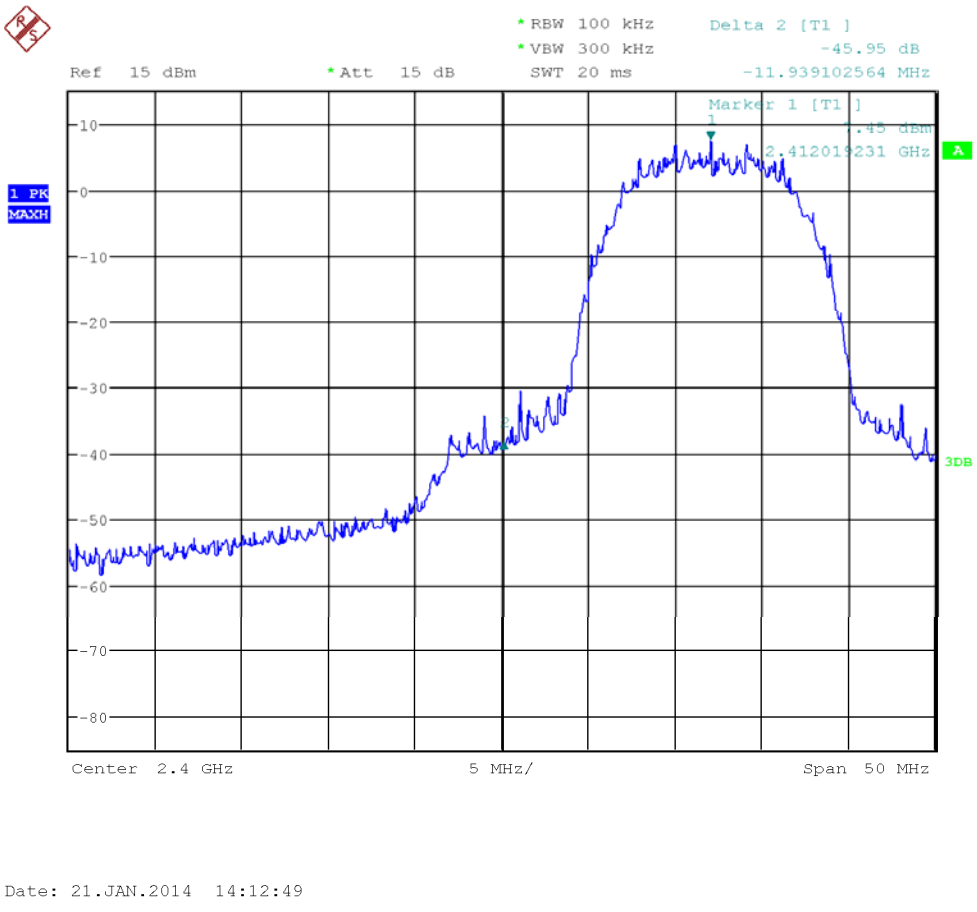


Fig.19 Band Edges (802.11b, Ch1)

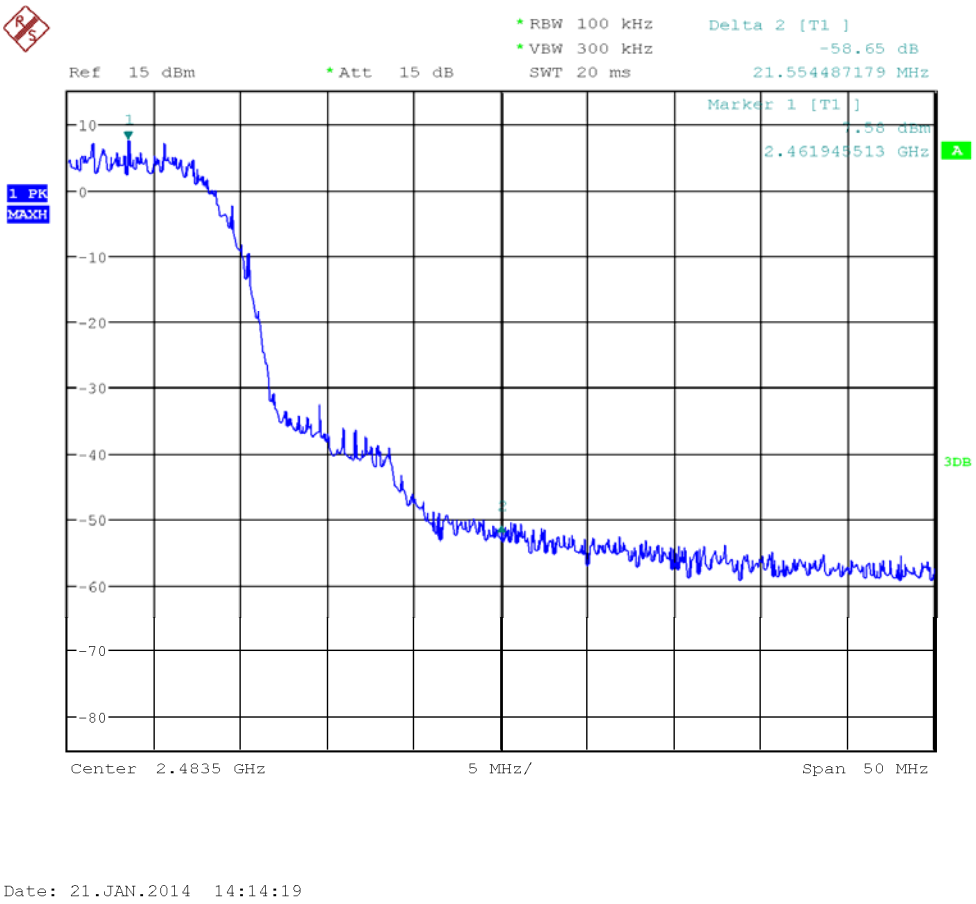


Fig.20 Band Edges (802.11b, Ch11)

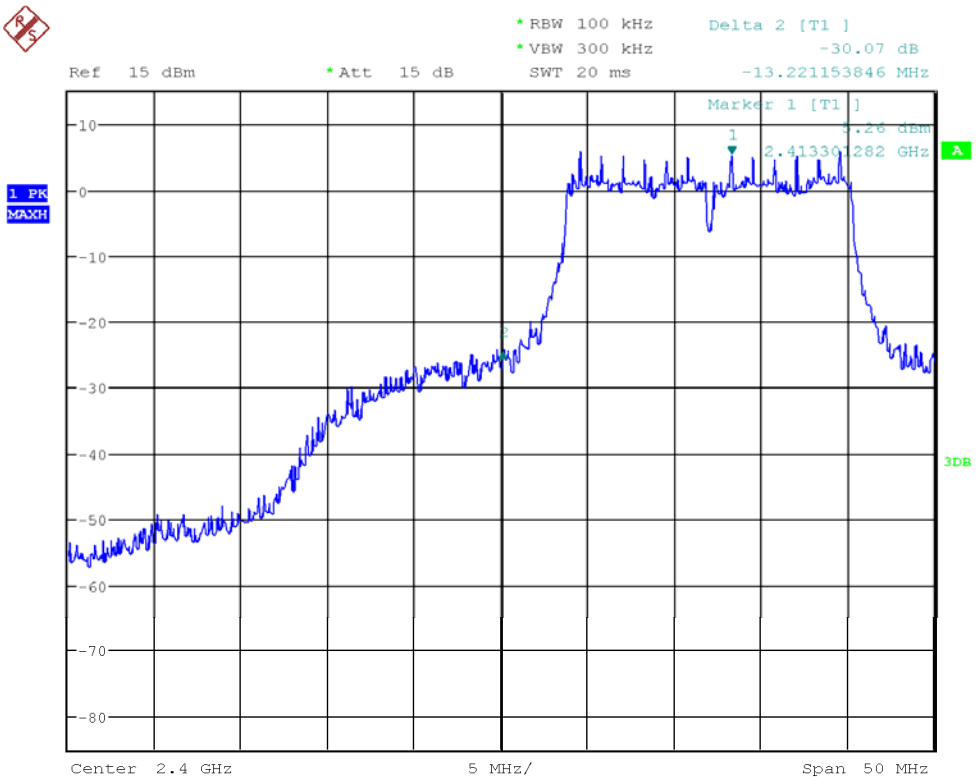


Fig.21 Band Edges (802.11g, Ch1)

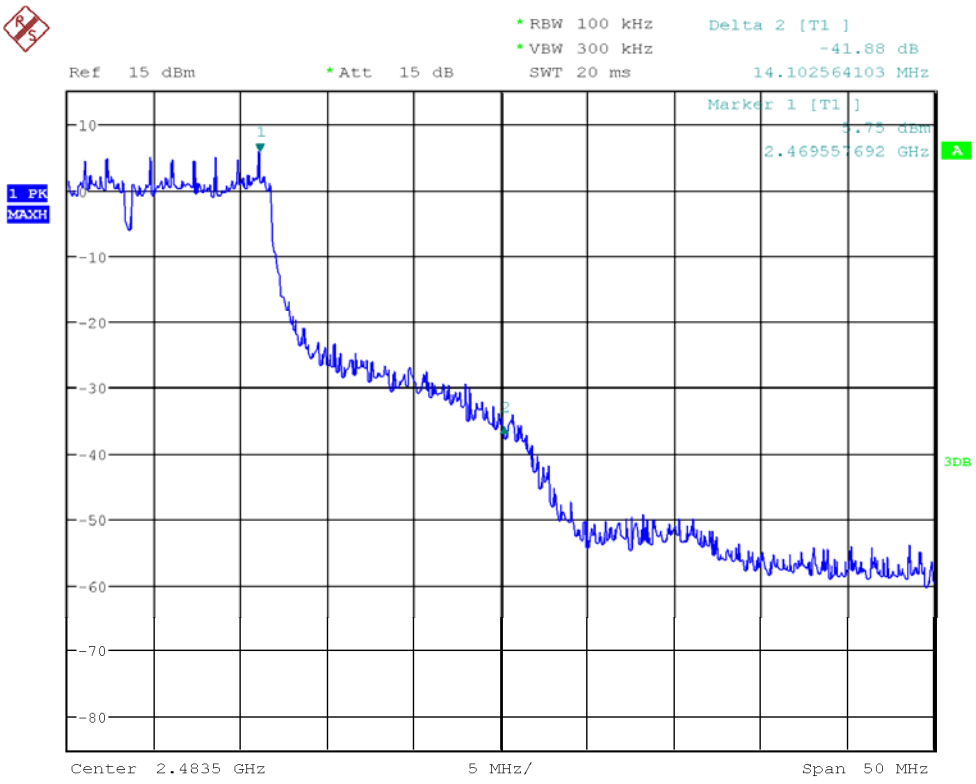


Fig.22 Band Edges (802.11g, Ch11)

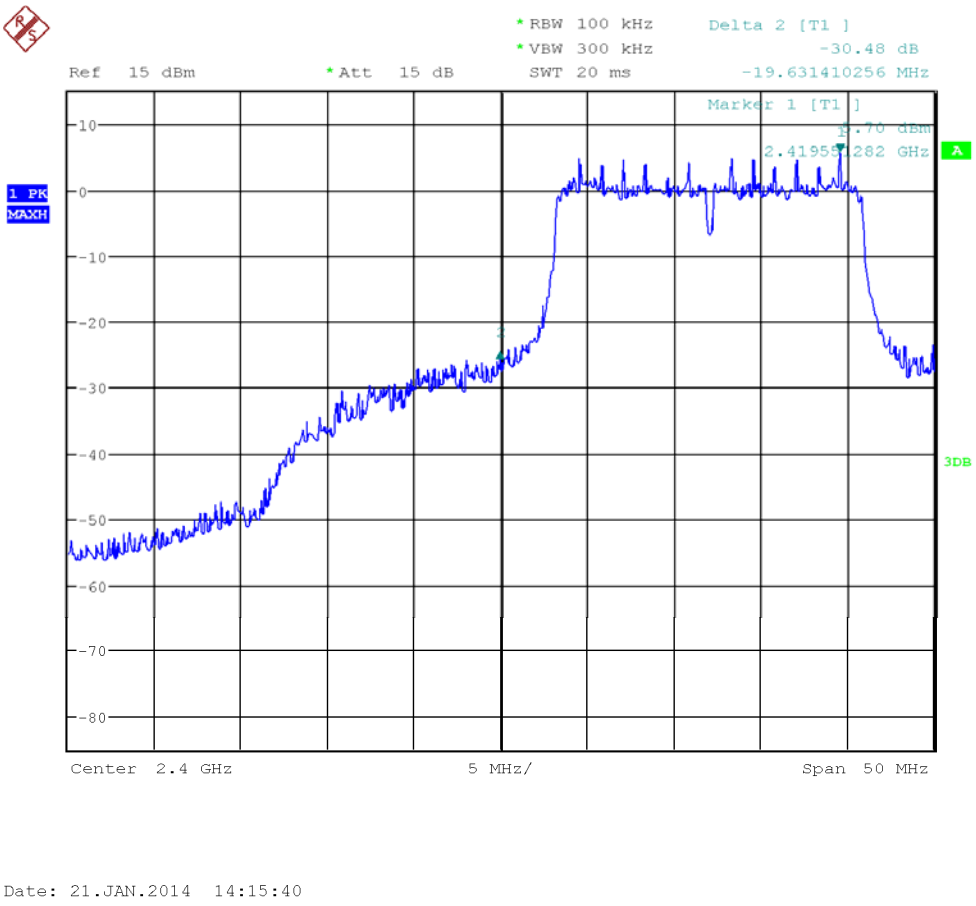


Fig.23 Band Edges (802.11n-20MHz, Ch1)

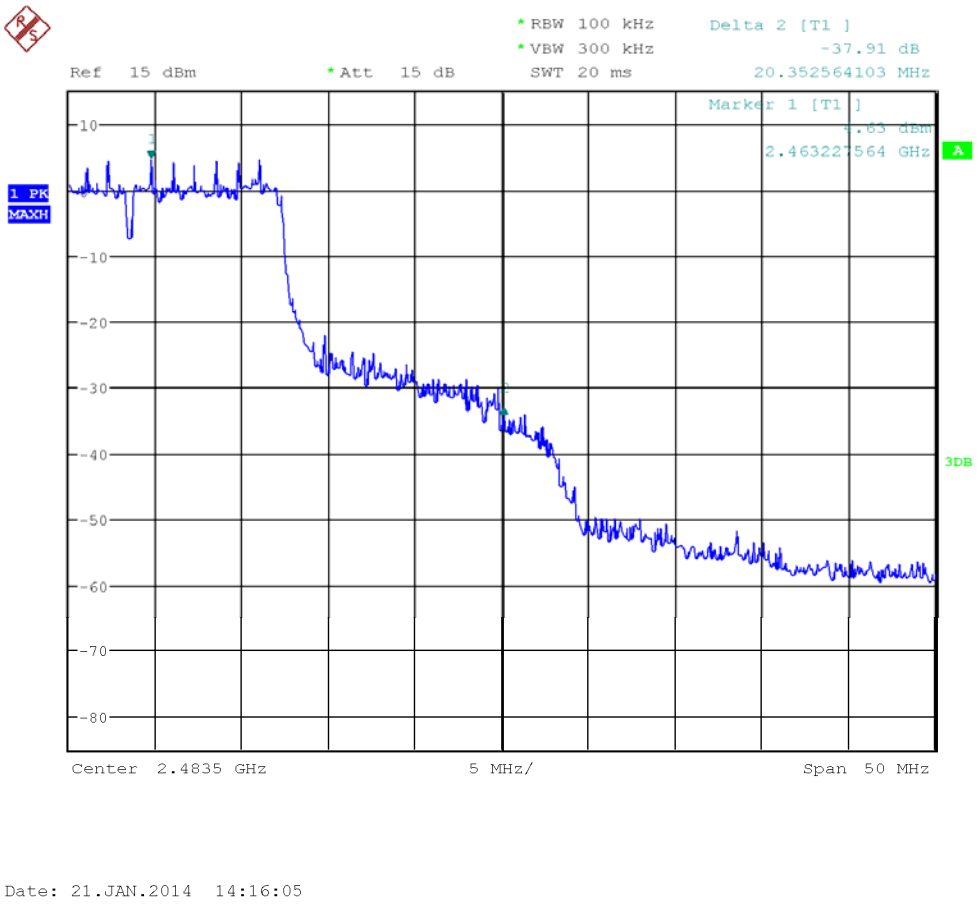


Fig.24 Band Edges (802.11b-20MHz, Ch11)

5.5. Transmitter Spurious Emission-conducted

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(d)	20dB below peak output power in 100KHz bandwidth

This measurement is according to ANSI C63.10.

Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz≤ f ≤2GHz	0.63
2GHz≤ f ≤3.6GHz	0.82
3.6GHz≤ f ≤8GHz	1.55
8GHz≤ f ≤20GHz	1.86
20GHz≤ f ≤22GHz	1.90
22GHz≤ f ≤26GHz	2.20

Test procedures:

4. Connect the EUT to spectrum analyzer.
5. Set RBW=100KHz, VBW=300KHz.
6. Detector =peak, sweep time=auto couple, trace mode=max hold.

Measurement Result:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412GHz	Fig.25	P
		30MHz~26GHz	Fig.26	P
	6	2.437GHz	Fig.27	P
		30MHz~26GHz	Fig.28	P
	11	2.472GHz	Fig.29	P
		30MHz~26GHz	Fig.30	P
802.11g	1	2.412GHz	Fig.31	P
		30MHz~26GHz	Fig.32	P
	6	2.437GHz	Fig.33	P
		30MHz~26GHz	Fig.34	P
	11	2.472GHz	Fig.35	P
		30MHz~26GHz	Fig.36	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	1	2.412GHz	Fig.37	P
		30MHz~26GHz	Fig.38	P
	6	2.437GHz	Fig.39	P
		30MHz~26GHz	Fig.40	P
	11	2.472GHz	Fig.41	P
		30MHz~26GHz	Fig.42	P
802.11n(40MHz)	1	/	/	/

		/	/	/
	6	/	/	/
		/		/
	11	/	/	/
		/		/

Conclusion: PASS

Test graphs as below:

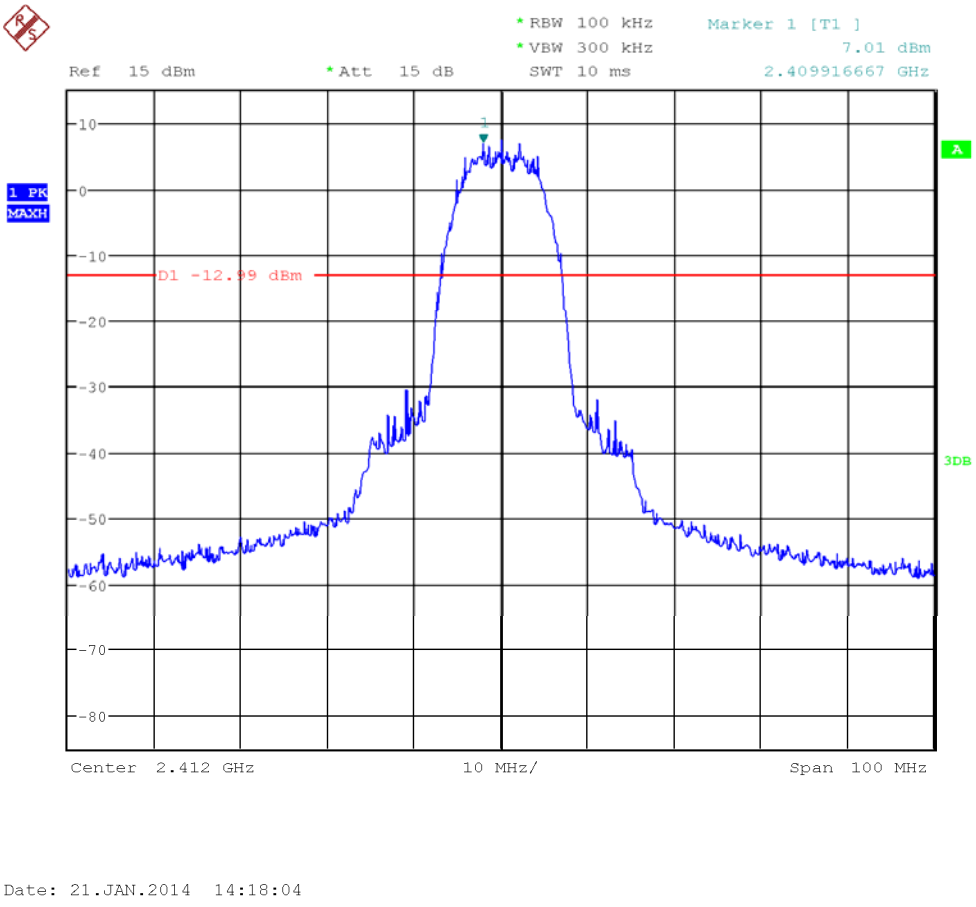


Fig.25 Conducted Spurious Emission (802.11b, Ch1)

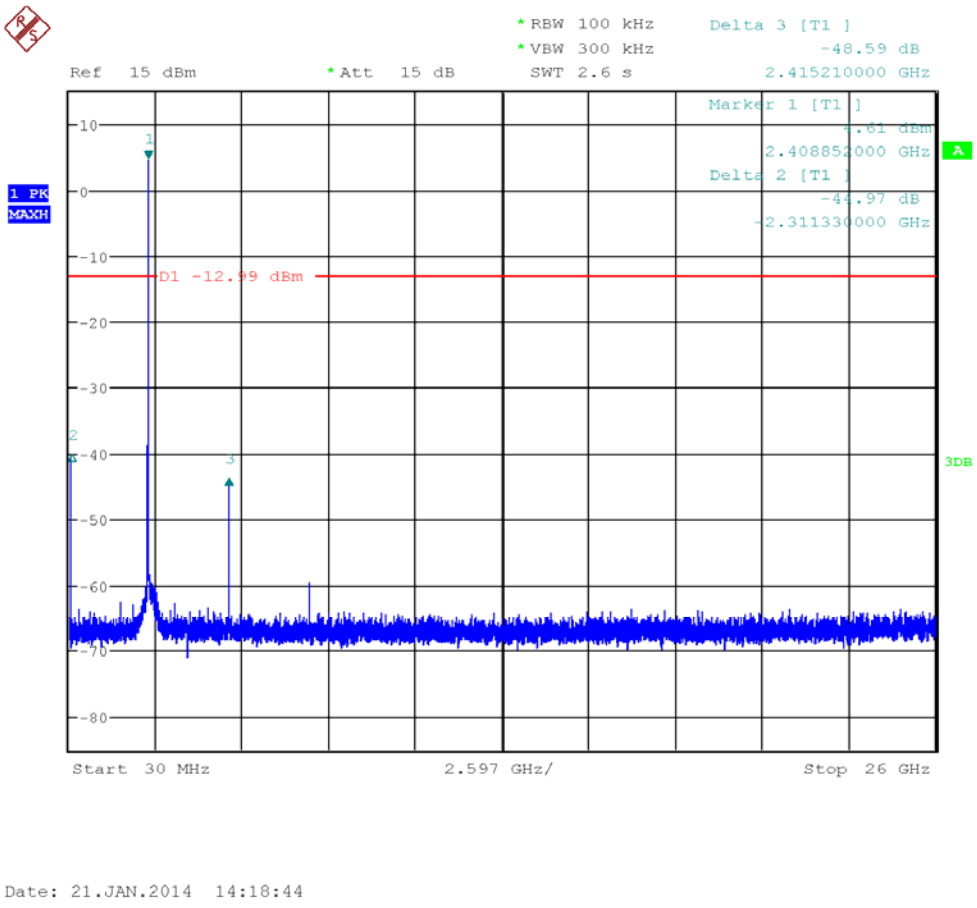


Fig.26 Conducted Spurious Emission (802.11b, Ch1, 30MHz~26GHz)

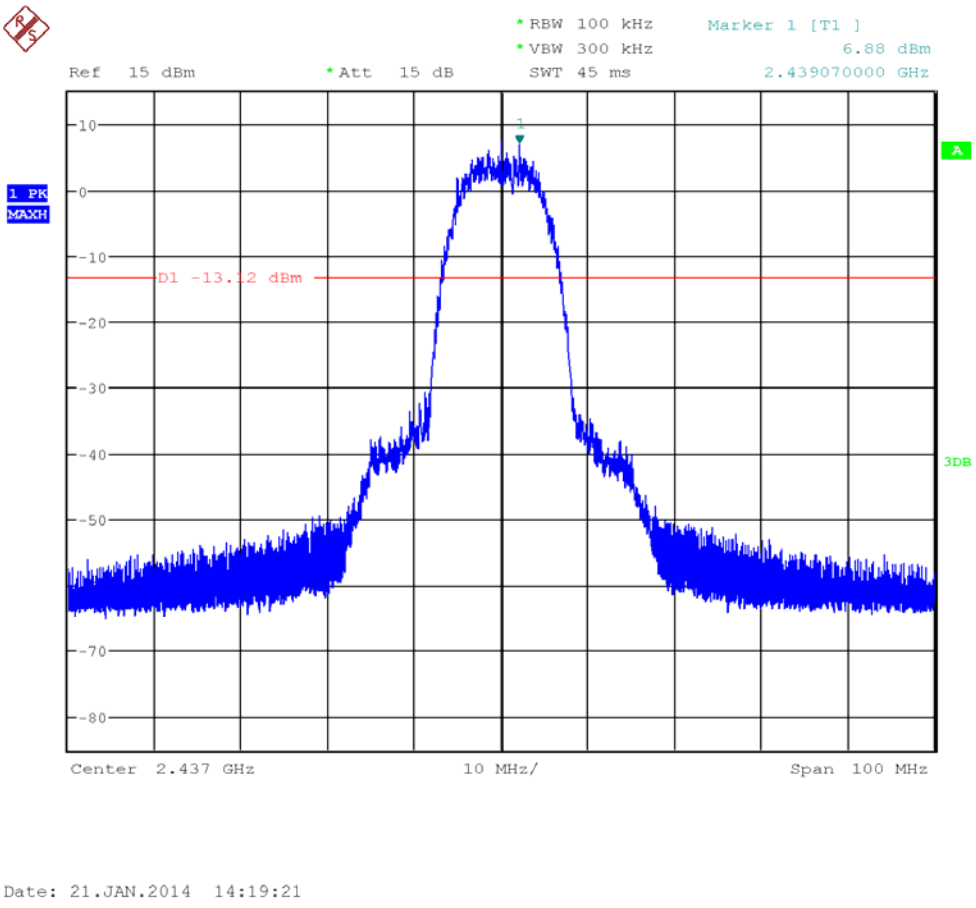


Fig.27 Conducted Spurious Emission (802.11b, Ch6)

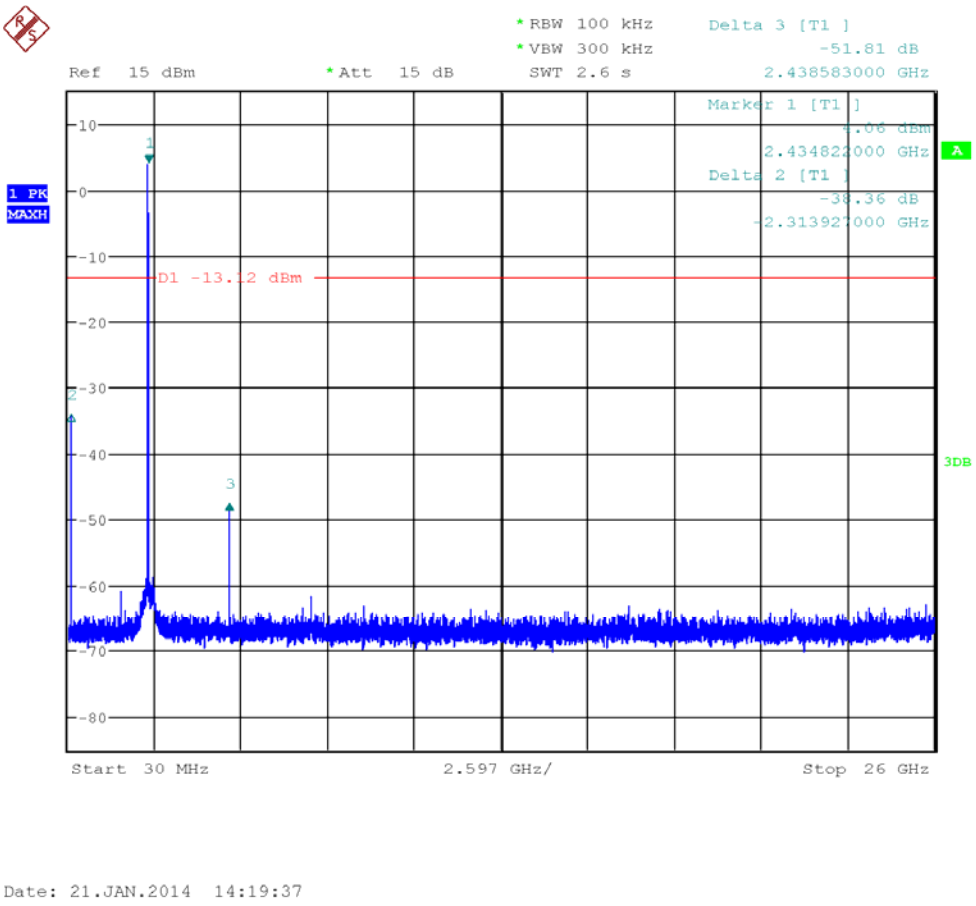


Fig.28 Conducted Spurious Emission (802.11b, Ch6, 30MHz~26GHz)

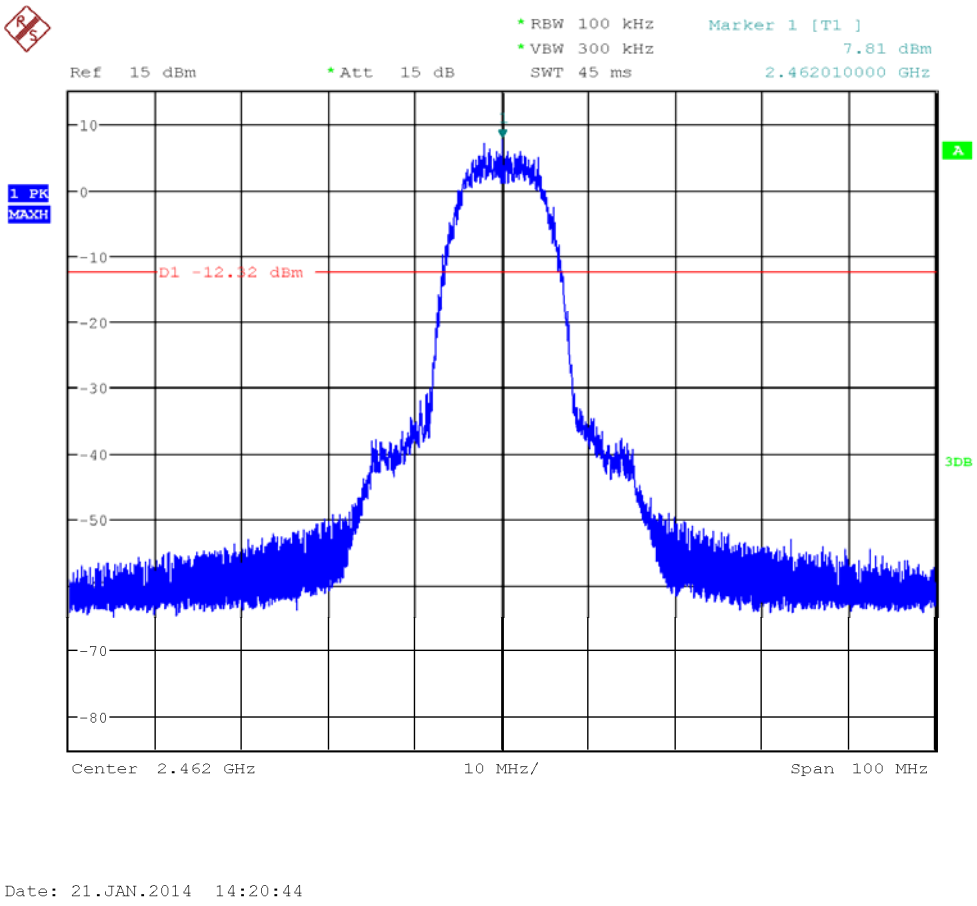


Fig.29 Conducted Spurious Emission (802.11b, Ch11)

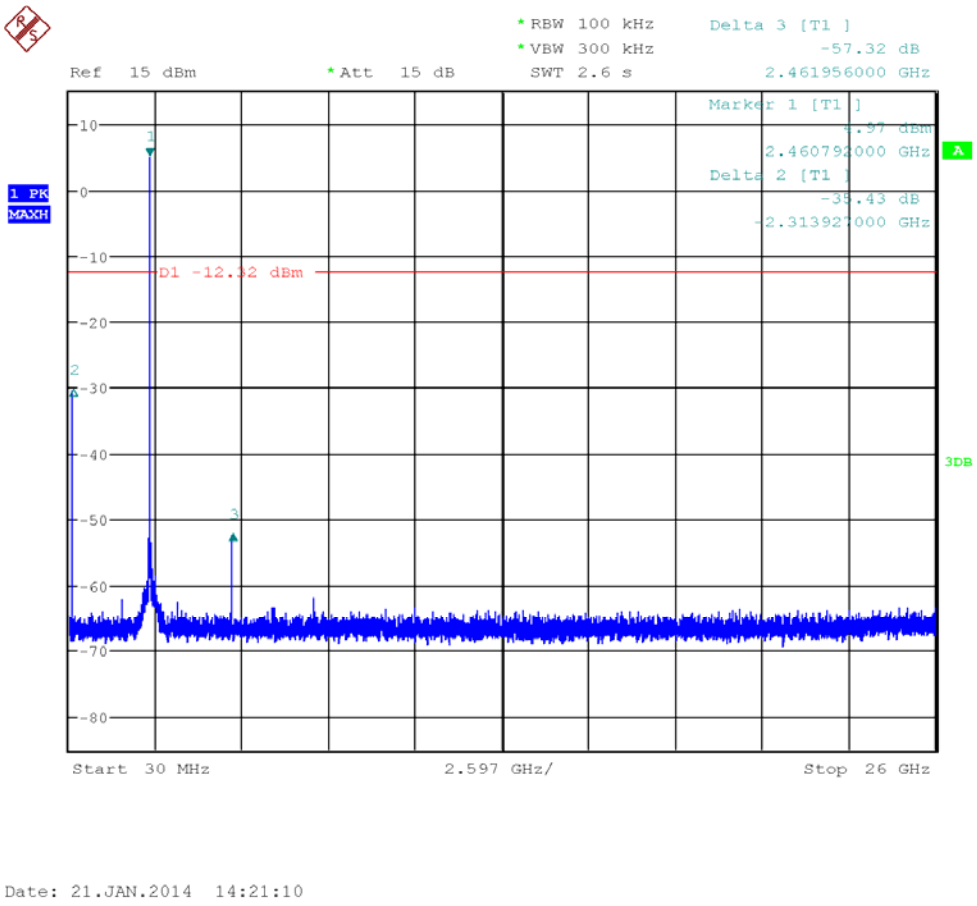


Fig.30 Conducted Spurious Emission (802.11b, Ch11, 30MHz~26GHz)

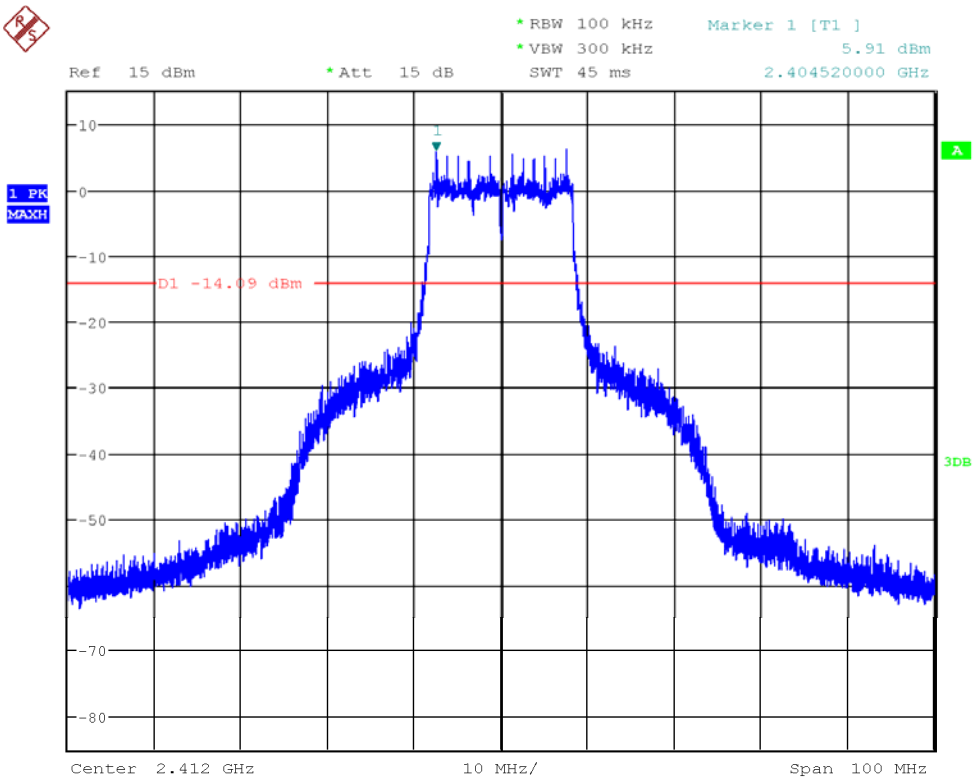


Fig.31 Conducted Spurious Emission (802.11g, Ch1)

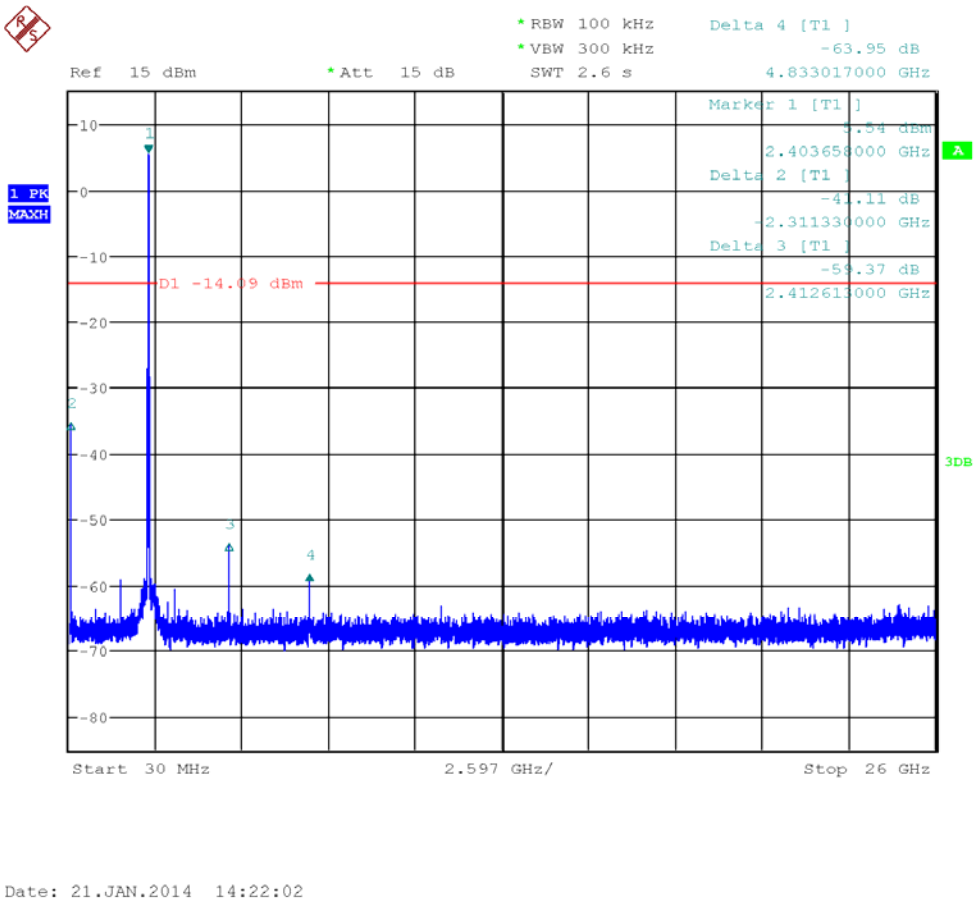


Fig.32 Conducted Spurious Emission (802.11g, Ch1, 30MHz~26GHz)

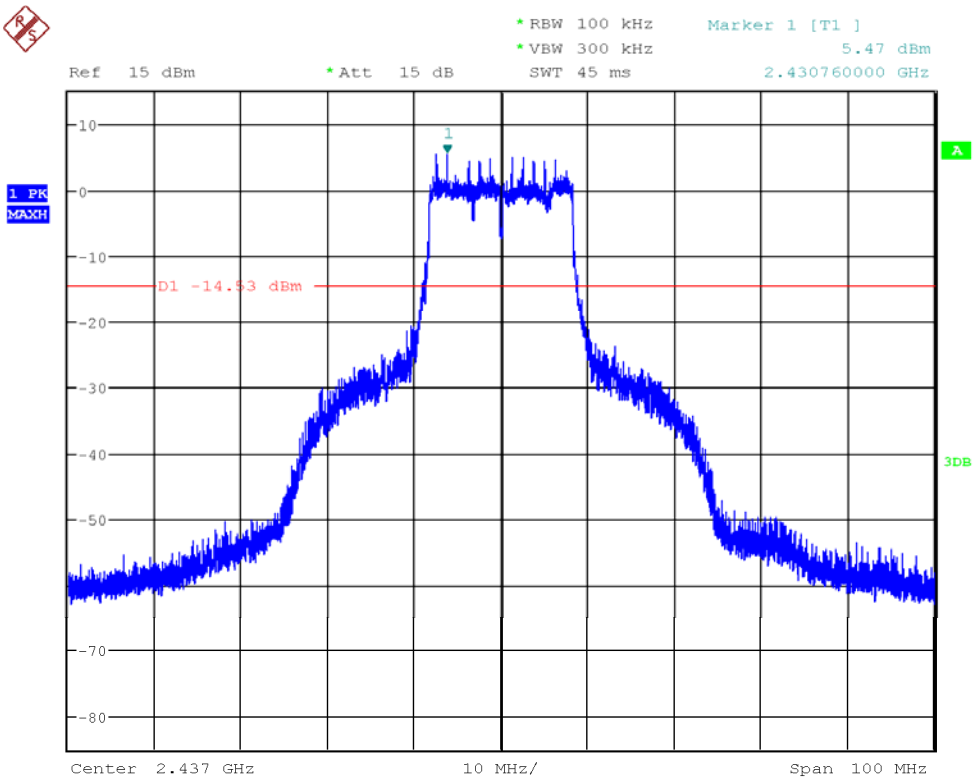


Fig.33 Conducted Spurious Emission (802.11g, Ch6)

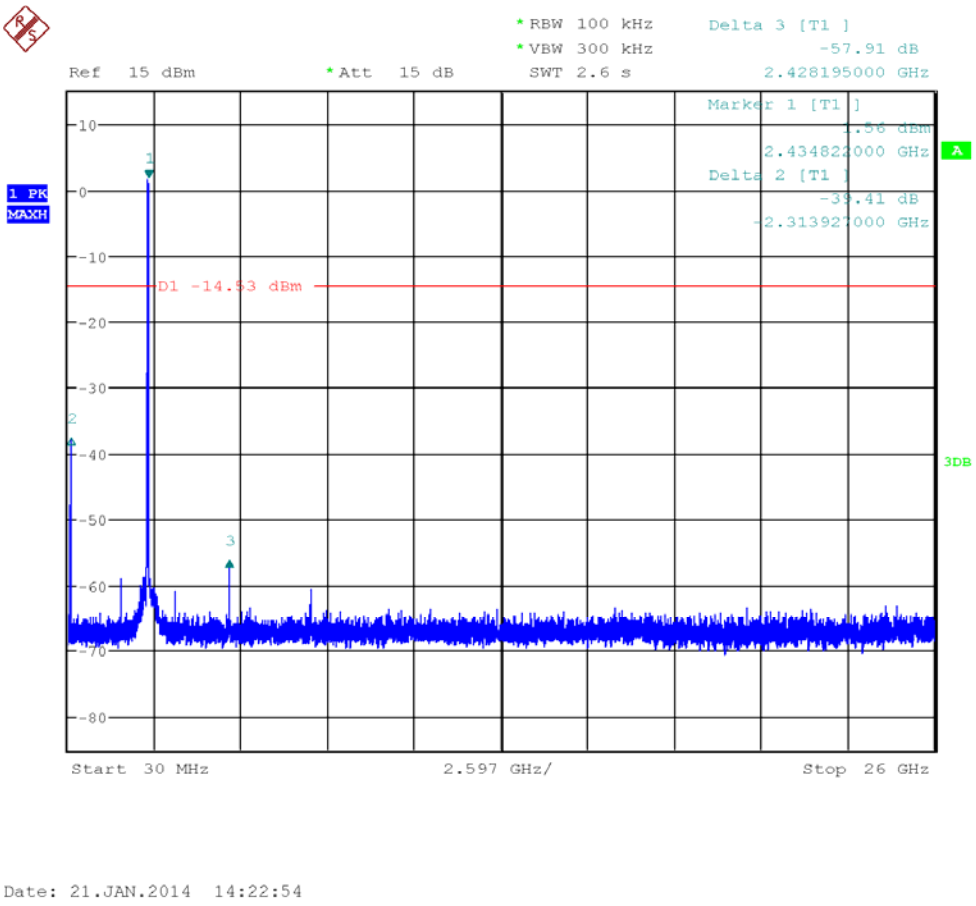


Fig.34 Conducted Spurious Emission (802.11g, Ch6, 30MHz~26GHz)

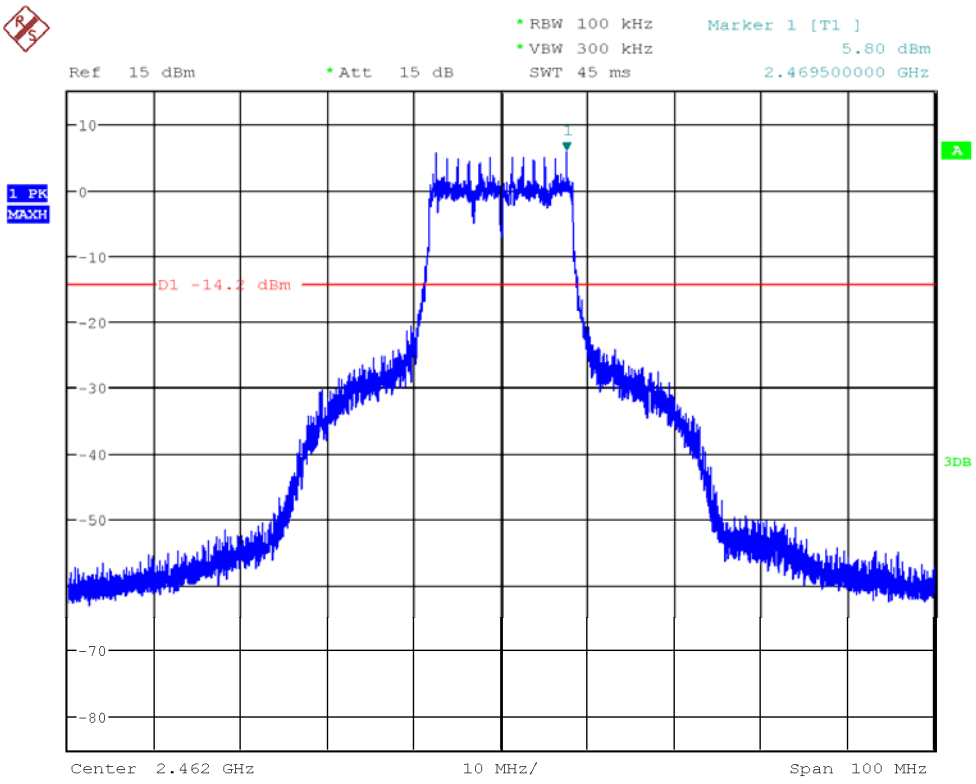


Fig.35 Conducted Spurious Emission (802.11g, Ch11)

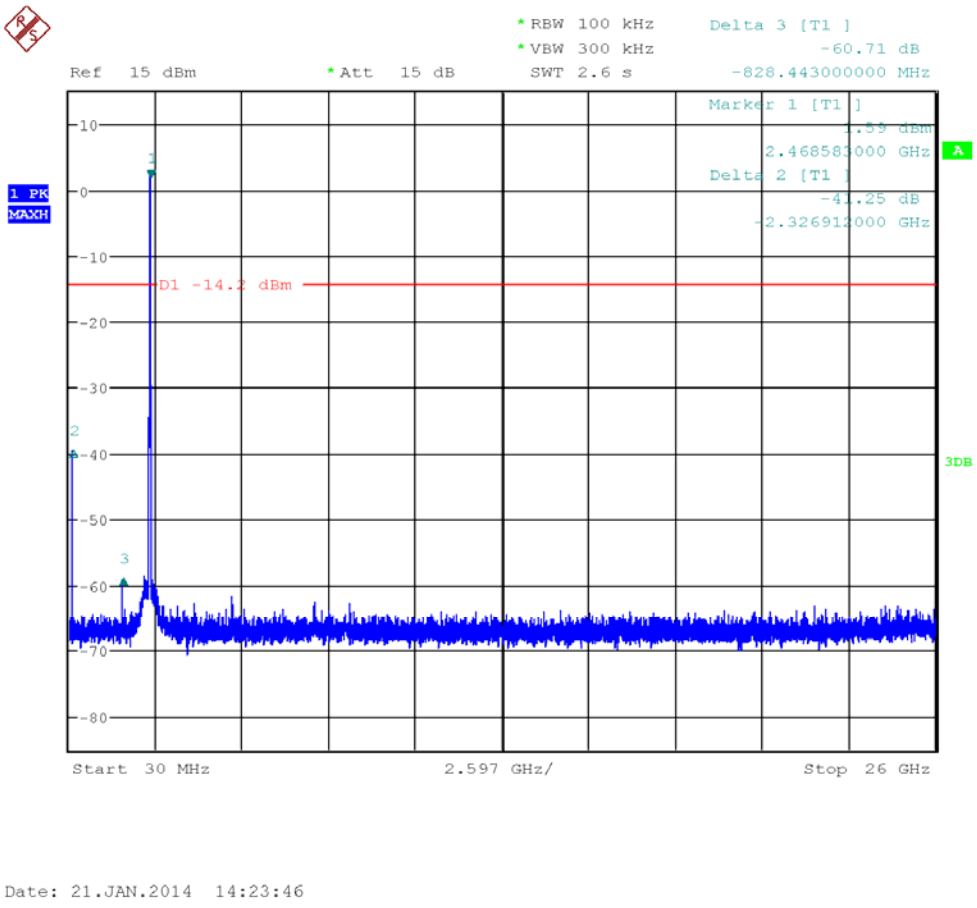


Fig.36 Conducted Spurious Emission (802.11g, Ch11, 30MHz~26GHz)

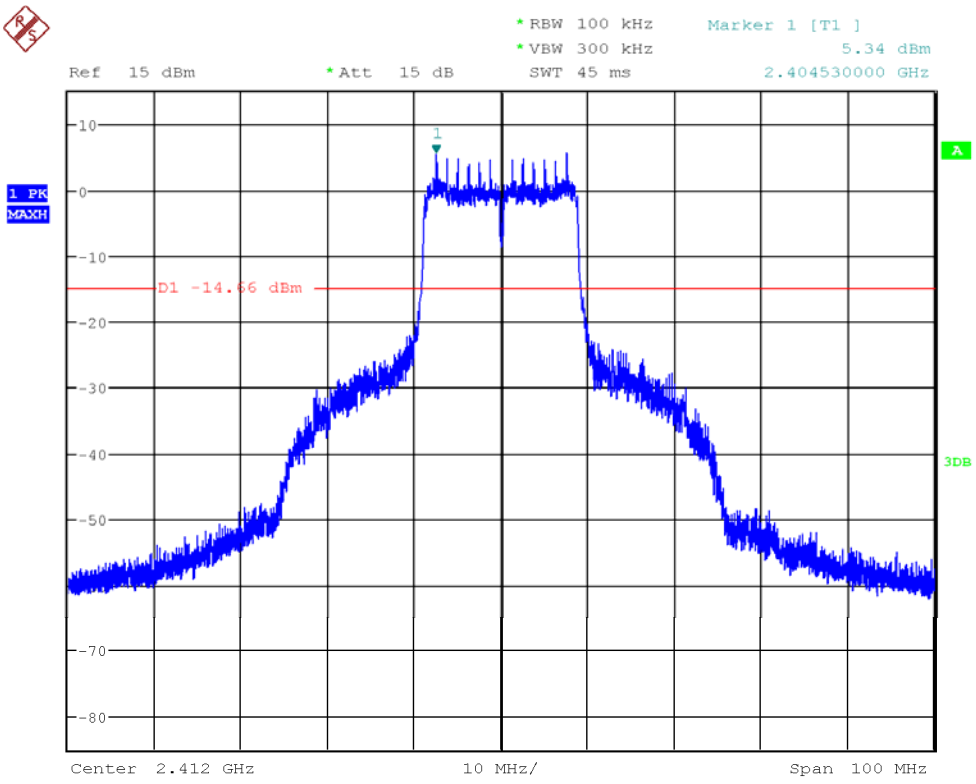


Fig.37 Conducted Spurious Emission (802.11n-20MHz, Ch1)

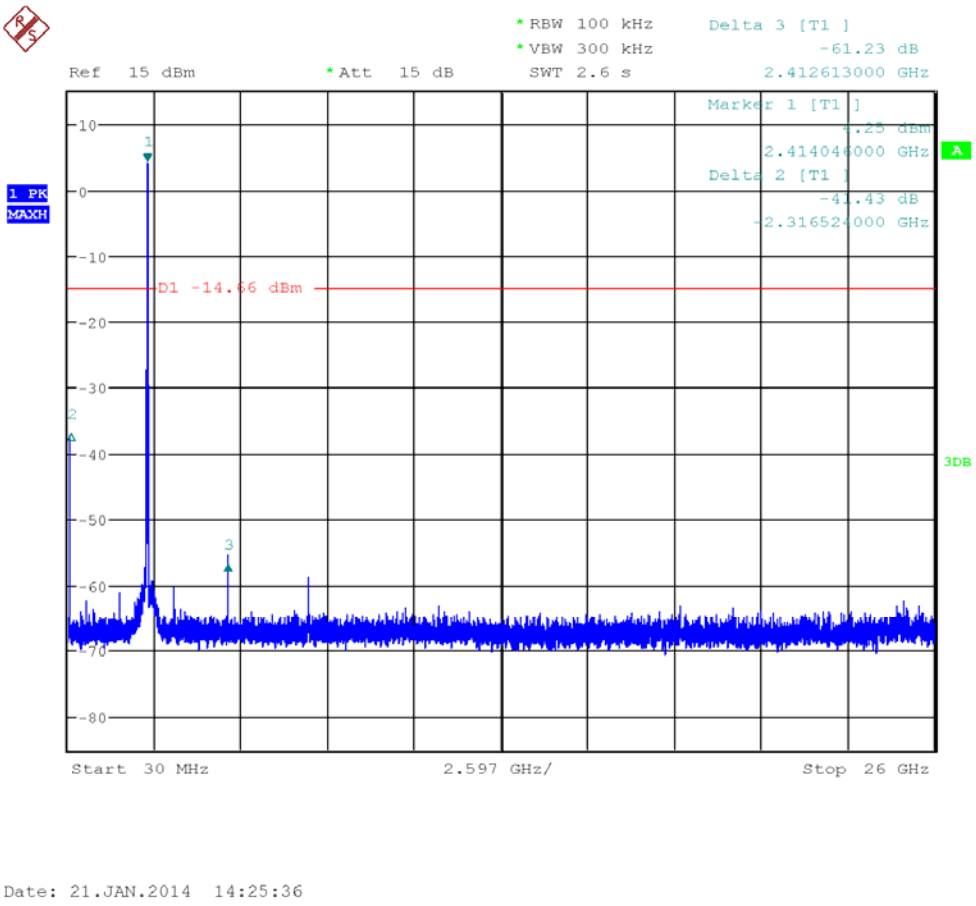


Fig.38 Conducted Spurious Emission (802.11n-20MHz, Ch1, 30MHz~26GHz)

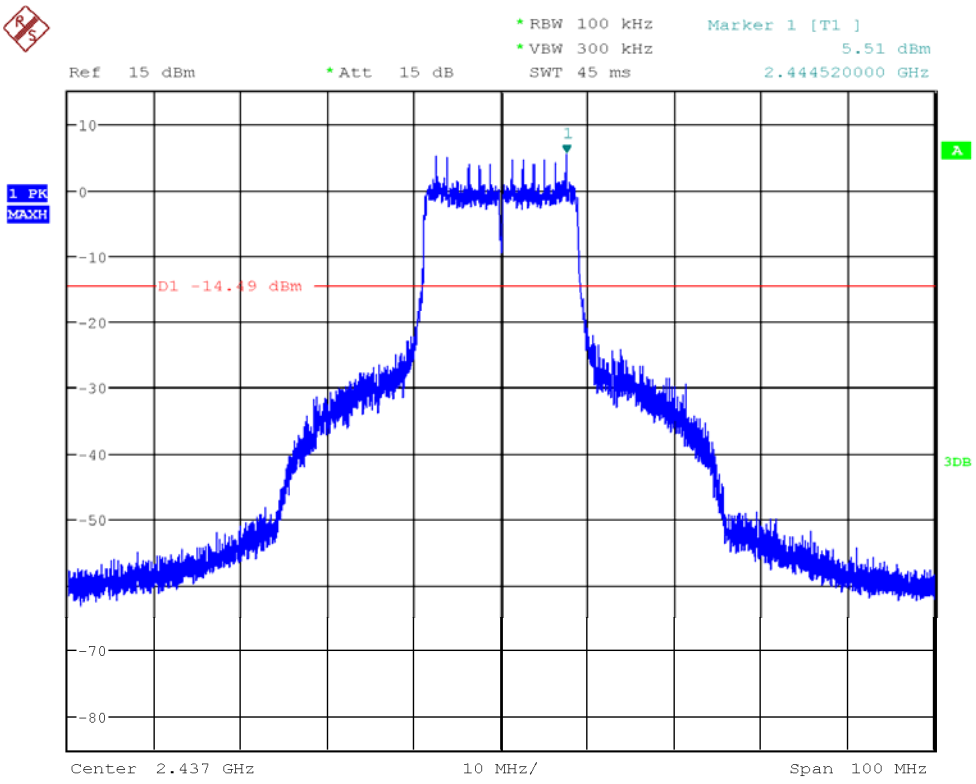


Fig.39 Conducted Spurious Emission (802.11n-20MHz, Ch6)

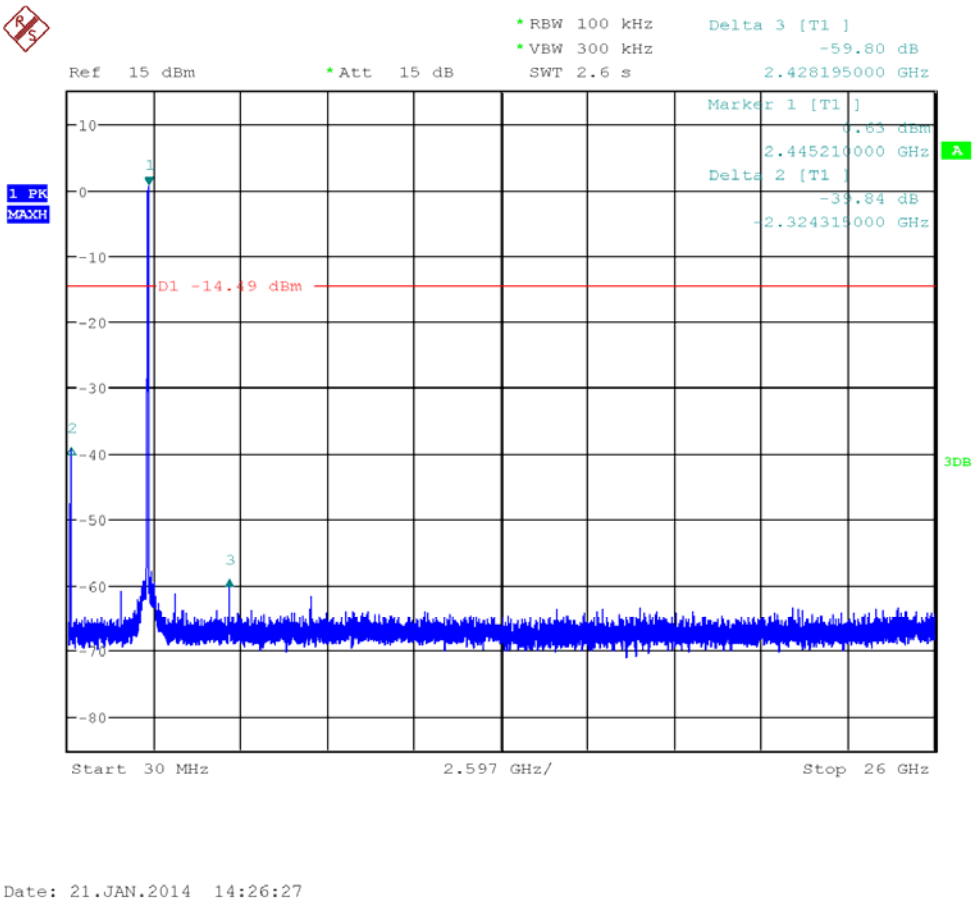


Fig.40 Conducted Spurious Emission (802.11n-20MHz, Ch6, 30MHz~26GHz)

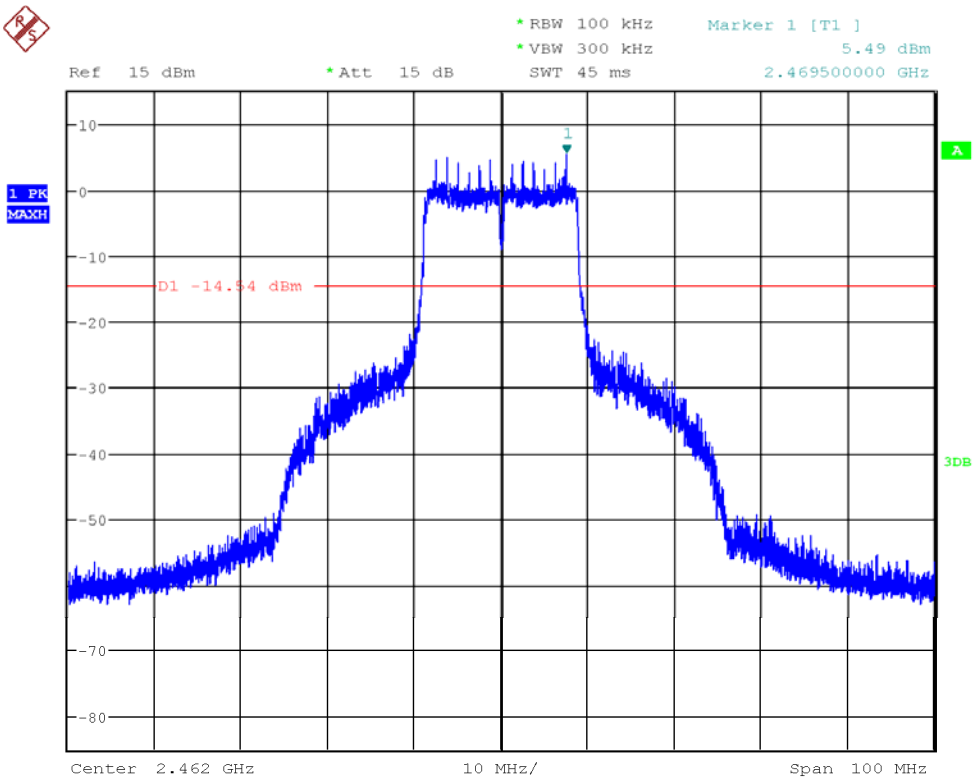


Fig.41 Conducted Spurious Emission (802.11n-20MHz, Ch11)

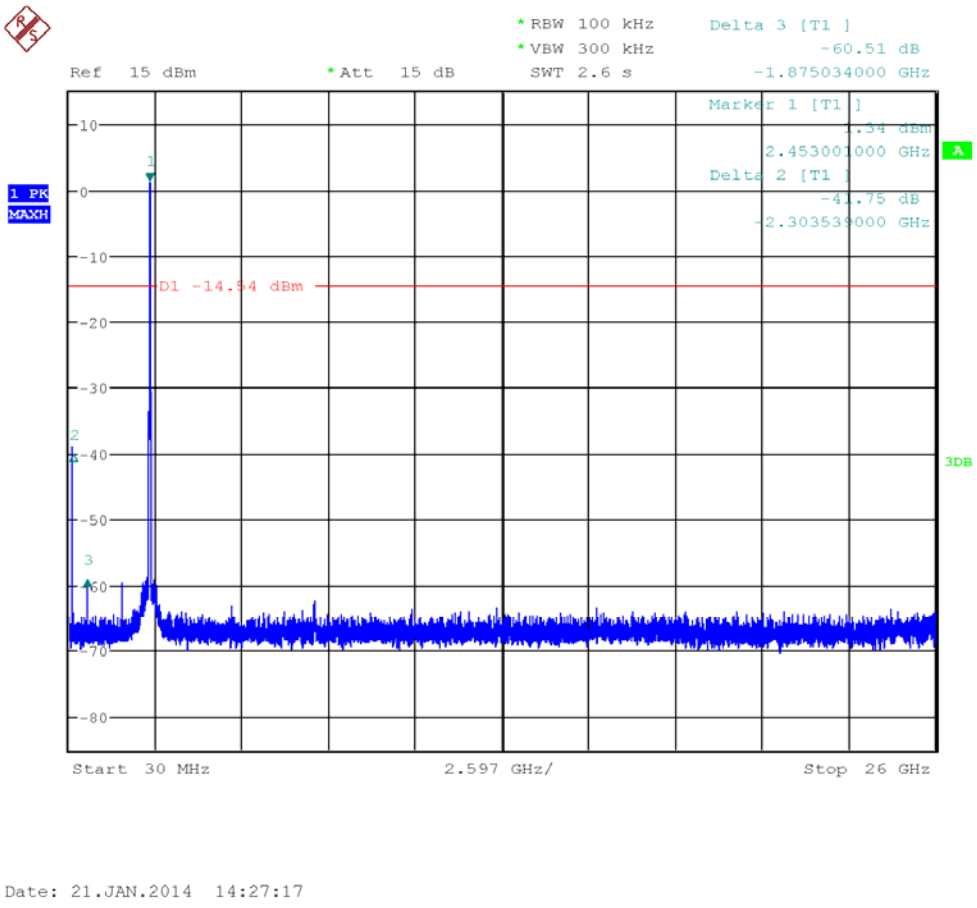


Fig.42 Conducted Spurious Emission (802.11n-20MHz, Ch11, 30MHz~26GHz)

5.6. 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 25.205(a), must also comply with the radiated emission limits specified in 15.209(a)(see 15.205(c)). The measurement is according to ANSI C63.10.

Limit in restricted band:

Frequency of emission(MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

Test condition:

Portable, small, lightweight, or modular devices that may be handheld, worn on the body,

or placed on a table during operation shall be positioned on a nonconducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

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

Frequency of emission (MHz)	RBW/VBW	Sweep Times (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz~2.45GHz	Fig.44	P
	Power	2.45GHz~2.5GHz	Fig.45	P
	1	30MHz~1GHz	Fig.46	P
		1GHz~3GHz	Fig.47	P
		3GHz~18GHz	Fig.48	P
802.11g	Power	2.38GHz~2.45GHz	Fig.49	P
	Power	2.45GHz~2.5GHz	Fig.50	P
	11	30MHz~1GHz	Fig.51	P
		1GHz~3GHz	Fig.52	P
		3GHz~18GHz	Fig.53	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	Power	2.38GHz~2.45GHz	Fig.54	P
	Power	2.45GHz~2.5GHz	Fig.55	P
	1	30MHz~1GHz	Fig.56	P
		1GHz~3GHz	Fig.57	P
		3GHz~18GHz	Fig.58	P
/	All channels	18GHz~26.5GHz	Fig.59	P

Conclusion: PASS

Note:

A ”reference path loss” is established and A_{Rpi} 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_{Rpi}= P_{Mea} + Cable Loss + Antenna Factor.

802.11b mode

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.994244	20.9	0.6	20.3	H
96.395692	31.1	0.81	30.29	V
209.903024	33.6	2.27	31.33	V
278.833832	33.3	2.71	30.59	V
418.224872	29.9	3.54	26.36	V
699.798732	32.0	4.12	27.88	V

Ch1 1GHz~3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2788.919800	53.6	13.87	39.73	V
2863.306600	54.3	14.52	39.78	V
2942.111200	54.9	15.73	39.17	V

Ch1 3GHz~18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4824.107666	46.8	5.62	41.18	V
14784.025200	48.1	14.84	33.26	H
16681.108267	50.7	15.22	35.48	H
16681.189400	49.7	15.22	34.48	V
17526.527866	50.7	16.37	34.33	V
17653.366000	51.3	16.44	34.86	H

802.11g

Ch11 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
172.168420	36.0	3.35	32.65	H
209.873624	32.9	3.84	29.06	H
278.839132	38.1	4.08	34.02	H
419.788928	30.6	5.37	25.23	H
497.927396	25.1	5.74	19.36	V
773.335796	24.9	6.96	17.94	H

Ch11 1GHz~3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1995.228000	53.5	12.69	40.81	H
2845.348800	54.1	13.15	40.95	H
2879.259600	54.7	13.93	40.77	H
2918.691000	54.9	15.72	39.18	H
2943.514000	55.3	15.86	39.44	V
2967.638400	54.6	16.01	38.59	H

Ch11 3GHz~18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4824.045600	42.6	8.1	34.5	V

7220.421867	48.1	8.32	39.78	V
16258.863000	48.3	11.54	36.76	H
16824.800800	49.1	11.97	37.13	H
17191.455933	49.9	12.87	37.03	H
17635.370333	50.0	12.98	37.02	H

802.11n-20MHz

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
38.477220	27.4	0.82	26.58	V
99.933676	27.9	3.33	24.57	H
172.273232	35.2	3.85	31.35	H
209.065872	32.4	4.48	27.92	H
279.105604	33.9	5.16	28.74	H
419.852028	33.4	6.22	27.18	H

Ch1 1GHz~3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2589.127200	52.9	14.17	38.73	H
2784.689600	54.0	14.45	39.55	H
2810.788400	54.1	15.53	38.57	V
2882.983600	54.5	15.56	38.94	H
2907.389600	54.6	15.91	38.69	H
2939.796800	54.6	16.04	38.56	H

Ch1 3GHz~18GHz

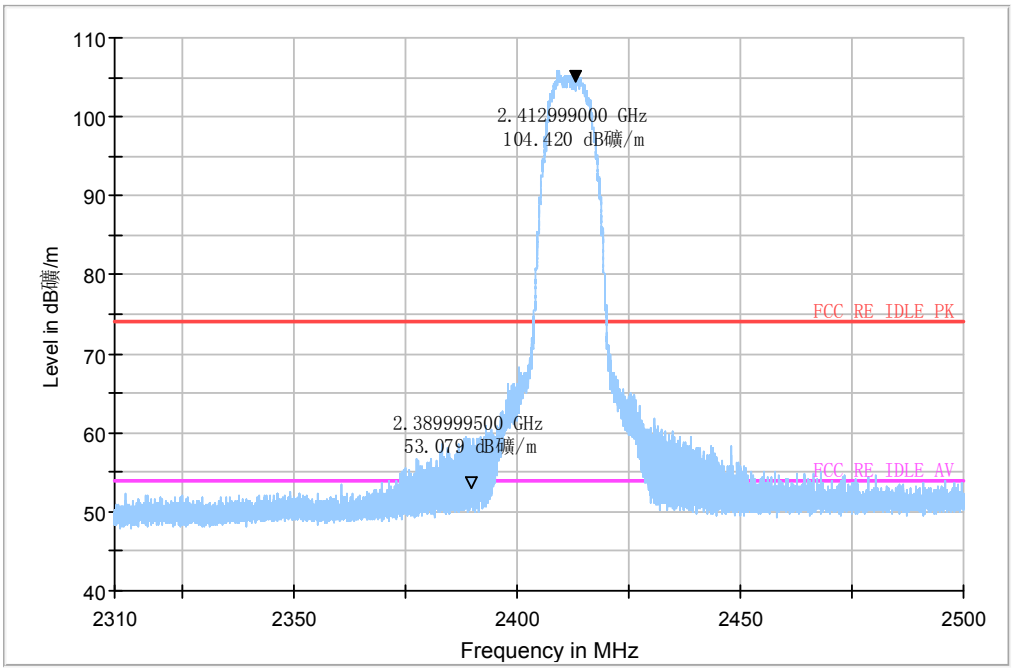
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
7221.820133	50.0	7.82	42.18	V
14217.122334	47.1	9.05	38.05	V
16345.214933	49.7	10.64	39.06	V

16808.095467	50.4	10.97	39.43	H
17326.319867	50.3	11.86	38.44	H
17755.178200	50.4	12.15	38.25	H

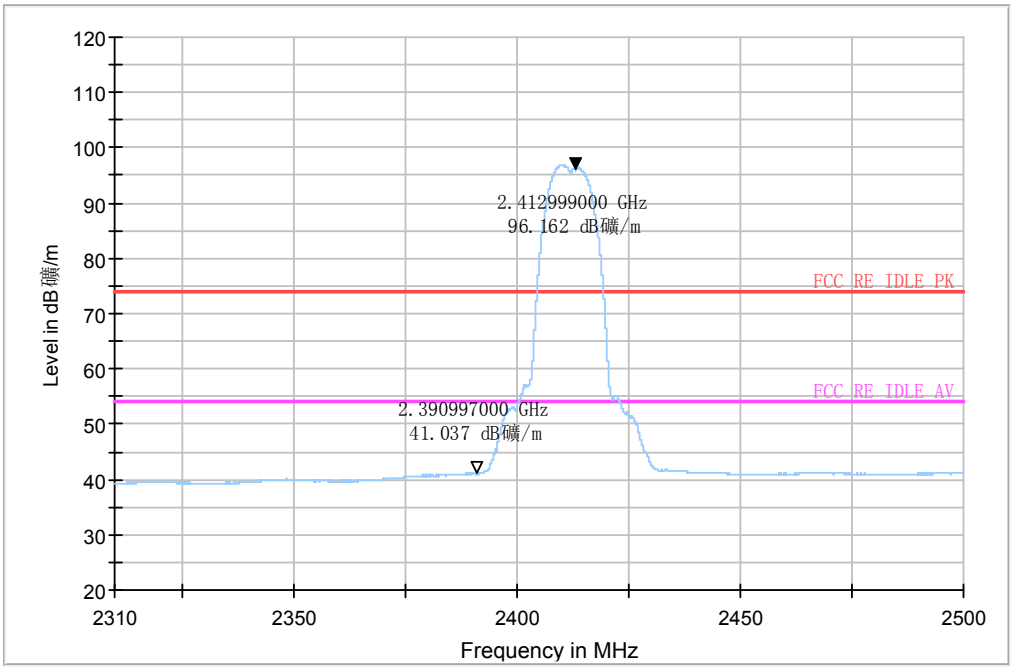
All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19560.600000	47.0	6.96	40.04	V
20440.350000	43.0	6.96	36.04	V
22736.200000	42.1	3.05	39.05	H
24072.400000	43.0	3.05	39.95	V
26183.800000	42.1	3.05	39.05	H

Test graphs as below:

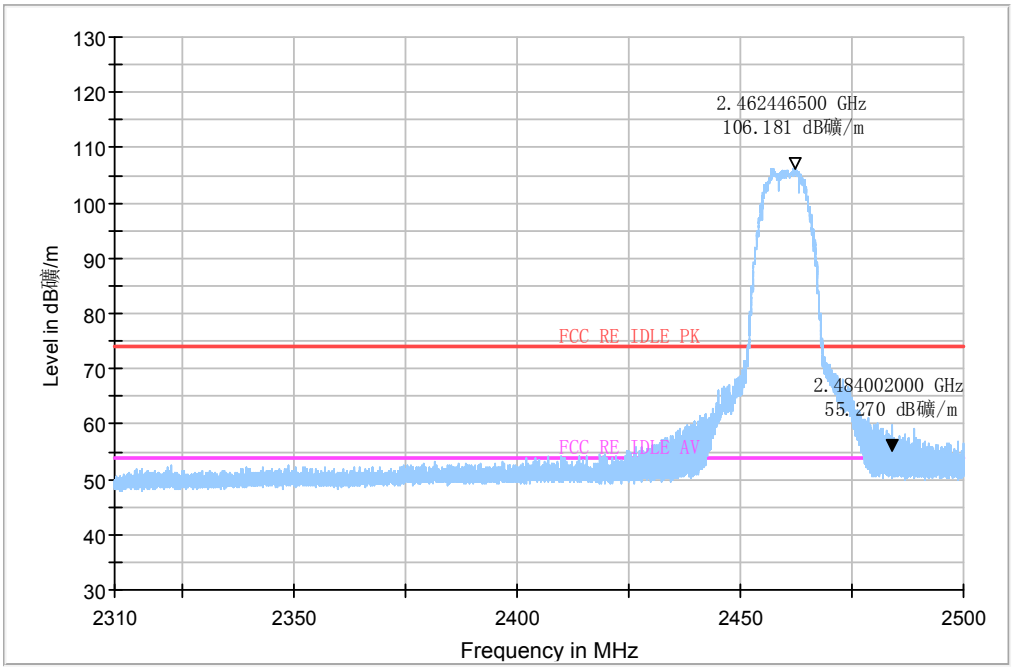


(Detector PK)

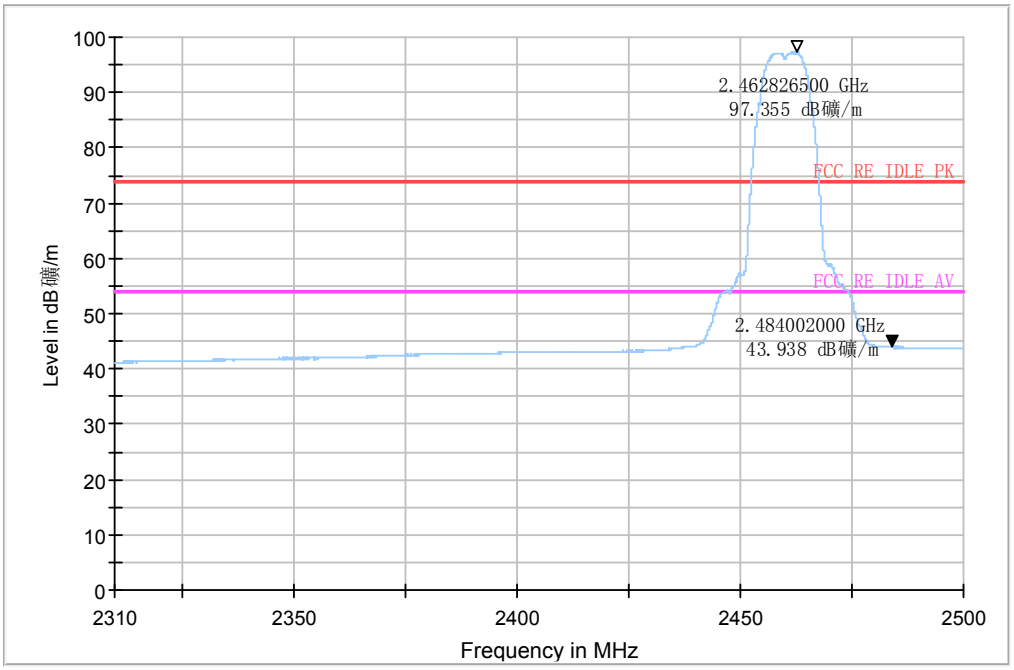


(Detector AV)

Fig.44 Radiated emission (Power): 802.11b, low channel

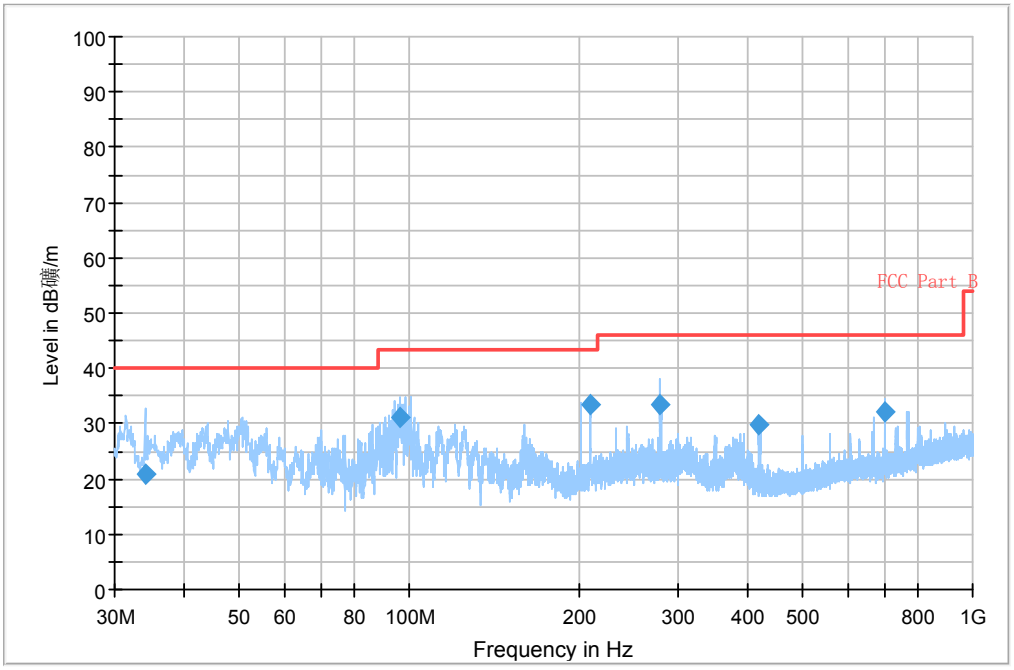


(Detector PK)



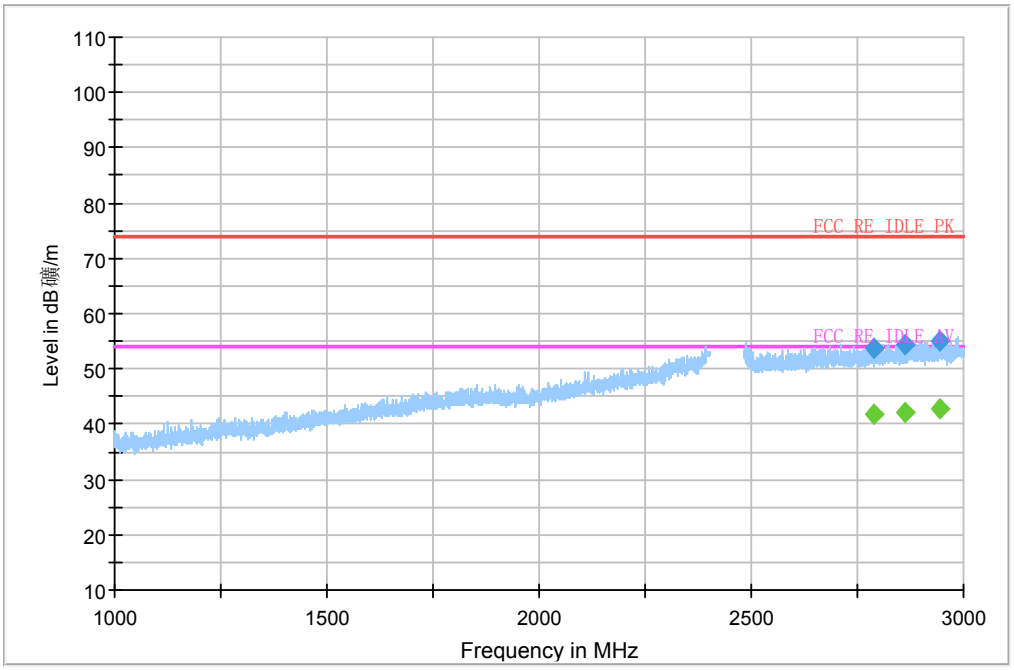
(Detector AV)

Fig.45 Radiated emission (Power): 802.11b, high channel



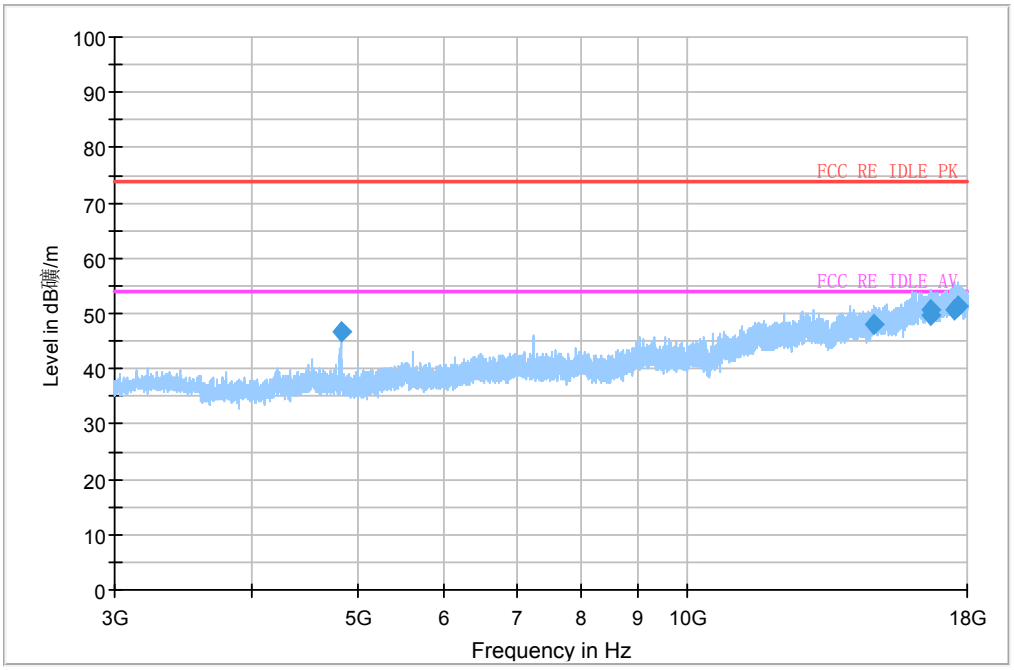
(Detector PK)

Fig.46 Radiated Spurious Emission (802.11b,Ch1,30MHz~1GHz)



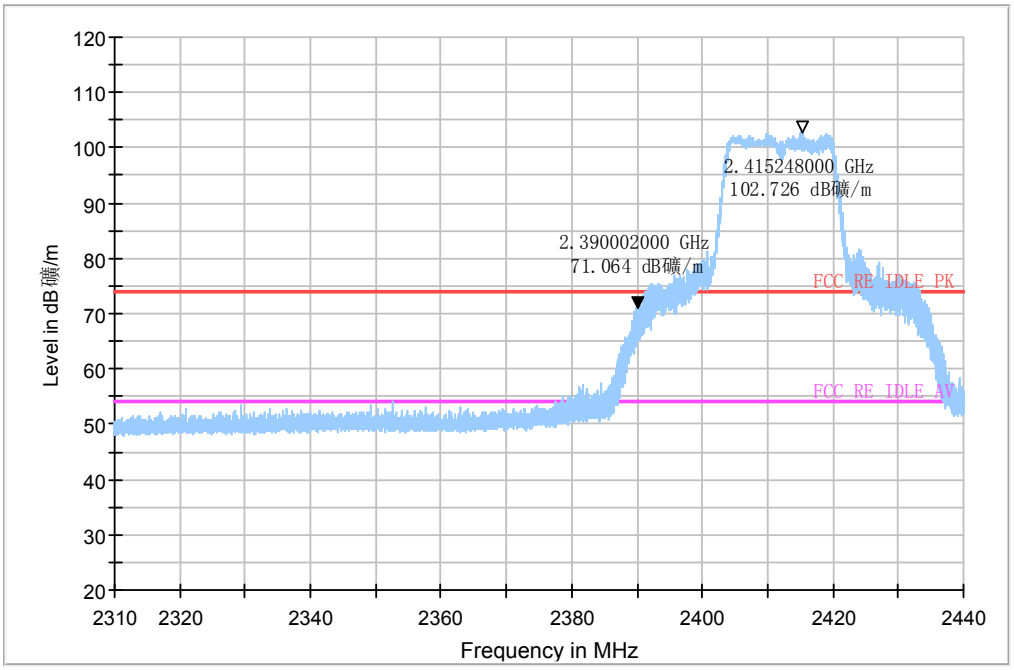
(Detector PK)

Fig.47 Radiated Spurious Emission (802.11b,Ch1,1GHz~3GHz)

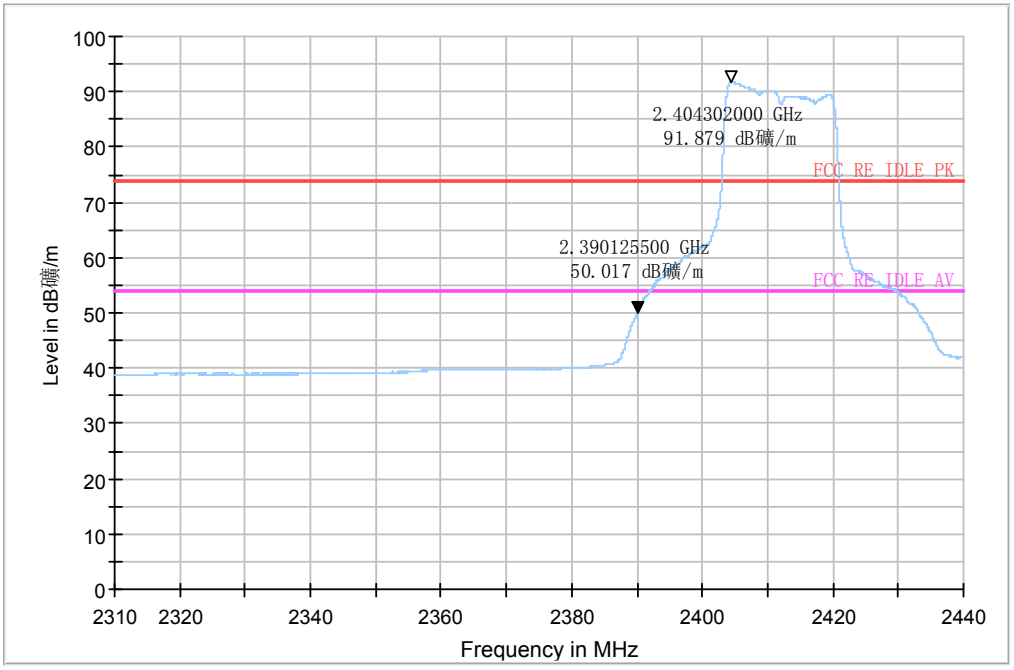


(Detector PK)

Fig.48 Radiated Spurious Emission (802.11b,Ch1,3GHz~18GHz)

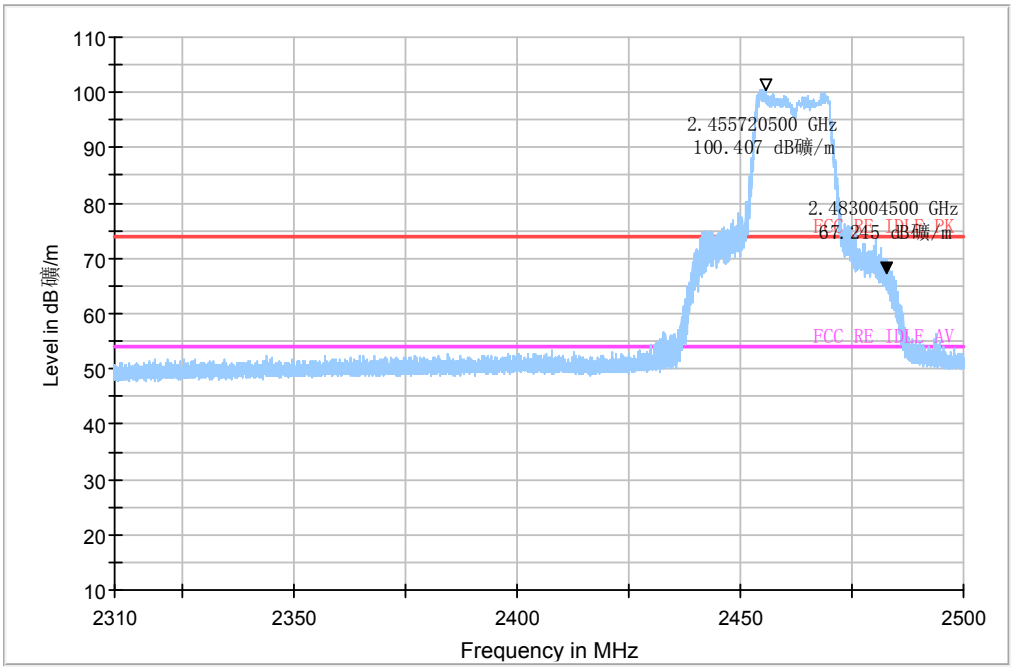


(Detector PK)

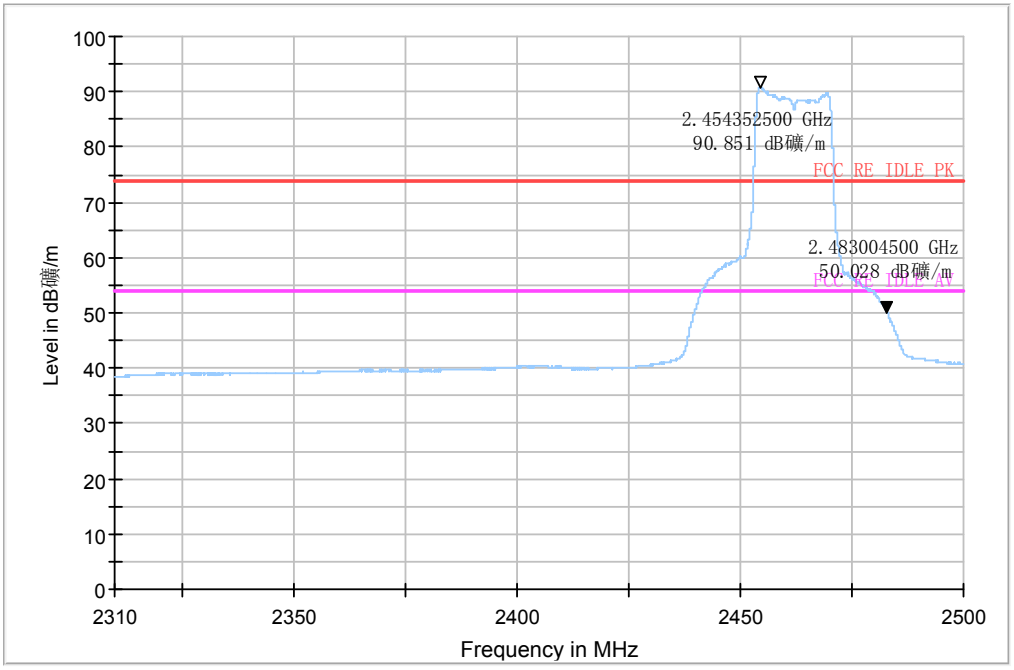


(Detector AV)

Fig.49 Radiated emission (Power): 802.11g, low channel

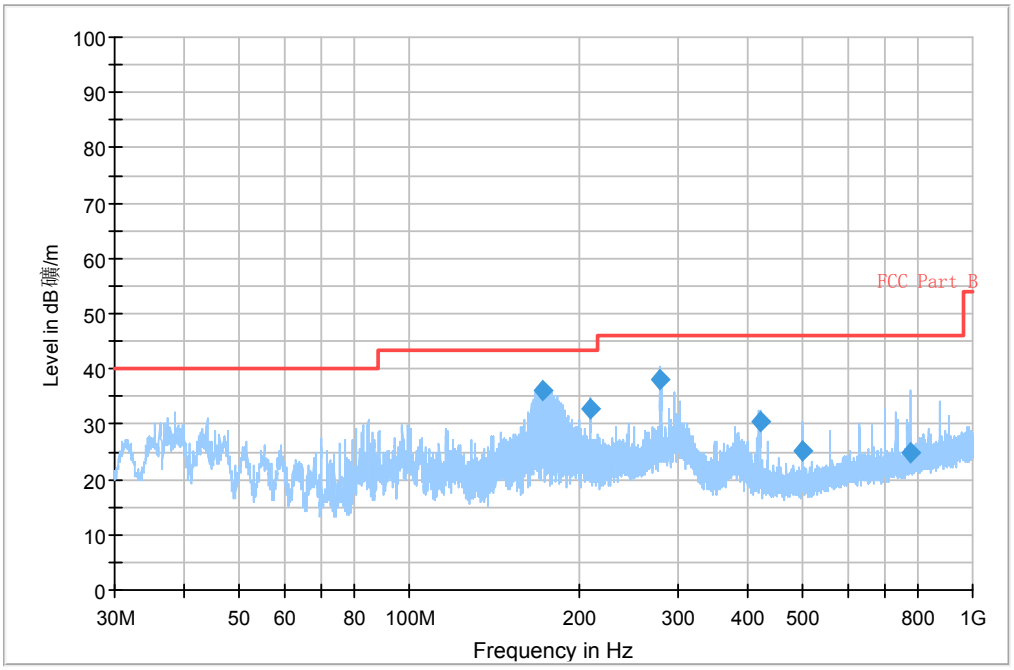


(Detector PK)



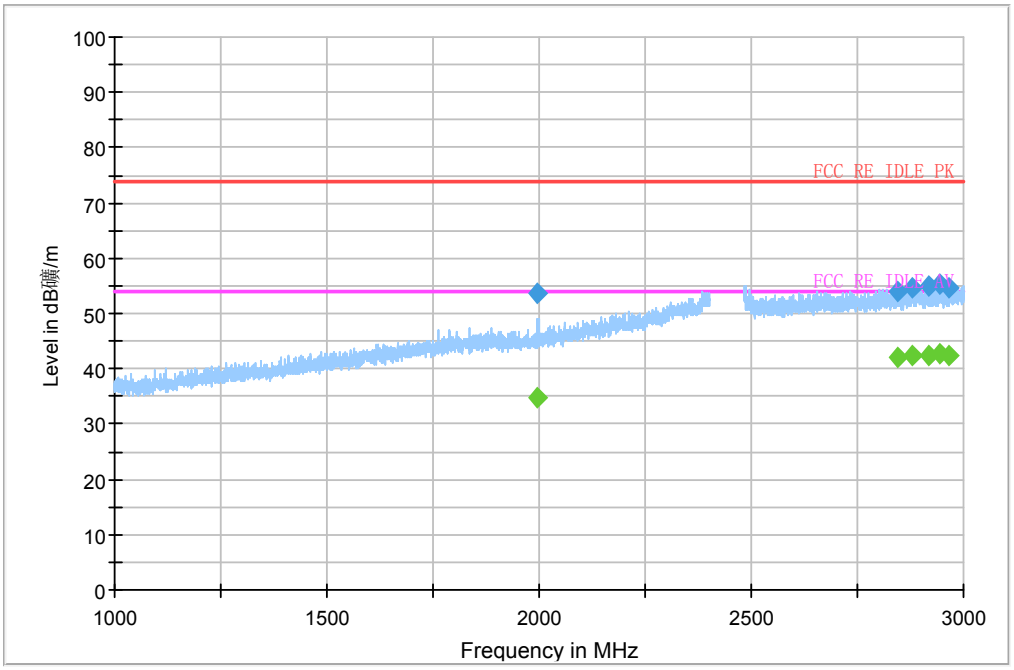
(Detector AV)

Fig.50 Radiated emission (Power): 802.11g, high channel



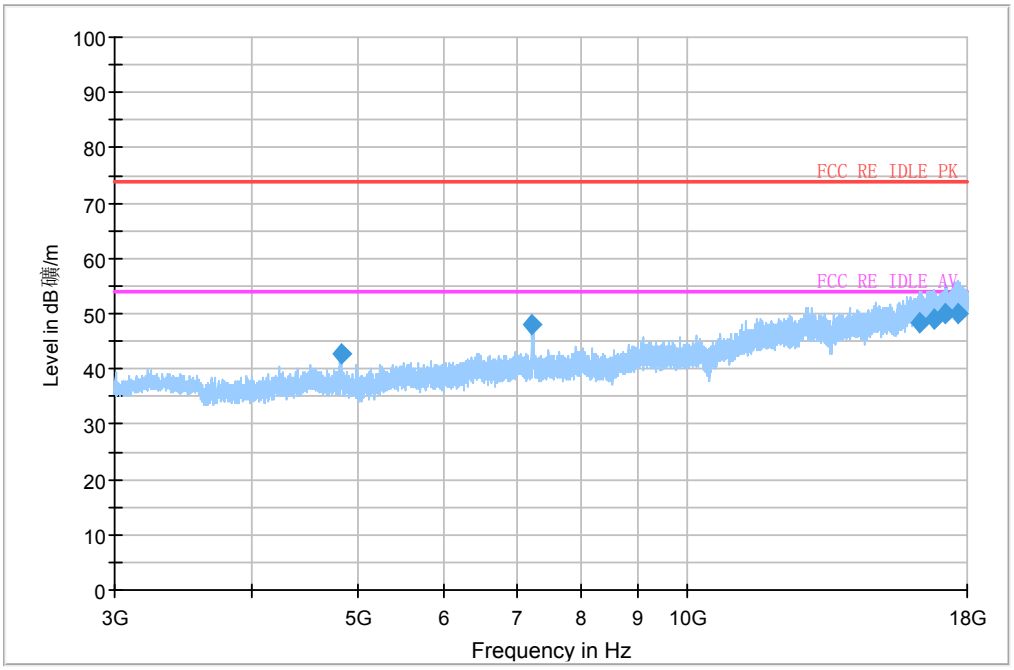
(Detector PK)

Fig.51 Radiated Spurious Emission (802.11g,Ch11,30MHz~1GHz)



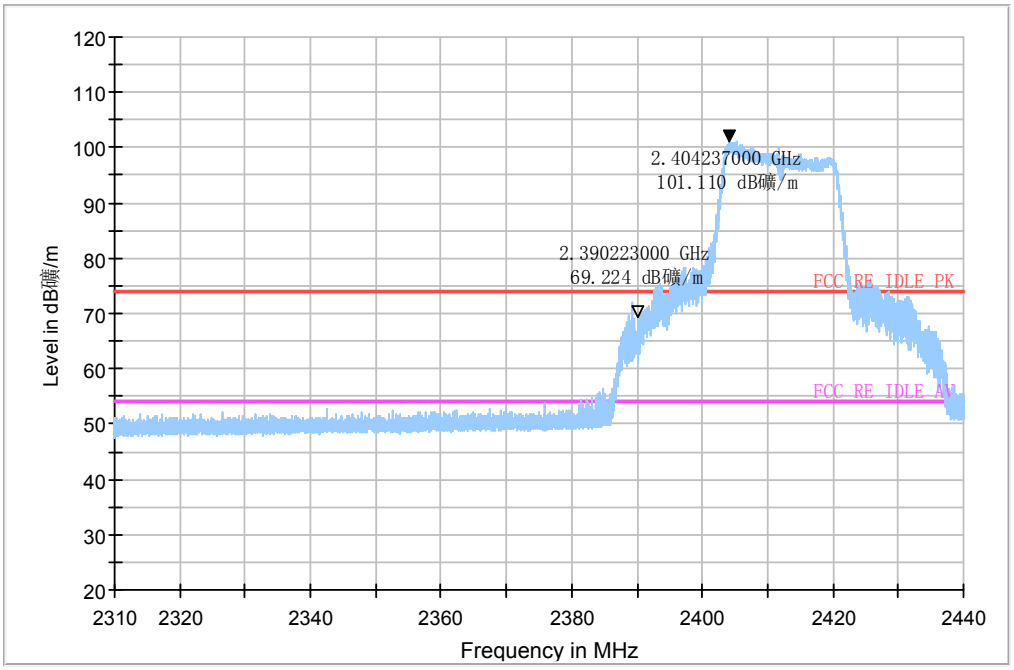
(Detector PK)

Fig.52 Radiated Spurious Emission (802.11g,Ch11,1GHz~3GHz)

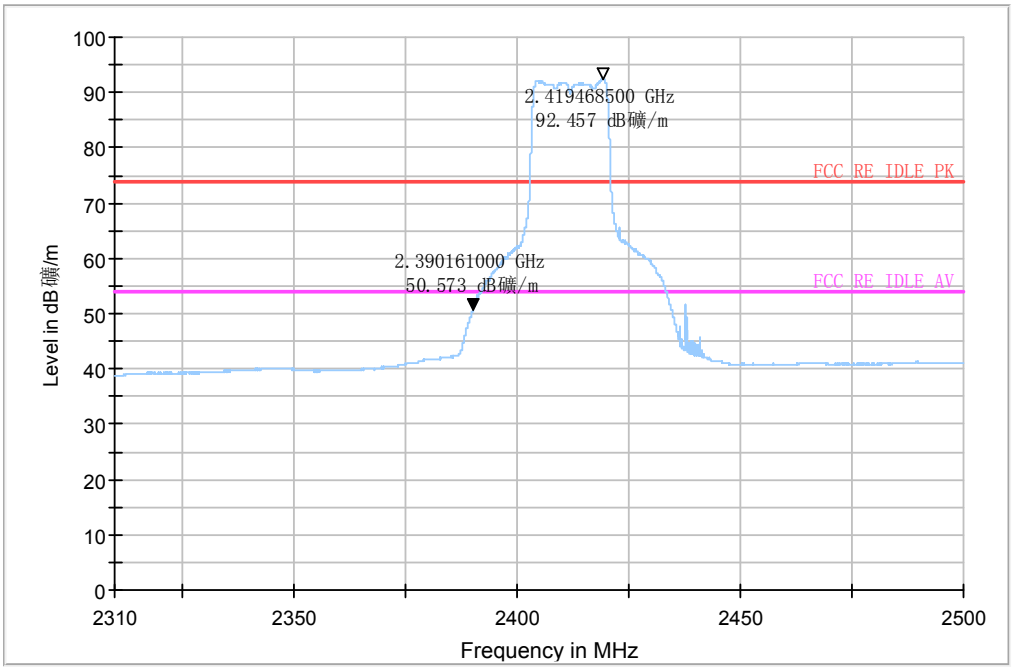


(Detector PK)

Fig.53 Radiated Spurious Emission (802.11g,Ch11,3GHz~18GHz)

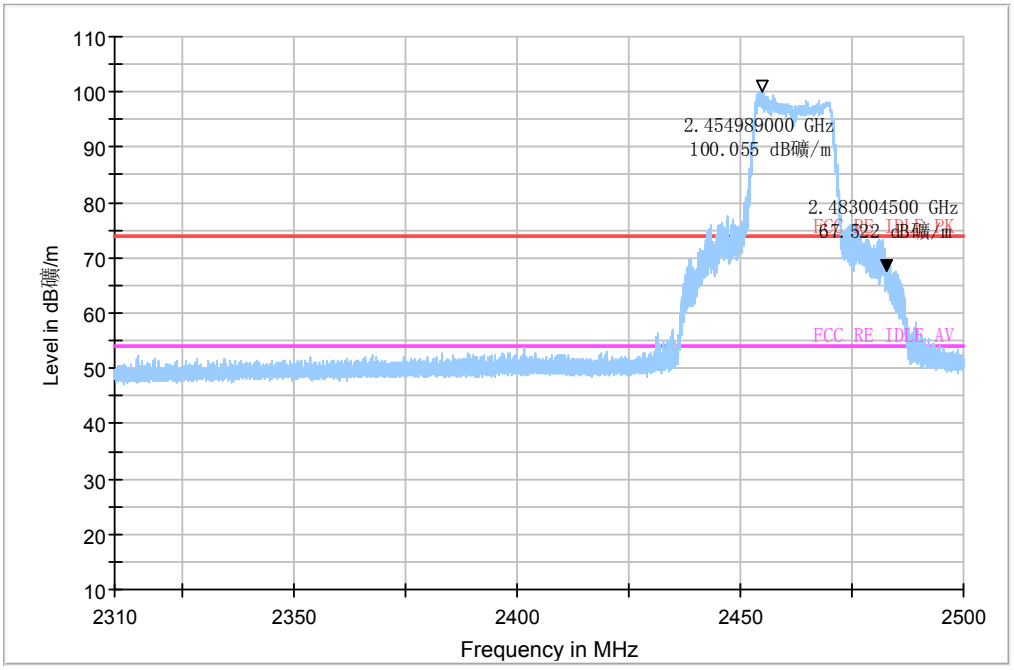


(Detector PK)

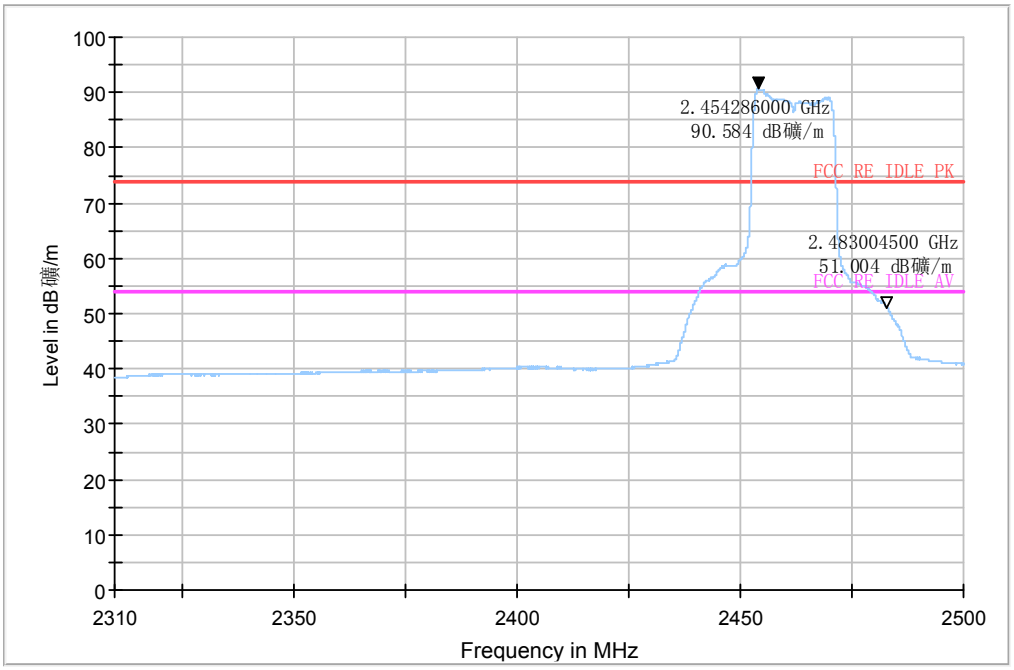


(Detector AV)

Fig.54 Radiated emission (Power): 802.11n, low channel

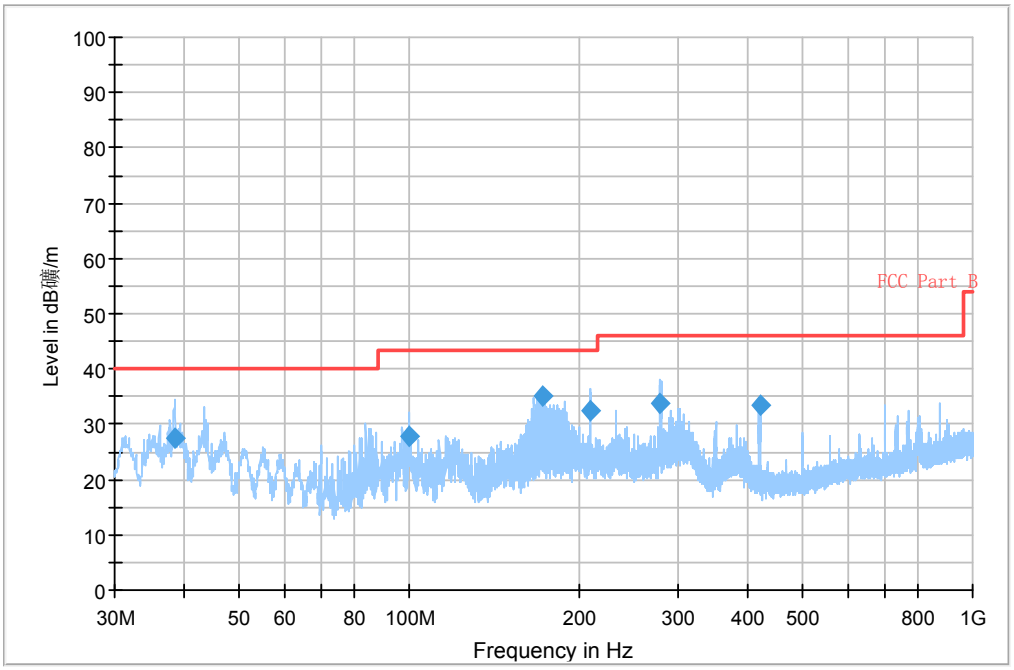


(Detector PK)



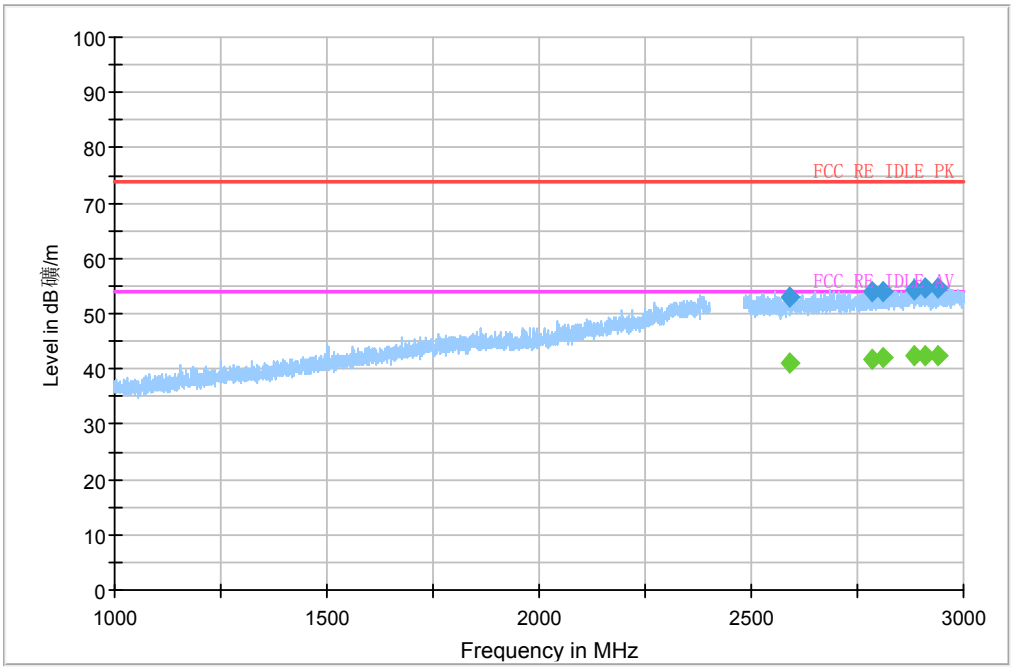
(Detector AV)

Fig.55 Radiated emission (Power): 802.11n, high channel



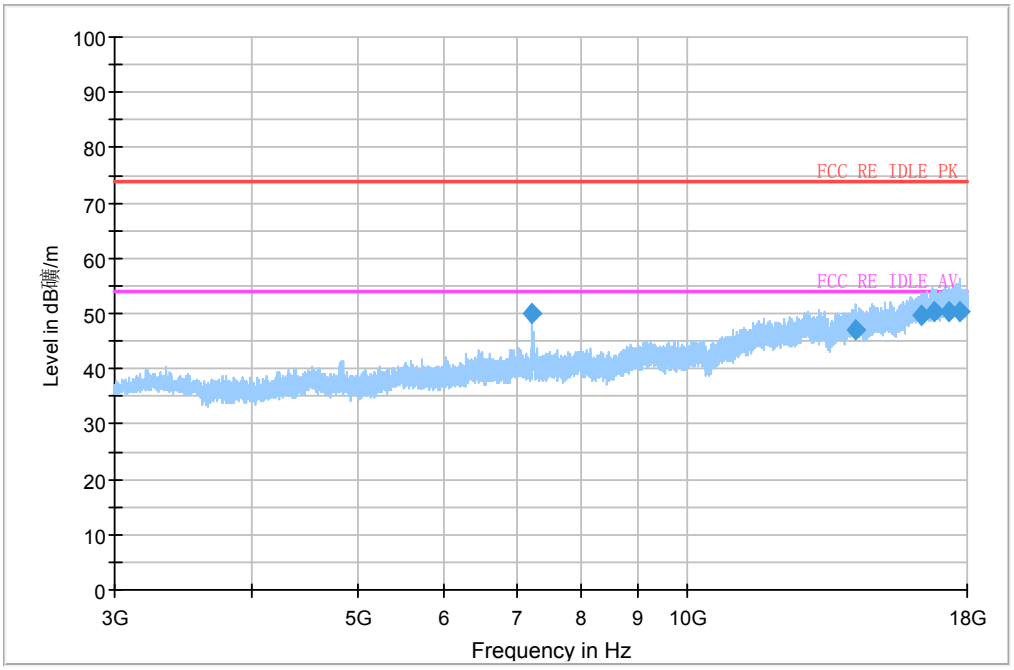
(Detector PK)

Fig.56 Radiated Spurious Emission (802.11 n-20MHz,Ch1,30MHz~1GHz)



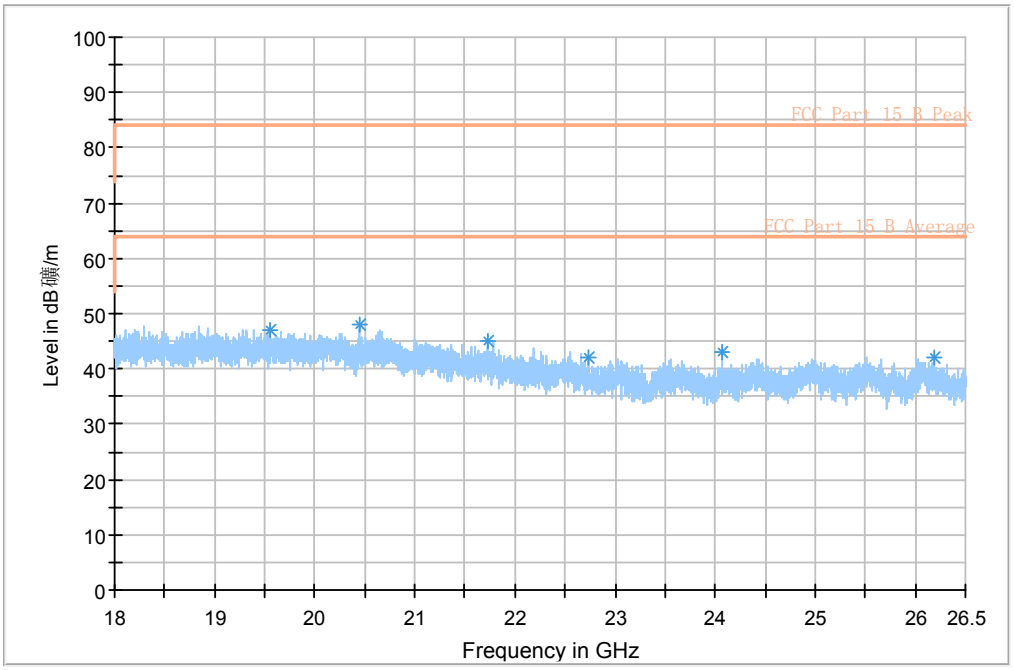
(Detector PK)

Fig.57 Radiated Spurious Emission (802.11 n-20MHz,Ch1,1GHz~3GHz)



(Detector PK)

Fig.58 Radiated Spurious Emission (802.11 n-20MHz,Ch1,3GHz~18GHz)



(Detector PK)

Fig.59 Radiated emission: GFSK, 18 GHz – 26.5 GHz

5.7. AC powerline Conducted Emission

Test condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and Limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBuV)	Result (dBuV)		Conclusion
		With charger		
		802.11n	Idle	
0.15 to 0.5	66 to 56	Fig.60	Fig.61	P
0.5 to 5	66			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBuV)	Result (dBuV)		Conclusion
		With charger		
		802.11n	Idle	
0.15 to 0.5	55 to 46	Fig.60	Fig.61	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 0.5MHz.				

The measurement is according to ANSI C63.4 and KDB558074.

Conclusion: PASS

Test graphs as below:

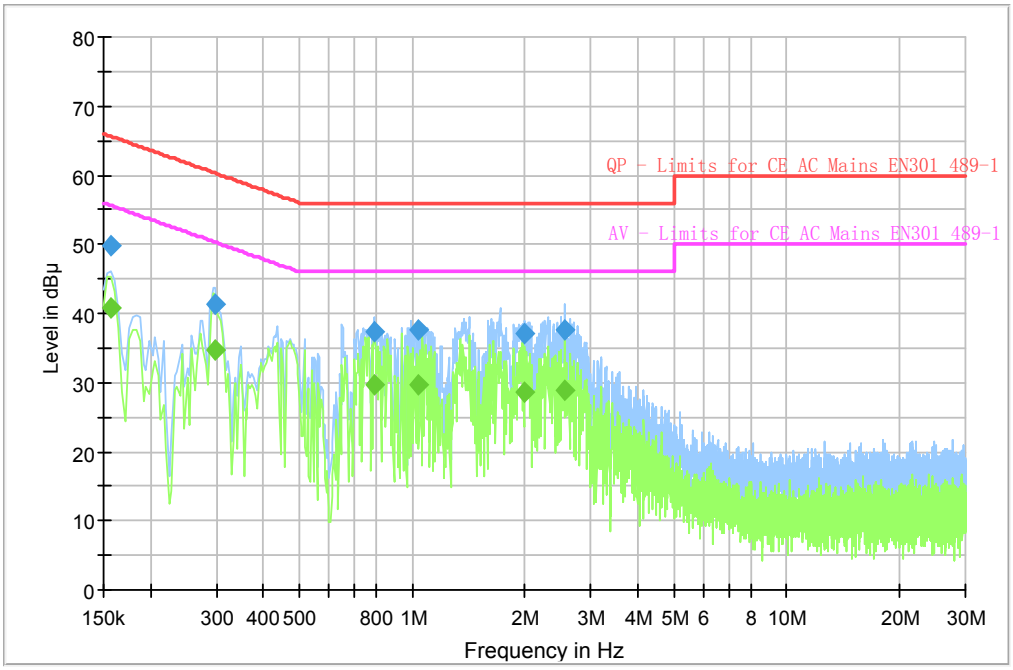


Fig.60 AC Powerline Conducted Emission 802.11n

Measurement result: "PK"

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.157462	49.8	1000.0	9.000	On	N	10.1	15.8	65.6
0.299250	41.4	1000.0	9.000	On	N	10.0	18.9	60.3
0.791775	37.5	1000.0	9.000	On	N	10.0	18.5	56.0
1.034306	37.6	1000.0	9.000	On	N	9.9	18.4	56.0
2.004431	37.1	1000.0	9.000	On	L1	9.9	18.9	56.0

Measurement result: " AV"

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.157462	40.9	1000.0	9.000	On	N	10.1	14.7	55.6
0.299250	34.6	1000.0	9.000	On	N	10.0	15.6	50.3
0.791775	29.7	1000.0	9.000	On	N	10.0	16.3	46.0
1.034306	29.6	1000.0	9.000	On	N	9.9	16.4	46.0
2.004431	28.7	1000.0	9.000	On	L1	9.9	17.3	46.0
2.545462	29.0	1000.0	9.000	On	N	9.9	17.0	46.0

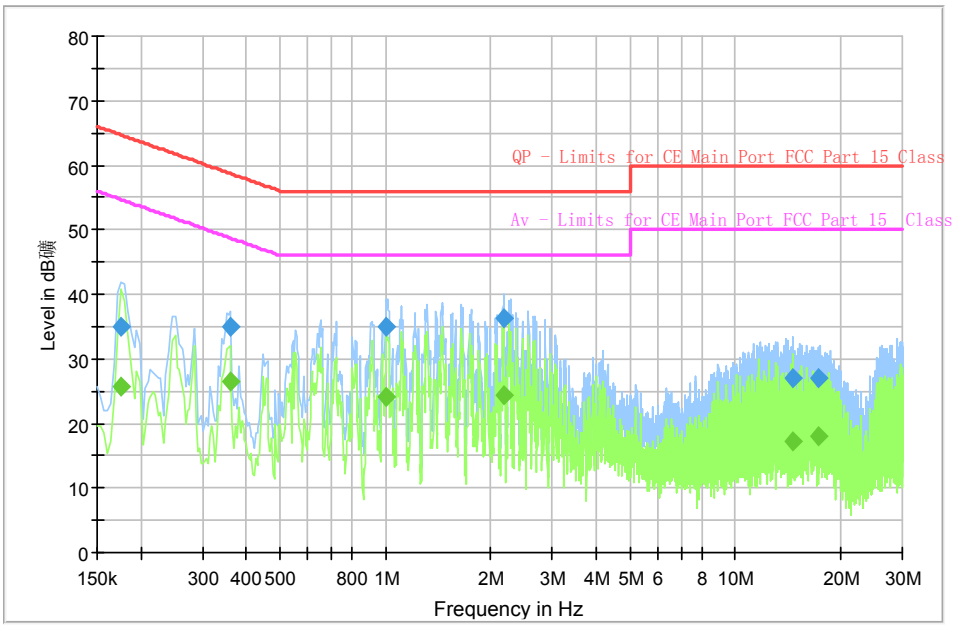


Fig.61 AC Powerline Conducted Emission Idle

Measurement result: "PK"

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.176119	48.6	1000.0	9.000	On	N	10.2	16.0	64.7
0.317906	45.3	1000.0	9.000	On	N	10.0	14.5	59.8
0.844012	42.4	1000.0	9.000	On	N	10.0	13.6	56.0
1.441012	42.1	1000.0	9.000	On	N	9.9	13.9	56.0
1.959656	41.6	1000.0	9.000	On	N	9.9	14.4	56.0
2.690981	40.9	1000.0	9.000	On	L1	9.8	15.1	56.0

Measurement result: "AV"

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.176119	38.9	1000.0	9.000	On	N	10.2	15.8	54.7
0.317906	36.5	1000.0	9.000	On	N	10.0	13.3	49.8
0.844012	34.6	1000.0	9.000	On	N	10.0	11.4	46.0
1.441012	33.5	1000.0	9.000	On	N	9.9	12.5	46.0
1.959656	34.0	1000.0	9.000	On	N	9.9	12.0	46.0
2.690981	31.4	1000.0	9.000	On	L1	9.8	14.6	46.0

6. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSQ26	101096	R&S	2014-08-30
2	DC Power Supply	ZUP60-14	LOC-220Z006	TDL-Lambda	2014-08-30

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Universal Radio Communication Tester	CMU200	123102	R&S	2014-08-30
2	Test Receiver	ESCI	101235	R&S	2014-08-30
3	Test Receiver	ESU40	100307	R&S	2014-10-29
4	Trilog Antenna	VULB9163	19-162515	Schwarzbeck	2014-11-11
5	Double Ridged Guide Antenna	ETS-3117	135885	ETS	2014-04-28
6	2-Line V-Network	ENV216	101380	R&S	2014-10-30

7	Single Phase Harmonic & Flicker	DPA500N	V1126109988	EM Test	2014-10-28
8	Multifunction AC/DC Power Source	Netwave7	V1126109989	EM Test	2014-10-28
9	Ultra Compact Simulator	UCS 500N7	V112610998 3	EM Test	2014-07-22
10	Motorized Variac	MV 2616	V112610998 7	EM Test	2014-07-22
11	Telecom Surge Module	TSurge7	V0902104582	EM Test	2014-07-22
12	Audio Analyzer	UPV	101950	R&S	2014-08-30
13	Power Meter	NRP2	101804	R&S	2014-08-30
14	Signal Generator	SMB 100A	105563	R&S	2014-08-30
15	ESD Test Simulator	Dito	V112610998 2	EM Test	2014-10-31

Anechoic chamber

Fully anechoic chamber by Frankonia German.

7. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits

along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Fully-anechoic chamber2 (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ

Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to 40000MHz

ANNEX A Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

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