Full

TEST REPORT

No. I18D00020-SRD03

For

Client : Hisense International Co., Ltd.

Production : Mobile Phone

Model Name : Hisense F23 PLUS

FCC ID: 2ADOBF23PLUS

Hardware Version: YK736-MB-V0.2

Software Version: Hisense_F17_4G_10_S01_20180118

Issued date: 2018-03-20

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

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Revision Version

Report Number	Revision	Date	Memo
I18D00020-SRD03	00	2018-03-12	Initial creation of test report
I18D00020-SRD03	01	2018-03-20	Second creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

1.3. Project data

Project Leader:	Xu Yuting
Testing Start Date:	2018-02-02
Testing End Date:	2017-02-11

1.4. Signature

Yang Dejun
(Prepared this test report)

Ding Li
(Reviewed this test report)

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

2. Client Information

2.1. Applicant Information

Company Name:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China
Postcode:	266010
Telephone:	/

2.2. Manufacturer Information

Company Name:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Economic & Technological Development Zone, Qingdao, Shandong Province, P.R. China
Postcode:	266510
Telephone:	/

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

3.1. About EUT

EUT Description	Mobile Phone
Model name	Hisense F23 PLUS
WLAN Frequency	2412MHz-2462MHz
WLAN Channel	Channel1-Channel11
WLAN type of modulation	802.11b:DSSS 802.11g/n: OFDM
Extreme Temperature	-10/+55 ℃
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.5V

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

3.2. Internal Identification of EUT used during the test

First Supply

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N09	861854039320062	YK736-MB-V0.2	Hisense_F17_4G_10_S01_20180118	2018-01-24
N08	N/A	YK736-MB-V0.2	Hisense_F17_4G_10_S01_20180118	2018-01-24
N14	N/A	YK736-MB-V0.2	Hisense_F17_4G_10_S01_20180118	2018-02-08

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

3.3. Internal Identification of AE used during the test

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

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

3.4. Internal Identification of AE used during the test

Main Supply

Part Name	Model Name	supplier	Remark
LCM	JTD055094I0	JINGTAI	

Secondary Supply

Part Name	Model Name	supplier	Remark
LCM	Y87597	Digital	

4. Reference Documents

4.1. 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, 2400-2483.5MHz, and 5725-5850MHz.	2017
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz	2013

5. 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 Public notice KDB558074 and ANSI C63.4.

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	3.8V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

5.1. 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.

5.2. Statements

The Hisense F23 PLUS, supporting GSM/GPRS/EDGE/WCDMA/ HSPA+/DC-HSDPA/LTE/WLAN/BT/BLE, manufactured by Hisense Communications Co., Ltd, 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.

6. Test result

6.1. Maximum Output Power

6.1.1 Measurement Limit and method:

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

6.1.2 Test procedure

The measurement is according to ANSI C63.10 clause 11.2

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW ⩾ OBW, VBW ⩾ 3RBW.
4. Detector : Peak.
5. Trace mode: Max Hold

6.1.3 Measurement Uncertainty:

Measurement Uncertainty	0.75dB

6.1.4 Maximum Peak Output Power-conducted

Measurement Results:

802.11b/g mode

Mode	Data Rate(Mbps)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	1	15.43	/	/
	2	15.77	/	/
	5.5	17.00	/	/
	11	18.17	18.05	18.12
802.11g	6	18.42	/	/
	9	18.44	/	/
	12	18.61	/	/
	18	18.79	/	/

	24	18.96	/	/
	36	18.62	/	/
	48	19.13	/	/
	54	19.31	19.09	19.14

The data rate 11 Mbps and 54 Mbps 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	17.46	/	/
	MCS1	17.59	/	/
	MCS2	17.63	/	/
	MCS3	17.91	/	/
	MCS4	18.04	/	/
	MCS5	18.34	/	/
	MCS6	18.50	/	/
	MCS7	18.67	18.25	18.51

The data rate MCS7 for 802.11n(20M) are selected as worse condition, and the following case are performed with this condition.

6.1.5 Maximum Average Output Power-conducted

802.11b/g mode

Mode	Test Result(dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
802.11b	14.74	14.38	14.61
802.11g	13.42	13.34	13.11

802.11n mode

Mode	Test Result(dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
802.11n(20MHz)	12.35	12.26	12.16

Conclusion: PASS

6.2. Peak Power Spectral Density

6.2.1 Measurement Limit:

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

6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.
6. Set the VBW $\geqslant$ [3 $\times$ RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

6.2.3 Measurement Uncertainty:

Measurement Uncertainty	0.75dB

6.2.4 Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density(dBm/3kHz)	Conclusion

802.11b	1	Fig 1.	-14.484	P
	6	Fig 2.	-13.673	P
	11	Fig 3.	-14.832	P
802.11g	1	Fig 4.	-18.289	P
	6	Fig 5.	-17.77	P
	11	Fig 6.	-17.605	P

802.11n mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11n(20MHz)	1	Fig 7.	-18.564	P
	6	Fig 8.	-19.436	P
	11	Fig 9.	-19.352	P

Conclusion: PASS

Test graphs as below:

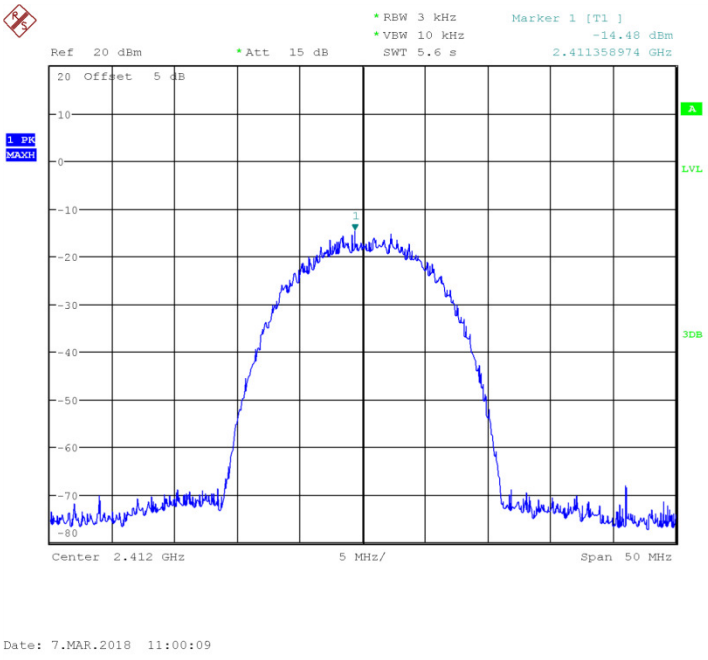


Fig 1. Power Spectral Density (802.1b,Ch1)

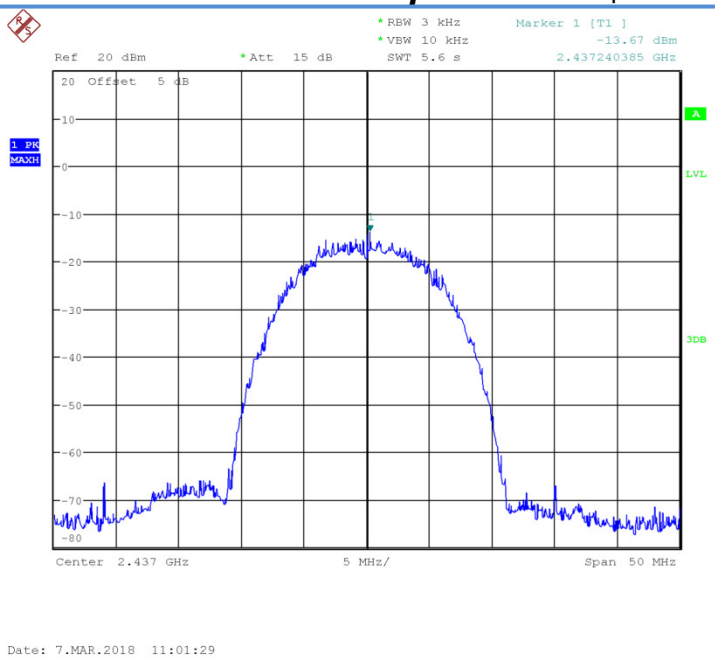


Fig 2. Power Spectral Density (802.1b,Ch6)

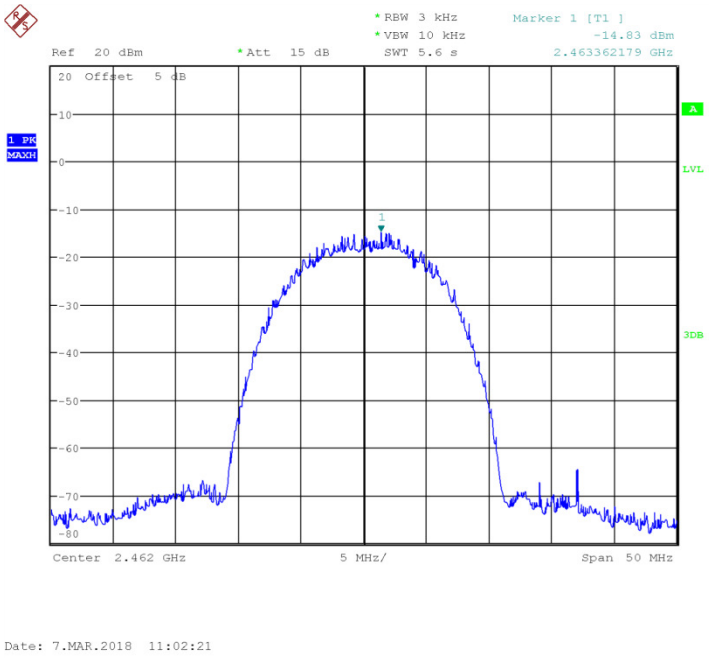


Fig 3. Power Spectral Density (802.1b,Ch11)

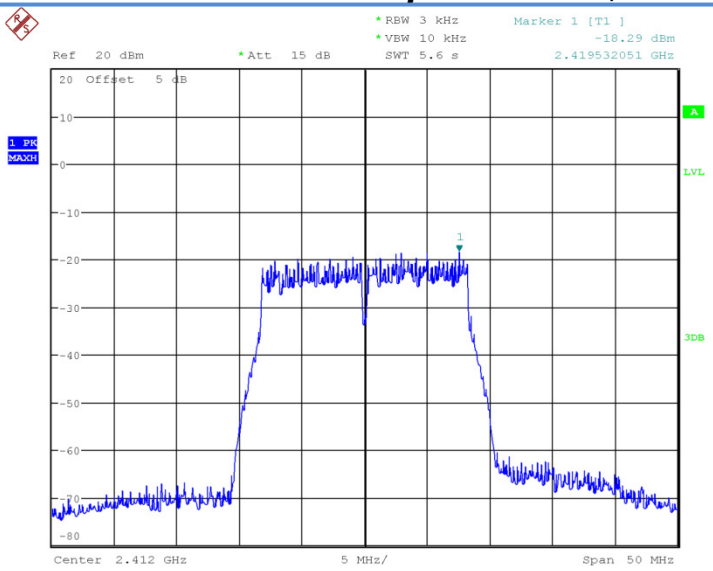


Fig.4 Power Spectral Density (802.1g,Ch1)

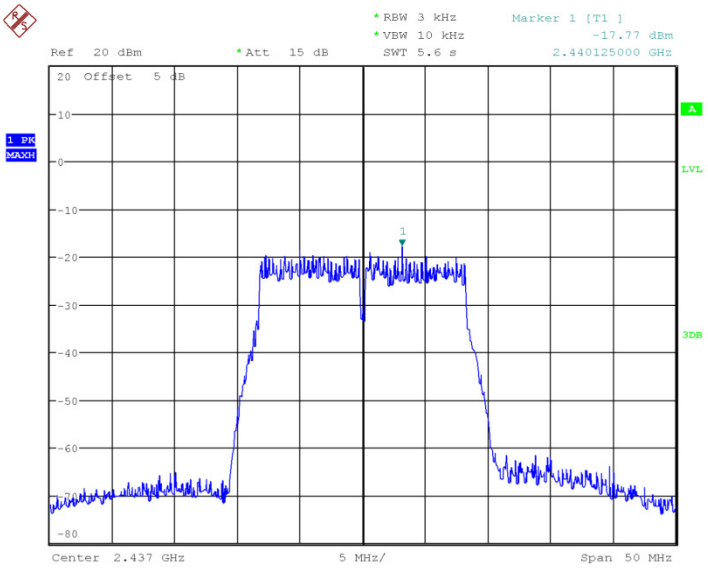


Fig.5 Power Spectral Density (802.1g,Ch6)

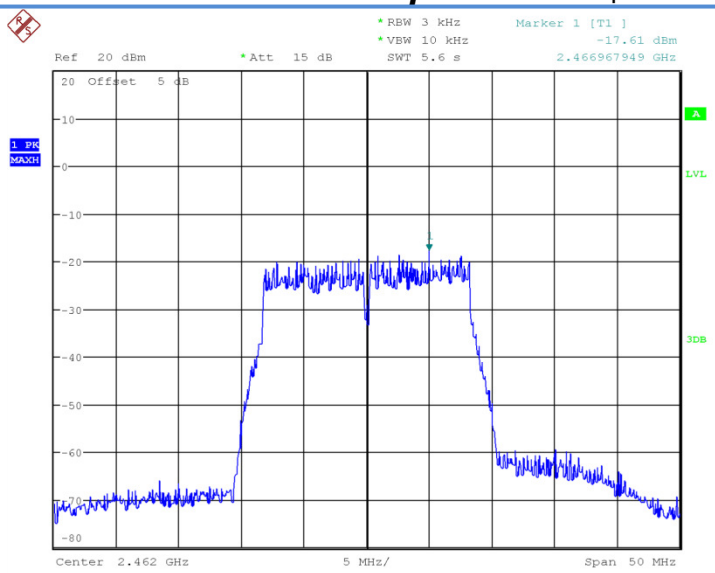


Fig.6 Power Spectral Density (802.1g,Ch11)

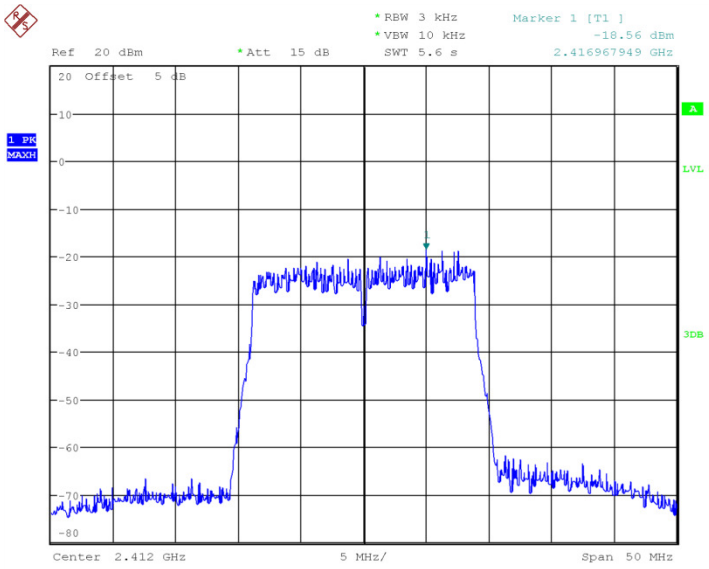


Fig.7 Power Spectral Density (802.1n-20MHz,Ch1)

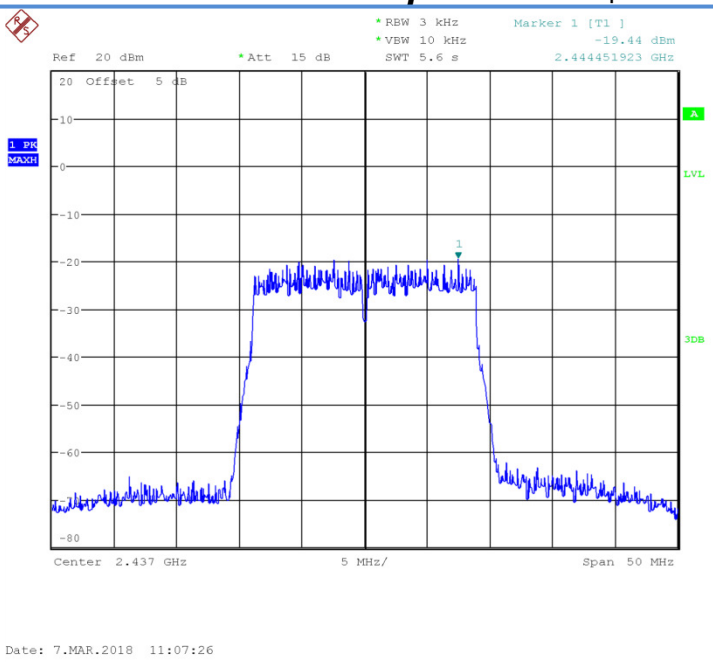


Fig.8 Power Spectral Density (802.1n-20MHz,Ch6)

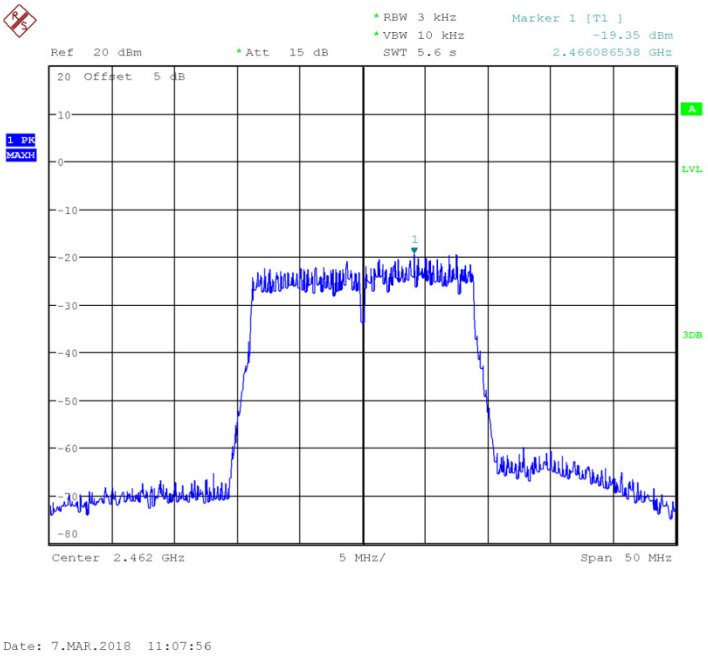


Fig.9 Power Spectral Density (802.1n-20MHz,Ch11)

6.3. Occupied 6dB Bandwidth

6.3.1 Measurement Limit:

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

6.3.2 Test procedure

The measurement is according to ANSI C63.10 clause 11.8.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW = 100 kHz.
4. Set the VBW ⩾ [3 × RBW].
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3.3 Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

6.3.4 Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth(KHz)		Conclusion
802.11b	1	Fig 10.	10.497	P
	6	Fig 11.	10.096	P
	11	Fig 12.	9.696	P
802.11g	1	Fig 13.	16.506	P
	6	Fig 14.	16.587	P
	11	Fig 15.	16.587	P

802.11n mode

Mode	Channel	Occupied 6dB Bandwidth(KHz)		Conclusion
802.11n(20MHz)	1	Fig 16.	17.708	P
	6	Fig 17.	17.869	P
	11	Fig 18.	17.708	P

Conclusion: PASS

Test graphs as below:

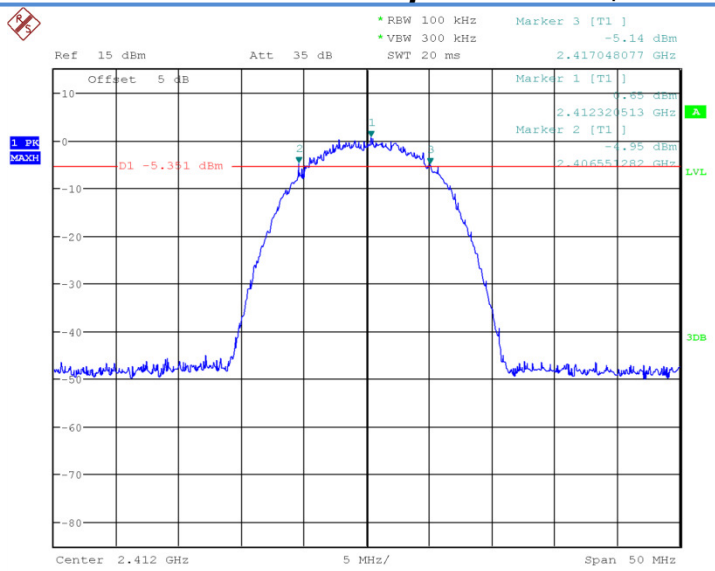


Fig.10 Occupied 6dB Bandwidth (802.11b, Ch1)

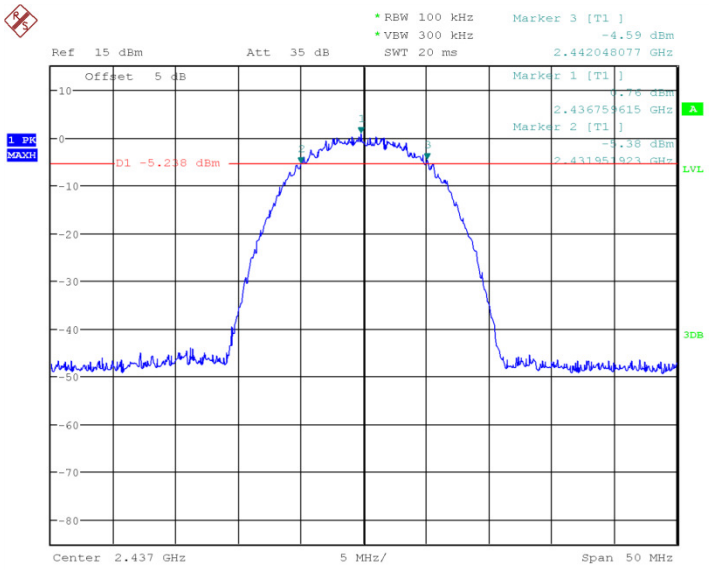


Fig.11 Occupied 6dB Bandwidth (802.11b, Ch6)

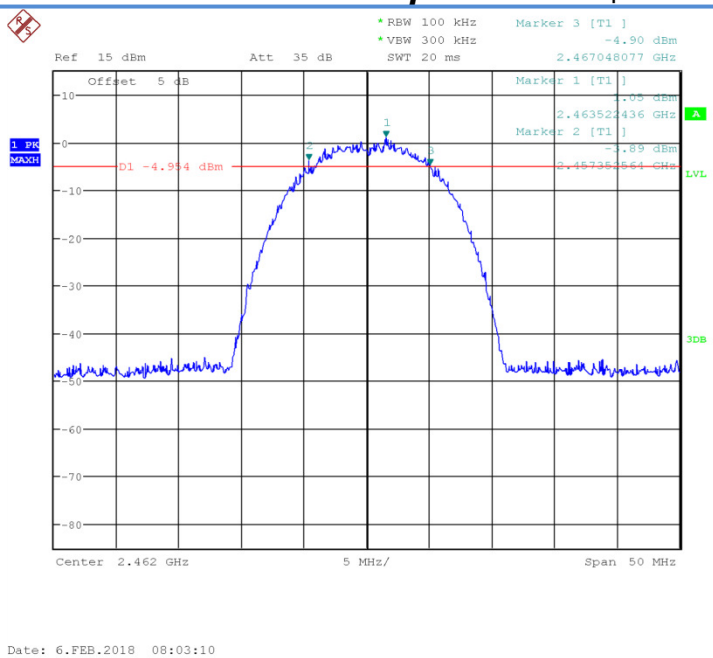


Fig.12 Occupied 6dB Bandwidth (802.11b, Ch11)

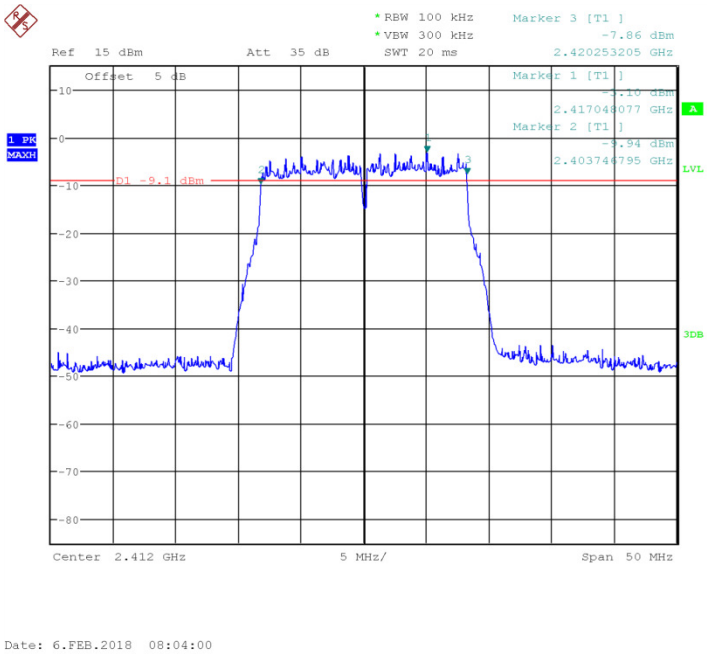


Fig.13 Occupied 6dB Bandwidth (802.11g, Ch1)

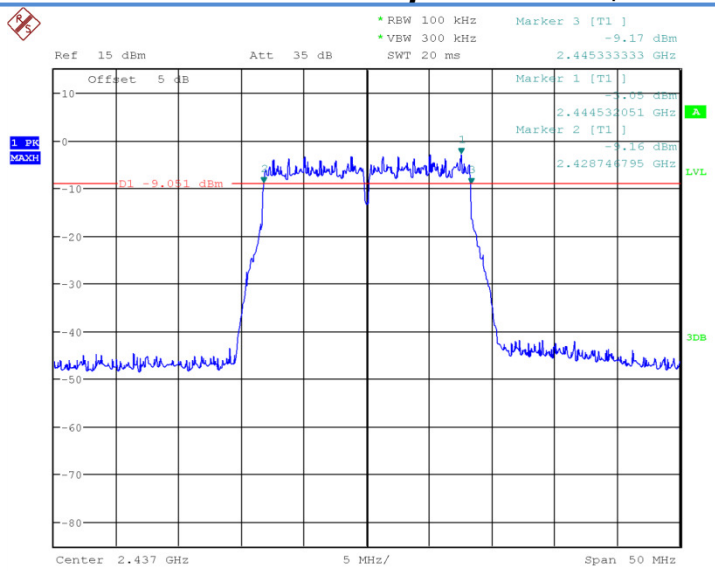


Fig.14 Occupied 6dB Bandwidth (802.11g, Ch6)

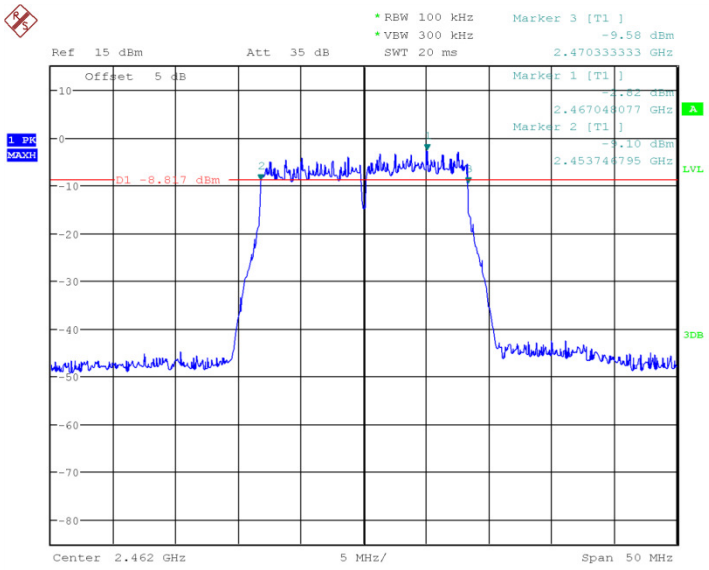


Fig.15 Occupied 6dB Bandwidth (802.11g, Ch11)

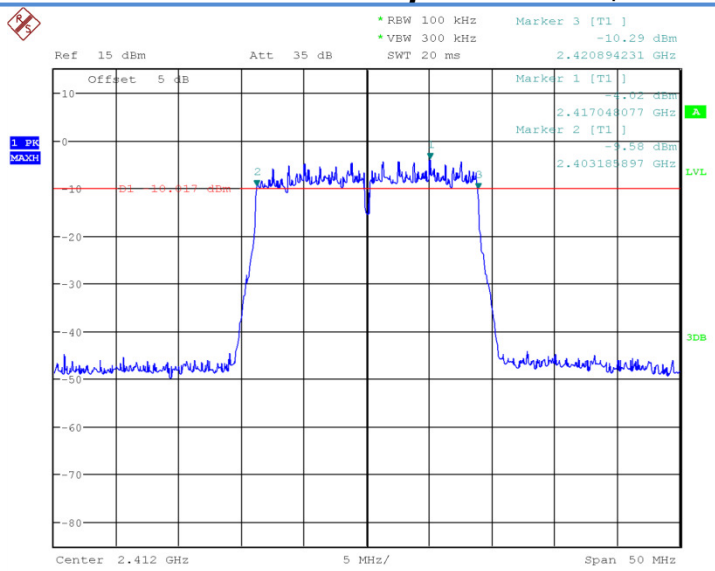


Fig.16 Occupied 6dB Bandwidth (802.11n-20MHz, Ch1)

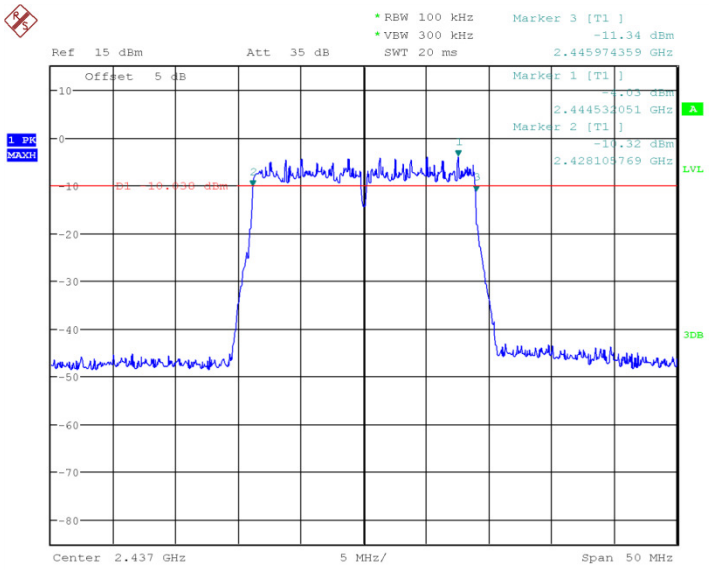


Fig.17 Occupied 6dB Bandwidth (802.11n-20MHz, Ch6)

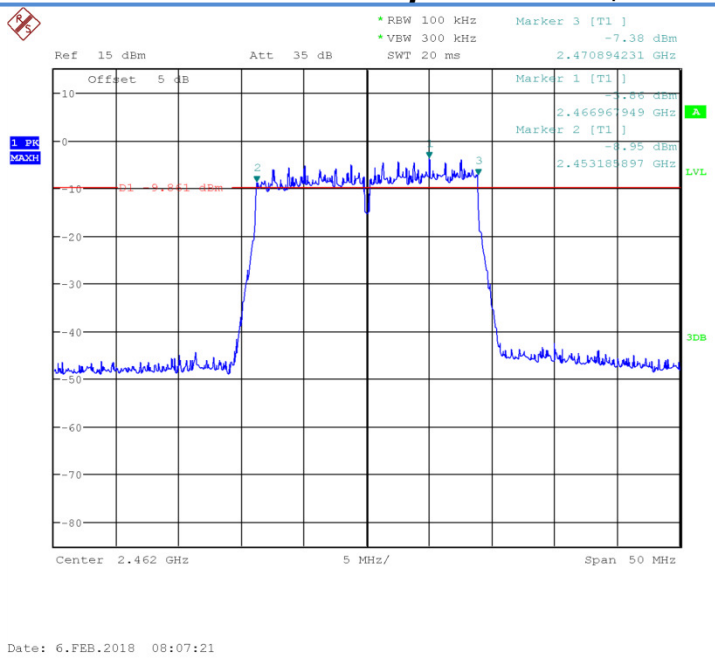


Fig.18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch11)

6.4. Band Edges Compliance

6.4.1 Measurement Limit:

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

6.4.2 Test procedures

The measurement is according to ANSI C63.10 clause11.13.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set instrument center frequency to the frequency of the emission to be measured (must be within 2MHz of the authorized band edge).
4. Set span to 2 MHz.
5. RBW = 100 kHz.
6. VBW $\geqslant$ [3 $\times$ RBW].
7. Detector = peak.
8. Sweep time = auto.
9. Trace mode = max hold.
10. Allow sweep to continue until the trace stabilizes

6.4.3 Measurement Uncertainty:

Measurement Uncertainty	0.75dB

6.4.4 Measurement results

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

Conclusion: PASS

Test graphs as blew:

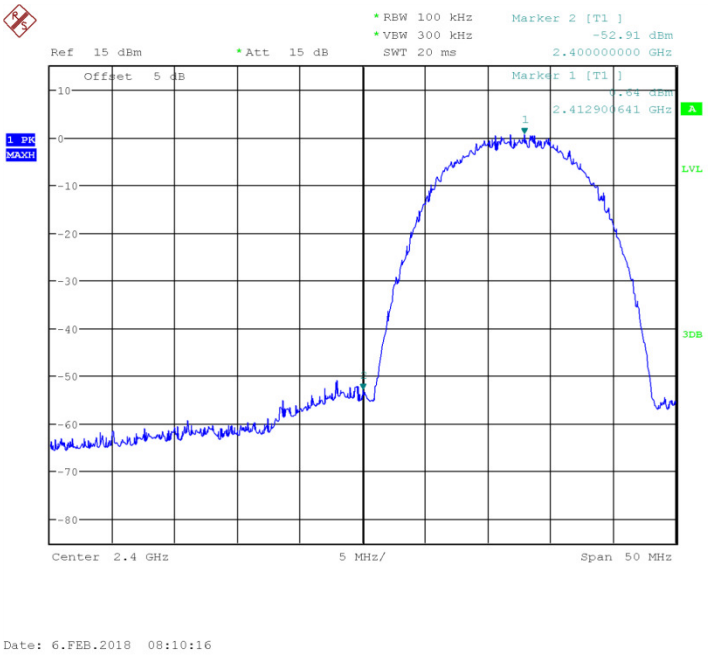


Fig.19 Band Edges (802.11b, Ch1)

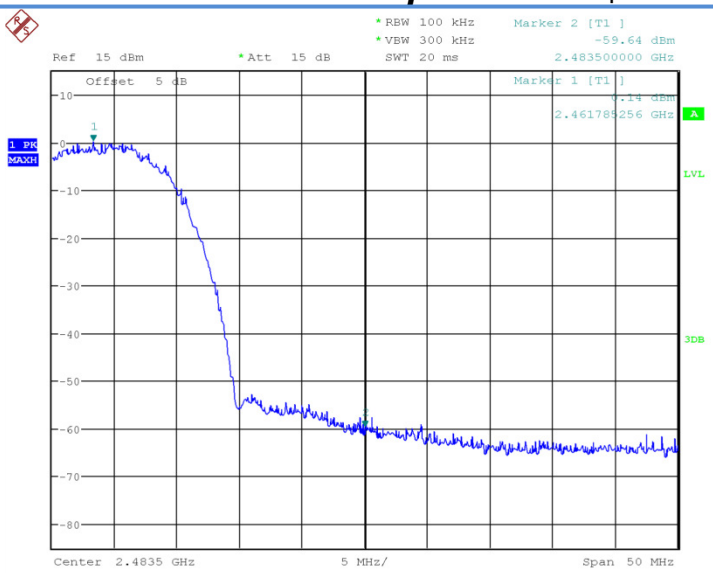


Fig.20 Band Edges (802.11b, Ch11)

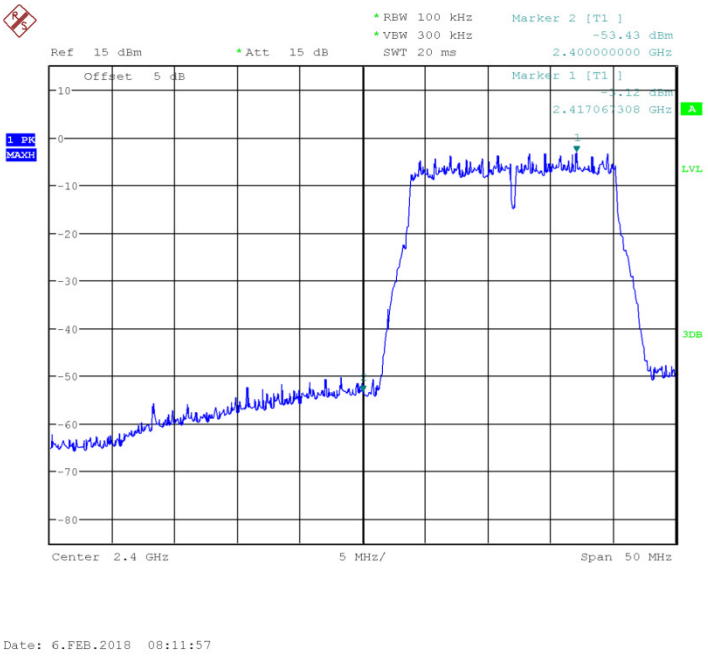


Fig.21 Band Edges (802.11g, Ch1)

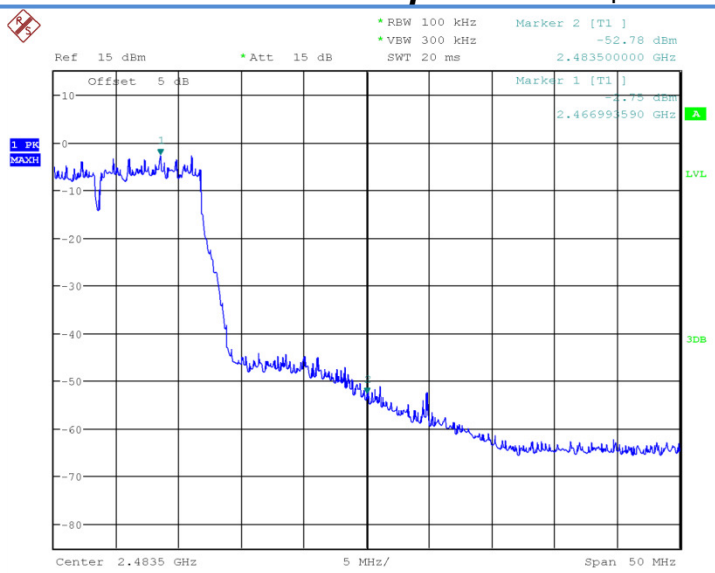


Fig.22 Band Edges (802.11g, Ch11)

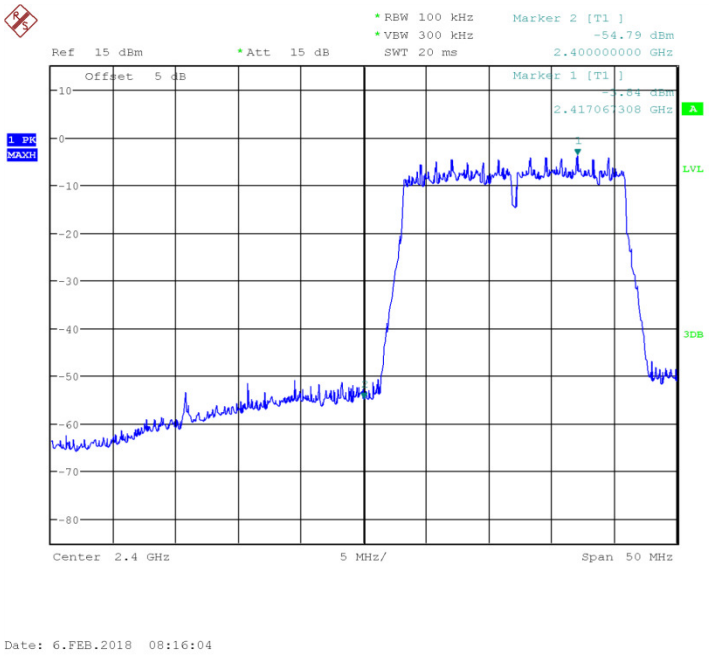


Fig.23 Band Edges (802.11n-20MHz, Ch1)

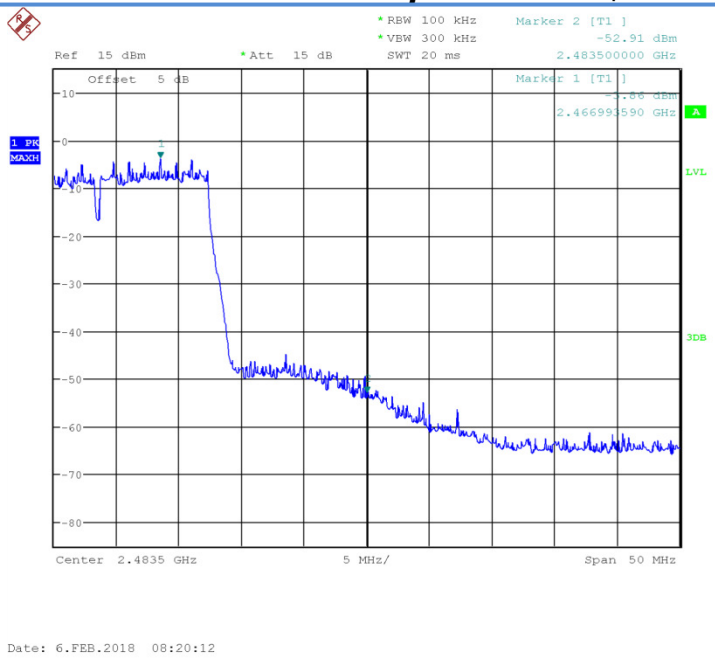


Fig.24 Band Edges (802.11b-20MHz, Ch11)

6.5. Transmitter Spurious Emission-conducted

6.5.1 Measurement Limit:

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

6.5.2 Test procedures

This measurement is according to ANSI C63.10 clause 11.11.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.

Reference level measurement

3. Set instrument center frequency to DTS channel center frequency.
4. Set the span to ≥ 1.5 times the DTS bandwidth.
5. Set the RBW = 100 kHz.
6. Set the VBW ≥ [3 × RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum PSD level.

Emission level measurement

12. Set the center frequency and span to encompass frequency range to be measured.

13. Set the RBW = 100 kHz.
14. Set the VBW ⩾ [3 × RBW].
15. Detector = peak.
16. Sweep time = auto couple.
17. Trace mode = max hold.
18. Allow trace to fully stabilize.
19. Use the peak marker function to determine the maximum amplitude level.

6.5.3 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

6.5.4 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	2.462GHz	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	2.462GHz	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	2.462GHz	Fig 41.	P
		30MHz~26GHz	Fig 42.	P

Conclusion: PASS

Test graphs as below:

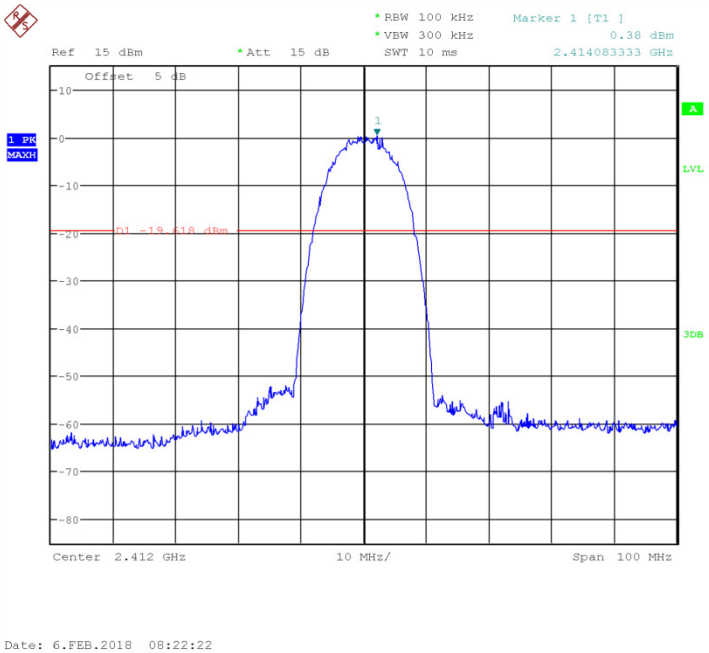


Fig.25 Conducted Spurious Emission (802.11b, Ch1)

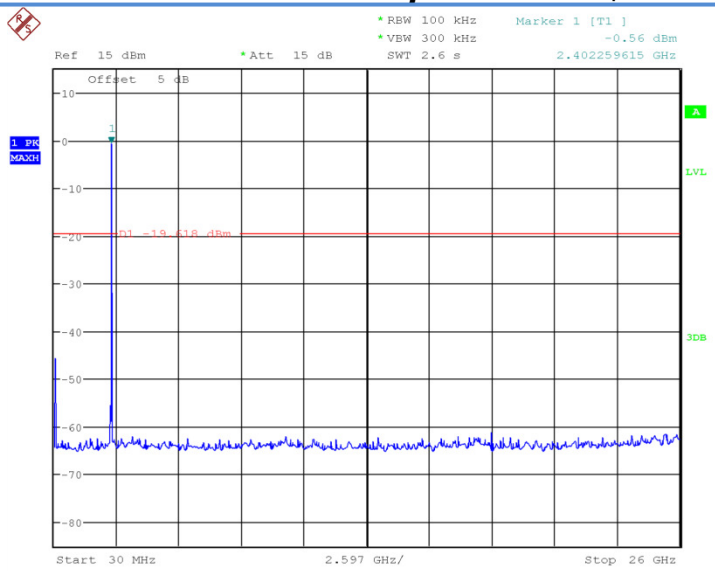


Fig.26 Conducted Spurious Emission (802.11b, Ch1, 30MHz~26GHz)

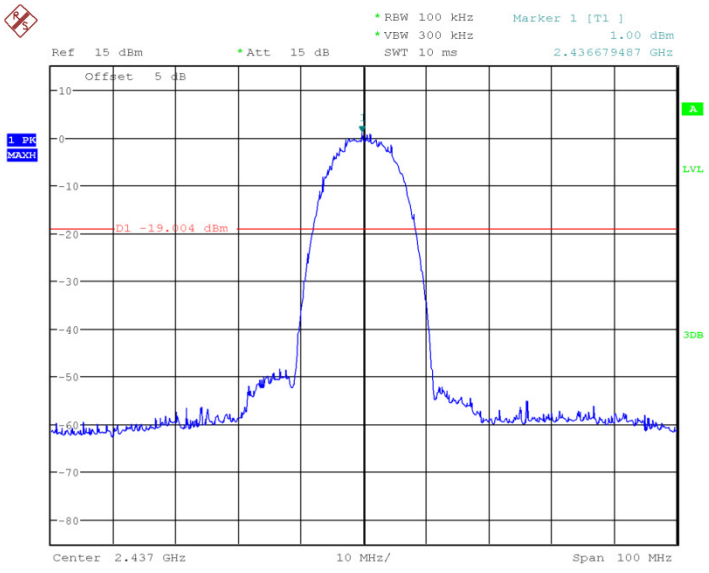


Fig.27 Conducted Spurious Emission (802.11b, Ch6)

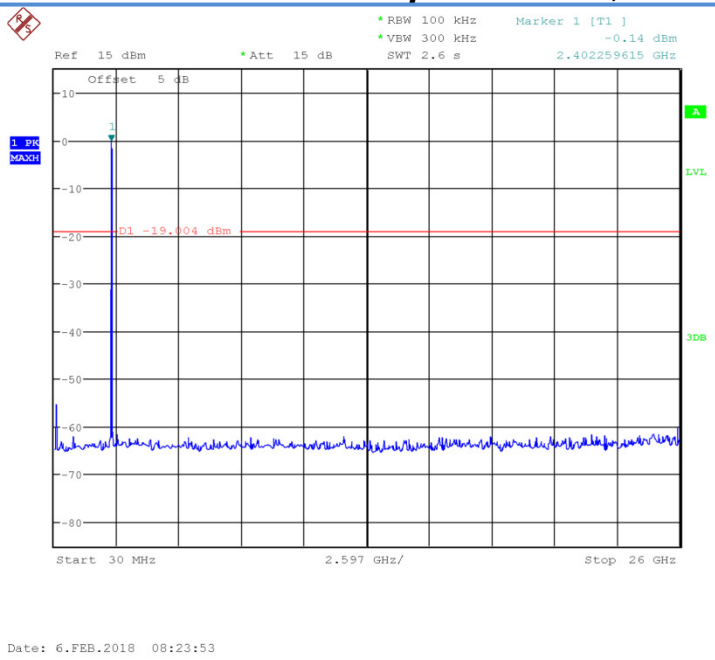


Fig.28 Conducted Spurious Emission (802.11b, Ch6, 30MHz~26GHz)

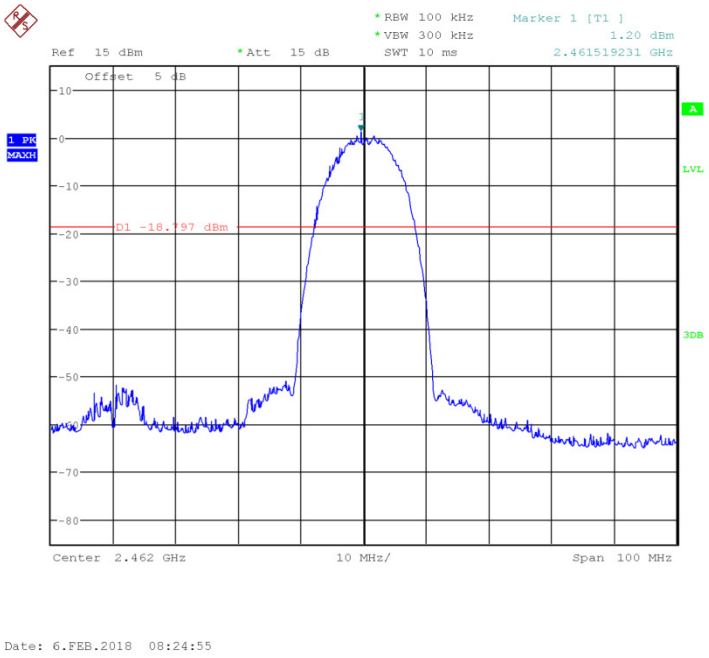


Fig.29 Conducted Spurious Emission (802.11b, Ch11)

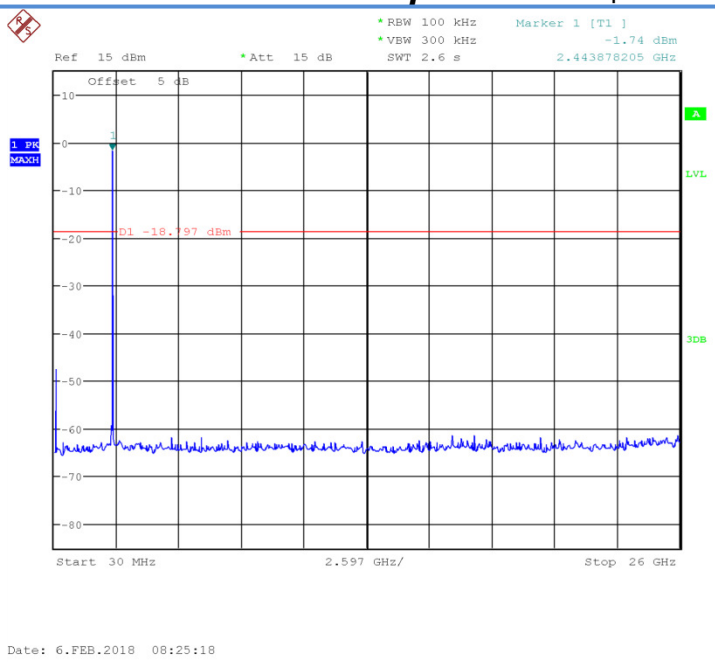


Fig.30 Conducted Spurious Emission (802.11b, Ch11, 30MHz~26GHz)

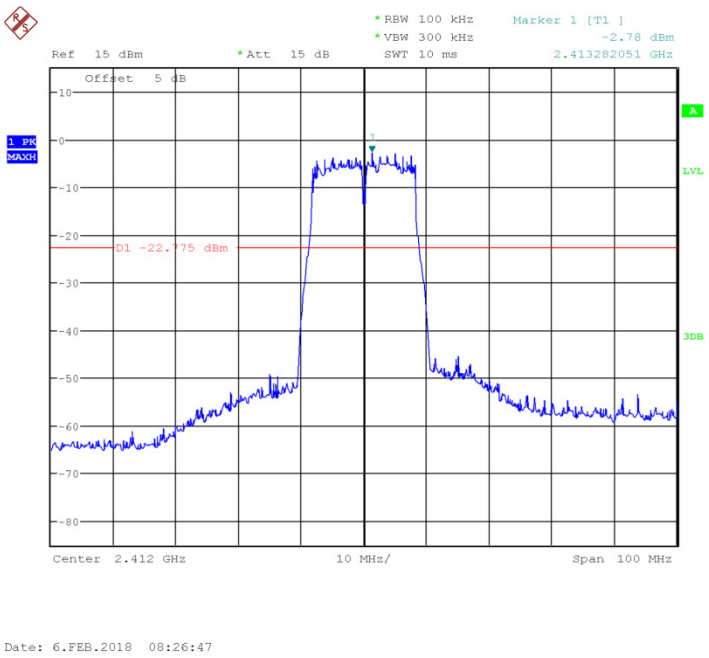


Fig.31 Conducted Spurious Emission (802.11g, Ch1)

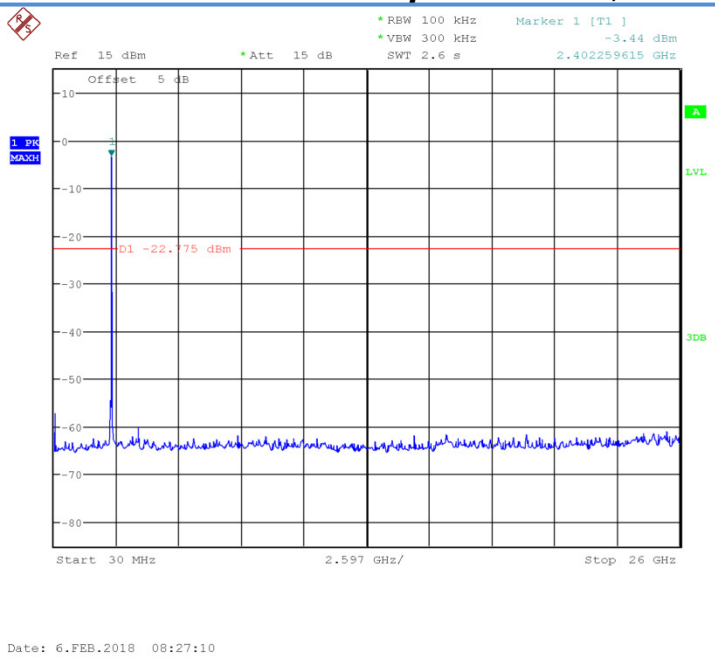


Fig.32 Conducted Spurious Emission (802.11g, Ch1, 30MHz~26GHz)

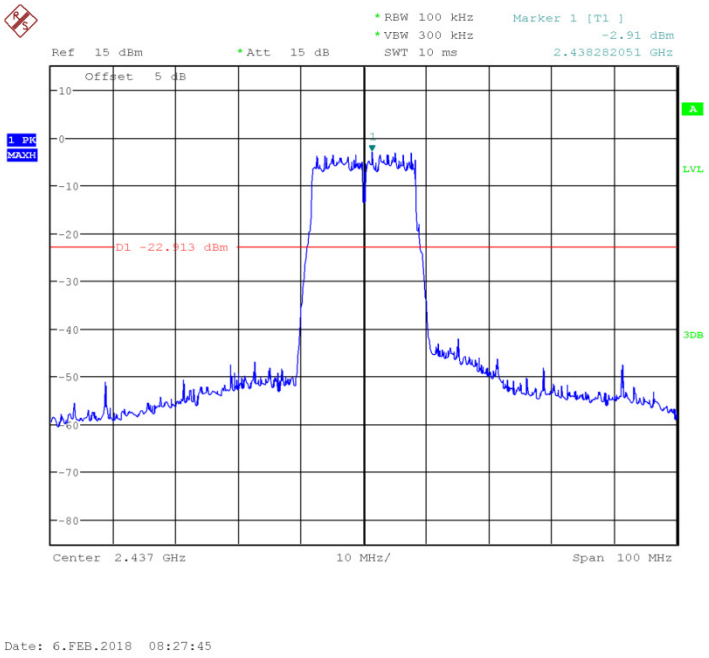


Fig.33 Conducted Spurious Emission (802.11g, Ch6)

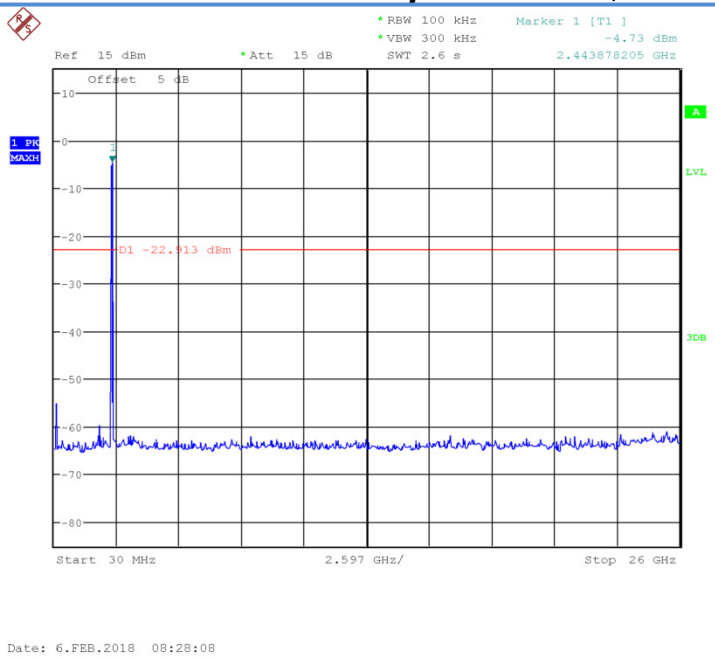


Fig.34 Conducted Spurious Emission (802.11g, Ch6, 30MHz~26GHz)

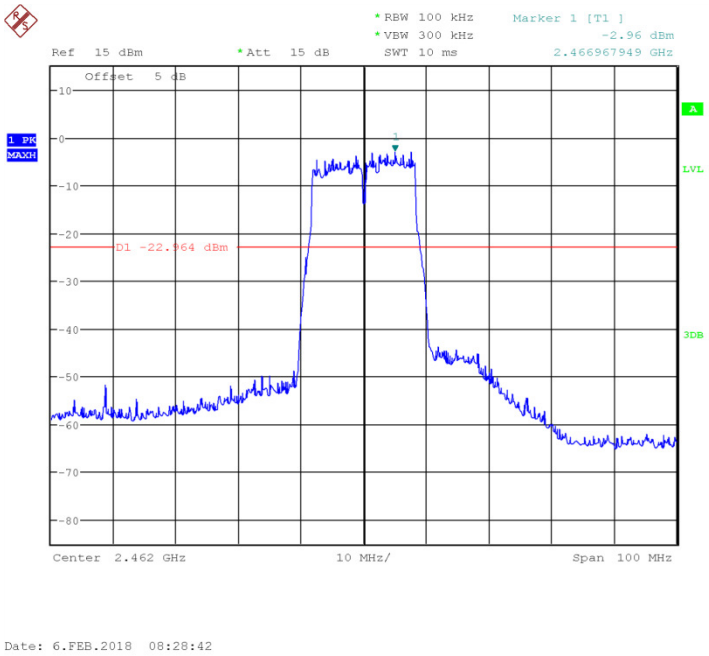


Fig.35 Conducted Spurious Emission (802.11g, Ch11)

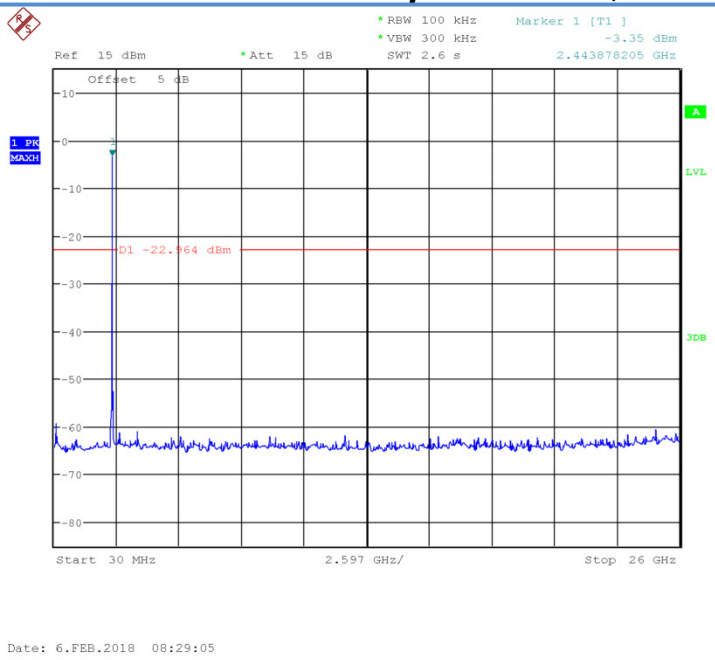


Fig.36 Conducted Spurious Emission (802.11g, Ch11, 30MHz~26GHz)

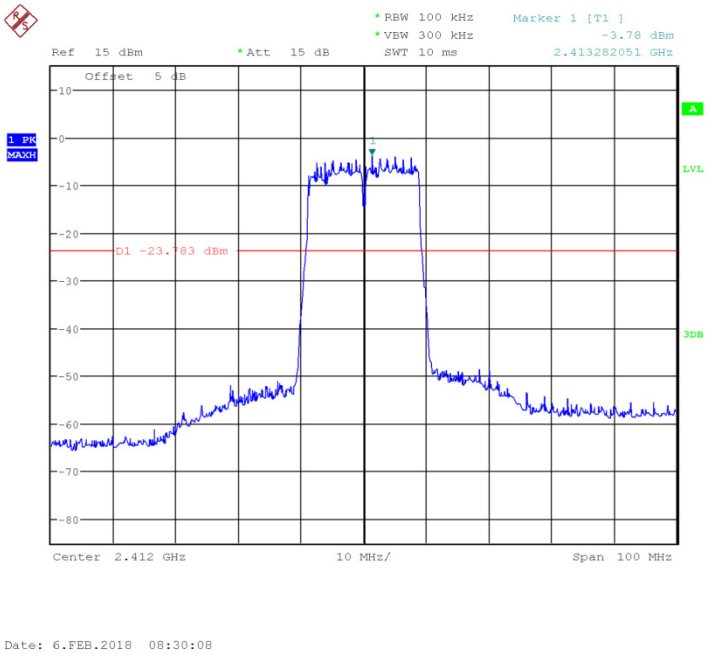


Fig.37 Conducted Spurious Emission (802.11n-20MHz, Ch1)

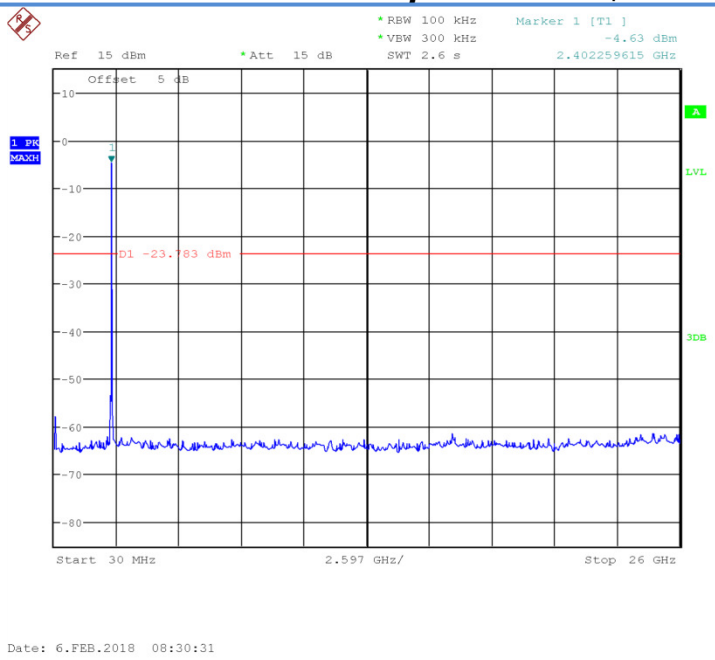


Fig.38 Conducted Spurious Emission (802.11n-20MHz, Ch1, 30MHz~26GHz)

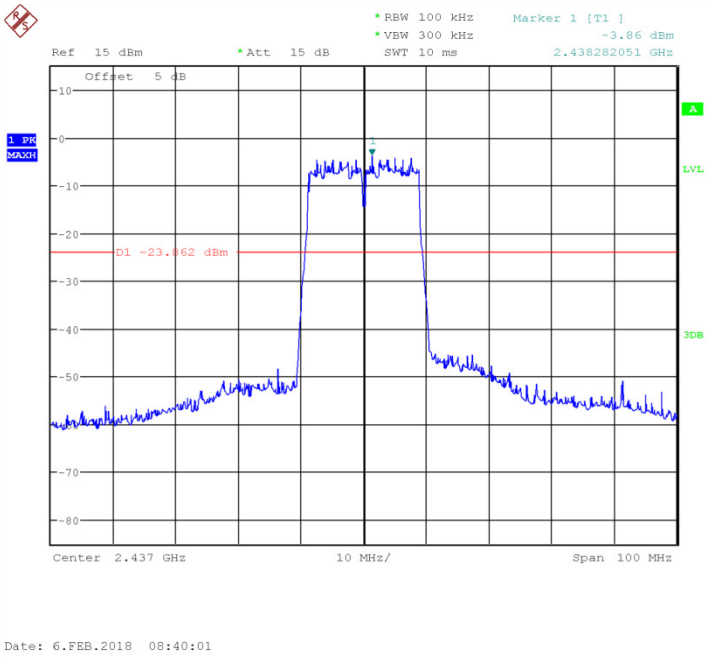


Fig.39 Conducted Spurious Emission (802.11n-20MHz, Ch6)

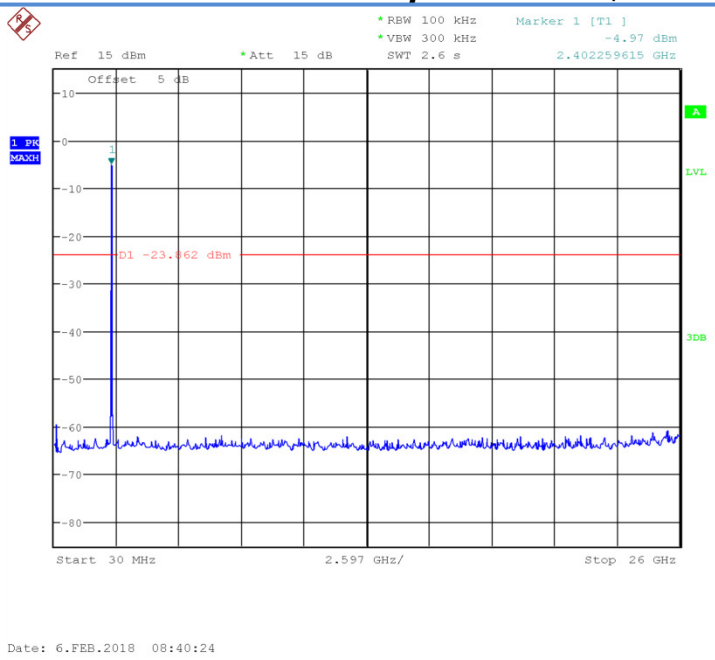


Fig.40 Conducted Spurious Emission (802.11n-20MHz, Ch6, 30MHz~26GHz)

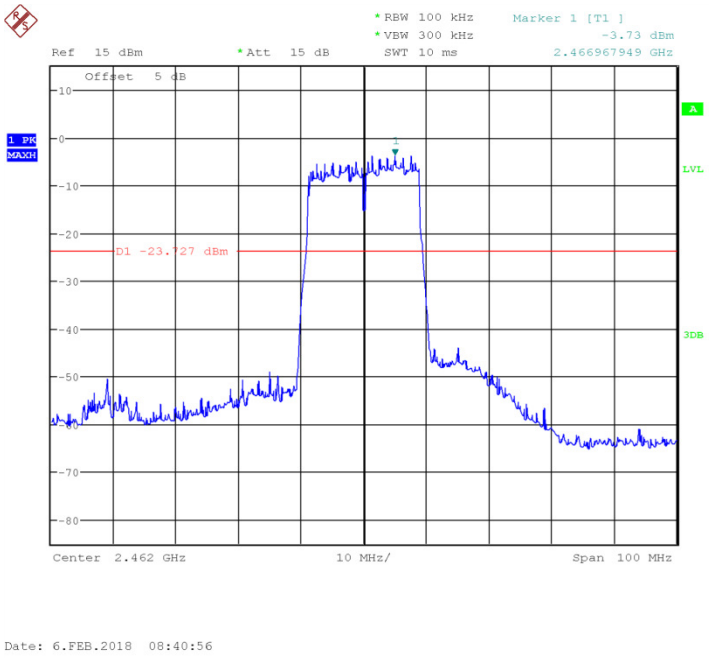


Fig.41 Conducted Spurious Emission (802.11n-20MHz, Ch11)

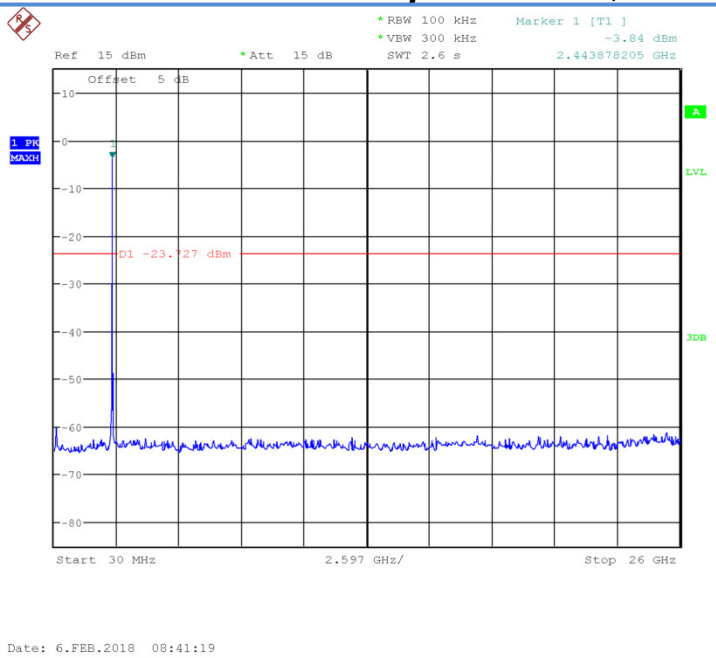


Fig.42 Conducted Spurious Emission (802.11n-20MHz, Ch11, 30MHz~26GHz)

6.6. Transmitter Spurious Emission-Radiated

6.6.1 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 clause 11.11 and 11.12.

6.6.2 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

6.6.3 Test procedures

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 C63.4-2013 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

Main supply

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz~2.45GHz	Fig 43.	P
	Power	2.45GHz~2.5GHz	Fig 44.	P
	1	30MHz~1GHz	Fig 45.	P
		1GHz~3GHz	Fig 46.	P
		3GHz~18GHz	Fig 47.	P
802.11g	Power	2.38GHz~2.45GHz	Fig 48.	P
	Power	2.45GHz~2.5GHz	Fig 49.	P
	1	30MHz~1GHz	Fig 50.	P
		1GHz~3GHz	Fig 51.	P

		3GHz~18GHz	Fig 52.	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	Power	2.38GHz~2.45GHz	Fig 53.	P
	Power	2.45GHz~2.5GHz	Fig 54.	P
	1	30MHz~1GHz	Fig 55.	P
		1GHz~3GHz	Fig 56.	P
		3GHz~18GHz	Fig 57.	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:

ARpi = Cable loss + Antenna Gain-Preamplifier gain

Result = P_{Mea} + Cable loss + Antenna Gain-Preamplifier gain = P_{Mea} + ARpi .

802.11b mode

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
32.838772	11.98	-22	33.98	V
35.76606	13.79	-21.7	35.49	V
42.858632	12.05	-20.4	32.45	H
792.967268	21.68	-11	32.68	V
860.44752	22.67	-10	32.67	V
936.014184	23.76	-9	32.76	H

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2633.700192	54.74	7.6	47.14	V
2729.782885	54.77	7.8	46.97	H

2832.512308	54.41	8.2	46.21	H
2878.916154	55.52	8.6	46.92	H
2936.983462	55.98	8.7	47.28	H
2978.848269	55.67	8.9	46.77	V

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2633.700192	42.12	7.6	34.52	V
2729.782885	42.48	7.8	34.68	H
2832.512308	42.8	8.2	34.6	H
2878.916154	43.47	8.6	34.87	H
2936.983462	43.76	8.7	35.06	H
2978.848269	43.74	8.9	34.84	V

Ch1 3GHz~18GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14320.44413	54.93	20.4	34.53	H
15411.88587	56.27	22.7	33.57	H
16023.28313	59.44	25.3	34.14	V
16618.89487	58.6	25.6	33	V
17113.01967	59.72	26.9	32.82	H
17604.64147	60.57	27.7	32.87	H

Ch1 3GHz~18GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14320.44413	42.41	20.4	22.01	H
15411.88587	44.03	22.7	21.33	H
16023.28313	47.18	25.3	21.88	V
16618.89487	45.95	25.6	20.35	V

17113.01967	47.31	26.9	20.41	H
17604.64147	48.03	27.7	20.33	H

802.11g

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.190964	12.91	-22	34.91	V
34.91232	15.34	-21.9	37.24	V
36.77818	12.95	-21.5	34.45	V
657.893596	19.4	-13.5	32.9	H
733.72932	20.84	-12.1	32.94	H
921.704156	23.6	-9.1	32.7	V

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2656.535192	55.23	7.7	47.53	V
2723.045961	55.16	7.8	47.36	V
2833.393269	54.99	8.2	46.79	H
2891.925	55.99	8.8	47.19	H
2946.293653	56.04	8.6	47.44	H
2998.950256	56.12	9	47.12	V

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2656.535192	42.69	7.7	34.99	V
2723.045961	42.52	7.8	34.72	V
2833.393269	42.77	8.2	34.57	H
2891.925	43.68	8.8	34.88	H
2946.293653	43.59	8.6	34.99	H

2998.950256	43.7	9	34.7	V

Ch1 3GHz~18GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13794.5694	54.22	18.5	35.72	H
14291.90913	54.89	20.7	34.19	V
15367.1692	56.74	22.4	34.34	H
16111.6	59.13	24.8	34.33	V
17148.93787	59.97	27.1	32.87	H
17800.11153	60.31	28.5	31.81	V

Ch1 3GHz~18GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13794.5694	41.62	18.5	23.12	H
14291.90913	42.86	20.7	22.16	V
15367.1692	43.5	22.4	21.1	H
16111.6	46.64	24.8	21.84	V
17148.93787	47.54	27.1	20.44	H
17800.11153	48.32	28.5	19.82	V

802.11n-20MHz

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.933288	12.86	-21.9	34.76	V
36.565792	12.76	-21.5	34.26	V
48.774964	12.26	-19.9	32.16	H
539.833892	17.14	-15.7	32.84	H
667.677056	19.55	-13.3	32.85	H
864.14518	22.66	-10	32.66	V

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2307.2976	52.35	5.2	47.15	H
2344.7328	52.44	5.9	46.54	H
2515.405962	53.8	7	46.8	H
2592.702885	54.53	7.3	47.23	H
2632.64	53.84	7.6	46.24	V
2677.865961	54.86	7.8	47.06	H

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2592.702885	42.12	7.3	34.82	H
2677.865961	42.5	7.8	34.7	H

Ch1 3GHz~18GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14323.31413	54.44	20.4	34.04	H
15074.71473	56.38	21.1	35.28	V
15708.40407	57.28	23.2	34.08	H
16362.5594	57.62	25.7	31.92	H
16921.82873	60.76	27.4	33.36	V
17539.41633	59.99	27.6	32.39	H

Ch1 3GHz~18GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14323.31413	42.31	20.4	21.91	H
15074.71473	43.31	21.1	22.21	V
15708.40407	44.69	23.2	21.49	H
16362.5594	45.94	25.7	20.24	H

16921.82873	48	27.4	20.6	V
17539.41633	47.97	27.6	20.37	H

Secondary supply

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz~2.45GHz	Fig 58.	P
	Power	2.45GHz~2.5GHz	Fig 59.	P
	1	30MHz~1GHz	Fig 60.	P
		1GHz~3GHz	Fig 61.	P
		3GHz~18GHz	Fig 62.	P

802.11b mode

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.284828	12.55	-22	34.55	V
36.482708	13	-21.6	34.6	V
100.462452	9.36	-23.5	32.86	V
417.794532	14.66	-18.5	33.16	V
554.069208	17.57	-15.4	32.97	H
857.352316	22.69	-10.2	32.89	H

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2287.7428	50.94	4.8	46.14	H
2354.87	53.26	6.4	46.86	H
2519.8375	54.08	6.9	47.18	V
2558.221539	53.64	7.2	46.44	H
2618.25423	54.66	7.4	47.26	H
2654.777692	54.99	7.7	47.29	H

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2519.8375	41.76	6.9	34.86	V
2618.25423	42.1	7.4	34.7	H
2654.777692	42.63	7.7	34.93	H

Ch1 3GHz~18GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13803.08207	54.6	18.6	36	H
14742.28007	55.47	20.9	34.57	H
15745.0348	56.12	23.3	32.82	V
16242.17433	58.48	25.3	33.18	V
17008.8022	60.15	27	33.15	H
17517.20907	60.18	27.6	32.58	V

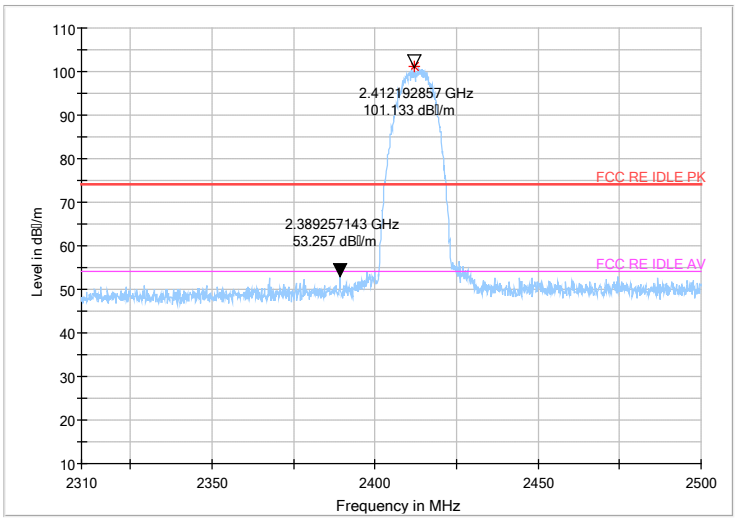
Ch1 3GHz~18GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13803.08207	41.6	18.6	23	H
14742.28007	42.94	20.9	22.04	H
15745.0348	44.51	23.3	21.21	V
16242.17433	46.05	25.3	20.75	V
17008.8022	48.07	27	21.07	H
17517.20907	47.85	27.6	20.25	V

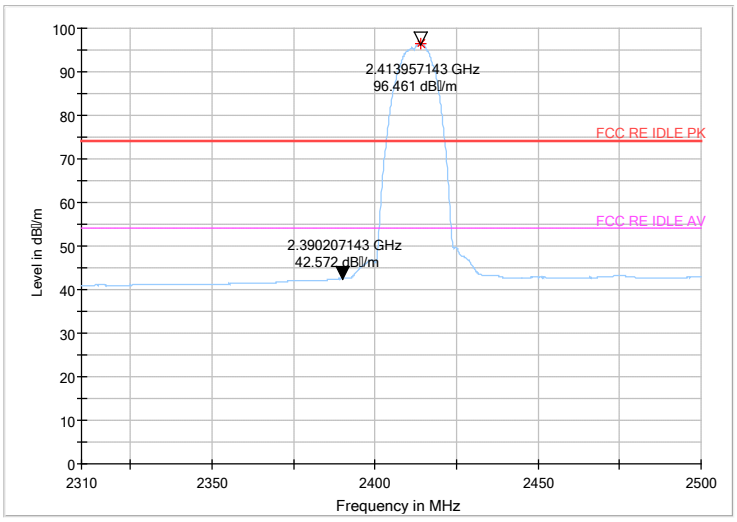
Note: Only the worst case is written in the report.

Main supply

Test graphs as below:

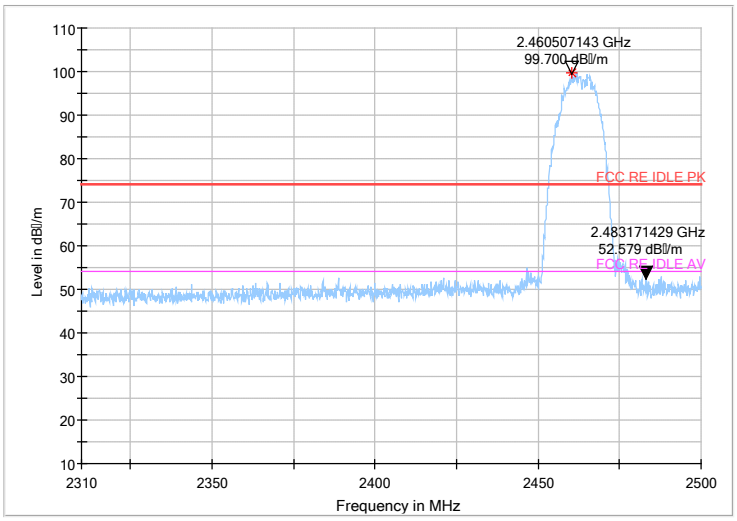


Peak detector

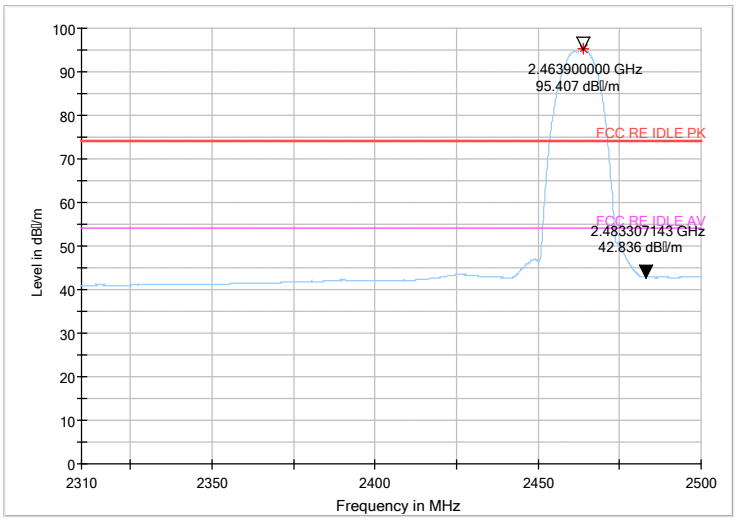


AV detector

Fig.43 Radiated emission (Power): 802.11b, low channel



Peak detector



AV detector

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

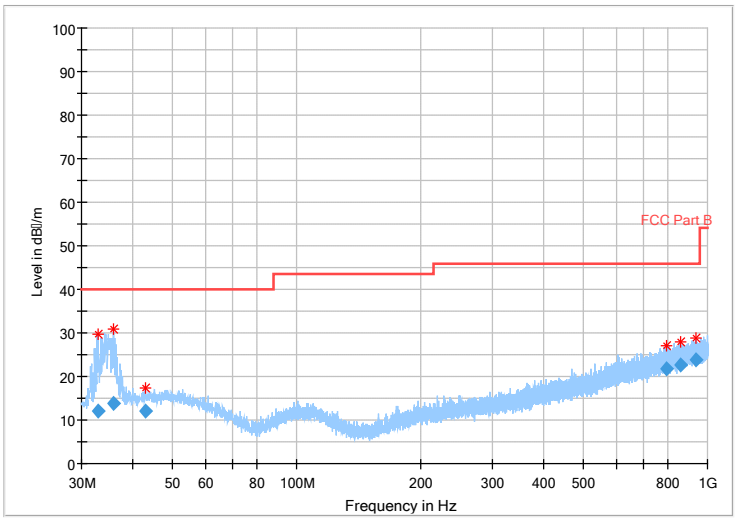


Fig.45 Radiated Spurious Emission (802.11b,Ch1,30MHz~1GHz)

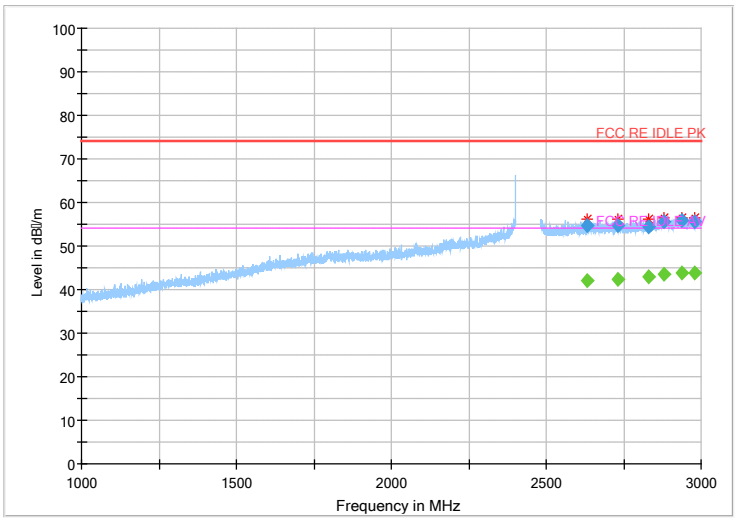


Fig.46 Radiated Spurious Emission (802.11b,Ch1,1GHz~3GHz)

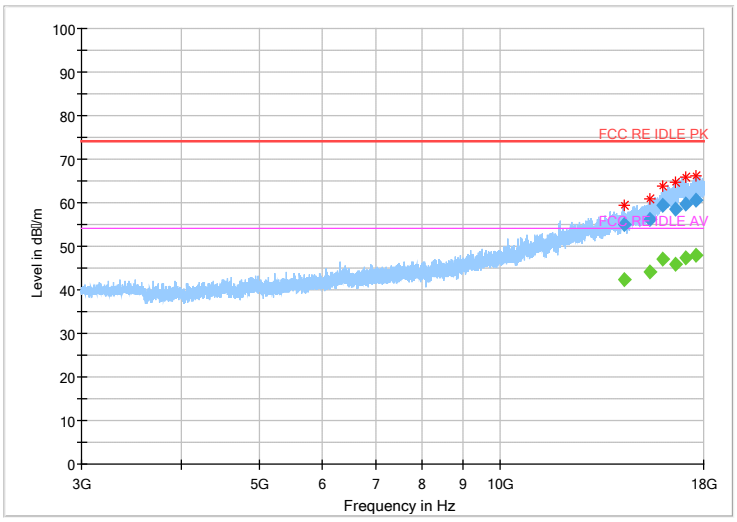
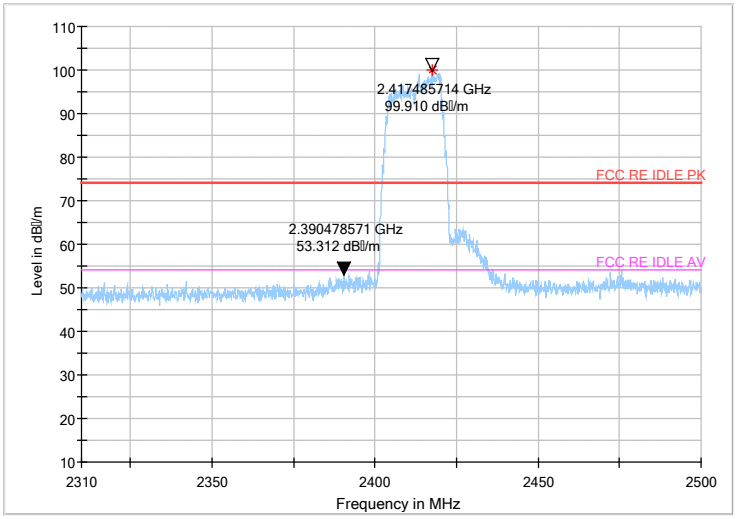
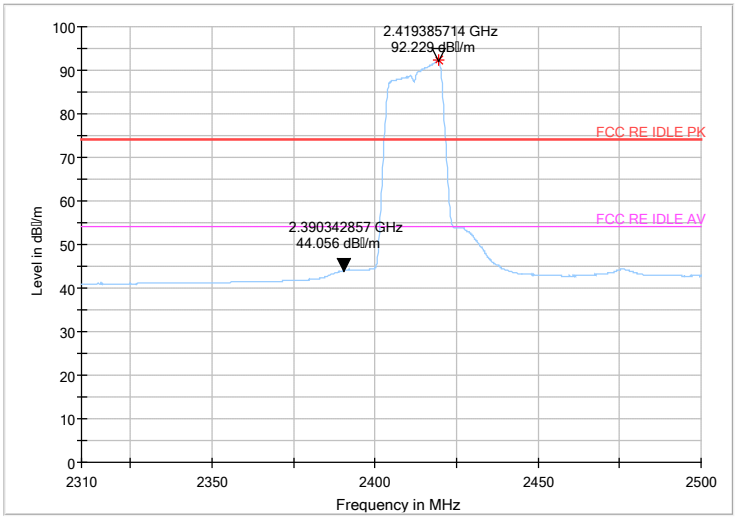


Fig.47 Radiated Spurious Emission (802.11b,Ch1,3GHz~18GHz)

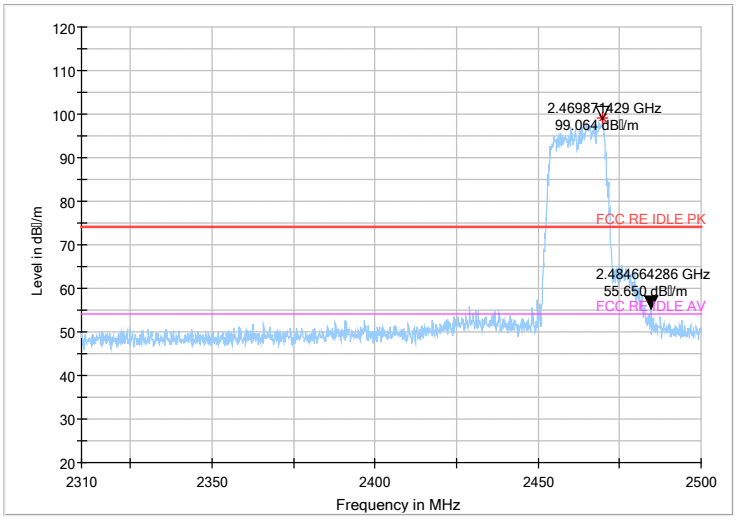


Peak detector

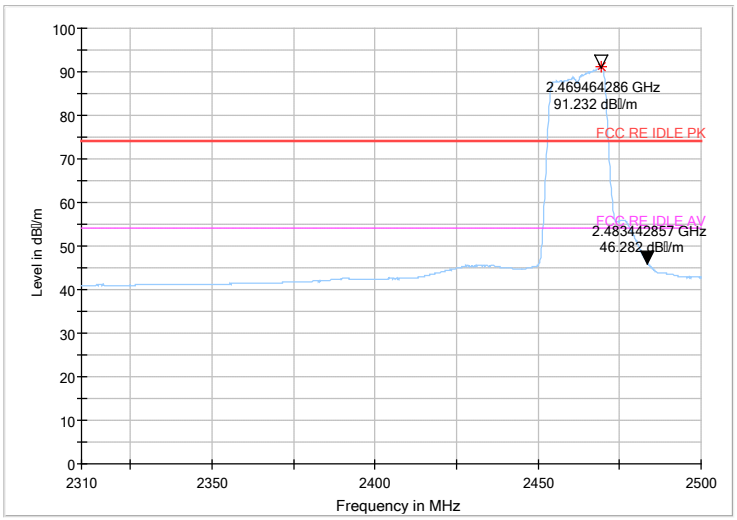


AV detector

Fig.48 Radiated emission (Power): 802.11g, low channel



Peak detector



AV detector

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

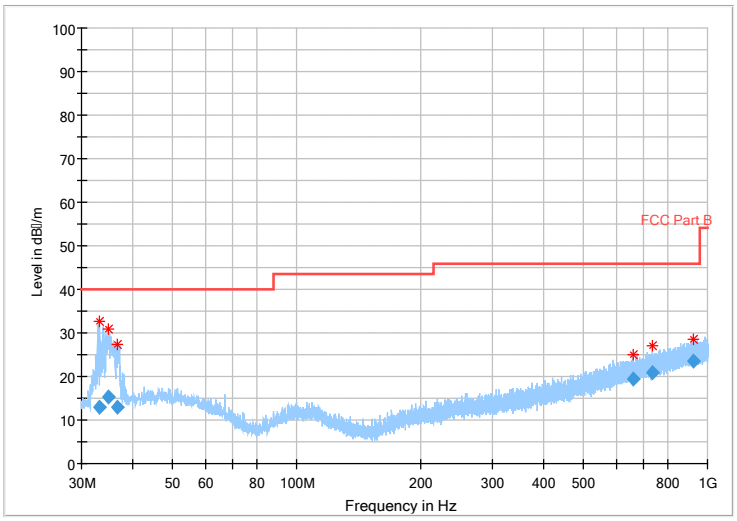


Fig.50 Radiated Spurious Emission (802.11g,Ch1,30MHz~1GHz)

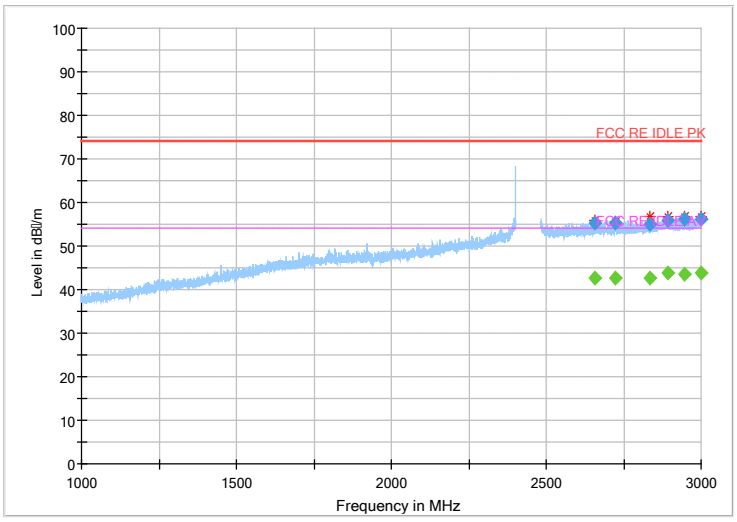


Fig.51 Radiated Spurious Emission (802.11g,Ch1,1GHz~3GHz)

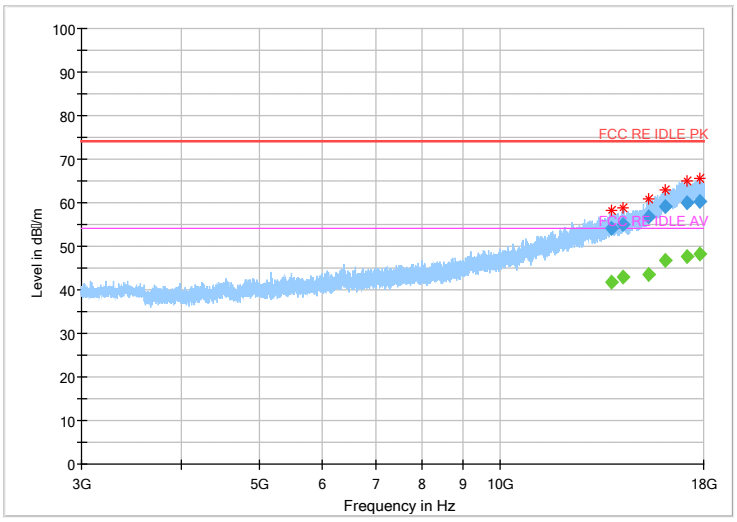
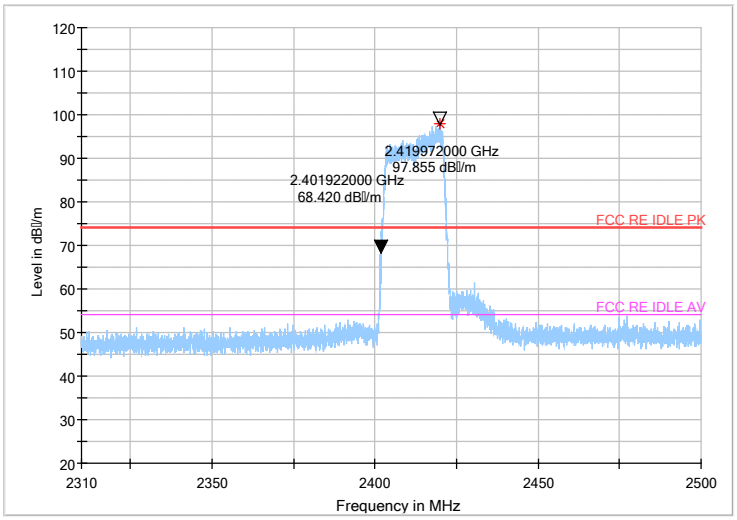
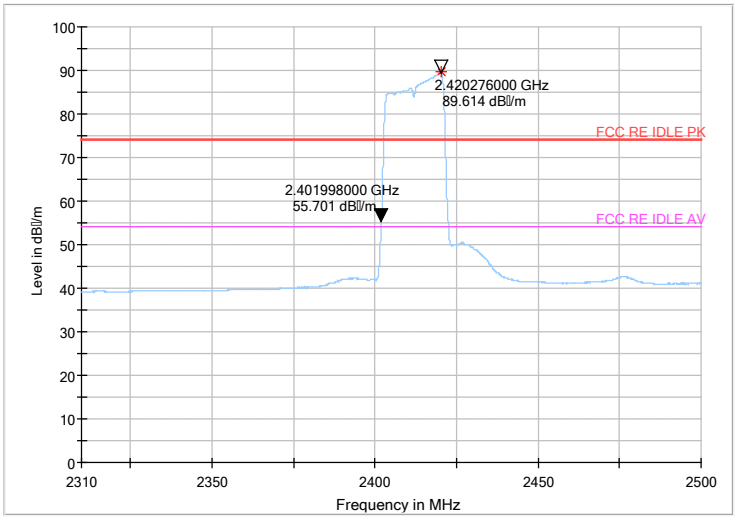


Fig.52 Radiated Spurious Emission (802.11g,Ch1,3GHz~18GHz)

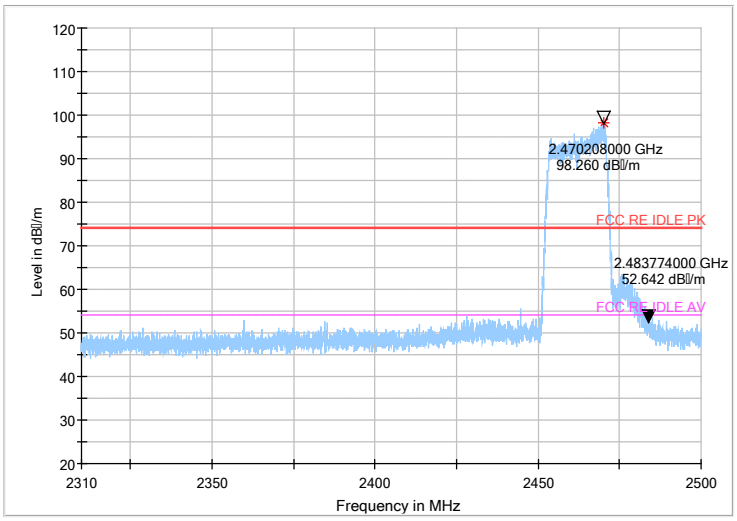


Peak detector

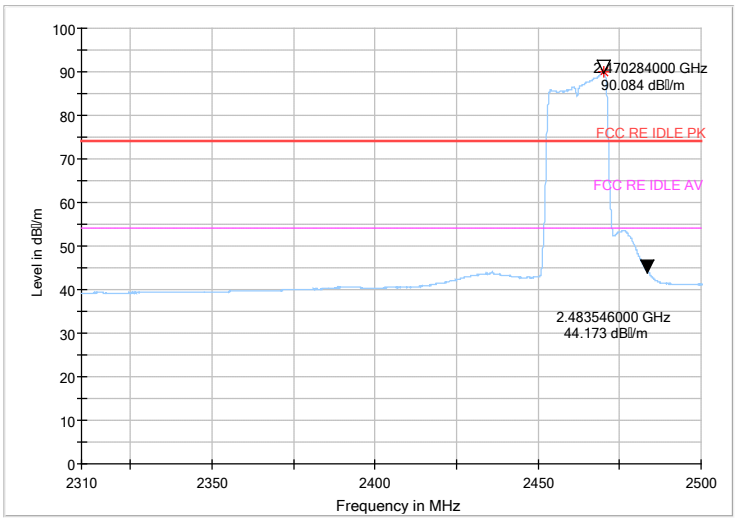


AV detector

Fig.53 Radiated emission (Power): 802.11n, low channel



Peak detector



AV detector

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

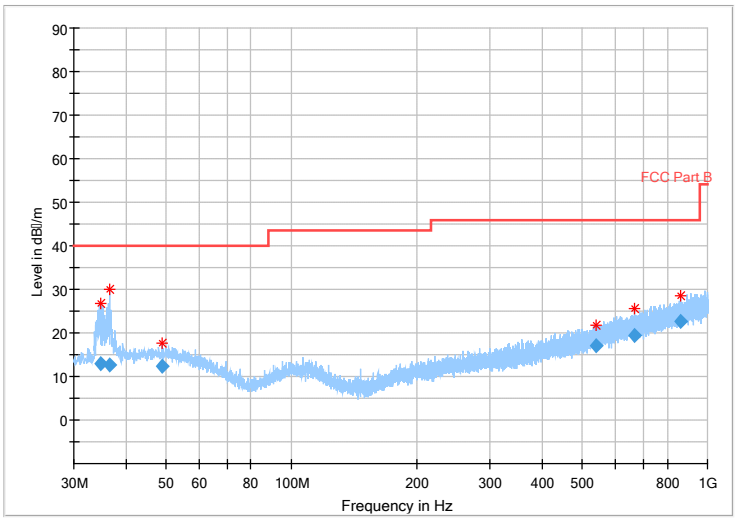


Fig.55 Radiated Spurious Emission (802.11 n-20MHz,Ch1,30MHz~1GHz)

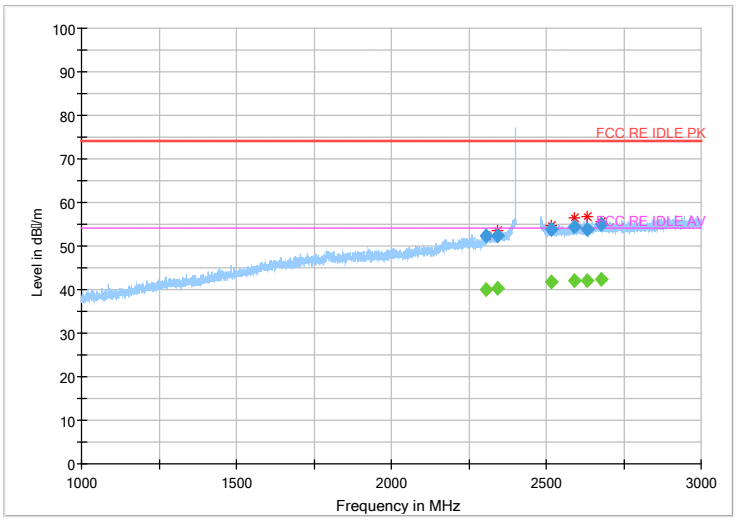


Fig.56 Radiated Spurious Emission (802.11 n-20MHz,Ch1,1GHz~3GHz)

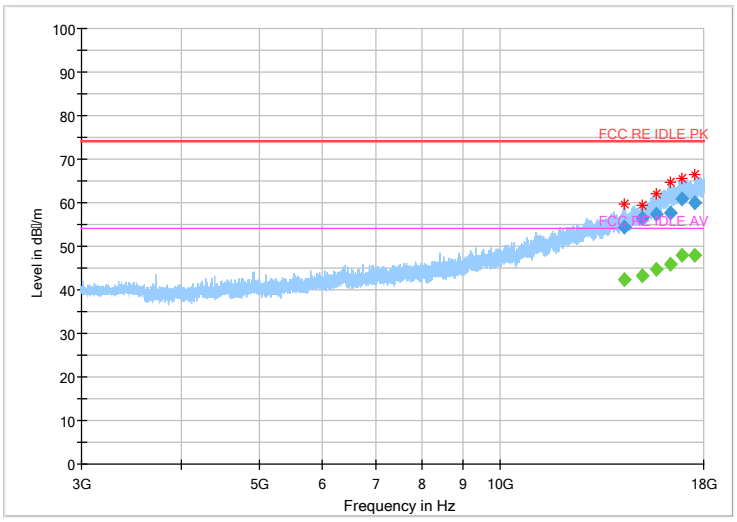
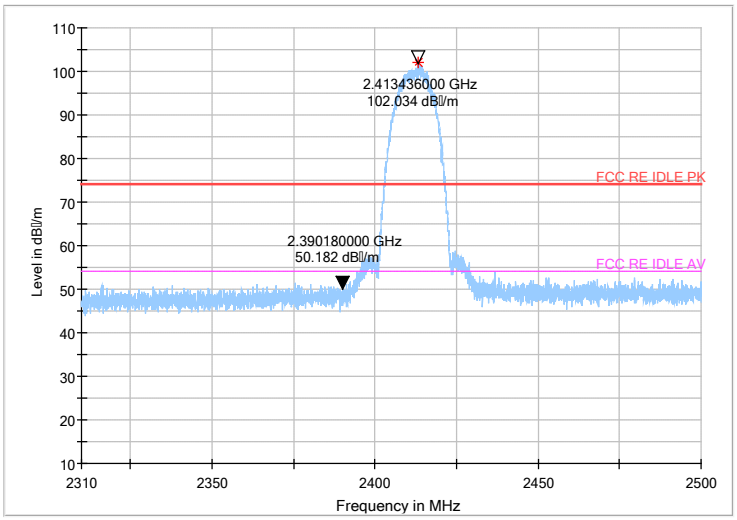
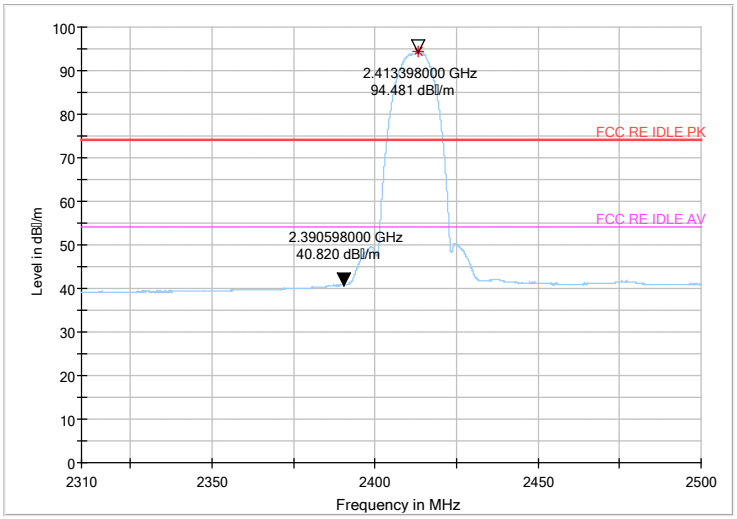


Fig.57 Radiated Spurious Emission (802.11 n-20MHz,Ch1,3GHz~18GHz)

Secondary supply

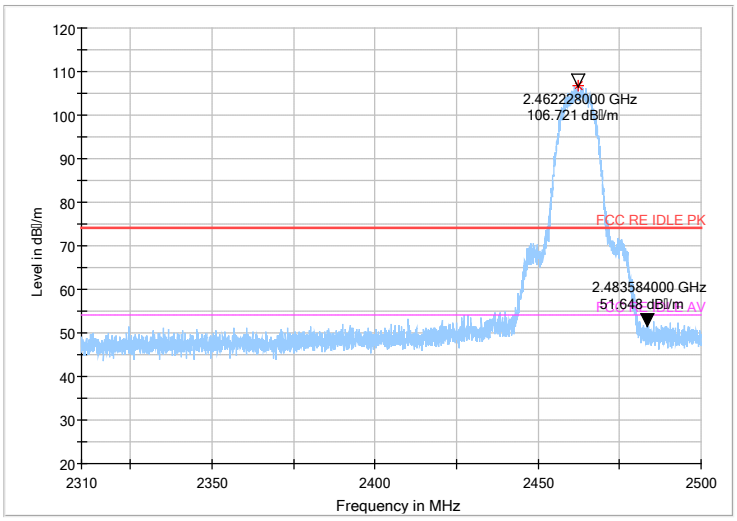


Peak detector

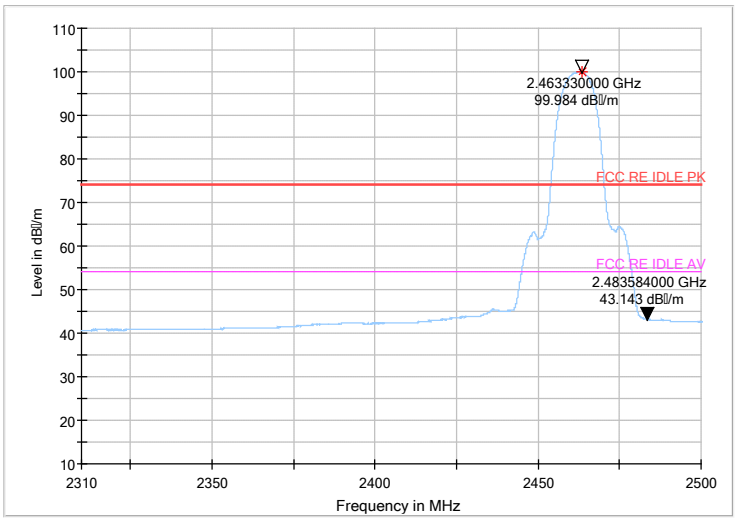


AV detector

Fig.58 Radiated emission (Power): 802.11b, low channel



Peak detector



AV detector

Fig.59 Radiated emission (Power): 802.11b, high channel

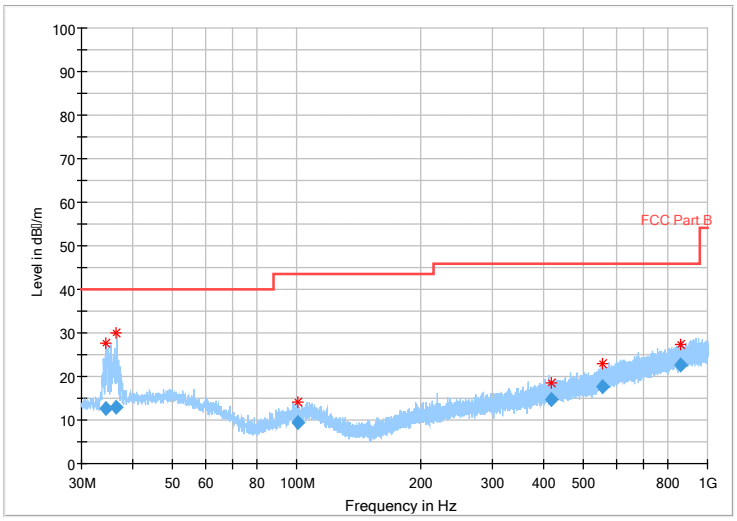


Fig.60 Radiated Spurious Emission (802.11b,Ch1,30MHz~1GHz)

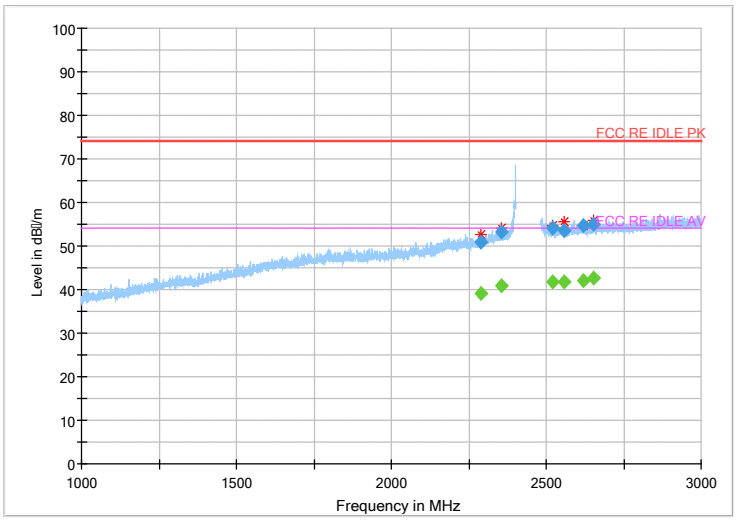


Fig.61 Radiated Spurious Emission (802.11b,Ch1,1GHz~3GHz)

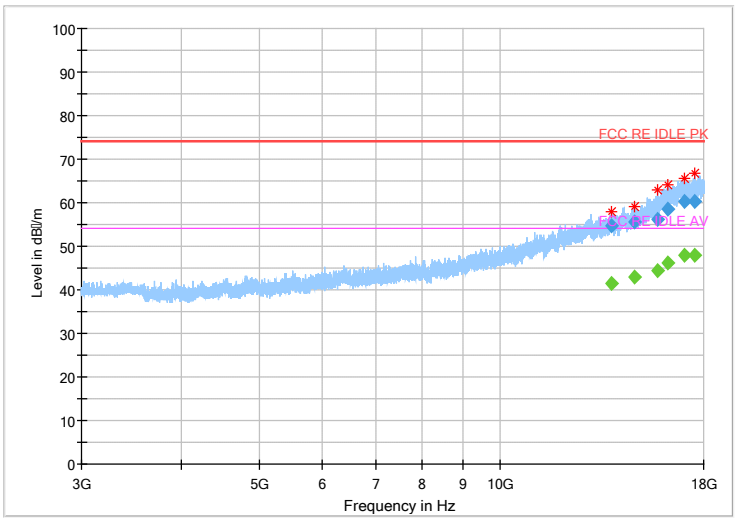
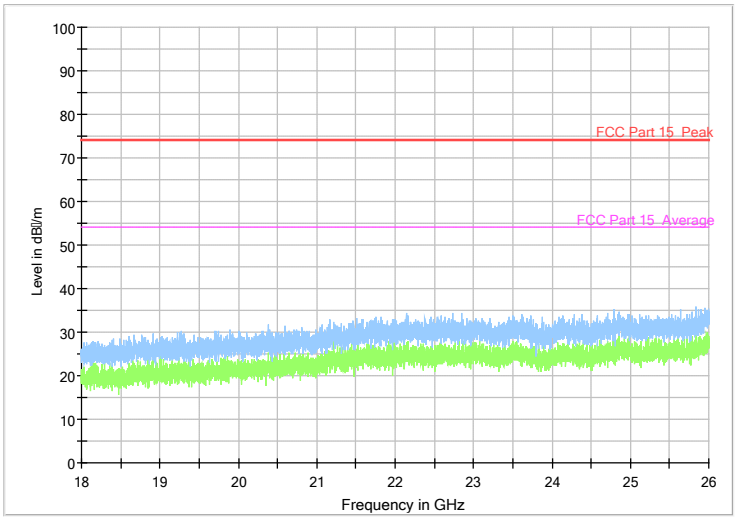


Fig.62 Radiated Spurious Emission (802.11b,Ch1,3GHz~18GHz)



ALL Channel 18GHz~26GHz

6.7. AC Powerline Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a

non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Result (dBμV) With charger 802.11b	Conclusion
0.15 to 0.5	66 to 56	56 to 46	Fig 58.	P
0.5 to 5	56	46		
5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

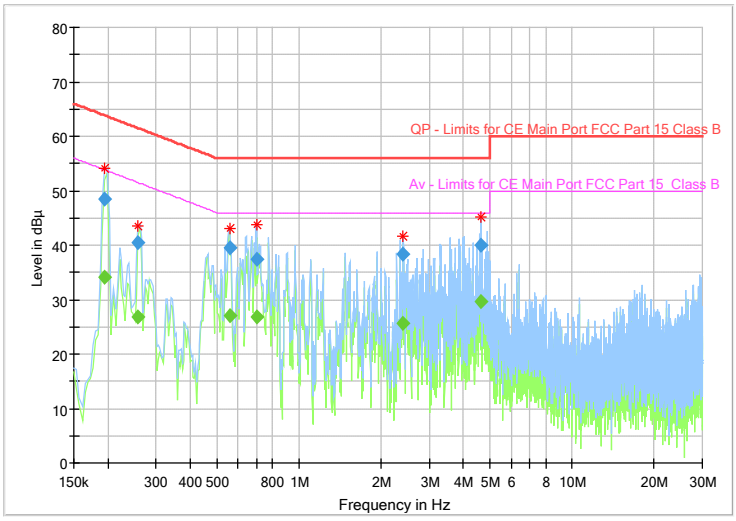


Fig.58 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.194775	---	34.13	53.83	19.70	1000.0	9.000	L1	ON	9.6
0.194775	48.53	---	63.83	15.30	1000.0	9.000	L1	ON	9.6
0.258206	---	26.81	51.49	24.68	1000.0	9.000	N	ON	9.7

0.258206	40.55	---	61.49	20.94	1000.0	9.000	N	ON	9.7
0.556706	---	27.14	46.00	18.86	1000.0	9.000	L1	ON	9.6
0.556706	39.60	---	56.00	16.40	1000.0	9.000	L1	ON	9.6
0.698494	---	26.78	46.00	19.22	1000.0	9.000	N	ON	9.7
0.698494	37.36	---	56.00	18.64	1000.0	9.000	N	ON	9.7
2.411138	---	25.70	46.00	20.30	1000.0	9.000	L1	ON	9.7
2.411138	38.34	---	56.00	17.66	1000.0	9.000	L1	ON	9.7
4.623769	---	29.74	46.00	16.26	1000.0	9.000	L1	ON	9.7
4.623769	40.01	---	56.00	15.99	1000.0	9.000	L1	ON	9.7

7. Test Equipment and Ancillaries Used For Tests

The test equipment and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Vector Signal Analyzer	FSQ26	101096	Rohde&Schwarz	2017-05-11	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2017-05-11	1 Year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2017-05-11	1 Year
2	EMI Test Receiver	ESU40	100307	R&S	2017-05-11	1 Year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double-ridged Waveguide Antenna	ETS-3117	00135890	ETS	2017-01-11	3 Year
5	2-Line V-Network	ENV216	101380	R&S	2017-05-11	1 Year

Anechoic chamber

Fully anechoic chamber by Frankonia German.

8. 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. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω

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

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

ANNEX B. Accreditation Certificate

Accredited Laboratory

A2LA has accredited

EAST CHINA INSTITUTE OF TELECOMMUNICATIONS

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 15th day of March 2017.

President and CEO
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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