Full

TEST REPORT

No. I15D00083-WLAN

For

Client :	**Suzhou Mobilead Eletronic Technology Co.,Ltd**
Production :	**WCDMA wireless data terminal**
Model Name :	**Mobilead M80**
FCC ID:	**2AFBBM80**
Hardware Version:	**V01**
Software Version:	**M80.01.01.20150526**
Issued date:	**2015-07-30**

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
I15D00083-WLAN	00	2015-07-30	Initial creation of test report

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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:	Lan Yaqin
Testing Start Date:	2015-06-08
Testing End Date:	2015-07-04

1.4. Signature

Wang Daming
(Prepared this test report)

Liu Jianquan
(Reviewed this test report)

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

2. Client Information

2.1. Applicant Information

Company Name:	Suzhou Mobilead Eletronic Technology Co.,Ltd
Address:	Room 1503, building G1, No.88, Dongchang Road, SIP, Suzhou, PRC
Telephone:	18014912125
Postcode:	215000

2.2. Manufacturer Information

Company Name:	MOBIWIRE MOBILES (NINGBO) CO.,LTD
Address:	No.999,Dacheng East Road,Fenghua City,Zhejiang
Telephone:	0574 59550618
Postcode:	315500

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

3.1. About EUT

EUT Description	WCDMA wireless data terminal
Model name	Mobilead M80
WLAN Frequency	2412MHz-2472MHz
WLAN Channel	Channel1-Channel13
WLAN type of modulation	802.11b:DSSS 802.11g/n: OFDM
Extreme Temperature	-10/+55℃
Nominal Voltage	3.9V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.6V

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

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	867762020000193	V01	M80.01.01.2015 0526	2015-06-09

*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.

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.	2014
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	3.7V
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.

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

5.2. Statements

The product name X10, supporting GSM/GPRS/WCDMA/HSDPA/HSUPA/HSPA+/WLAN/BT/BLE/GPS, manufactured by Moxee Technologies 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	15.57	15.23	14.88
	2	15.45	/	/
	5.5	15.16	/	/
	11	15.43	/	/
802.11g	6	13.90	/	/
	9	13.65	/	/
	12	14.35	/	/

	18	13.07	/	/
	24	14.10	/	/
	36	14.65	13.91	14.51
	48	13.91	/	/
	54	14.51	/	/

The data rate 1Mbps and 36Mbps 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	15.06	/	/
	MCS1	14.11	/	/
	MCS2	14.57	/	/
	MCS3	14.42	/	/
	MCS4	14.36	/	/
	MCS5	14.52	/	/
	MCS6	15.55	14.13	13.54
	MCS7	14.93	/	/

Mode	Data Rate(Index)	Teat Result(dBm)		
		2422MHz(Ch3)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(40MHz)	MCS0	15.52	/	/
	MCS1	14.68	/	/
	MCS2	14.91	/	/
	MCS3	14.90	/	/
	MCS4	14.28	/	/
	MCS5	15.10	/	/

	MCS6	15.67	14.67	13.03
	MCS7	15.52	/	/

The data rate MCS6 is selected as worse condition for 20MHz bandwidth and 40MHz, 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	14.48	14.02	13.81
802.11g	6.37	5.29	5.05

802.11n mode

Mode	Test Result(dBm)		
	2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(20MHz)	7.69	7.15	6.60

Mode	Test Result(dBm)		
	2422MHz(Ch3)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(40MHz)	8.32	7.83	7.90

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 ≤ 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 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	-7.70	P
	6	Fig.2	-8.41	P
	11	Fig.3	-8.03	P
802.11g	1	Fig.4	-16.55	P
	6	Fig.5	-17.34	P
	11	Fig.6	-17.08	P

802.11n mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11n(20MHz)	1	Fig.7	-14.25	P
	6	Fig.8	-14.47	P
	11	Fig.9	-13.93	P
802.11n(40MHz)	1	Fig.10	-14.61	P
	6	Fig.11	-15.41	P

	11	Fig.12	-14.29	P

Conclusion: PASS

Test graphs as below:

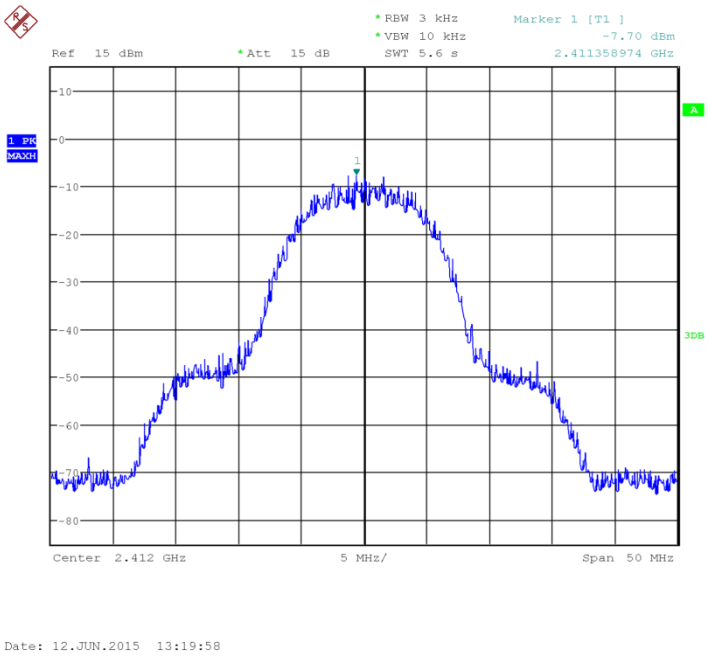

Fig.1 Power Spectral Density (802.1b,Ch1)

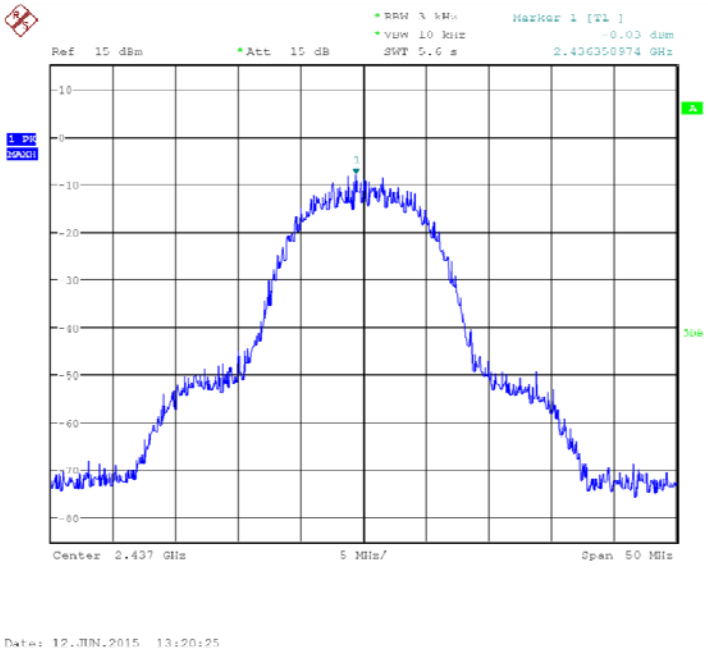

Fig.2 Power Spectral Density (802.1b,Ch6)

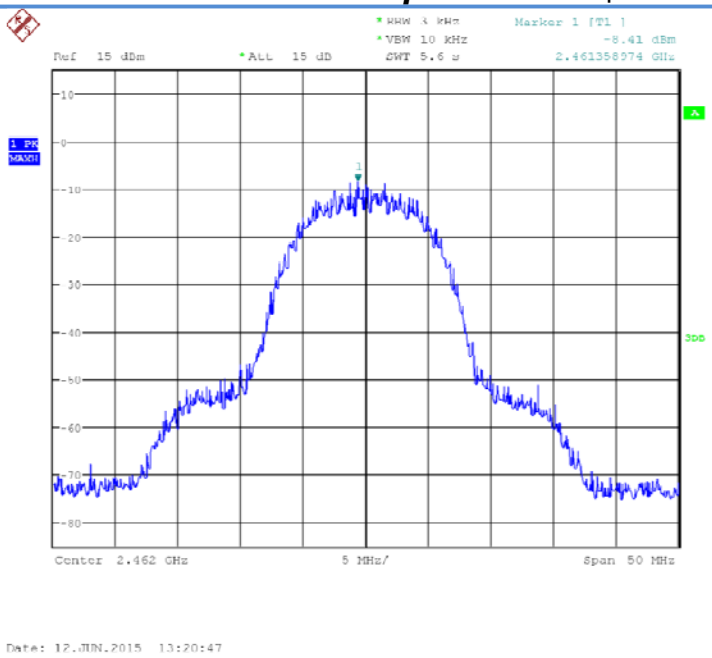

Fig.3 Power Spectral Density (802.1b,Ch11)

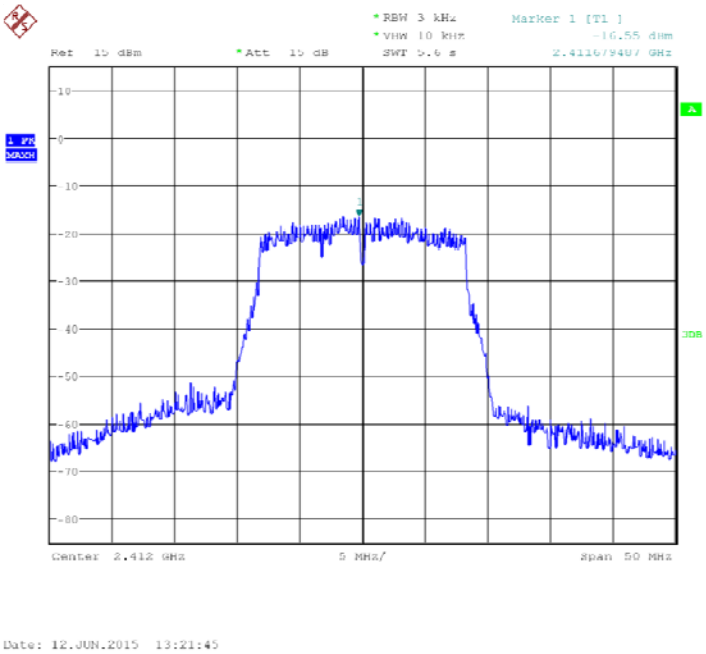

Fig.4 Power Spectral Density (802.1g,Ch1)

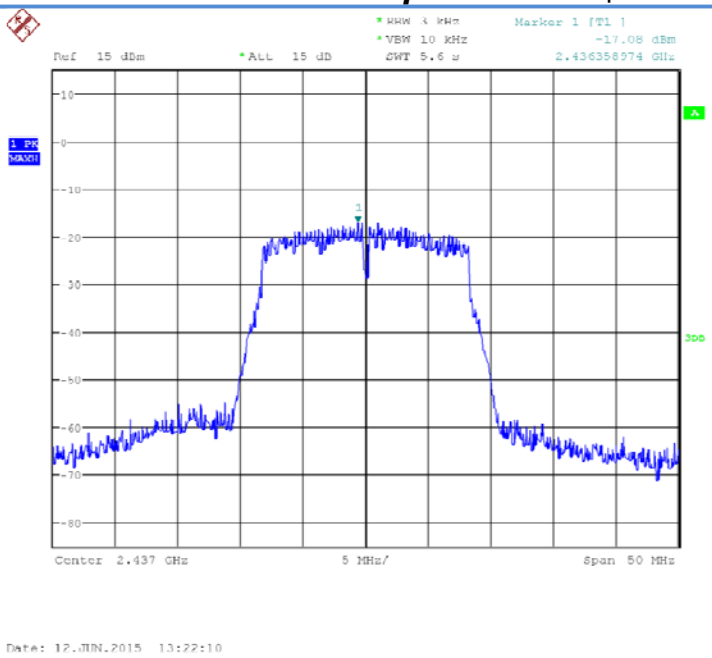

Fig.5 Power Spectral Density (802.1g,Ch6)

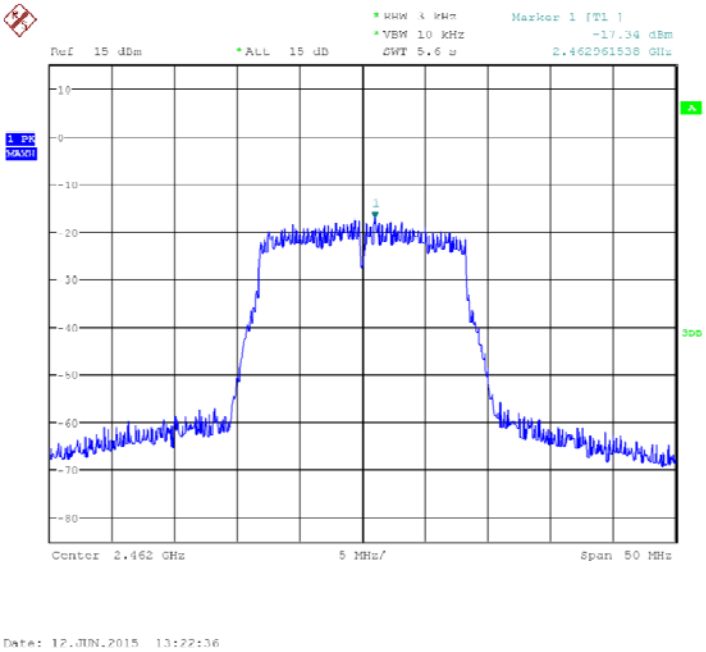

Fig.6 Power Spectral Density (802.1g,Ch11)

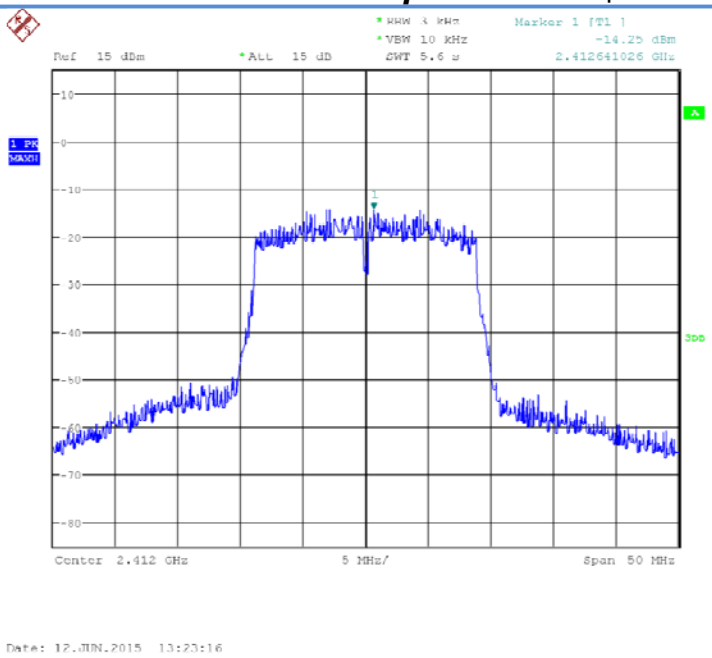

Fig.7 Power Spectral Density (802.1n-20MHz,Ch1)

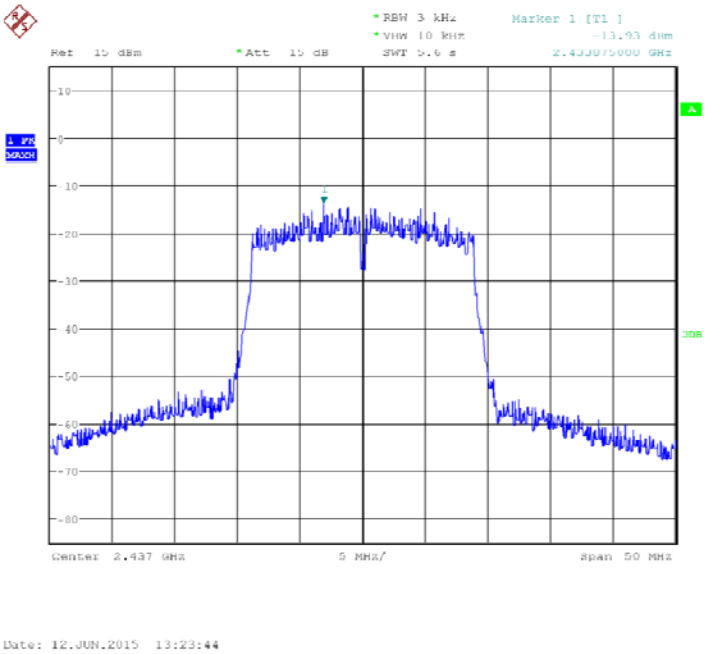

Fig.8 Power Spectral Density (802.1n-20MHz,Ch6)

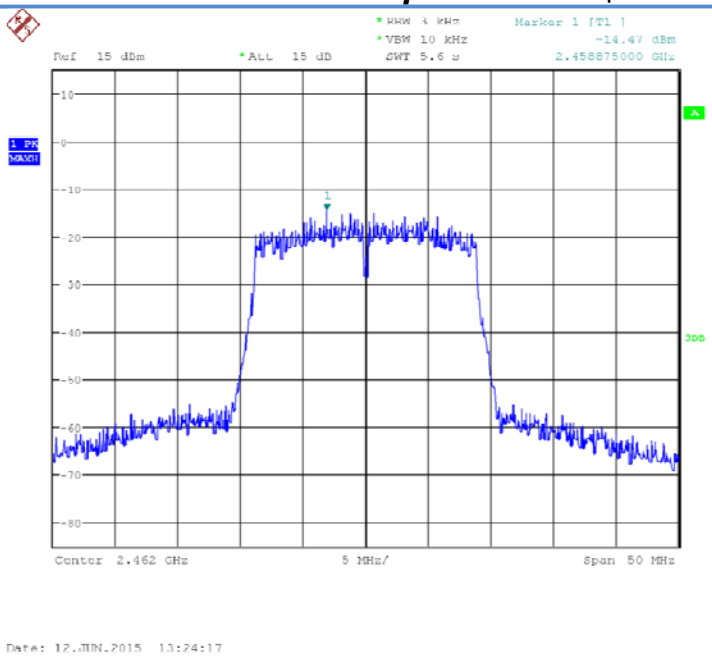

Fig.9 Power Spectral Density (802.1n-20MHz,Ch11)

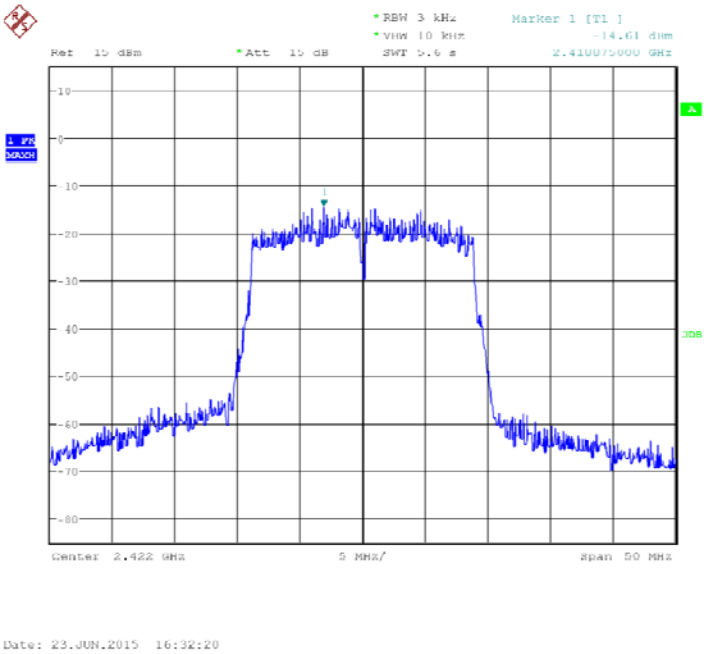

Fig.10 Power Spectral Density (802.1n-40MHz,Ch3)

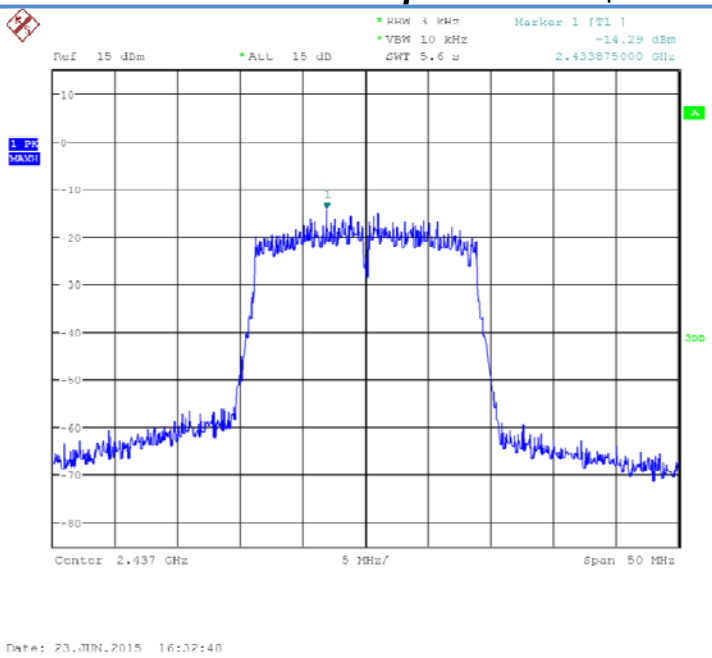

Fig.11 Power Spectral Density (802.1n-40MHz,Ch6)

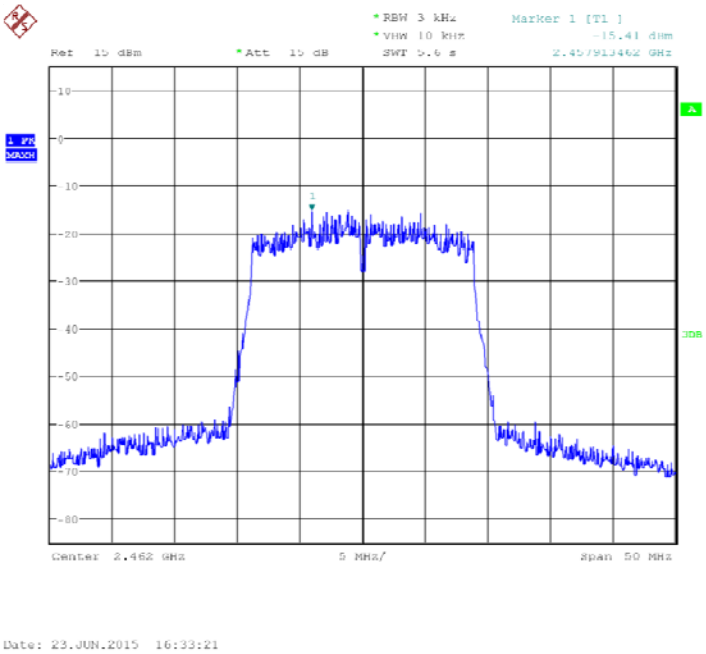

Fig.12 Power Spectral Density (802.1n-40MHz,Ch11)

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.

6.3.4 Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

6.3.5 Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth(KHz)		Conclusion
802.11b	1	Fig.13	8.974	P
	6	Fig.14	8.894	P
	11	Fig.15	8.974	P
802.11g	1	Fig.16	16.506	P
	6	Fig.17	16.506	P
	11	Fig.18	16.506	P

802.11n mode

Mode	Channel	Occupied 6dB Bandwidth(KHz)		Conclusion
802.11n(20MHz)	1	Fig.19	17.708	P
	6	Fig.20	17.788	P
	11	Fig.21	17.788	P
802.11n(40MHz)	1	Fig.22	36.378	P

	6	Fig.23	36.058	P
	11	Fig.24	36.378	P

Conclusion: PASS

Test graphs as below:

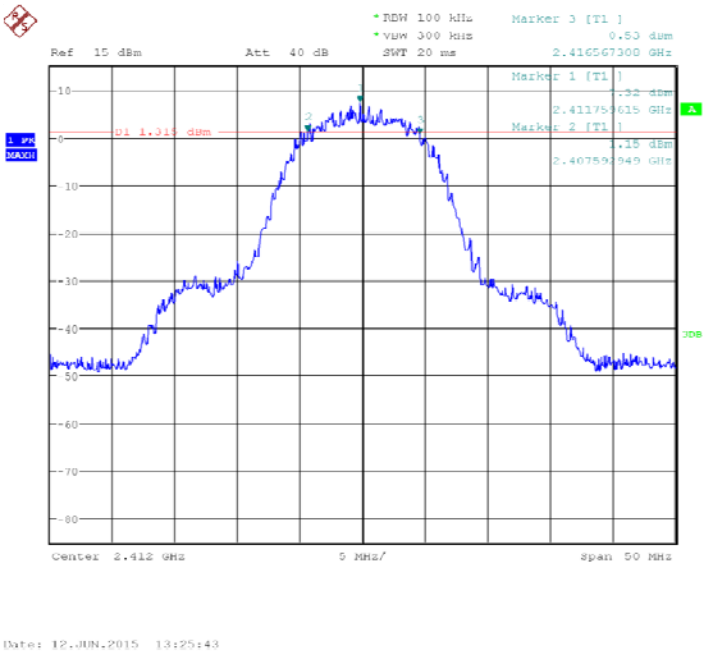

Fig.13 Occupied 6dB Bandwidth (802.11b, Ch1)

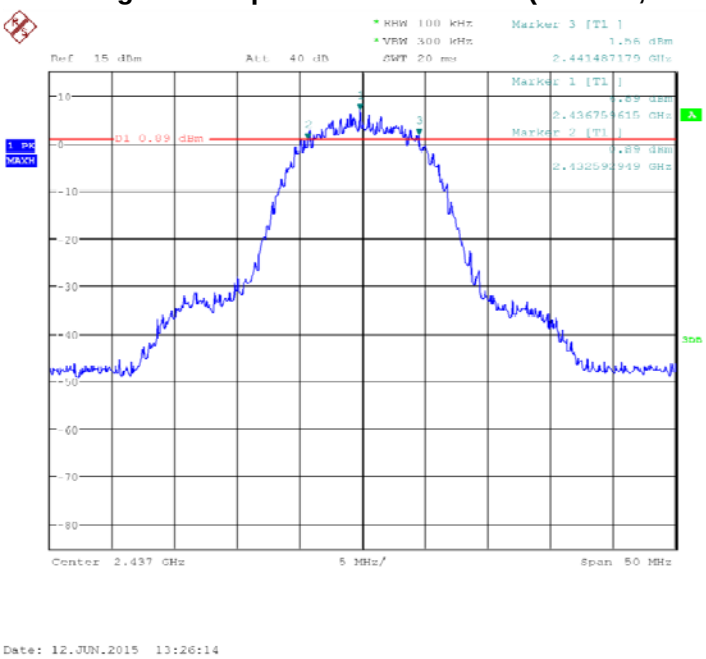

Fig.14 Occupied 6dB Bandwidth (802.11b, Ch6)

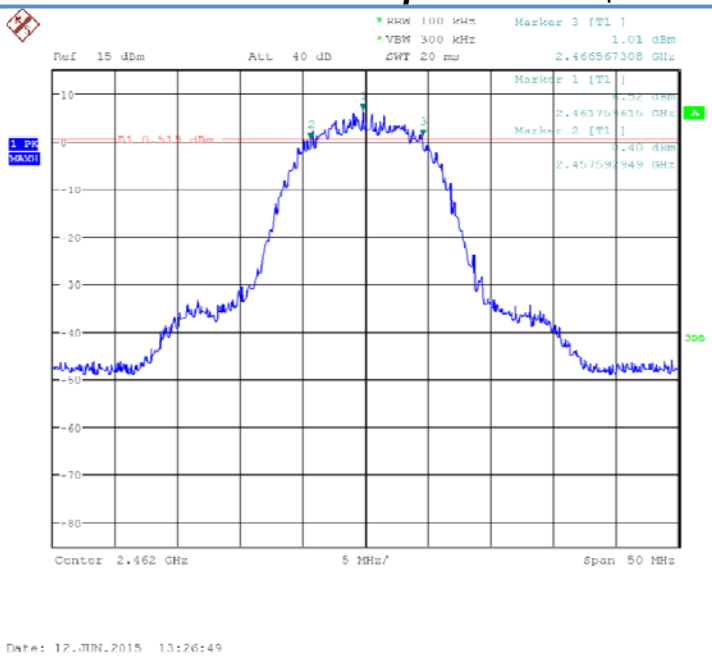

Fig.15 Occupied 6dB Bandwidth (802.11b, Ch11)

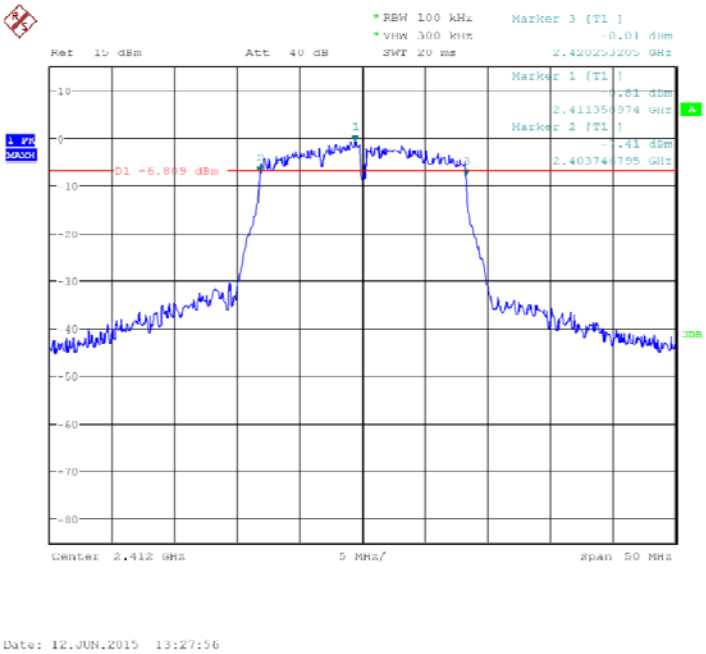

Fig.16 Occupied 6dB Bandwidth (802.11g, Ch1)

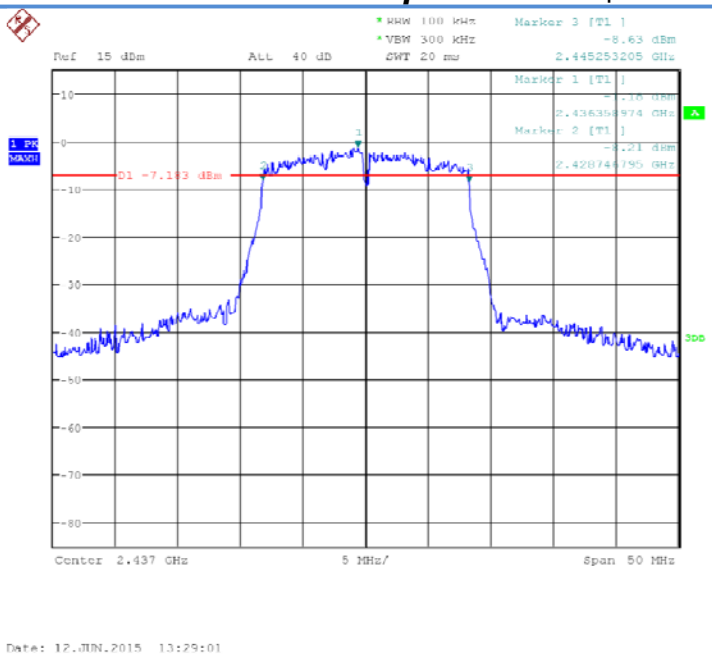

Fig.17 Occupied 6dB Bandwidth (802.11g, Ch6)

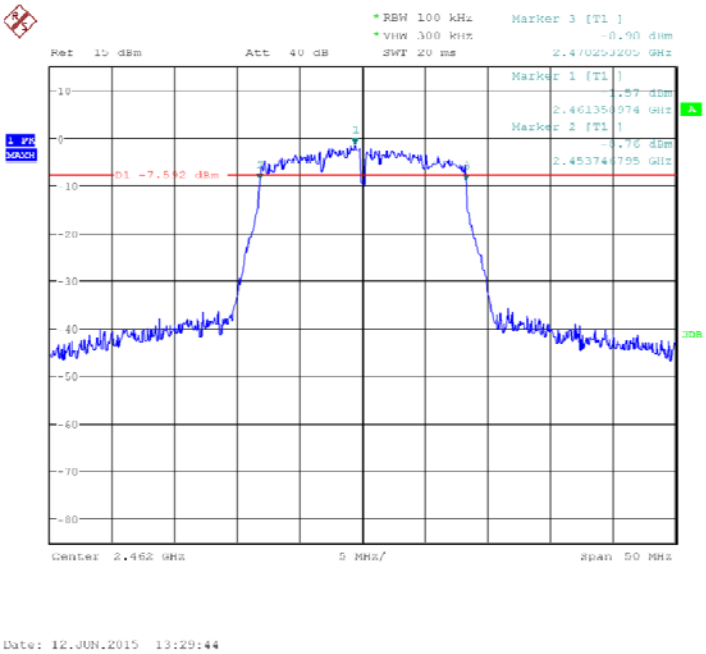

Fig.18 Occupied 6dB Bandwidth (802.11g, Ch11)

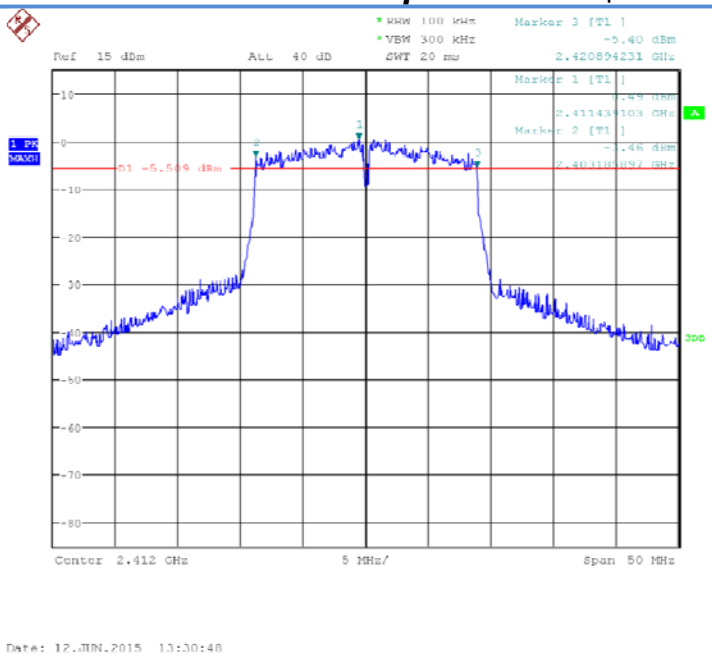

Fig.19 Occupied 6dB Bandwidth (802.11n-20MHz, Ch1)

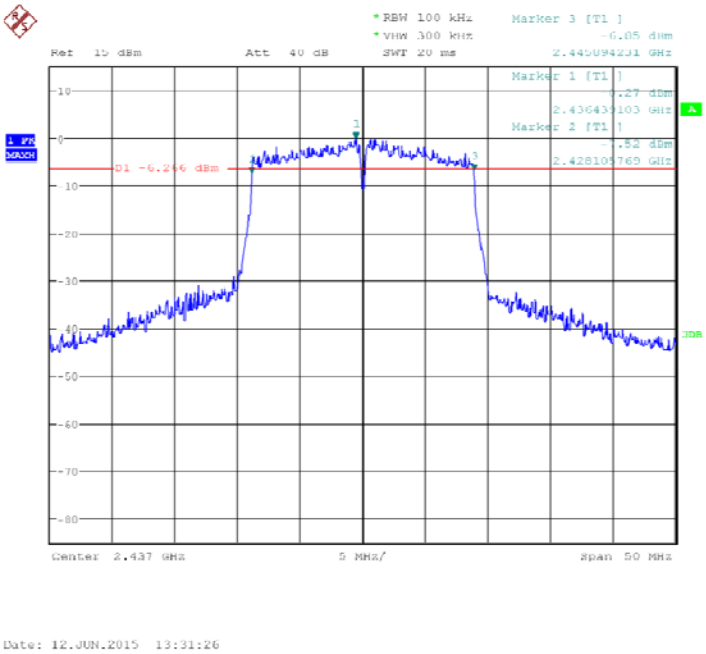

Fig.20 Occupied 6dB Bandwidth (802.11n-20MHz, Ch6)

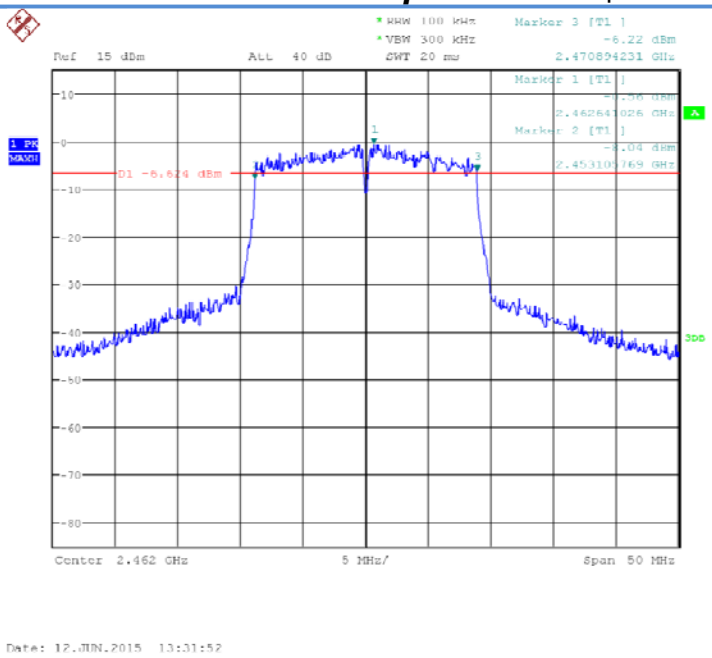

Fig.21 Occupied 6dB Bandwidth (802.11n-20MHz, Ch11)

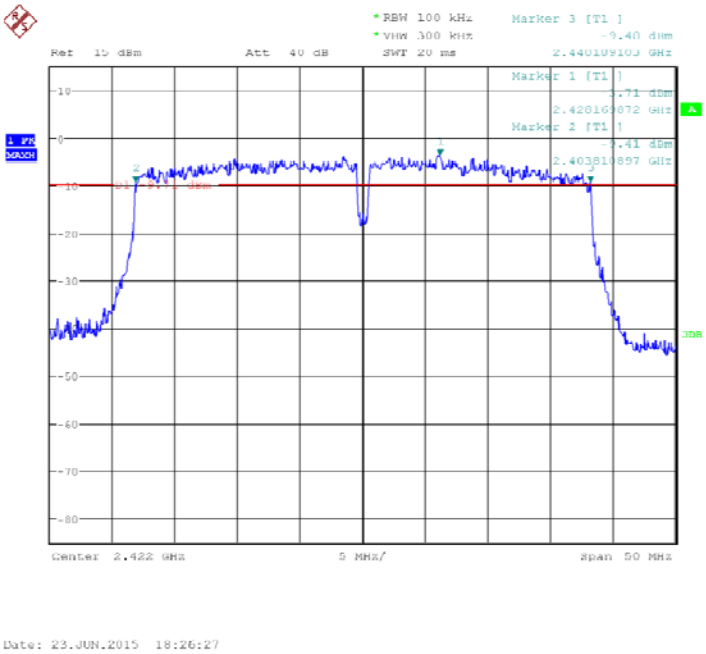

Fig.22 Occupied 6dB Bandwidth (802.11n-40MHz, Ch3)

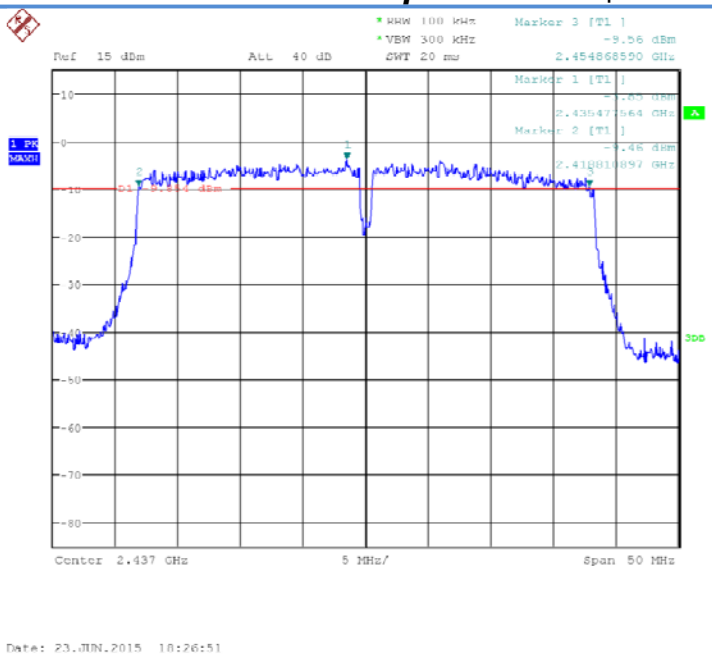

Fig.23 Occupied 6dB Bandwidth (802.11n-40MHz, Ch6)

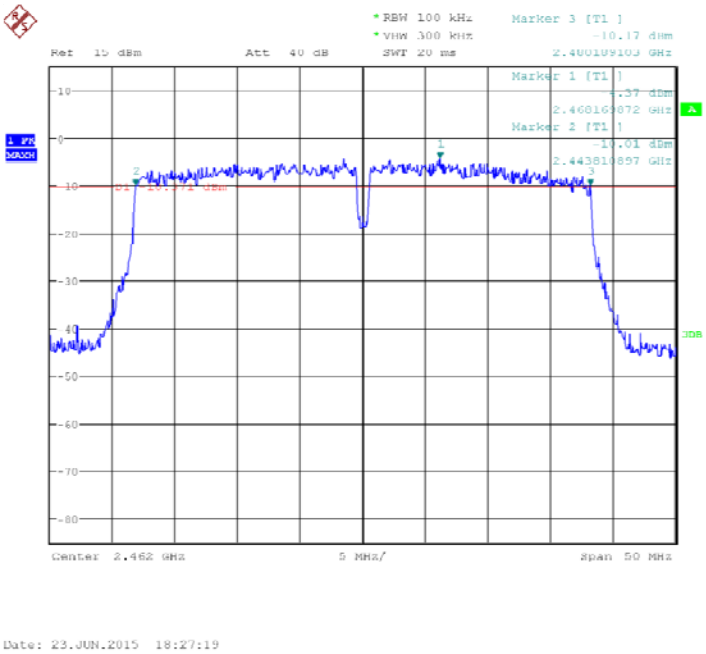

Fig.24 Occupied 6dB Bandwidth (802.11n-40MHz, Ch11)

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 ⩾ [3 × 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.25	P
	11	Fig.26	P
802.11g	1	Fig.27	P
	11	Fig.28	P

802.11n mode

Mode	Channel	Test Results	Conclusion
802.11n(20MHz)	1	Fig.29	P
	11	Fig.30	P
802.11(40MHz)	1	Fig.31	P
	11	Fig.32	P

Conclusion: PASS

Test graphs as blew:

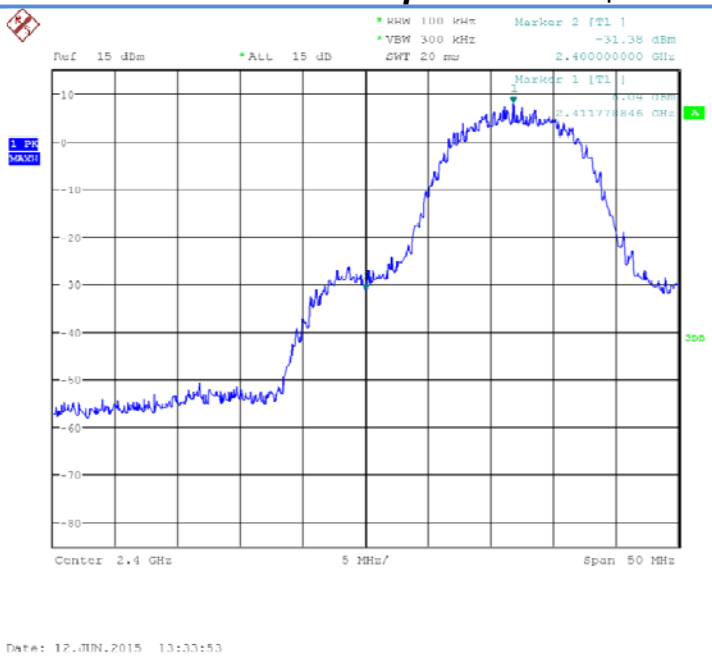

Fig.25 Band Edges (802.11b, Ch1)

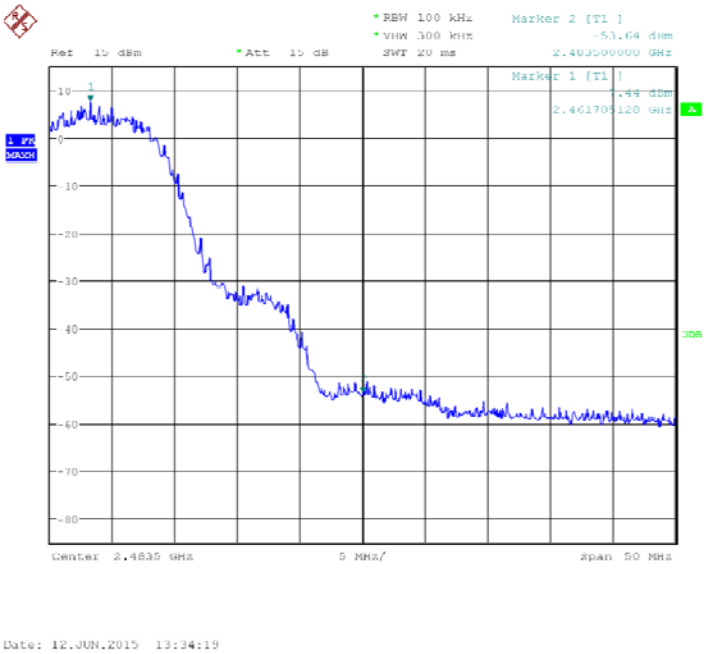

Fig.26 Band Edges (802.11b, Ch11)

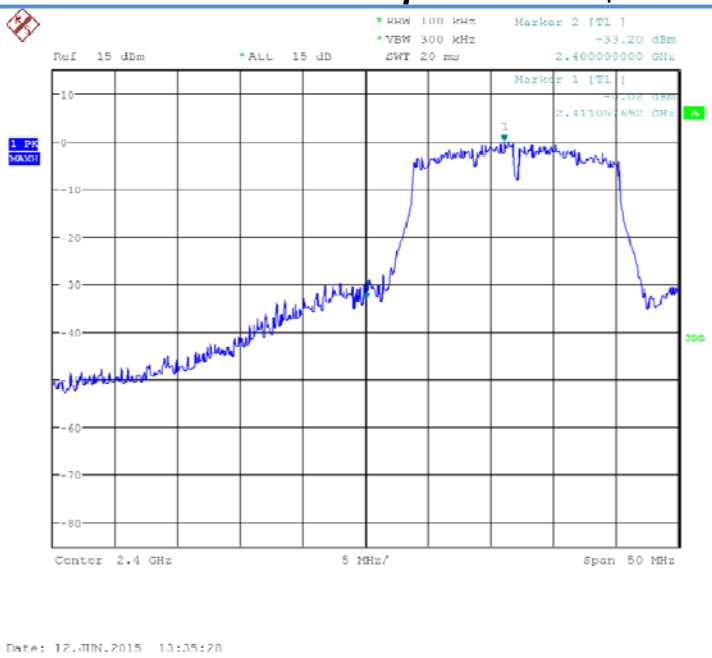

Fig.27 Band Edges (802.11g, Ch1)

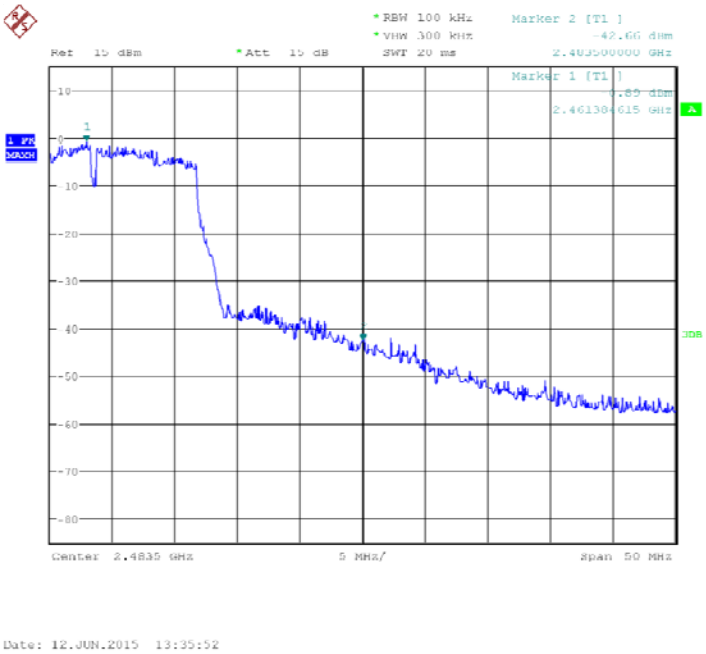

Fig.28 Band Edges (802.11g, Ch11)

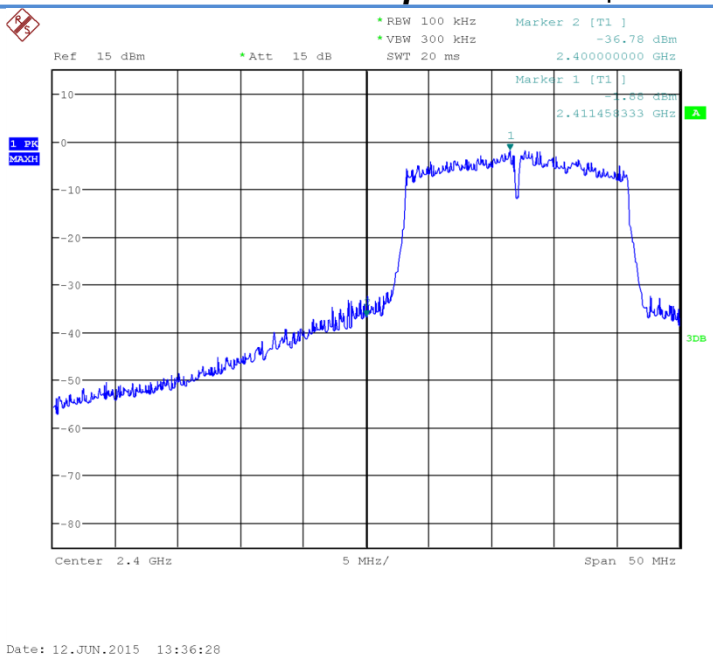

Fig.29 Band Edges (802.11n-20MHz, Ch1)

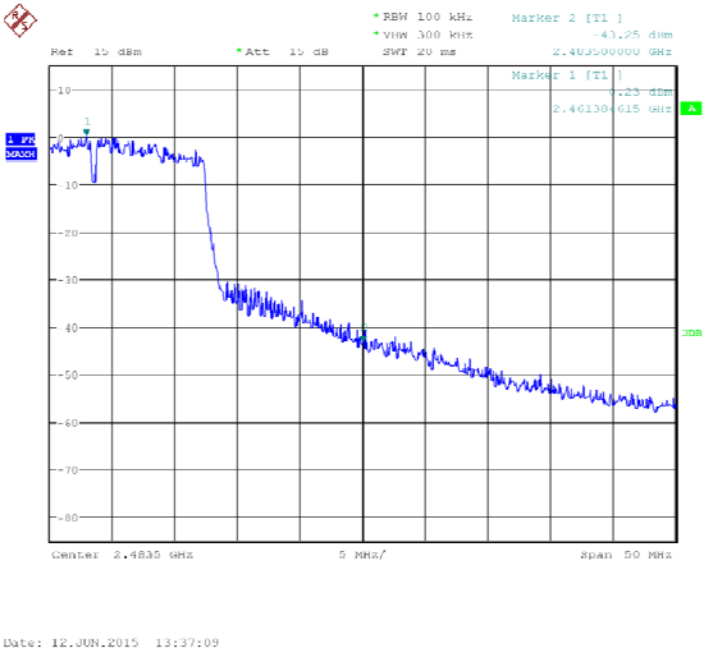

Fig.30 Band Edges (802.11b-20MHz, Ch11)

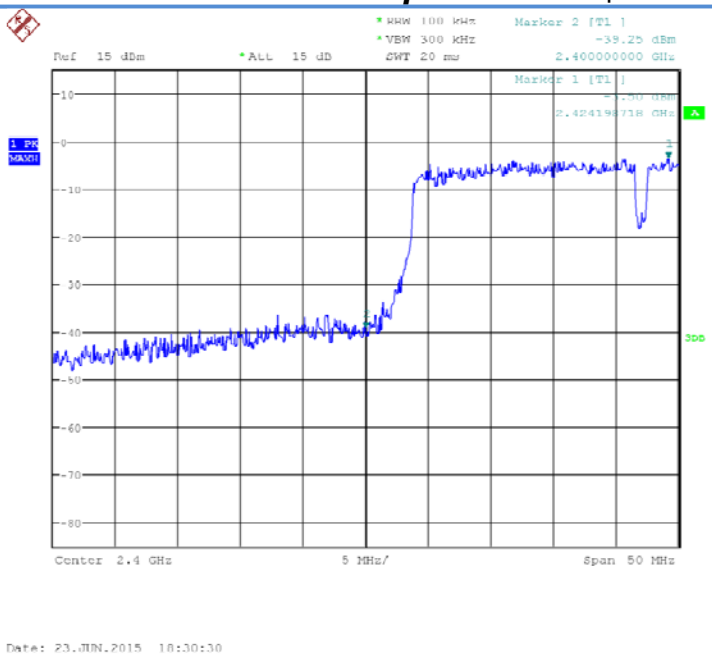

Fig.31 Band Edges (802.11n-40MHz, Ch3)

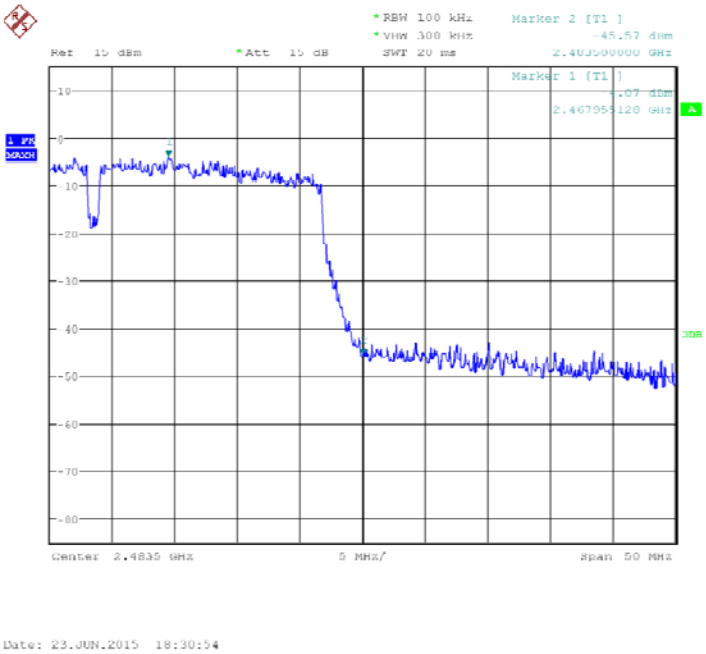

Fig.32 Band Edges (802.11n-40MHz, Ch11)

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.33	P
		30MHz~26GHz	Fig.34	P
	6	2.437GHz	Fig.35	P
		30MHz~26GHz	Fig.36	P
	11	2.472GHz	Fig.37	P
		30MHz~26GHz	Fig.38	P
802.11g	1	2.412GHz	Fig.39	P
		30MHz~26GHz	Fig.40	P
	6	2.437GHz	Fig.41	P
		30MHz~26GHz	Fig.42	P
	11	2.472GHz	Fig.43	P
		30MHz~26GHz	Fig.44	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	1	2.412GHz	Fig.45	P
		30MHz~26GHz	Fig.46	P
	6	2.437GHz	Fig.47	P
		30MHz~26GHz	Fig.48	P
	11	2.472GHz	Fig.49	P
		30MHz~26GHz	Fig.50	P
802.11n(40MHz)	3	2.422GHz	Fig.51	P
		30MHz~26GHz	Fig.52	P
	6	2.437GHz	Fig.53	P
		30MHz~26GHz	Fig.54	P
	11	2.472GHz	Fig.55	P
		30MHz~26GHz	Fig.56	P

Conclusion: PASS

Test graphs as below:

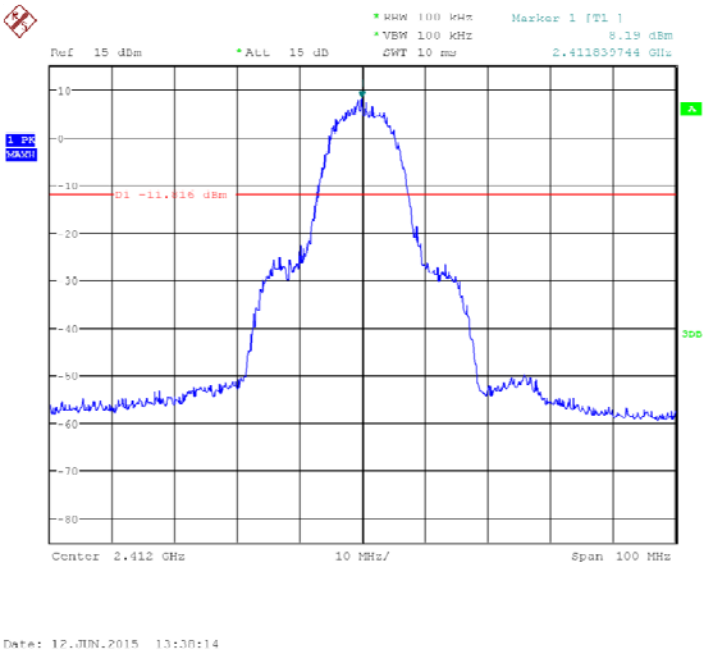

Fig.33 Conducted Spurious Emission (802.11b, Ch1)

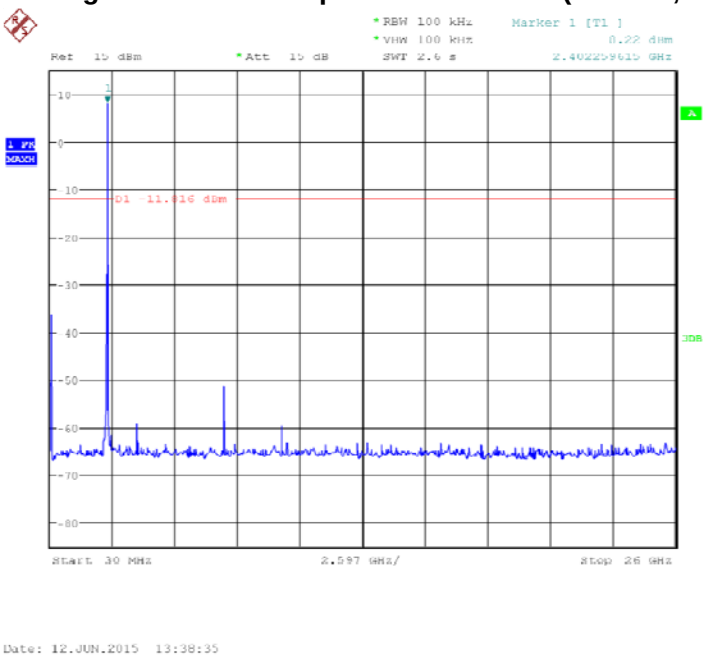

Fig.34 Conducted Spurious Emission (802.11b, Ch1, 30MHz~26GHz)