TEST REPORT

REPORT NUMBER: B15X50050-FCC-Wifi_Rev2

ON

Type of Equipment: **Ilium X400 Smart Phone**
Model Number: **Ilium X400**
Manufacturer: **Shenzhen fortuneship technology, LTD**

ACCORDING TO

FCC Part 15, Subpart C, 2015:
15.205 Restricted bands of operation,
15.209 Radiated emission limits; general requirements,
15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

China Telecommunication Technology Labs.

Month date, year
APR, 09, 2015

Signature

He Guili
Director

FCC ID:	ZC4X400
Report Date:	2015-04-09

Test Firm Name:	China Telecommunication Technology Labs
Registration Number:	840587

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC Parts 15, subpart C. The sample tested was found to comply with the requirements defined in the applied rules.

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1 General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC Parts 15, subpart C and ANSI C63.10-2013 and FCC DA 00-705.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

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

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1.2 Testers

Name:	Li Guoqing
Position:	Engineer
Department:	Department of EMC test
Date:	2015-04-09
Signature:	李国庆

Editor of this test report:

Name:	Li Guoqing
Position:	Engineer
Department:	Department of EMC test
Date:	2015-04-09
Signature:	李国庆

Technical responsibility for area of testing:

Name:	Zou Dongyi
Position:	Manager
Department:	Department of EMC test
Date:	2015-04-09
Signature:	邹东毅

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1.3 Testing Laboratory information

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District BEIJING P. R. CHINA, 100083
Tel:	+86 10 68094053
Fax:	+86 10 68011404
Email:	emc@chinattl.com

1.3.2 Details of accreditation status

Accredited by:	China National Accreditation Service for Conformity Assessment (CNAS)
Registration number:	CNAL Registration No.L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Street:	------
City:	------
Country:	------
Telephone:	------
Fax:	------
Postcode:	------

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1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	Coroporativo Lanix S.A. de C.V
Address:	Carrterera internacional Hermosillo-Nogales Km 8.5
Country:	Mexico
Telephone:	6621090811
Fax:	--
Contact:	Oscar Guzman
Telephone:	+86 6621090811
Email:	Oguzman@lanix.ciim

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	Shenzhen fortuneship technology, LTD
Address:	6th Floor, Kingson Building, New Energ Innovation Industrial Park, No.1Chuangsheng Road, Nanshan District, Shenzhen, P.R.China

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	Shenzhen fortuneship technology.,LTD
Address:	6th Floor, Kingson Building, New Energ Innovation Industrial Park, No.1Chuangsheng Road, Nanshan District, Shenzhen, P.R.China

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2 Test Item

2.1 General Information

Manufacturer:	Shenzhen fortuneship technology, LTD
Name:	Ilium X400 Smart Phone
Model Number:	Ilium X400
Serial Number:	--
Production Status:	Production
Receipt date of test item:	2015-02-02

2.2 Outline of EUT

E.U.T. is a GSM850/ PCS1900 bands and UMTS/HSDPA/HSUPA/HSPA+ FDD II/V bands Terminal Equipment with Bluetooth and wifi.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	Mobile phone	Shenzhen fortuneship technology, LTD	X400	863911029798349	None
B	Battery	None	None	--	None
C	Adaptor	None	None	--	None

2.5 Other Information

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3 Summary of Test Results

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

	Name of Test	Result
1、	Maximum Peak Output Power	Pass
2、	Peak Power Spectral Density	Pass
3、	6dB Occupied Bandwidth	Pass
4、	Band Edges Compliance	Pass
5、	Transmitter Spurious Emission-Conducted	Pass
6、	Transmitter Spurious Emission-Radiated	Pass
7、	Power line Conducted Emissions	Pass
Note: none		

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4 Test Results

4.1 Peak Output Power-Conducted

Date of Tests	2015-02-10-2015-03-31
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Test equipment Used:	

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESU40	100350	2015-03-07	Normal

4.1.1 Measurement Limit

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

4.1.2 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, Set the appropriate VBW
4. Detector : Peak.
5. Trace mode: Max Hold

4.1.3 Measurement Results:

802.11b/g mode

Mode	Data Rate(Mbps)	Teat Result(dBm)			Conclusion
		Ch1	Ch6	Ch11	
802.11b	1	18.61	18.15	18.89	Pass
	2	18.53	18.35	18.87	Pass
	5.5	17.76	18.16	18.70	Pass
	11	18.19	18.41	18.99	Pass
802.11g	6	20.72	21.15	21.34	Pass
	9	20.93	21.88	21.82	Pass
	12	20.73	21.48	21.31	Pass
	18	20.13	20.91	21.07	Pass
	24	20.67	21.52	21.32	Pass

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	36	20.83	21.44	21.63	Pass
	48	20.76	21.30	21.07	Pass
	54	20.71	21.53	21.43	Pass

802.11n mode

Mode	Data Rate(Mbps)	Teat Result(dBm)			Conclusion
		Ch1	Ch6	Ch11	
802.11n (20MHz)	MCS0	20.46	21.05	21.38	Pass
	MCS1	20.51	21.15	21.45	Pass
	MCS2	20.43	21.21	21.18	Pass
	MCS3	20.41	21.06	21.27	Pass
	MCS4	20.35	20.95	20.86	Pass
	MCS5	20.70	21.37	21.47	Pass
	MCS6	20.75	21.58	21.64	Pass
	MCS7	20.55	21.54	21.61	Pass
802.11n (40MHz)	MCS0	18.75	18.50	18.36	Pass
	MCS1	18.80	18.11	18.21	Pass
	MCS2	19.08	18.16	18.29	Pass
	MCS3	19.20	18.34	18.41	Pass
	MCS4	19.33	18.46	18.45	Pass
	MCS5	19.52	18.69	18.92	Pass
	MCS6	19.68	18.68	18.89	Pass
	MCS7	18.46	18.39	18.43	Pass

Conclusion: PASS

Test figure as below:

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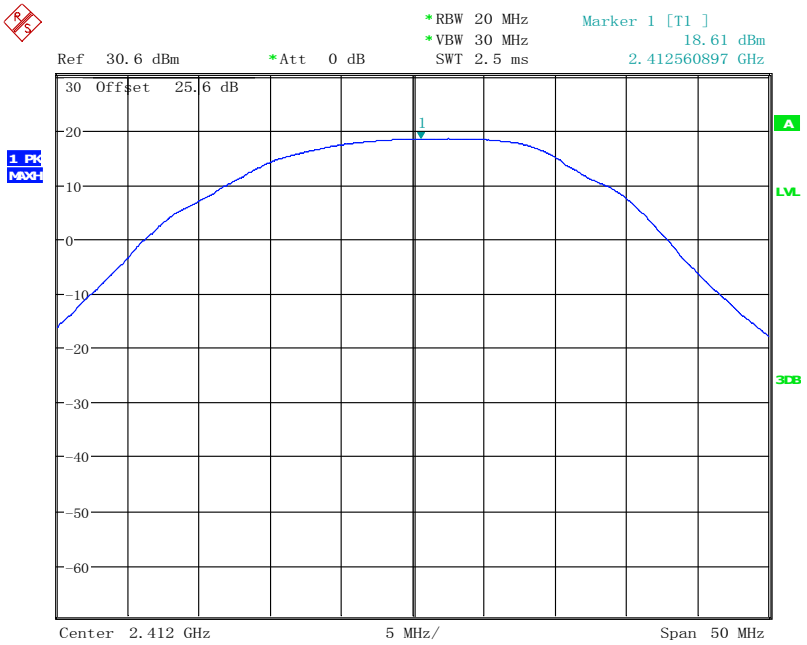

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Fig.1 Peak Conducted Output Power CH1, 11b, Rate1

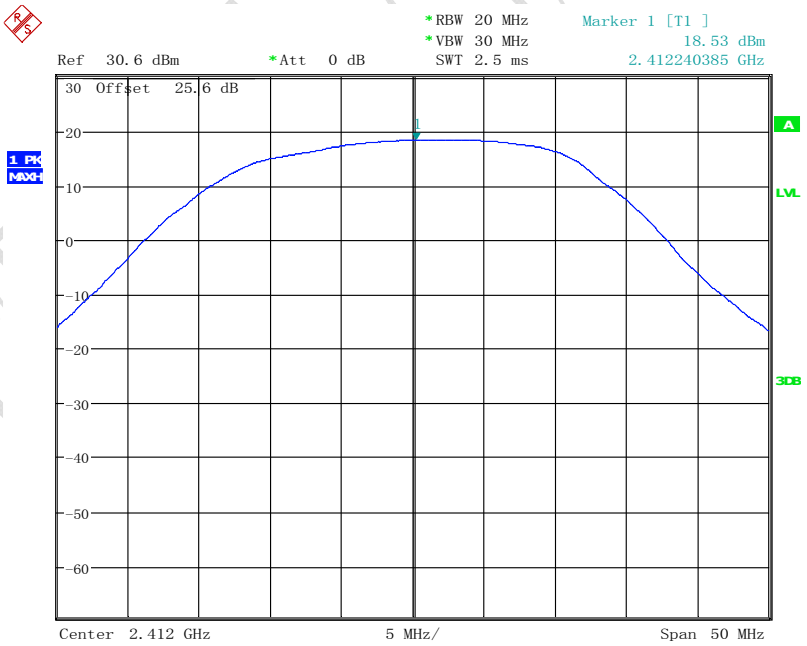

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Fig.2 Peak Conducted Output Power CH1, 11b, Rate2

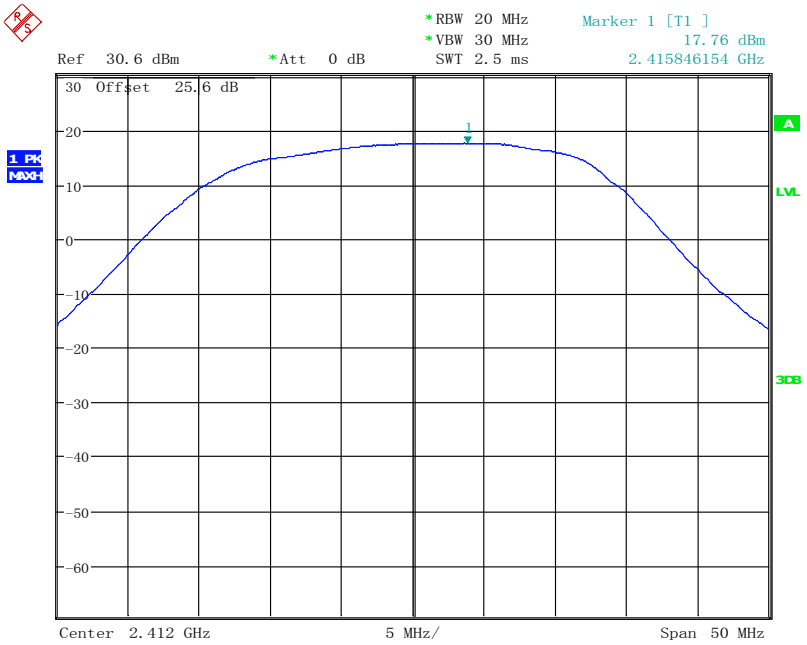

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Fig.3 Peak Conducted Output Power CH1, 11b, Rate5.5

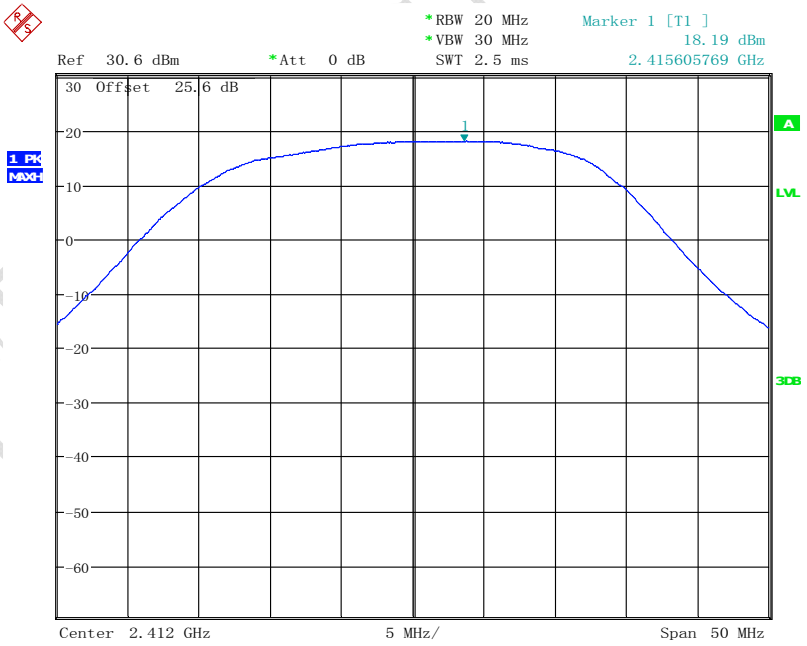

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Fig.4 Peak Conducted Output Power CH1, 11b, Rate11

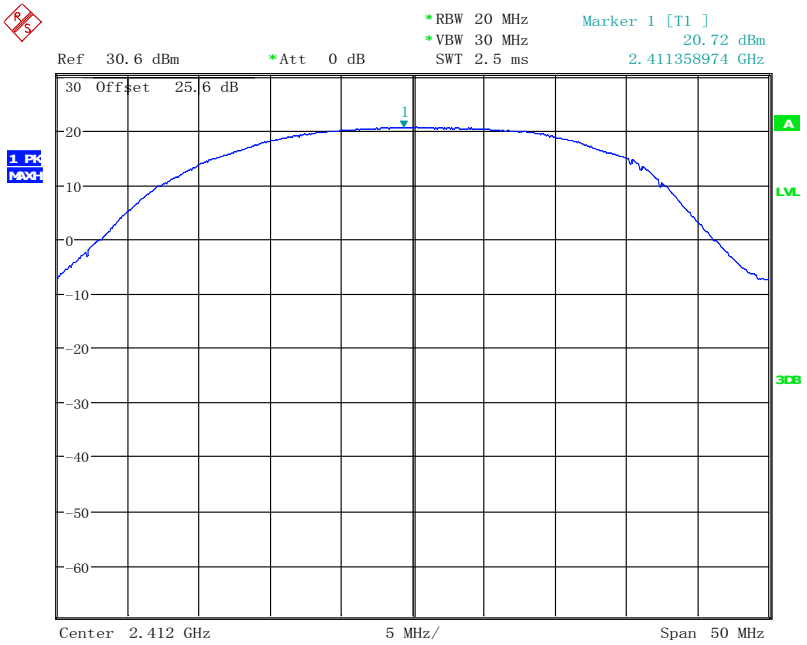

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Fig.5 Peak Conducted Output Power CH1, 11g, Rate6

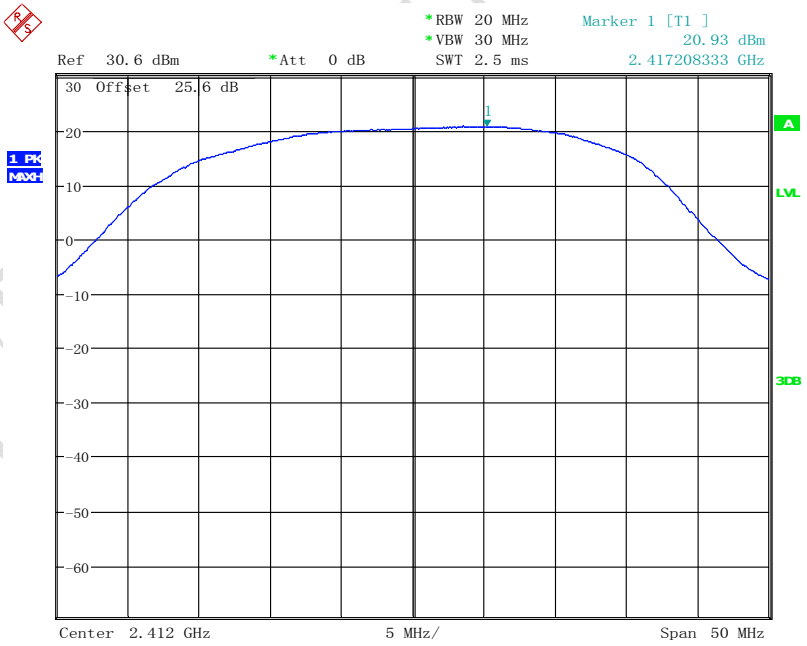

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Fig.6 Peak Conducted Output Power CH1, 11g, Rate9

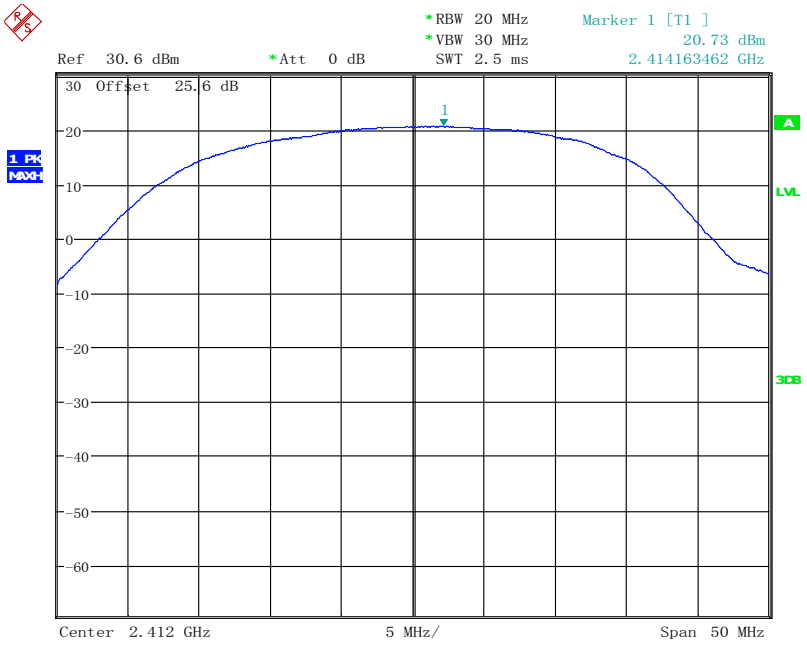

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Fig.7 Peak Conducted Output Power CH1, 11g, Rate12

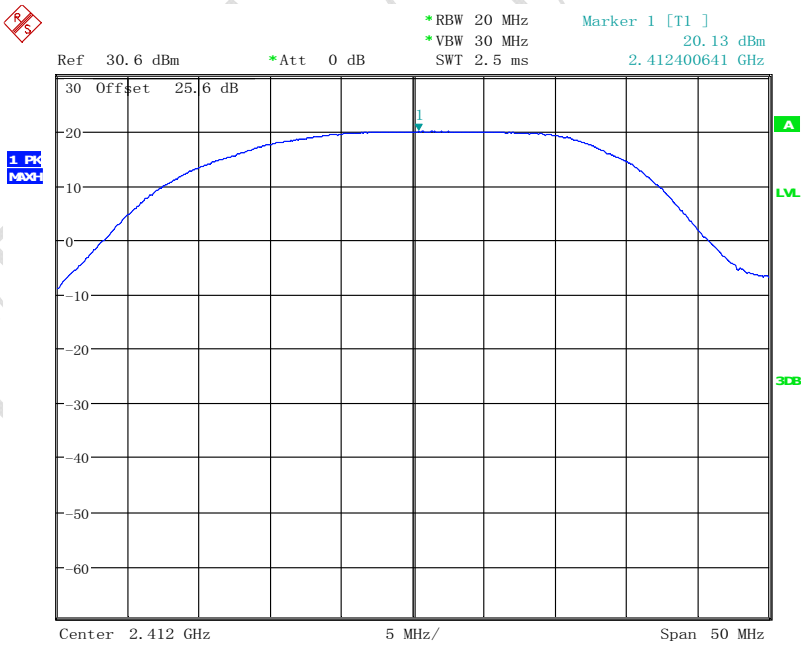

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Fig.8 Peak Conducted Output Power CH1, 11g, Rate18

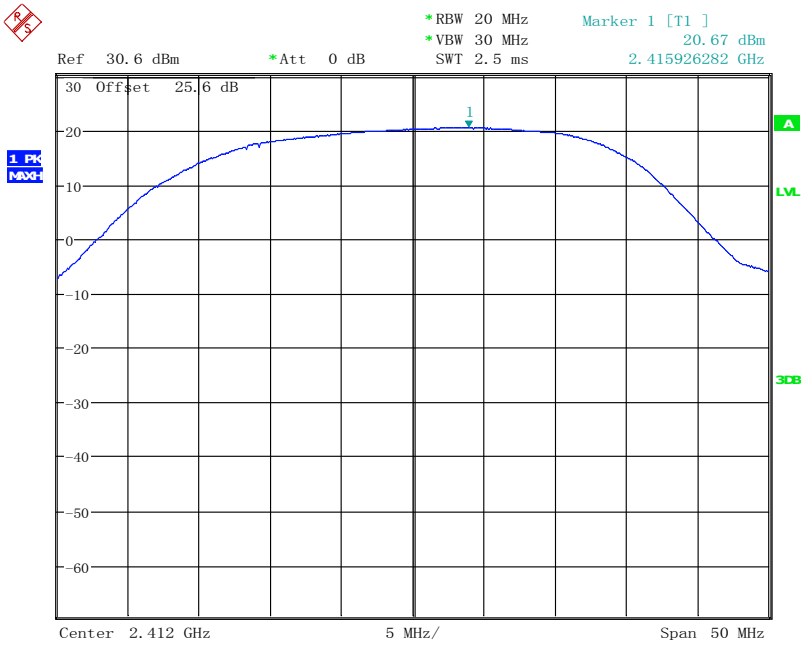

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Fig.9 Peak Conducted Output Power CH1, 11g, Rate24

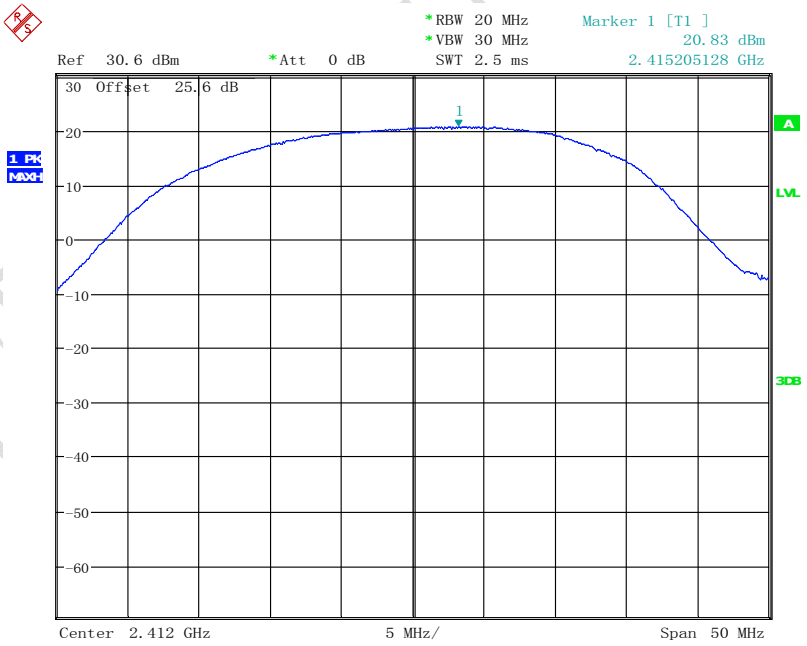

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Fig.10 Peak Conducted Output Power CH1, 11g, Rate36

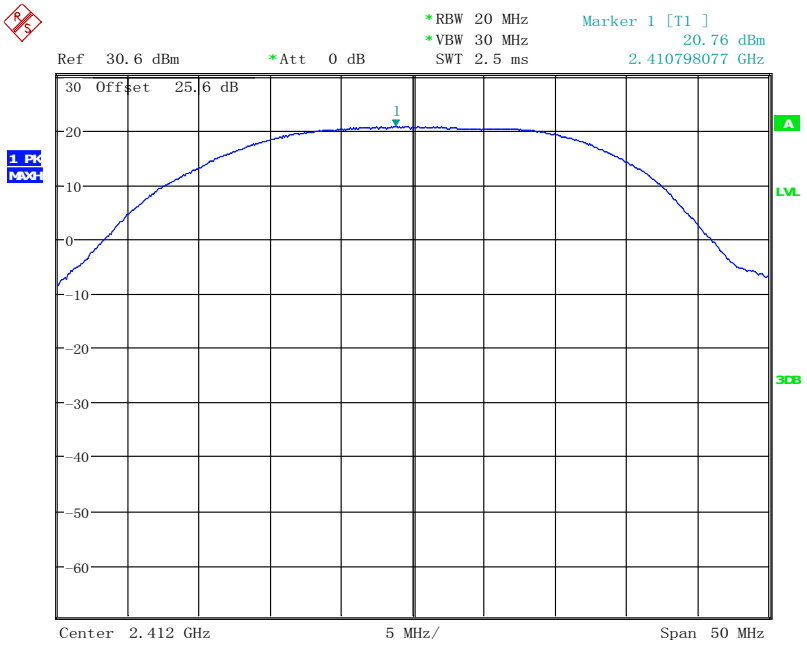

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Fig.11 Peak Conducted Output Power CH1, 11g, Rate48

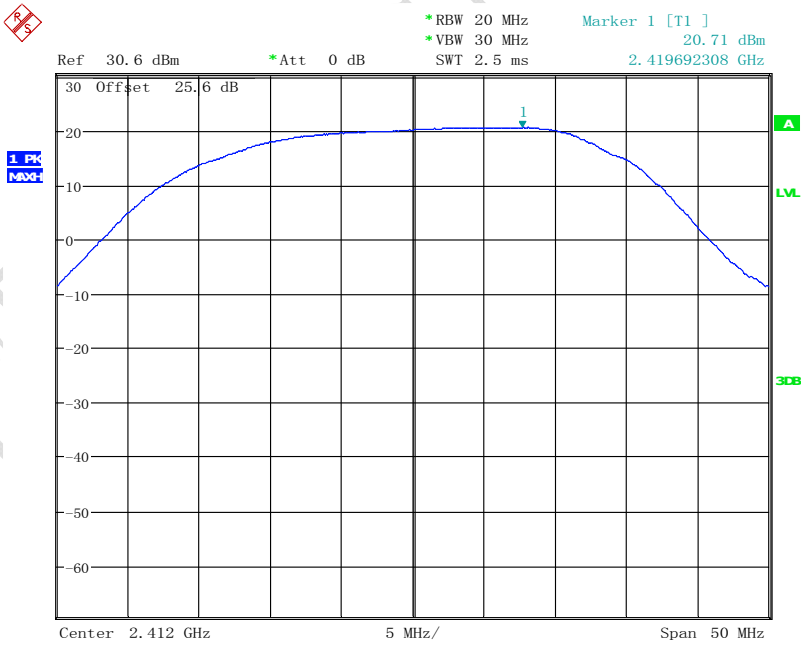

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Fig.12 Peak Conducted Output Power CH1, 11g, Rate54

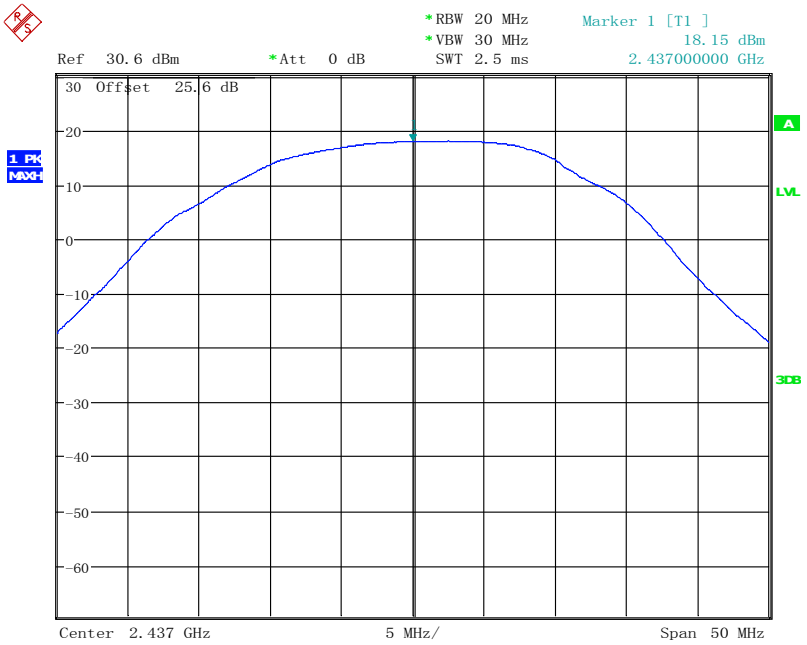

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Fig.13 Peak Conducted Output Power CH6, 11b, Rate1

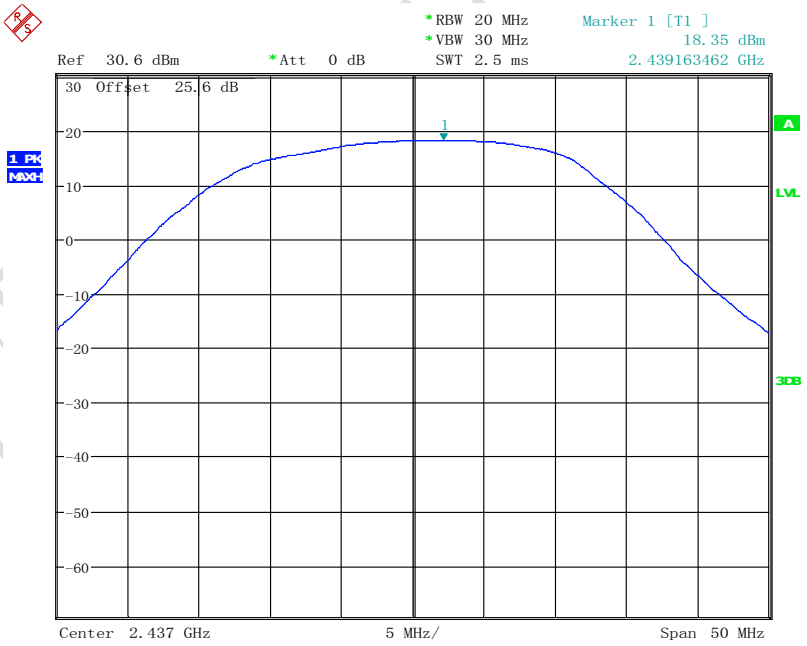

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Fig.14 Peak Conducted Output Power CH6, 11b, Rate2

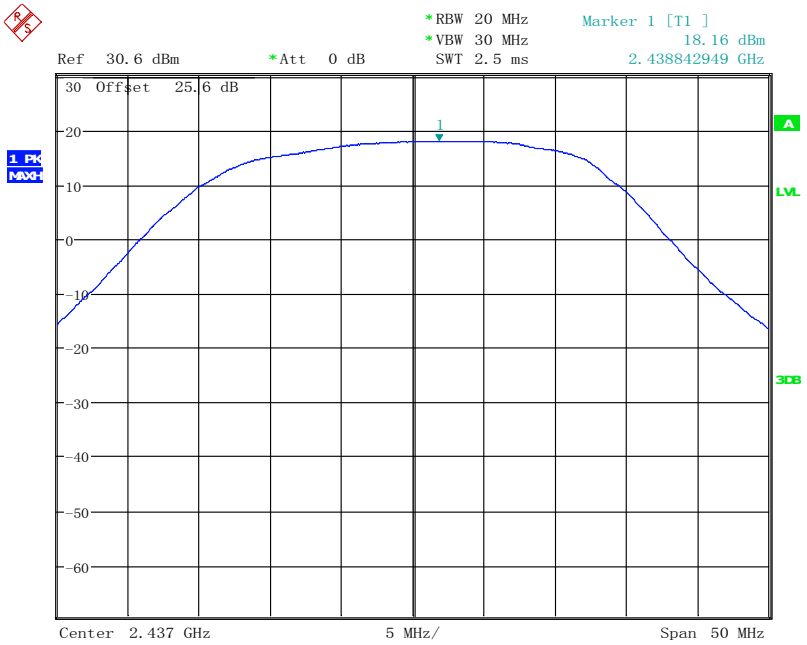

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Fig.15 Peak Conducted Output Power CH6, 11b, Rate5.5

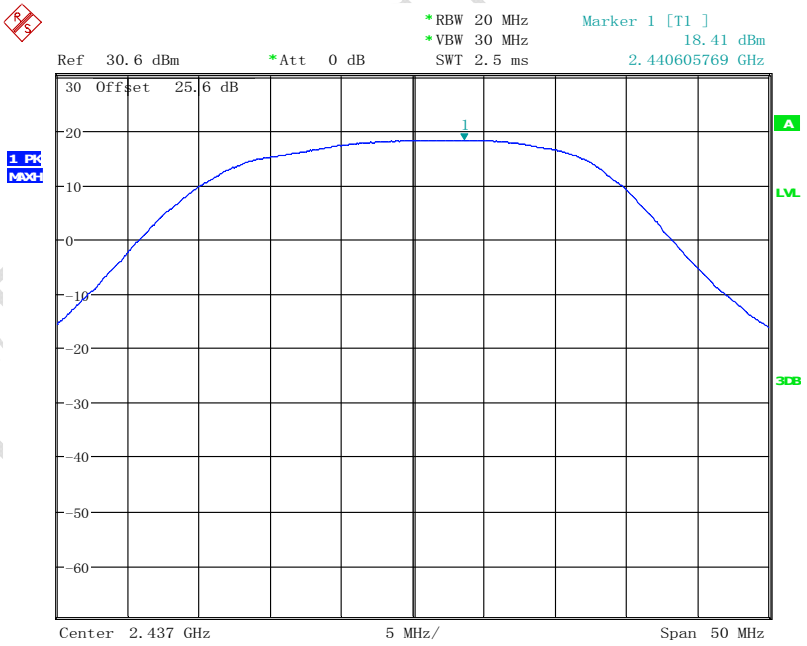

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Fig.16 Peak Conducted Output Power CH6, 11b, Rate11

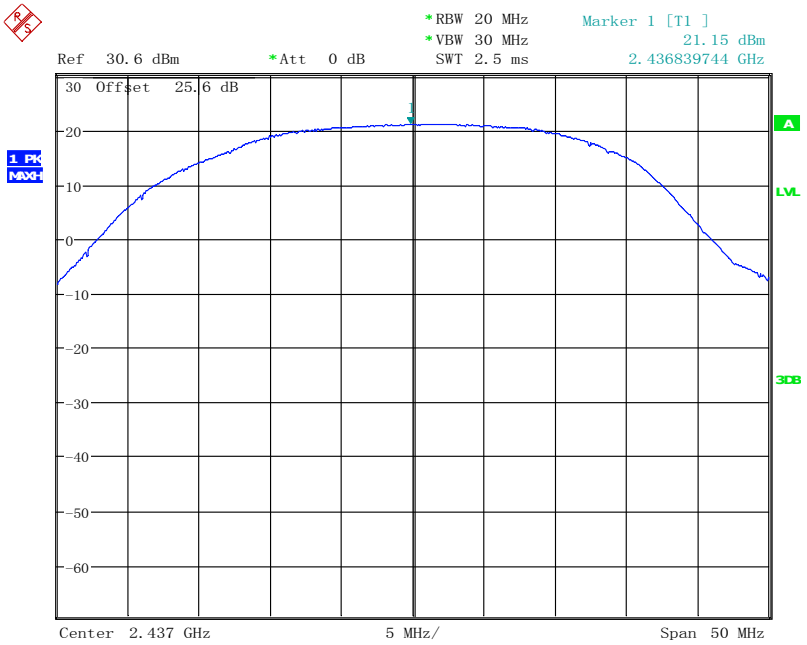

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Fig.17 Peak Conducted Output Power CH6, 11g, Rate6

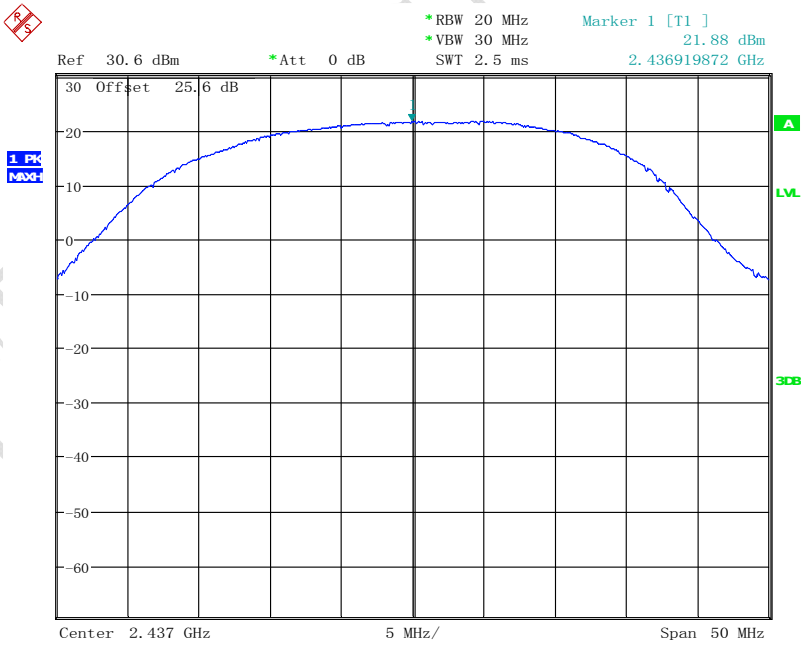

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Fig.18 Conducted Output Power CH6, 11g, Rate9

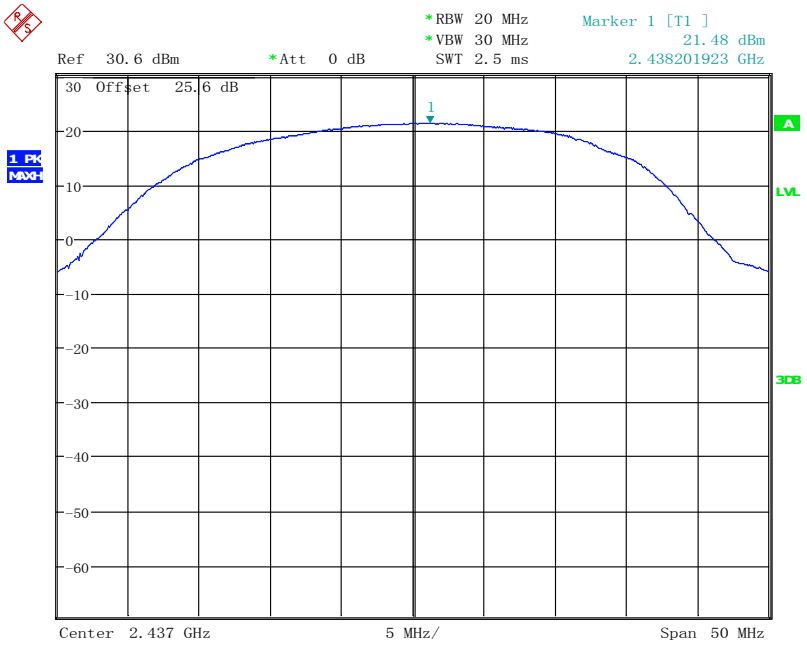

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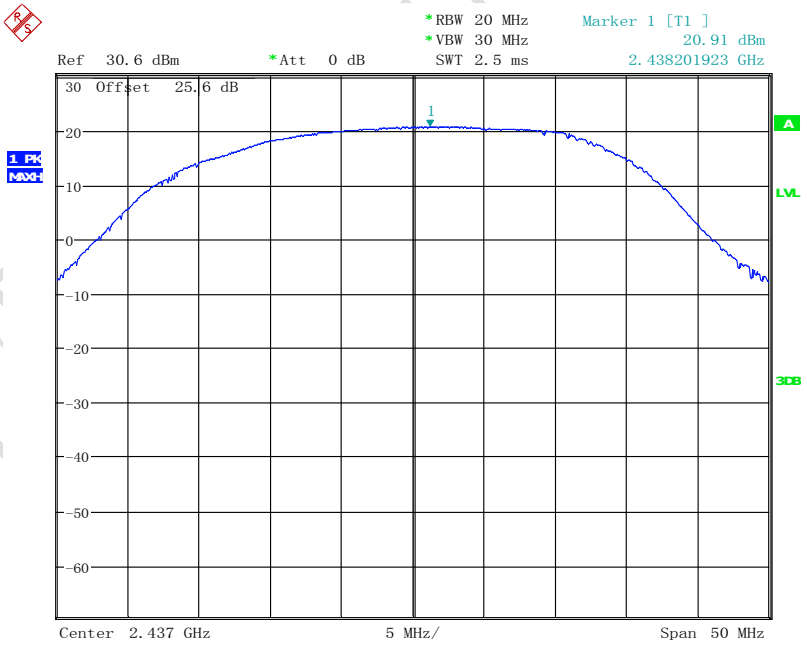
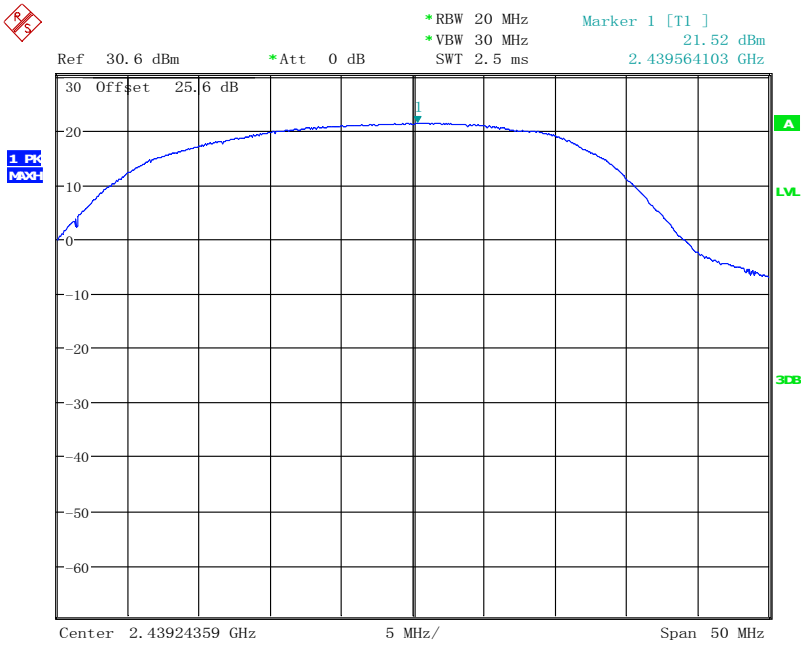
Fig.19 Conducted Output Power CH6, 11g, Rate12



Date: 10.FEB.2015 07:49:28

Fig.20 Conducted Output Power CH6, 11g, Rate18



Date: 10.FEB.2015 07:50:03

Fig.21 Conducted Output Power CH6, 11g, Rate24

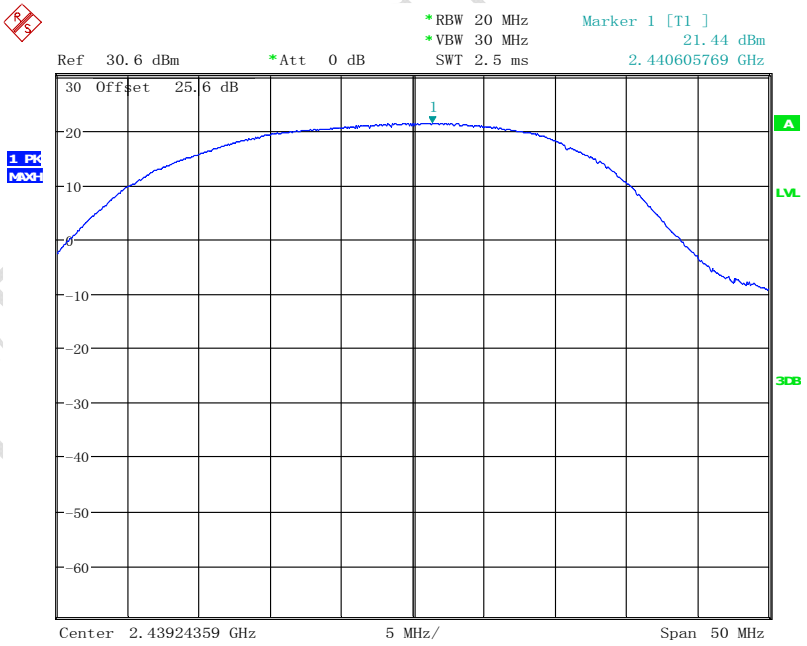


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Fig.22 Conducted Output Power CH6, 11g, Rate36

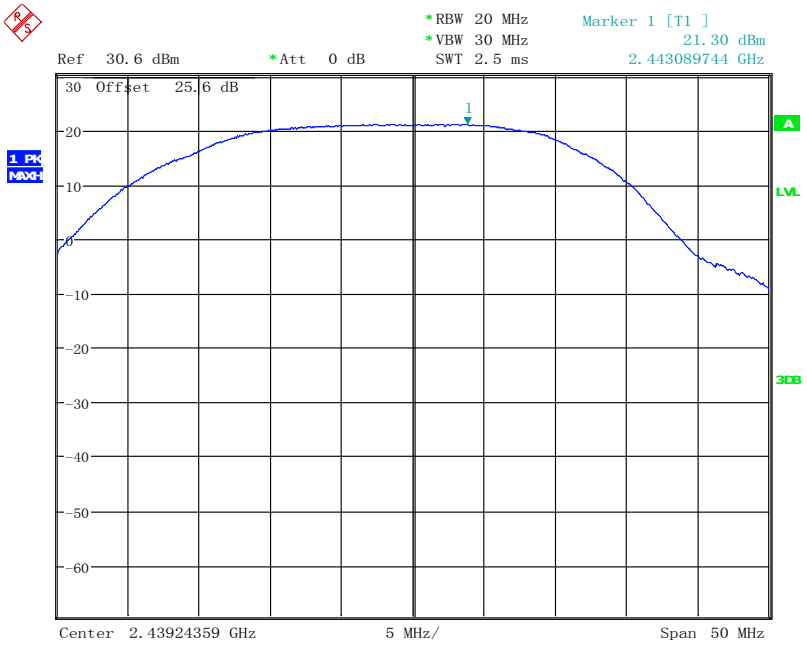

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Fig.23 Conducted Output Power CH6, 11g, Rate48

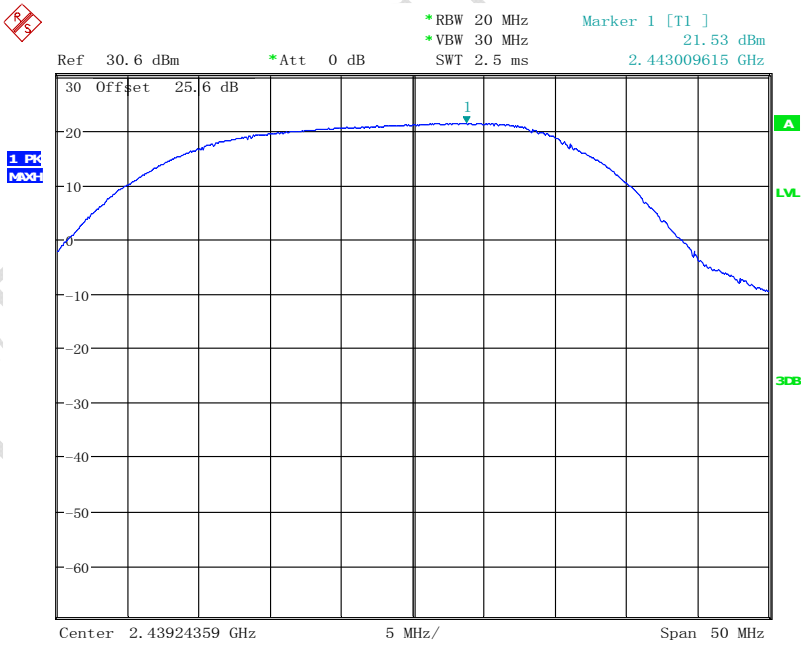

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Fig.24 Conducted Output Power CH6, 11g, Rate54

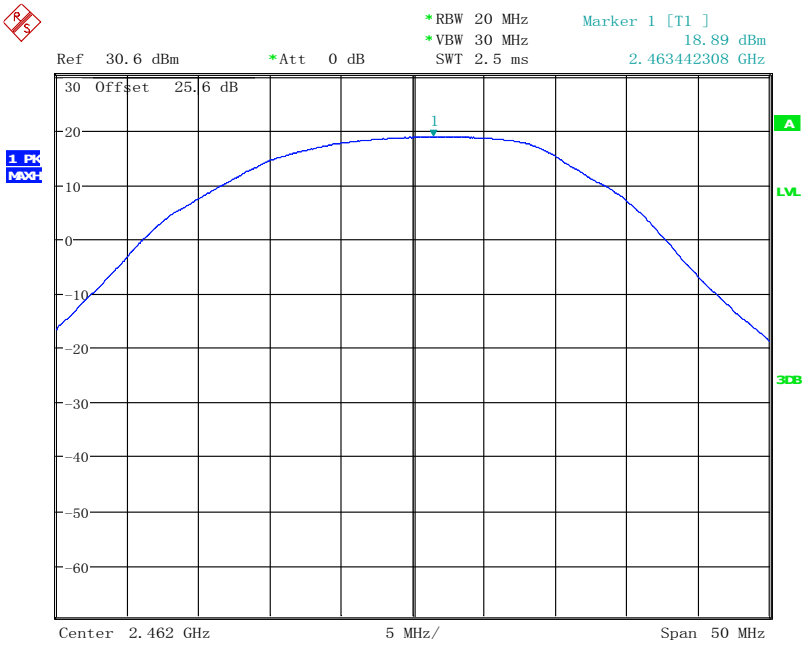

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Fig.25 Conducted Output Power CH11, 11b, Rate1

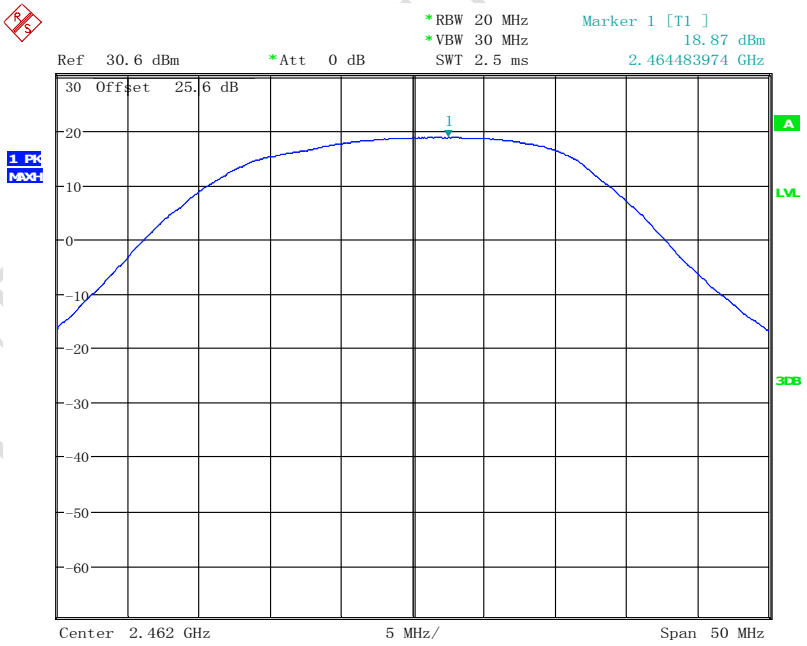

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Fig.26 Conducted Output Power CH11, 11b, Rate2

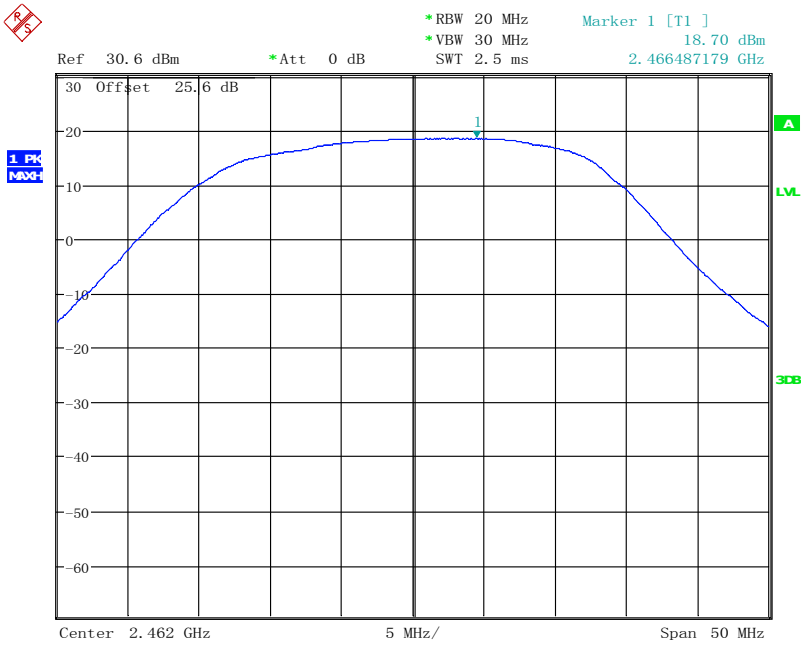

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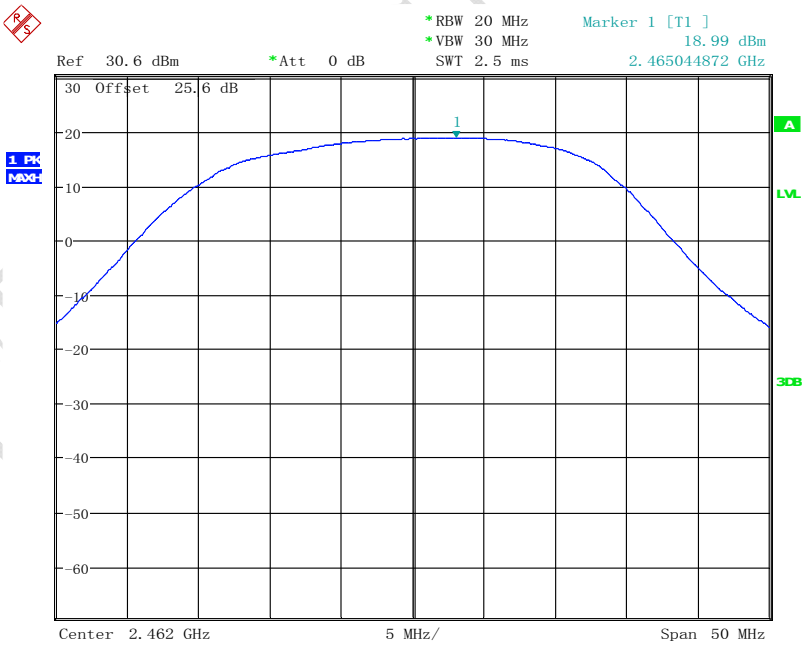
Fig.27 Conducted Output Power CH11, 11b, Rate5.5



Date: 10.FEB.2015 08:52:46

Fig.28 Conducted Output Power CH11, 11b, Rate11

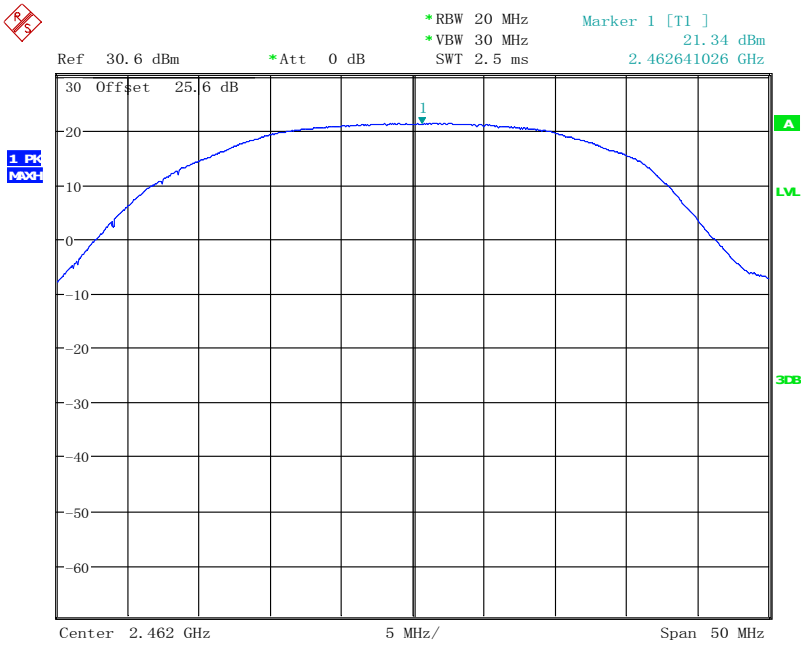


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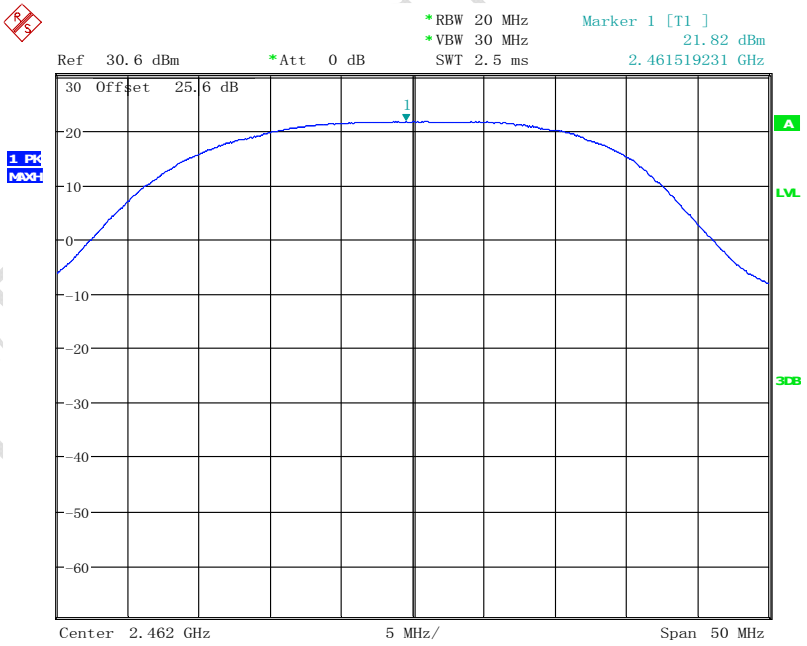
Fig.29 Conducted Output Power CH11, 11g, Rate6



Date: 10.FEB.2015 08:54:08

Fig.30 Conducted Output Power CH11, 11g, Rate9

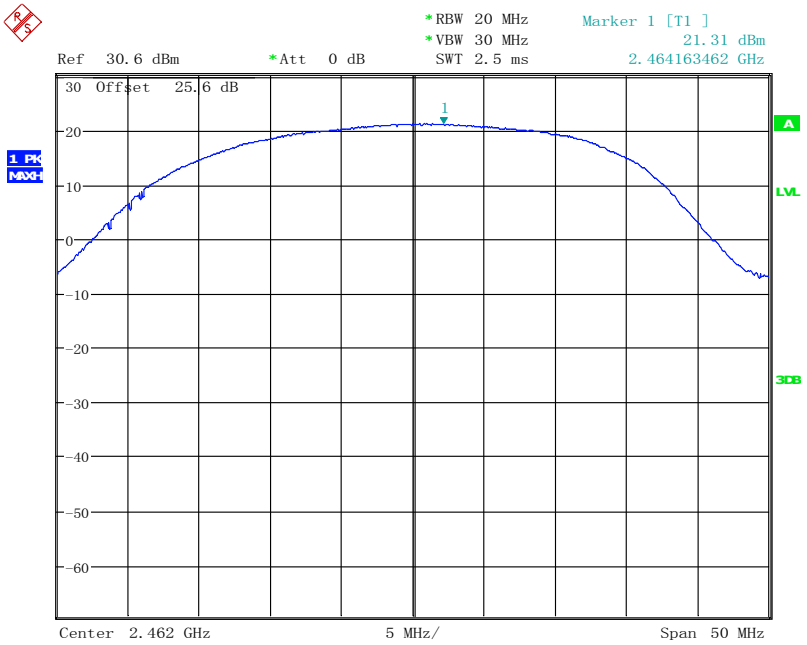


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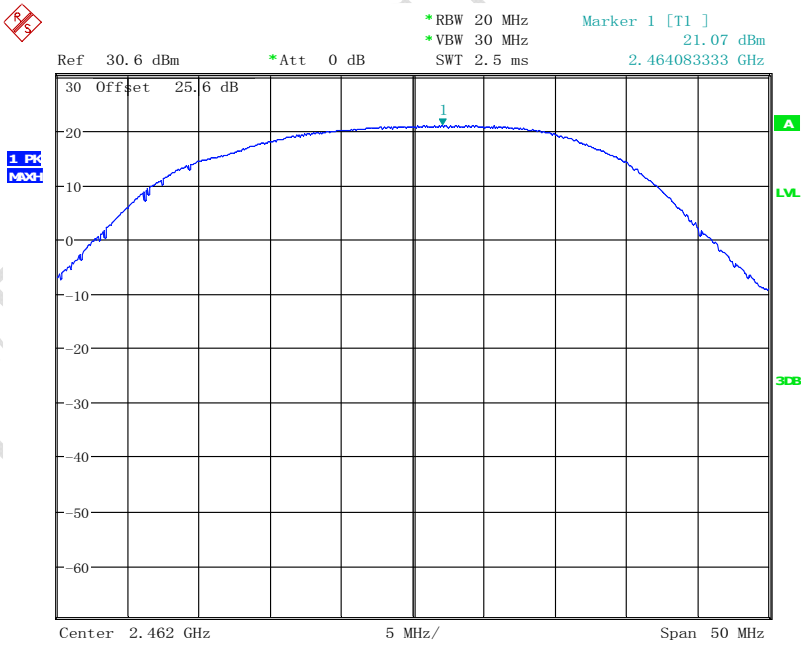
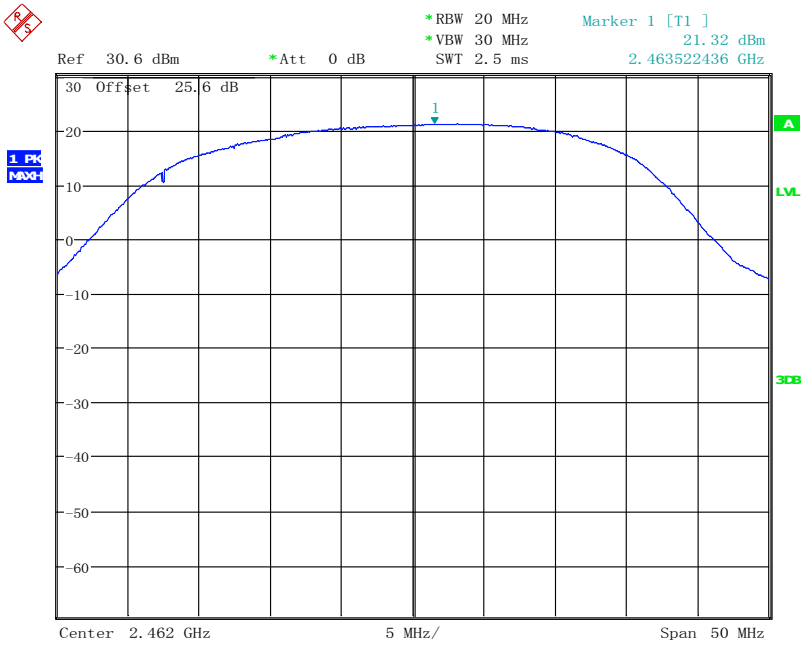
Fig.31 Conducted Output Power CH11, 11g, Rate12



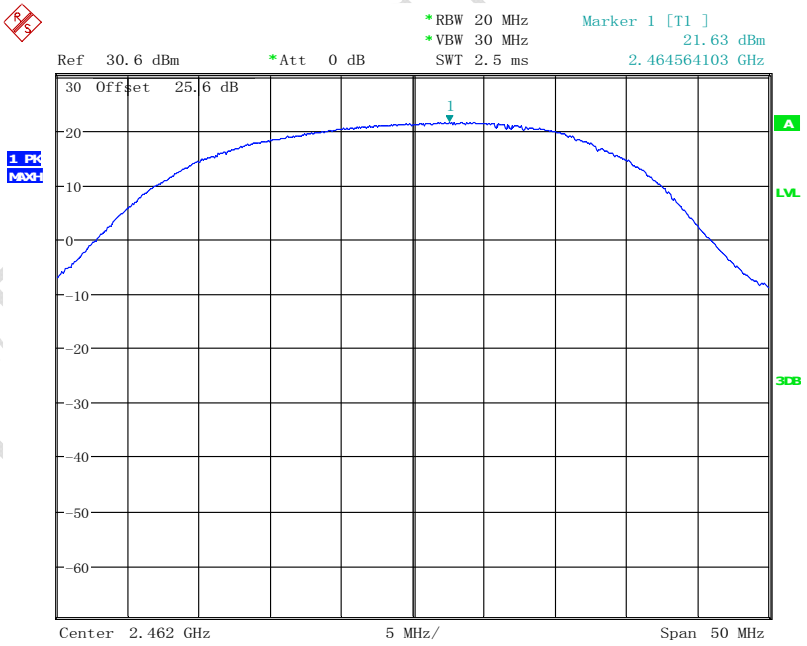
Date: 10.FEB.2015 08:55:18

Fig.32 Conducted Output Power CH11, 11g, Rate18



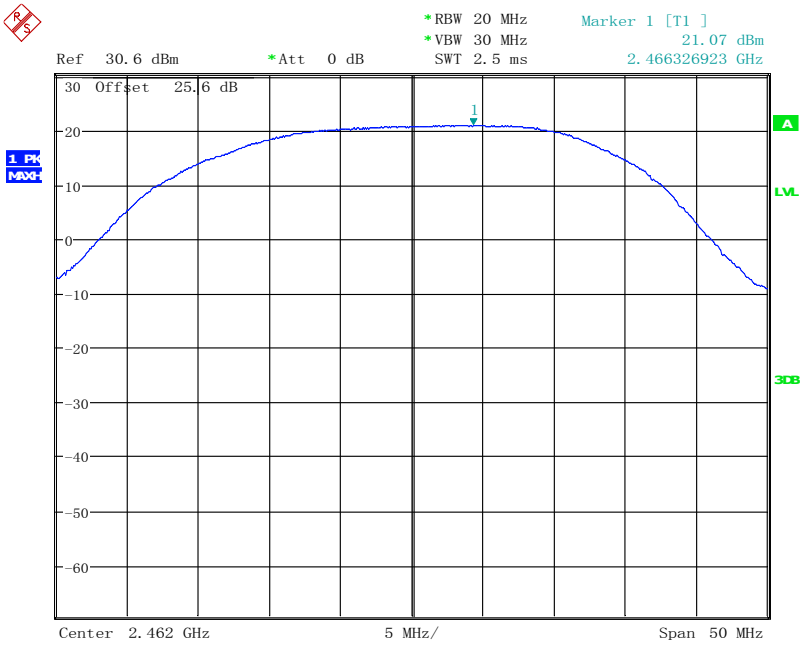
Date: 10.FEB.2015 08:55:51

Fig.33 Conducted Output Power CH11, 11g, Rate24



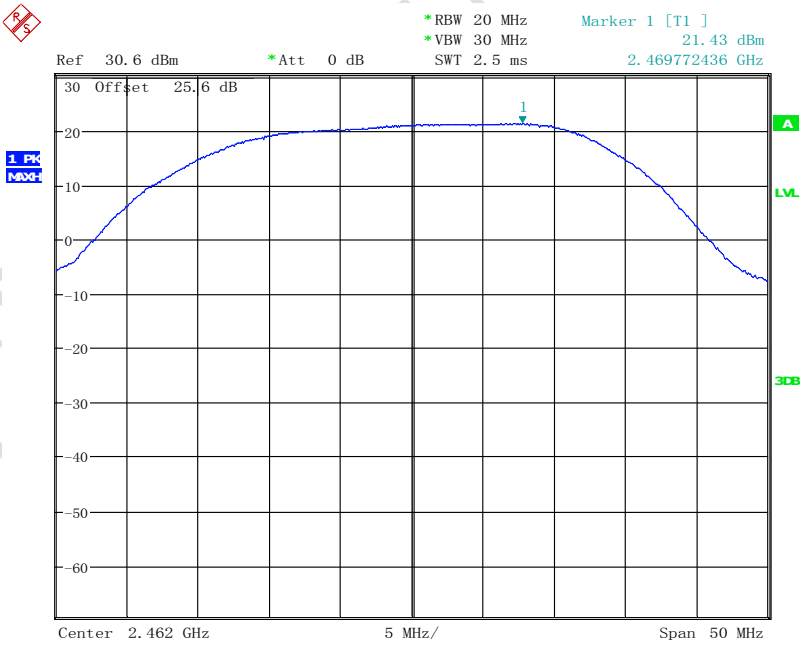
Date: 10.FEB.2015 08:56:24

Fig.34 Conducted Output Power CH11, 11g, Rate36



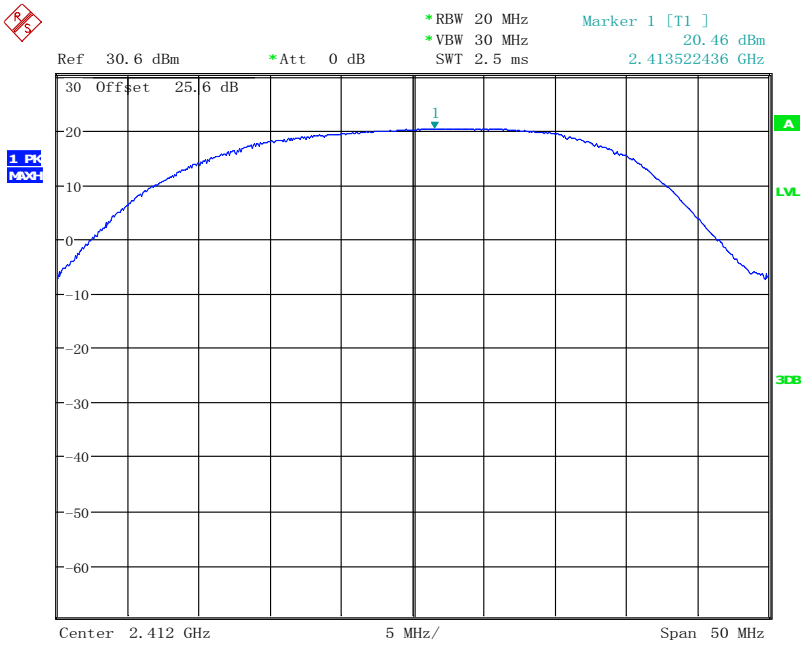
Date: 10.FEB.2015 08:56:54

Fig.35 Conducted Output Power CH11, 11g, Rate48



Date: 10.FEB.2015 08:57:35

Fig.36 Conducted Output Power CH11, 11g, Rate54



Date: 10.FEB.2015 07:09:25

Fig.37 Conducted Output Power CH1, 11n, Rate MCS0

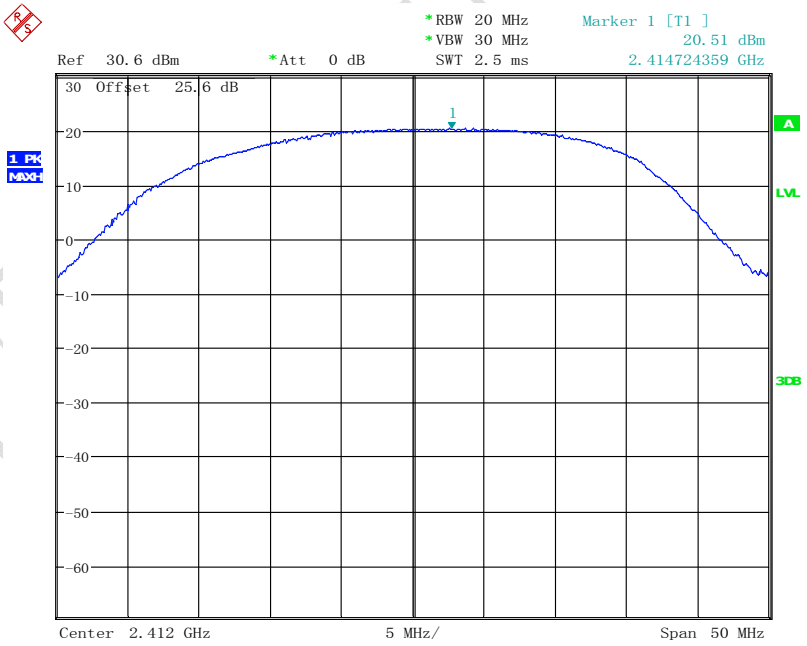


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Fig.38 Conducted Output Power CH1, 11n, Rate MCS1

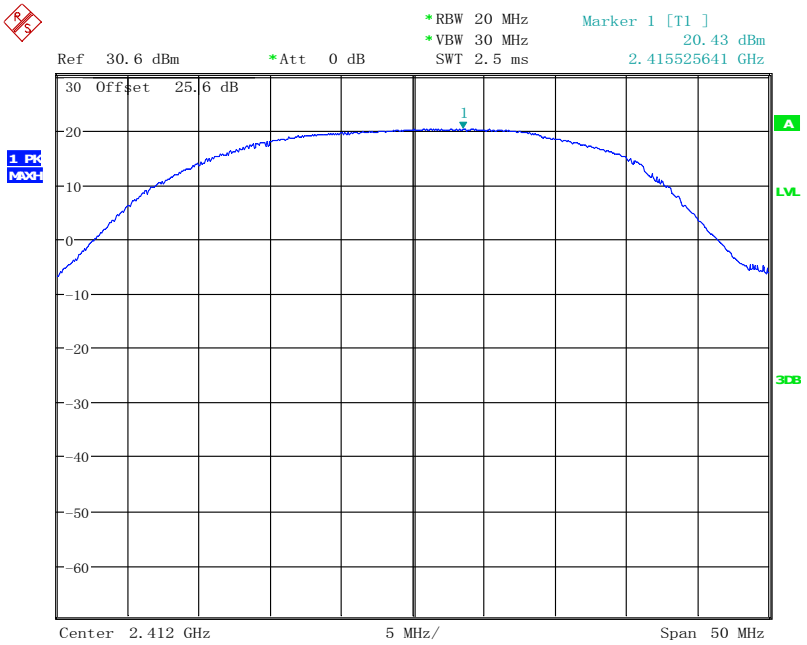

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Fig.39 Conducted Output Power CH1, 11n, Rate MCS2

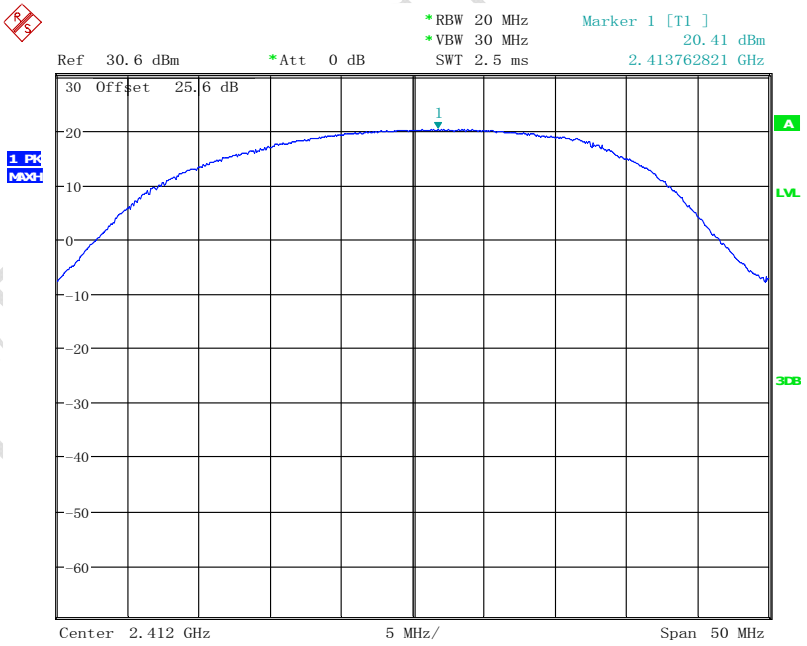

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Fig.40 Conducted Output Power CH1, 11n, Rate MCS3

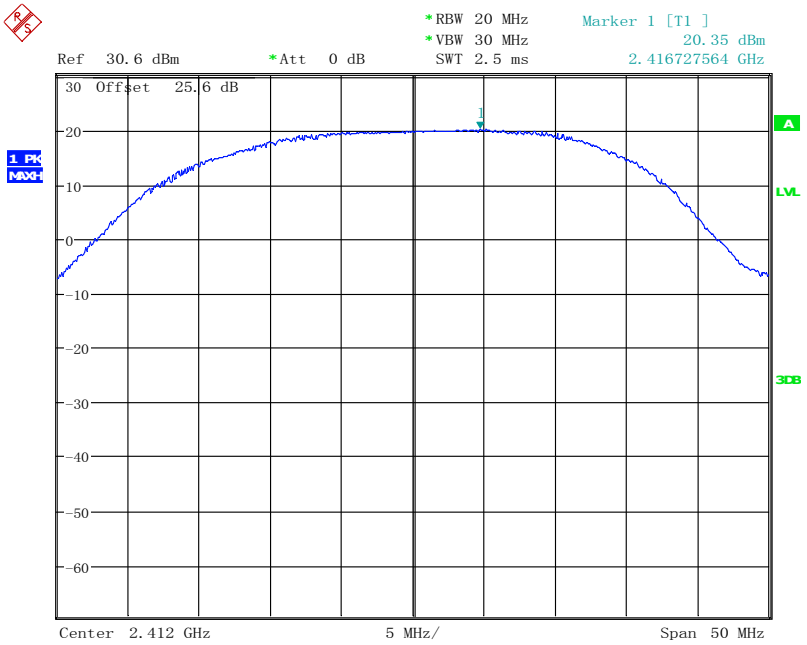

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Fig.41 Conducted Output Power CH1, 11n, Rate MCS4

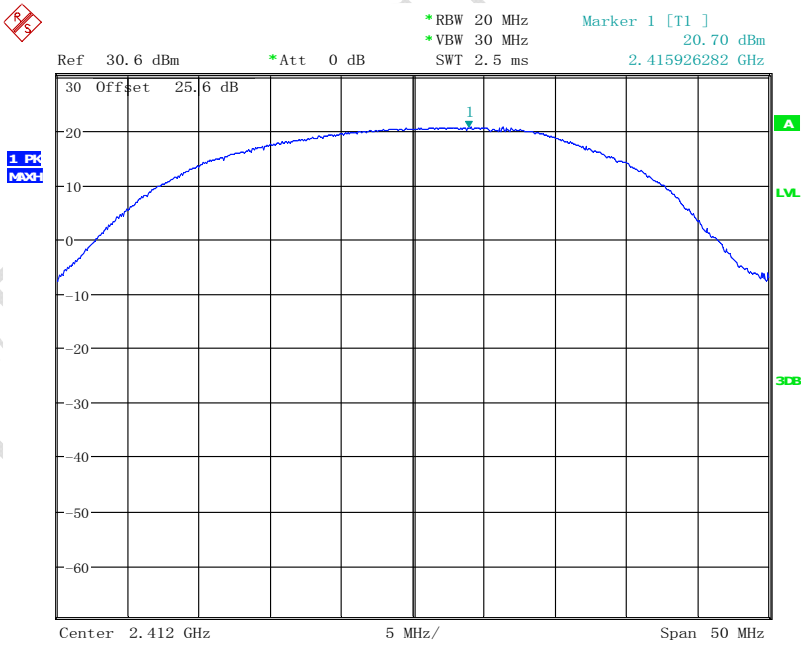

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Fig.42 Conducted Output Power CH1, 11n, Rate MCS5

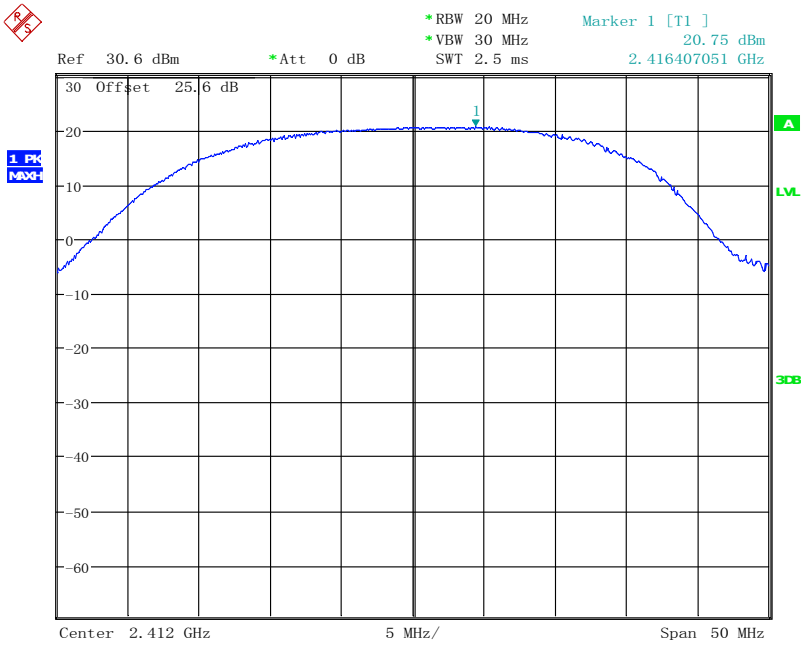

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Fig.43 Conducted Output Power CH1, 11n, Rate MCS6

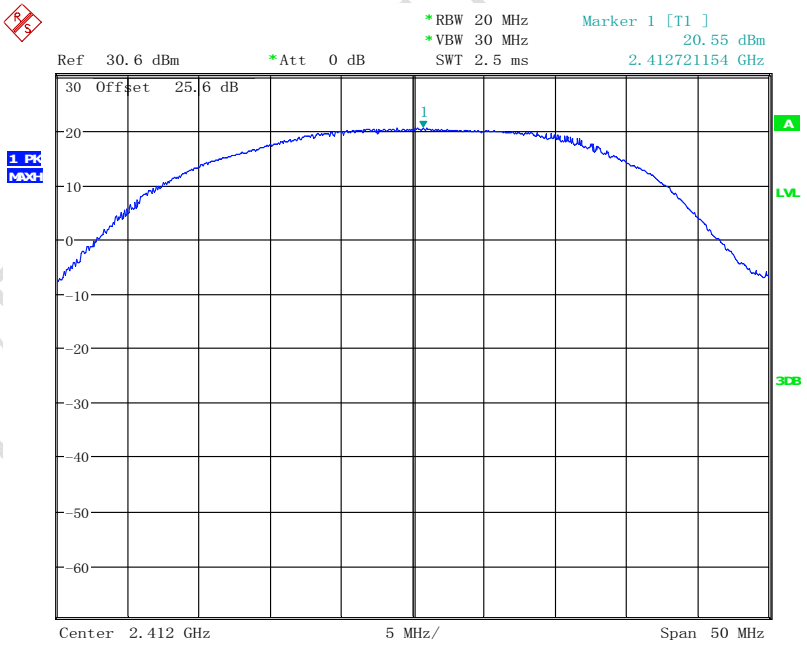

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Fig.44 Conducted Output Power CH1, 11n, Rate MCS7

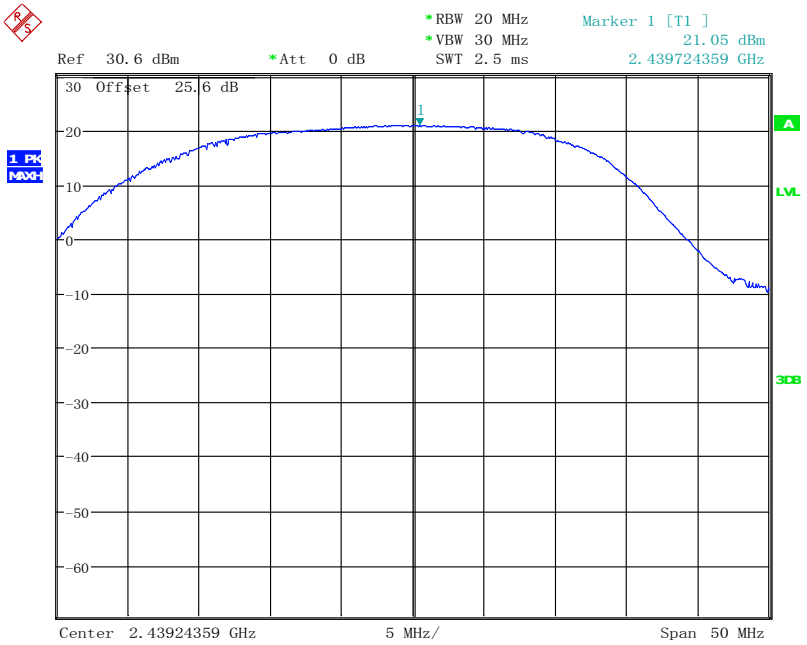

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Fig.45 Conducted Output Power CH6, 11n, Rate MCS0

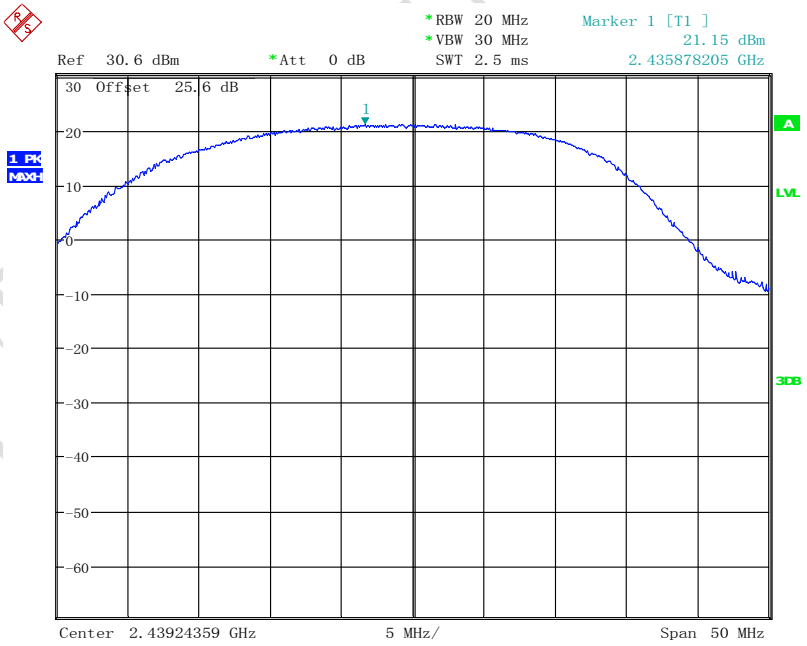

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Fig.46 Conducted Output Power CH6, 11n, Rate MCS1

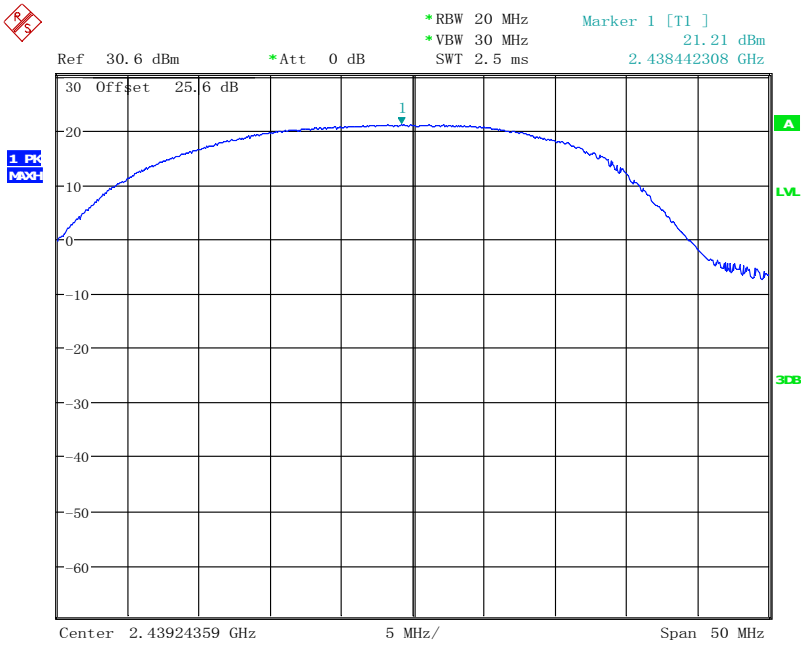

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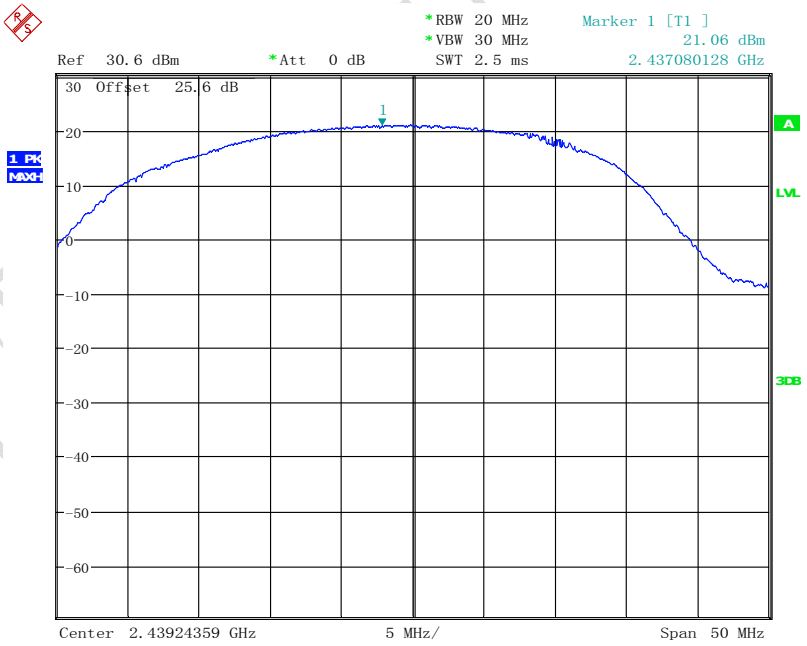
Fig.47 Conducted Output Power CH6, 11n, Rate MCS2



Date: 10.FEB.2015 07:53:30

Fig.48 Conducted Output Power CH6, 11n, Rate MCS3

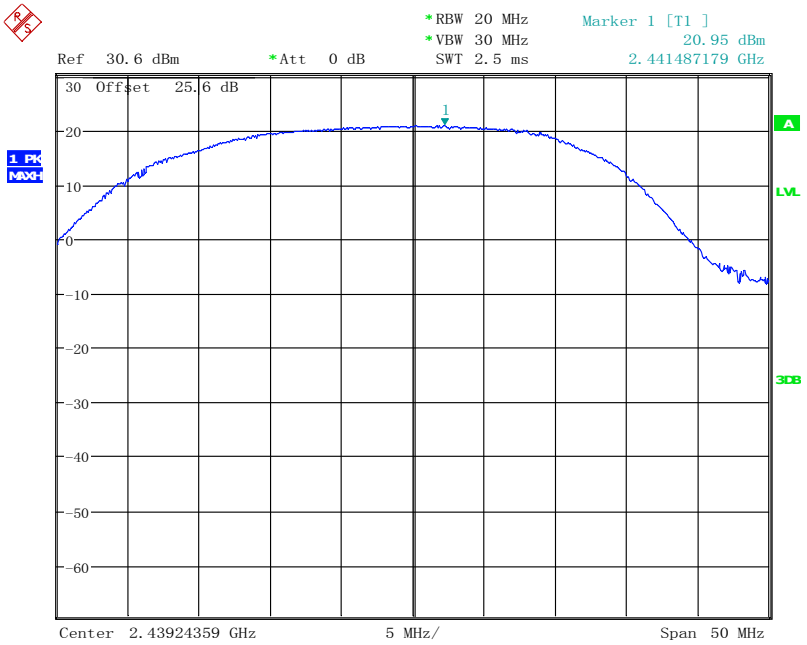


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Fig.49 Conducted Output Power CH6, 11n, Rate MCS4

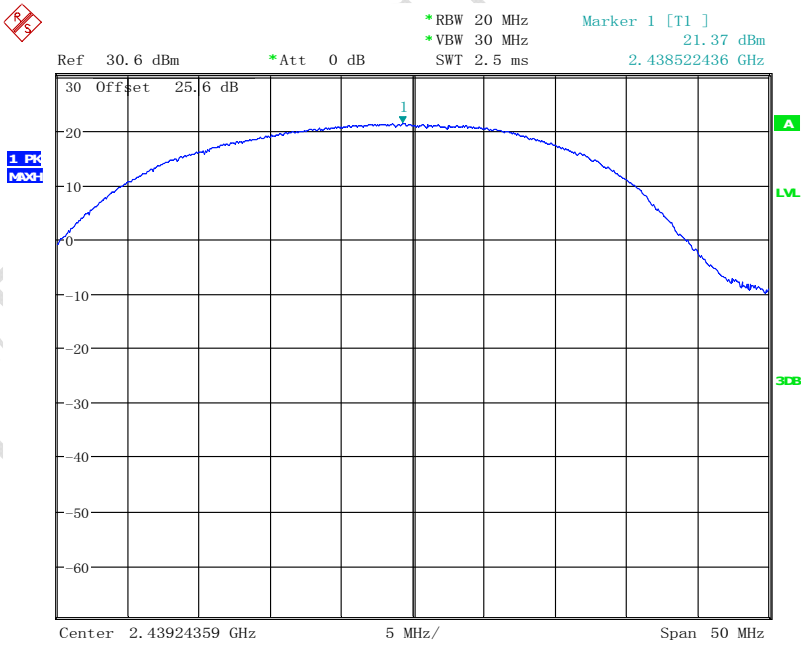

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Fig.50 Conducted Output Power CH6, 11n, Rate MCS5

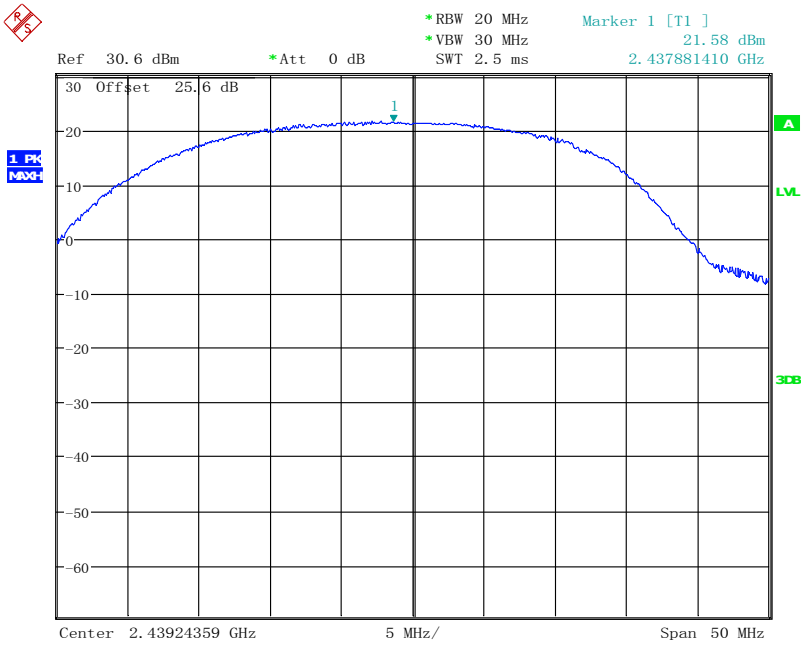

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Fig.51 Conducted Output Power CH6, 11n, Rate MCS6

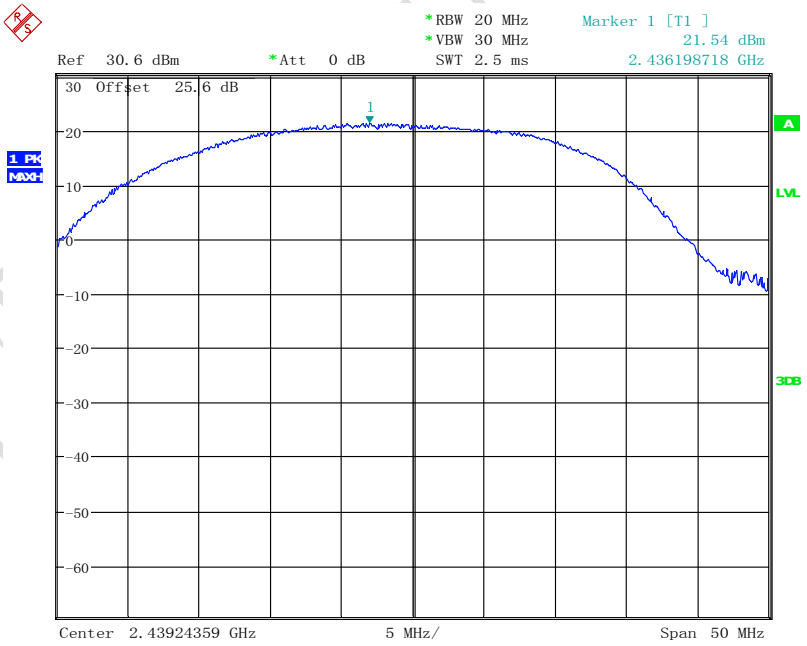

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Fig.52 Conducted Output Power CH6, 11n, Rate MCS7

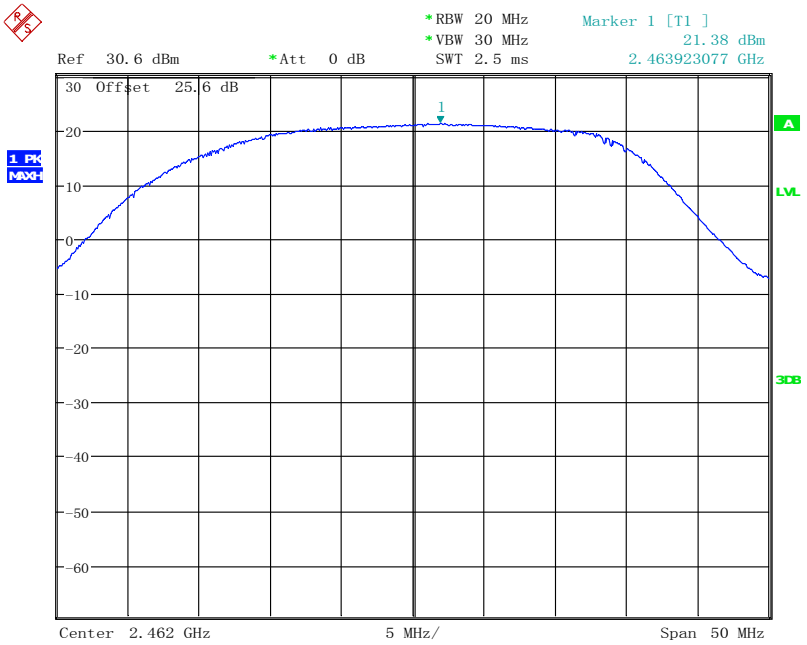

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Fig.53 Conducted Output Power CH11, 11n, Rate MCS0

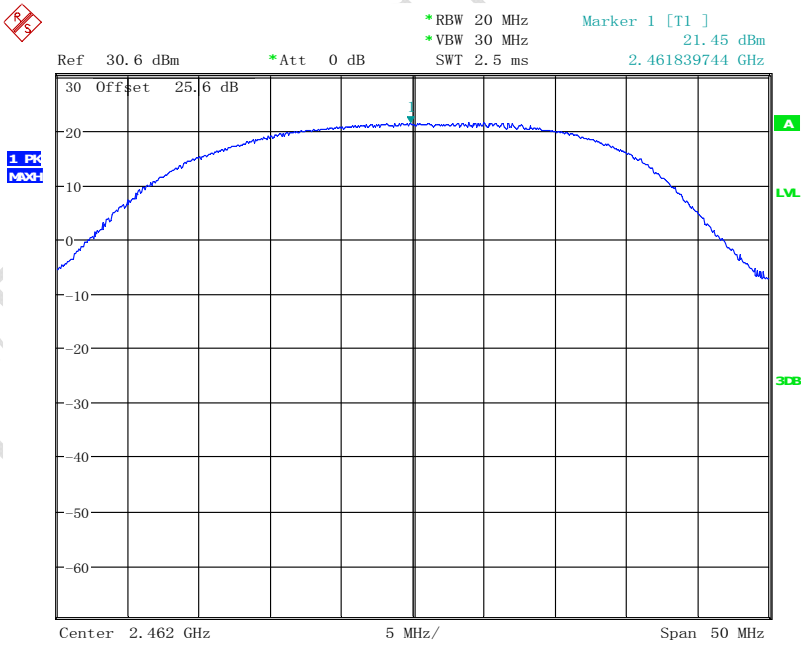

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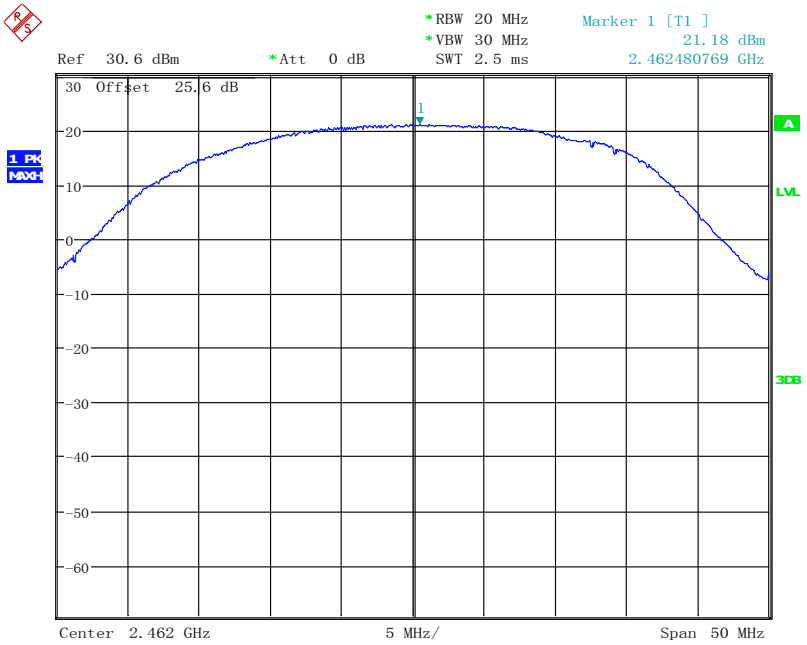
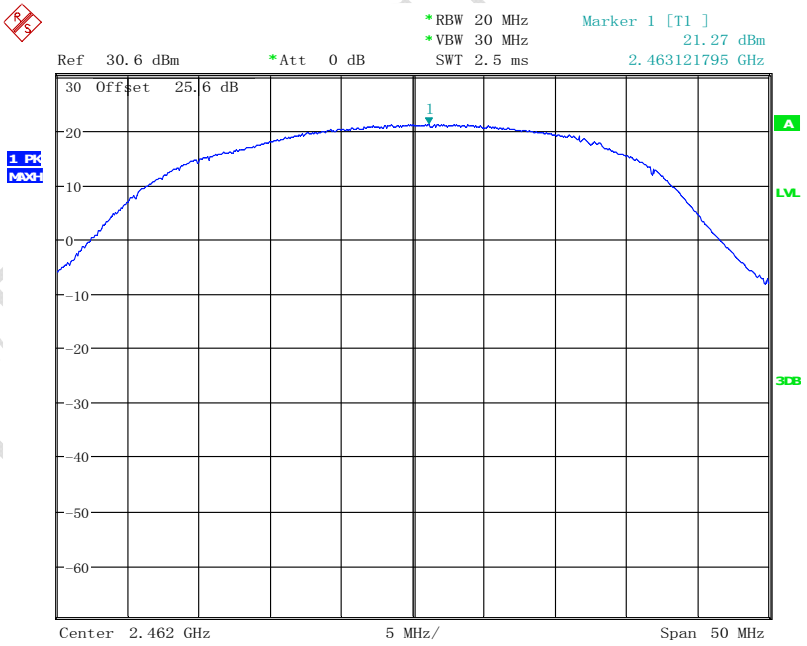
Fig.54 Conducted Output Power CH11, 11n, Rate MCS1



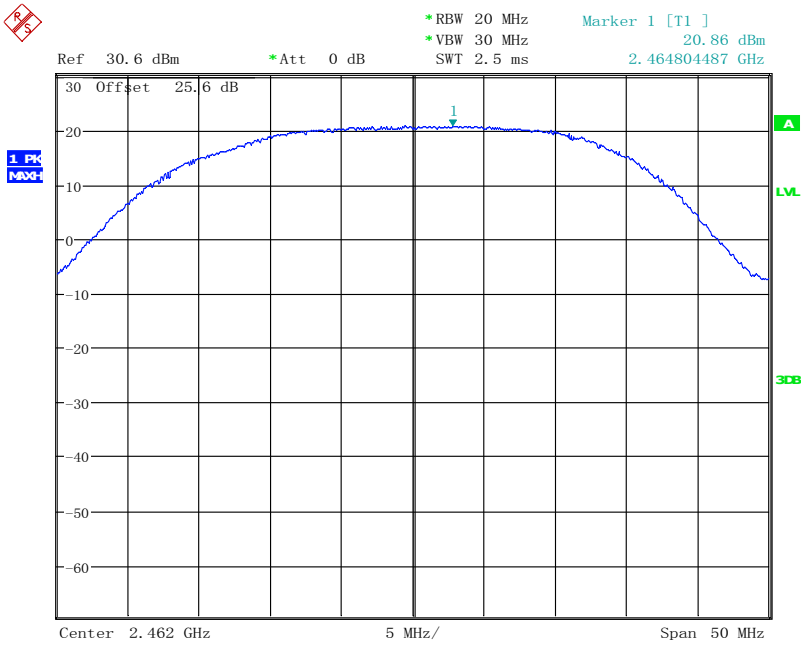
Date: 10.FEB.2015 08:59:25

Fig.55 Conducted Output Power CH11, 11n, Rate MCS2



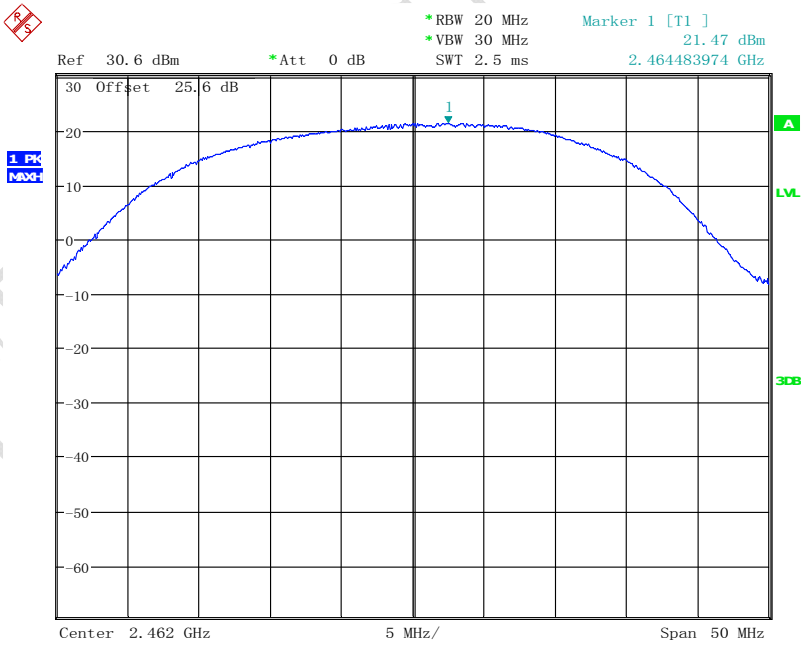
Date: 10.FEB.2015 08:59:58

Fig.56 Conducted Output Power CH11, 11n, Rate MCS3



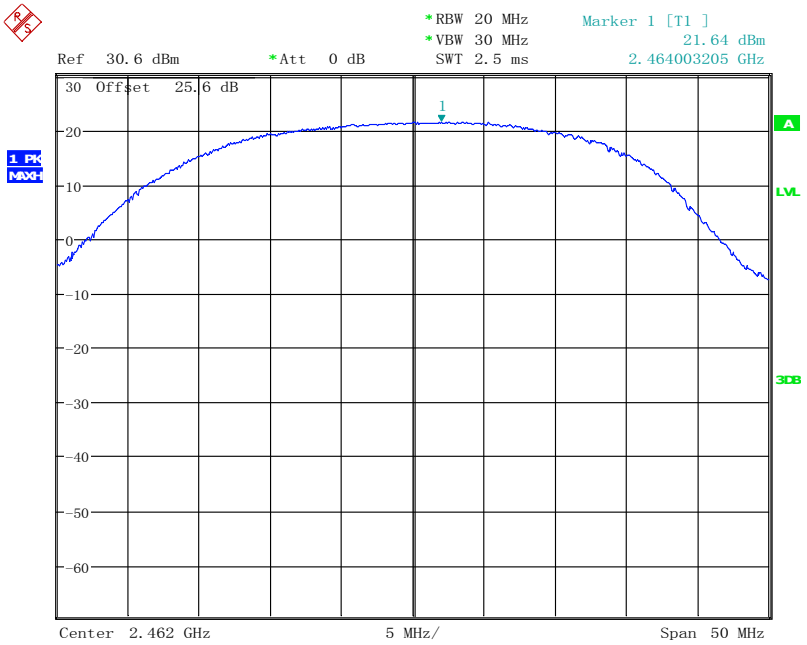
Date: 10.FEB.2015 09:00:31

Fig.57 Conducted Output Power CH11, 11n, Rate MCS4



Date: 10.FEB.2015 09:01:02

Fig.58 Conducted Output Power CH11, 11n, Rate MCS5



Date: 10.FEB.2015 09:01:31

Fig.59 Conducted Output Power CH11, 11n, Rate MCS6

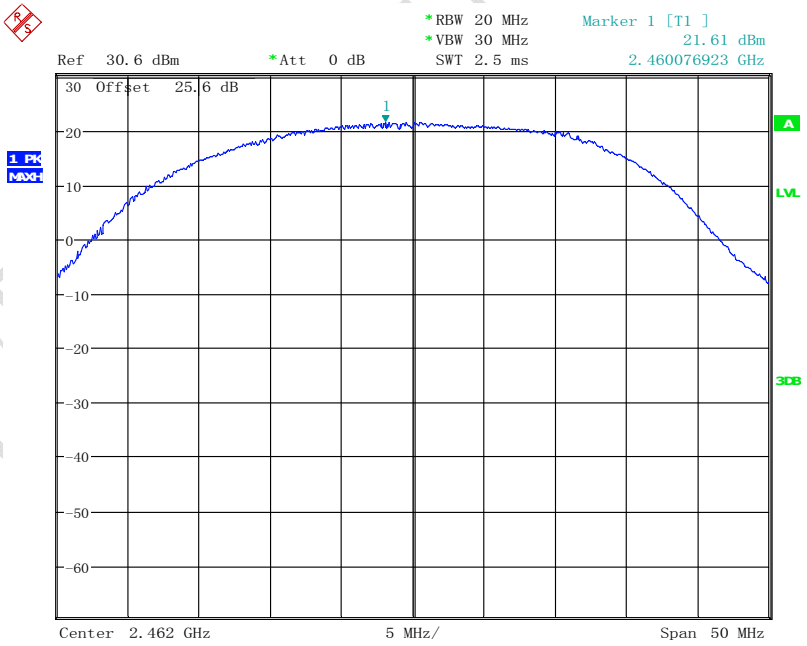


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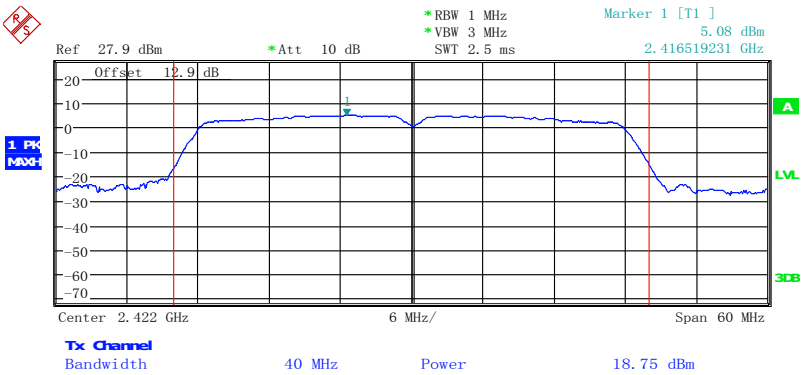
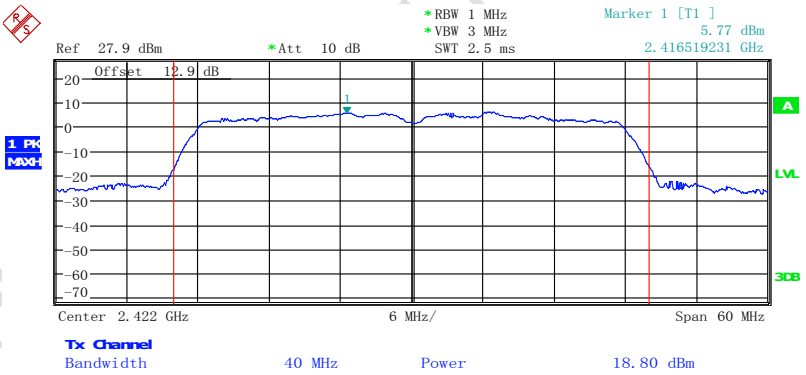
Fig.60 Conducted Output Power CH11, 11n, Rate MCS7



Date: 31.MAR.2015 16:29:10

Fig.61 Conducted Output Power CH1, 11n(40M), Rate MCS0



Date: 31.MAR.2015 16:29:40

Fig.62 Conducted Output Power CH1, 11n(40M), Rate MCS1

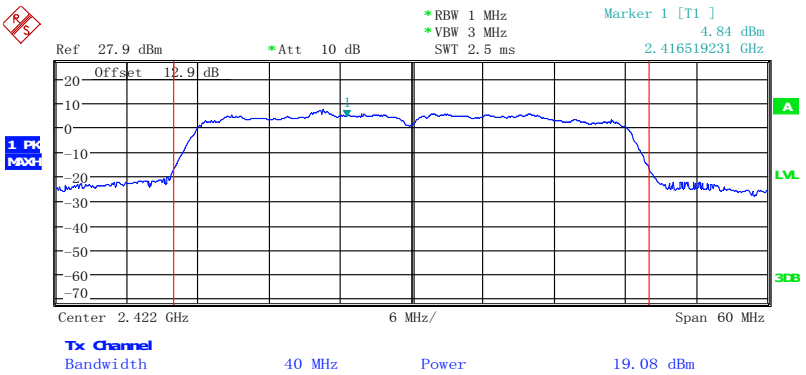


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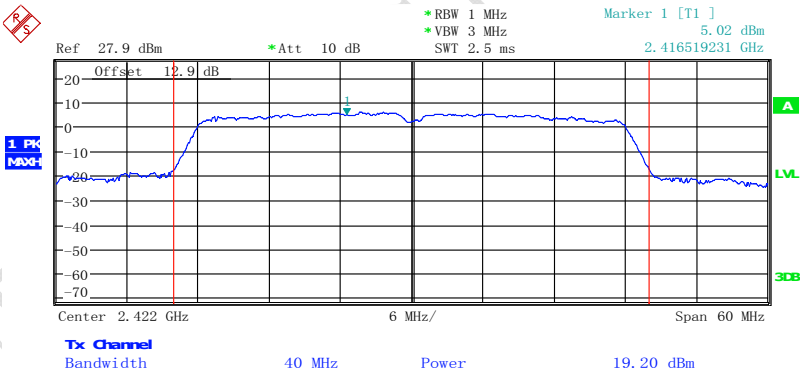
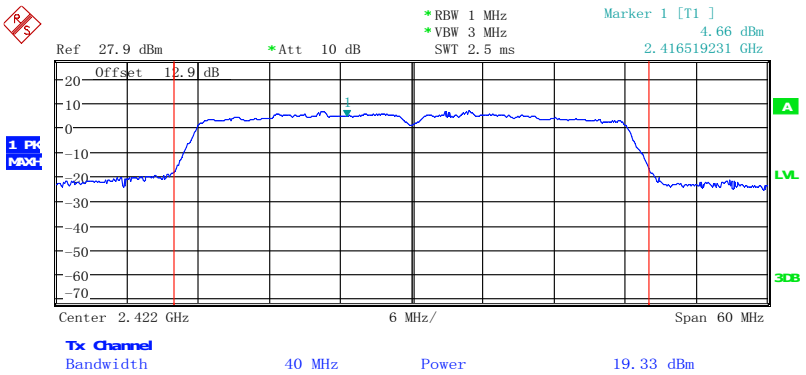
Fig.63 Conducted Output Power CH1, 11n(40M), Rate MCS2



Date: 31.MAR.2015 16:30:42

Fig.64 Conducted Output Power CH1, 11n(40M), Rate MCS3



Date: 31.MAR.2015 16:31:00

Fig.65 Conducted Output Power CH1, 11n(40M), Rate MCS4

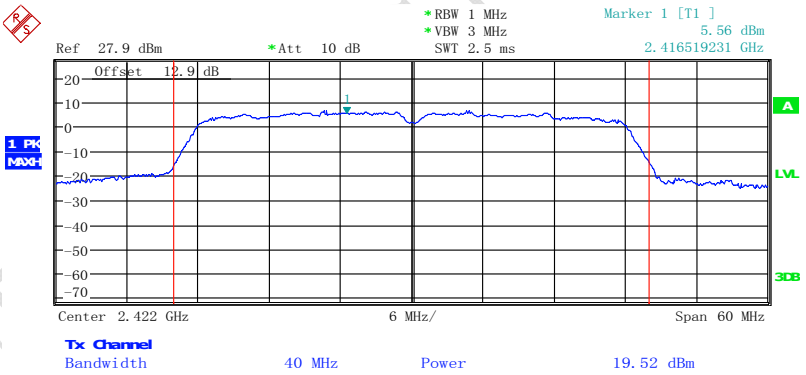


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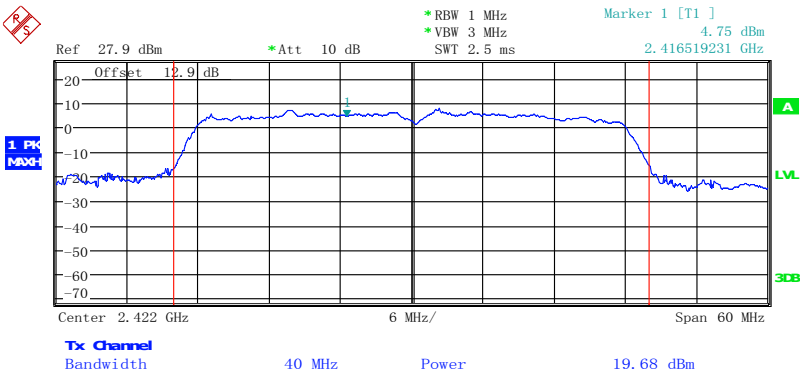
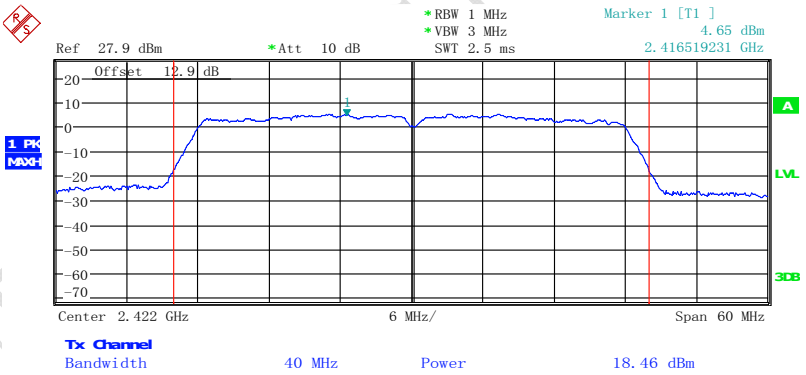
Fig.66 Conducted Output Power CH1, 11n(40M), Rate MCS5



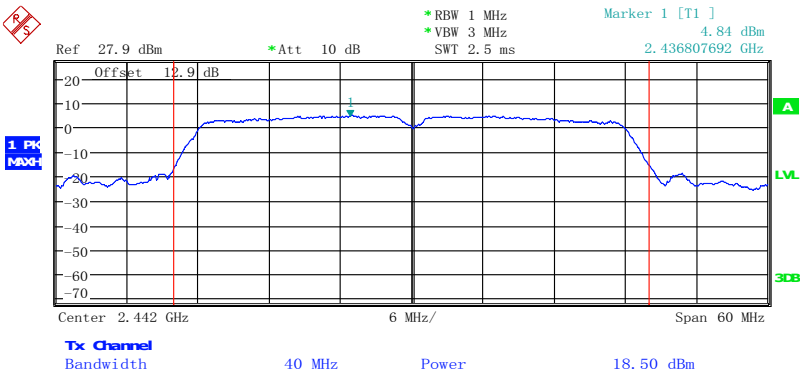
Date: 31.MAR.2015 16:31:29

Fig.67 Conducted Output Power CH1, 11n(40M), Rate MCS6



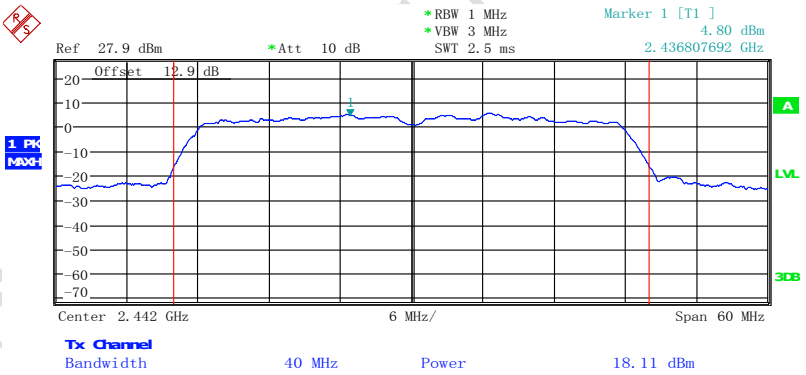
Date: 31.MAR.2015 16:32:30

Fig.68 Conducted Output Power CH1, 11n(40M), Rate MCS7



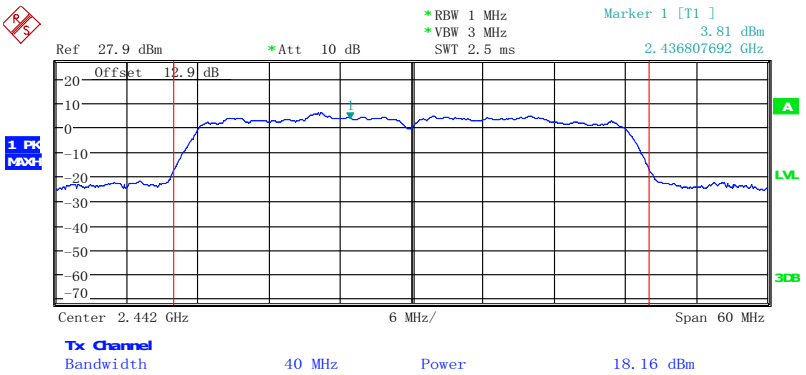
Date: 31.MAR.2015 16:33:44

Fig.69 Conducted Output Power CH6, 11n(40M), Rate MCS0



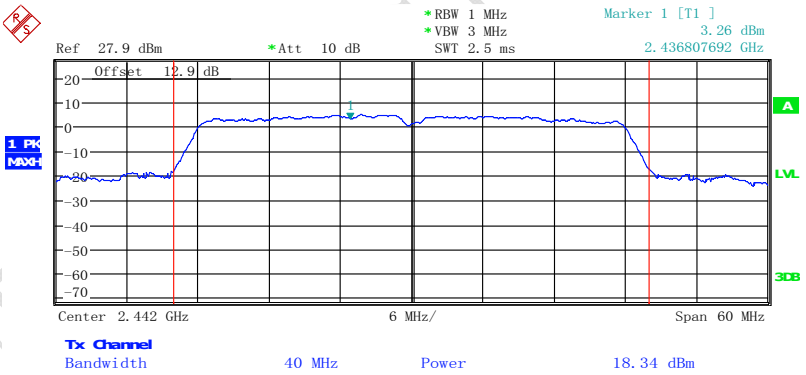
Date: 31.MAR.2015 16:34:19

Fig.70 Conducted Output Power CH6, 11n(40M), Rate MCS1



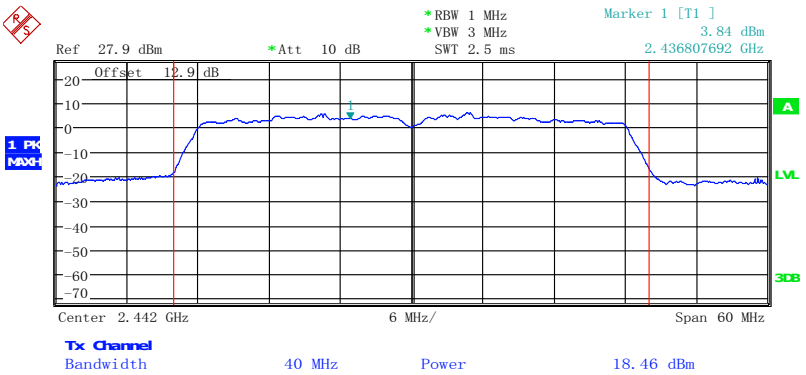
Date: 31.MAR.2015 16:34:44

Fig.71 Conducted Output Power CH6, 11n(40M), Rate MCS2



Date: 31.MAR.2015 16:35:03

Fig.72 Conducted Output Power CH6, 11n(40M), Rate MCS3



Date: 31.MAR.2015 16:35:24

Fig.73 Conducted Output Power CH6, 11n(40M), Rate MCS4

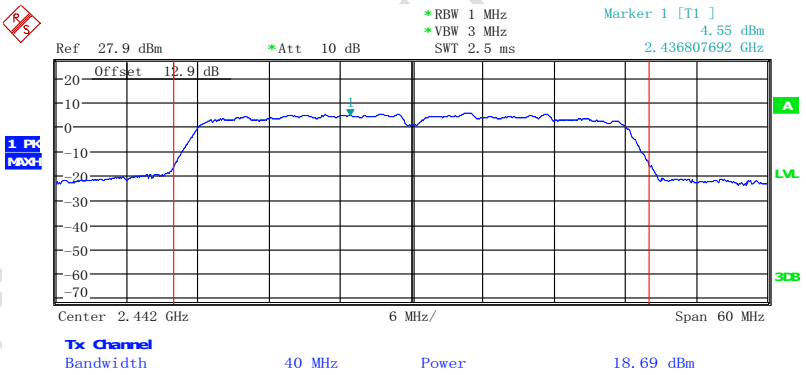


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Fig.74 Conducted Output Power CH6, 11n(40M), Rate MCS5

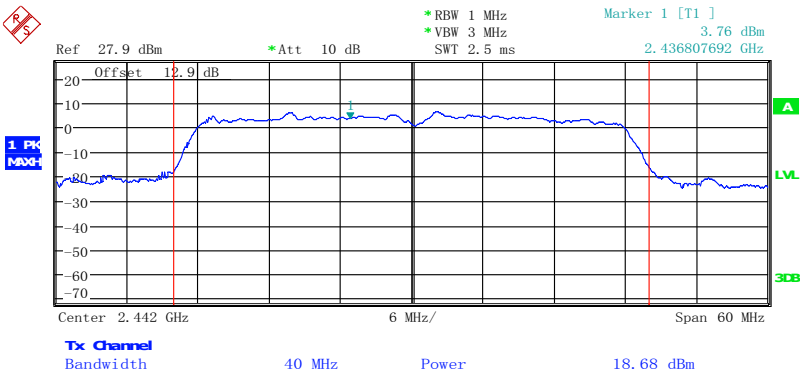

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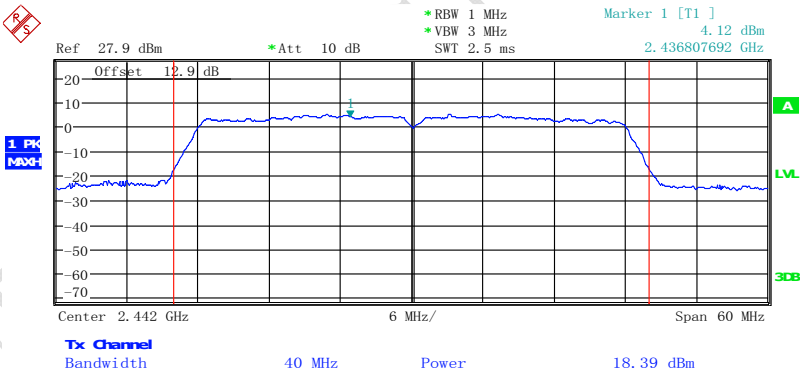
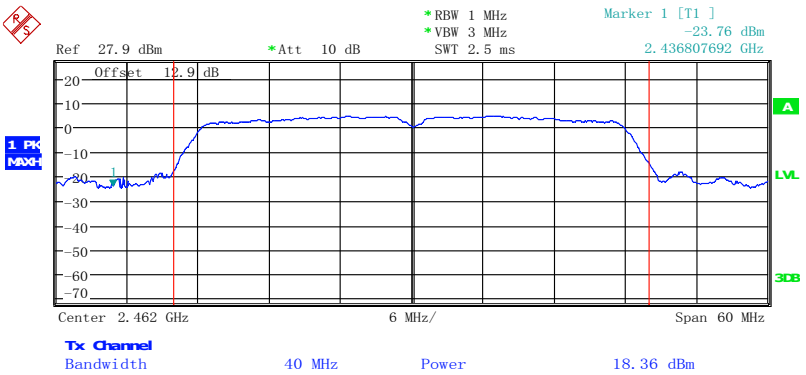
Fig.75 Conducted Output Power CH6, 11n(40M), Rate MCS6



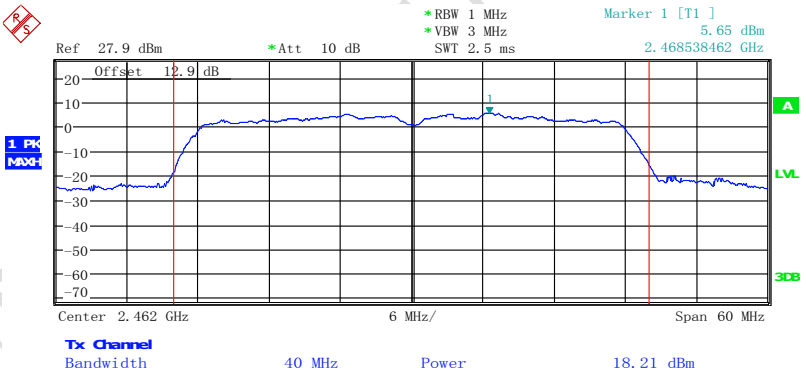
Date: 31.MAR.2015 16:36:24

Fig.76 Conducted Output Power CH6, 11n(40M), Rate MCS7



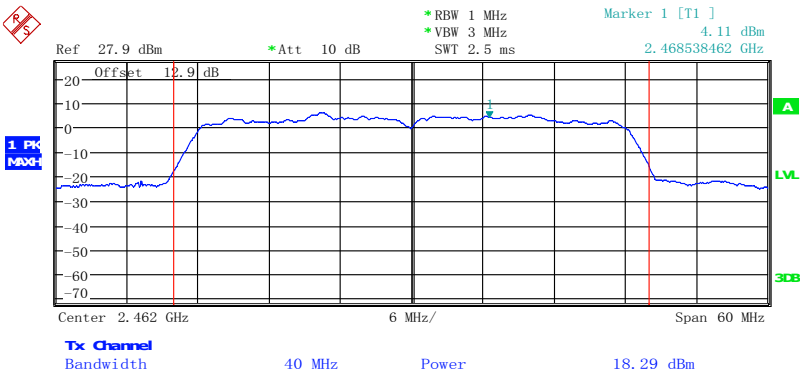
Date: 31.MAR.2015 16:36:53

Fig.77 Conducted Output Power CH11, 11n(40M), Rate MCS0



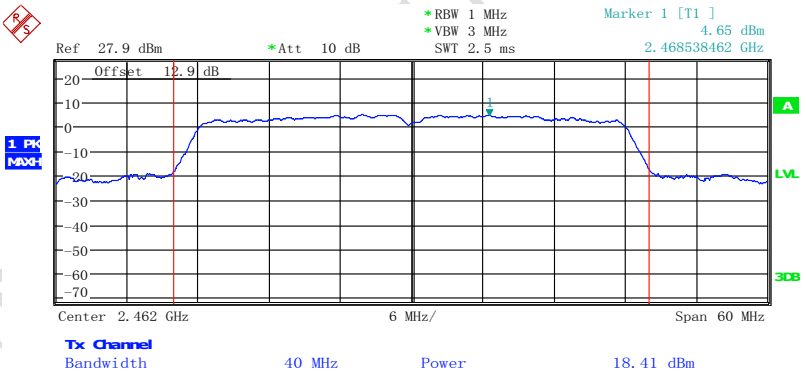
Date: 31.MAR.2015 16:37:13

Fig.78 Conducted Output Power CH11, 11n(40M), Rate MCS1



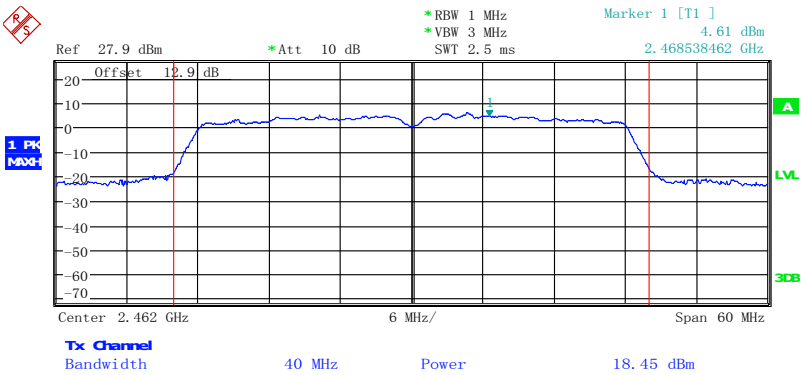
Date: 31.MAR.2015 16:37:45

Fig.79 Conducted Output Power CH11, 11n(40M), Rate MCS2



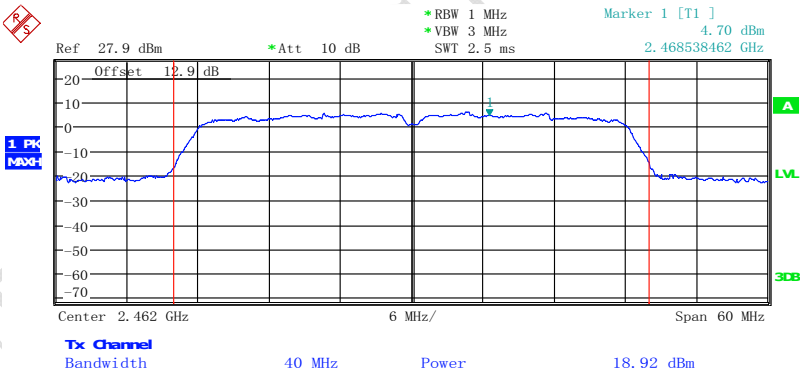
Date: 31.MAR.2015 16:38:06

Fig.80 Conducted Output Power CH11, 11n(40M), Rate MCS3



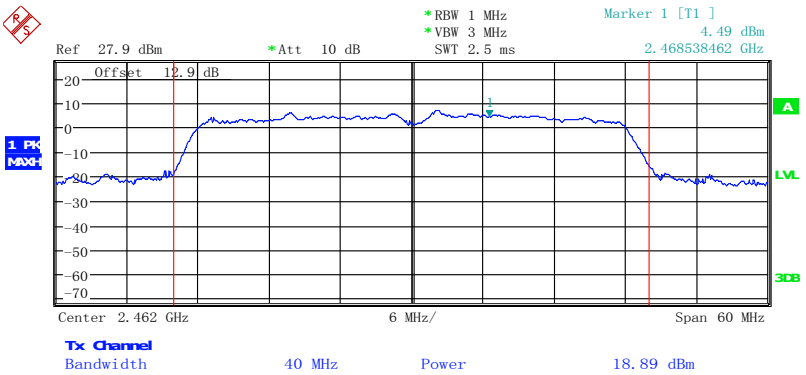
Date: 31.MAR.2015 16:38:25

Fig.81 Conducted Output Power CH11, 11n(40M), Rate MCS4



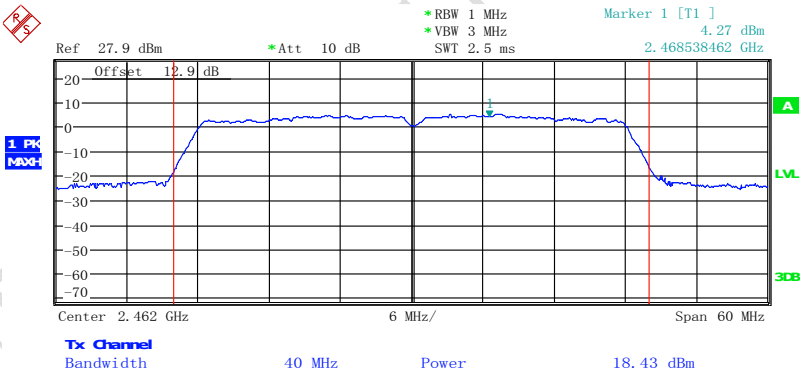
Date: 31.MAR.2015 16:38:39

Fig.82 Conducted Output Power CH11, 11n(40M), Rate MCS5



Date: 31.MAR.2015 16:38:52

Fig.83 Conducted Output Power CH11, 11n(40M), Rate MCS6



Date: 31.MAR.2015 16:39:10

Fig.84 Conducted Output Power CH11, 11n(40M), Rate MCS7

4.2 Peak Power Spectral Density

Date of Tests	2015-02-10
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Test equipment Used:	

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESU40	100350	2015-03-07	Normal

4.2.1 Measurement Limit:

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

4.2.2 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.

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4.2.3 Measurement Results:

802.11b/g mode

Mode	Power Spectral Density(dBm/3kHz)			Conclusion
	Ch1	Ch6	Ch11	
802.11b	-12.99	-12.35	-5.44	Pass
802.11g	-14.75	-14.23	-12.64	Pass

802.11n mode

Mode	Power Spectral Density(dBm/3kHz)			Conclusion
	Ch1	Ch6	Ch11	
802.11n(20MHz)	-13.57	-11.00	-12.56	Pass
802.11n(40MHz)	-16.98	-16.69	-16.51	Pass

Test figure as below:

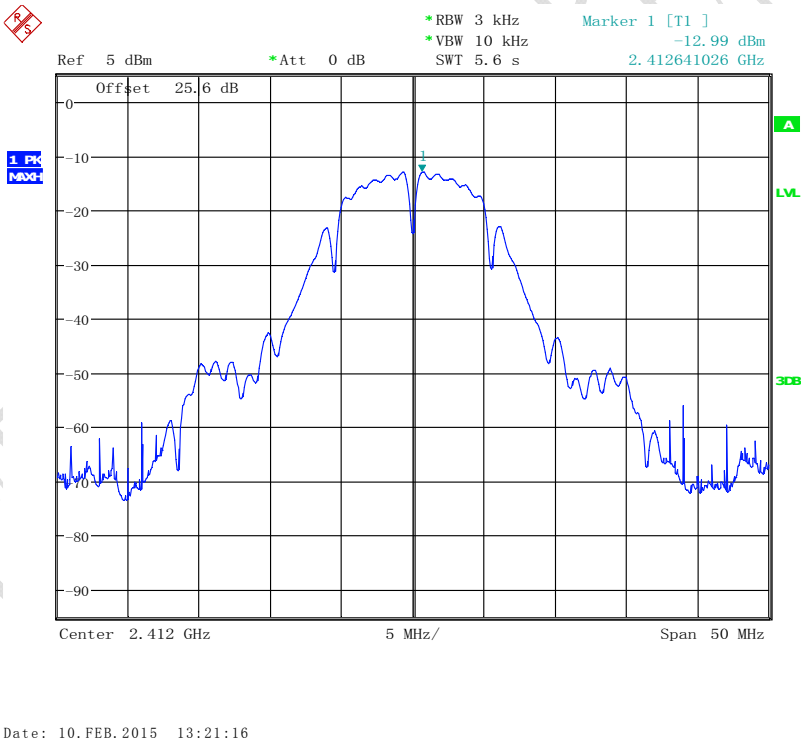
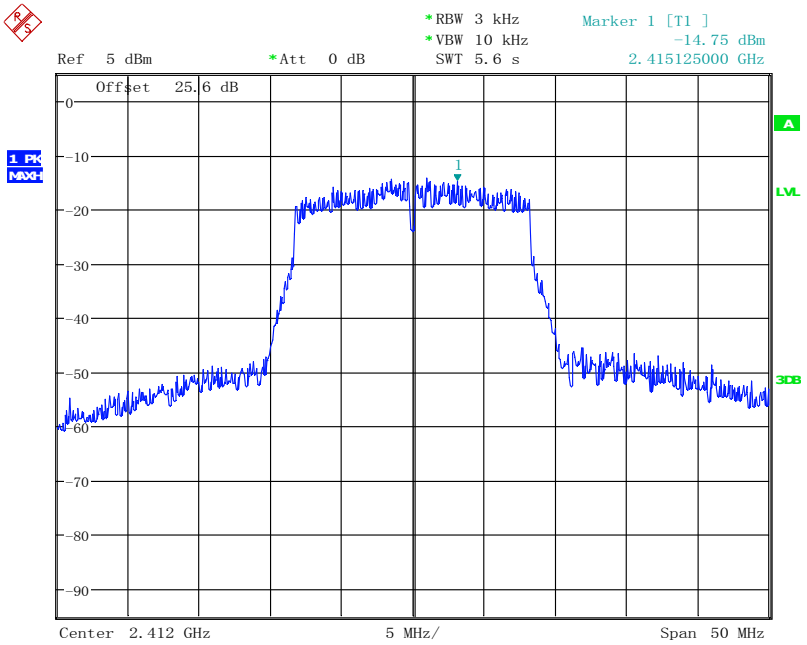
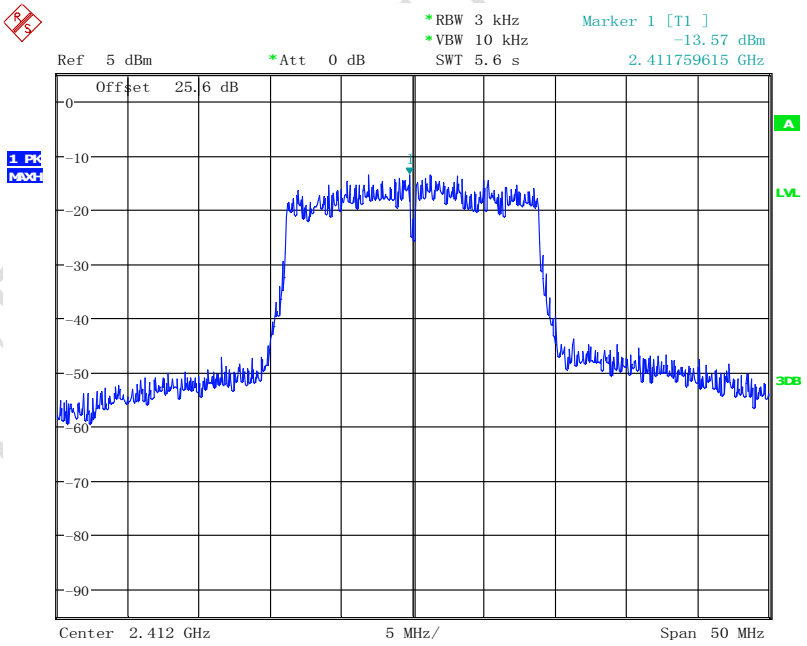


Fig.85 Power spectral density: CH1,11b



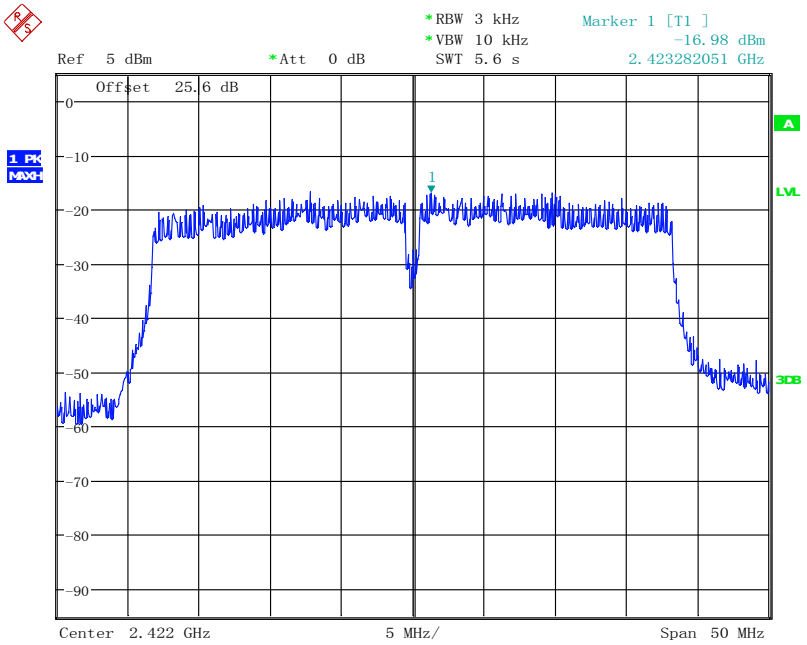
Date: 10.FEB.2015 13:22:18

Fig.86 Power spectral density: CH1,11g



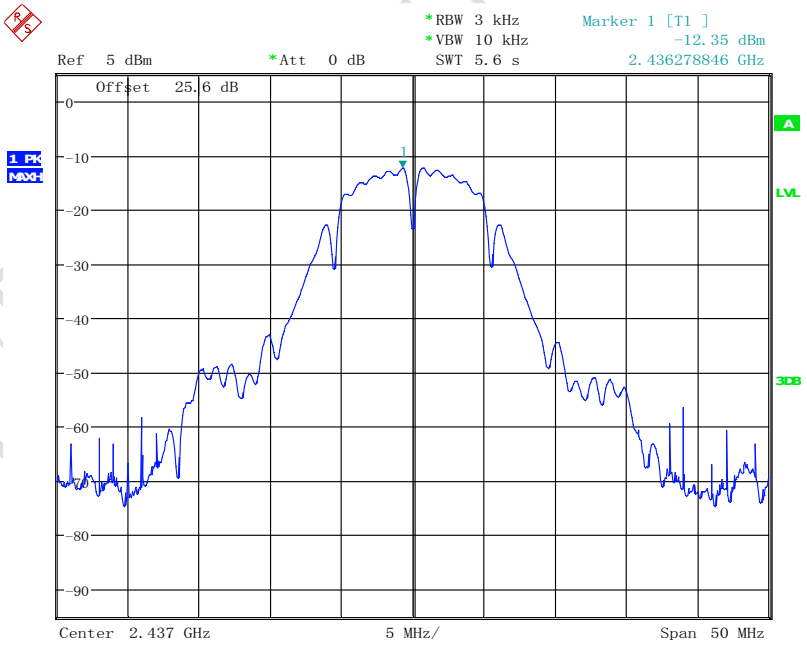
Date: 10.FEB.2015 13:22:56

Fig.87 Power spectral density: CH1,11n



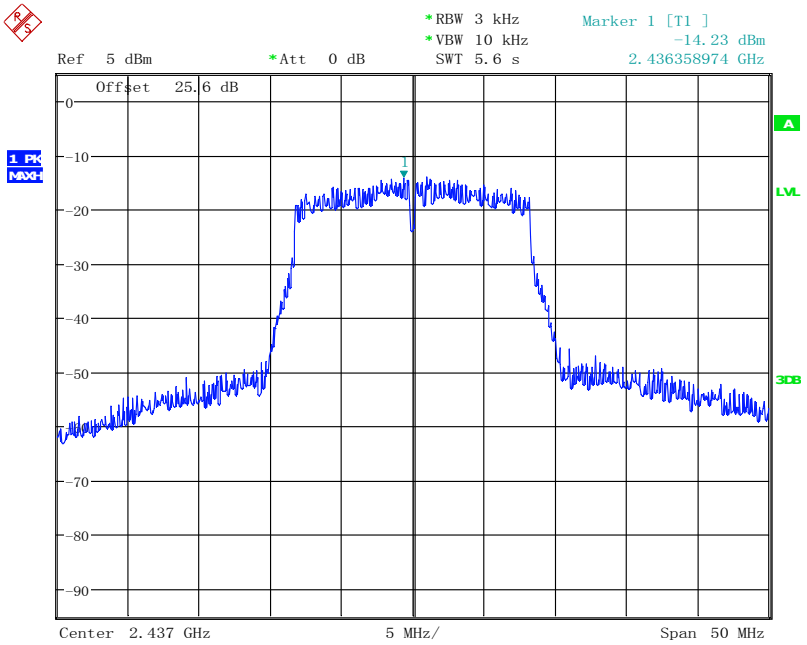
Date: 10.FEB.2015 13:23:36

Fig.88 Power spectral density: CH1,11n(40M)



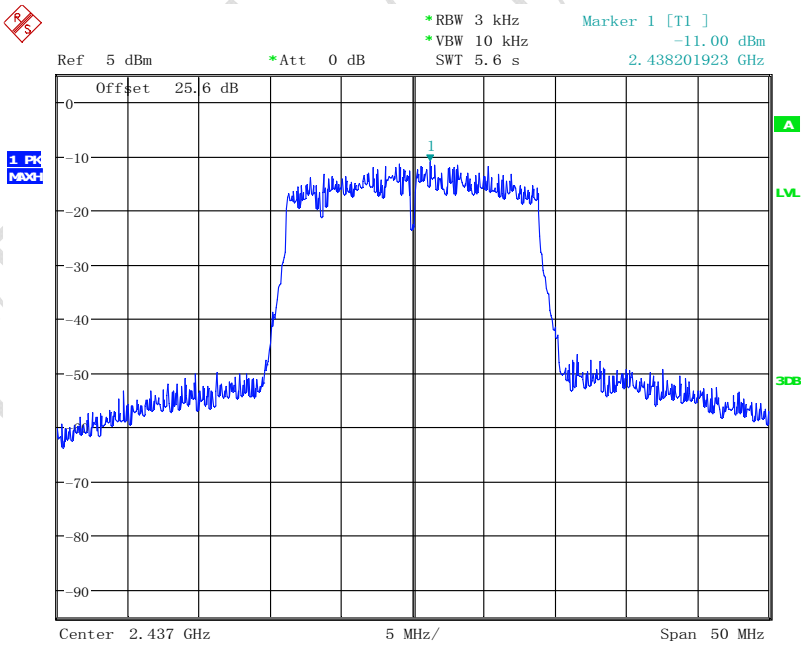
Date: 10.FEB.2015 13:24:59

Fig.89 Power spectral density: CH6,11b



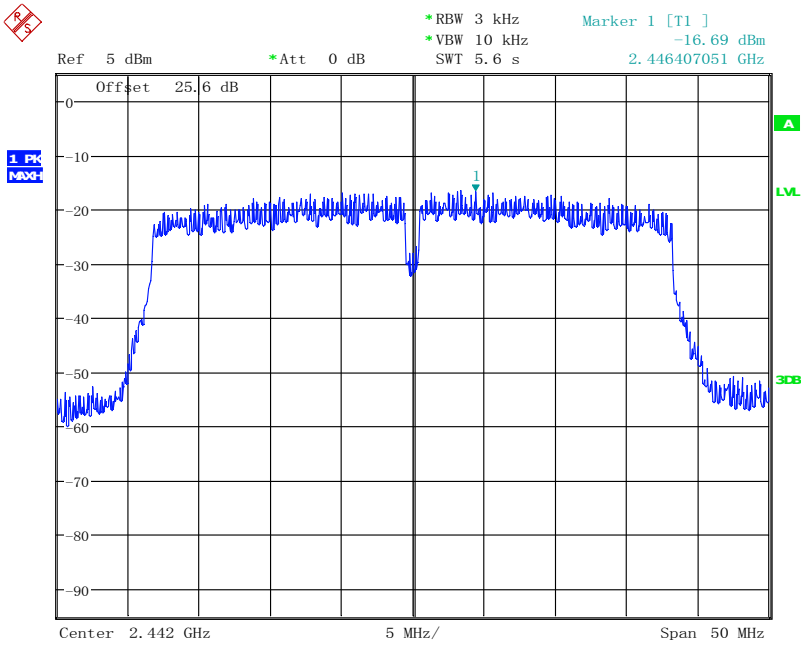
Date: 10.FEB.2015 13:25:27

Fig.90 Fig.66 Power spectral density: CH6,11g



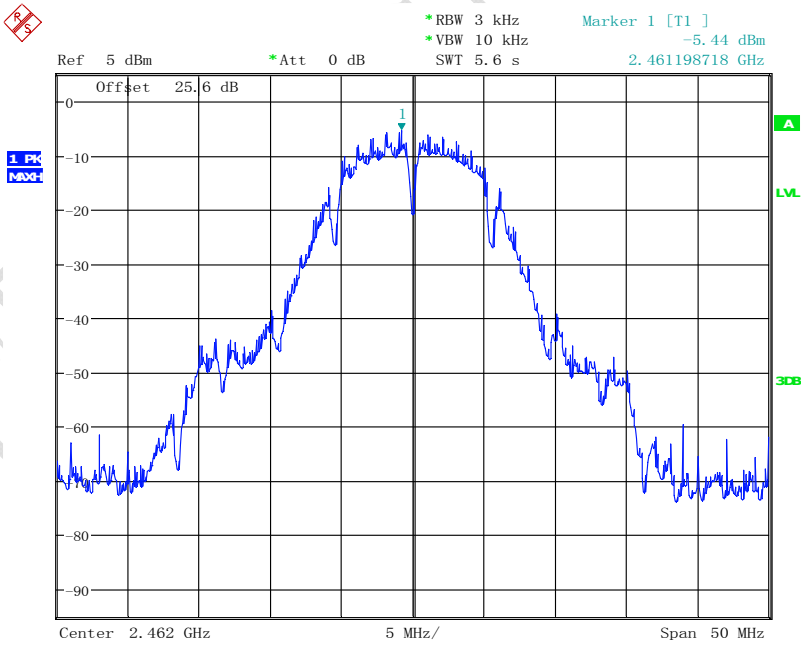
Date: 10.FEB.2015 13:25:51

Fig.91 Power spectral density: CH6,11n



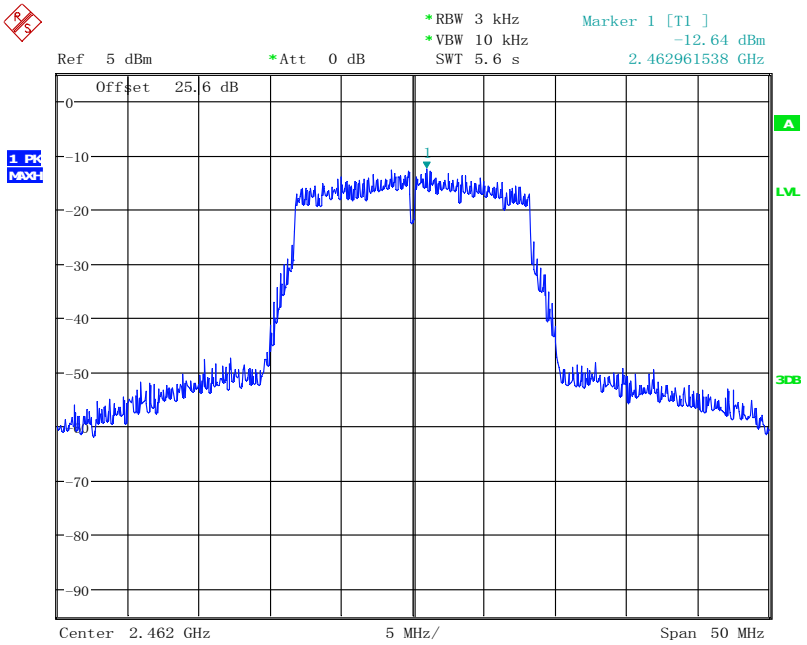
Date: 10.FEB.2015 13:27:10

Fig.92 Power spectral density: CH6,11n(40M)



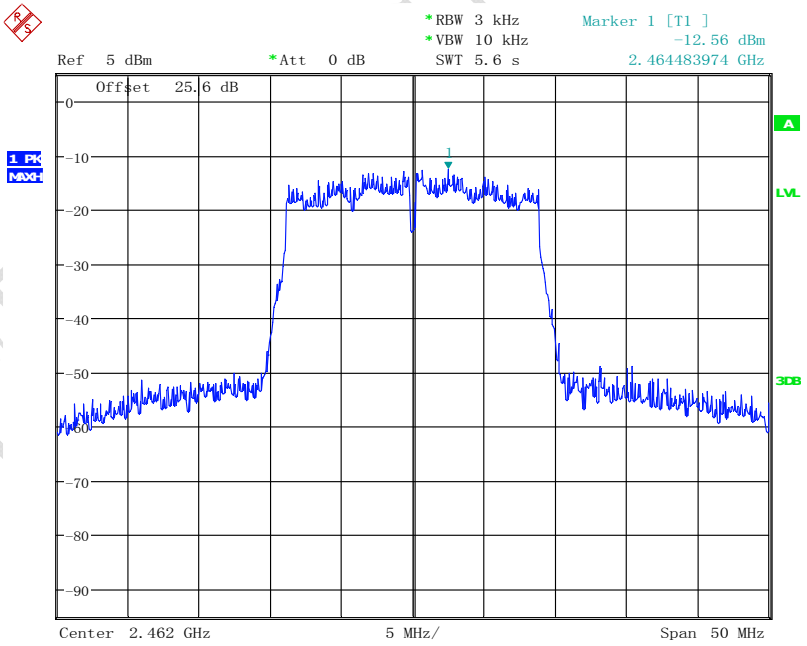
Date: 10.FEB.2015 13:27:54

Fig.93 Power spectral density: CH11,11b



Date: 10.FEB.2015 13:28:34

Fig.94 Power spectral density: CH11,11g



Date: 10.FEB.2015 13:28:57

Fig.95 Power spectral density: CH11,11n

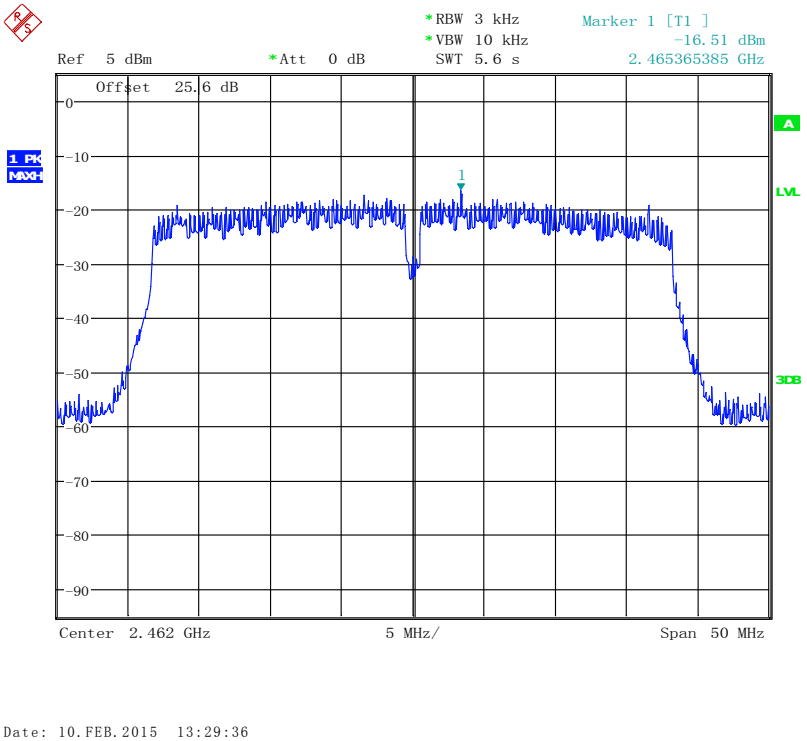


Fig.96 Power spectral density: CH11,11n(40M)

4.3 6dB Bandwidth

Date of Test	2015-02-10
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Test equipment Used:	

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESU40	100350	2015-03-07	Normal

4.3.1 Measurement Limit:

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

4.3.2 Test procedures

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.

4.3.3 Measurement Result:

802.11b/g mode

Mode	Occupied 6dB Bandwidth(MHz)			Conclusion
	Ch1	Ch6	Ch11	
802.11b	8.405	9.711	10.064	Pass
802.11g	16.498	16.522	16.474	Pass

802.11n mode

Mode	Occupied 6dB Bandwidth(MHz)			Conclusion
	Ch1	Ch6	Ch11	

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802.11n(20MHz)	17.539	17.804	17.836	Pass
802.11n(40MHz)	36.378	36.635	36.827	Pass

Conclusion: PASS

Test figure as below:

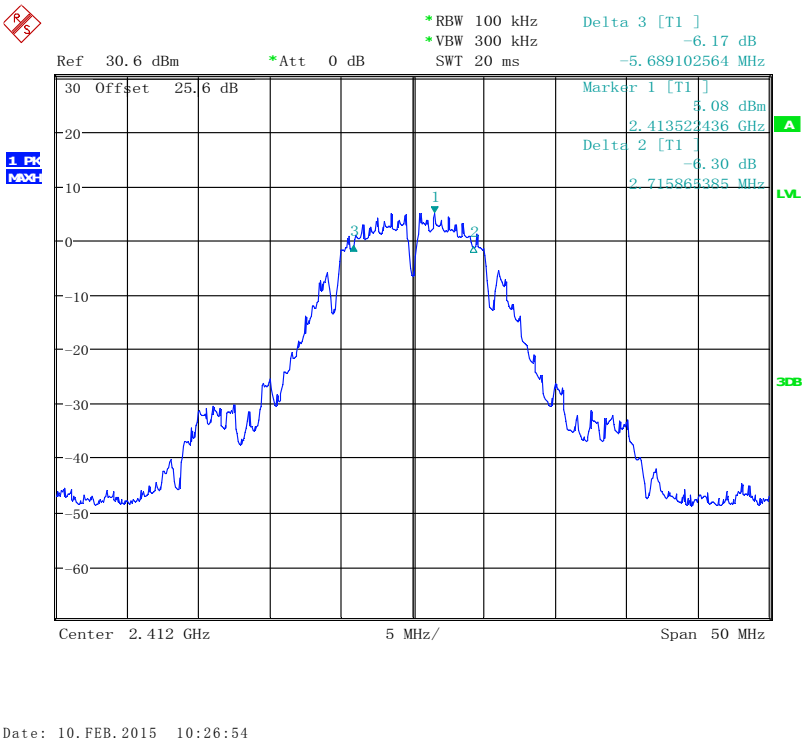
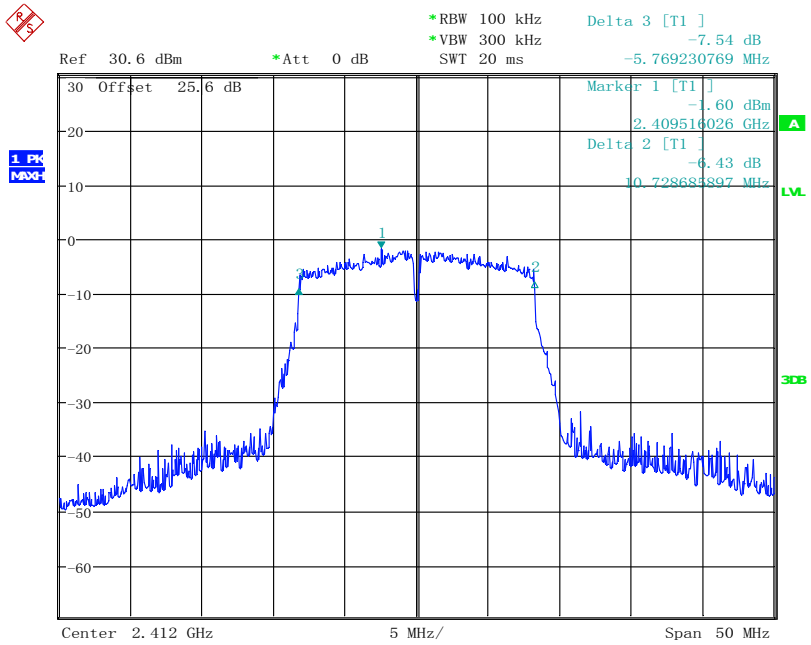
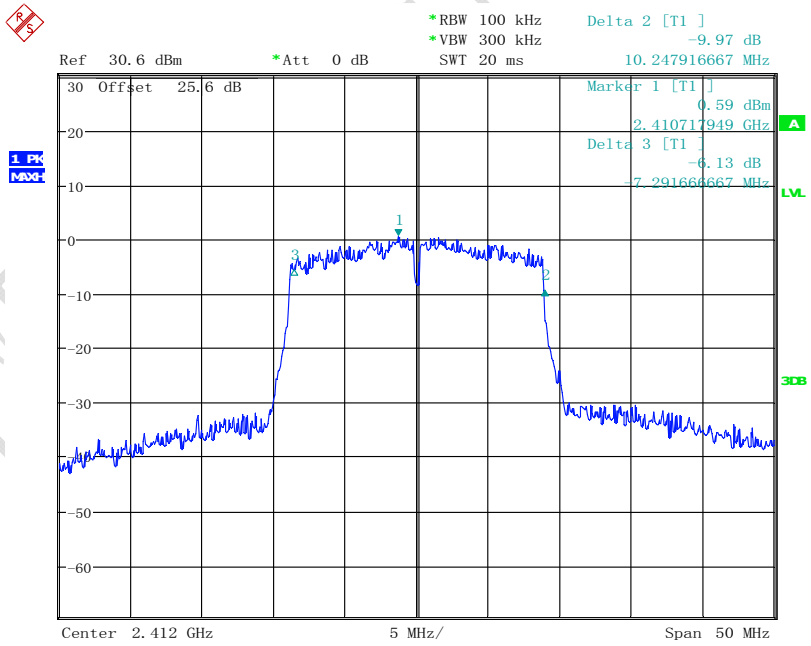


Fig.97 6dB Bandwidth: Ch1,11b



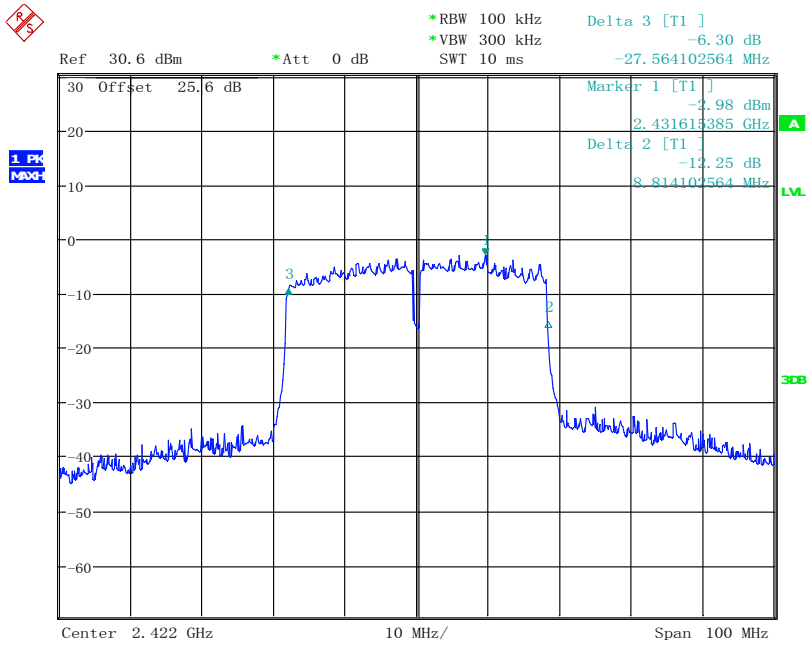
Date: 10.FEB.2015 10:28:21

Fig.98 6dB Bandwidth: Ch1,11g



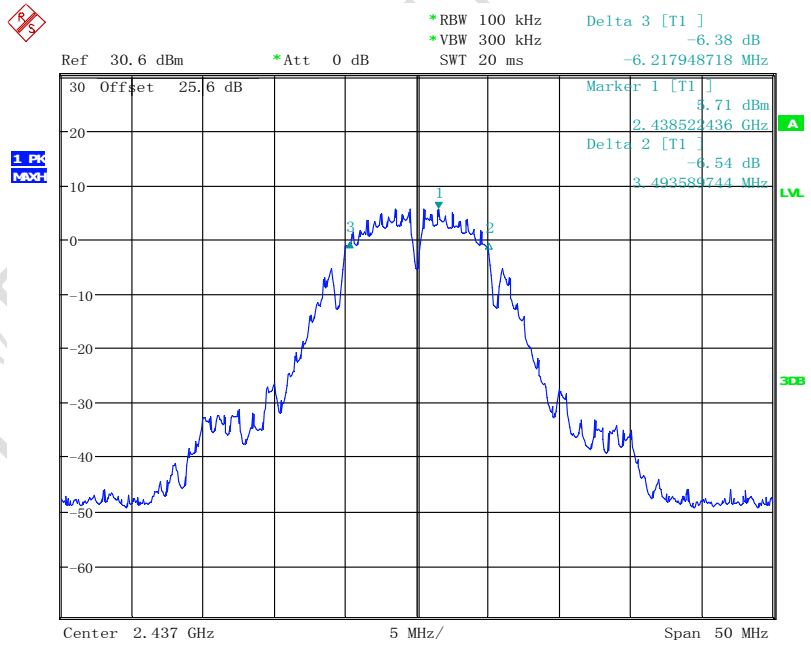
Date: 10.FEB.2015 10:29:21

Fig.99 6dB Bandwidth: Ch1,11n



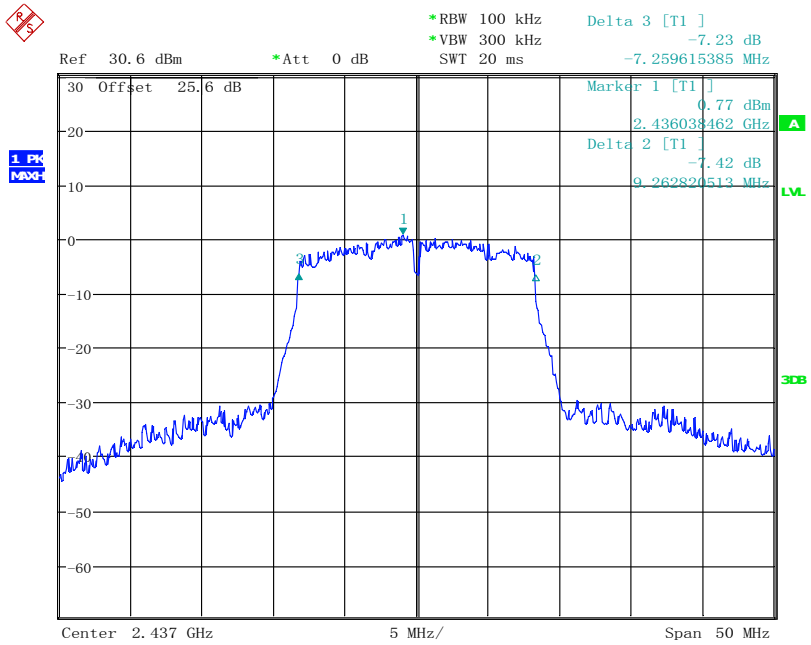
Date: 10.FEB.2015 10:38:11

Fig.100 6dB Bandwidth: Ch1,11n(40M)



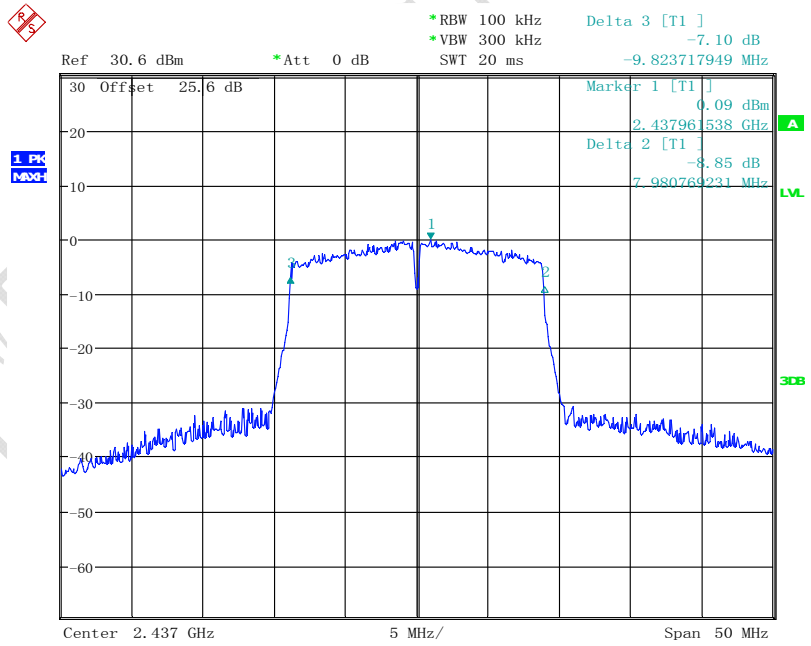
Date: 10.FEB.2015 11:28:34

Fig.101 6dB Bandwidth: Ch6,11b



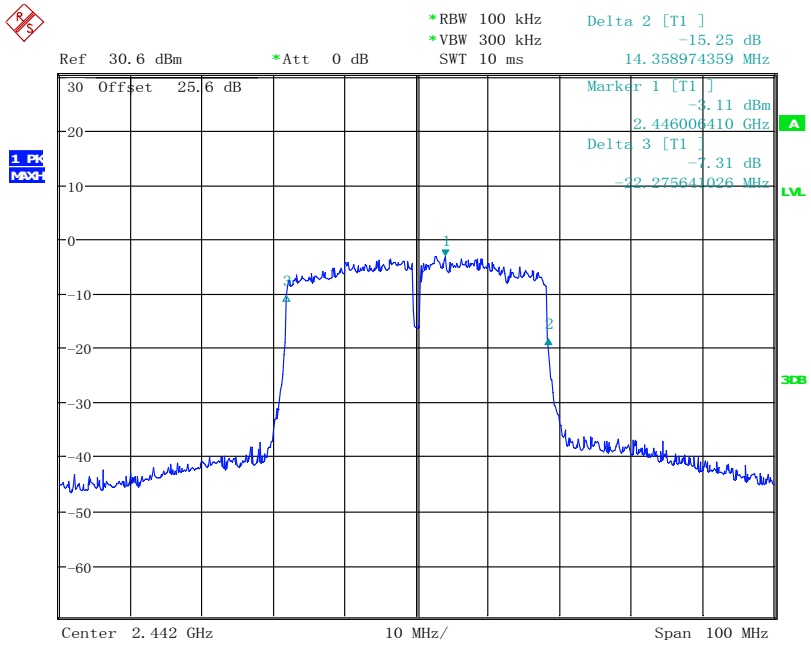
Date: 10.FEB.2015 11:29:26

Fig.102 6dB Bandwidth: Ch6,11g



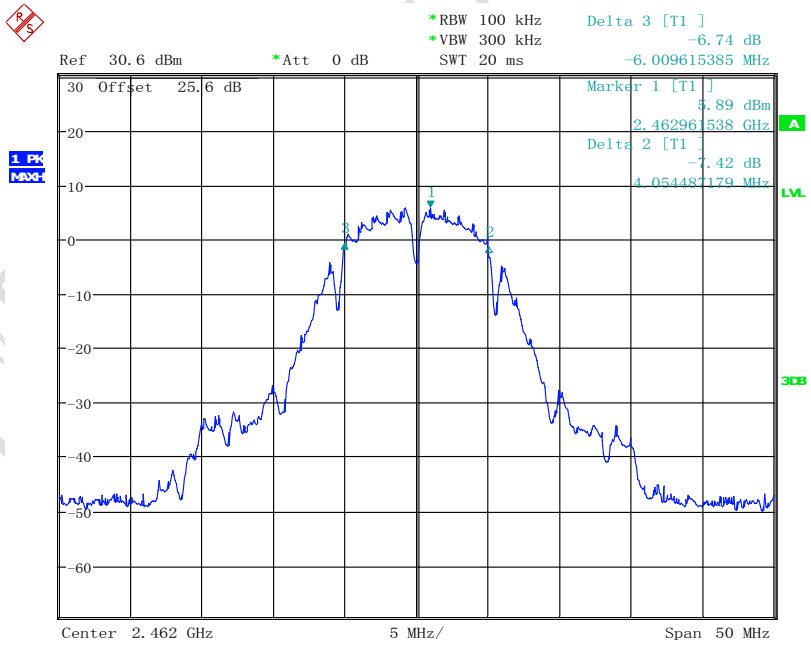
Date: 10.FEB.2015 11:30:05

Fig.103 6dB Bandwidth: Ch6,11n



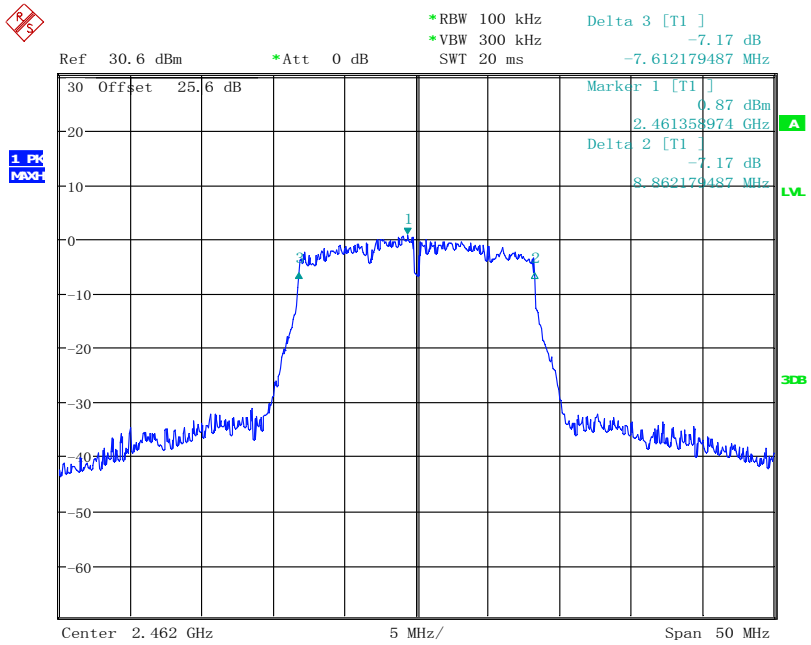
Date: 10.FEB.2015 11:26:57

Fig.104 6dB Bandwidth: Ch6,11n(40M)



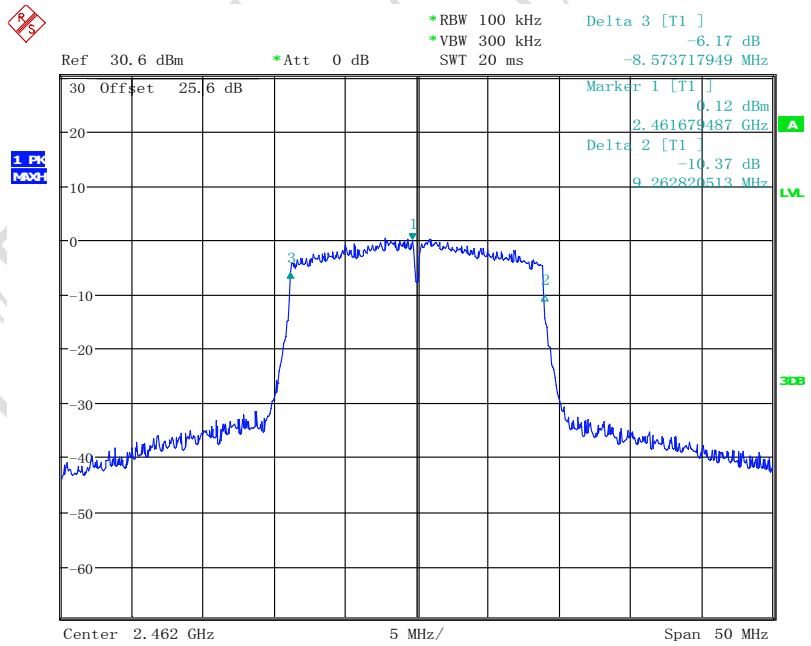
Date: 10.FEB.2015 11:32:41

Fig.105 6dB Bandwidth: Ch11,11b



Date: 10.FEB.2015 11:33:18

Fig.106 6dB Bandwidth: Ch11,11g



Date: 10.FEB.2015 11:36:24

Fig.107 6dB Bandwidth: Ch11,11n

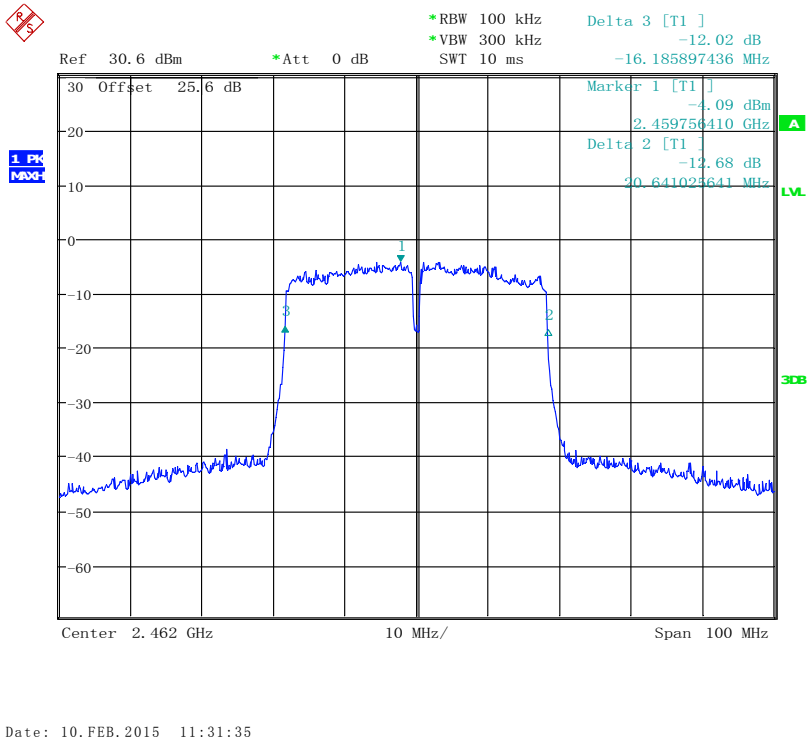


Fig.108 6dB Bandwidth: Ch11,11n(40M)

4.4 Frequency Band Edges

Date of Test	2015-04-09
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Test equipment Used:	

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESU40	100350	2015-03-07	Normal

4.4.1 Measurement Limit:

Standard	Limited(dBuV/m)	
FCC 47 CFR Part 15.247(d)	Peak	74
	Average	54

4.4.2 Test procedure

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

1. Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
2. Reference level offset: Corrected for gains and losses of test antenna factor, preamp gain and cable loss, so as to indicate field strength, in units of dBμV/m at 3 m, directly on the instrument display. Alternatively, the reference level offset may be set to zero and calculations shall be provided showing the conversion of raw measured data to thefield strength in dBμV/m at 3 m.
3. Reference level: As required to keep the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2..
4. Attenuation: Auto (at least 10 dB preferred).
5. Sweep time: Coupled.
6. Resolution bandwidth: Above 1 GHz: 1 MHz
7. Video bandwidth: VBW for Peak, Quasi-peak, or Average Detector Function: 3× RBW
8. Detector (unless specified otherwise): Peak and average above 1 GHz
9. Trace: Max hold for final measurement; a combination of two traces, clear-write and max hold, is recommended for maximizing the emission.

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4.4.3 Measurement results

802.11b/g mode

mode	Channel	Test Results(dBuV/m)			Conclusion
802.11b	1	Peak	2338.362MHz	51.069	Pass
		Average	2338.322MHz	41.179	
		Fig.109			
802.11b	11	Peak	2483.506MHz	40.527	Pass
		Average	2483.506MHz	30.550	
		Fig.110			
802.11g	1	Peak	2330.086MHz	50.564	Pass
		Average	2329.918MHz	38.653	
		Fig.111			
802.11g	11	Peak	2483.500MHz	41.343	Pass
		Average	2483.500MHz	31.243	
		Fig.112			

802.11n mode

mode	Channel	Test Results(dBuV/m)			Conclusion
802.11n（20MHz）	3	Peak	2330.226MHz	50.534	Pass
		Average	2329.596MHz	38.320	
		Fig.113			
802.11n（20MHz）	11	Peak	2483.500MHz	40.672	Pass
		Average	2483.500MHz	31.503	
		Fig.114			
802.11n（40MHz）	3	Peak	2330.058MHz	50.863	Pass
		Average	2329.369MHz	38.593	
		Fig.115			
802.11n（40MHz）	11	Peak	2483.500MHz	41.106	Pass
		Average	2483.500MHz	31.238	
		Fig.116			

Conclusion: PASS

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Test figure as below:

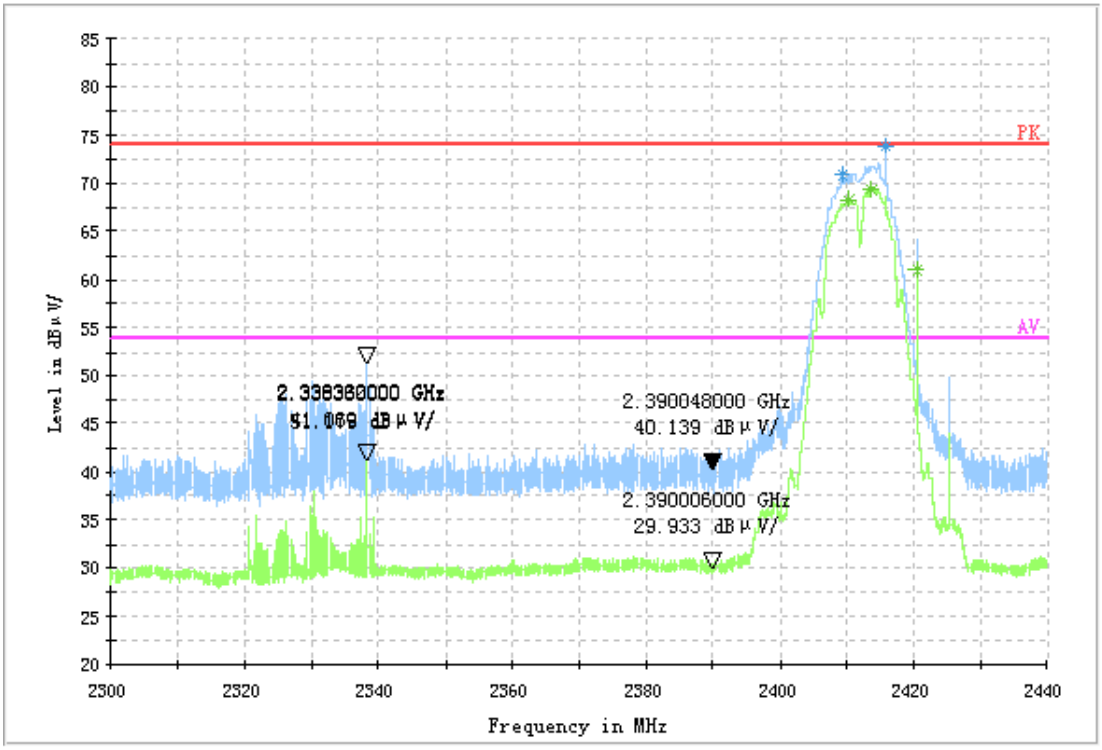

Fig.109 Frequency Band Edge: Ch1,11b

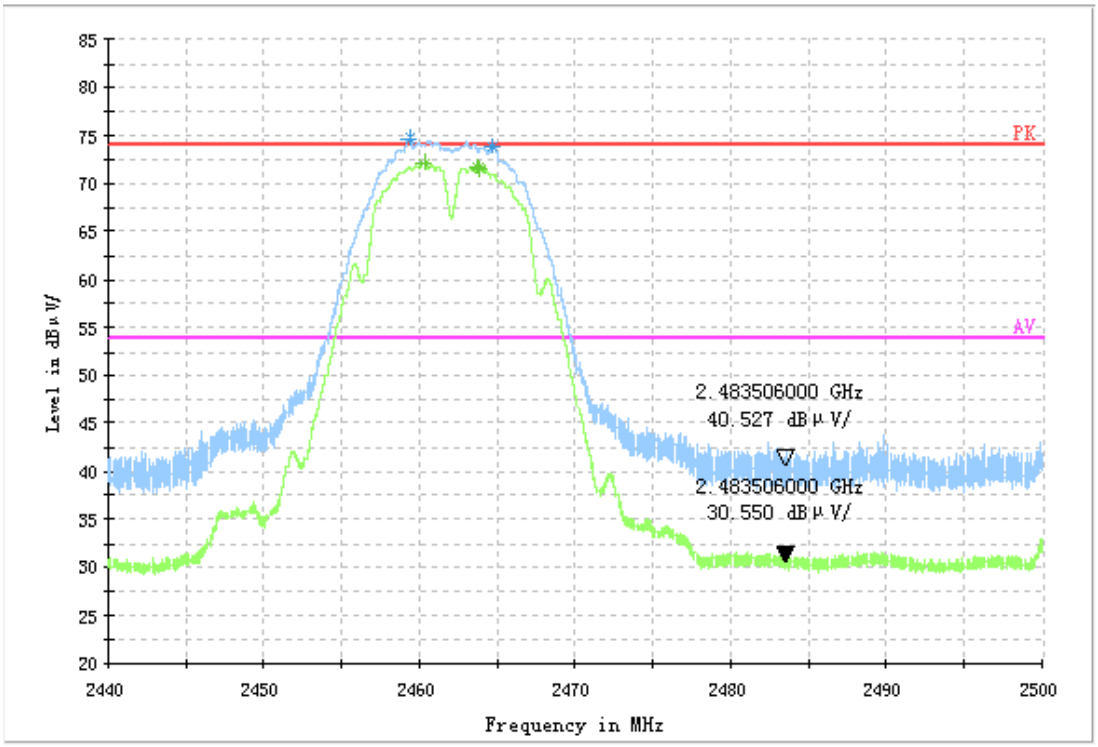

Fig.110 Frequency Band Edge: Ch11,11b

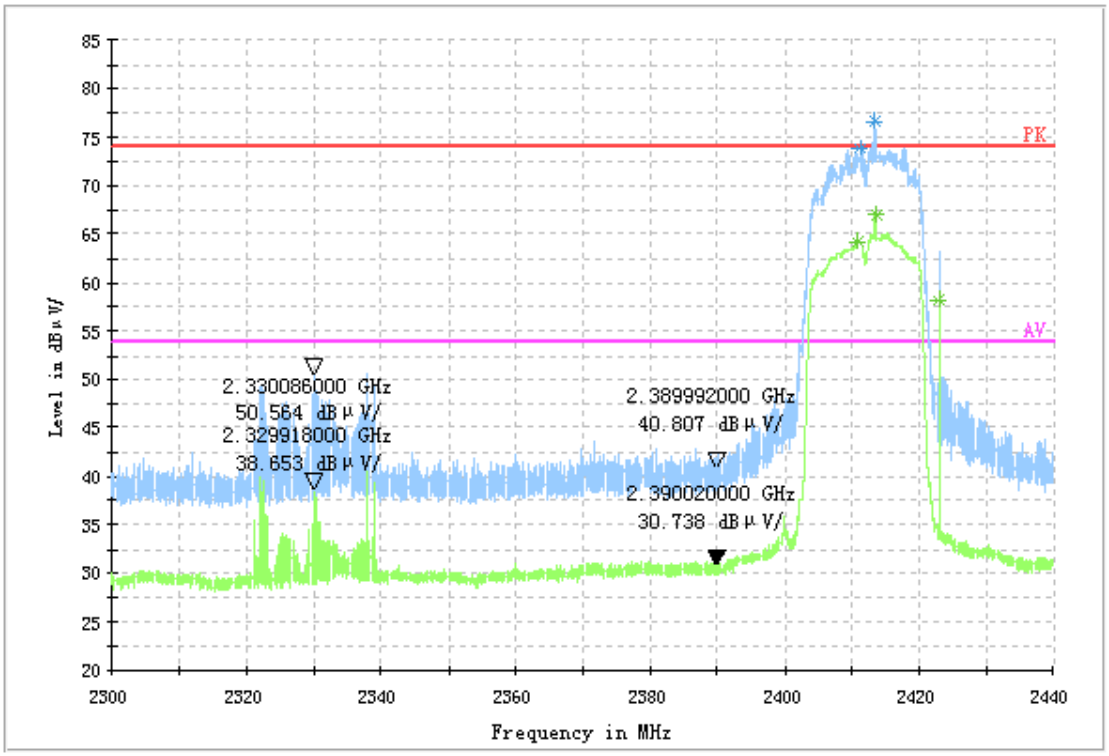

Fig.111 Frequency Band Edge: Ch1,11g

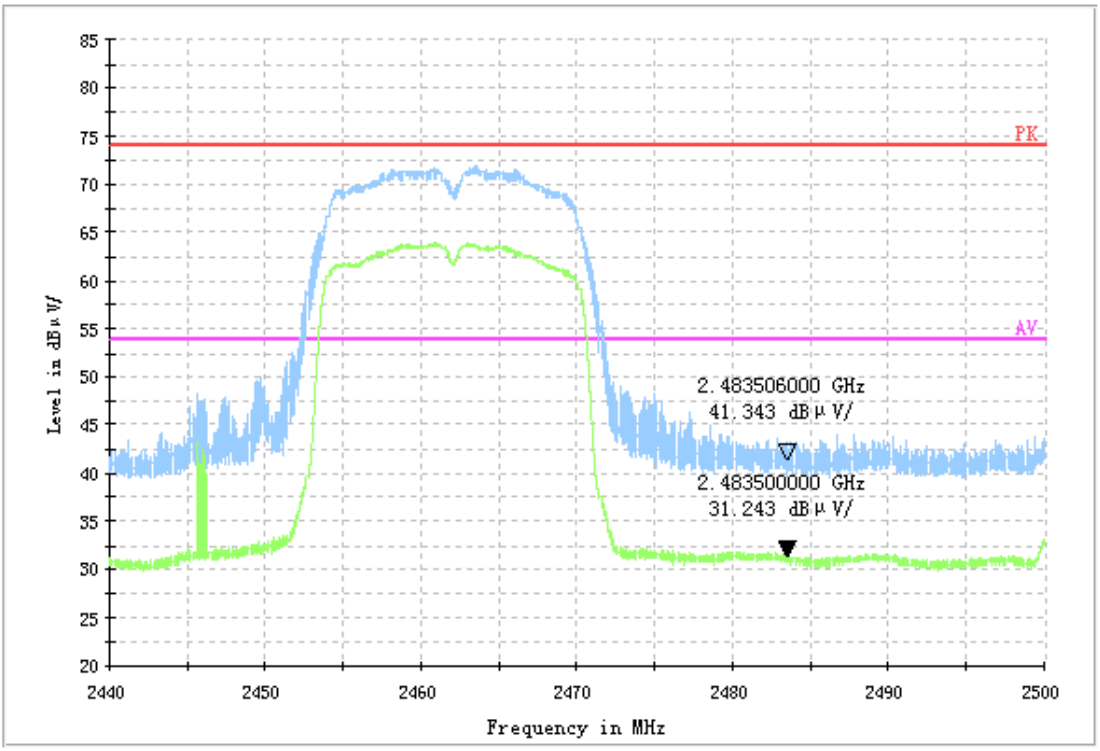

Fig.112 Frequency Band Edge: Ch11,11g

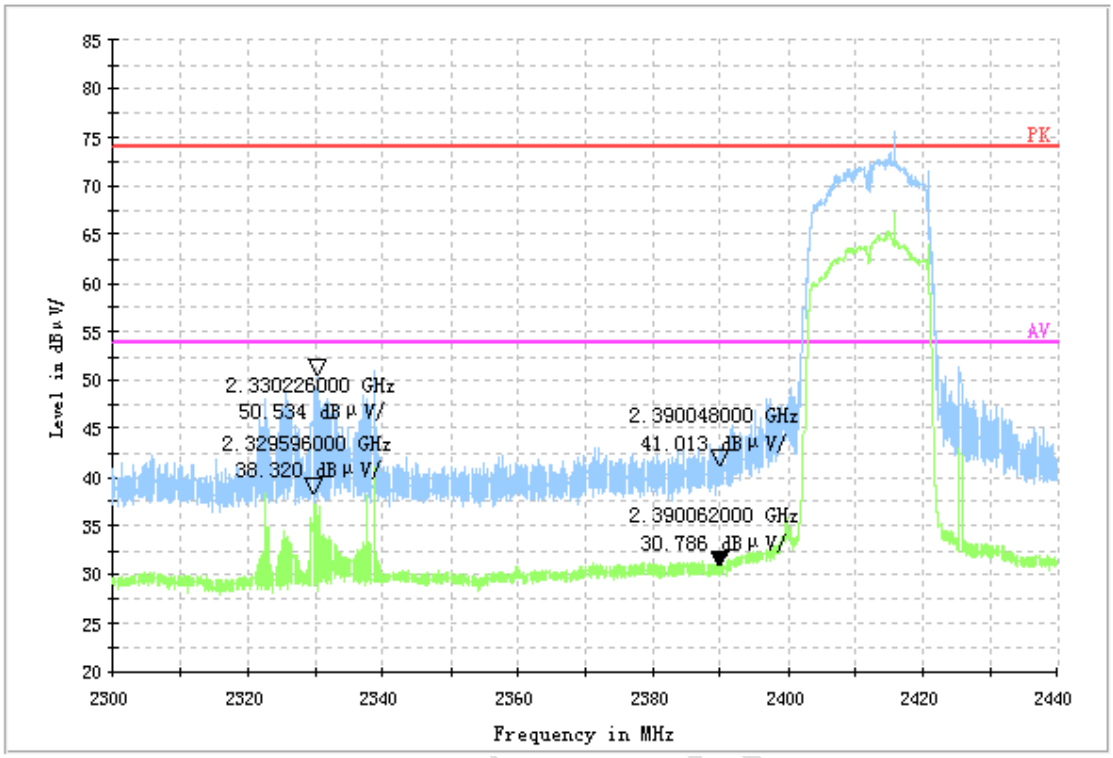

Fig.113 Frequency Band Edge: Ch3,11n(20MHz)

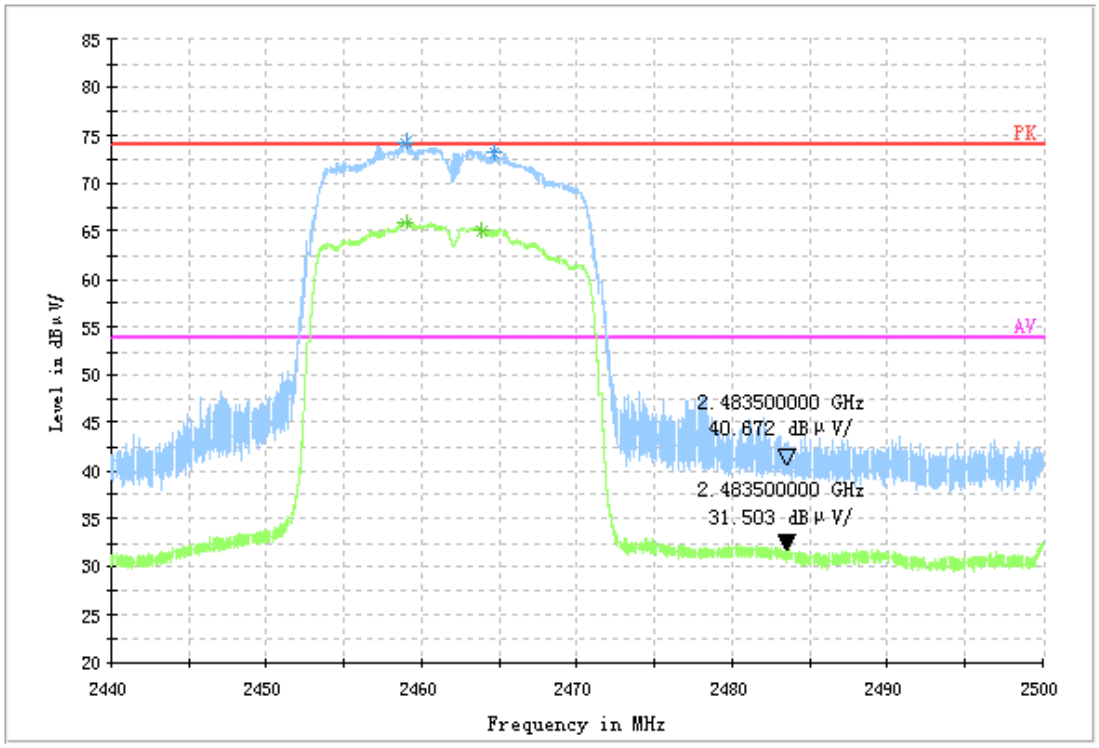

Fig.114 Frequency Band Edge: Ch11,11n(20MHz)

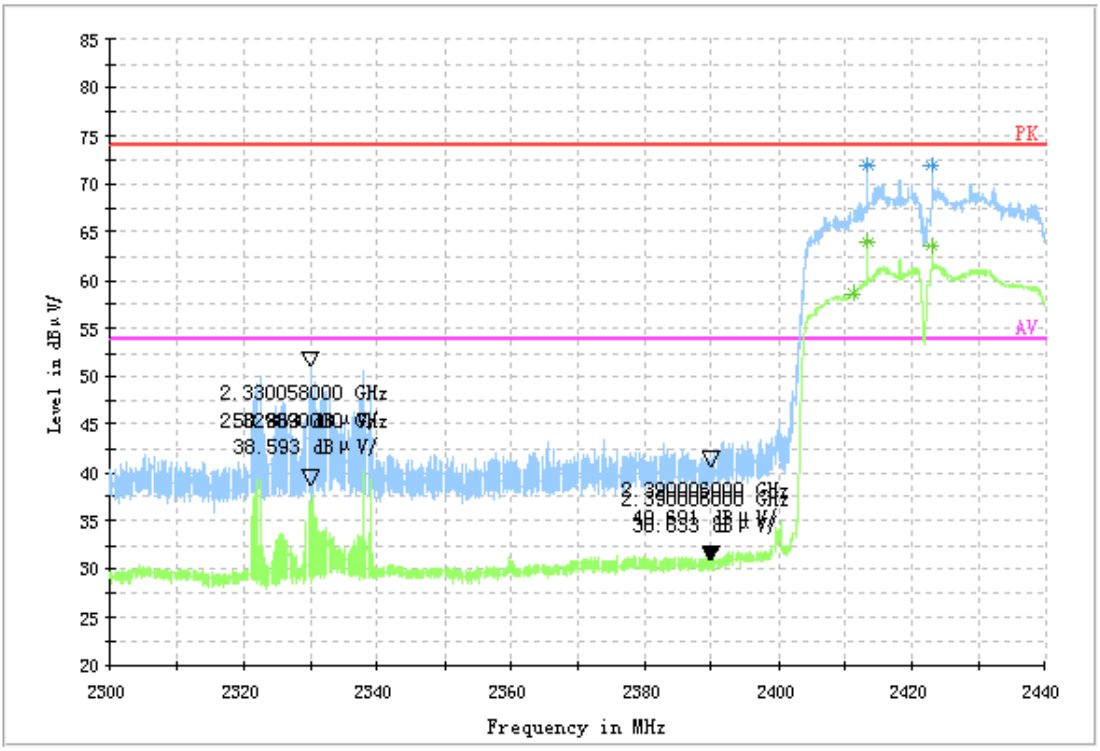

Fig.115 Frequency Band Edge: Ch3,11n(40M)

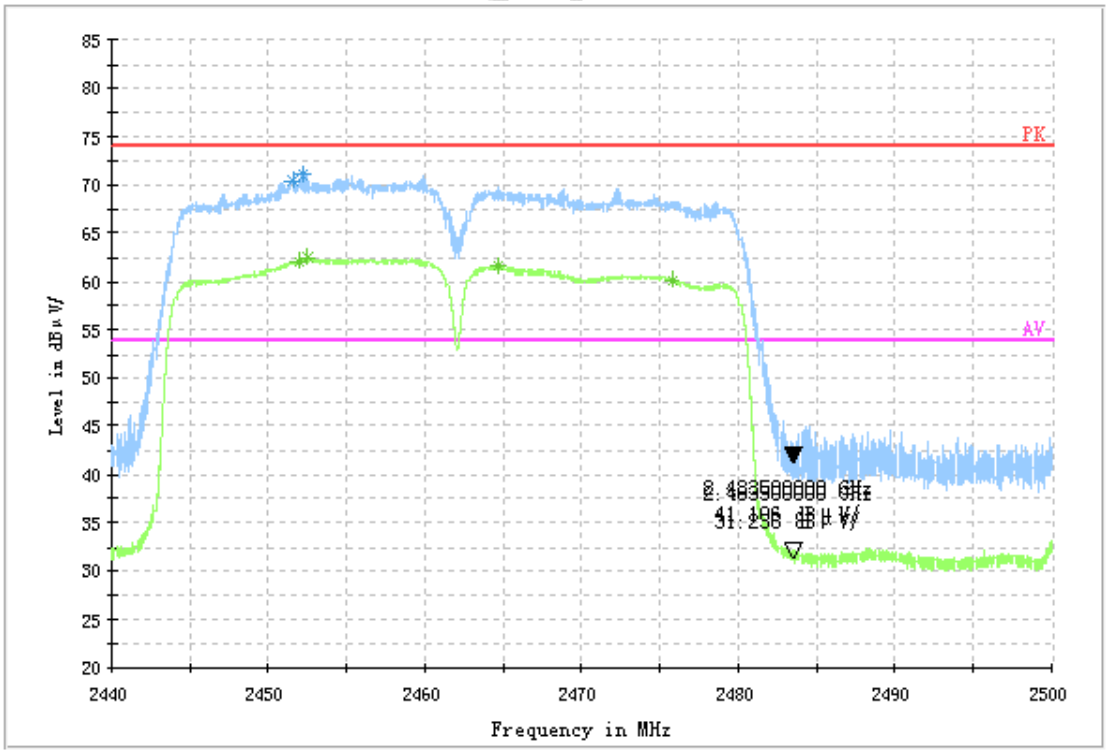

Fig.116 Frequency Band Edge: Ch11,11n(40M)

4.5 Conducted Emission

Date of Test	2015-02-10
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass
Test equipment Used:	

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESU40	100350	2015-03-07	Normal

4.5.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

4.5.2 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.

4.5.3 Measurement Results:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412GHz	Fig.117	P
		30MHz~26GHz	Fig.118	P
	6	2.437GHz	Fig.119	P
		30MHz~26GHz	Fig.120	P
	11	2.462GHz	Fig.121	P
		30MHz~26GHz	Fig.122	P
802.11g	1	2.412GHz	Fig.123	P
		30MHz~26GHz	Fig.124	P
	6	2.437GHz	Fig.125	P
		30MHz~26GHz	Fig.126	P
	11	2.462GHz	Fig.127	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	1	2.412GHz	Fig.128	P
		30MHz~26GHz	Fig.129	P
	6	2.437GHz	Fig.130	P
		30MHz~26GHz	Fig.131	P
	11	2.462GHz	Fig.132	P
		30MHz~26GHz	Fig.133	P
802.11n(40MHz)	1	2.422GHz	Fig.134	P
		30MHz~26GHz	Fig.135	P
	6	2.442GHz	Fig.136	P
		30MHz~26GHz	Fig.137	P
	11	2.462GHz	Fig.138	P

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		30MHz~26GHz	Fig.139	P

Conclusion: PASS

Test figure as below:

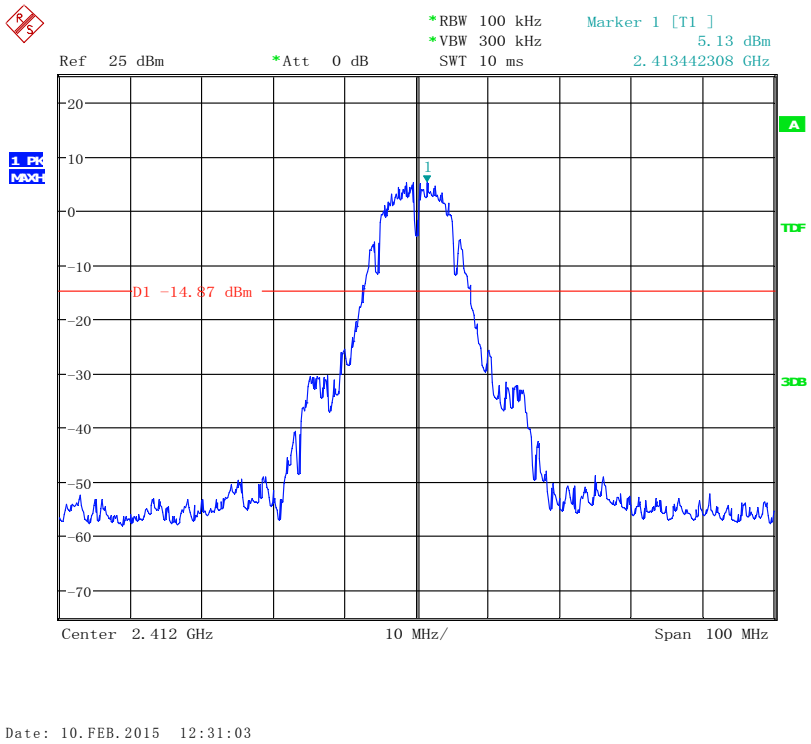


Fig.117 Conducted spurious emission: Ch1,11b,2412MHz

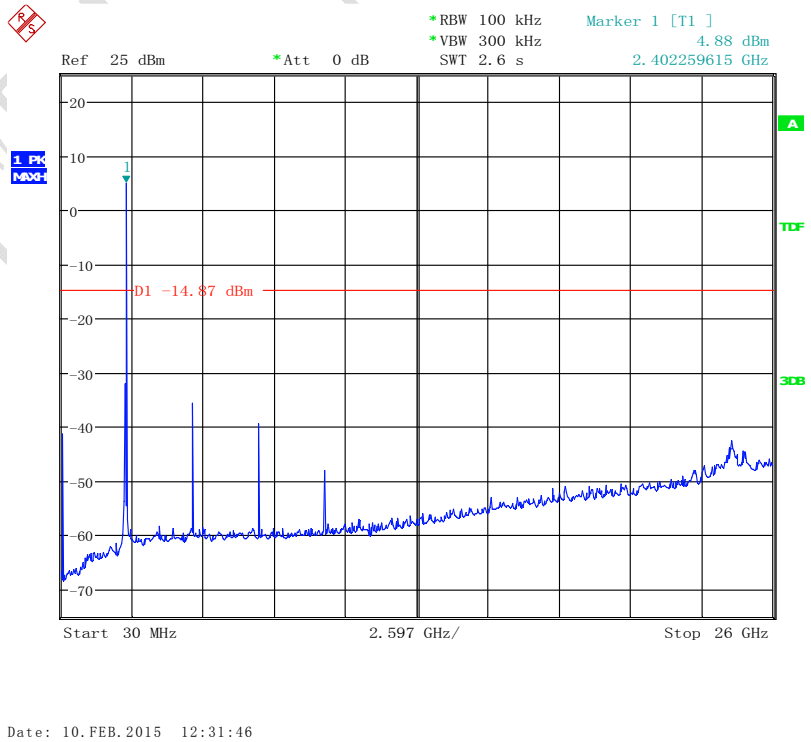


Fig.118 Conducted spurious emission: Ch1,11b,30MHz~26GHz

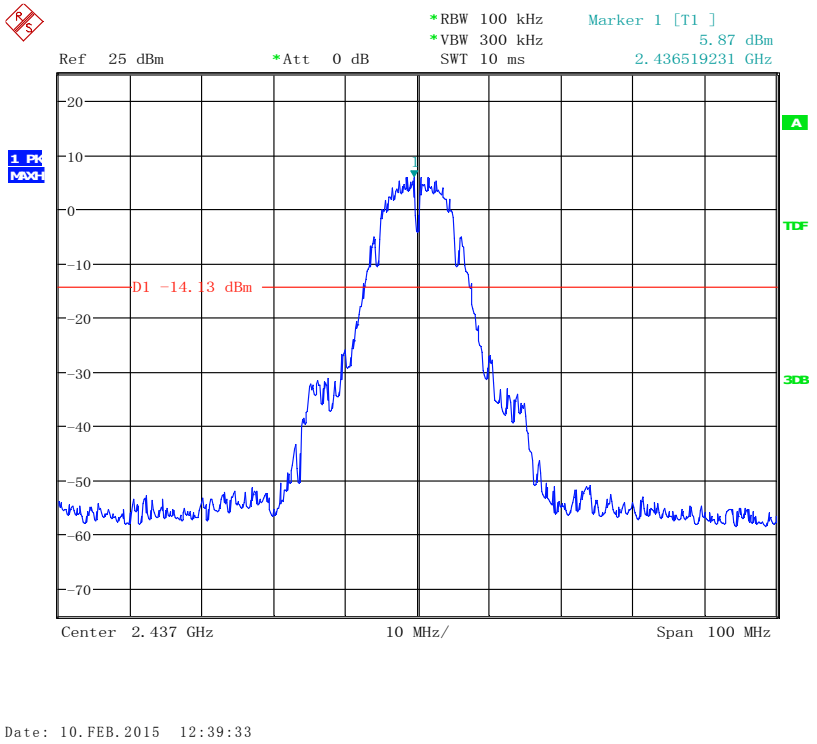


Fig.119 Conducted spurious emission: Ch6,11b,2437MHz

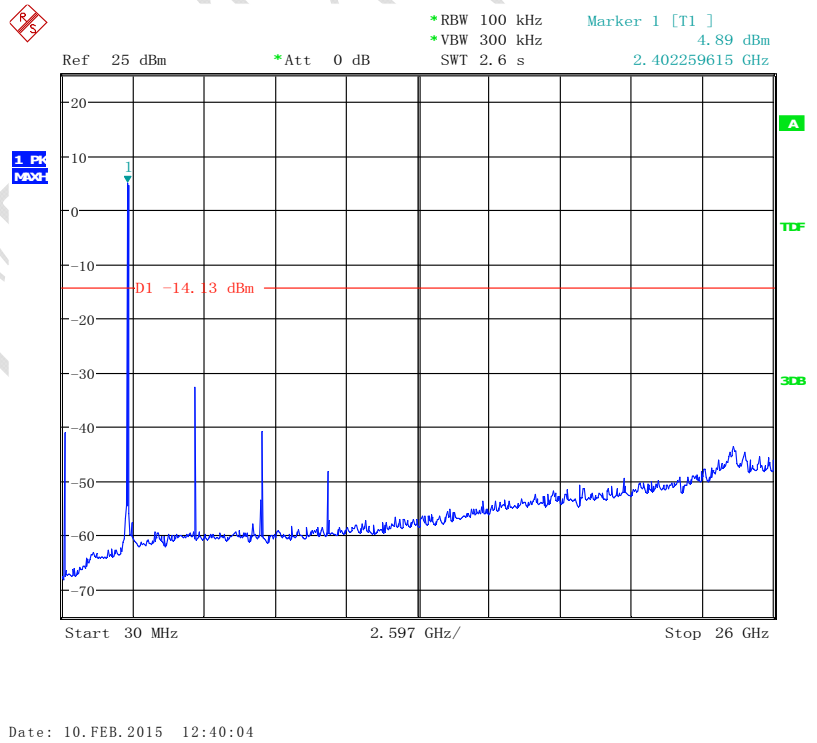


Fig.120 Conducted spurious emission: Ch6,11b,30MHz~26GHz

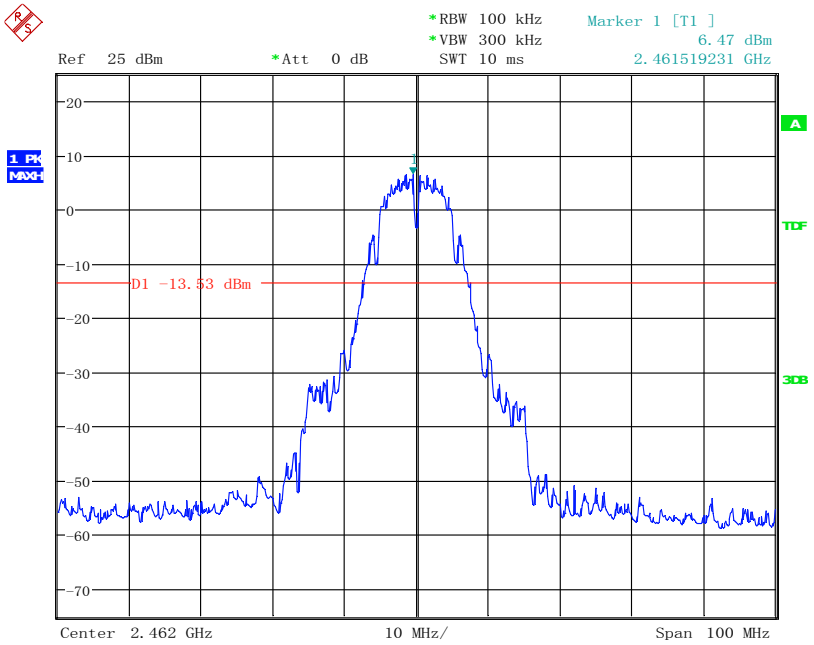


Fig.121 Conducted spurious emission: Ch11,11b,2462MHz

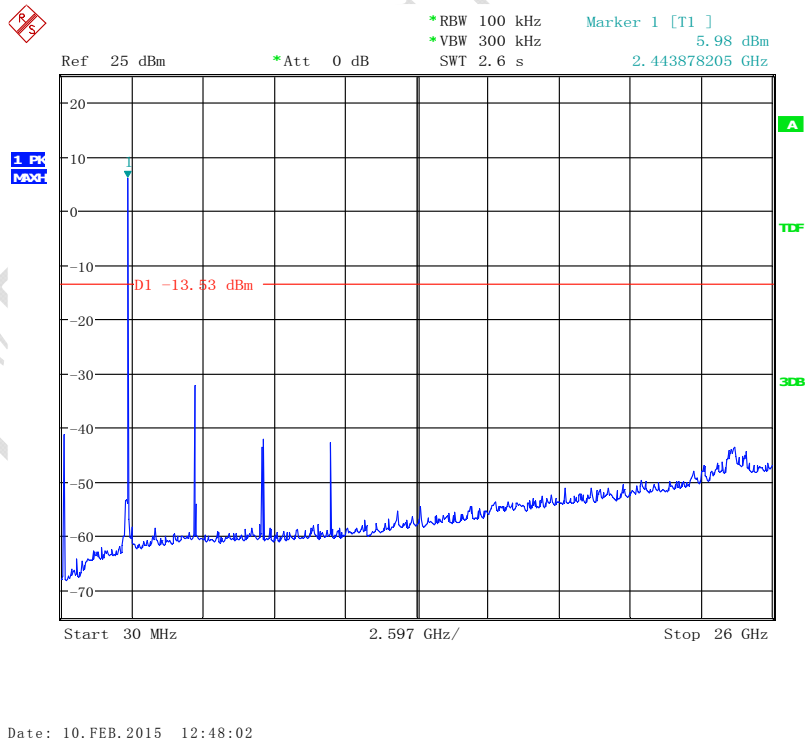


Fig.122 Conducted spurious emission: Ch11,11b,30MHz~26GHz

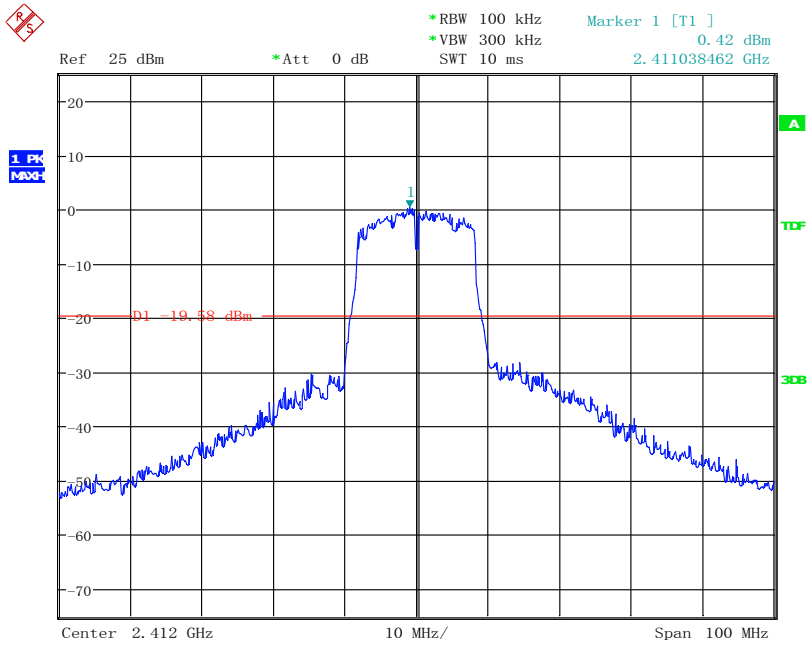


Fig.123 Conducted spurious emission: Ch1,11g,2412MHz

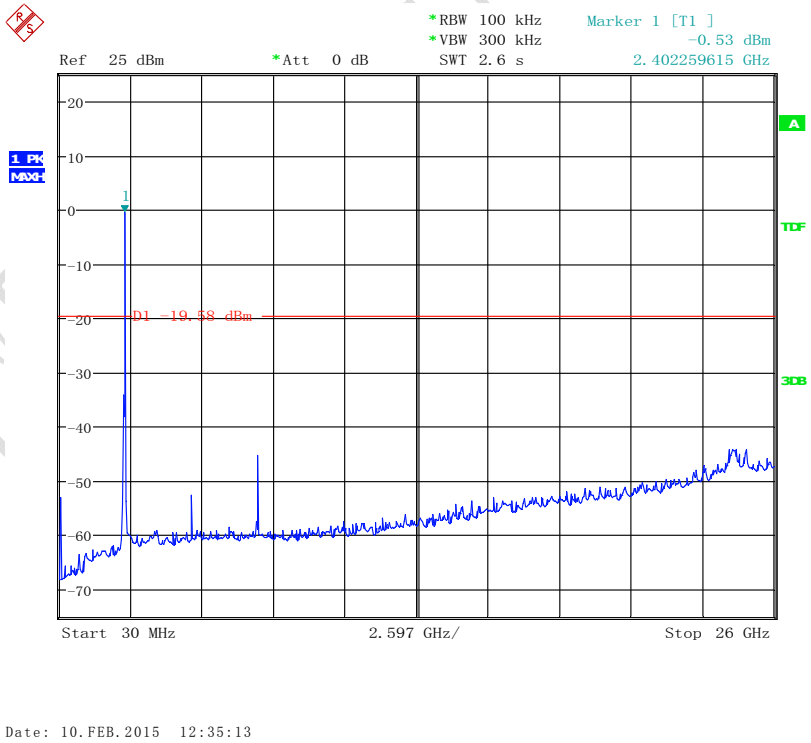


Fig.124 Conducted spurious emission: Ch1,11g,30MHz~26GHz

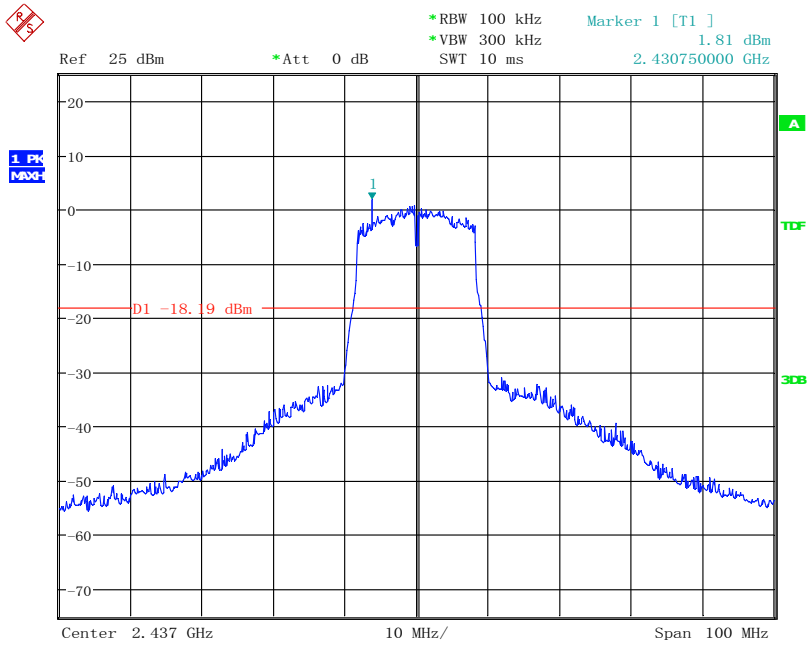


Fig.125 Conducted spurious emission: Ch6,11g,2437MHz

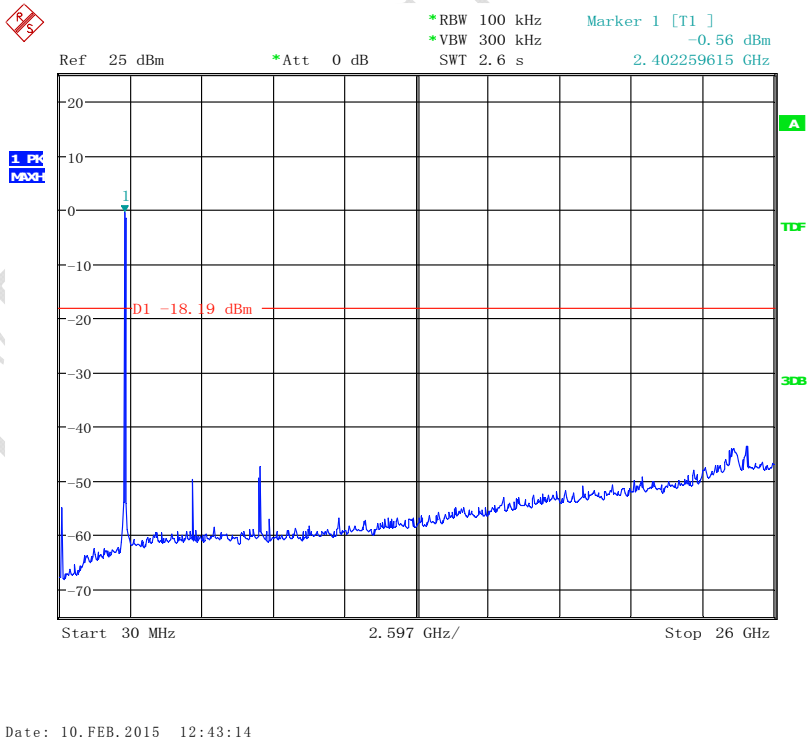
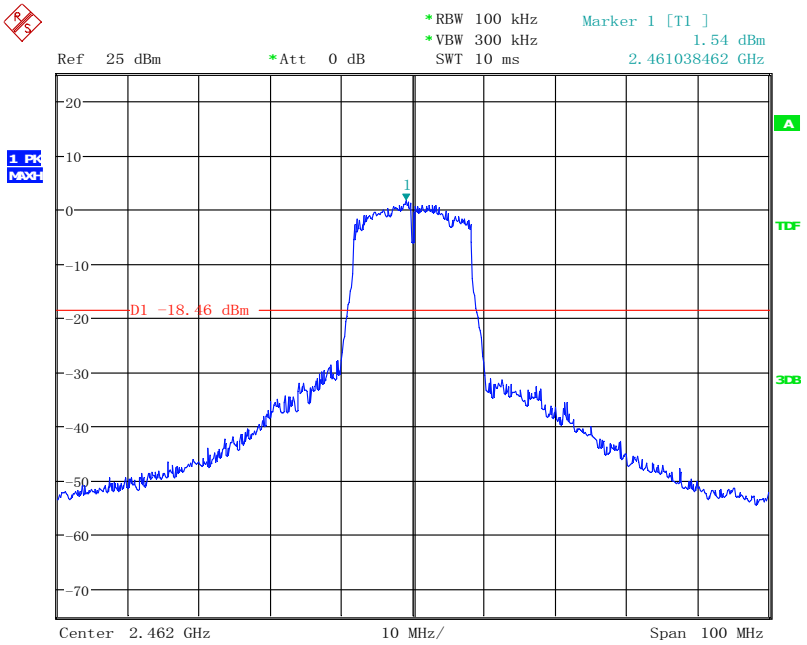
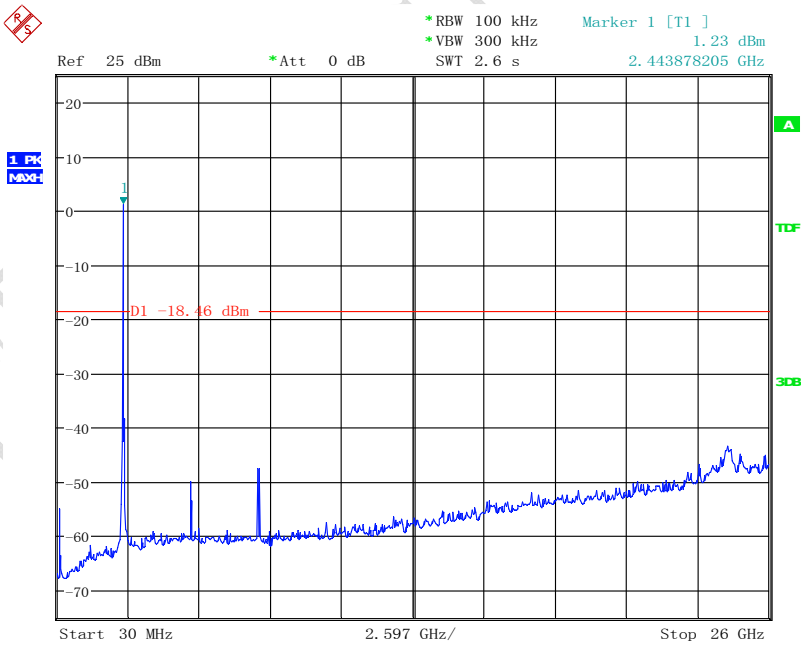


Fig.126 Conducted spurious emission: Ch6,11g,30MHz~26GHz



Date: 10.FEB.2015 12:48:45

Fig.127 Conducted spurious emission: Ch11,11g,2462MHz



Date: 10.FEB.2015 12:49:09

Fig.128 Conducted spurious emission: Ch11,11g,30MHz~26GHz

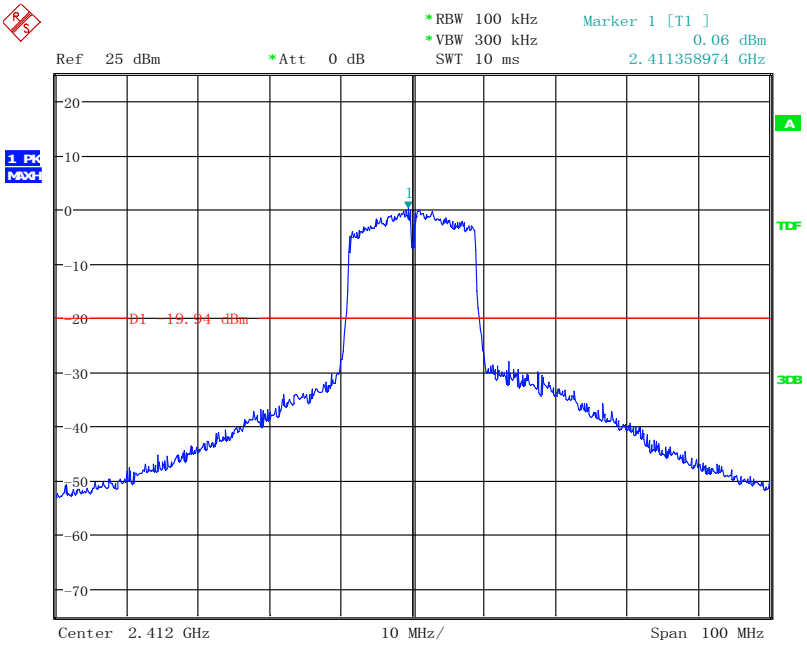


Fig.129 Conducted spurious emission: Ch1,11n,2412MHz

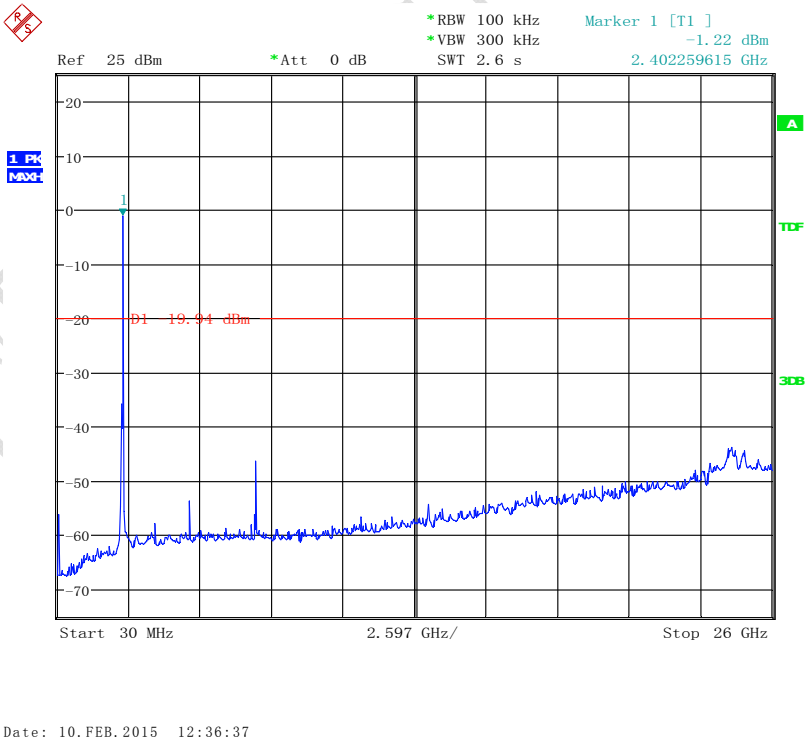


Fig.130 Conducted spurious emission: Ch1,11n,30MHz~26GHz

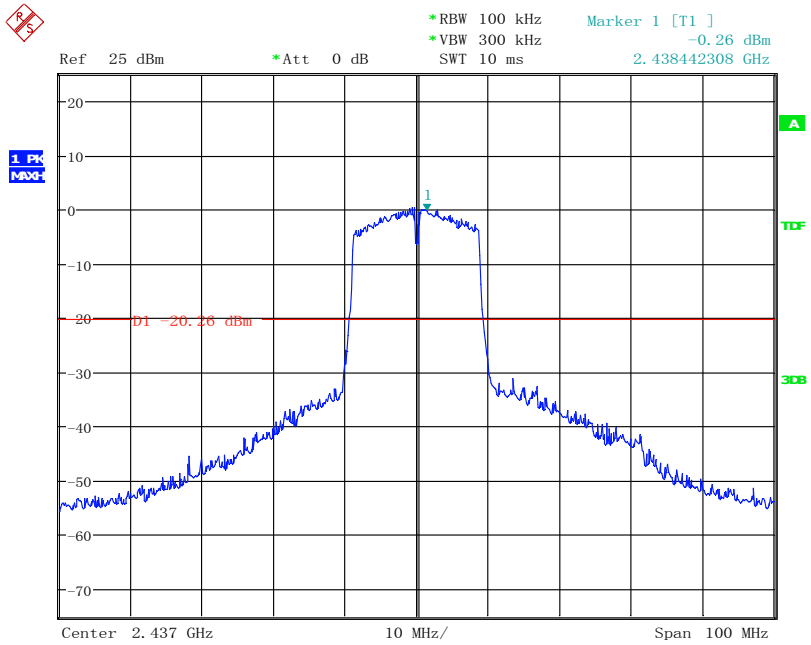


Fig.131 Conducted spurious emission: Ch6,11n,2437MHz

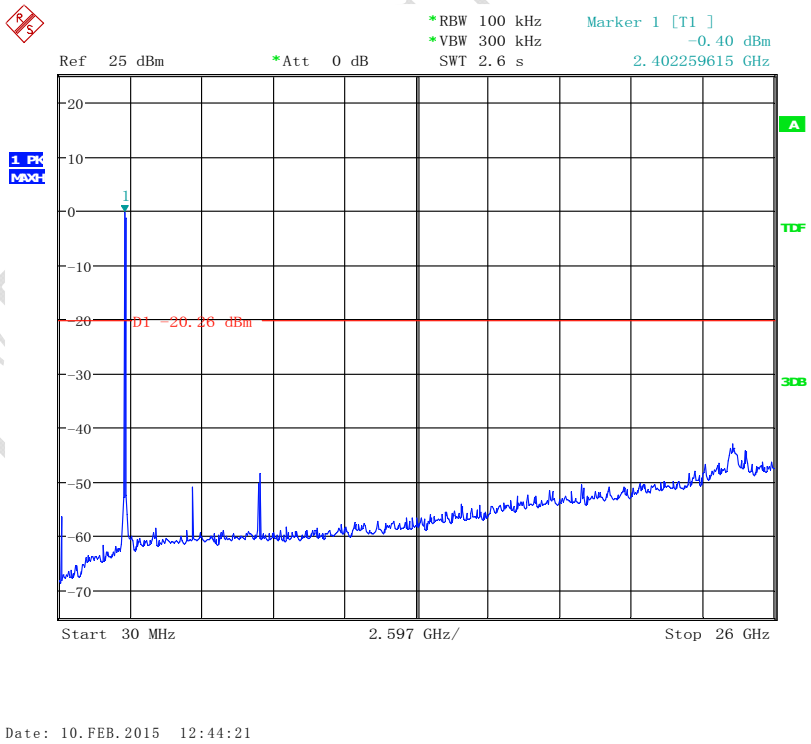


Fig.132 Conducted spurious emission: Ch6,11n,30MHz~26GHz

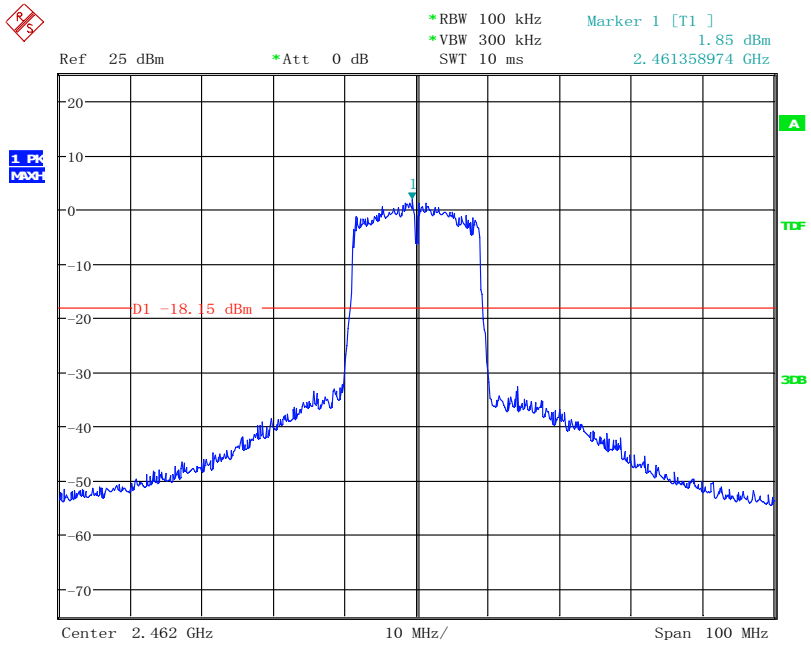


Fig.133 Conducted spurious emission: Ch11,11n,2462MHz

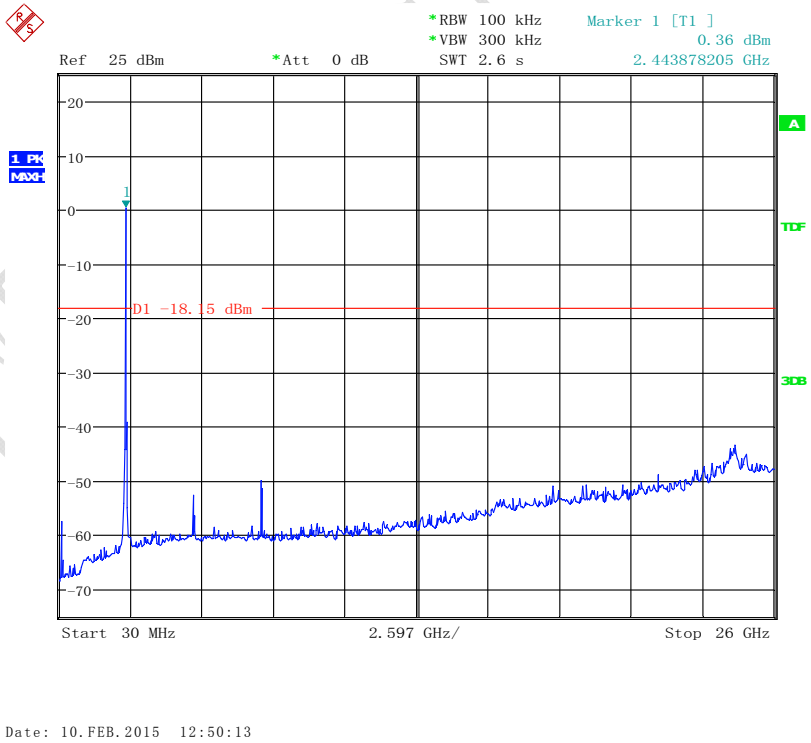
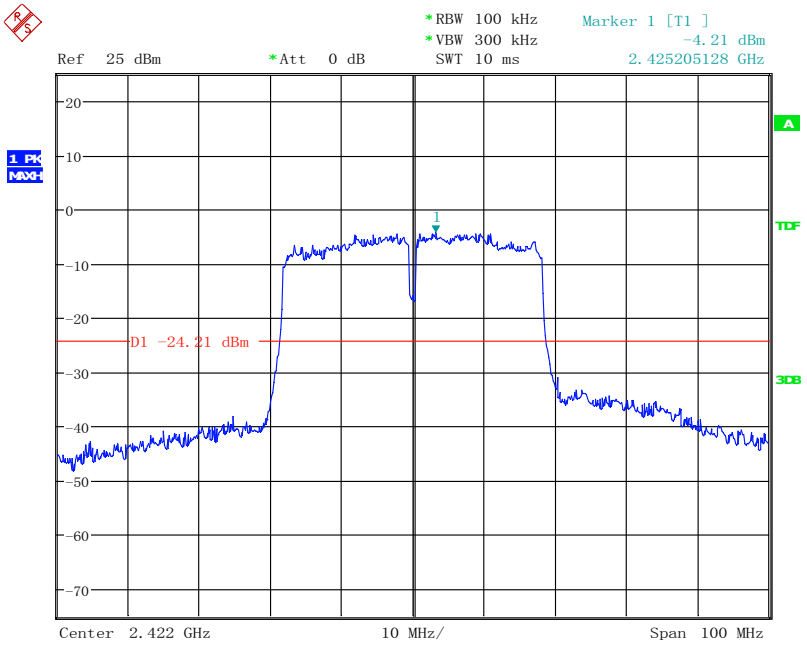
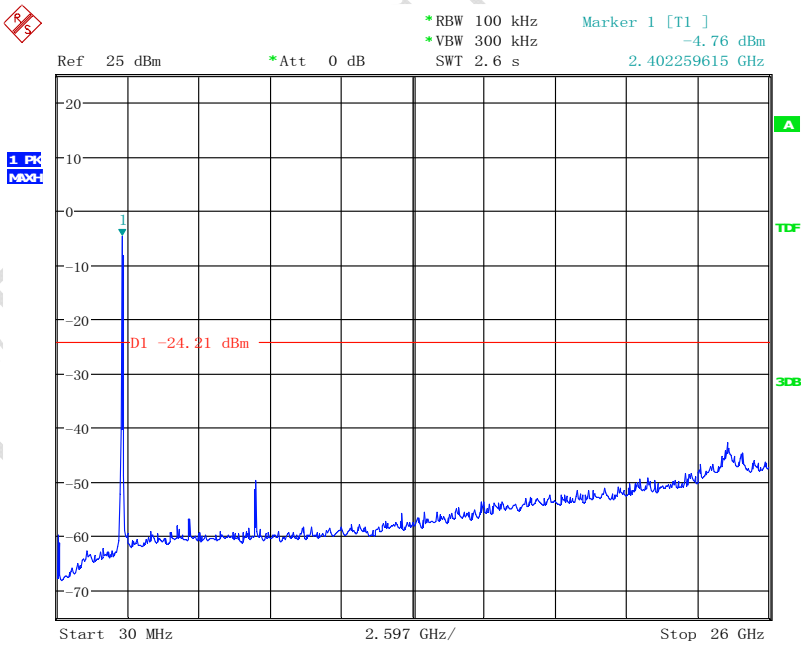


Fig.134 Conducted spurious emission: Ch11,11n,30MHz~26GHz



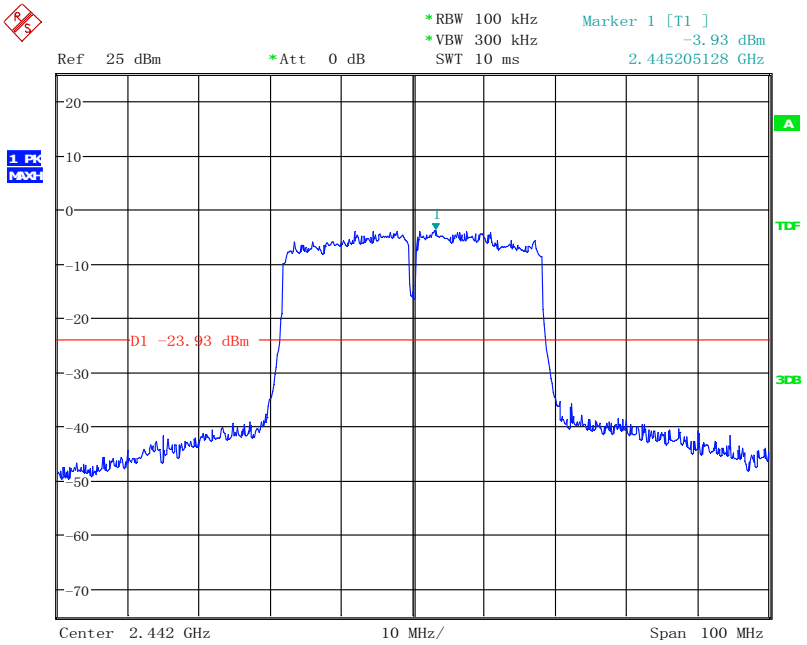
Date: 10.FEB.2015 12:38:07

Fig.135 Conducted spurious emission: Ch1,11n(40M),2422MHz



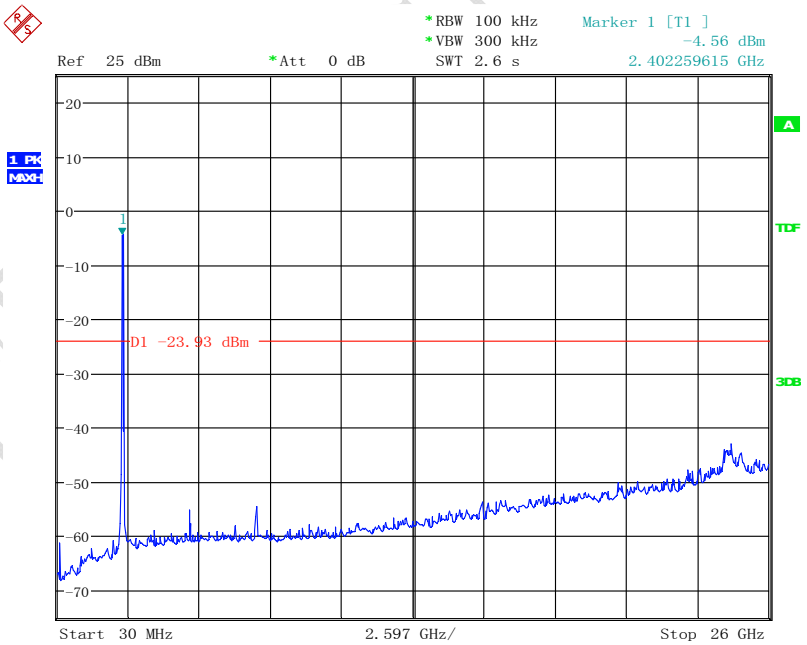
Date: 10.FEB.2015 12:38:33

Fig.136 Conducted spurious emission: Ch1,11n(40M),30MHz~26GHz



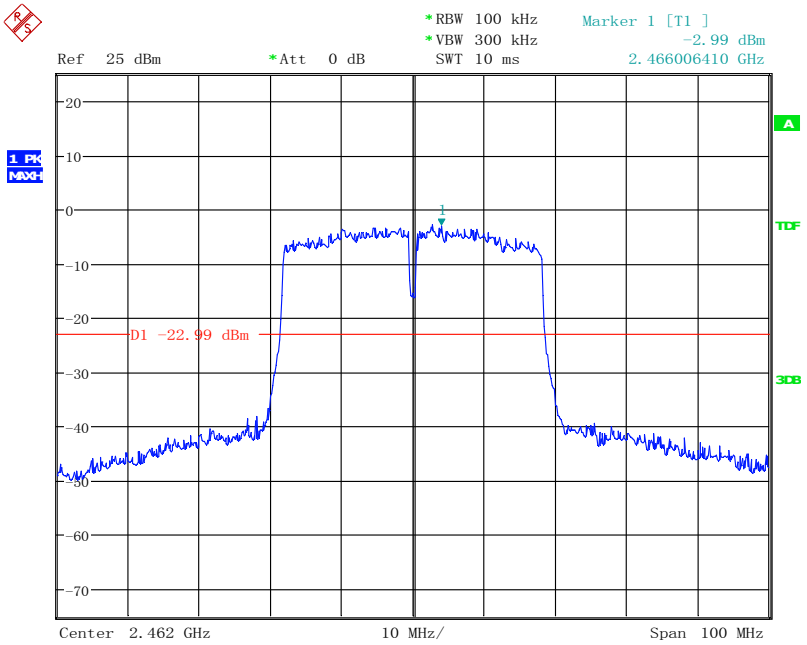
Date: 10.FEB.2015 12:45:53

Fig.137 Conducted spurious emission: Ch6,11n(40M),2442MHz



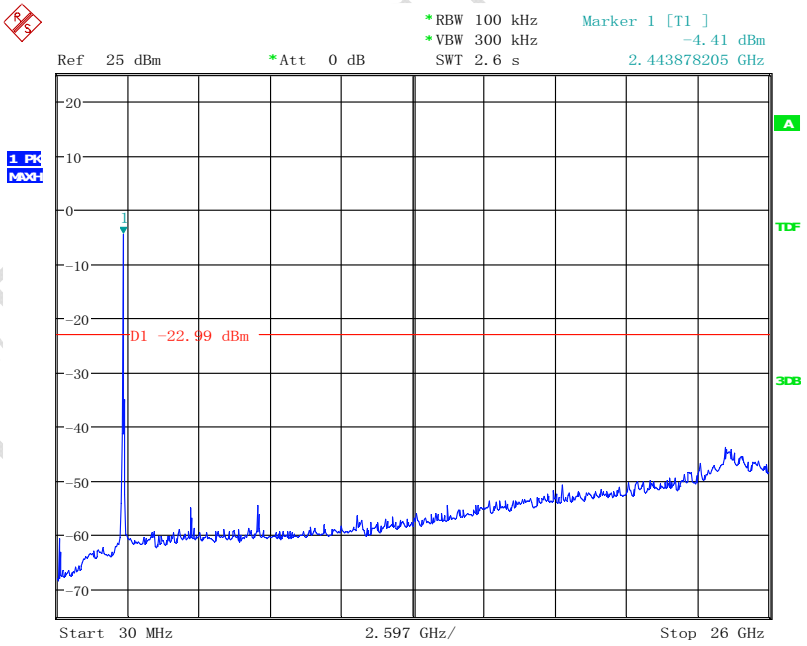
Date: 10.FEB.2015 12:46:15

Fig.138 Conducted spurious emission: Ch6,11n(40M),30MHz~26GHz



Date: 10.FEB.2015 12:51:00

Fig.139 Conducted spurious emission: Ch11,11n(40M),2462MHz



Date: 10.FEB.2015 12:51:25

Fig.140 Conducted spurious emission: Ch11,11n(40M),30MHz~26GHz

4.6 Radiated Emission Measurement

Date of Test	2015-02-12
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Test equipment Used:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R&S	ESIB26	100211	2016-01-12	Normal
2	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2015-11-16	Normal
3	BLUETOOTH TESTER	R/S	CBT	100657	2016-01-28	Normal
4	Loop Antenna	R&S	HFH2-Z2	836553/001	2015-08-23	Normal
5	Double-Ridged Horn Antenna	R&S	HF906	100037	2015-11-17	Normal
6	Ultra Broad Antenna	Schwarzbeck	Vulb9160	Vulb9160-3252	2015-11-24	Normal
7	Horn Antenna	ETS	3160-09	1247	2015-11-17	Normal
8	Biconical VHF-UHF test Antenna	Schwarzbeck	VUBA9117	Vulb9160-05	2015-11-24	Normal
9	Double-Ridged Horn Antenna	R/S	HF906	100036	2015-11-17	Normal
10	Signal Generator	R/S	SMR27	100003	2016-01-18	Normal

4.6.1 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 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

Limit in restricted band:

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

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4.6.2 Test Method

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 non-conducting 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 C63.10-2013 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 the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

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

4.6.3 Measurement Results:

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.

The measurement results are obtained as described below:

A_{Rpi}= Cable loss + Antenna Gain-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

Channel	Frequency Range	Test Results	Conclusion
Ch1	30MH~1GHz	Fig.1	P
	1GHz~3GHz	Fig.2	P
	3GHz~18GHz	Fig.3	P

Channel	Frequency Range	Test Results	Conclusion
Ch6	30MH~1GHz	Fig.4	P
	1GHz~3GHz	Fig.5	P
	3GHz~18GHz	Fig.6	P

Channel	Frequency Range	Test Results	Conclusion
Ch11	30MH~1GHz	Fig.7	P
	1GHz~3GHz	Fig.8	P
	3GHz~18GHz	Fig.9	P
All channels	18GHz~26GHz	Fig.10	P

Ch1 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
43.113000	23.9	-24.7	48.6	V
45.811000	30.6	-24.7	55.3	V
85.969000	21.6	-27.4	49.0	H

Ch1 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2663.000000	46.0	1.9	47.9	H
2848.200000	47.2	2.8	50.0	V
2944.800000	47.2	3.1	50.3	V

Ch1 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4819.800000	56.4	-1.6	58.0	H
7229.175000	72.6	1.7	70.9	H

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12055.425000	60.2	6.7	53.5	H

Ch6 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
43.113000	25.6	-24.7	52.3	V
45.717000	34.9	-24.7	58.9	V
86.175000	23.3	-27.3	53.6	H

Ch6 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2258.600000	43.0	-1.1	44.1	V
2465.000000	48.0	0.8	47.2	V
2822.200000	46.9	2.7	44.2	V

Ch6 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4876.200000	61.7	-1.4	63.1	H
7316.925000	72.2	1.6	70.6	V
12183.350000	61.3	6.5	54.8	H

Ch11 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
43.113000	27.6	-24.7	52.3	V
46.002000	34.2	-24.7	58.9	V
181.999000	26.1	-27.5	53.6	H

Ch11 1GHz-3GHz

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Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2447.400000	53.9	0.5	53.4	V
2591.600000	45.9	1.6	44.3	V
2822.400000	47.3	2.7	43.6	V

Ch11 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4922.400000	60.1	-1.0	61.1	H
7383.075000	72.6	1.7	70.9	V
12304.525000	52.8	6.9	45.9	H

All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97	42.03	V
20684.980000	47.7	6.97	40.73	H
22119.789000	45.3	3.05	42.05	V
23627.899000	43.8	3.05	40.75	H
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	H

Note: all the test data shown was peak detected.
Conclusion: PASS
Test graphs as below:

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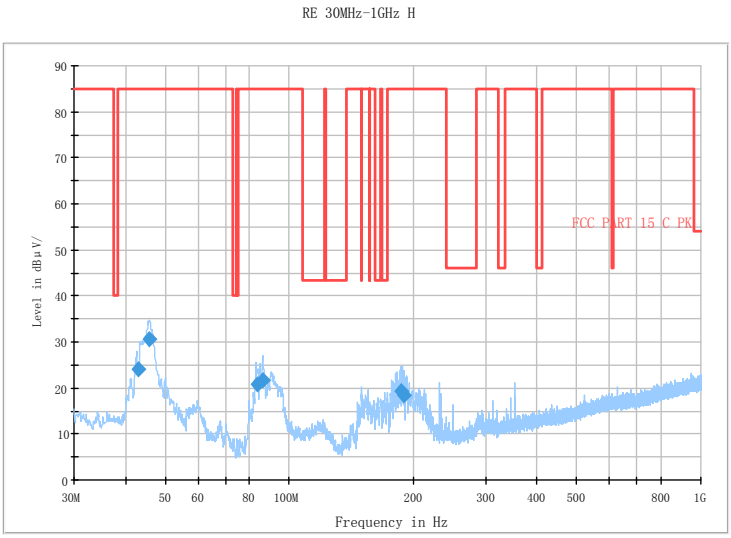


Fig.1 Radiated emission: Ch1, 30MHz~1GHz

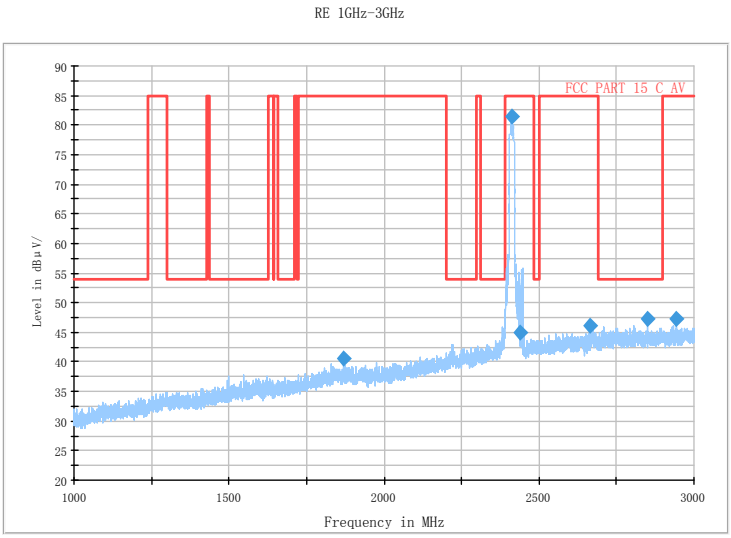


Fig.2 Radiated emission: Ch1, 1GHz~3GHz

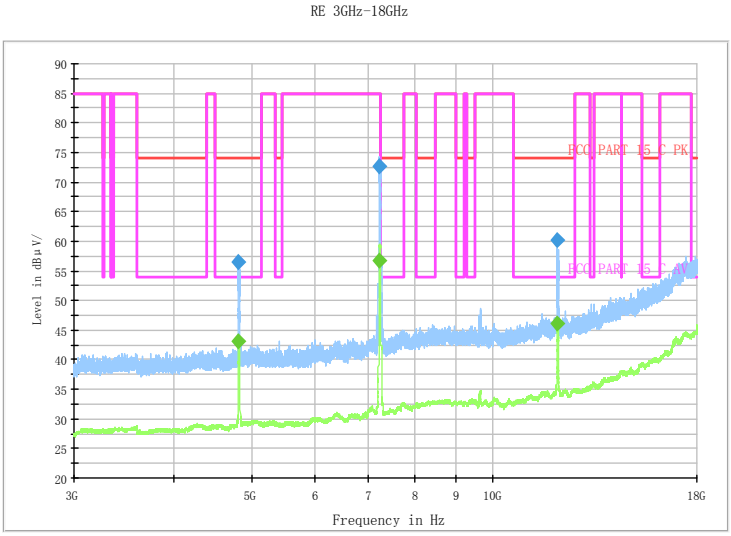


Fig.3 Radiated emission: Ch1, 3GHz~18GHz

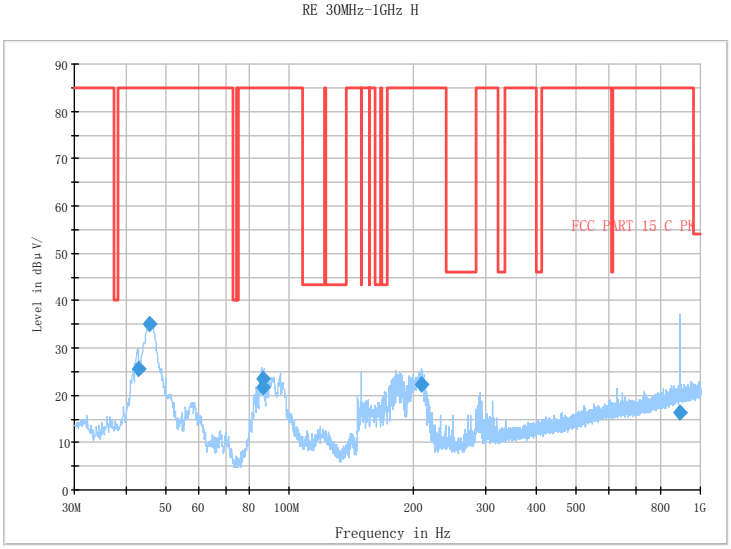


Fig.4 Ch6, 30MHz~1GHz

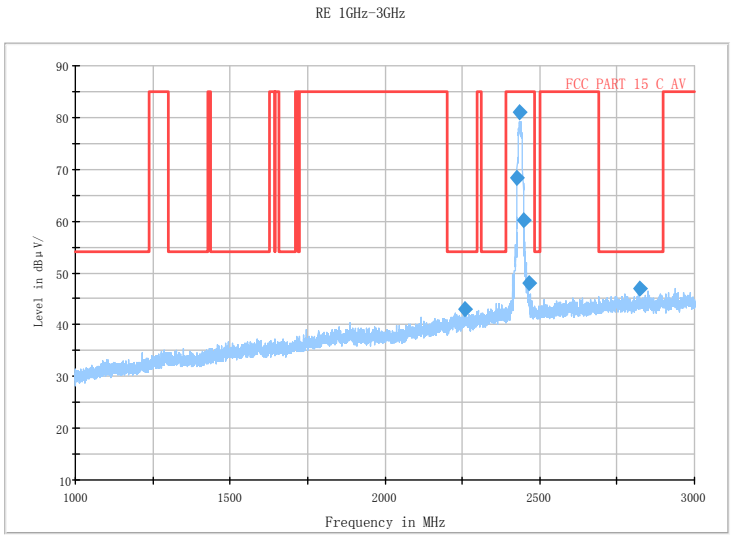


Fig.5 Radiated emission: Ch6, 1GHz~3GHz

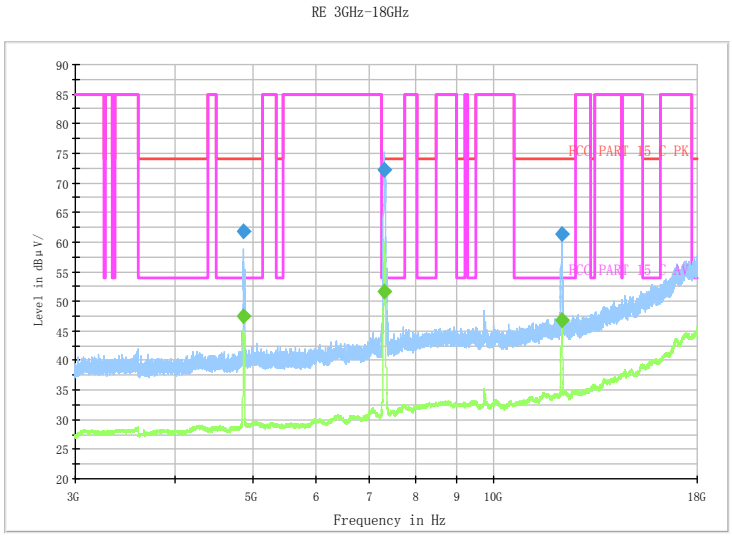


Fig.6 Radiated emission: Ch6, 3GHz~18GHz

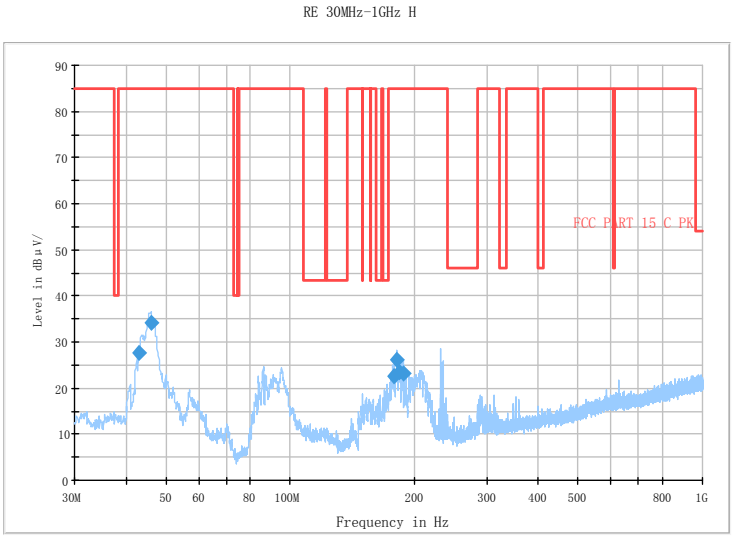


Fig.7 Radiated emission: Ch11, 30MHz~1GHz

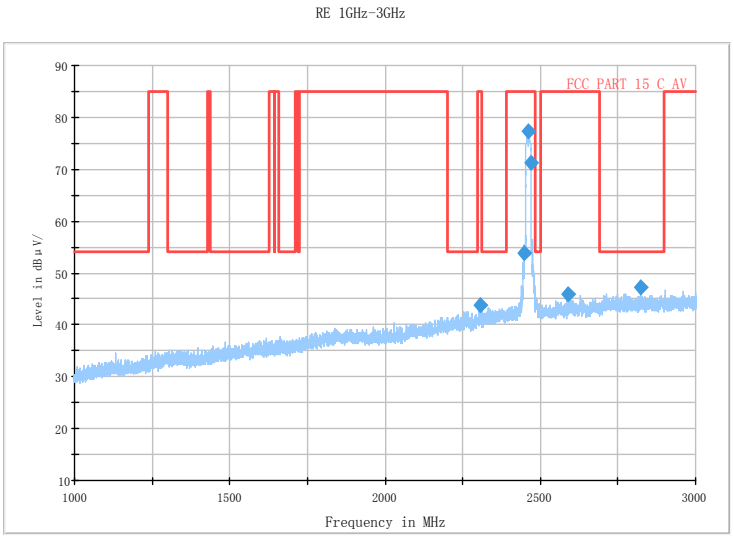


Fig.8 Radiated emission: Ch11, 1GHz~3GHz

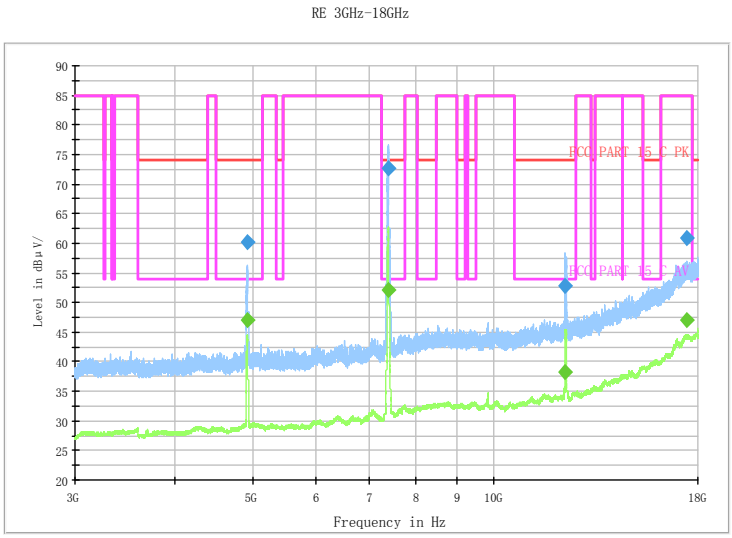


Fig.9 Radiated emission: Ch11, 3GHz~18GHz

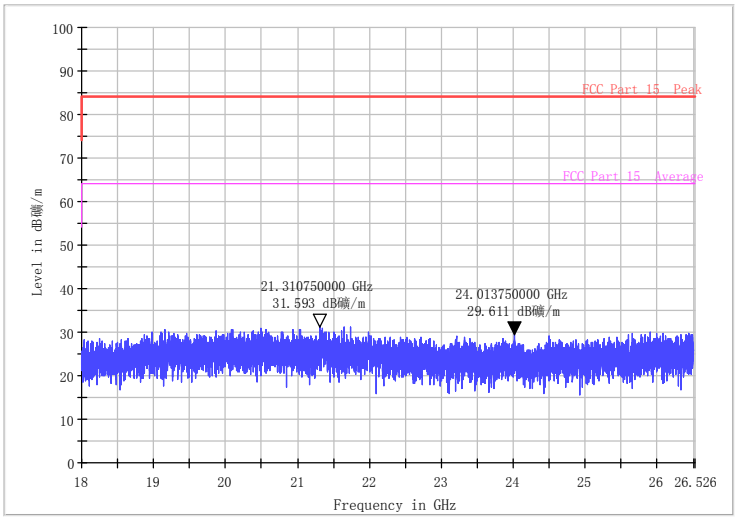


Fig.10 Radiated emission: 18 GHz - 26 GHz

Test photo

See the Pic1- Pic6 in document" Ilium X400_Wifi_BT_Test Setup Photos_Rev2".

4.7 Power line Conducted Emissions

Specifications:	ANSI C63.4 voltage mains test
Date of Test	2015-02-13
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	Normal
Test Results:	Pass

Test equipment Used:

Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2016-01-12	Normal
7330	Artificial Mains Network	R/S	ESH2-Z5	837480/002	2016-01-08	Normal
714	Shielding Room	ETS	--	19003	2015-11-16	Normal
7330	BLUETOOTH TESTER	R/S	CBT	100657	2016-01-28	Normal

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Limits of the conducted disturbance at the AC mains ports:

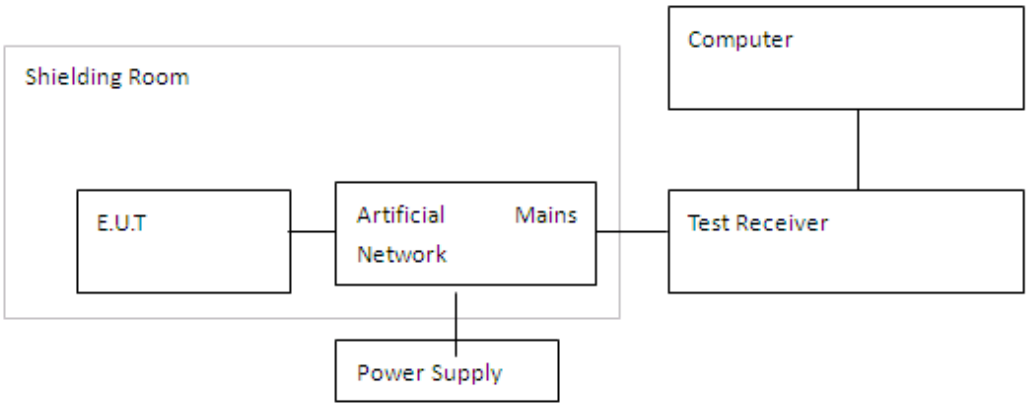
Frequency range	Limit(Quasi-peak)	Limit(Average)
0.15 MHz to 0.5 MHz	66 dBμV – 56 dBμV	56 dBμV – 46 dBμV
>0.5 MHz to 5MHz	56 dBμV	46 dBμV
>5 MHz to 30 MHz	60 dBμV	50 dBμV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Setup

The EUT was placed in a shielding room. The BLUETOOTH TESTER was used to set the TX channel and power level. The ac adapter output is connected to Receiver through an AMN (Artificial Mains Network).

CTTL Test Report



TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

The measurement is made according to Public notice FCC Public Notice DA 00-705, March 2000, and ANSI C63.4-2014.

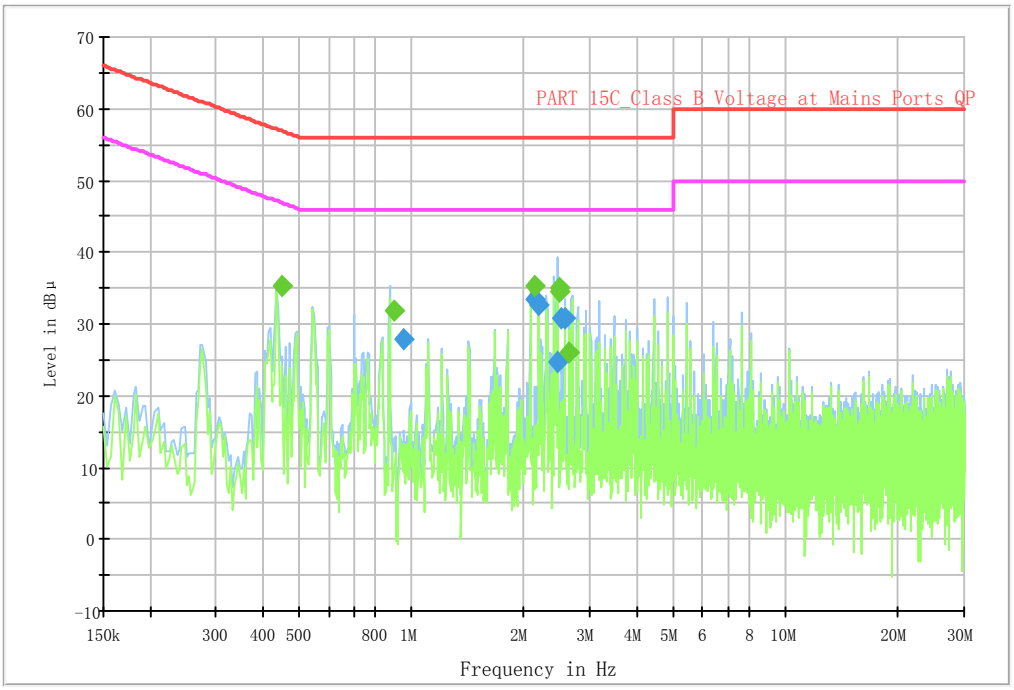
Test Result:

Line L&N					
Detector (QP)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
QP	0.949672	28.0	56.0	L1	FLO
QP	2.146356	33.5	56.0	L1	FLO
QP	2.187262	32.7	56.0	L1	FLO
QP	2.465138	24.7	56.0	N	FLO
QP	2.523375	30.8	56.0	L1	FLO
QP	2.581312	30.8	56.0	L1	FLO

Line L&N					
Detector (AV)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
AV	0.449306	35.4	46.9	L1	FLO
AV	0.897862	31.8	46.0	L1	FLO
AV	2.135056	35.2	46.0	L1	FLO
AV	2.473126	35.0	46.0	L1	FLO
AV	2.473375	34.6	46.0	N	FLO
AV	2.643519	26.0	46.0	N	FLO

CTTL Test Report

CISPR N&L1 Voltage 150k to 30MHz-Class B



Line L &Line N

Test photo

See the Pic7 in document" Ilium X400_Wifi_BT_Test Setup Photos_Rev2".

Annex A External Photos

See the document "Ilium X400- External Photos".

Annex B Internal Photos

See the document "Ilium X400-Internal Photos".

ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

The End of this Report

CTTL Test Report