



FCC PART 15C TEST REPORT No. 2012WLN0416

for

ZTE Corporation

WCDMA/GSM (GPRS) Dual-Mode Digital Mobile Phone

Model: ZTE Z788G

With

FCC ID: Q78-Z788G

Hardware Version: y50A

Software Version: Z788GV1.0.0B01

Issued Date: 2012-10-22



DAR accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629B

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 TMC Beijing.

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1. TEST LABORATORY

1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China
Postal Code: 100191
Telephone: 008610623046332561
Fax: 008610623046332504

1.2. Testing Environment

Normal Temperature: 15-30°C
Extreme Temperature: -10/+55°C
Relative Humidity: 30-60%
Air Pressure 990hPa-1040hPa

Note: The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Testing Start Date: 2012-09-11
Testing End Date: 2012-09-28

1.4. Signature



Sun Zhenyu

(Prepared this test report)



Gao Hong

(Reviewed this test report)



Xiao Li

Deputy Director of the laboratory

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2. CLIENT INFORMATION

2.1. Applicant Information

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2.2. Manufacturer Information

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3. EQUIPMENT UNDER TEST(EUT) AND ANCILLARY EQUIPMENT(AE)

3.1. About EUT

Description	WCDMA/GSM (GPRS) Dual-Mode Digital Mobile Phone
Model	ZTE Z788G
FCC ID	Q78-Z788G
IC ID	/
With WLAN Function	Yes
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	21.56dBm(OFDM)
Power Supply	3.7V DC by Battery

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

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	864183010017050	y50A	Z788GV1.0.0B01
EUT2	864183010017738	y50A	Z788GV1.0.0B01

*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	Type	SN
AE1	Battery	Li3715T42P3h504857	/
AE2	Charger	STC-A22O50I700USBA-Z	/

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

3.4. General Description

Equipment Under Test (EUT) is a model of WCDMA/GSM (GPRS) Dual-Mode Digital Mobile Phone with integrated antenna. It consists of normal options: Battery and Charger.

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

Samples undergoing test were selected by the Client.

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

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

4.2. REFERENCE DOCUMENTS FOR TESTING

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

FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	Oct, 2009 Edition
ANSI C63.10	Procedures for testing compliance of a wide variety of unlicensed wireless devices	2009

5. LABORATORY ENVIRONMENT

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

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

Semi-anechoic chamber (10 meters×6.7meters×6.15meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 M ohm
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielding Room2 (7.30 meters×4.00 meters×3.80 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (a)	/	P
Peak Power Spectral Density	15.247 (d)	/	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, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

The measurement is made according to Public notice ANSI C63.10.

Terms used in Verdict column

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

6.2. Statements

TMC has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High Voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

For this report, all the test cases listed above are tested under Normal Temperature and Normal Voltage which is using a new battery, and also under norm humidity, the specific conditions as following:

Temperature	T nom	26°C
Voltage	V nom	3.7V(By battery)
Humidity	H nom	44%
Air Pressure	A nom	1010hPa

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2013-07-19
2	Spectrum Analyzer	MS2687B	6200819812	Anritsu	2013-09-22
3	Test Receiver	ESS	847151/015	Rohde & Schwarz	2012-10-30
4	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-08-12

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESI40	831564/002	Rohde & Schwarz	2013-08-11
2	BiLog Antenna	3142B	9908-1403	EMCO	2013-03-15
3	Dual-Ridge Waveguide Horn Antenna	3115	9906-5827	EMCO	2012-12-25
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2013-06-30

Anechoic chamber

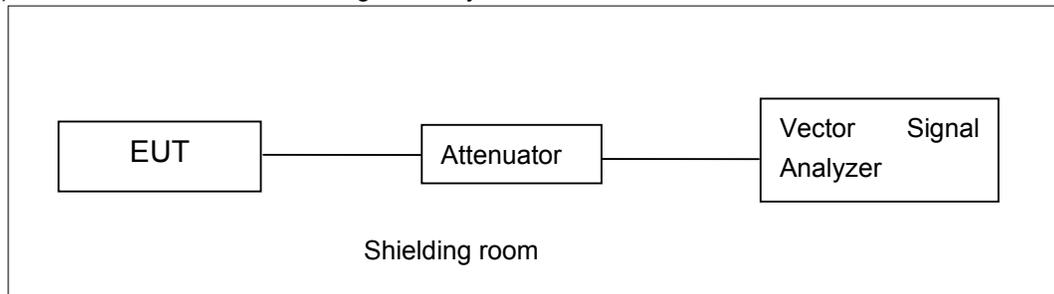
Anechoic chamber by Frankonia German.

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer

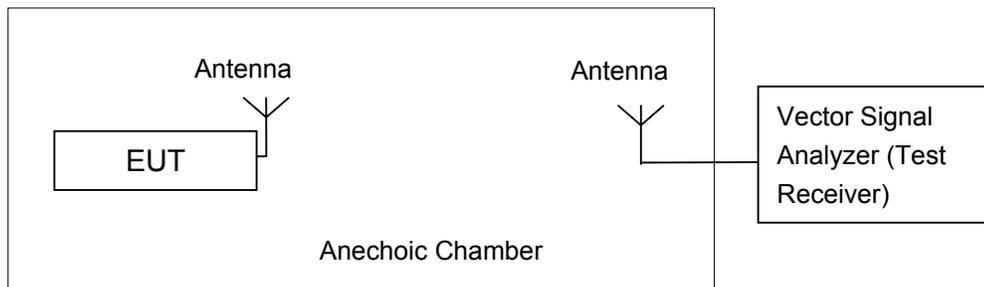


A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10

A.2. Maximum Output Power

Measurement Limit and Method:

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

The measurement is made according to ANSI C63.10, and EUT is operating in continuous transmitting mode.

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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A.2.1. Maximum Peak Output Power-conducted

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	17.25	/	/
	2	17.29	/	/
	5.5	18.80	/	/
	11	20.18	20.25	20.86
802.11g	6	19.33	/	/
	9	19.28	/	/
	12	19.08		
	18	19.13	/	/
	24	20.86	/	/
	36	20.92	/	/
	48	21.02	/	/
	54	21.18	21.20	21.56

The data rate 11Mbps and 54Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	18.80	18.50	18.82
	MCS1	18.61	/	/
	MCS2	17.72	/	/
	MCS3	18.77	/	/
	MCS4	18.00	/	/
	MCS5	18.04	/	/
	MCS6	18.07	/	/

	MCS7	17.24	/	/
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The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n (40MHz)	MCS0	/	/	/
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

Conclusion: PASS

A.2.2. Maximum Average Output Power-conducted

802.11b/g mode

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	13.79	13.66	14.34
802.11g	12.15	11.69	12.62

802.11n-HT20 mode

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	10.44	10.09	10.52

802.11n-HT40 mode

Mode	Test Result (dBm)		
	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n (40MHz)	/	/	/

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

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

The measurement is made according to ANSI C63.10

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
		Fig.	Value	
802.11b	1	Fig.1	-10.76	P
	6	Fig.2	-11.05	P
	11	Fig.3	-10.46	P
802.11g	1	Fig.4	-13.12	P
	6	Fig.5	-13.11	P
	11	Fig.6	-12.56	P

802.11n-HT20 mode

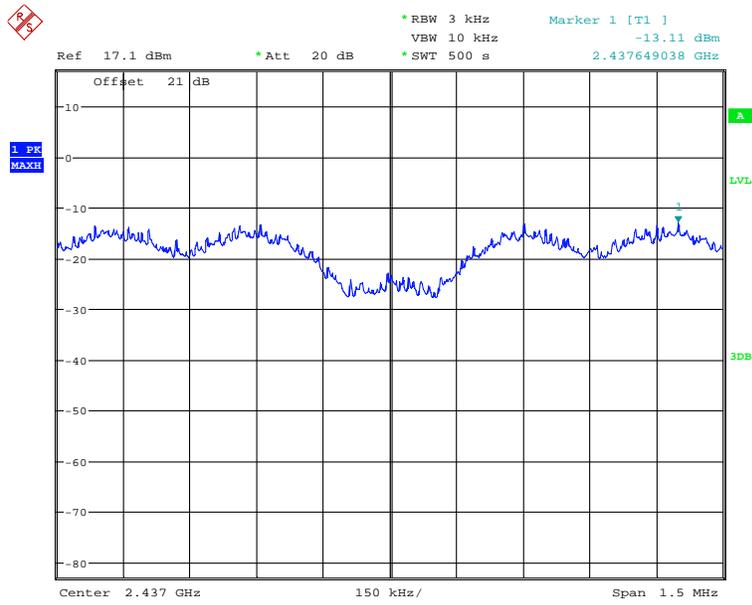
Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
		Fig.	Value	
802.11n (20MHz)	1	Fig.7	-12.91	P
	6	Fig.8	-13.24	P
	11	Fig.9	-12.75	P

802.11n-HT40 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
		Fig.	Value	
802.11n (40MHz)	3	/	/	/
	6	/	/	/
	9	/	/	/

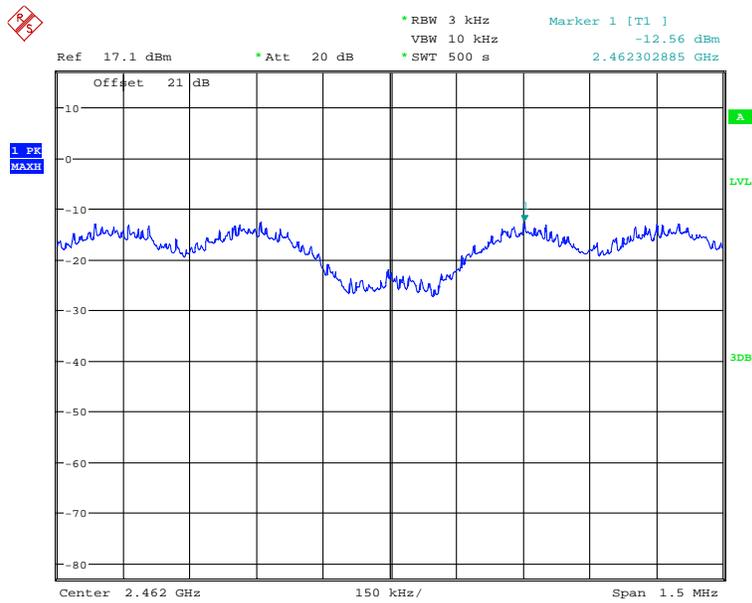
Conclusion: PASS

Test graphs as below:



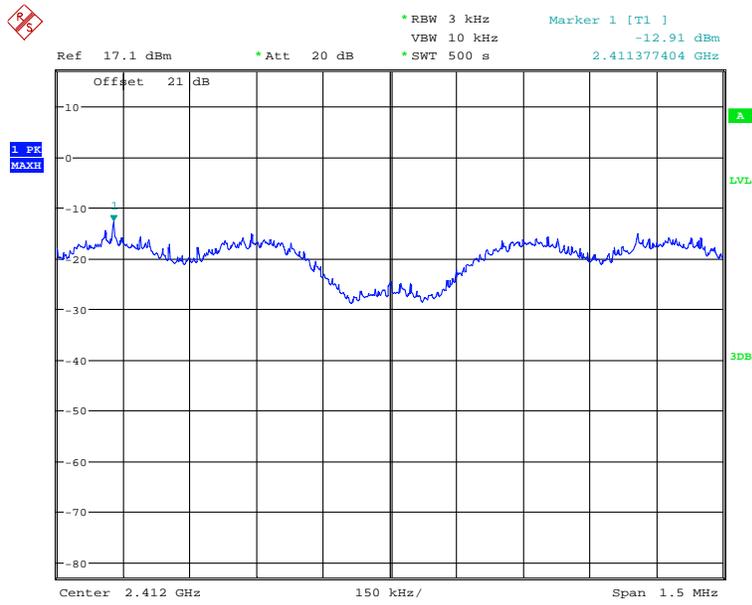
Date: 25.SEP.2012 15:36:02

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



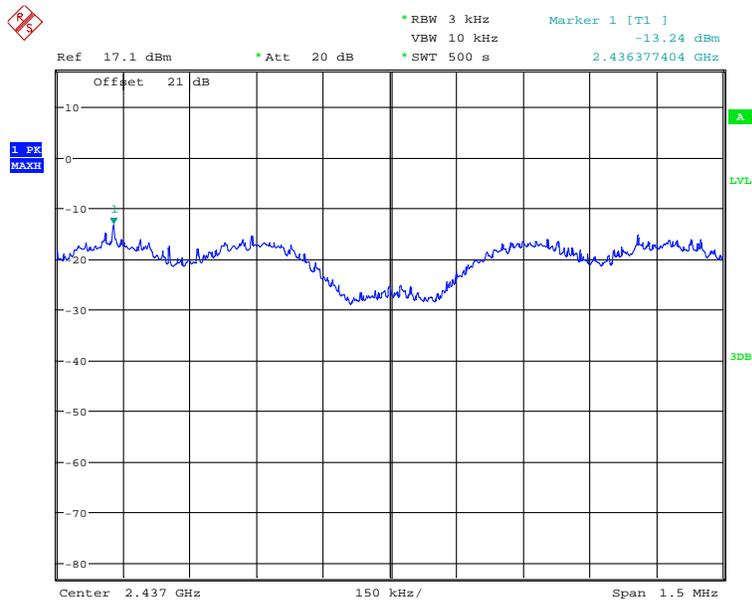
Date: 25.SEP.2012 15:26:39

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



Date: 25.SEP.2012 16:22:04

Fig. 7 Power Spectral Density (802.11n-20MHz, Ch 1)



Date: 25.SEP.2012 16:37:30

Fig. 8 Power Spectral Density (802.11n-20MHz, Ch 6)

A.4. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is made according to ANSI C63.10

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
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Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11b	1	Fig.10	11092	P
	6	Fig.11	11057	P
	11	Fig.12	11105	P
802.11g	1	Fig.13	12526	P
	6	Fig.14	16538	P
	11	Fig.15	16442	P

802.11n-HT20 mode

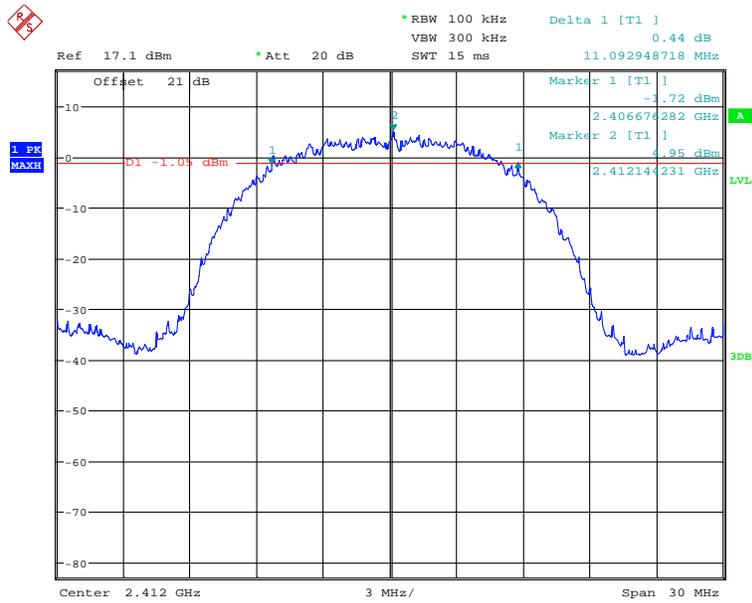
Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11n (20MHz)	1	Fig.16	17583	P
	6	Fig.17	17596	P
	11	Fig.18	17596	P

802.11n-HT40 mode

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11n (40MHz)	3	/	/	/
	6	/	/	/
	9	/	/	/

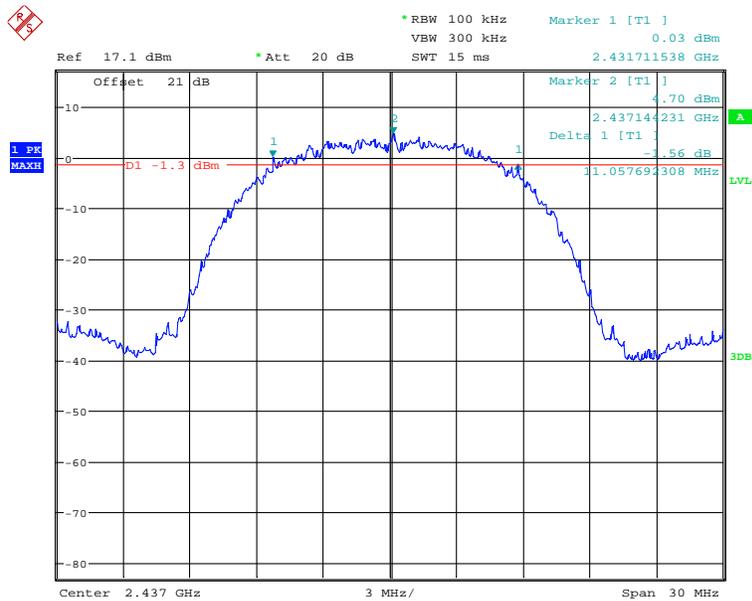
Conclusion: PASS

Test graphs as below:



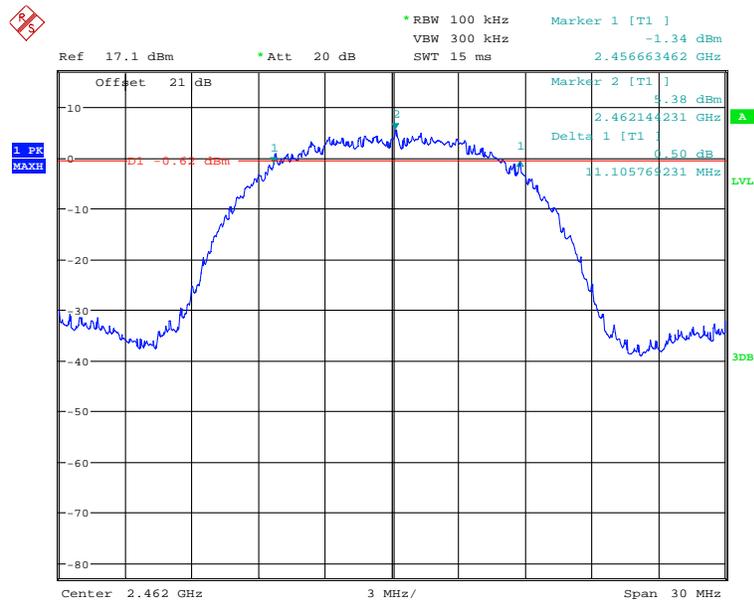
Date: 26.SEP.2012 09:51:44

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



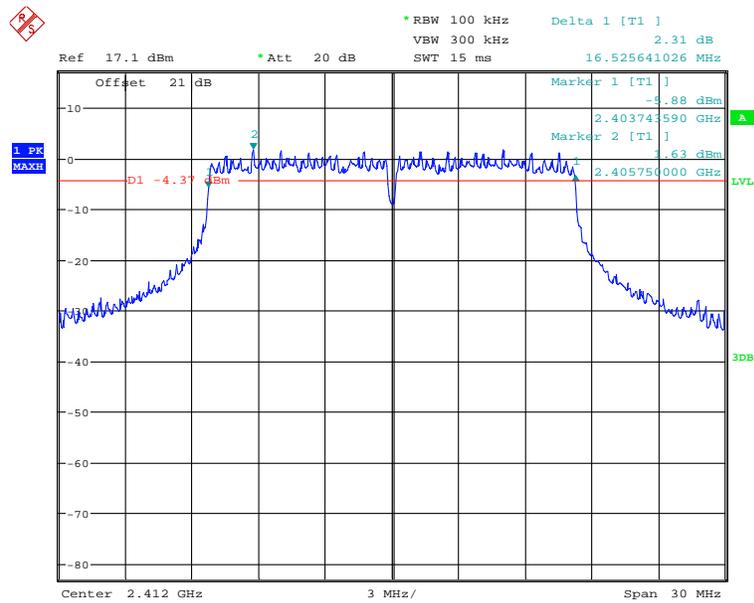
Date: 26.SEP.2012 10:39:16

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



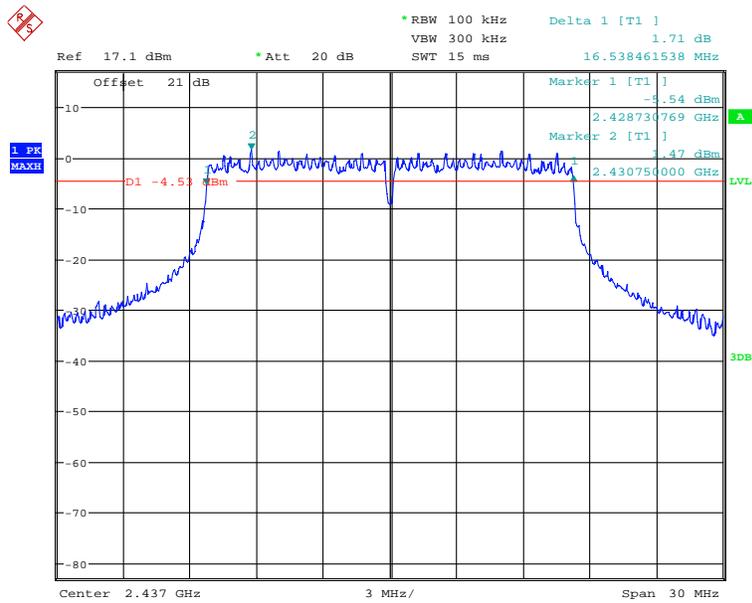
Date: 26.SEP.2012 10:43:26

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



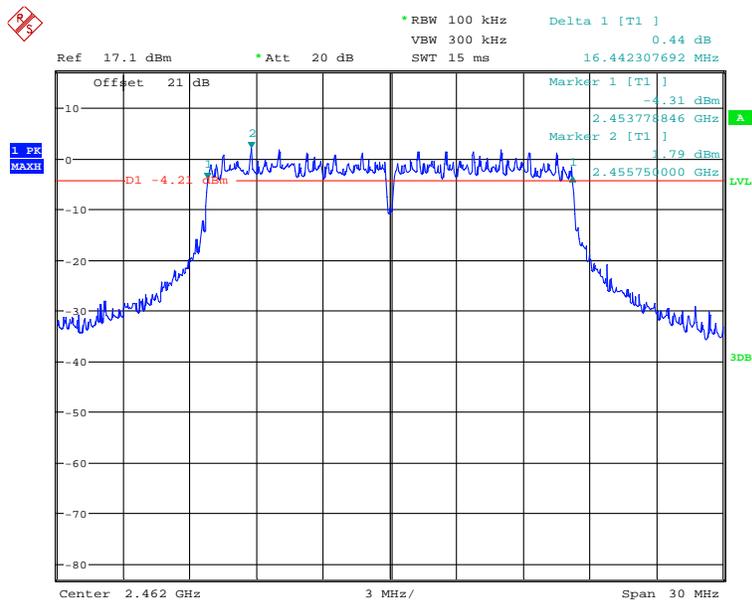
Date: 26.SEP.2012 09:52:57

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



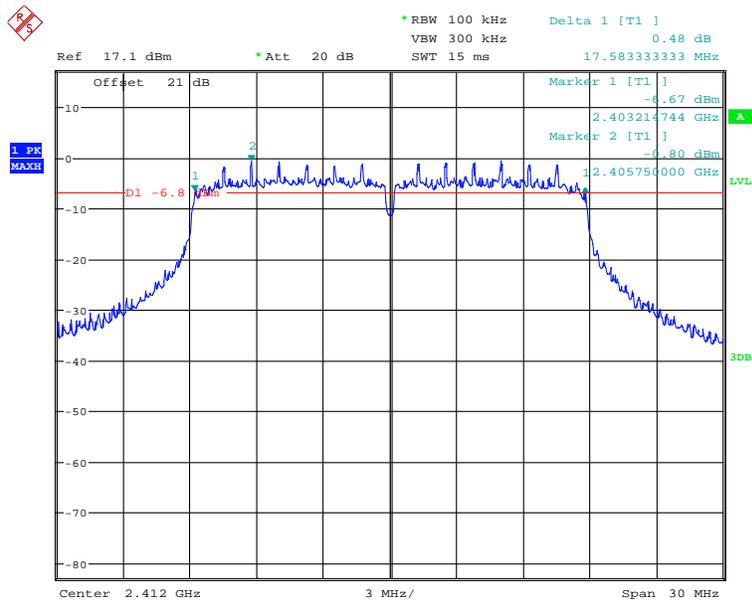
Date: 26.SEP.2012 10:09:14

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



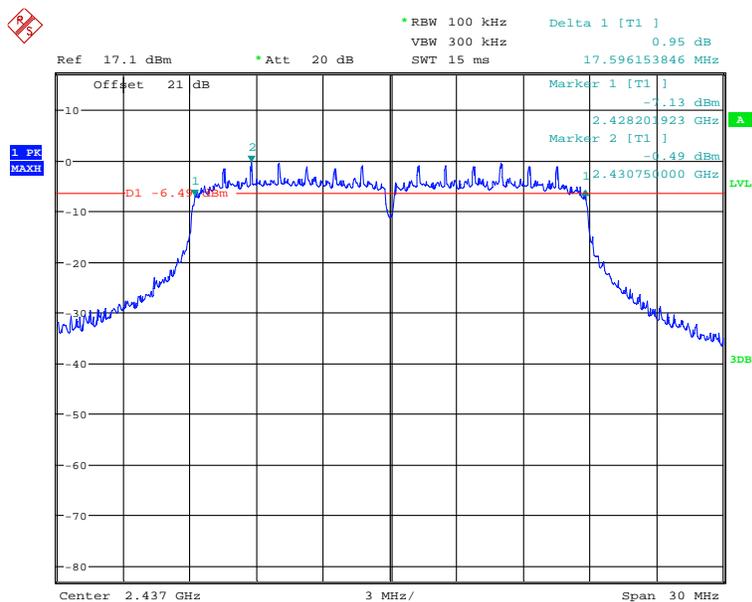
Date: 26.SEP.2012 10:57:03

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



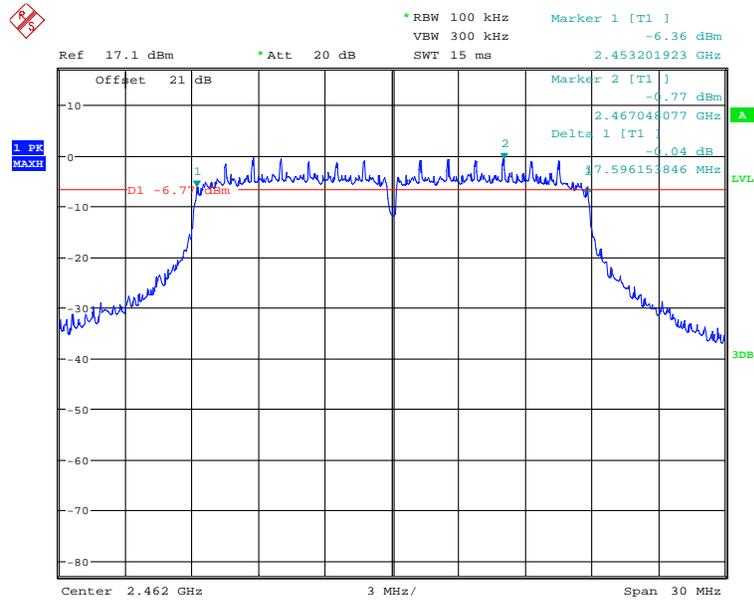
Date: 26.SEP.2012 09:53:59

Fig. 16 Occupied 6dB Bandwidth (802.11n-20MHz, Ch 1)



Date: 26.SEP.2012 09:55:17

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



Date: 26.SEP.2012 10:58:11

Fig. 18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch 11)

A.5. Band Edges Compliance

Measurement Limit:

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

The measurement is made according to ANSI C63.10

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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Measurement Result:

802.11b/g mode

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.19	P
	11	Fig.20	P
802.11g	1	Fig.21	P
	11	Fig.22	P

802.11n-HT20 mode

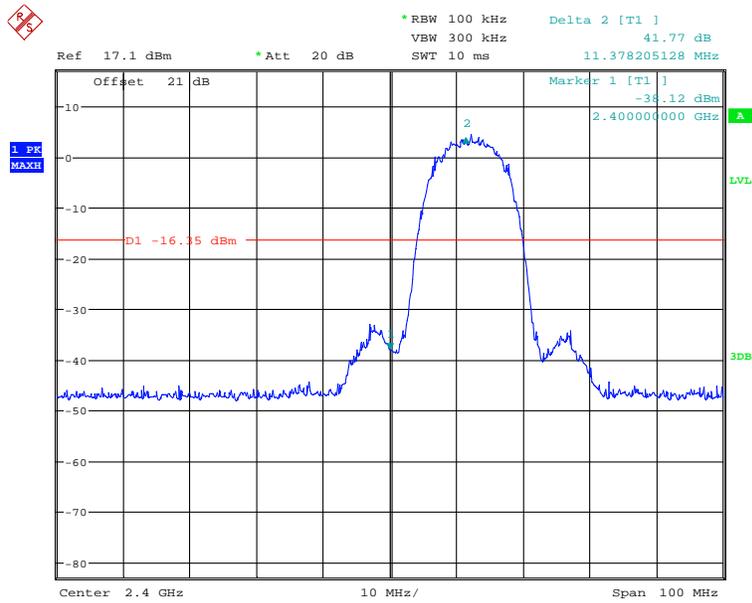
Mode	Channel	Test Results	Conclusion
802.11n (20MHz)	1	Fig.23	P
	11	Fig.24	P

802.11n-HT40 mode

Mode	Channel	Test Results	Conclusion
802.11n (40MHz)	3	/	/
	9	/	/

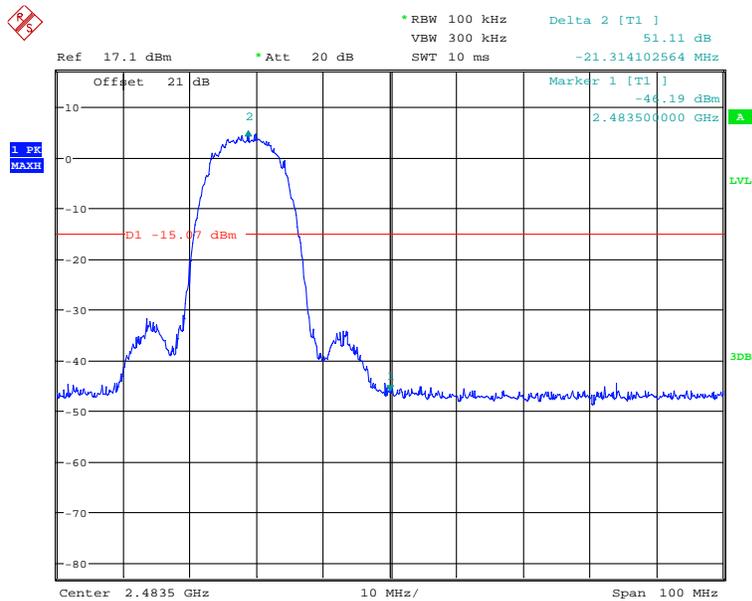
Conclusion: PASS

Test graphs as below:



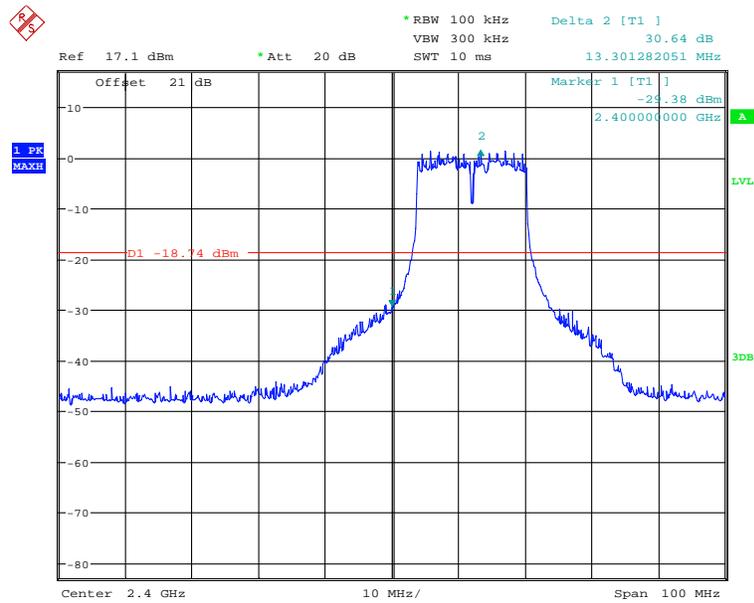
Date: 27.SEP.2012 09:38:32

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



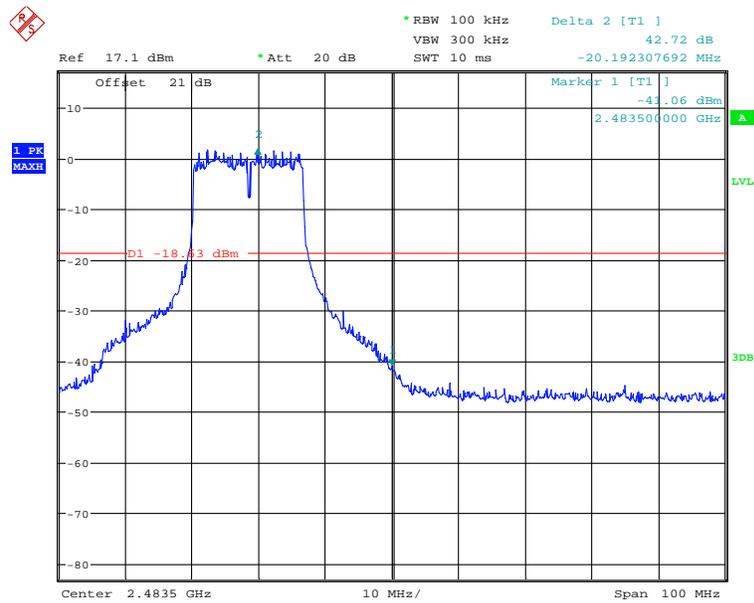
Date: 27.SEP.2012 10:30:49

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



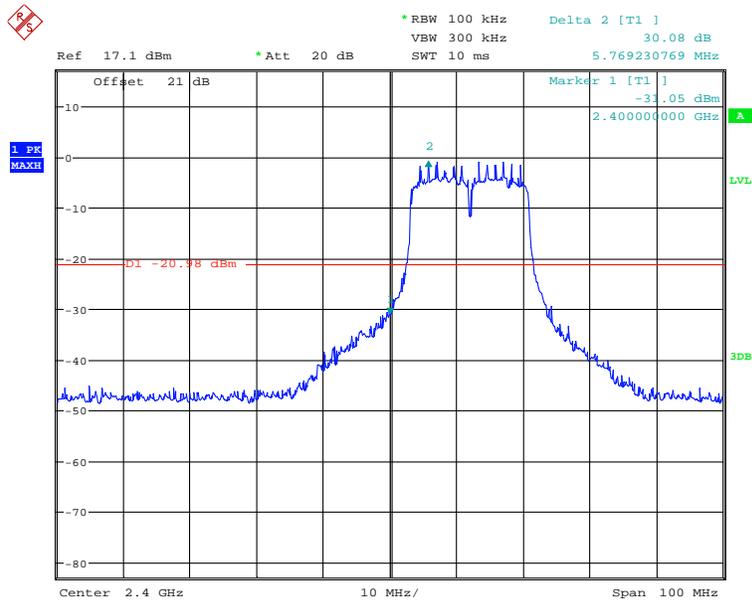
Date: 27.SEP.2012 09:39:38

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



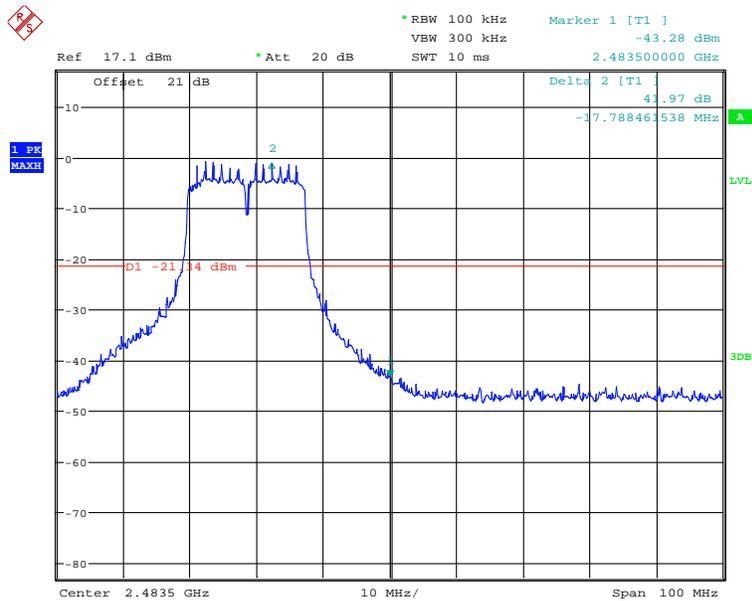
Date: 27.SEP.2012 10:27:23

Fig. 22 Band Edges (802.11g, Ch 1)



Date: 27.SEP.2012 09:41:24

Fig. 23 Band Edges (802.11n-20MHz, Ch 1)



Date: 27.SEP.2012 09:42:21

Fig. 24 Band Edges (802.11n-20MHz, Ch 11)

A.6. Transmitter Spurious Emission

A.6.1 Transmitter Spurious Emission - Conducted

Measurement Limit:

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

The measurement is made according to ANSI C63.10

Measurement Uncertainty:

Frequency Range	Uncertainty
$30\text{MHz} \leq f \leq 2\text{GHz}$	0.63
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	0.82
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.55
$8\text{GHz} \leq f \leq 20\text{GHz}$	1.86
$20\text{GHz} \leq f \leq 22\text{GHz}$	1.90
$22\text{GHz} \leq f \leq 26\text{GHz}$	2.20

Measurement Results:

802.11b/g mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.25	P
		30 MHz ~ 1 GHz	Fig.26	P
		1 GHz ~ 2.5 GHz	Fig.27	P
		2.5 GHz ~ 7.5 GHz	Fig.28	P
		7.5 GHz ~ 10 GHz	Fig.29	P
		10 GHz ~ 15 GHz	Fig.30	P
		15 GHz ~ 20 GHz	Fig.31	P
		20 GHz ~ 26 GHz	Fig.32	P
	6	2.437 GHz	Fig.33	P
		30 MHz ~ 1 GHz	Fig.34	P
		1 GHz ~ 2.5 GHz	Fig.35	P
		2.5 GHz ~ 7.5 GHz	Fig.36	P
		7.5 GHz ~ 10 GHz	Fig.37	P
		10 GHz ~ 15 GHz	Fig.38	P
		15 GHz ~ 20 GHz	Fig.39	P
		20 GHz ~ 26 GHz	Fig.40	P
	11	2.462 GHz	Fig.41	P
		30 MHz ~ 1 GHz	Fig.42	P
		1 GHz ~ 2.5 GHz	Fig.43	P
		2.5 GHz ~ 7.5 GHz	Fig.44	P

		7.5 GHz ~ 10 GHz	Fig.45	P
		10 GHz ~ 15 GHz	Fig.46	P
		15 GHz ~ 20 GHz	Fig.47	P
		20 GHz ~ 26 GHz	Fig.48	P
802.11g	1	2.412 GHz	Fig.49	P
		30 MHz ~ 1 GHz	Fig.50	P
		1 GHz ~ 2.5 GHz	Fig.51	P
		2.5 GHz ~ 7.5 GHz	Fig.52	P
		7.5 GHz ~ 10 GHz	Fig.53	P
		10 GHz ~ 15 GHz	Fig.54	P
		15 GHz ~ 20 GHz	Fig.55	P
		20 GHz ~ 26 GHz	Fig.56	P
	6	2.437 GHz	Fig.57	P
		30 MHz ~ 1 GHz	Fig.58	P
		1 GHz ~ 2.5 GHz	Fig.59	P
		2.5 GHz ~ 7.5 GHz	Fig.60	P
		7.5 GHz ~ 10 GHz	Fig.61	P
		10 GHz ~ 15 GHz	Fig.62	P
		15 GHz ~ 20 GHz	Fig.63	P
		20 GHz ~ 26 GHz	Fig.64	P
	11	2.462 GHz	Fig.65	P
		30 MHz ~ 1 GHz	Fig.66	P
		1 GHz ~ 2.5 GHz	Fig.67	P
		2.5 GHz ~ 7.5 GHz	Fig.68	P
		7.5 GHz ~ 10 GHz	Fig.69	P
		10 GHz ~ 15 GHz	Fig.70	P
		15 GHz ~ 20 GHz	Fig.71	P
		20 GHz ~ 26 GHz	Fig.72	P

802.11n-HT20 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	1	2.412 GHz	Fig.73	P
		30 MHz ~ 1 GHz	Fig.74	P
		1 GHz ~ 2.5 GHz	Fig.75	P
		2.5 GHz ~ 7.5 GHz	Fig.76	P
		7.5 GHz ~ 10 GHz	Fig.77	P
		10 GHz ~ 15 GHz	Fig.78	P
		15 GHz ~ 20 GHz	Fig.79	P
		20 GHz ~ 26 GHz	Fig.80	P
	6	2.437 GHz	Fig.81	P
		30 MHz ~ 1 GHz	Fig.82	P
		1 GHz ~ 2.5 GHz	Fig.83	P
		2.5 GHz ~ 7.5 GHz	Fig.84	P
		7.5 GHz ~ 10 GHz	Fig.85	P
		10 GHz ~ 15 GHz	Fig.86	P
		15 GHz ~ 20 GHz	Fig.87	P
		20 GHz ~ 26 GHz	Fig.88	P
	11	2.462 GHz	Fig.89	P
		30 MHz ~ 1 GHz	Fig.90	P
		1 GHz ~ 2.5 GHz	Fig.91	P
		2.5 GHz ~ 7.5 GHz	Fig.92	P
		7.5 GHz ~ 10 GHz	Fig.93	P
		10 GHz ~ 15 GHz	Fig.94	P
		15 GHz ~ 20 GHz	Fig.95	P
		20 GHz ~ 26 GHz	Fig.96	P

802.11n-HT40 mode

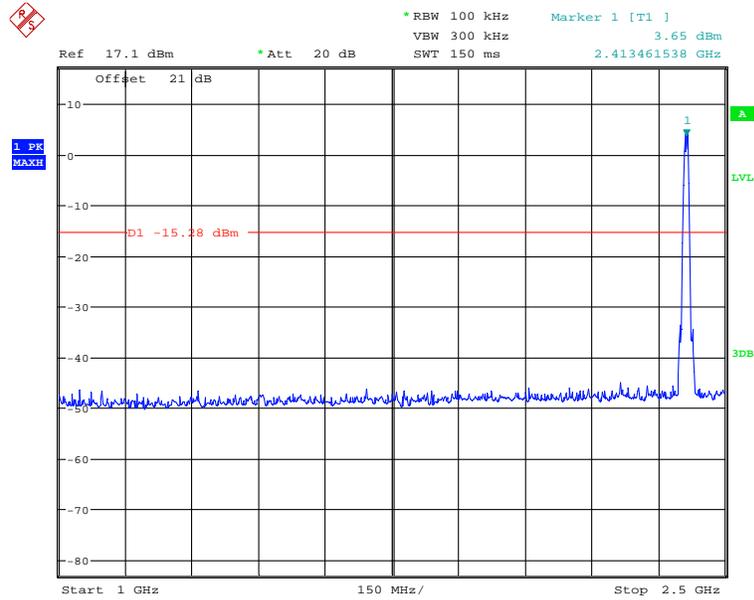
MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (40MHz)	3	2.422 GHz	/	/
		30 MHz ~ 1 GHz	/	/
		1 GHz ~ 2.5 GHz	/	/
		2.5 GHz ~ 7.5 GHz	/	/
		7.5 GHz ~ 10 GHz	/	/
		10 GHz ~ 15 GHz	/	/
		15 GHz ~ 20 GHz	/	/
		20 GHz ~ 26 GHz	/	/
	6	2.437 GHz	/	/
		30 MHz ~ 1 GHz	/	/
		1 GHz ~ 2.5 GHz	/	/
		2.5 GHz ~ 7.5 GHz	/	/
		7.5 GHz ~ 10 GHz	/	/
		10 GHz ~ 15 GHz	/	/
		15 GHz ~ 20 GHz	/	/

		15 GHz ~ 20 GHz	/	/
		20 GHz ~ 26 GHz	/	/
	9	2.452 GHz	/	/
		30 MHz ~ 1 GHz	/	/
		1 GHz ~ 2.5 GHz	/	/
		2.5 GHz ~ 7.5 GHz	/	/
		7.5 GHz ~ 10 GHz	/	/
		10 GHz ~ 15 GHz	/	/
		15 GHz ~ 20 GHz	/	/
		20 GHz ~ 26 GHz	/	/

Conclusion: PASS

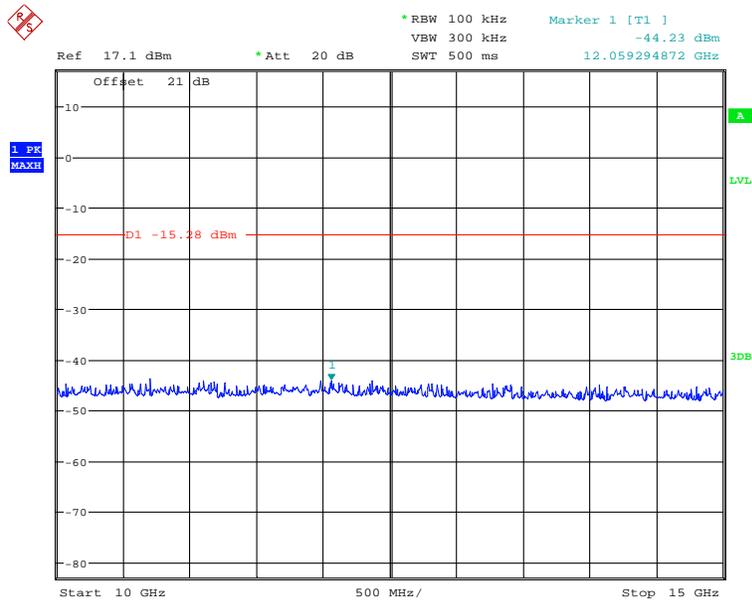
Test graphs as below:

Fig. 26 Conducted Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)



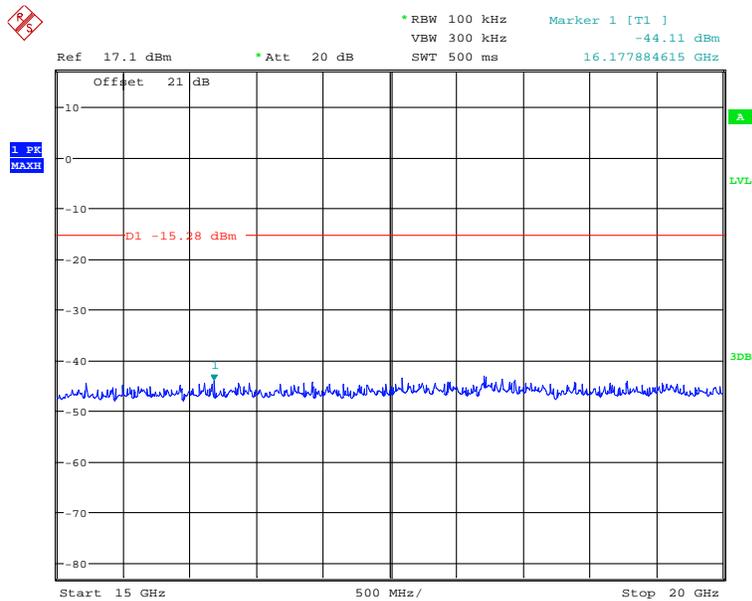
Date: 25.SEP.2012 10:00:45

Fig. 27 Conducted Spurious Emission (802.11b, Ch1, 1 GHz-2.5 GHz)



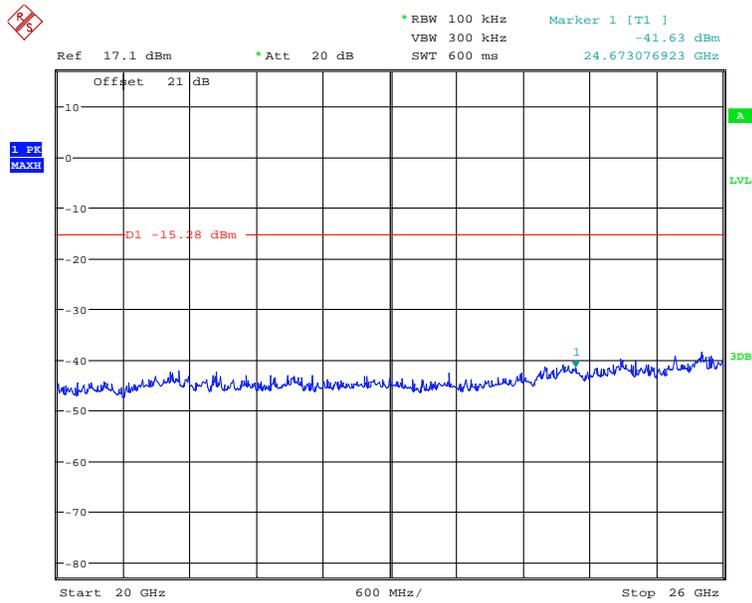
Date: 25.SEP.2012 10:05:34

Fig. 30 Conducted Spurious Emission (802.11b, Ch1, 10 GHz-15 GHz)



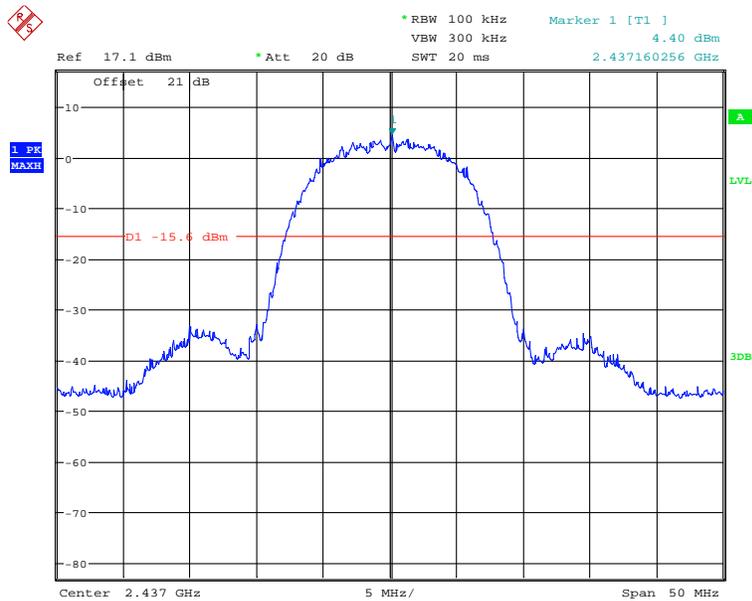
Date: 25.SEP.2012 10:05:50

Fig. 31 Conducted Spurious Emission (802.11b, Ch1, 15 GHz-20 GHz)



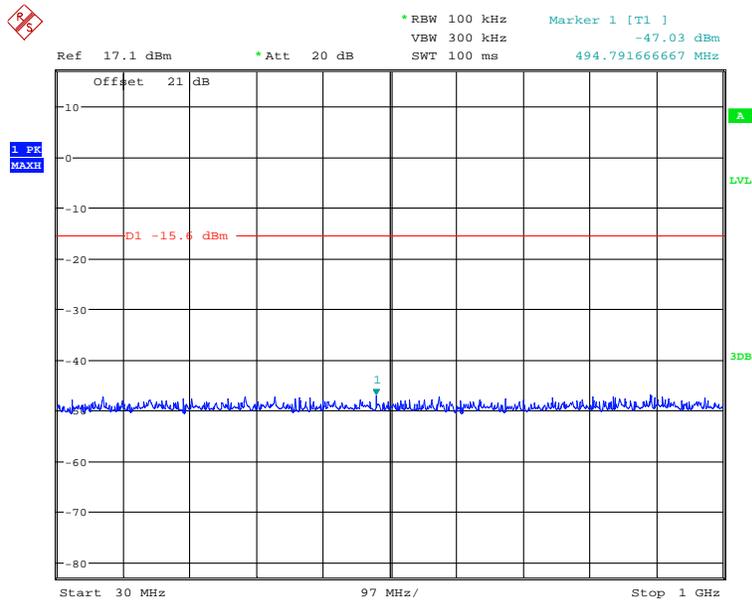
Date: 25.SEP.2012 10:06:08

Fig. 32 Conducted Spurious Emission (802.11b, Ch1, 20 GHz-26 GHz)



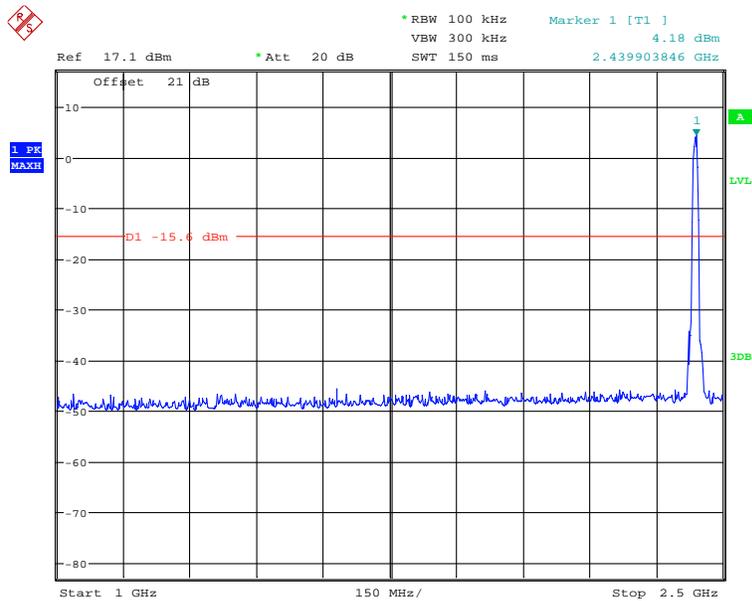
Date: 27.SEP.2012 10:49:05

Fig. 33 Conducted Spurious Emission (802.11b, Ch6, Center Frequency)



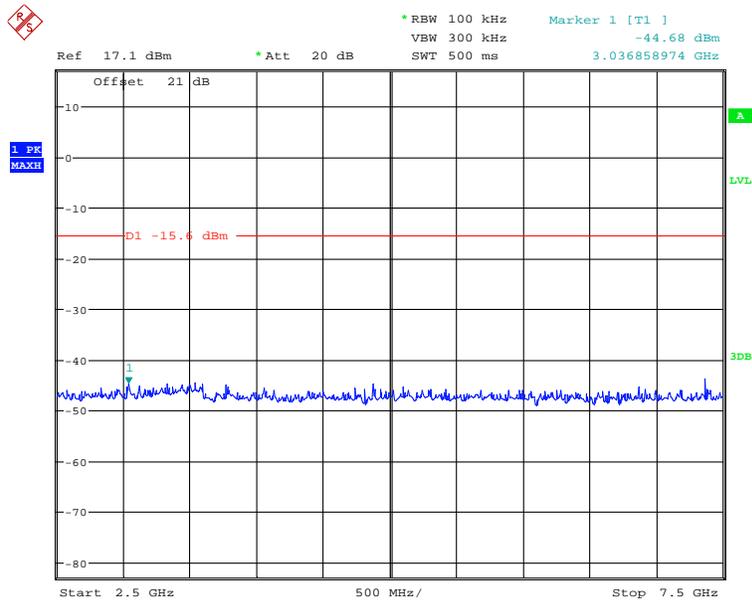
Date: 27.SEP.2012 10:49:15

Fig. 34 Conducted Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)



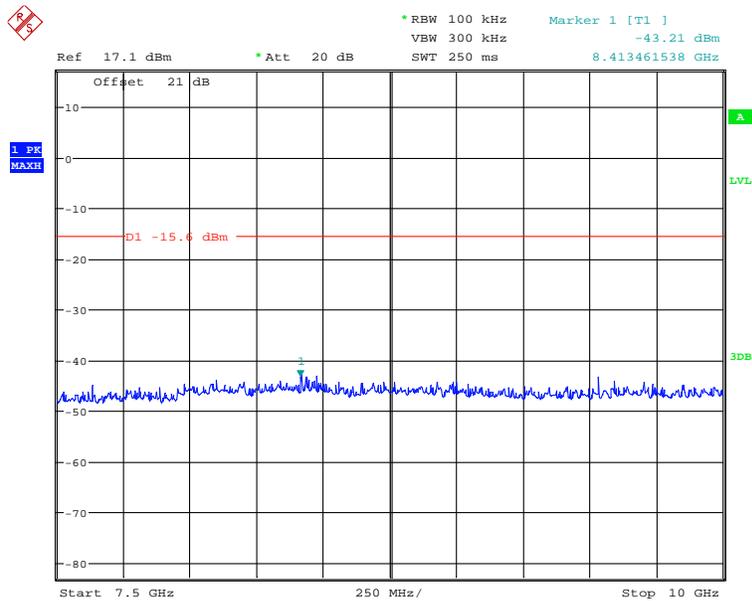
Date: 27.SEP.2012 10:49:33

Fig. 35 Conducted Spurious Emission (802.11b, Ch6, 1 GHz-2.5 GHz)



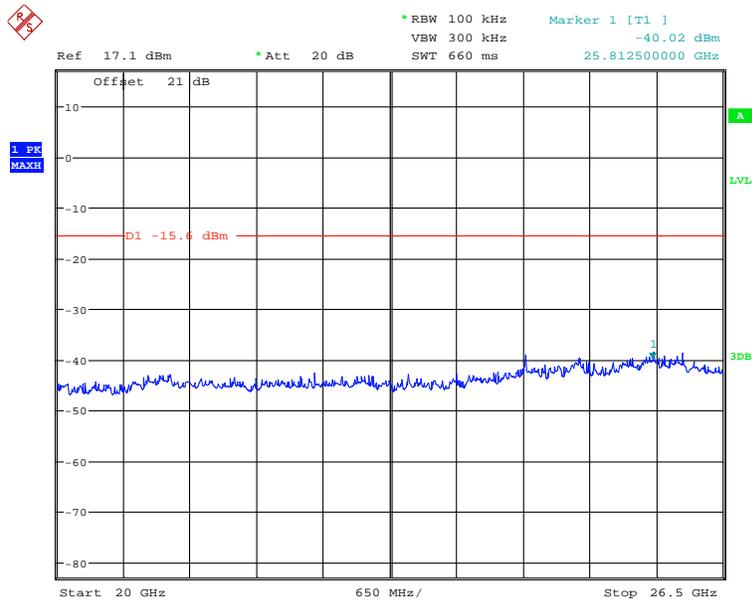
Date: 27.SEP.2012 10:49:56

Fig. 36 Conducted Spurious Emission (802.11b, Ch6, 2.5 GHz-7.5 GHz)



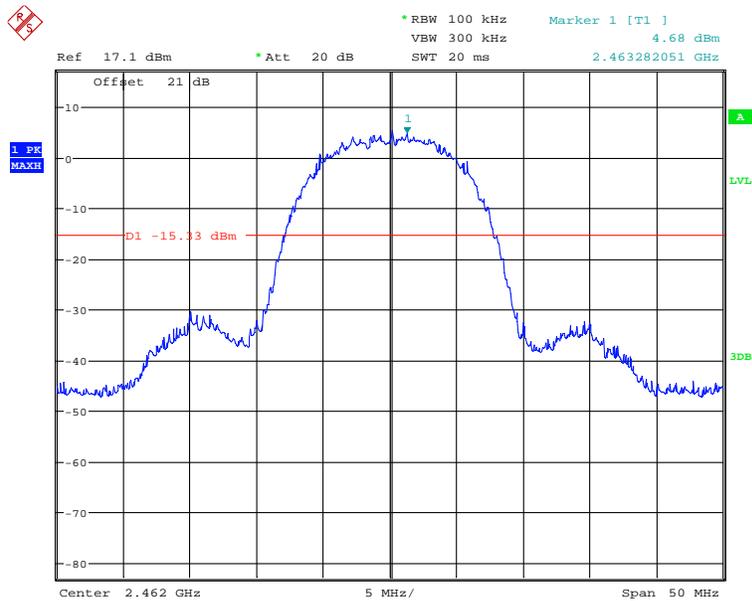
Date: 27.SEP.2012 10:50:12

Fig. 37 Conducted Spurious Emission (802.11b, Ch6, 7.5 GHz-10 GHz)



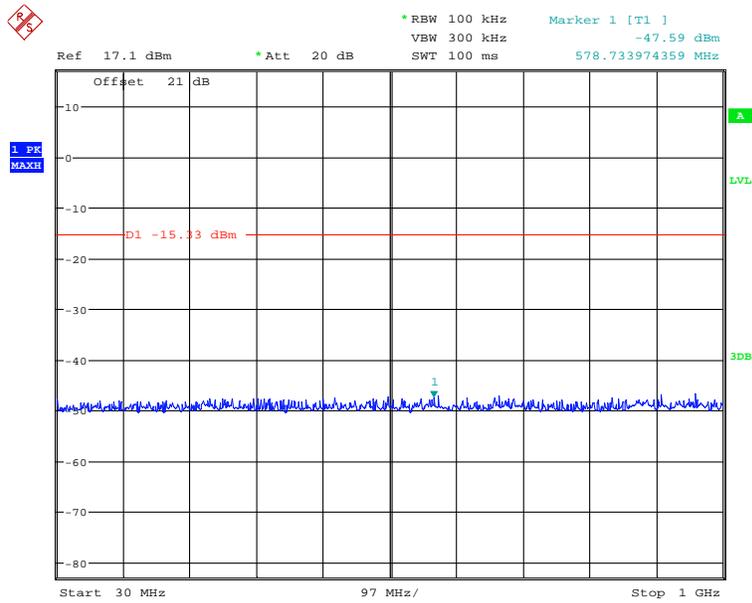
Date: 27.SEP.2012 10:51:04

Fig. 40 Conducted Spurious Emission (802.11b, Ch6, 20 GHz-26 GHz)



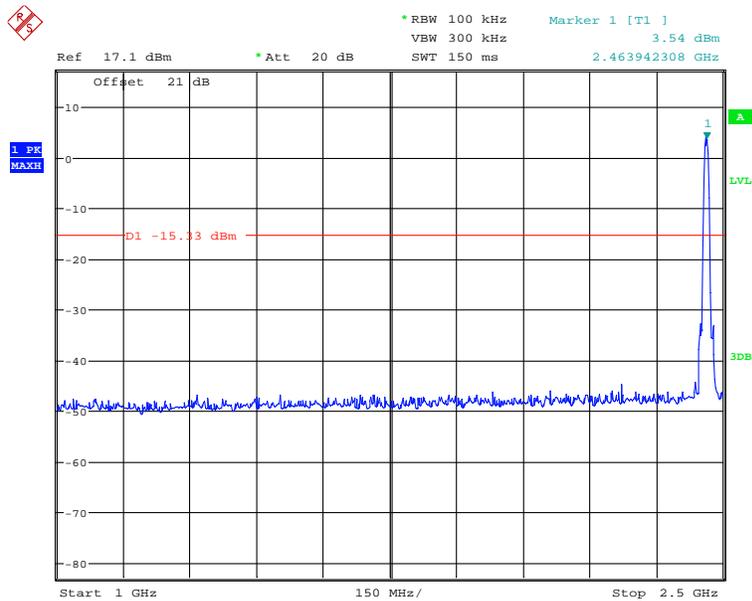
Date: 27.SEP.2012 10:41:03

Fig. 41 Conducted Spurious Emission (802.11b, Ch11, Center Frequency)



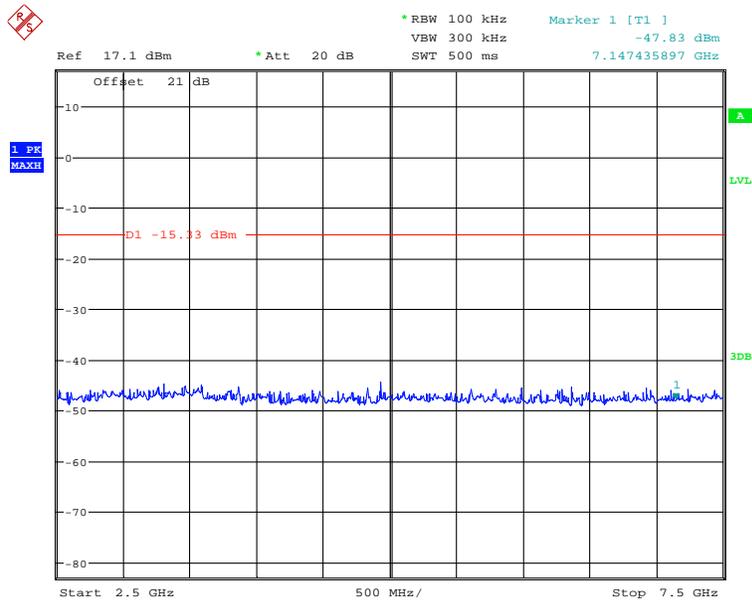
Date: 27.SEP.2012 10:42:20

Fig. 42 Conducted Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)



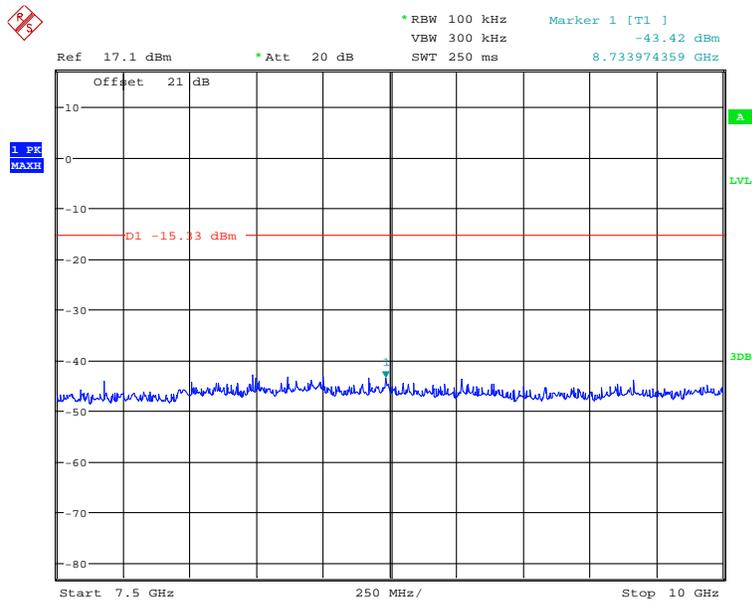
Date: 27.SEP.2012 10:42:32

Fig. 43 Conducted Spurious Emission (802.11b, Ch11, 1 GHz-2.5 GHz)



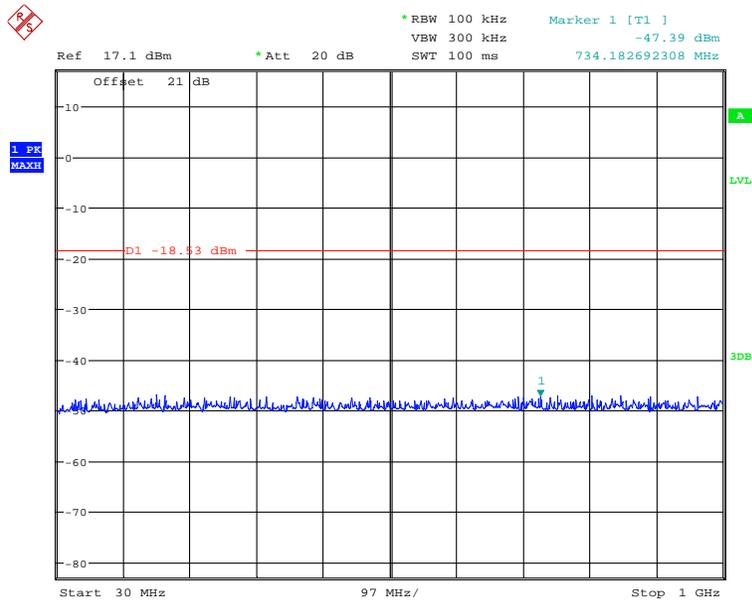
Date: 27.SEP.2012 10:42:50

Fig. 44 Conducted Spurious Emission (802.11b, Ch11, 2.5 GHz-7.5 GHz)



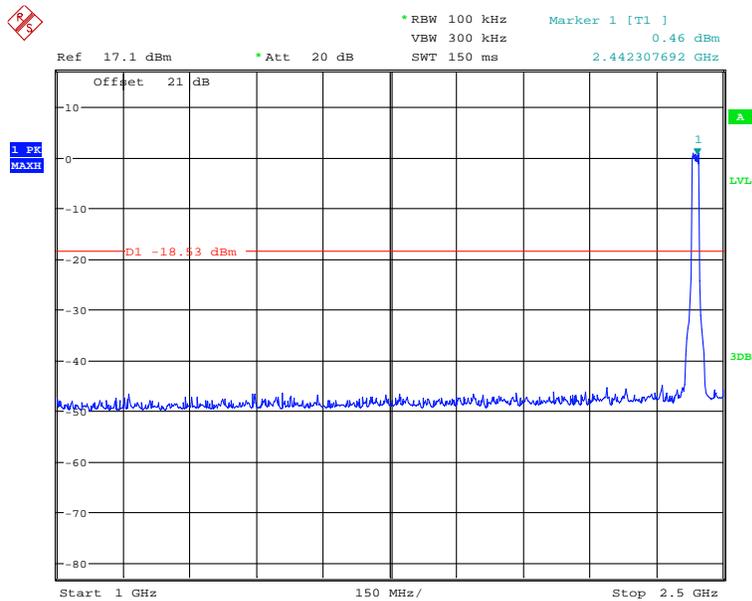
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Fig. 45 Conducted Spurious Emission (802.11b, Ch11, 7.5 GHz-10 GHz)



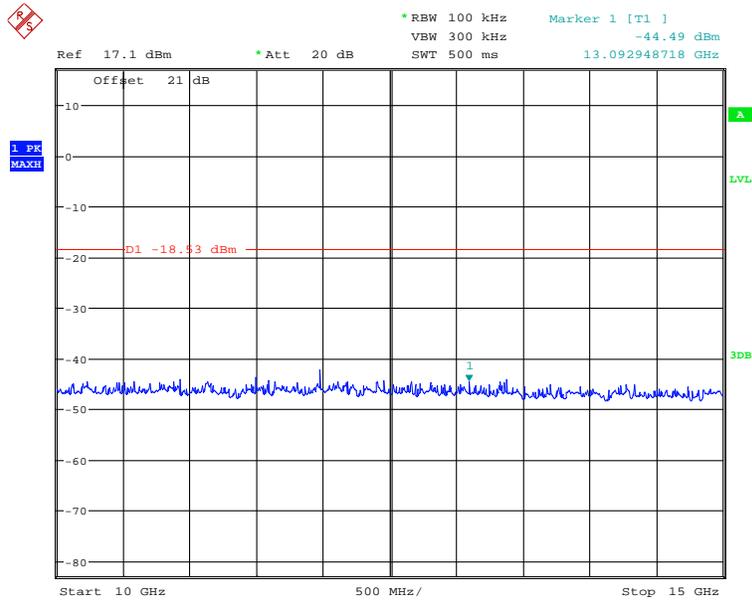
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Fig. 58 Conducted Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)



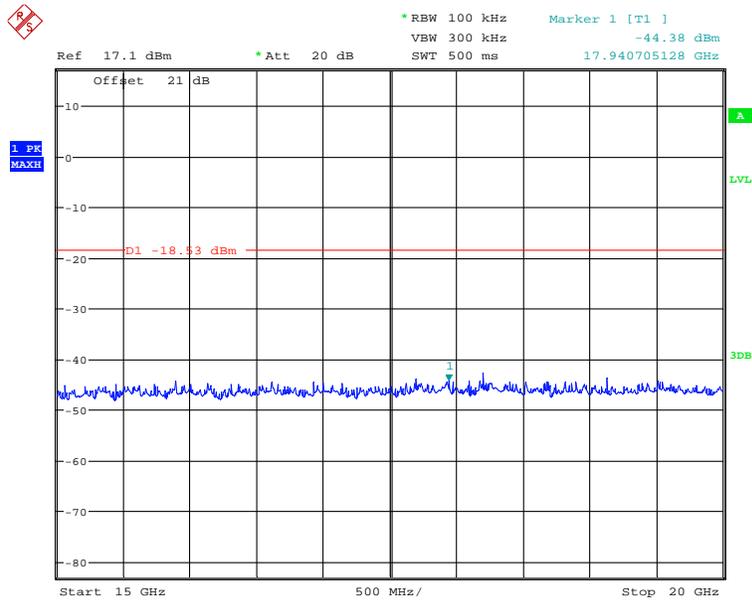
Date: 27.SEP.2012 11:01:45

Fig. 59 Conducted Spurious Emission (802.11g, Ch6, 1 GHz-2.5 GHz)



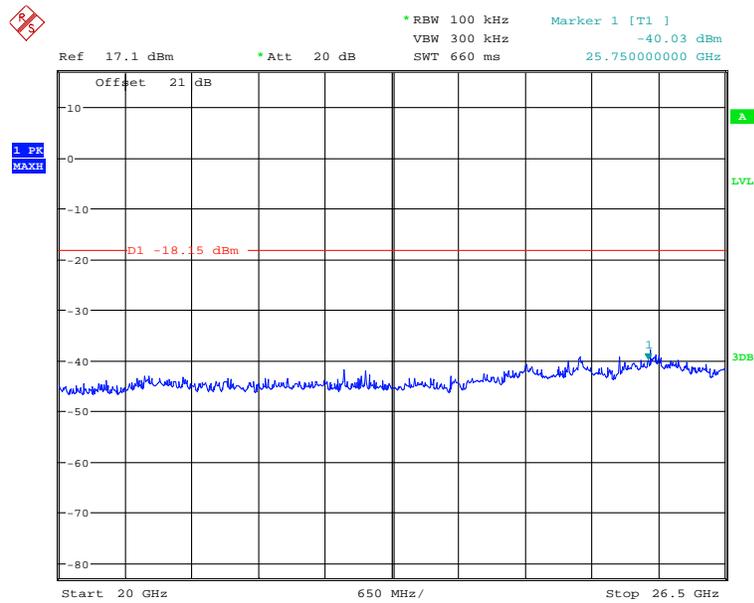
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Fig. 62 Conducted Spurious Emission (802.11g, Ch6, 10 GHz-15 GHz)



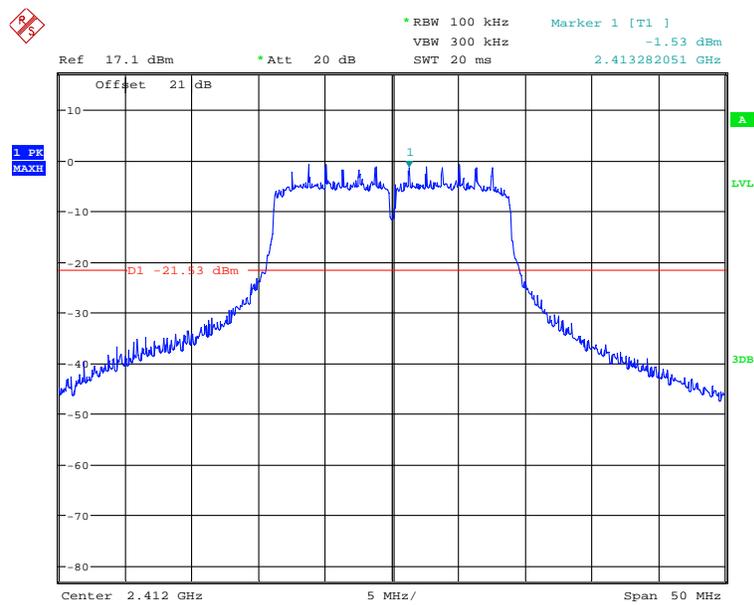
Date: 27.SEP.2012 11:02:42

Fig. 63 Conducted Spurious Emission (802.11g, Ch6, 15 GHz-20 GHz)



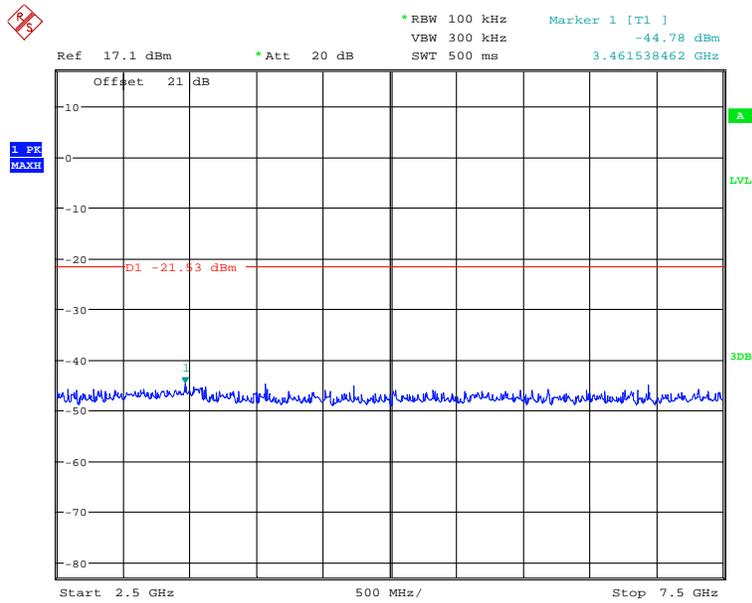
Date: 27.SEP.2012 11:11:59

Fig. 72 Conducted Spurious Emission (802.11g, Ch11, 20 GHz-26 GHz)



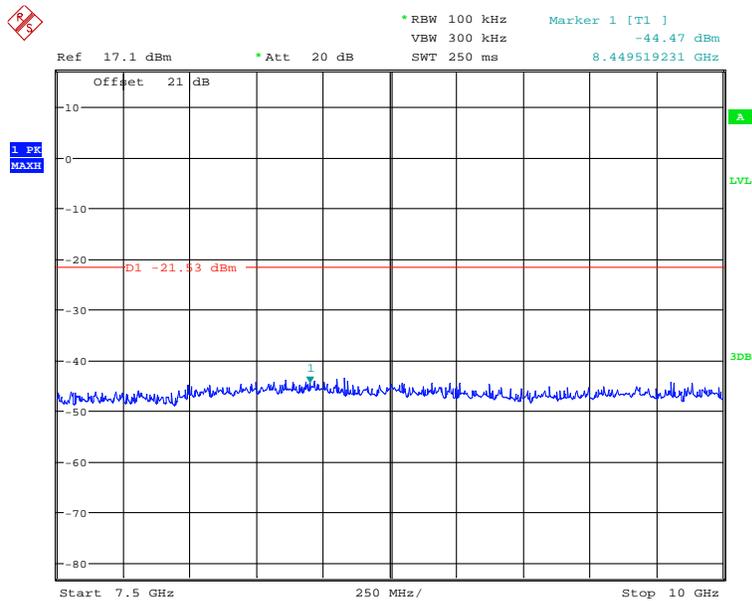
Date: 27.SEP.2012 11:25:43

Fig. 73 Conducted Spurious Emission (802.11n-HT20, Ch1, Center Frequency)



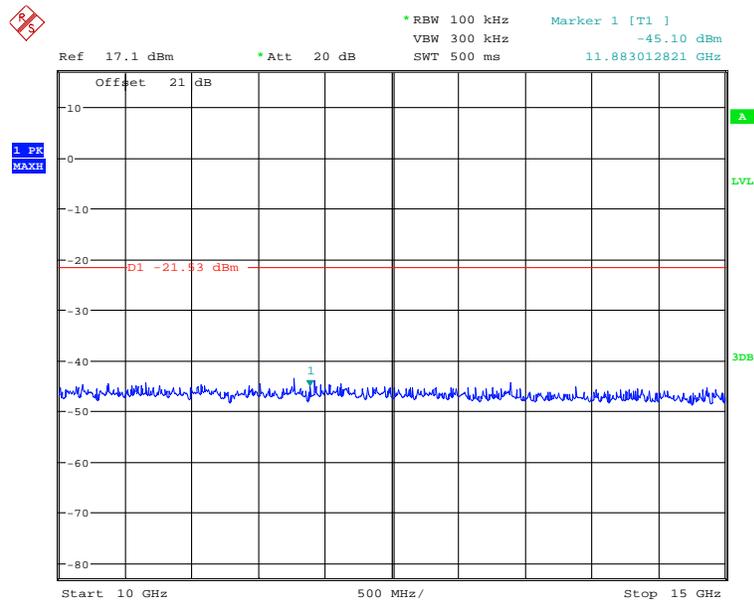
Date: 27.SEP.2012 11:26:27

Fig. 76 Conducted Spurious Emission (802.11n-HT20, Ch1, 2.5 GHz-7.5 GHz)



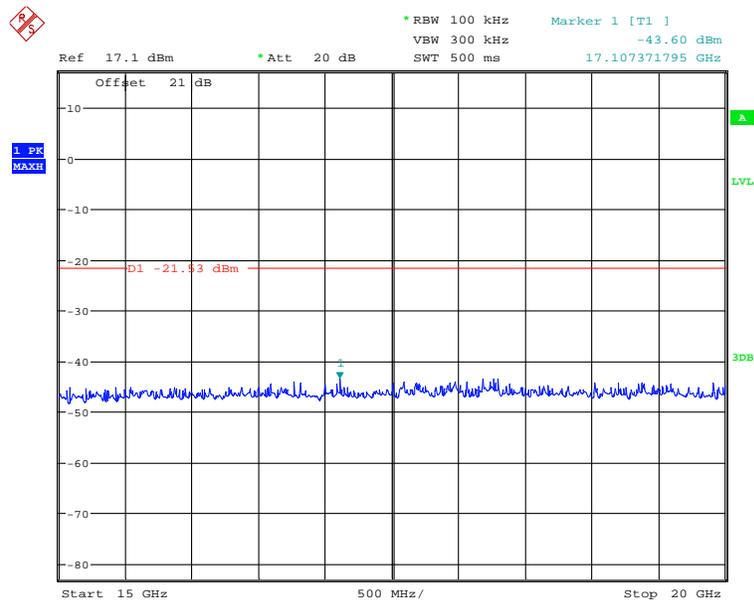
Date: 27.SEP.2012 11:26:38

Fig. 77 Conducted Spurious Emission (802.11n-HT20, Ch1, 7.5 GHz-10 GHz)



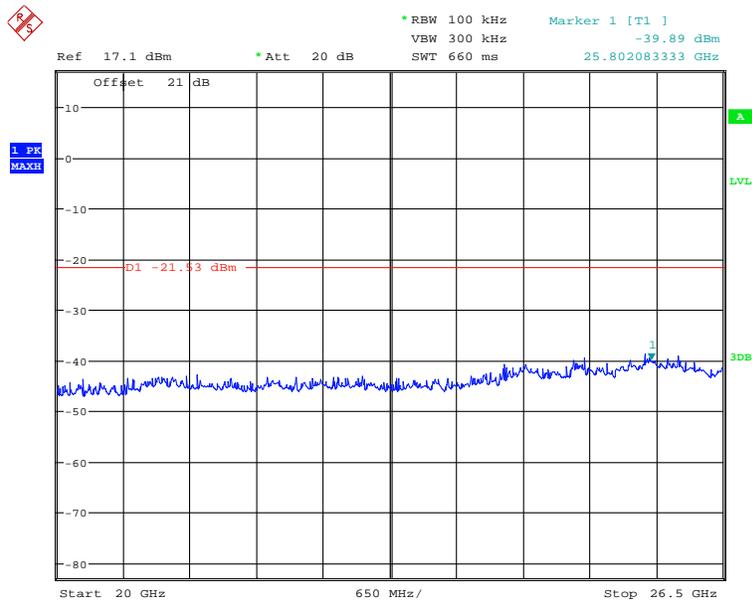
Date: 27.SEP.2012 11:27:38

Fig. 78 Conducted Spurious Emission (802.11n-HT20, Ch1, 10 GHz-15 GHz)



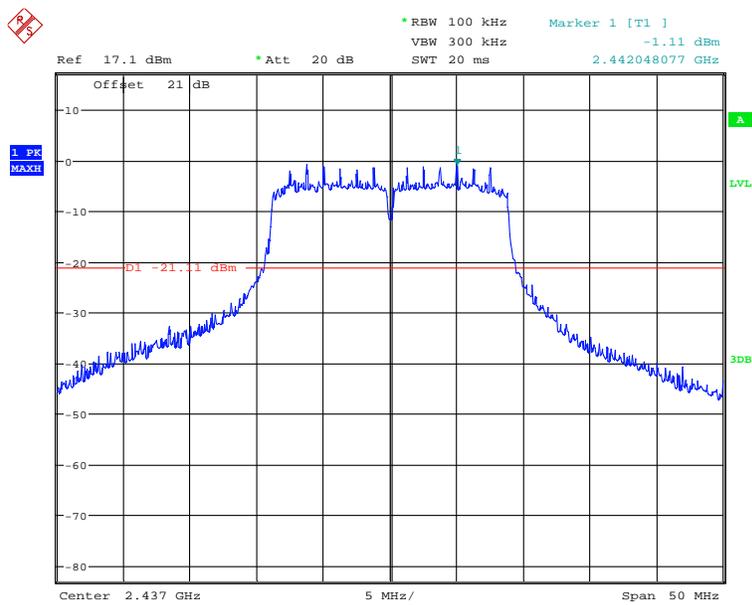
Date: 27.SEP.2012 11:27:50

Fig. 79 Conducted Spurious Emission (802.11n-HT20, Ch1, 15 GHz-20 GHz)



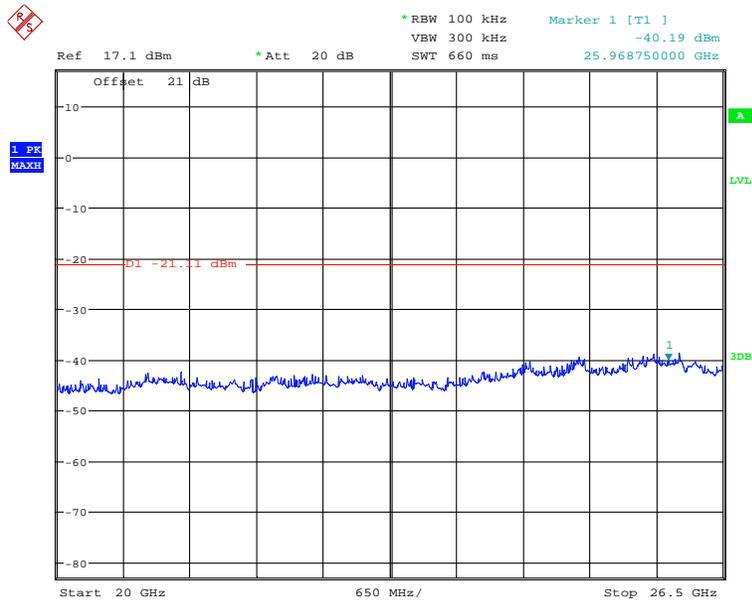
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Fig. 80 Conducted Spurious Emission (802.11n-HT20, Ch1, 20 GHz-26 GHz)



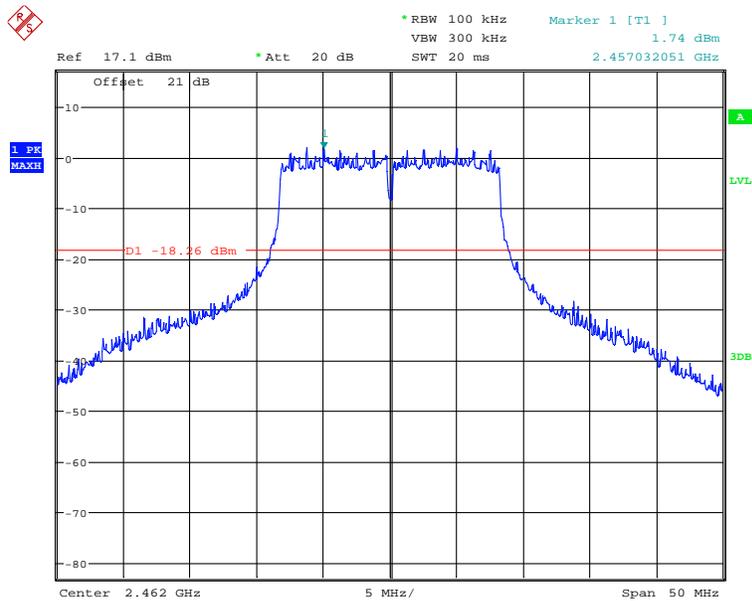
Date: 27.SEP.2012 11:17:48

Fig. 81 Conducted Spurious Emission (802.11n-HT20, Ch6, Center Frequency)



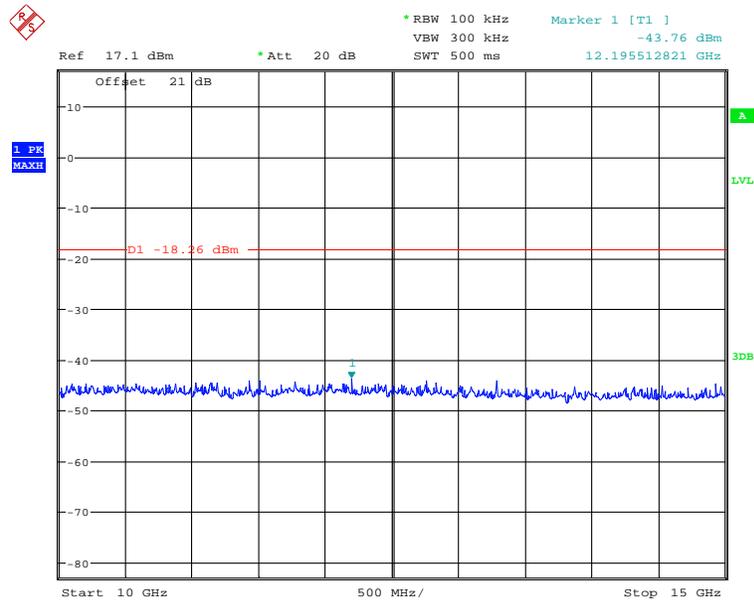
Date: 27.SEP.2012 11:20:15

Fig. 88 Conducted Spurious Emission (802.11n-HT20, Ch6, 20 GHz-26 GHz)



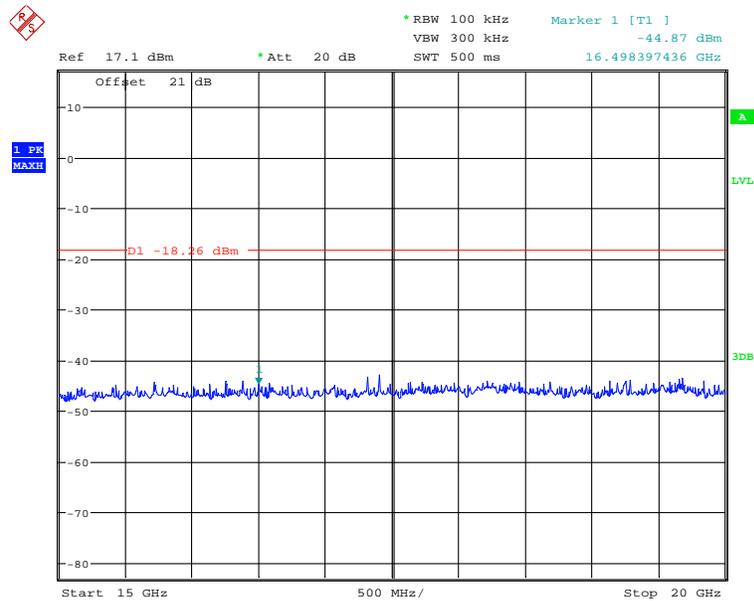
Date: 27.SEP.2012 11:13:31

Fig. 89 Conducted Spurious Emission (802.11n-HT20, Ch11, Center Frequency)



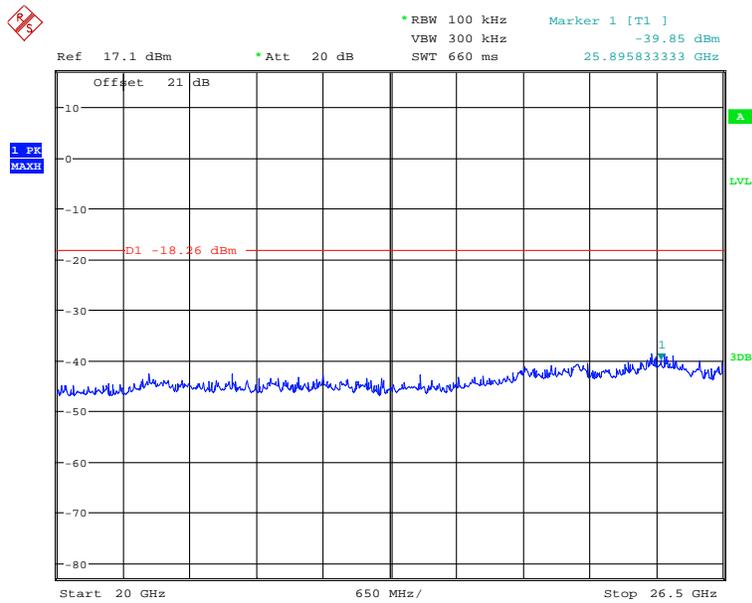
Date: 27.SEP.2012 11:14:41

Fig. 94 Conducted Spurious Emission (802.11n-HT20, Ch11, 10 GHz-15 GHz)



Date: 27.SEP.2012 11:14:53

Fig. 95 Conducted Spurious Emission (802.11n-HT20, Ch11, 15 GHz-20 GHz)



Date: 27.SEP.2012 11:15:15

Fig. 96 Conducted Spurious Emission (802.11n-HT20, Ch11, 20 GHz-26 GHz)

A.6.2 Transmitter Spurious Emission - Radiated

Measurement Limit:

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

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

The measurement is made according to ANSI C63.10.

Limit in restricted band:

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

Test Condition

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

Measurement Results:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz ~2.45GHz	Fig.97	P
	1	30 MHz ~1 GHz	Fig.98	P
		1 GHz ~ 3 GHz	Fig.99	P
		3 GHz ~ 18 GHz	Fig.100	P
	6	30 MHz ~1 GHz	Fig.101	P
		1 GHz ~ 3 GHz	Fig.102	P
		3 GHz ~ 18 GHz	Fig.103	P
	Power	2.45GHz ~2.5GHz	Fig.104	P
	11	30 MHz ~1 GHz	Fig.105	P
		1 GHz ~ 3 GHz	Fig.106	P
		3 GHz ~ 18 GHz	Fig.107	P
	802.11g	Power	2.38GHz ~2.43GHz	Fig.108
1		30 MHz ~1 GHz	Fig.109	P
		1 GHz ~ 3 GHz	Fig.110	P
		3 GHz ~ 18 GHz	Fig.111	P
6		30 MHz ~1 GHz	Fig.112	P
		1 GHz ~ 3 GHz	Fig.113	P
		3 GHz ~ 18 GHz	Fig.114	P
Power		2.45GHz ~2.5GHz	Fig.115	P
11		30 MHz ~1 GHz	Fig.116	P
		1 GHz ~ 3 GHz	Fig.117	P
		3 GHz ~ 18 GHz	Fig.118	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	Power	2.38GHz ~2.45GHz	Fig.119	P
	1	30 MHz ~1 GHz	Fig.120	P
		1 GHz ~ 3 GHz	Fig.121	P
		3 GHz ~ 18 GHz	Fig.122	P
	6	30 MHz ~1 GHz	Fig.123	P
		1 GHz ~ 3 GHz	Fig.124	P
		3 GHz ~ 18 GHz	Fig.125	P
	Power	2.45GHz ~2.5GHz	Fig.126	P
	11	30 MHz ~1 GHz	Fig.127	P
		1 GHz ~ 3 GHz	Fig.128	P
		3 GHz ~ 18 GHz	Fig.129	P
	802.11n (40MHz)	Power	2.38GHz ~2.45GHz	/
3		30 MHz ~1 GHz	/	/
		1 GHz ~ 3 GHz	/	/

		3 GHz ~ 18 GHz	/	/
	6	30 MHz ~1 GHz	/	/
		1 GHz ~ 3 GHz	/	/
		3 GHz ~ 18 GHz	/	/
	Power	2.45GHz ~2.5GHz	/	/
	9	30 MHz ~1 GHz	/	/
		1 GHz ~ 3 GHz	/	/
		3 GHz ~ 18 GHz	/	/
/	All channels	18 GHz~ 26.5 GHz	Fig.130	P

Conclusion: PASS

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

802.11b

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2762.200	45.9	-27.1	33.3	39.655	H
2792.200	45.8	-26.3	33.3	38.854	V
2793.800	45.8	-26.3	33.3	38.831	H
2778.000	45.8	-26.3	33.3	38.821	V
2773.400	45.8	-27.1	33.3	39.544	V
2731.000	45.7	-27.6	33.3	39.990	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2789.600	45.7	-26.3	33.3	38.742	V
2775.000	45.7	-27.1	33.3	39.463	V
2794.200	45.6	-26.3	33.3	38.670	H
2772.400	45.6	-27.1	33.3	39.390	V
2782.600	45.6	-26.3	33.3	38.630	H
2786.600	45.6	-26.3	33.3	38.615	V

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2783.600	45.8	-26.3	33.3	38.804	V
2793.600	45.7	-26.3	33.3	38.723	V
2767.600	45.6	-27.1	33.3	39.423	V
2782.600	45.6	-26.3	33.3	38.668	V
2791.400	45.6	-26.3	33.3	38.662	H
2787.200	45.6	-26.3	33.3	38.652	V

802.11g

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2792.000	45.8	-26.3	33.3	38.824	V
2775.400	45.7	-27.1	33.3	39.535	V
2756.600	45.7	-27.1	33.3	39.529	H
2795.000	45.7	-26.3	33.3	38.776	V
2763.000	45.7	-27.1	33.3	39.501	V
2799.600	45.7	-26.3	33.3	38.715	V

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2794.000	45.7	-26.3	33.3	38.733	H
2769.200	45.6	-27.1	33.3	39.384	V
2765.800	45.6	-27.1	33.3	39.384	V
2781.600	45.6	-26.3	33.3	38.635	H
2770.200	45.6	-27.1	33.3	39.364	V
2776.000	45.6	-26.3	33.3	38.612	V

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2791.800	45.7	-26.3	33.3	38.710	V
2773.800	45.7	-27.1	33.3	39.435	V
2771.200	45.6	-27.1	33.3	39.408	V
2770.600	45.6	-27.1	33.3	39.382	V
2799.200	45.6	-26.3	33.3	38.631	H
2766.400	45.6	-27.1	33.3	39.367	V

802.11n-HT20

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2794.000	45.8	-26.3	33.3	38.832	V
2767.800	45.8	-27.1	33.3	39.565	V
2794.200	45.7	-26.3	33.3	38.775	H
2756.200	45.7	-27.1	33.3	39.511	V
2796.400	45.7	-26.3	33.3	38.753	H
2799.000	45.7	-26.3	33.3	38.693	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2785.200	45.6	-26.3	33.3	38.657	V
2789.200	45.6	-26.3	33.3	38.654	H
2762.400	45.6	-27.1	33.3	39.367	V
2774.000	45.6	-27.1	33.3	39.351	H
2794.600	45.6	-26.3	33.3	38.602	H
2803.000	45.6	-26.3	33.8	38.102	V

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2774.000	45.7	-27.1	33.3	39.464	V
2738.200	45.7	-27.6	33.3	39.920	V
2799.400	45.7	-26.3	33.3	38.689	V
2788.400	45.6	-26.3	33.3	38.686	H
2739.600	45.6	-27.6	33.3	39.899	H
2794.800	45.6	-26.3	33.3	38.649	V

802.11n-HT40

Ch3

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

Ch9

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

Test graphs as below:

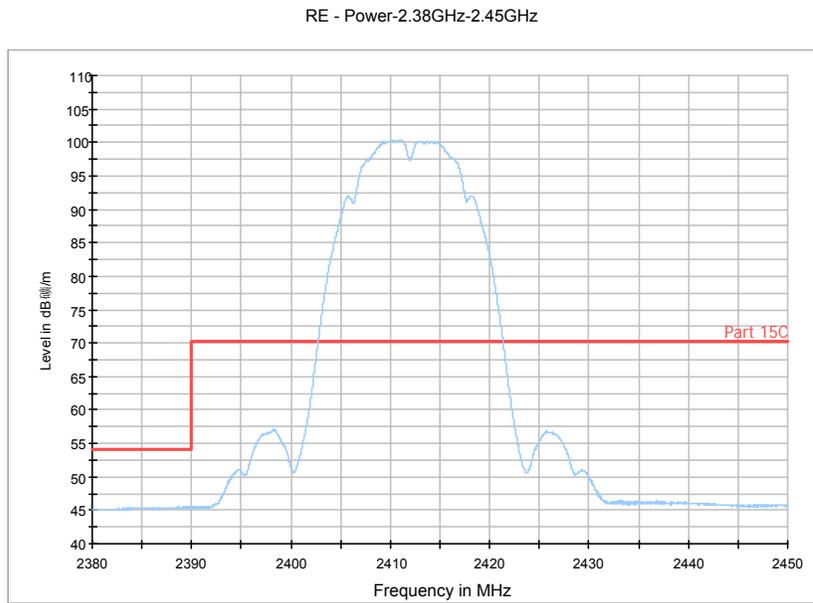


Fig. 97 Radiated Spurious Emission (Power): 802.11b, ch1, 2.38 GHz - 245GHz

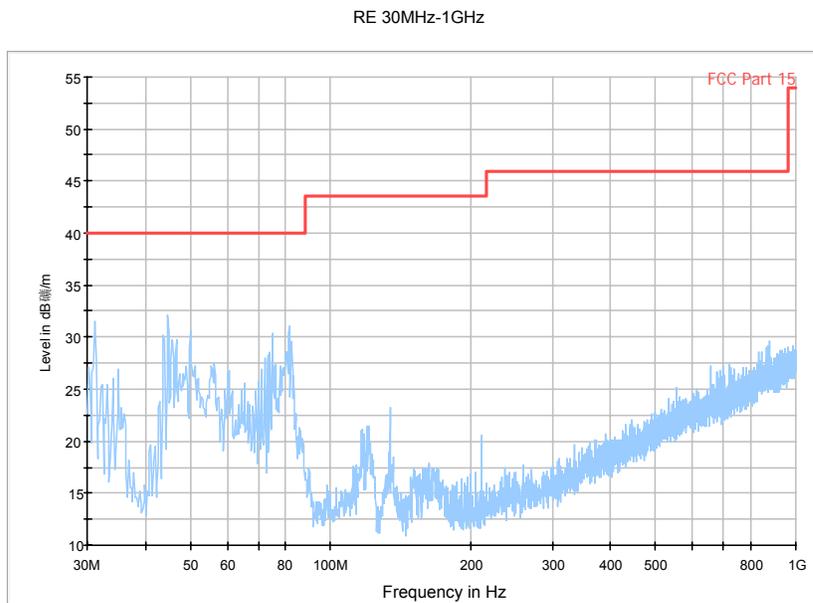


Fig. 98 Radiated Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)

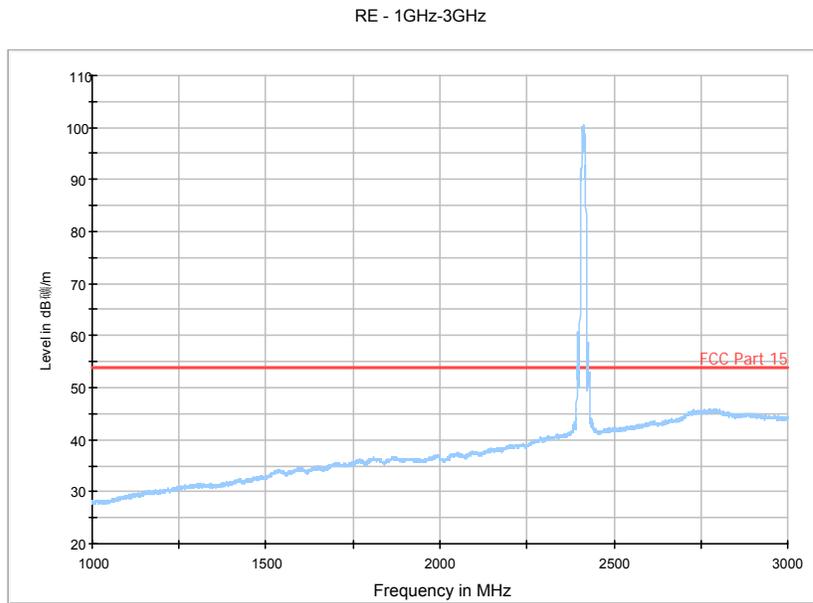


Fig. 99 Radiated Spurious Emission (802.11b, Ch1, 1 GHz-3 GHz)

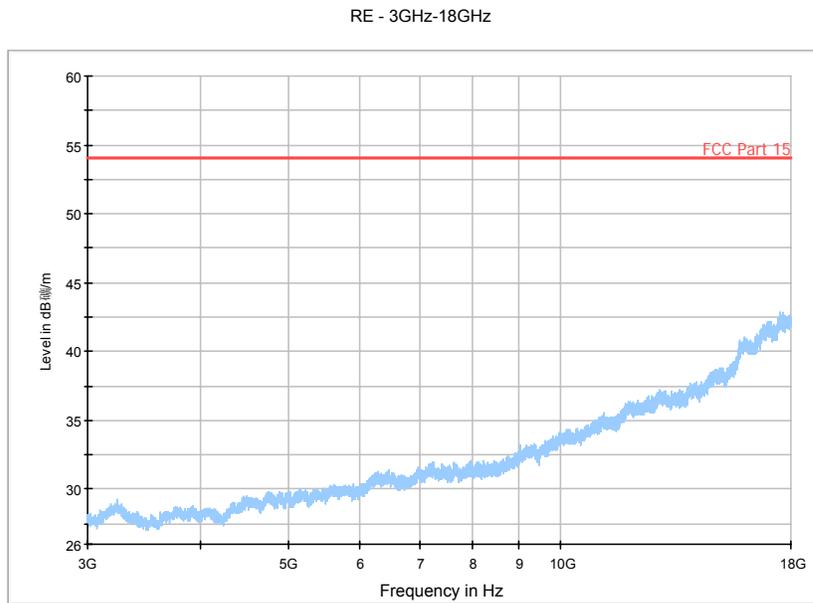


Fig. 100 Radiated Spurious Emission (802.11b, Ch1, 3 GHz-18 GHz)

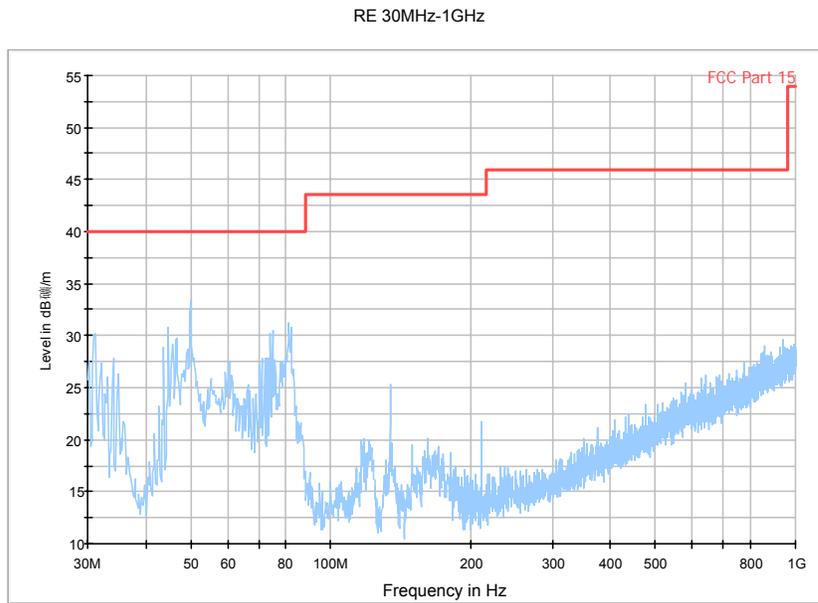


Fig. 101 Radiated Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)

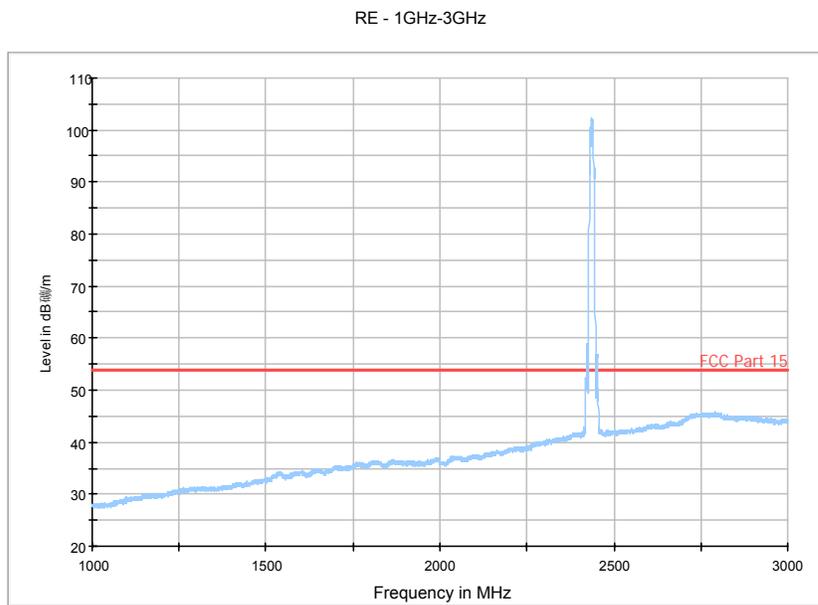


Fig. 102 Radiated Spurious Emission (802.11b, Ch6, 1 GHz-3 GHz)

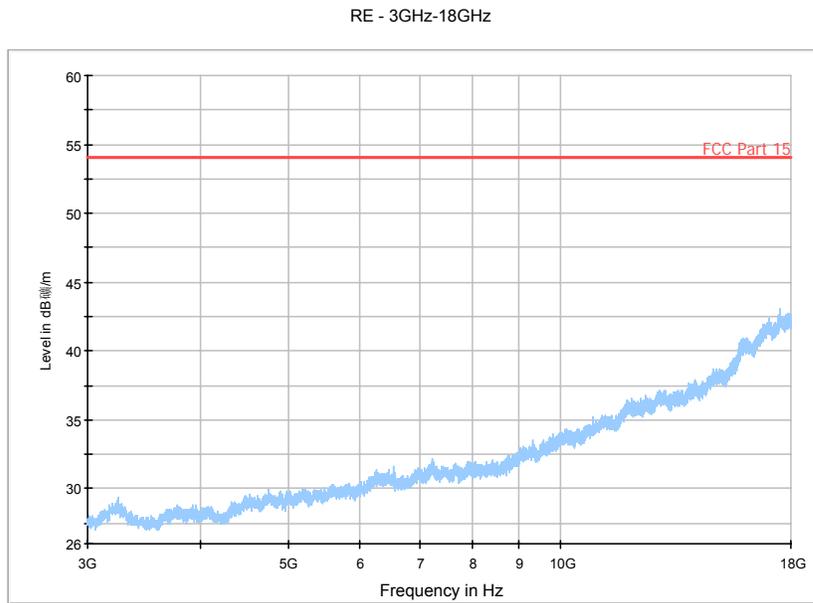


Fig. 103 Radiated Spurious Emission (802.11b, Ch6, 3 GHz-18 GHz)

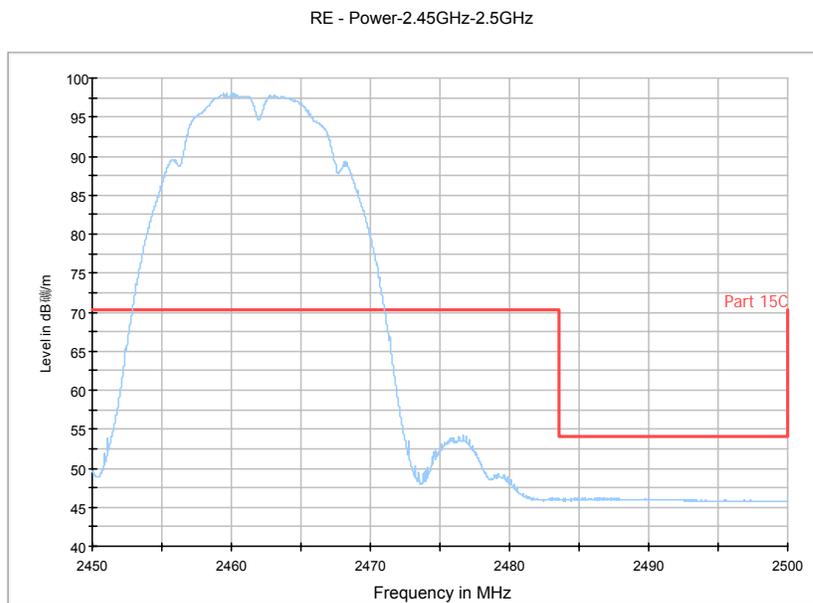


Fig. 104 Radiated Spurious Emission (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

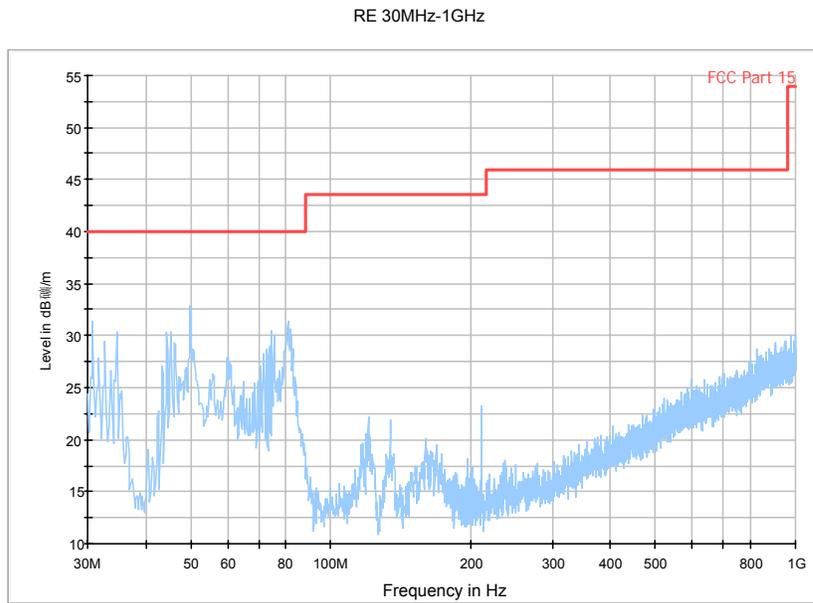


Fig. 105 Radiated Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)

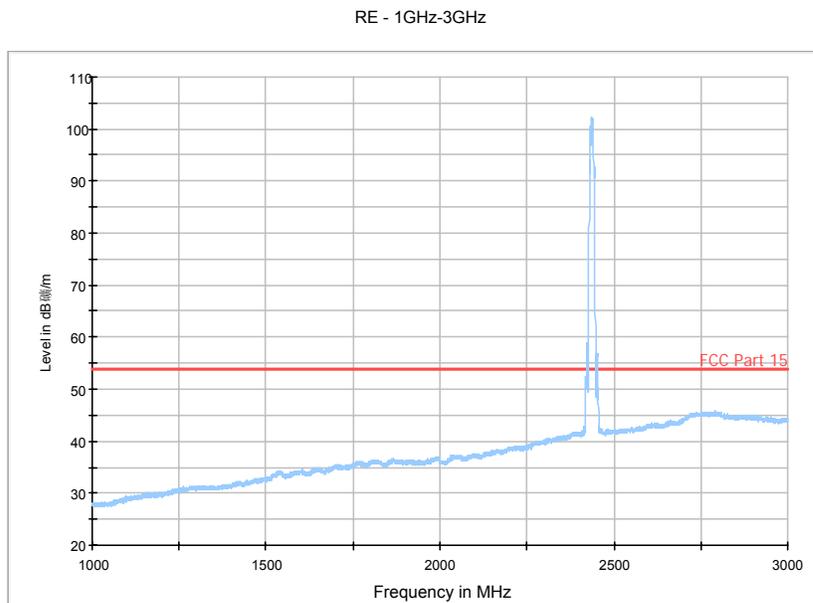


Fig. 106 Radiated Spurious Emission (802.11b, Ch11, 1 GHz-3 GHz)

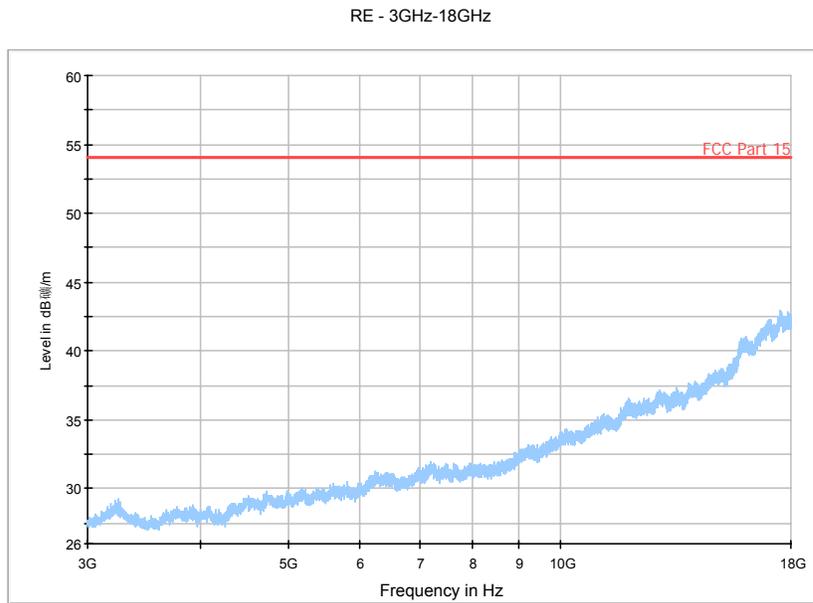


Fig. 107 Radiated Spurious Emission (802.11b, Ch11, 3 GHz-18 GHz)

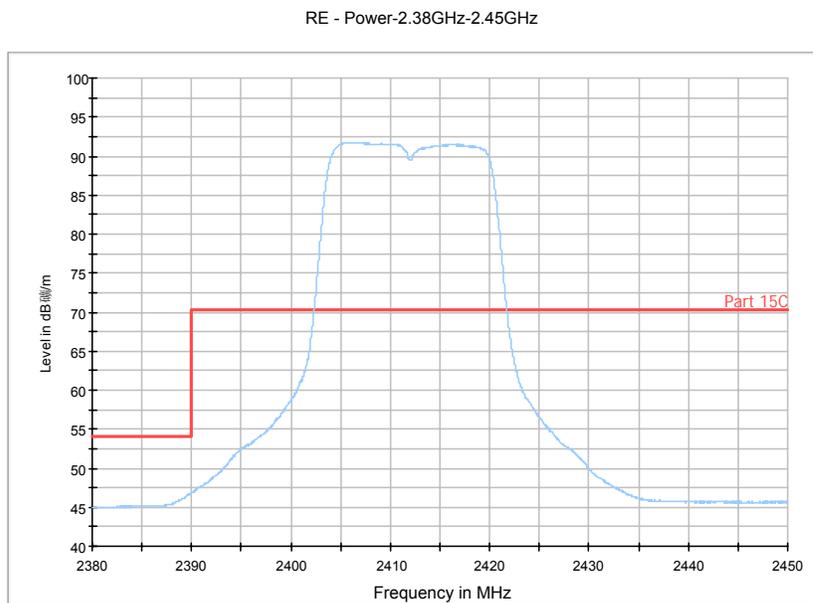


Fig. 108 Radiated Spurious Emission (Power): 802.11g, ch1, 2.38 GHz - 2.45GHz

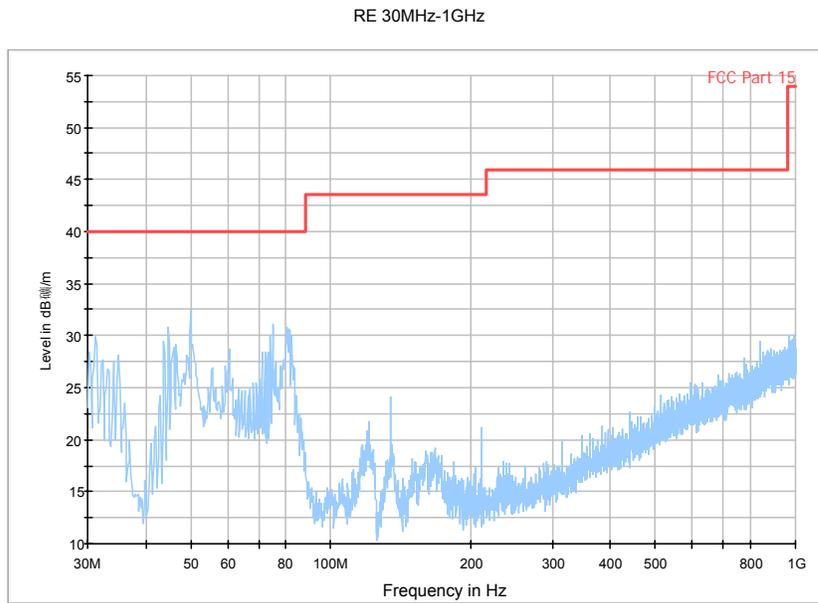


Fig. 109 Radiated Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)

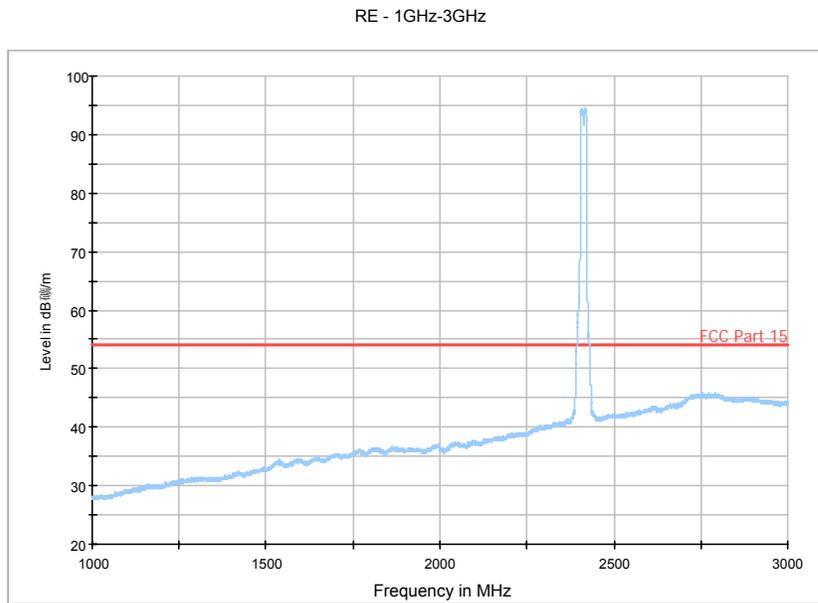


Fig. 110 Radiated Spurious Emission (802.11g, Ch1, 1 GHz-3 GHz)

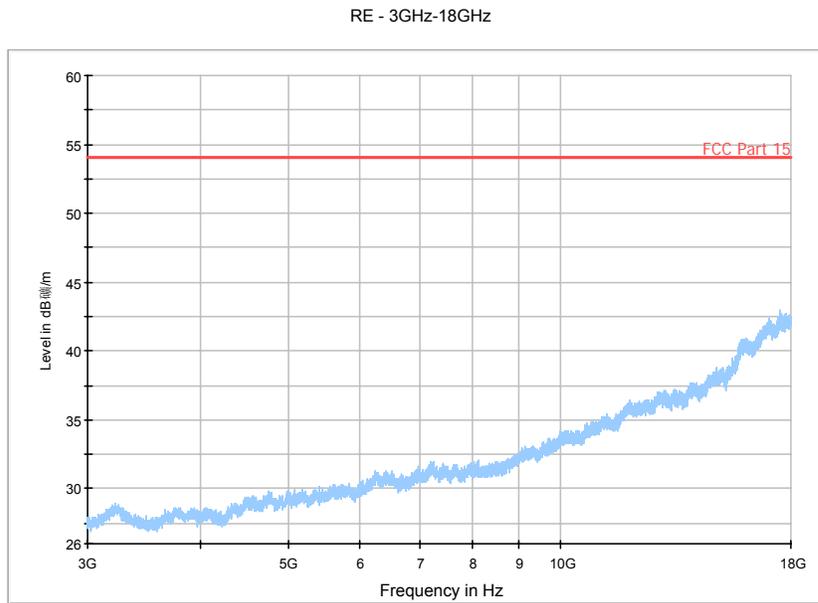


Fig. 111 Radiated Spurious Emission (802.11g, Ch1, 3 GHz-18 GHz)

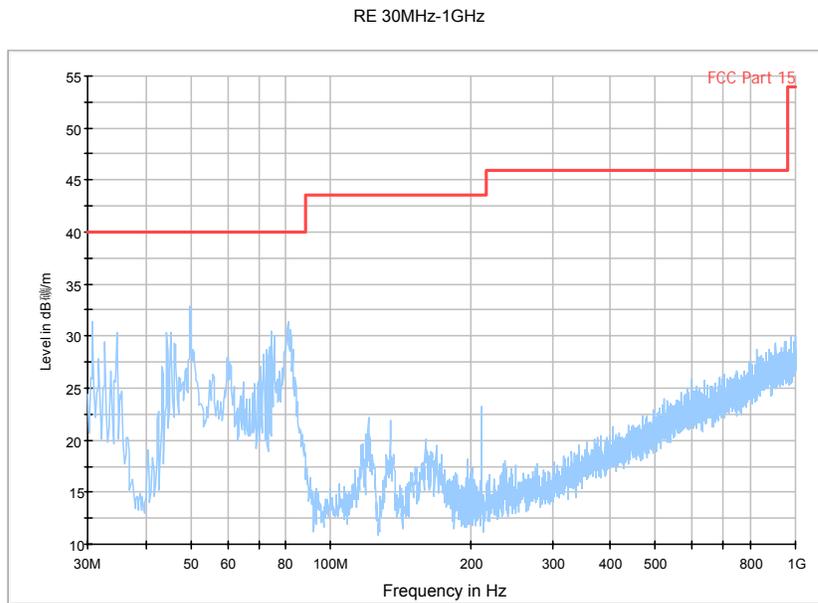


Fig. 112 Radiated Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)

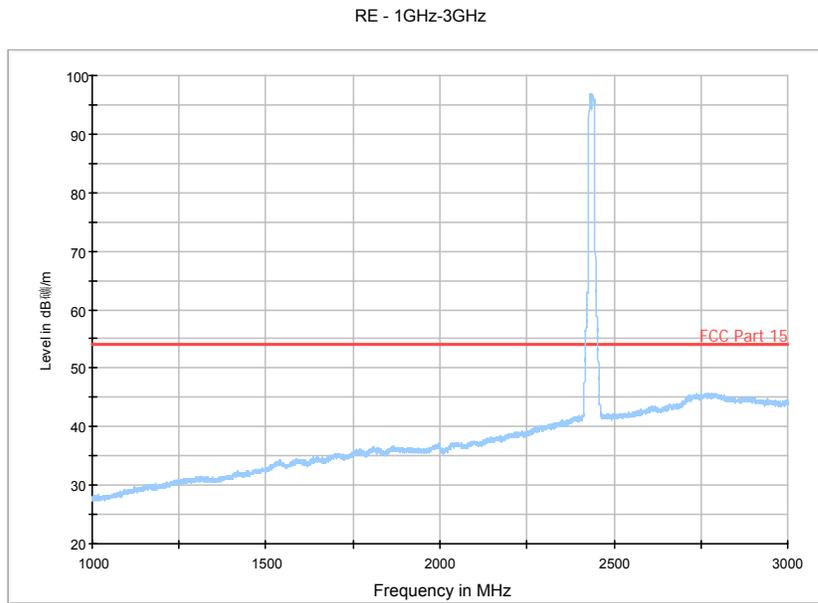


Fig. 113 Radiated Spurious Emission (802.11g, Ch6, 1 GHz-3 GHz)

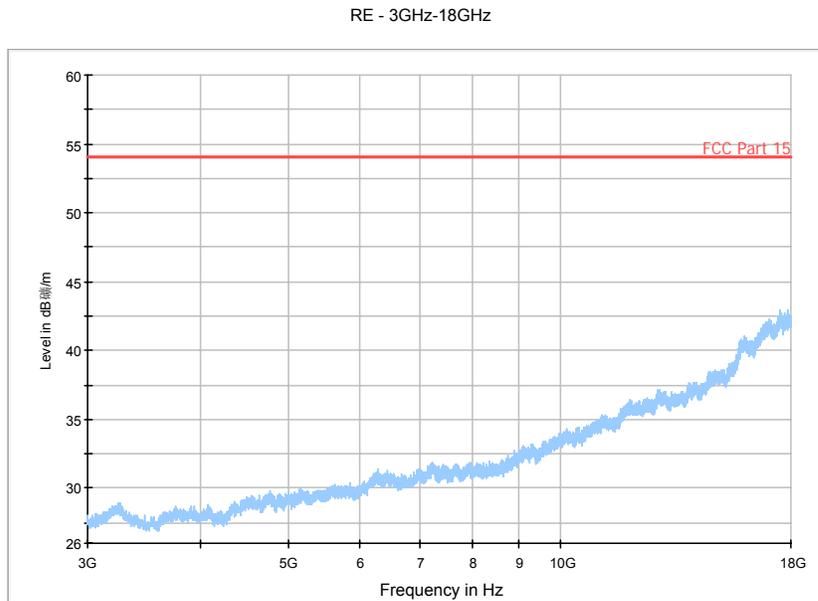


Fig. 114 Radiated Spurious Emission (802.11g, Ch6, 3 GHz-18 GHz)

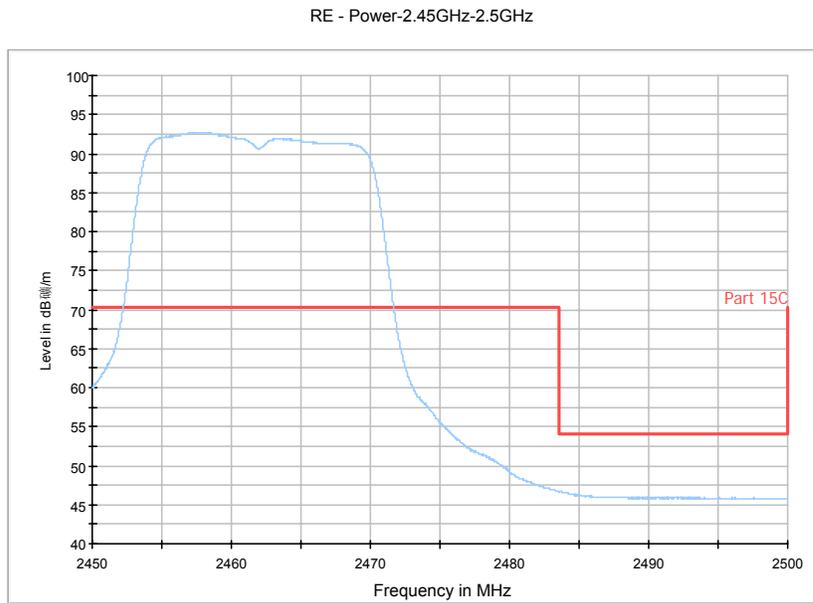


Fig. 115 Radiated Spurious Emission (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

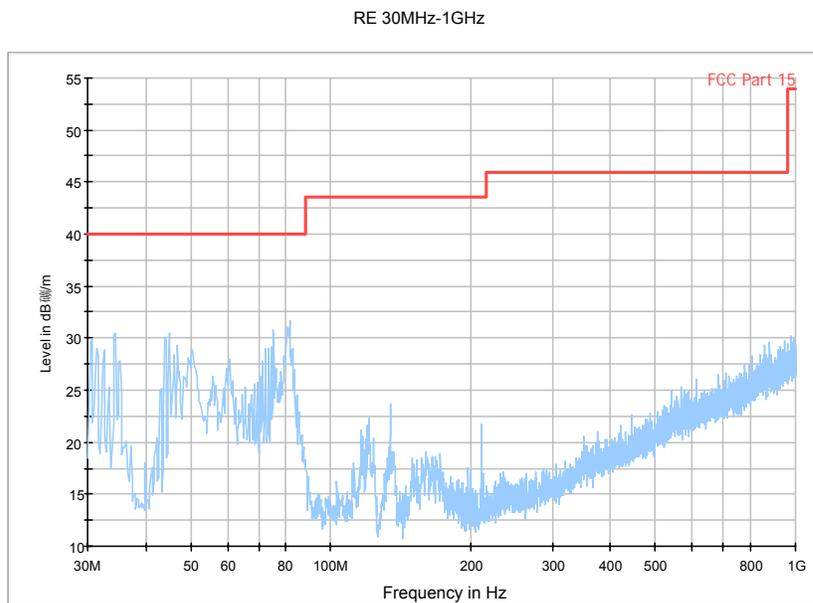


Fig. 116 Radiated Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)

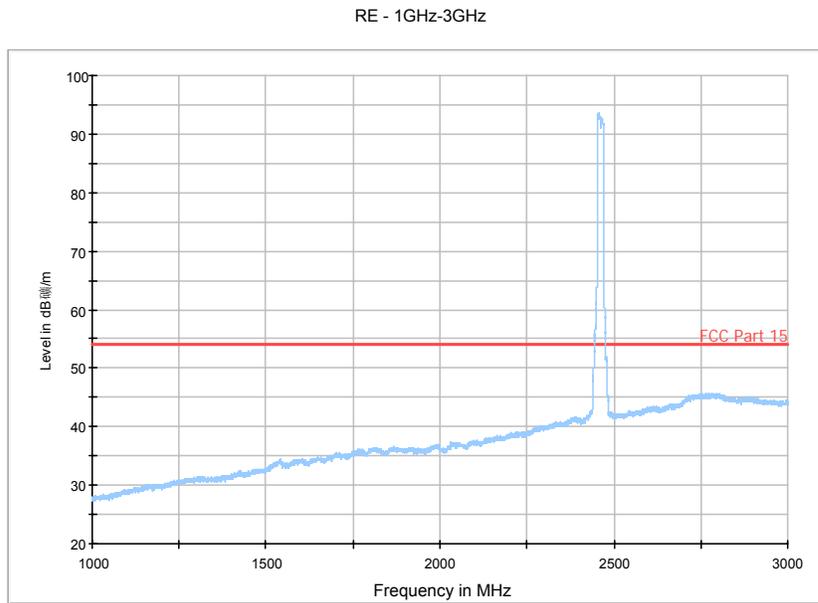


Fig. 117 Radiated Spurious Emission (802.11g, Ch11, 1 GHz-3 GHz)

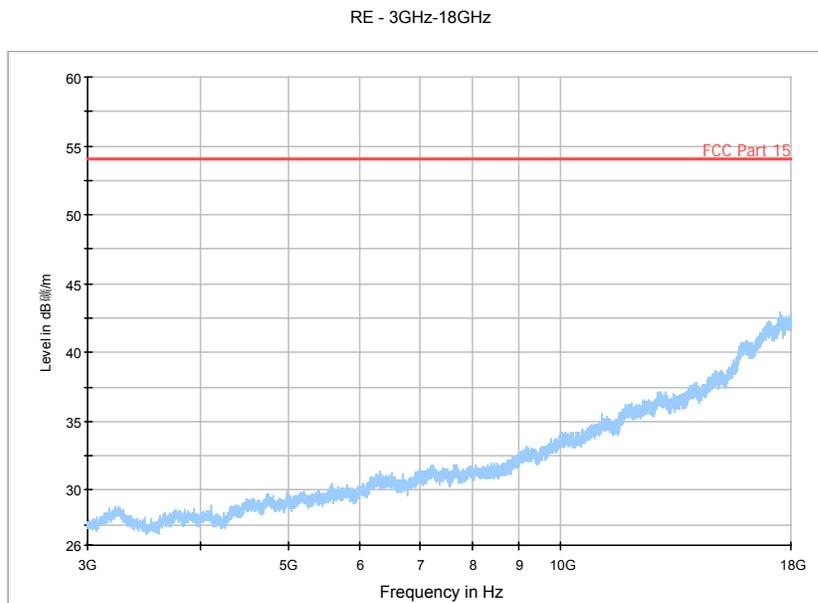


Fig. 118 Radiated Spurious Emission (802.11g, Ch11, 3 GHz-18 GHz)

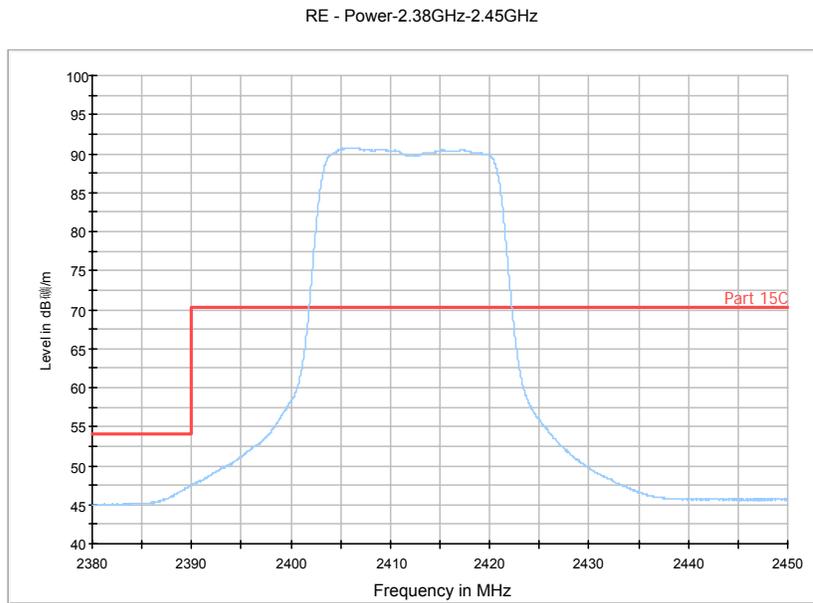


Fig. 119 Radiated Spurious Emission (Power): 802.11n-20MHz, ch1, 2.38 GHz - 2.45GHz

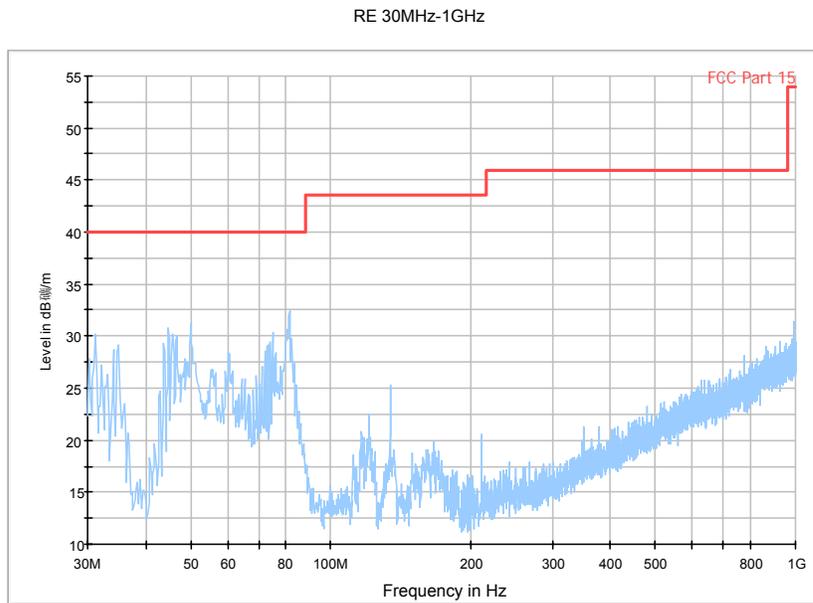


Fig. 120 Radiated Spurious Emission (802.11n-20MHz, Ch1, 30 MHz-1 GHz)

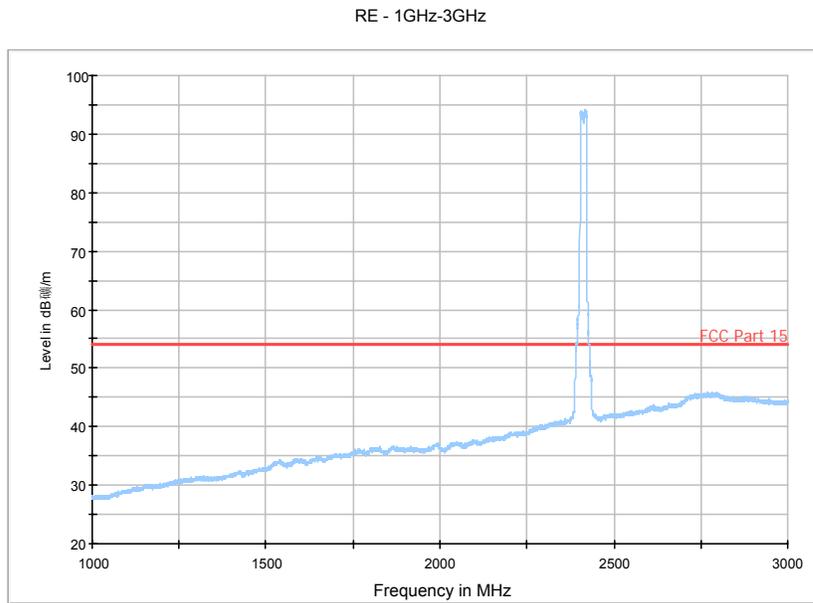


Fig. 121 Radiated Spurious Emission (802.11n-20MHz, Ch1, 1 GHz-3 GHz)

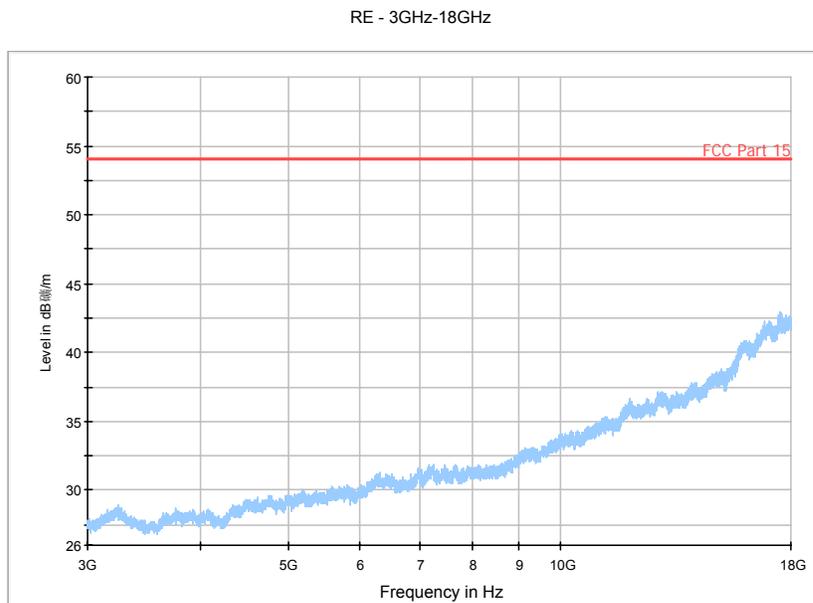


Fig. 122 Radiated Spurious Emission (802.11n-20MHz, Ch1, 3 GHz-18 GHz)

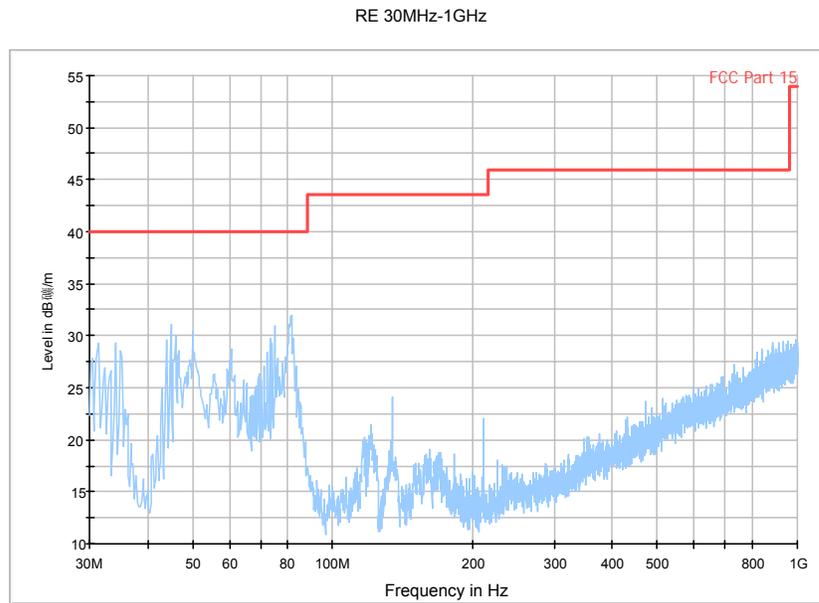


Fig. 123 Radiated Spurious Emission (802.11n-20MHz, Ch6, 30 MHz-1 GHz)

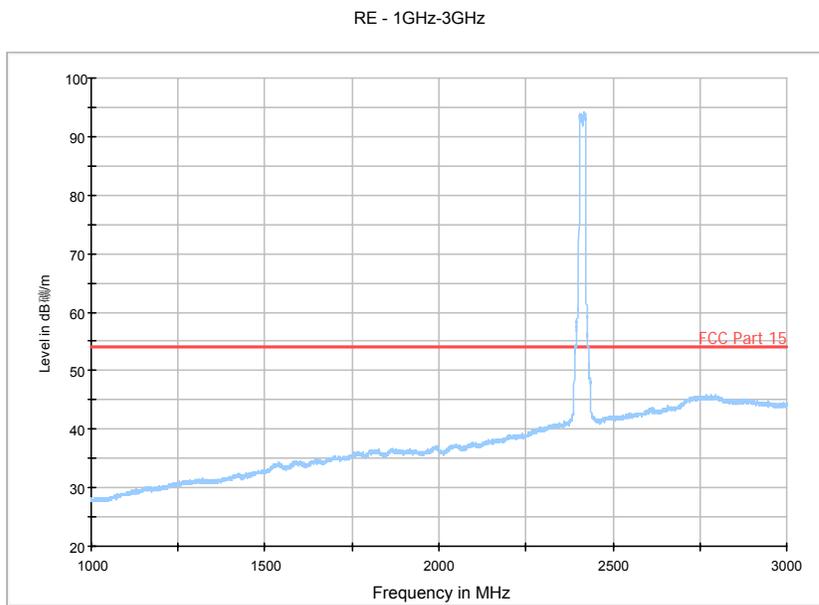


Fig. 124 Radiated Spurious Emission (802.11n-20MHz, Ch6, 1 GHz-3 GHz)

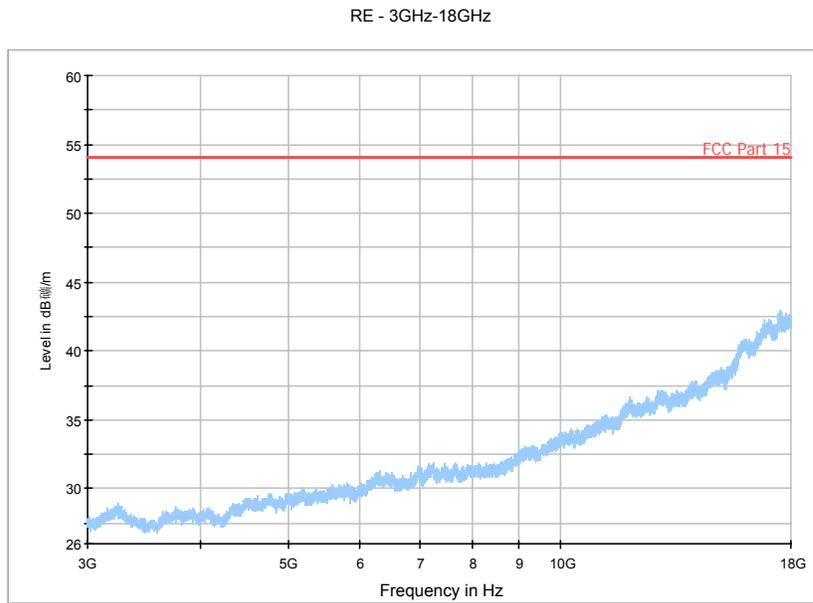


Fig. 125 Radiated Spurious Emission (802.11n-20MHz, Ch6, 3 GHz-18 GHz)

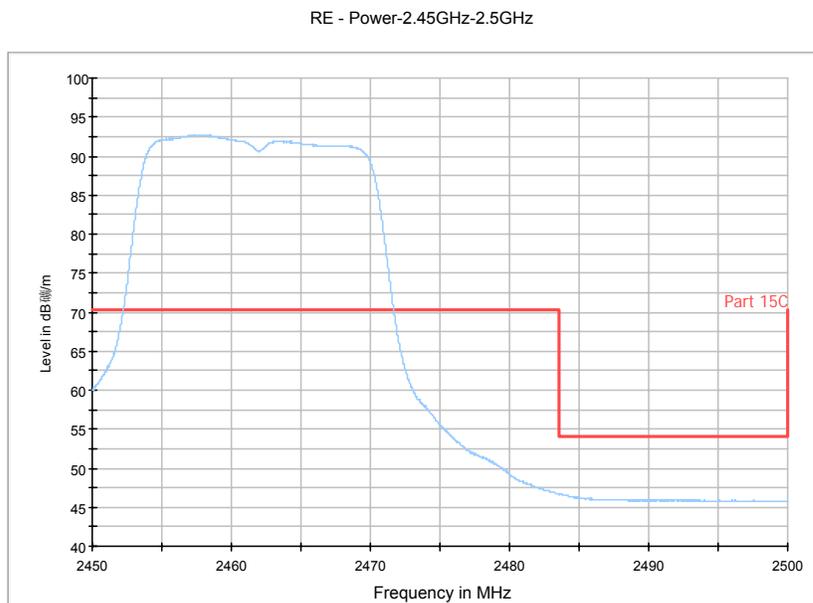


Fig. 126 Radiated Spurious Emission (Power): 802.11n-20MHz, ch11, 2.45 GHz - 2.50GHz

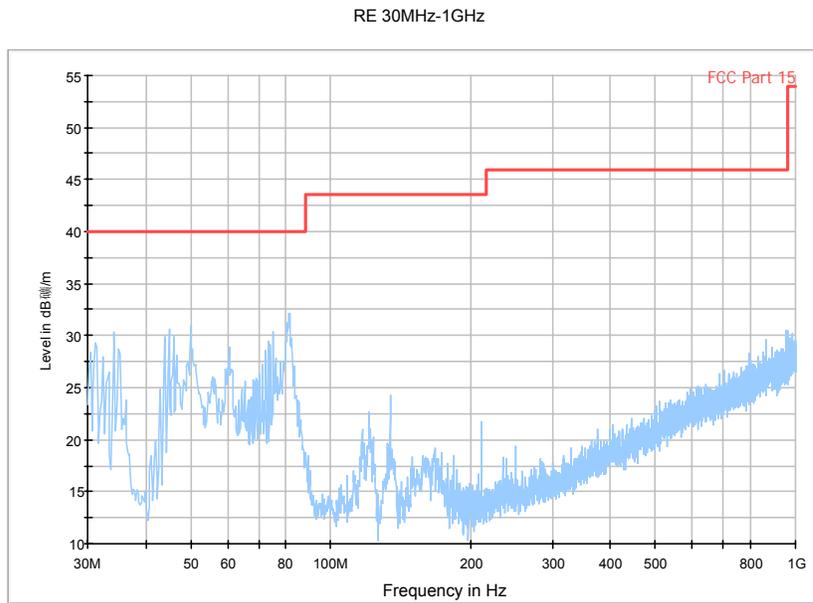


Fig. 127 Radiated Spurious Emission (802.11n-20MHz, Ch11, 30 MHz-1 GHz)

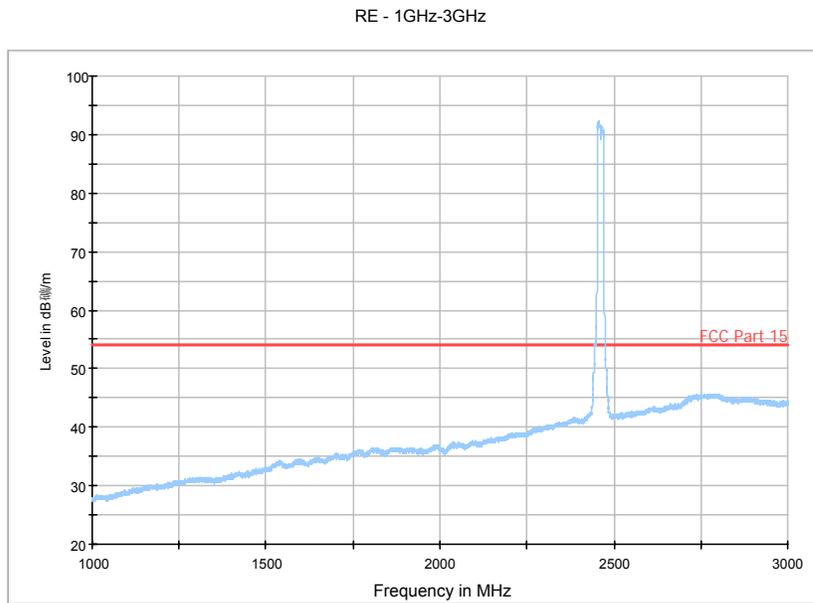


Fig. 128 Radiated Spurious Emission (802.11n-20MHz, Ch11, 1 GHz-3 GHz)

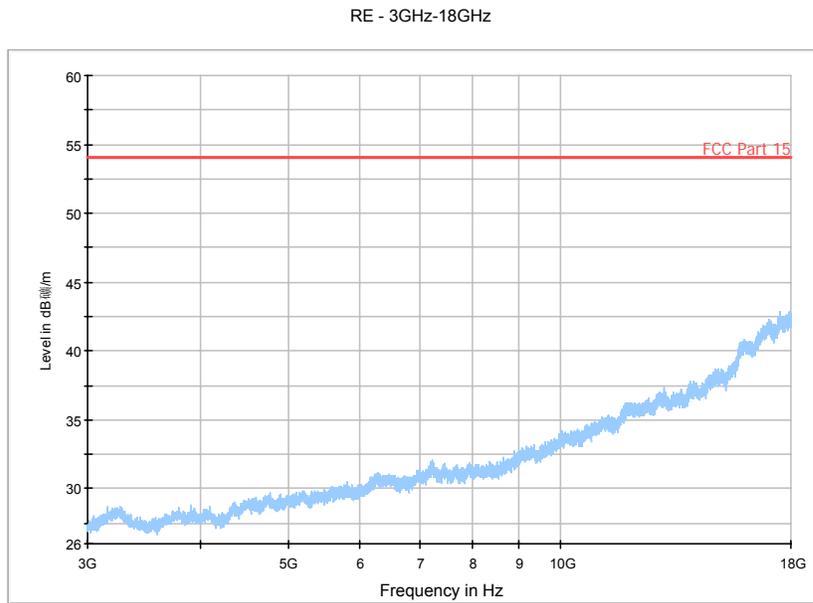


Fig. 129 Radiated Spurious Emission (802.11n-20MHz, Ch11, 3 GHz-18 GHz)

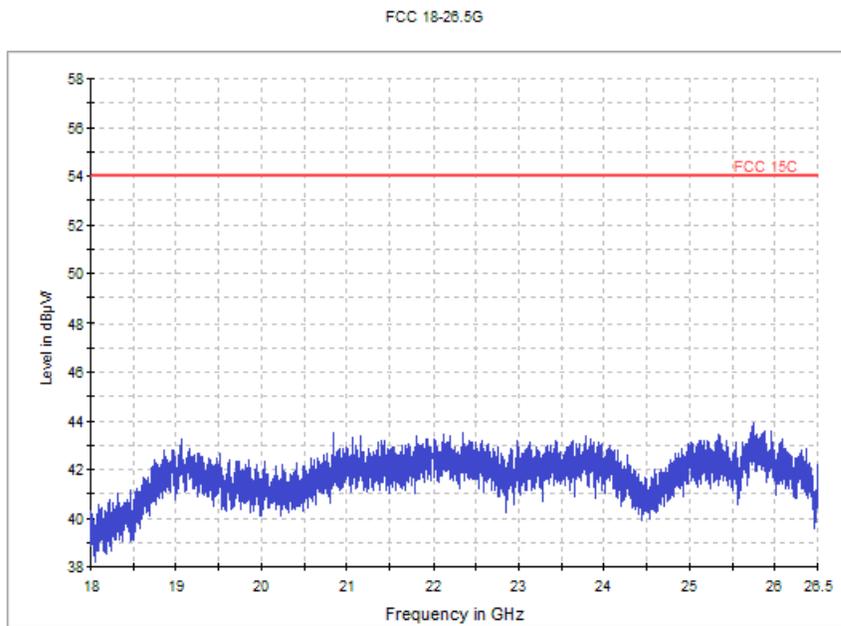


Fig. 130 Radiated Spurious Emission (All channels): 18GHz - 26.5GHz

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11n	IDLE	
0.15 to 0.5	66 to 56	Fig. 131	Fig.132	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11n	IDLE	
0.15 to 0.5	56 to 46	Fig.131	Fig.132	P
0.5 to 5	46			
5 to 30	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

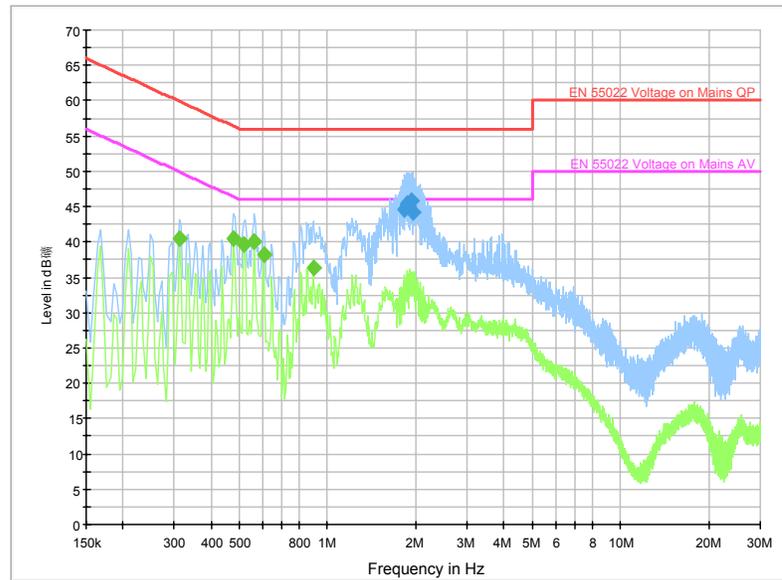


Fig. 131 AC Powerline Conducted Emission-802.11b

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.837500	44.7	GND	L1	10.0	11.3	56.0
1.869000	45.5	GND	L1	10.0	10.5	56.0
1.878000	45.3	GND	L1	10.0	10.7	56.0
1.887000	45.0	GND	L1	10.0	11.0	56.0
1.945500	45.8	GND	L1	10.0	10.2	56.0
1.968000	44.3	GND	L1	10.0	11.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.312000	40.4	GND	N	10.0	9.5	49.9
0.478500	40.4	GND	N	10.0	5.9	46.4
0.519000	39.7	GND	N	10.0	6.3	46.0
0.564000	40.1	GND	N	10.0	5.9	46.0
0.604500	38.2	GND	N	10.0	7.8	46.0
0.897000	36.3	GND	N	10.0	9.7	46.0

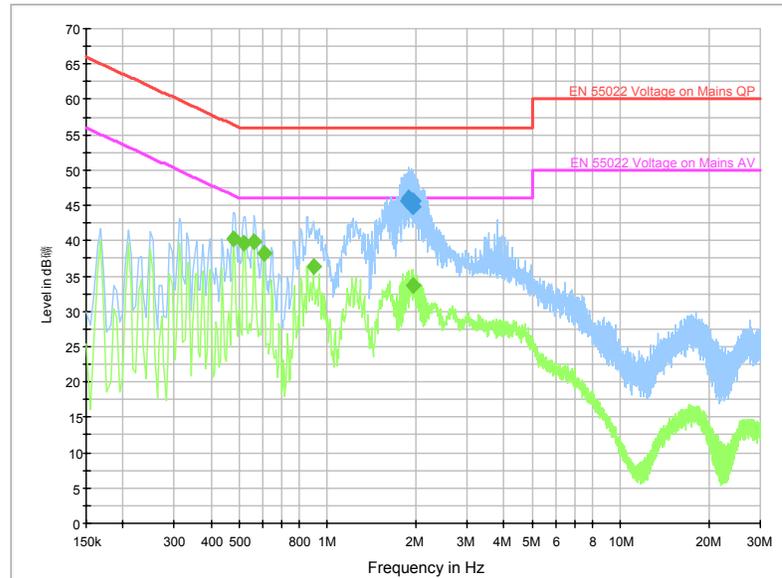


Fig. 132 AC Powerline Conducted Emission-802.11g

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.860000	45.6	GND	L1	10.0	10.4	56.0
1.900500	46.0	GND	L1	10.0	10.0	56.0
1.932000	45.1	GND	L1	10.0	10.9	56.0
1.941000	45.5	GND	L1	10.0	10.5	56.0
1.950000	45.5	GND	L1	10.0	10.5	56.0
1.963500	44.8	GND	L1	10.0	11.2	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.478500	40.3	GND	N	10.0	6.0	46.4
0.519000	39.7	GND	N	10.0	6.3	46.0
0.564000	39.9	GND	N	10.0	6.1	46.0
0.604500	38.2	GND	N	10.0	7.8	46.0
0.897000	36.3	GND	N	10.0	9.7	46.0
1.950000	33.6	GND	L1	10.0	12.4	46.0

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