



FCC PART 15C TEST REPORT No.2012WLN0406

for

TCT Mobile Limited

HSUPA/HSDPA/UMTS single band / GSM quad bands mobile phone

Model: GIN NFC VF

Market Name: Vodafone Smart 861

With

FCC ID: RAD305

Hardware Version: PIO

Software Version: 01003

Issued Date: 2012-09-03



No. DGA-PL-114/01-02

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

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IC O.A.T.S listed: No.6629A-1

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
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Postal Code: 100191
Telephone: 008610623046332678
Fax: 008610623046332504

1.2. Testing Environment

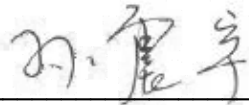
Normal Temperature: 15-30°C
Extreme Temperature: -20/+55°C
Relative Humidity: 30-60%
Air Pressure 990hPa-1040hPa

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: 2011-11-25
Testing End Date: 2011-12-20

1.4. Signature



Sun Zhenyu
(Prepared this test report)



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(Reviewed this test report)



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2. CLIENT INFORMATION

2.1. Applicant Information

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2.2. Manufacturer Information

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City: Shanghai
Postal Code: 201203
Country: China
Contact Gong Zhizhou
Email zhizhou.gong @jrdcom.com
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

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

3.1. About EUT

Description	HSUPA/HSDPA/UMTS single band / GSM quad bands mobile phone
Model	GIN NFC VF
Market name	Vodafone Smart 861
FCC ID	RAD305
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	23.53dBm(CCK)
Power Supply	3.8V 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	/	PIO	01003
EUT2	/	PIO	01003

*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	CAB31P0000C1	/
AE2	Battery	CAB31P0000C2	/
AE3	Travel Adapter	CBA6050AA1C1	/
AE4	Travel Adapter	CBA6050AA1C2	

*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 HSUPA/HSDPA/UMTS single band / GSM quad bands 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	American National Standard for Testing 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 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	2012-09-22
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

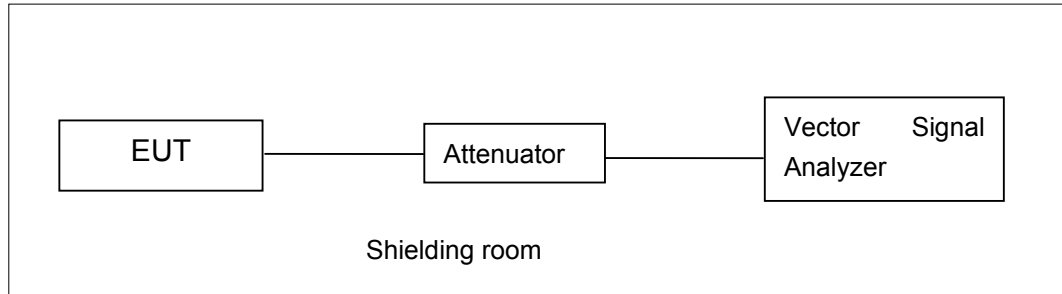
Anechoic chamber by Frankonia German.

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

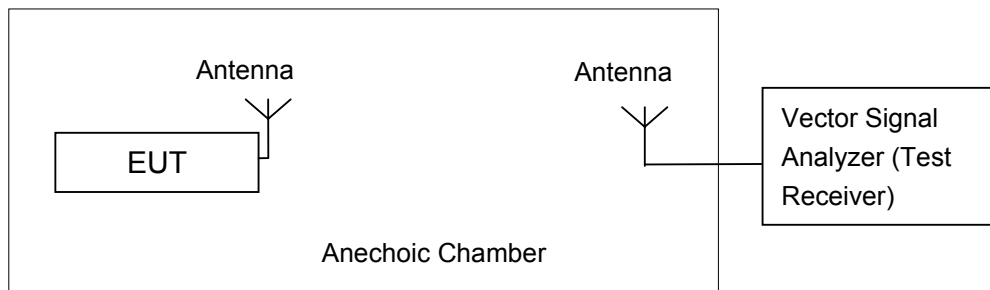


A.1.2. Radiated Emission Measurements

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

EUT ID: EUT2

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	20.41	/	/
	2	20.61	/	/
	5.5	22.66	/	/
	11	23.49	23.24	23.53
802.11g	6	22.04	/	/
	9	22.04	/	/
	12	21.72	/	/
	18	21.68	/	/
	24	22.42	22.35	22.32
	36	22.23	/	/
	48	22.21	/	/
	54	22.32	/	/

The data rate 11Mbps and 24Mbps 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	21.96	/	/
	MCS1	22.06	/	/
	MCS2	22.03	/	/
	MCS3	22.59	/	/
	MCS4	22.58	/	/
	MCS5	22.71	22.72	22.34

	MCS6	22.68	/	/
	MCS7	22.68	/	/

The data rate MCS5 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

EUT ID: EUT2

802.11b/g mode

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	15.30	15.92	15.53
802.11g	12.87	12.58	13.06

802.11n-HT20 mode

Mode	Test Result (dBm)		
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	12.30	12.10	12.62

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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EUT ID: EUT2

Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11b	1	Fig.1	-7.97	P
	6	Fig.2	-7.77	P
	11	Fig.3	-7.95	P
802.11g	1	Fig.4	-10.31	P
	6	Fig.5	-10.67	P
	11	Fig.6	-10.85	P

802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (20MHz)	1	Fig.7	-11.54	P
	6	Fig.8	-11.55	P
	11	Fig.9	-11.31	P

802.11n-HT40 mode

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

Conclusion: PASS

Test graphs as below:

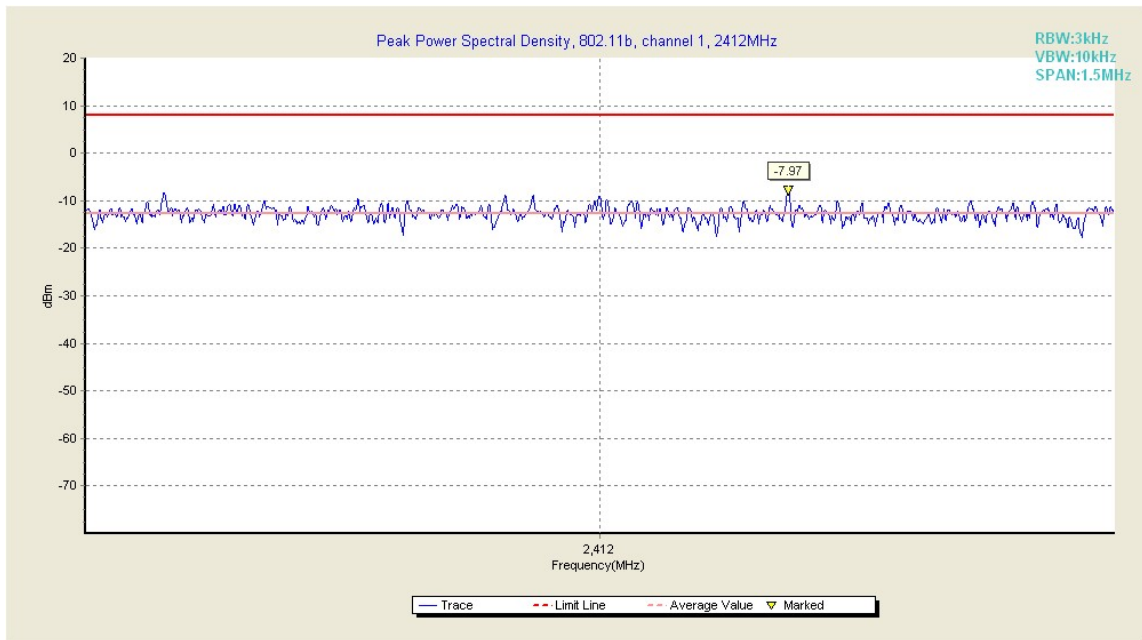


Fig. 1 Power Spectral Density (802.11b, Ch 1)

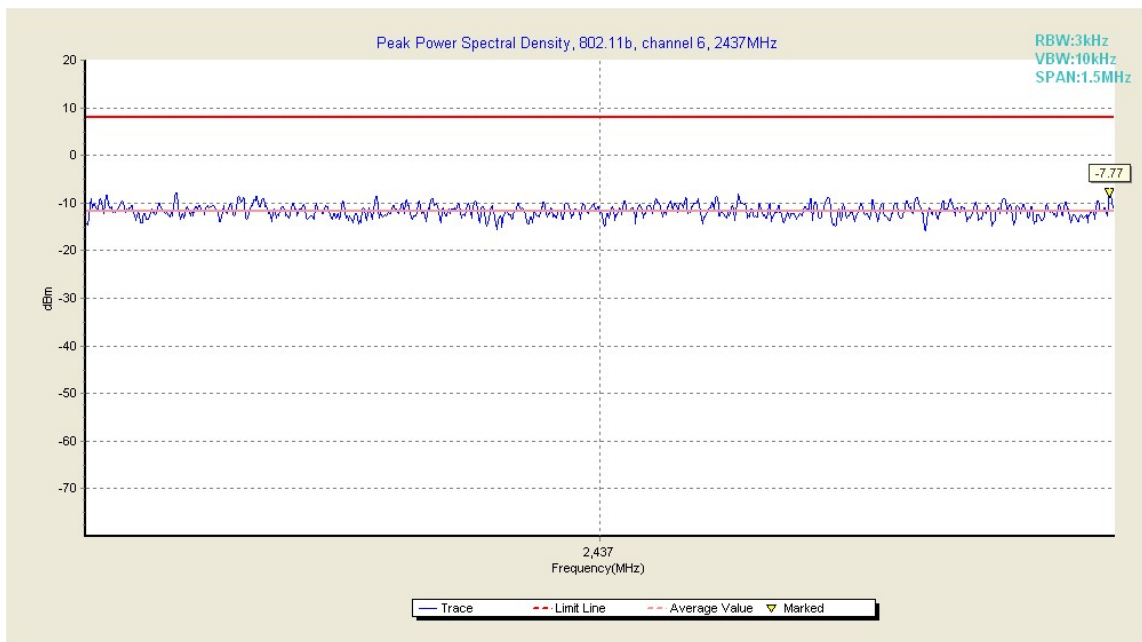


Fig. 2 Power Spectral Density (802.11b, Ch 6)

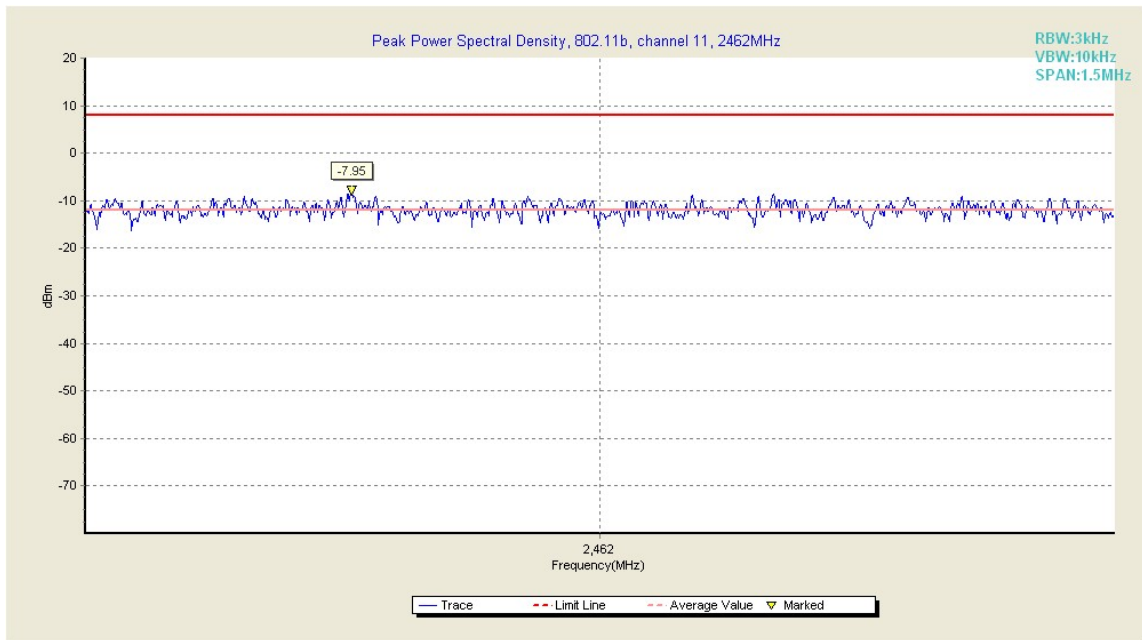


Fig. 3 Power Spectral Density (802.11b, Ch 11)

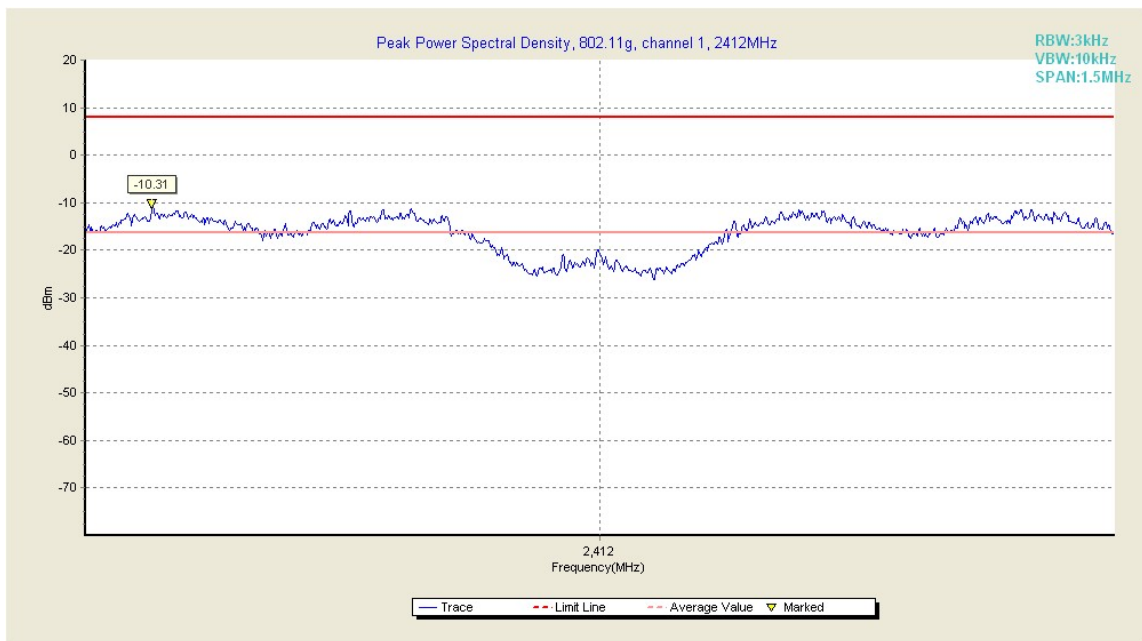


Fig. 4 Power Spectral Density (802.11g, Ch 1)

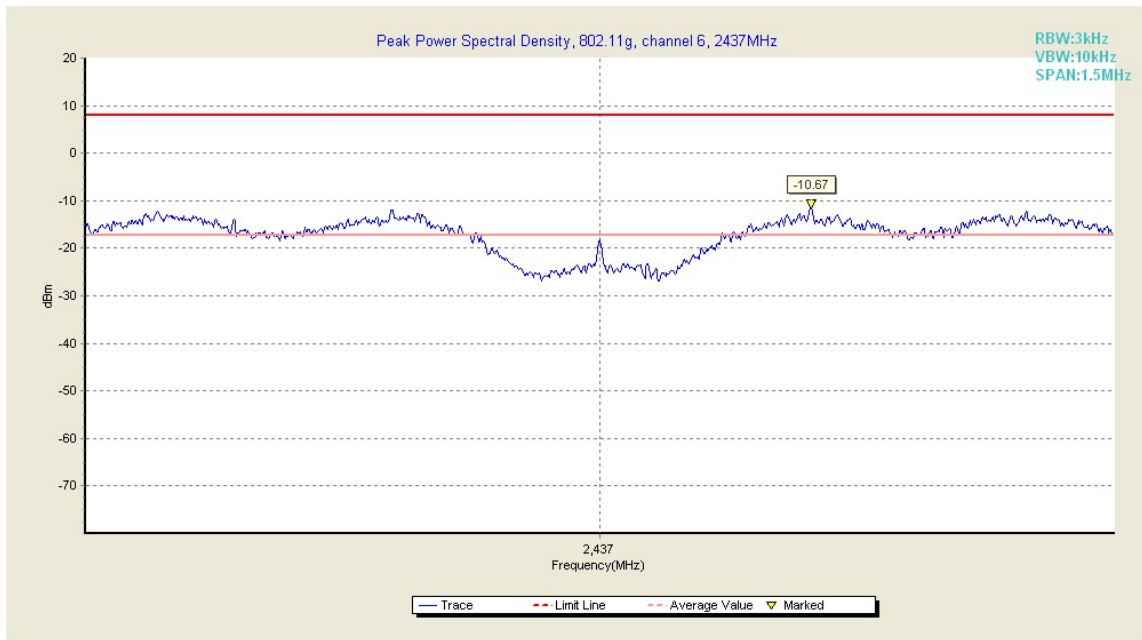


Fig. 5 Power Spectral Density (802.11g, Ch 6)

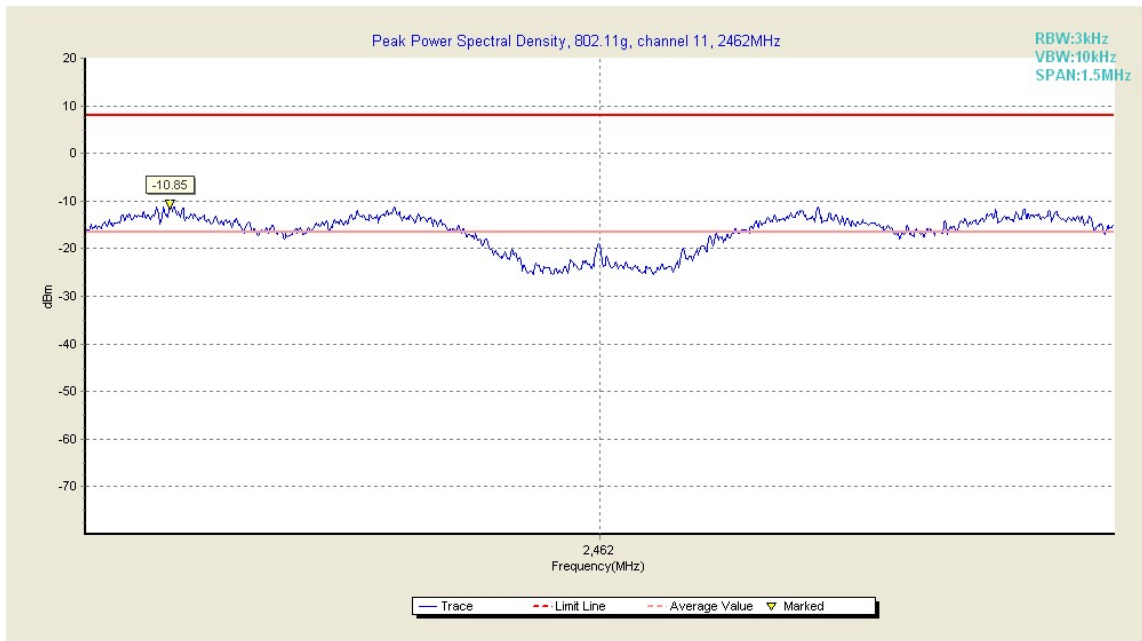


Fig. 6 Power Spectral Density (802.11g, Ch 11)

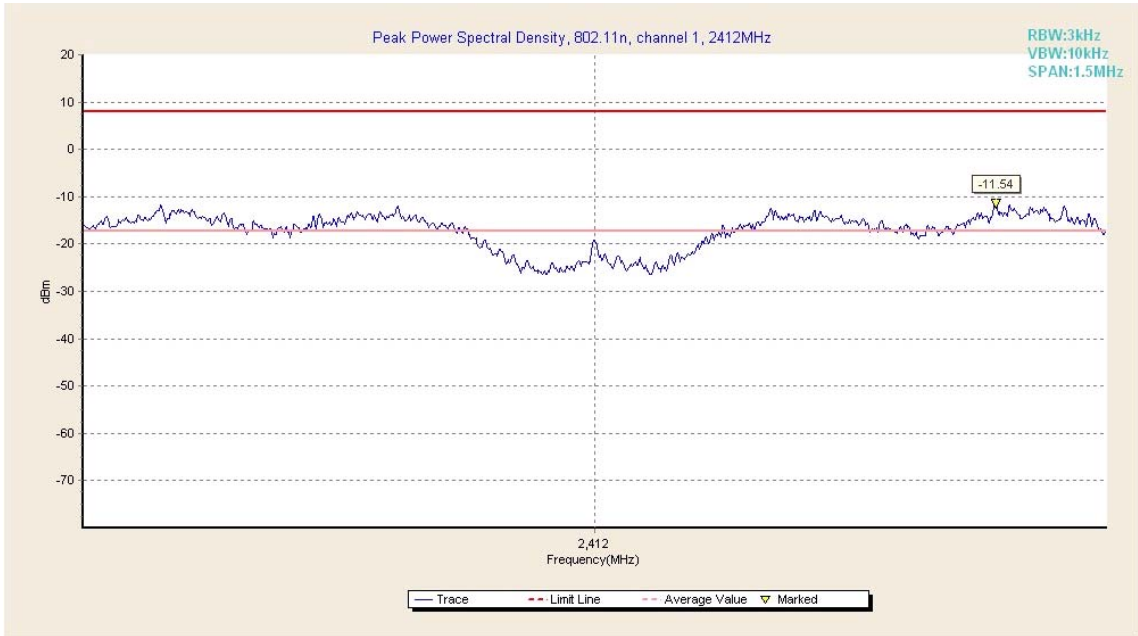


Fig. 7 Power Spectral Density (802.11n-20MHz, Ch 1)

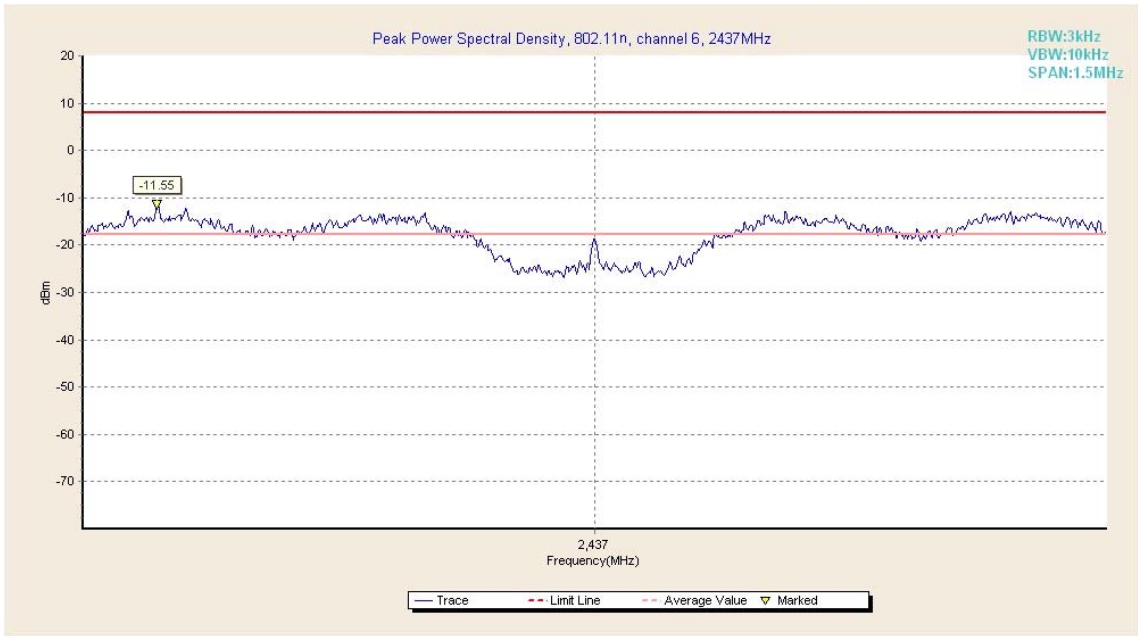


Fig. 8 Power Spectral Density (802.11n-20MHz, Ch 6)

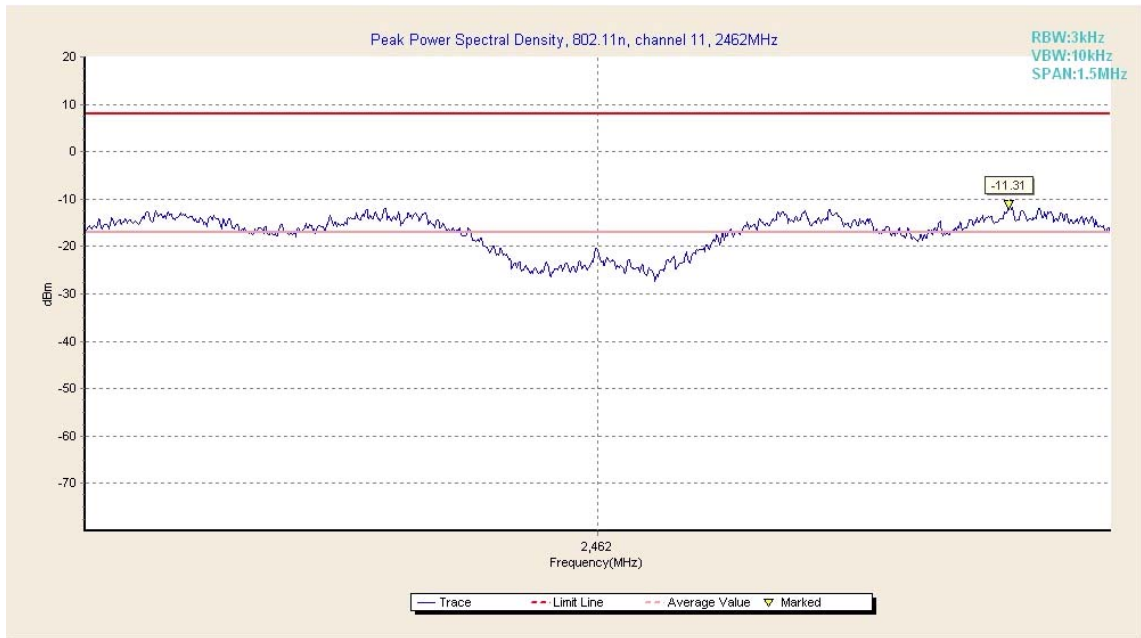


Fig. 9 Power Spectral Density (802.11n-20MHz, Ch 11)

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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EUT ID: EUT2

Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11b	1	Fig.10	9560	P
	6	Fig.11	9300	P
	11	Fig.12	9450	P
802.11g	1	Fig.13	16600	P
	6	Fig.14	16600	P
	11	Fig.15	16600	P

802.11n-HT20 mode

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
802.11n (20MHz)	1	Fig.16	17850	P
	6	Fig.17	17800	P
	11	Fig.18	17800	P

802.11n-HT40 mode

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

Conclusion: PASS

Test graphs as below:

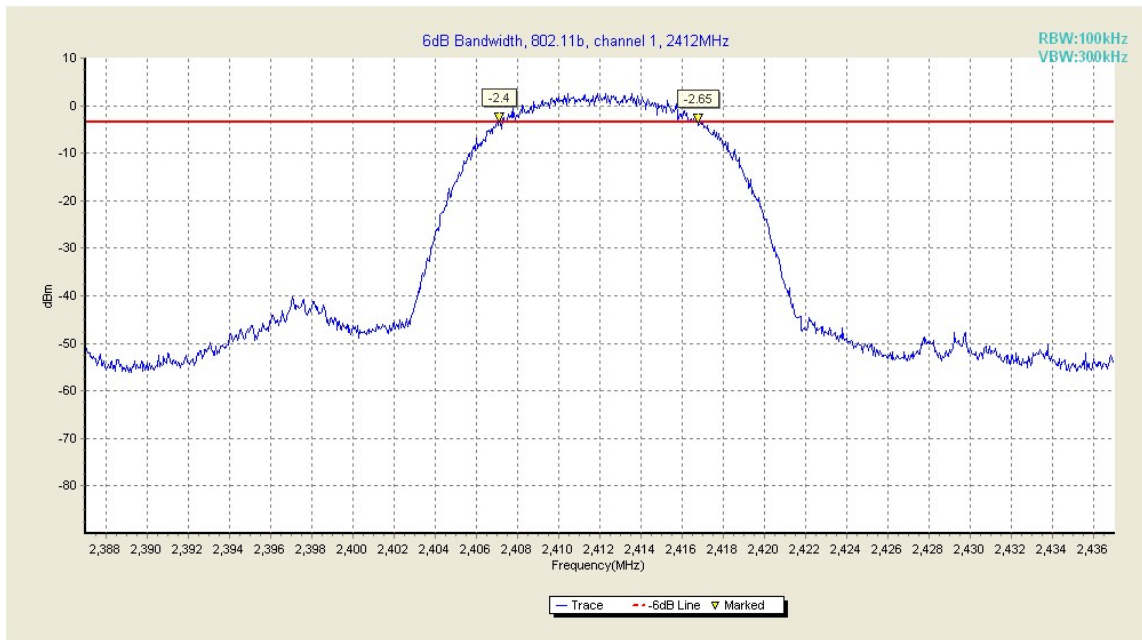


Fig. 10 Occupied 6dB Bandwidth (802.11b, Ch 1)

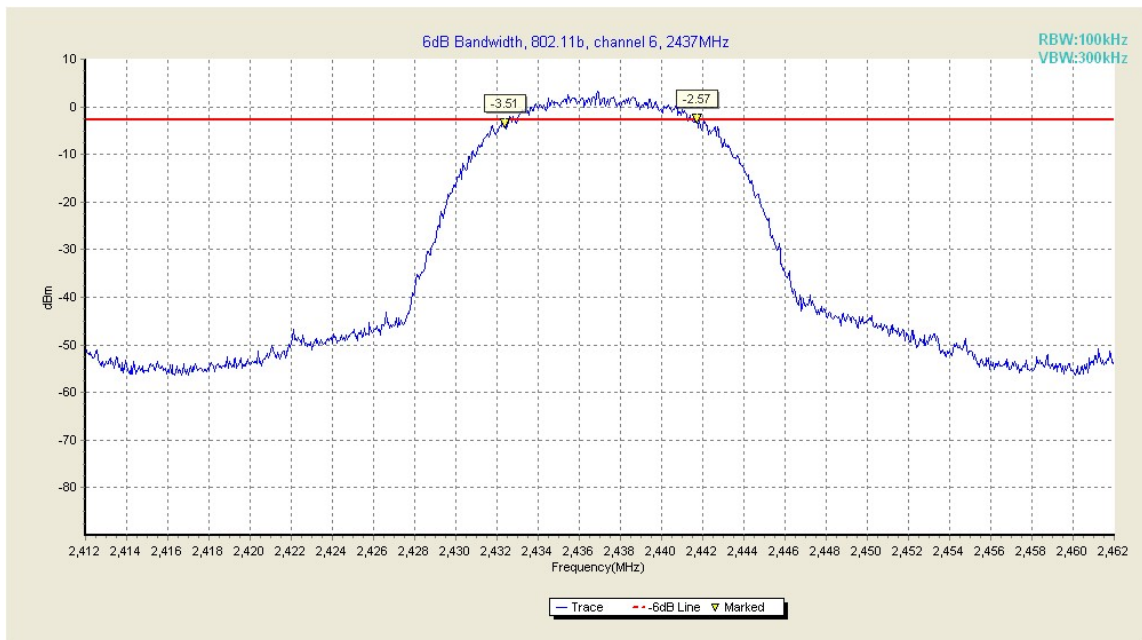


Fig. 11 Occupied 6dB Bandwidth (802.11b, Ch 6)

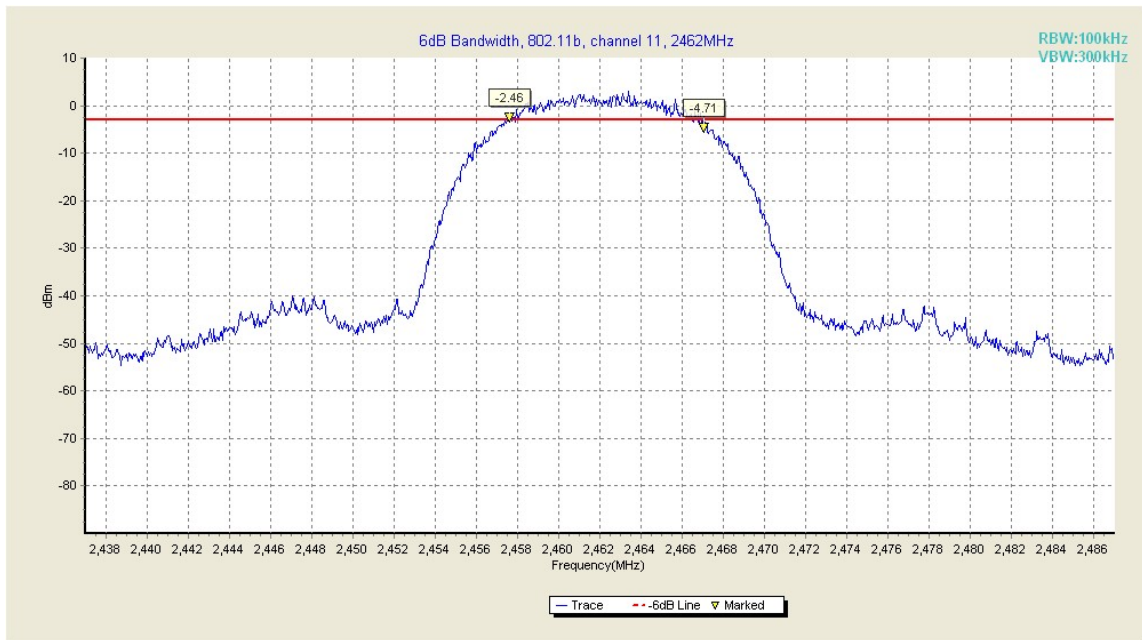


Fig. 12 Occupied 6dB Bandwidth (802.11b, Ch 11)

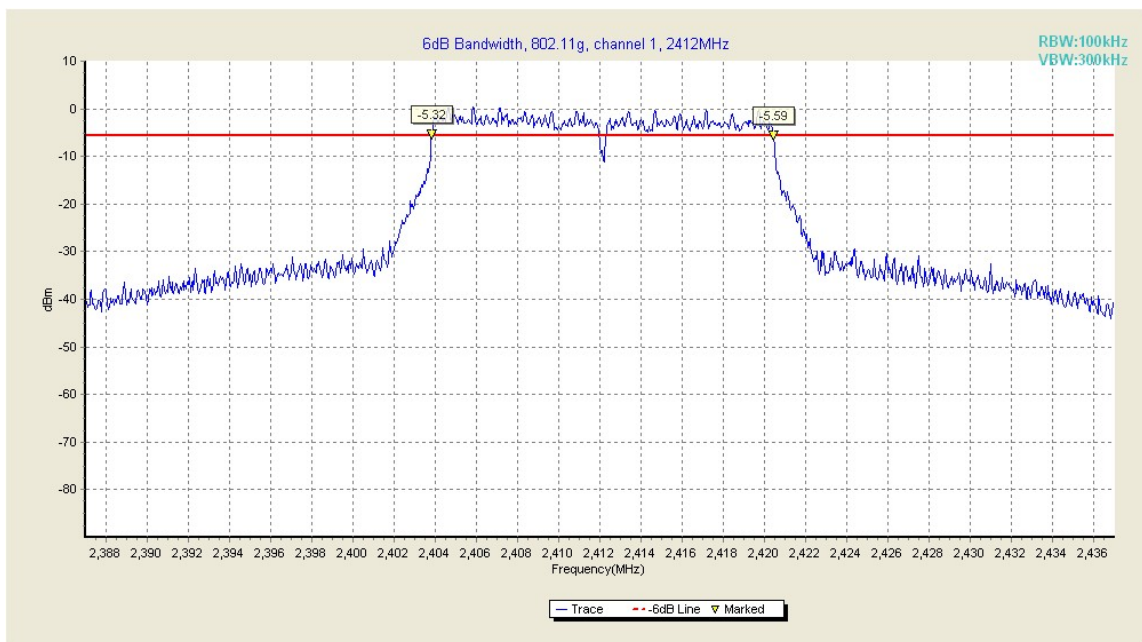


Fig. 13 Occupied 6dB Bandwidth (802.11g, Ch 1)

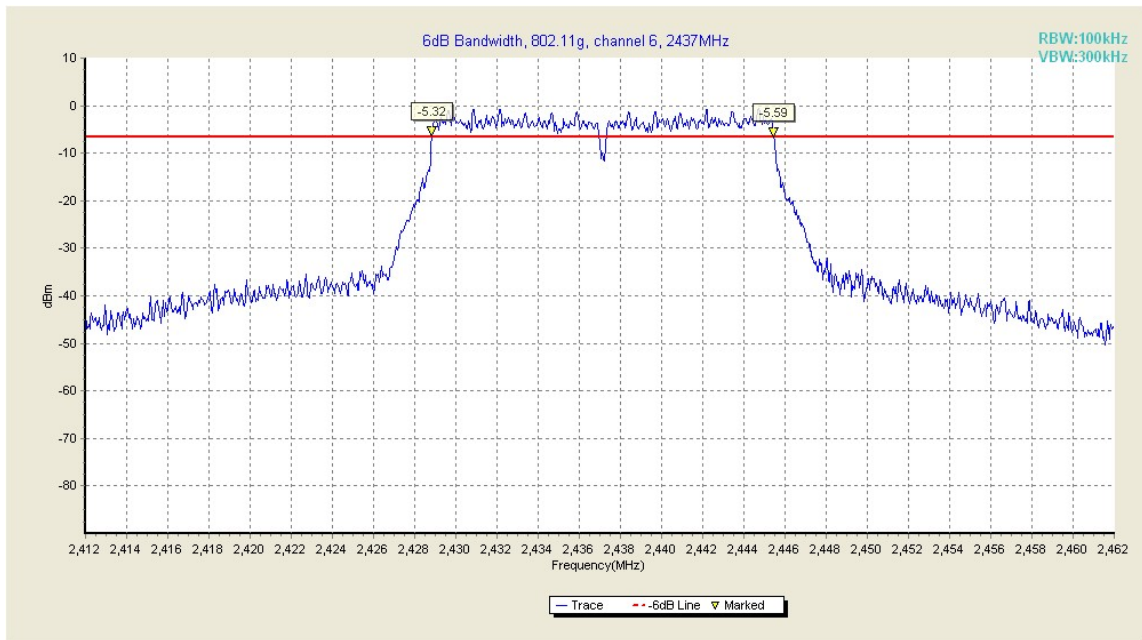


Fig. 14 Occupied 6dB Bandwidth (802.11g, Ch 6)

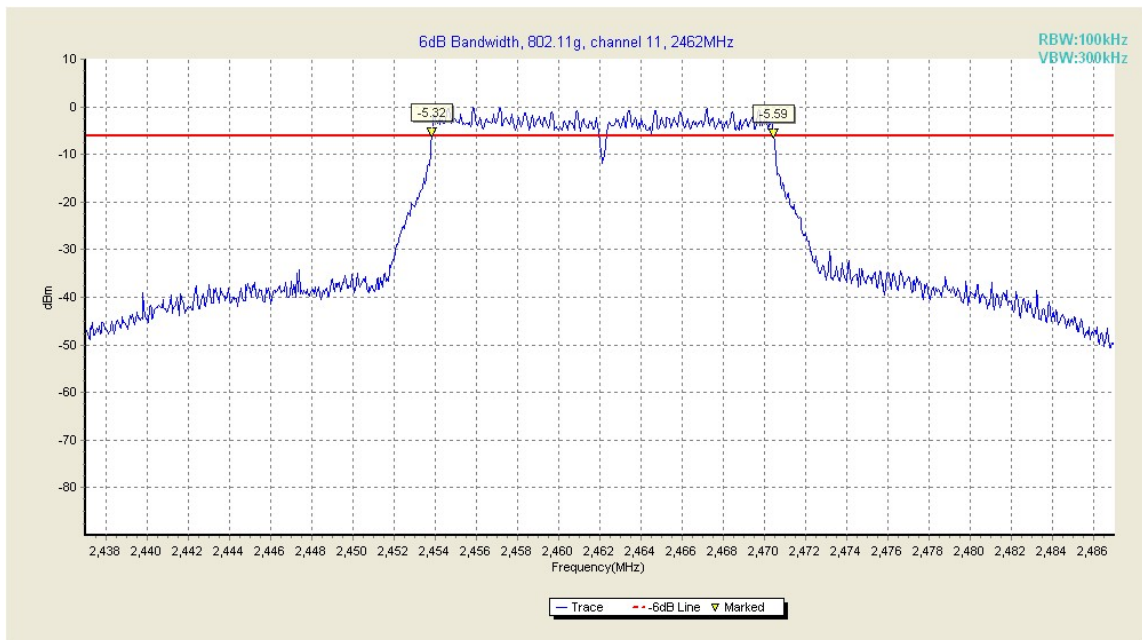


Fig. 15 Occupied 6dB Bandwidth (802.11g, Ch 11)

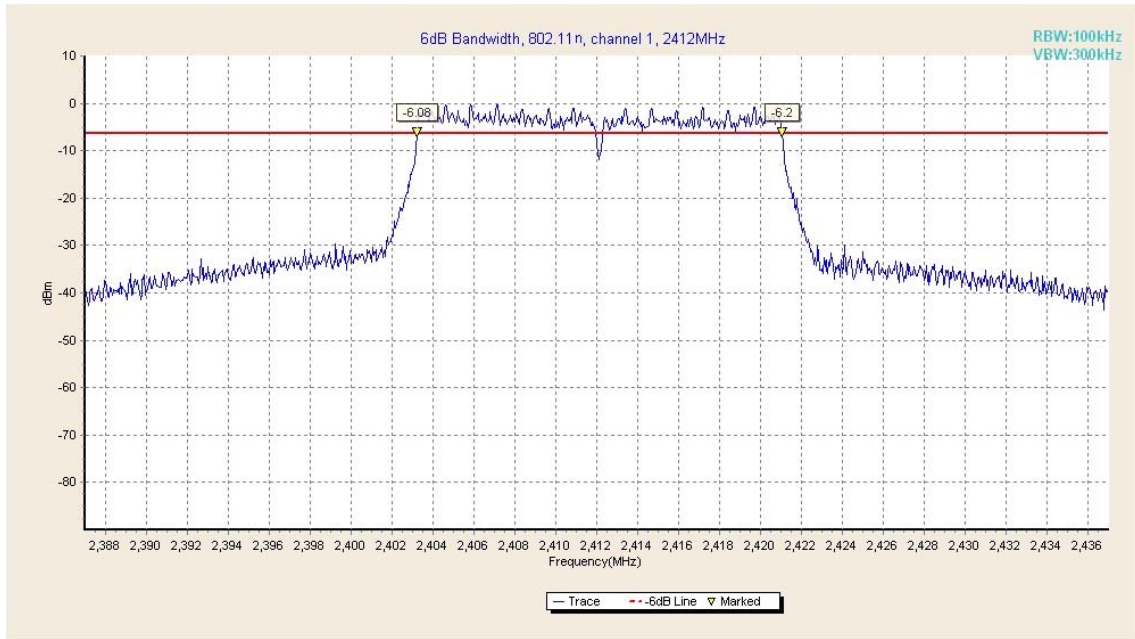


Fig. 16 Occupied 6dB Bandwidth (802.11 n-20MHz, Ch 1)

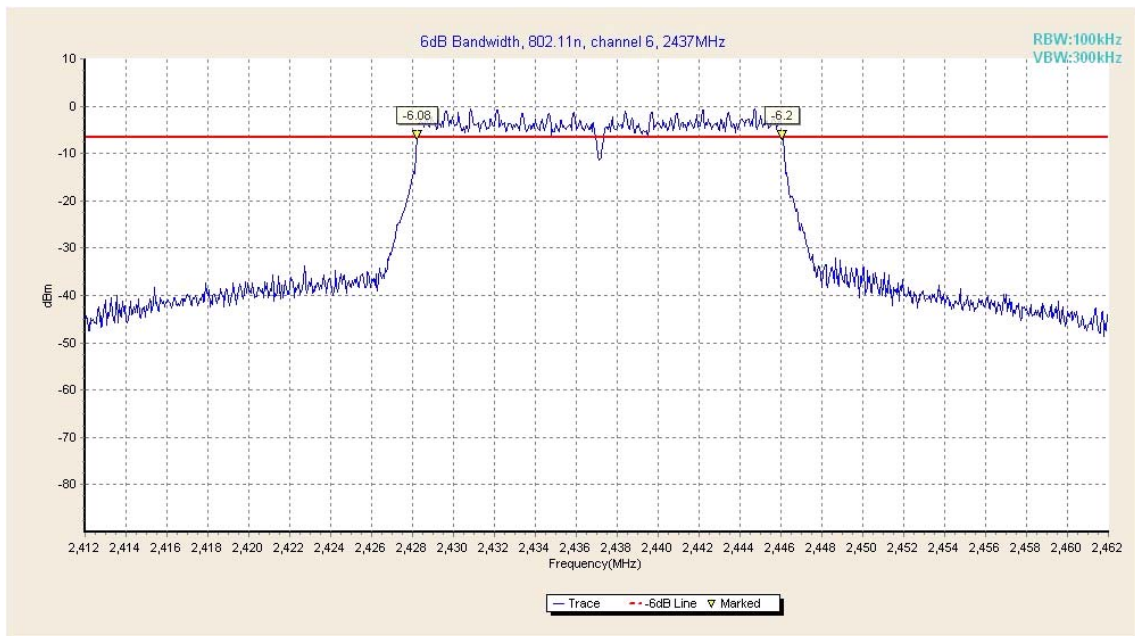


Fig. 17 Occupied 6dB Bandwidth (802.11 n-20MHz, Ch 6)

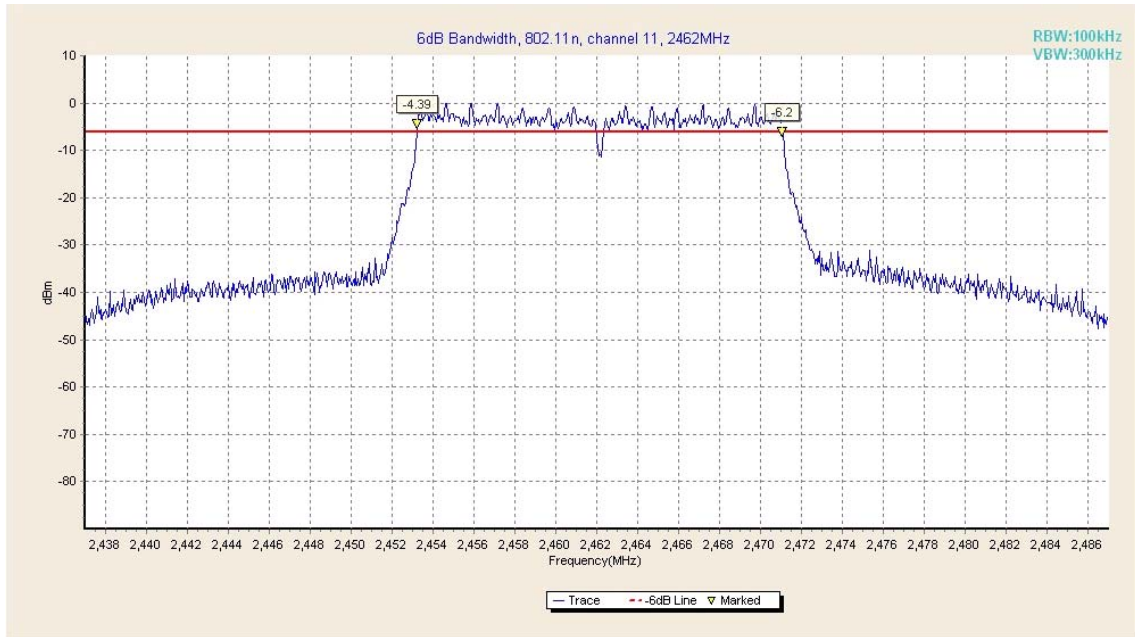


Fig. 18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch 11)

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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EUT ID: EUT2

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:

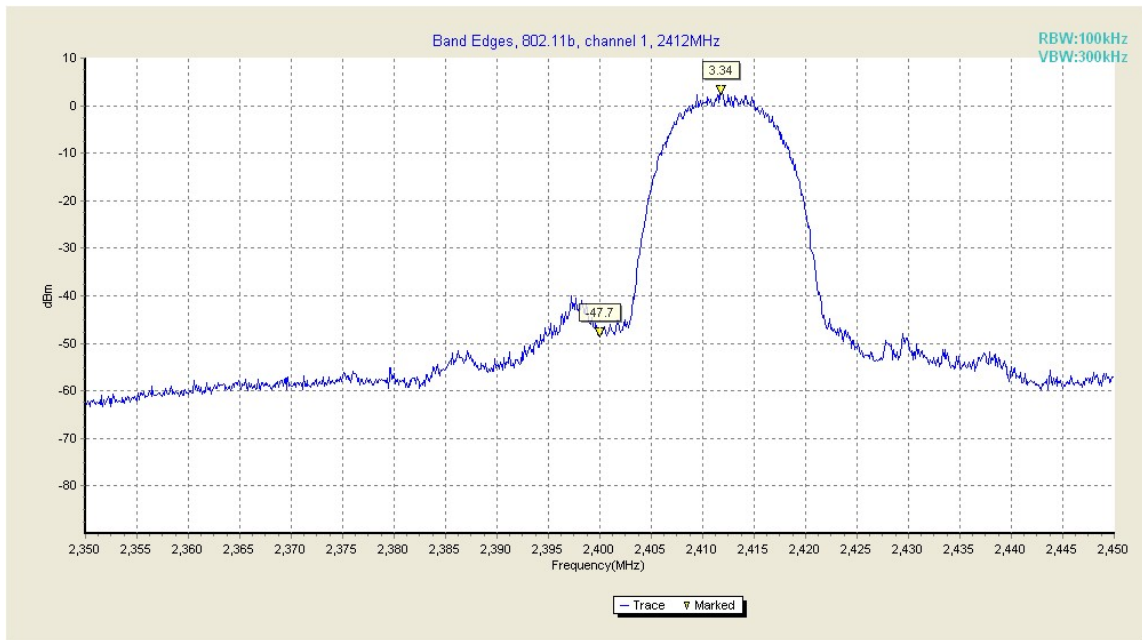


Fig. 19 Band Edges (802.11b, Ch 1)

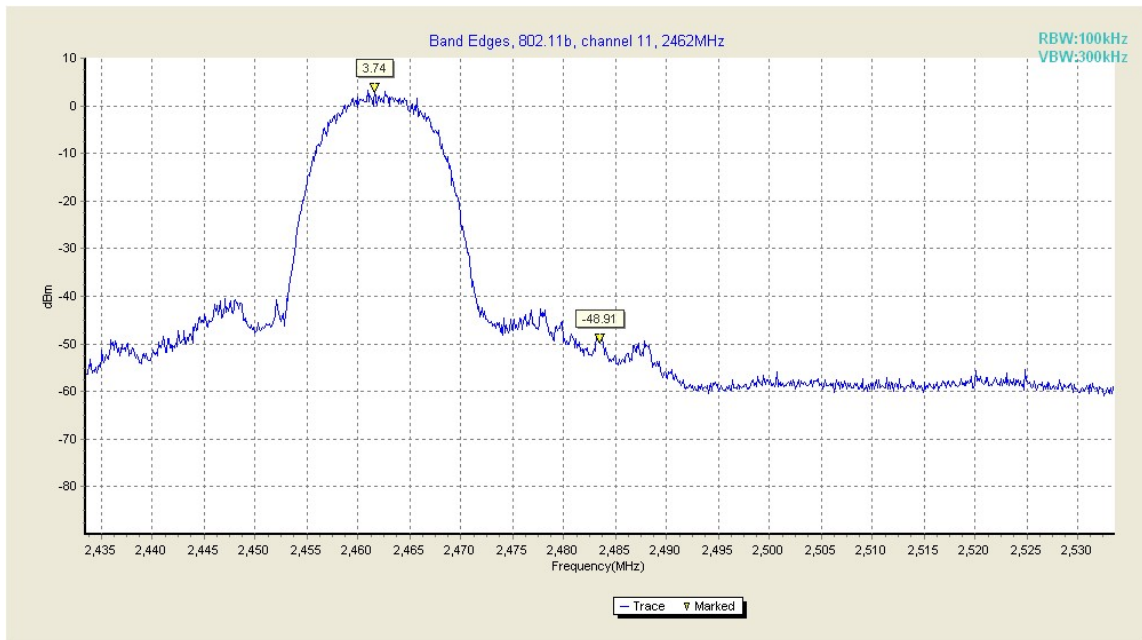


Fig. 20 Band Edges (802.11b, Ch 11)

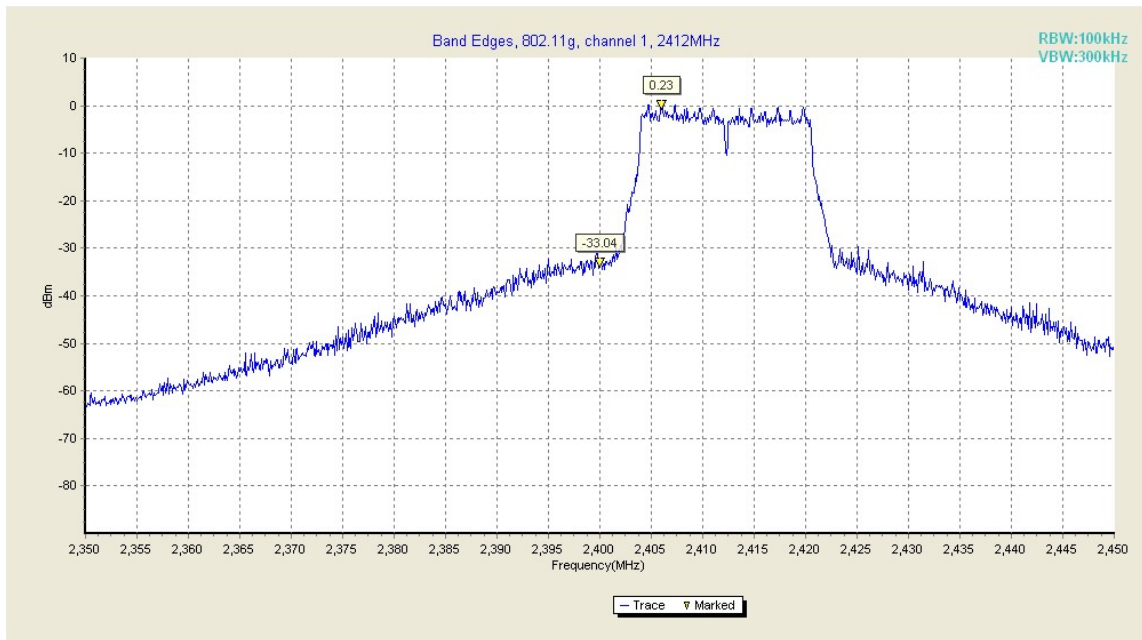


Fig. 21 Band Edges (802.11g, Ch 1)

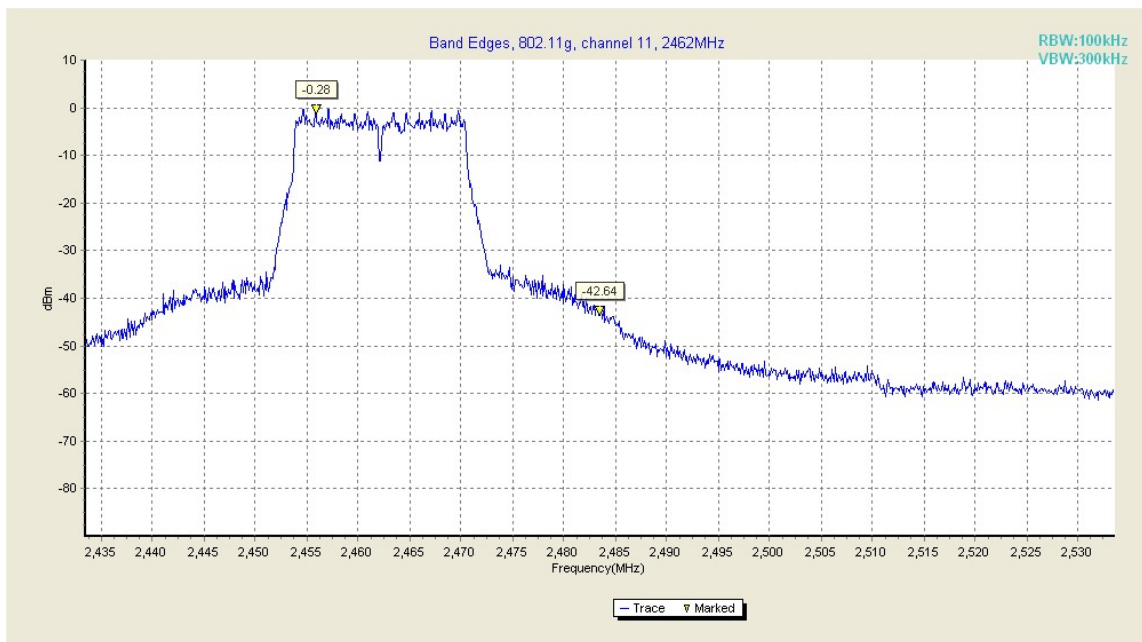


Fig. 22 Band Edges (802.11g, Ch 11)

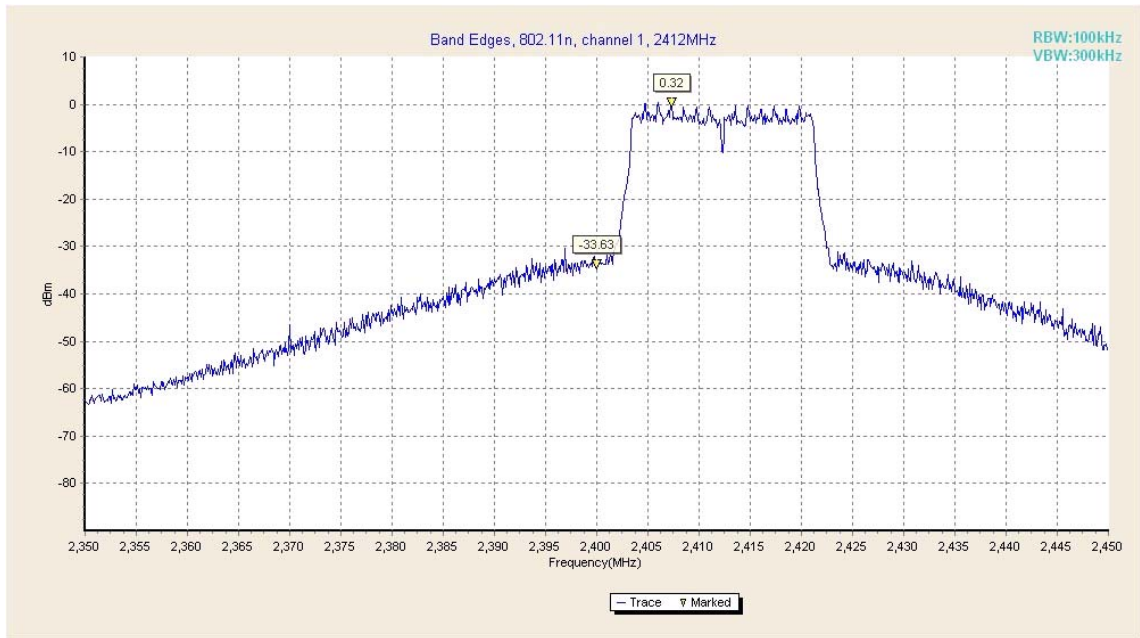


Fig. 23 Band Edges (802.11n-20MHz, Ch 1)

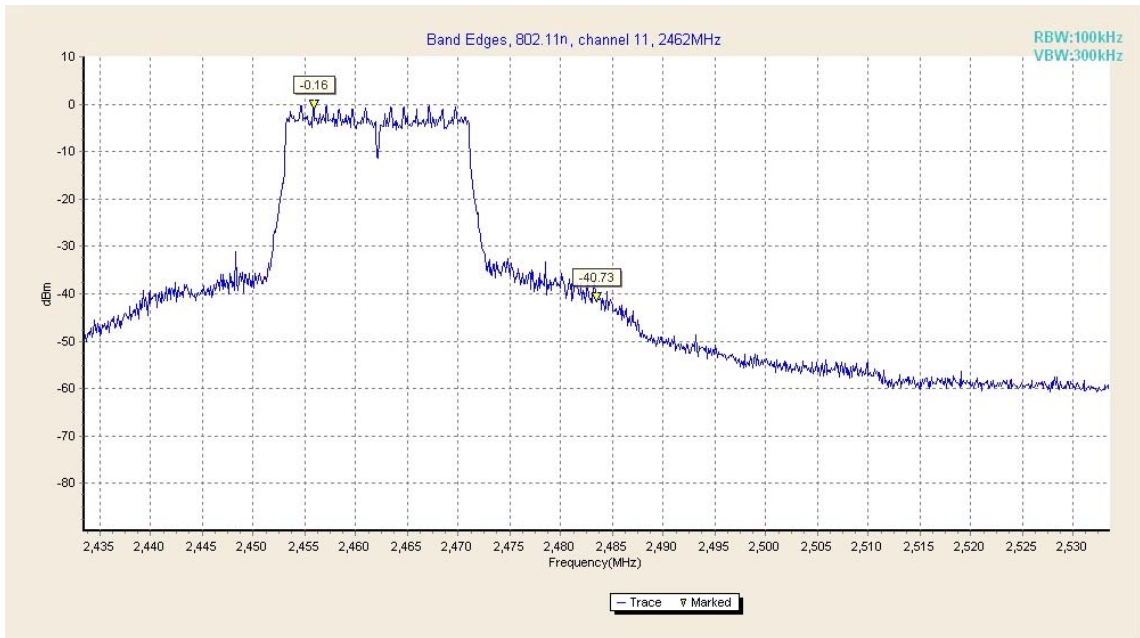


Fig. 24 Band Edges (802.11n-20MHz, Ch 11)

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

EUT ID: EUT2

Measurement Results:

802.11b/g mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.25	P
		30 MHz ~ 26 GHz	Fig.26	P
	6	2.437 GHz	Fig.27	P
		30 MHz ~ 26 GHz	Fig.28	P
	11	2.462 GHz	Fig.29	P
		30 MHz ~ 26 GHz	Fig.30	P
802.11g	1	2.412 GHz	Fig.31	P
		30 MHz ~ 26 GHz	Fig.32	P
	6	2.437 GHz	Fig.33	P
		30 MHz ~ 26 GHz	Fig.34	P
	11	2.462 GHz	Fig.35	P
		30 MHz ~ 26 GHz	Fig.36	P

802.11n-HT20 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	1	2.412 GHz	Fig.37	P
		30 MHz ~ 26 GHz	Fig.38	P
	6	2.437 GHz	Fig.39	P
		30 MHz ~ 26 GHz	Fig.40	P
	11	2.462 GHz	Fig.41	P
		30 MHz ~ 26 GHz	Fig.42	P

802.11n-HT40 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (40MHz)	3	2.422 GHz	/	/
		30 MHz ~ 26 GHz	/	/
	6	2.437 GHz	/	/
		30 MHz ~ 26 GHz	/	/
	9	2.452 GHz	/	/
		30 MHz ~ 26 GHz	/	/

Conclusion: PASS

Test graphs as below:

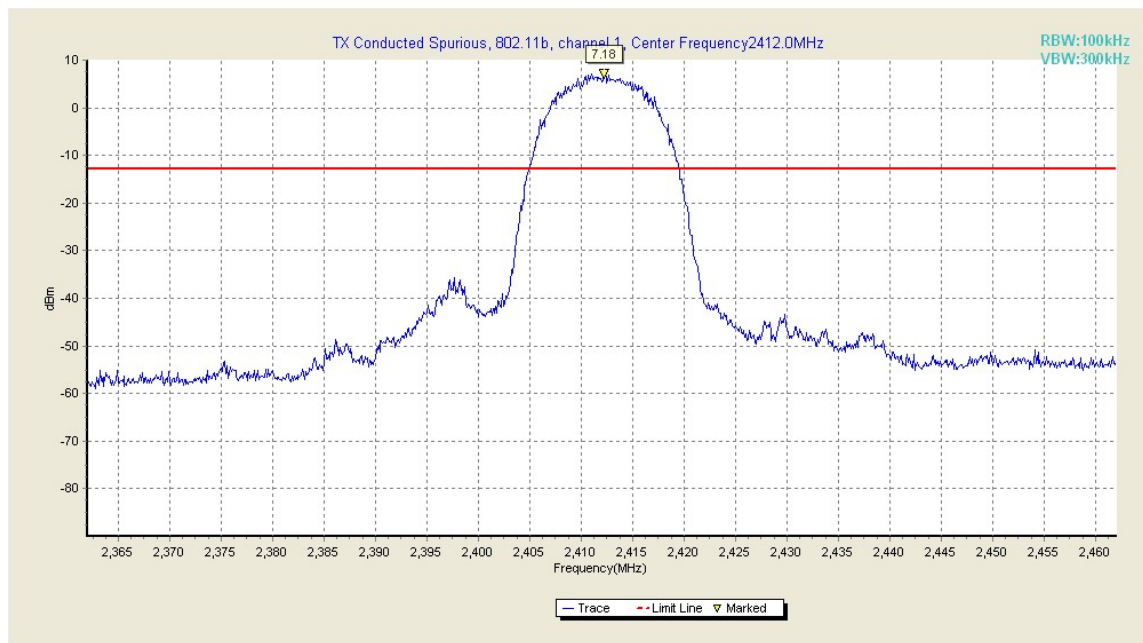


Fig. 25 Conducted Spurious Emission (802.11b, Ch1, Center Frequency)

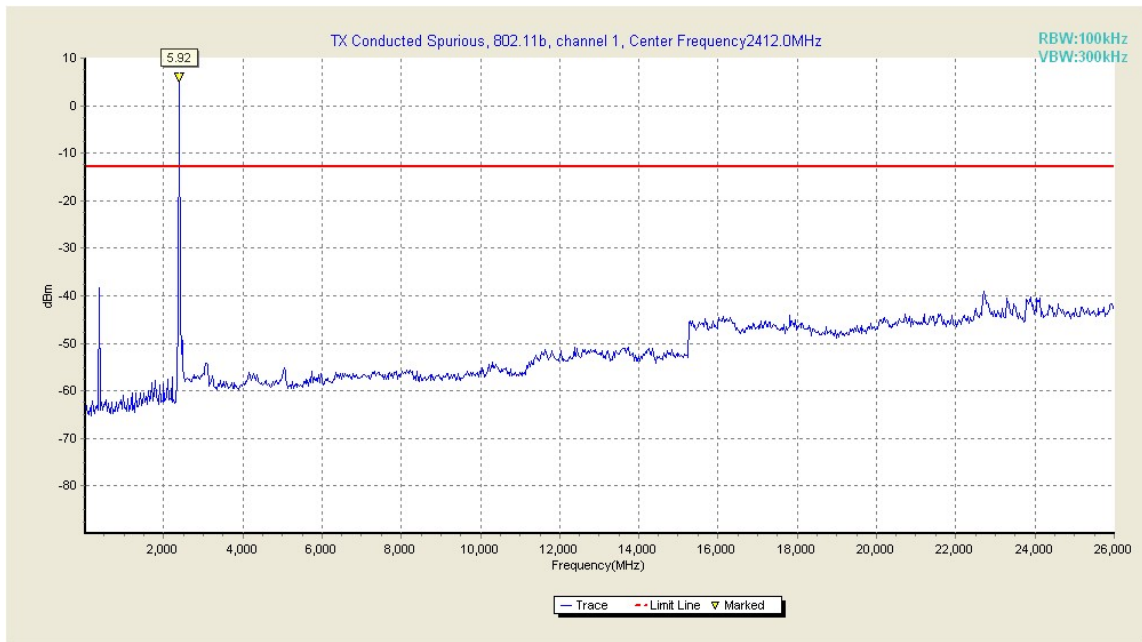


Fig. 26 Conducted Spurious Emission (802.11b, Ch1, 30 MHz-26 GHz)

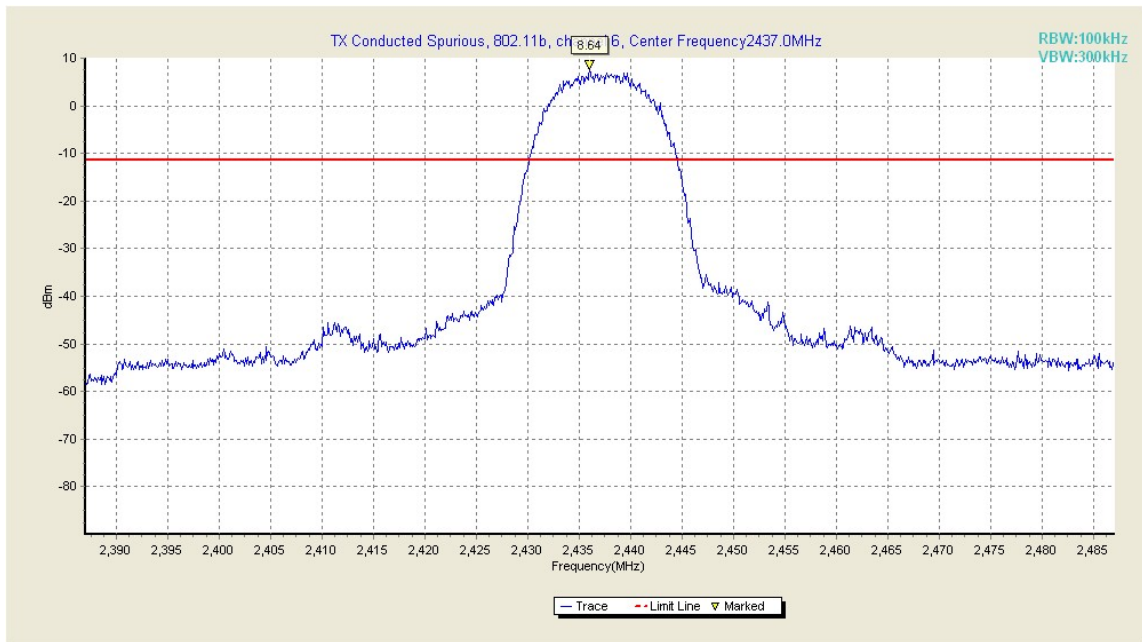


Fig. 27 Conducted Spurious Emission (802.11b, Ch6, Center Frequency)

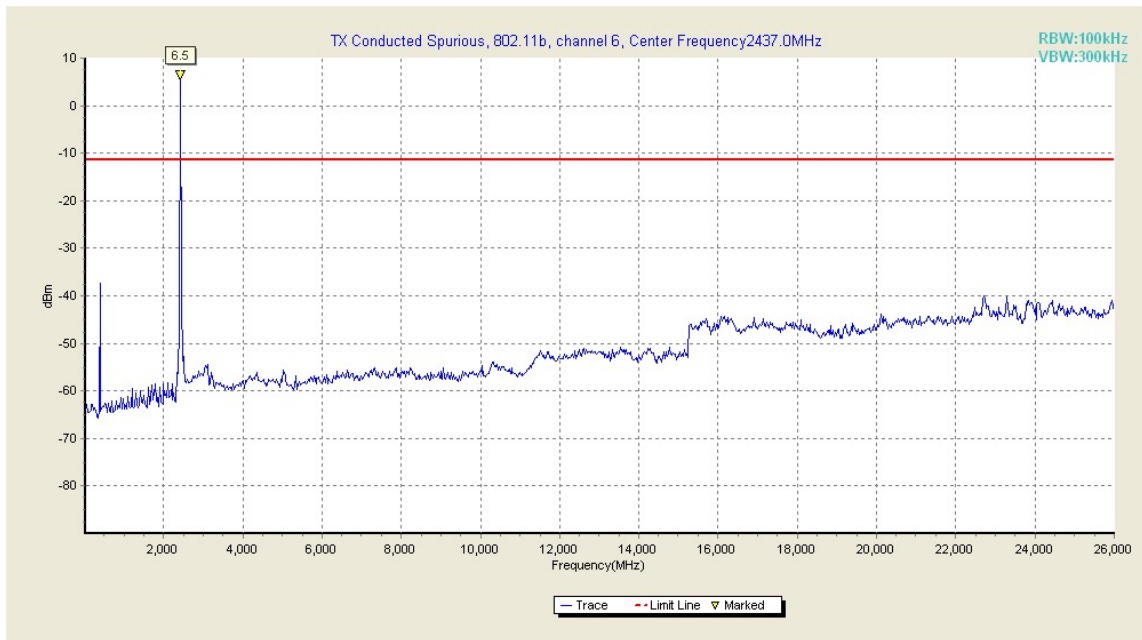


Fig. 28 Conducted Spurious Emission (802.11b, Ch6, 30 MHz-26 GHz)

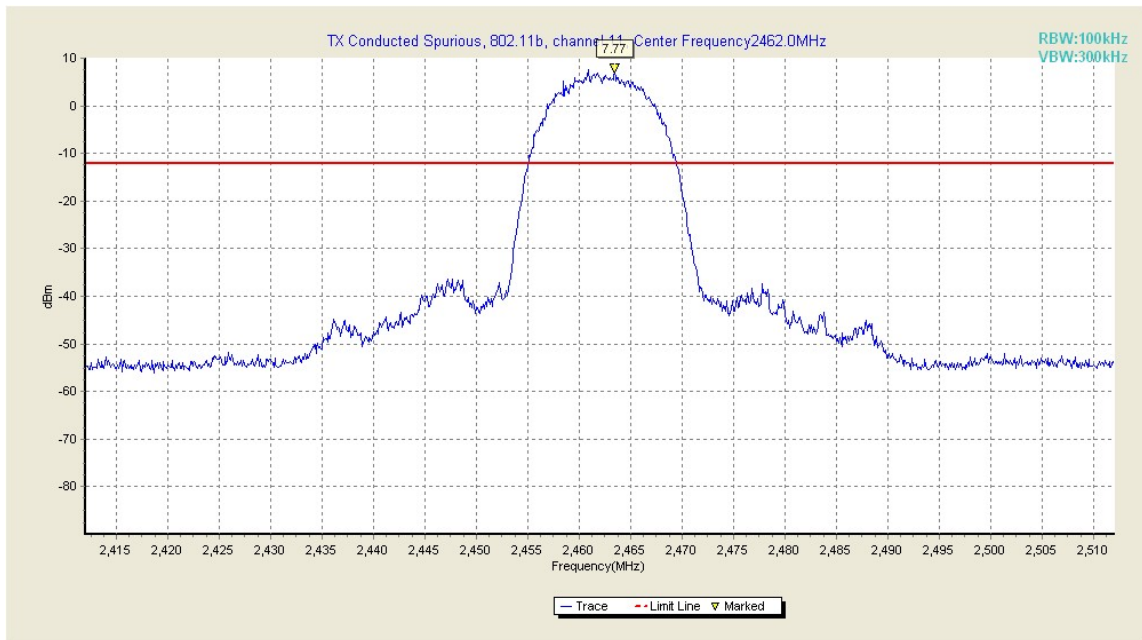


Fig. 29 Conducted Spurious Emission (802.11b, Ch11, Center Frequency)

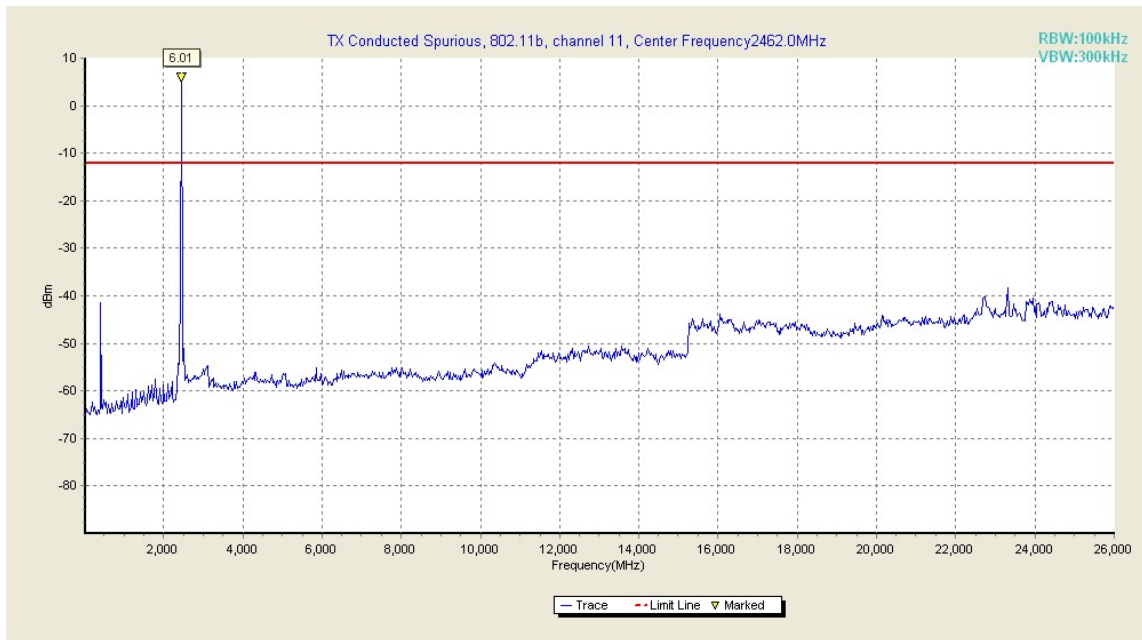


Fig. 30 Conducted Spurious Emission (802.11b, Ch11, 30 MHz-26 GHz)

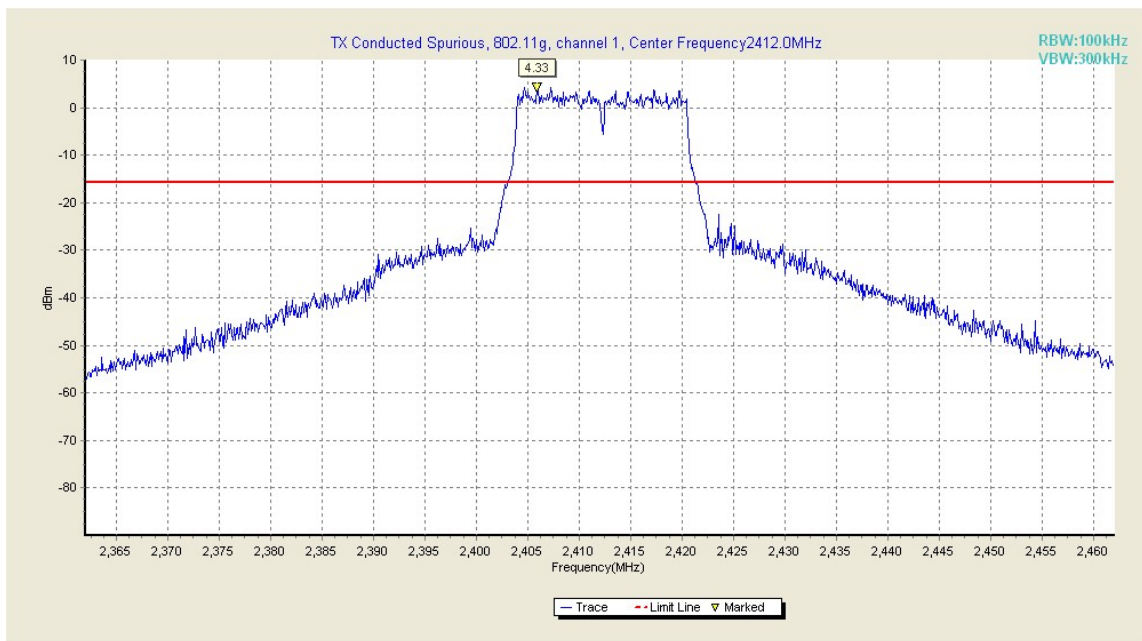


Fig. 31 Conducted Spurious Emission (802.11g, Ch1, Center Frequency)

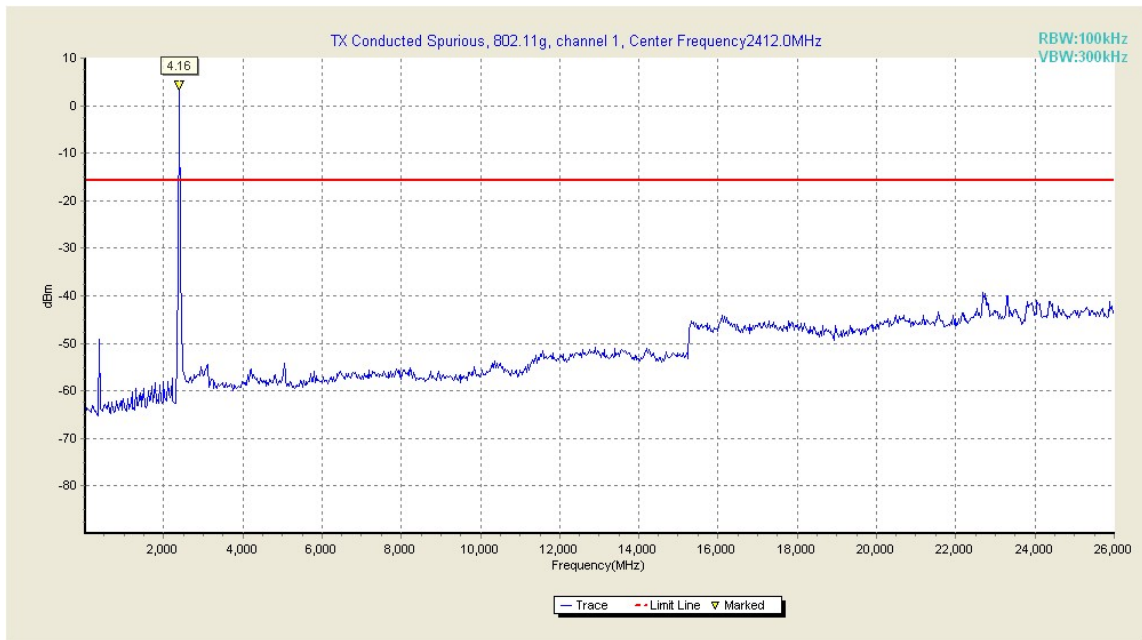


Fig. 32 Conducted Spurious Emission (802.11g, Ch1, 30 MHz-26 GHz)

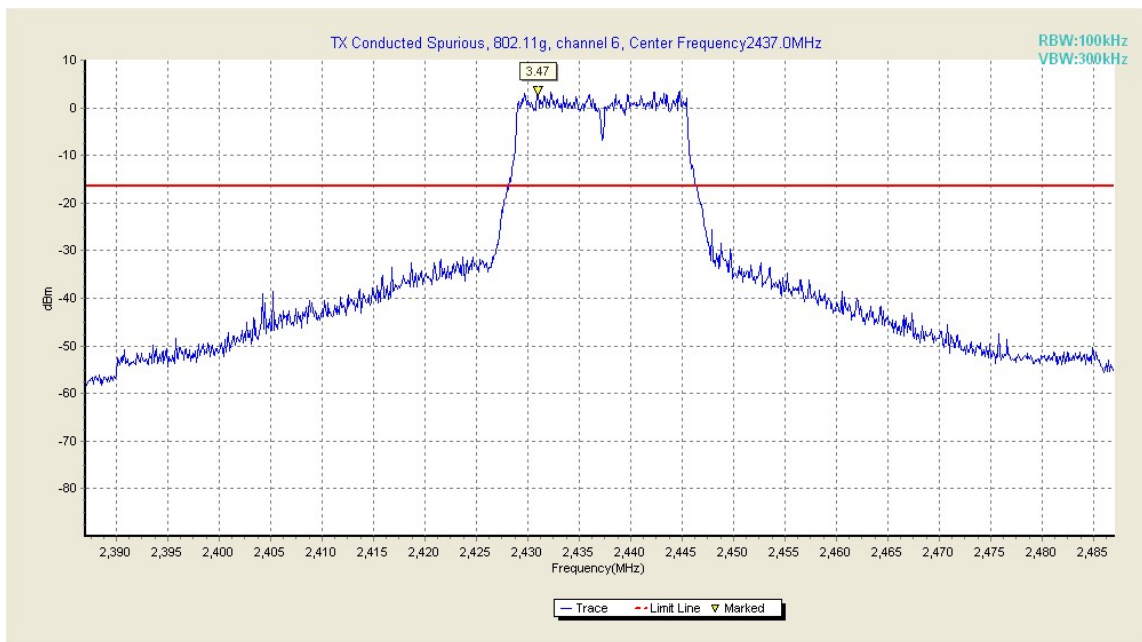


Fig. 33 Conducted Spurious Emission (802.11g, Ch6, Center Frequency)

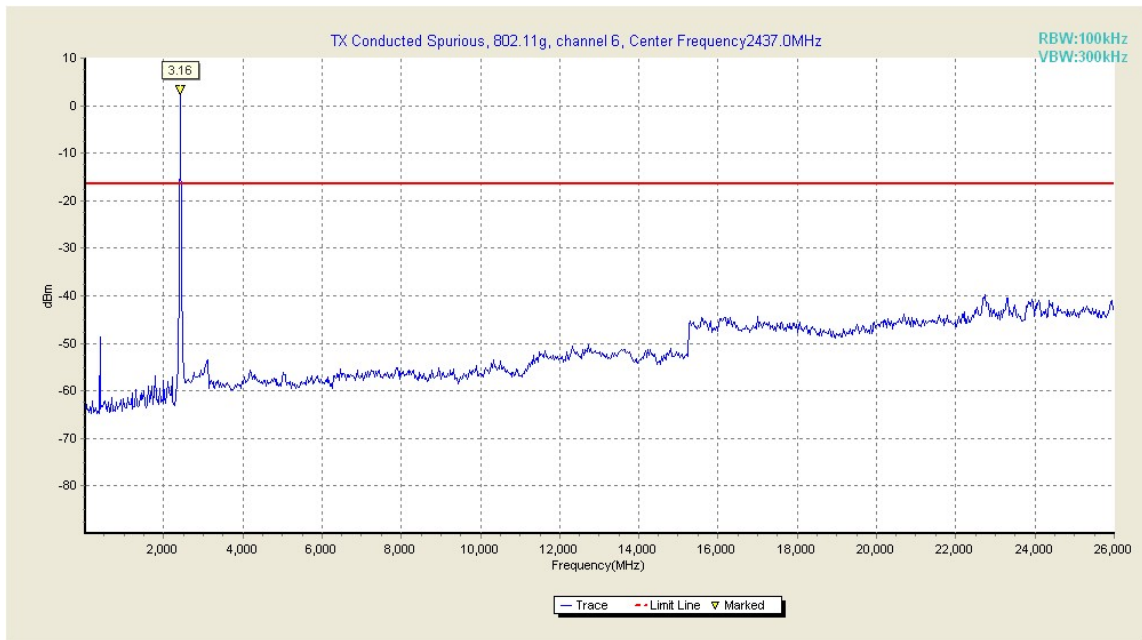


Fig. 34 Conducted Spurious Emission (802.11g, Ch6, 30 MHz-26 GHz)

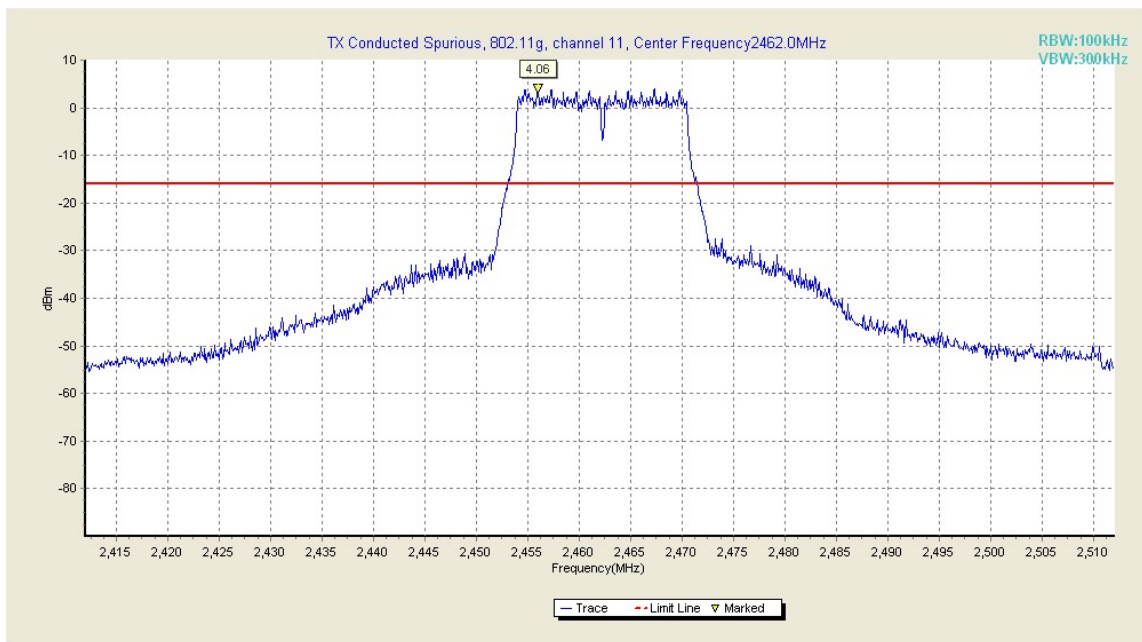


Fig. 35 Conducted Spurious Emission (802.11g, Ch11, Center Frequency)

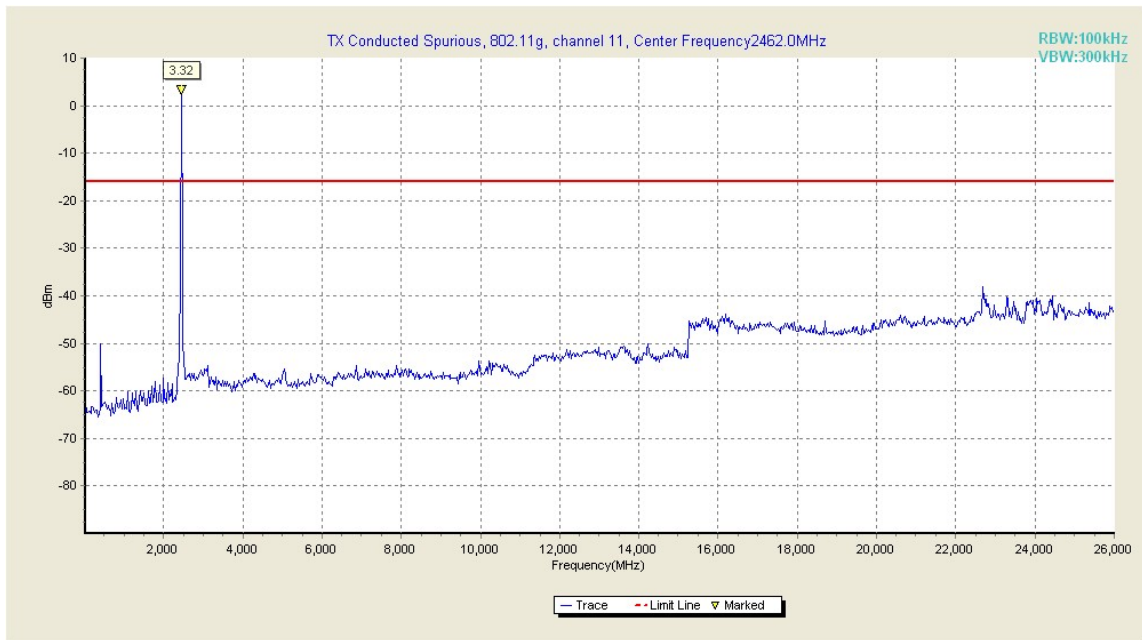


Fig. 36 Conducted Spurious Emission (802.11g, Ch11, 30 MHz-26 GHz)

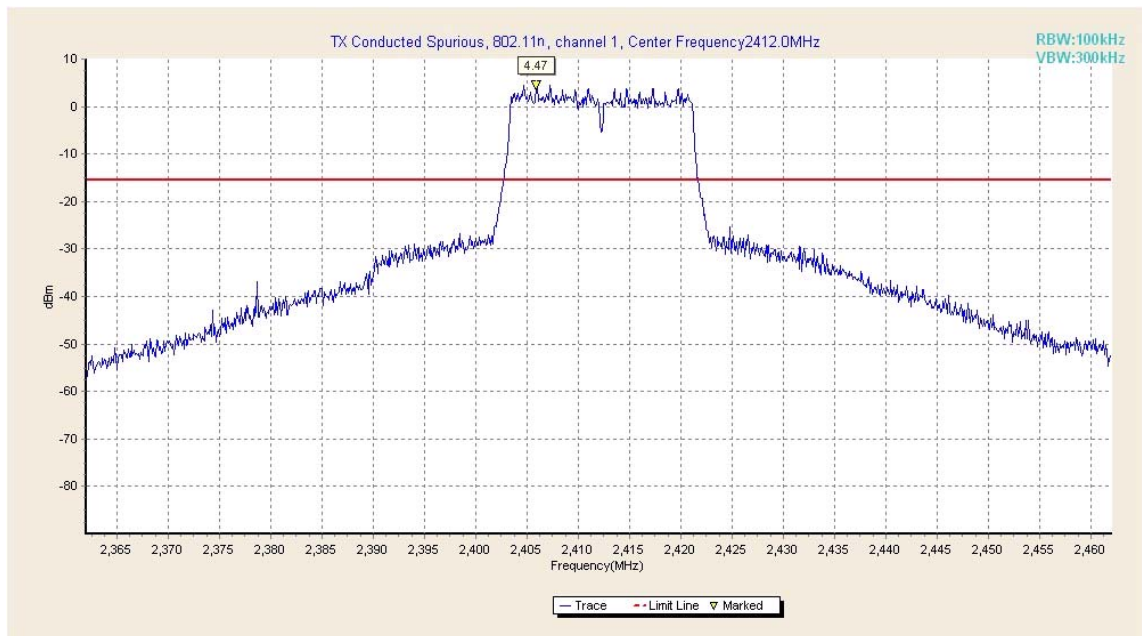


Fig. 37 Conducted Spurious Emission (802.11n-20MHz, Ch1, Center Frequency)

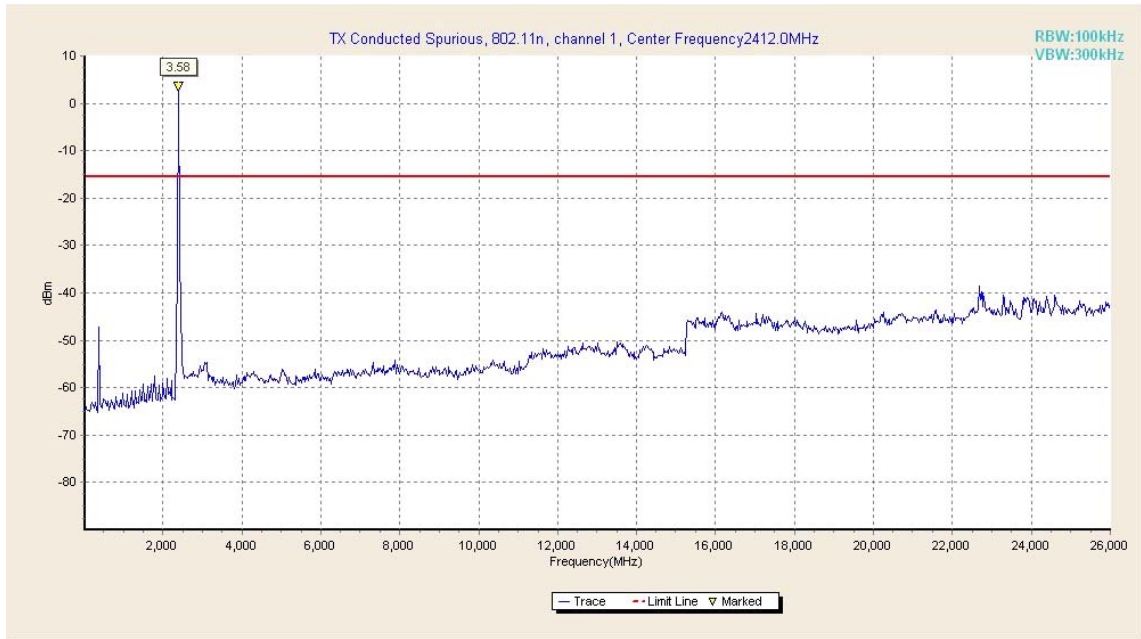


Fig. 38 Conducted Spurious Emission (802.11n-20MHz, Ch1, 30 MHz-26 GHz)

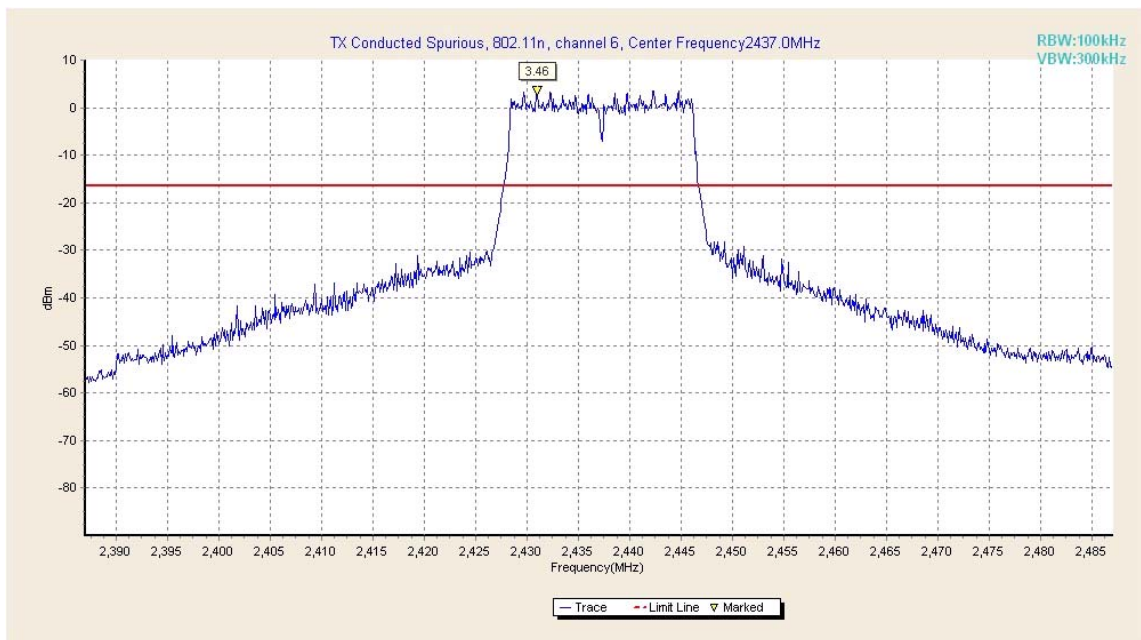


Fig. 39 Conducted Spurious Emission (802.11n-20MHz, Ch6, Center Frequency)

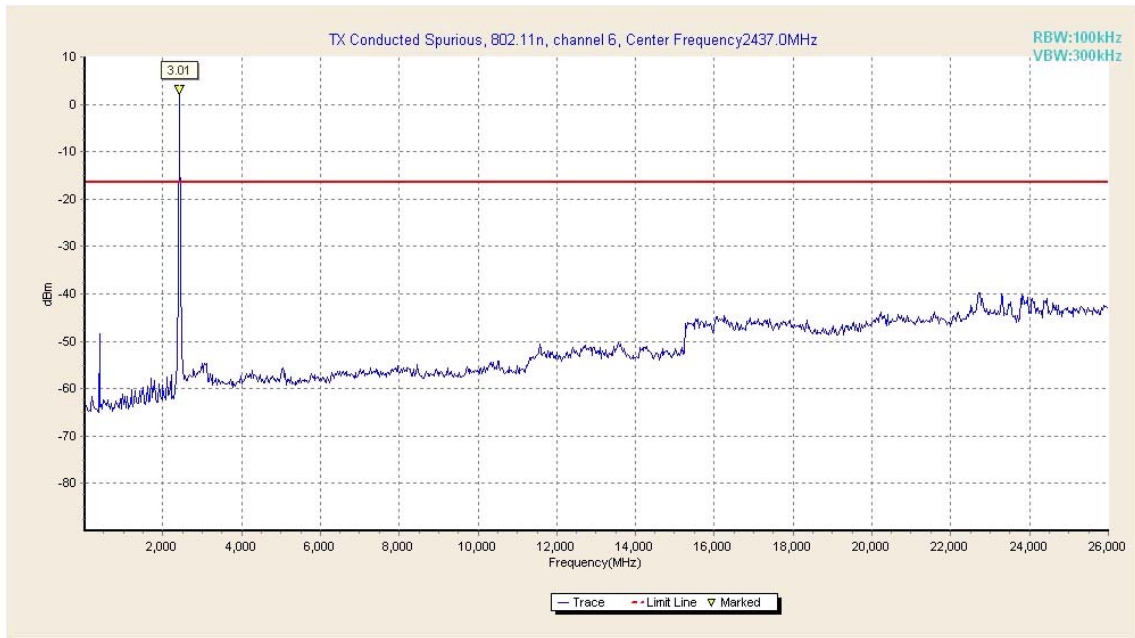


Fig. 40 Conducted Spurious Emission (802.11n-20MHz, Ch6, 30 MHz-26 GHz)

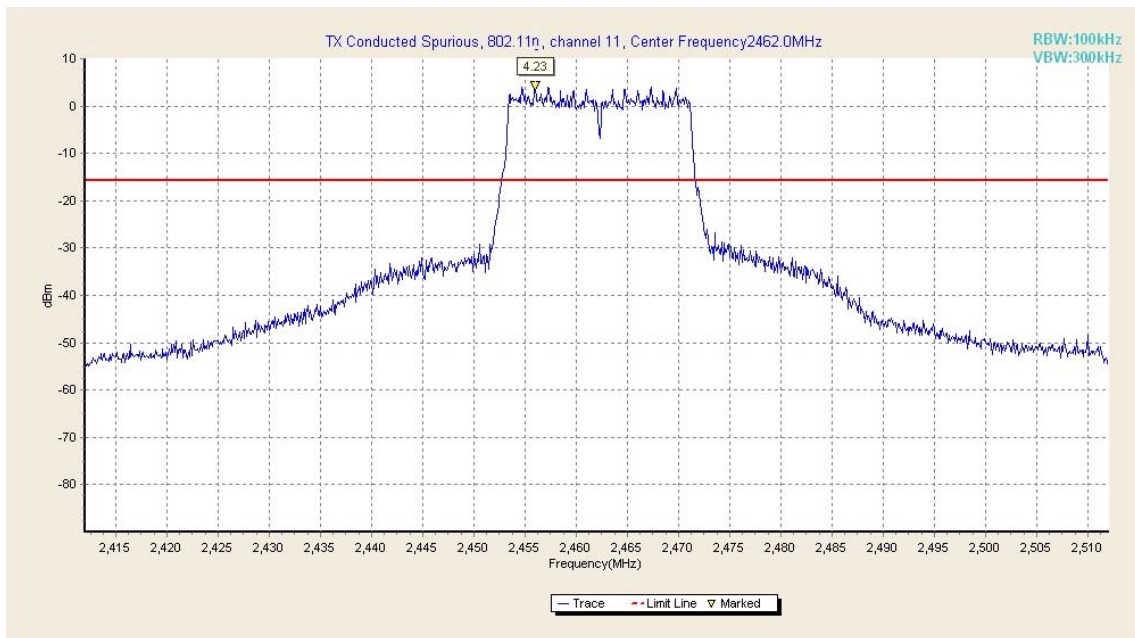


Fig. 41 Conducted Spurious Emission (802.11n-20MHz, Ch11, Center Frequency)

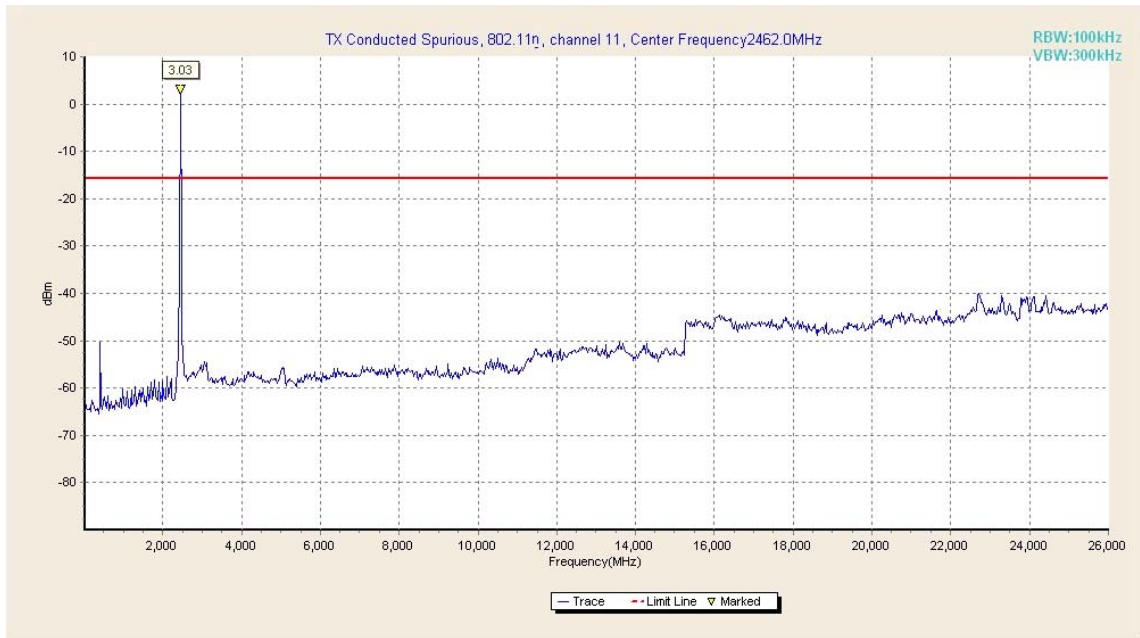


Fig. 42 Conducted Spurious Emission (802.11n-20MHz, Ch11, 30 MHz-26 GHz)

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

EUT ID: EUT1

Measurement Results:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz ~2.45GHz	Fig.43	P
	1	30 MHz ~1 GHz	Fig.44	P
		1 GHz ~ 4 GHz	Fig.45	P
		4 GHz ~ 18 GHz	Fig.46	P
	6	30 MHz ~1 GHz	Fig.47	P
		1 GHz ~ 4 GHz	Fig.48	P
		4 GHz ~ 18 GHz	Fig.49	P
	Power	2.45GHz ~2.5GHz	Fig.50	P
	11	30 MHz ~1 GHz	Fig.51	P
		1 GHz ~ 4 GHz	Fig.52	P
		4 GHz ~ 18 GHz	Fig.53	P
	802.11g	Power	2.38GHz ~2.43GHz	Fig.54
1		30 MHz ~1 GHz	Fig.55	P
		1 GHz ~ 4 GHz	Fig.56	P
		4 GHz ~ 18 GHz	Fig.57	P
6		30 MHz ~1 GHz	Fig.58	P
		1 GHz ~ 4 GHz	Fig.59	P
		4 GHz ~ 18 GHz	Fig.60	P
Power		2.45GHz ~2.5GHz	Fig.61	P
11		30 MHz ~1 GHz	Fig.62	P
		1 GHz ~ 4 GHz	Fig.63	P
		4 GHz ~ 18 GHz	Fig.64	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	Power	2.38GHz ~2.45GHz	Fig.65	P
	1	30 MHz ~1 GHz	Fig.66	P
		1 GHz ~ 4 GHz	Fig.67	P
		4 GHz ~ 18 GHz	Fig.68	P
	6	30 MHz ~1 GHz	Fig.69	P
		1 GHz ~ 4 GHz	Fig.70	P
		4 GHz ~ 18 GHz	Fig.71	P
	Power	2.45GHz ~2.5GHz	Fig.72	P
	11	30 MHz ~1 GHz	Fig.73	P
		1 GHz ~ 4 GHz	Fig.74	P
		4 GHz ~ 18 GHz	Fig.75	P
	802.11n (40MHz)	Power	2.38GHz ~2.45GHz	/
3		30 MHz ~1 GHz	/	/

		1 GHz ~ 4 GHz	/	/
		4 GHz ~ 18 GHz	/	/
	6	30 MHz ~1 GHz	/	/
		1 GHz ~ 4 GHz	/	/
		4 GHz ~ 18 GHz	/	/
	Power	2.45GHz ~2.5GHz	/	/
	9	30 MHz ~1 GHz	/	/
		1 GHz ~ 4 GHz	/	/
		4 GHz ~ 18 GHz	/	/
/	All channels	18 GHz~ 26.5 GHz	Fig.76	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:

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

802.11b

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2414.83	85.92	-18.7	27.5	77.12	VERTICAL
2410.822	85.22	-18.7	27.5	76.42	VERTICAL
2418.838	77.48	-18.7	27.5	68.68	HORIZONTAL
2406.814	74.85	-18.7	27.5	66.05	HORIZONTAL
2422.846	51.13	-18.8	27.5	42.43	VERTICAL
2402.806	45.43	-18.7	27.5	36.63	VERTICAL

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2438.878	87.71	-18.9	27.5	79.11	VERTICAL
2434.87	87.38	-18.9	27.5	78.78	HORIZONTAL
2442.886	81.54	-18.9	27.5	72.94	HORIZONTAL
2430.862	71.71	-18.9	27.5	63.11	HORIZONTAL
2446.894	59.16	-18.9	27.5	50.56	VERTICAL
2422.846	44.26	-18.8	27.5	35.56	VERTICAL

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2462.926	80.34	-18.6	27.5	71.44	VERTICAL
2466.934	77.73	-18.6	27.5	68.83	VERTICAL
2458.918	76.93	-18.7	27.5	68.13	HORIZONTAL
2470.942	58.11	-18.4	27.5	49.01	HORIZONTAL
2454.91	57.14	-18.7	27.5	48.34	VERTICAL
3699.399	41.58	-19.2	33.4	27.38	VERTICAL

802.11g

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2410.822	76.3	-18.7	27.5	67.5	VERTICAL
2414.83	76.22	-18.7	27.5	67.42	VERTICAL
2418.838	75.73	-18.7	27.5	66.93	VERTICAL
2406.814	75.51	-18.7	27.5	66.71	VERTICAL
2422.846	63.05	-18.8	27.5	54.35	HORIZONTAL
2402.806	60.3	-18.7	27.5	51.5	HORIZONTAL

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2434.87	85.25	-18.9	27.5	76.65	HORIZONTAL
2442.886	85.05	-18.9	27.5	76.45	VERTICAL
2430.862	84.81	-18.9	27.5	76.21	HORIZONTAL
2438.878	84.04	-18.9	27.5	75.44	HORIZONTAL
2446.894	78.99	-18.9	27.5	70.39	HORIZONTAL
2426.854	59.99	-18.8	27.5	51.29	VERTICAL

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2458.918	76.02	-18.7	27.5	67.22	VERTICAL
2466.934	75.93	-18.6	27.5	67.03	HORIZONTAL
2462.926	75.41	-18.6	27.5	66.51	HORIZONTAL
2454.91	73.1	-18.7	27.5	64.3	VERTICAL
2470.942	72.63	-18.4	27.5	63.53	HORIZONTAL
2474.95	43.75	-18.4	27.5	34.65	VERTICAL

802.11n-HT20

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2410.822	79.95	-18.7	27.5	71.15	HORIZONTAL
2414.83	79.62	-18.7	27.5	70.82	HORIZONTAL
2406.814	79.16	-18.7	27.5	70.36	VERTICAL
2418.838	79.11	-18.7	27.5	70.31	VERTICAL
2422.846	71.18	-18.8	27.5	62.48	VERTICAL
2402.806	68.78	-18.7	27.5	59.98	HORIZONTAL

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2430.862	88.04	-18.9	27.5	79.44	VERTICAL
2434.87	87.98	-18.9	27.5	79.38	VERTICAL
2442.886	87.04	-18.9	27.5	78.44	HORIZONTAL
2438.878	86.69	-18.9	27.5	78.09	HORIZONTAL
2446.894	83.15	-18.9	27.5	74.55	HORIZONTAL
2426.854	68.48	-18.8	27.5	59.78	VERTICAL

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
2458.918	76.49	-18.7	27.5	67.69	HORIZONTAL
2466.934	76.48	-18.6	27.5	67.58	VERTICAL
2462.926	75.88	-18.6	27.5	66.98	VERTICAL
2454.91	75.56	-18.7	27.5	66.76	HORIZONTAL
2470.942	74.91	-18.4	27.5	65.81	VERTICAL
2474.95	48.28	-18.4	27.5	39.18	VERTICAL

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:

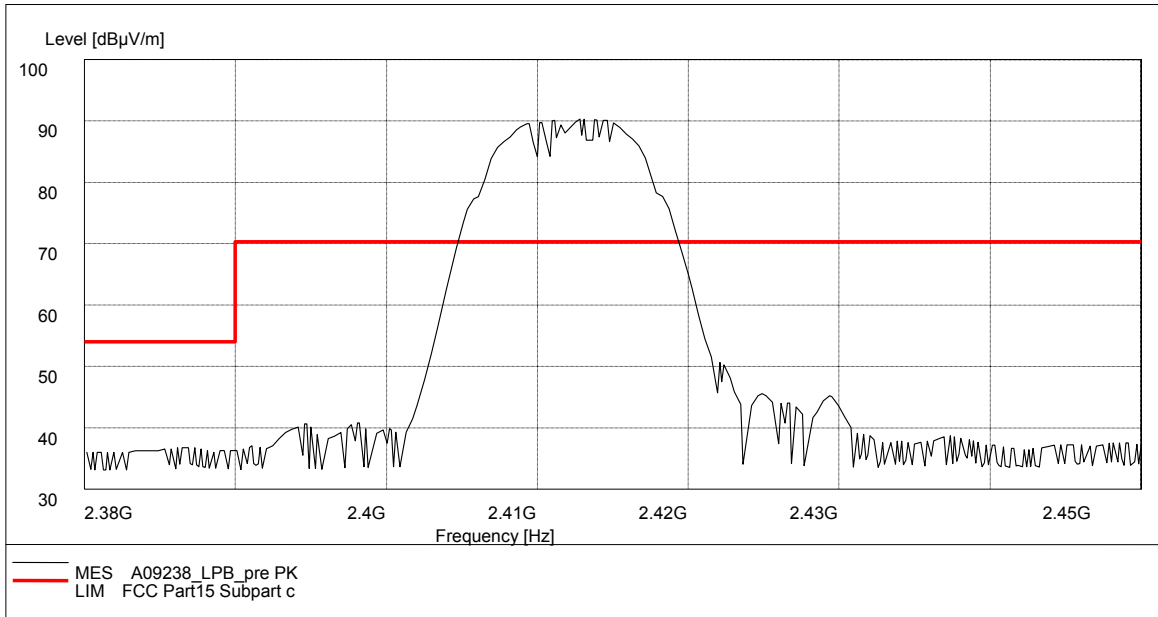


Fig. 43 Radiated Spurious Emission (Power): 802.11b, ch1, 2.38 GHz - 245GHz

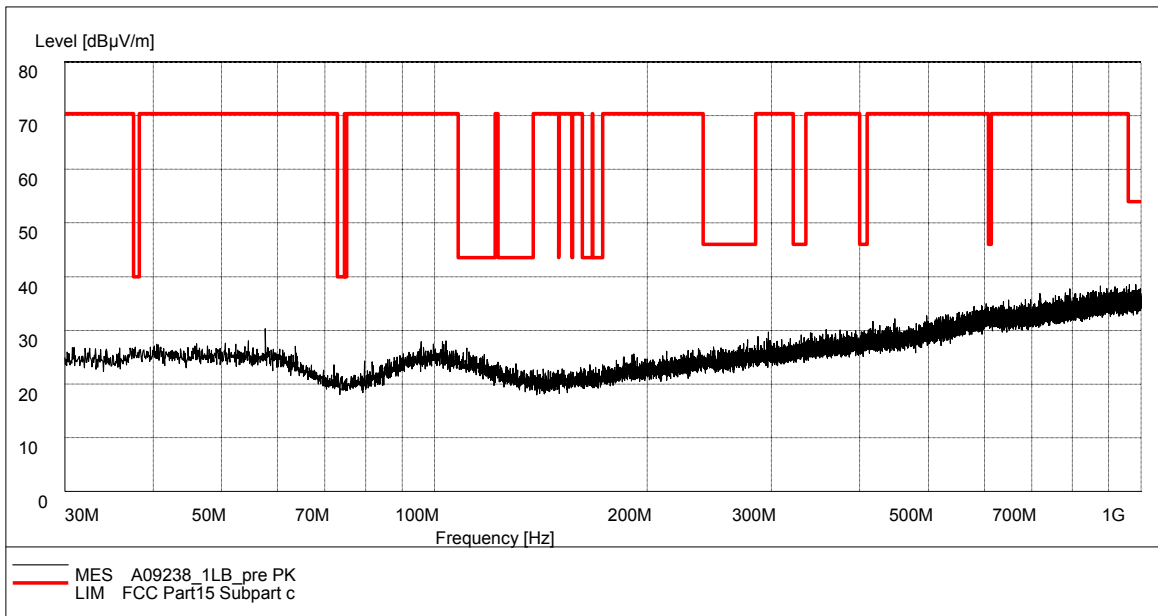


Fig. 44 Radiated Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)

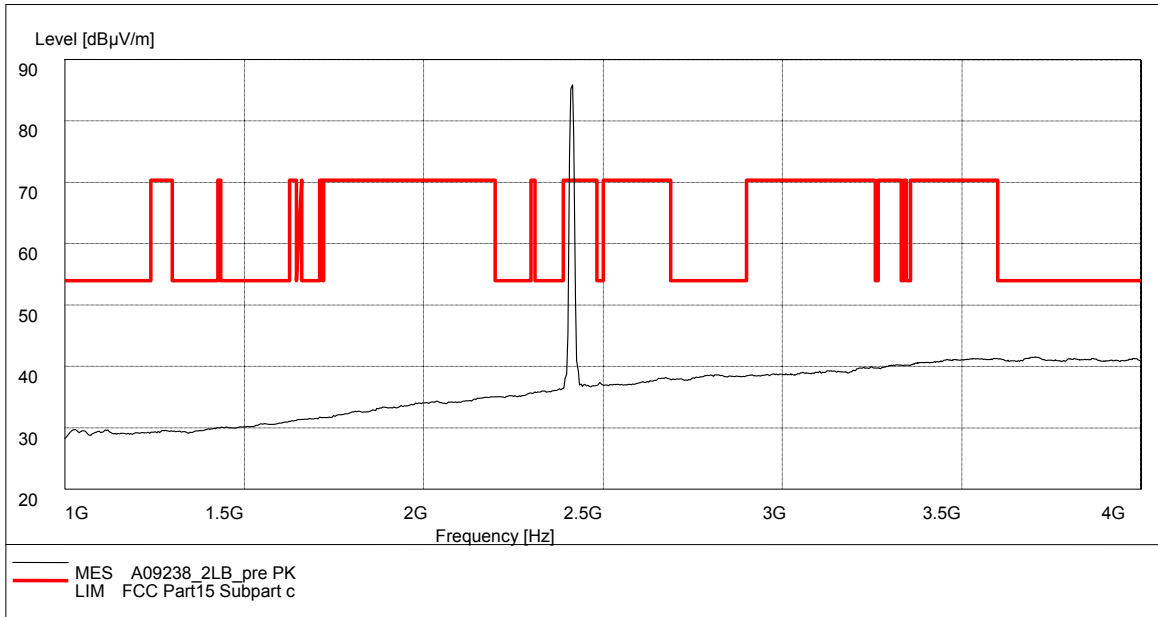


Fig. 45 Radiated Spurious Emission (802.11b, Ch1, 1 GHz-4 GHz)

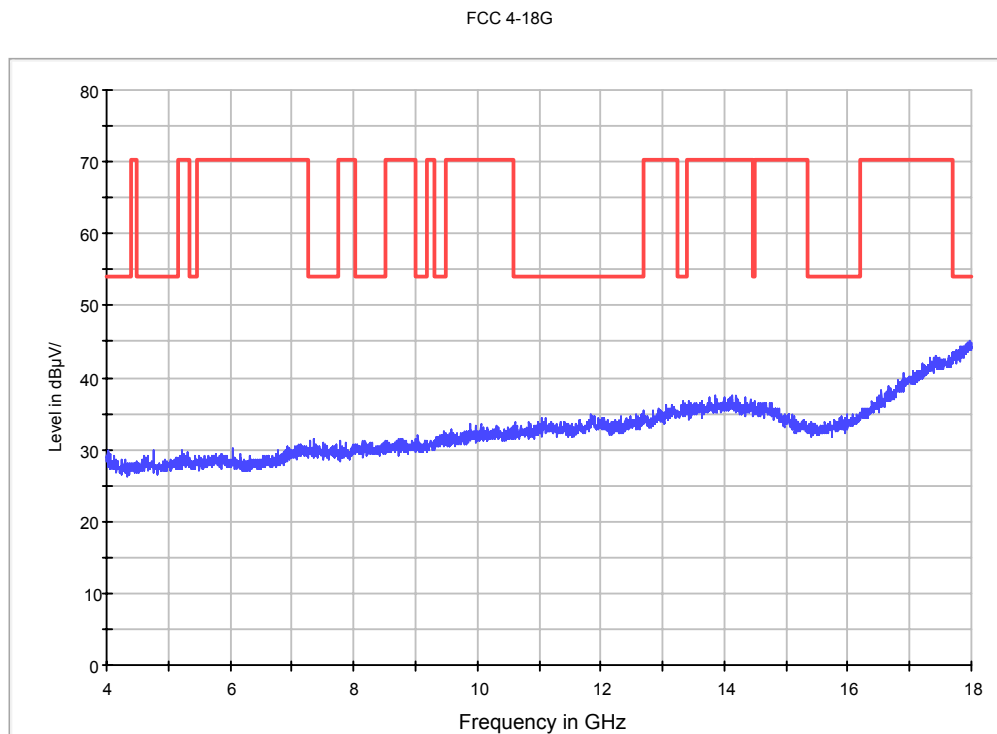


Fig. 46 Radiated Spurious Emission (802.11b, Ch1, 4 GHz-18 GHz)

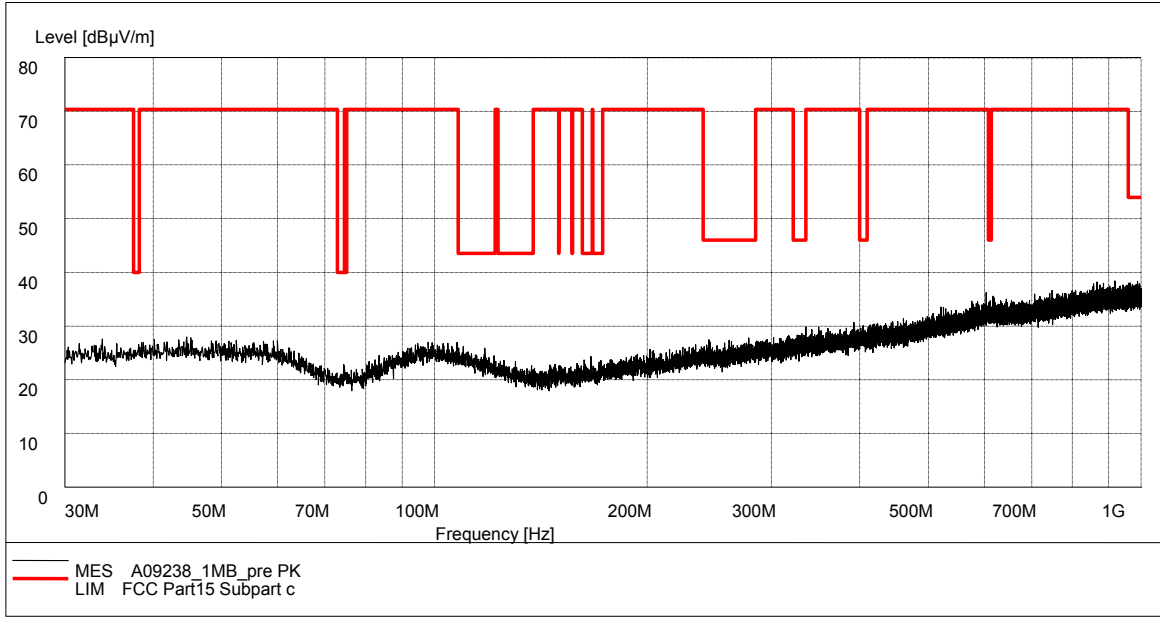


Fig. 47 Radiated Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)

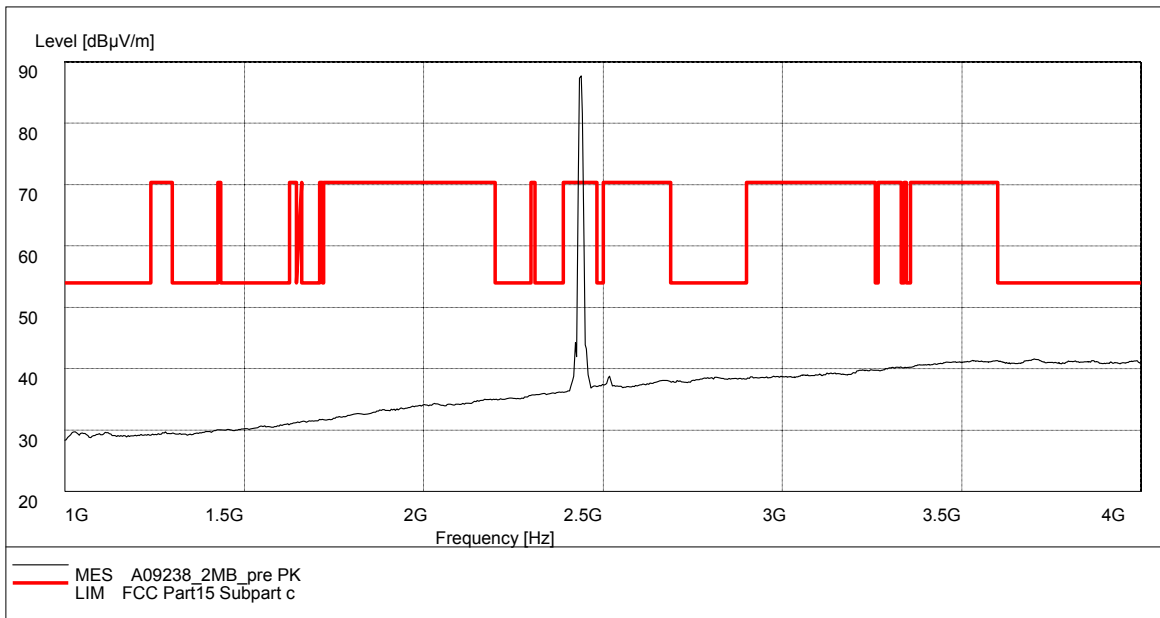


Fig. 48 Radiated Spurious Emission (802.11b, Ch6, 1 GHz-4 GHz)

FCC 4-18G

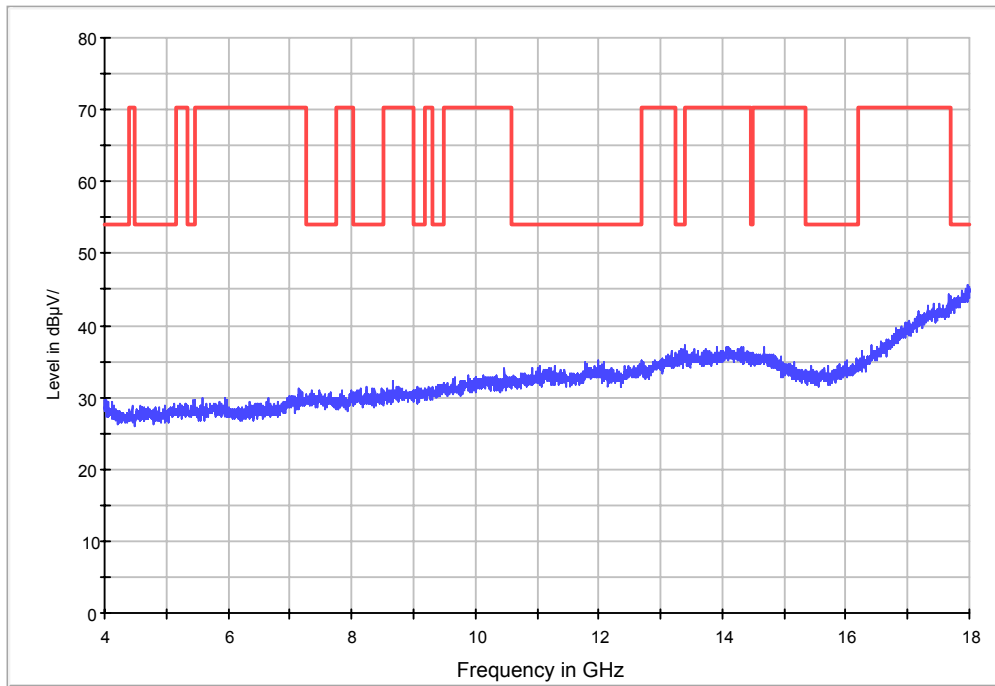


Fig. 49 Radiated Spurious Emission (802.11b, Ch6, 4 GHz-18 GHz)

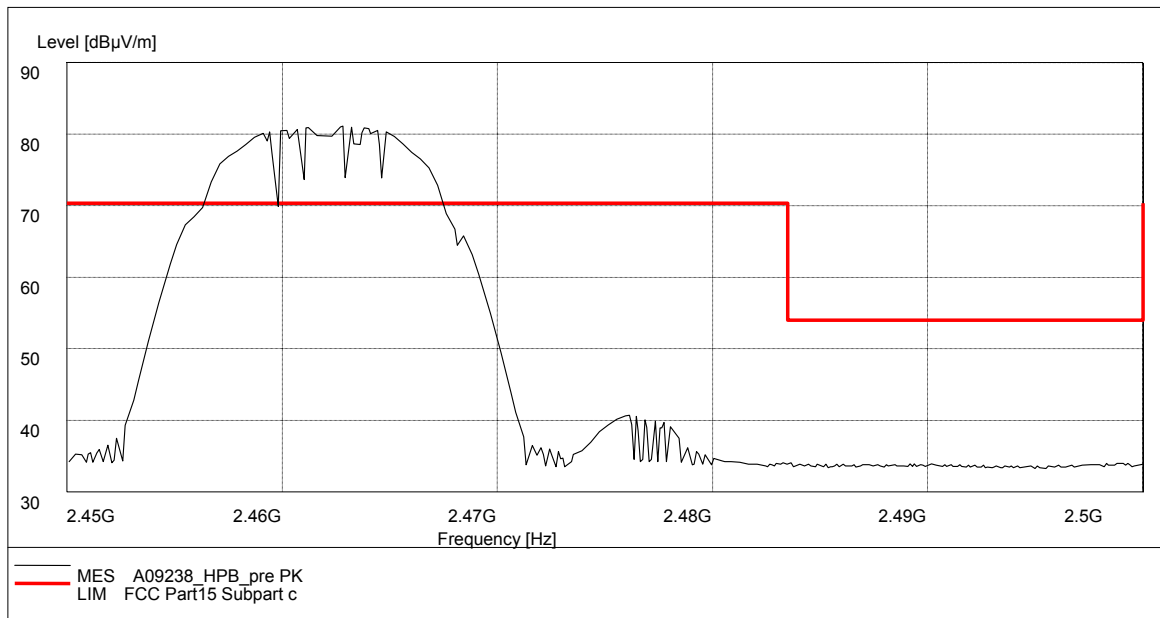


Fig. 50 Radiated Spurious Emission (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

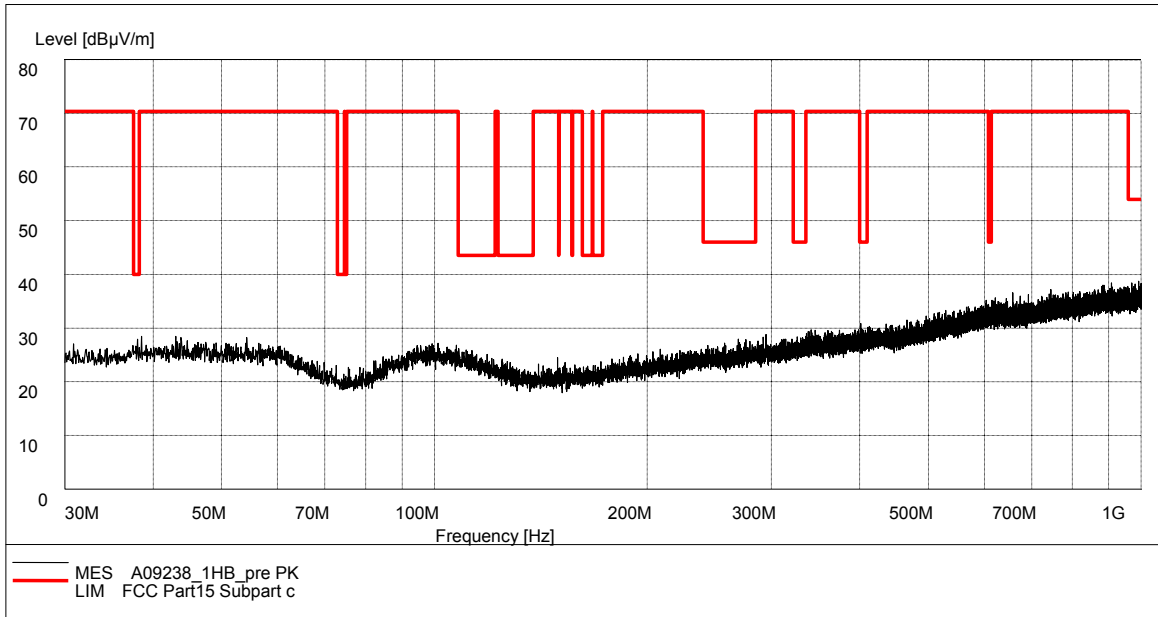


Fig. 51 Radiated Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)

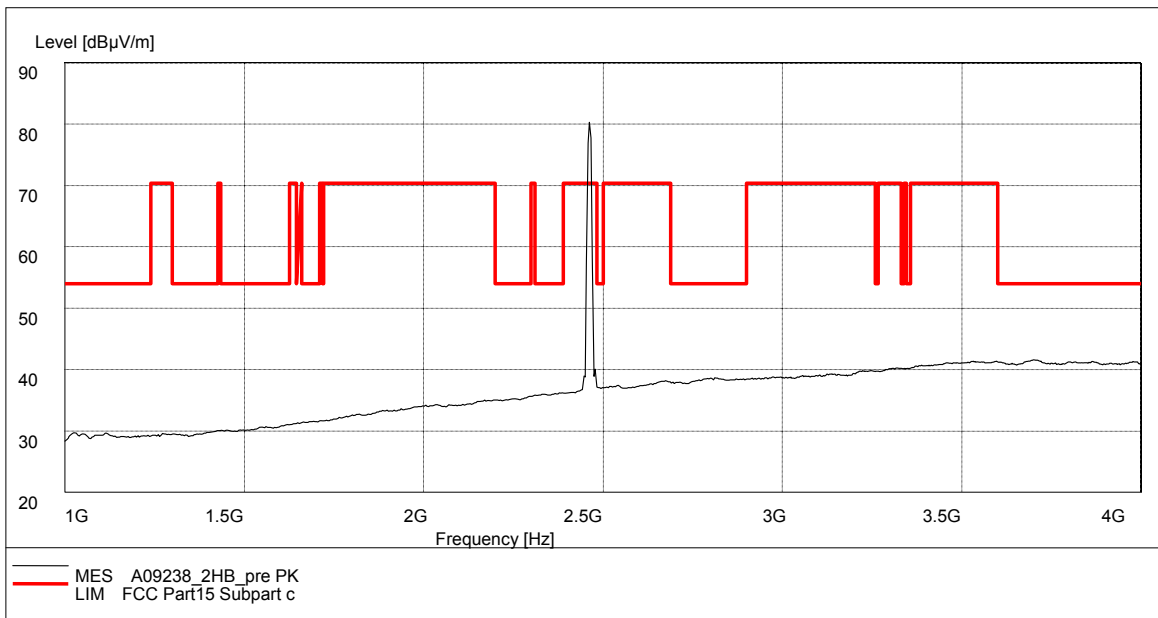


Fig. 52 Radiated Spurious Emission (802.11b, Ch11, 1 GHz-4 GHz)

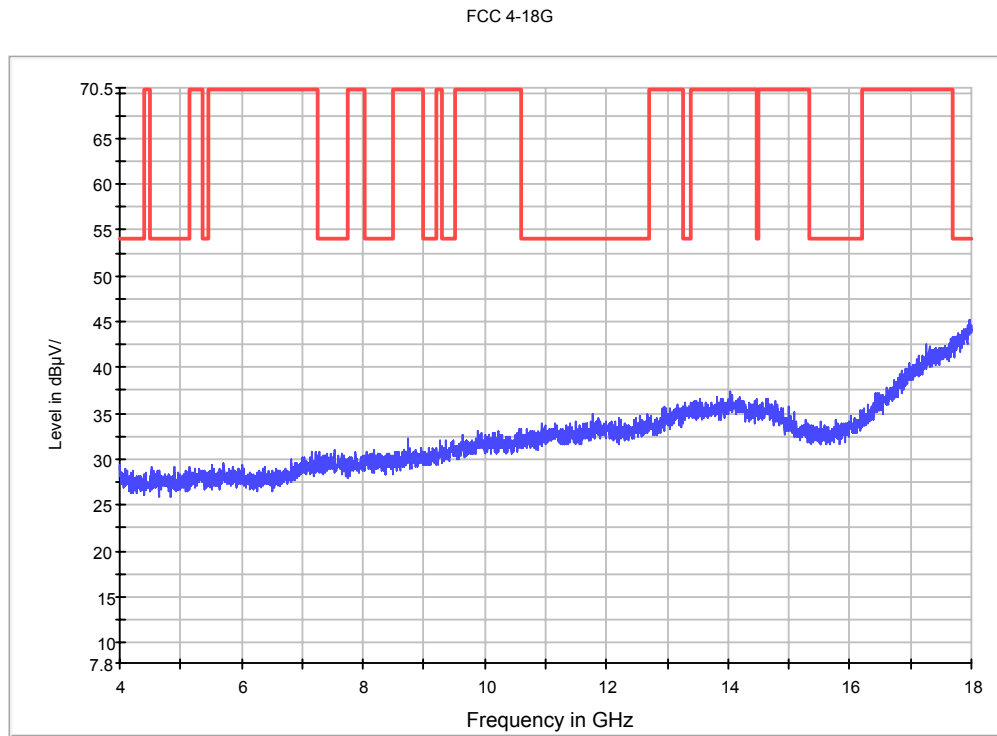


Fig. 53 Radiated Spurious Emission (802.11b, Ch11, 4 GHz-18 GHz)

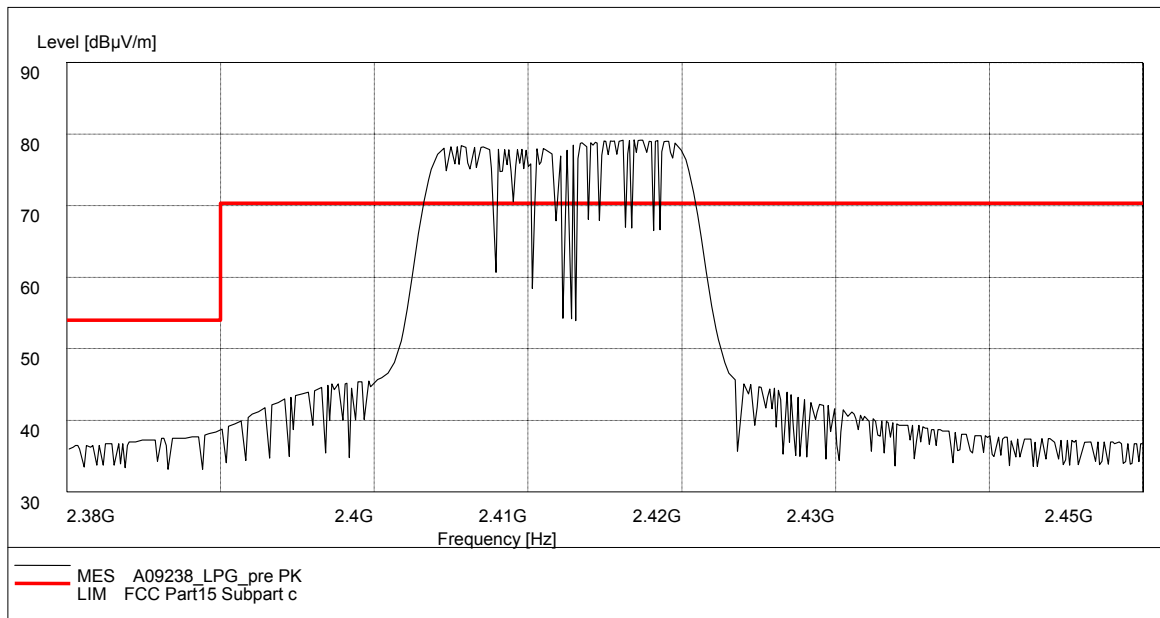


Fig. 54 Radiated Spurious Emission (Power): 802.11g, ch1, 2.38 GHz - 2.45GHz

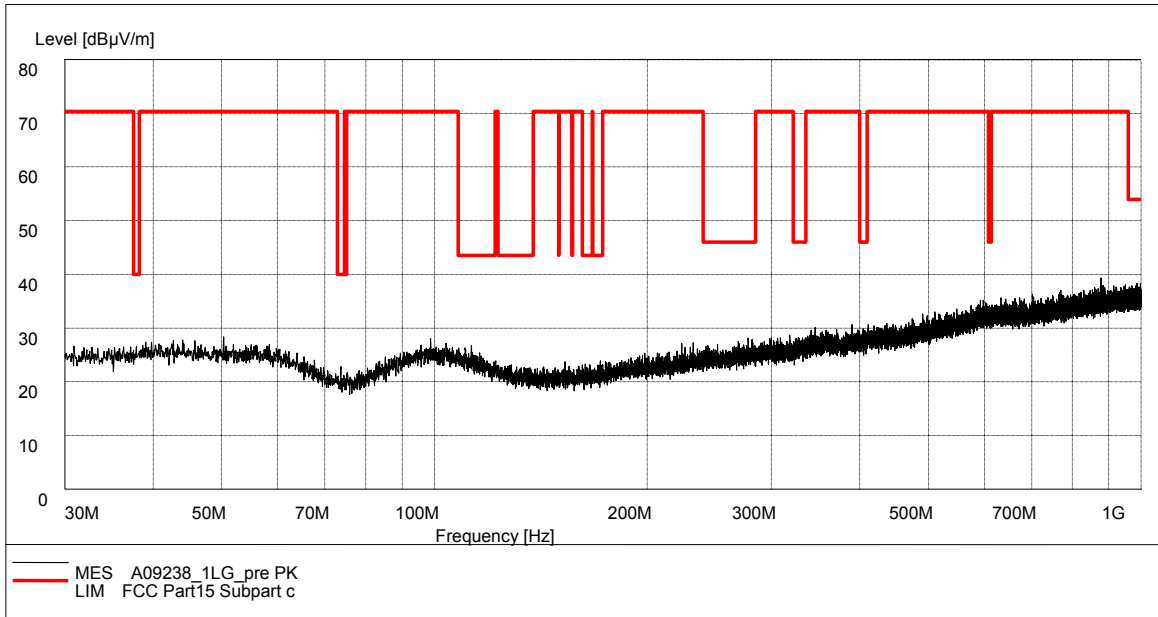


Fig. 55 Radiated Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)

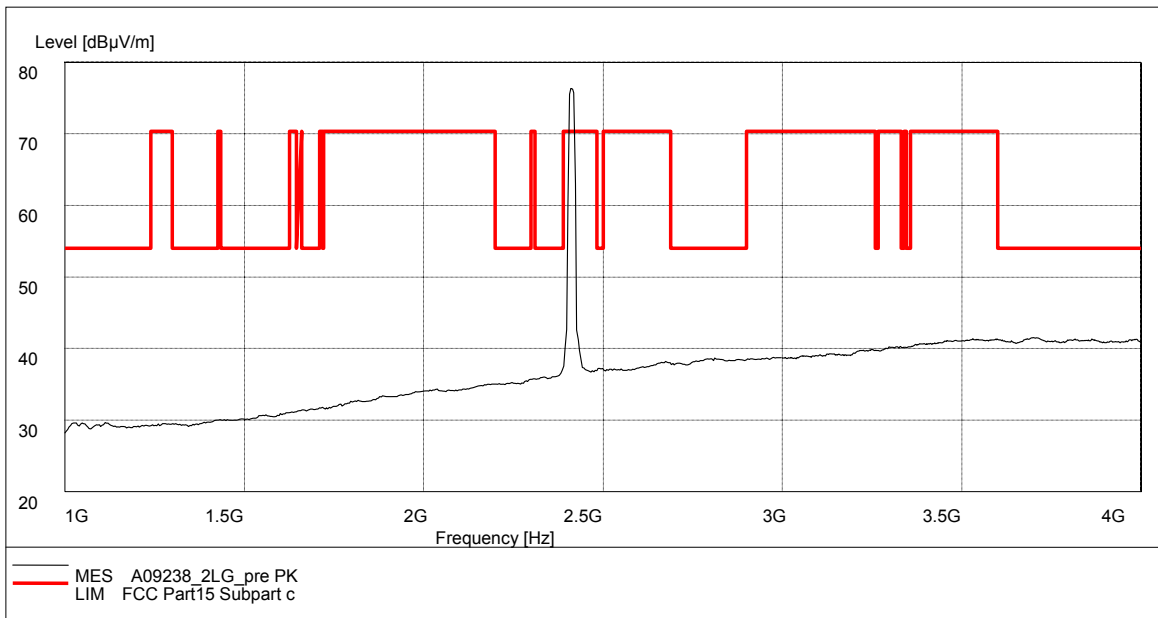


Fig. 56 Radiated Spurious Emission (802.11g, Ch1, 1 GHz-4 GHz)

FCC 4-18G

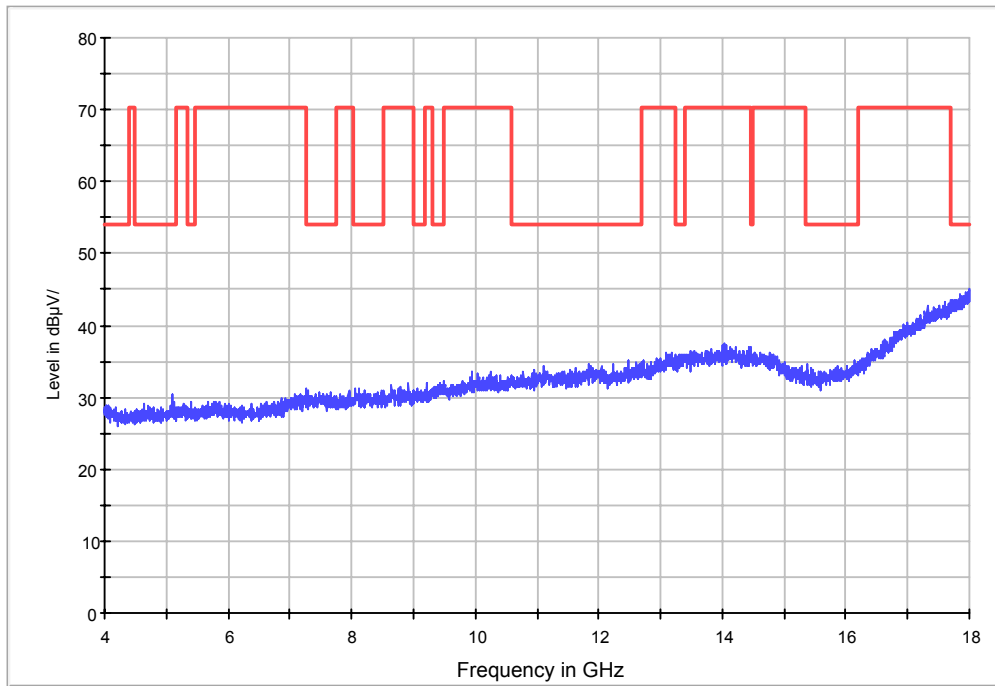


Fig. 57 Radiated Spurious Emission (802.11g, Ch1, 4 GHz-18 GHz)

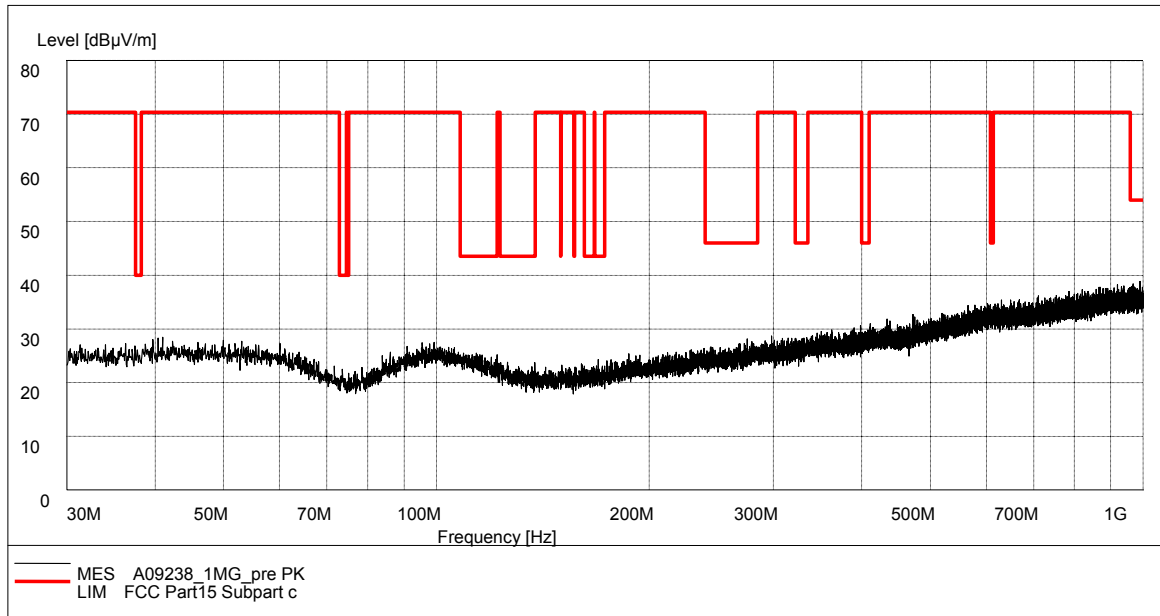


Fig. 58 Radiated Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)

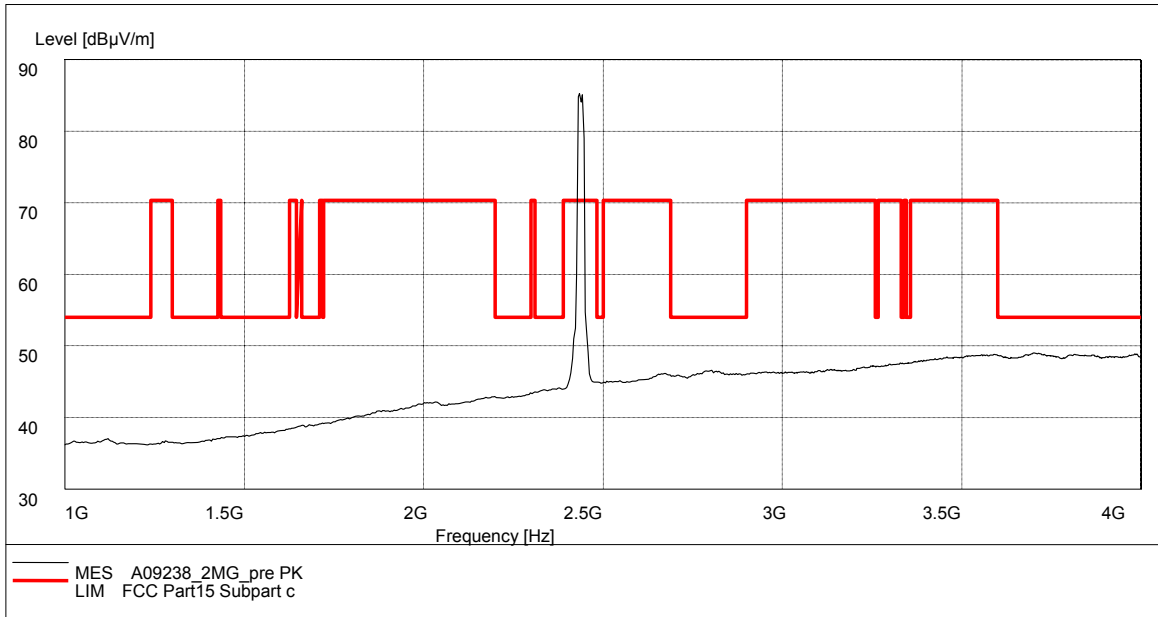


Fig. 59 Radiated Spurious Emission (802.11g, Ch6, 1 GHz-4 GHz)

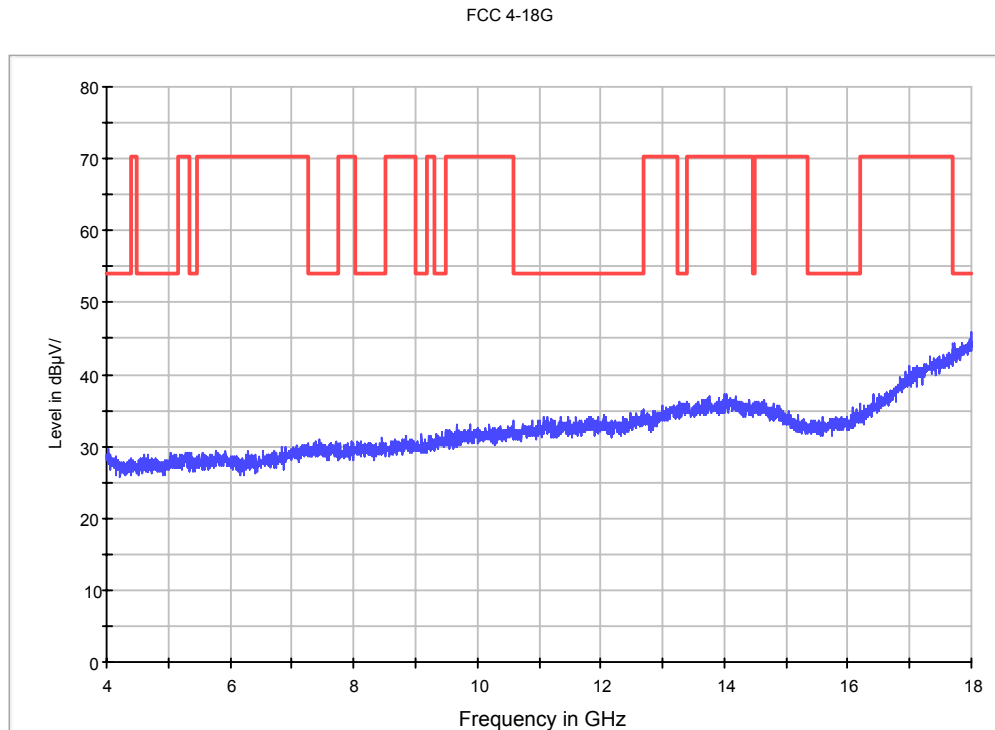


Fig. 60 Radiated Spurious Emission (802.11g, Ch6, 4 GHz-18 GHz)

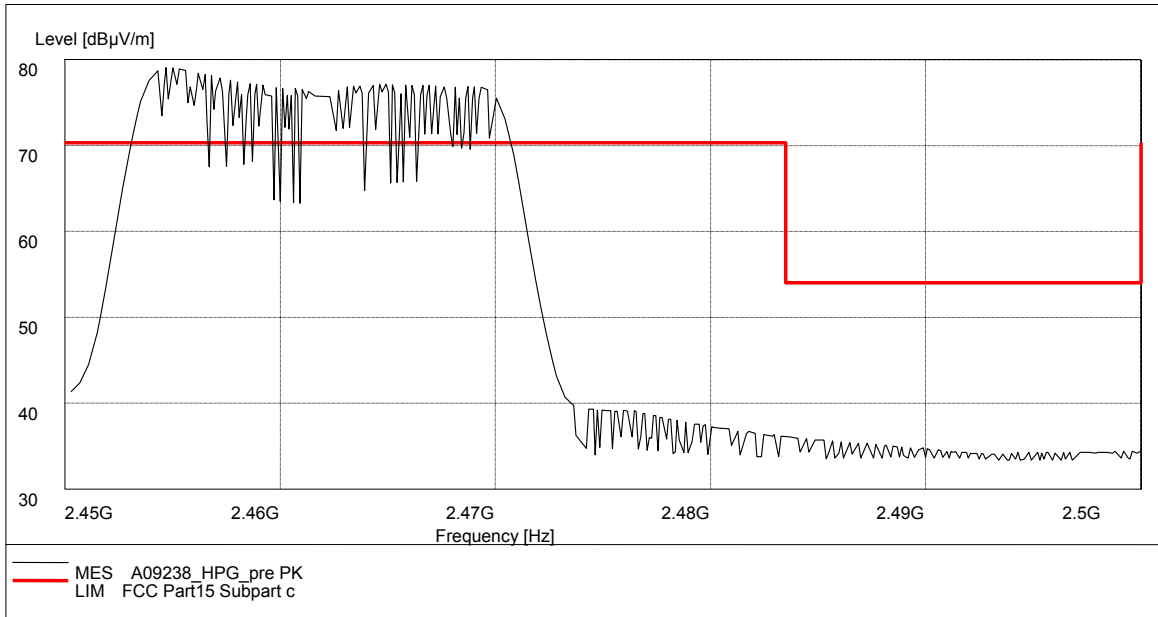


Fig. 61 Radiated Spurious Emission (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

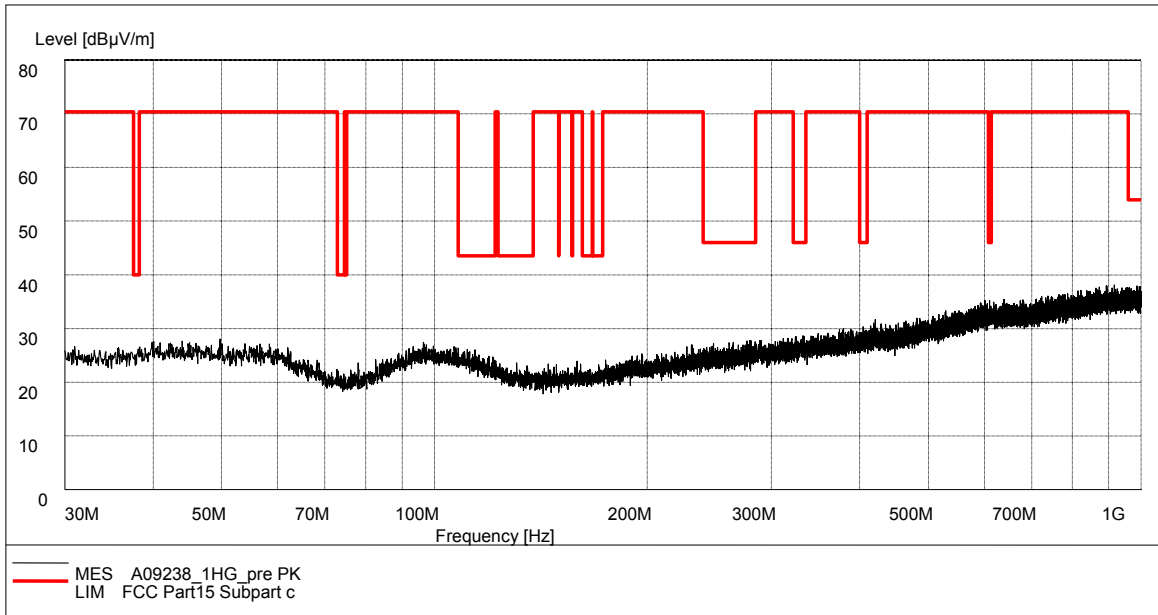


Fig. 62 Radiated Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)

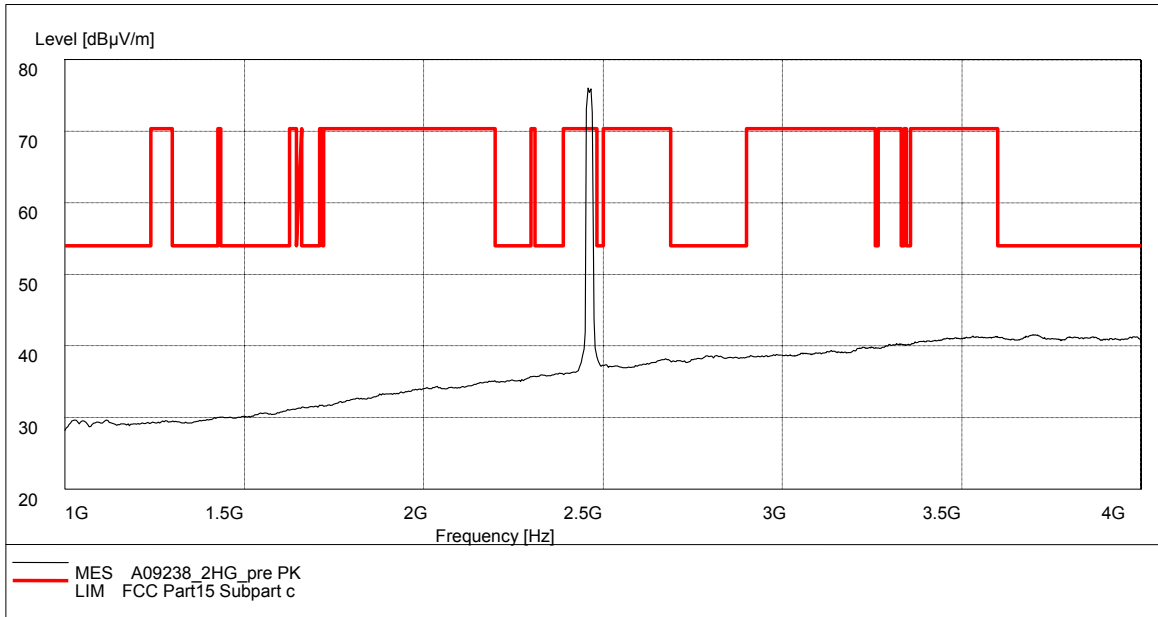


Fig. 63 Radiated Spurious Emission (802.11g, Ch11, 1 GHz-4 GHz)

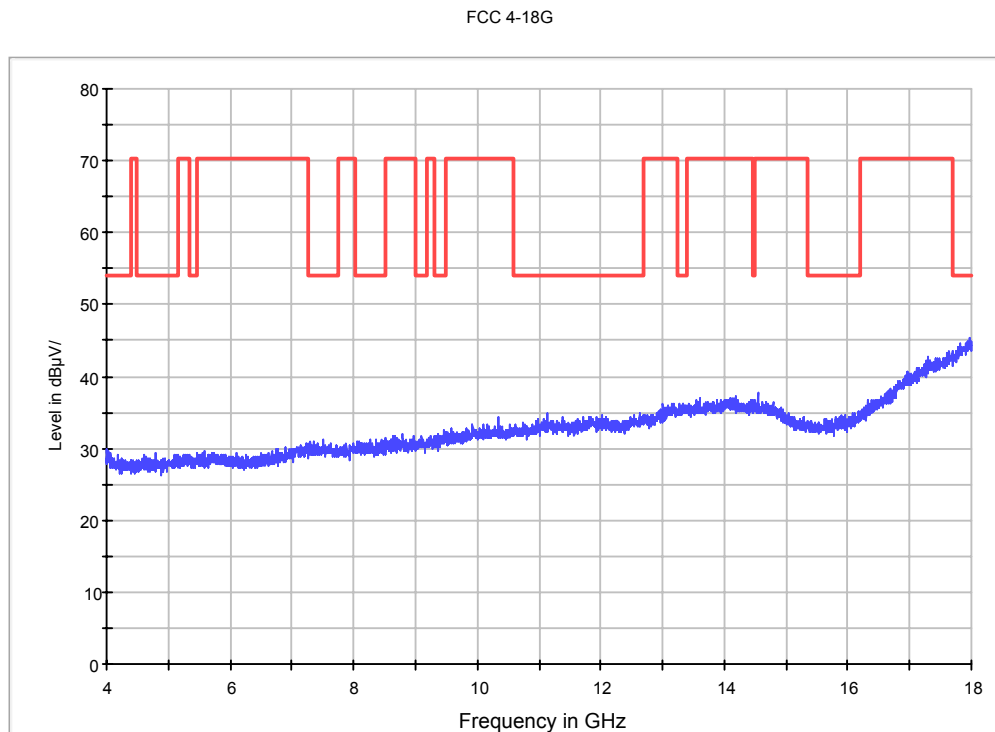


Fig. 64 Radiated Spurious Emission (802.11g, Ch11, 4 GHz-18 GHz)

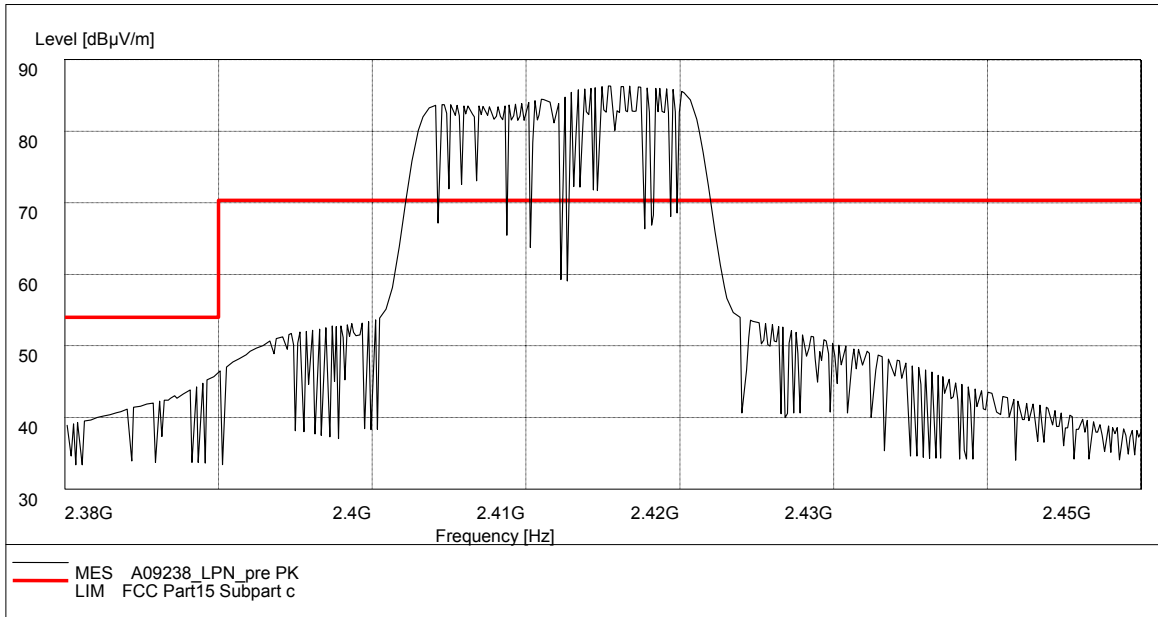


Fig. 65 Radiated Spurious Emission (Power): 802.11n-20MHz, ch1, 2.38 GHz - 2.45GHz

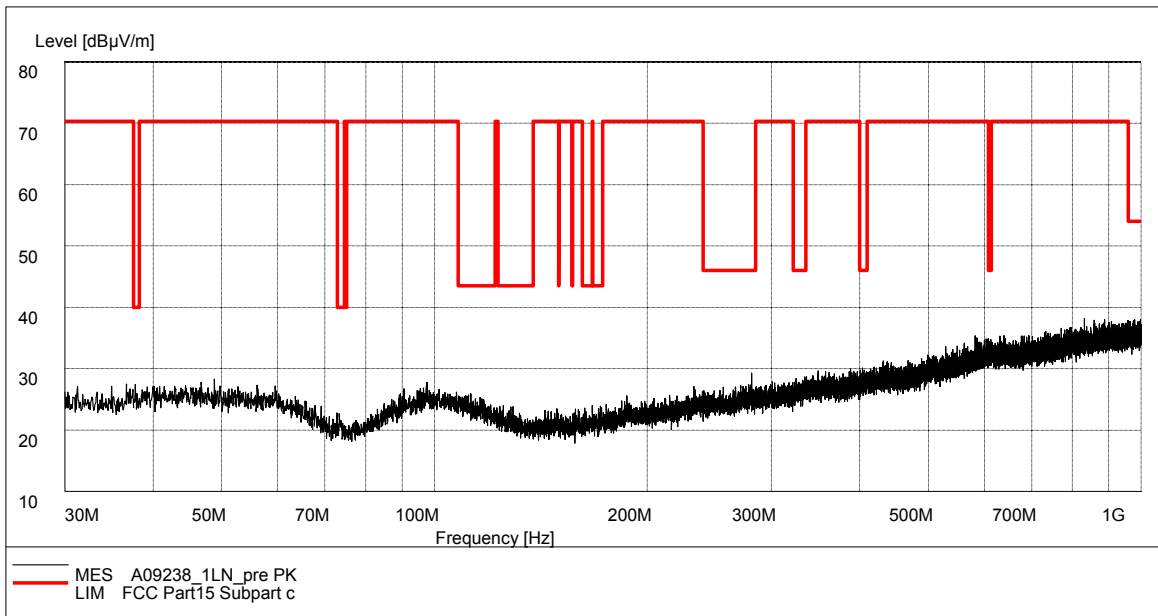


Fig. 66 Radiated Spurious Emission (802.11n-20MHz, Ch1, 30 MHz-1 GHz)

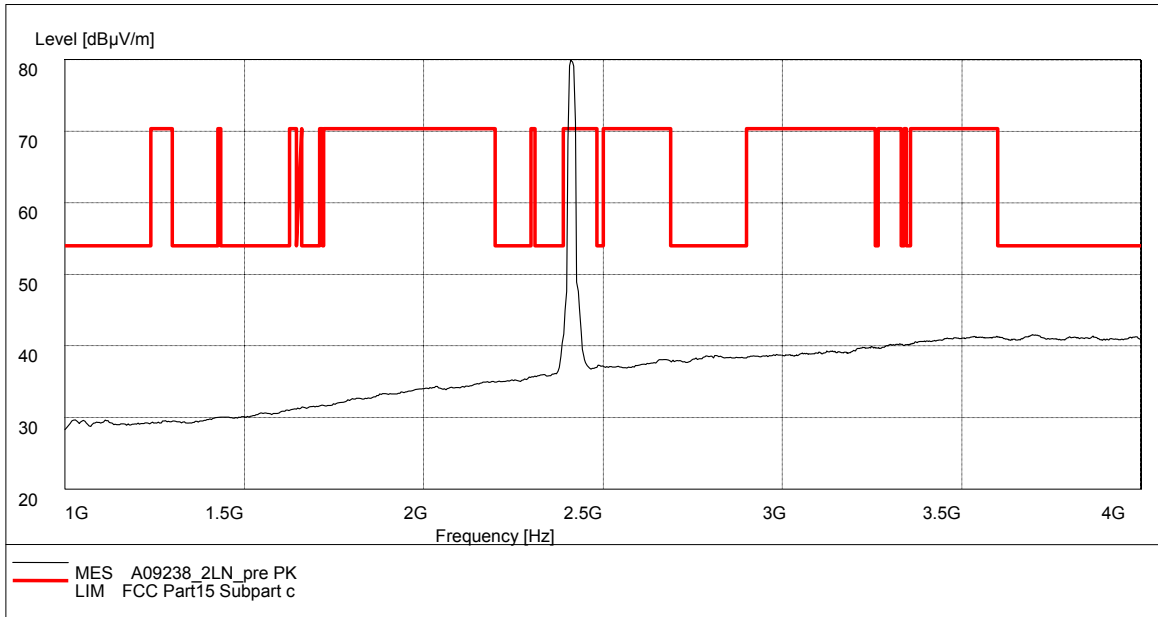


Fig. 67 Radiated Spurious Emission (802.11n-20MHz, Ch1, 1 GHz-4 GHz)

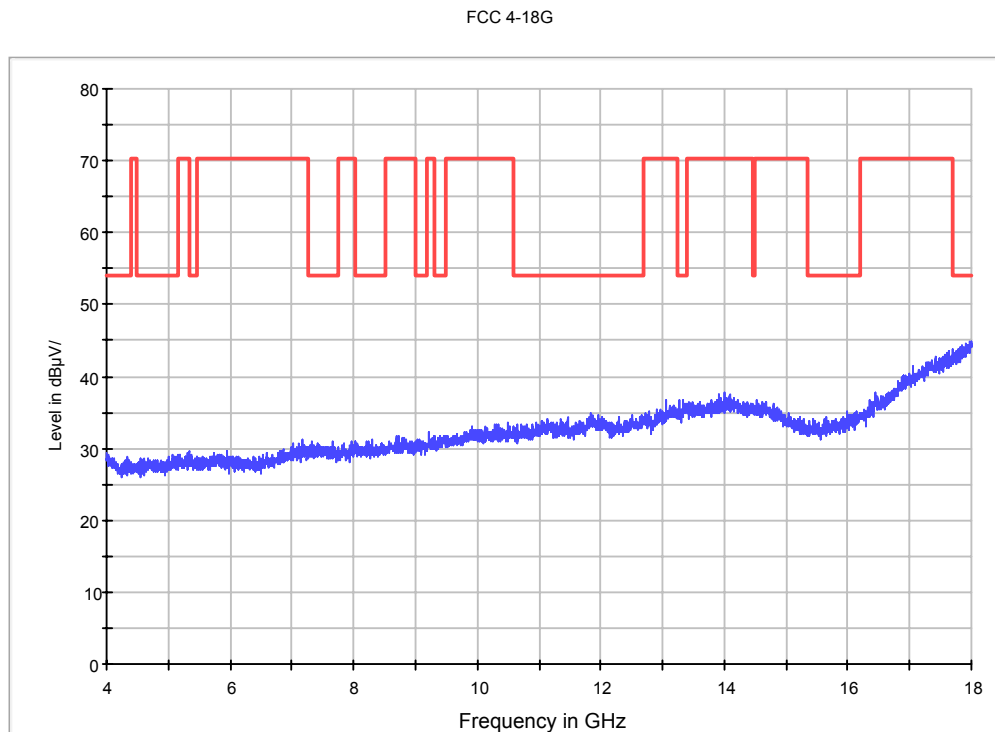


Fig. 68 Radiated Spurious Emission (802.11n-20MHz, Ch1, 4 GHz-18 GHz)

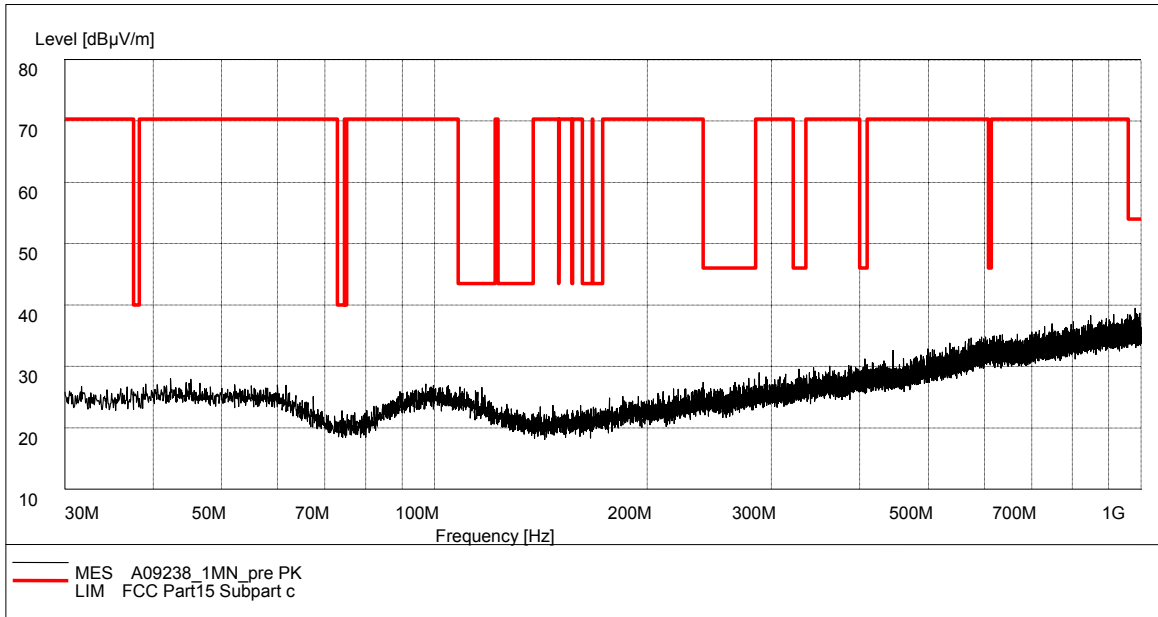


Fig. 69 Radiated Spurious Emission (802.11n-20MHz, Ch6, 30 MHz-1 GHz)

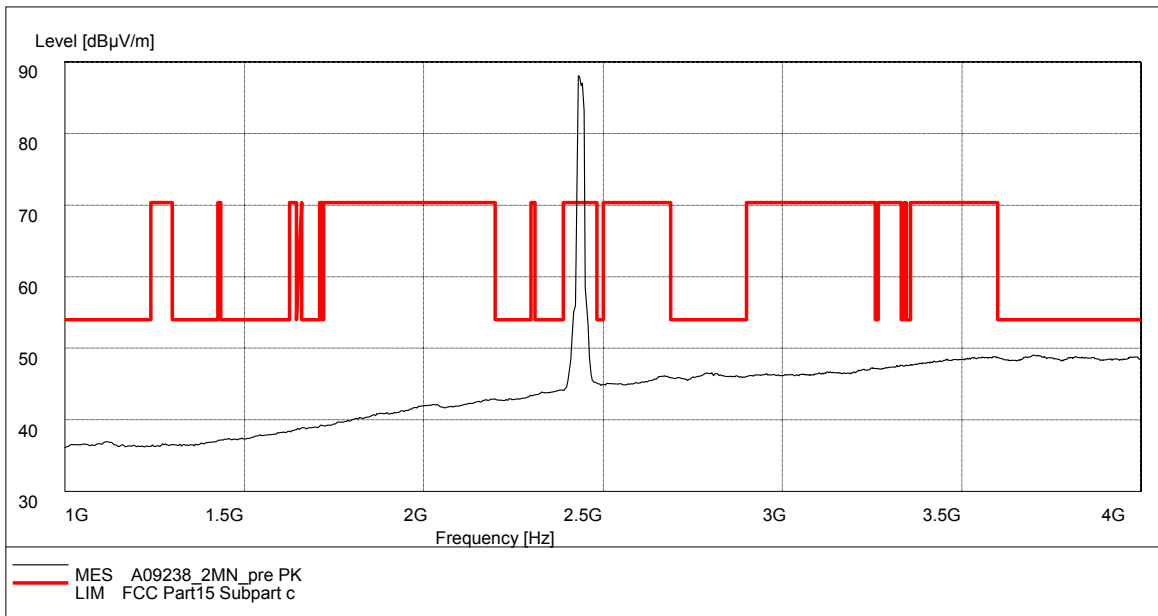


Fig. 70 Radiated Spurious Emission (802.11n-20MHz, Ch6, 1 GHz-4 GHz)

FCC 4-18G

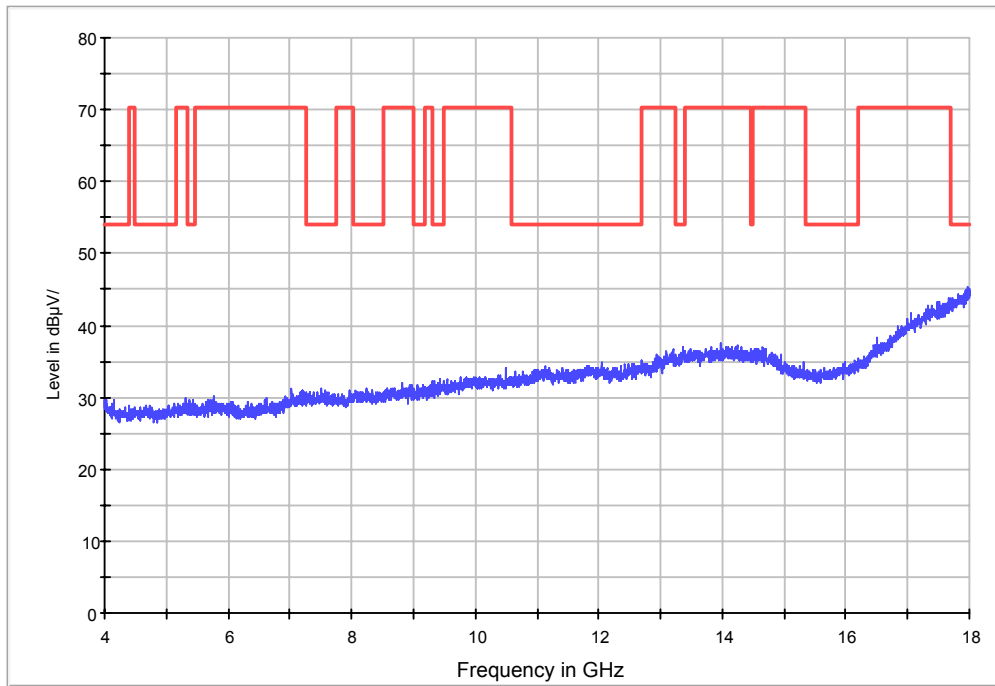


Fig. 71 Radiated Spurious Emission (802.11n-20MHz, Ch6, 4 GHz-18 GHz)

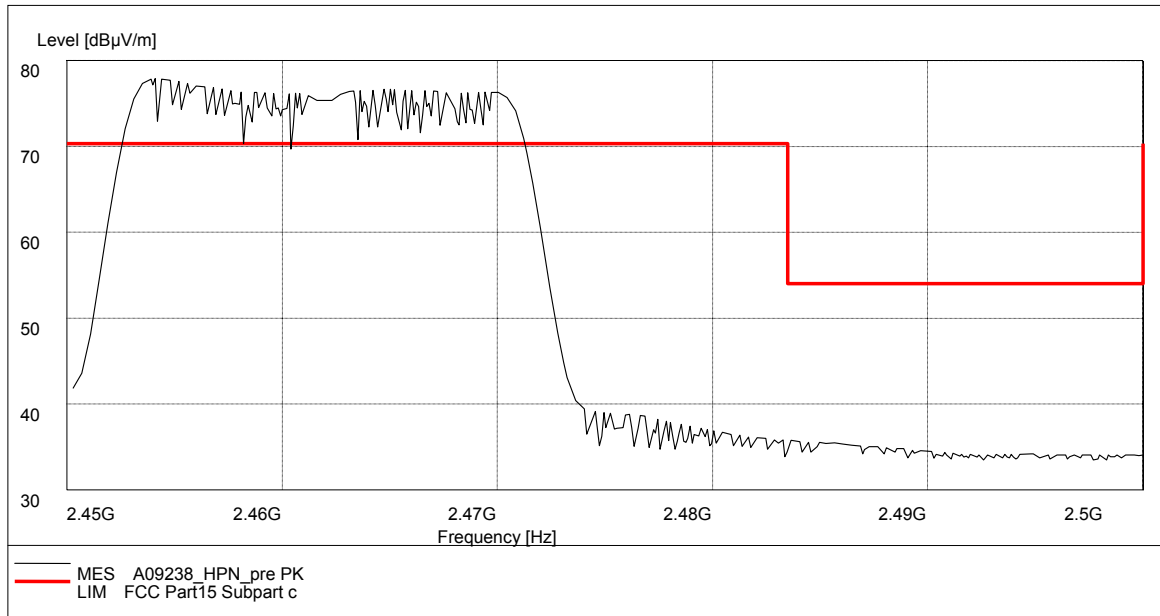


Fig. 72 Radiated Spurious Emission (Power): 802.11n-20MHz, ch11, 2.45 GHz - 2.50GHz

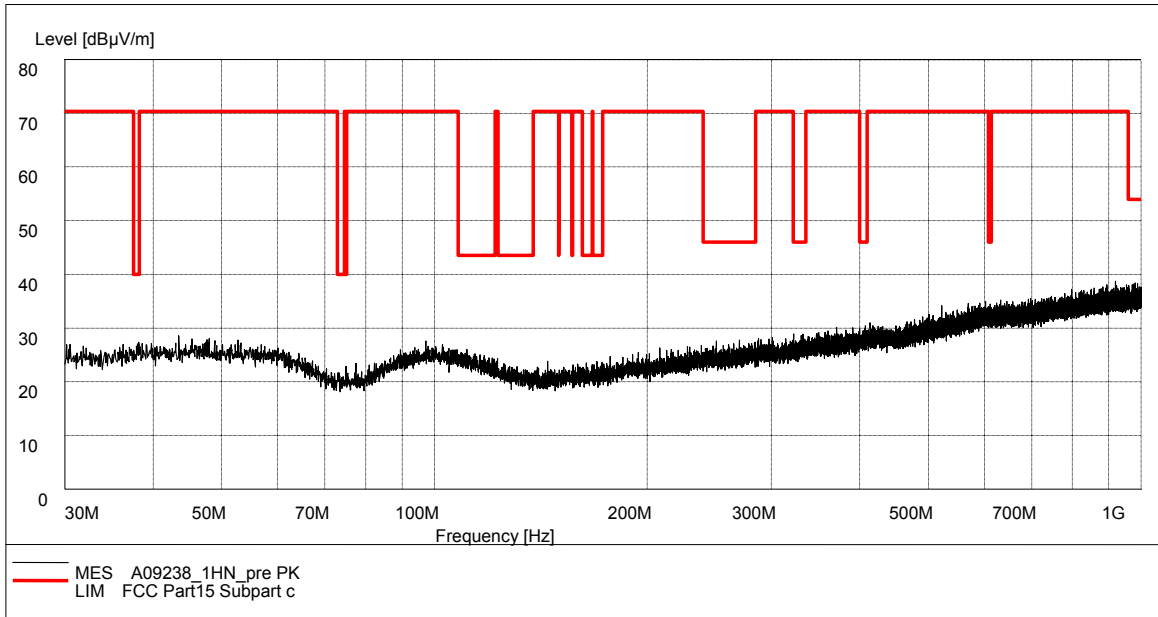


Fig. 73 Radiated Spurious Emission (802.11n-20MHz, Ch11, 30 MHz-1 GHz)

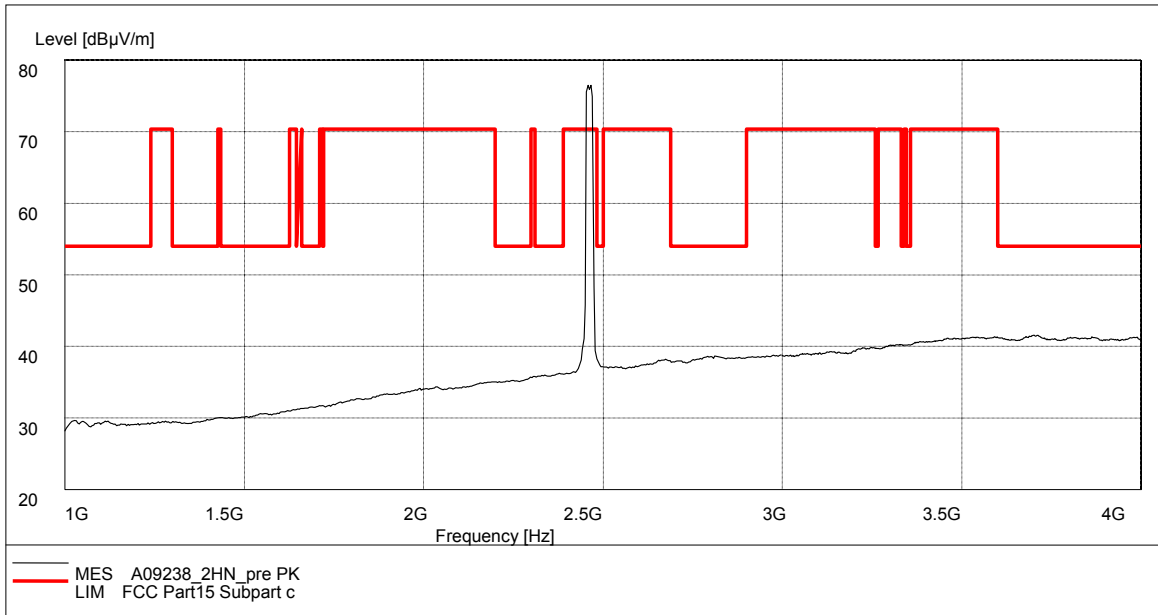


Fig. 74 Radiated Spurious Emission (802.11n-20MHz, Ch11, 1 GHz-4 GHz)

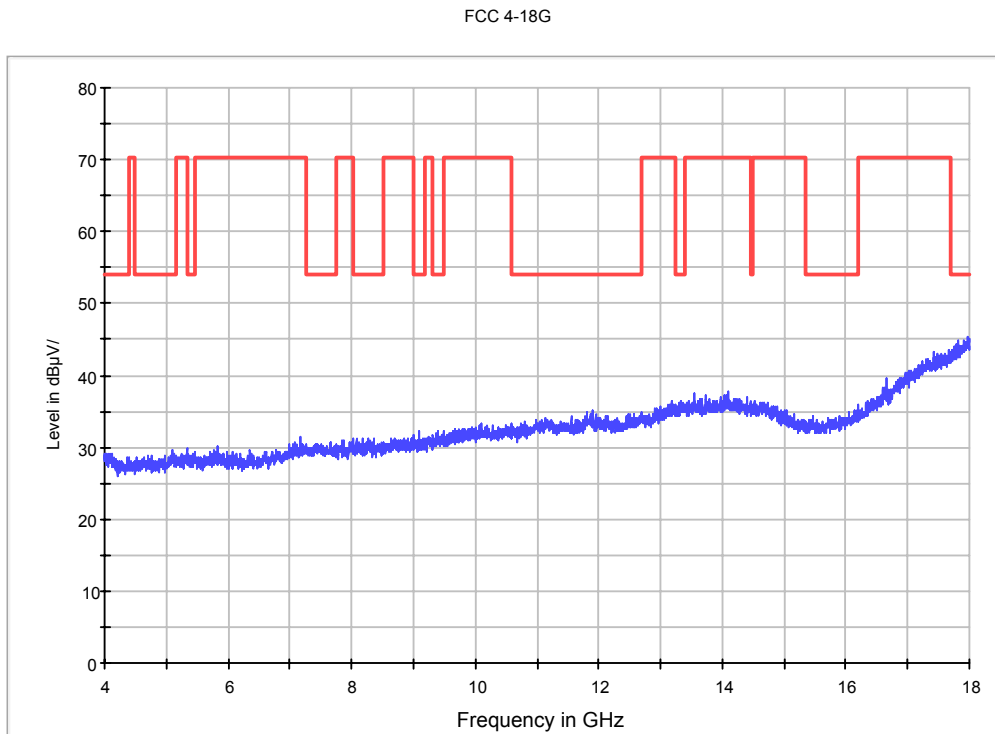


Fig. 75 Radiated Spurious Emission (802.11n-20MHz, Ch11, 4 GHz-18 GHz)

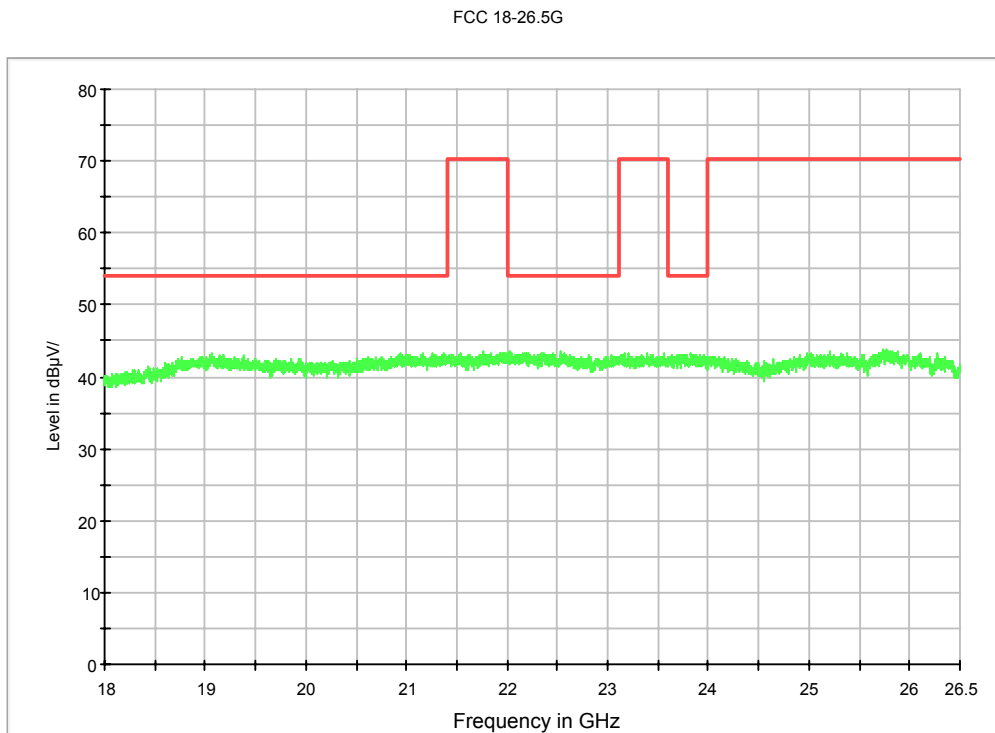


Fig. 76 Radiated emission: 18 GHz - 26.5 GHz

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

EUT ID: EUT1

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger 1		
		802.11n	IDLE	
0.15 to 0.5	66 to 56	Fig. 77	Fig.78	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 1		
		802.11n	IDLE	
0.15 to 0.5	56 to 46	Fig.77	Fig.78	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.

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger 2		
		802.11n	IDLE	
0.15 to 0.5	67 to 56	Fig. 79	Fig.80	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 2		
		802.11n	IDLE	
0.15 to 0.5	56 to 46	Fig.79	Fig.80	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:

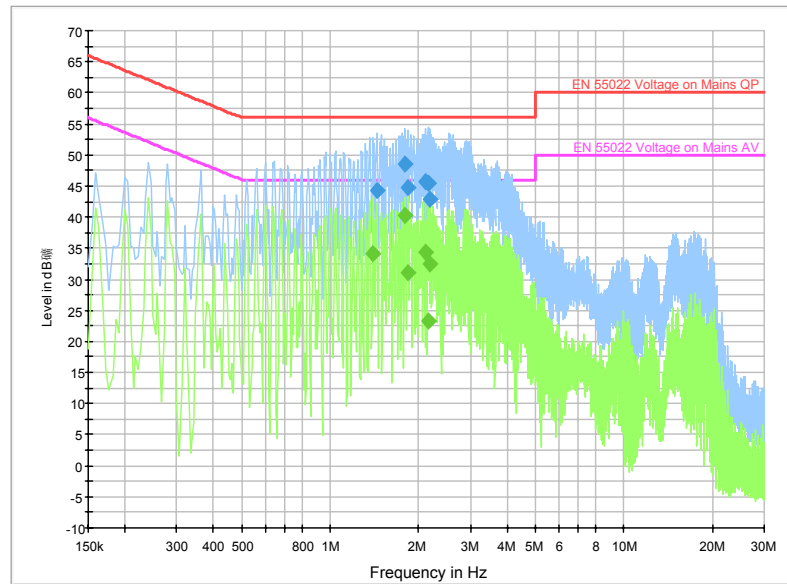


Fig. 77 AC Powerline Conducted Emission-802.11n

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.446000	44.2	GND	L1	10.0	11.8	56.0
1.792500	48.6	GND	L1	10.0	7.4	56.0
1.833000	44.6	GND	L1	10.0	11.4	56.0
2.112000	45.7	GND	L1	10.0	10.3	56.0
2.152500	45.5	GND	L1	10.0	10.5	56.0
2.193000	42.8	GND	L1	10.0	13.2	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.396500	34.1	GND	L1	10.0	11.9	46.0
1.792500	40.3	GND	L1	10.0	5.7	46.0
1.833000	31.0	GND	L1	10.0	15.0	46.0
2.112000	34.3	GND	L1	10.0	11.7	46.0
2.152500	23.2	GND	L1	10.0	22.8	46.0
2.193000	32.5	GND	L1	10.0	13.5	46.0

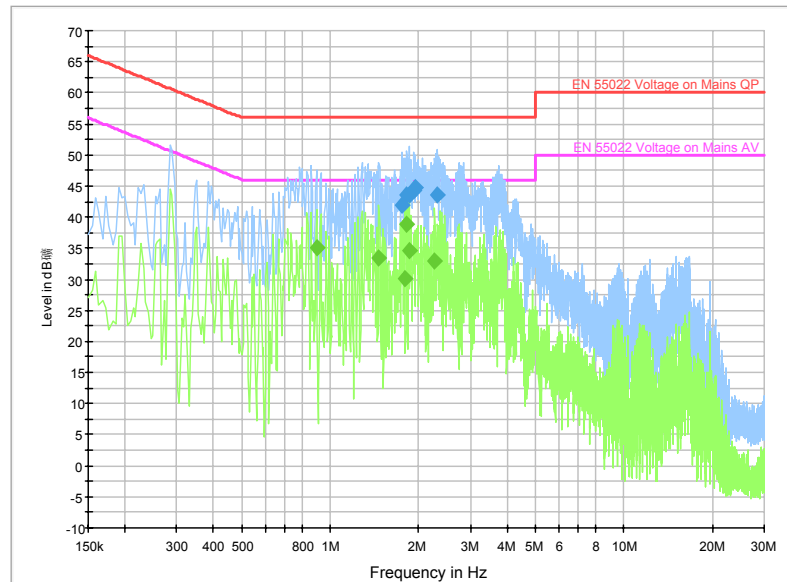


Fig. 78 AC Powerline Conducted Emission-IDLE

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.756500	42.0	GND	L1	10.0	14.0	56.0
1.824000	43.7	GND	L1	10.0	12.3	56.0
1.855500	43.6	GND	L1	10.0	12.4	56.0
1.923000	44.3	GND	L1	10.0	11.7	56.0
1.950000	44.7	GND	L1	10.0	11.3	56.0
2.323500	43.7	GND	L1	10.0	12.3	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.897000	35.1	GND	L1	10.0	10.9	46.0
1.468500	33.4	GND	L1	10.0	12.6	46.0
1.792500	30.1	GND	L1	10.0	15.9	46.0
1.824000	38.7	GND	L1	10.0	7.3	46.0
1.855500	34.6	GND	L1	10.0	11.4	46.0
2.269500	32.9	GND	L1	10.0	13.1	46.0

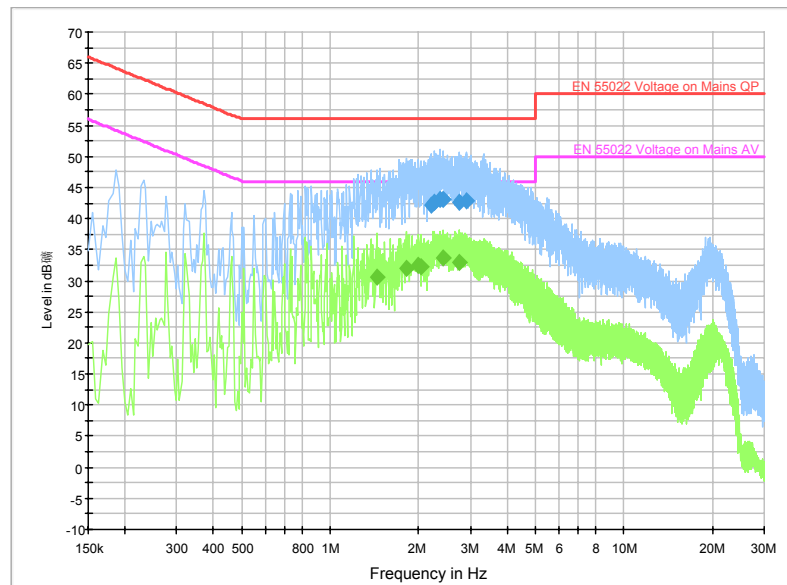


Fig. 79 AC Powerline Conducted Emission-802.11n

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.197500	42.0	GND	L1	10.0	14.0	56.0
2.269500	42.7	GND	L1	10.0	13.3	56.0
2.373000	43.1	GND	L1	10.0	12.9	56.0
2.431500	43.1	GND	L1	10.0	12.9	56.0
2.737500	42.7	GND	L1	10.0	13.3	56.0
2.922000	43.0	GND	L1	10.0	13.0	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
1.437000	30.7	GND	L1	10.0	15.3	46.0
1.810500	31.9	GND	L1	10.0	14.1	46.0
1.999500	32.4	GND	L1	10.0	13.6	46.0
2.044500	32.2	GND	L1	10.0	13.8	46.0
2.431500	33.6	GND	L1	10.0	12.4	46.0
2.737500	32.9	GND	L1	10.0	13.1	46.0

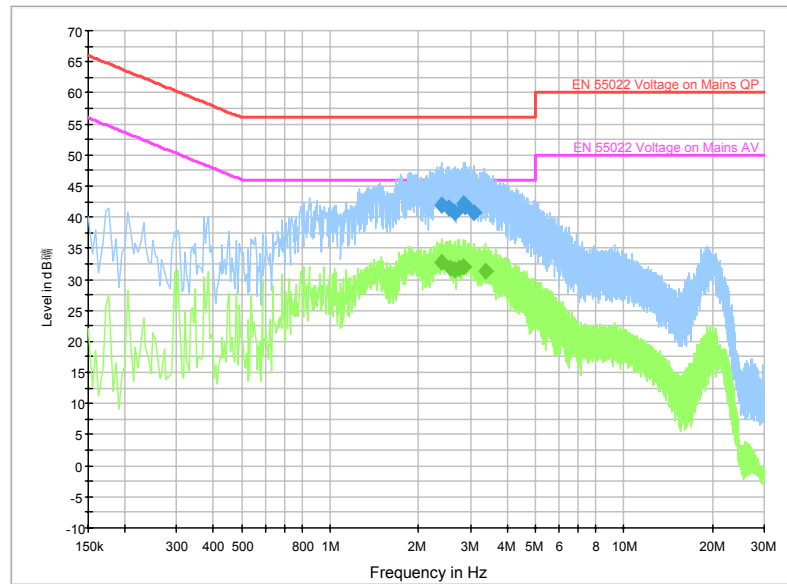


Fig. 80 AC Powerline Conducted Emission-IDLE

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.395500	41.9	GND	L1	10.0	14.1	56.0
2.526000	41.6	GND	L1	10.0	14.4	56.0
2.647500	40.8	GND	L1	10.0	15.2	56.0
2.845500	42.1	GND	L1	10.0	13.9	56.0
2.872500	41.7	GND	L1	10.0	14.3	56.0
3.097500	40.8	GND	L1	10.0	15.2	56.0

Final Result 2

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.404500	32.7	GND	L1	10.0	13.3	46.0
2.566500	31.7	GND	L1	10.0	14.3	46.0
2.647500	31.6	GND	L1	10.0	14.4	46.0
2.760000	31.7	GND	L1	10.0	14.3	46.0
2.841000	32.1	GND	L1	10.0	13.9	46.0
3.394500	31.2	GND	L1	10.0	14.8	46.0

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