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Report No.: GZEM140400183802
Page: 1 of 96
FCC ID: 2ABNA-G01

TEST REPORT

Application No.:	GZEM1404001838RF
Applicant:	Guangzhou Geoelectron Science & Technology Company Limited
FCC ID:	2ABNA-G01
Product Name:	Communication Module
Product Description:	802.11b/g/n(HT20) wireless module
Model No.:	GEBW127XA
Trade mark:	GEOELECTRON
Standards:	CFR 47 FCC PART 15 SUBPART C:2013 section 15.247
Date of Receipt:	2014-04-24
Date of Test:	2014-06-15 to 2014-06-19
Date of Issue:	2014-07-02
Test Result :	Pass*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further detail.

Authorized Signature: 
Richard Li
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2014-07-02		Original

Authorized for issue by:				
Tested By				2014-06-15 to 2014-06-19
		(Jack Liang) /Project Engineer		Date
Prepared By				2014-06-24
		(Jack Liang) /Clerk		Date
Checked By				2014-07-02
		(Fred Zhu)/Reviewer		Date



3 Test Summary

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
6 dB Bandwidth	FCC PART 15 C section 15.247 (a)(2)	ANSI C63.10: Clause 6.9.1	PASS
Maximum Peak Output Power	FCC PART 15 C section 15.247(b)(3)	FCC/KDB-558074 D01 v03r02 Clause 9.1.2	PASS
Peak Power Spectral Density	FCC PART 15 C section 15.247(e)	ANSI C63.10: Clause 6.11.2.3	PASS
Conducted Spurious Emission (30MHz to 25GHz)	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 6.7	PASS
Radiated Spurious Emission 30 MHz to 25 GHz)	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 6.4, 6.5 and 6.6	PASS
Band Edges Measurement	FCC PART 15 C section 15.247 (d) &15.205	FCC/KDB-558074 D01 v03r02 Clause 13.3.1	PASS

Remark:

N/A: not applicable. Refer to the relative section for the details.

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.



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5 General Information

5.1 Client Information

Applicant: Guangzhou Geoelectron Science & Technology Company Limited
Address of Applicant: No.704,7/F, Building C, No.7, Cai Pin Road, Science City,Luogang District, Guangzhou, China 510663

5.2 General Description of E.U.T.

Product Name: Communication Module
Model No.: GEBW127XA

5.3 Details of E.U.T.

Operating Frequency 2412 MHz to 2462 MHz for 802.11b/g/n(HT20)
802.11b: DSSS(CCK/QPSK/BPSK)
Type of Modulation: 802.11g: OFDM(BPSK/QPSK/16QAM/64QAM)
802.11n(HT20): OFDM (BPSK/QPSK/16QAM/64QAM)
802.11b :1/2/5.5/11 Mbps
Transmit Data Rate: 802.11g :6/9/12/18/24/36/48/54 Mbps
802.11n(HT20): 6.5, 13,19.5, 26, 39, 52, 58.5, 65Mbps
Number of Channels 11 Channels for 802.11b/g/n(HT20)
Channel Separation: 5 MHz
Antenna Type The module without antenna, and connection with the host from one pin,the host has a integrated antenna.
Antenna gain: 0dBi
Function: 802.11b/g/n(HT20) wireless module
Power Supply: DC 3.3V from host(refer to section 5.4)
Power cord: N/A

5.4 Description of Support Units

The EUT should be put inside the host. During test the transferred board was used for finding the fixed frequency. The information of the support units is shown as below:



5.5 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

5.6 Abnormalities from Standard Conditions

None.

5.7 Other Information Requested by the Customer

None.

5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

5.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co. Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584, G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECCE 01:2006-10 and Rules of procedure IECCE 02:2006-10, and the relevant IECCE CB-Scheme Operational documents.

6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal. Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2012-08-30	2014-08-30
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	1 00283	2014-04-19	2015-04-19
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	1 00236	2014-03-03	2015-03-03
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	2015-05-09
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2013-08-31	2016-08-31
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-08-31	2016-08-31
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2012-06-02	2015-06-02
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 91 20D	9120D-841	2013-08-31	2016-08-31
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	1 00096	2012-07-01	2015-07-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-03	2015-03-03
EMC2065	Amplifier	HP	8447F	N/A	2013-08-31	2014-08-31
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2013-07-29	2014-07-29
EMC0075	310N Amplifier	Sonoma	310N	272683	2014-03-03	2015-03-03
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-03-03	2016-03-03
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9170	9170-375	2014-05-26	2017-05-26
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-04-19	2015-04-19
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-05-03	2016-05-03

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal. Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2013-09-13	2014-09-13
EMC0007	DMM	Fluke	73	70671122	2013-09-13	2014-09-13

7 Test Results

7.1 E.U.T. test conditions

Test Voltage: DC 3.3V from host

Temperature: 20.0 -25.0 °C

Humidity: 38-50 % RH

Atmospheric Pressure: 1000 -1010 mbar

Requirements: **15.31(e):** For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

15.32: Power supplies and CPU boards used with personal computers and for which separate authorizations are required to be obtained shall be tested as follows: Testing shall be in accordance with the procedures specified in Section 15.31 of this part.

Test frequencies and frequency range:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

EUT channels and frequencies list:

1. Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Channel	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

7.2 Antenna Requirement

Standard requirement

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

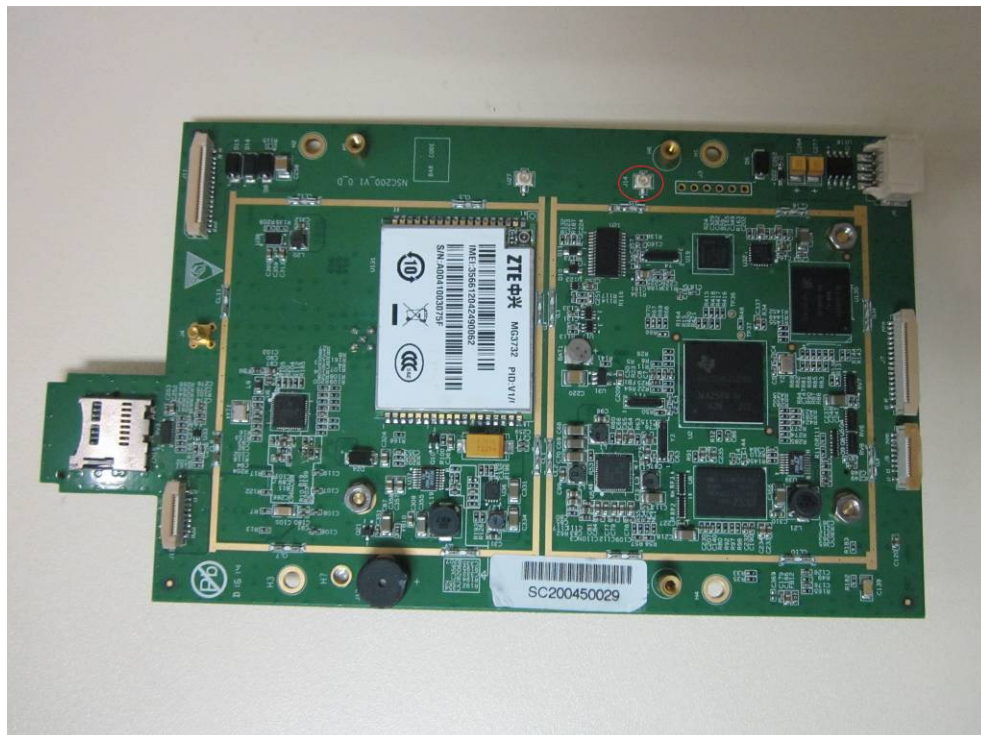
15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

The module without antenna, and connection with the host from one pin, the host has a integrated antenna. The antenna is professionally installed by host manufacturer under the installation instruction and it cannot be installed and changed by end user.

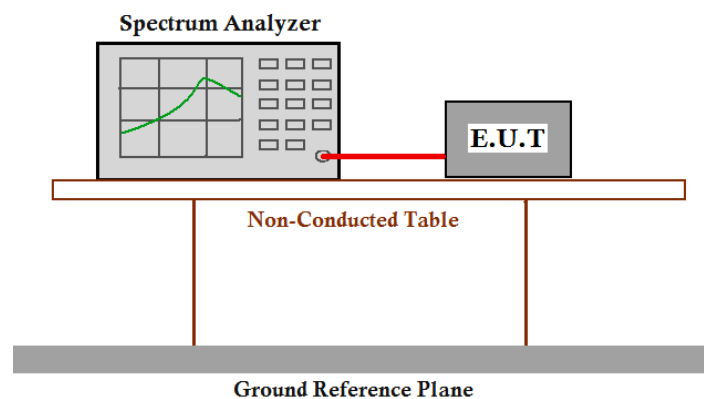
The antenna is integrated and no consideration of replacement. The maximum gain of the antenna is 0 dBi.



Test result: The unit does meet the FCC requirements.

7.3 6 dB Bandwidth

- Test Requirement: FCC Part 15 C section 15.247
(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
- Test Method: ANSI C63.10: Clause 6.9.1
- Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
- Test Configuration:



- Test Procedure:
1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =1.5dB) from the antenna port to the spectrum.
 2. Set the spectrum analyzer:
Sweep = auto; Detector Function = Peak; ace = Max Hold
RBW: 1%~5% OBW; VBW: $\geq 3 \times RBW$
Span: two times and five times the OBW.
 3. Mark the peak power frequency and -6dB (upper and lower) power frequency.
 4. Repeat until all the test status is investigated.
 5. Report the worse case.



Channel No.	Frequency (MHz)	Mode	Data Rate	Measured 6dB bandwidth (MHz)	Limit	Result
1	2412	802.11b	11 Mbps	9.459	≥500KHz	Pass
6	2437		11 Mbps	9.619		Pass
11	2462		11 Mbps	9.860		Pass
1	2412	802.11g	54 Mbps	16.273	≥500KHz	Pass
6	2437		54 Mbps	16.353		Pass
11	2462		54 Mbps	16.273		Pass
1	2412	802.11n (HT20)	72.2 Mbps	17.475	≥500KHz	Pass
6	2437		72.2 Mbps	17.395		Pass
11	2462		72.2 Mbps	17.395		Pass

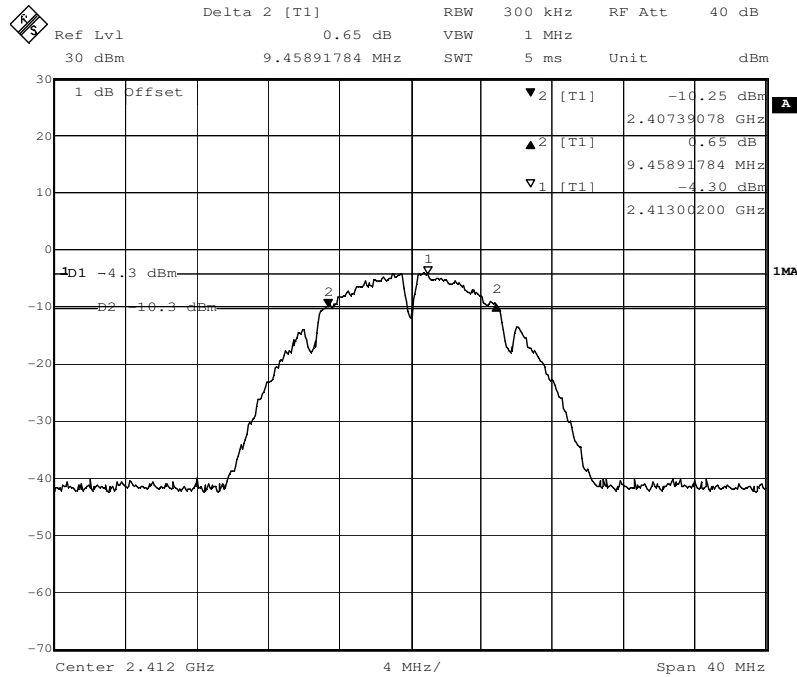
Test result: The unit does meet the FCC requirements.



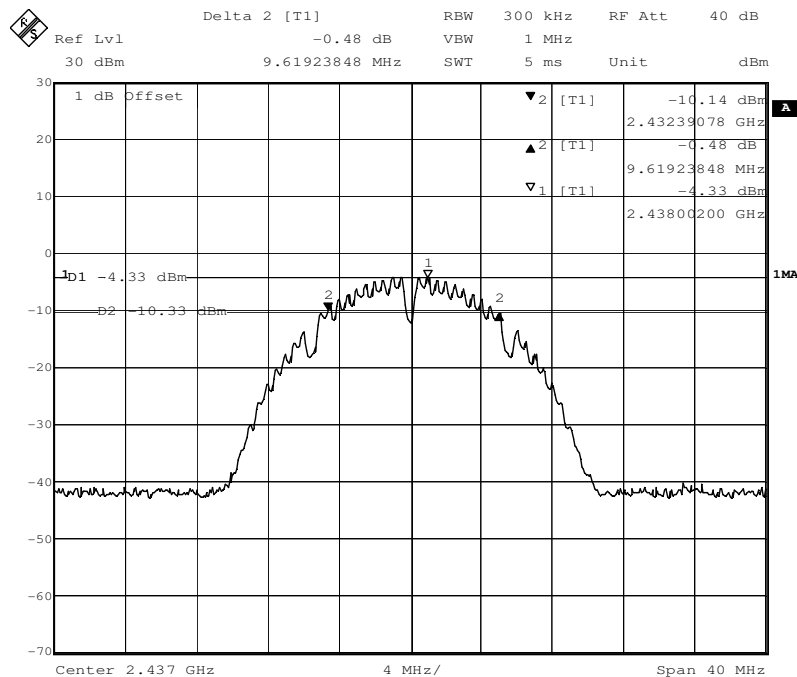
Result plot as follows:

802.11b mode with 11Mbps data rate

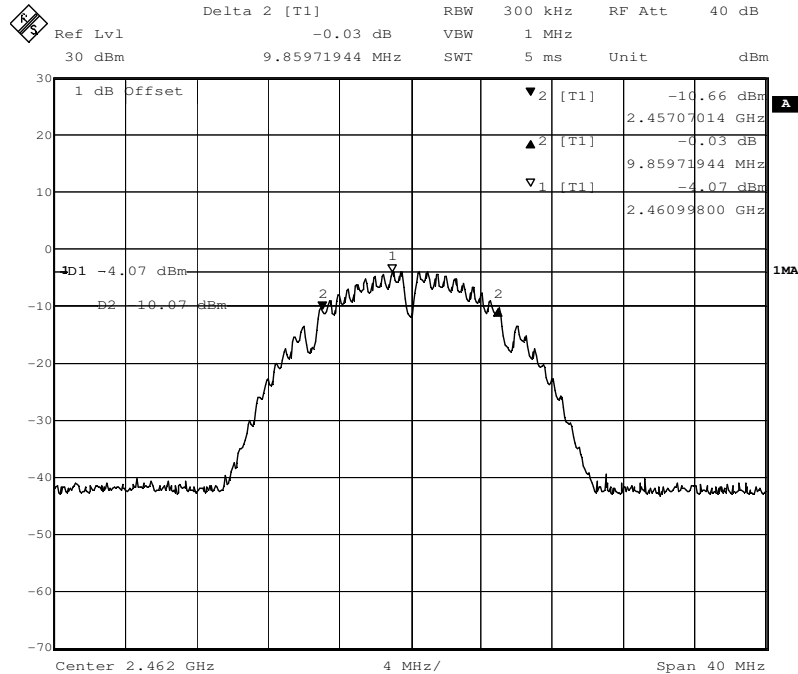
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

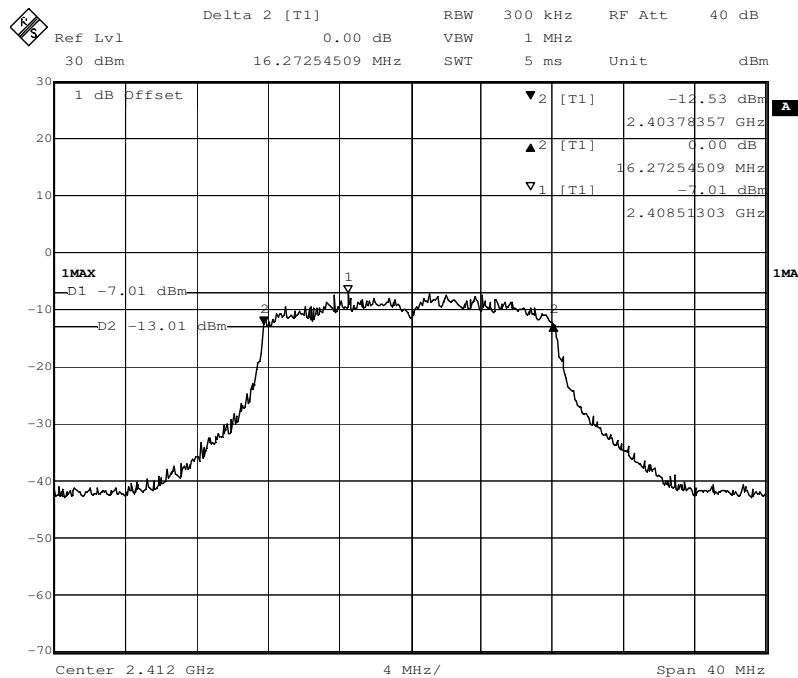


Channel 11: 2.462GHz:

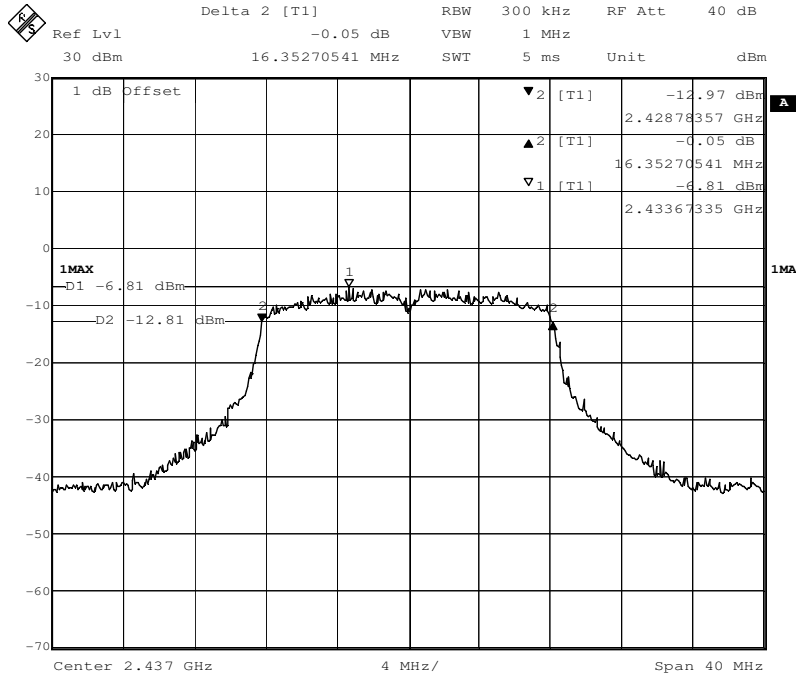


802.11g mode with 54Mbps data rate

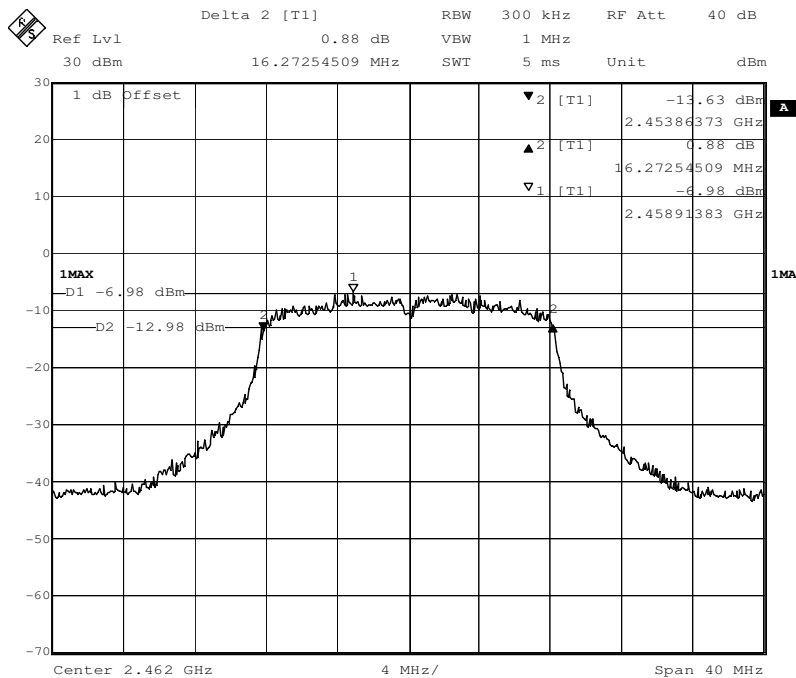
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

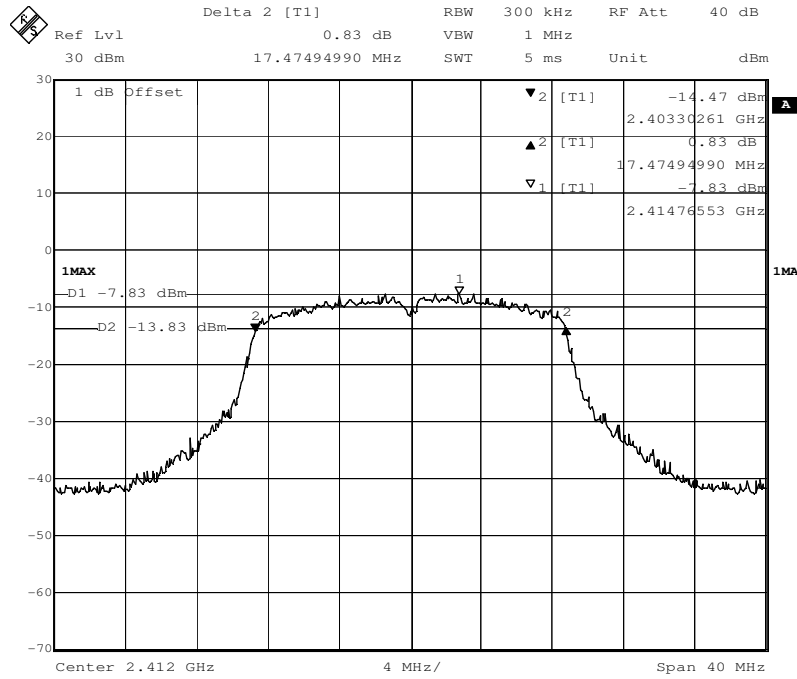


Channel 11: 2.462GHz:

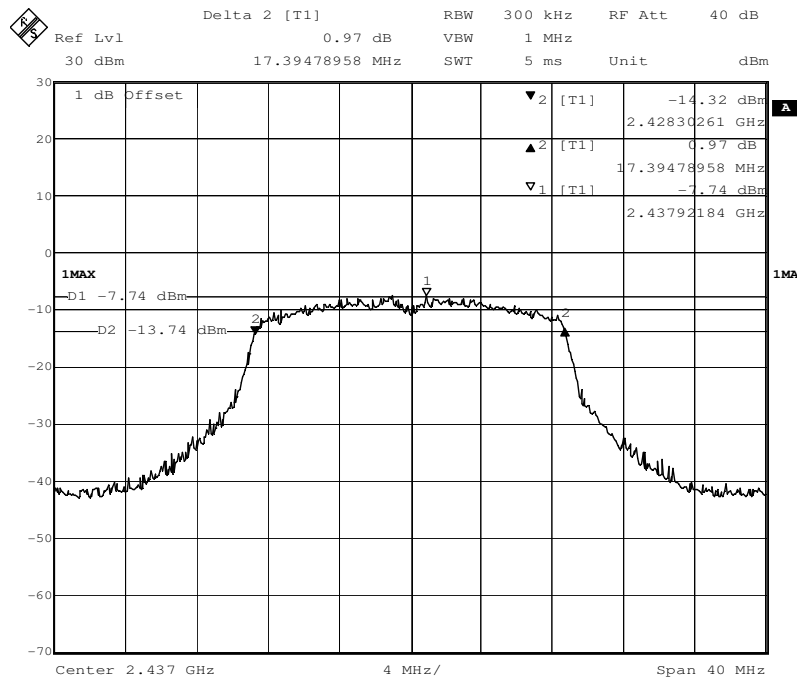


802.11n(HT20) mode with 65Mbps data rate

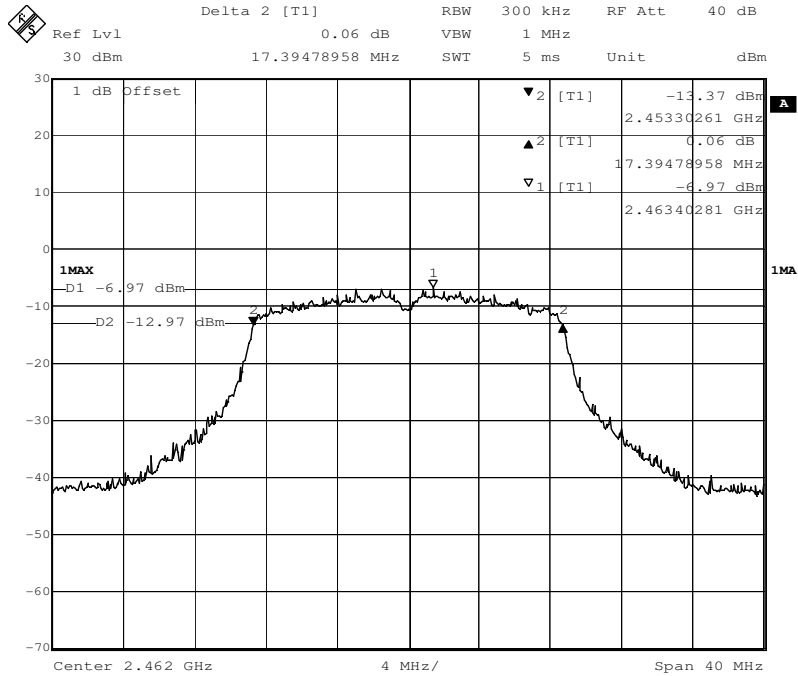
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

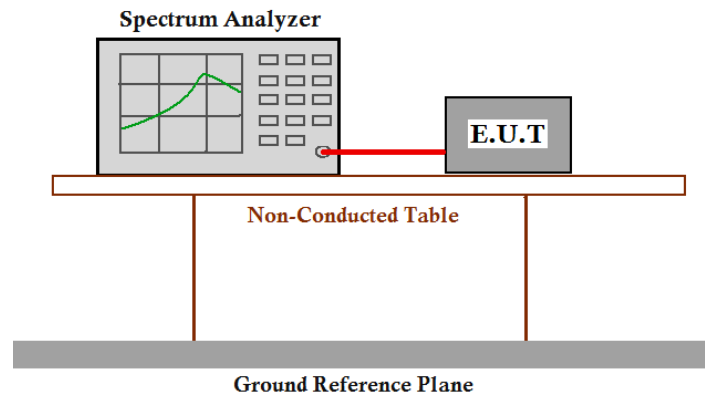


Channel 11: 2.462GHz:



7.4 Maximum Peak Output Power

Test Requirement:	FCC Part 15 C section 15.247 (b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Test Method:	FCC/KDB-558074 D01 v03r02 9.1.1 RBW \geq DTS bandwidth
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (Cable loss =1.5dB) from the antenna port to the spectrum.
2. Set the RBW≥DTS bandwidth
3. Set the VBW ≥ 3 x RBW
4. Set the span ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Use peak marker function to determine the peak amplitude level.
9. Report the worse case.

Test result:

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
1	2412	802.11b	11 Mbps	7.11	1W(30dBm)	Pass
6	2437		11 Mbps	7.20		Pass
11	2462		11 Mbps	7.19		Pass
1	2412	802.11g	54 Mbps	7.34		Pass
6	2437		54 Mbps	7.35		Pass
11	2462		54 Mbps	7.59		Pass
1	2412	802.11n (HT20)	65 Mbps	7.55		Pass
6	2437		65 Mbps	8.06		Pass
11	2462		65 Mbps	7.97		Pass

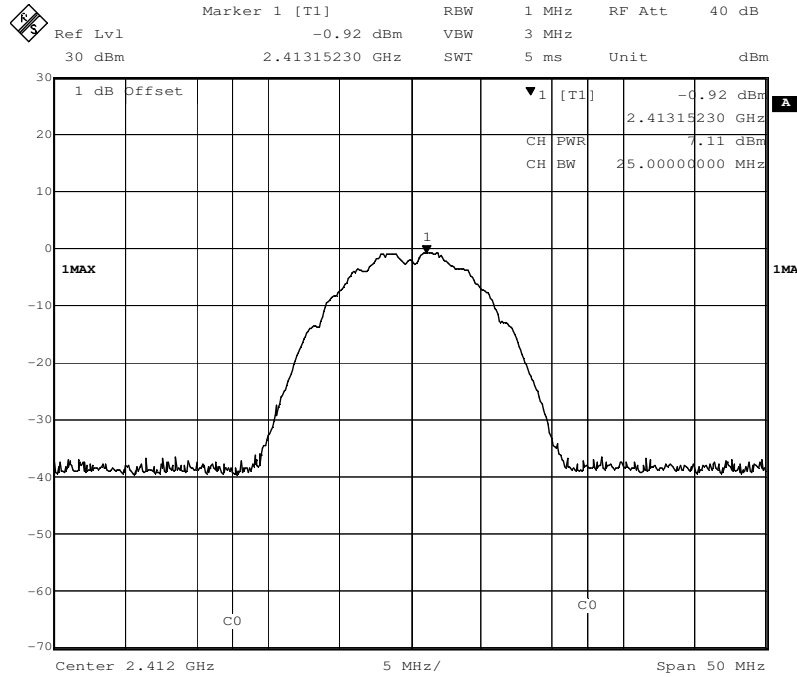
Remark: Level = Read Level + Cable Loss.

The unit does meet the FCC requirements.

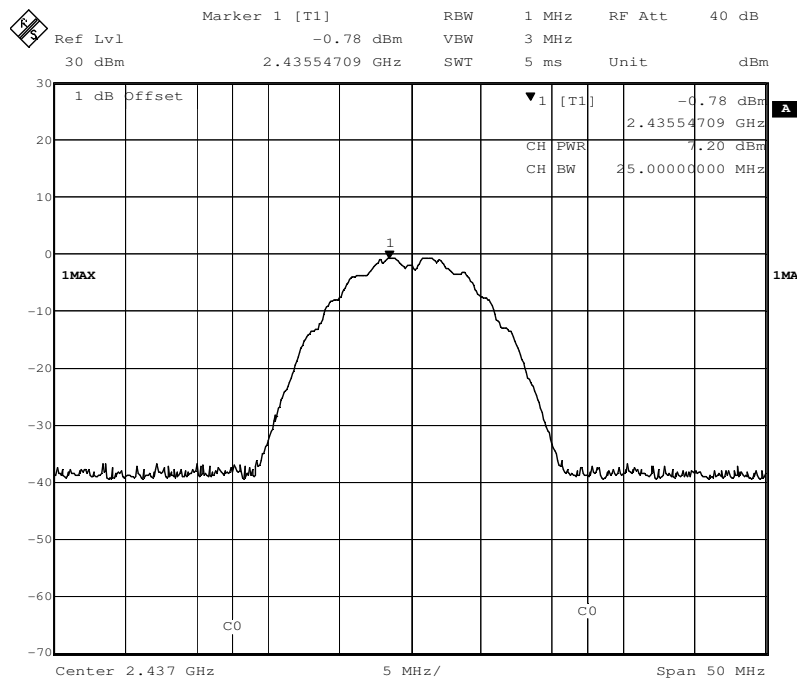
Result plot as follows:

802.11b mode with 11Mbps data rate

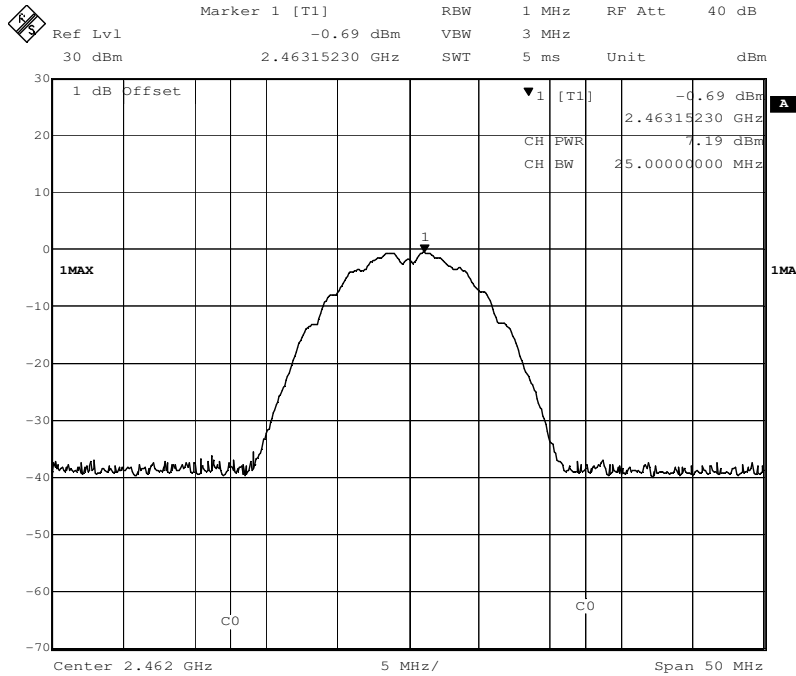
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

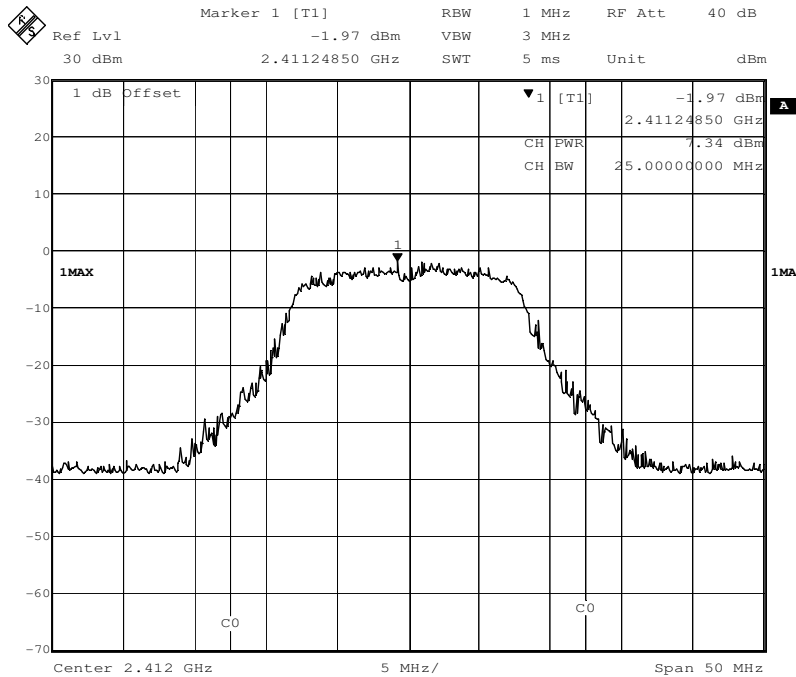


Channel 11: 2.462GHz:

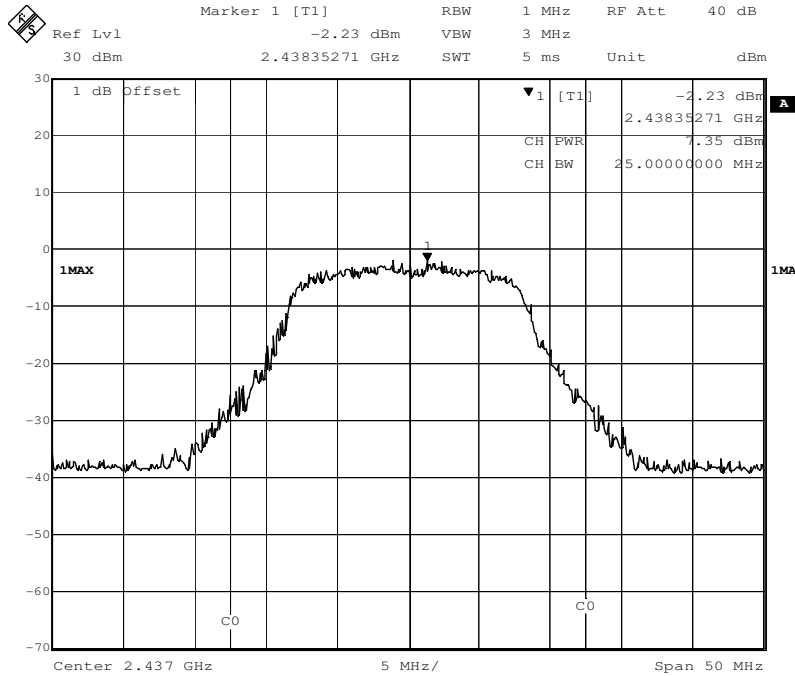


802.11g mode with 54Mbps data rate

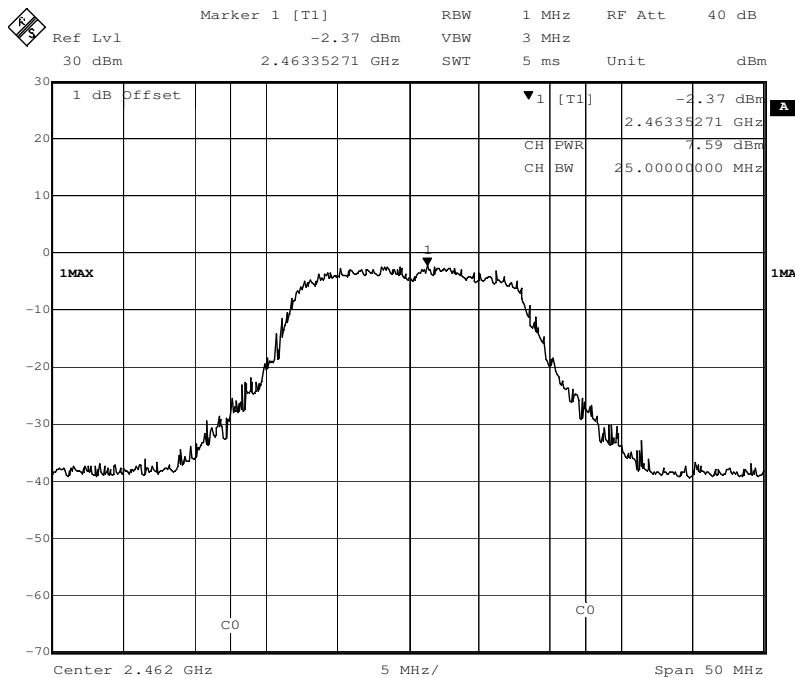
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

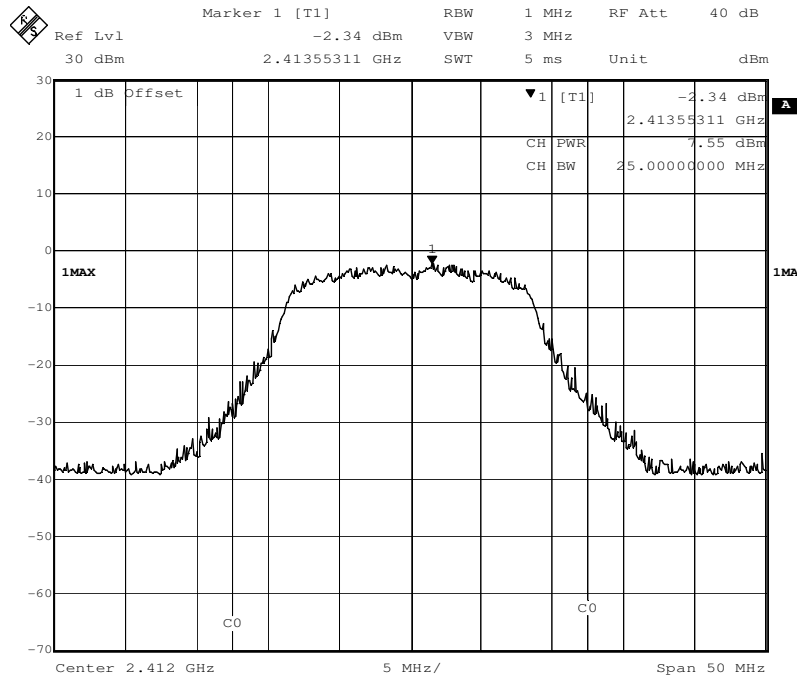


Channel 11: 2.462GHz:

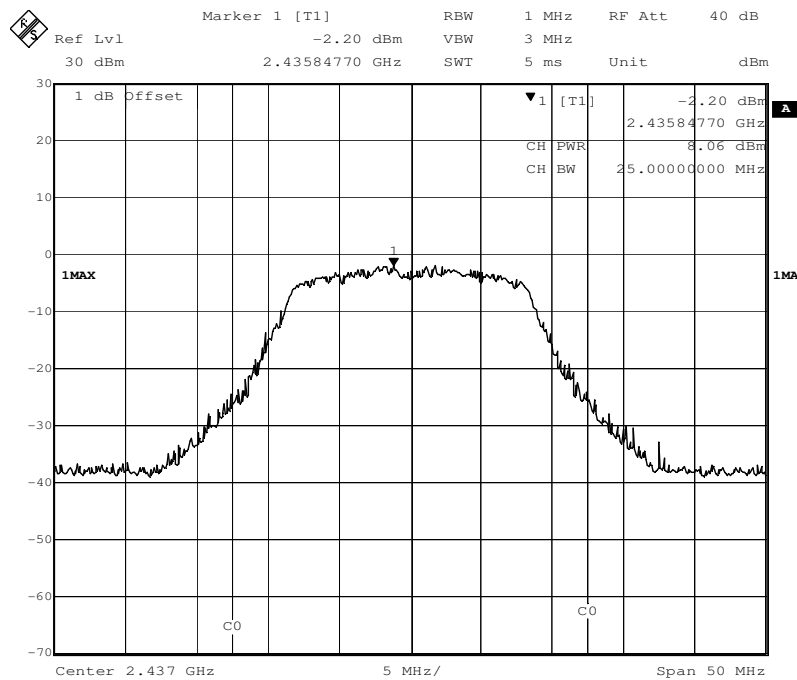


802.11n(HT20) mode with 65Mbps data rate

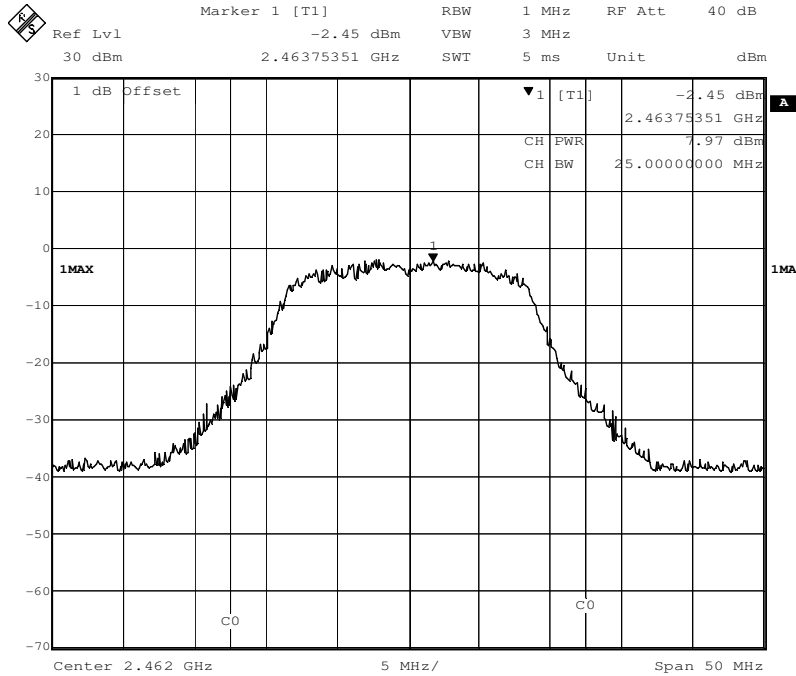
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



Channel 11: 2.462GHz:



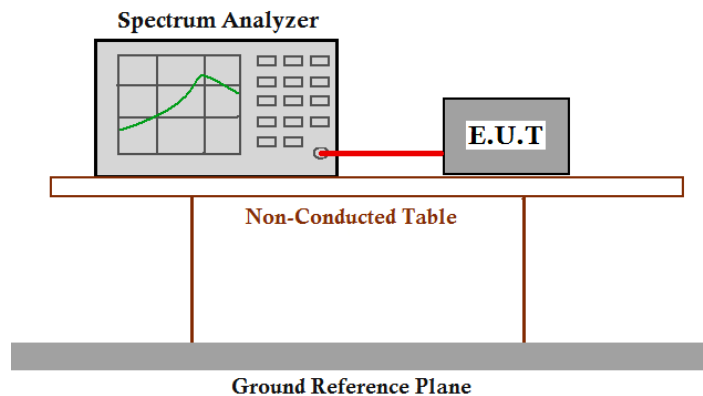
7.5 Peak Power Spectral Density

Test Requirement: FCC Part 15 C section 15.247
 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
 This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Method: ANSI C63.10: Clause 6.11.2.3

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =2.5dB) from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer:
 - a) Set CENTER FREQUENCY = Frequency from Power Spectral Density Test Matrix (see 6.10.2)
 - b) Set SPAN = 20 MHz (For devices with a nominal 40 MHz BW, 50 MHz span will be needed)
 - c) Set REFERENCE LEVEL = 20 dBm
 - d) Set ATTENUATION = 0 dB (add internal attenuation, if necessary)
 - e) Set SWEEP TIME = Coupled
 - f) Set RBW = 3 kHz
 - g) Set VBW = 10 kHz
 - h) Set DETECTOR = Peak
 - i) Set MKR = Center Frequency
 - j) Set TRACE = CLEAR WRITE

Place the radio in continuous transmit mode. Set the TRACE to MAX HOLD, and after the trace stabilizes, the TRACE to VIEW. Set the marker on the peak of the signal and then adjust the center frequency of the spectrum analyzer to the marker frequency.

After viewing the EUT waveform on the spectrum analyzer, perform the following spectrum analyzer functions to capture the trace:

Set SPAN = 300 kHz

Set SWEEP TIME = 100 s

Set TRACE = MAX HOLD

Set MKR = PEAK SEARCH

3. Measure the Power Spectral Density of the test frequency with special test status.
4. Repeat until all the test status is investigated.
5. Report the worse case.



Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Peak Power		Result
				Spectral Density (dBm/3KHz)	Limit	
1	2412	802.11b	11 Mbps	-20.46	8dBm/3KHz	Pass
6	2437		11 Mbps	-19.56		Pass
11	2462		11 Mbps	-20.00		Pass
1	2412	802.11g	54 Mbps	-25.83		Pass
6	2437		54 Mbps	-25.88		Pass
11	2462		54 Mbps	-26.12		Pass
1	2412	802.11n (HT20)	65 Mbps	-24.46		Pass
6	2437		65 Mbps	-24.58		Pass
11	2462		65 Mbps	-24.76		Pass

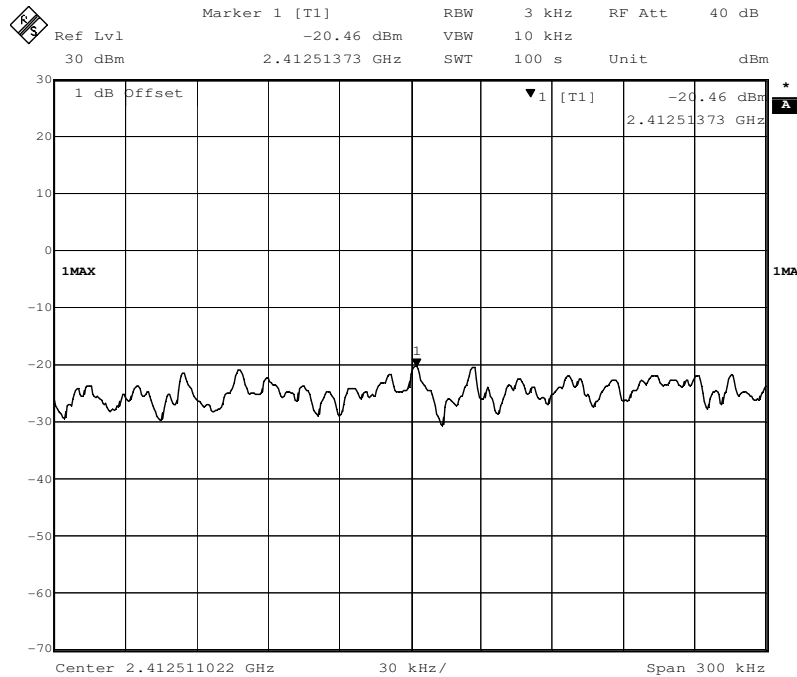
Test result: Level = Read Level + Cable Loss.

The unit does meet the FCC requirements.

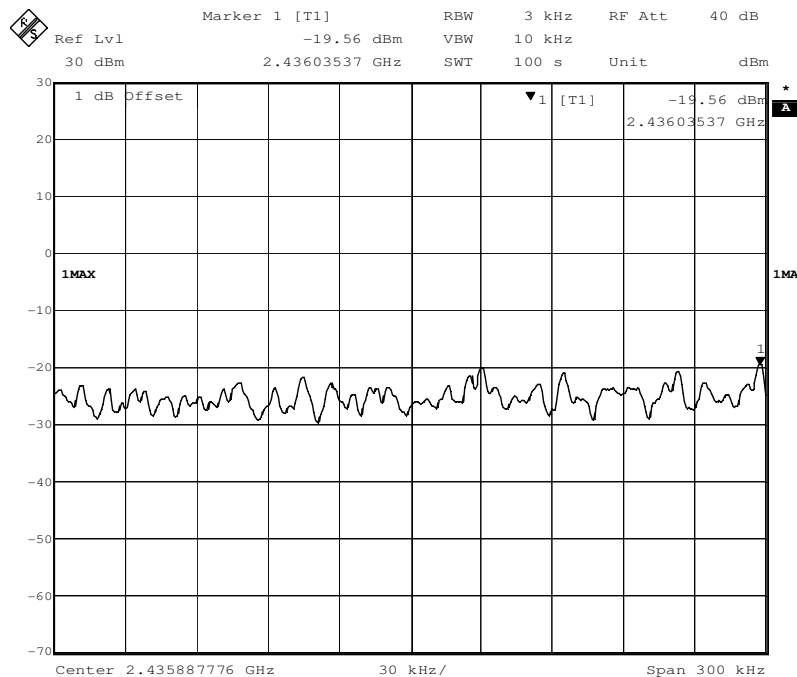
Result plot as follows:

802.11b mode with 11Mbps data rate

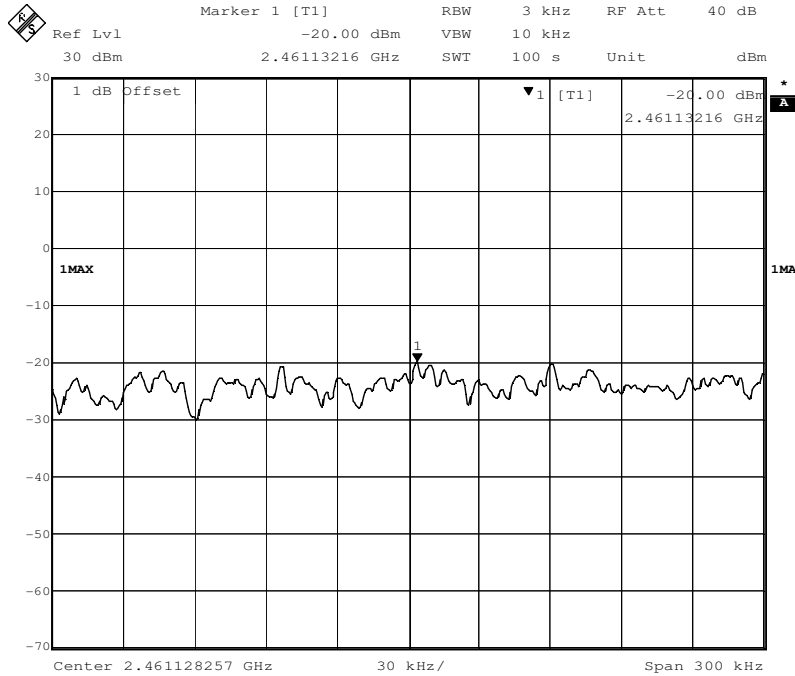
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

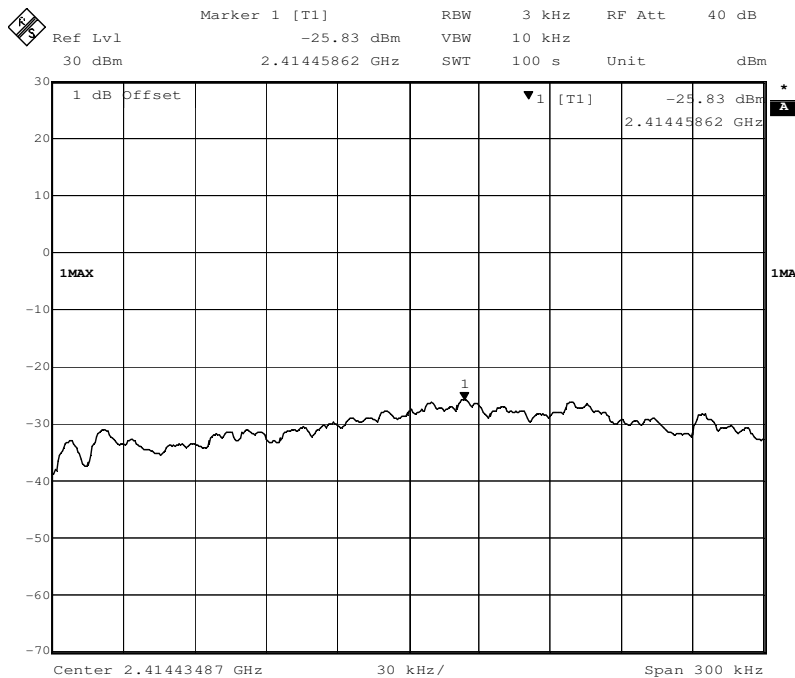


Channel 11: 2.462GHz:

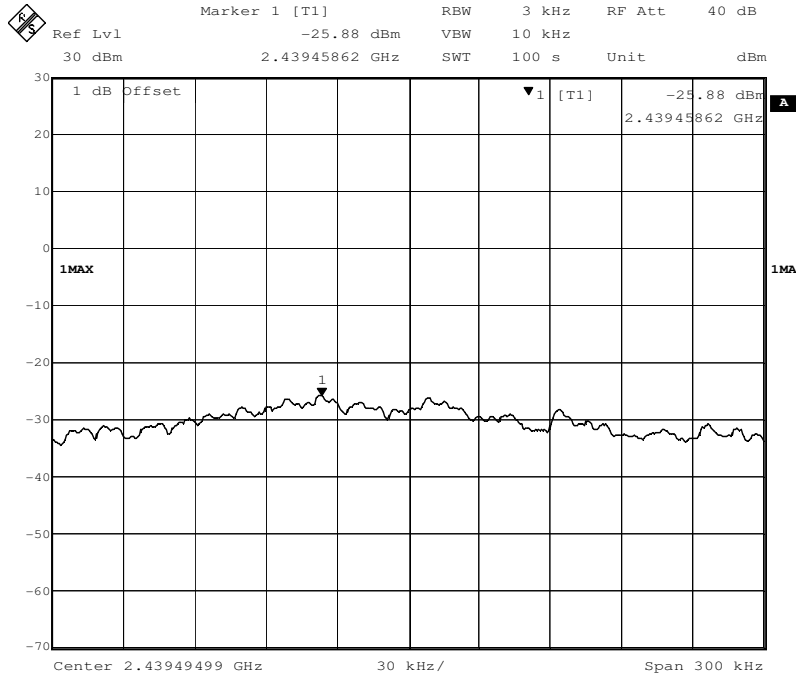


802.11g mode with 54Mbps data rate

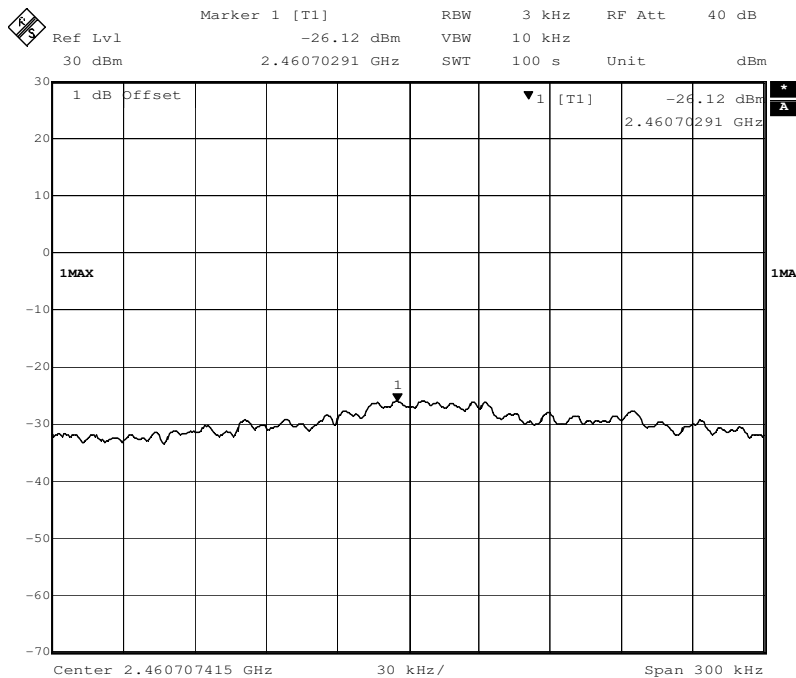
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

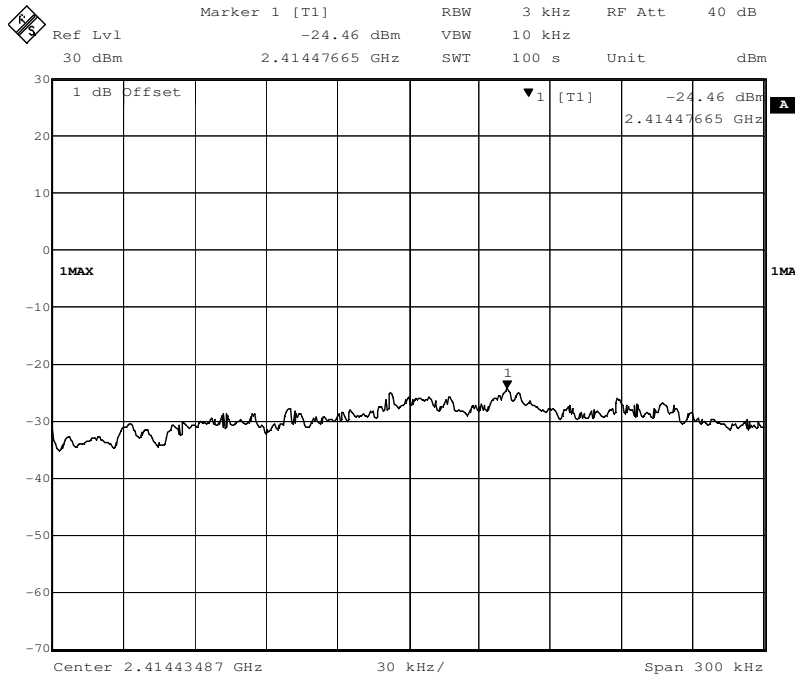


Channel 11: 2.462GHz:

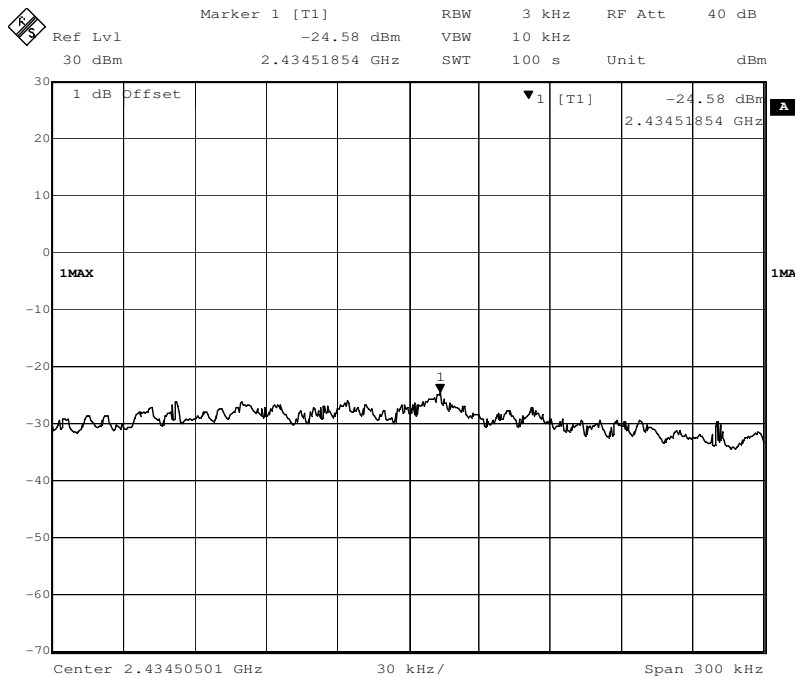


802.11n(HT20) mode with 65Mbps data rate

Channel 1: 2.412GHz:

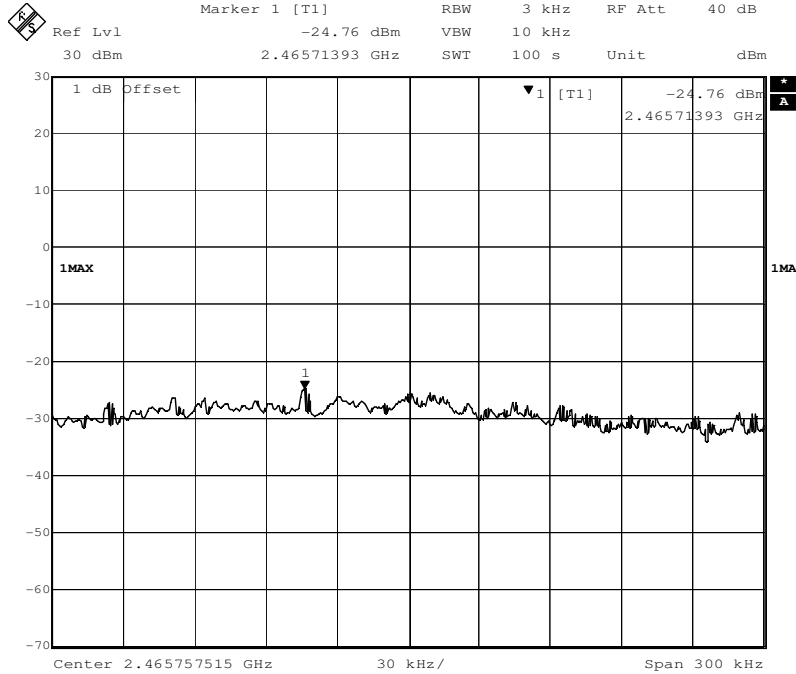


Channel 6: 2.437GHz:



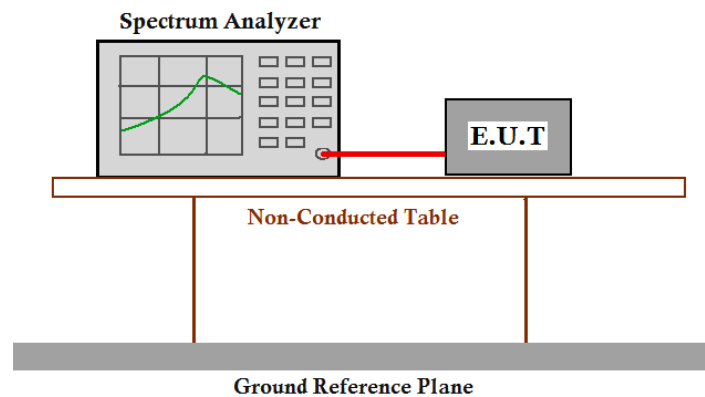


Channel 11: 2.462GHz:



7.6 Conducted Spurious Emissions

- Test Requirement:** FCC Part 15 C section 15.247
- (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Based on either an RF conducted or a radiated measurement. Provided the transmitter demonstrates compliance with the peak conducted power limits.
- Test Method:** ANSI C63.10: Clause 6.7
- Test Status:** Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
- Test Configuration:**



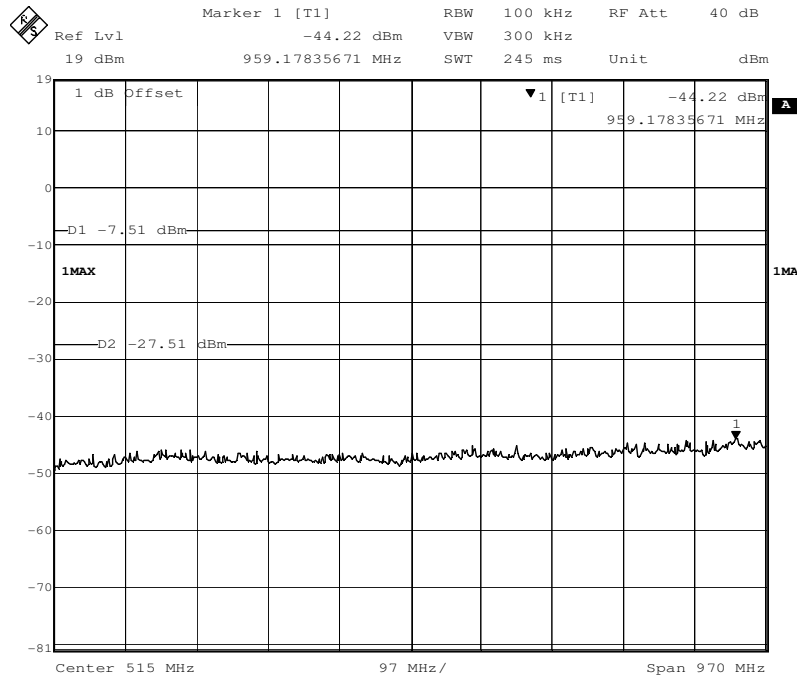
- Test Procedure:**
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
 2. Set the spectrum analyzer: RBW=100 KHz, VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Scan up through 10th harmonic.
 3. Measure the Conducted Spurious Emissions of the test frequency with special test status.
 4. Repeat until all the test status is investigated.
 5. Report the worse case.

Result plot as follows:

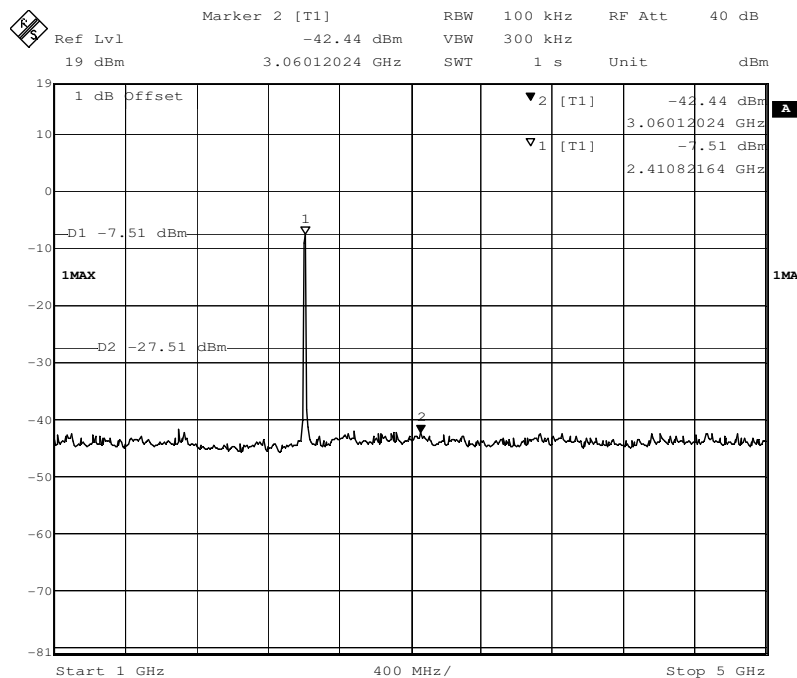
802.11b mode with 11Mbps data rate

Channel 1: 2.412GHz:

30 MHz to 1 GHz

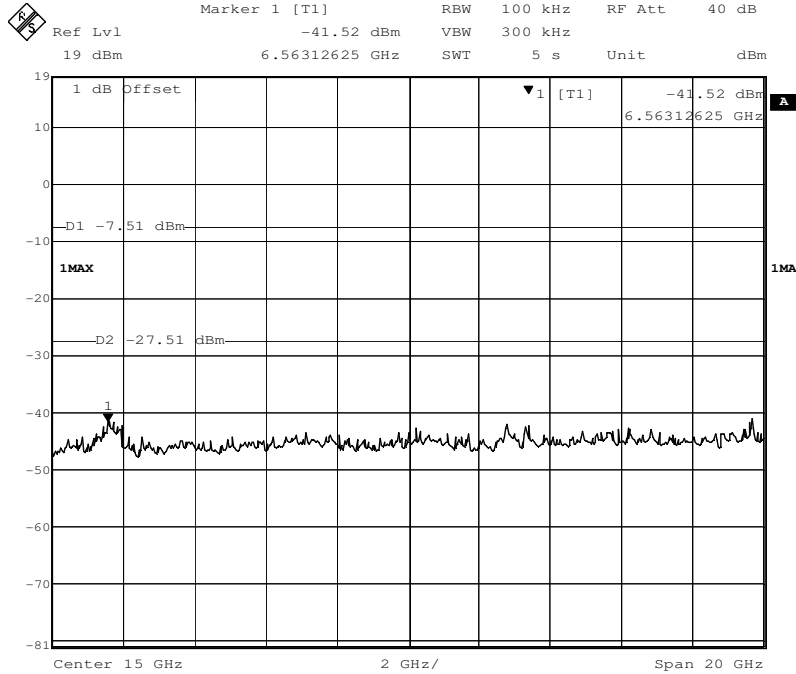


1 G to 5 GHz



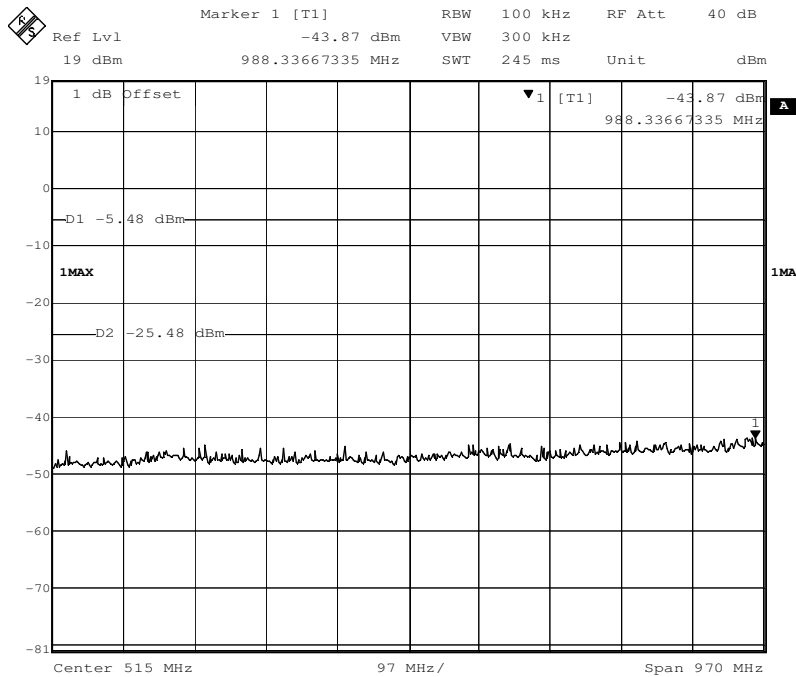


5 G to 25 GHz

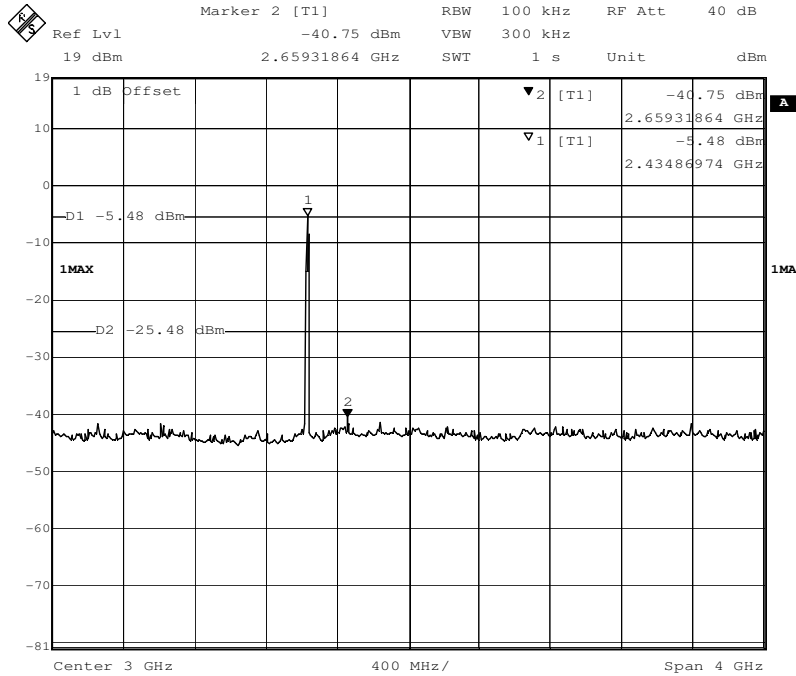


Channel 6: 2.437GHz:

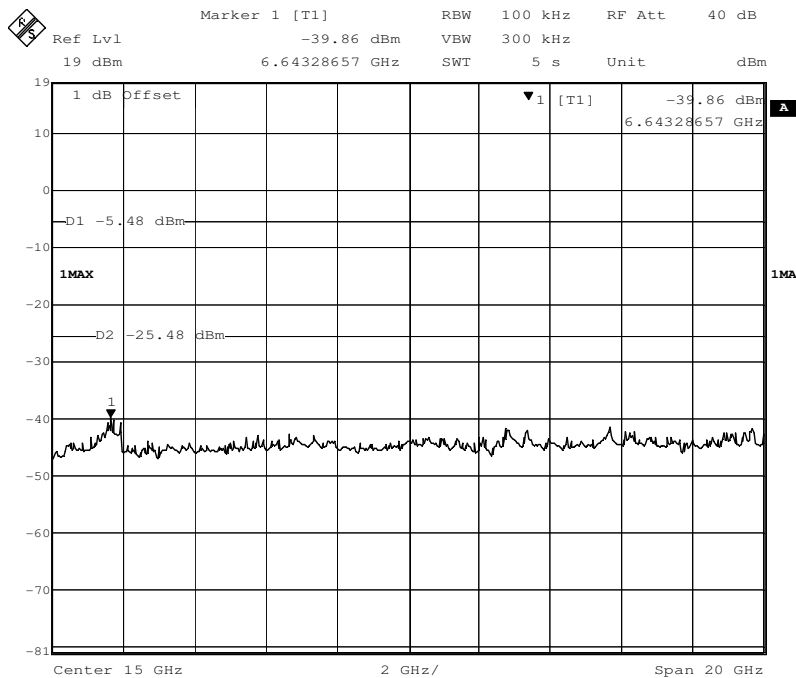
30 MHz to 1 GHz



1 G to 5 GHz

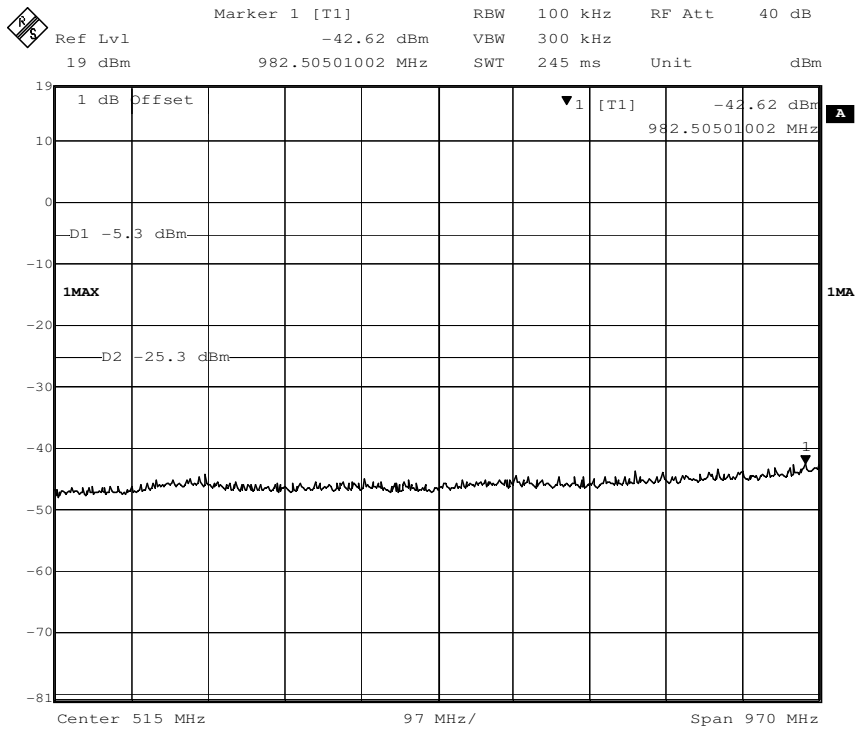


5 G to 25 GHz

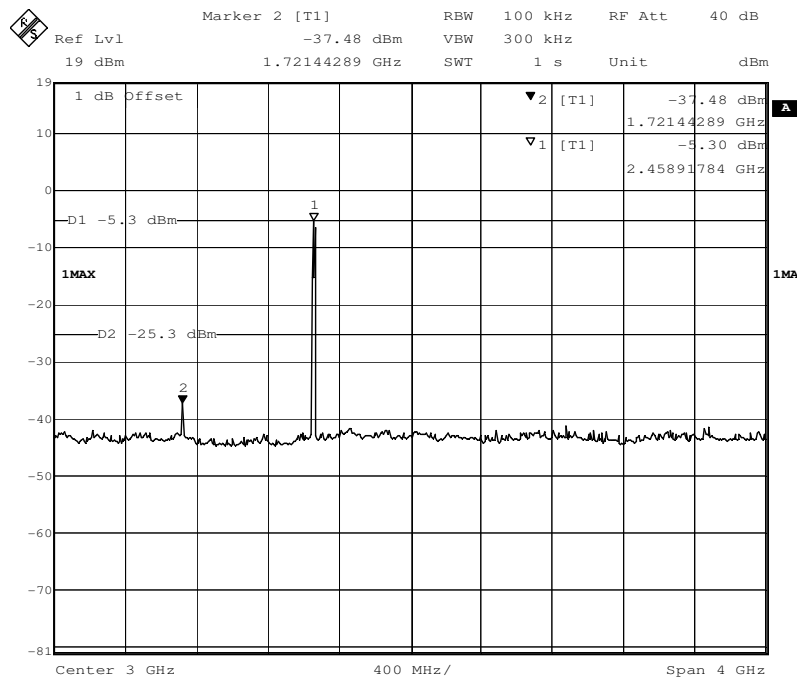


Channel 11:2.462 GHz

30 MHz to 1 GHz

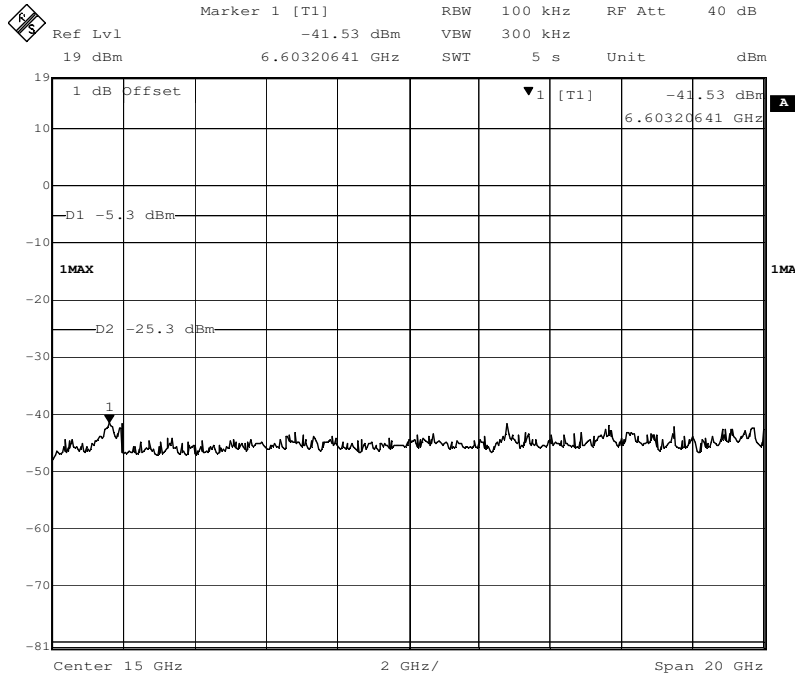


1 G to 5 GHz





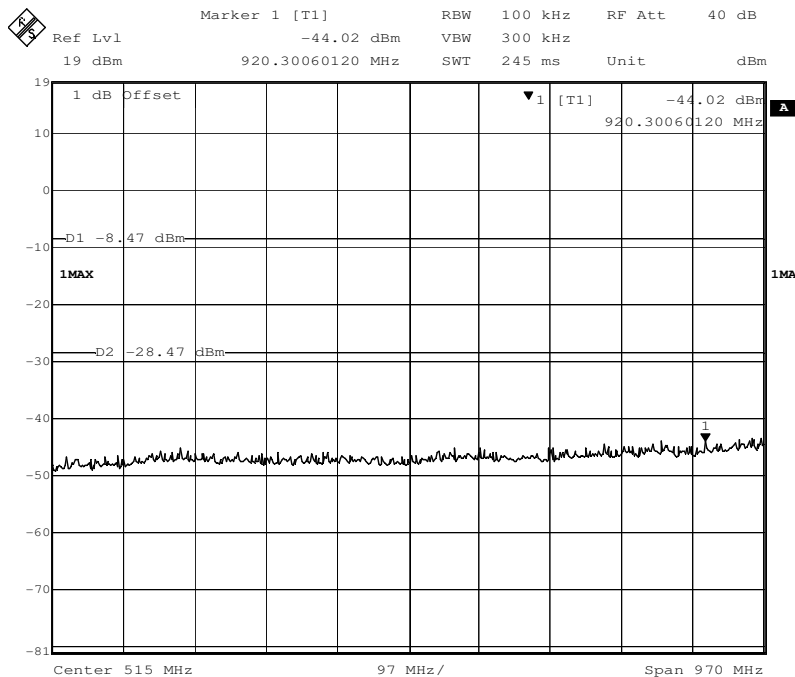
5 G to 25 GHz



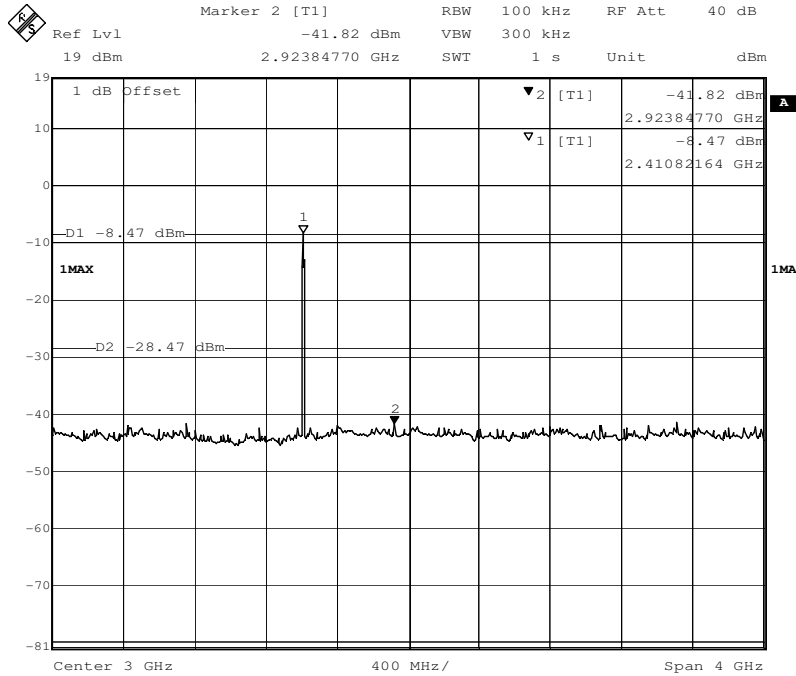
802.11g mode with 54Mbps data rate

Channel 1: 2.412GHz:

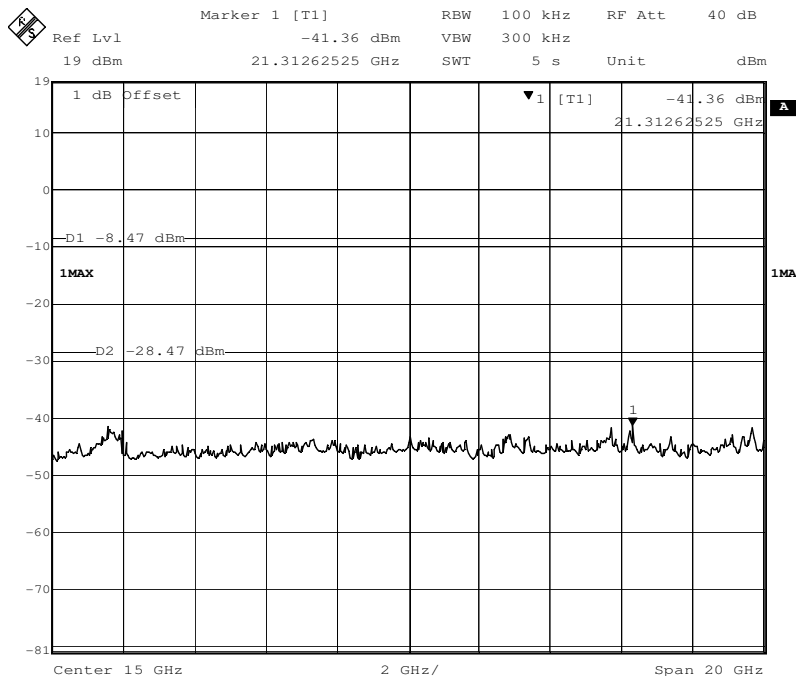
30 MHz to 1 GHz



1 G to 5 GHz



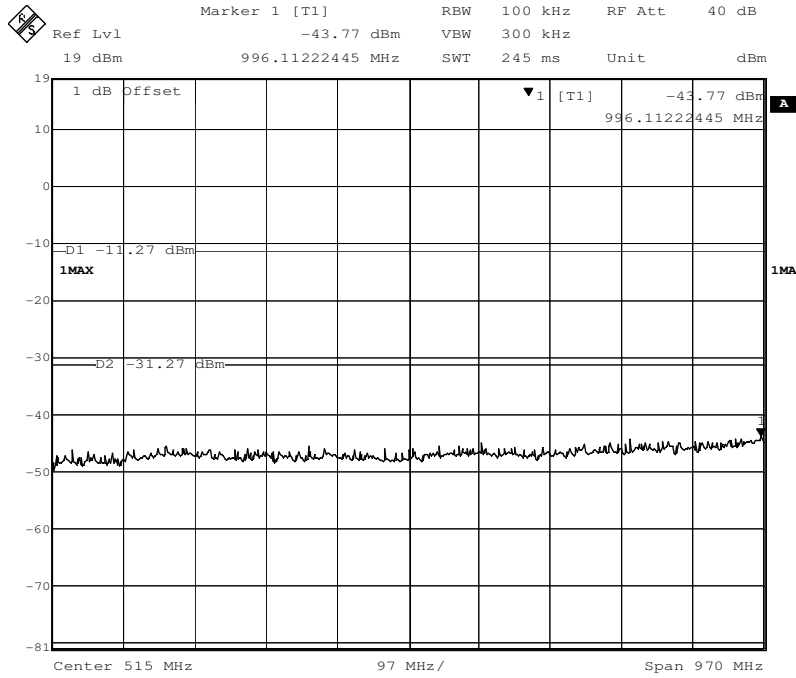
5 G to 25 GHz



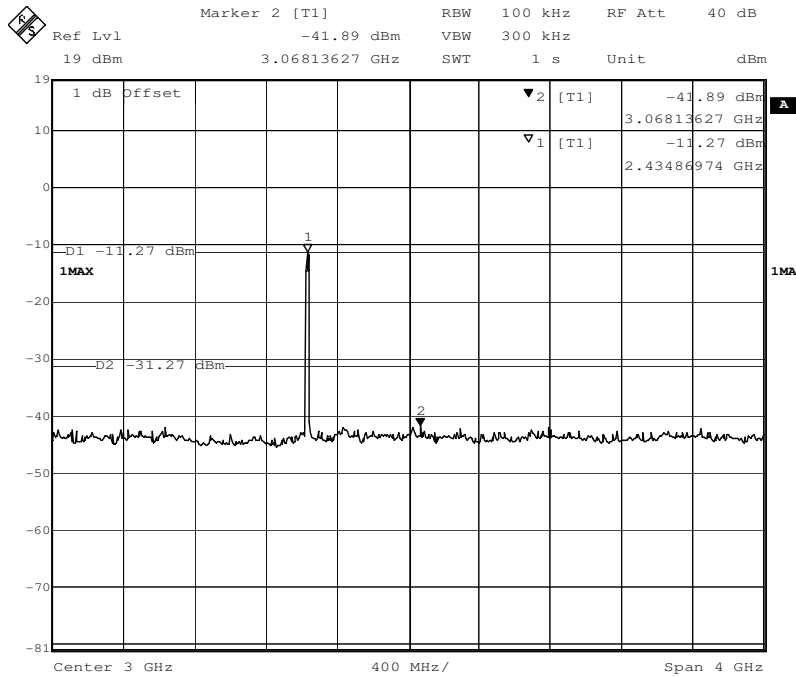


Channel 6: 2.437GHz:

30 MHz to 1 GHz

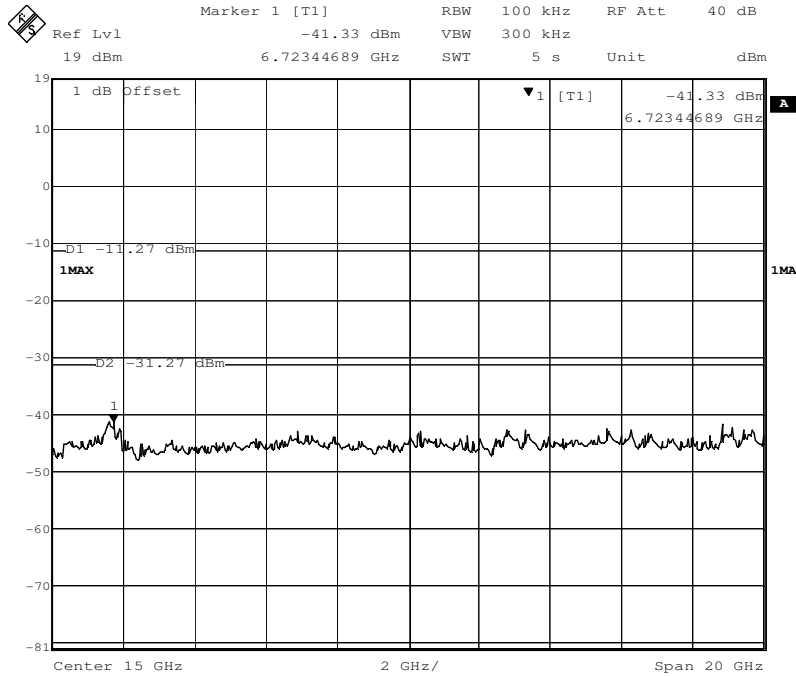


1 G to 5 GHz



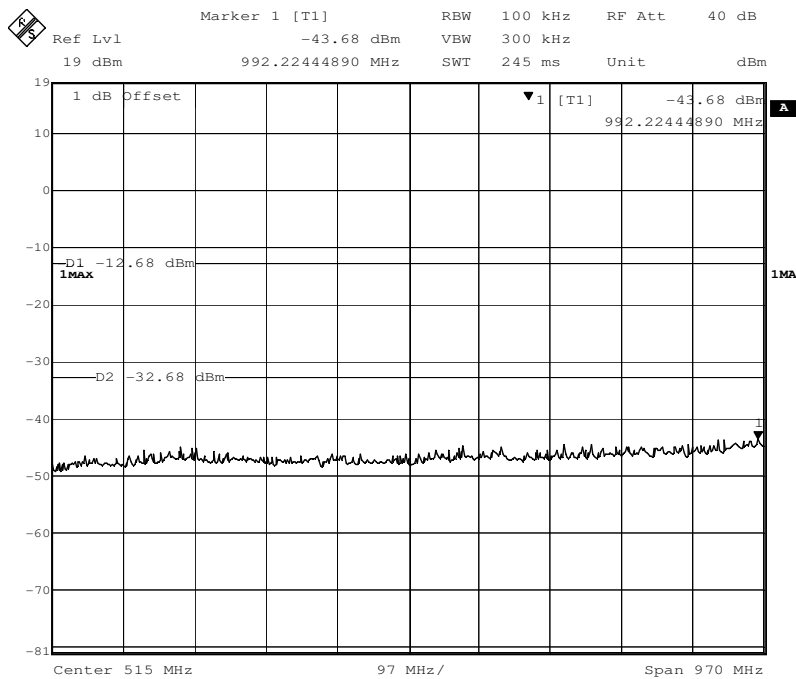


5 G to 25 GHz



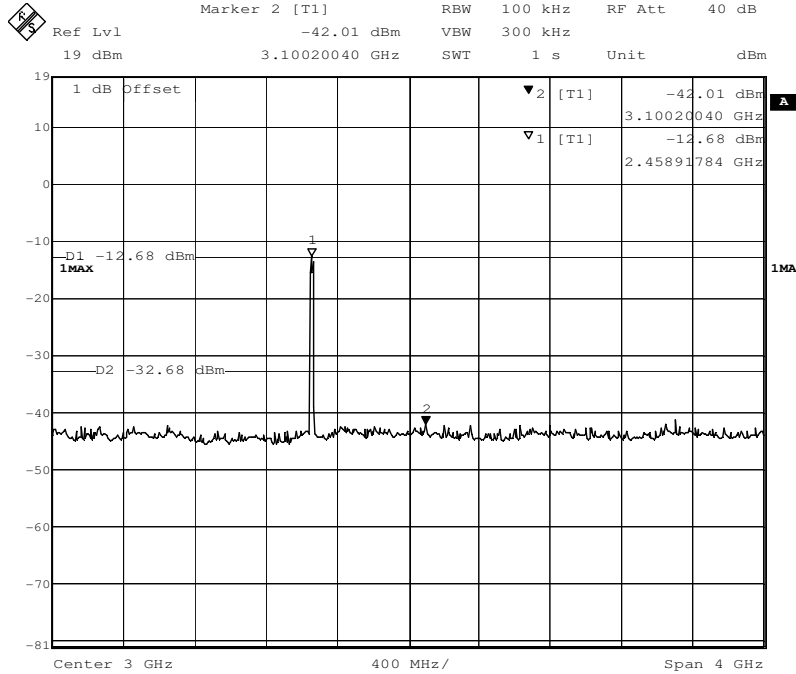
Channel 11:2.462 GHz

30 MHz to 1 GHz

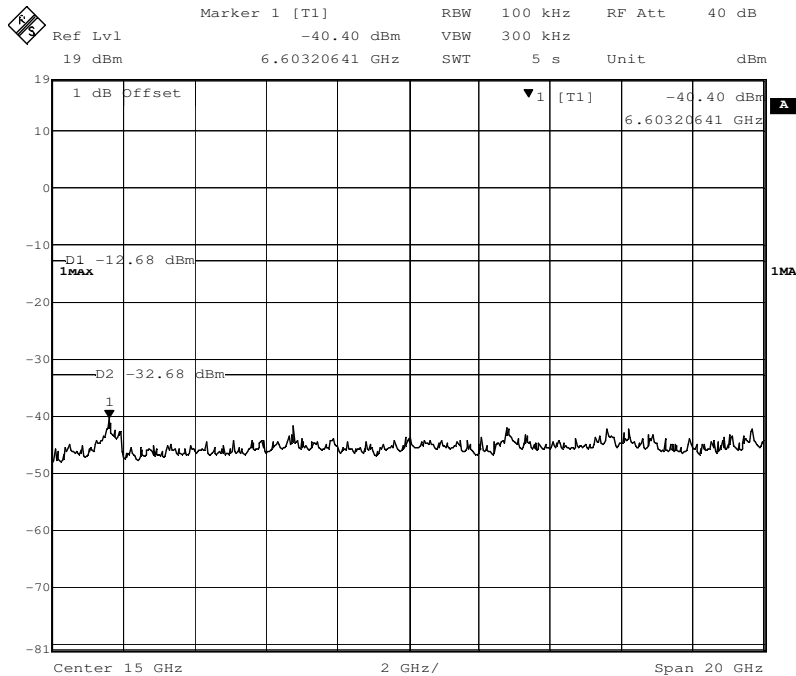




1 G to 5 GHz



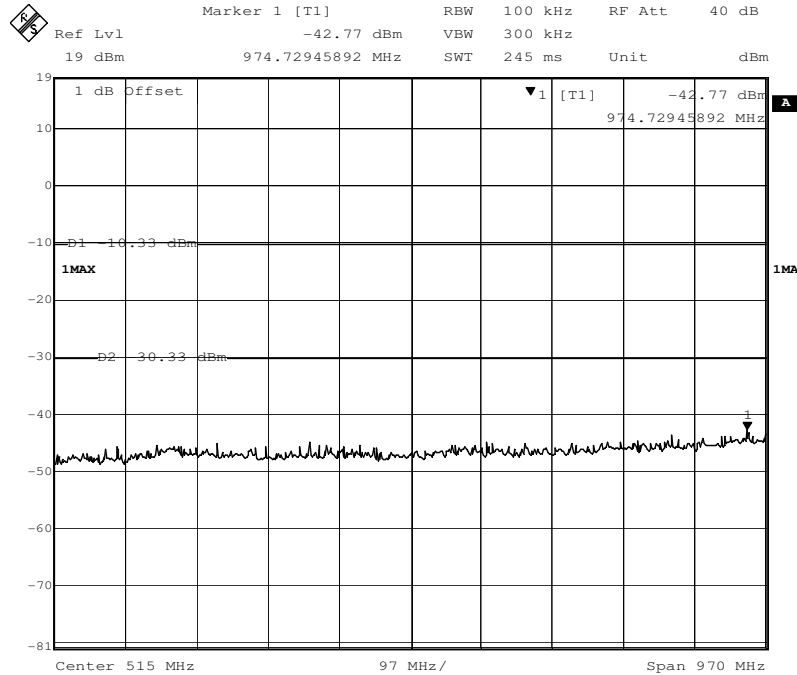
5 G to 25 GHz



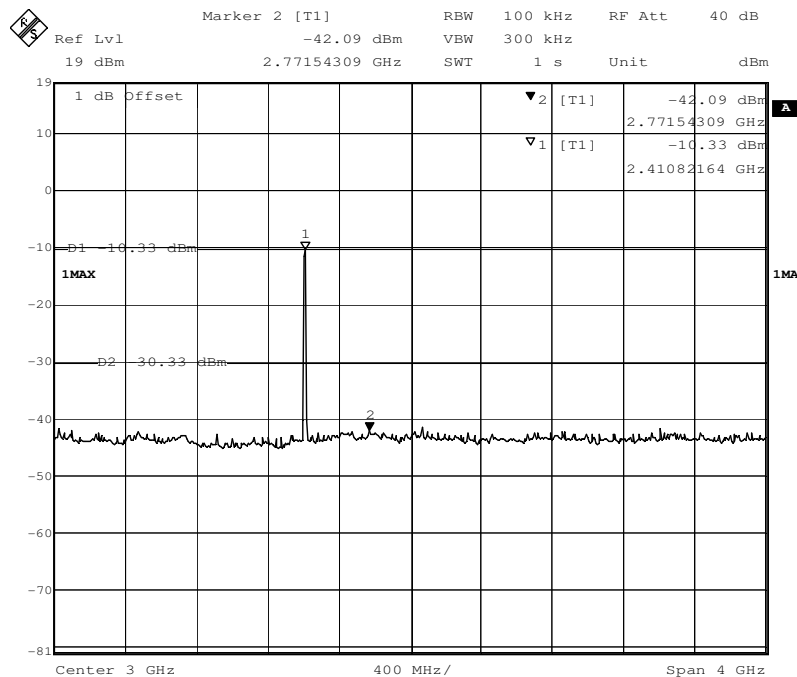
802.11n(HT20) mode with 65Mbps data rate

Channel 1: 2.412GHz:

30 MHz to 1 GHz

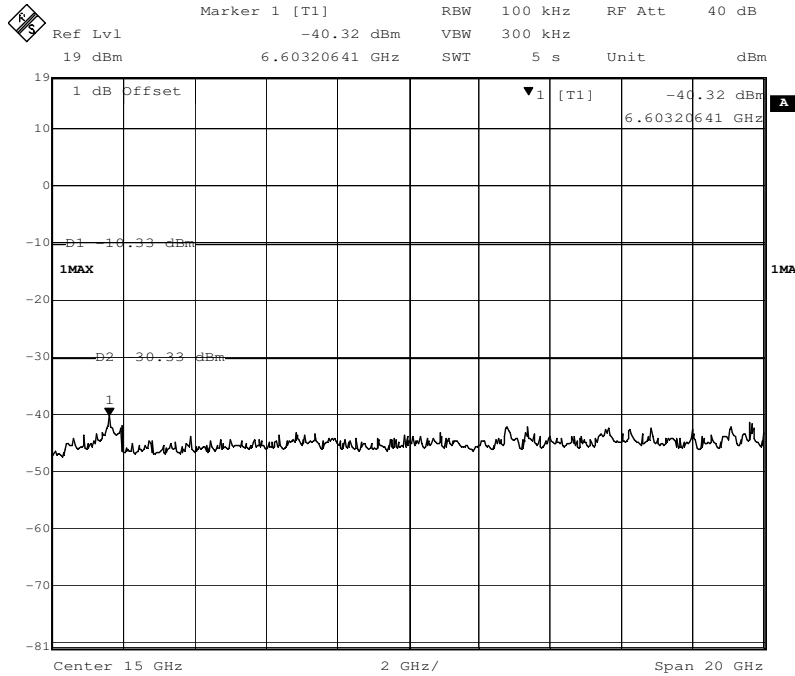


1 G to 5 GHz



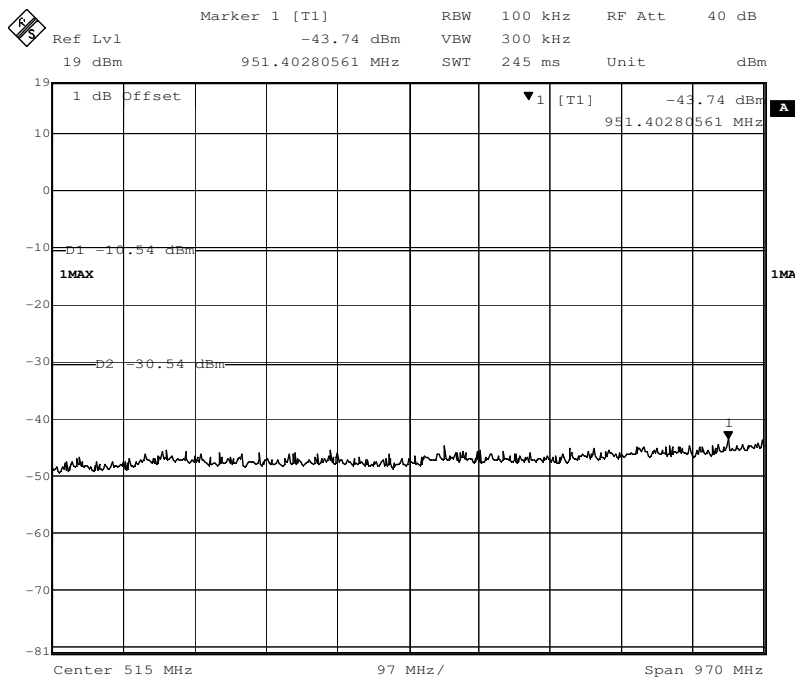


5 G to 25 GHz

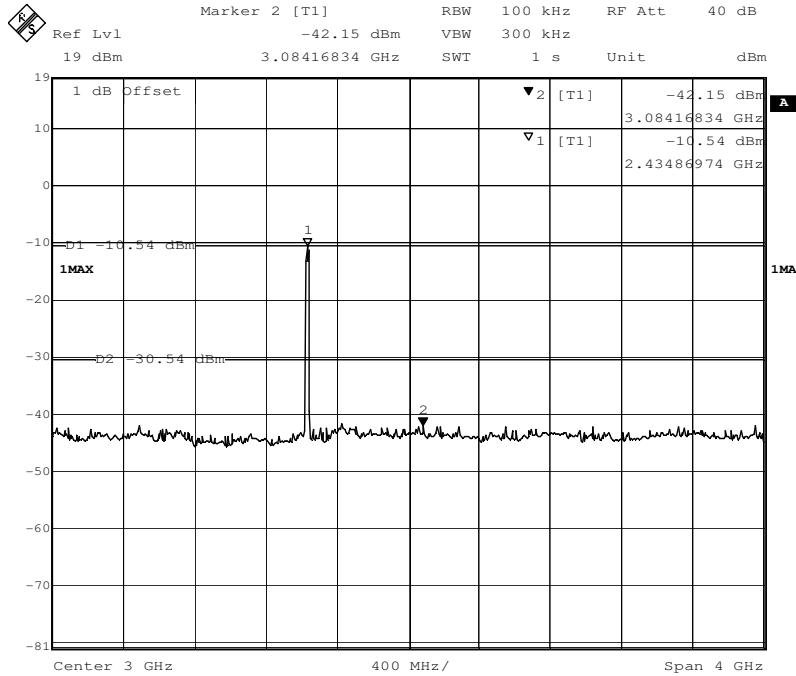


Channel 6: 2.437GHz:

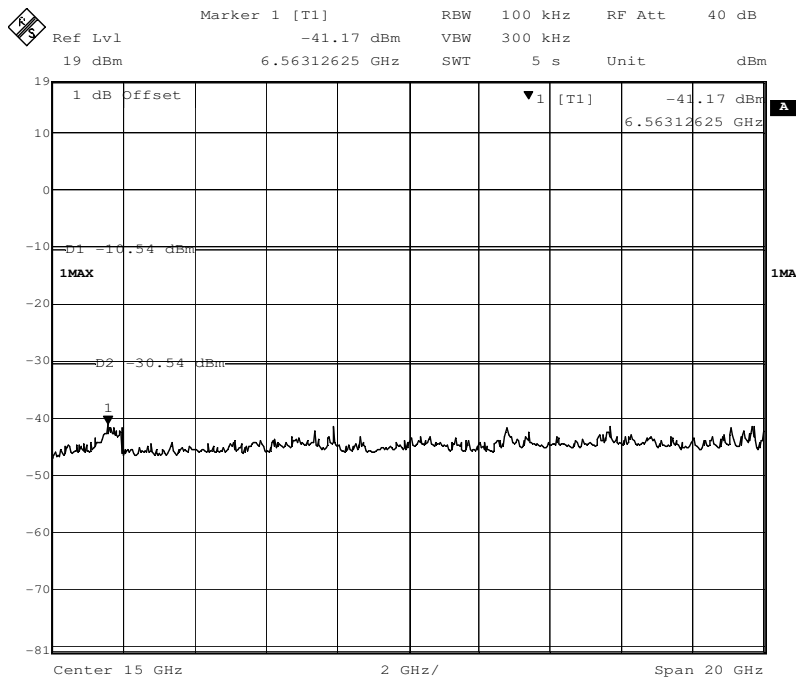
30 MHz to 1 GHz



1 G to 5 GHz

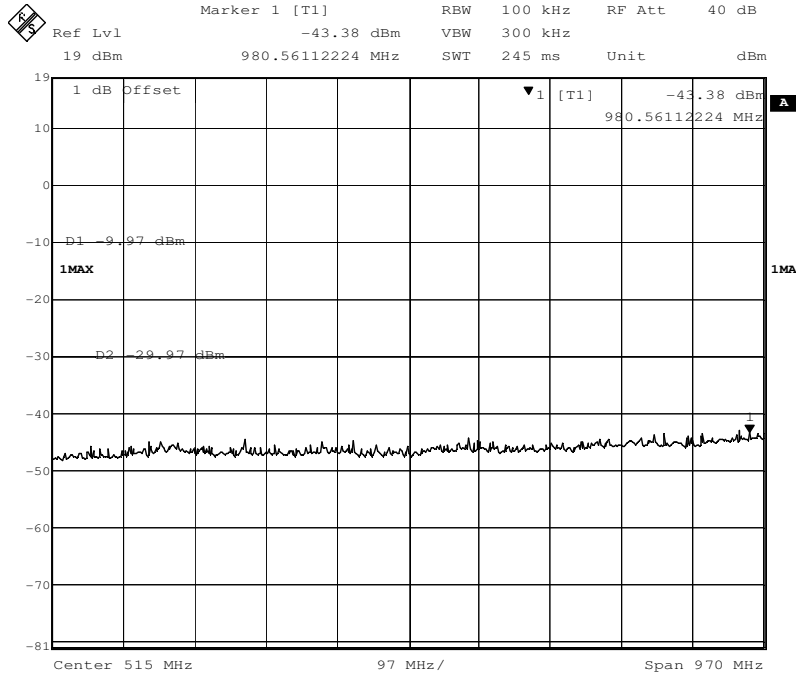


5 G to 25 GHz

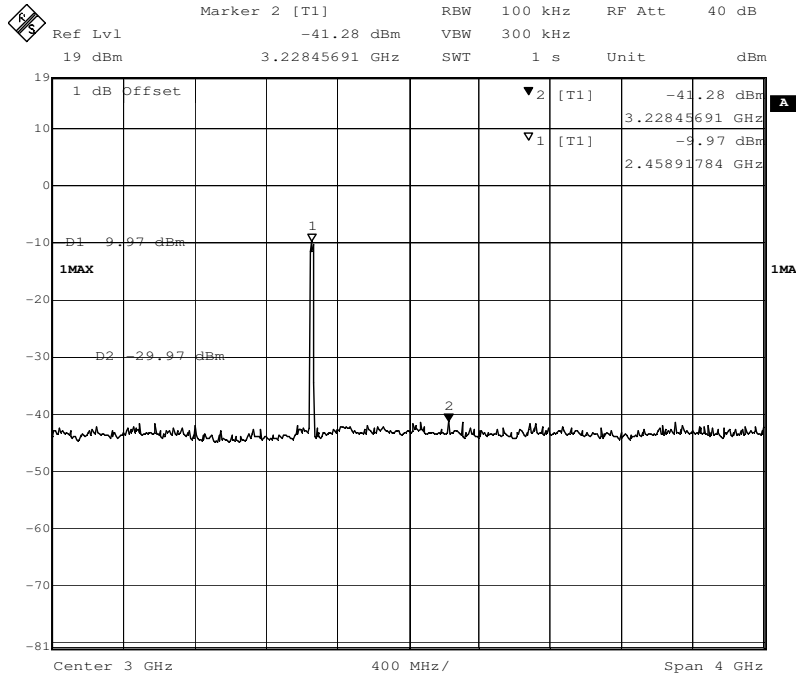


Channel 11:2.462 GHz

30 MHz to 1 GHz

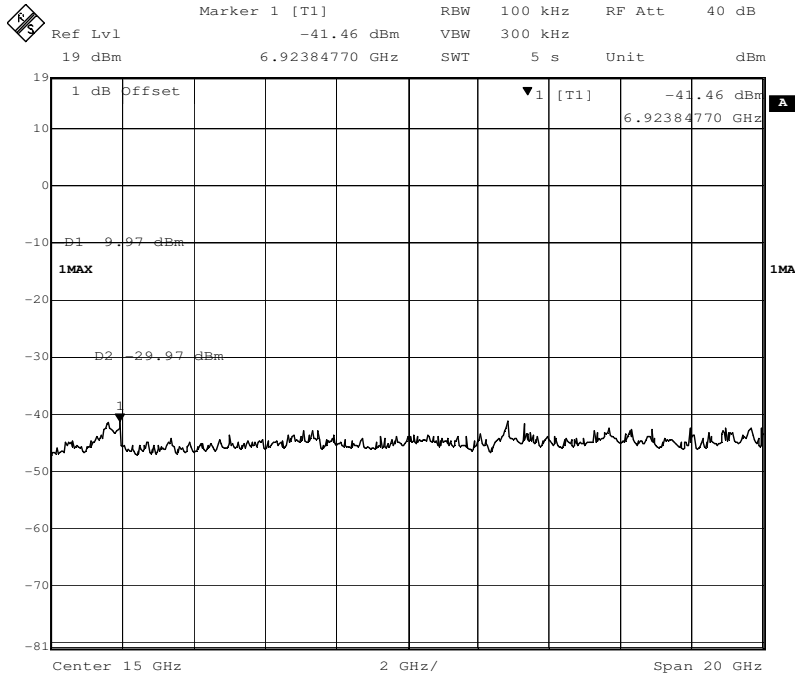


1 G to 5 GHz





5 G to 25 GHz

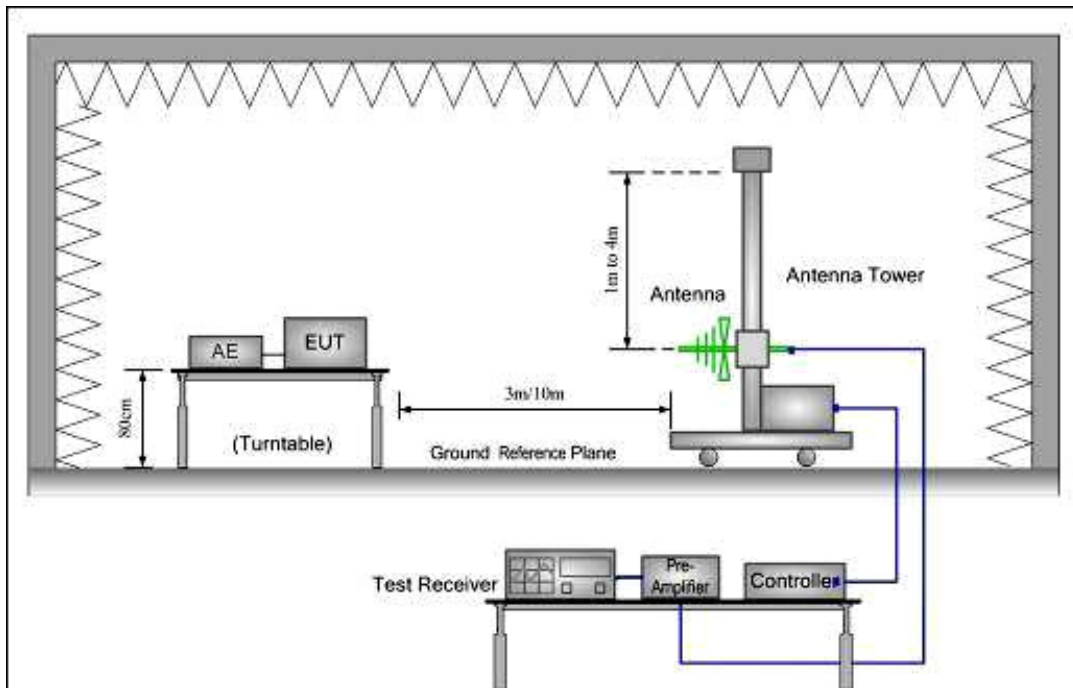


7.7 Radiated Spurious Emissions

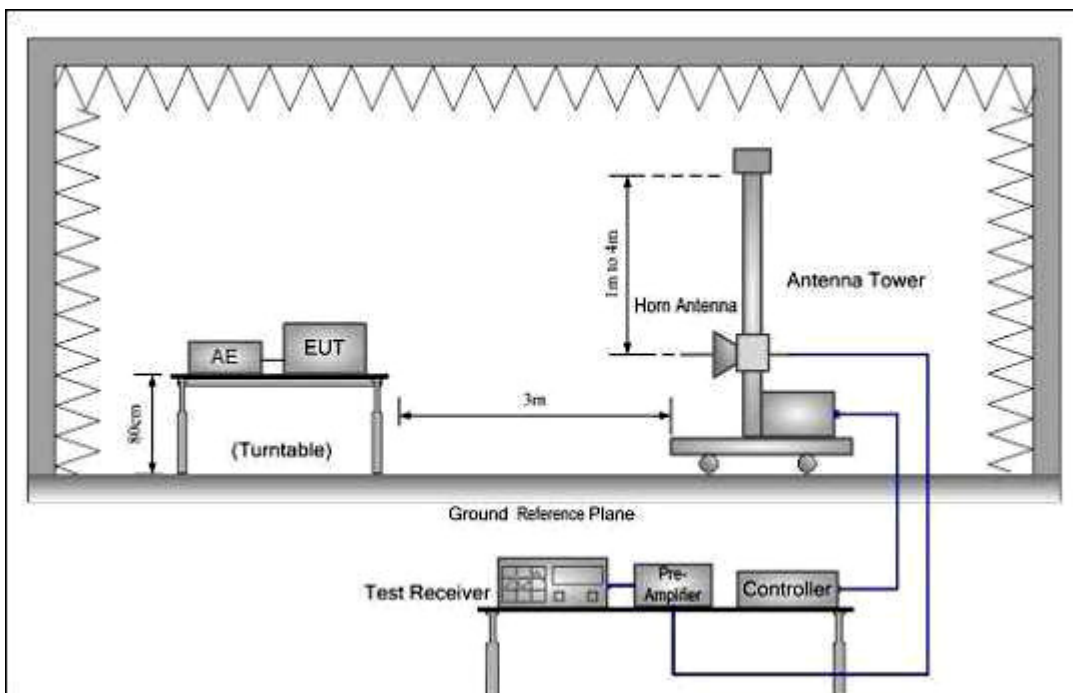
Test Requirement:	FCC Part 15 C section 15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, and provided the transmitter demonstrates compliance with the peak conducted power limits.
Test Method:	ANSI C63.10: Clause 6.4, 6.5 and 6.6
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Detector:	For PK value: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW \geq RBW Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW = 10Hz Sweep = auto Detector function = peak Trace = max hold
15.209 Limit:	40.0 dB μ V/m between 30MHz & 88MHz 43.5 dB μ V/m between 88MHz & 216MHz 46.0 dB μ V/m between 216MHz & 960MHz 54.0 dB μ V/m above 960MHz

Test Configuration:

- 1) 30 MHz to 1 GHz emissions:



- 2) 1 GHz to 40 GHz emissions:



Test Procedure:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

From 30MHz to 1GHz, read the Quasi-Peak field strength of the emissions with receiver QP detector RBW=120KHz.

Above 1GHz, read the Peak field strength and Average field strength.

Read the Peak field strength through RBW=1MHz, VBW=3MHz in spectrum analyzer setting;

Read the Average field strength through RBW=1MHz, VBW=10Hz in spectrum analyzer setting;

While maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the average field strength reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit.

7.7.1 Harmonic and other spurious emissions

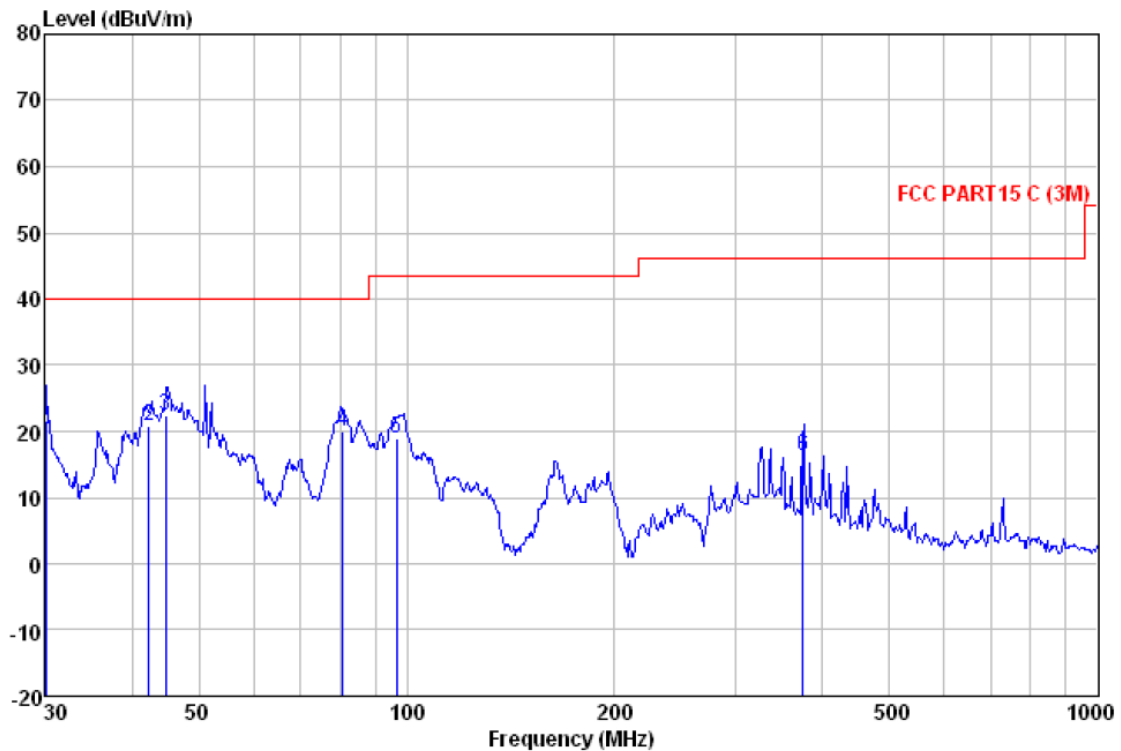
7.7.1.1 802.11b mode with 11Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan



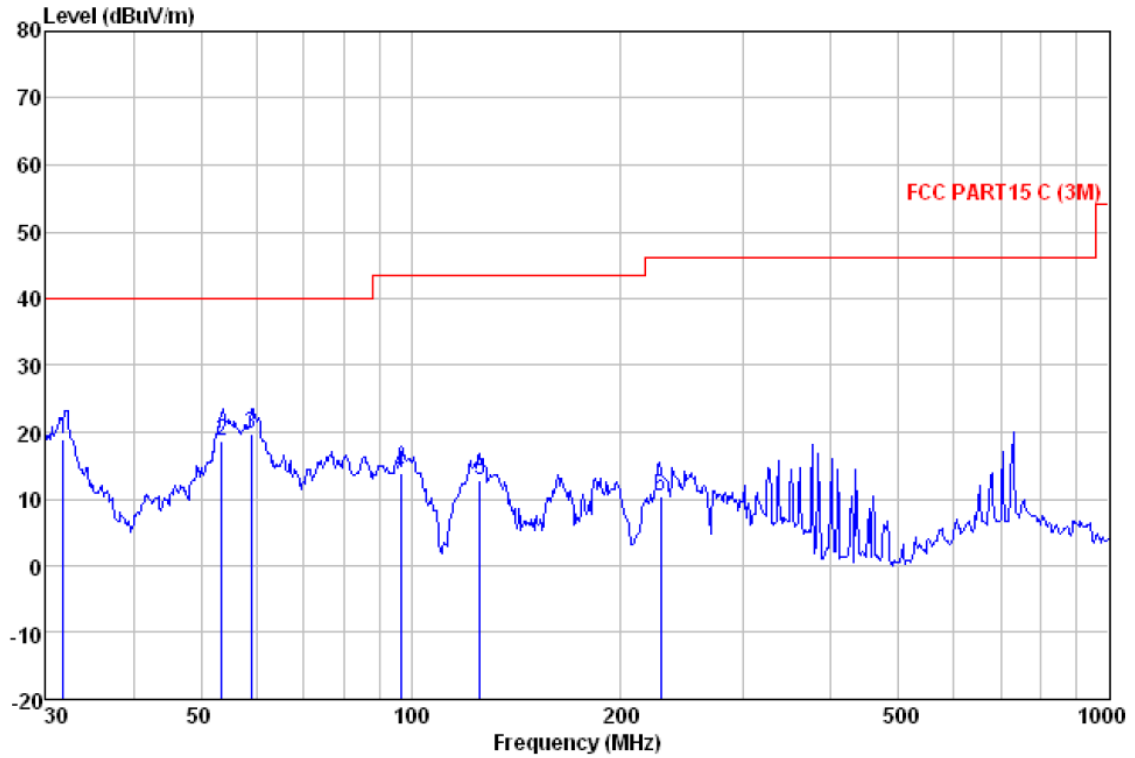
Quasi-peak measurement

	Freq	ReadAntenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	30.105	51.82	0.00	0.80	31.02	21.60	40.00	-18.40 QP
2	42.302	50.90	0.00	1.02	31.00	20.92	40.00	-19.08 QP
3	44.743	52.39	0.00	1.04	31.00	22.43	40.00	-17.57 QP
4	80.927	49.83	0.00	1.30	31.00	20.13	40.00	-19.87 QP
5	96.775	48.68	0.00	1.37	31.00	19.05	43.50	-24.45 QP
6	374.623	44.35	0.00	2.74	30.92	16.17	46.00	-29.83 QP

Horizontal:

Peak scan

Level (dB μ V/m)



Quasi-peak measurement

	Freq	ReadAntenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit
	MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB
1	31.731	49.04	0.00	0.84	31.02	18.86	40.00	-21.14
2	53.505	48.60	0.00	1.10	31.00	18.70	40.00	-21.30
3	59.025	49.65	0.00	1.10	31.00	19.75	40.00	-20.25
4	96.775	43.57	0.00	1.37	31.00	13.94	43.50	-29.56
5	125.446	42.38	0.00	1.47	31.02	12.83	43.50	-30.67
6	227.691	39.56	0.00	1.99	31.07	10.48	46.00	-35.52



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	53.06	31.54	11.14	45.16	50.58	74	V
7236.00	50.68	36.48	13.03	45.45	54.74	74	V
4824.00	50.57	31.54	11.14	45.16	48.09	74	H
7236.00	50.01	36.48	13.03	45.45	54.07	74	H

Average Measurement:

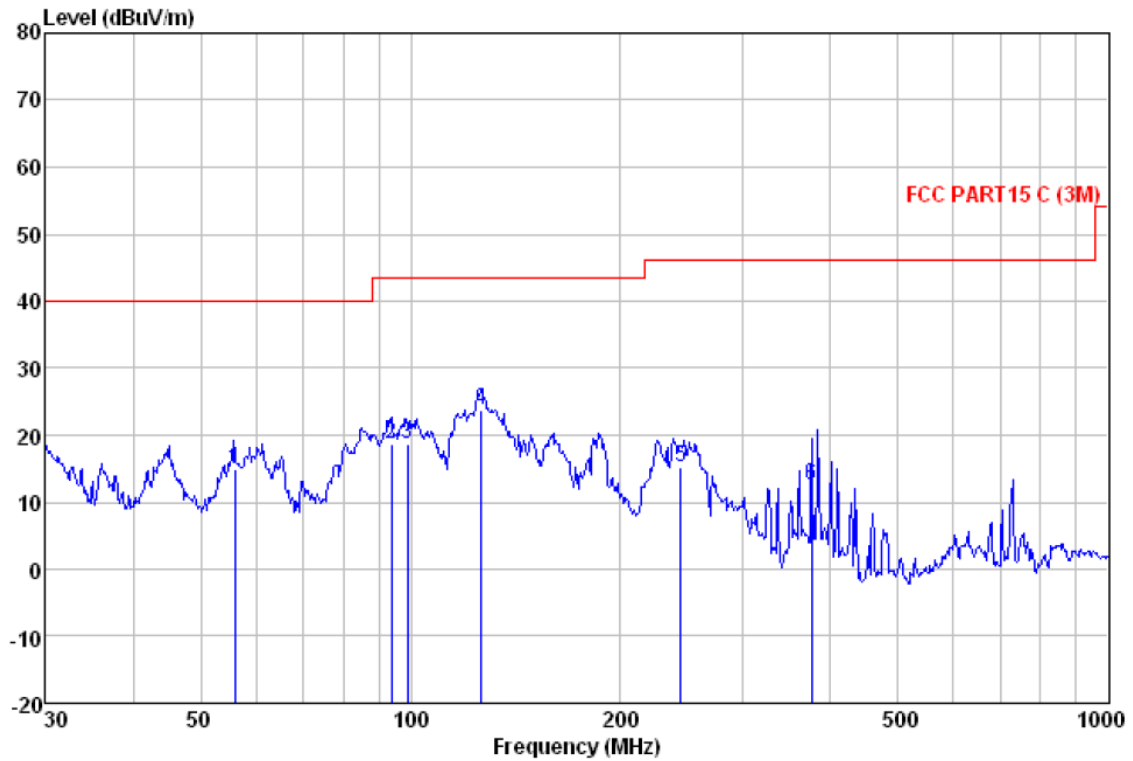
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	43.67	31.54	11.14	45.16	41.19	54	V
7236.00	40.68	36.48	13.03	45.45	44.74	54	V
4824.00	41.96	31.54	11.14	45.16	39.48	54	H
7236.00	43.02	36.48	13.03	45.45	47.08	54	H

Test at Channel 6 (2.437 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

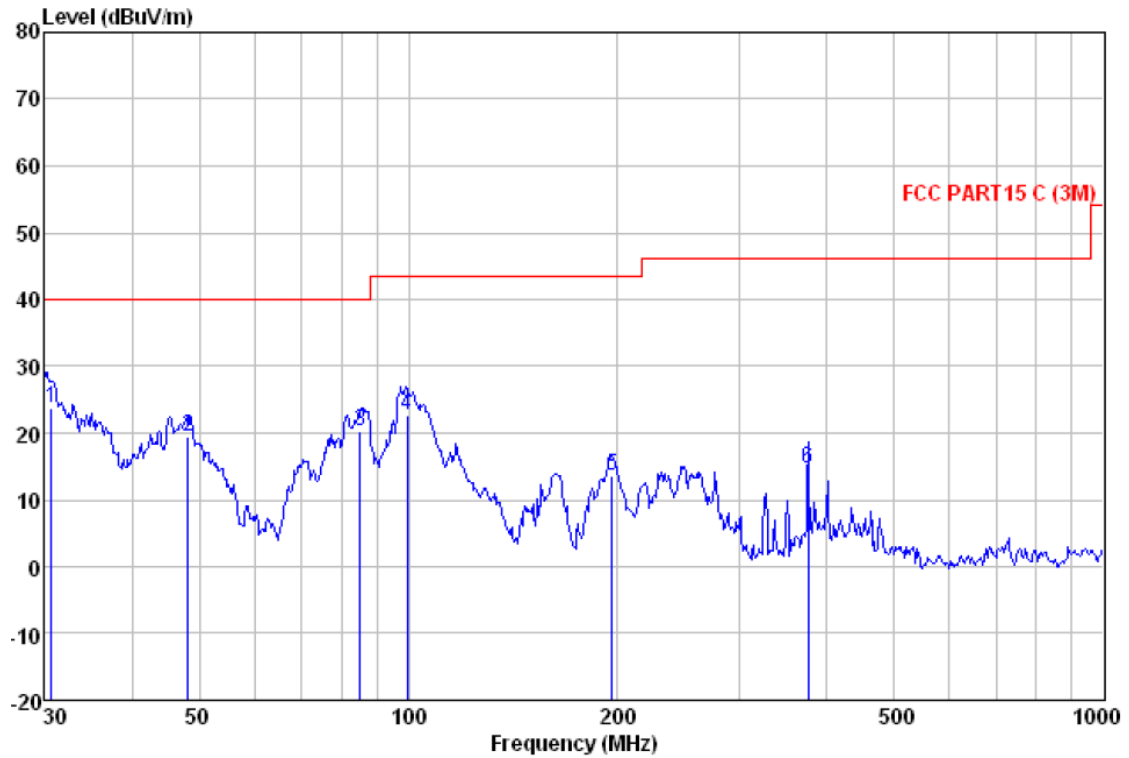


Quasi-peak measurement

	ReadAntenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Line	Limit	Remark		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	56.001	44.81	0.00	1.10	31.00	14.91	40.00	-25.09 QP
2	93.768	48.39	0.00	1.34	31.00	18.73	43.50	-24.77 QP
3	98.833	48.24	0.00	1.39	31.00	18.63	43.50	-24.87 QP
4	126.329	53.33	0.00	1.48	31.02	23.79	43.50	-19.71 QP
5	244.232	44.24	0.00	2.09	31.05	15.28	46.00	-30.72 QP
6	375.939	40.62	0.00	2.74	30.91	12.45	46.00	-33.55 QP

Horizontal:

Peak scan



Quasi-peak measurement

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.638	54.05	0.00	0.82	31.02	23.85	40.00	-16.15	QP
2	48.163	49.32	0.00	1.08	31.00	19.40	40.00	-20.60	QP
3	85.298	49.86	0.00	1.30	31.00	20.16	40.00	-19.84	QP
4	99.528	52.17	0.00	1.40	31.00	22.57	43.50	-20.93	QP
5	196.510	42.70	0.00	1.89	31.10	13.49	43.50	-30.01	QP
6	375.939	42.80	0.00	2.74	30.91	14.63	46.00	-31.37	QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	48.67	31.57	11.24	45.17	46.31	74.00	V
7311.00	49.62	36.49	13.22	45.54	53.79	74.00	V
4874.00	52.04	31.57	11.24	45.17	49.68	74.00	H
7311.00	48.16	36.49	13.22	45.54	52.33	74.00	H

Average Measurement:

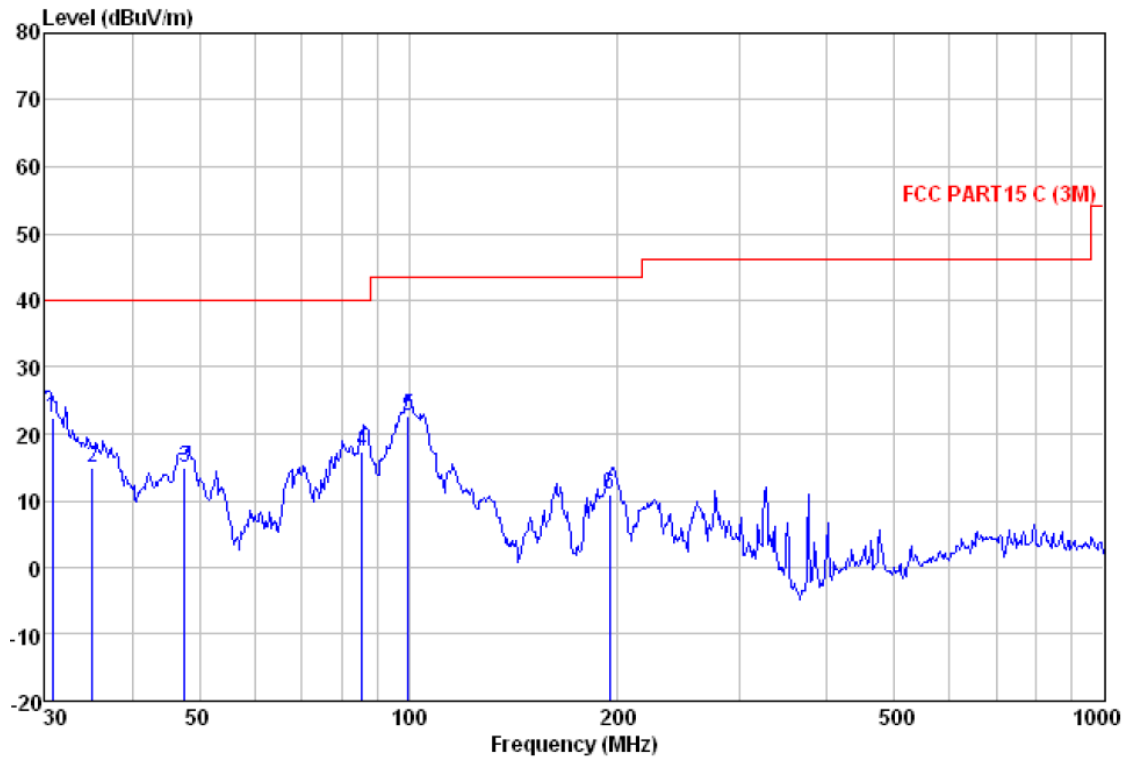
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	41.92	31.57	11.24	45.17	39.56	54.00	V
7311.00	42.17	36.49	13.22	45.54	46.34	54.00	V
4874.00	46.02	31.57	11.24	45.17	43.66	54.00	H
7311.00	40.16	36.49	13.22	45.54	44.33	54.00	H

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

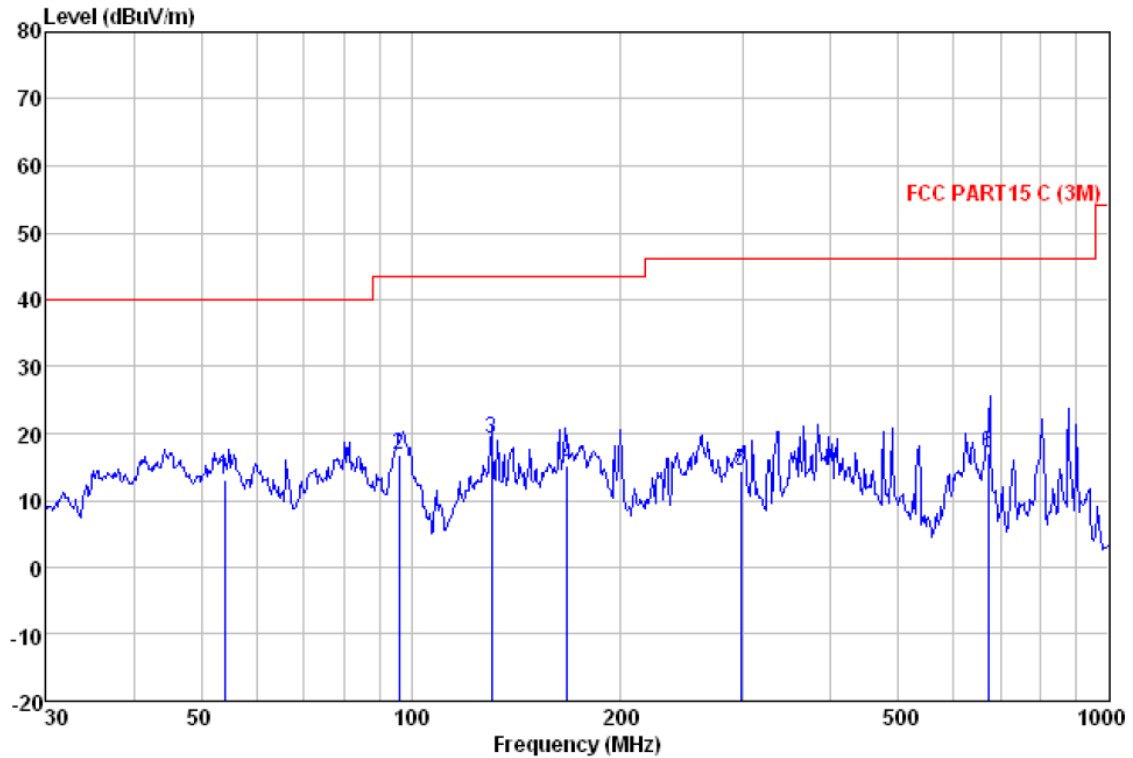


Quasi-peak measurement

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.745	52.70	0.00	0.82	31.02	22.50	40.00	-17.50 QP
2	35.128	45.09	0.00	0.90	31.01	14.98	40.00	-25.02 QP
3	47.659	44.90	0.00	1.07	31.00	14.97	40.00	-25.03 QP
4	85.598	47.13	0.00	1.30	31.00	17.43	40.00	-22.57 QP
5	99.878	52.15	0.00	1.40	31.00	22.55	43.50	-20.95 QP
6	194.453	40.17	0.00	1.89	31.10	10.96	43.50	-32.54 QP

Horizontal:

Peak scan



Quasi-peak measurement

	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	54.071	43.04	0.00	1.10	31.00	13.14	40.00	-26.86	QP
2	96.099	46.55	0.00	1.36	31.00	16.91	43.50	-26.59	QP
3	130.379	48.66	0.00	1.49	31.03	19.12	43.50	-24.38	QP
4	167.237	44.55	0.00	1.79	31.08	15.26	43.50	-28.24	QP
5	297.224	42.97	0.00	2.39	31.00	14.36	46.00	-31.64	QP
6	672.845	44.64	0.00	3.45	30.90	17.19	46.00	-28.81	QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	49.16	31.65	11.34	45.18	46.97	74.00	V
7386.00	47.01	36.54	13.47	45.62	51.40	74.00	V
4924.00	49.45	31.65	11.34	45.18	47.26	74.00	H
7386.00	46.56	36.54	13.47	45.62	50.95	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	40.16	31.65	11.34	45.18	37.97	54.00	V
7386.00	41.62	36.54	13.47	45.62	46.01	54.00	V
4924.00	43.25	31.65	11.34	45.18	41.06	54.00	H
7386.00	39.17	36.54	13.47	45.62	43.56	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

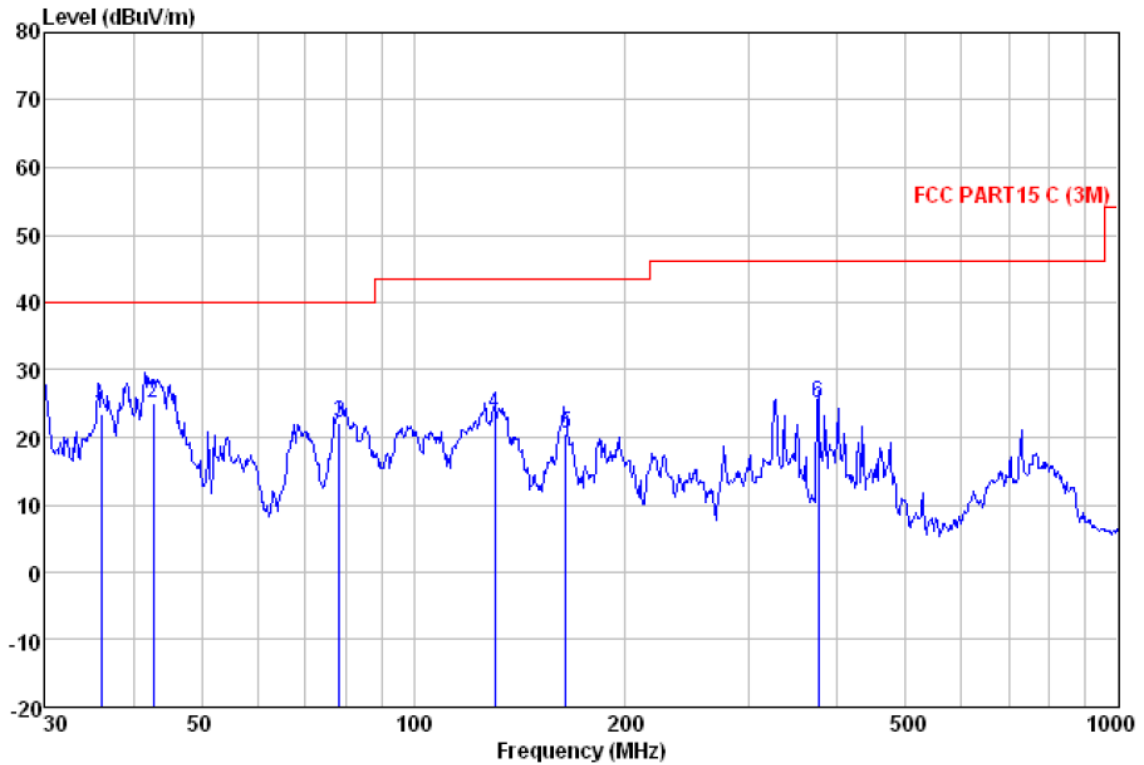
7.7.1.2 802.11g mode with 54Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

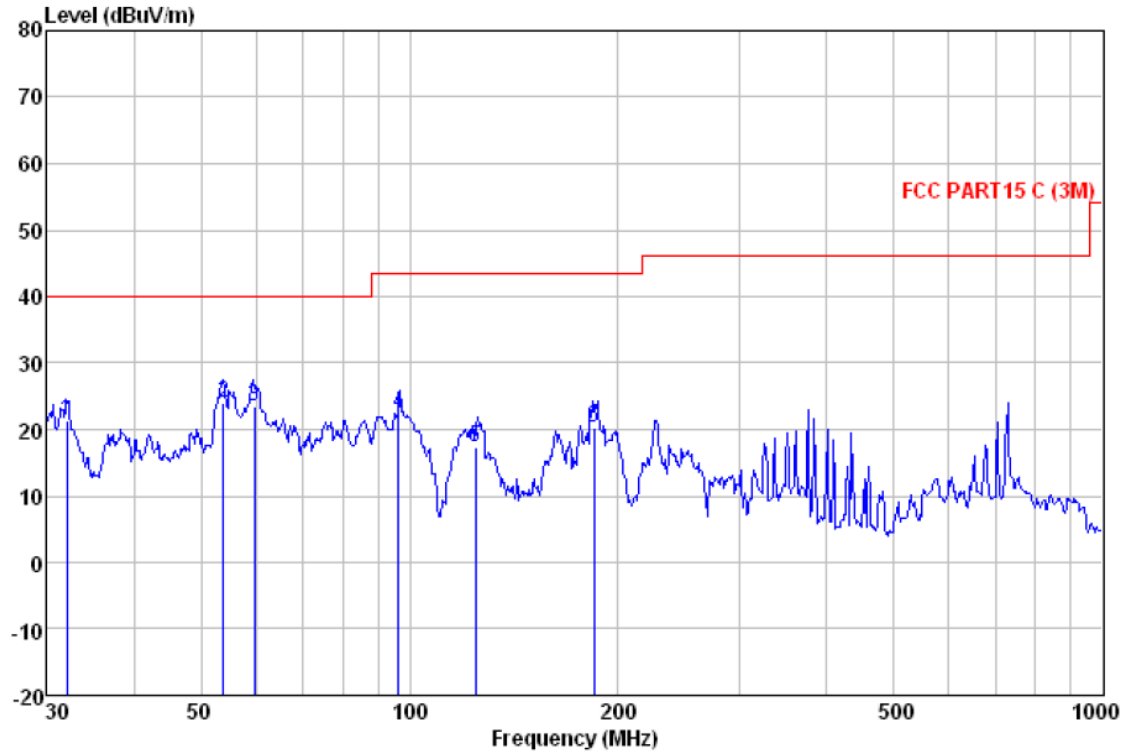


Quasi-peak measurement

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.001	53.57	0.00	0.92	31.01	23.48	40.00	-16.52	QP
2	42.750	54.93	0.00	1.02	31.00	24.95	40.00	-15.05	QP
3	78.413	51.89	0.00	1.29	31.00	22.18	40.00	-17.82	QP
4	130.379	52.93	0.00	1.49	31.03	23.39	43.50	-20.11	QP
5	164.330	49.87	0.00	1.77	31.08	20.56	43.50	-22.94	QP
6	375.939	53.18	0.00	2.74	30.91	25.01	46.00	-20.99	QP

Horizontal:

Peak scan



Quasi-peak measurement

	Freq	ReadAntenna Level	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	32.067	51.40	0.00	0.84	31.02	21.22	40.00	-18.78 QP
2	53.882	53.93	0.00	1.10	31.00	24.03	40.00	-15.97 QP
3	59.649	53.42	0.00	1.10	31.00	23.52	40.00	-16.48 QP
4	96.436	51.91	0.00	1.36	31.00	22.27	43.50	-21.23 QP
5	124.569	46.99	0.00	1.47	31.02	17.44	43.50	-26.06 QP
6	184.490	49.62	0.00	1.86	31.09	20.39	43.50	-23.11 QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	51.16	31.54	11.14	45.16	48.68	74.00	V
7236.00	51.05	36.48	13.03	45.45	55.11	74.00	V
4824.00	52.15	31.54	11.14	45.16	49.67	74.00	H
7236.00	50.14	36.48	13.03	45.45	54.20	74.00	H

Average Measurement:

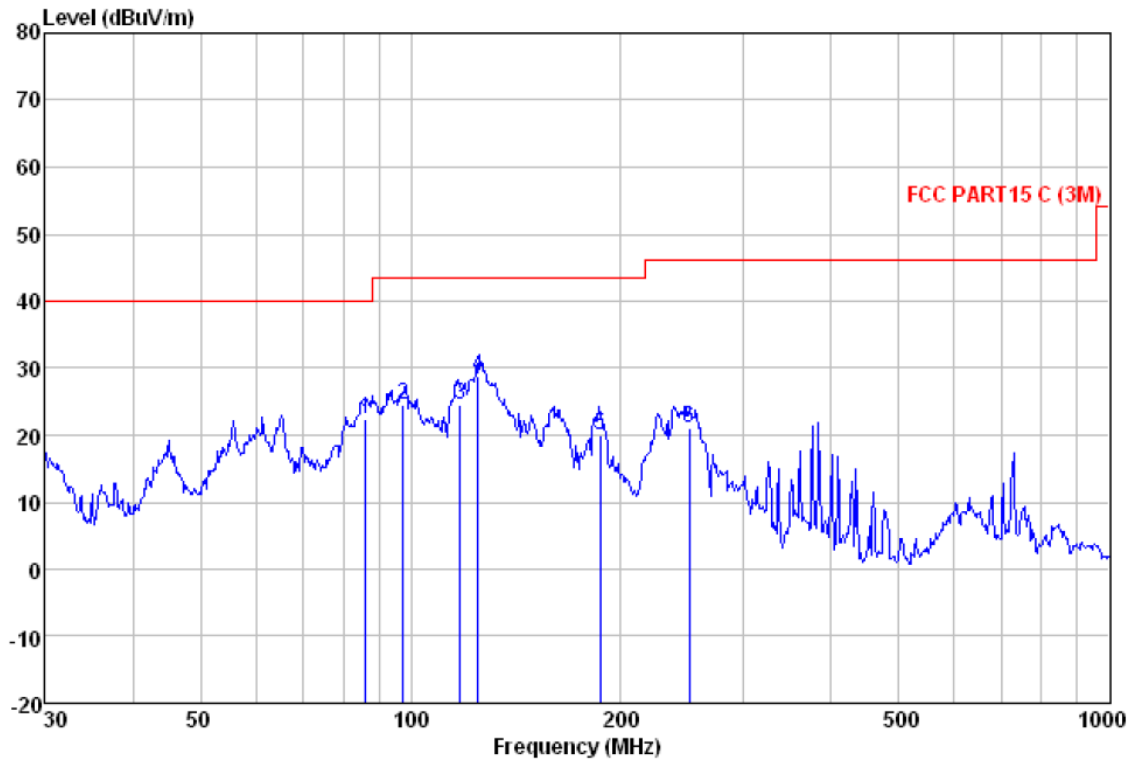
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	41.15	31.54	11.14	45.16	38.67	54.00	V
7236.00	41.15	36.48	13.03	45.45	45.21	54.00	V
4824.00	44.59	31.54	11.14	45.16	42.11	54.00	H
7236.00	38.54	36.48	13.03	45.45	42.60	54.00	H

Test at Channel 6 (2.437GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

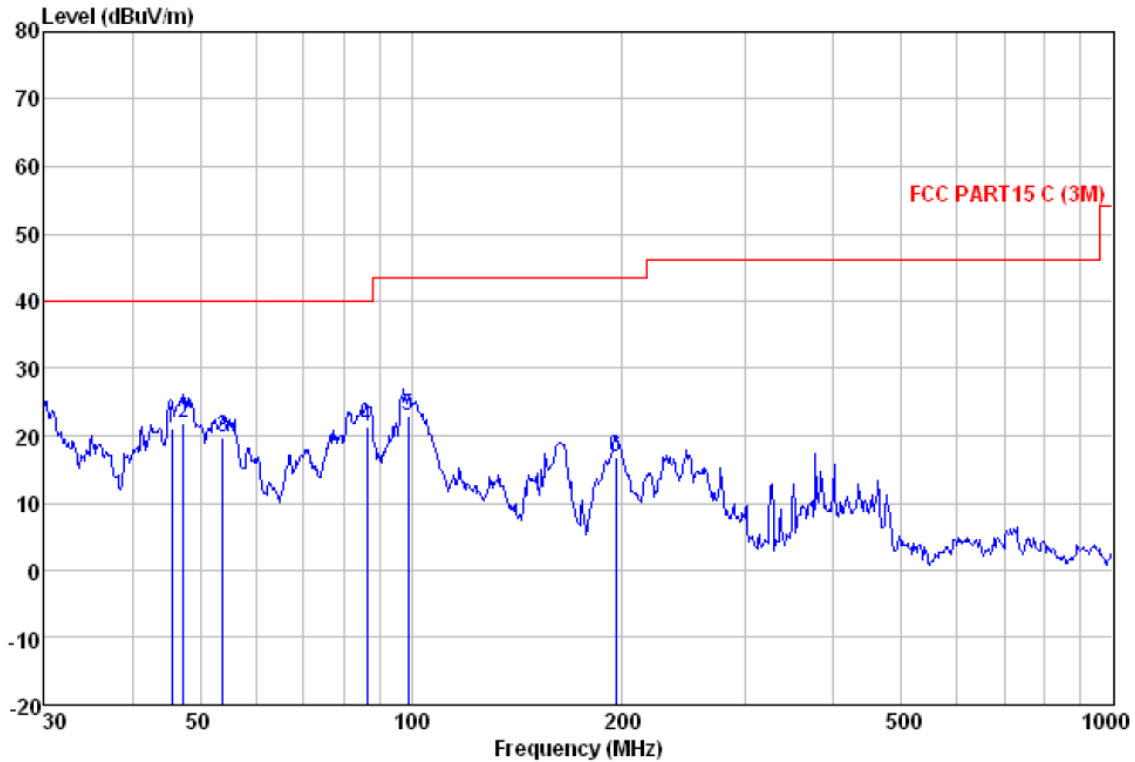


Quasi-peak measurement

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	86.200	52.18	0.00	1.30	31.00	22.48	40.00	-17.52 QP
2	97.456	54.04	0.00	1.38	31.00	24.42	43.50	-19.08 QP
3	117.773	54.21	0.00	1.45	31.02	24.64	43.50	-18.86 QP
4	125.007	58.32	0.00	1.47	31.02	28.77	43.50	-14.73 QP
5	186.441	49.30	0.00	1.86	31.09	20.07	43.50	-23.43 QP
6	250.301	49.92	0.00	2.16	31.04	21.04	46.00	-24.96 QP

Horizontal:

Peak scan



Quasi-peak measurement

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	Remark
	MHz	Level	Factor	Loss	Factor	Line	Limit	
		dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	45.535	51.11	0.00	1.05	31.00	21.16	40.00	-18.84 QP
2	47.326	51.71	0.00	1.07	31.00	21.78	40.00	-18.22 QP
3	53.882	49.56	0.00	1.10	31.00	19.66	40.00	-20.34 QP
4	86.503	51.10	0.00	1.30	31.00	21.40	40.00	-18.60 QP
5	98.833	52.47	0.00	1.39	31.00	22.86	43.50	-20.64 QP
6	195.822	45.91	0.00	1.89	31.10	16.70	43.50	-26.80 QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	48.29	31.57	11.24	45.17	45.93	74.00	V
7311.00	49.16	36.49	13.22	45.54	53.33	74.00	V
4874.00	52.31	31.57	11.24	45.17	49.95	74.00	H
7311.00	50.72	36.49	13.22	45.54	54.89	74.00	H

Average Measurement:

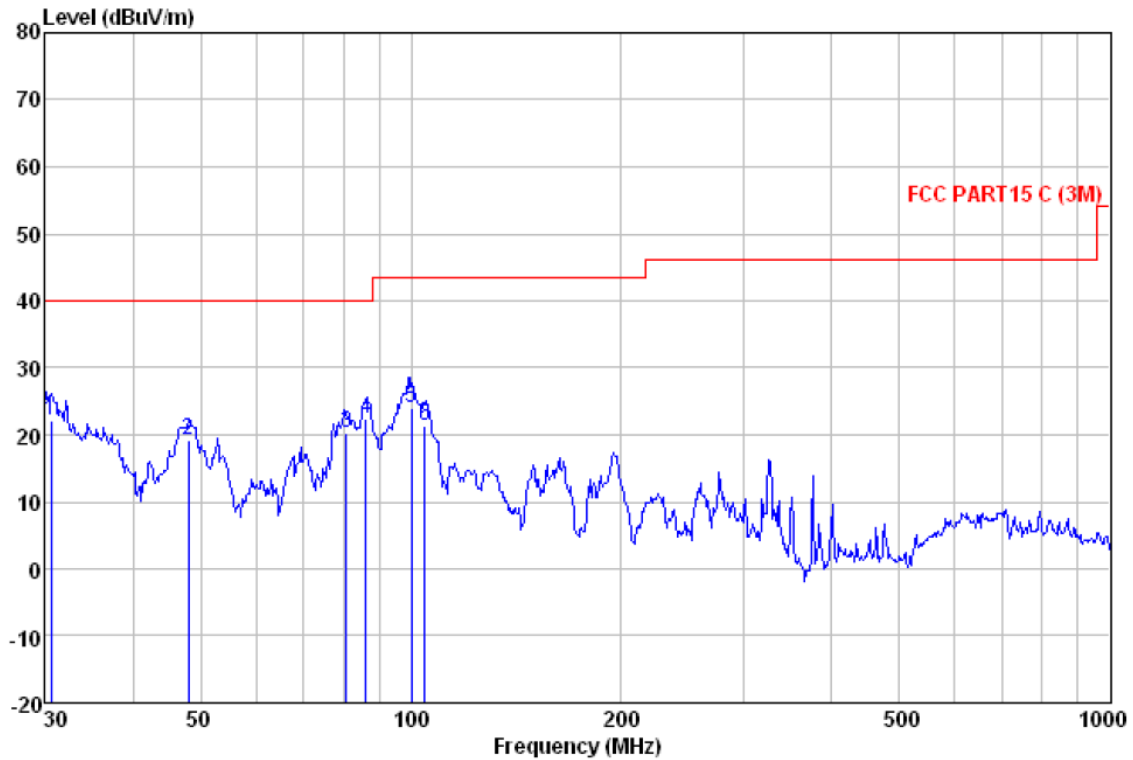
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	43.35	31.57	11.24	45.17	40.99	54.00	V
7311.00	43.19	36.49	13.22	45.54	47.36	54.00	V
4874.00	46.55	31.57	11.24	45.17	44.19	54.00	H
7311.00	40.99	36.49	13.22	45.54	45.16	54.00	H

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

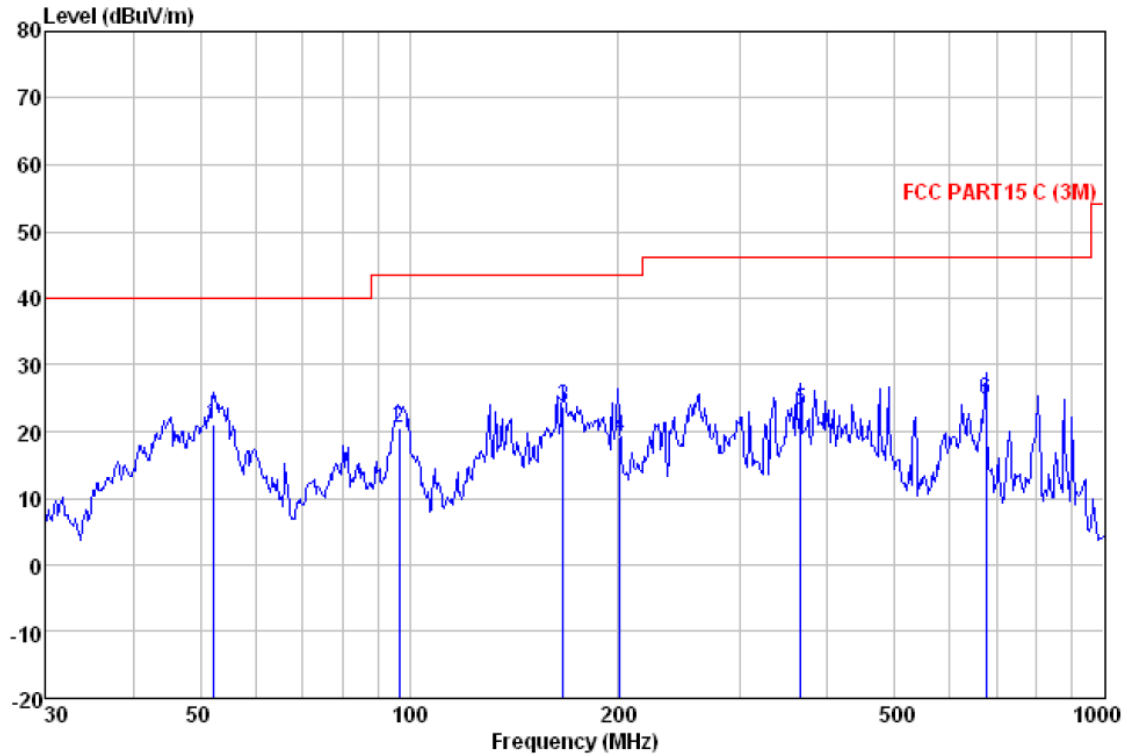


Quasi-peak measurement

	ReadAntenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.531	52.39	0.00	0.82	31.02	22.19	40.00	-17.81 QP
2	47.994	49.12	0.00	1.08	31.00	19.20	40.00	-20.80 QP
3	80.927	49.88	0.00	1.30	31.00	20.18	40.00	-19.82 QP
4	86.200	52.12	0.00	1.30	31.00	22.42	40.00	-17.58 QP
5	100.229	53.72	0.00	1.40	31.00	24.12	43.50	-19.38 QP
6	104.536	51.02	0.00	1.41	31.00	21.43	43.50	-22.07 QP

Horizontal:

Peak scan



Quasi-peak measurement

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark		
	MHz	Level	Factor	Loss	Factor	Line	Limit		
		dBuV	dB/m	dB	dB	dBuV/m	dB		
1	52.208	50.87	0.00	1.10	31.00	20.97	40.00	-19.03	QP
2	96.775	50.18	0.00	1.37	31.00	20.55	43.50	-22.95	QP
3	166.651	53.14	0.00	1.79	31.08	23.85	43.50	-19.65	QP
4	200.688	48.30	0.00	1.90	31.10	19.10	43.50	-24.40	QP
5	365.539	51.40	0.00	2.71	30.93	23.18	46.00	-22.82	QP
6	675.208	52.14	0.00	3.45	30.90	24.69	46.00	-21.31	QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	49.16	31.65	11.34	45.18	46.97	74.00	V
7386.00	46.62	36.54	13.47	45.62	51.01	74.00	V
4924.00	52.16	31.65	11.34	45.18	49.97	74.00	H
7386.00	48.17	36.54	13.47	45.62	52.56	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	40.64	31.65	11.34	45.18	38.45	54.00	V
7386.00	45.42	36.54	13.47	45.62	49.81	54.00	V
4924.00	43.16	31.65	11.34	45.18	40.97	54.00	H
7386.00	41.92	36.54	13.47	45.62	46.31	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

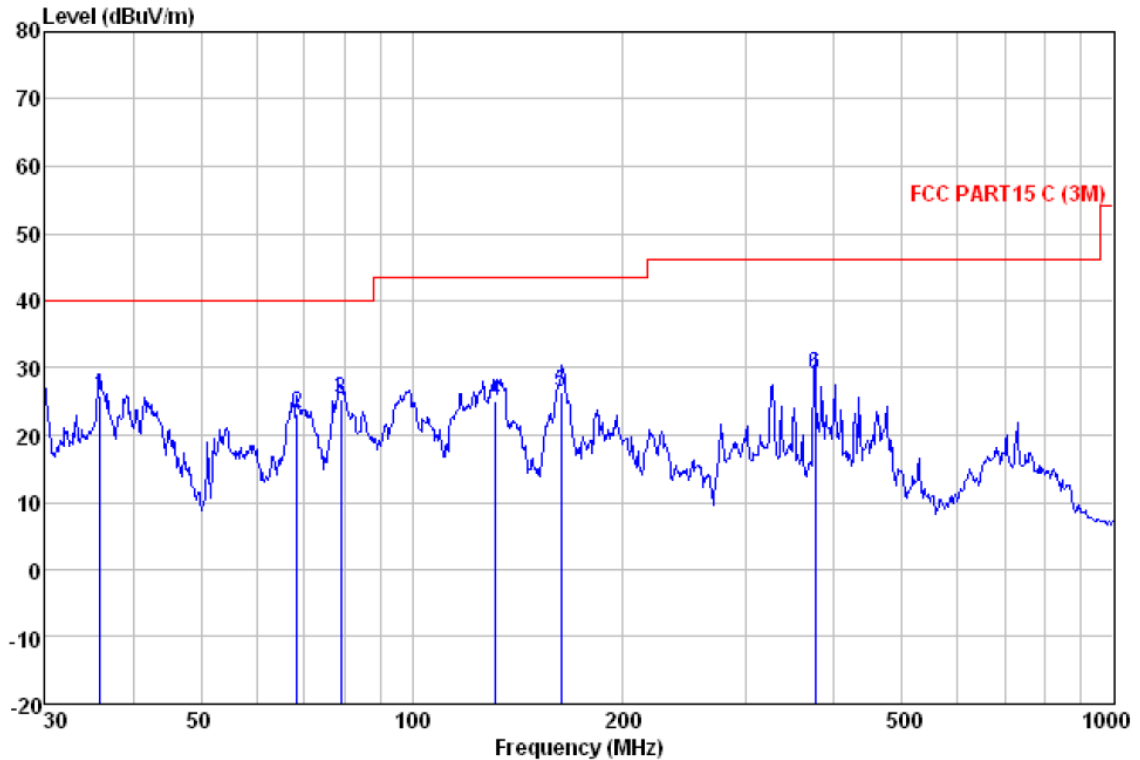
7.7.1.3 802.11n(HT20) mode with 65Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

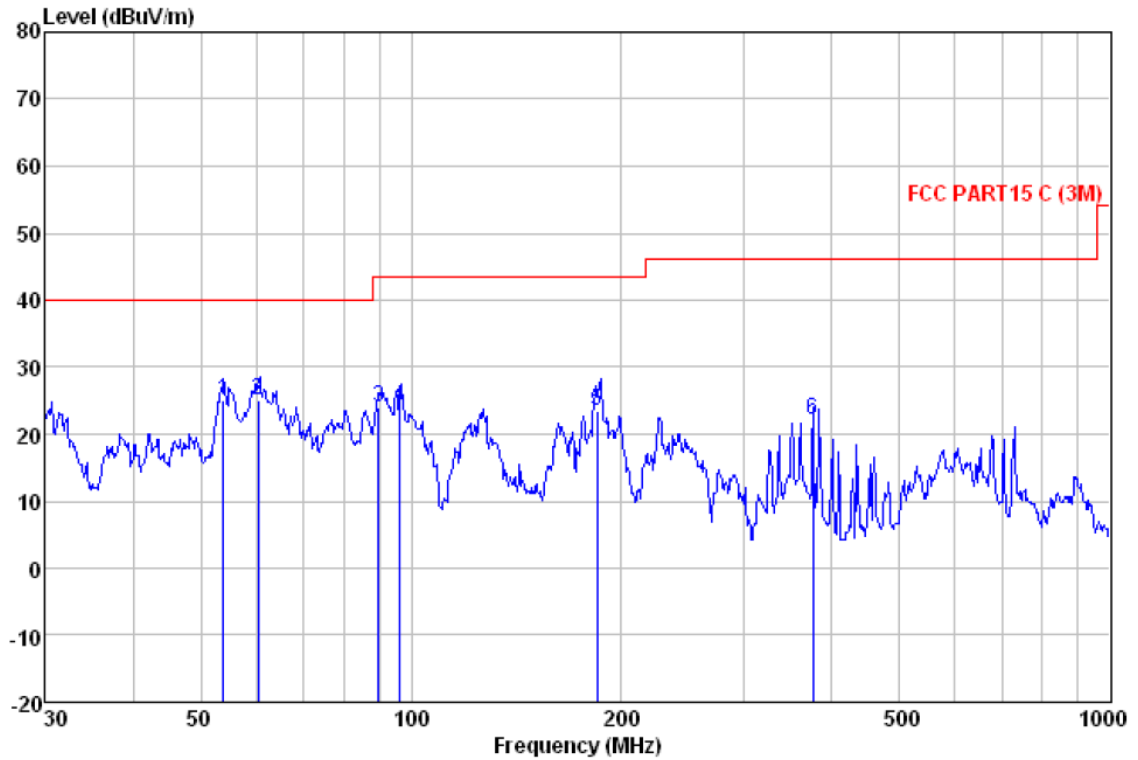


Quasi-peak measurement

	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	35.875	55.84	0.00	0.92	31.01	25.75	40.00	-14.25	QP
2	68.631	52.90	0.00	1.19	31.00	23.09	40.00	-16.91	QP
3	79.243	55.12	0.00	1.29	31.00	25.41	40.00	-14.59	QP
4	131.758	54.61	0.00	1.50	31.03	25.08	43.50	-18.42	QP
5	163.182	55.77	0.00	1.77	31.08	26.46	43.50	-17.04	QP
6	375.939	57.18	0.00	2.74	30.91	29.01	46.00	-16.99	QP

Horizontal:

Peak scan



Quasi-peak measurement

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.882	54.93	0.00	1.10	31.00	25.03	40.00	-14.97 QP
2	60.492	54.94	0.00	1.10	31.00	25.04	40.00	-14.96 QP
3	89.905	53.66	0.00	1.30	31.00	23.96	43.50	-19.54 QP
4	96.436	53.91	0.00	1.36	31.00	24.27	43.50	-19.23 QP
5	184.490	52.62	0.00	1.86	31.09	23.39	43.50	-20.11 QP
6	375.939	50.24	0.00	2.74	30.91	22.07	46.00	-23.93 QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	50.87	31.54	11.14	45.16	48.39	74.00	V
7236.00	45.74	36.48	13.03	45.45	49.80	74.00	V
4824.00	50.22	31.54	11.14	45.16	47.74	74.00	H
7236.00	46.47	36.48	13.03	45.45	50.53	74.00	H

Average Measurement:

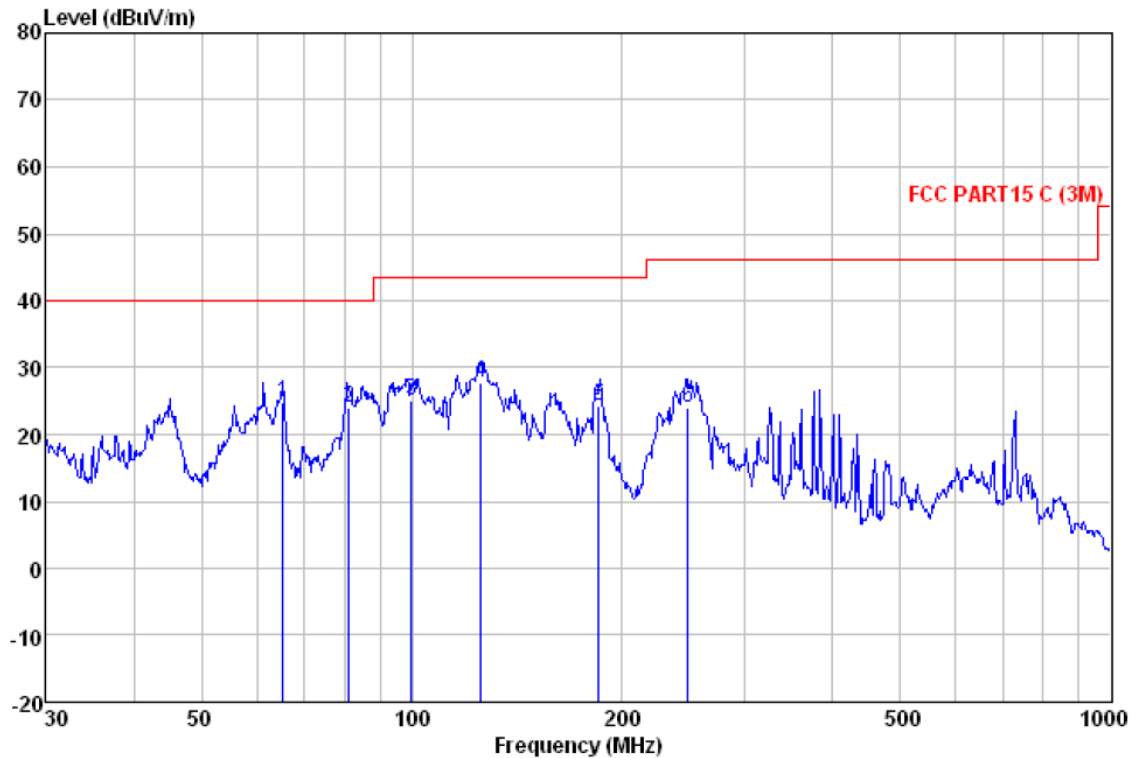
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4824.00	45.90	31.54	11.14	45.16	43.42	54.00	V
7236.00	43.03	36.48	13.03	45.45	47.09	54.00	V
4824.00	43.78	31.54	11.14	45.16	41.30	54.00	H
7236.00	41.89	36.48	13.03	45.45	45.95	54.00	H

Test at Channel 6 (2.437 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

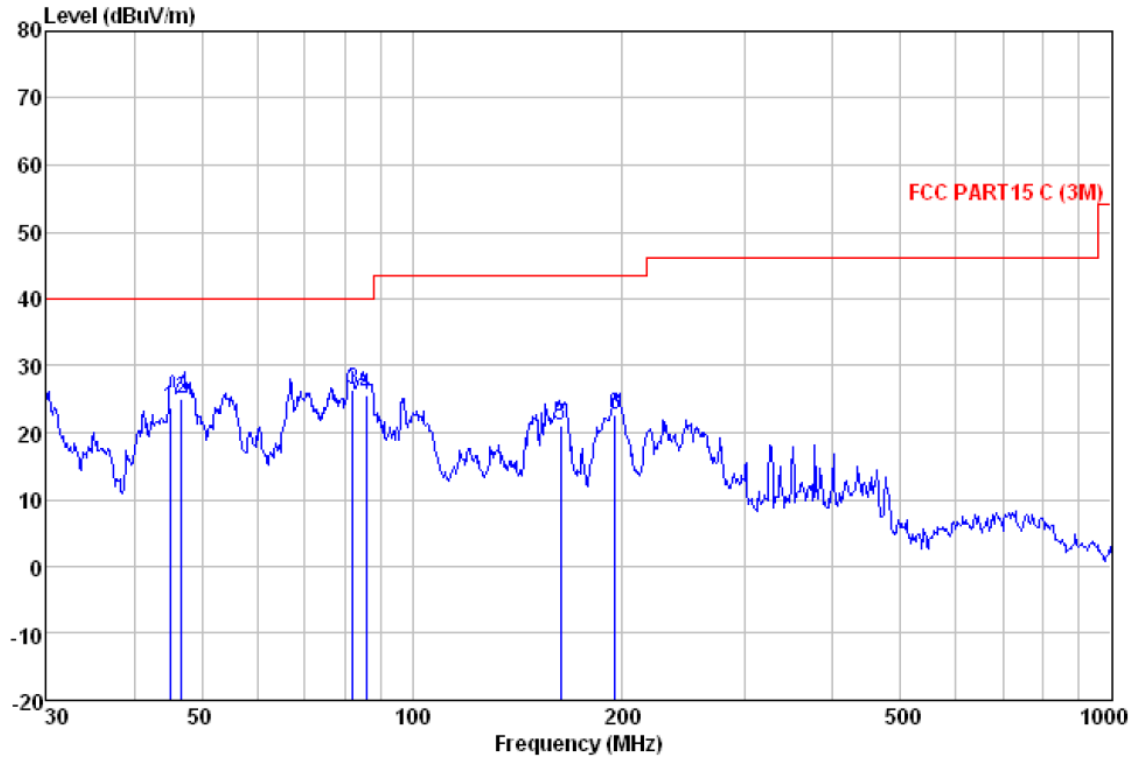


Quasi-peak measurement

	Freq	ReadAntenna Level	ReadAntenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	65.343	54.68	0.00	1.15	31.00	24.83	40.00	-15.17	QP
2	81.212	53.67	0.00	1.30	31.00	23.97	40.00	-16.03	QP
3	99.878	54.80	0.00	1.40	31.00	25.20	43.50	-18.30	QP
4	125.446	57.37	0.00	1.47	31.02	27.82	43.50	-15.68	QP
5	185.138	53.61	0.00	1.86	31.09	24.38	43.50	-19.12	QP
6	248.552	52.88	0.00	2.14	31.04	23.98	46.00	-22.02	QP

Horizontal:

Peak scan



Quasi-peak measurement

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.058	53.63	0.00	1.05	31.00	23.68	40.00	-16.32 QP
2	46.830	54.88	0.00	1.06	31.00	24.94	40.00	-15.06 QP
3	82.359	56.15	0.00	1.30	31.00	26.45	40.00	-13.55 QP
4	85.898	55.39	0.00	1.30	31.00	25.69	40.00	-14.31 QP
5	163.182	50.28	0.00	1.77	31.08	20.97	43.50	-22.53 QP
6	195.137	51.93	0.00	1.89	31.10	22.72	43.50	-20.78 QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	50.19	31.57	11.24	45.17	47.83	74.00	V
7311.00	47.99	36.49	13.22	45.54	52.16	74.00	V
4874.00	51.39	31.57	11.24	45.17	49.03	74.00	H
7311.00	48.04	36.49	13.22	45.54	52.21	74.00	H

Average Measurement:

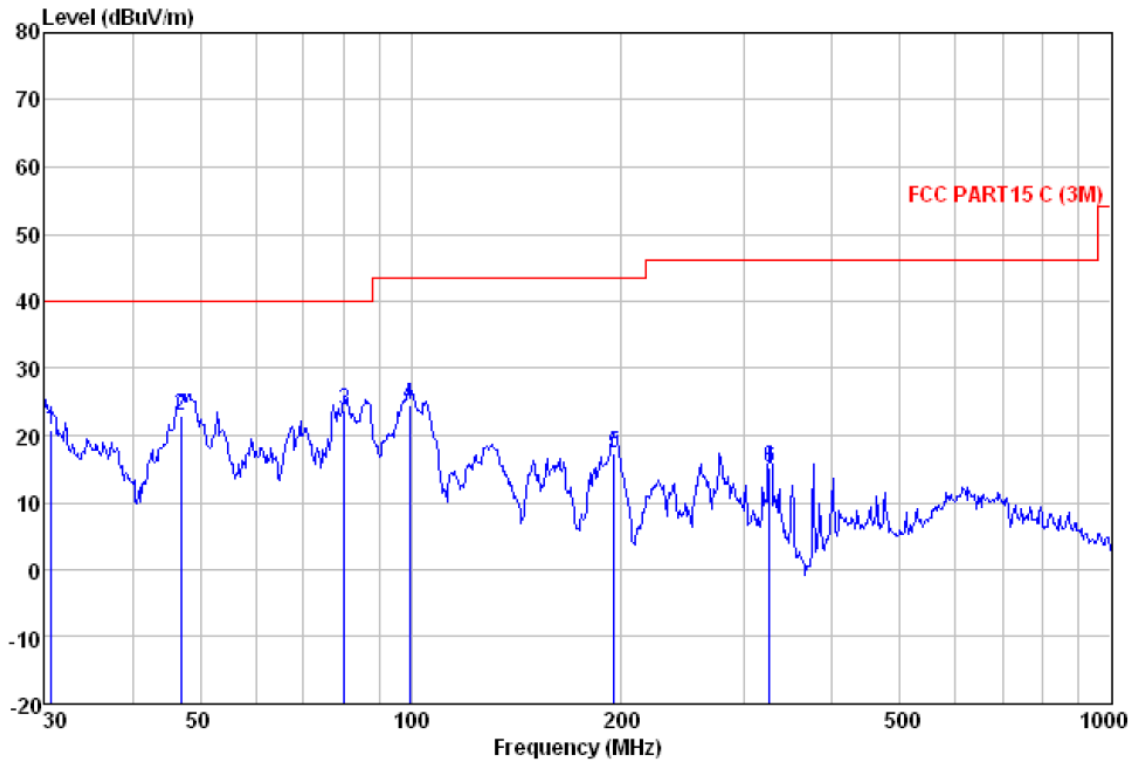
Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
4874.00	44.11	31.57	11.24	45.17	41.75	54.00	V
7311.00	41.16	36.49	13.22	45.54	45.33	54.00	V
4874.00	44.76	31.57	11.24	45.17	42.40	54.00	H
7311.00	42.54	36.49	13.22	45.54	46.71	54.00	H

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan



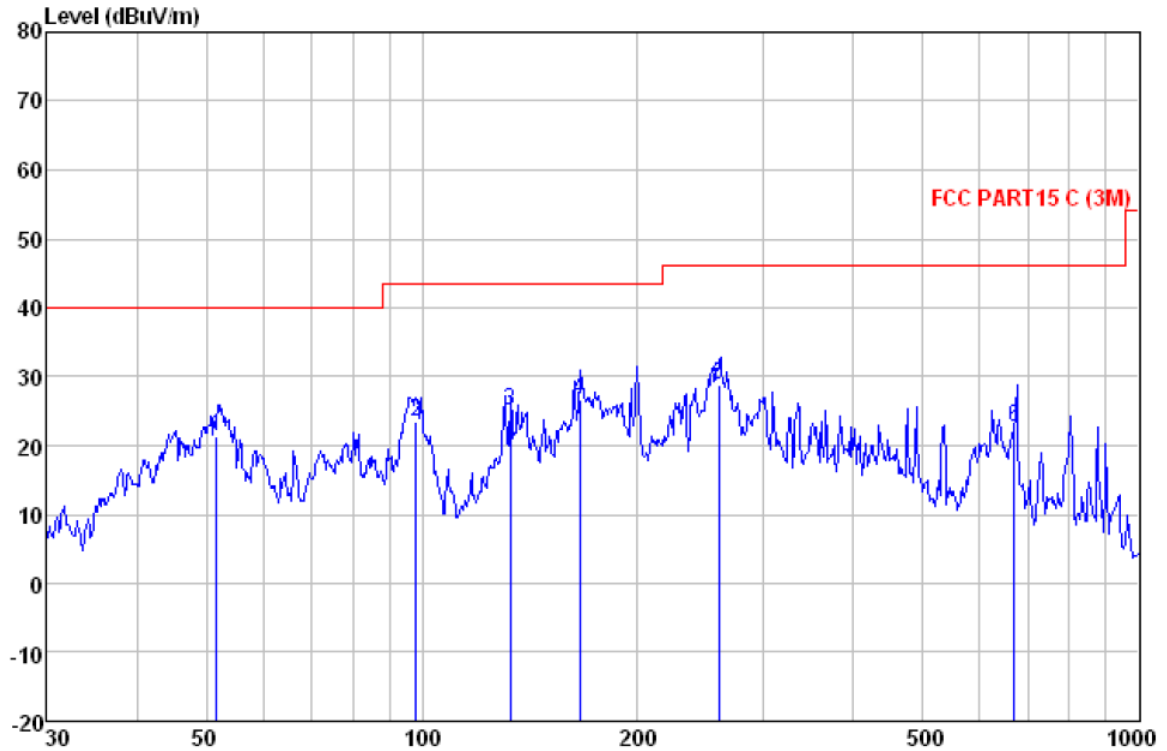
Quasi-peak measurement

	ReadAntenna	Cable	Preamp	Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.638	51.08	0.00	0.82	31.02	20.88	40.00	-19.12 QP
2	46.995	52.87	0.00	1.07	31.00	22.94	40.00	-17.06 QP
3	80.362	53.56	0.00	1.30	31.00	23.86	40.00	-16.14 QP
4	99.528	54.19	0.00	1.40	31.00	24.59	43.50	-18.91 QP
5	195.137	46.55	0.00	1.89	31.10	17.34	43.50	-26.16 QP
6	325.596	43.66	0.00	2.46	30.98	15.14	46.00	-30.86 QP



Horizontal:

Peak scan



Quasi-peak measurement

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	51.662	51.31	0.00	1.10	31.00	21.41	40.00	-18.59	QP
2	98.142	53.16	0.00	1.38	31.00	23.54	43.50	-19.96	QP
3	132.685	54.49	0.00	1.51	31.03	24.97	43.50	-18.53	QP
4	166.068	55.83	0.00	1.78	31.08	26.53	43.50	-16.97	QP
5	259.234	57.56	0.00	2.24	31.03	28.77	46.00	-17.23	QP
6	670.489	50.14	0.00	3.44	30.90	22.68	46.00	-23.32	QP



1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	50.78	31.65	11.34	45.18	48.59	74.00	V
7386.00	48.25	36.54	13.47	45.62	52.64	74.00	V
4924.00	50.23	31.65	11.34	45.18	48.04	74.00	H
7386.00	45.84	36.54	13.47	45.62	50.23	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4924.00	44.33	31.65	11.34	45.18	42.14	54.00	V
7386.00	40.44	36.54	13.47	45.62	44.83	54.00	V
4924.00	44.87	31.65	11.34	45.18	42.68	54.00	H
7386.00	41.47	36.54	13.47	45.62	45.86	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Preamplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.



Remark:

- 1) .For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3rd harmonic.
- 2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the FCC requirements.



7.7.2 Radiated Emissions which fall in the restricted bands

Test Requirement:	FCC Part 15 C section 15.247 (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI C63.10: Clause 6.4, 6.5 and 6.6
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dB μ V/m between 30MHz & 88MHz; 43.5 dB μ V/m between 88MHz & 216MHz; 46.0 dB μ V/m between 216MHz & 960MHz; 54.0 dB μ V/m above 960MHz.
Detector:	For PK value: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW \geq RBW Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW = 10Hz Sweep = auto Detector function = peak Trace = max hold



Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

Test Result:

7.7.2.1 802.11b mode with 11Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	52.00	27.93	6.52	41.50	44.95	74.00	Vertical
2390.000	53.16	27.63	6.55	44.97	42.37	74.00	V
2483.500	52.96	27.55	6.99	45.02	42.48	74.00	V
2500.000	53.91	27.55	7.02	45.02	43.46	74.00	V
2310.000	53.44	27.93	6.52	44.95	42.94	74.00	Horizontal
2390.000	54.69	27.63	6.55	44.97	43.90	74.00	H
2483.500	52.65	27.55	6.99	45.02	42.17	74.00	H
2500.000	52.64	27.55	7.02	45.02	42.19	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	44.31	27.93	6.52	44.95	33.81	54.00	Vertical
2390.000	48.27	27.63	6.55	44.97	37.48	54.00	V
2483.500	44.33	27.55	6.99	45.02	33.85	54.00	V
2500.000	45.11	27.55	7.02	45.02	34.66	54.00	V
2310.000	43.13	27.93	6.52	44.95	32.63	54.00	Horizontal
2390.000	42.53	27.63	6.55	44.97	31.74	54.00	H
2483.500	46.98	27.55	6.99	45.02	36.50	54.00	H
2500.000	43.49	27.55	7.02	45.02	33.04	54.00	H

Test at Channel 6 (2.437 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	53.16	27.93	6.52	44.95	42.66	74.00	Vertical
2390.000	54.31	27.63	6.55	44.97	43.52	74.00	V
2483.500	50.00	27.55	6.99	45.02	39.52	74.00	V
2500.000	53.16	27.55	7.02	45.02	42.71	74.00	V
2310.000	51.13	27.93	6.52	44.95	40.63	74.00	Horizontal
2390.000	52.04	27.63	6.55	44.97	41.25	74.00	H
2483.500	51.17	27.55	6.99	45.02	40.69	74.00	H
2500.000	50.46	27.55	7.02	45.02	40.01	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	47.06	27.93	6.52	44.95	36.56	54.00	Vertical
2390.000	46.00	27.63	6.55	44.97	35.21	54.00	V
2483.500	46.08	27.55	6.99	45.02	35.60	54.00	V
2500.000	45.22	27.55	7.02	45.02	34.77	54.00	V
2310.000	45.16	27.93	6.52	44.95	34.66	54.00	Horizontal
2390.000	44.66	27.63	6.55	44.97	33.87	54.00	H
2483.500	44.18	27.55	6.99	45.02	33.70	54.00	H
2500.000	43.06	27.55	7.02	45.02	32.61	54.00	H



Test at Channel 11 (2.462 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	50.64	27.93	6.52	44.95	40.14	74.00	Vertical
2390.000	49.16	27.63	6.55	44.97	38.37	74.00	V
2483.500	53.08	27.55	6.99	45.02	42.60	74.00	V
2500.000	50.55	27.55	7.02	45.02	40.10	74.00	V
2310.000	50.16	27.93	6.52	44.95	39.66	74.00	Horizontal
2390.000	50.16	27.63	6.55	44.97	39.37	74.00	H
2483.500	54.08	27.55	6.99	45.02	43.60	74.00	H
2500.000	51.12	27.55	7.02	45.02	40.67	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	44.36	27.93	6.52	44.95	33.86	54.00	Vertical
2390.000	46.16	27.63	6.55	44.97	35.37	54.00	V
2483.500	47.56	27.55	6.99	45.02	37.08	54.00	V
2500.000	46.06	27.55	7.02	45.02	35.61	54.00	V
2310.000	42.03	27.93	6.52	44.95	31.53	54.00	Horizontal
2390.000	45.16	27.63	6.55	44.97	34.37	54.00	H
2483.500	46.02	27.55	6.99	45.02	35.54	54.00	H
2500.000	42.02	27.55	7.02	45.02	31.57	54.00	H

7.7.2.2 802.11g mode with 54Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	51.10	27.93	6.52	44.95	40.60	74.00	Vertical
2390.000	54.17	27.63	6.55	44.97	43.38	74.00	V
2483.500	49.04	27.55	6.99	45.02	38.56	74.00	V
2500.000	51.17	27.55	7.02	45.02	40.72	74.00	V
2310.000	54.16	27.93	6.52	44.95	43.66	74.00	Horizontal
2390.000	53.17	27.63	6.55	44.97	42.38	74.00	H
2483.500	53.47	27.55	6.99	45.02	42.99	74.00	H
2500.000	52.16	27.55	7.02	45.02	41.71	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dB μ V)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2310.000	43.16	27.93	6.52	44.95	32.66	54.00	Vertical
2390.000	48.03	27.63	6.55	44.97	37.24	54.00	V
2483.500	41.18	27.55	6.99	45.02	30.70	54.00	V
2500.000	45.16	27.55	7.02	45.02	34.71	54.00	V
2310.000	42.46	27.93	6.52	44.95	31.96	54.00	Horizontal
2390.000	42.16	27.63	6.55	44.97	31.37	54.00	H
2483.500	47.08	27.55	6.99	45.02	36.60	54.00	H
2500.000	45.13	27.55	7.02	45.02	34.68	54.00	H

Test at Channel 6 (2.437 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	51.06	27.93	6.52	44.95	40.56	74.00	Vertical
2390.000	55.92	27.63	6.55	44.97	45.13	74.00	V
2483.500	52.04	27.55	6.99	45.02	41.56	74.00	V
2500.000	52.97	27.55	7.02	45.02	42.52	74.00	V
2310.000	52.16	27.93	6.52	44.95	41.66	74.00	Horizontal
2390.000	50.17	27.63	6.55	44.97	39.38	74.00	H
2483.500	51.15	27.55	6.99	45.02	40.67	74.00	H
2500.000	52.95	27.55	7.02	45.02	42.50	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	48.15	27.93	6.52	44.95	37.65	54.00	Vertical
2390.000	44.57	27.63	6.55	44.97	33.78	54.00	V
2483.500	47.18	27.55	6.99	45.02	36.70	54.00	V
2500.000	46.16	27.55	7.02	45.02	35.71	54.00	V
2310.000	46.14	27.93	6.52	44.95	35.64	54.00	Horizontal
2390.000	46.17	27.63	6.55	44.97	35.38	54.00	H
2483.500	46.17	27.55	6.99	45.02	35.69	54.00	H
2500.000	46.09	27.55	7.02	45.02	35.64	54.00	H

Test at Channel 11 (2.462 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	50.16	27.93	6.52	44.95	39.66	74.00	Vertical
2390.000	50.18	27.63	6.55	44.97	39.39	74.00	V
2483.500	54.14	27.55	6.99	45.02	43.66	74.00	V
2500.000	52.16	27.55	7.02	45.02	41.71	74.00	V
2310.000	52.16	27.93	6.52	44.95	41.66	74.00	Horizontal
2390.000	50.17	27.63	6.55	44.97	39.38	74.00	H
2483.500	53.21	27.55	6.99	45.02	42.73	74.00	H
2500.000	53.15	27.55	7.02	45.02	42.70	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	45.16	27.93	6.52	44.95	34.66	54.00	Vertical
2390.000	47.52	27.63	6.55	44.97	36.73	54.00	V
2483.500	49.15	27.55	6.99	45.02	38.67	54.00	V
2500.000	46.12	27.55	7.02	45.02	35.67	54.00	V
2310.000	41.15	27.93	6.52	44.95	30.65	54.00	Horizontal
2390.000	46.86	27.63	6.55	44.97	36.07	54.00	H
2483.500	48.95	27.55	6.99	45.02	38.47	54.00	H
2500.000	42.61	27.55	7.02	45.02	32.16	54.00	H

7.7.2.3 802.11n(HT20) mode with 65Mbps data rate

Test at Channel 1 (2.412 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	49.08	27.93	6.52	44.95	38.58	74.00	Vertical
2390.000	50.65	27.63	6.55	44.97	39.86	74.00	V
2483.500	52.55	27.55	6.99	45.02	42.07	74.00	V
2500.000	53.93	27.55	7.02	45.02	43.48	74.00	V
2310.000	49.38	27.93	6.52	44.95	38.88	74.00	Horizontal
2390.000	49.26	27.63	6.55	44.97	38.47	74.00	H
2483.500	51.53	27.55	6.99	45.02	41.05	74.00	H
2500.000	52.13	27.55	7.02	45.02	41.68	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	43.30	27.93	6.52	44.95	32.80	54.00	Vertical
2390.000	43.94	27.63	6.55	44.97	33.15	54.00	V
2483.500	45.35	27.55	6.99	45.02	34.87	54.00	V
2500.000	46.27	27.55	7.02	45.02	35.82	54.00	V
2310.000	42.48	27.93	6.52	44.95	31.98	54.00	Horizontal
2390.000	42.03	27.63	6.55	44.97	31.24	54.00	H
2483.500	44.69	27.55	6.99	45.02	34.21	54.00	H
2500.000	43.41	27.55	7.02	45.02	32.96	54.00	H

Test at Channel 6 (2.437 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	49.92	27.93	6.52	44.95	39.42	74.00	Vertical
2390.000	52.85	27.63	6.55	44.97	42.06	74.00	V
2483.500	52.02	27.55	6.99	45.02	41.54	74.00	V
2500.000	52.05	27.55	7.02	45.02	41.60	74.00	V
2310.000	49.80	27.93	6.52	44.95	39.30	74.00	Horizontal
2390.000	49.36	27.63	6.55	44.97	38.57	74.00	H
2483.500	51.89	27.55	6.99	45.02	41.41	74.00	H
2500.000	49.33	27.55	7.02	45.02	38.88	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	44.23	27.93	6.52	44.95	33.73	54.00	Vertical
2390.000	45.17	27.63	6.55	44.97	34.38	54.00	V
2483.500	44.45	27.55	6.99	45.02	33.97	54.00	V
2500.000	45.16	27.55	7.02	45.02	34.71	54.00	V
2310.000	41.77	27.93	6.52	44.95	31.27	54.00	Horizontal
2390.000	43.56	27.63	6.55	44.97	32.77	54.00	H
2483.500	43.61	27.55	6.99	45.02	33.13	54.00	H
2500.000	42.93	27.55	7.02	45.02	32.48	54.00	H

Test at Channel 11 (2.462 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	47.75	27.93	6.52	44.95	37.25	74.00	Vertical
2390.000	49.18	27.63	6.55	44.97	38.39	74.00	V
2483.500	52.39	27.55	6.99	45.02	41.91	74.00	V
2500.000	52.19	27.55	7.02	45.02	41.74	74.00	V
2310.000	47.94	27.93	6.52	44.95	37.44	74.00	Horizontal
2390.000	49.32	27.63	6.55	44.97	38.53	74.00	H
2483.500	51.76	27.55	6.99	45.02	41.28	74.00	H
2500.000	54.19	27.55	7.02	45.02	43.74	74.00	H

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.000	41.18	27.93	6.52	44.95	30.68	54.00	Vertical
2390.000	43.98	27.63	6.55	44.97	33.19	54.00	V
2483.500	46.28	27.55	6.99	45.02	35.8	54.00	V
2500.000	47.10	27.55	7.02	45.02	36.65	54.00	V
2310.000	41.07	27.93	6.52	44.95	30.57	54.00	Horizontal
2390.000	42.42	27.63	6.55	44.97	31.63	54.00	H
2483.500	43.59	27.55	6.99	45.02	33.11	54.00	H
2500.000	46.79	27.55	7.02	45.02	36.34	54.00	H

7.8 Band Edges Requirement

Test Requirement: FCC Part 15 C section 15.247

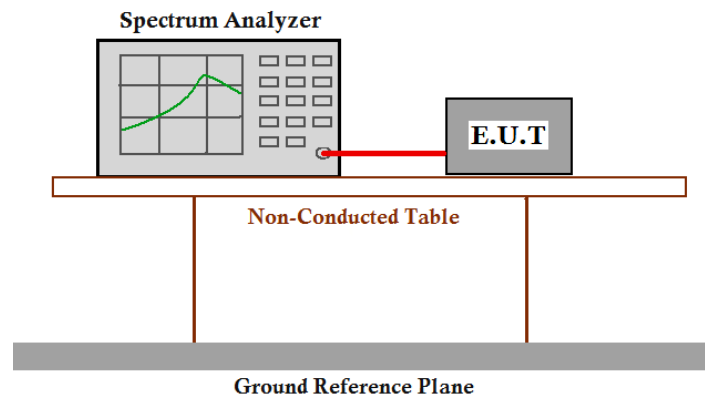
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Based on either an RF conducted or a radiated measurement. Provided the transmitter demonstrates compliance with the peak conducted power limits.

Frequency Band: 2400 MHz to 2483.5 MHz

Test Method: FCC/KDB-558074 D01 v03r02 Clause 13.3.1

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:





Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set instrument center frequency to the frequency of the emission to be measured(must be within 2MHz of the authorized band edge).
3. Set span to 2MHz,
4. RBW=100kHz,
5. VBW \geq 3 \times RBW
6. Detector=peak
7. Sweep time =auto,
8. Trace mode=max hold.
9. Allow sweep to continue until the trace stabilizes(required measurement time may increase for low duty cycle applications)
10. Compute the power by integrating the spectrum over 1MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency($f_{\text{emission}} \pm 0.5\text{MHz}$). If the instrument does not have a band power function, the sum the amplitude levels(in power units) at 100kHz intervals extending across the 1MHz spectrum defined by $f_{\text{emission}} \pm 0.5\text{MHz}$.

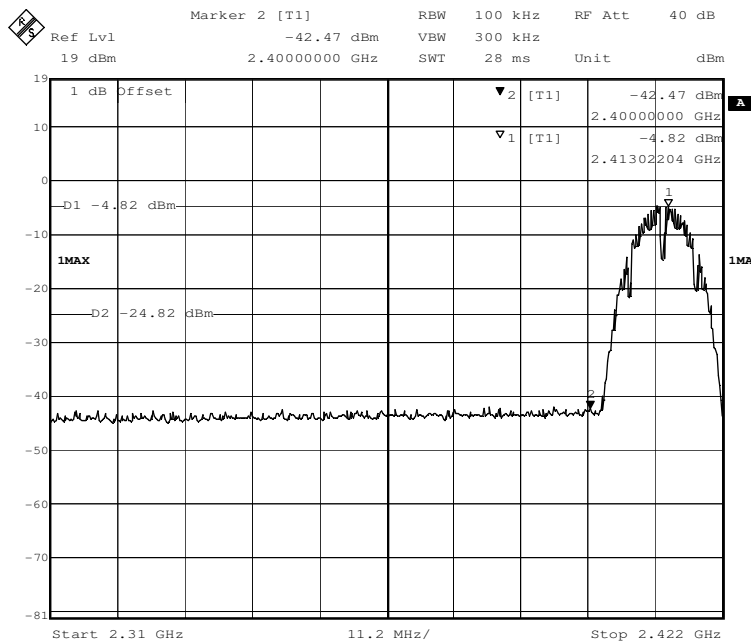
Test result with plots as follows:

Compare with the output power of the lowest frequency, the Lower Edges attenuated more than 20dB

Compare with the output power of the highest frequency, the Upper Edges attenuated more than 20dB.

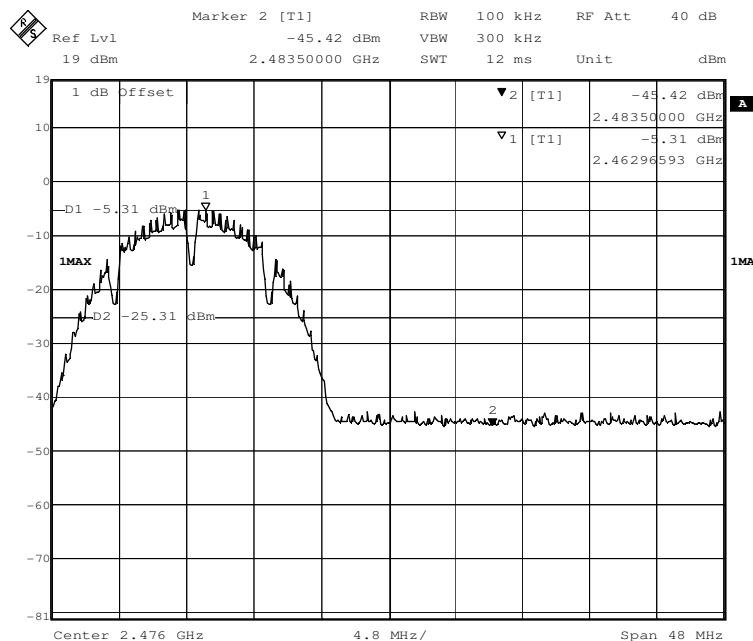
802.11b mode with 11 Mbps data rate

Channel1: 2.412 GHz



802.11b mode with 11 Mbps data rate

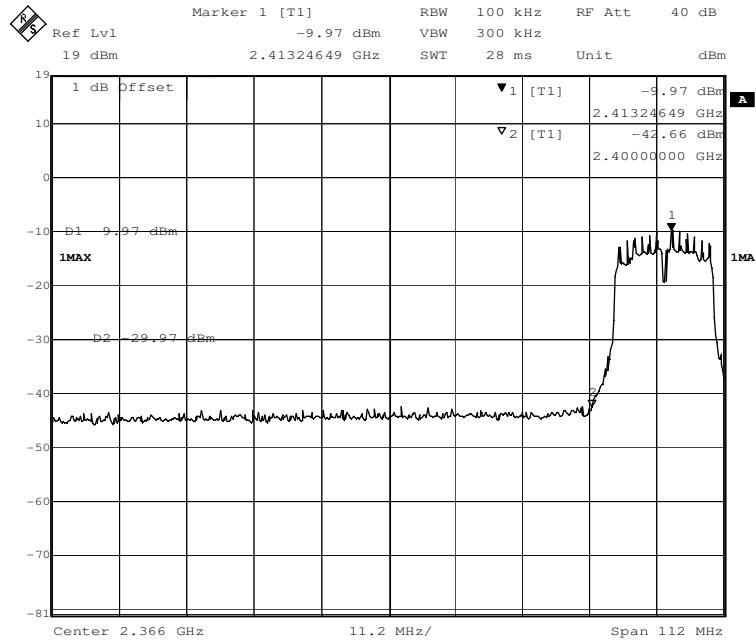
Channel11: 2.462 GHz





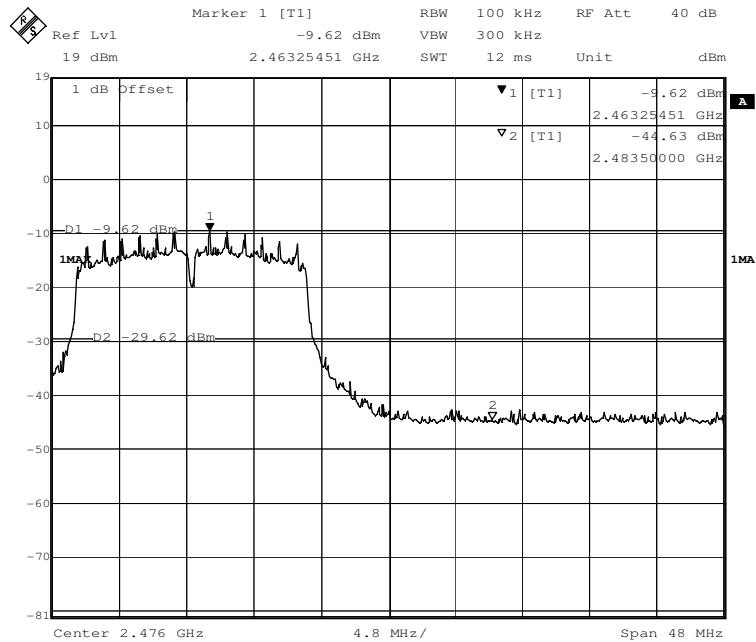
802.11g mode with 54 Mbps data rate

Channel11: 2.412 GHz



802.11g mode with 54 Mbps data rate

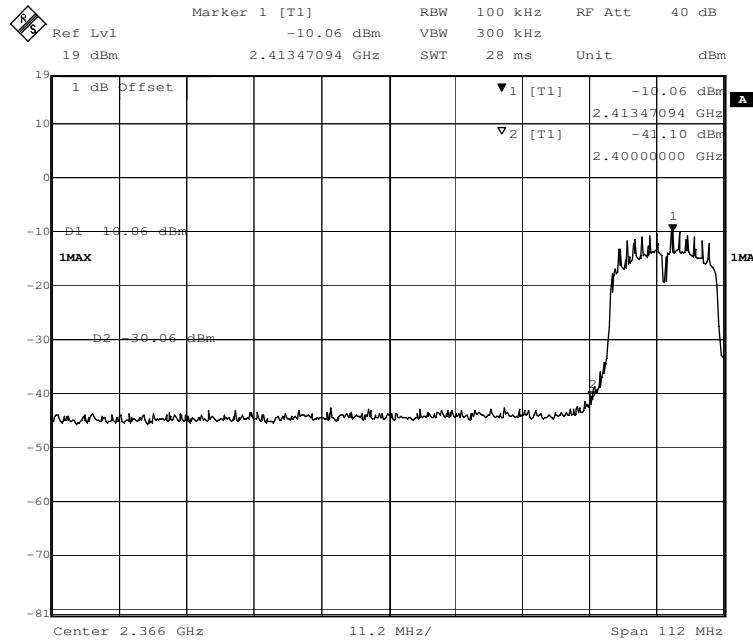
Channel11: 2.462 GHz





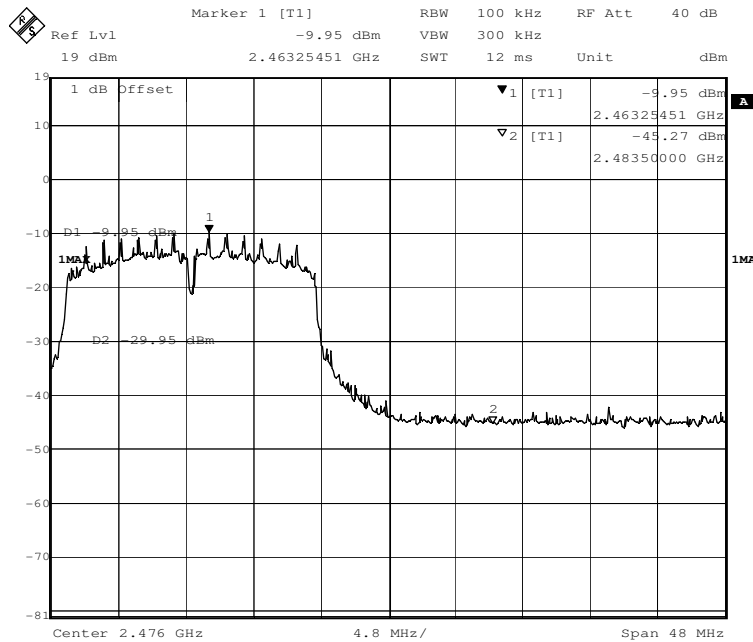
802.11n(HT20) mode with 65Mbps data rate

Channel1: 2.412 GHz



802.11n(HT20) mode with 72.2Mbps data rate

Channel11: 2.462 GHz



--End of Report--