FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Product Name: Pro series 3D Printer
Brand Name: RAISE 3D
Model No.: Pro2,Pro2 Plus
Series Model.: Pro1,Pro3,Pro3 Plus,Pro4,Pro5,Pro6
FCC ID: 2APQR-A
Test Report Number:
C180629R01-RPW

Issued for

Shanghai Fusion Tech Co., Ltd.
Floor 4,Building B5,No.1600,Guoquan N Rd.Shanghai,200438 China

Issued by

Compliance Certification Services Inc.
Kun shan Laboratory
No.10 Weiye Rd., Innovation park, Eco&Tec,
Development Zone, Kunshan City, Jiangsu, China
TEL: 86-512-57355888
FAX: 86-512-57370818

TESTING CERT #2541.01

Note: *This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by A2LA or any government agencies. The test results in the report only apply to the tested sample.*

TABLE OF CONTENTS

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	June 24, 2018	C180502R02-RPW	ALL	N/A
Update	June 29, 2018	C180629R01-RPW	P1; P4	Modify Applicant's and Manufacturer's address
01	July 9, 2018	C180629R01-RPW	P5; P6; P8	Modify the data rate for HT20; Add the directional gain for MIMO on P5; Add KDB 558074 and KDB 662911 to Section 3; Modify the description of the Radiated emission and powerline conducted emission
02	July 16, 2018	C180629R01-RPW	P5; P30-33	Modify Directional gain

1. TEST RESULT CERTIFICATION

Product Name:	Pro series 3D Printer
Trade Name:	RAISE 3D
Model Name.:	Pro2,Pro2 Plus
Series Model:	Pro1,Pro3,Pro3 Plus,Pro4,Pro5,Pro6
Applicant Discrepancy:	Initial
Device Category:	mobile unit
Date of Test:	May 9,2018~June 20, 2018
Applicant:	**Shanghai Fusion Tech Co., Ltd.** Floor 4,Building B5,No.1600,Guoquan N Rd.Shanghai,200438 China
Manufacturer:	**Shanghai Fusion Tech Co., Ltd.** Floor 4,Building B5,No.1600,Guoquan N Rd.Shanghai,200438 China
Application Type:	Certification

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Jeff.Fang
RF Manager
Compliance Certification Service Inc.

Tested by:

Lily.Wang
Test Engineer
Compliance Certification Service Inc.

2. EUT DESCRIPTION

Product Name:	Pro series 3D Printer	
Brand Name:	RAISE 3D	
Model Name:	Pro2,Pro2 Plus	
Series Model:	Pro1,Pro3,Pro3 Plus,Pro4,Pro5,Pro6	
Model Discrepancy:	The Pro2, Pro2 Plus, Pro1, Pro3, Pro3 Plus, Pro4 ,Pro5 ,Pro6 3D Printer are belong to Pro series 3D printer. All of them are manufactured by Shanghai Fusion. The Pro1,Pro2,Pro3,Pro4,Pro5,Pro6 are basic model. All height in dimension are lower. They use the same parts and components only for different markets. For Pro2 Plus, Pro3 Plus, that are plus series printer based on the Pro2 and Pro3. Only the printer's height is different. The Pro2 's height is 760 mm. The Pro2 Plus's height is 1105mm.	
Power Rating:	100-240V,50/60Hz	
Frequency Range:	IEEE 802.11b/g: 2412MHz to 2462 MHz IEEE 802.11n HT20: 2412MHz to 2462 MHz	
Max Peak Output Power:	IEEE 802.11b mode: 21.04dBm IEEE 802.11g mode: 23.62dBm IEEE 802.11n HT20 mode: 24.37dBm	
Max Average Output Power:	IEEE 802.11b mode: 18.31dBm IEEE 802.11g mode: 15.62dBm IEEE 802.11n HT20 mode: 14.90dBm	
Modulation Technique:	IEEE802.11b mode: DSSS (1,2,5.5 and 11 Mbps) IEEE802.11g mode: DSSS /OFDM (6,9,12,18,24,36,48 and 54 Mbps) IEEE802.11n HT20 mode: OFDM (MCS8~MCS15)	
Number of Channels:	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT20: 11 Channels	
Antenna Specification:	FPC Antenna	
Antenna Specification:		Gain(dBi)
		2.4G
	Antenna 1	4.33
	Antenna 2	4.33
	Directional gain	7.34
Beamforming Function:	☐ With beamforming	☒ Without beamforming

Remark:

1.The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

2.This submittal(s) (test report) is intended for ***FCC ID: 2APQR-A*** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 2013 and FCC CFR 47 15.207, 15.209, 15.247 and KDB 558074, KDB 662911.

3.1.EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2.EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3.GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.1 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10 2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

Under 1GHz

The EUT is placed on a turn table, which is 0.1 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.4 & 6.5 of ANSI C63.10:2013.

Above 1GHz

The EUT is placed on a turn table, which is 0.1 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.6 of ANSI C63.10:2013.

3.4.FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5.DESCRIPTION OF TEST MODES

Test Mode	Antenna 1	Antenna 2	Antenna 1+2
802.11b	√	√	x
802.11g	√	√	x
802.11n HT20	√	√	√

The worst-case data rates:
IEEE802.11b mode:

Channel Low (2412MHz)

Channel Mid (2437MHz)

Channel High (2462MHz) with 11Mbps data rate was chosen for full testing.

IEEE802.11g mode:

Channel Low (2412MHz)

Channel Mid (2437MHz)

Channel High (2462MHz) with 54Mbps data rate was chosen for full testing.

IEEE 802.11n HT20 MHz Channel mode:

Channel Low (2412MHz)

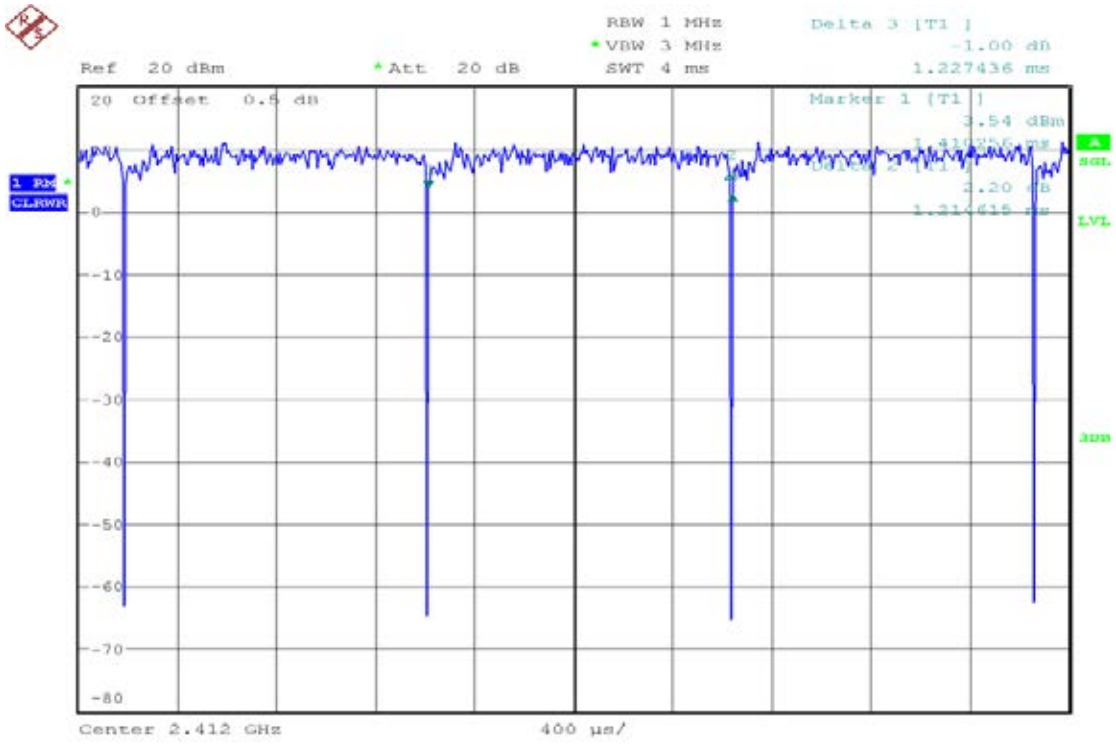
Channel Mid (2437MHz)

Channel High (2462MHz) with MCS15 data rate was chosen for full testing.

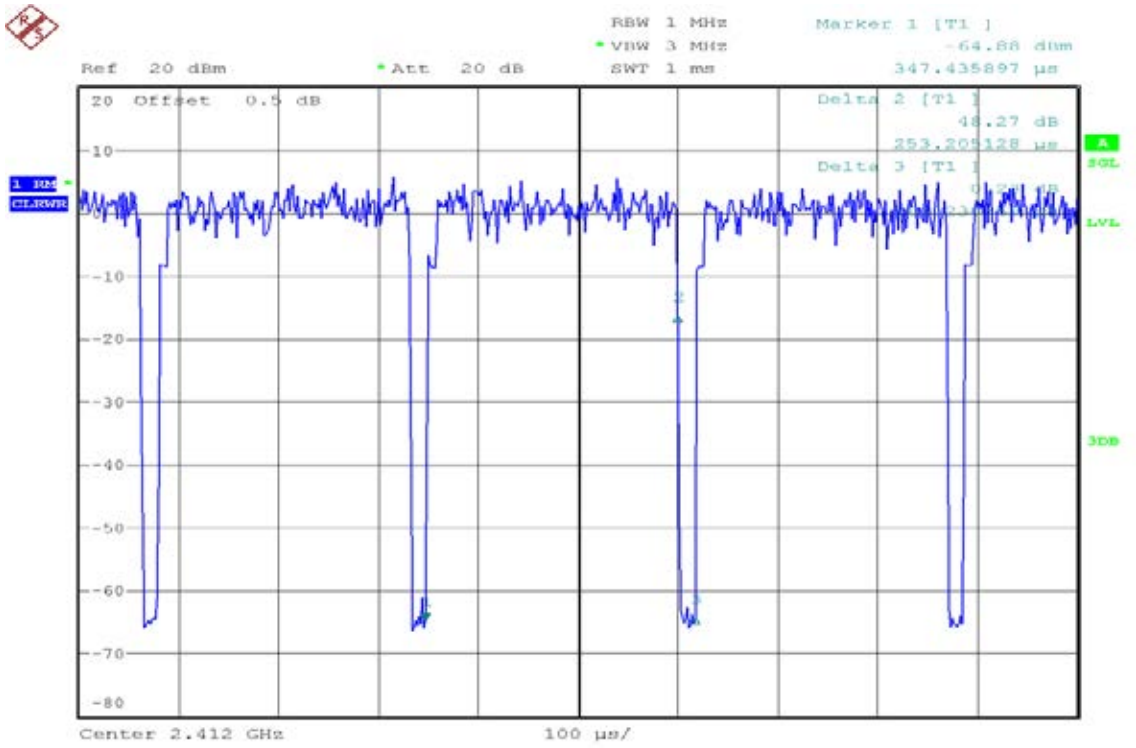
3.6.DUTY CYCLE

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 b	99.02	-	-	10Hz
IEEE 802.11 g	94.05	0.253	3.95	5KHz
IEEE 802.11n HT20	89.74	0.190	5.26	10KHz

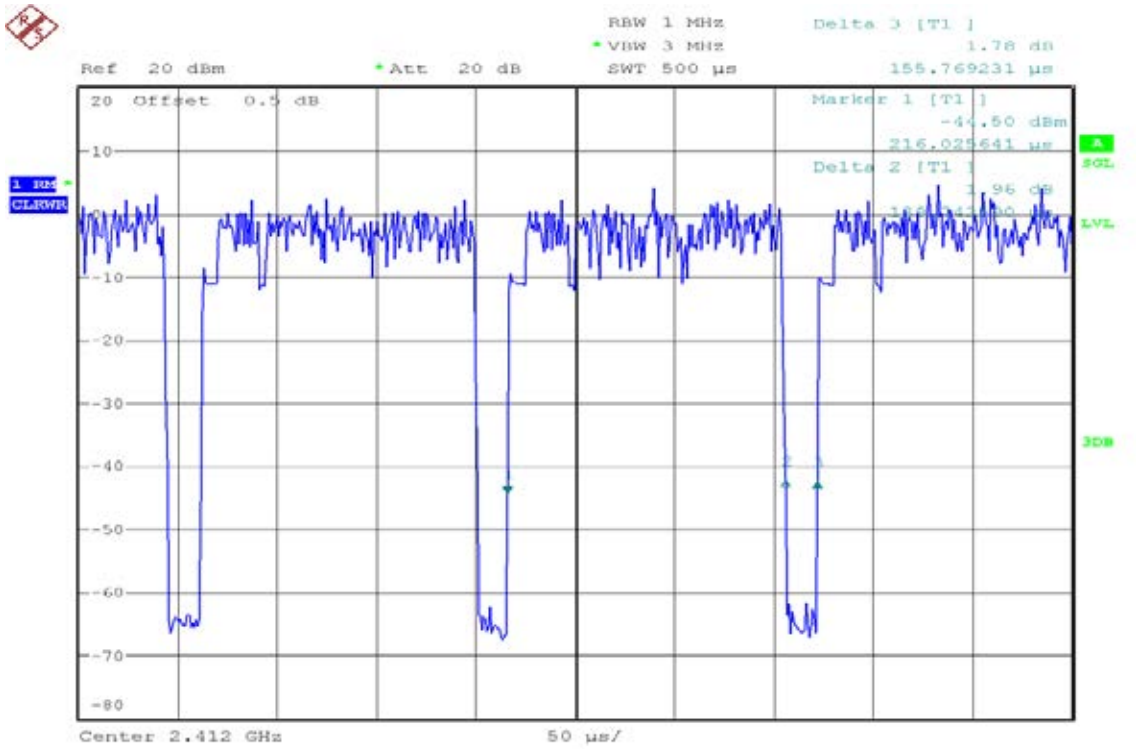
IEEE 802.11 b



IEEE 802.11 g



IEEE 802.11n HT20

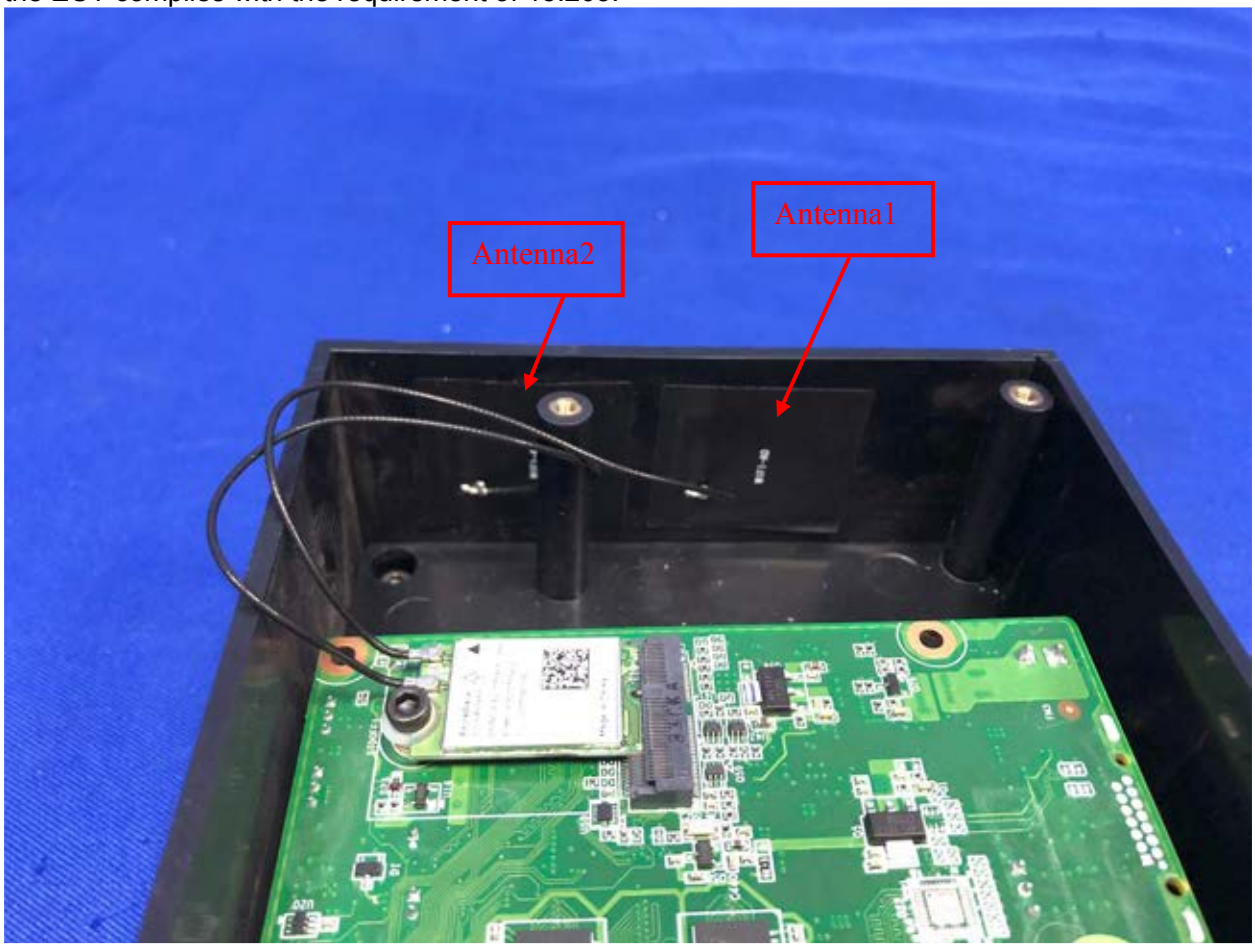


3.7.ANTENNA DESCRIPTION

According to FCC 47 CFR 15.203

“an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”

As the photo below, the EUT use a unique coupling to the intentional radiator attached antenna, so the EUT complies with the requirement of 15.203.



4. INSTRUMENT CALIBRATION

4.1.MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

Equipment Used for Emissions Measurement

Conducted Emissions Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2017-9-4	2018-9-3
Spectrum Analyzer	RS	FSU26	200789	2017-7-20	2018-7-19
Power meter	Anritsu	ML2495A	1445010	2018-4-26	2019-4-25
Power sensor	Anritsu	MA2411B	1339220	2018-4-26	2019-4-25
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R	N.C.R
DC Power Supply	AGILENT	E3632A	MY50340053	N.C.R	N.C.R
Cable	N/A	Cable-05	N/A	2018-4-24	2019-4-23
Cable	N/A	Cable-06	N/A	2018-4-24	2019-4-23
6dB Attenuator	N/A	N/A	N/A	2018-4-24	2019-4-23
Temp. / Humidity Gauge	Anymetre	TH603	CCS007	2017-10-24	2018-10-23
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI TEST RECEIVER	R&S	ESCI	100781	2018-2-26	2019-2-25
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	2017-10-29	2018-10-28
TWO-LINE V-NETWORK	R&S	ENV216	101604	2017-10-29	2018-10-28
Pulse LIMITER	R&S	ESH3-Z2	100524	2017-12-27	2018-12-26
Cable	Thermax	Cable-02	14	2017-12-27	2018-12-26
Test Software			EZ-EMC		

977 Chamber					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2017-9-4	2018-9-3
Spectrum Analyzer	RS	FSU26	200789	2017-7-20	2018-7-19
EMI Test Receiver	R&S	ESCI	101378	2017-12-26	2018-12-25
Amplifier	COM-POWER	PAM-840A	461332	2017-11-29	2018-11-28
Amplifier	MITEQ	JS41-00101800-32-10P	1675713	2017-7-20	2018-7-19
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	9170-515	2018-2-27	2019-2-26
Bilog Antenna	SCHAFFNER	CBL6143	5078	2017-11-5	2018-11-4
Loop Antenna	COM-POWER	AL-130R	10160008	2018-5-8	2019-5-7
Horn-antenna	SCHWARZBECK	9120D	D:266	2018-2-26	2019-2-25
Horn-antenna	SCHWARZBECK	9120D	D:267	2017-11-5	2018-11-4
Turn Table	CT	CT123	4165	N.C.R	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R	N.C.R
Controller	CT	CT1OO	95637	N.C.R	N.C.R
Cable	REBES MICROWAVE	Cable-93	N/A	2017-10-29	2018-10-28
Cable	REBES MICROWAVE	Cable-94	N/A	2017-10-29	2018-10-28
Cable	REBES MICROWAVE	Cable-95	N/A	2017-10-29	2018-10-28
Cable	N/A	Cable-03	N/A	2018-4-24	2019-4-23
Cable	N/A	Cable-04	N/A	2018-4-24	2019-4-23
2.4G Filter	N/A	N/A	N/A	2018-4-24	2019-4-23
Filter 5150MHz-5350MHz	N/A	N/A	N/A	2018-4-24	2019-4-23
Filter 5725MHz-5850MHz	N/A	N/A	N/A	2018-4-24	2019-4-23
Test Software			EZ-EMC		

Remark: *Each piece of equipment is scheduled for calibration once a year.*

4.2.MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).
Table 6 is based on such expansion factors.

Table 6: Maximum measurement uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.129dB
Unwanted Emissions, conducted	±2.406dB
RF Power density, conducted	±2.379dB
Conducted emissions	±2.582dB
All emissions, radiated (Below 1GHz)	±4.725dB
All emissions, radiated (Above 1GHz)	± 4.818dB
Temperature	±0.3dB
Supply voltages	±0.2%

5. FACILITIES AND ACCREDITATIONS

5.1.FACILITIES

All measurement facilities used to collect the measurement data are located at
CCS China Kunshan Lab at 10#Weiye Rd, Innovation Park Eco. & Tec. Development Zone

Kunshan city JiangSu, (215300), CHINA.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 2013 and CISPR Publication 22.

5.2.EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3.LABORATORY ACCREDITATIONS AND LISTING

FCC –Designation Number: CN1172.

Compliance Certification Services Inc. Kun shan 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 and the Designation Number: CN1172.

5.4.TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC, Part 15,Subpart B (using ANSI 63.4 :2009 and ANSI C63.4:2014);ICES-003; 47 CFR FCC, Part 18(using MP-5:1986);ICES-001;VCCI - V3; VCCI-CISPR-32(up to 6GHz);VCCI 32-1;CNS 13438(up to 6GHz); CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22; EN 55022; AS/NZS CISPR 22;CISPR32;EN55032; AS/NZS CISPR 32;EN55014-1(excluding clicks);CISPR 14-1(excluding clicks);EN55015;CISPR 15; IEC 61000-3-2; EN 61000-3-2; AS/NZS 61000.3.2 IEC 61000-3-3; EN 61000-3-3; AS/NZS 61000.3.3 IEC 61000-4-2; EN 61000-4-2; AS/NZS 61000.4.2 IEC 61000-4-3; EN 61000-4-3; AS/NZS 61000.4.3 IEC 61000-4-4; EN 61000-4-4; AS/NZS 61000.4.4 IEC 61000-4-5; EN 61000-4-5; AS/NZS 61000.4.5 IEC 61000-4-6; EN 61000-4-6; AS/NZS 61000.4.6 IEC 61000-4-8; EN 61000-4-8; AS/NZS 61000.4.8 IEC 61000-4-11; EN 61000-4-11; AS/NZS 61000.4.11 EN 61000-6-1; EN 61000-6-2; EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; IEC 61000-6-1; IEC 61000-6-2; IEC 61000-6-3 (excluding discontinuous interference); IEC 61000-6-4; AS/NZS 61000.6.1; AS/NZS 61000.6.2; AS/NZS 61000.6.3 (excluding discontinuous interference); AS/NZS 61000.6.4; EN 55024; CISPR 24; AS/NZS CISPR 24; EN 61547; IEC 61547; EN 60601-1-2; IEC 60601-1-2; EN 50130-4; EN 55014-2; CISPR 14-2; EN 62040-2; IEC 62040-2; EN 61204-3; IEC 61204-3; EN 50121-1; EN 50121-3-2; EN 50121-4; EN 50121-5; EN 50155 (clauses 5.4 and 5.5); EN 61326-1; IEC 61326-1; EN 50083-2; EN 300 386; EN 301 489-1 (excluding Section 9.6); EN 301 489-3; EN 301 489-7; EN 301 489-17; EN 301 489-19; EN 301 489-24; EN 301 489-25; EN 301 489-34 FCC Part 15, Subparts 15C, 15E (KDB 905462 D03 (v01r02))(using ANSI C63.4:2009, ANSI C63.4:2014 and ANSI C63.10:2013) FCC Parts 22E, 24E (using ANSI/TIA-603-D) RSS-132; RSS-133; RSS-210; RSS-247 (excluding DFS testing) EN 300 220-1; EN 300 220-2; EN 300 328; EN 300 330-1; EN 300 330-2; EN 300 440-1; EN 300 440-2; EN 301 893 (excluding DFS testing); EN 301 511(clauses 4.2.12 to 4.2.19, and 5.2.12 to 5.2.19); EN 301 908-1 (clauses 4.2.2, 4.2.3, 5.3.1, and 5.3.2);	 TESTING CERT #2541.01

		EN 301 908-2 (clauses 4.2.4, 4.2.10, 5.3.3, and 5.3.9) AS/NZS 4268 IEEE Std 1528:2013; EN 50360; EN 50566; EN 62479; EN 50383; EN 50385; EN 62311; IEC 62209-1; EN 62209-1; IEC 62209-2; EN 62209-2; CNS 14958-1; CNS 14959; RSS-102; ACMA Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 2014	
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	CN1172
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	R-1600 C-1707 G-216

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1.SETUP CONFIGURATION OF EUT

See test photographs attached in Setup photo for the actual connections between EUT and support equipment.

6.2.SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
N/A					

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

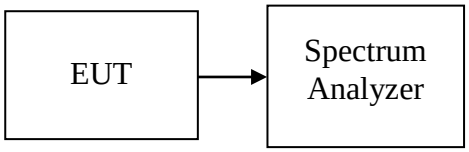
7. FCC PART 15.247 REQUIREMENTS

7.1.6DB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, and 2400 - 2483.5 MHz bands, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.

Test Configuration



TEST PROCEDURE

Set the spectrum analyzer as RBW = 100 kHz, VBW = 300 kHz, Sweep = auto couple.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	8.654	>500	PASS
Mid	2437	8.654		PASS
High	2462	8.590		PASS

IEEE 802.11b mode /Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	8.718	>500	PASS
Mid	2437	8.654		PASS
High	2462	8.846		PASS

IEEE 802.11g mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.474	>500	PASS
Mid	2437	16.410		PASS
High	2462	16.474		PASS

IEEE 802.11g mode /Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.410	>500	PASS
Mid	2437	16.474		PASS
High	2462	16.410		PASS

IEEE 802.11n HT20 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.987	>500	PASS
Mid	2437	16.987		PASS
High	2462	16.987		PASS

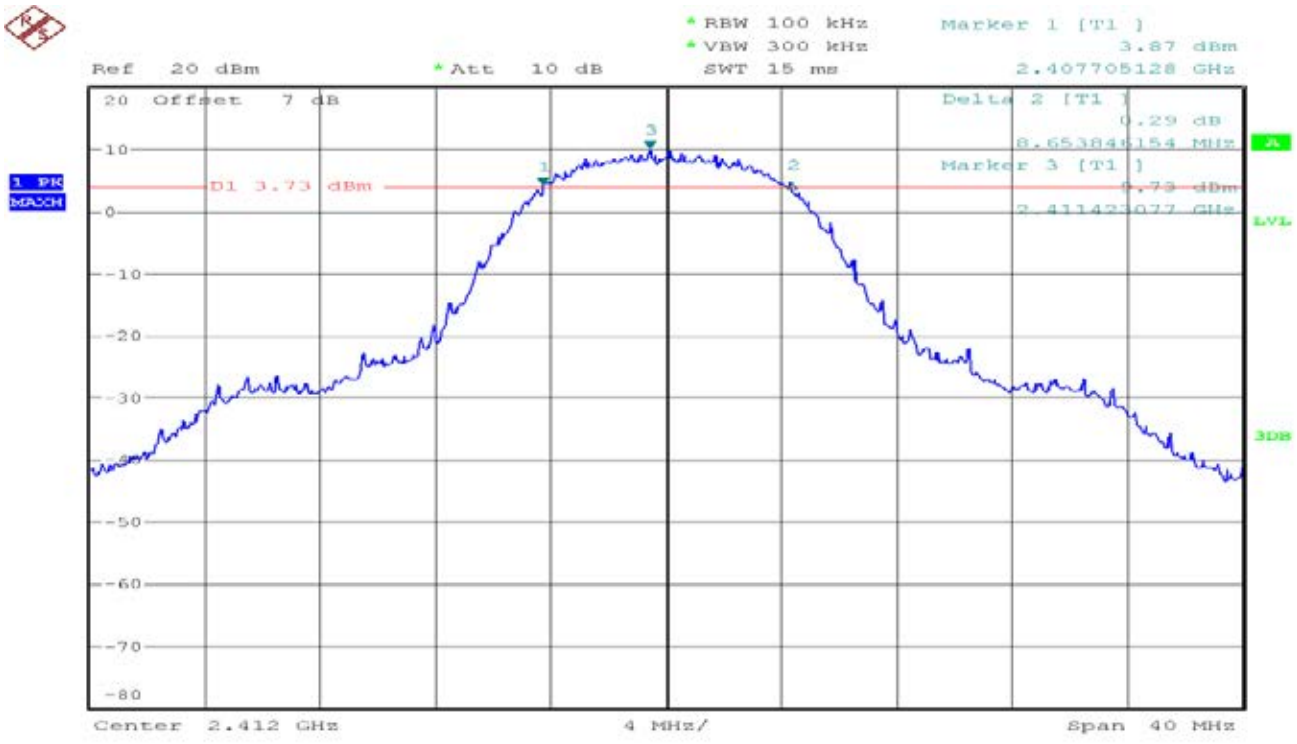
IEEE 802.11n HT20 mode / Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.244	>500	PASS
Mid	2437	17.051		PASS
High	2462	16.987		PASS

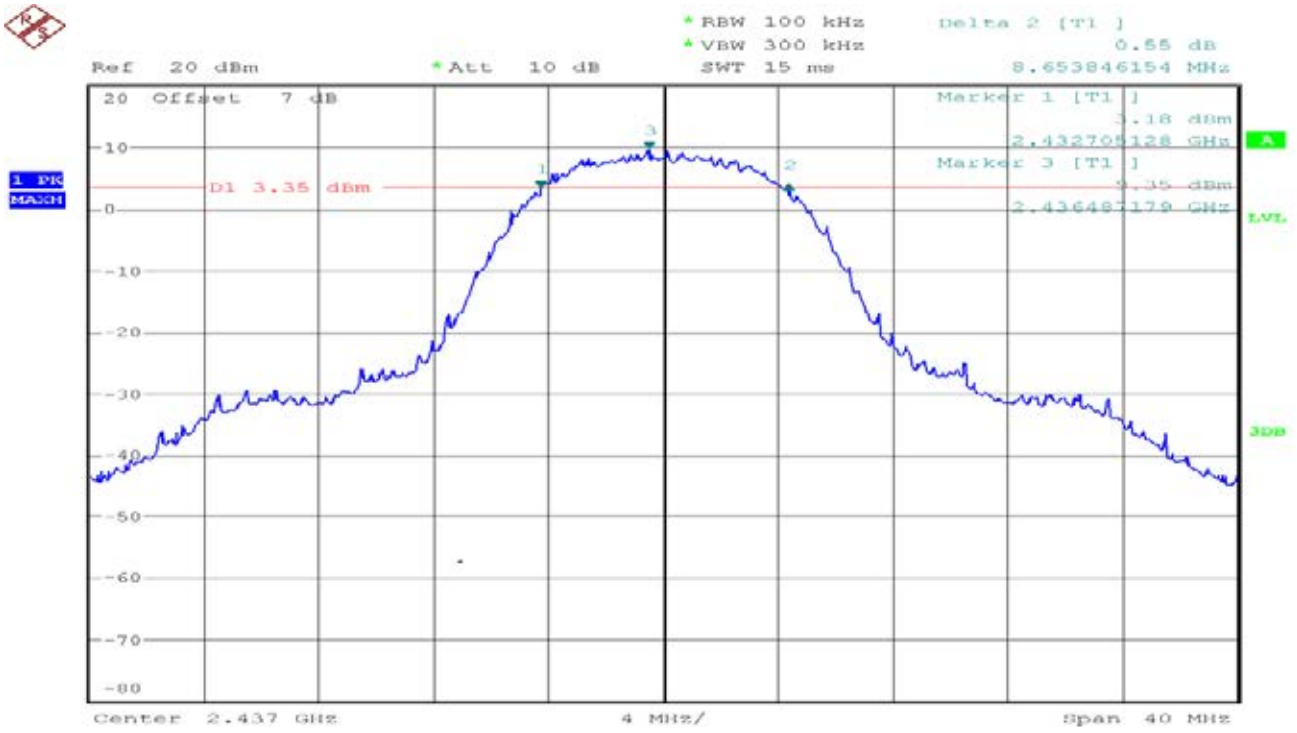
Test Plot

IEEE 802.11b MODE /Chain 1

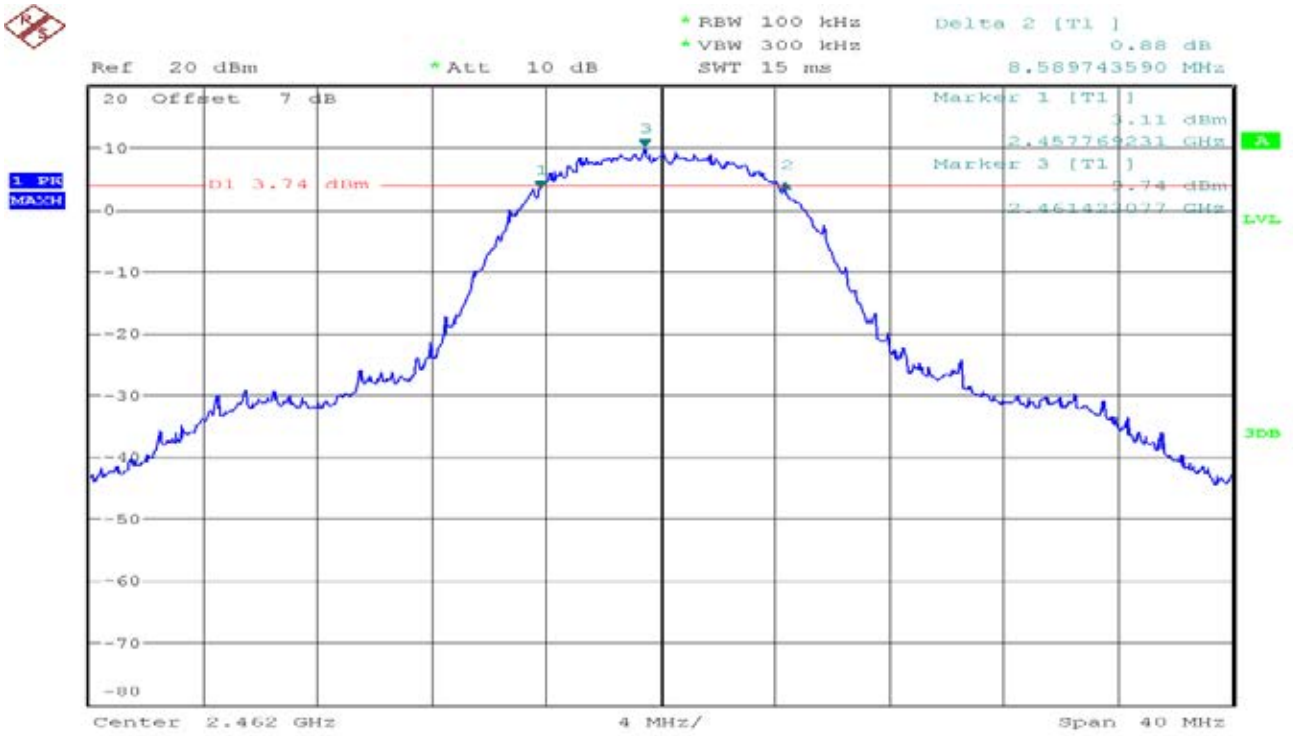
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

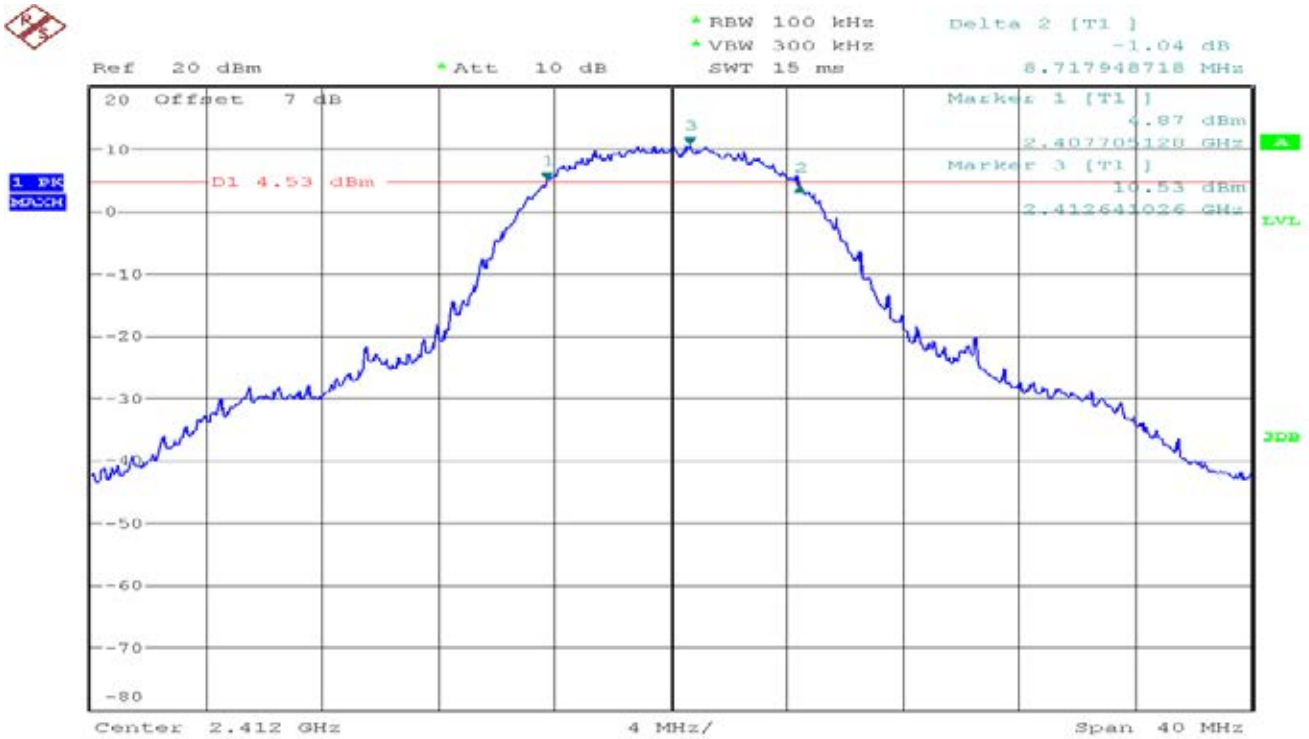


6dB Bandwidth (CH High)

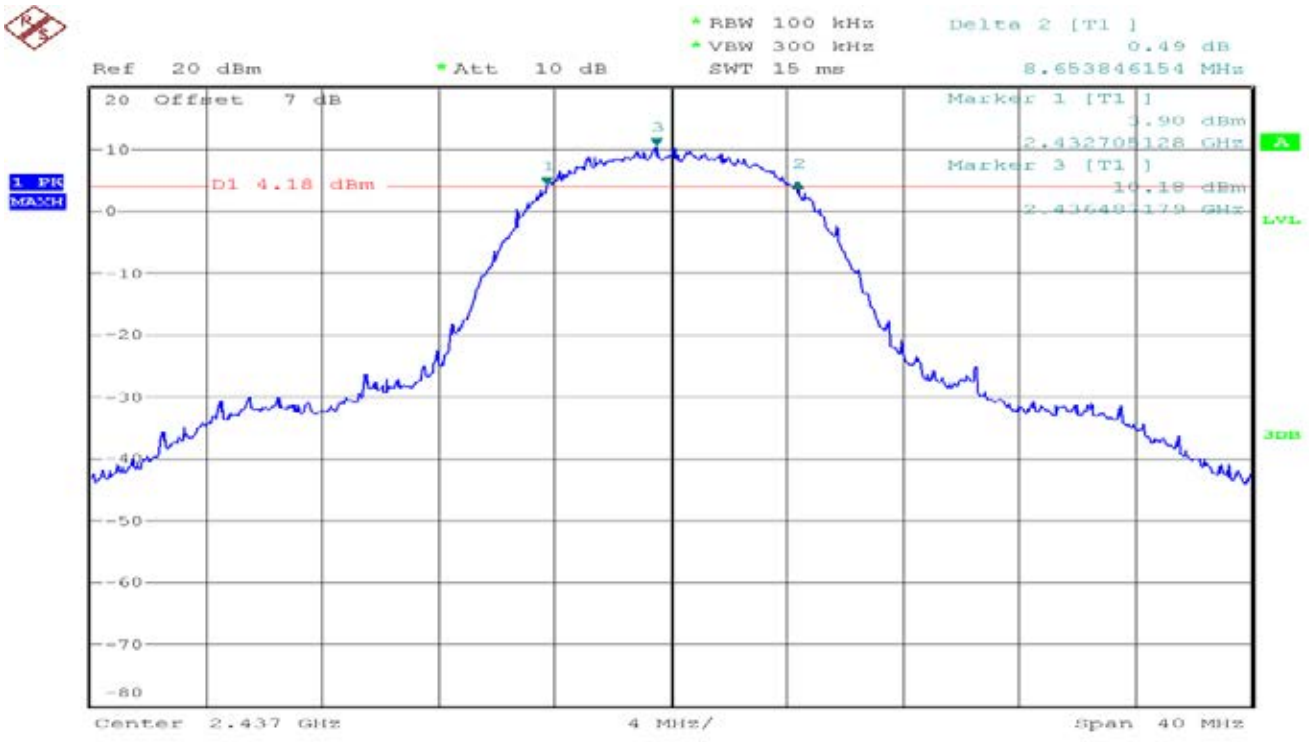


IEEE 802.11b MODE /Chain 2

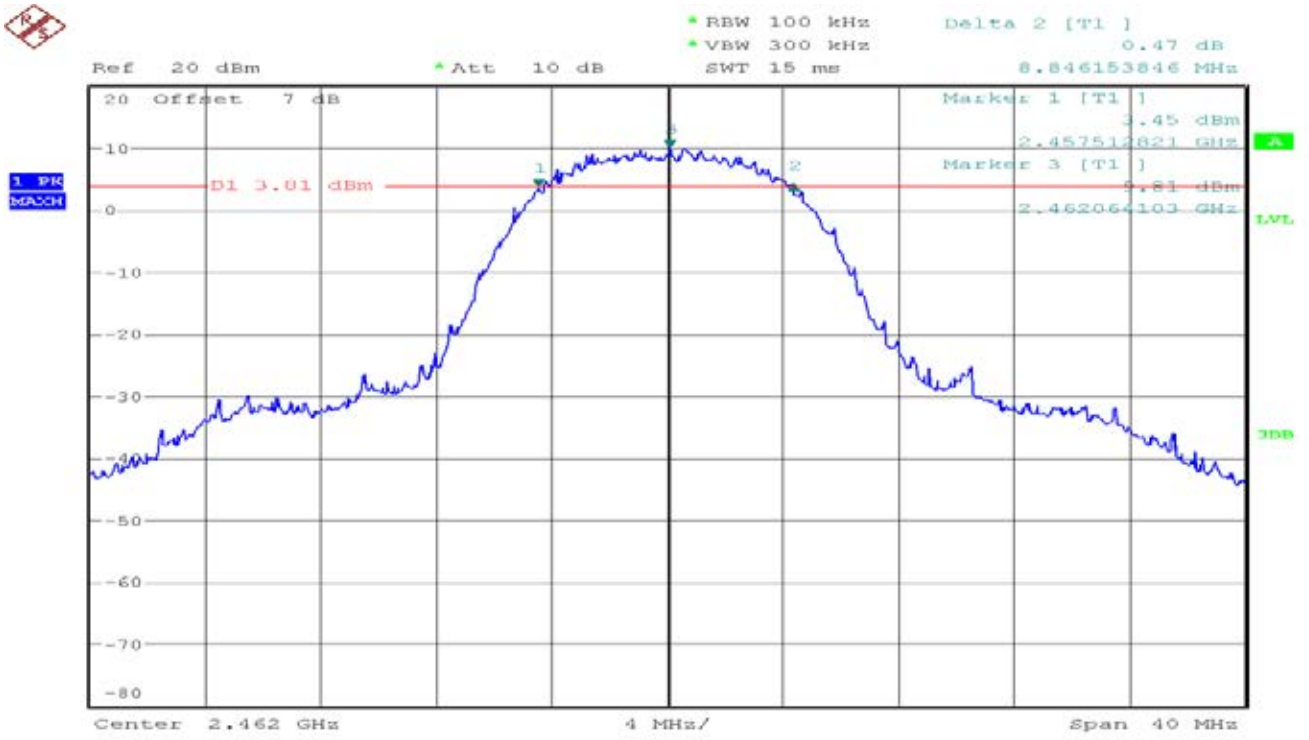
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

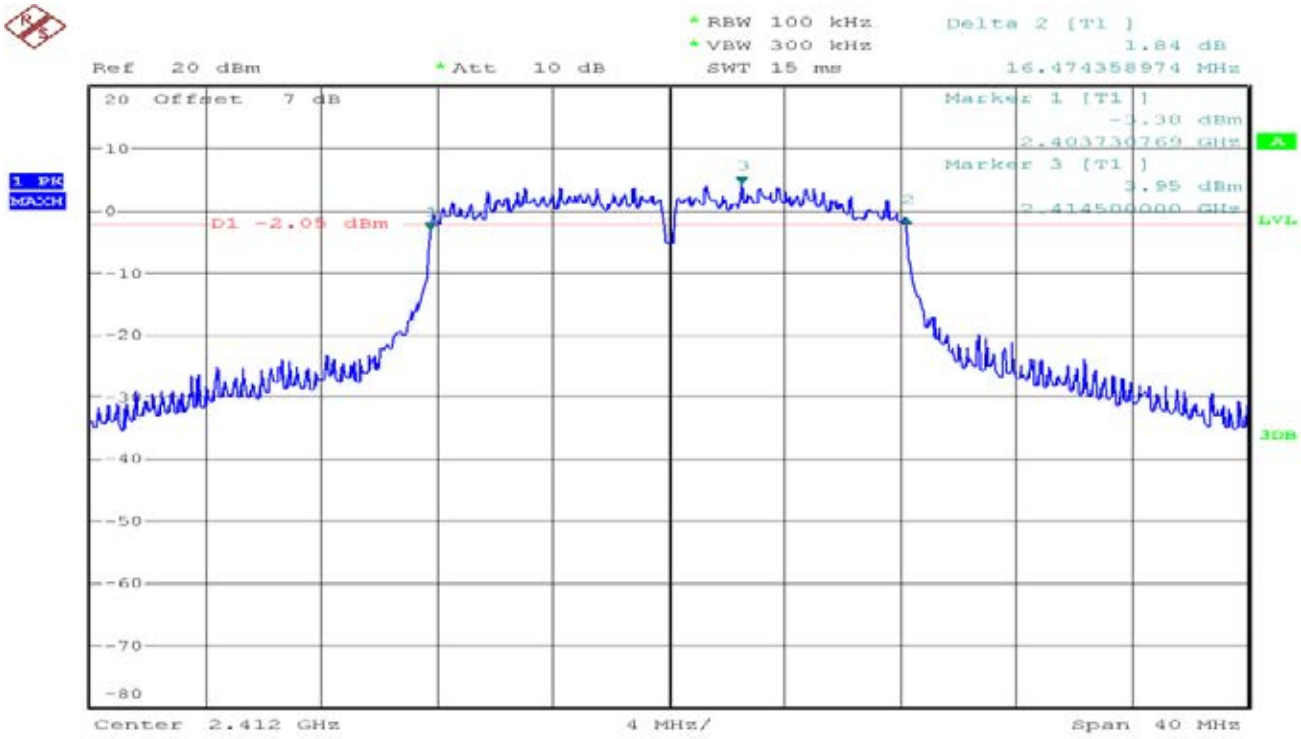


6dB Bandwidth (CH High)

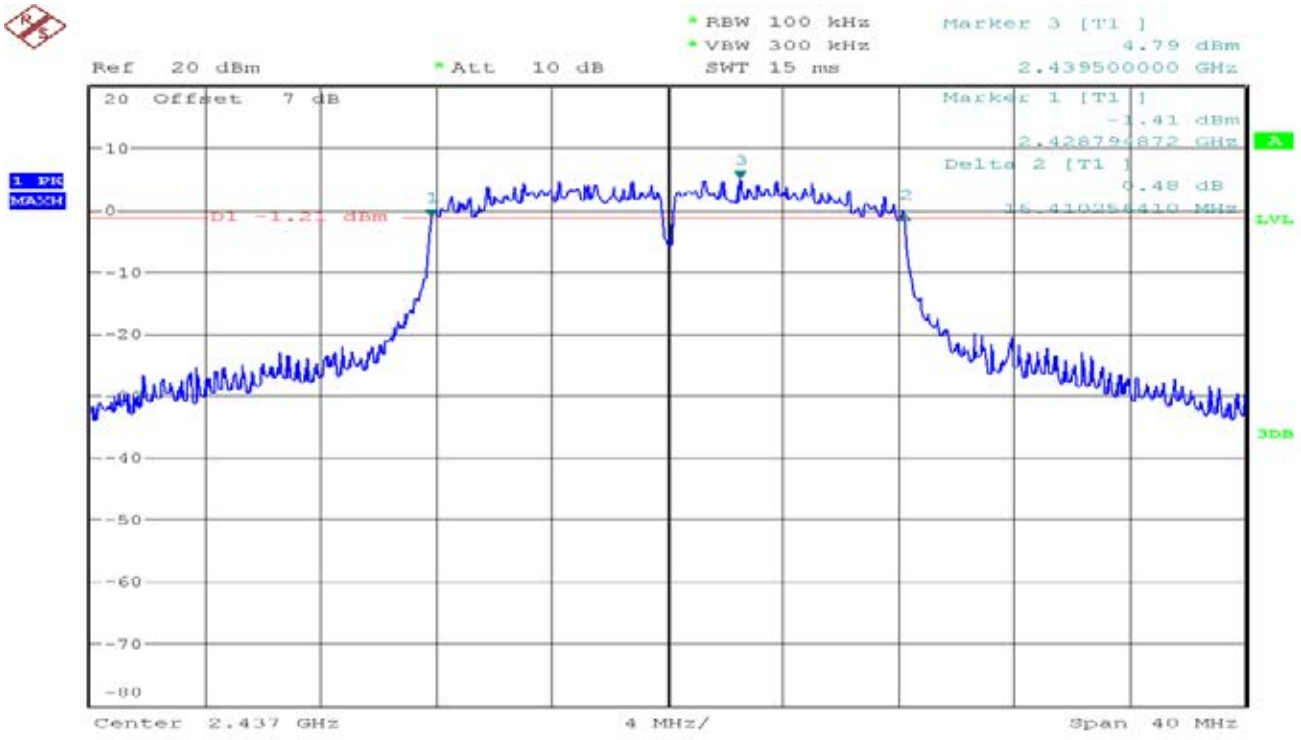


IEEE 802.11g MODE /Chain 1

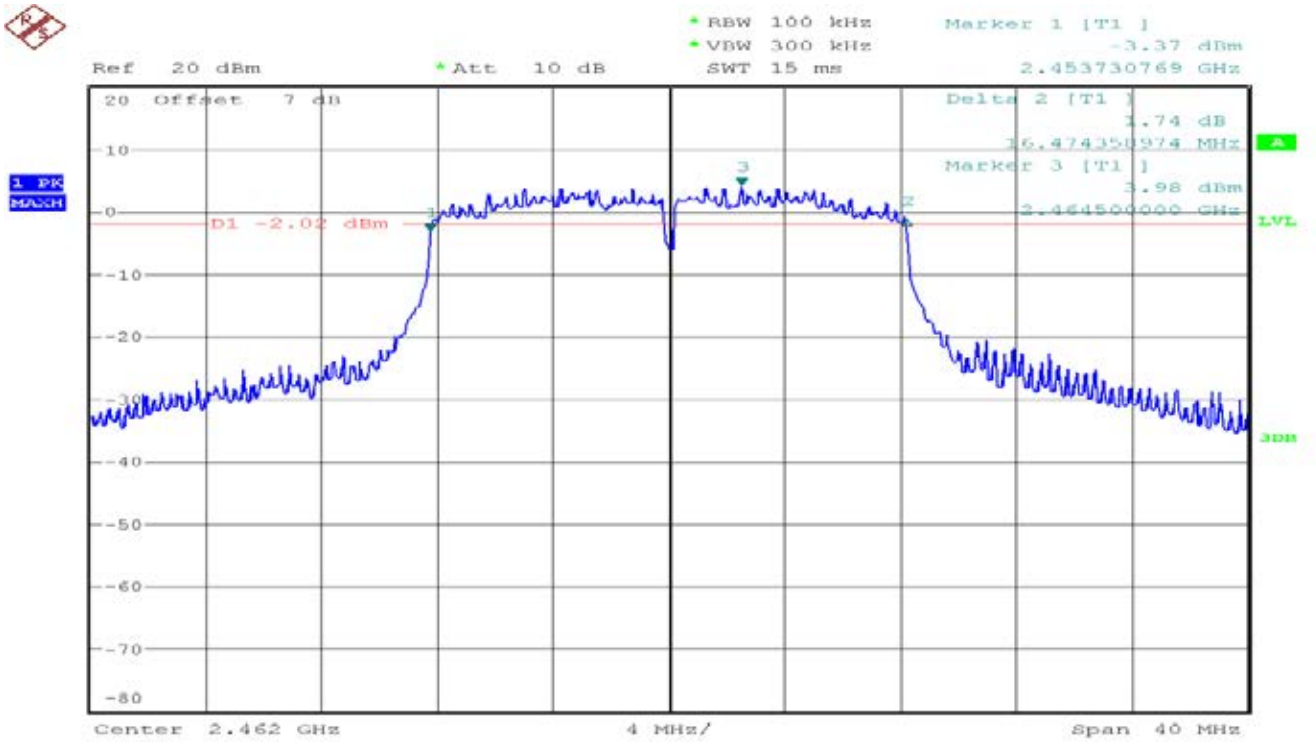
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

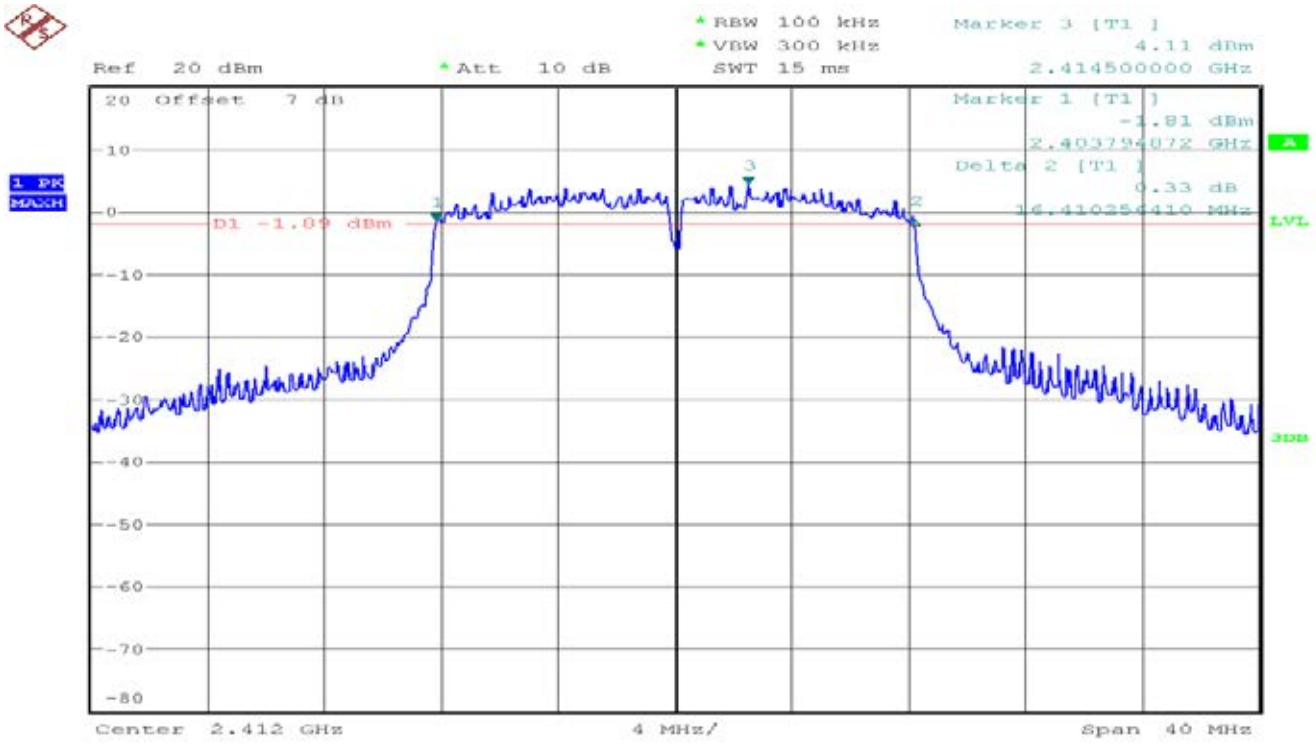


6dB Bandwidth (CH High)

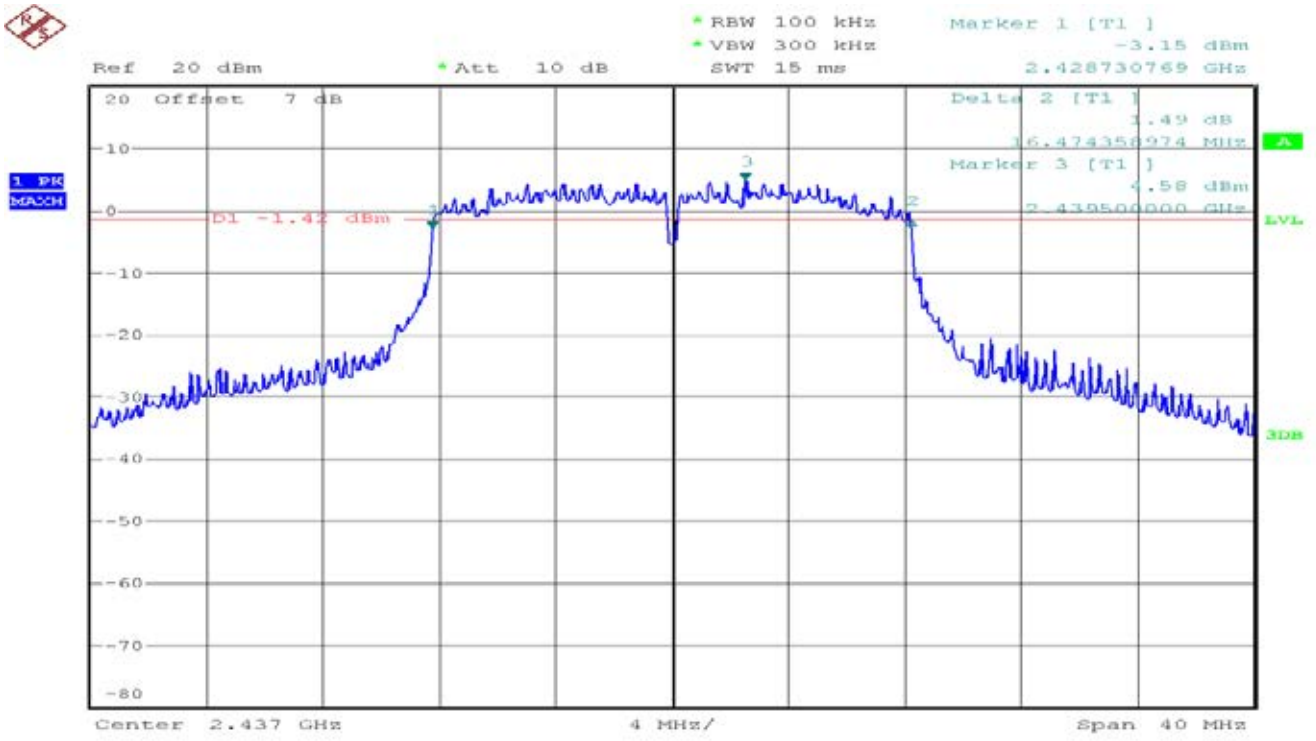


IEEE 802.11g MODE /Chain 2

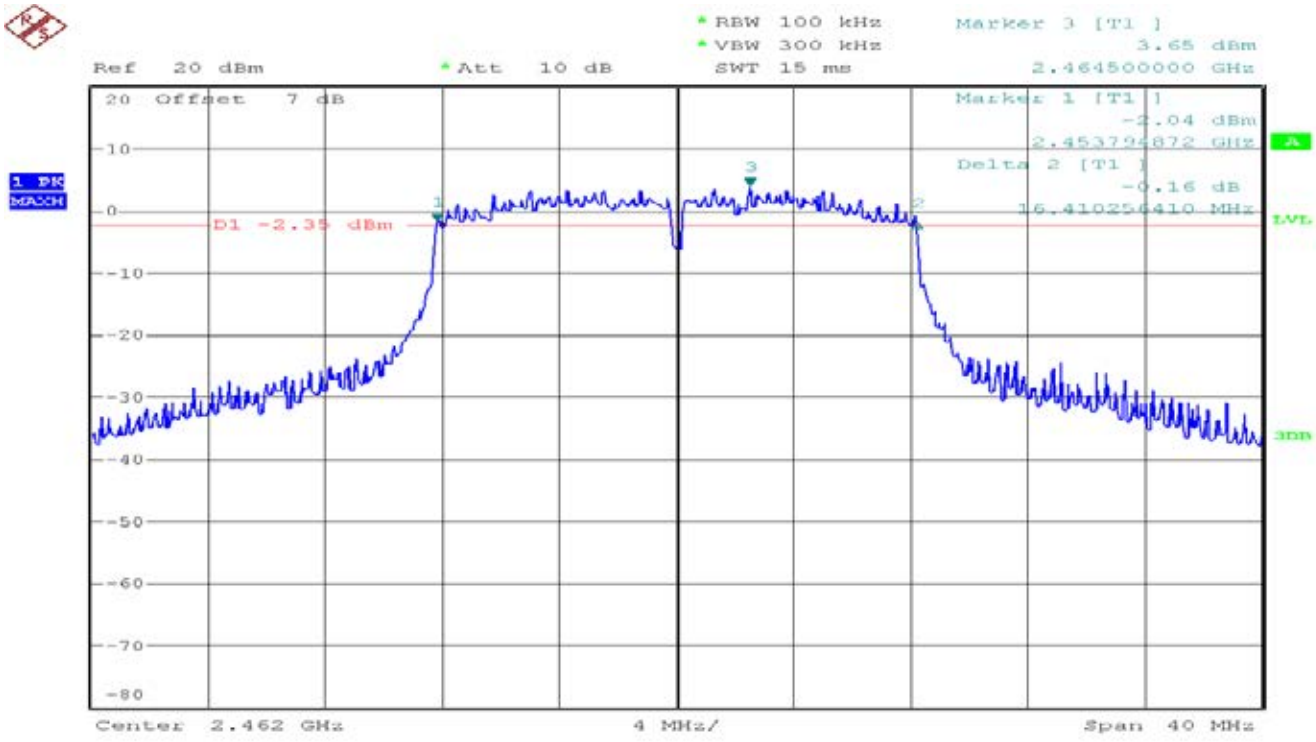
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

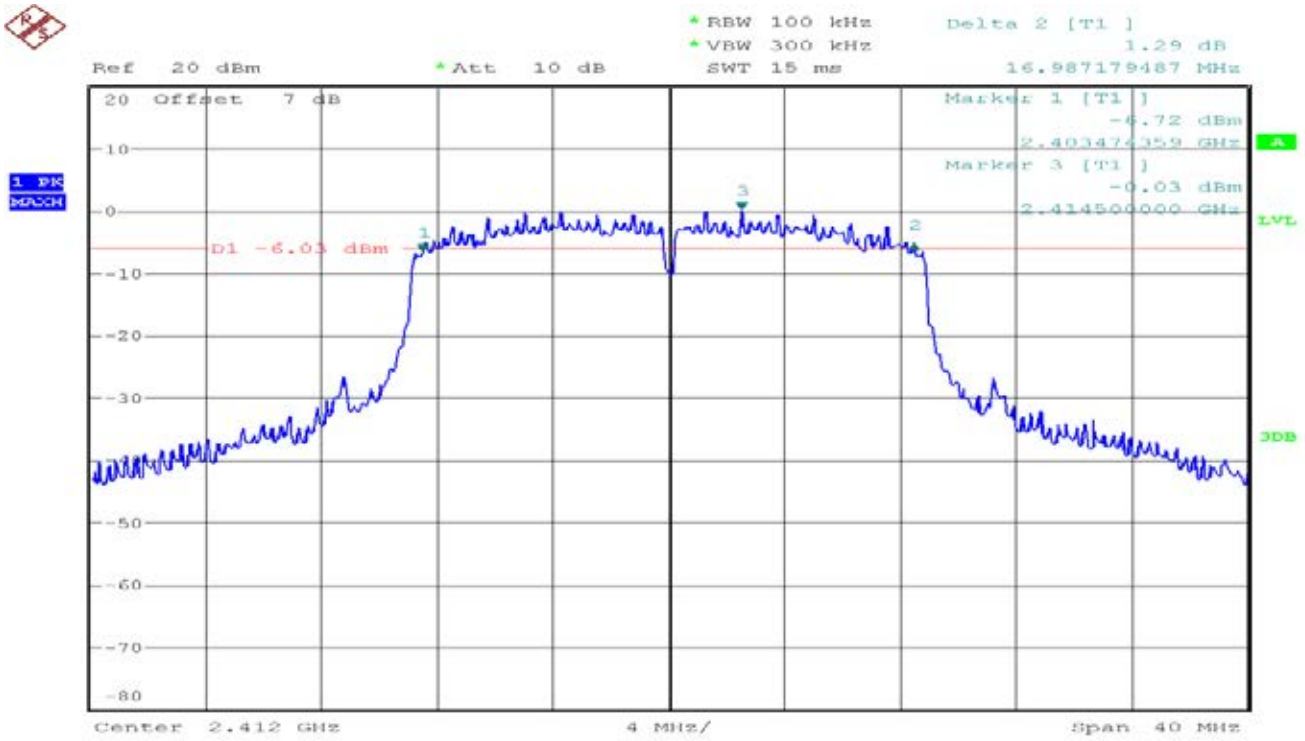


6dB Bandwidth (CH High)

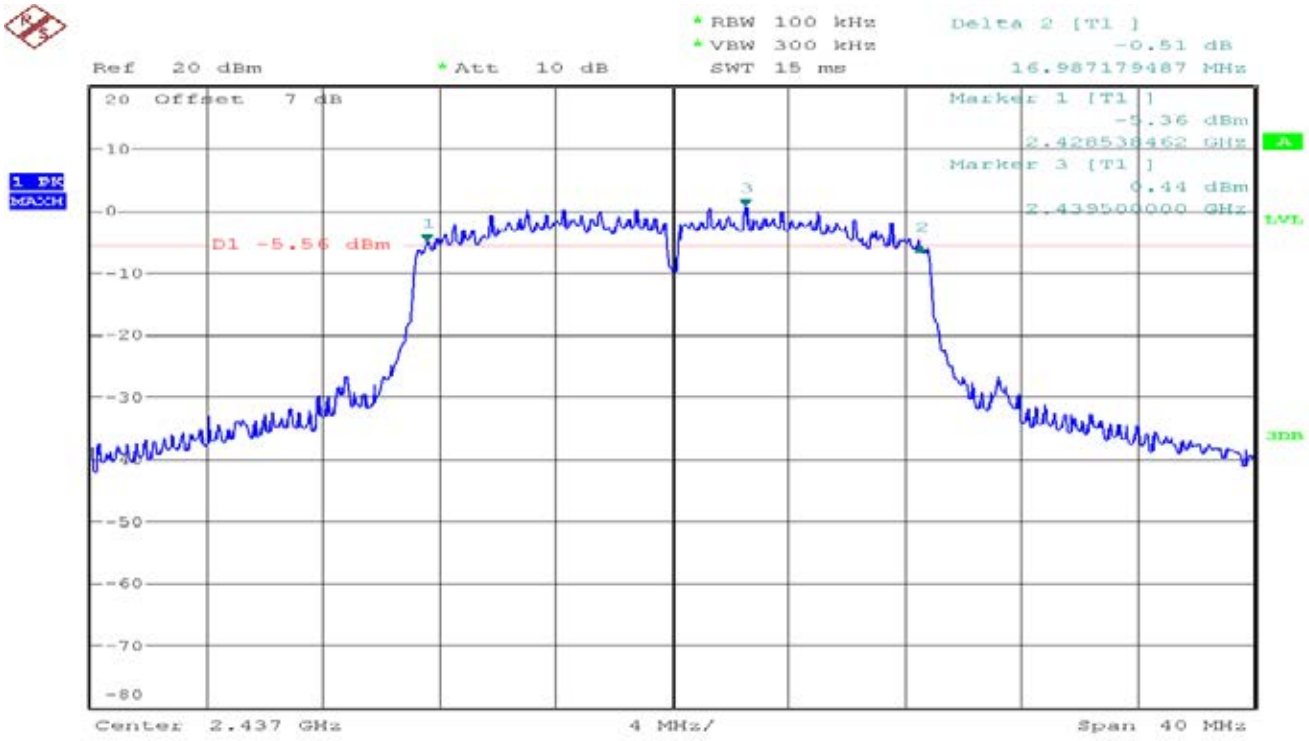


IEEE 802.11n HT20 mode / Chain 1

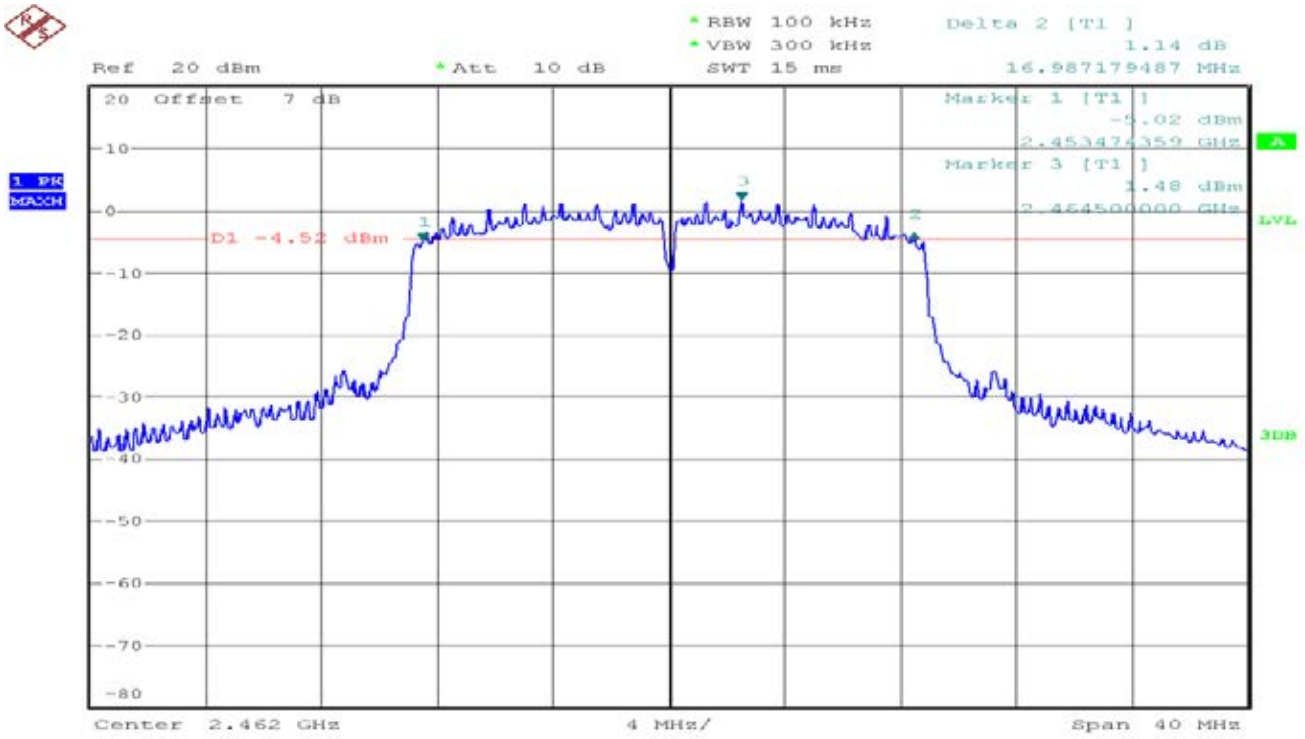
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

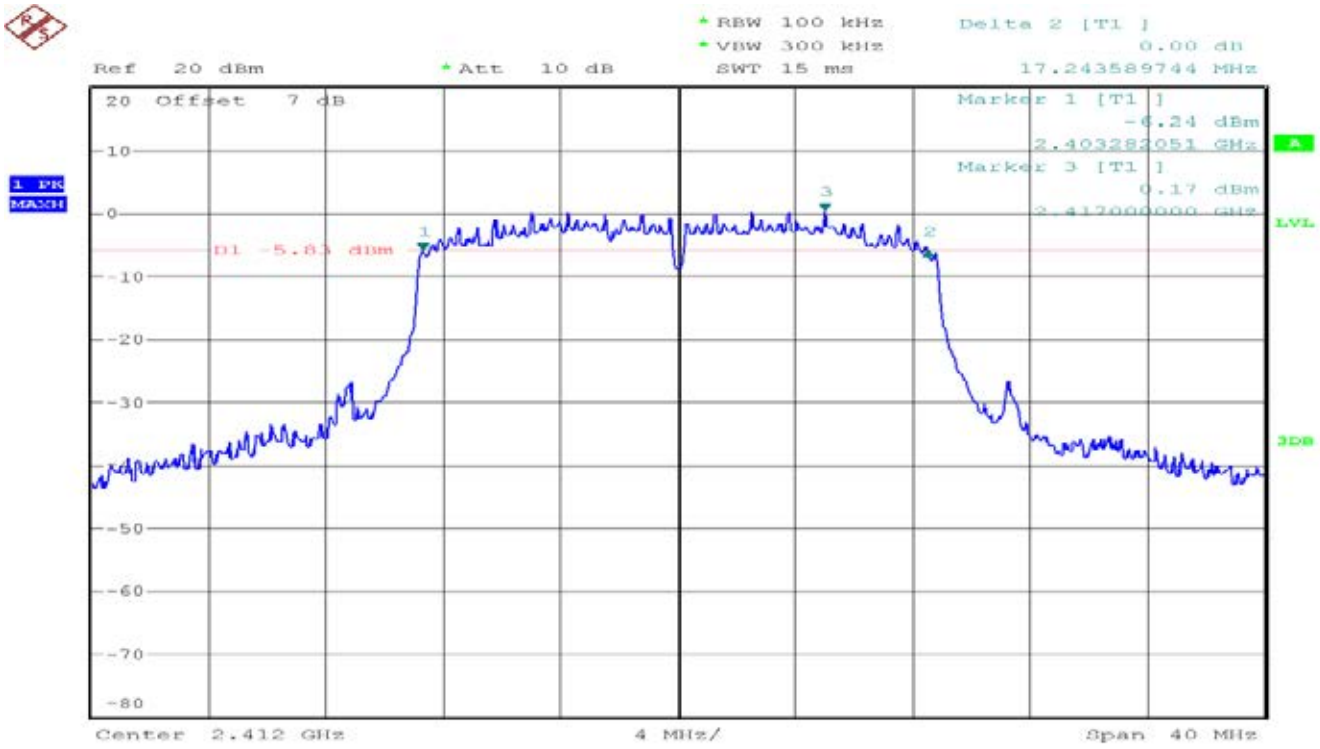


6dB Bandwidth (CH High)

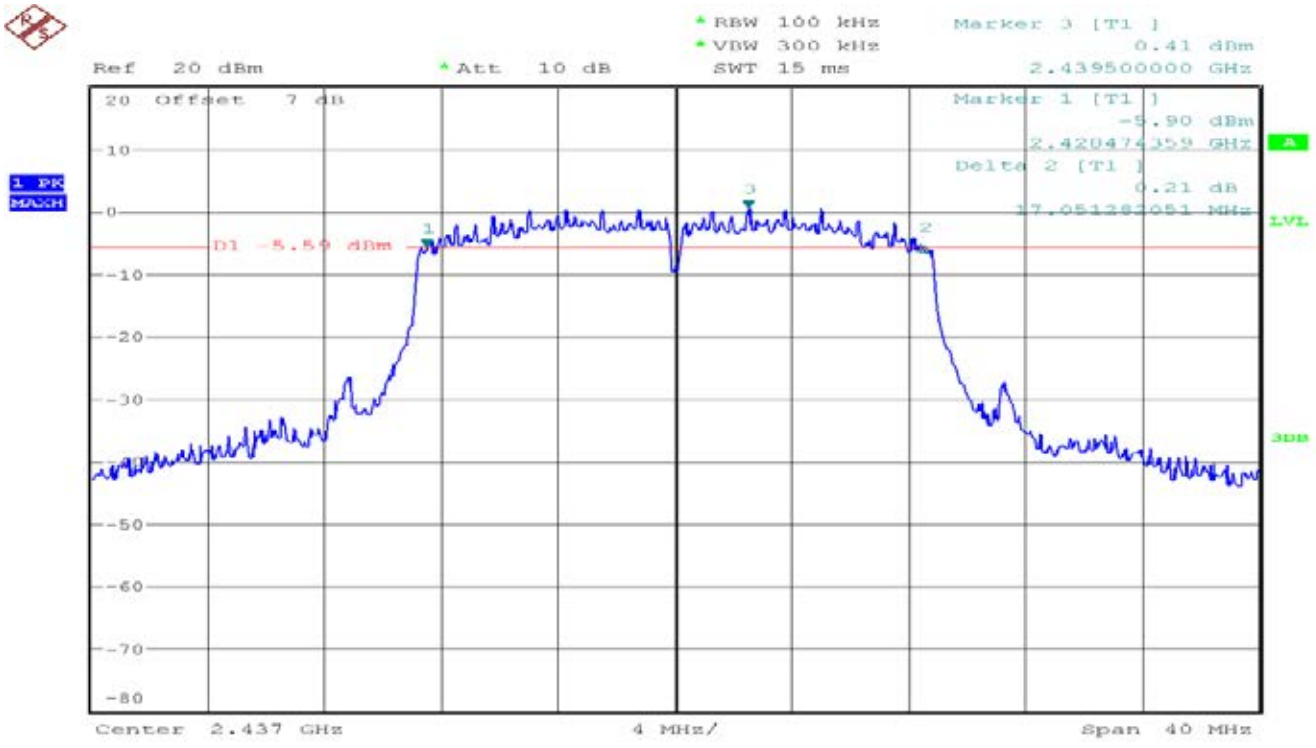


IEEE 802.11n HT20 mode / Chain 2

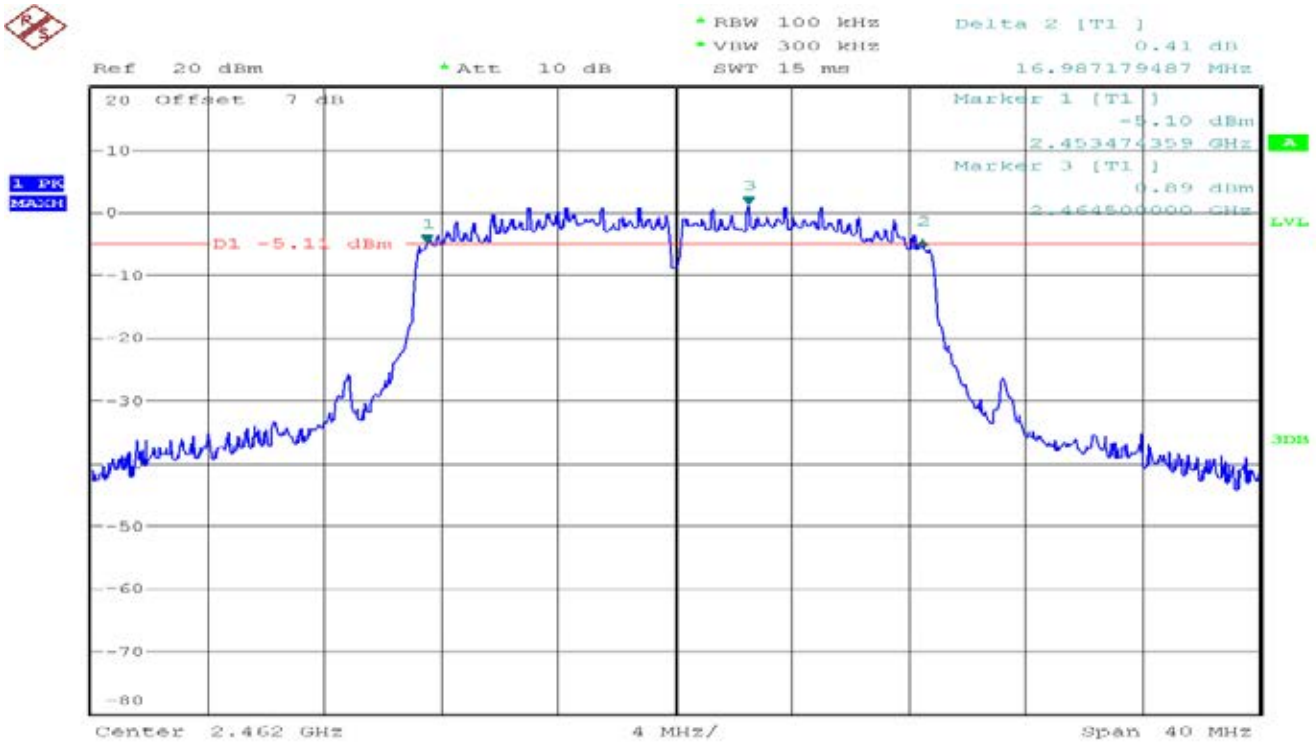
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



7.2.PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

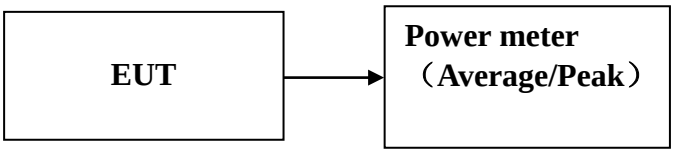
1.According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, and 2400-2483.5 MHz: 1 Watt.

2.According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6dBi 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 6dBi.

Directional Gain =7.34dBi>6dBi

Limit=30dBm-(7.34-6) dB=28.66dBm

Test Configuration



TEST PROCEDURE

1. The EUT transmitter output is connected to the Power meter.
   The Power meter is set to the peak power detection.
2. The testing follows the Measurement Procedure FCC KDB No. 558074 D01 DTS Meas. Guidance v04. 9.1.3 PKPM1 Peak-reading power meter method.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 2 peak Output Power (dBm)	Limit (dBm)
Low	2412	20.99	21.04	30.00
Mid	2437	20.45	20.58	30.00
High	2462	20.60	20.83	30.00

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)
Low	2412	18.21	18.31
Mid	2437	17.36	17.55
High	2462	17.55	17.83

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 2 peak Output Power (dBm)	Limit (dBm)
Low	2412	22.00	23.36	30.00
Mid	2437	22.84	23.62	30.00
High	2462	22.83	23.47	30.00

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)
Low	2412	15.07	15.17
Mid	2437	15.62	15.47
High	2462	15.04	14.70

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 2 peak Output Power (dBm)	Total peak Output Power (dBm)	Limit (dBm)
Low	2412	20.53	21.11	23.84	28.66
Mid	2437	20.90	21.20	24.06	28.66
High	2462	21.24	21.47	24.37	28.66

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)	Total Average Output Power (dBm)
Low	2412	11.38	11.53	14.47
Mid	2437	11.75	11.56	14.67
High	2462	12.08	11.70	14.90

***Remark**:* 1.Total Output Power (dBm) = 10*LOG(10^(Chain 0 Output Power / 10)+10^(Chain 1 Output Power /10))

2.Duty factor has been offset with cable loss

7.3.PEAK POWER SPECTRAL DENSITY

LIMIT

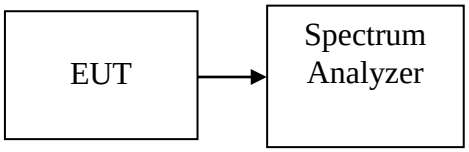
1.According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

2.According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Directional Gain =7.34dBi>6dBi

Limit=8dBm-(7.34-6) dB=6.66dBm

Test Configuration



TEST PROCEDURE

1.Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

2.Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 1.5 times the DTS bandwidth, Sweep = auto

3.Record the max reading.

4.Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Limit (dBm)	Result
Low	2412	-4.07	-2.87	8.00	PASS
Mid	2437	-6.35	-4.48	8.00	PASS
High	2462	-5.59	-4.87	8.00	PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Limit (dBm)	Result
Low	2412	-10.64	-10.05	8.00	PASS
Mid	2437	-9.83	-10.48	8.00	PASS
High	2462	-11.02	-11.50	8.00	PASS

Test mode: IEEE 802.11n HT20 mode

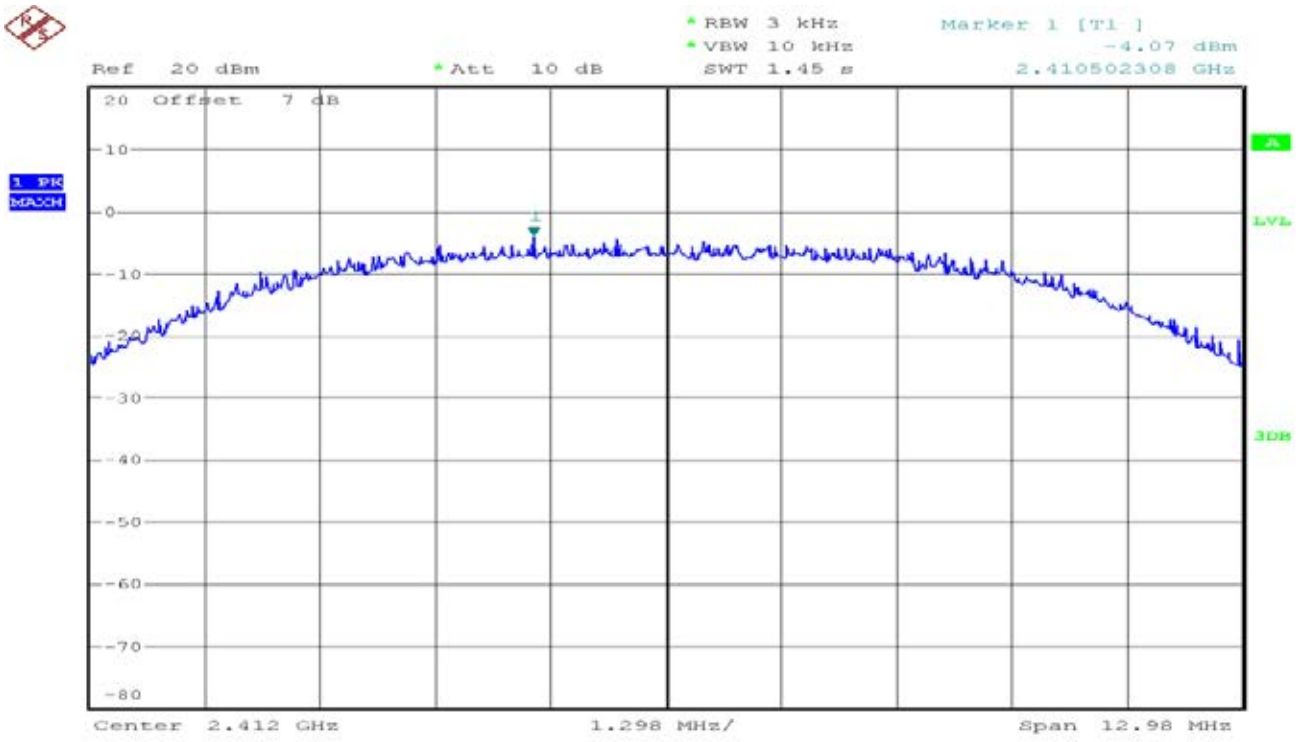
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Result
Low	2412	-14.28	-12.56	-10.33	6.66	PASS
Mid	2437	-13.79	-13.15	-10.45	6.66	PASS
High	2462	-13.38	-11.97	-9.61	6.66	PASS

***Remark**:1.Total PPSD(dBm) = 10*LOG(10^(Chain 0 PPSD/ 10)+10^(Chain 1 PPSD/10))*

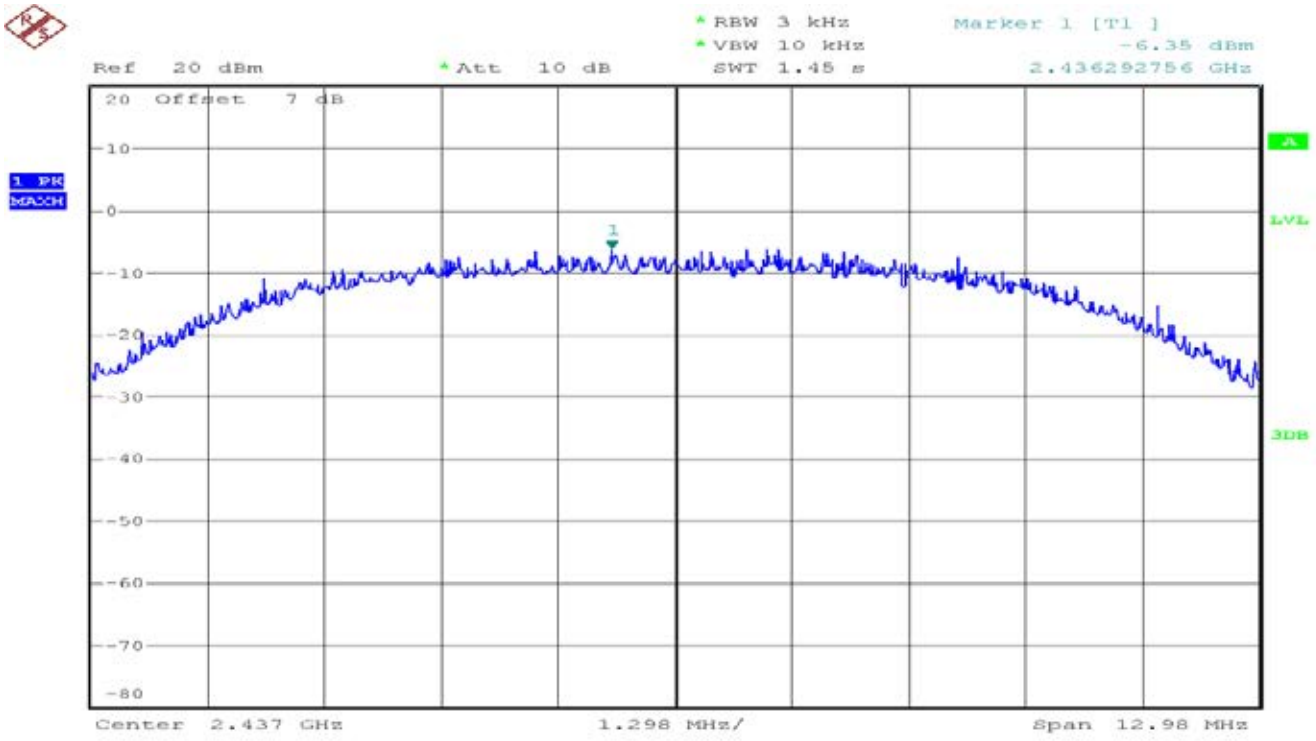
Test Plot

IEEE 802.11b mode/Chain 1

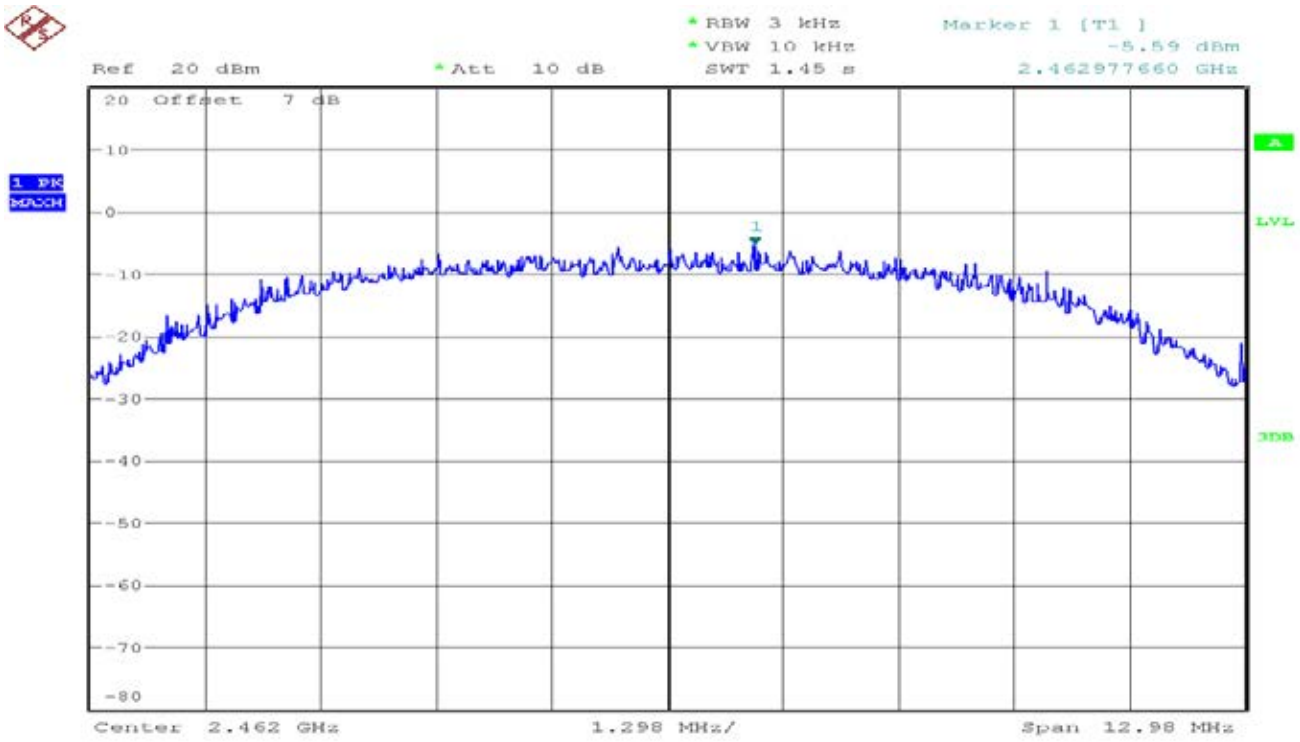
PPSD (CH Low)



PPSD(CH Mid)

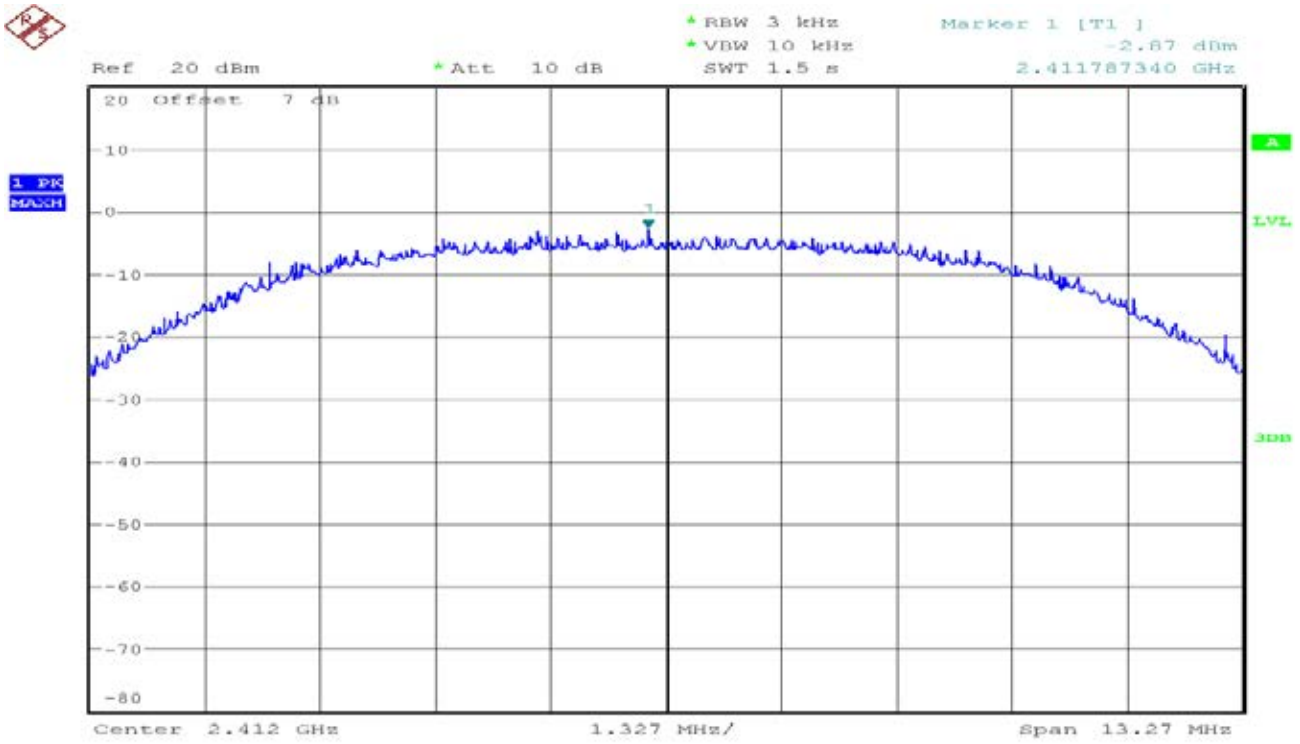


PPSD (CH High)

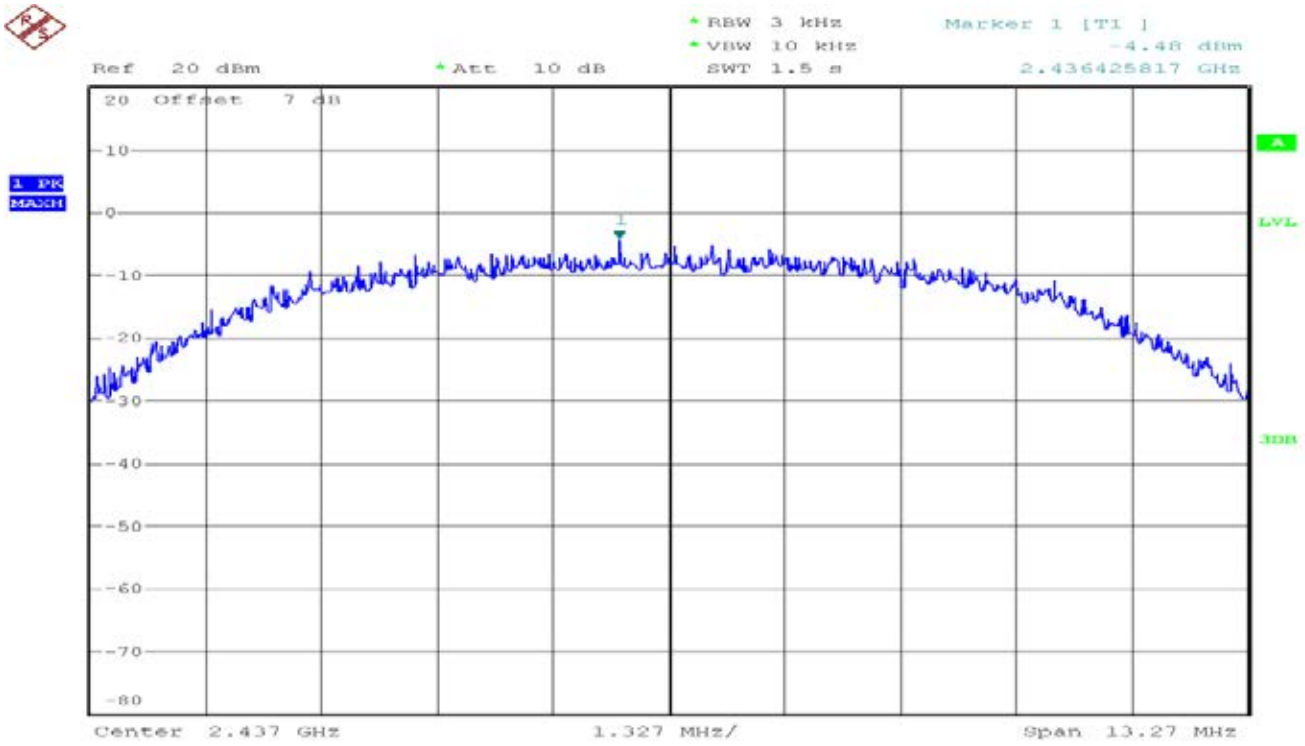


IEEE 802.11b mode/Chain 2

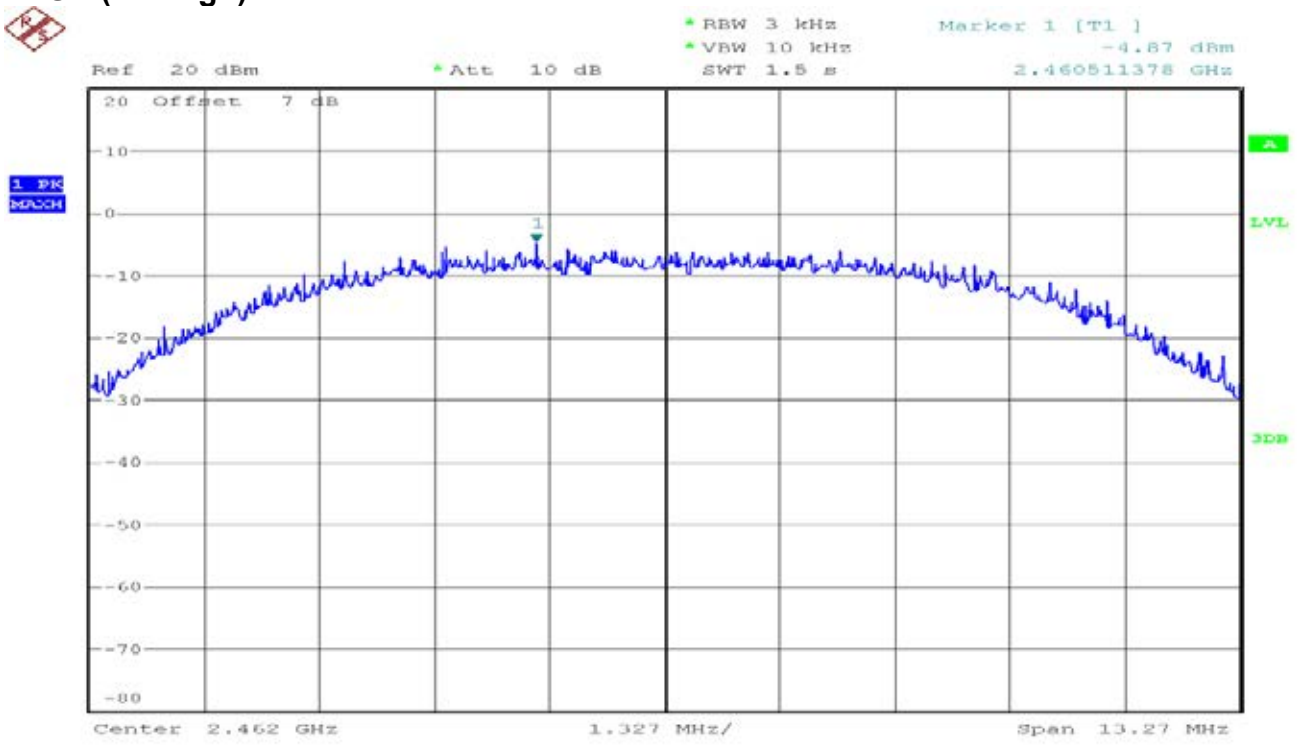
PPSD (CH Low)



PPSD(CH Mid)

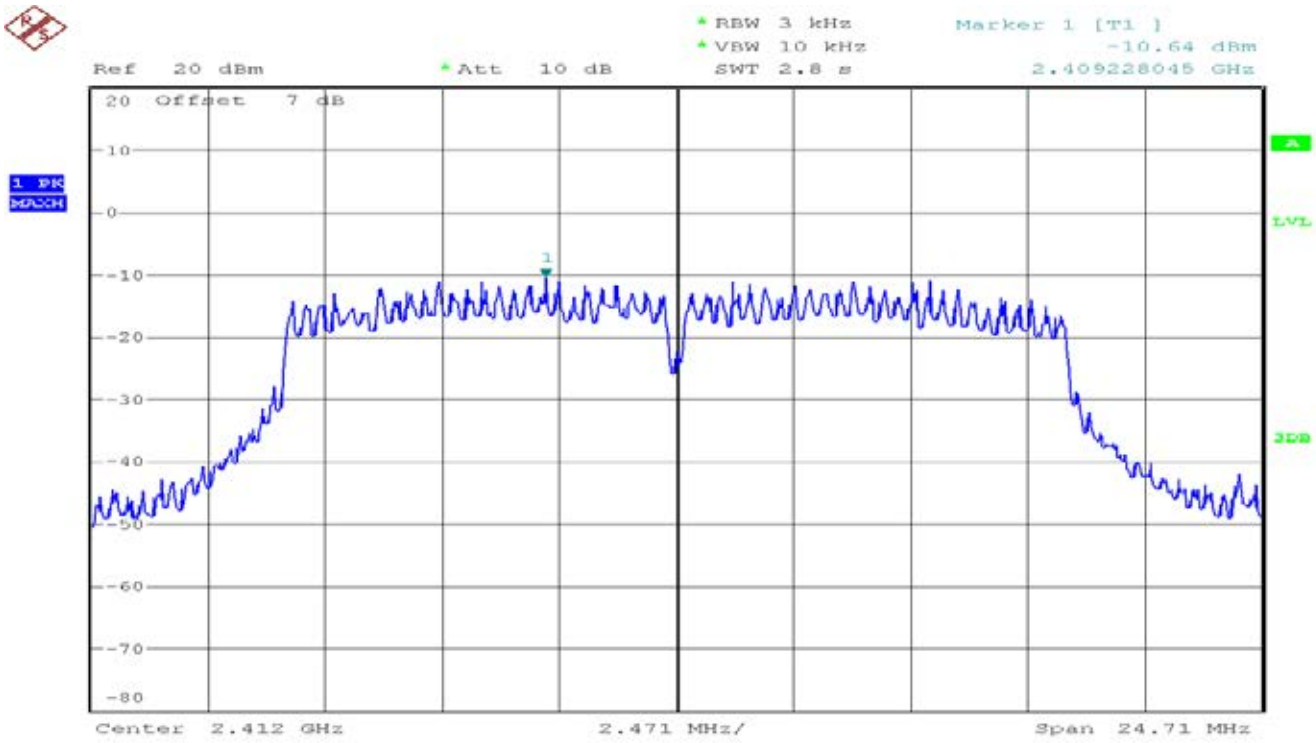


PPSD (CH High)

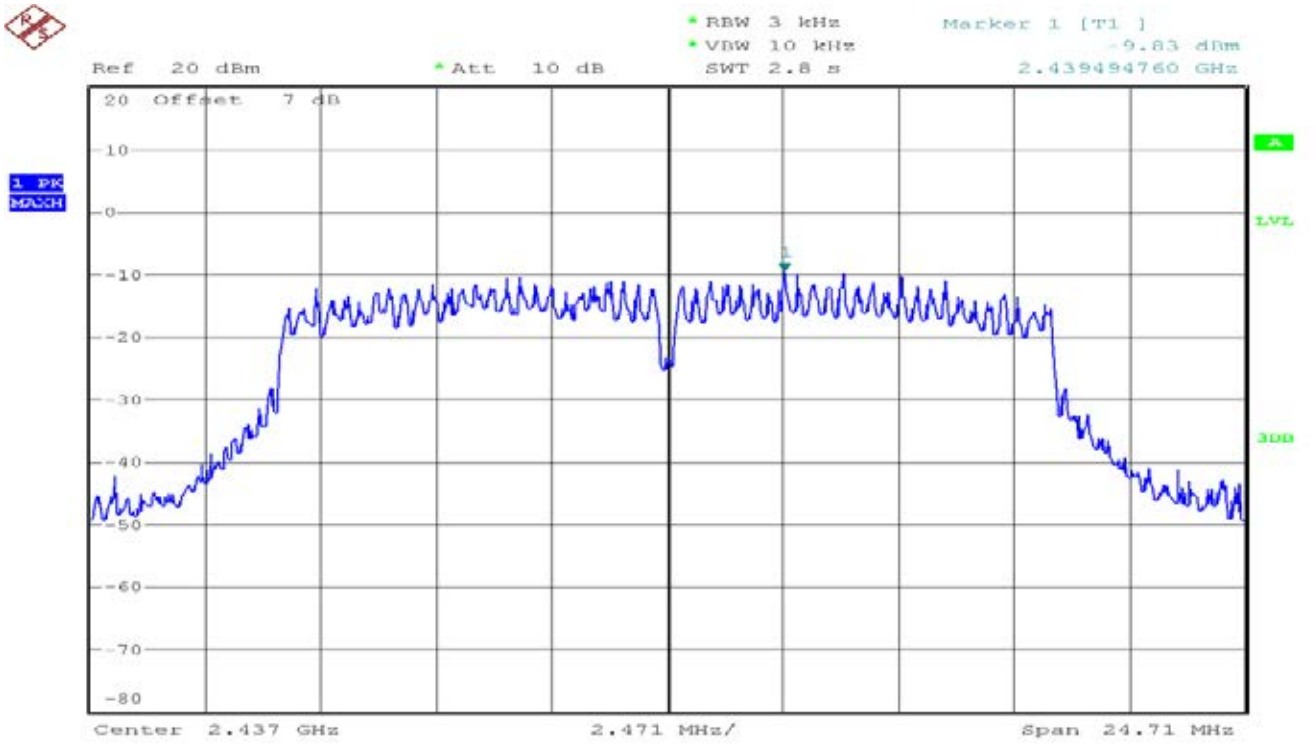


IEEE 802.11g mode/Chain 1

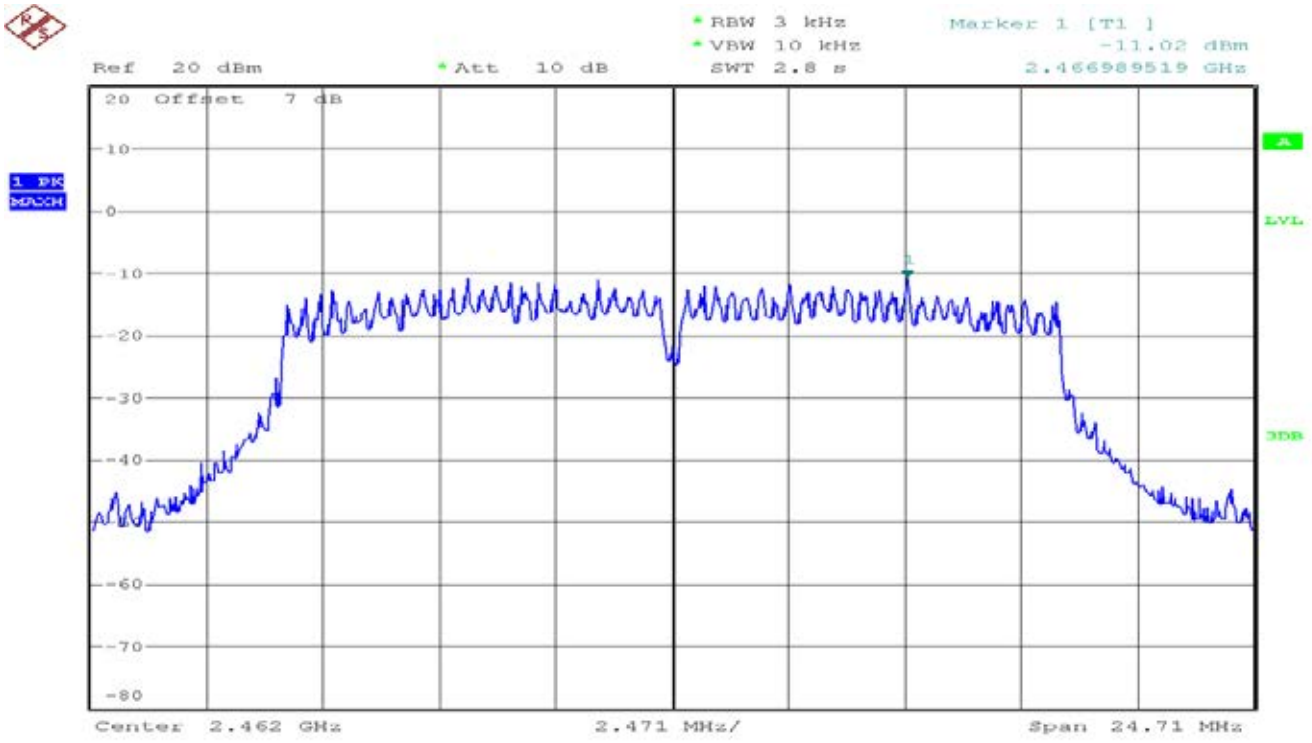
PPSD (CH Low)



PPSD (CH Mid)

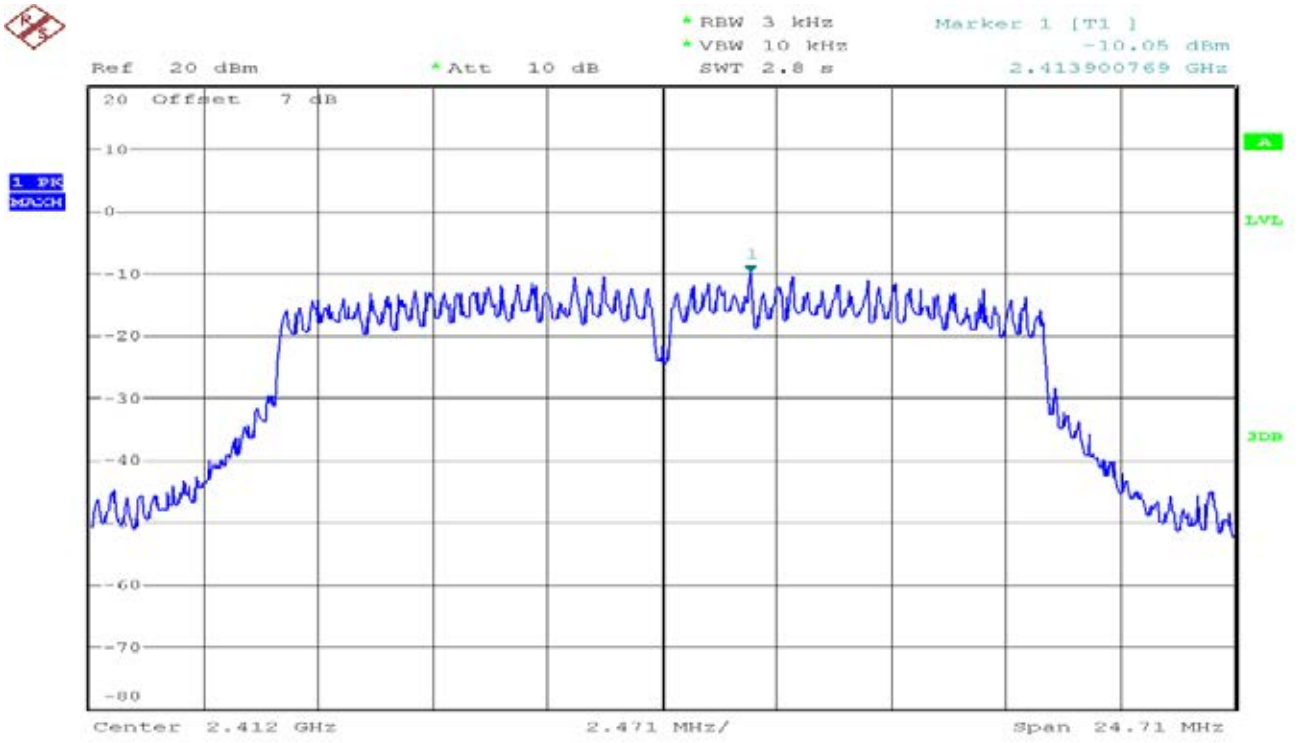


PPSD (CH High)

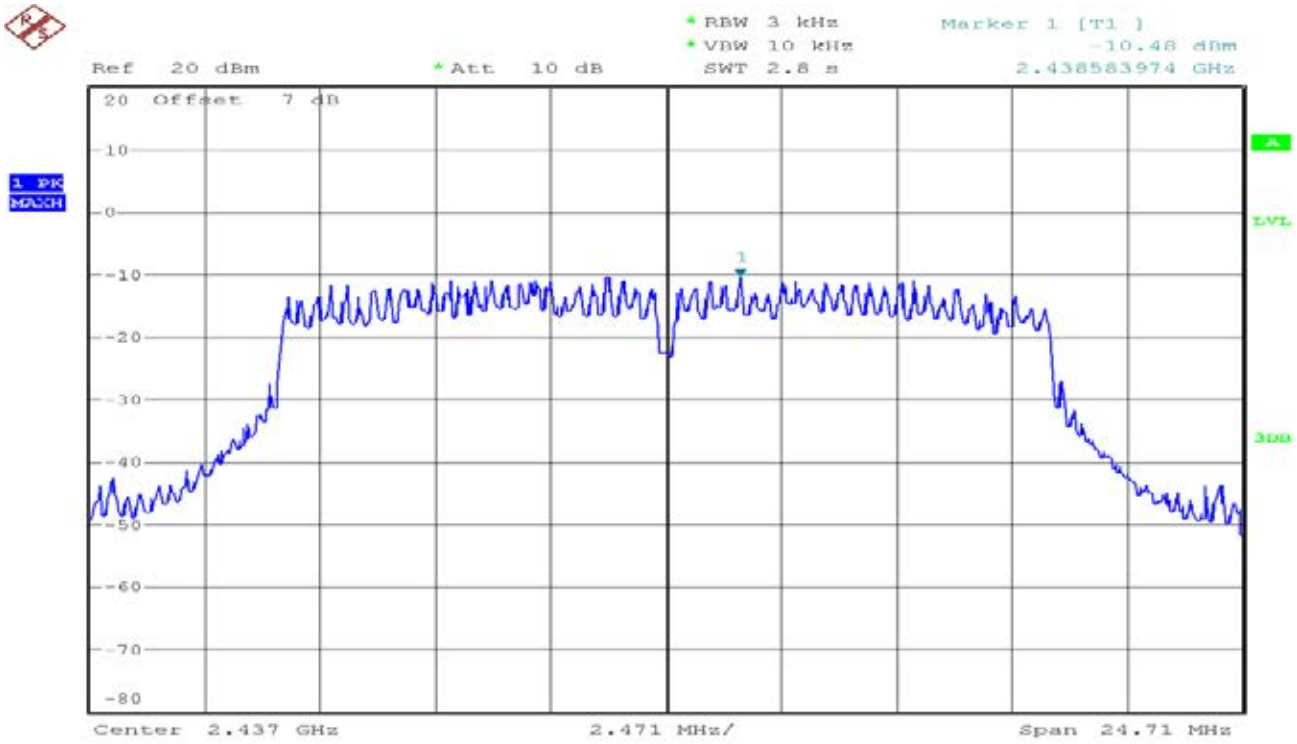


IEEE 802.11g mode/Chain 2

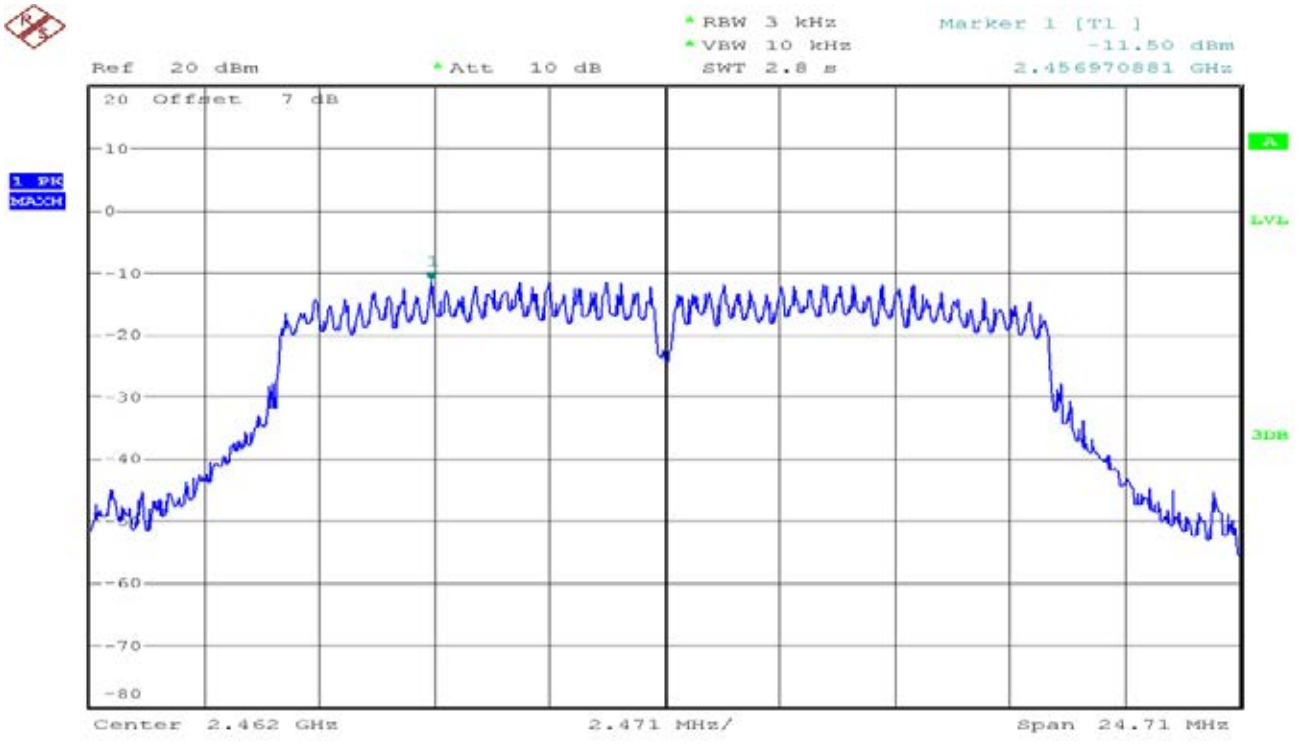
PPSD (CH Low)



PPSD (CH Mid)

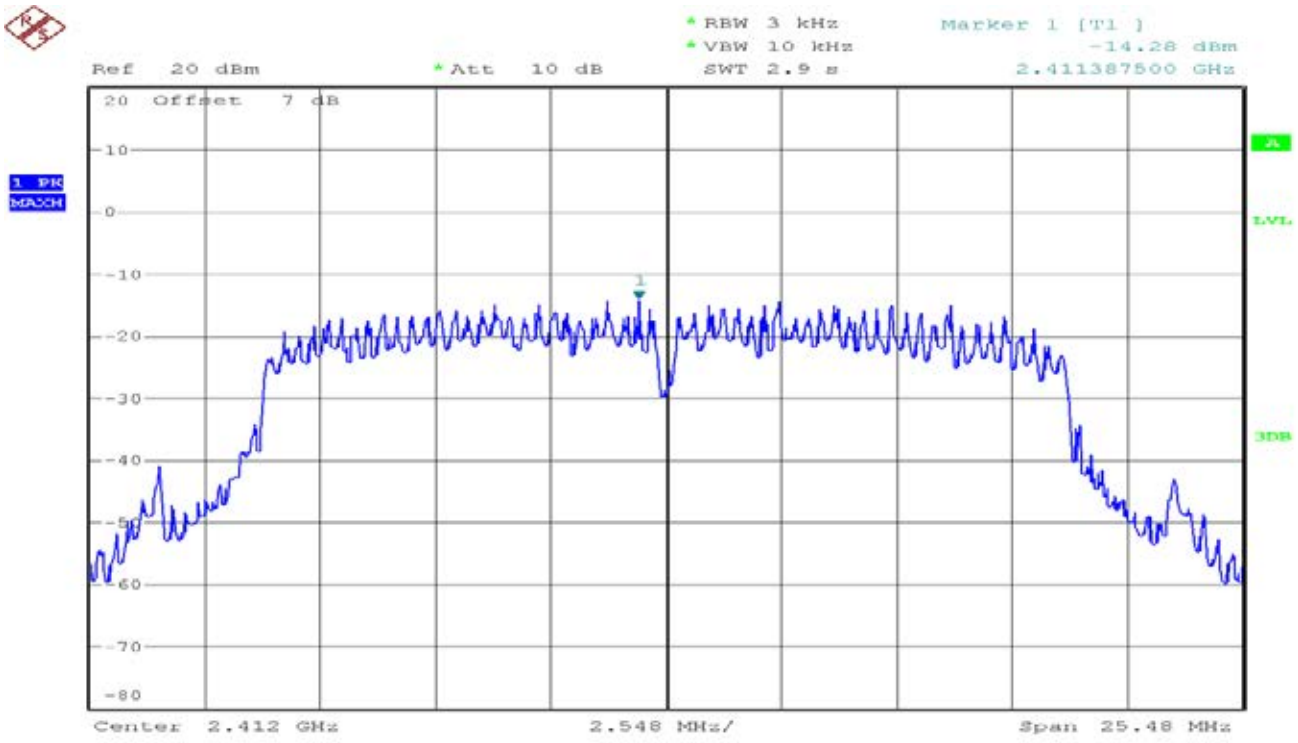


PPSD (CH High)

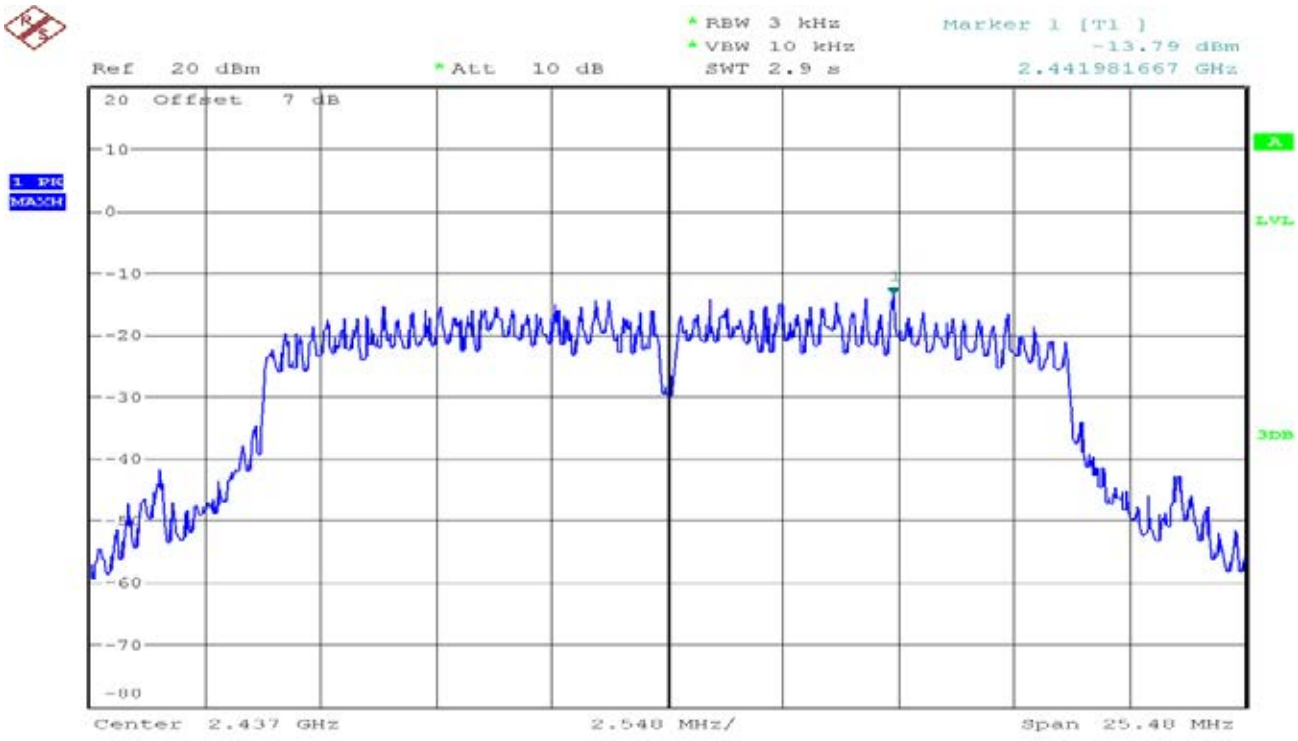


IEEE 802.11n HT20 mode/Chain 1

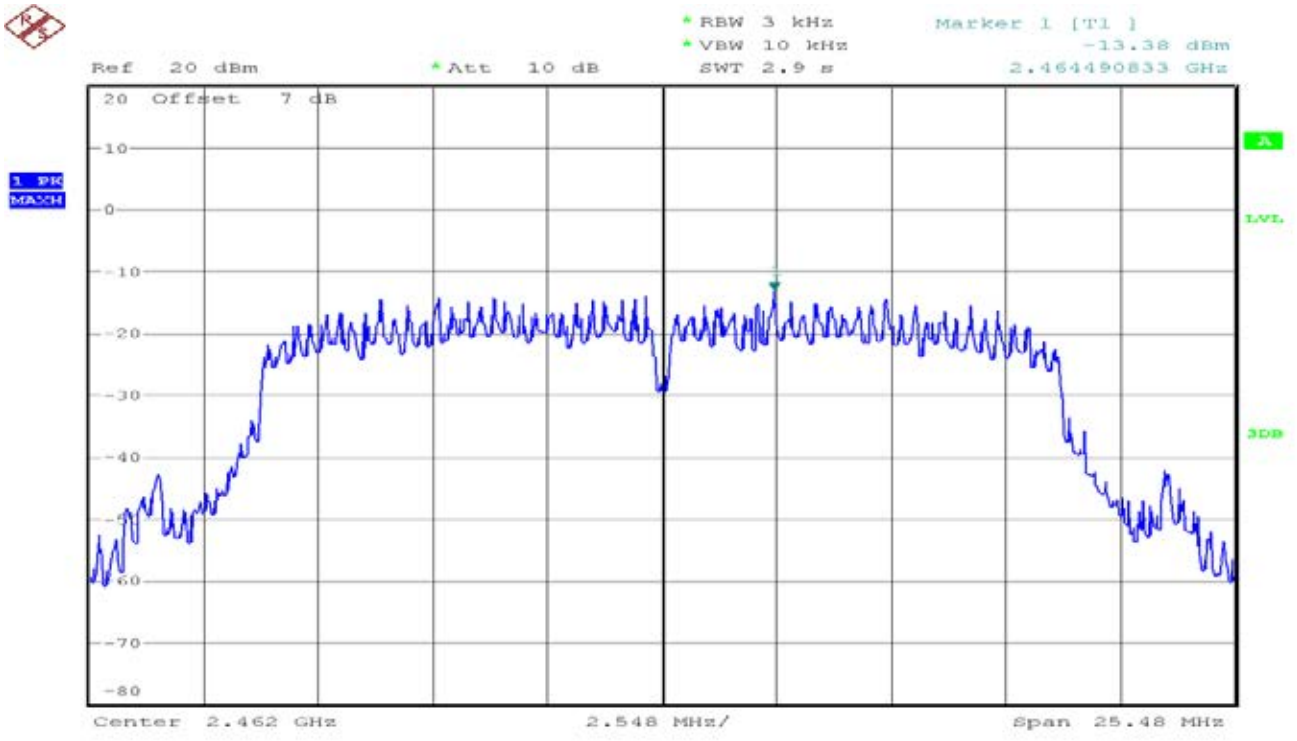
PPSD (CH Low)



PPSD (CH Mid)

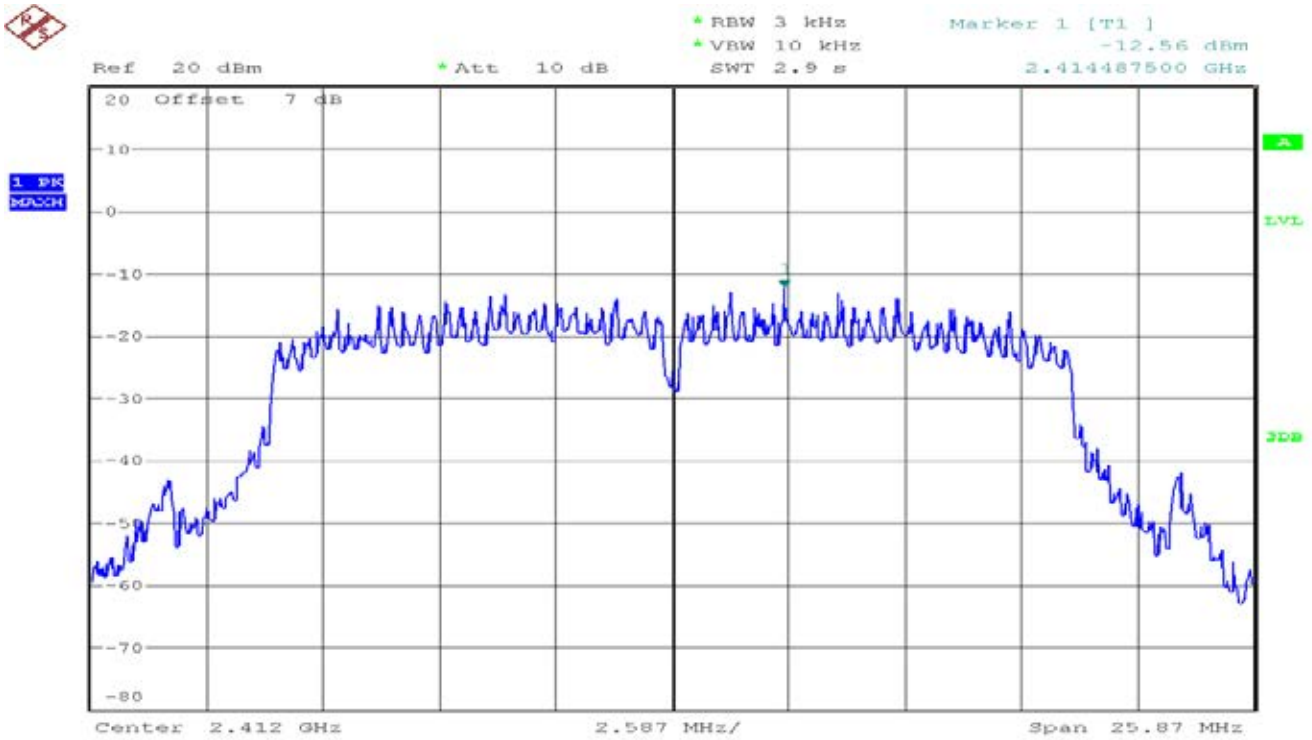


PPSD (CH High)

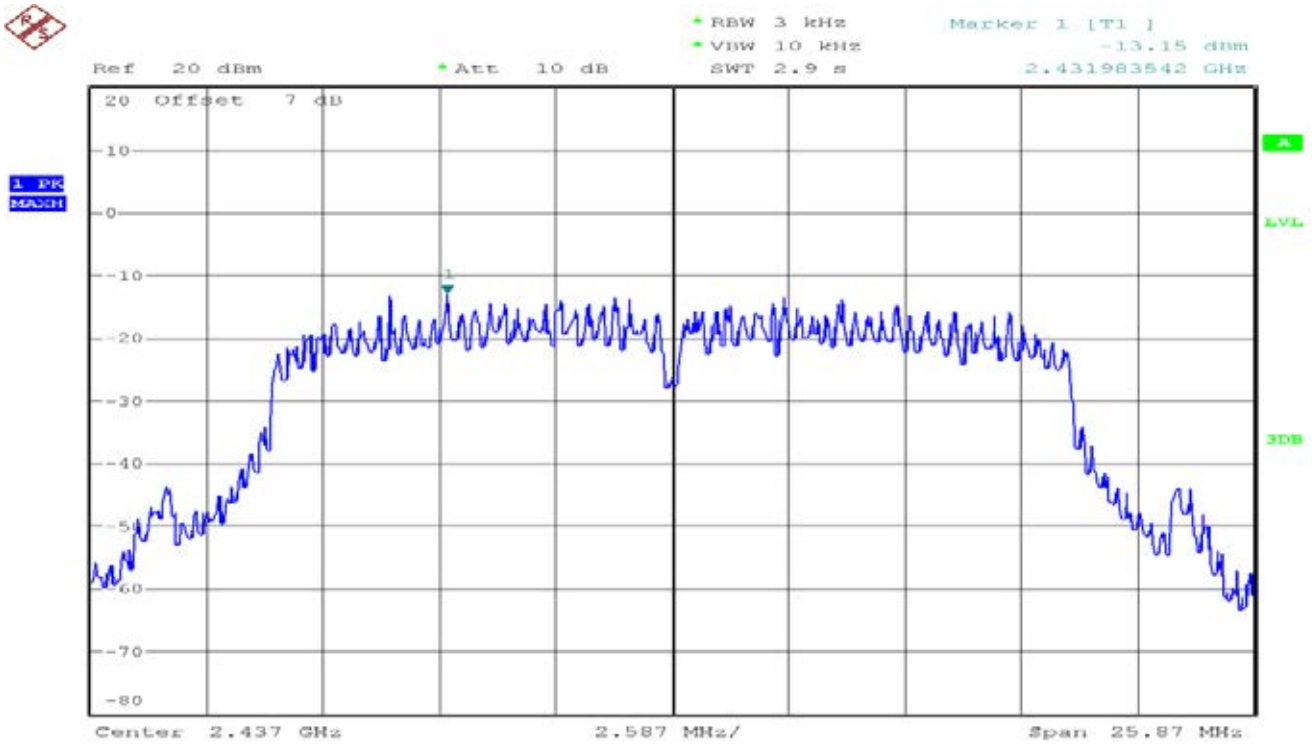


IEEE 802.11n HT20 mode/Chain 2

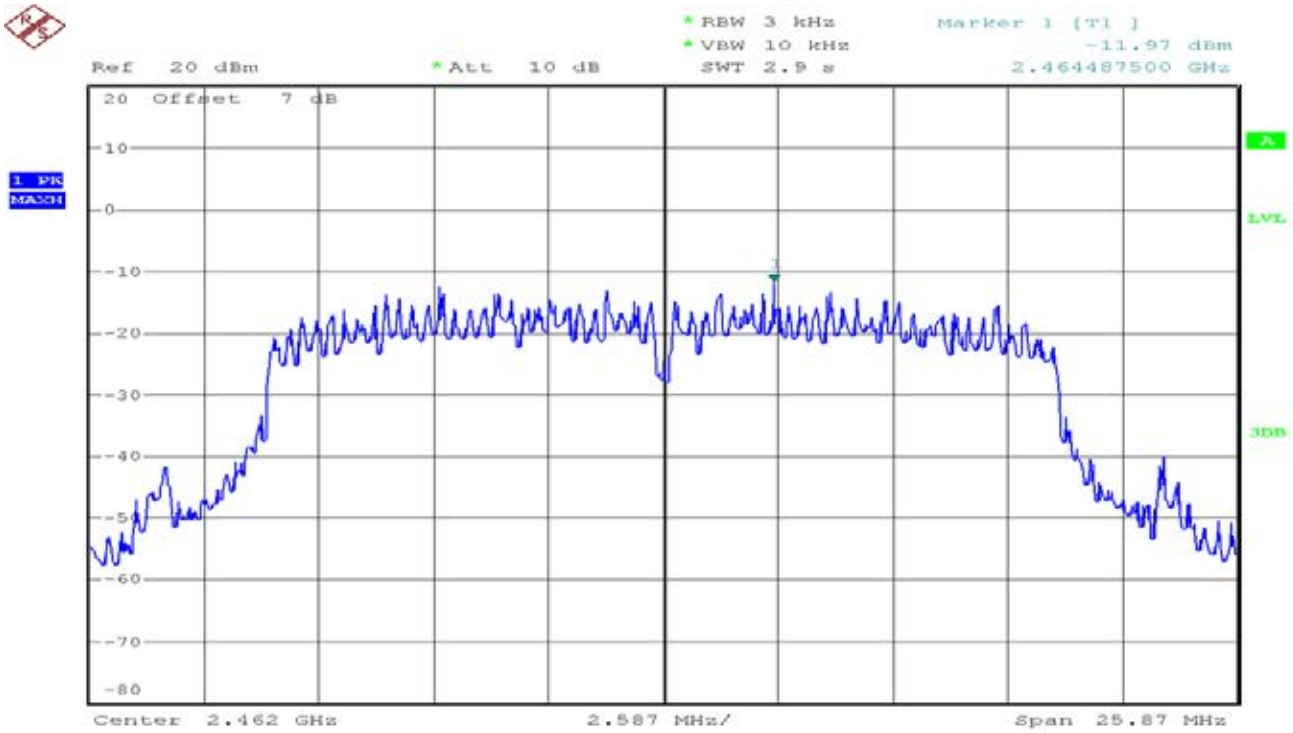
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



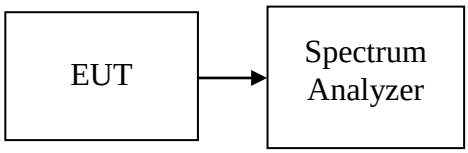
7.4.SPURIOUS EMISSIONS

Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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. 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 Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

Measurements are made over the 30MHz to 25GHz range with the transmitter set to the lowest, middle, and highest channels.

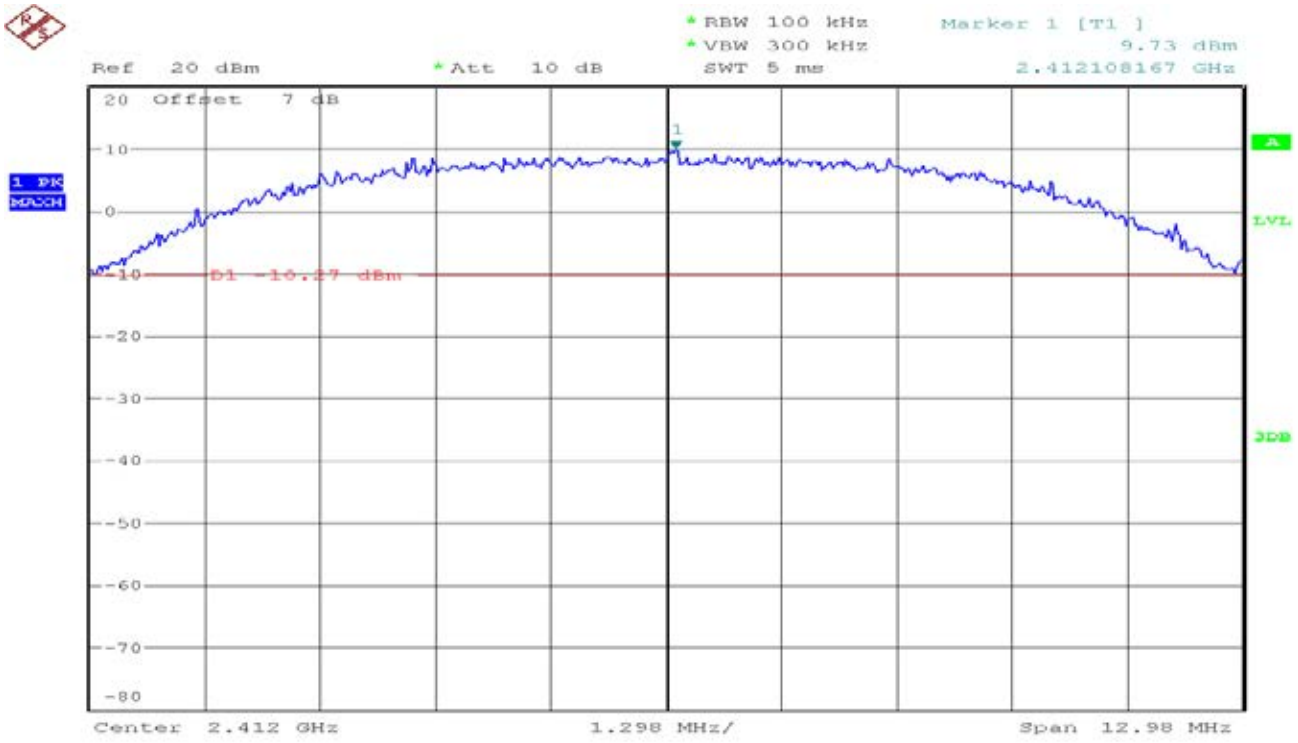
TEST RESULTS

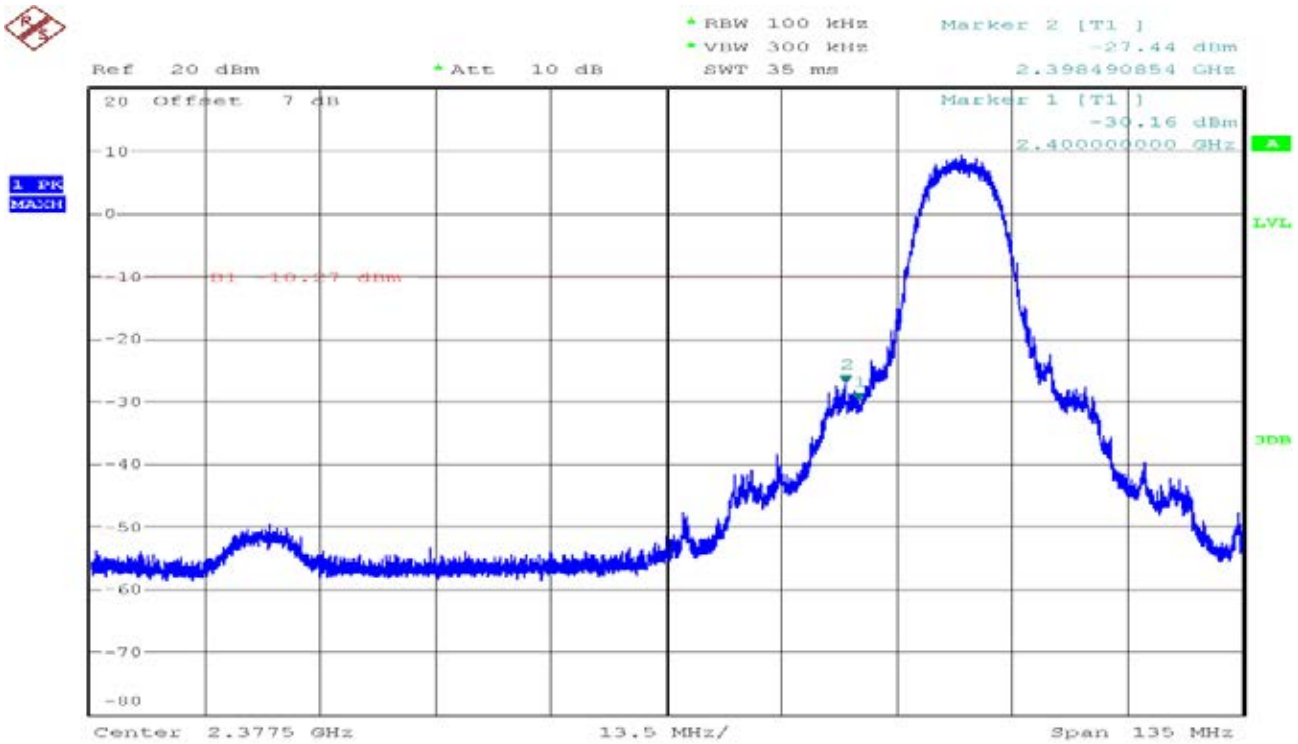
No non-compliance noted

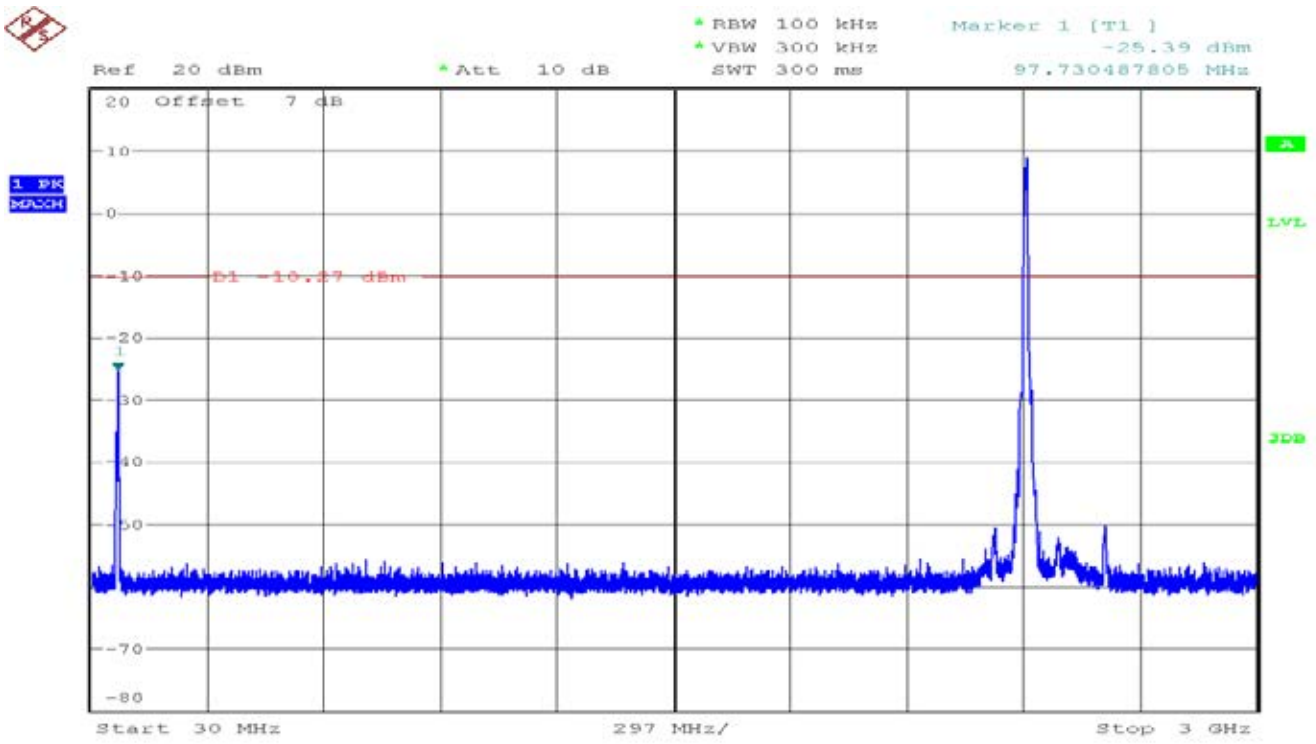
Test Plot
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

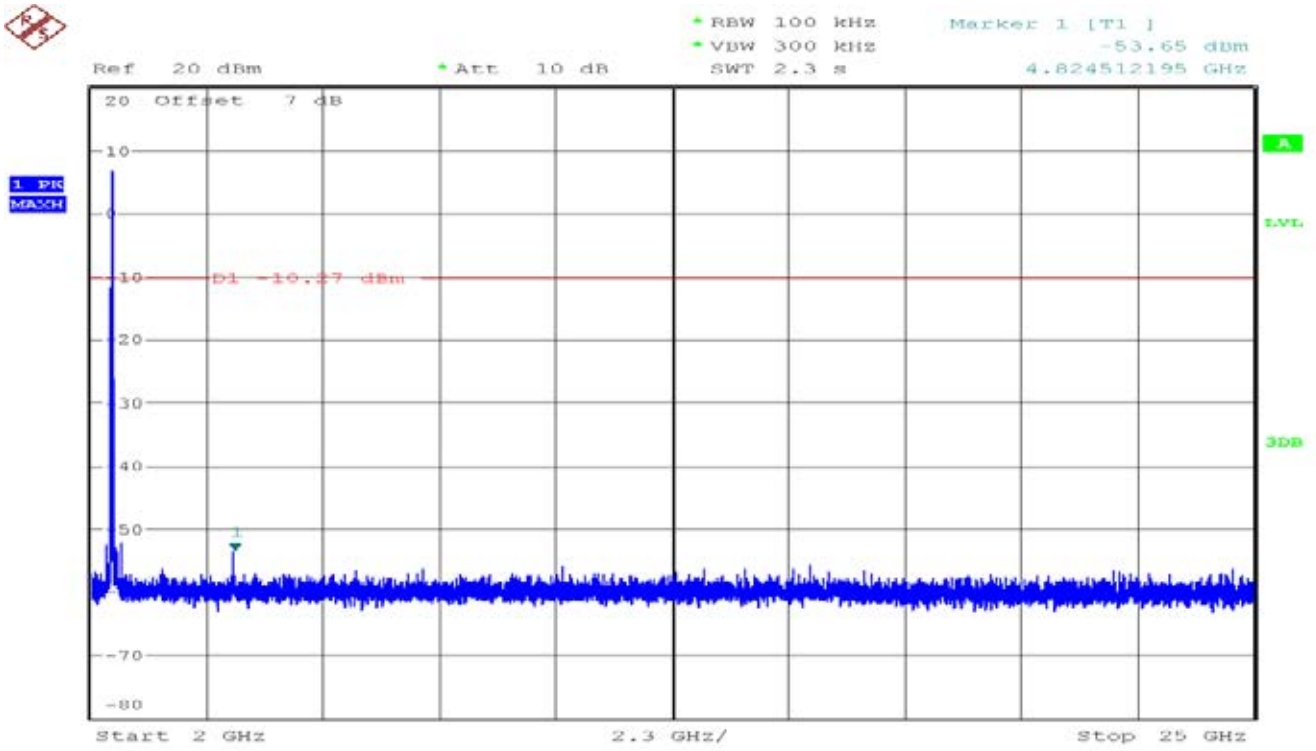
IEEE 802.11b mode/Chain 1

CH Low

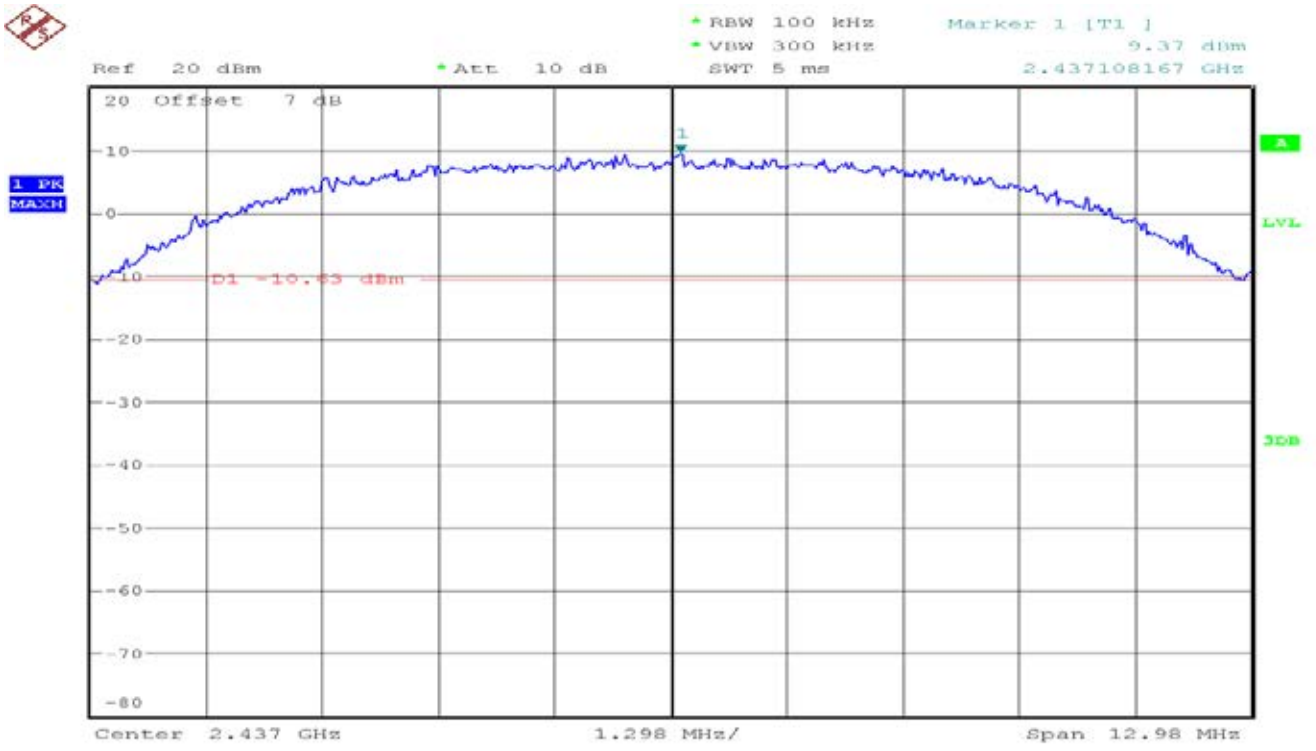


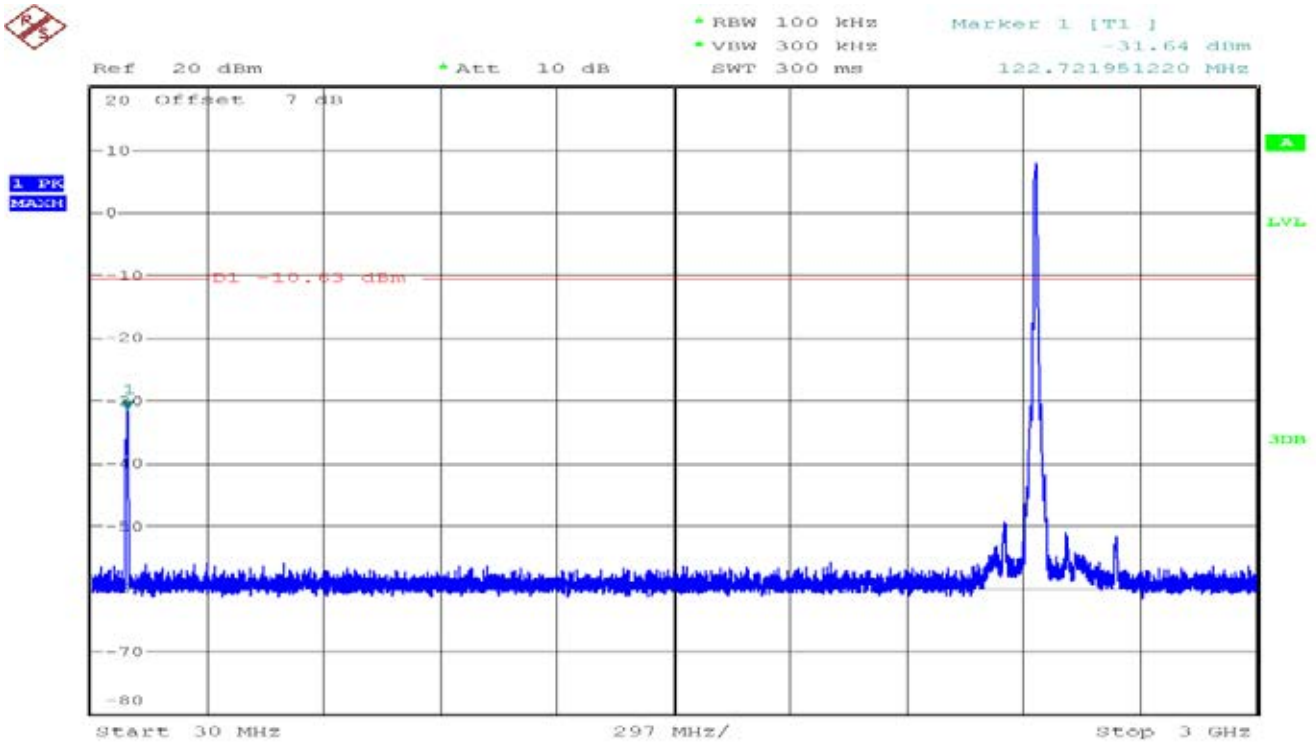


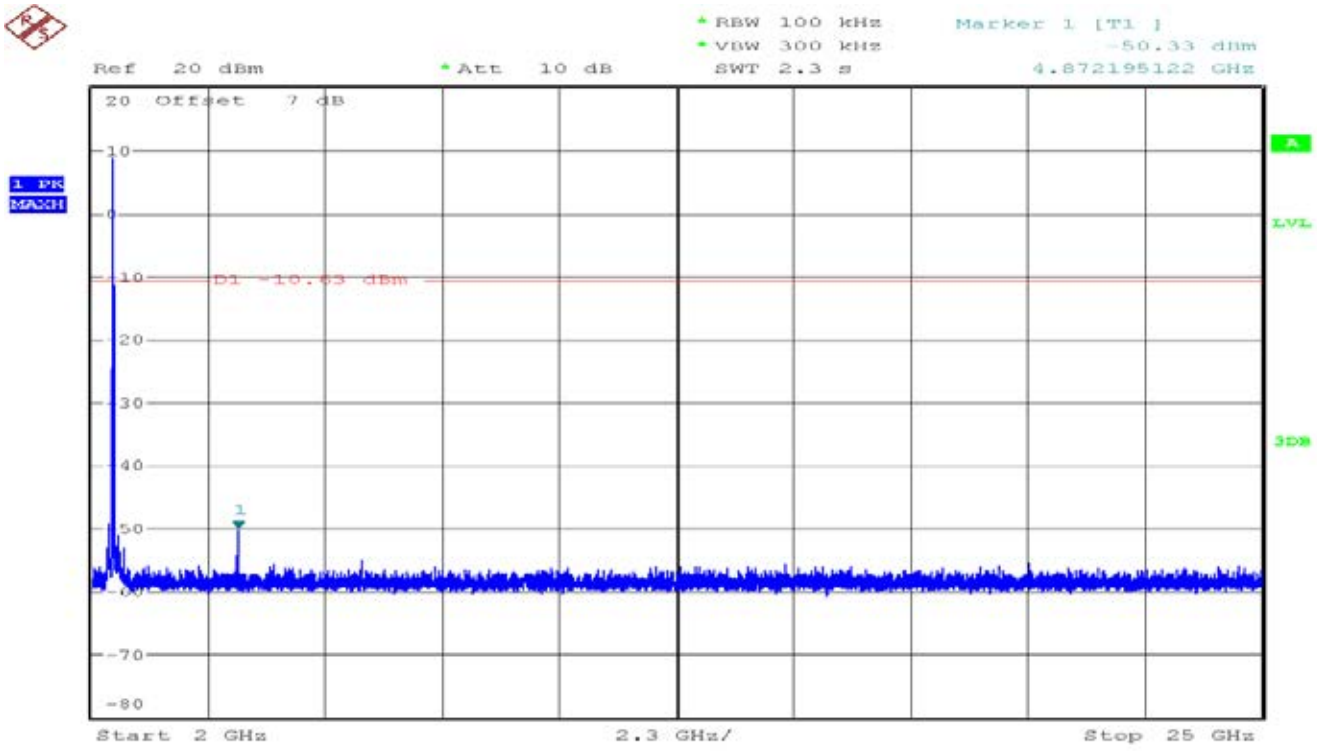

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-25.39 dBm
97.730487805 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.27 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-53.65 dBm
4.824512195 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.27 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

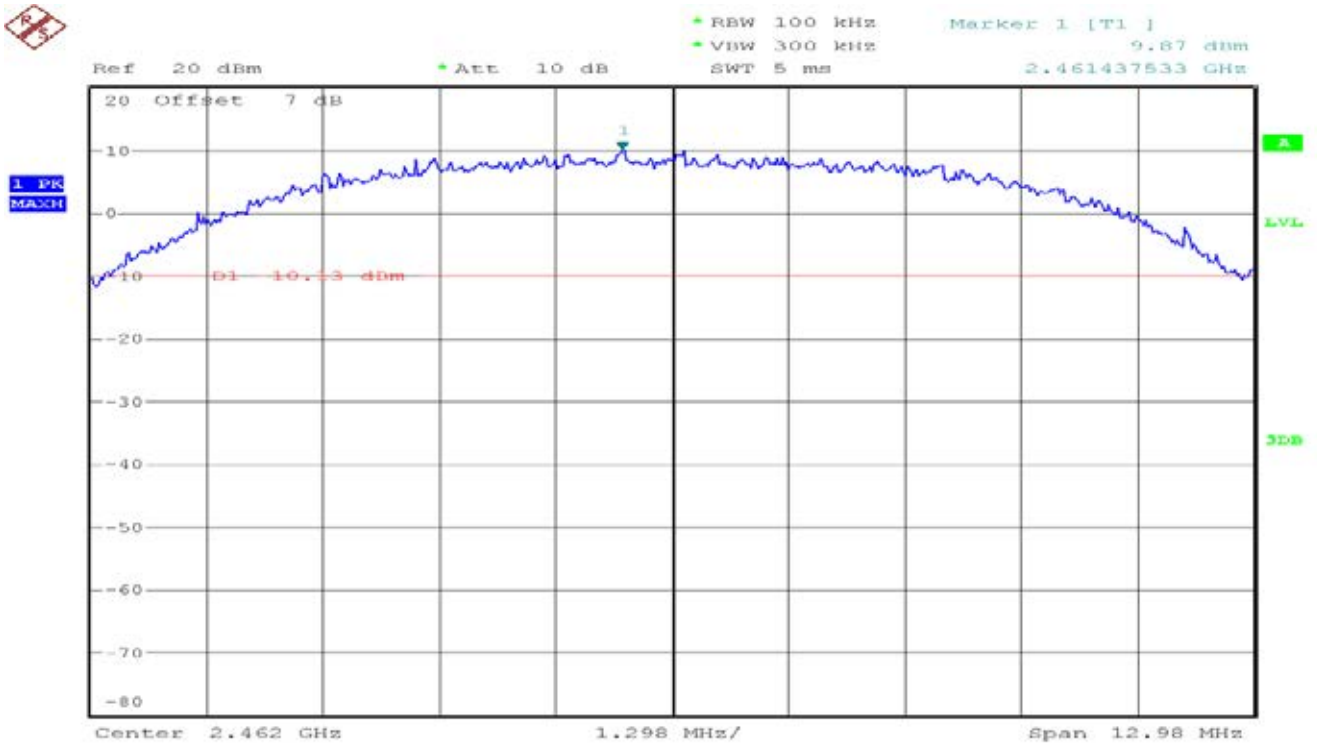
CH Mid

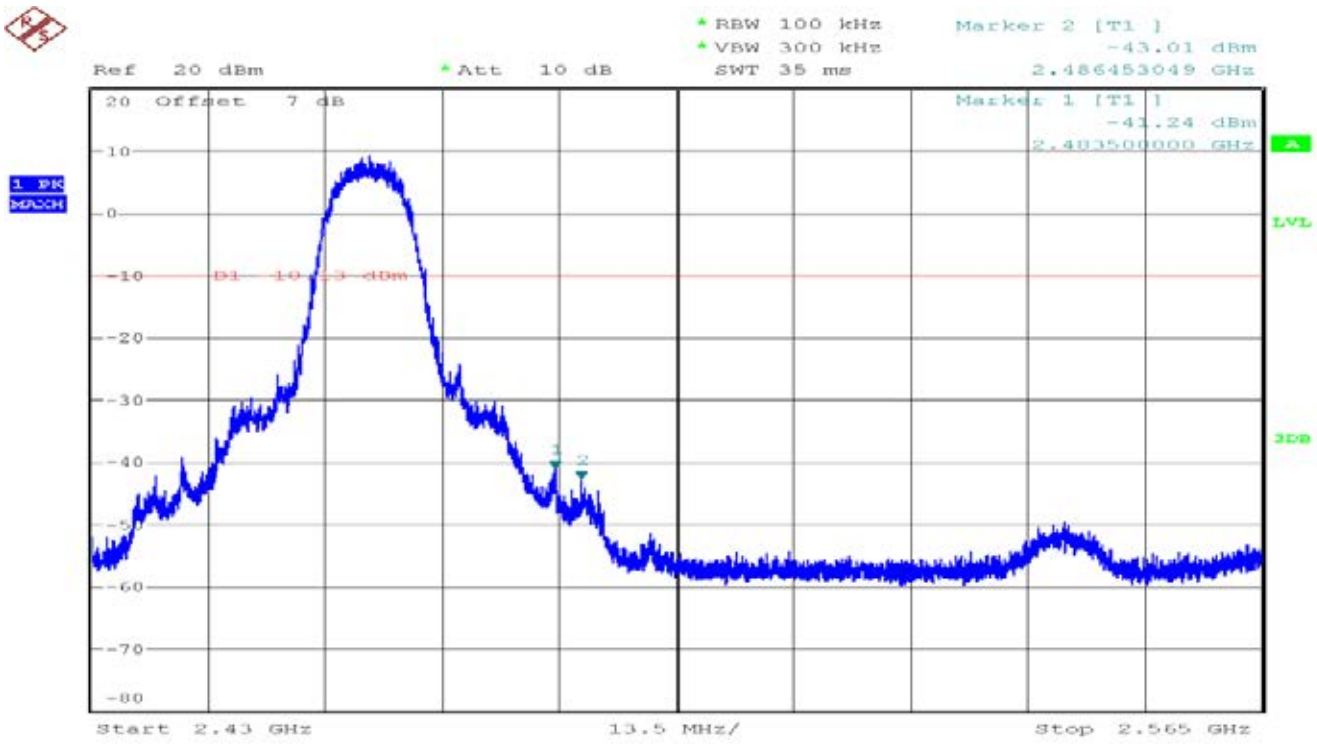

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
9.37 dBm
2.437108167 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -10.63 dBm
A
LVL
3DB
Center 2.437 GHz
1.298 MHz/
Span 12.98 MHz

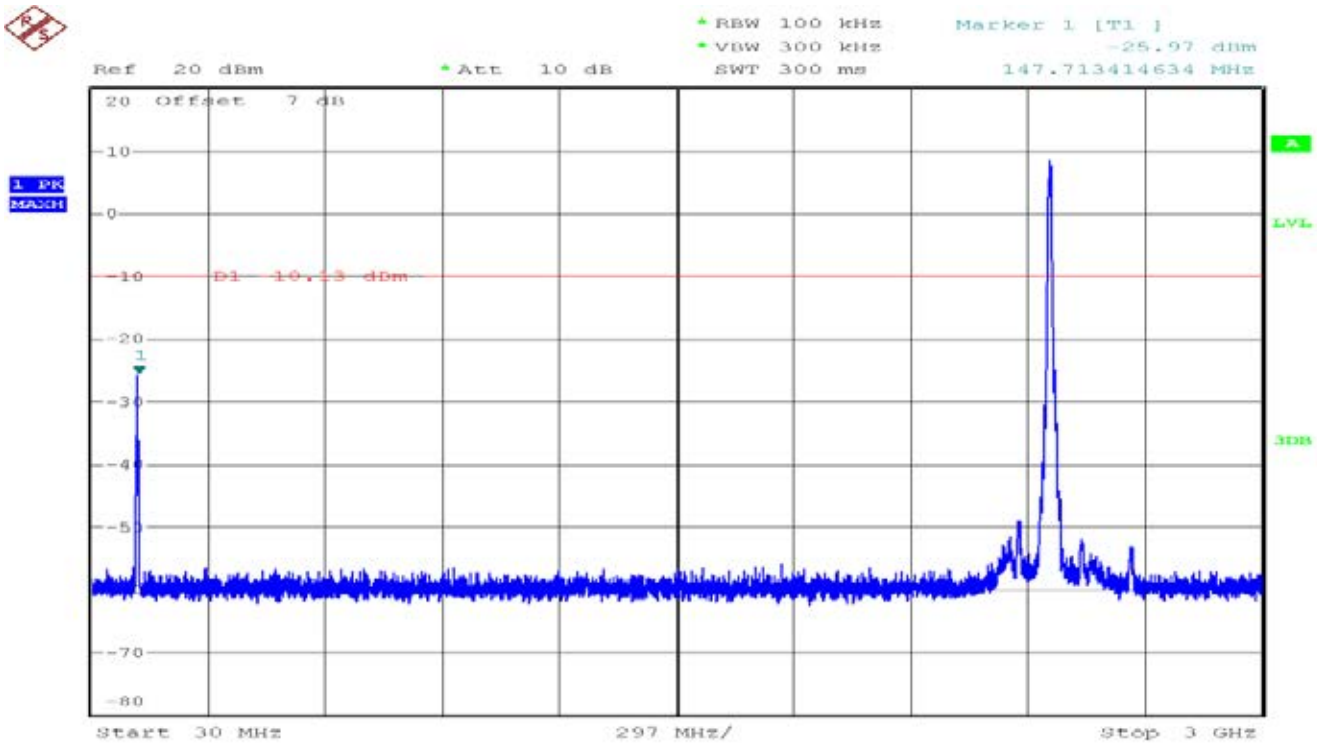

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-31.64 dBm
122.721951220 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -10.63 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

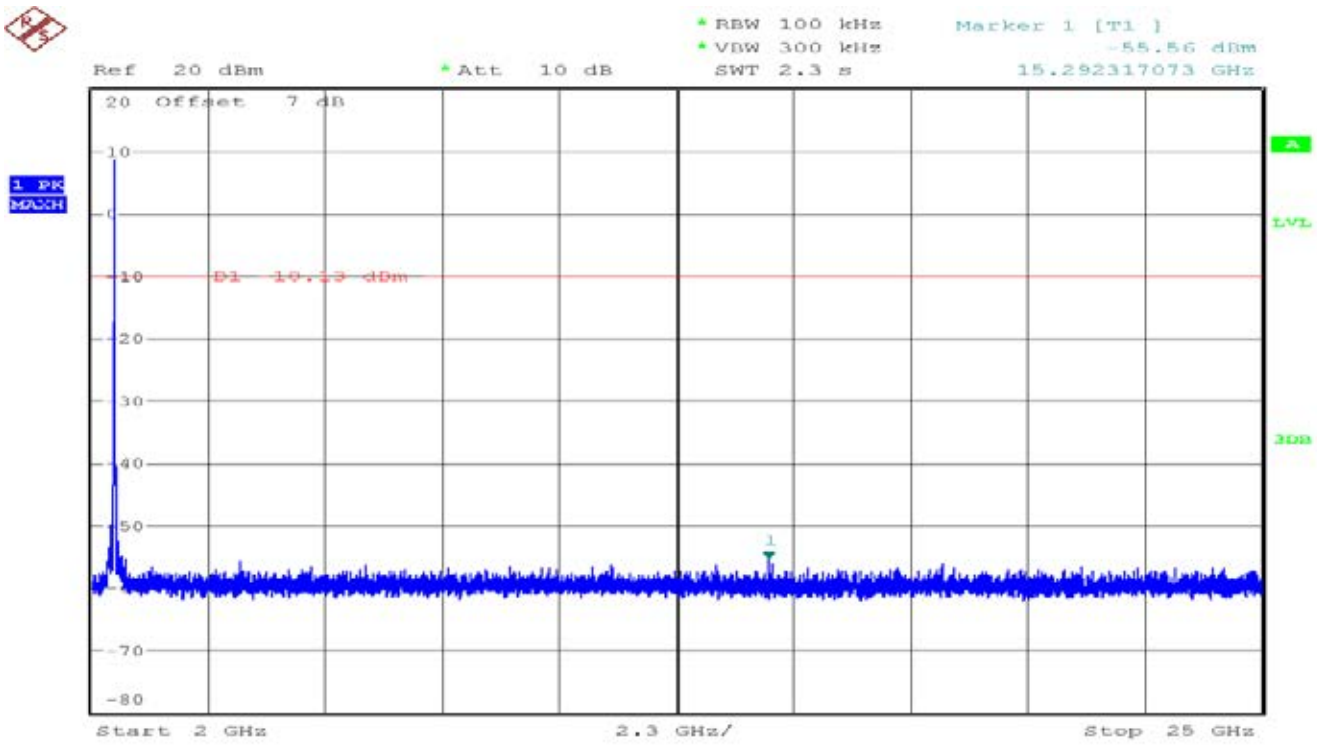

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-50.33 dBm
4.872195122 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -10.63 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
9.87 dBm
2.461437533 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 10.13 dBm
A
LVL
3DB
Center 2.462 GHz
1.298 MHz/
Span 12.98 MHz

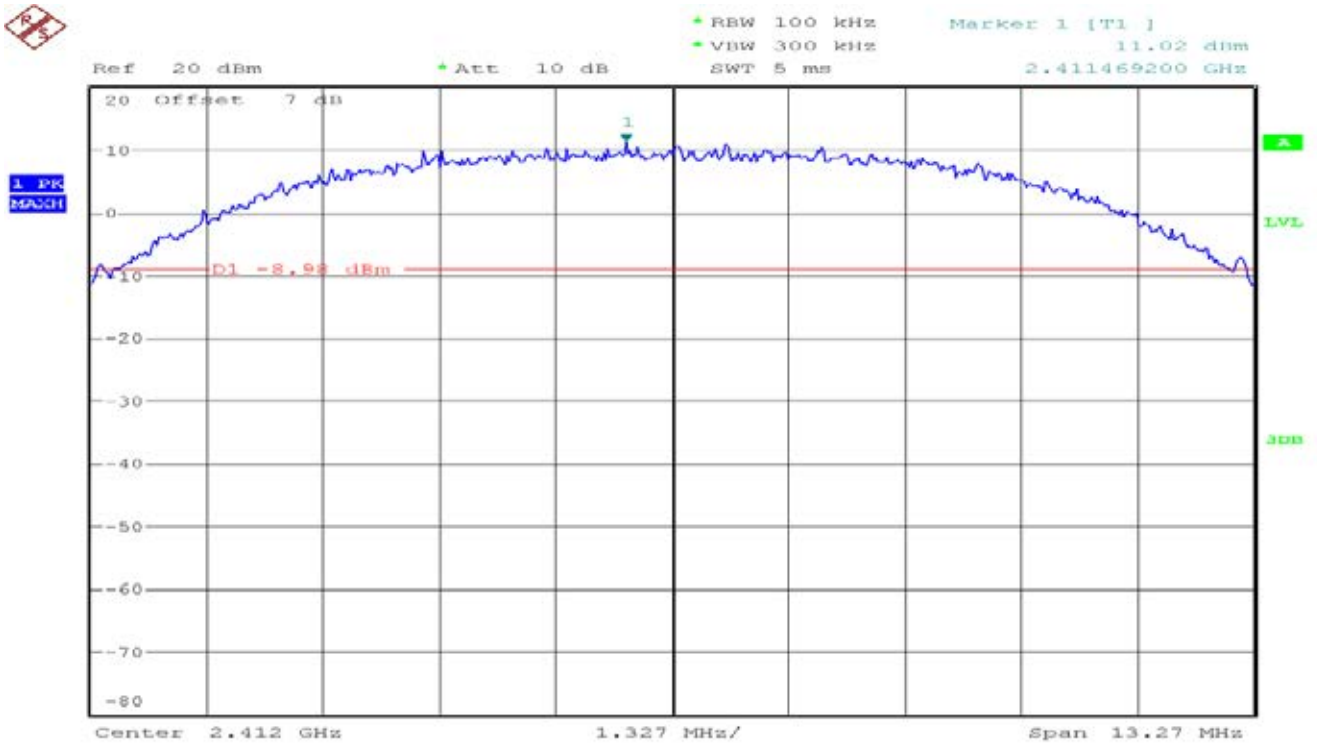

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-43.01 dBm
2.486453049 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
Marker 1 [T1]
-41.24 dBm
2.483500000 GHz
1 PK
MAXH
D1 -10.13 dBm
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

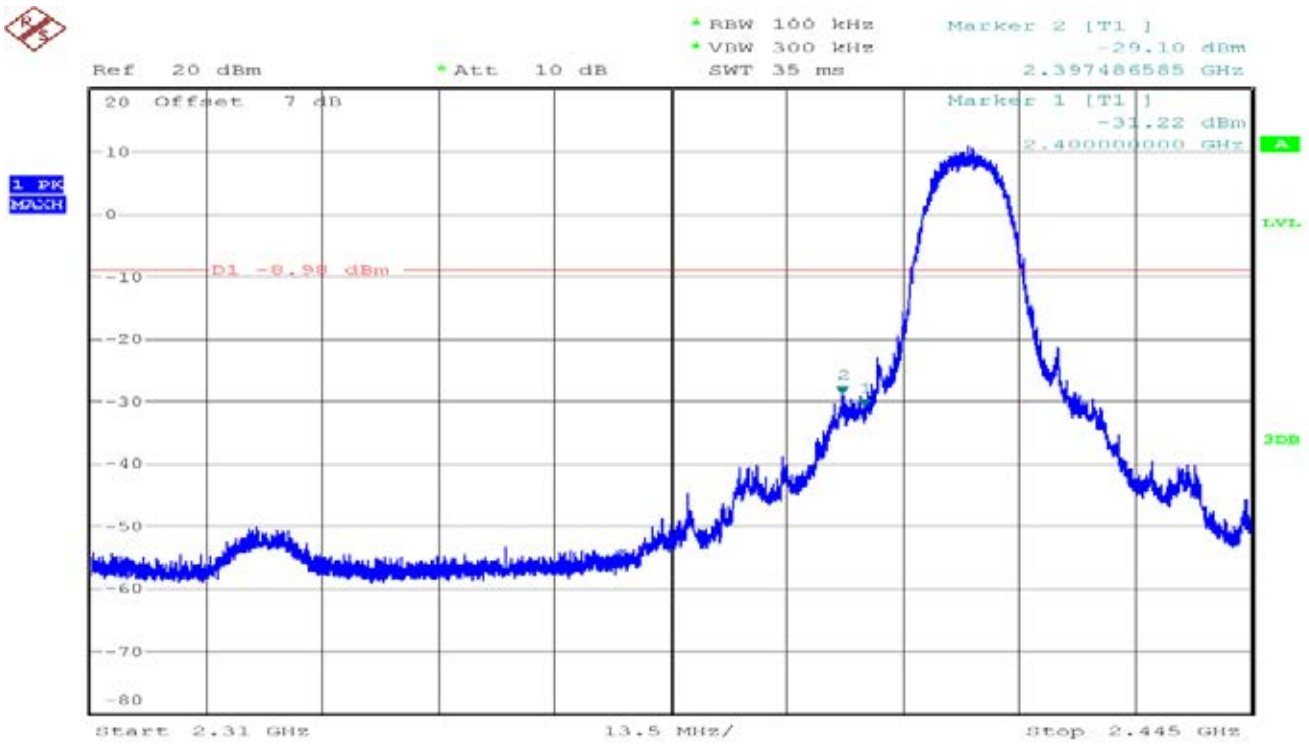

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-25.97 dBm
147.713414634 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -10.13 dBm
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

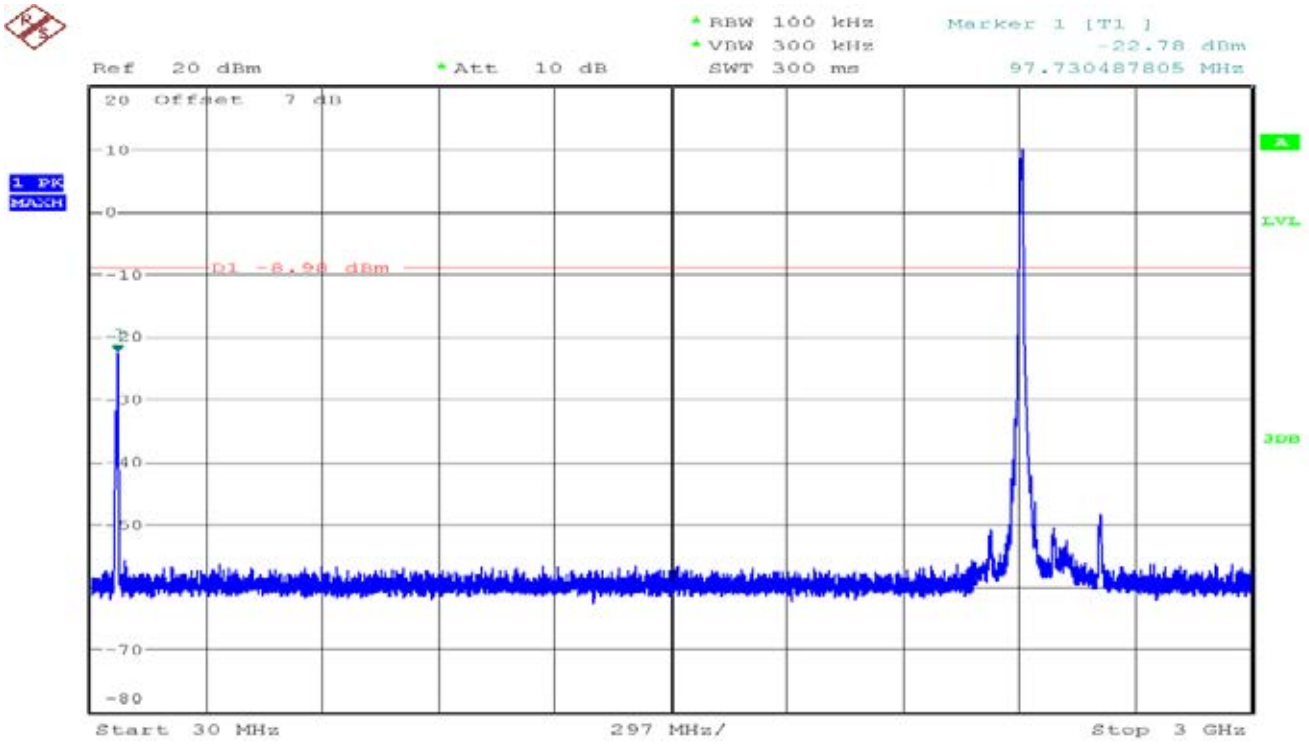


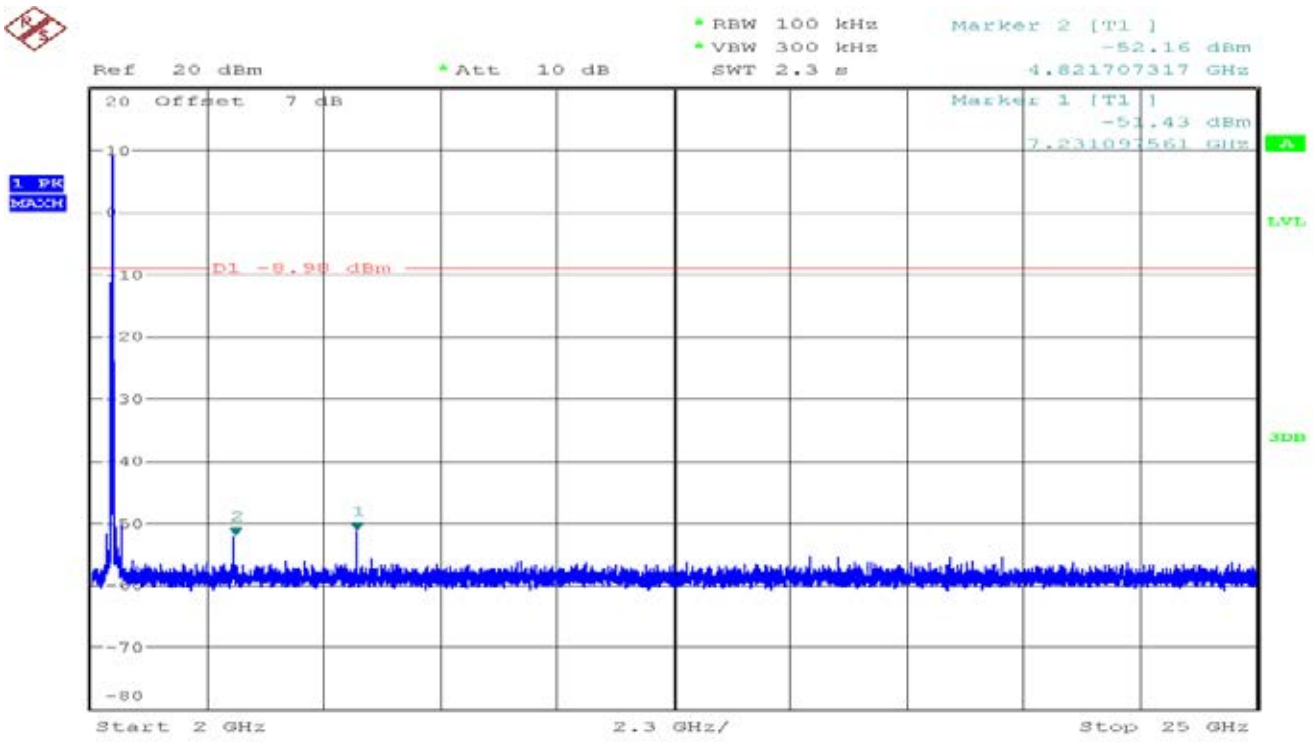
IEEE 802.11b mode/Chain 2

CH Low

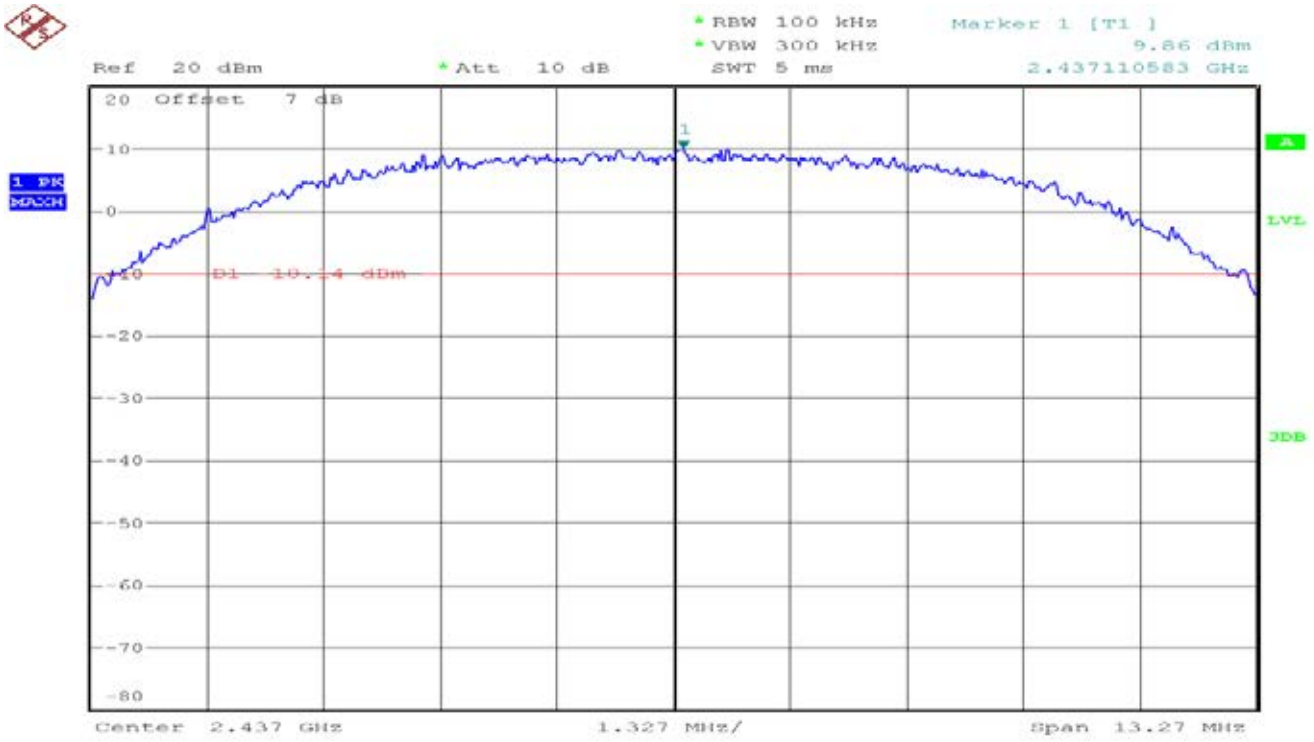


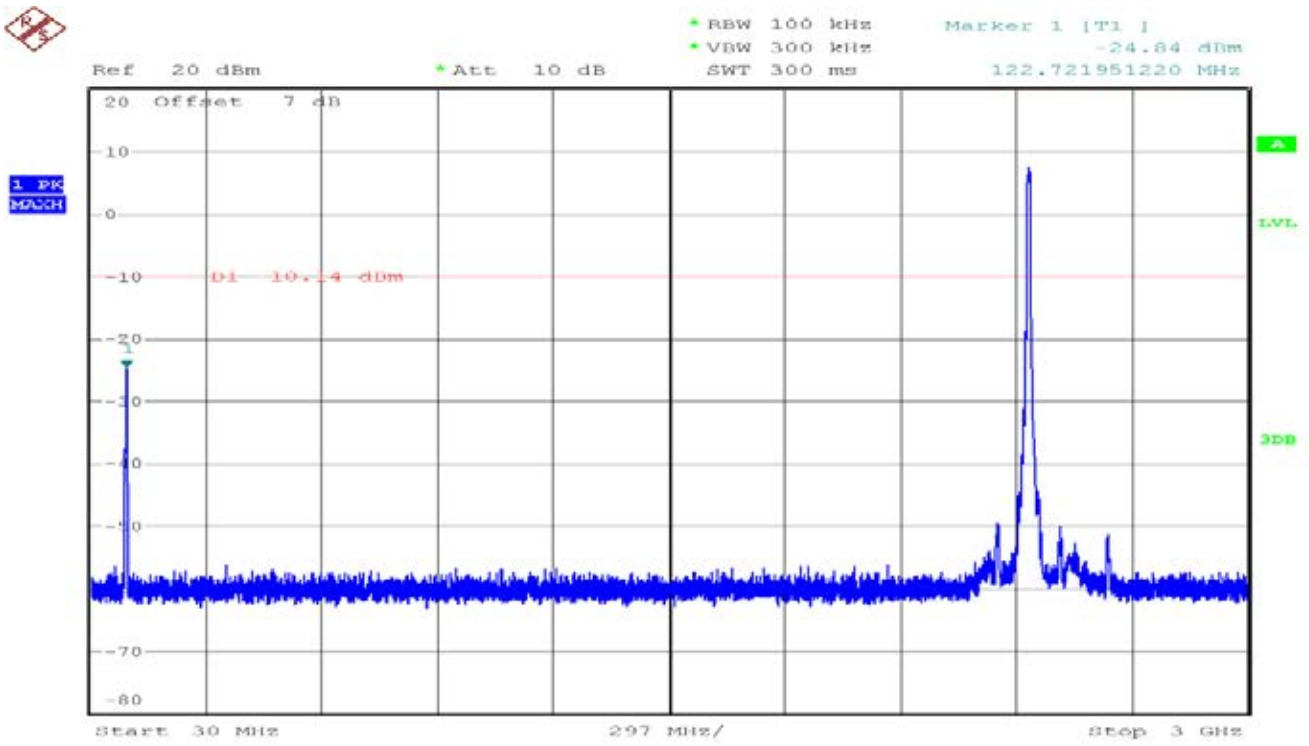

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-29.10 dBm
2.397486585 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
Marker 1 [T1]
-31.22 dBm
2.400000000 GHz
1 PK
MAXH
D1 -8.98 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

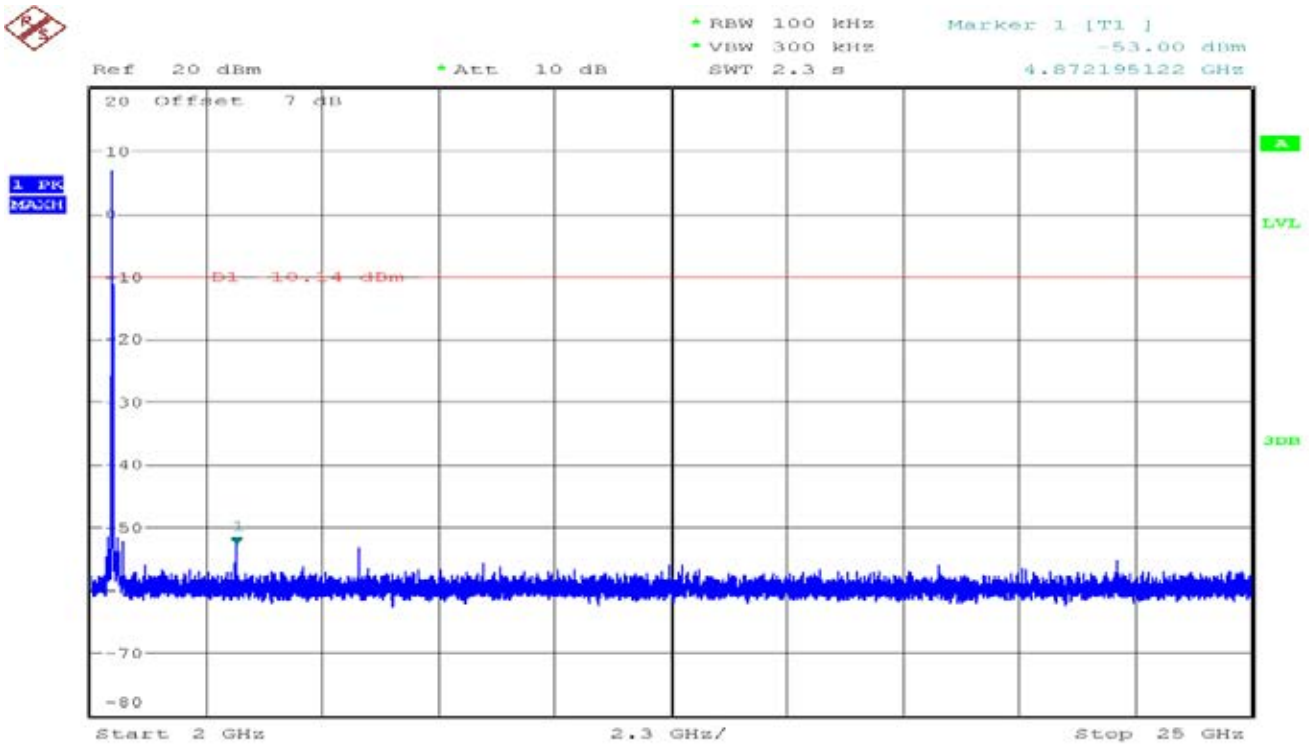

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-22.78 dBm
97.730487805 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -8.98 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 2 [T1]
-52.16 dBm
4.821707317 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
Marker 1 [T1]
-51.43 dBm
7.231097561 GHz
1 PK
MAXH
D1 -9.98 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

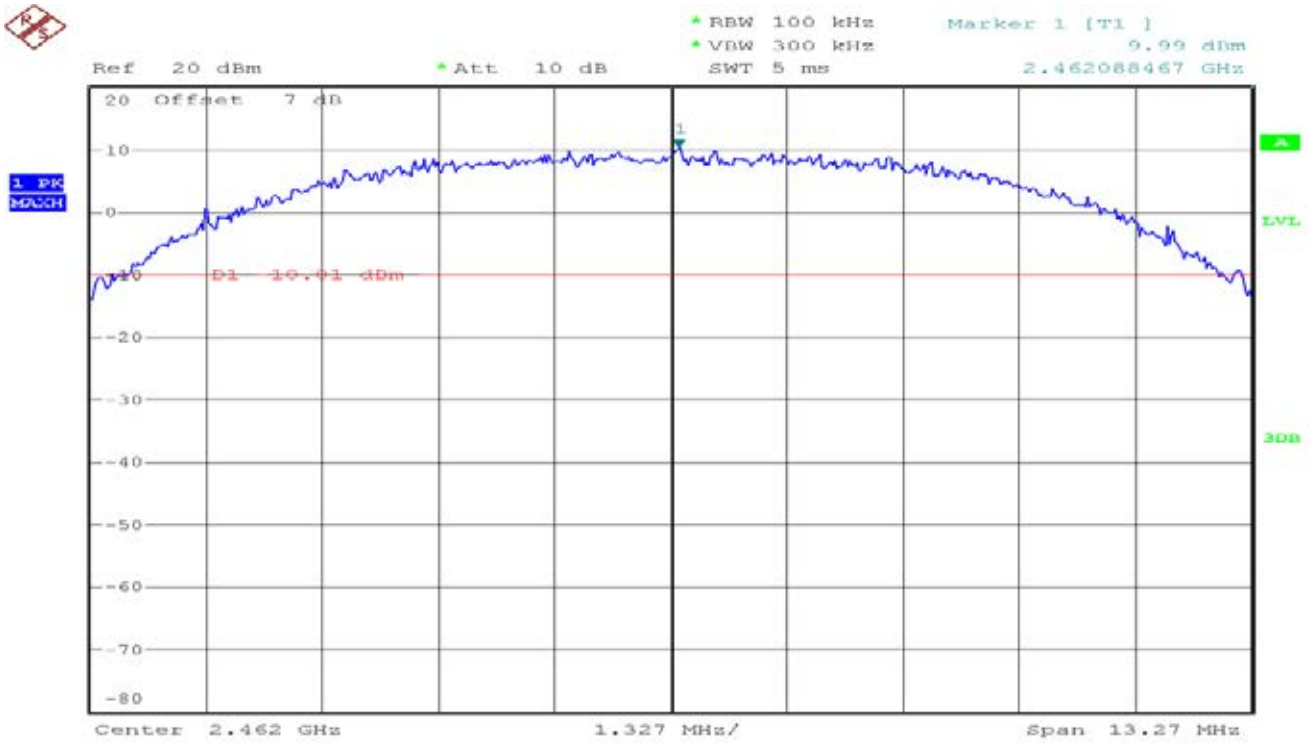
CH Mid

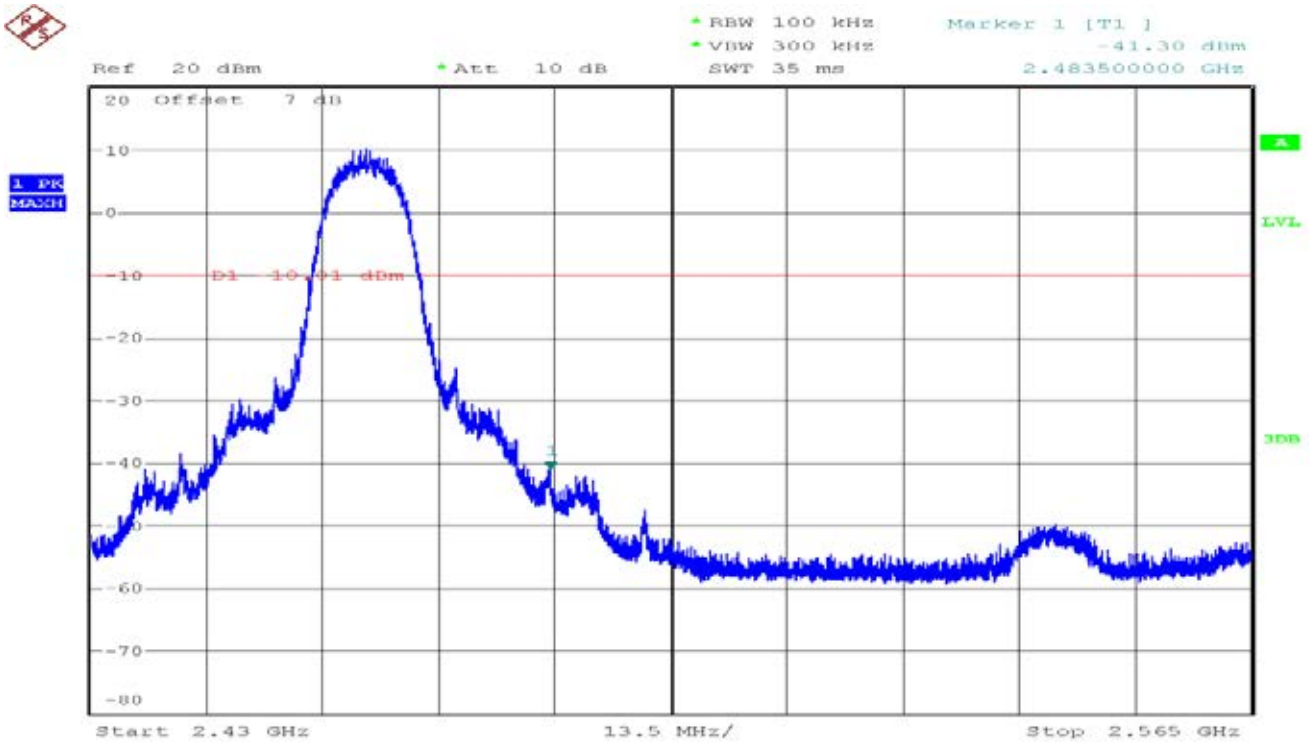

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
9.86 dBm
2.437110583 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -10.14 dBm
Center 2.437 GHz
1.327 MHz/
Span 13.27 MHz

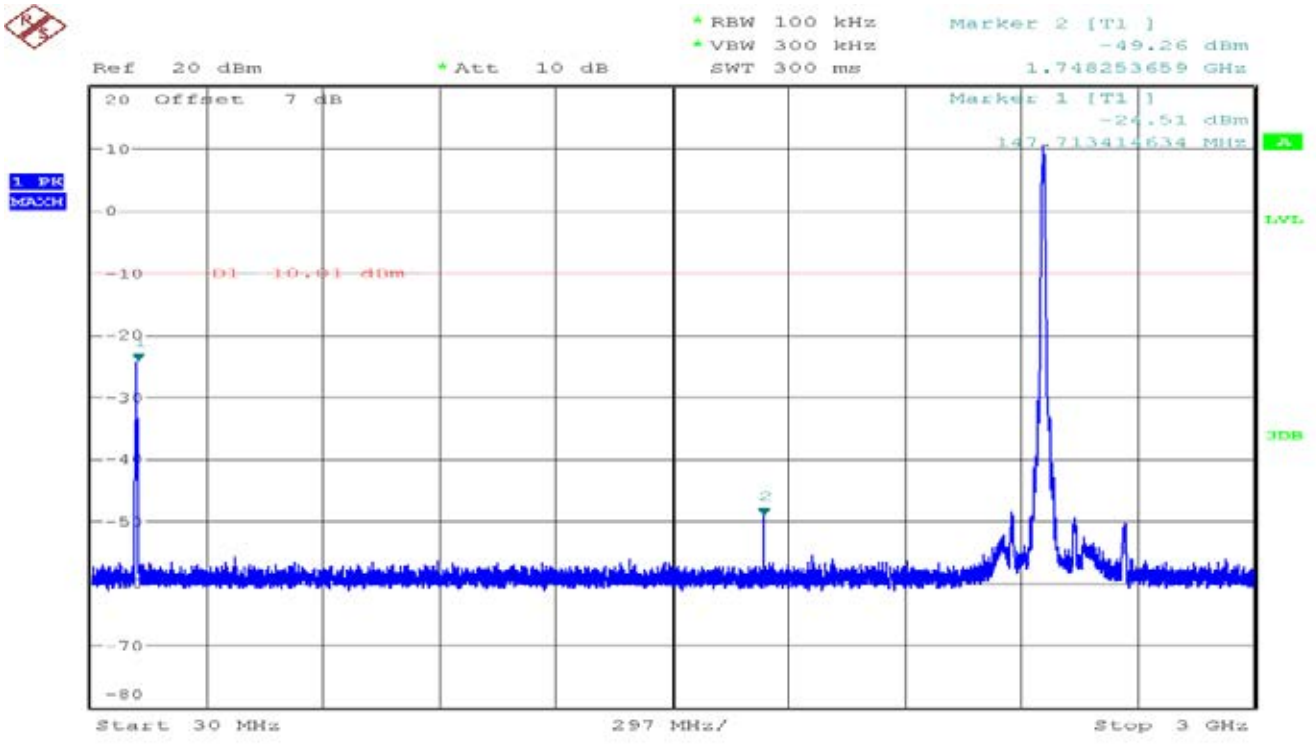

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-24.84 dBm
122.721951220 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.14 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

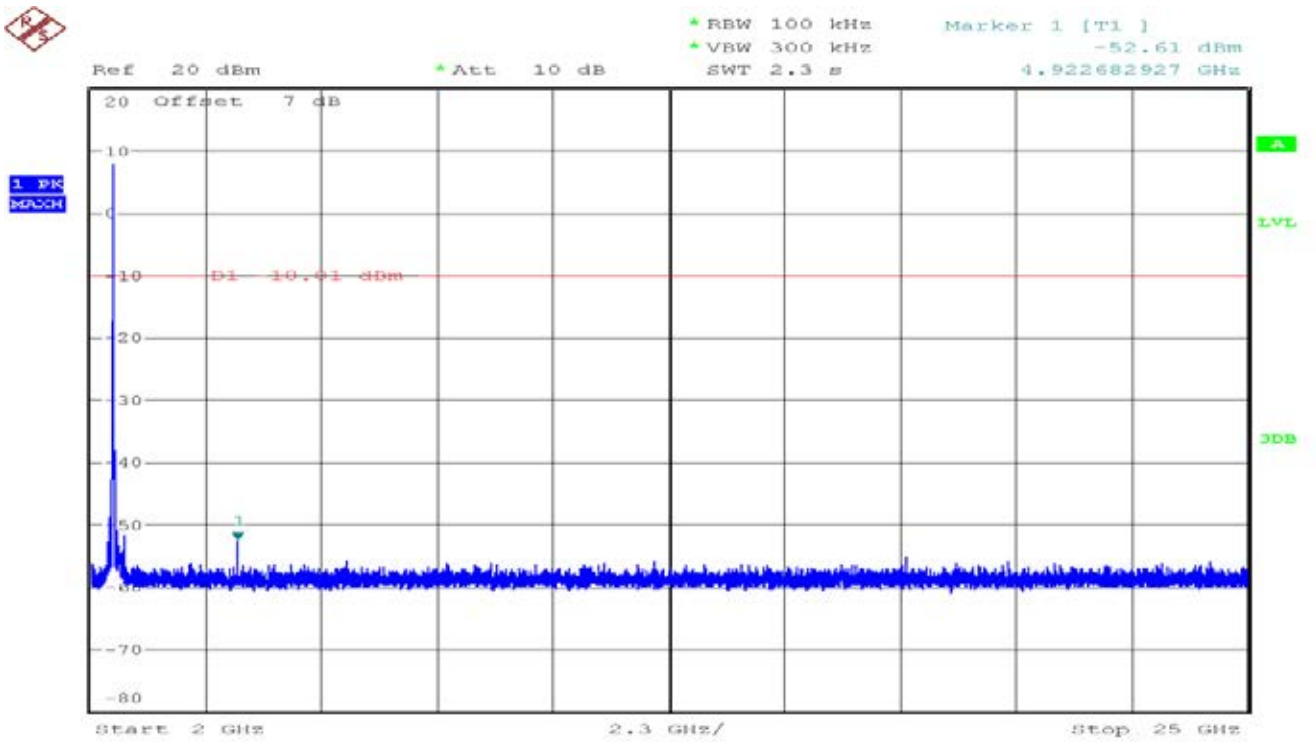

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-53.00 dBm
4.872195122 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.14 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
9.99 dBm
2.462088467 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.01 dBm
A
LVL
3DB
Center 2.462 GHz
1.327 MHz/
Span 13.27 MHz

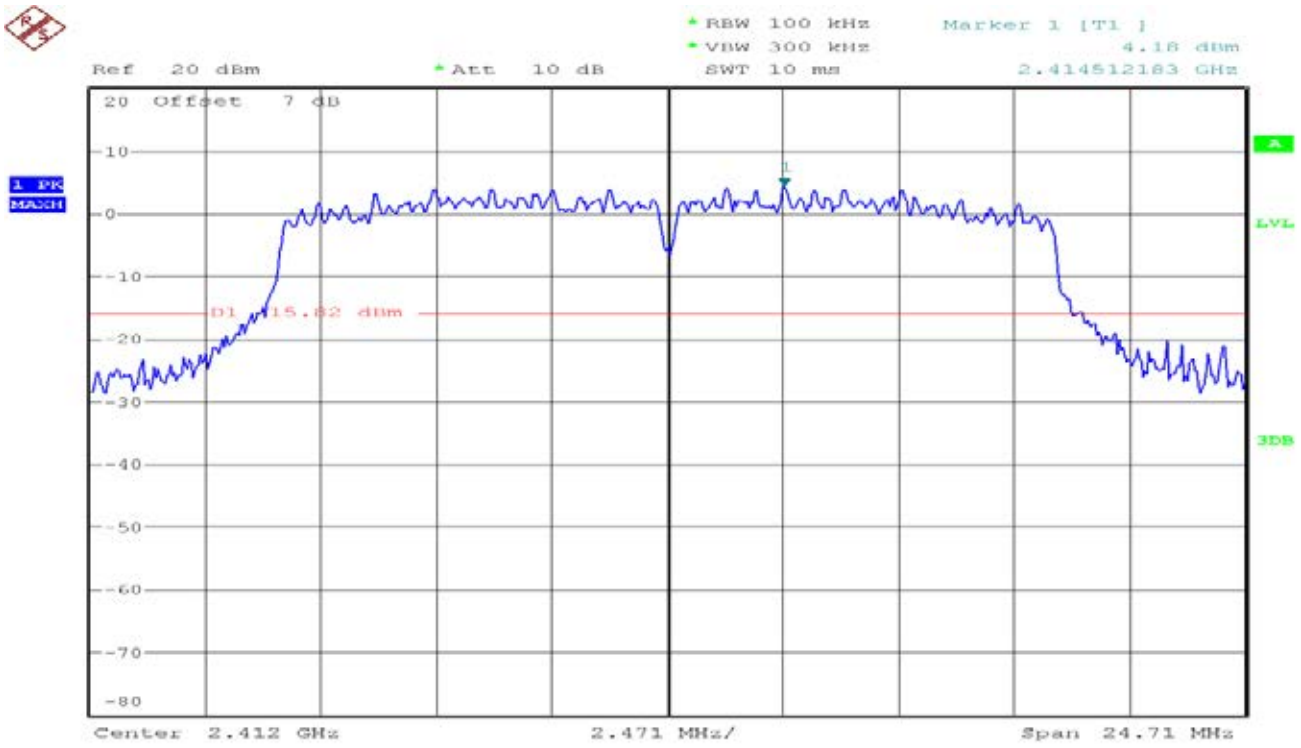

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-41.30 dBm
2.483500000 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.01 dBm
A
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

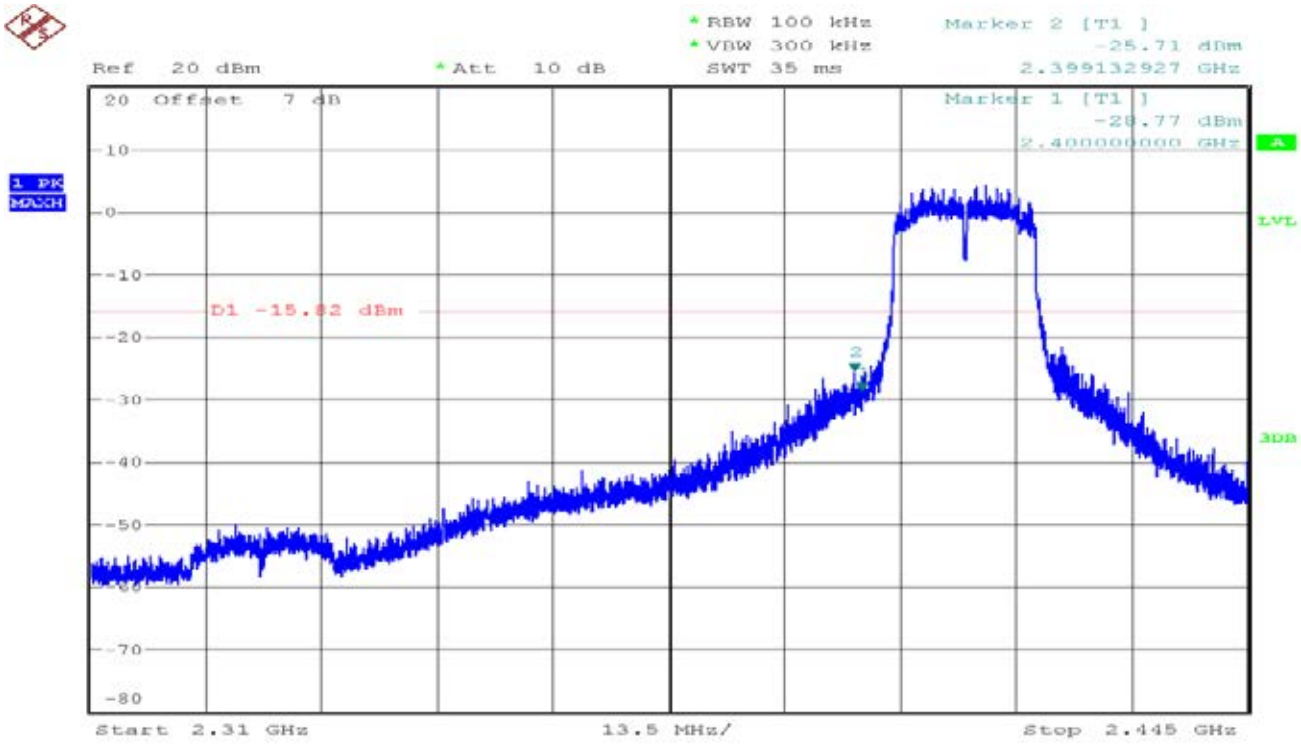

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 2 [T1]
-49.26 dBm
1.748253659 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
Marker 1 [T1]
-24.51 dBm
147.713414634 MHz
1 PK
MAXH
D1 -10.61 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

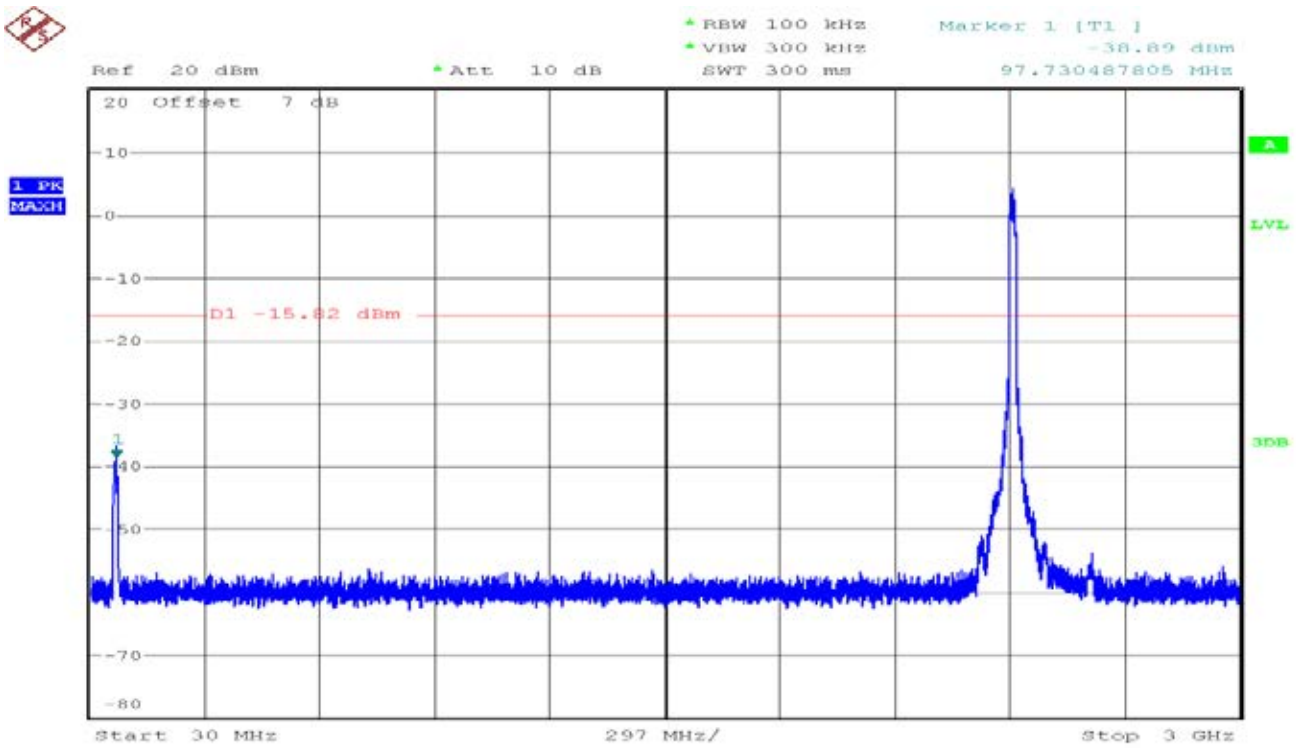

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-52.61 dBm
4.922682927 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.61 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

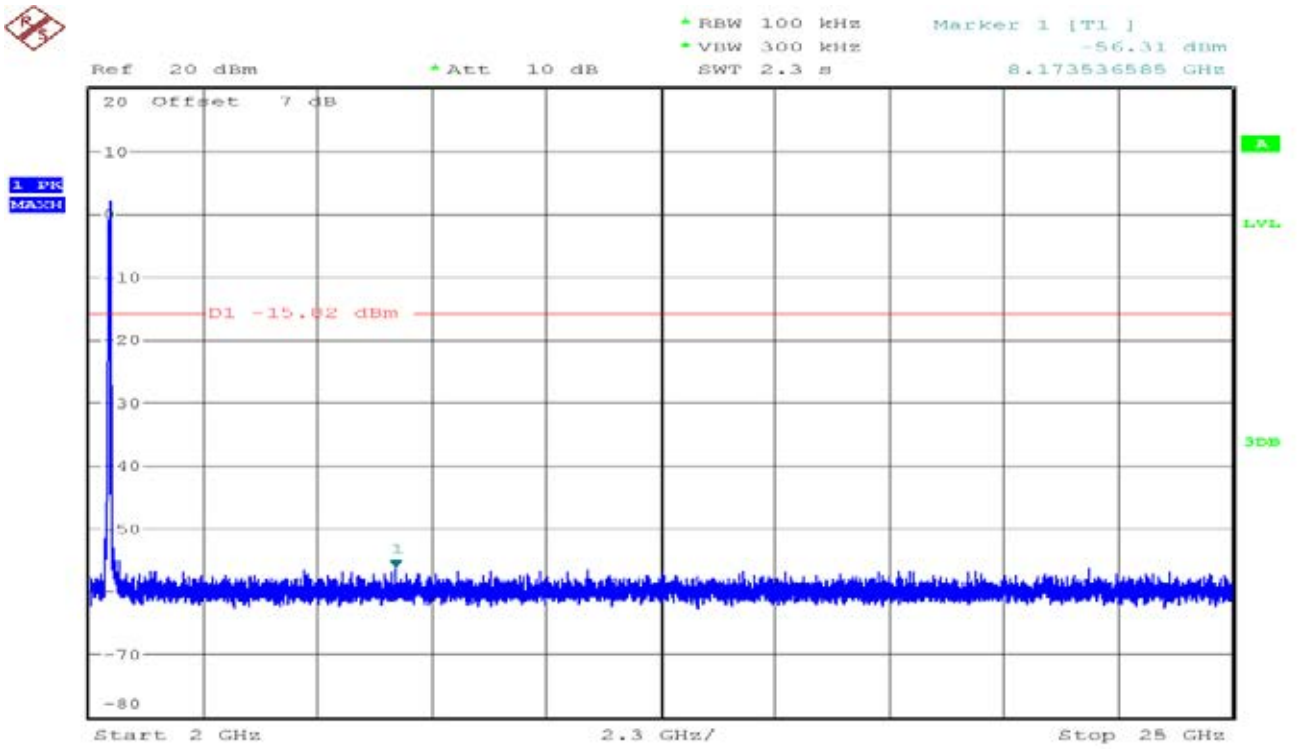
IEEE 802.11g mode/Chain 1

CH Low

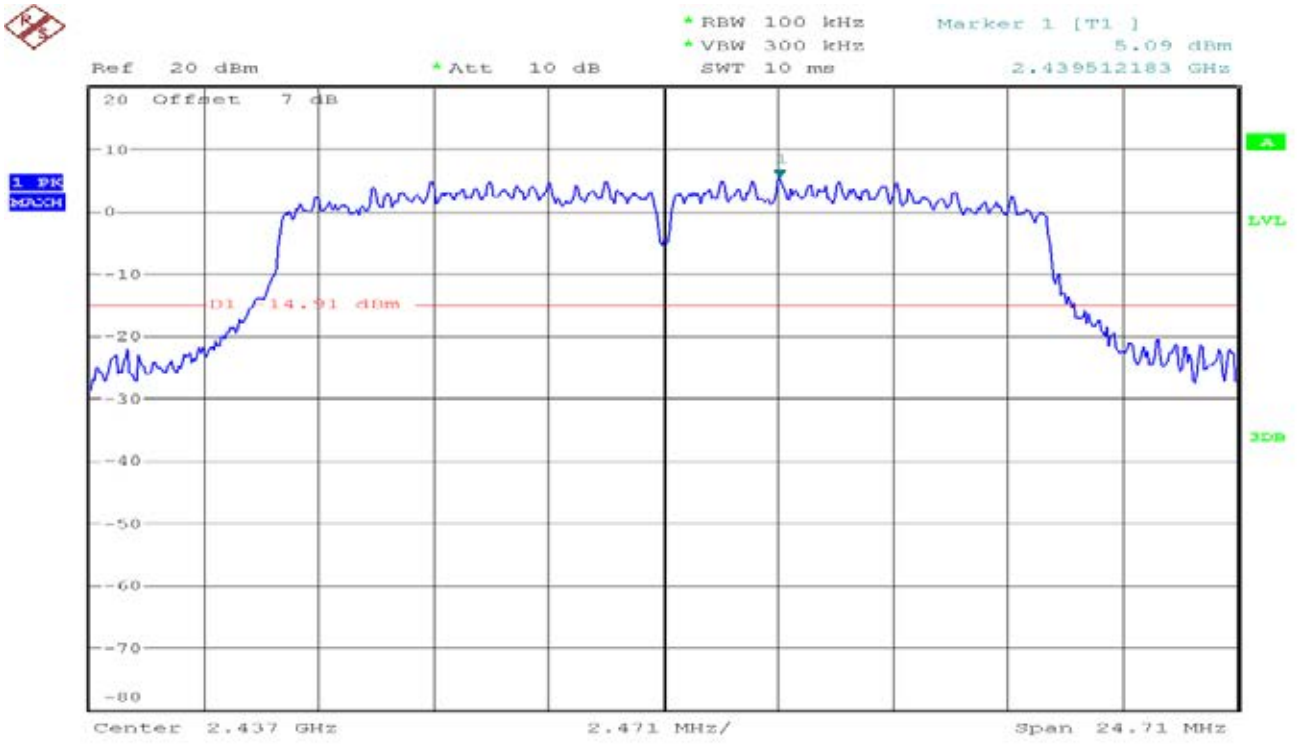


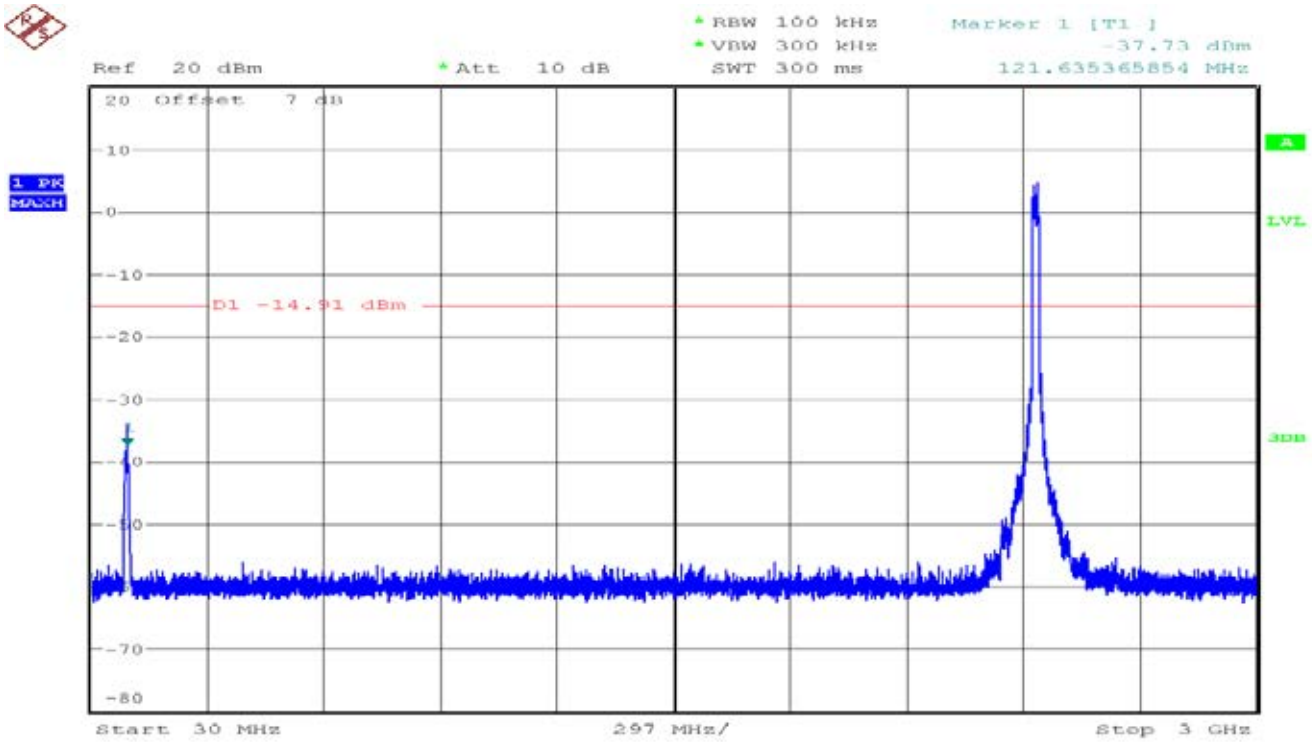


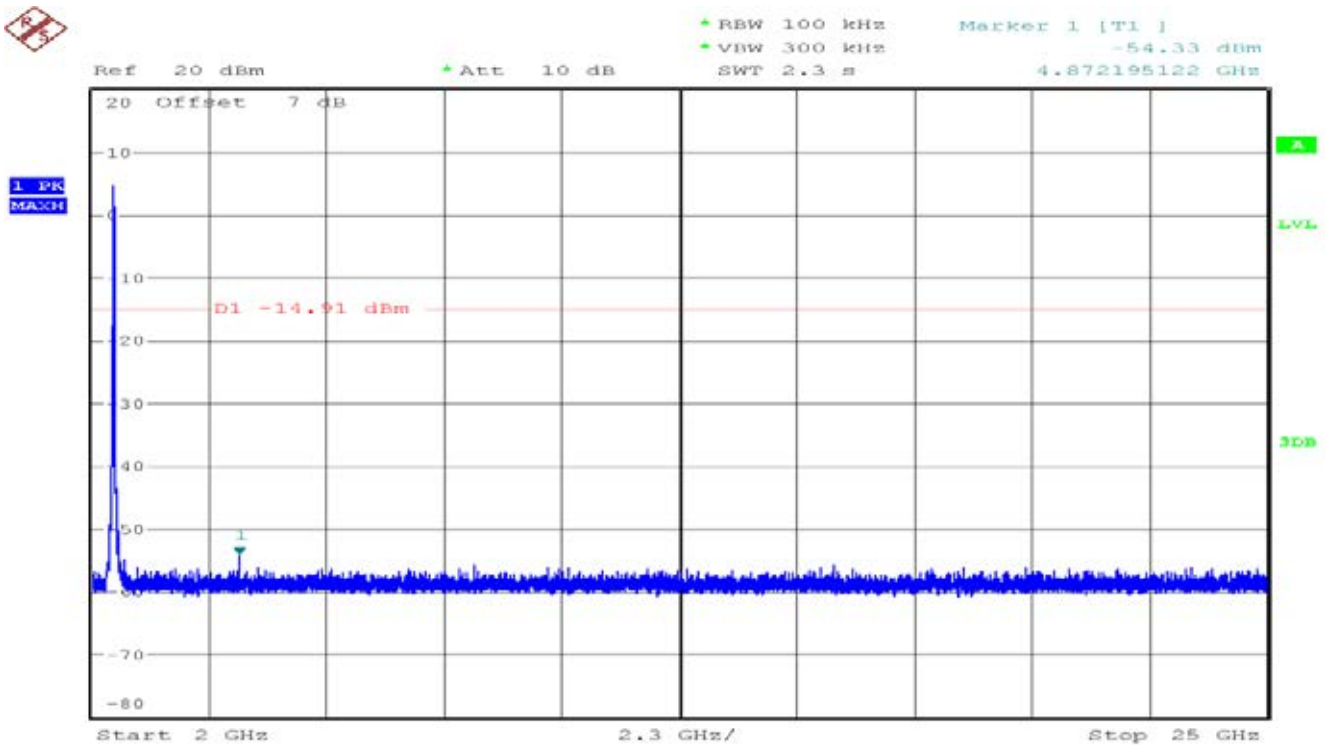

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-38.89 dBm
97.730487805 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -15.82 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-56.31 dBm
8.173536585 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -15.82 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

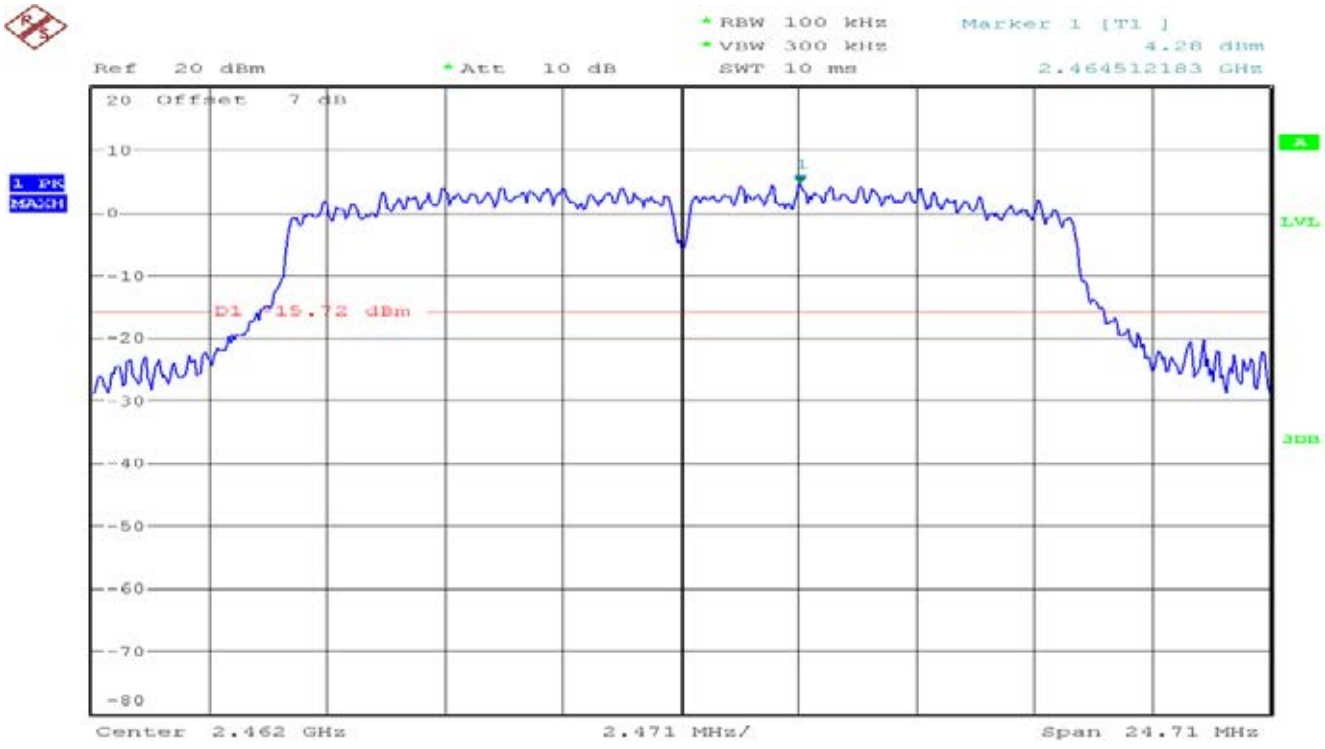
CH Mid

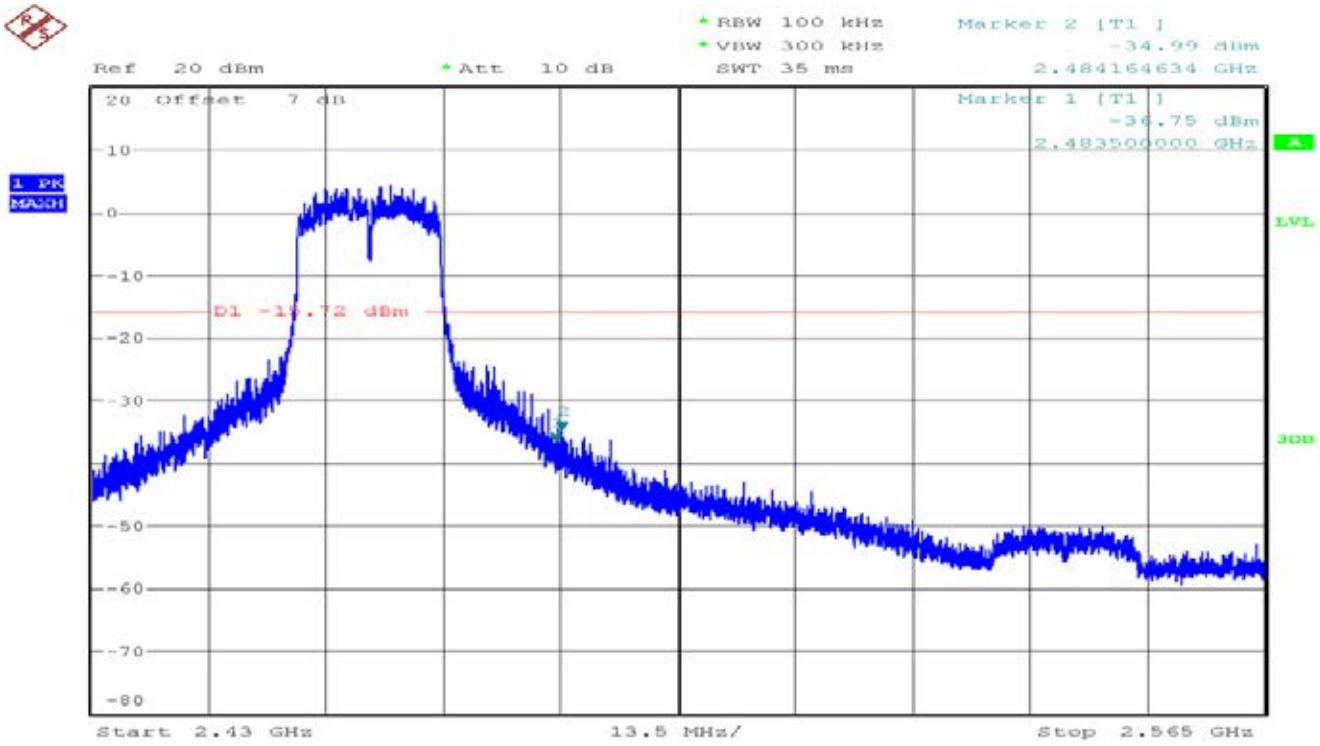

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
5.09 dBm
2.439512183 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -14.91 dBm
A
LVL
3DB
Center 2.437 GHz
2.471 MHz/
Span 24.71 MHz

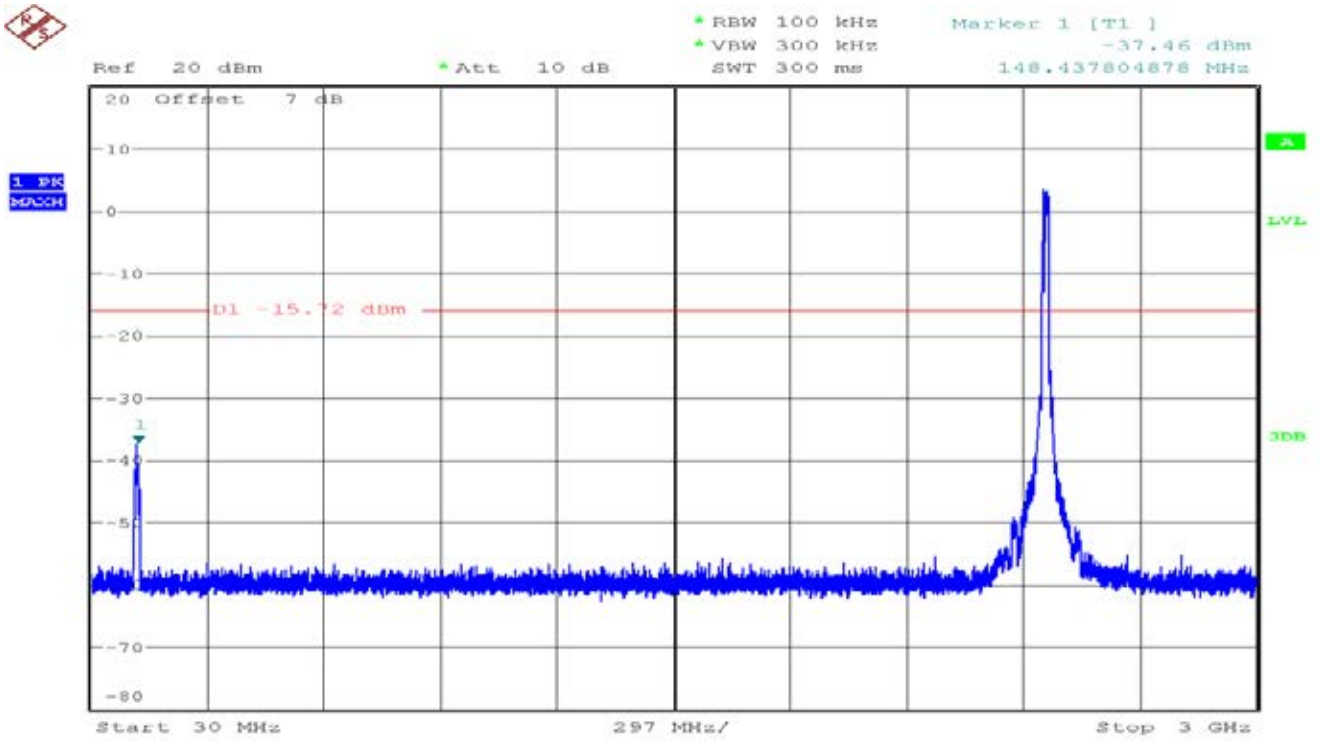

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-37.73 dBm
121.635365854 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -14.91 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

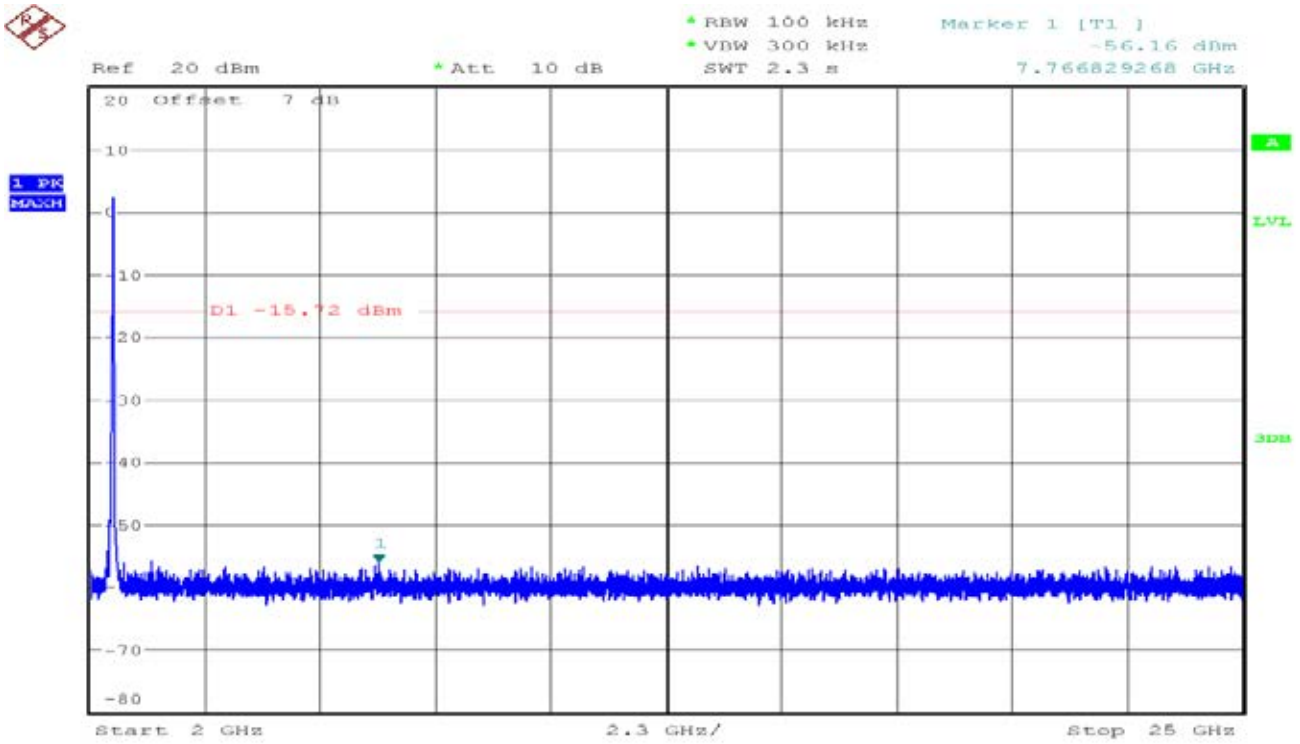

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-54.33 dBm
4.872195122 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -14.91 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
4.28 dBm
2.464512183 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -15.72 dBm
A
LVL
3DB
Center 2.462 GHz
2.471 MHz/
Span 24.71 MHz

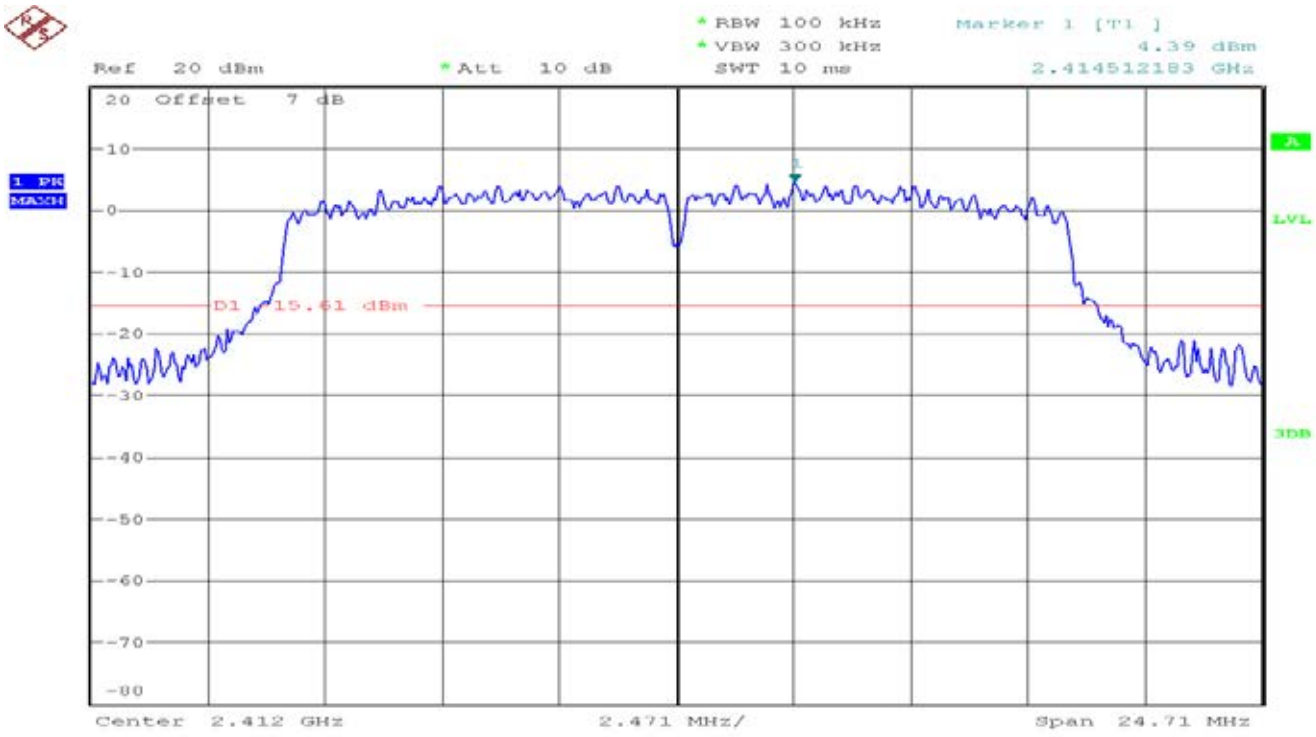

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-34.99 dBm
2.484164634 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
Marker 1 [T1]
-36.75 dBm
2.483500000 GHz
1 PK
MAXH
D1 -15.72 dBm
A
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

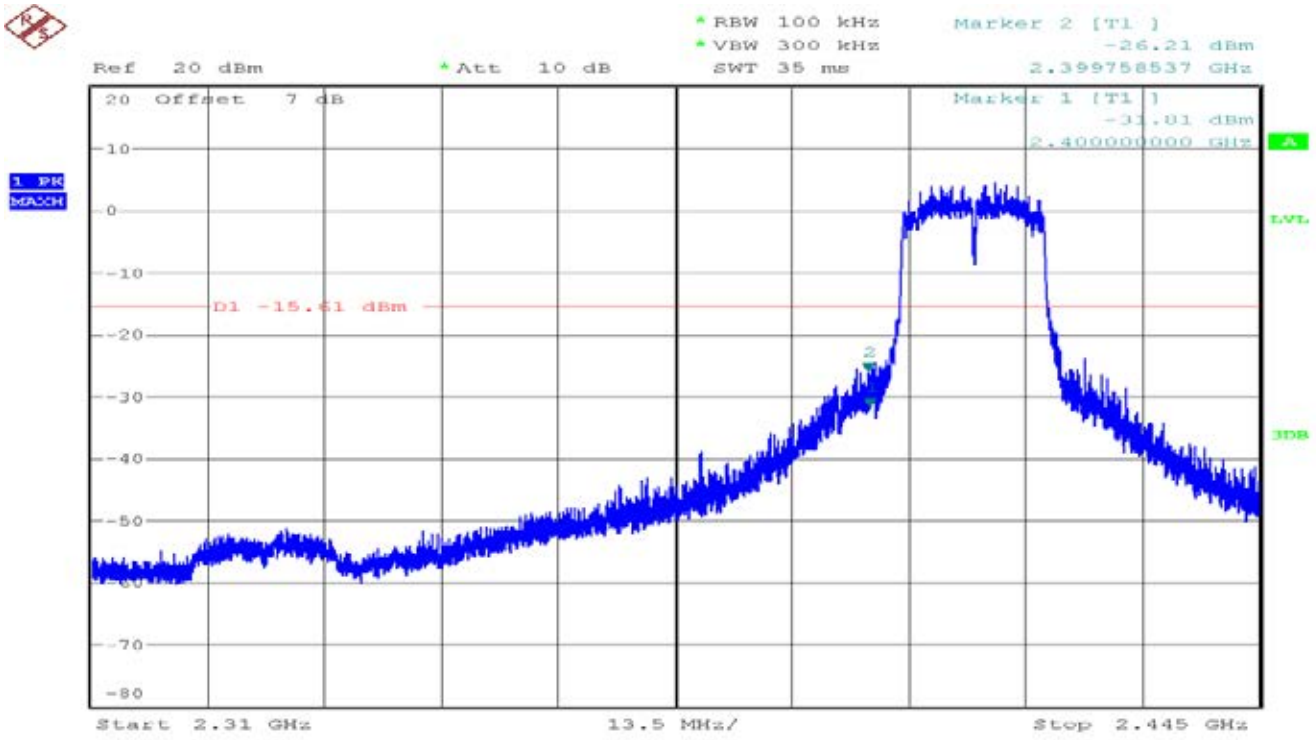

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-37.46 dBm
148.437804878 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -15.72 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

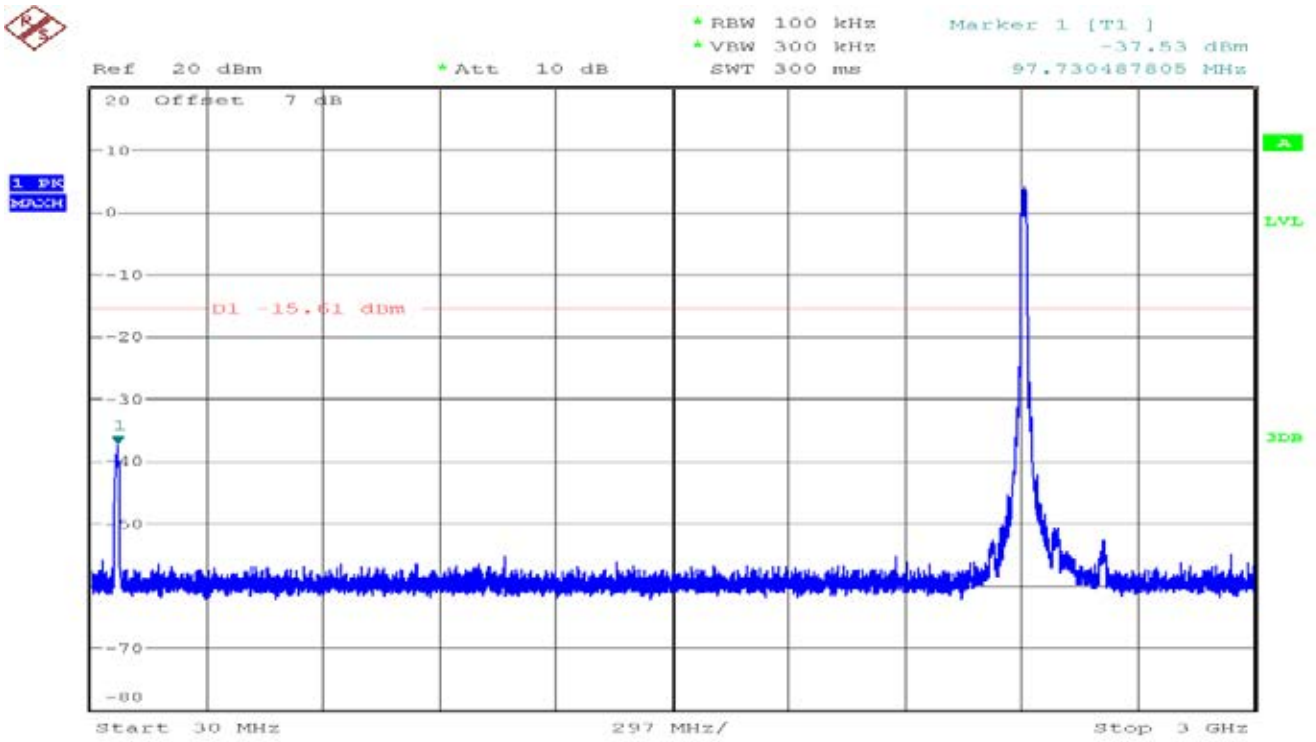


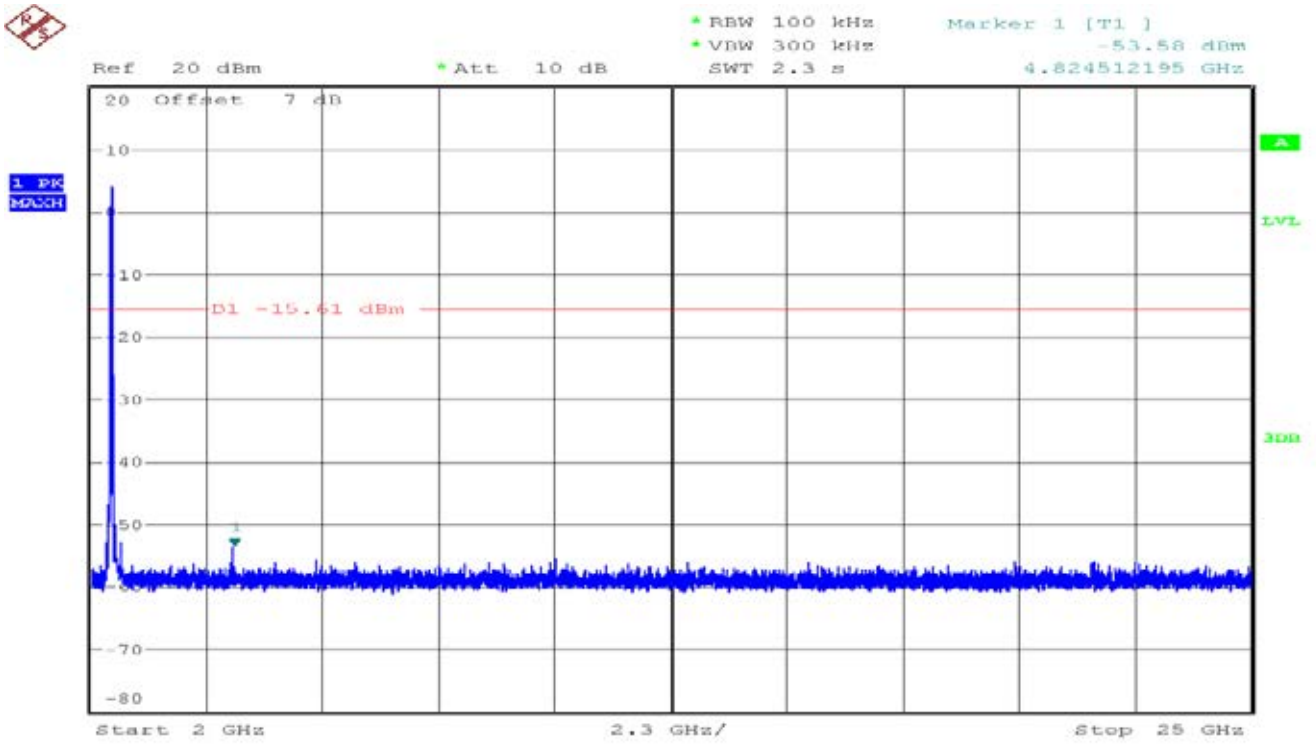
IEEE 802.11g mode/Chain 2

CH Low

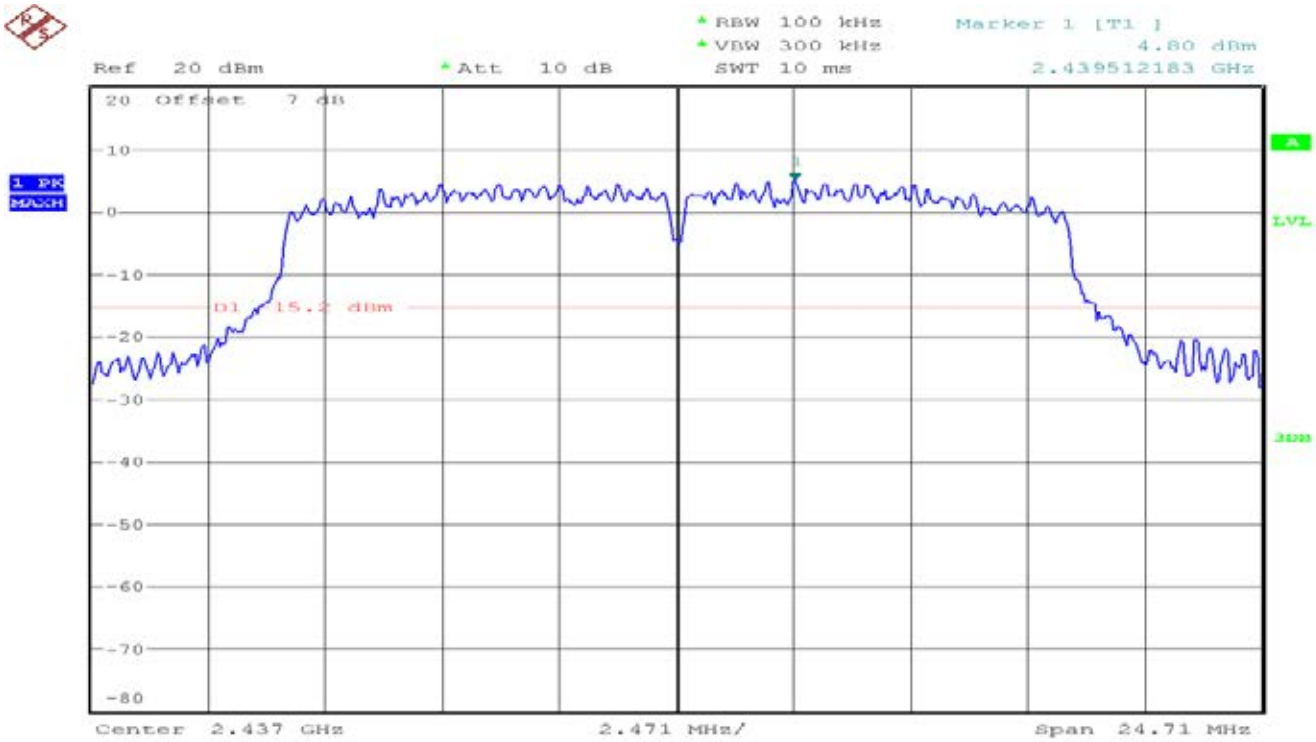


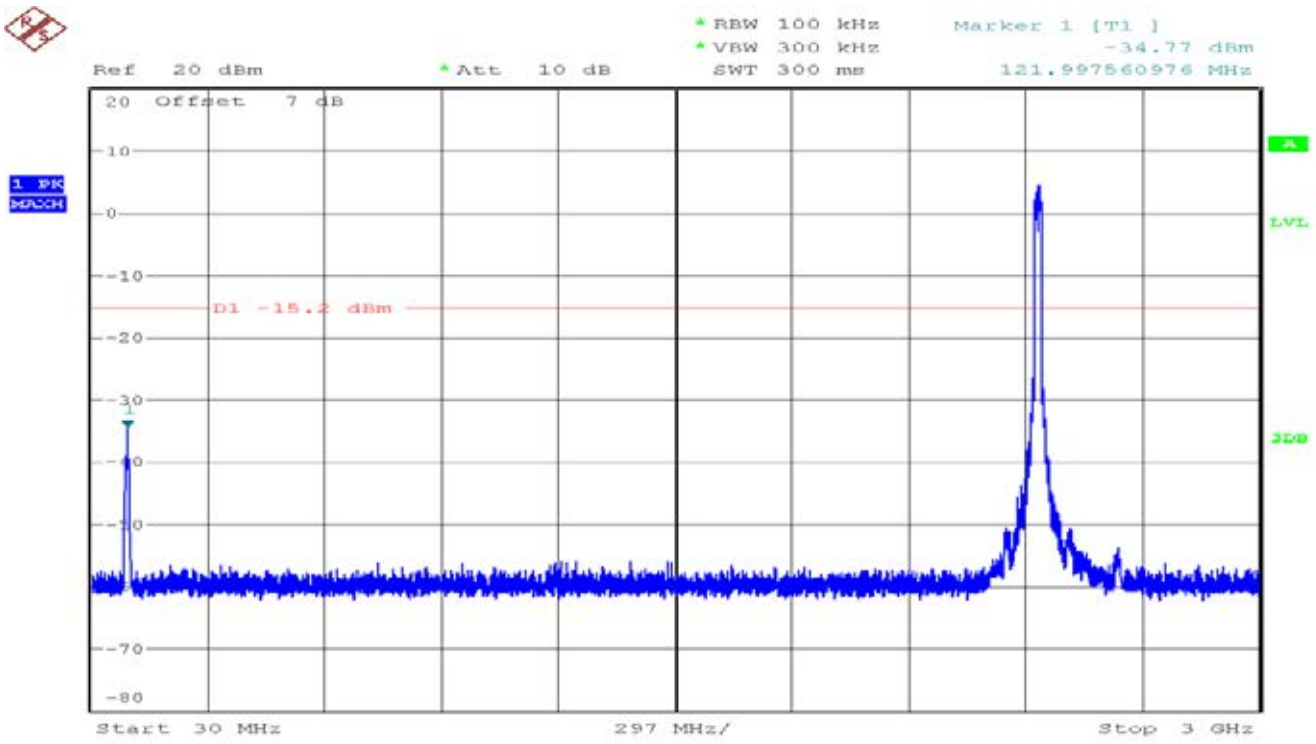

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-26.21 dBm
2.399758537 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
Marker 1 [T1]
-31.01 dBm
2.400000000 GHz
1 PK
MAXH
D1 -15.61 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

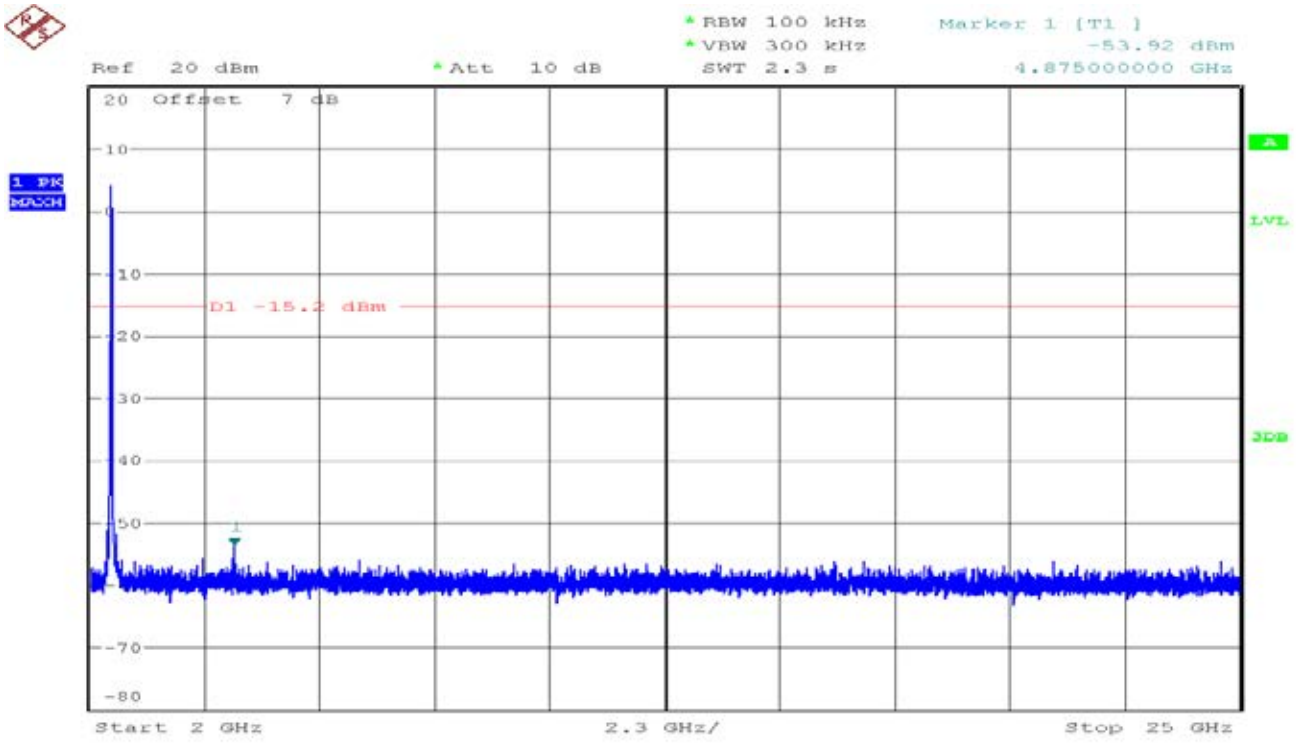

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-37.53 dBm
97.730487805 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -15.61 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-53.58 dBm
4.824512195 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
D1 -15.61 dBm
1 PK
MAXH
Start 2 GHz
2.3 GHz/
Stop 25 GHz

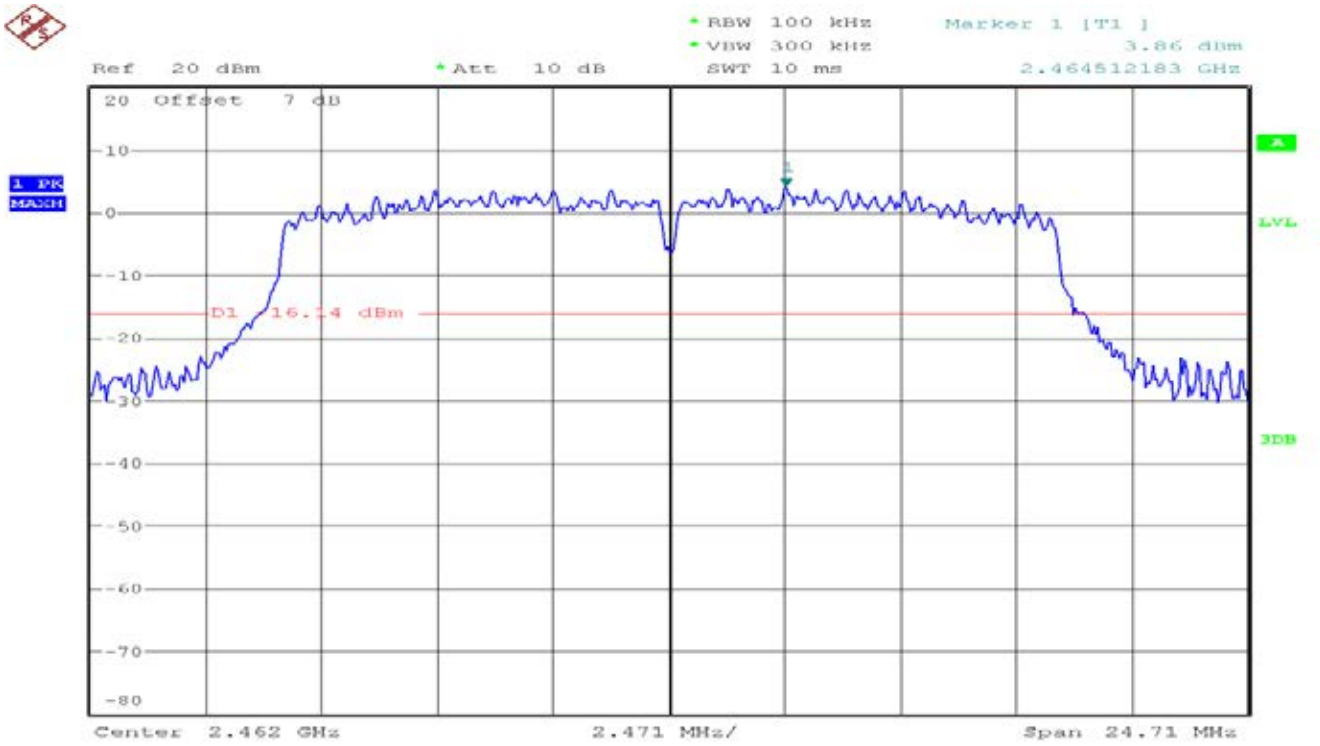
CH Mid

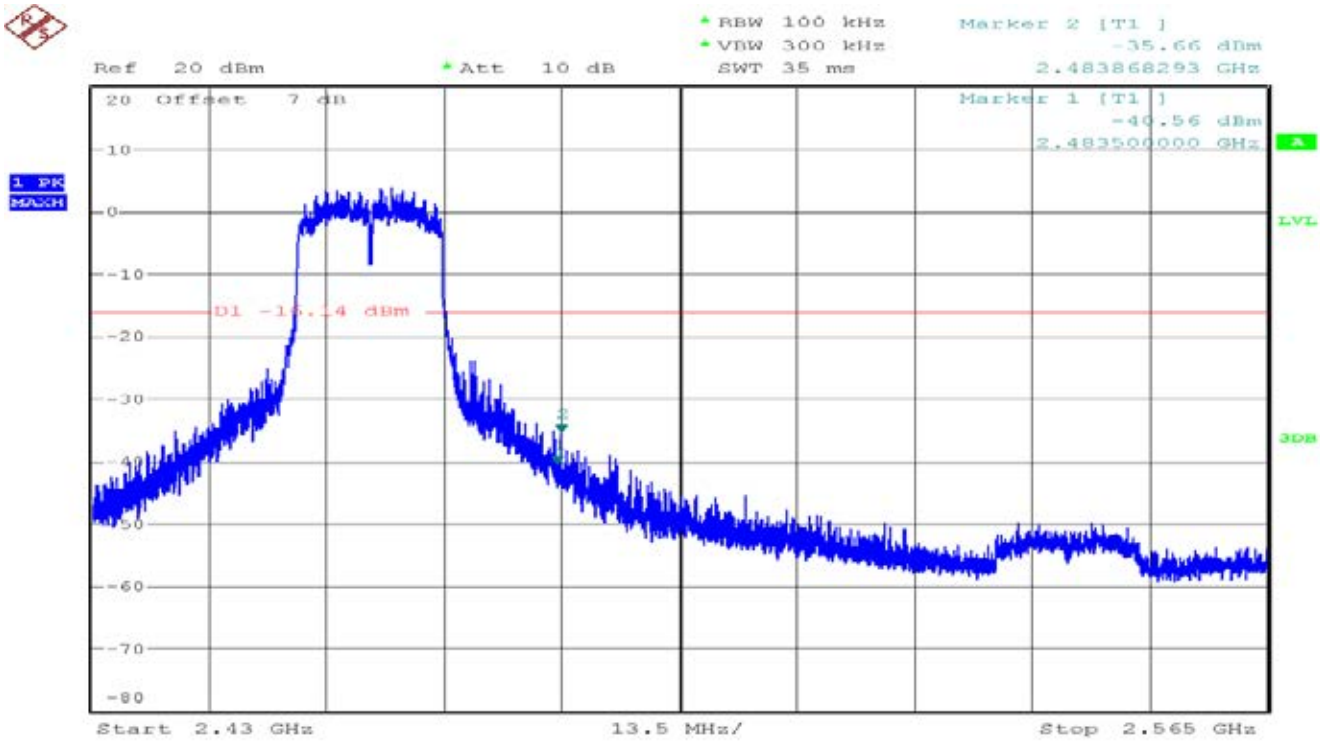

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
4.80 dBm
2.439512183 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
D1 15.2 dBm
1 PK
MAXH
Center 2.437 GHz
2.471 MHz/
Span 24.71 MHz

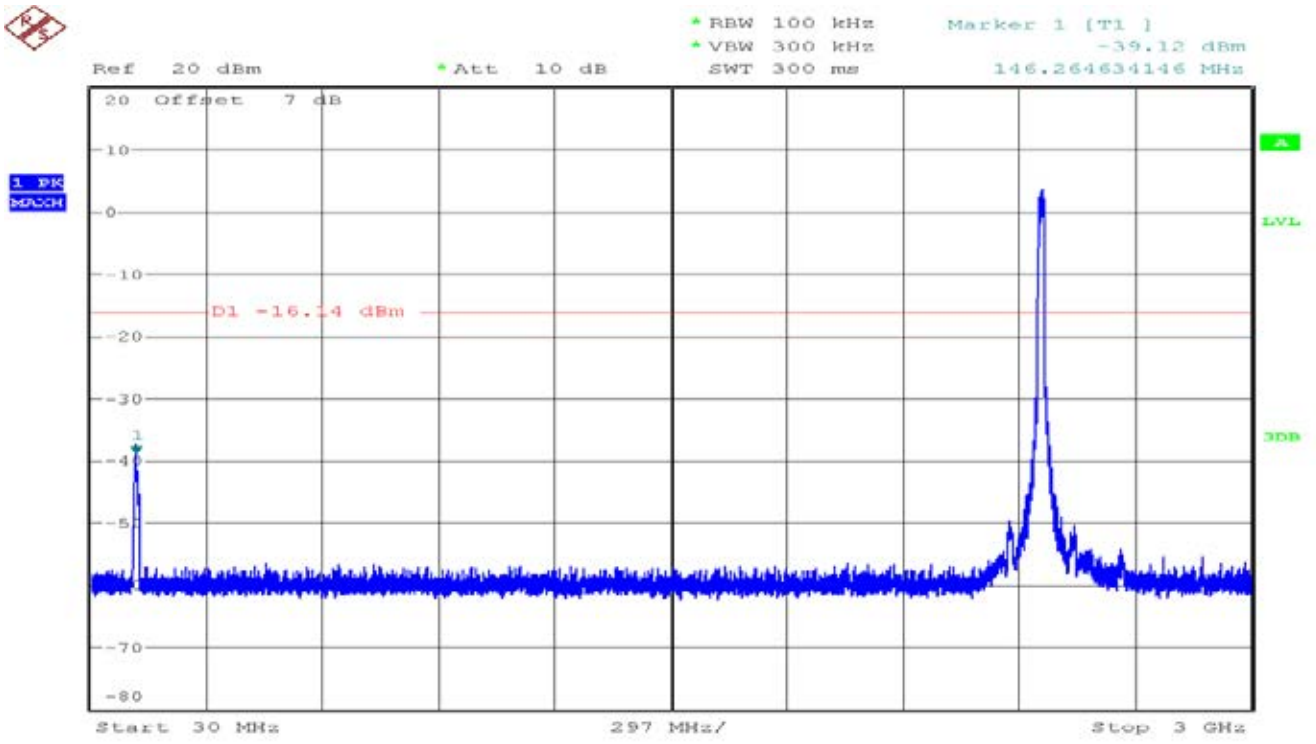

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-34.77 dBm
121.997560976 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -15.2 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

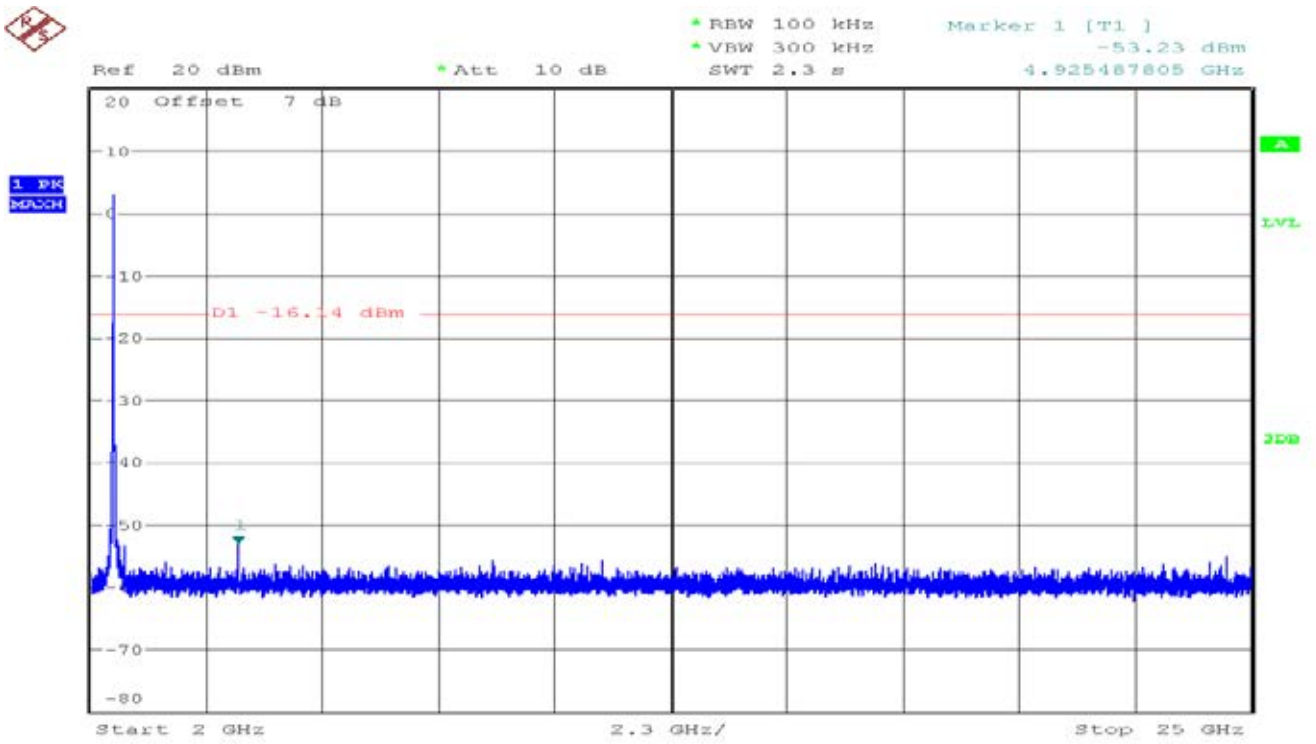

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-53.92 dBm
4.875000000 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -15.2 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
3.86 dBm
2.464512183 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 16.14 dBm
A
LVL
3DB
Center 2.462 GHz
2.471 MHz/
Span 24.71 MHz

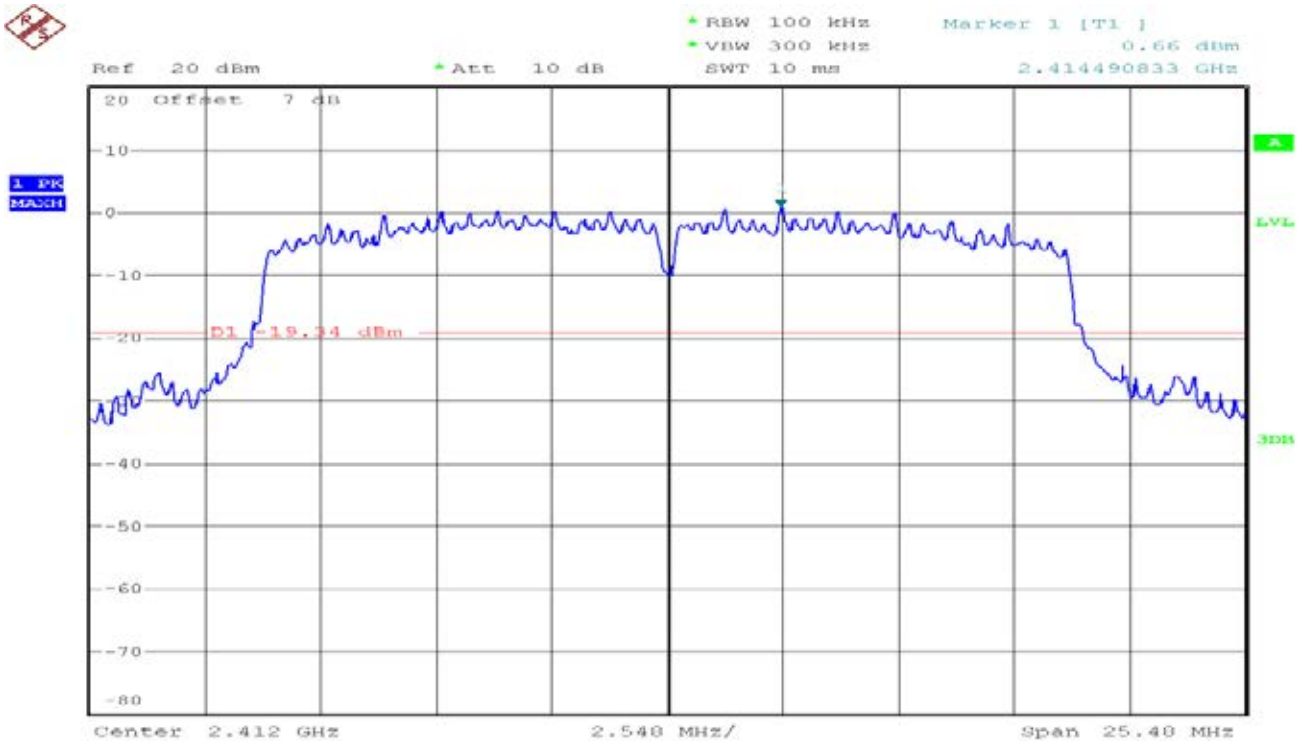

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-35.66 dBm
2.483868293 GHz
Marker 1 [T1]
-40.56 dBm
2.483500000 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -16.14 dBm
A
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

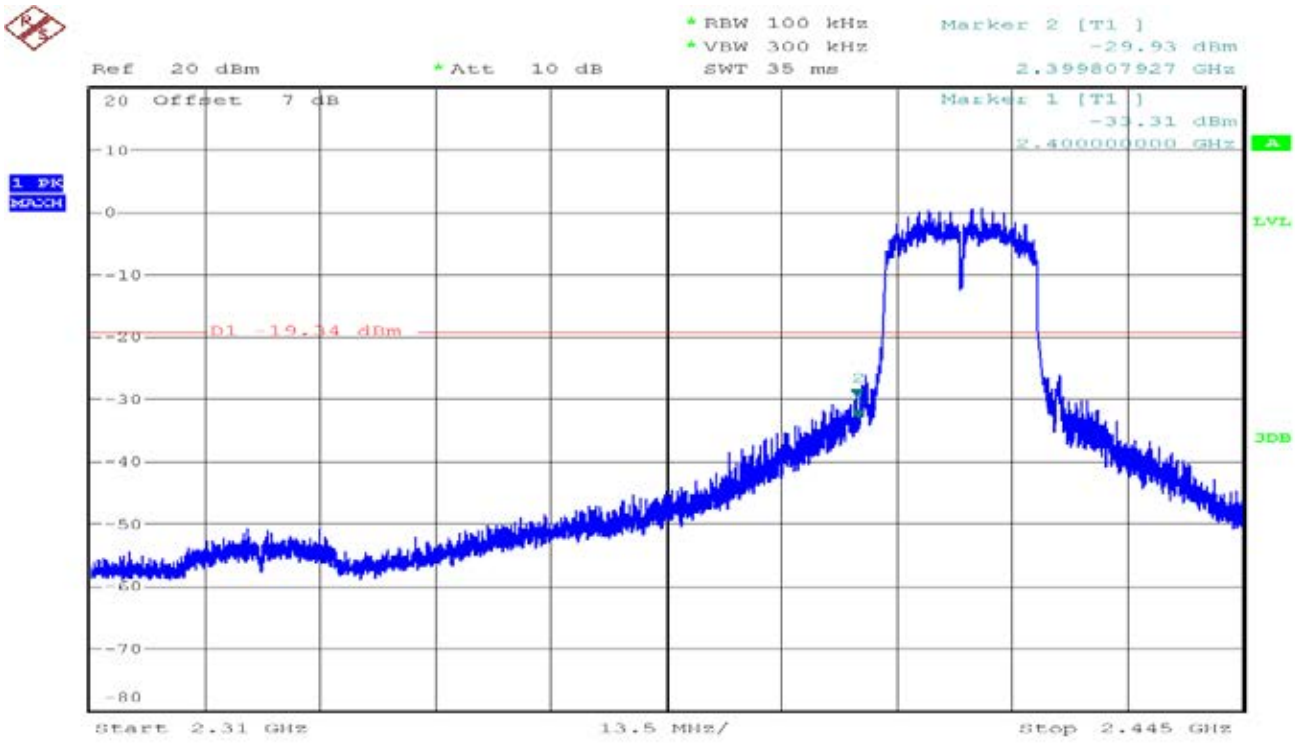

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-39.12 dBm
146.264634146 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
D1 -16.24 dBm
1 PK
MAXH
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

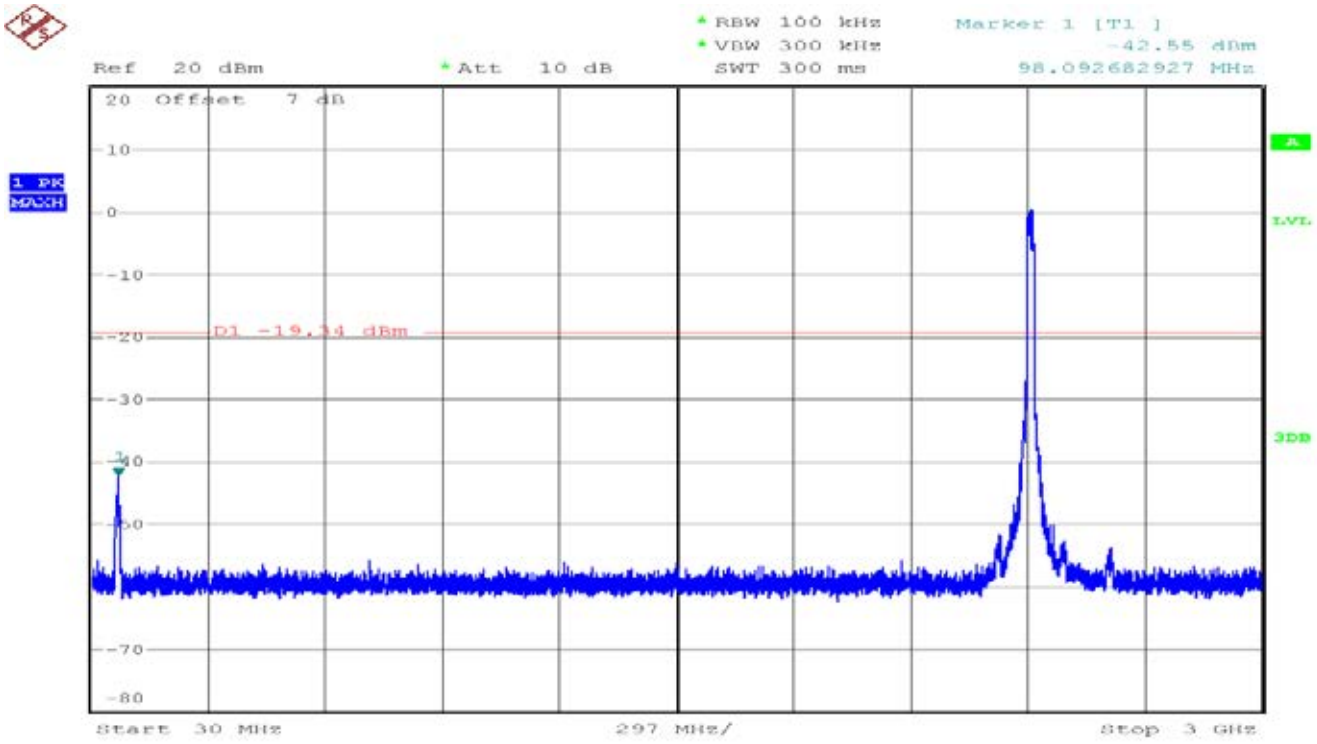

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-53.23 dBm
4.925487805 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
D1 -16.24 dBm
1 PK
MAXH
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

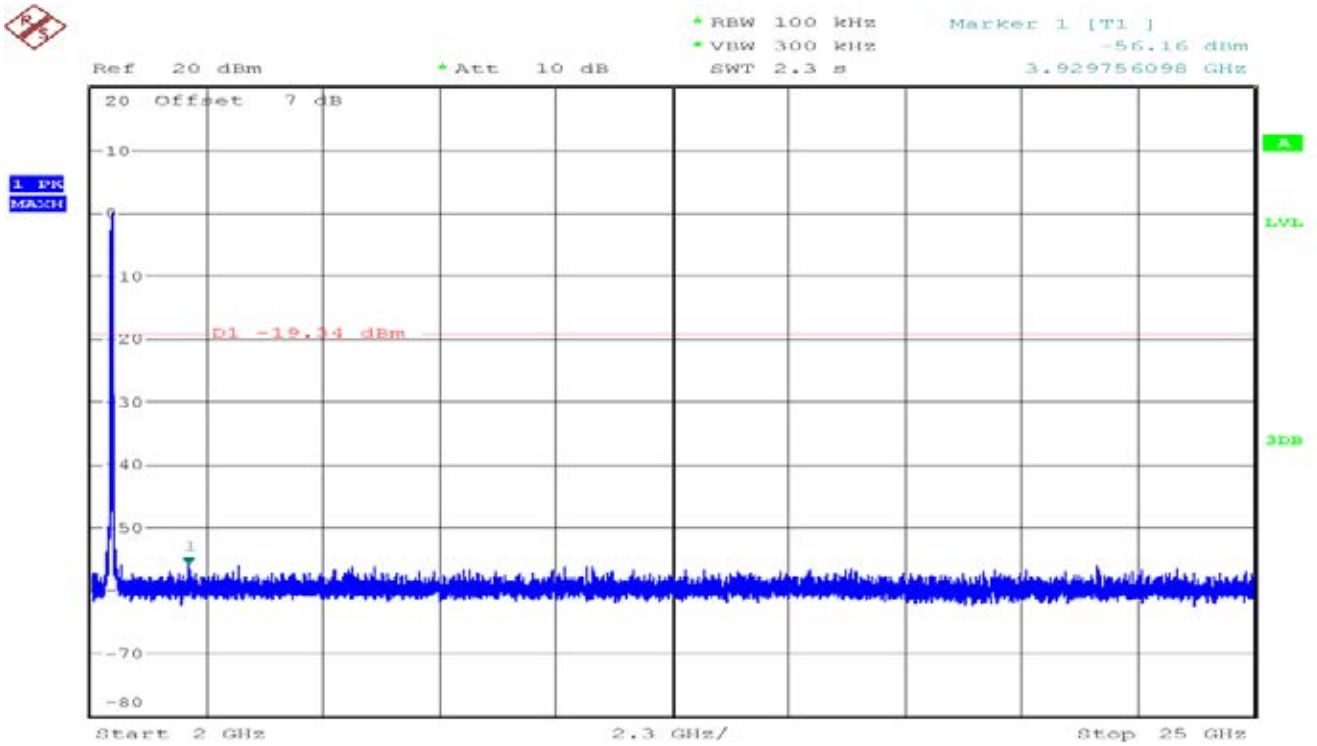
IEEE 802.11n HT20 mode/Chain 1

CH Low

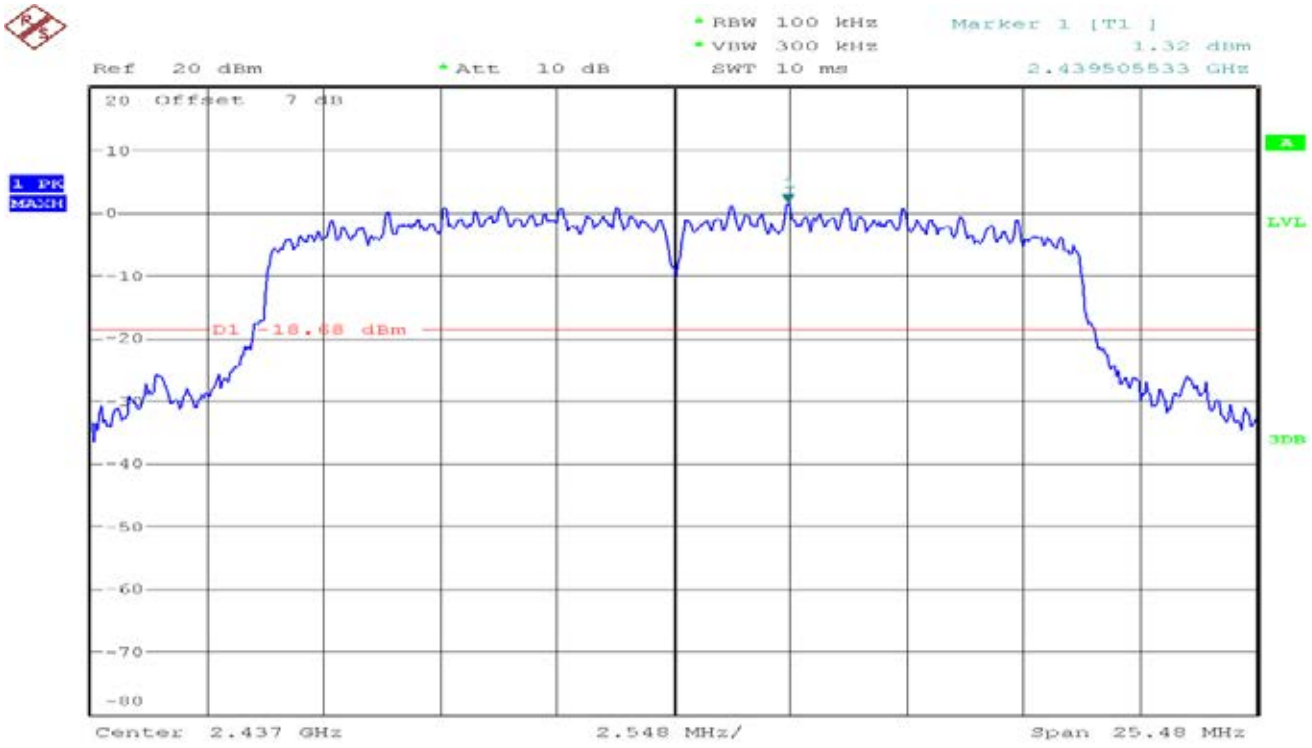


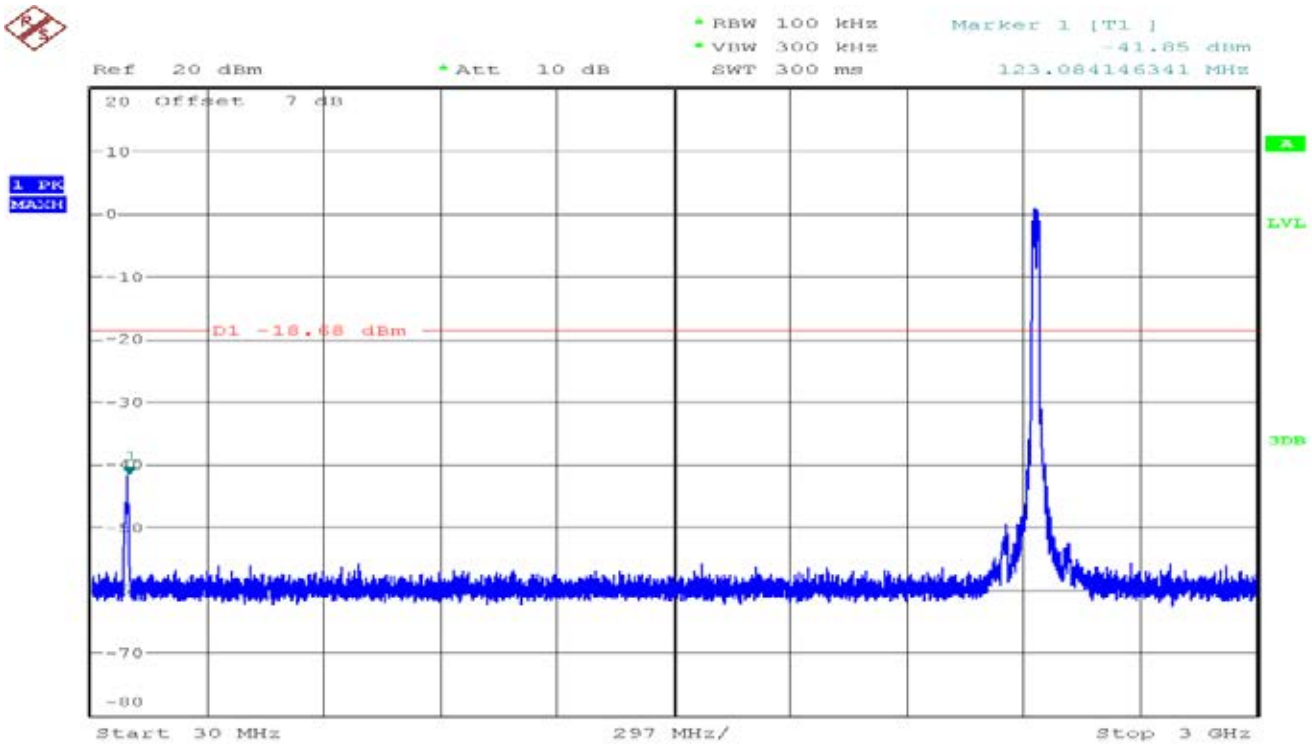


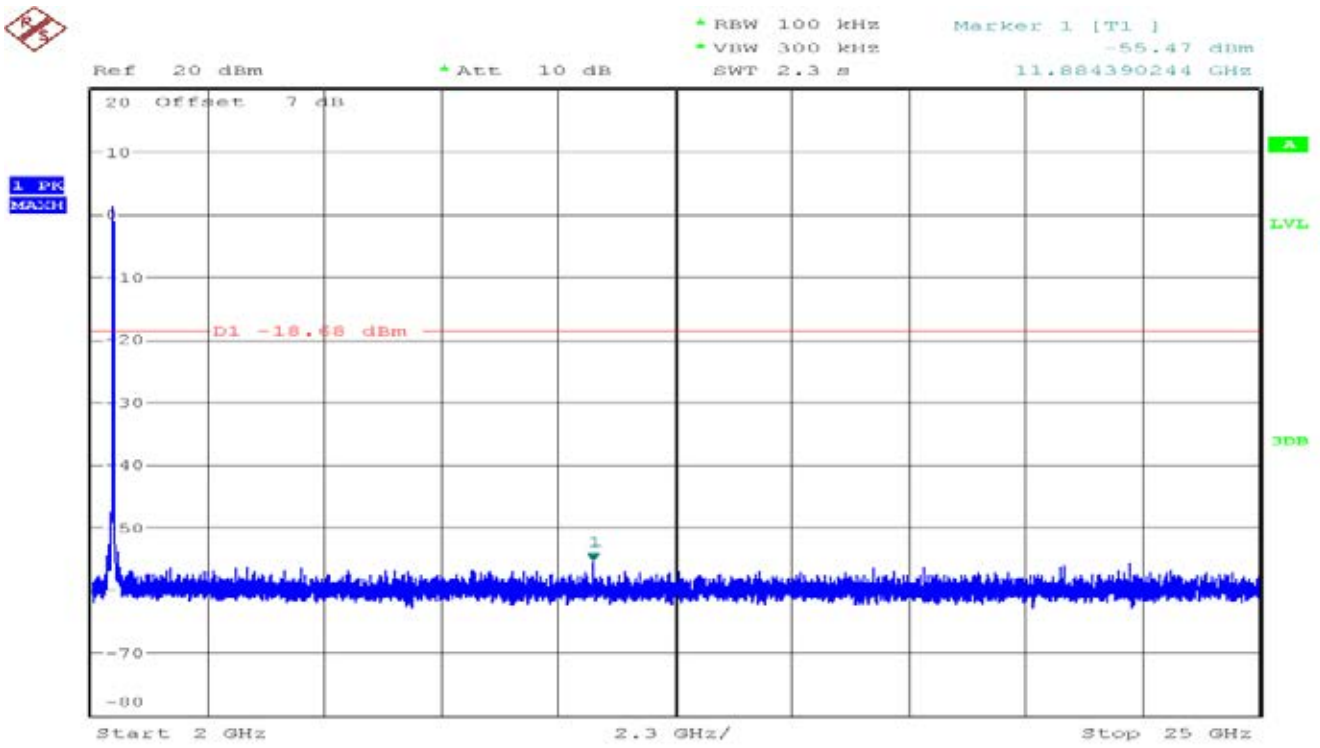

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-42.55 dBm
98.092682927 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -19.14 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-56.16 dBm
3.929756098 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -19.14 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

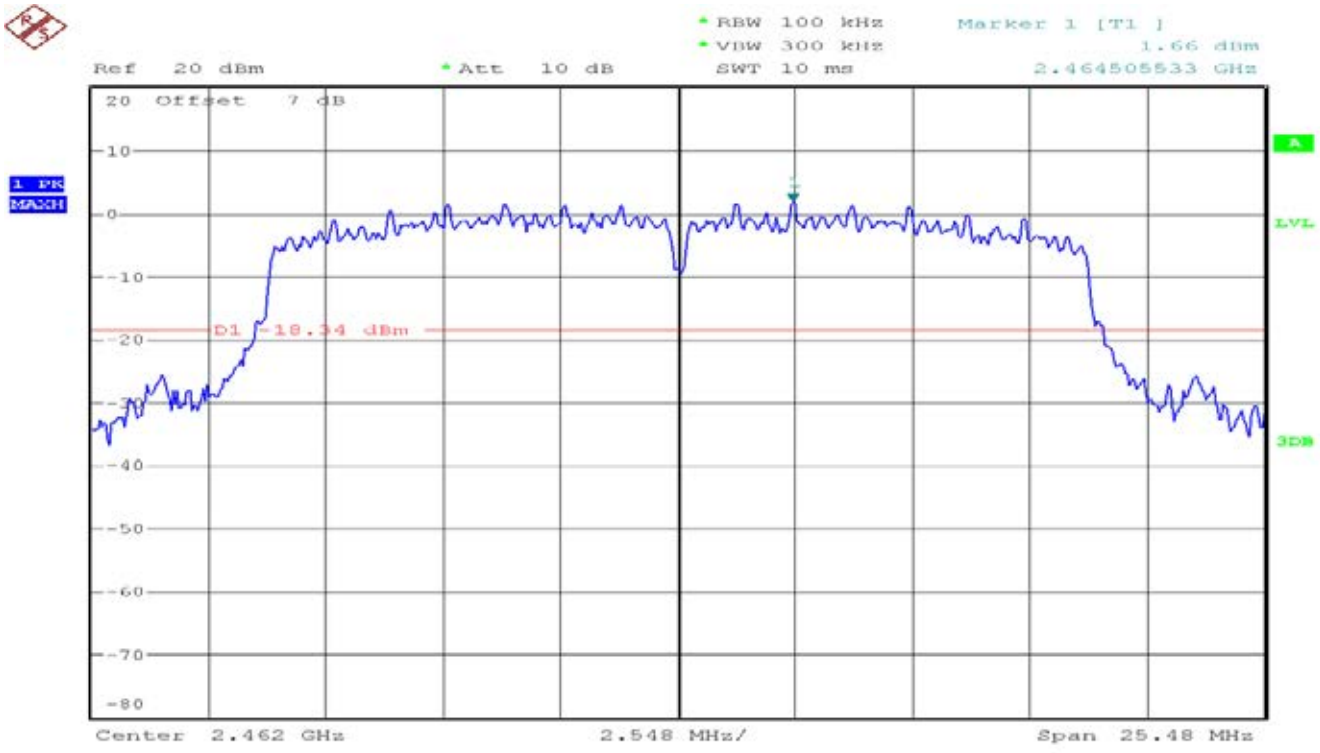
CH Mid

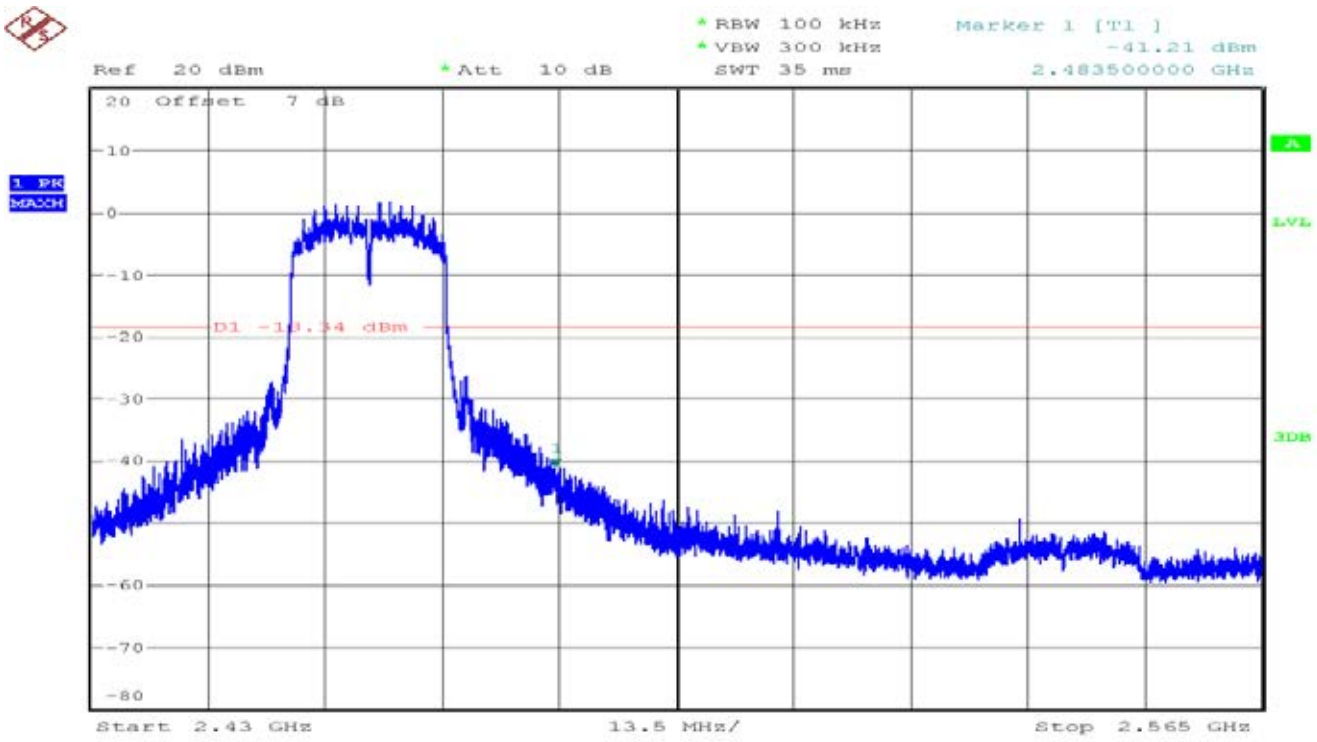

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
1.32 dBm
2.439505533 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -18.68 dBm
A
LVL
3DB
Center 2.437 GHz
2.548 MHz/
Span 25.48 MHz

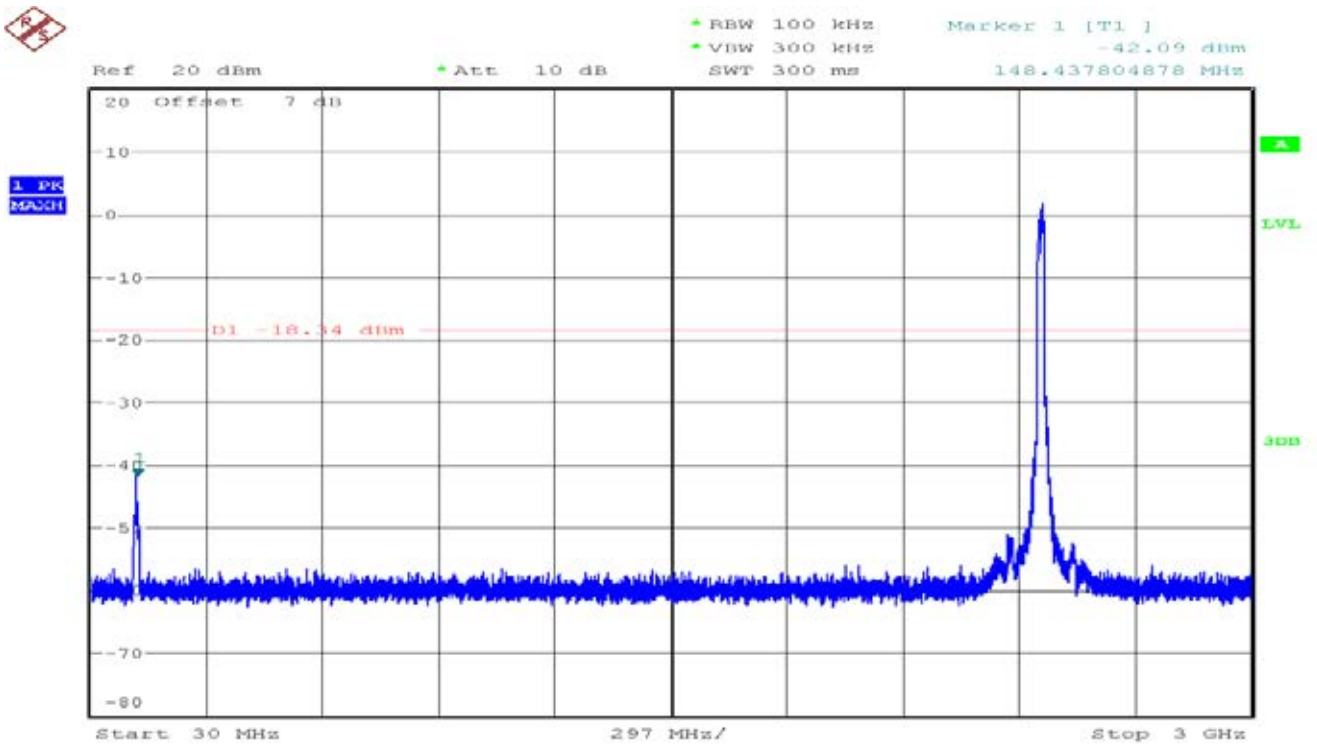

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-41.85 dBm
123.084146341 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -18.68 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

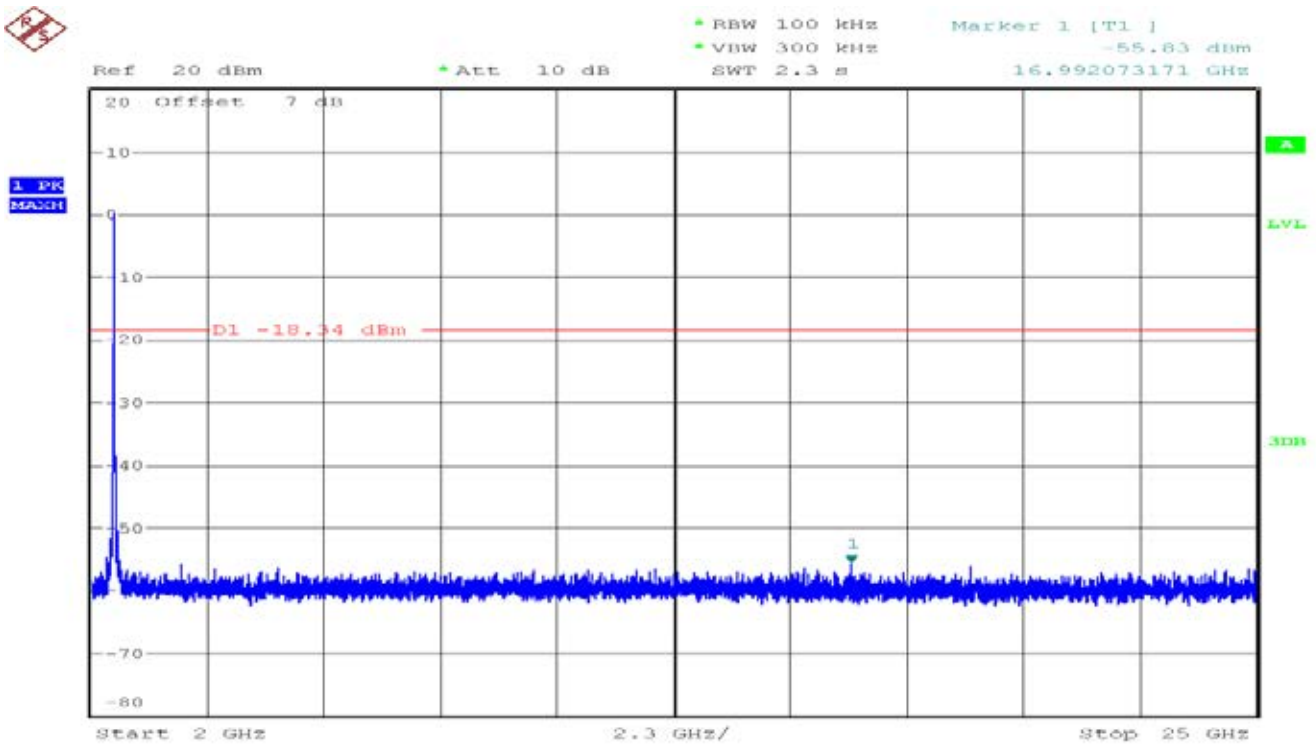

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-55.47 dBm
11.884390244 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -18.66 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
1.66 dBm
2.464505533 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -18.34 dBm
A
LVL
3DB
Center 2.462 GHz
2.548 MHz/
Span 25.48 MHz

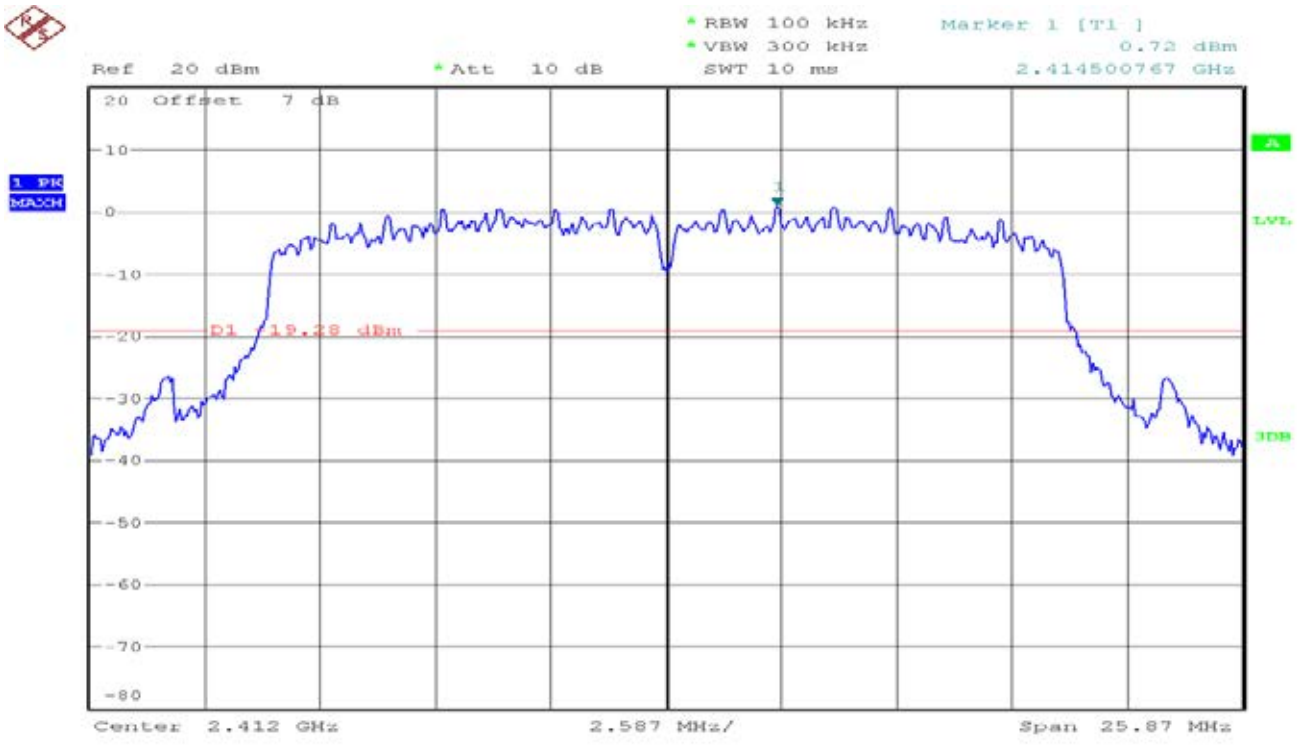

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-41.21 dBm
2.483500000 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -18.34 dBm
A
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

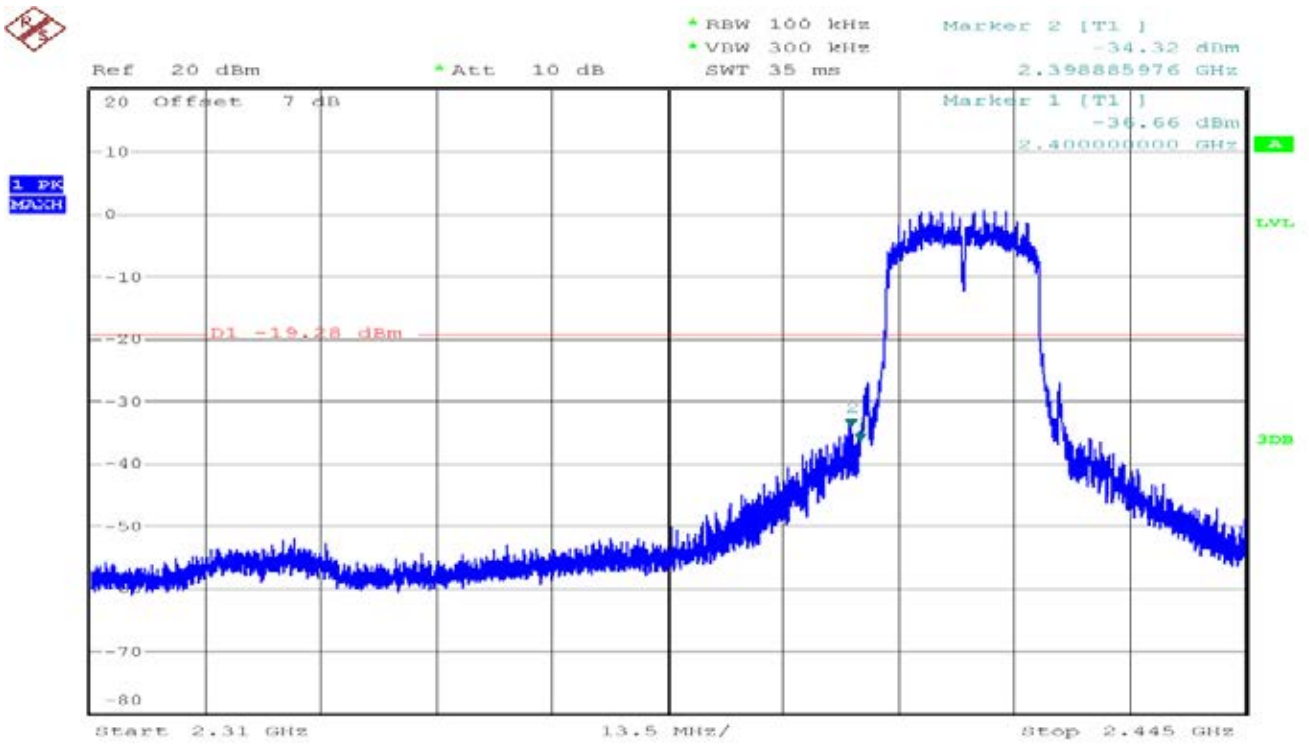

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-42.09 dBm
148.437804878 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -18.34 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

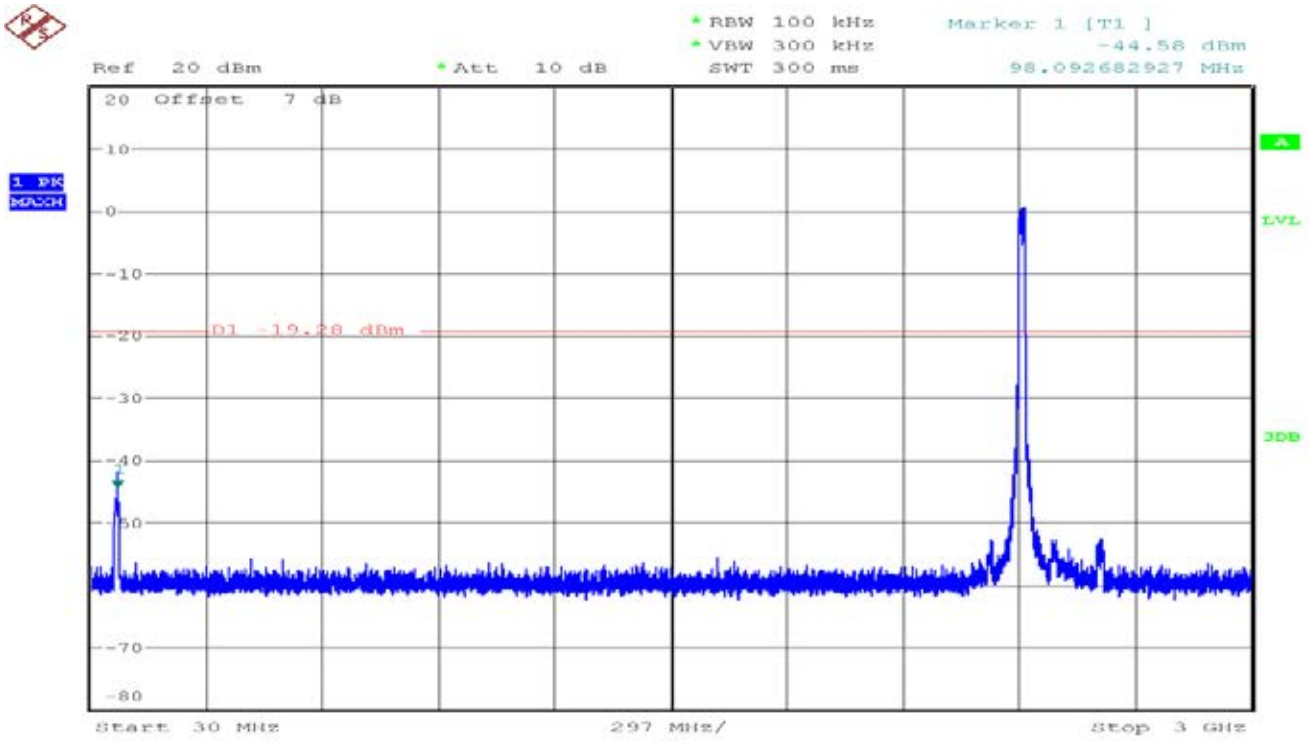


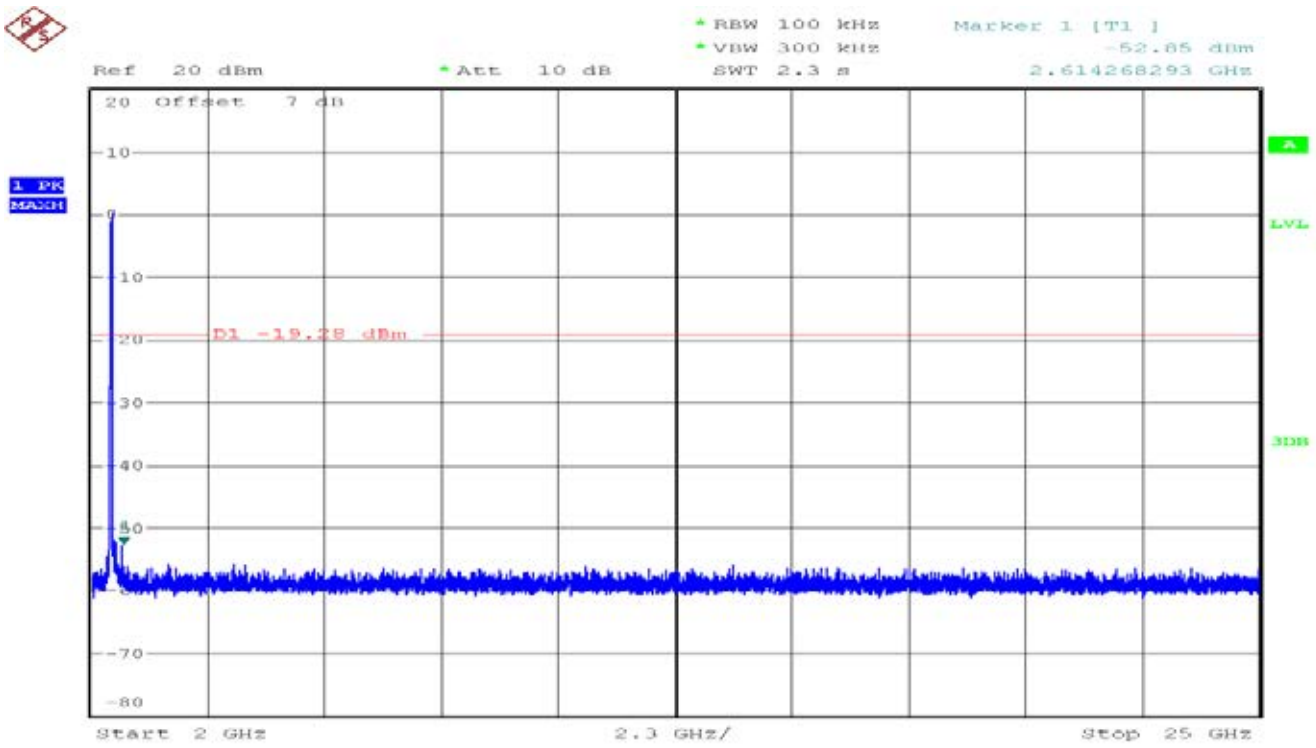
IEEE 802.11n HT20 mode/Chain 2

CH Low

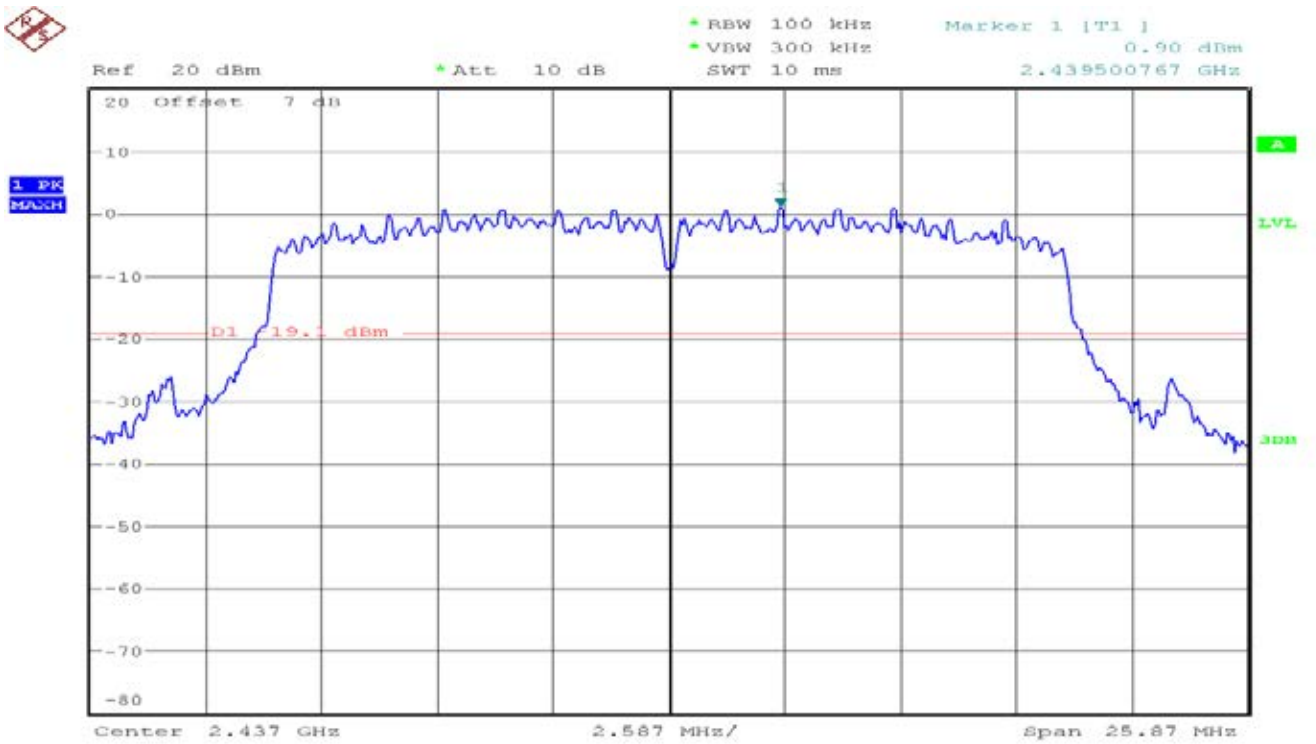


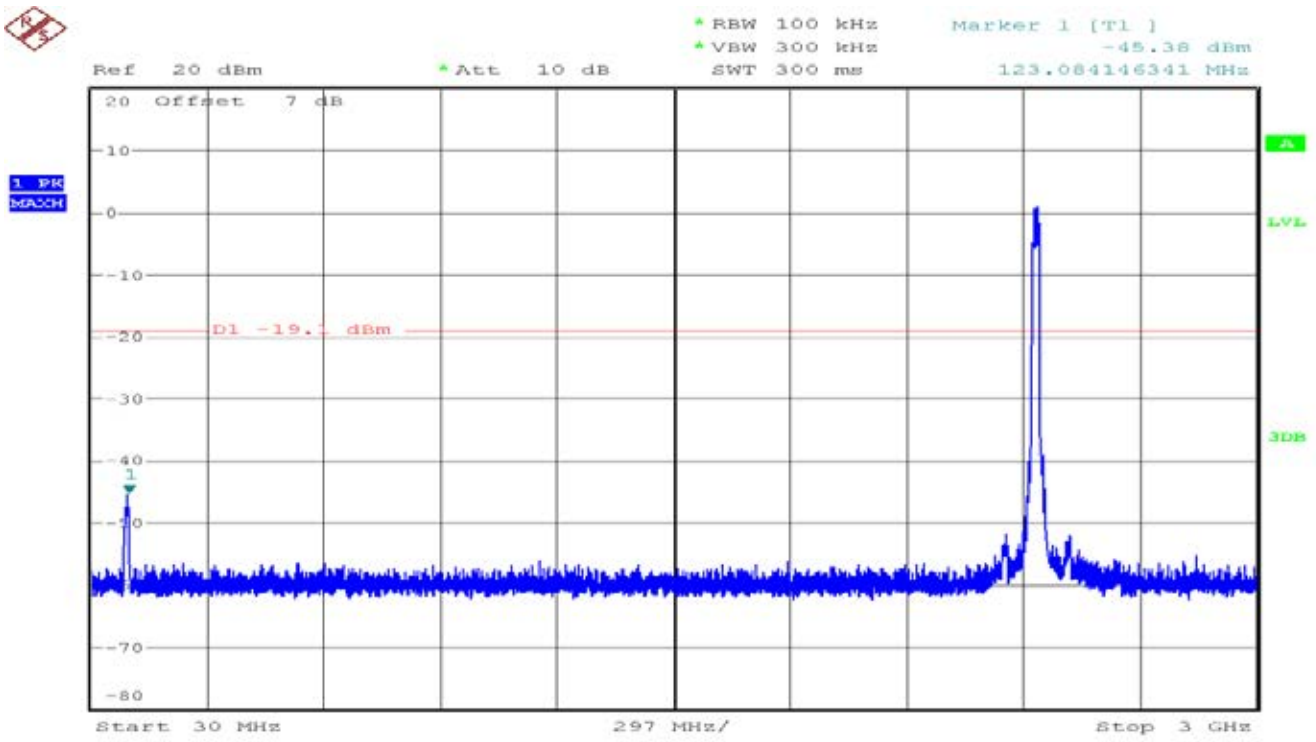

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-34.32 dBm
2.398885976 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
Marker 1 [T1]
-36.66 dBm
2.400000000 GHz
1 PK
MAXH
D1 -19.28 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

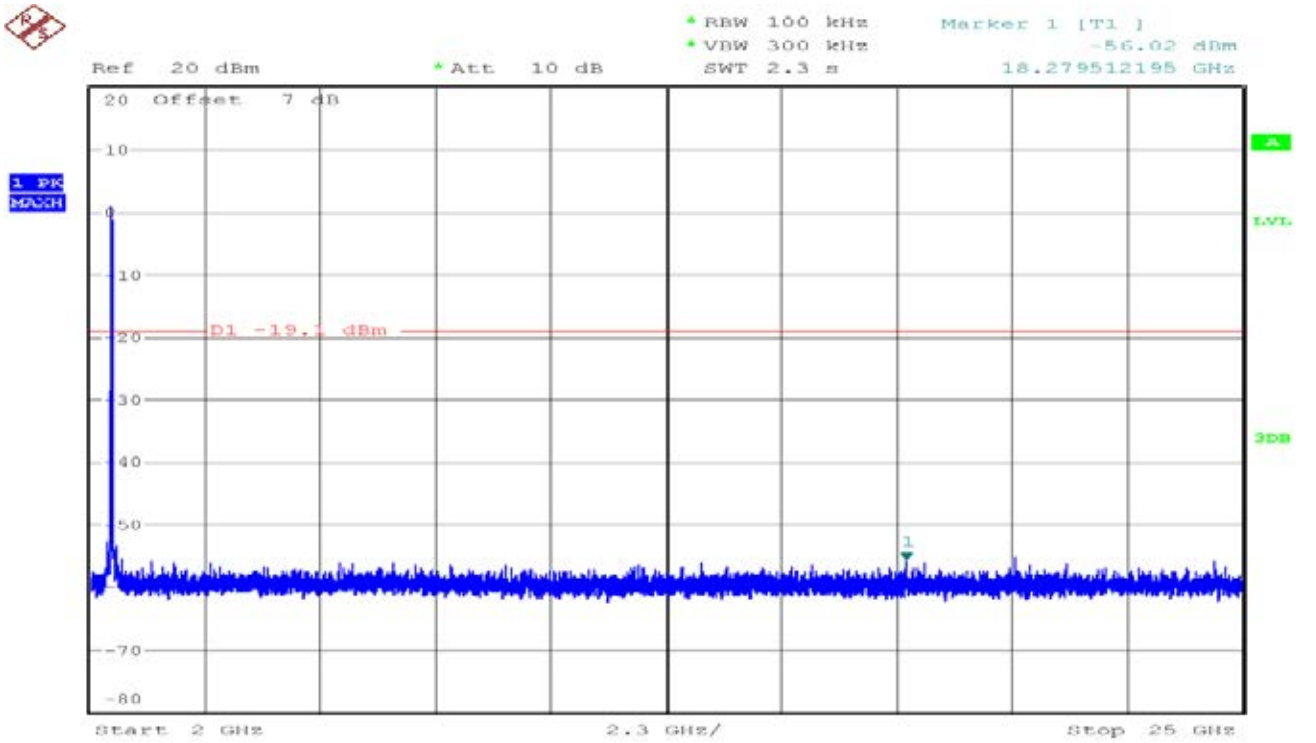

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-44.58 dBm
98.092682927 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -19.28 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-52.85 dBm
2.614268293 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -19.28 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

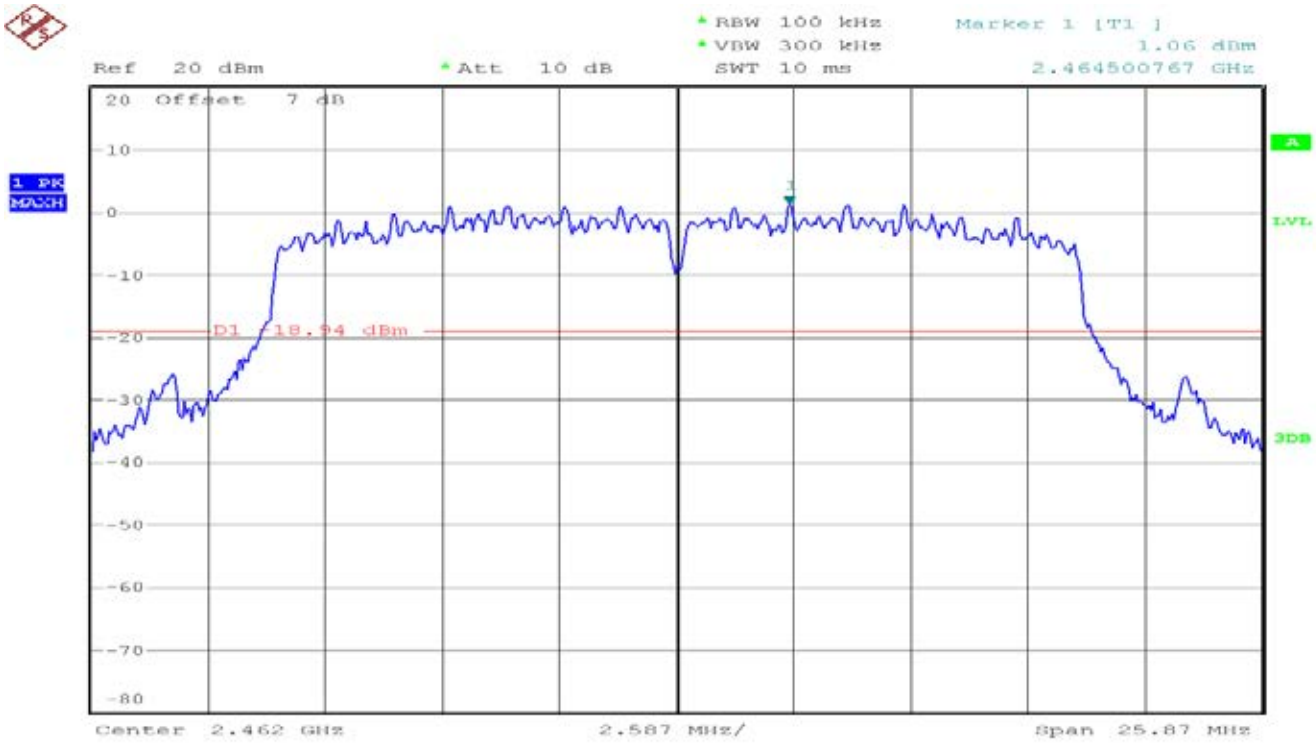
CH Mid

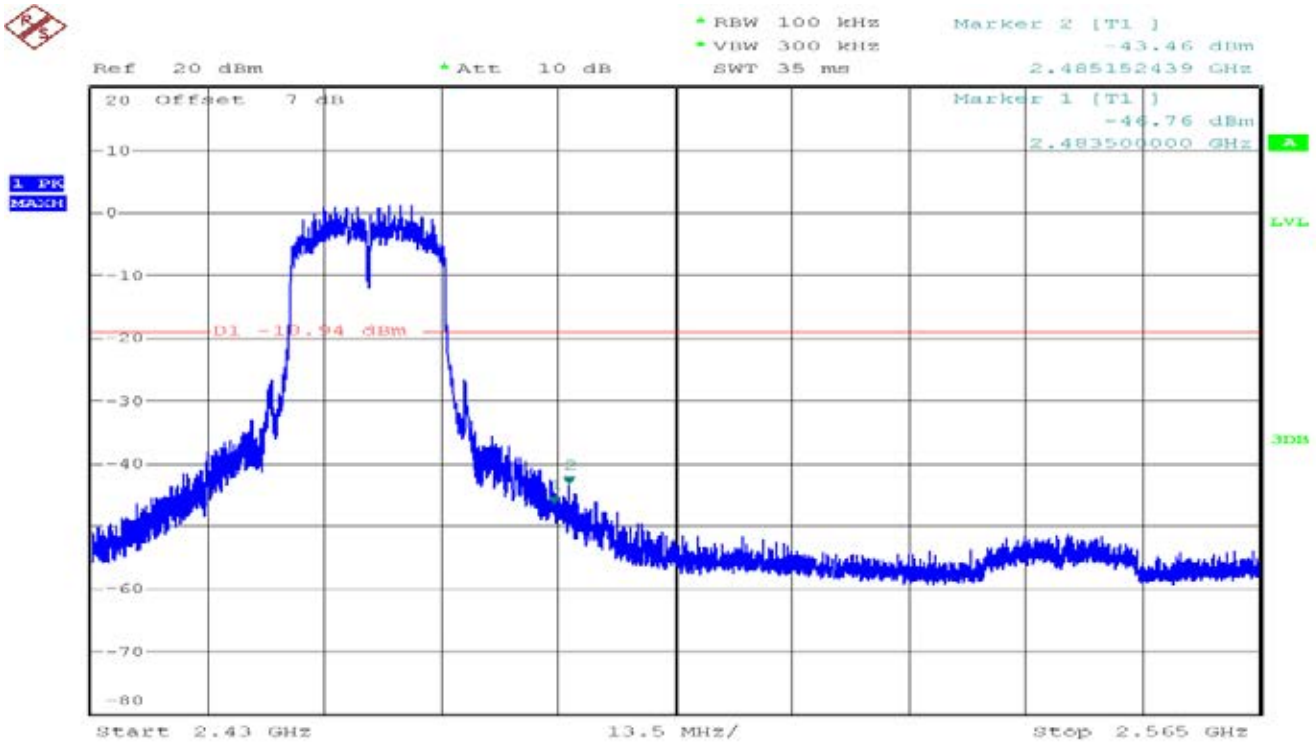

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
0.90 dBm
2.439500767 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -19.1 dBm
A
LVL
3DB
Center 2.437 GHz
2.587 MHz/
Span 25.87 MHz

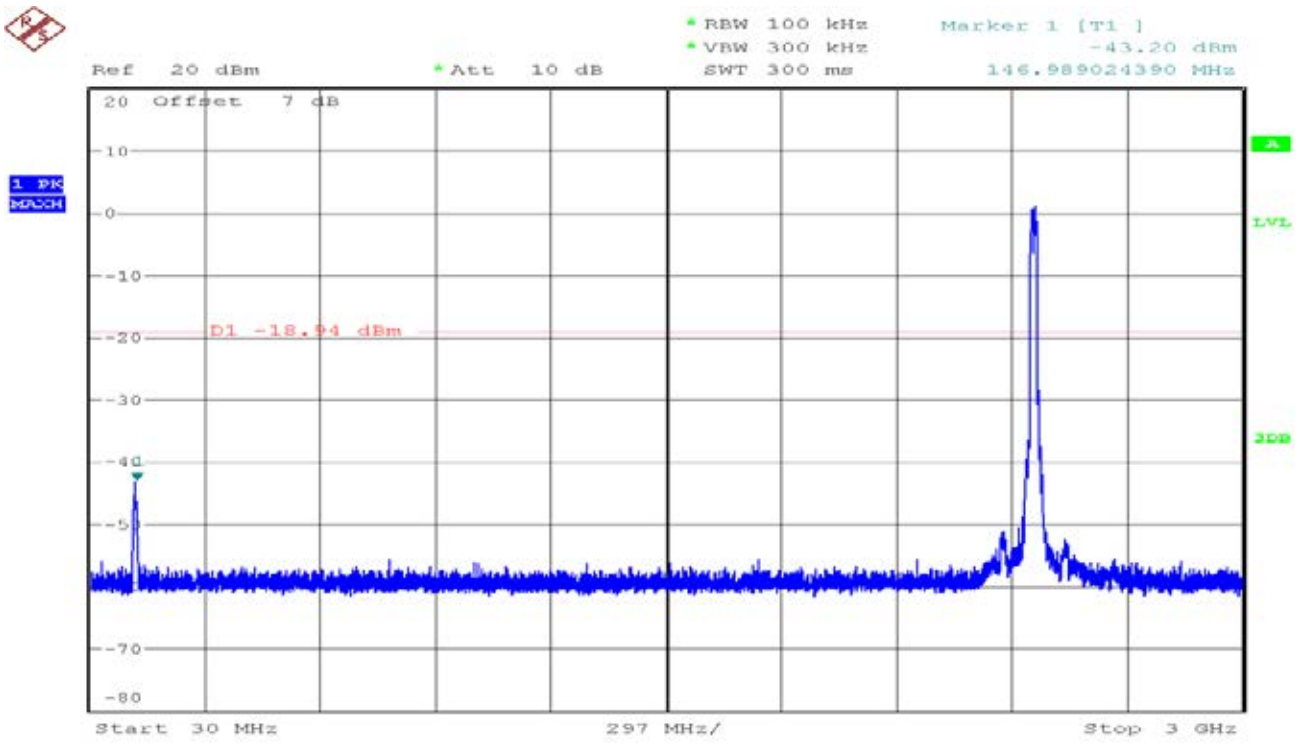

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-45.38 dBm
123.084146341 MHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -19.7 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

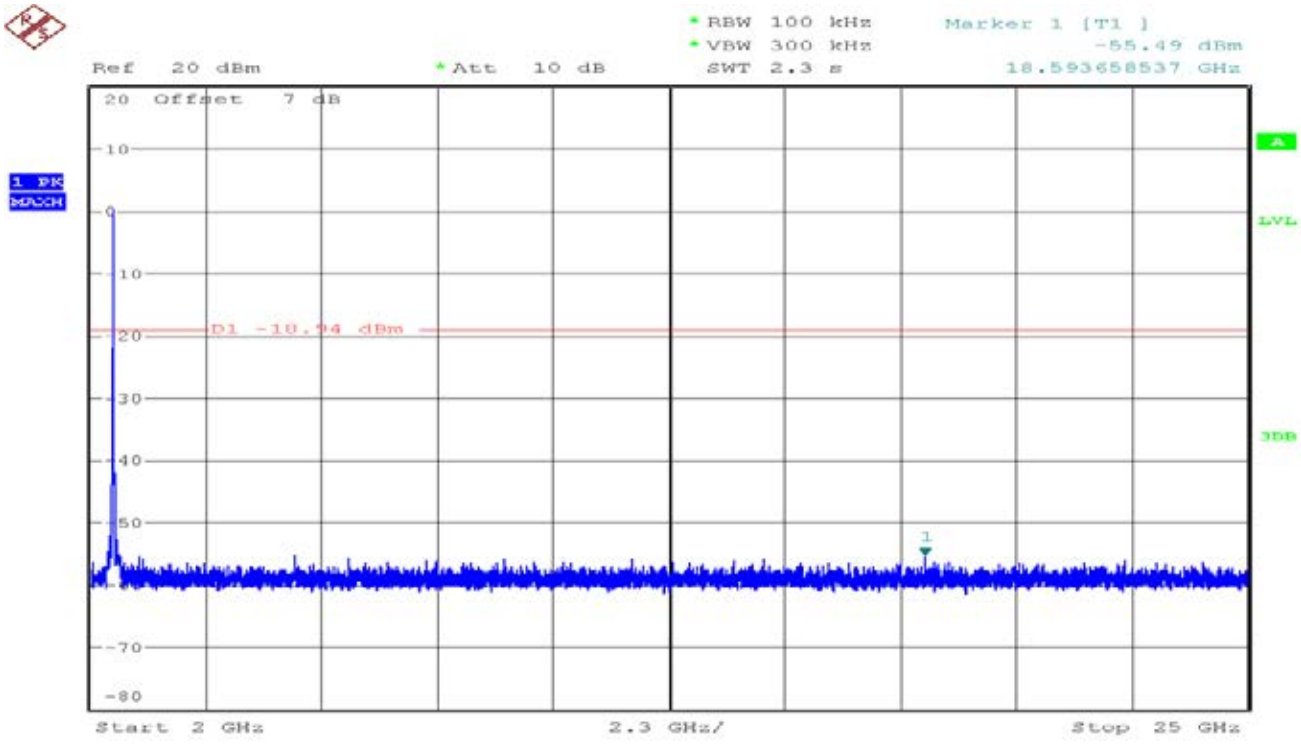

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-56.02 dBm
18.279512195 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
1 PK
MAXH
D1 -19.7 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
1.06 dBm
2.464500767 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
D1 -18.94 dBm
1 PK
MAXH
A
LVL
3DB
Center 2.462 GHz
2.587 MHz/
Span 25.87 MHz


RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-43.46 dBm
2.485152439 GHz
Marker 1 [T1]
-46.76 dBm
2.483500000 GHz
Ref 20 dBm
Att 10 dB
20 Offset 7 dB
D1 -18.94 dBm
1 PK
MAXH
A
LVL
3DB
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz


RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-43.20 dBm
146.989024390 MHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -18.94 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-55.49 dBm
18.593658537 GHz
Ref 20 dBm
Att 10 dB
Offset 7 dB
1 PK
MAXH
D1 -10.94 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

7.5. RADIATED EMISSIONS

LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.1 meter for frequency below 1GHz and 0.1 meter for frequency above 1GHz. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCIES(MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

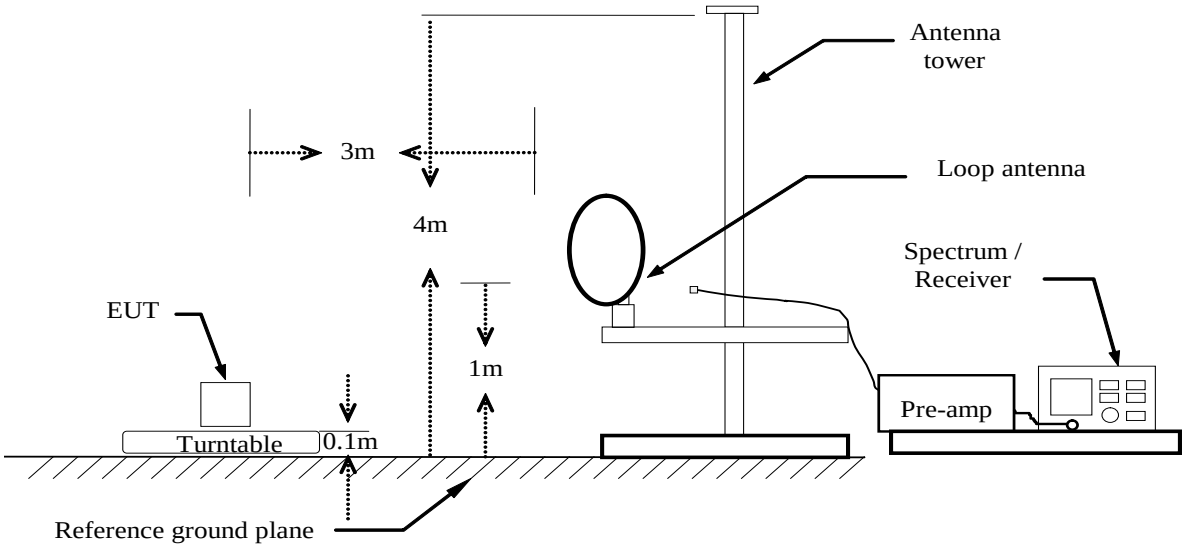
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2.In the emission table above, the tighter limit applies at the band edges.

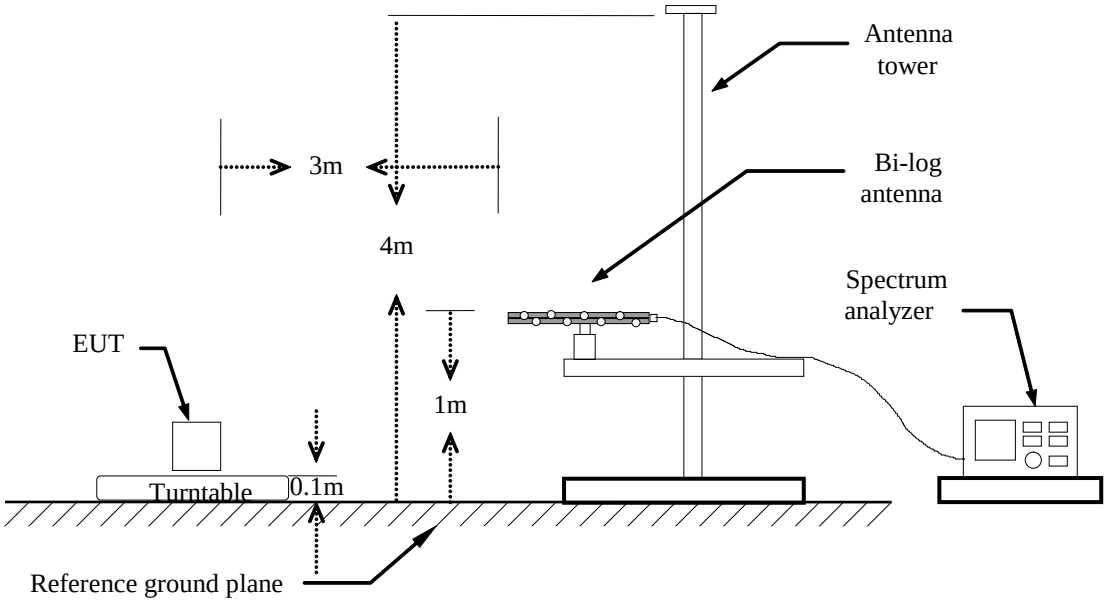
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

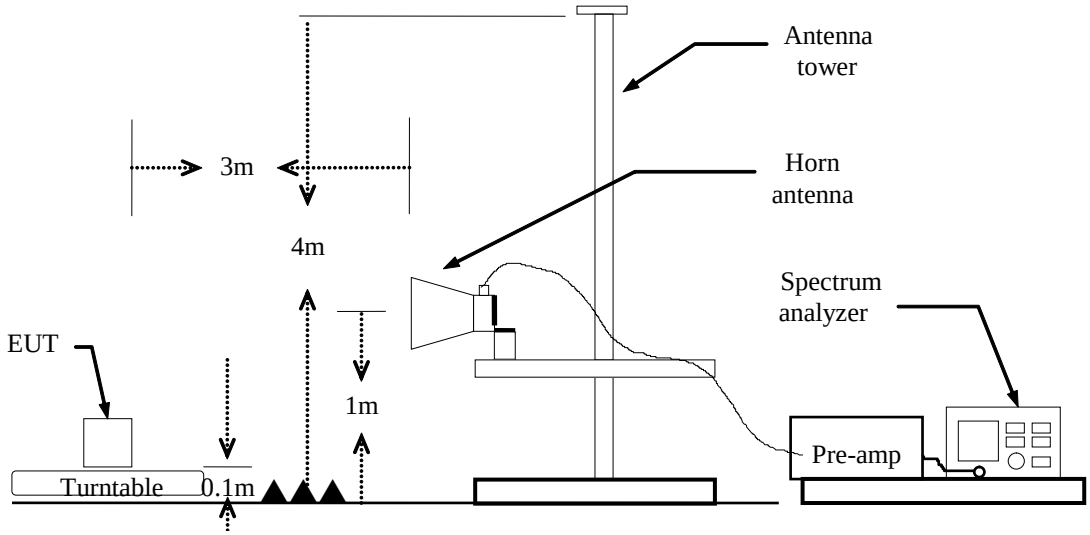
Below 30MHz



Below 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable above ground plane, which is 0.1 meter for frequency below 1GHz and 0.1 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   PEAK: RBW=VBW=1MHz / Sweep=AUTO

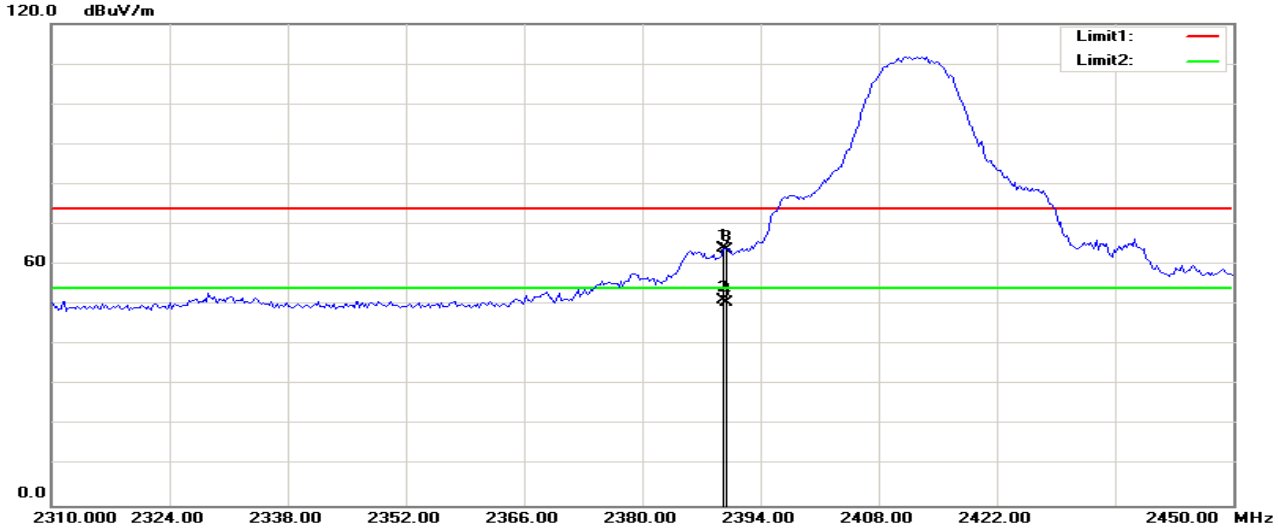
   AVERAGE: RBW=1MHz / Sweep=AUTO

   VBW=10Hz,when duty cycle is no less than 98 percent.

   VBW≧1/T,when duty cycle is less than 98 percent,where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximun power control level for the tested mode of operation.
7. Repeat above procedures until the measurements for all frequencies are complete.

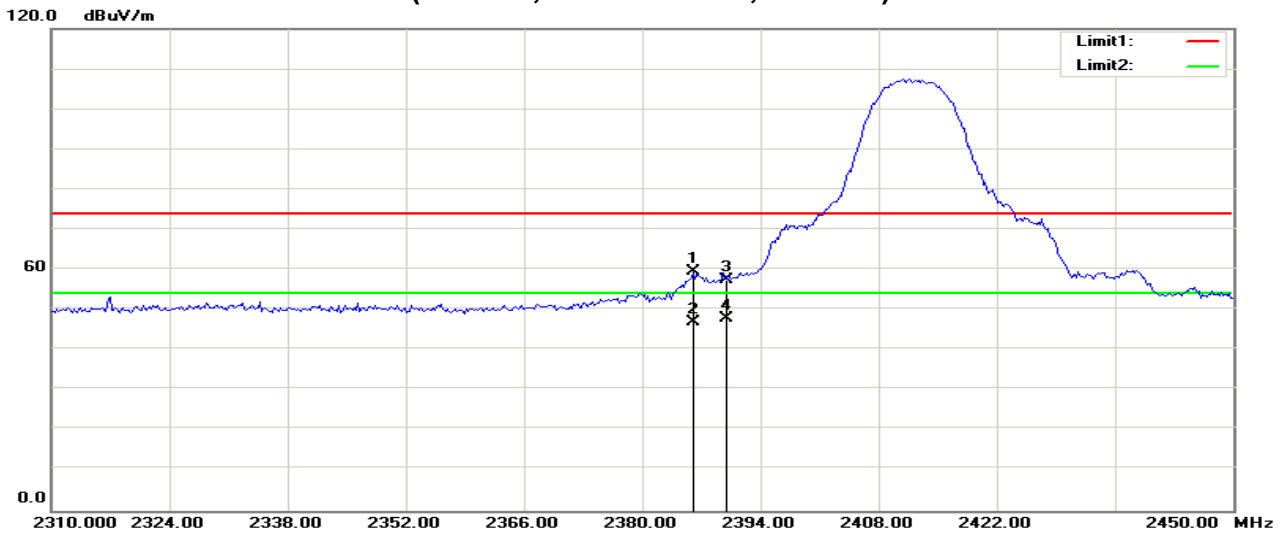
TEST RESULTS

RESTRICTED BANDEDGE (b Mode, Low Channel, Horizontal)



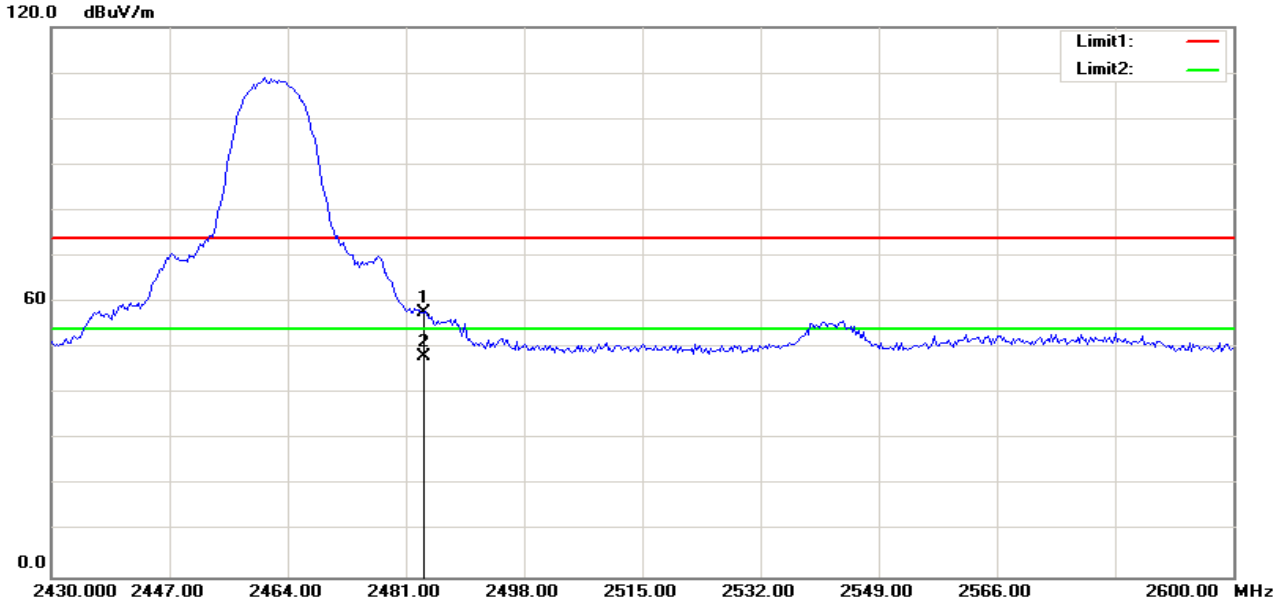
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2389.647	71.60	-7.57	64.03	74.00	-9.97	100	350	peak
2	2389.647	58.69	-7.57	51.12	54.00	-2.88	100	349	AVG
3	2390.000	71.22	-7.57	63.65	74.00	-10.35	200	334	peak
4	2390.000	58.20	-7.57	50.63	54.00	-3.37	100	341	AVG

RESTRICTED BANDEDGE (b Mode, Low Channel, Vertical)



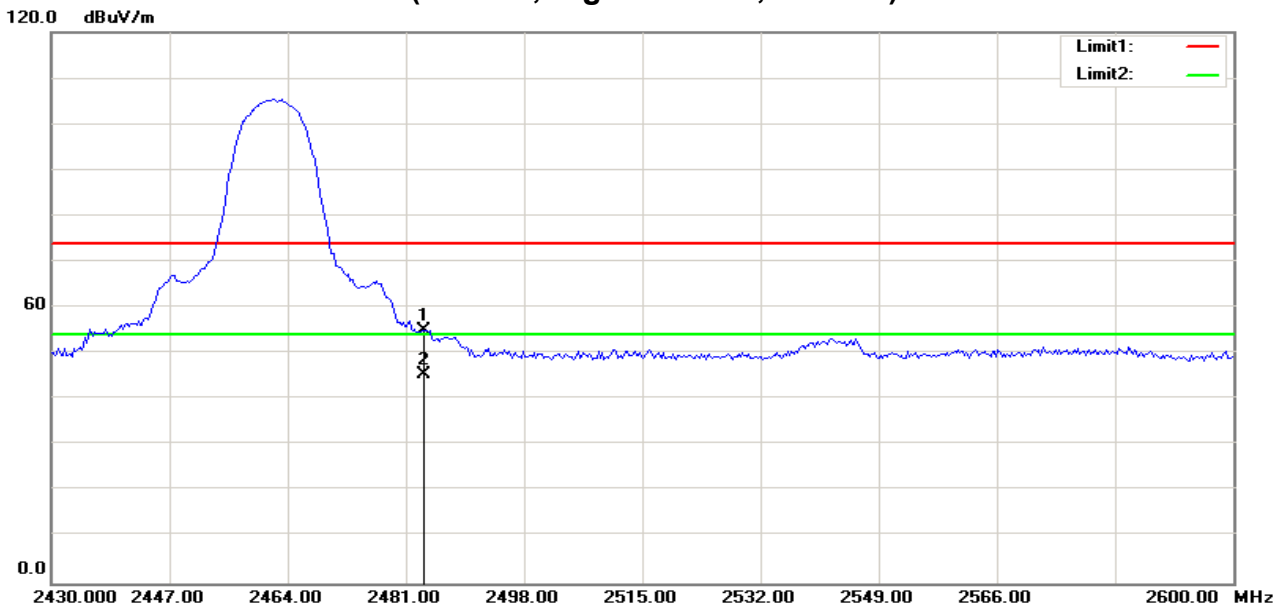
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2386.058	67.11	-7.59	59.52	74.00	-14.48	100	190	peak
2	2386.058	54.63	-7.59	47.04	54.00	-6.96	100	201	AVG
3	2390.000	65.17	-7.57	57.60	74.00	-16.40	100	205	peak
4	2390.000	55.43	-7.57	47.86	54.00	-6.14	100	205	AVG

RESTRICTED BANDEDGE (b Mode, High Channel, Horizontal)



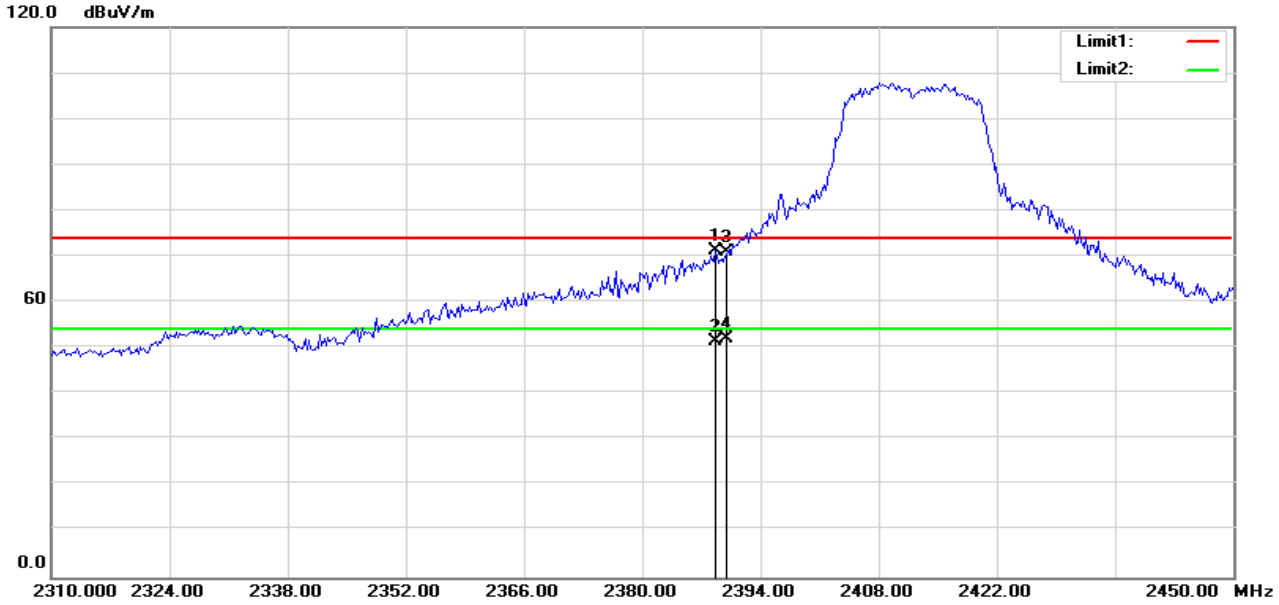
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	65.01	-7.26	57.75	74.00	-16.25	200	330	peak
2	2483.500	55.51	-7.26	48.25	54.00	-5.75	100	342	AVG

RESTRICTED BANDEDGE (b Mode, High Channel, Vertical)



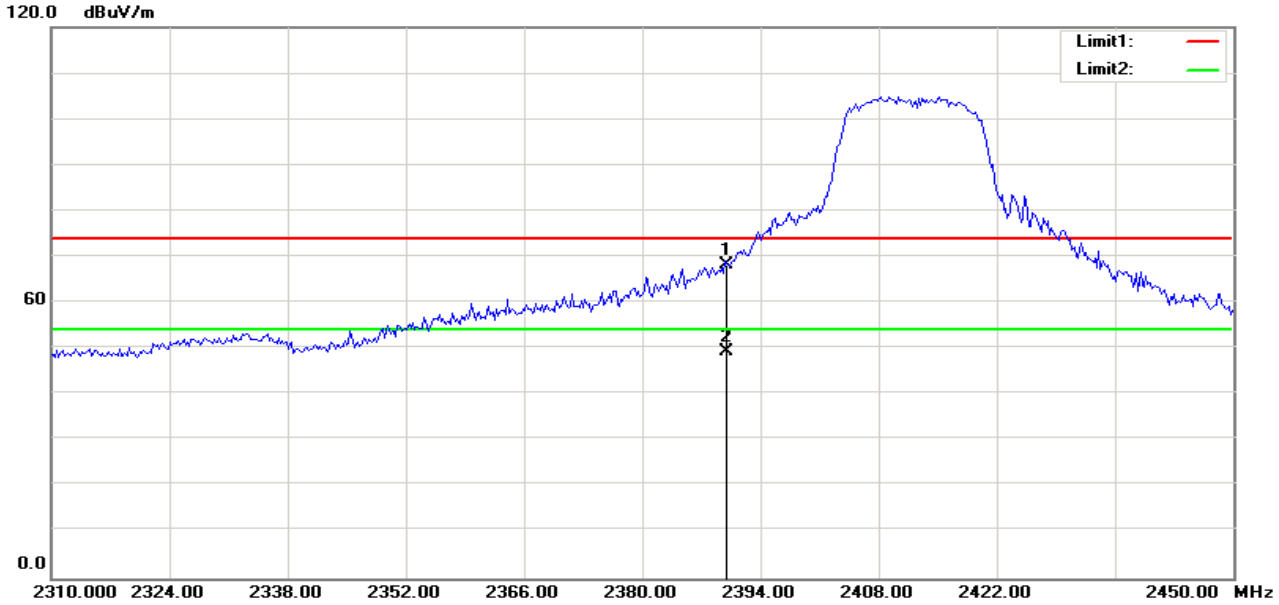
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	62.19	-7.26	54.93	74.00	-19.07	200	107	peak
2	2483.500	52.79	-7.26	45.53	54.00	-8.47	100	87	AVG

RESTRICTED BANDEDGE (g Mode, Low Channel, Horizontal)



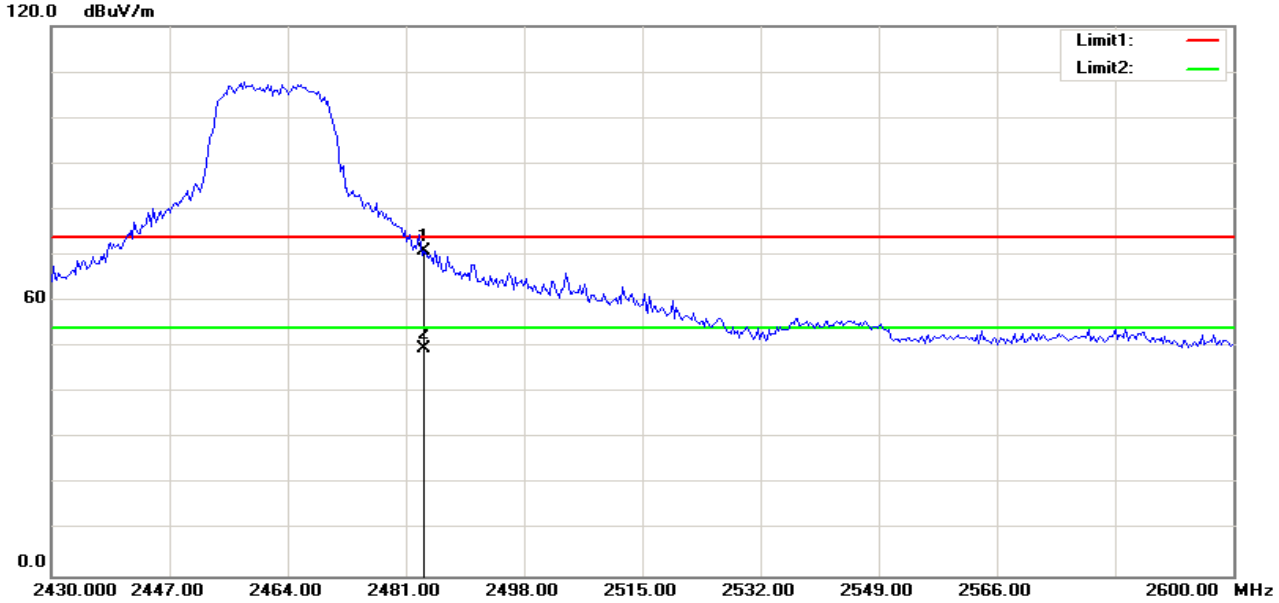
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2388.750	78.73	-7.58	71.15	74.00	-2.85	100	29	peak
2	2388.750	58.93	-7.58	51.35	54.00	-2.65	100	32	AVG
3	2390.000	78.62	-7.57	71.05	74.00	-2.95	200	328	peak
4	2390.000	59.66	-7.57	52.09	54.00	-1.91	100	322	AVG

RESTRICTED BANDEDGE (g Mode, Low Channel, Vertical)



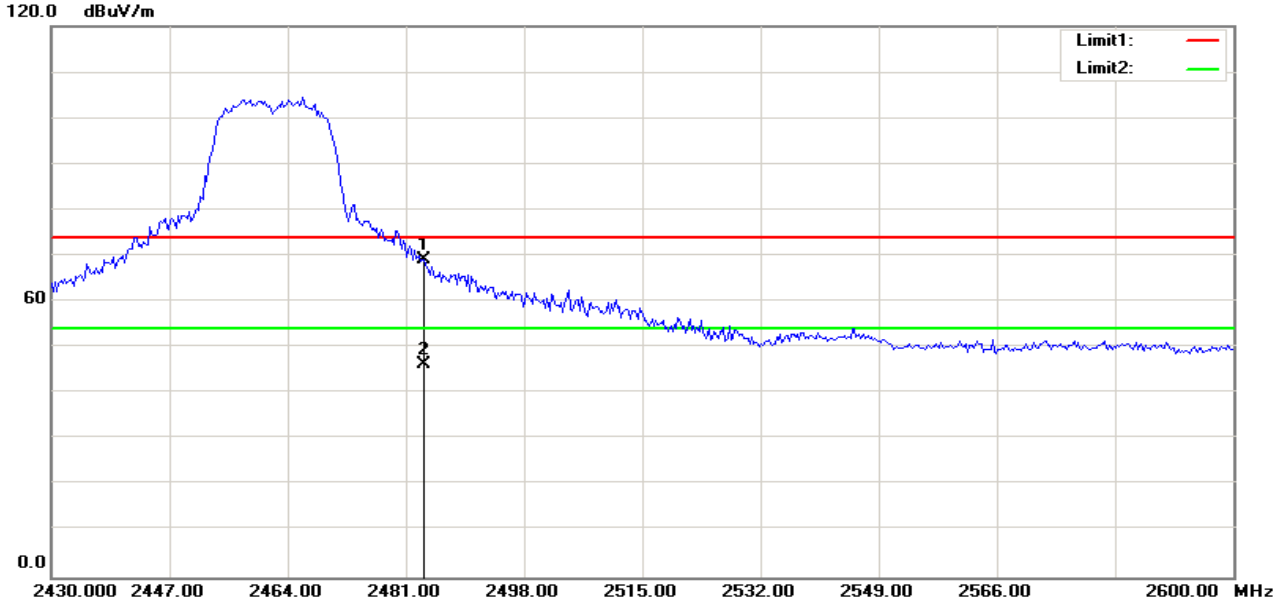
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	75.79	-7.57	68.22	74.00	-5.78	200	125	peak
2	2390.000	56.94	-7.57	49.37	54.00	-4.63	200	100	AVG

RESTRICTED BANDEDGE (g Mode, High Channel, Horizontal)



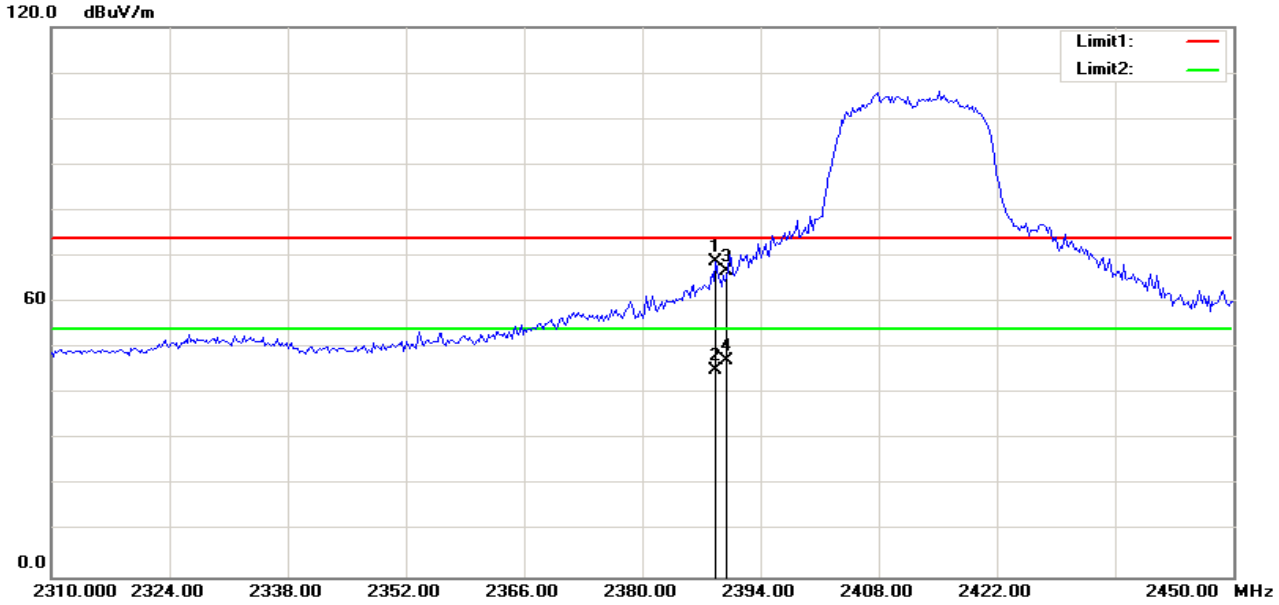
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	78.13	-7.26	70.87	74.00	-3.13	200	254	peak
2	2483.500	56.87	-7.26	49.61	54.00	-4.39	100	30	AVG

RESTRICTED BANDEDGE (g Mode, High Channel, Vertical)



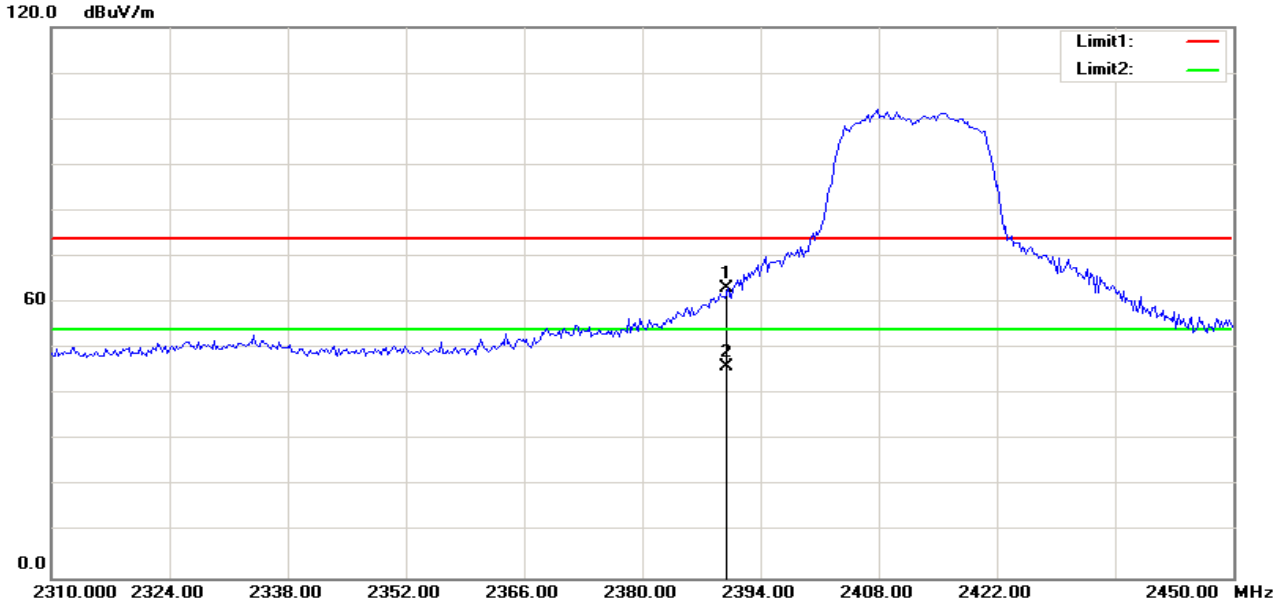
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	76.54	-7.26	69.28	74.00	-4.72	200	35	peak
2	2483.500	53.73	-7.26	46.47	54.00	-7.53	100	89	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT20 mode, Low Channel, Horizontal)



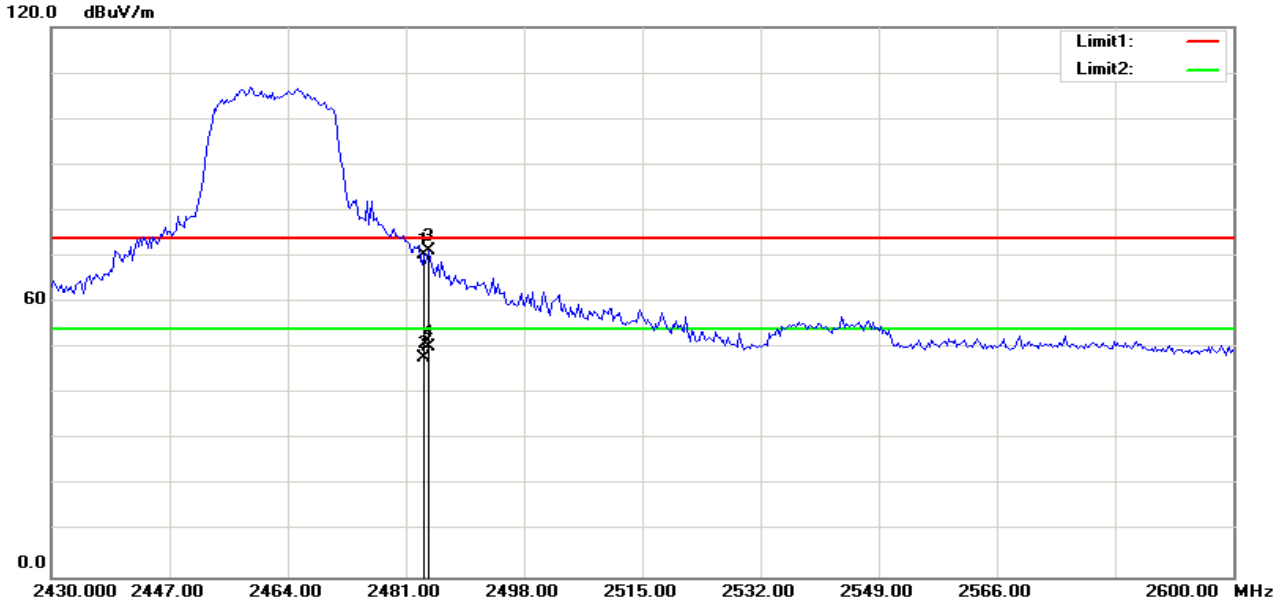
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2388.750	76.49	-7.58	68.91	74.00	-5.09	100	339	peak
2	2388.750	52.88	-7.58	45.30	54.00	-8.70	200	323	AVG
3	2390.000	74.43	-7.57	66.86	74.00	-7.14	200	336	peak
4	2390.000	54.69	-7.57	47.12	54.00	-6.88	100	337	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT20 mode, Low Channel, Vertical)



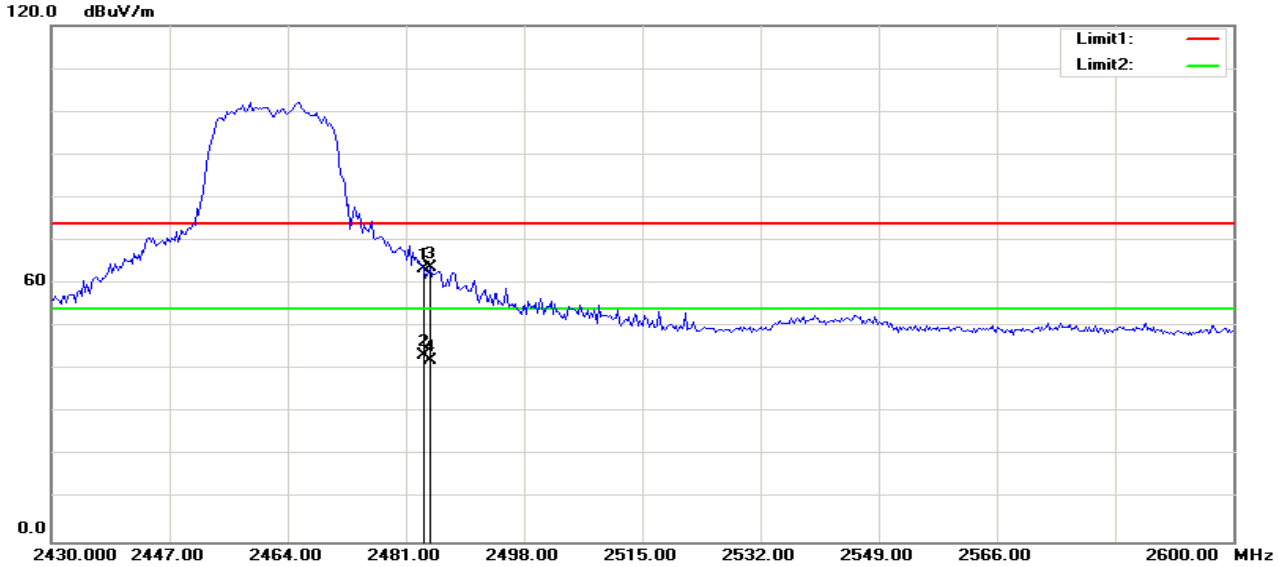
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	70.62	-7.57	63.05	74.00	-10.95	200	59	peak
2	2390.000	53.66	-7.57	46.09	54.00	-7.91	100	102	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT20 mode, High Channel, Horizontal)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	77.68	-7.26	70.42	74.00	-3.58	200	117	peak
2	2483.500	55.19	-7.26	47.93	54.00	-6.07	100	38	AVG
3	2484.215	78.62	-7.26	71.36	74.00	-2.64	100	345	peak
4	2484.215	57.49	-7.26	50.23	54.00	-3.77	100	339	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT20 mode, High Channel, Vertical)



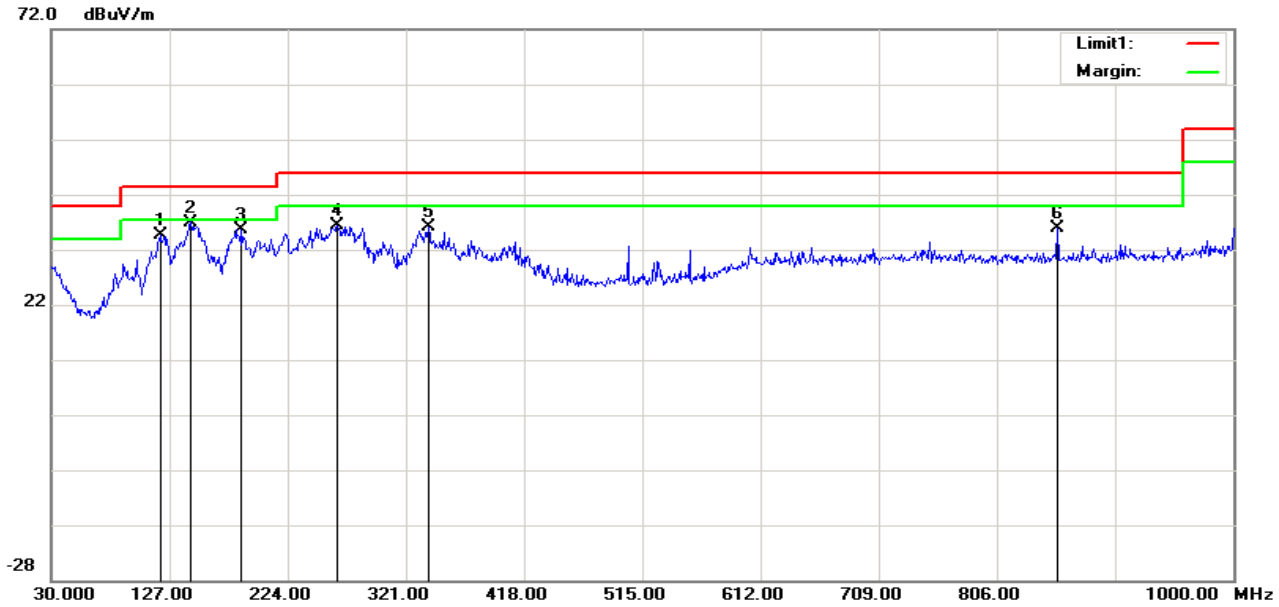
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	70.58	-7.26	63.32	74.00	-10.68	100	127	peak
2	2483.500	50.53	-7.26	43.27	54.00	-10.73	100	197	AVG
3	2484.487	70.92	-7.26	63.66	74.00	-10.34	100	103	peak
4	2484.487	49.31	-7.26	42.05	54.00	-11.95	100	300	AVG

Test Result of Radiated Emission

Below 30MHz and above 18GHz. The measured value have enough margin over 20dB than the limit, therefore they are not reported.

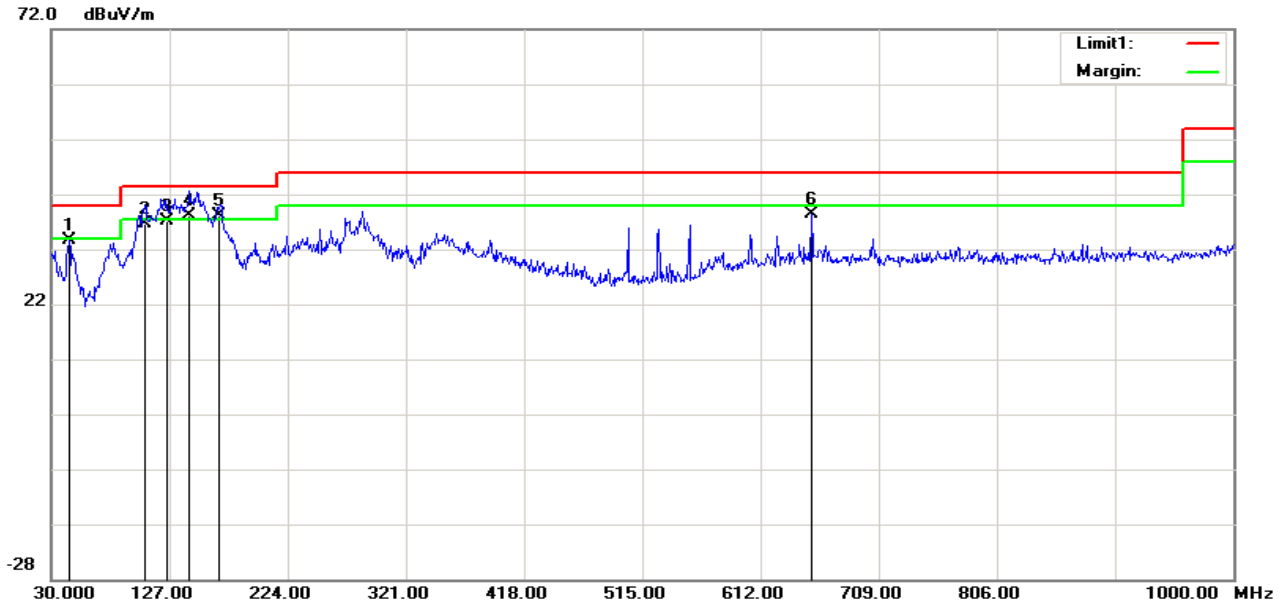
30MHz-1GHz

Operation Mode:	Normal Link	**Test Date:**	2018-6-20
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	40% RH	**Polarity:**	Hor.



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	119.2400	20.71	13.90	34.61	43.50	-8.89	200	236	peak
2	144.4600	22.74	14.26	37.00	43.50	-6.50	200	199	peak
3	186.1700	21.01	14.57	35.58	43.50	-7.92	200	112	peak
4	264.7400	20.57	15.70	36.27	46.00	-9.73	100	244	peak
5	339.4300	17.80	18.38	36.18	46.00	-9.82	100	43	peak
6	855.4700	9.89	26.02	35.91	46.00	-10.09	100	24	peak

Operation Mode:	Normal Link	Test Date:	2018-6-20
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	40% RH	Polarity:	Ver.



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	44.5500	14.96	18.58	33.54	40.00	-6.46	100	228	peak
2	106.6930	22.93	13.73	36.66	43.50	-6.84	100	137	QP
3	124.5560	23.18	13.98	37.16	43.50	-6.34	100	124	QP
4	143.5750	23.92	14.25	38.17	43.50	-5.33	100	119	QP
5	168.0010	23.77	14.46	38.23	43.50	-5.27	100	74	QP
6	653.7100	12.98	25.41	38.39	46.00	-7.61	100	32	peak

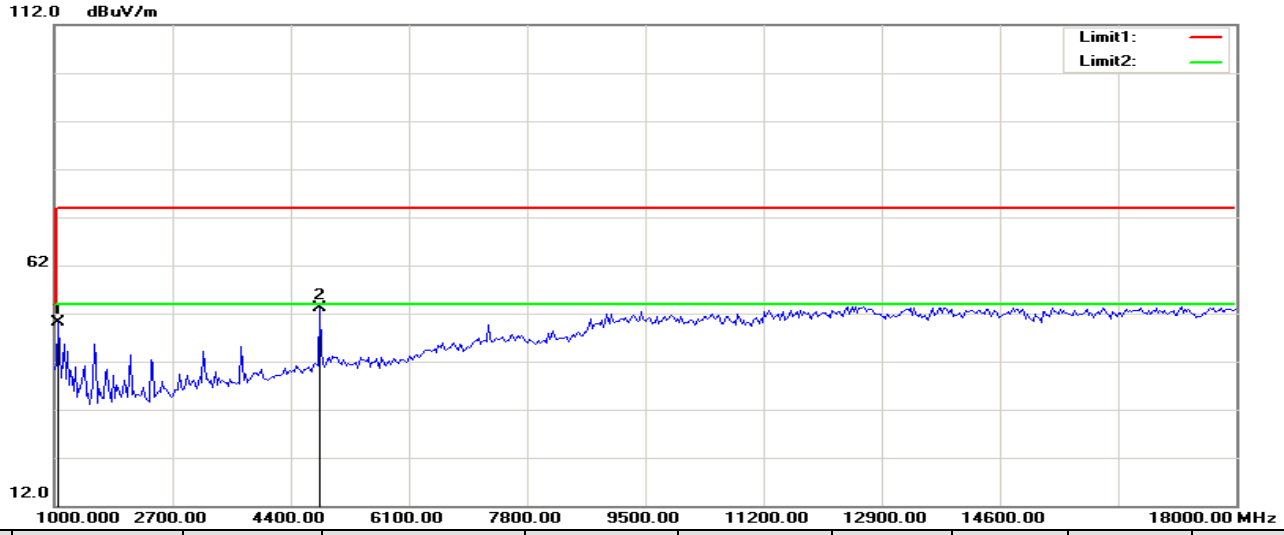
Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz (No emission found between lowest internal used/generated frequency to 30 MHz).*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

Above 1 GHz

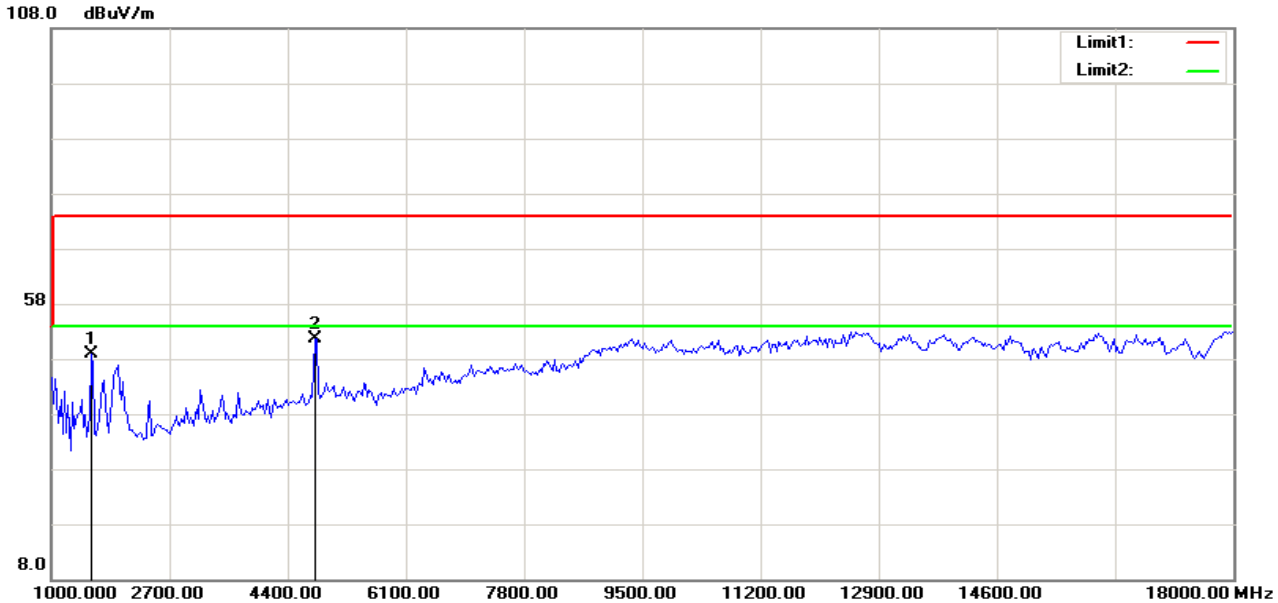
Operation Mode: TX / IEEE 802.11b / CH Low
Test Date: 2018-5-9
Temperature: 25°C
Tested by: Lily.Wang
Humidity: 40 % RH
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1054.487	61.62	-11.52	50.10	74.00	-23.90	100	200	peak
2	4814.103	53.54	-0.33	53.21	74.00	-20.79	100	171	peak

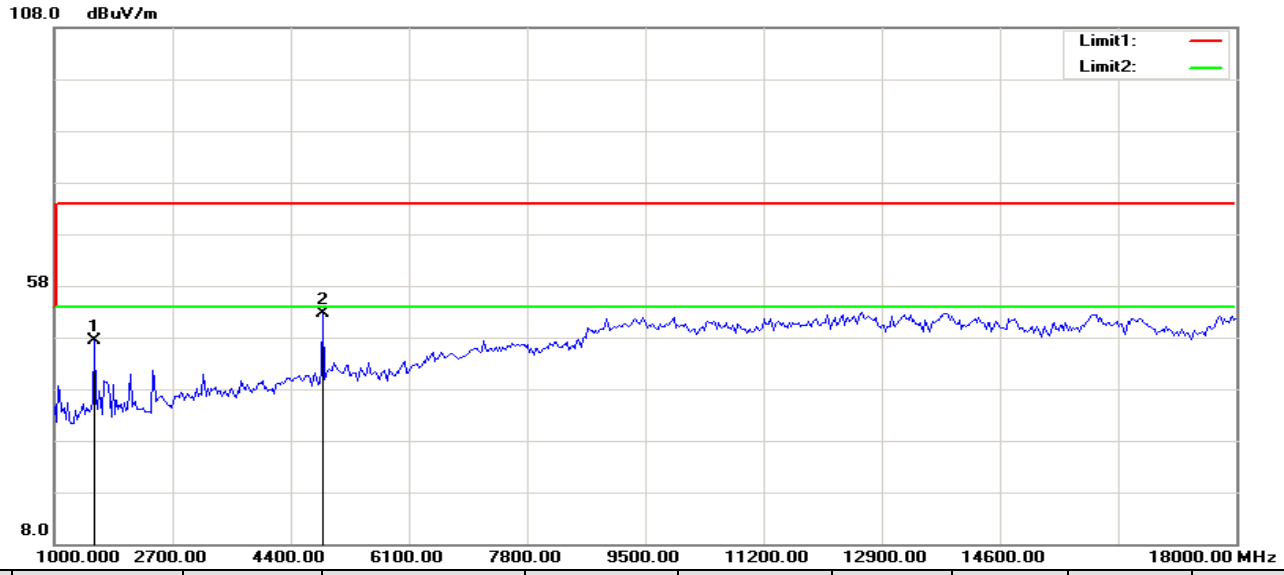
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1572.115	58.78	-9.85	48.93	74.00	-25.07	100	305	peak
2	4786.859	52.11	-0.43	51.68	74.00	-22.32	100	145	peak

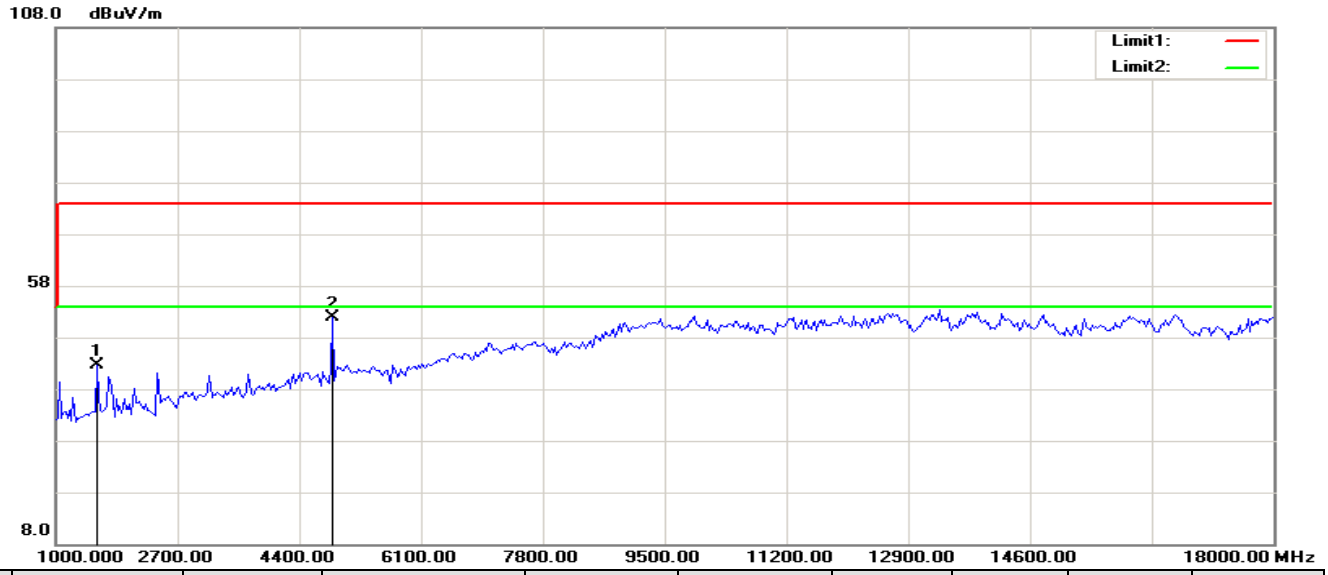
Operation Mode: TX / IEEE 802.11b / CH Mid
Test Date: 2018-5-9
Temperature: 25°C
Tested by: Lily.Wang
Humidity: 40 % RH
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1572.115	57.22	-9.85	47.37	74.00	-26.63	100	298	peak
2	4868.590	52.66	-0.12	52.54	74.00	-21.46	100	330	peak

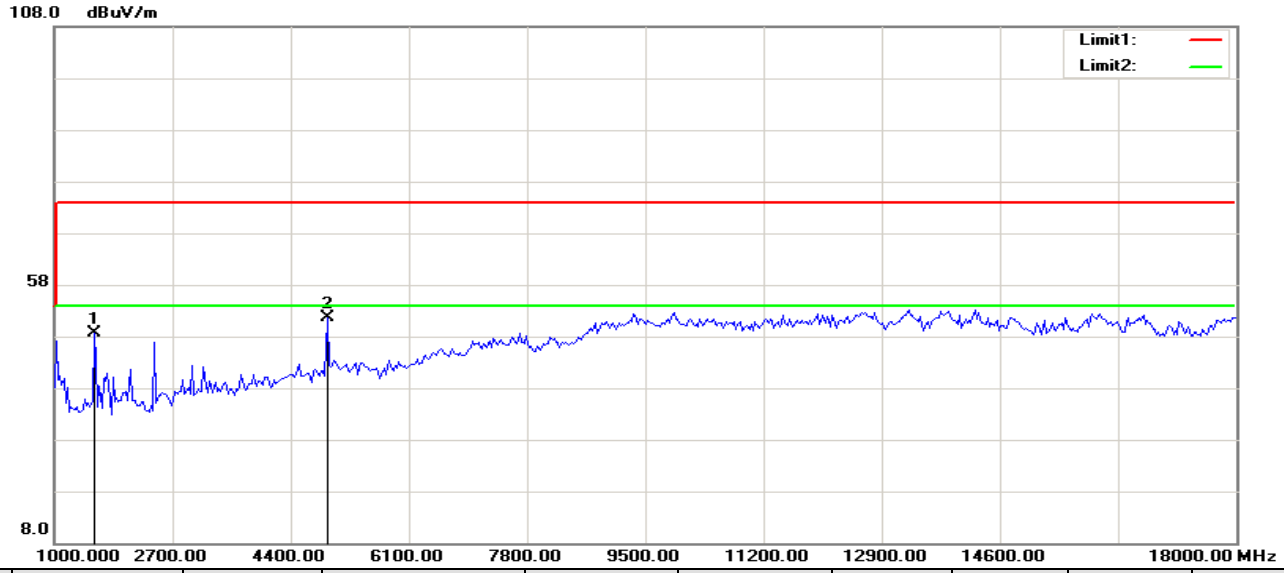
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1572.115	52.50	-9.85	42.65	74.00	-31.35	100	322	peak
2	4868.590	51.96	-0.12	51.84	74.00	-22.16	100	303	peak

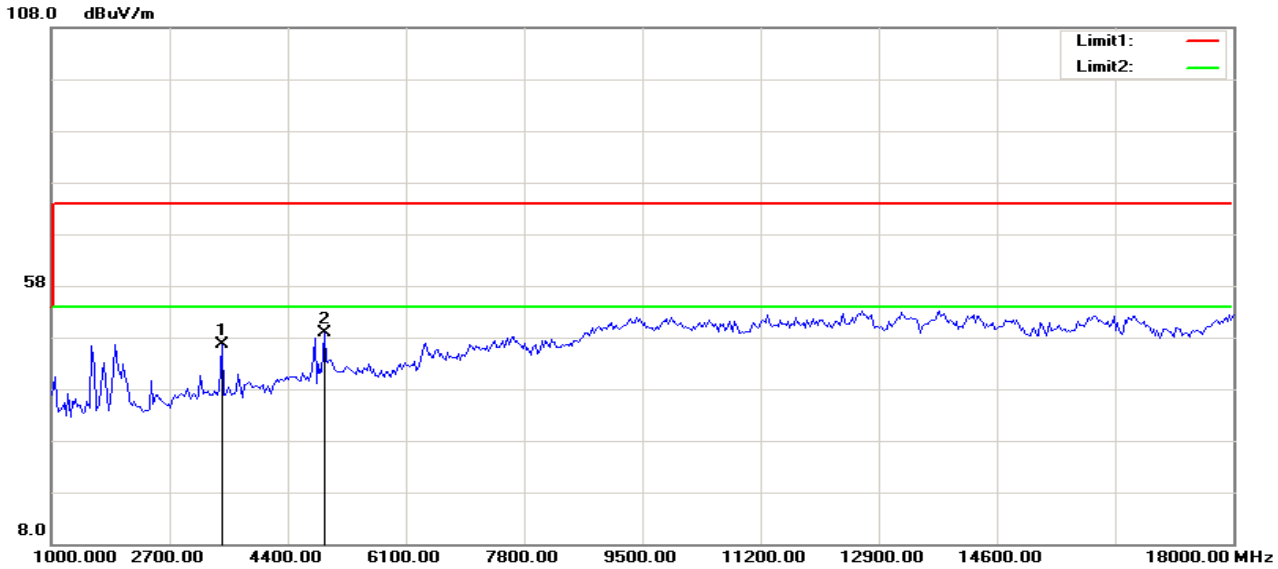
Operation Mode: TX / IEEE 802.11b / CH High
Test Date: 2018-5-9
Temperature: 25°C
Tested by: Lily.Wang
Humidity: 40 % RH
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1572.115	58.53	-9.85	48.68	74.00	-25.32	100	297	peak
2	4923.077	51.59	0.08	51.67	74.00	-22.33	100	256	peak

Vertical



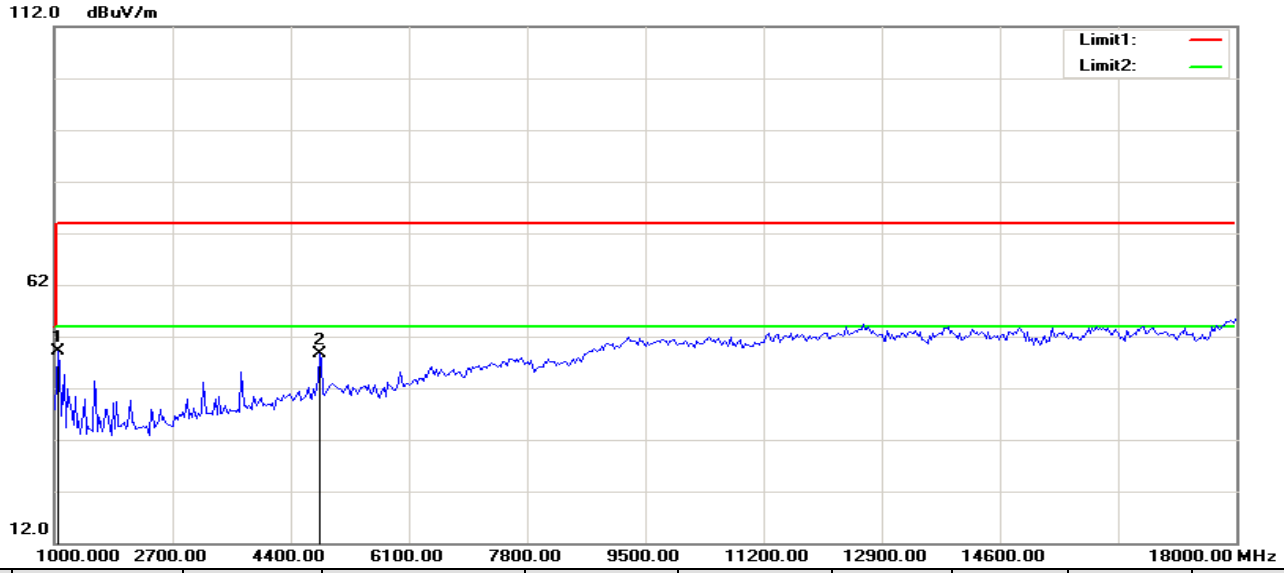
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	3451.923	51.73	-5.01	46.72	74.00	-27.28	100	160	peak
2	4923.077	48.87	0.08	48.95	74.00	-25.05	100	237	peak

Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** 2018-5-9

Temperature: 25°C **Tested by:** Lily.Wang

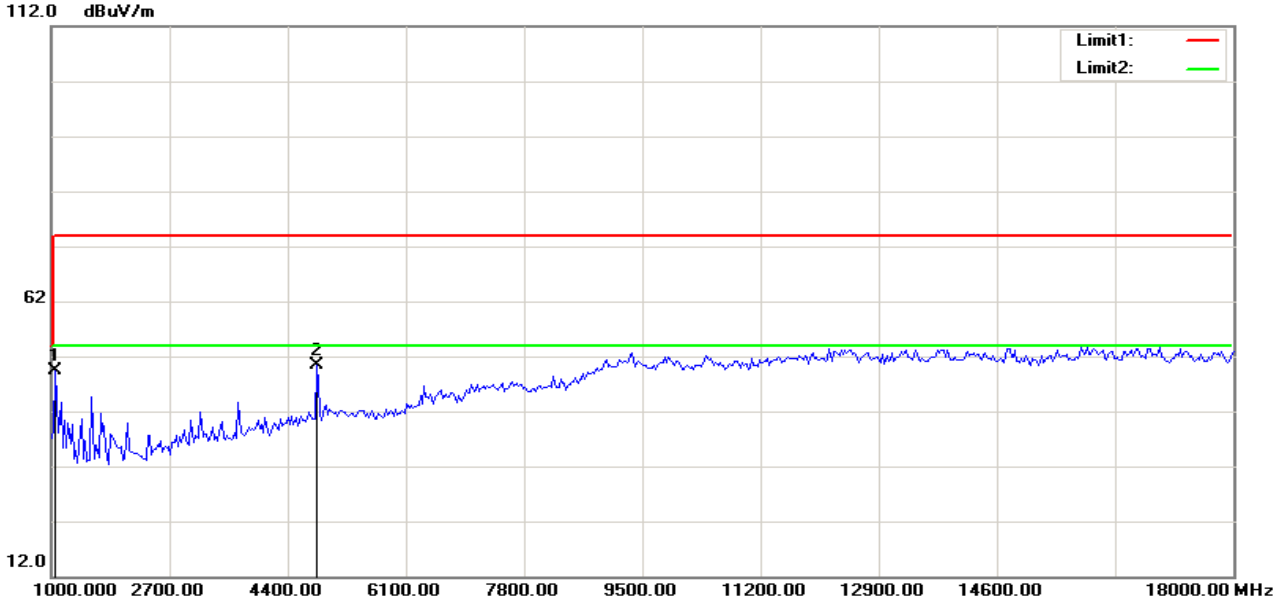
Humidity: 40 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1054.487	60.65	-11.52	49.13	74.00	-24.87	100	215	peak
2	4814.103	48.92	-0.33	48.59	74.00	-25.41	100	290	peak

Vertical



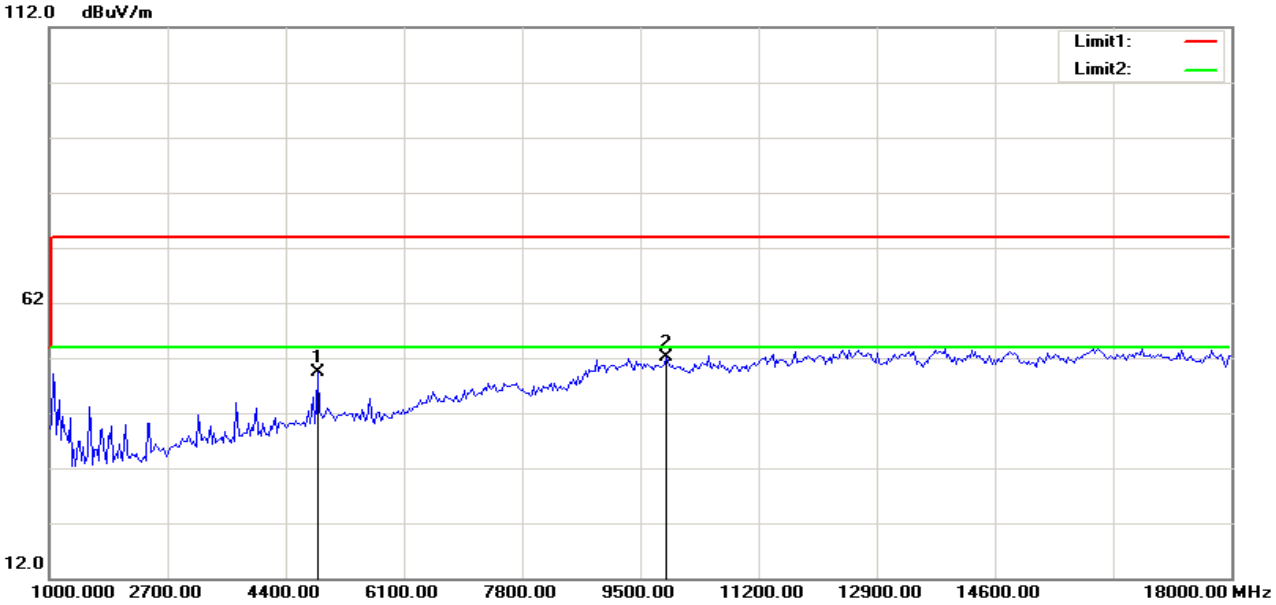
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1054.487	60.88	-11.52	49.36	74.00	-24.64	100	202	peak
2	4814.103	50.82	-0.33	50.49	74.00	-23.51	100	283	peak

Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** 2018-5-9

Temperature: 25°C **Tested by:** Lily.Wang

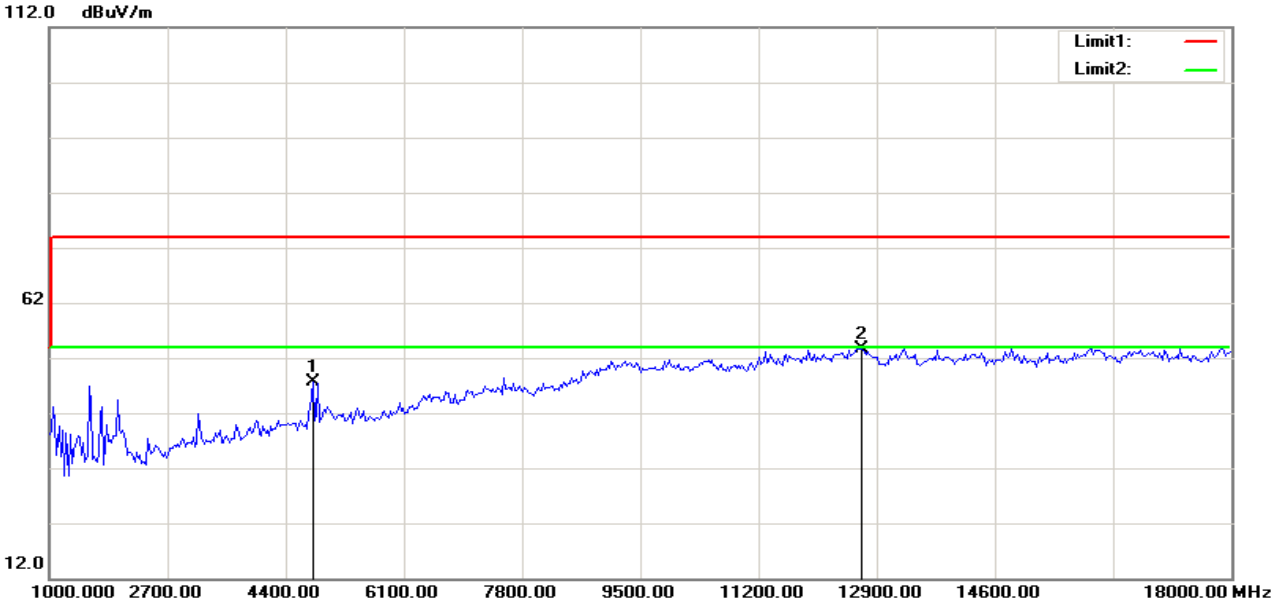
Humidity: 40 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4868.590	49.46	-0.12	49.34	74.00	-24.66	100	166	peak
2	9881.410	40.70	11.35	52.05	74.00	-21.95	100	4	peak

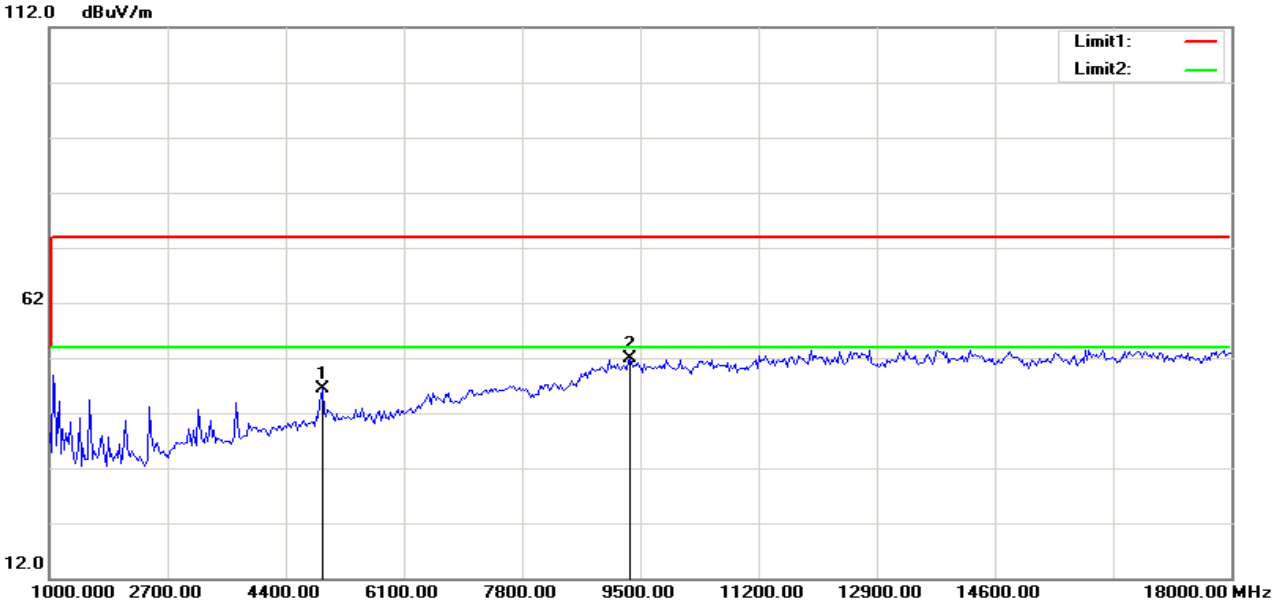
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	48.11	-0.43	47.68	74.00	-26.32	100	169	peak
2	12687.500	38.39	15.25	53.64	74.00	-20.36	100	219	peak

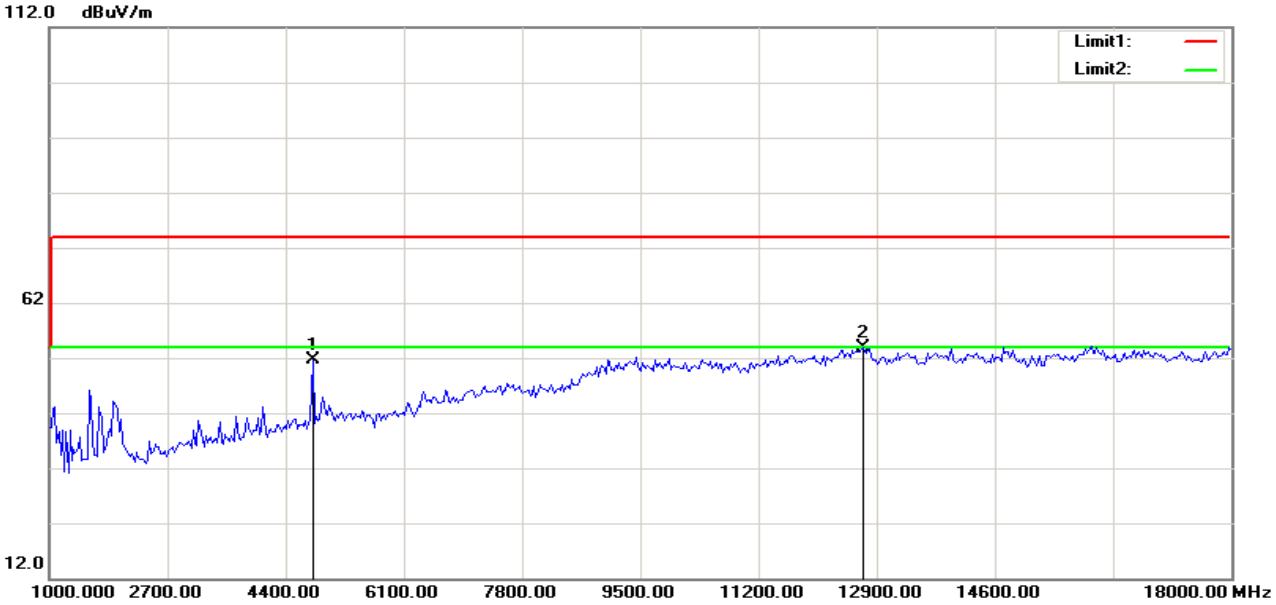
Operation Mode: TX / IEEE 802.11g / CH High
Test Date: 2018-5-9
Temperature: 25°C
Tested by: Lily.Wang
Humidity: 40 % RH
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4923.077	46.41	0.08	46.49	74.00	-27.51	100	293	peak
2	9363.782	40.88	10.98	51.86	74.00	-22.14	100	293	peak

Vertical



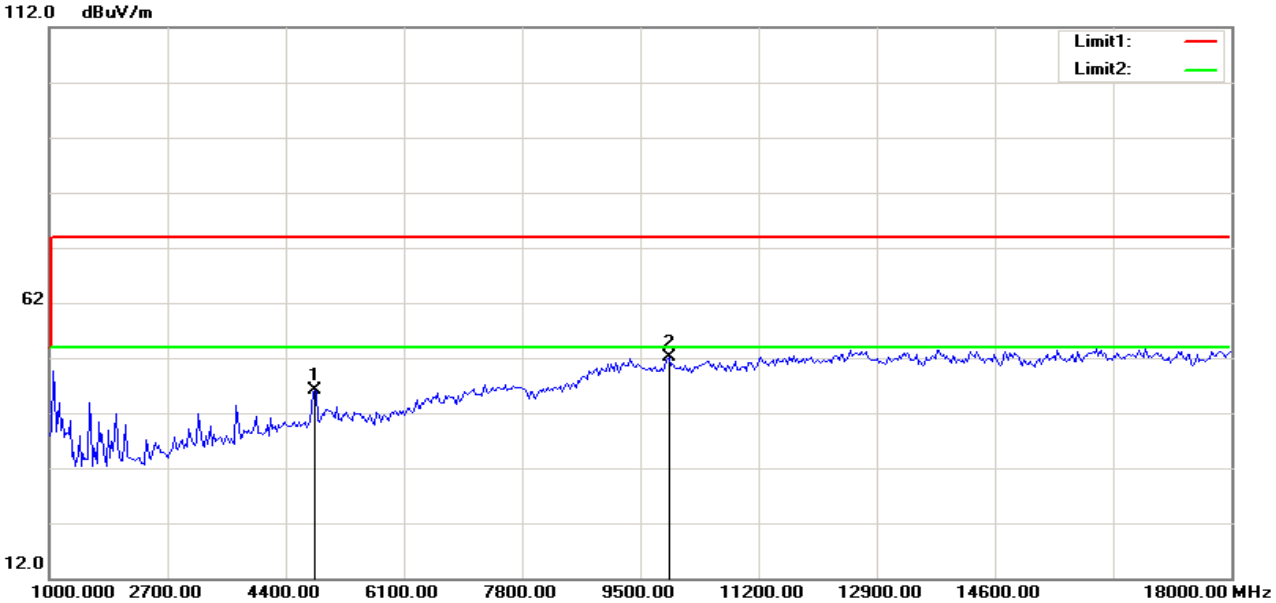
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	52.15	-0.43	51.72	74.00	-22.28	100	158	peak
2	12714.744	38.69	15.18	53.87	74.00	-20.13	100	233	peak

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Low **Test Date:** 2018-5-9

Temperature: 25°C **Tested by:** Lily.Wang

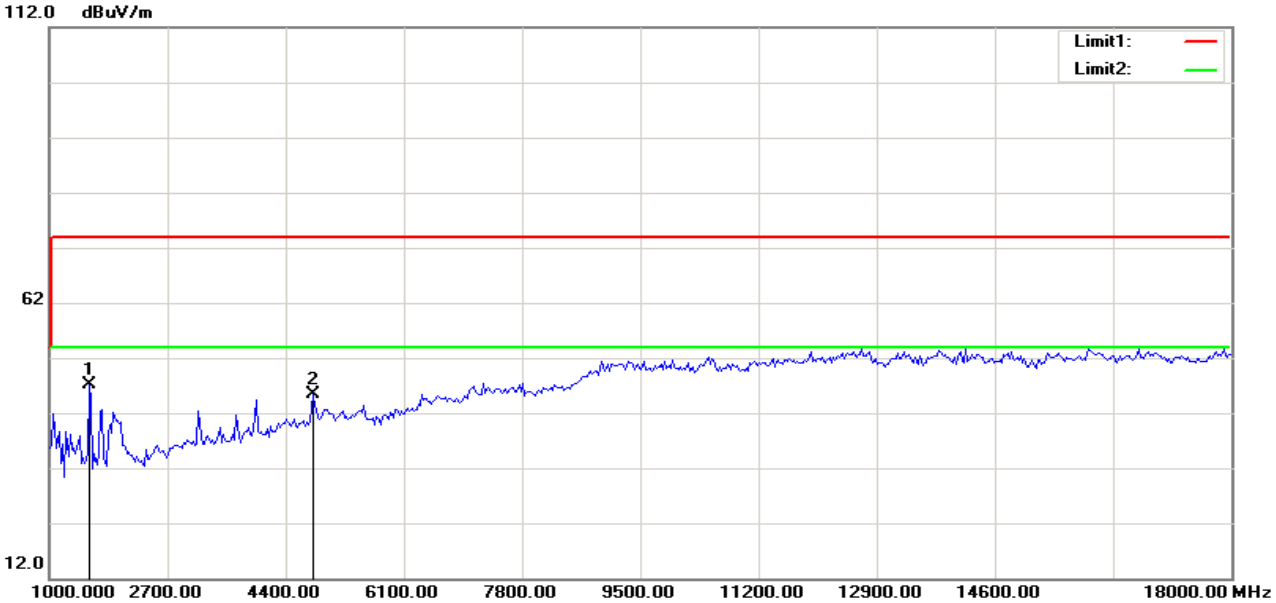
Humidity: 40 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4814.103	46.37	-0.33	46.04	74.00	-27.96	100	288	peak
2	9908.654	40.79	11.36	52.15	74.00	-21.85	100	130	peak

Vertical



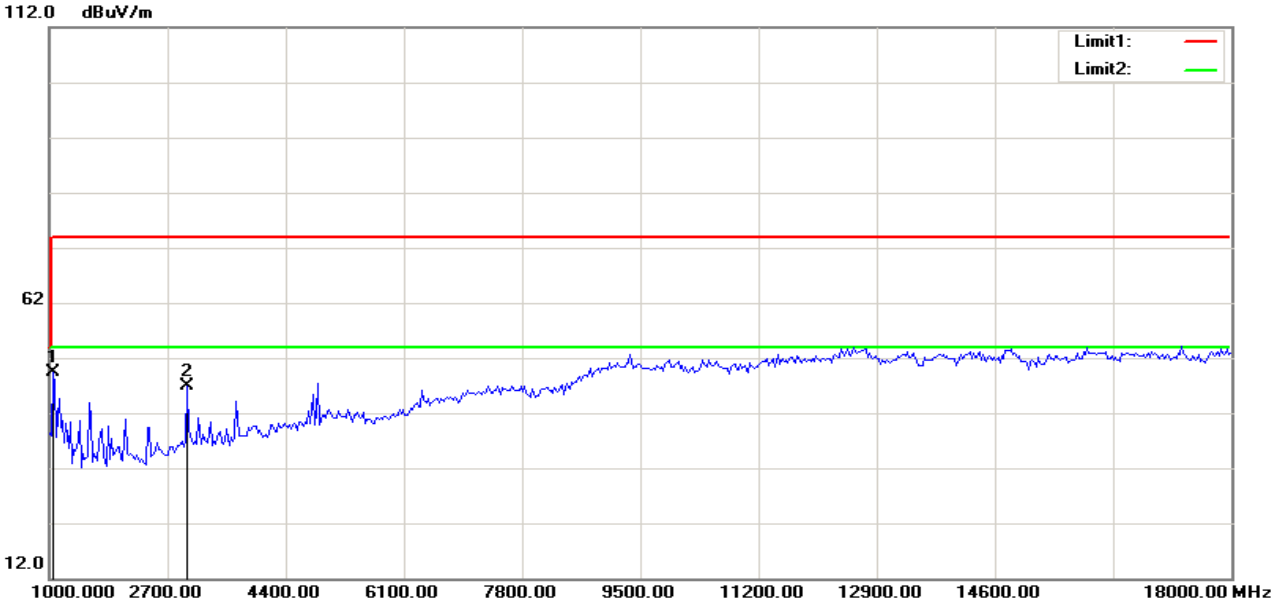
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1572.115	57.04	-9.85	47.19	74.00	-26.81	100	306	peak
2	4786.859	45.90	-0.43	45.47	74.00	-28.53	100	171	peak

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Mid **Test Date:** 2018-5-9

Temperature: 25°C **Tested by:** Lily.Wang

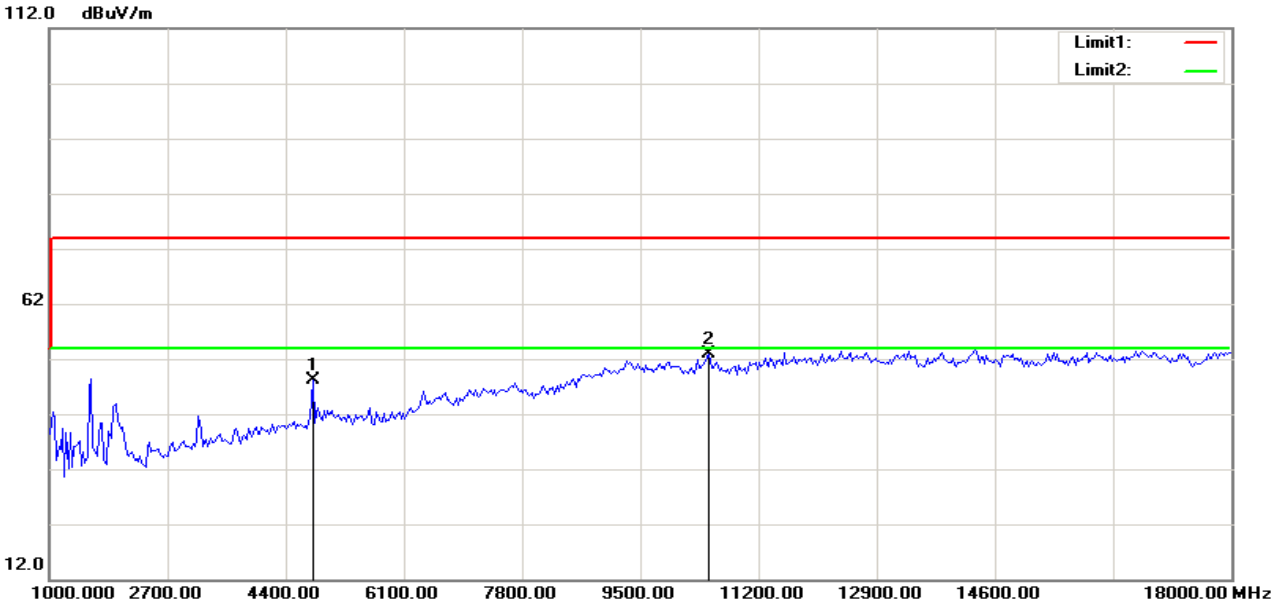
Humidity: 40 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	1054.487	60.98	-11.52	49.46	74.00	-24.54	100	200	peak
2	2988.782	52.83	-5.87	46.96	74.00	-27.04	100	354	peak

Vertical



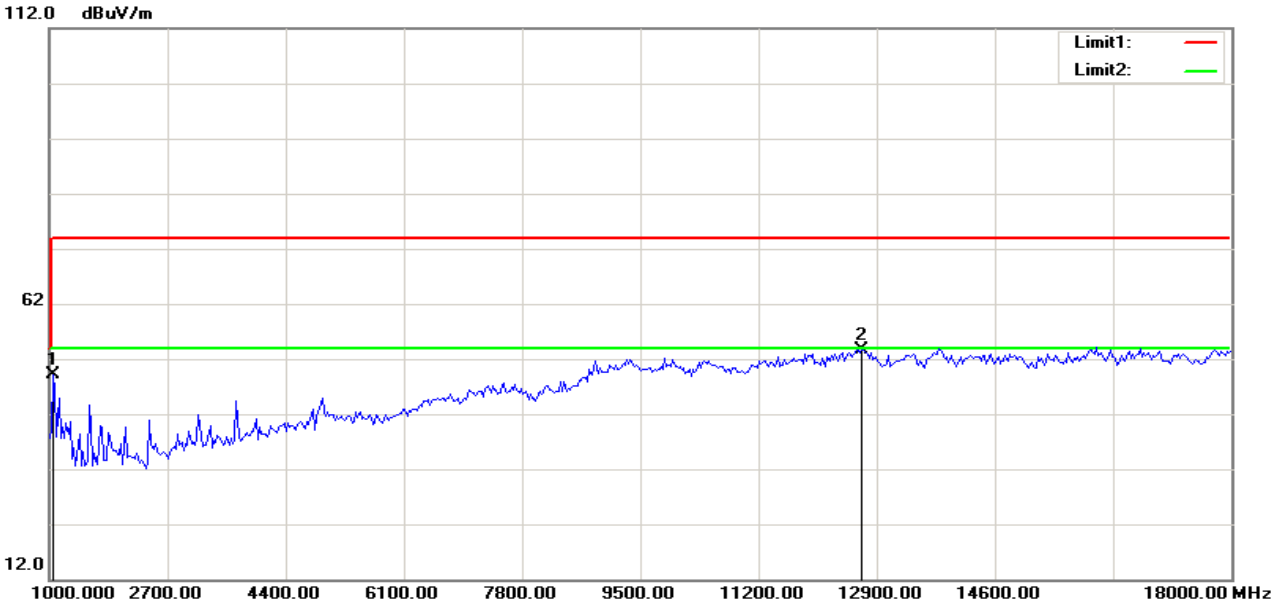
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	48.66	-0.43	48.23	74.00	-25.77	100	290	peak
2	10480.769	40.94	11.88	52.82	74.00	-21.18	100	261	peak

Operation Mode: TX / IEEE 802.11n HT20 mode / CH High **Test Date:** 2018-5-9

Temperature: 25°C **Tested by:** Lily.Wang

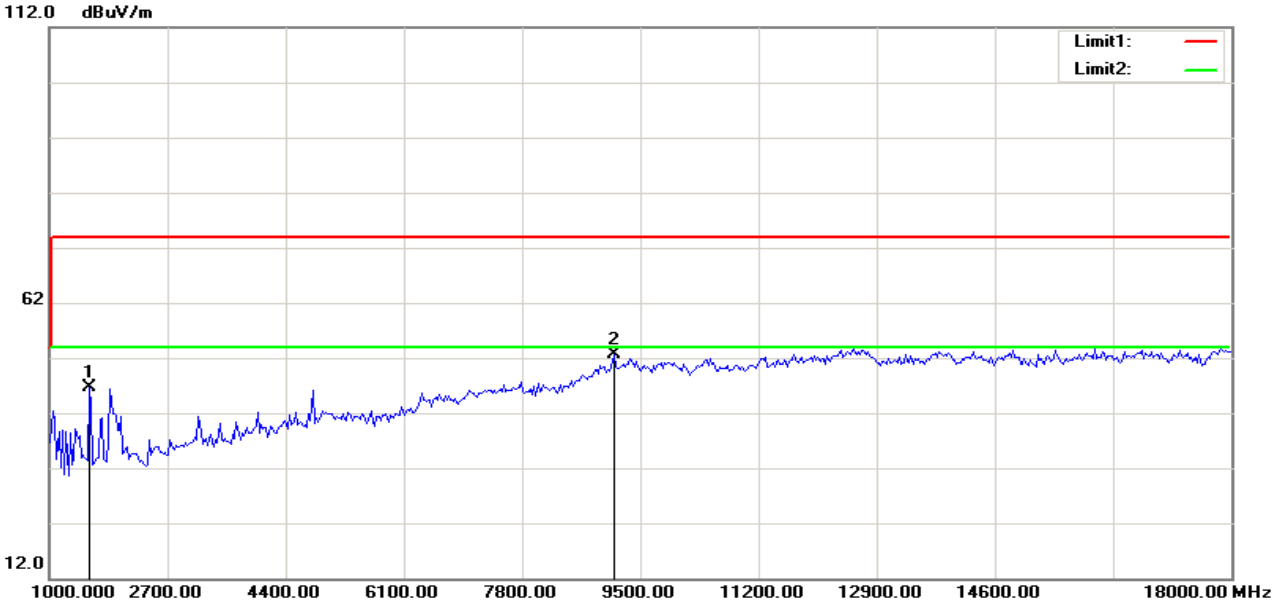
Humidity: 40 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	1054.487	60.61	-11.52	49.09	74.00	-24.91	100	196	peak
2	12687.500	38.44	15.25	53.69	74.00	-20.31	100	352	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	1572.115	56.57	-9.85	46.72	74.00	-27.28	100	308	peak
2	9118.590	42.28	10.45	52.73	74.00	-21.27	100	40	peak

7.6.POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

** Decreases with the logarithm of the frequency.*

Test Configuration

See test photographs attached in Setup photo for the actual connections between EUT and support equipment.

TEST PROCEDURE

1.The EUT was placed on a turntable, which is 0.1m above ground plane.

2.Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

3.Repeat above procedures until all frequency measured were complete.

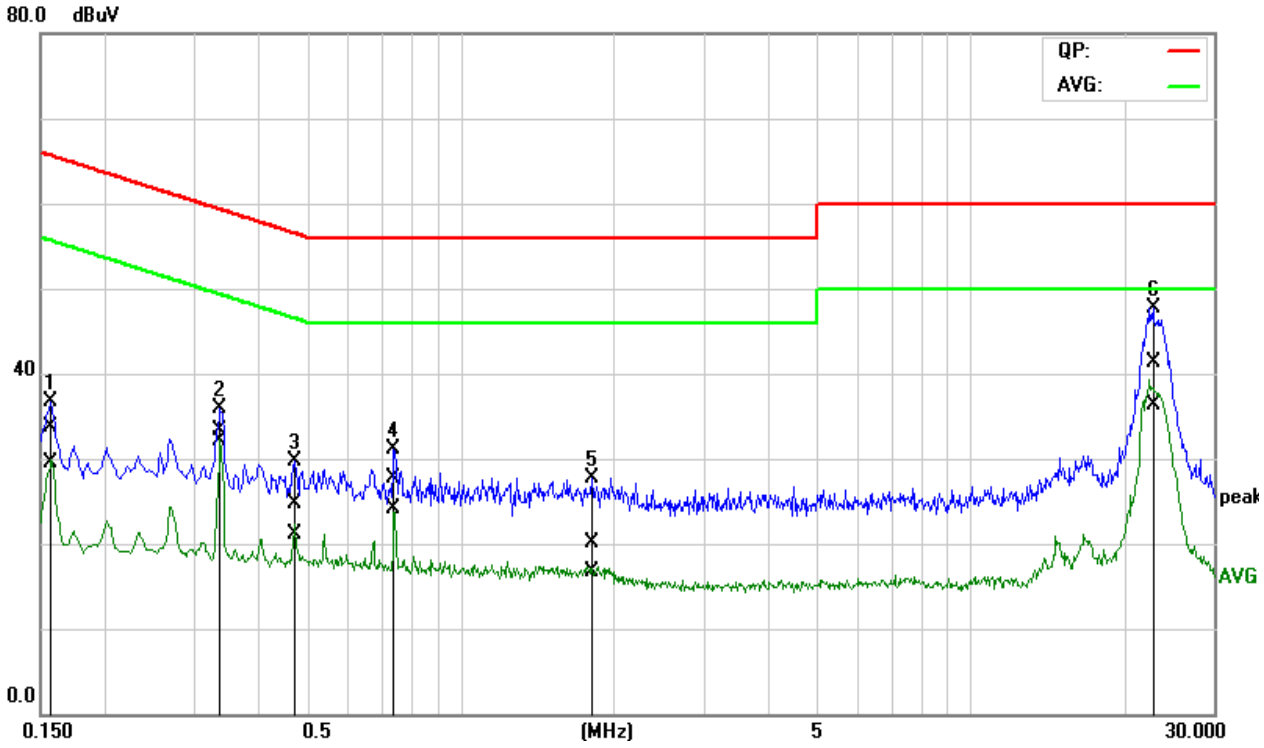
TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

TEST DATA

Job No.:	C180629R01	Date:	2018/5/11
Model No.:	Pro2 Plus	Time:	16:00:46
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L1

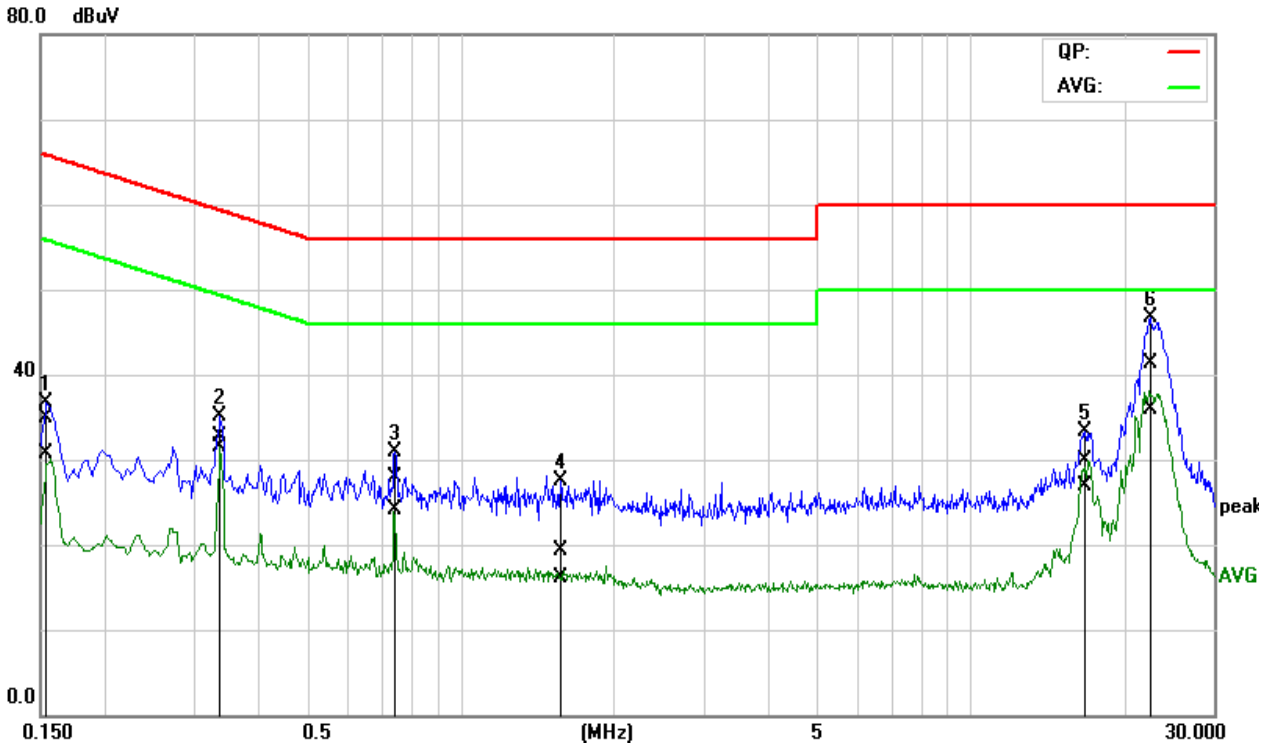


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1578	14.34	10.07	19.43	33.77	29.50	65.57	55.58	-31.80	-26.08	Pass
2	0.3372	13.87	12.60	19.48	33.35	32.08	59.27	49.27	-25.92	-17.19	Pass
3	0.4724	5.29	1.68	19.49	24.78	21.17	56.47	46.47	-31.69	-25.30	Pass
4	0.7429	8.22	4.55	19.54	27.76	24.09	56.00	46.00	-28.24	-21.91	Pass
5	1.7873	0.51	-2.97	19.58	20.09	16.61	56.00	46.00	-35.91	-29.39	Pass
6*	22.8031	21.30	16.22	20.08	41.38	36.30	60.00	50.00	-18.62	-13.70	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C180629R01	Date:	2018/5/11
Model No.:	Pro2 Plus	Time:	16:07:40
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L2

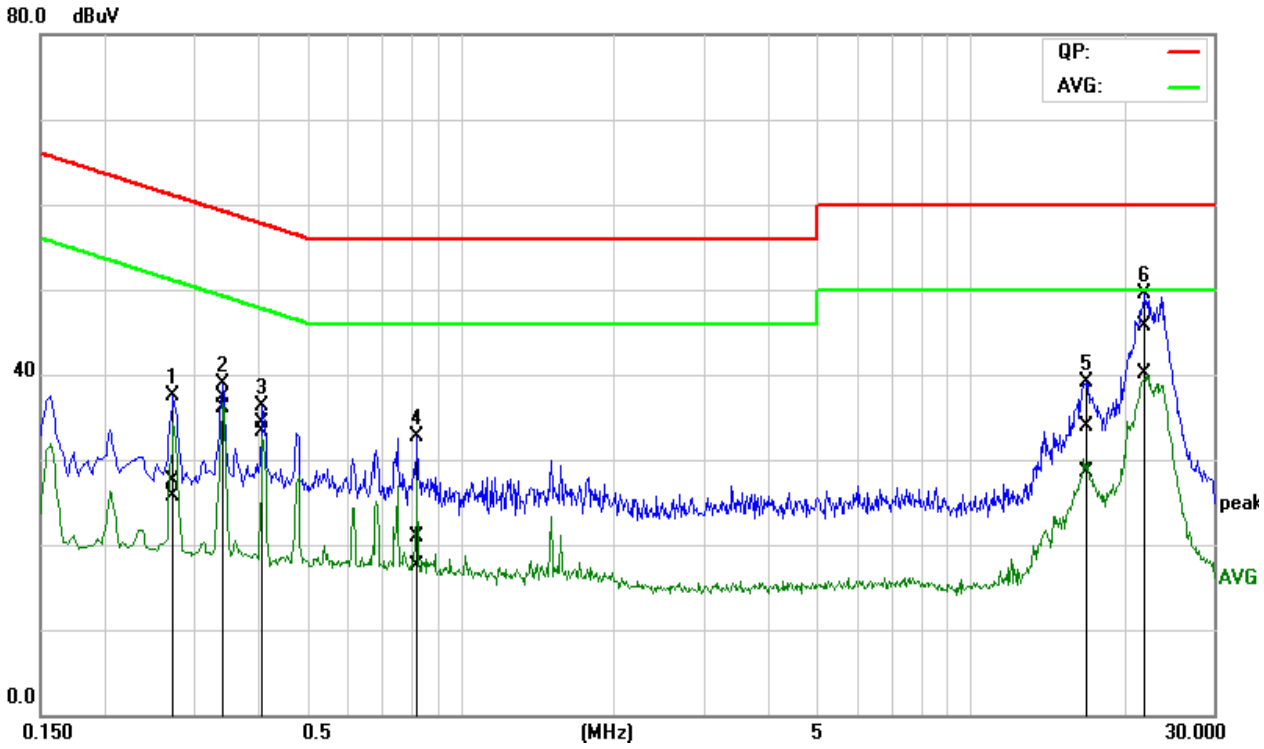


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1554	15.41	11.19	19.43	34.84	30.62	65.70	55.71	-30.86	-25.09	Pass
2	0.3378	13.31	11.93	19.48	32.79	31.41	59.26	49.26	-26.47	-17.85	Pass
3	0.7433	8.27	4.55	19.54	27.81	24.09	56.00	46.00	-28.19	-21.91	Pass
4	1.5708	-0.18	-3.46	19.58	19.40	16.12	56.00	46.00	-36.60	-29.88	Pass
5	16.7850	9.89	6.75	20.06	29.95	26.81	60.00	50.00	-30.05	-23.19	Pass
6*	22.6590	21.20	15.87	20.08	41.28	35.95	60.00	50.00	-18.72	-14.05	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C180629R01	Date:	2018/5/11
Model No.:	Pro2 Plus	Time:	14:09:46
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L1

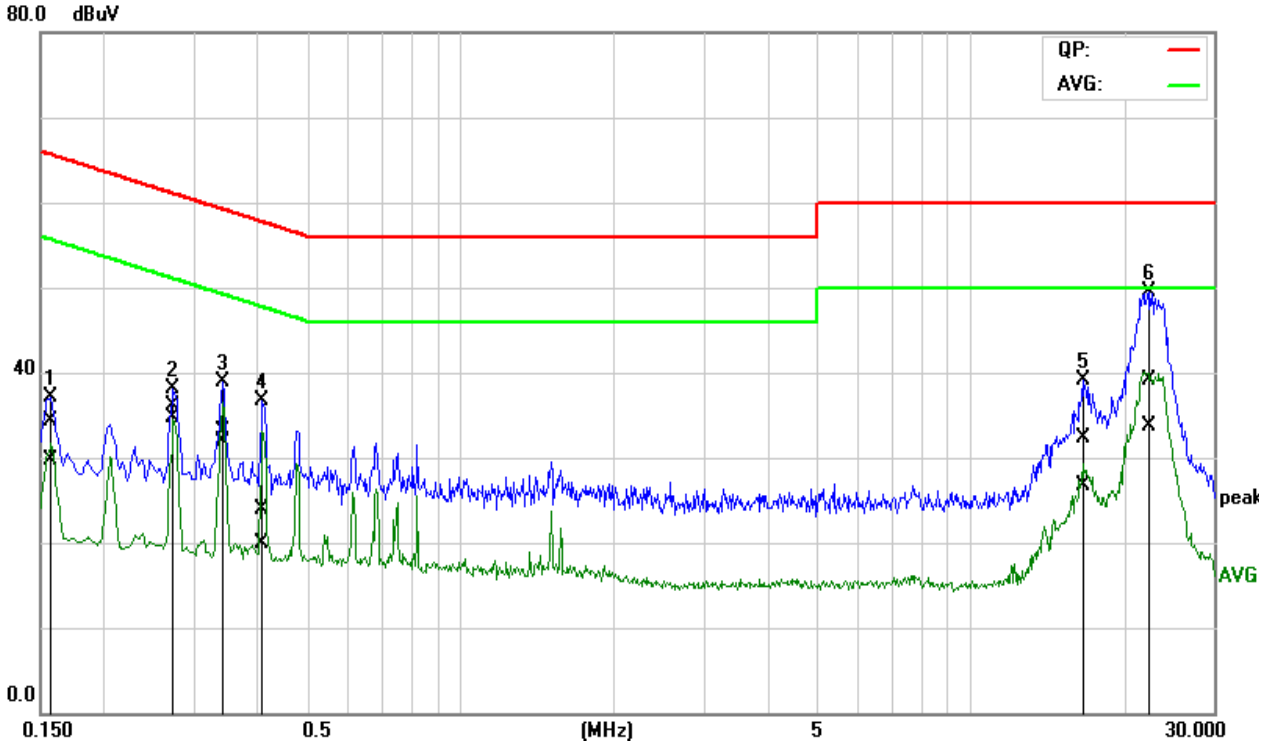


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.2741	8.03	6.31	19.46	27.49	25.77	60.99	50.99	-33.50	-25.22	Pass
2	0.3409	17.74	16.73	19.47	37.21	36.20	59.18	49.18	-21.97	-12.98	Pass
3	0.4099	14.83	13.82	19.47	34.30	33.29	57.65	47.65	-23.35	-14.36	Pass
4	0.8277	1.28	-1.98	19.54	20.82	17.56	56.00	46.00	-35.18	-28.44	Pass
5	16.9635	14.00	8.41	20.00	34.00	28.41	60.00	50.00	-26.00	-21.59	Pass
6*	21.9846	25.66	20.18	20.02	45.68	40.20	60.00	50.00	-14.32	-9.80	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C180629R01	Date:	2018/5/11
Model No.:	Pro2 Plus	Time:	14:16:17
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L2



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1558	14.79	10.28	19.42	34.21	29.70	65.68	55.68	-31.47	-25.98	Pass
2*	0.2748	16.64	15.17	19.46	36.10	34.63	60.97	50.97	-24.87	-16.34	Pass
3	0.3373	13.71	12.53	19.47	33.18	32.00	59.27	49.27	-26.09	-17.27	Pass
4	0.4082	4.38	0.37	19.47	23.85	19.84	57.68	47.68	-33.83	-27.84	Pass
5	16.6281	12.40	6.77	20.00	32.40	26.77	60.00	50.00	-27.60	-23.23	Pass
6	22.3402	19.15	13.63	20.03	39.18	33.66	60.00	50.00	-20.82	-16.34	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

*R*emark:

1.The measuring frequencies range between 0.15 MHz and 30 MHz.

2.The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.

3."---" denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.

4.The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.

END OF REPORT