FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Product Name: Wireless digital flat panel detector
Brand Name: N/A
Model No.: Mars1717XU-VSI
Series Model.: N/A
FCC ID: 2AQ9VMARS1717XU
Test Report Number:
C180928E08-RPW

Issued for

Shanghai United Imaging Healthcare Co., Ltd.
2258 Chengbei Rd., Jiading District, Shanghai

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

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	November 7, 2018	C180928E08-RPW	ALL	N/A
01	December 11, 2018	C180928E08-RPW	P5; P9; P10-P12; P108-P109	Update power rating; Add channel list; Update duty cycle plot; Update radiated emissions data of below 1GHz.
02	December 17, 2018	C180928E08-RPW	P5; P9	Add test voltage and the worst-case test mode.
03	December 19, 2018	C180928E08-RPW	P5	Add a note for test voltage.

1. TEST RESULT CERTIFICATION

Product Name:	Wireless digital flat panel detector
Trade Name:	N/A
Model Name.:	Mars1717XU-VSI
Series Model:	N/A
Applicant Discrepancy:	Initial
Date of Test:	October 30, 2018~November 5, 2018 and December 11, 2018
Applicant:	**Shanghai United Imaging Healthcare Co., Ltd.** 2258 Chengbei Rd., Jiading District, Shanghai
Manufacturer:	**iRay Technology Co., Ltd.** RM202,Building 7 No. 590,Ruiqing RD. Zhangjiang East, Pudong 201201 Shanghai,China
Application Type:	Certification

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

We hereby certify that:

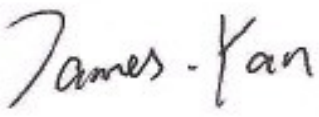
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described 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
Manager
Compliance Certification Services Inc.

Reviewed by:



James.Yan
RF Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product Name:	Wireless digital flat panel detector	
Brand Name:	N/A	
Model Name:	Mars1717XU-VSI	
Series Model:	N/A	
Model Discrepancy:	N/A	
Power Rating:	Input: 12V⎓2.5A Capacitance 1: 3.8V-2.2V 2100F 2.8Wh Capacitance 2: 3.8V-2.2V 2100F 2.8Wh Capacitance 1+ Capacitance 2: 7.6V-4.4V	
Test Voltage:	DC 7.6V (full charge) AC120V/60Hz (see remark 3)	
Frequency Range:	IEEE 802.11b/g: 2412MHz to 2462 MHz IEEE 802.11n HT20: 2412MHz to 2462 MHz IEEE 802.11n HT40: 2422MHz to 2452 MHz	
Max Peak Output Power:	IEEE 802.11b mode: 16.37dBm IEEE 802.11g mode: 22.80dBm IEEE 802.11n HT20 mode: 25.15dBm IEEE 802.11n HT40 mode: 23.38dBm	
Max Average Output Power:	IEEE 802.11b mode: 13.42dBm IEEE 802.11g mode: 12.29dBm IEEE 802.11n HT20 mode: 15.27dBm IEEE 802.11n HT40 mode: 13.01dBm	
Modulation Technique:	IEEE802.11b mode: DSSS (1,2,5.5 and 11 Mbps) IEEE802.11g mode: OFDM (6,9,12,18,24,36,48 and 54 Mbps) IEEE802.11n HT20 mode: OFDM (MCS0~MCS15) IEEE802.11n HT40 mode: OFDM (MCS0~MCS15)	
Number of Channels:	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40 : 7 Channels	
Antenna Specification:	FPC Antenna	
Antenna Specification:		Gain(dBi)
		2.4G
	Antenna 1	5.0
	Antenna 2	4.6
	Directional gain	7.81

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: 2AQ9VMARS1717XU*** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3.Only for powerline conducted test.

3. SUMMARY OF THE TEST RESULT

FCC 47 CFR Part 15, Subpart C 15.247			
Part	**Rule section**	**Description of Test**	**Result**
8.1	47 CFR Part 15, Subpart C 15.247	6db Bandwidth	Compliance
8.2	47 CFR Part 15, Subpart C 15.247	Peak Power	Compliance
8.3	47 CFR Part 15, Subpart C 15.247	Peak Power Spectral Density	Compliance
8.4	47 CFR Part 15, Subpart C 15.247	Spurious Emissions	Compliance
8.5	47 CFR Part 15, Subpart C 15.247	Radiated Emissions	Compliance
8.6	47 CFR Part 15, Subpart C 15.247	Powerline Conducted Emissions	Compliance

4. 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.

4.1.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.

4.2.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.

4.3.GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 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 0.8 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 1.5 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.

4.4.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.

4.5.DESCRIPTION OF TEST MODES

Mode	SISO Antenna 1	SISO Antenna 2	MIMO at both Antennas 1 and 2
802.11b	√	√	x
802.11g	√	√	x
802.11n HT20	√	√	√
802.11n HT40	√	√	√

The worst-case for conducted:

Mode	SISO Antenna 1	SISO Antenna 2	MIMO at both Antennas 1 and 2
802.11b	√	√	x
802.11g	√	√	x
802.11n HT20	x	x	√
802.11n HT40	x	x	√

The worst-case for radiated and powerline conducted:

Mode	SISO Antenna 1	SISO Antenna 2	MIMO at both Antennas 1 and 2
802.11b	x	√	x
802.11g	x	√	x
802.11n HT20	x	x	√
802.11n HT40	x	x	√

Operated in 2412MHz~2462MHz band:

11 channels are used for 802.11b, 802.11g, 802.11n HT20:

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

7 channels are used for 802.11n HT40:

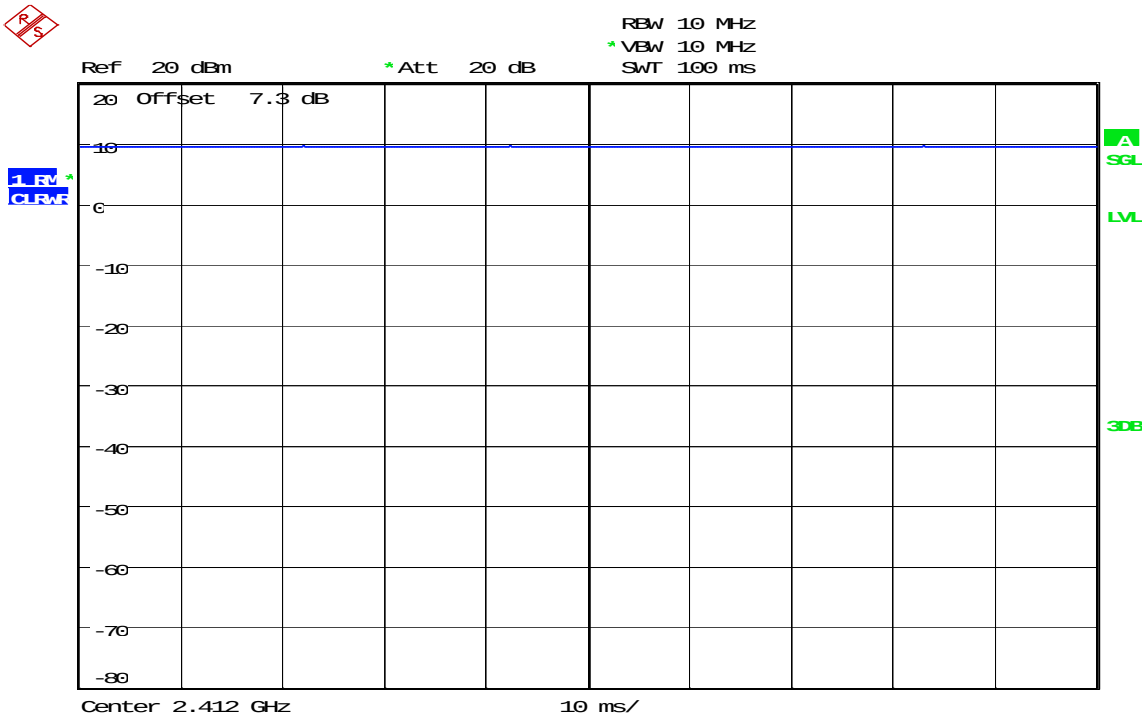
Channel Frequency	Channel Frequency
3	2422 MHz
4	2427 MHz
5	2432 MHz
6	2437 MHz
7	2442 MHz
8	2447 MHz
9	2452 MHz

The worst-case data rates:
IEEE802.11b mode:
Channel Low (2412MHz)
Channel Mid (2437MHz)
Channel High (2462MHz) with 1Mbps data rate was chosen for full testing.
IEEE802.11g mode:
Channel Low (2412MHz)
Channel Mid (2437MHz)
Channel High (2462MHz) with 6Mbps data rate was chosen for full testing.
IEEE 802.11n HT20 MHz Channel mode:
Channel Low (2412MHz)
Channel Mid (2437MHz)
Channel High (2462MHz) with MCS0 data rate was chosen for full testing.
IEEE 802.11n HT40 MHz Channel mode:
Channel Low (2422MHz)
Channel Mid (2437MHz)
Channel High (2452MHz) with MCS0 data rate was chosen for full testing.

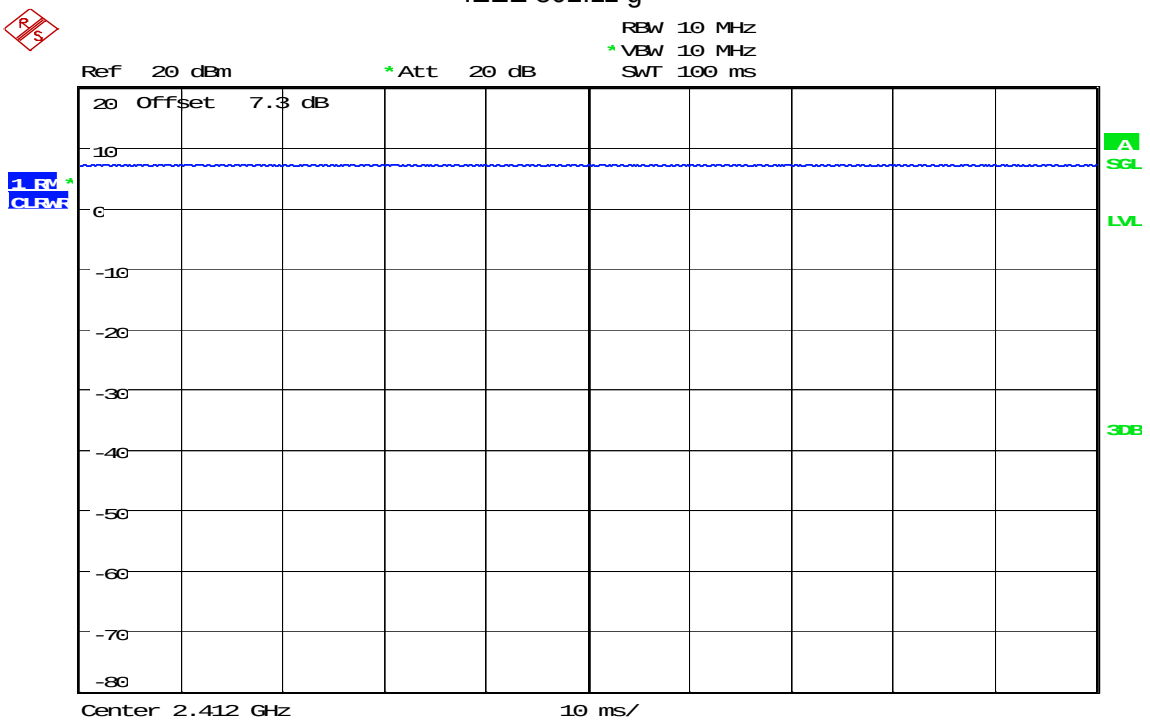
4.6.DUTY CYCLE

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 b	100	-	-	10Hz
IEEE 802.11 g	100	-	-	10Hz
IEEE 802.11n HT20	100	-	-	10Hz
IEEE 802.11n HT40	100	-	-	10Hz

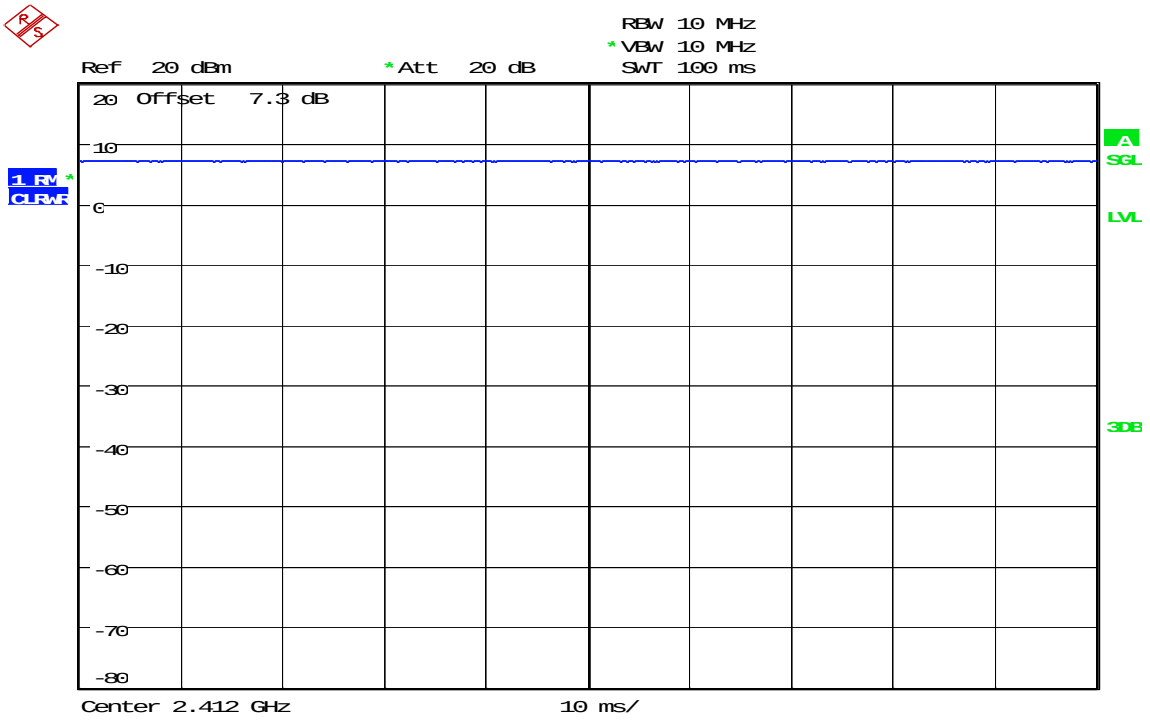
IEEE 802.11 b



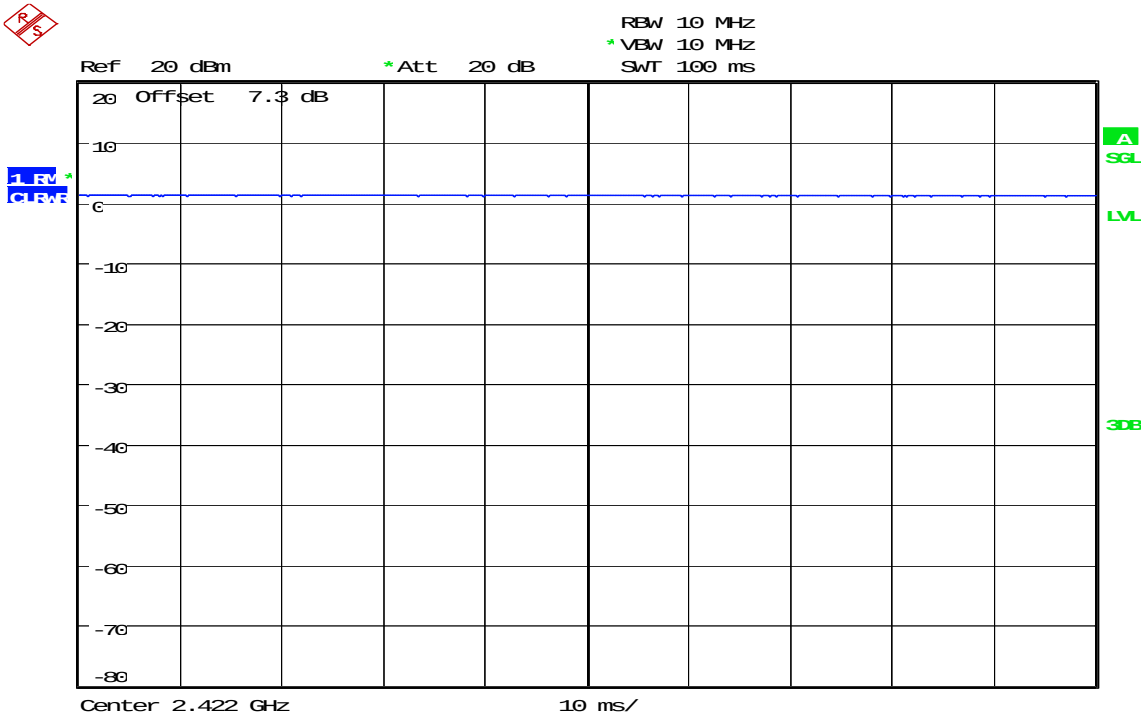
IEEE 802.11 g



IEEE 802.11n HT20



IEEE 802.11n HT40

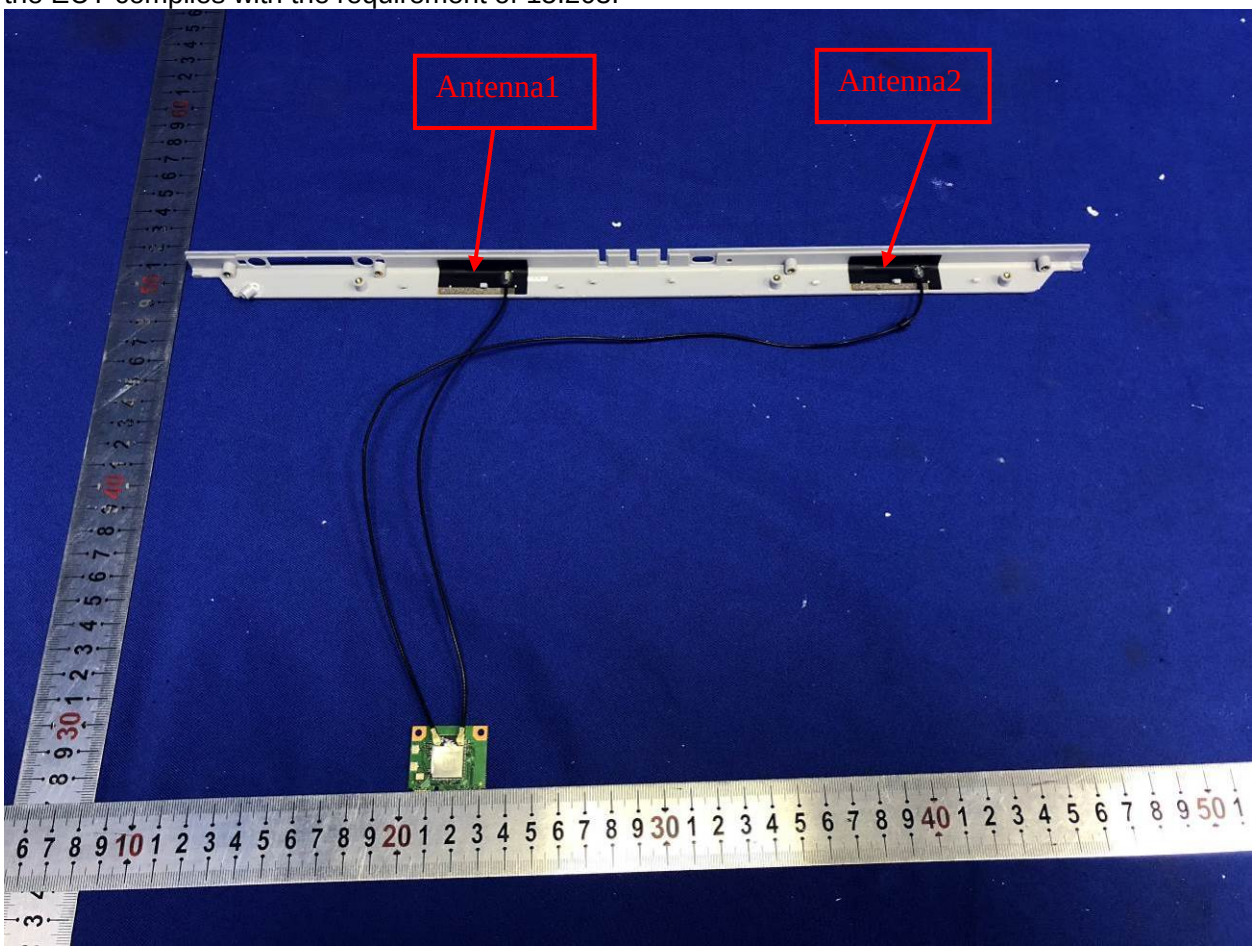


4.7.ANTENNA DESCRIPTION

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.



5. INSTRUMENT CALIBRATION

5.1.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	RS	FSU26	200789	2018-7-13	2019-7-12
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
Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	2018-4-23	2019-4-22
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	2018-10-30	2019-10-29

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	2018-10-28	2019-10-27
TWO-LINE V-NETWORK	R&S	ENV216	101604	2018-10-28	2019-10-27
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 ver.3A1		

977 Chamber					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
Spectrum Analyzer	RS	FSU26	200789	2018-7-13	2019-7-12
Spectrum Analyzer	RS	FSV40	101493	2017-12-18	2018-12-17
EMI Test Receiver	R&S	ESCI	101378	2017-12-27	2018-12-26
Amplifier	COM-POWER	PAM-840A	461332	2017-11-29	2018-11-28
Amplifier	COM-POWER	PAM-118A	551044	2018-4-26	2019-4-25
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	9170-515	2018-2-27	2019-2-26
Bilog Antenna	SCHAFFNER	CBL6112D	36996	2018-7-7	2019-7-6
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
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	2018-10-28	2019-10-27
Cable	REBES MICROWAVE	Cable-94	N/A	2018-10-28	2019-10-27
Cable	REBES MICROWAVE	Cable-95	N/A	2018-10-28	2019-10-27
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
Test Software			EZ-EMC ver.3A1		

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

5.2.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%

6. FACILITIES AND ACCREDITATIONS

6.1.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.

6.2.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.”

6.3.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.

6.4.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);	

		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.*

7. SETUP OF EQUIPMENT UNDER TEST

7.1.SETUP CONFIGURATION OF EUT

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

7.2.SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1	Adapter	TDK	HWS100A-12/MEA	N/A	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.*

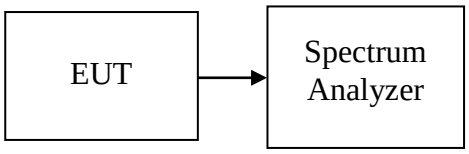
8. FCC PART 15.247 REQUIREMENTS

8.1.6DB 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

1. The testing follows Sub-clause 11.8 of ANSI C63.10.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.104	>500	PASS
Mid	2437	10.104		PASS
High	2462	10.104		PASS

IEEE 802.11b mode /Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.104	>500	PASS
Mid	2437	10.104		PASS
High	2462	10.104		PASS

IEEE 802.11g mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.728	>500	PASS
Mid	2437	16.680		PASS
High	2462	16.728		PASS

IEEE 802.11g mode /Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.680	>500	PASS
Mid	2437	16.680		PASS
High	2462	16.728		PASS

IEEE 802.11n HT20 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.784	>500	PASS
Mid	2437	17.832		PASS
High	2462	17.784		PASS

IEEE 802.11n HT20 mode / Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.784	>500	PASS
Mid	2437	17.784		PASS
High	2462	17.784		PASS

IEEE 802.11n HT40 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.720	>500	PASS
Mid	2437	36.624		PASS
High	2452	36.720		PASS

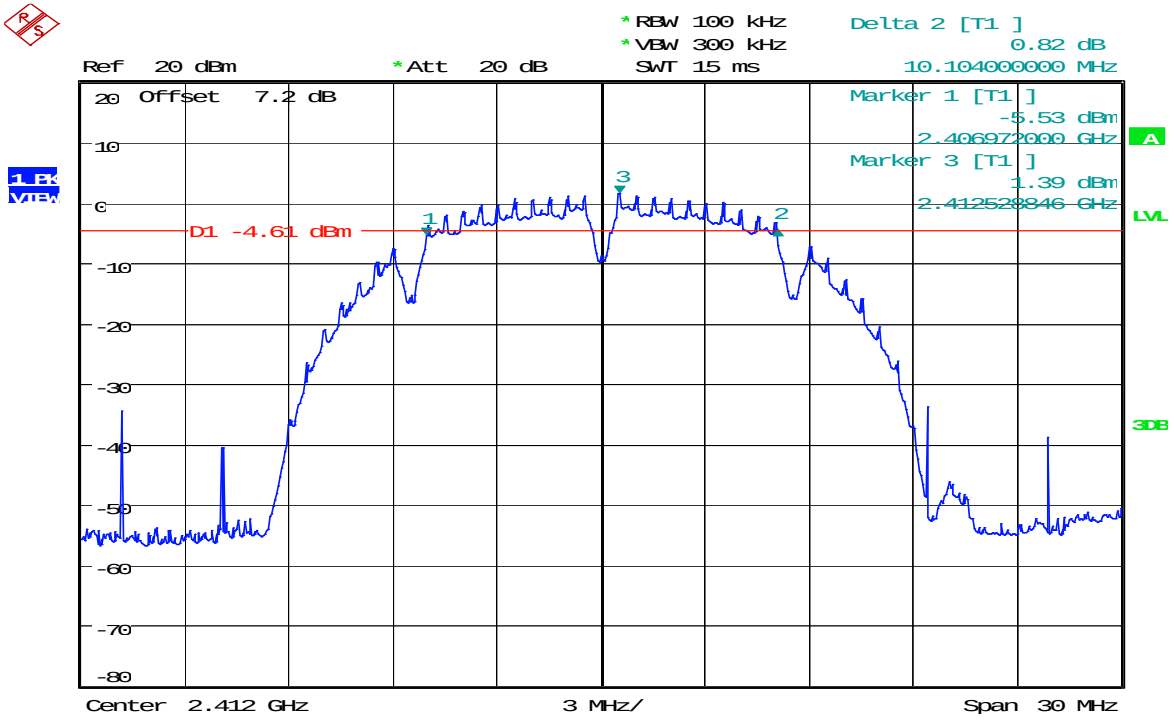
IEEE 802.11n HT40 mode / Chain 2

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.720	>500	PASS
Mid	2437	36.720		PASS
High	2452	36.720		PASS

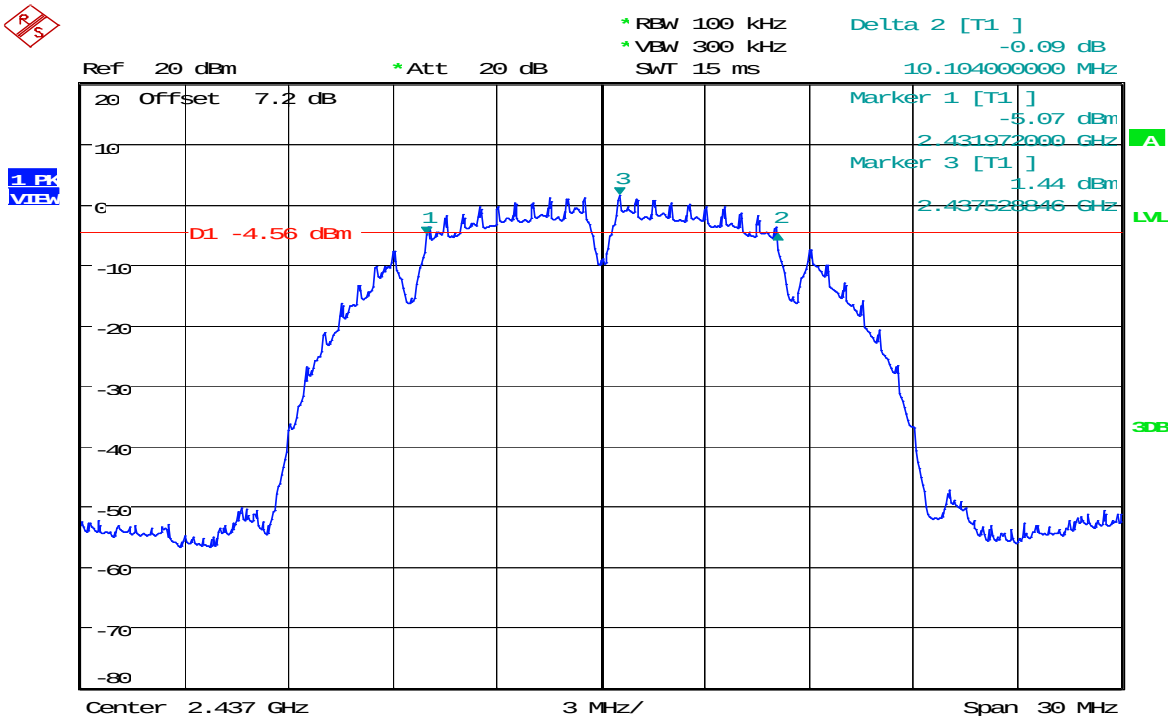
Test Plot

IEEE 802.11b MODE /Chain 1

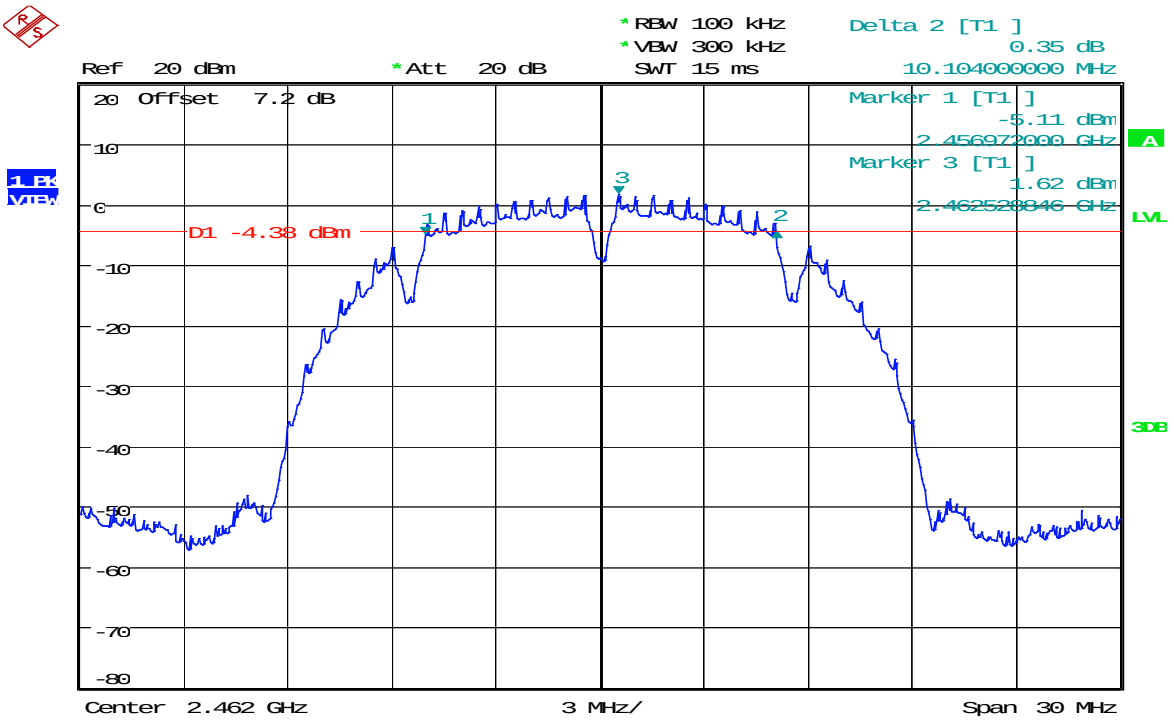
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

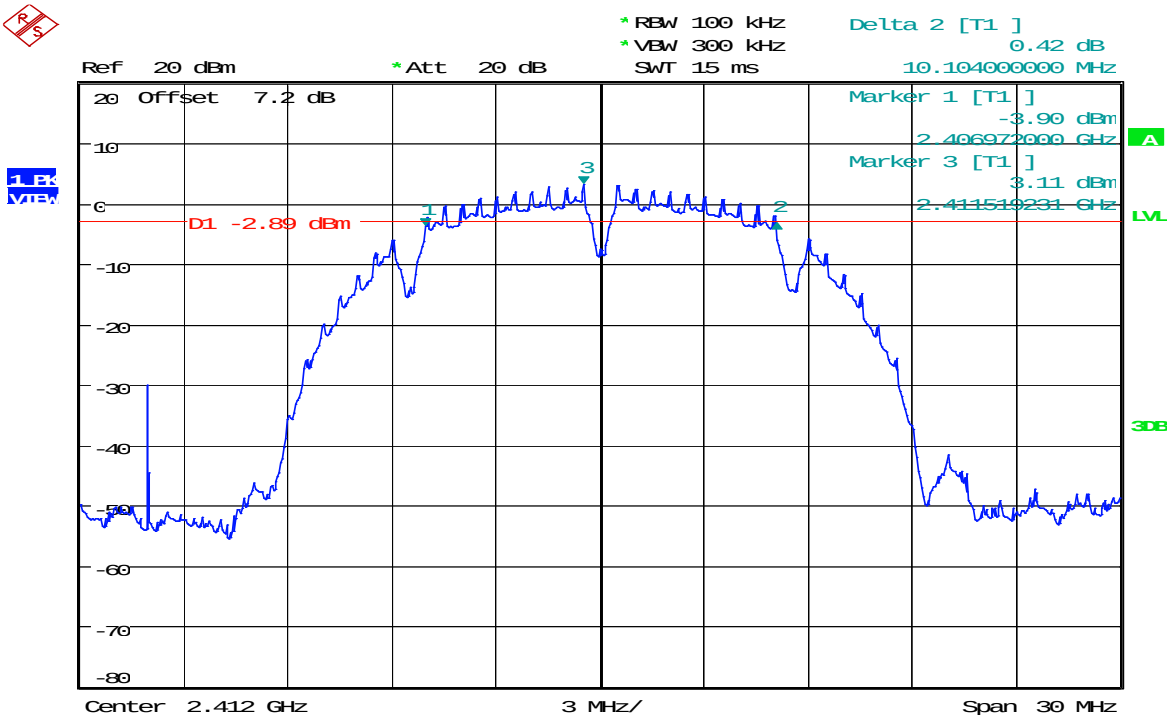


6dB Bandwidth (CH High)

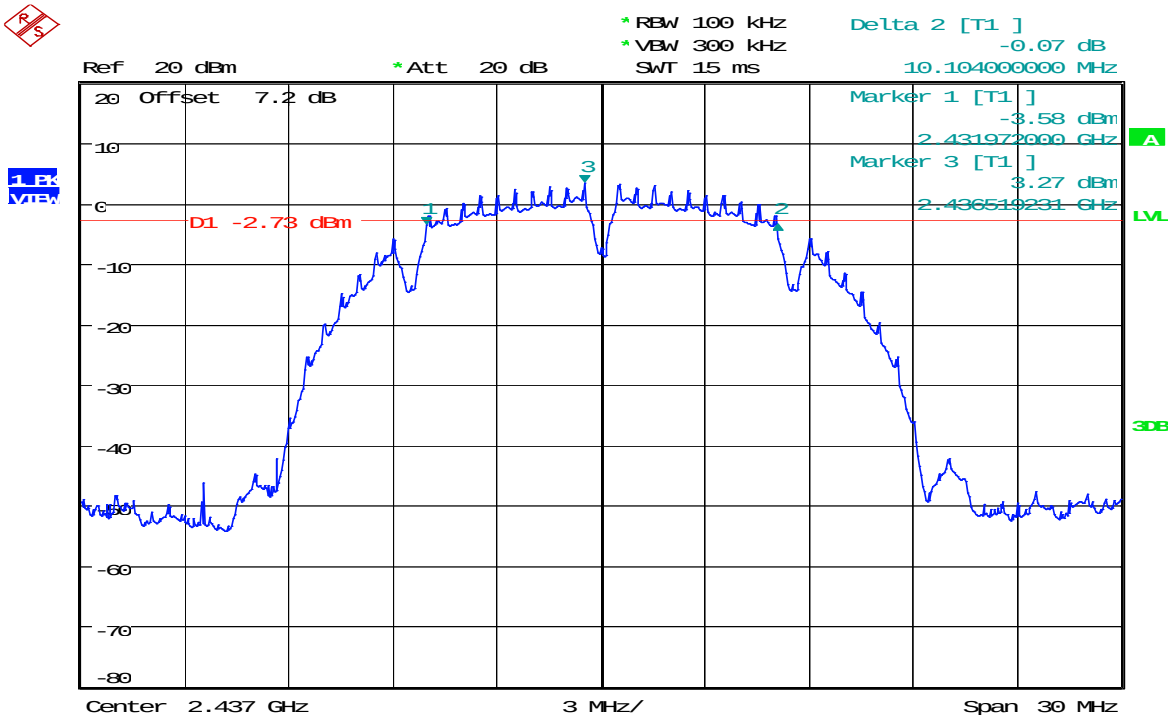


IEEE 802.11b MODE /Chain 2

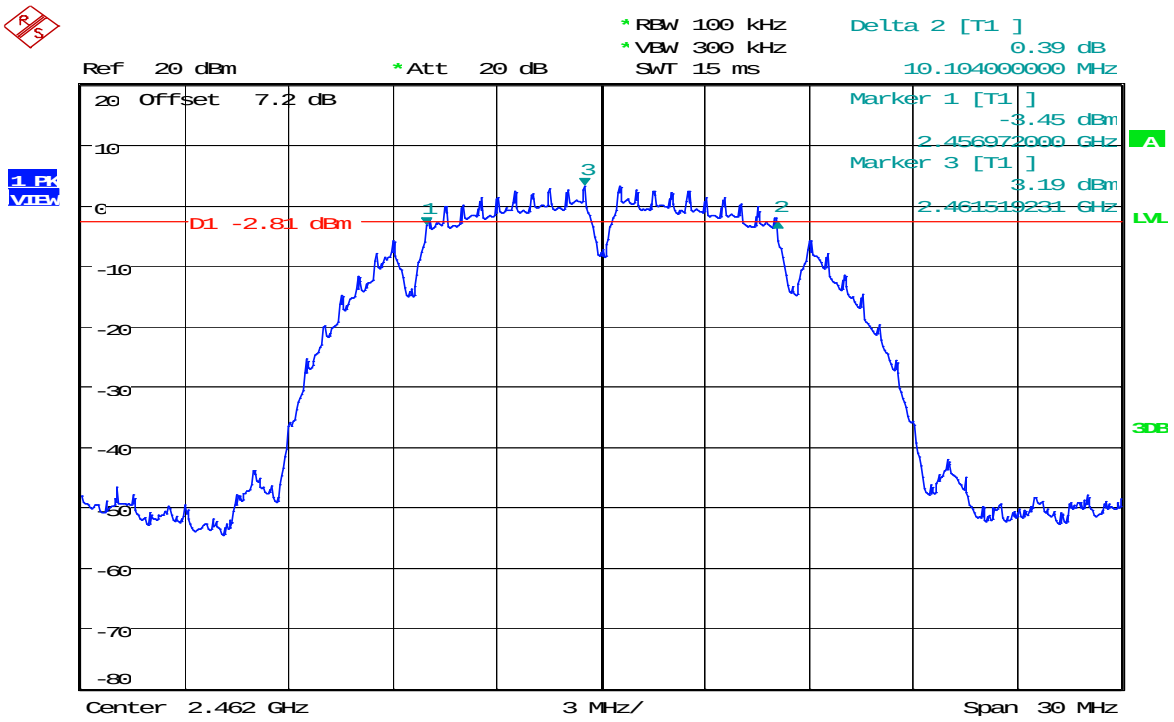
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

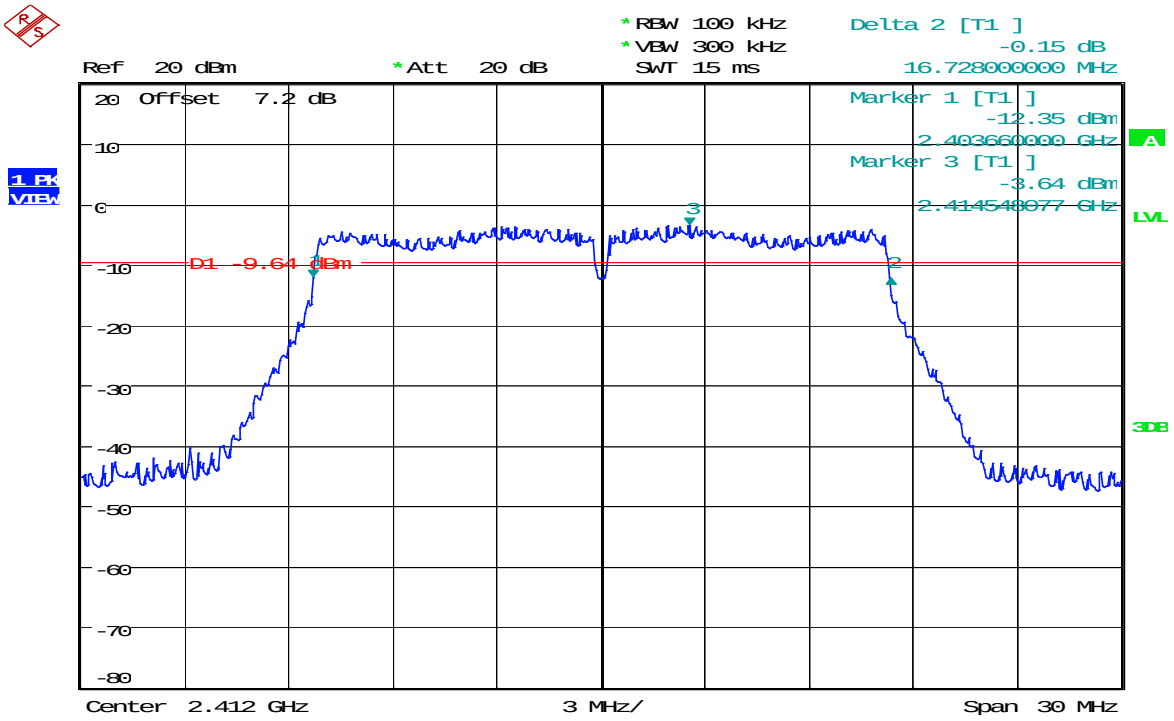


6dB Bandwidth (CH High)

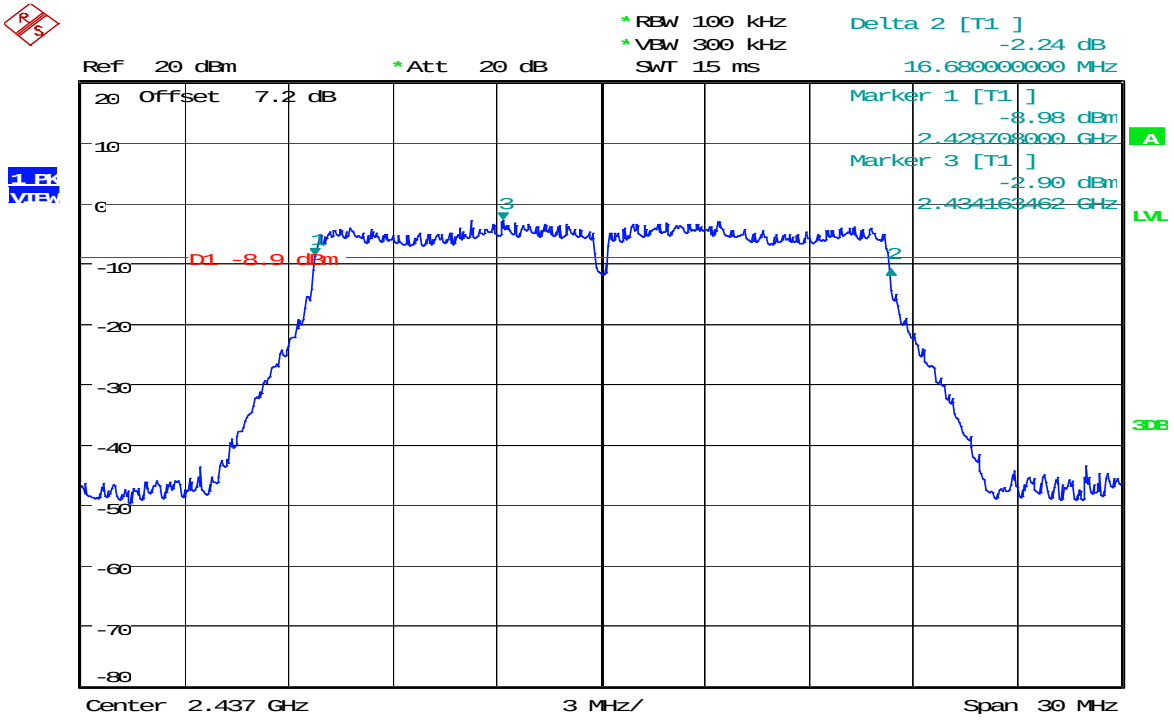


IEEE 802.11g MODE /Chain 1

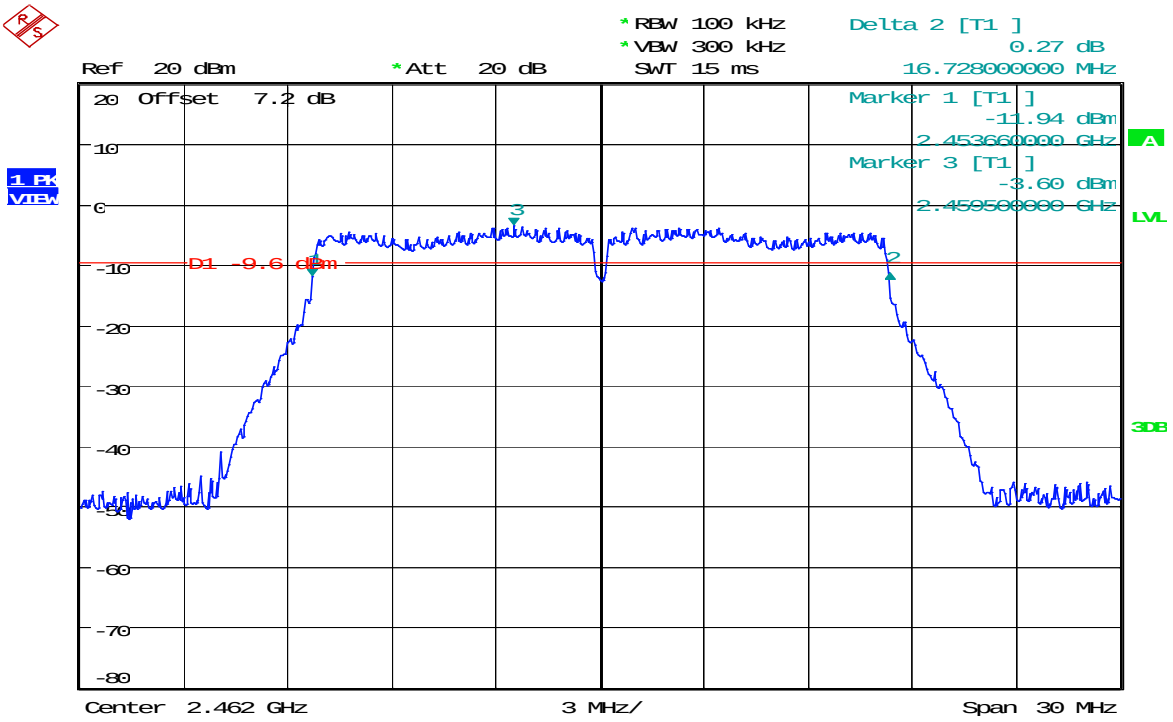
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

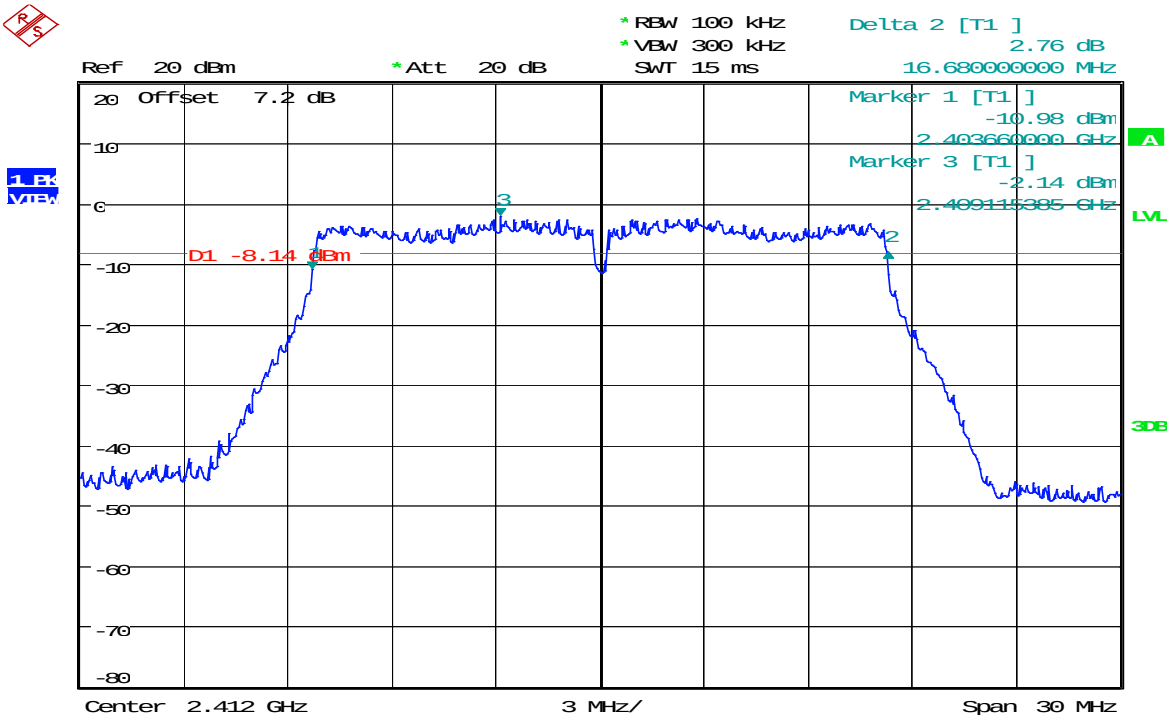


6dB Bandwidth (CH High)

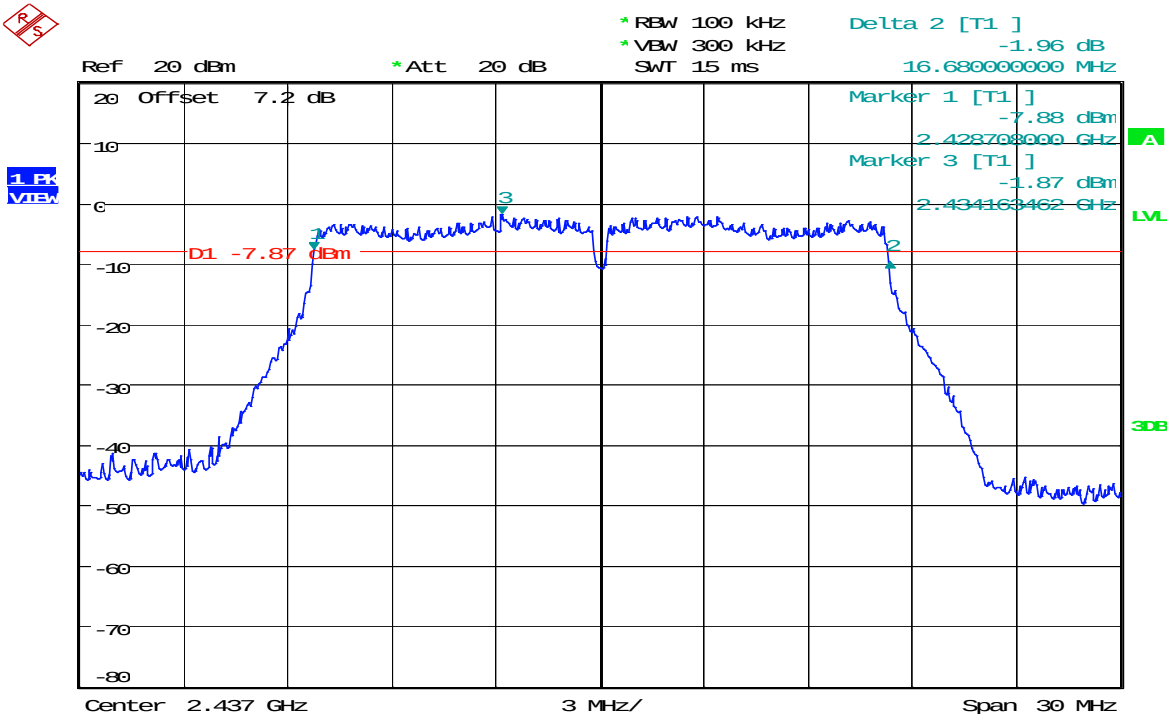


IEEE 802.11g MODE /Chain 2

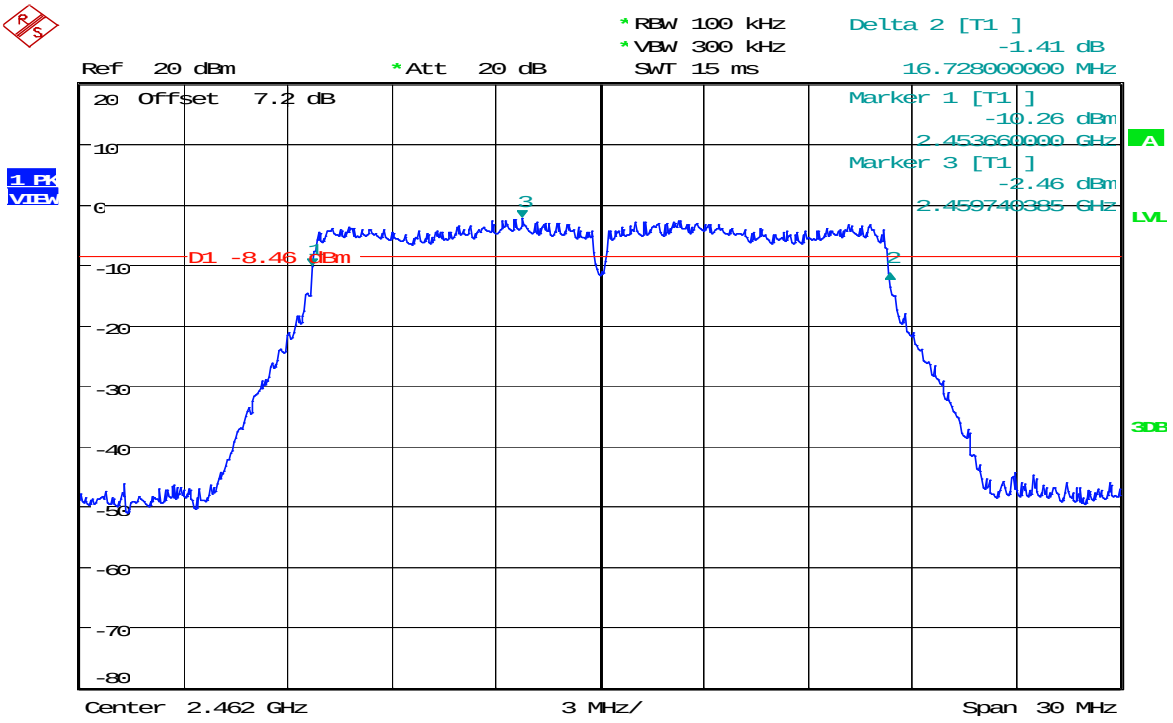
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

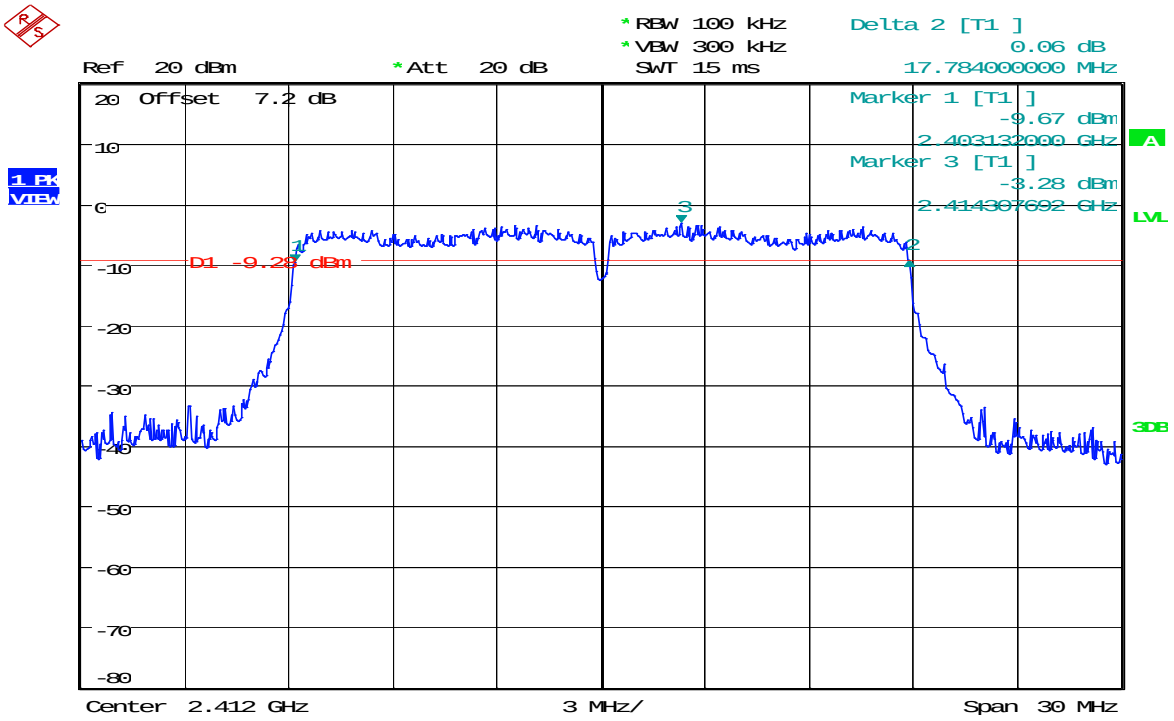


6dB Bandwidth (CH High)

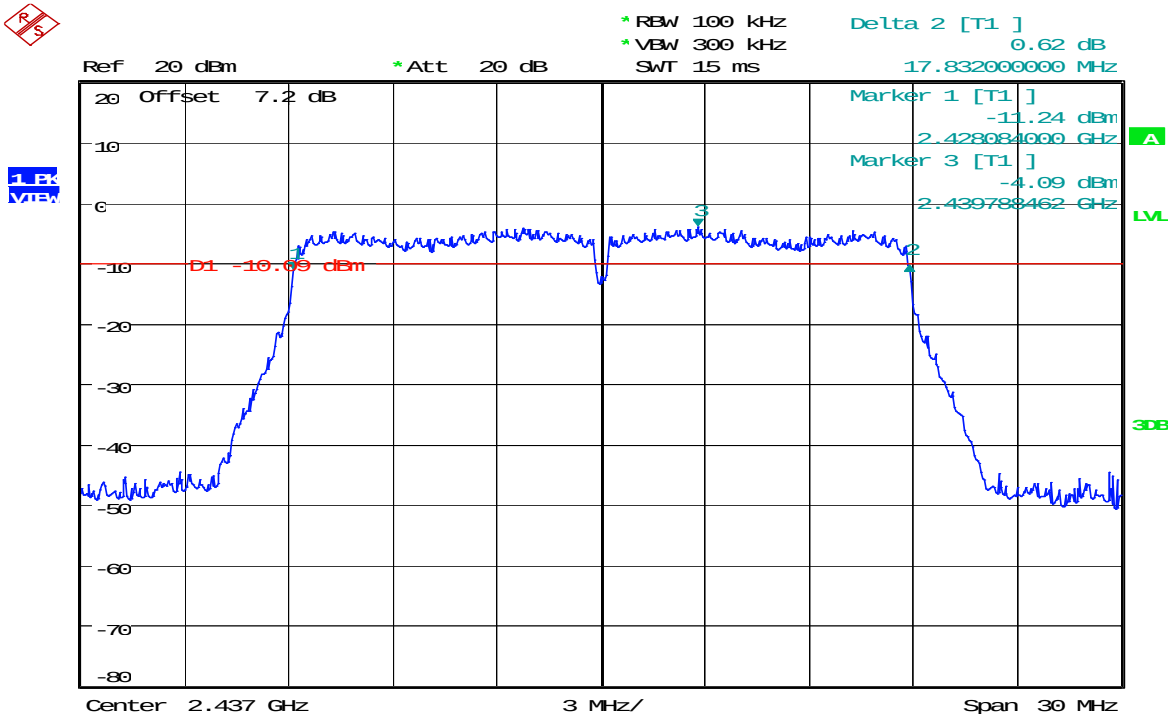


IEEE 802.11n HT20 mode / Chain 1

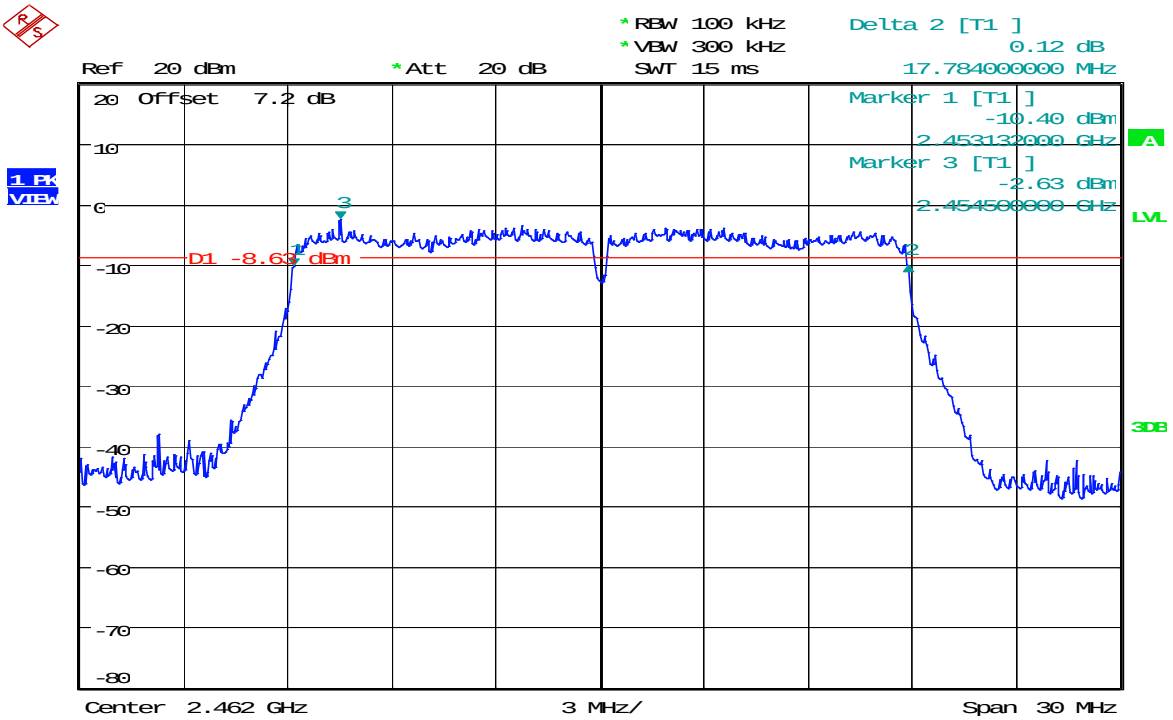
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

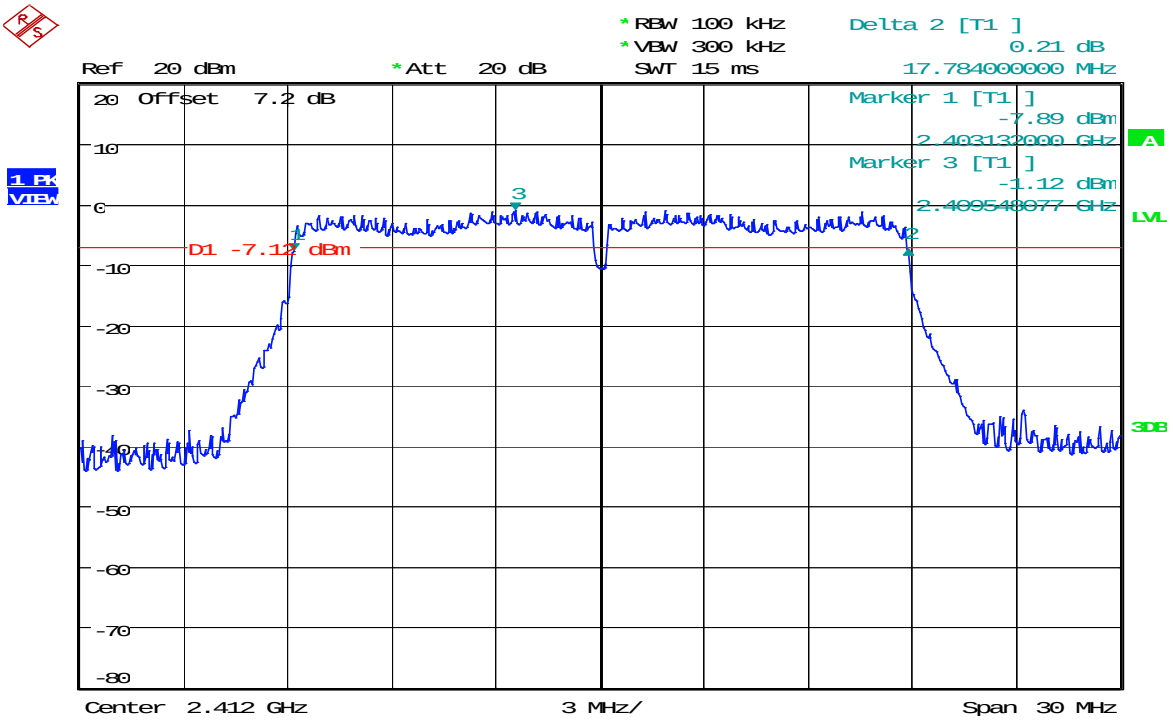


6dB Bandwidth (CH High)

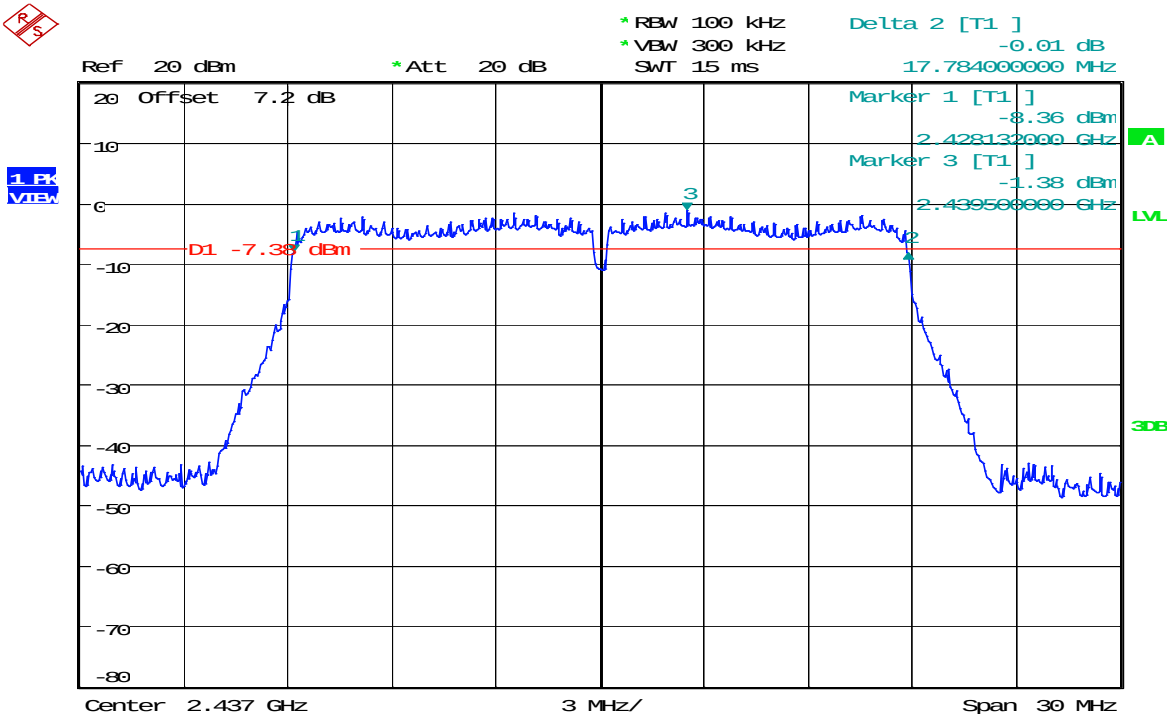


IEEE 802.11n HT20 mode / Chain 2

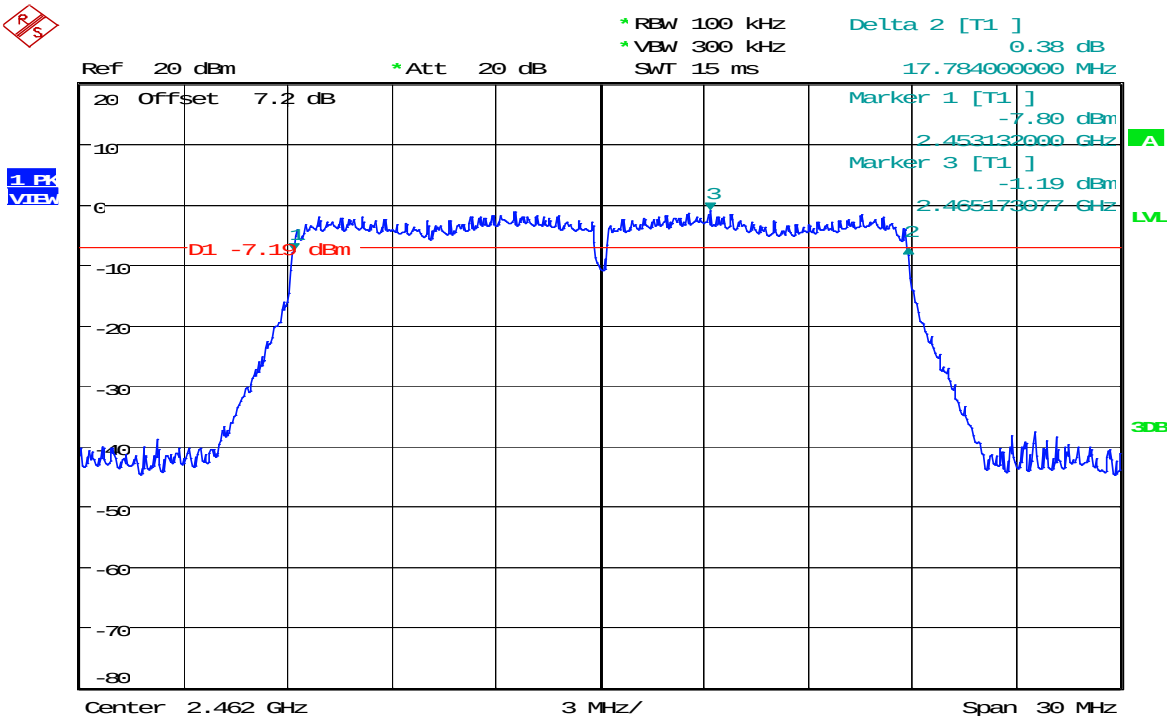
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

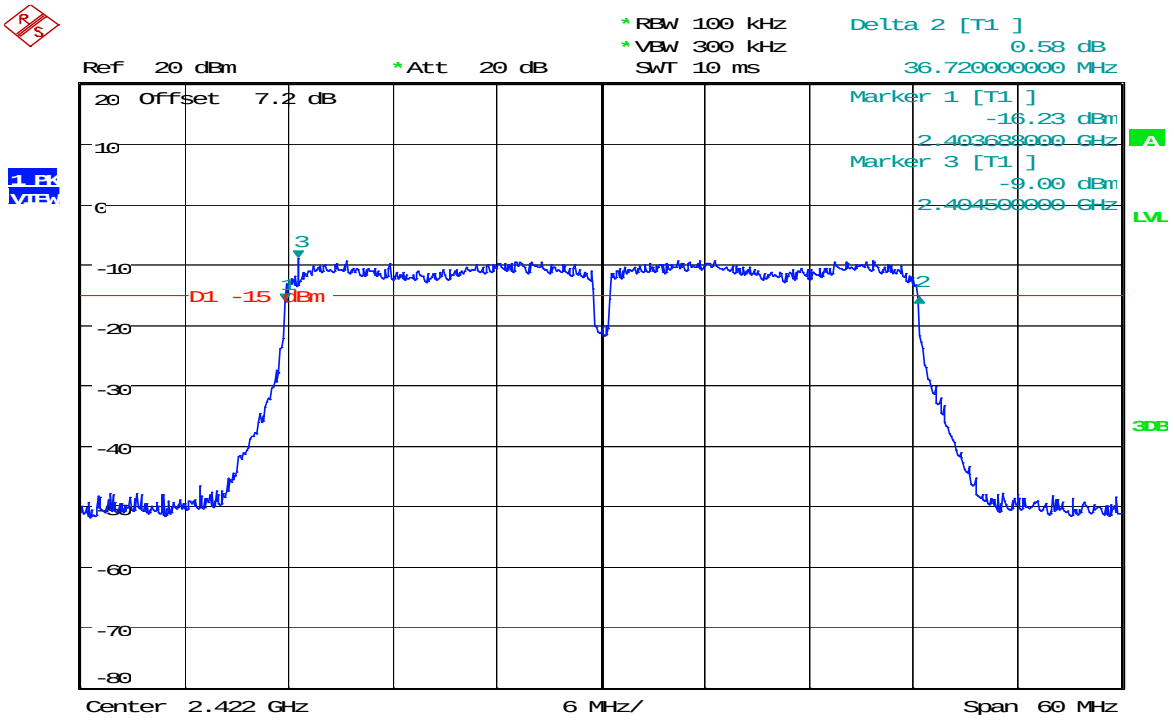


6dB Bandwidth (CH High)

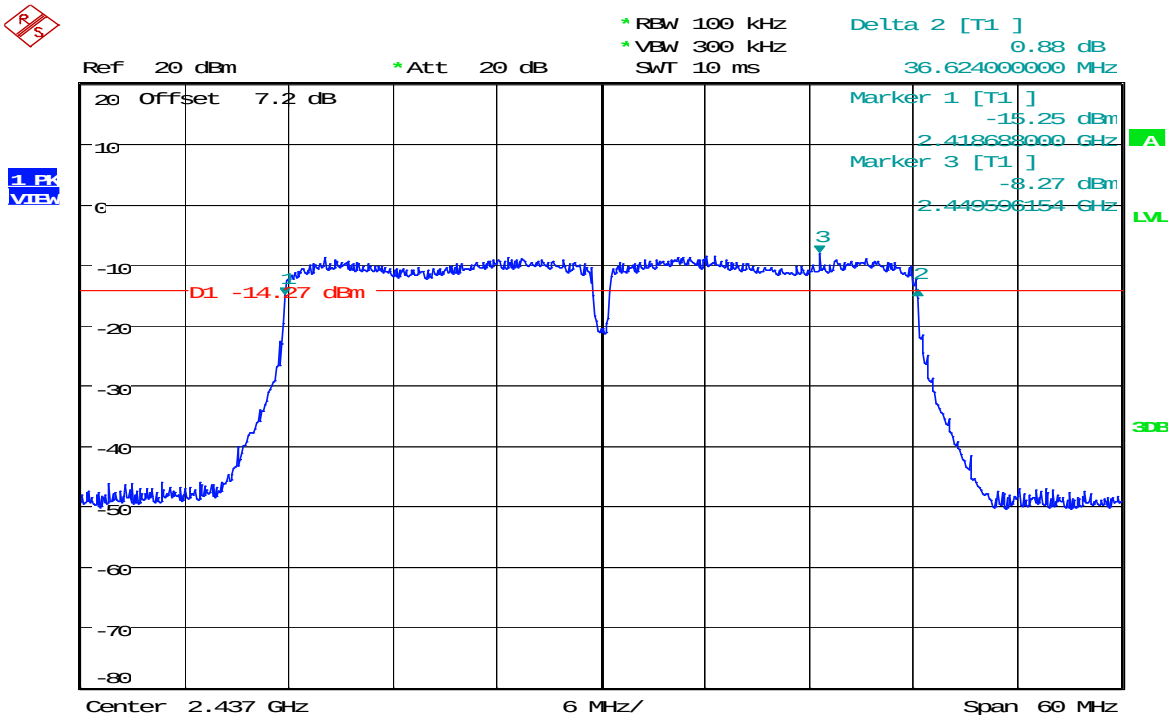


IEEE 802.11n HT40 mode /Chain 1

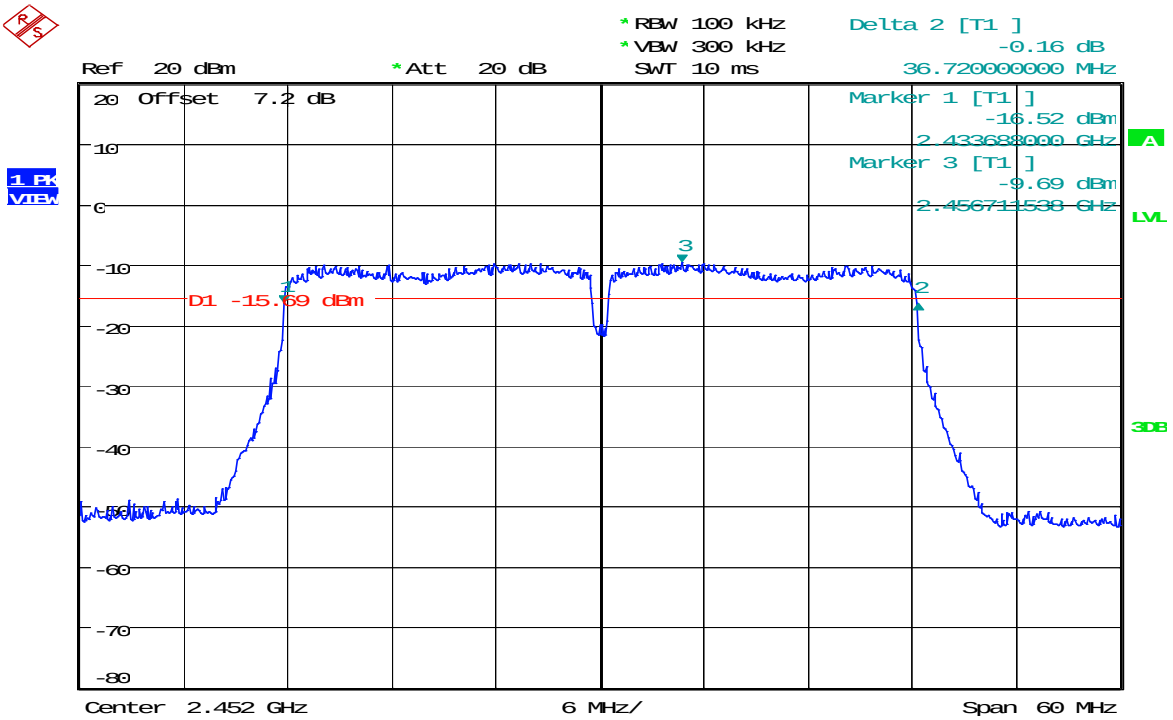
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

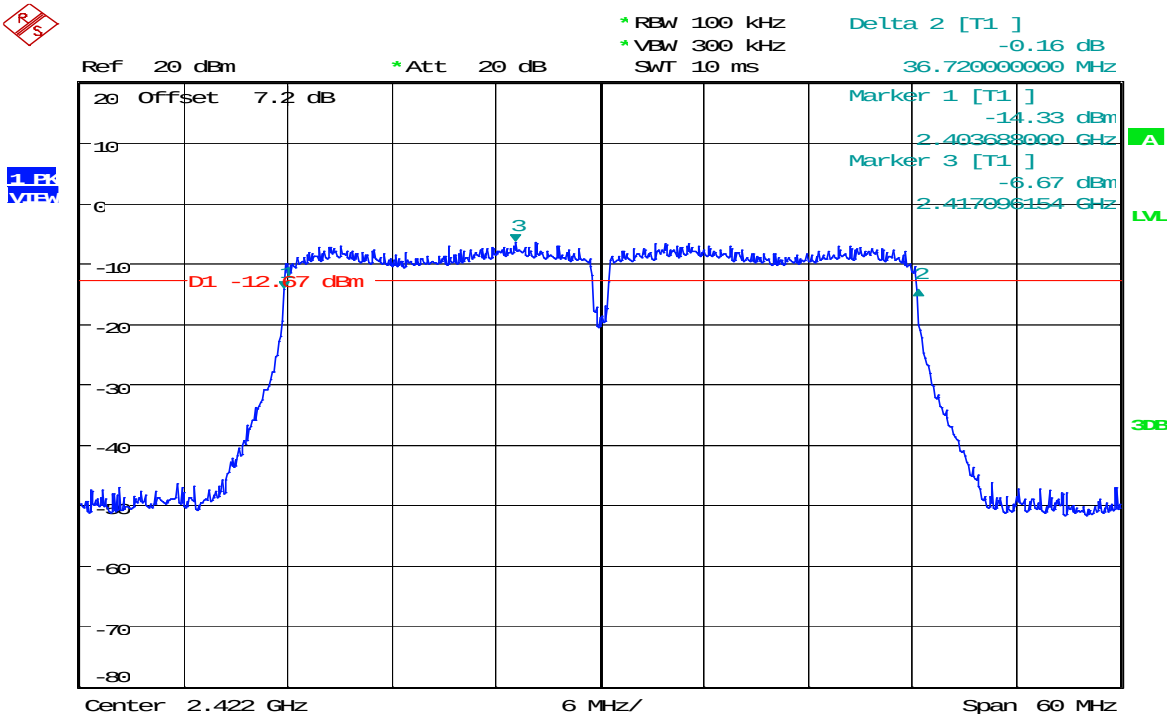


6dB Bandwidth (CH High)

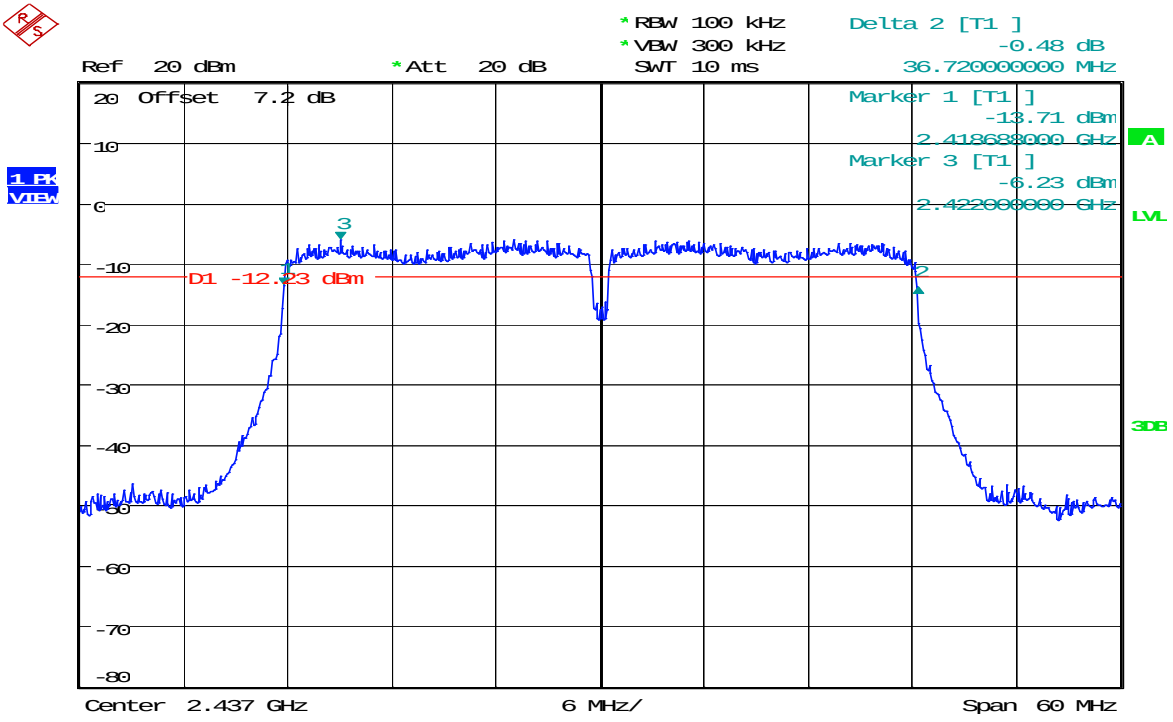


IEEE 802.11n HT40 mode /Chain 2

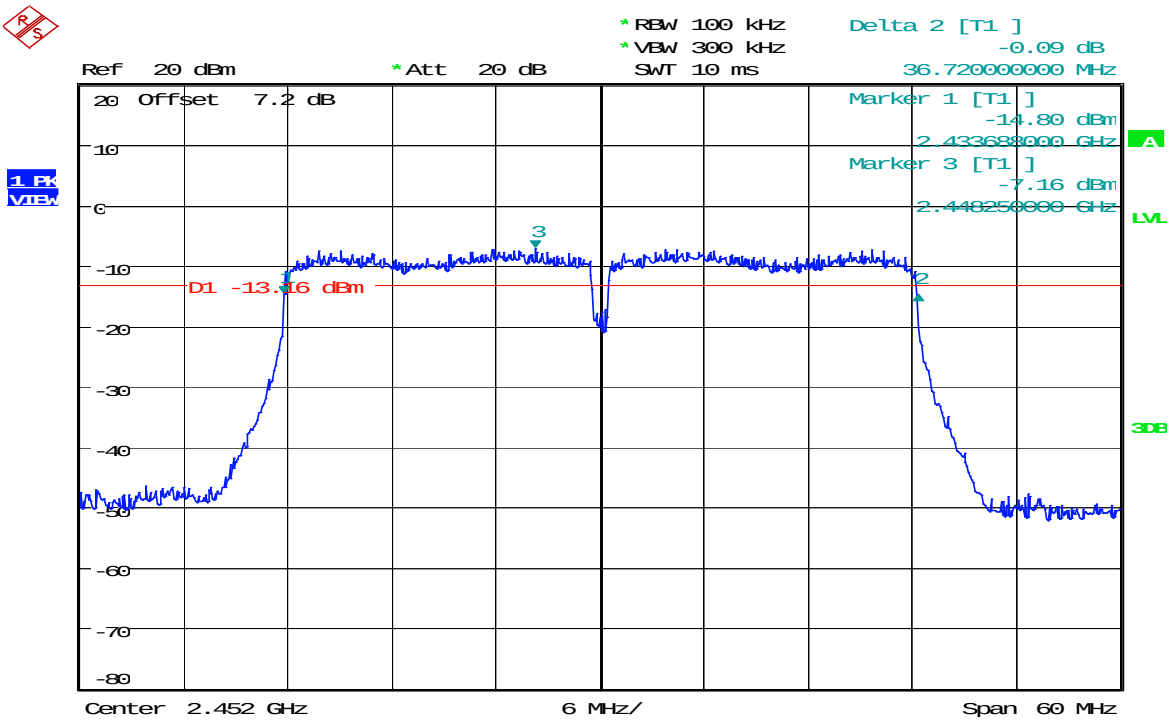
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



8.2.PEAK POWER

LIMIT

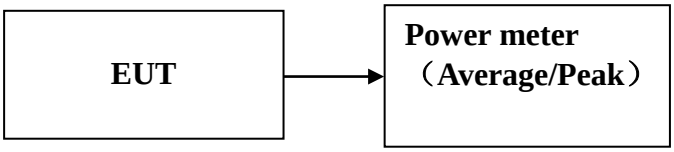
The maximum peak output power of the intentional radiator shall not exceed the following:

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.

Antenna 1 Gain=5.0dBi<6dBi
Chain1 Limit=30.00dBm
Antenna 2 Gain=4.6dBi<6dBi
Chain2 Limit=30.00dBm
Directional Gain =7.81dBi>6dBi
MIMO Limit=30.00dBm-(7.81-6) dB=28.19dBm

Test Configuration



TEST PROCEDURE

1. The testing follows the Measurement Procedure of Sub-clause 11.9 of ANSI C63.10.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 1 Limit (dBm)	Chain 2 peak Output Power (dBm)	Chain 2 Limit (dBm)
Low	2412	14.53	30.00	16.23	30.00
Mid	2437	14.46	30.00	16.27	30.00
High	2462	14.93	30.00	16.37	30.00

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)
Low	2412	11.58	13.26
Mid	2437	11.56	13.31
High	2462	11.99	13.42

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 1 Limit (dBm)	Chain 2 peak Output Power (dBm)	Chain 2 Limit (dBm)
Low	2412	21.03	30.00	22.80	30.00
Mid	2437	21.05	30.00	22.32	30.00
High	2462	21.08	30.00	22.30	30.00

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)
Low	2412	10.70	12.10
Mid	2437	11.05	12.29
High	2462	10.75	11.97

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)	MIMO Limit (dBm)
Low	2412	21.10	22.98	25.15	28.19
Mid	2437	20.65	22.50	24.68	28.19
High	2462	20.96	22.57	24.85	28.19

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)	Total Average Output Power (dBm)
Low	2412	11.02	13.22	15.27
Mid	2437	10.56	13.04	14.98
High	2462	10.95	13.20	15.23

Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	Chain 1 peak Output Power (dBm)	Chain 2 peak Output Power (dBm)	Total peak Output Power (dBm)	MIMO Limit (dBm)
Low	2422	18.10	21.05	22.83	28.19
Mid	2437	19.19	21.30	23.38	28.19
High	2452	18.63	21.08	23.04	28.19

Channel	Frequency (MHz)	Chain 1 Average Output Power (dBm)	Chain 2 Average Output Power (dBm)	Total Average Output Power (dBm)
Low	2422	8.43	10.83	12.80
Mid	2437	8.63	11.04	13.01
High	2452	8.10	10.57	12.52

***Remark**:* 1.Total Output Power (dBm) = 10*LOG(10^(Chain 1 Output Power / 10)+10^(Chain 2 Output Power /10))
2.Duty factor has been offset with cable loss

8.3.PEAK POWER SPECTRAL DENSITY

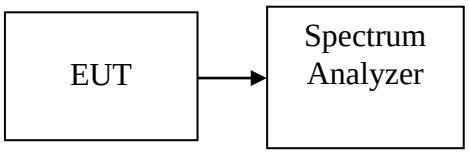
LIMIT

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.

Antenna 1 Gain=5.0dBi<6dBi
Chain 1 Limit=8.00dBm
Antenna 2 Gain=4.6dBi<6dBi
Chain 2 Limit=8.00dBm
Directional Gain =7.81dBi>6dBi
MIMO Limit=8.00dBm-(7.81-6) dB=6.19dBm

Test Configuration



TEST PROCEDURE

1. The testing follows Measurement Procedure of Sub-clause 11.10 of ANSI C63.10
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 1 Limit (dBm)	Chain 2 PPSD (dBm)	Chain 2 Limit (dBm)	Result
Low	2412	-12.79	8.00	-11.43	8.00	PASS
Mid	2437	-12.95	8.00	-11.26	8.00	PASS
High	2462	-13.01	8.00	-11.35	8.00	PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 1 Limit (dBm)	Chain 2 PPSD (dBm)	Chain 2 Limit (dBm)	Result
Low	2412	-16.62	8.00	-15.52	8.00	PASS
Mid	2437	-15.98	8.00	-15.29	8.00	PASS
High	2462	-16.53	8.00	-15.05	8.00	PASS

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	MIMO Limit (dBm)	Result
Low	2412	-15.70	-11.94	-10.41	6.19	PASS
Mid	2437	-15.94	-14.09	-11.91	6.19	PASS
High	2462	-15.99	-13.12	-11.31	6.19	PASS

Test mode: IEEE 802.11n HT40 mode

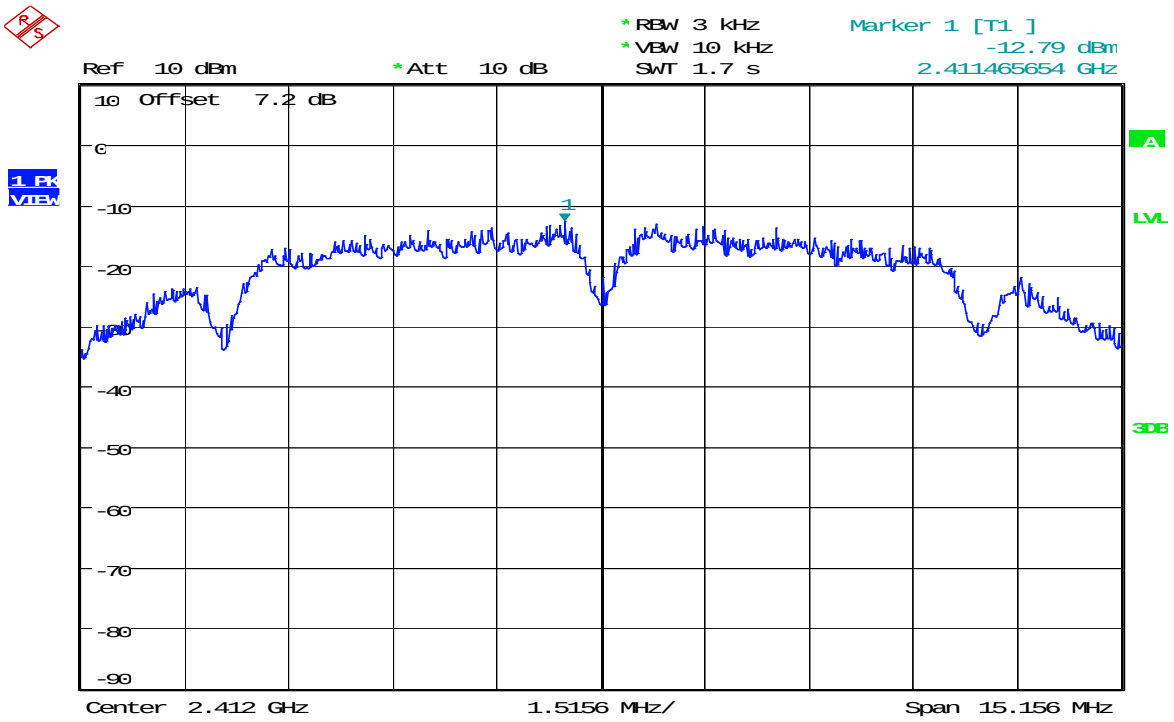
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total PPSD (dBm)	MIMO Limit (dBm)	Result
Low	2422	-20.26	-18.55	-16.31	6.19	PASS
Mid	2437	-19.73	-17.74	-15.61	6.19	PASS
High	2452	-21.16	-18.83	-16.83	6.19	PASS

***Remark**:1.Total PPSD(dBm) = 10*LOG(10^(Chain 1 PPSD/ 10)+10^(Chain 2 PPSD/10))*

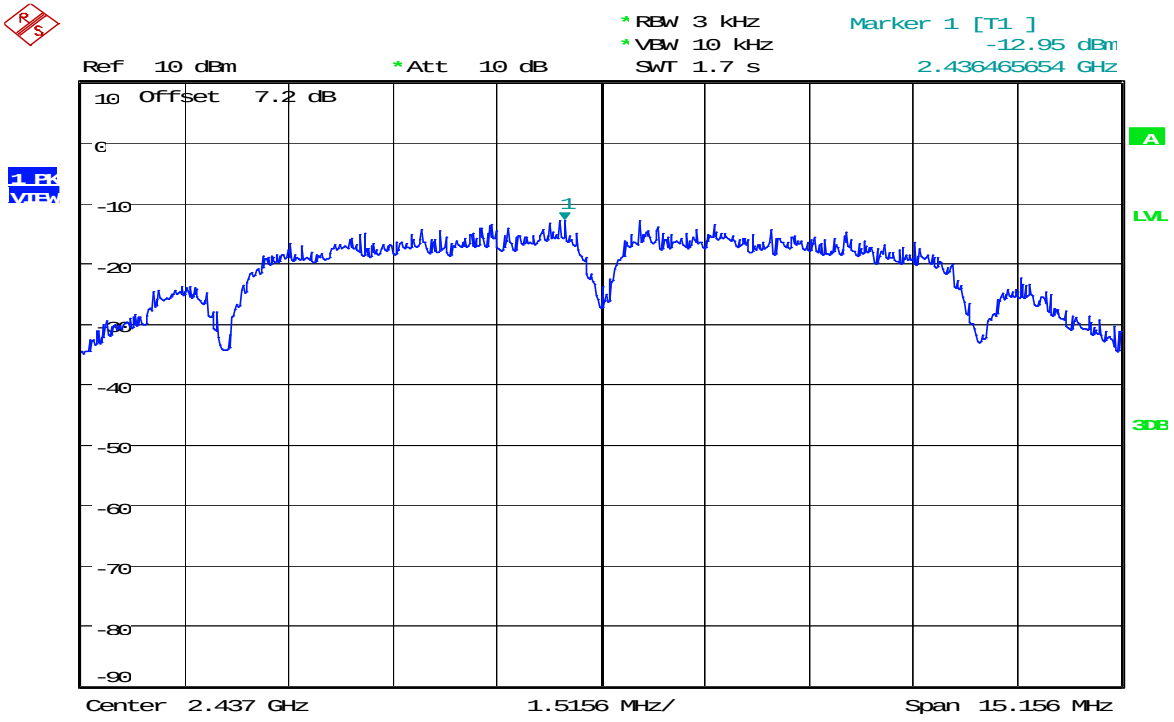
Test Plot

IEEE 802.11b mode/Chain 1

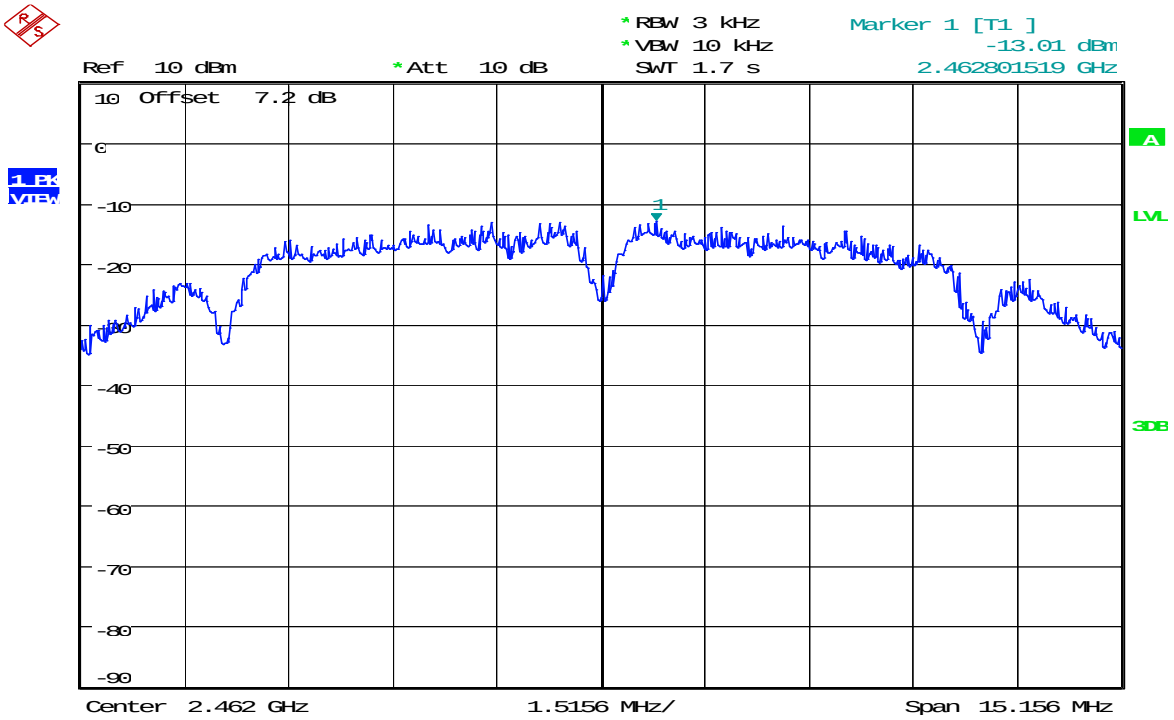
PPSD (CH Low)



PPSD(CH Mid)

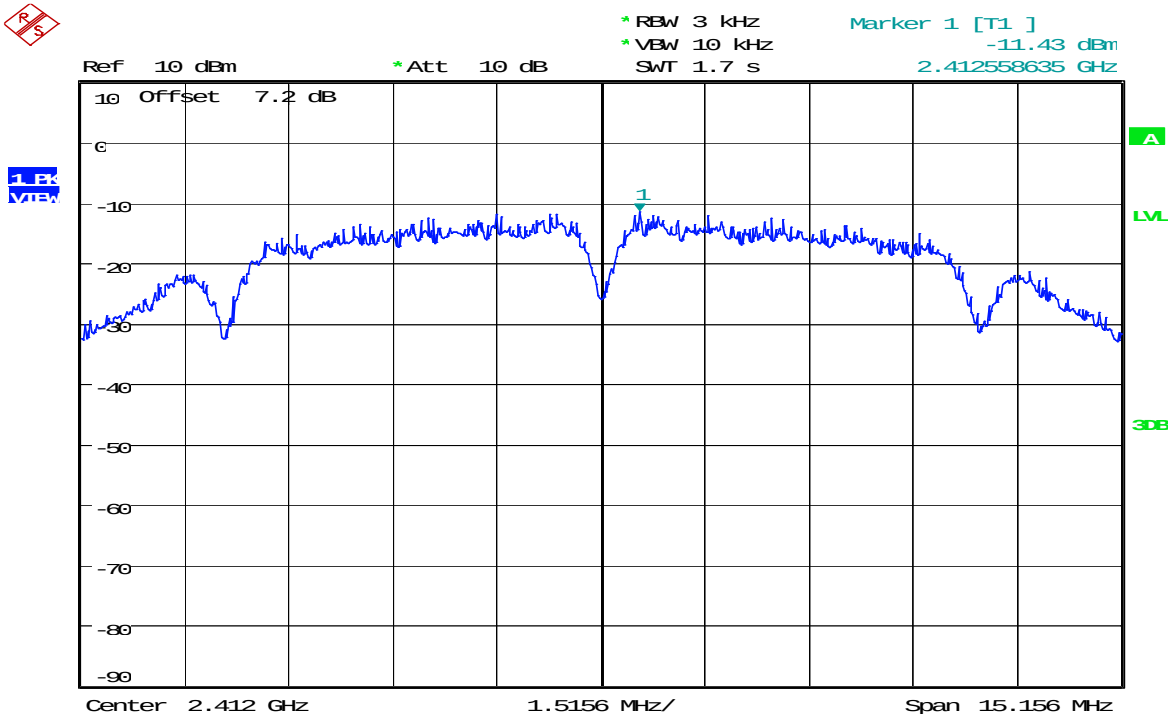


PPSD (CH High)

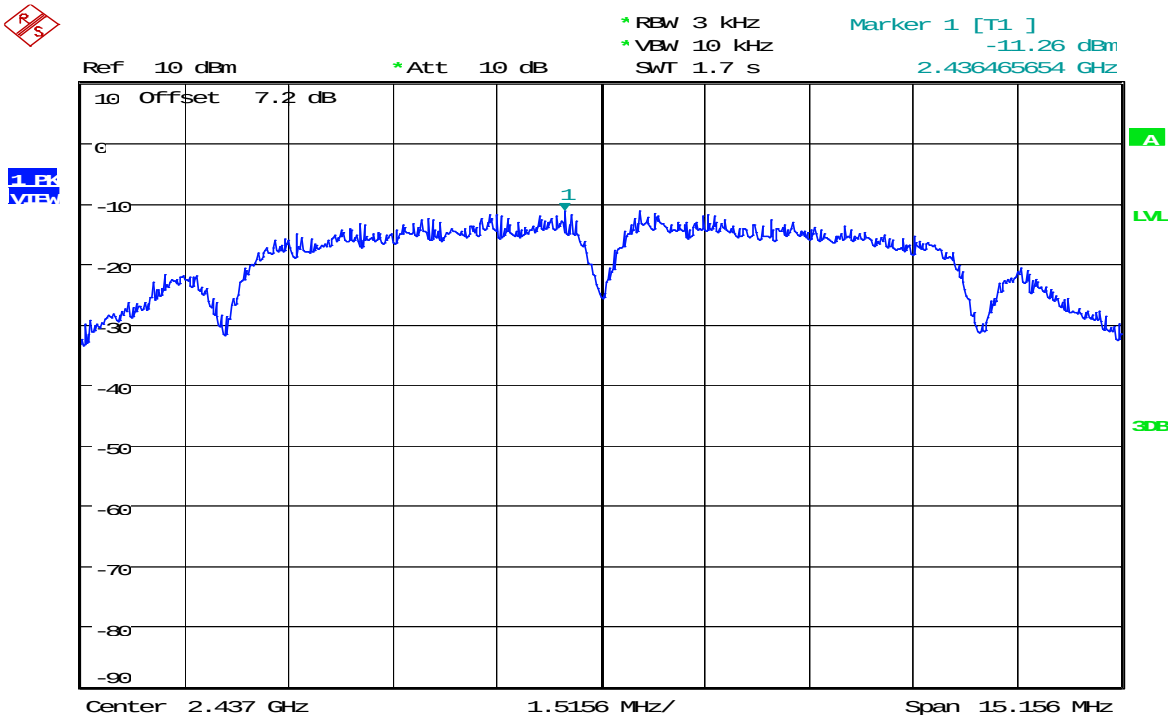


IEEE 802.11b mode/Chain 2

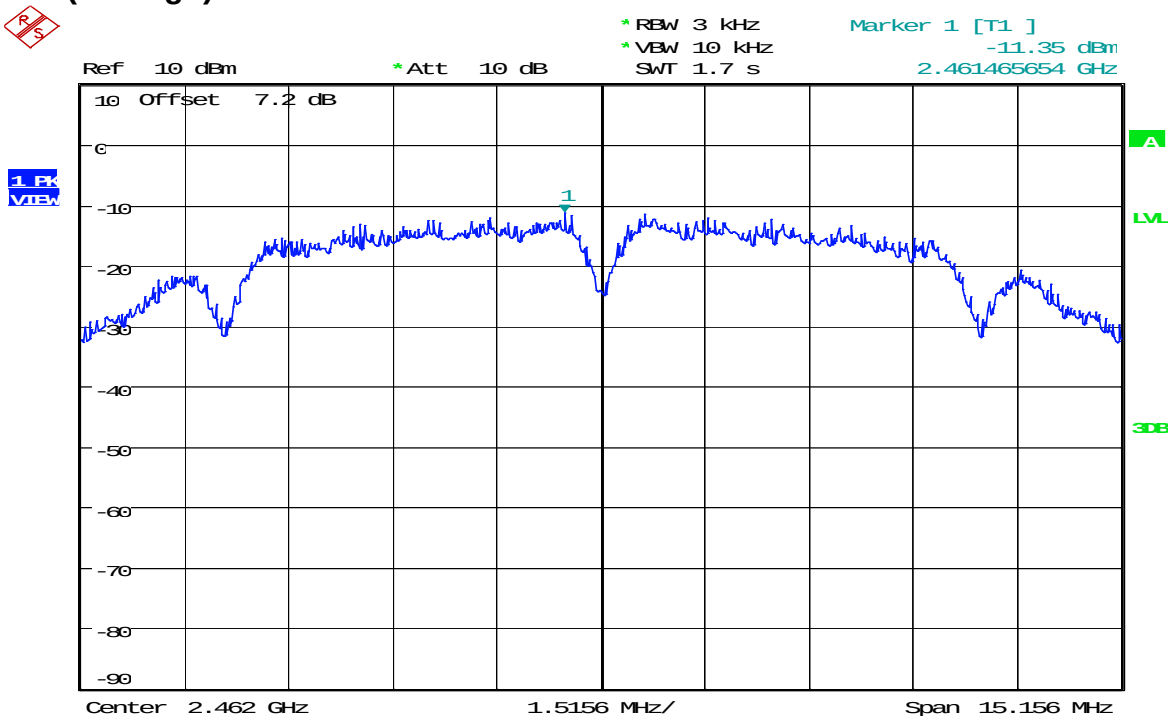
PPSD (CH Low)



PPSD(CH Mid)

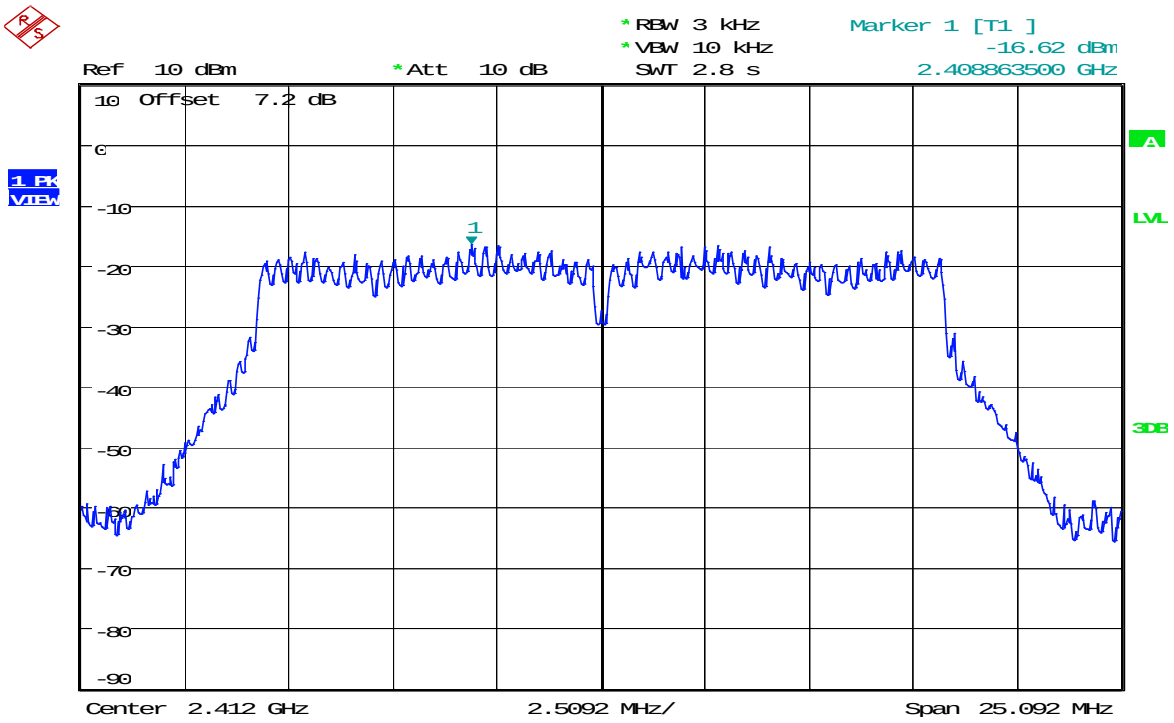


PPSD (CH High)

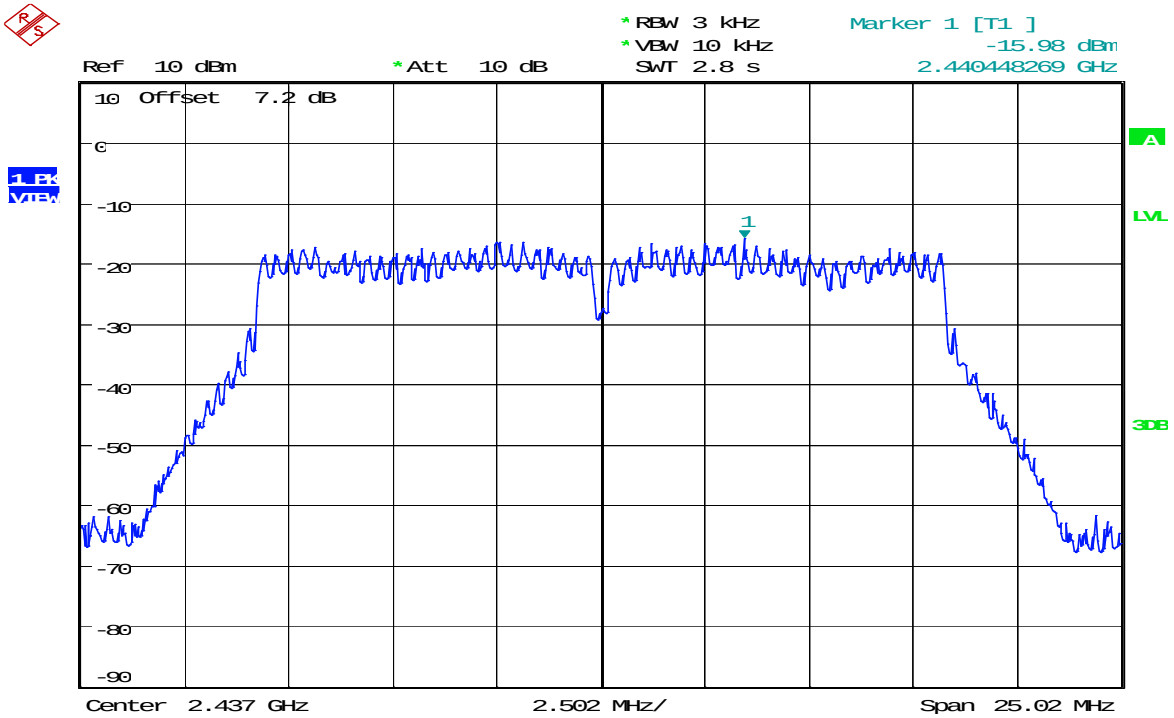


IEEE 802.11g mode/Chain 1

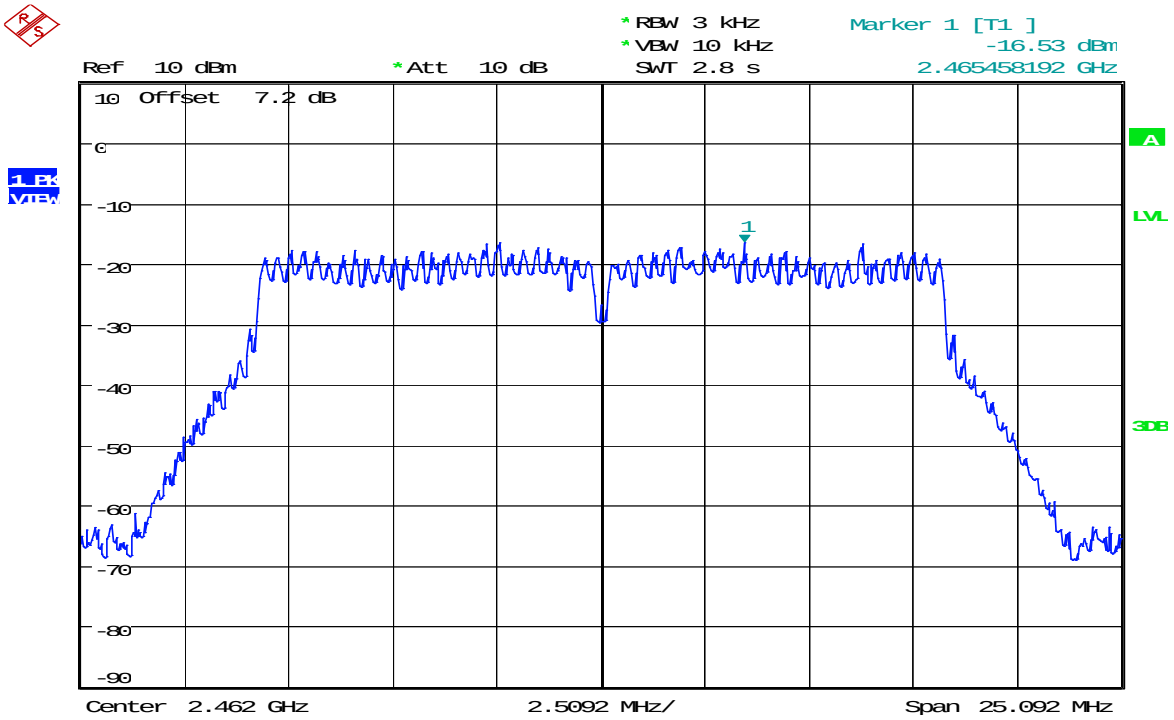
PPSD (CH Low)



PPSD (CH Mid)

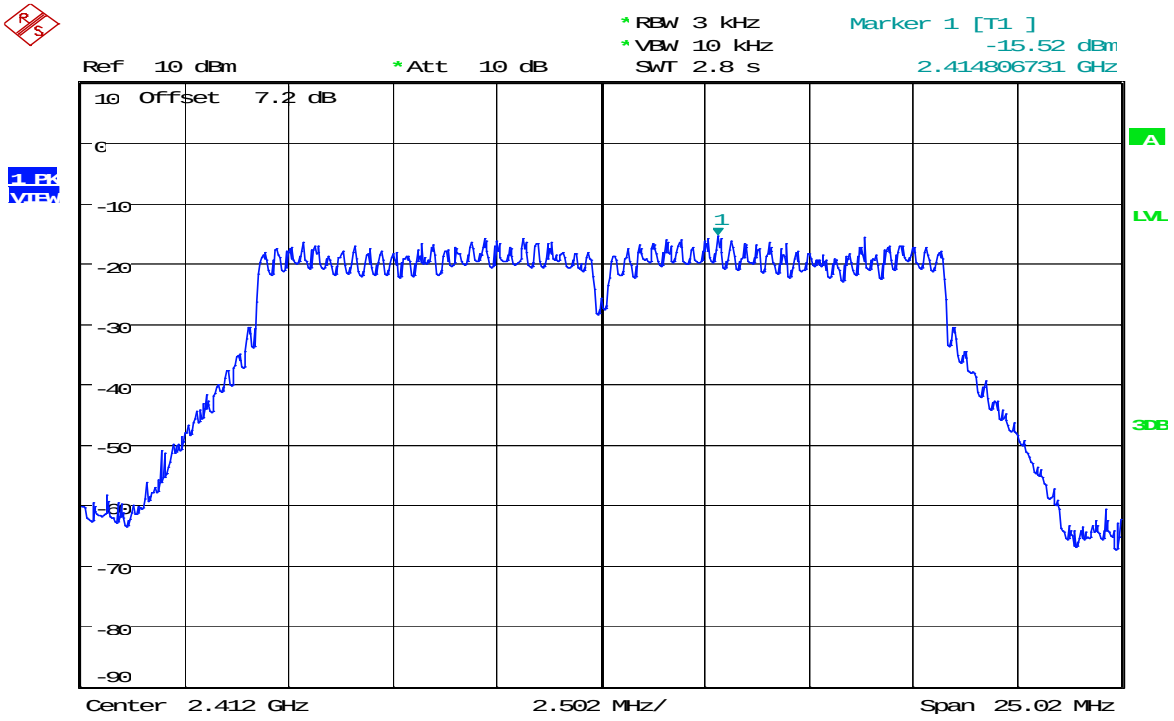


PPSD (CH High)

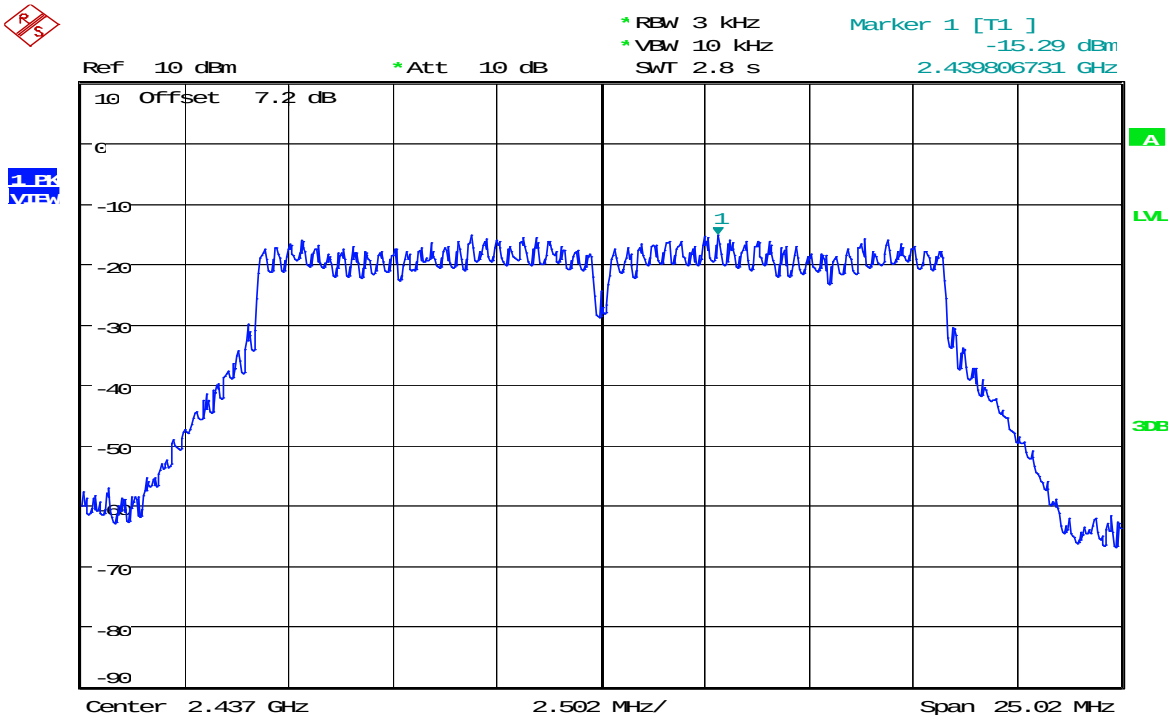


IEEE 802.11g mode/Chain 2

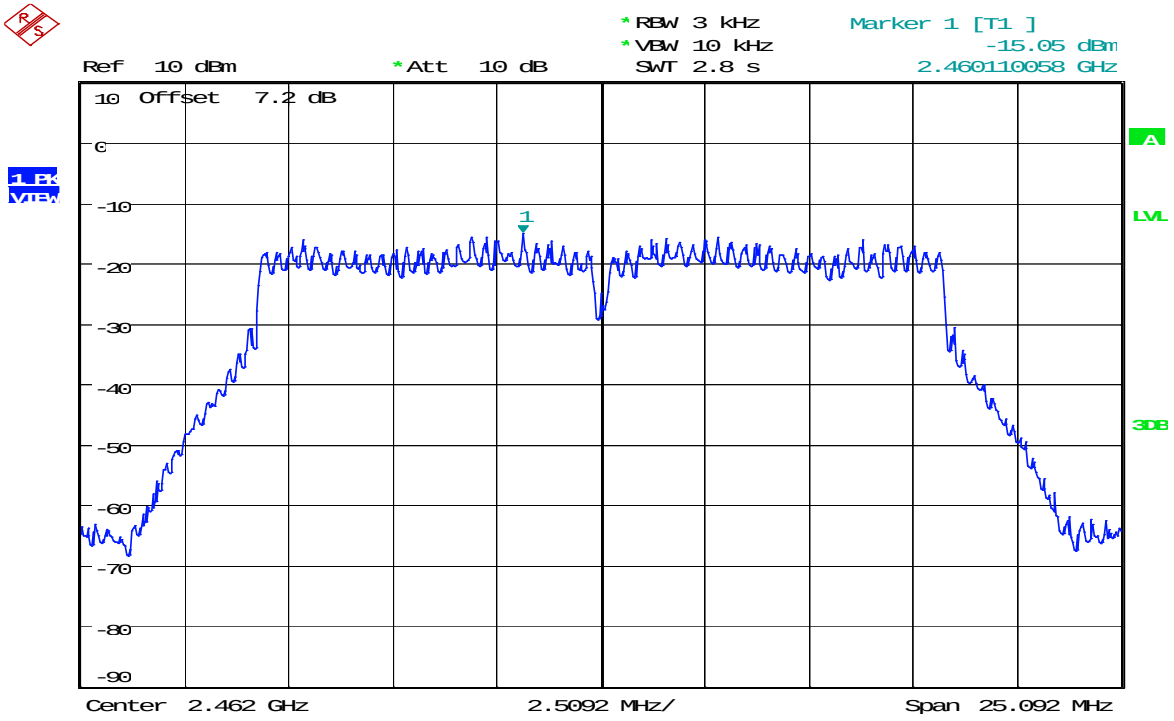
PPSD (CH Low)



PPSD (CH Mid)

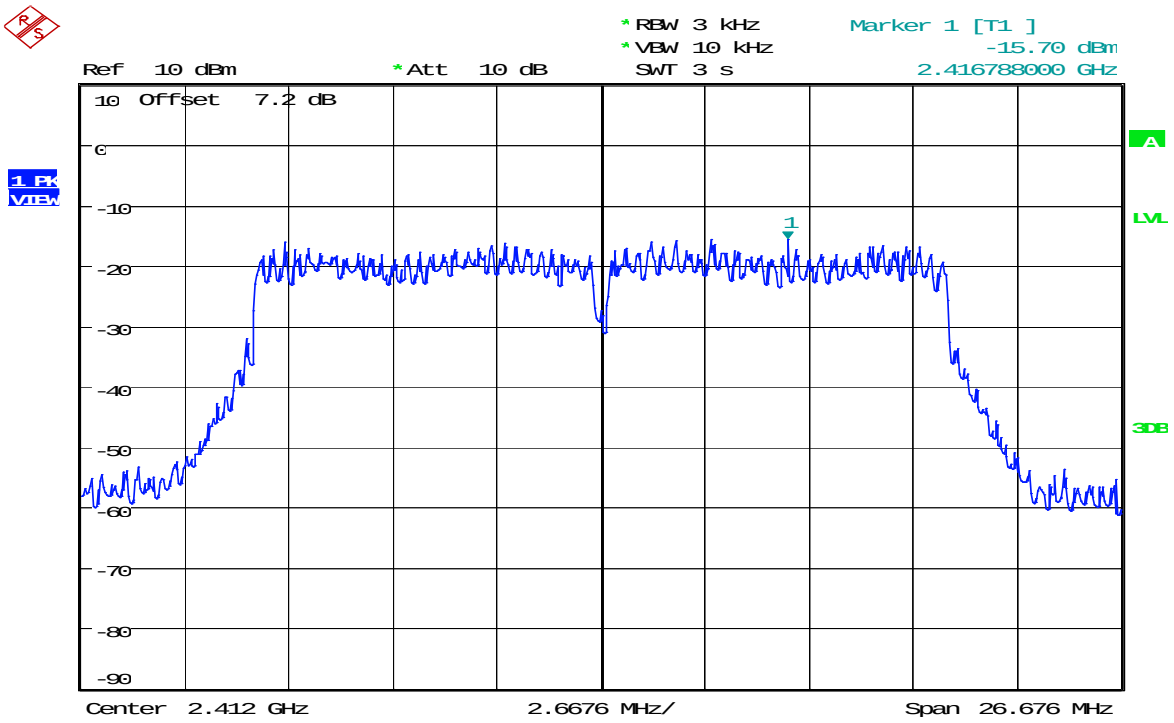


PPSD (CH High)

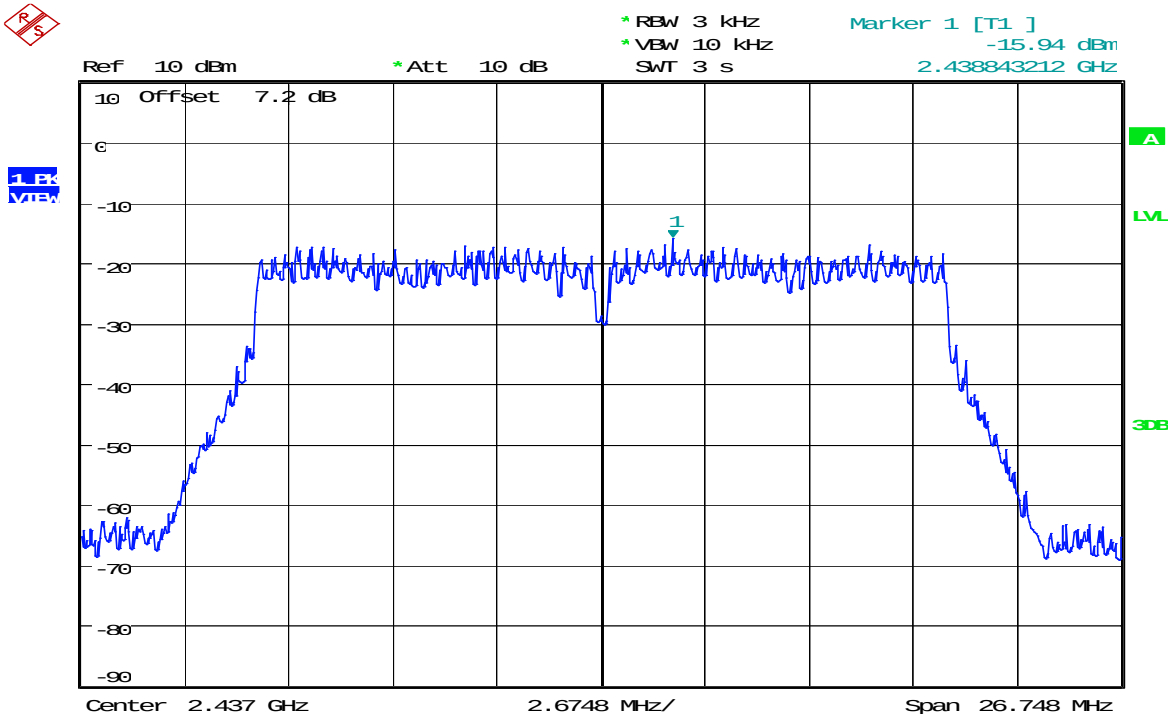


IEEE 802.11n HT20 mode/Chain 1

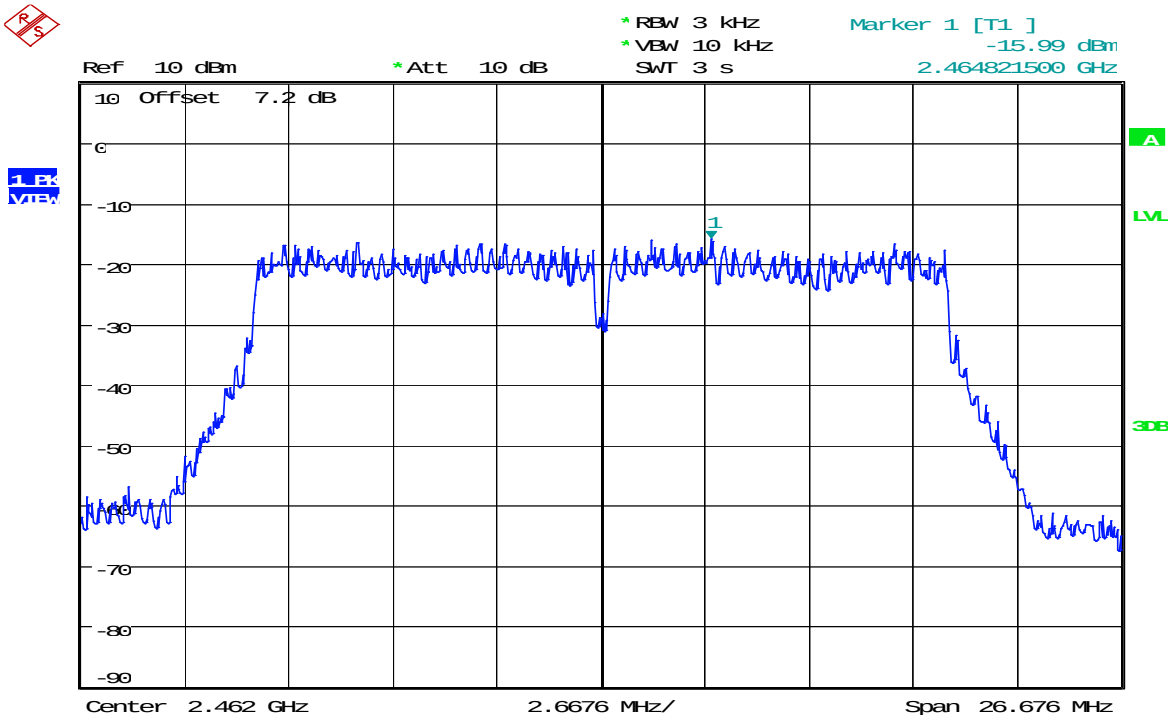
PPSD (CH Low)



PPSD (CH Mid)

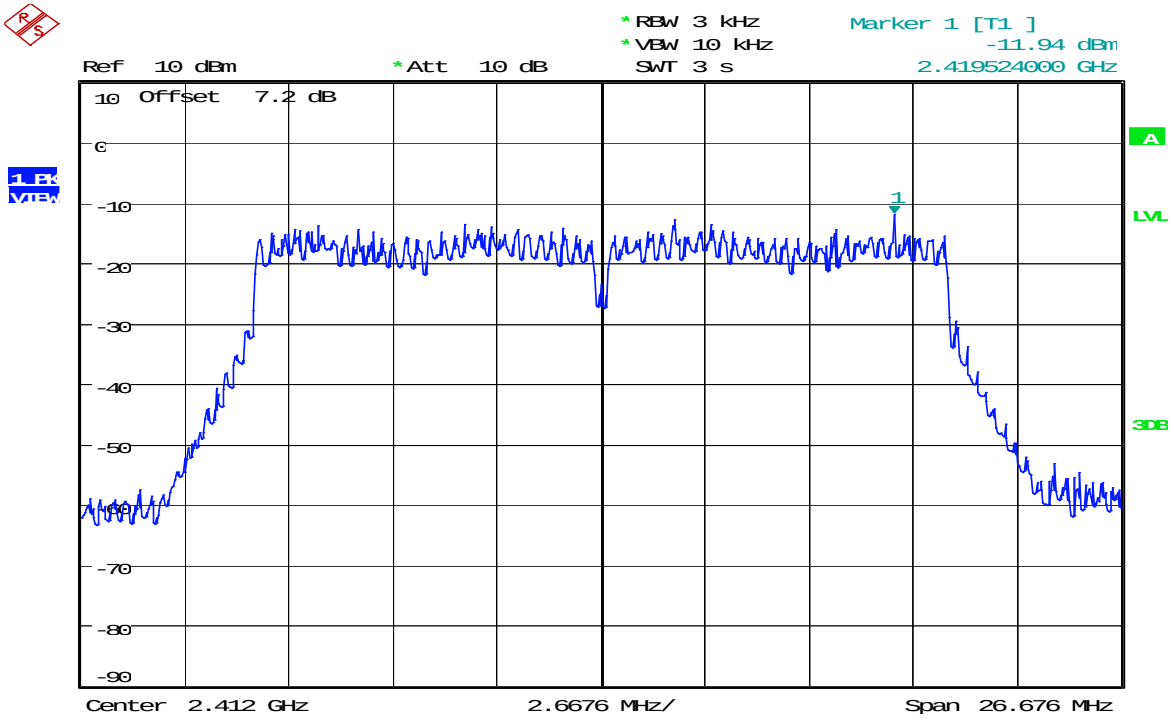


PPSD (CH High)

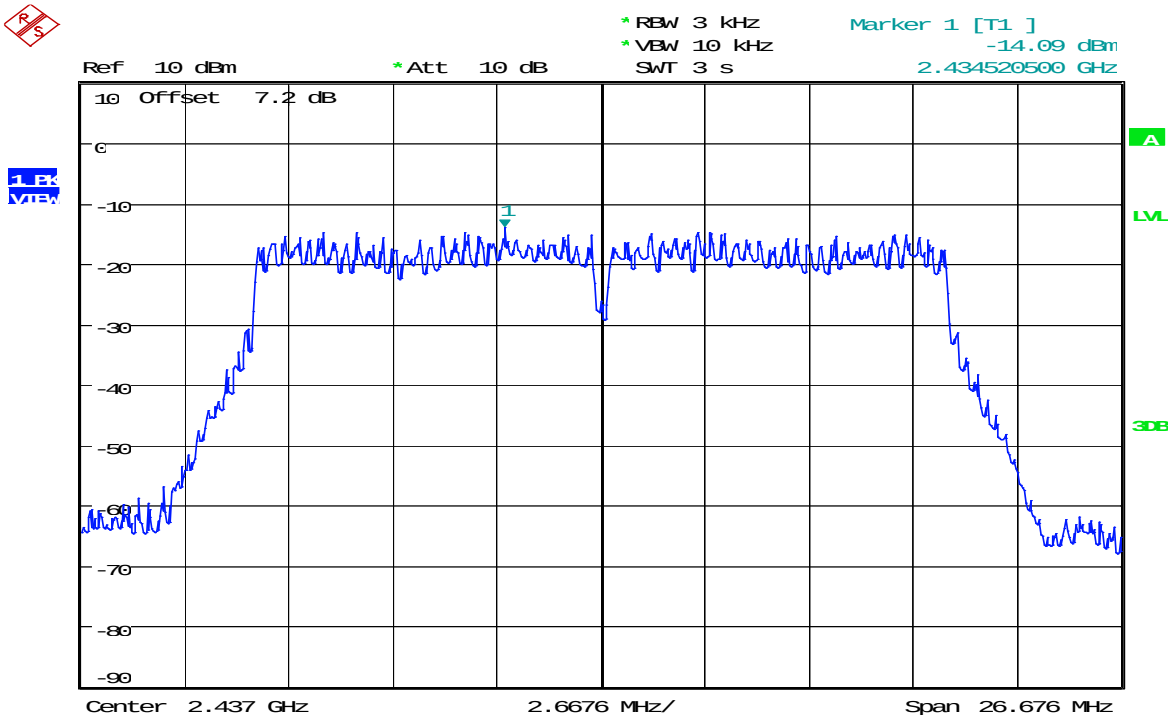


IEEE 802.11n HT20 mode/Chain 2

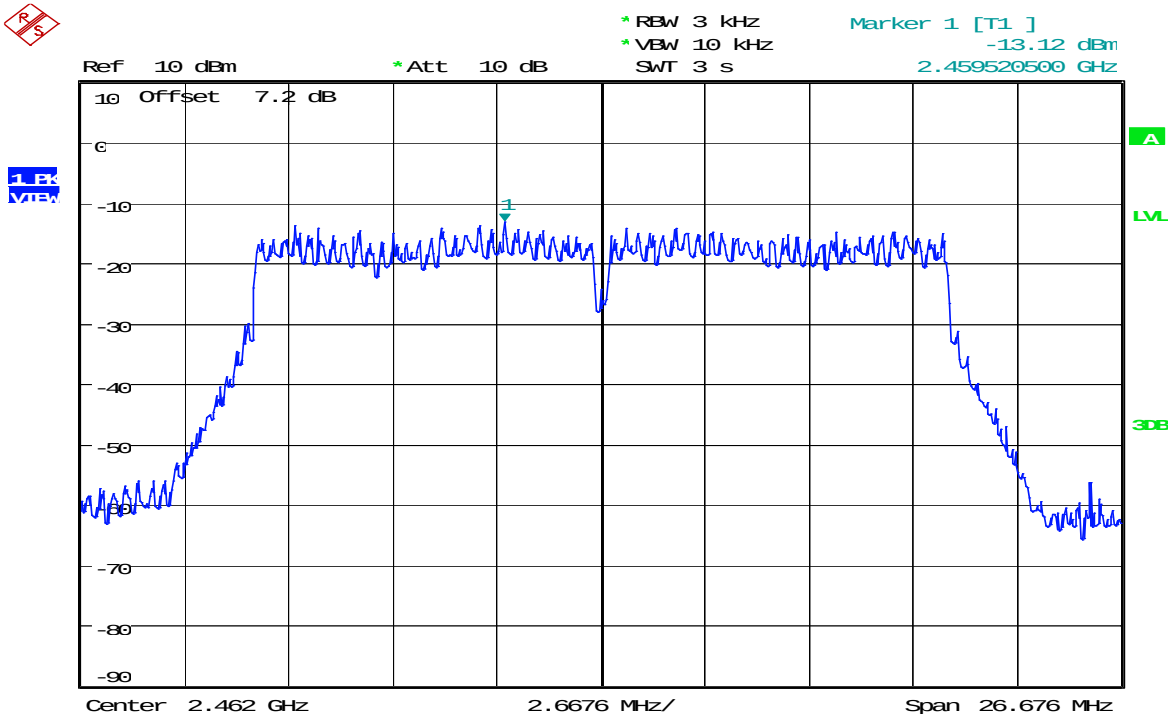
PPSD (CH Low)



PPSD (CH Mid)

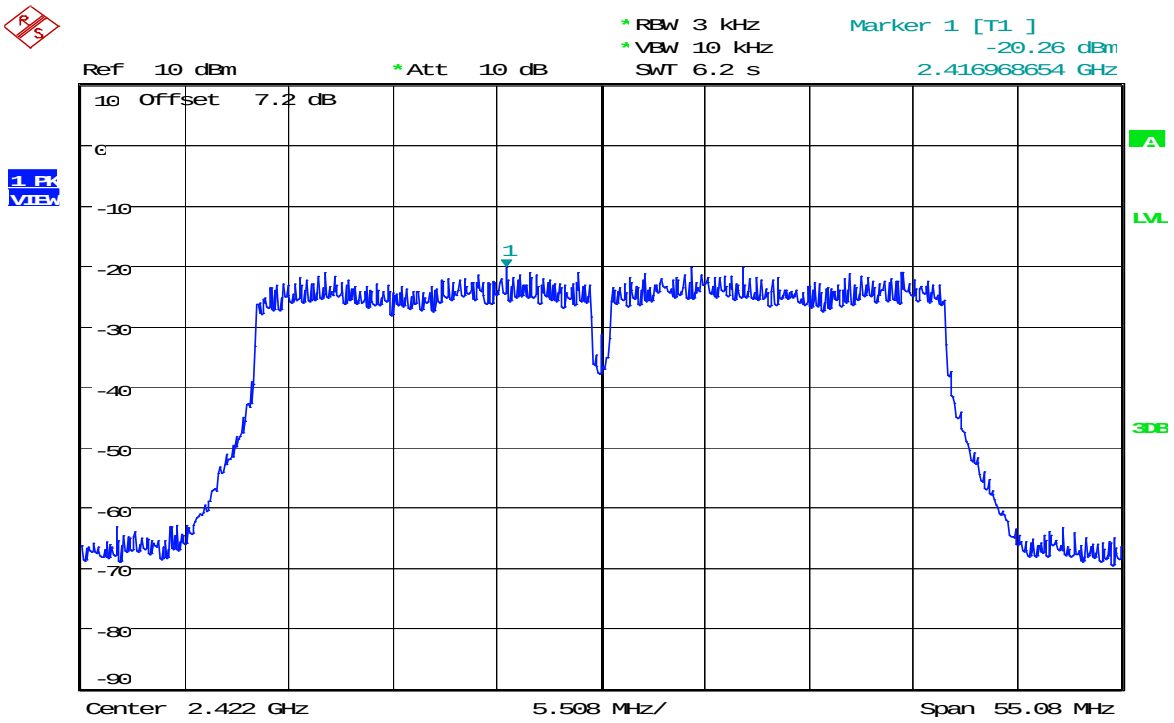


PPSD (CH High)

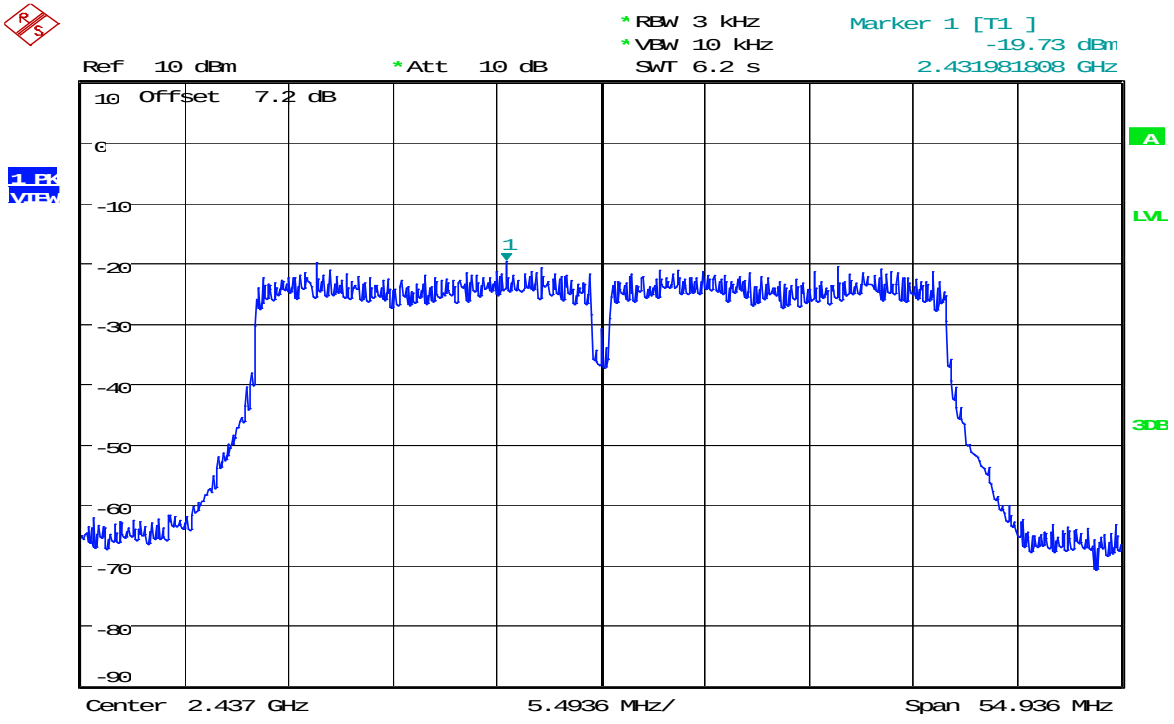


IEEE 802.11n HT40 mode/Chain 1

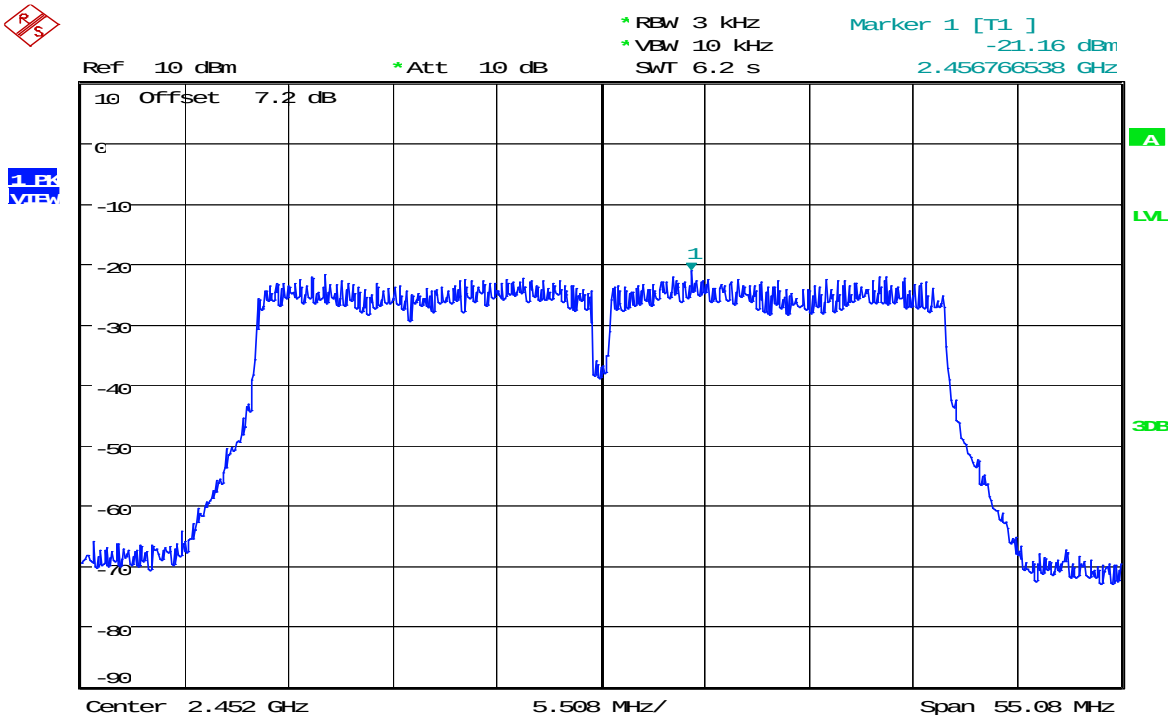
PPSD (CH Low)



PPSD (CH Mid)

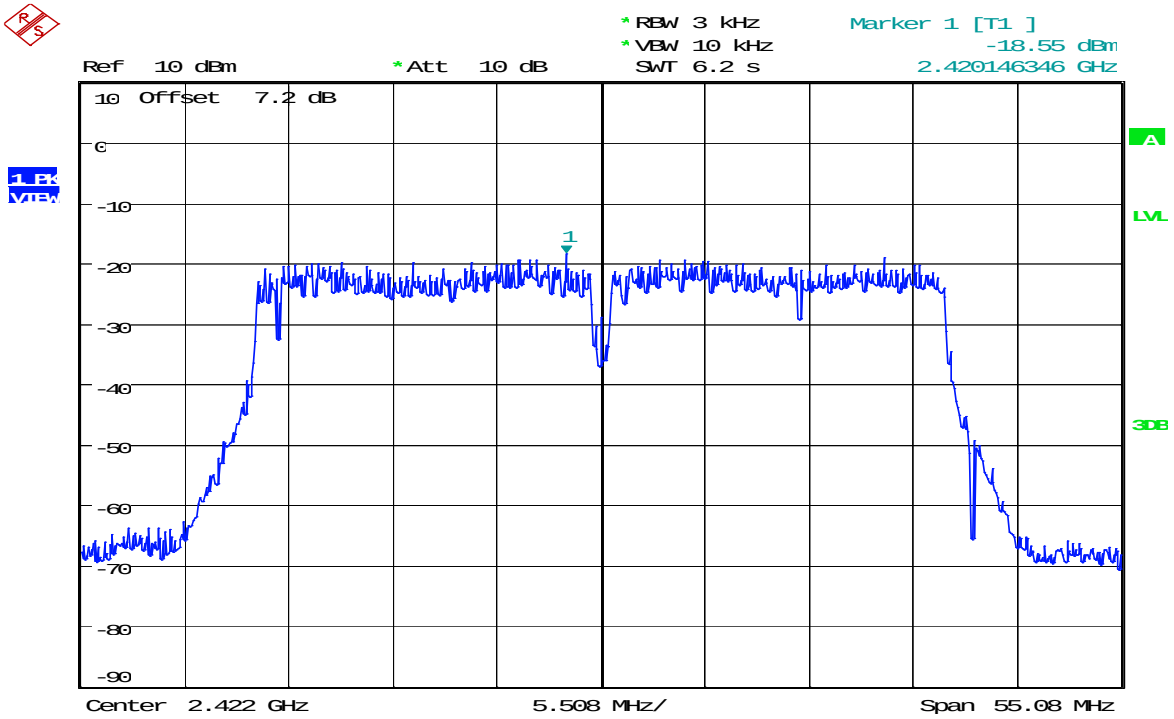


PPSD (CH High)

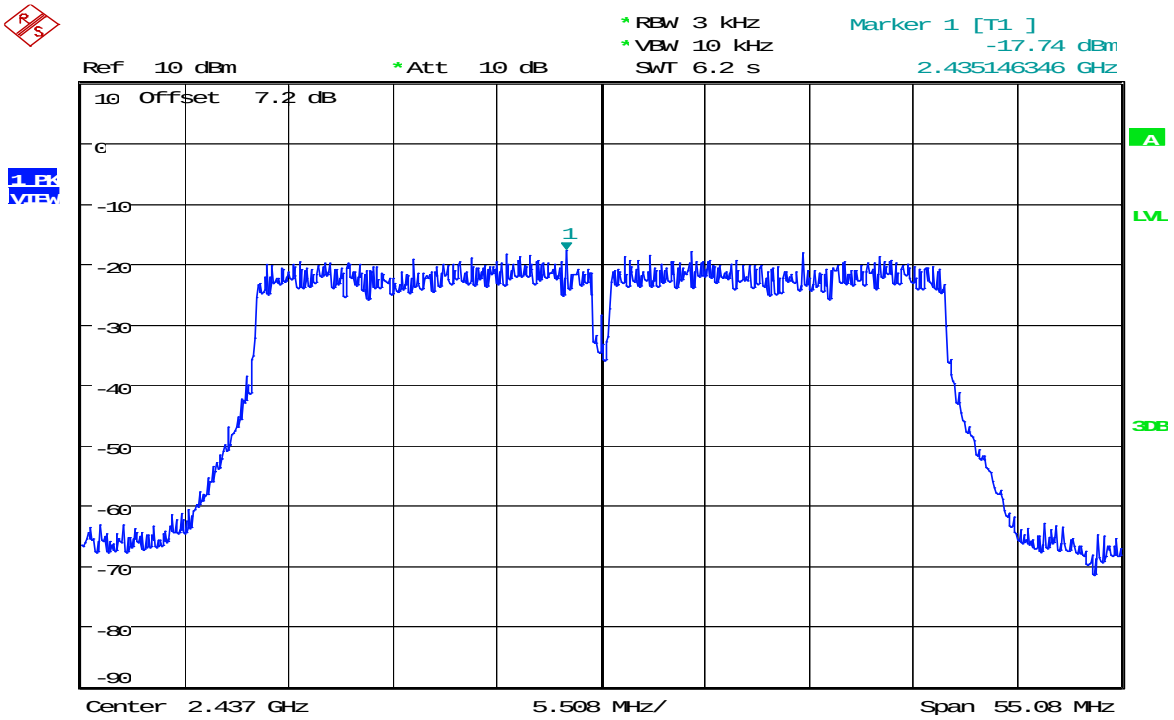


IEEE 802.11n HT40 mode/Chain 2

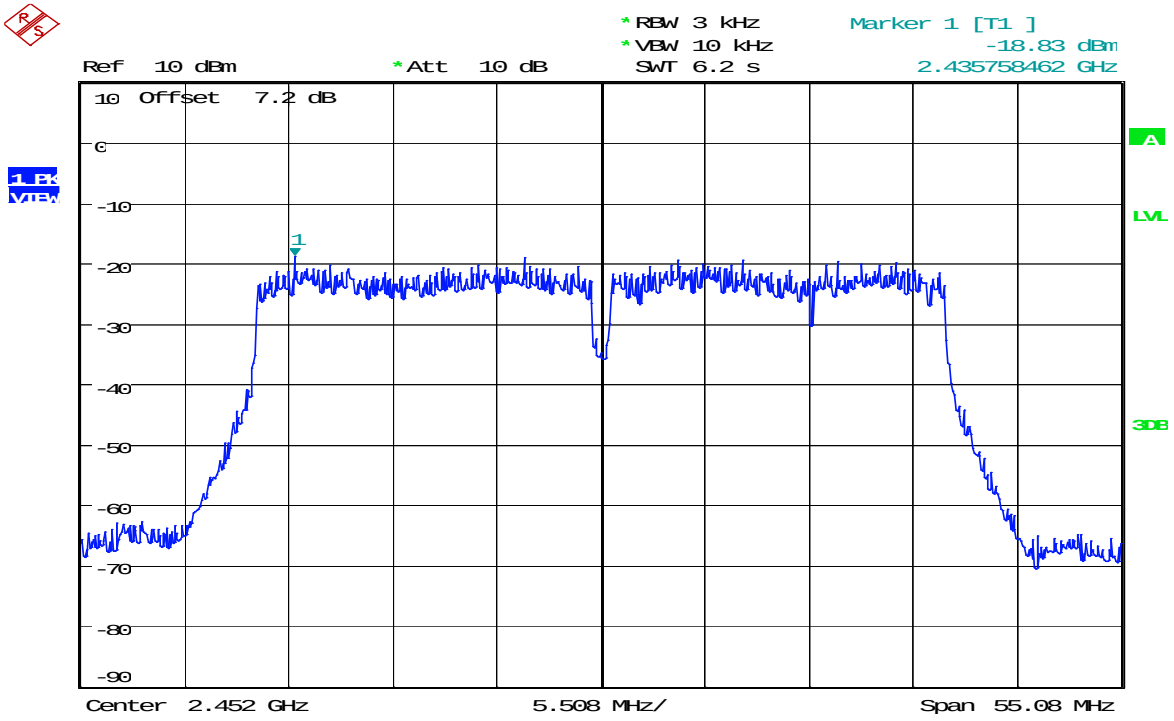
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)

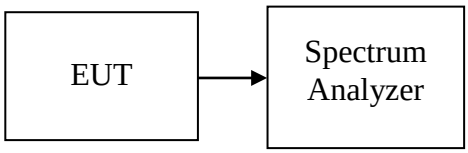


8.4.SPURIOUS EMISSIONS
Conducted Measurement

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.

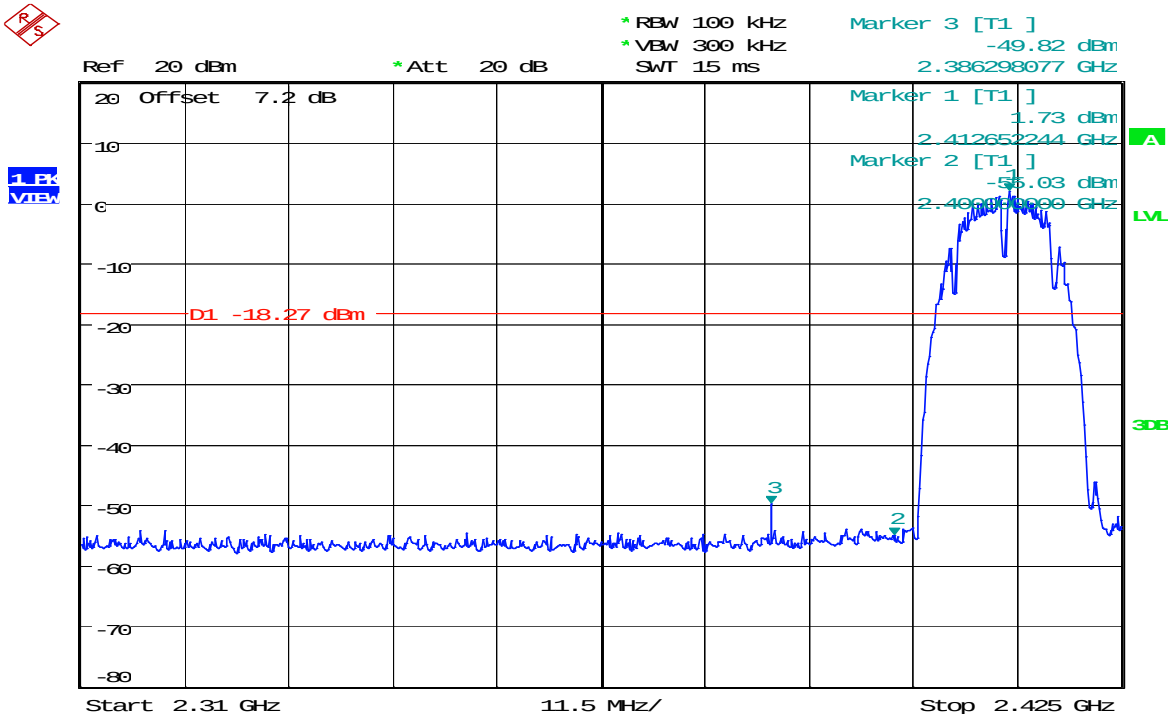
TEST RESULTS

No non-compliance noted

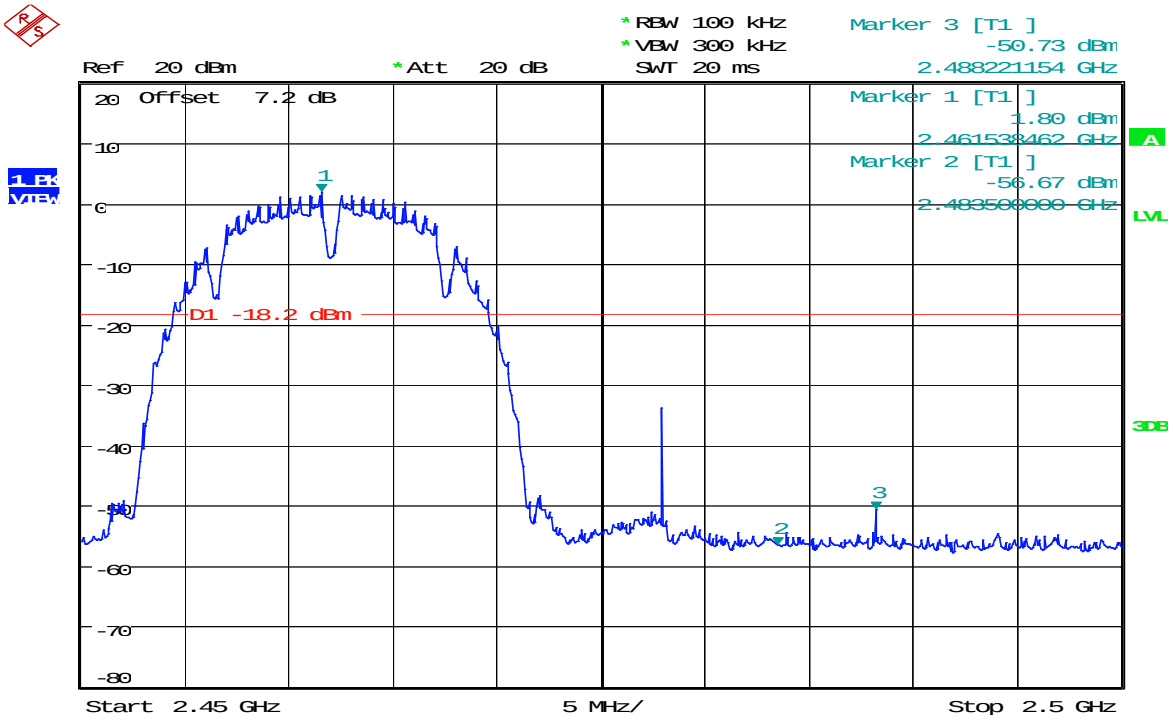
Test Plot
TEST RESULT OF CONDUCTED BAND EDGES

IEEE 802.11b mode/Chain 1

CH Low

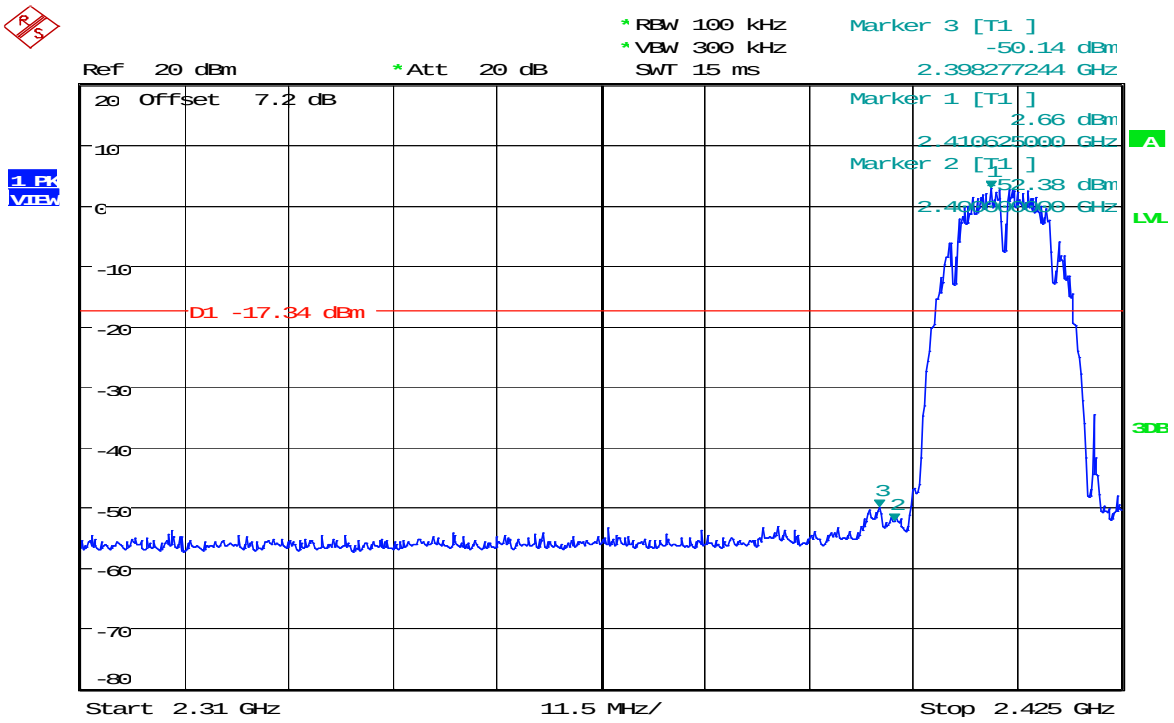


CH High

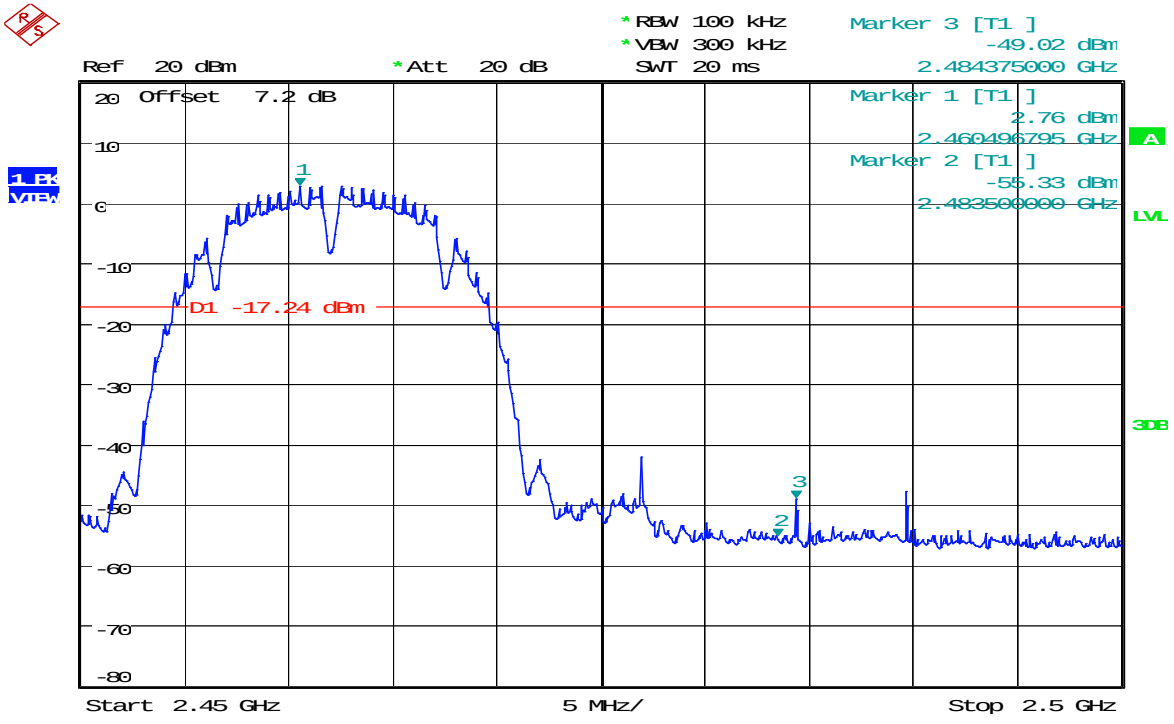


IEEE 802.11b mode/Chain 2

CH Low

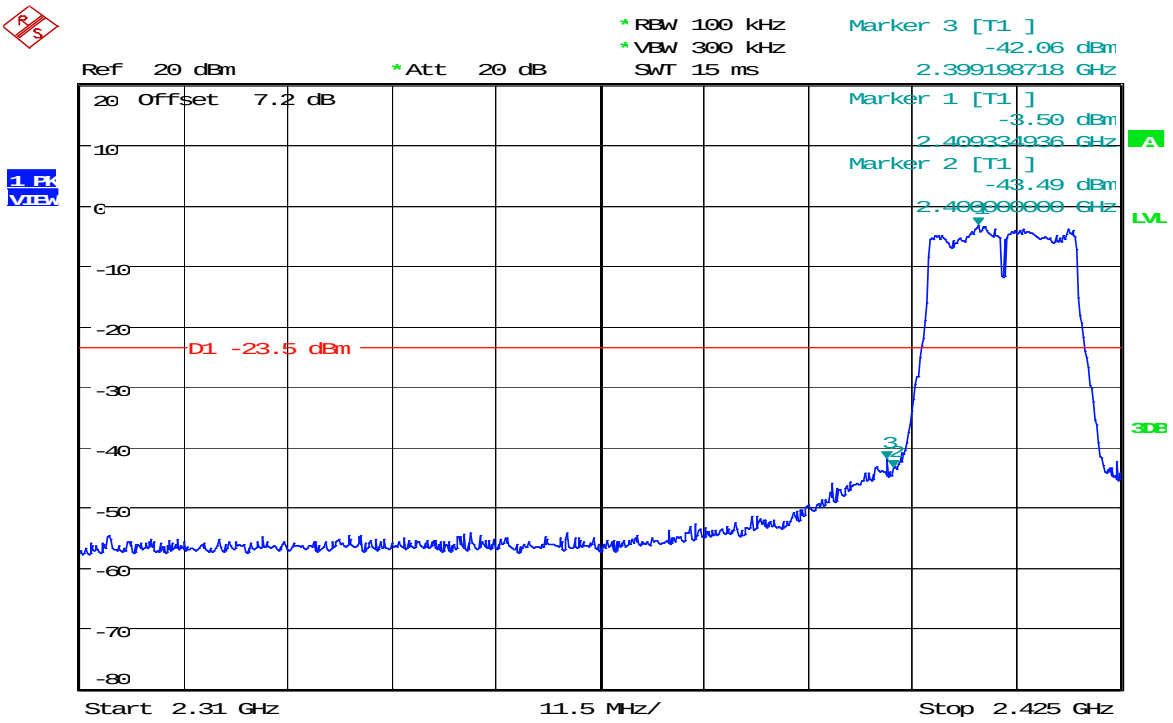


CH High

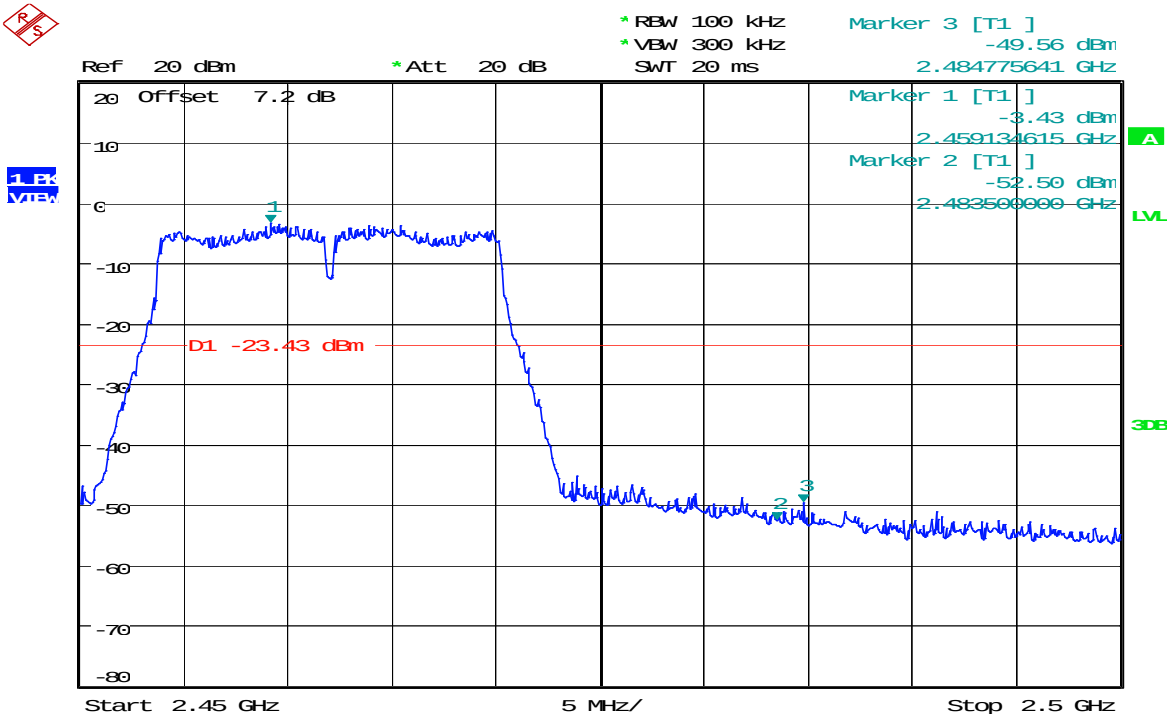


IEEE 802.11g mode/Chain 1

CH Low

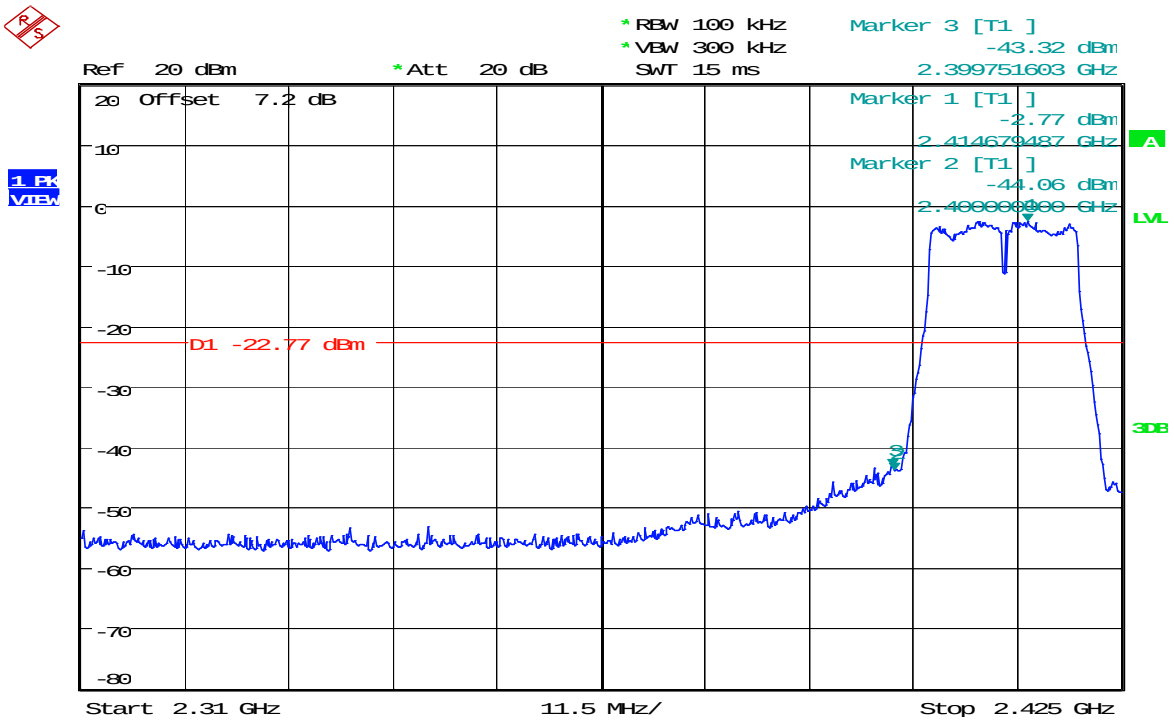


CH High

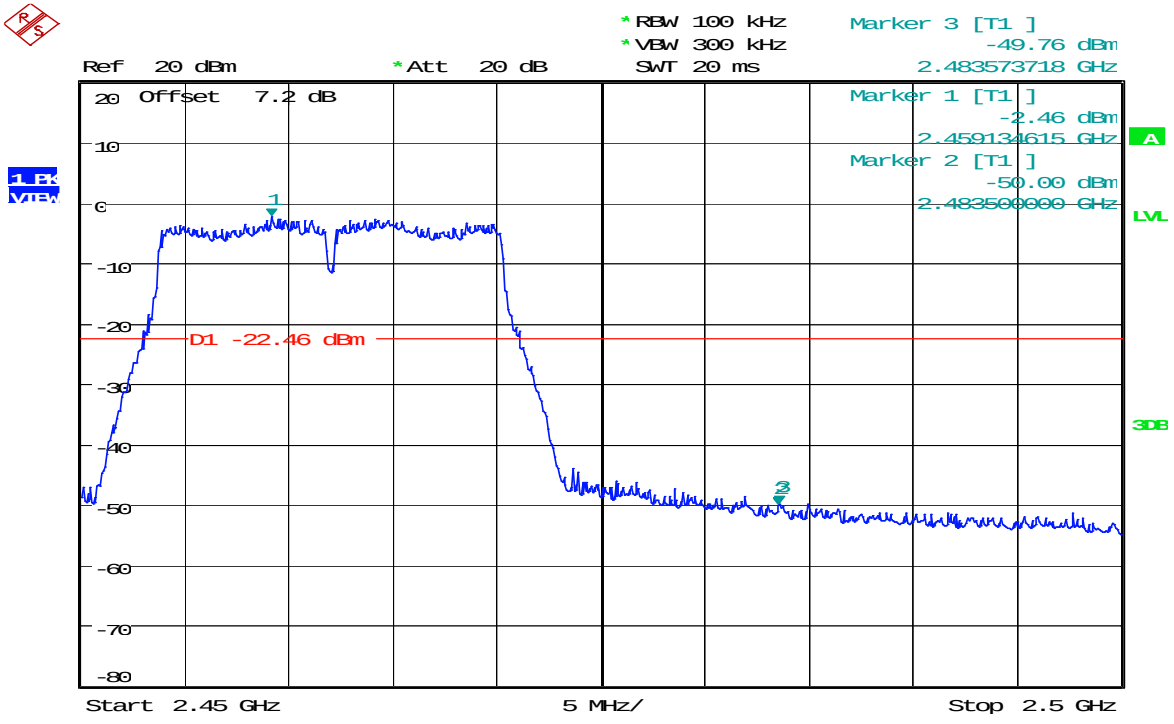


IEEE 802.11g mode/Chain 2

CH Low

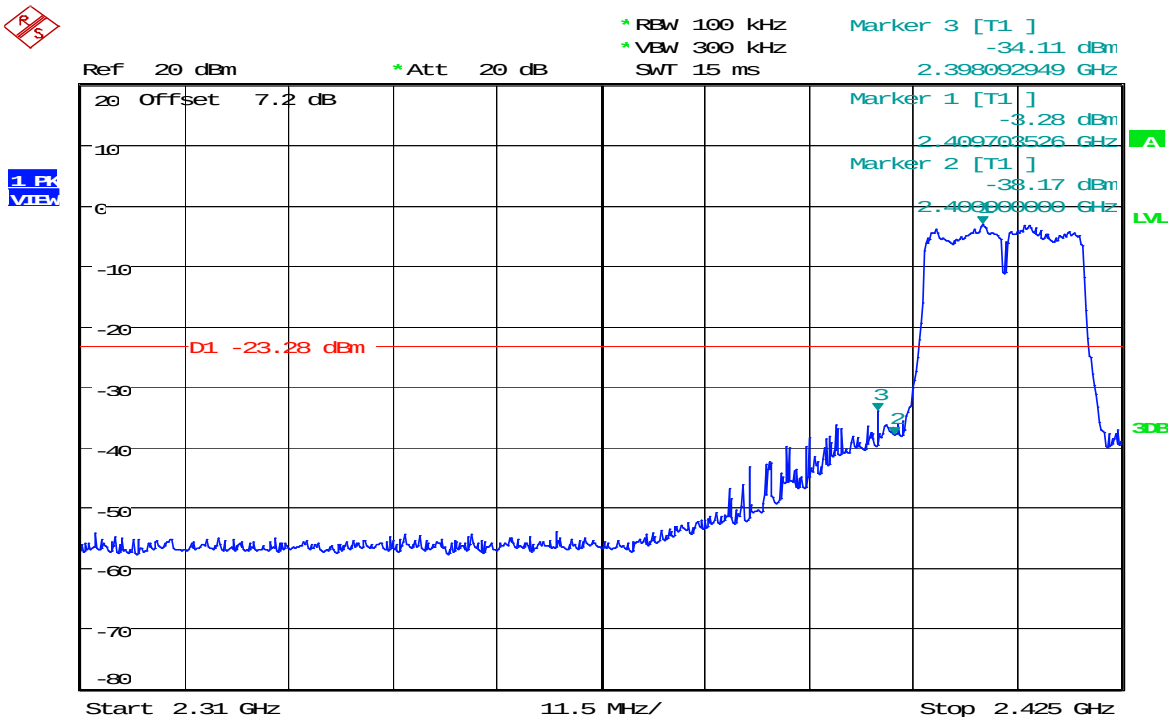


CH High

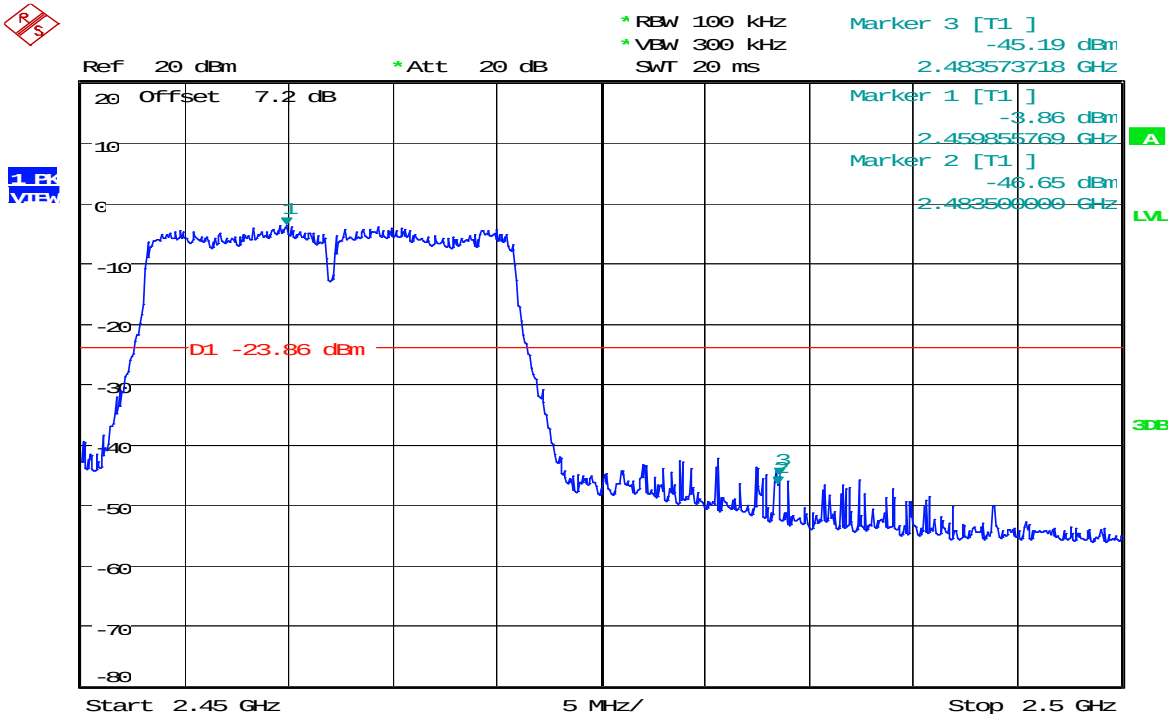


IEEE 802.11n HT20 mode/Chain 1

CH Low

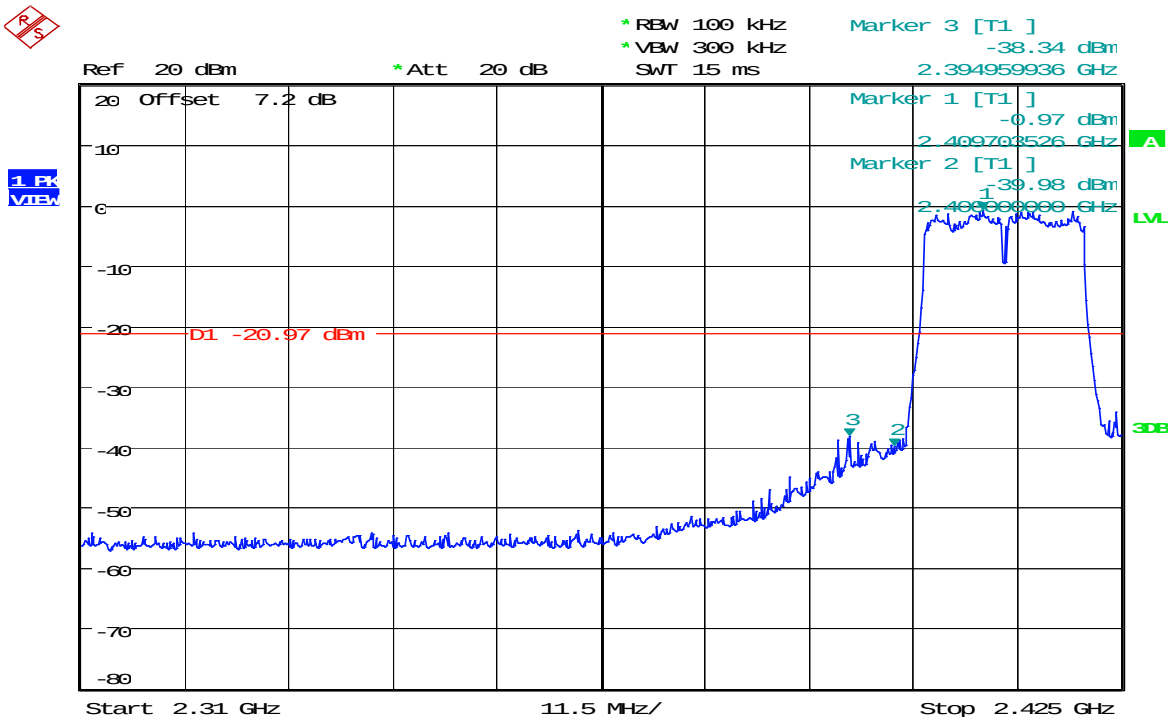


CH High

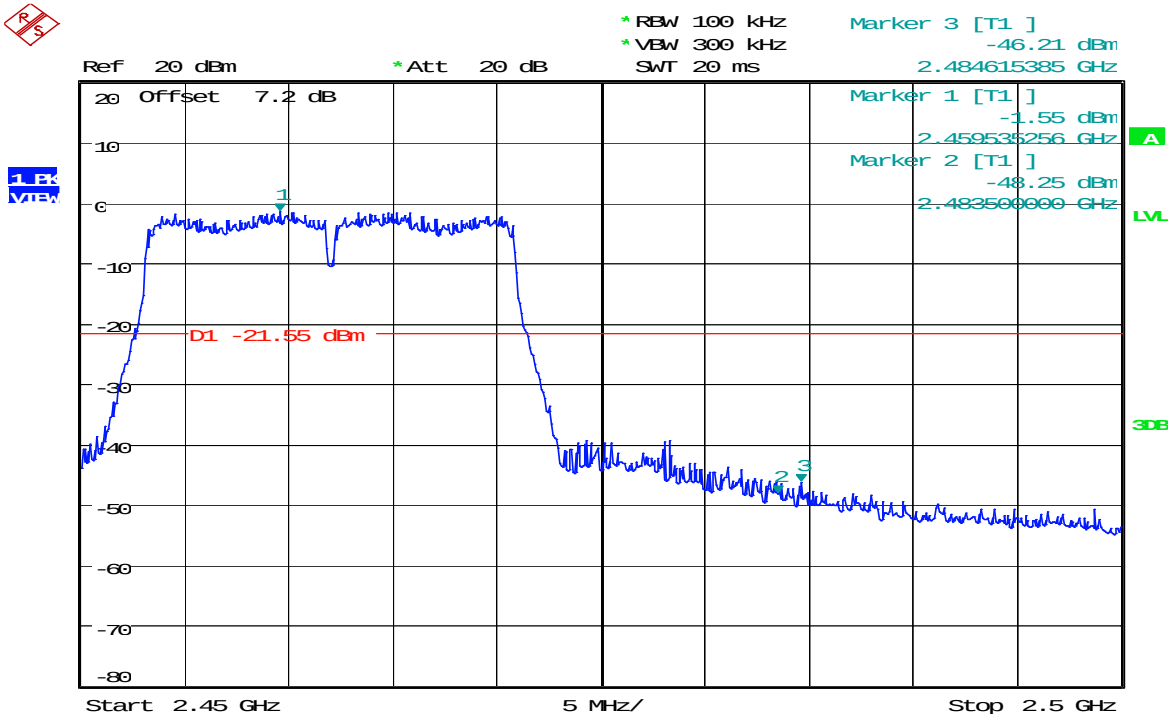


IEEE 802.11n HT20 mode/Chain 2

CH Low

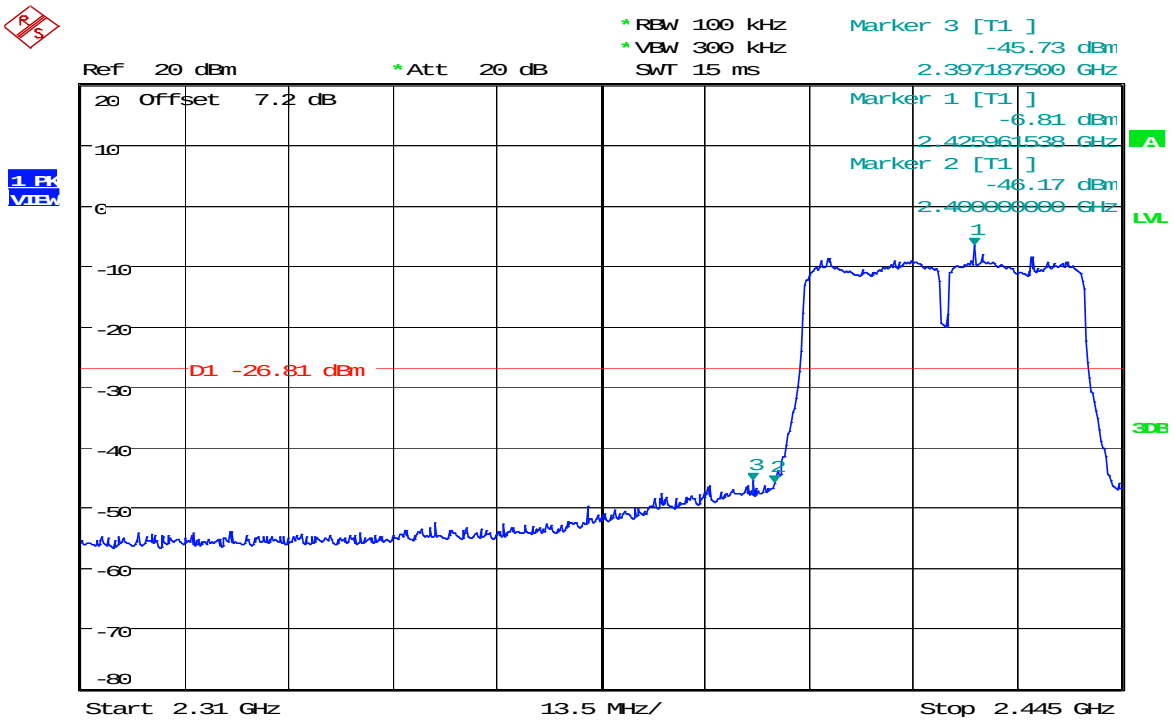


CH High

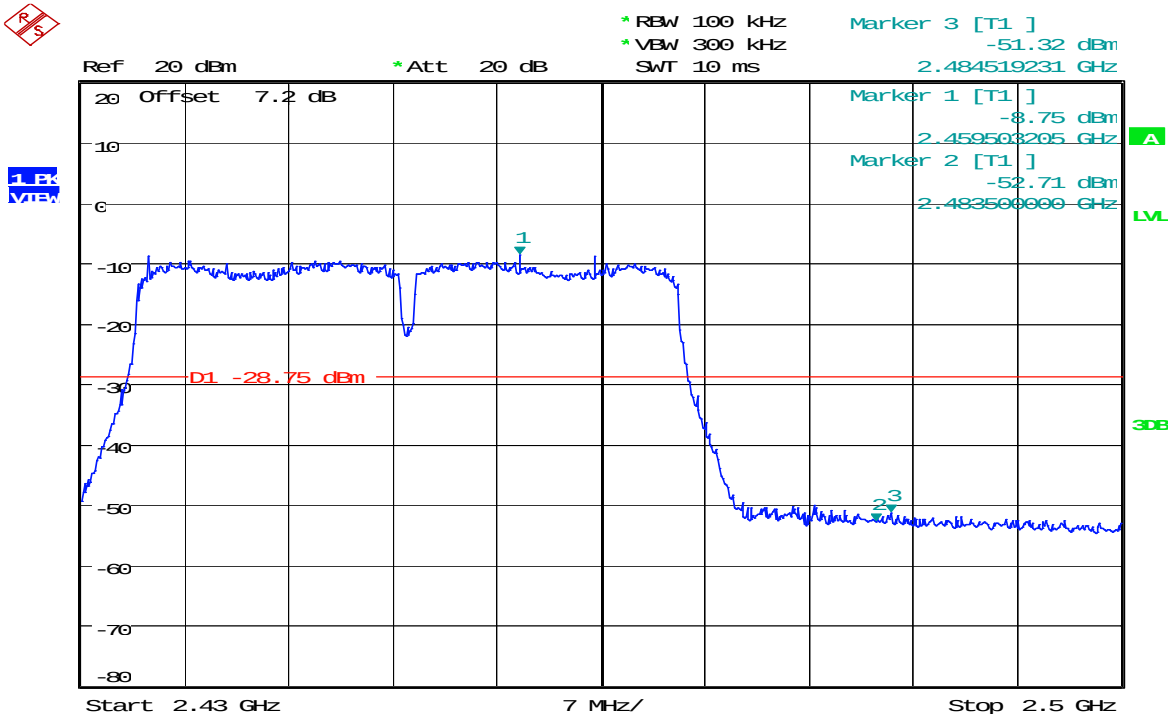


IEEE 802.11n HT40 mode/Chain 1

CH Low

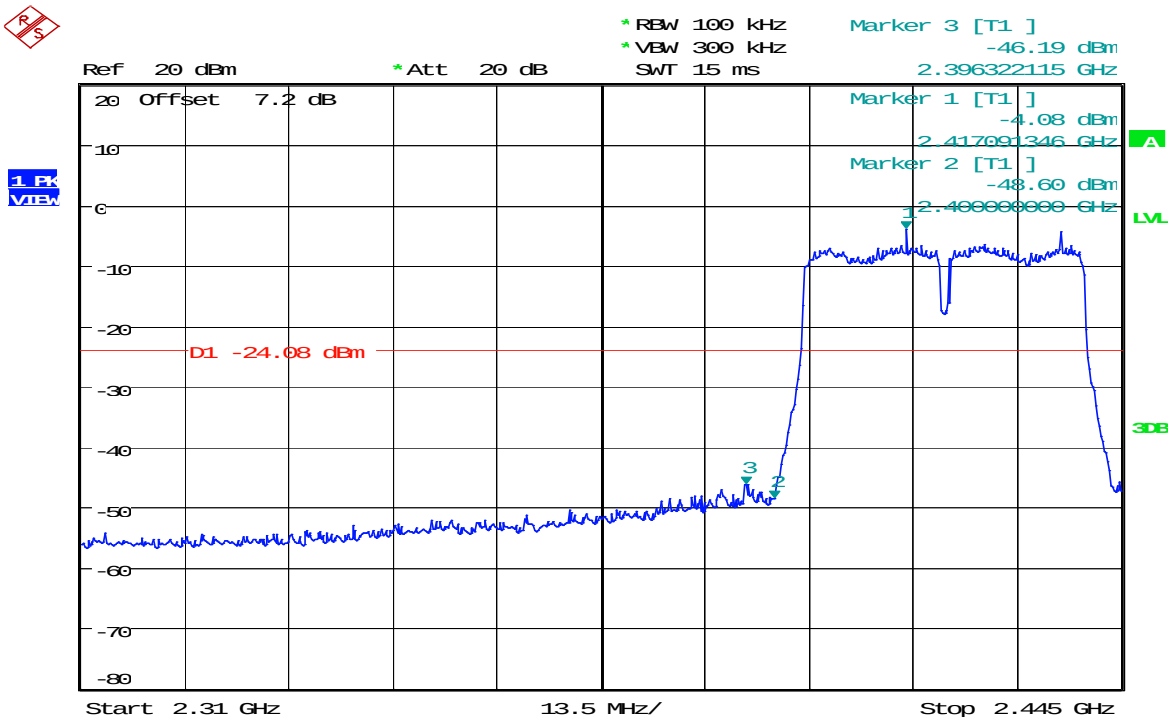


CH High

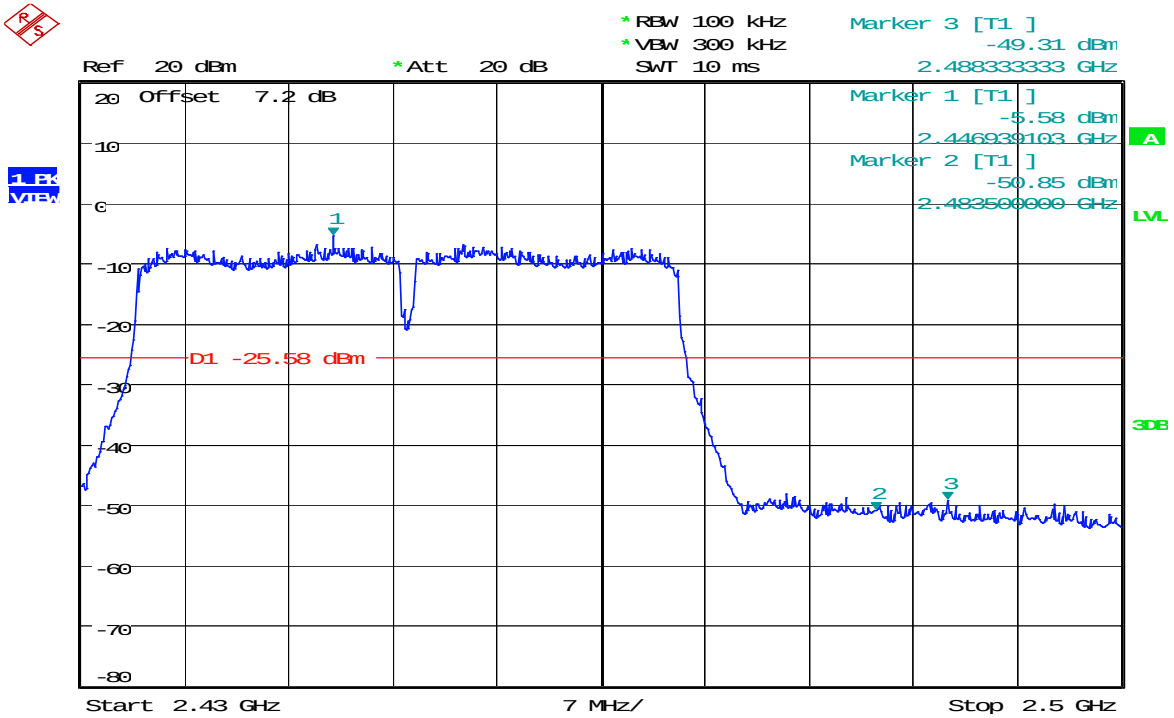


IEEE 802.11n HT40 mode/Chain 2

CH Low



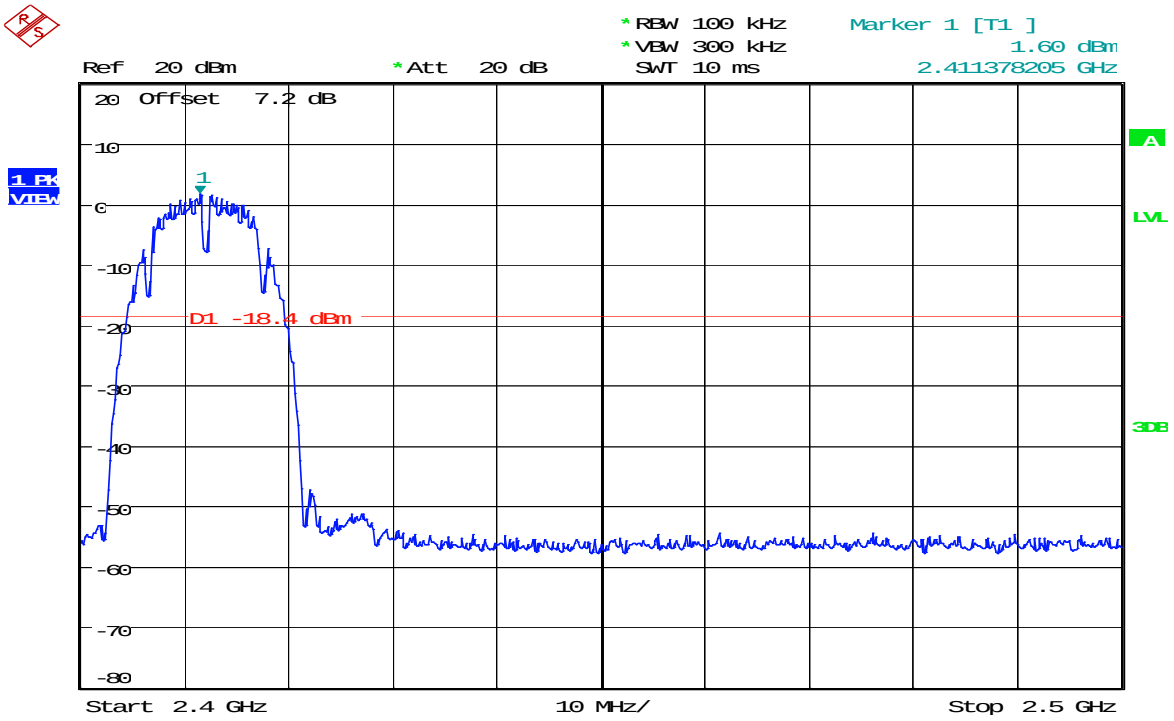
CH High

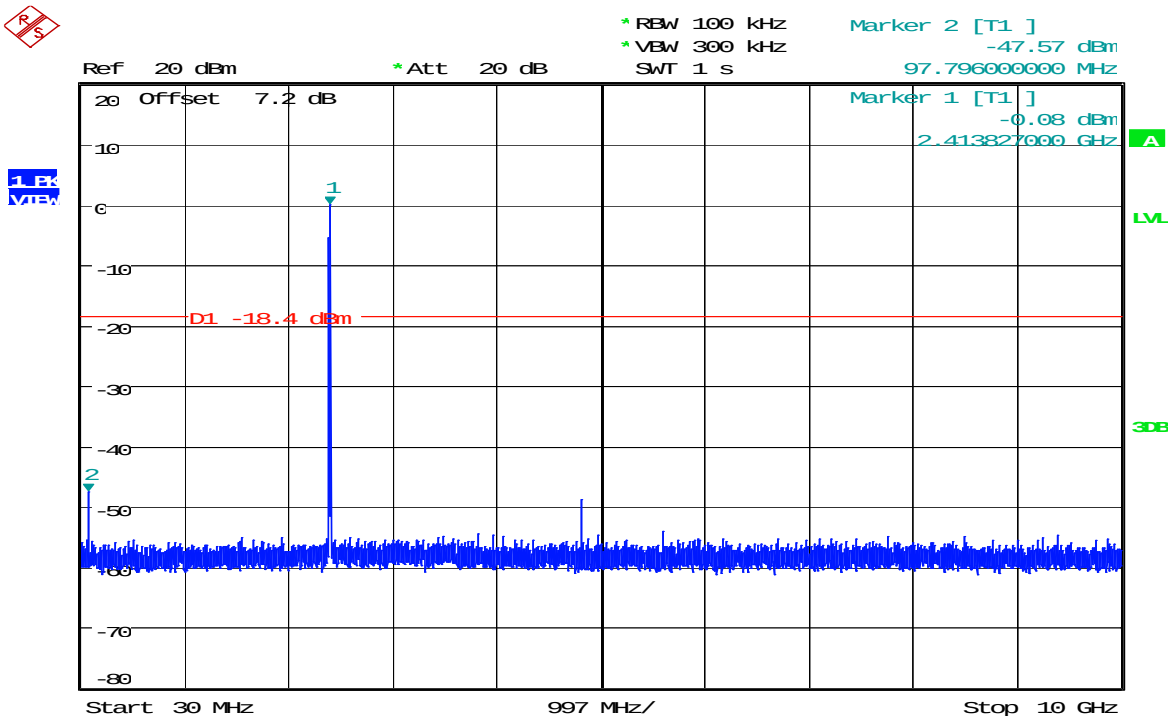


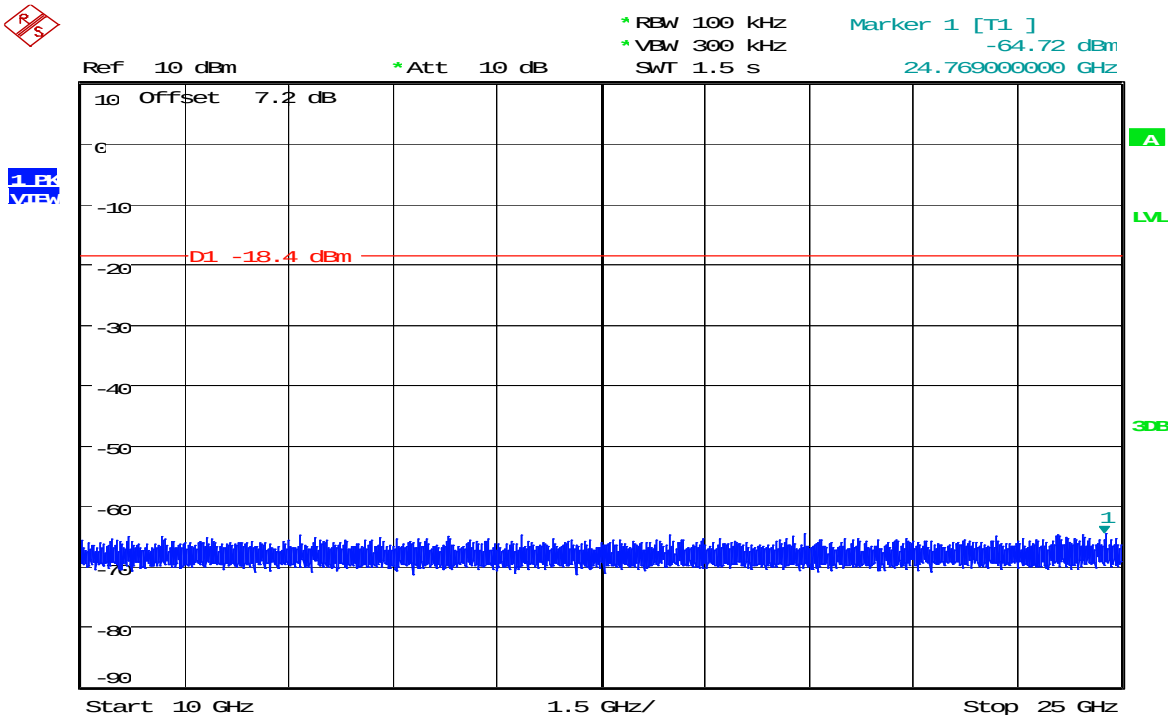
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

IEEE 802.11b mode/Chain 1

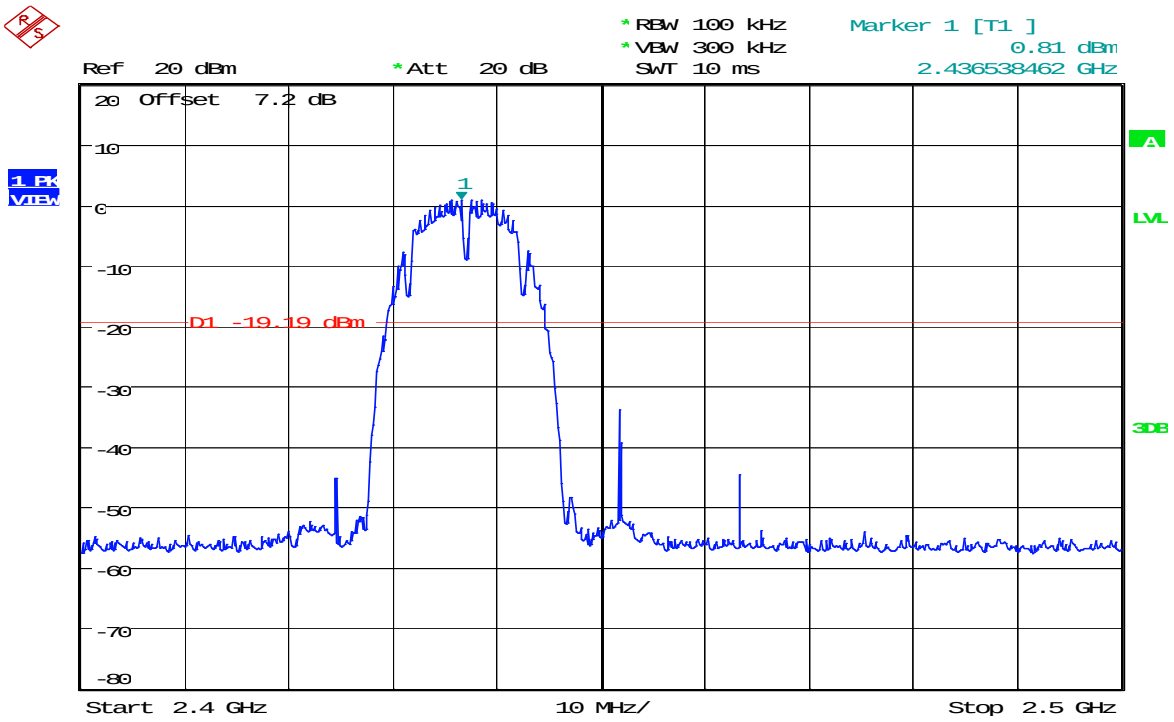
CH Low

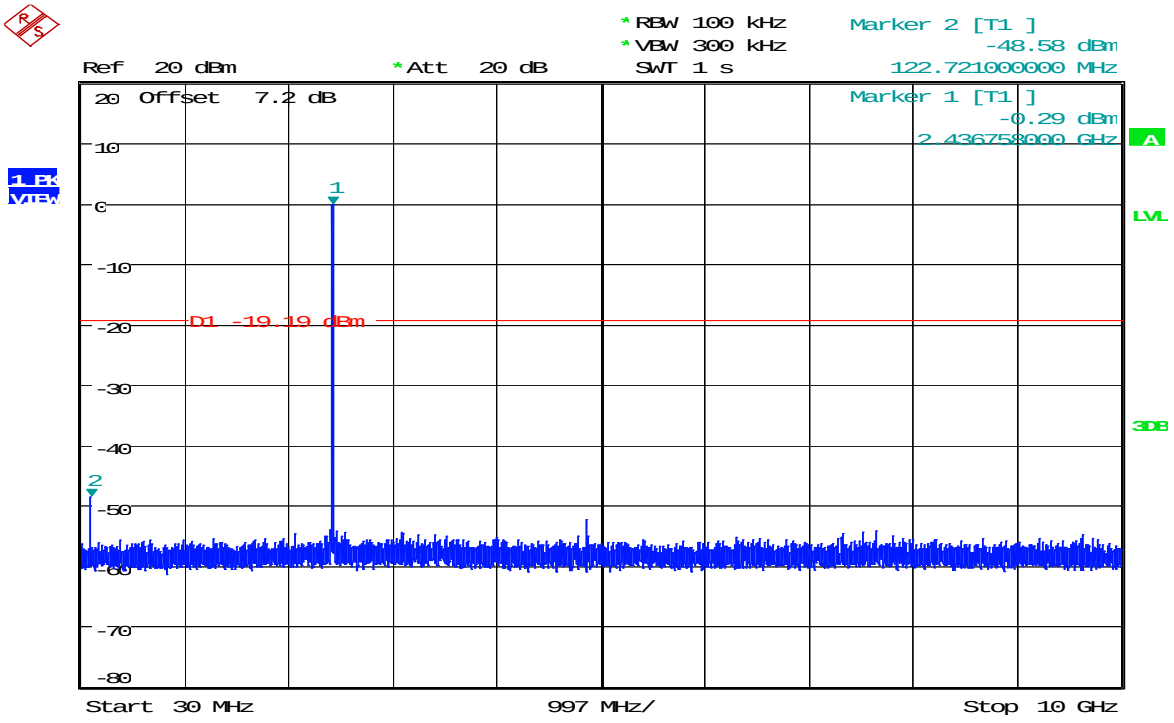


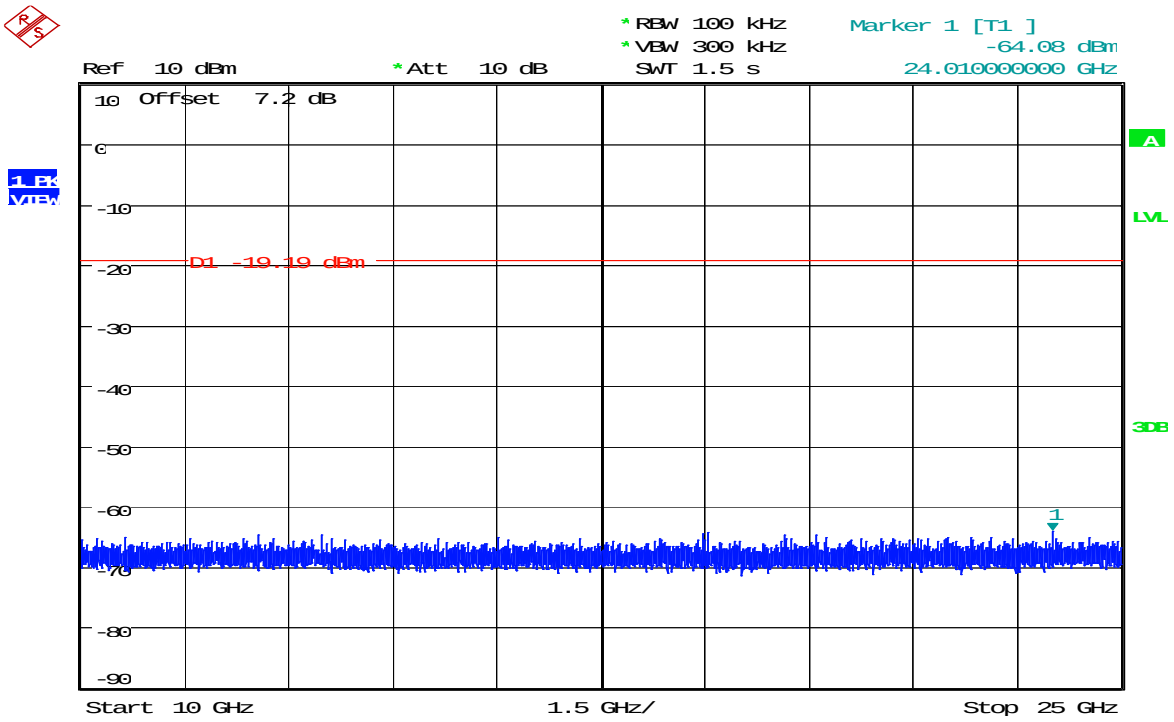



RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.72 dBm
24.769000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -18.4 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

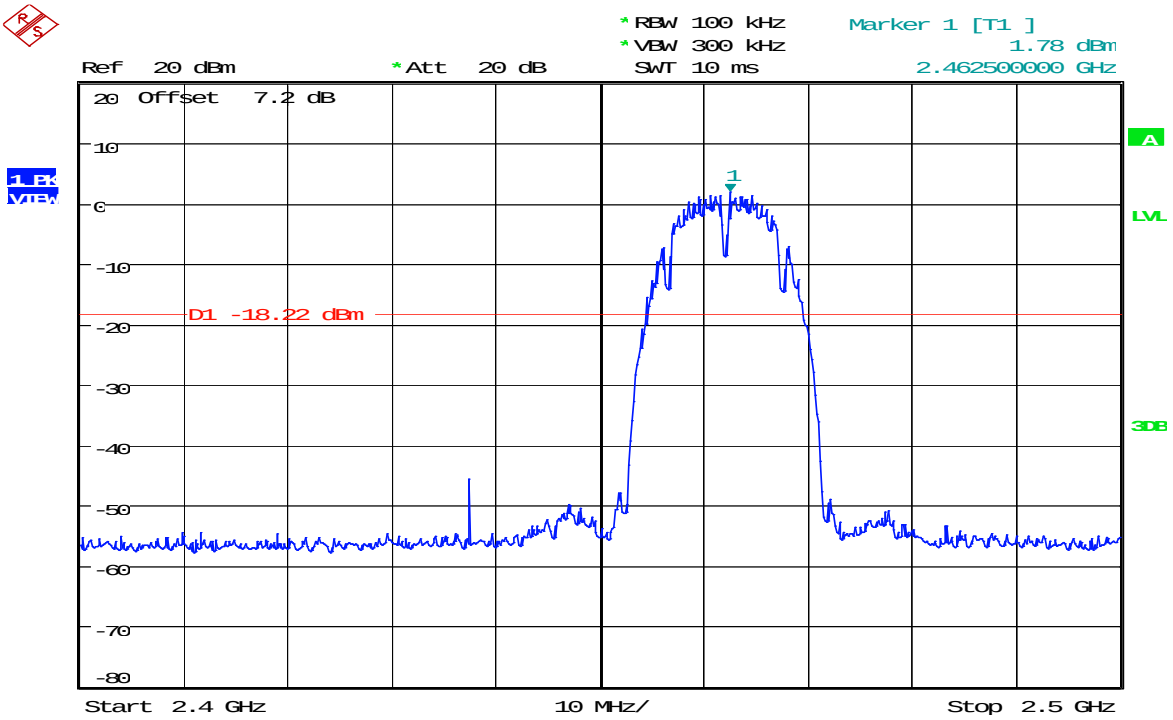
CH Mid

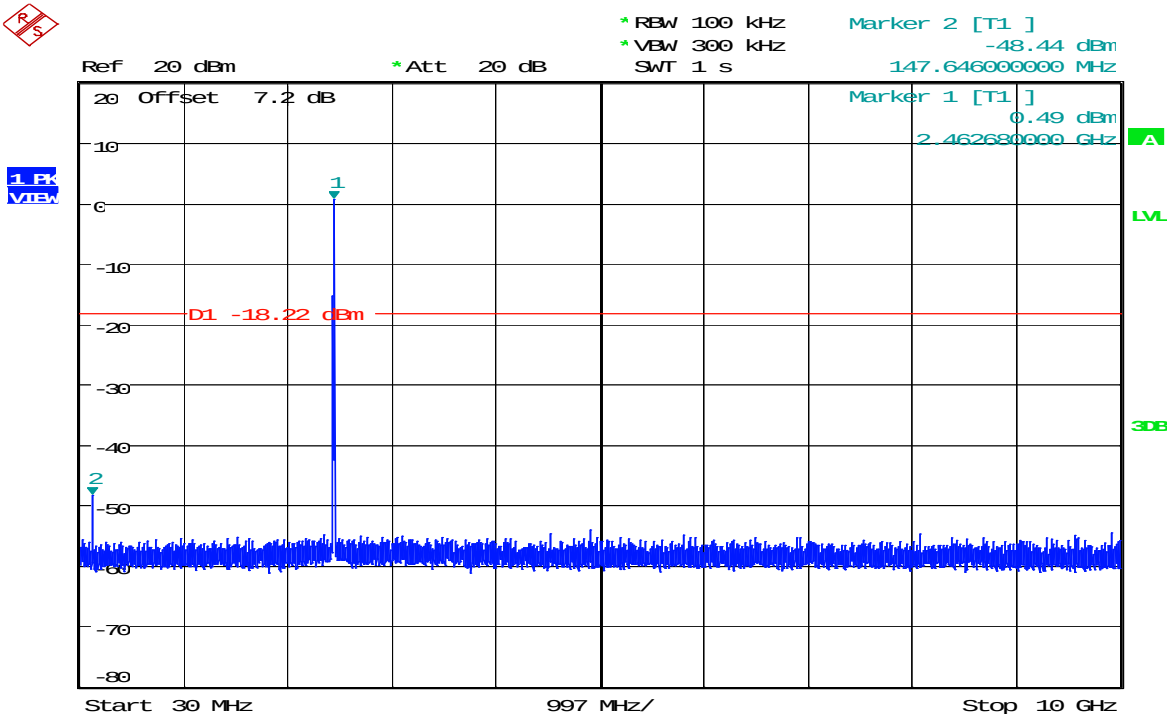

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
0.81 dBm
2.436538462 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -19.19 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

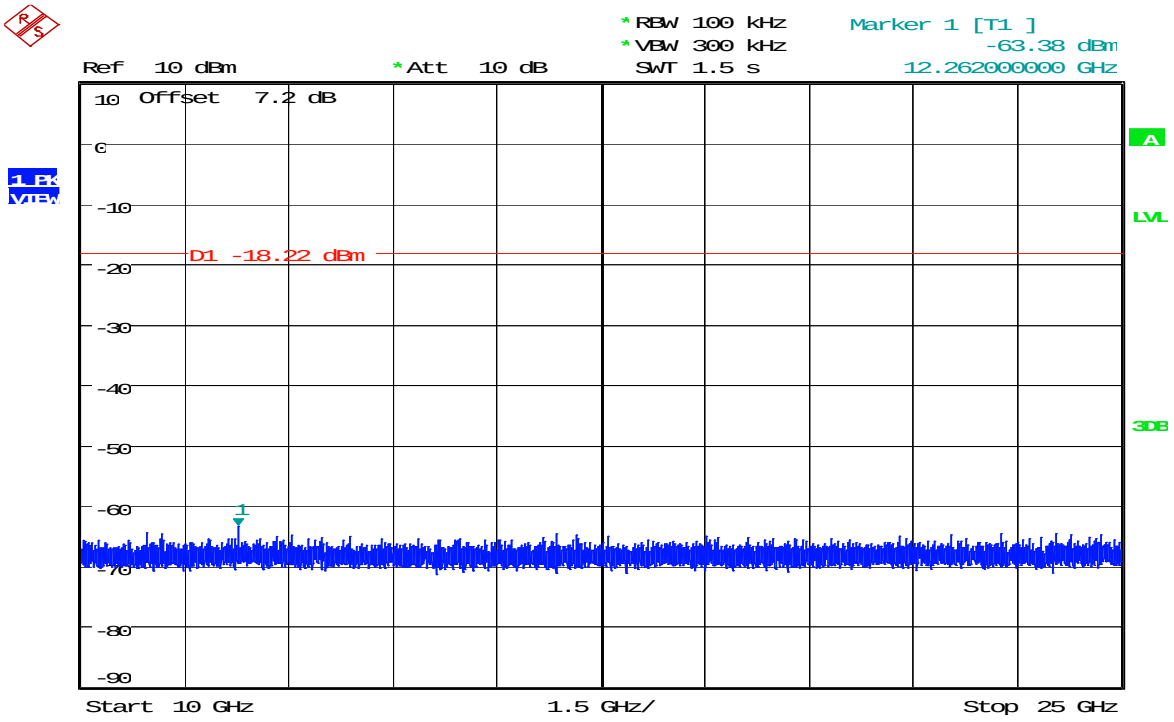

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-48.58 dBm
122.721000000 MHz
Marker 1 [T1]
-0.29 dBm
2.436758000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 Pk
MtBW
A
LVL
3DB
D1 -19.19 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.08 dBm
24.010000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 Pk
MtBW
A
LVL
3DB
D1 -19.19 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

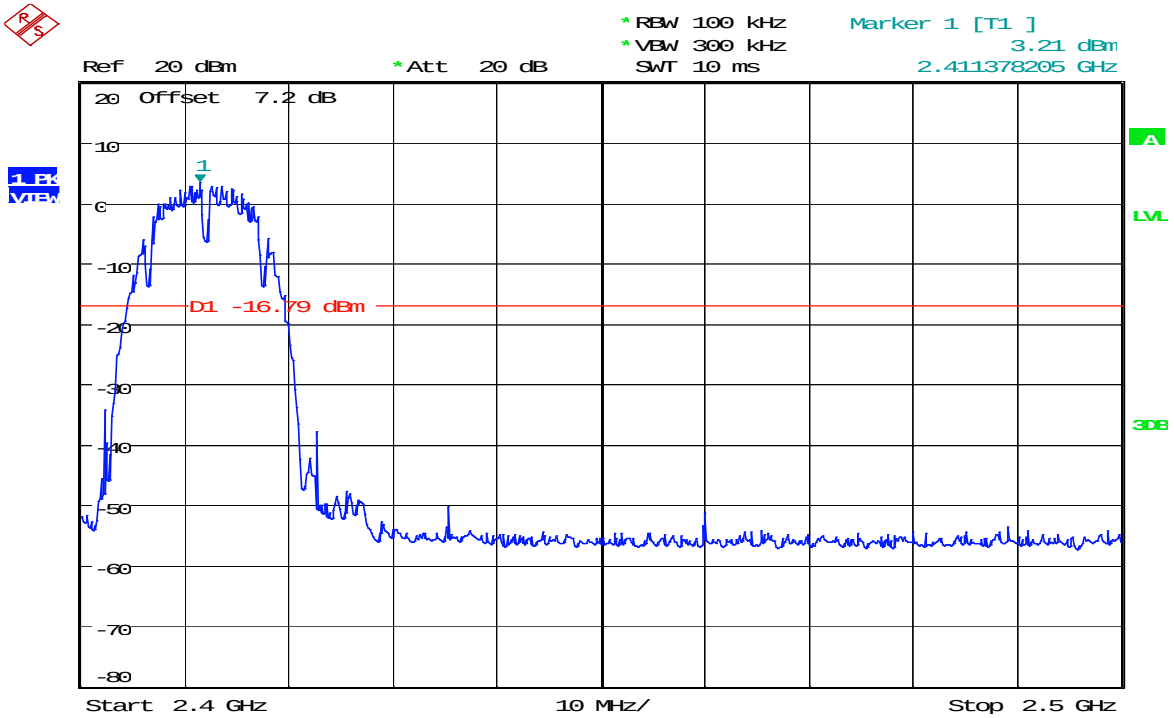

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
1.78 dBm
2.462500000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -18.22 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz
1 PK
VIEW
A
LVL
3DB

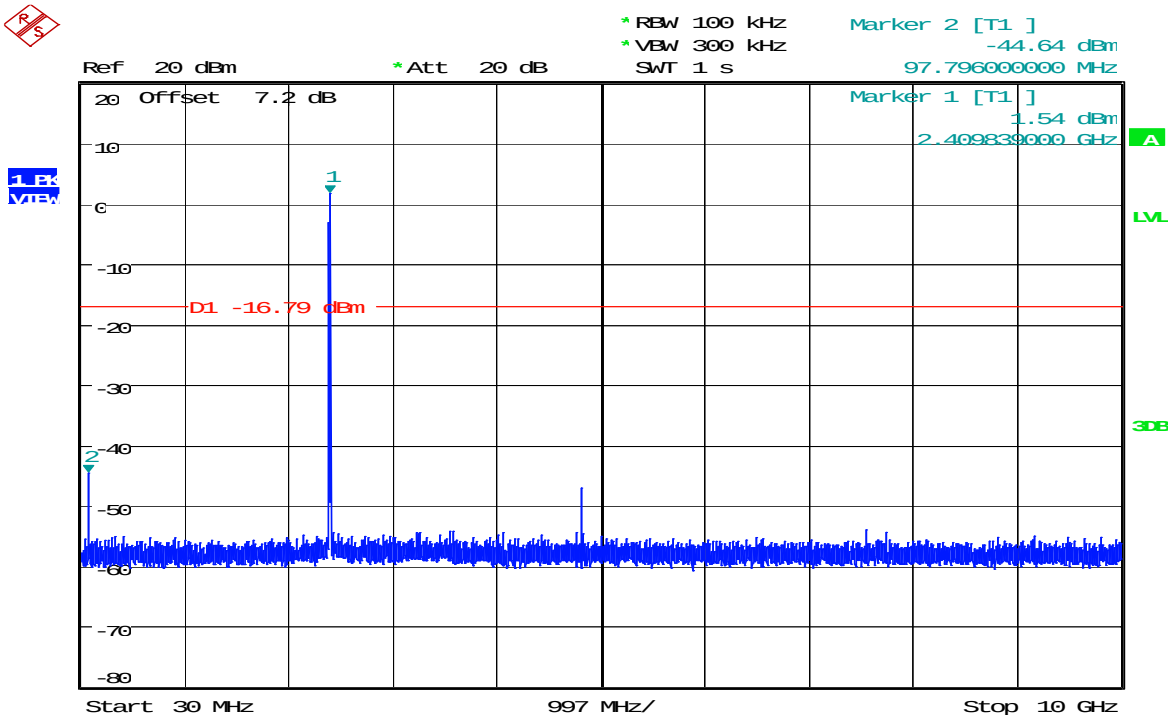

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-48.44 dBm
147.646000000 MHz
Marker 1 [T1]
0.49 dBm
2.462680000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -18.22 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz
1 PK
VIEW
A
LVL
3DB

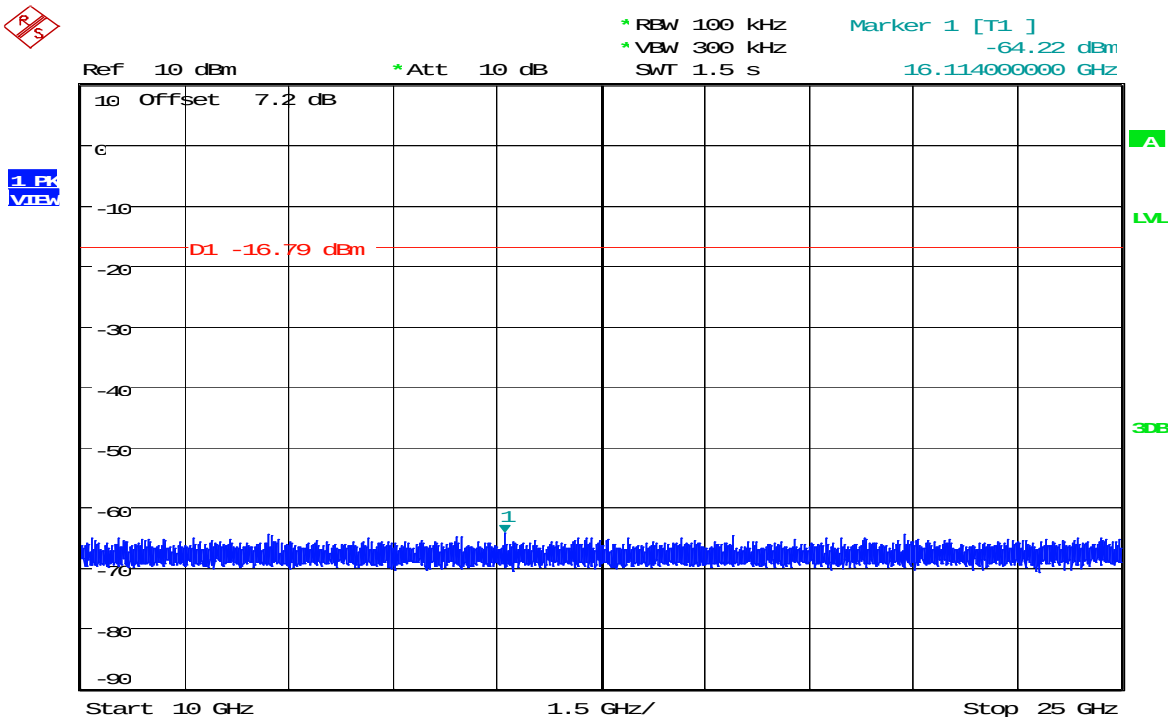


IEEE 802.11b mode/Chain 2

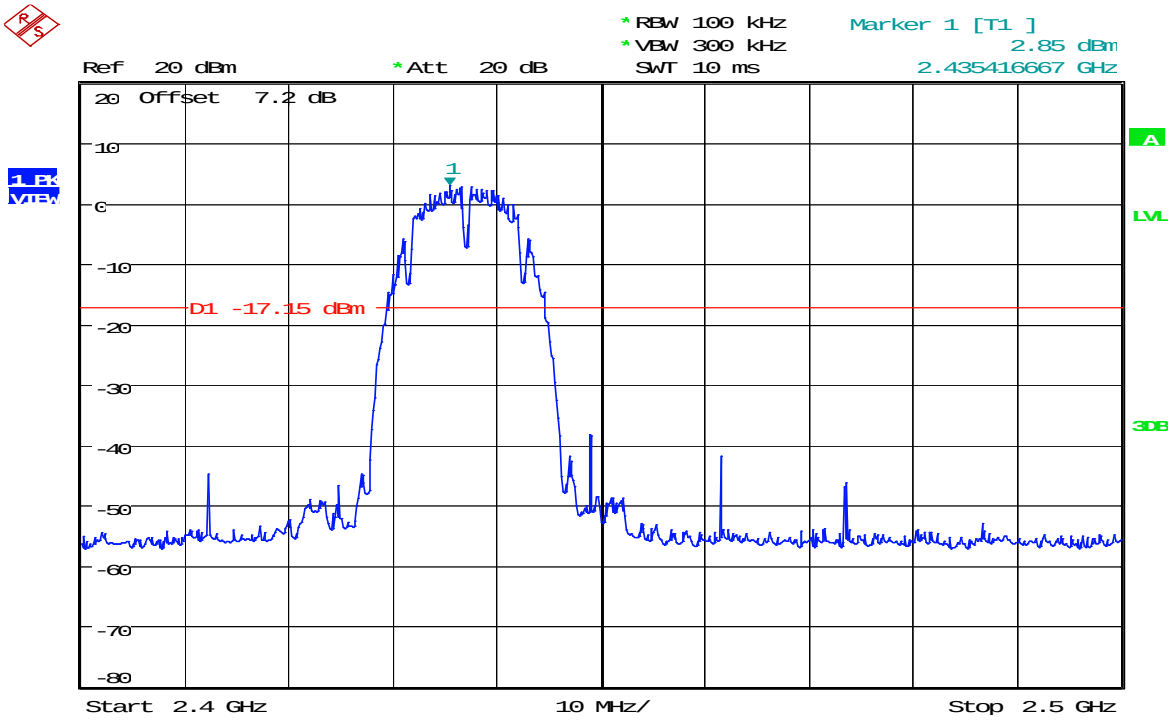
CH Low

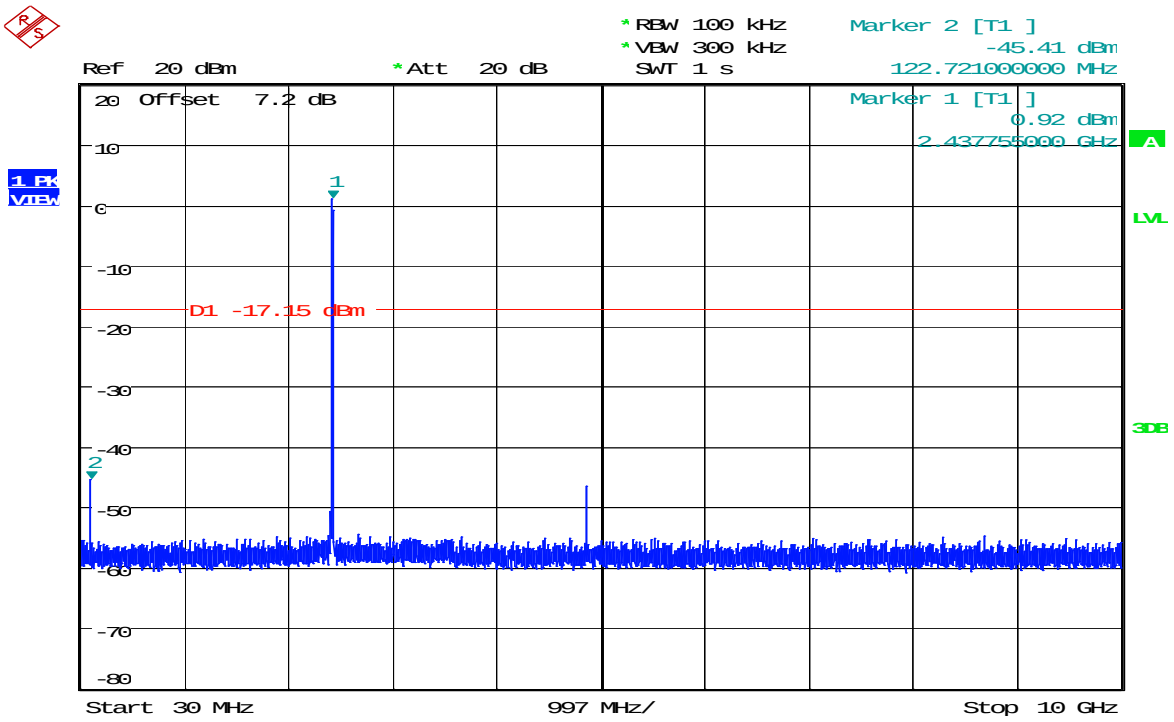


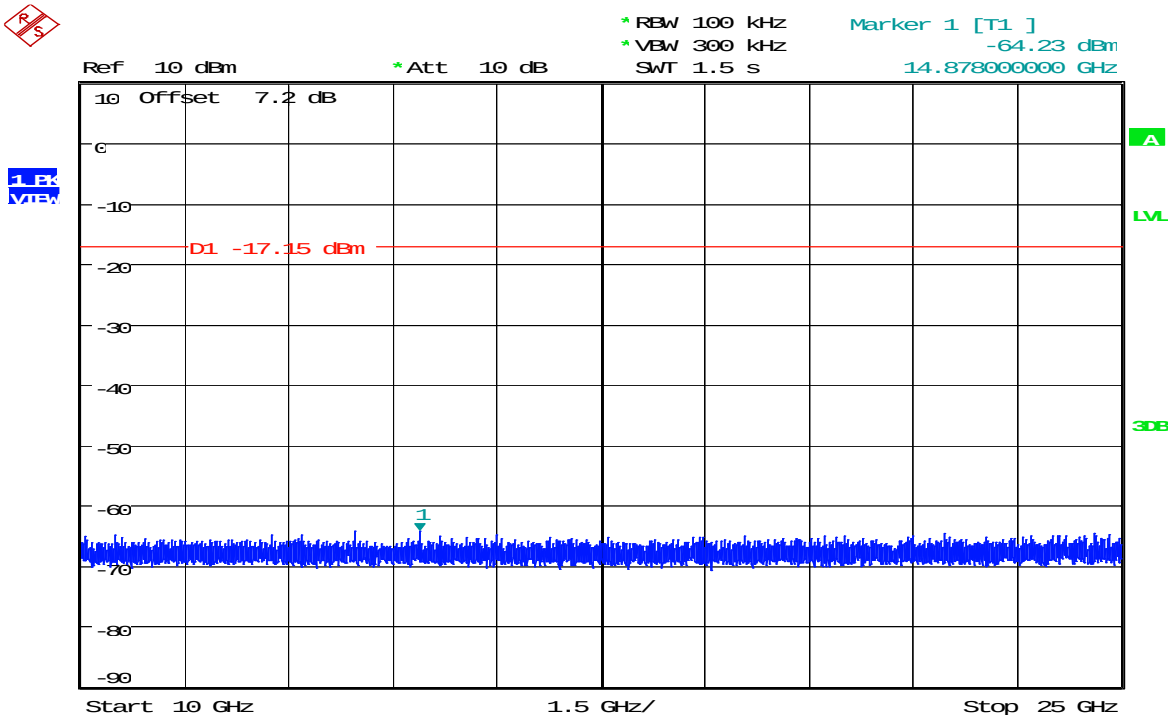

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-44.64 dBm
97.796000000 MHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
1.54 dBm
2.409839000 GHz
D1 -16.79 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.22 dBm
16.114000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -16.79 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

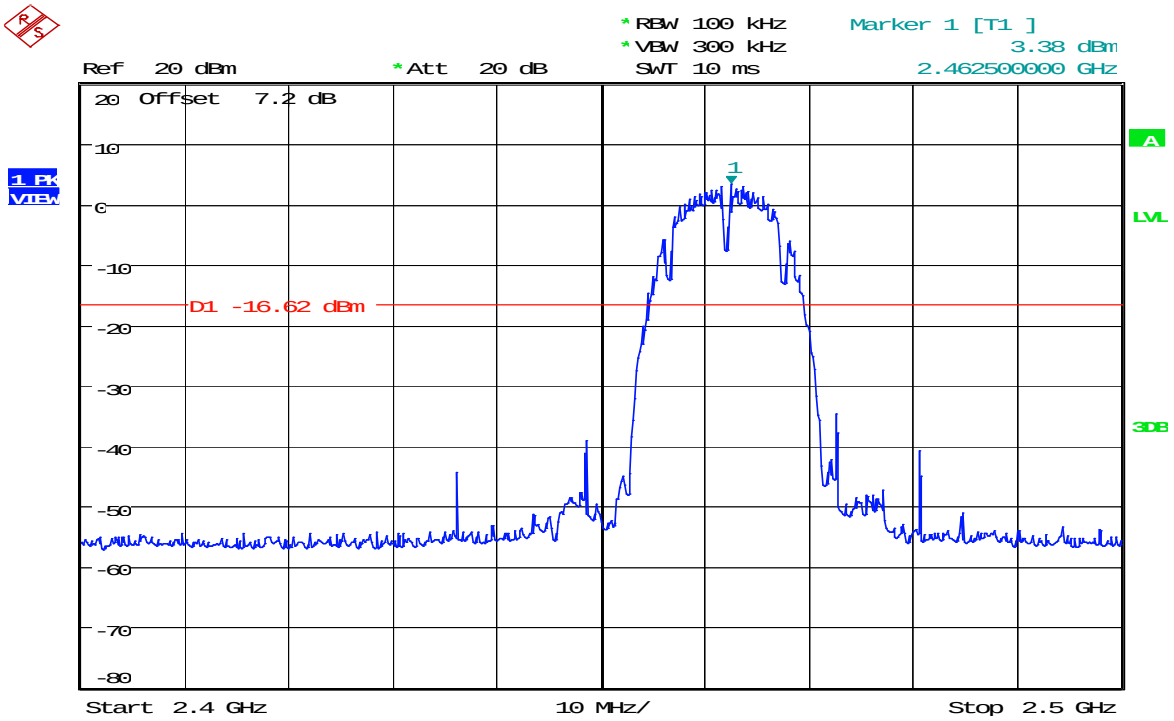
CH Mid

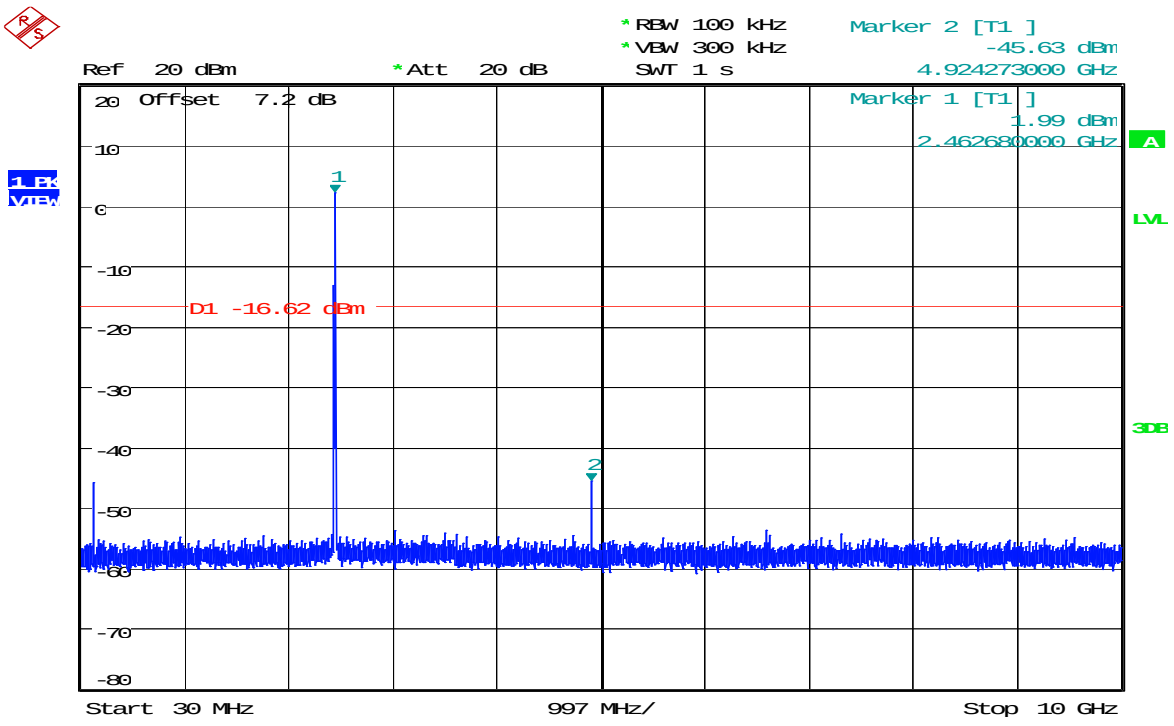

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
2.85 dBm
2.435416667 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -17.15 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

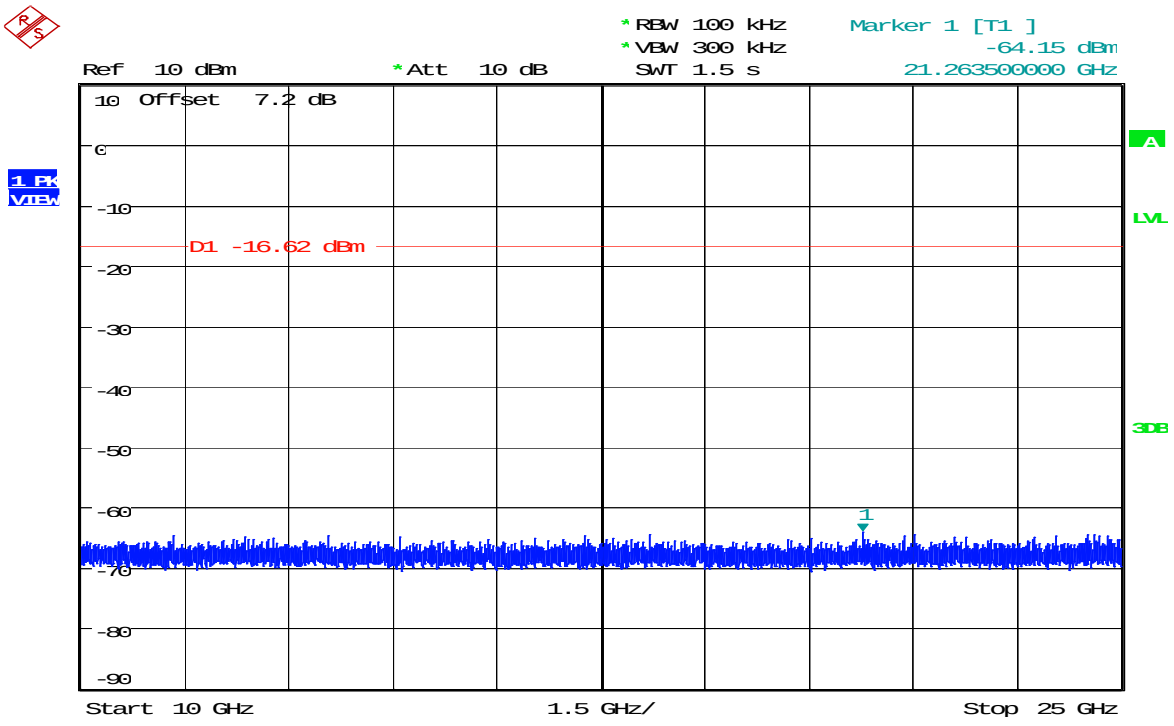

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-45.41 dBm
122.721000000 MHz
Marker 1 [T1]
0.92 dBm
2.437755000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -17.15 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.23 dBm
14.878000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -17.15 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

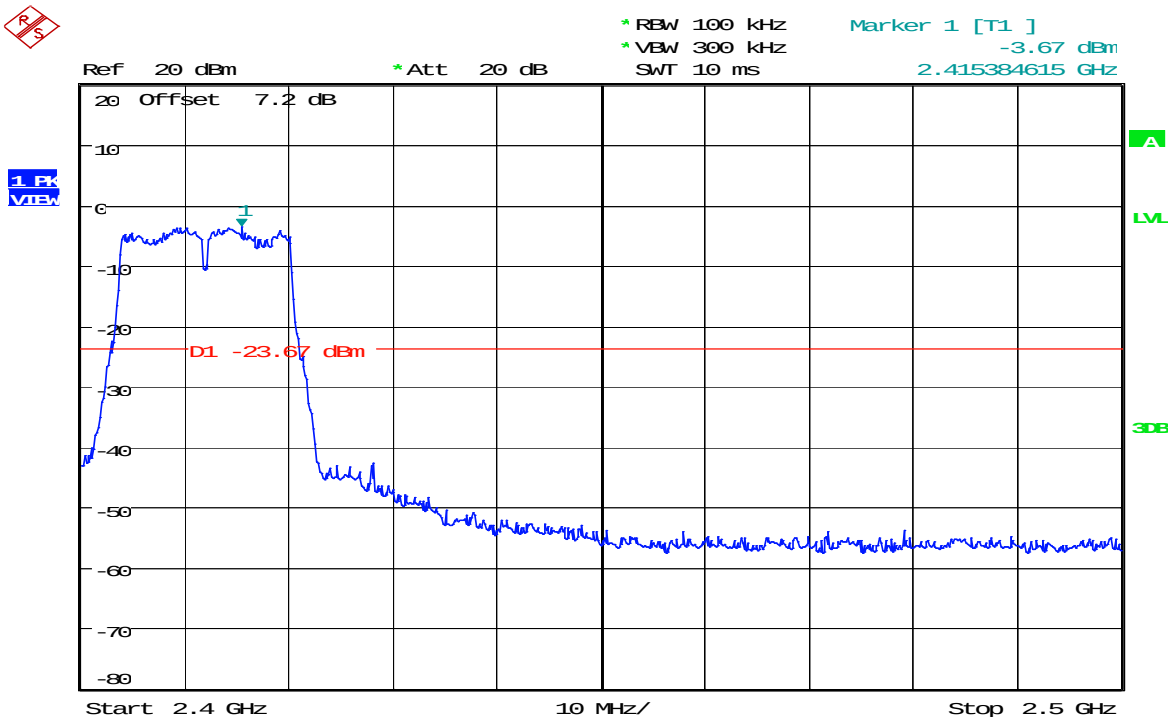

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
3.38 dBm
2.462500000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -16.62 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

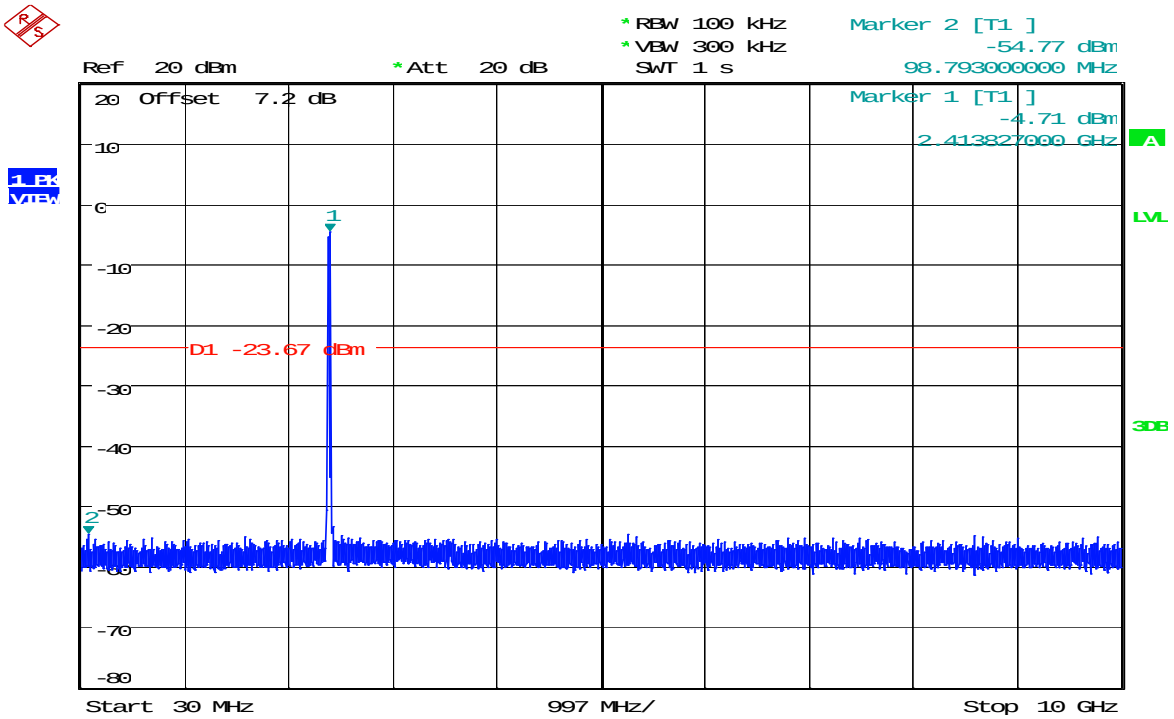

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-45.63 dBm
4.924273000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
1.99 dBm
2.462680000 GHz
D1 -16.62 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

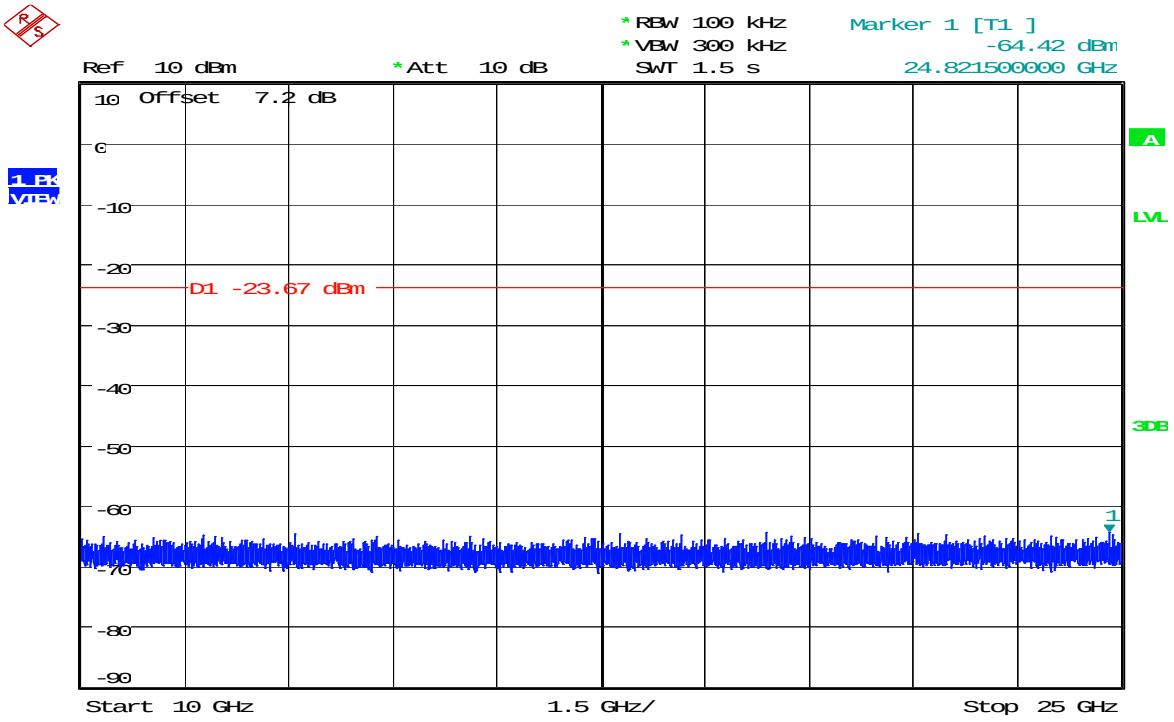

RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.15 dBm
21.263500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -16.62 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

IEEE 802.11g mode/Chain 1

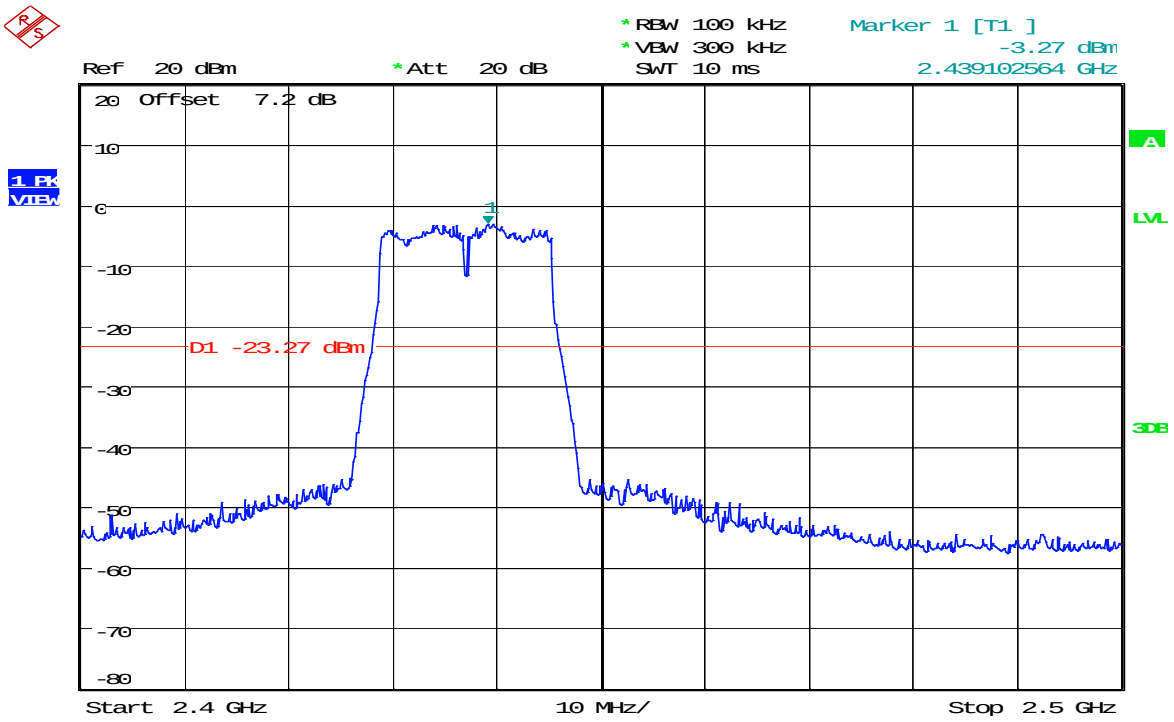
CH Low

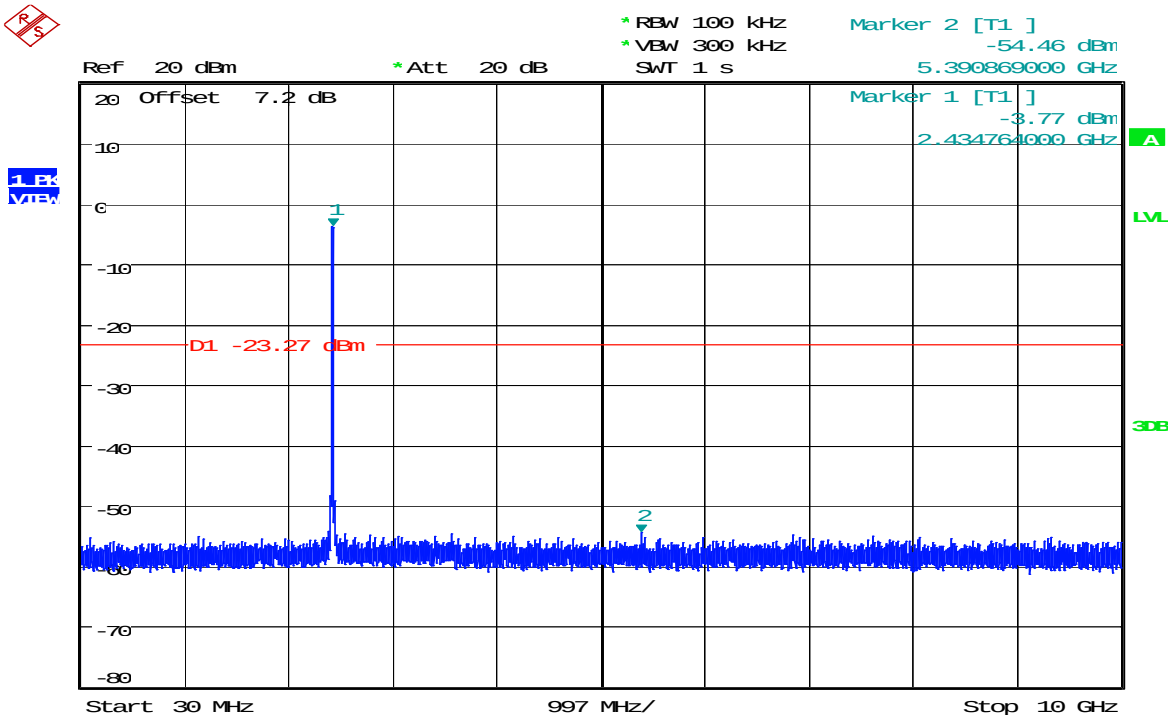


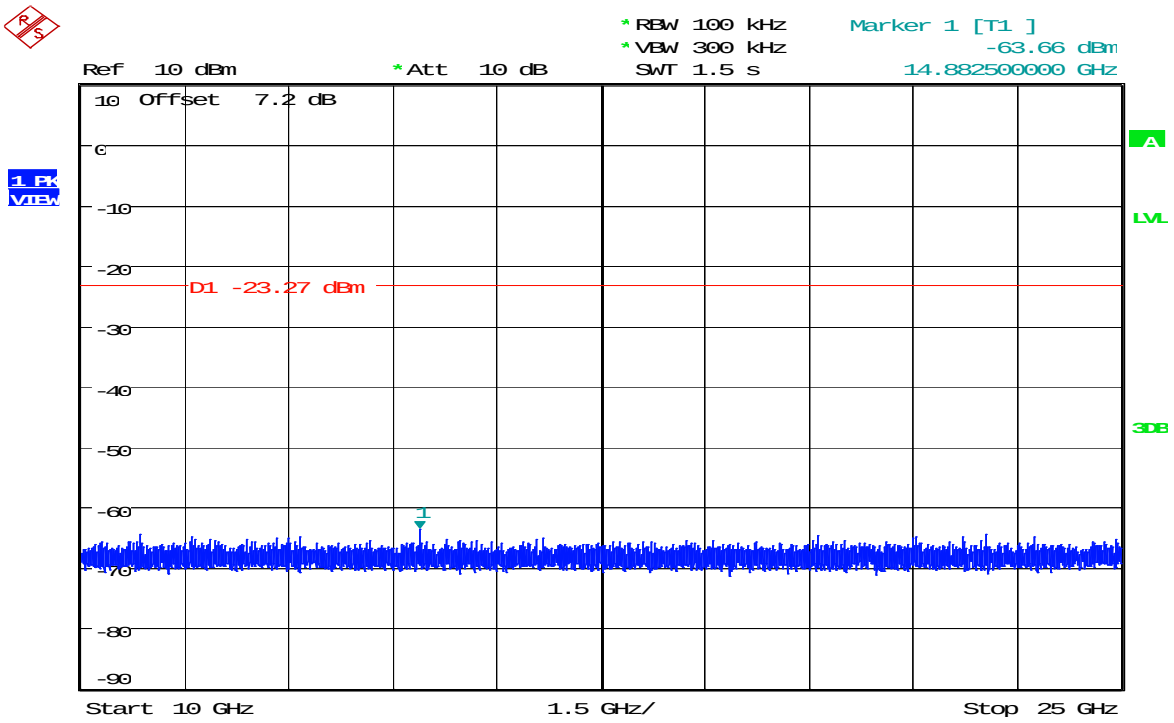



RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.42 dBm
24.821500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -23.67 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

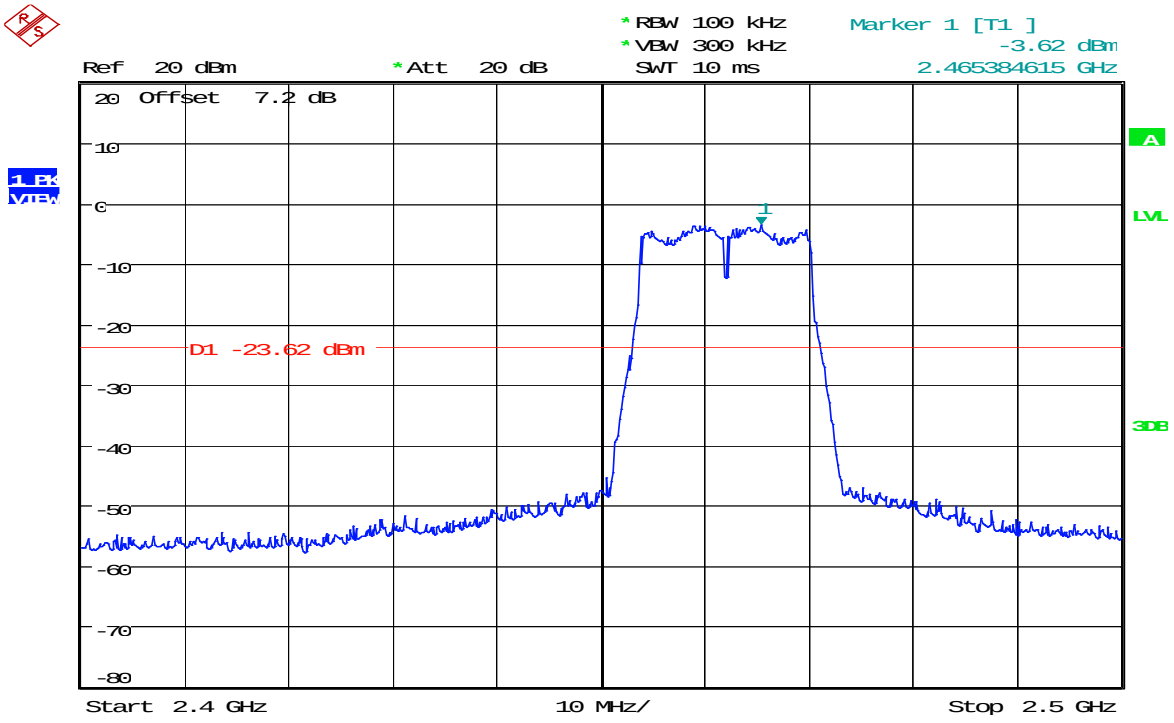
CH Mid

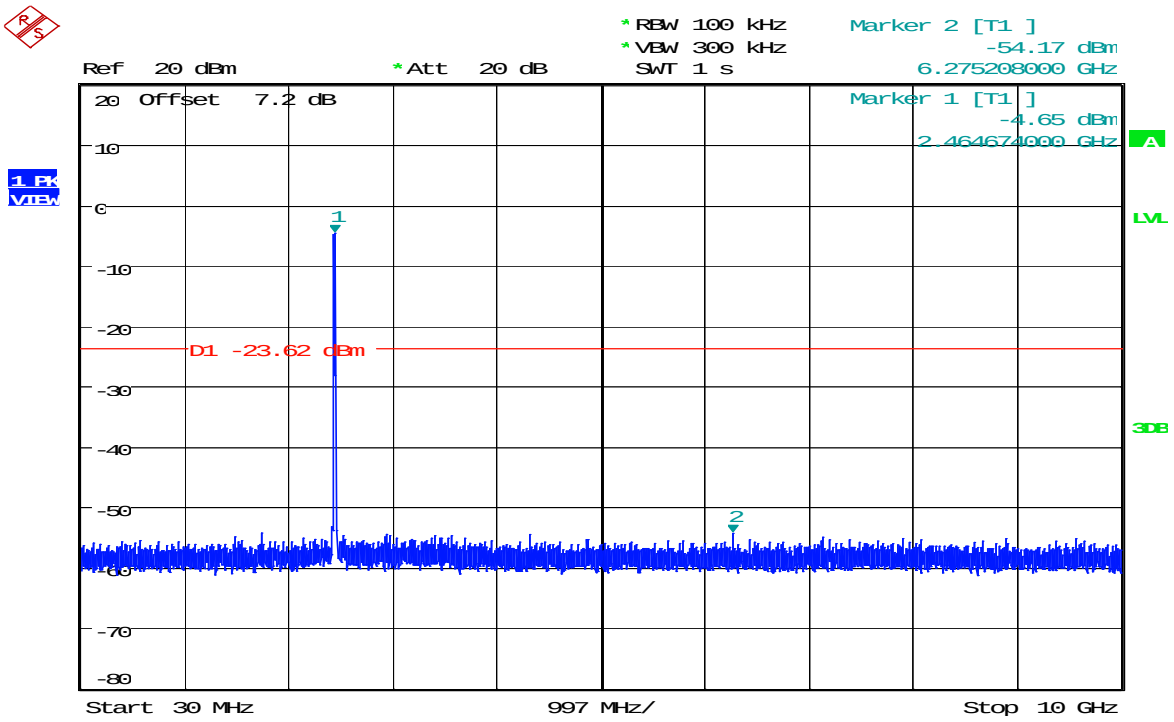

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-3.27 dBm
2.439102564 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -23.27 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

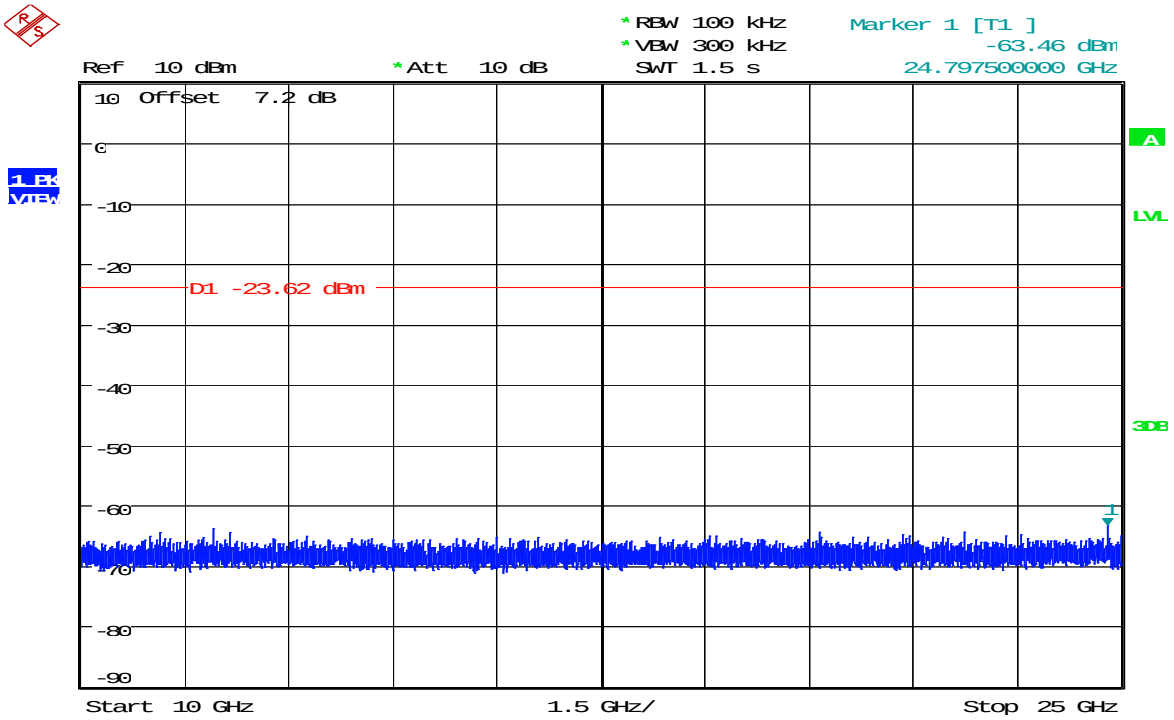

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.46 dBm
5.390869000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
-3.77 dBm
2.434764000 GHz
D1 -23.27 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.66 dBm
14.882500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -23.27 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

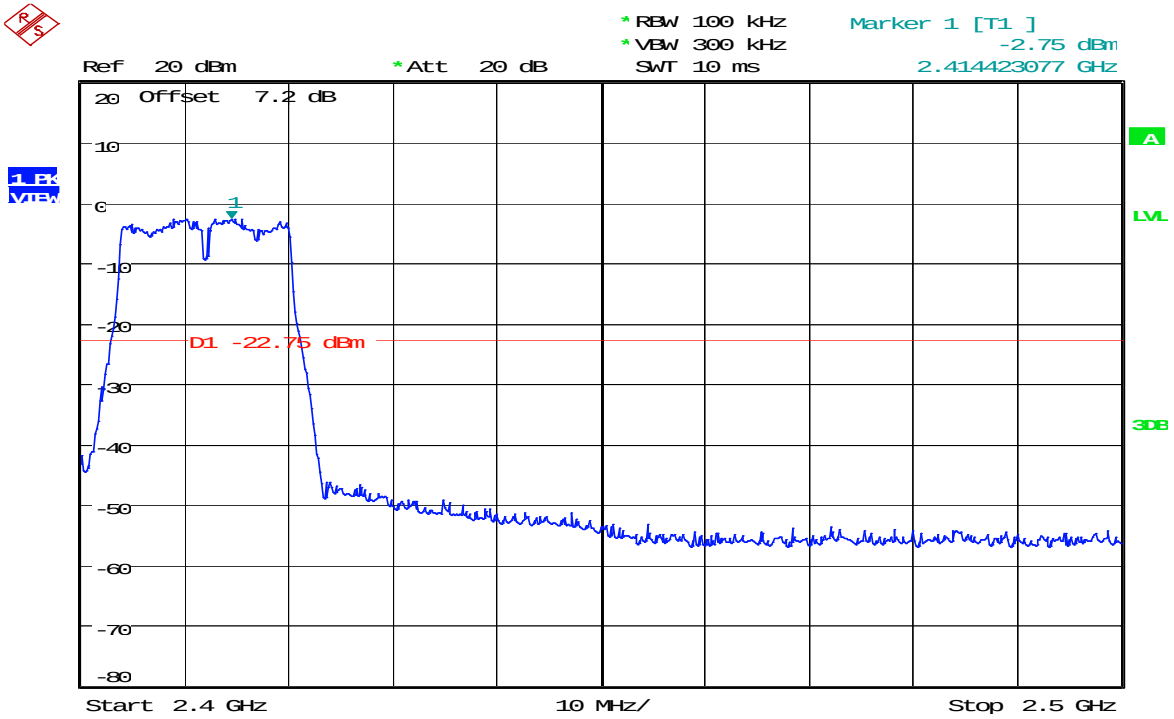

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-3.62 dBm
2.465384615 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -23.62 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

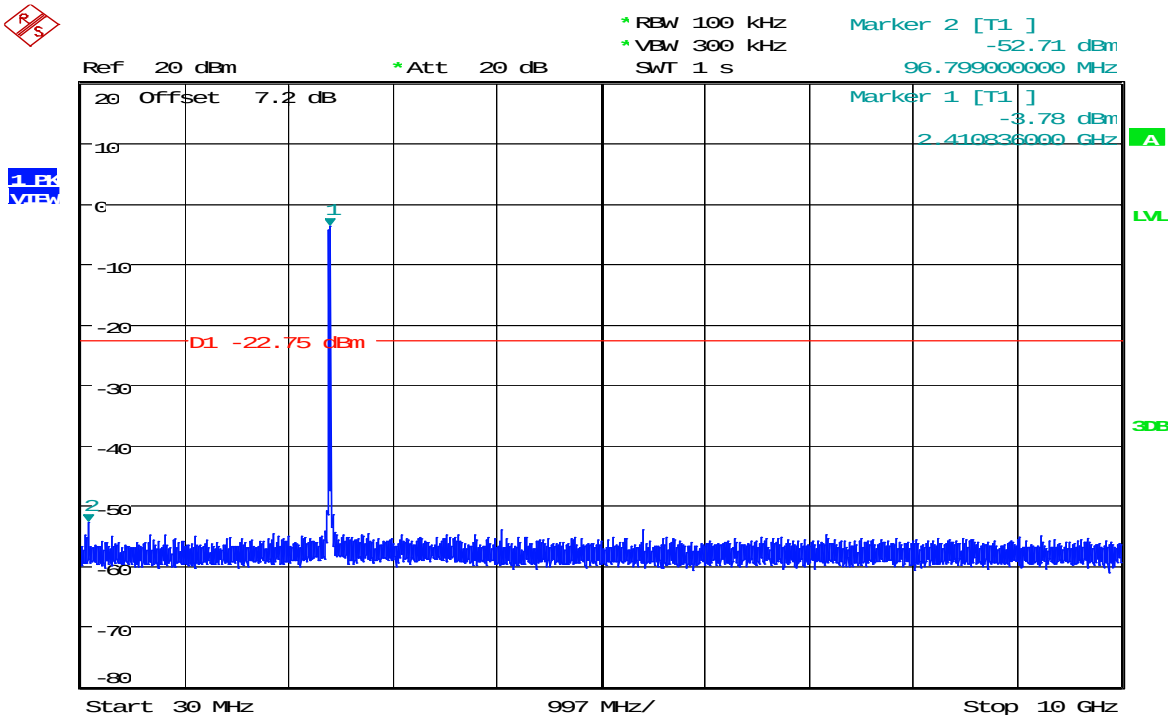

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.17 dBm
6.275208000 GHz
Marker 1 [T1]
-4.65 dBm
2.464674000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -23.62 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

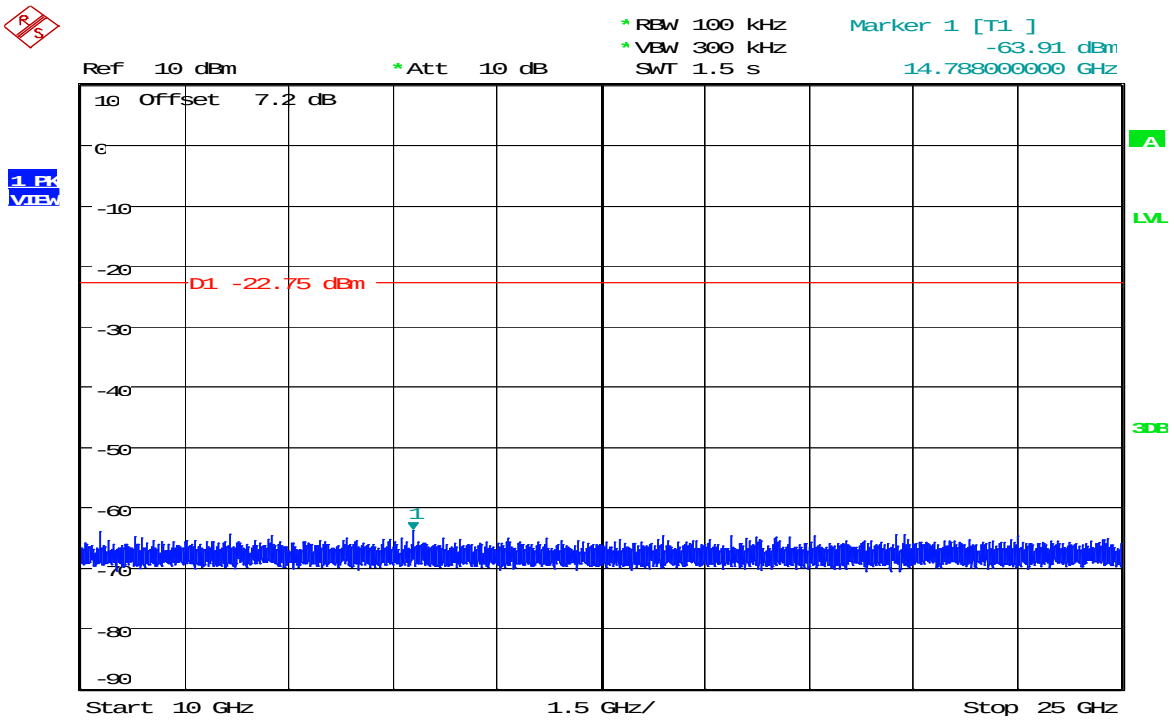


IEEE 802.11g mode/Chain 2

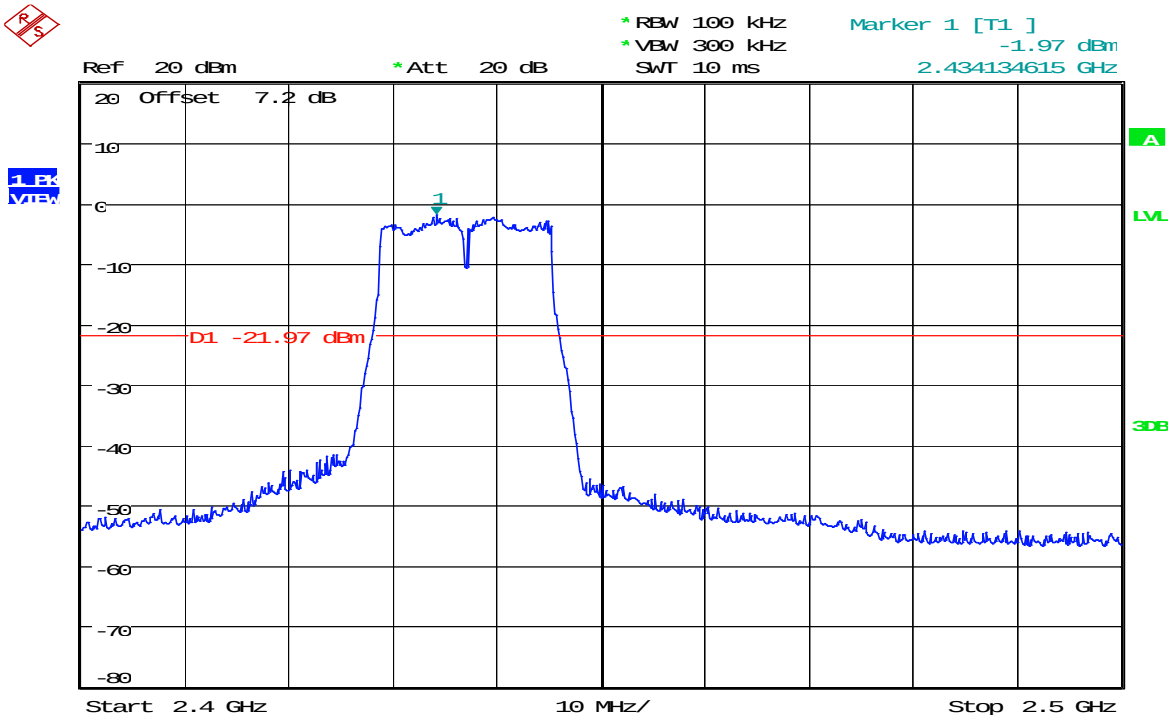
CH Low

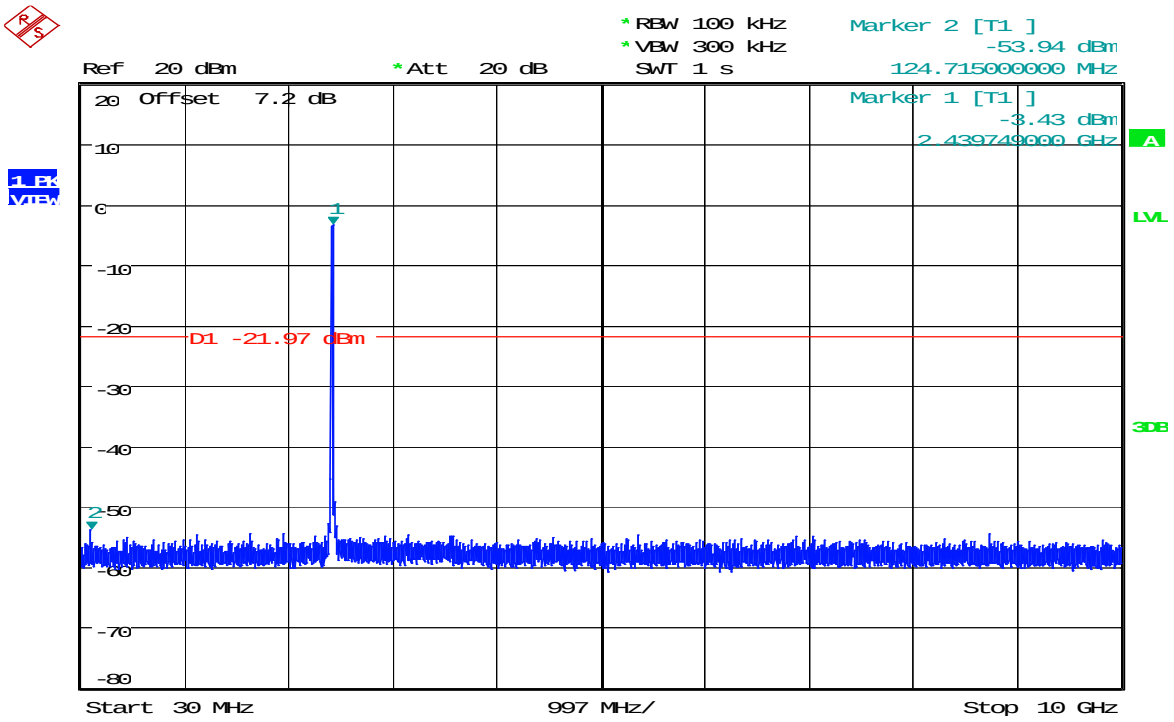


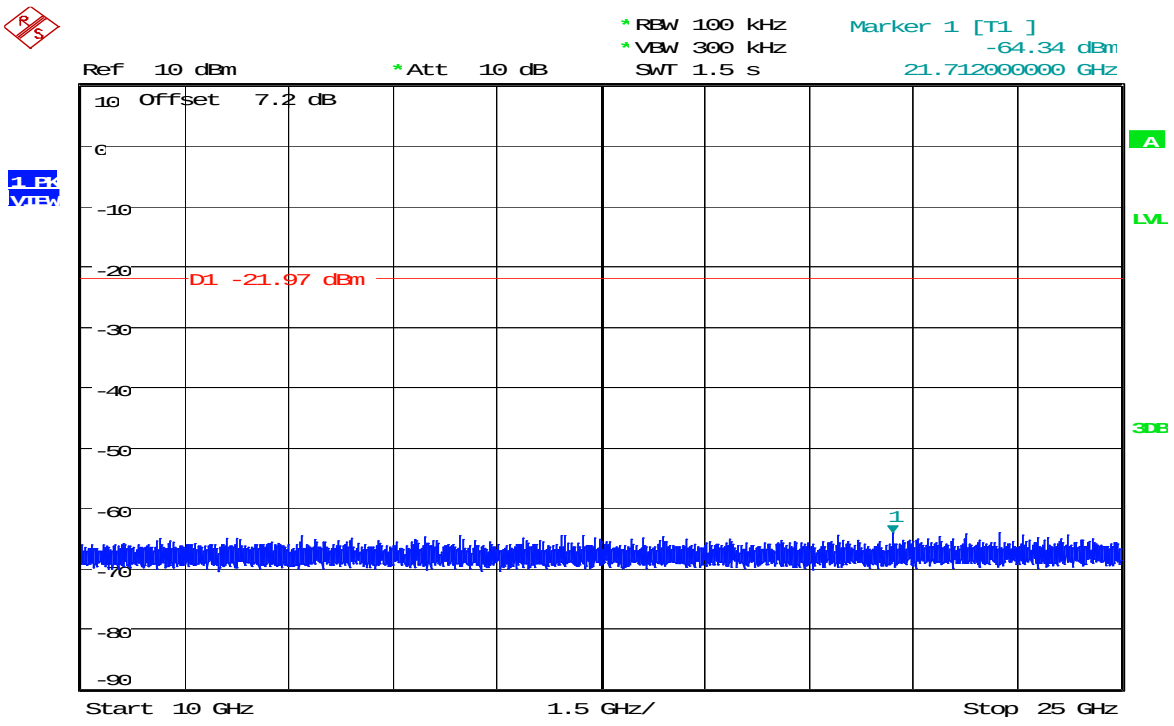

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-52.71 dBm
96.799000000 MHz
Ref 20 dBm
Att 20 dB
20 Offset 7.2 dB
Marker 1 [T1]
-3.78 dBm
2.410836000 GHz
1 PK
VIEW
A
LVL
3DB
D1 -22.75 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.91 dBm
14.788000000 GHz
Ref 10 dBm
Att 10 dB
10 Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -22.75 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

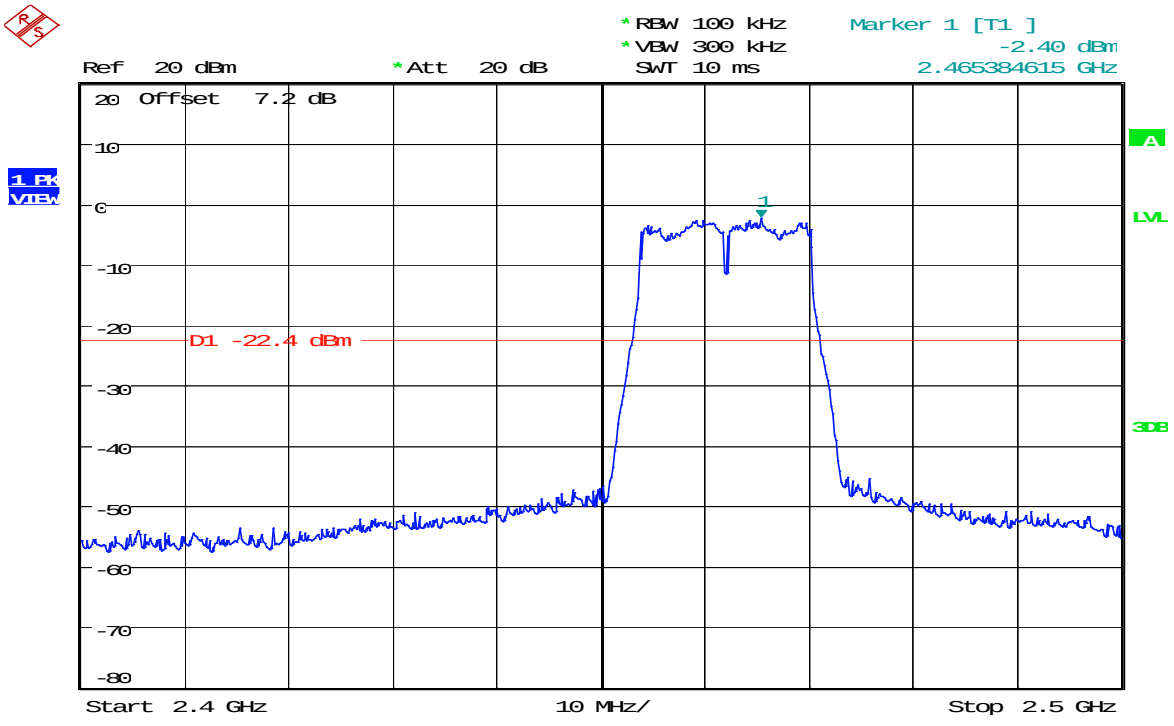
CH Mid

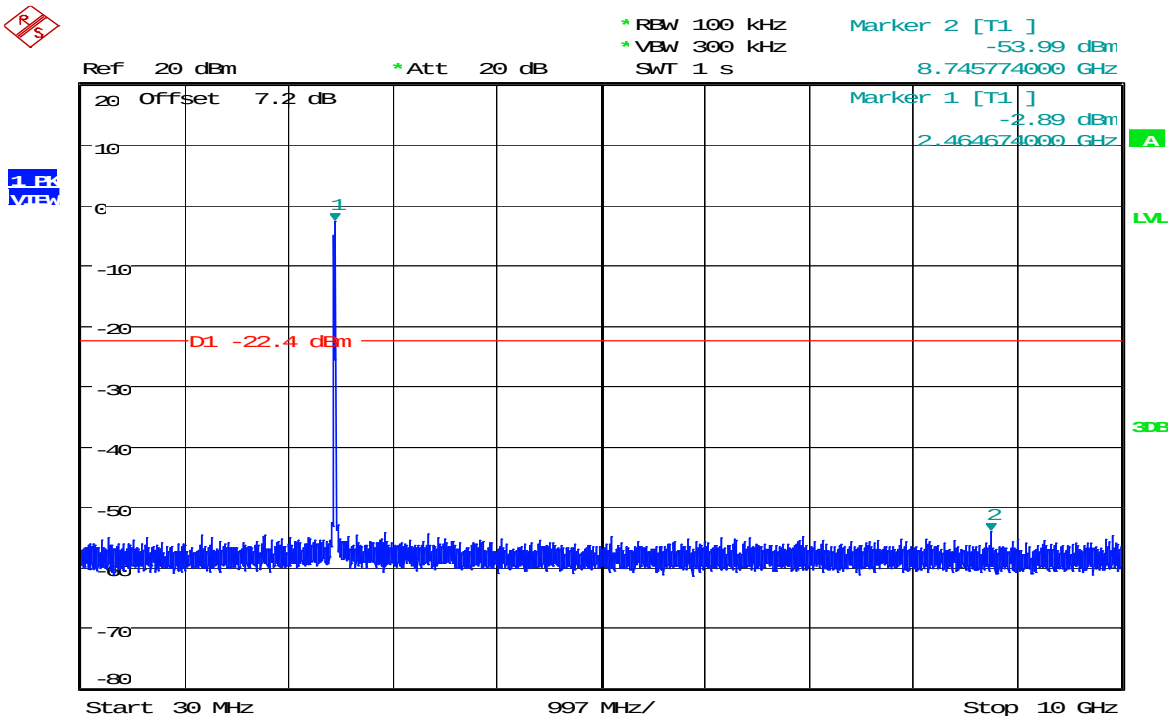

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-1.97 dBm
2.434134615 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -21.97 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

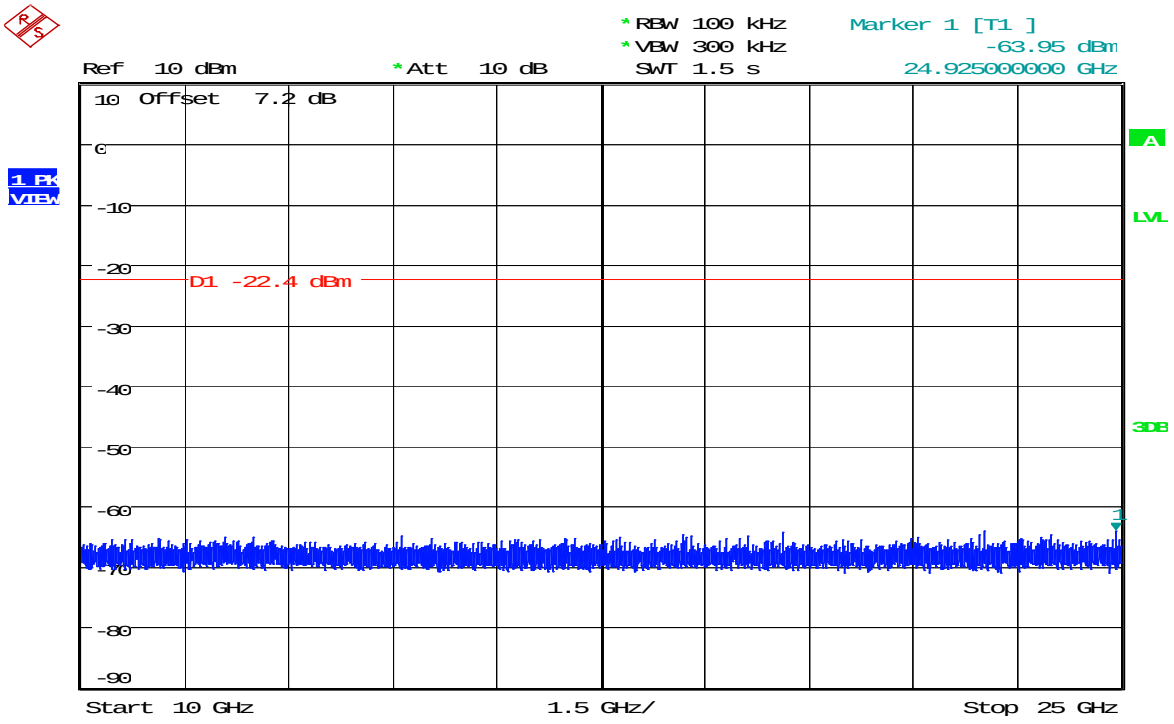

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-53.94 dBm
124.715000000 MHz
Marker 1 [T1]
-3.43 dBm
2.439749000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -21.97 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.34 dBm
21.712000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -21.97 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

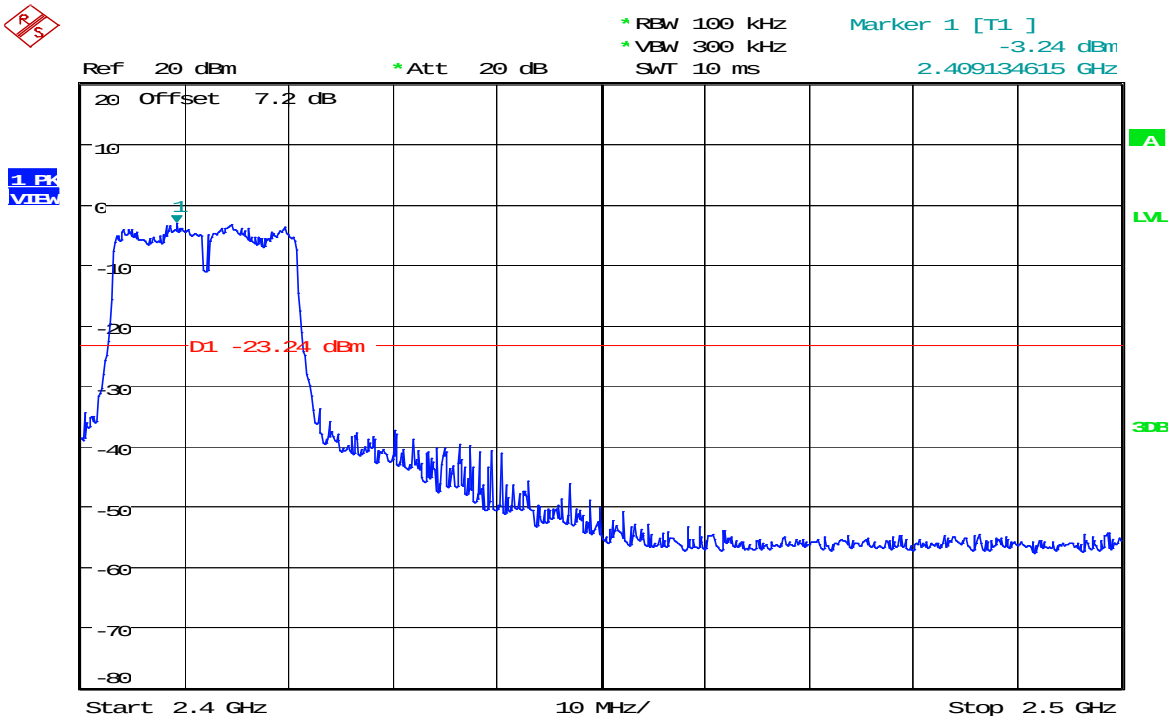

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-2.40 dBm
2.465384615 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -22.4 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

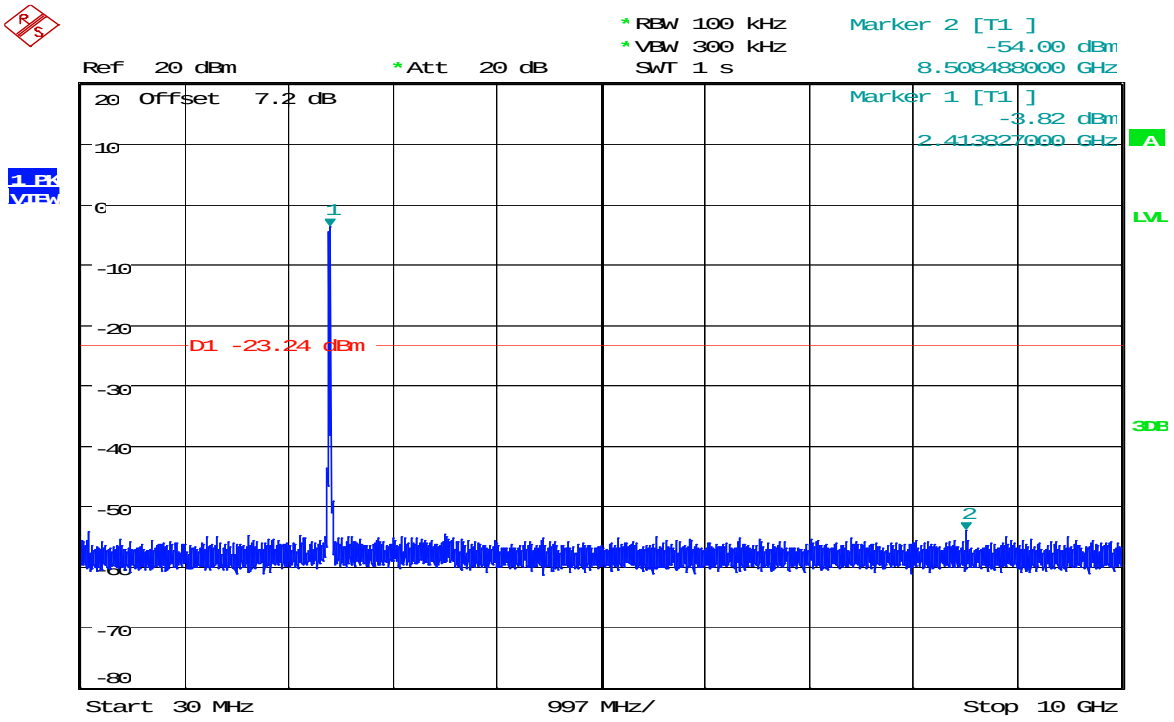

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-53.99 dBm
8.745774000 GHz
Marker 1 [T1]
-2.89 dBm
2.464674000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK VIEW
A
LVL
3DB
D1 -22.4 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

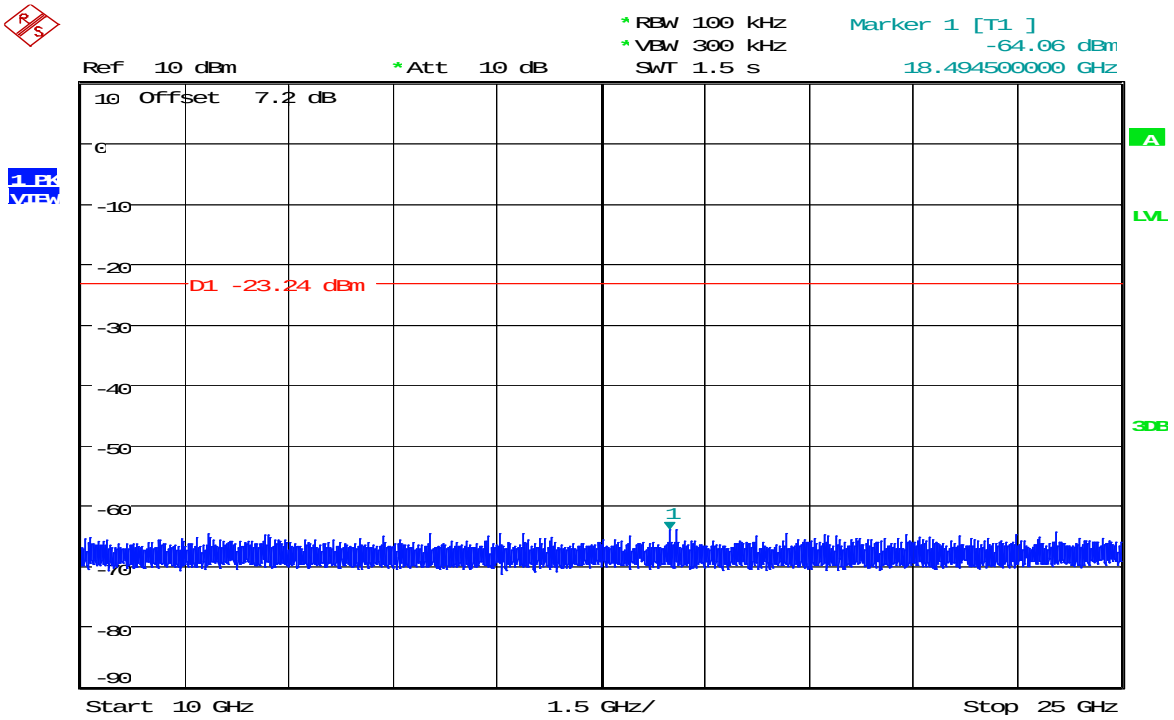

RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.95 dBm
24.925000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK VIEW
A
LVL
3DB
D1 -22.4 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

IEEE 802.11n HT20 mode/Chain 1

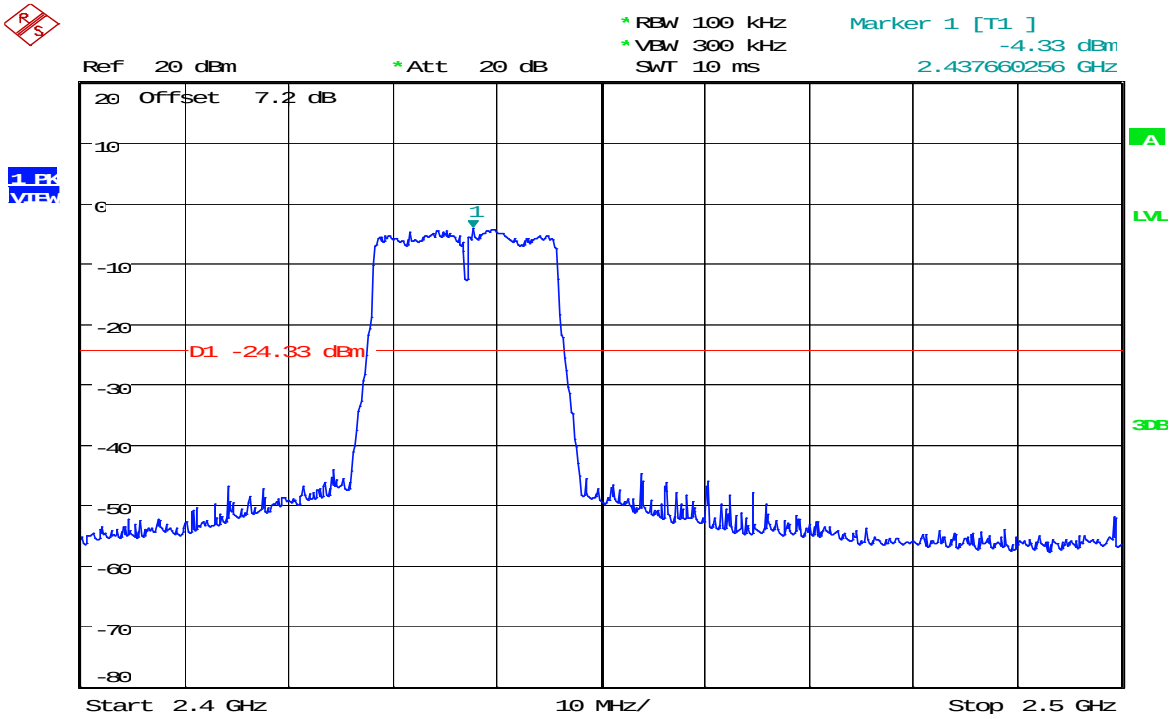
CH Low

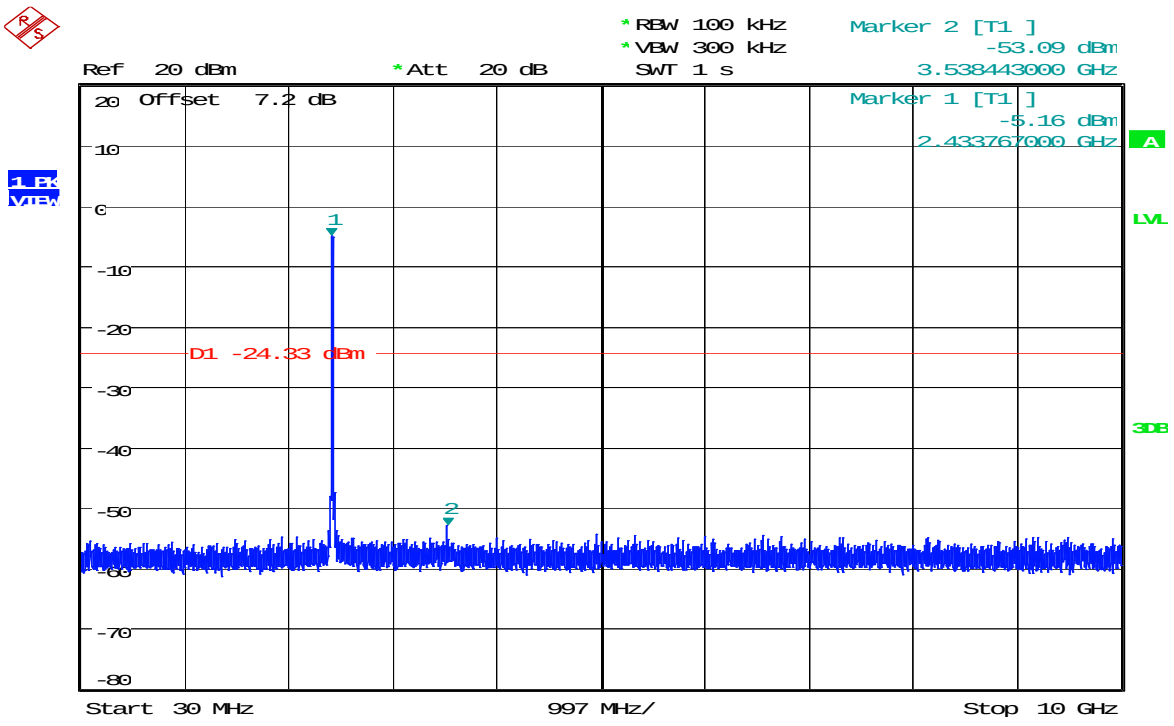


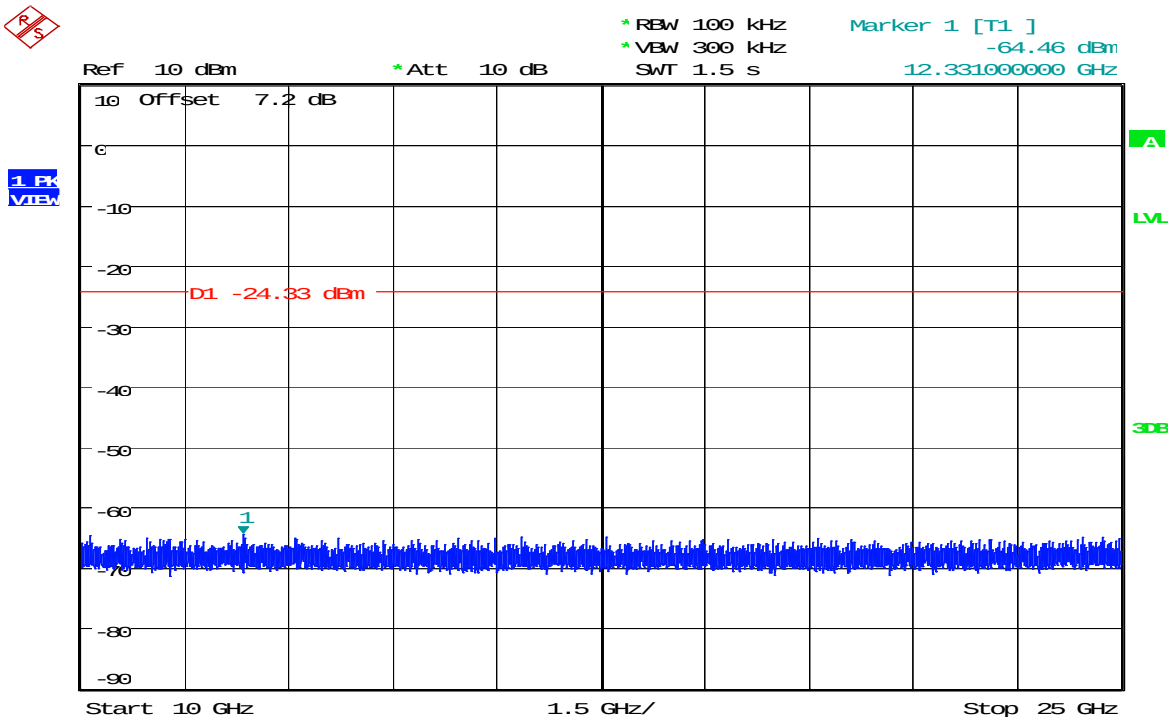



RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.06 dBm
18.494500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -23.24 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

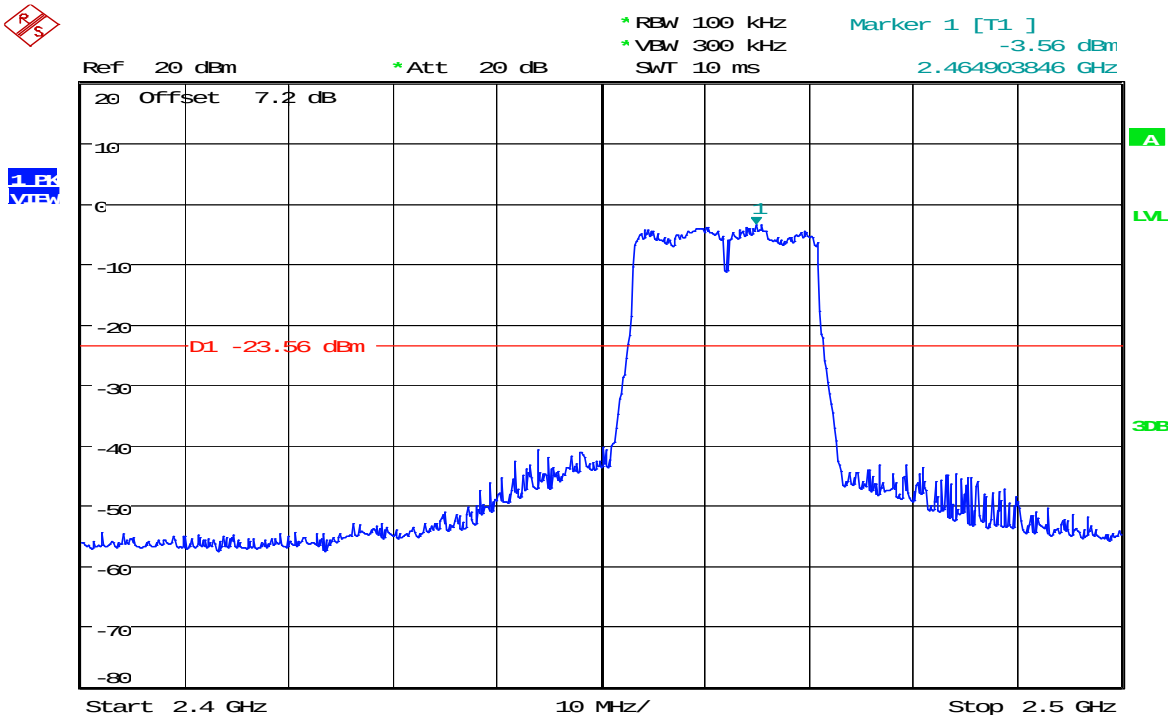
CH Mid

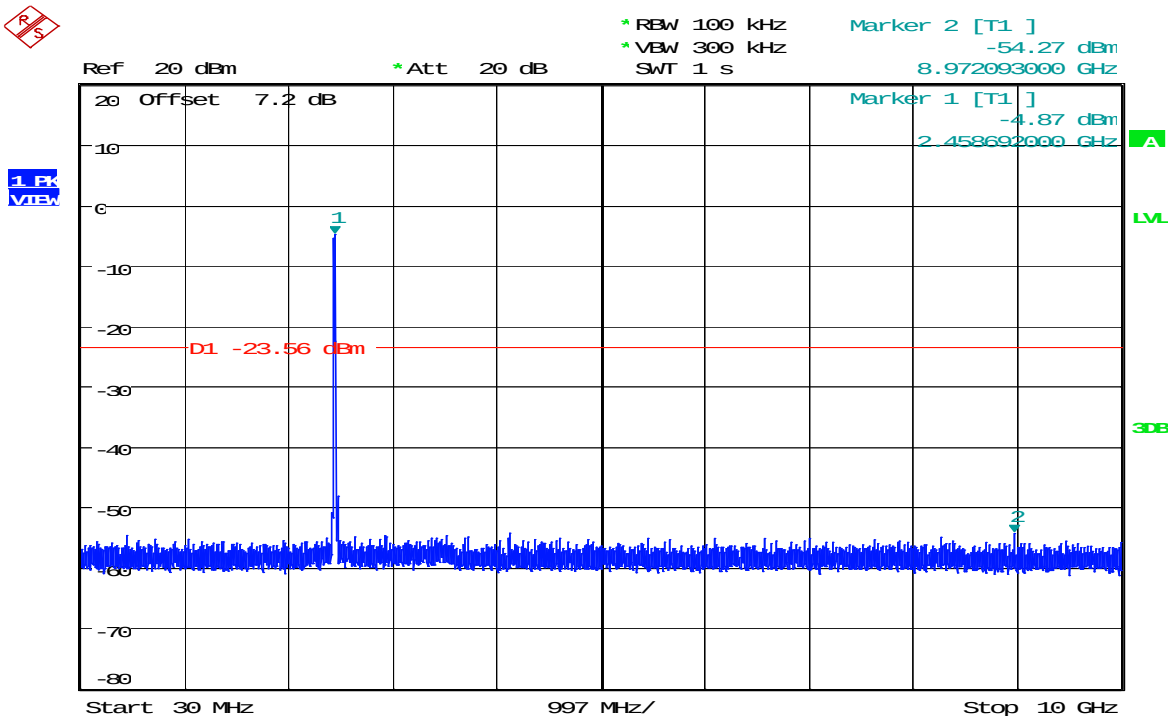

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-4.33 dBm
2.437660256 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -24.33 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

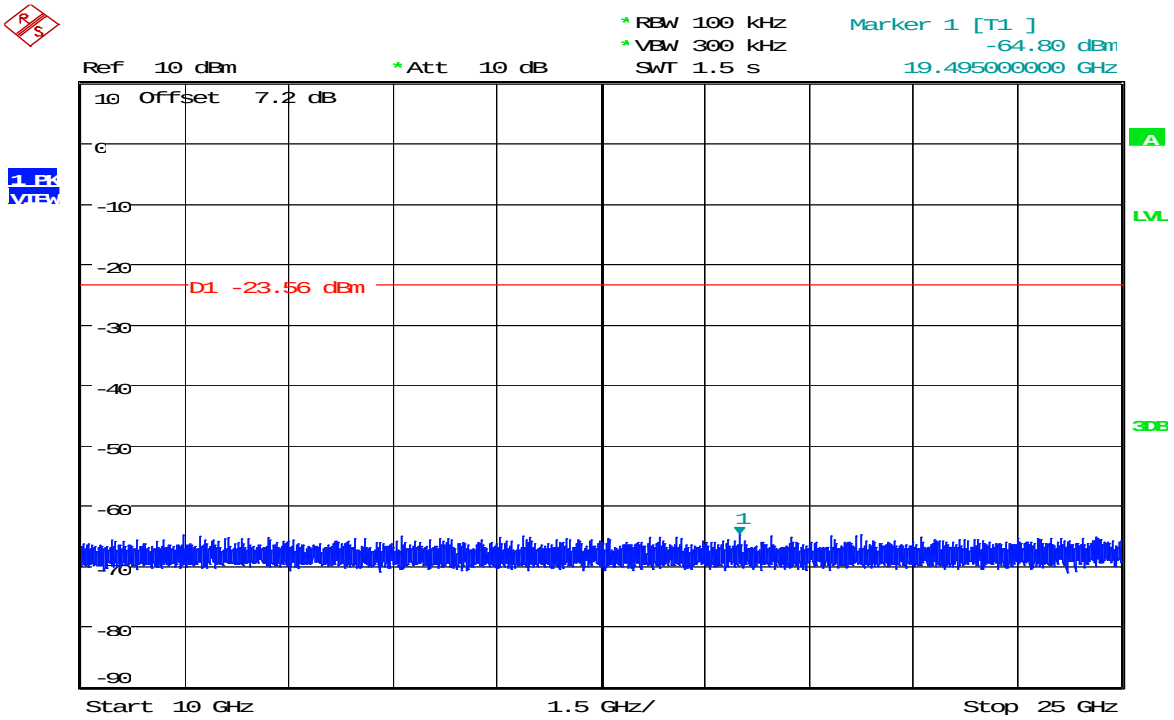

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-53.09 dBm
3.538443000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
-5.16 dBm
2.433767000 GHz
1 PK VIEW
A
LVL
3DB
D1 -24.33 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.46 dBm
12.331000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK VIEW
A
LVL
3DB
D1 -24.33 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

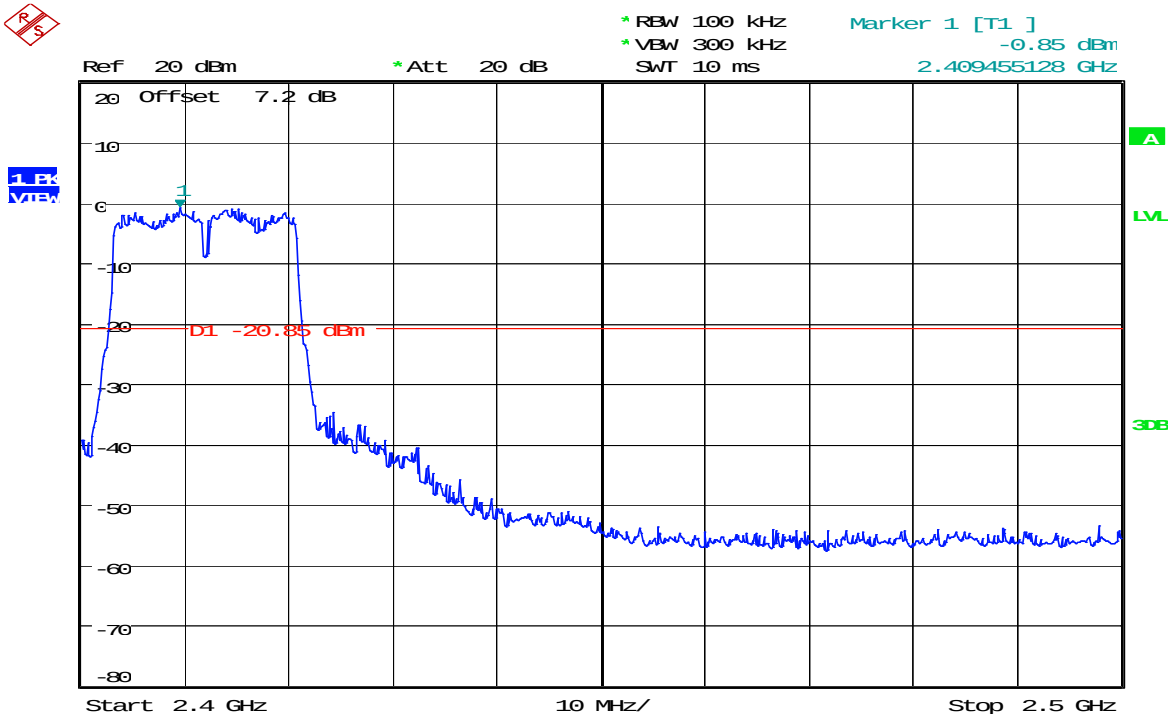

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-3.56 dBm
2.464903846 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -23.56 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

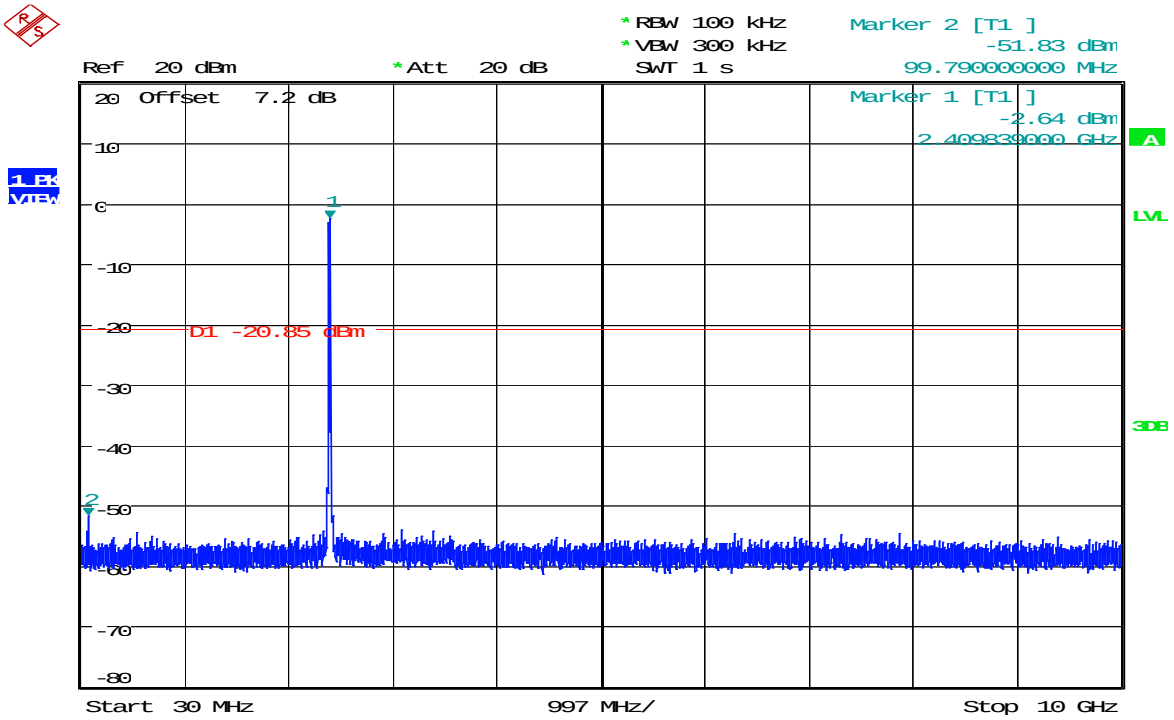

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.27 dBm
8.972093000 GHz
Marker 1 [T1]
-4.87 dBm
2.458692000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -23.56 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

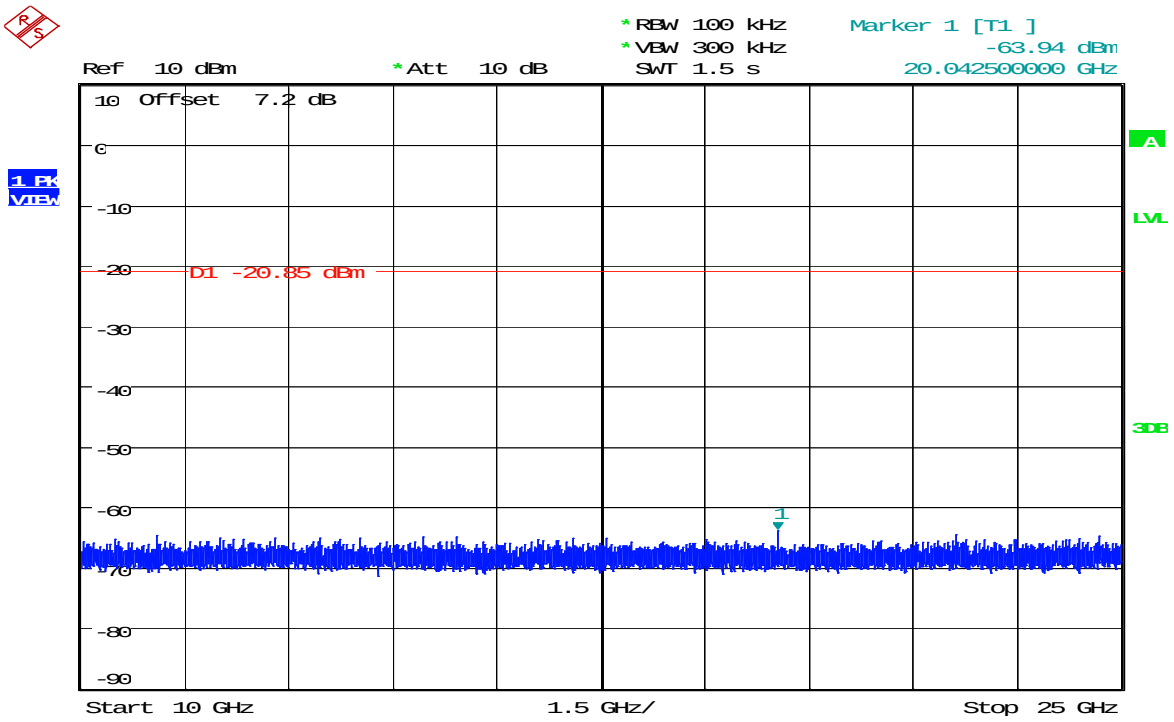


IEEE 802.11n HT20 mode/Chain 2

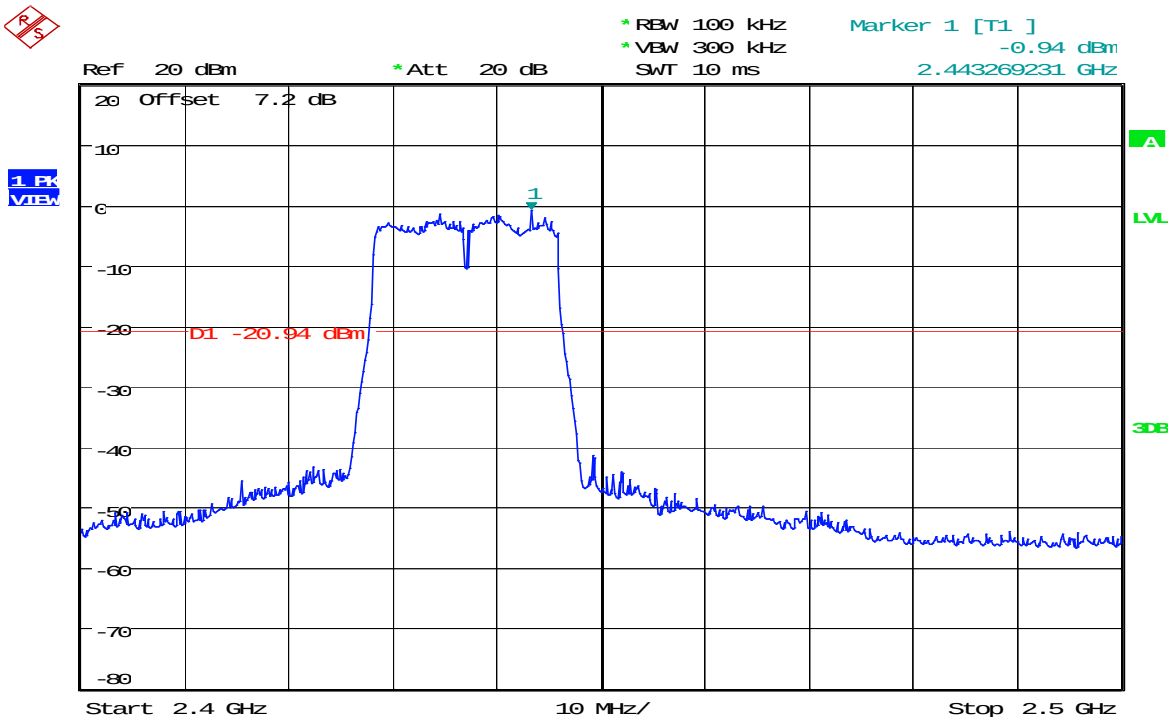
CH Low

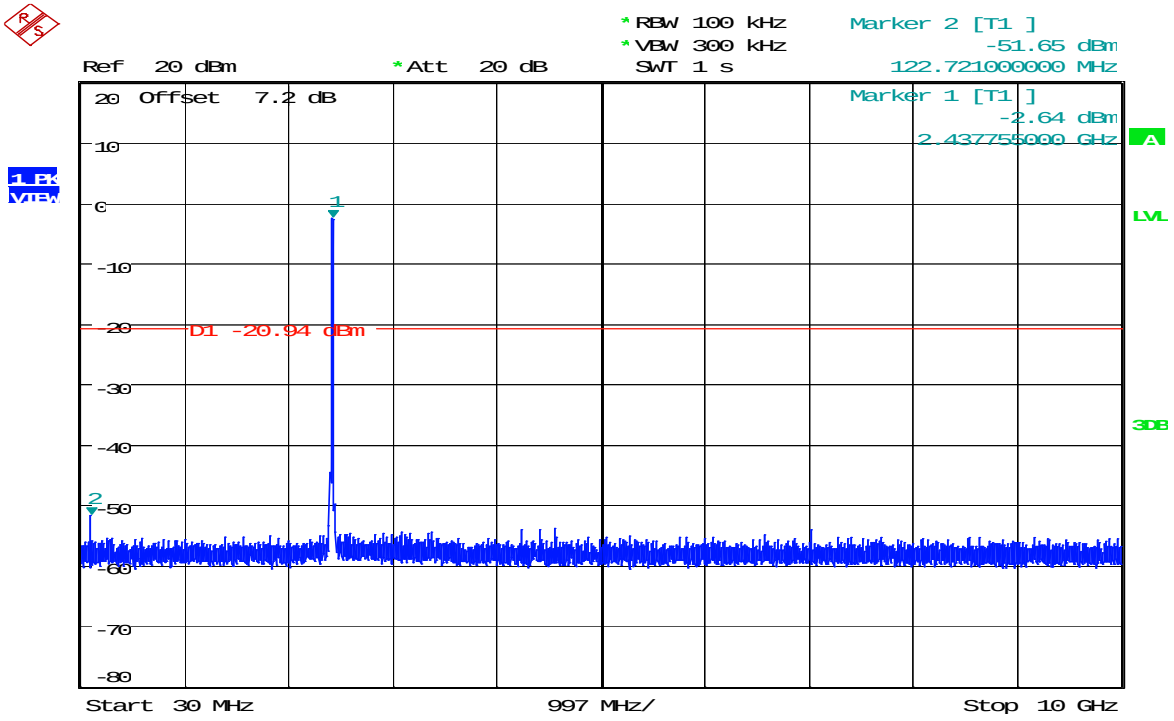


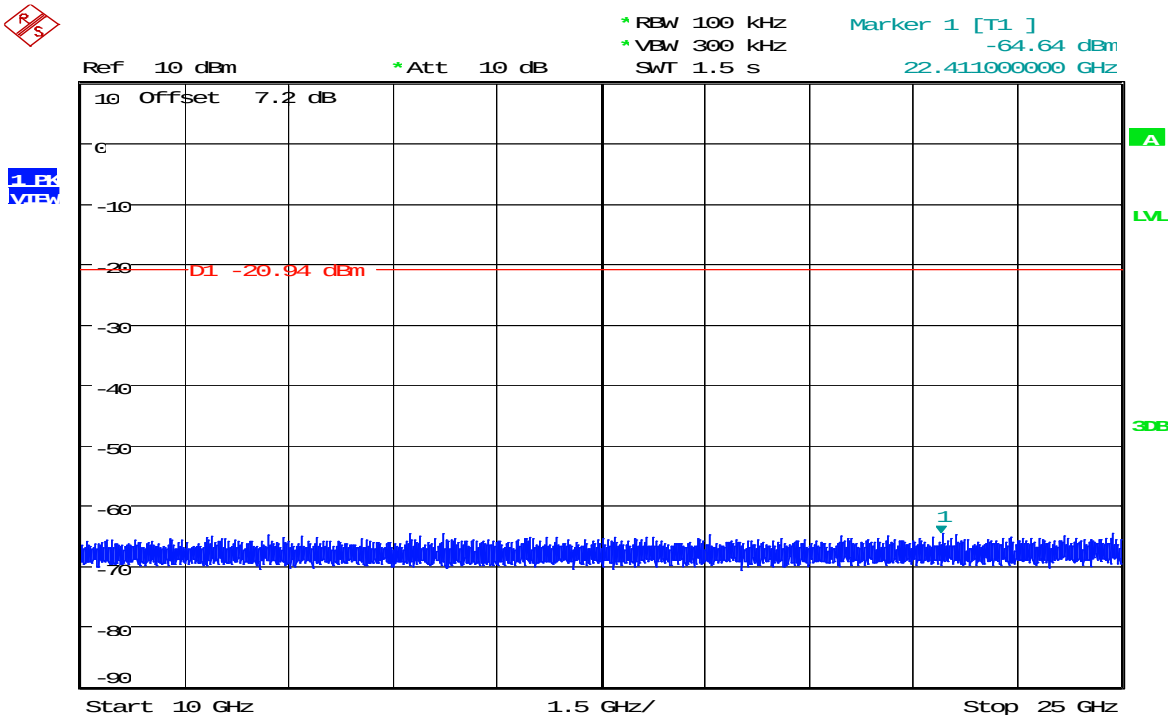

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-51.83 dBm
99.790000000 MHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
-2.64 dBm
2.409839000 GHz
1 PK
VIEW
A
LVL
3DB
D1 -20.85 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.94 dBm
20.042500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -20.85 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

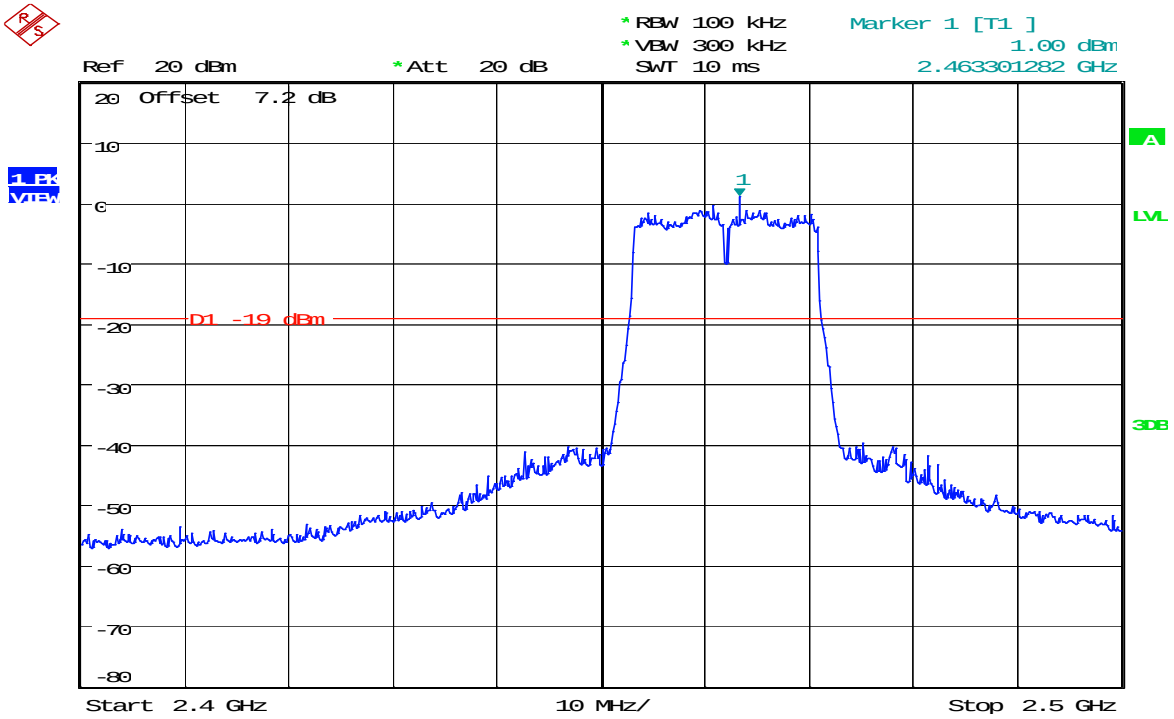
CH Mid

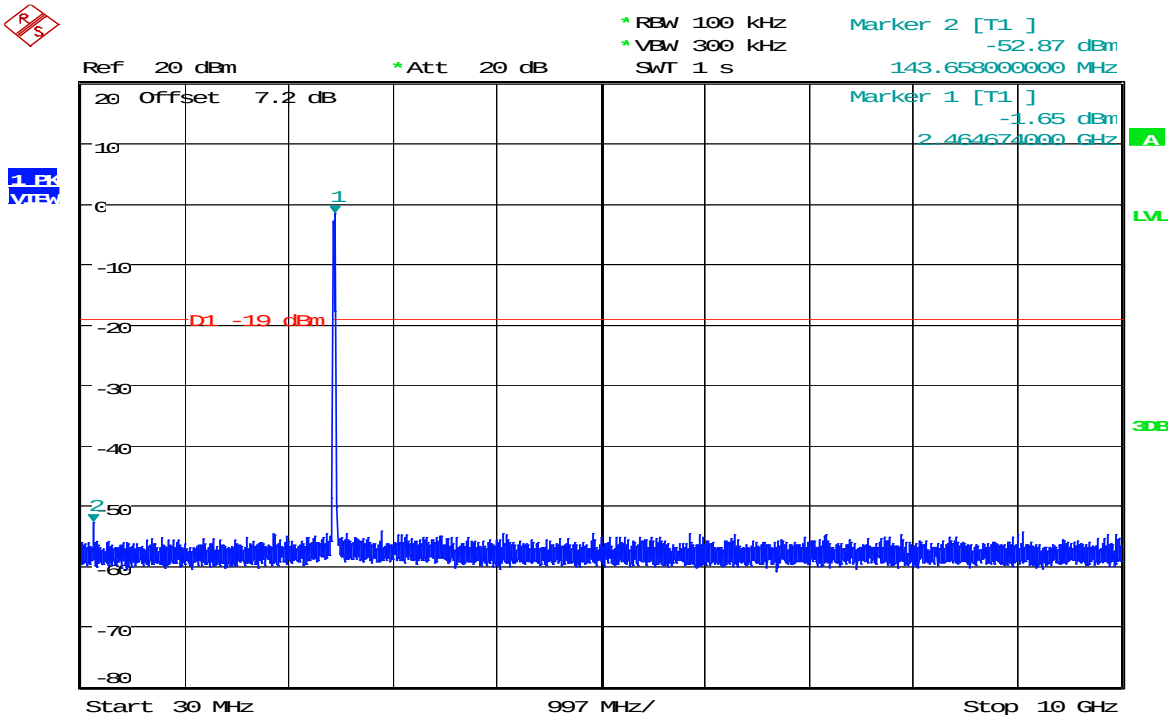

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-0.94 dBm
2.443269231 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK VIEW
D1 -20.94 dBm
A
LVL
3DB
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

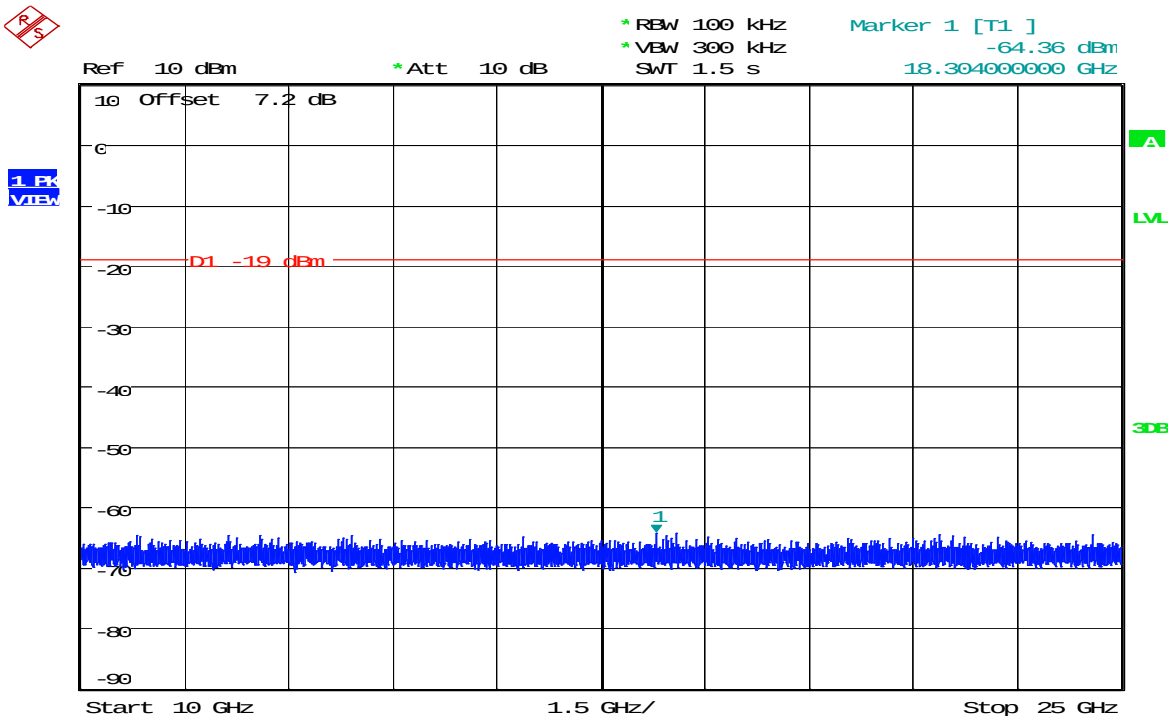

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-51.65 dBm
122.721000000 MHz
Marker 1 [T1]
-2.64 dBm
2.437755000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK VIEW
D1 -20.94 dBm
A
LVL
3DB
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.64 dBm
22.411000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -20.94 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

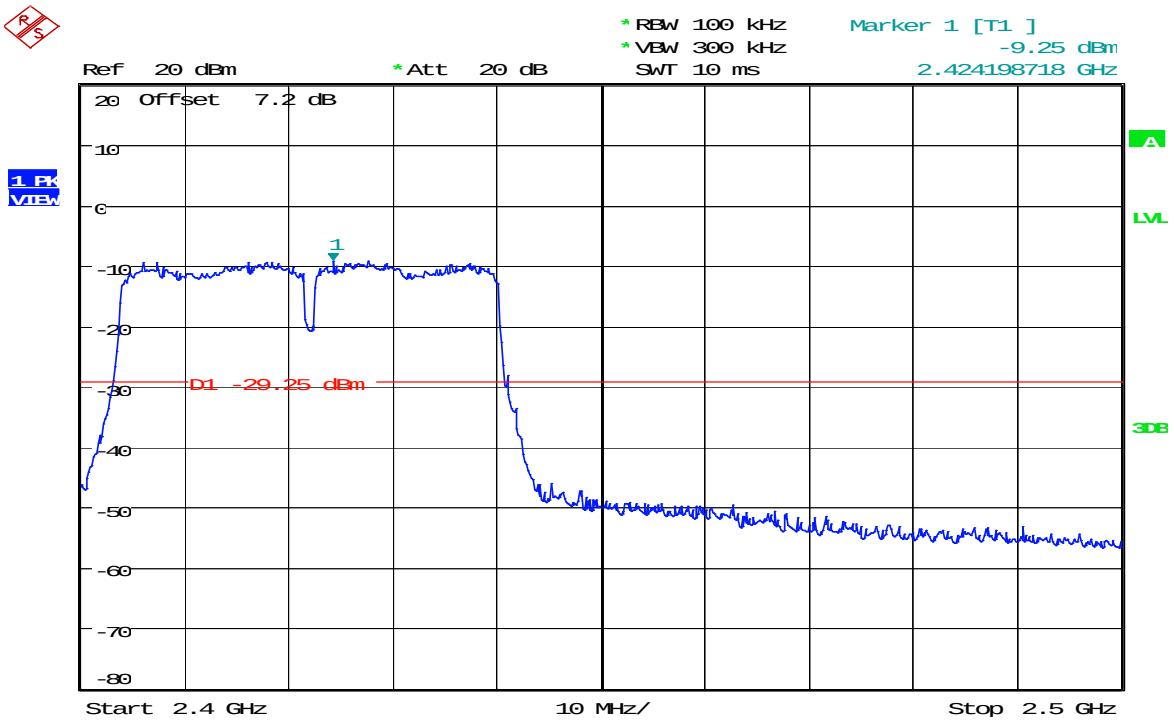

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
1.00 dBm
2.463301282 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -19 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

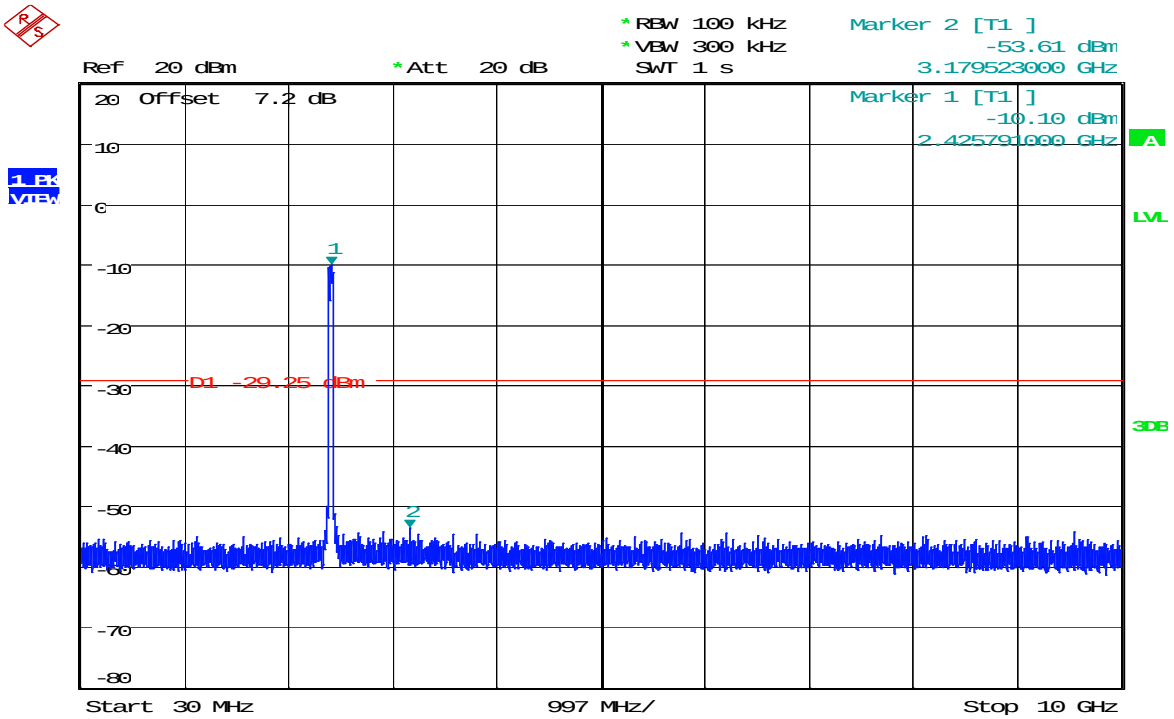

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-52.87 dBm
143.658000000 MHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
-1.65 dBm
2.464674000 GHz
1 PK
VIEW
A
LVL
3DB
D1 -19 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

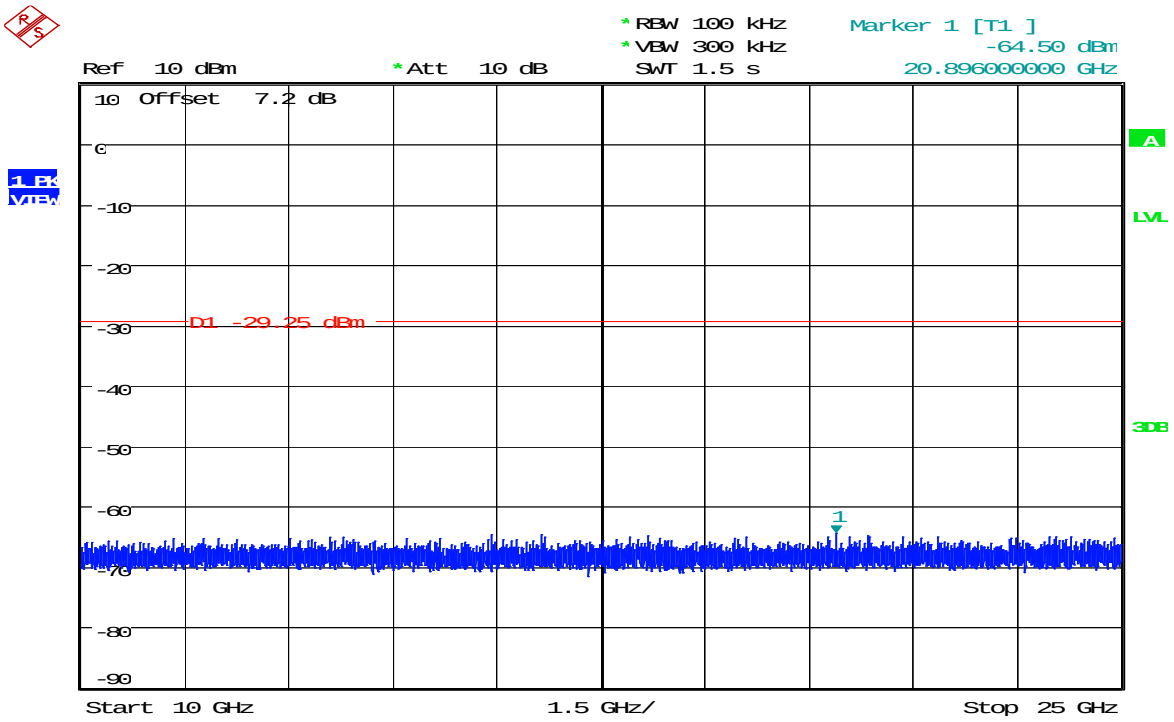

RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.36 dBm
18.304000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -19 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

IEEE 802.11n HT40 mode/Chain 1

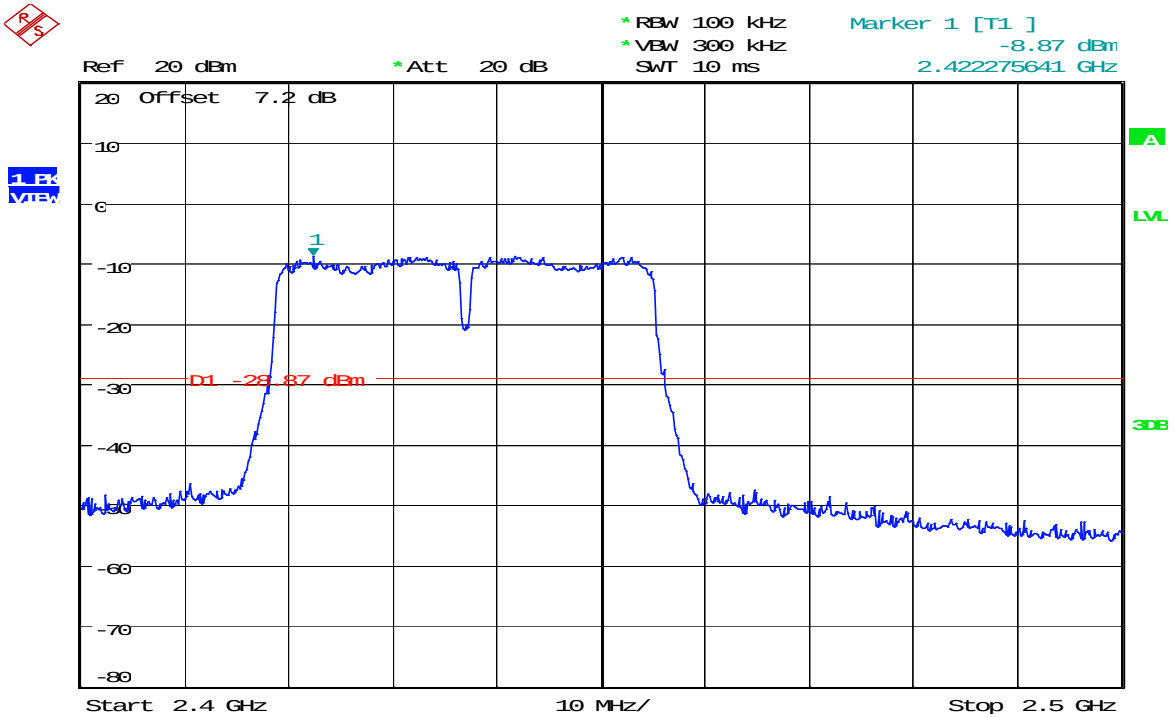
CH Low

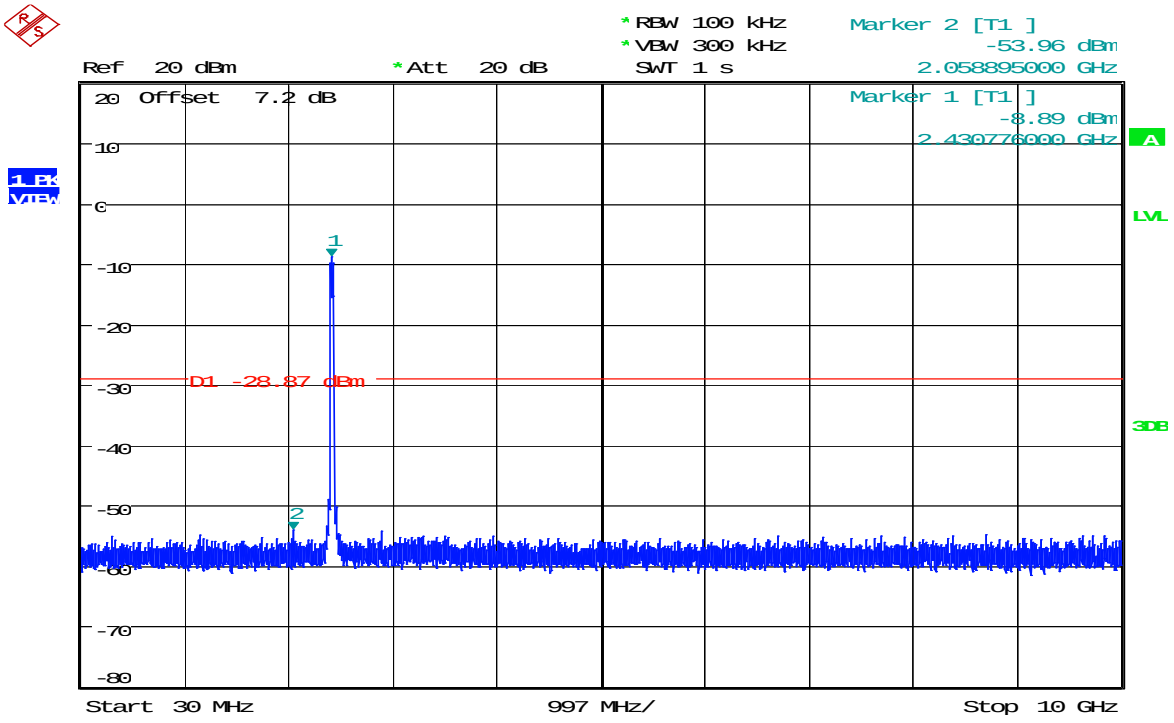


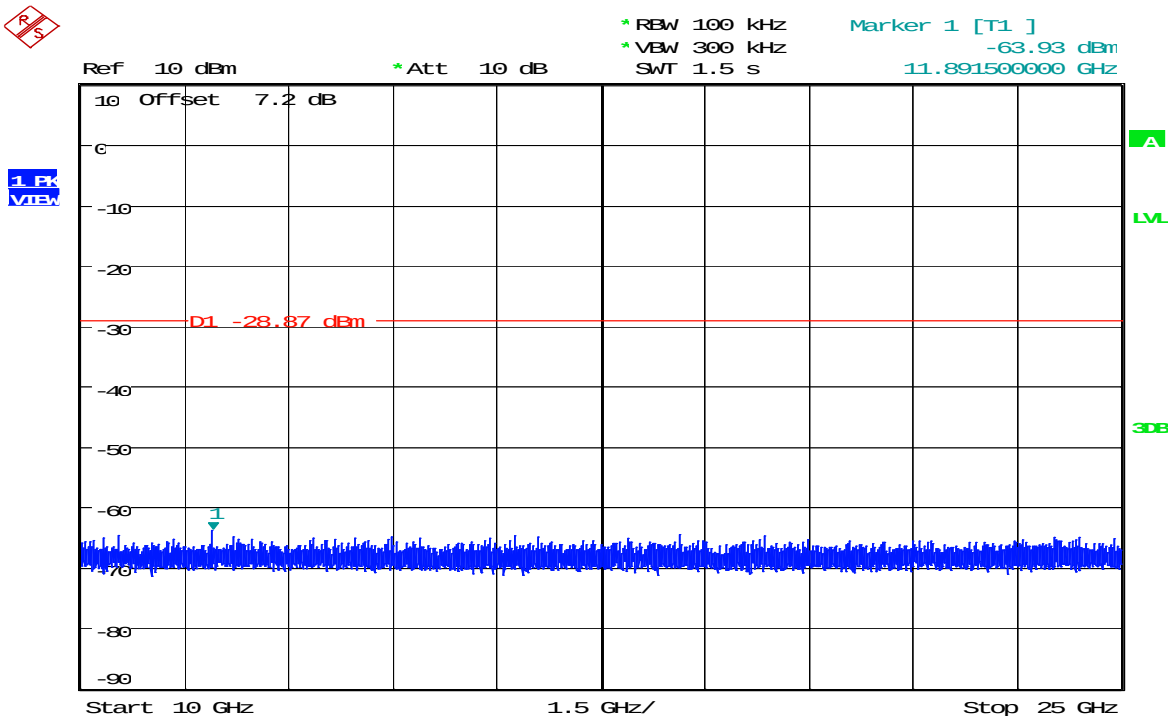



RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-64.50 dBm
20.896000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -29.25 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

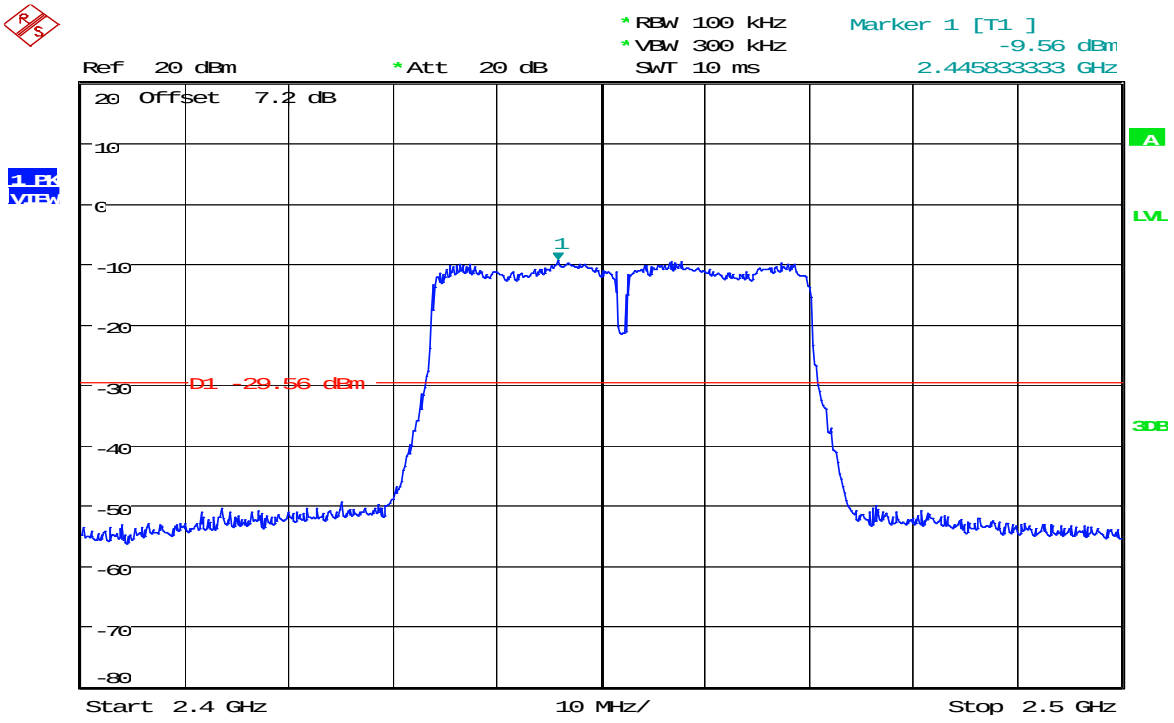
CH Mid

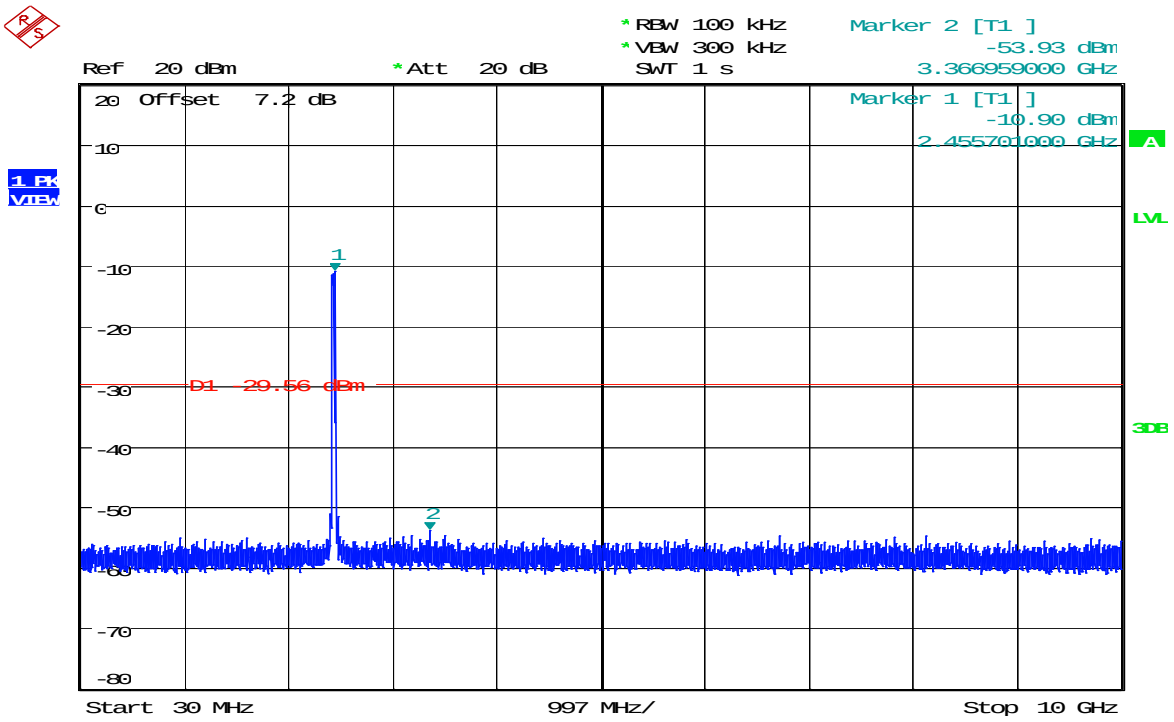

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-8.87 dBm
2.422275641 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -28.87 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

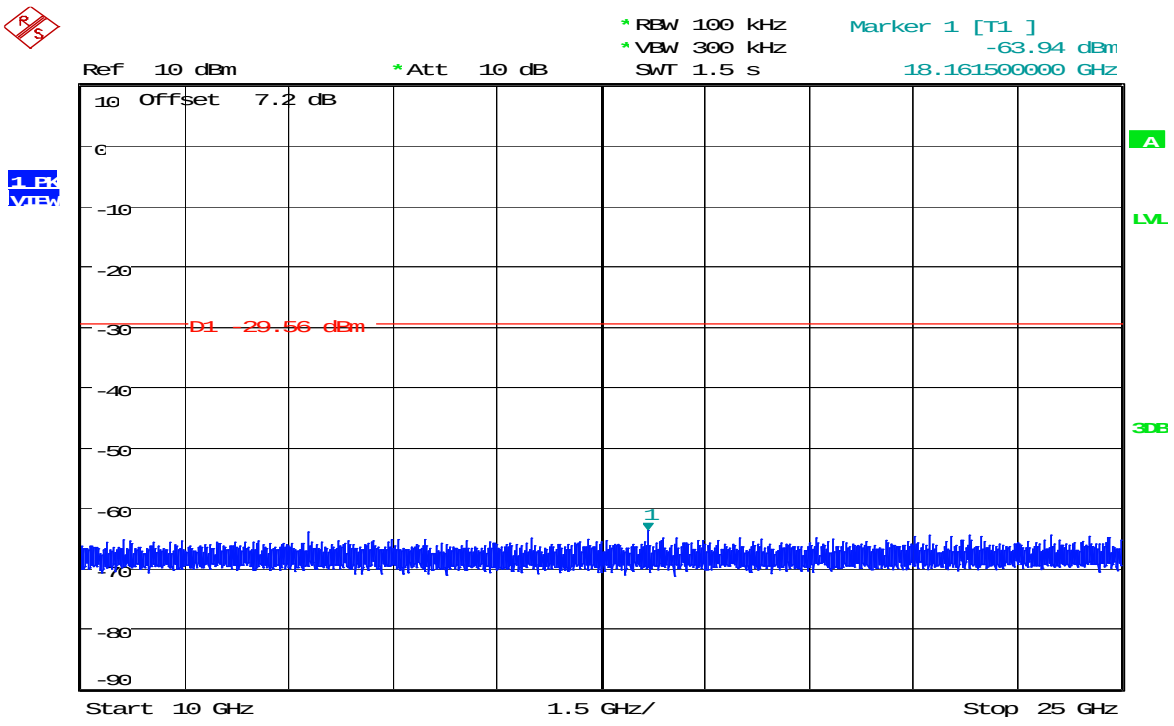

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-53.96 dBm
2.058895000 GHz
Marker 1 [T1]
-8.89 dBm
2.430776000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -28.87 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.93 dBm
11.891500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -28.87 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High

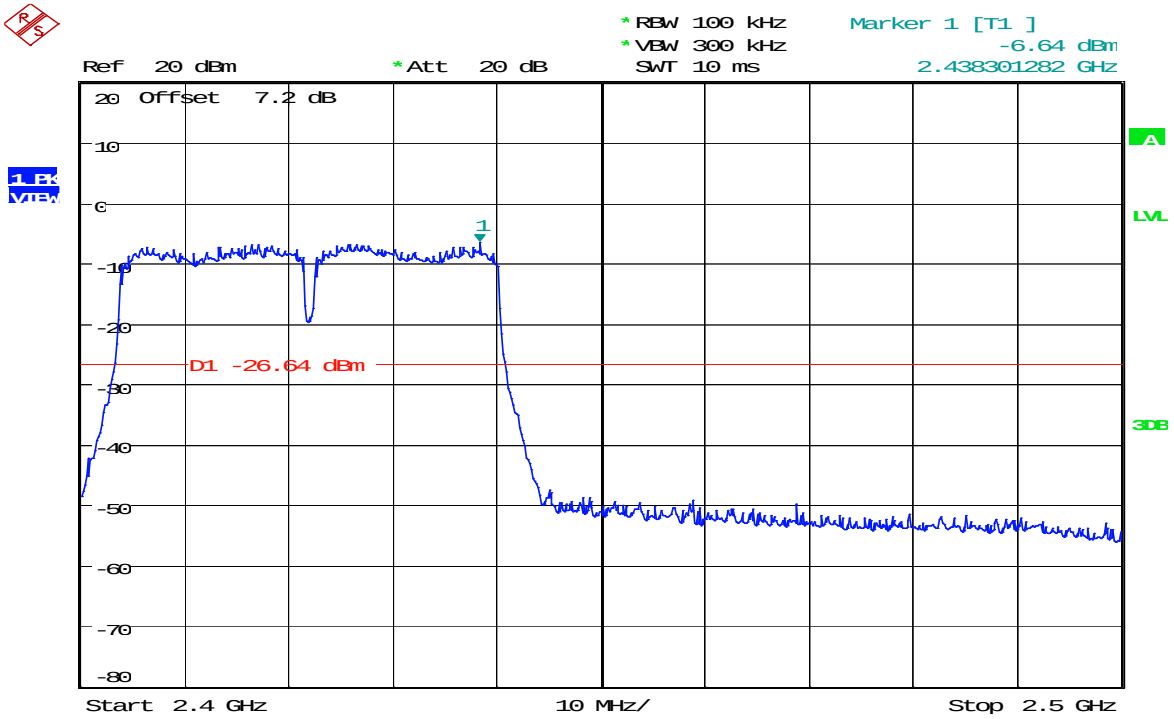

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-9.56 dBm
2.445833333 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -29.56 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

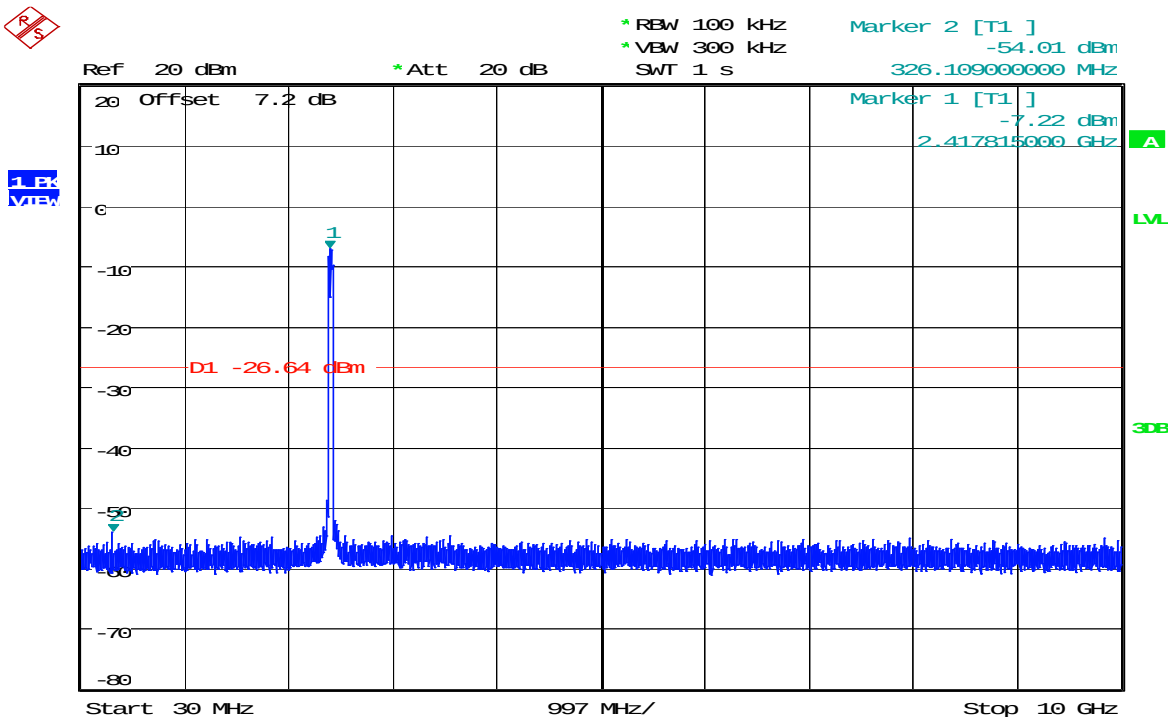

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-53.93 dBm
3.366959000 GHz
Marker 1 [T1]
-10.90 dBm
2.455701000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -29.56 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz

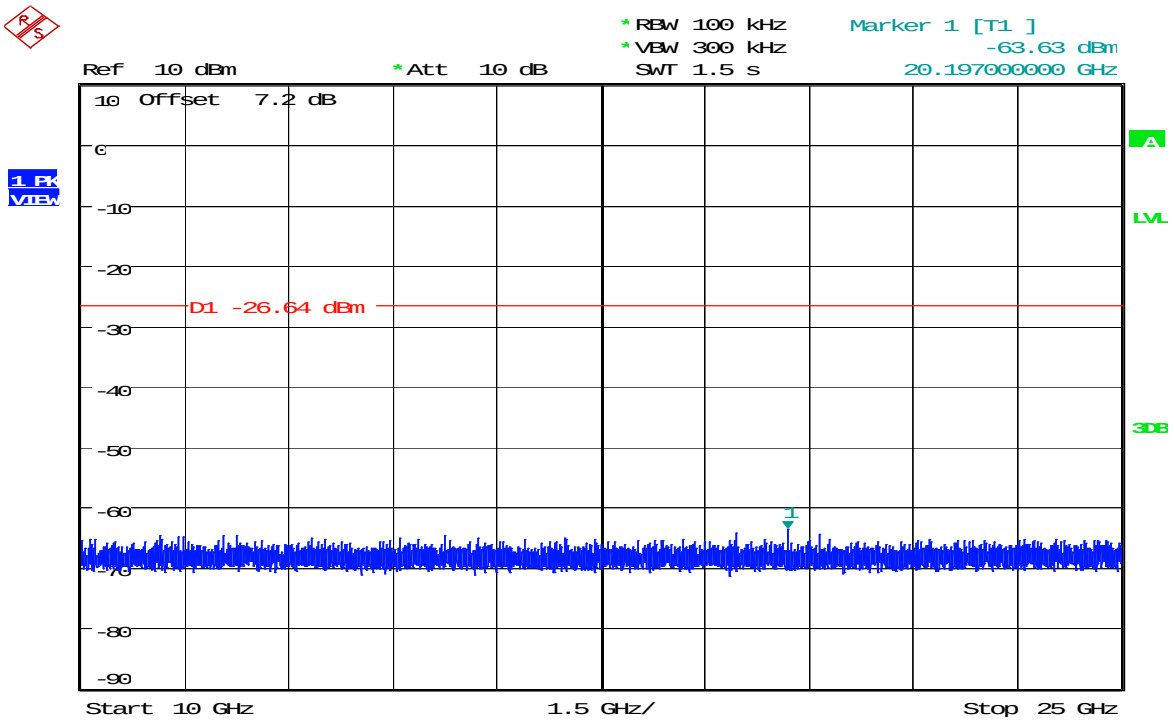


IEEE 802.11n HT40 mode/Chain 2

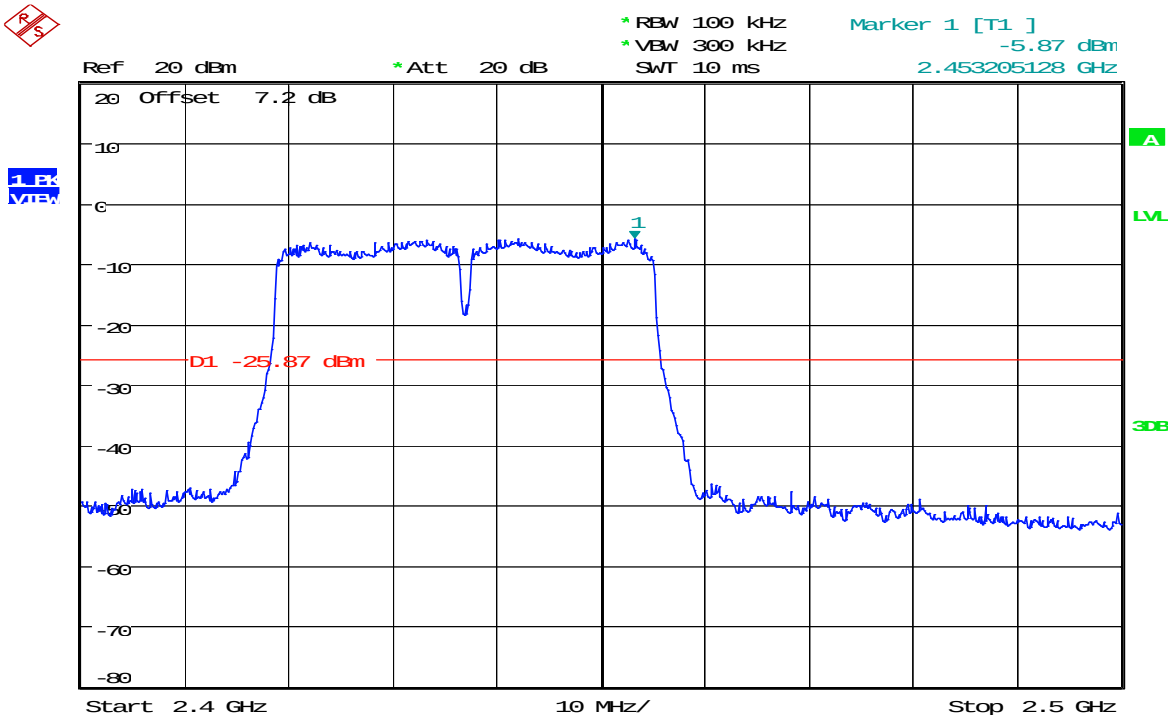
CH Low

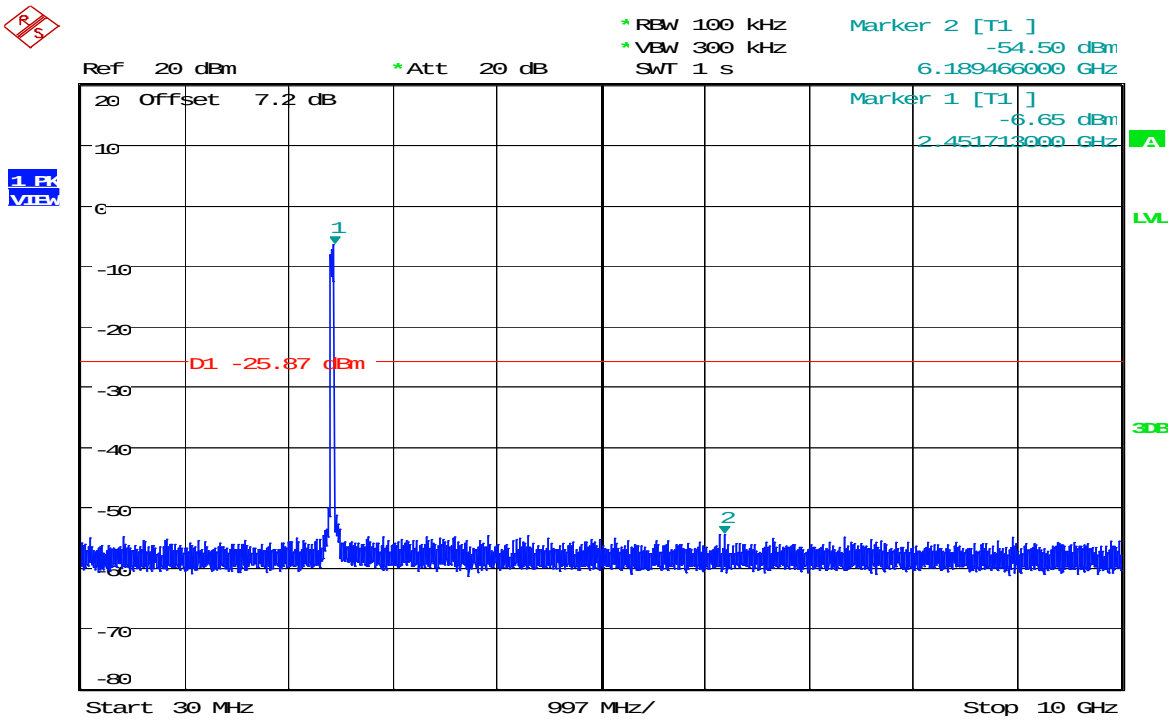


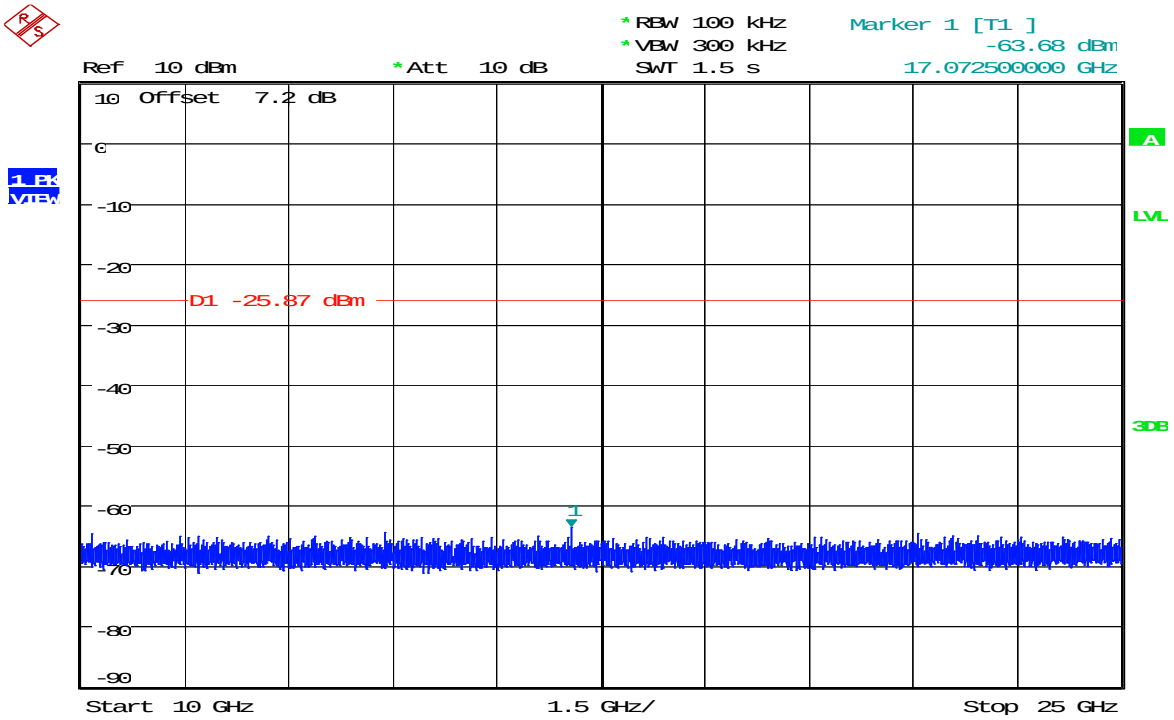

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.01 dBm
326.109000000 MHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
Marker 1 [T1]
-7.22 dBm
2.417815000 GHz
D1 -26.64 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.63 dBm
20.197000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -26.64 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

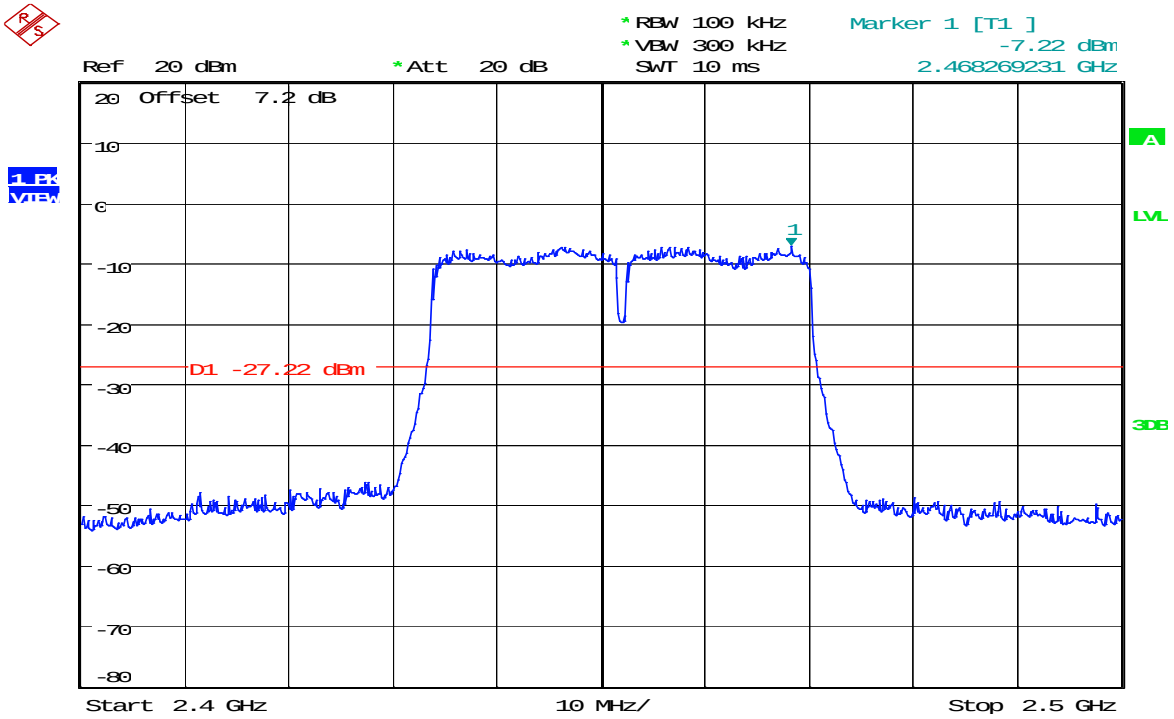
CH Mid

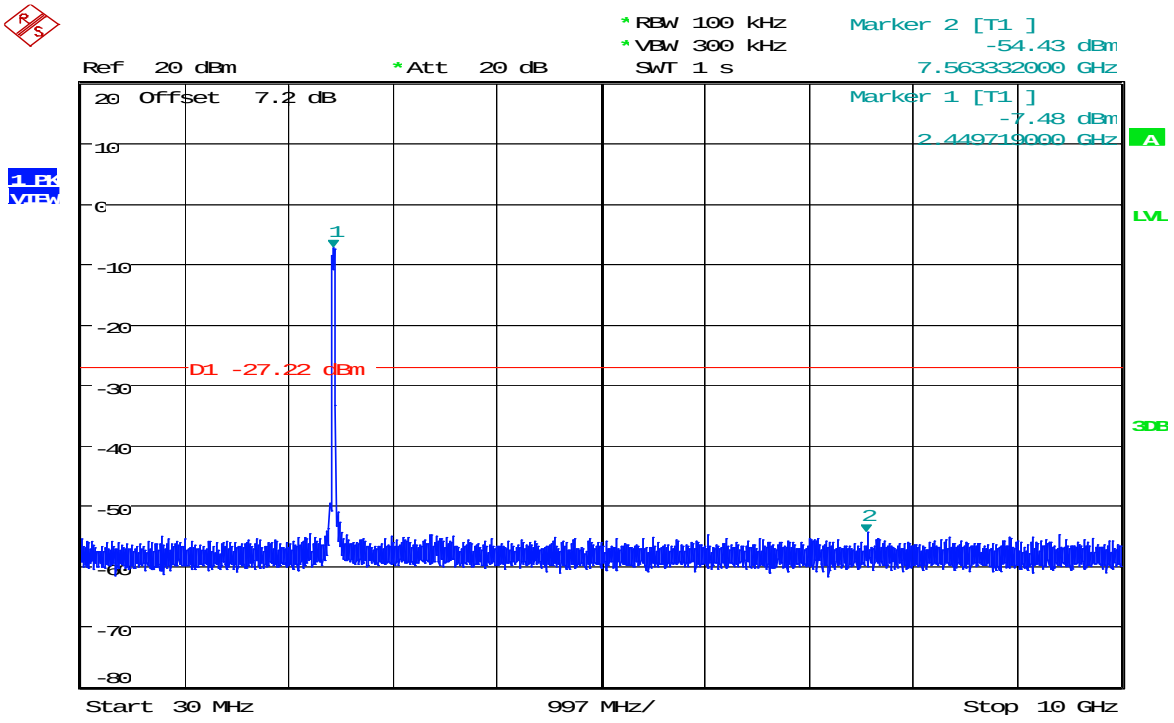

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.87 dBm
2.453205128 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -25.87 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

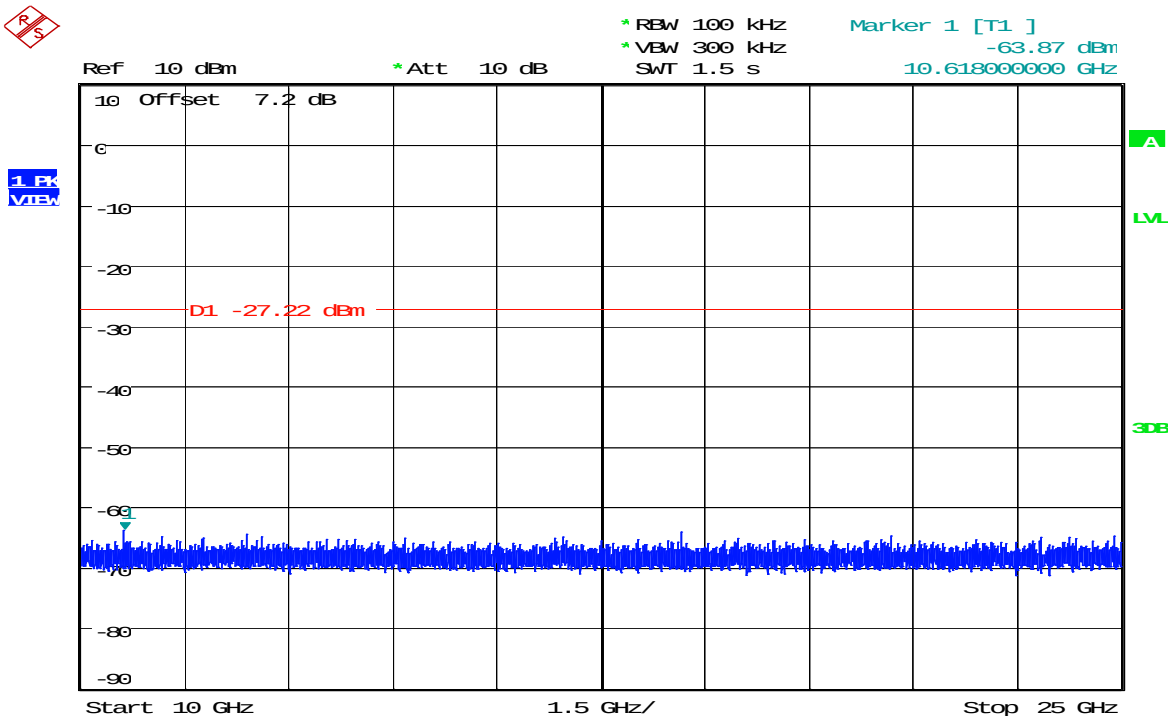

RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.50 dBm
6.189466000 GHz
Marker 1 [T1]
-6.65 dBm
2.451713000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -25.87 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.68 dBm
17.072500000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
D1 -25.87 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-7.22 dBm
2.468269231 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
D1 -27.22 dBm
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 2 [T1]
-54.43 dBm
7.563332000 GHz
Marker 1 [T1]
-7.48 dBm
2.449719000 GHz
Ref 20 dBm
Att 20 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -27.22 dBm
Start 30 MHz
997 MHz/
Stop 10 GHz


RBW 100 kHz
VBW 300 kHz
SWT 1.5 s
Marker 1 [T1]
-63.87 dBm
10.618000000 GHz
Ref 10 dBm
Att 10 dB
Offset 7.2 dB
1 PK
VIEW
A
LVL
3DB
D1 -27.22 dBm
Start 10 GHz
1.5 GHz/
Stop 25 GHz

8.5. 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, 0.8 meter for frequency below 1GHz and 1.5 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

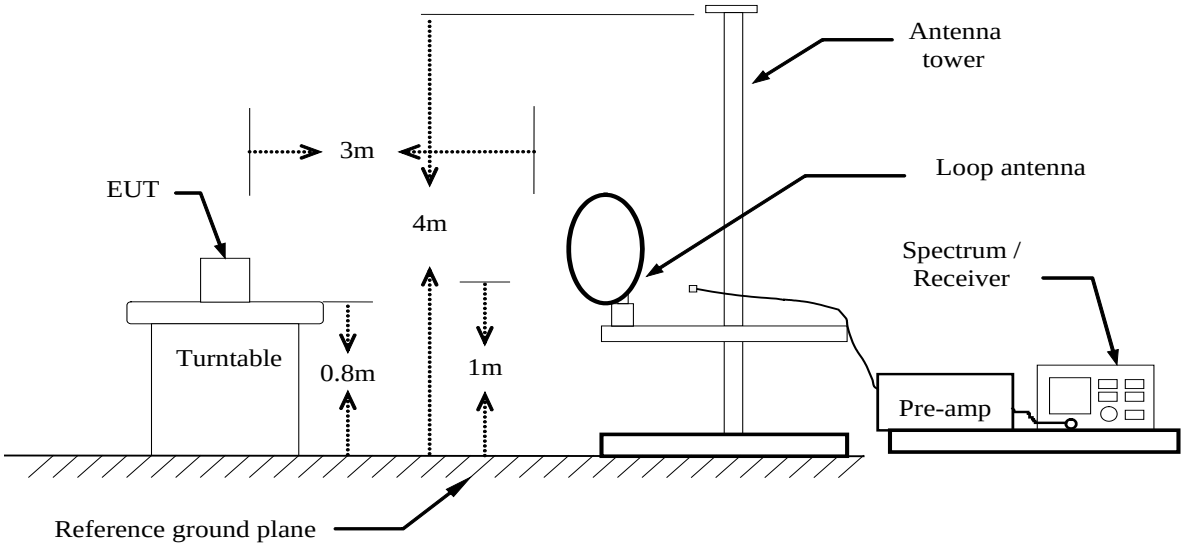
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

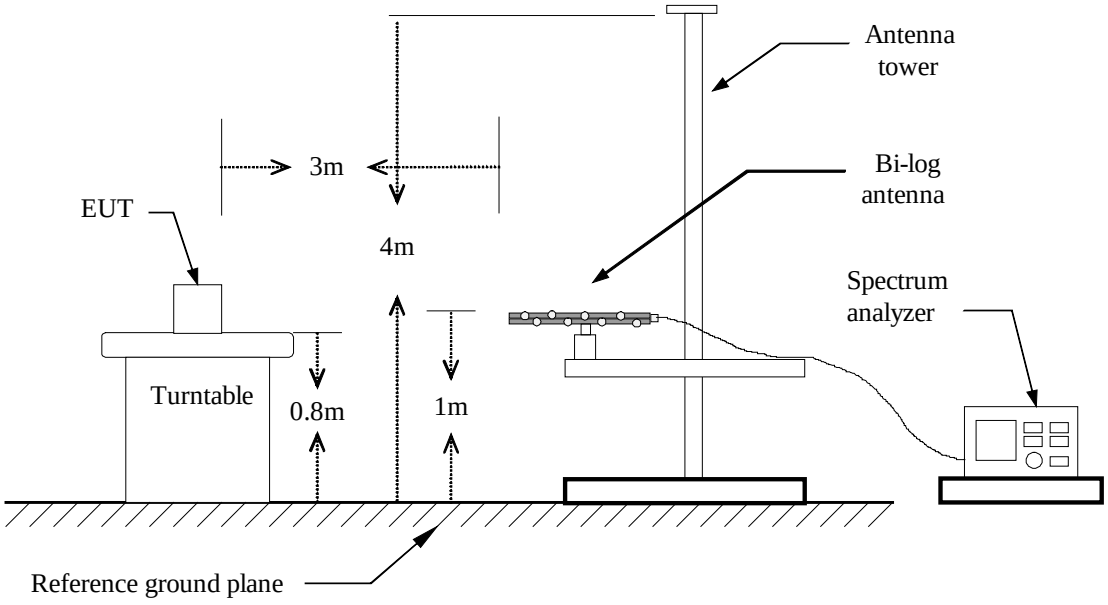
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

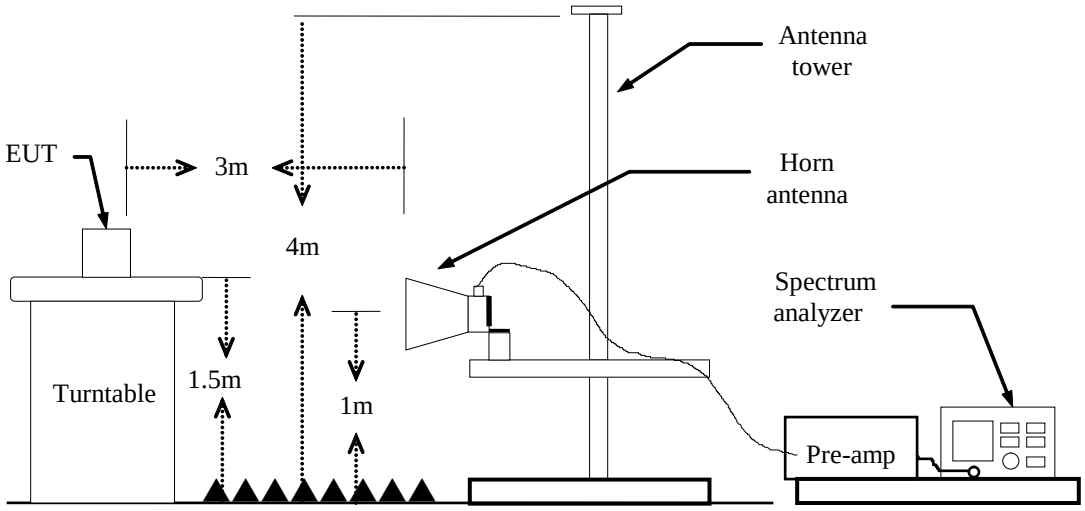
Below 30MHz



Below 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 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

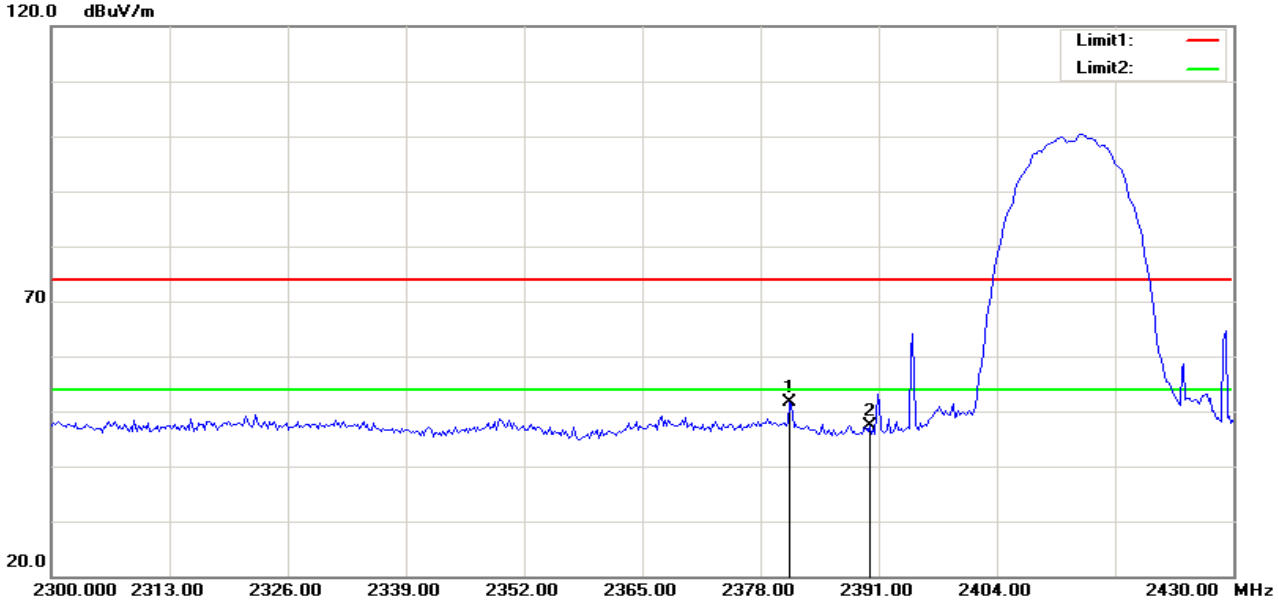
   AVERAGE: RBW=1MHz / Sweep=AUTO

   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.

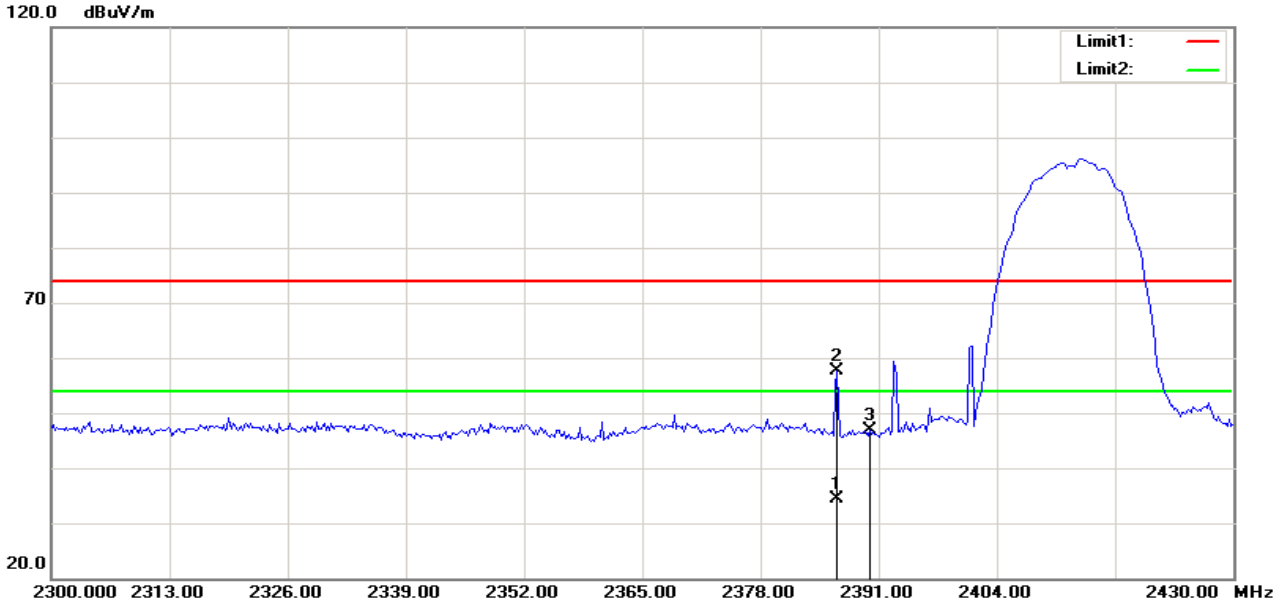
TEST RESULTS

RESTRICTED BANDEDGE (b Mode, Low Channel, Horizontal)



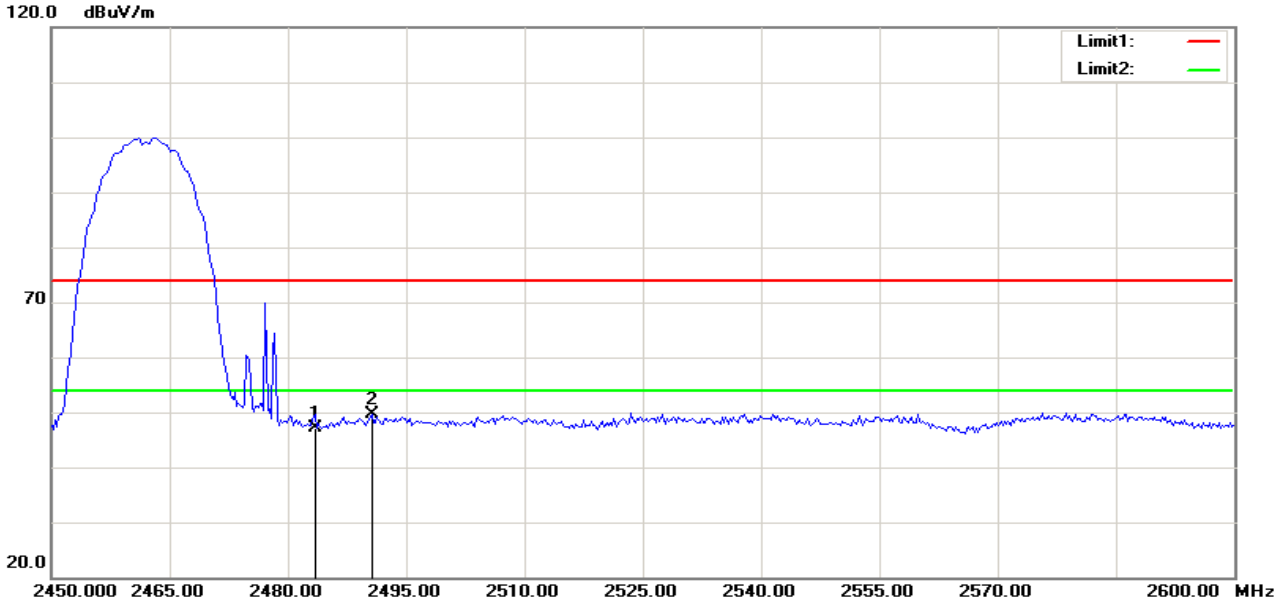
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2381.250	60.72	-9.00	51.72	74.00	-22.28	100	96	peak
2	2390.000	56.37	-8.95	47.42	74.00	-26.58	100	201	peak

RESTRICTED BANDEDGE (b Mode, Low Channel, Vertical)



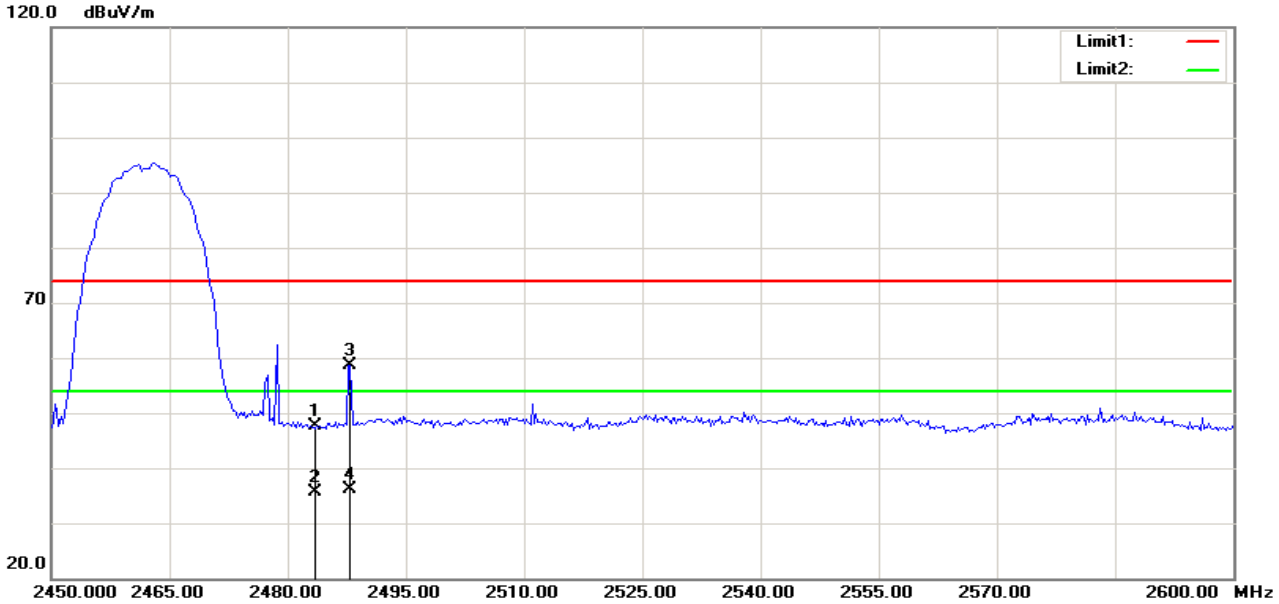
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2386.446	43.35	-8.97	34.38	54.00	-19.62	100	187	AVG
2	2386.458	66.62	-8.97	57.65	74.00	-16.35	100	193	peak
3	2390.000	55.93	-8.95	46.98	74.00	-27.02	100	255	peak

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	55.52	-8.35	47.17	74.00	-26.83	100	130	peak
2	2490.625	58.03	-8.30	49.73	74.00	-24.27	100	81	peak

RESTRICTED BANDEDGE (b Mode, High Channel, Vertical)

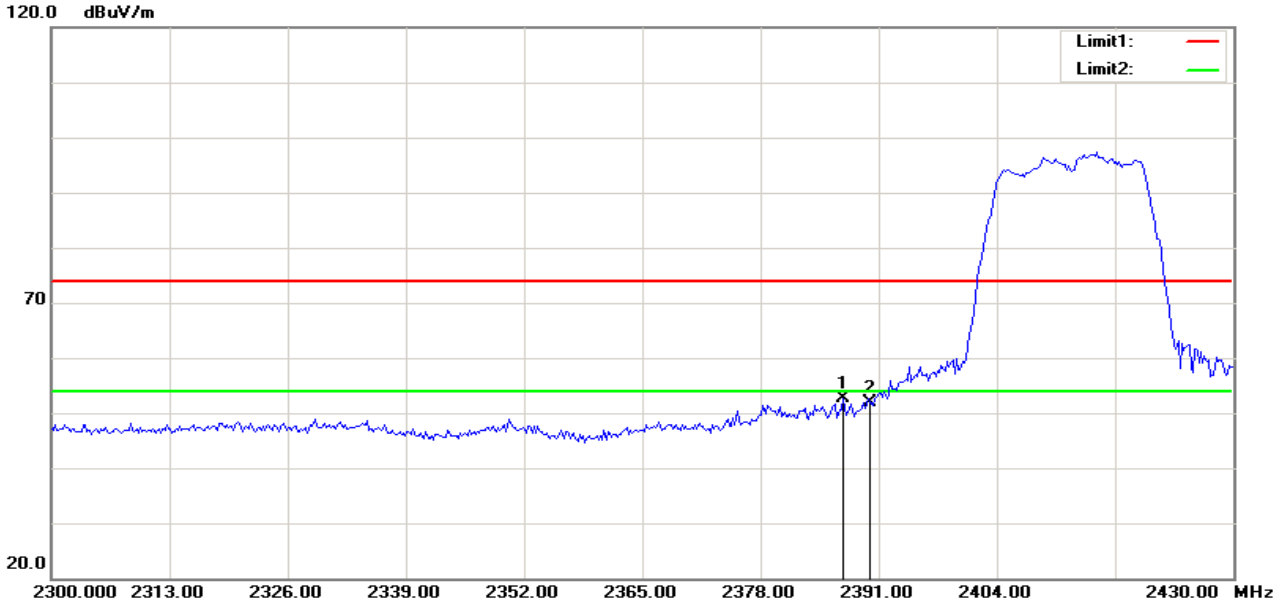


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	56.10	-8.35	47.75	74.00	-26.25	200	286	peak
2	2483.500	44.02	-8.35	35.67	54.00	-18.33	200	286	AVG
3	2487.981	66.87	-8.32	58.55	74.00	-15.45	200	0	peak
4	2487.981	44.42	-8.32	36.10	54.00	-17.90	200	1	AVG

RESTRICTED BANDEDGE (g Mode, Low Channel, Horizontal)

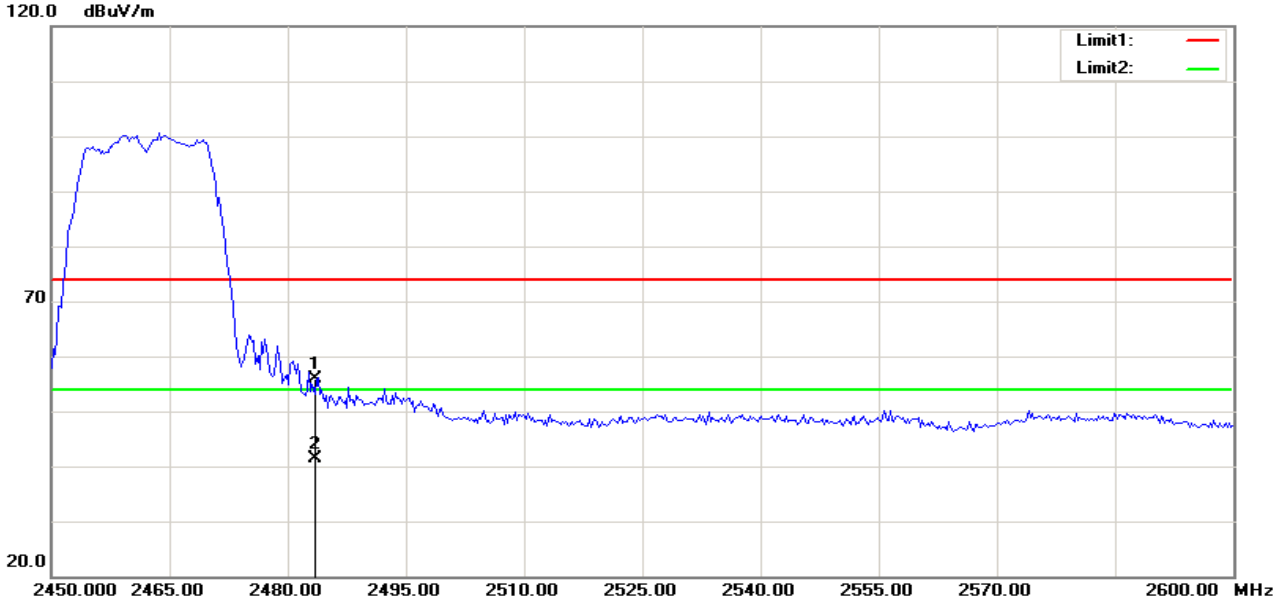
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2390.000	65.30	-8.95	56.35	74.00	-17.65	200	107	peak
2	2390.000	48.96	-8.95	40.01	54.00	-13.99	100	93	AVG

RESTRICTED BANDEDGE (g Mode, Low Channel, Vertical)



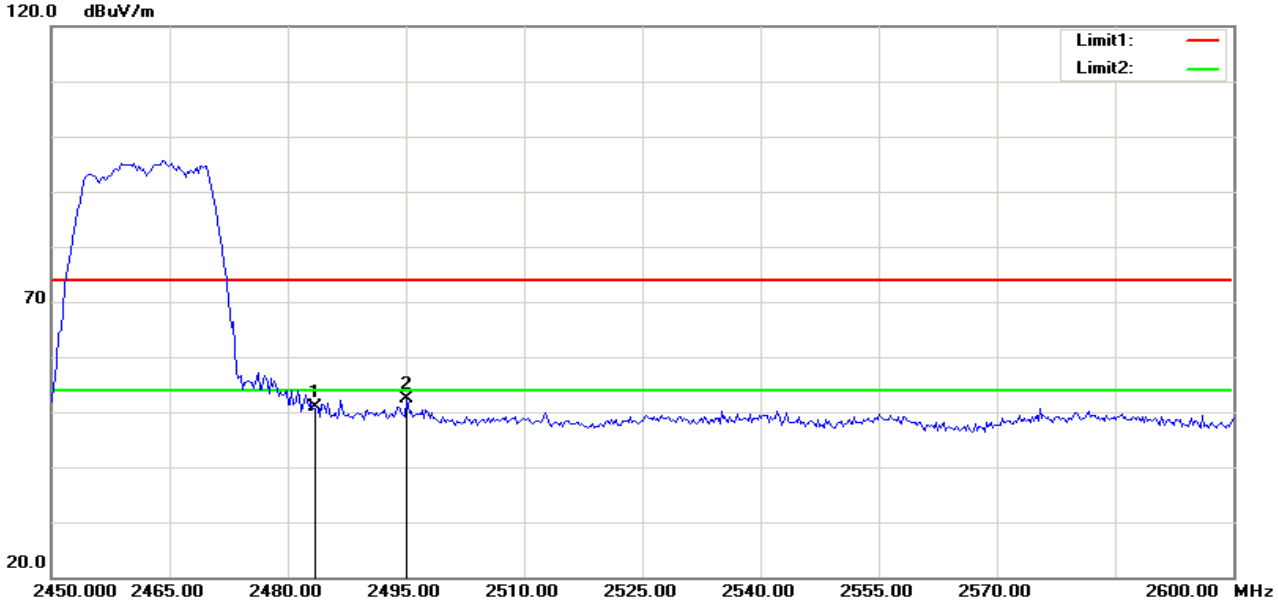
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2387.083	61.58	-8.96	52.62	74.00	-21.38	100	189	peak
2	2390.000	60.82	-8.95	51.87	74.00	-22.13	100	360	peak

RESTRICTED BANDEDGE (g Mode, High Channel, Horizontal)



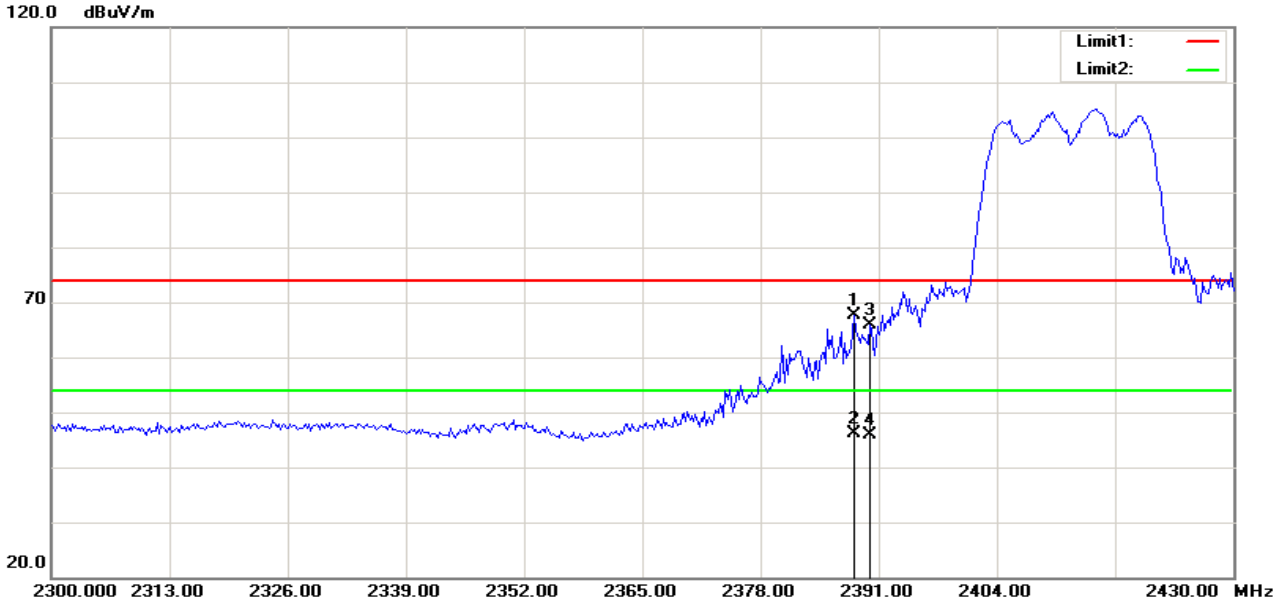
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	64.24	-8.35	55.89	74.00	-18.11	100	111	peak
2	2483.500	49.72	-8.35	41.37	54.00	-12.63	100	97	AVG

RESTRICTED BANDEDGE (g Mode, High Channel, Vertical)



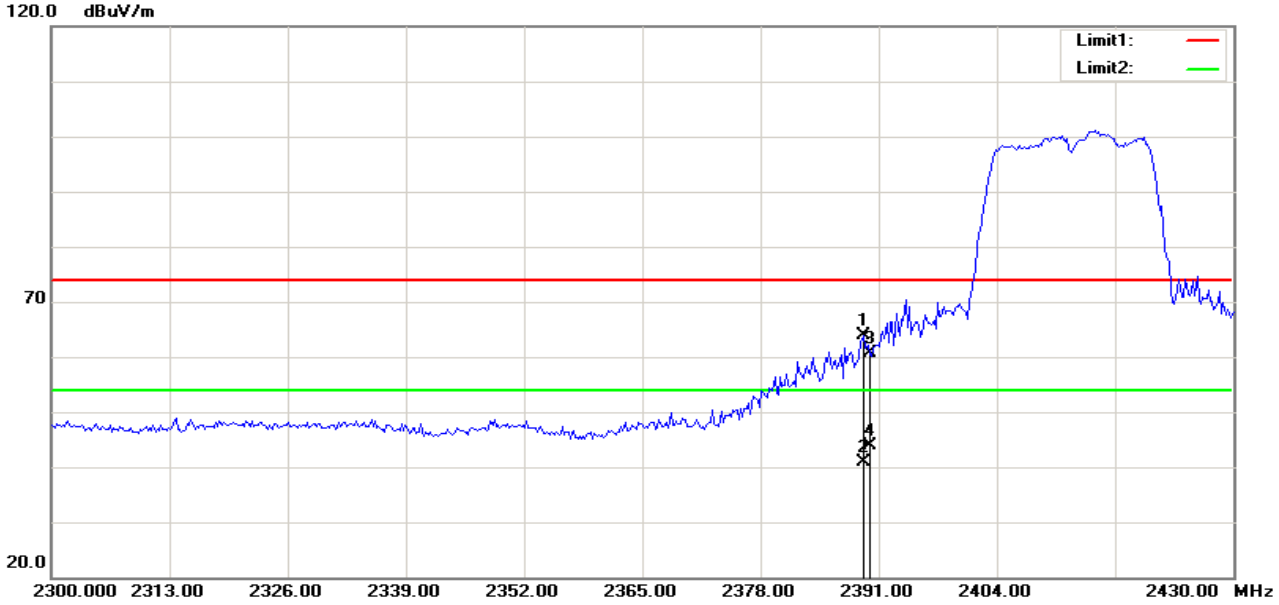
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	59.18	-8.35	50.83	74.00	-23.17	200	360	peak
2	2495.192	60.53	-8.27	52.26	74.00	-21.74	200	73	peak

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	2388.333	76.58	-8.96	67.62	74.00	-6.38	100	100	peak
2	2388.333	55.05	-8.96	46.09	54.00	-7.91	100	114	AVG
3	2390.000	74.81	-8.95	65.86	74.00	-8.14	100	96	peak
4	2390.000	54.88	-8.95	45.93	54.00	-8.07	100	110	AVG

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

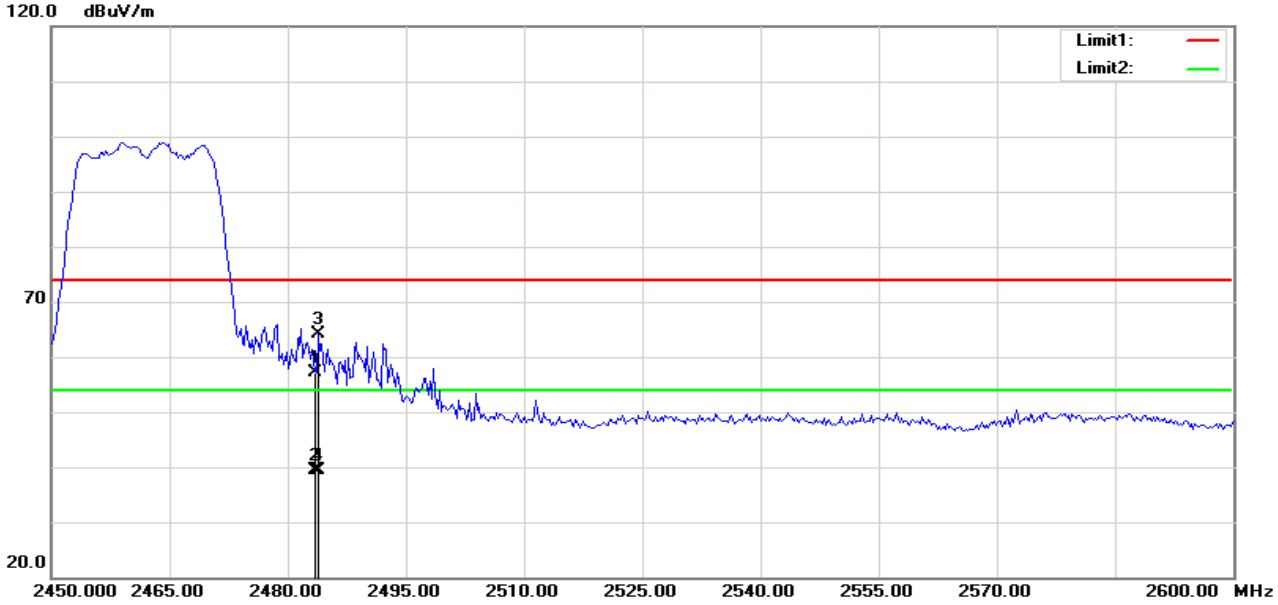


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2389.375	72.72	-8.95	63.77	74.00	-10.23	200	89	peak
2	2389.375	49.88	-8.95	40.93	54.00	-13.07	200	79	AVG
3	2390.000	69.66	-8.95	60.71	74.00	-13.29	100	121	peak
4	2390.000	52.85	-8.95	43.90	54.00	-10.10	100	115	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	67.16	-8.35	58.81	74.00	-15.19	100	102	peak
2	2483.500	53.29	-8.35	44.94	54.00	-9.06	100	105	AVG
3	2488.461	76.23	-8.31	67.92	74.00	-6.08	100	128	peak
4	2488.461	50.57	-8.31	42.26	54.00	-11.74	100	116	AVG

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

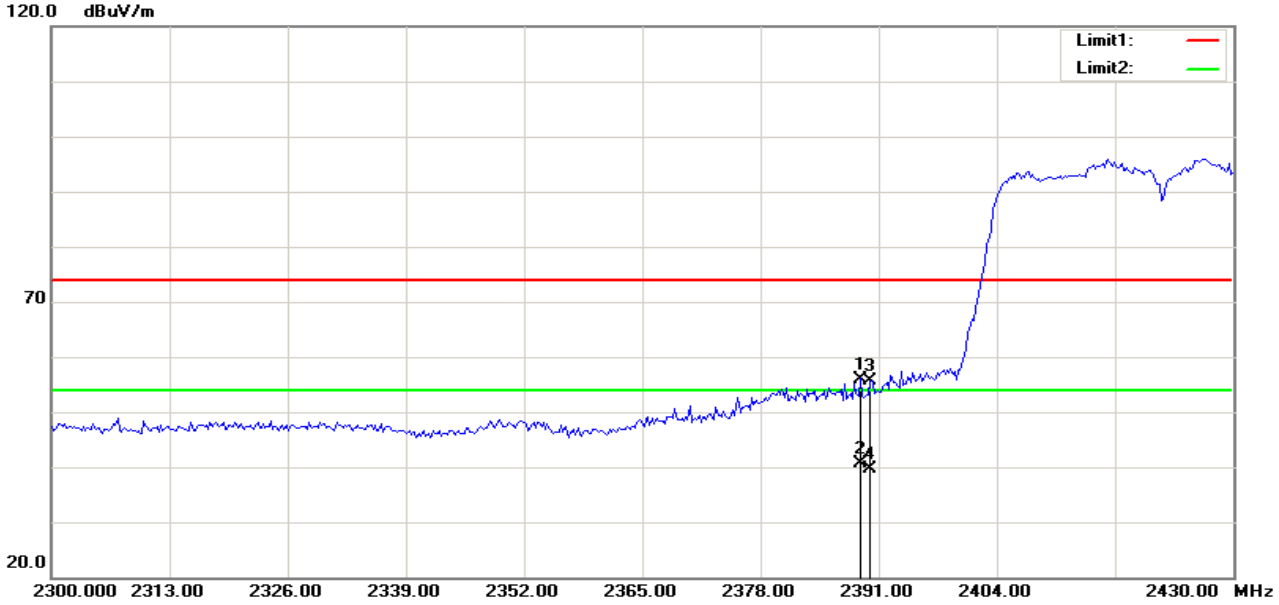


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	65.54	-8.35	57.19	74.00	-16.81	200	149	peak
2	2483.500	47.61	-8.35	39.26	54.00	-14.74	200	191	AVG
3	2483.894	72.37	-8.34	64.03	74.00	-9.97	200	209	peak
4	2483.894	47.63	-8.34	39.29	54.00	-14.71	200	209	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 mode, Low Channel, Horizontal)

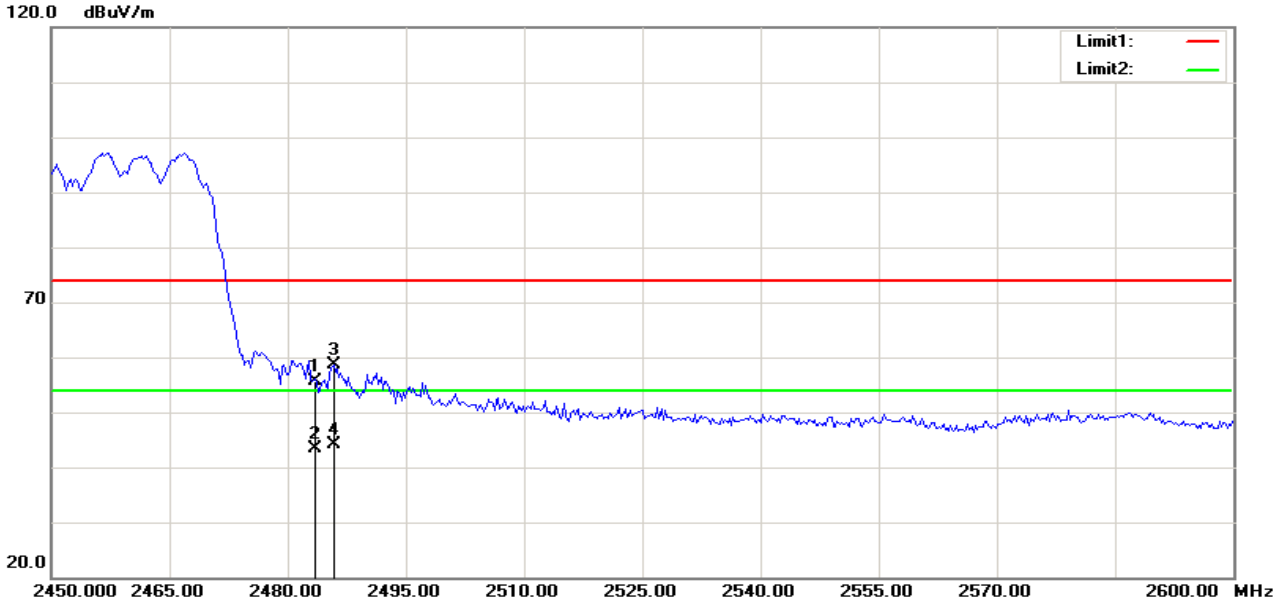
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2381.042	71.41	-9.00	62.41	74.00	-11.59	100	112	peak
2	2381.044	52.51	-9.00	43.51	54.00	-10.49	100	109	AVG
3	2390.000	66.17	-8.95	57.22	74.00	-16.78	100	102	peak
4	2390.000	54.60	-8.95	45.65	54.00	-8.35	100	117	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 mode, Low Channel, Vertical)



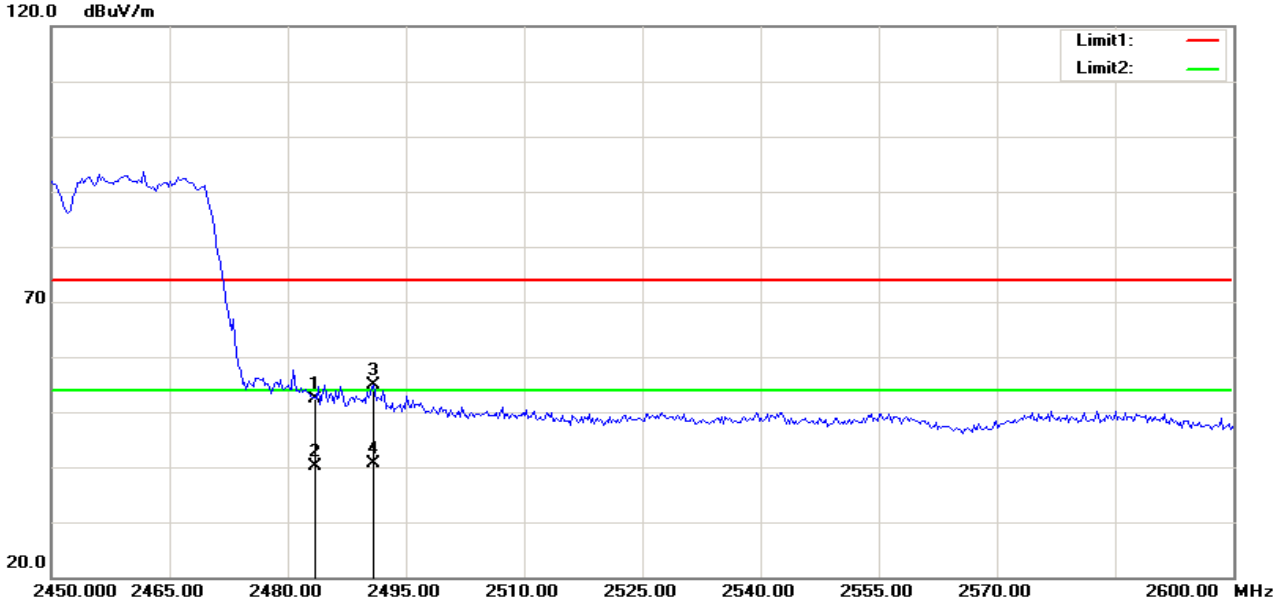
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2388.958	64.95	-8.95	56.00	74.00	-18.00	100	185	peak
2	2388.958	49.47	-8.95	40.52	54.00	-13.48	100	194	AVG
3	2390.000	64.69	-8.95	55.74	74.00	-18.26	100	360	peak
4	2390.000	48.47	-8.95	39.52	54.00	-14.48	100	360	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 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	63.98	-8.35	55.63	74.00	-18.37	100	101	peak
2	2483.500	51.80	-8.35	43.45	54.00	-10.55	100	89	AVG
3	2485.817	67.01	-8.33	58.68	74.00	-15.32	100	105	peak
4	2485.817	52.50	-8.33	44.17	54.00	-9.83	100	90	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 mode, High Channel, Vertical)



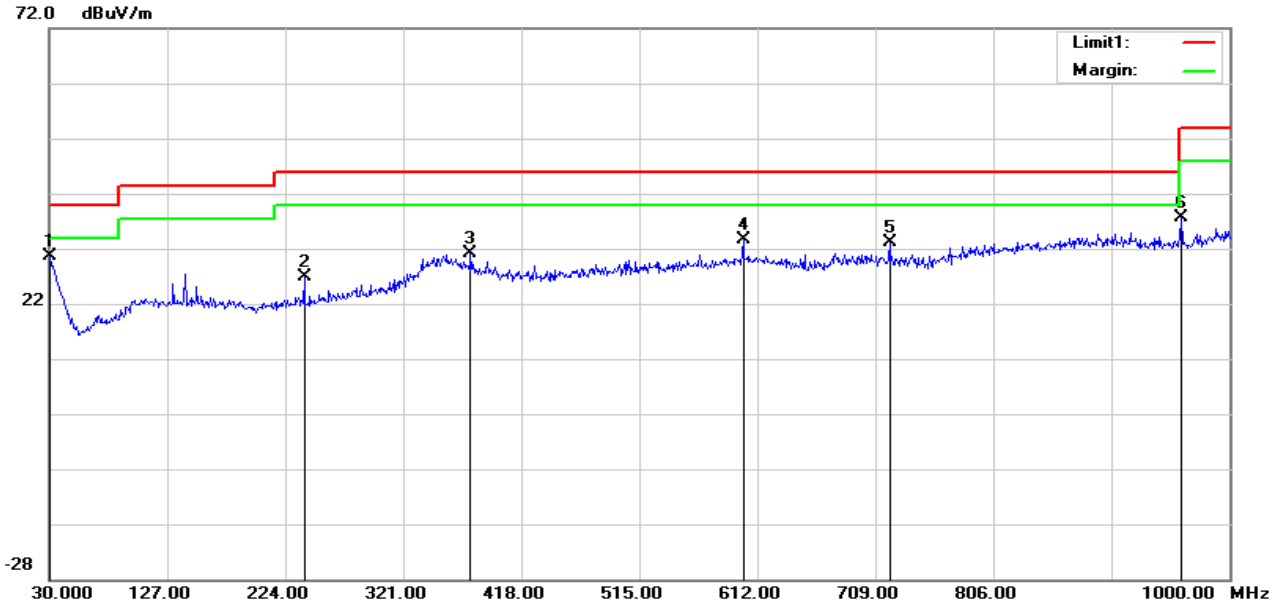
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	60.84	-8.35	52.49	74.00	-21.51	100	186	peak
2	2483.500	48.51	-8.35	40.16	54.00	-13.84	100	184	AVG
3	2490.865	63.22	-8.30	54.92	74.00	-19.08	200	74	peak
4	2490.865	49.01	-8.30	40.71	54.00	-13.29	200	83	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.

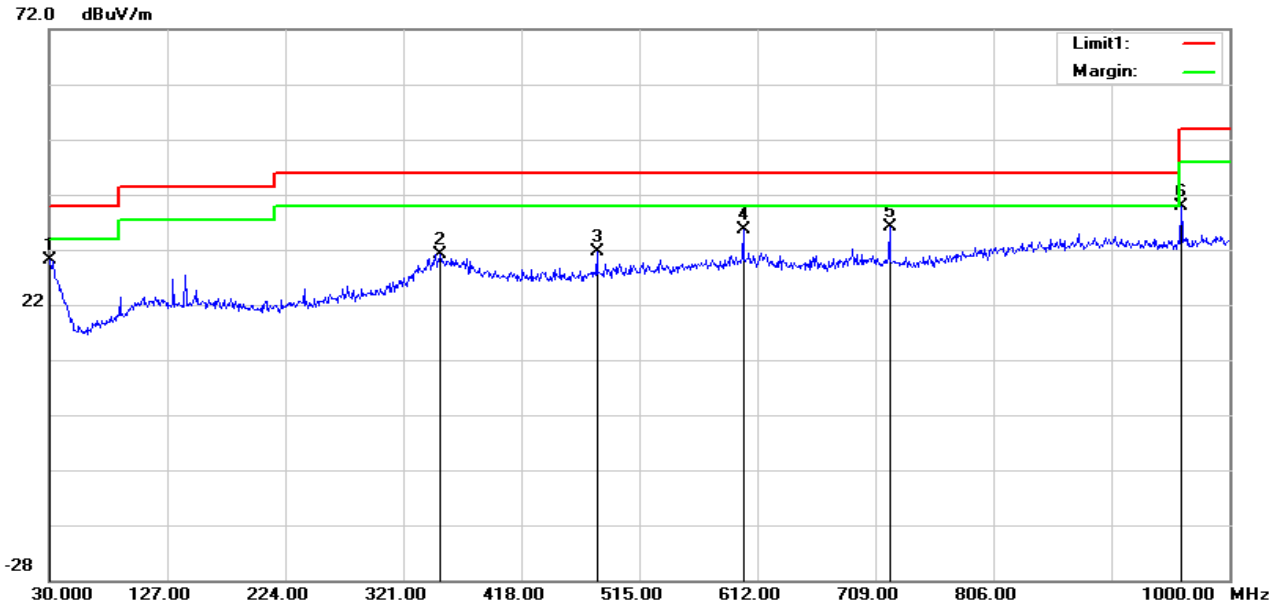
30MHz-1GHz

Operation Mode:	IEEE 802.11b mode	**Test Date:**	2018-12-11
Temperature:	25°C	**Tested by:**	Wendy.Wei
Humidity:	51% 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	30.9700	5.48	25.09	30.57	40.00	-9.43	200	41	peak
2	239.5200	8.65	18.32	26.97	46.00	-19.03	200	184	peak
3	376.2900	6.11	25.05	31.16	46.00	-14.84	100	100	peak
4	600.3600	7.72	25.95	33.67	46.00	-12.33	200	135	peak
5	720.6400	7.57	25.62	33.19	46.00	-12.81	100	97	peak
6	960.2300	8.60	28.93	37.53	54.00	-16.47	100	206	peak

Operation Mode:	IEEE 802.11b mode	Test Date:	2018-12-11
Temperature:	25°C	Tested by:	Wendy.Wei
Humidity:	51% 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	30.0000	4.45	25.76	30.21	40.00	-9.79	200	320	peak
2	351.0700	4.84	26.25	31.09	46.00	-14.91	200	0	peak
3	480.0800	7.46	24.10	31.56	46.00	-14.44	200	0	peak
4	600.3600	9.70	25.95	35.65	46.00	-10.35	200	171	peak
5	720.6400	10.49	25.62	36.11	46.00	-9.89	100	3	peak
6	960.2300	11.05	28.93	39.98	54.00	-14.02	200	175	peak

Remark:

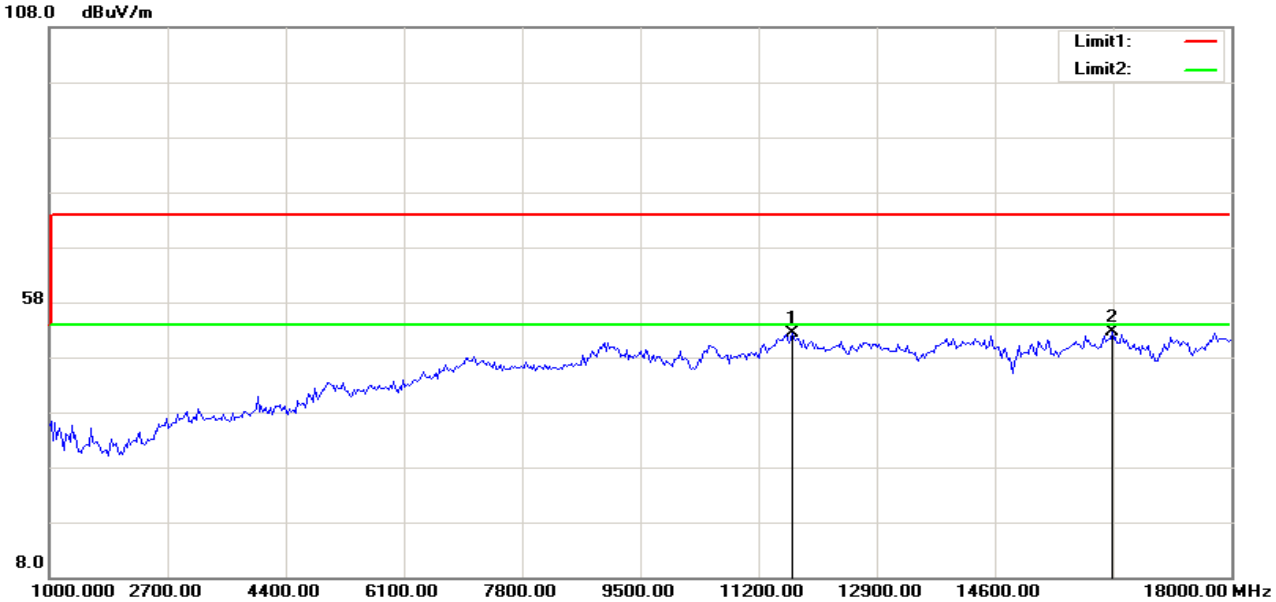
1. *Measuring frequencies from 30 MHz to the 1GHz (No emission found between lowest internal used/generated frequency to 30 MHz).*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Measurements above show only 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
Temperature: 25°C
Humidity: 51 % RH

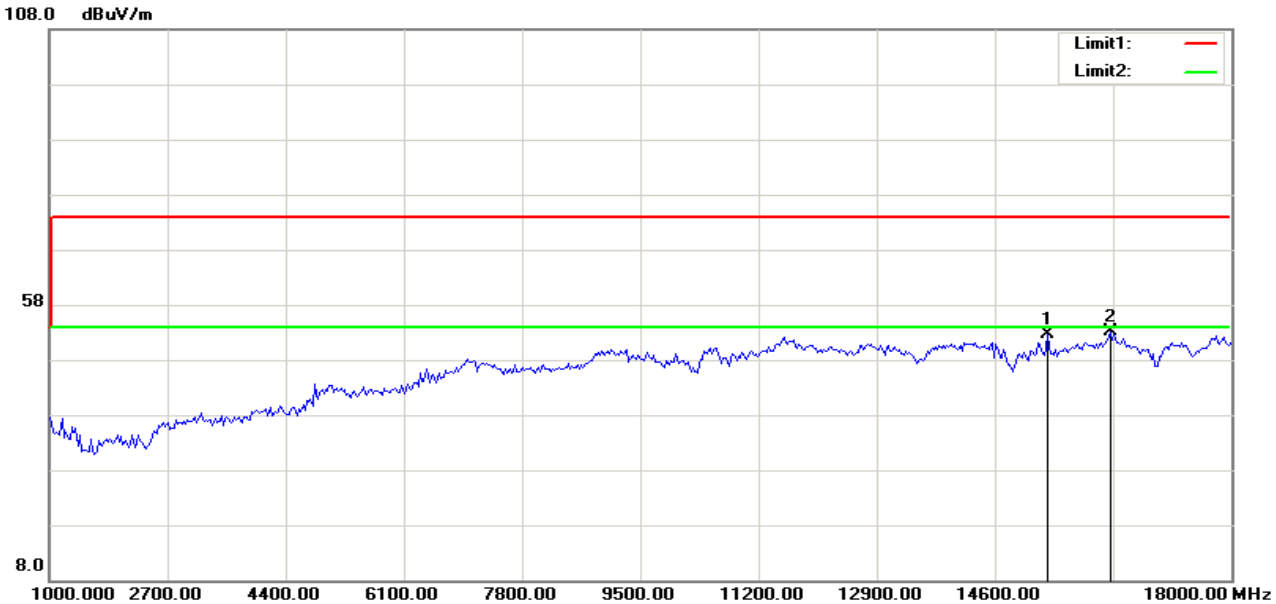
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11679.487	40.77	11.60	52.37	74.00	-21.63	200	159	peak
2	16283.654	38.15	14.40	52.55	74.00	-21.45	200	0	peak

Vertical

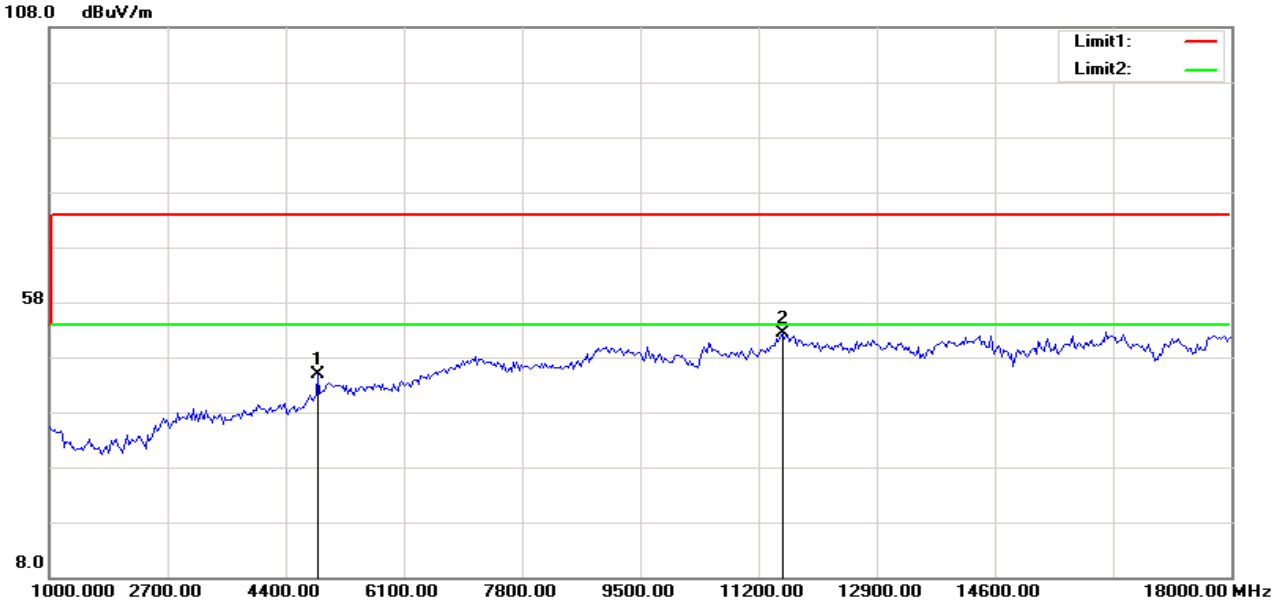


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	15357.372	38.83	13.70	52.53	74.00	-21.47	100	23	peak
2	16256.410	38.85	14.39	53.24	74.00	-20.76	200	336	peak

Operation Mode: TX / IEEE 802.11b / CH Mid
Temperature: 25°C
Humidity: 51 % RH

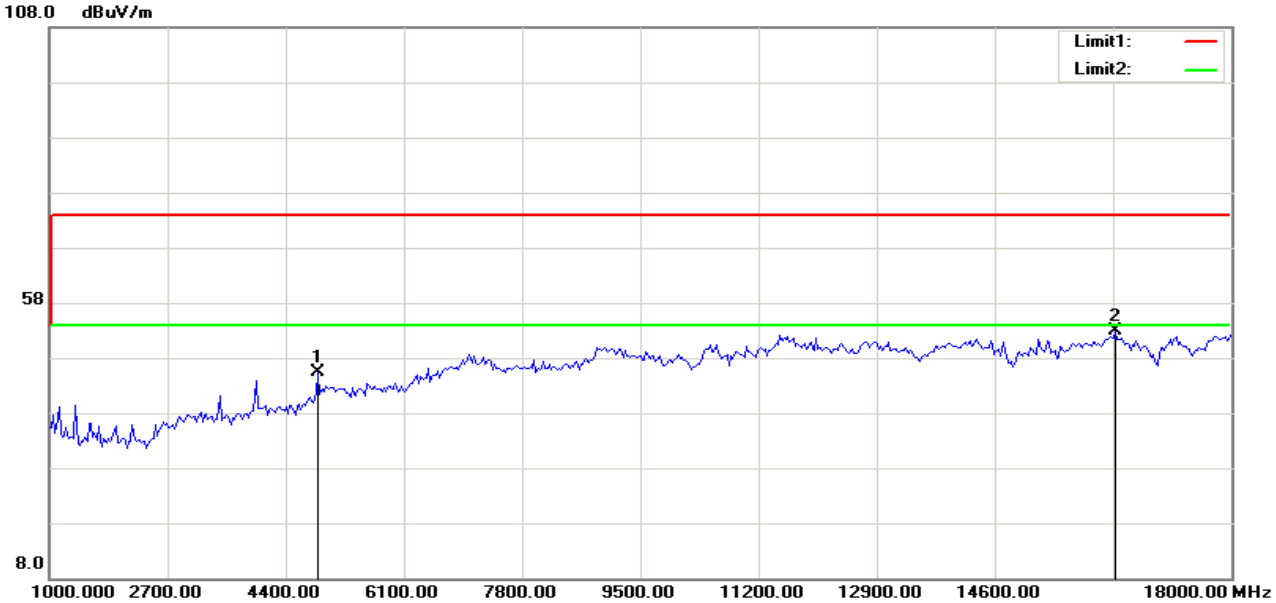
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4868.590	45.38	-0.43	44.95	74.00	-29.05	100	175	peak
2	11543.269	41.05	11.36	52.41	74.00	-21.59	100	57	peak

Vertical

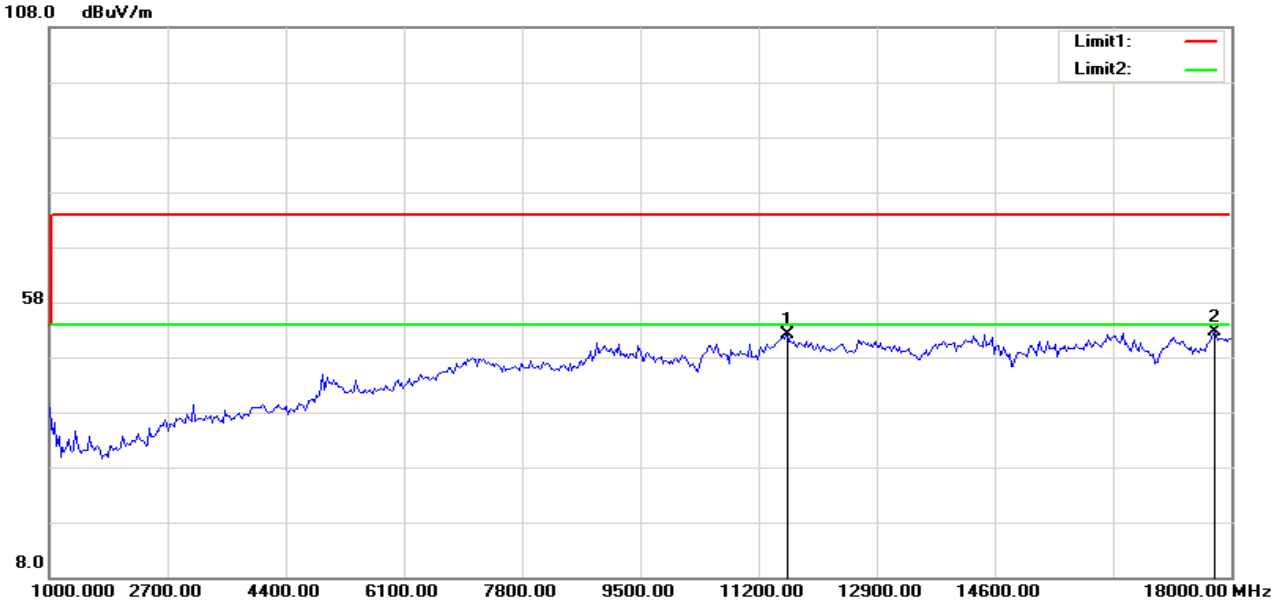


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4868.590	45.78	-0.43	45.35	74.00	-28.65	100	219	peak
2	16338.141	38.38	14.41	52.79	74.00	-21.21	200	0	peak

Operation Mode: TX / IEEE 802.11b / CH High
Temperature: 25°C
Humidity: 51 % RH

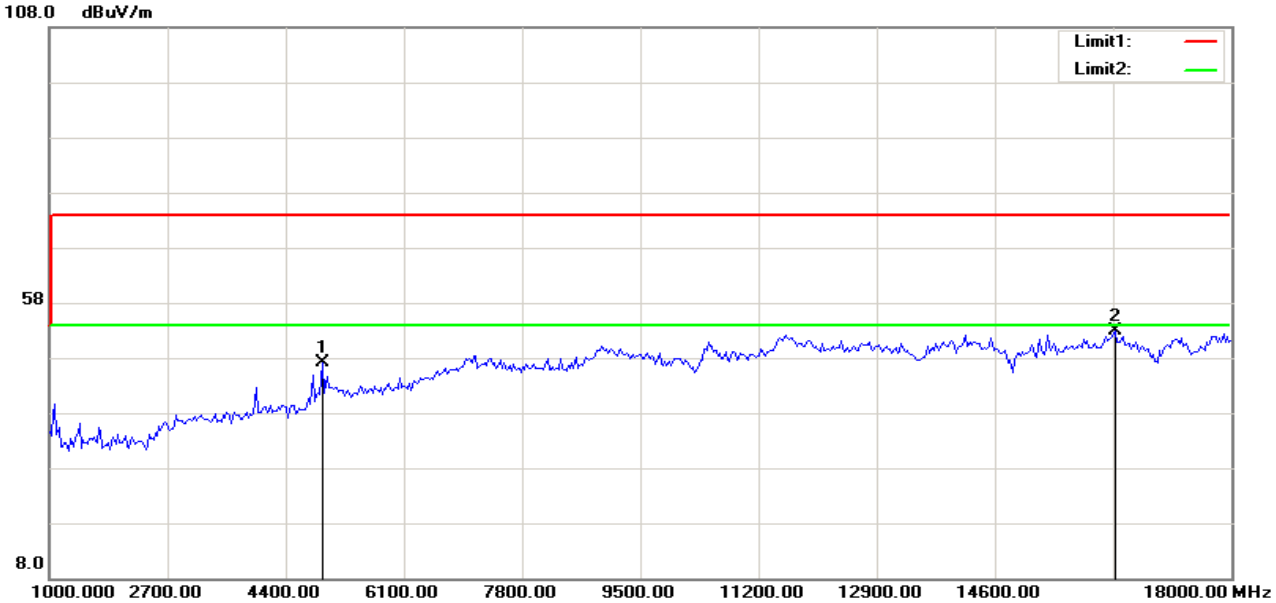
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11625.000	40.59	11.50	52.09	74.00	-21.91	200	360	peak
2	17754.808	34.63	17.88	52.51	74.00	-21.49	100	324	peak

Vertical

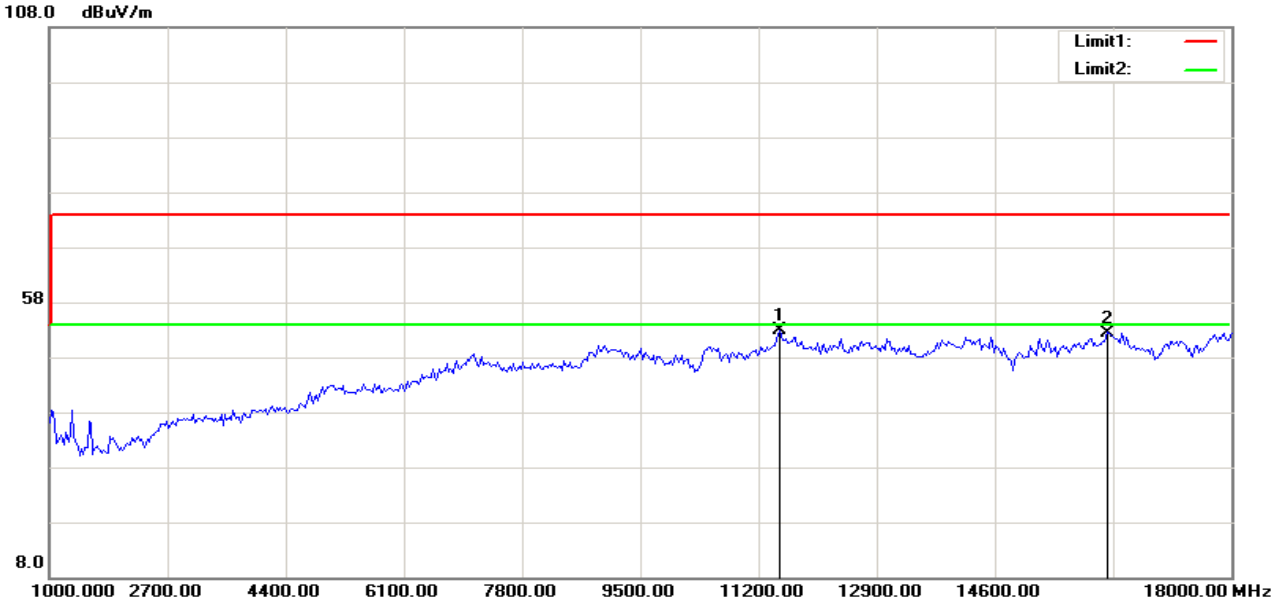


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4923.077	47.08	0.03	47.11	74.00	-26.89	100	204	peak
2	16338.141	38.51	14.41	52.92	74.00	-21.08	200	322	peak

Operation Mode: TX / IEEE 802.11g / CH Low
Temperature: 25°C
Humidity: 51 % RH

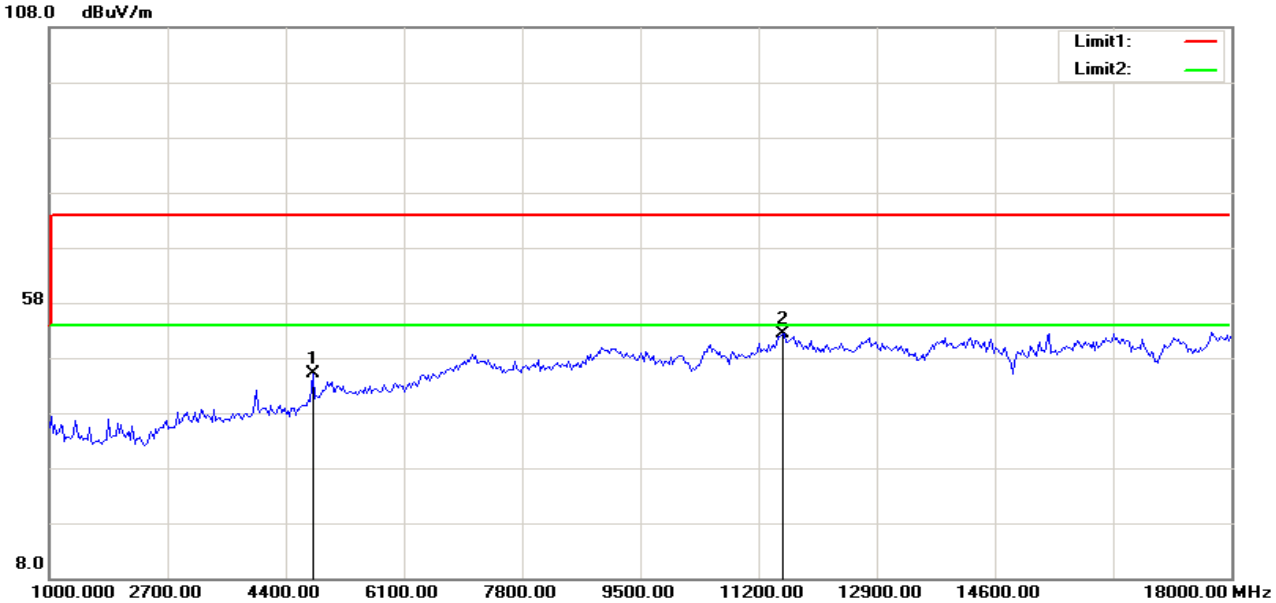
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11516.026	41.45	11.32	52.77	74.00	-21.23	100	191	peak
2	16229.167	38.12	14.38	52.50	74.00	-21.50	100	360	peak

Vertical

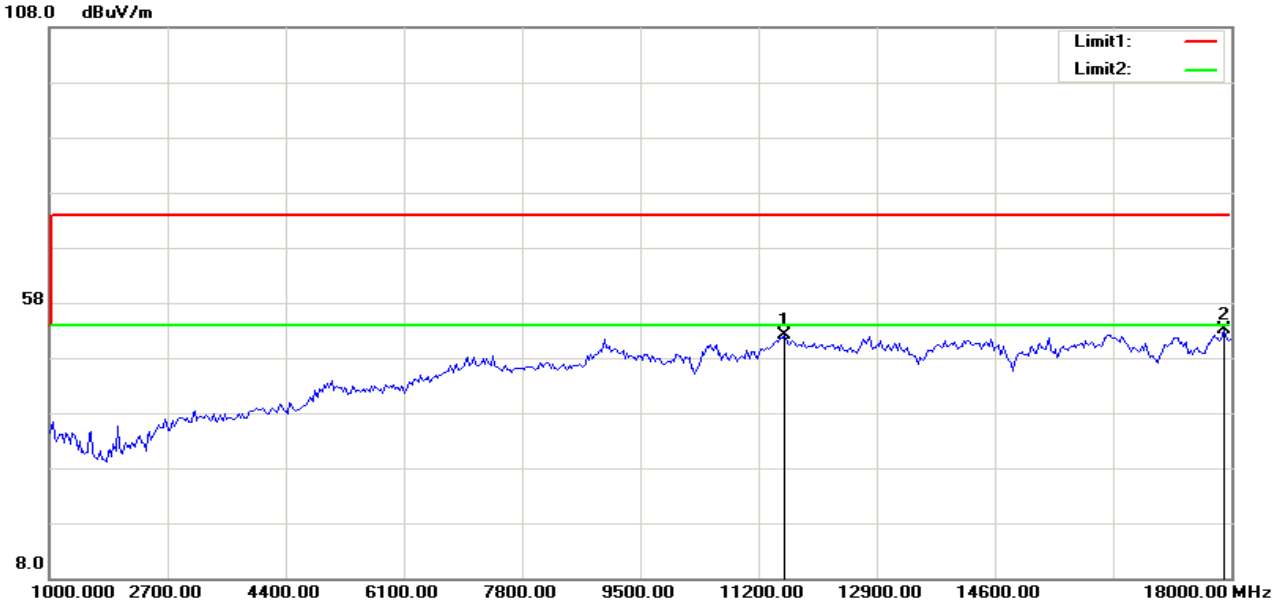


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4786.859	46.27	-1.13	45.14	74.00	-28.86	100	280	peak
2	11543.269	41.07	11.36	52.43	74.00	-21.57	200	0	peak

Operation Mode: TX / IEEE 802.11g / CH Mid
Temperature: 25°C
Humidity: 51 % RH

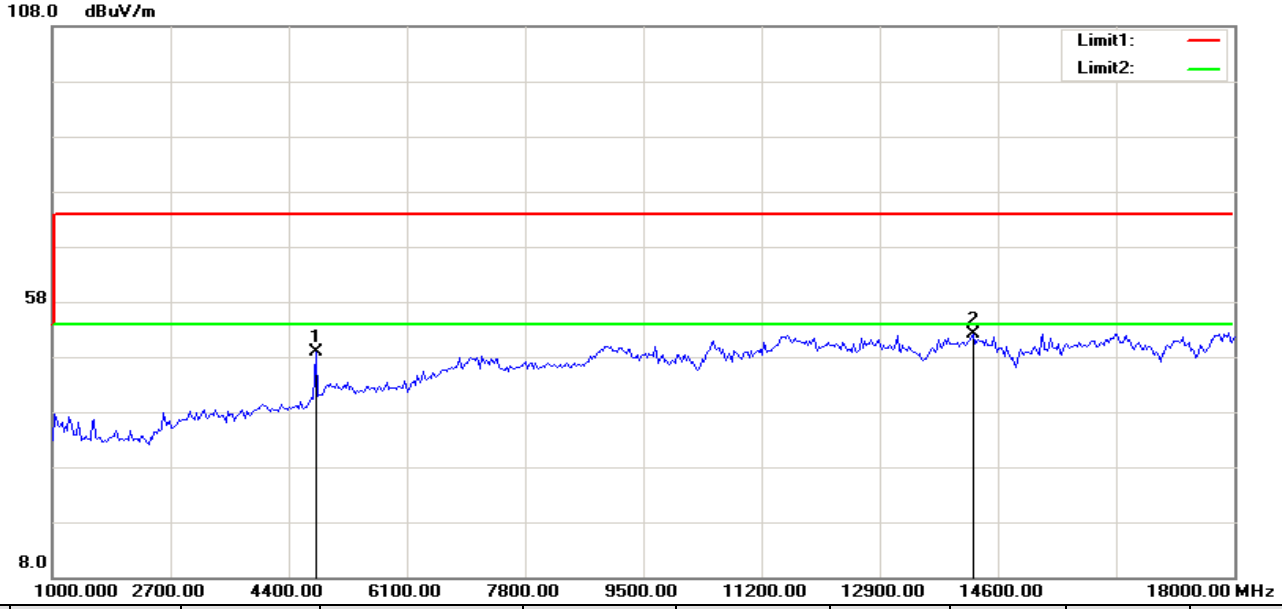
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11570.513	40.60	11.41	52.01	74.00	-21.99	200	329	peak
2	17891.026	35.02	18.02	53.04	74.00	-20.96	200	360	peak

Vertical

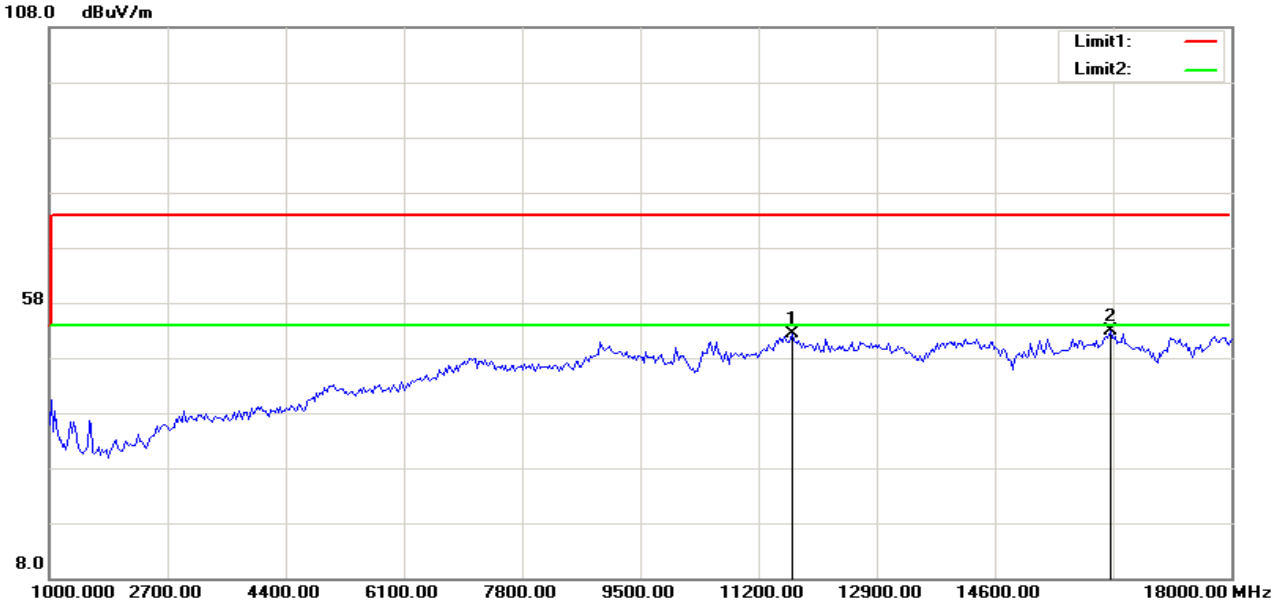


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	50.10	-1.13	48.97	74.00	-25.03	100	305	peak
2	14240.385	38.98	13.11	52.09	74.00	-21.91	100	3	peak

Operation Mode: TX / IEEE 802.11g / CH High
Temperature: 25°C
Humidity: 51 % RH

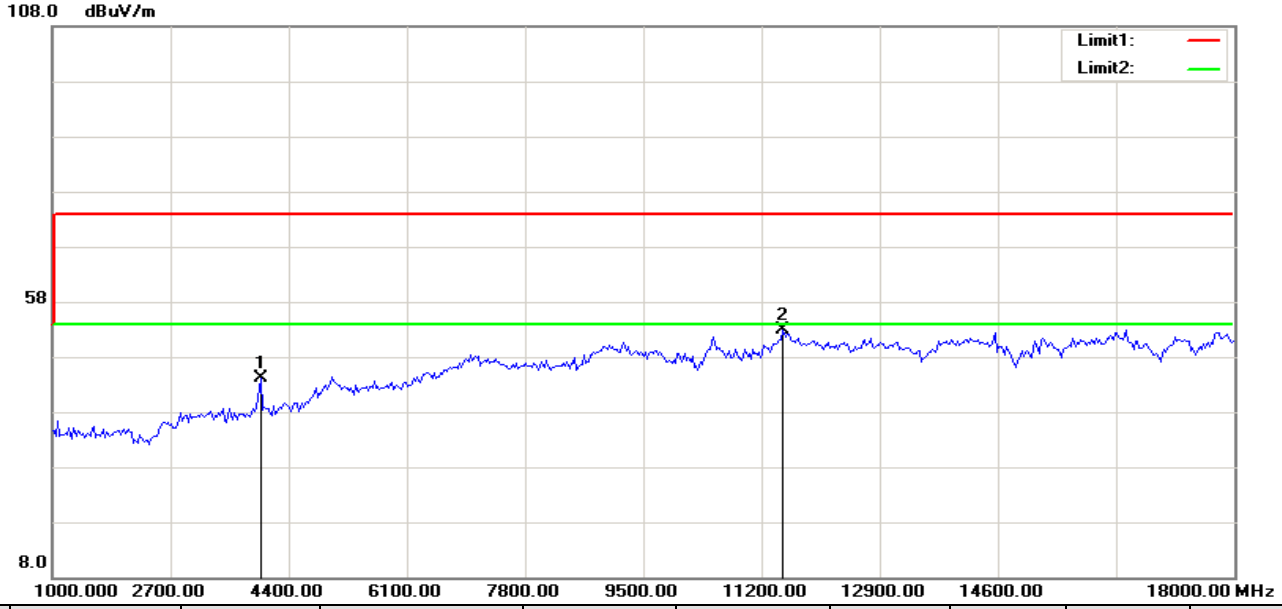
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11679.487	40.76	11.60	52.36	74.00	-21.64	100	280	peak
2	16256.410	38.56	14.39	52.95	74.00	-21.05	100	341	peak

Vertical

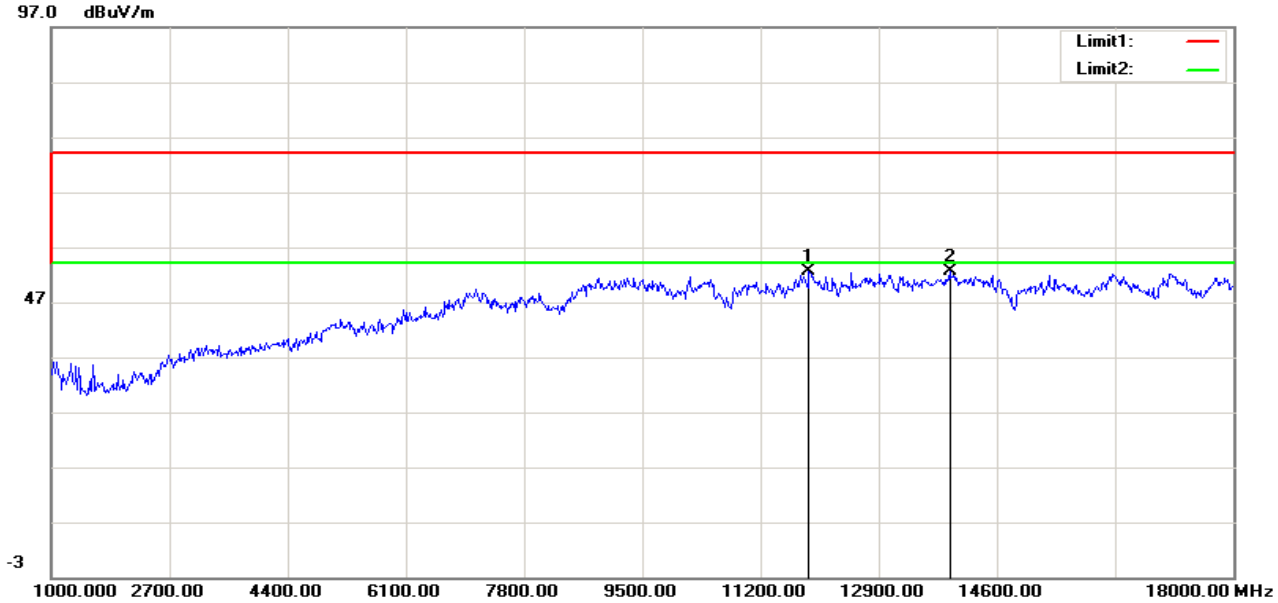


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	3996.795	48.51	-4.44	44.07	74.00	-29.93	100	5	peak
2	11516.026	41.56	11.32	52.88	74.00	-21.12	200	136	peak

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Low
Temperature: 25°C
Humidity: 51 % RH

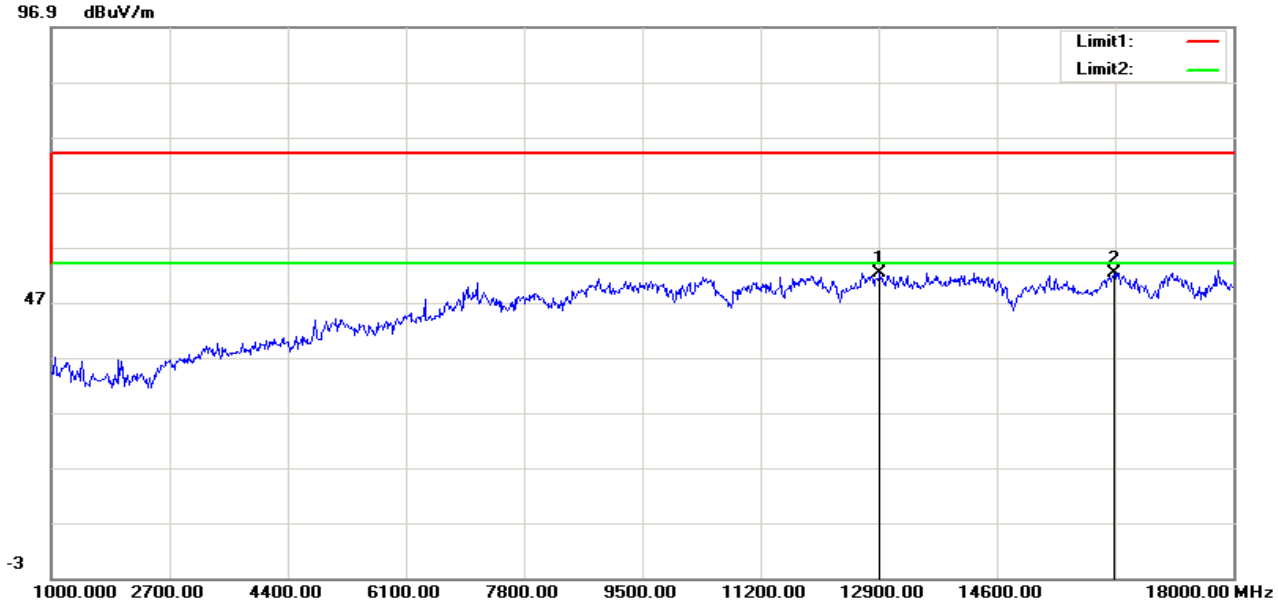
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11897.000	40.69	11.96	52.65	74.00	-21.35	200	116	peak
2	13920.000	39.87	12.70	52.57	74.00	-21.43	200	299	peak

Vertical

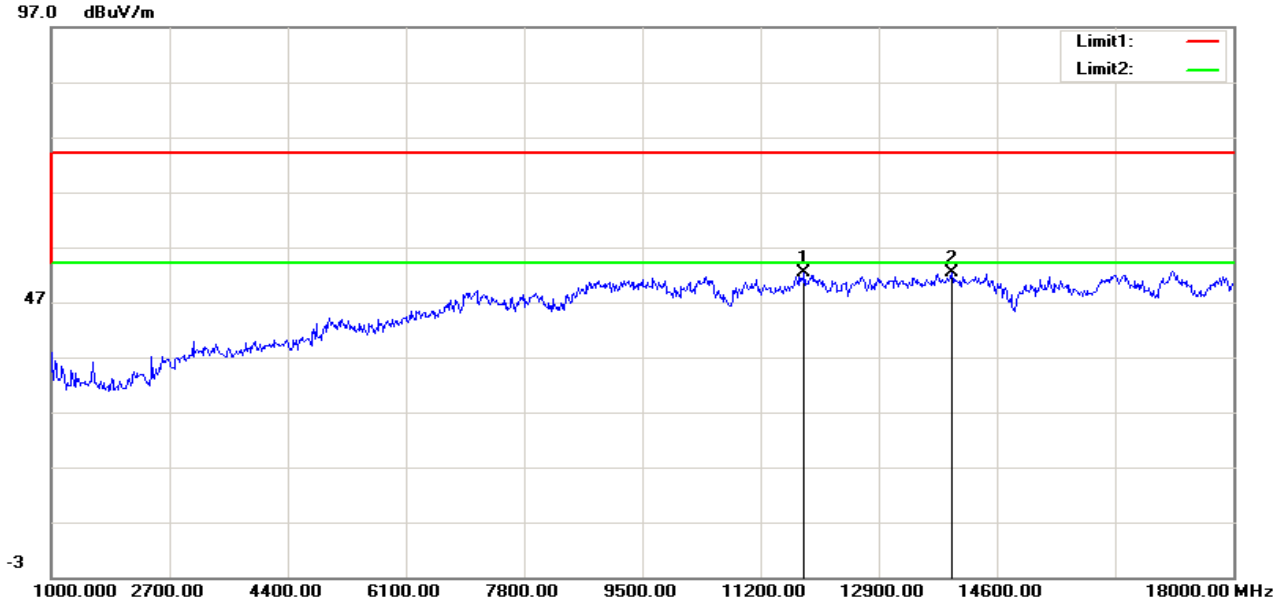


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	12917.000	39.84	12.42	52.26	74.00	-21.74	100	31	peak
2	16283.000	37.94	14.40	52.34	74.00	-21.66	100	360	peak

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Mid
Temperature: 25°C
Humidity: 51 % RH

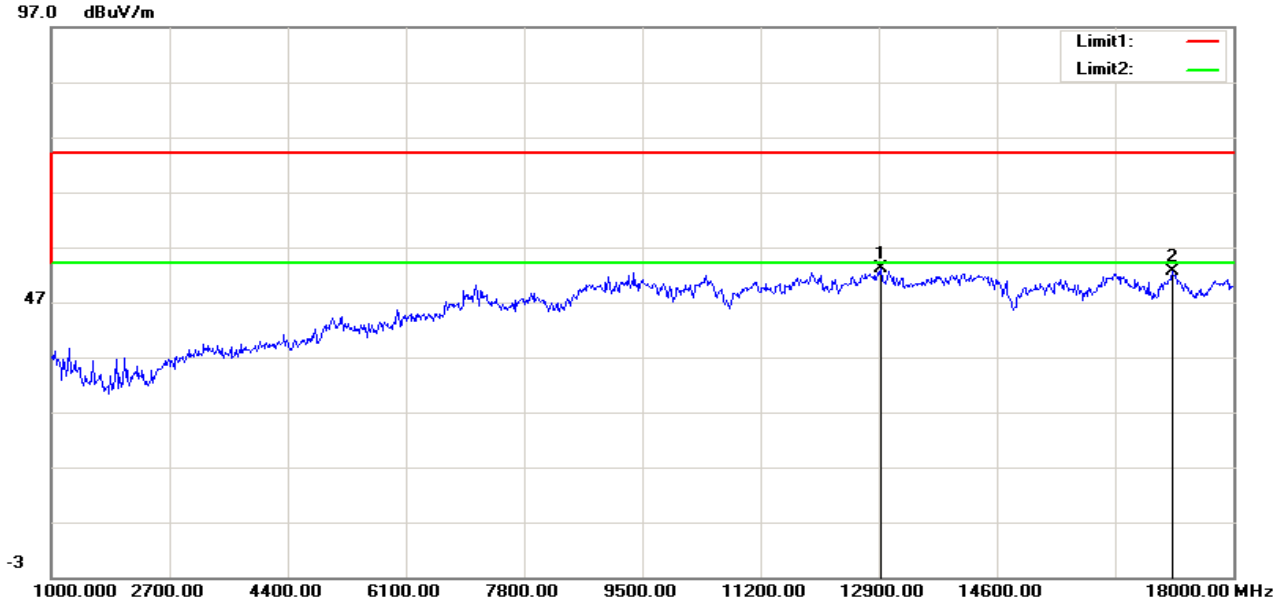
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11829.000	40.50	11.85	52.35	74.00	-21.65	100	339	peak
2	13954.000	39.39	12.91	52.30	74.00	-21.70	100	204	peak

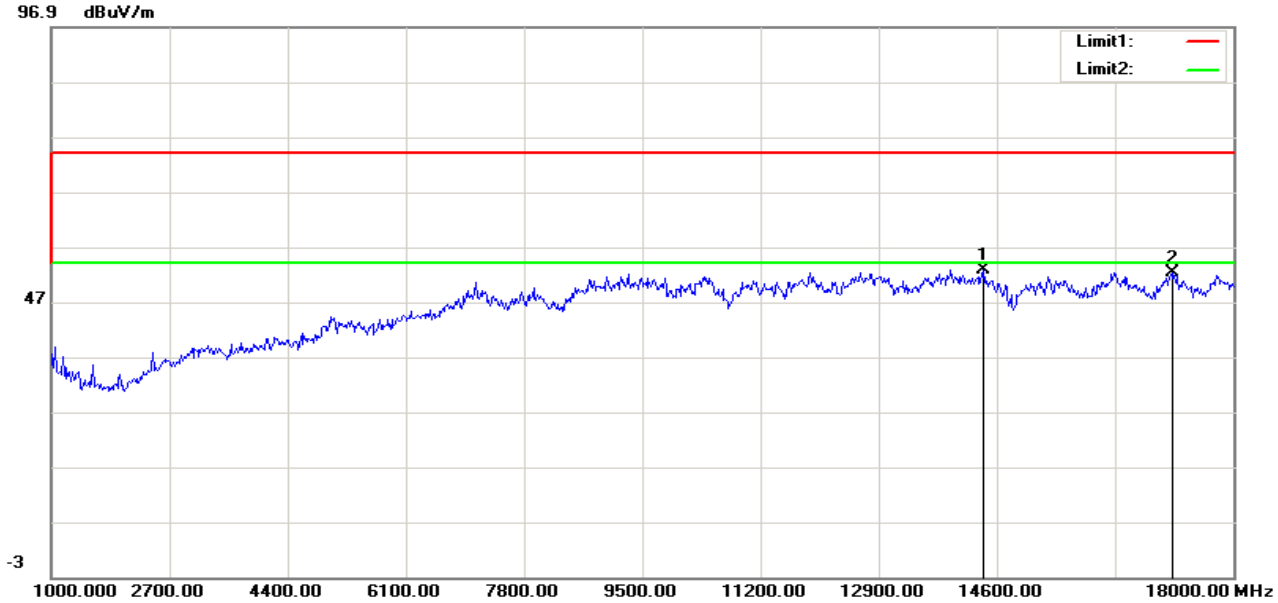
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12934.000	40.62	12.44	53.06	74.00	-20.94	100	360	peak
2	17116.000	36.58	16.08	52.66	74.00	-21.34	200	204	peak

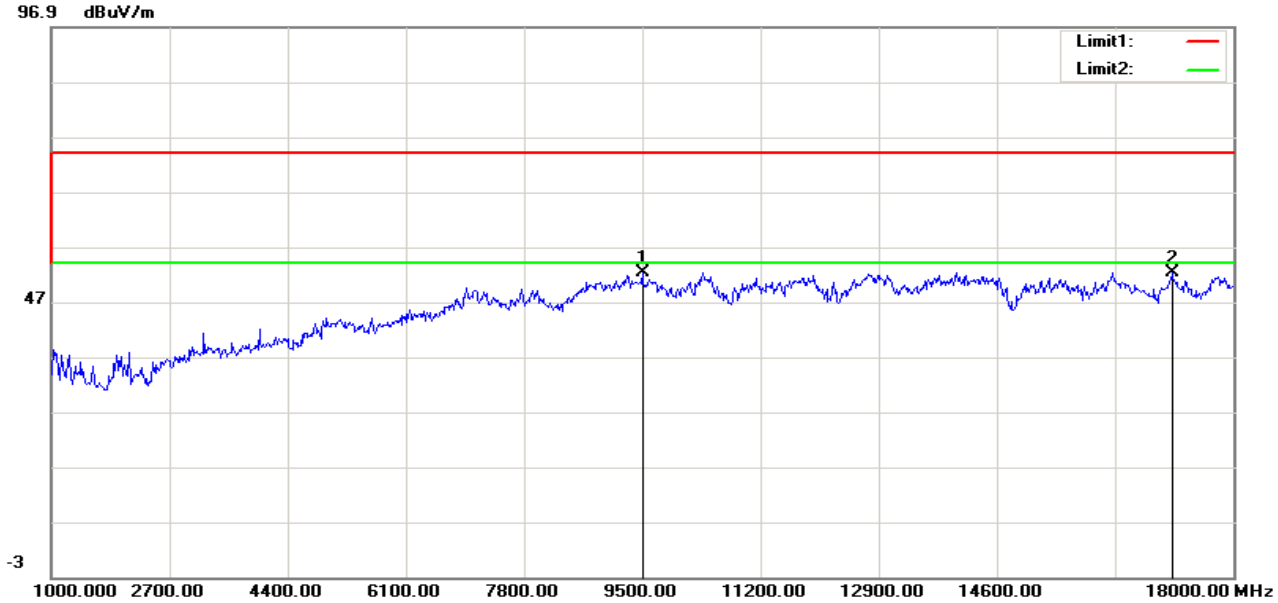
Operation Mode: TX / IEEE 802.11n HT20 mode / CH High **Test Date:** 2018-11-1
Temperature: 25°C **Tested by:** Wendy.Wei
Humidity: 51 % RH **Polarity:** Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	14413.000	39.77	13.05	52.82	74.00	-21.18	200	122	peak
2	17116.000	36.29	16.08	52.37	74.00	-21.63	100	309	peak

Vertical

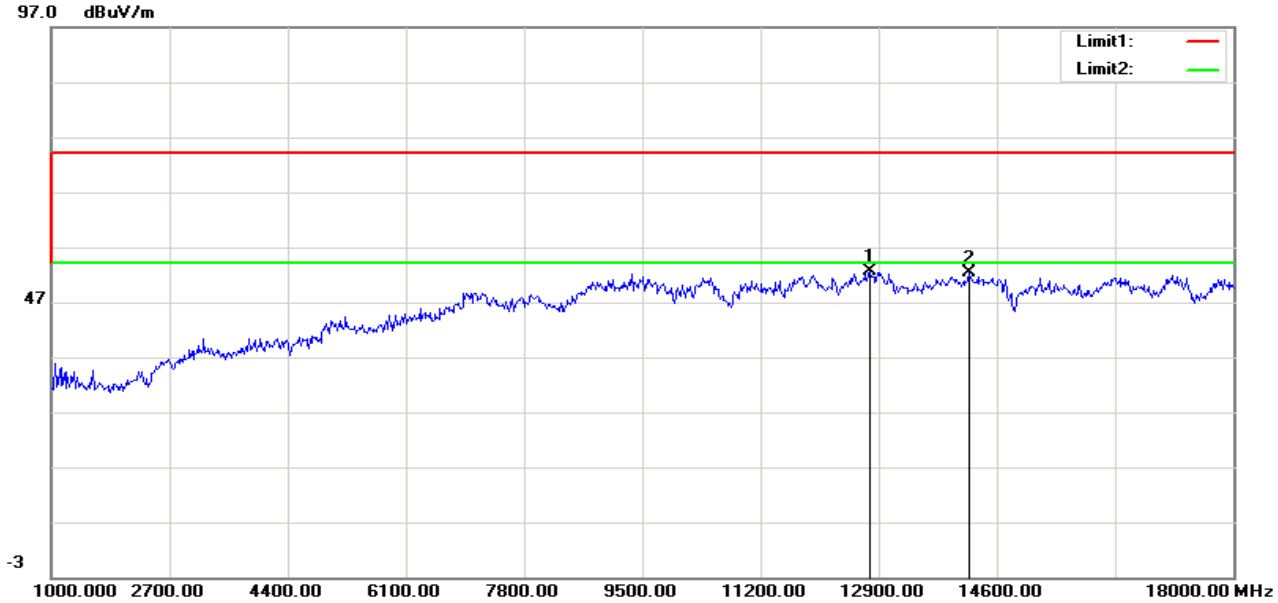


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	9500.000	43.19	9.06	52.25	74.00	-21.75	100	164	peak
2	17116.000	36.24	16.08	52.32	74.00	-21.68	200	227	peak

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Low
Temperature: 25°C
Humidity: 51 % RH

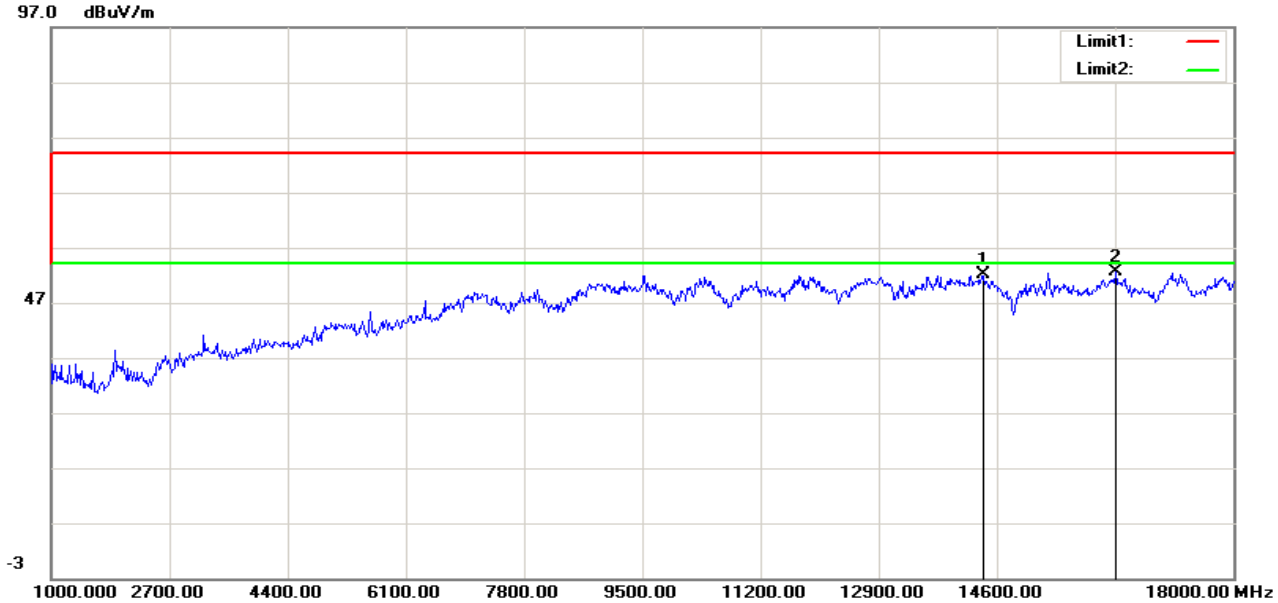
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	12764.000	40.41	12.19	52.60	74.00	-21.40	100	86	peak
2	14192.000	39.32	13.12	52.44	74.00	-21.56	100	214	peak

Vertical

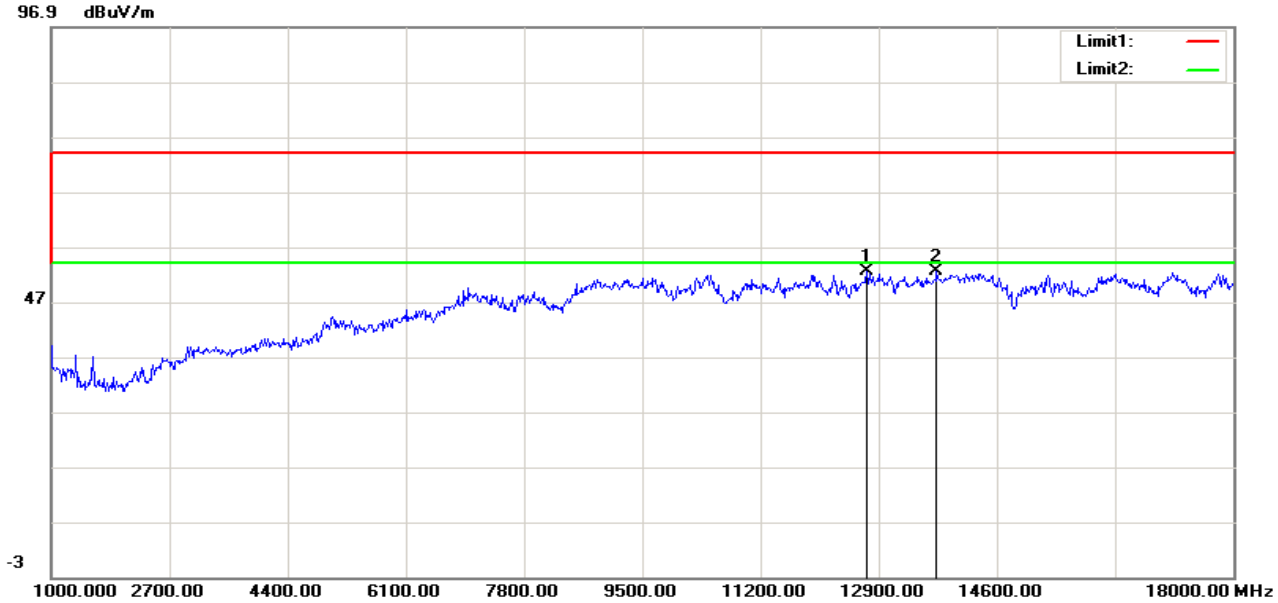


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	14396.000	38.93	13.06	51.99	74.00	-22.01	200	124	peak
2	16317.000	38.23	14.41	52.64	74.00	-21.36	100	360	peak

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Mid
Temperature: 25°C
Humidity: 51 % RH

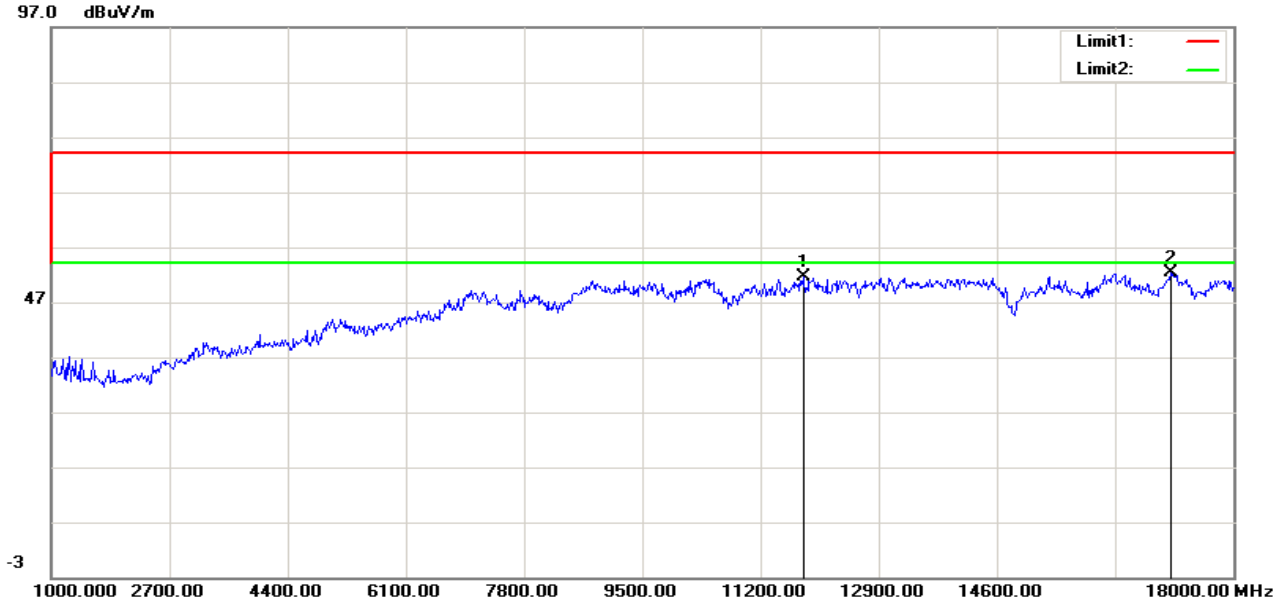
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12730.000	40.29	12.13	52.42	74.00	-21.58	100	101	peak
2	13733.000	40.91	11.56	52.47	74.00	-21.53	100	360	peak

Vertical

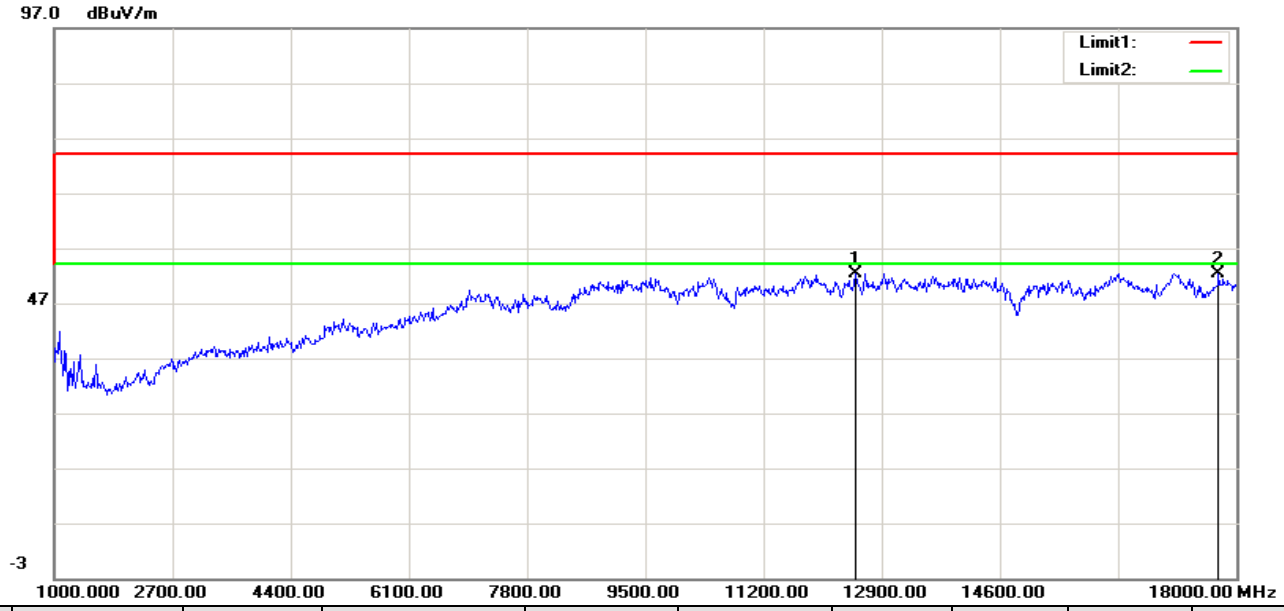


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11812.000	39.91	11.82	51.73	74.00	-22.27	100	189	peak
2	17099.000	36.37	16.01	52.38	74.00	-21.62	100	229	peak

Operation Mode: TX / IEEE 802.11n HT40 mode / CH High
Temperature: 25°C
Humidity: 51 % RH

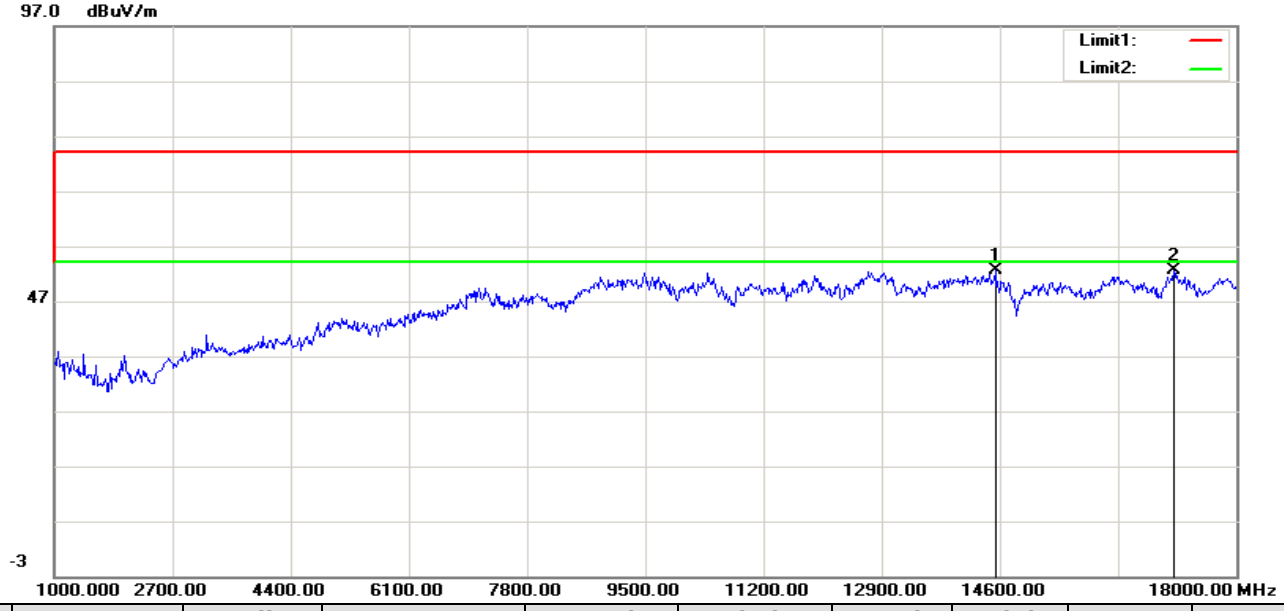
Test Date: 2018-11-1
Tested by: Wendy.Wei
Polarity: Ver. / Hor.

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12526.000	40.51	11.83	52.34	74.00	-21.66	100	360	peak
2	17745.000	34.51	17.86	52.37	74.00	-21.63	100	349	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	14532.000	39.45	13.05	52.50	74.00	-21.50	200	301	peak
2	17099.000	36.67	16.01	52.68	74.00	-21.32	200	135	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 3 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.
6. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).

8.6.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 0.8m 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.

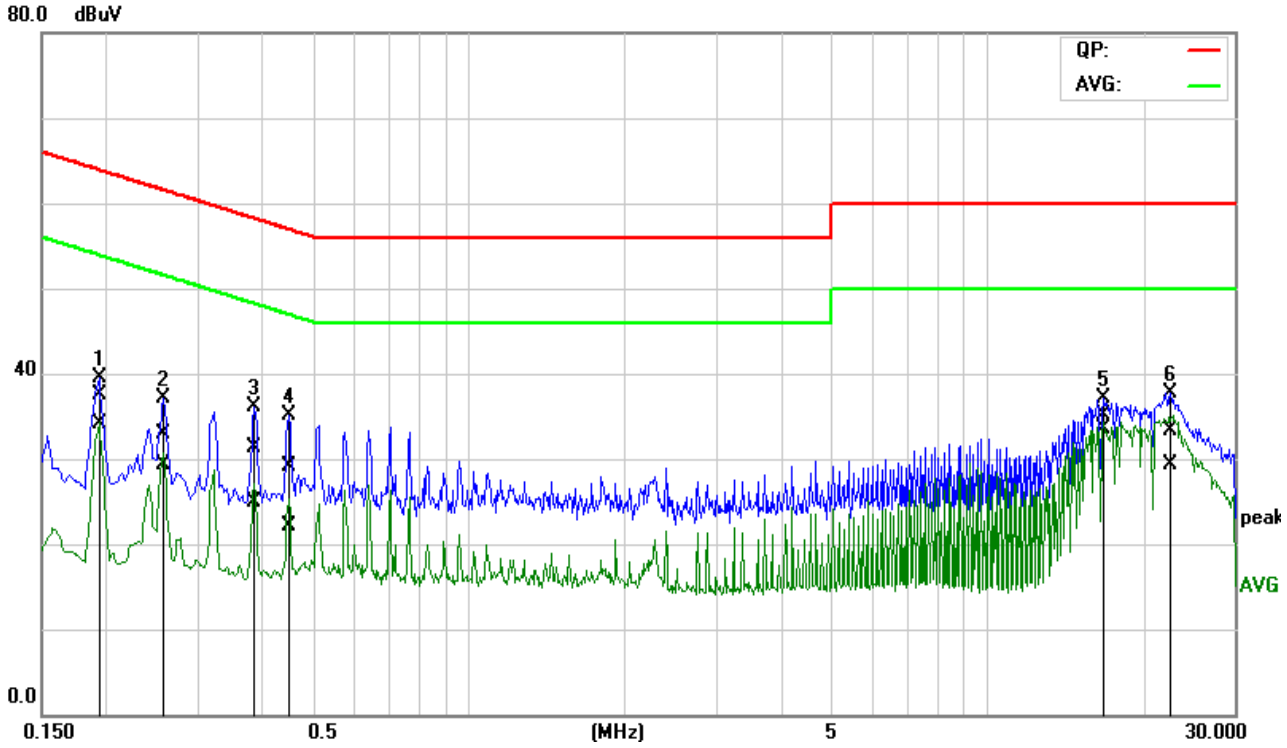
TEST RESULTS

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.:	C180928E08	Date:	2018/11/5
Model No.:	Mars1717XU-VSI	Time:	9:14:31
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/41%
Test item:	Conduction test	Test By:	Wendy.Wei
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L1

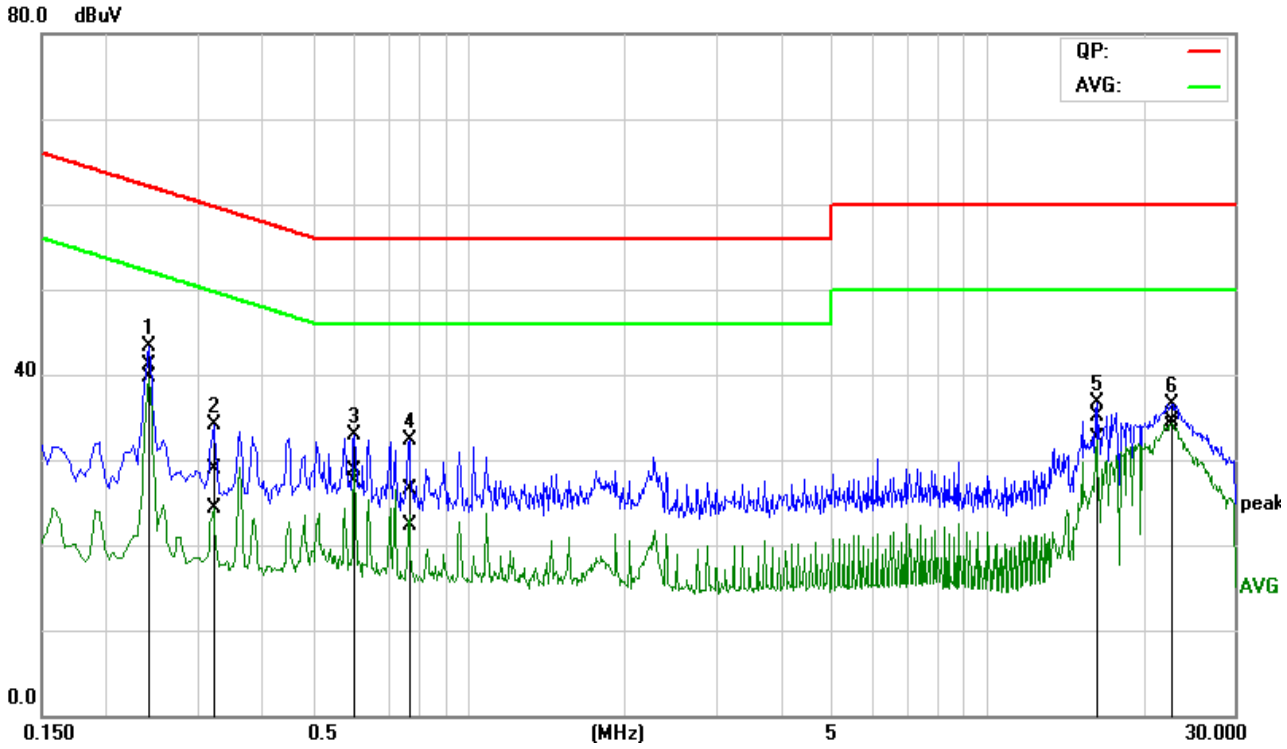


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1927	18.01	14.67	19.45	37.46	34.12	63.92	53.92	-26.46	-19.80	Pass
2	0.2586	13.45	9.89	19.47	32.92	29.36	61.48	51.48	-28.56	-22.12	Pass
3	0.3876	11.84	5.41	19.49	31.33	24.90	58.11	48.11	-26.78	-23.21	Pass
4	0.4523	9.59	2.56	19.49	29.08	22.05	56.83	46.83	-27.75	-24.78	Pass
5*	16.8426	15.03	13.43	20.06	35.09	33.49	60.00	50.00	-24.91	-16.51	Pass
6	22.6191	13.18	9.13	20.08	33.26	29.21	60.00	50.00	-26.74	-20.79	Pass

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

Job No.:	C180928E08	Date:	2018/11/5
Model No.:	Mars1717XU-VSI	Time:	9:21:22
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/41%
Test item:	Conduction test	Test By:	Wendy.Wei
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*	0.2410	21.74	20.30	19.45	41.19	39.75	62.06	52.06	-20.87	-12.31	Pass
2	0.3211	9.35	4.81	19.47	28.82	24.28	59.68	49.68	-30.86	-25.40	Pass
3	0.6037	9.29	7.96	19.49	28.78	27.45	56.00	46.00	-27.22	-18.55	Pass
4	0.7706	7.00	2.76	19.53	26.53	22.29	56.00	46.00	-29.47	-23.71	Pass
5	16.2290	15.20	12.52	20.00	35.20	32.52	60.00	50.00	-24.80	-17.48	Pass
6	22.7383	14.53	13.81	20.03	34.56	33.84	60.00	50.00	-25.44	-16.16	Pass

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

*Re*mark:

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