FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Product Name: Wireless Presentation & Collaboration System
Brand Name: DELTA , VIVITEK
Model No.: NP2000
Series Model.: DS200
FCC ID:H79-0120C8
Test Report Number:
C151118R01-RPW

Issued for

Delta Electronic Incorporated.
3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan

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

ACCREDITED
TESTING CERT #2541.01

Revision History

Revision	REPORT NO.	Date	Page Revised	Contents
Original	C151118R01-RPW	May 10, 2016	N/A	N/A
01	C151118R01-RPW	June 1, 2016	P10,P29,P31, P93~P101	On page 29&31 add antennas description, Calculate the antenna gain is 3dBi,on page 64 add 9kHz to 30MHz don't test specification, On page 93 to 101 update the bandedge test data

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1. TEST RESULT CERTIFICATION

Product Name:	Wireless Presentation & Collaboration System
Trade Name:	DELTA , VIVITEK
Model Name.:	NP2000
Series Model:	DS200
Applicant Discrepancy:	Initial
Device Category:	Production unit
Date of Test:	April12, 2016 ~ April 29, 2016
Applicant:	**Delta Electronic Incorporated.** 3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Manufacturer:	**Delta Electronic Incorporated.** 3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan
Application Type:	Certification

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

We hereby certify that:

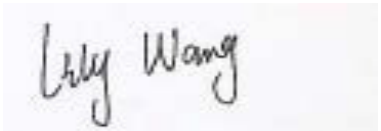
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described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

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

Approved by:

Jeff.Fang
RF Manager
Compliance Certification Service Inc.

Tested by:



Lily.Wang
Test Engineer
Compliance Certification Service Inc.

2. EUT DESCRIPTION

Product Name:	Wireless Presentation & Collaboration System
Brand Name:	DELTA , VIVITEK
Model Name:	NP2000
Series Model:	DS200
Model Discrepancy:	Only for market segment
Power Adapter:	Power supply and ADP（rating）: Model: W12-010N3A Input: 100-240V-50/60Hz 0.3A Output: 5V 2A
Frequency Range:	IEEE 802.11b/g: 2412MHz to 2472 MHz IEEE 802.11n HT20: 2412MHz to 2472 MHz IEEE 802.11n HT40: 2422MHz to 2462 MHz
Transmit Power:	IEEE 802.11b mode: 10.48dBm IEEE 802.11g mode: 14.89 dBm IEEE 802.11n HT20 mode: 17.15 dBm IEEE 802.11n HT40 mode: 17.58 dBm
Modulation Technique:	IEEE802.11b mode: DSSS (1,2,5.5 and 11 Mbps) IEEE802.11g mode: DSSS /OFDM (6,9,12,18,24,36,48 and 54 Mbps) IEEE802.11n HT20 mode: OFDM (MCS0~MCS7) IEEE802.11n HT40 mode: OFDM (MCS0~MCS7)
Number of Channels:	IEEE 802.11b/g/n HT20 mode: 11 Channels IEEE 802.11n HT40 : 9 Channels
Antenna Specification:	PCB antenna 0 for 2.4GHz Gain 3.0dBi PCB antenna 1 for 2.4GHz Gain 3.0dBi

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:H79-0120C8*** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

3. TEST METHODOLOGY

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

3.1. EUT CONFIGURATION

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

3.2. EUT EXERCISE

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

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

3.3. GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 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 13.1.4.1 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 13.1.4.1 of ANSI C63.10:2013.

3.4.FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

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

[2] Above 38.6

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

3.5.DESCRIPTION OF TEST MODES

Test Mode	Ant 1	Ant 2	Ant 1+2
802.11b	√	√	x
802.11g	√	√	x
802.11n HT20	√	√	√
802.11n HT40	√	√	√

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 24Mbps 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)

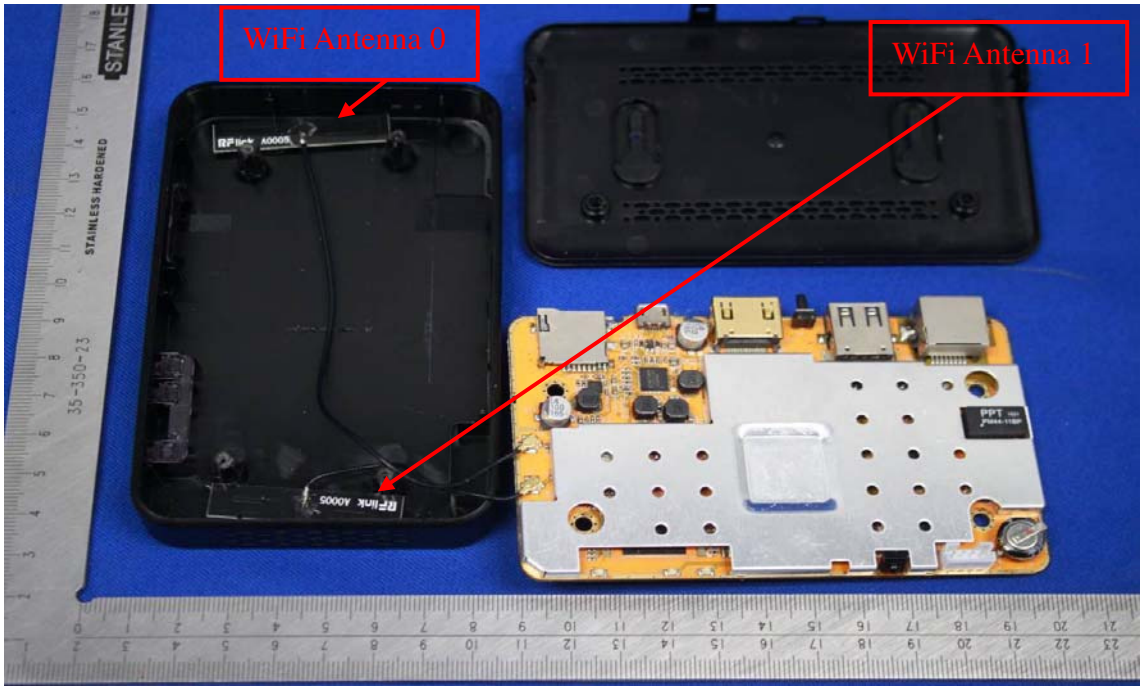
Channel Mid (2437MHz)

Channel High (2452MHz) with MCS0 data rate was chosen for full testing.

3.6.ANTENNA DESCRIPTION

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"

* the antenna of this EUT is a unique(PCB Antenna for 2.4G WiFi).
* the EUT complies with the requirement of 15.203.



4. INSTRUMENT CALIBRATION

4.1.MEASURING INSTRUMENT CALIBRATION

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

Equipment Used for Emissions Measurement

Conducted Emissions Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-9-11	2016-9-10
Spectrum Analyzer	RS	FSU26	200789	2015-8-10	2016-8-9
OSCILLOSCOPE	Agilent	DSO6104A	MY44002585	2016-3-2	2017-3-1
Power meter	Anritsu	ML2495A	1445010	2016-04-23	2017-04-22
Power sensor	Anritsu	MA2411B	1339220	2016-04-23	2017-04-22
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	2016-1-11	2017-1-10
Test Software			EZ-EMC		

977 Chamber					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-9-11	2016-9-10
Spectrum Analyzer	RS	FSU26	200789	2015-8-10	2016-8-9
EMI Test Receiver	R&S	ESCI	101378	2016-1-6	2017-1-5
Pre-Amplfier	MINI	ZFL-1000VH2	070306	2016-1-13	2017-1-12
Pre-Amplfier	Miteq	JS41-00101800-32-10P	1675713	2015-8-10	2016-8-9
Bilog Antenna	Sunol	JB1	A062604	2016-3-6	2017-3-5
Bilog Antenna	Sunol	JB1	A110204-1	2016-3-6	2017-3-5
Horn-antenna	SCHWARZBECK	9120D	D:266	2016-3-7	2017-3-5
Horn-antenna	SCHWARZBECK	9120D	D:267	2015-11-10	2016-11-9
Loop Antenna	SCHWARZBECK	HXYZ9170	9170-108	2016-4-7	2017-4-6
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
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI TEST RECEIVER	R&S	ESCI	100781	2016-3-2	2017-3-1
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	2015-11-2	2016-11-1
LISN (EUT)	FCC	FCC-LISN-50/250-50-2-02	05012	2015-9-16	2016-9-15
Pulse LIMITER	R&S	ESH3-Z2	100524	2016-1-6	2017-1-5
Test Software			EZ-EMC		

Remark: *The measurement uncertainty is less than +/- 2.81dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Expanded Uncertainty (95% CONFIDENCE INTERVAL): K=2

5. FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

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

Kunshan city JiangSu, (215300), CHINA.

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

5.2. EQUIPMENT

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

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

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

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

5.3. LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 200581-0 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, 2324E-1 for 10m chamber 10m, 2324E-2 for 10m chamber 3m; the test facilities are listed with USA, Certification and Engineering Bureau, 424105 for 10m chamber 10m, 238958 for 10m chamber 3m.

5.4.TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC Part 15/18 (using ANSI C63.10 :2013)；VCCI V3; CNS 13438; CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22:2005; CISPR 22:1997 +A1 :2000+A2 :2002；EN 55022:2006; EN55022 :1998 +A1 :2001+A2 :2003；EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; AS/NZS CISPR 22; CAN/CSA-CEI/IEC CISPR 22；EN 61000-3-2；EN 61000-3-3；EN550024； EN 61000-4-2; EN 61000-4-3；EN61000-4-4；EN 61000-4-5； EN 61000-4-6；IEC 61000-4-8；EN 61000-4-11；IEC61000-3-2；IEC61000-3-3；IEC 61000-4-2； IEC 61000-4-3；IEC 61000-4-4； IEC 61000-4-5；IEC 61000-4-6；IEC 61000-4-8；IEC 61000-4-11；EN 300 220-3; EN 300 328; EN 300 330-2; EN 300 440-1; EN 300-440-2; EN 300 893; EN 301 489-01; EN 301 489-3; EN 301 489-07; EN 301 489-17；47 CFR FCC Part 15, 22, 24	ACCREDITED TESTING CERT #2541.01
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	93105, 90471
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-1600 C-1707 G-216

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

6. SETUP OF EQUIPMENT UNDER TEST

6.1.SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2.SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1.					

Remark:

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

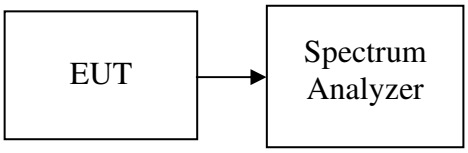
7. FCC PART 15.247 REQUIREMENTS

7.1.6DB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the selected span. The VBW is set to 3 times the RBW. The sweep time is occupied.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode /Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.038	>500	PASS
Mid	2437	8.990		PASS
High	2462	9.087		PASS

IEEE 802.11b mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.038	>500	PASS
Mid	2437	8.990		PASS
High	2462	8.990		PASS

IEEE 802.11g mode /Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.298	>500	PASS
Mid	2437	16.298		PASS
High	2462	16.250		PASS

IEEE 802.11g mode /Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.346	>500	PASS
Mid	2437	16.202		PASS
High	2462	16.010		PASS

IEEE 802.11n HT20 mode / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.596	>500	PASS
Mid	2437	17.452		PASS
High	2462	17.500		PASS

IEEE 802.11n HT20 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.644	>500	PASS
Mid	2437	17.644		PASS
High	2462	17.644		PASS

IEEE 802.11n HT40 mode / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.635	>500	PASS
Mid	2437	36.635		PASS
High	2452	36.635		PASS

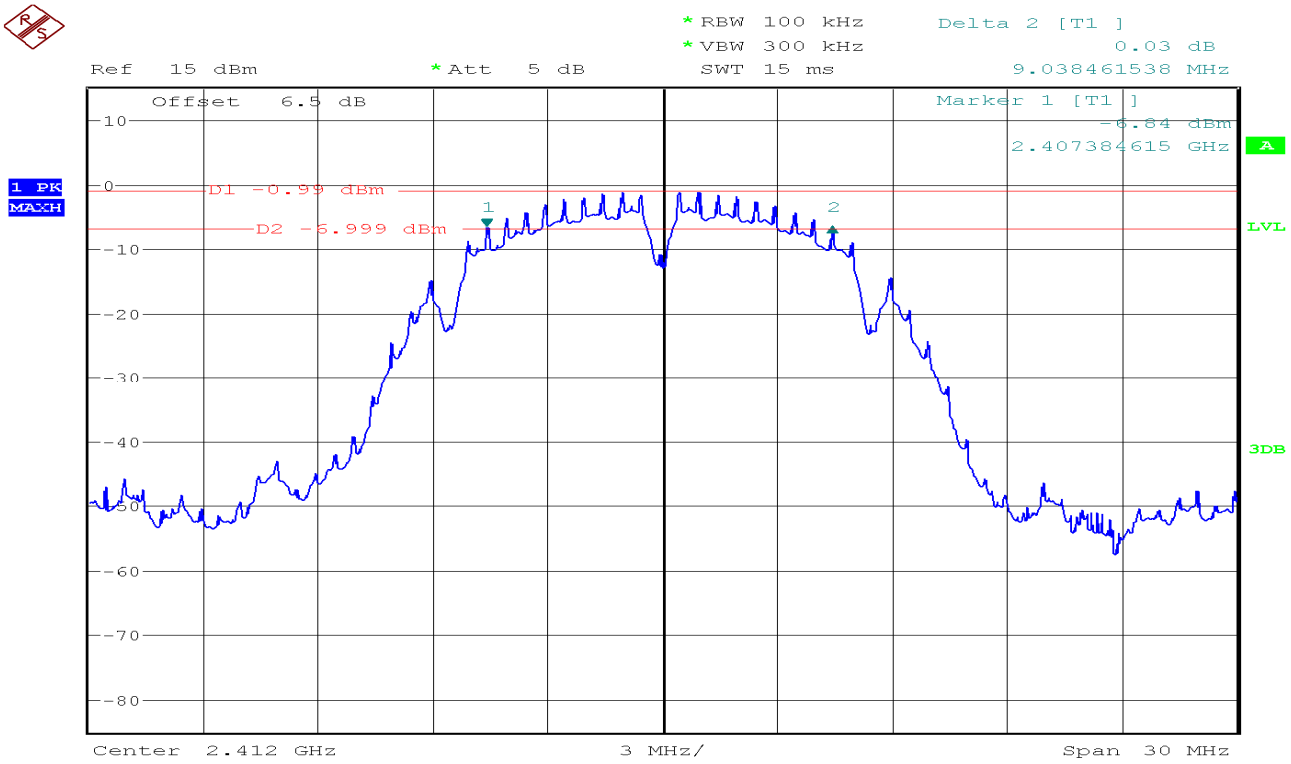
IEEE 802.11n HT40 mode / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.635	>500	PASS
Mid	2437	36.538		PASS
High	2452	36.538		PASS

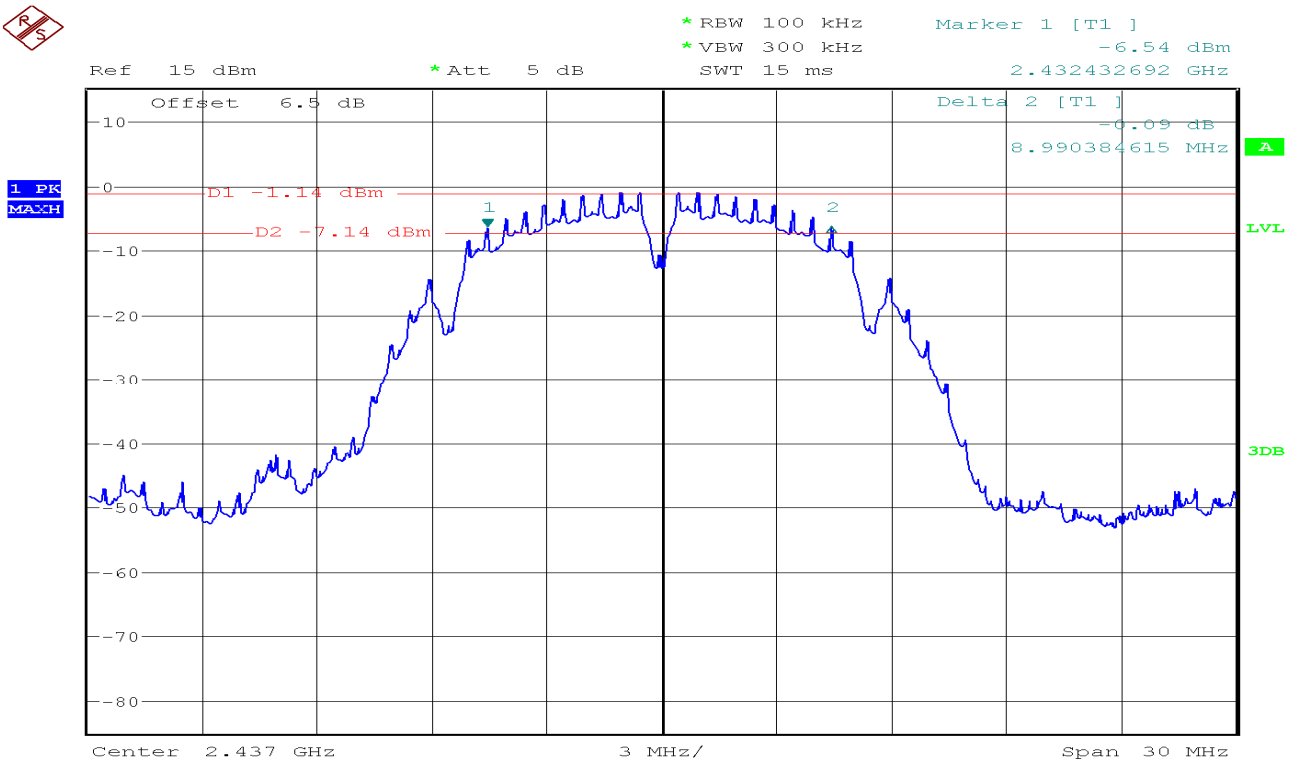
Test Plot

IEEE 802.11b MODE /Chain 0

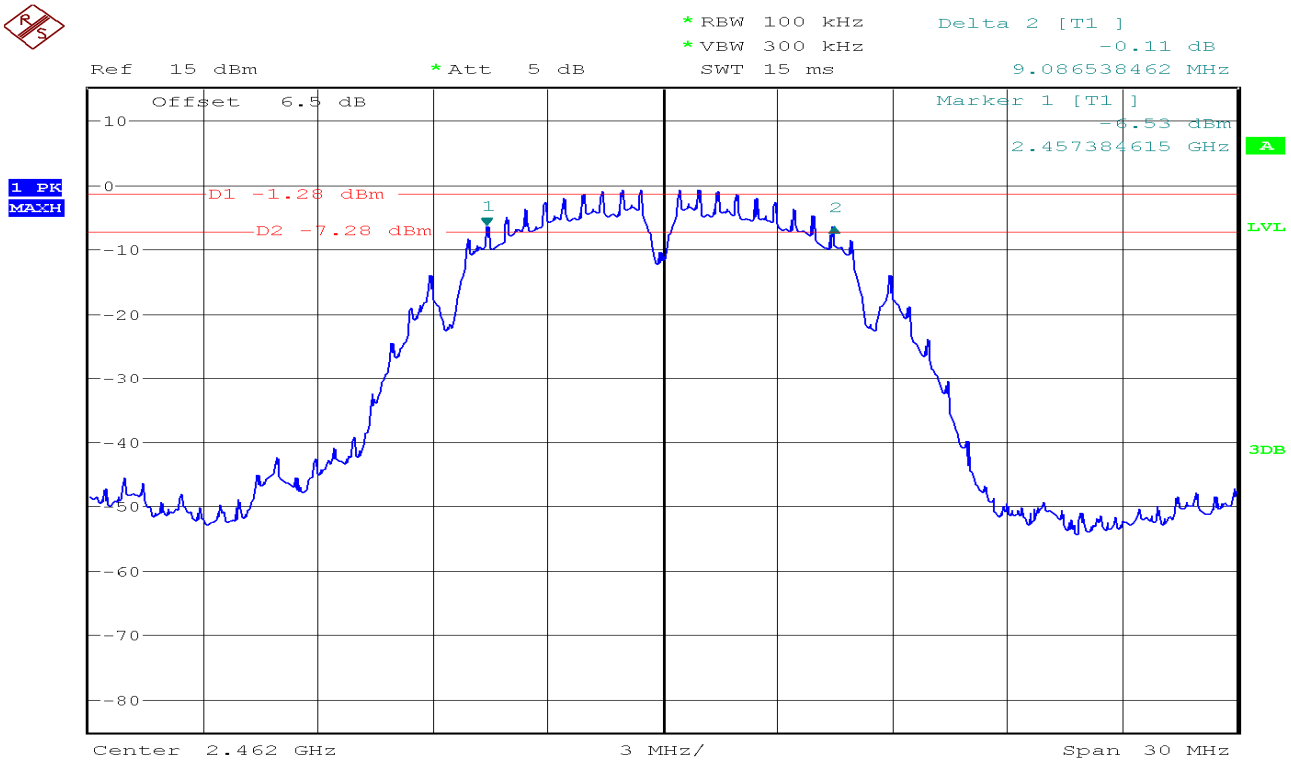
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

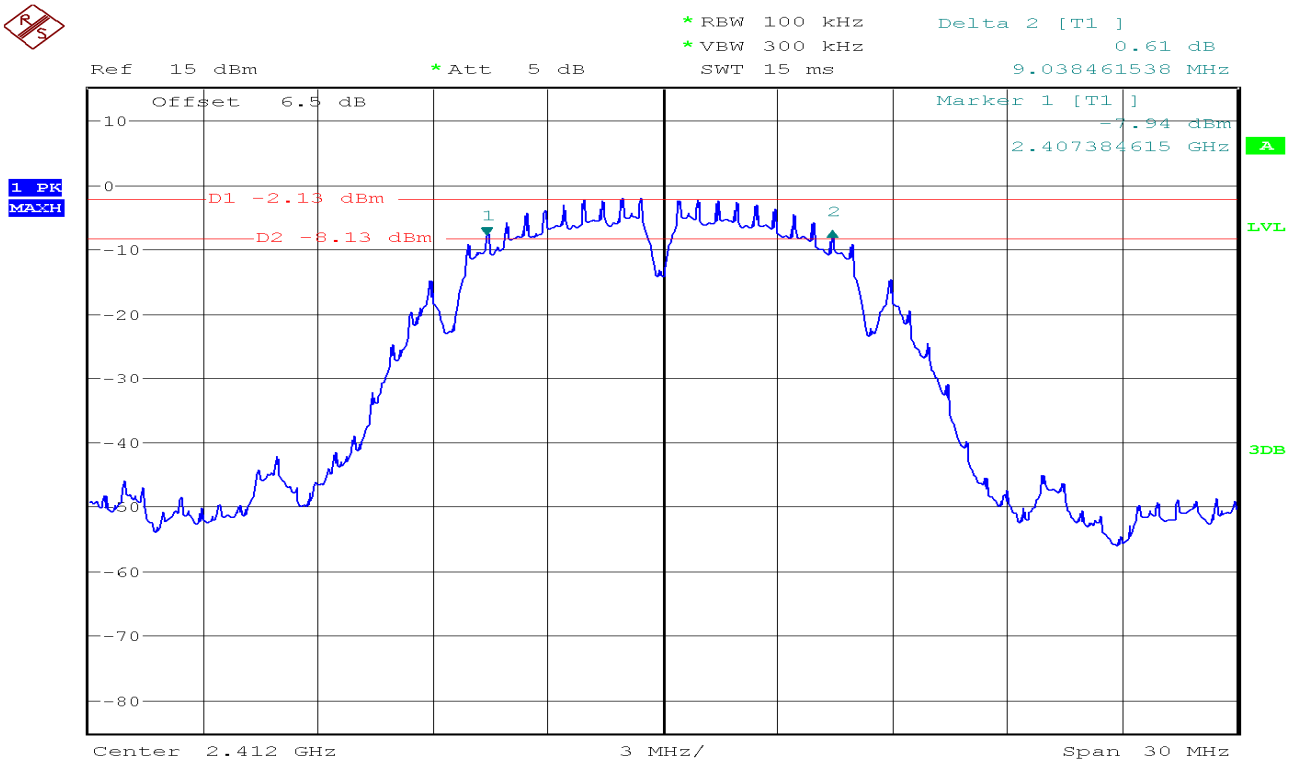


6dB Bandwidth (CH High)

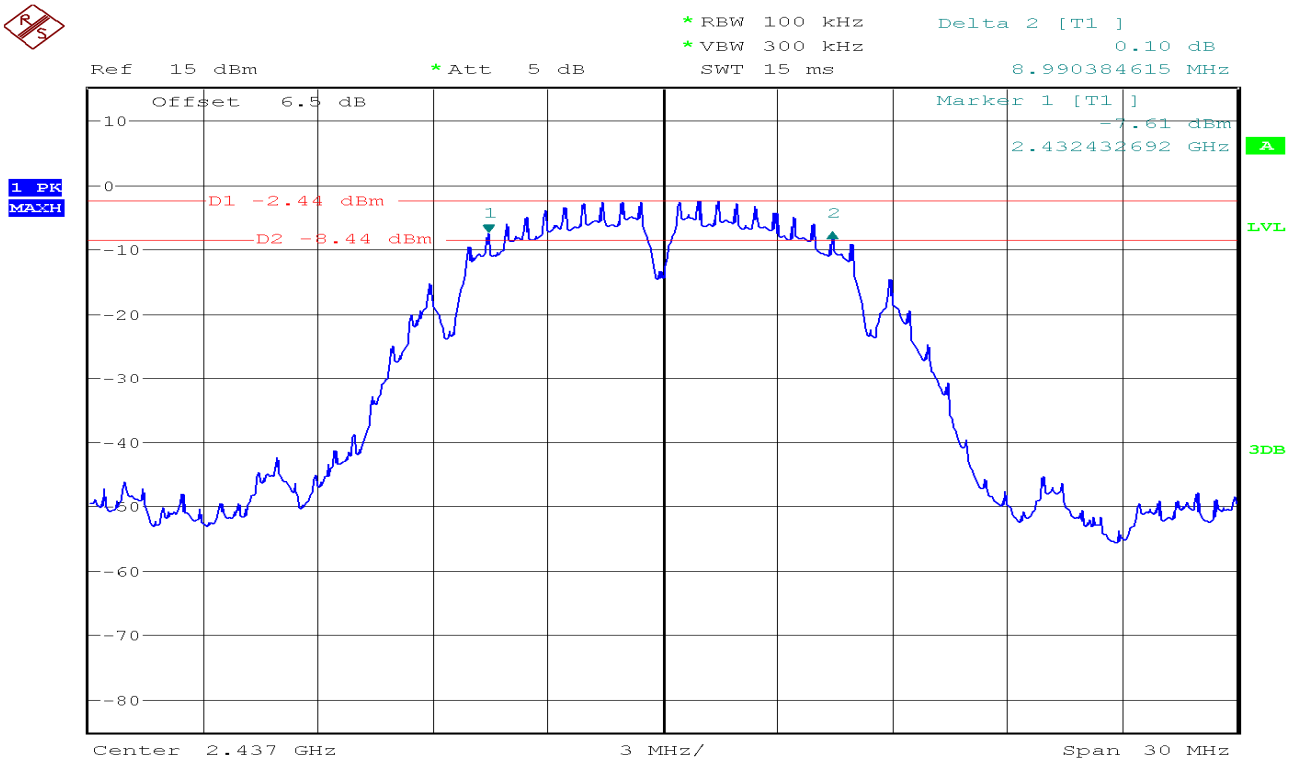


IEEE 802.11b MODE /Chain 1

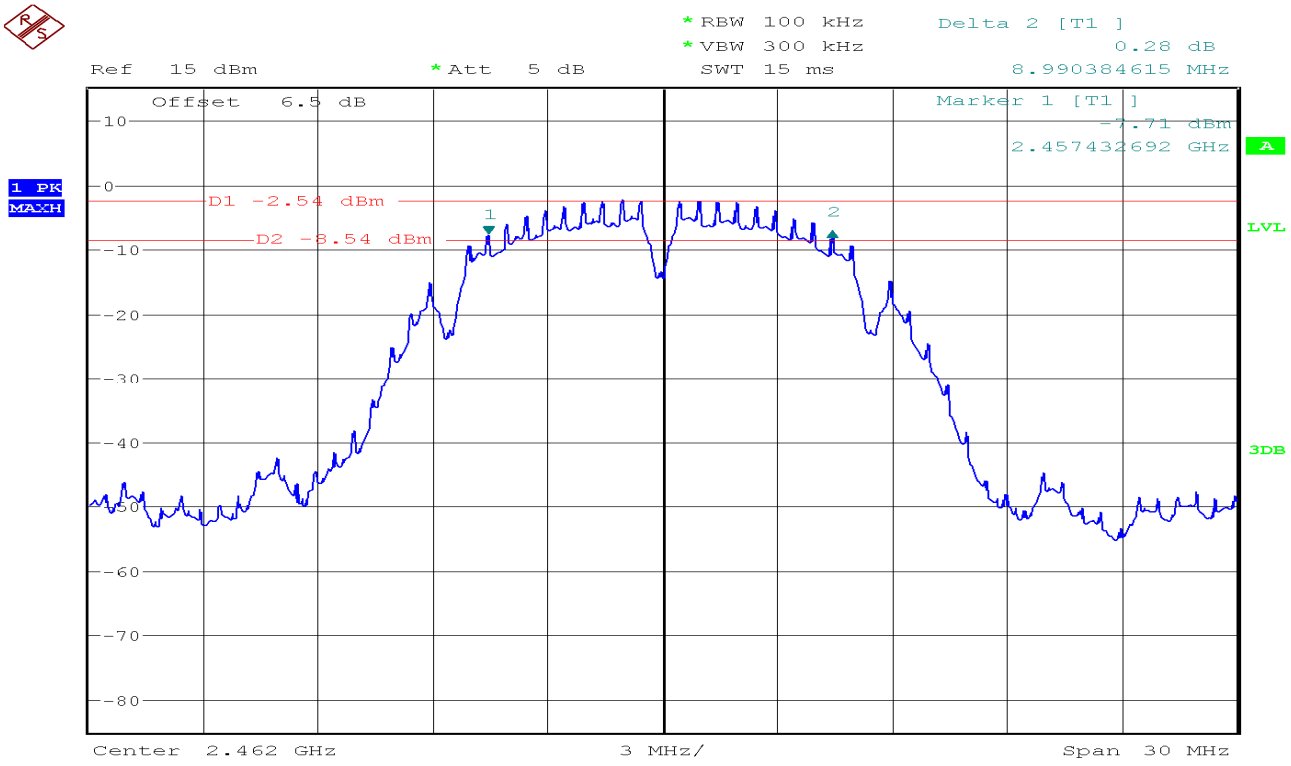
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

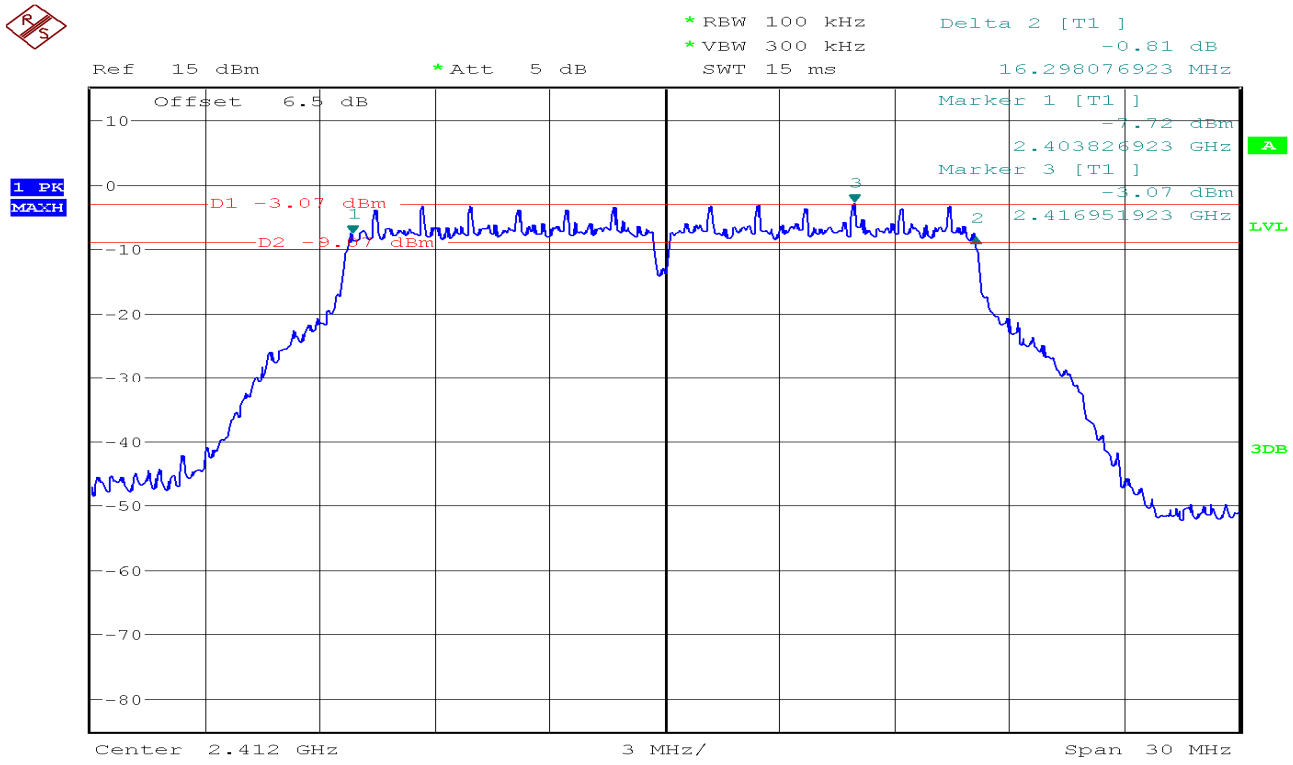


6dB Bandwidth (CH High)

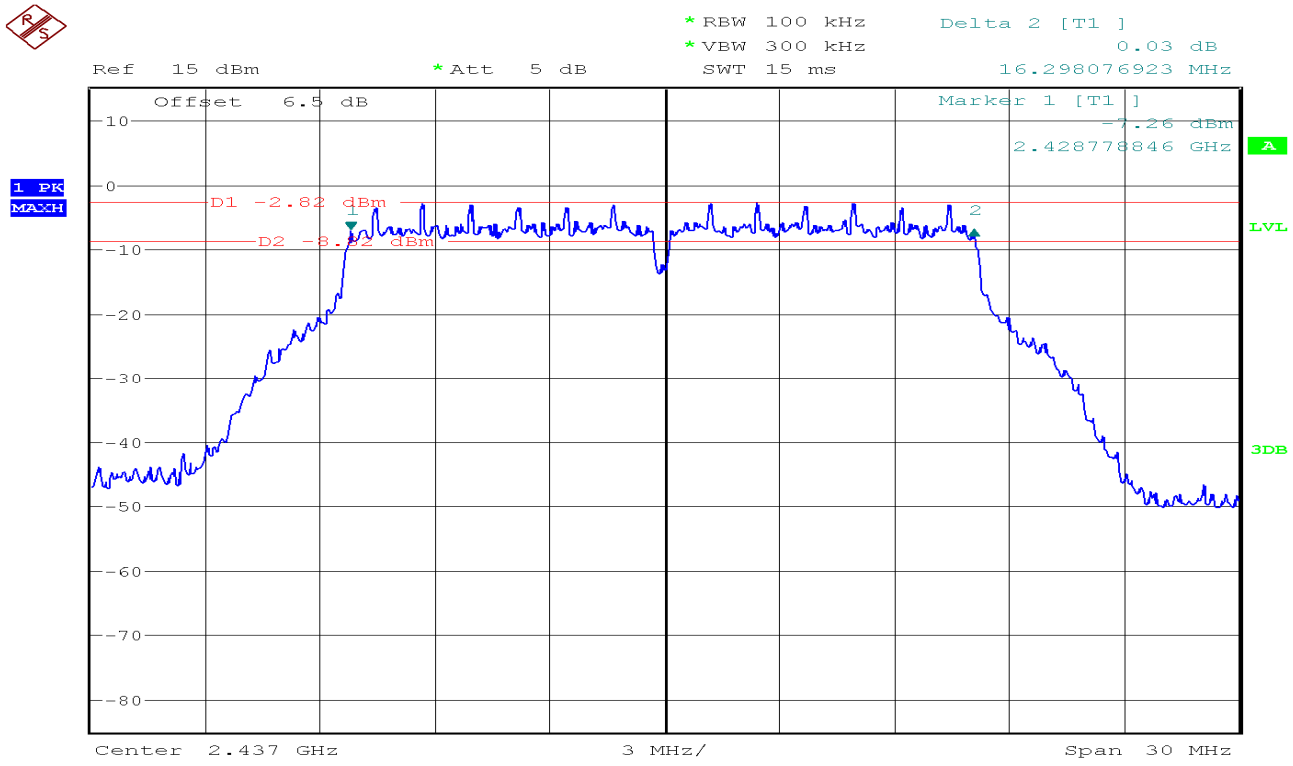


IEEE 802.11g MODE /Chain 0

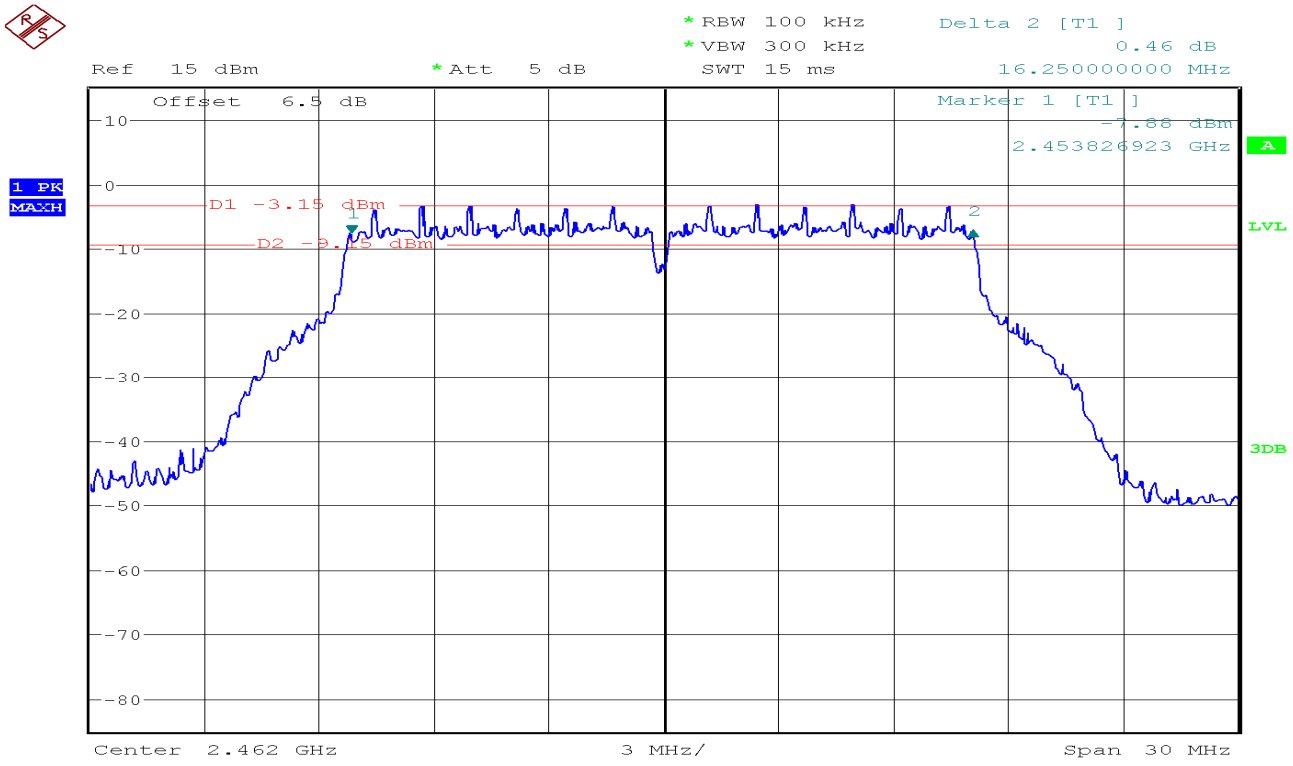
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

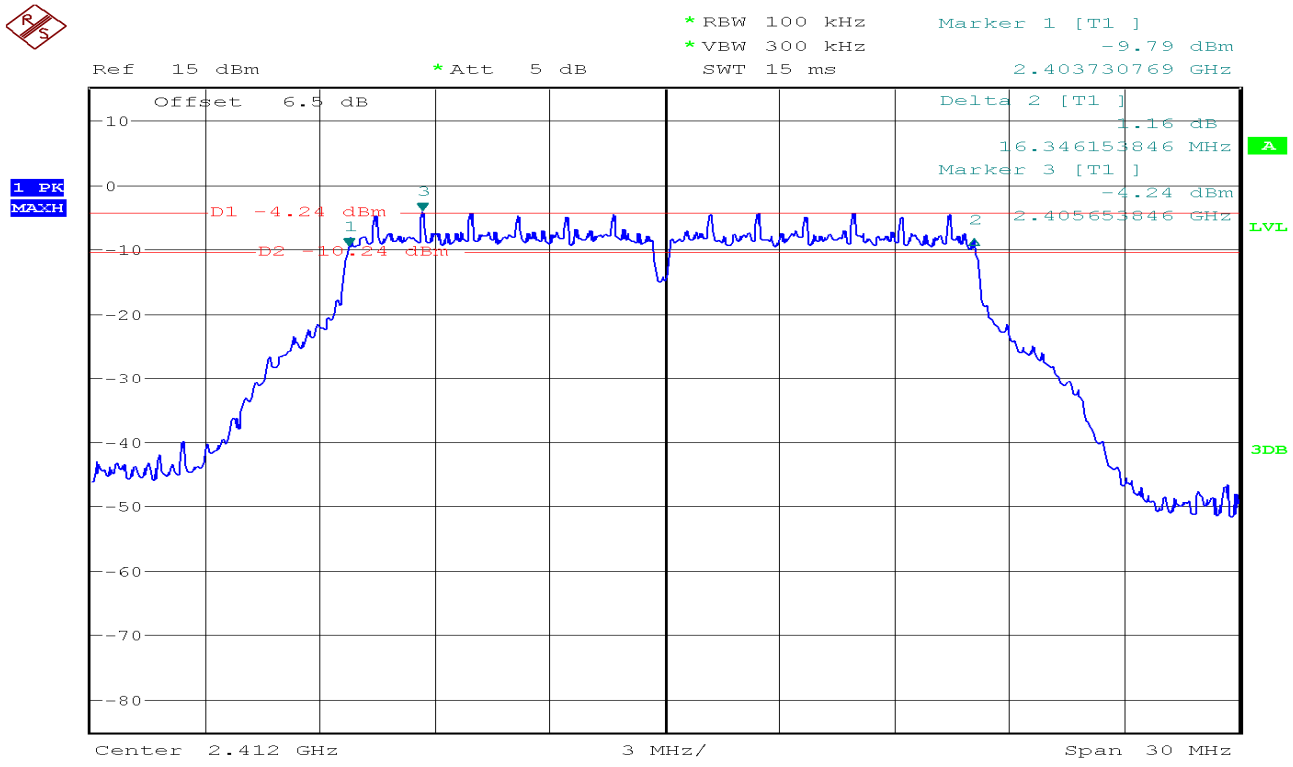


6dB Bandwidth (CH High)

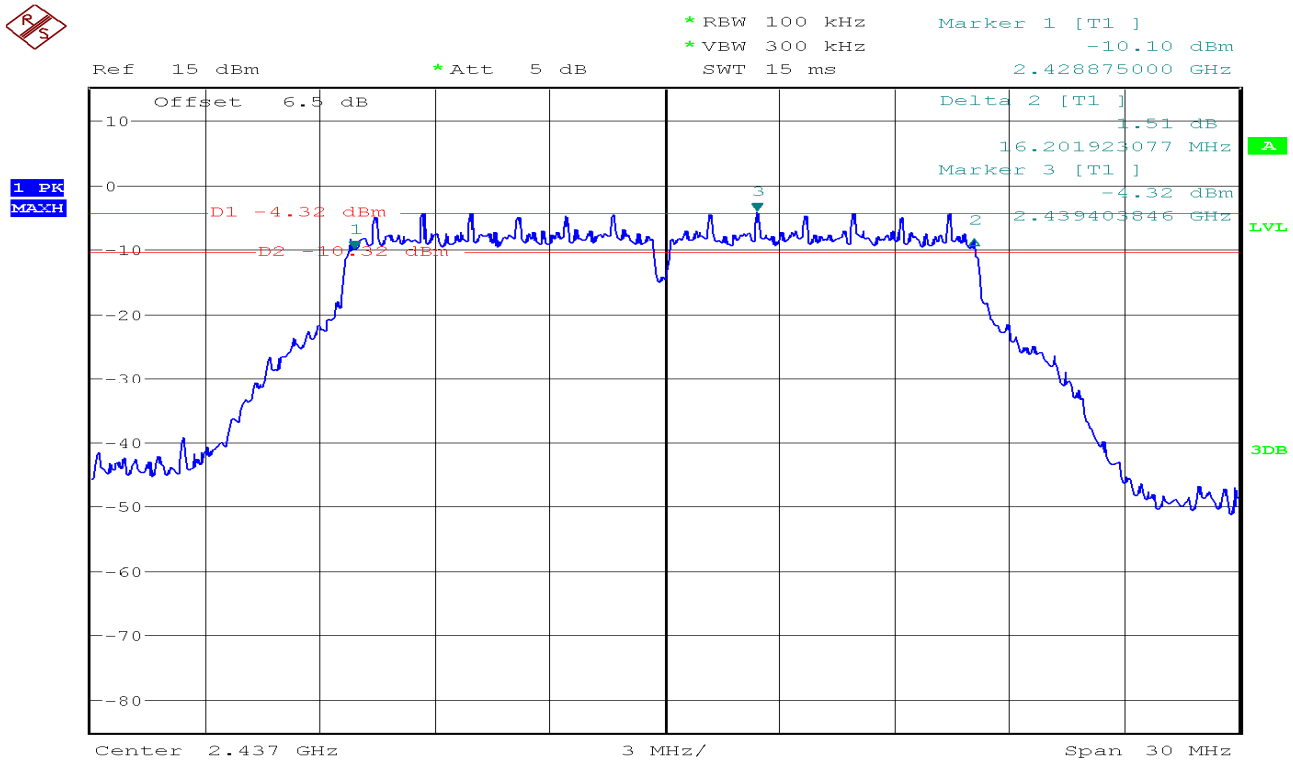


IEEE 802.11g MODE /Chain 1

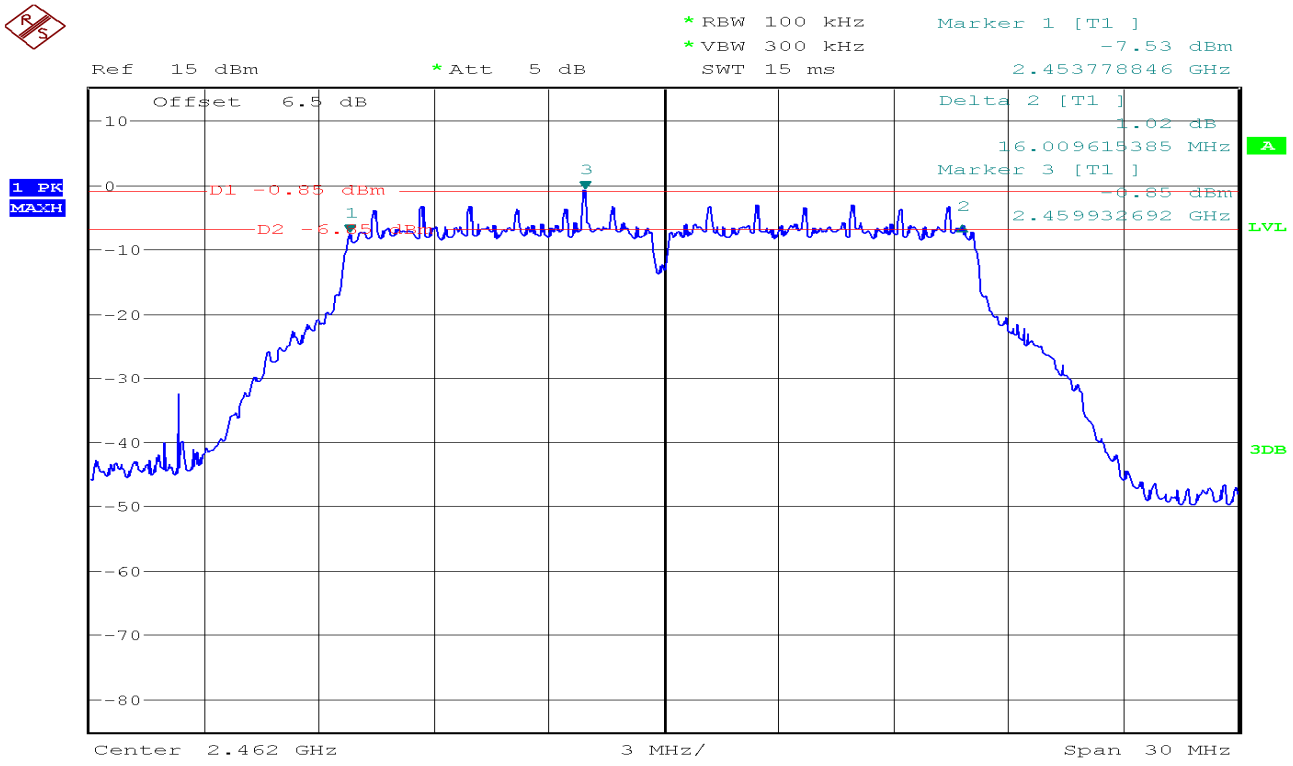
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

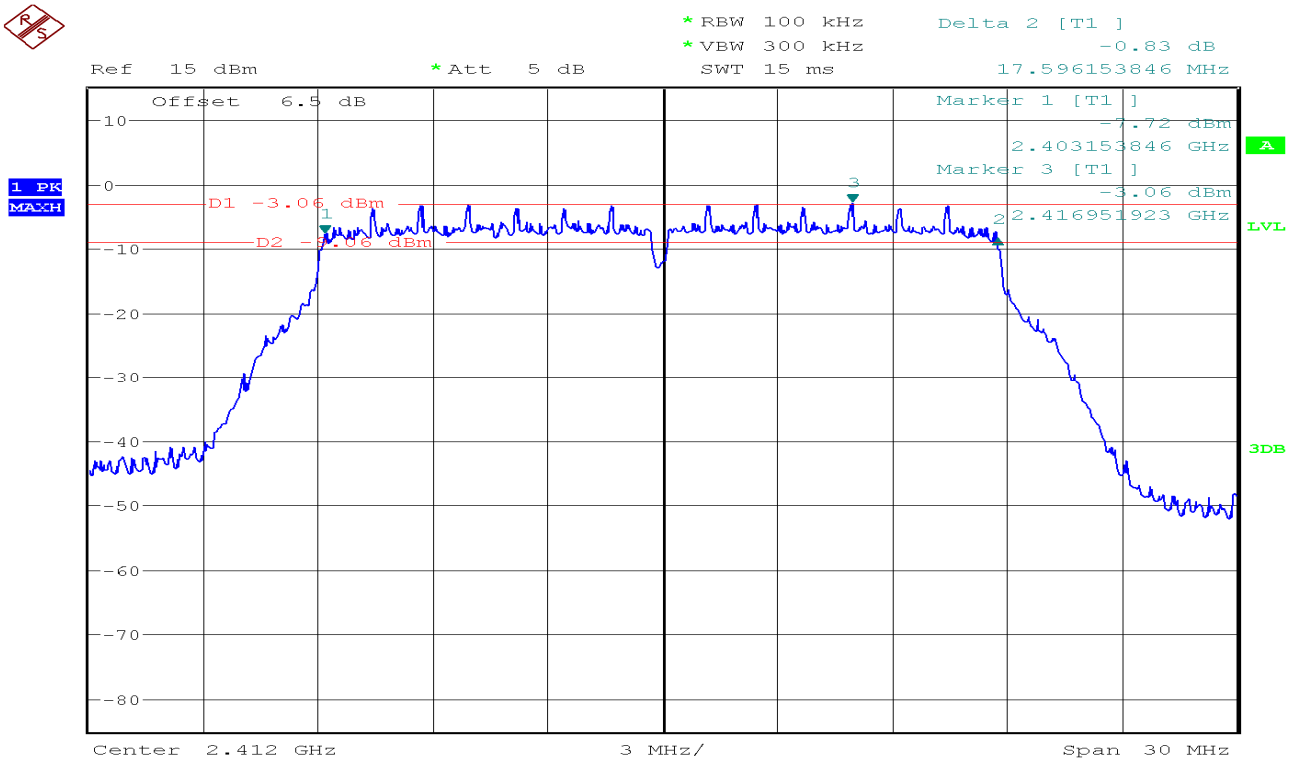


6dB Bandwidth (CH High)

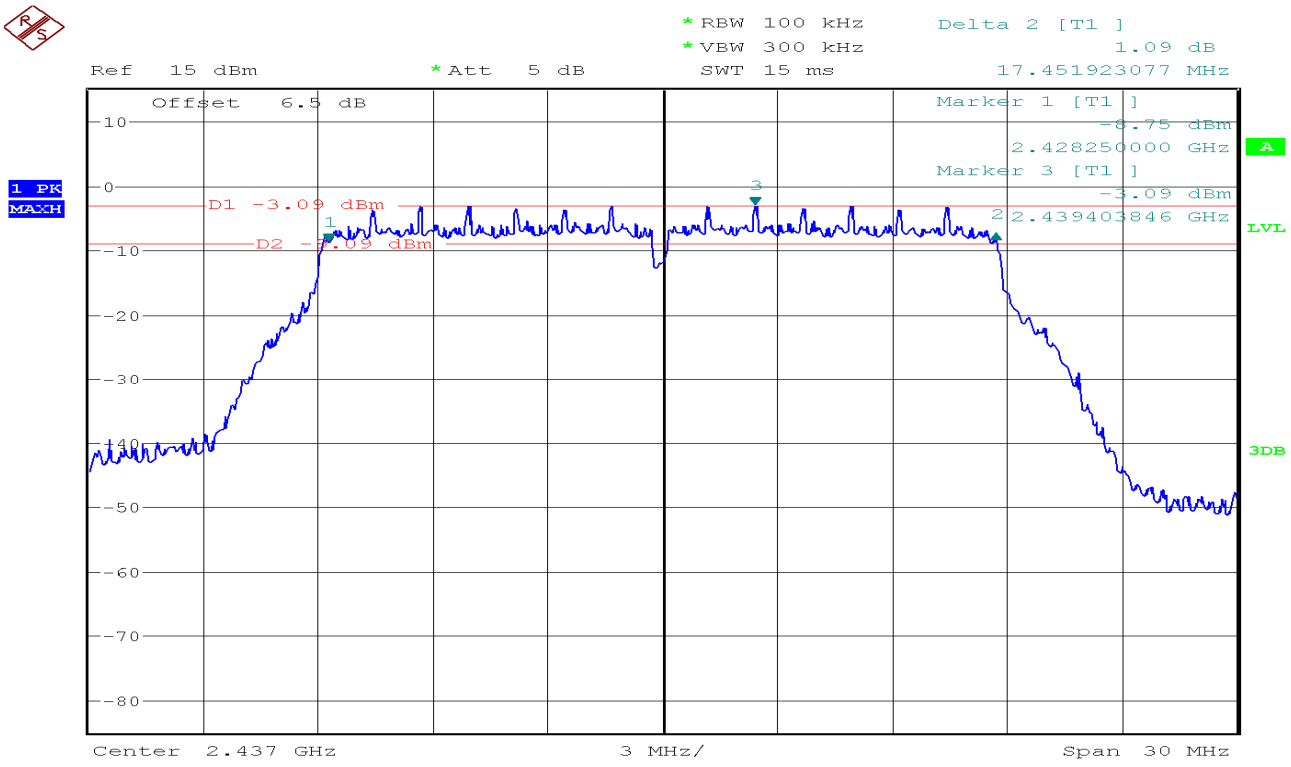


IEEE 802.11n HT20 mode / Chain 0

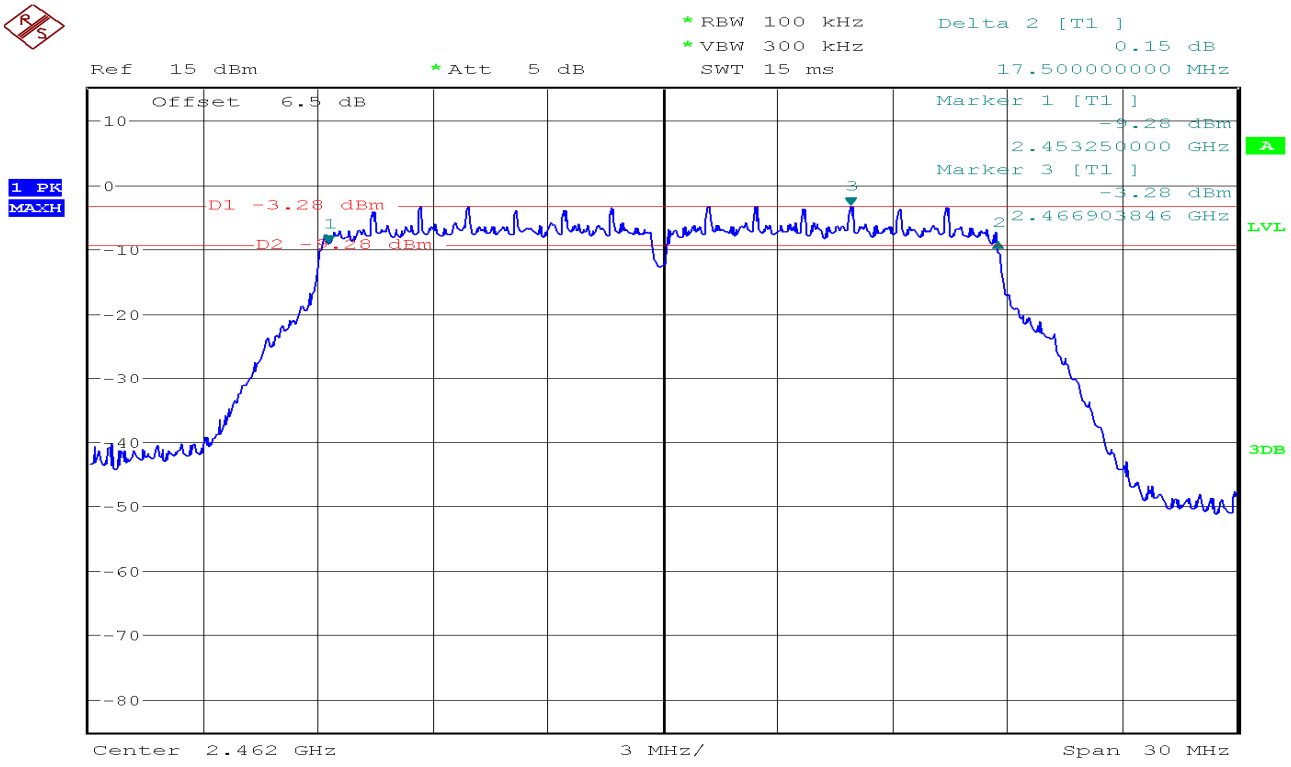
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

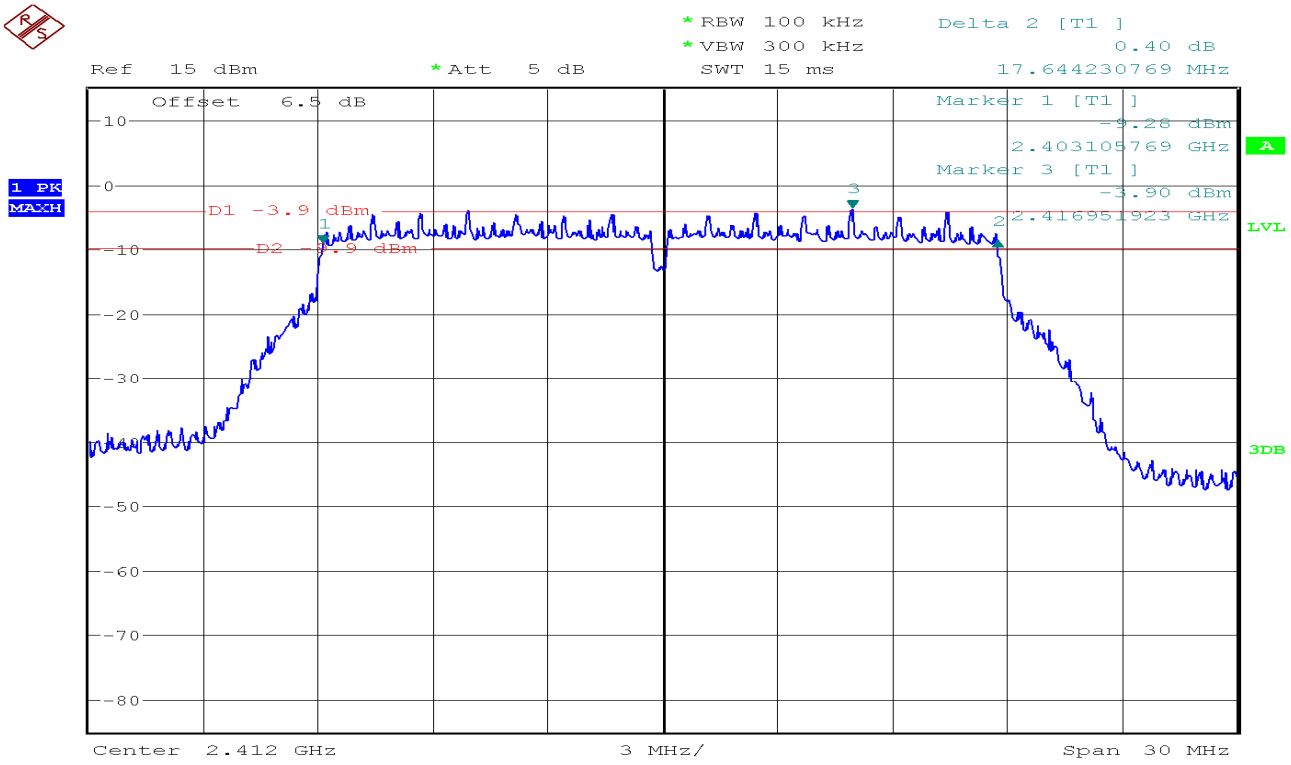


6dB Bandwidth (CH High)

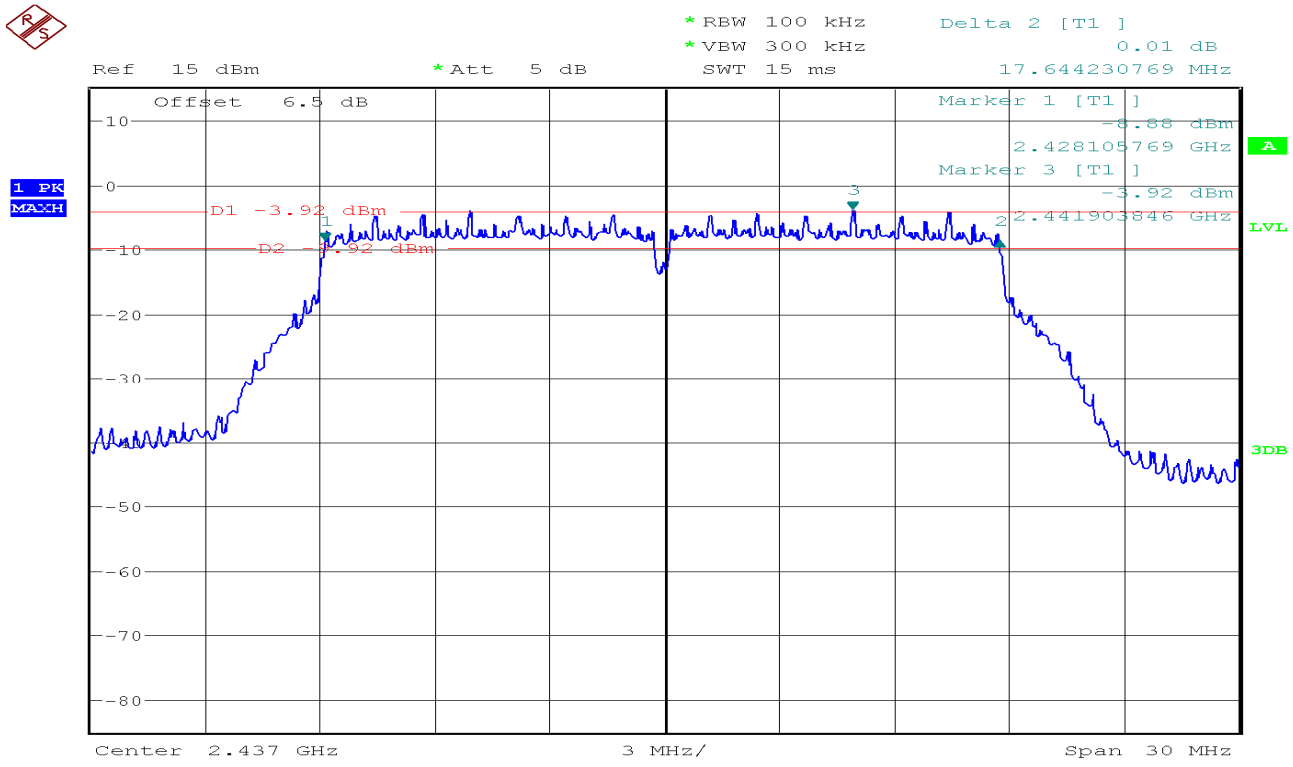


IEEE 802.11n HT20 mode / Chain 1

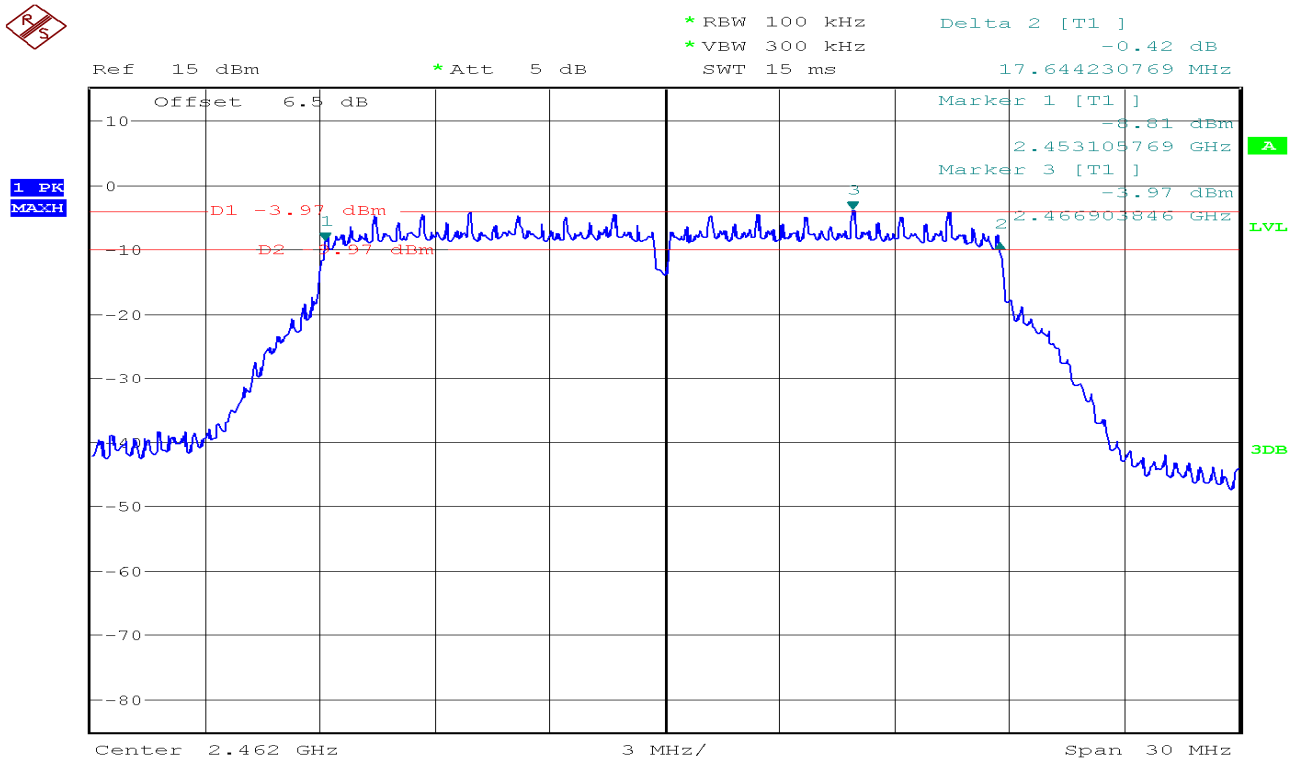
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

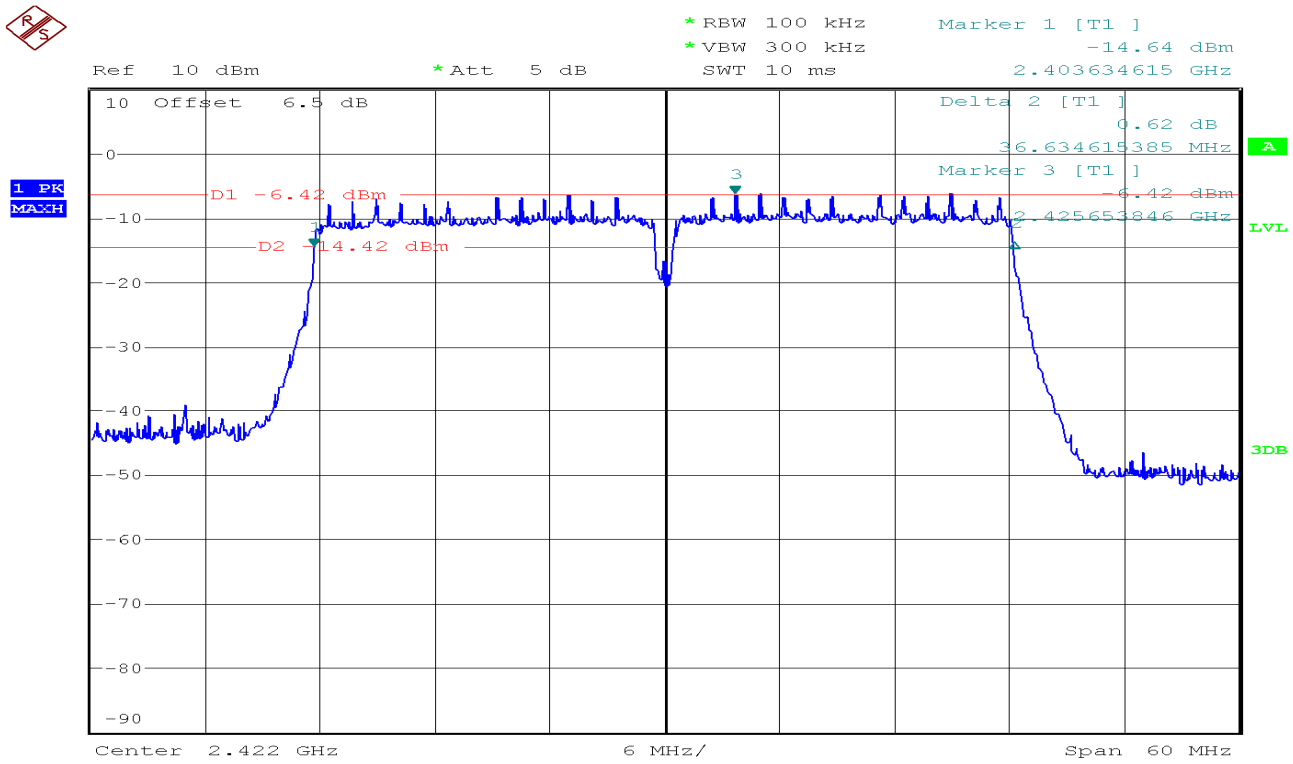


6dB Bandwidth (CH High)

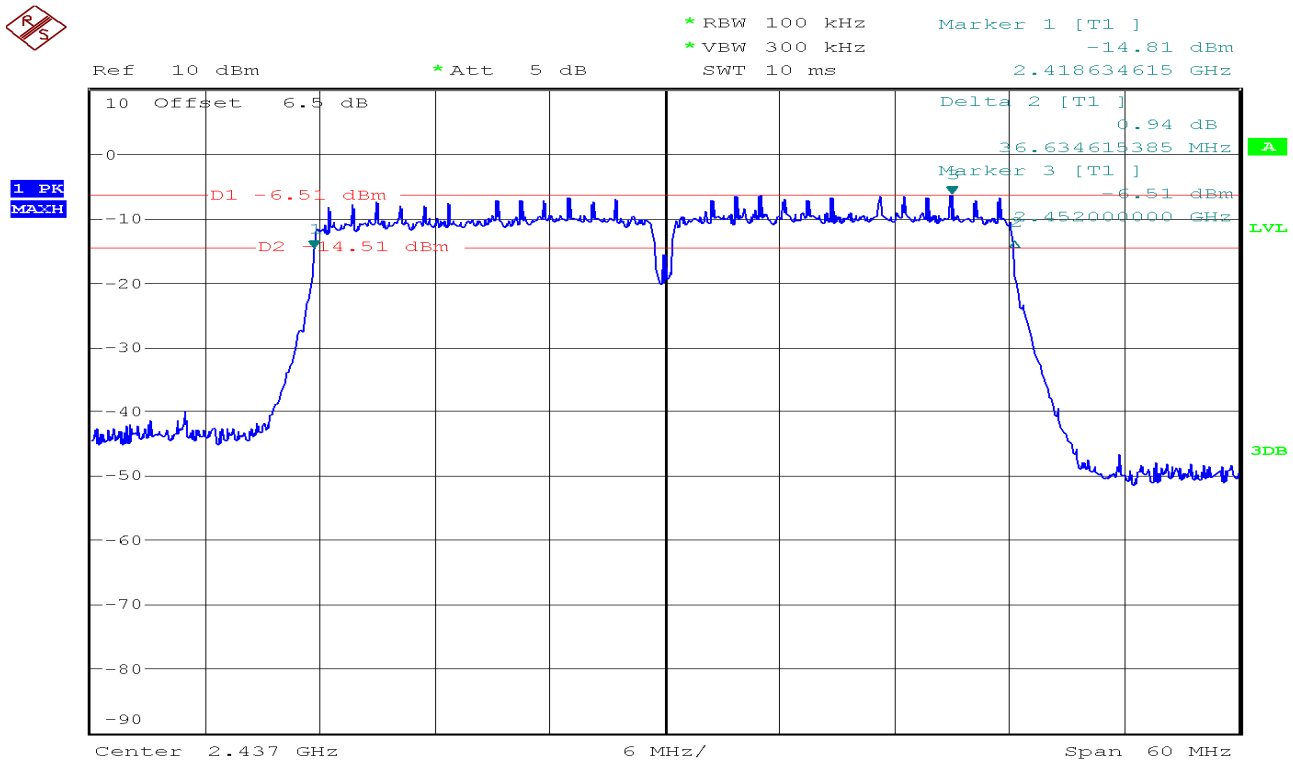


IEEE 802.11n HT40 mode / Chain 0

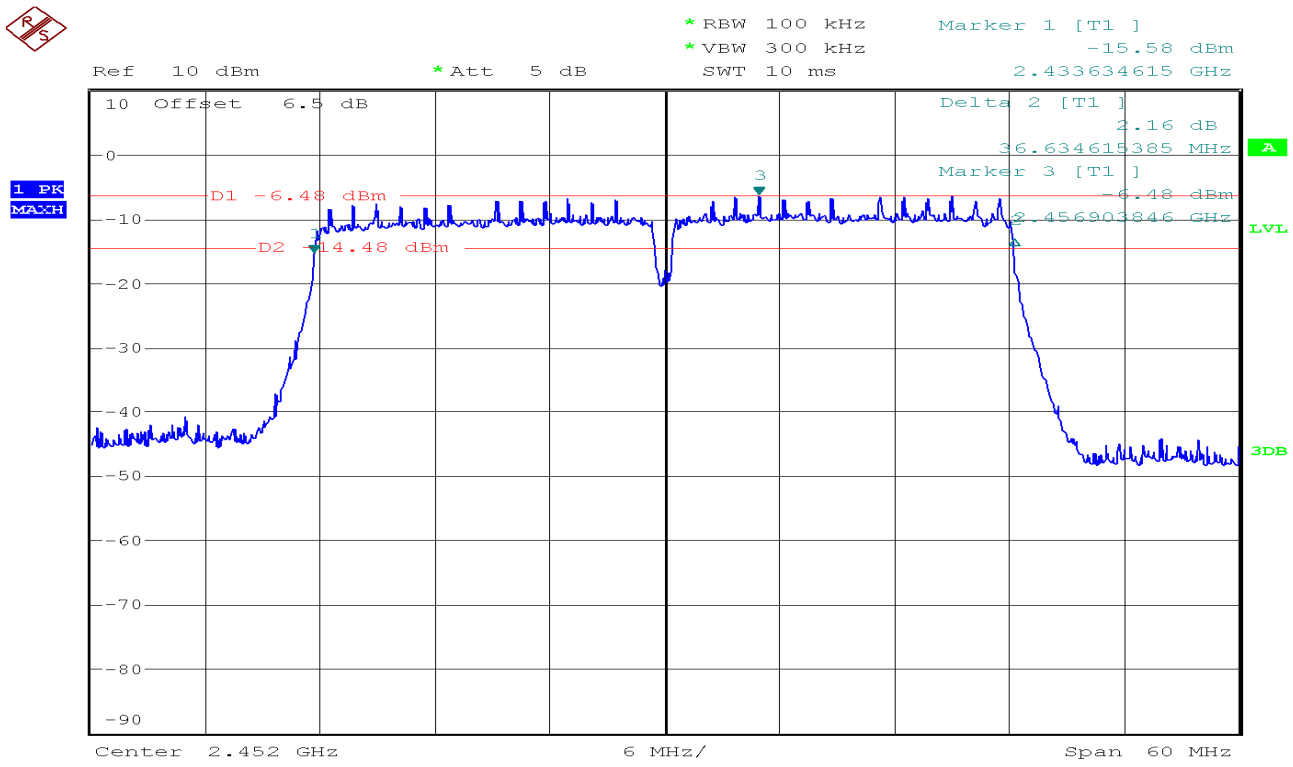
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

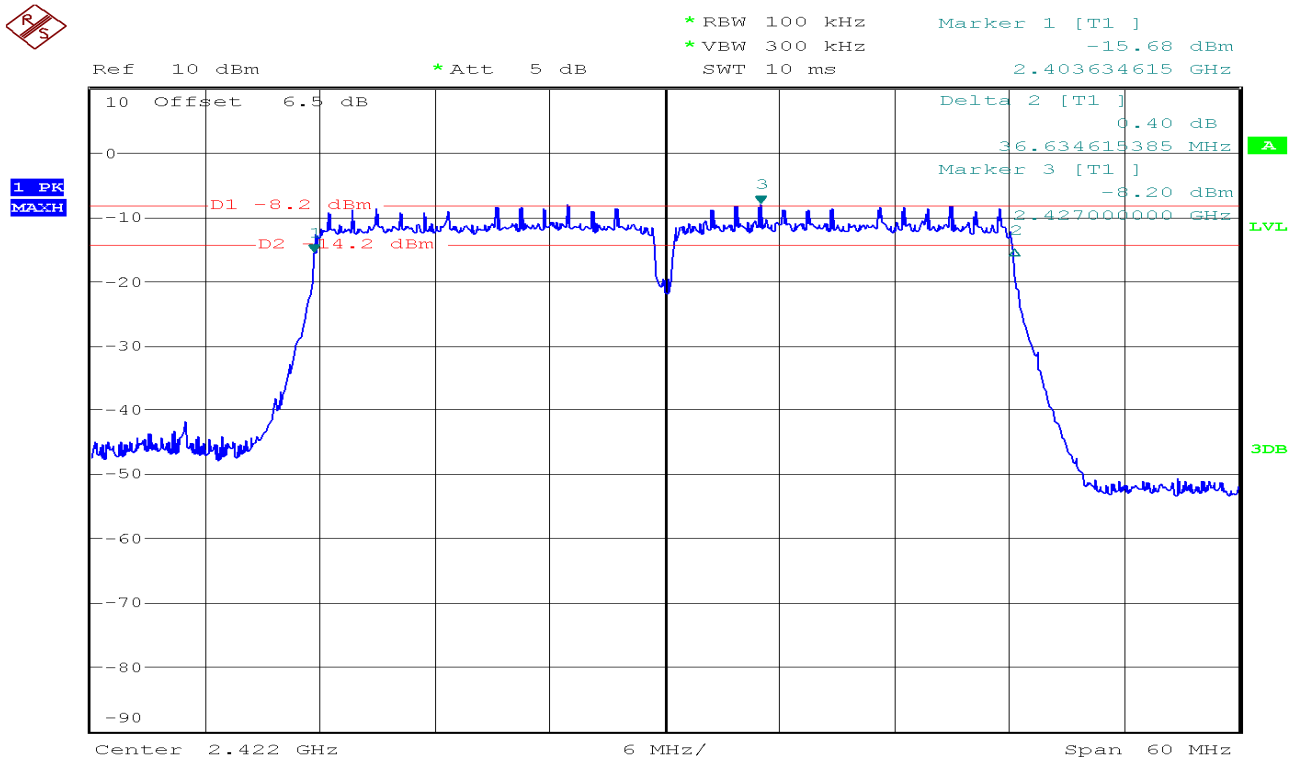


6dB Bandwidth (CH High)

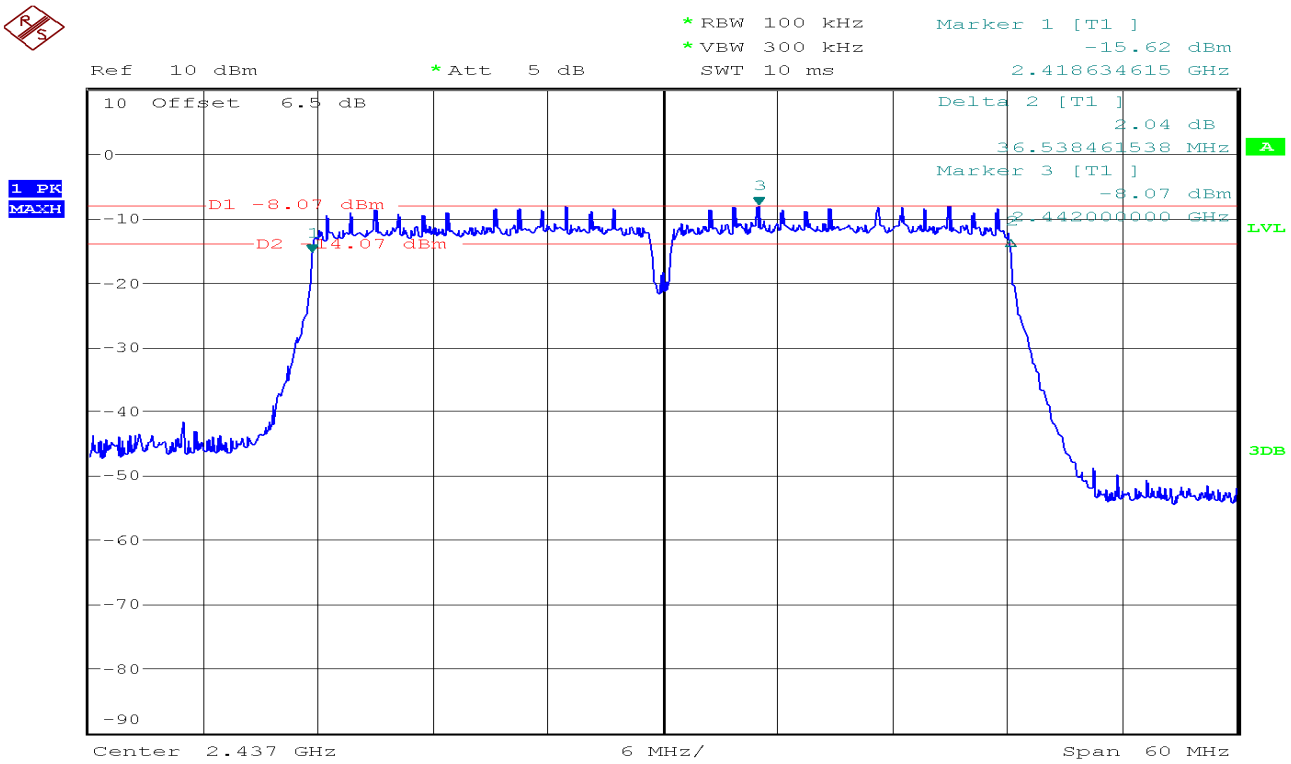


IEEE 802.11n HT40 mode / Chain 1

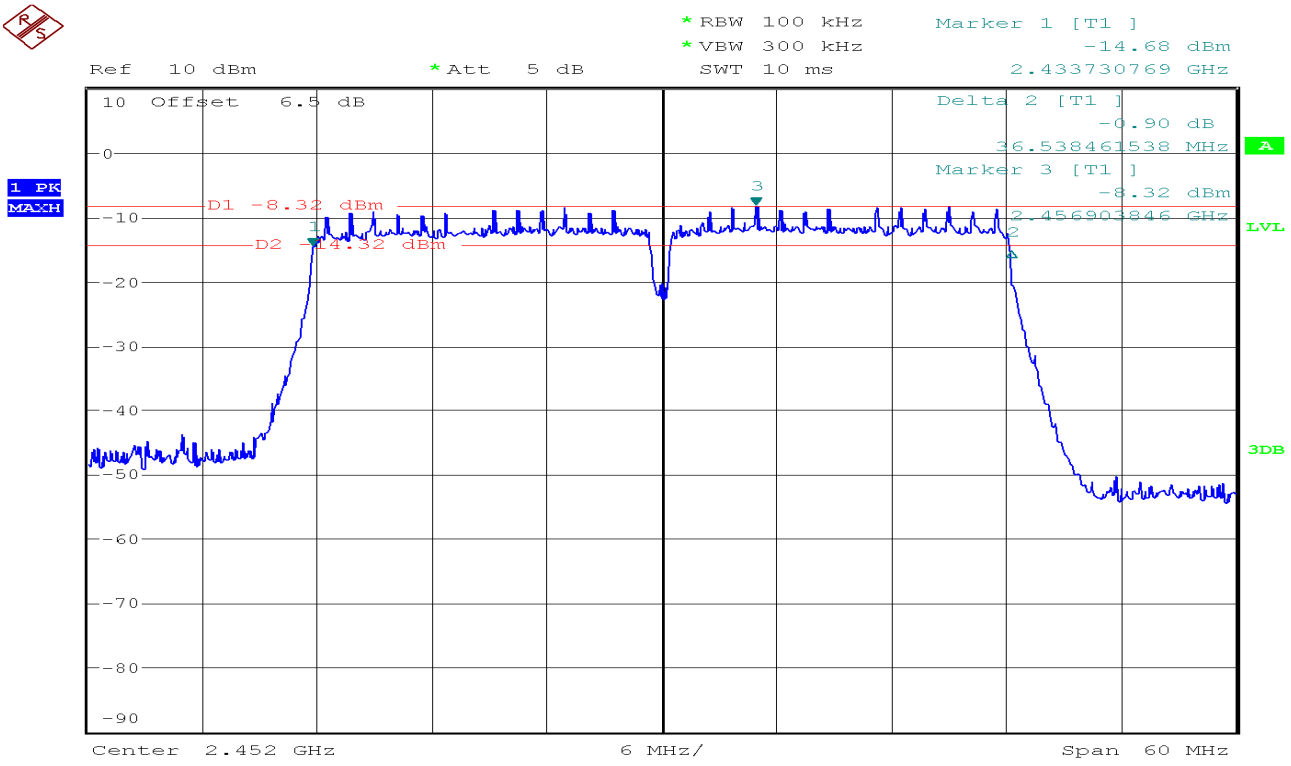
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



7.2.PEAK POWER

LIMIT

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

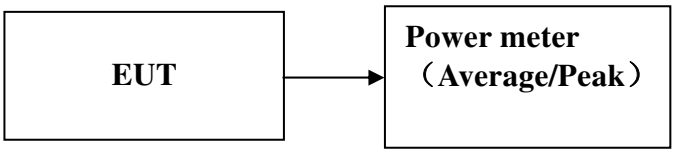
1.According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, and 2400-2483.5 MHz: 1 Watt.

2.According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT with two transmit antennas, each with the same directional gain 3dBi, being driven by two transmitter outputs of equal power. Directional gain is to be computed as follows:

All transmit signals are completely uncorrelated with each other, So directional gain=3dBi＜6dBi.

Test Configuration



TEST PROCEDURE

1. The EUT transmitter output is connected to the Power meter.
   The Power meter is set to the peak power detection.
2. The testing follows the Measurement Procedure FCC KDB No. 558074 D01 DTS Meas.
3. Guidance v03r05. 9.1.2 PKPM1 Peak power meter method.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Limit (dBm)
Low	2412	10.48	8.77	30.00
Mid	2437	10.33	8.43	30.00
High	2462	10.19	8.46	30.00

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Limit (dBm)
Low	2412	14.89	13.22	30.00
Mid	2437	14.67	12.87	30.00
High	2462	14.62	12.89	30.00

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	2412	14.96	13.14	17.15	30.00
Mid	2437	14.76	12.97	16.97	30.00
High	2462	14.54	13.11	16.89	30.00

Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	2422	15.43	13.49	17.58	30.00
Mid	2437	15.09	13.28	17.29	30.00
High	2452	15.35	13.55	17.55	30.00

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

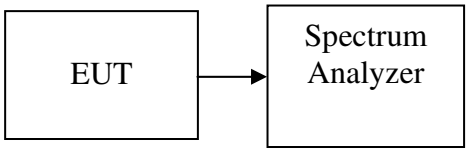
7.3.PEAK POWER SPECTRAL DENSITY

LIMIT

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

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

Test Configuration



TEST PROCEDURE

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

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

3.Record the max reading.

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

EUT with two transmit antennas, each with the same directional gain 3dBi, being driven by two transmitter outputs of equal power. Directional gain is to be computed as follows:

All transmit signals are completely uncorrelated with each other, So directional gain=3dBi＜6dBi.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Limit (dBm)	Result
Low	2412	-15.51	-17.81	8.00	PASS
Mid	2437	-15.89	-17.53	8.00	PASS
High	2462	-15.30	-17.78	8.00	PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Limit (dBm)	Result
Low	2412	-17.46	-18.72	8.00	PASS
Mid	2437	-17.86	-19.89	8.00	PASS
High	2462	-18.28	-19.74	8.00	PASS

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Result
Low	2412	-18.32	-19.54	-15.88	8.00	PASS
Mid	2437	-18.39	-19.57	-15.93	8.00	PASS
High	2462	-18.60	-20.71	-16.52	8.00	PASS

Test mode: IEEE 802.11n HT40 mode

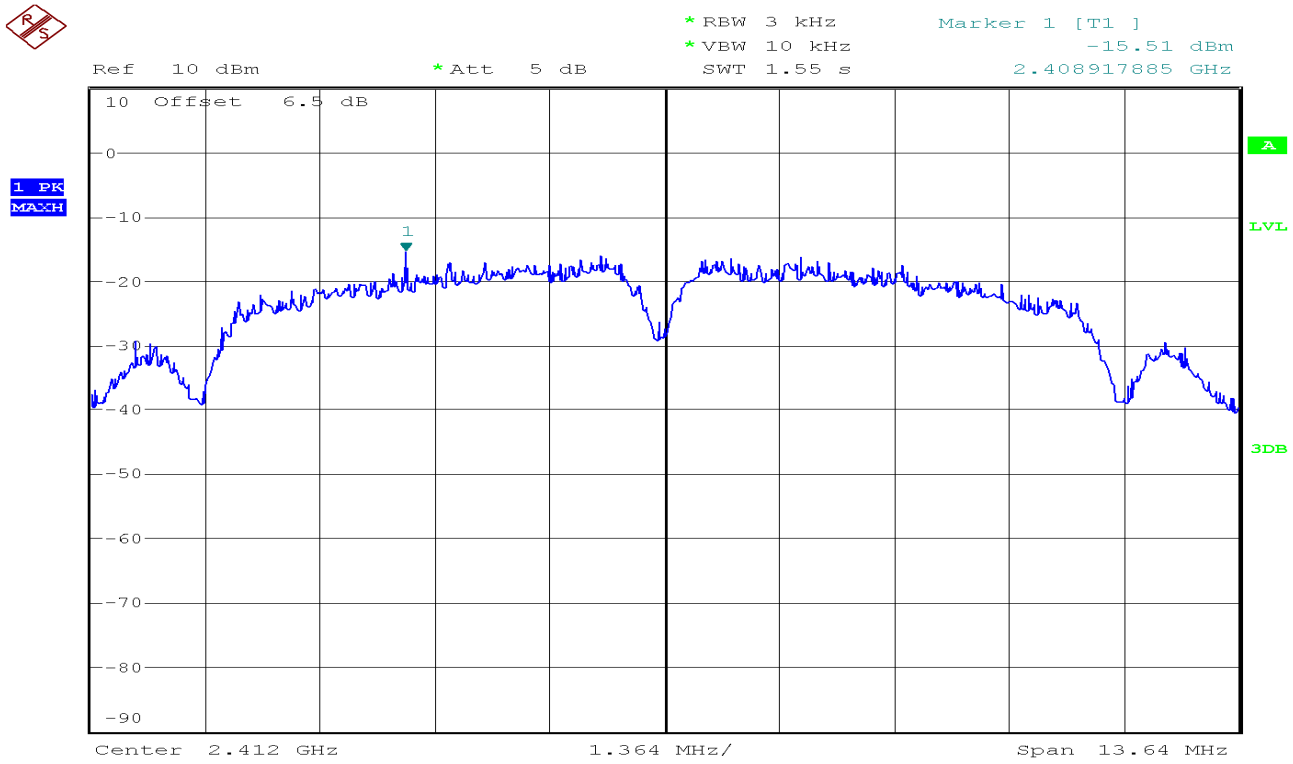
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)	Result
Low	2422	-19.91	-21.72	-17.71	8.00	PASS
Mid	2437	-19.39	-22.38	-17.62	8.00	PASS
High	2452	-20.96	-22.42	-18.62	8.00	PASS

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

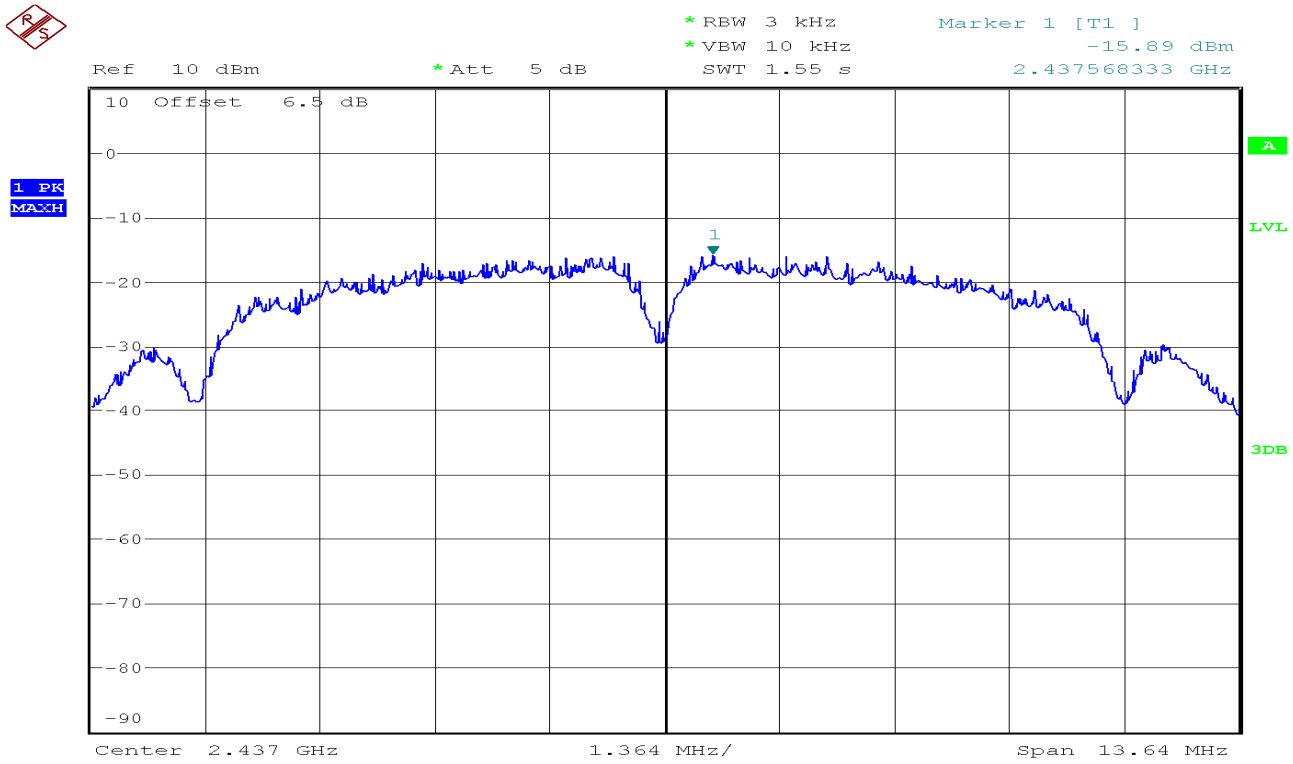
Test Plot

IEEE 802.11b mode/Chain 0

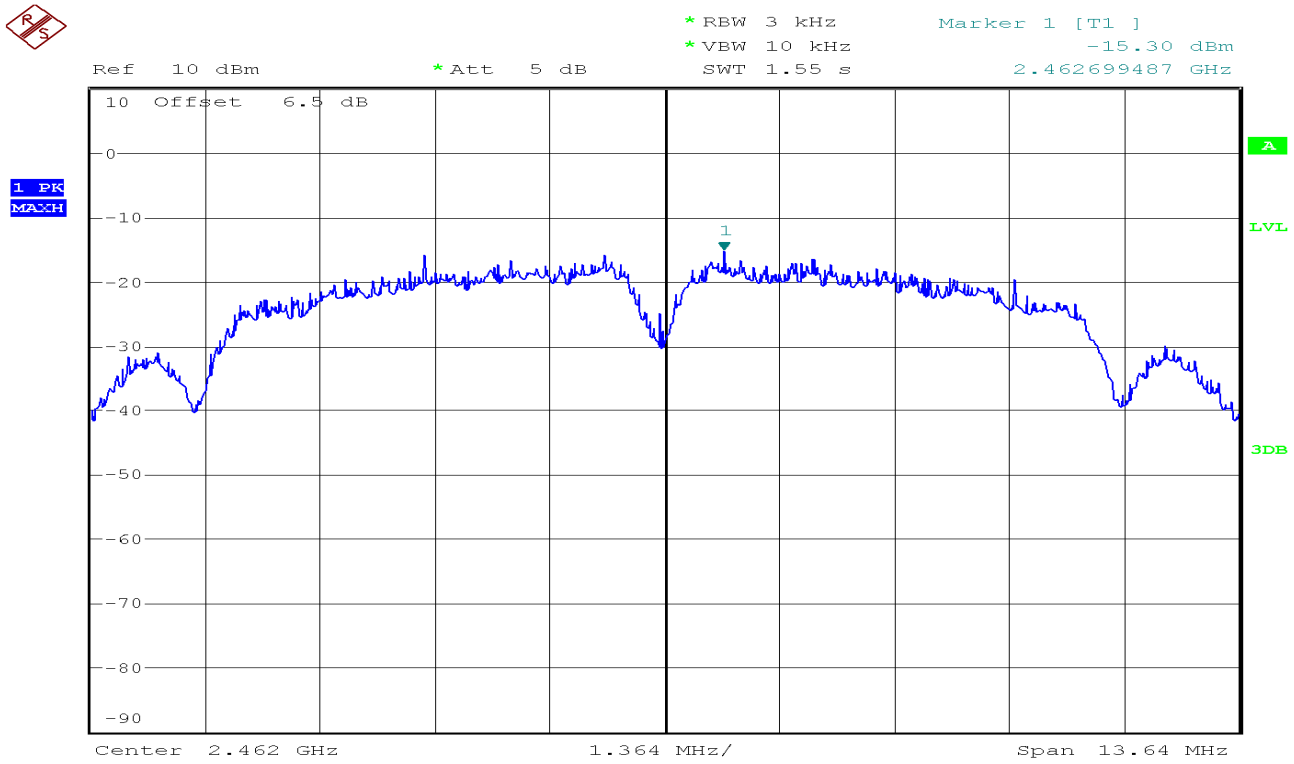
PPSD (CH Low)



PPSD(CH Mid)

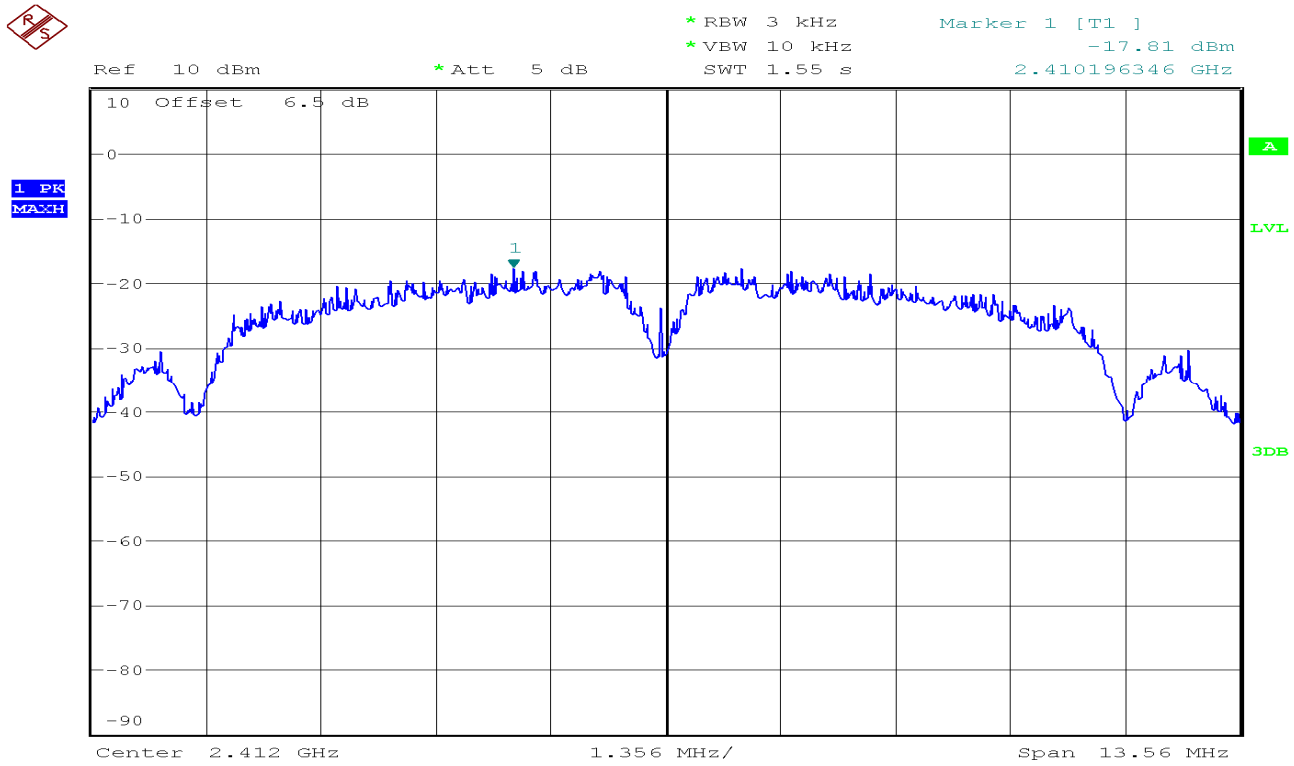


PPSD (CH High)

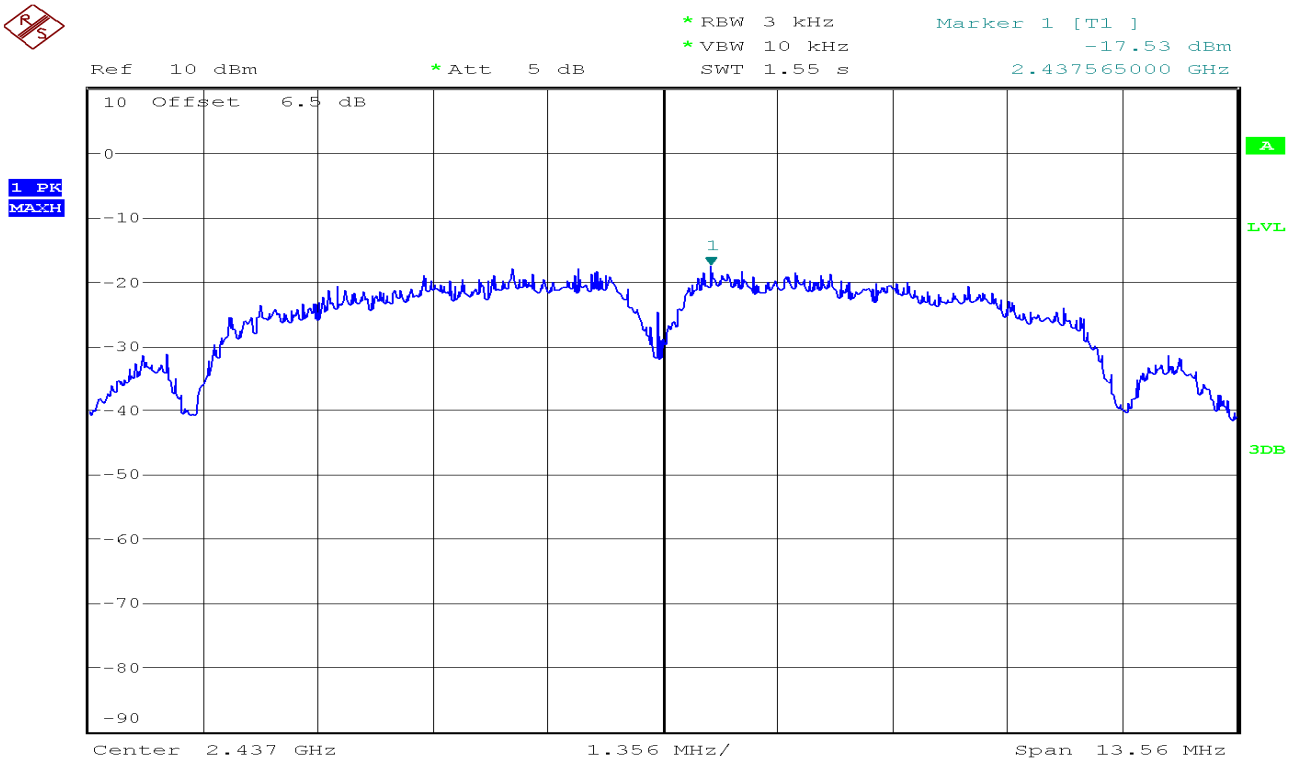


IEEE 802.11b mode/Chain 1

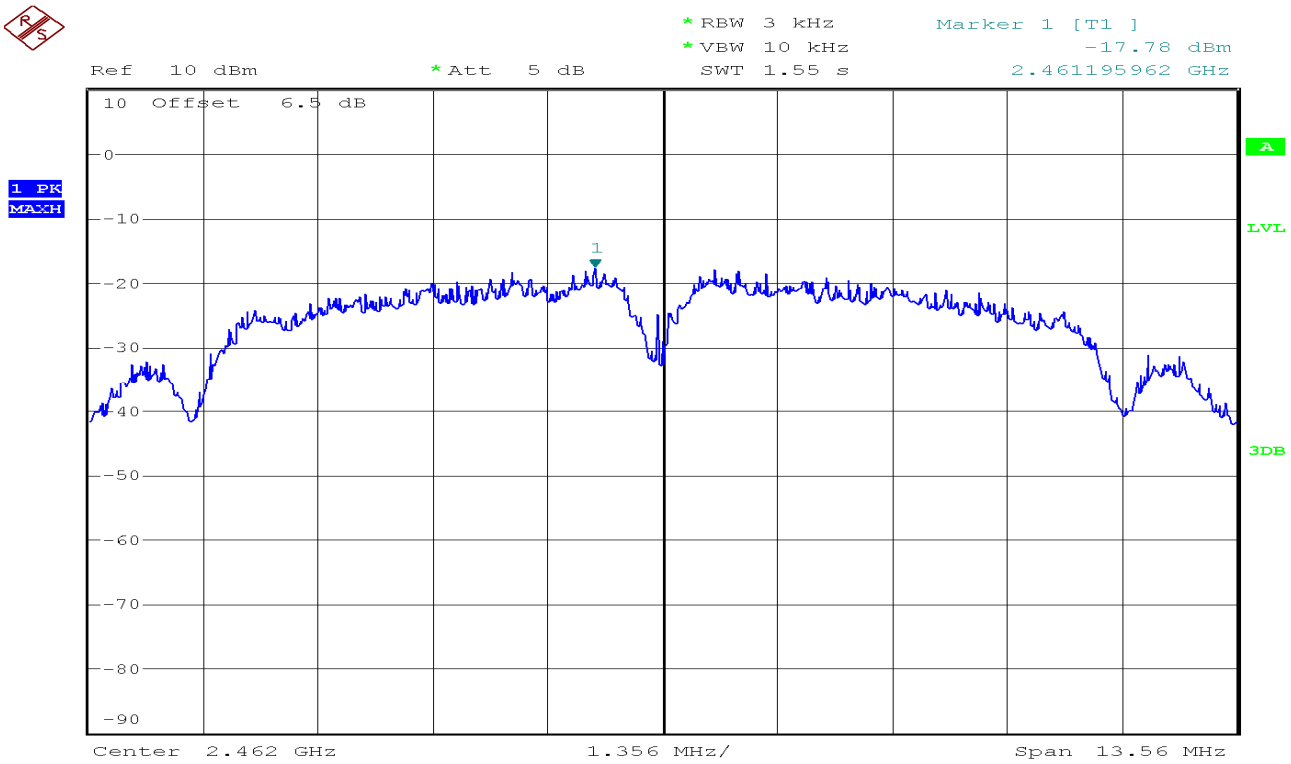
PPSD (CH Low)



PPSD (CH Mid)

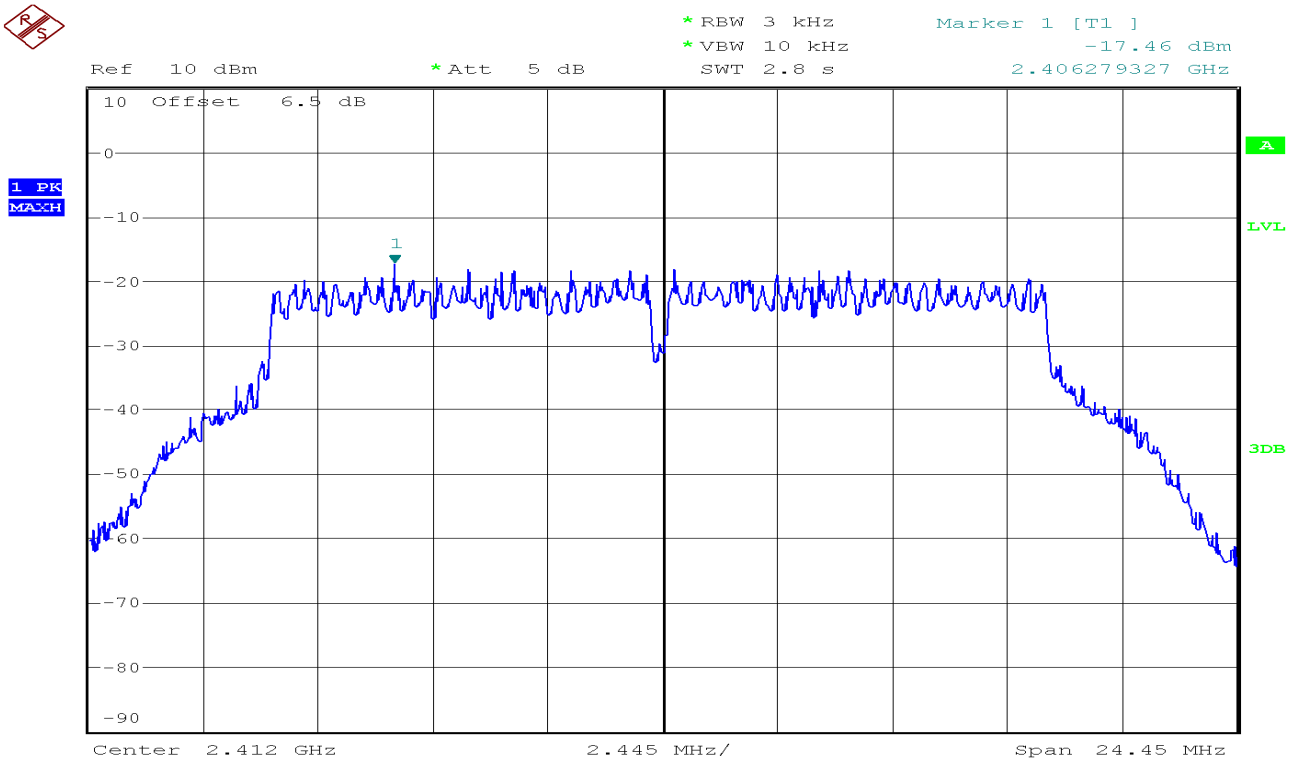


PSD (CH High)

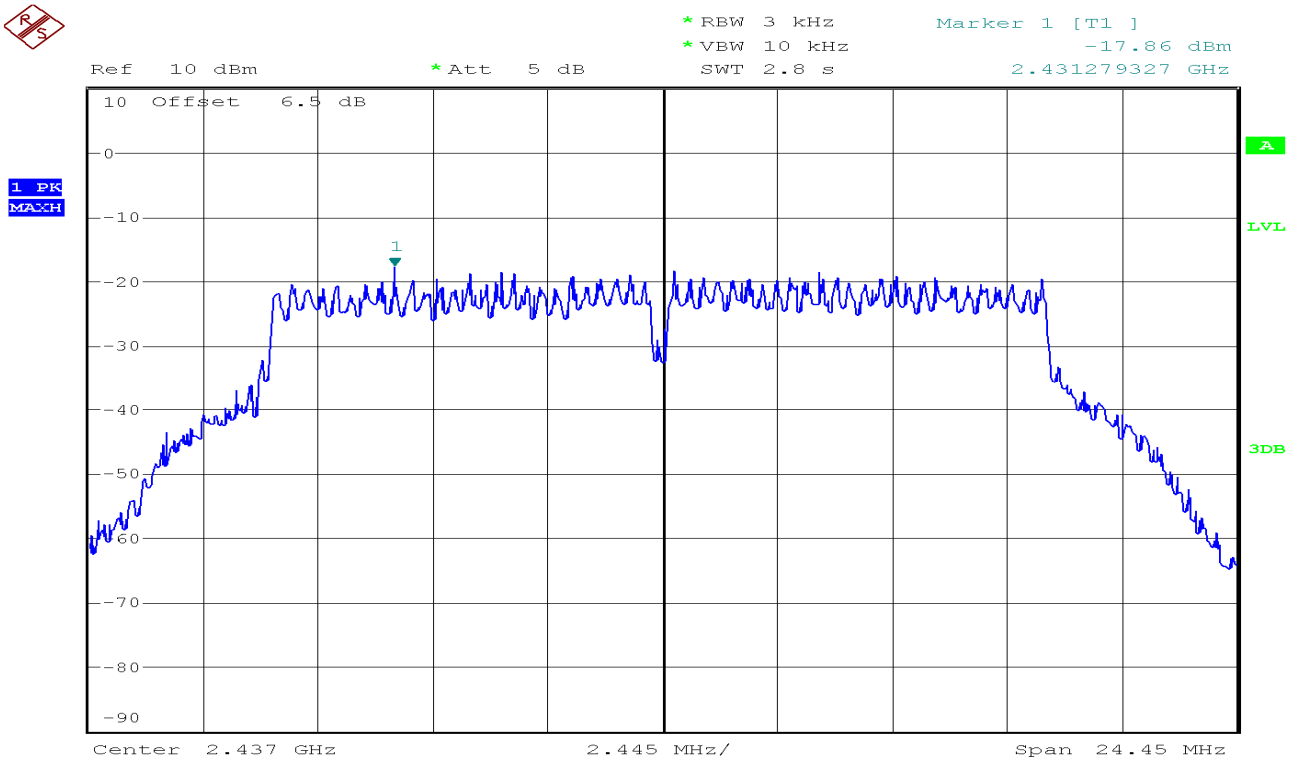


IEEE 802.11g mode/Chain 0

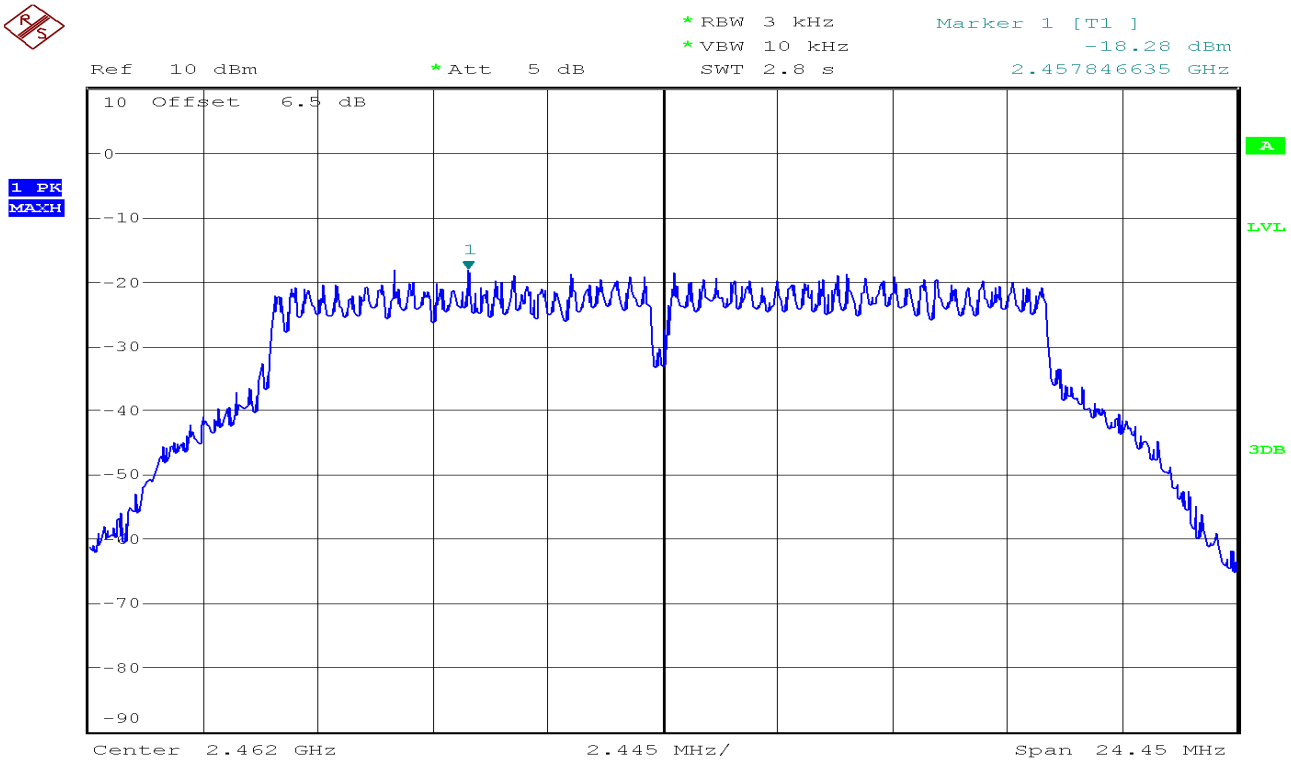
PPSD (CH Low)



PPSD (CH Mid)

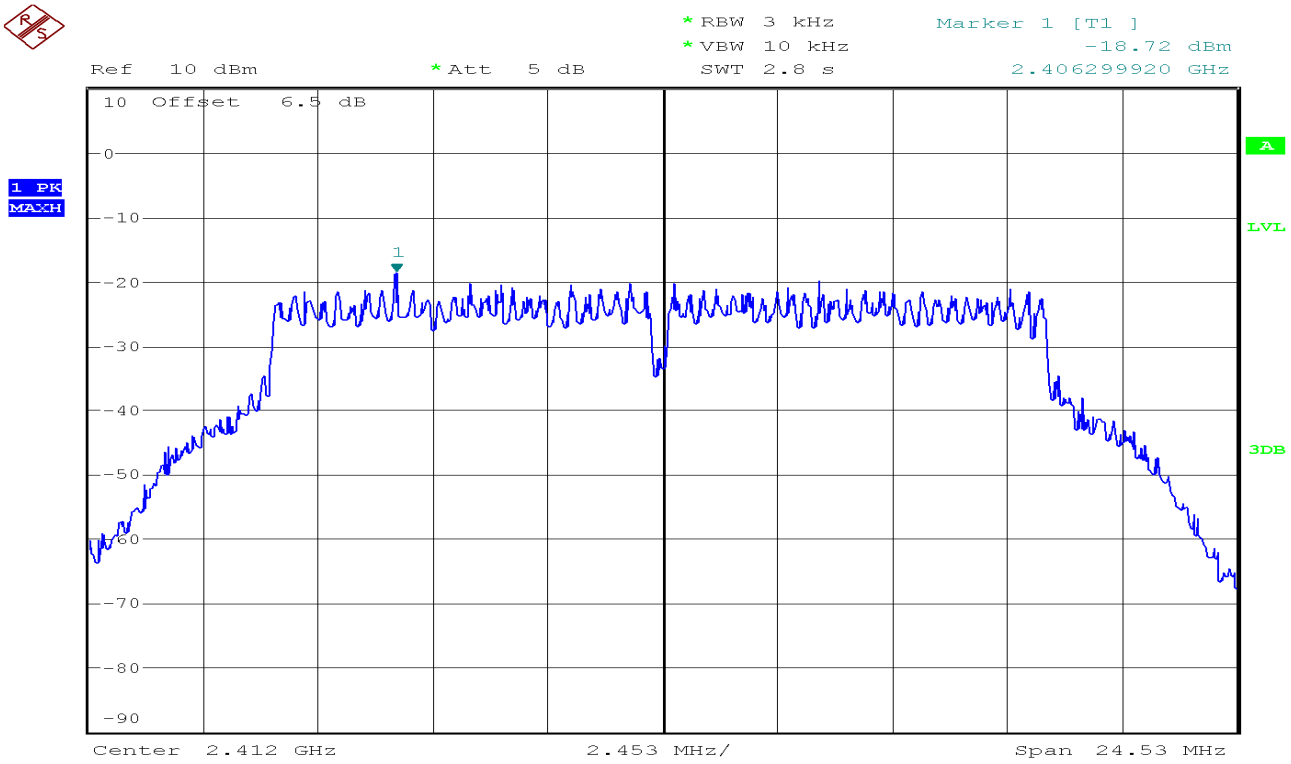


PPSD (CH High)

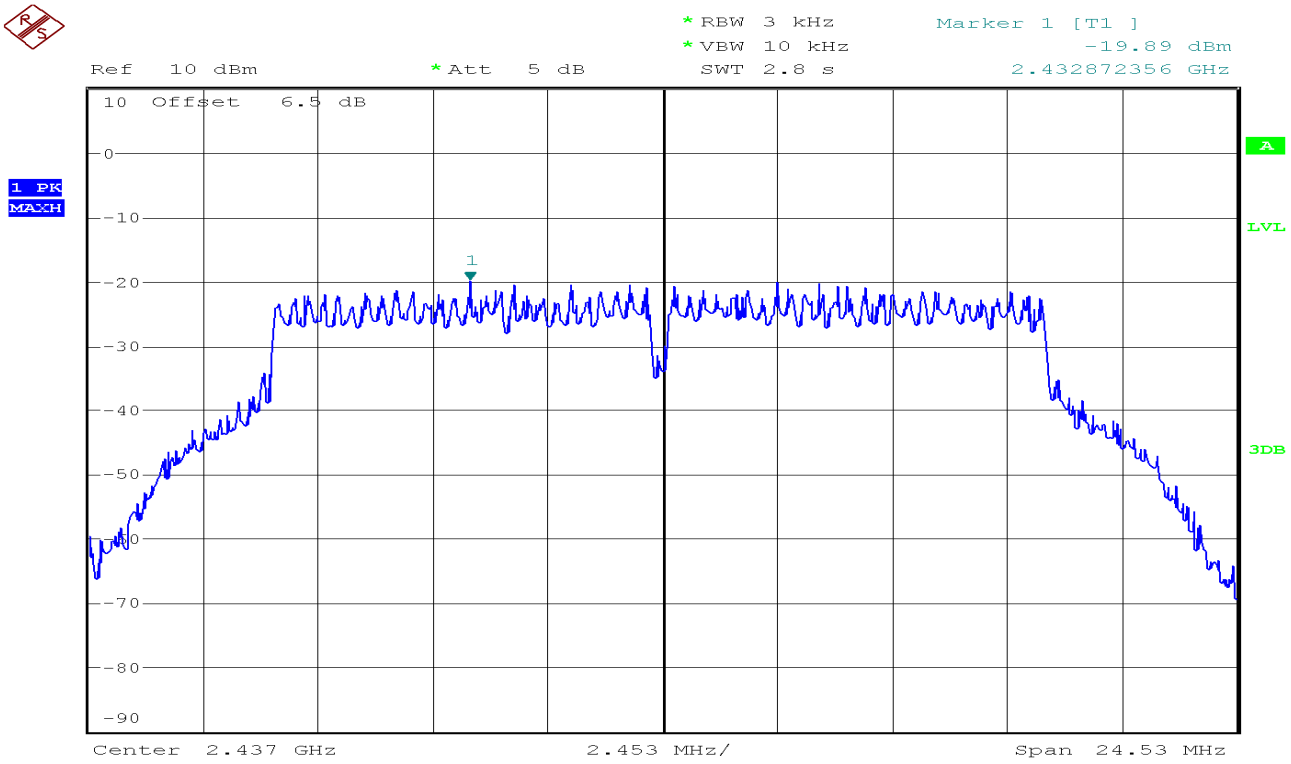


IEEE 802.11g mode/Chain 1

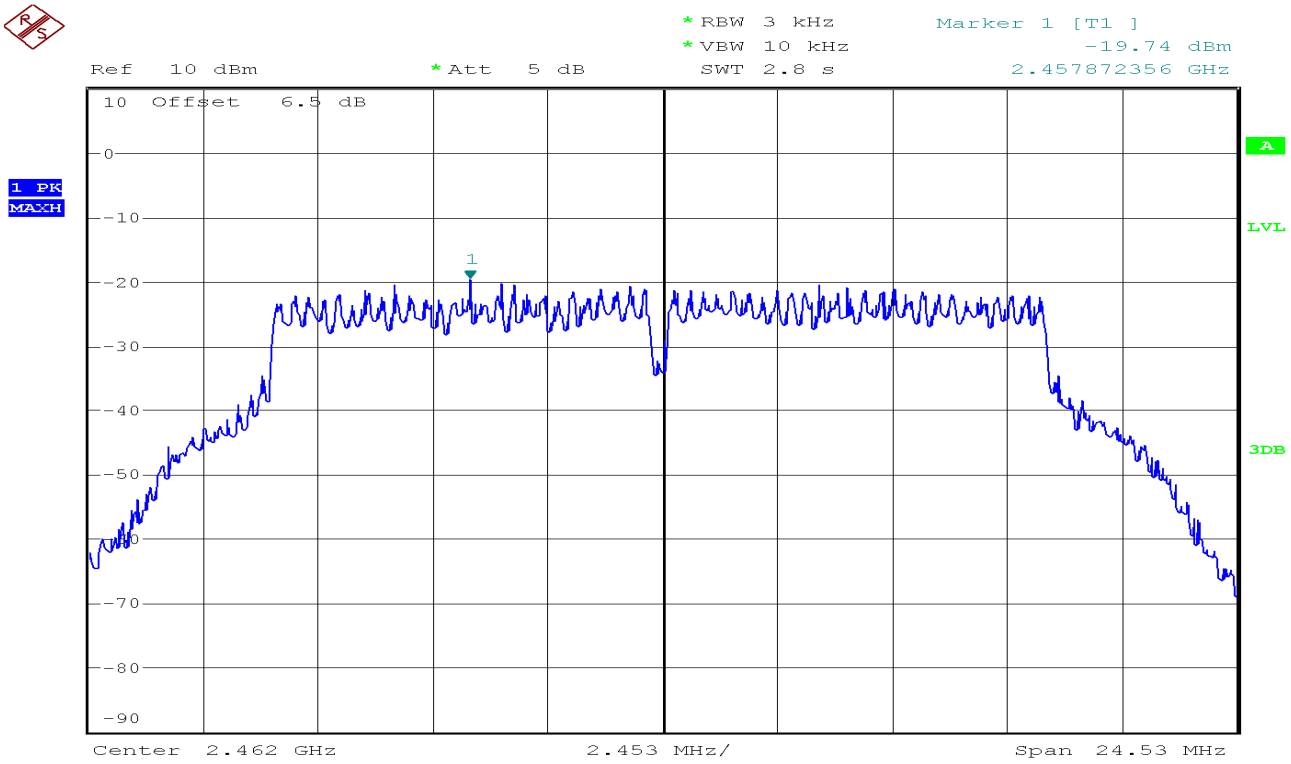
PPSD (CH Low)



PPSD (CH Mid)

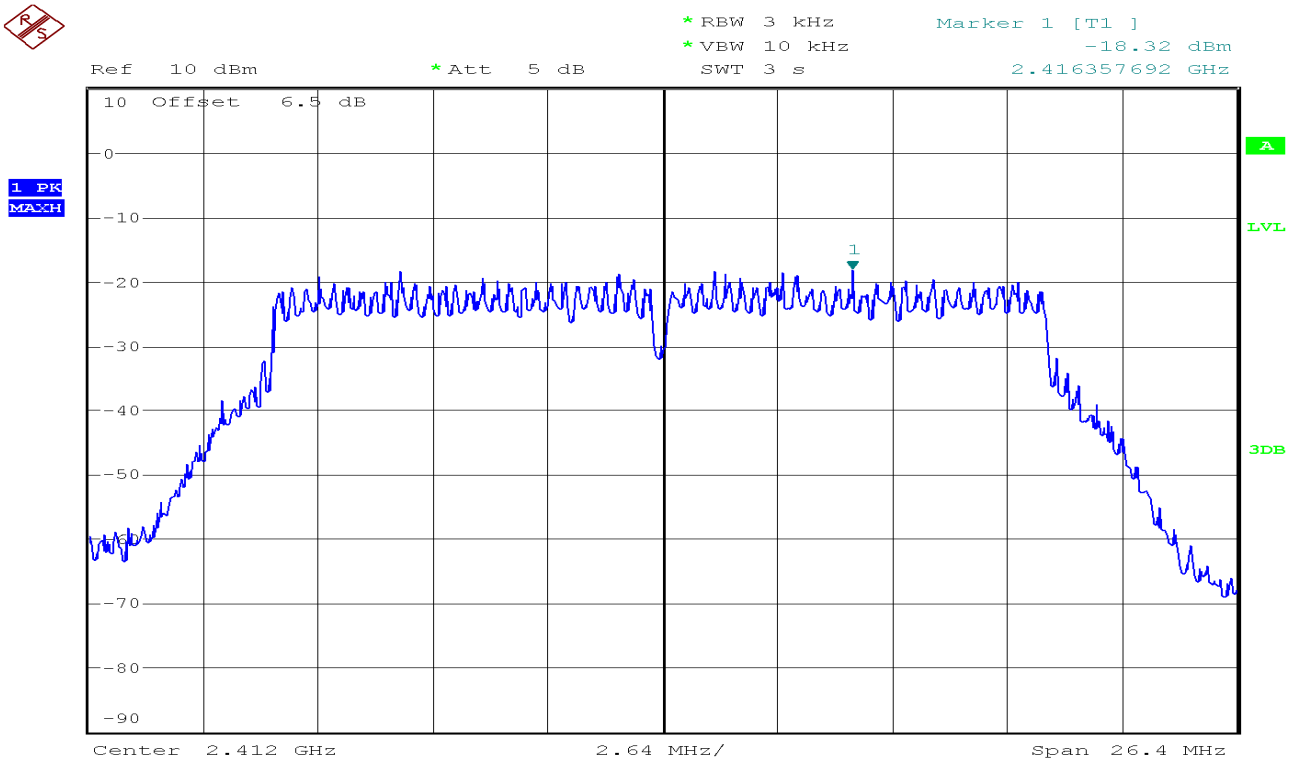


PPSD (CH High)

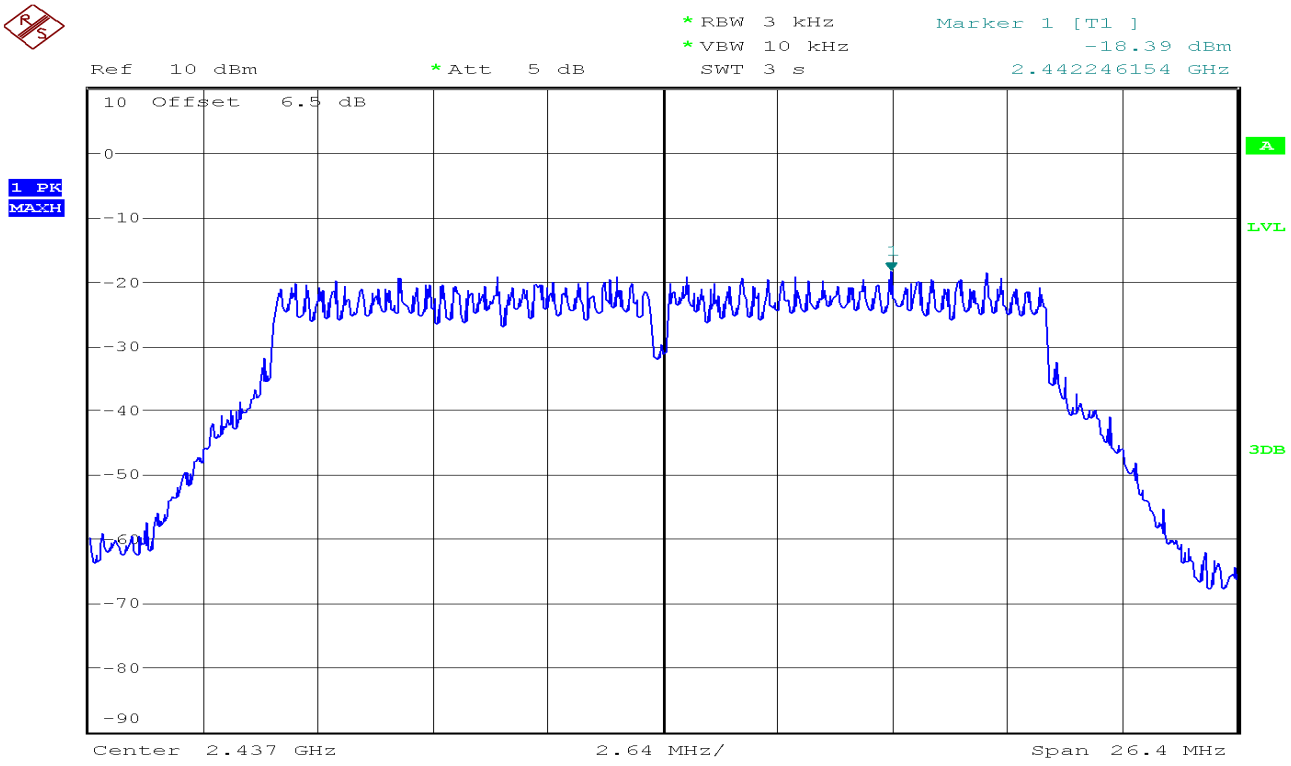


IEEE 802.11n HT20 mode / Chain 0

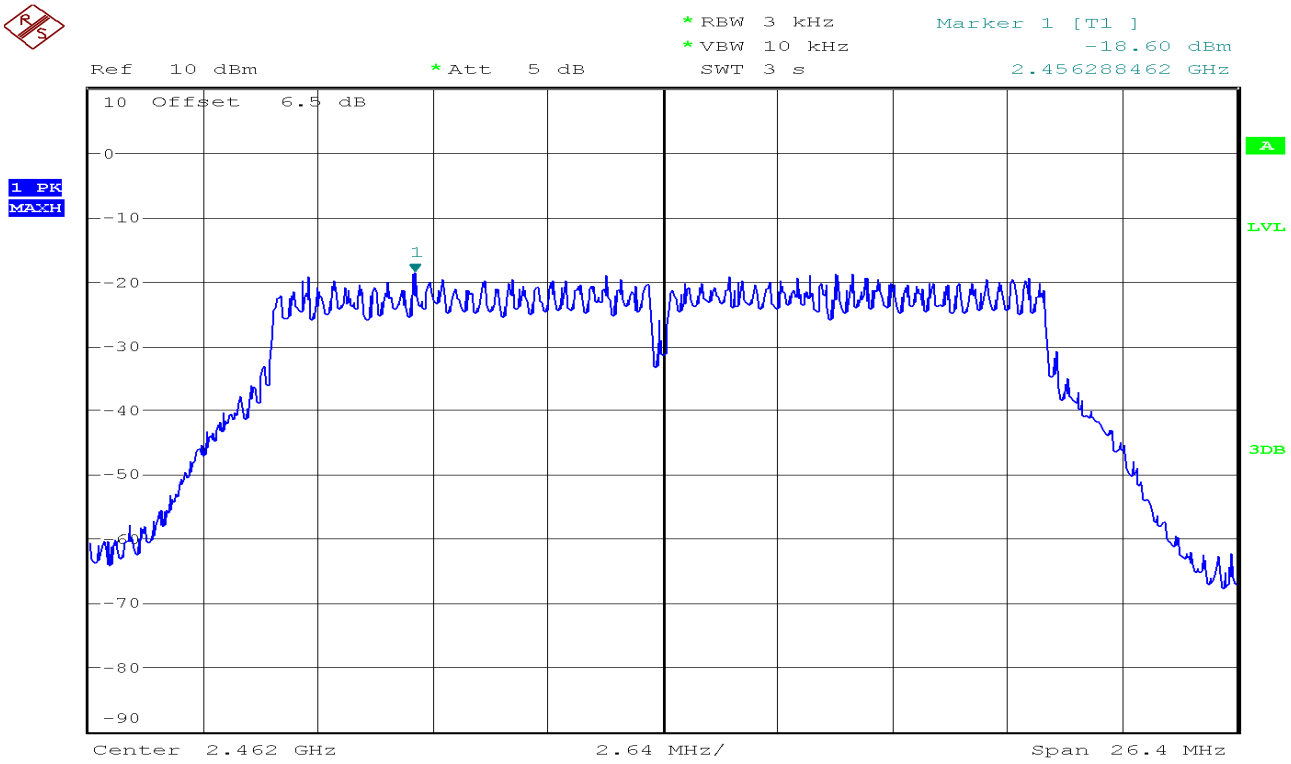
PPSD (CH Low)



PPSD (CH Mid)

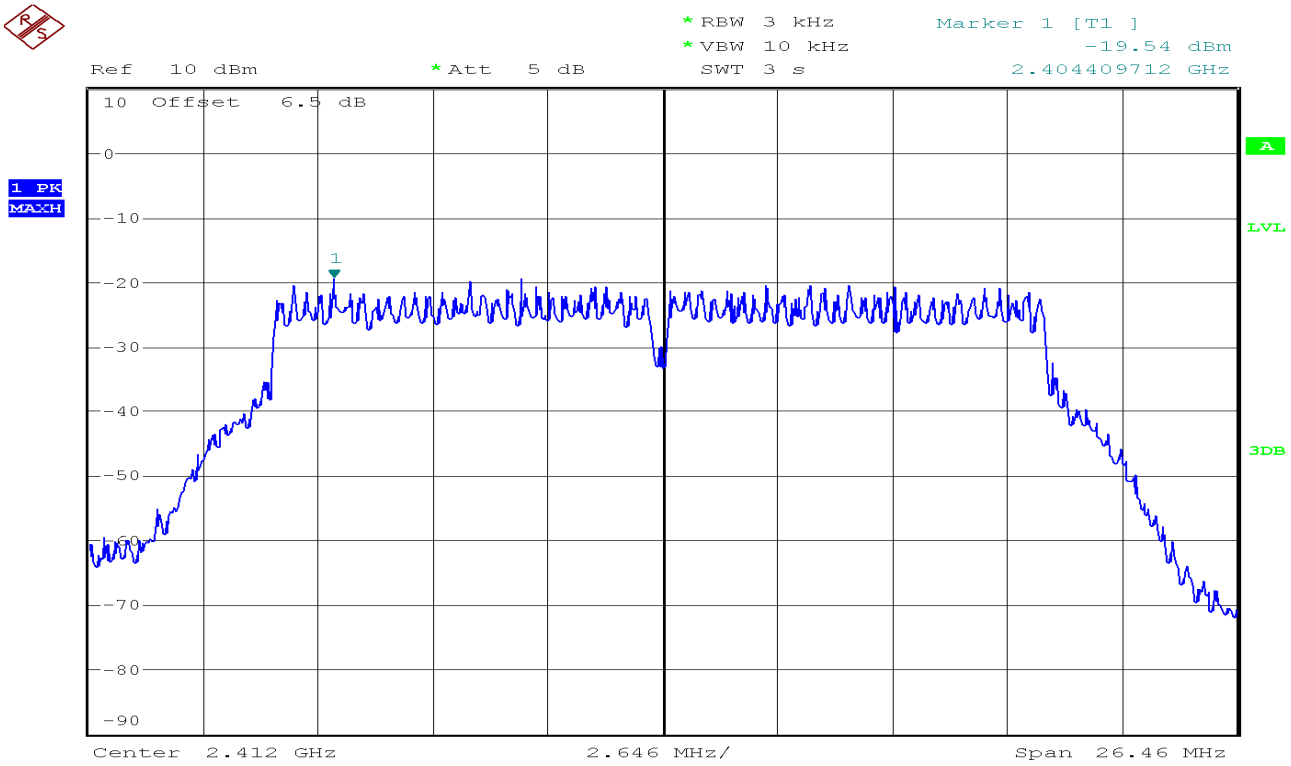


PPSD (CH High)

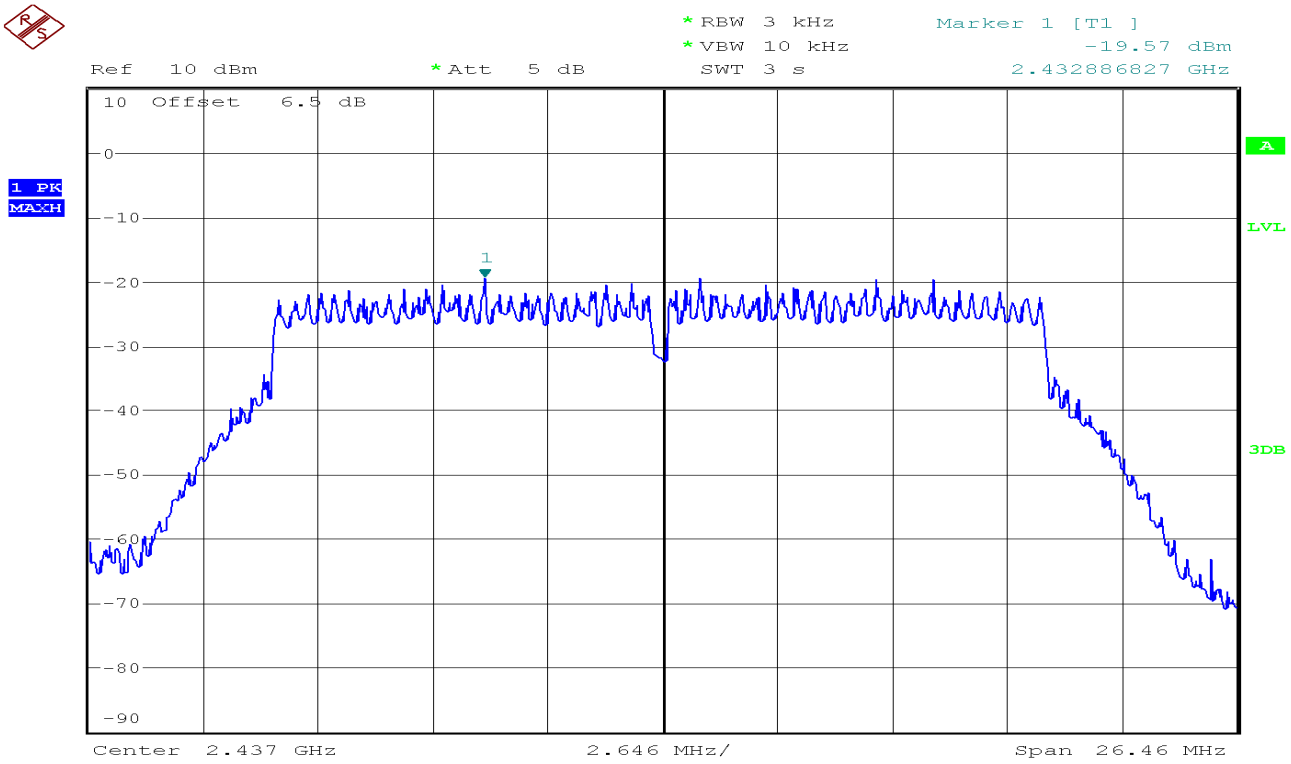


IEEE 802.11n HT20 mode / Chain 1

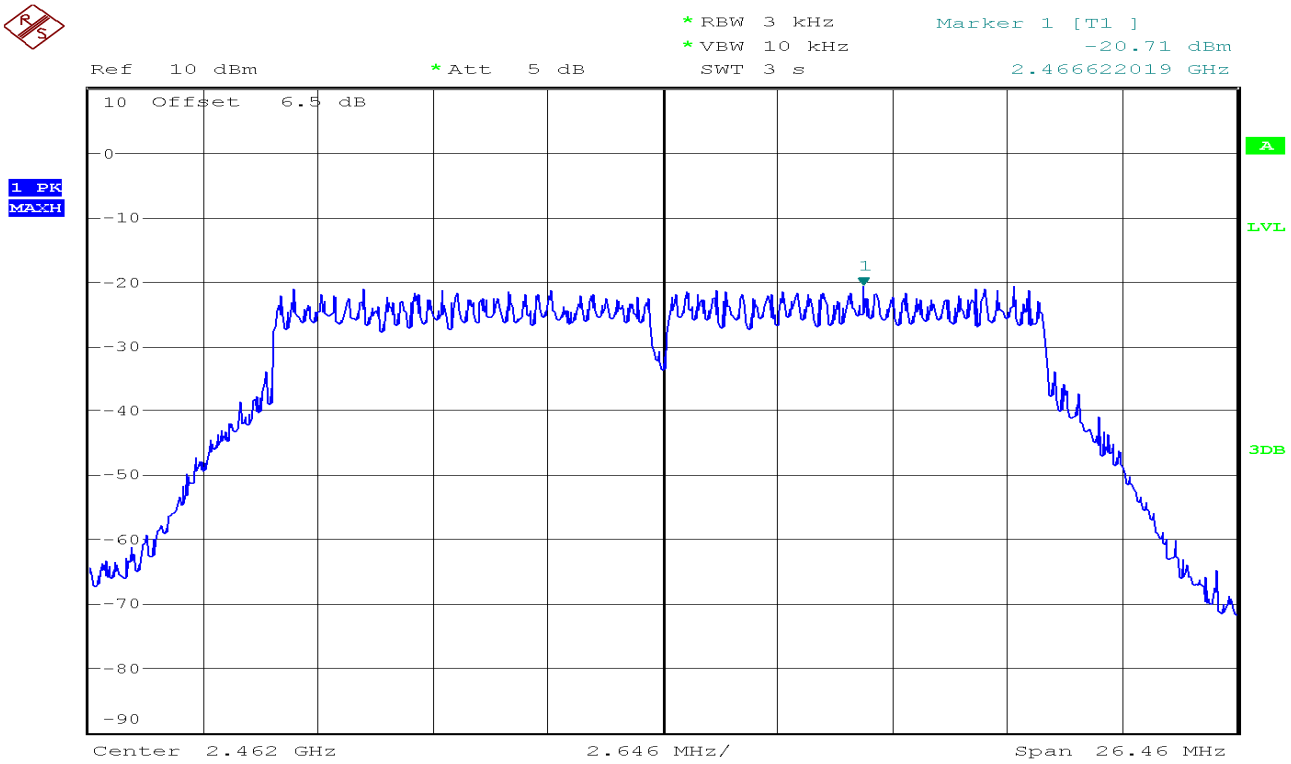
PPSD (CH Low)



PPSD (CH Mid)

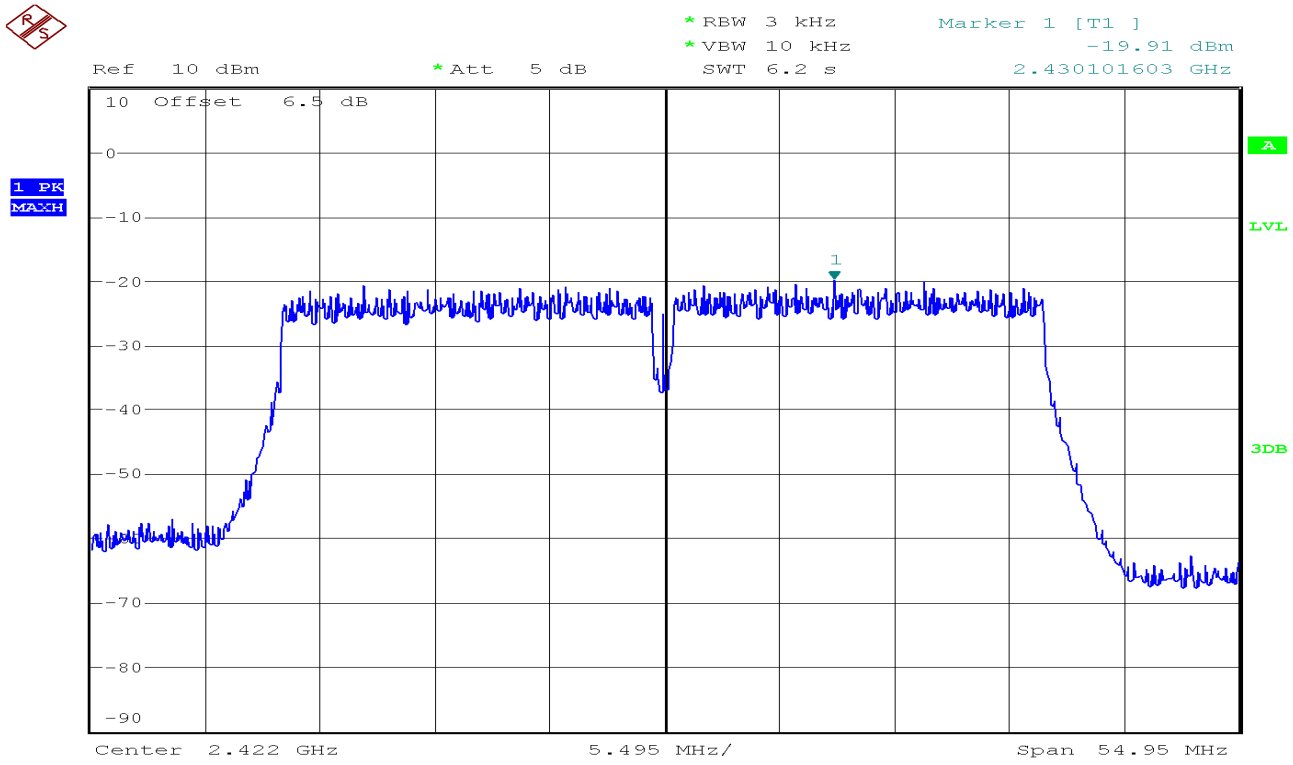


PPSD (CH High)

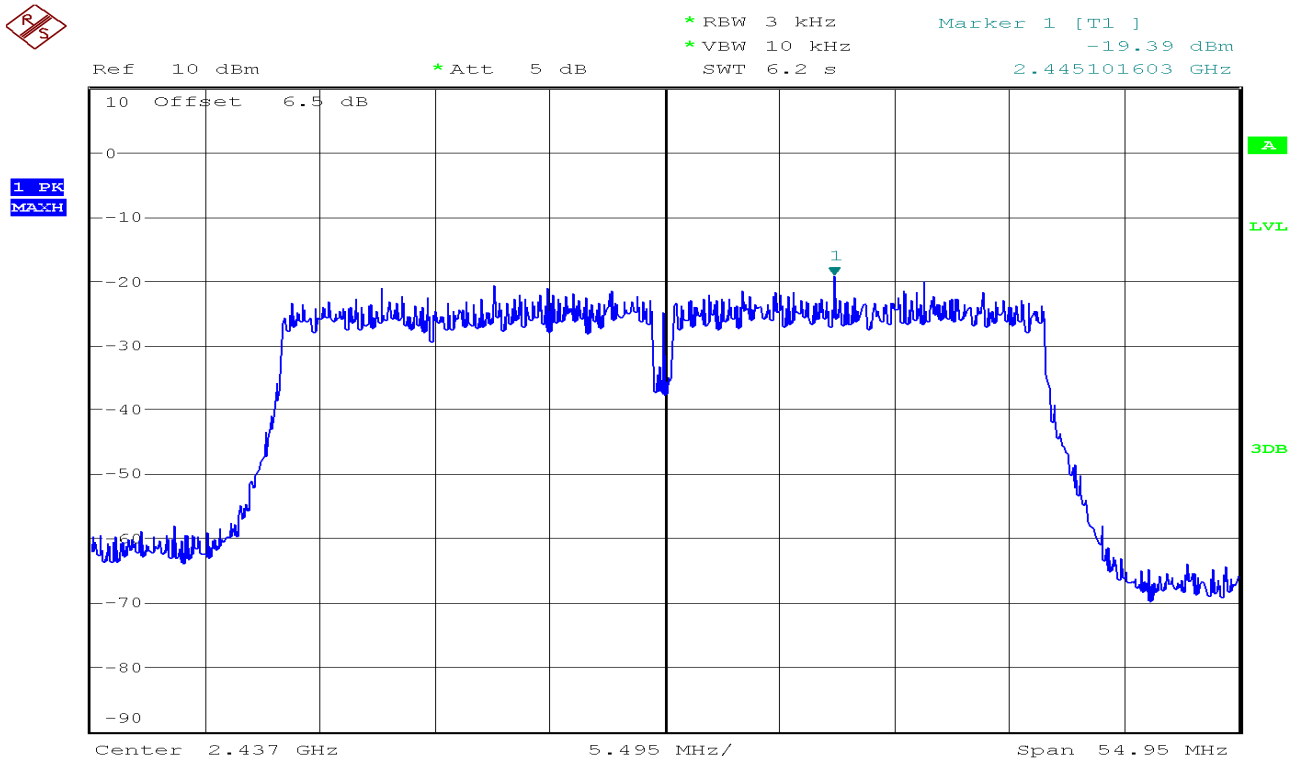


IEEE 802.11n HT40 mode / Chain 0

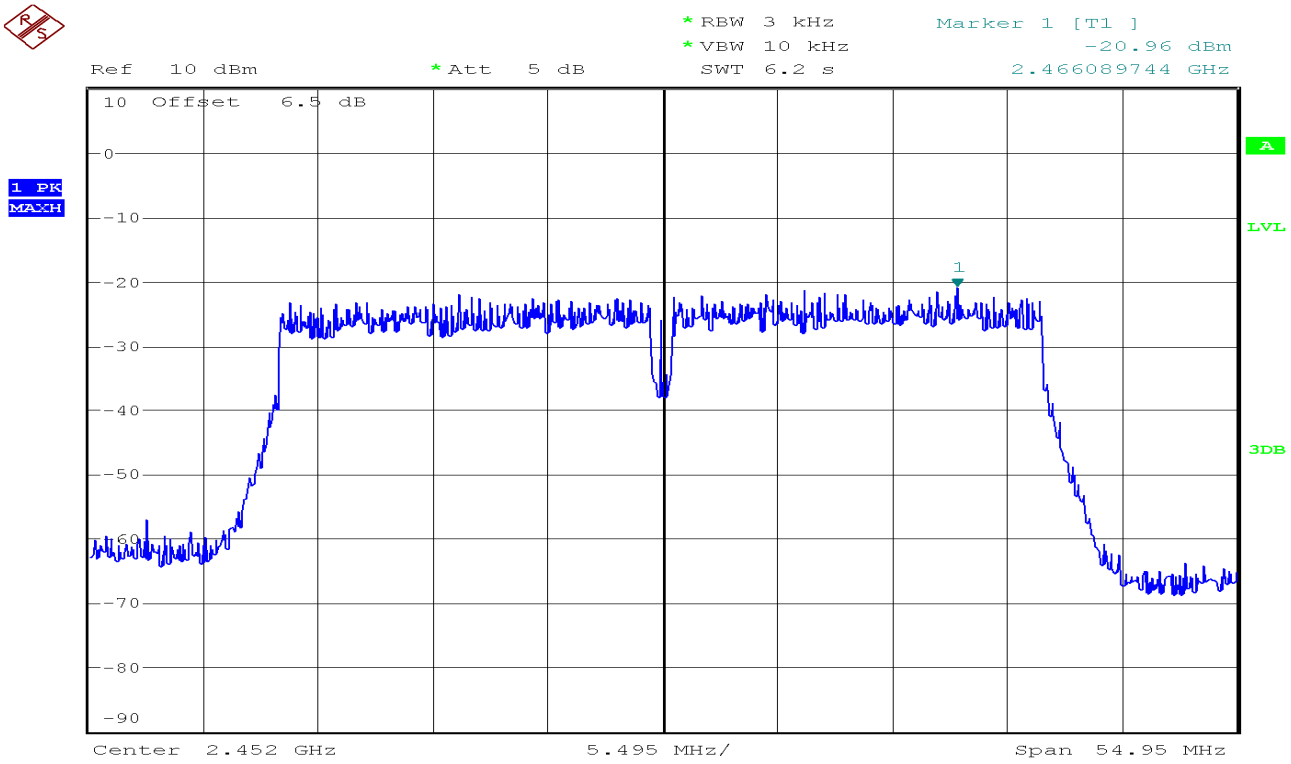
PPSD (CH Low)



PPSD (CH Mid)

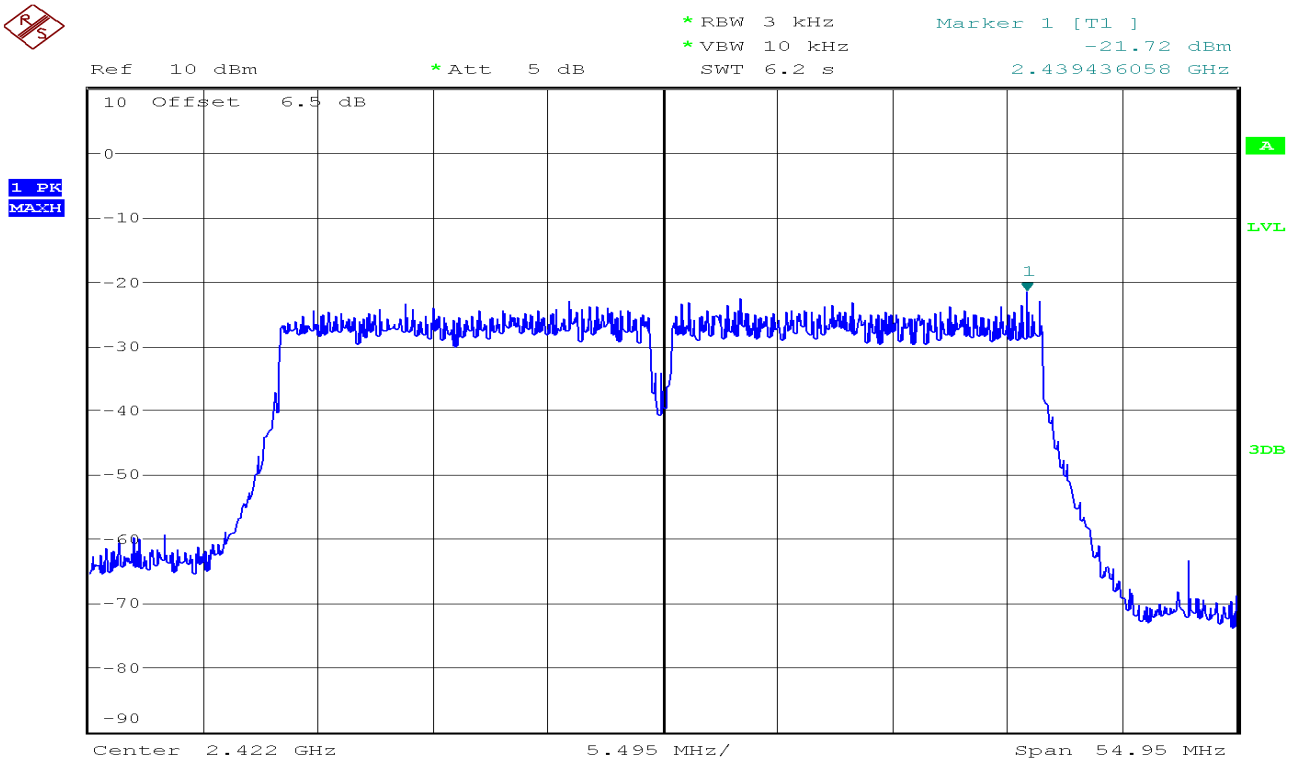


PPSD (CH High)

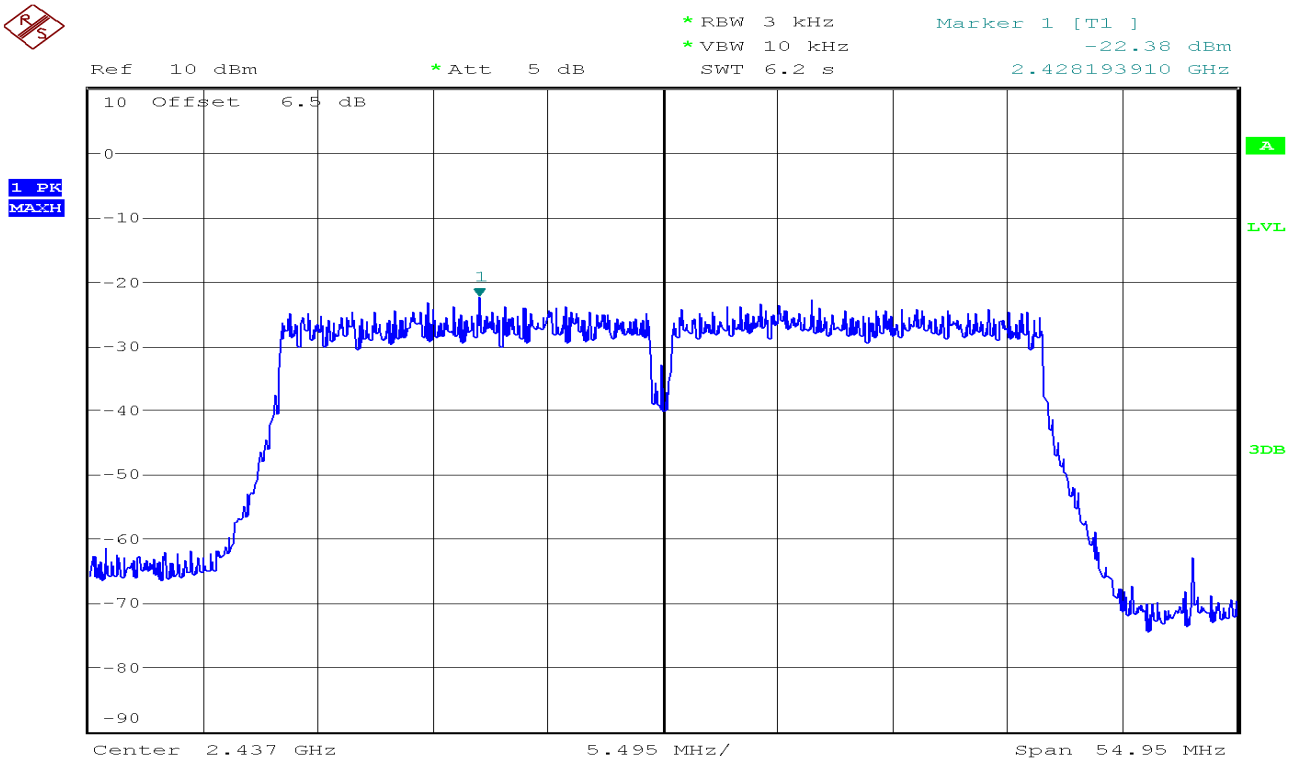


IEEE 802.11n HT40 mode / Chain 1

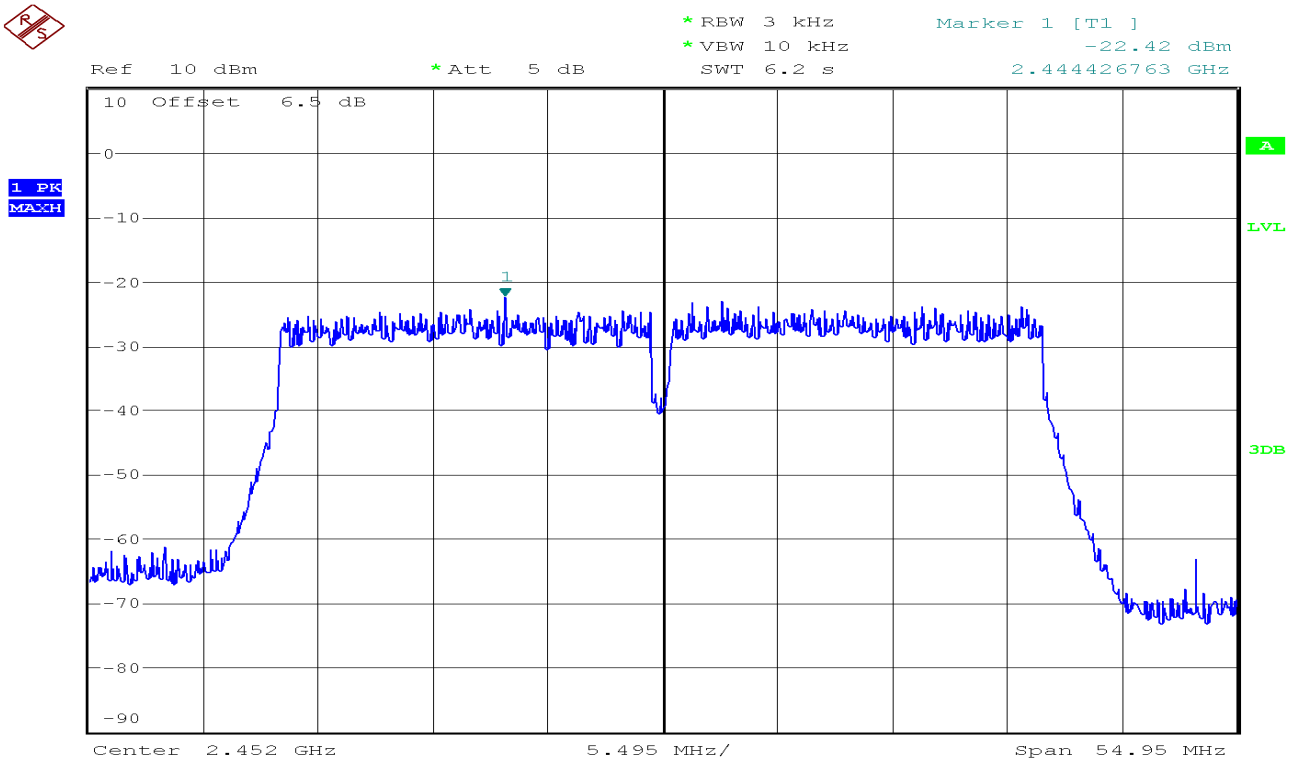
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



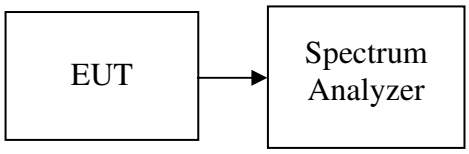
7.4.SPURIOUS EMISSIONS

Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

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

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

Measurements are made over the 30MHz to 40GHz range with the transmitter set to the lowest, middle, and highest channels.

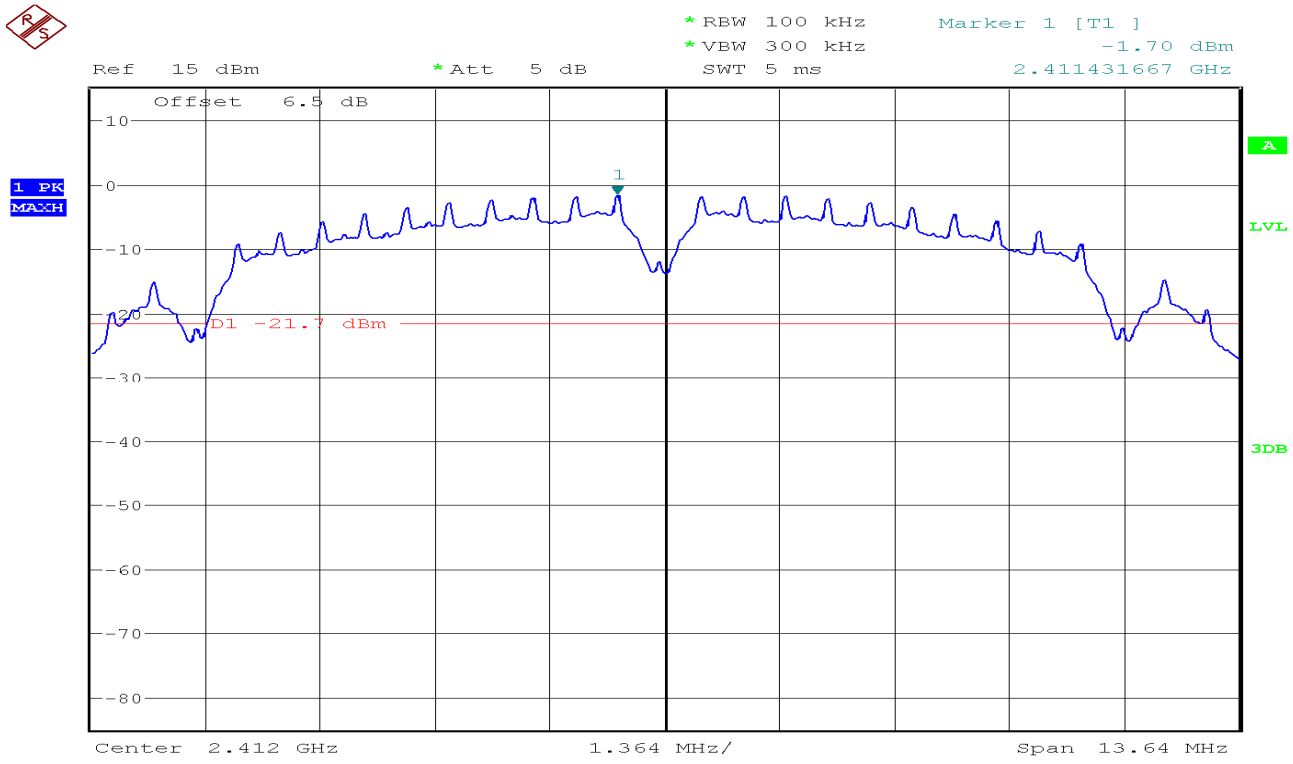
TEST RESULTS

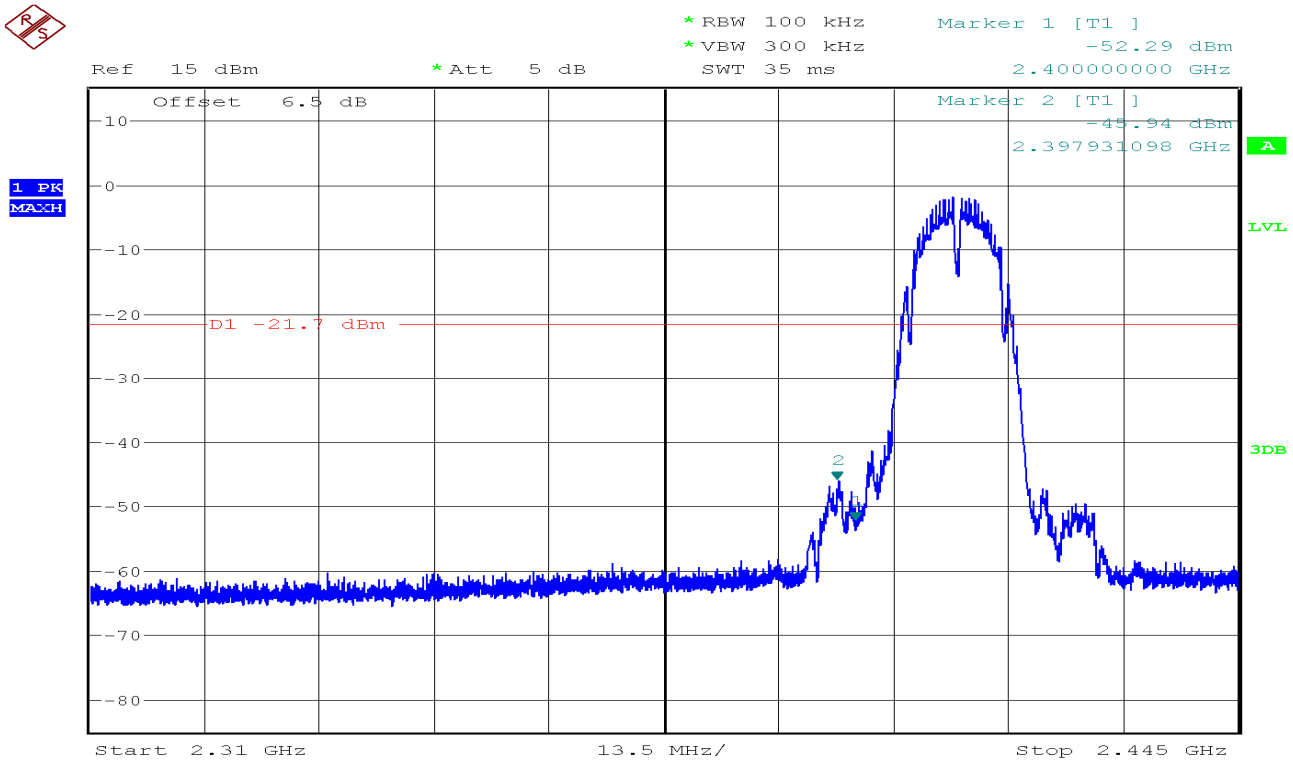
No non-compliance noted

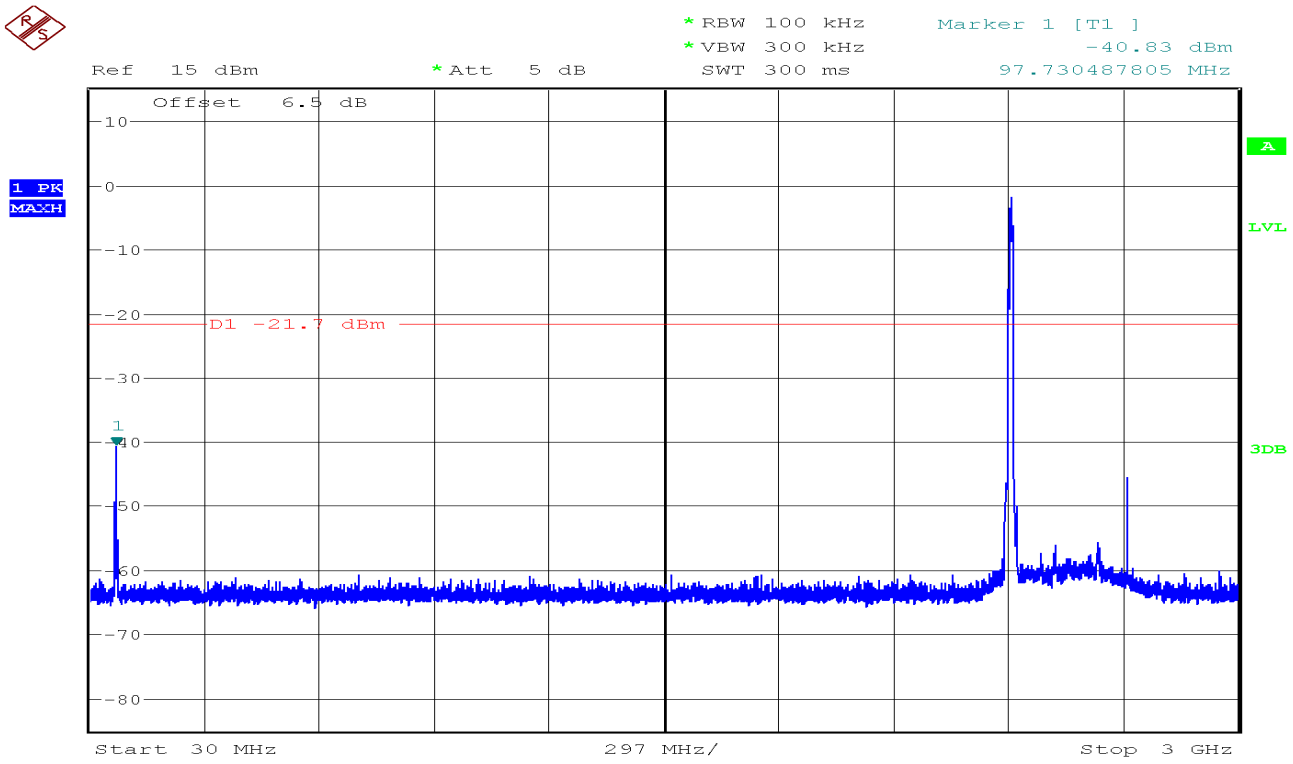
Test Plot
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

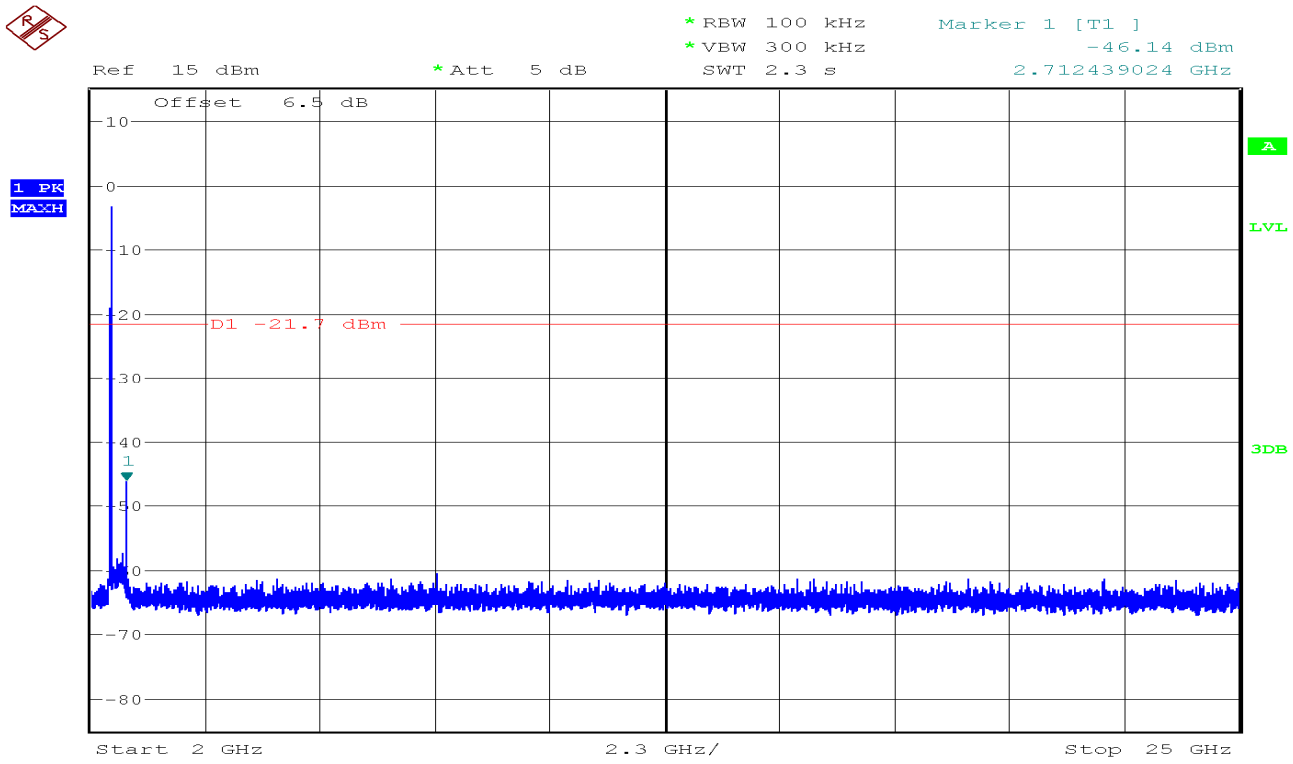
IEEE 802.11b mode/Chain 0

CH Low

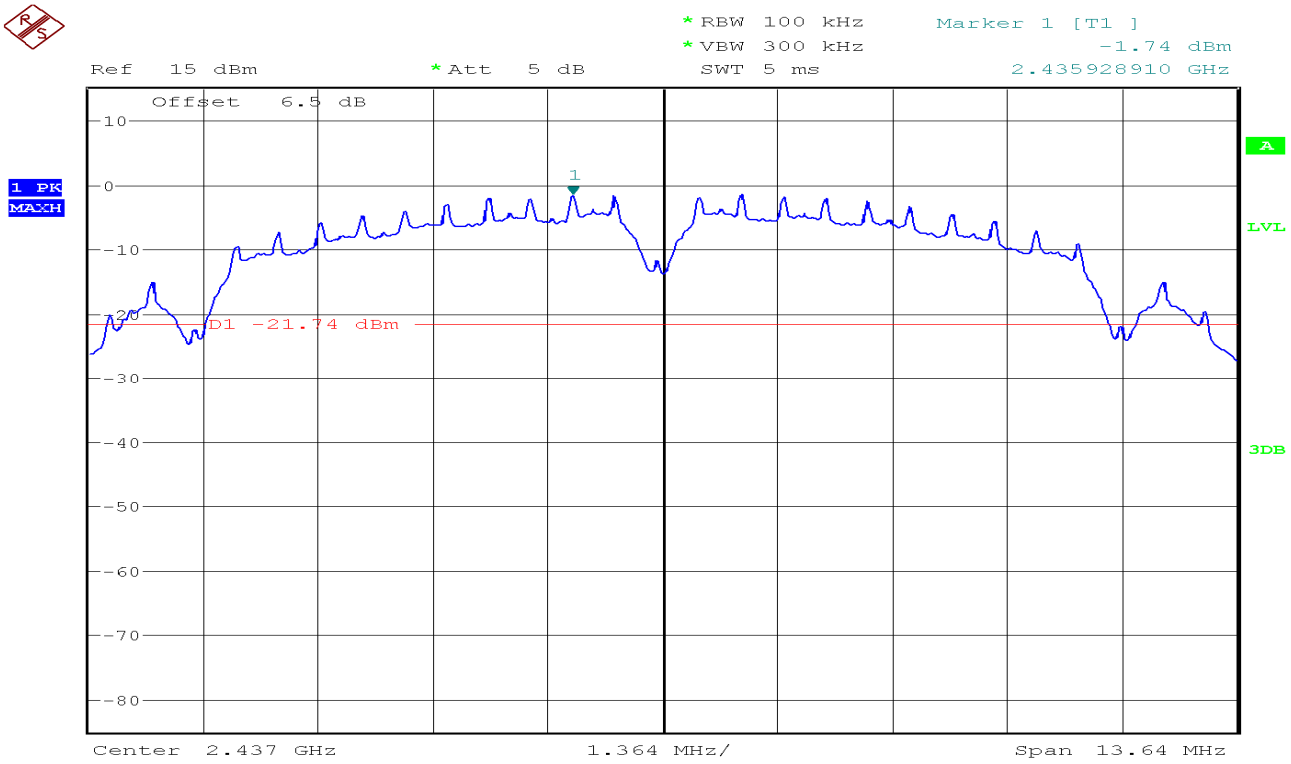


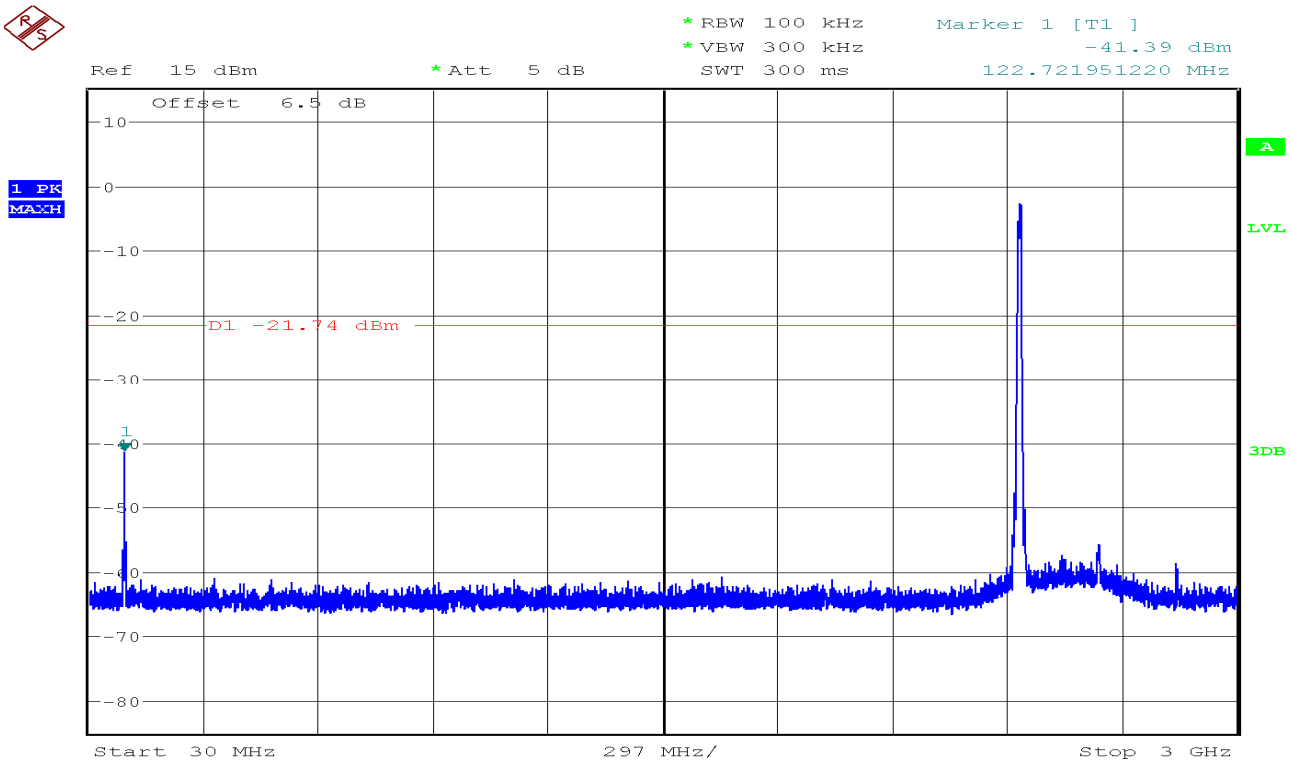


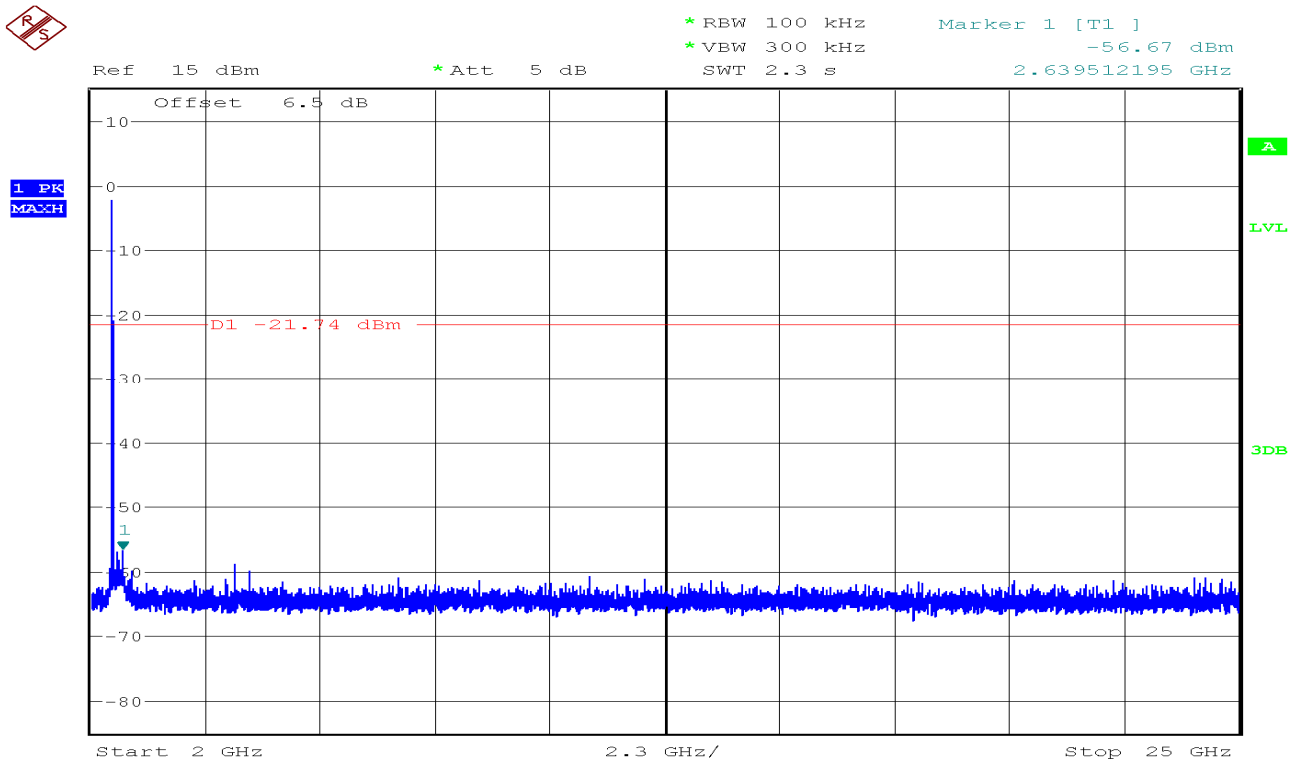

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-40.83 dBm
97.730487805 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -21.7 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-46.14 dBm
2.712439024 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -21.7 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

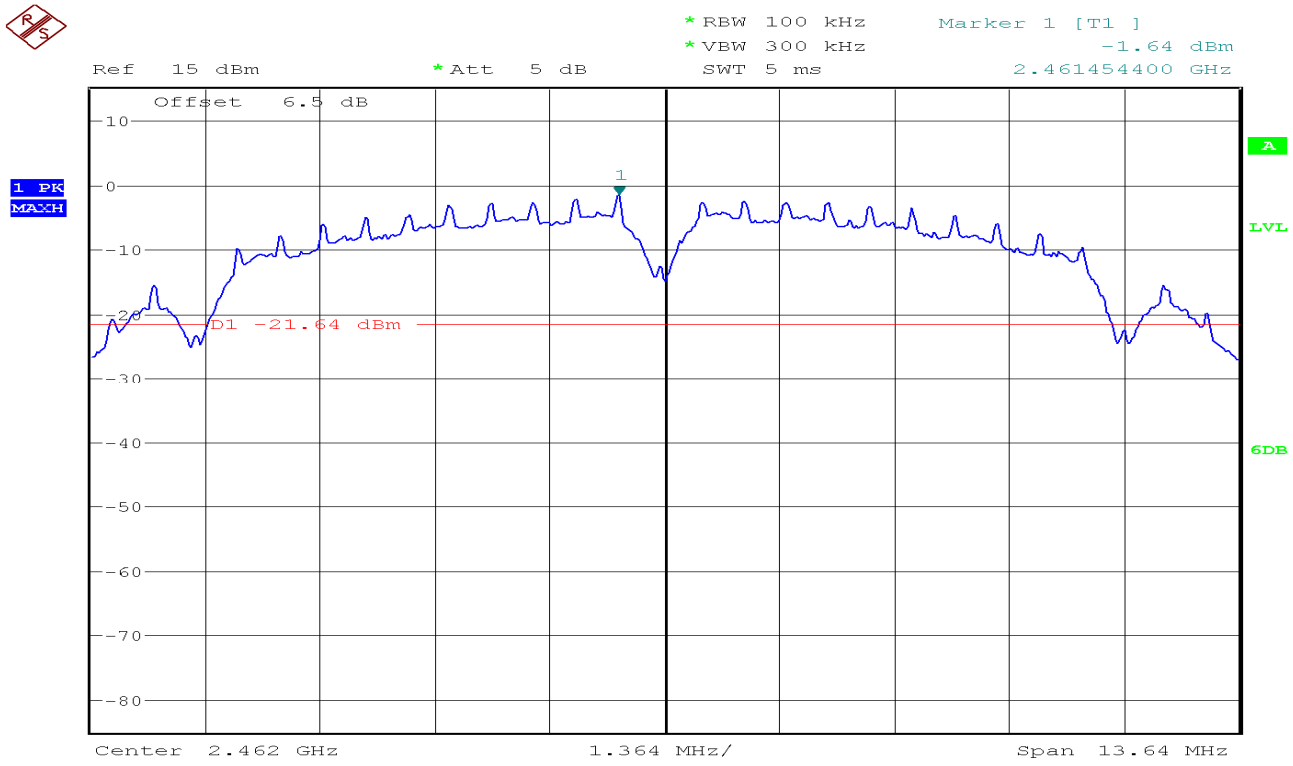
CH Mid

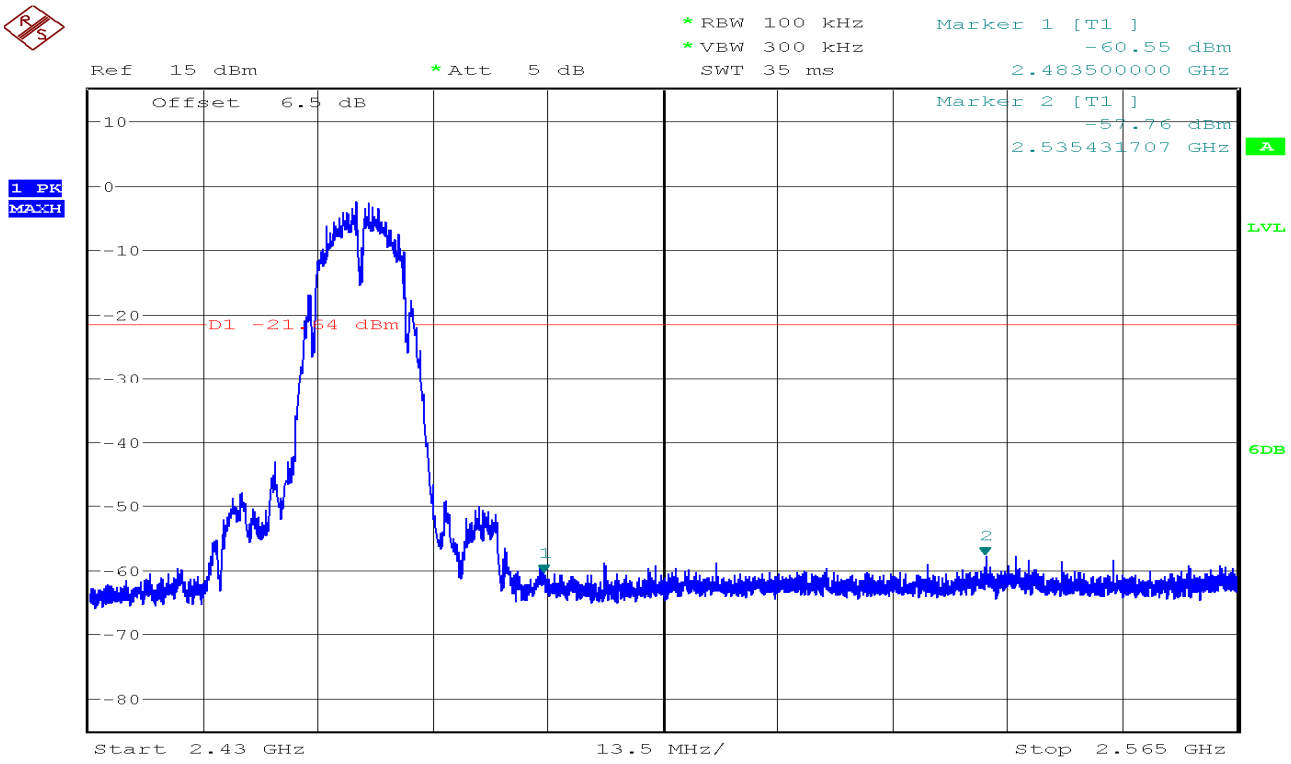

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-1.74 dBm
2.435928910 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -21.74 dBm
A
LVL
3DB
Center 2.437 GHz
1.364 MHz/
Span 13.64 MHz

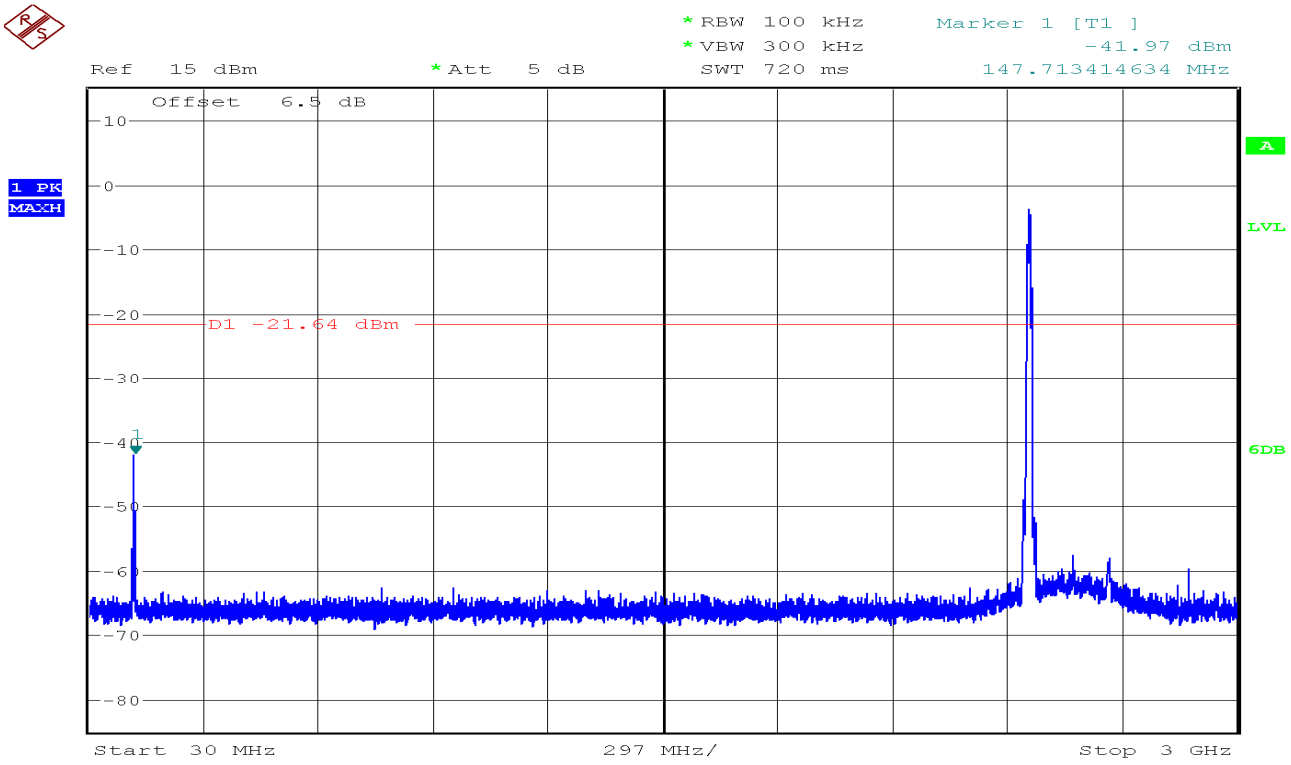

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-41.39 dBm
122.721951220 MHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -21.74 dBm
A
LVL
3DB
Start 30 MHz
297 MHz/
Stop 3 GHz

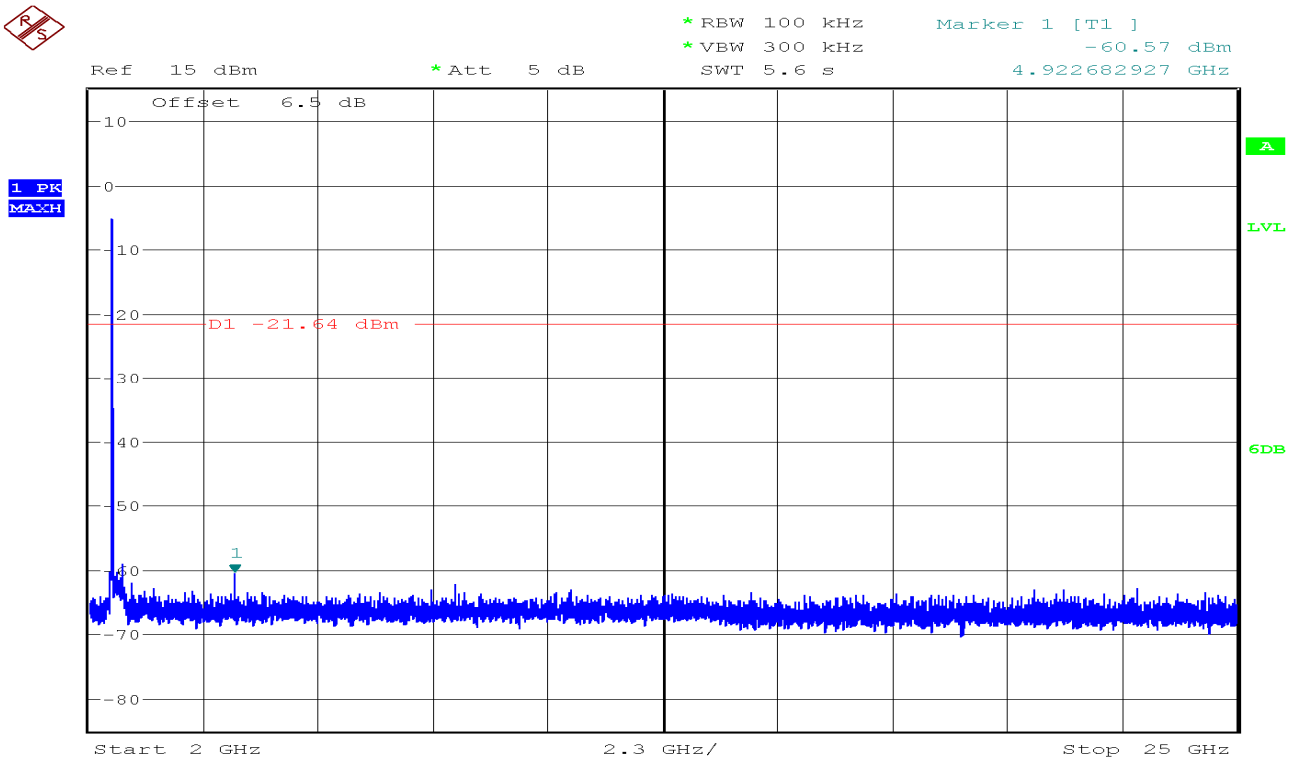

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-56.67 dBm
2.639512195 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -21.74 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-1.64 dBm
2.461454400 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -21.64 dBm
A
LVL
6DB
Center 2.462 GHz
1.364 MHz/
Span 13.64 MHz

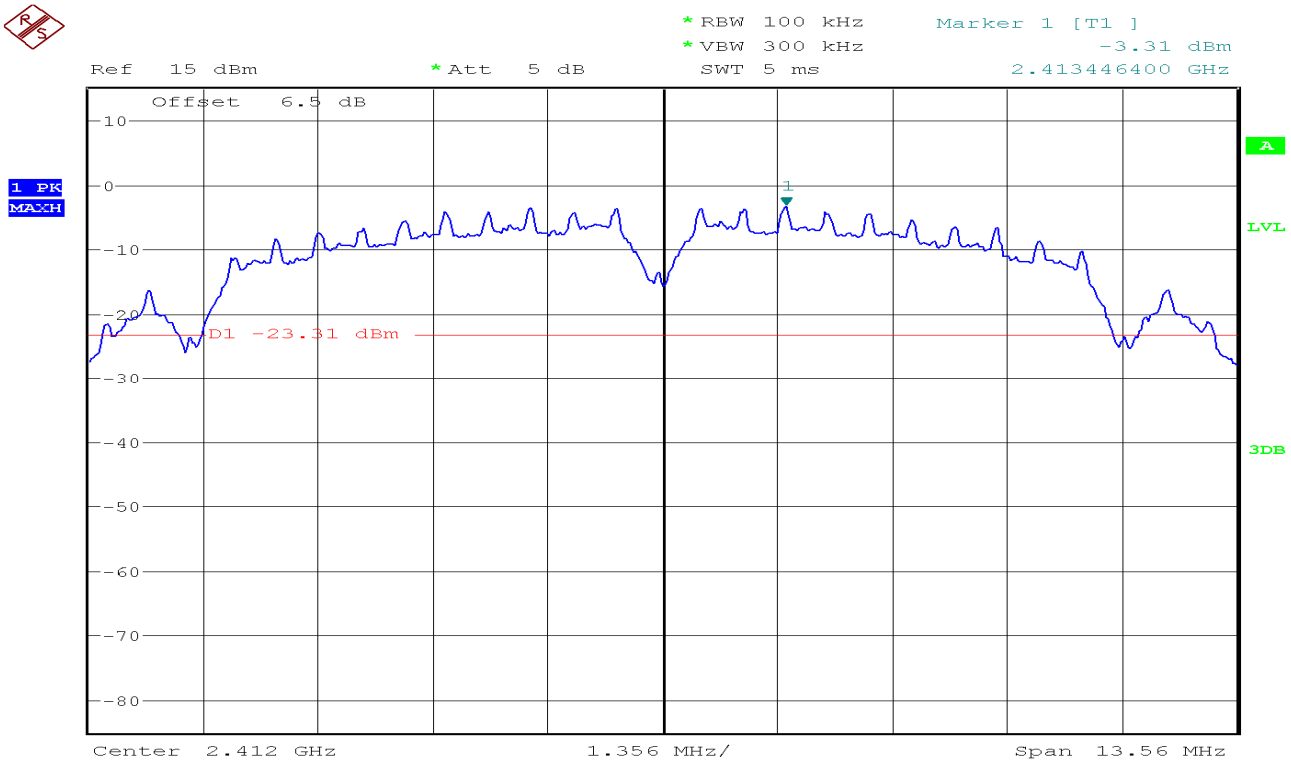

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-60.55 dBm
2.483500000 GHz
Marker 2 [T1]
-57.76 dBm
2.535431707 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -21.64 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

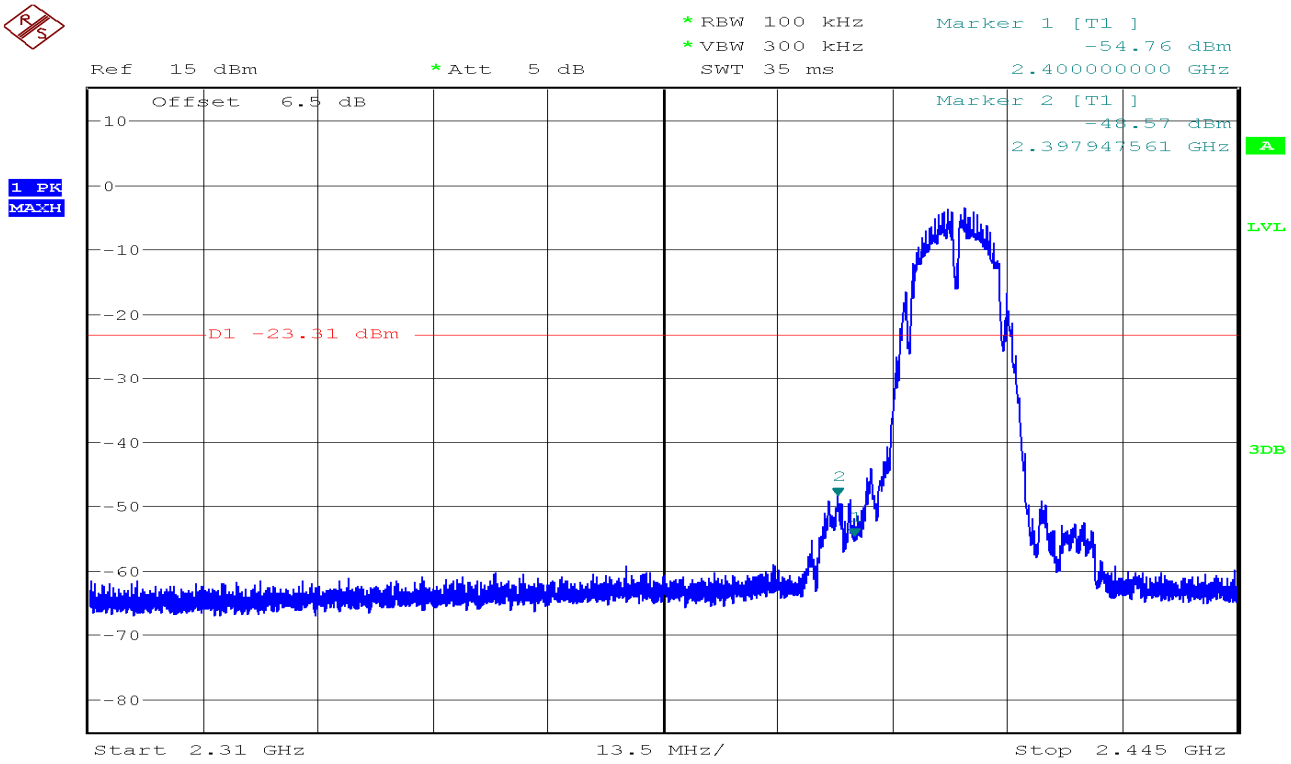

* RBW 100 kHz
* VBW 300 kHz
SWT 720 ms
Marker 1 [T1]
-41.97 dBm
147.713414634 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -21.64 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

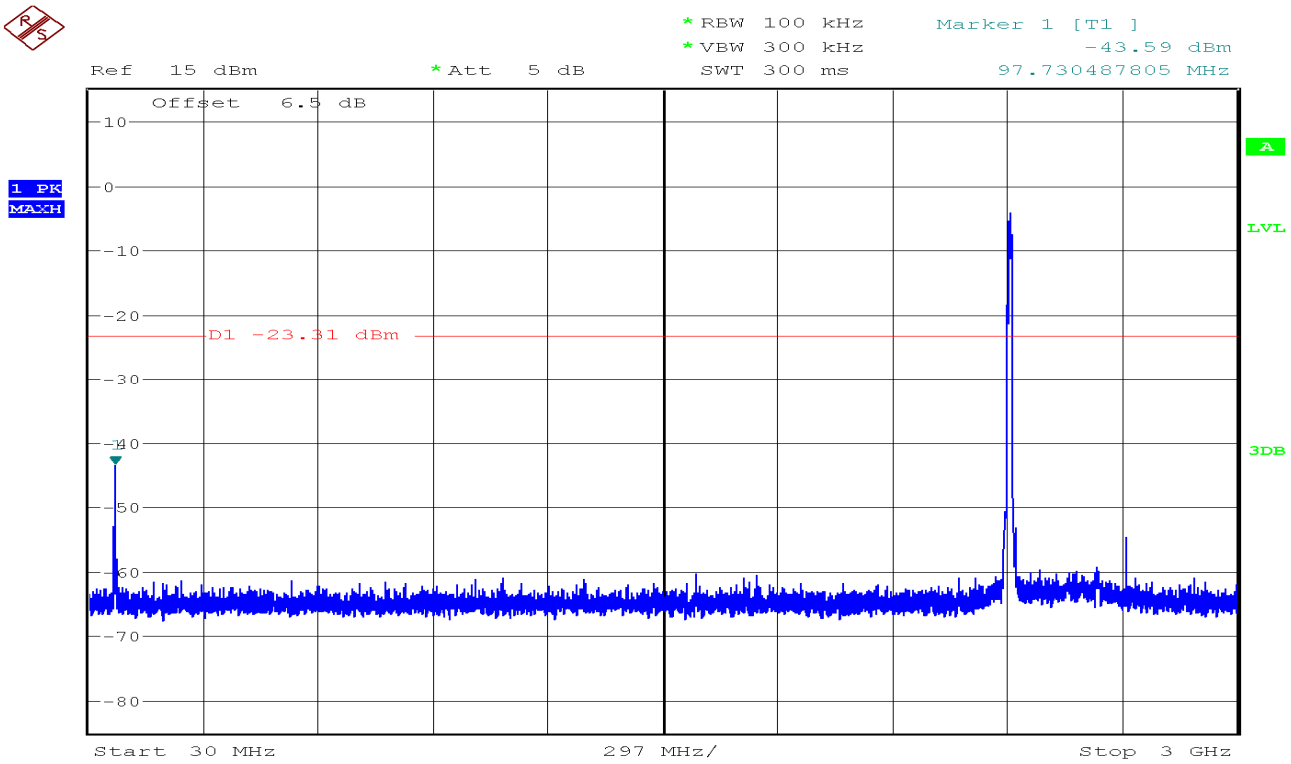


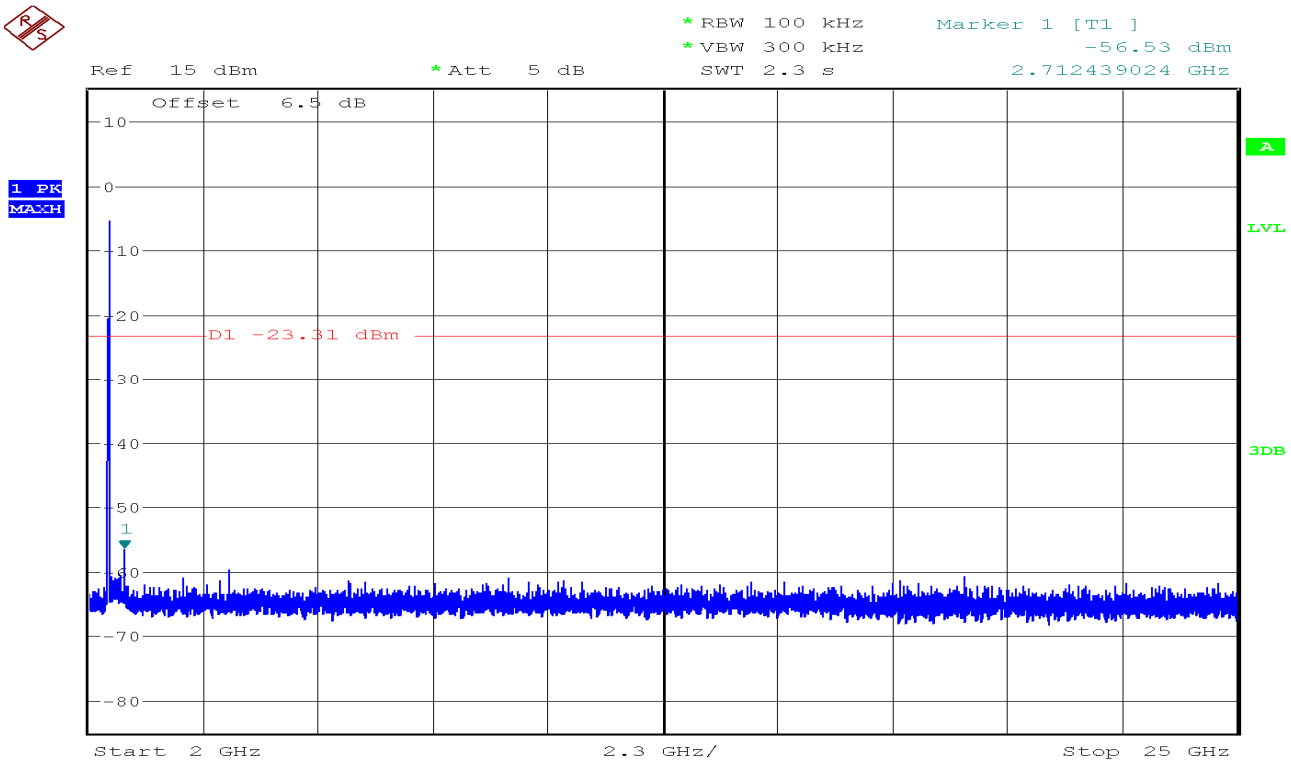
IEEE 802.11b mode/Chain 1

CH Low

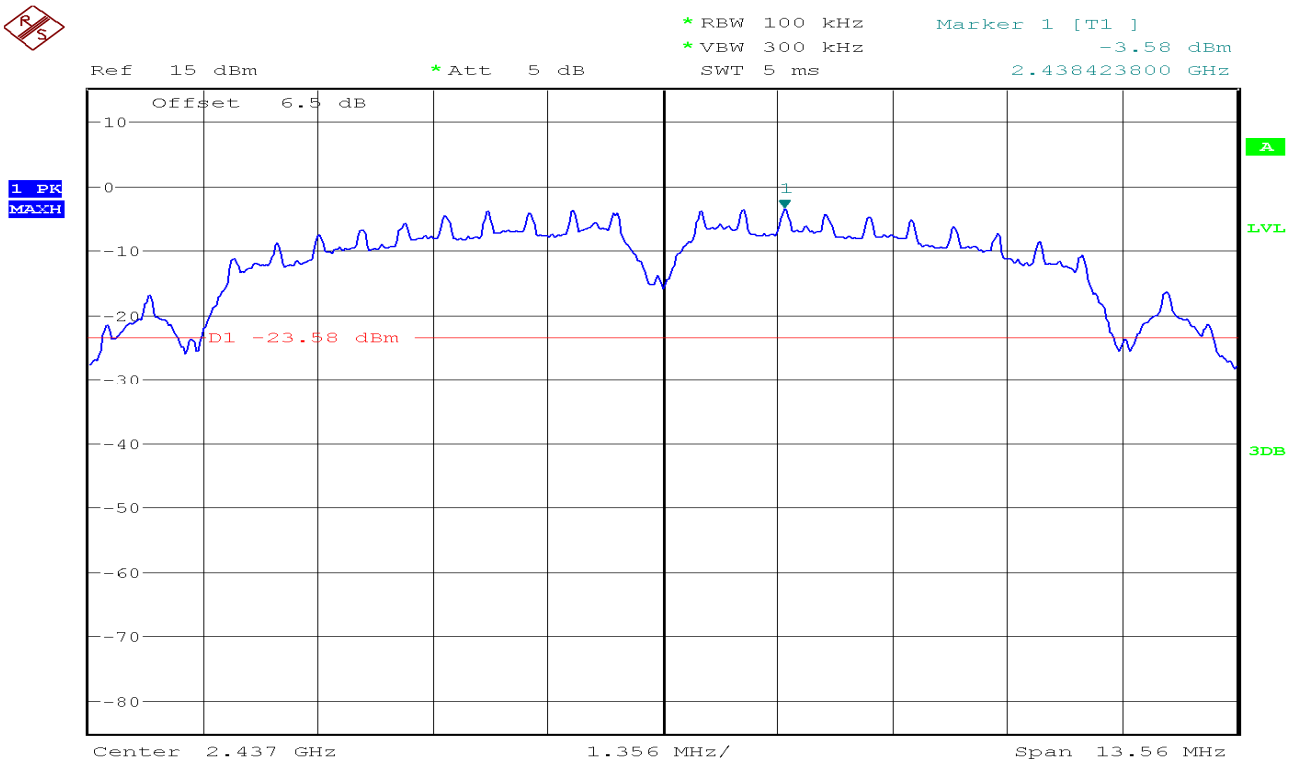


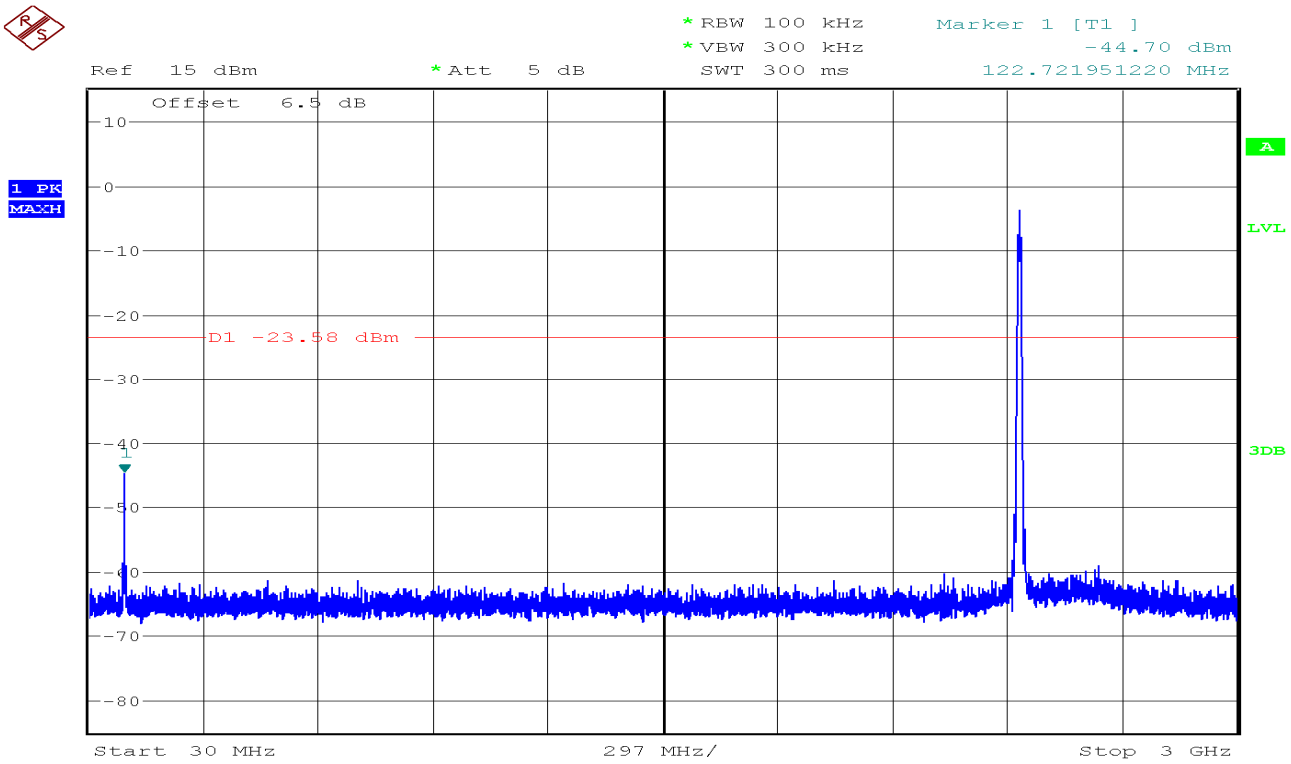

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-54.76 dBm
2.400000000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-48.57 dBm
2.397947561 GHz
1 PK MAXH
A
LVL
3DB
D1 -23.31 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

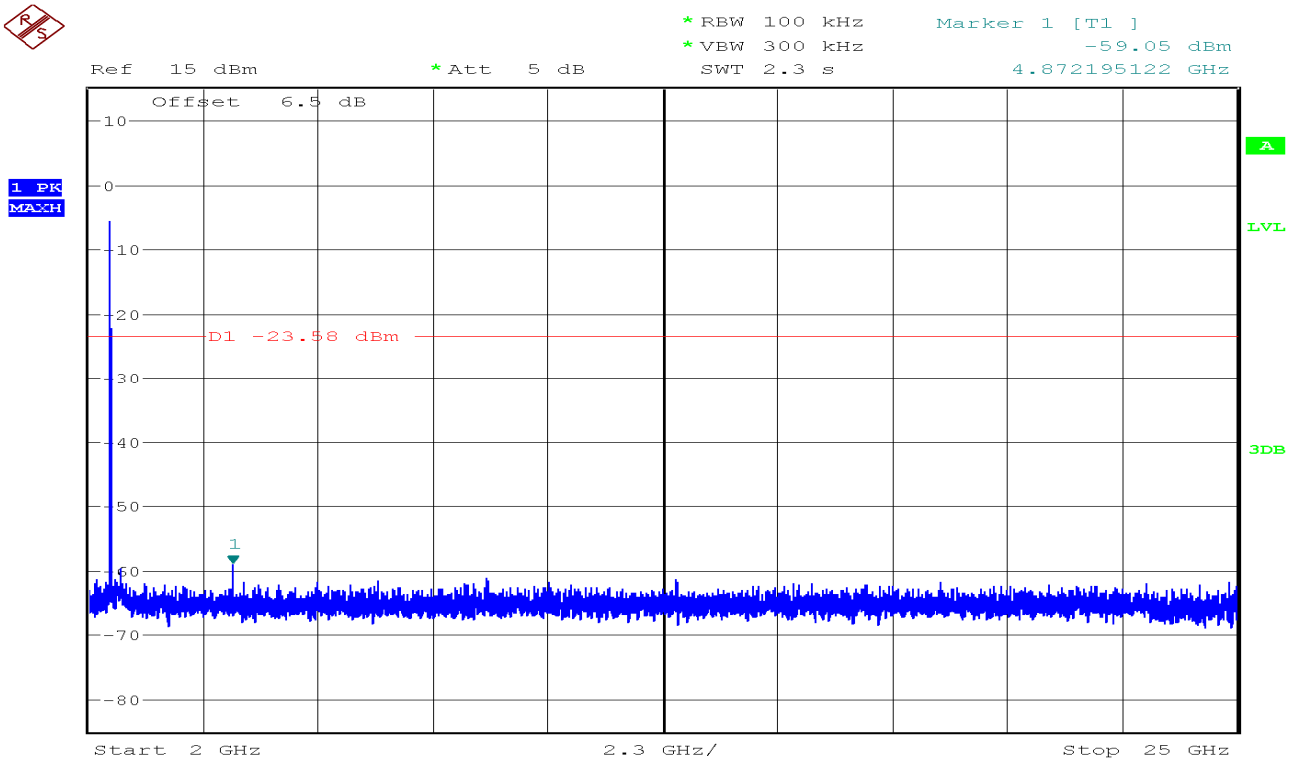

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-43.59 dBm
97.730487805 MHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.31 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-56.53 dBm
2.712439024 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.31 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

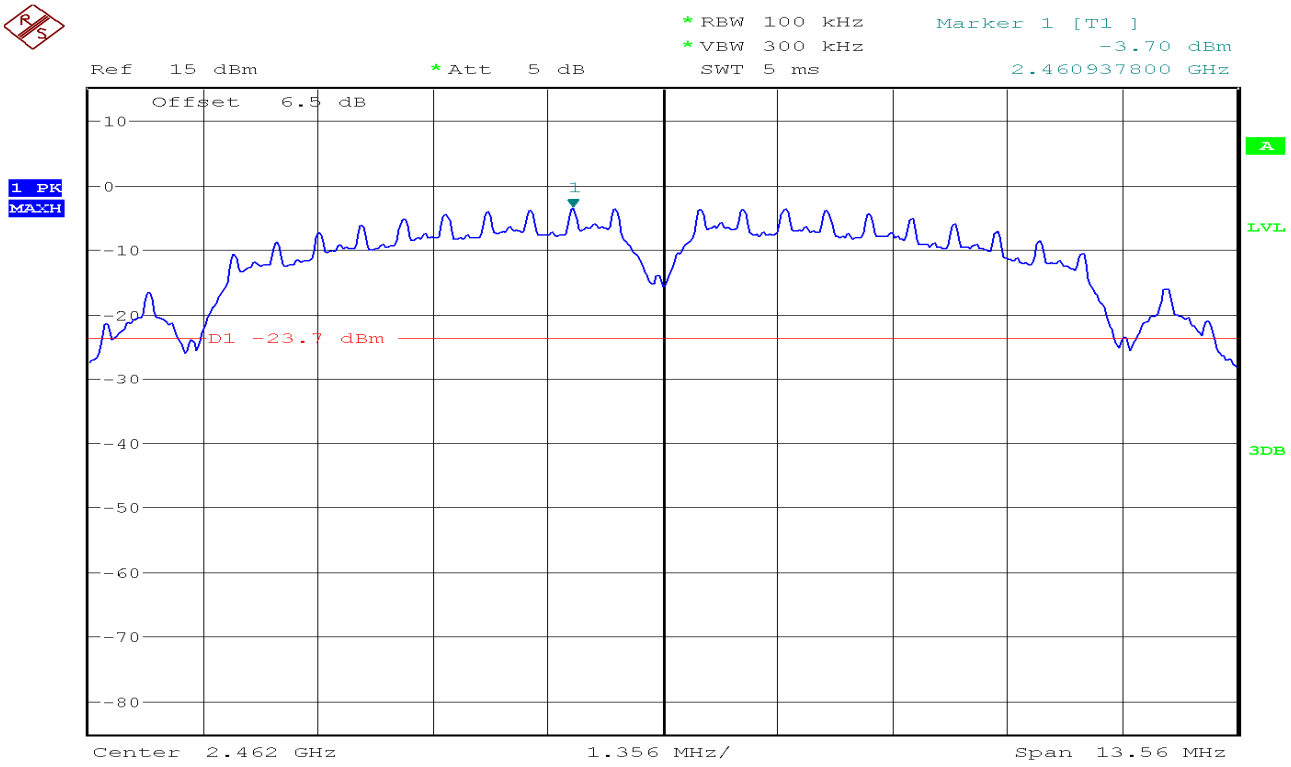
CH Mid

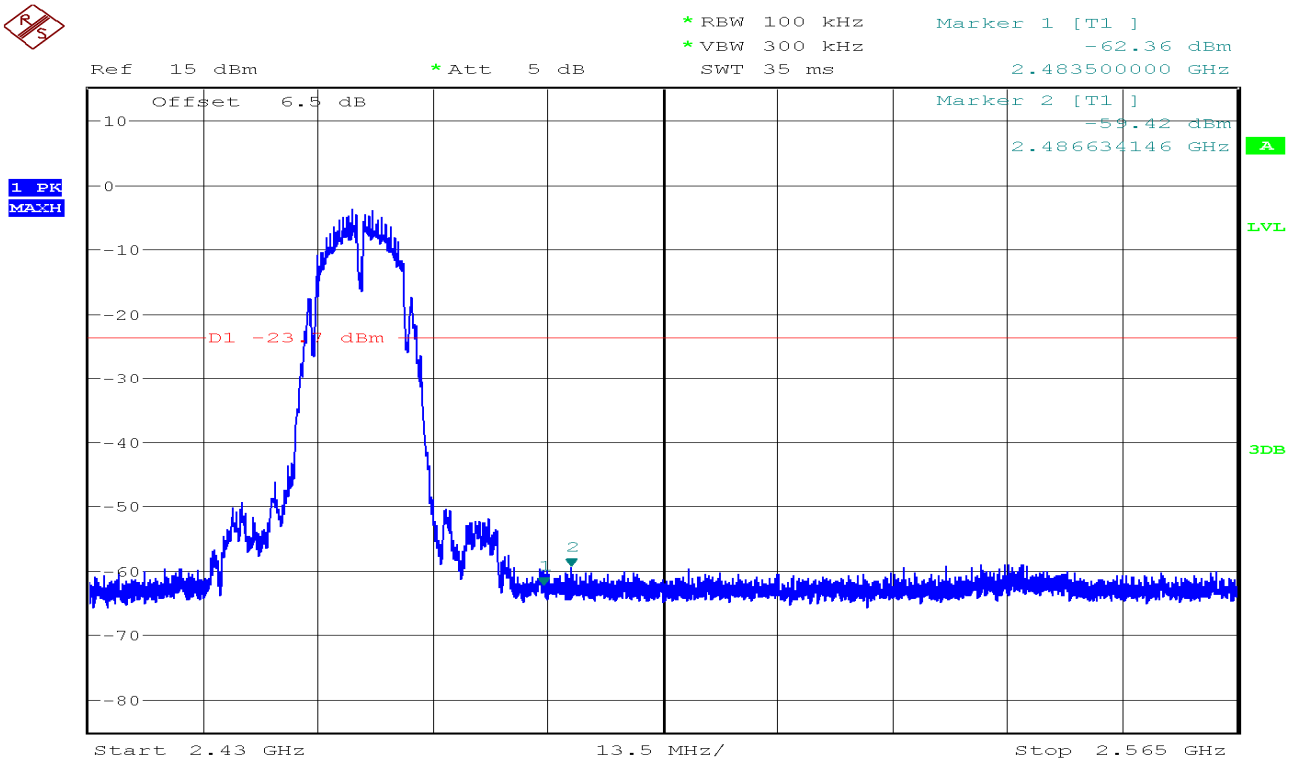

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-3.58 dBm
2.438423800 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.58 dBm
Center 2.437 GHz
1.356 MHz/
Span 13.56 MHz

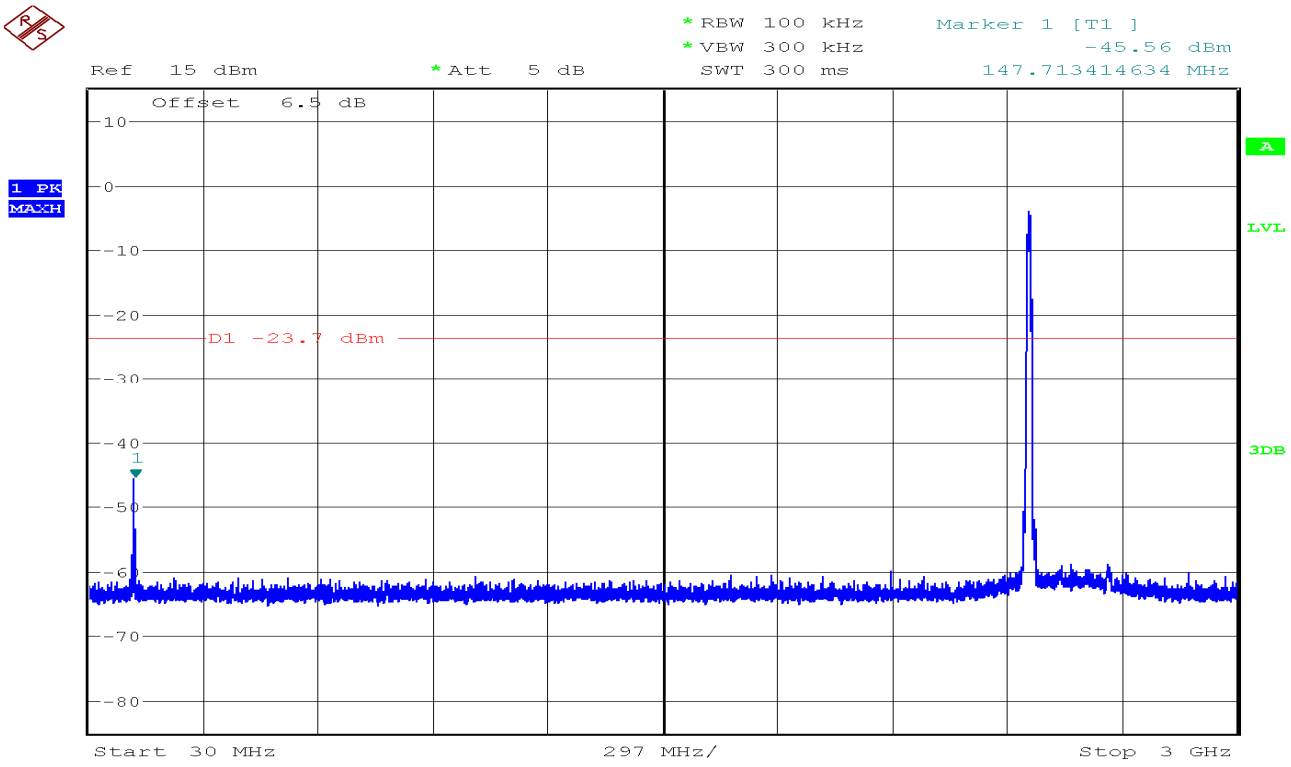

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-44.70 dBm
122.721951220 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.58 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

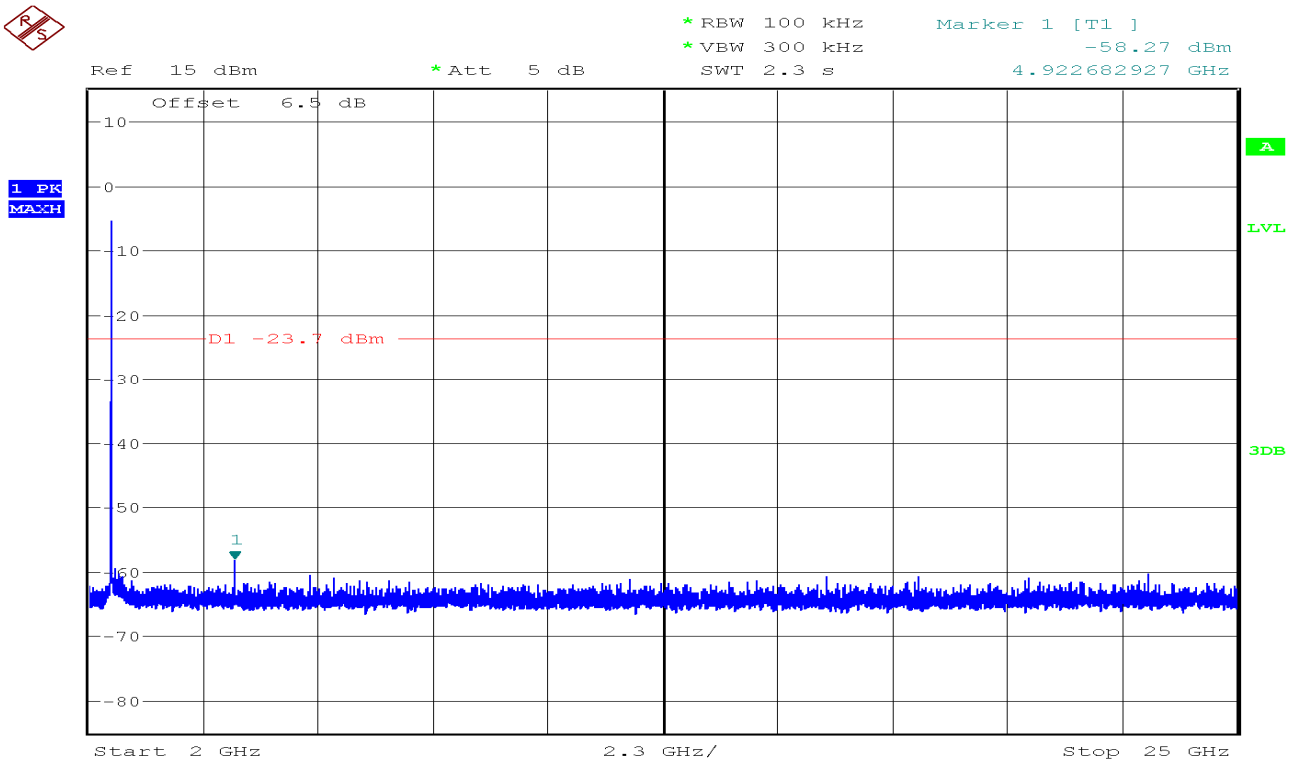

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-59.05 dBm
4.872195122 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.58 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
-3.70 dBm
2.460937800 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.7 dBm
Center 2.462 GHz
1.356 MHz/
Span 13.56 MHz

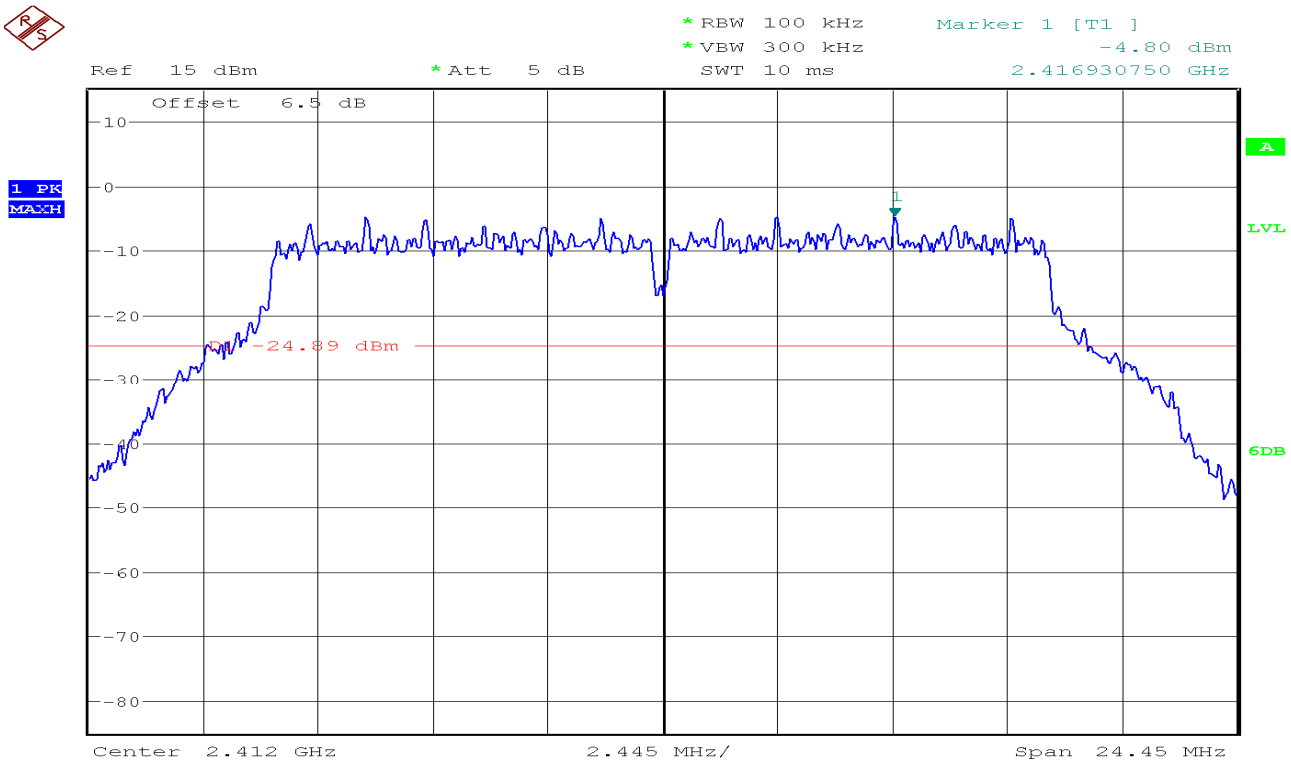

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-62.36 dBm
2.483500000 GHz
Marker 2 [T1]
-59.42 dBm
2.486634146 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.7 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

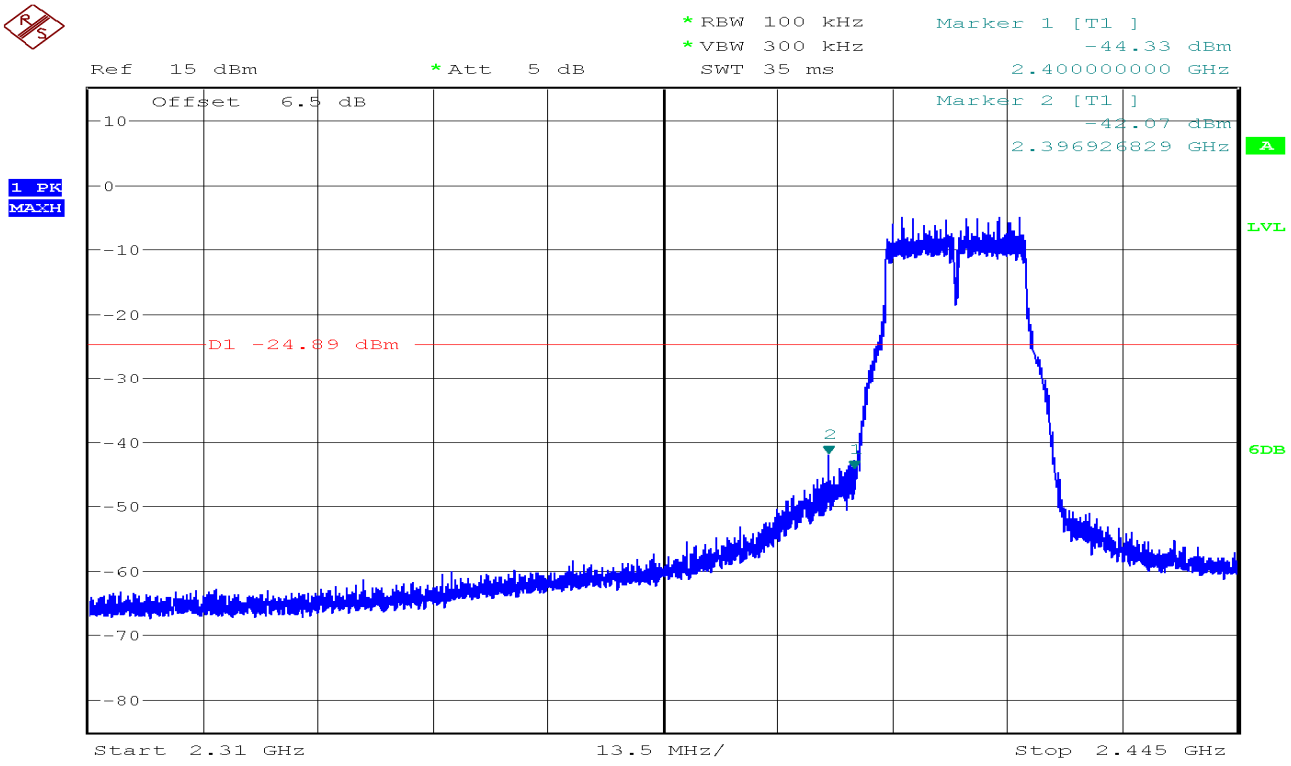

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-45.56 dBm
147.713414634 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.7 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

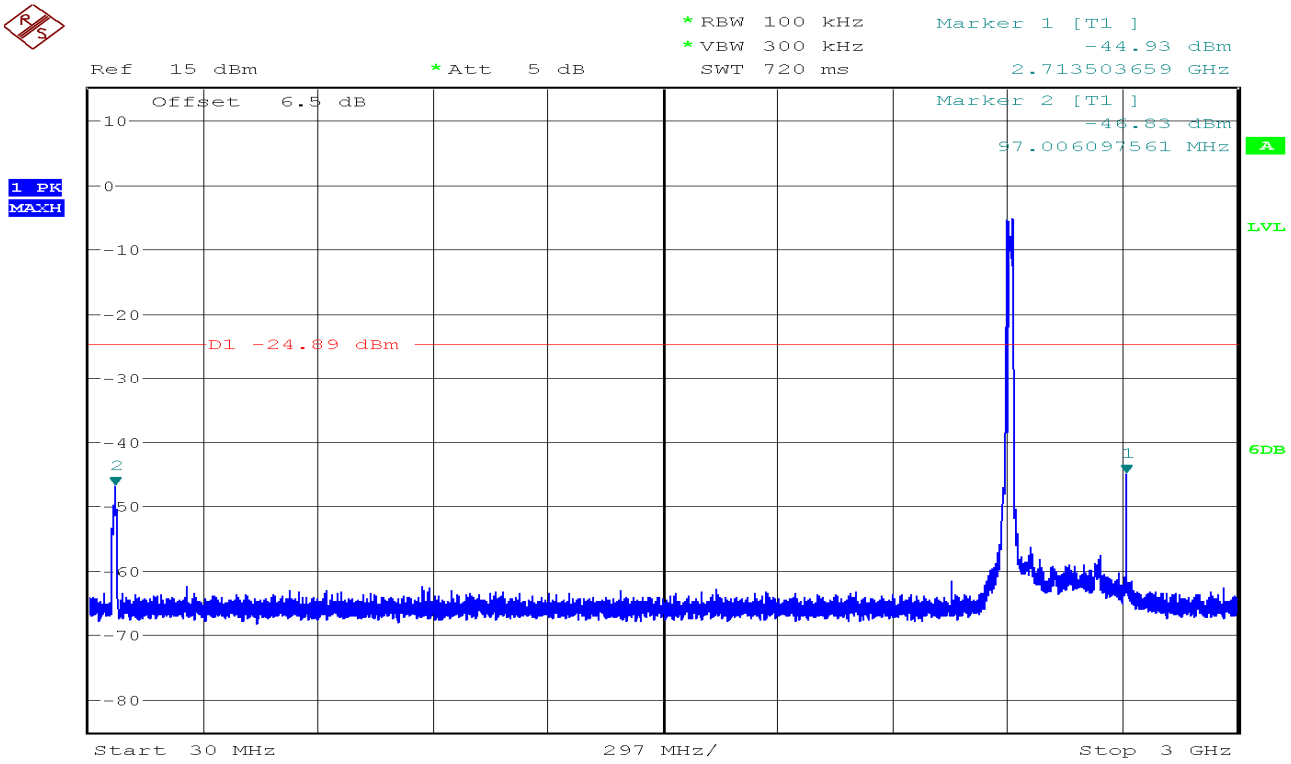

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-58.27 dBm
4.922682927 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.7 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

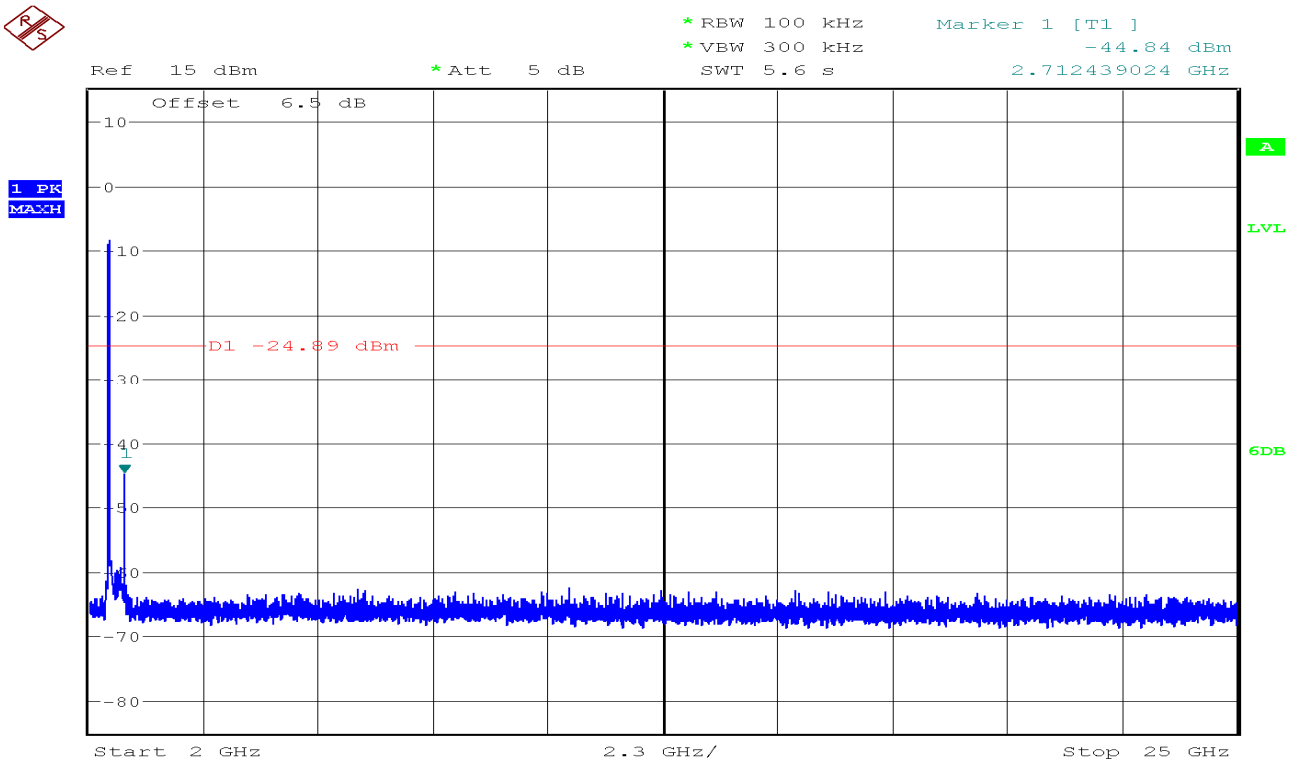
IEEE 802.11g mode/Chain 0

CH Low

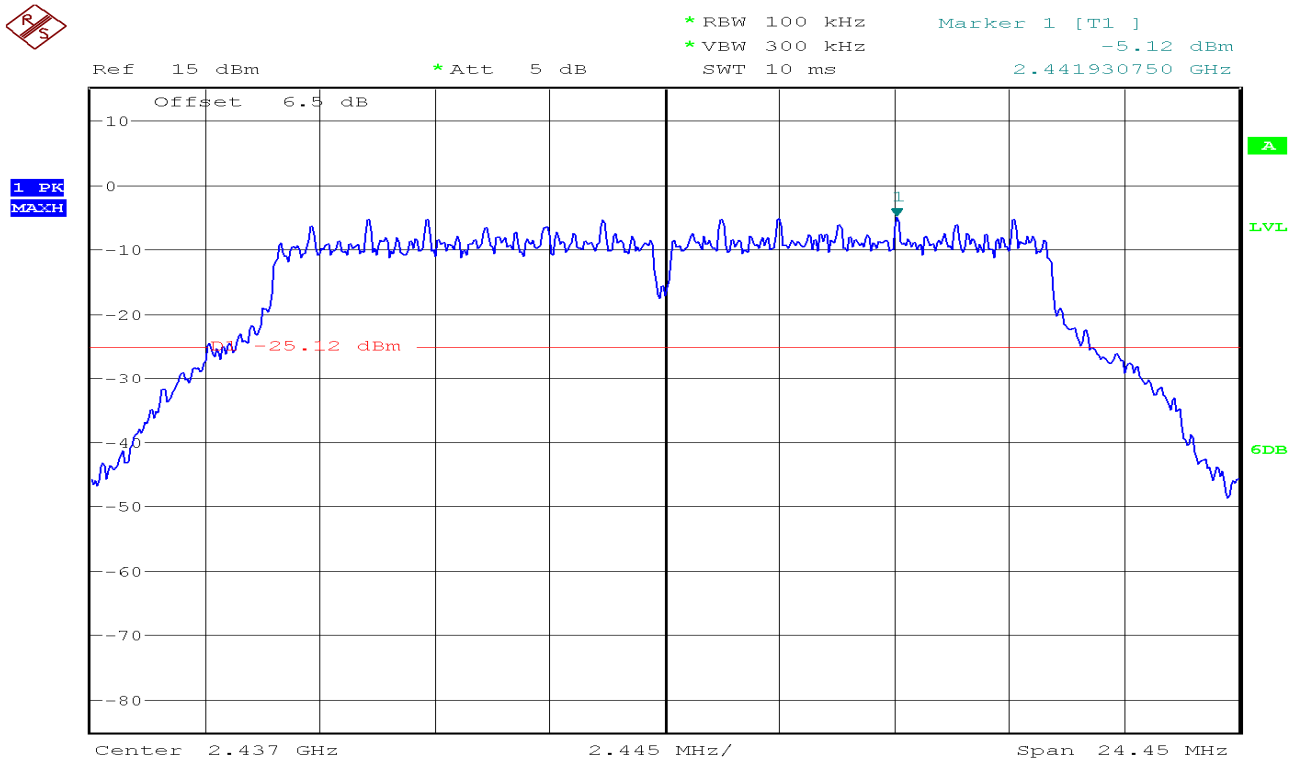


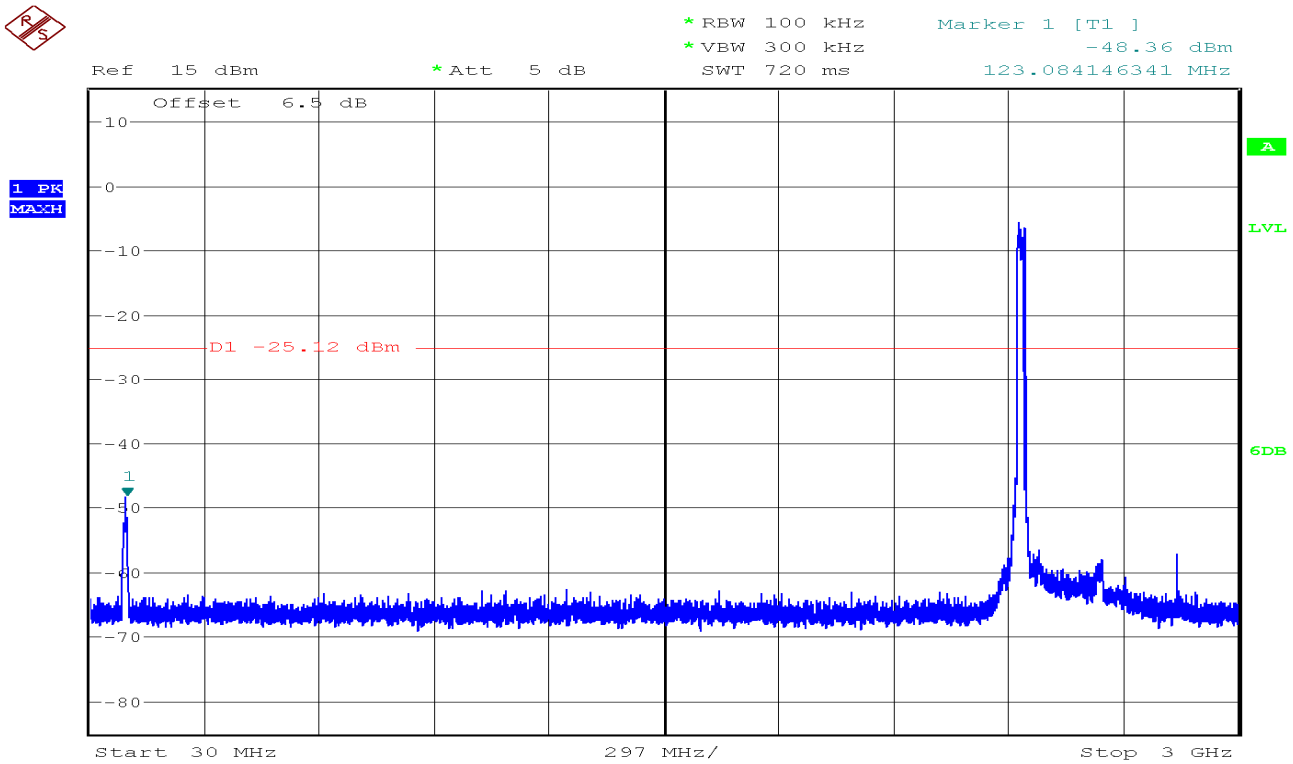


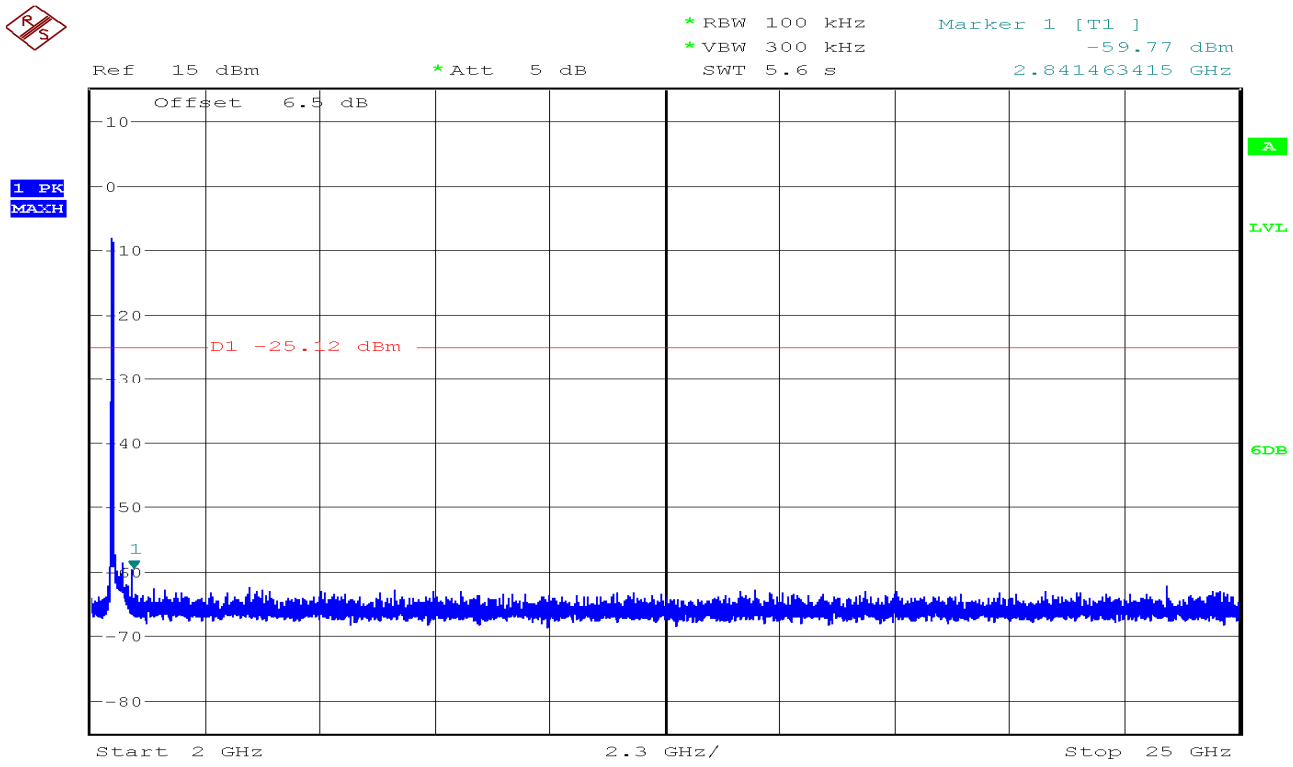

RBW 100 kHz
VBW 300 kHz
SWT 720 ms
Marker 1 [T1]
-44.93 dBm
2.713503659 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-46.83 dBm
97.006097561 MHz
1 PK
MAXH
A
LVL
6DB
D1 -24.89 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 5.6 s
Marker 1 [T1]
-44.84 dBm
2.712439024 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK
MAXH
A
LVL
6DB
D1 -24.89 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

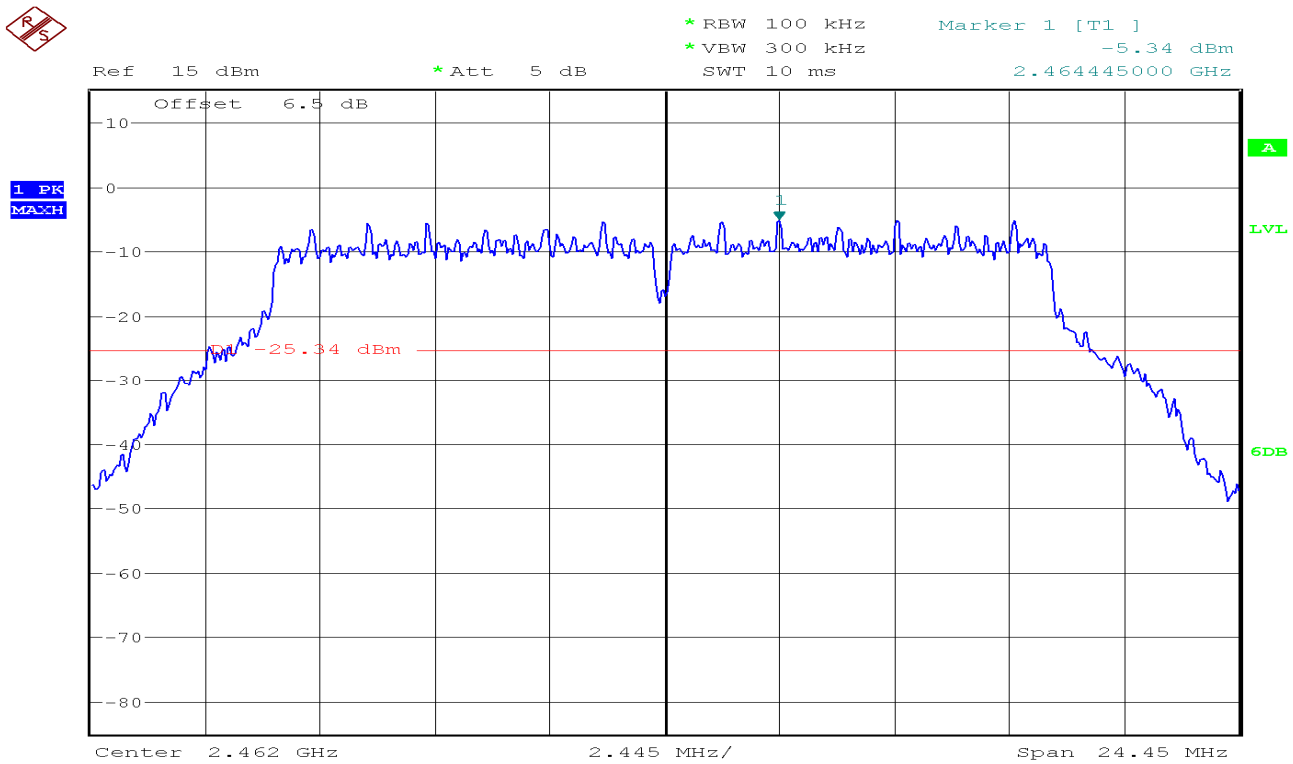
CH Mid

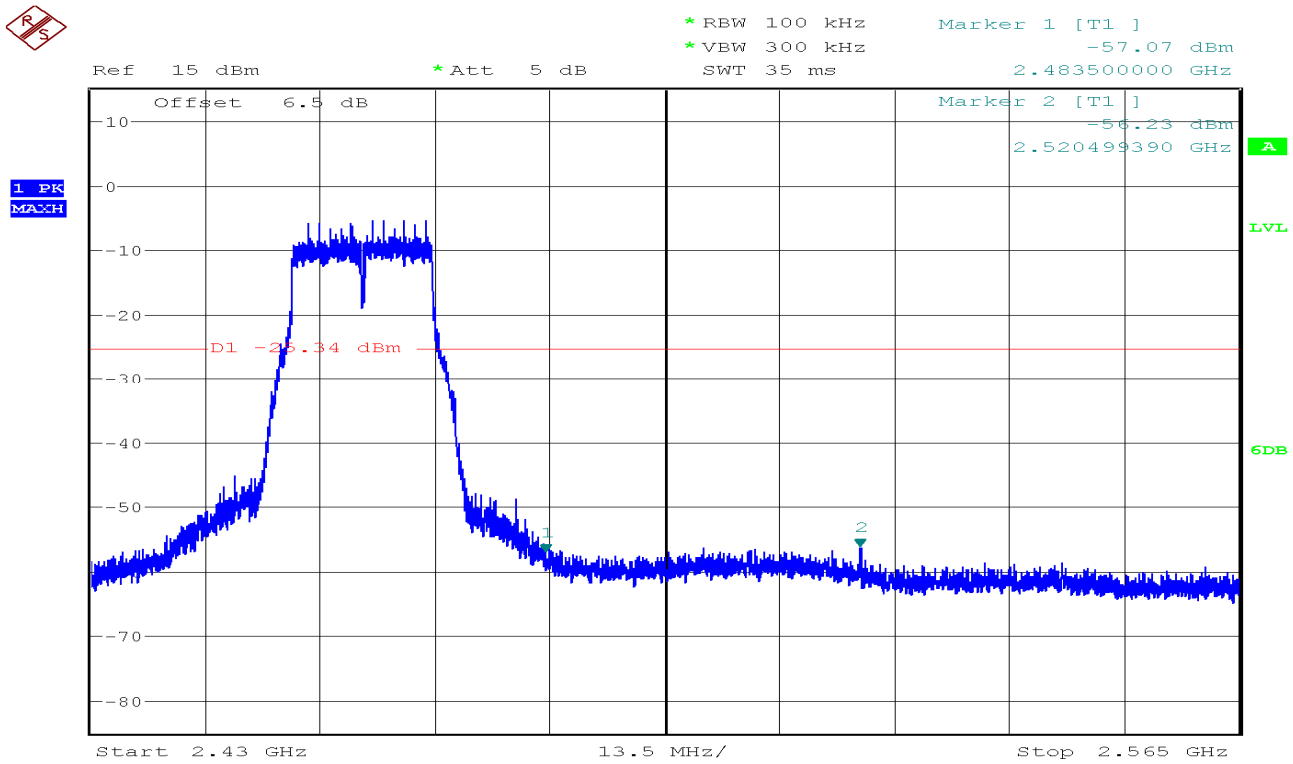

* RBW 100 kHz
* VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.12 dBm
2.441930750 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -25.12 dBm
Center 2.437 GHz
2.445 MHz/
Span 24.45 MHz

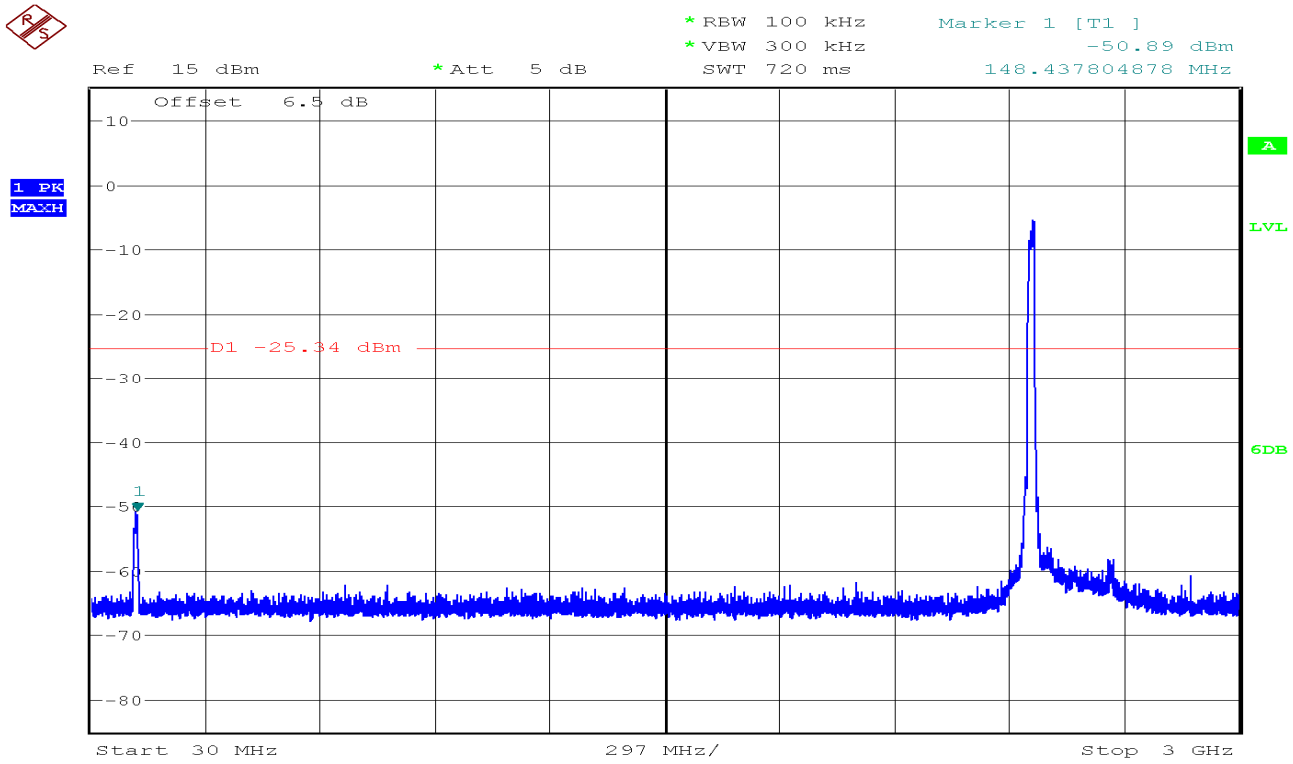

* RBW 100 kHz
* VBW 300 kHz
SWT 720 ms
Marker 1 [T1]
-48.36 dBm
123.084146341 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -25.12 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

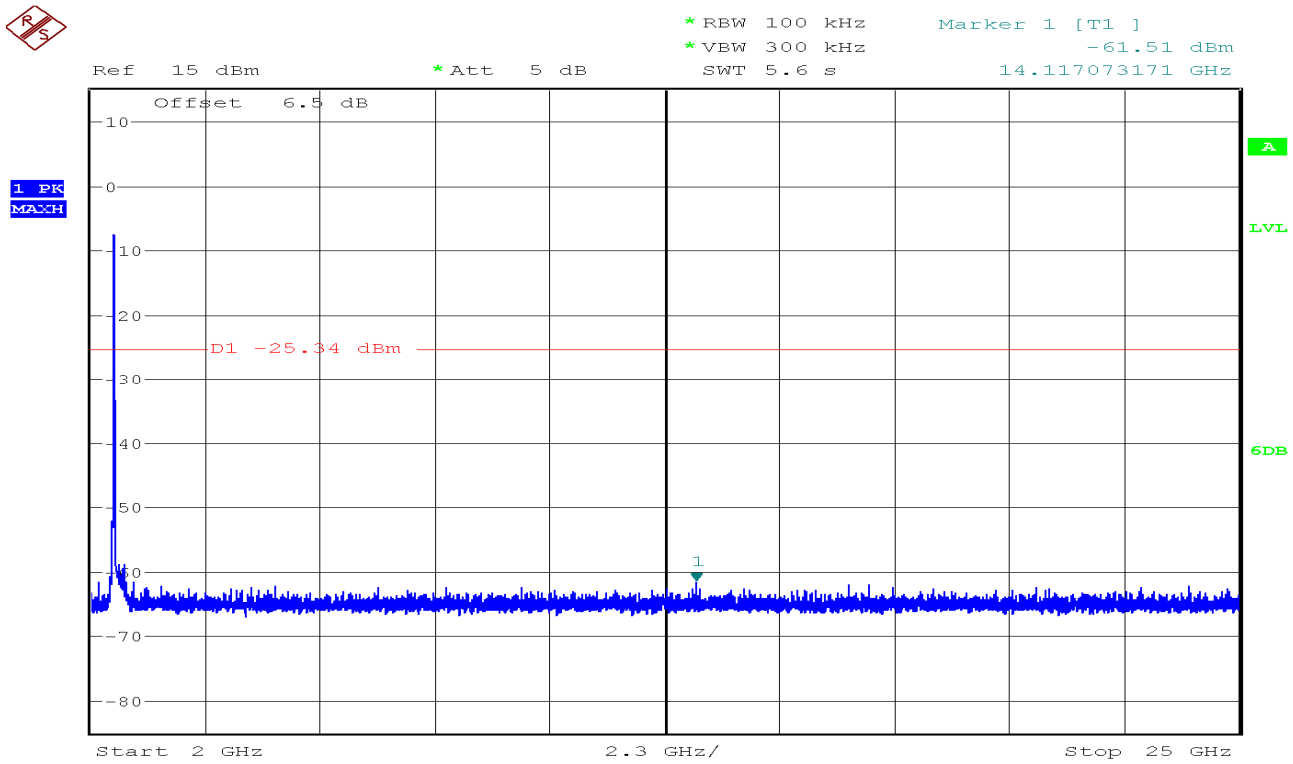

* RBW 100 kHz
* VBW 300 kHz
SWT 5.6 s
Marker 1 [T1]
-59.77 dBm
2.841463415 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -25.12 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


* RBW 100 kHz
* VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.34 dBm
2.464445000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -25.34 dBm
Center 2.462 GHz
2.445 MHz/
Span 24.45 MHz

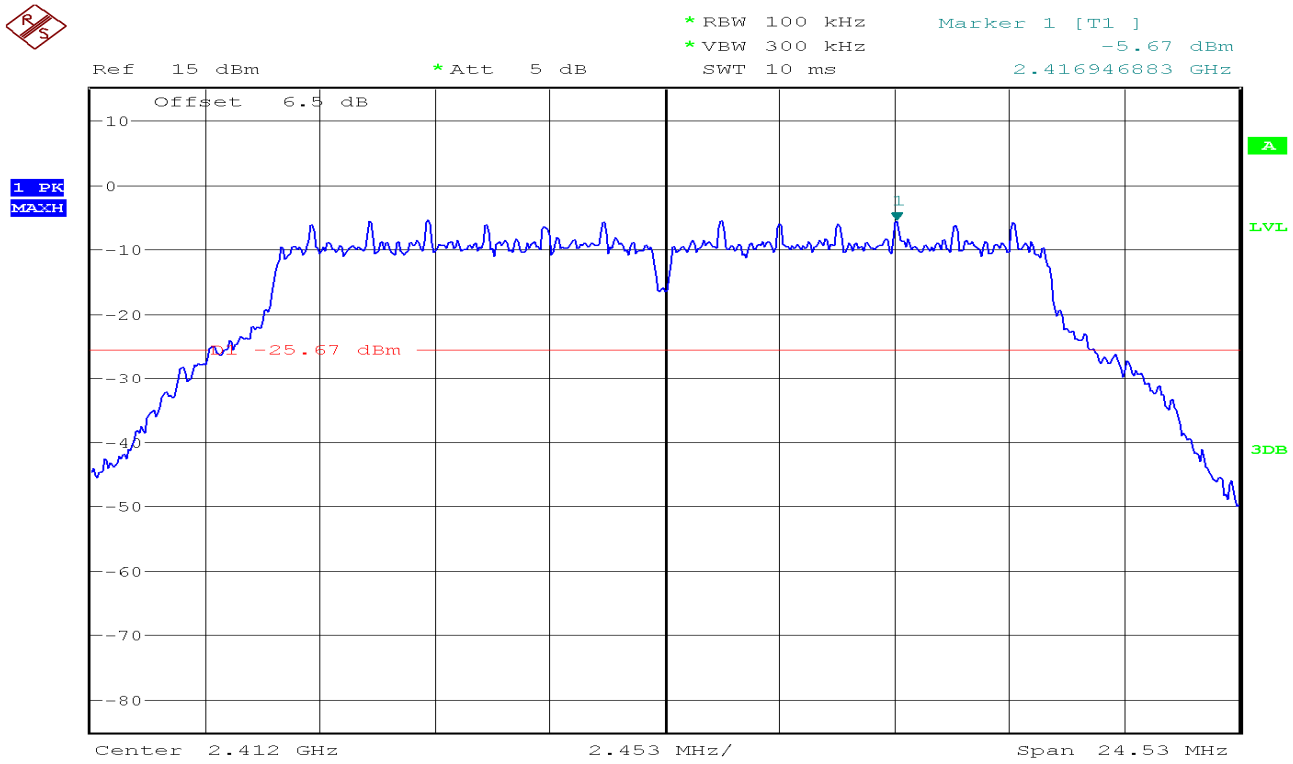

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-57.07 dBm
2.483500000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-56.23 dBm
2.520499390 GHz
1 PK MAXH
A
LVL
6DB
D1 -25.34 dBm
10
0
-10
-20
-30
-40
-50
-70
-80
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

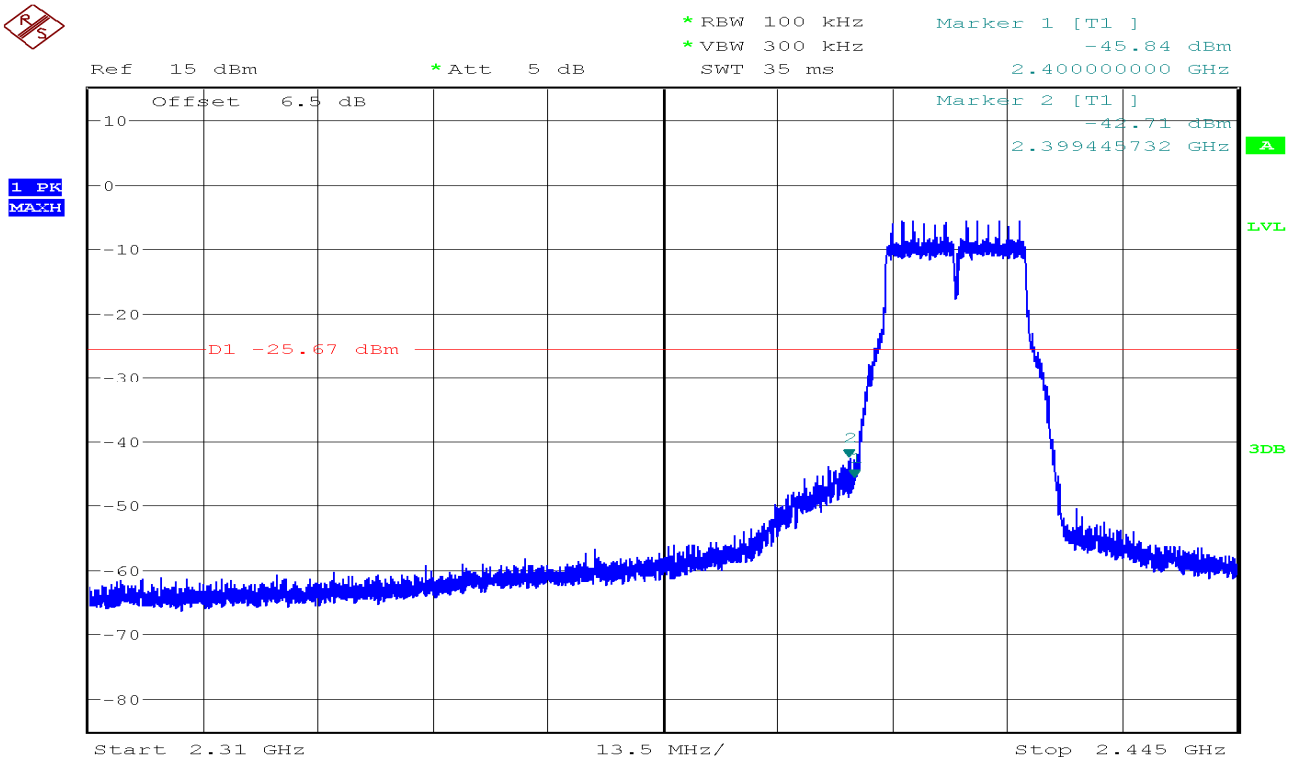

* RBW 100 kHz
* VBW 300 kHz
SWT 720 ms
Marker 1 [T1]
-50.89 dBm
148.437804878 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
6DB
D1 -25.34 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
297 MHz/
Stop 3 GHz

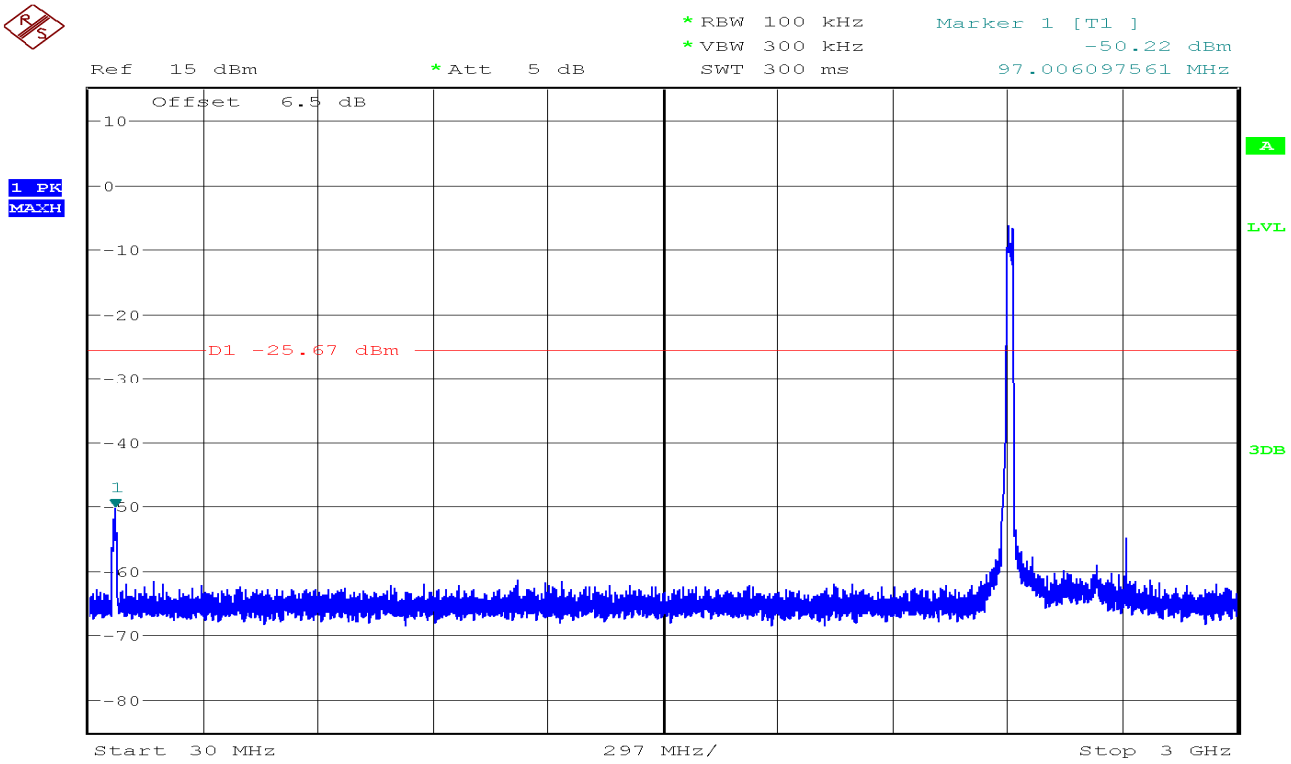


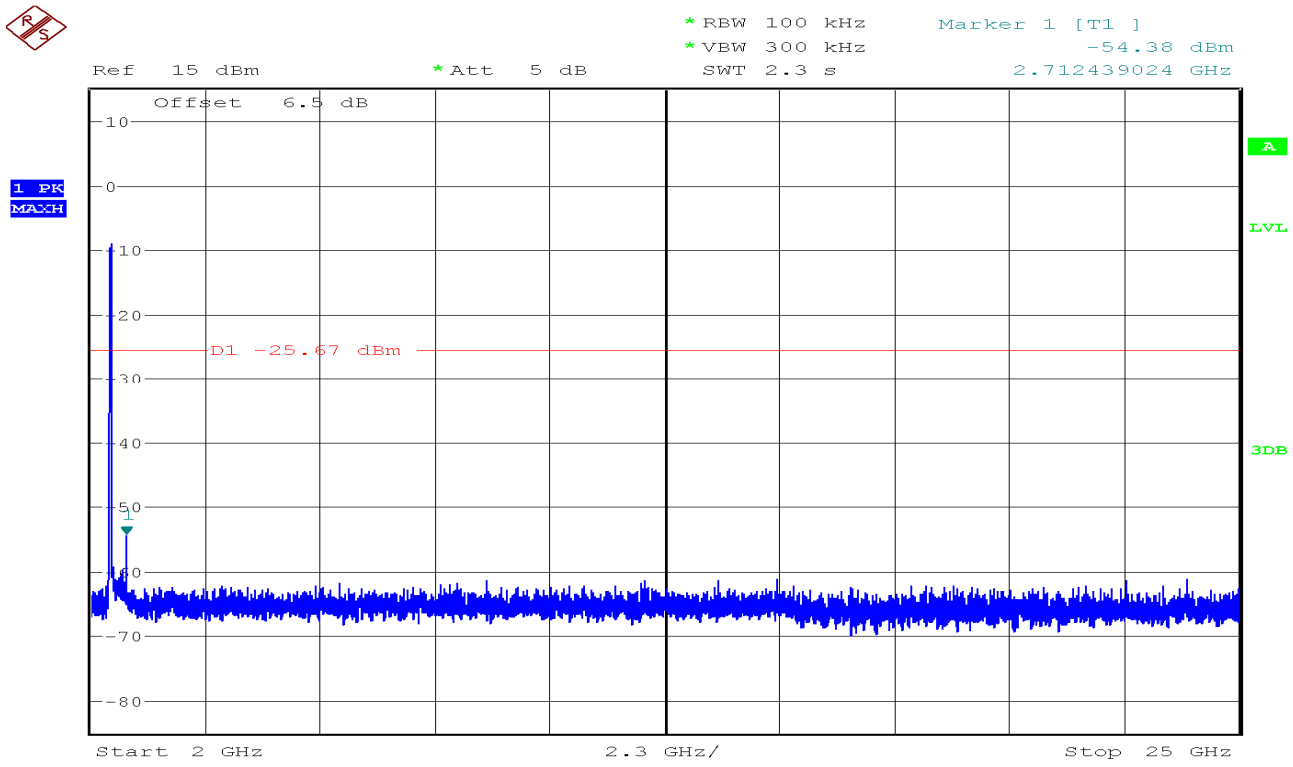
IEEE 802.11g mode/Chain 1

CH Low

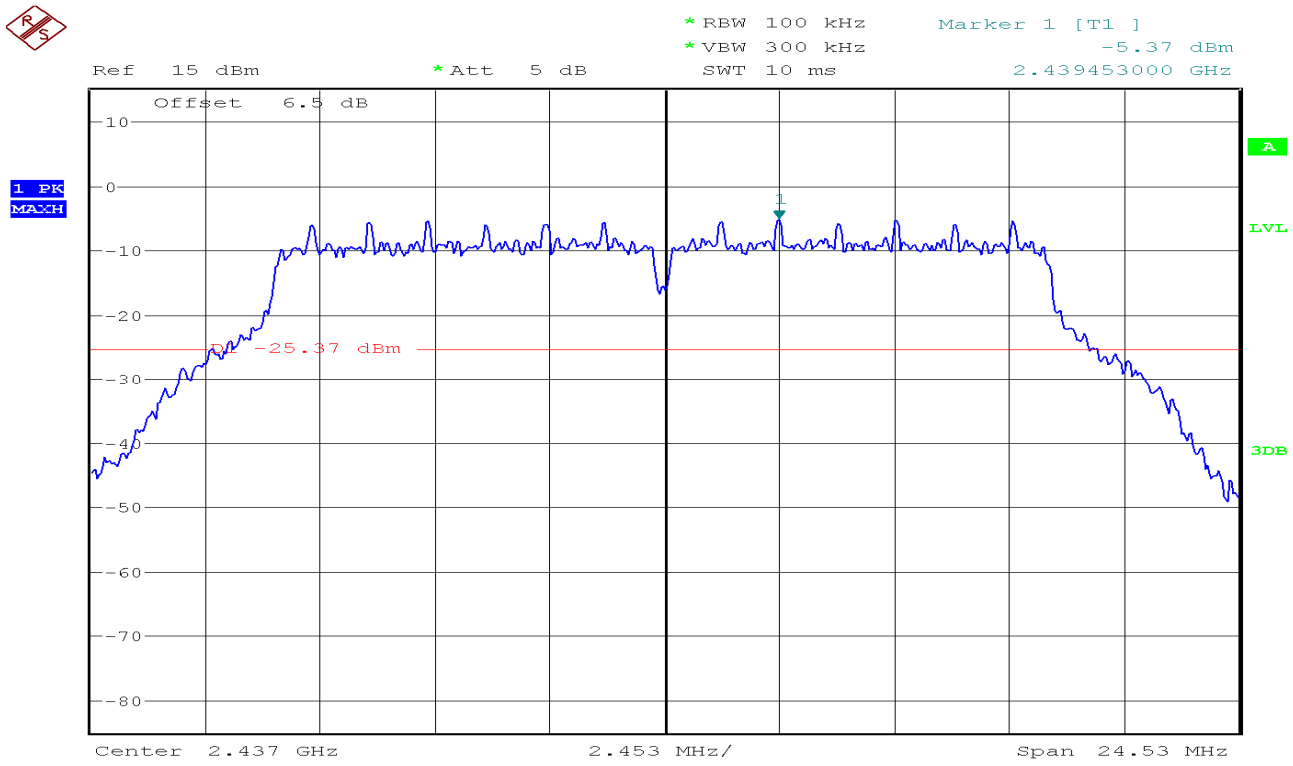


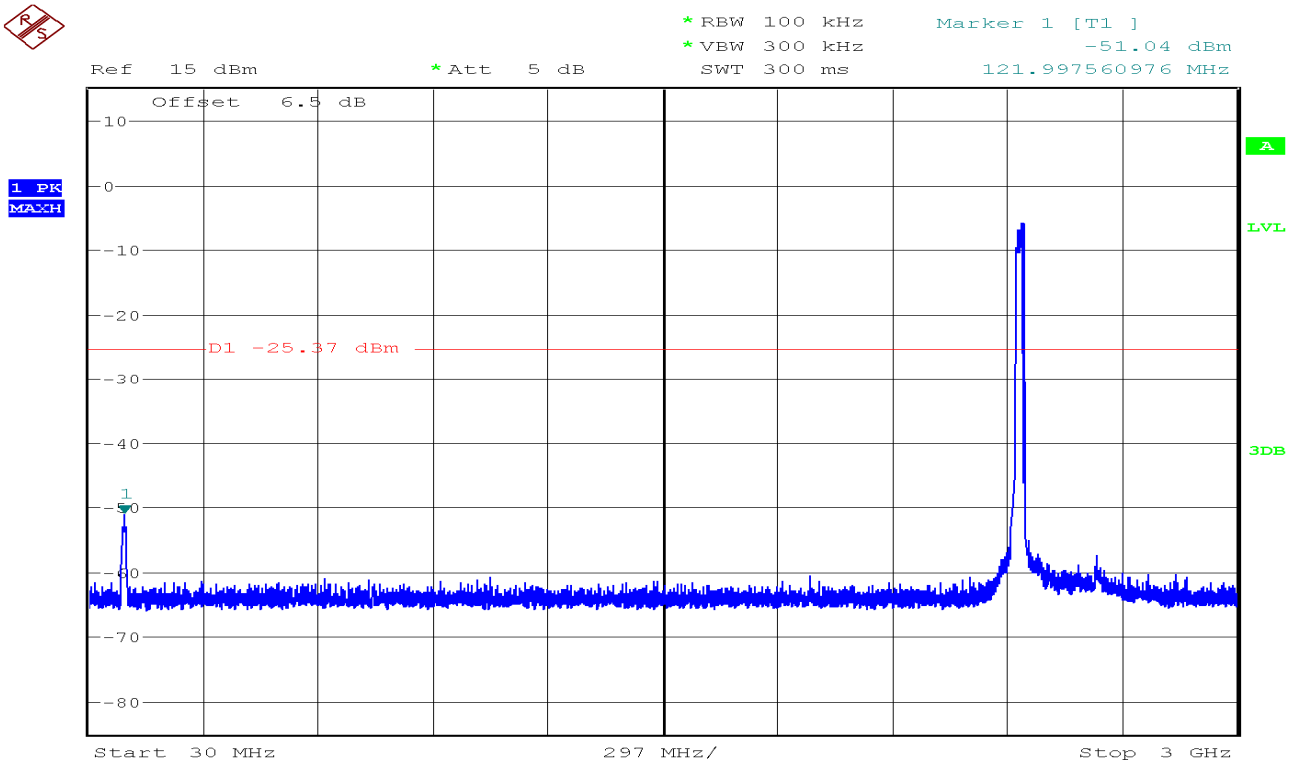

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-45.84 dBm
2.400000000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-42.71 dBm
2.399445732 GHz
1 PK MAXH
A
LVL
3DB
D1 -25.67 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

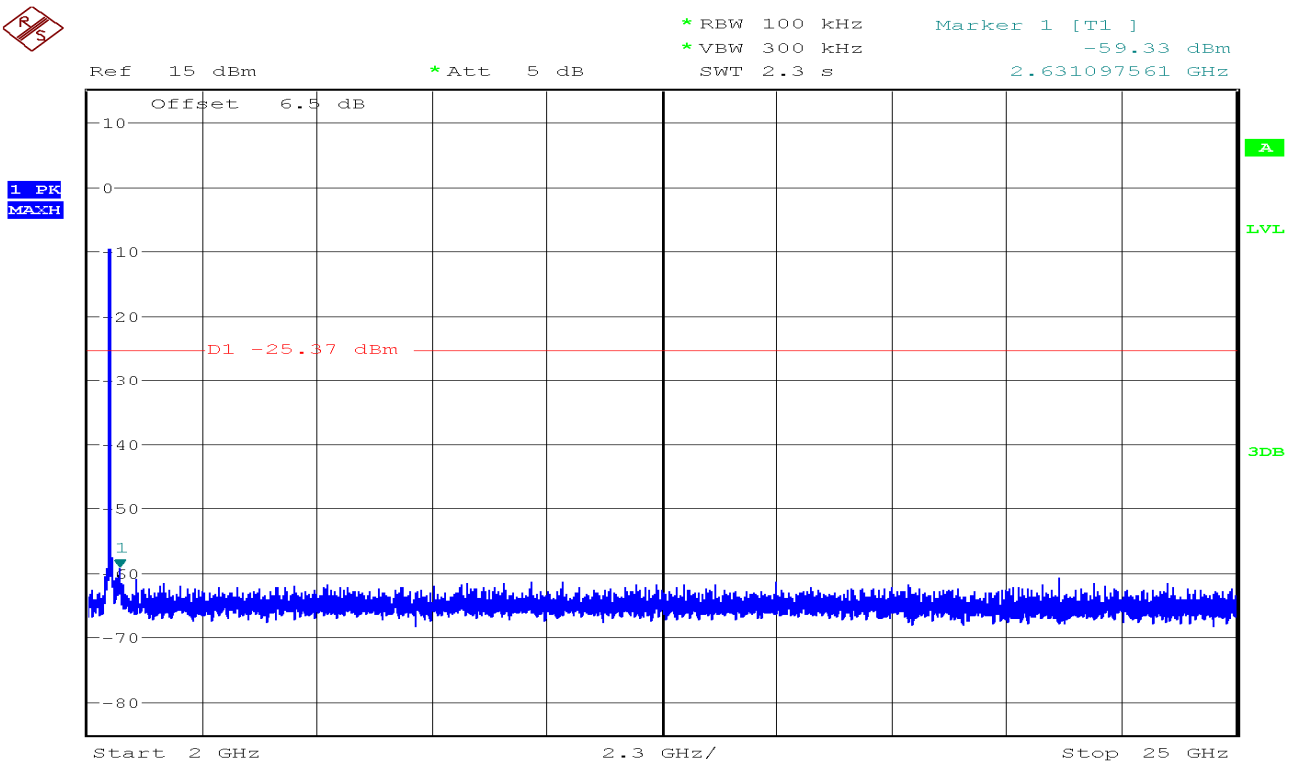

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-50.22 dBm
97.006097561 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.67 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-54.38 dBm
2.712439024 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.67 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

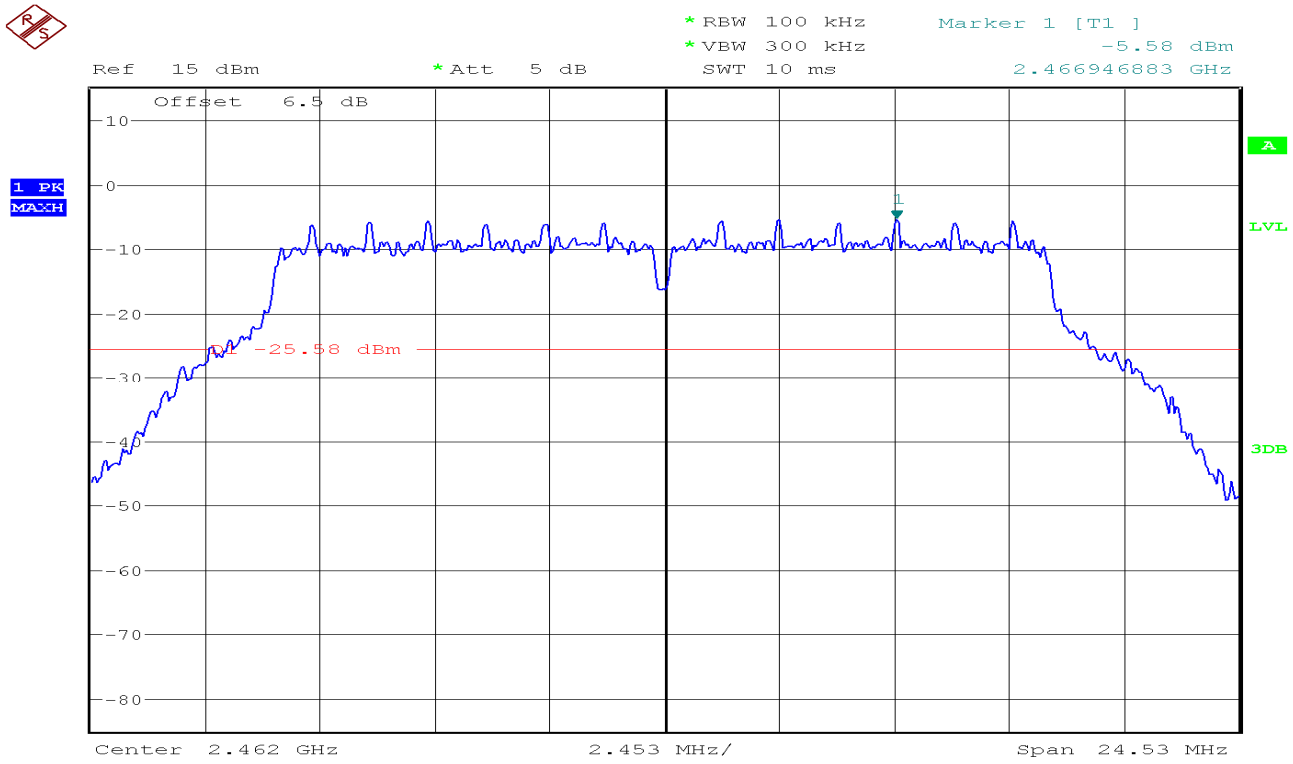
CH Mid

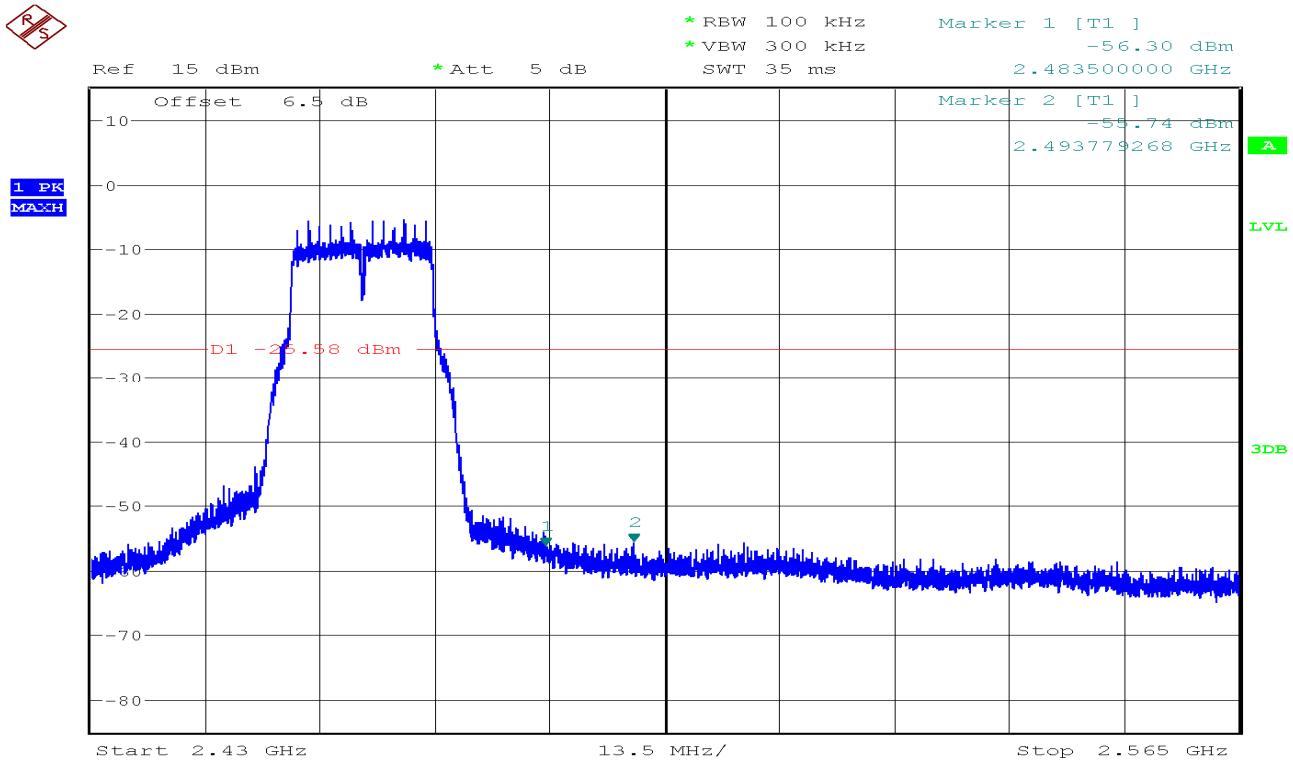

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.37 dBm
2.439453000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.37 dBm
Center 2.437 GHz
2.453 MHz/
Span 24.53 MHz

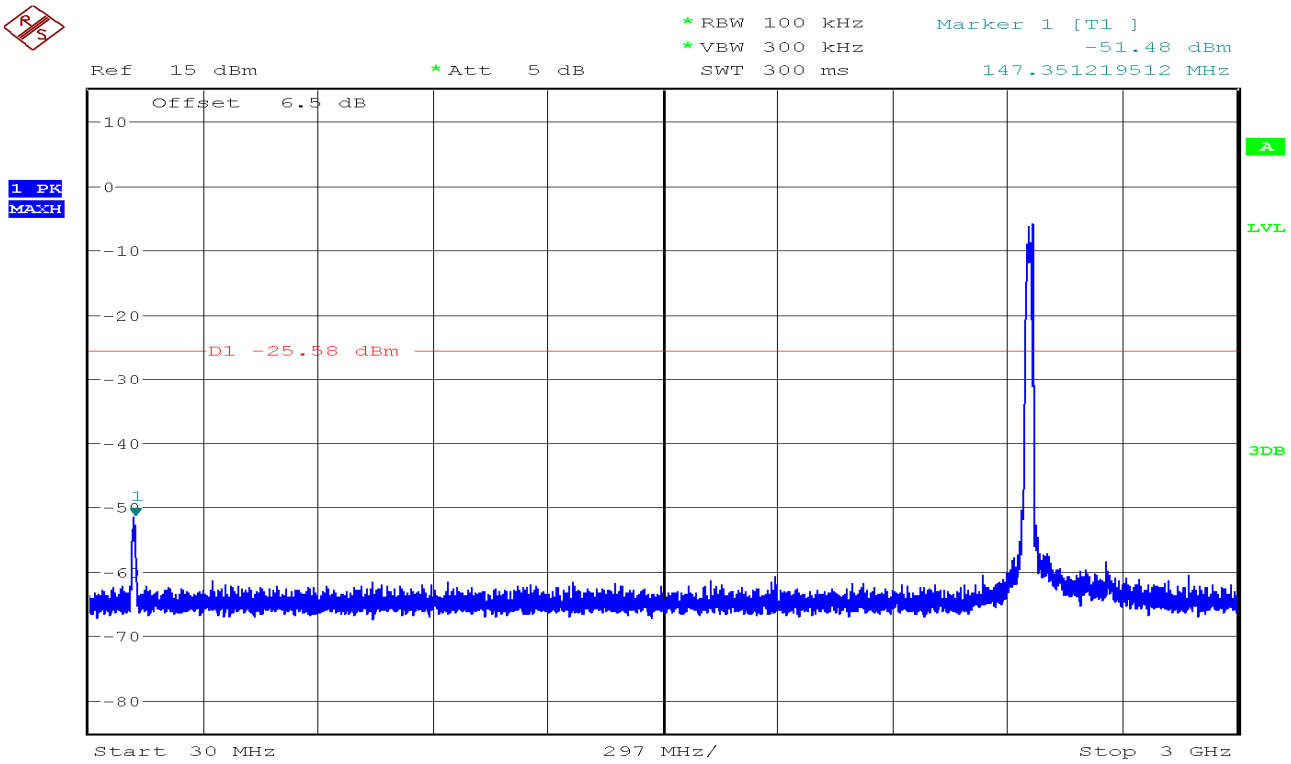

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-51.04 dBm
121.997560976 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.37 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

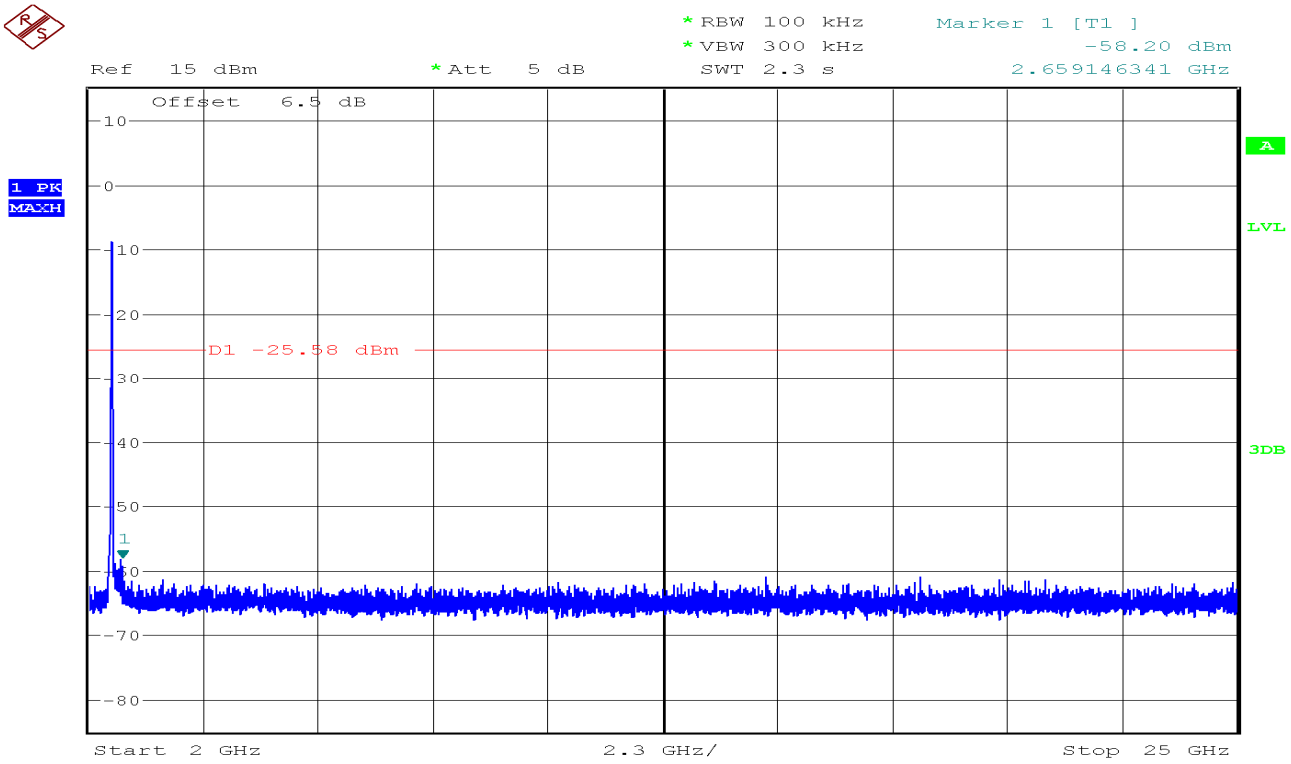

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-59.33 dBm
2.631097561 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.37 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.58 dBm
2.466946883 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.58 dBm
Center 2.462 GHz
2.453 MHz/
Span 24.53 MHz

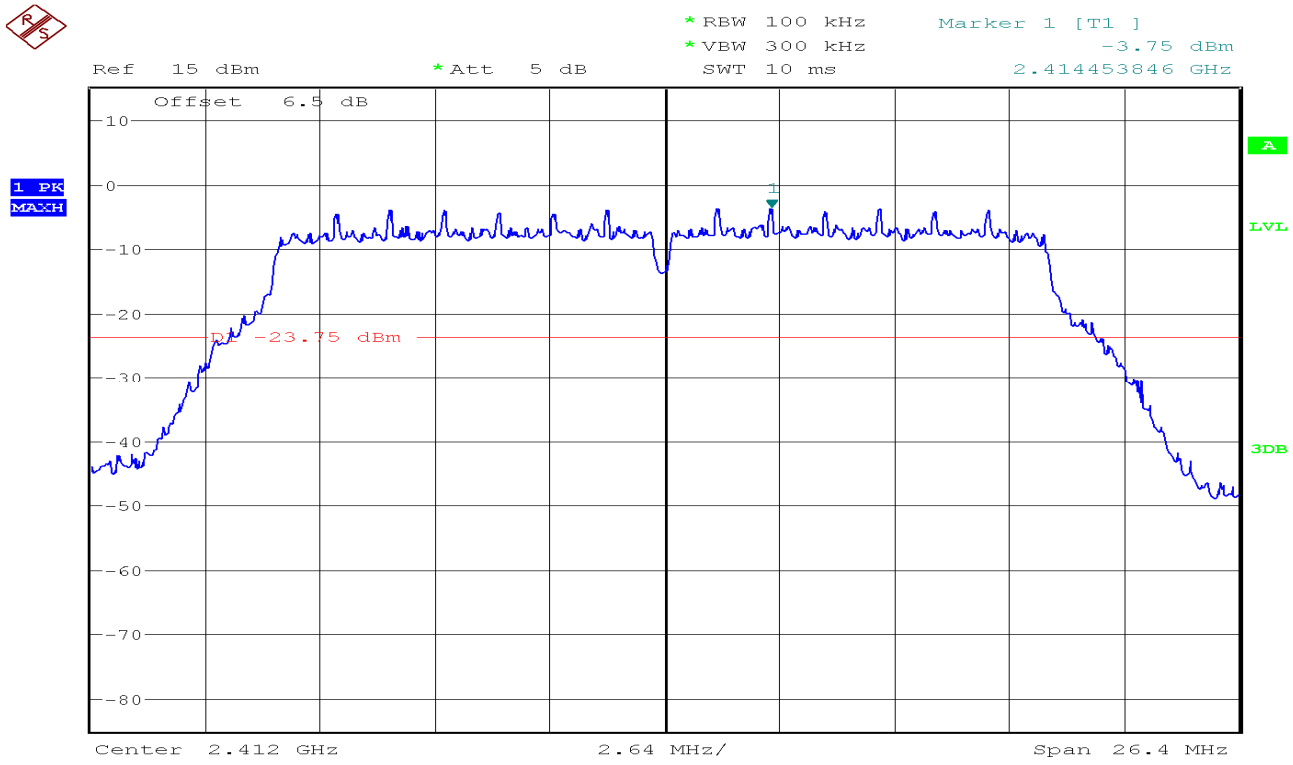

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-56.30 dBm
2.483500000 GHz
Marker 2 [T1]
-55.74 dBm
2.493779268 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.58 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

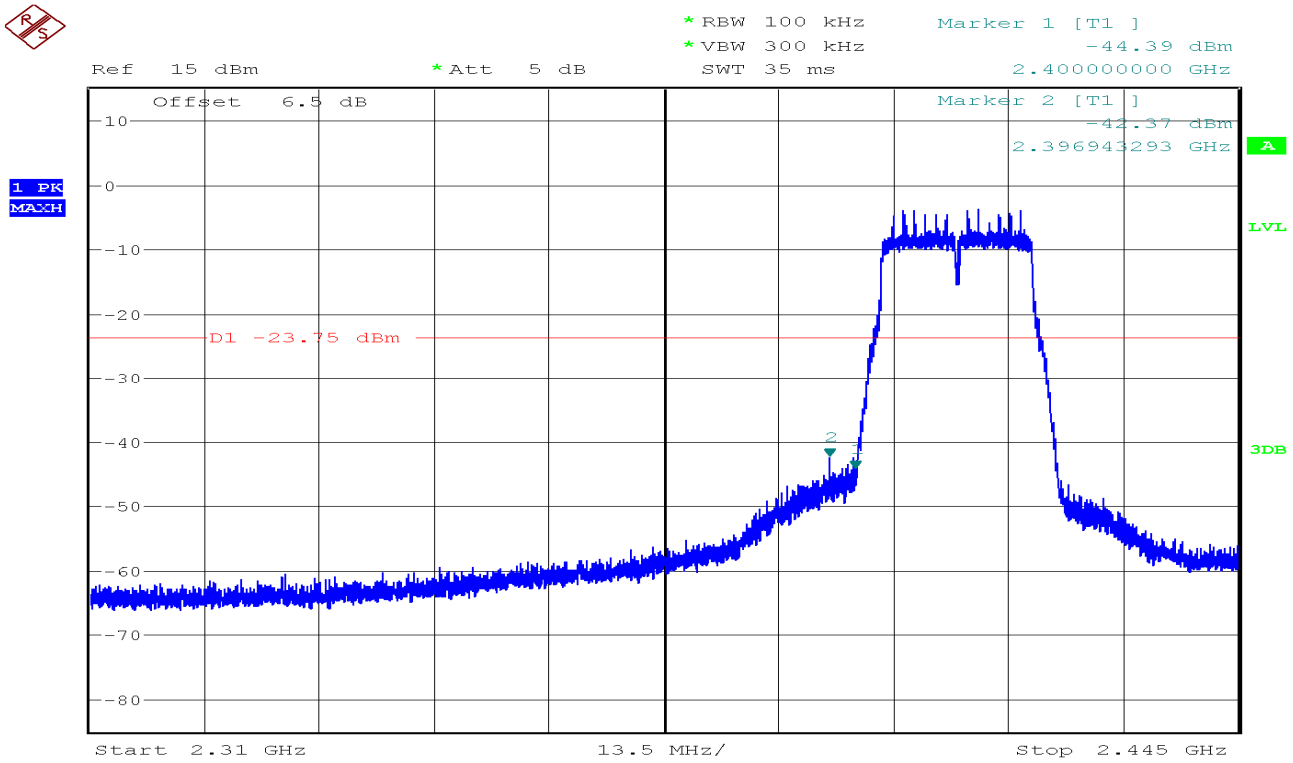

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-51.48 dBm
147.351219512 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.58 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

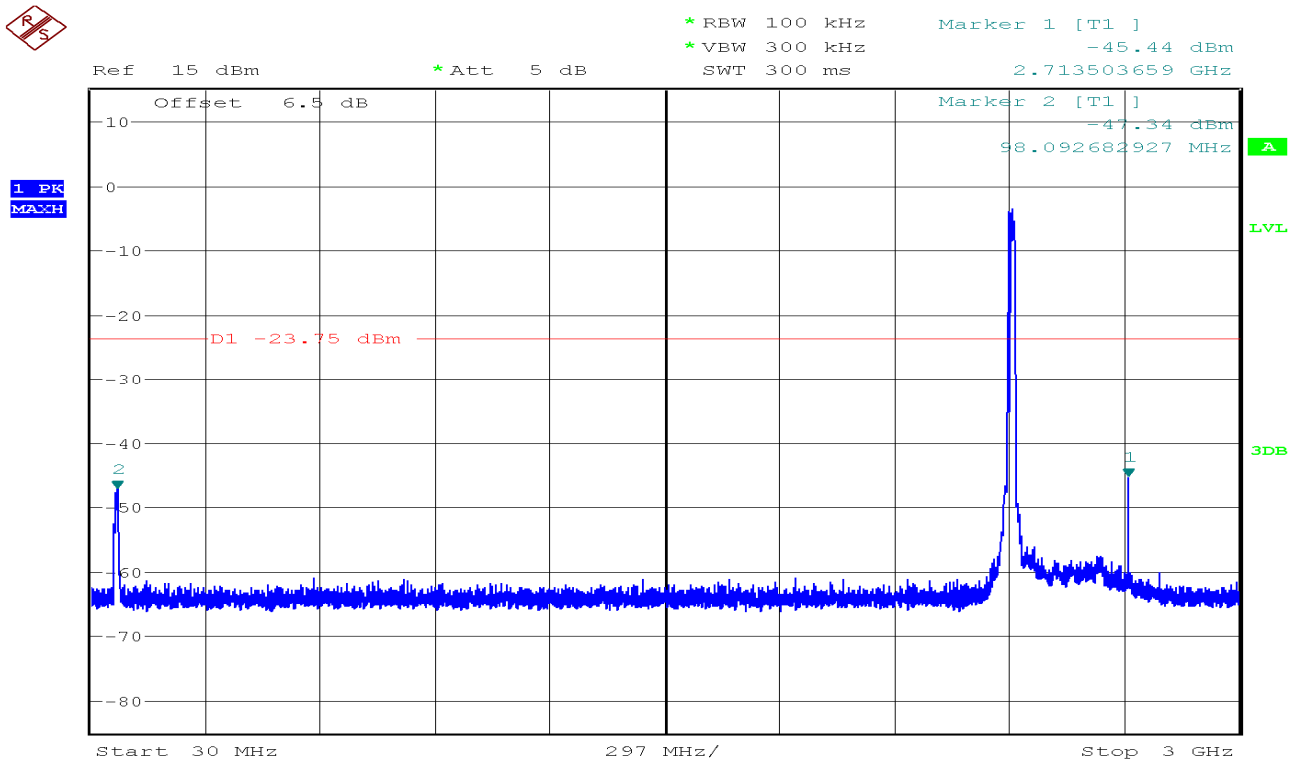

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-58.20 dBm
2.659146341 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.58 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

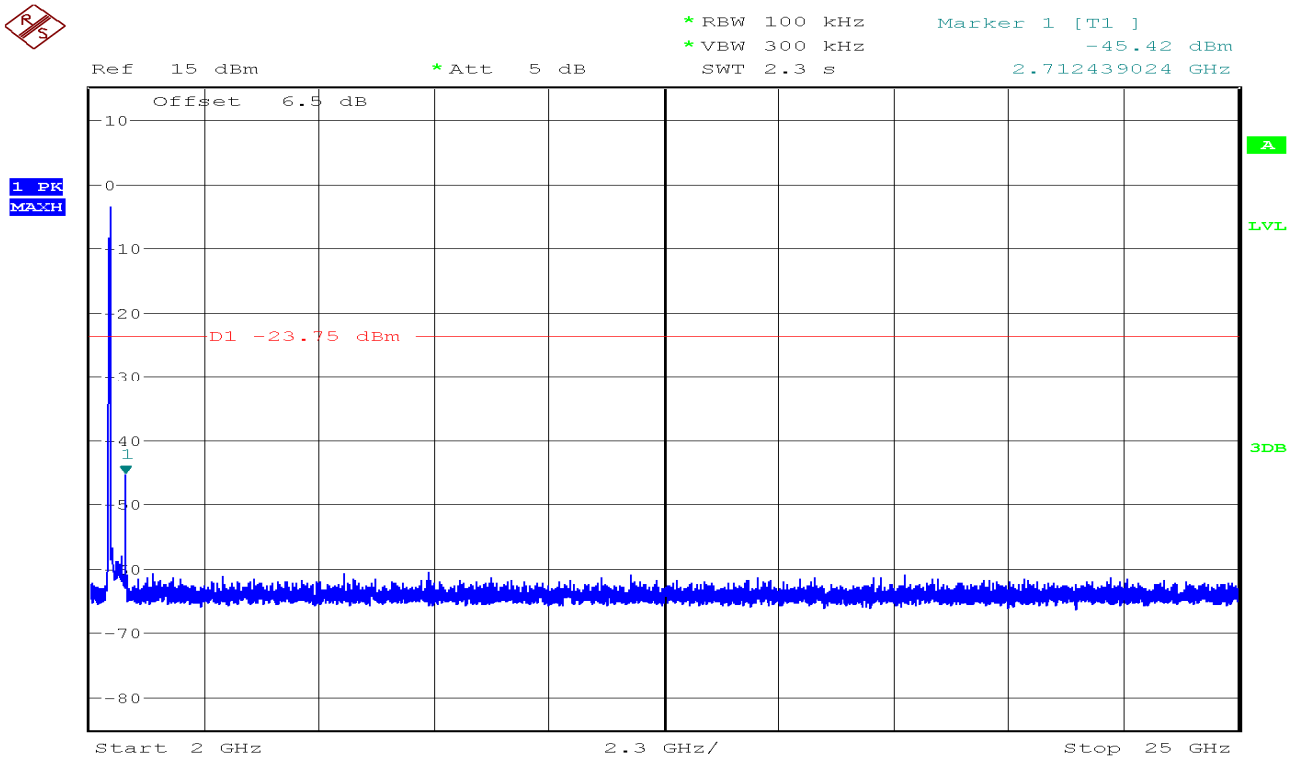
IEEE 802.11n HT20 mode / Chain 0

CH Low

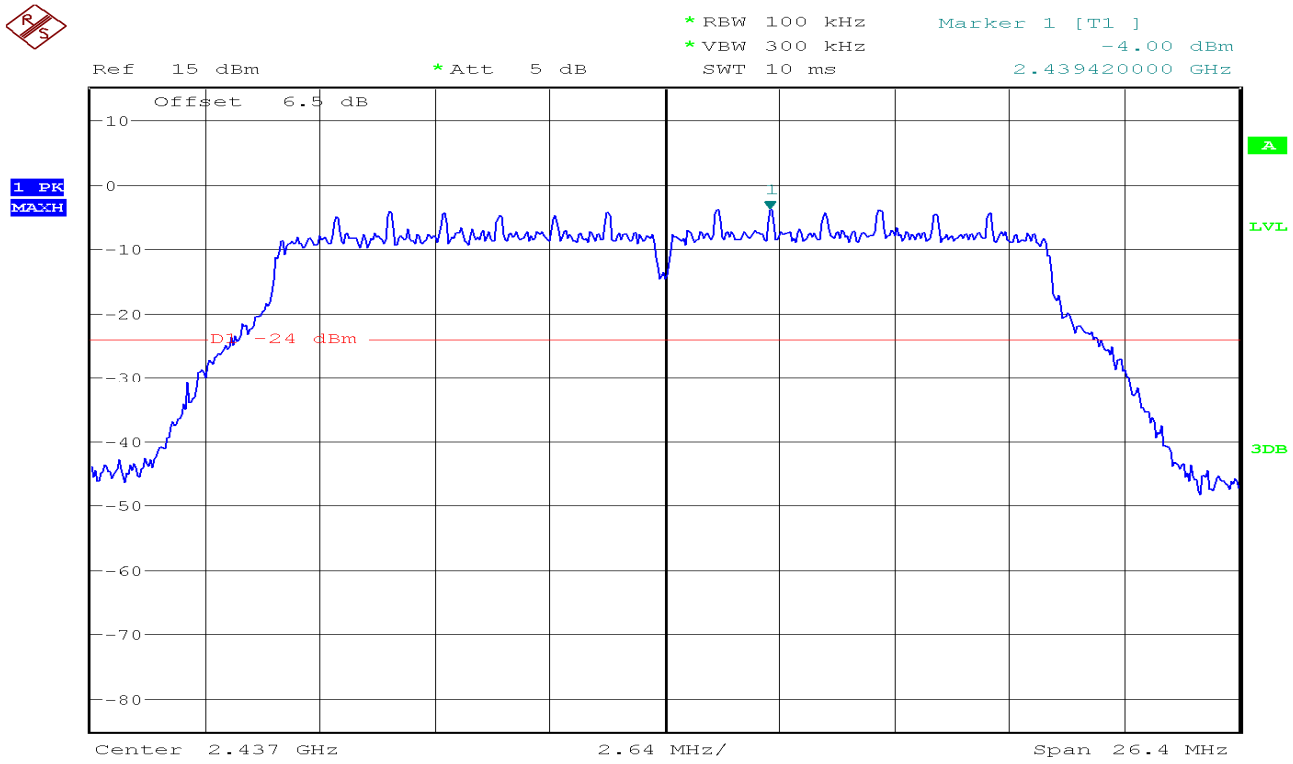


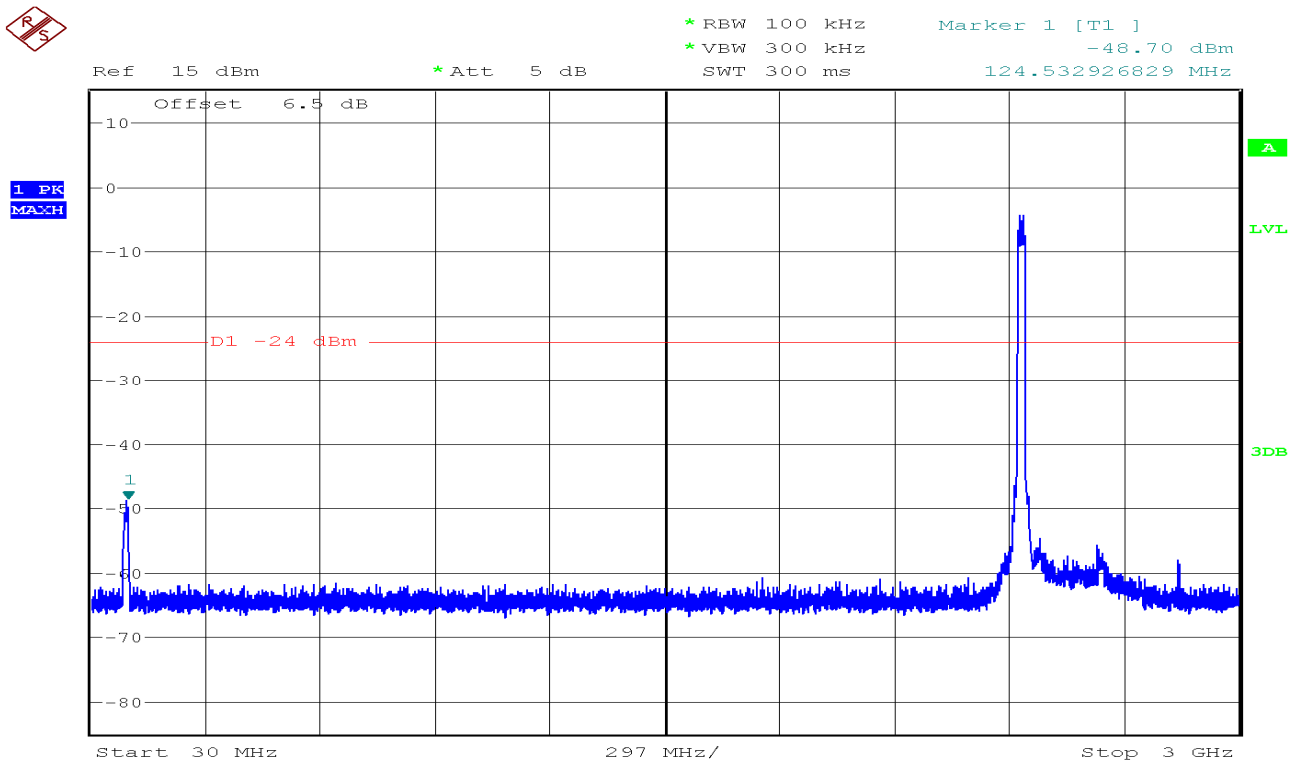


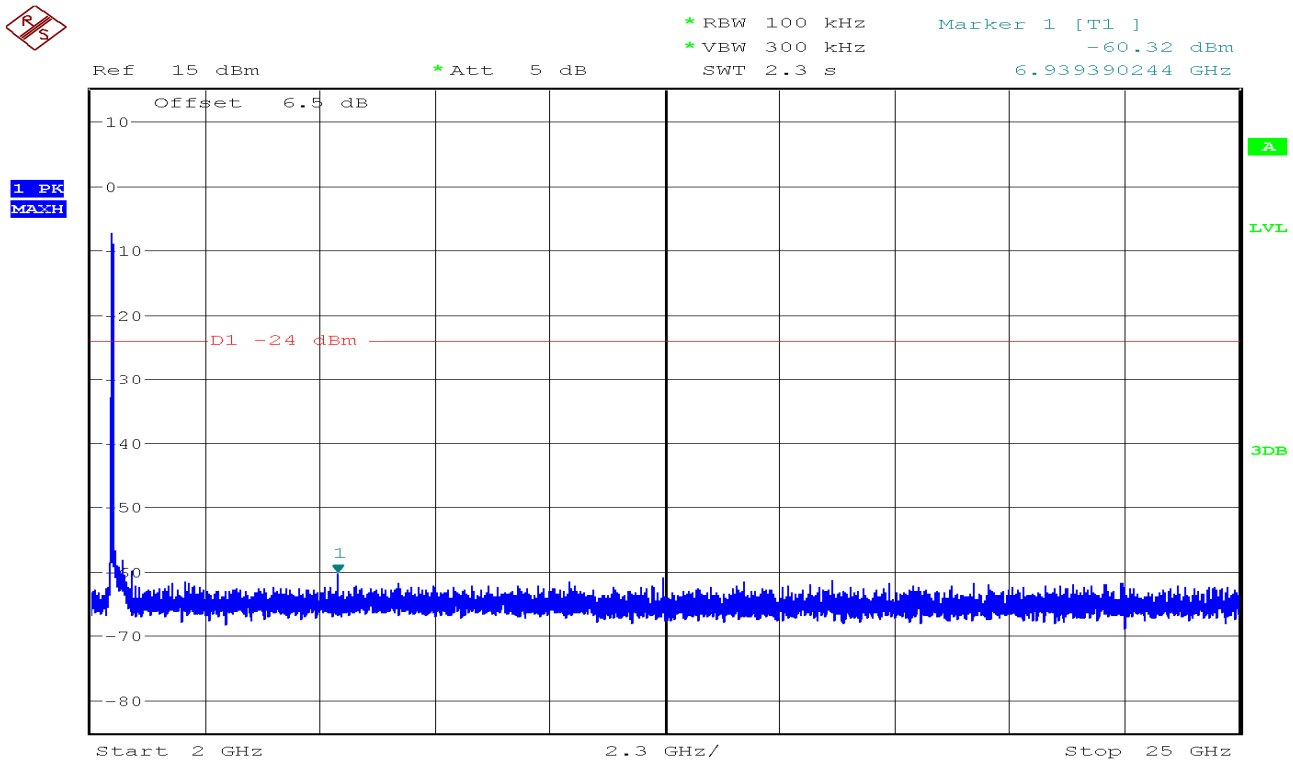

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-45.44 dBm
2.713503659 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-47.34 dBm
98.092682927 MHz
1 PK MAXH
A
LVL
3DB
D1 -23.75 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-45.42 dBm
2.712439024 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.75 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

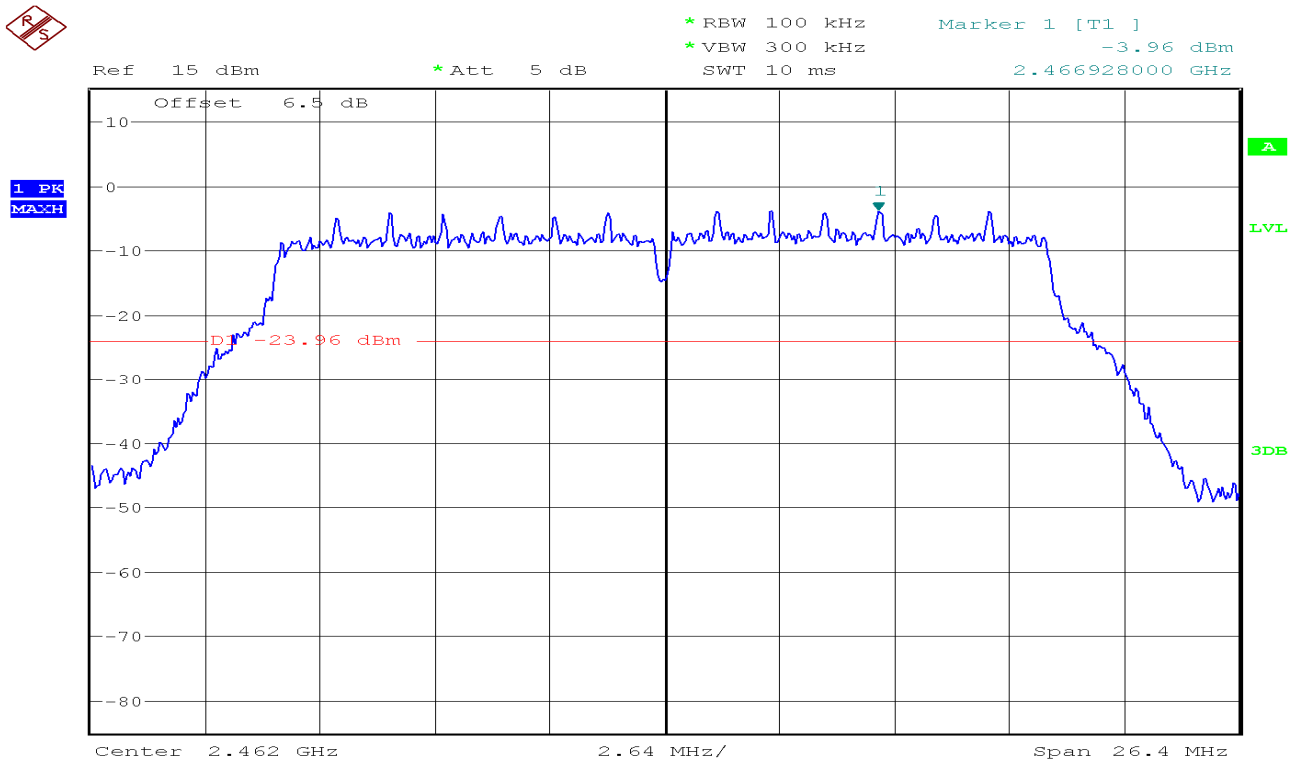
CH Mid

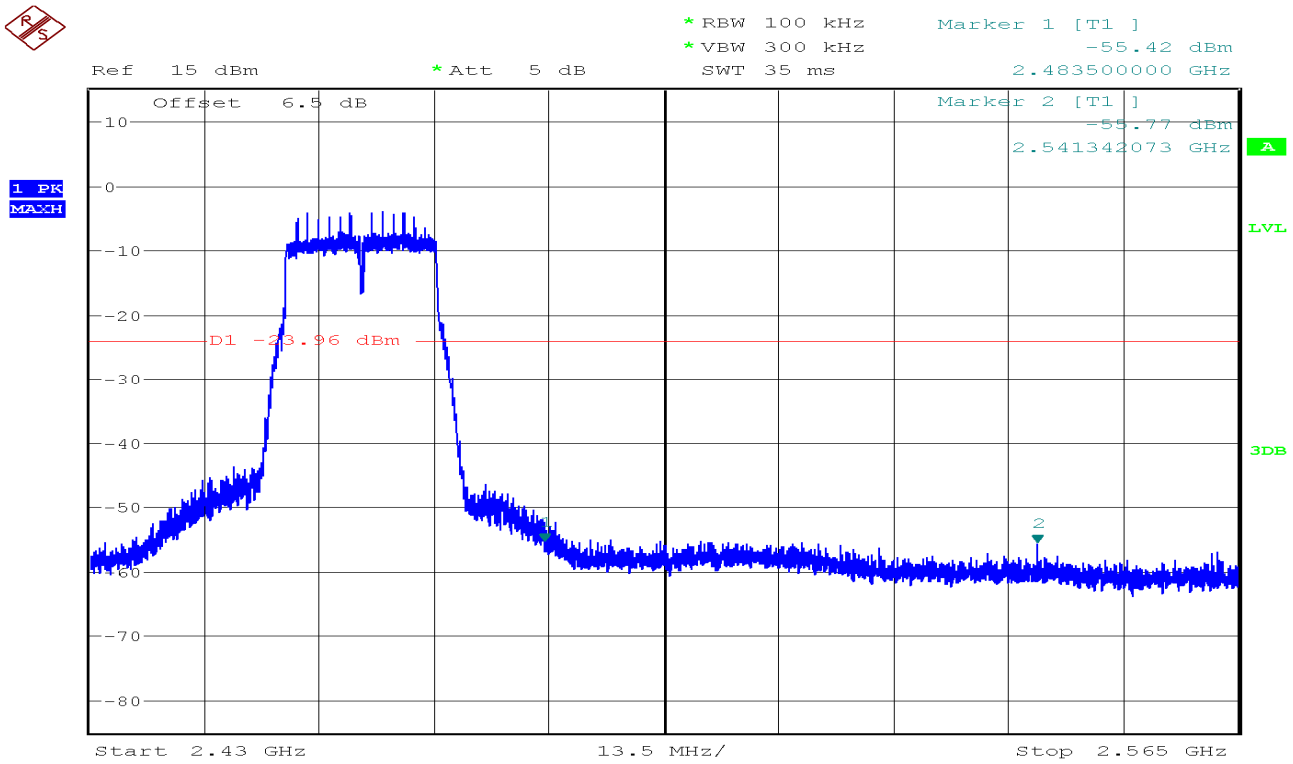

* RBW 100 kHz
* VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-4.00 dBm
2.439420000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -24 dBm
Center 2.437 GHz
2.64 MHz/
Span 26.4 MHz

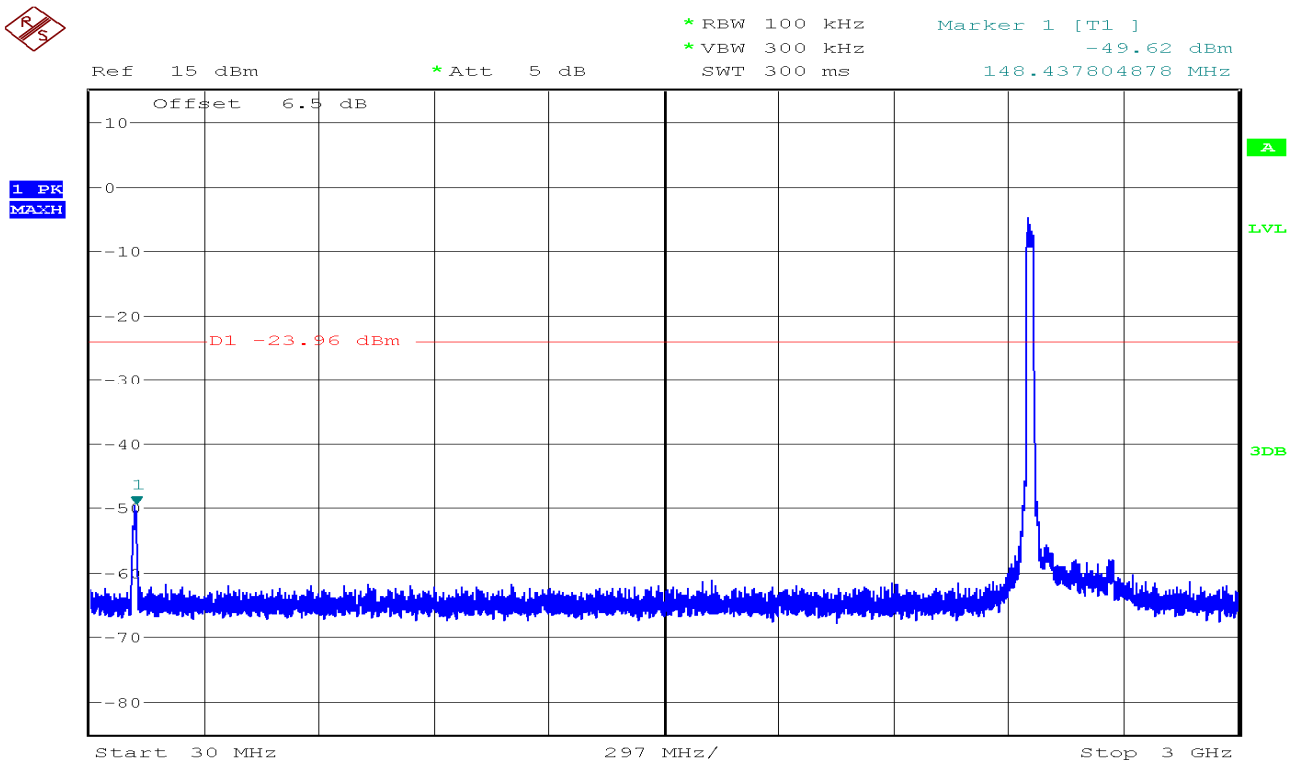

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-48.70 dBm
124.532926829 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -24 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

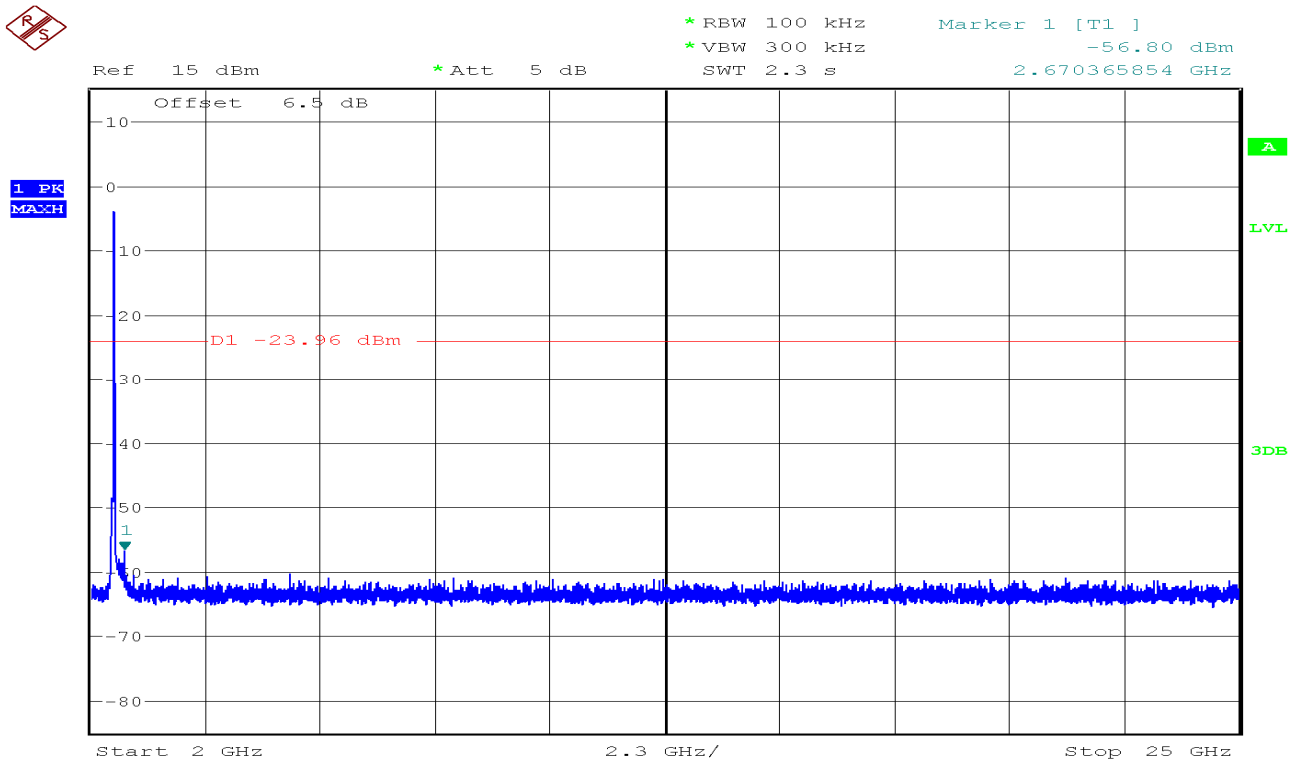

RBW 100 kHz
VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.32 dBm
6.939390244 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -24 dBm
A
LVL
3DB
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-3.96 dBm
2.466928000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
D1 -23.96 dBm
A
LVL
3DB
Center 2.462 GHz
2.64 MHz/
Span 26.4 MHz

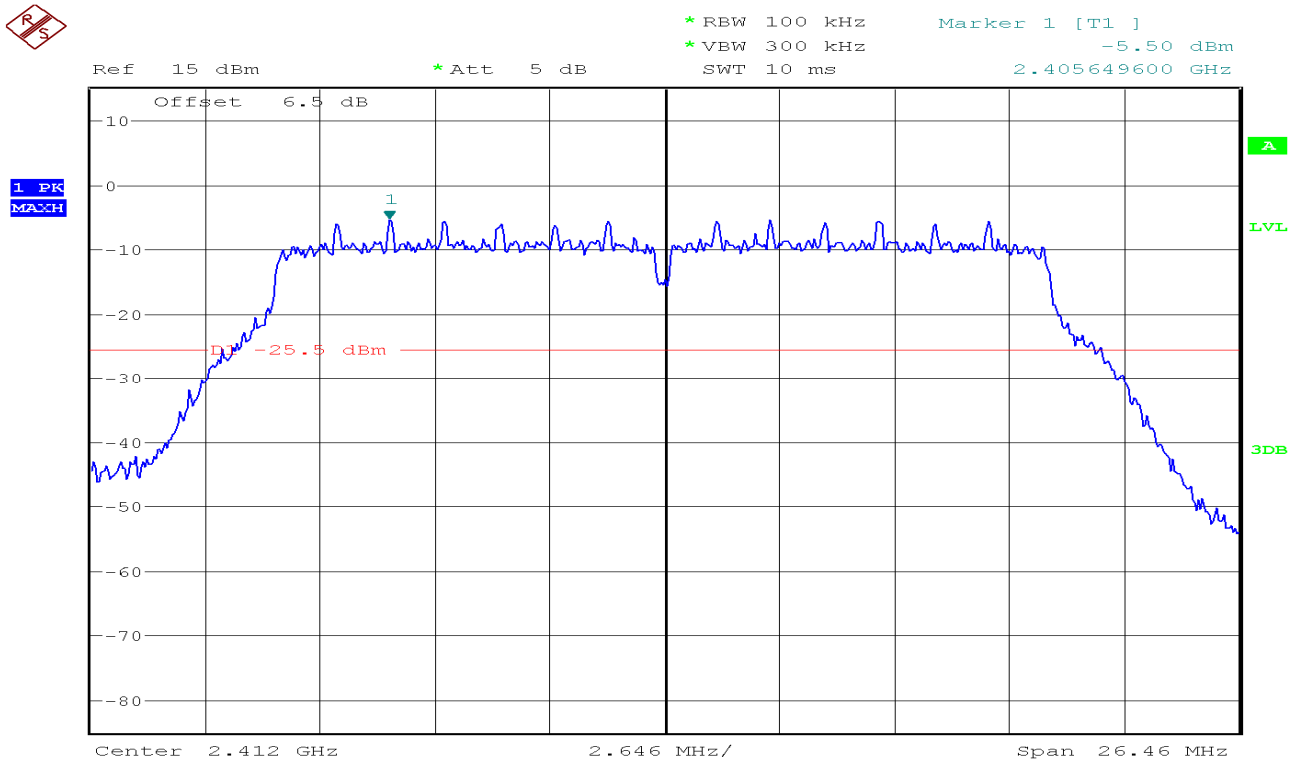

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-55.42 dBm
2.483500000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-55.77 dBm
2.541342073 GHz
1 PK MAXH
A
LVL
3DB
D1 -23.96 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

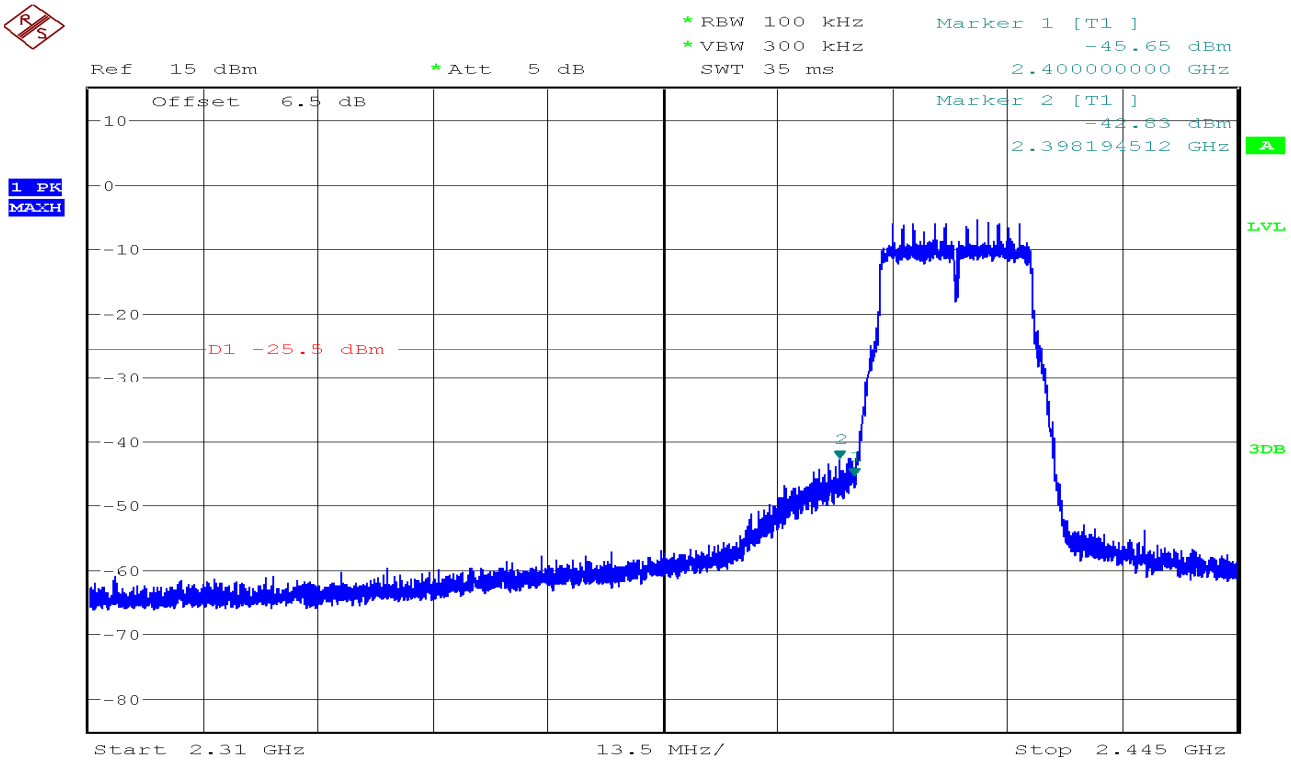

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-49.62 dBm
148.437804878 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -23.96 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

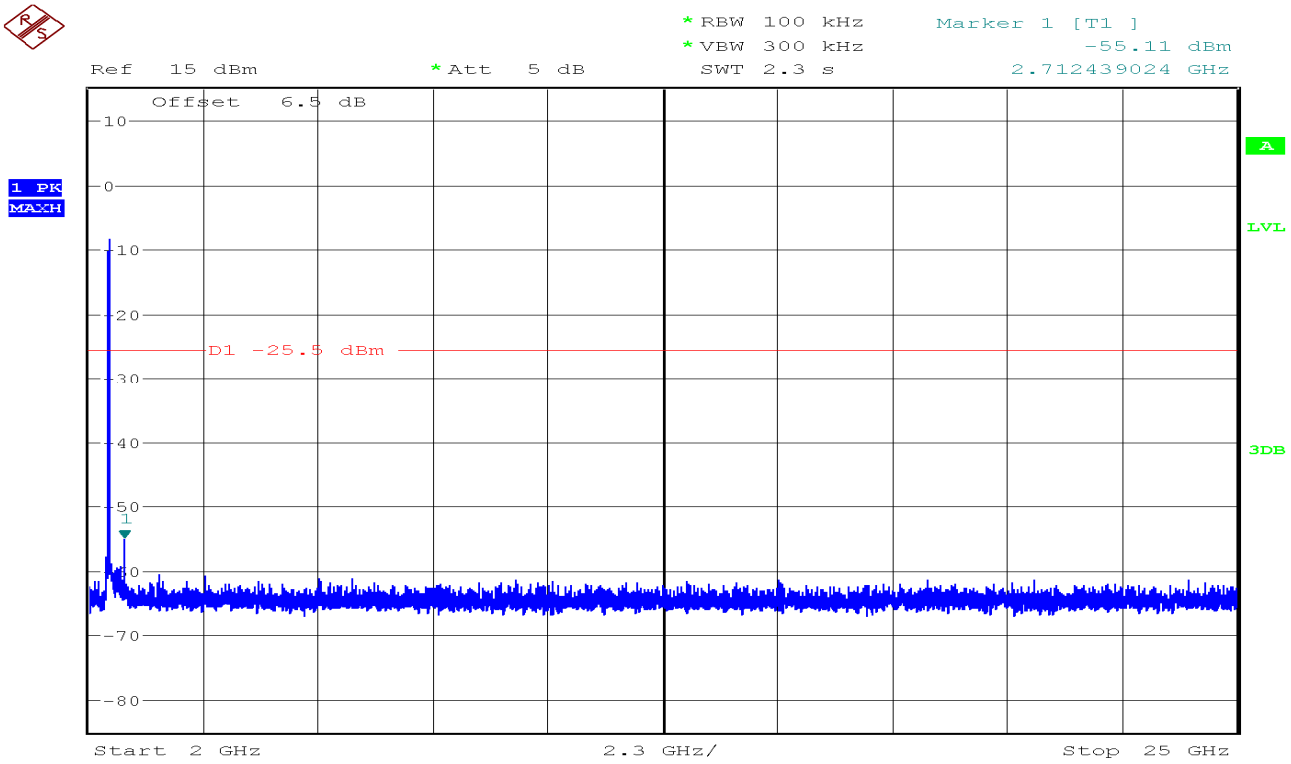


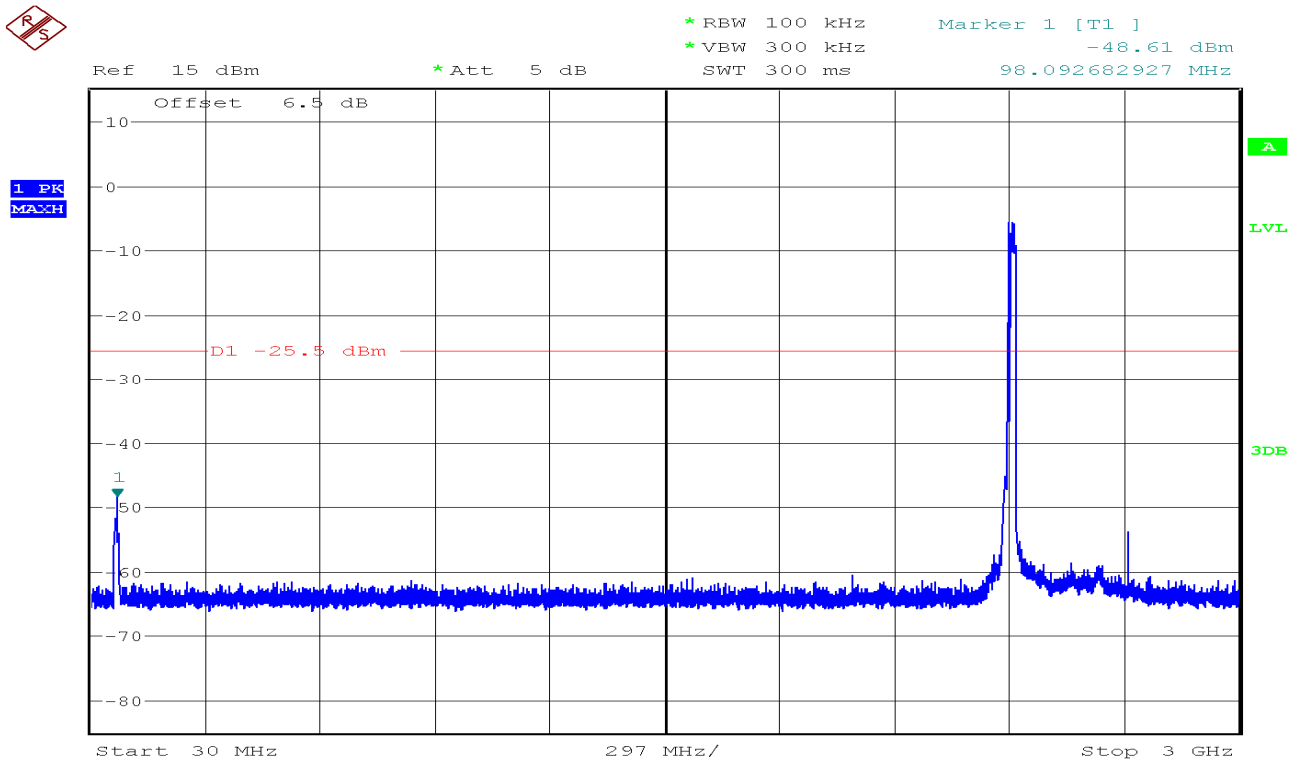
IEEE 802.11n HT20 mode / Chain 1

CH Low

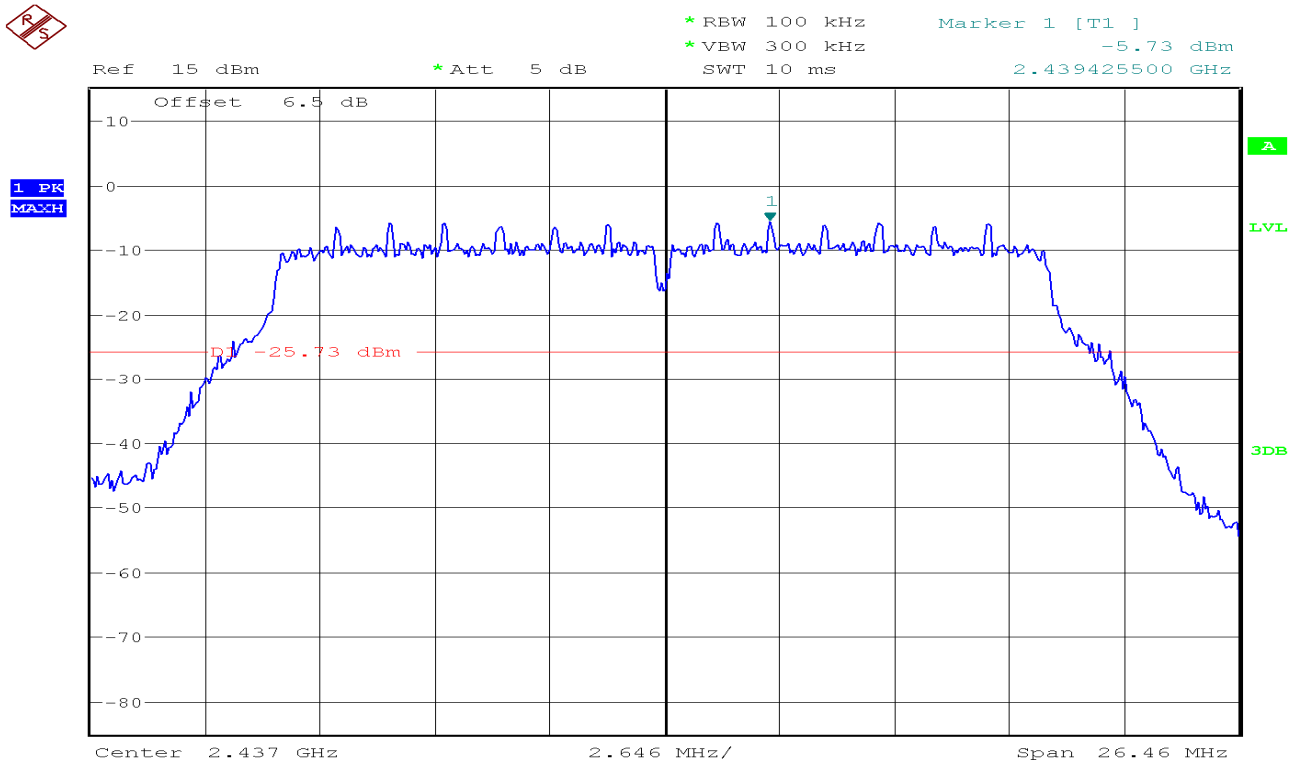


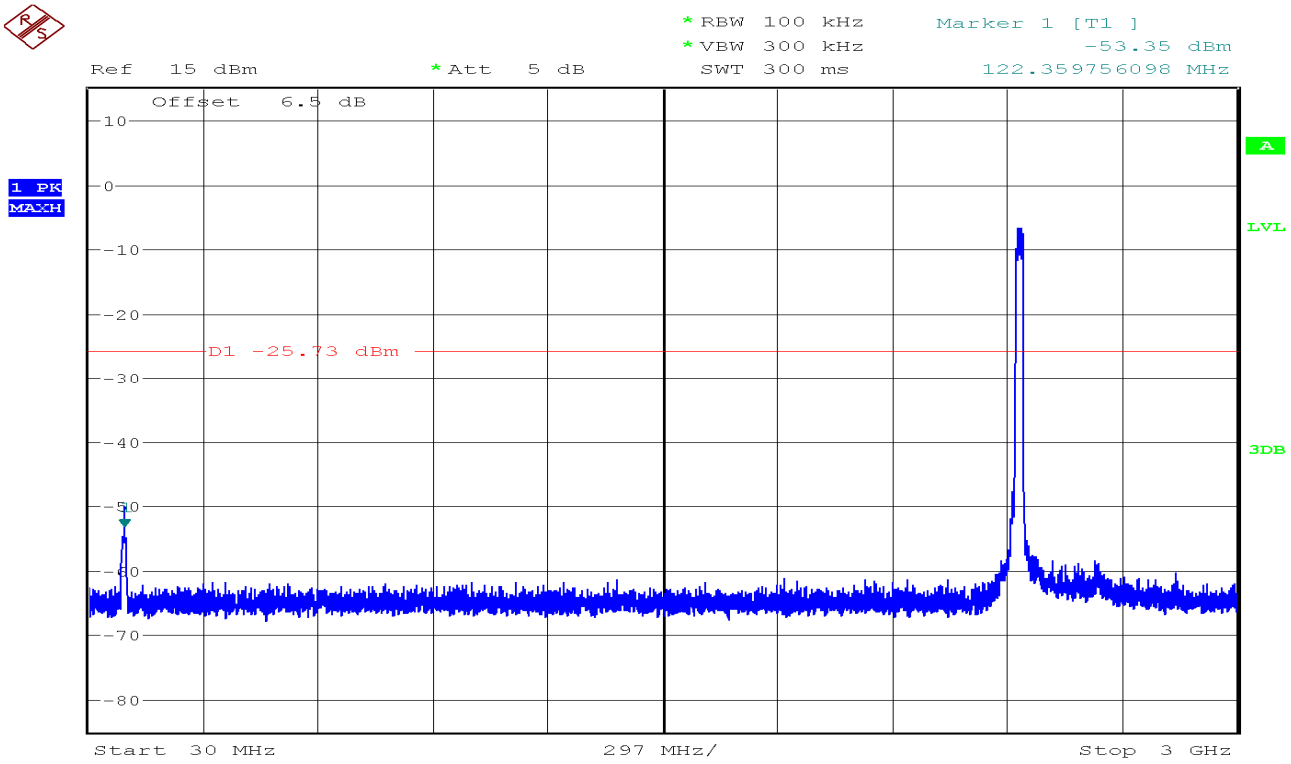

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-45.65 dBm
2.400000000 GHz
Marker 2 [T1]
-42.83 dBm
2.398194512 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.5 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

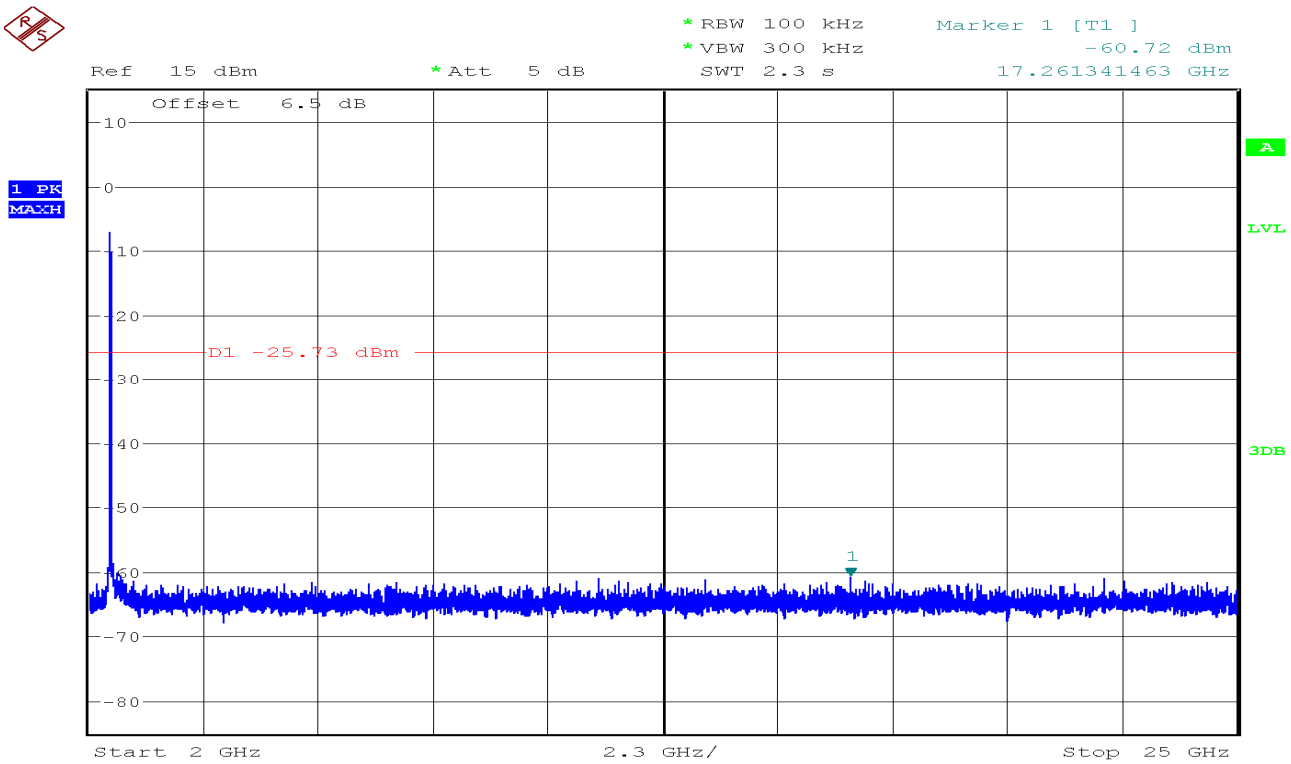

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-55.11 dBm
2.712439024 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.5 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz


RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-48.61 dBm
98.092682927 MHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.5 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

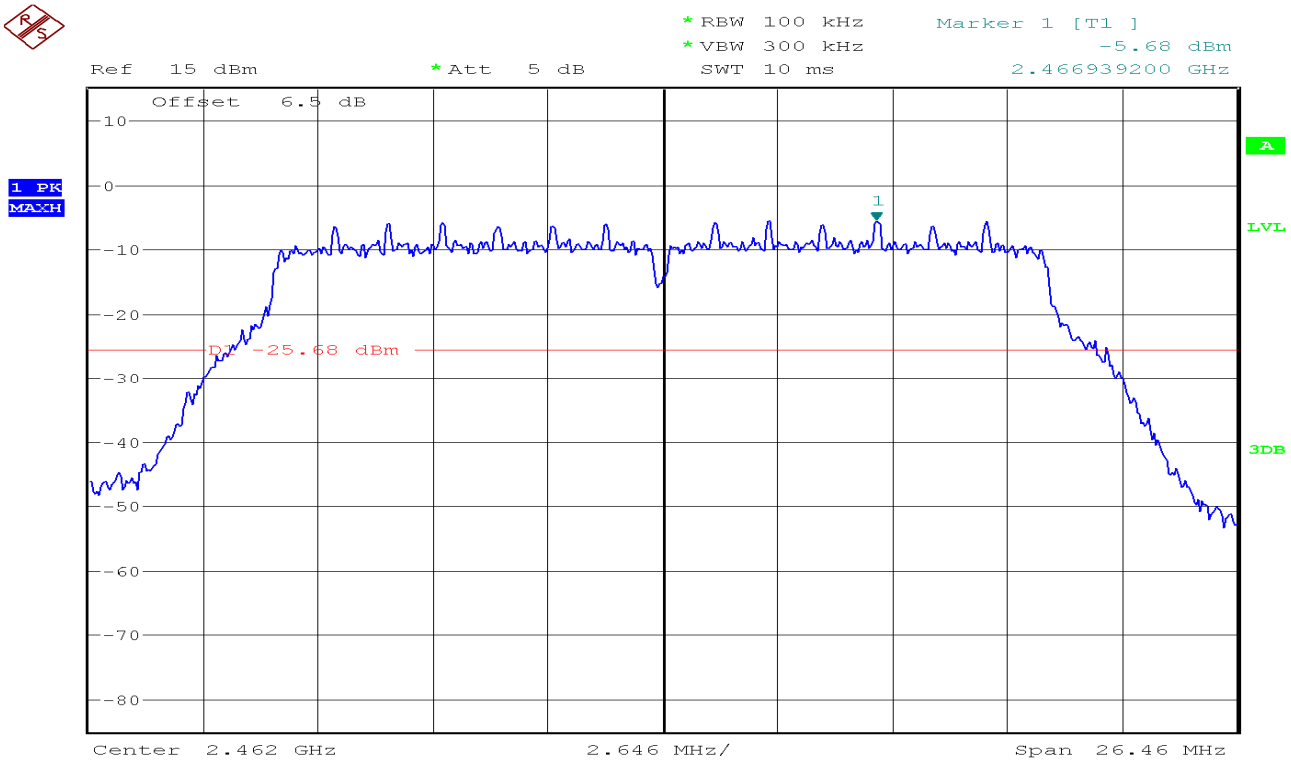
CH Mid

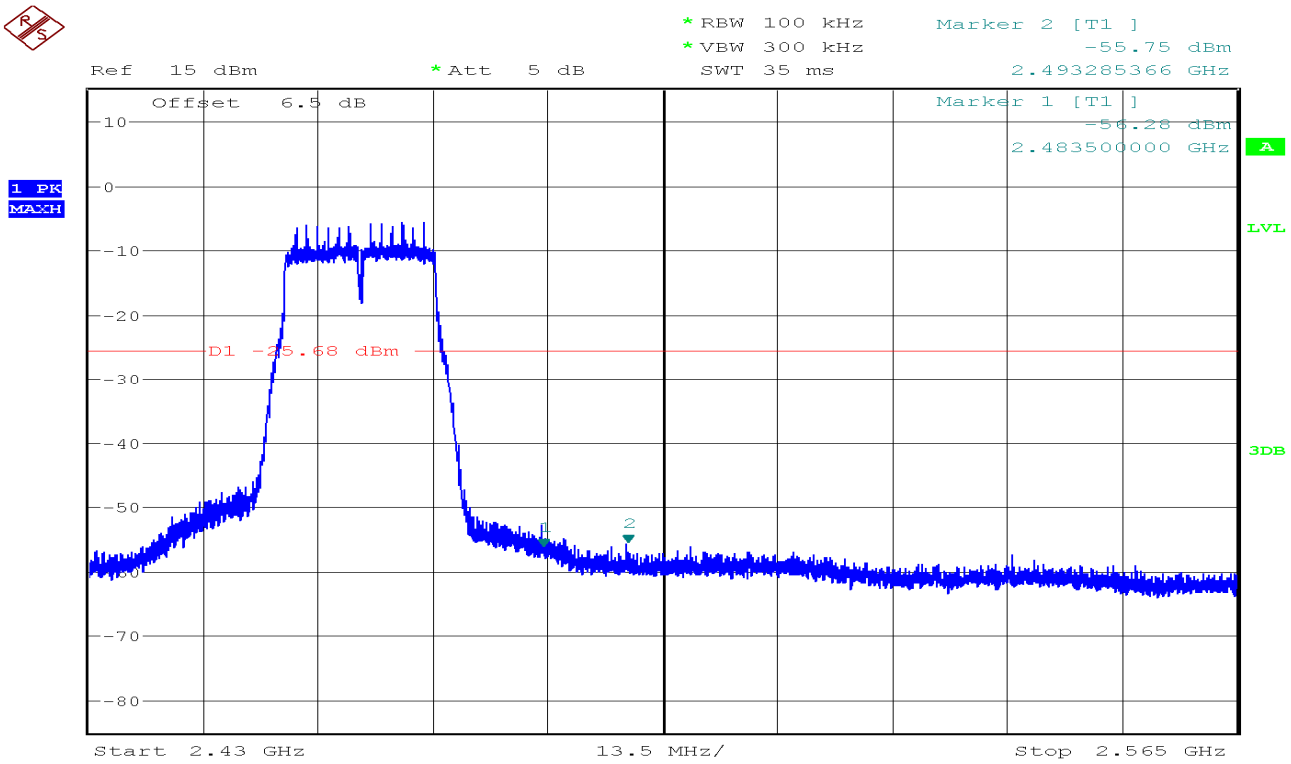

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.73 dBm
2.439425500 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.73 dBm
Center 2.437 GHz
2.646 MHz/
Span 26.46 MHz

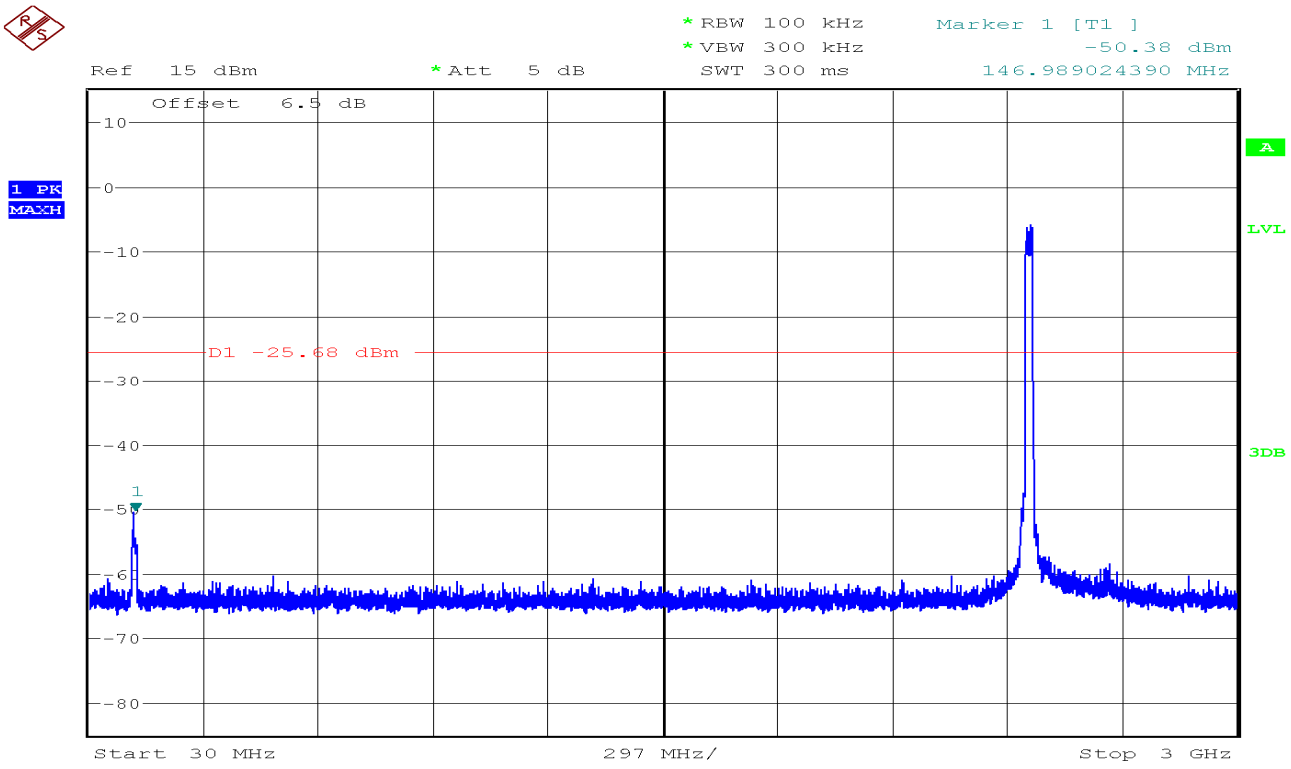

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-53.35 dBm
122.359756098 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.73 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

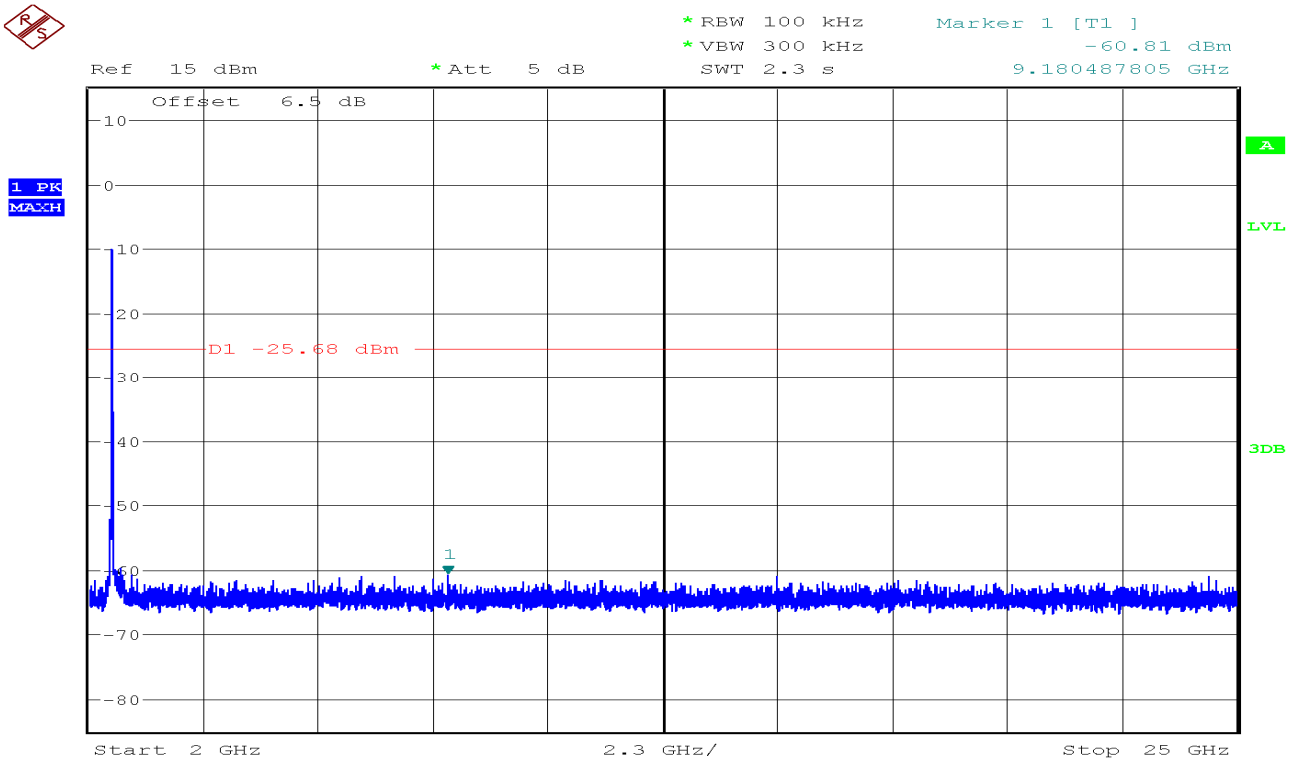

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.72 dBm
17.261341463 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.73 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-5.68 dBm
2.466939200 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -25.68 dBm
Center 2.462 GHz
2.646 MHz/
Span 26.46 MHz

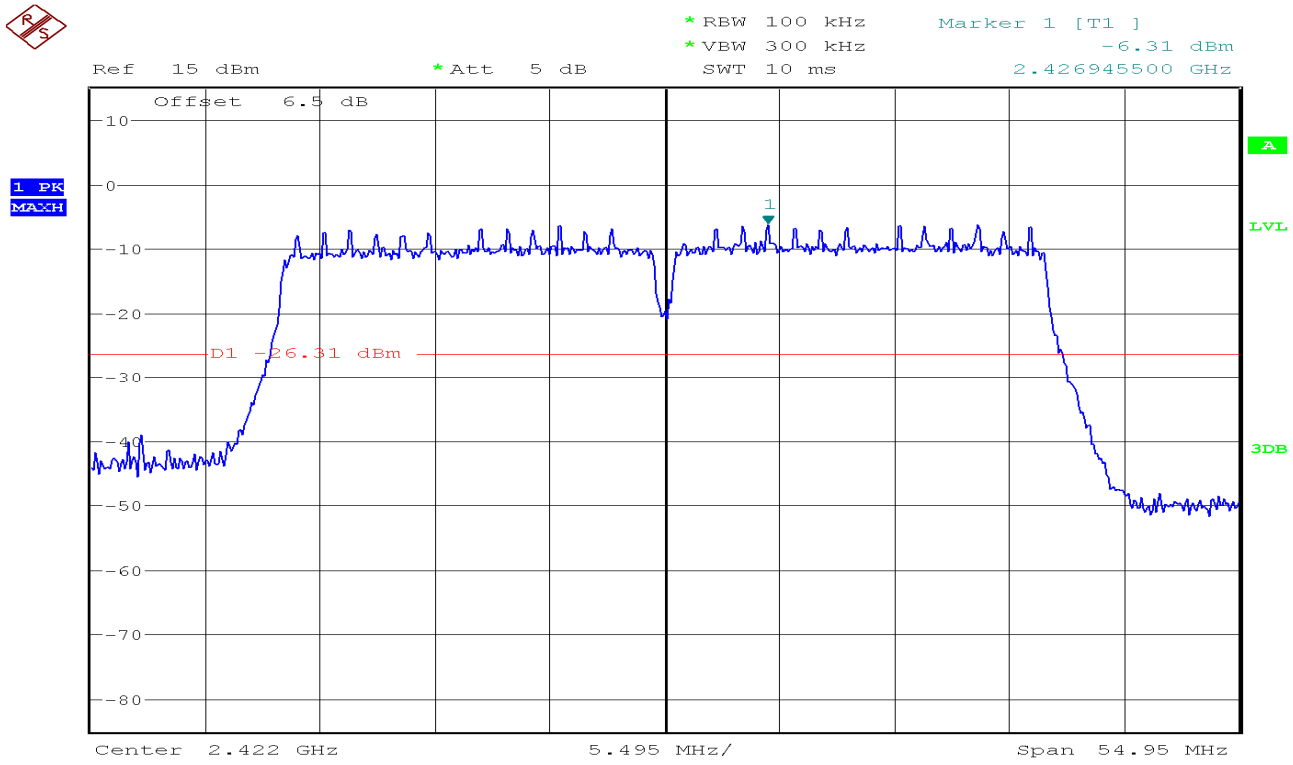

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 2 [T1]
-55.75 dBm
2.493285366 GHz
Marker 1 [T1]
-56.28 dBm
2.483500000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -25.68 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

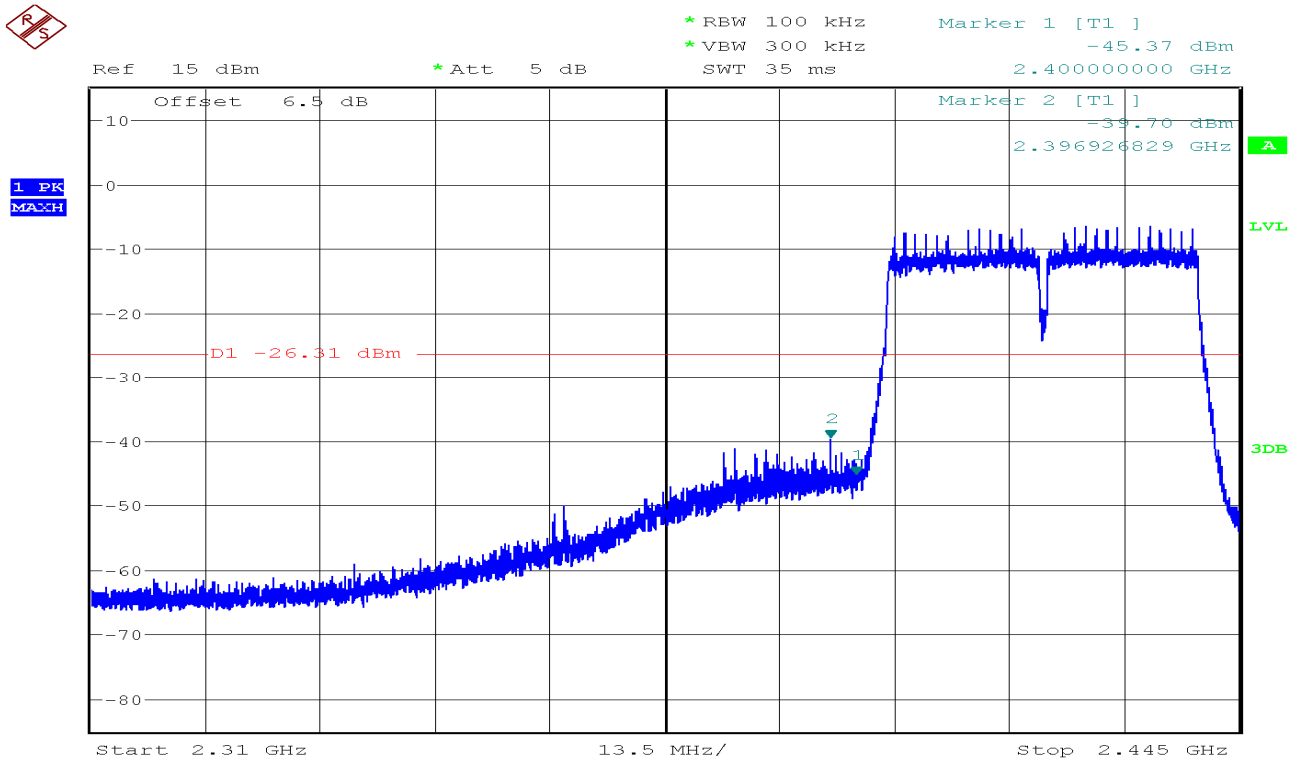

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-50.38 dBm
146.989024390 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.68 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

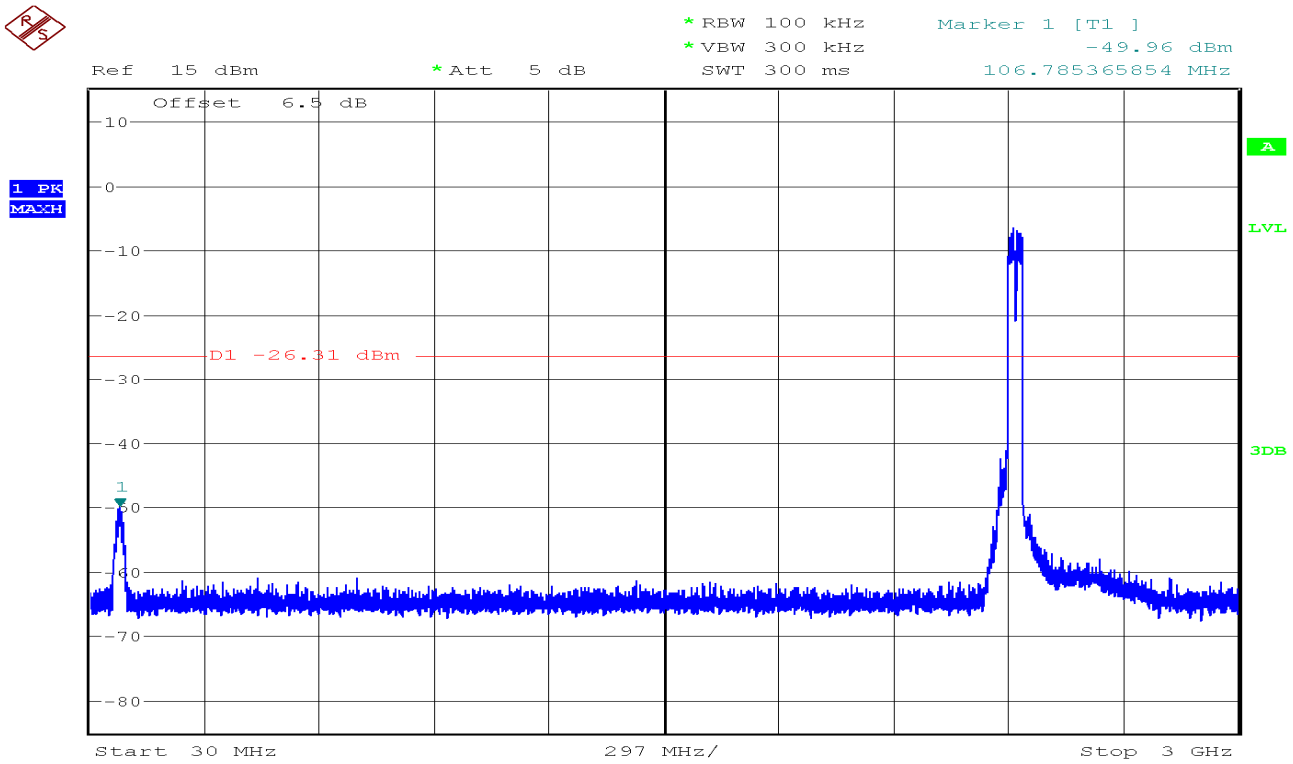

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.81 dBm
9.180487805 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -25.68 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

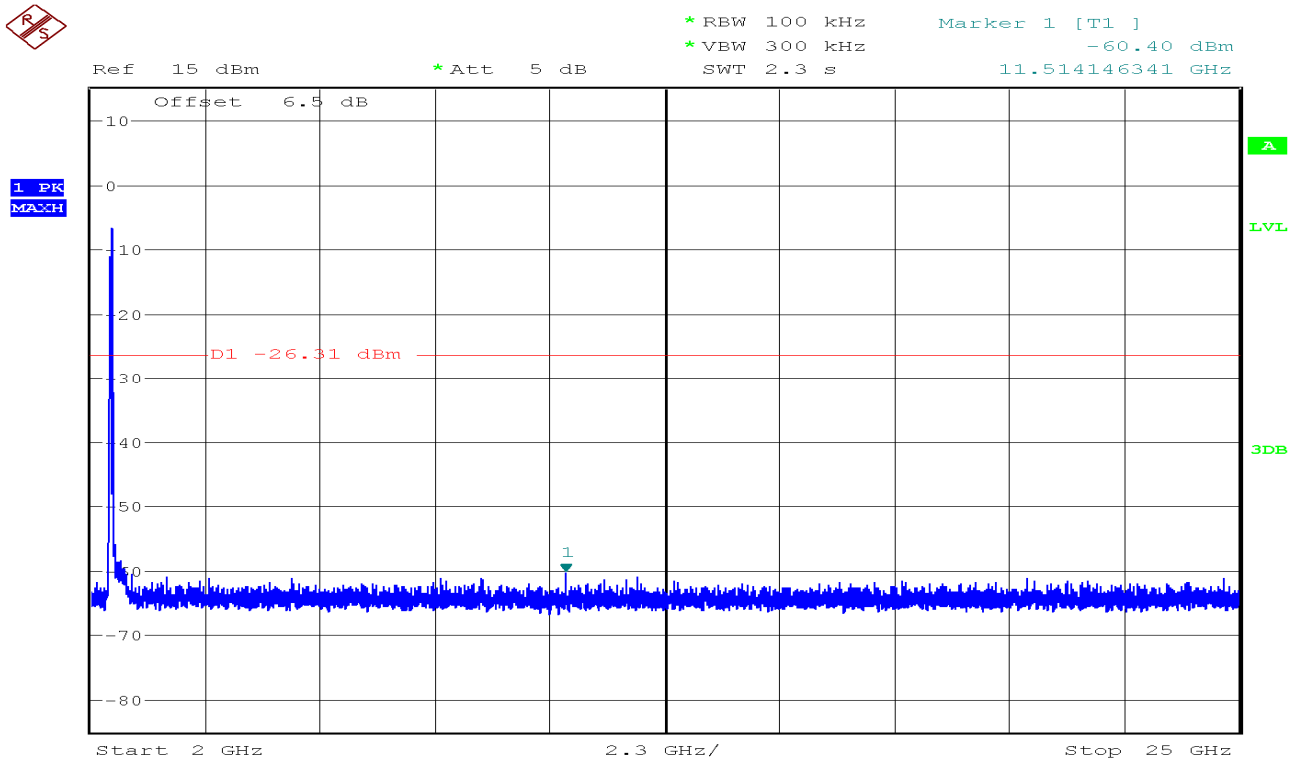
IEEE 802.11n HT40 mode / Chain 0

CH Low

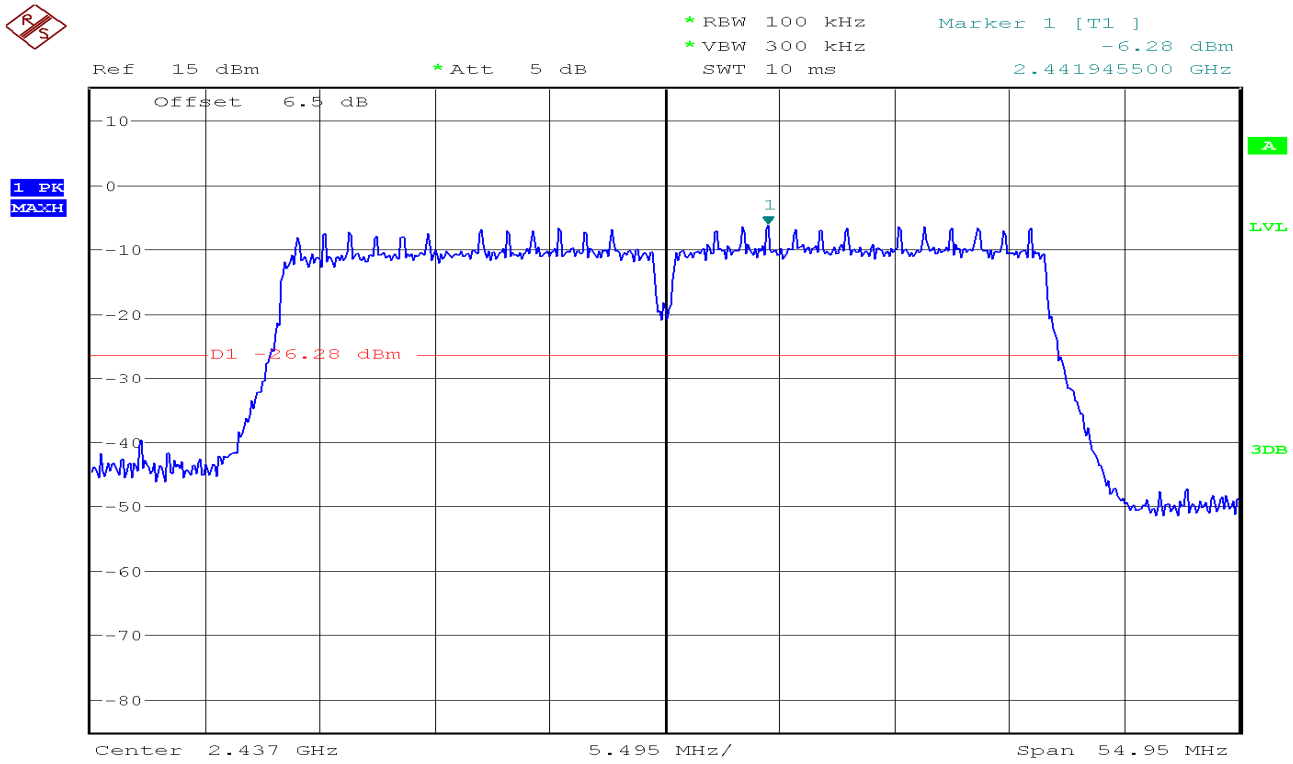


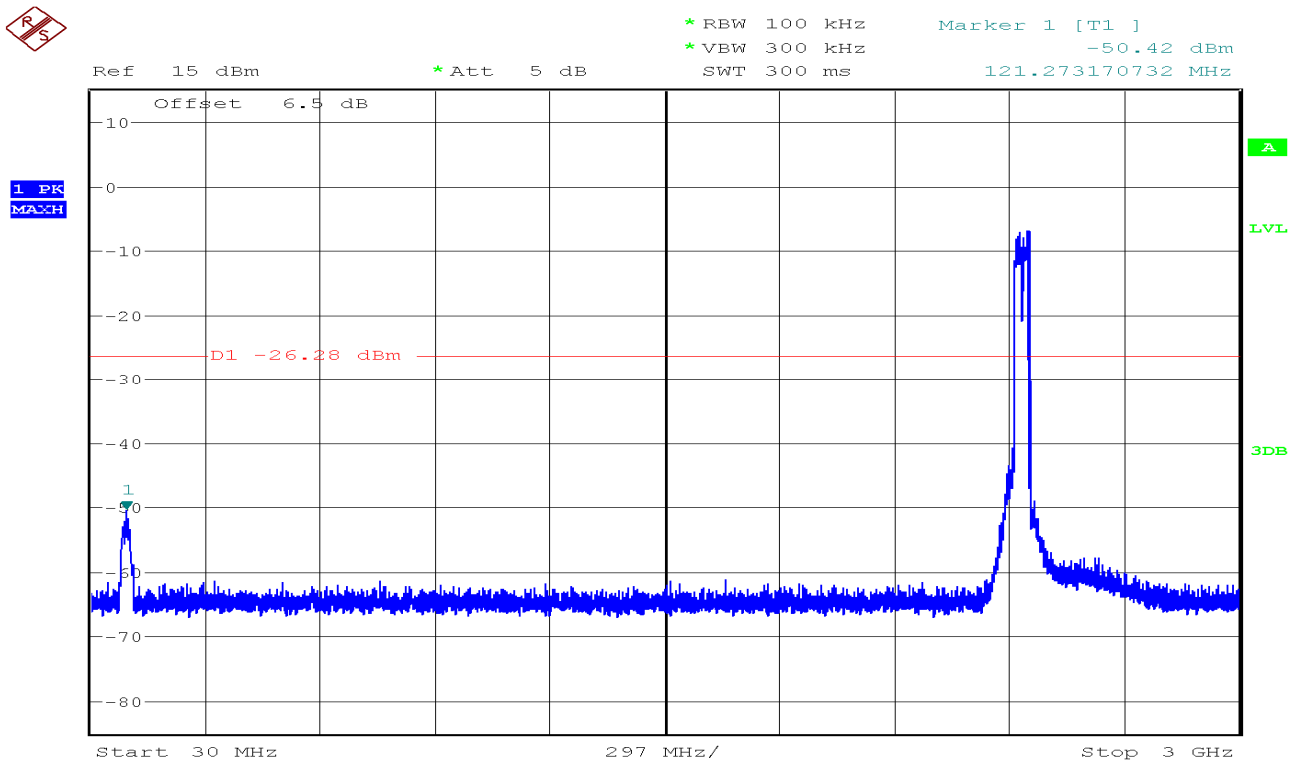


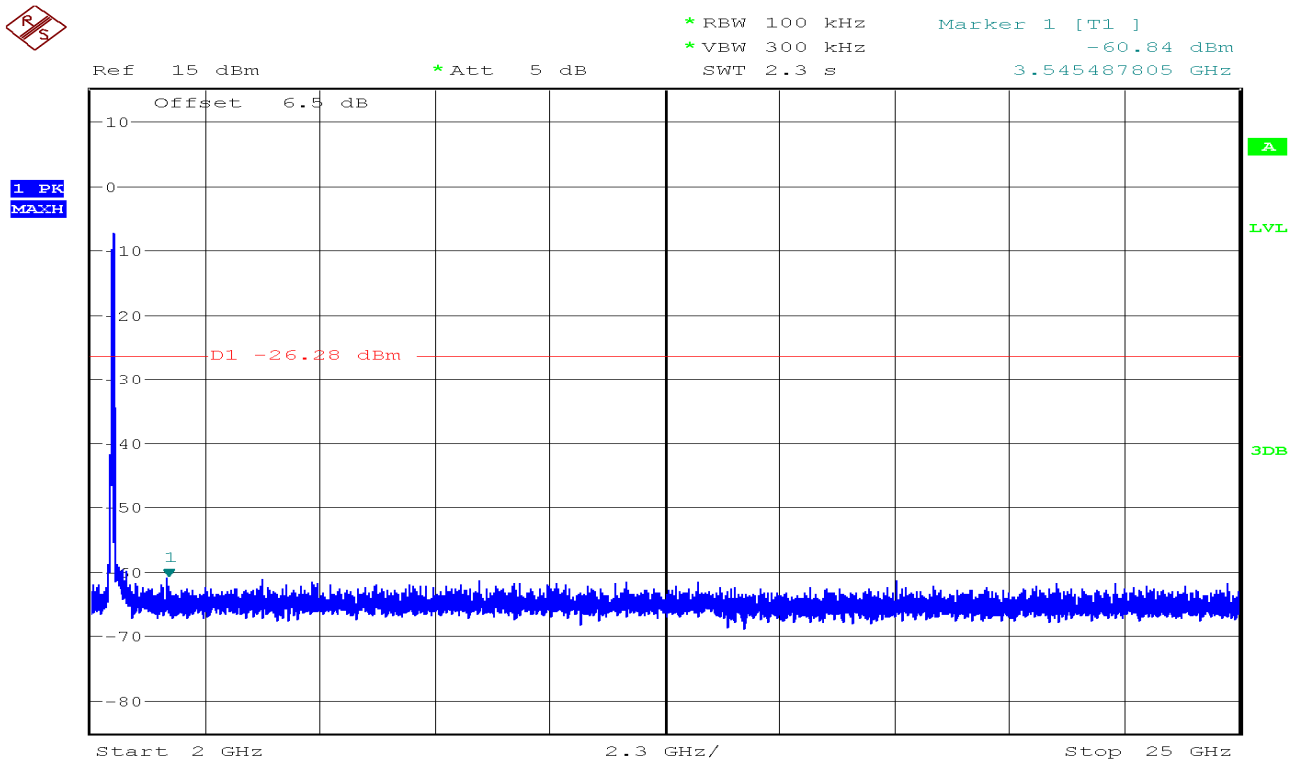

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-49.96 dBm
106.785365854 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.31 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.40 dBm
11.514146341 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.31 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

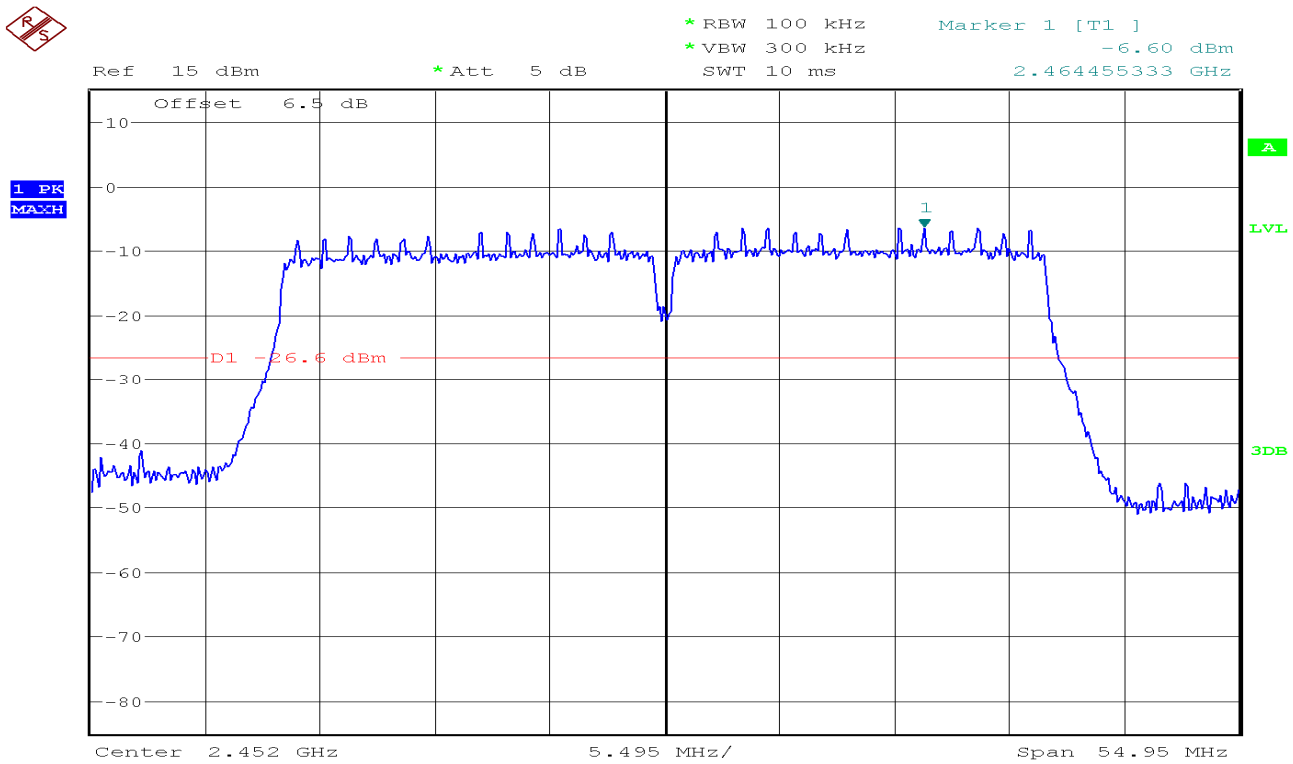
CH Mid

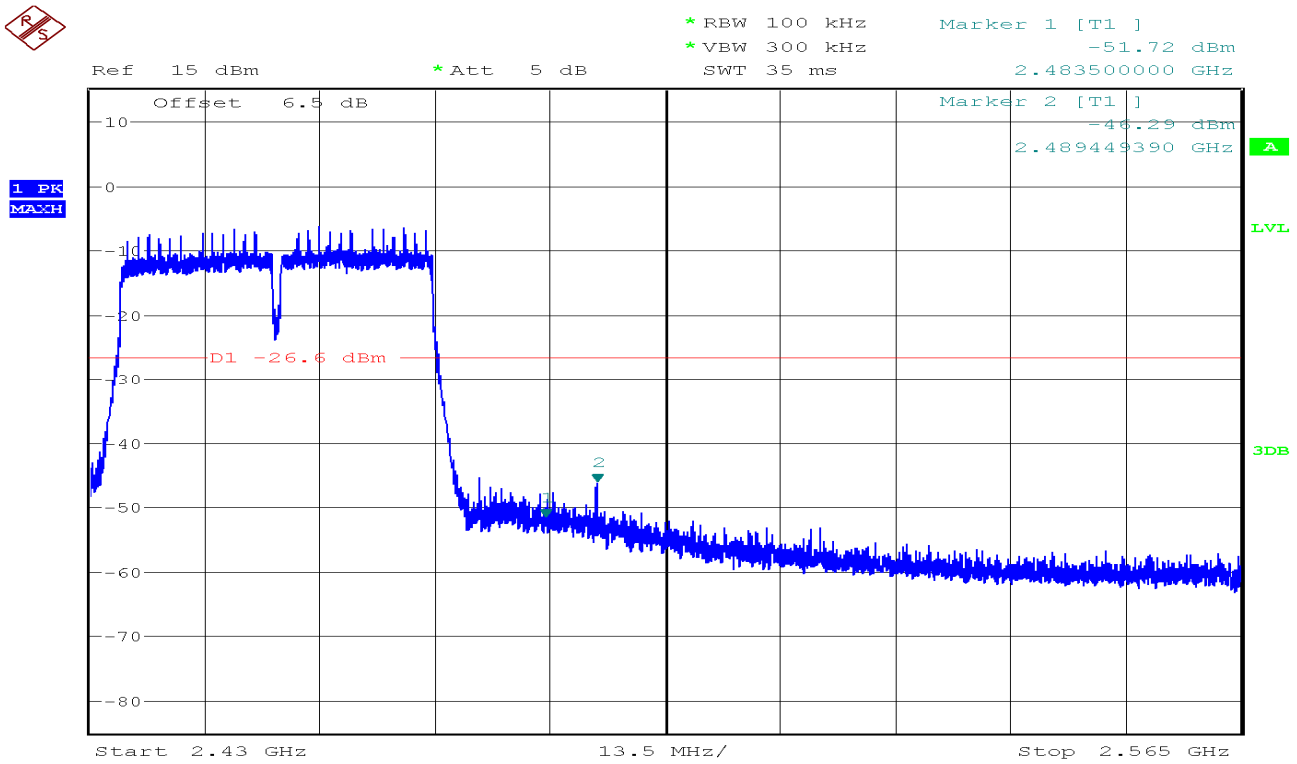

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-6.28 dBm
2.441945500 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.28 dBm
Center 2.437 GHz
5.495 MHz/
Span 54.95 MHz

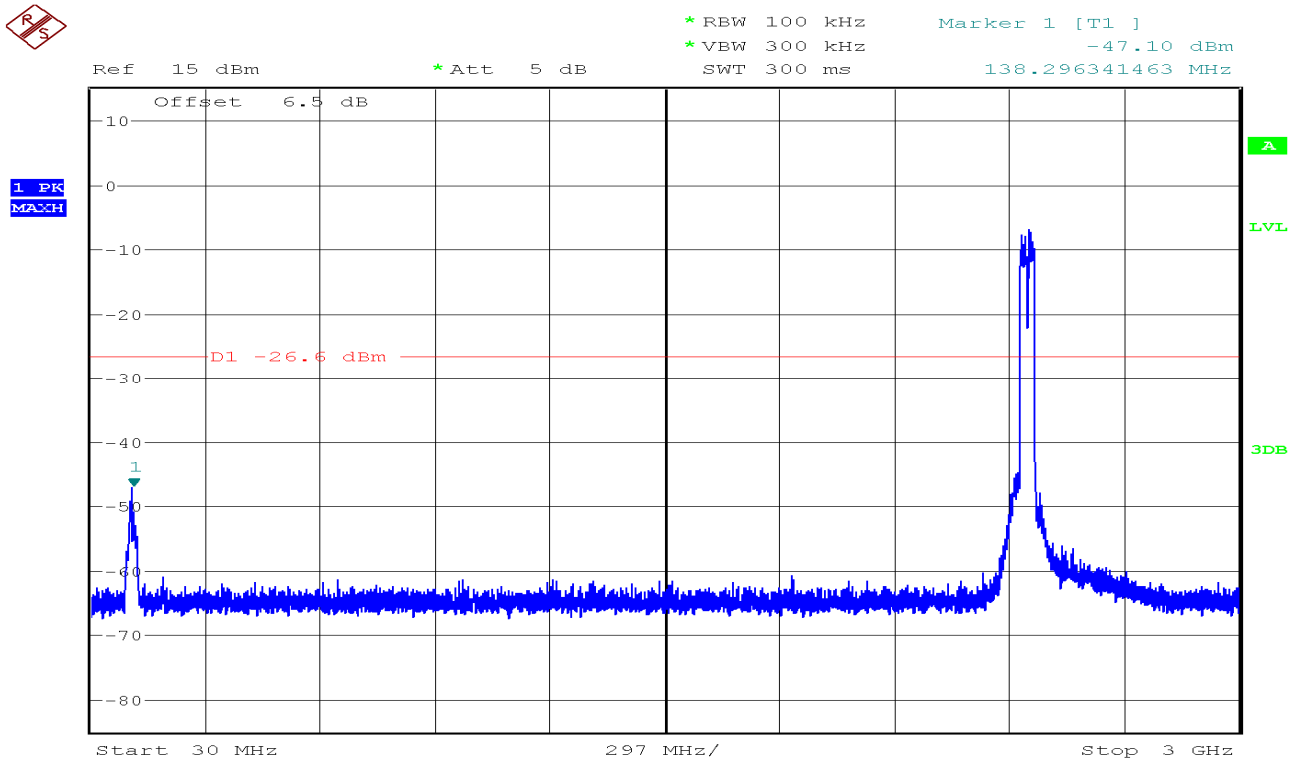

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-50.42 dBm
121.273170732 MHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.28 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

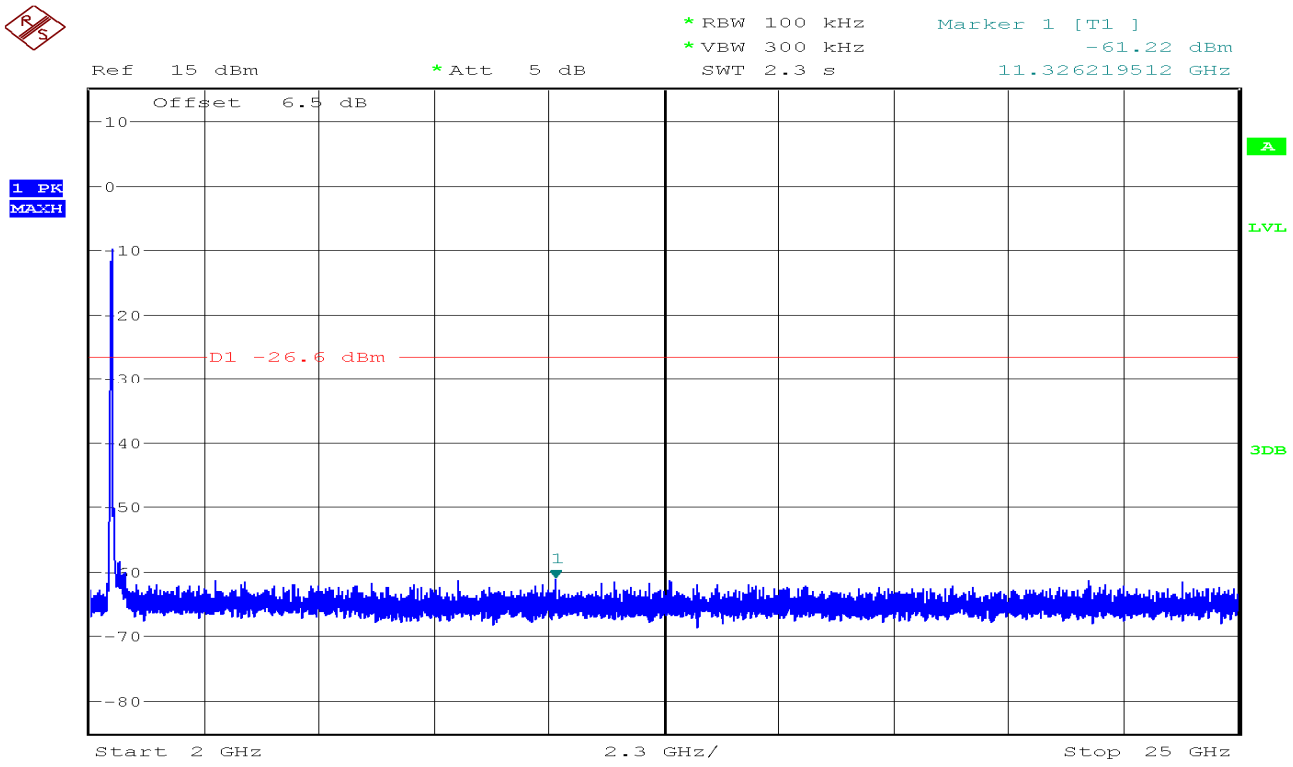

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.84 dBm
3.545487805 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.28 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


* RBW 100 kHz
* VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-6.60 dBm
2.464455333 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.6 dBm
Center 2.452 GHz
5.495 MHz/
Span 54.95 MHz

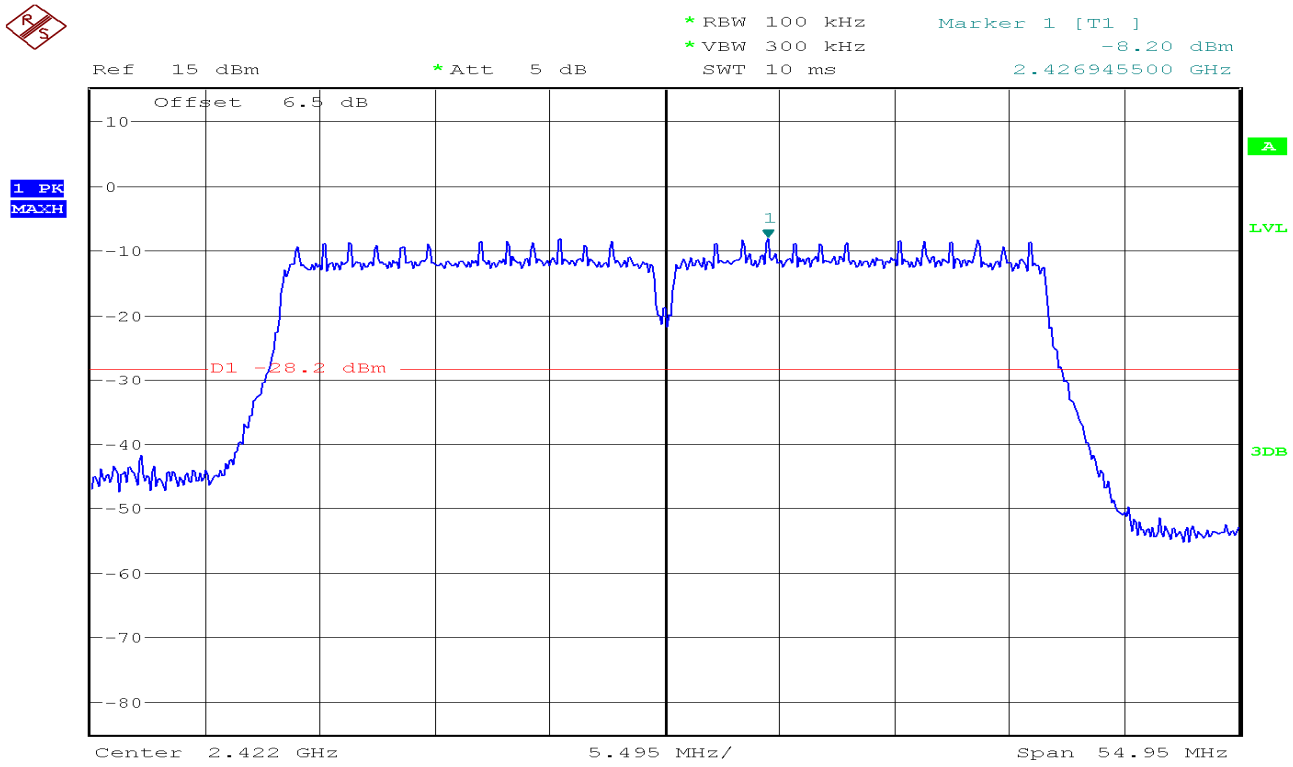

* RBW 100 kHz
* VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-51.72 dBm
2.483500000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-46.29 dBm
2.489449390 GHz
1 PK MAXH
A
LVL
3DB
D1 -26.6 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz

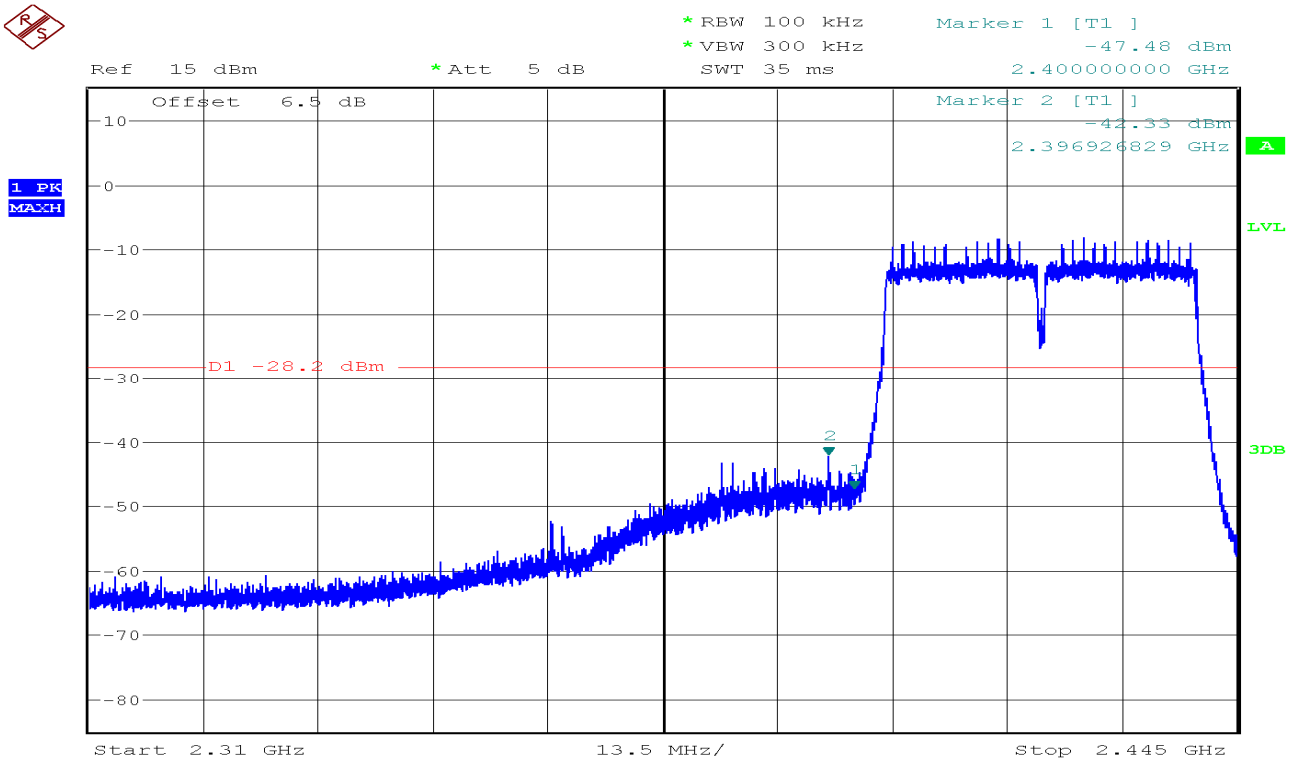

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-47.10 dBm
138.296341463 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -26.6 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

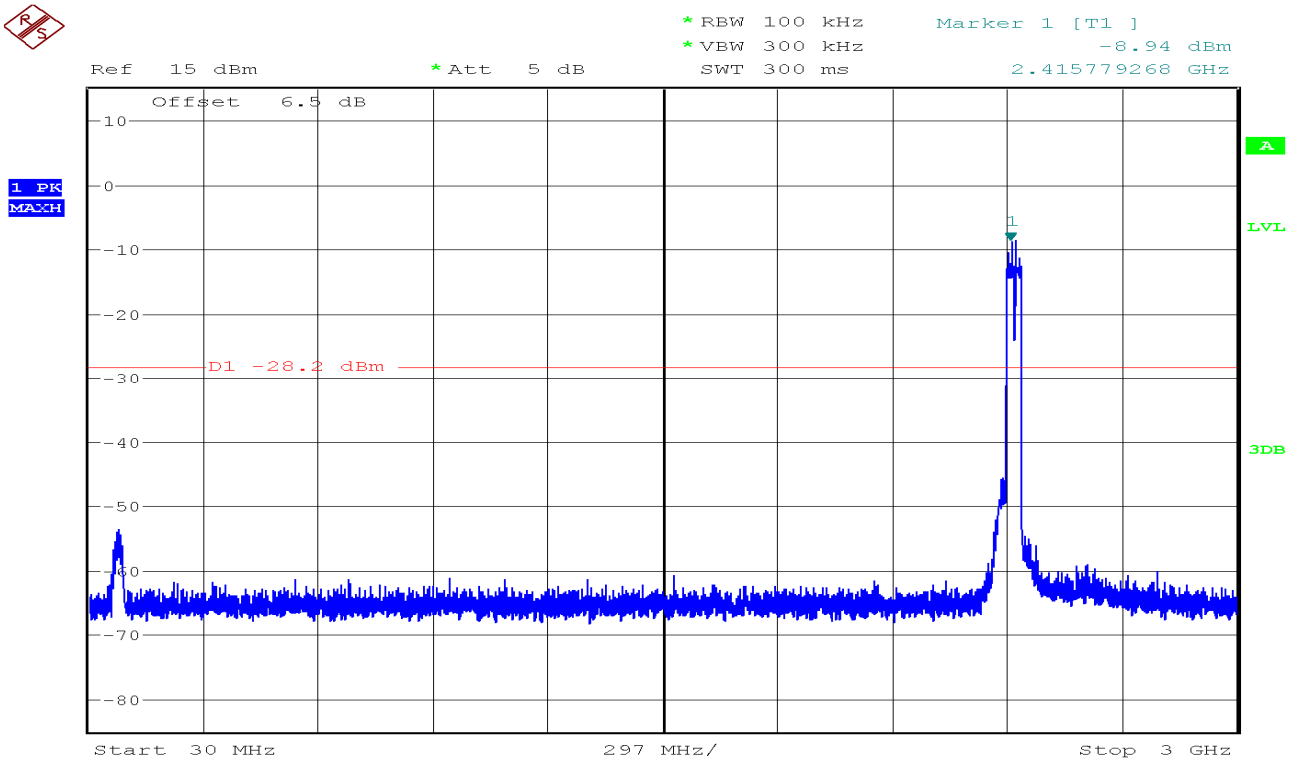


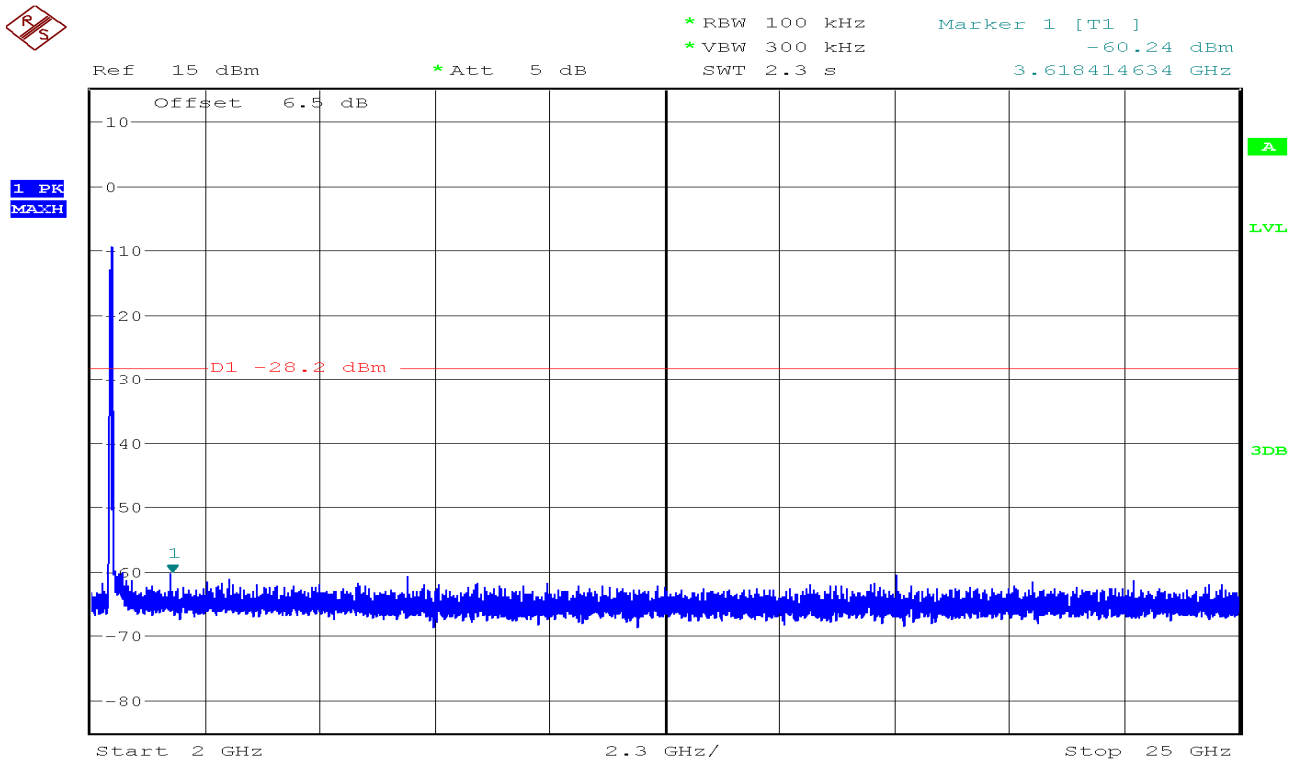
IEEE 802.11n HT40 mode / Chain 1

CH Low

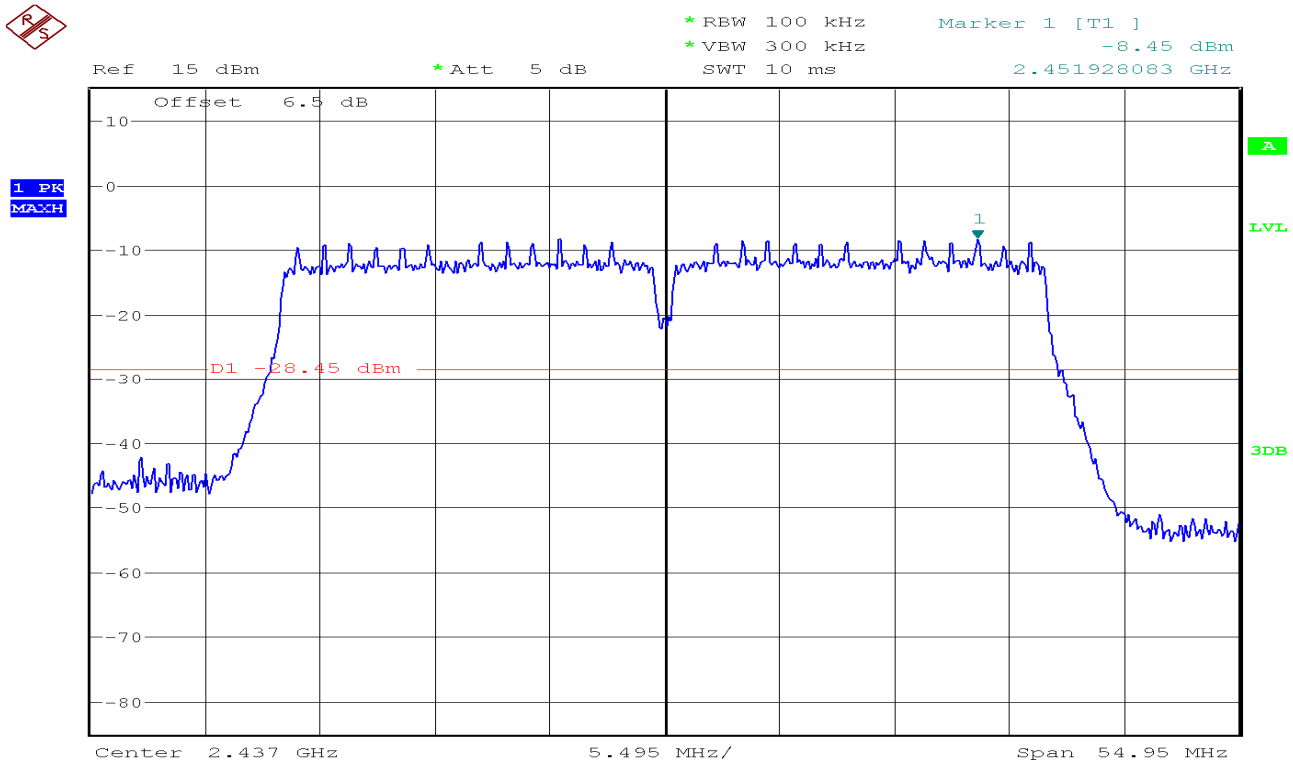


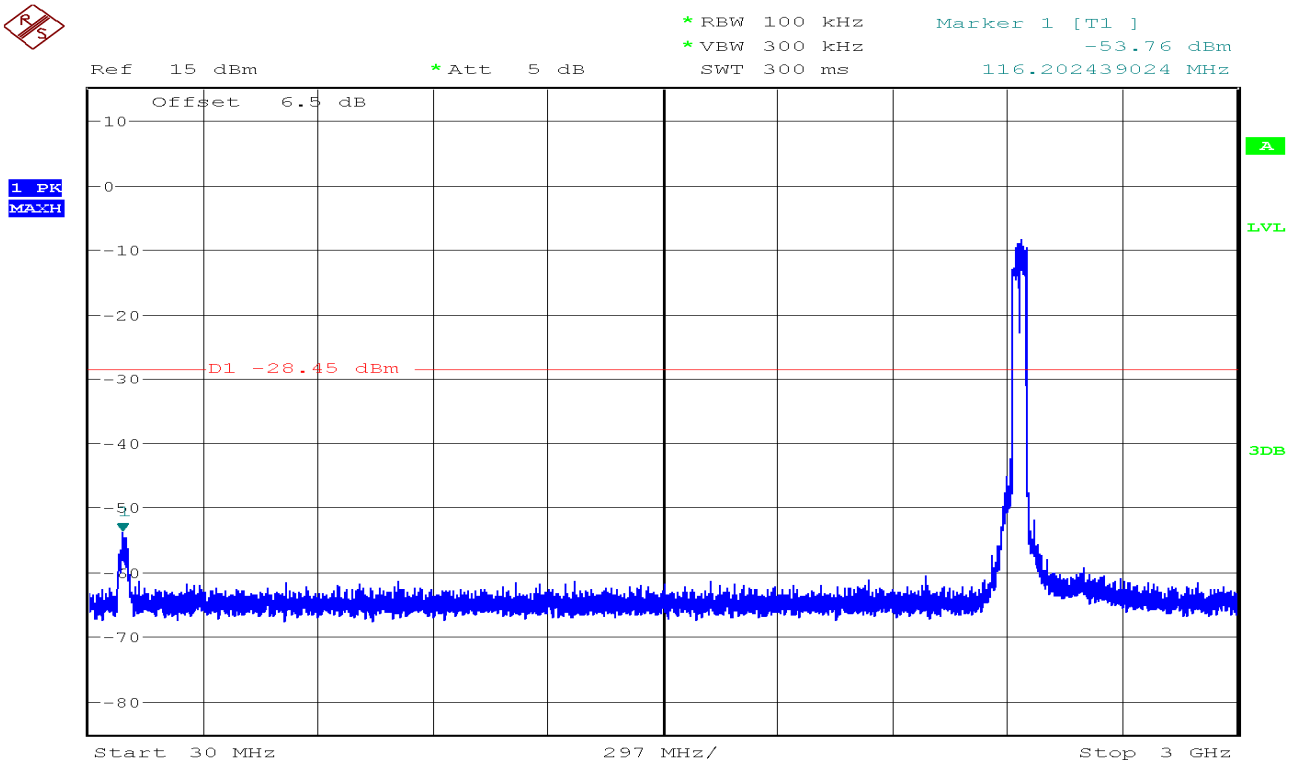

RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-47.48 dBm
2.400000000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-42.33 dBm
2.396926829 GHz
1 PK MAXH
A
LVL
3DB
D1 -28.2 dBm
Start 2.31 GHz
13.5 MHz/
Stop 2.445 GHz

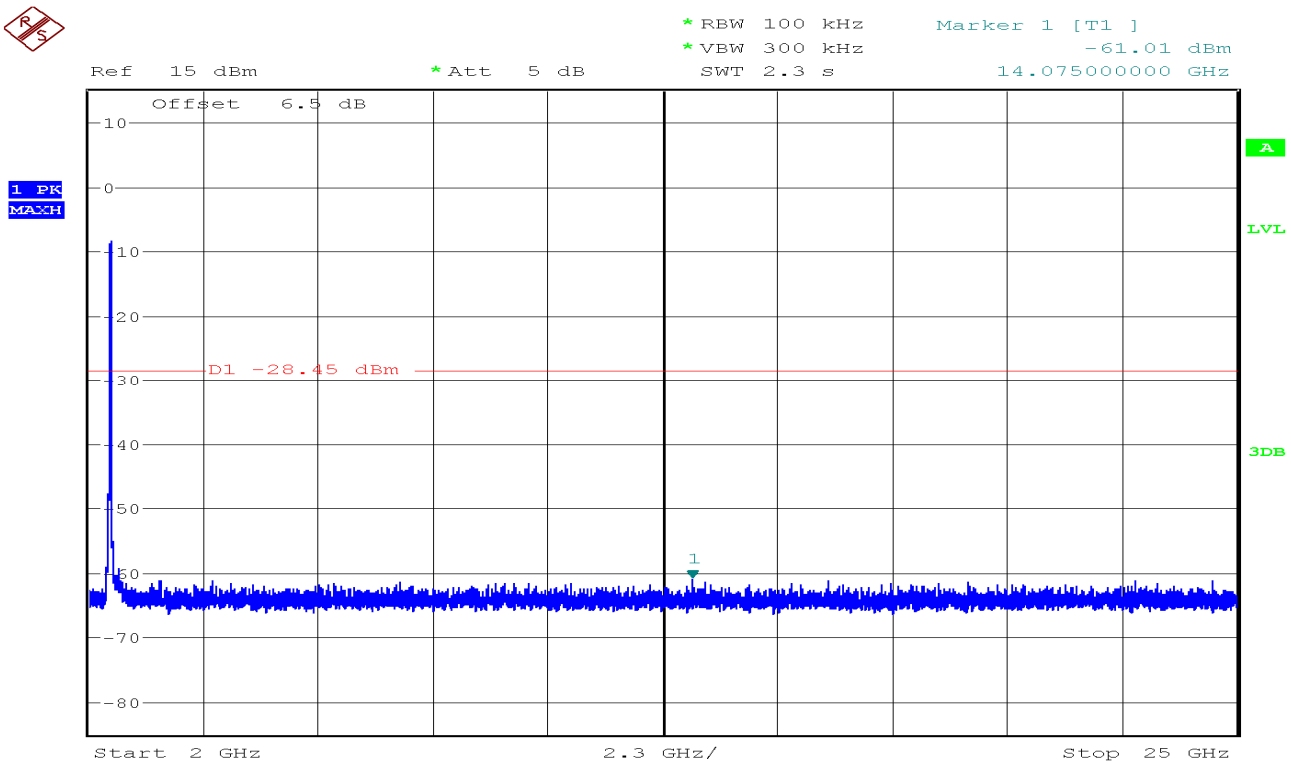

RBW 100 kHz
VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-8.94 dBm
2.415779268 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.2 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-60.24 dBm
3.618414634 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.2 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

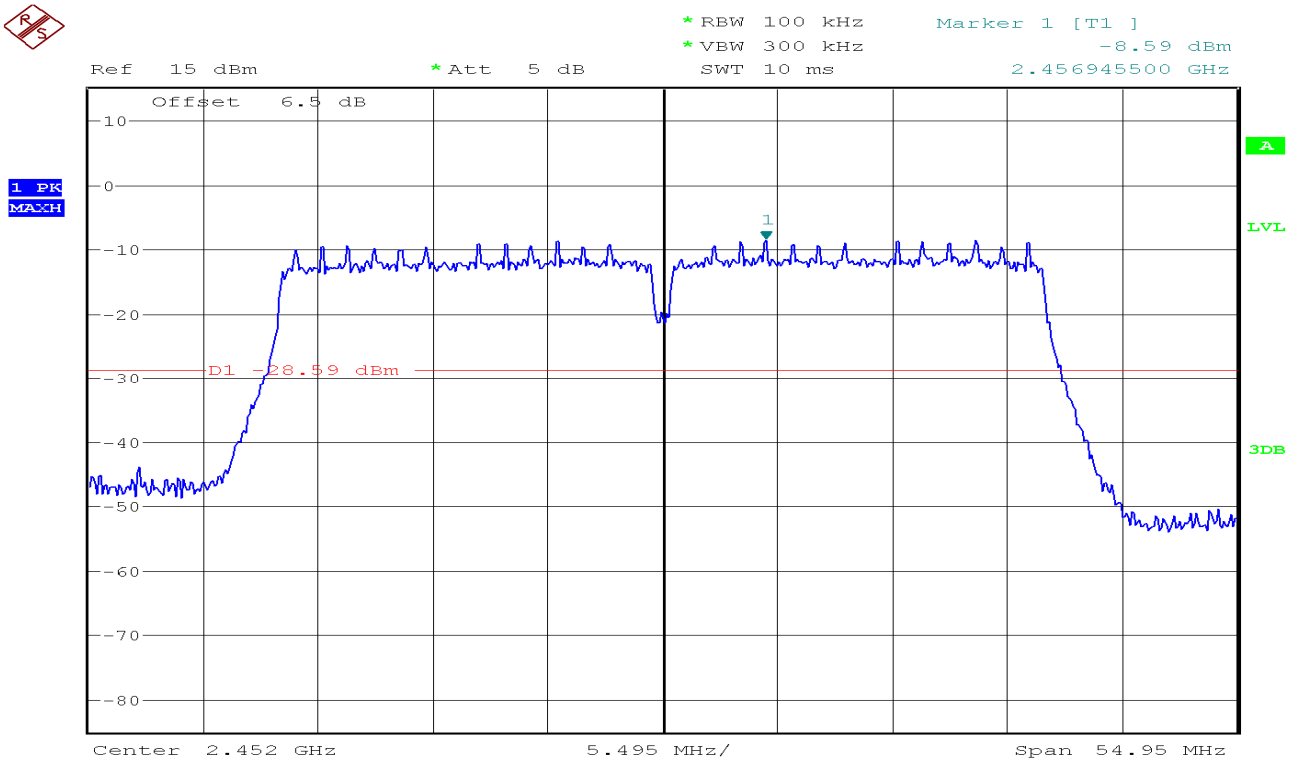
CH Mid

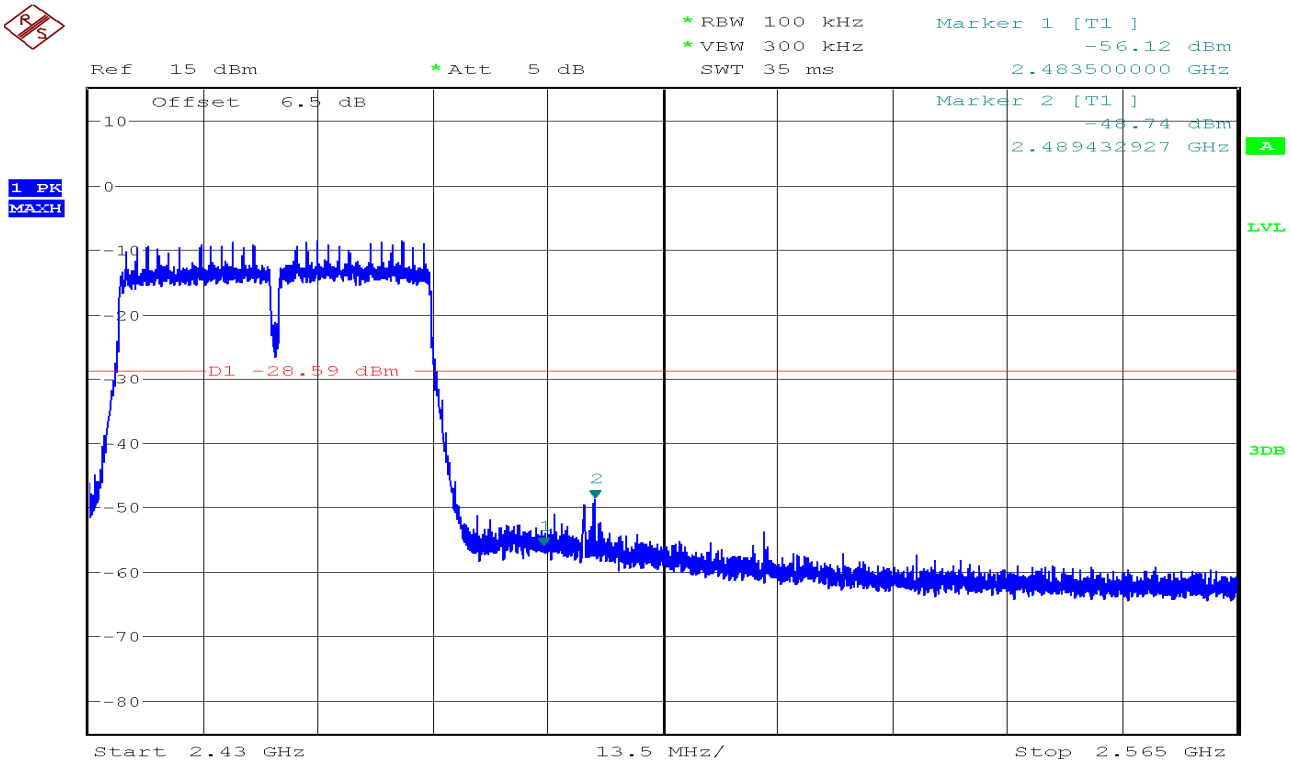

* RBW 100 kHz
* VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-8.45 dBm
2.451928083 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.45 dBm
Center 2.437 GHz
5.495 MHz/
Span 54.95 MHz

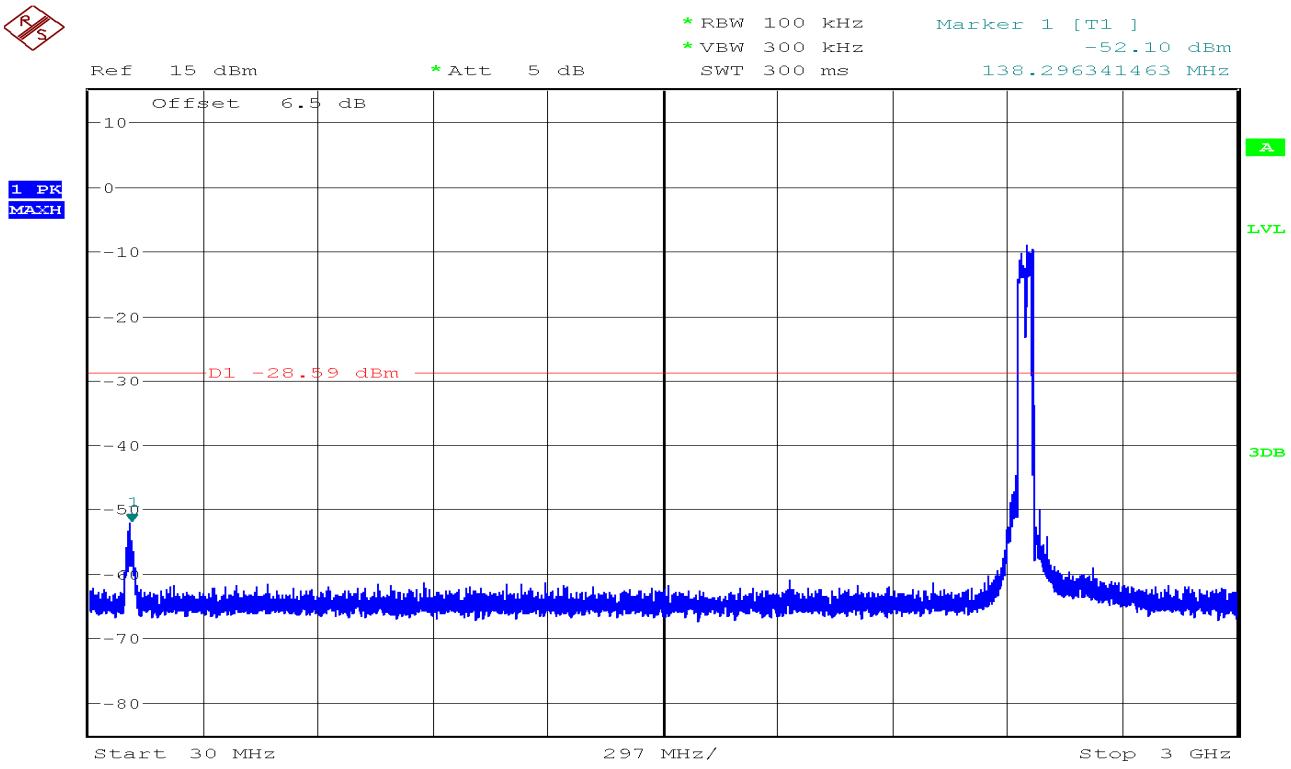

* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-53.76 dBm
116.202439024 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.45 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz

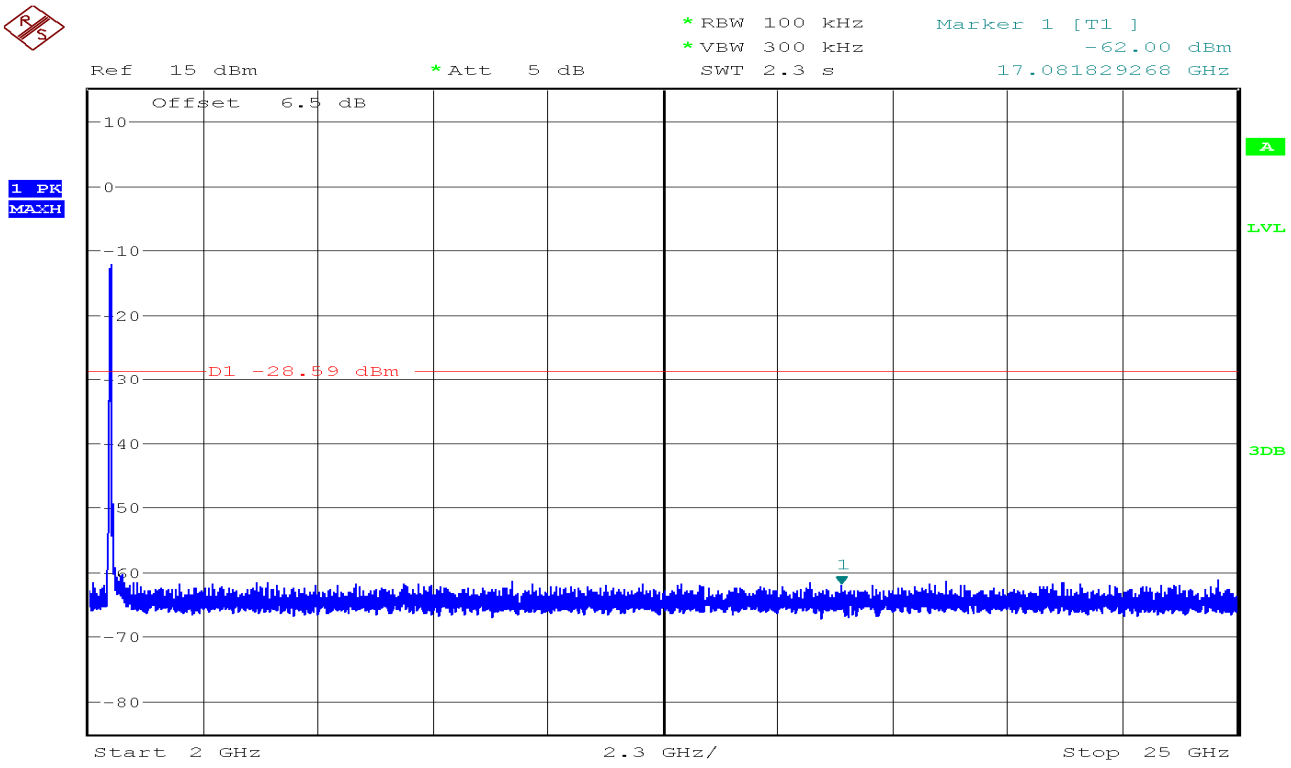

* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-61.01 dBm
14.075000000 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.45 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

CH High


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-8.59 dBm
2.456945500 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -28.59 dBm
Center 2.452 GHz
5.495 MHz/
Span 54.95 MHz


RBW 100 kHz
VBW 300 kHz
SWT 35 ms
Marker 1 [T1]
-56.12 dBm
2.483500000 GHz
Ref 15 dBm
Att 5 dB
Offset 6.5 dB
Marker 2 [T1]
-48.74 dBm
2.489432927 GHz
1 PK
MAXH
A
LVL
3DB
D1 -28.59 dBm
Start 2.43 GHz
13.5 MHz/
Stop 2.565 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 300 ms
Marker 1 [T1]
-52.10 dBm
138.296341463 MHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.59 dBm
Start 30 MHz
297 MHz/
Stop 3 GHz


* RBW 100 kHz
* VBW 300 kHz
SWT 2.3 s
Marker 1 [T1]
-62.00 dBm
17.081829268 GHz
Ref 15 dBm
* Att 5 dB
Offset 6.5 dB
1 PK MAXH
A
LVL
3DB
D1 -28.59 dBm
Start 2 GHz
2.3 GHz/
Stop 25 GHz

7.5.RADIATED EMISSIONS

LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.8 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

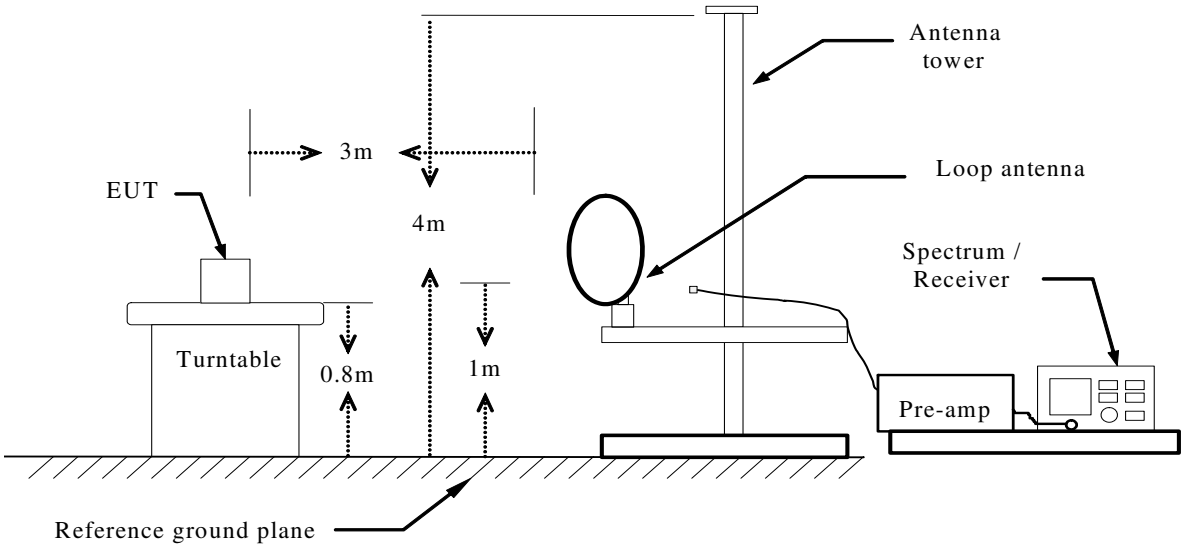
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

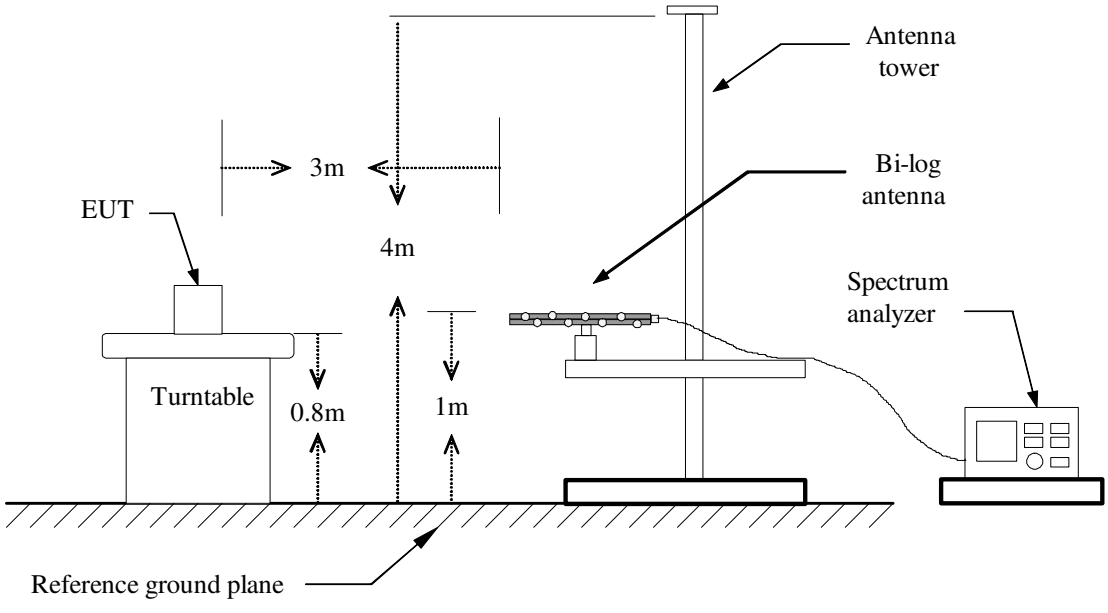
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

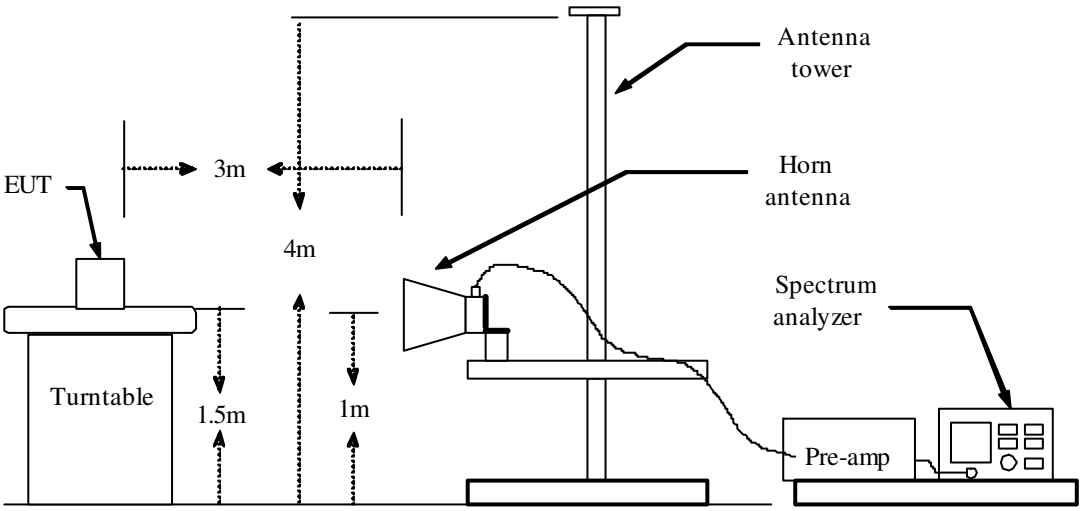
Below 30MHz



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:

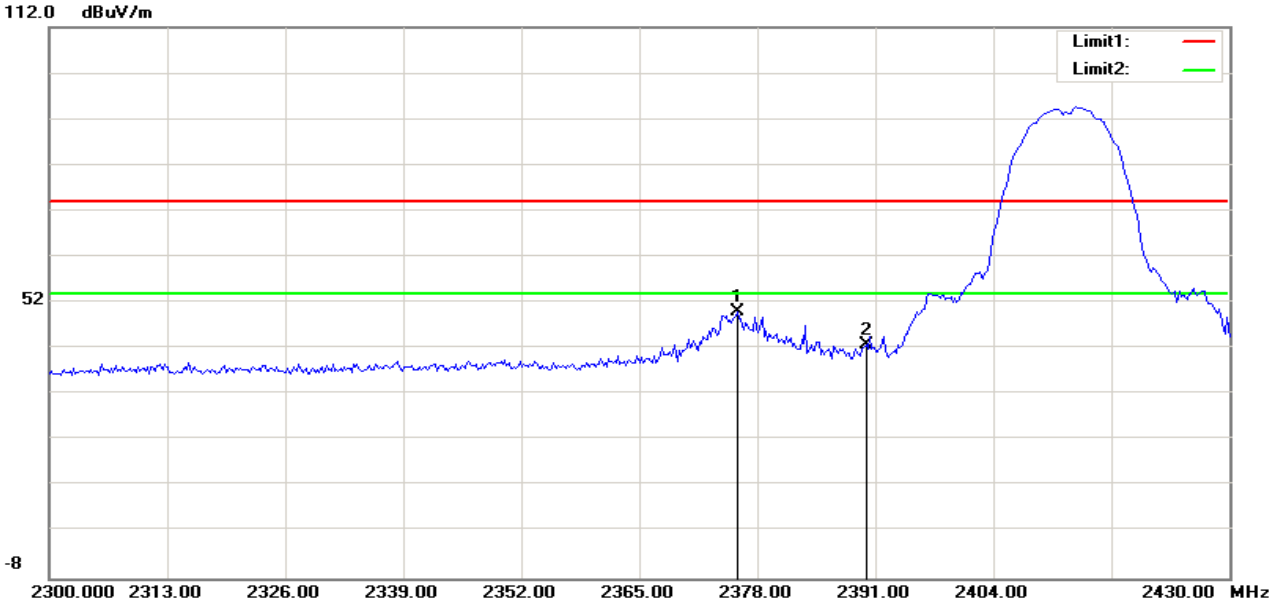
   PEAK: RBW=VBW=1MHz / Sweep=AUTO

   AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

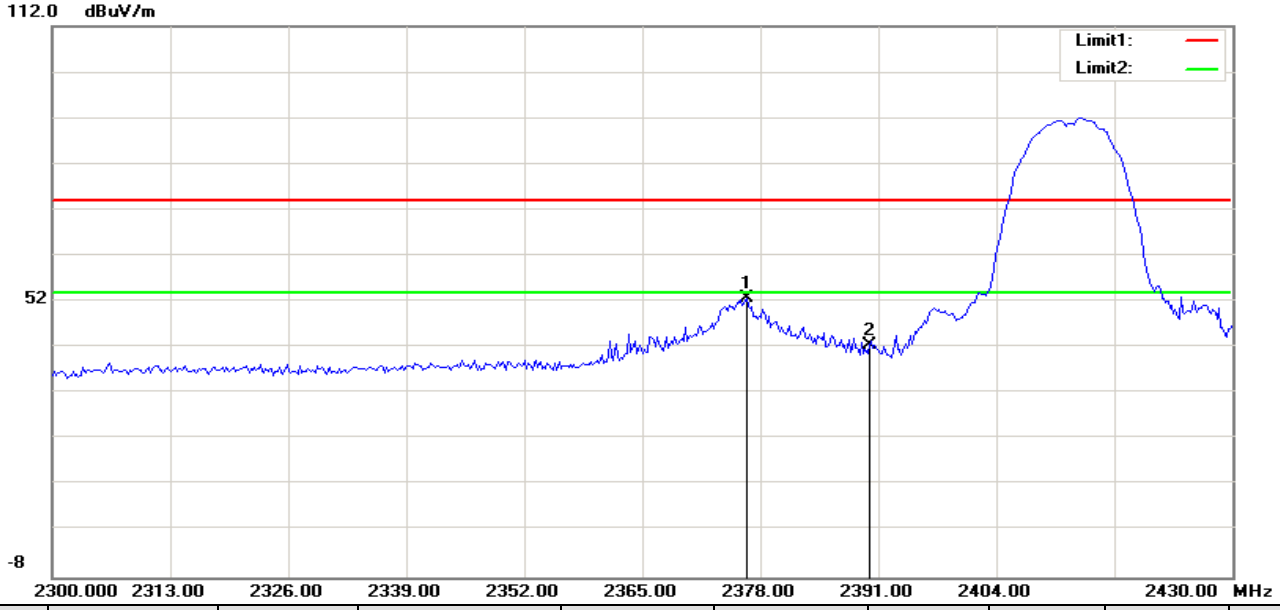
TEST RESULTS

RESTRICTED BANDEDGE (b Mode, Low Channel, Horizontal)



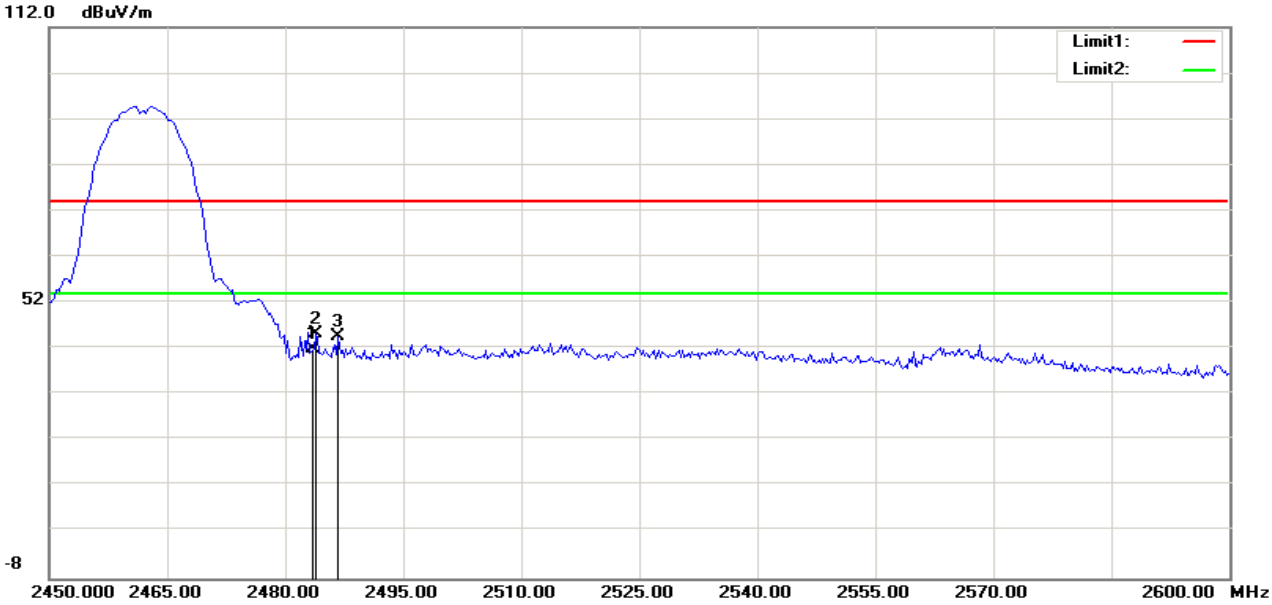
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.833	58.44	-8.51	49.93	74.00	-24.07	100	146	peak
2	2390.000	51.39	-8.49	42.90	74.00	-31.10	100	273	peak

RESTRICTED BANDEDGE (b Mode, Low Channel, Vertical)



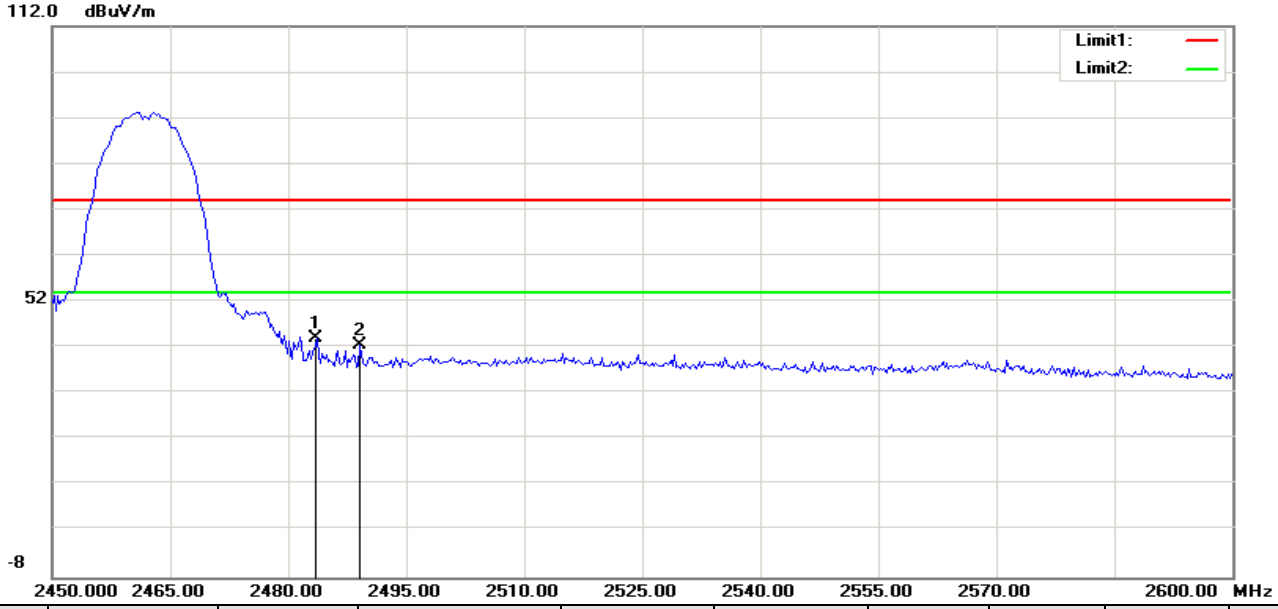
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2376.250	60.68	-8.51	52.17	74.00	-21.83	100	149	peak
2	2390.000	57.35	-8.49	48.86	74.00	-25.14	100	317	peak

RESTRICTED BANDEDGE (b Mode, High Channel, Horizontal)



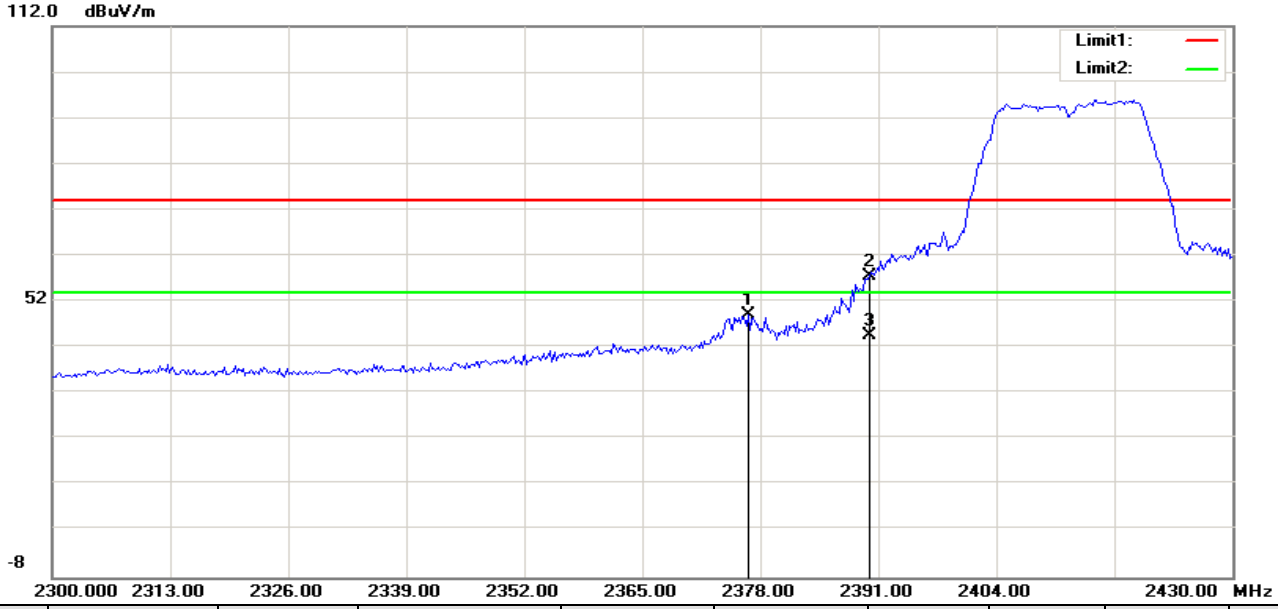
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	50.14	-8.30	41.84	74.00	-32.16	100	310	peak
2	2483.894	53.37	-8.30	45.07	74.00	-28.93	100	318	peak
3	2486.779	52.95	-8.30	44.65	74.00	-29.35	100	261	peak

RESTRICTED BANDEDGE (b Mode, High Channel, Vertical)



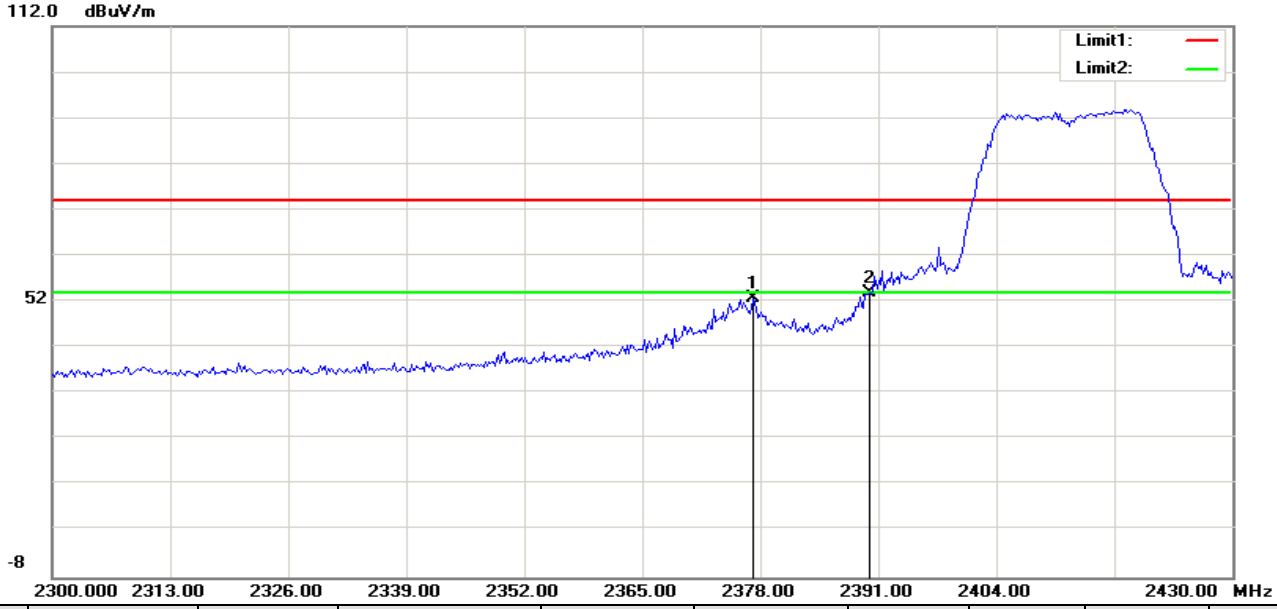
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	52.45	-8.30	44.15	74.00	-29.85	100	306	peak
2	2489.183	50.66	-8.29	42.37	74.00	-31.63	100	322	peak

RESTRICTED BANDEDGE (g Mode, Low Channel, Horizontal)



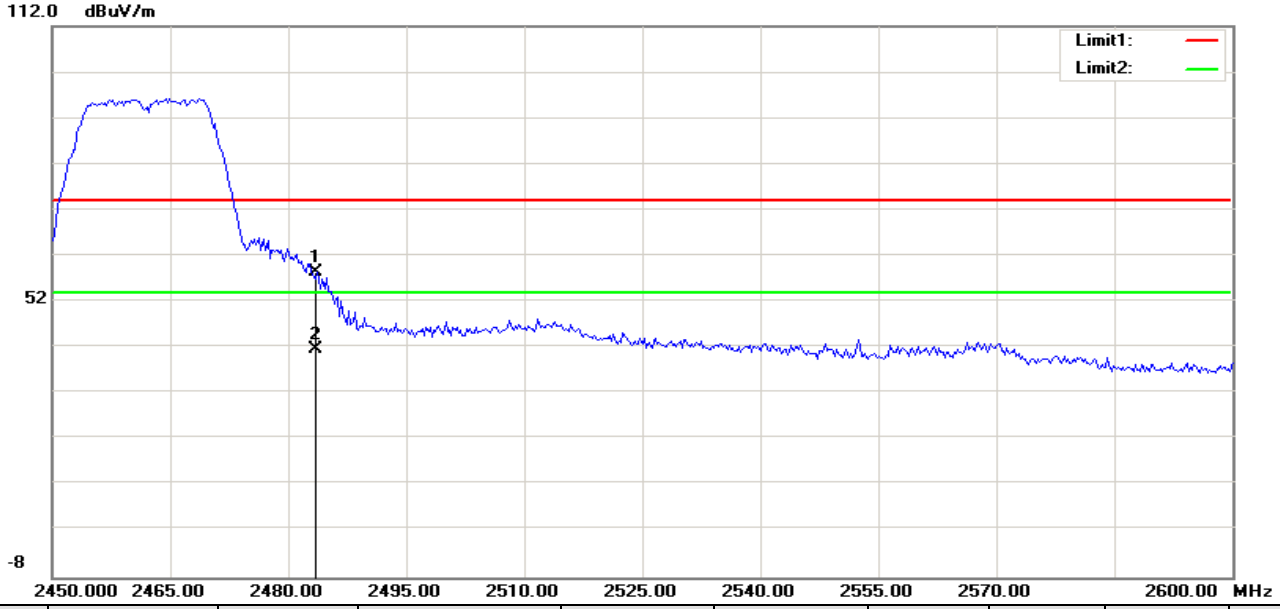
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2376.667	57.61	-8.51	49.10	74.00	-24.90	100	144	peak
2	2390.000	66.14	-8.49	57.65	74.00	-16.35	100	262	peak
3	2390.000	52.98	-8.49	44.49	54.00	-9.51	100	262	AVG

RESTRICTED BANDEDGE (g Mode, Low Channel, Vertical)



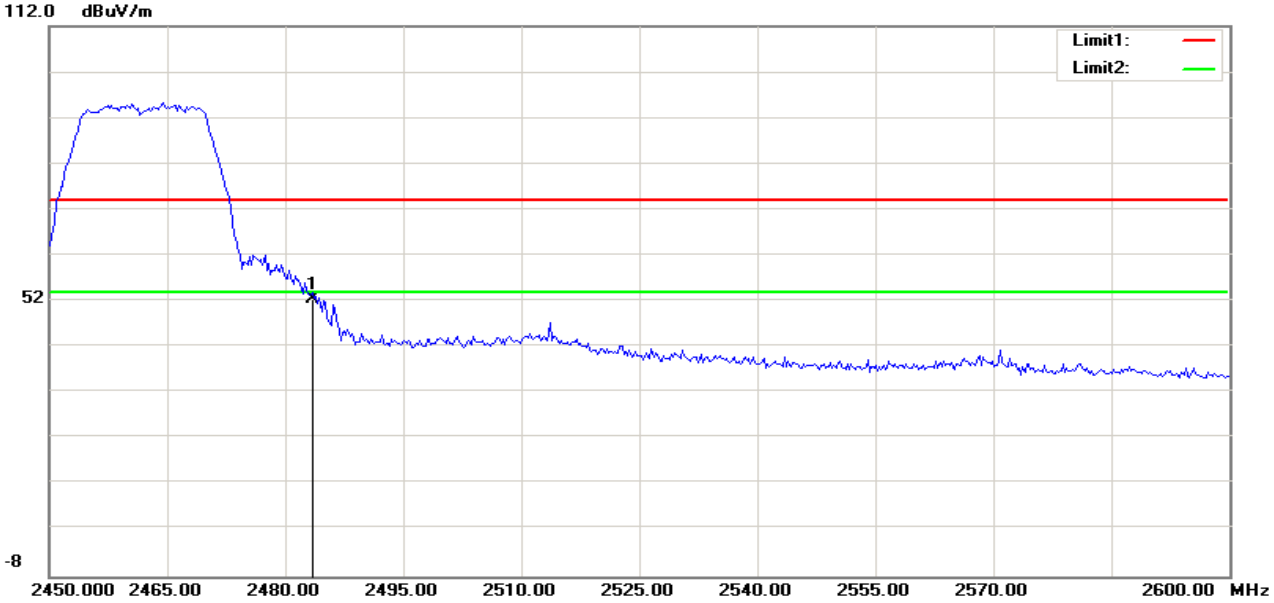
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2377.292	61.36	-8.51	52.85	74.00	-21.15	100	194	peak
2	2390.000	62.39	-8.49	53.90	74.00	-20.10	100	355	peak

RESTRICTED BANDEDGE (g Mode, High Channel, Horizontal)



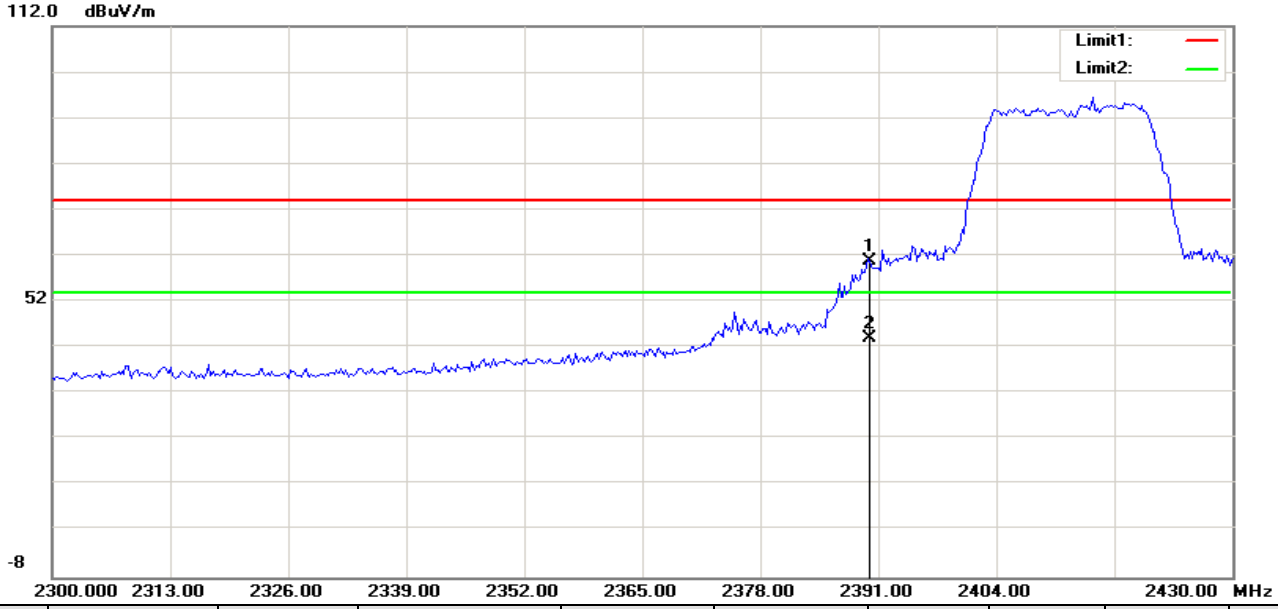
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	66.81	-8.30	58.51	74.00	-15.49	100	266	peak
2	2483.500	50.05	-8.30	41.75	54.00	-12.25	100	266	AVG

RESTRICTED BANDEDGE (g Mode, High Channel, Vertical)



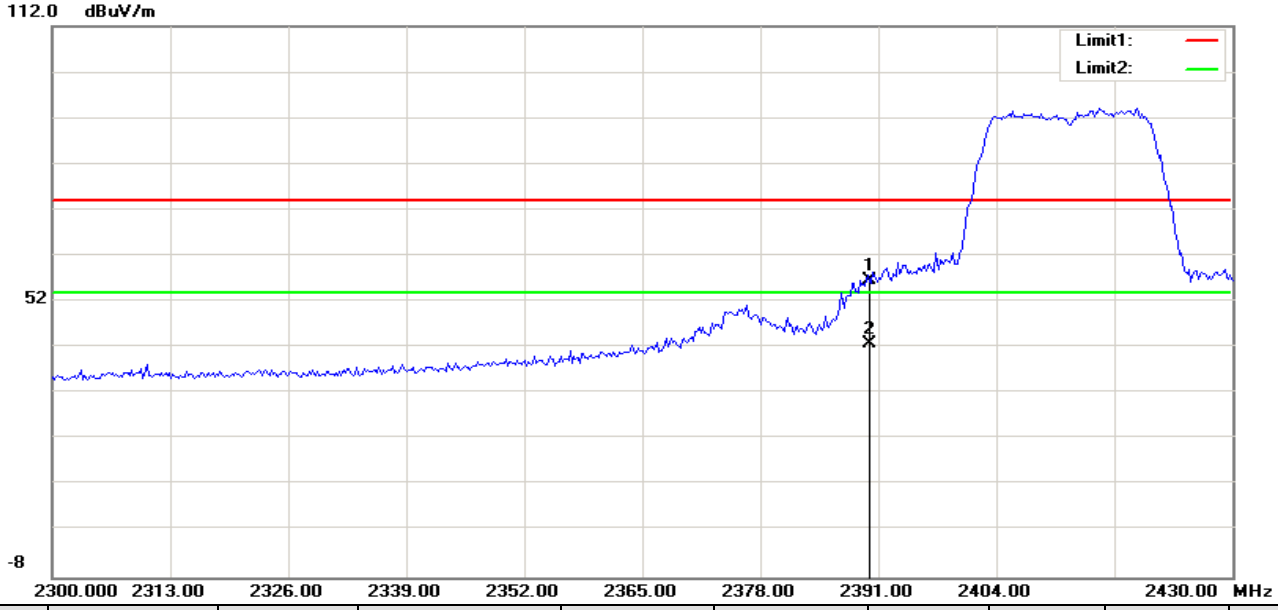
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	60.86	-8.30	52.56	74.00	-21.44	100	307	peak

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



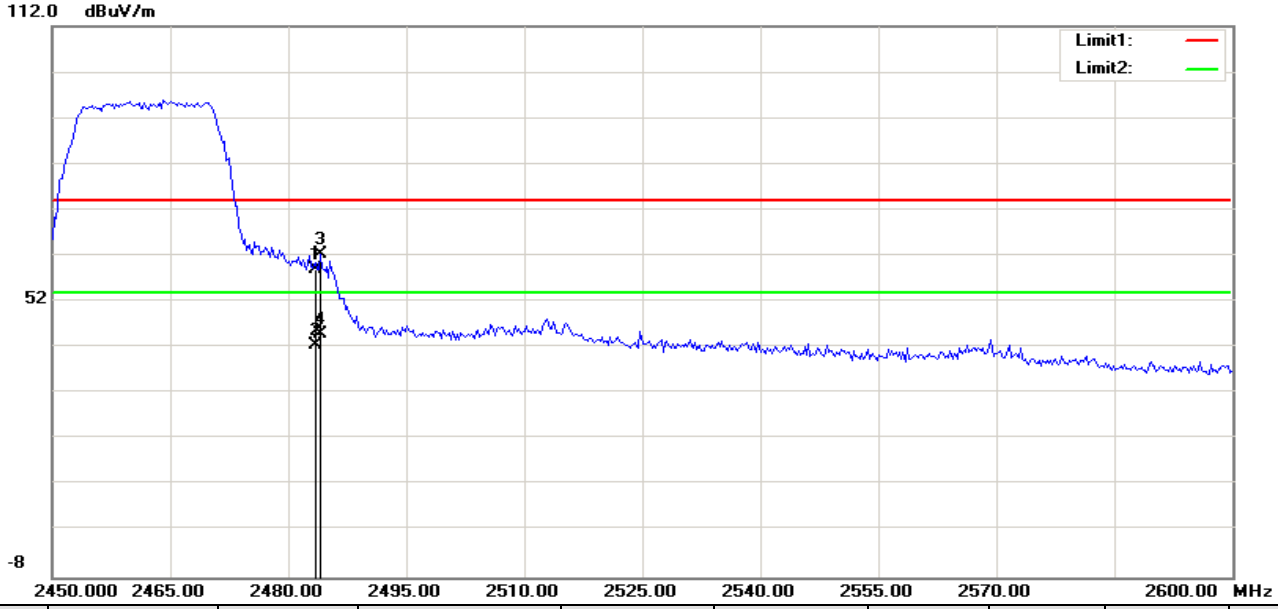
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2390.000	69.39	-8.49	60.90	74.00	-13.10	100	269	peak
2	2390.000	52.46	-8.49	43.97	54.00	-10.03	100	269	AVG

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



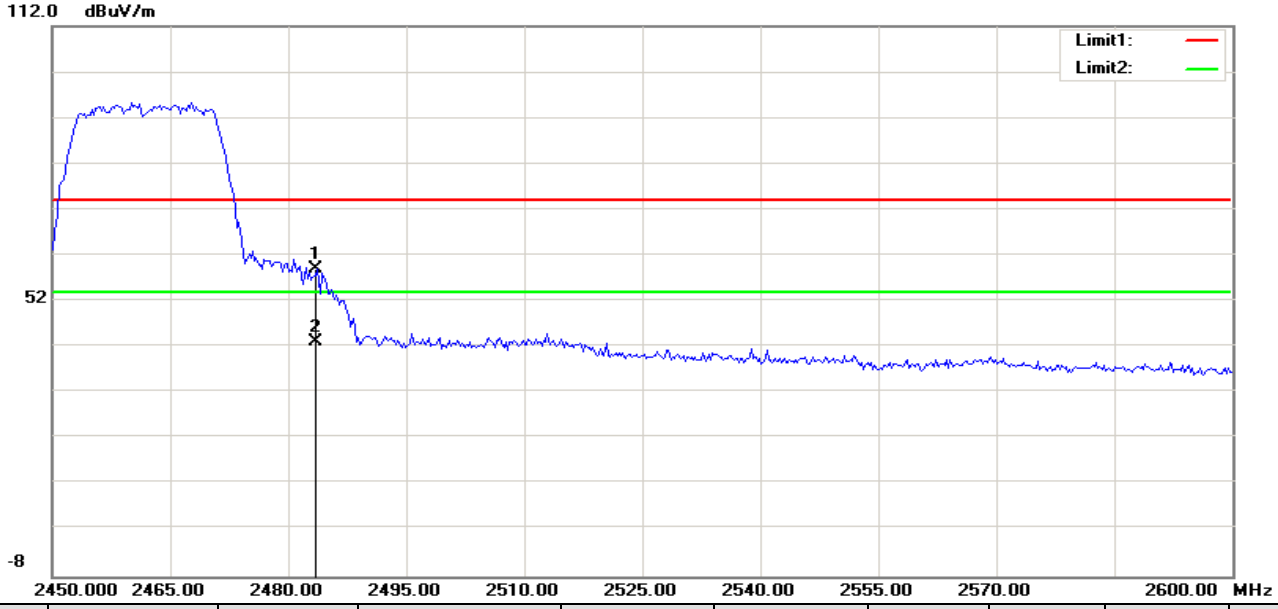
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2390.000	64.99	-8.49	56.50	74.00	-17.50	100	172	peak
2	2390.000	51.45	-8.49	42.96	54.00	-11.04	100	172	AVG

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



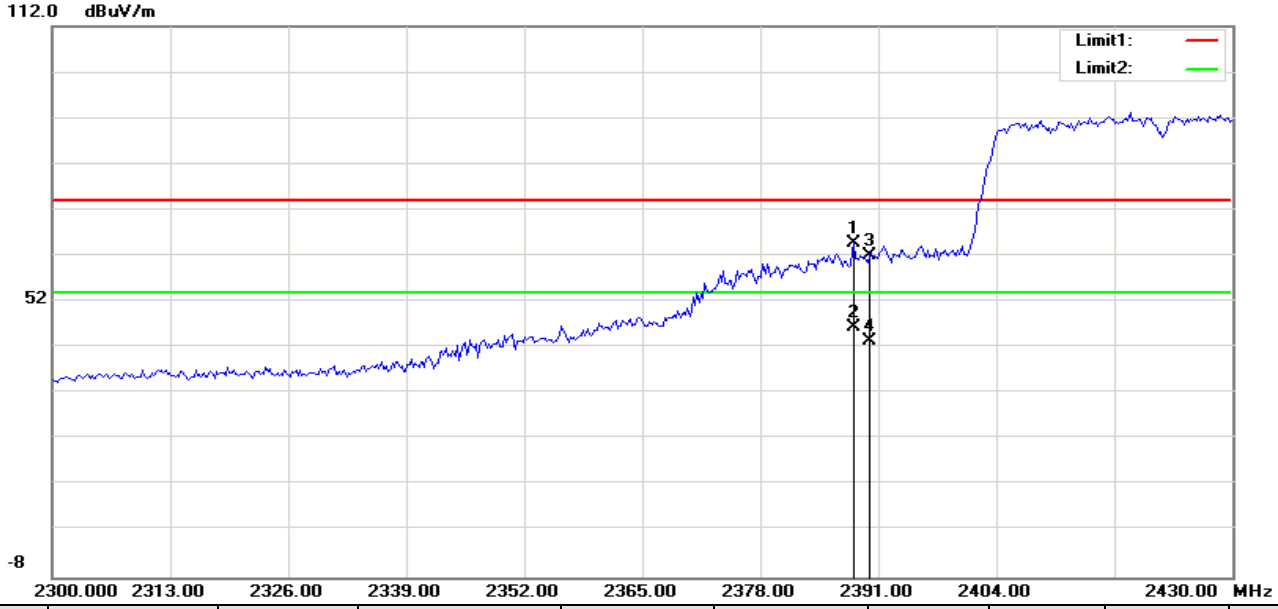
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	67.32	-8.30	59.02	74.00	-14.98	100	263	peak
2	2483.500	50.92	-8.30	42.62	54.00	-11.38	100	263	AVG
3	2484.135	70.52	-8.30	62.22	74.00	-11.78	100	263	peak
4	2484.135	53.15	-8.30	44.85	54.00	-9.15	100	263	AVG

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



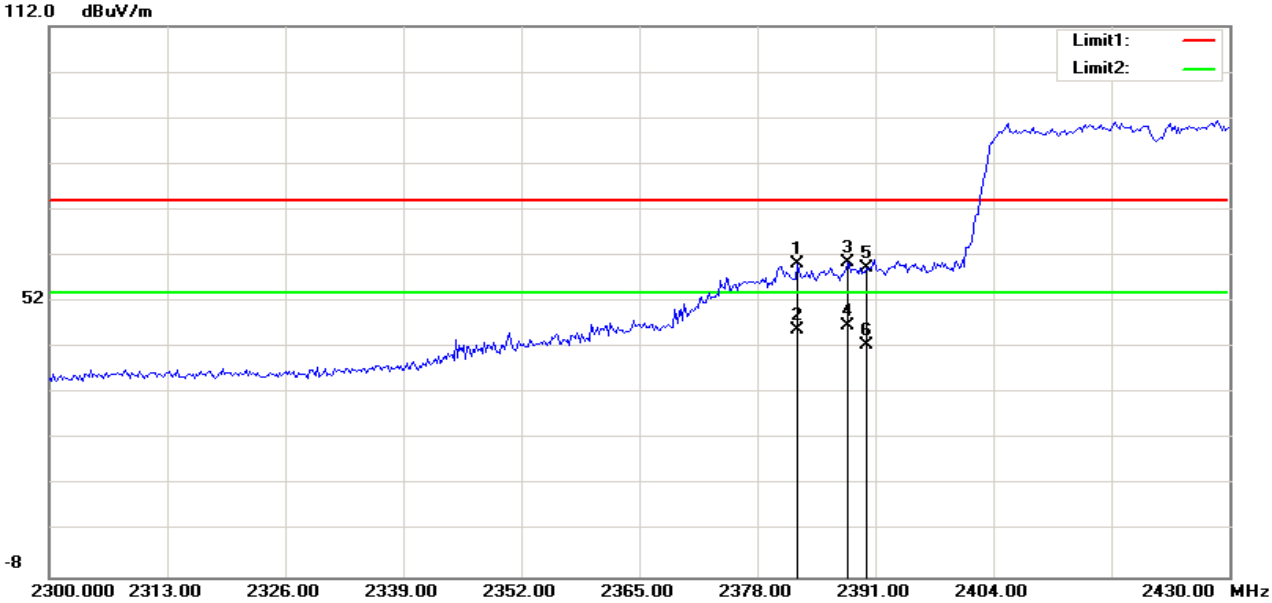
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	67.24	-8.30	58.94	74.00	-15.06	100	308	peak
2	2483.500	51.52	-8.30	43.22	54.00	-10.78	100	308	AVG

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



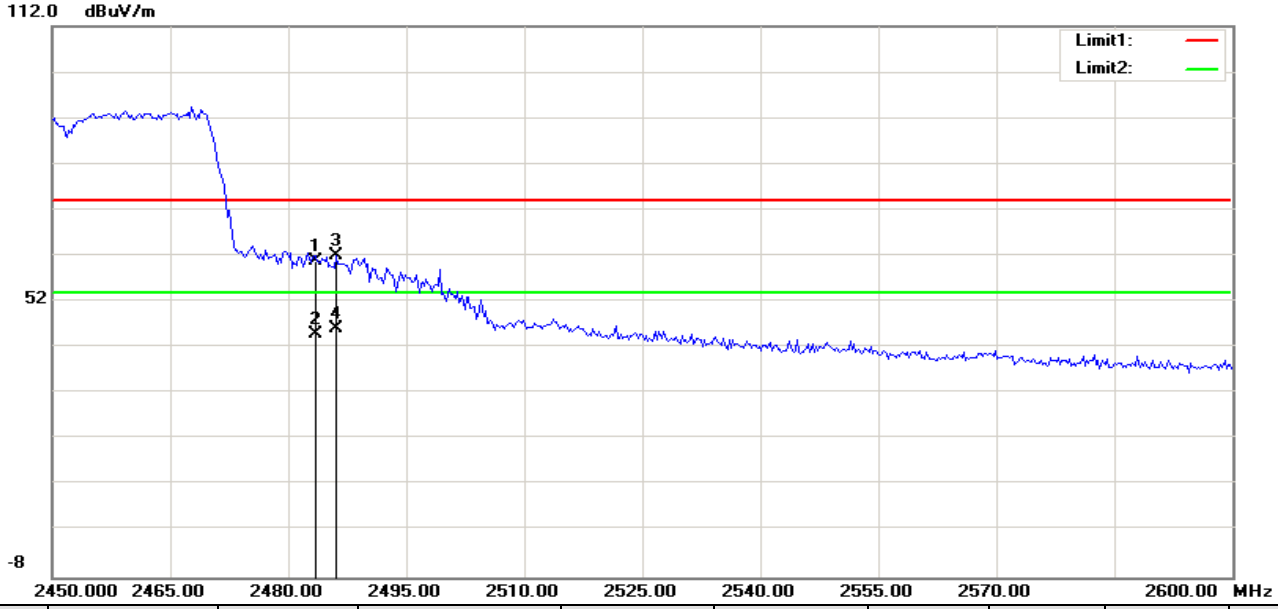
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2388.333	73.12	-8.49	64.63	74.00	-9.37	100	261	peak
2	2388.333	55.04	-8.49	46.55	54.00	-7.45	100	261	AVG
3	2390.000	70.54	-8.49	62.05	74.00	-11.95	100	262	peak
4	2390.000	52.06	-8.49	43.57	54.00	-10.43	100	262	AVG

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



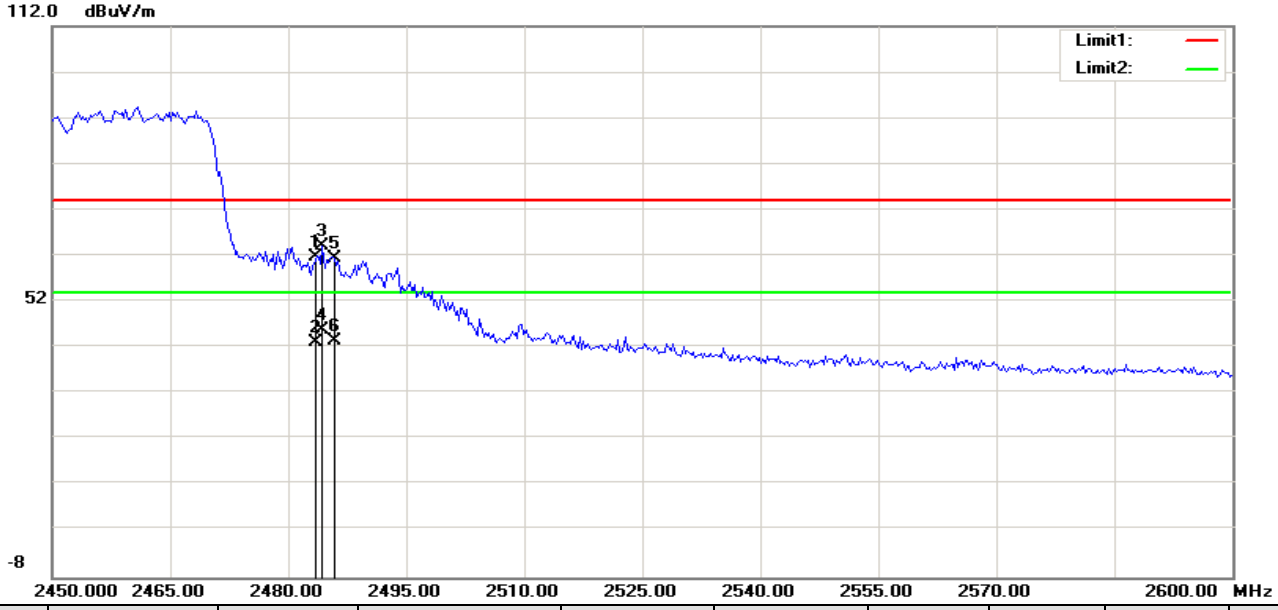
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2382.500	68.63	-8.50	60.13	74.00	-13.87	100	351	peak
	2382.500	54.36	-8.50	45.86	54.00	-8.14	100	351	AVG
2	2387.917	69.09	-8.49	60.60	74.00	-13.40	100	190	peak
	2387.917	55.08	-8.49	46.59	54.00	-7.41	100	190	AVG
3	2390.000	67.87	-8.49	59.38	74.00	-14.62	100	192	peak
	2390.000	51.05	-8.49	42.56	54.00	-11.44	100	192	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 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	69.15	-8.30	60.85	74.00	-13.15	100	264	peak
2	2483.500	53.14	-8.30	44.84	54.00	-9.16	100	264	AVG
3	2486.058	70.22	-8.30	61.92	74.00	-12.08	100	264	peak
4	2486.058	54.50	-8.30	46.20	54.00	-7.80	100	264	AVG

RESTRICTED BANDEDGE (IEEE 802.11n HT40 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	70.16	-8.30	61.86	74.00	-12.14	100	323	peak
2	2483.500	51.51	-8.30	43.21	54.00	-10.79	100	323	AVG
3	2484.375	72.34	-8.30	64.04	74.00	-9.96	100	323	peak
4	2484.375	54.15	-8.30	45.85	54.00	-8.15	100	323	AVG
5	2485.817	69.59	-8.30	61.29	74.00	-12.71	100	323	peak
6	2485.817	51.76	-8.30	43.46	54.00	-10.54	100	323	AVG

Below 30MHz

The interference of the frequency value is lower than the limit below 20 db, measured as the background noise values and will not be recorded.

Below 1GHz

Operation Mode:	Normal Link	**Test Date:**	2016-4-12
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	48% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
32.9100	V	16.32	19.19	35.51	40.00	-4.49	peak
95.9600	V	24.35	9.55	33.90	40.00	-6.10	peak
114.3900	V	22.61	10.30	32.91	40.00	-7.09	peak
197.8100	V	23.48	12.24	35.72	40.00	-4.28	peak
701.2400	V	21.72	21.54	43.26	47.00	-3.74	QP
793.3900	V	23.96	22.78	46.74	47.00	-0.26	QP
31.9400	H	14.55	19.70	34.25	40.00	-5.75	peak
70.7400	H	25.48	8.66	34.14	40.00	-5.86	peak
116.3300	H	23.49	10.35	33.84	40.00	-6.16	peak
149.3100	H	18.57	11.11	29.68	40.00	-10.32	peak
701.2400	H	23.32	21.54	44.86	47.00	-2.14	peak
792.4200	H	20.05	22.77	42.82	47.00	-4.18	peak

Remark:

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

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4786.859	45.52	-3.45	42.07	74.00	-31.93	100	327	peak
2	7756.410	44.07	3.35	47.42	74.00	-26.58	100	76	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4759.615	46.37	-3.51	42.86	74.00	-31.14	100	57	peak
2	7701.923	42.46	3.09	45.55	74.00	-28.45	100	32	peak
N/A									

Operation Mode: TX / IEEE 802.11b / CH Mid **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5113.782	44.98	-2.80	42.18	74.00	-31.82	100	28	peak
2	8110.577	42.64	4.53	47.17	74.00	-26.83	100	125	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4895.833	45.40	-3.19	42.21	74.00	-31.79	100	262	peak
2	7919.872	42.91	4.11	47.02	74.00	-26.98	100	305	peak
N/A									

Operation Mode: TX / IEEE 802.11b / CH High **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5004.808	44.58	-2.94	41.64	74.00	-32.36	100	357	peak
2	7674.680	43.33	2.96	46.29	74.00	-27.71	100	214	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4950.320	44.76	-3.07	41.69	74.00	-32.31	100	184	peak
2	8028.846	43.00	4.50	47.50	74.00	-26.50	100	73	peak
N/A									

Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4677.885	45.55	-3.70	41.85	74.00	-32.15	100	273	peak
2	7756.410	41.92	3.35	45.27	74.00	-28.73	100	38	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4759.615	45.21	-3.51	41.70	74.00	-32.30	100	4	peak
2	7865.385	42.28	3.86	46.14	74.00	-27.86	100	318	peak
N/A									

Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4786.859	45.77	-3.45	42.32	74.00	-31.68	100	280	peak
2	7701.923	43.50	3.09	46.59	74.00	-27.41	100	115	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5059.295	45.60	-2.87	42.73	74.00	-31.27	100	38	peak
2	8355.769	43.28	4.61	47.89	74.00	-26.11	100	123	peak
N/A									

Operation Mode: TX / IEEE 802.11g / CH High **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5032.051	44.21	-2.91	41.30	74.00	-32.70	100	250	peak
2	8056.090	42.11	4.51	46.62	74.00	-27.38	100	64	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4977.564	44.83	-3.00	41.83	74.00	-32.17	100	294	peak
2	8028.846	42.18	4.50	46.68	74.00	-27.32	100	318	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Low **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4868.590	45.27	-3.26	42.01	74.00	-31.99	100	237	peak
2	7674.680	43.16	2.96	46.12	74.00	-27.88	100	270	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4841.346	44.96	-3.32	41.64	74.00	-32.36	100	217	peak
2	7674.680	42.49	2.96	45.45	74.00	-28.55	100	31	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Mid **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4759.615	45.03	-3.51	41.52	74.00	-32.48	100	327	peak
2	8083.333	42.40	4.52	46.92	74.00	-27.08	100	121	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4759.615	46.04	-3.51	42.53	74.00	-31.47	100	171	peak
2	7974.359	42.48	4.37	46.85	74.00	-27.15	100	41	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT20 mode / CH High **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % 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	5059.295	45.20	-2.87	42.33	74.00	-31.67	100	95	peak
2	8083.333	42.96	4.52	47.48	74.00	-26.52	100	9	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5032.051	44.95	-2.91	42.04	74.00	-31.96	100	3	peak
2	8083.333	42.05	4.52	46.57	74.00	-27.43	100	202	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Low **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % 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	4759.615	45.57	-3.51	42.06	74.00	-31.94	100	26	peak
2	7647.436	42.97	2.84	45.81	74.00	-28.19	100	292	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4650.641	45.31	-3.77	41.54	74.00	-32.46	100	144	peak
2	7729.167	42.45	3.22	45.67	74.00	-28.33	100	360	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Mid **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5059.295	44.81	-2.87	41.94	74.00	-32.06	100	224	peak
2	7783.654	43.40	3.48	46.88	74.00	-27.12	100	143	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5032.051	45.11	-2.91	42.20	74.00	-31.80	100	59	peak
2	8301.282	43.45	4.59	48.04	74.00	-25.96	100	334	peak
N/A									

Operation Mode: TX / IEEE 802.11n HT40 mode / CH High **Test Date:** 2016-4-12

Temperature: 24°C **Tested by:** Lily.Wang

Humidity: 48 % RH **Polarity:** Ver. / Hor.

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4759.615	46.17	-3.51	42.66	74.00	-31.34	100	330	peak
2	8056.090	42.86	4.51	47.37	74.00	-26.63	100	332	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5059.295	44.10	-2.87	41.23	74.00	-32.77	100	92	peak
2	8137.820	43.14	4.54	47.68	74.00	-26.32	100	237	peak
N/A									

7.6.POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

** Decreases with the logarithm of the frequency.*

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1.The EUT was placed on a table, 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.

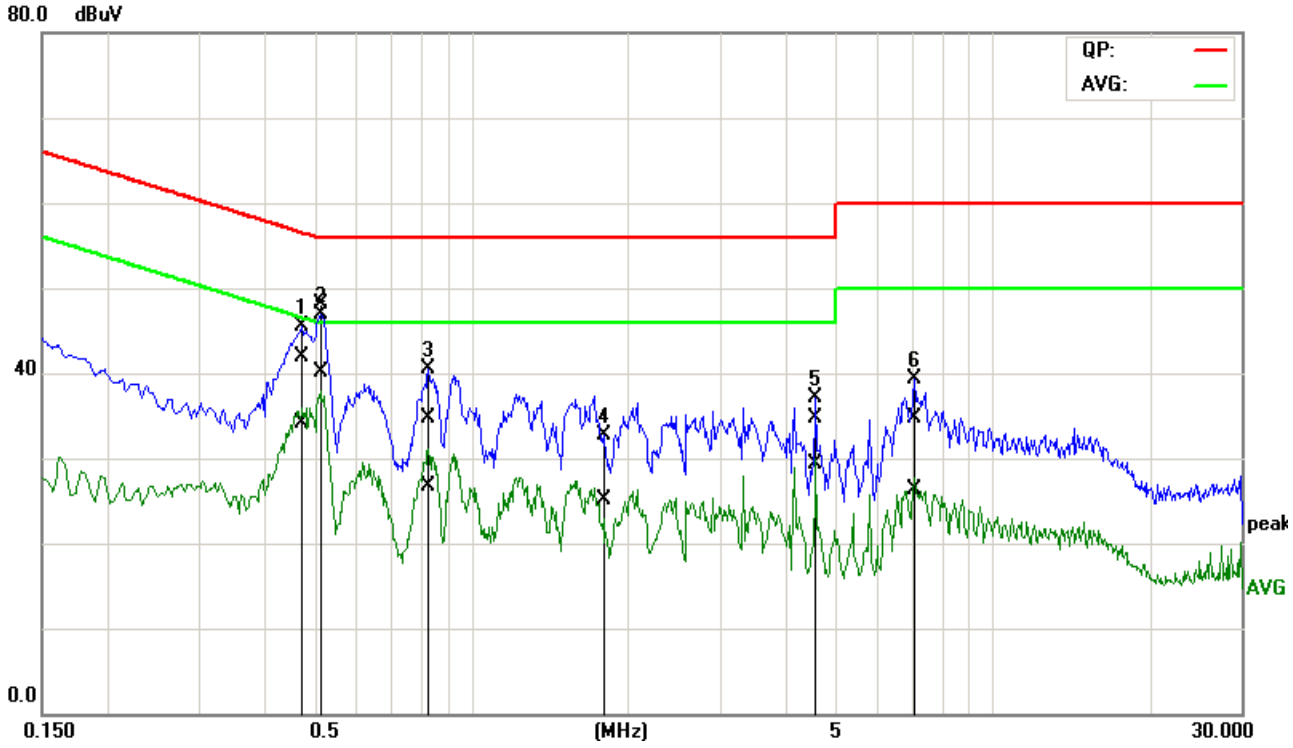
TEST RESULTS

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.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:17:53
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L1

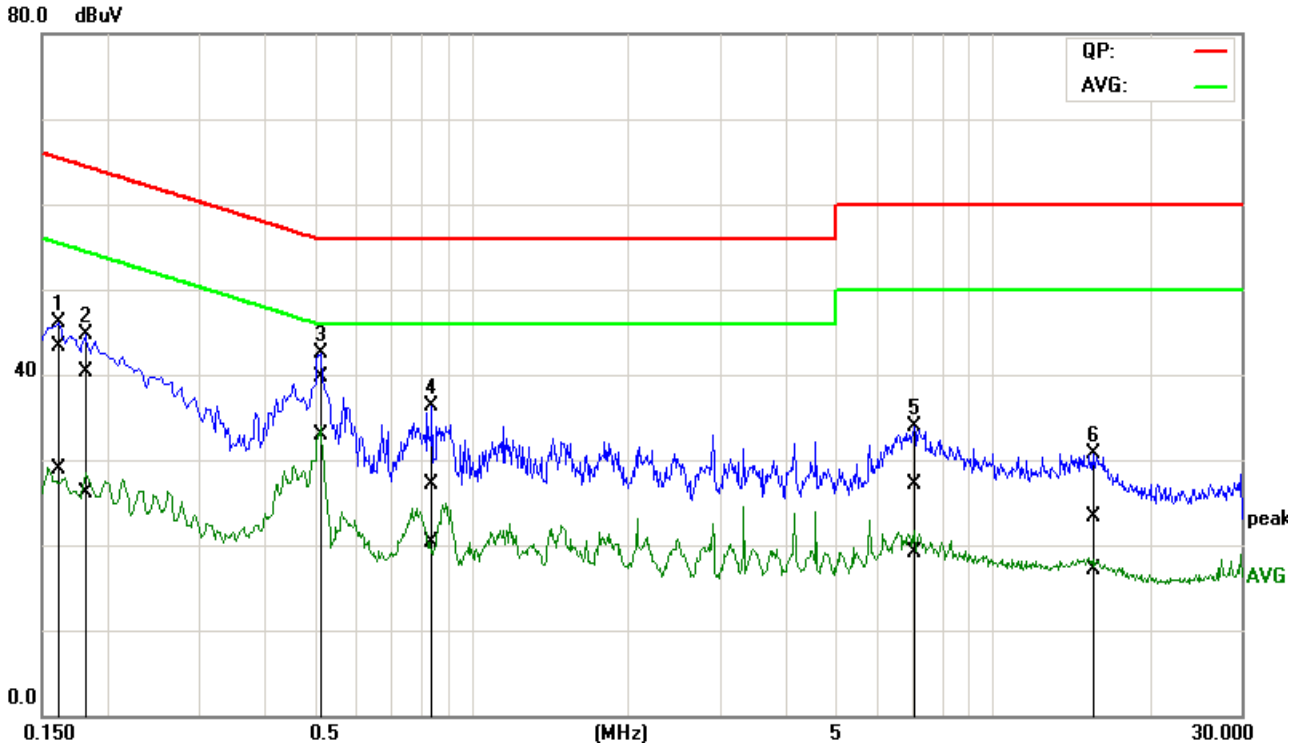


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.4716	22.03	14.24	19.81	41.84	34.05	56.49	46.49	-14.65	-12.44	Pass
2*	0.5112	28.33	20.33	19.81	48.14	40.14	56.00	46.00	-7.86	-5.86	Pass
3	0.8183	14.85	6.84	19.80	34.65	26.64	56.00	46.00	-21.35	-19.36	Pass
4	1.7989	12.84	5.25	19.83	32.67	25.08	56.00	46.00	-23.33	-20.92	Pass
5	4.5777	14.79	9.46	19.92	34.71	29.38	56.00	46.00	-21.29	-16.62	Pass
6	7.0742	14.81	6.34	19.92	34.73	26.26	60.00	50.00	-25.27	-23.74	Pass

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

Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:22:45
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L2

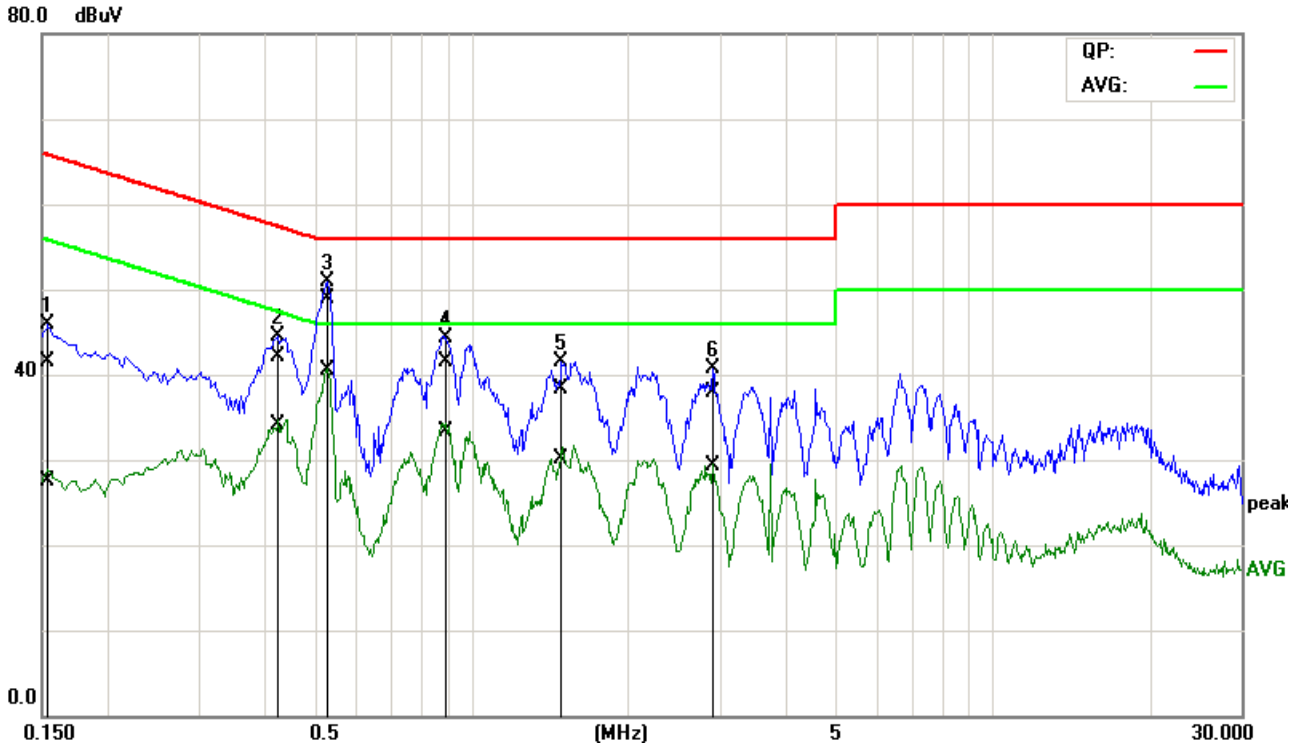


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1598	23.55	9.13	19.74	43.29	28.87	65.47	55.47	-22.18	-26.60	Pass
2	0.1810	20.60	6.28	19.74	40.34	26.02	64.43	54.44	-24.09	-28.42	Pass
3*	0.5148	19.98	13.16	19.75	39.73	32.91	56.00	46.00	-16.27	-13.09	Pass
4	0.8329	7.41	0.52	19.74	27.15	20.26	56.00	46.00	-28.85	-25.74	Pass
5	7.0894	7.15	-0.82	19.89	27.04	19.07	60.00	50.00	-32.96	-30.93	Pass
6	15.5751	2.89	-3.20	20.33	23.22	17.13	60.00	50.00	-36.78	-32.87	Pass

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

Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:28:21
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L1

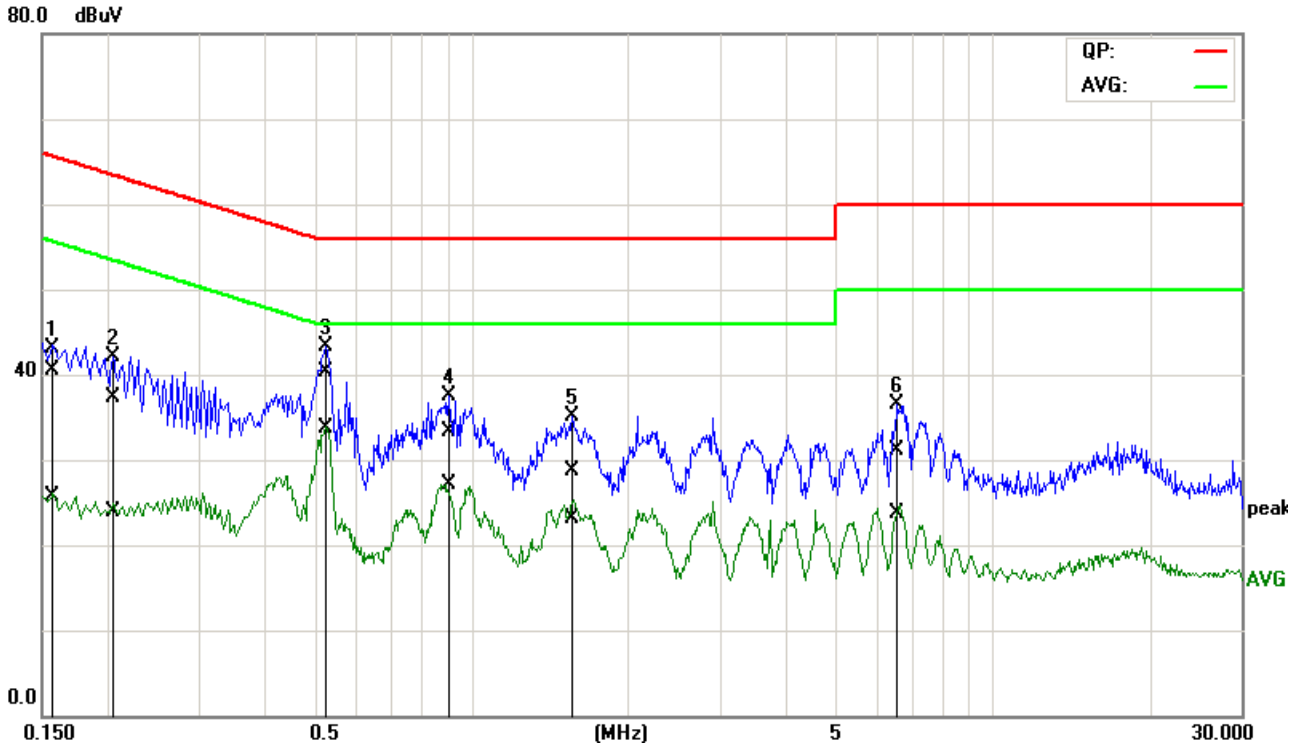


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1522	21.77	7.65	19.79	41.56	27.44	65.87	55.88	-24.31	-28.44	Pass
2	0.4271	22.26	14.37	19.81	42.07	34.18	57.31	47.31	-15.24	-13.13	Pass
3*	0.5276	29.15	20.64	19.81	48.96	40.45	56.00	46.00	-7.04	-5.55	Pass
4	0.8989	21.78	13.49	19.79	41.57	33.28	56.00	46.00	-14.43	-12.72	Pass
5	1.4976	18.43	10.29	19.81	38.24	30.10	56.00	46.00	-17.76	-15.90	Pass
6	2.9113	18.09	9.32	19.89	37.98	29.21	56.00	46.00	-18.02	-16.79	Pass

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

Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:33:33
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L2



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1544	20.77	6.00	19.74	40.51	25.74	65.75	55.76	-25.24	-30.02	Pass
2	0.2034	17.47	4.10	19.74	37.21	23.84	63.47	53.47	-26.26	-29.63	Pass
3*	0.5226	20.60	13.97	19.75	40.35	33.72	56.00	46.00	-15.65	-12.28	Pass
4	0.8916	13.54	7.34	19.74	33.28	27.08	56.00	46.00	-22.72	-18.92	Pass
5	1.5386	8.93	3.42	19.75	28.68	23.17	56.00	46.00	-27.32	-22.83	Pass
6	6.5813	11.28	3.82	19.87	31.15	23.69	60.00	50.00	-28.85	-26.31	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