

Application for FCC Certification
On behalf of

Hisense Broadband Multimedia Technologies Co., Ltd

Product Name: GPON SFU

Model No.: 7259G, 7258G

Brand Name: Hisense, iPHOTONIX, Ligent

FCC ID: R66001

Prepared For :Hisense Broadband Multimedia Technologies Co., Ltd
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Report No. : ACI-F12198
Date of Test : Nov 19, 2012 – Jan 18, 2013
Date of Report : Jan 21, 2013

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TEST REPORT FOR FCC CERTIFICATE

Applicant : Hisense Broadband Multimedia Technologies Co., Ltd
Manufacturer : Hisense Broadband Multimedia Technologies Co., Ltd
EUT Description : GPON SFU
(A) Model No. : 7259G, 7258G
(B) Brand Name : Hisense, iPHOTONIX, Ligent
(C) Test Voltage : AC 120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2012
AND ANSI C63.4-2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

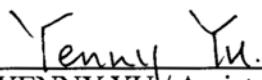
The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested on Nov 19, 2012 – Jan 18, 2013 is technically compliance with the FCC limits.

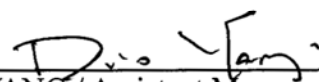
This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

The test results for EUT's other function are contained in No. EM-F1010987, a Declaration of Conformity report.

Date of Test : Nov 19, 2012 – Jan 18, 2013 Date of Report : Jan 21, 2013

Producer : 
YENNY YU/ Assistant

Review : 
DIO YANG/ Assistant Manager

 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : 
Authorized Signature EMC SAMMY CHEN/ Deputy Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.207
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2012 AND ANSI C63.4:2003 AND KDB558074	Pass	15.247(e)

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : GPON SFU

Type of EUT ☐ Production ☒ Pre-product ☐ Pro-type

Model Number : 7259G, 7258G

Brand Name : Hisense, iPHOTONIX, Ligent

Note : The different list between these two models are as follows:

M/N: 7259G	2POTS+4GE+RF+RF Return+WiFi
M/N: 7258G	2POTS+4GE+RF +WiFi

The model 7259G was tested and reported in the report.

Radio Tech : IEEE 802.11b/g/n (2.4GHz)

Freq. Band : 2412MHz ~ 2462MHz (Ch1-Ch11) for 802.11b/g
2412MHz ~ 2462MHz (Ch1-Ch11) for
802.11n 20MHz Band
2422MHz ~ 2452MHz (Ch3-Ch9) for
802.11n 40MHz Band

Tested Freq. : for 802.11b/g/n HT20
2412MHz (Ch1), 2437MHz (Ch6), 2462MHz (Ch11)
for 802.11n HT40
2422MHz (Ch3), 2437MHz (Ch6), 2452MHz (Ch9)

Modulation : DSSS for 802.11b
OFDM for 802.11g/n

Transmit data rate : 802.11b: 1, 2, 5.5, 11 Mbps
802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n HT20:
(MCS0-MCS7) 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps
802.11n HT40:
(MCS0-MCS7) 13.5, 27, 40.5, 54, 81, 108, 121.5, 135 Mbps

After testing, the highest peak output power of the EUT was at 11 Mbps in 802.11b mode, 36 Mbps in 802.11g mode, 58.5 Mbps in 802.11n HT20 mode and 13.5 Mbps in 802.11n HT40 mode.

So data rate mentioned above were representative selected to test in this report.

Antenna Gain : 3.12 dBi (for both ANT1 & ANT2)

AC Adapter : Manufacturer : MOSO
Model Number : MSP-C2000IC 12.0-24W-US
Input : 100-240V~, 50/60Hz 0.8A
Output : 12V $\overline{\text{---}}$ 2.0A
Output Cable : Unshielded, Undetachable, 1.8m

Applicant : Hisense Broadband Multimedia Technologies Co., Ltd.
11 Jiangxi Road, Qingdao Shandong 266071 PR China

Manufacturer : Hisense Broadband Multimedia Technologies Co., Ltd.
11 Jiangxi Road, Qingdao Shandong 266071 PR China

2.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber) : Sept. 17, 1998 file on
Mar 16, 2012 Renewed
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F 34 Bldg 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China

FCC registration Number : 91789

Accredited by NVLAP, Lab Code : 200371-0

2.3 Measurement Uncertainty

Conducted Emission Expanded Uncertainty : U = 3.42 dB

Radiated Emission Expanded Uncertainty (30-200MHz):
U = 4.14dB (Horizontal)
U = 4.28dB (Vertical)

Radiated Emission Expanded Uncertainty (200M-1GHz):
U = 4.18dB (Horizontal)
U = 4.26dB (Vertical)

Radiated Emission Expanded Uncertainty (Above 1GHz):
U= 4.50 dB (Horizontal)
U= 4.16 dB (Vertical)

6 dB Bandwidth Expanded Uncertainty : U = 0.05 kHz

Maximum Peak Output Power Expanded Uncertainty: U = 0.30 dBm

Emission Limitations Expanded Uncertainty : U = 0.15 dB

Band Edge Expanded Uncertainty : U = 0.15 dB

Power Spectral Density Expanded Uncertainty : U = 0.15 dB

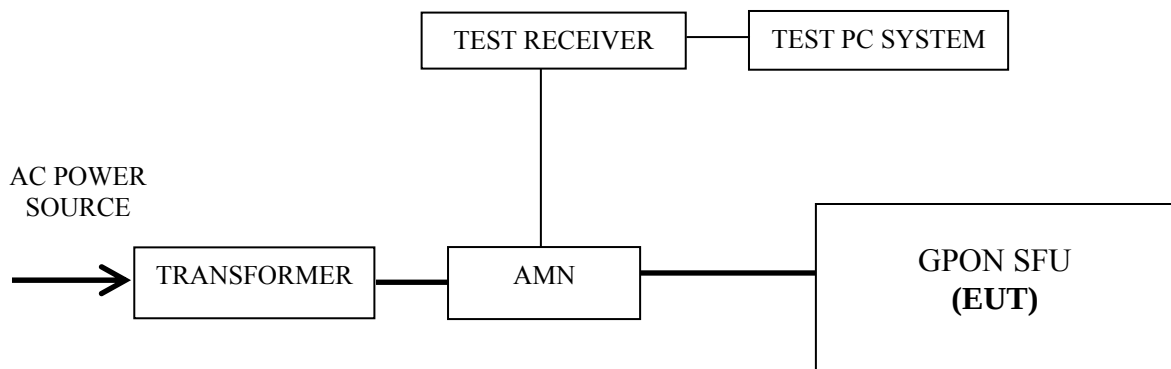
3 CONDUCTED EMISSION TEST

3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	100841	Mar 22, 2012	Mar 22, 2013
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 13, 2012	Feb 13, 2013
3.	50Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2012	Mar 18, 2013
4.	Software	Audix	E3	SET00200 9804M592	--	--

3.2 Block Diagram of Test Setup



— : Signal Line
— : Power Line

3.3 Conducted Emission Limits [FCC Part 15 Subpart C 15.207]

Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56*	56~46*
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE – *Decreases with the logarithm of the frequency.		

3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipments and the EUT.
- 3.5.3 Set the EUT on the test mode (Transmitting), and then test.

3.6 Test Procedures

The EUT was connected to the power mains through an Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (Line & Neutral) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.4:2003 during conducted emission test.

The bandwidth of R&S Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7.

3.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

NOTE 3 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 4 – The worst emission is detected at 15.146 MHz (Quasi-Peak Value) with corrected signal level of 50.11 dB (μV) (limit is 60.00 dB (μV)), when the Neutral of the EUT is connected to AMN.

EUT : GPON SFU Temperature : 18°C

Model No. : 7259G Humidity : 47%RH

Test Mode : Transmitting Date of Test : Nov 19, 2012

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Line	0.17584	41.29	0.24	41.53	64.68	23.15	QP
	0.50469	37.11	0.35	37.46	56.00	18.54	
	1.908	36.61	0.39	37.00	56.00	19.00	
	4.027	39.14	0.49	39.63	56.00	16.37	
	8.323	42.79	0.69	43.48	60.00	16.52	
	15.146	47.32	0.84	48.16	60.00	11.84	
	0.17584	30.20	0.24	30.44	54.68	24.24	AV
	0.50469	25.60	0.35	25.95	46.00	20.05	
	1.908	25.30	0.39	25.69	46.00	20.31	
	4.027	25.63	0.49	26.12	46.00	19.88	
	8.323	30.23	0.69	30.92	50.00	19.08	
	15.146	35.60	0.84	36.44	50.00	13.56	
Neutral	0.17584	42.41	0.12	42.53	64.68	22.15	QP
	0.50469	38.36	0.17	38.53	56.00	17.47	
	1.645	35.90	0.17	36.07	56.00	19.93	
	3.985	40.63	0.39	41.02	56.00	14.98	
	8.323	45.20	0.55	45.75	60.00	14.25	
	15.146	49.38	0.73	50.11	60.00	9.89	
	0.17584	32.60	0.12	32.72	54.68	21.96	AV
	0.50469	25.70	0.17	25.87	46.00	20.13	
	1.645	25.60	0.17	25.77	46.00	20.23	
	3.985	30.23	0.39	30.62	46.00	15.38	
	8.323	34.60	0.55	35.15	50.00	14.85	
	15.146	37.69	0.73	38.42	50.00	11.58	

TEST ENGINEER: JOE YE

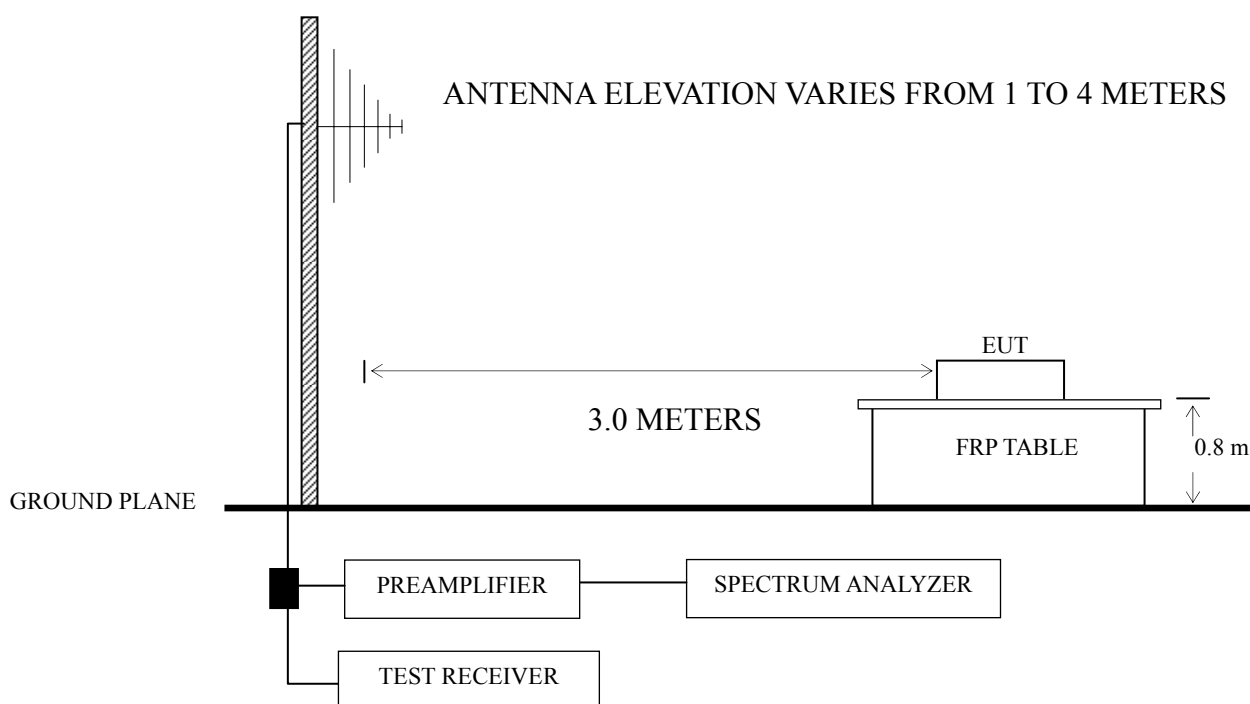
4 RADIATED EMISSION TEST

4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A10548	Sep 18, 2012	Mar 18, 2013
2.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2012	Apr 29, 2013
3.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Dec 17, 2012	Dec 17, 2013
4.	Test Receiver	R&S	ESCI	101302	Sep 11, 2012	Sep 11, 2013
5.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2012	May 03, 2013
6.	Horn Antenna	EMCO	3115	9607-4878	May 03, 2012	May 03, 2013
7.	Horn Antenna	EMCO	3116	00062643	Jul 21, 2012	Jul 21, 2013
8.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2012	Mar 18, 2013
9.	Software	Audix	E3	SET00200 9912M295-2	-	-

4.2 Block Diagram of Test Setup



■ : 50 ohm Coaxial Switch

4.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	
		(μV/m)	dB(μV/m)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
NOTE 1 - Emission Level dB (μV/m) = 20 log Emission Level (μV/m) NOTE 2 - The tighter limit applies at the band edges. NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system. NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz. NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT			

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.3.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 3.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable that is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent E7405A.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

The EUT was tested under the following test modes:

Mode	Operation	Channel
1.	Transmitting	Low
2.		High
3.	Receiving	--
4.	Transmitting	Low
5.	Band-Edge	High

All the test results are listed in Sec.4.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

No.	Operation	Modulation	Channel	Frequency	Data Page
1.	Transmitting	802.11b	01	2412 MHz	P15
2.			11	2462 MHz	P16
3.		802.11g	01	2412 MHz	P17
4.			11	2462 MHz	P18
5.		802.11n HT20	01	2412 MHz	P19
6.			11	2462 MHz	P20
7.		802.11n HT40	03	2422 MHz	P21
8.			09	2452 MHz	P22
9.	Receiving	--	--	--	P23
10.	Transmitting	Cabinet Emission			P24
11.	Transmitting ANT1	802.11b	01	2412 MHz	P26
12.			11	2462 MHz	P27
13.		802.11g	01	2412 MHz	P28
14.			11	2462 MHz	P29
15.		802.11n HT20	01	2412 MHz	P30
16.			11	2462 MHz	P31
17.		802.11n HT40	03	2422 MHz	P32
18.			09	2452 MHz	P33
19.	Transmitting ANT2	802.11b	01	2412 MHz	P34
20.			11	2462 MHz	P35
21.		802.11g	01	2412 MHz	P36
22.			11	2462 MHz	P37
23.		802.11n HT20	01	2412 MHz	P38
24.			11	2462 MHz	P39
25.		802.11n HT40	03	2422 MHz	P40
26.			09	2452 MHz	P41
27.	Transmitting ANT1+ANT2	802.11n	--	--	P42

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)

NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor (>1GHz)

NOTE 3 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11b Transmitting Ch01 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	3.24	17.65	0.67	--	21.56	40.00	18.44	QP
	167.74	14.04	8.40	1.76	--	24.20	43.50	19.30	
	349.13	16.22	14.80	2.62	--	33.64	46.00	12.36	
	502.39	16.89	18.17	2.98	--	38.04	46.00	7.96	
	531.49	16.58	18.40	3.05	--	38.03	46.00	7.97	
	751.68	20.04	18.73	3.58	--	42.35	46.00	3.65	
	1333.00	52.79	25.11	5.47	37.39	45.98	74.00	28.02	PK
	1666.00	53.69	27.49	5.89	36.56	50.51	74.00	23.49	
	5527.00	43.61	33.47	8.68	34.74	51.02	74.00	22.98	
	6076.00	44.72	32.65	9.14	34.60	51.91	74.00	22.09	
Vertical	38.73	18.68	13.30	0.76	--	25.77	43.50	17.73	QP
	116.33	12.77	11.54	1.46	--	27.91	43.50	15.59	
	167.74	17.75	8.40	1.76	--	35.29	46.00	10.71	
	502.39	14.14	18.17	2.98	--	38.46	46.00	7.54	
	751.68	16.15	18.73	3.58	--	34.58	46.00	11.42	
	798.24	11.54	19.43	3.61	--	25.77	43.50	17.73	
	1342.00	55.01	25.15	5.47	37.37	48.26	74.00	25.74	PK
	1765.00	53.90	28.75	6.11	36.40	52.36	74.00	21.64	
	5590.00	42.90	33.36	8.68	34.72	50.22	74.00	23.78	
	6004.00	44.10	32.60	9.04	34.60	51.14	74.00	22.86	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11b Transmitting Ch11 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	3.98	17.65	0.67	--	22.30	40.00	17.70	QP
	167.74	13.85	8.40	1.76	--	24.01	43.50	19.49	
	295.78	16.99	12.58	2.52	--	32.09	46.00	13.91	
	502.39	16.75	18.17	2.98	--	37.90	46.00	8.10	
	751.68	19.71	18.73	3.58	--	42.02	46.00	3.98	
	931.13	11.28	19.10	4.63	--	35.01	46.00	10.99	
	1666.00	50.69	27.49	5.89	36.56	47.51	74.00	26.49	PK
	1999.00	52.78	31.00	6.20	36.10	53.88	74.00	20.12	
	4195.00	41.52	32.39	8.66	35.32	47.25	74.00	26.75	
	6076.00	41.72	32.65	9.14	34.60	48.91	74.00	25.09	
Vertical	38.73	18.63	13.30	0.76	--	32.69	40.00	7.31	QP
	167.74	17.71	8.40	1.76	--	27.87	43.50	15.63	
	295.78	16.99	12.58	2.52	--	32.09	46.00	13.91	
	489.78	17.66	17.60	2.96	--	38.22	46.00	7.78	
	502.39	16.75	18.17	2.98	--	37.90	46.00	8.10	
	751.68	19.71	18.73	3.58	--	42.02	46.00	3.98	
	1342.00	52.01	25.15	5.47	37.37	45.26	74.00	28.74	PK
	1765.00	50.90	28.75	6.11	36.40	49.36	74.00	24.64	
	4816.00	45.68	30.36	9.07	35.05	50.06	74.00	23.94	
	6004.00	41.10	32.60	9.04	34.60	48.14	74.00	25.86	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18°C

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11g Transmitting Ch01 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	3.72	17.65	0.67	--	22.04	40.00	17.96	QP
	167.74	13.87	8.40	1.76	--	24.03	43.50	19.47	
	339.43	16.06	14.80	2.61	--	33.47	46.00	12.53	
	470.38	23.12	17.60	2.90	--	43.62	46.00	2.38	
	751.68	19.97	18.73	3.58	--	42.28	46.00	3.72	
	900.09	11.30	19.30	4.55	--	35.15	46.00	10.85	
	1207.00	56.11	24.56	5.15	37.72	48.10	74.00	25.90	PK
	1801.00	53.08	29.17	6.15	36.34	52.06	74.00	21.94	
	4824.00	54.23	30.03	9.07	35.05	58.28	74.00	15.72	
	7236.00	51.58	35.05	10.63	34.53	62.73	74.00	11.27	
	4824.00	40.23	30.03	9.07	35.05	44.28	54.00	9.72	AV
	7236.00	39.73	35.05	10.63	34.53	50.88	54.00	3.12	
Vertical	38.73	18.14	13.30	0.76	--	32.20	40.00	7.80	QP
	121.18	12.87	11.42	1.48	--	25.77	43.50	17.73	
	167.74	17.78	8.40	1.76	--	27.94	43.50	15.56	
	252.13	29.16	12.17	2.22	--	43.55	46.00	2.45	
	502.39	13.99	18.17	2.98	--	35.14	46.00	10.86	
	751.68	16.01	18.73	3.58	--	38.32	46.00	7.68	
	1999.00	52.78	31.00	6.20	36.10	53.88	74.00	20.12	PK
	3547.00	42.03	30.99	8.24	35.49	45.77	74.00	28.23	
	4195.00	41.52	32.39	8.66	35.32	47.25	74.00	26.75	
	6076.00	41.72	32.65	9.14	34.60	48.91	74.00	25.09	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11g Transmitting Ch11 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	4.32	17.65	0.67	--	22.64	40.00	17.36	QP
	167.74	13.80	8.40	1.76	--	23.96	43.50	19.54	
	390.84	14.55	15.40	2.68	--	32.63	46.00	13.37	
	502.39	17.12	18.17	2.98	--	38.27	46.00	7.73	
	531.49	15.02	18.40	3.05	--	36.47	46.00	9.53	
	751.68	20.27	18.73	3.58	--	42.58	46.00	3.42	
	1342.00	53.01	25.15	5.47	37.37	46.26	74.00	27.74	PK
	1765.00	51.90	28.75	6.11	36.40	50.36	74.00	23.64	
	4816.00	46.68	30.36	9.07	35.05	51.06	74.00	22.94	
	6004.00	42.10	32.60	9.04	34.60	49.14	74.00	24.86	
Vertical	36.79	15.71	14.92	0.74	--	31.37	40.00	8.63	QP
	116.33	12.54	11.54	1.46	--	25.54	43.50	17.96	
	167.74	16.55	8.40	1.76	--	26.71	43.50	16.79	
	252.13	29.11	12.17	2.22	--	43.50	46.00	2.50	
	502.39	11.56	18.17	2.98	--	32.71	46.00	13.29	
	751.68	13.65	18.73	3.58	--	35.96	46.00	10.04	
	1999.00	51.78	31.00	6.20	36.10	52.88	74.00	21.12	PK
	3403.00	40.07	30.51	8.00	35.53	43.05	74.00	30.95	
	4195.00	40.52	32.39	8.66	35.32	46.25	74.00	27.75	
	6076.00	40.72	32.65	9.14	34.60	47.91	74.00	26.09	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11n HT20
Transmitting Ch01 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	128.94	11.39	11.82	1.53	--	24.74	43.50	18.76	QP
	167.74	16.04	8.40	1.76	--	26.20	43.50	17.30	
	349.13	14.22	14.80	2.62	--	31.64	46.00	14.36	
	502.39	18.89	18.17	2.98	--	40.04	46.00	5.96	
	531.49	18.58	18.40	3.05	--	40.03	46.00	5.97	
	751.68	18.04	18.73	3.58	--	40.35	46.00	5.65	
	1099.00	43.49	24.09	4.99	37.98	34.59	74.00	39.41	PK
	1594.00	45.95	26.60	5.66	36.70	41.51	74.00	32.49	
	3664.00	41.06	31.44	8.29	35.47	45.32	74.00	28.68	
	4816.00	44.68	30.36	9.07	35.05	49.06	74.00	24.94	
Vertical	38.73	19.68	13.30	0.76	--	33.74	40.00	6.26	QP
	61.04	20.09	4.70	0.89	--	25.68	40.00	14.32	
	116.33	11.77	11.54	1.46	--	24.77	43.50	18.73	
	252.13	25.53	12.17	2.22	--	39.92	46.00	6.08	
	502.39	11.14	18.17	2.98	--	32.29	46.00	13.71	
	751.68	14.15	18.73	3.58	--	36.46	46.00	9.54	
	1333.00	48.79	25.11	5.47	37.39	41.98	74.00	32.02	PK
	1666.00	49.69	27.49	5.89	36.56	46.51	74.00	27.49	
	4564.00	40.44	31.60	8.88	35.16	45.76	74.00	28.24	
	5527.00	39.61	33.47	8.68	34.74	47.02	74.00	26.98	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11n HT20
Transmitting Ch11 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	252.13	28.69	12.17	2.22	--	43.08	46.00	2.92	QP
	295.78	15.99	12.58	2.52	--	31.09	46.00	14.91	
	378.23	13.34	15.07	2.66	--	31.07	46.00	14.93	
	502.39	15.75	18.17	2.98	--	36.90	46.00	9.10	
	751.68	18.71	18.73	3.58	--	41.02	46.00	4.98	
	931.13	10.28	19.10	4.63	--	34.01	46.00	11.99	
	1342.00	52.01	25.15	5.47	37.37	45.26	74.00	28.74	PK
	1765.00	50.90	28.75	6.11	36.40	49.36	74.00	24.64	
	4816.00	45.68	30.36	9.07	35.05	50.06	74.00	23.94	
	6004.00	41.10	32.60	9.04	34.60	48.14	74.00	25.86	
Vertical	38.73	16.63	13.30	0.76	--	30.69	40.00	9.31	QP
	61.04	18.56	4.70	0.89	--	24.15	40.00	15.85	
	116.33	10.82	11.54	1.46	--	23.82	43.50	19.68	
	252.13	28.69	12.17	2.22	--	43.08	46.00	2.92	
	489.78	14.66	17.60	2.96	--	35.22	46.00	10.78	
	751.68	17.71	18.73	3.58	--	40.02	46.00	5.98	
	1999.00	50.78	31.00	6.20	36.10	51.88	74.00	22.12	PK
	4006.00	38.45	32.70	8.47	35.39	44.23	74.00	29.77	
	4195.00	39.52	32.39	8.66	35.32	45.25	74.00	28.75	
	6355.00	39.42	32.89	9.45	34.58	47.18	74.00	26.82	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11n HT40
Transmitting Ch03 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	2.72	17.65	0.67	--	21.04	40.00	18.96	QP
	167.74	12.87	8.40	1.76	--	23.03	43.50	20.47	
	252.13	27.36	12.17	2.22	--	41.75	46.00	4.25	
	339.43	10.06	14.80	2.61	--	27.47	46.00	18.53	
	470.38	16.12	17.60	2.90	--	36.62	46.00	9.38	
	751.68	17.97	18.73	3.58	--	40.28	46.00	5.72	
	1342.00	50.01	25.15	5.47	37.37	43.26	74.00	30.74	PK
	1765.00	48.90	28.75	6.11	36.40	47.36	74.00	26.64	
	3988.00	37.98	32.66	8.47	35.40	43.71	74.00	30.29	
	4816.00	43.68	30.36	9.07	35.05	48.06	74.00	25.94	
Vertical	38.73	15.14	13.30	0.76	--	29.20	40.00	10.80	QP
	167.74	14.78	8.40	1.76	--	24.94	43.50	18.56	
	252.13	26.16	12.17	2.22	--	40.55	46.00	5.45	
	502.39	10.99	18.17	2.98	--	32.14	46.00	13.86	
	751.68	13.01	18.73	3.58	--	35.32	46.00	10.68	
	877.78	5.18	19.77	4.32	--	29.27	46.00	16.73	
	2089.00	41.11	30.52	6.26	36.07	41.82	74.00	32.18	PK
	3241.00	38.89	29.89	7.66	35.58	40.86	74.00	33.14	
	3943.00	39.44	32.52	8.44	35.41	44.99	74.00	29.01	
	5527.00	39.61	33.47	8.68	34.74	47.02	74.00	26.98	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18℃

Model No. : 7259G Humidity : 47%RH

Test Mode : 802.11n HT40
Transmitting Ch09 Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.00	9.89	18.80	0.65	--	29.34	40.00	10.66	QP
	128.94	12.95	11.82	1.53	--	26.30	43.50	17.20	
	252.13	28.33	12.17	2.22	--	42.72	46.00	3.28	
	332.64	9.58	14.53	2.60	--	26.71	46.00	19.29	
	502.39	15.12	18.17	2.98	--	36.27	46.00	9.73	
	751.68	18.27	18.73	3.58	--	40.58	46.00	5.42	
	1765.00	49.90	28.75	6.11	36.40	48.36	74.00	25.64	PK
	2665.00	43.33	28.50	6.68	35.83	42.68	74.00	31.32	
	4816.00	44.68	30.36	9.07	35.05	49.06	74.00	24.94	
	6517.00	43.37	33.05	9.66	34.57	51.51	74.00	22.49	
Vertical	36.79	12.71	14.92	0.74	--	28.37	40.00	11.63	QP
	109.54	8.69	11.84	1.40	--	21.93	43.50	21.57	
	122.15	7.17	11.44	1.49	--	20.10	43.50	23.40	
	167.74	13.55	8.40	1.76	--	23.71	43.50	19.79	
	252.13	26.11	12.17	2.22	--	40.50	46.00	5.50	
	502.39	8.56	18.17	2.98	--	29.71	46.00	16.29	
	1099.00	45.54	24.09	4.99	37.98	36.64	74.00	37.36	PK
	1666.00	48.69	27.49	5.89	36.56	45.51	74.00	28.49	
	4195.00	39.52	32.39	8.66	35.32	45.25	74.00	28.75	
	6076.00	39.72	32.65	9.14	34.60	46.91	74.00	27.09	

TEST ENGINEER: RAVEN JIN

EUT : GPON SFU Temperature : 18°C

Model No. : 7259G Humidity : 47%RH

Test Mode : Receiving Date of Test : Nov 19, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	31.94	8.52	16.50	0.68	--	25.70	40.00	14.30	QP
	60.07	16.85	4.70	0.89	--	22.44	40.00	17.56	
	116.33	13.51	11.54	1.46	--	26.51	43.50	16.99	
	252.13	27.36	12.17	2.22	--	41.75	46.00	4.25	
	470.38	21.12	17.60	2.90	--	41.62	46.00	4.38	
	751.68	18.97	18.73	3.58	--	41.28	46.00	4.72	
	2665.00	43.33	28.50	6.68	35.83	42.68	74.00	31.32	PK
	3664.00	41.06	31.44	8.29	35.47	45.32	74.00	28.68	
Vertical	4816.00	44.68	30.36	9.07	35.05	49.06	74.00	24.94	QP
	38.73	15.14	13.30	0.76	--	29.20	40.00	10.80	
	58.13	15.41	5.58	0.88	--	21.87	40.00	18.13	
	167.74	14.78	8.40	1.76	--	24.94	43.50	18.56	
	252.13	26.16	12.17	2.22	--	40.55	46.00	5.45	
	501.42	8.65	18.17	2.98	--	29.80	46.00	16.20	
	751.68	13.01	18.73	3.58	--	35.32	46.00	10.68	
	1666.00	49.69	27.49	5.89	36.56	46.51	74.00	27.49	PK
	1999.00	51.78	31.00	6.20	36.10	52.88	74.00	21.12	
	4006.00	39.45	32.70	8.47	35.39	45.23	74.00	28.77	

TEST ENGINEER: RAVEN JIN

Band edge using conducted measurement:

According to the KDB 558074 D01 DTS Meas Guidance v02 10.2.2, antenna-port conducted measurements is also be permitted as an alternative to radiated measurements in the restricted frequency bands.

The transmitter output was connected to the Test Receiver. The EUT was set to transmit continuously ($\geq 98\%$ duty cycle).

The test procedure is defined in KDB558074 v02:2012

(10.2.3.3 Average Power Measurement Procedure was used for average measurement & the 10.2.3.2 Peak Power Measurement Procedure was used for peak measurement):

As for the “10.2.3.3 Average Power Measurement Procedure”, **the 8.2.2 Option 2 was used.**

Note1 – The additional radiated test was performed to prove that the cabinet emissions (transmit antenna be replaced with a termination) also meets the requirement which according to 10.2.2.3 Radiated Spurious Emissions Measurement.

Cabinet Emission (Radiated with antenna terminated):

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	2390.00	51.34	28.80	6.42	35.95	51.02	74.00	22.98	PK
	2483.50	51.67	28.36	6.45	35.91	50.57	74.00	23.43	
	2390.00	39.32	28.80	6.42	35.95	38.59	54.00	15.41	AV
	2483.50	39.12	28.36	6.45	35.91	38.02	54.00	15.98	
Vertical	2390.00	51.36	28.80	6.42	35.95	50.63	74.00	23.37	PK
	2483.50	51.34	28.36	6.45	35.91	50.24	74.00	23.76	
	2390.00	38.23	28.80	6.42	35.95	37.50	54.00	16.50	AV
	2483.50	38.22	28.36	6.45	35.91	37.12	54.00	16.88	

Note2 – The antenna gain (3.12dBi) and cable loss (1dB) were set as offset (4.12dB) in the spectrum.

(According to KDB558074 v02:2012 Sec. 10.2.2.2, when determining the EIRP from the measured conducted power, the upper bound on antenna gain for a device with a signal RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater.)

Note3 – The sweep time of AV measurement should be $\geq 10 \times$ (number of measurement points in sweep) $\times$ (maximum data rate per stream) according to KDB558074 v02:2012 Sec. 8.2.2.

We use 100ms as the sweep time ($> 10 \times 501\text{points} \times 58.5\text{Mbps/s}$).

Note4 – $\text{EIRP} = E + 20\log(d) - 104.8$

Where: EIRP = the equivalent isotropic radiated power in dBm,

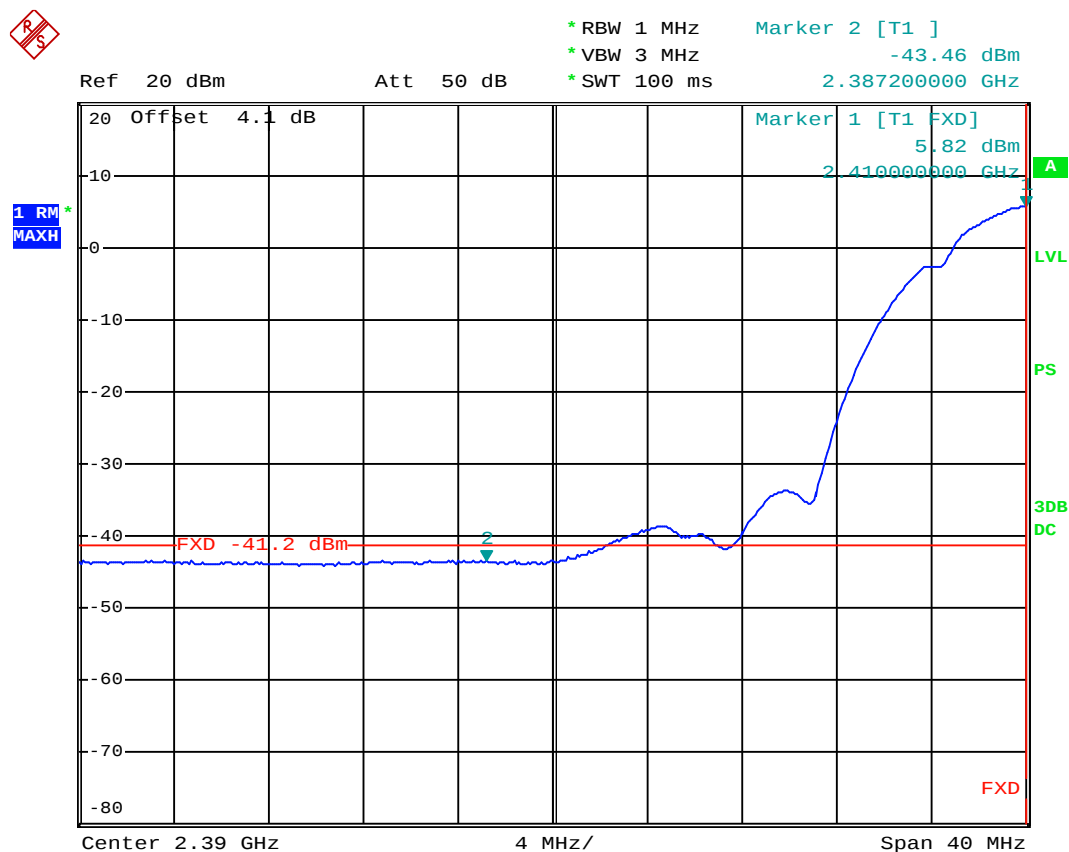
E = electric field strength in $\text{dB}\mu\text{V/m}$,

d = measurement distance in meters.

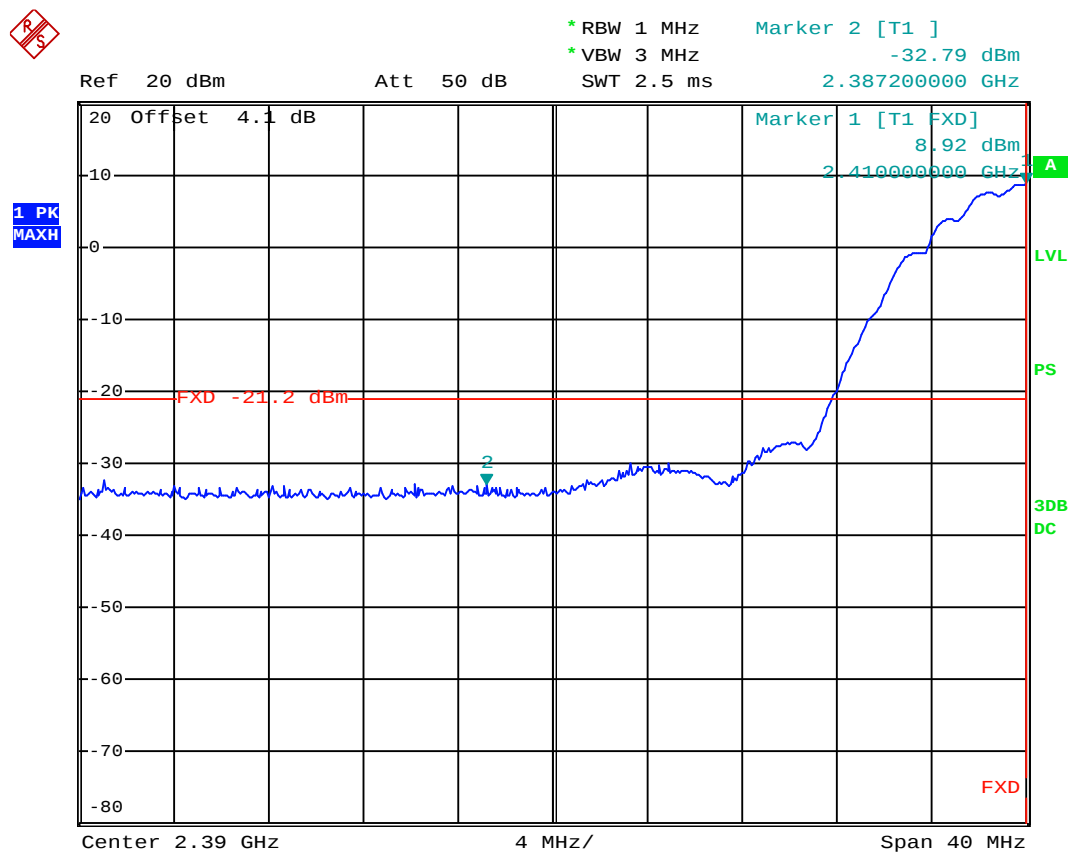
The Average Power limit = -41.2 dBm

The Peak Power limit = -21.2 dBm

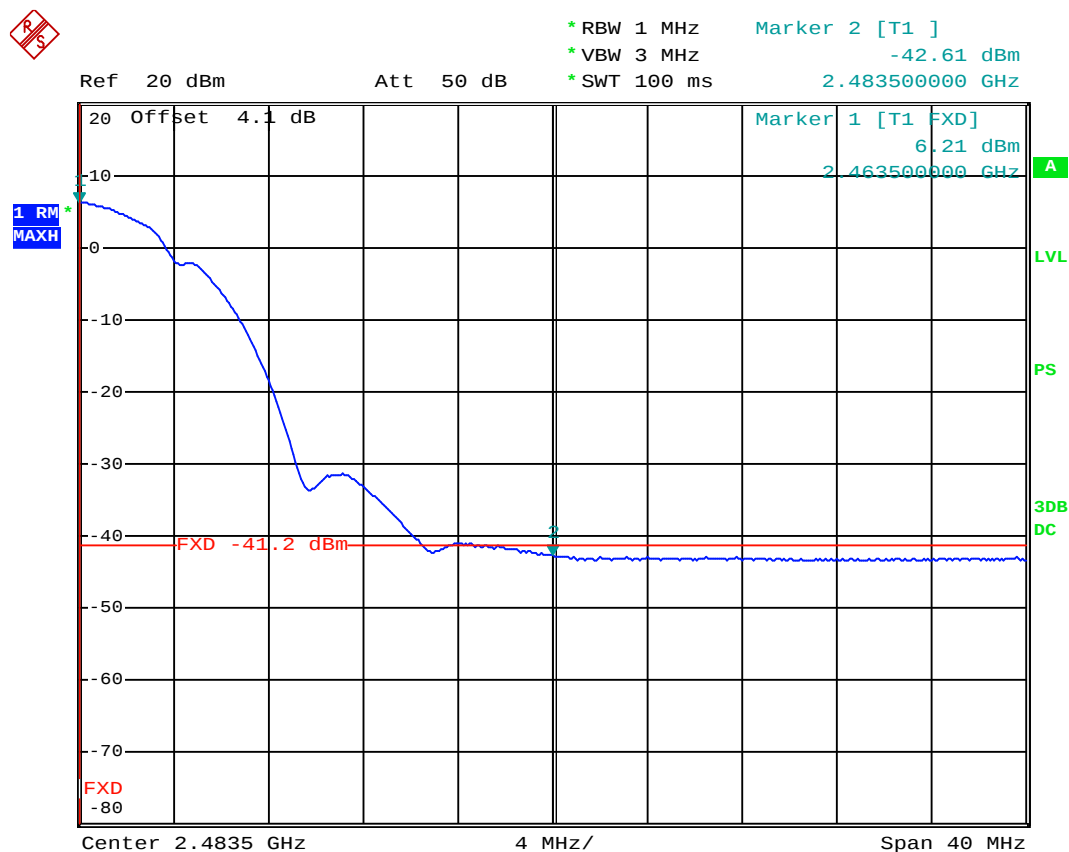
AV Result on 802.11b Ch 01 ANT1



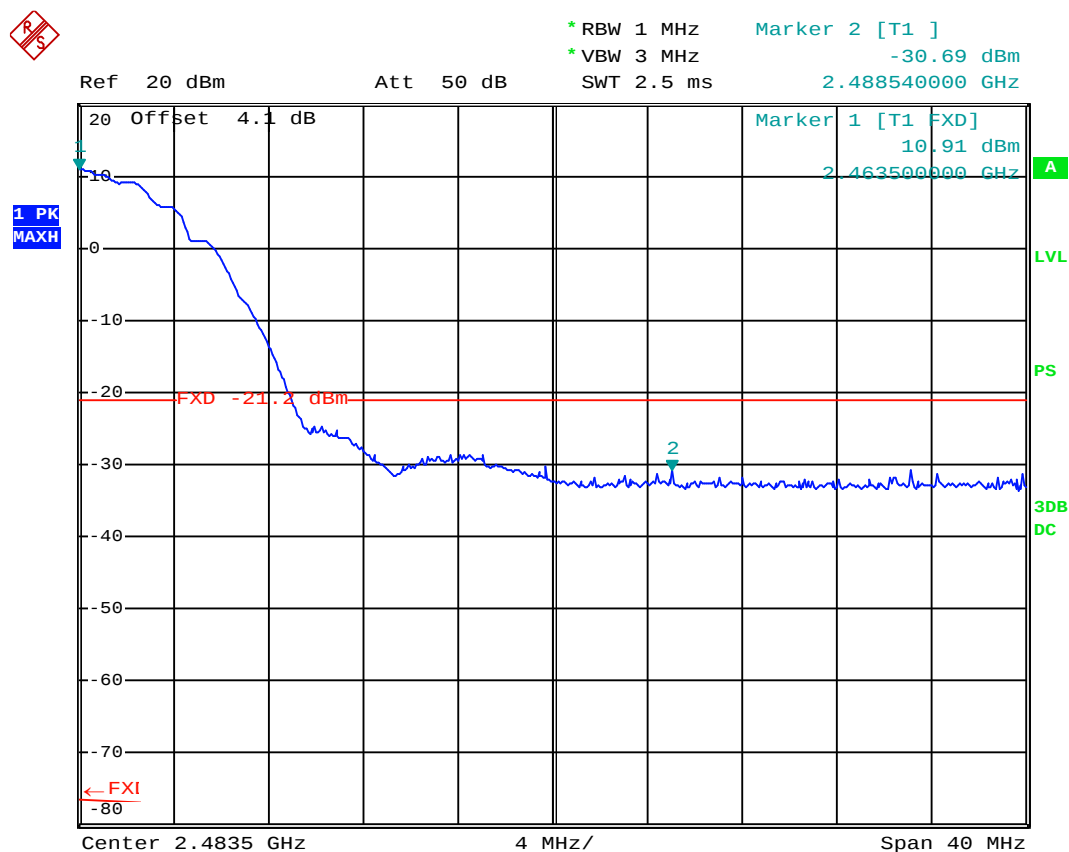
PK Result on 802.11b Ch 01 ANT1



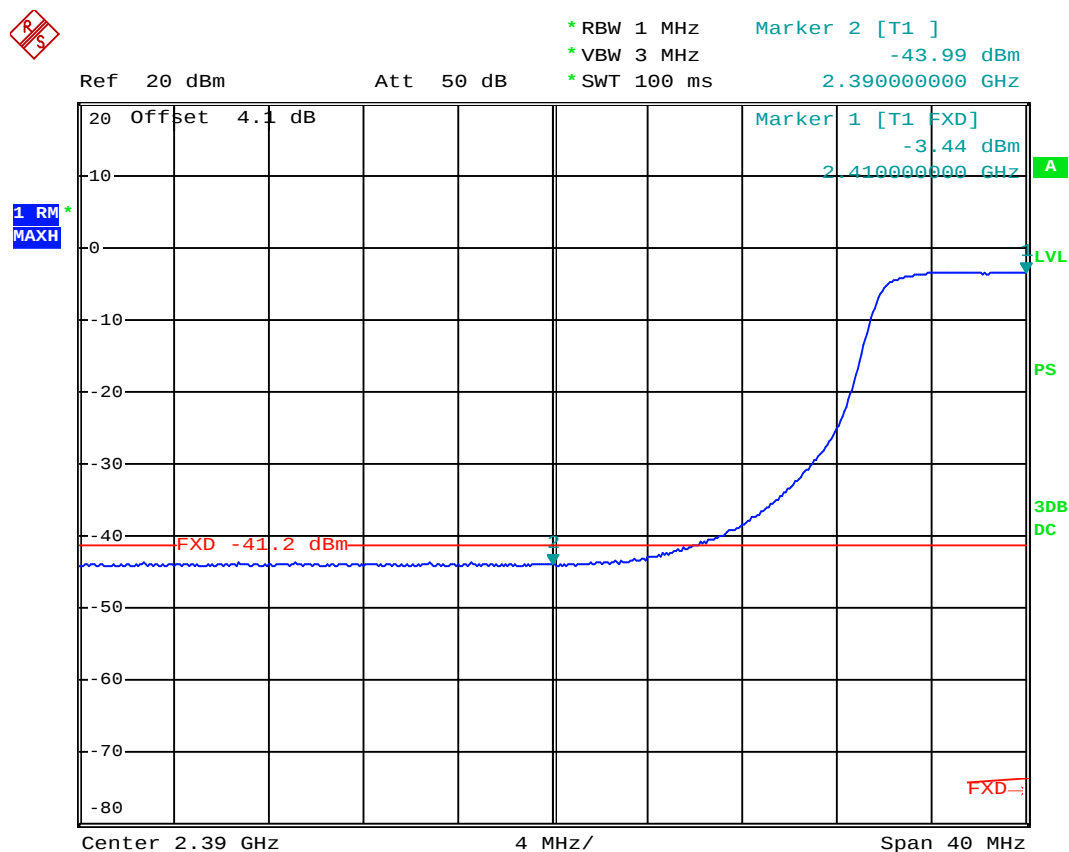
AV Result on 802.11b Ch 11 ANT1



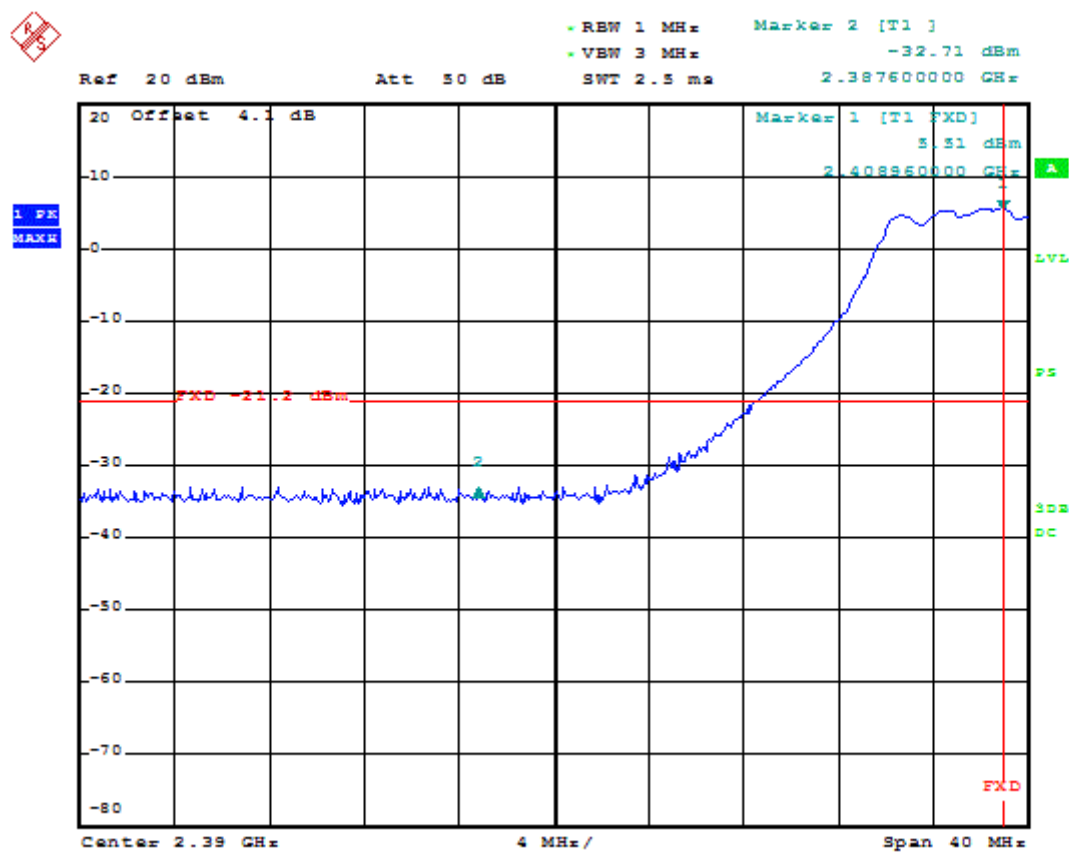
PK Result on 802.11b Ch 11 ANT1



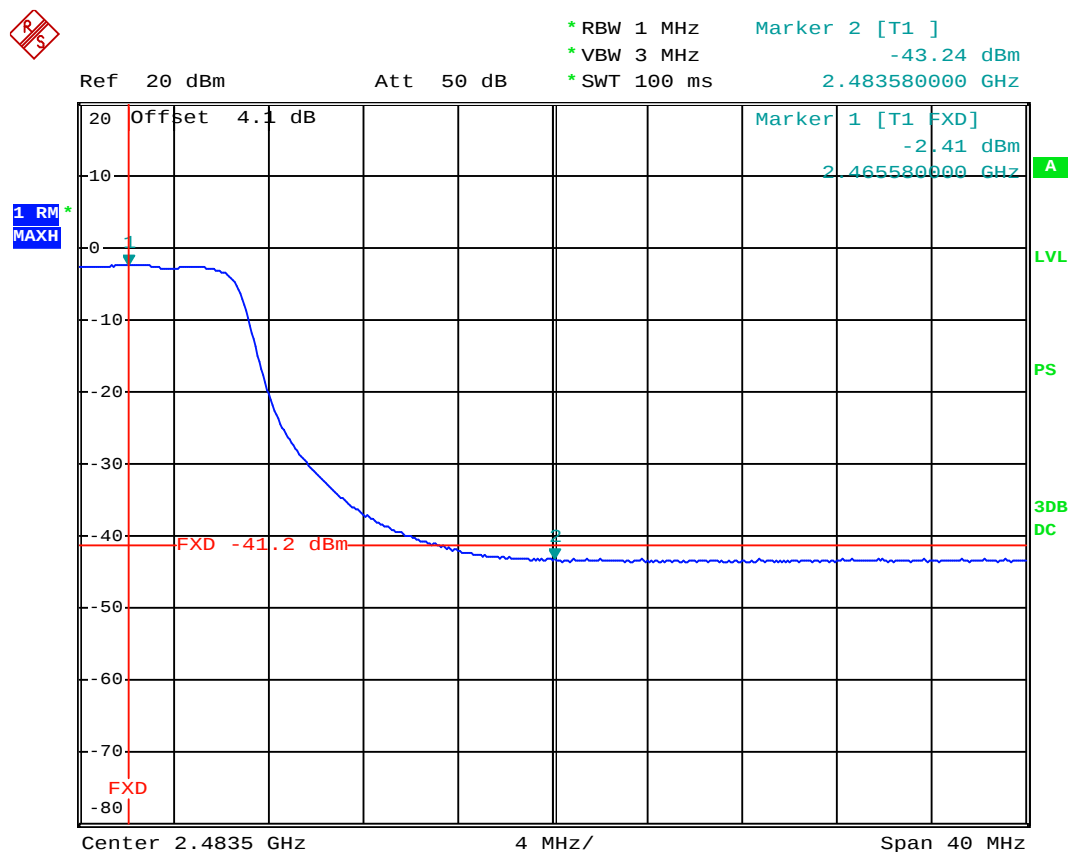
AV Result on 802.11g Ch 01 ANT1



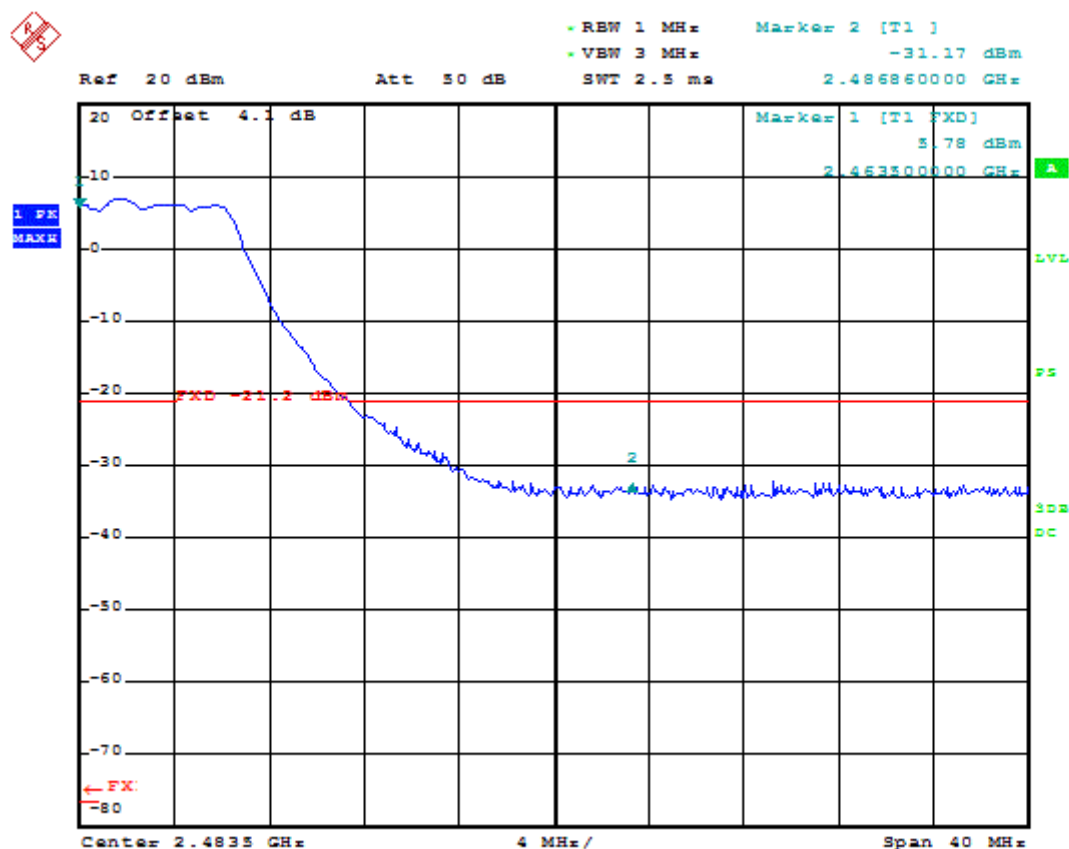
PK Result on 802.11g Ch 01 ANT1



AV Result on 802.11g Ch 11 ANT1

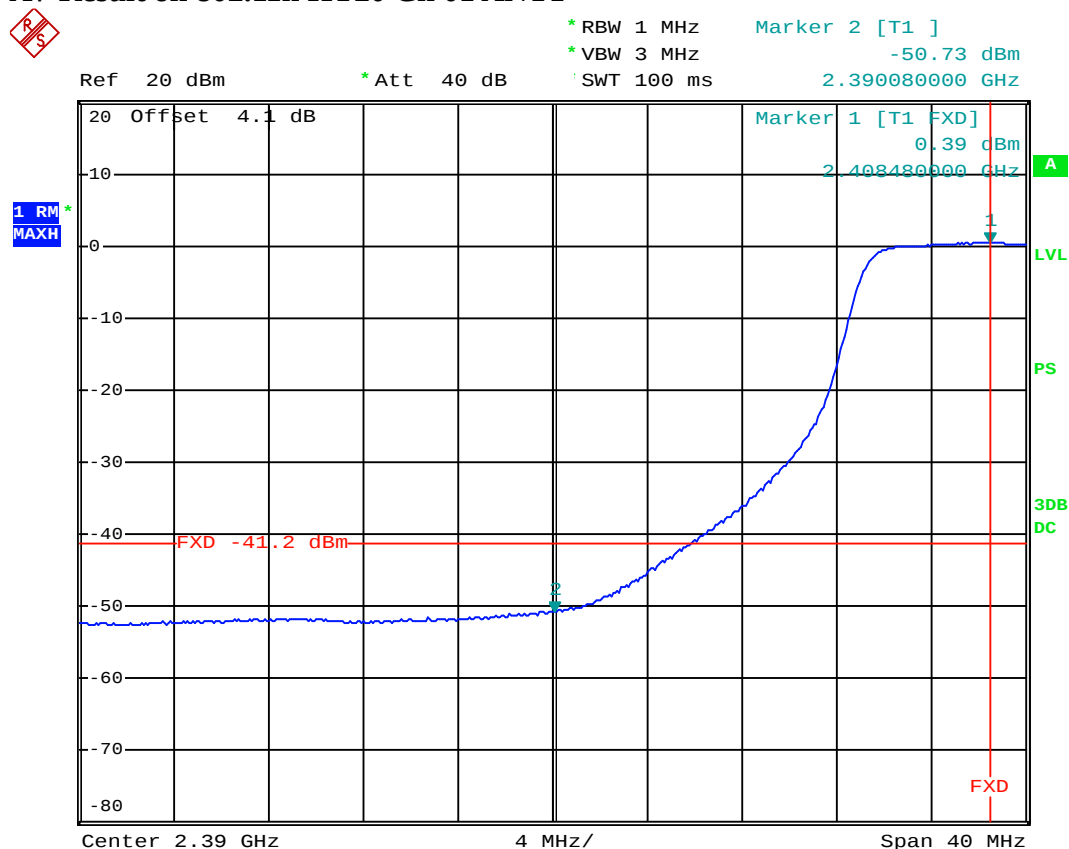


PK Result on 802.11g Ch 11 ANT1

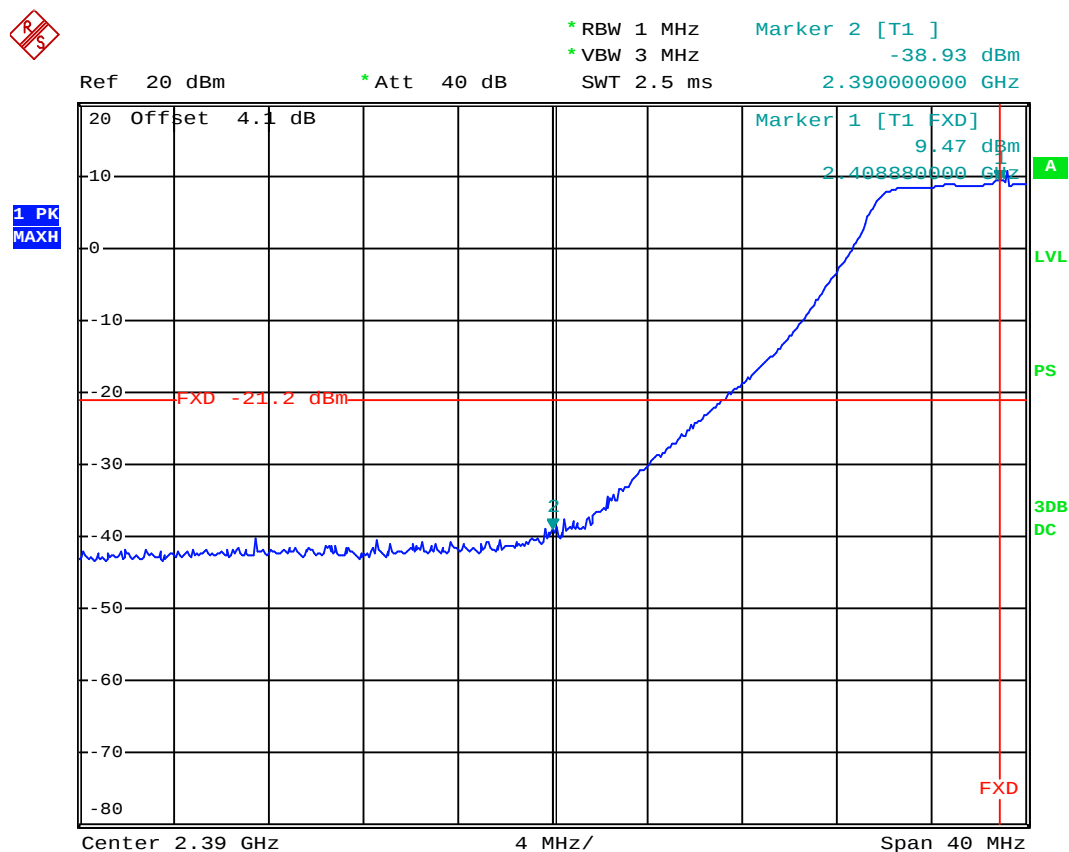


Note - the total power result of ANT1+ANT2 in 802.11n mode see the end of the section

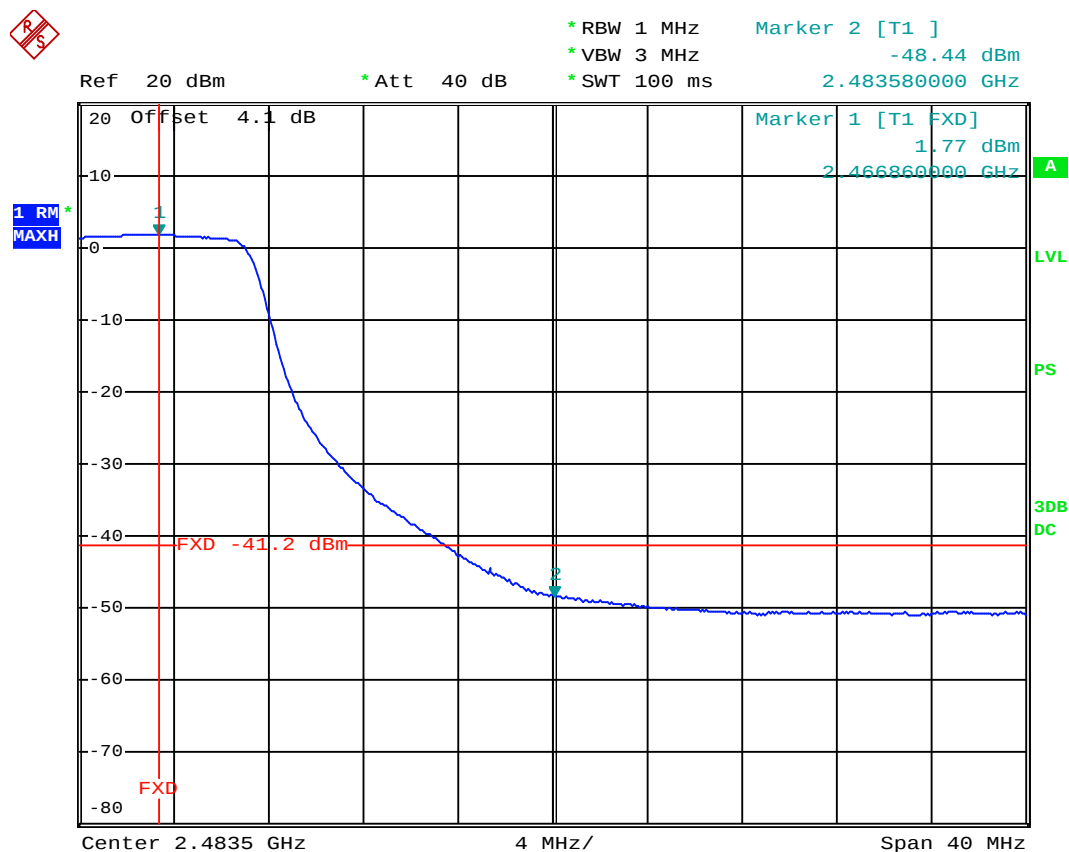
AV Result on 802.11n HT20 Ch 01 ANT1



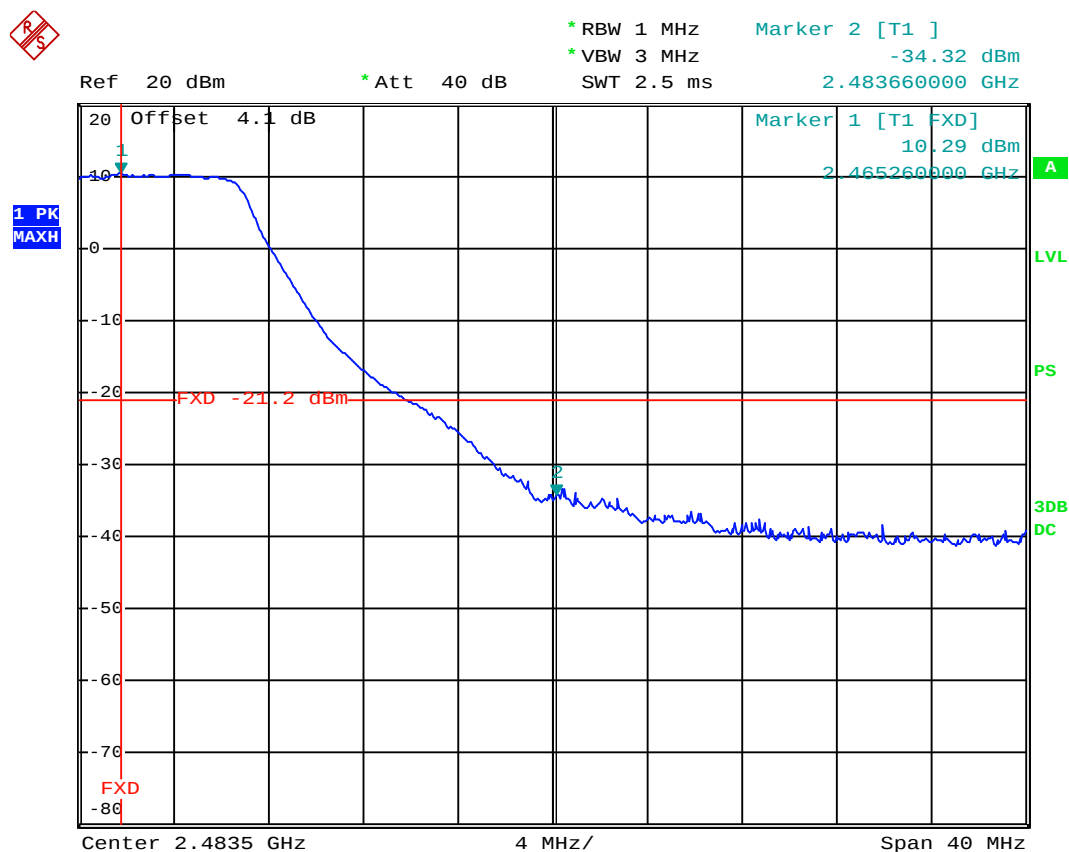
PK Result on 802.11n HT20 Ch 01 ANT1



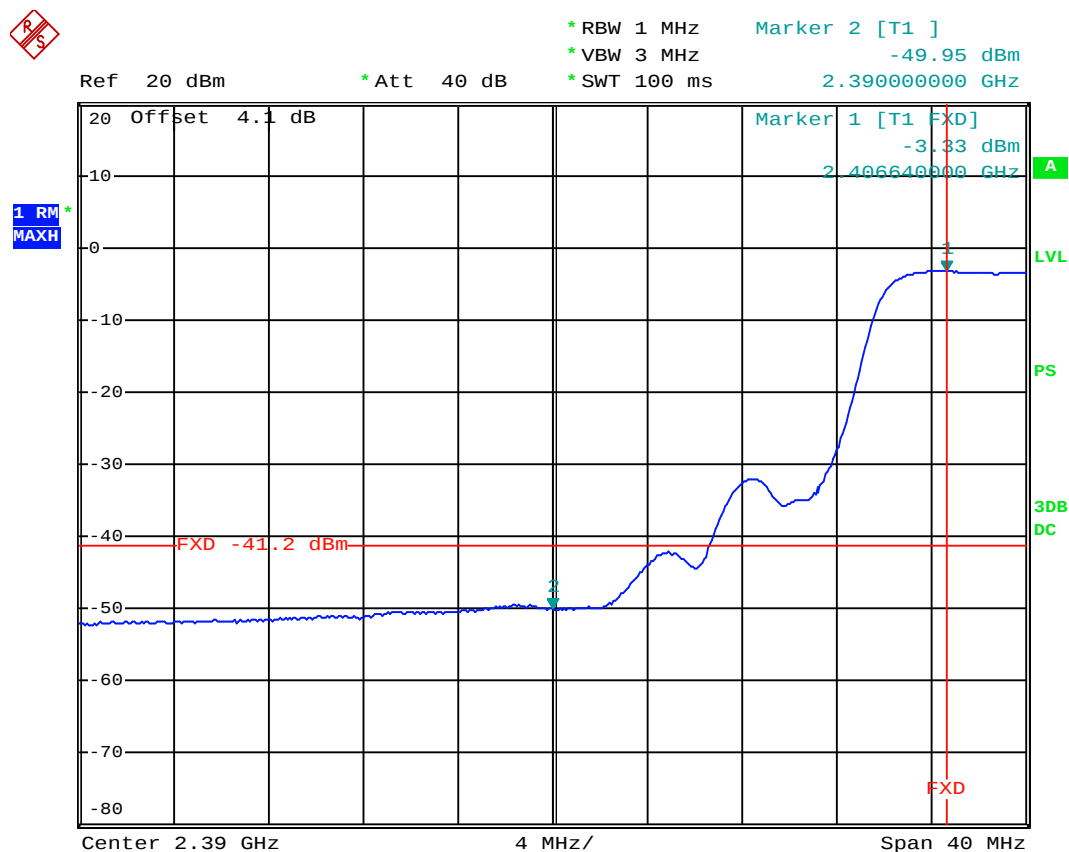
AV Result on 802.11n HT20 Ch 11 ANT1



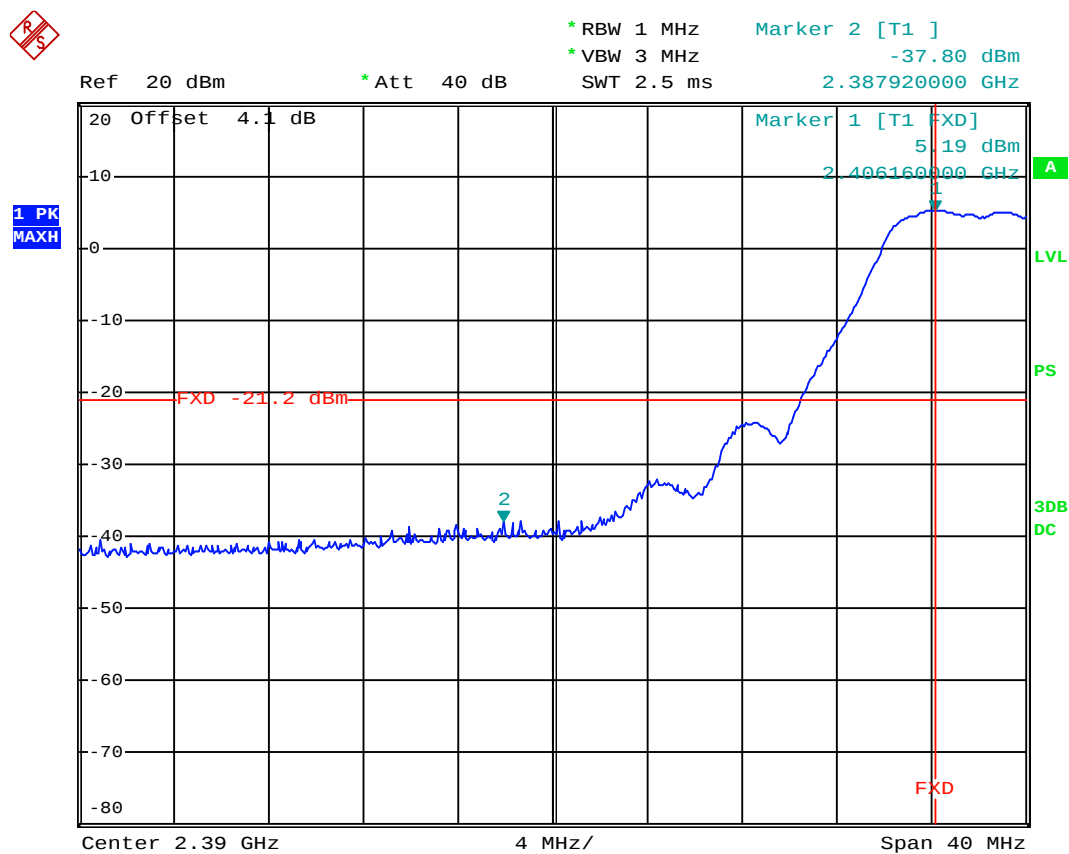
PK Result on 802.11n HT20 Ch 11 ANT1



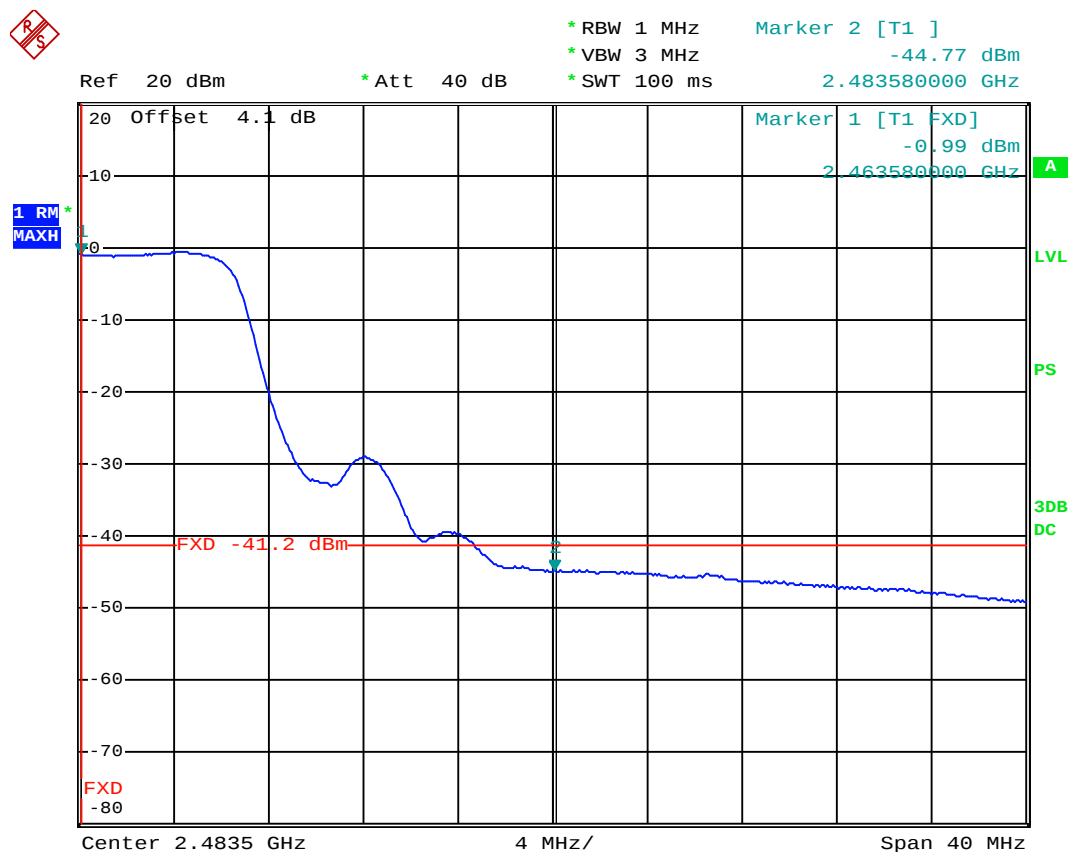
AV Result on 802.11n HT40 Ch 03 ANT1



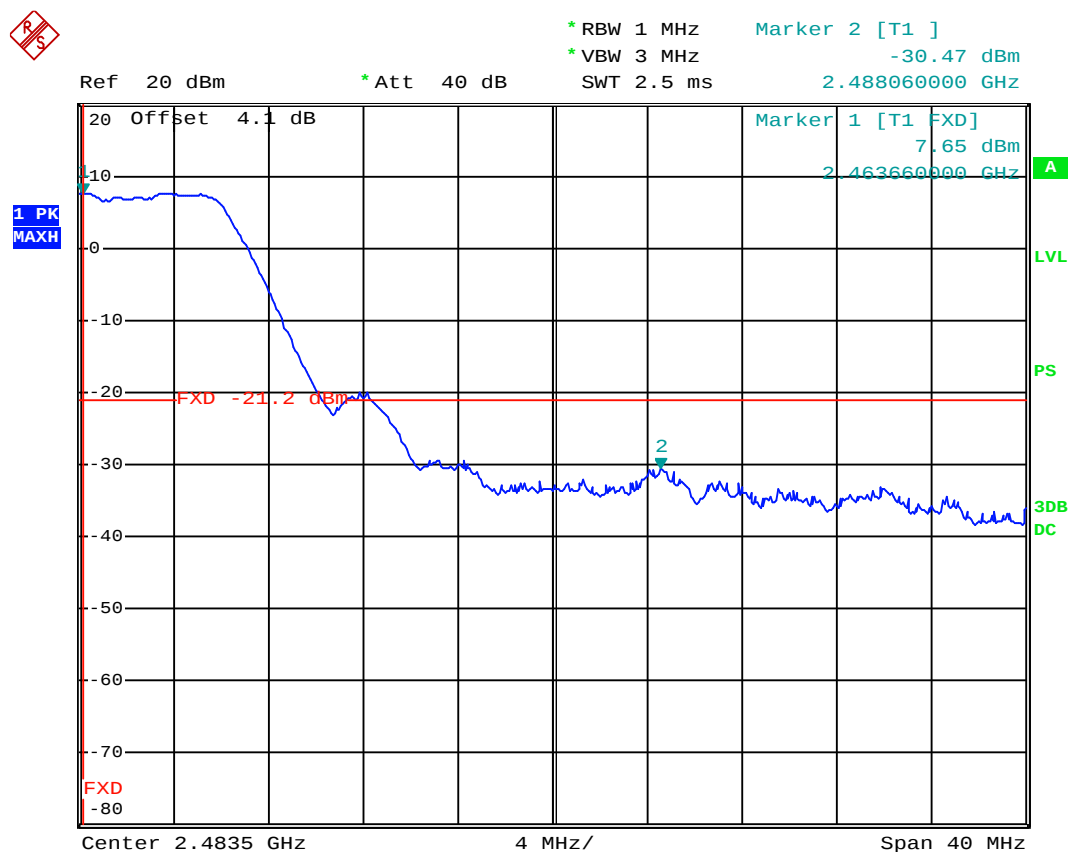
PK Result on 802.11n HT40 Ch 03 ANT1



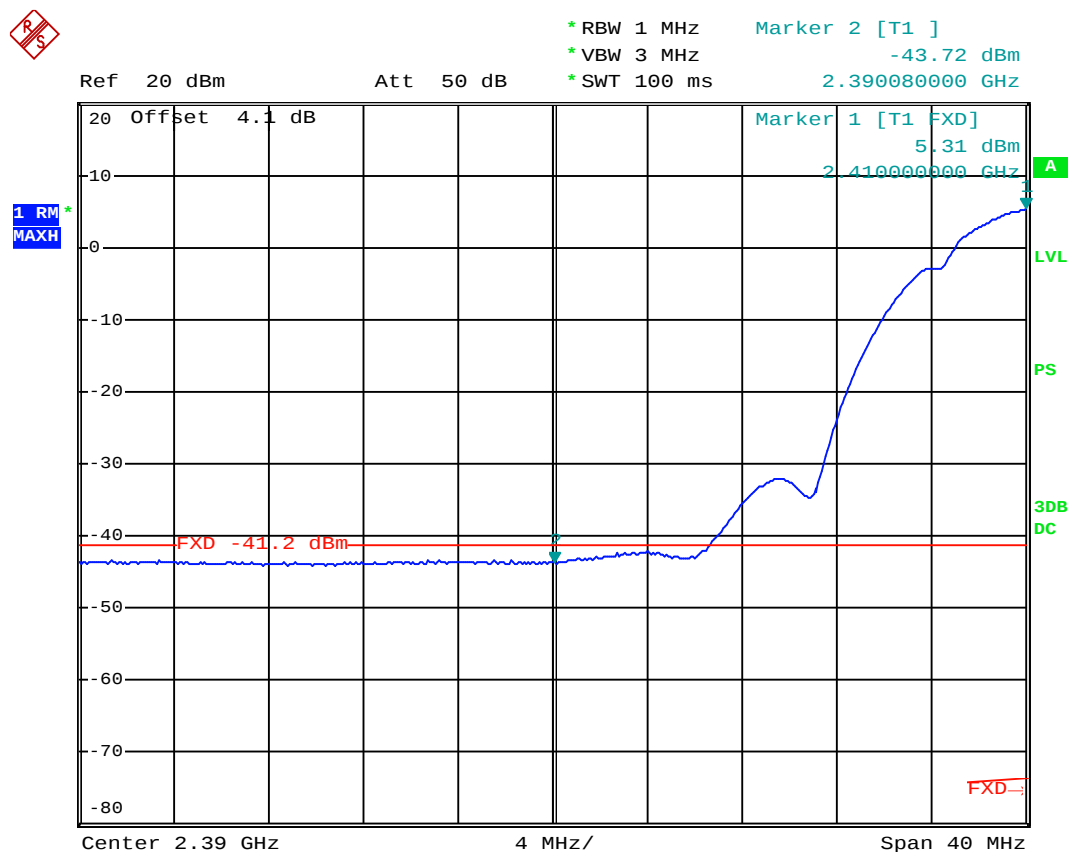
AV Result on 802.11n HT40 Ch 09 ANT1



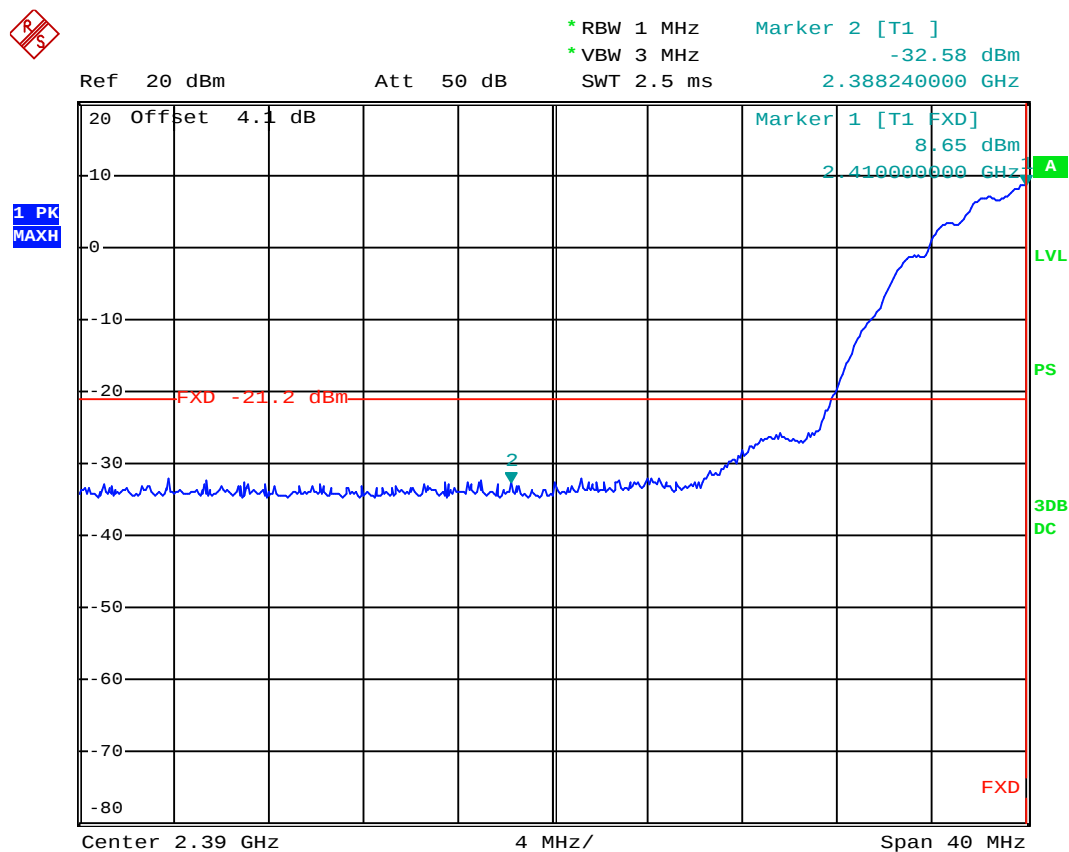
PK Result on 802.11n HT40 Ch 09 ANT1



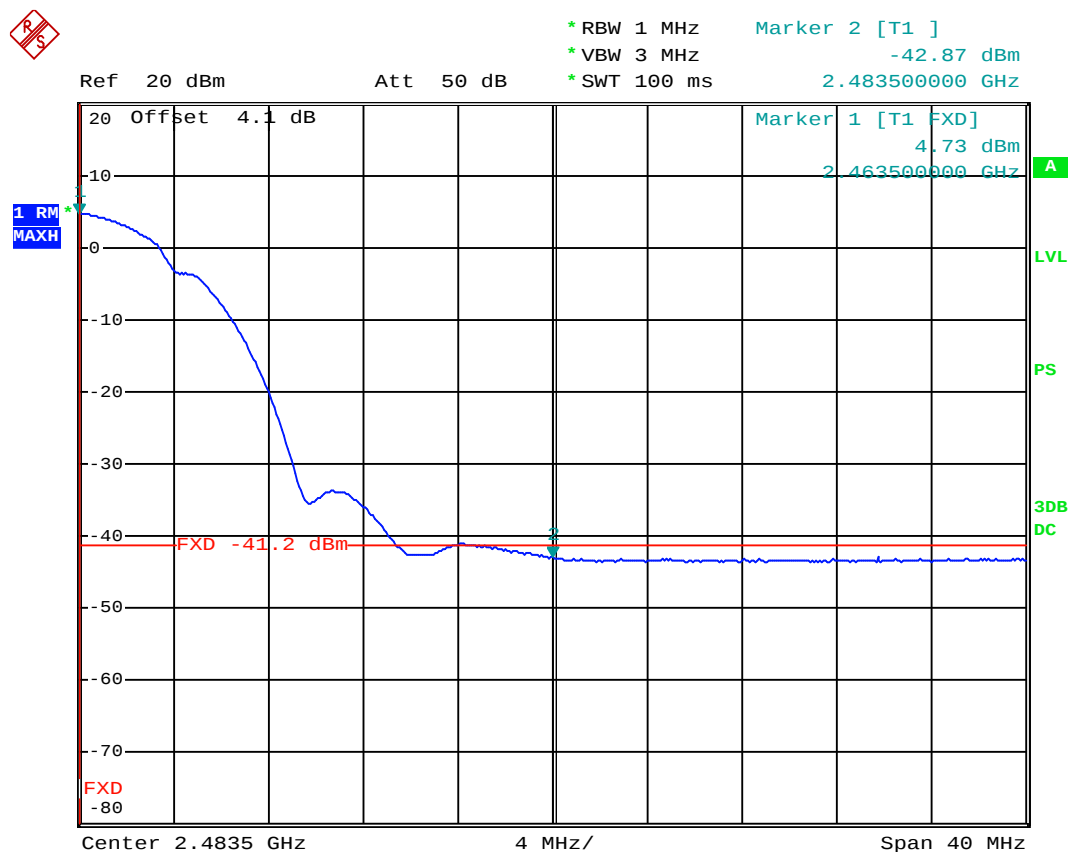
AV Result on 802.11b Ch 01 ANT2



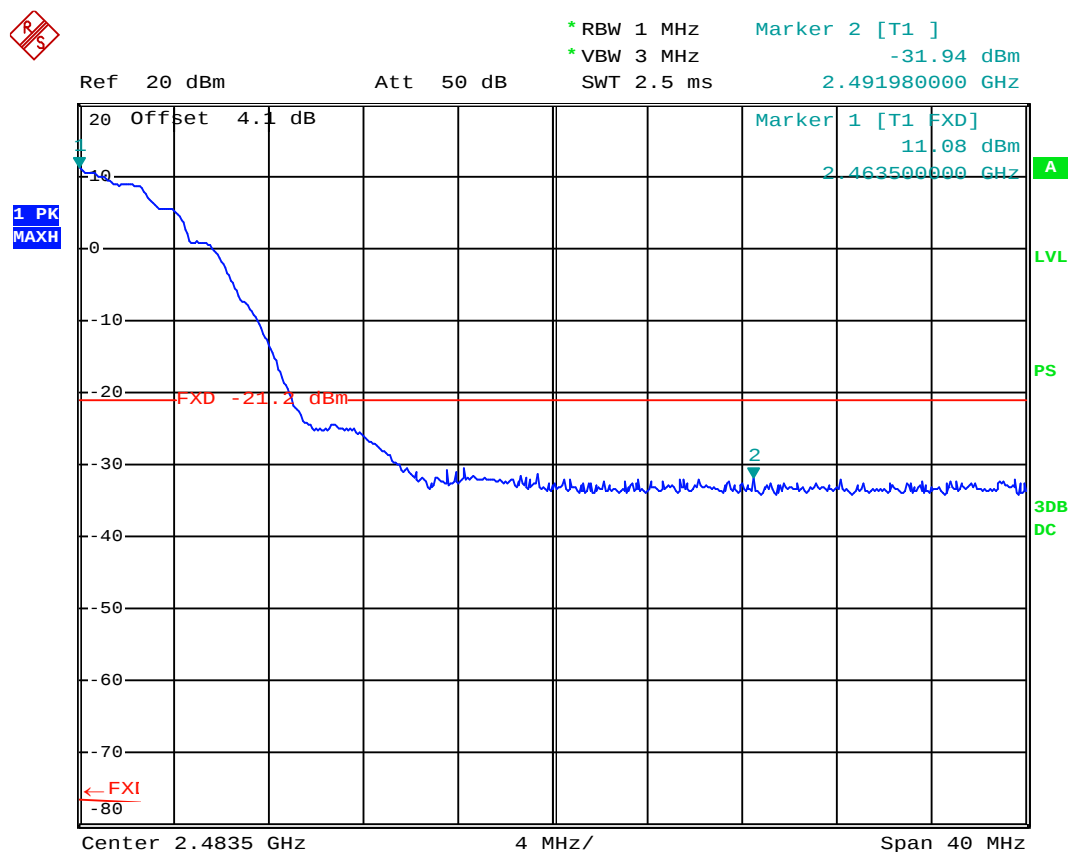
PK Result on 802.11b Ch 01 ANT2



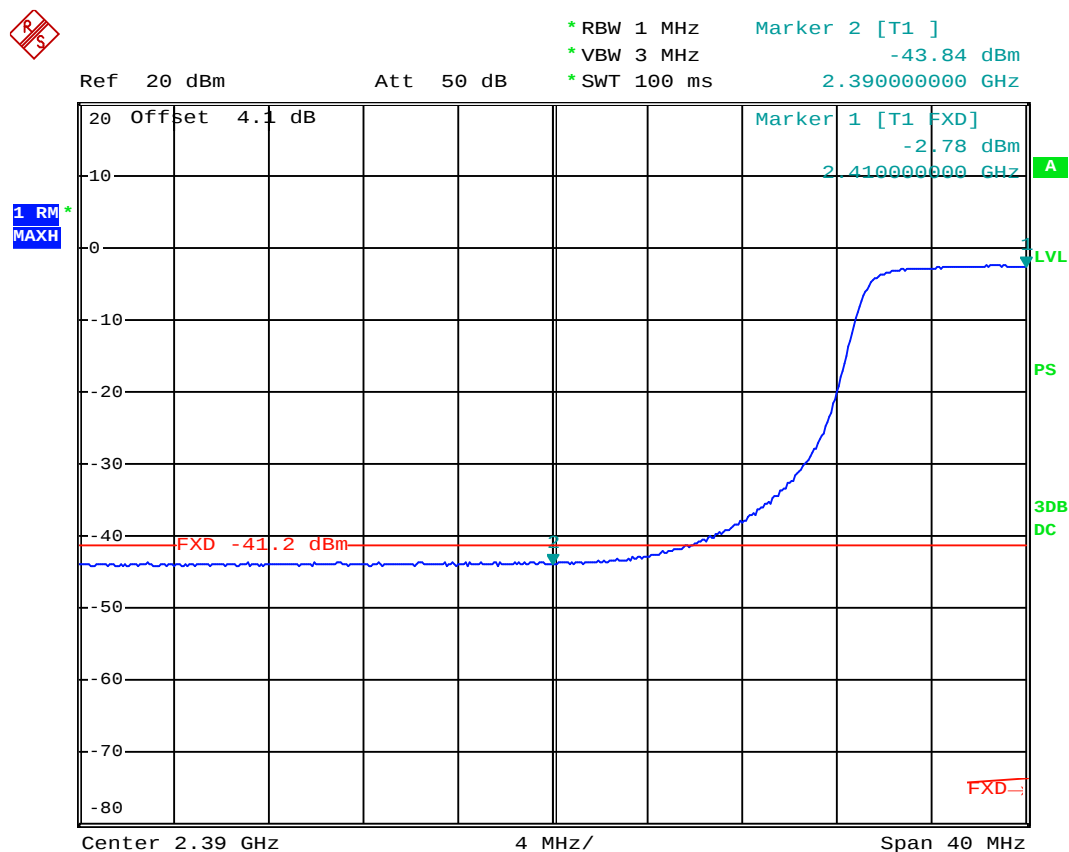
AV Result on 802.11b Ch 11 ANT2



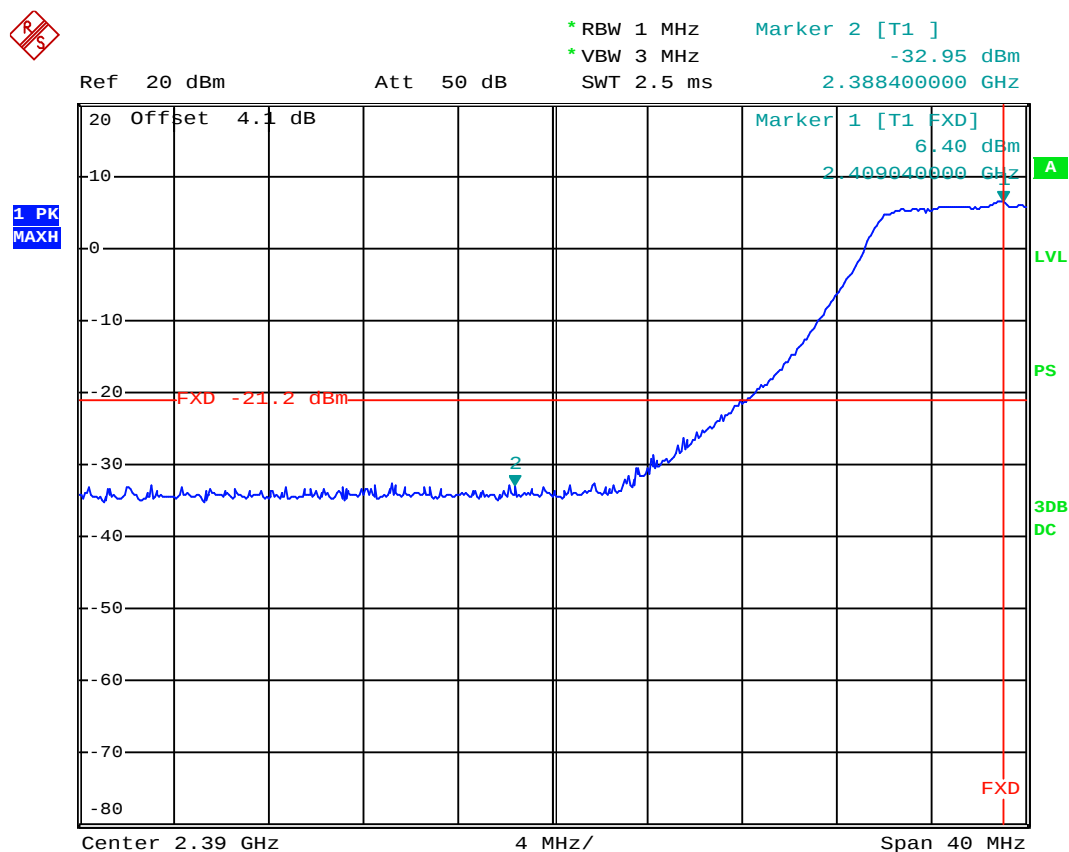
PK Result on 802.11b Ch 11 ANT2



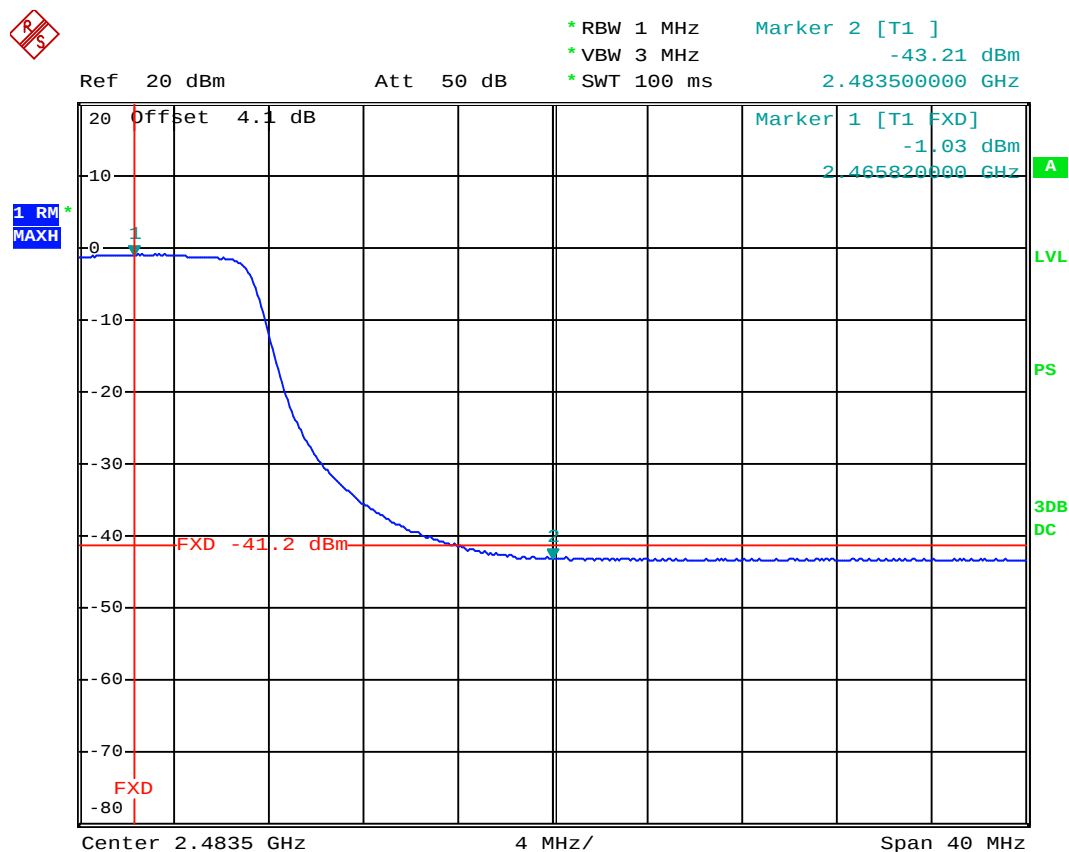
AV Result on 802.11g Ch 01 ANT2



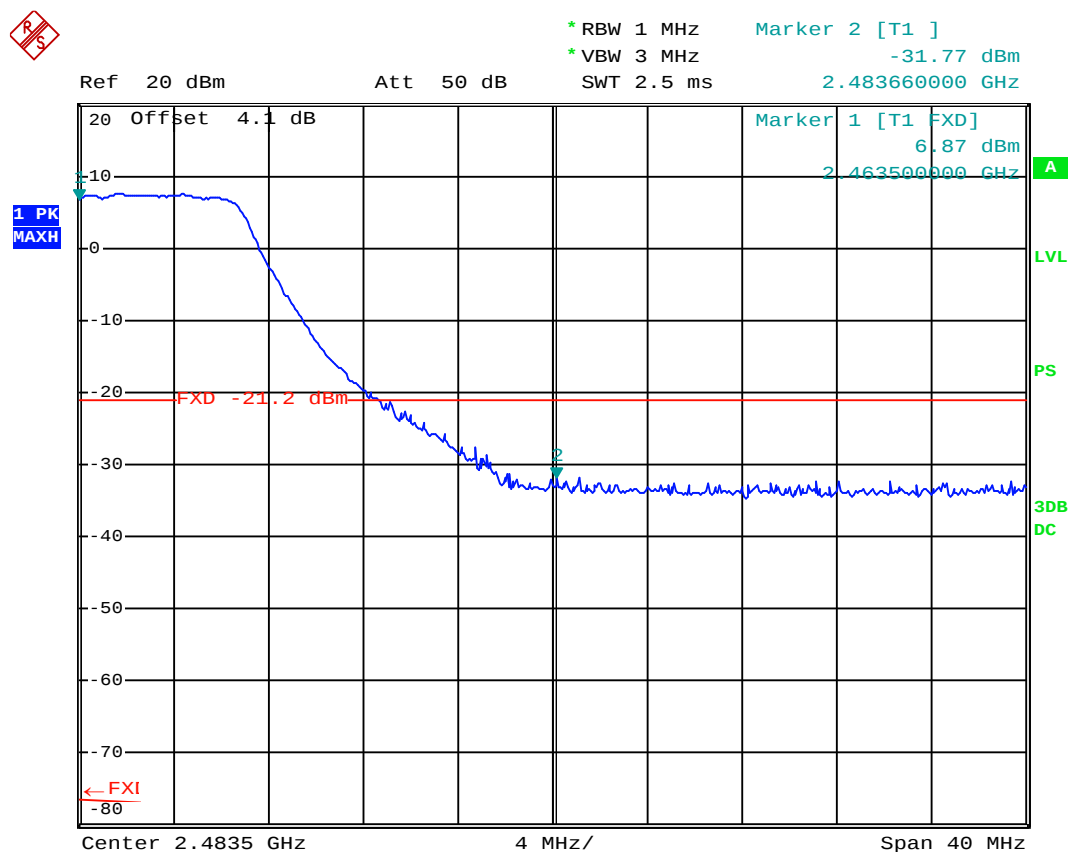
PK Result on 802.11g Ch 01 ANT2



AV Result on 802.11g Ch 11 ANT2

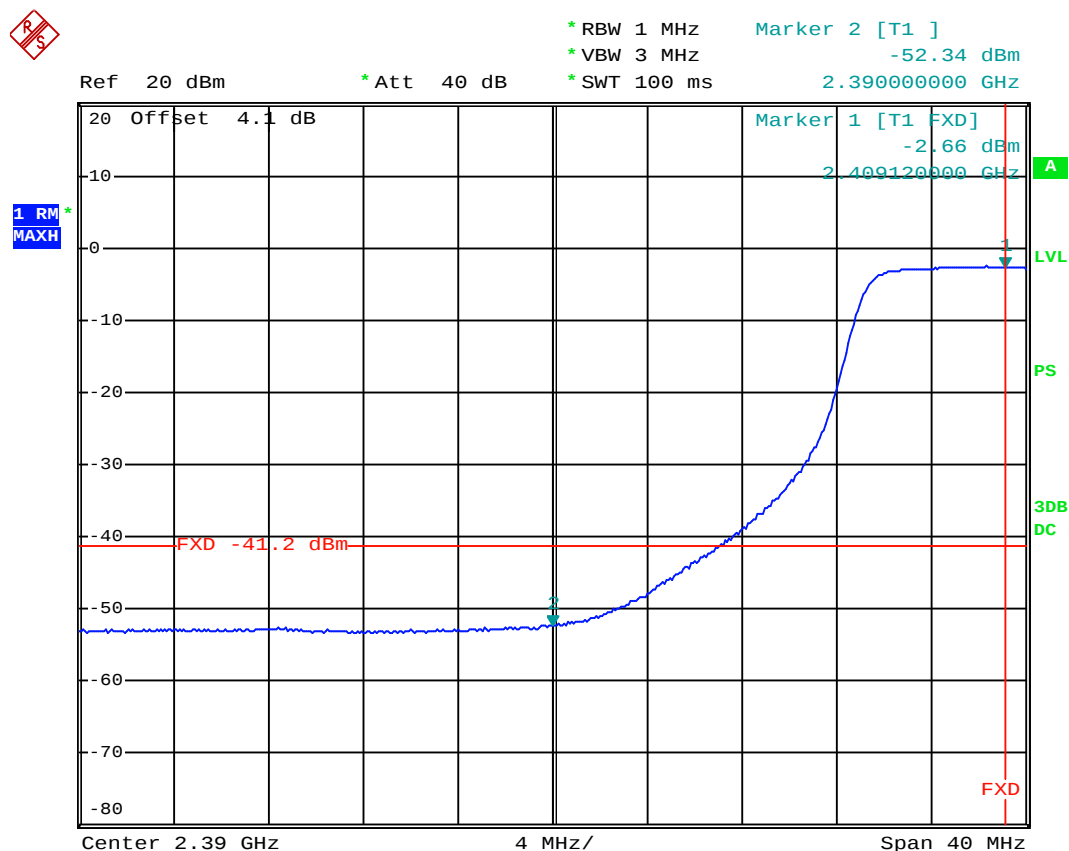


PK Result on 802.11g Ch 11 ANT2

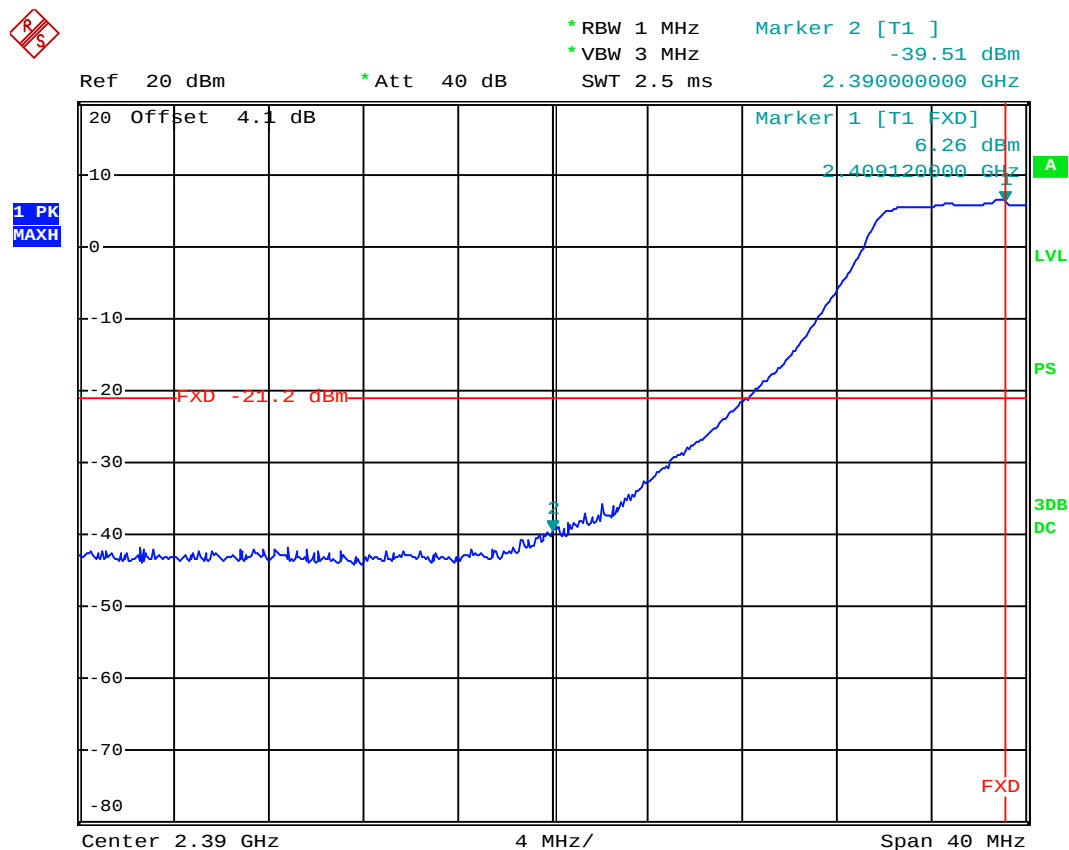


Note - the total power result of ANT1+ANT2 in 802.11n mode see the end of the section

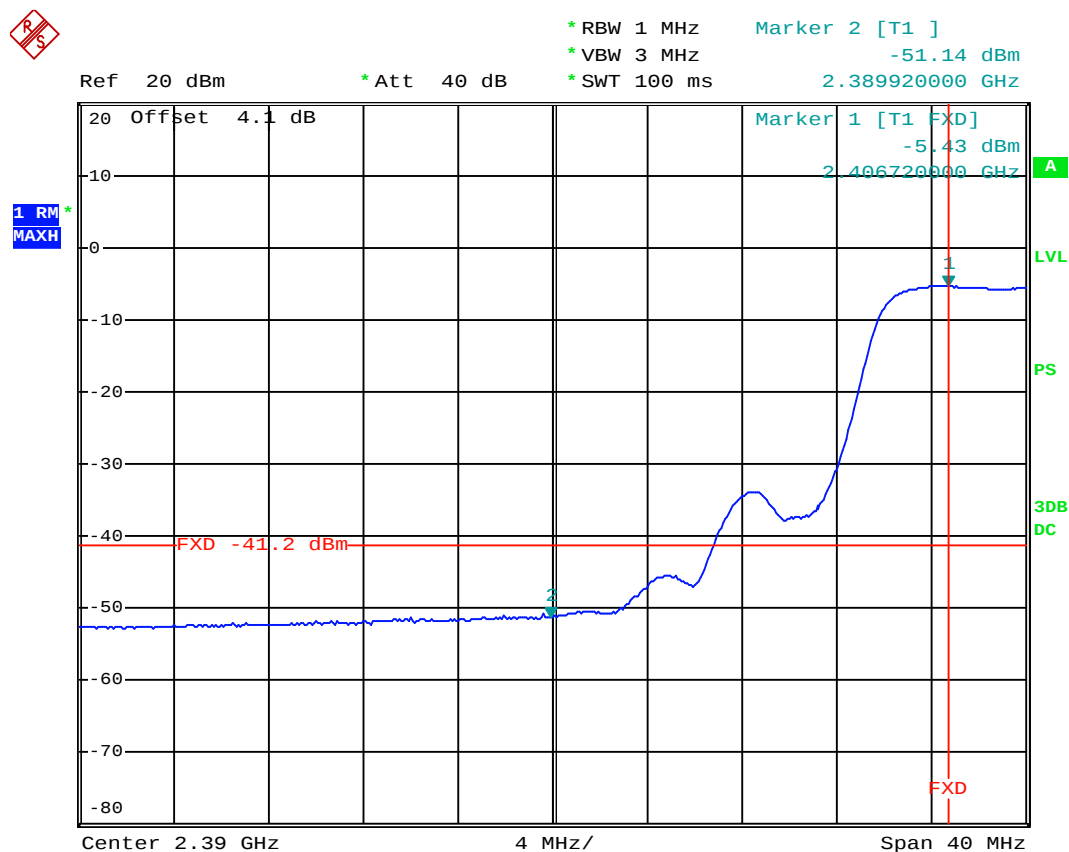
AV Result on 802.11n HT20 Ch 01 ANT2



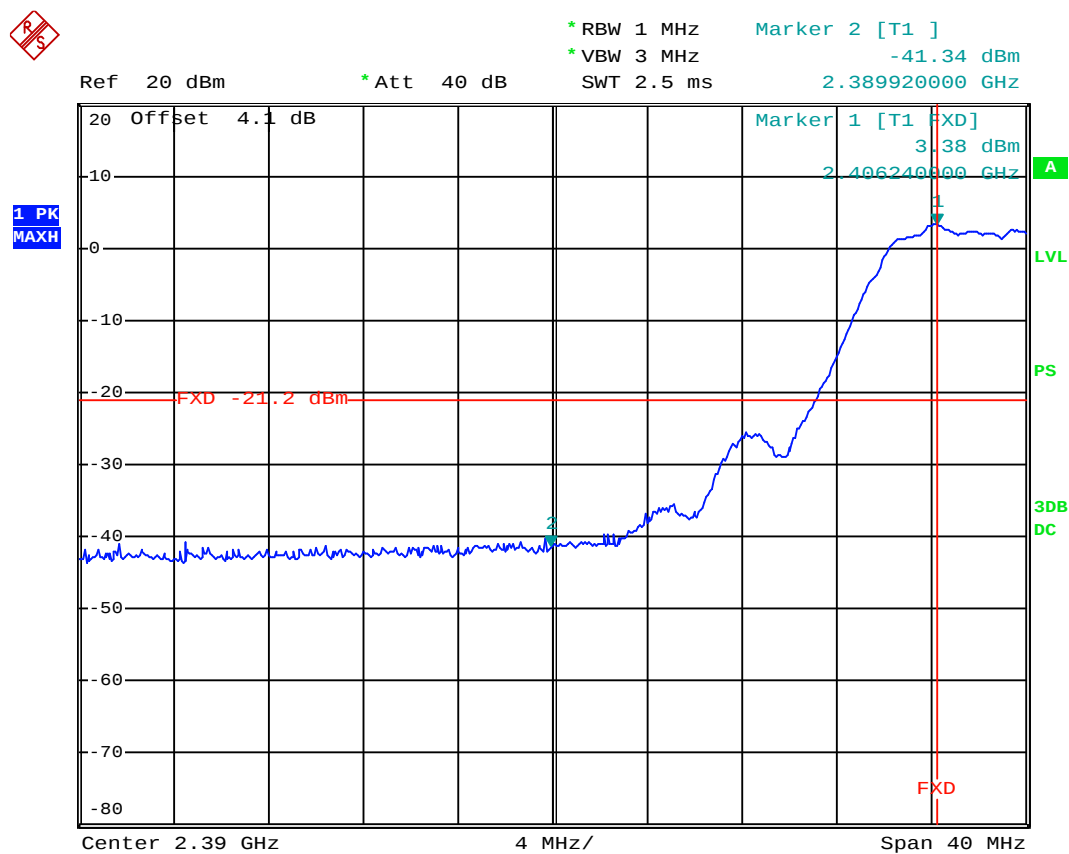
PK Result on 802.11n HT20 Ch 01 ANT2



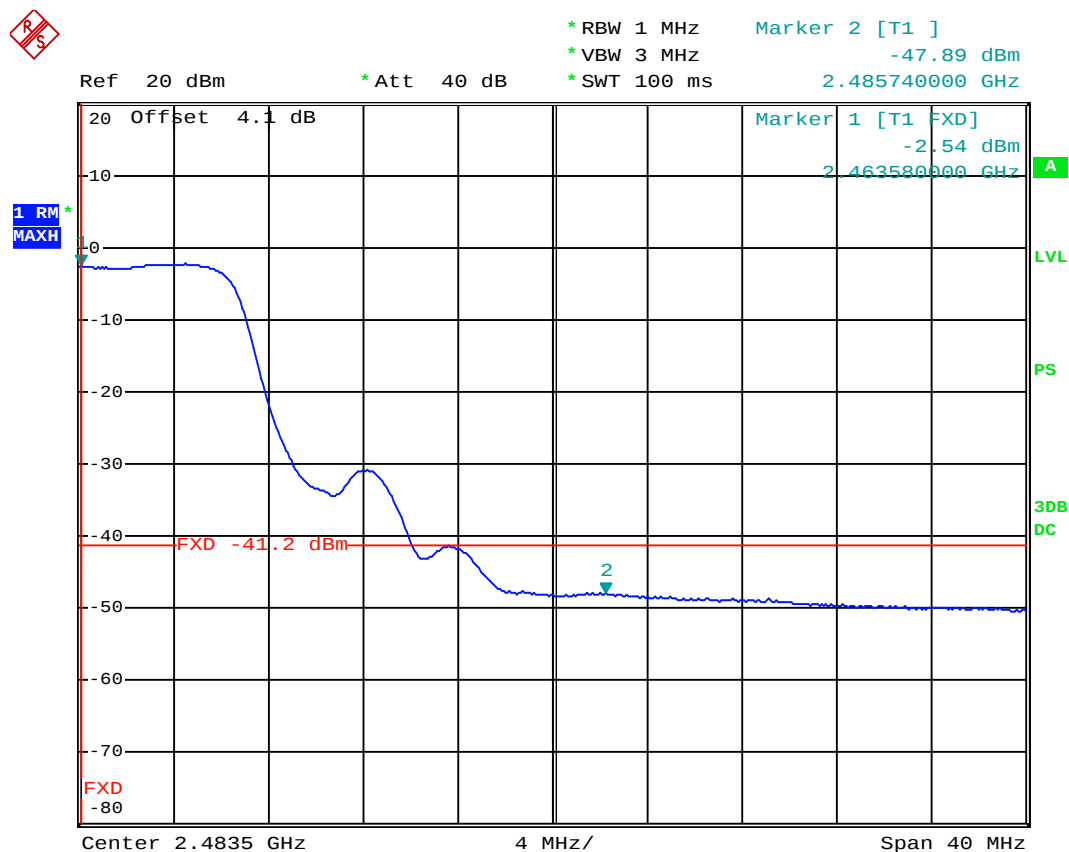
AV Result on 802.11n HT40 Ch 03 ANT2



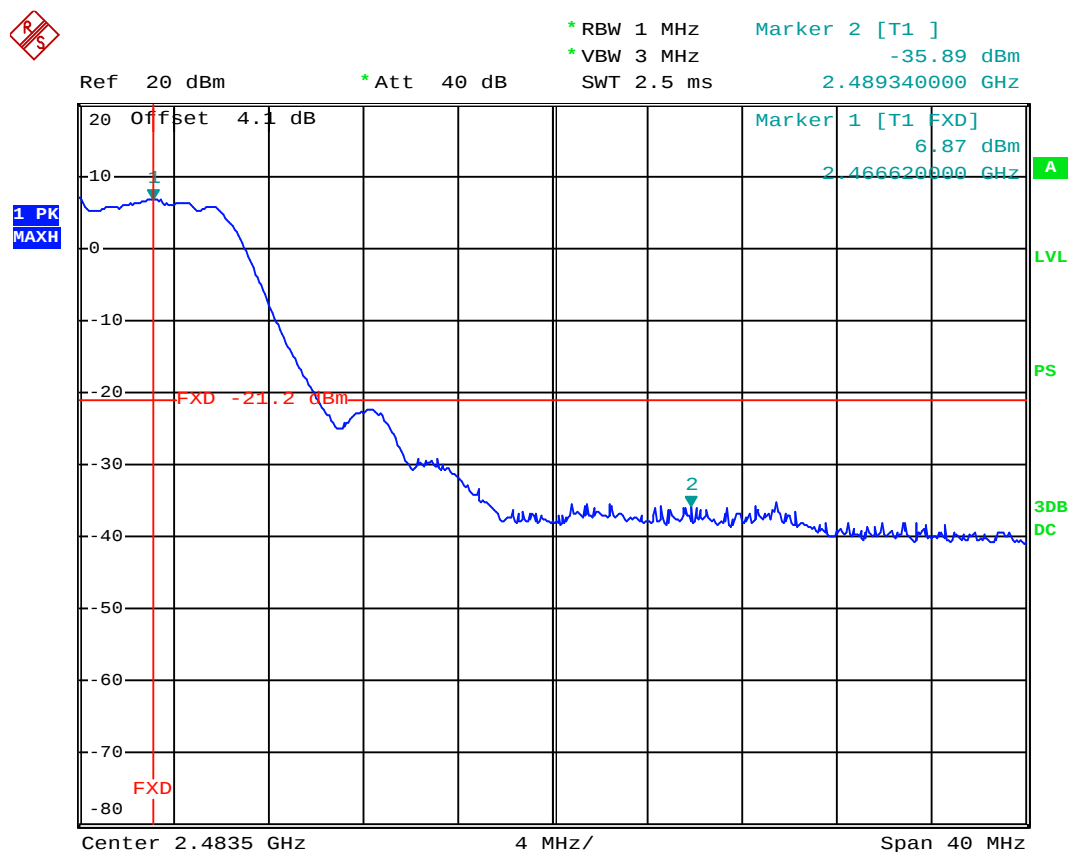
PK Result on 802.11n HT40 Ch 03 ANT2



AV Result on 802.11n HT40 Ch 09 ANT2



PK Result on 802.11n HT40 Ch 09 ANT2



802.11n Total Band edge Conducted Power Calculation

Band edge	Modulation	Detector	ANT1 (dBm)	ANT2 (dBm)	ANT1+ANT2 (dBm)	Limit (dBm)	Result
below 2390MHz	802.11n HT20	AV	-50.73	-52.34	-48.45	-41.2	PASS
		PK	-38.93	-39.51	-36.20	-21.2	PASS
AV		-48.44	-51.10	-46.56	-41.2	PASS	
PK		-34.32	-38.95	-33.03	-21.2	PASS	
Below 2483.5MHz	802.11n HT40	AV	-49.95	-51.14	-47.49	-41.2	PASS
PK		-37.80	-41.34	-36.21	-21.2	PASS	
AV		-44.77	-47.89	-43.05	-41.2	PASS	
PK		-30.47	-35.89	-29.37	-21.2	PASS	

Note – the ANT1 & ANT2 readings refer to data plot above.

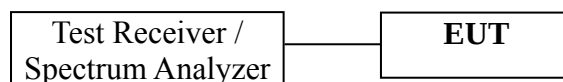
5 6 dB BANDWIDTH MEASUREMENT

5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

5.2 Block Diagram of Test Setup



5.3 Specification Limits (§15.247(a)(2))

The minimum 6 dB bandwidth shall be at least 500 kHz.

5.4 Operating Condition of EUT

The test program “MP_TEST” was used to enable the EUT to transmit data at different channel frequency individually.

5.5 Test Procedure

The transmitter output was connected to the Test Receiver. The bandwidth of the fundamental frequency was measure by Test Receiver with 100 kHz RBW / 300 kHz VBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

The test procedure is defined in KDB558074 v02:2012 (the 7.1 Measurement Procedure “Option 1” was used).

5.6 Test Results

PASSED.

All the test results are attached in next pages.

(Test Date: Nov 20, 2012 Temperature: 24°C Humidity: 45 %)

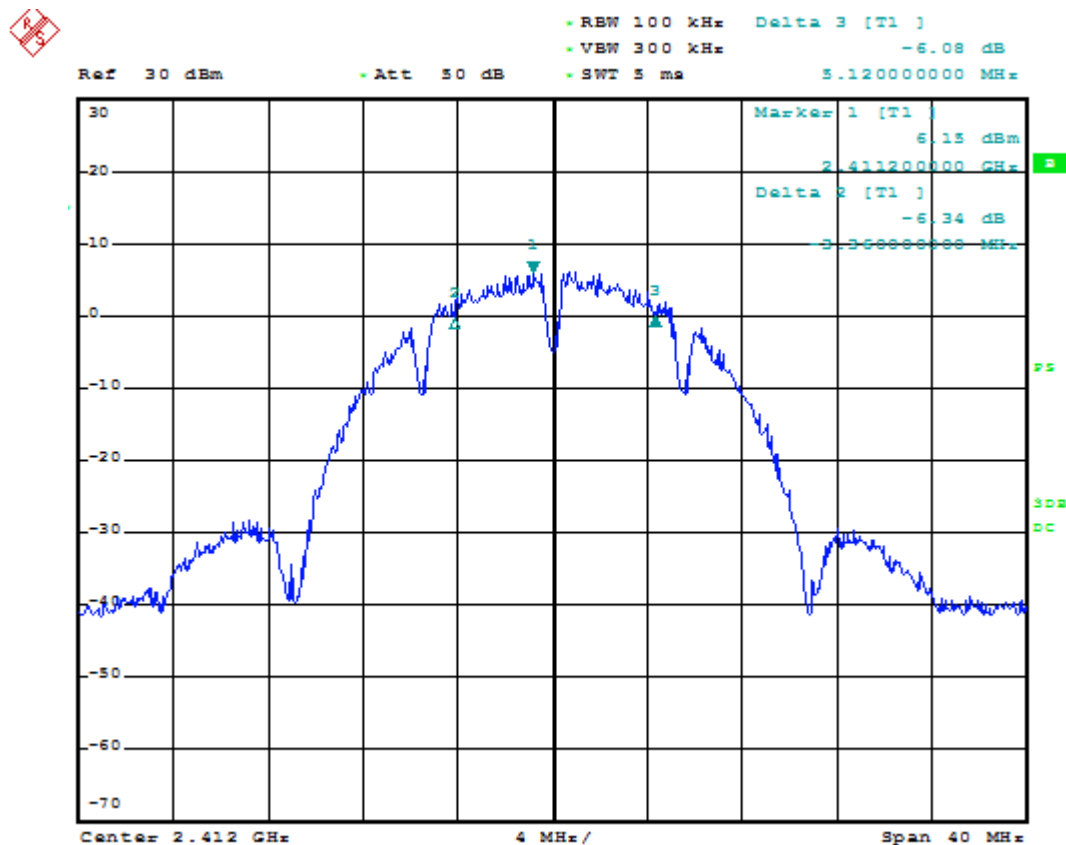
ANT 1

Modulation	Channel	Frequency	6dB Bandwidth
802.11b	01	2412 MHz	8.48 MHz
	06	2437 MHz	8.48 MHz
	11	2462 MHz	8.72 MHz
802.11g	01	2412 MHz	15.76 MHz
	06	2437 MHz	16.56 MHz
	11	2462 MHz	16.64 MHz
802.11n HT20	01	2412 MHz	17.84 MHz
	06	2437 MHz	17.90 MHz
	11	2462 MHz	16.84 MHz
802.11n HT40	03	2422 MHz	36.59 MHz
	06	2437 MHz	36.77 MHz
	09	2452 MHz	36.67 MHz

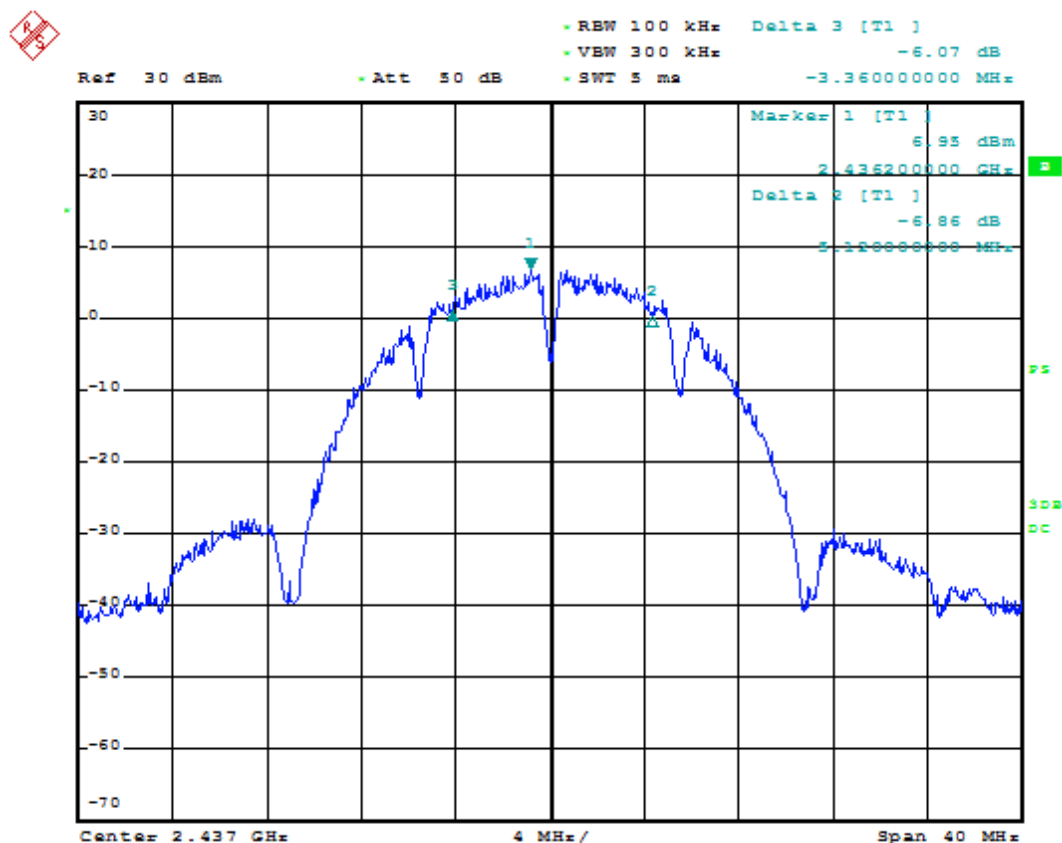
ANT 2

Modulation	Channel	Frequency	6dB Bandwidth
802.11b	01	2412 MHz	9.01 MHz
	06	2437 MHz	9.50 MHz
	11	2462 MHz	8.30 MHz
802.11g	01	2412 MHz	16.60 MHz
	06	2437 MHz	16.60 MHz
	11	2462 MHz	16.60 MHz
802.11n HT20	01	2412 MHz	18.07 MHz
	06	2437 MHz	17.90 MHz
	11	2462 MHz	18.00 MHz
802.11n HT40	03	2422 MHz	36.59 MHz
	06	2437 MHz	36.67 MHz
	09	2452 MHz	36.67 MHz

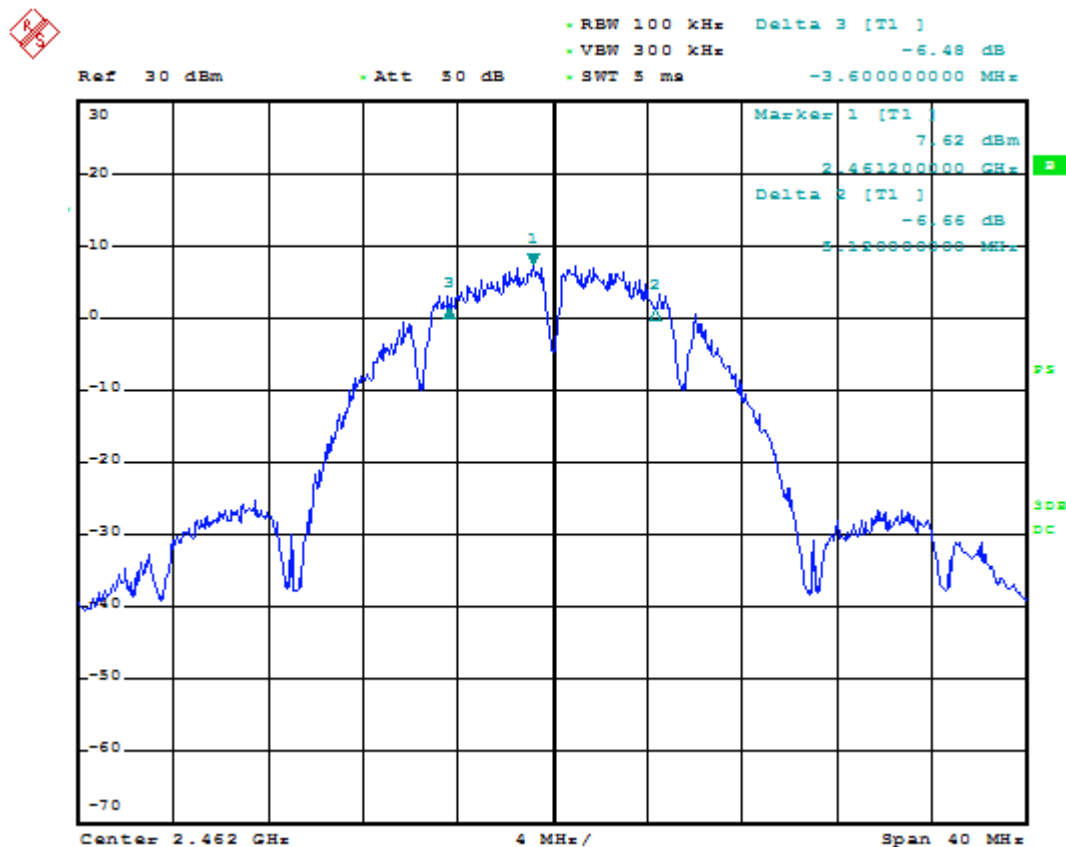
802.11b Ch 01 (2412 MHz) ANT1



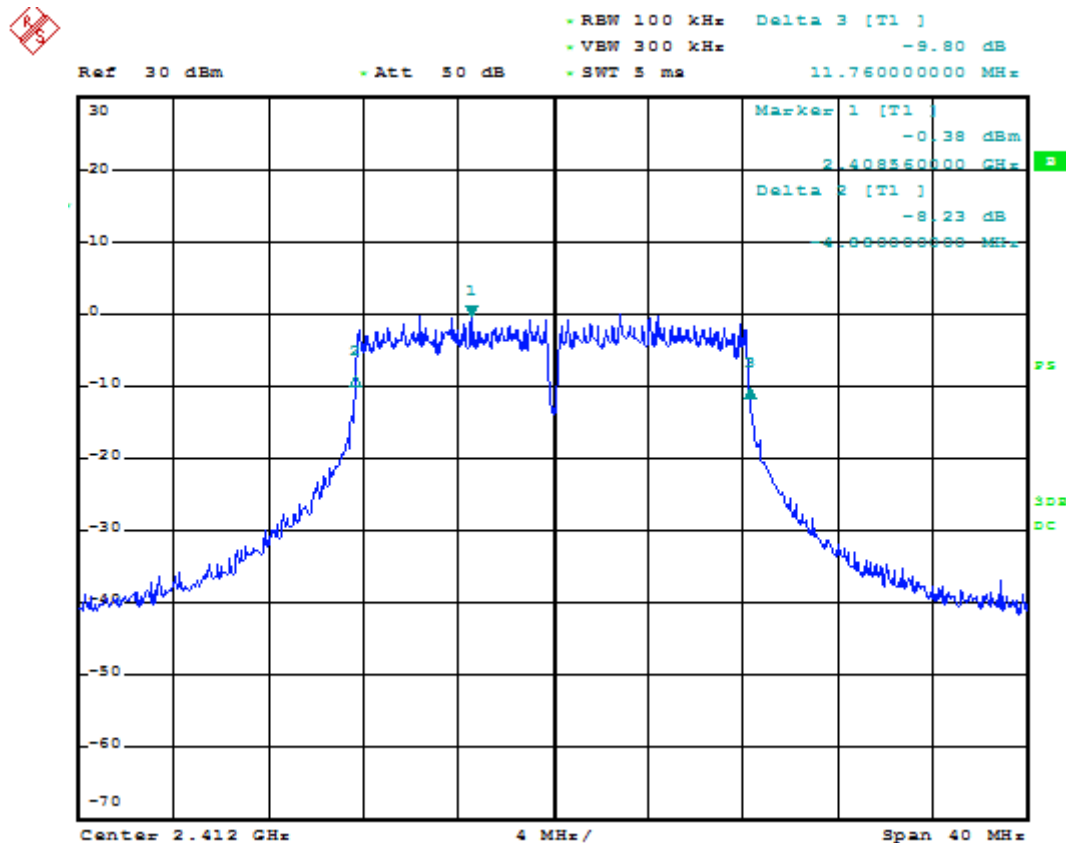
802.11b Ch 06 (2437 MHz) ANT1



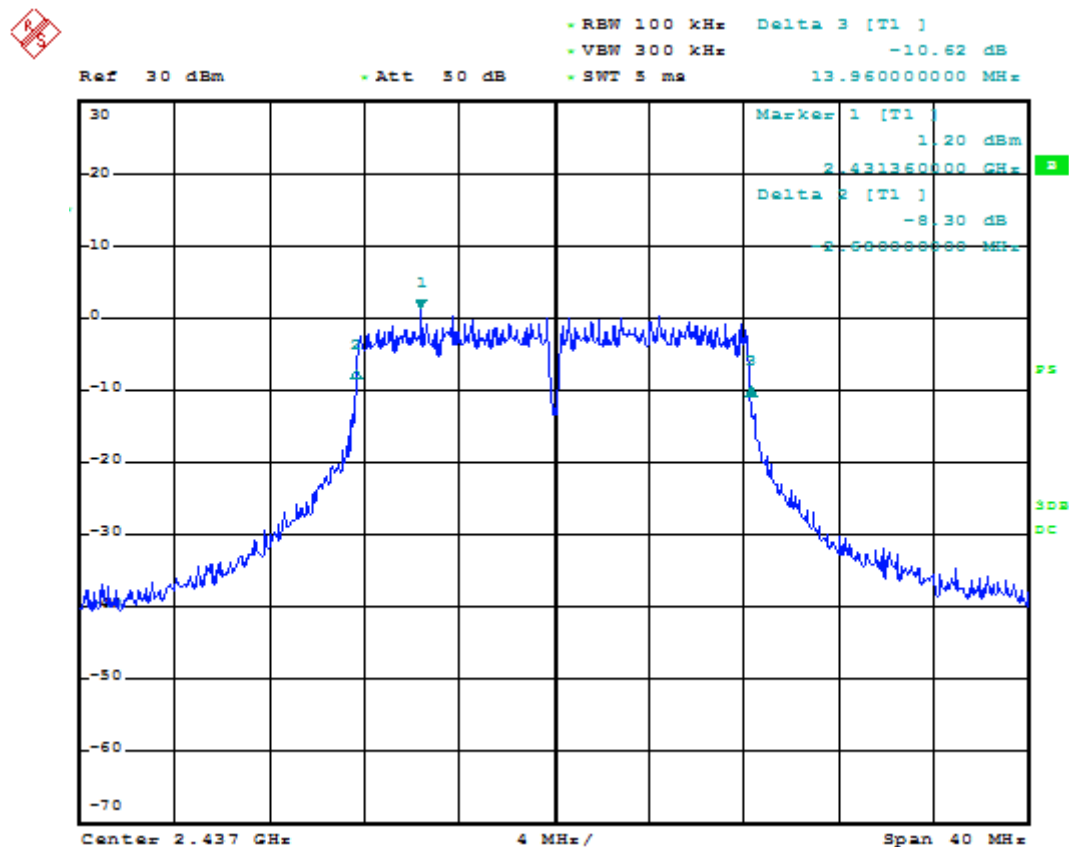
802.11b Ch 11 (2462 MHz) ANT1



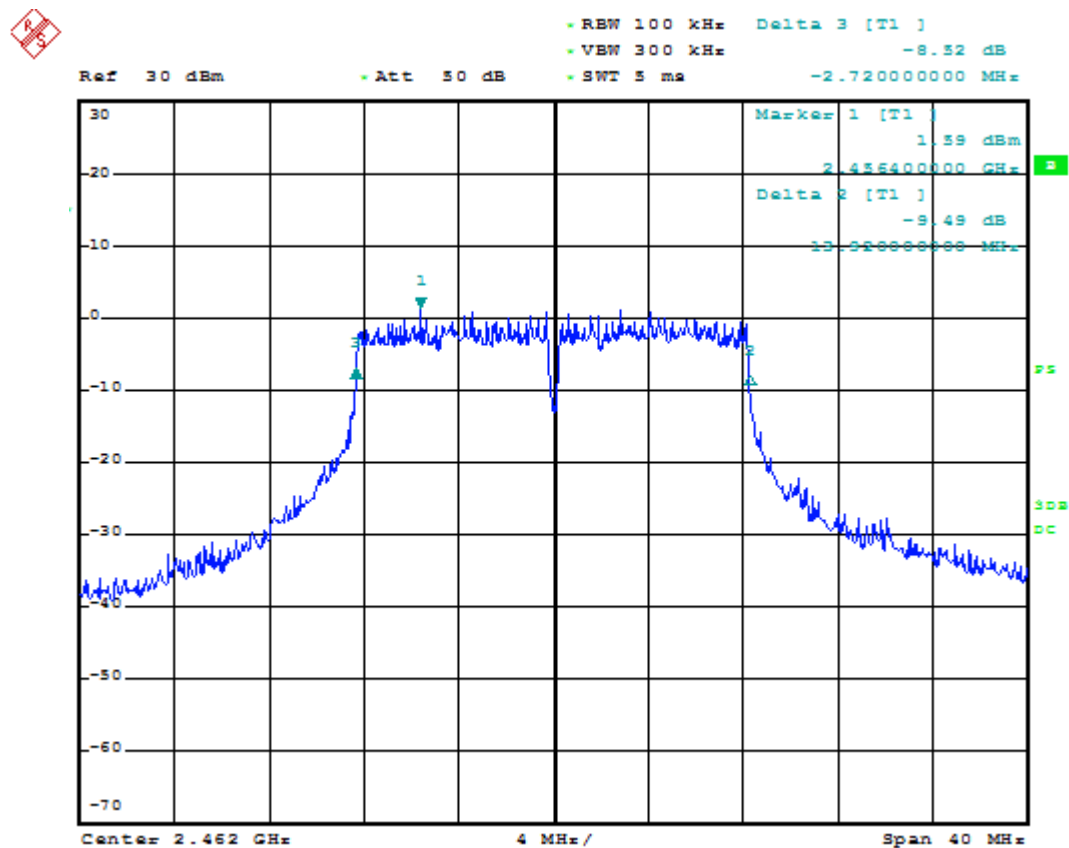
802.11g Ch 01 (2412 MHz) ANT1



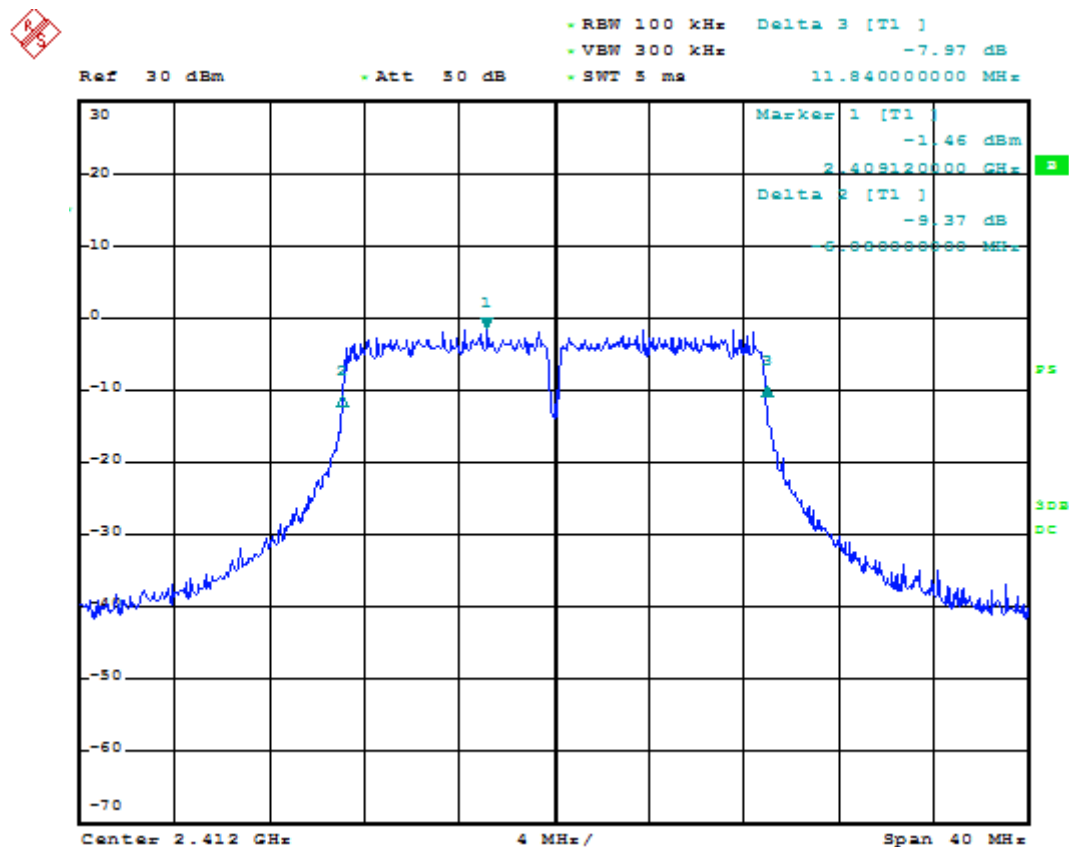
802.11g Ch 06 (2437 MHz) ANT1



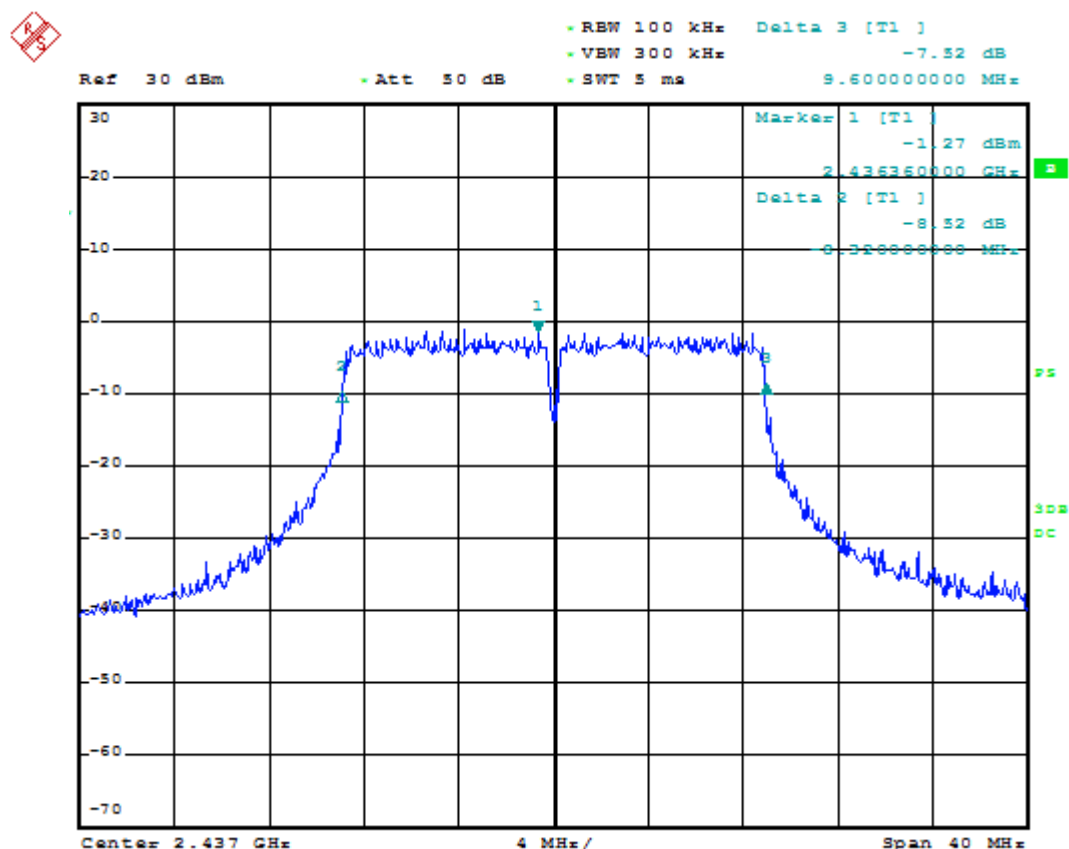
802.11g Ch 11 (2462 MHz) ANT1



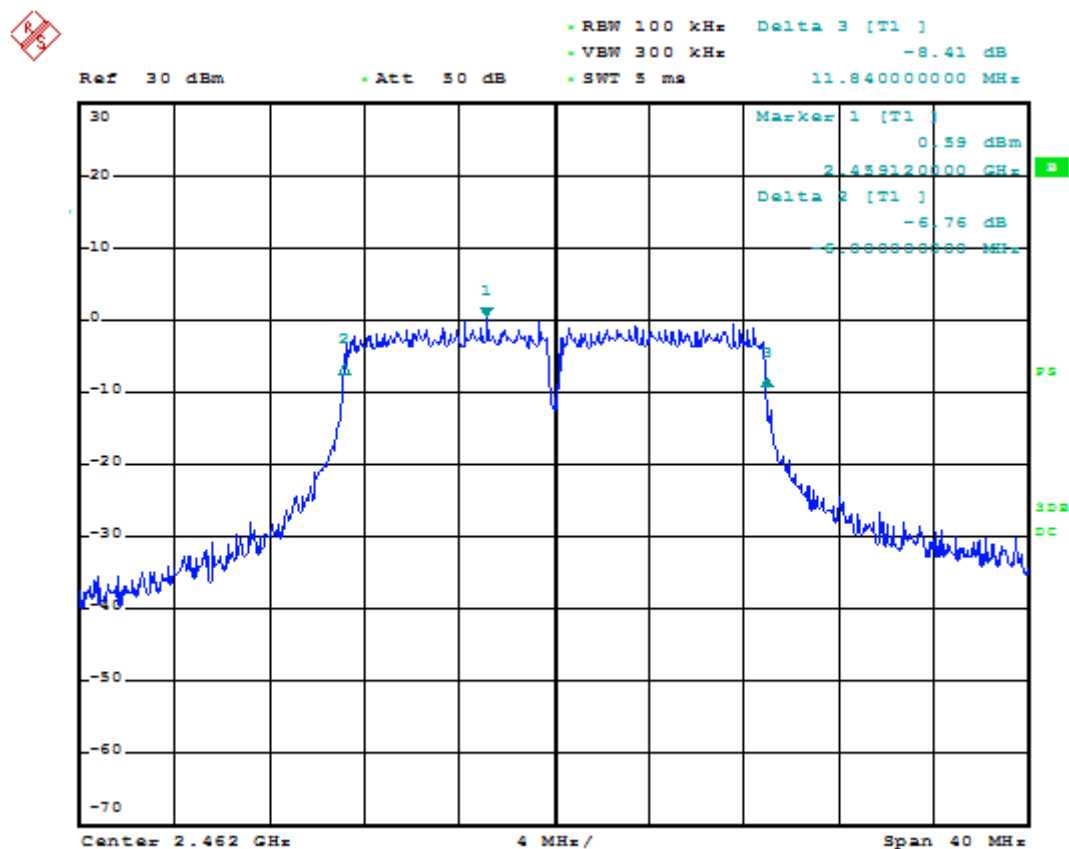
802.11n HT20 Ch 01 (2412 MHz) ANT1



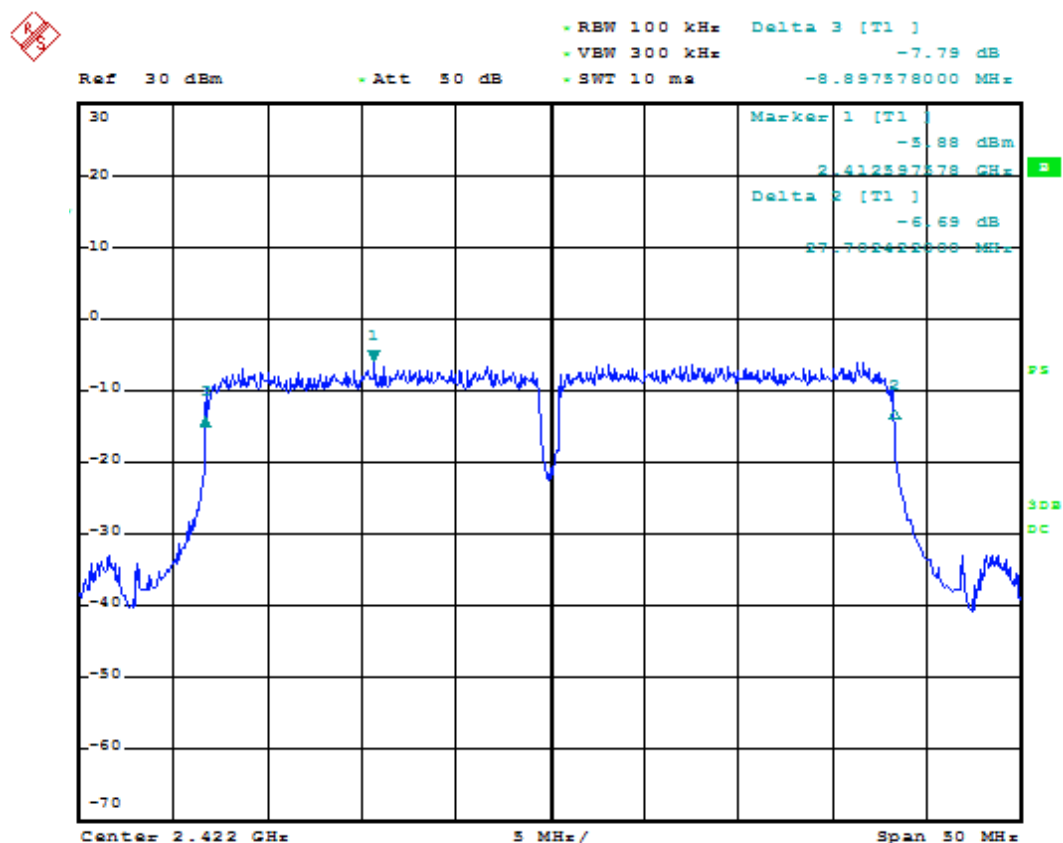
802.11n HT20 Ch 06 (2437 MHz) ANT1



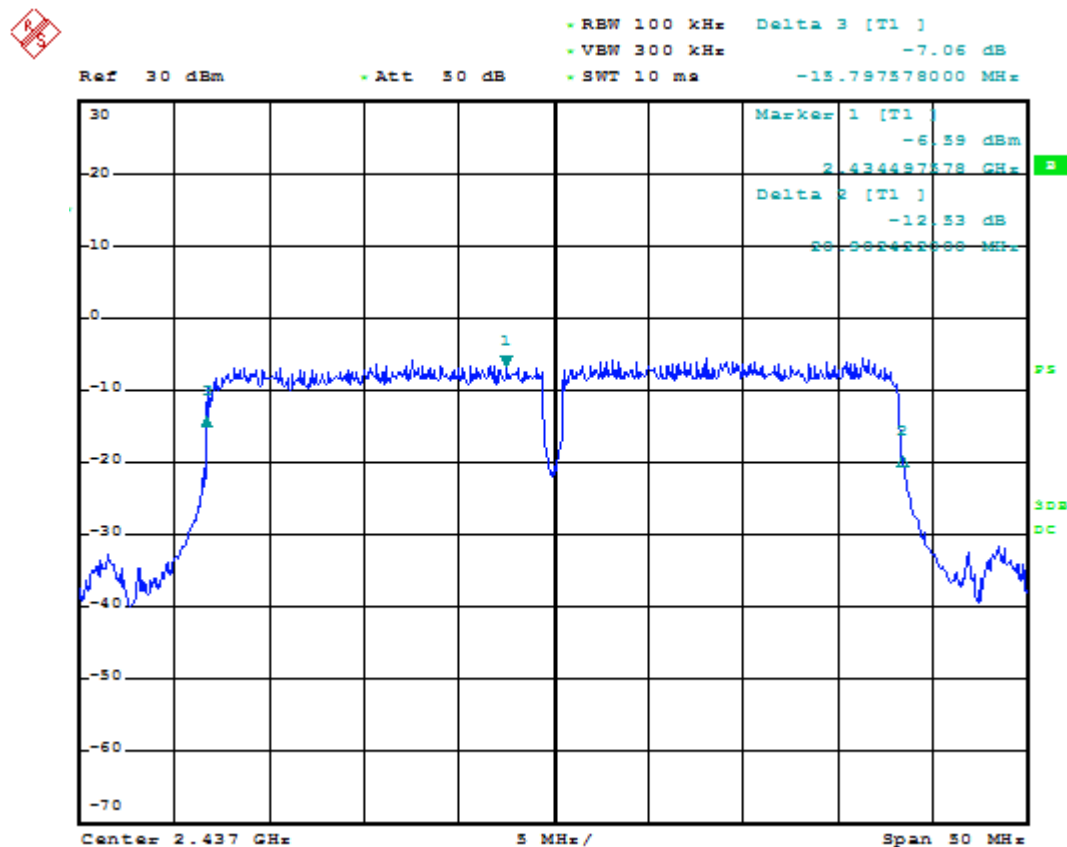
802.11n HT20 Ch 11 (2462 MHz) ANT1



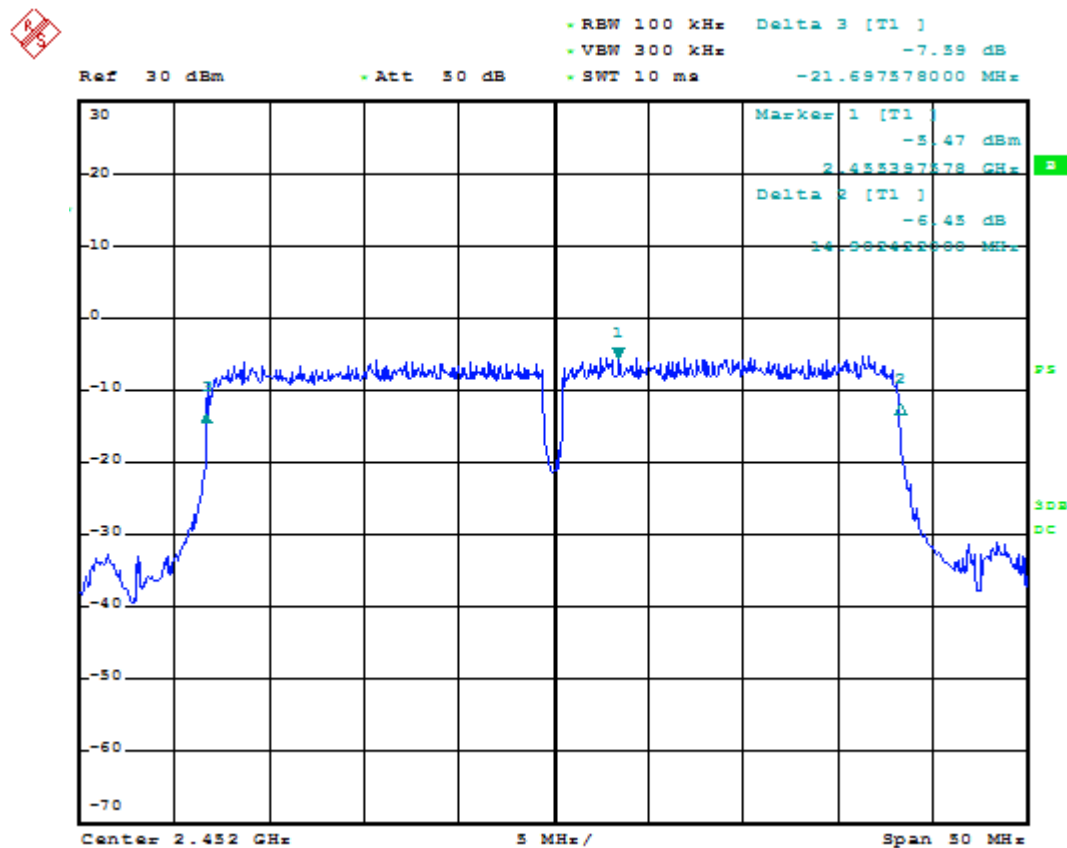
802.11n HT40 Ch 03 (2422 MHz) ANT1



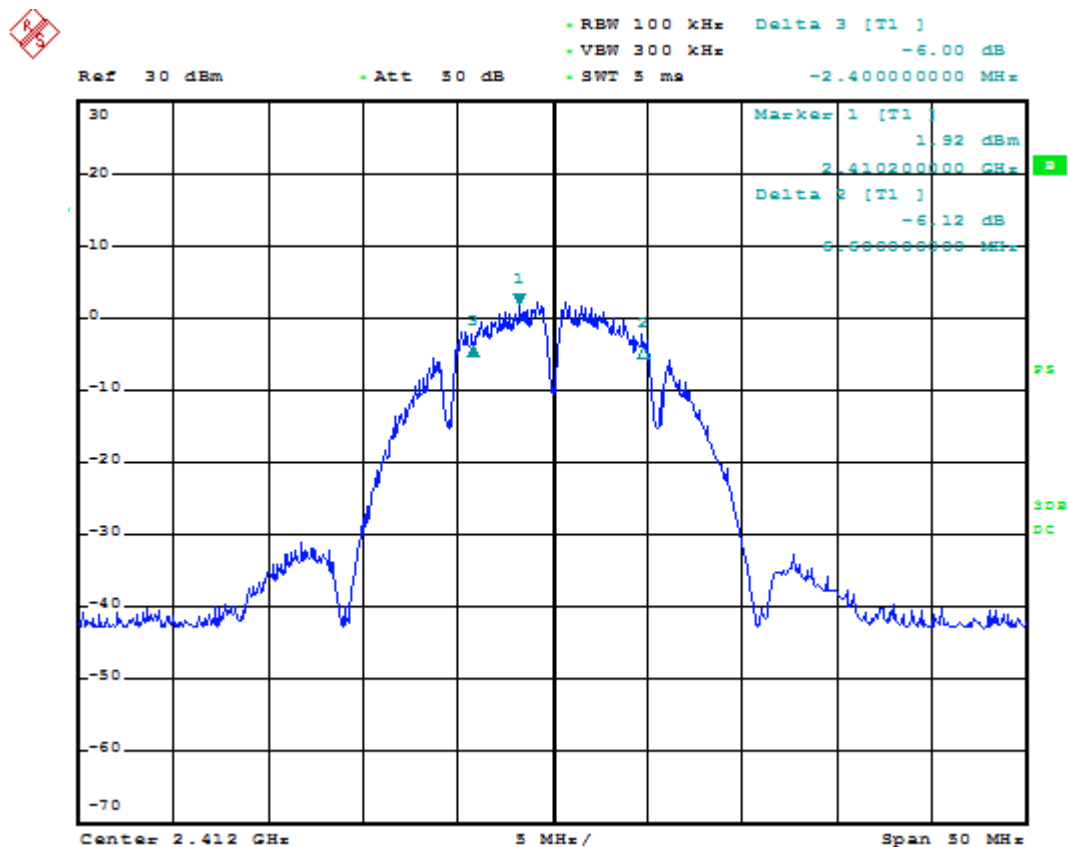
802.11n HT40 Ch 06 (2437 MHz) ANT1



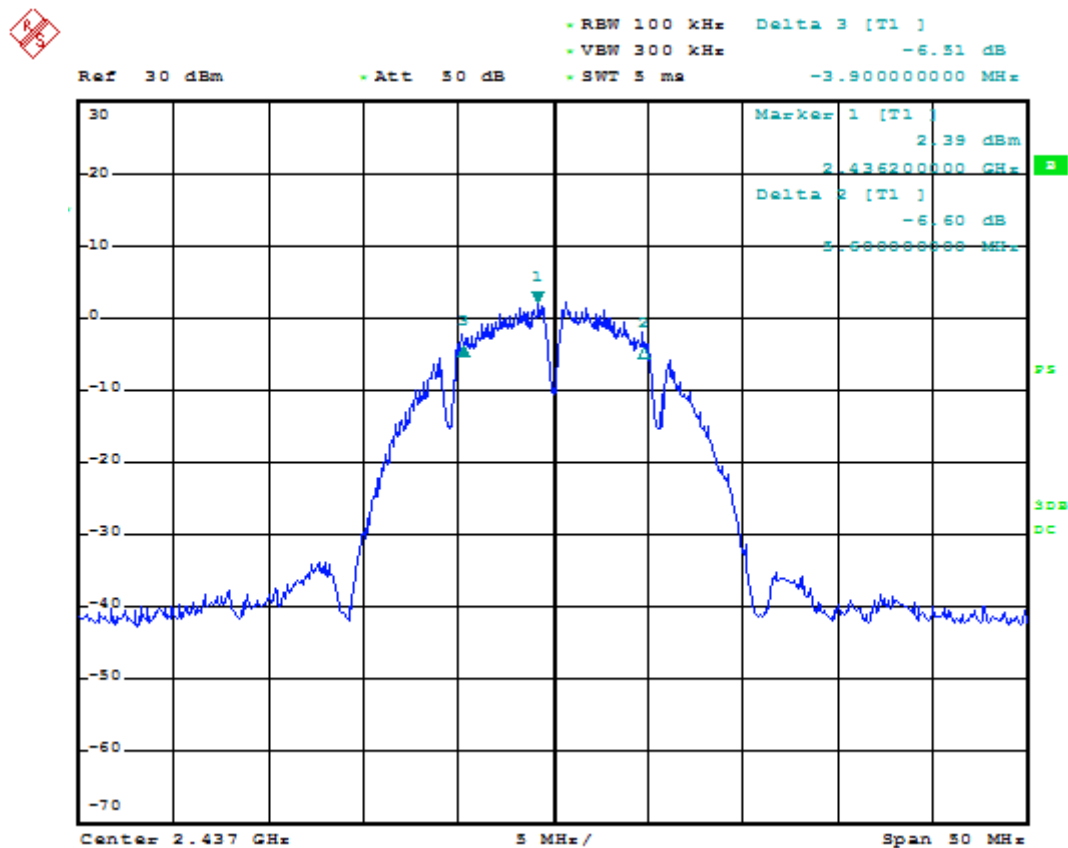
802.11n HT40 Ch 09 (2452 MHz) ANT1



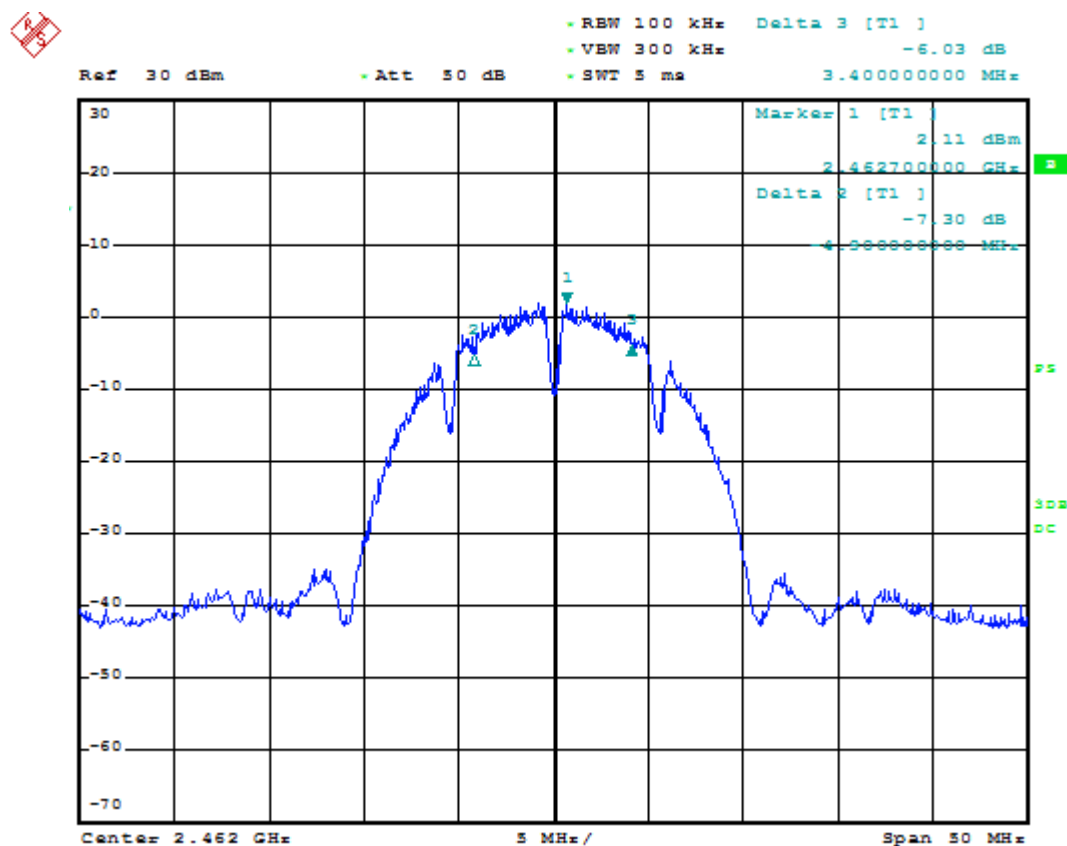
802.11b Ch 01 (2412 MHz) ANT2



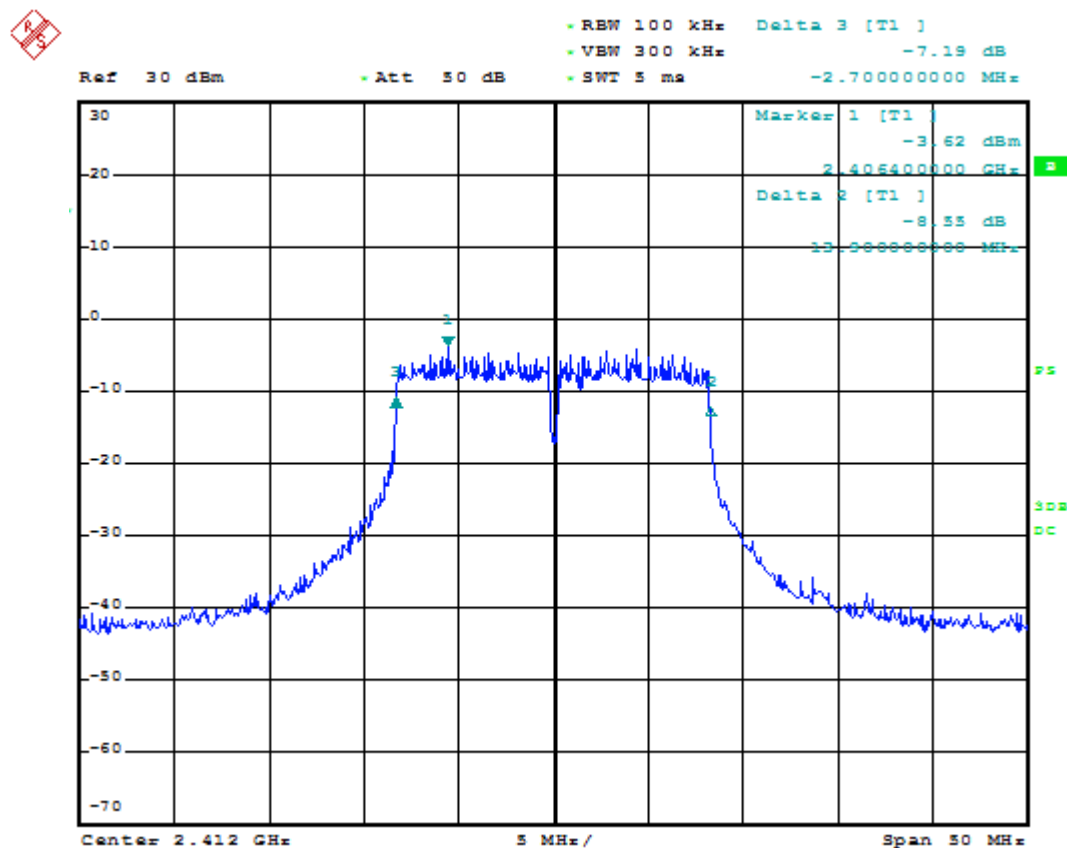
802.11b Ch 06 (2437 MHz) ANT2



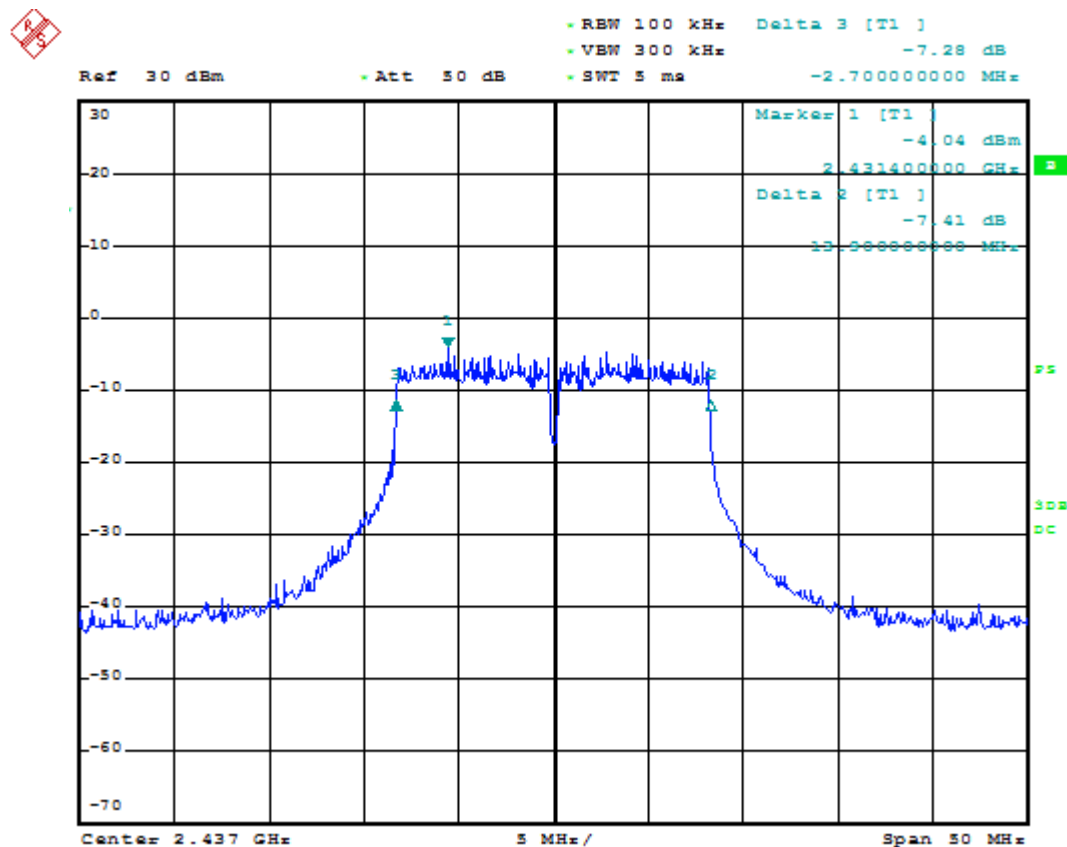
802.11b Ch 11 (2462 MHz) ANT2



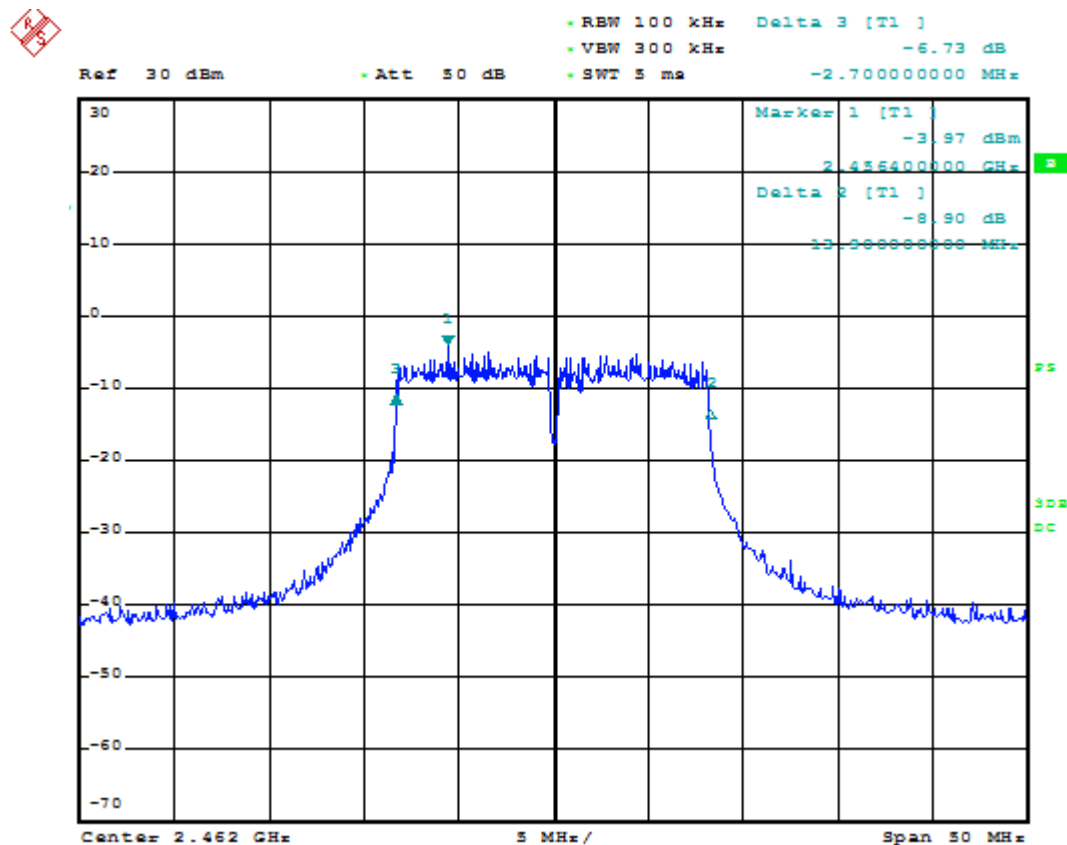
802.11g Ch 01 (2412 MHz) ANT2



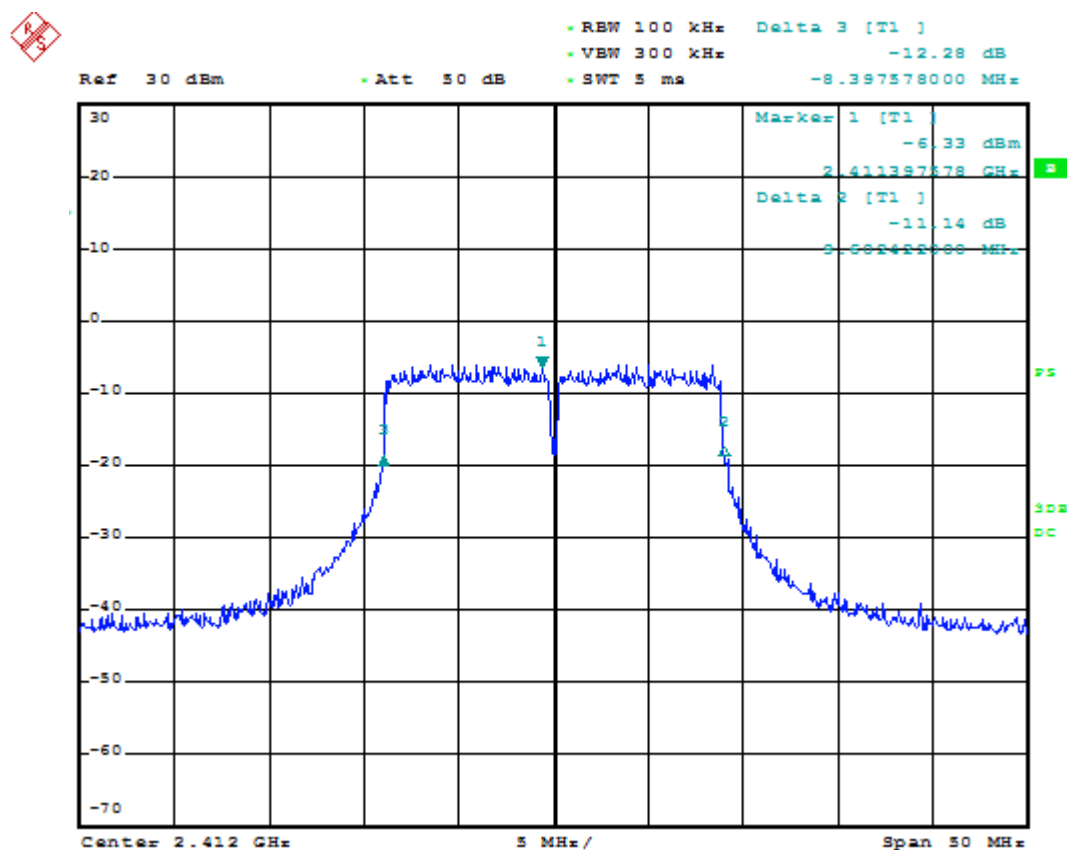
802.11g Ch 06 (2437 MHz) ANT2



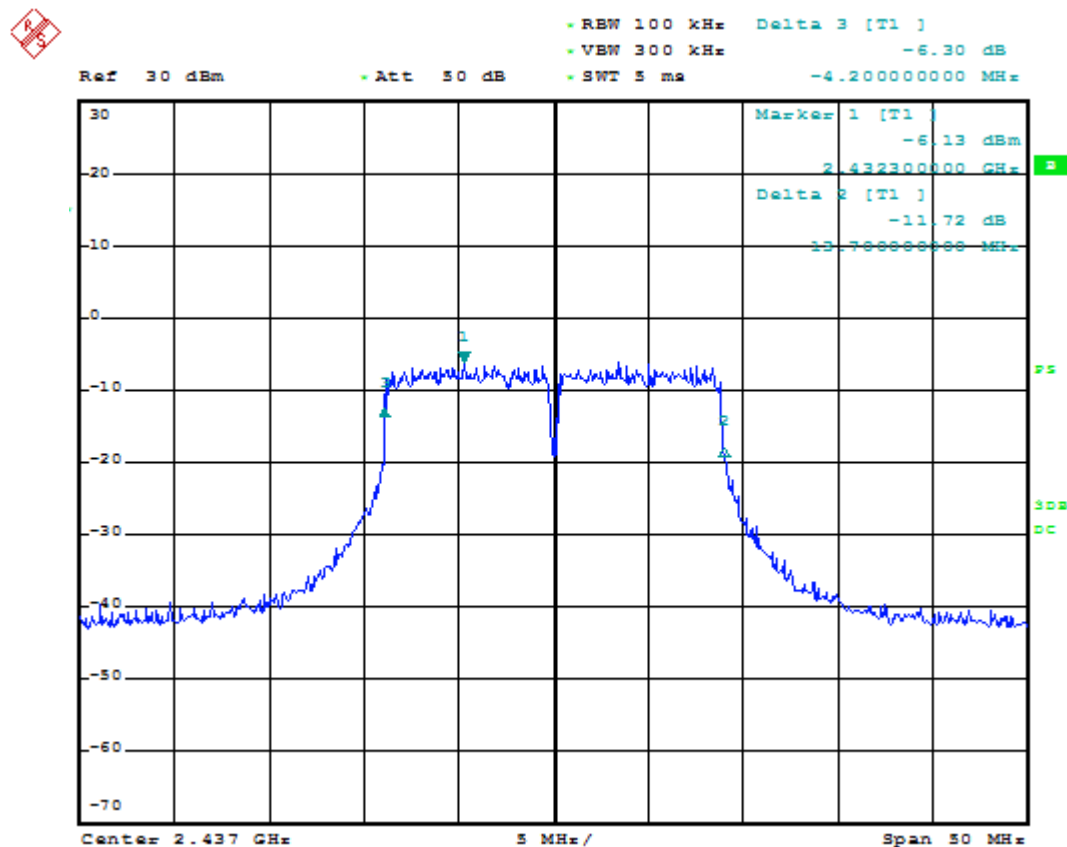
802.11g Ch 11 (2462 MHz) ANT2



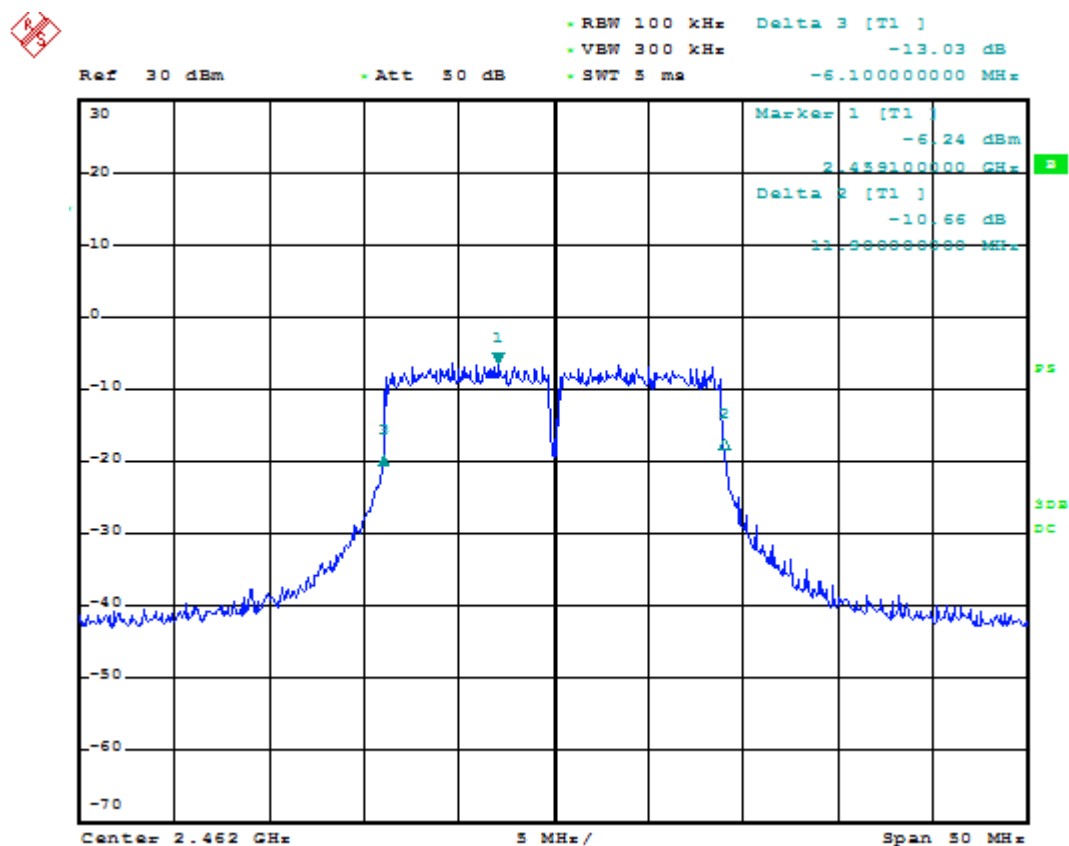
802.11n HT20 Ch 01 (2412 MHz) ANT2



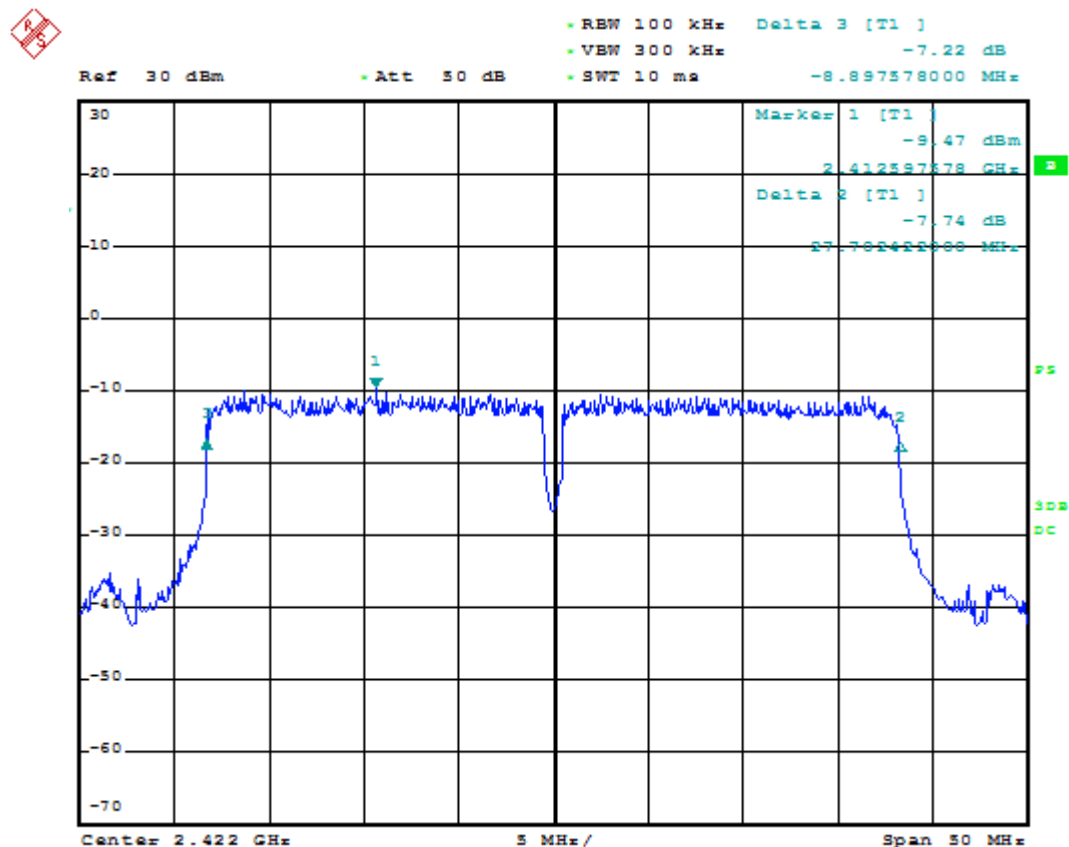
802.11n HT20 Ch 06 (2437 MHz) ANT2



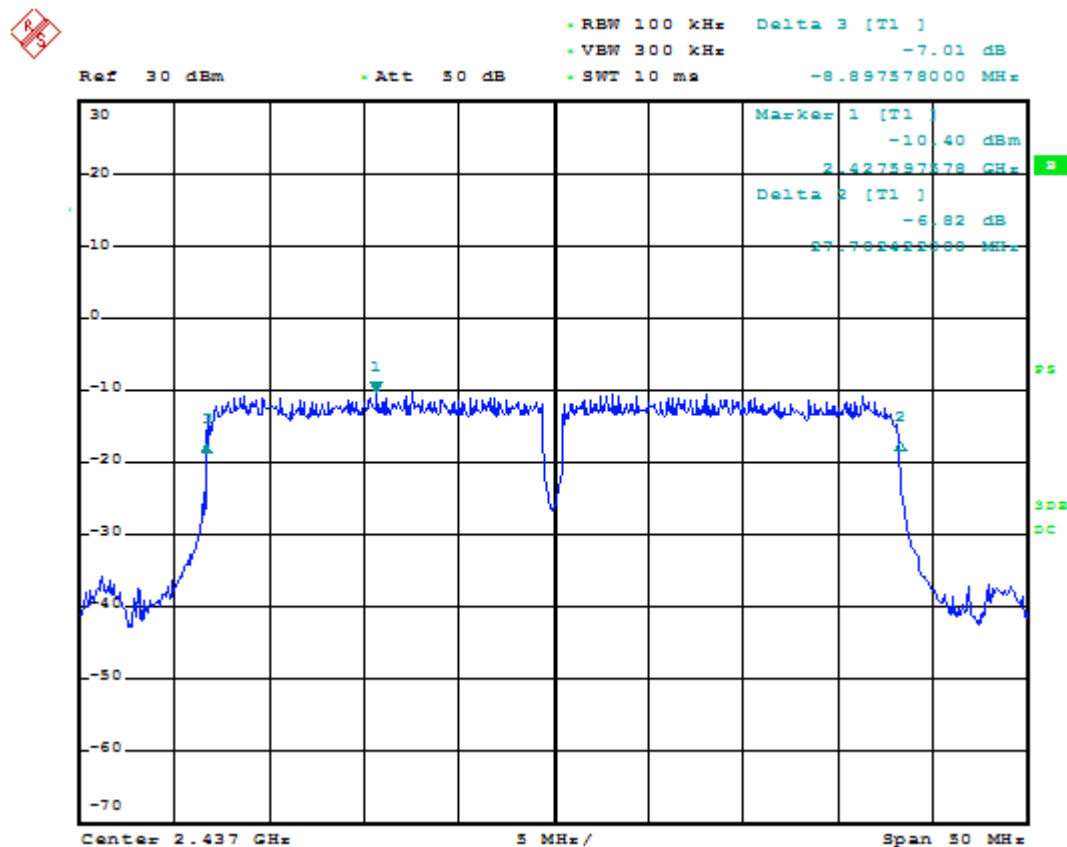
802.11n HT20 Ch 11 (2462 MHz) ANT2



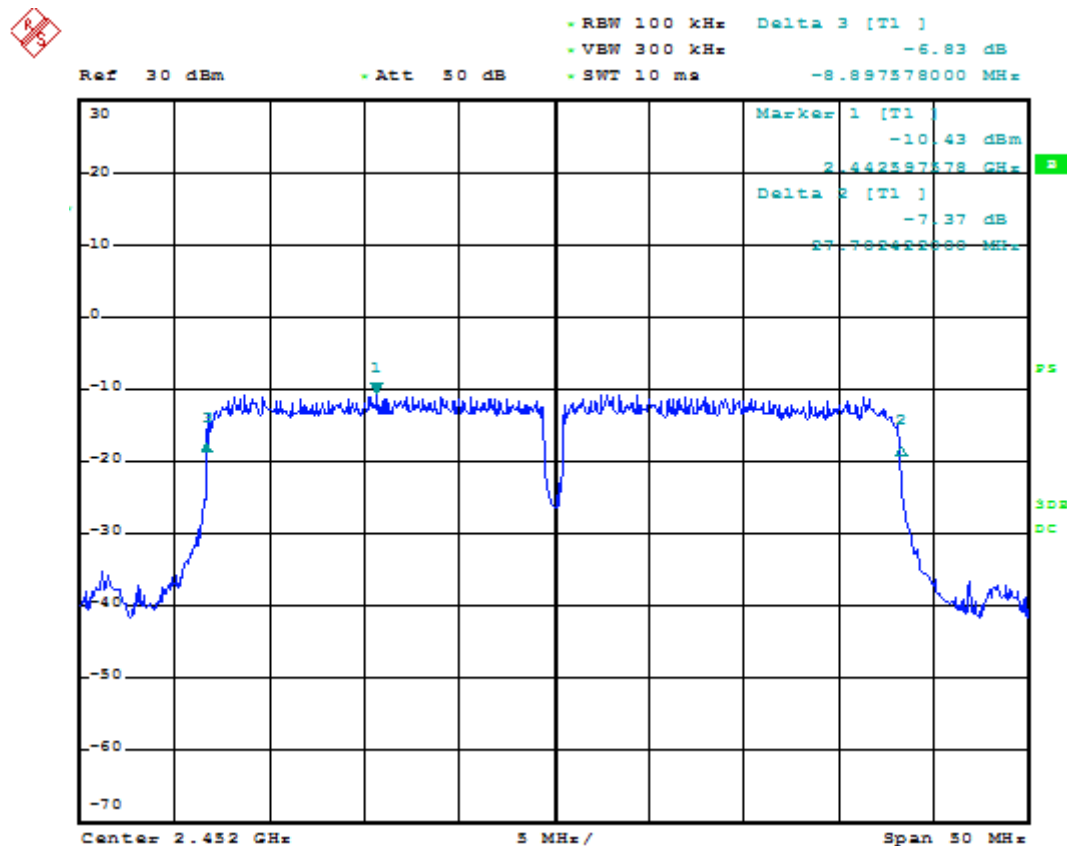
802.11n HT40 Ch 03 (2422 MHz) ANT2



802.11n HT40 Ch 06 (2437 MHz) ANT2



802.11n HT40 Ch 09 (2452 MHz) ANT2



6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

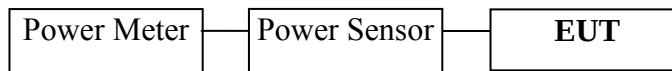
6.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

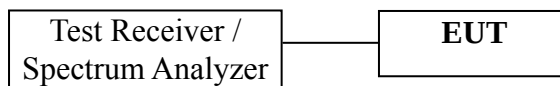
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Power Meter	Anritsu	ML2487A	6K00003245	Mar 22, 2012	Mar 22, 2013
2.	Power Sensor	Anritsu	MA2491A	32489	Mar 22, 2012	Mar 22, 2013
3.	Test Receiver	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

6.2 Block Diagram of Test Setup

For 802.11b/g/n HT20



For 802.11n HT40



6.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

6.4 Operating Condition of EUT

The test program “MP_TEST” was used to enable the EUT to transmit data at different channel frequency individually.

6.5 Test Procedure

This is an RF conducted test.

For 802.11b/g/n HT20:

Use a direct connection between the antenna port of the transmitter and the power meter, through suitable attenuation. We use Power Output Option 1 (which defined in KDB558074) to measure the power output. Power Output Option 1 is a peak measurement. The transmitter output was connected to the power meter that was designed to detect peak value automatically.

Note: The bandwidth of the power meter is 20MHz.

For 802.11n HT40:

The transmitter output was connected to the Test Receiver. The Test Receiver was set as RBW = 10MHz (maximum available), VBW = 10MHz (maximum available setting (must be $\geq$ RBW)), span to fully encompass the DTS bandwidth. Use the Test Receiver’s band power measurement function with the band limits set equal to the DTS bandwidth edges.

The test procedure is defined in KDB558074 v02:2012 (the 8.1.2 Measurement Procedure “Option 2 (channel integration method)” was used).

6.6 Test Results

PASSED. All the test results are listed below.

(Test Date: Nov. 20, 2012 Temperature: 24°C Humidity: 45 %)

ANT1

Modulation	Channel	Frequency	Peak Output Power	Limit
802.11b	01	2412 MHz	20.07 dBm	30 dBm
	06	2437 MHz	20.85 dBm	30 dBm
	11	2462 MHz	20.14 dBm	30 dBm
802.11g	01	2412 MHz	21.00 dBm	30 dBm
	06	2437 MHz	22.17 dBm	30 dBm
	11	2462 MHz	21.96 dBm	30 dBm

ANT2

Modulation	Channel	Frequency	Peak Output Power	Limit
802.11b	01	2412 MHz	17.30 dBm	30 dBm
	06	2437 MHz	17.64 dBm	30 dBm
	11	2462 MHz	17.81 dBm	30 dBm
802.11g	01	2412 MHz	19.00 dBm	30 dBm
	06	2437 MHz	19.50 dBm	30 dBm
	11	2462 MHz	19.61 dBm	30 dBm

802.11n

Modulation	Channel	Frequency	Peak Output Power ANT1	Peak Output Power ANT2	Total Peak Output Power	Limit
802.11n HT20	01	2412 MHz	21.60 dBm	18.62 dBm	23.37 dBm	30 dBm
	06	2437 MHz	21.97 dBm	19.01 dBm	23.75 dBm	30 dBm
	11	2462 MHz	21.83 dBm	19.21 dBm	23.72 dBm	30 dBm
802.11n HT40	03	2422 MHz	21.09 dBm	18.19 dBm	22.89 dBm	30 dBm
	06	2437 MHz	22.34 dBm	17.63 dBm	23.60 dBm	30 dBm
	09	2452 MHz	22.57 dBm	17.47 dBm	23.74 dBm	30 dBm

7 EMISSION LIMITATIONS MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the emission limitations test :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	Agilent	E7405A	MY45106600	Dec 17, 2012	Dec 17, 2013

7.2 Block Diagram of Test Setup

The same as Section. 5.2.

7.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※This test result attaching to Section. 4.7)

7.4 Operating Condition of EUT

The test program “MP_TEST” was used to enable the EUT to transmit data at different channel frequency individually.

7.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW = 100 kHz, VBW $\geq$ 300 kHz, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

The test procedure is defined in KDB558074 v02:2012 (the 10.1.2 Unwanted Emission Level Measurement was used).

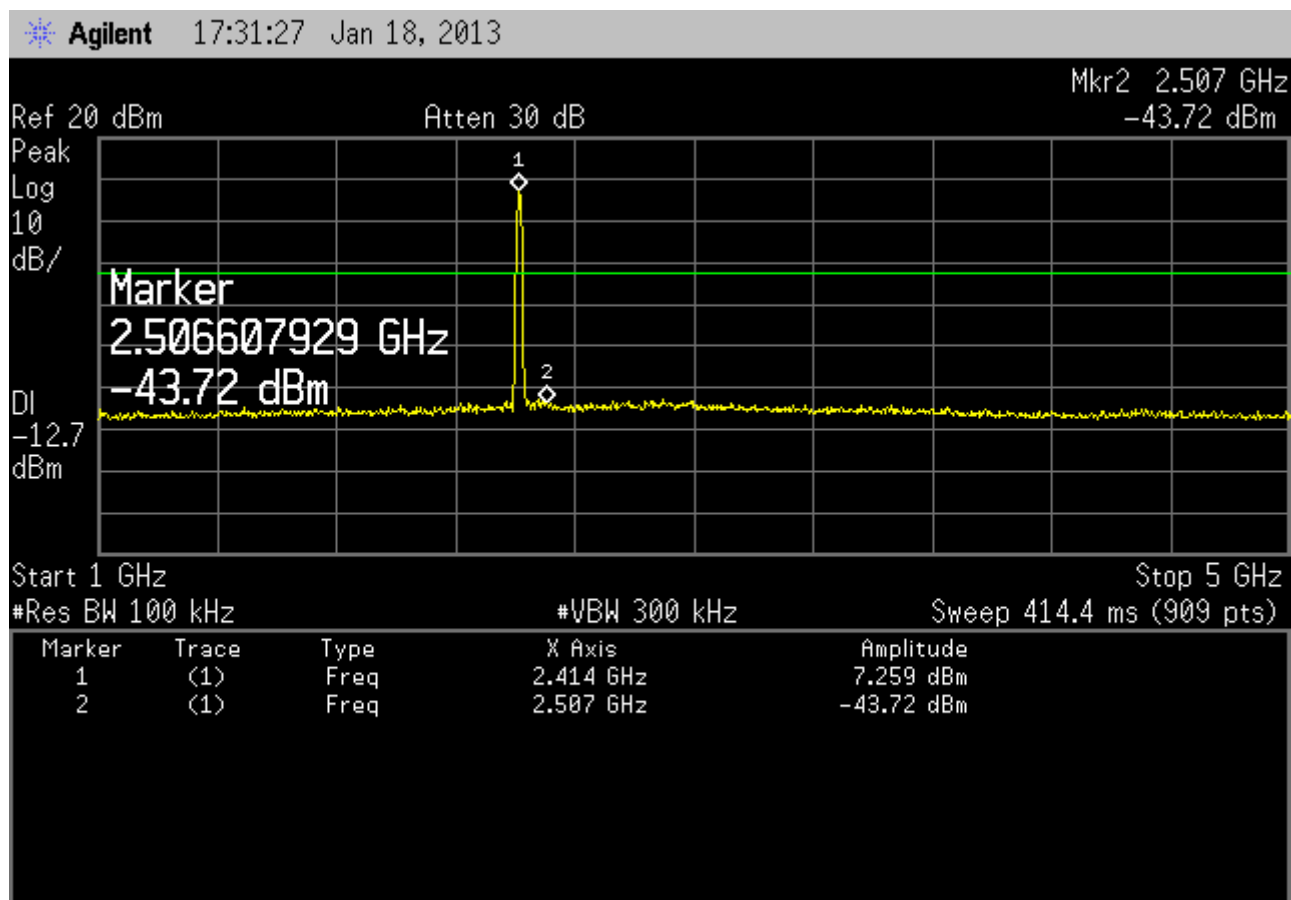
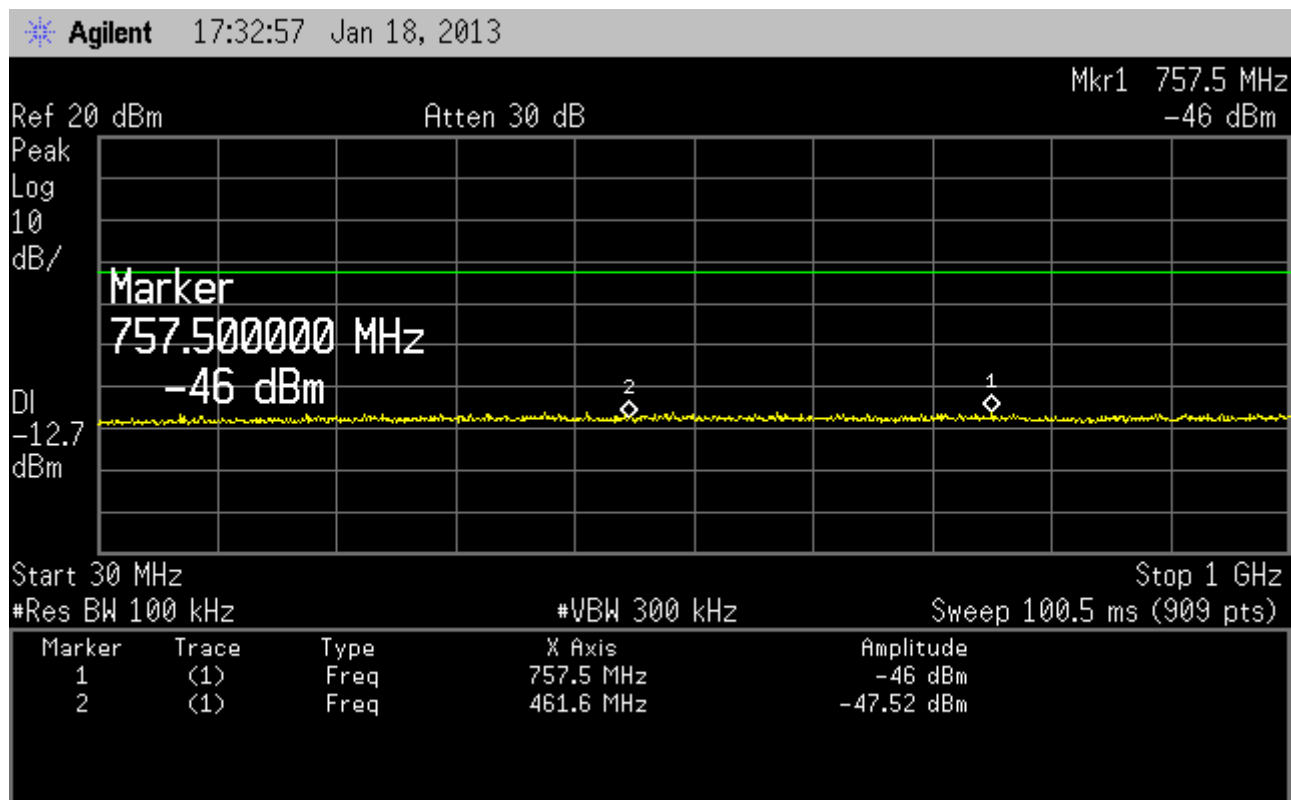
7.6 Test Results

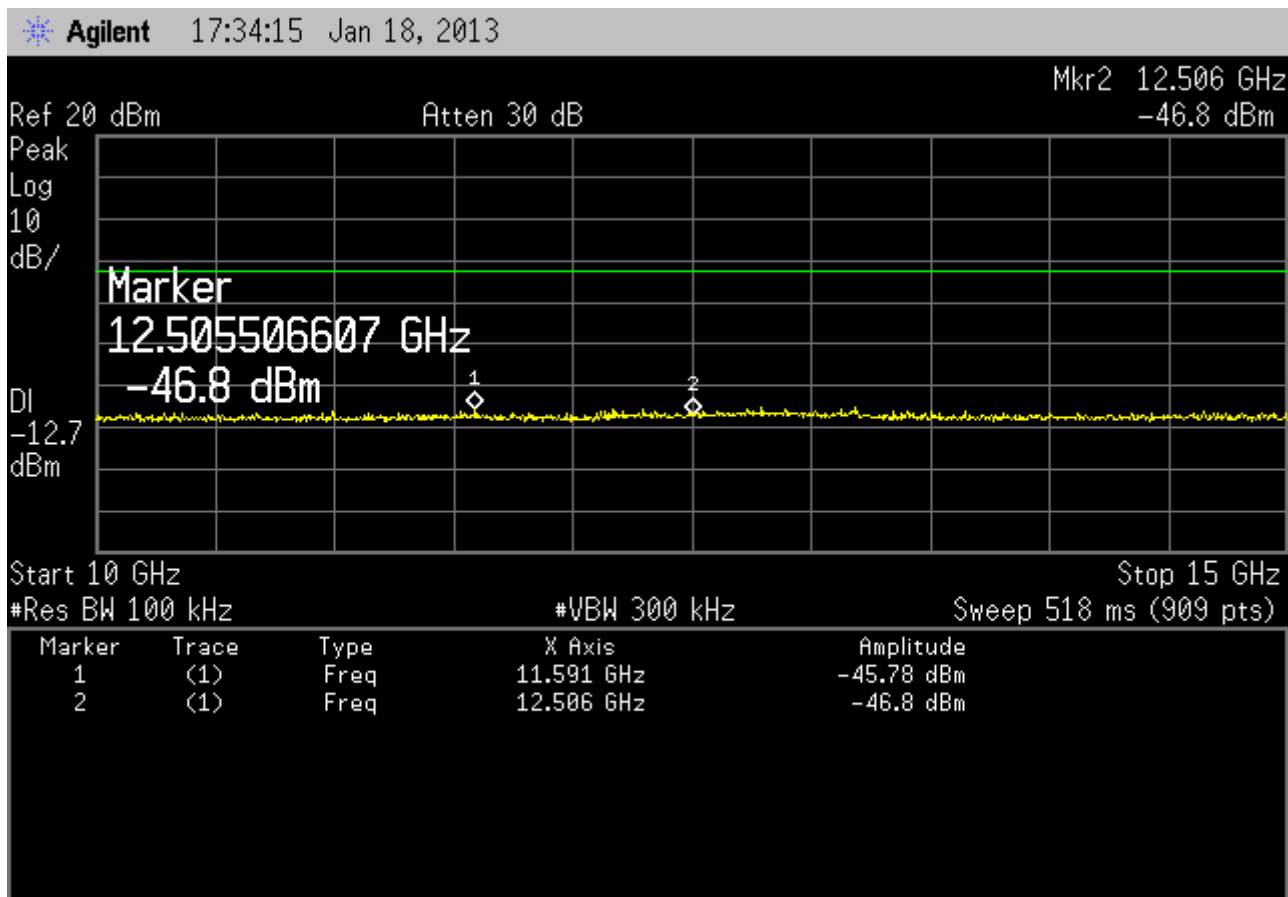
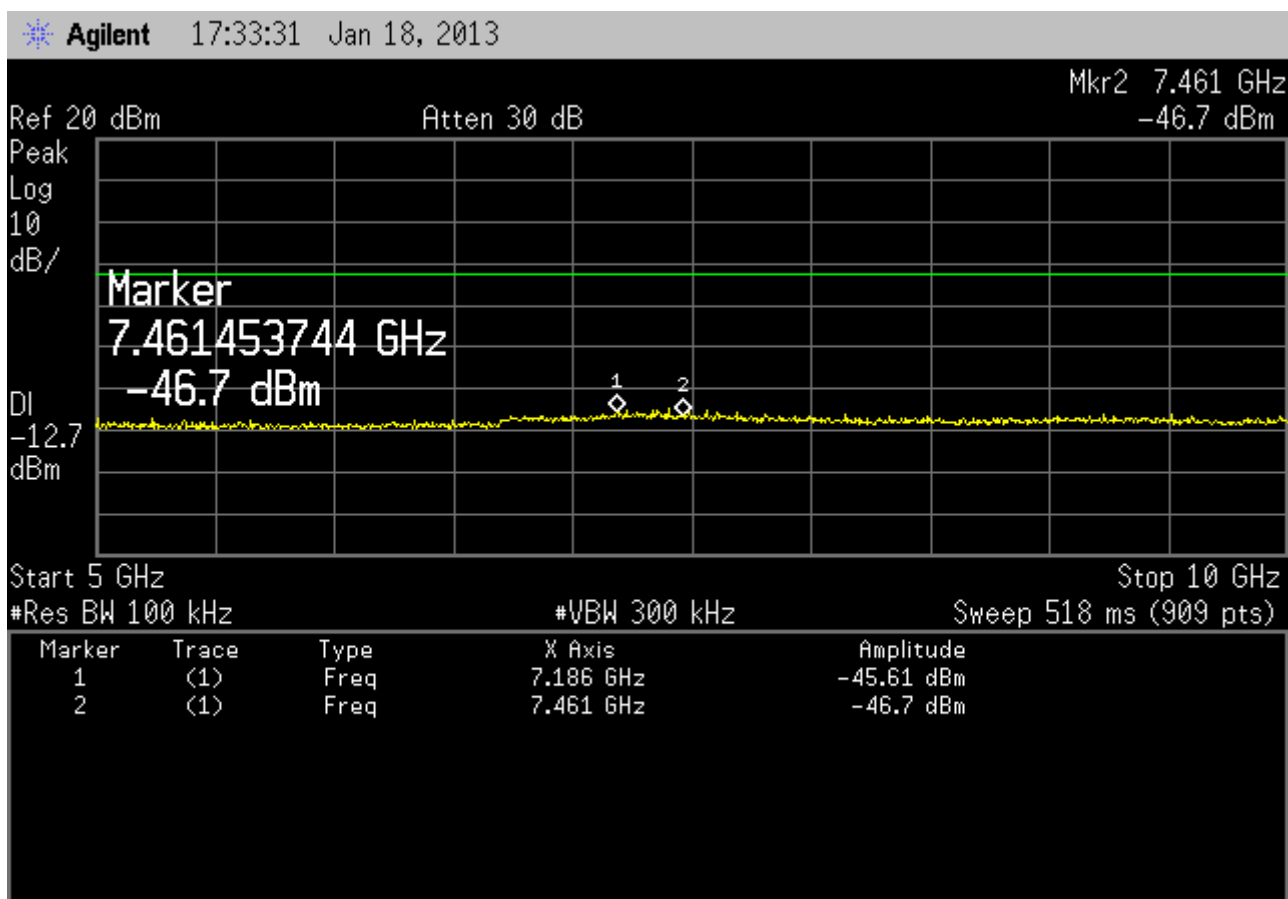
PASSED.

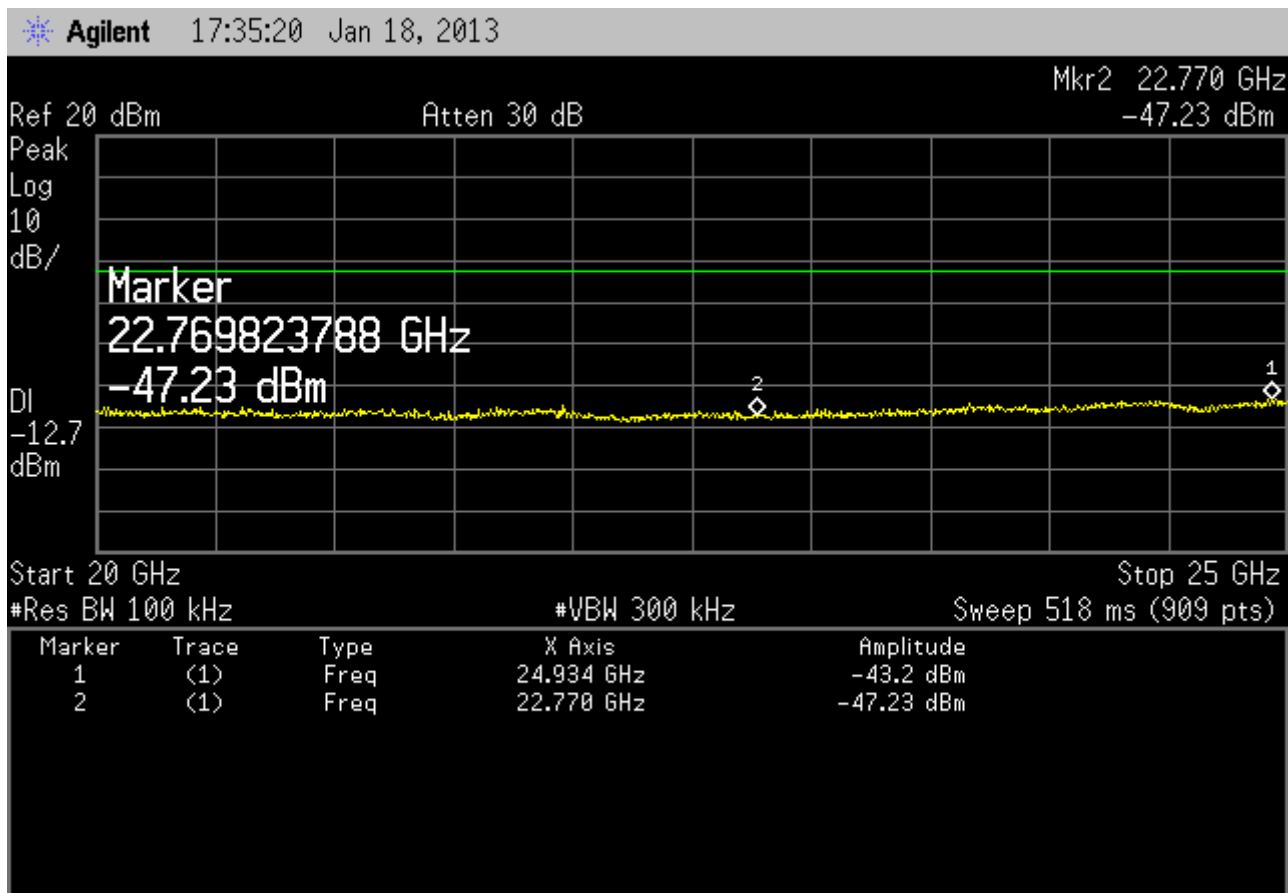
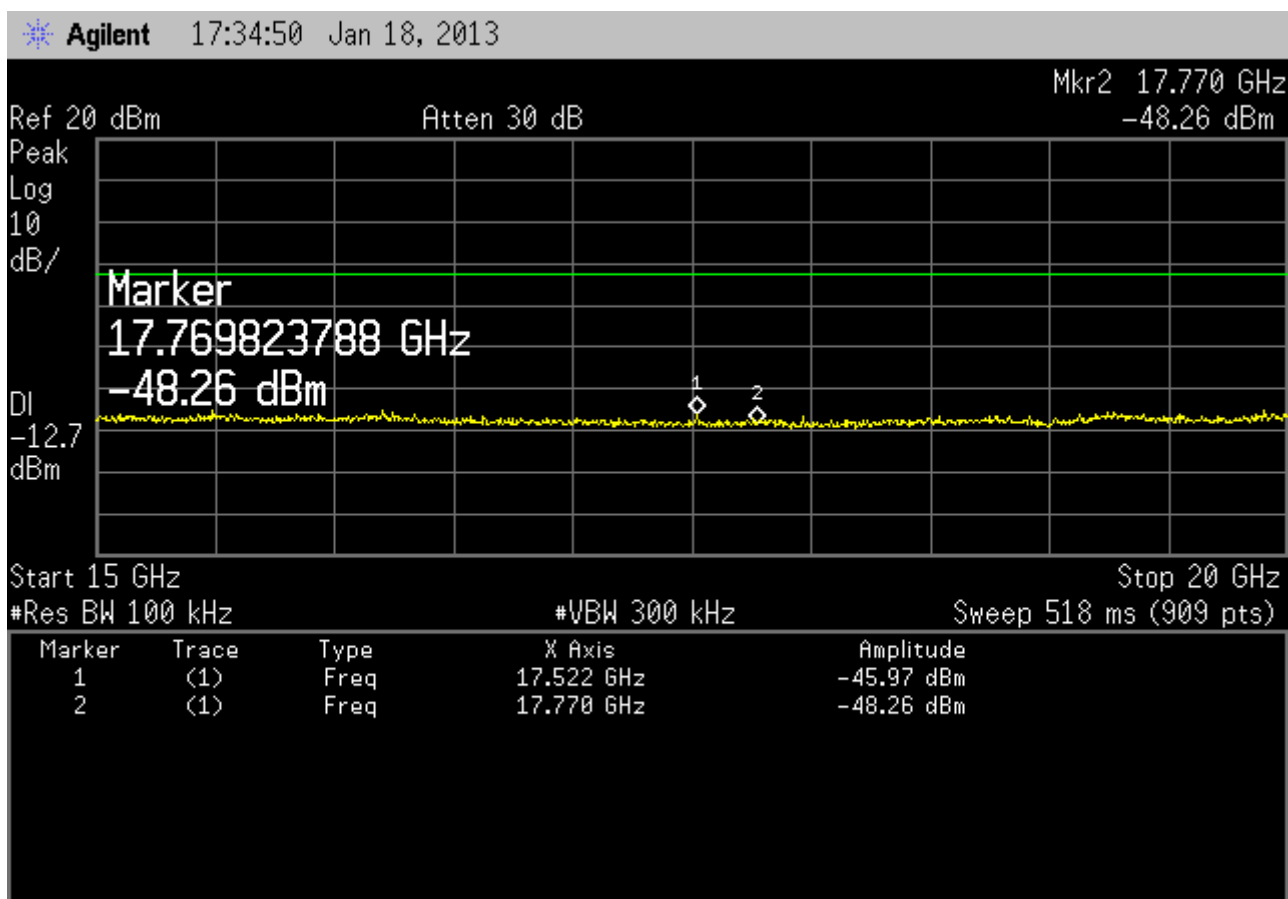
The test data was attached in the next pages.

(Test Date: Jan. 18, 2013 Temperature: 24°C Humidity: 46 %)

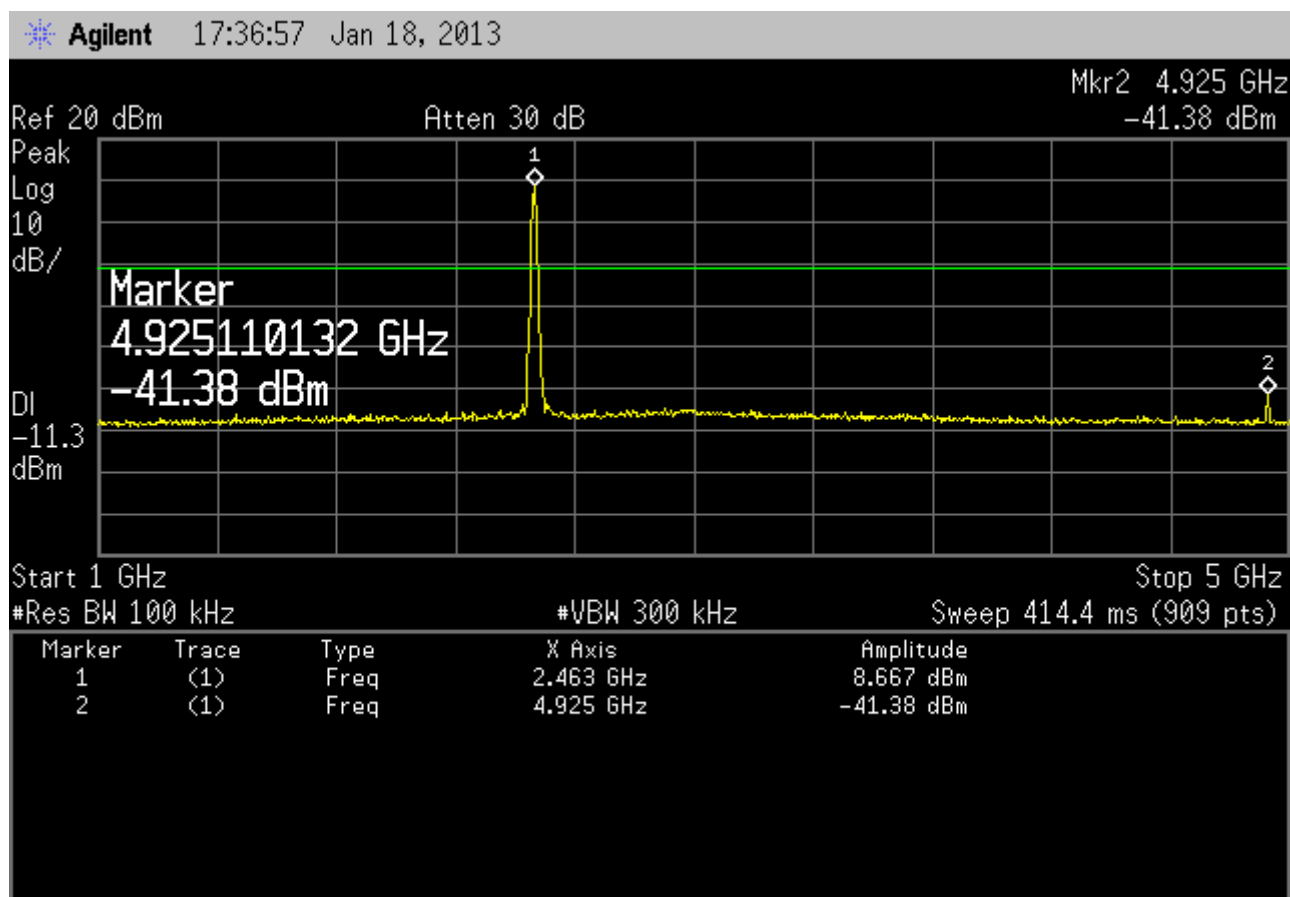
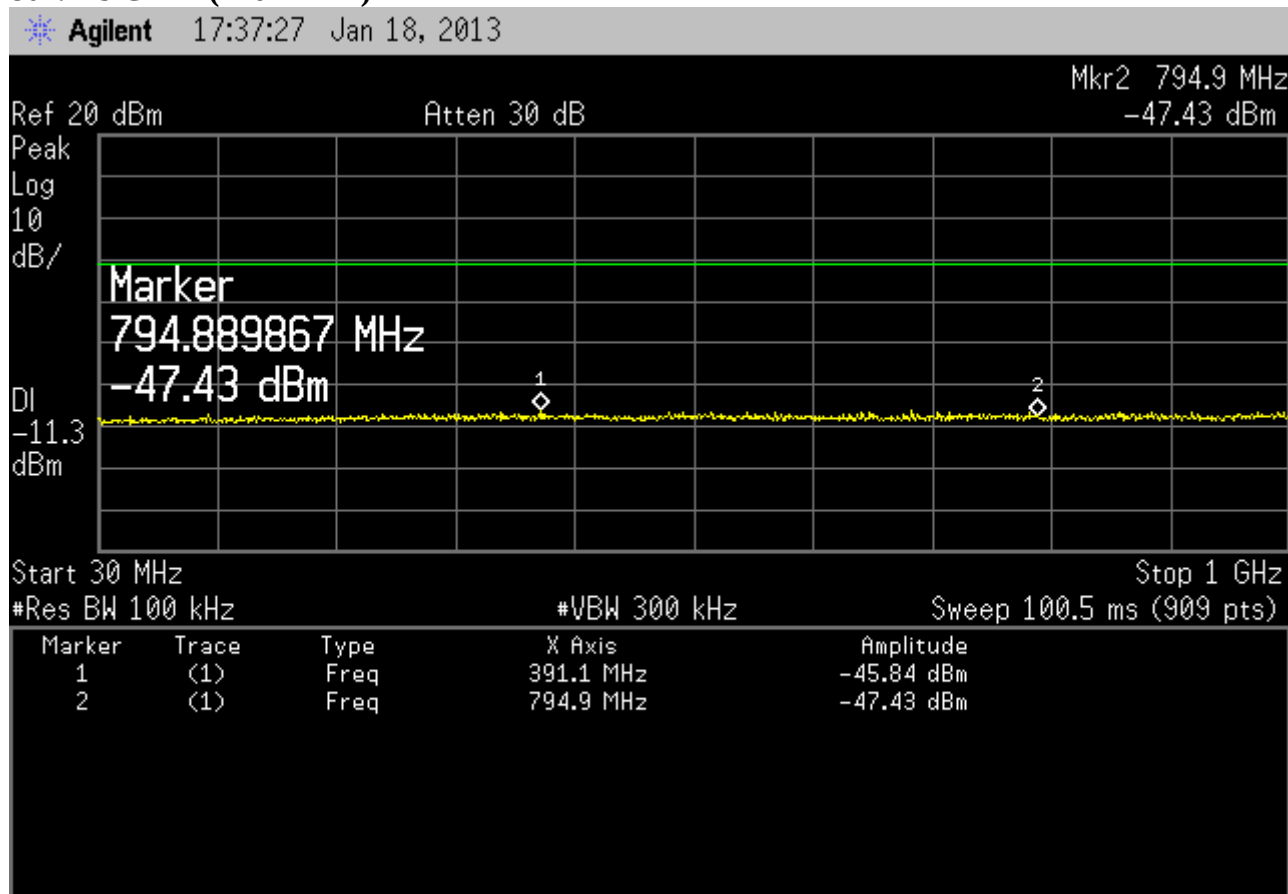
802.11b Ch 01 (2412 MHz) ANT1

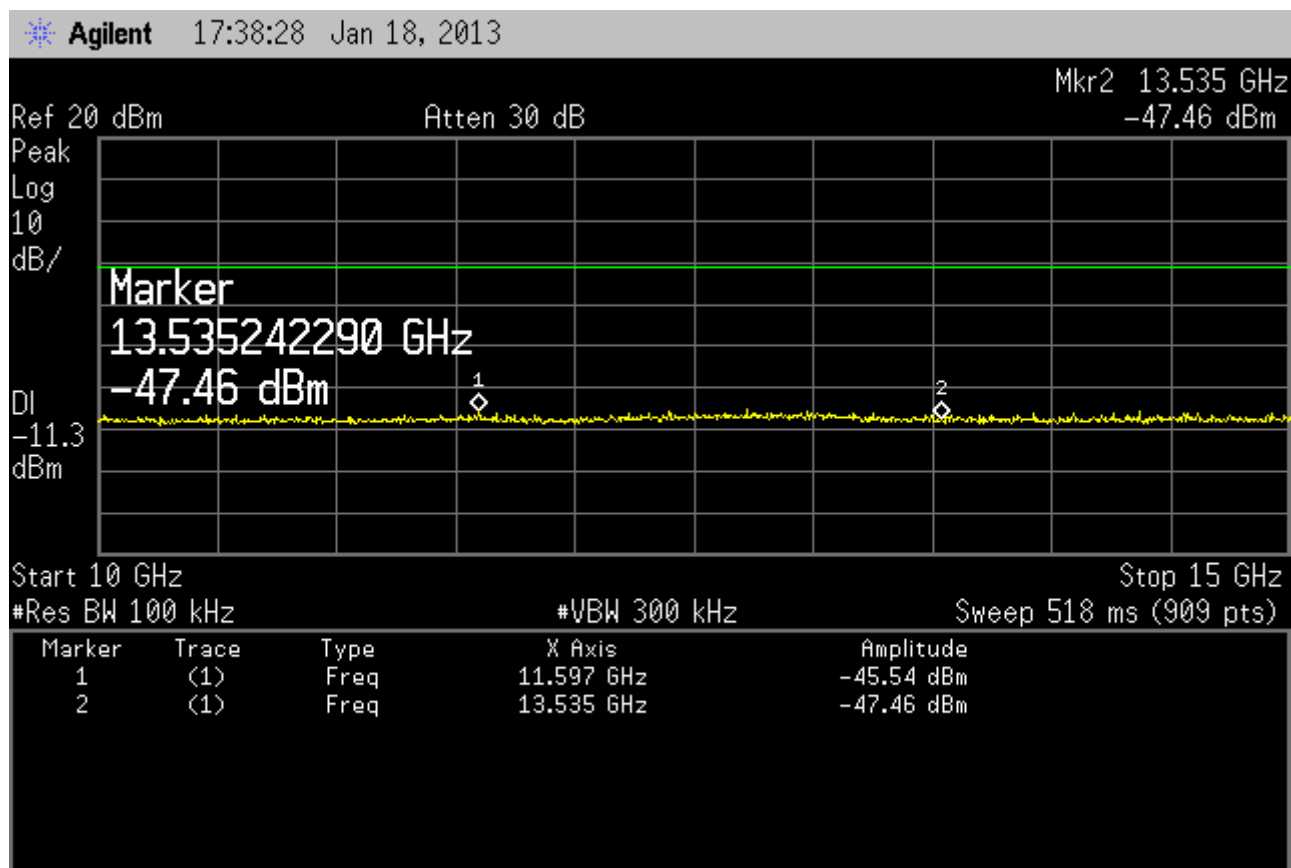
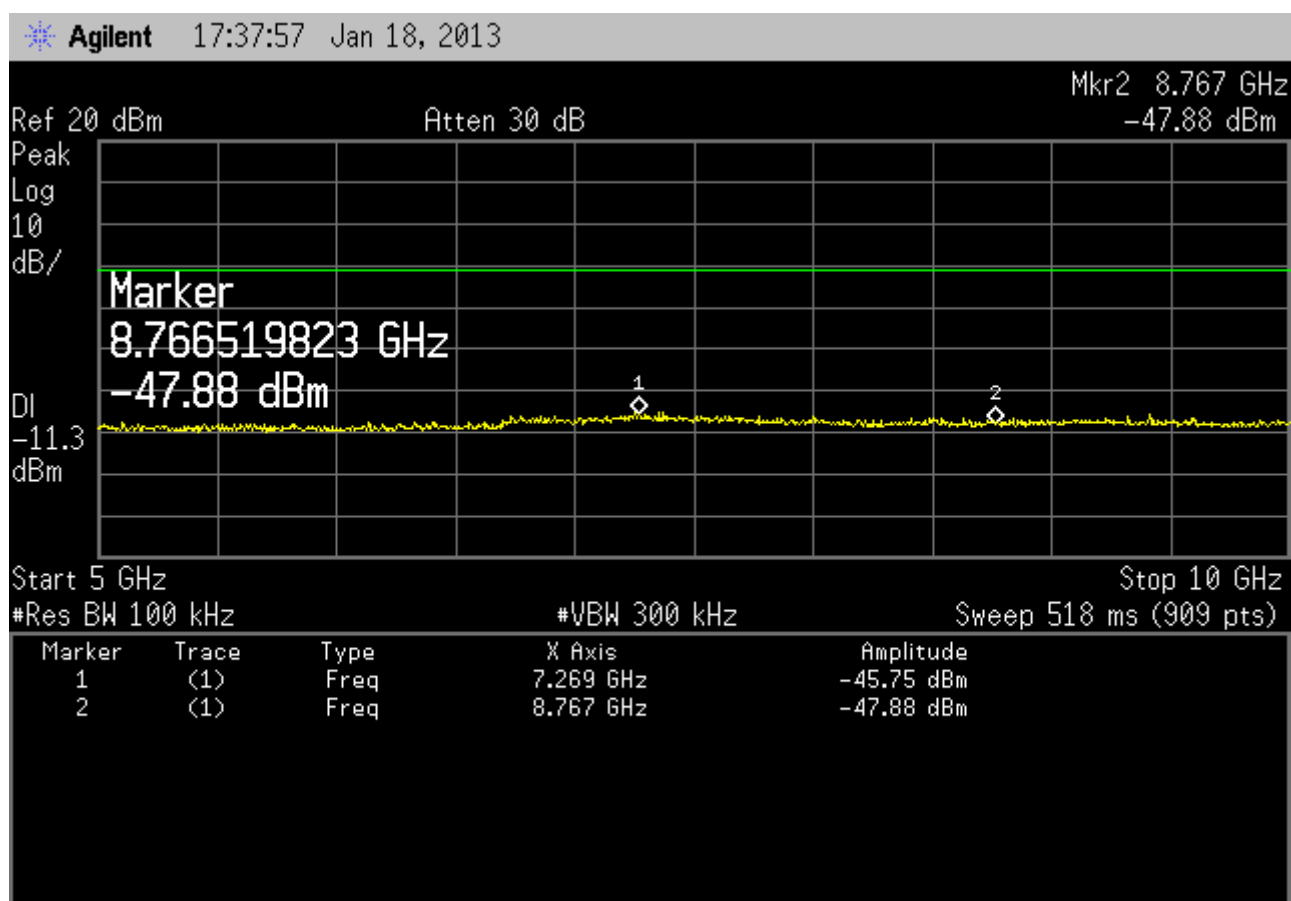


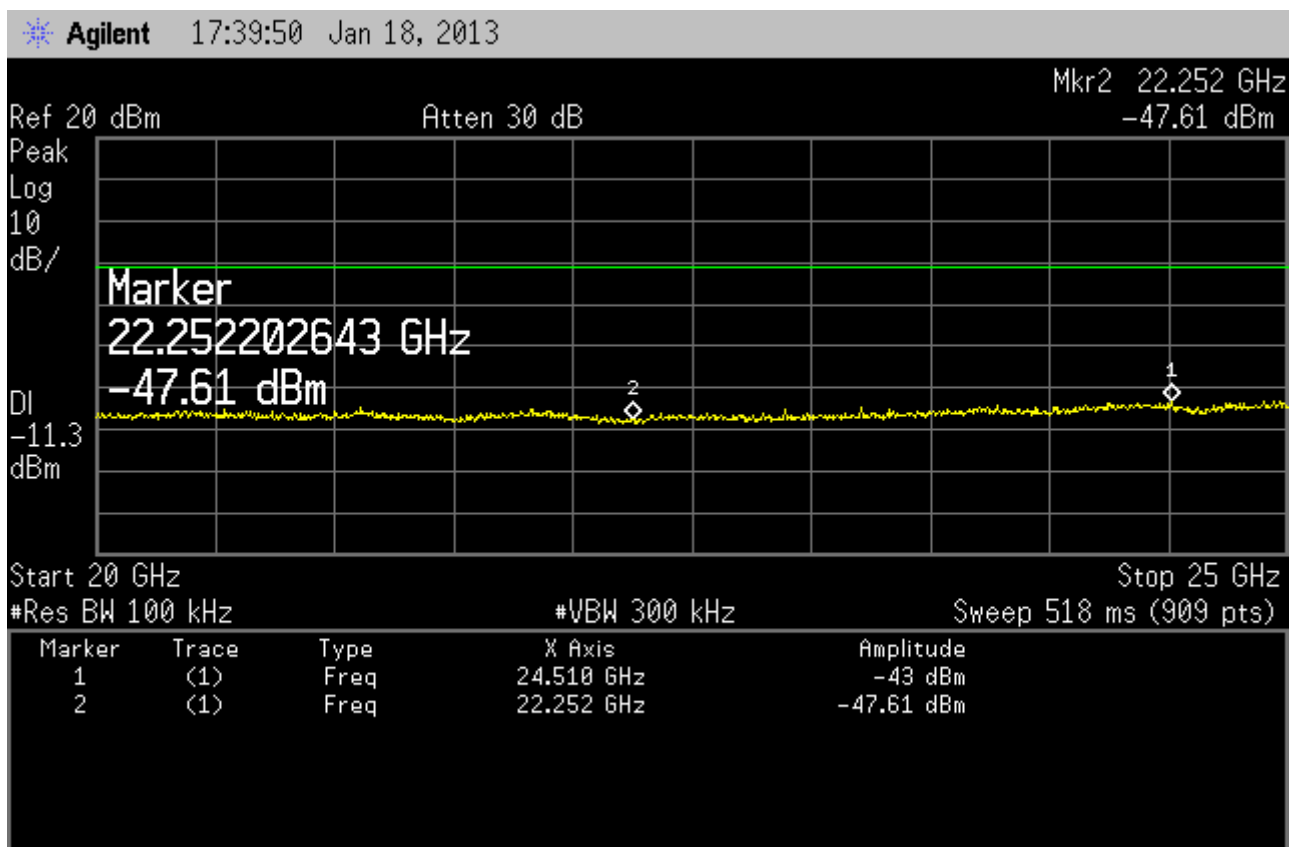
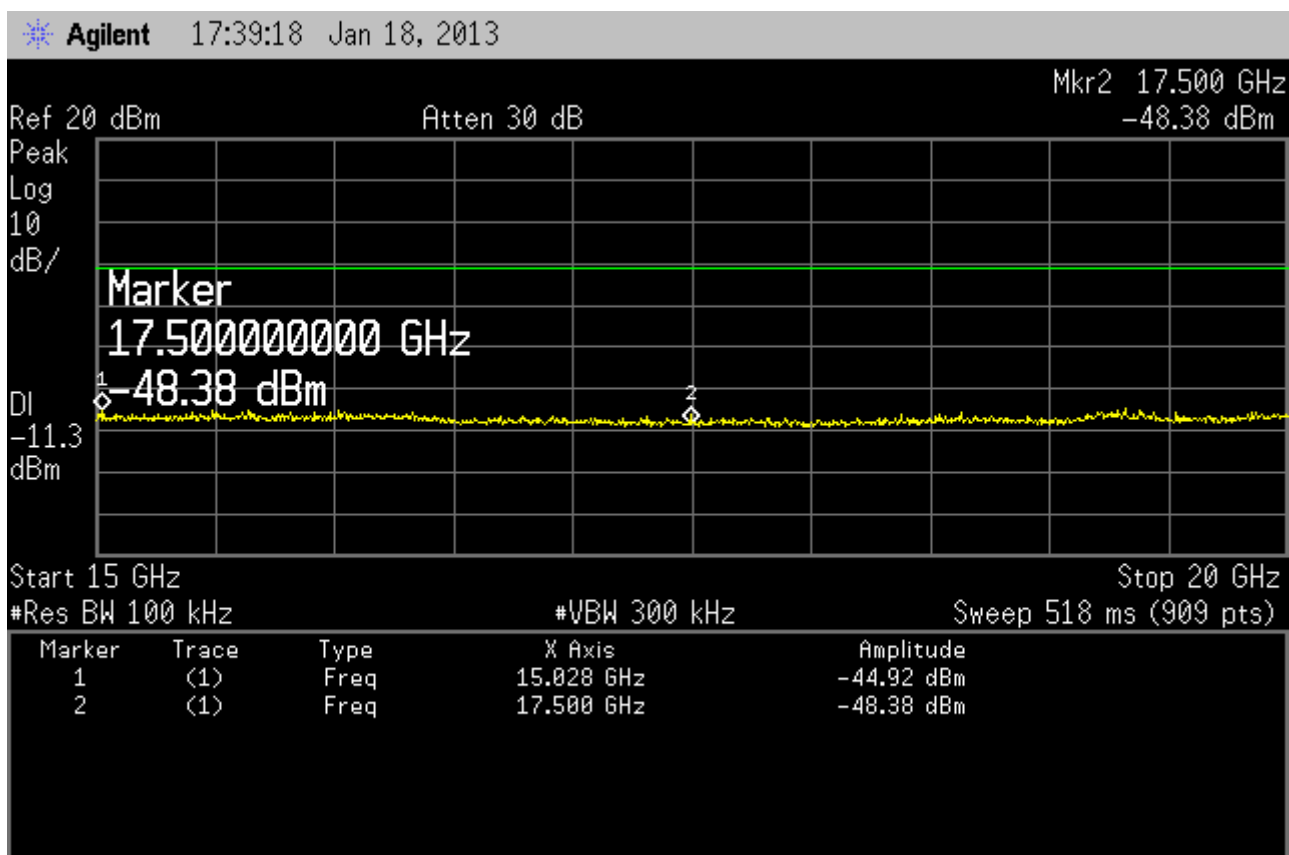




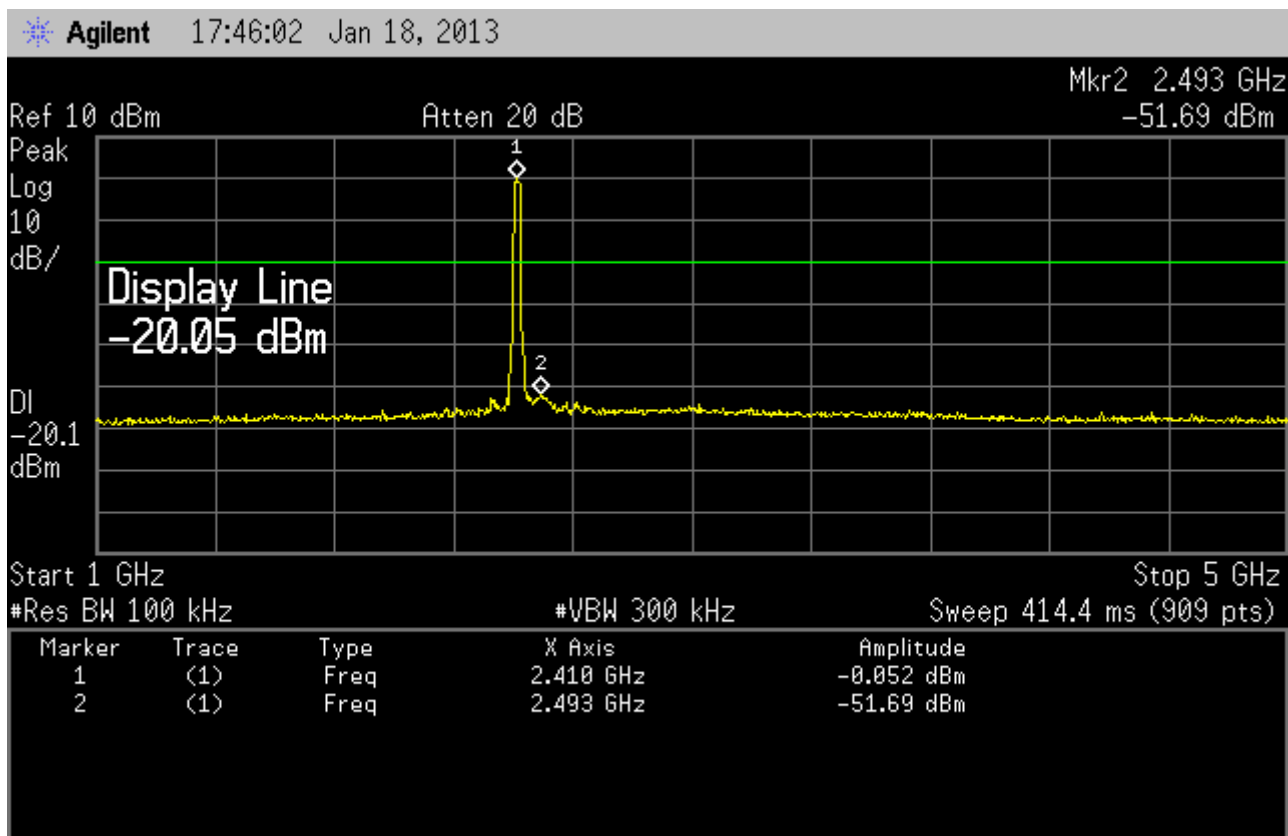
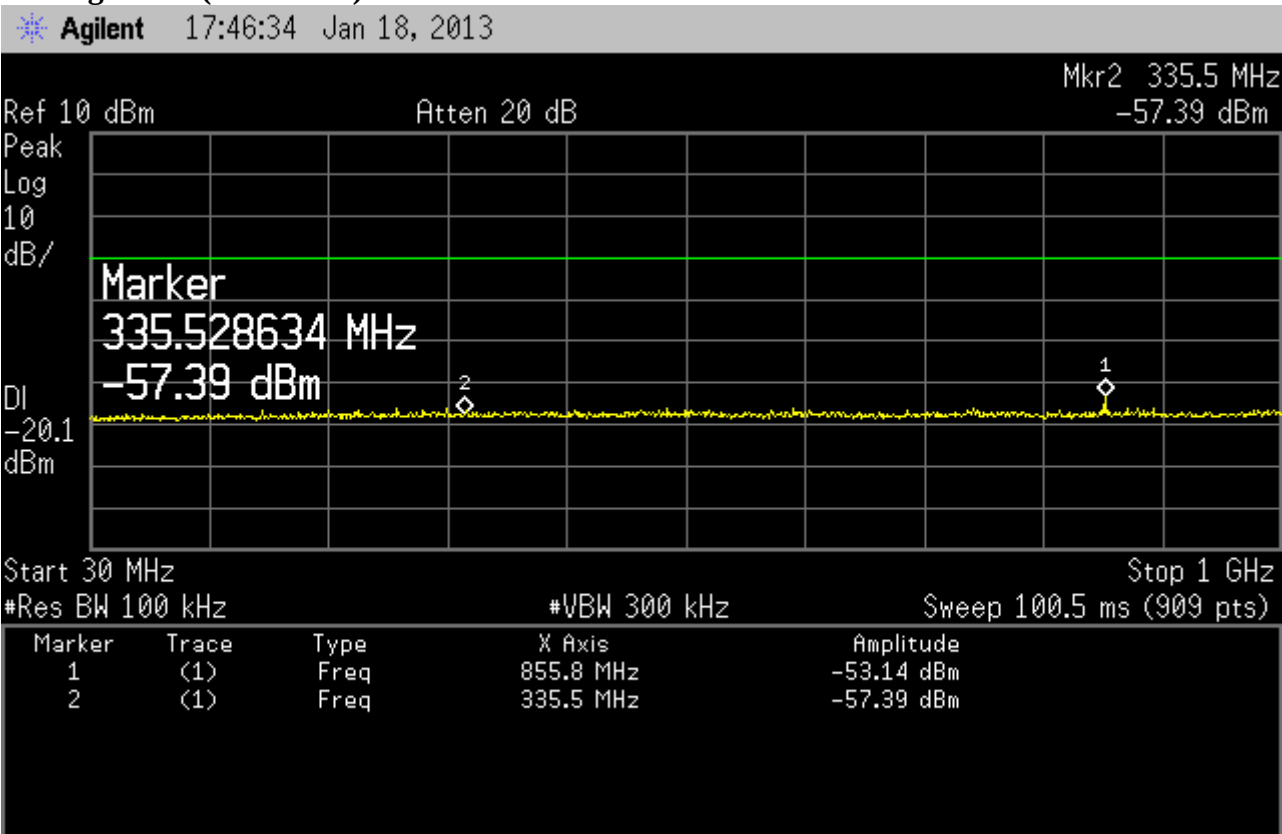
802.11b Ch 11 (2462 MHz) ANT1

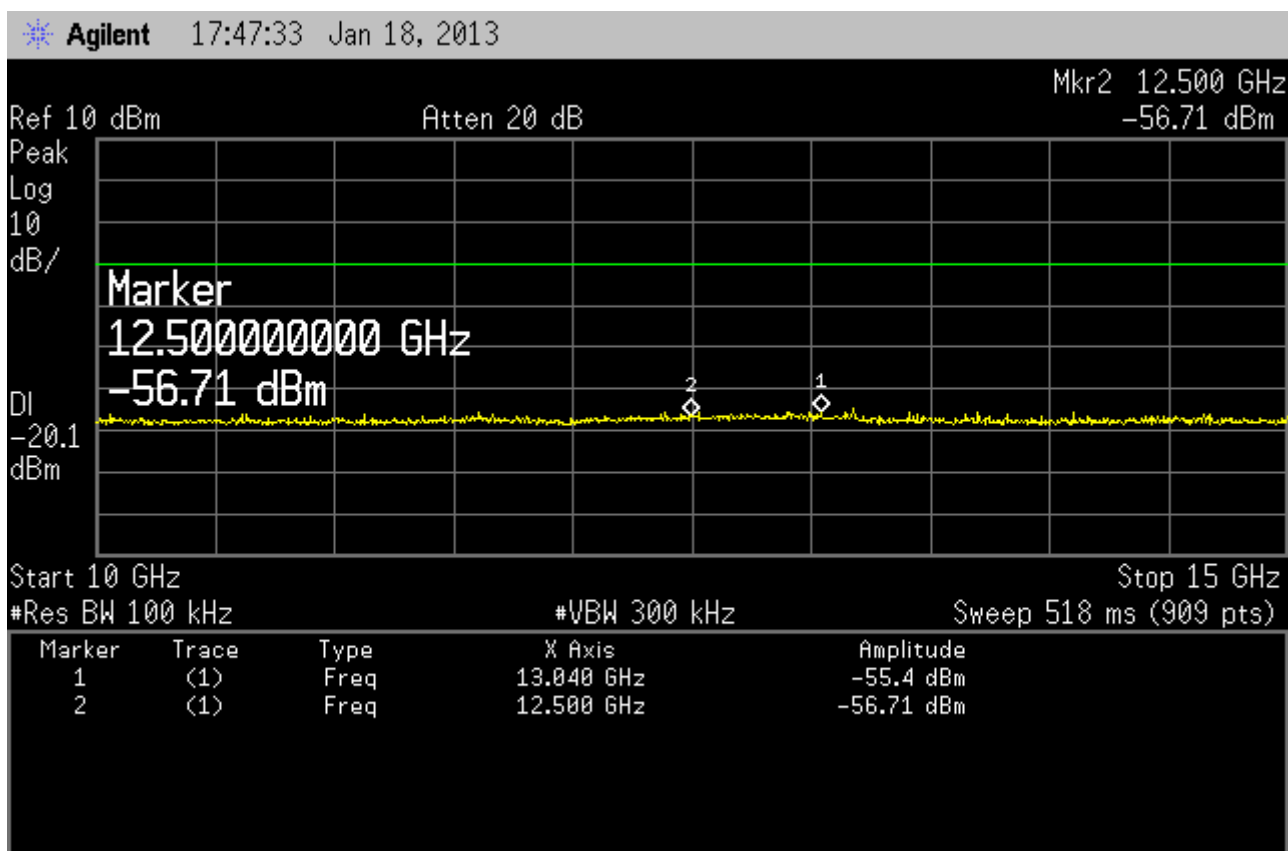
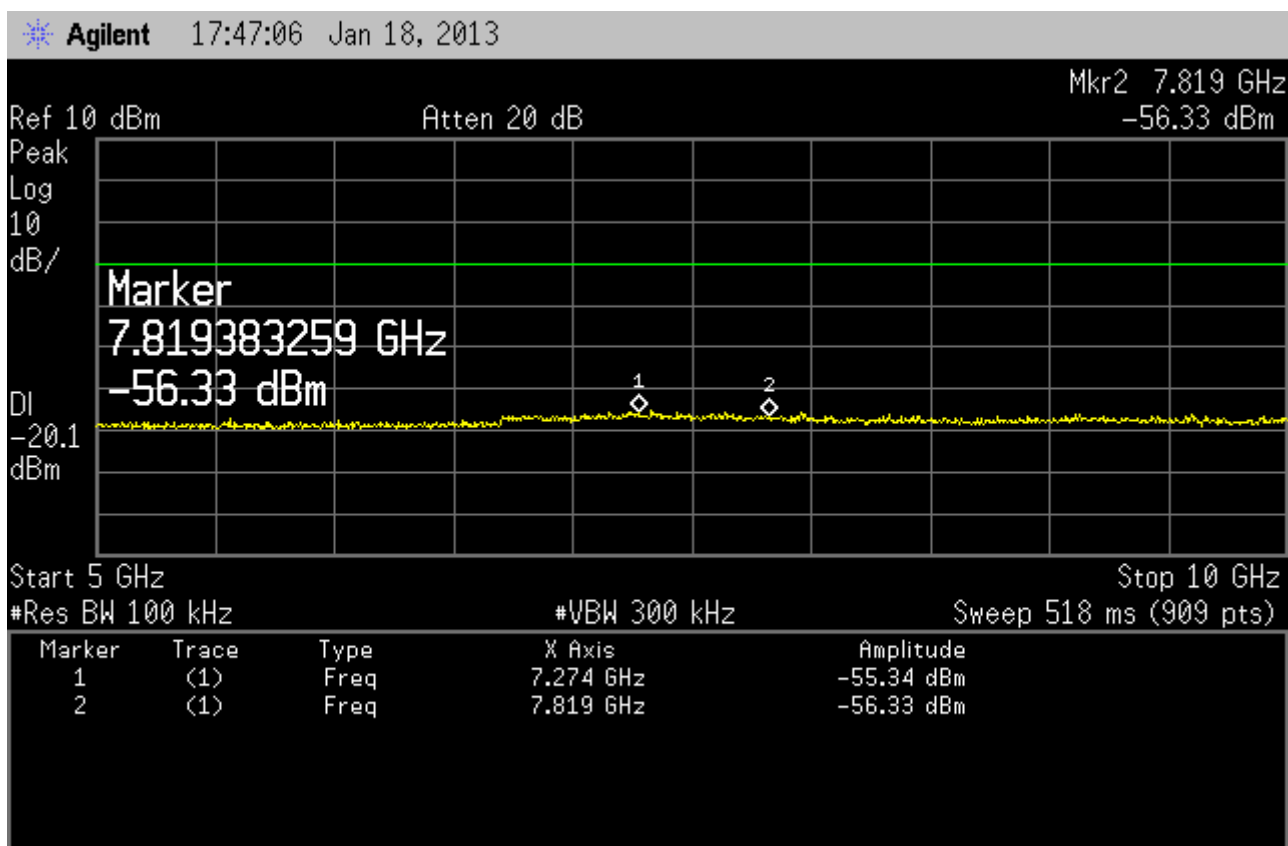


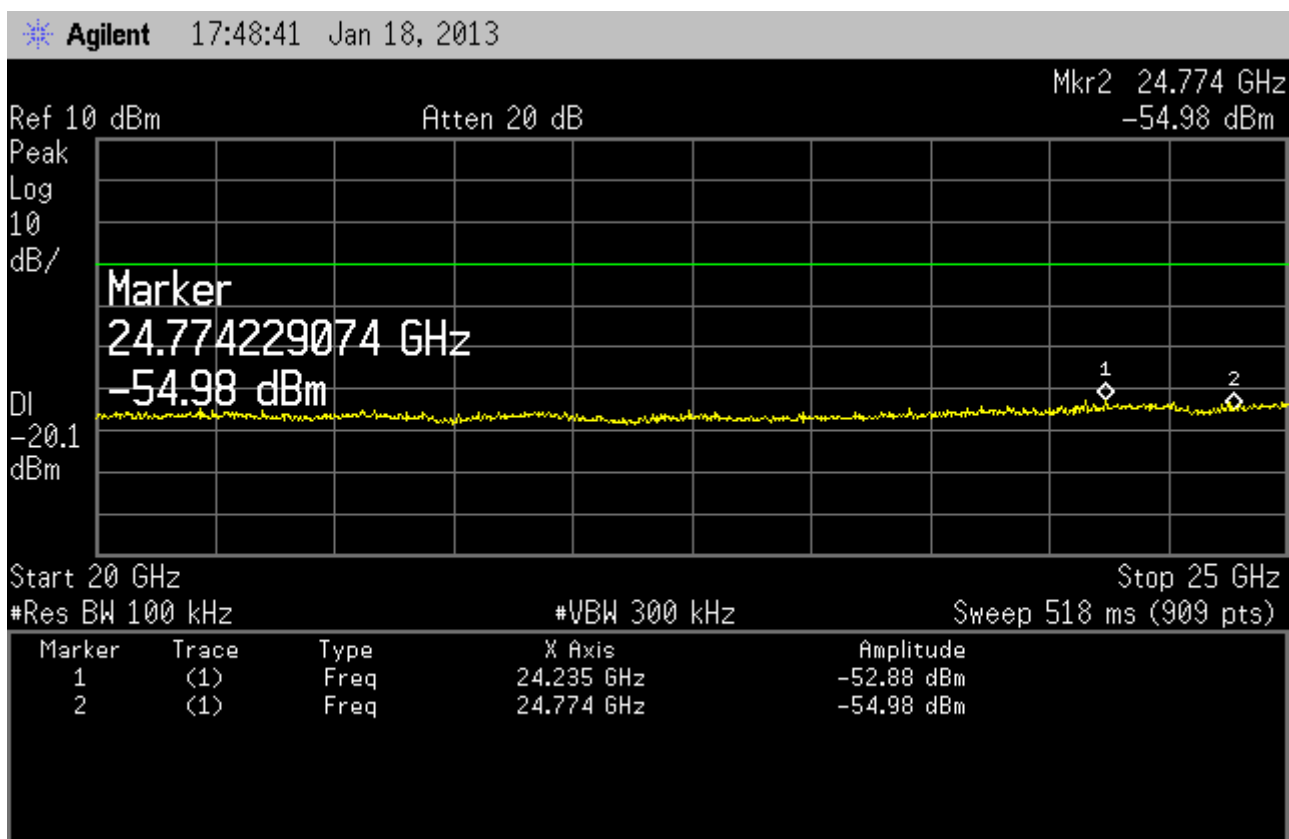
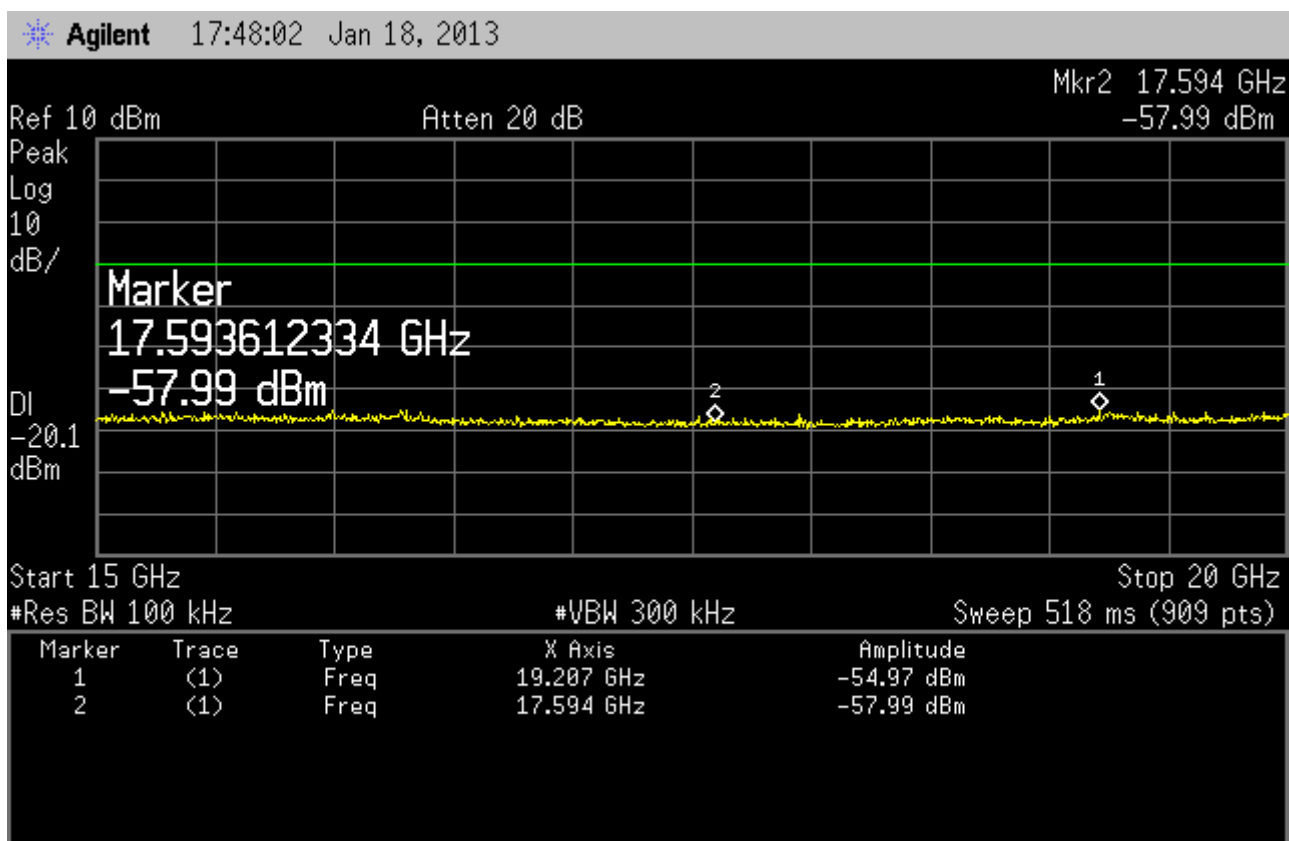




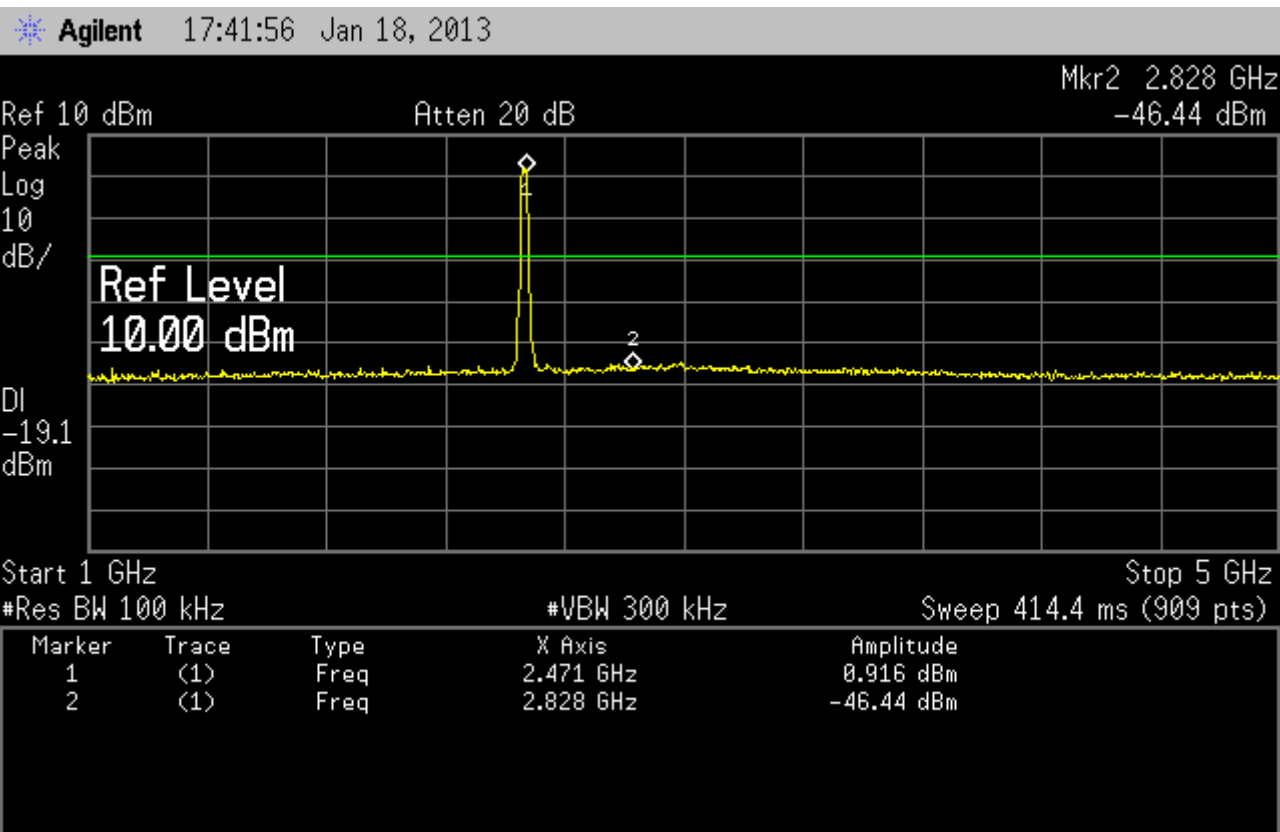
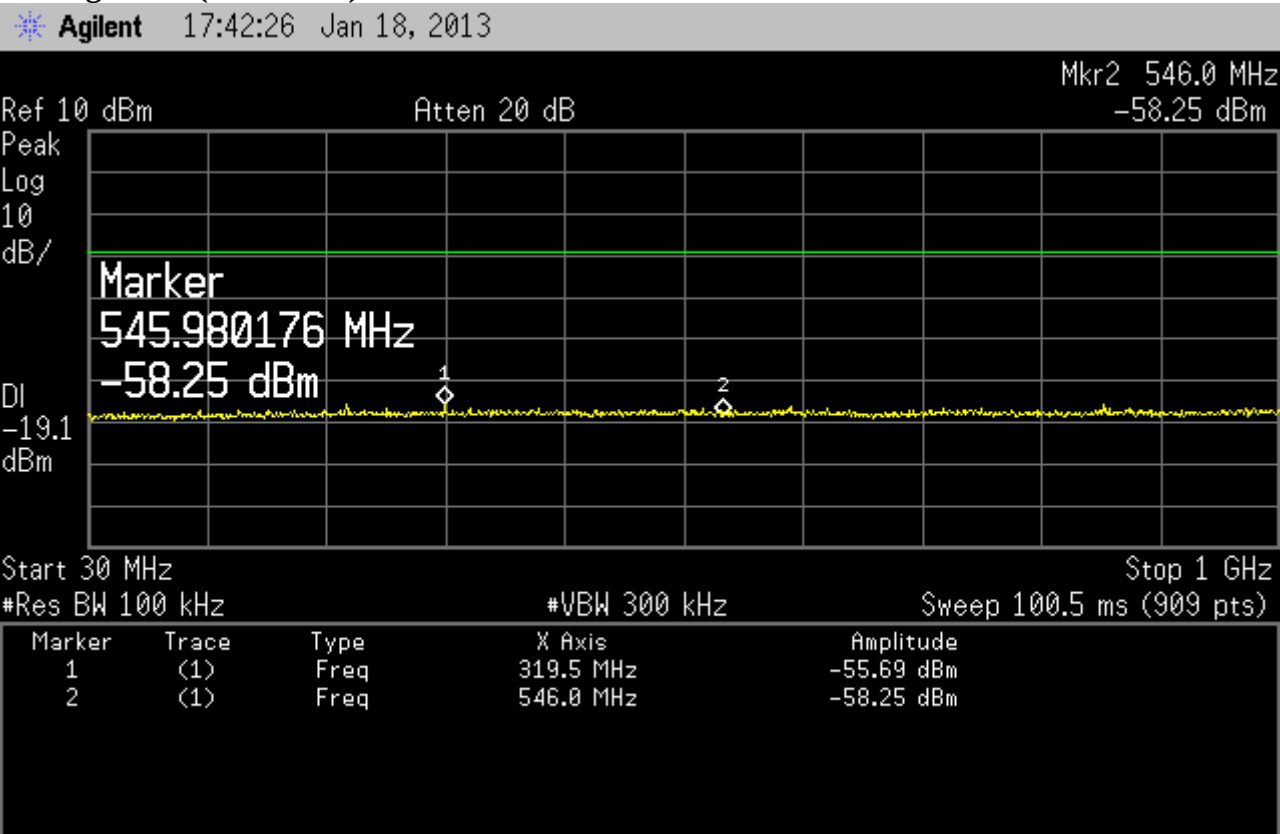
802.11g Ch 01 (2412 MHz) ANT1

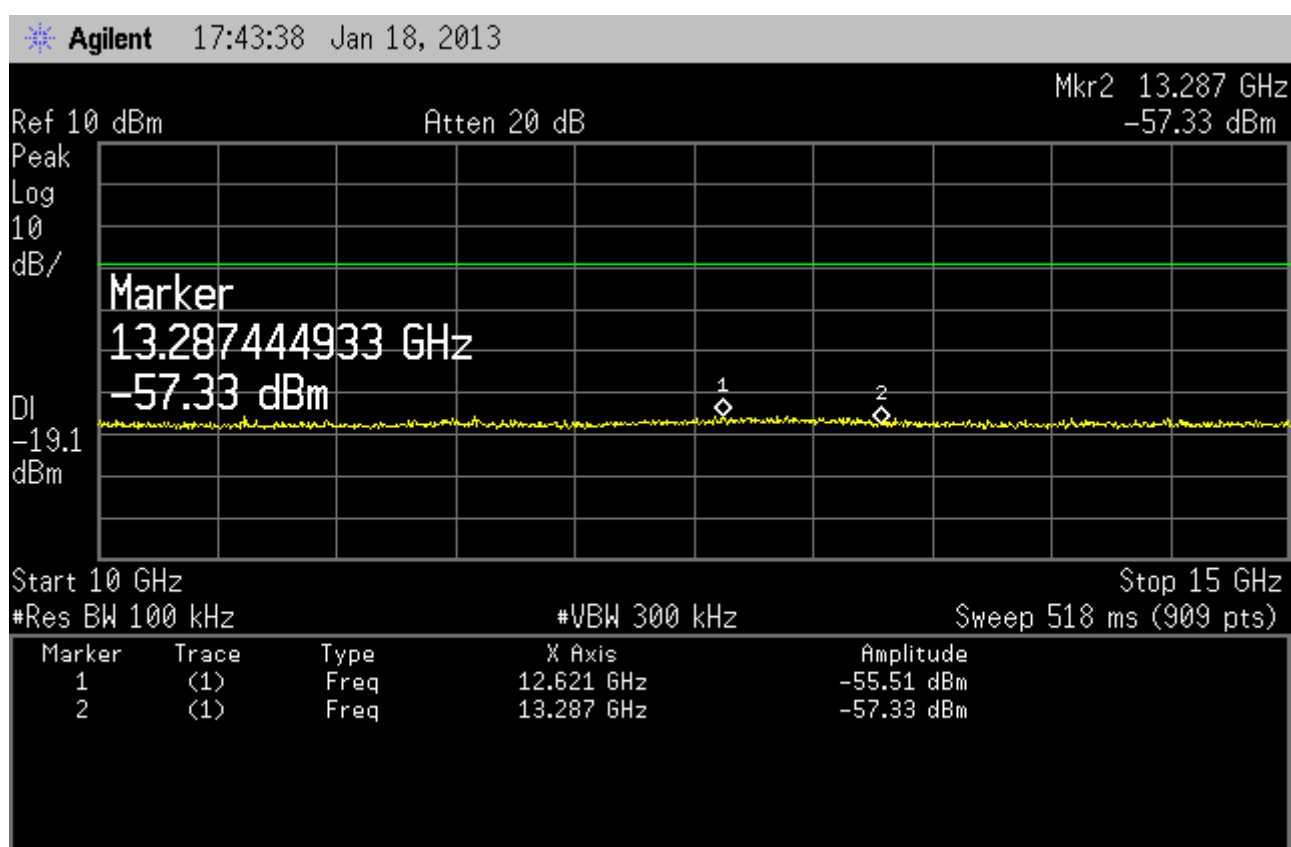
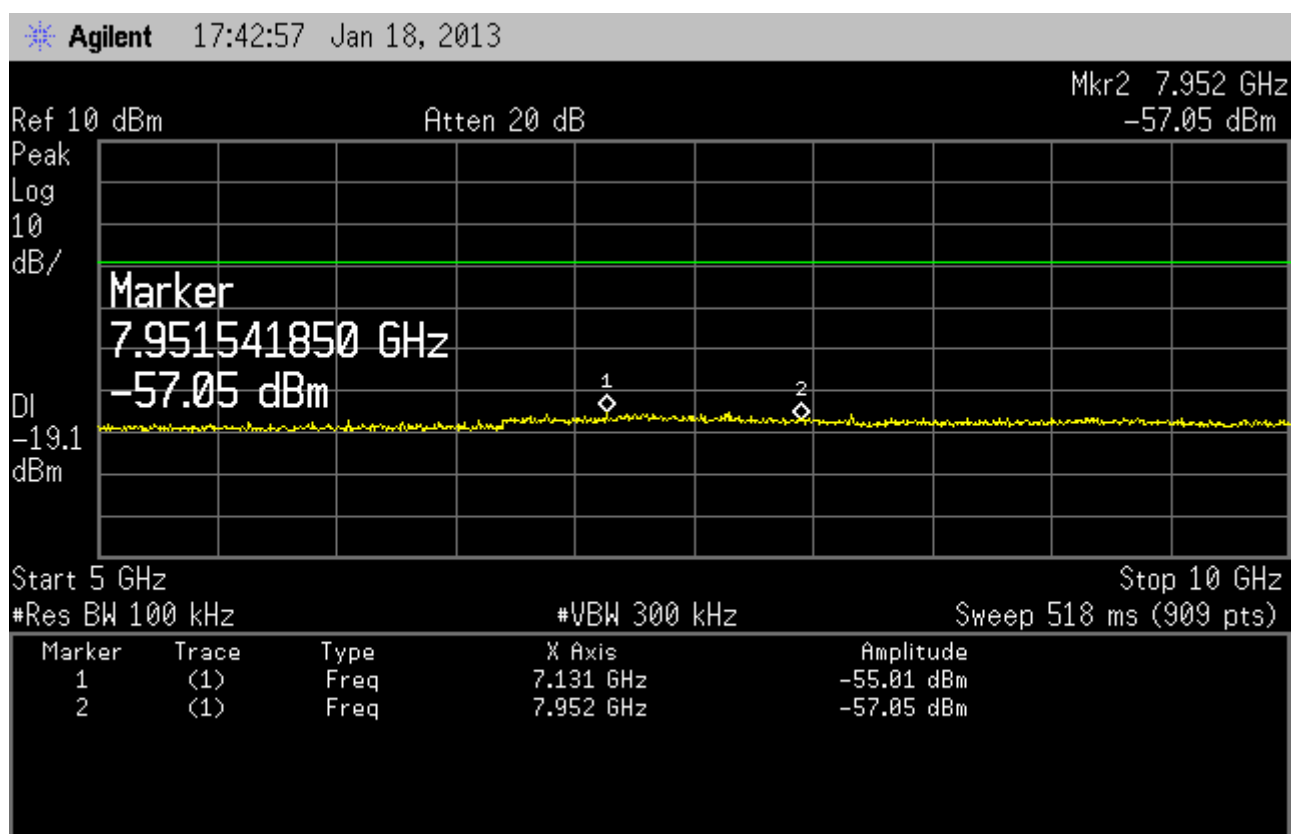


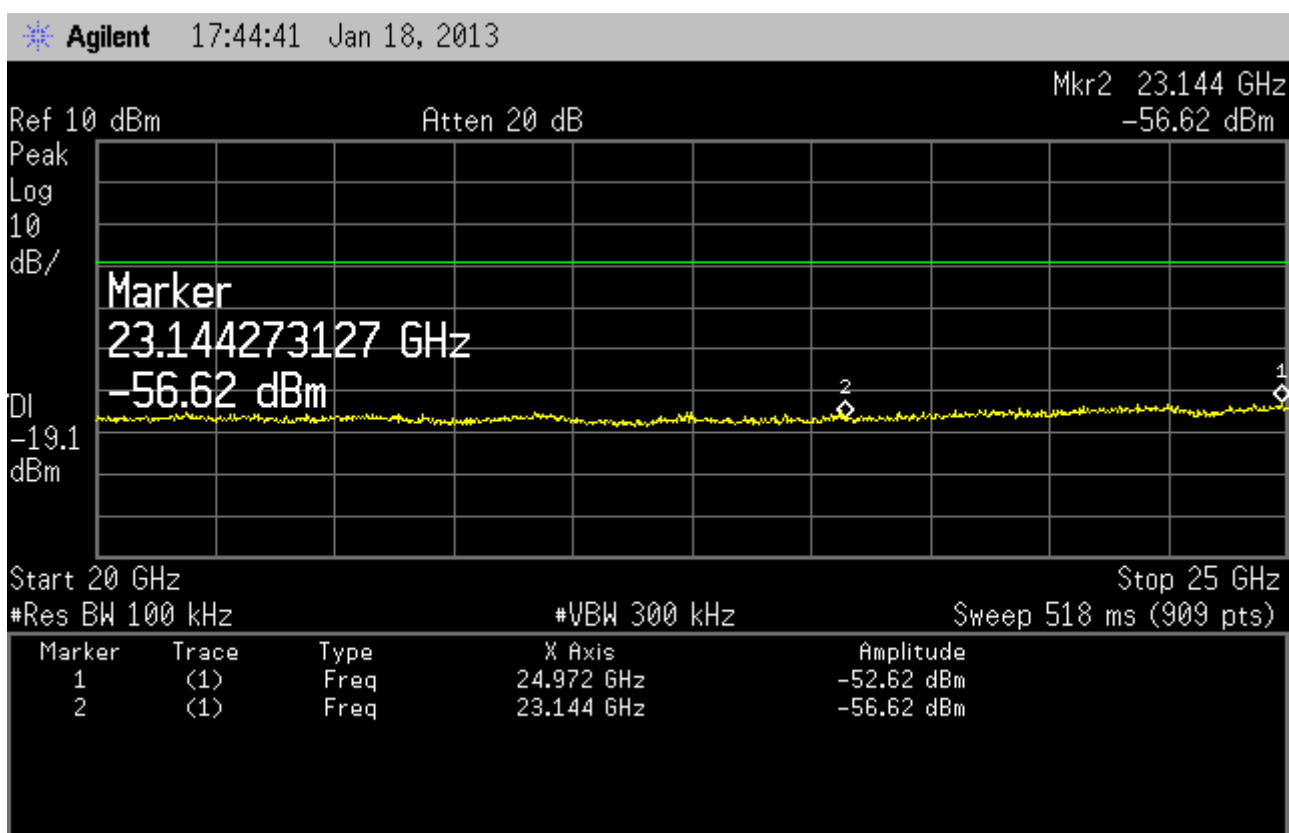
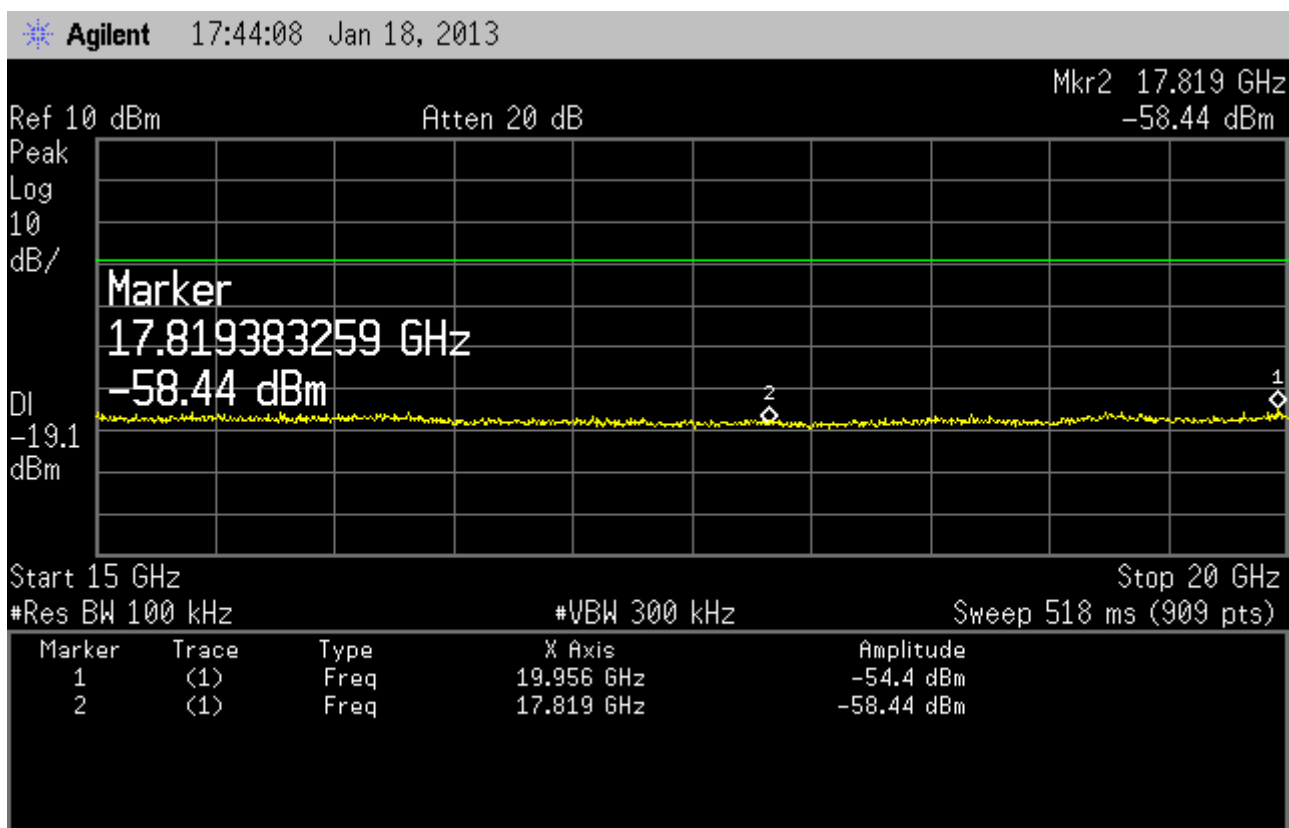




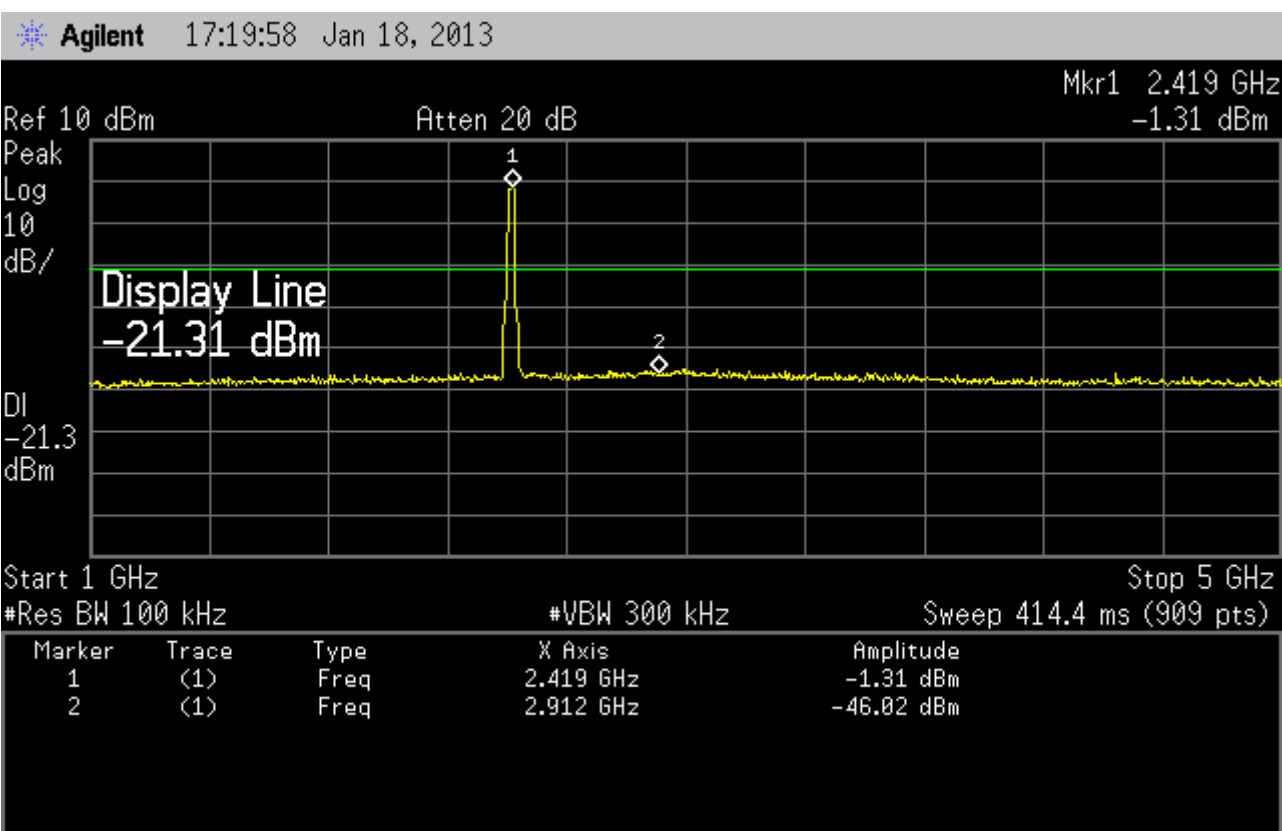
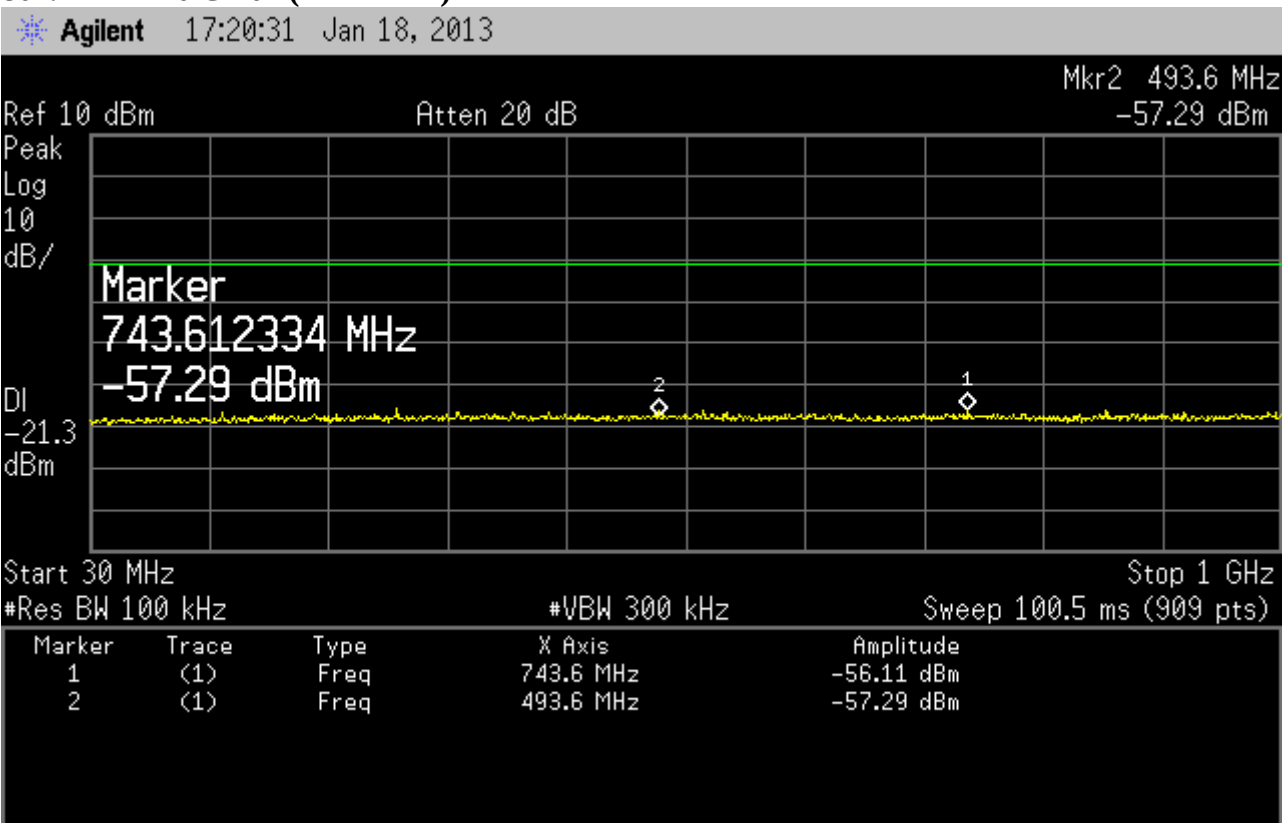
802.11g Ch 11 (2462 MHz) ANT1

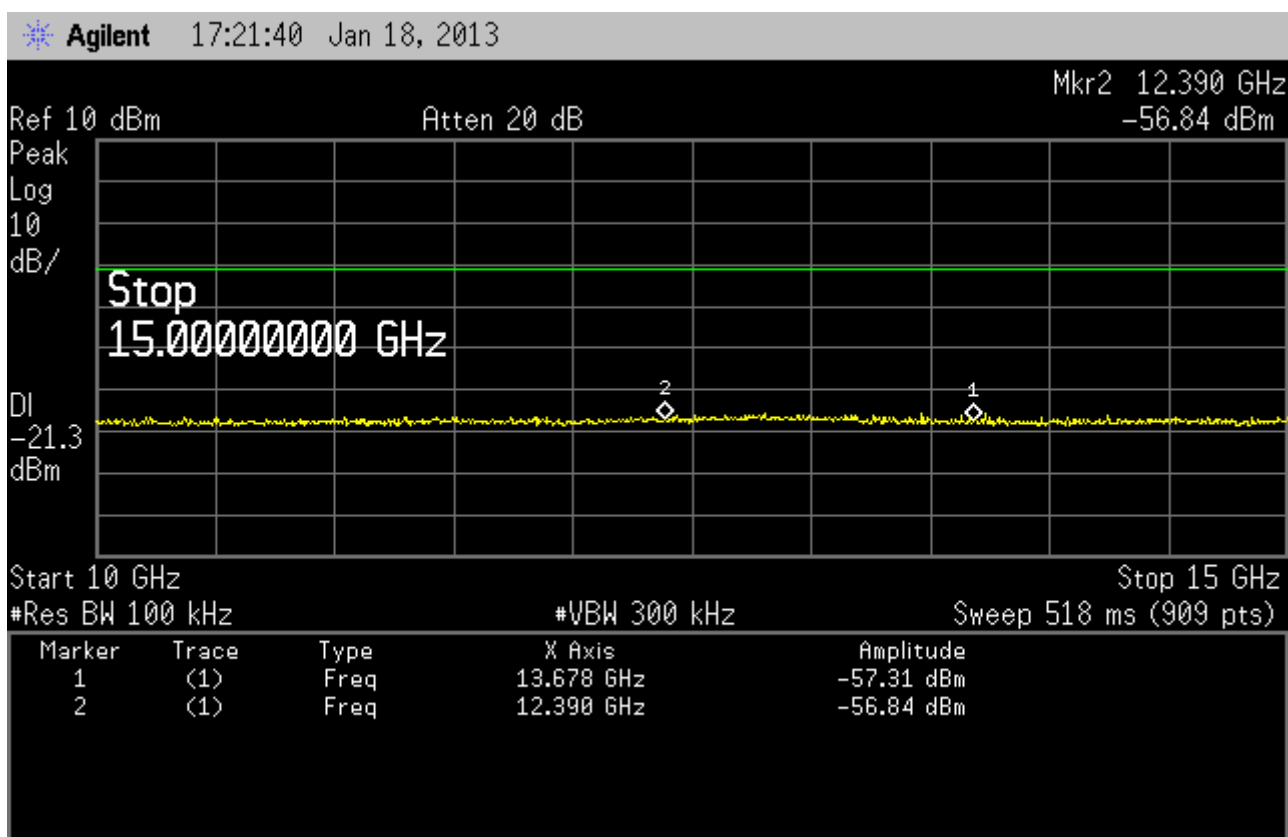
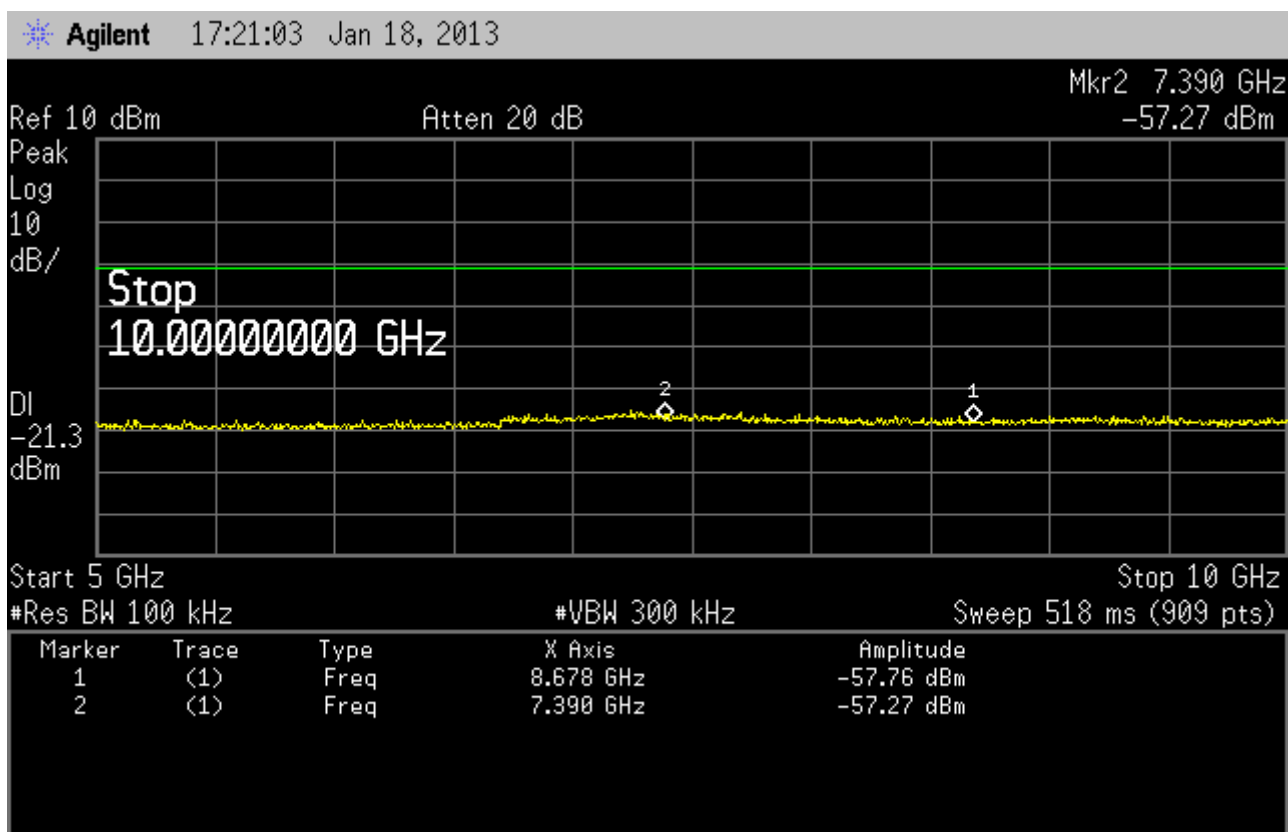


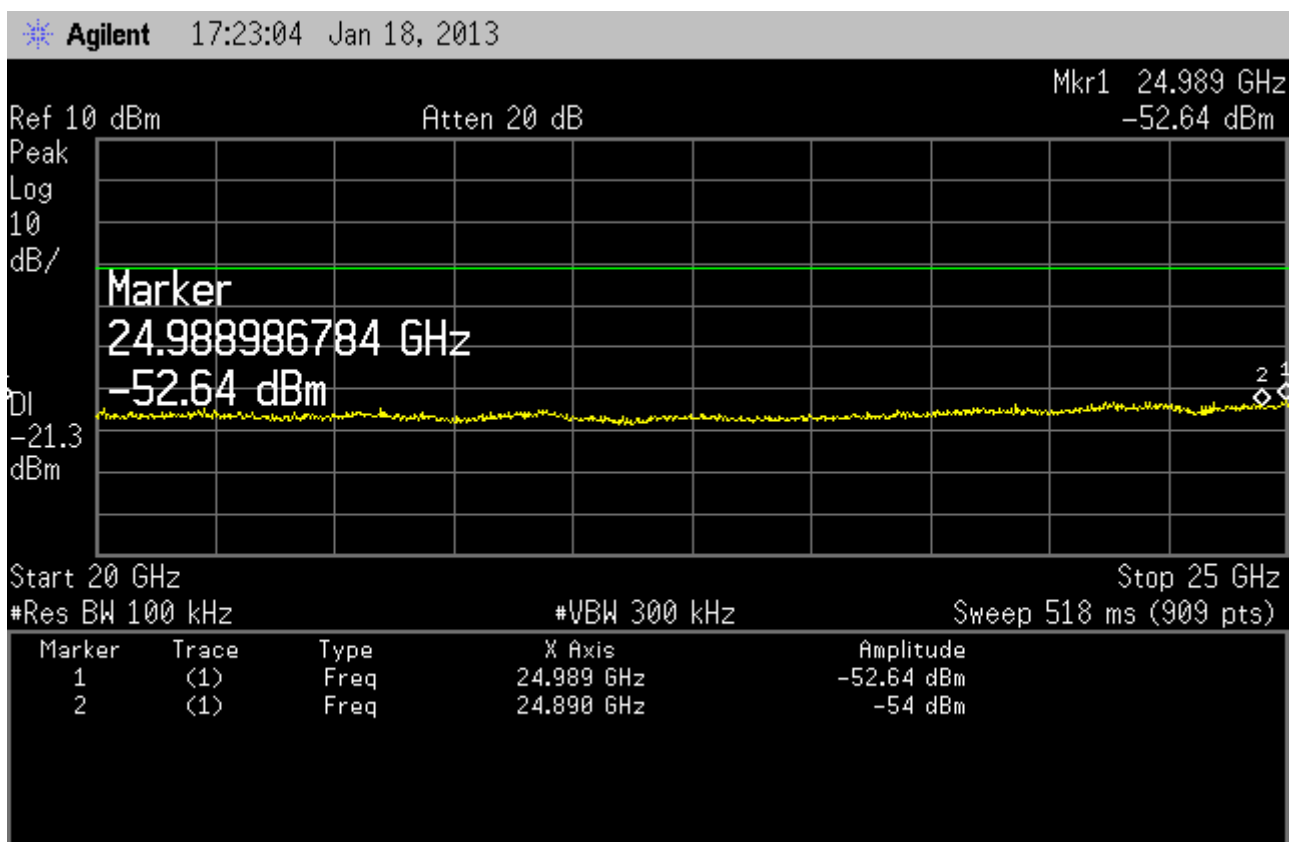
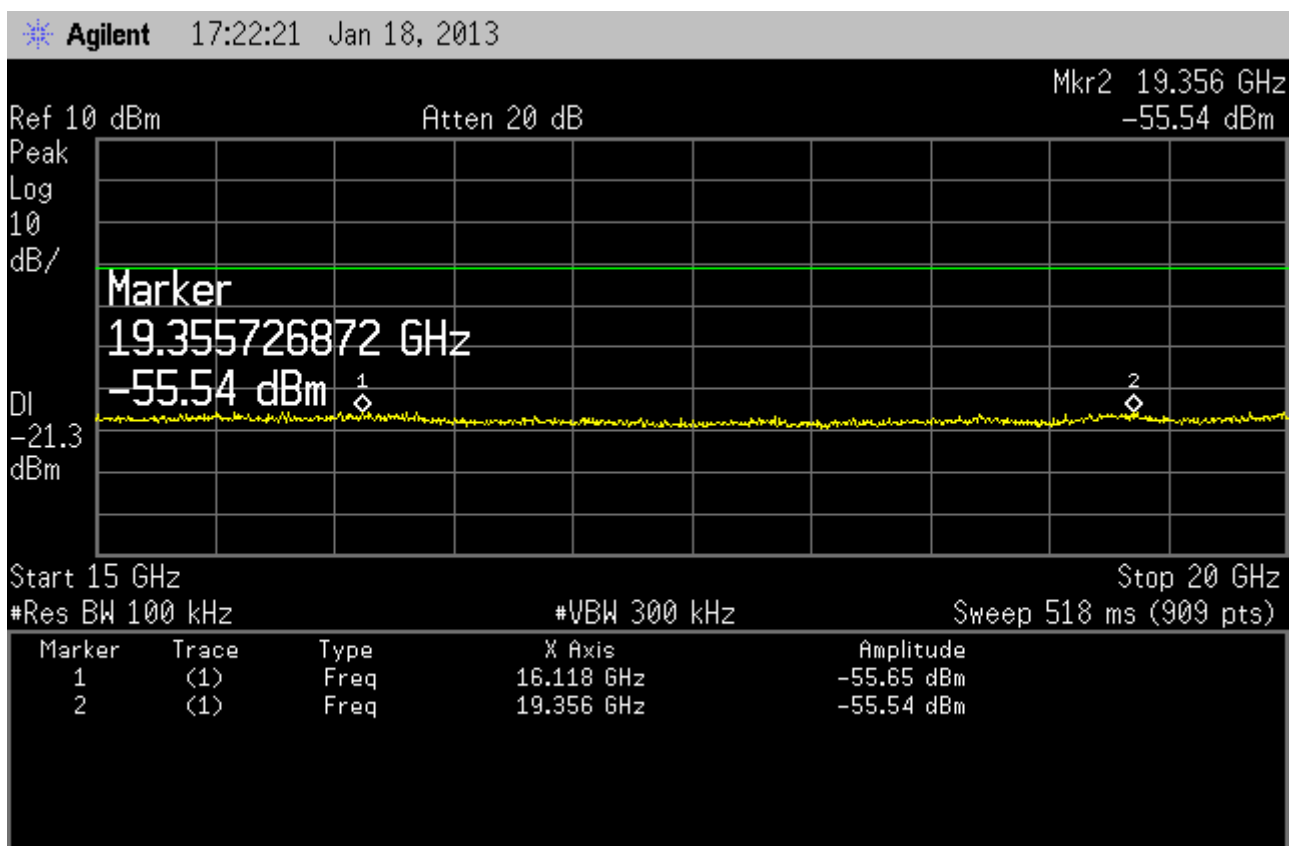




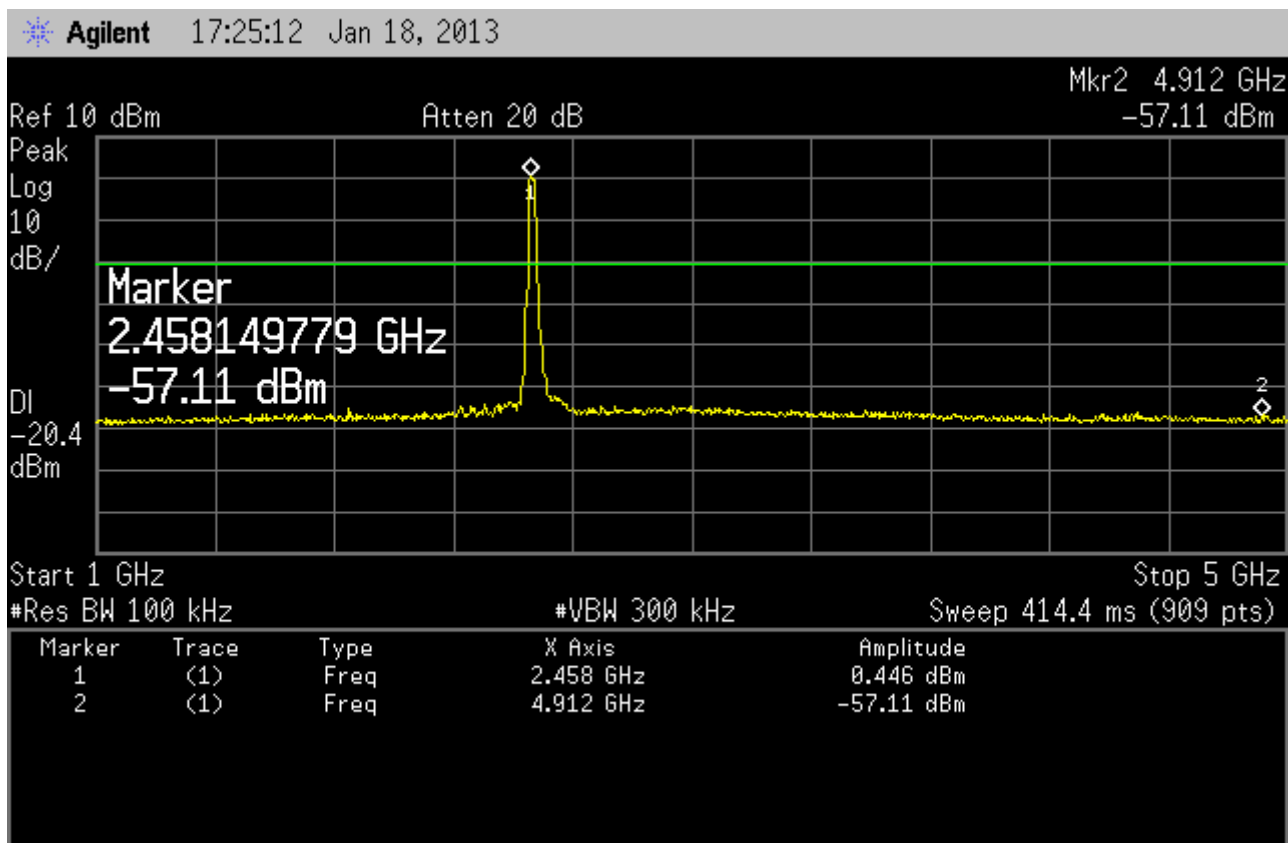
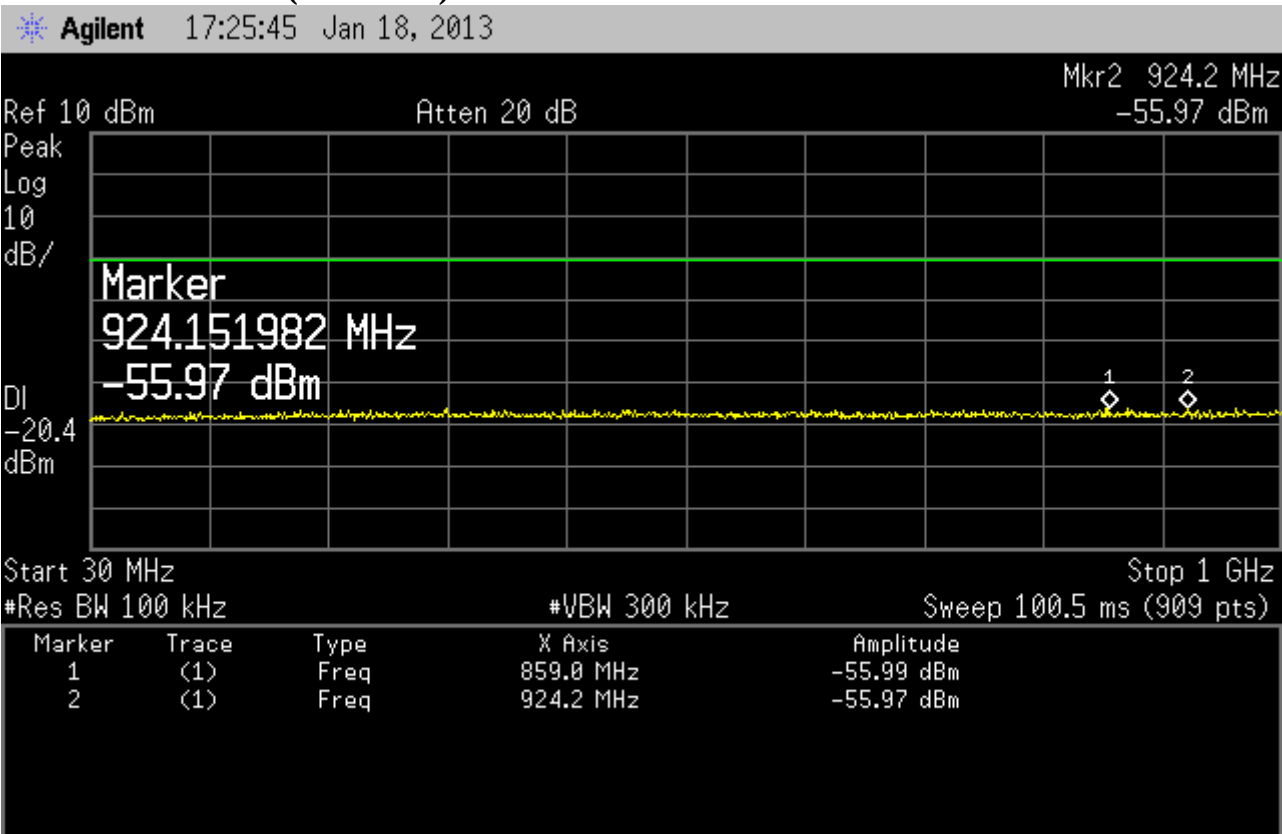
802.11n HT20 Ch 01 (2412 MHz) ANT1

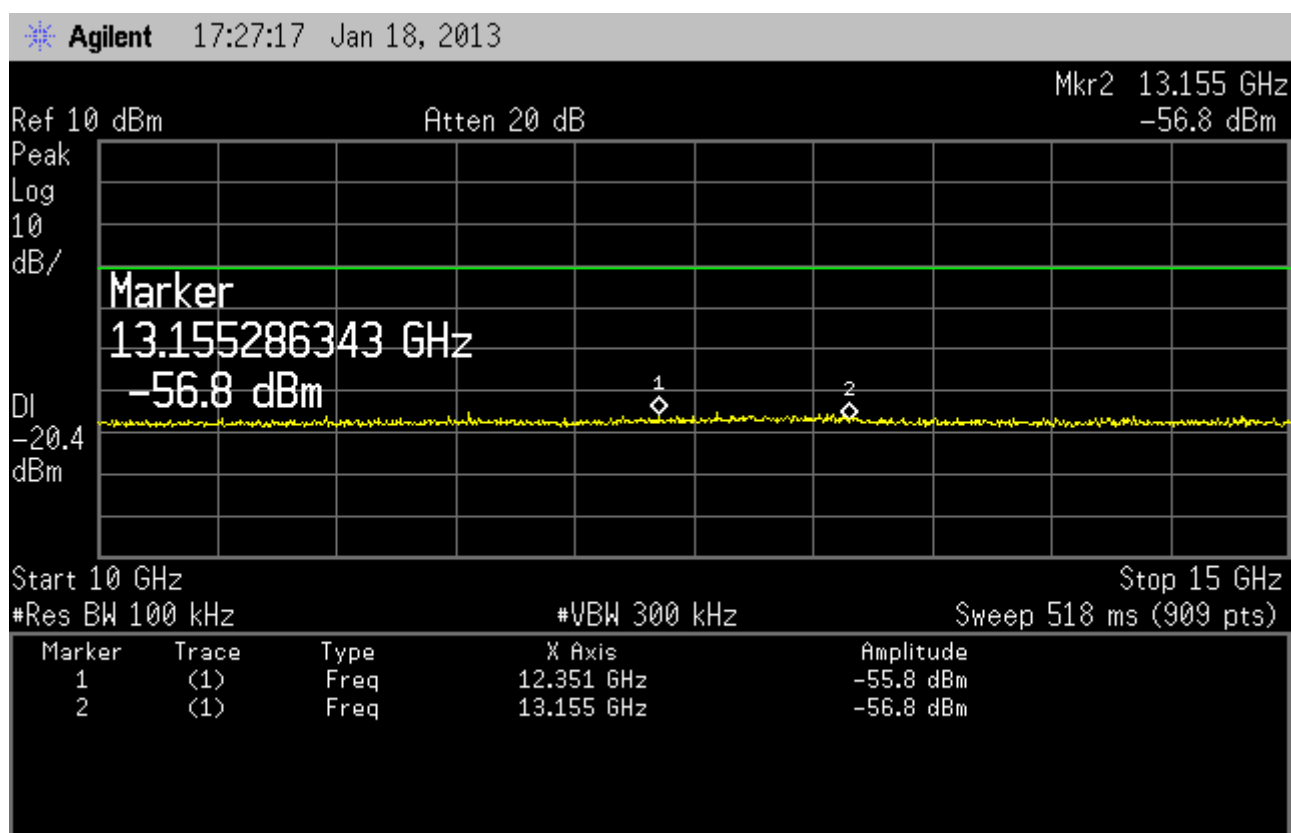
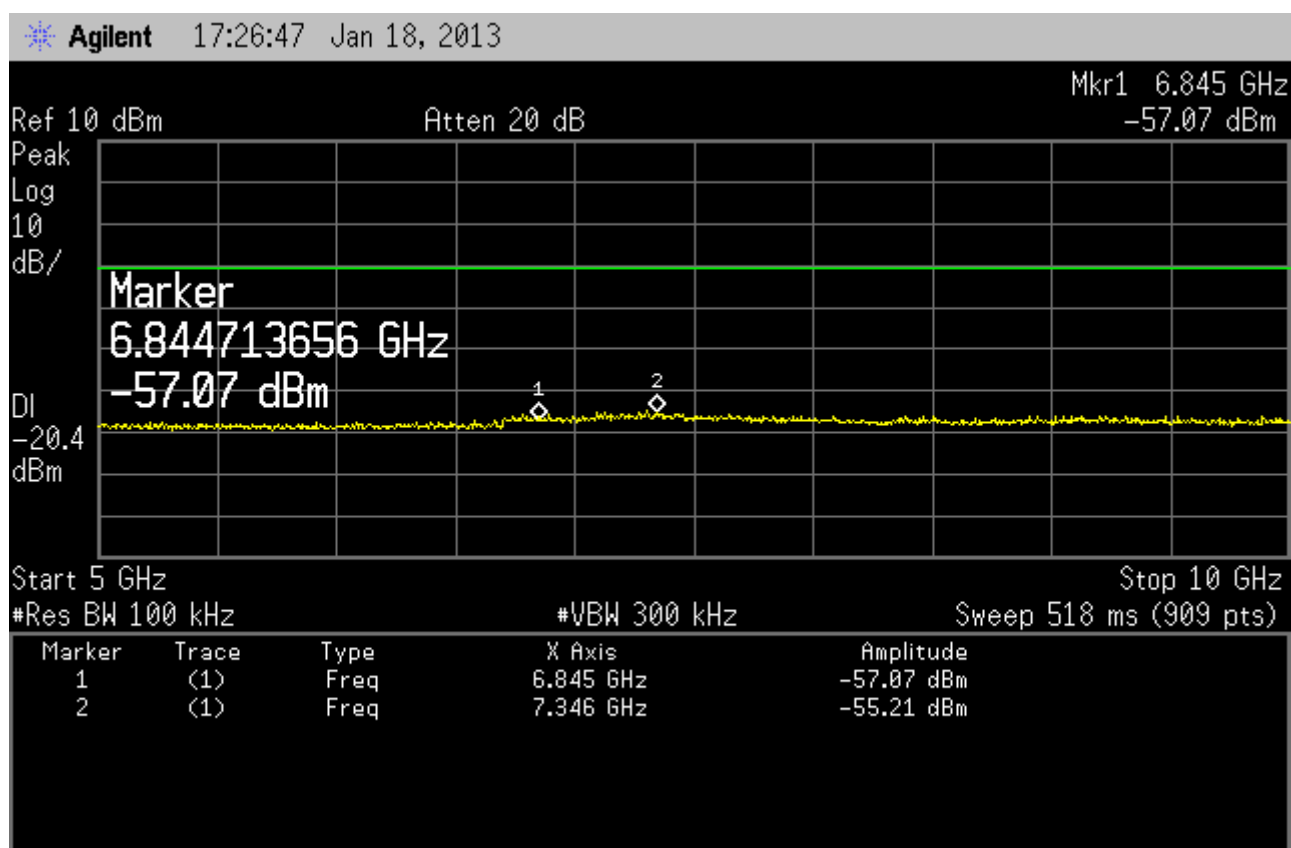


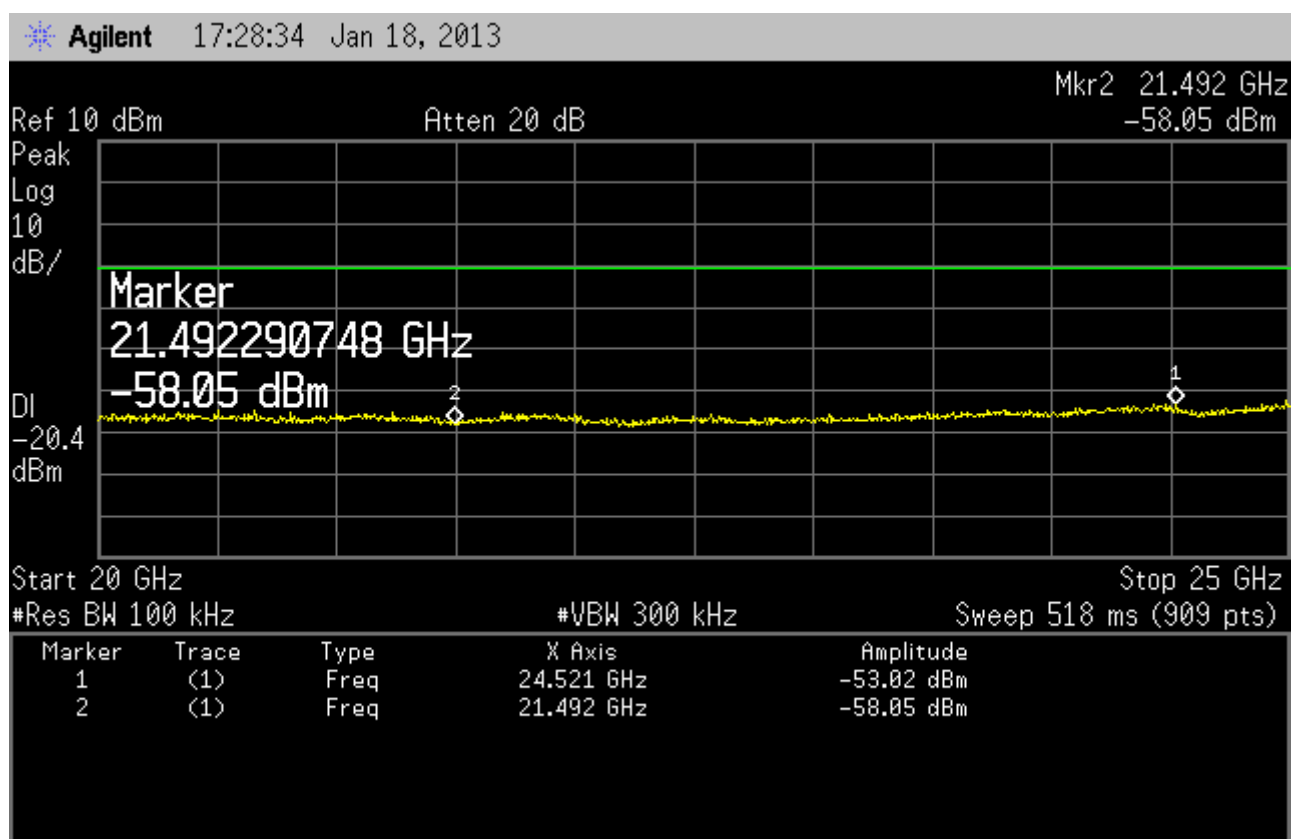
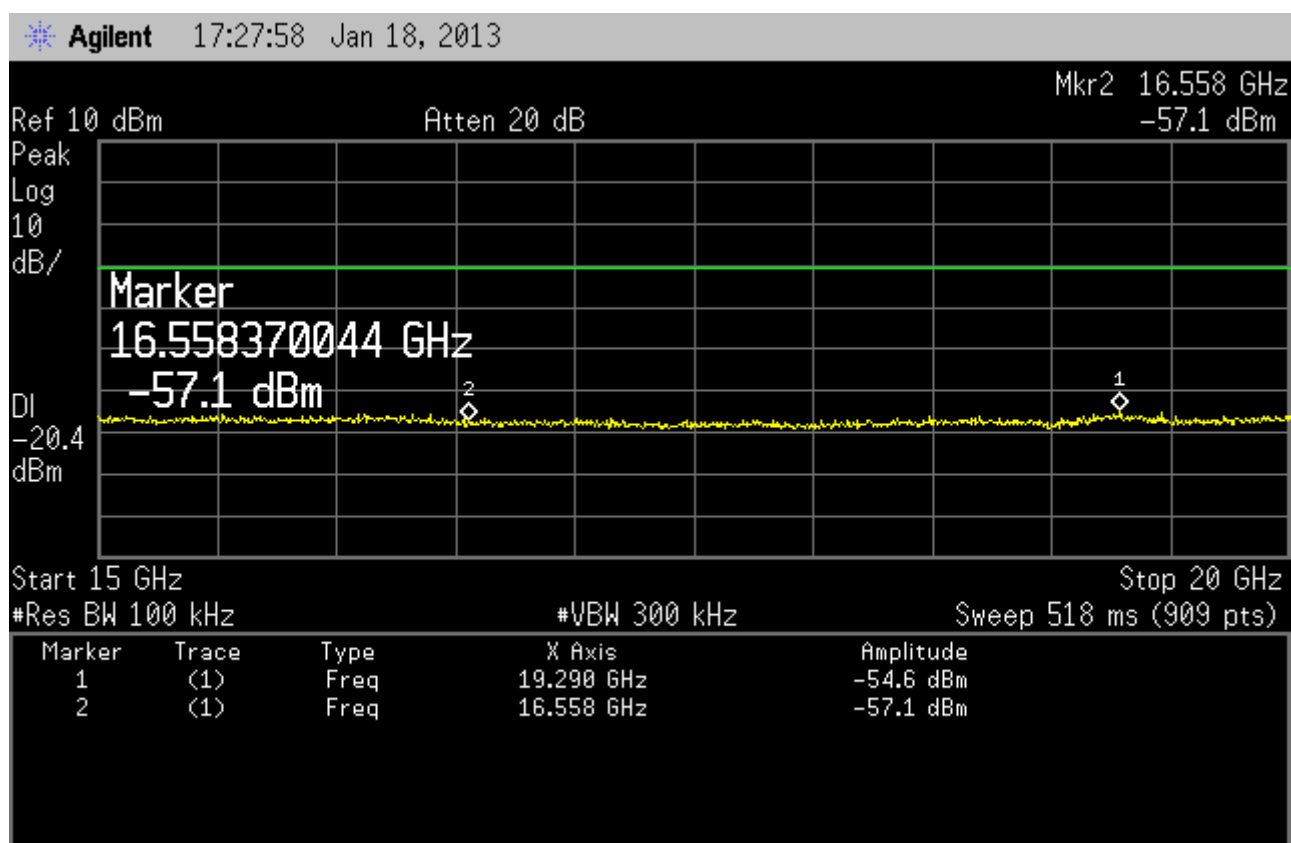




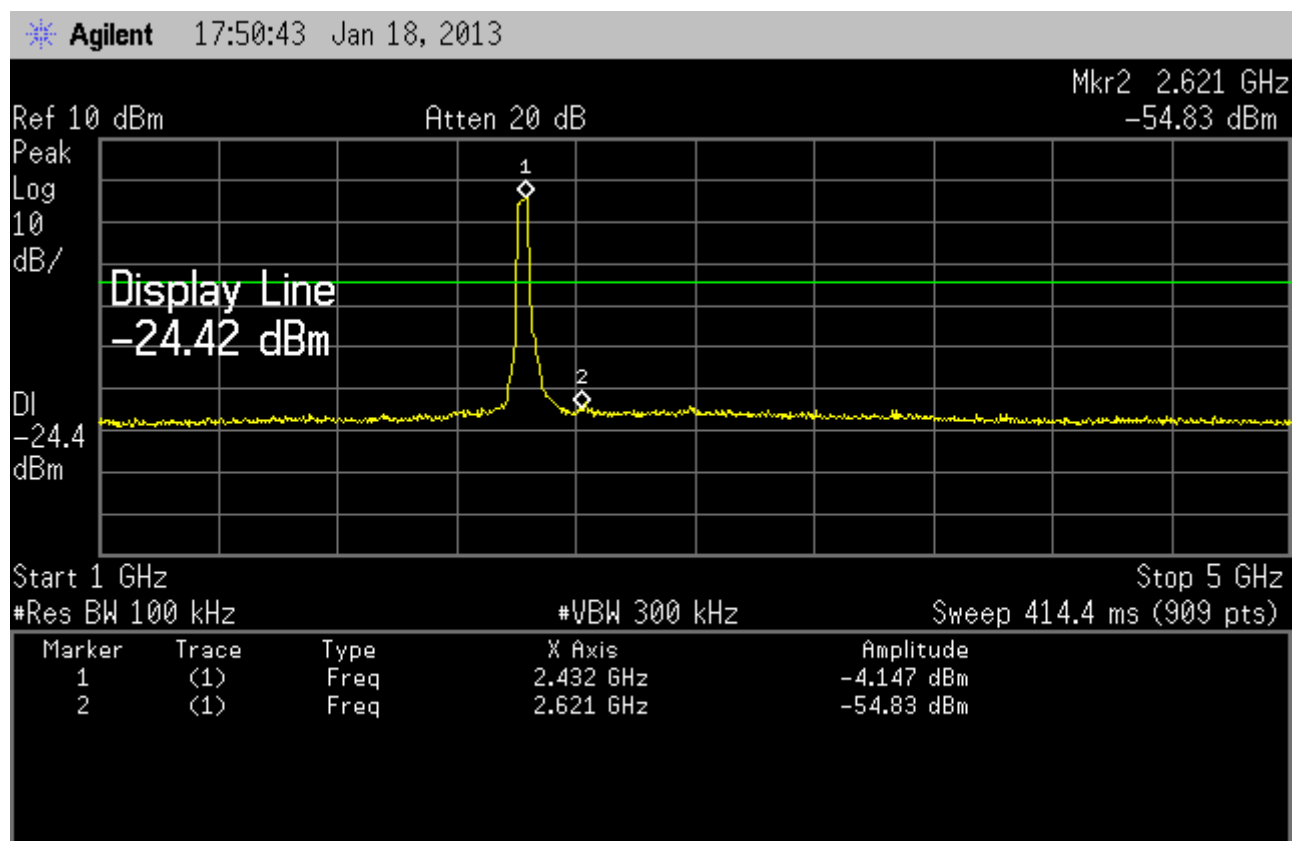
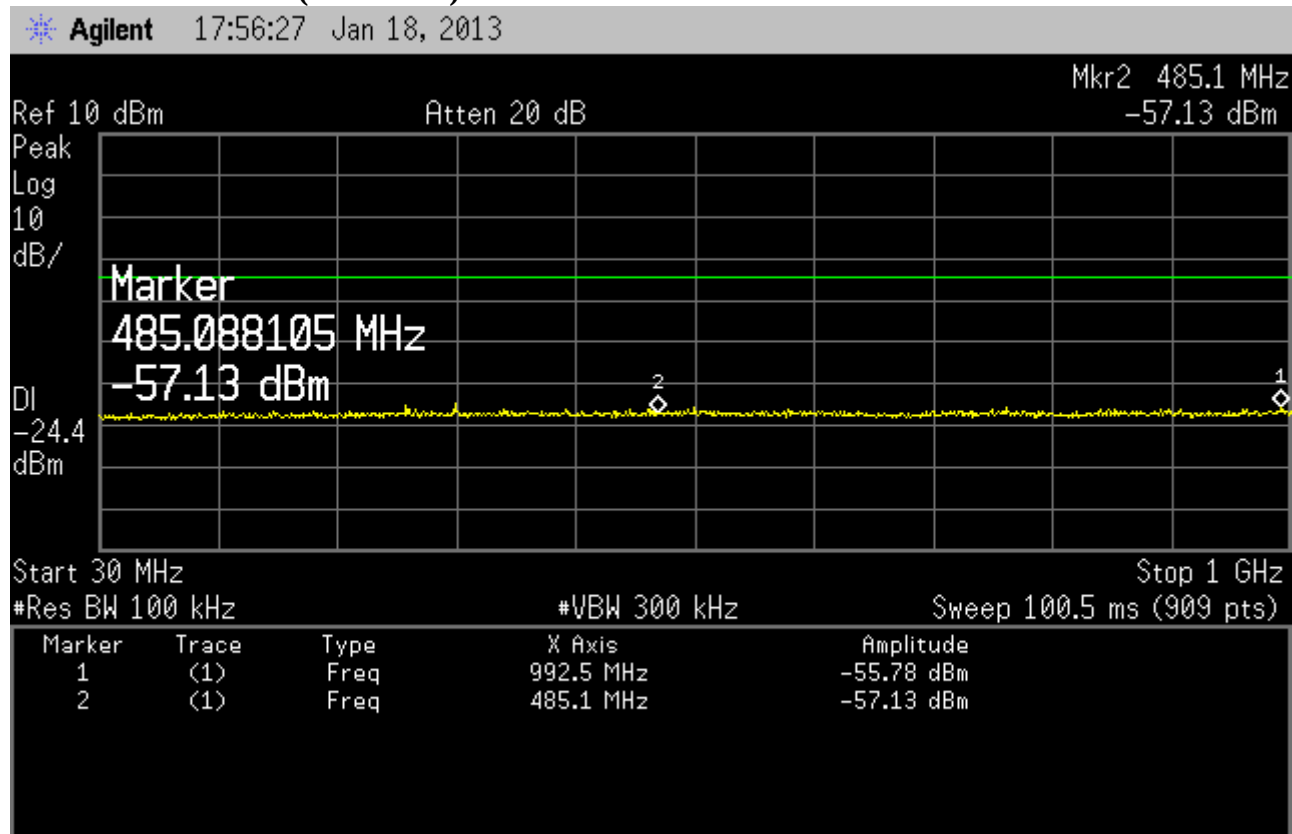
802.11n HT20 Ch 11 (2462 MHz) ANT1

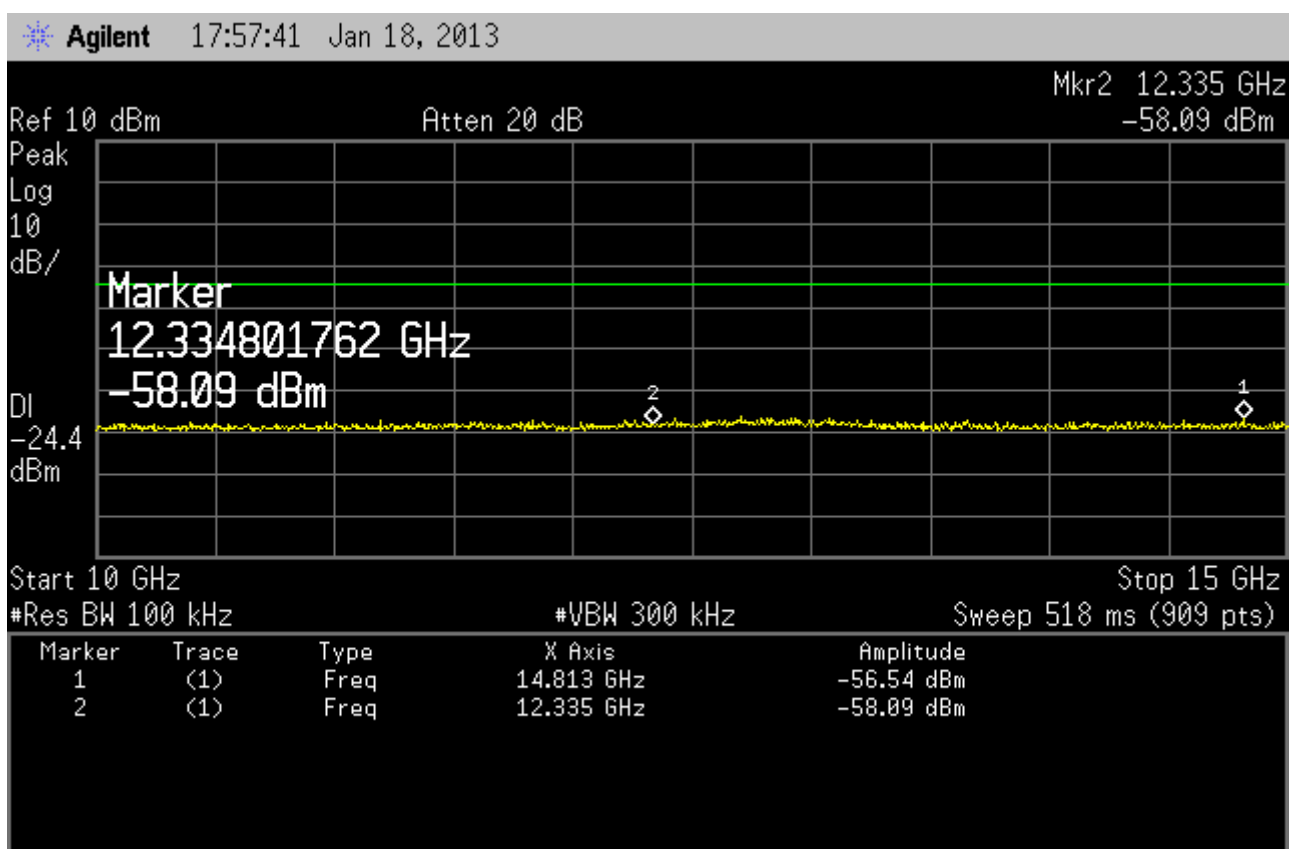
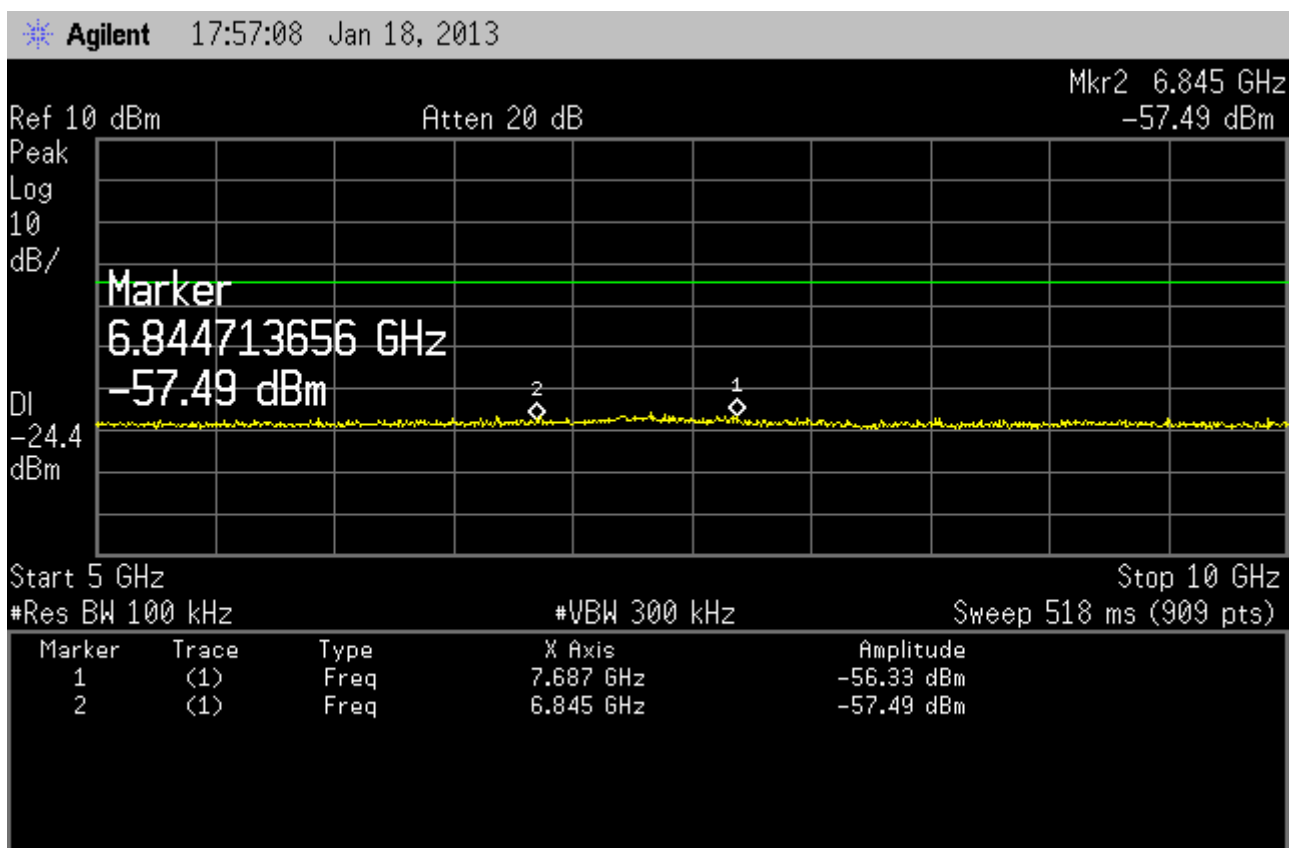


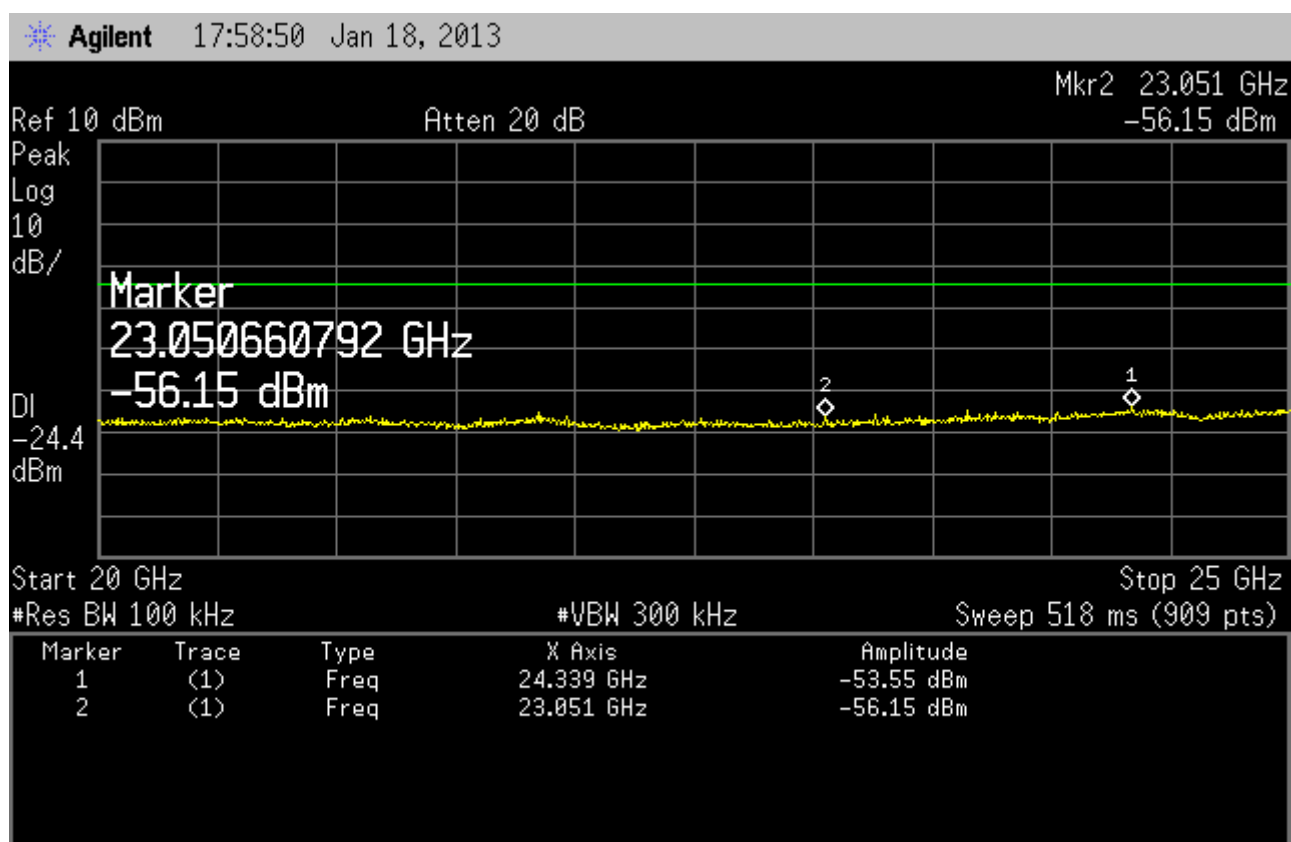
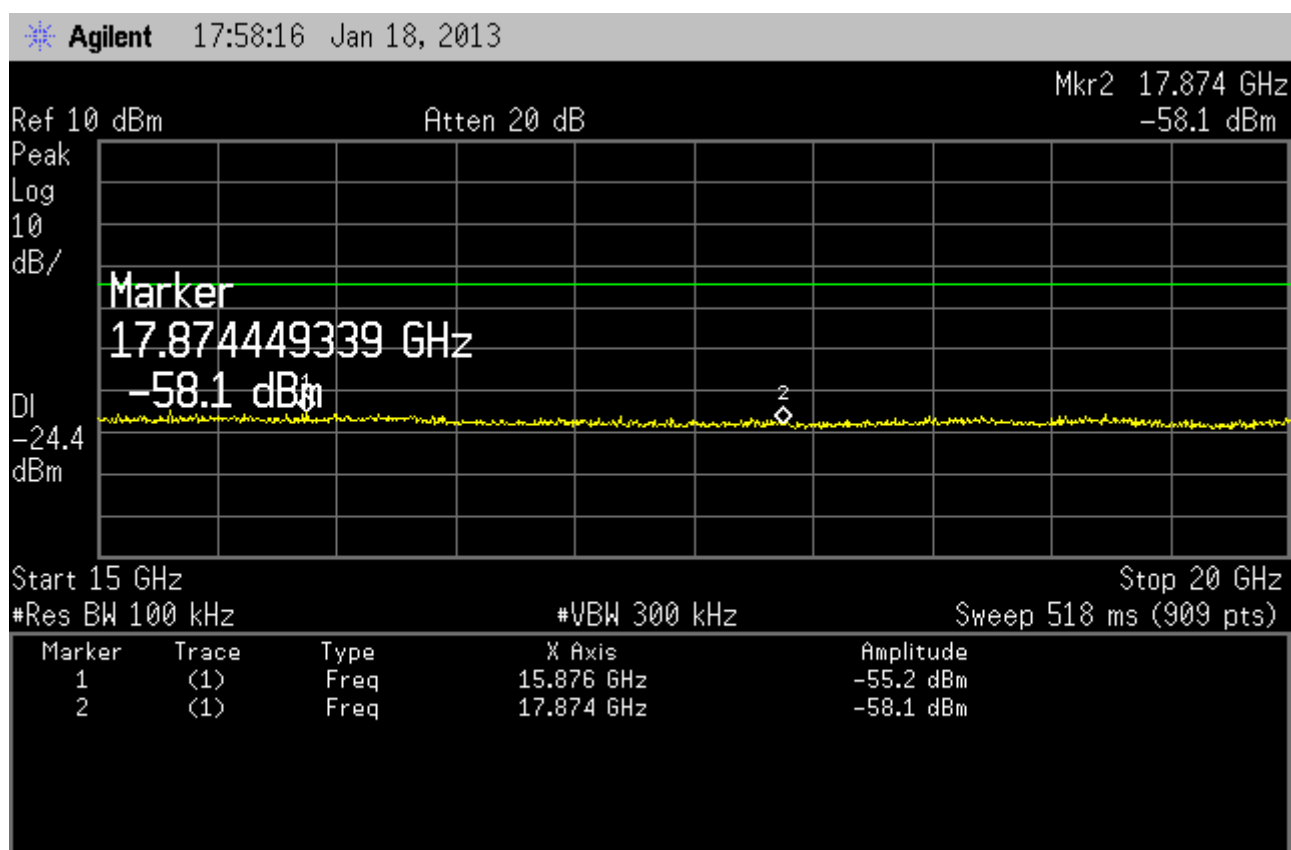




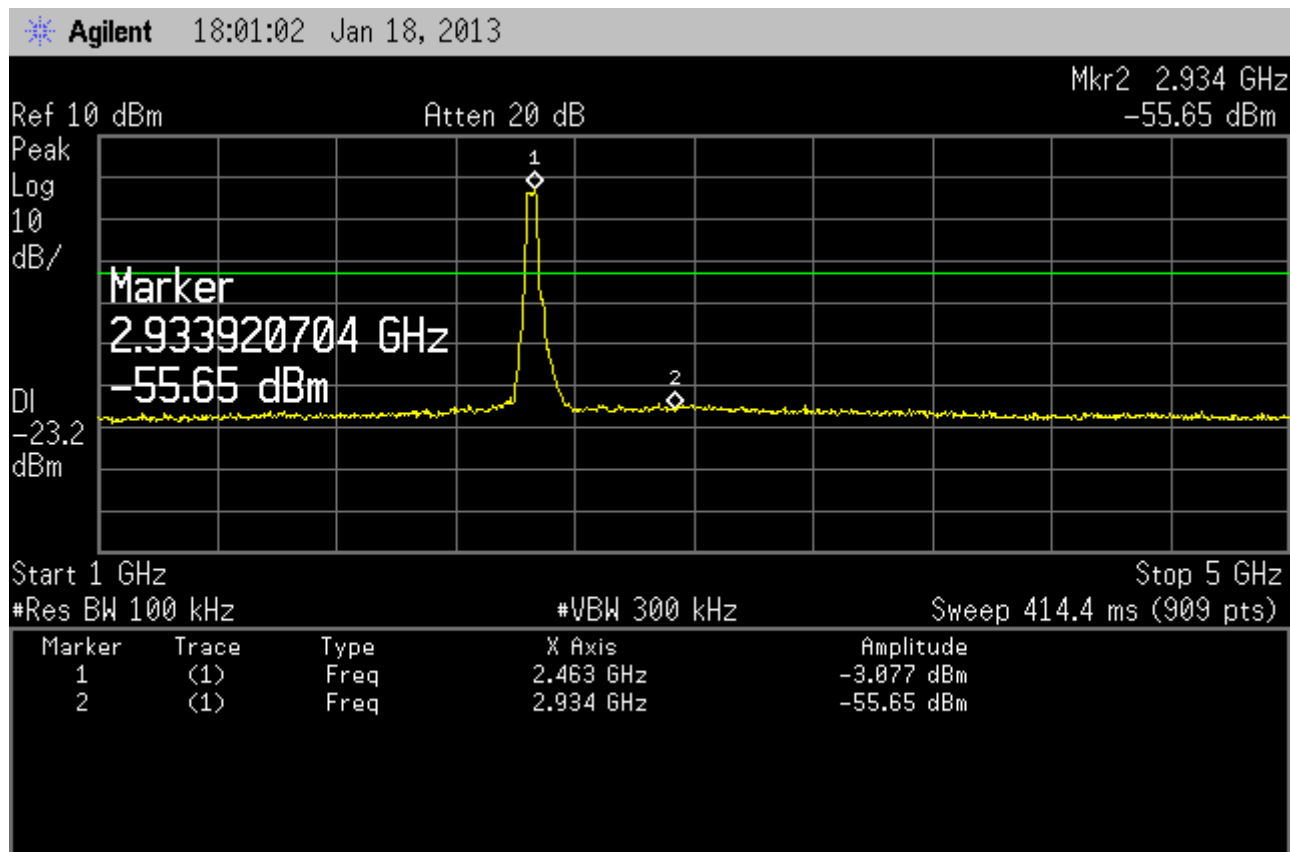
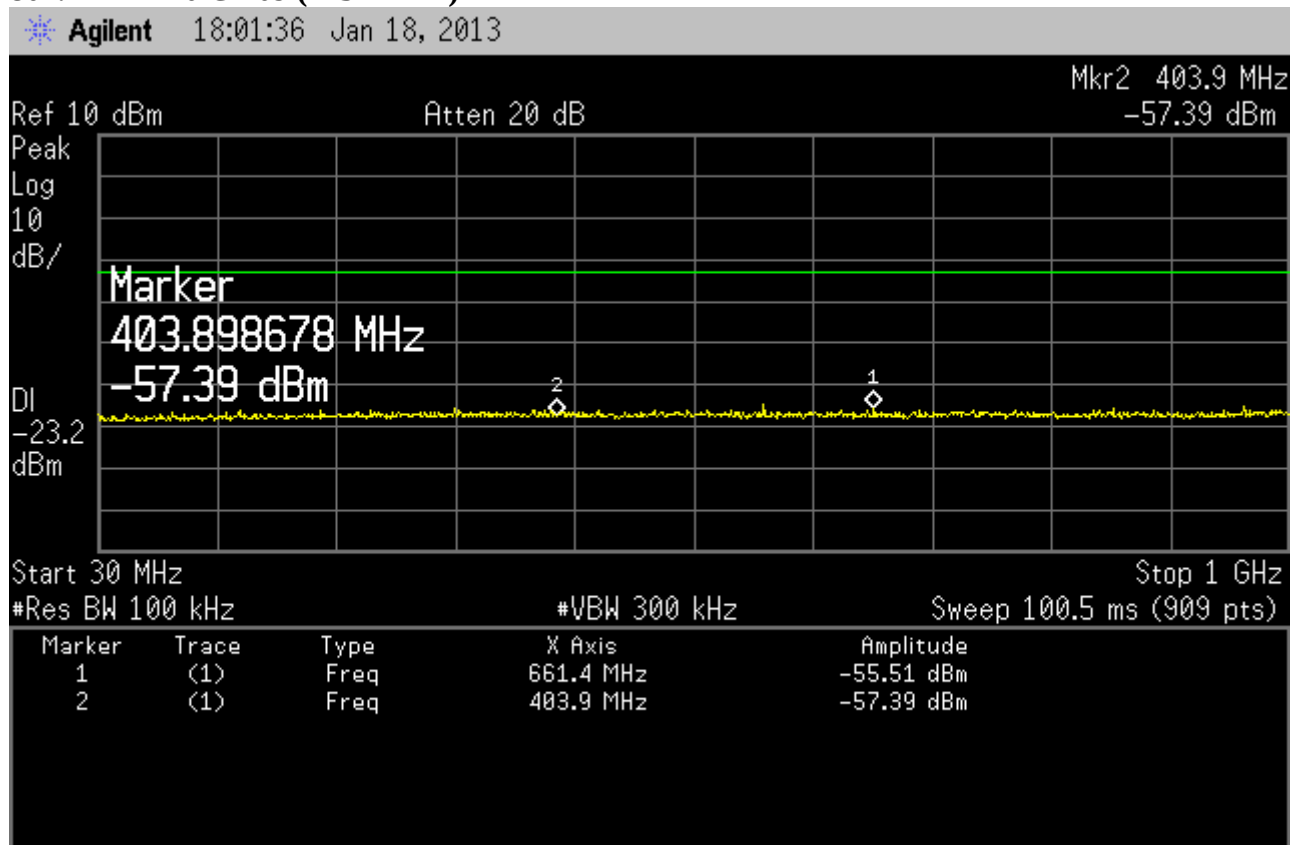
802.11n HT40 Ch 03 (2422 MHz) ANT1

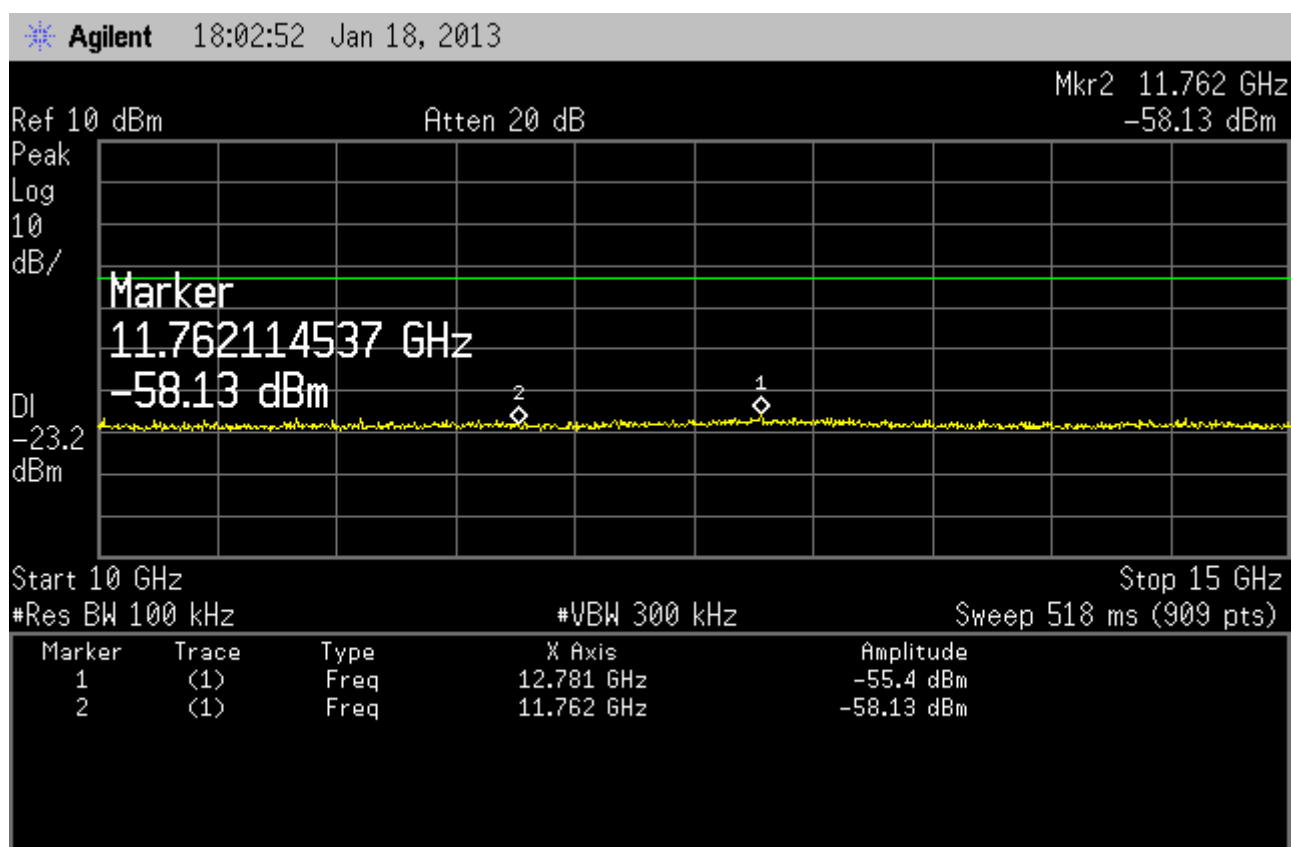
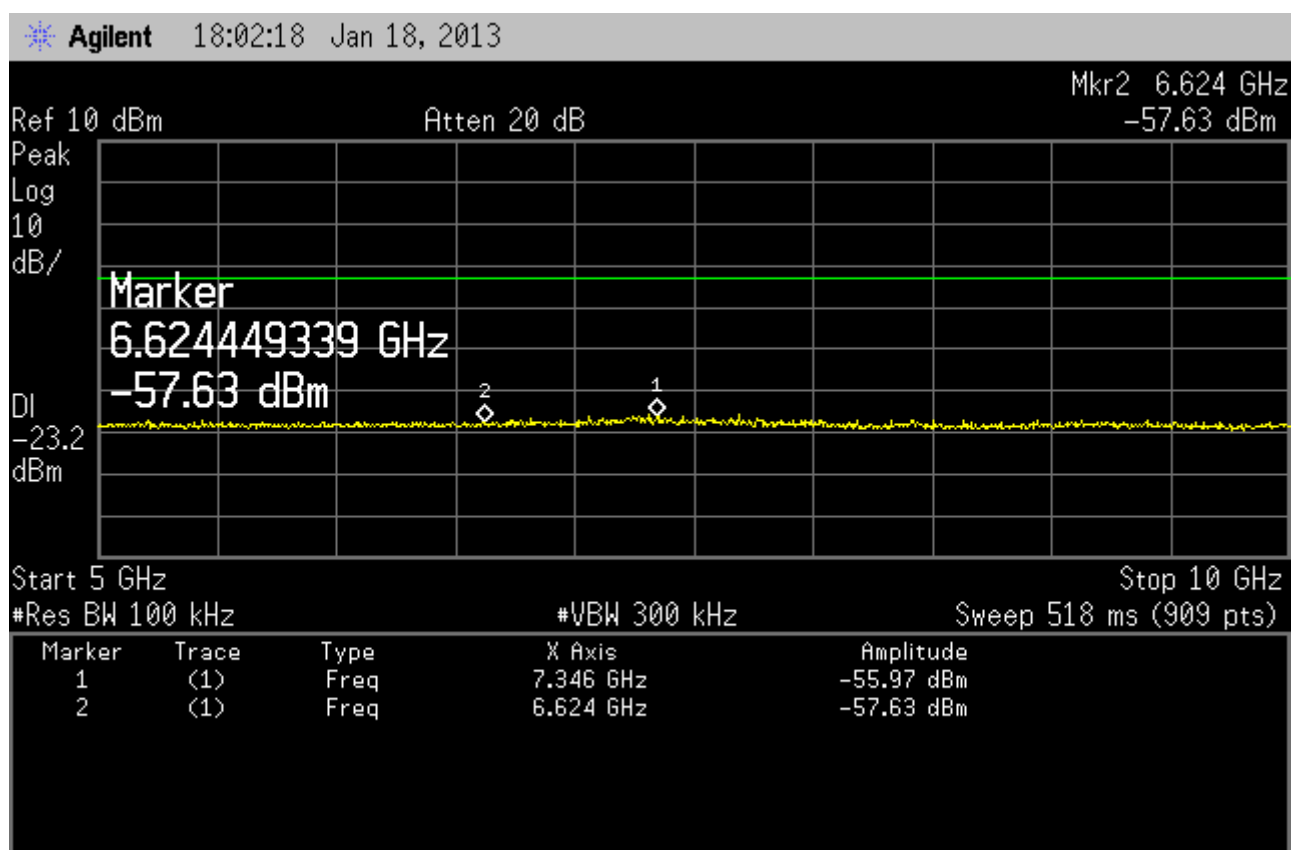


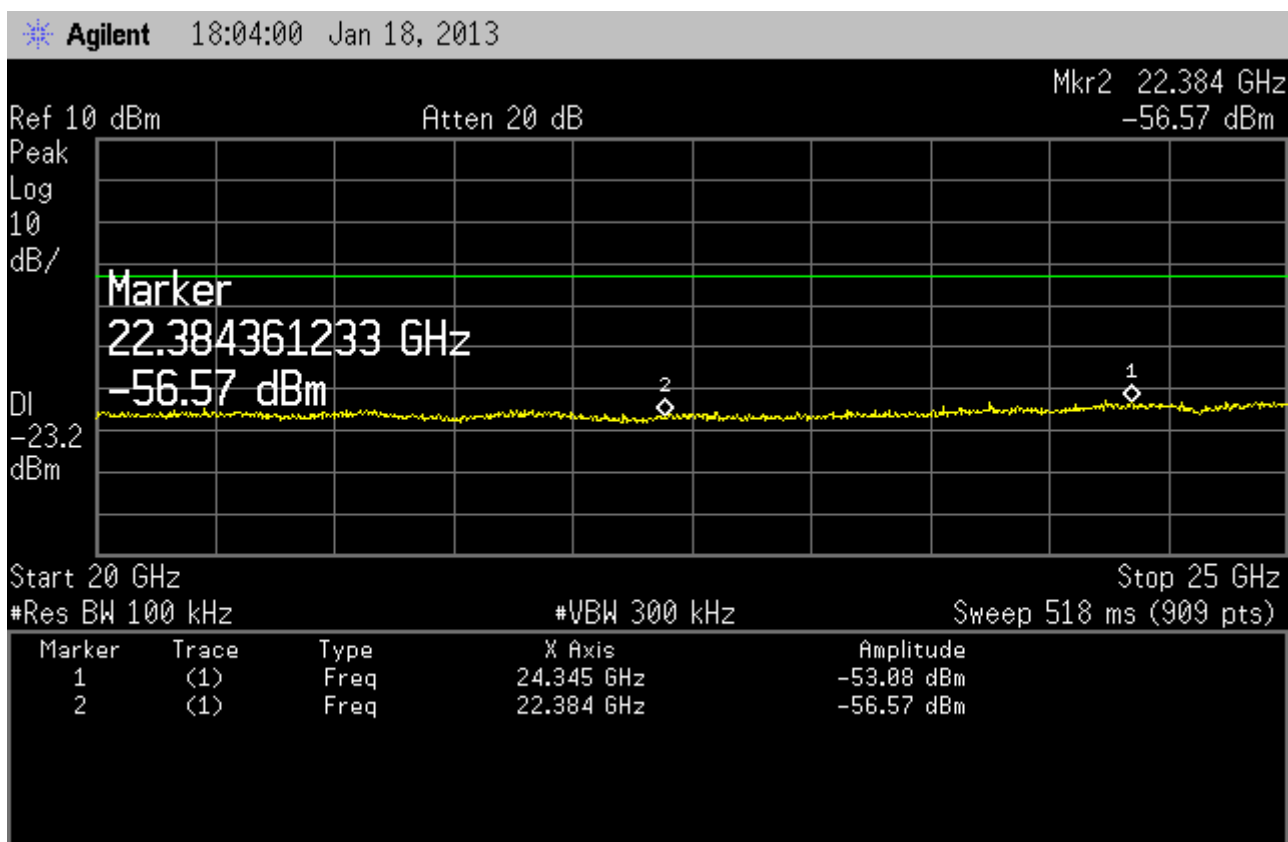
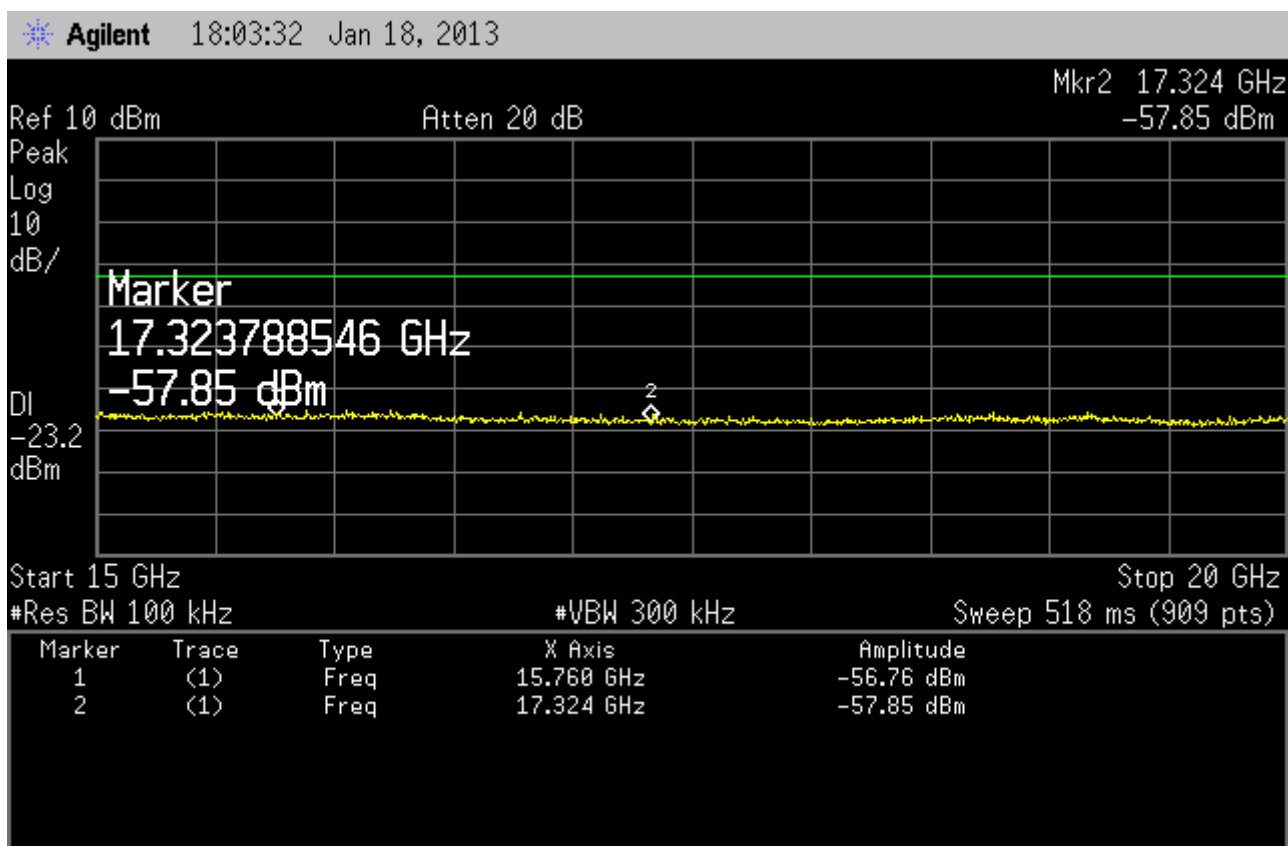




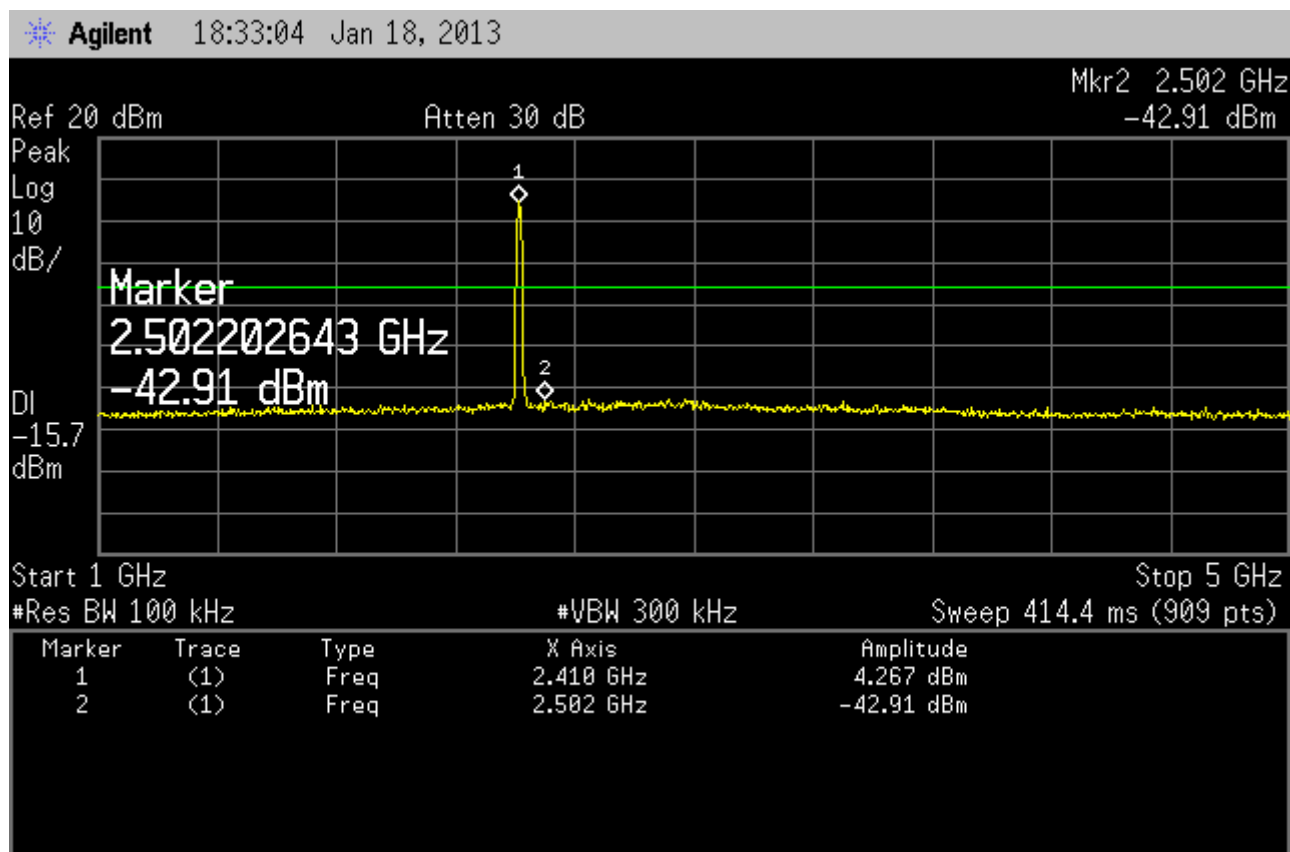
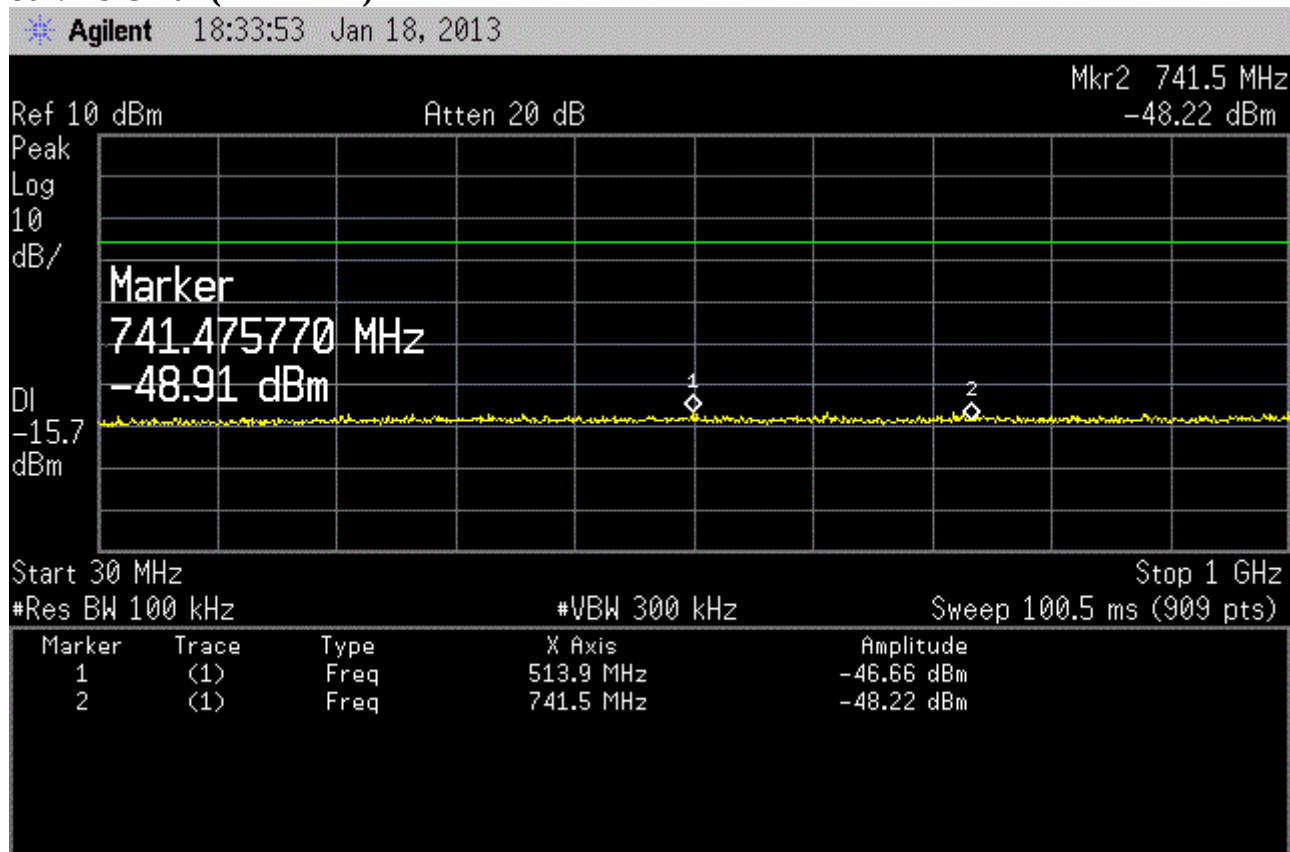
802.11n HT40 Ch 09 (2452 MHz) ANT1

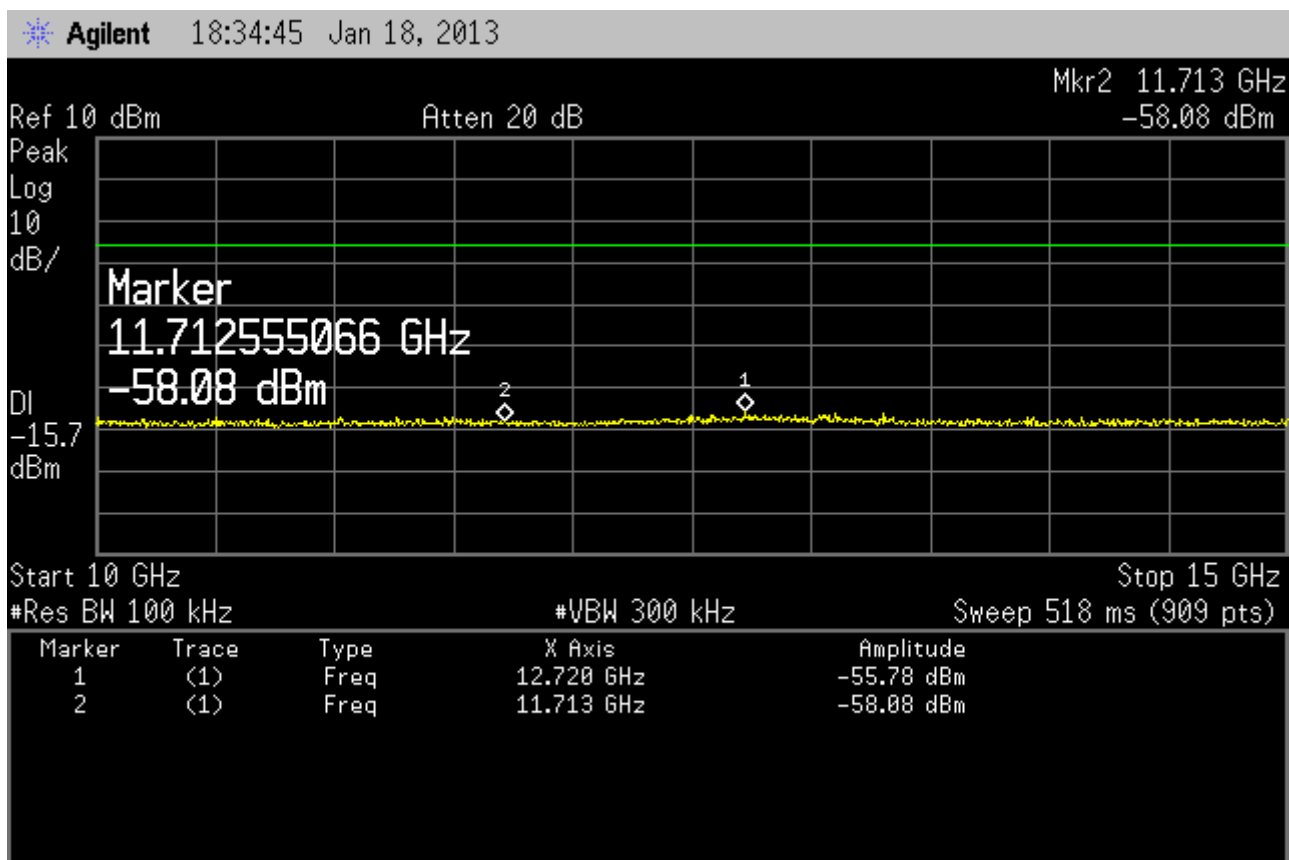
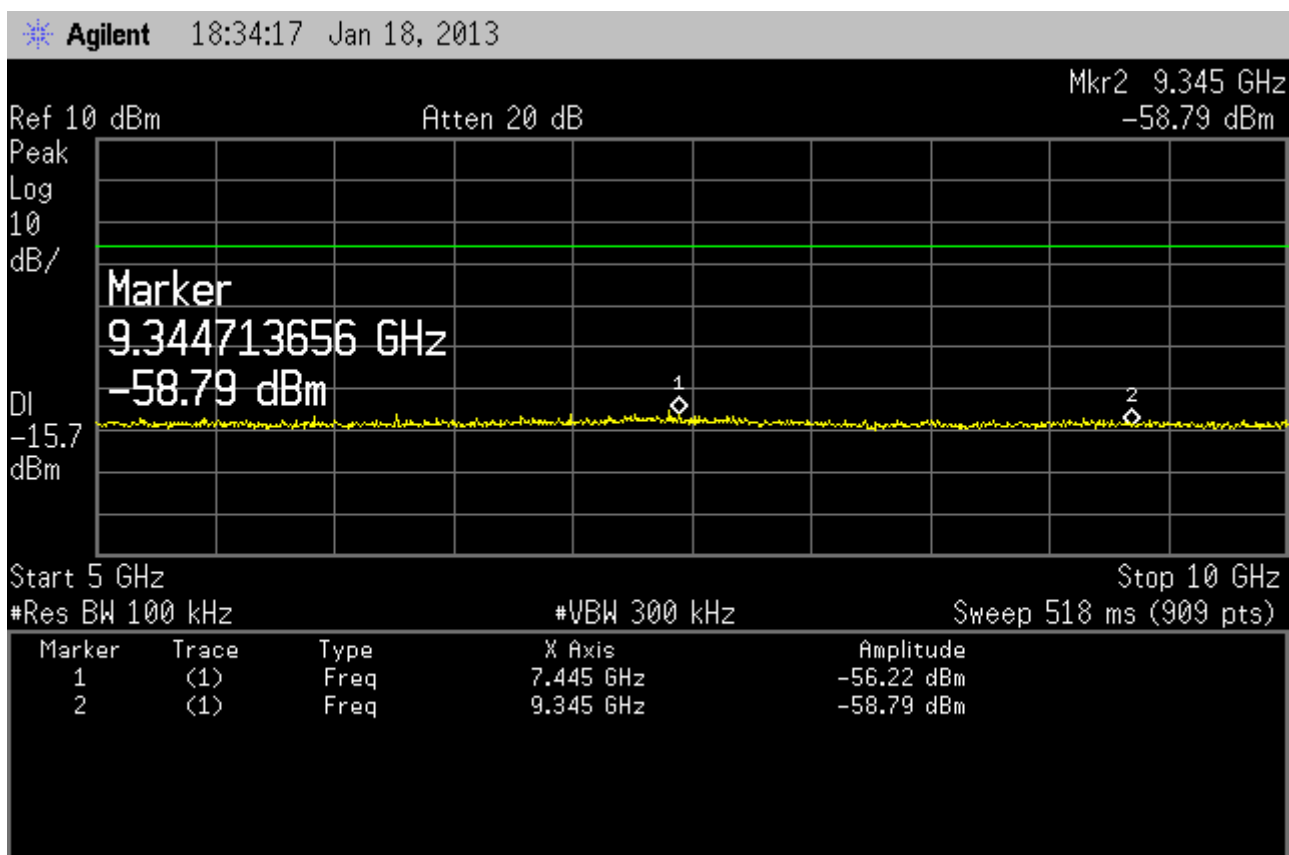


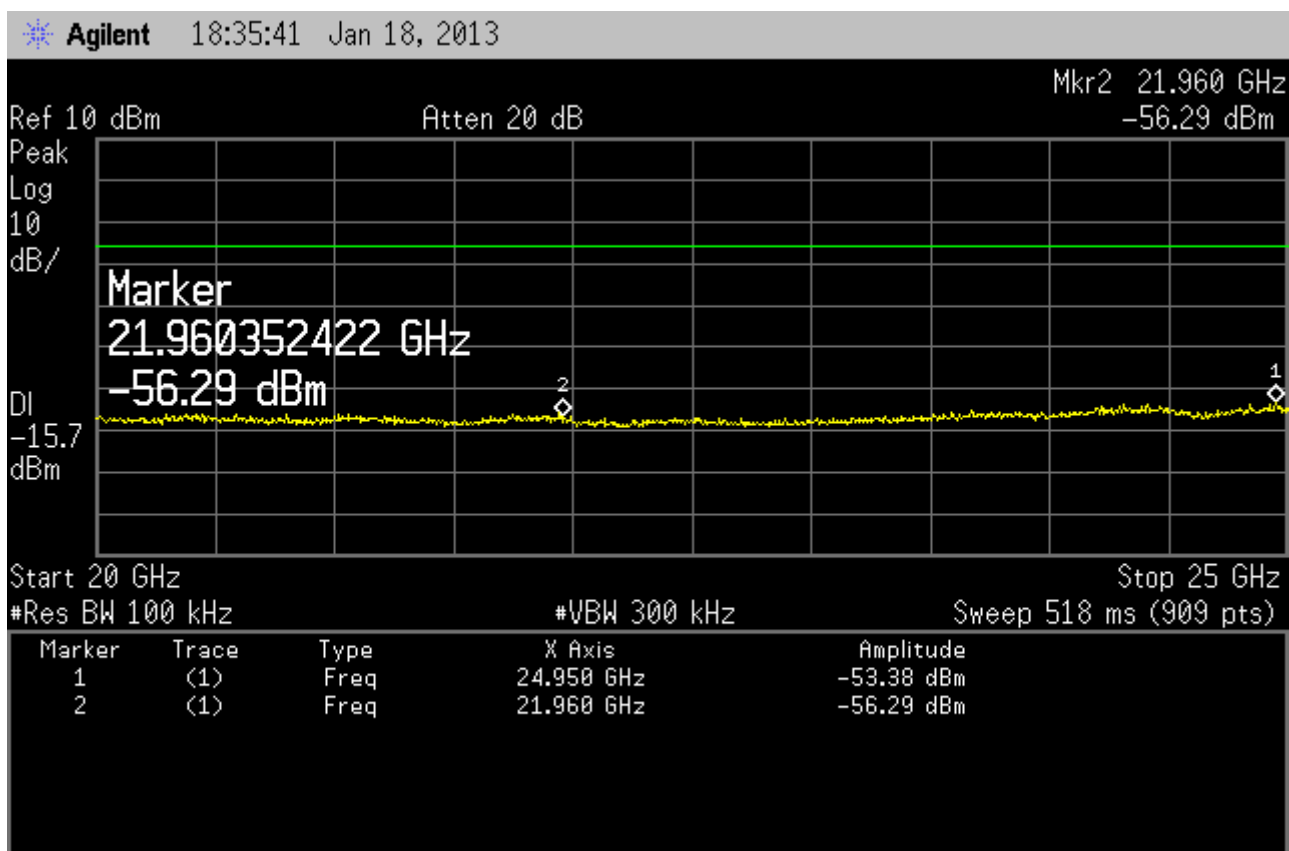
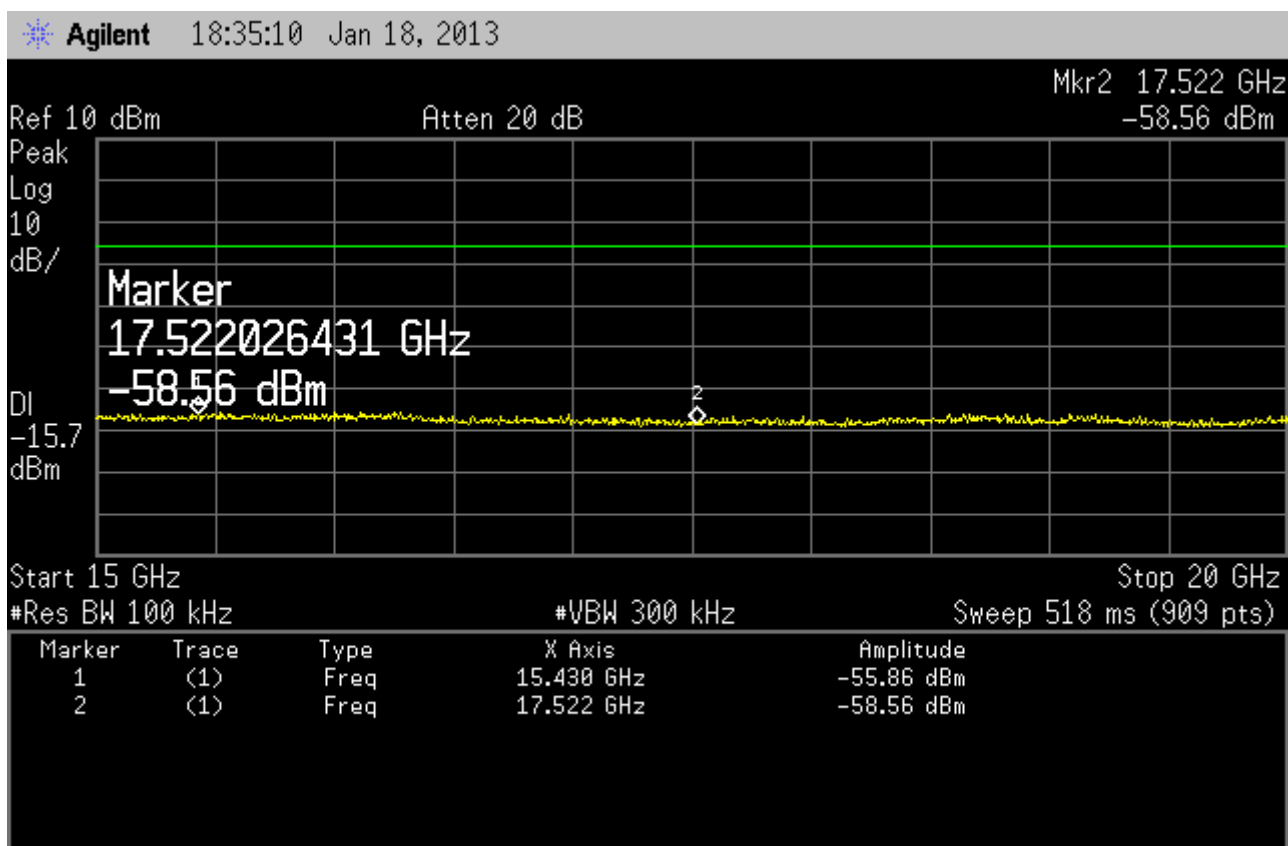




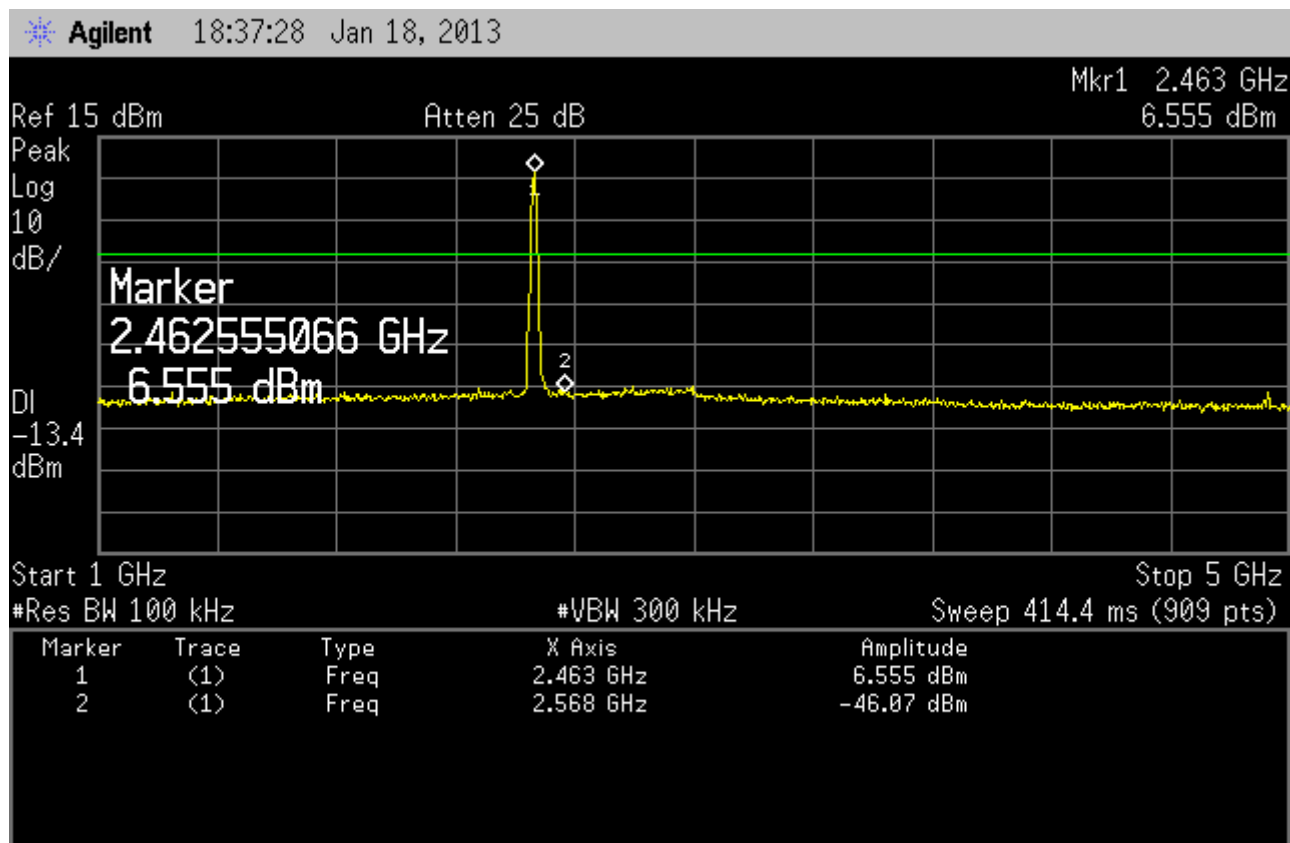
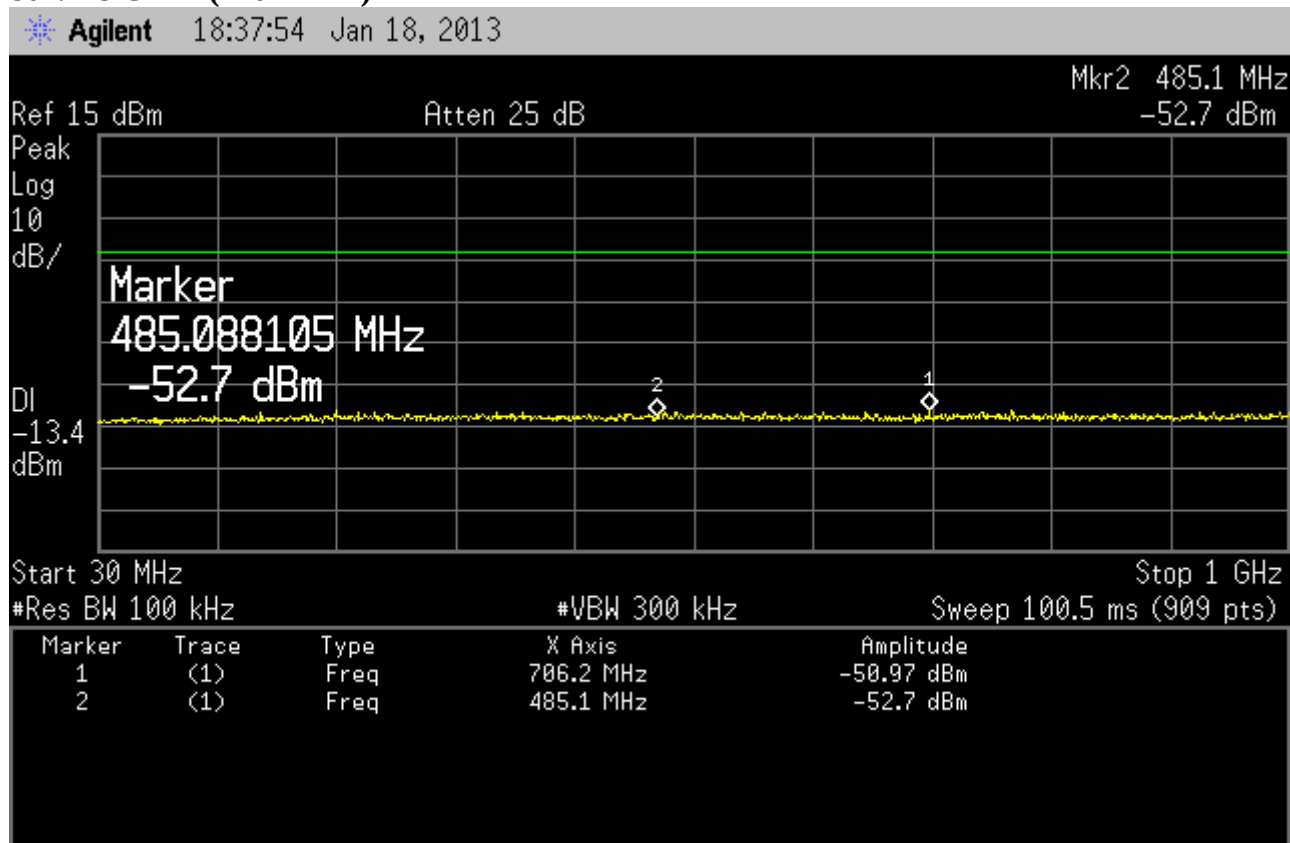
802.11b Ch 01 (2412 MHz) ANT2

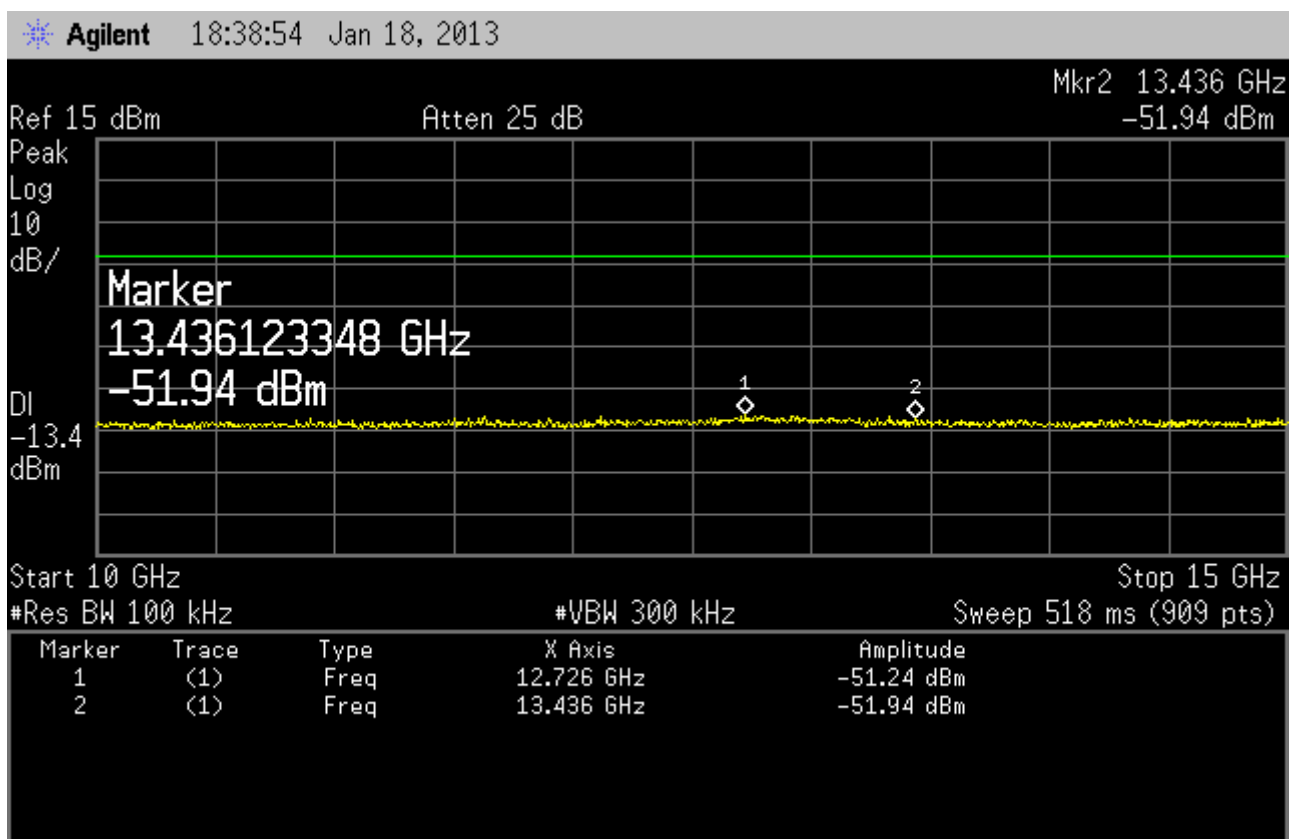
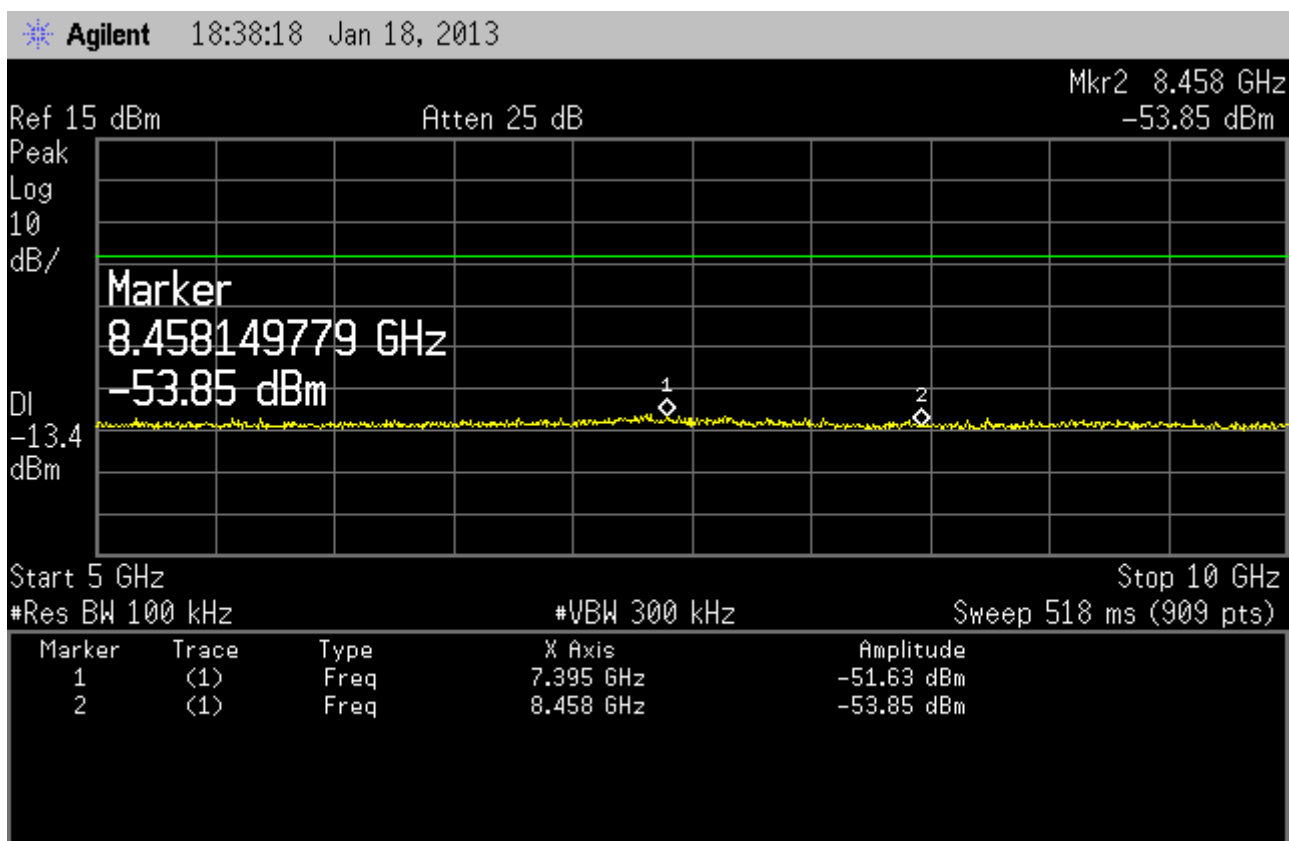


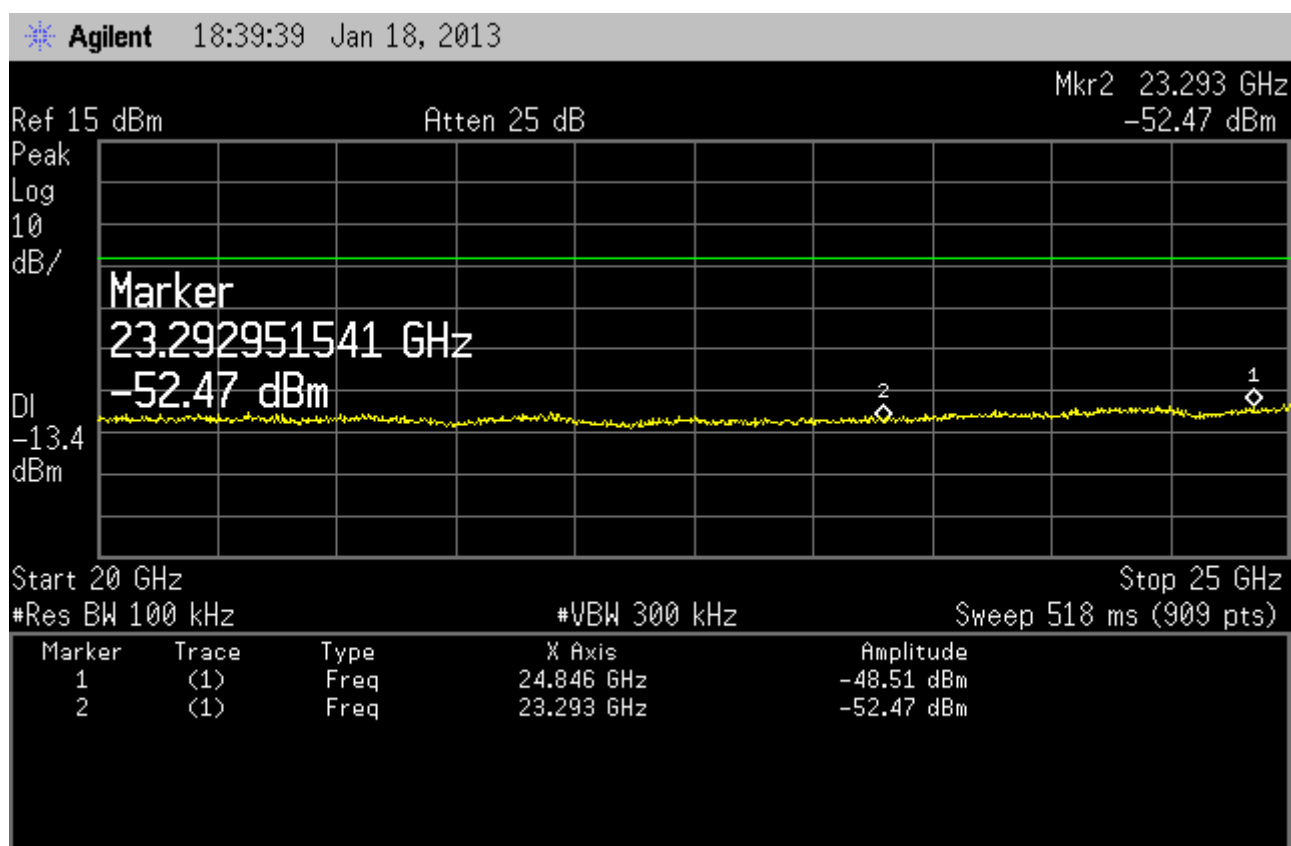
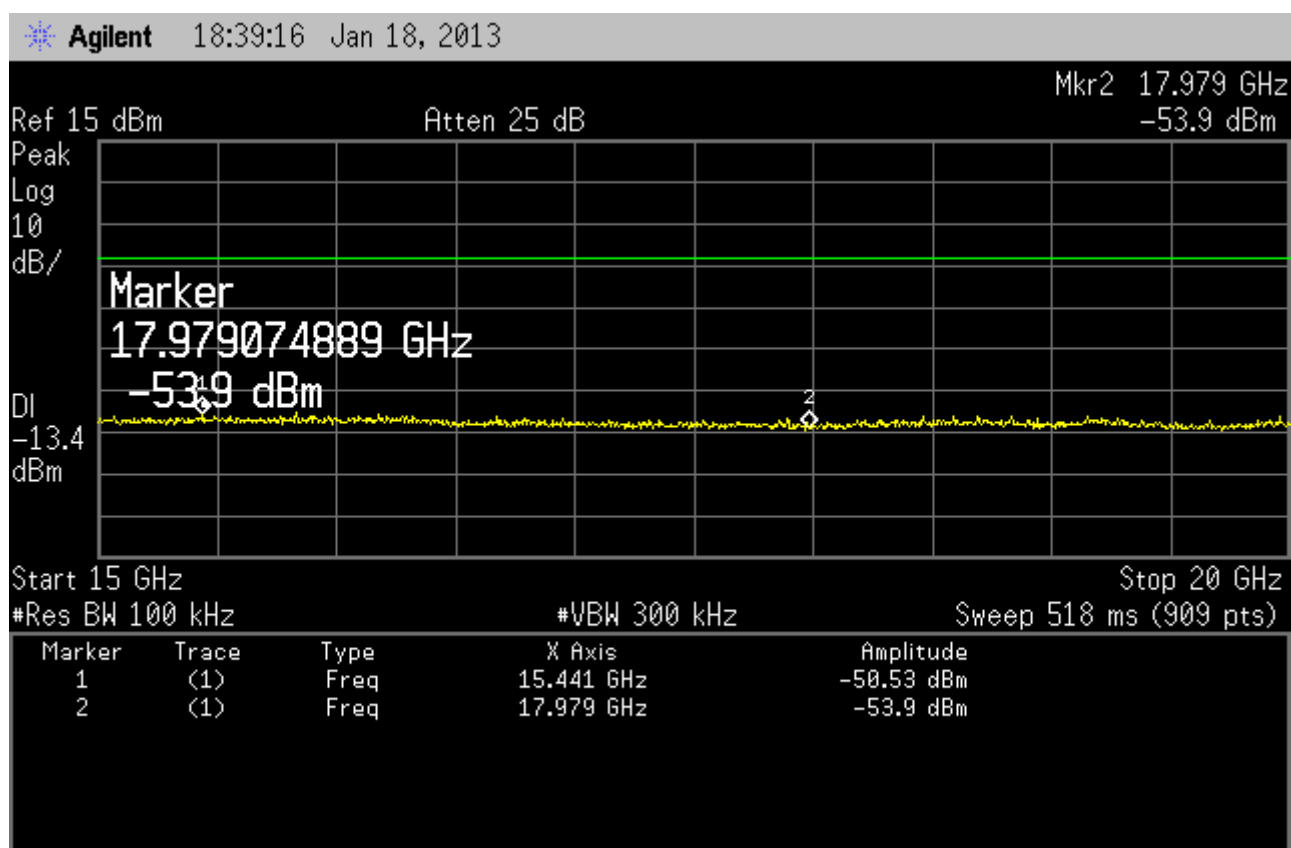




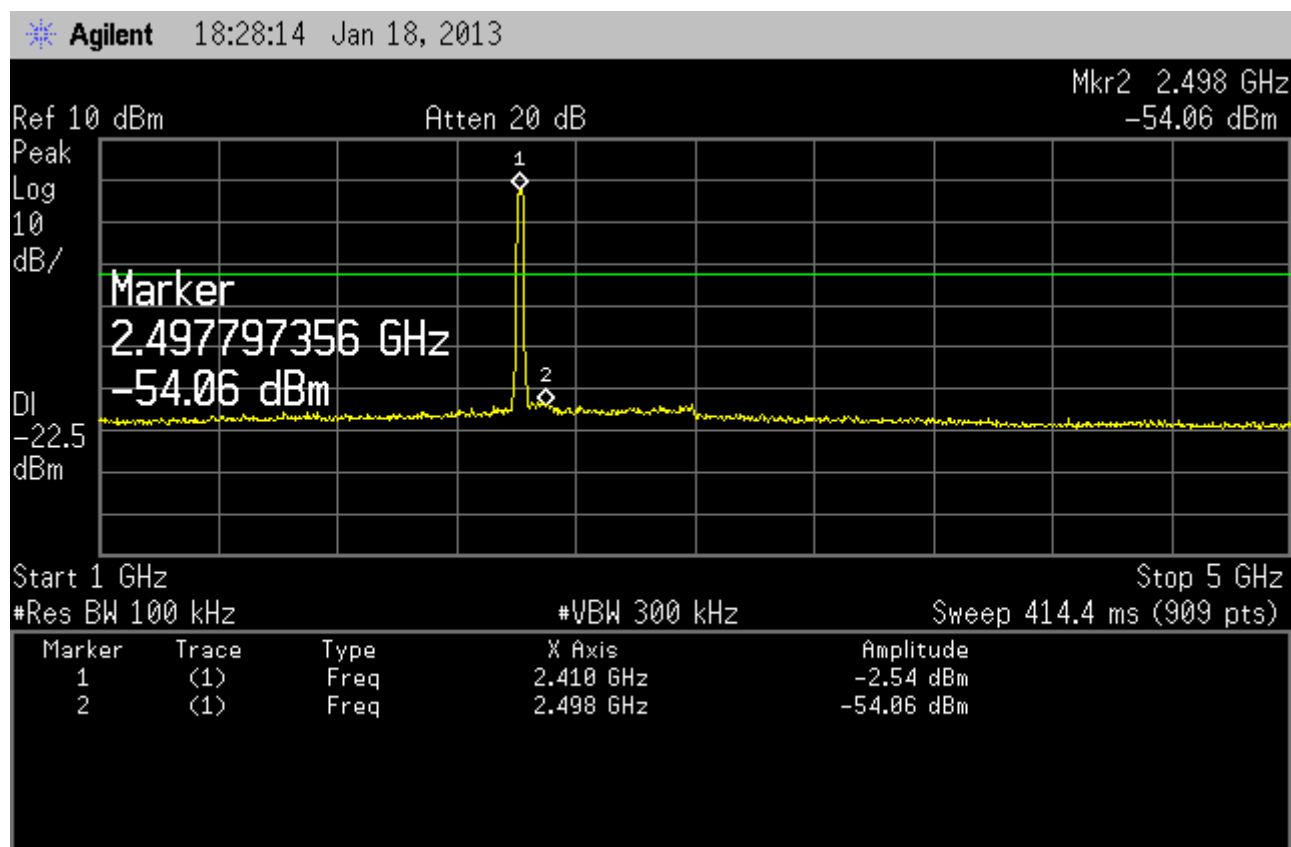
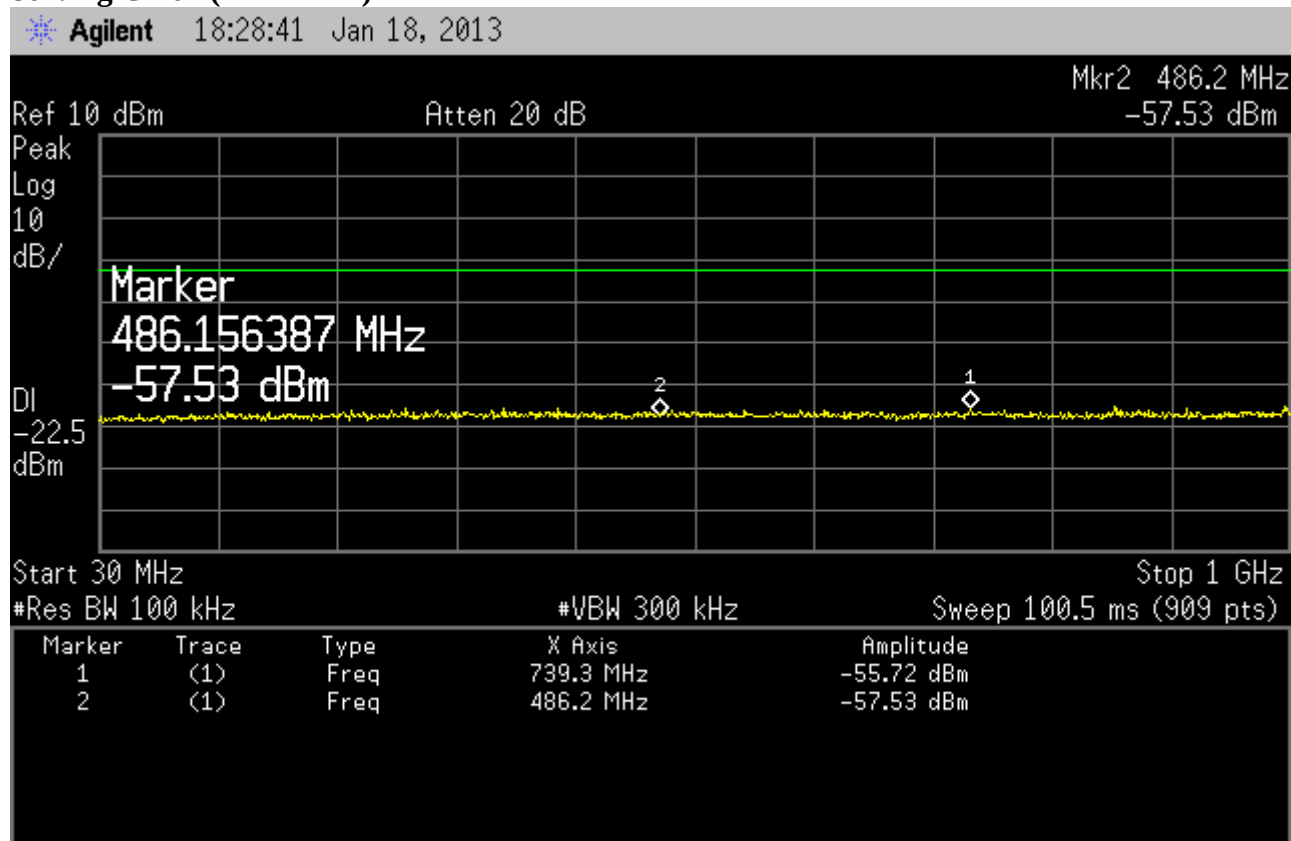
802.11b Ch 11 (2462 MHz) ANT2

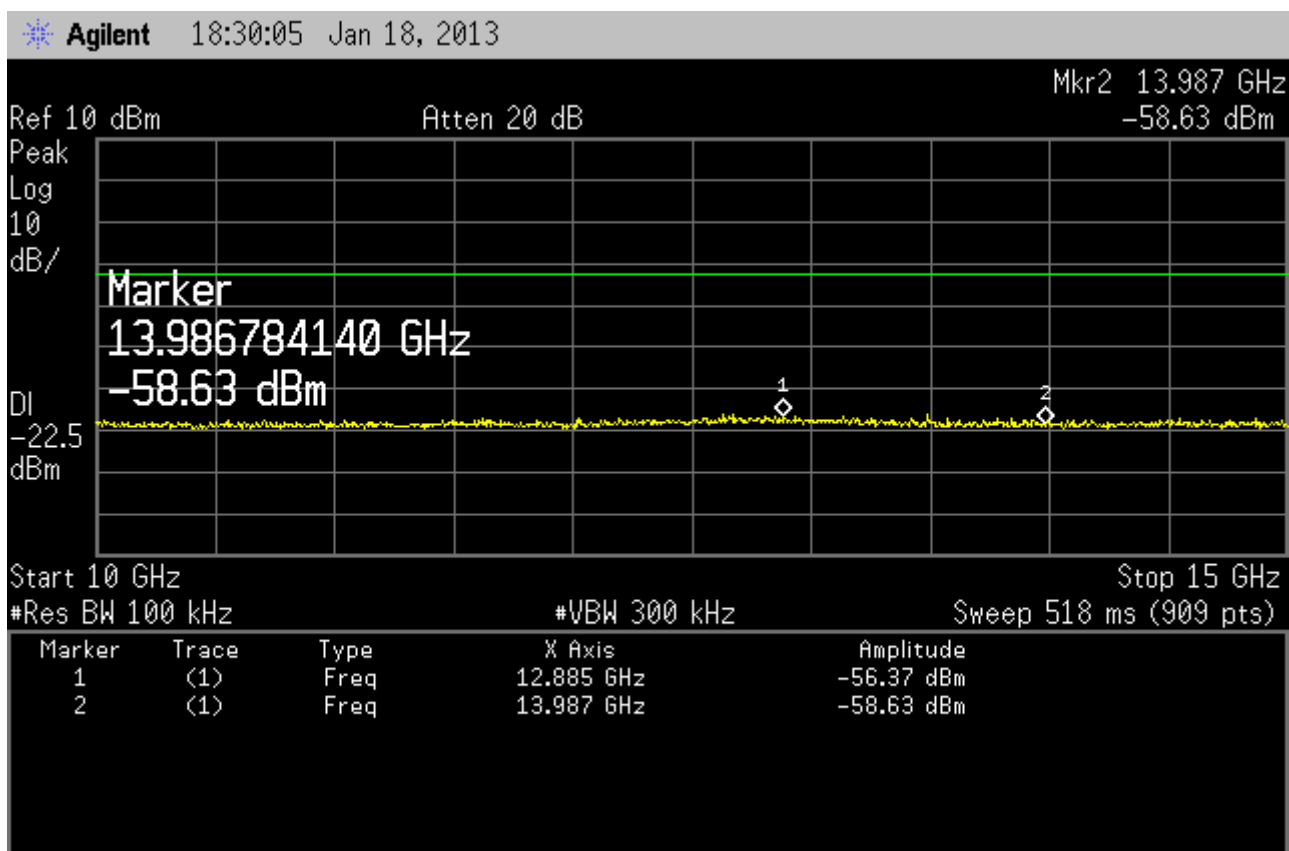
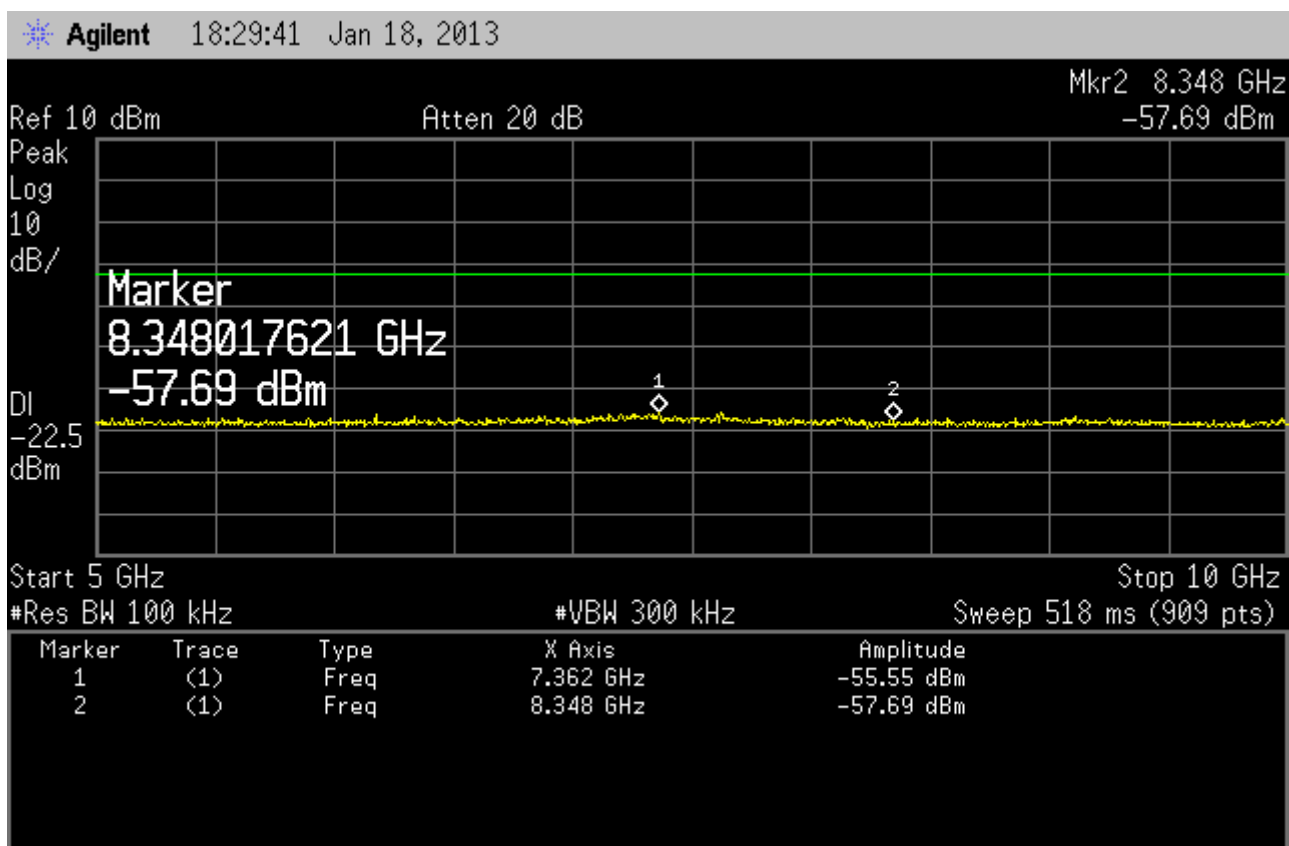


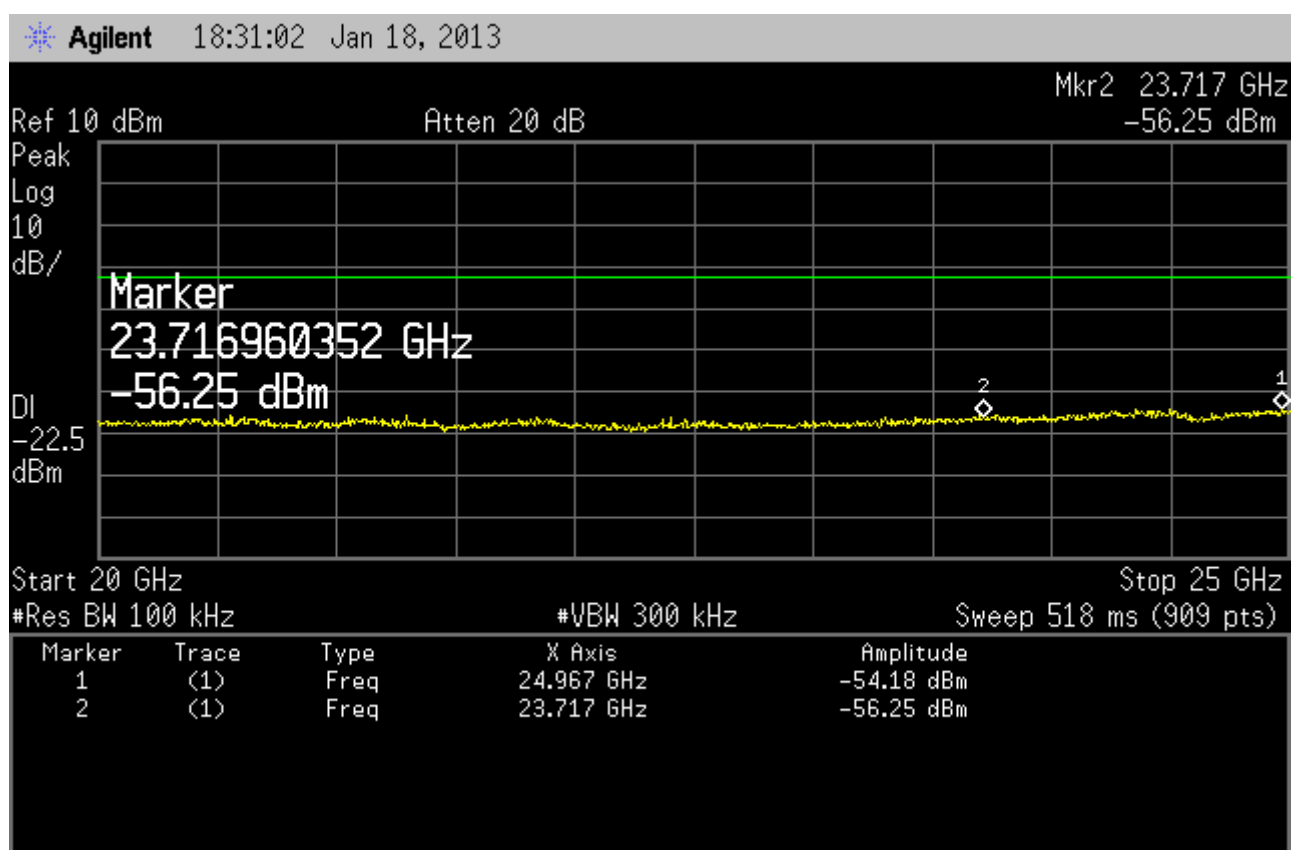
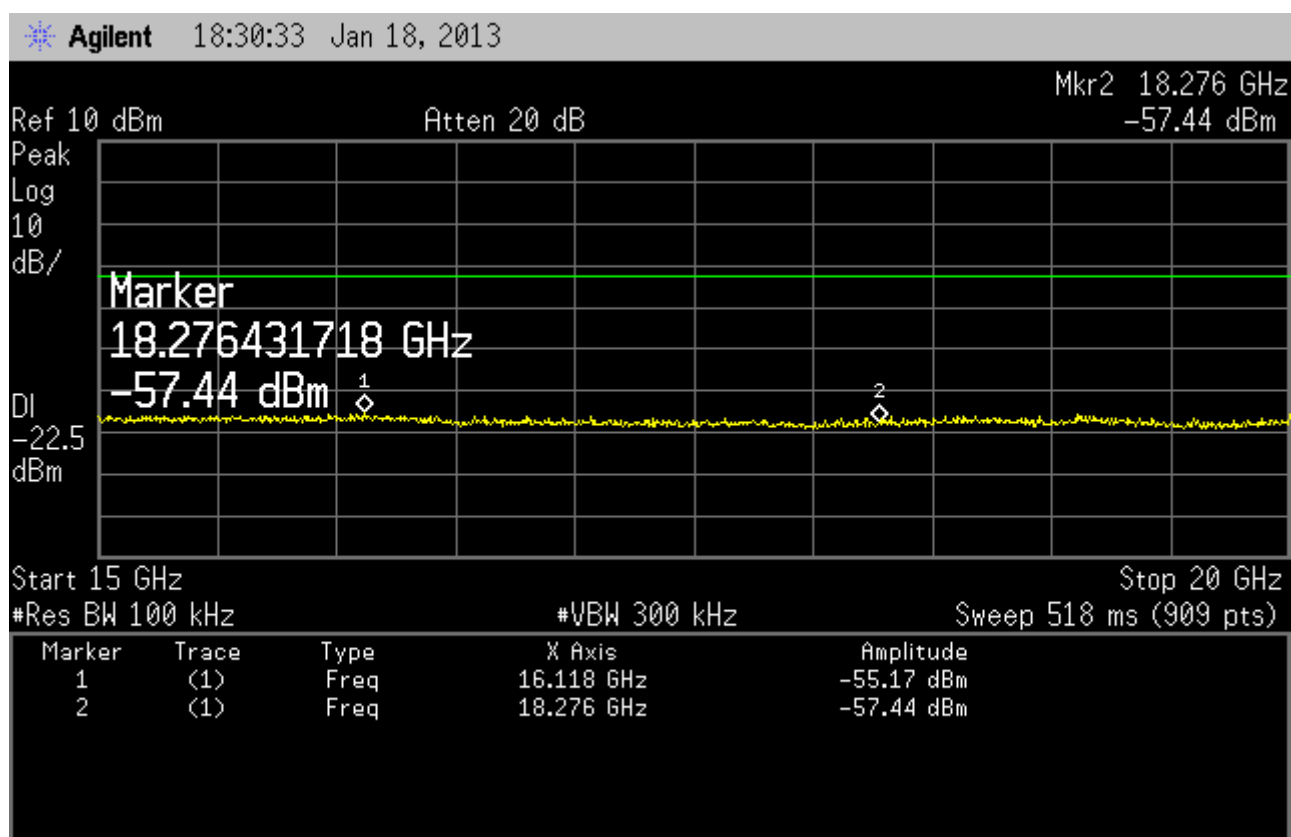




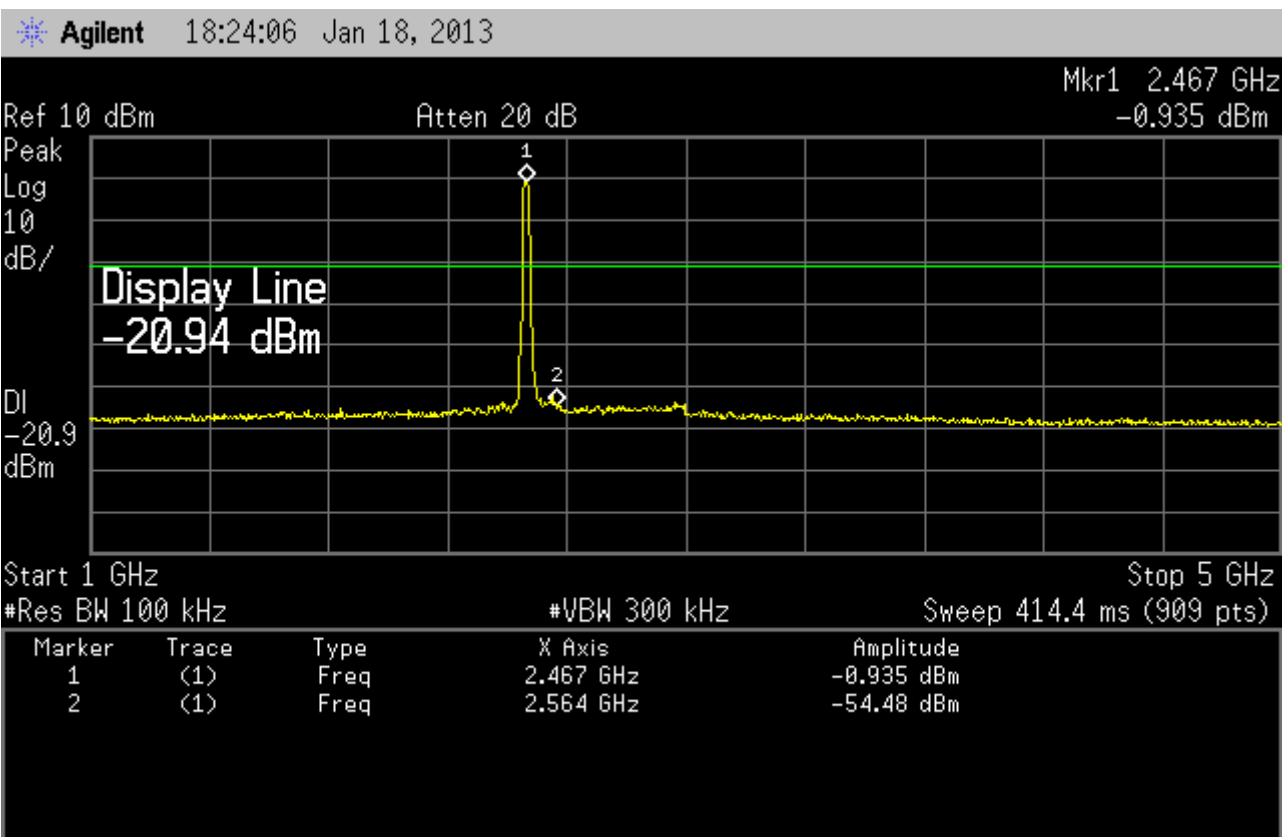
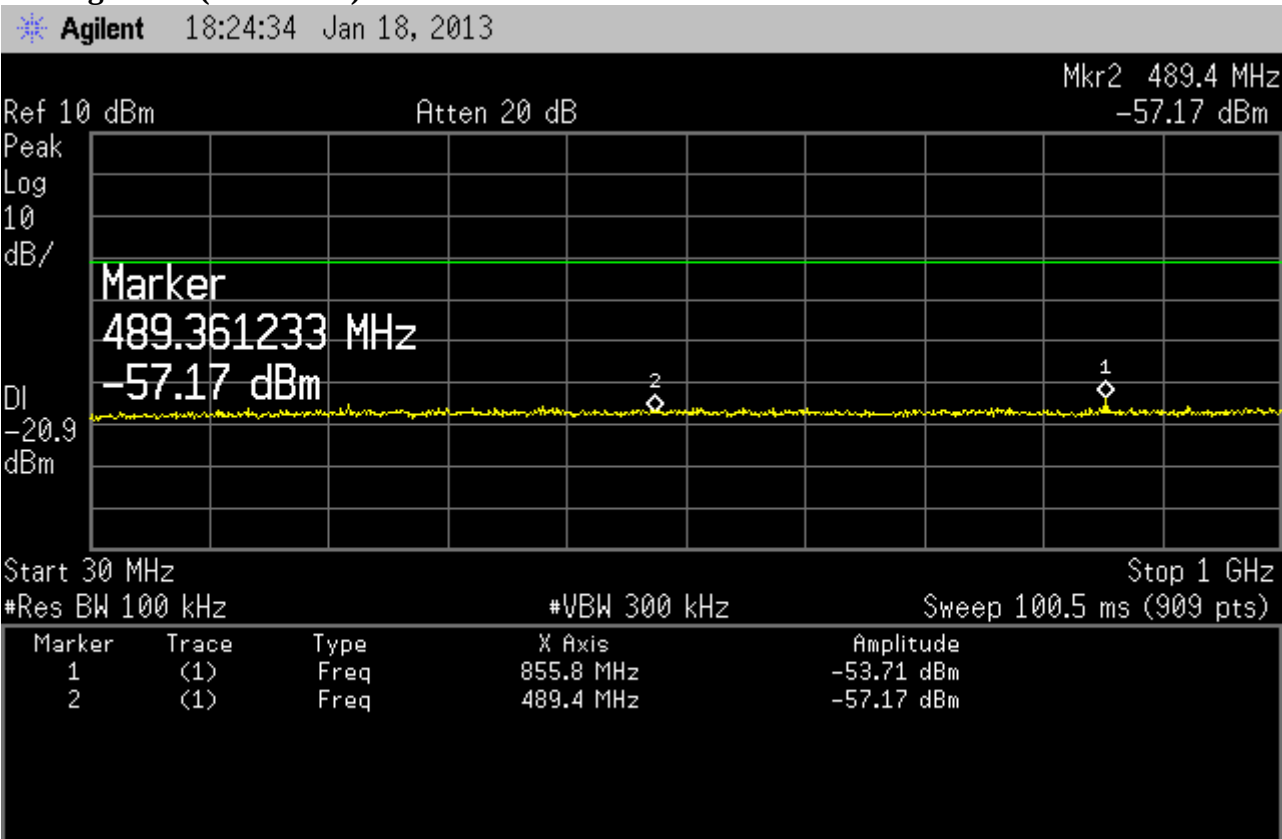
802.11g Ch 01 (2412 MHz) ANT2

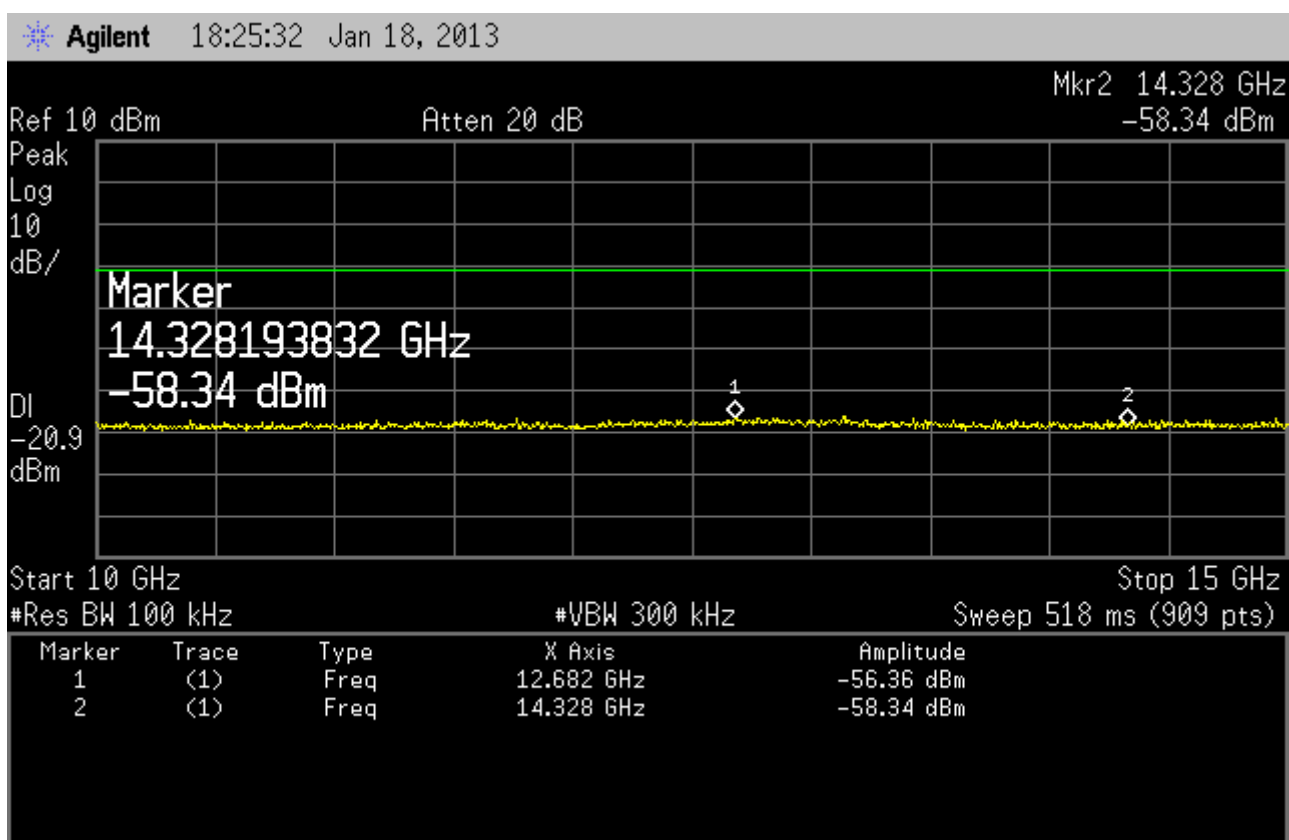
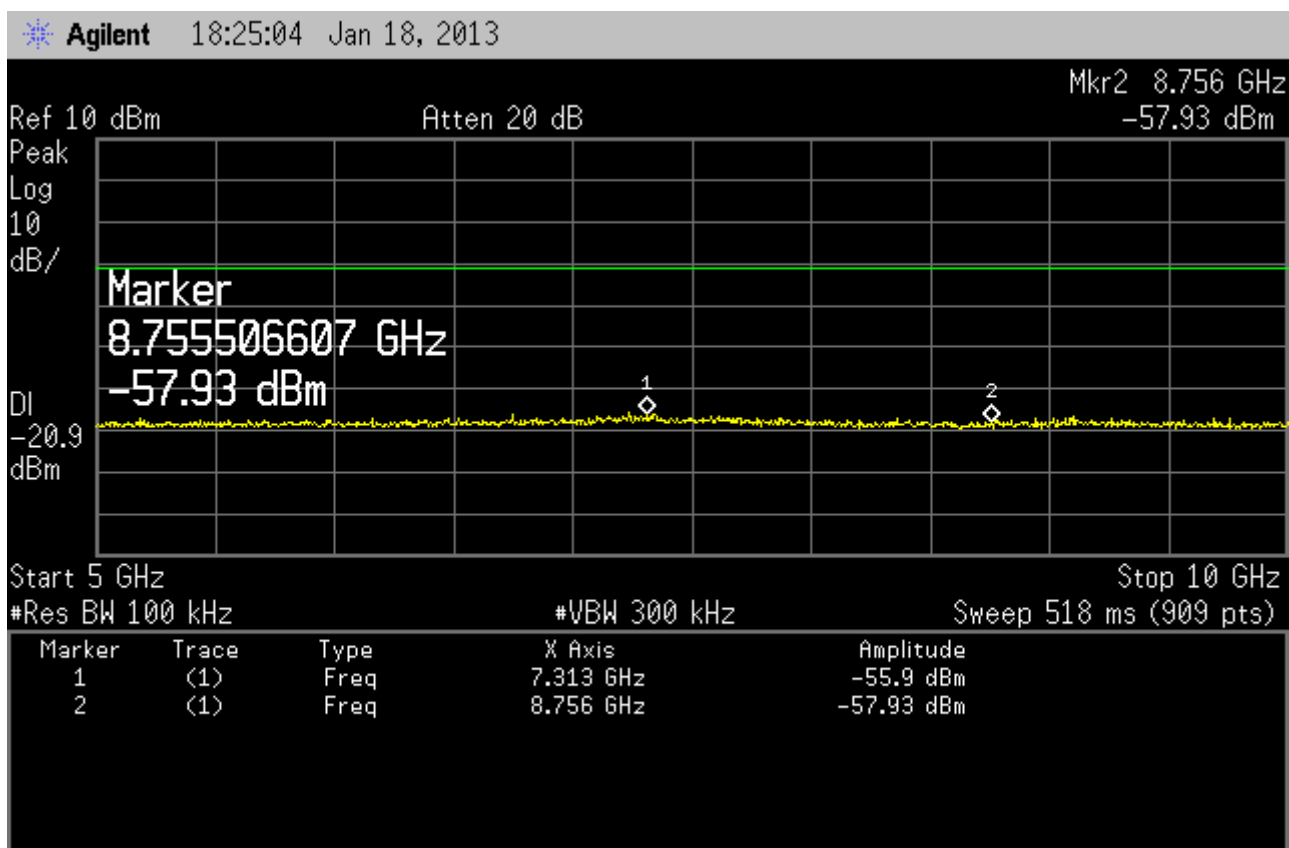


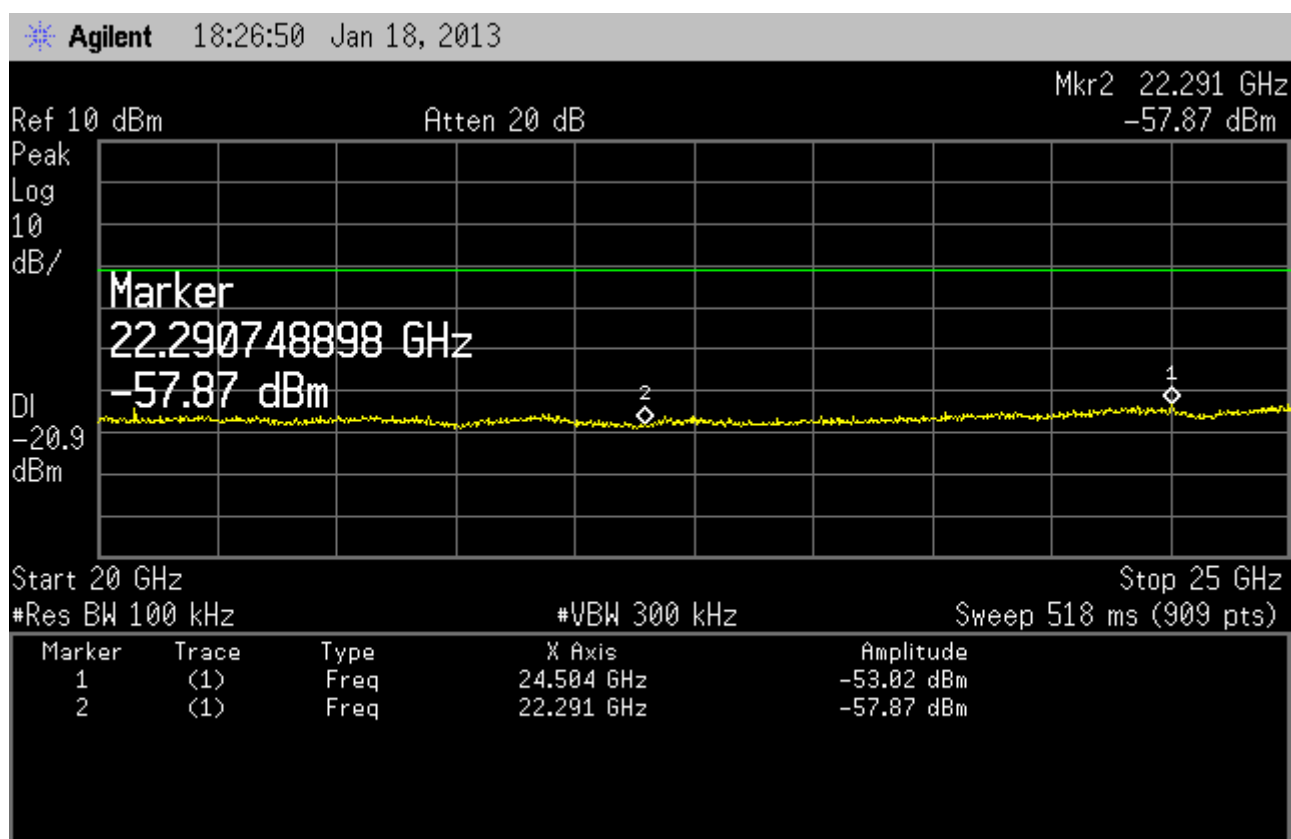
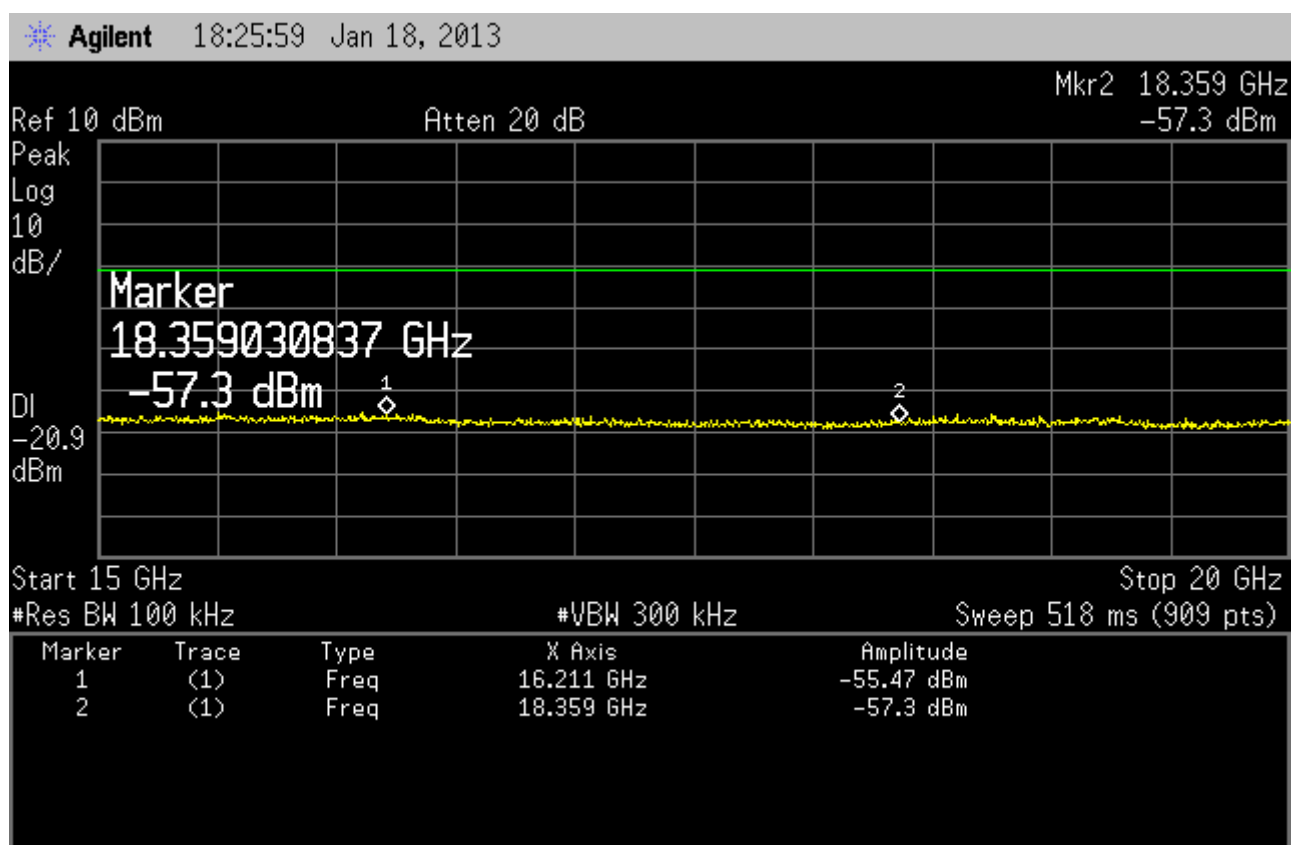




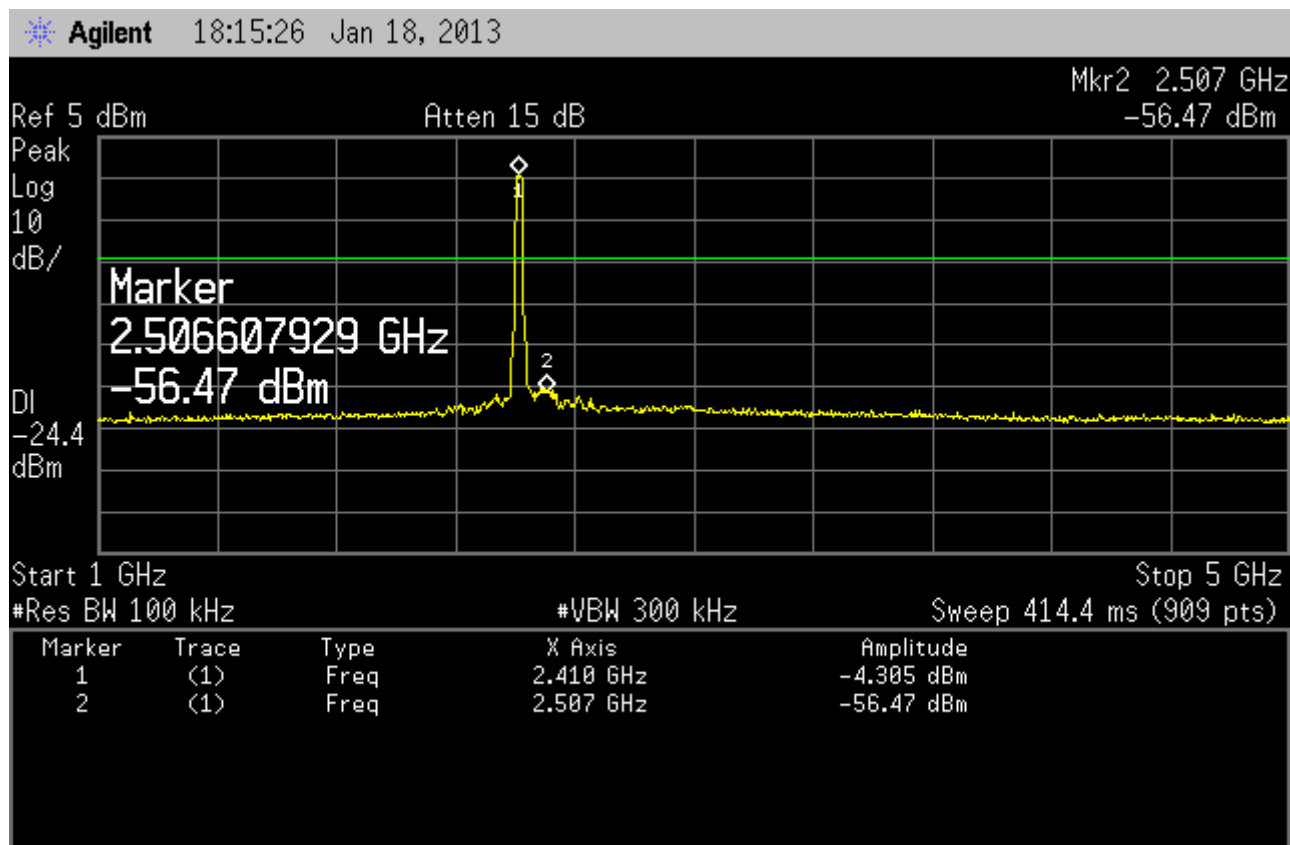
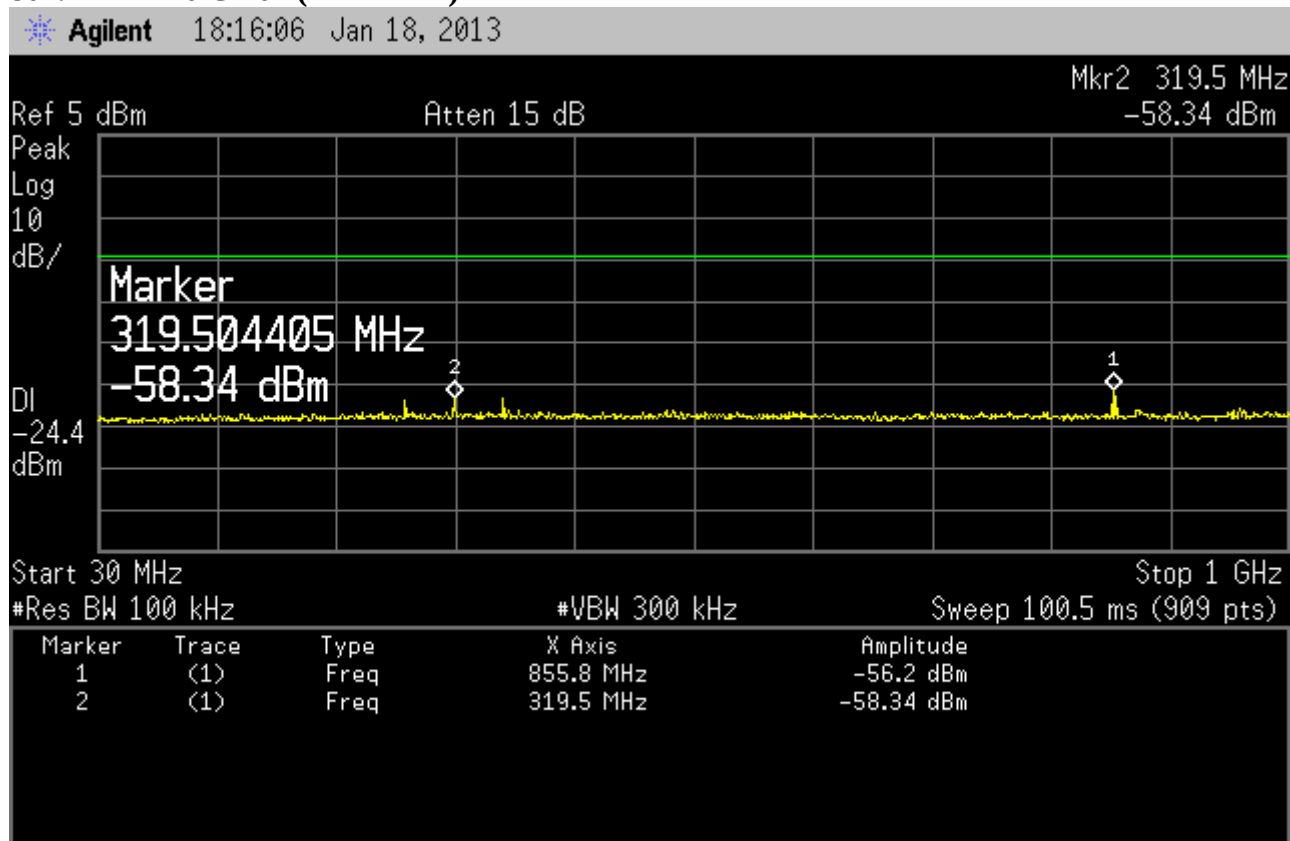
802.11g Ch 11 (2462 MHz) ANT2

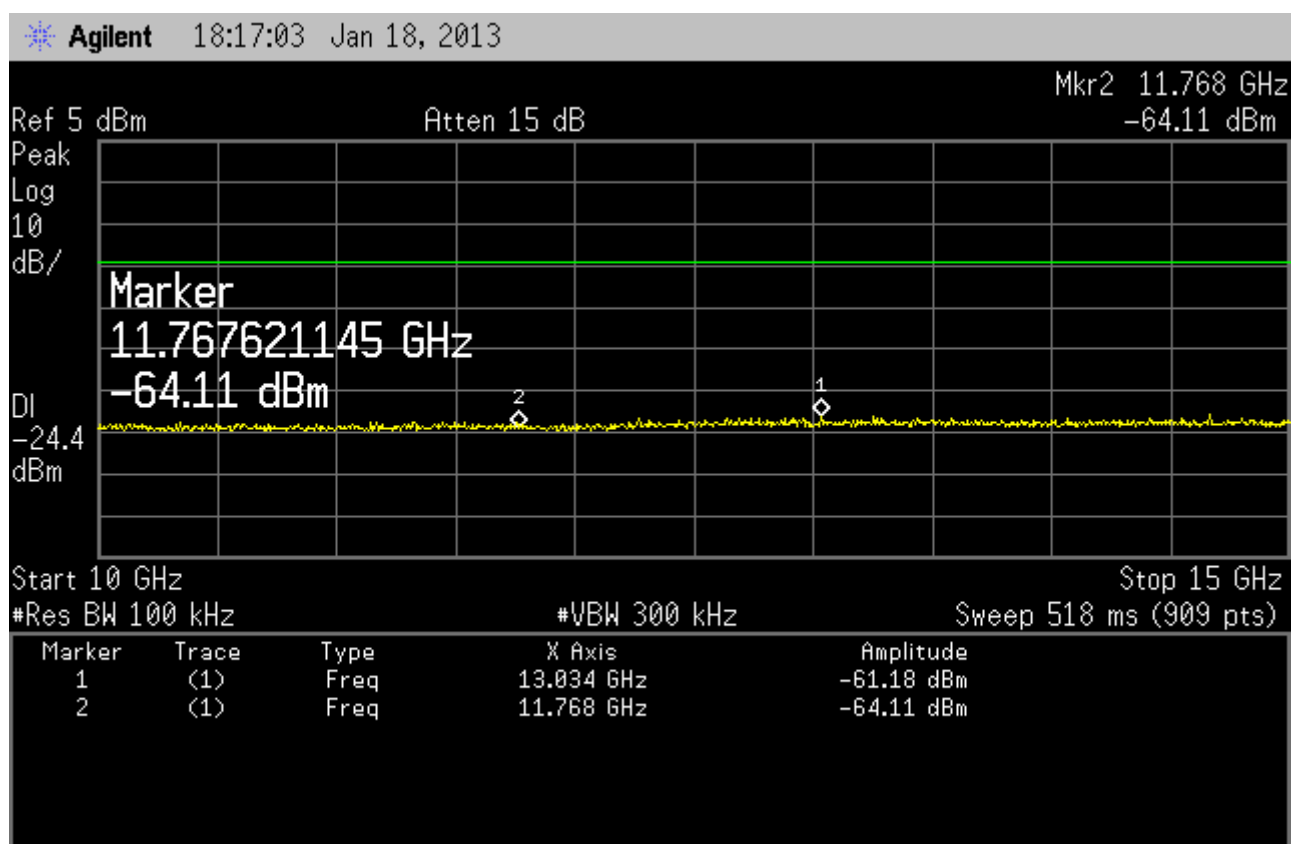
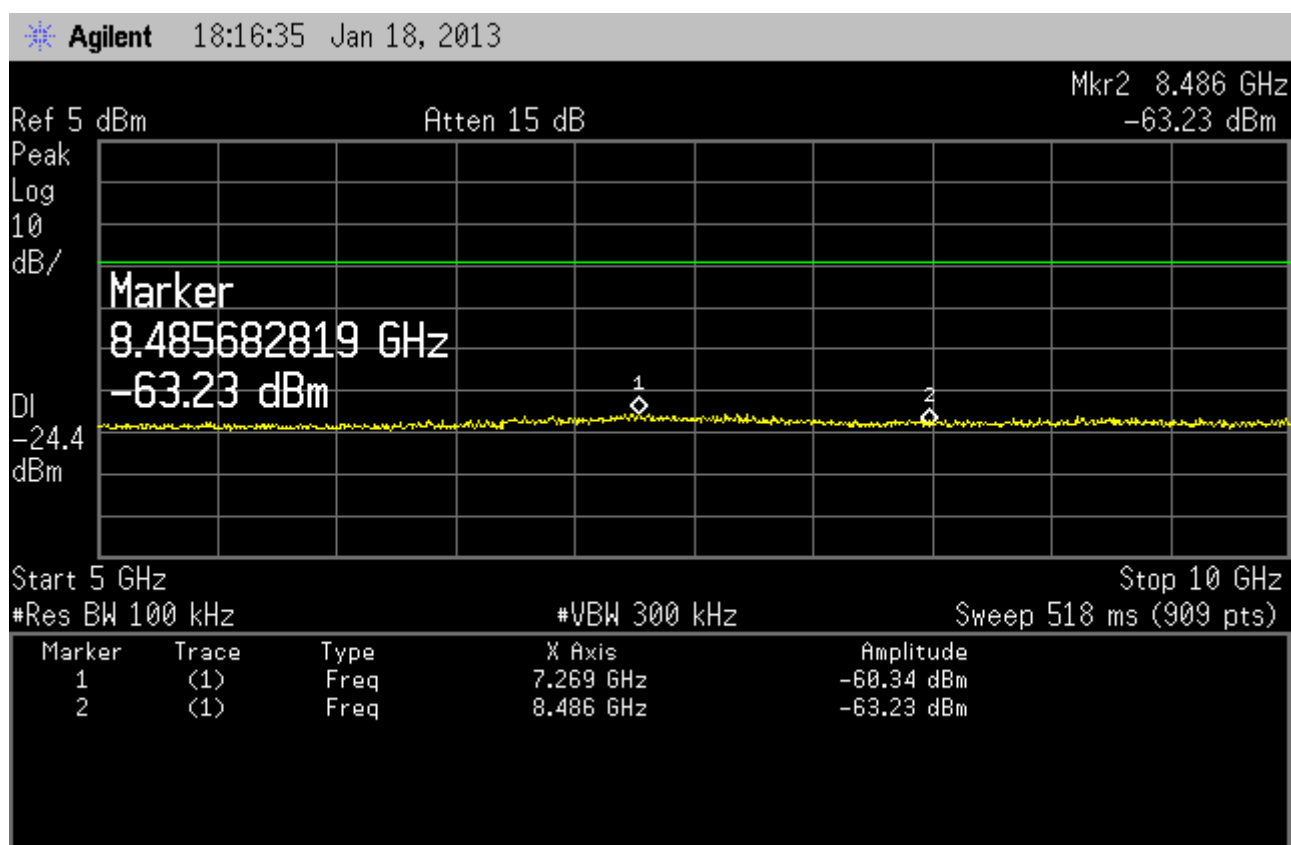


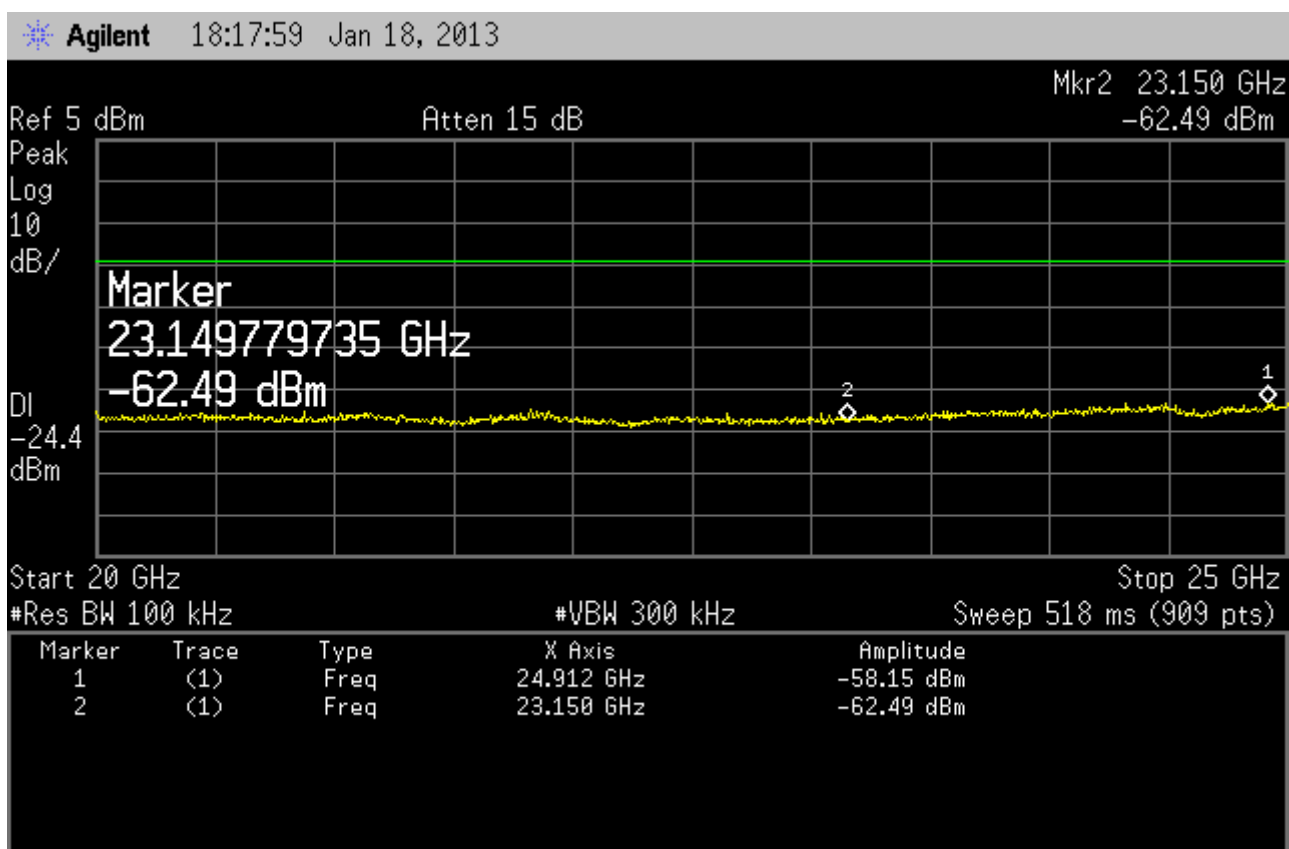
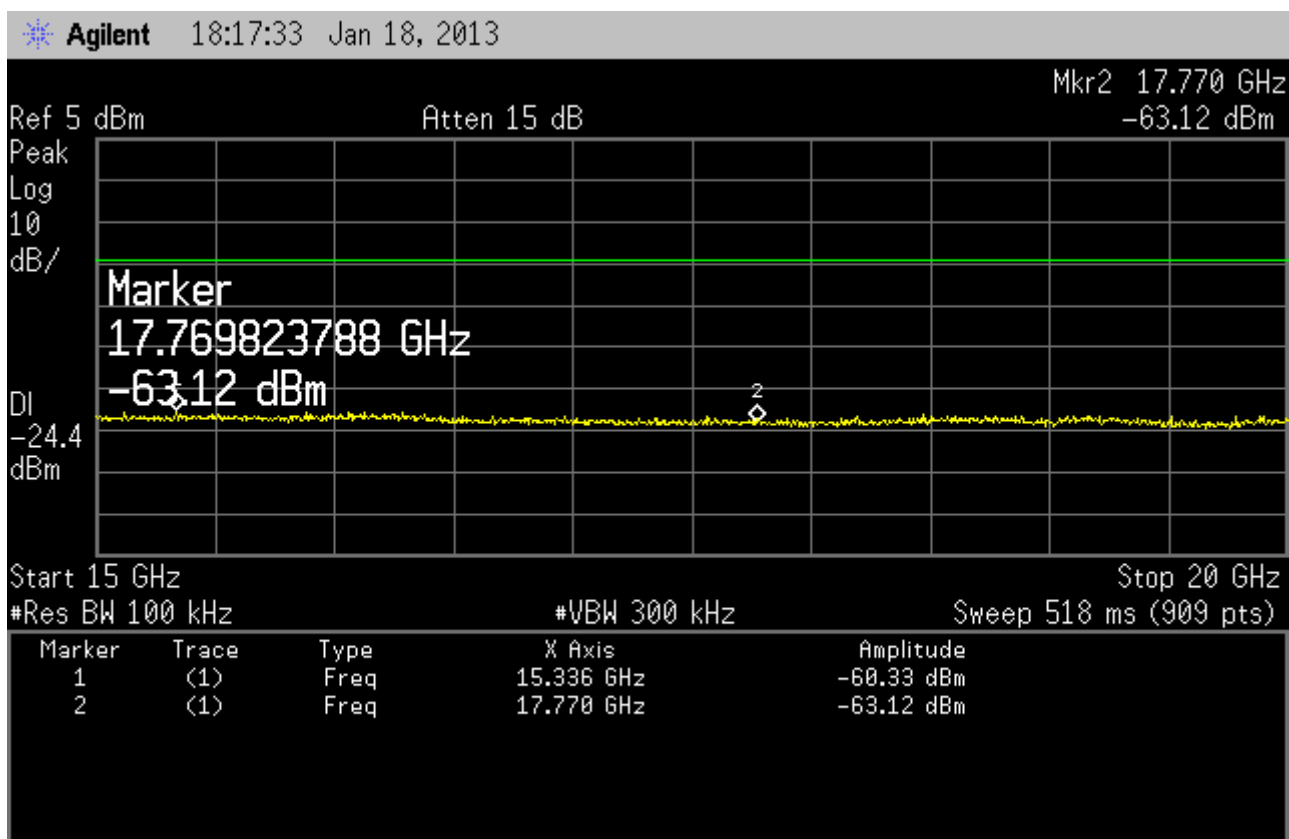




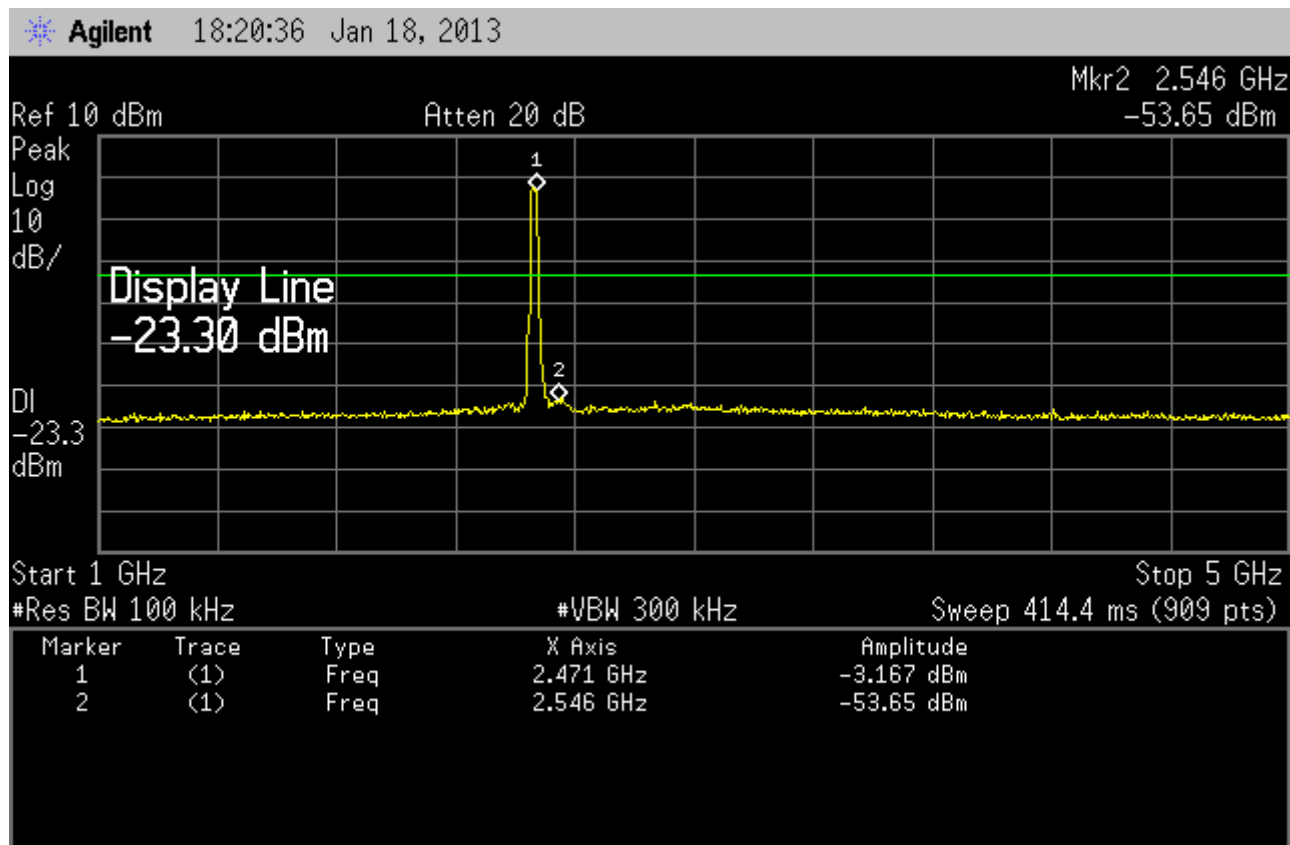
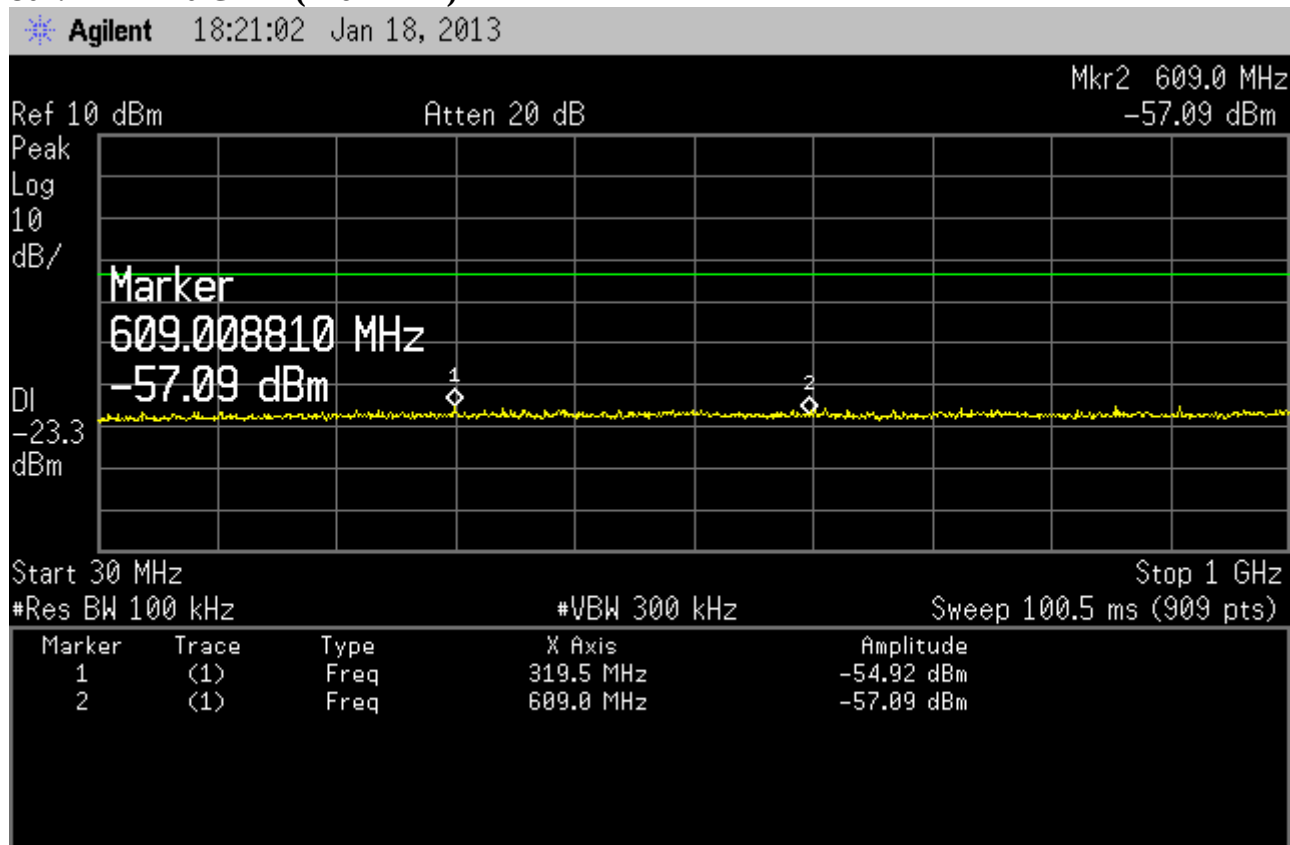
802.11n HT20 Ch 01 (2412 MHz)ANT2

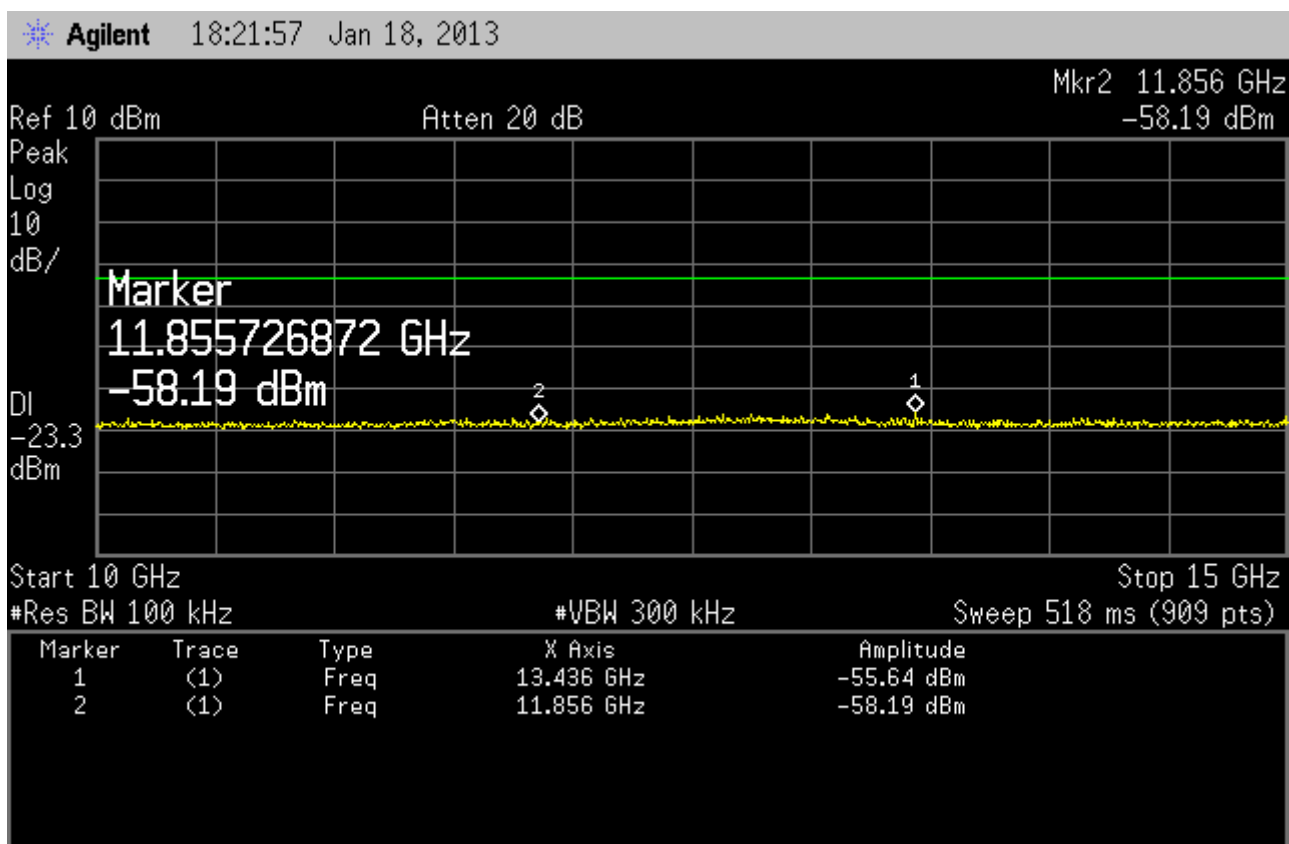
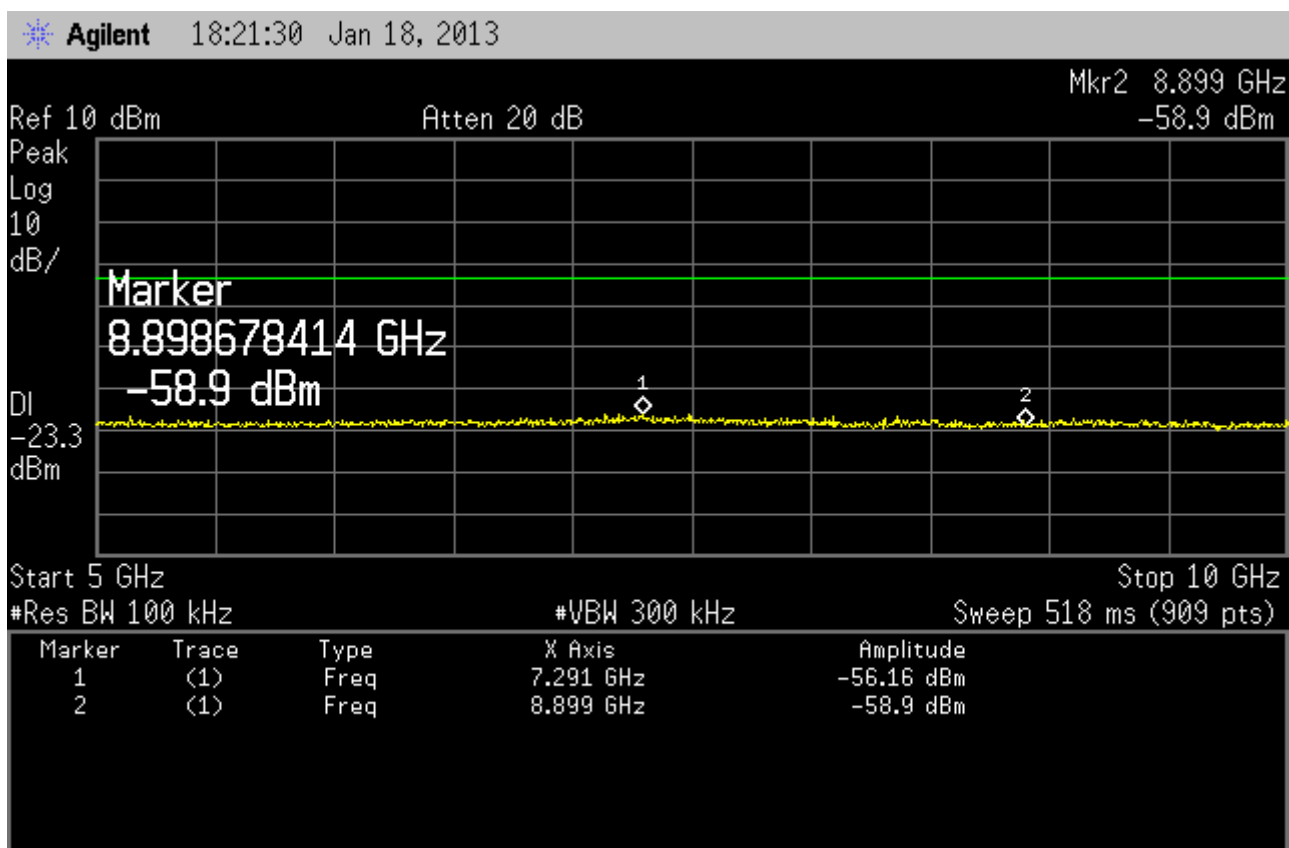


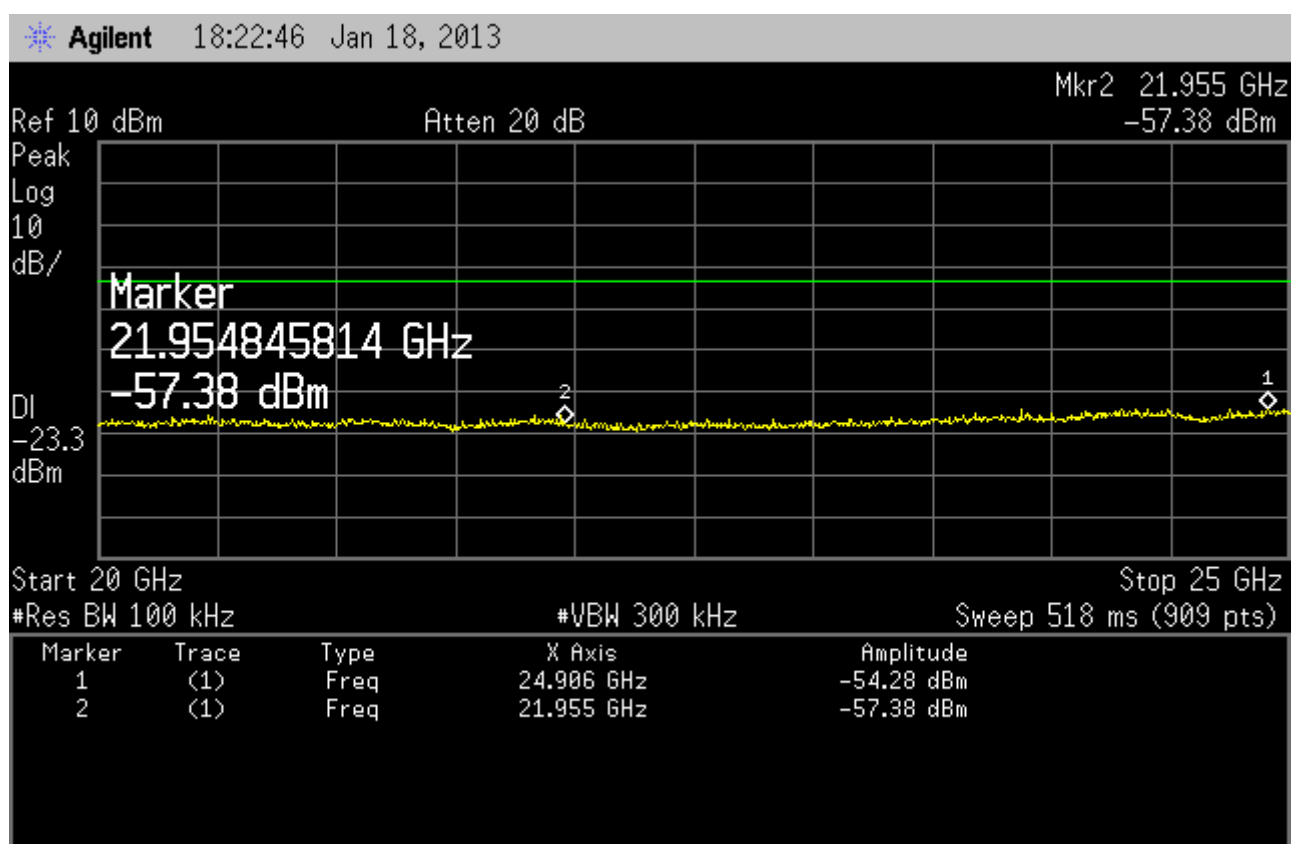
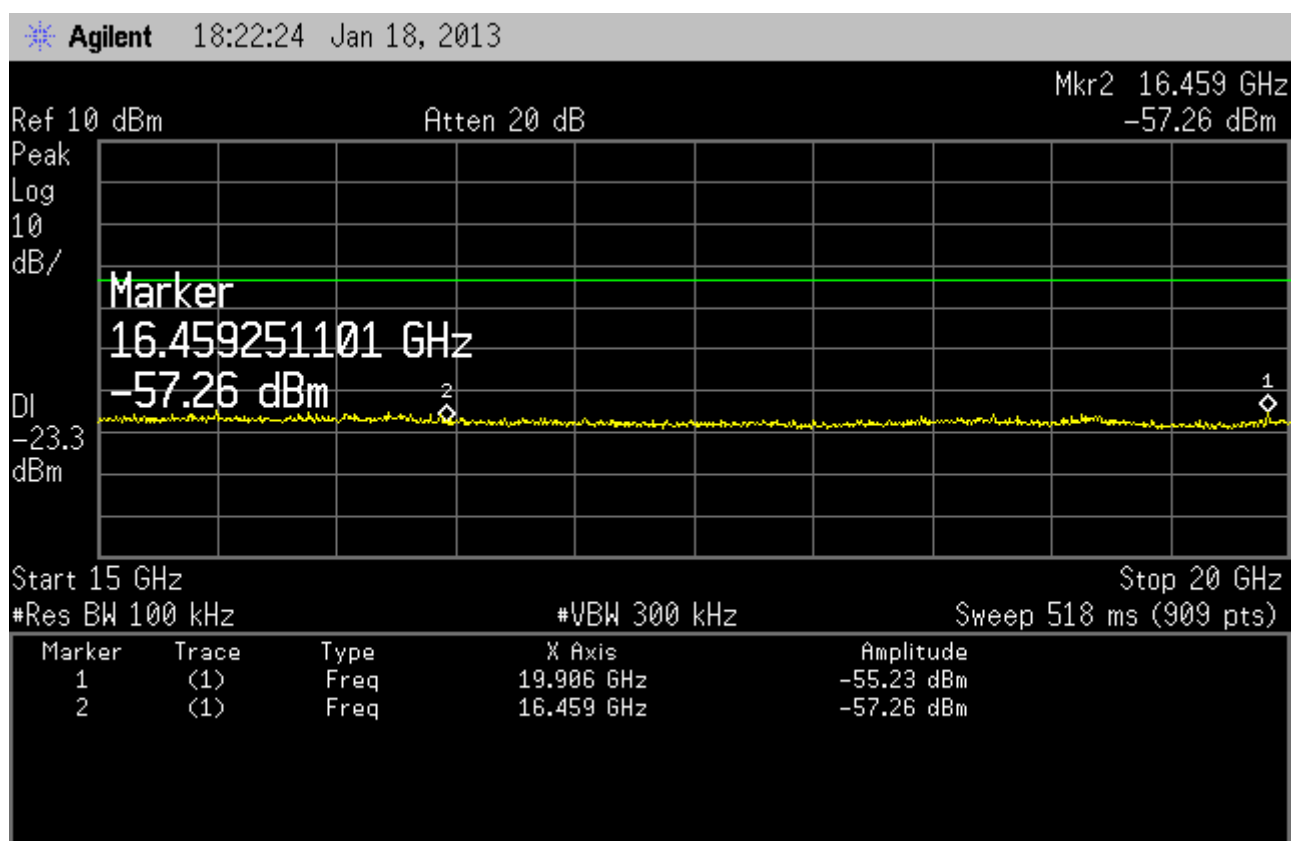




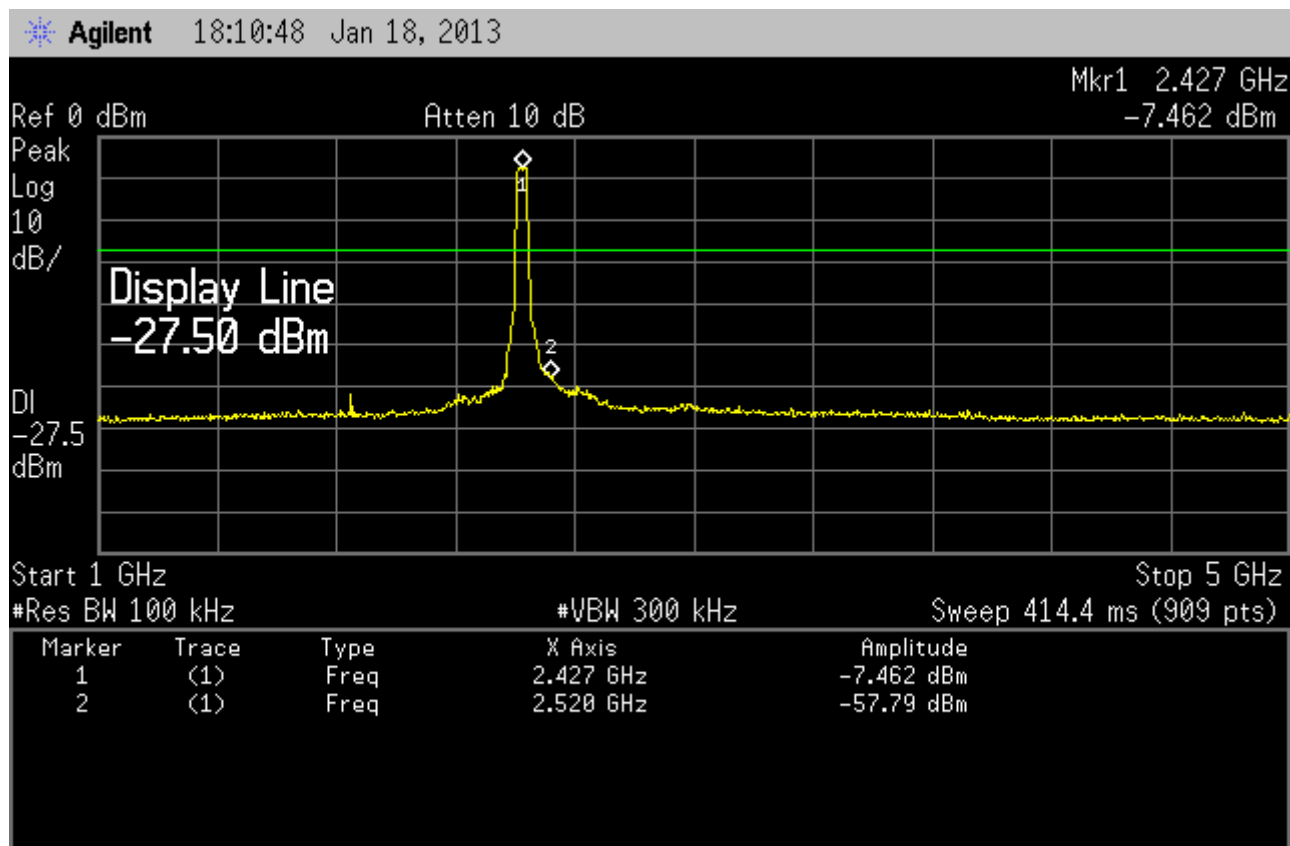
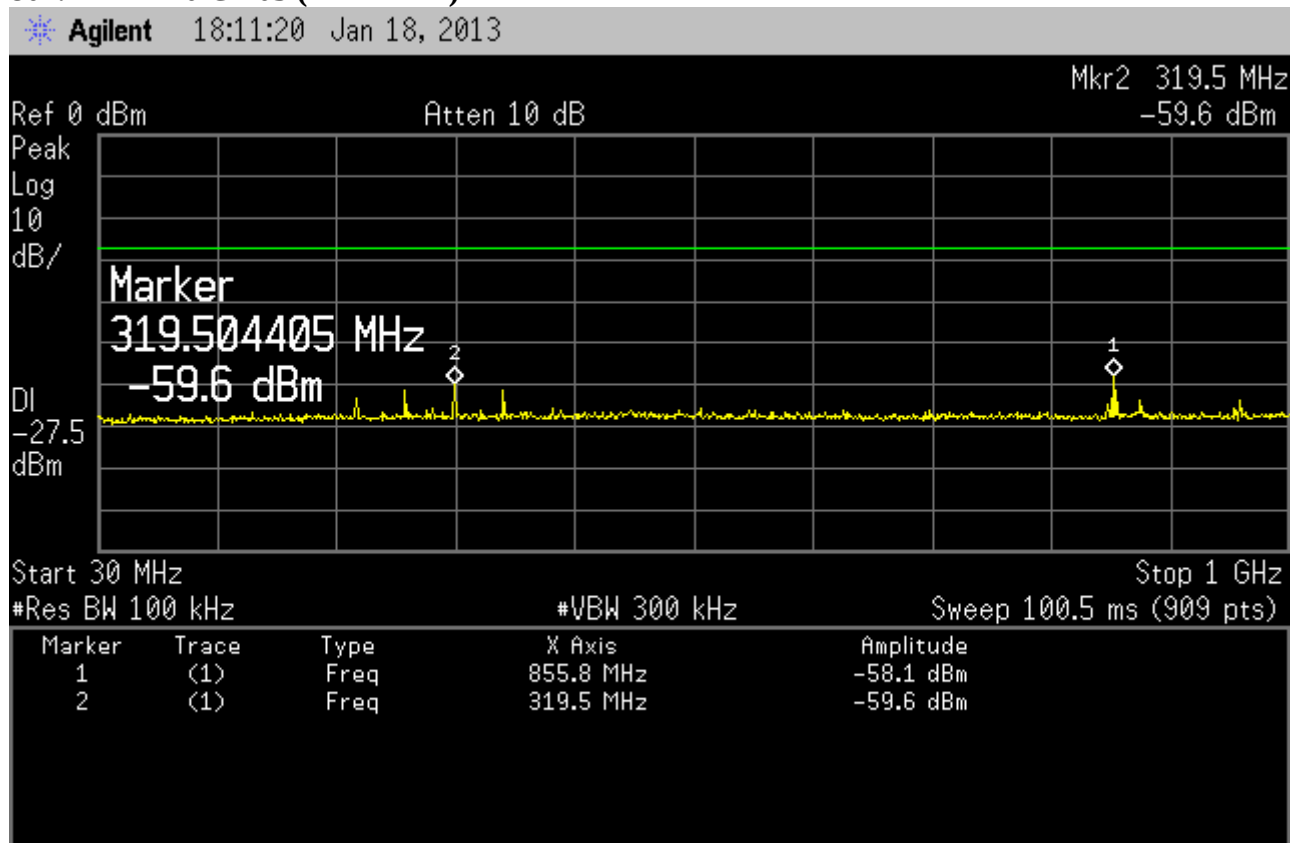
802.11n HT20 Ch 11 (2462 MHz) ANT2

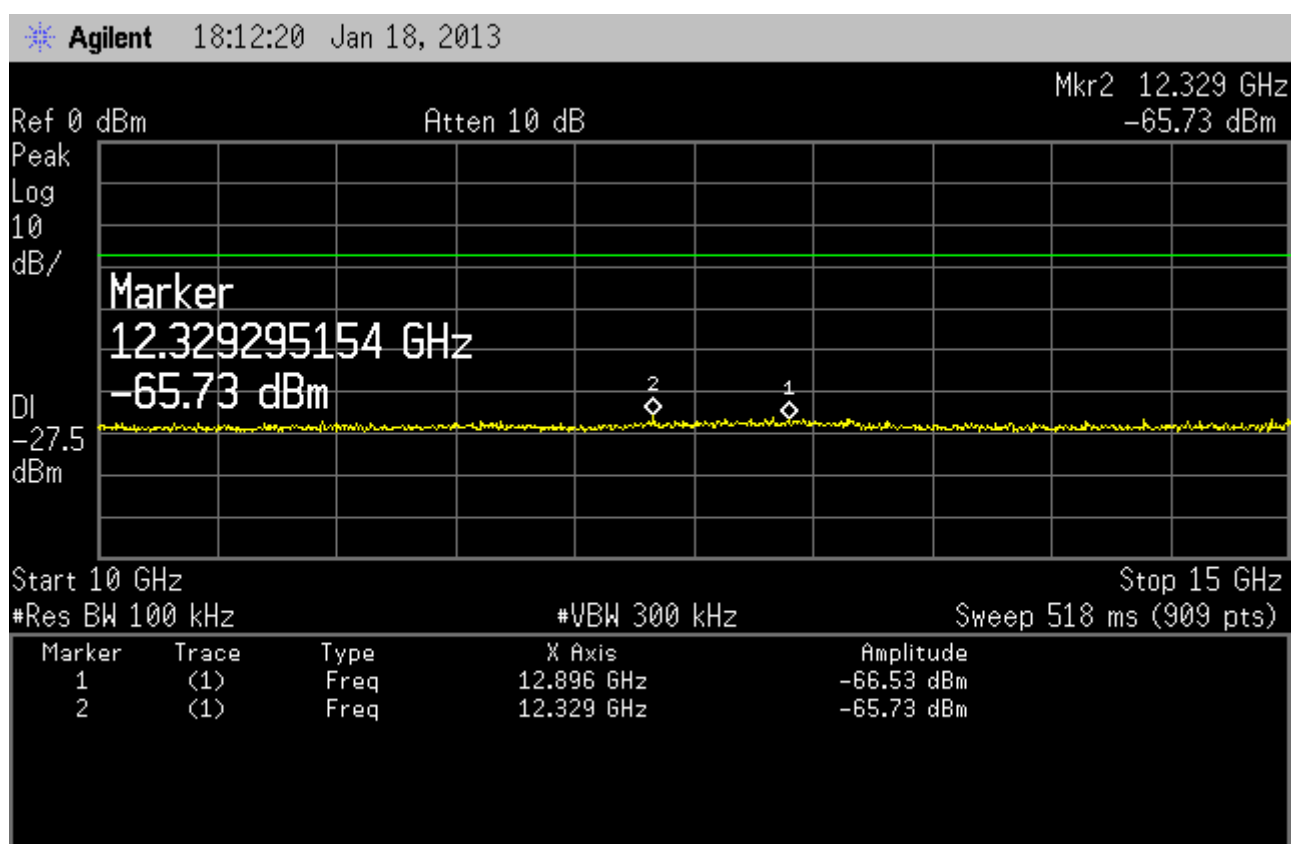
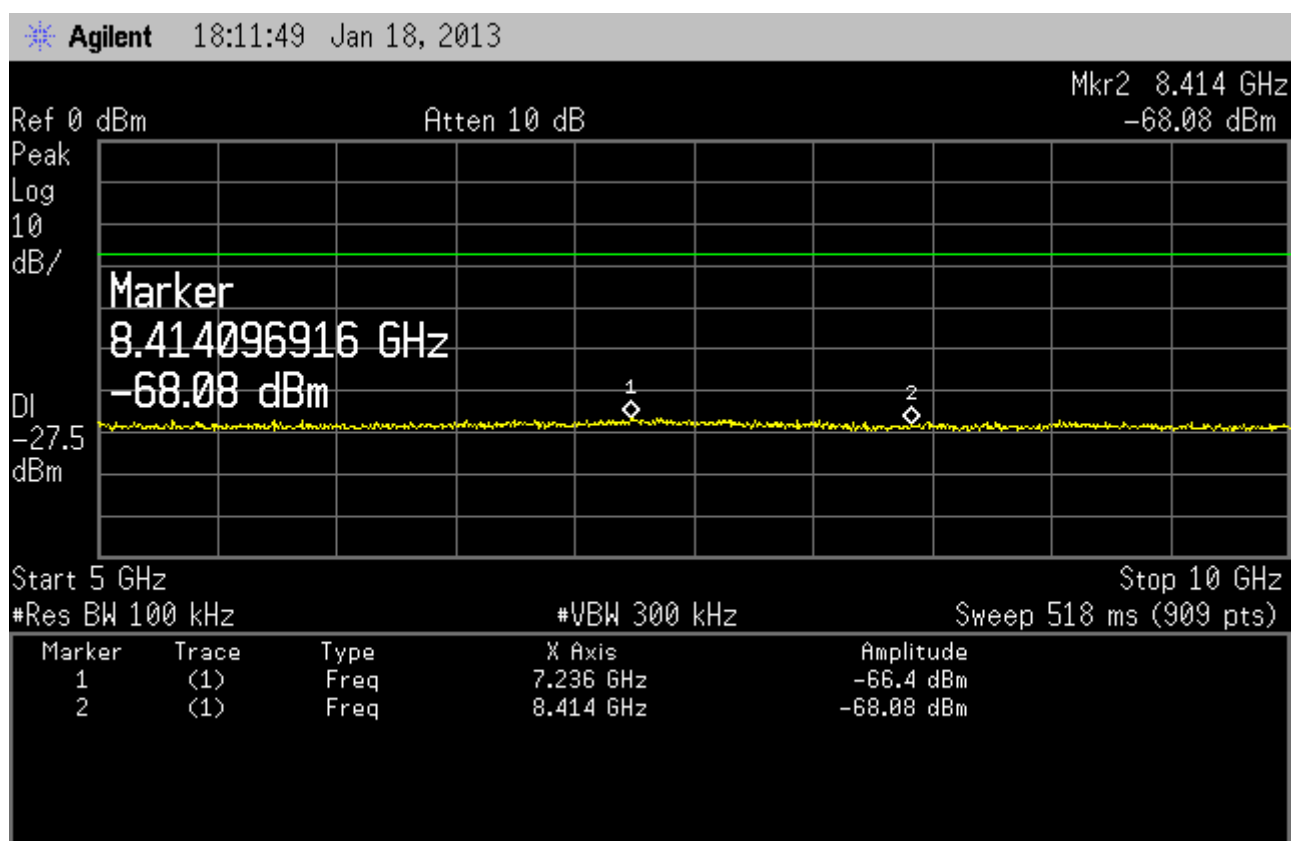


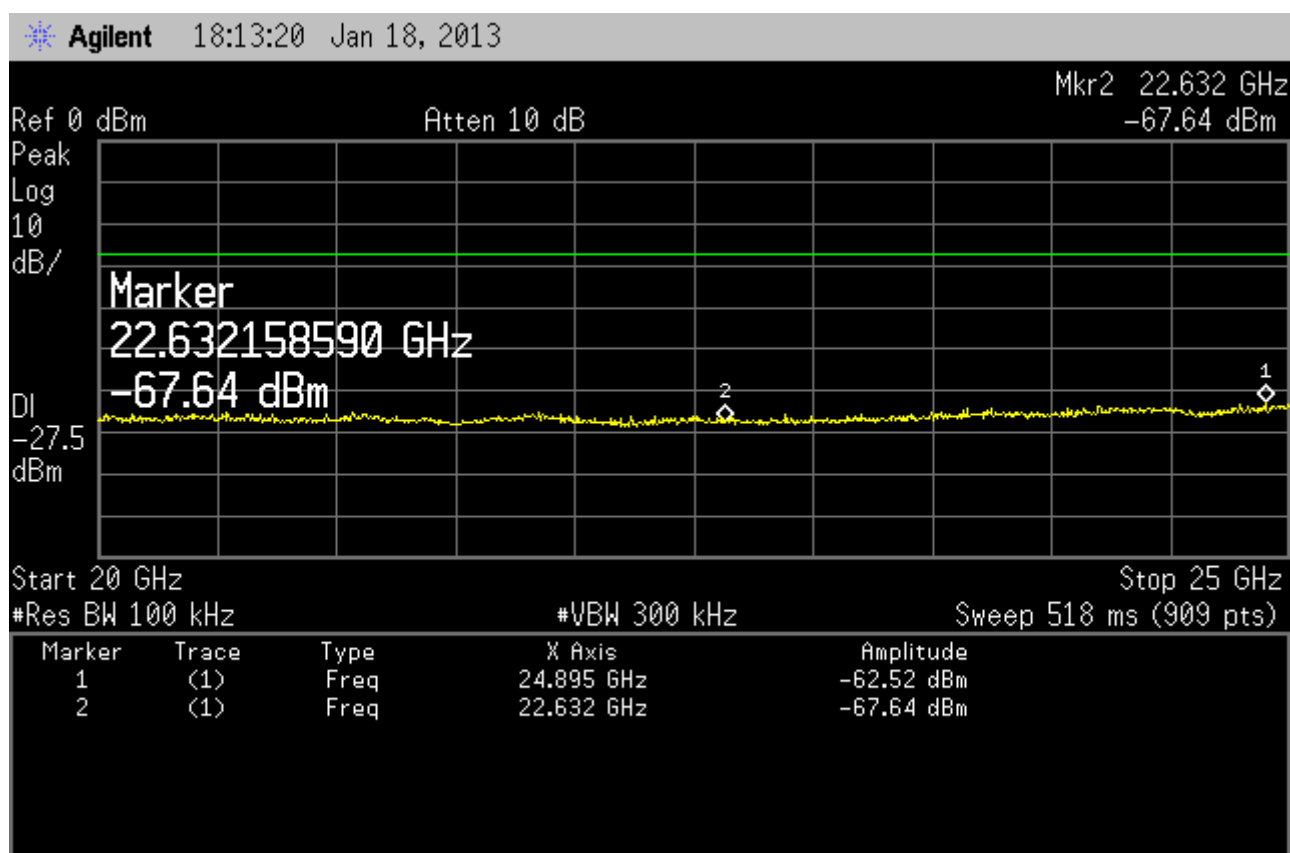
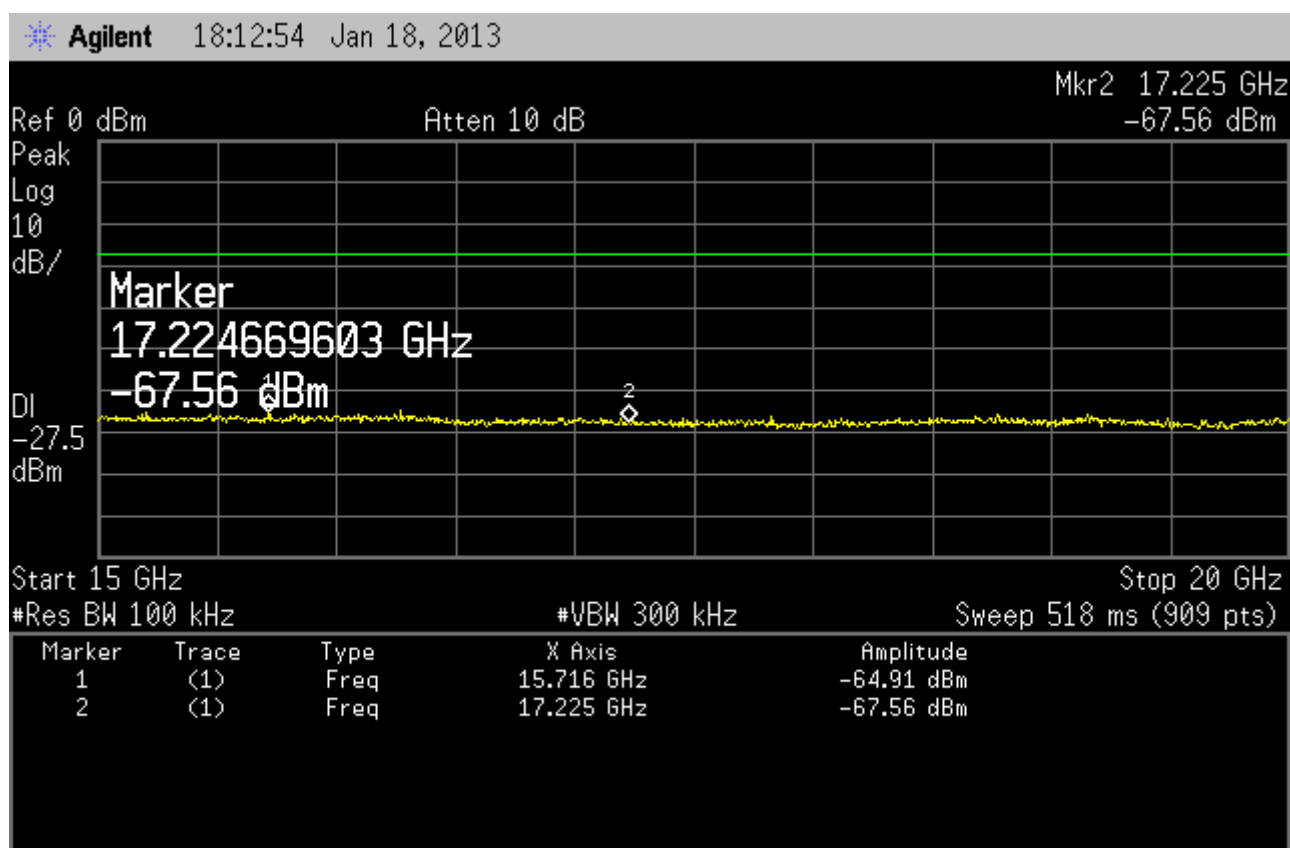




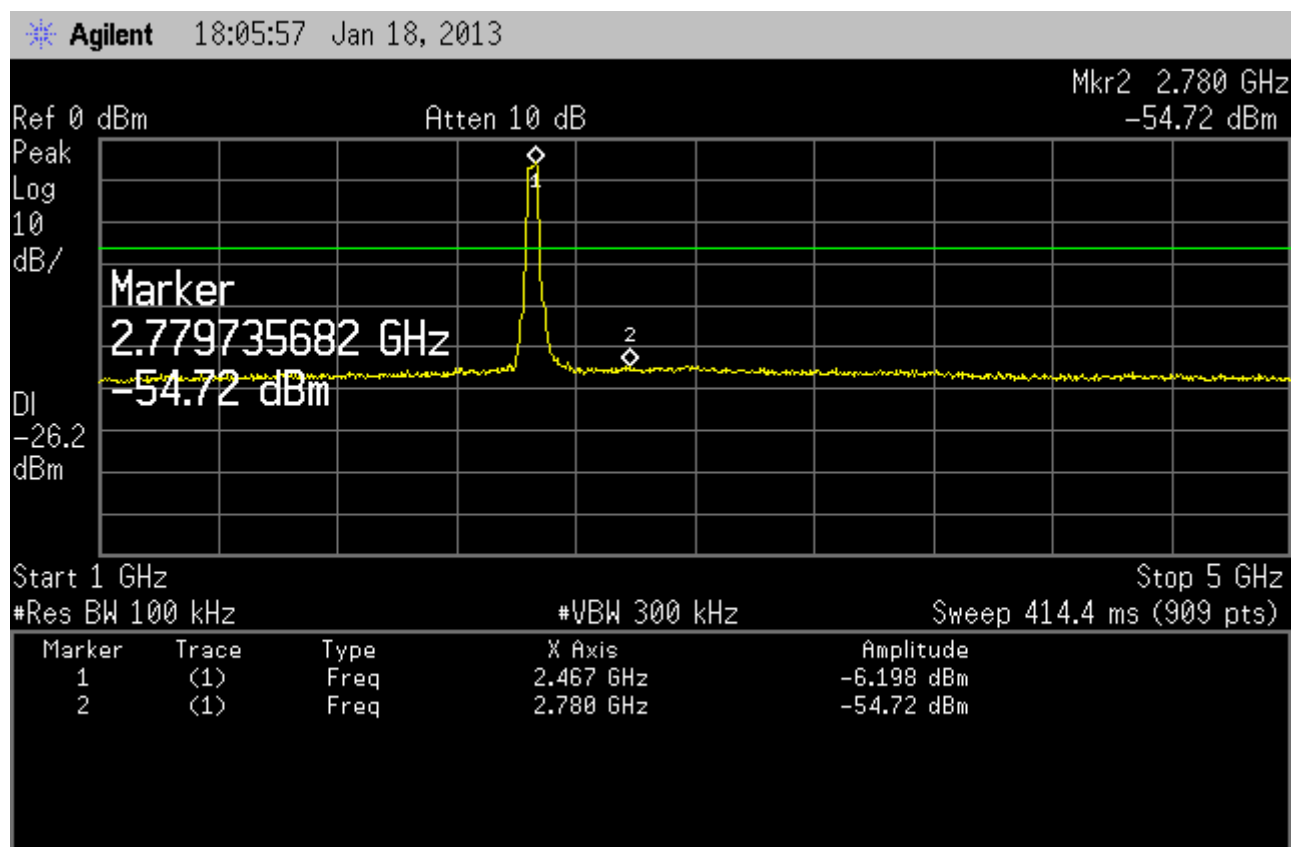
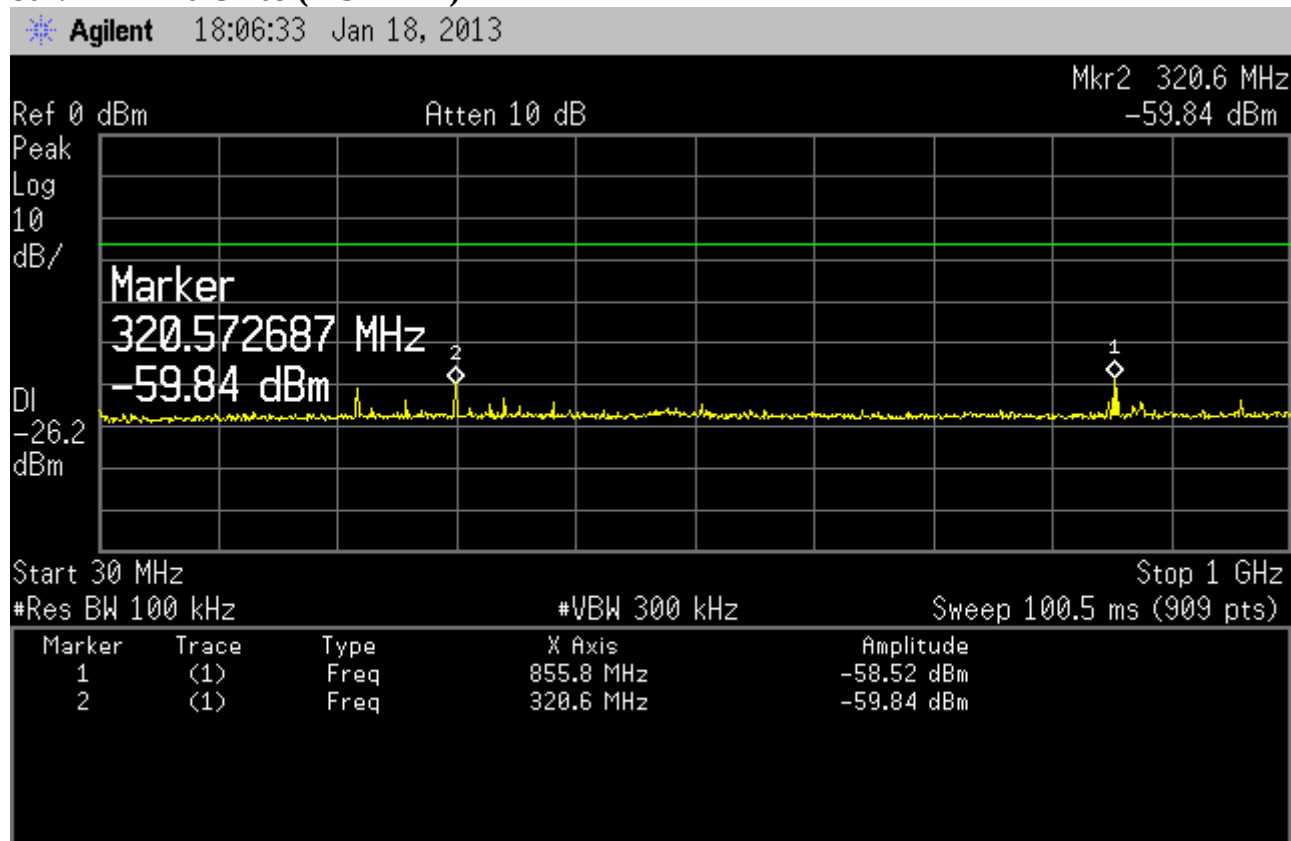
802.11n HT40 Ch 03 (2422 MHz) ANT2

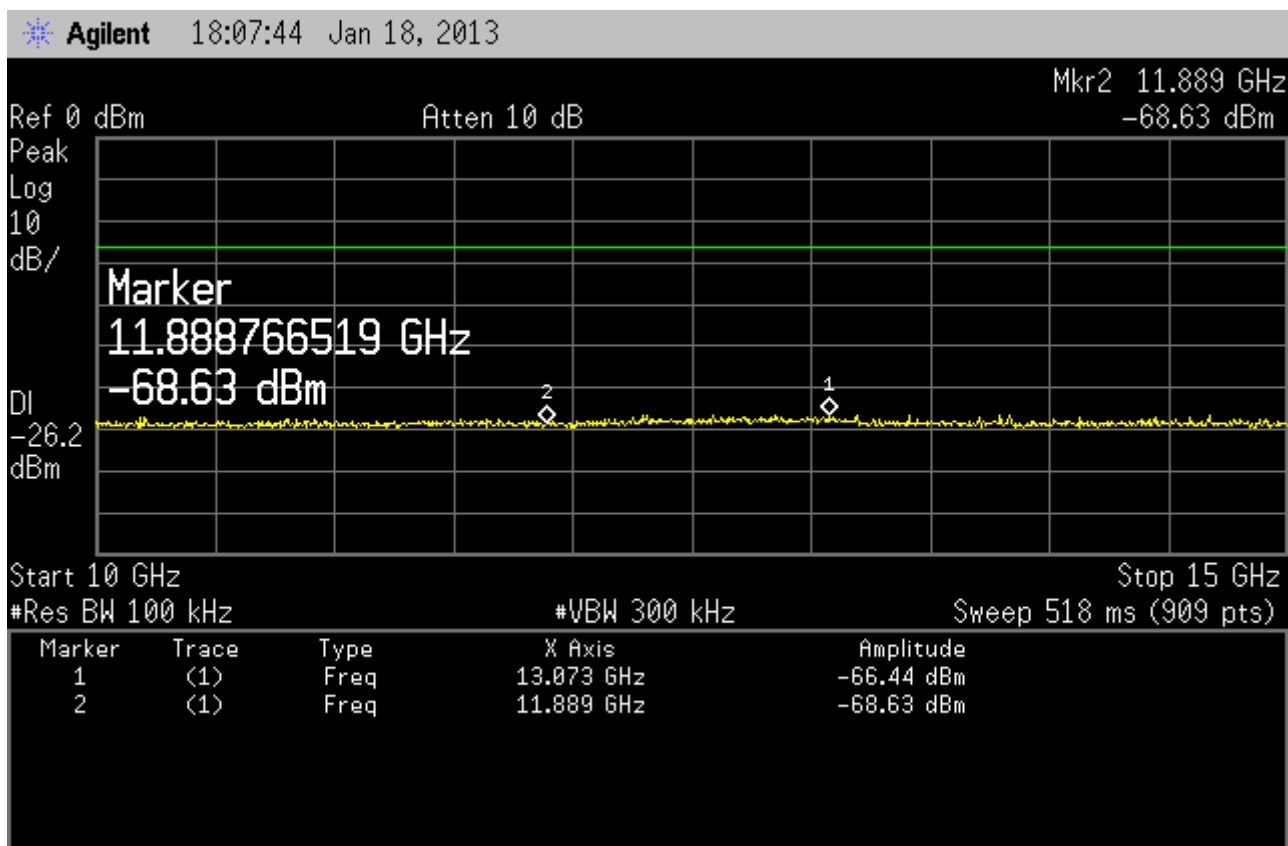
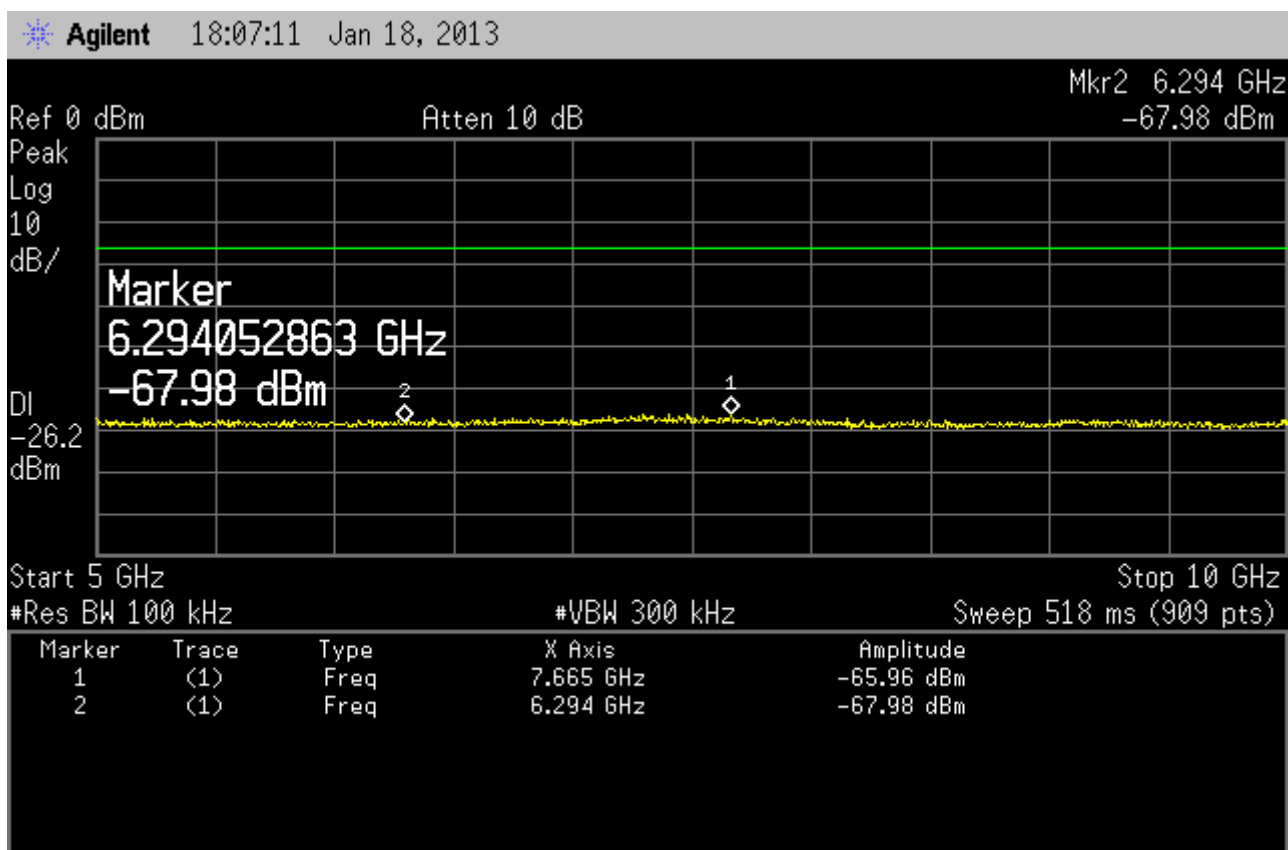


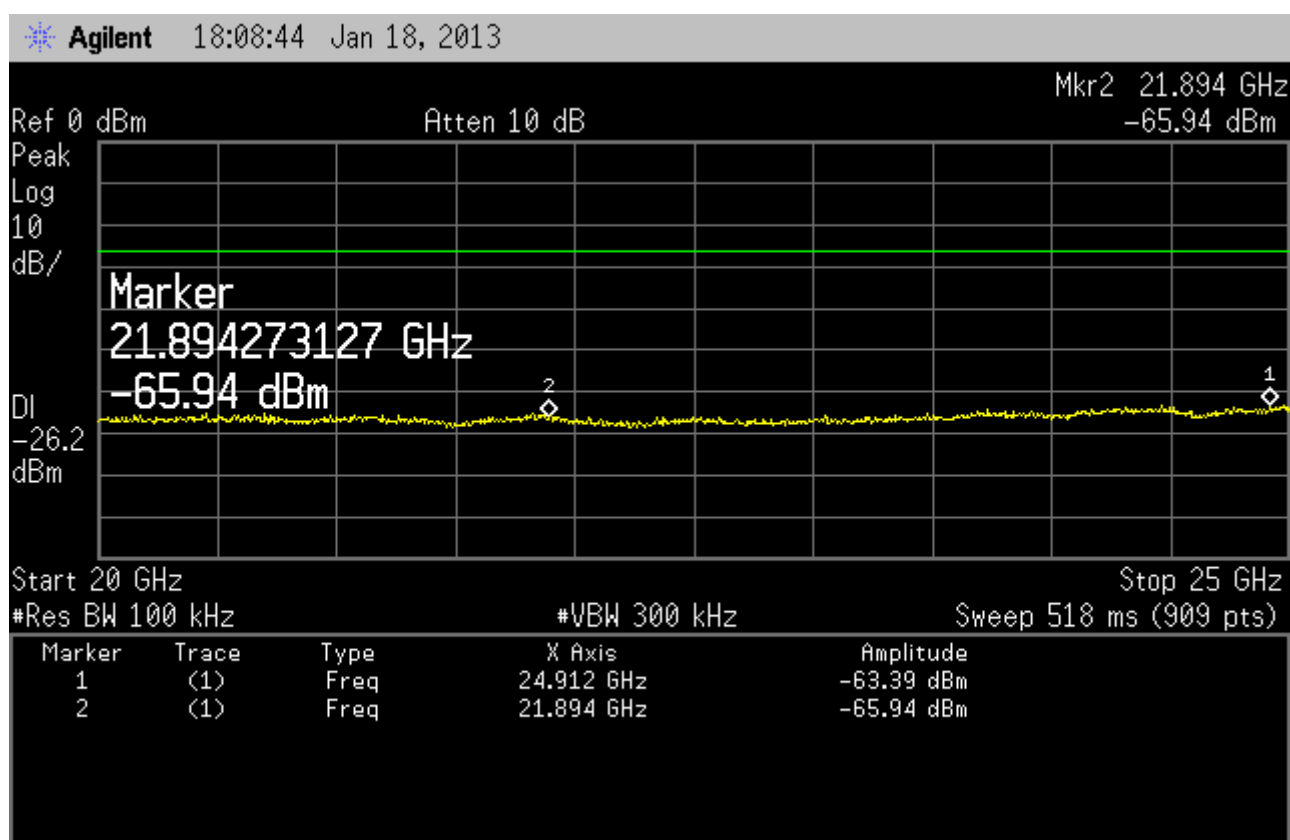
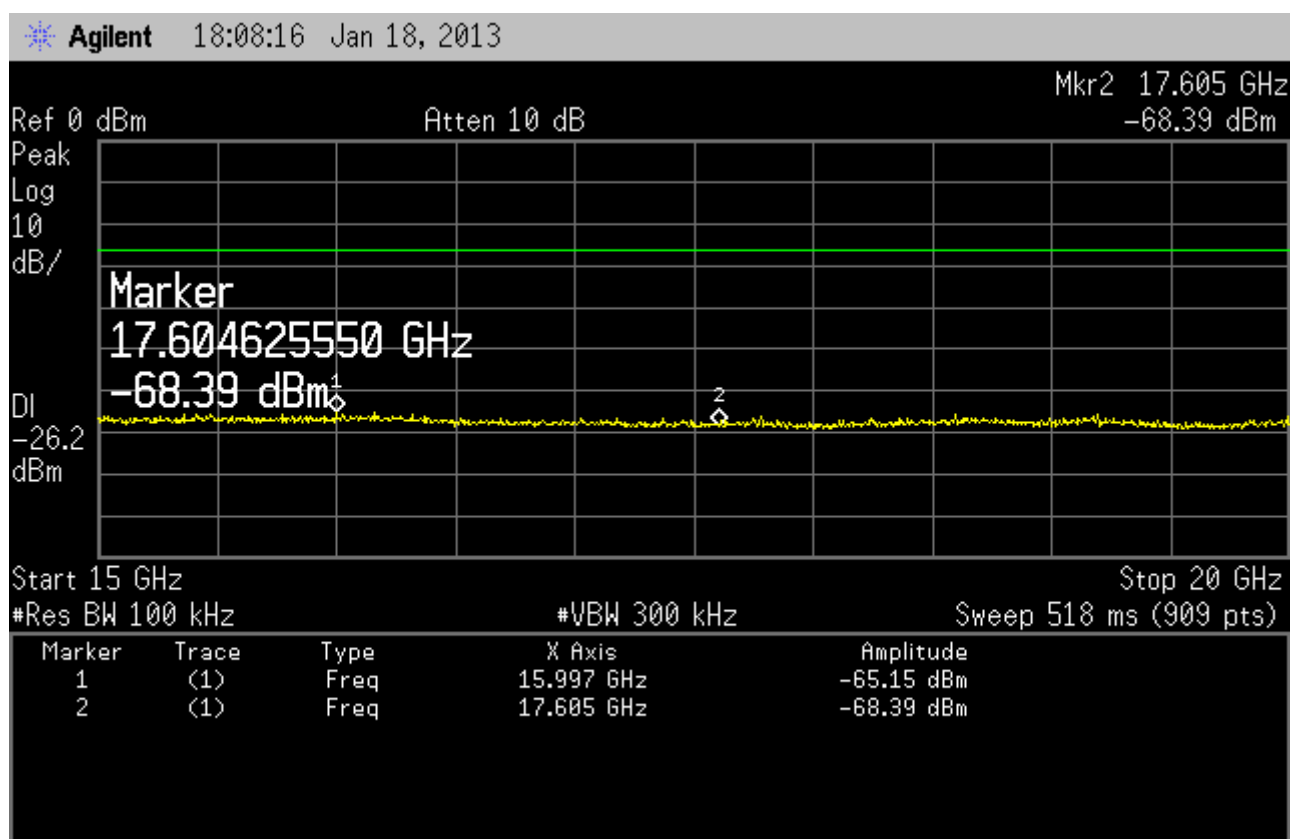




802.11n HT40 Ch 09 (2452 MHz) ANT2







8 BAND EDGES MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

8.2 Block Diagram of Test Setup

The same as section.5.2.

8.3 Specification Limits (§15.247(d))

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

8.4 Operating Condition of EUT

The test program “MP_TEST” was used to enable the EUT to transmit and receive data at different channel frequency individually.

8.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW of Test Receiver to 100kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

8.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: Nov 20, 2012 Temperature: 24°C Humidity: 46 %)

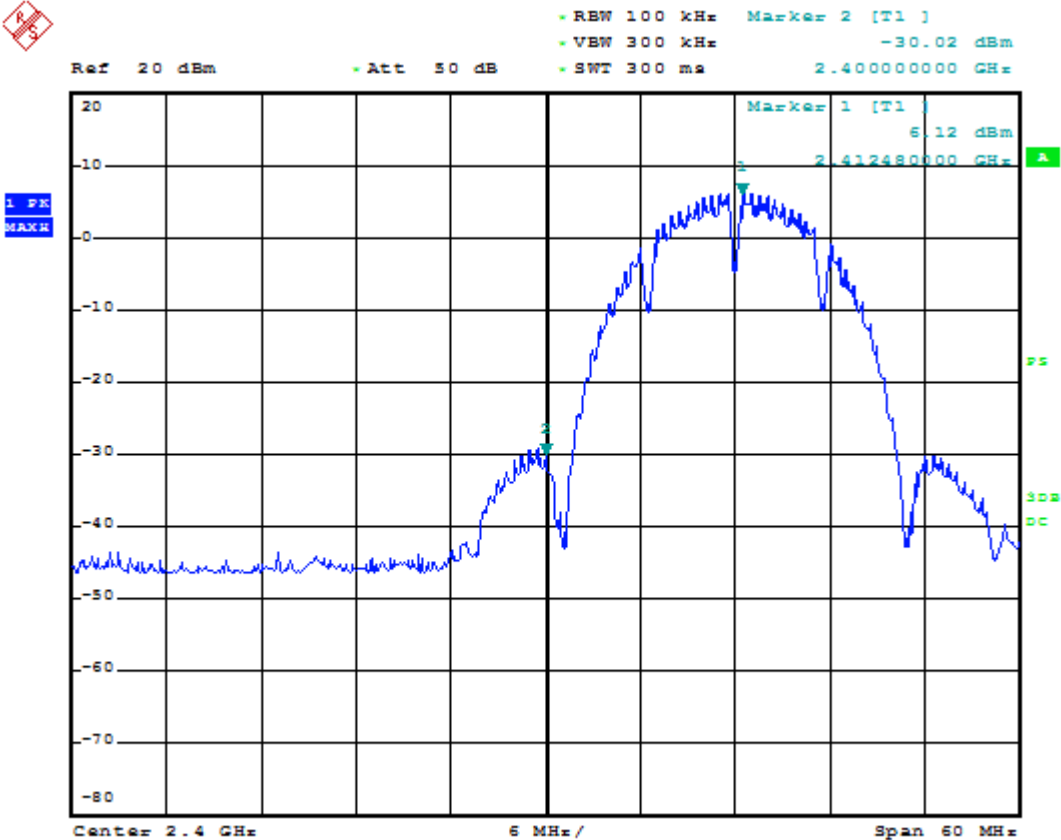
ANT1

Modulation	Location	Channel	Frequency	Delta Marker	Result
802.11b	Below Band Edge	01	2412 MHz	36.14 dB	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462 MHz	46.24 dB	
802.11g	Below Band Edge	01	2412 MHz	31.29 dB	
	Upper Band Edge	11	2462 MHz	33.71 dB	
802.11n HT20	Below Band Edge	01	2412 MHz	28.65 dB	
	Upper Band Edge	11	2462 MHz	29.69 dB	
802.11n HT40	Below Band Edge	03	2412 MHz	28.19 dB	
	Upper Band Edge	09	2462 MHz	23.66 dB	

ANT2

Modulation	Location	Channel	Frequency	Delta Marker	Result
802.11b	Below Band Edge	01	2412 MHz	34.37 dB	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462 MHz	50.03 dB	
802.11g	Below Band Edge	01	2412 MHz	31.13 dB	
	Upper Band Edge	11	2462 MHz	42.94 dB	
802.11n HT20	Below Band Edge	01	2412 MHz	28.07 dB	
	Upper Band Edge	11	2462 MHz	40.92 dB	
802.11n HT40	Below Band Edge	03	2412 MHz	34.51 dB	
	Upper Band Edge	09	2462 MHz	36.22 dB	

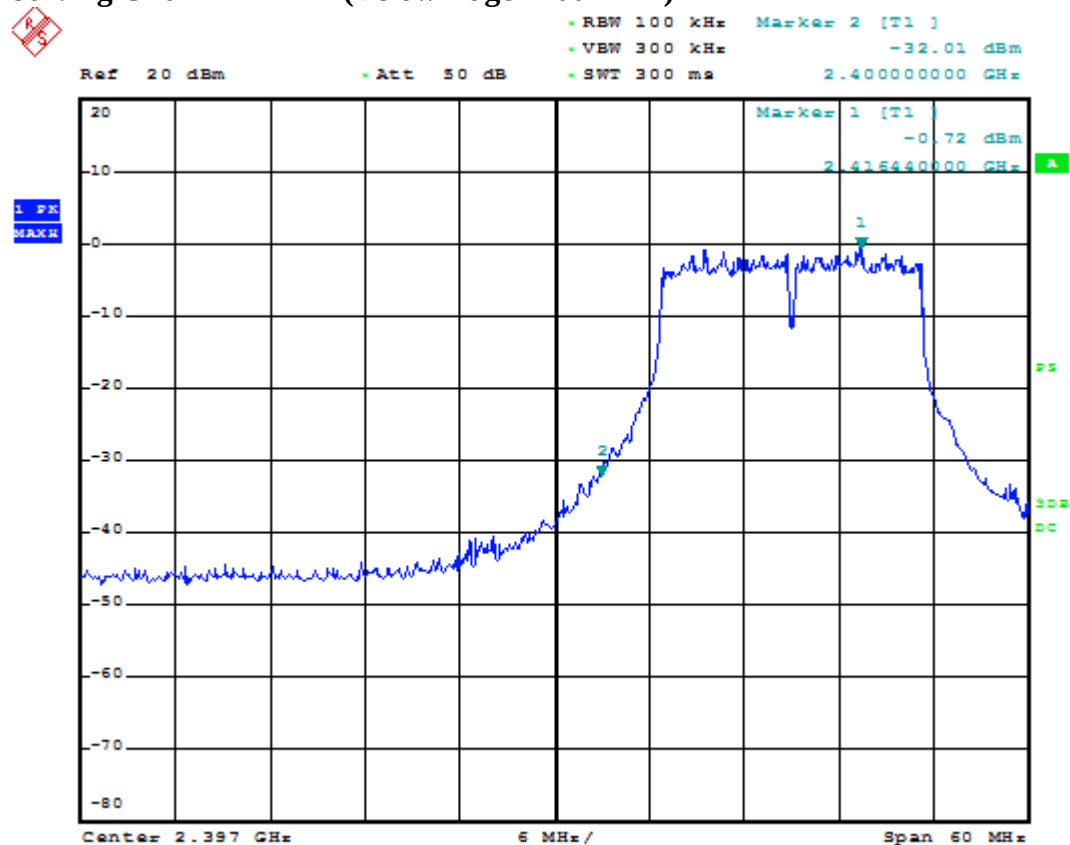
802.11b Ch01 2412MHz (Below Edge 2400 MHz) ANT1



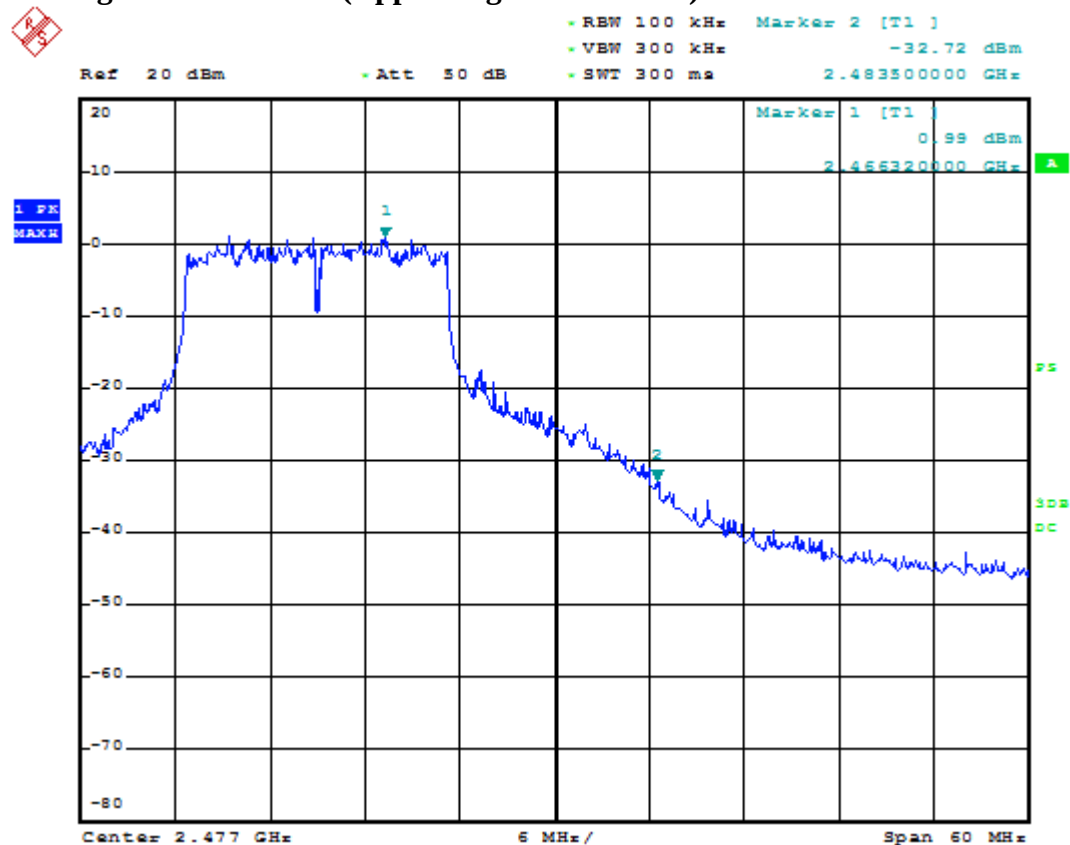
802.11b Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT1



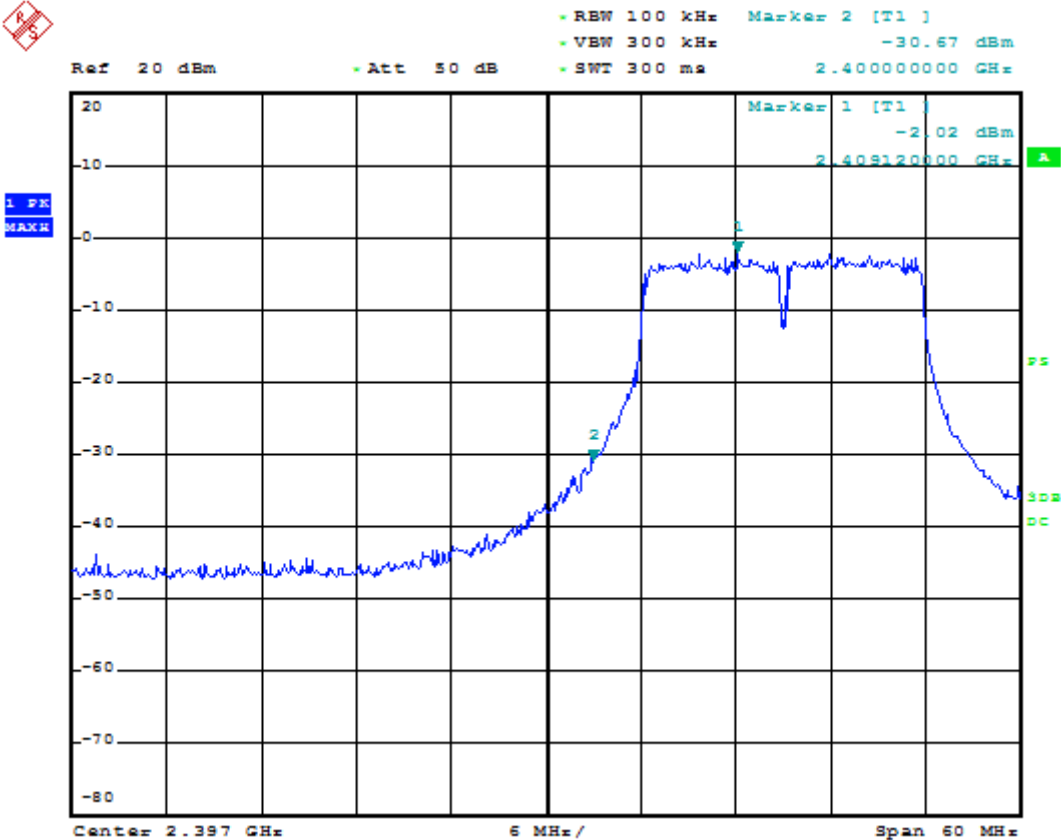
802.11g Ch01 2412MHz (Below Edge 2400 MHz) ANT1



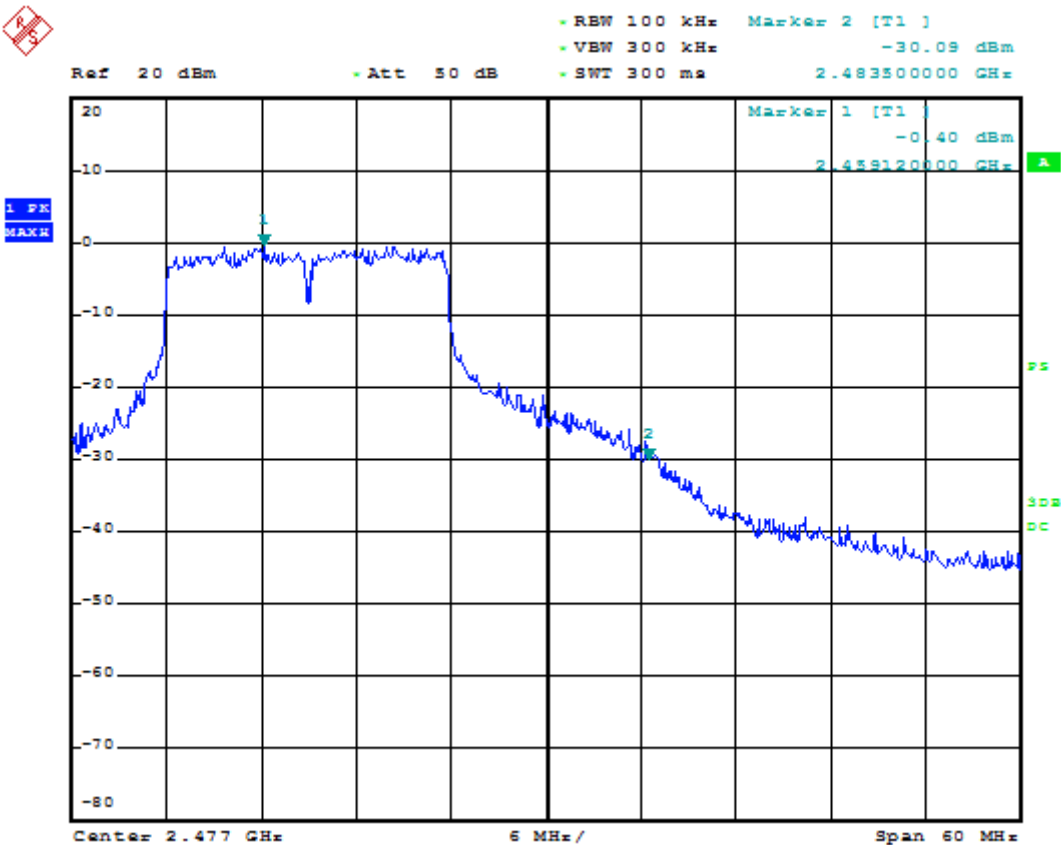
802.11g Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT1



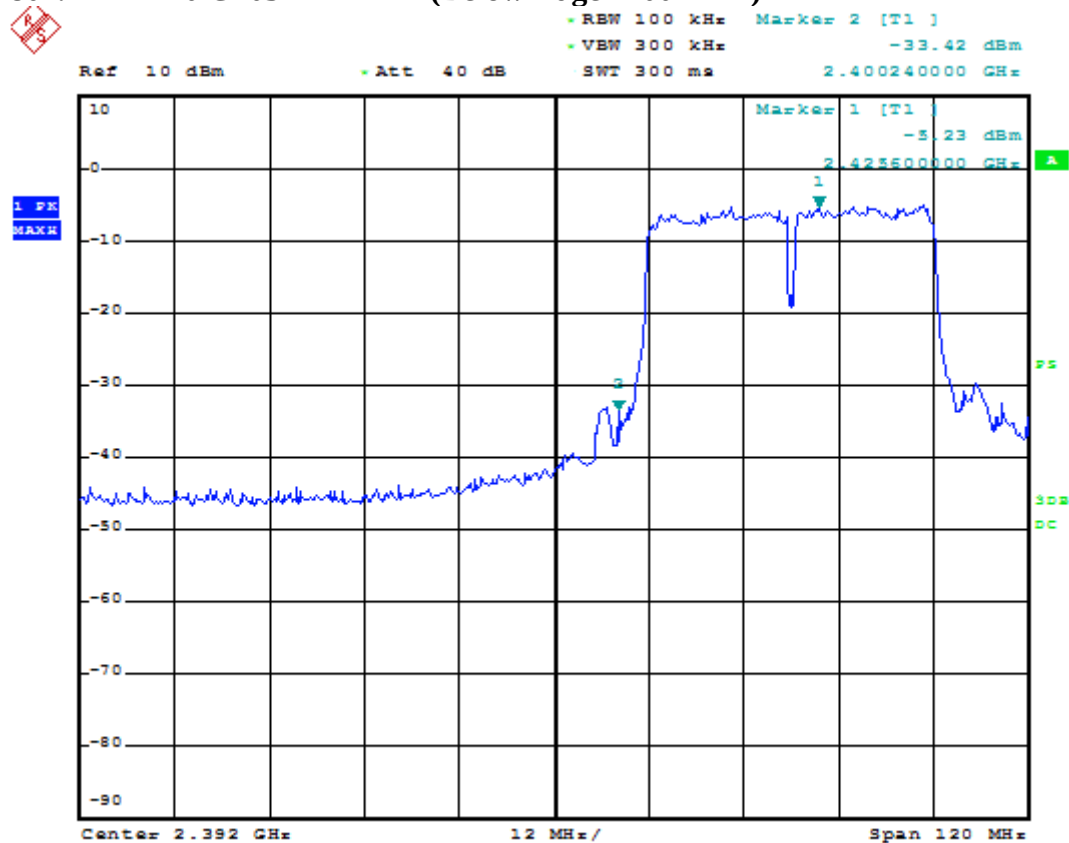
802.11n HT20 Ch01 2412MHz (Below Edge 2400 MHz) ANT1



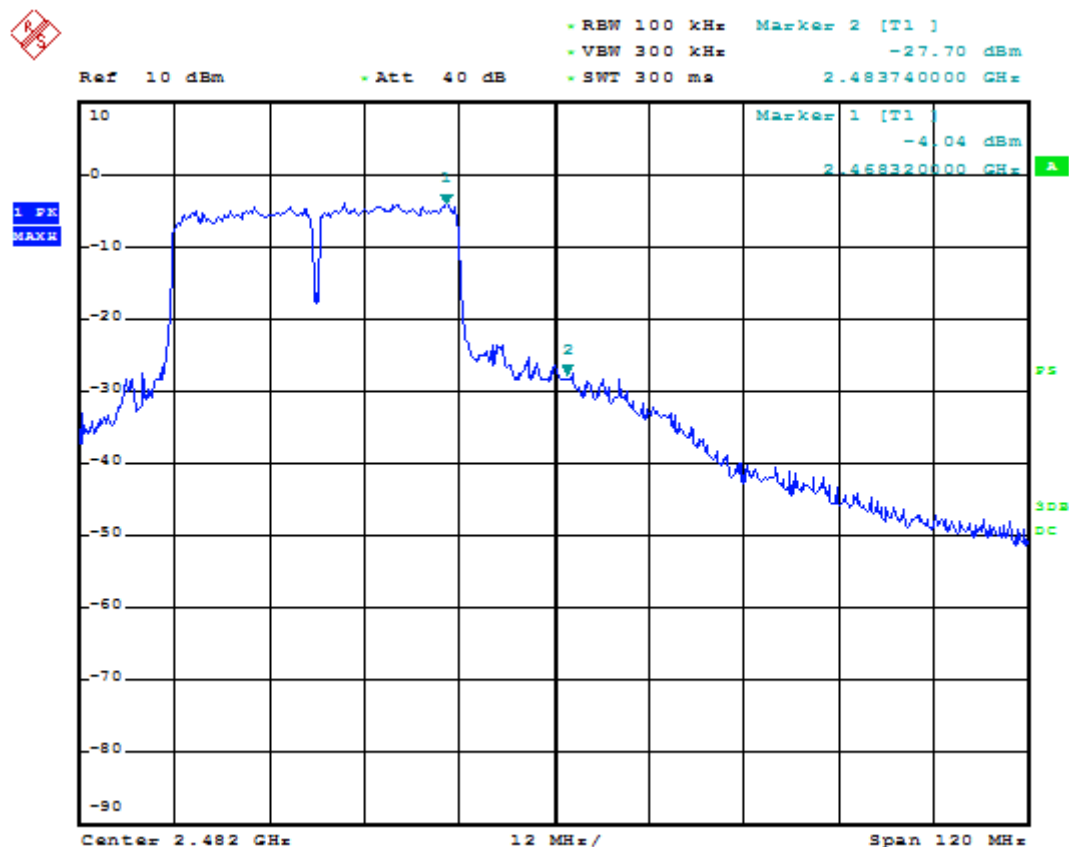
802.11n HT20 Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT1



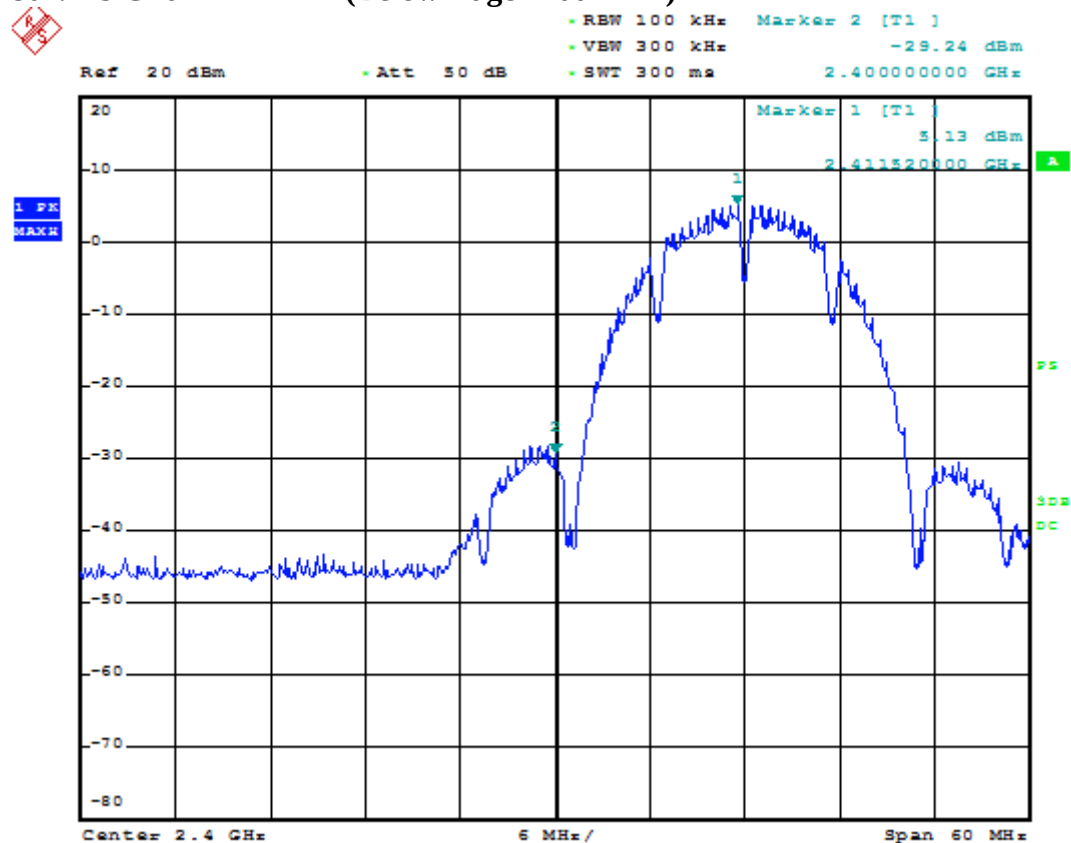
802.11n HT40 Ch03 2422MHz (Below Edge 2400 MHz) ANT1



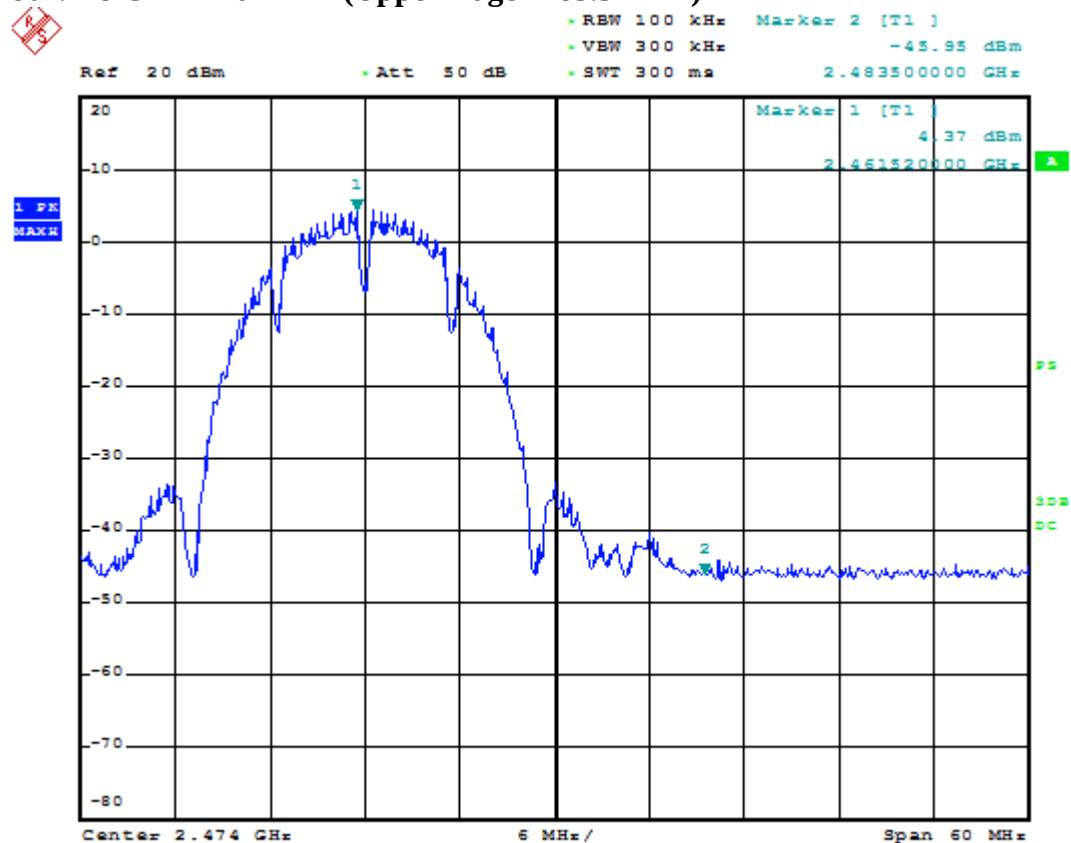
802.11n HT40 Ch09 2452MHz (Upper Edge 2483.5 MHz) ANT1



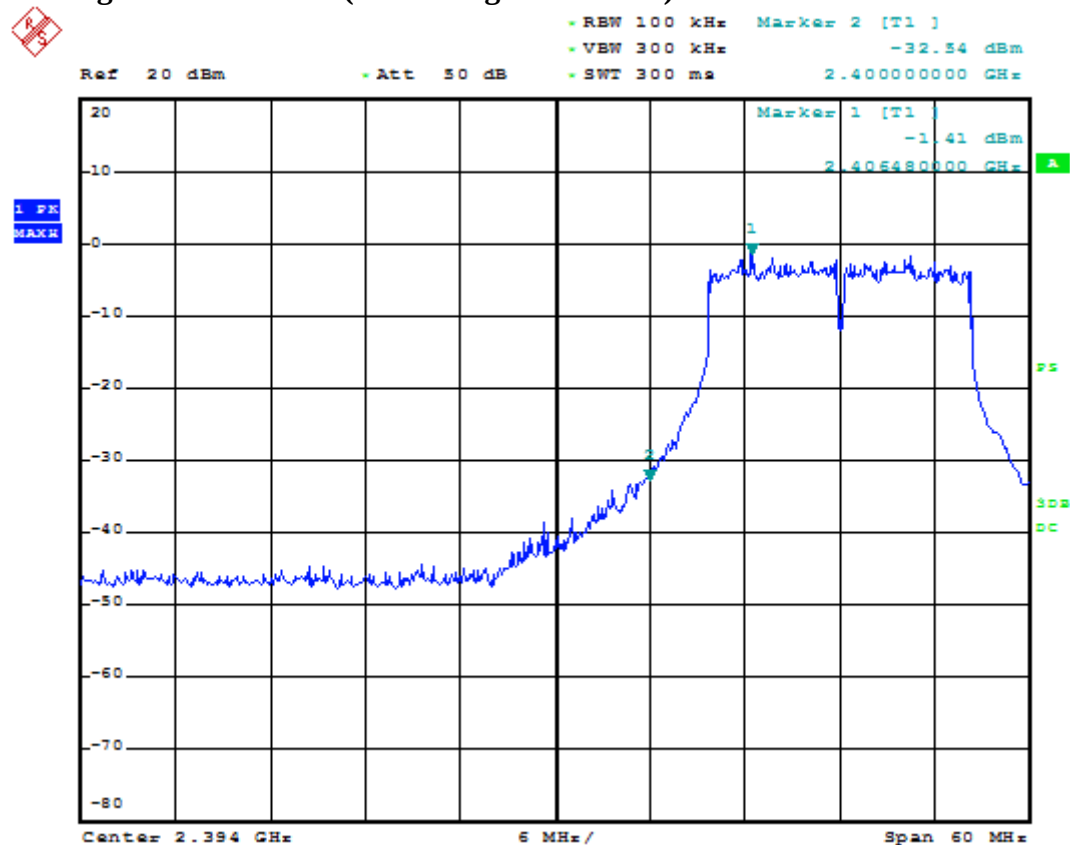
802.11b Ch01 2412MHz (Below Edge 2400 MHz) ANT2



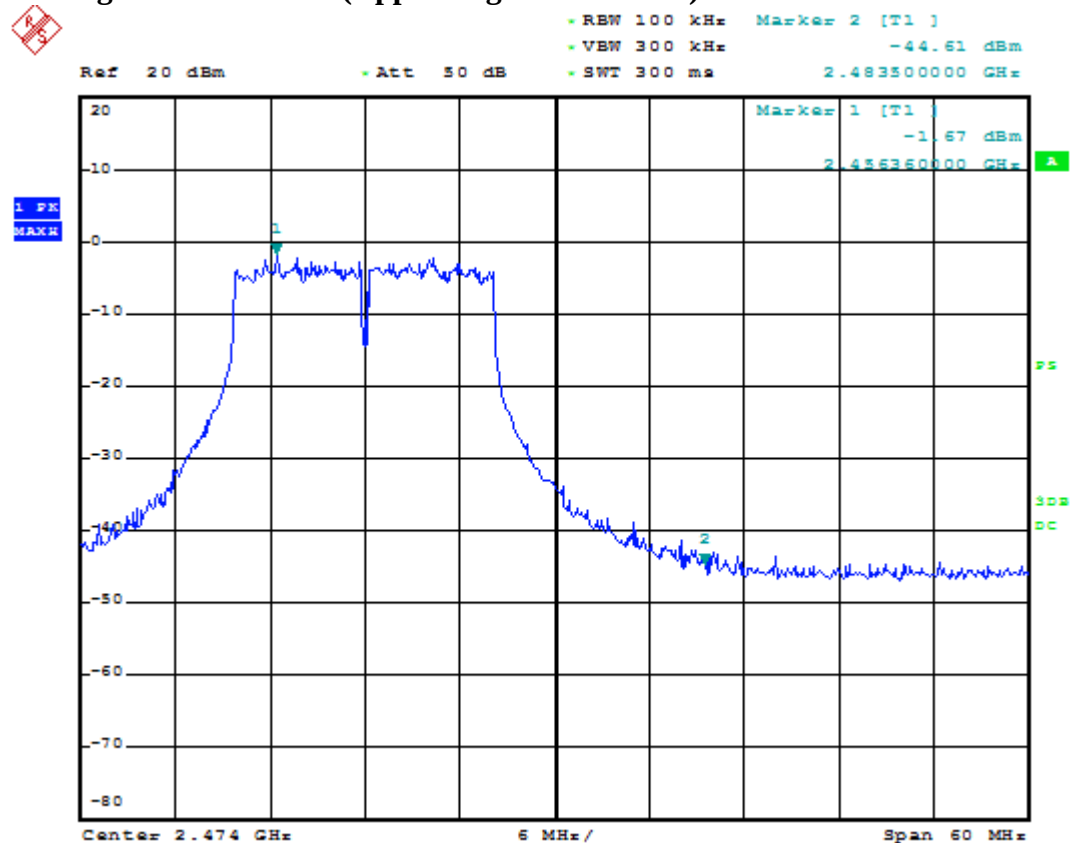
802.11b Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT2



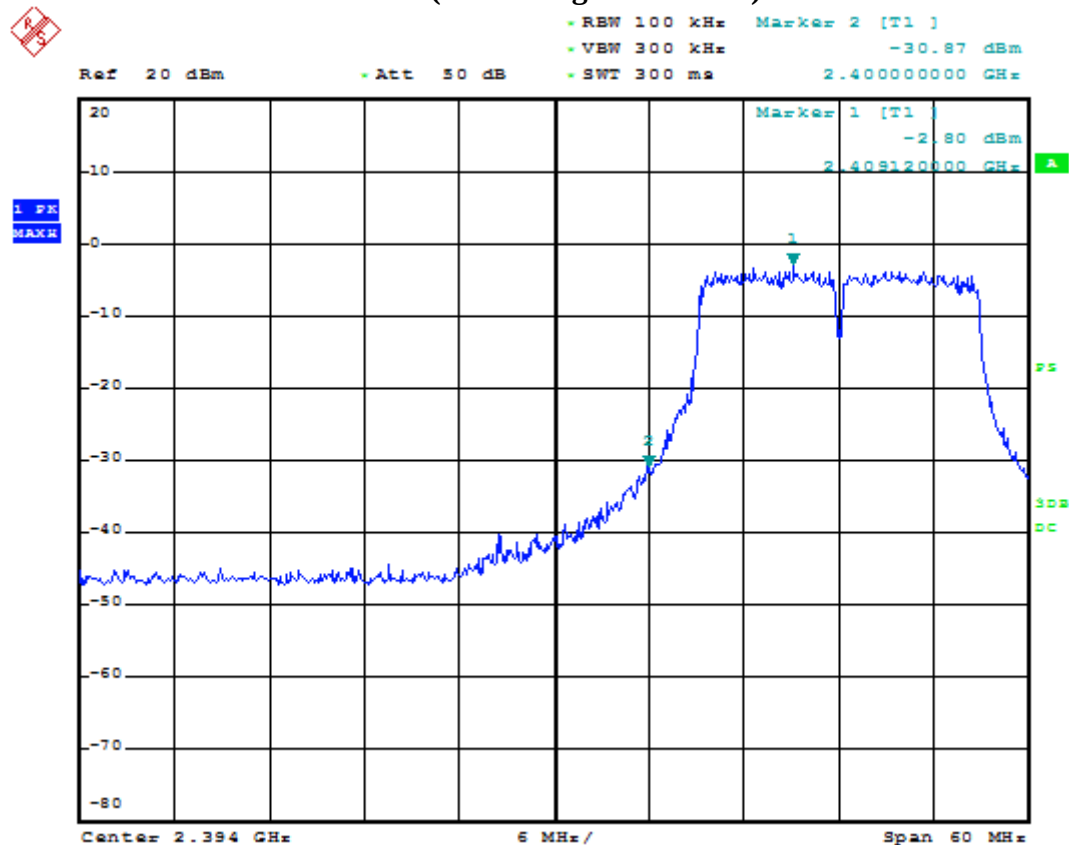
802.11g Ch01 2412MHz (Below Edge 2400 MHz) ANT2



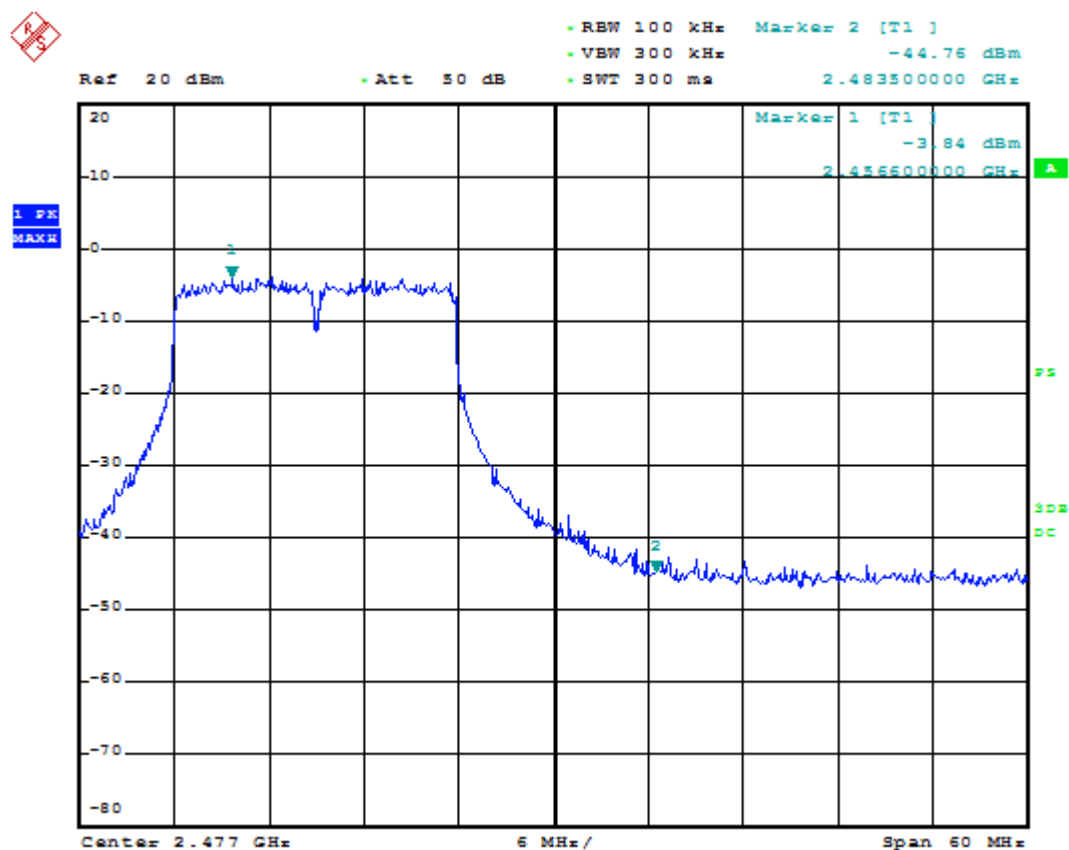
802.11g Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT2



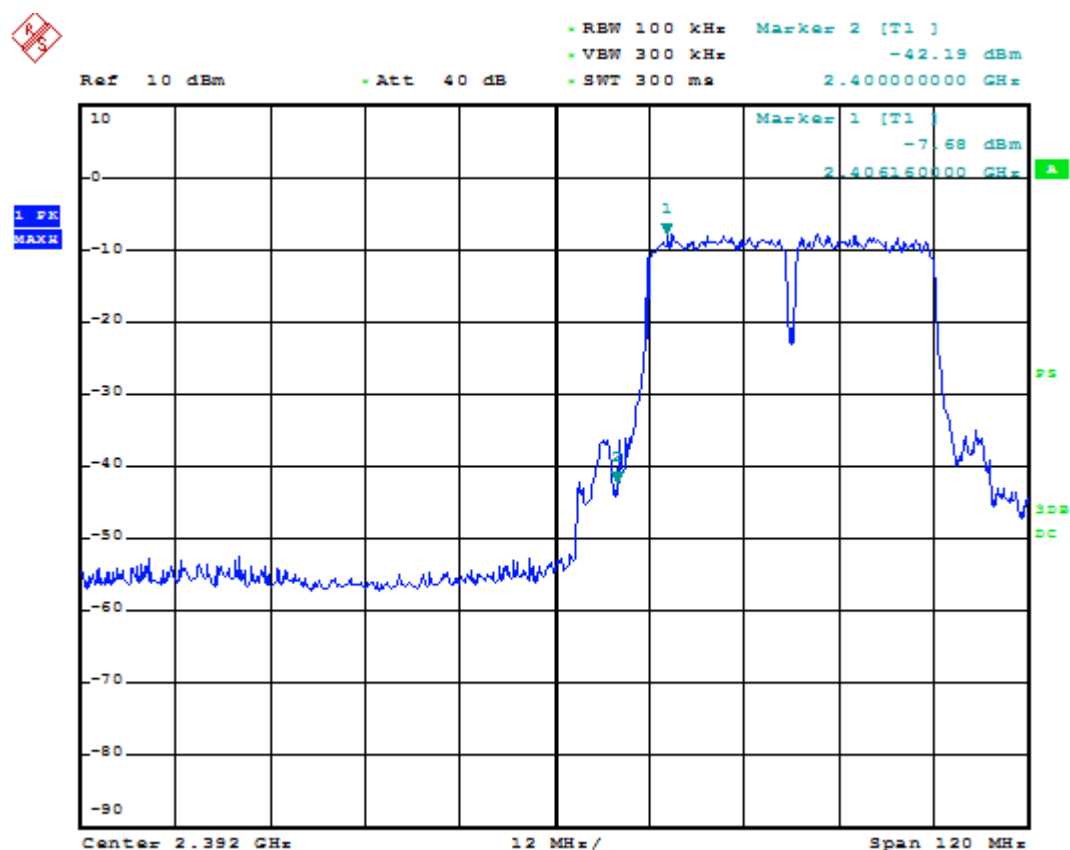
802.11n HT20 Ch01 2412MHz (Below Edge 2400 MHz) ANT2



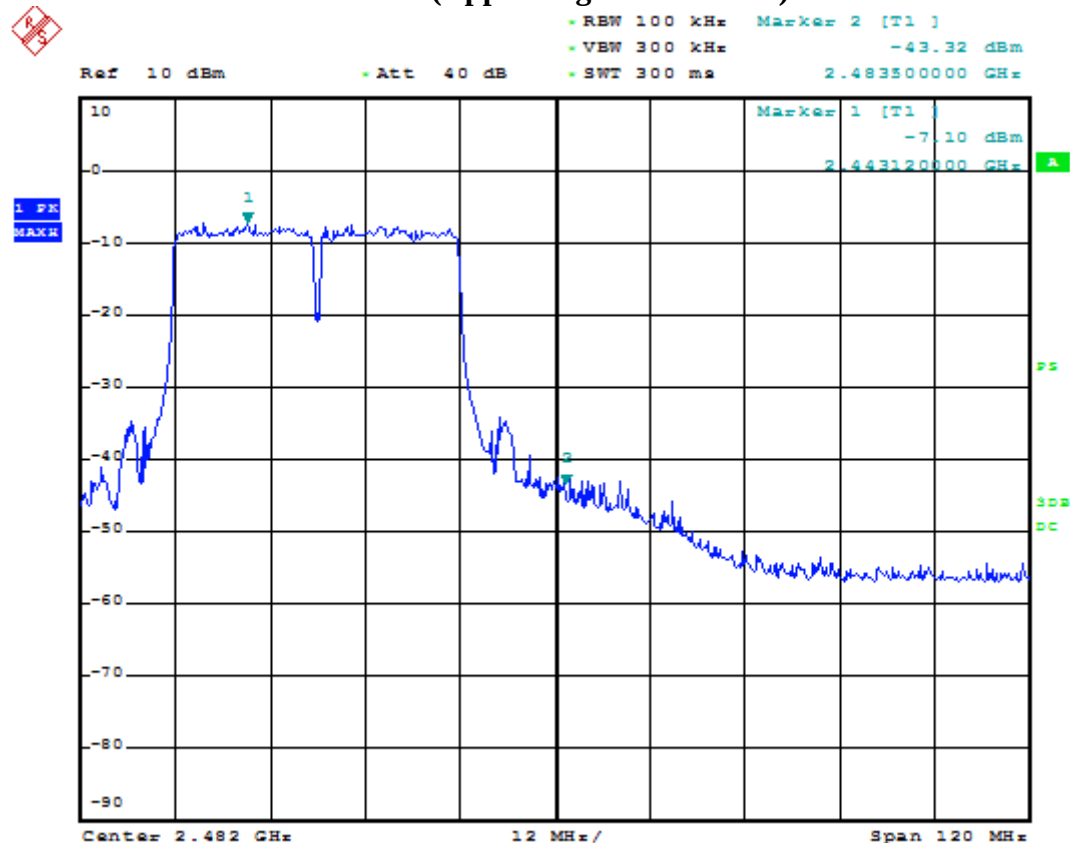
802.11n HT20 Ch11 2462MHz (Upper Edge 2483.5 MHz) ANT2



802.11n HT40 Ch03 2422MHz (Below Edge 2400 MHz) ANT2



802.11n HT40 Ch09 2452MHz (Upper Edge 2483.5 MHz) ANT2



9 POWER SPECTRAL DENSITY MEASUREMENT

9.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

9.2 Block Diagram of Test Setup

The same as section.5.2.

9.3 Specification Limits (§15.247(e))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

9.4 Operating Condition of EUT

The test program “MP_TEST” was used to enable the EUT to transmit data at different channel frequency individually.

9.5 Test Procedure

The transmitter output was connected to the Test Receiver. The Test Receiver was set as $RBW \geq 3\text{kHz}$, $VBW \geq 3 \times RBW$, span = 1.5 times the DTS channel bandwidth.

The test procedure is defined in KDB558074 v02:2012 (the 9.1 Measurement Procedure “Option 1” was used).

9.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: Nov 20, 2012 Temperature: 24°C Humidity: 46 %)

ANT1

Modulation	Channel	Frequency	Power Spectral Density	Limit
802.11b	01	2412 MHz	-8.44 dBm	8dBm
	06	2437 MHz	-9.54 dBm	8dBm
	11	2462 MHz	-5.79 dBm	8dBm
802.11g	01	2412 MHz	-10.78 dBm	8dBm
	06	2437 MHz	-10.24 dBm	8dBm
	11	2462 MHz	-9.94 dBm	8dBm
802.11n HT20	01	2412 MHz	-12.51 dBm	8dBm
	06	2437 MHz	-12.24 dBm	8dBm
	11	2462 MHz	-11.10 dBm	8dBm
802.11n HT40	03	2422 MHz	-14.14 dBm	8dBm
	06	2437 MHz	-13.08 dBm	8dBm
	09	2452 MHz	-13.33 dBm	8dBm

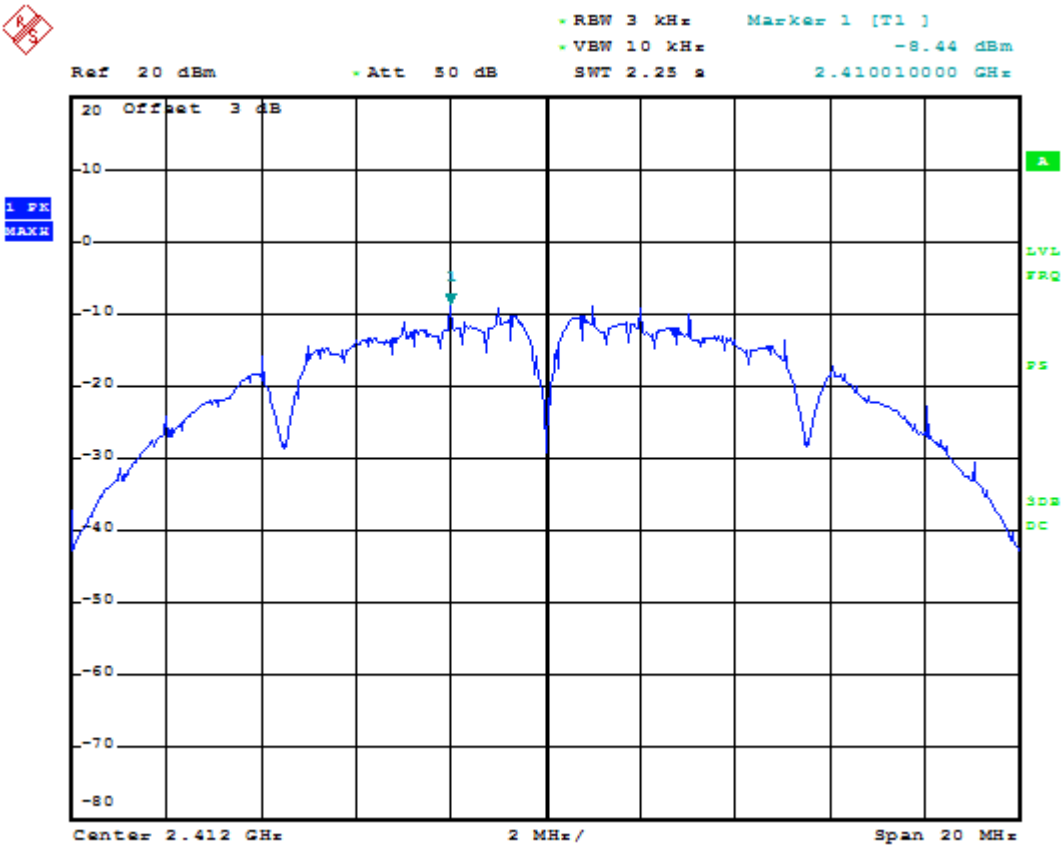
ANT2

Modulation	Channel	Frequency	Power Spectral Density	Limit
802.11b	01	2412 MHz	-13.64 dBm	8dBm
	06	2437 MHz	-13.03 dBm	8dBm
	11	2462 MHz	-13.97 dBm	8dBm
802.11g	01	2412 MHz	-14.10 dBm	8dBm
	06	2437 MHz	-14.49 dBm	8dBm
	11	2462 MHz	-14.61 dBm	8dBm
802.11n HT20	01	2412 MHz	-15.12 dBm	8dBm
	06	2437 MHz	-15.60 dBm	8dBm
	11	2462 MHz	-16.01 dBm	8dBm
802.11n HT40	03	2422 MHz	-16.02 dBm	8dBm
	06	2437 MHz	-17.34 dBm	8dBm
	09	2452 MHz	-18.73 dBm	8dBm

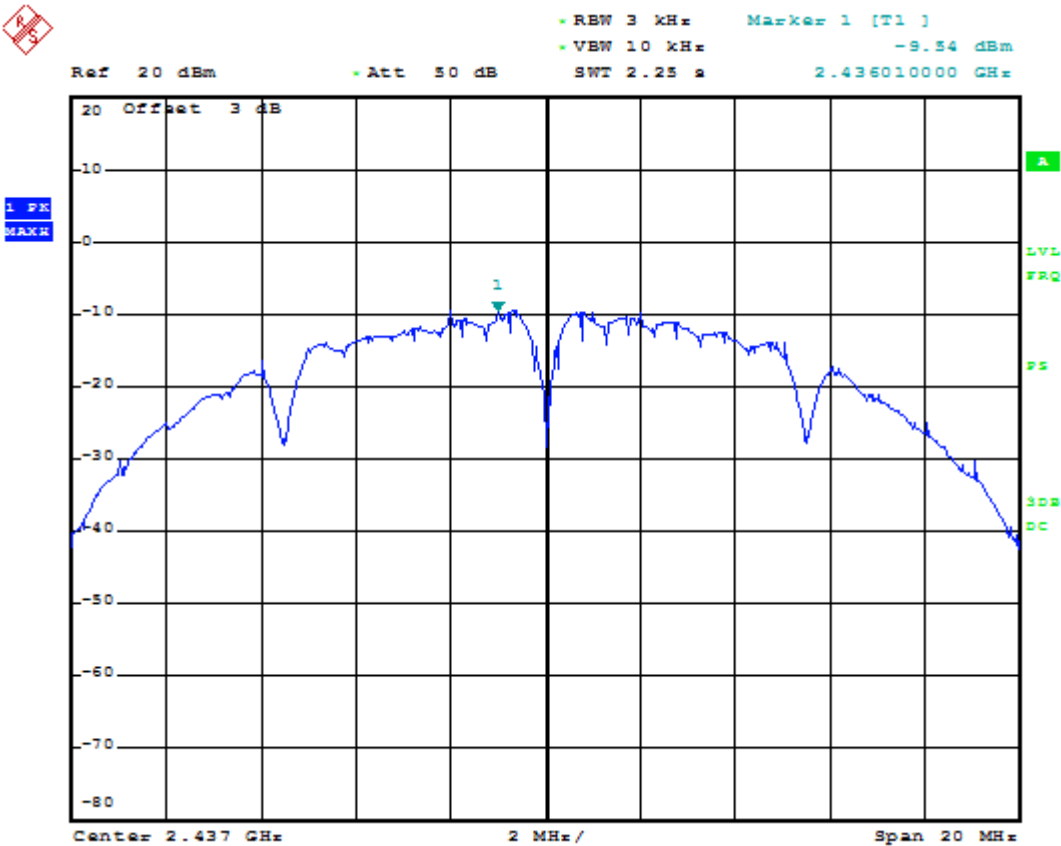
TOTAL POWER 802.11n ANT1+ANT2

Modulation	Channel	Frequency	Power Spectral Density	Limit
802.11n HT20	01	2412 MHz	-10.61 dBm	8dBm
	06	2437 MHz	-10.59 dBm	8dBm
	11	2462 MHz	-9.88 dBm	8dBm
802.11n HT40	03	2422 MHz	-11.97 dBm	8dBm
	06	2437 MHz	-11.70 dBm	8dBm
	09	2452 MHz	-12.23 dBm	8dBm

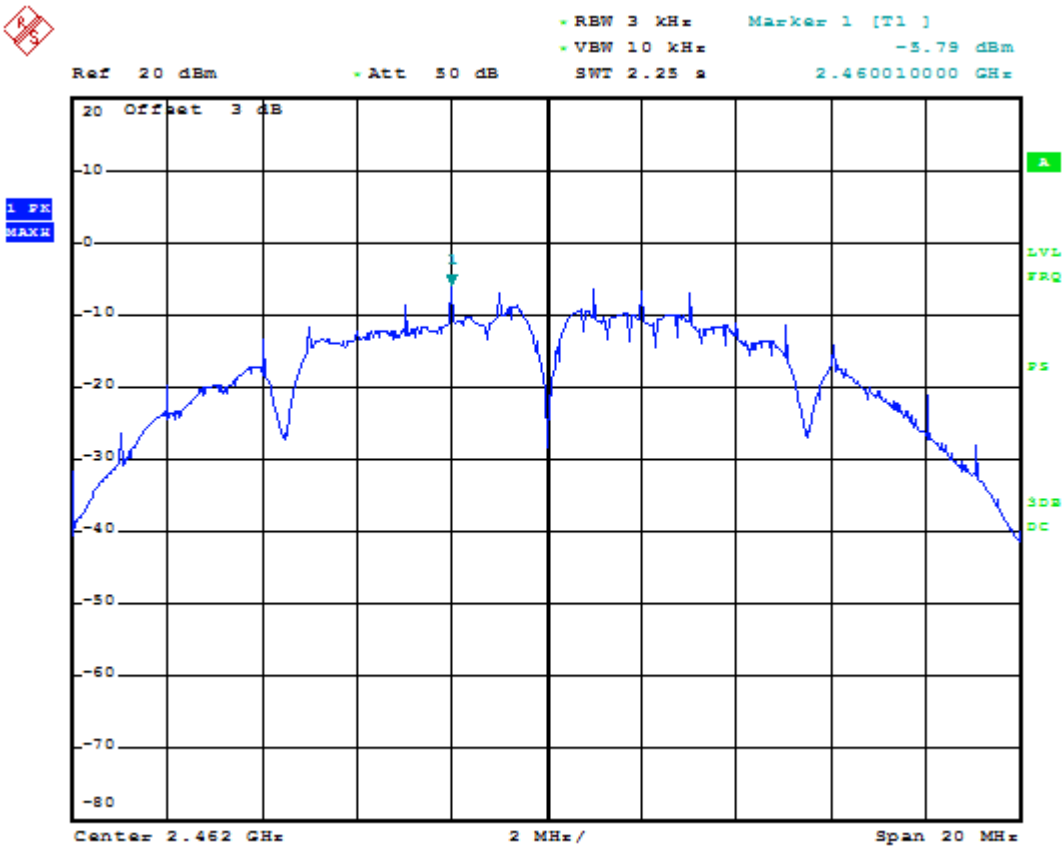
802.11b Ch01 2412 MHz ANT1



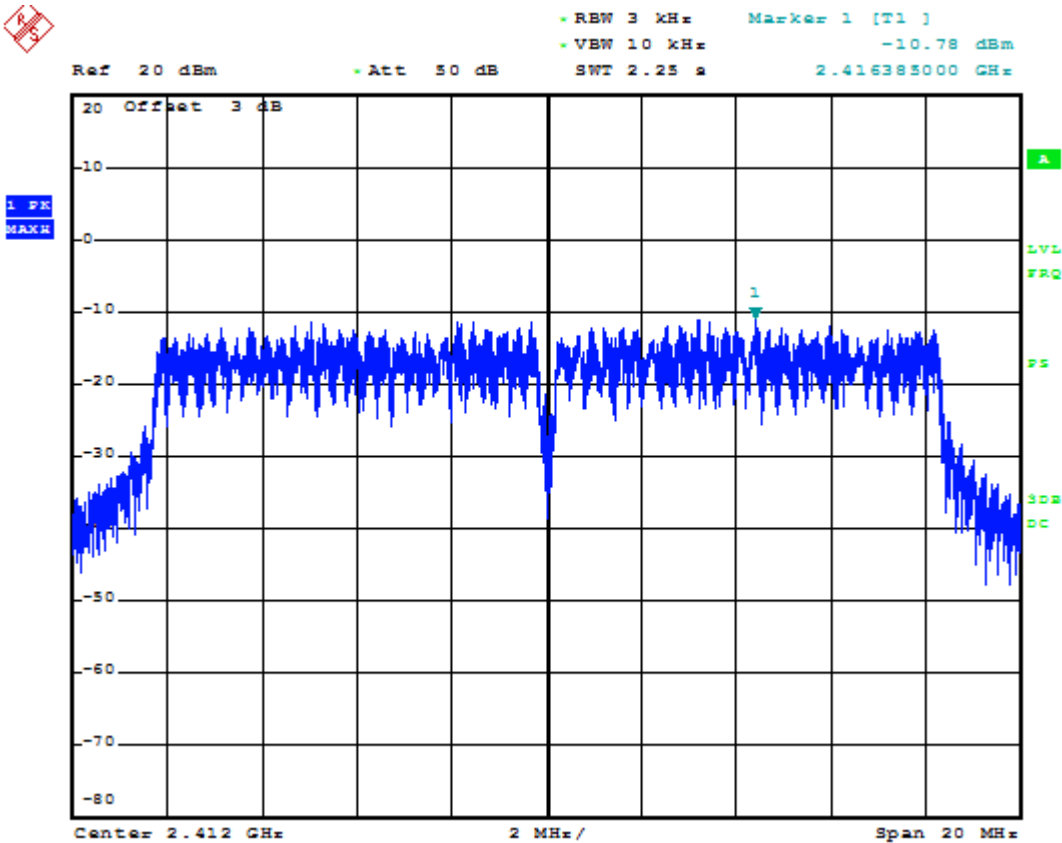
802.11b Ch06 2437 MHz ANT1



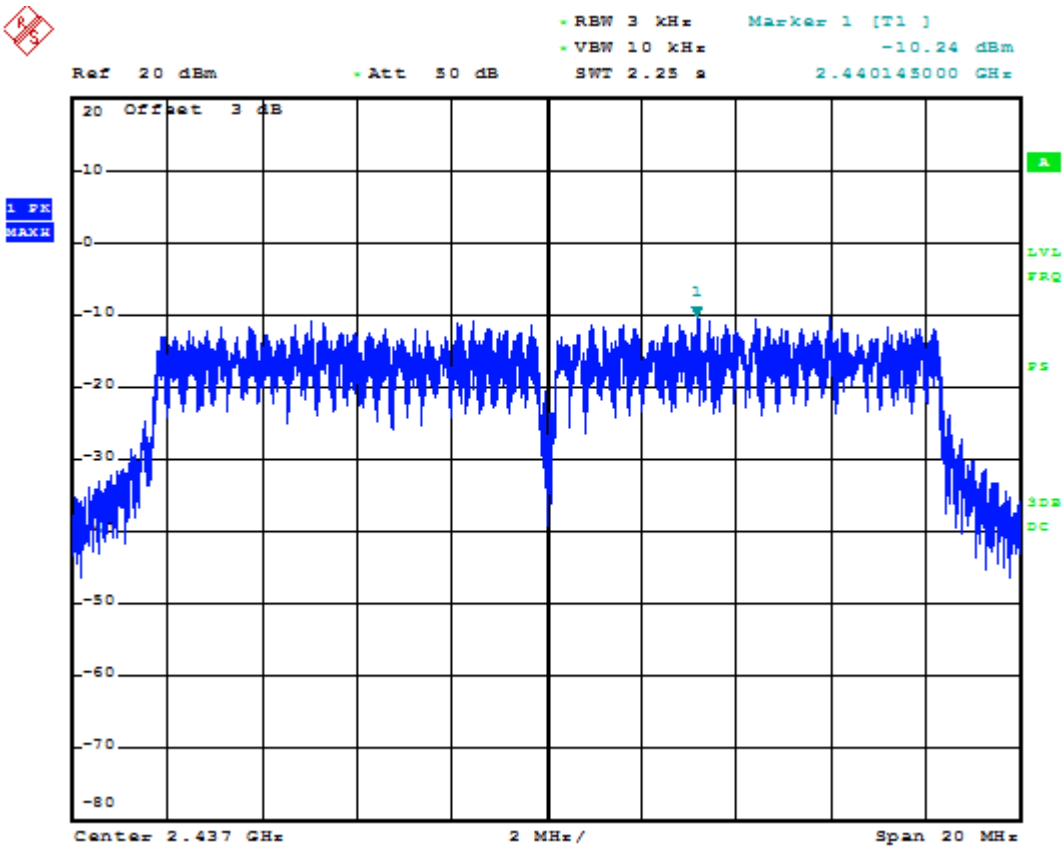
802.11b Ch11 2462 MHz ANT1



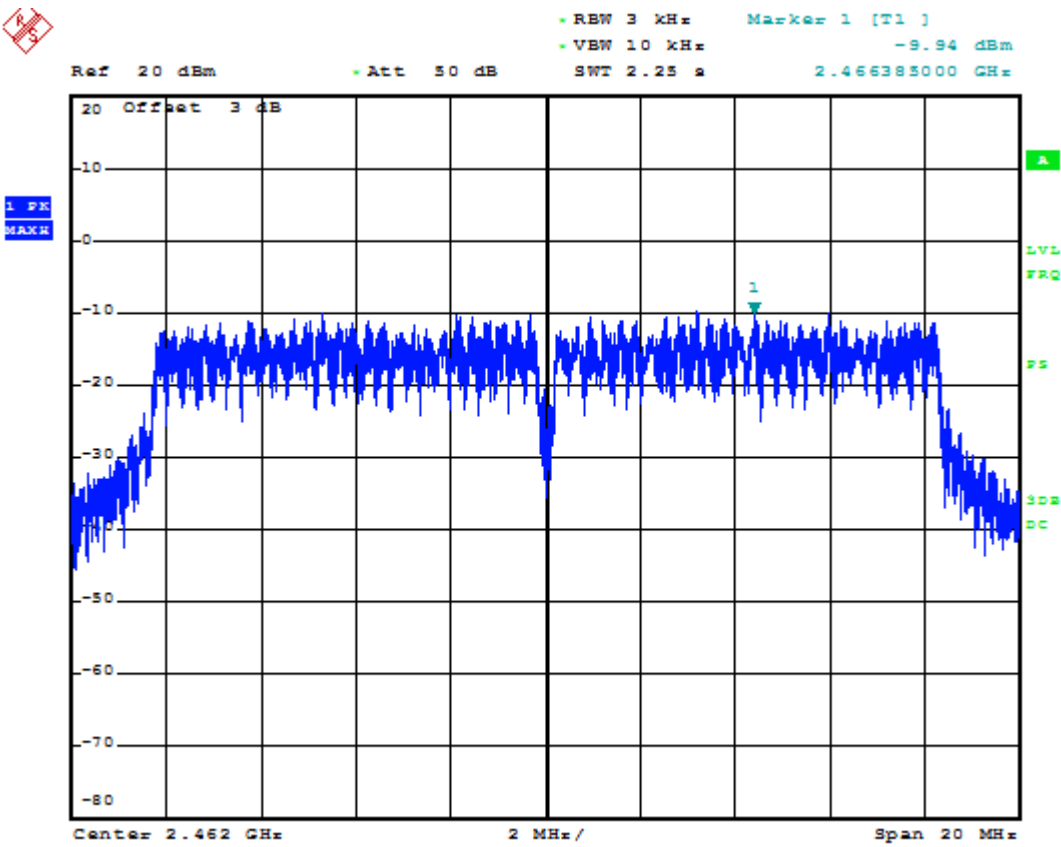
802.11g Ch01 2412 MHz ANT1



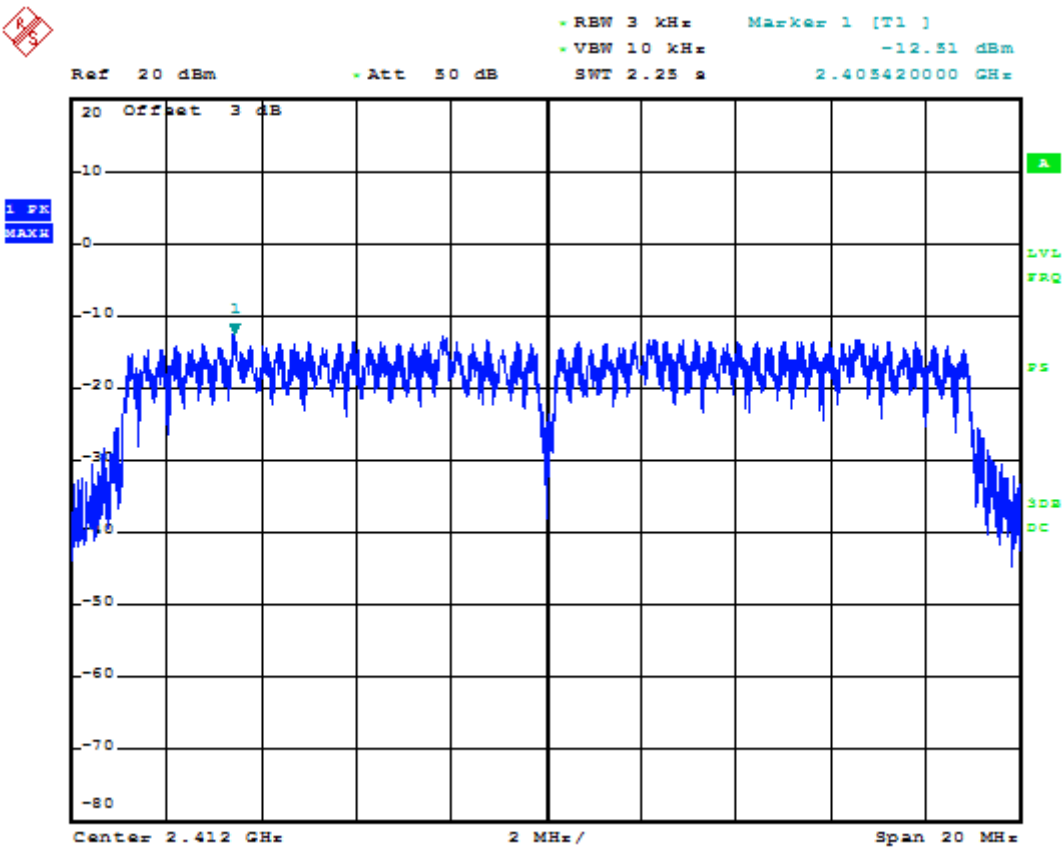
802.11g Ch06 2437 MHz ANT1



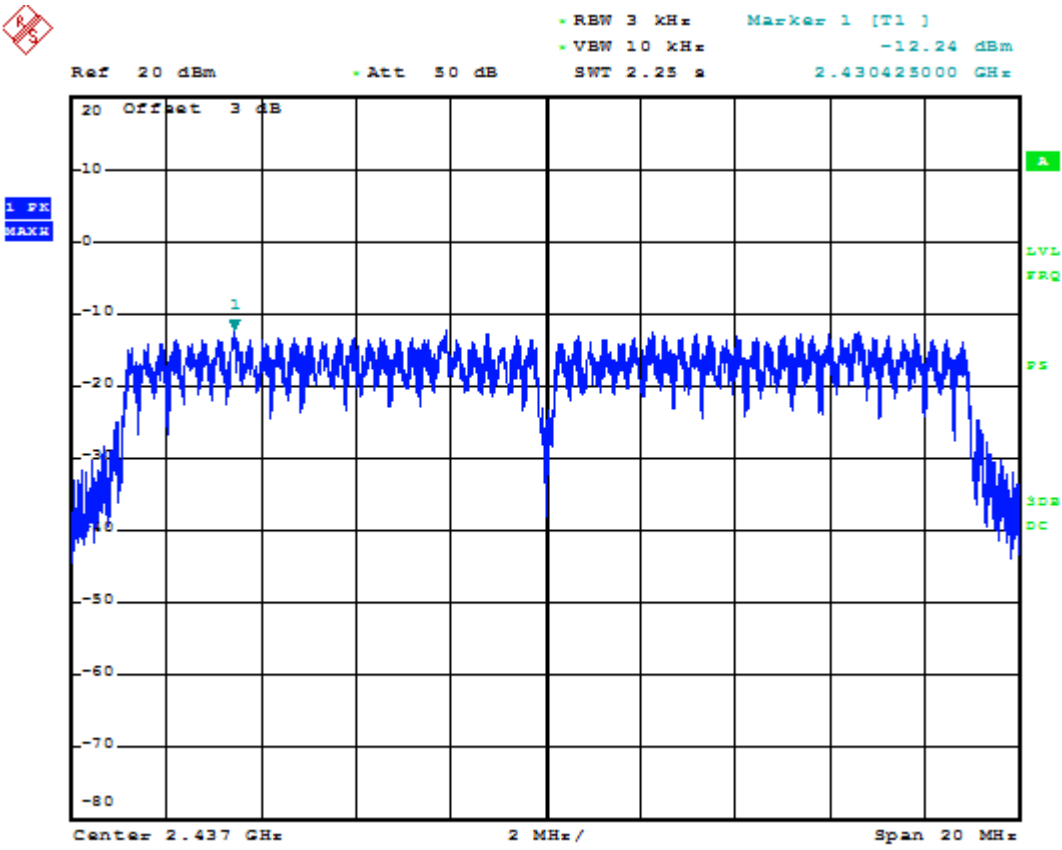
802.11g Ch11 2462 MHz ANT1



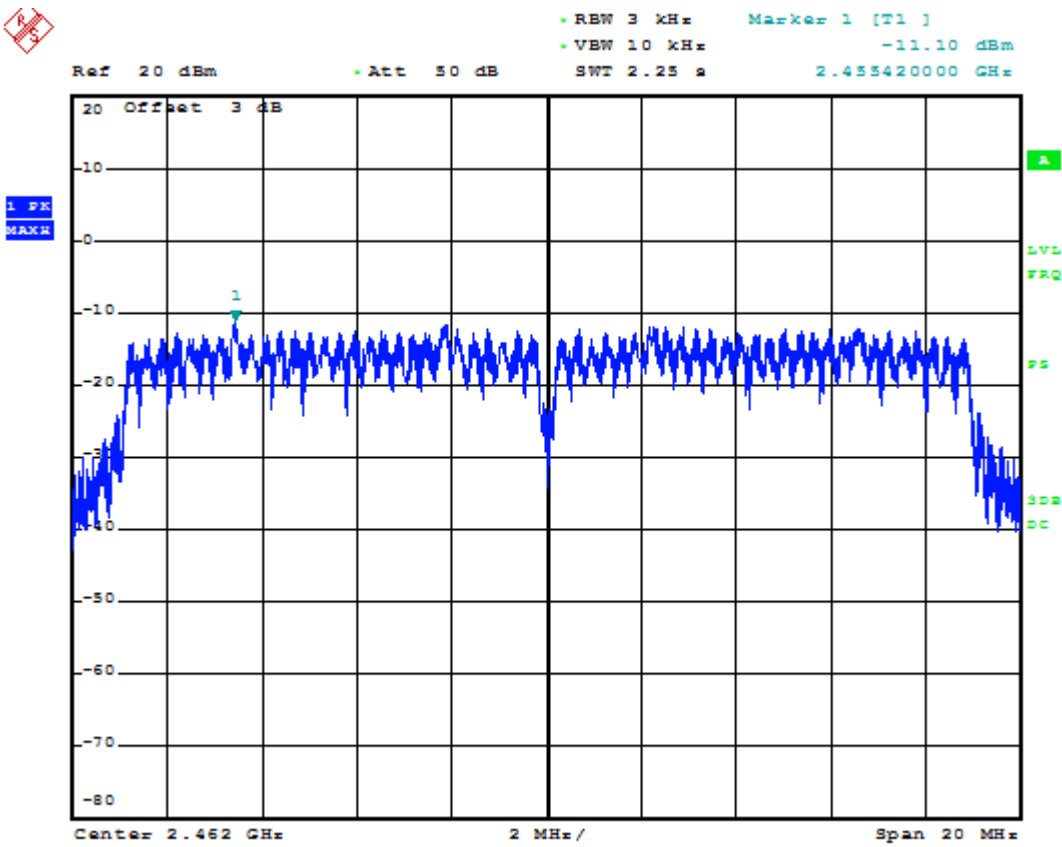
802.11n HT20 Ch01 2412 MHz ANT1



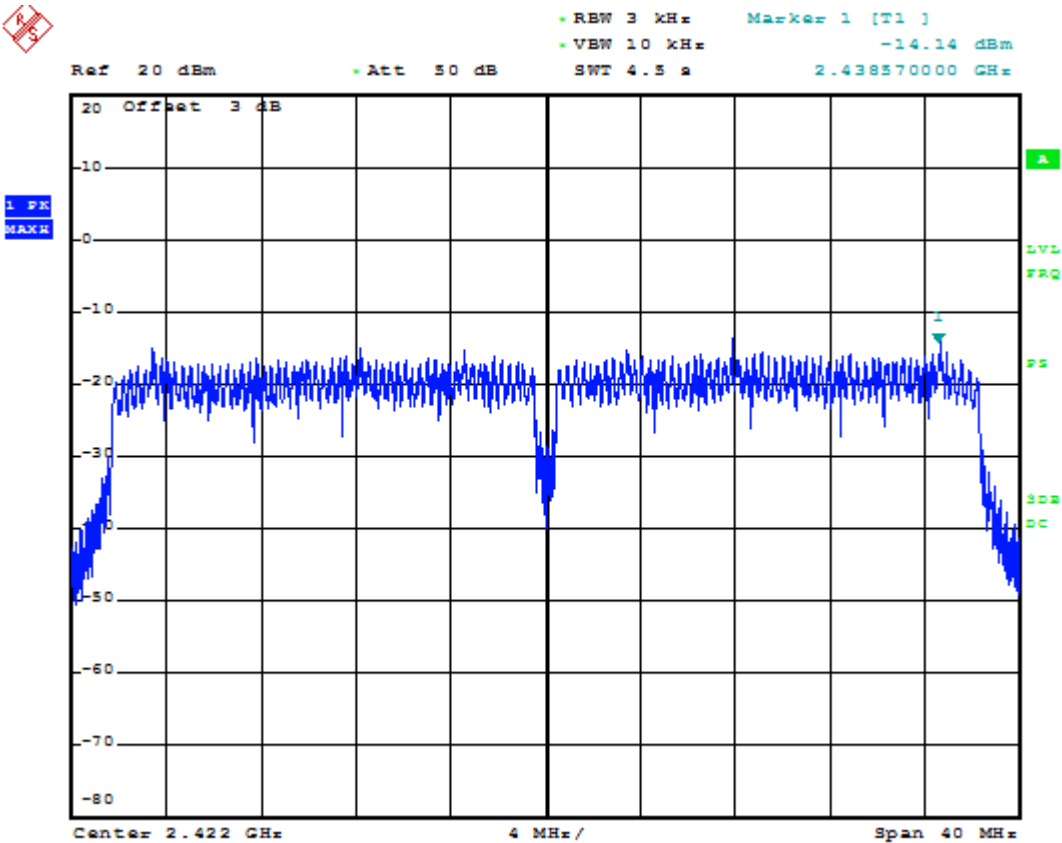
802.11n HT20 Ch06 2437 MHz ANT1



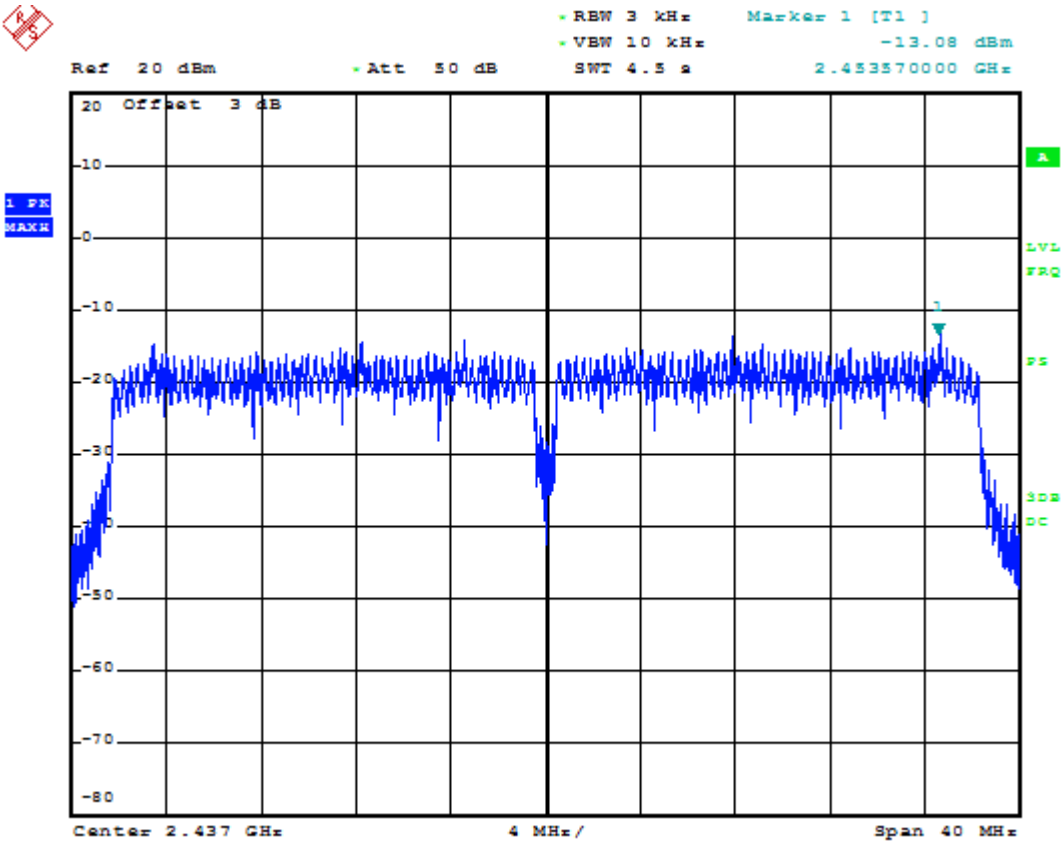
802.11n HT20 Ch11 2462 MHz ANT1



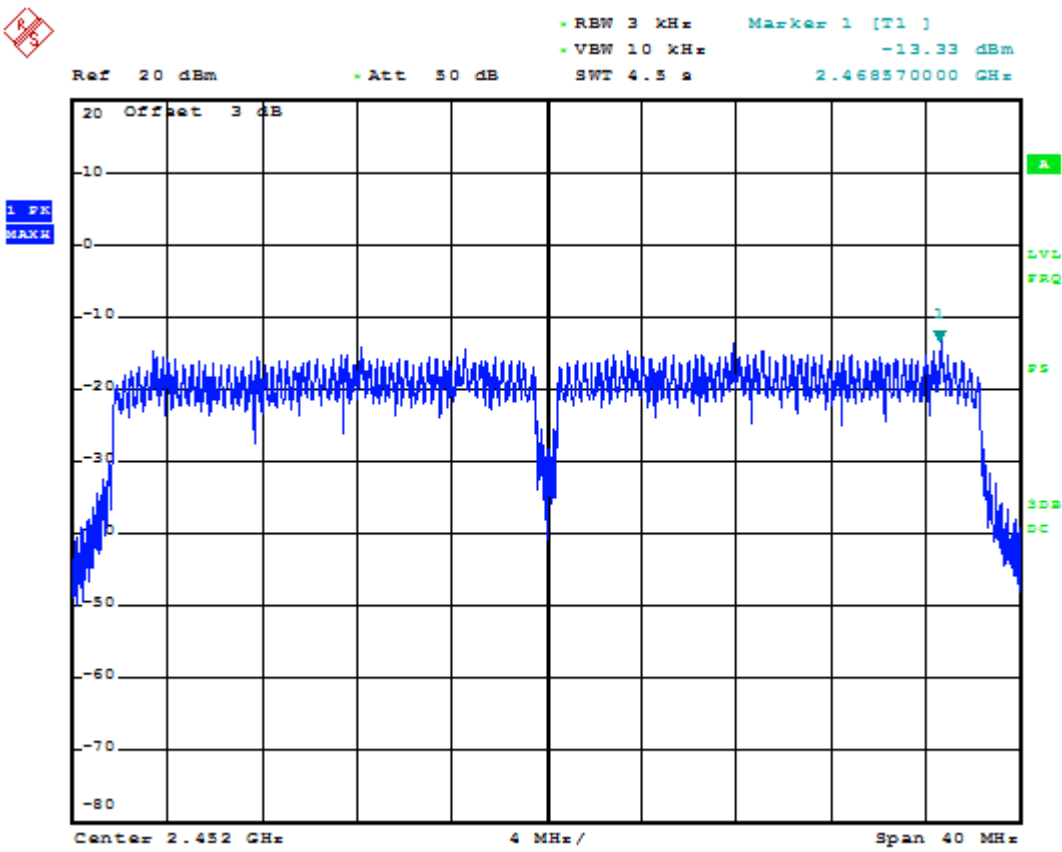
802.11n HT40 Ch03 2422 MHz ANT1



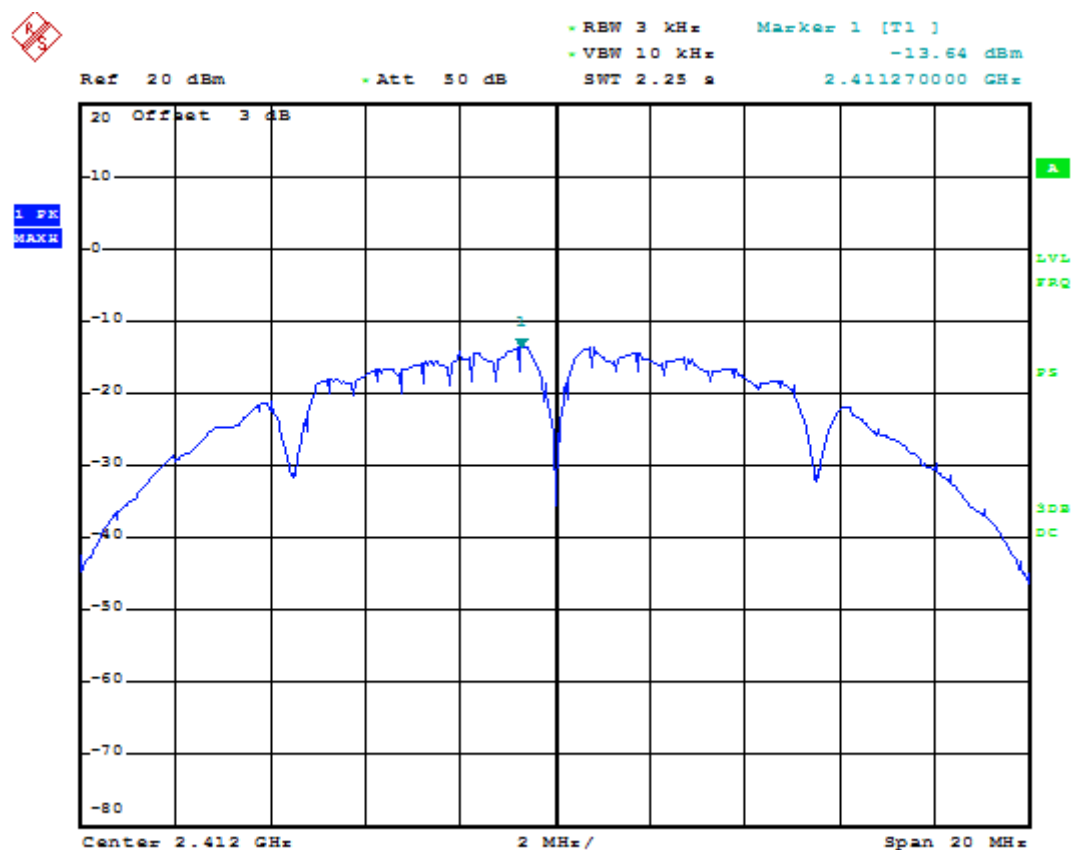
802.11n HT40 Ch06 2437 MHz ANT1



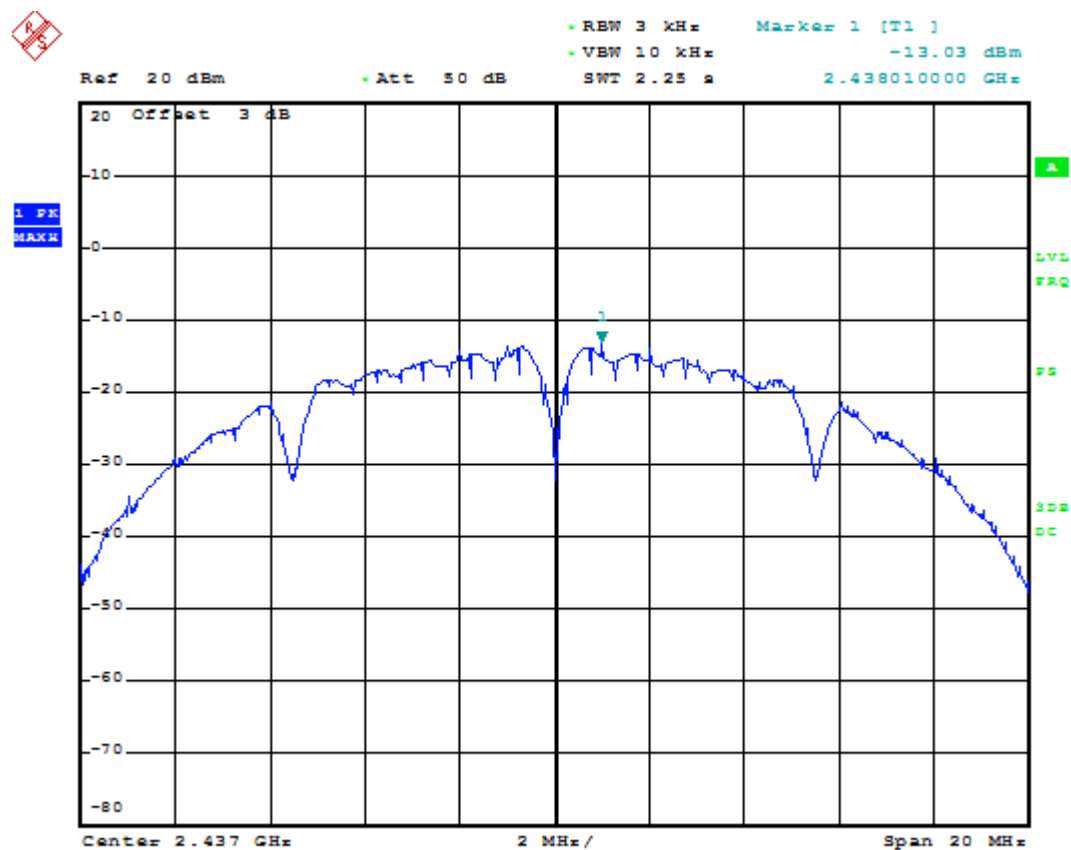
802.11n HT40 Ch09 2452 MHz ANT1



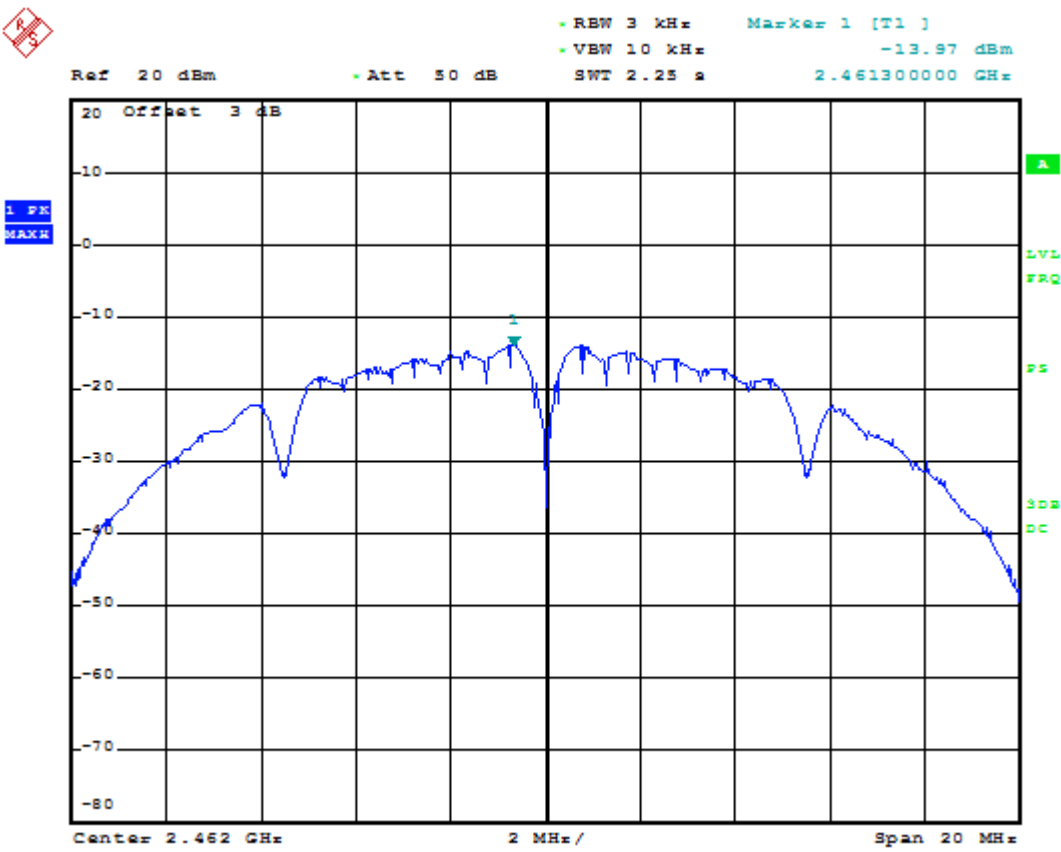
802.11b Ch01 2412 MHz ANT2



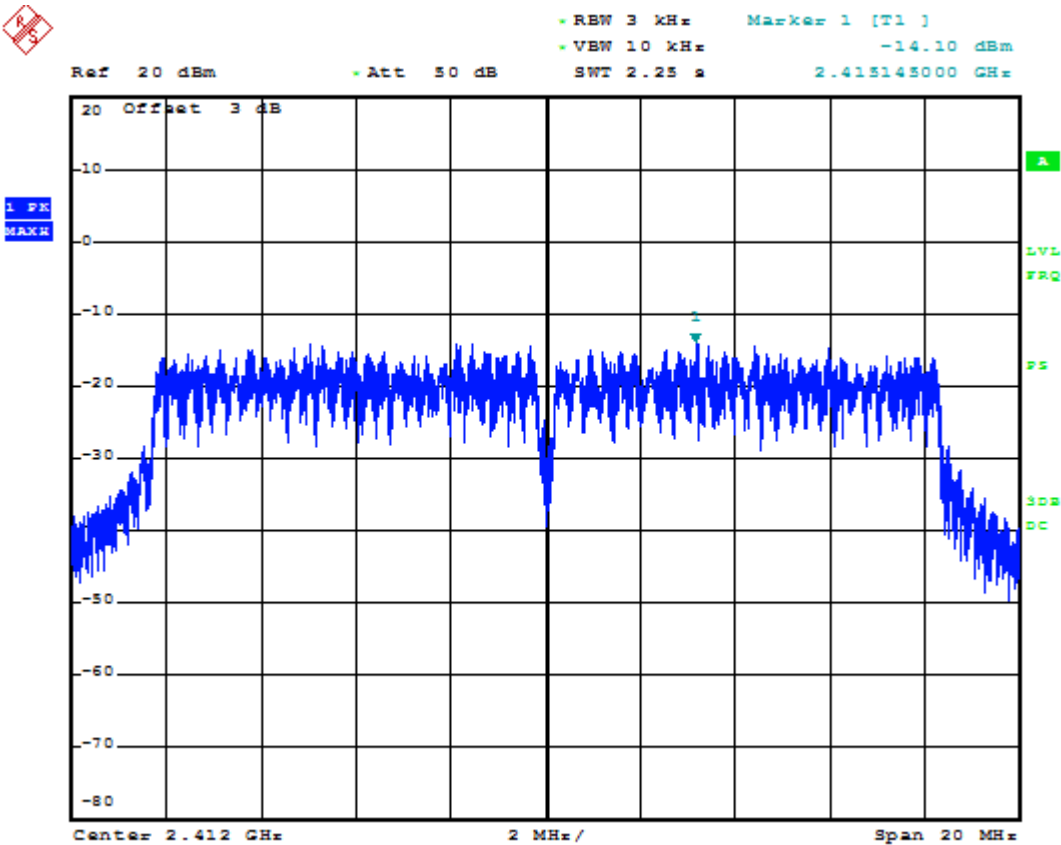
802.11b Ch06 2437 MHz ANT2



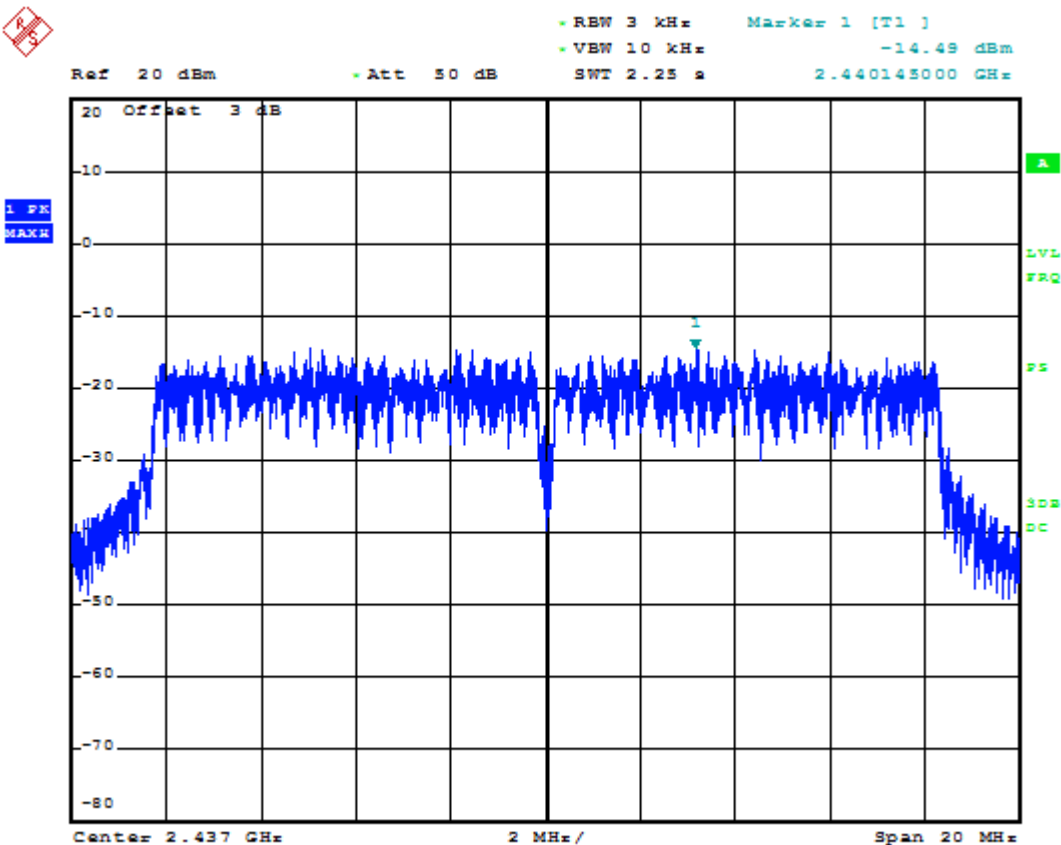
802.11b Ch11 2462 MHz ANT2



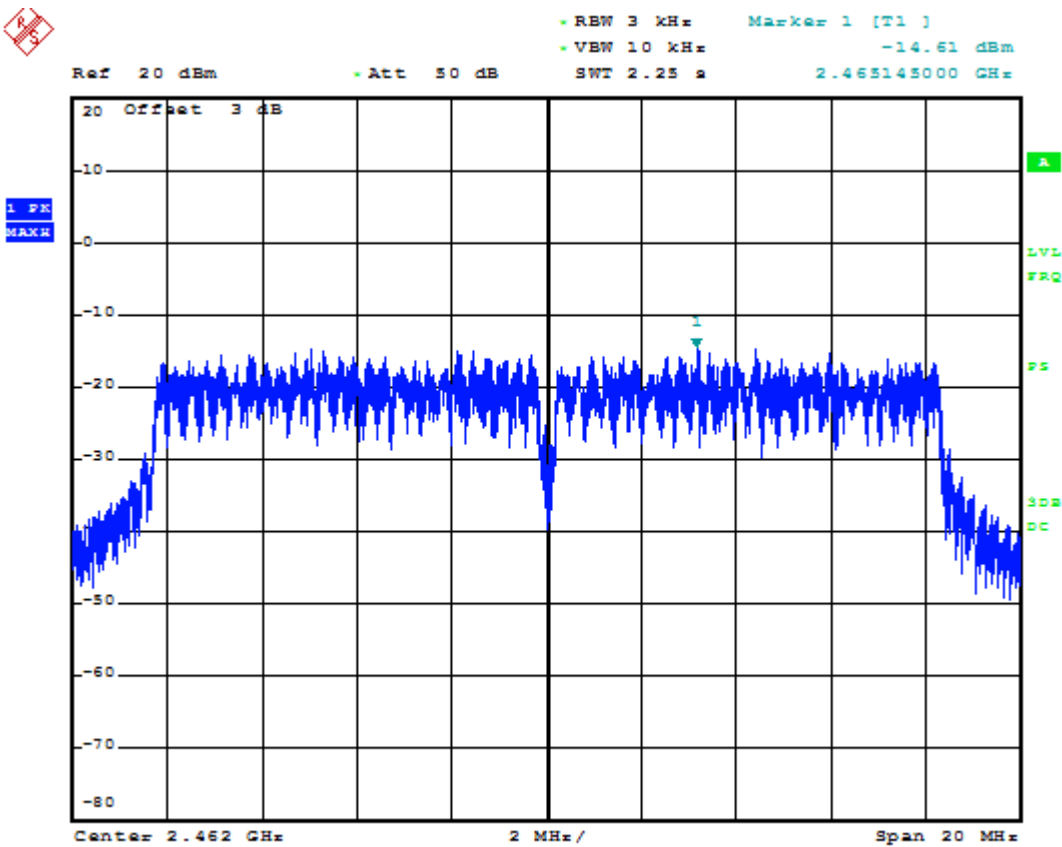
802.11g Ch01 2412 MHz ANT2



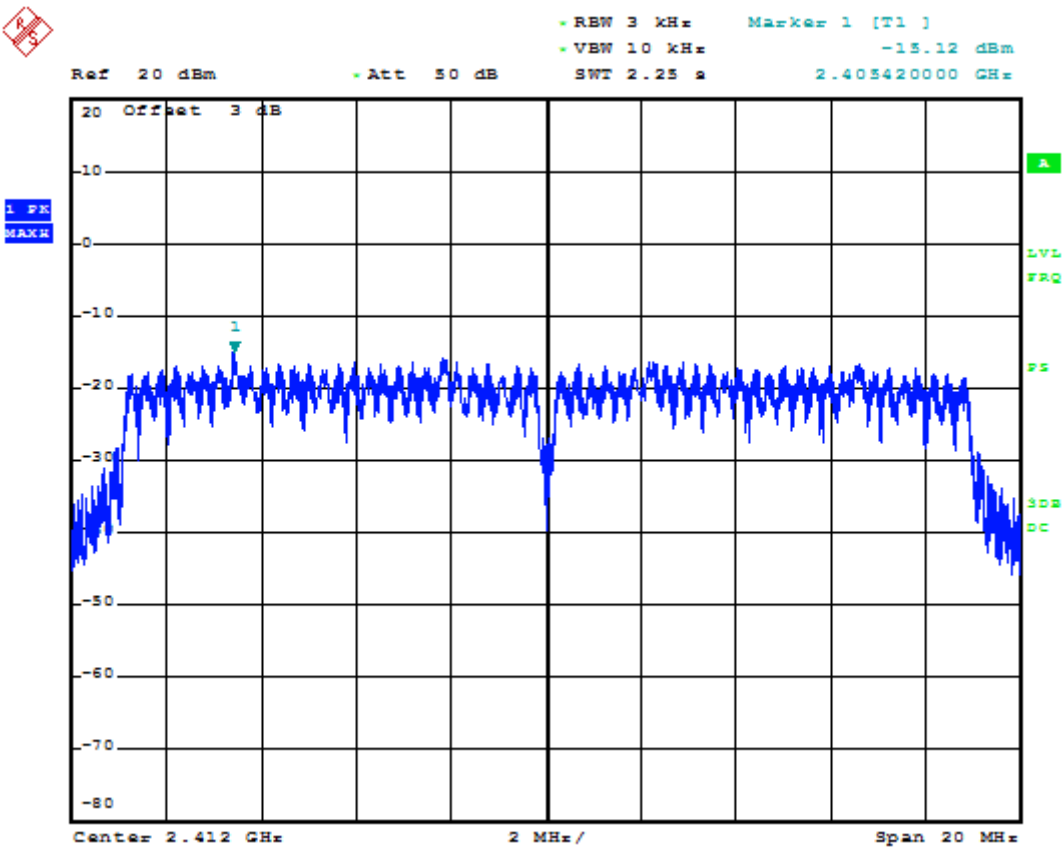
802.11g Ch06 2437 MHz ANT2



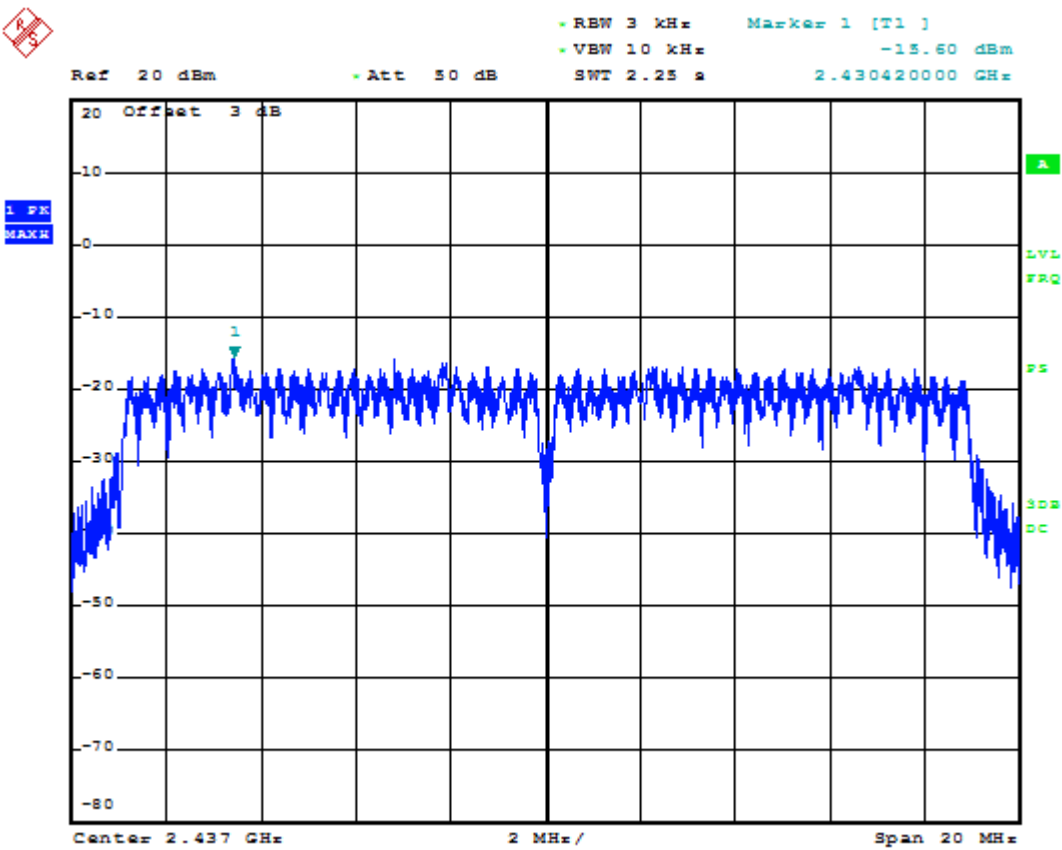
802.11g Ch11 2462 MHz ANT2



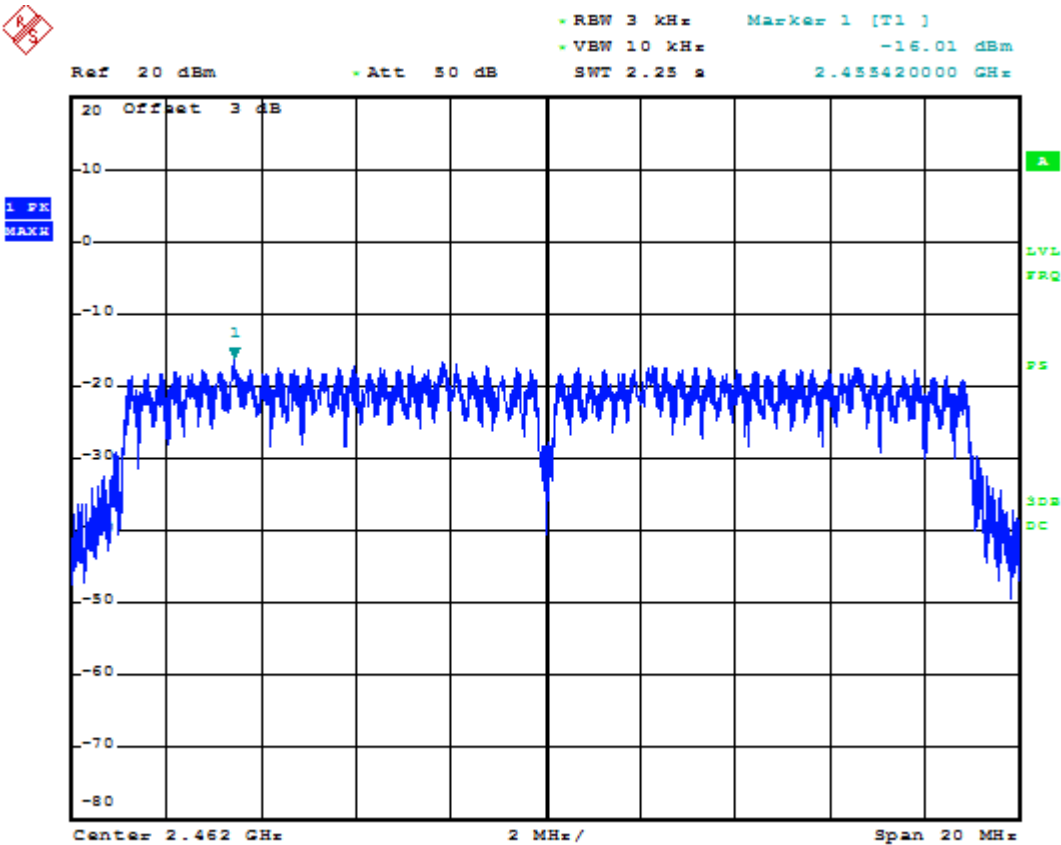
802.11n HT20 Ch01 2412 MHz ANT2



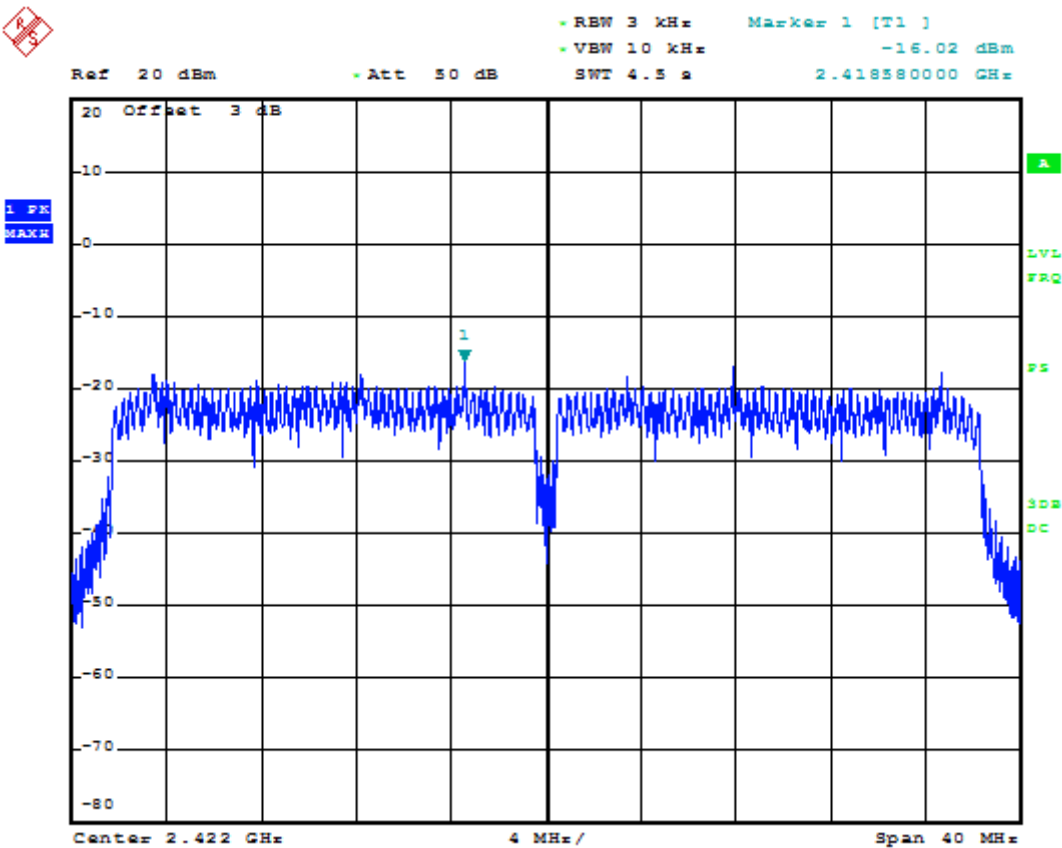
802.11n HT20 Ch06 2437 MHz ANT2



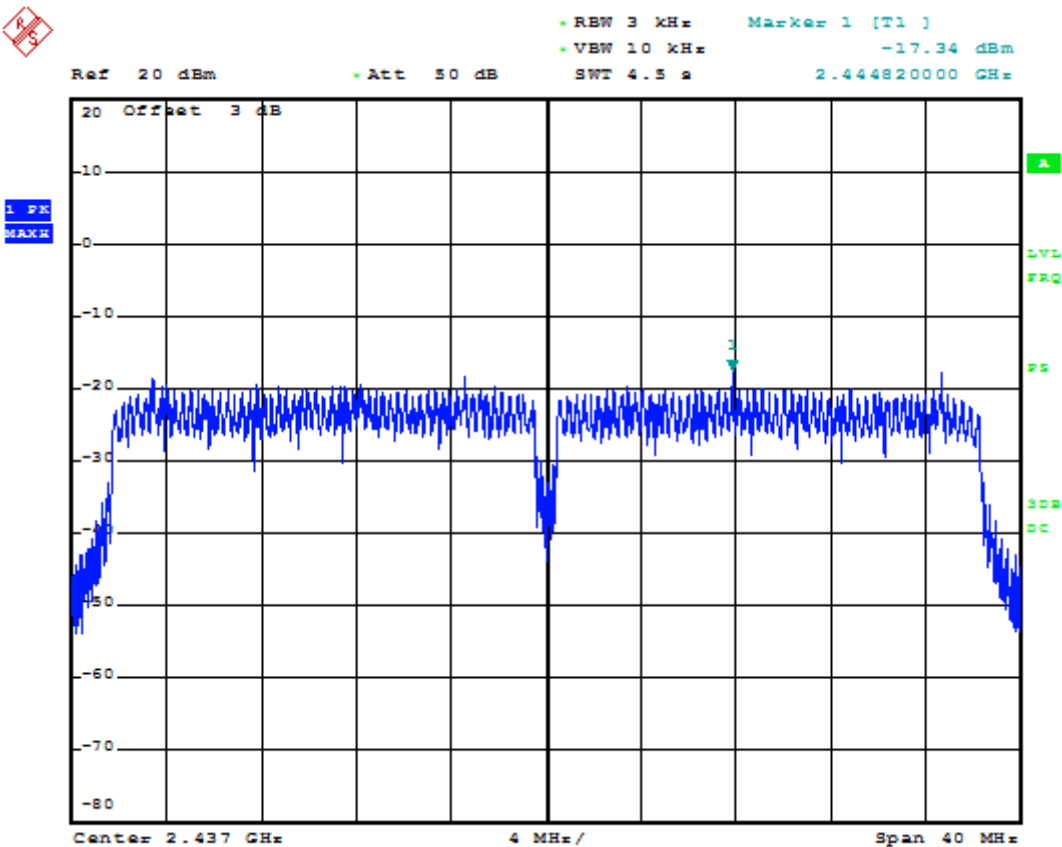
802.11n HT20 Ch11 2462 MHz ANT2



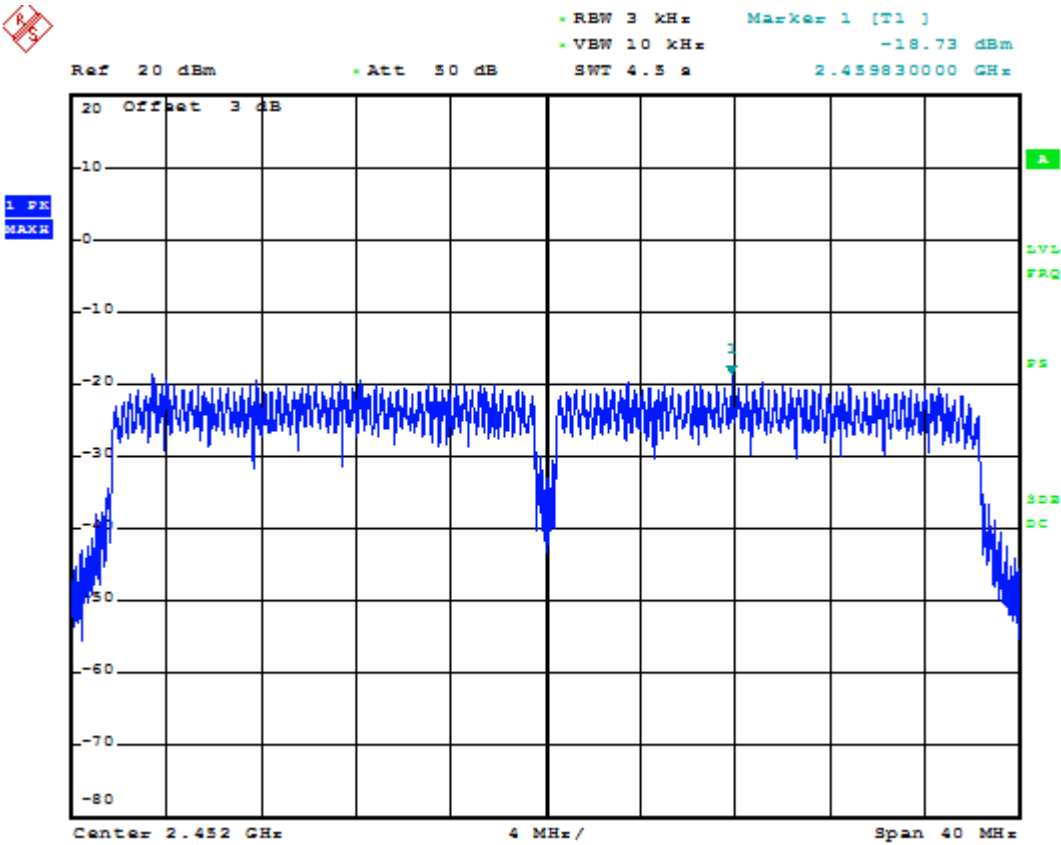
802.11n HT40 Ch03 2422 MHz ANT2



802.11n HT40 Ch06 2437 MHz ANT2



802.11n HT40 Ch09 2452 MHz ANT2



10 DEVIATION TO TEST SPECIFICATIONS

None.