FCC TEST REPORT

According to

FCC CFR Title 47 Part 15 Subpart C

Applicant	:	ZyXEL Communications Corporation
Address	:	NO.6,Innovation Rd.II Science Based Industrial Park Hsin-Chu,Taiwan
Equipment	:	Wireless N VDSL2 4-port Bonding Combo WAN Gateway with HPNA;
Model No.	:	VMG4380-B10A
FCC ID	:	I88VMG4380B10A

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- The test report must not be used by the clients to claim product certification approval by **NVLAP** or any agency of the Government.

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Document history

Attachment No.	Date	Description
SEFI1208110	September 3, 2012	First issue

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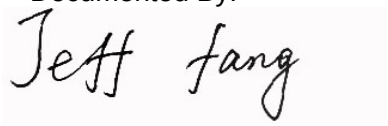
Address	:	NO.6,Innovation Rd.II Science Based Industrial Park Hsin-Chu,Taiwan
Equipment	:	Wireless N VDSL2 4-port Bonding Combo WAN Gateway with HPNA;
Model No.	:	VMG4380-B10A
FCC ID	:	I88VMG4380B10A

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2003** and the energy emitted by this equipment was ***passed*** **CISPR PUB. 22 and FCC Part 15** in both radiated and conducted emission class B limits. Testing was carried out on September 3,2012 at ***Cerpass Technology Corp.***

Documented By:



Jeff Fang/ Administration

Approved By:

Miro Chueh/ Technical director

1. Report of Measurements and Examinations

1.1. List of Measurements and Examinations

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209 15.247(d)	. Radiated Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak Output Power	Pass
15.247(d)	. 100kHz Bandwidth of Frequency Band Edges	Pass
15.247(e)	. Power Spectral Density	Pass
1.1307 1.1310 2.1091 2.1093	. RF Exposure Compliance	Pass

2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Product name	Model No.	
Wireless N VDSL2 4-port Bonding Combo WAN Gateway with HPNA;	VMG4380-B10A	
Adapter	Model No.:	
	Input:	100-240V~50-60Hz, 0.6A
	Output:	12V⎓1.5A
	Power supply cable	Non-Shielded, 1.5m

WLAN	Broadcom/BCM6306KMLG
Spreading	802.11b: CCK, DQPSK, DBPSK 802.11g: 64 QAM, 16 QAM, QPSK, BPSK 802.11n: BPSK, QPSK,16-QAM, 64-QAM
Frequency Range	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels	802.11b/g/n (20MHz):11 802.11n (40MHz): 7
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~MCS15
Antenna	Antenna 1（chain 0） Dipole 3.0dBi Antenna 2（chain 1） PIFA 3.0dBi

2.2. Carrier Frequency of Channels

For 2.4G 802.11b, 802.11g, 802.11n (20MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	---	---

For 2.4G 802.11n (40MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	---	08	2447
02	---	09	2452
03	2422	---	---
04	2427	---	---
05	2432	---	---
06	2437	---	---
07	2442	---	---

2.3. Test Manner

Test Manner	
a	During testing, the interface cables and equipment positions were varied according to 47 CFR, Part 2, Part 15
b	Adjust the EUT at the test mode and the test channel. Then test.
The test modes:	

The EUT transmitting and receiving with one (chain 0) antenna working at b/g mode, so one antenna working configuration was used for b/g mode testing in this report.
The EUT transmitting and receiving with two antennas simultaneously working at N mode (Chain 0+Chain 1). The chip set RT5392L supports 802.11 b/g + MIMO 2x2 configuration was finally used in this report.
The worst-case data rates are determined to be as follows for each mode based on investigation by measuring the average power, peak power and PPSD across all data rates, bandwidths, and modulations.
The worst-case data rates:
IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.
IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 54Mbps data rate were chosen for full testing.
IEEE 802.11gn Standard-20 MHz Channel mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with MCS0 data rate were chosen for full testing.
IEEE 802.11gn Wide-40 MHz Channel mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with MCS0 data rate were chosen for full testing.

Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.

2.4. Description of Test System

No	Device	Manufacturer	Model No.	Description
1	Notebook	ASUS	W6A	Power by adaptor
2	HUB	D-Link	DI-504	N/A
3	IPOD	Apple	MA477TA/A	N/A

2.5. General Information of Test

Test Site:	Cerpass Technology Corp.
Performand Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz

Laboratory accreditation

2.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	±2.71 dB
Radiated Emission	30 MHz ~ 25GHz	Vertical	±4.11 dB
		Horizontal	±4.10 dB
Occupied Bandwidth	---	---	±7500 Hz
Maximum Peak Output Power	---	---	±1.4 dB
Band Edges	---	---	±2.2 dB
Power Spectral Density	---	---	±2.2 dB

3. Antenna Requirements

3.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2. Antenna Construction and Directional Gain

Antenna 1:
Antenna type: Dipole Antenna
Antenna Gain: 3.00 dBi

Antenna 2:
Antenna type: PIFA Antenna
Antenna Gain: 3.00 dBi

Total gain = G_{ANT} + 10 log(N) dBi=6.01 dBi

4. Test of Conducted Emission

4.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

4.2. Test Procedures

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

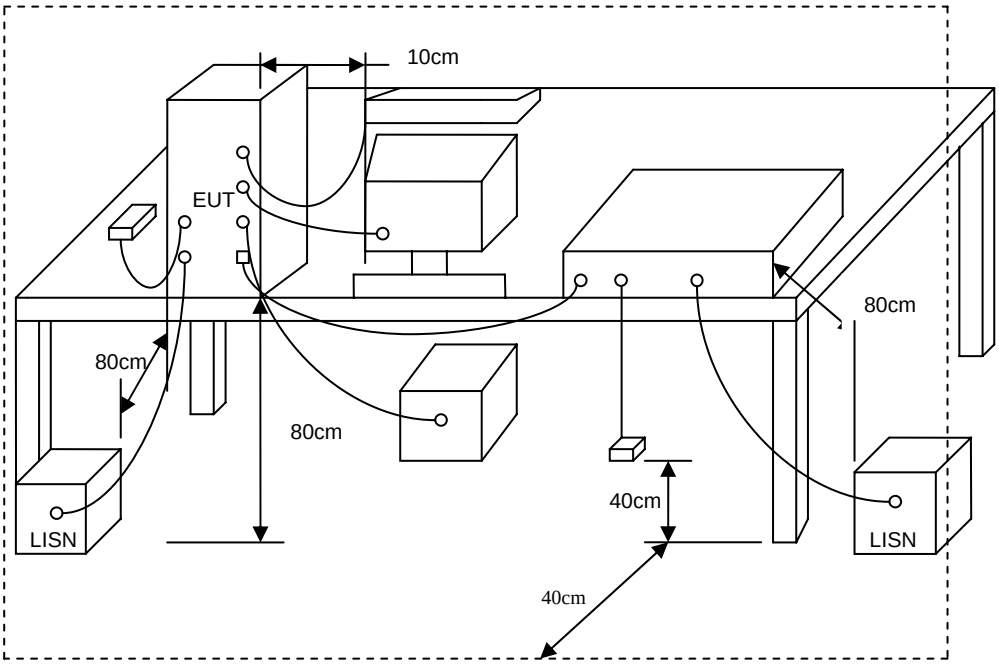
The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4.3. Typical Test Setup

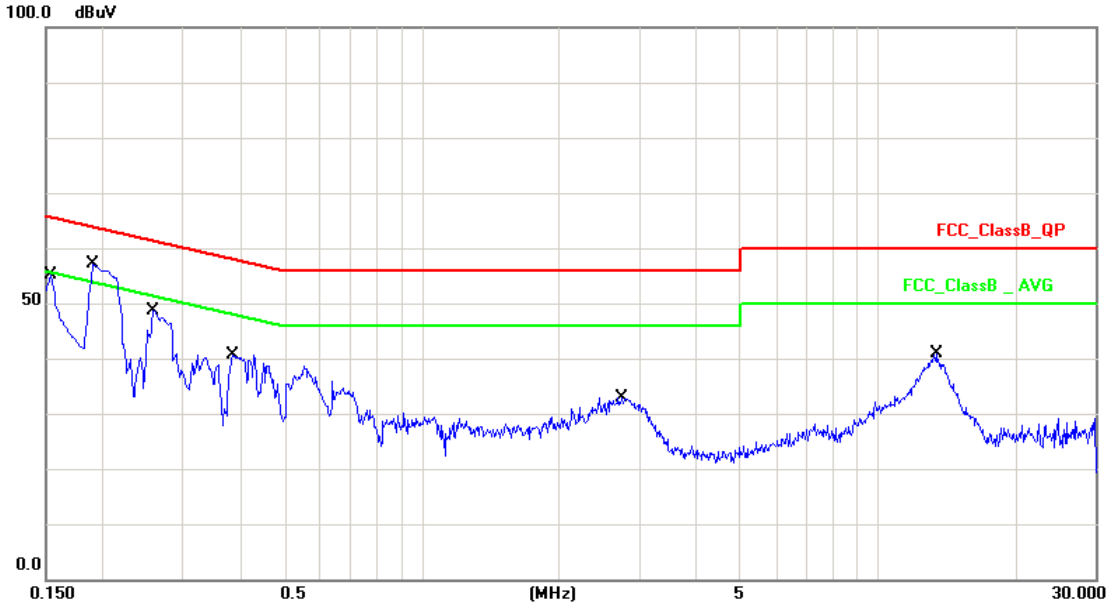


4.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2012.01.15	2013.01.14
AMN	R&S	ESH2-Z5	100182	2012.03.14	2013.03.13
Two-Line V-Network	R&S	ENV216	100325	2012.03.14	2013.03.13
ISN	FCC	FCC-TLISN-T 2-02	20379	2012.03.14	2013.03.13
ISN	FCC	FCC-TLISN-T 4-02	20380	2012.03.14	2013.03.13
ISN	FCC	FCC-TLISN-T 8-02	20381	2012.03.14	2013.03.13
Attenuator	R&S	ESH3-Z2	100529	2012.01.11	2013.01.10
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2012.08.14	2013.08.13

4.5. Test Result and Data

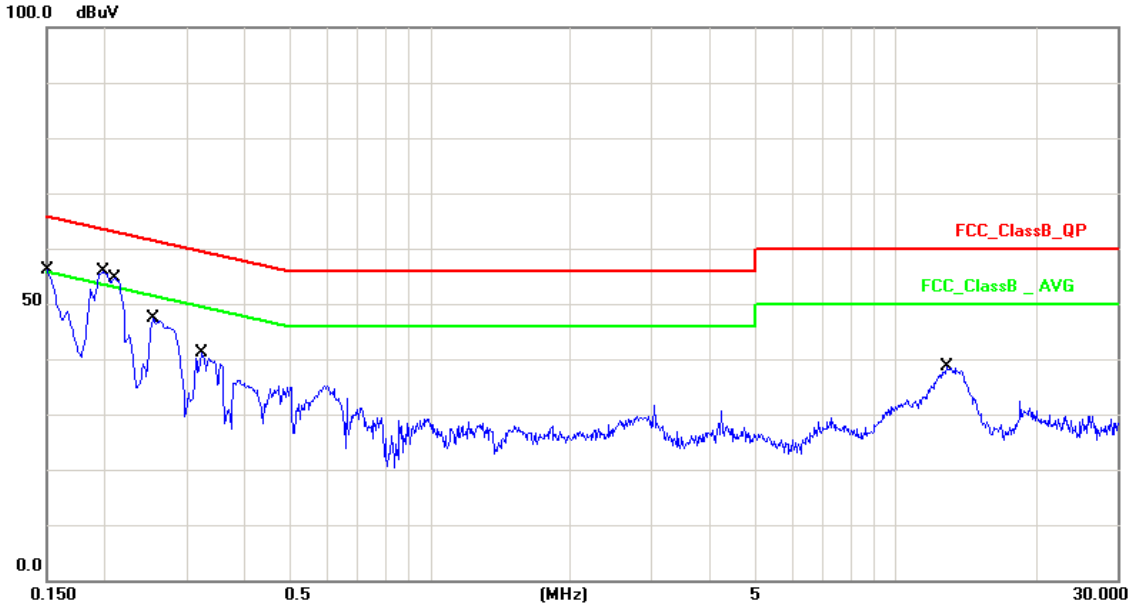
Test Mode :	Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	LINE
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2012/08/31



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1539	9.50	33.00	42.50	65.78	-23.28	QP
2	0.1539	9.50	10.23	19.73	55.78	-36.05	AVG
3	0.1900	9.50	43.35	52.85	64.03	-11.18	QP
4	0.1900	9.50	24.53	34.03	54.03	-20.00	AVG
5	0.2580	9.50	35.45	44.95	61.49	-16.54	QP
6	0.2580	9.50	19.22	28.72	51.49	-22.77	AVG
7	0.3860	9.50	26.51	36.01	58.15	-22.14	QP
8	0.3860	9.50	12.12	21.62	48.15	-26.53	AVG
9	2.7540	9.54	17.32	26.86	56.00	-29.14	QP
10	2.7540	9.54	9.30	18.84	46.00	-27.16	AVG
11	13.4740	9.90	24.65	34.55	60.00	-25.45	QP
12	13.4740	9.90	16.13	26.03	50.00	-23.97	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test Mode :	Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Temperature :	22°C	Humidity :	50%
Pressure(mbar) :	1002	Date:	2012/08/31



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	9.87	38.40	48.27	65.99	-17.72	QP
2	0.1500	9.87	16.94	26.81	55.99	-29.18	AVG
3	0.1980	9.87	43.85	53.72	63.69	-9.97	QP
4	0.1980	9.87	26.56	36.43	53.69	-17.26	AVG
5	0.2100	9.87	41.73	51.60	63.20	-11.60	QP
6	0.2100	9.87	23.04	32.91	53.20	-20.29	AVG
7	0.2540	9.86	34.67	44.53	61.62	-17.09	QP
8	0.2540	9.86	13.49	23.35	51.62	-28.27	AVG
9	0.3220	9.87	27.53	37.40	59.65	-22.25	QP
10	0.3220	9.87	10.71	20.58	49.65	-29.07	AVG
11	12.9500	9.78	22.76	32.54	60.00	-27.46	QP
12	12.9500	9.78	14.51	24.29	50.00	-25.71	AVG

Note: Measurement Level = Reading Level + Correct Factor

5. Test of Radiated Emission

5.1. Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2003. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V/ 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

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/ M)
30-230	10	30
230-1000	10	37

5.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

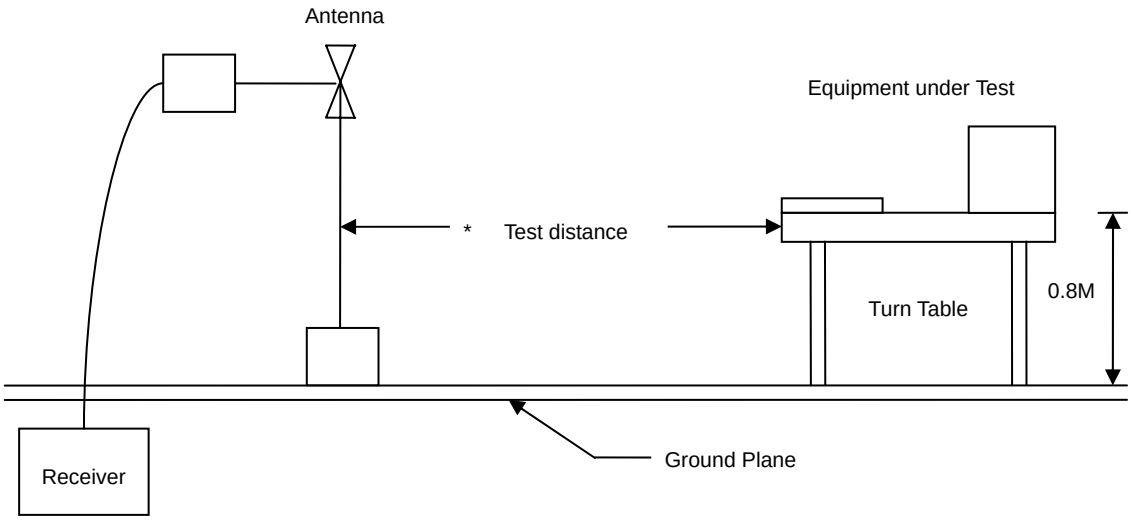
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.3. Typical Test Setup



5.4. Measurement Equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Test Receiver	ESCI	R&S	101183	2012.05.11	2013.05.10
H64 Amplifier	8447F	HP	3113A05582	2012.08.14	2013.08.13
Preamplifier	8449B	Agilent	3008A02342	2012.02.10	2013.02.09
Ultra Broadband Antenna	HL562	R&S	100363	2012.05.07	2013.05.06
Broad-Band Horn Antenna	BBHA9120D	Schwarzbeck	9120D-619	2012.05.07	2013.05.06
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13
Temperature/ Humidity Meter	ZC1-11	Zhicheng	CEP-TH-002	2012.08.17	2013.08.16

5.5. Test Result and Data

Under 1G

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: normal link	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant.Pol. H/V	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
32.91	V	44.29	-15.02	29.27	40.00	-10.73	Peak
144.46	V	48.11	-16.87	31.24	43.50	-12.26	Peak
170.41	V	49.74	-16.54	33.2	46.00	-12.8	Peak
501.87	V	43.21	-8.91	34.3	46.00	-11.7	Peak
666.46	V	41.51	-5.87	35.64	46.00	-10.36	Peak
835.81	V	47.32	-6.31	41.01	54.00	-12.99	Peak
166.78	H	45.62	-16.78	28.84	40.00	-11.16	Peak
335.87	H	44.9	-15.21	29.69	43.50	-13.81	Peak
502.41	H	39.87	-6.87	33	43.50	-10.5	Peak
755.21	H	35.95	-4.22	31.73	43.50	-11.77	Peak
833.12	H	37.84	-3.54	34.3	46.00	-11.7	Peak
910.45	H	36.87	-2.81	34.06	46.00	-11.94	Peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Above 1G

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11b (2412MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4824.50	V	43.21	35.87	6.53	49.74	42.40	74.00	54.00	-11.60	average
7234.12	V	35.98	26.40	15.48	51.46	41.88	74.00	54.00	-12.12	average
4824.76	H	43.35	34.87	6.53	49.88	41.40	74.00	54.00	-12.60	average
7235.55	H	36.35	26.56	15.48	51.83	42.04	74.00	54.00	-11.96	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11b (2437MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4875.67	V	46.98	36.98	6.85	53.83	43.83	74.00	54.00	-10.17	average
7315.98	V	41.51	29.52	15.52	57.03	45.04	74.00	54.00	-8.96	average
4874.24	H	45.78	36.75	6.85	52.63	43.60	74.00	54.00	-10.40	average
7314.83	H	37.86	25.76	15.52	53.38	41.28	74.00	54.00	-12.72	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11b (2462MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4924.54	V	46.75	36.76	6.99	53.74	43.75	74.00	54.00	-10.25	average
7384.45	V	35.67	24.67	15.60	51.27	40.27	74.00	54.00	-13.73	average
4925.24	H	46.75	36.78	6.99	53.74	43.77	74.00	54.00	-10.23	average
7383.23	H	36.56	25.76	15.60	52.16	41.36	74.00	54.00	-12.64	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11g (2412MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4825.00	V	44.65	36.78	6.53	51.18	43.31	74.00	54.00	-10.69	average
7233.46	V	40.41	28.41	15.48	55.89	43.89	74.00	54.00	-10.11	average
4825.00	H	45.76	36.72	6.53	52.29	43.25	74.00	54.00	-10.75	average
7234.31	H	36.92	28.45	15.48	52.40	43.93	74.00	54.00	-10.07	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11g (2437MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4875.12	V	45.64	36.41	6.85	52.49	43.26	74.00	54.00	-10.74	average
7314.51	V	36.54	27.45	15.52	52.06	42.97	74.00	54.00	-11.03	average
4875.04	H	44.51	36.41	6.85	51.36	43.26	74.00	54.00	-10.74	average
7313.33	H	35.56	25.78	15.52	51.08	41.30	74.00	54.00	-12.70	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11g (2462MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4924.51	V	46.51	36.76	6.99	53.50	43.75	74.00	54.00	-10.25	average
7384.45	V	35.67	24.44	15.60	51.27	40.04	74.00	54.00	-13.96	average
4925.21	H	45.61	35.98	6.99	52.60	42.97	74.00	54.00	-11.03	average
7384.34	H	35.67	25.44	15.60	51.27	41.04	74.00	54.00	-12.96	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (20MHz) (2412MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4825.00	V	46.56	36.75	6.53	53.09	43.28	74.00	54.00	-10.72	average
7234.33	V	39.31	27.12	15.48	54.79	42.60	74.00	54.00	-11.40	average
4825.00	H	46.41	36.56	6.53	52.94	43.09	74.00	54.00	-10.91	average
7233.46	H	36.72	27.56	15.48	52.20	43.04	74.00	54.00	-10.96	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (20MHz) (2437MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4875.00	V	46.74	36.41	6.85	53.59	43.26	74.00	54.00	-10.74	average
7313.33	V	35.67	25.67	15.52	51.19	41.19	74.00	54.00	-12.81	average
4875.24	H	46.67	35.67	6.85	53.52	42.52	74.00	54.00	-11.48	average
7313.23	H	35.72	26.78	15.52	51.24	42.30	74.00	54.00	-11.70	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (20MHz) (2462MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4925.67	V	46.56	36.76	6.99	53.55	43.75	74.00	54.00	-10.25	average
7384.45	V	38.64	26.75	15.61	54.25	42.36	74.00	54.00	-11.64	average
4925.36	H	46.22	35.67	6.99	53.21	42.66	74.00	54.00	-11.34	average
7385.16	H	36.76	25.67	15.61	52.37	41.28	74.00	54.00	-12.72	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (40MHz) (2422MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4845.00	V	45.67	37.39	6.53	52.20	43.92	74.00	54.00	-10.08	average
7265.33	V	40.52	27.44	15.48	56.00	42.92	74.00	54.00	-11.08	average
4844.12	H	46.93	36.01	6.53	53.46	42.54	74.00	54.00	-11.46	average
7266.51	H	35.78	27.11	15.48	51.26	42.59	74.00	54.00	-11.41	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (40MHz) (2437MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4876.21	V	46.86	36.33	6.85	53.71	43.18	74.00	54.00	-10.82	average
7311.45	V	35.67	24.68	15.52	51.19	40.20	74.00	54.00	-13.80	average
4875.21	H	46.23	35.80	6.85	53.08	42.65	74.00	54.00	-11.35	average
7312.96	H	35.97	26.78	15.52	51.49	42.30	74.00	54.00	-11.70	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2012/8/31**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 802.11n (40MHz) (2452MHz)	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
4905.24	V	45.97	35.79	6.99	52.96	42.78	74.00	54.00	-11.22	average
7355.41	V	39.56	25.97	15.61	55.17	41.58	74.00	54.00	-12.42	average
4905.68	H	45.78	36.92	6.99	52.77	43.91	74.00	54.00	-10.09	average
7356.78	H	36.89	25.24	15.61	52.50	40.85	74.00	54.00	-13.15	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

6. Occupied Bandwidth

6.1. Test Limit

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725- 5850 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2. Test Procedures

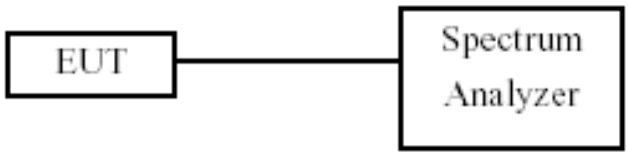
a. The transmitter output was connected to the spectrum analyzer.

b. Set RBW of spectrum analyzer to 1~5% of the emission bandwidth and VBW ≥ 3x RBW.

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

d. The 6dB Bandwidth was measured and recorded.

6.3. Test Setup Layout



6.4. Measurement Equipment

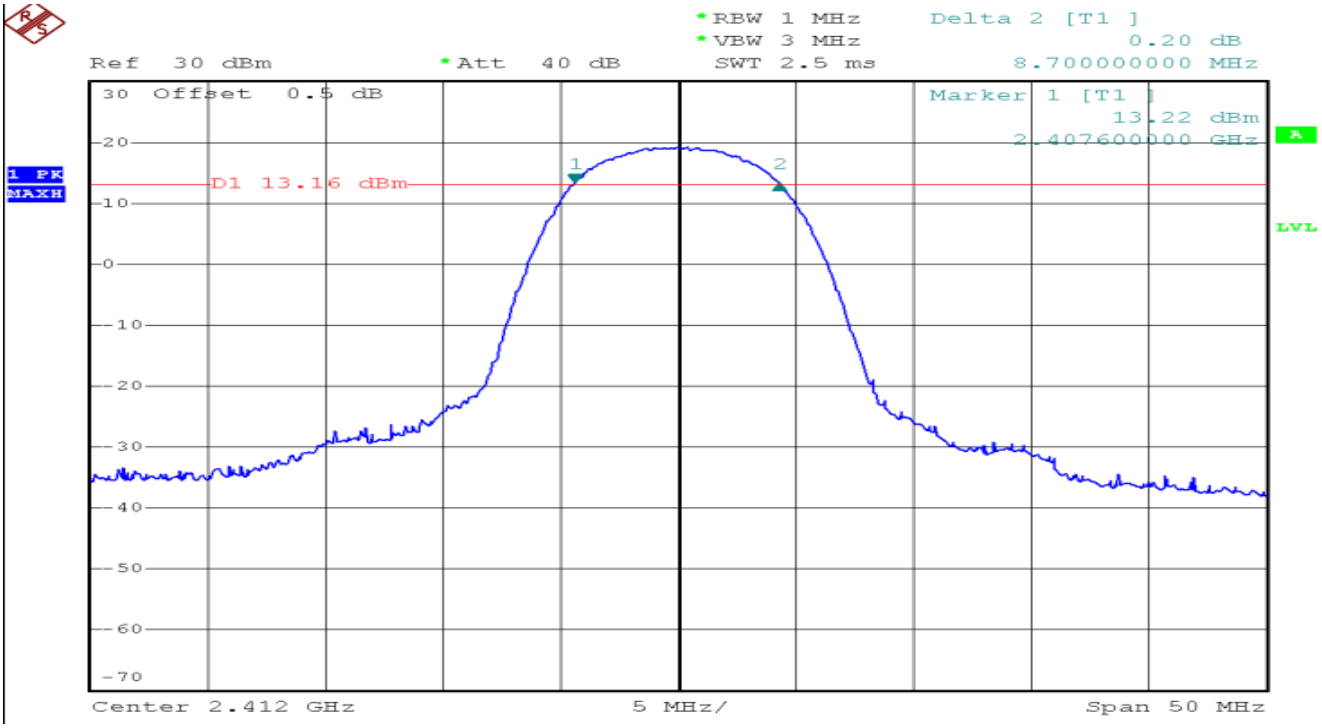
Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

6.5. Test Result and Data

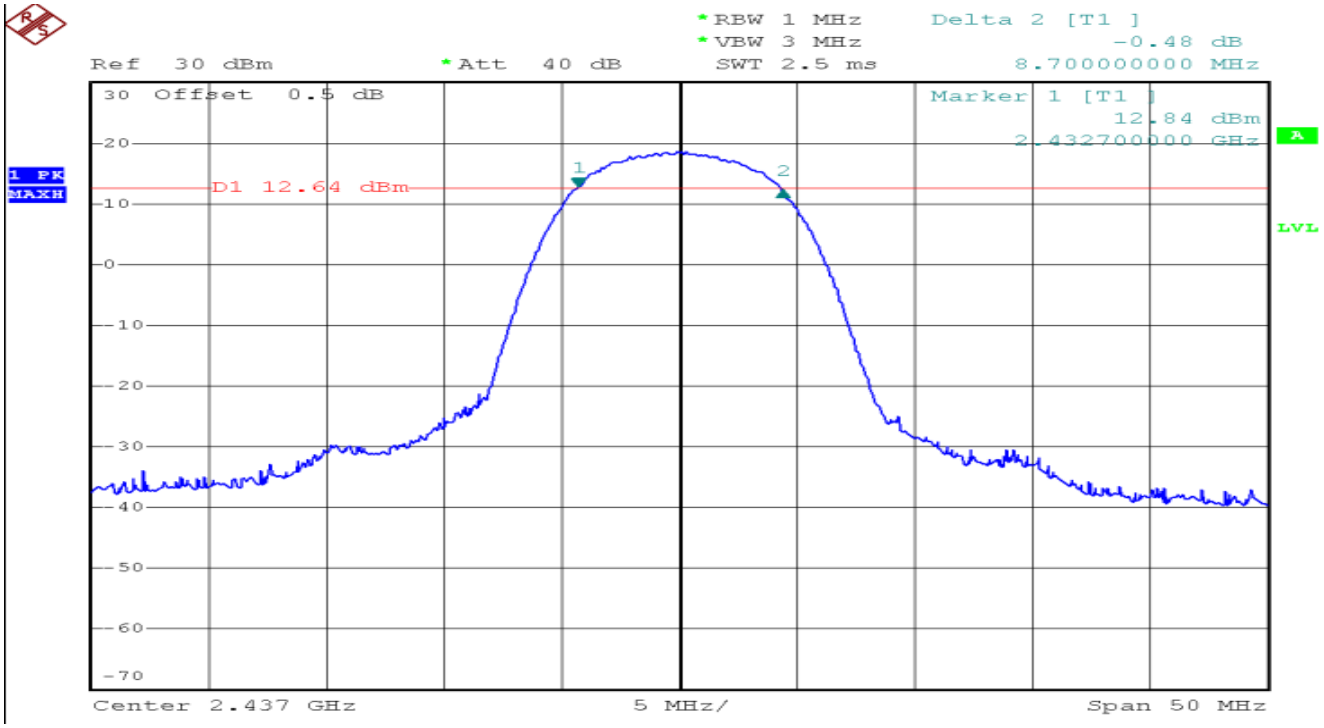
Test Item	Occupied Bandwidth
Test Mode	Transmit by 802.11b
Test Date	2012-8-31

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	8700	500	Pass
06	2437	8700	500	Pass
11	2462	8700	500	Pass

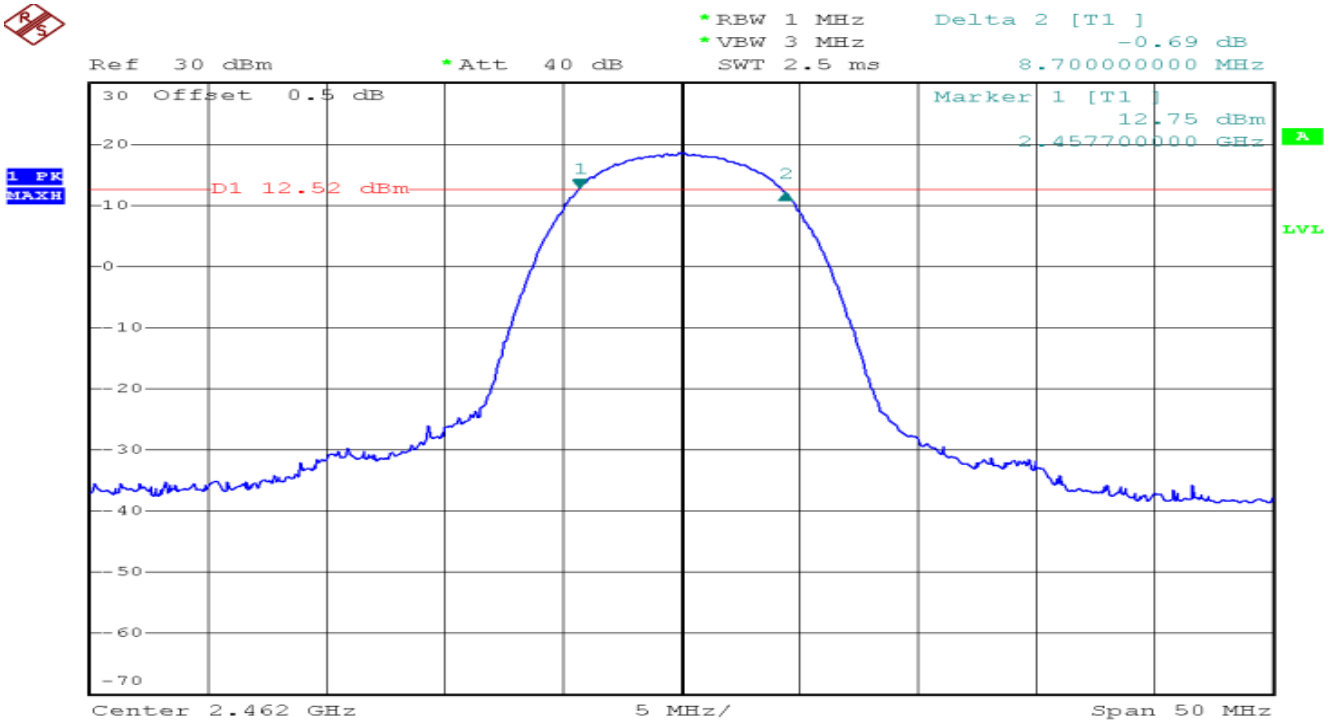
Channel 01 (2412MHz)



Channel 06 (2437MHz)



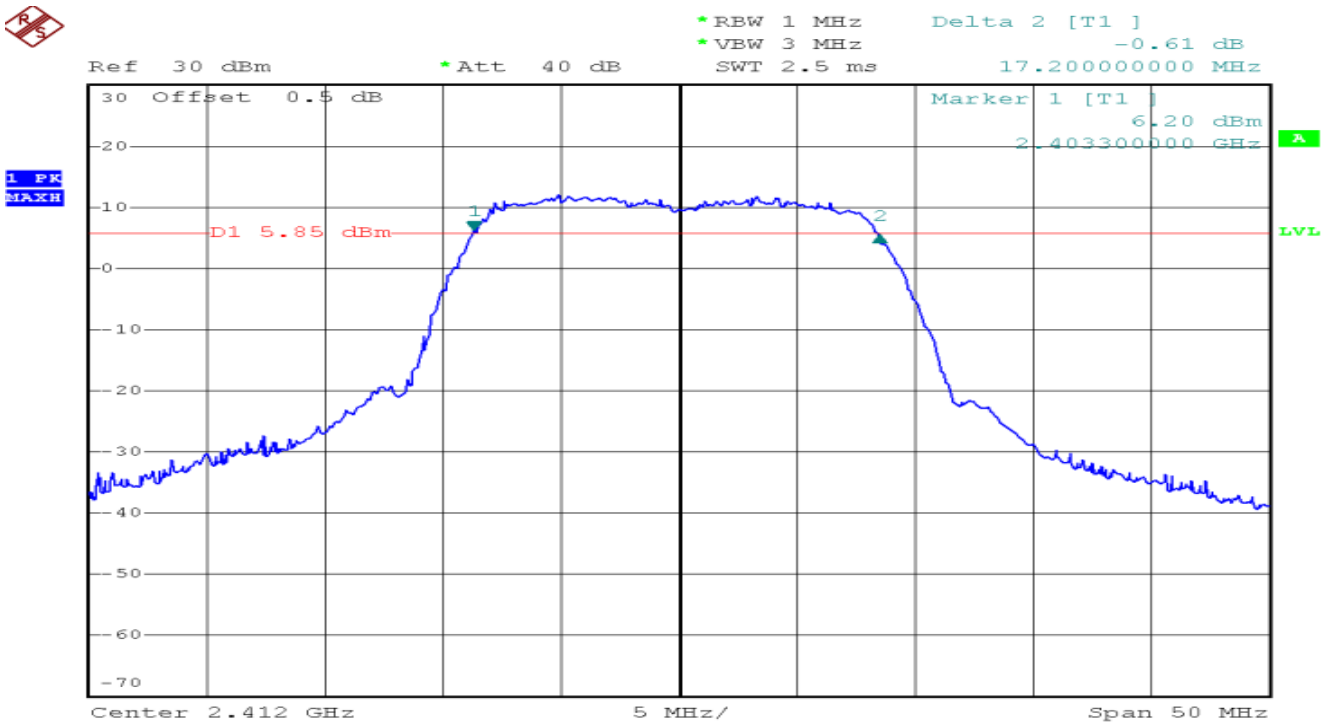
Channel11(2462MHz)



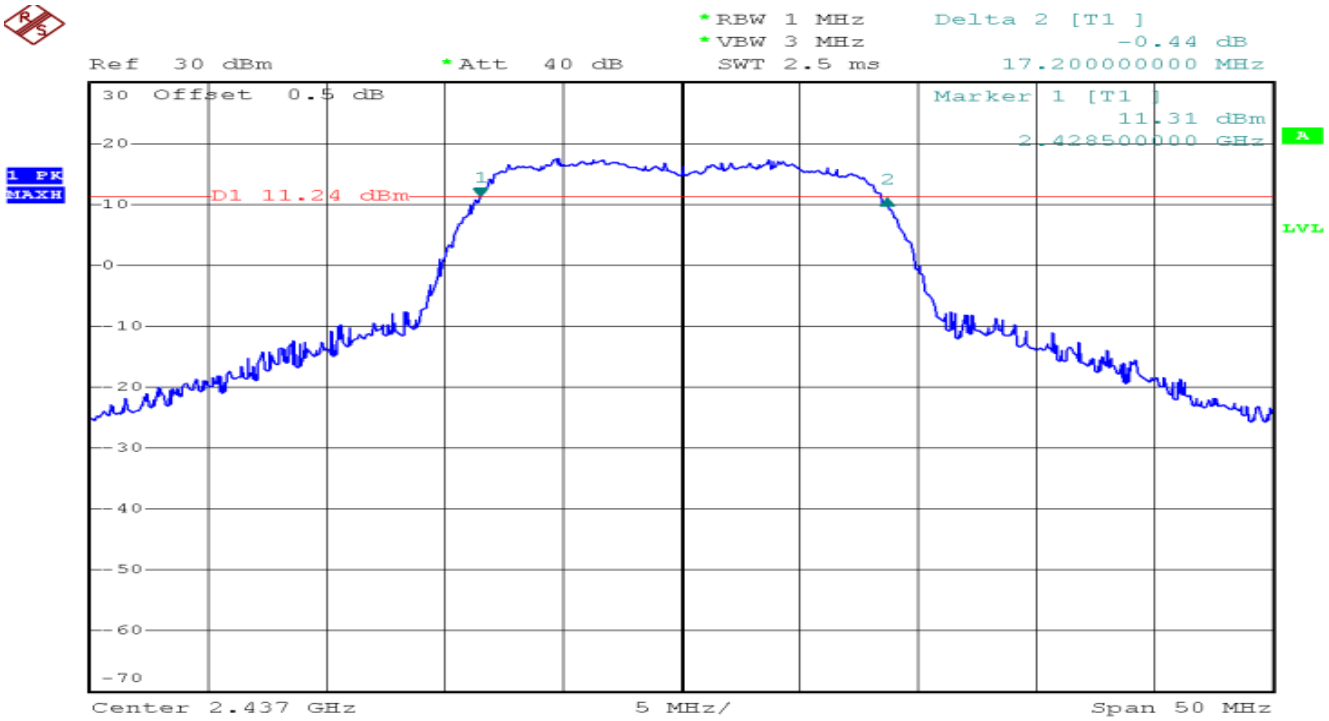
Test Item	Occupied Bandwidth
Test Mode	Transmit by 802.11g
Test Date	2012-8-31

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17200	500	Pass
06	2437	17200	500	Pass
11	2462	16900	500	Pass

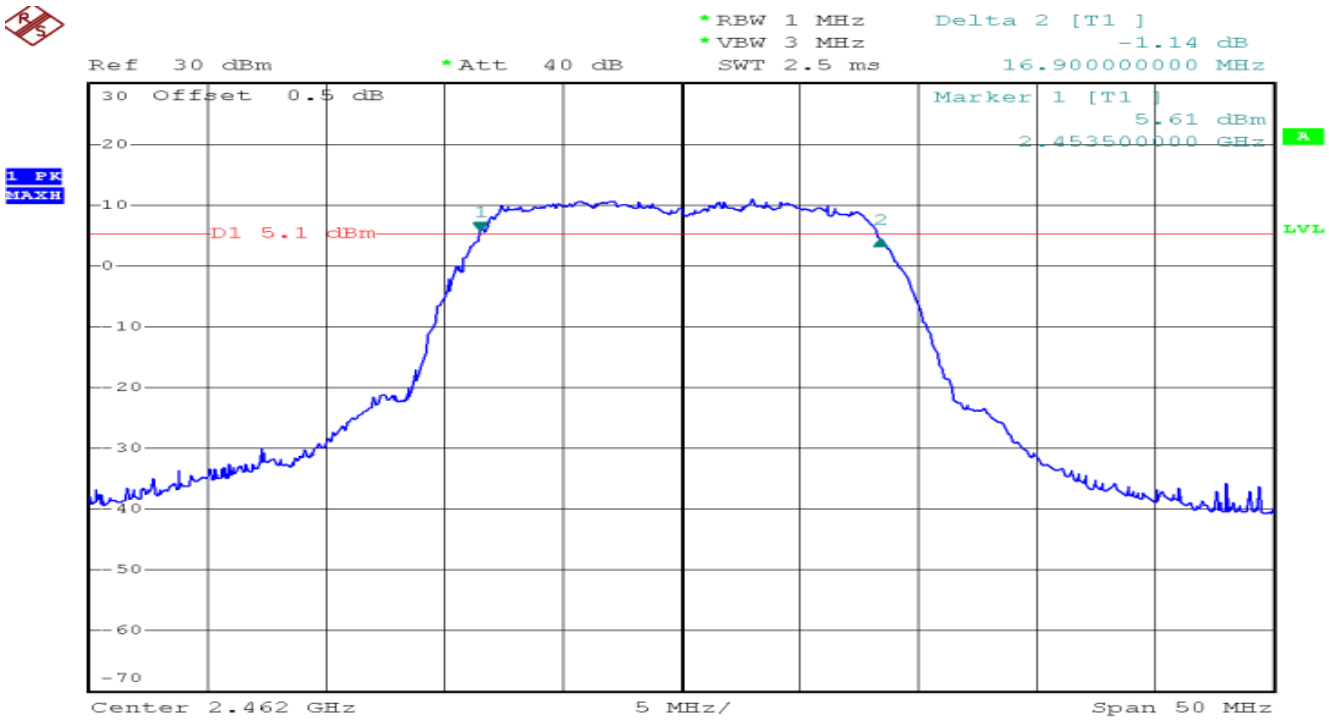
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

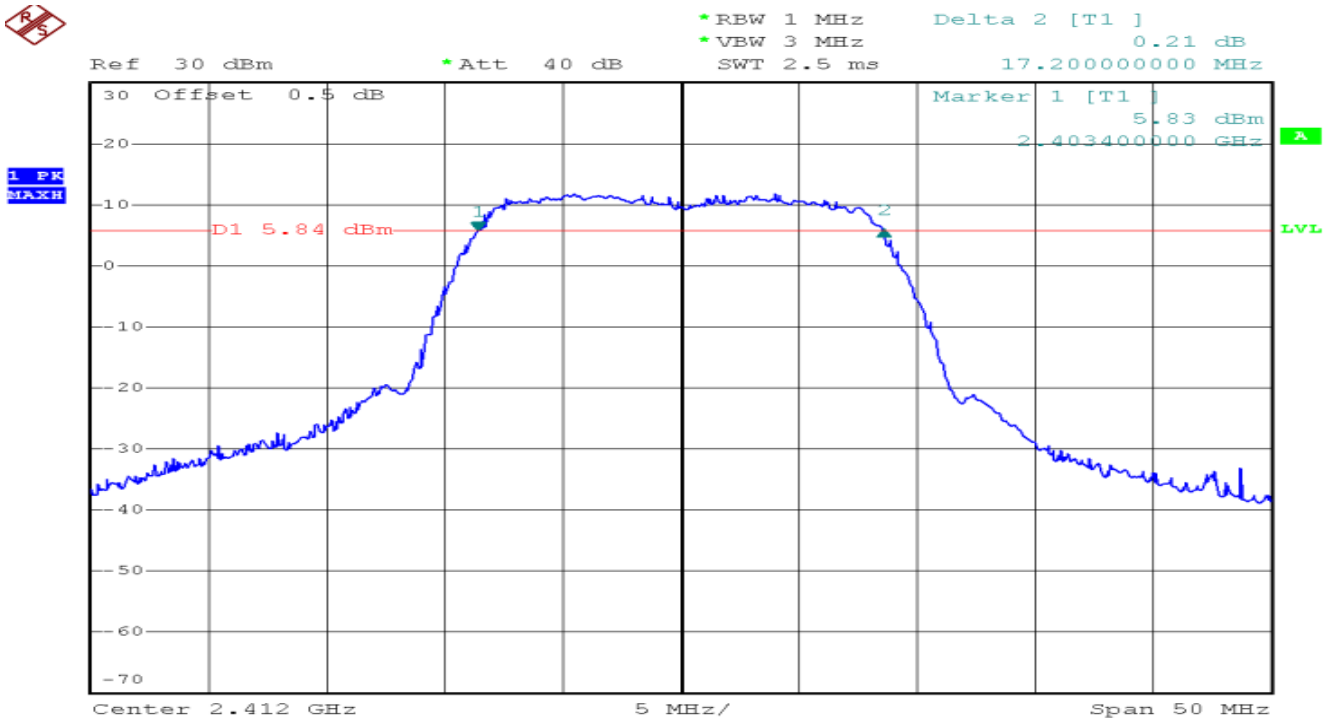


Test Item	Occupied Bandwidth
Test Mode	Transmit by 802.11n (20MHz)
Test Date	2012-8-31

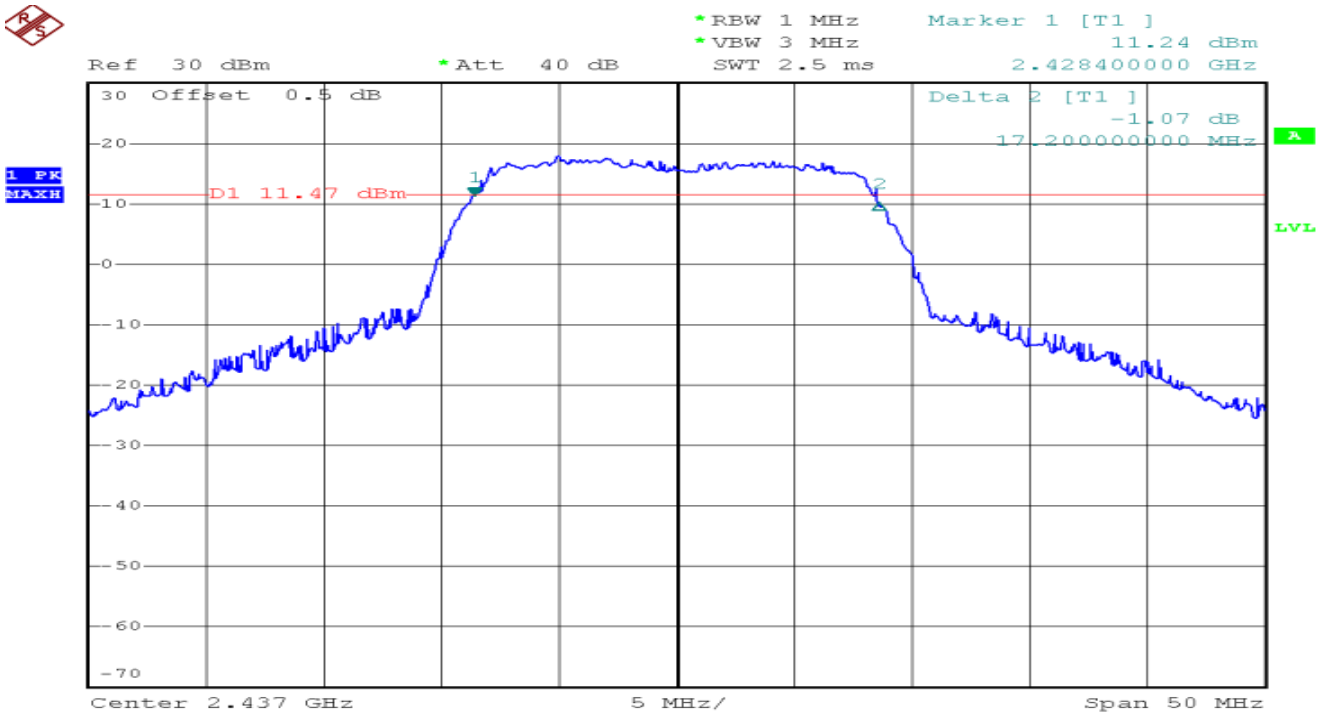
Chain 0

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17200	500	Pass
06	2437	17200	500	Pass
11	2462	17200	500	Pass

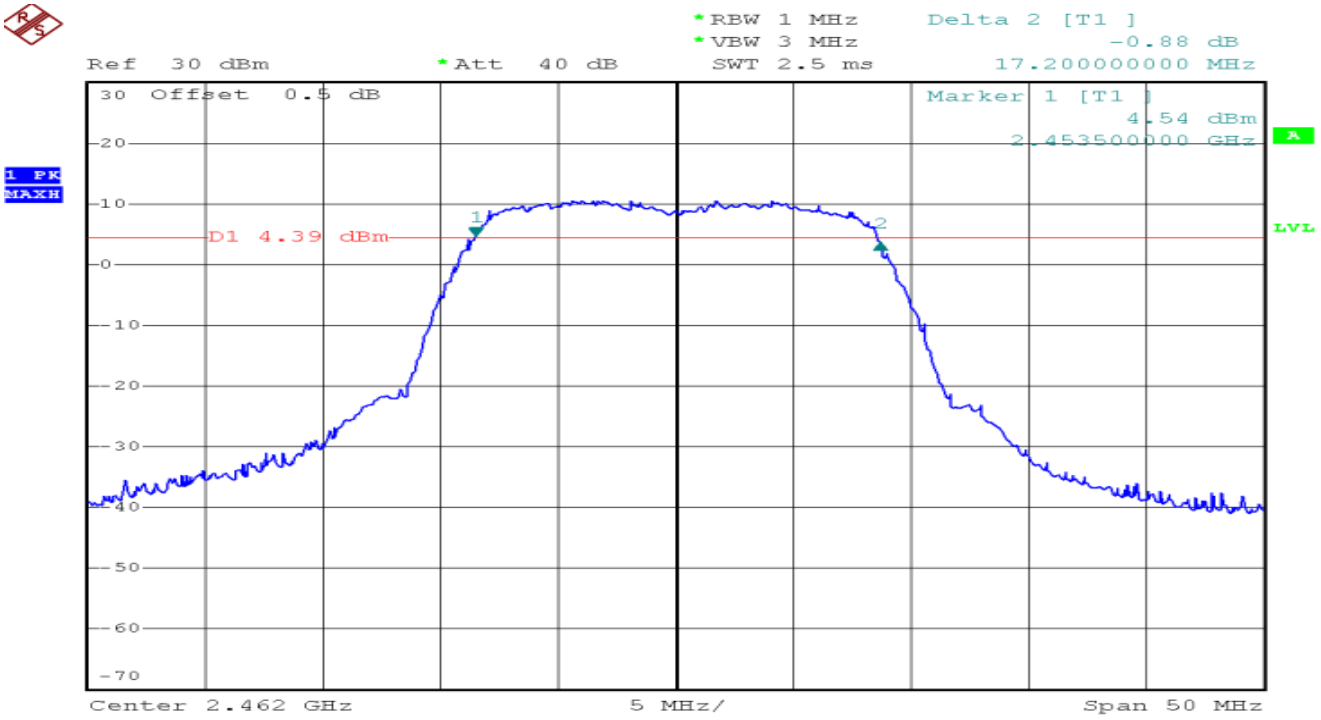
Channel 01 (2412MHz)



Channel 06 (2437MHz)



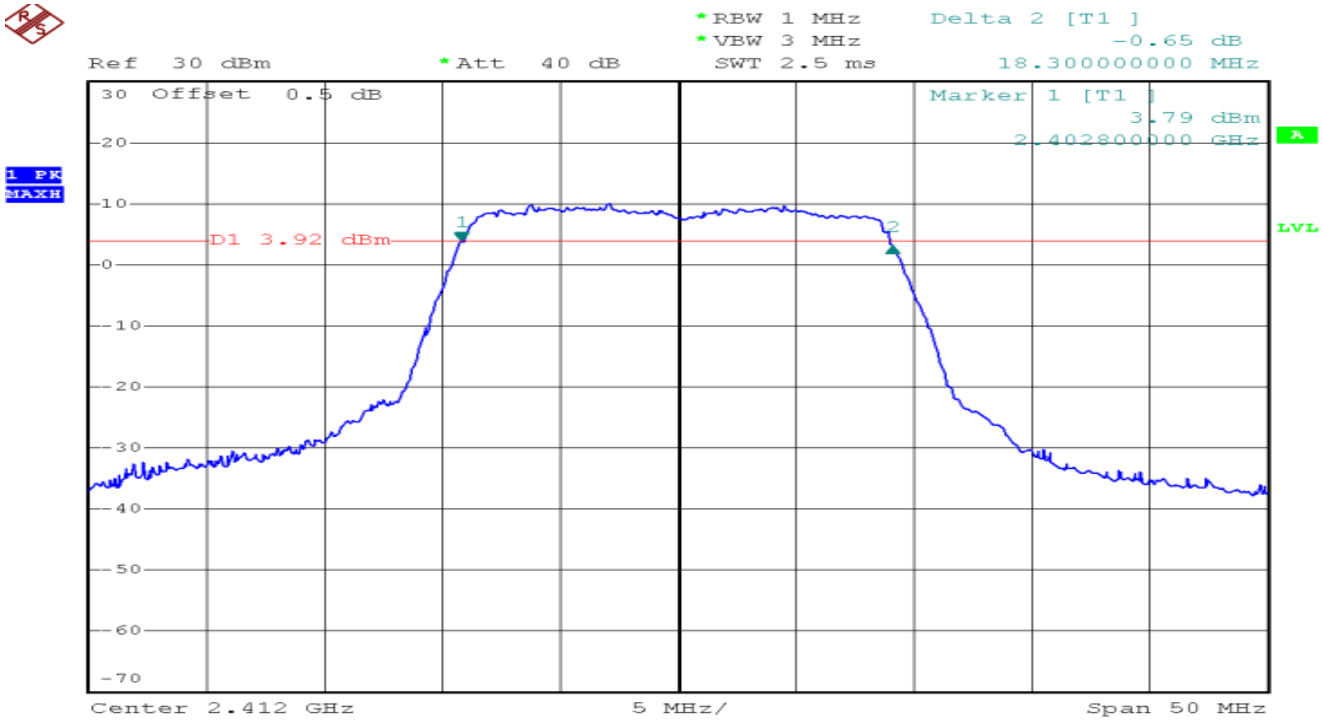
Channel 11 (2462MHz)



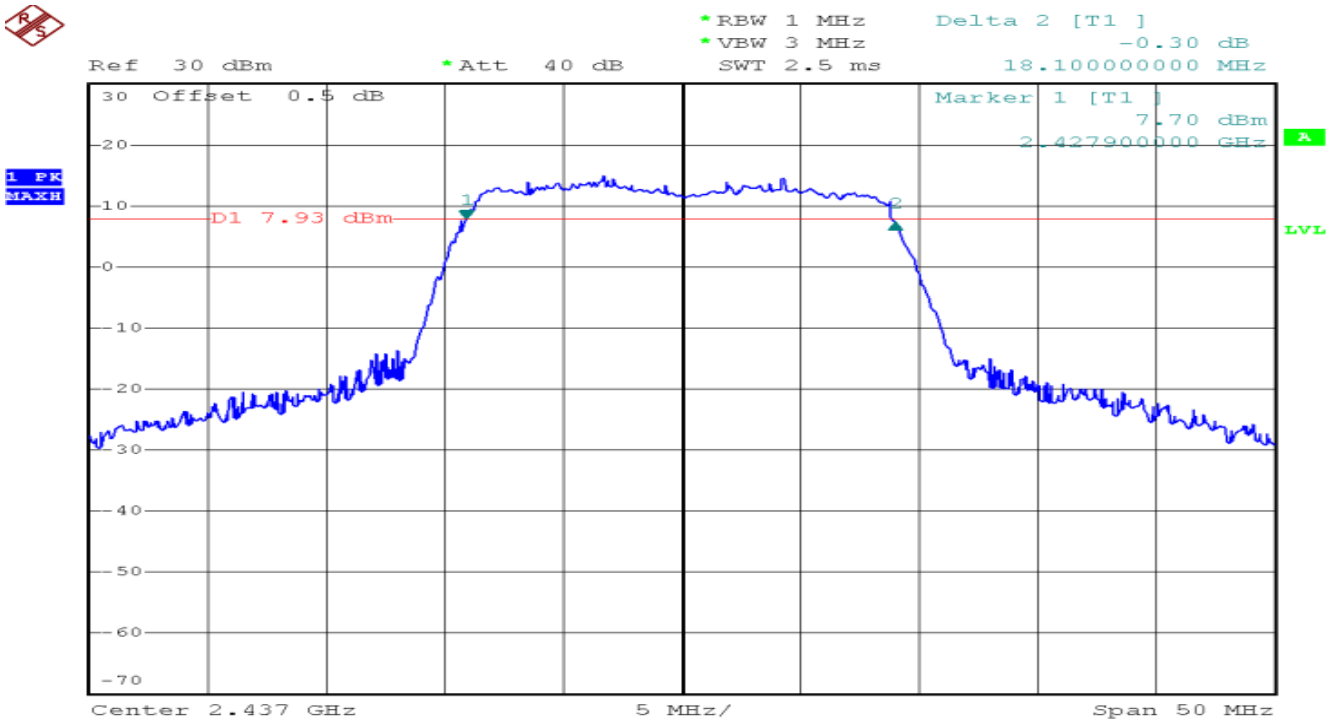
Chain 1

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17500	500	Pass
06	2437	17600	500	Pass
11	2462	17600	500	Pass

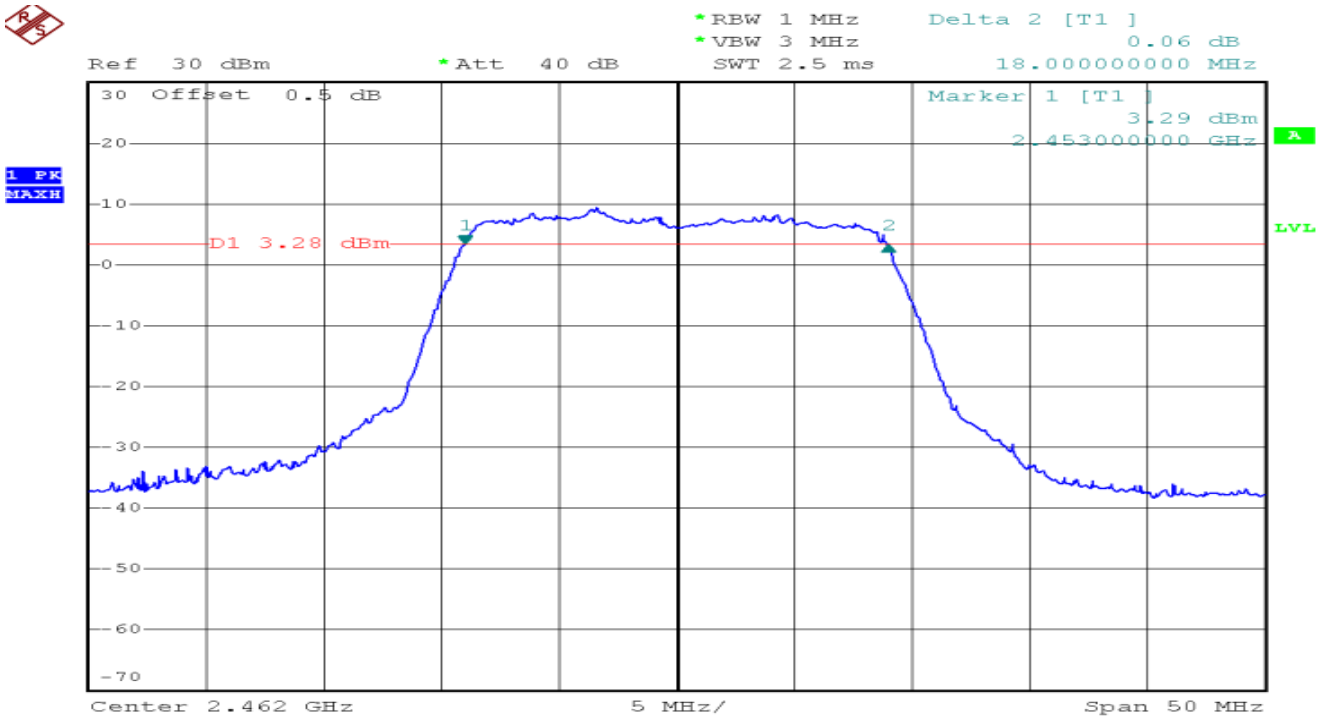
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

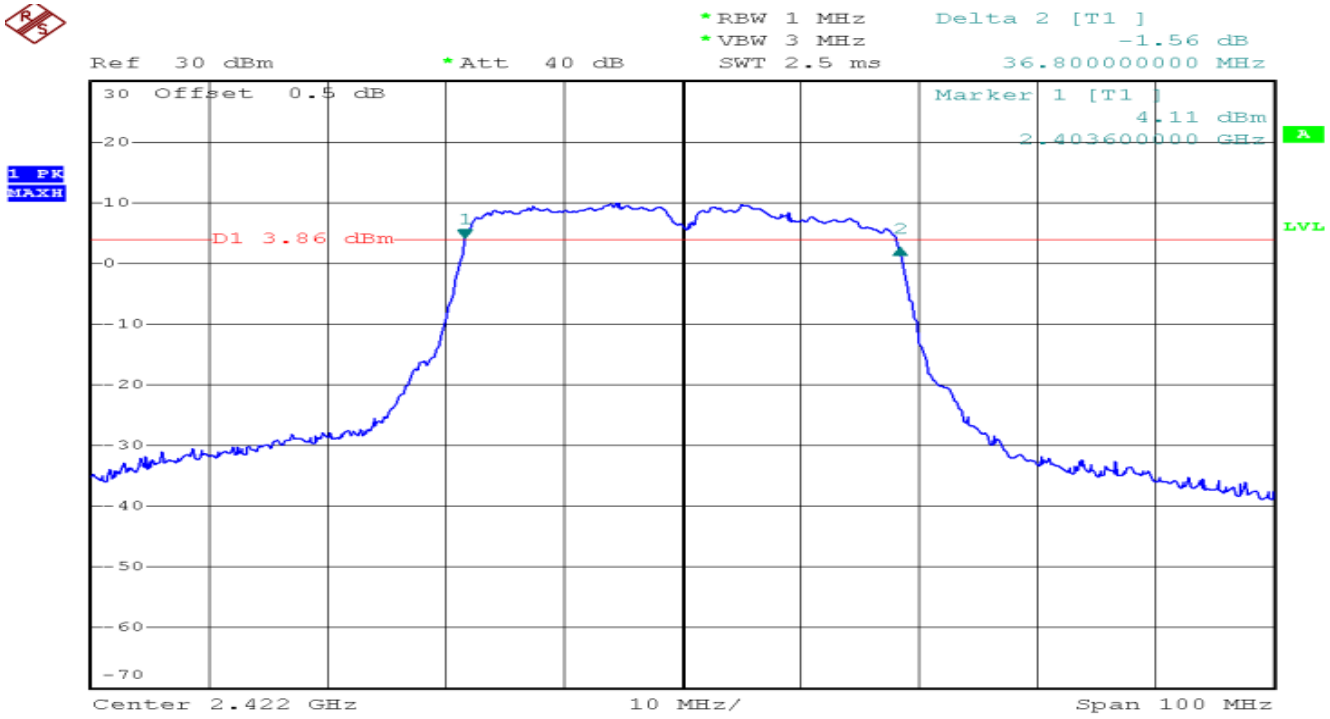


Test Item	Occupied Bandwidth
Test Mode	Transmit by 802.11n (40MHz)
Test Date	2012-8-31

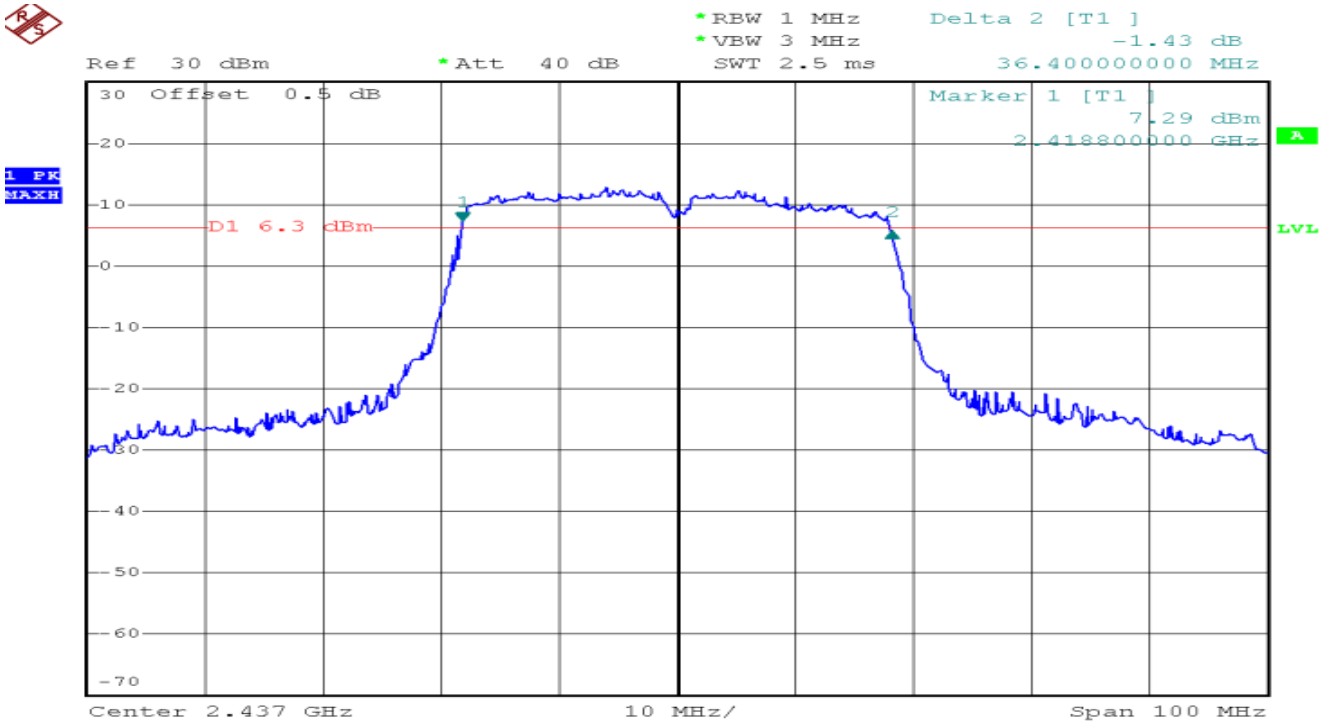
Chain 0

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	36800	500	Pass
06	2437	36400	500	Pass
09	2452	36400	500	Pass

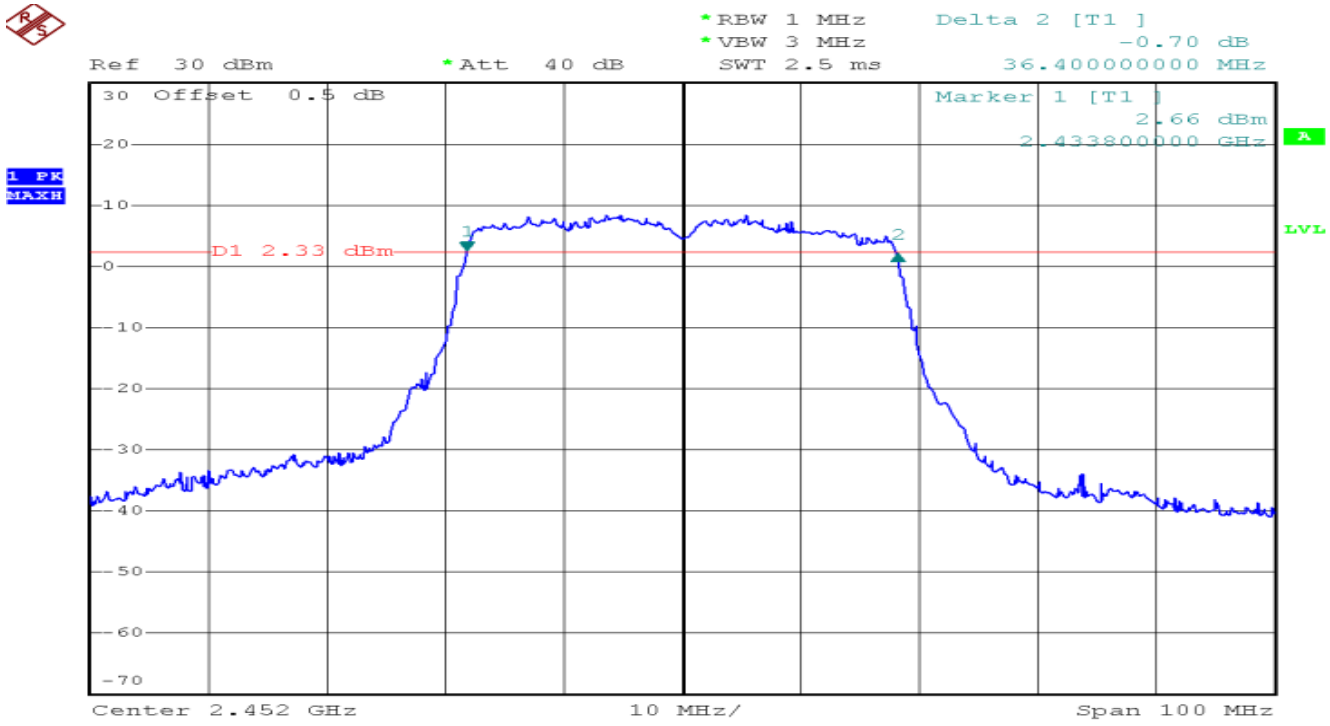
Channel 03 (2422MHz)



Channel 06 (2437MHz)



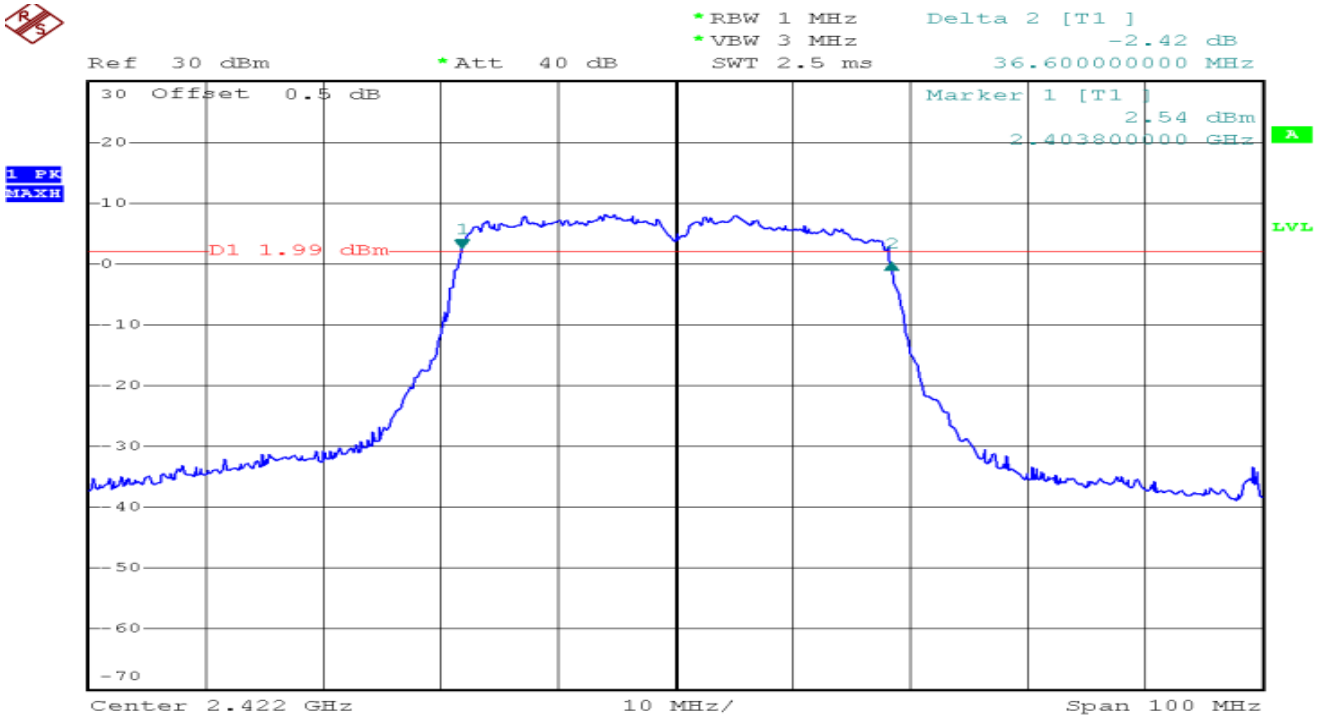
Channel 9 (2452MHz)



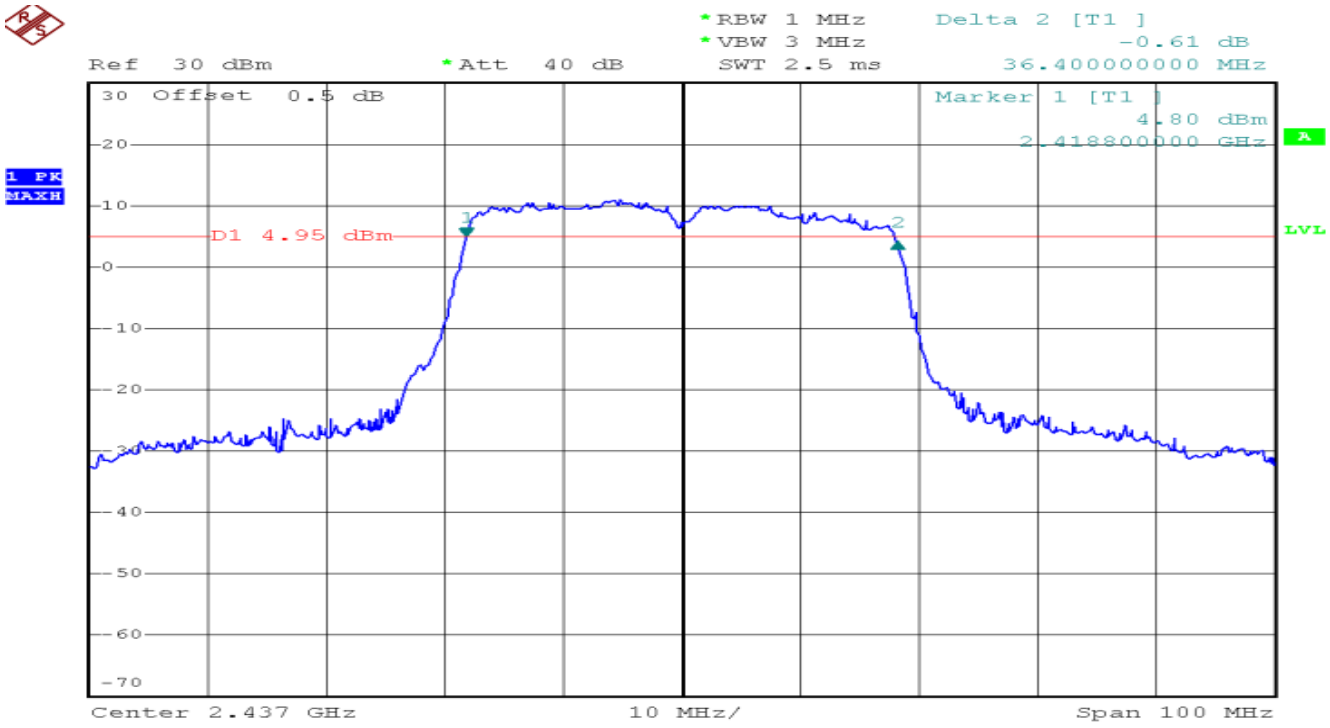
Chain 1

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	36600	500	Pass
06	2437	36400	500	Pass
09	2452	36200	500	Pass

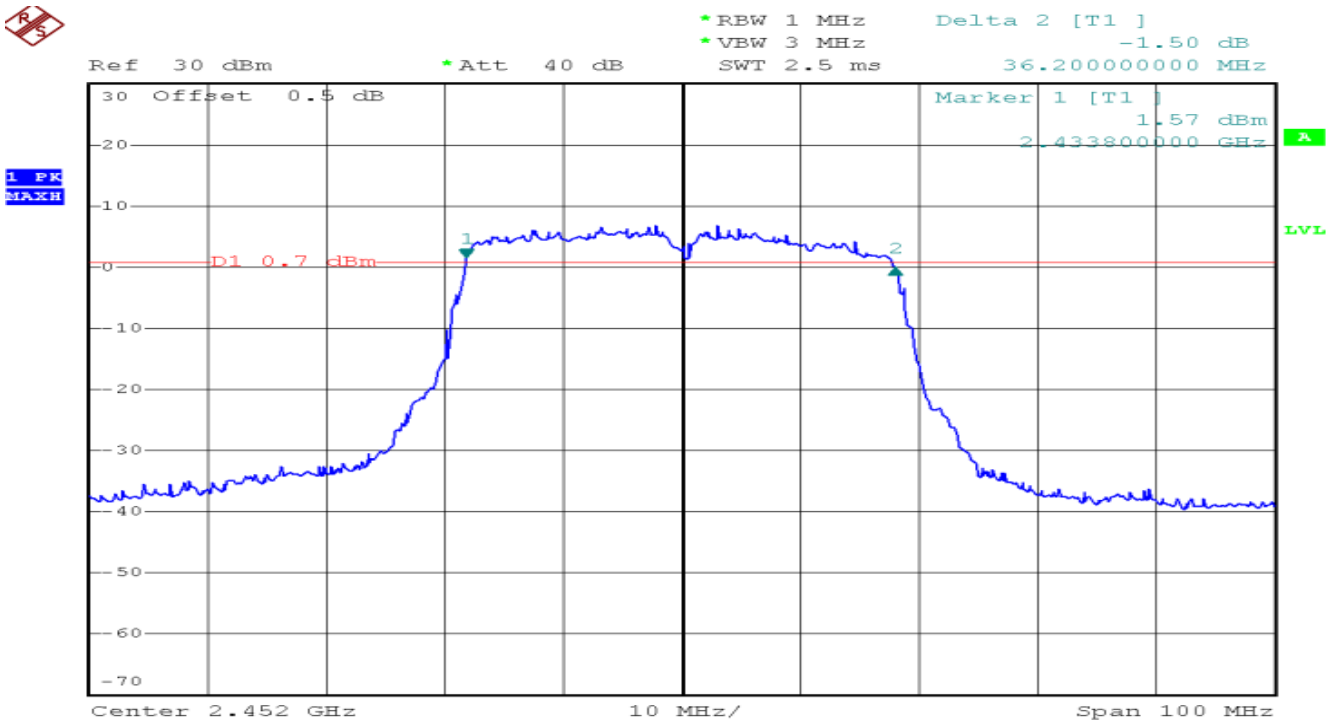
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 9 (2452MHz)



7. Maximum Peak Output Power

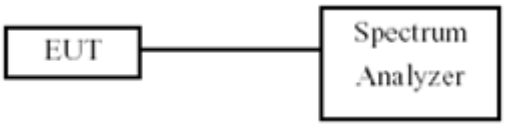
7.1. Test Limit

The maximum peak power shall be less 1Watt (30dBm).
The conducted output power limits specified in §15.247(b) are based on the use of transmit antennae with directional gains that do not exceed 6 dBi. If transmit antennae with an effective directional gain greater than 6 dBi are used, then the conducted output power from the EUT shall be reduced as specified in §15.247(b) and (c).

7.2. Test Procedure

a. The transmitter output was connected to the spectrum analyzer.
b. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
c. Set detector mode to peak (for peak output power) or set detector mode to RMS (for average output power).
d. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges.
e. The maximum peak and average output power was measured and recorded.

7.3. Test Setup Layout



7.4. Measurement Equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

7.5. Test Result and Data

Test Item	Maximum Peak Output Power
Test Mode	Transmit by 802.11b
Duty cycle	99%
Test Date	2012-8-31

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
01	2412	26.84	22.78	30	Pass
06	2437	26.04	21.81	30	Pass
11	2462	25.61	21.54	30	Pass

Test Item	Maximum Peak Output Power
Test Mode	Transmit by 802.11g
Duty cycle	99%
Test Date	2012-8-31

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
01	2412	21.78	15.77	30	Pass
06	2437	26.71	21.23	30	Pass
11	2462	21.21	14.80	30	Pass

Test Item	Maximum Peak Output Power
Test Mode	Transmit by 802.11n (20MHz)
Duty cycle	99%
Test Date	2012-8-31

Chain 0

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
01	2412	21.60	15.58	30	Pass
06	2437	26.21	21.25	30	Pass
11	2462	16.24	14.99	30	Pass

Chain 1

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
01	2412	19.81	14.04	30	Pass
06	2437	24.32	18.01	30	Pass
11	2462	18.32	12.27	30	Pass

Chain 0+ Chain 1

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)*	Result
		Peak	Average		
01	2412	23.81	17.89	29.99	Pass
06	2437	28.38	22.94	29.99	Pass
11	2462	20.65	16.85	29.99	Pass

Note: Measurement Level=10*LOG10(10^(Chain 0/10)+10^(Chain 1/10))

*: Required Limit=30-(6.01-6)=29.99

Test Item	Maximum Peak Output Power
Test Mode	Transmit by 802.11n (40MHz)
Duty cycle	99%
Test Date	2012-8-31

Chain 0

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
03	2422	18.04	12.20	30	Pass
06	2437	17.50	11.66	30	Pass
09	2452	17.12	11.30	30	Pass

Chain 1

Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)	Result
		Peak	Average		
03	2422	17.20	11.28	30	Pass
06	2437	16.89	10.77	30	Pass
09	2452	15.77	10.00	30	Pass

Chain 0+ Chain 1

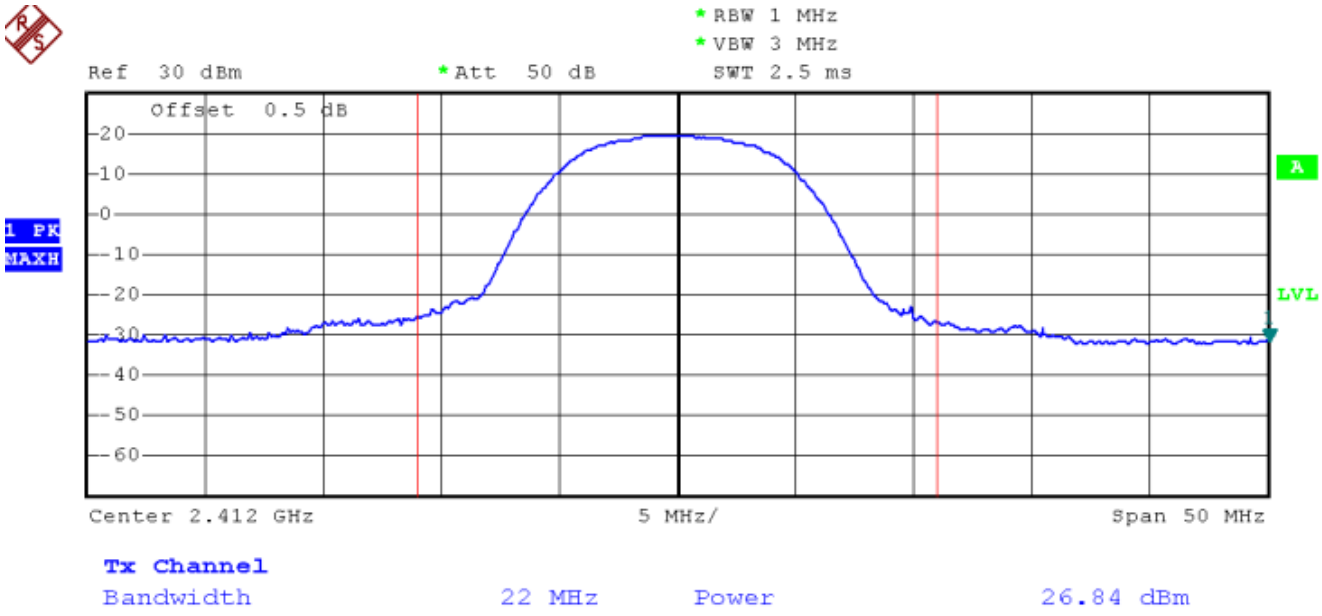
Channel No.	Frequency (MHz)	Measurement (dBm)		Required Limit (dBm)*	Result
		Peak	Average		
03	2422	20.65	14.77	29.99	Pass
06	2437	20.22	14.25	29.99	Pass
09	2452	19.51	13.71	29.99	Pass

Note: Measurement Level=10*LOG10(10^(Chain 0/10)+10^(Chain 1/10))

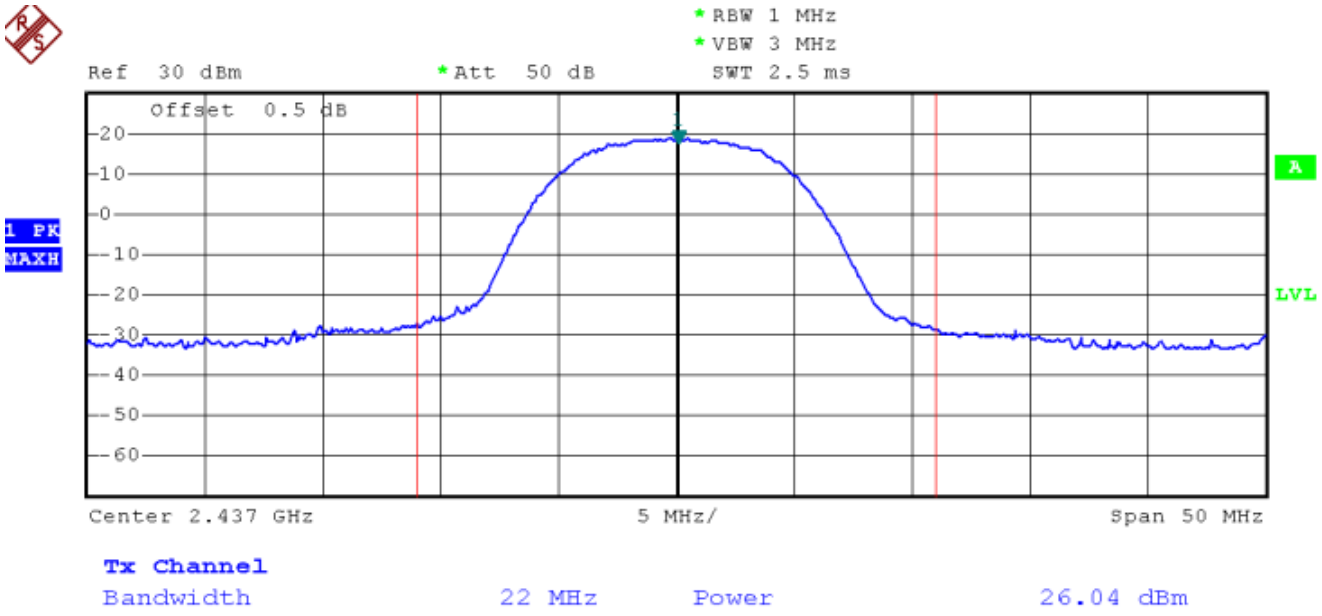
*: Required Limit=30-(6.01-6)=29.99

Peak:

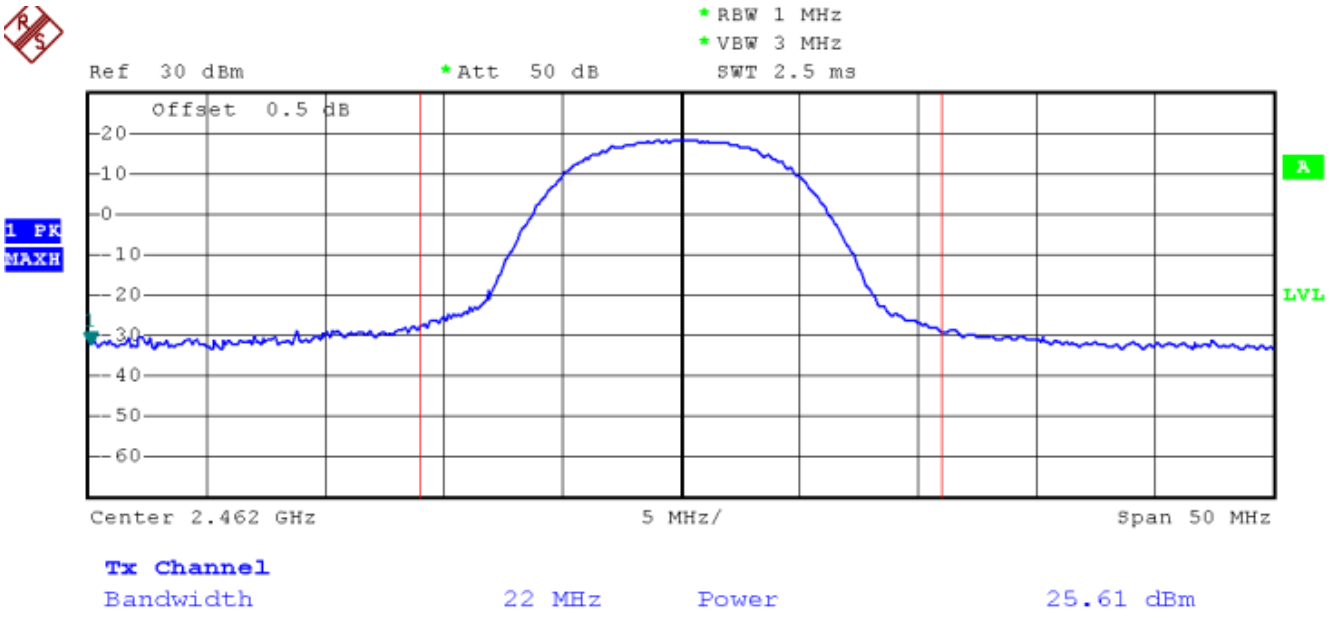
Transmit by 802.11b Channel 1



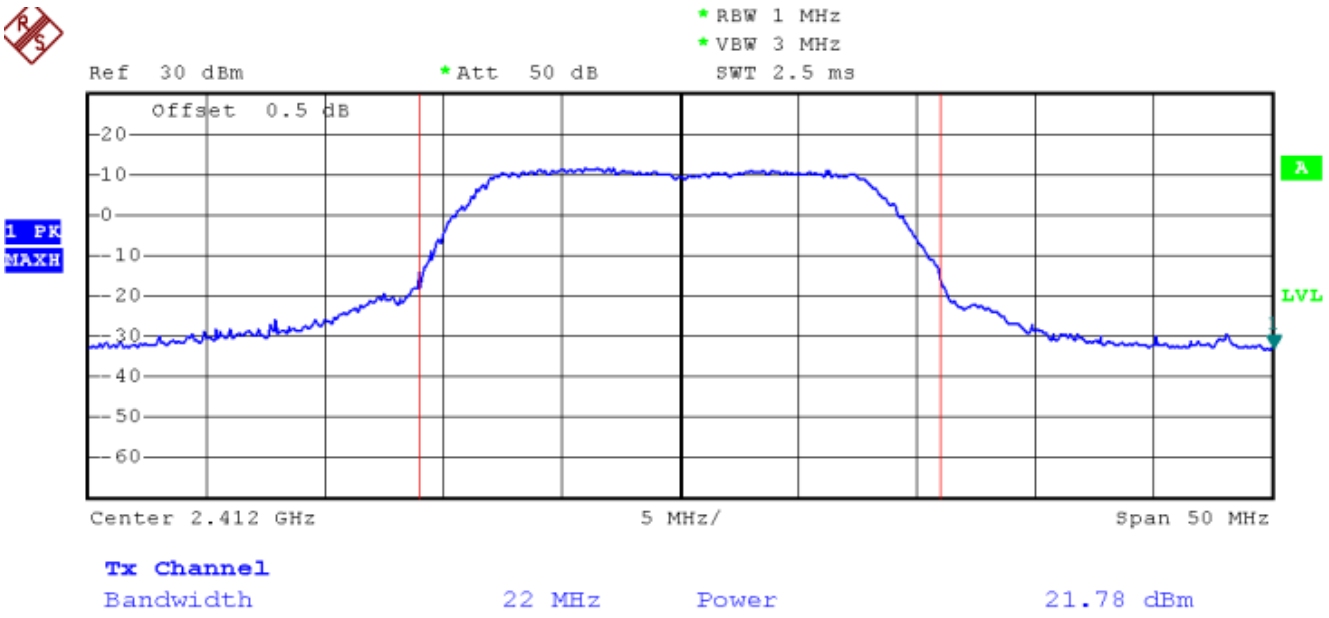
Transmit by 802.11b Channel 6



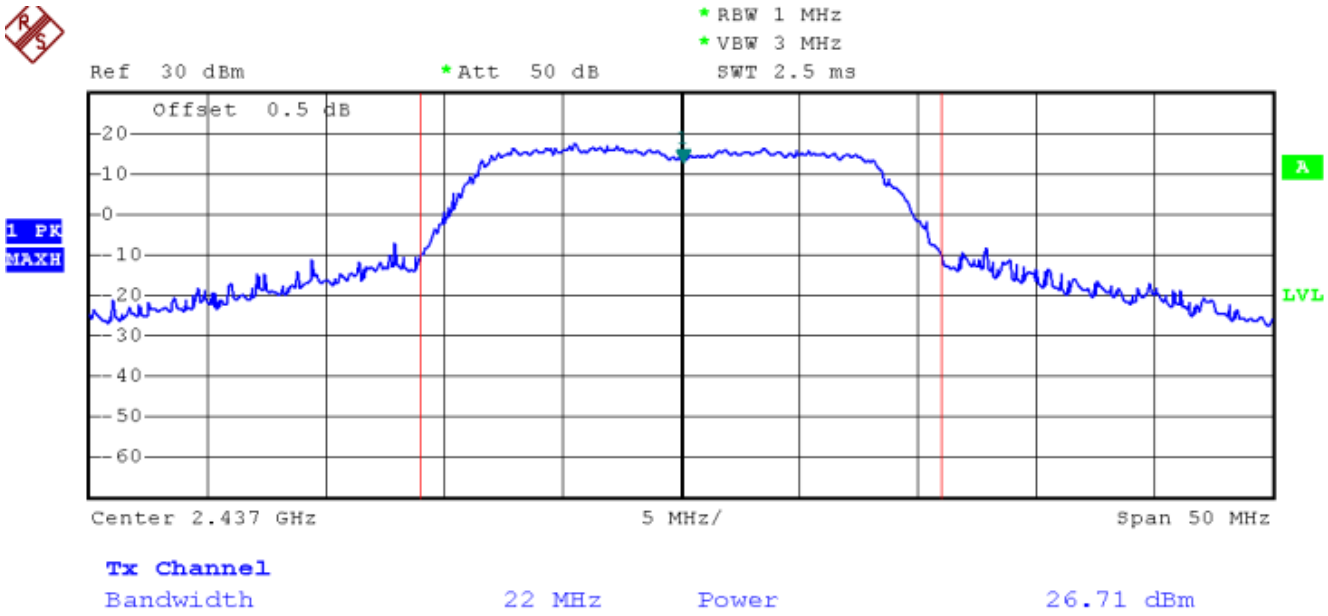
Transmit by 802.11b Channel 11



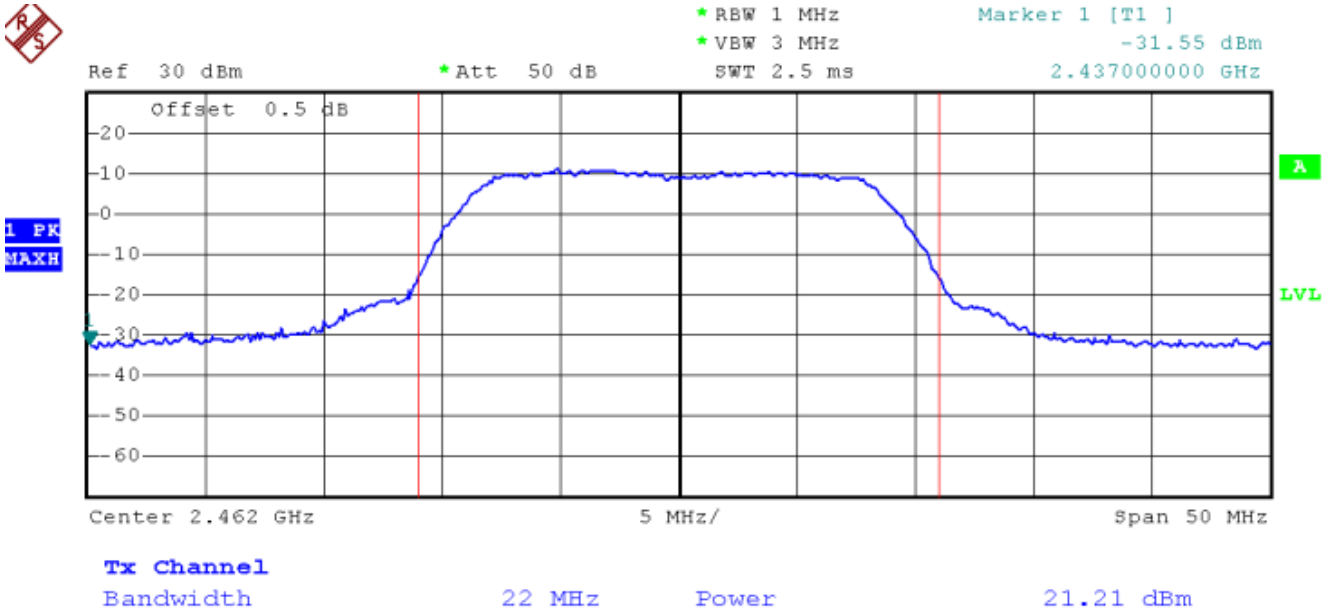
Transmit by 802.11g Channel 1



Transmit by 802.11g Channel 6

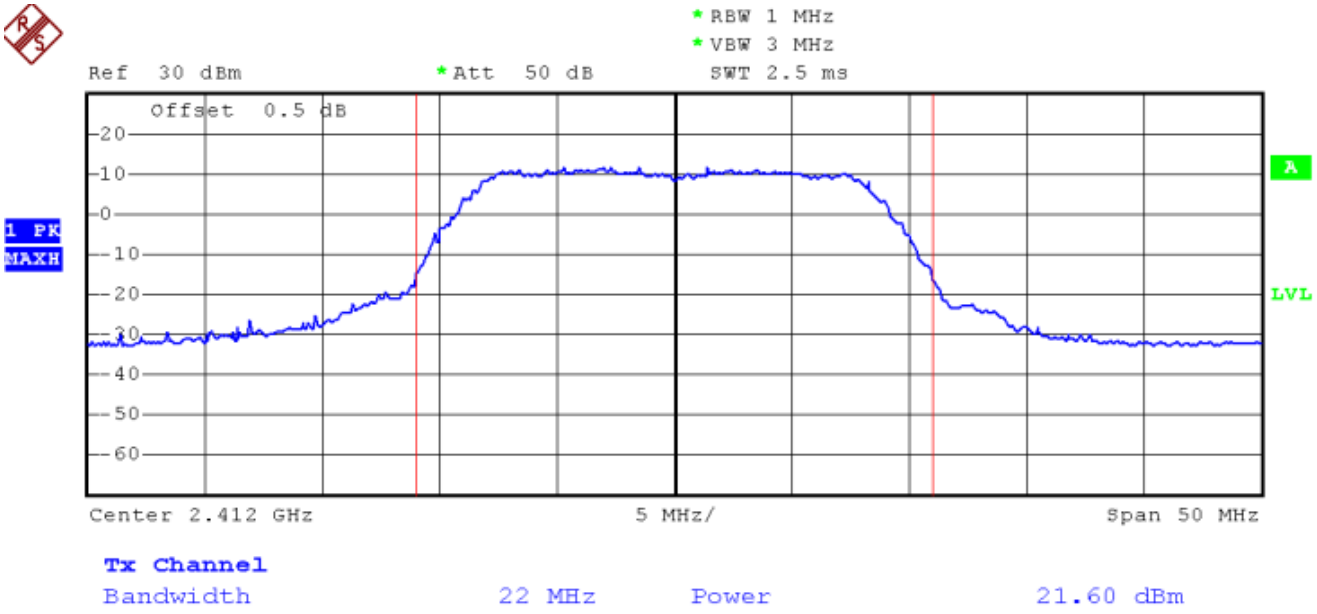


Transmit by 802.11g Channel 11



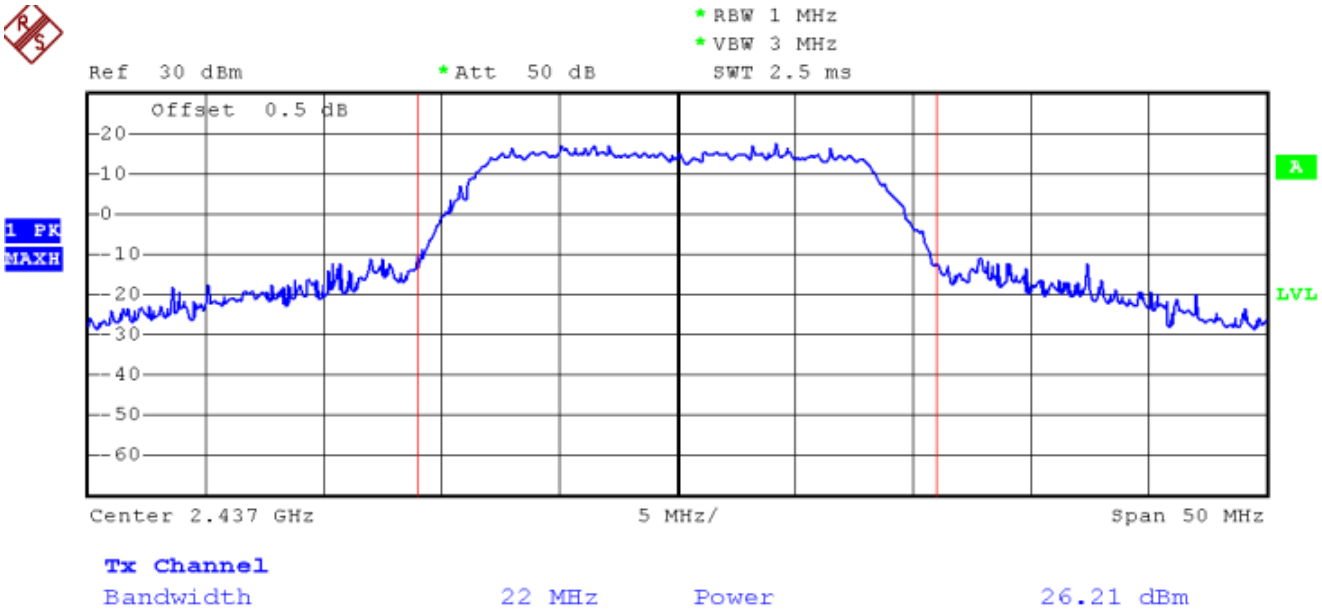
Transmit by 802.11n HT20 Channel 1

Chain 0



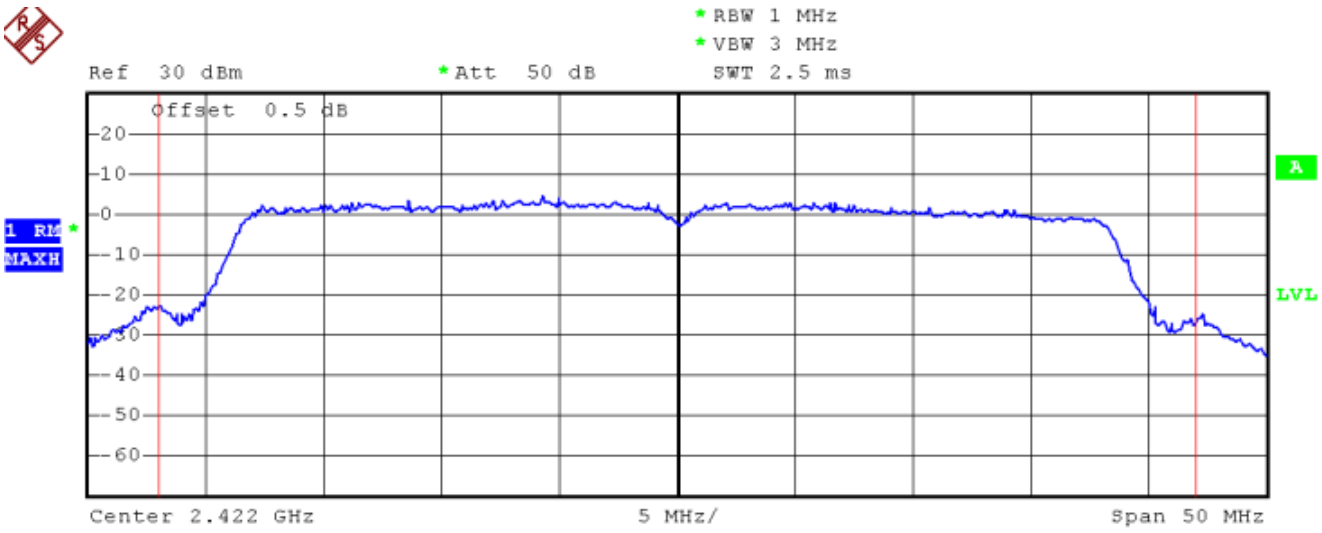
Transmit by 802.11n HT20 Channel 6

Chain 0



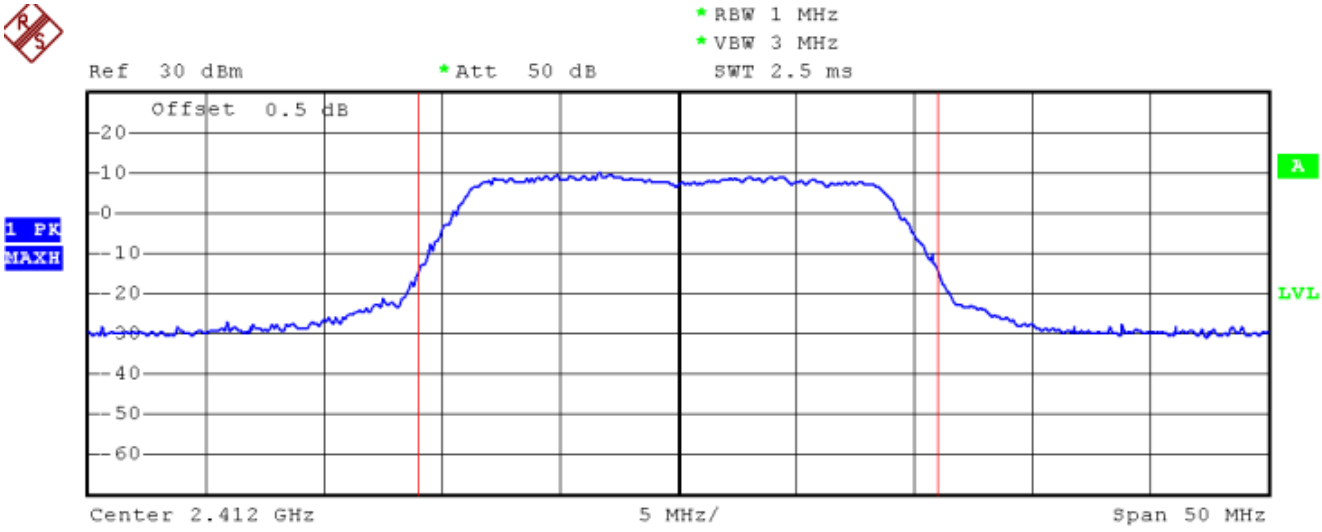
Transmit by 802.11n HT20 Channel 11

Chain 0



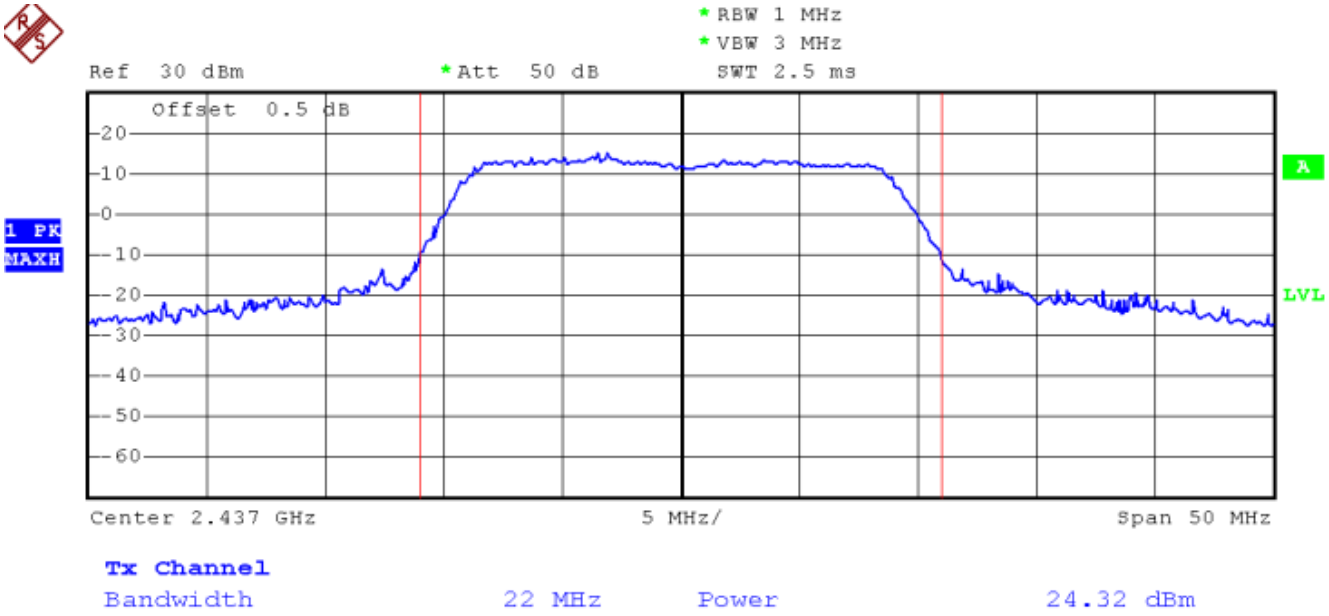
Transmit by 802.11n HT20 Channel 1

Chain 1



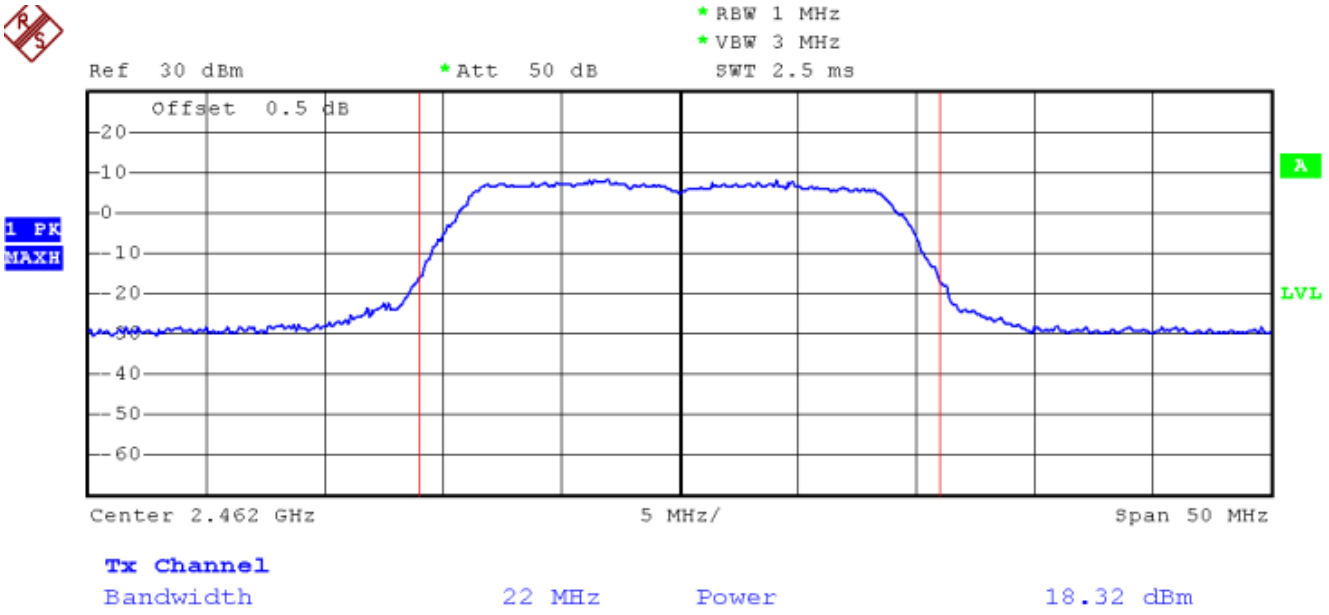
Transmit by 802.11n HT20 Channel 6

Chain 1



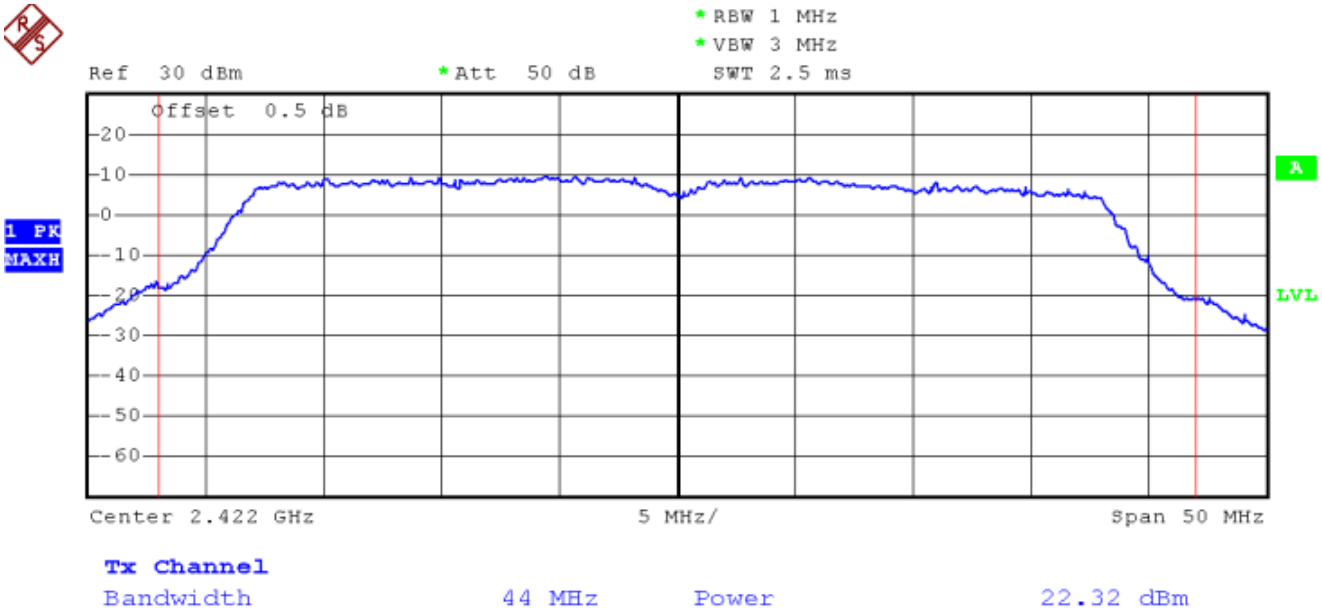
Transmit by 802.11n HT20 Channel 11

Chain 1



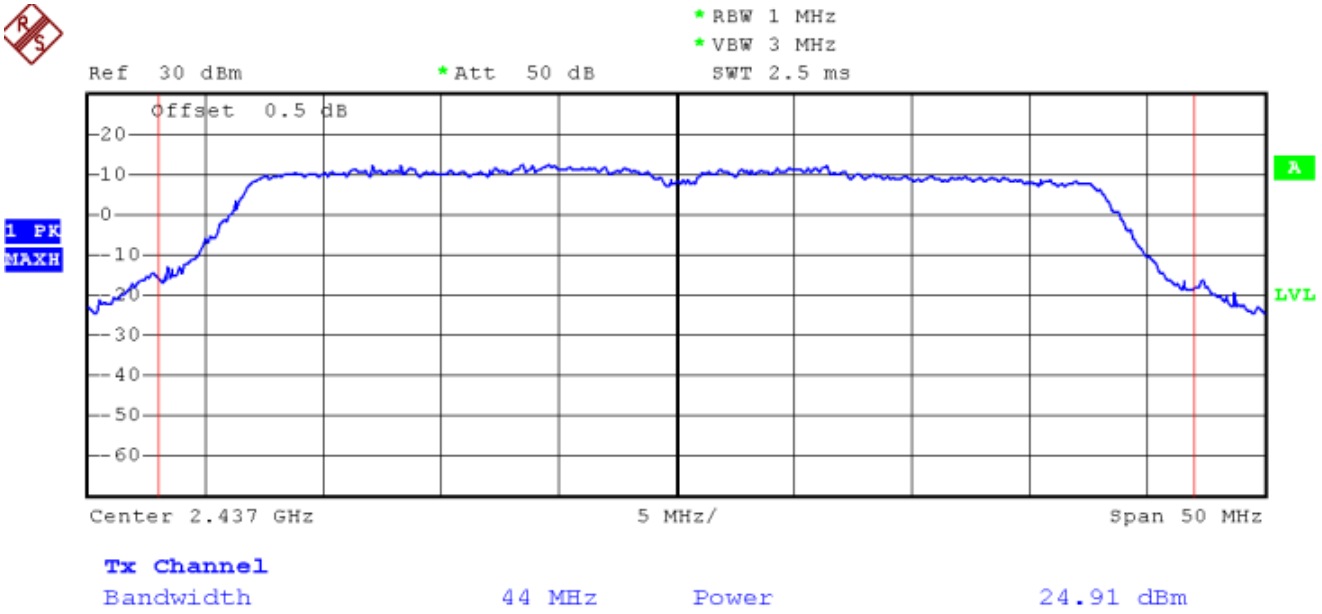
Transmit by 802.11n HT40 Channel 3

Chain 0



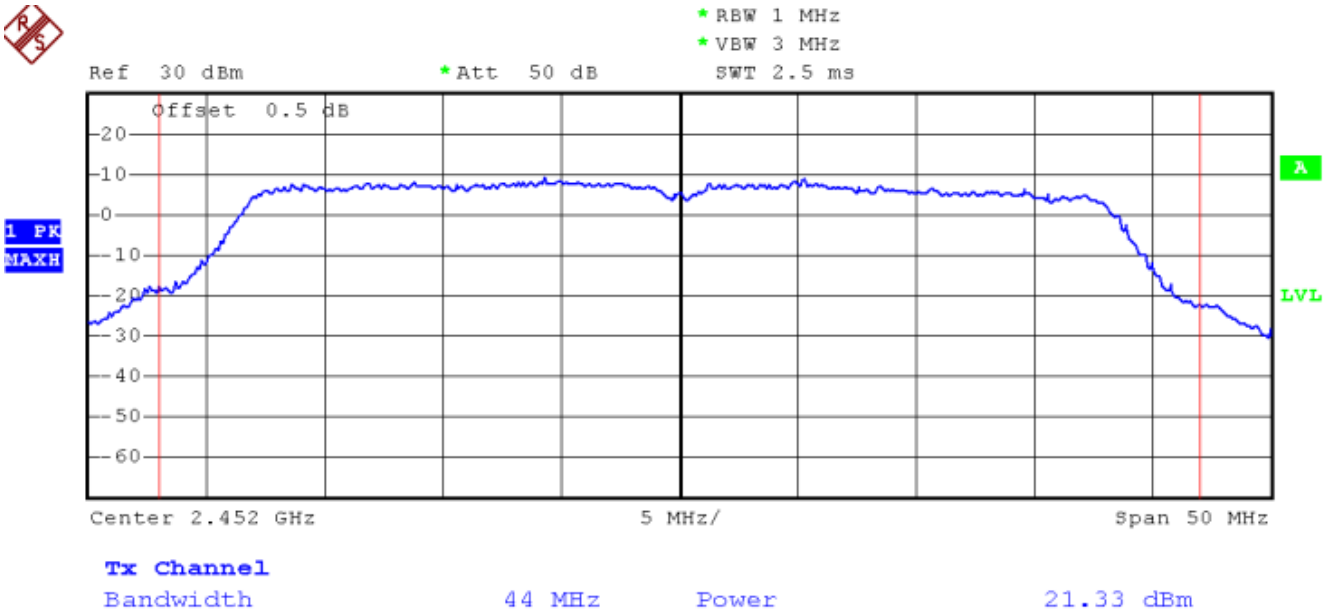
Transmit by 802.11n HT40 Channel 6

Chain 0



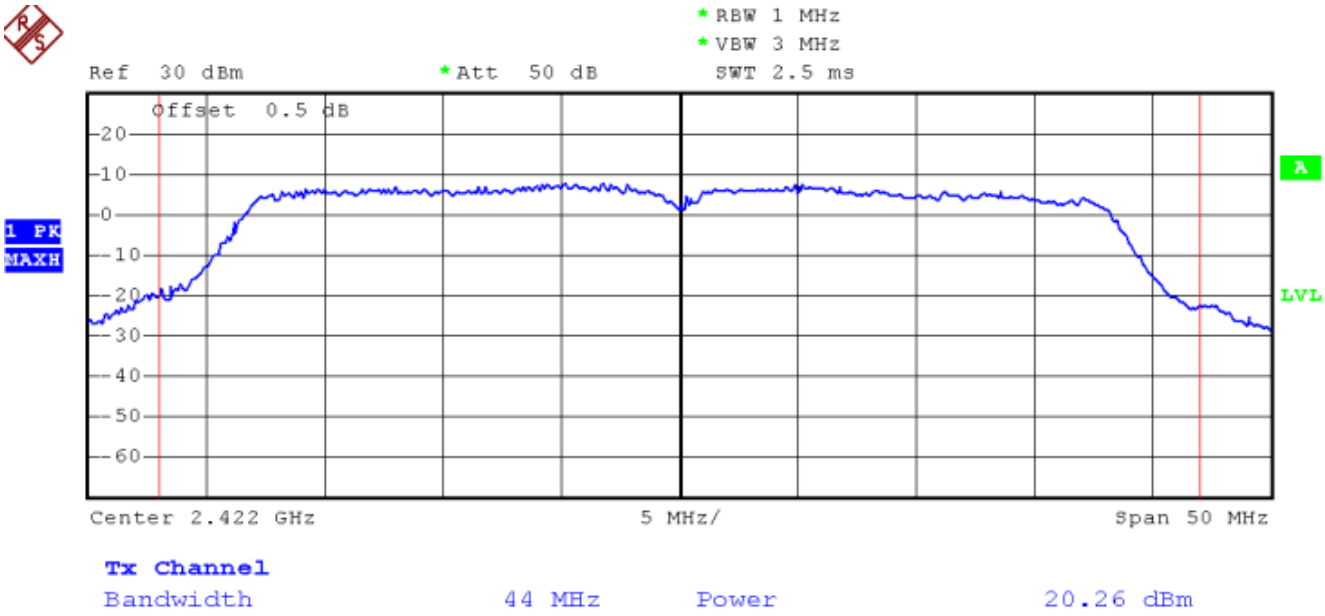
Transmit by 802.11n HT40 Channel 9

Chain 0



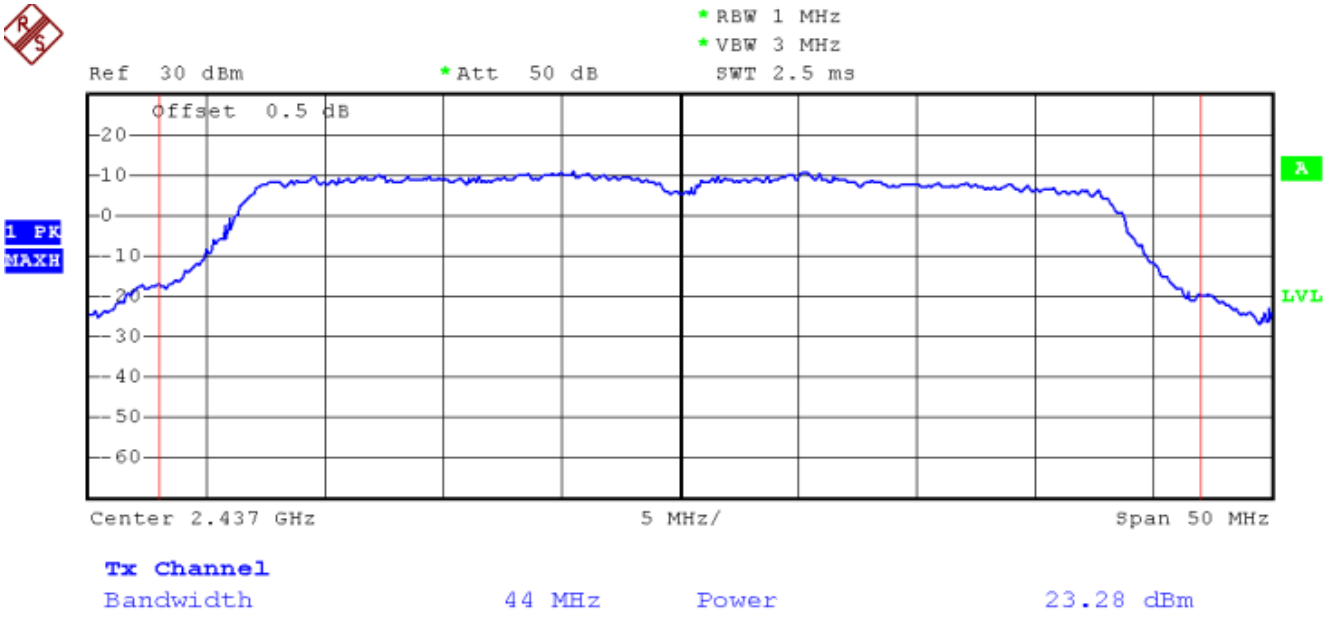
Transmit by 802.11n HT40 Channel 3

Chain 1



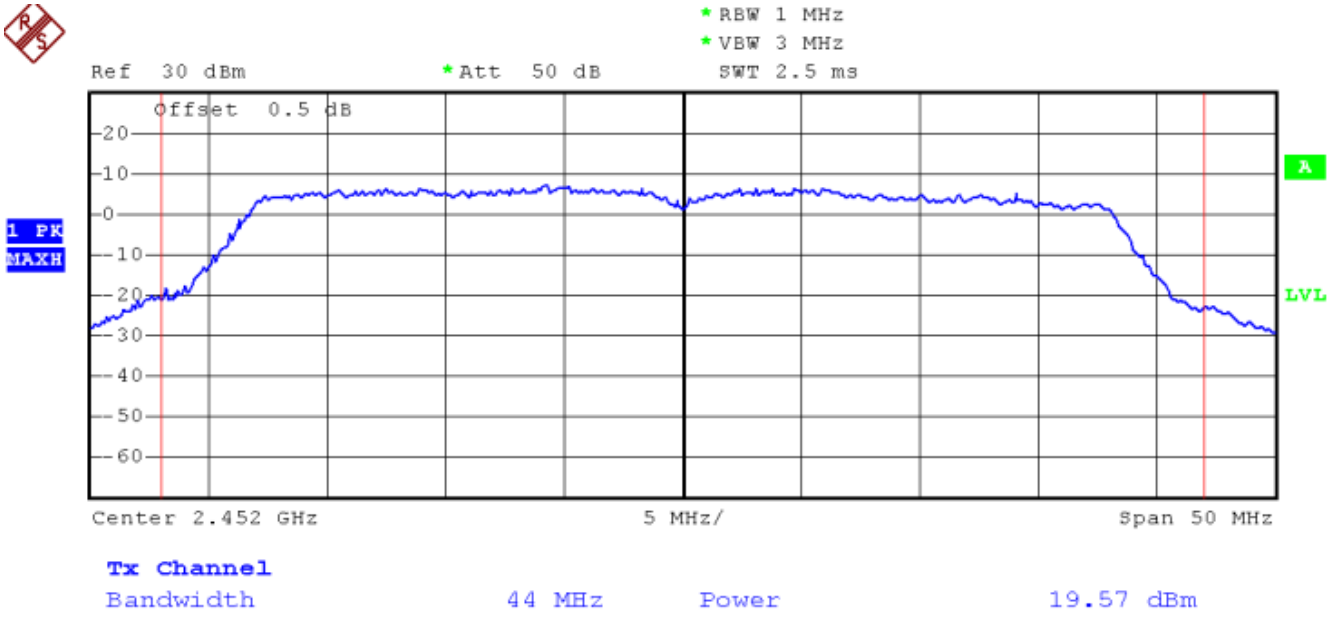
Transmit by 802.11n HT40 Channel 6

Chain 1



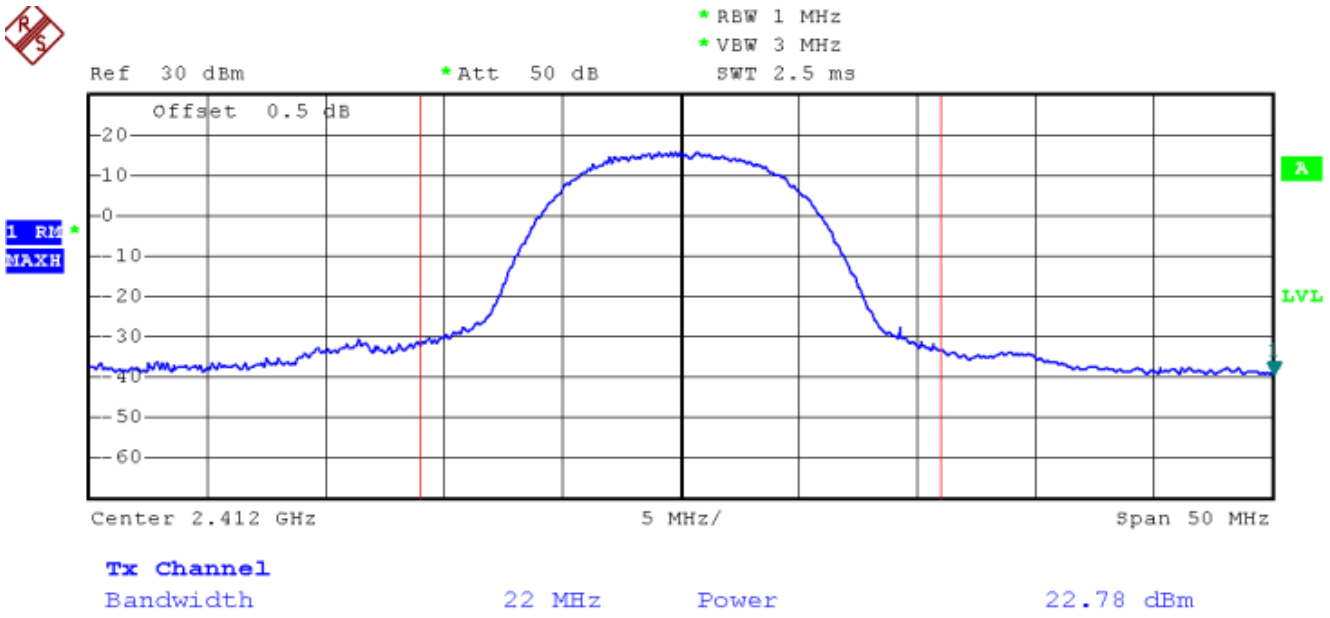
Transmit by 802.11n HT40 Channel 9

Chain 1

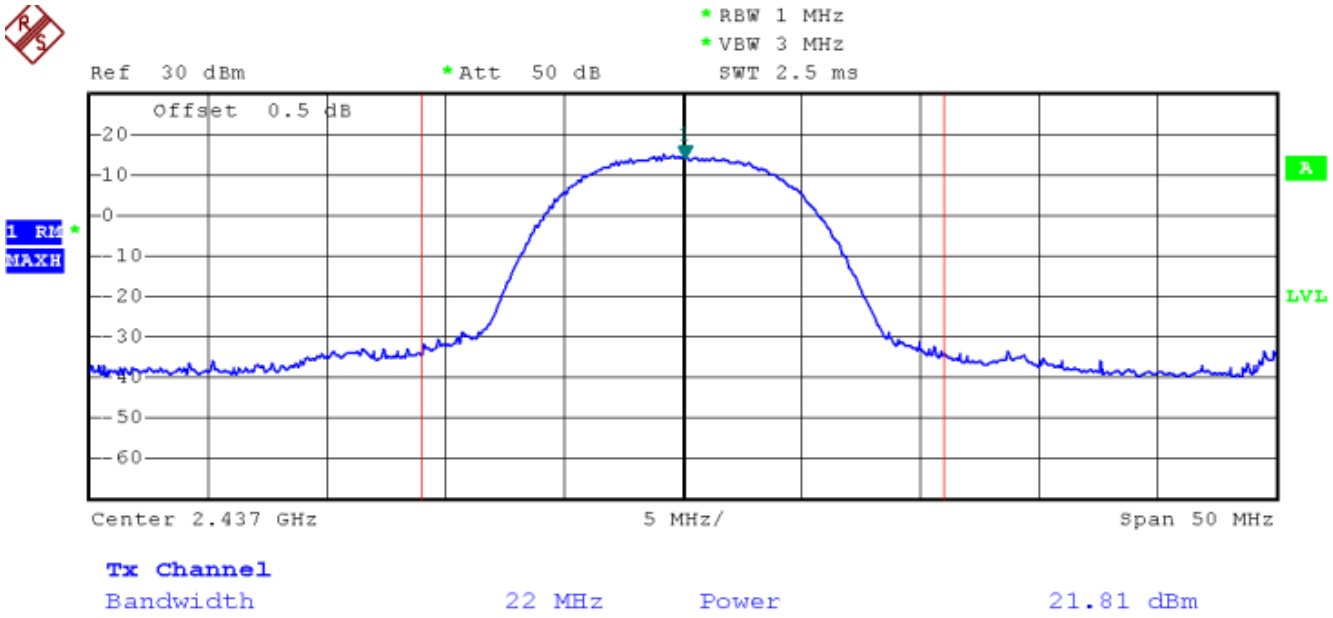


Average:

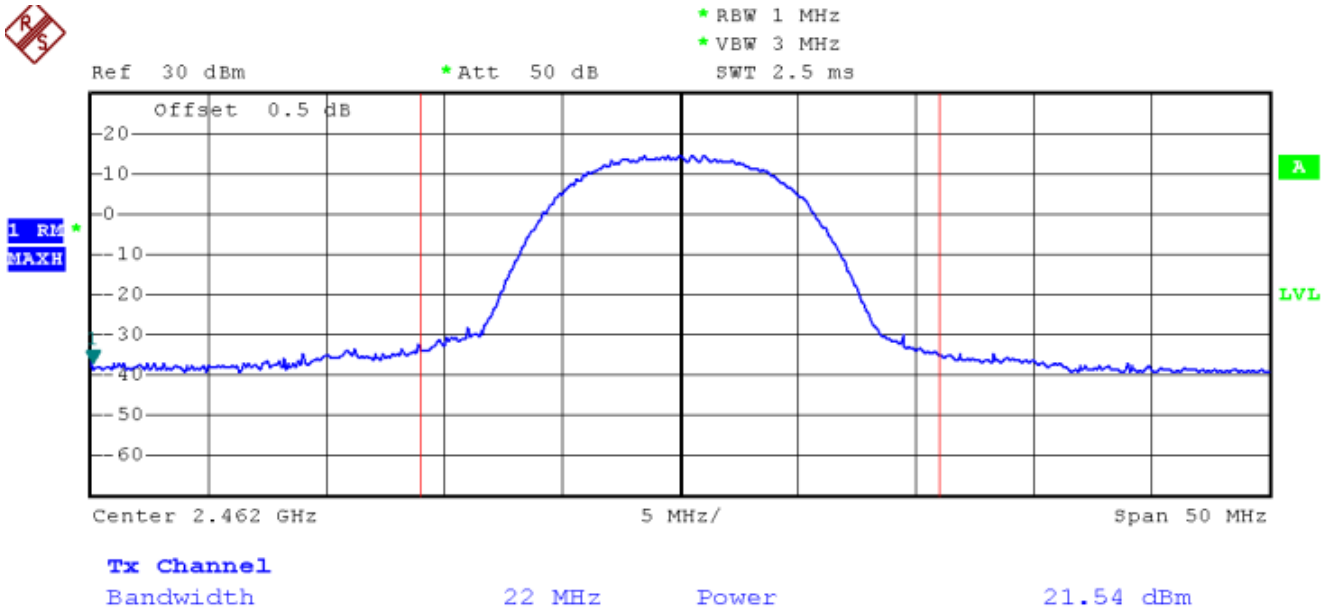
Transmit by 802.11b Channel 1



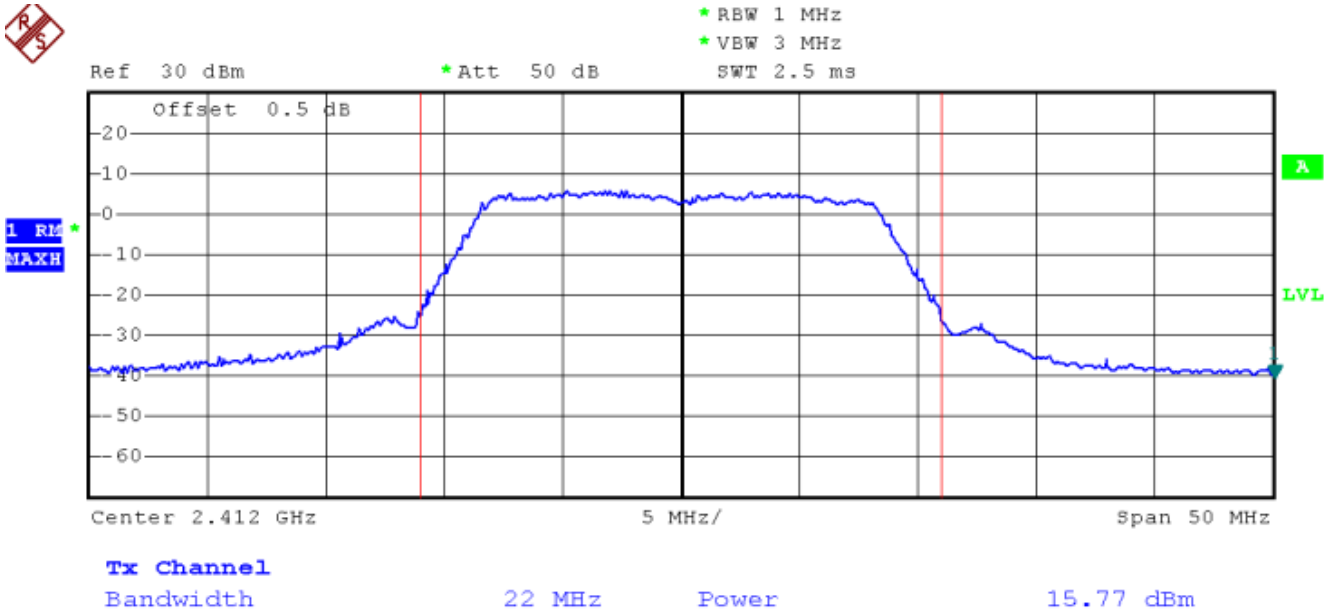
Transmit by 802.11b Channel 6



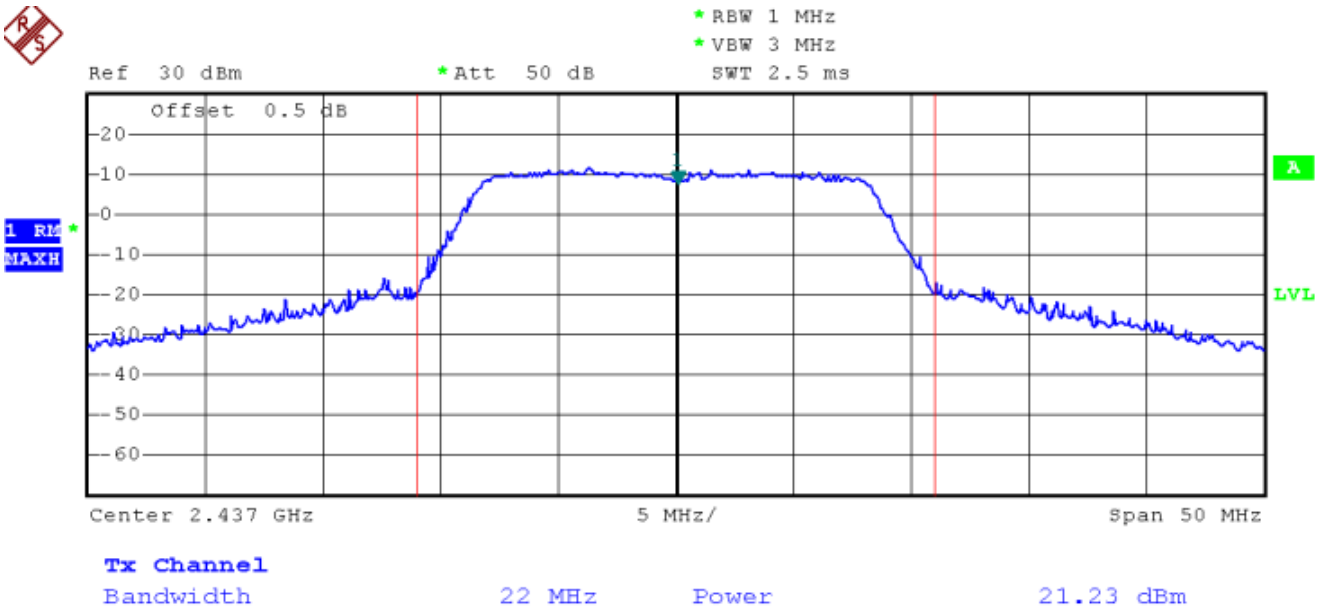
Transmit by 802.11b Channel 11



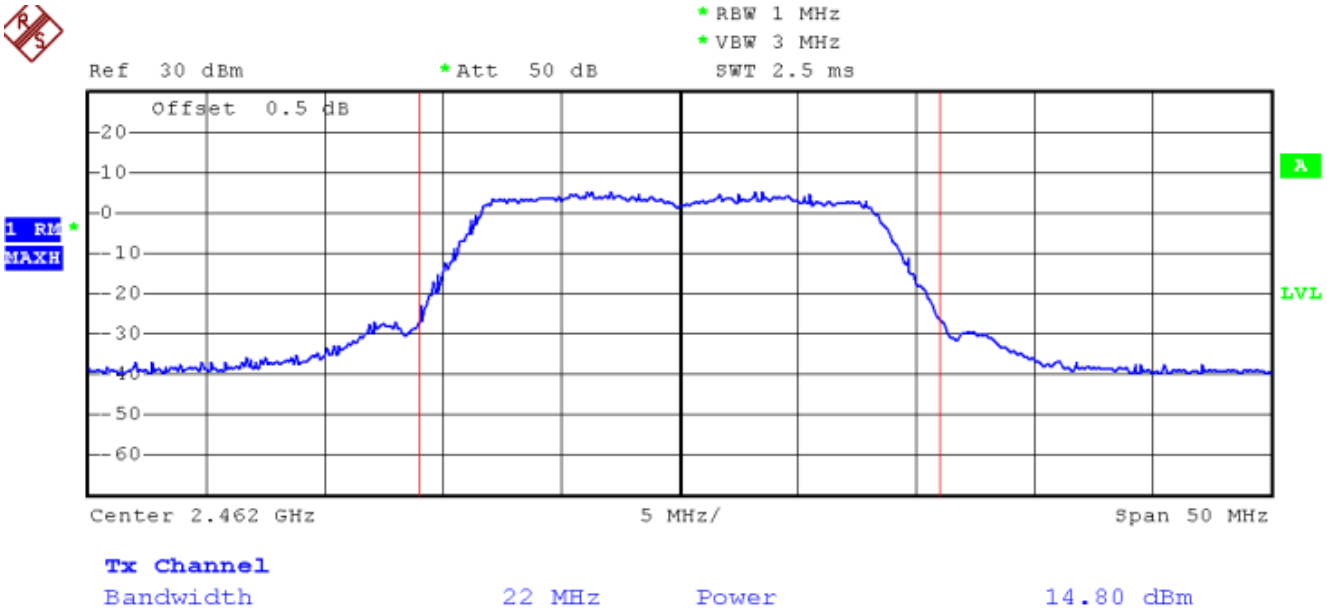
Transmit by 802.11g Channel 1



Transmit by 802.11g Channel 6

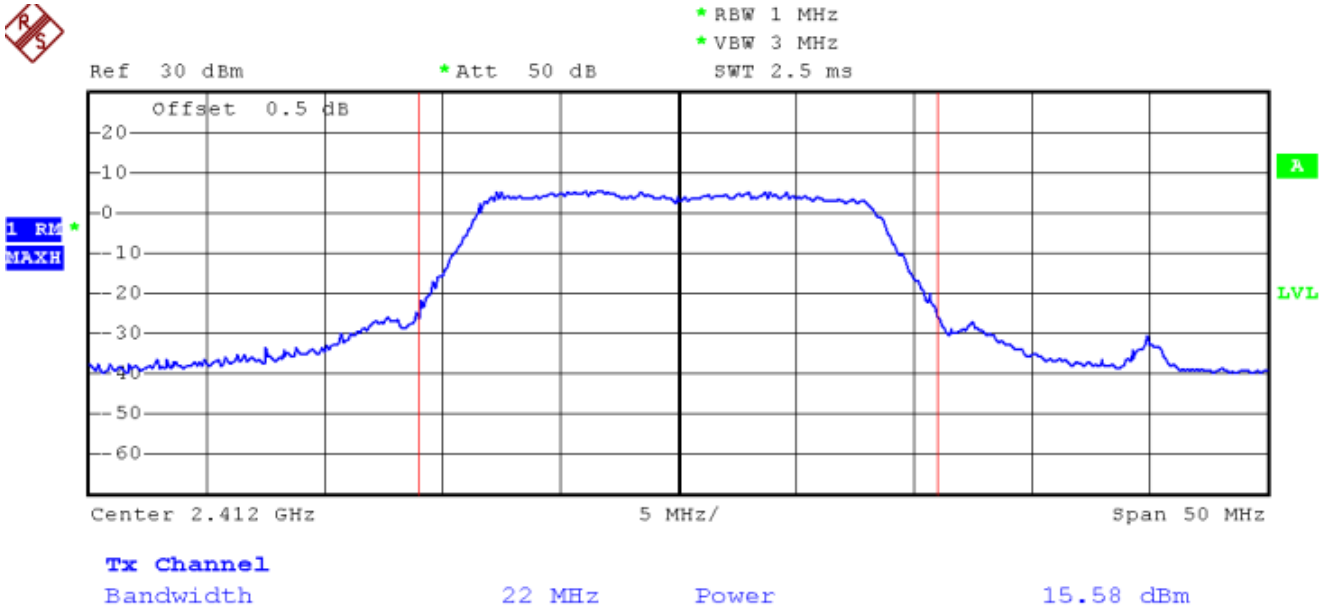


Transmit by 802.11g Channel 11



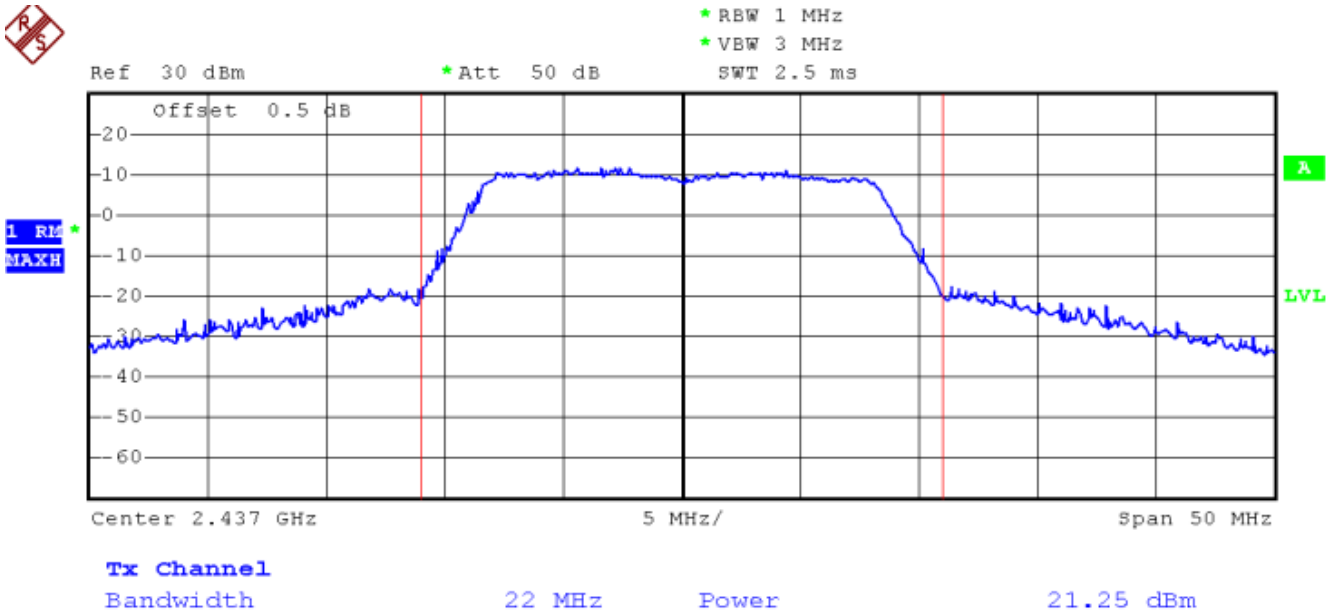
Transmit by 802.11n HT20 Channel 1

Chain 0



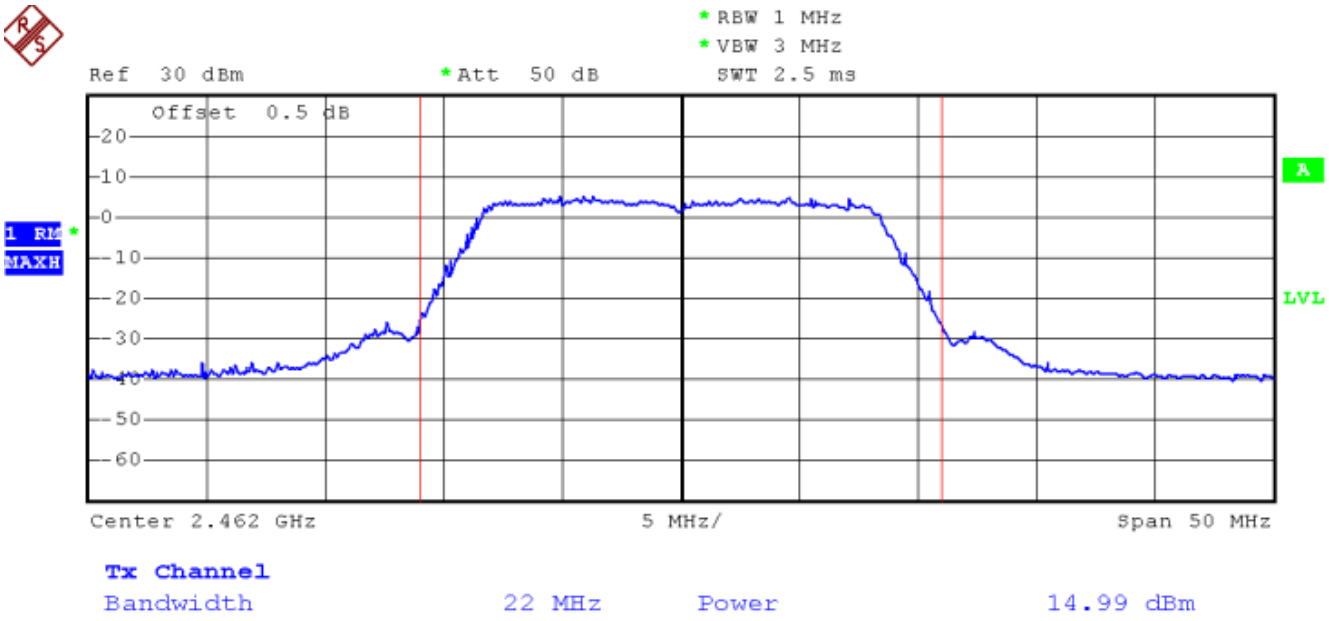
Transmit by 802.11n HT20 Channel 6

Chain 0



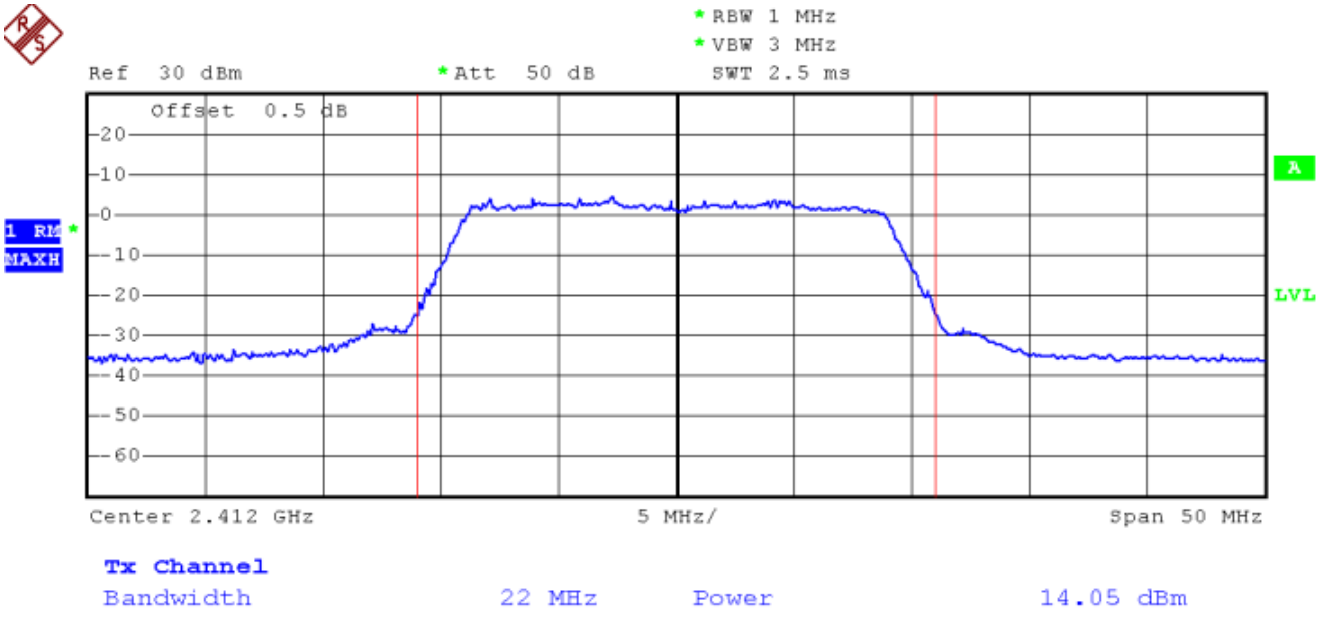
Transmit by 802.11n HT20 Channel 11

Chain 0



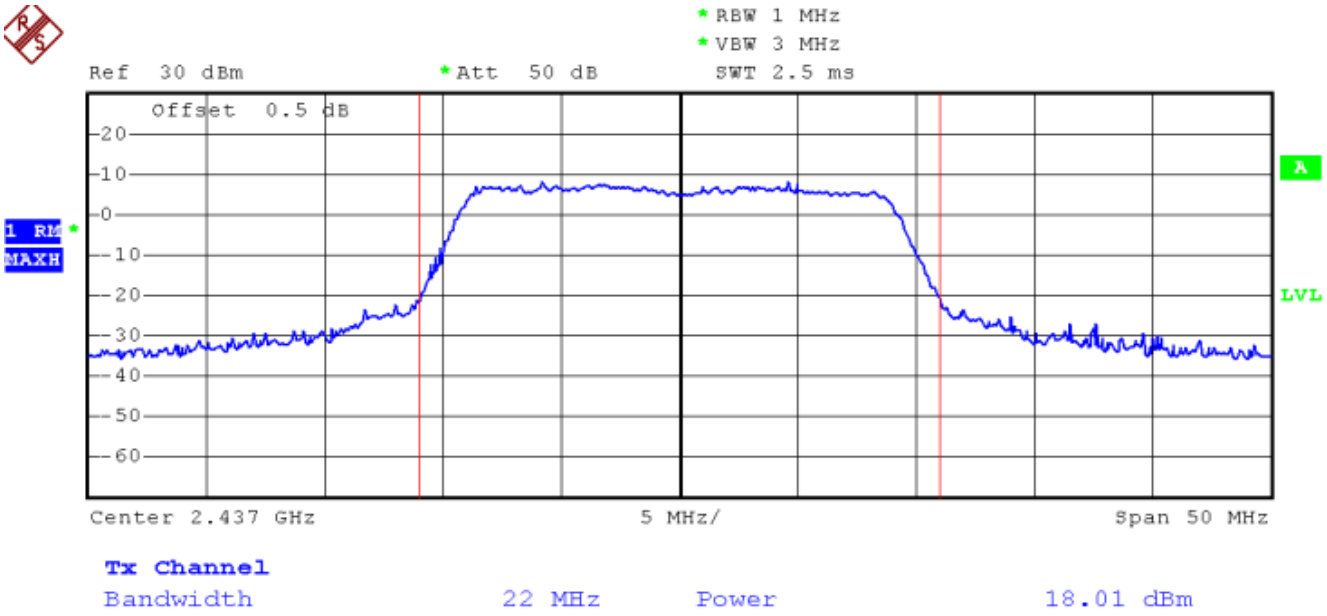
Transmit by 802.11n HT20 Channel 1

Chain 1



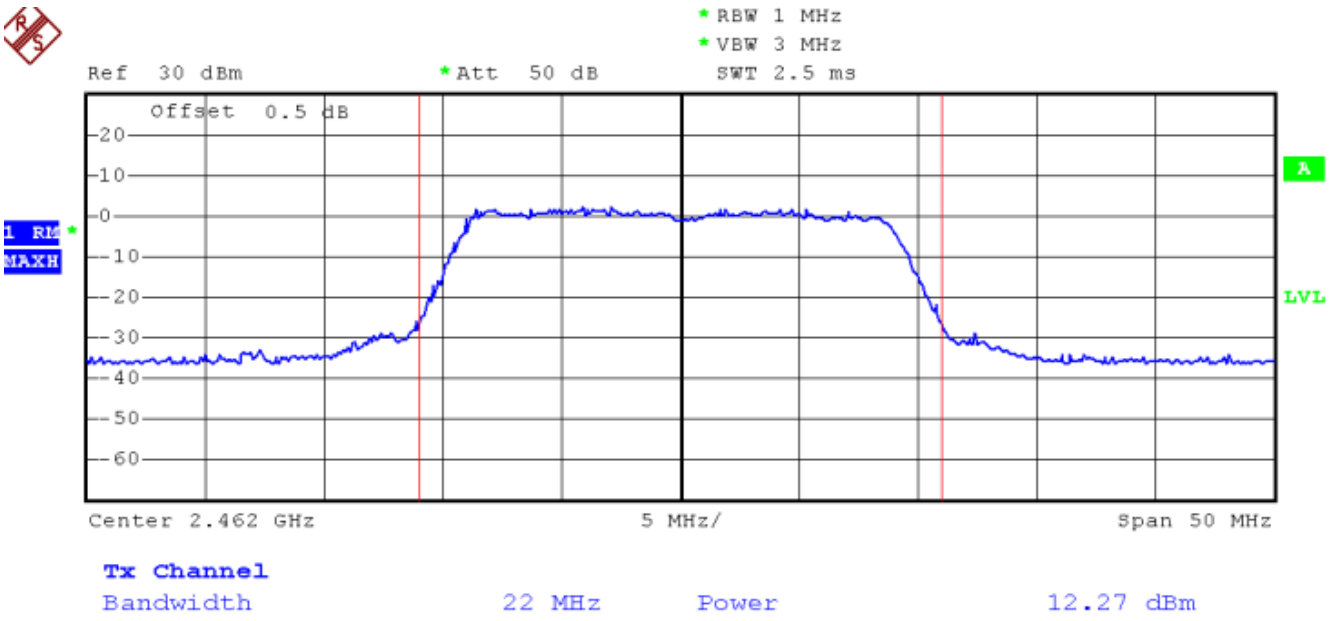
Transmit by 802.11n HT20 Channel 6

Chain 1



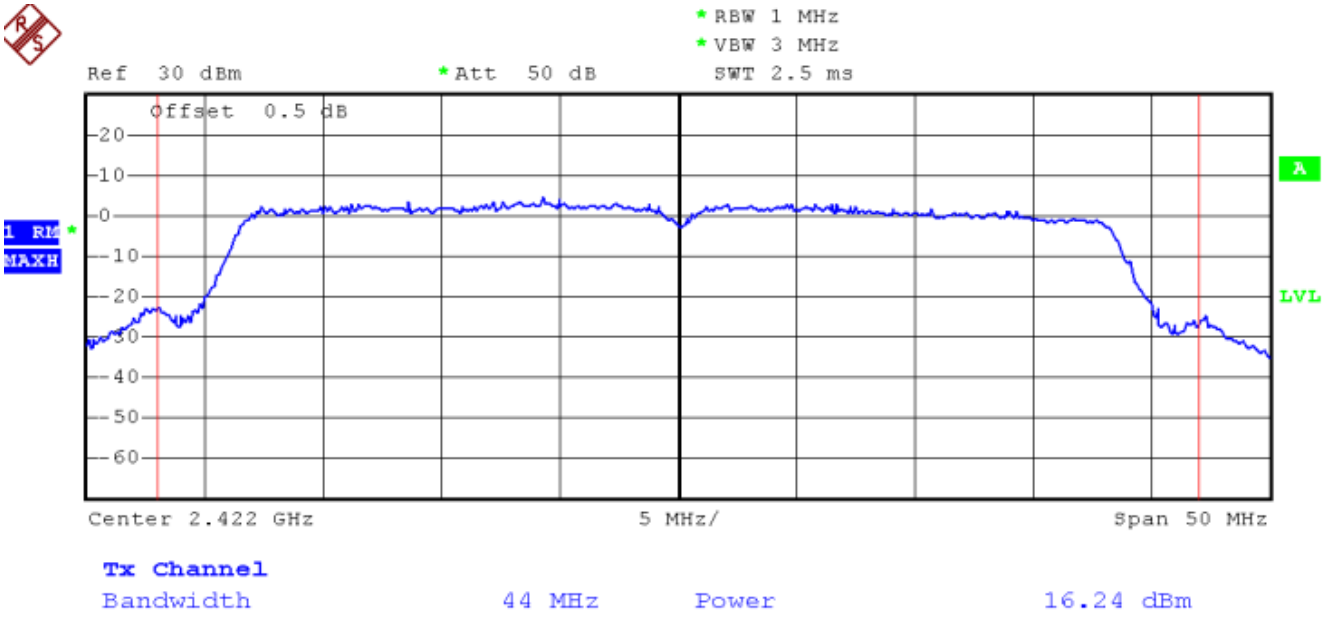
Transmit by 802.11n HT20 Channel 11

Chain 1



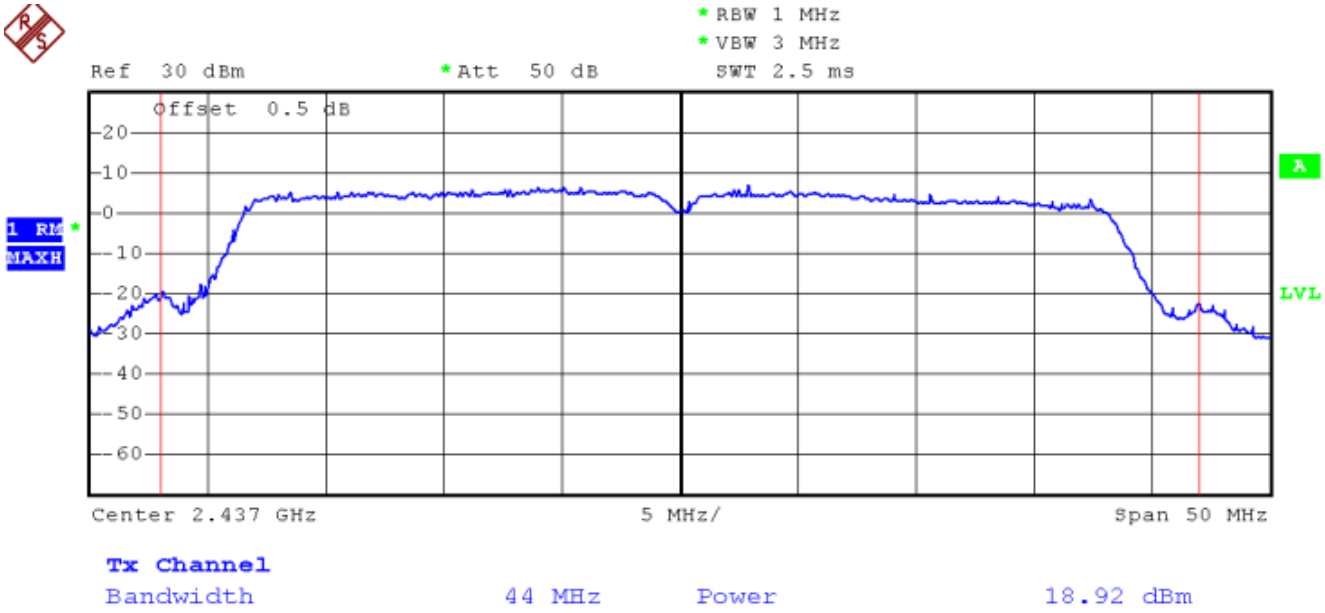
Transmit by 802.11n HT40 Channel 3

Chain 0



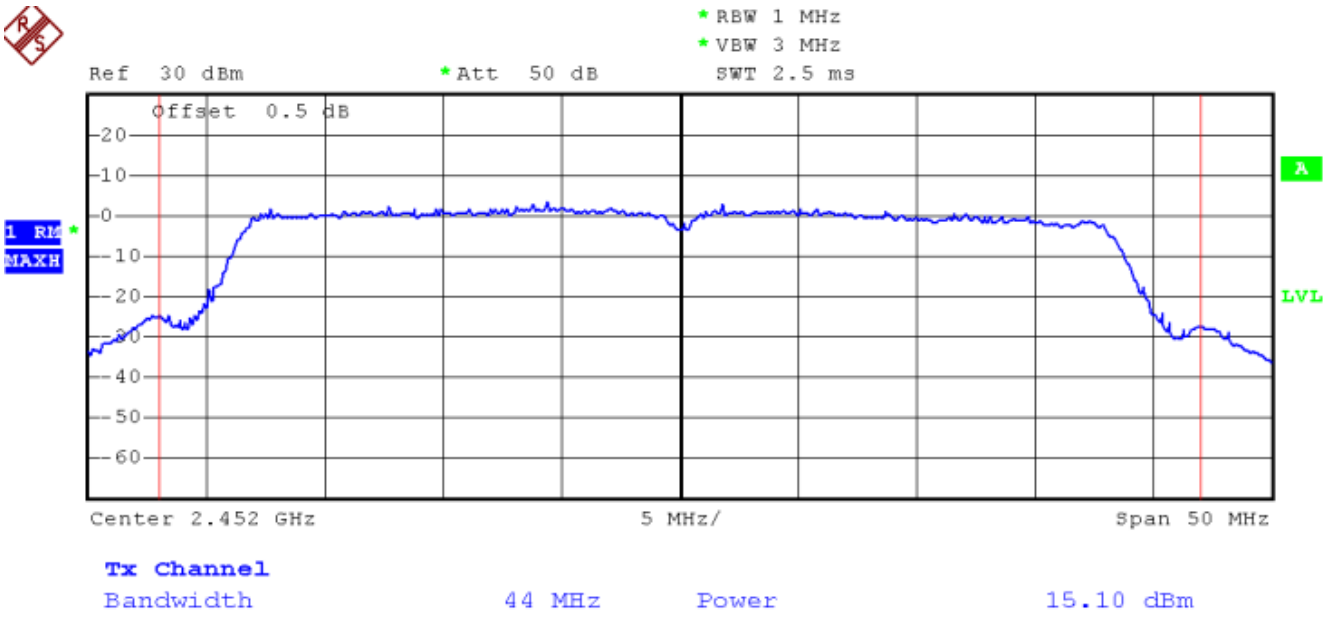
Transmit by 802.11n HT40 Channel 6

Chain 0



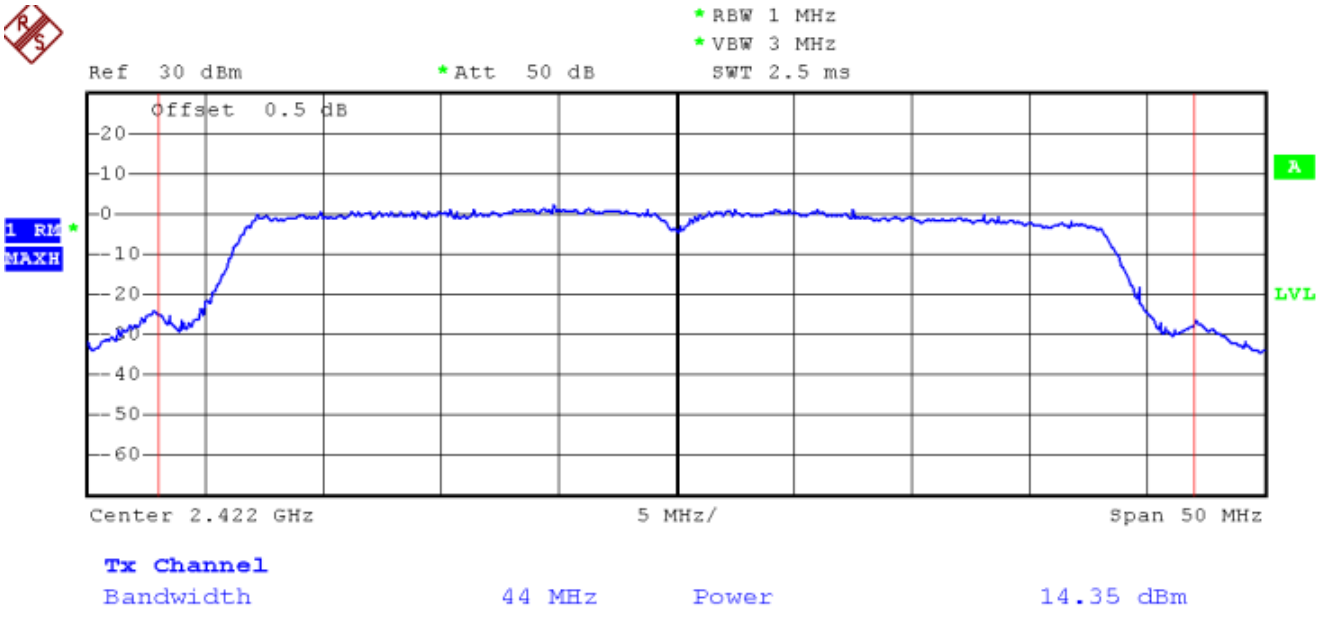
Transmit by 802.11n HT40 Channel 9

Chain 0



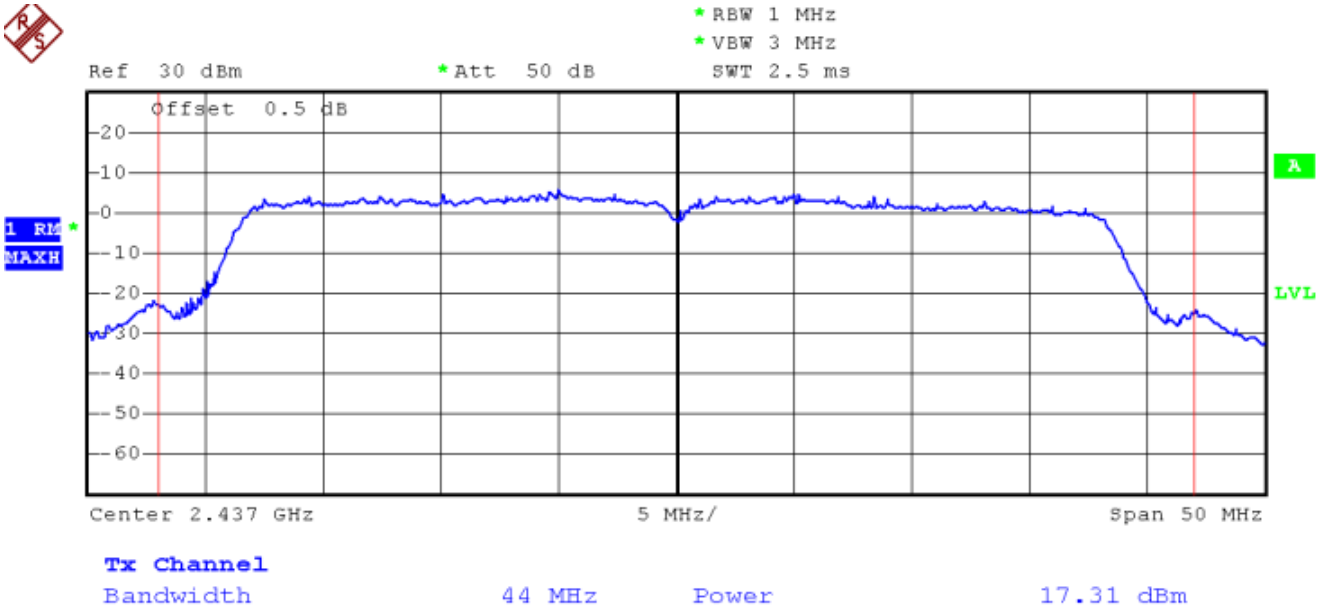
Transmit by 802.11n HT40 Channel 3

Chain 1



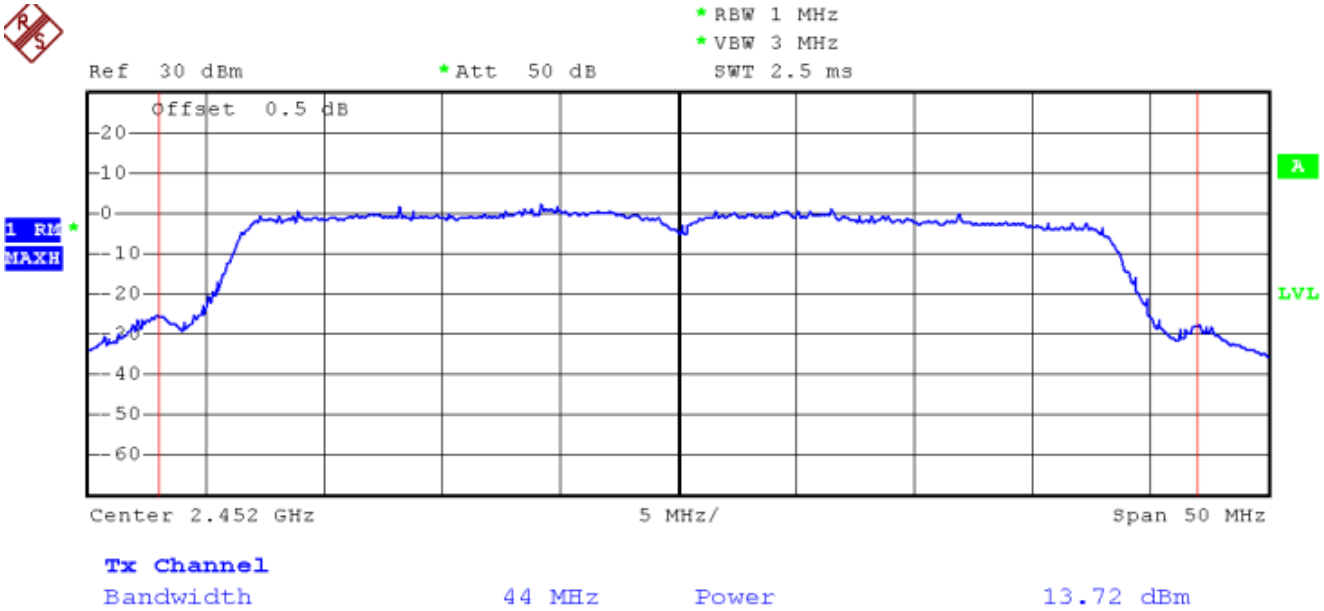
Transmit by 802.11n HT40 Channel 6

Chain 1



Transmit by 802.11n HT40 Channel 9

Chain 1



8. Band Edges Measurement

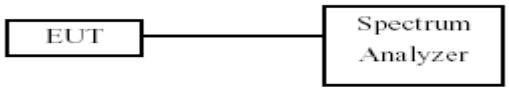
8.1. Test Limit

Below –20dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

8.2. Test Procedure

a. The transmitter output was connected to the spectrum analyzer via a low lose cable.
b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
c. The band edges was measured and recorded.

8.3. Test Setup Layout



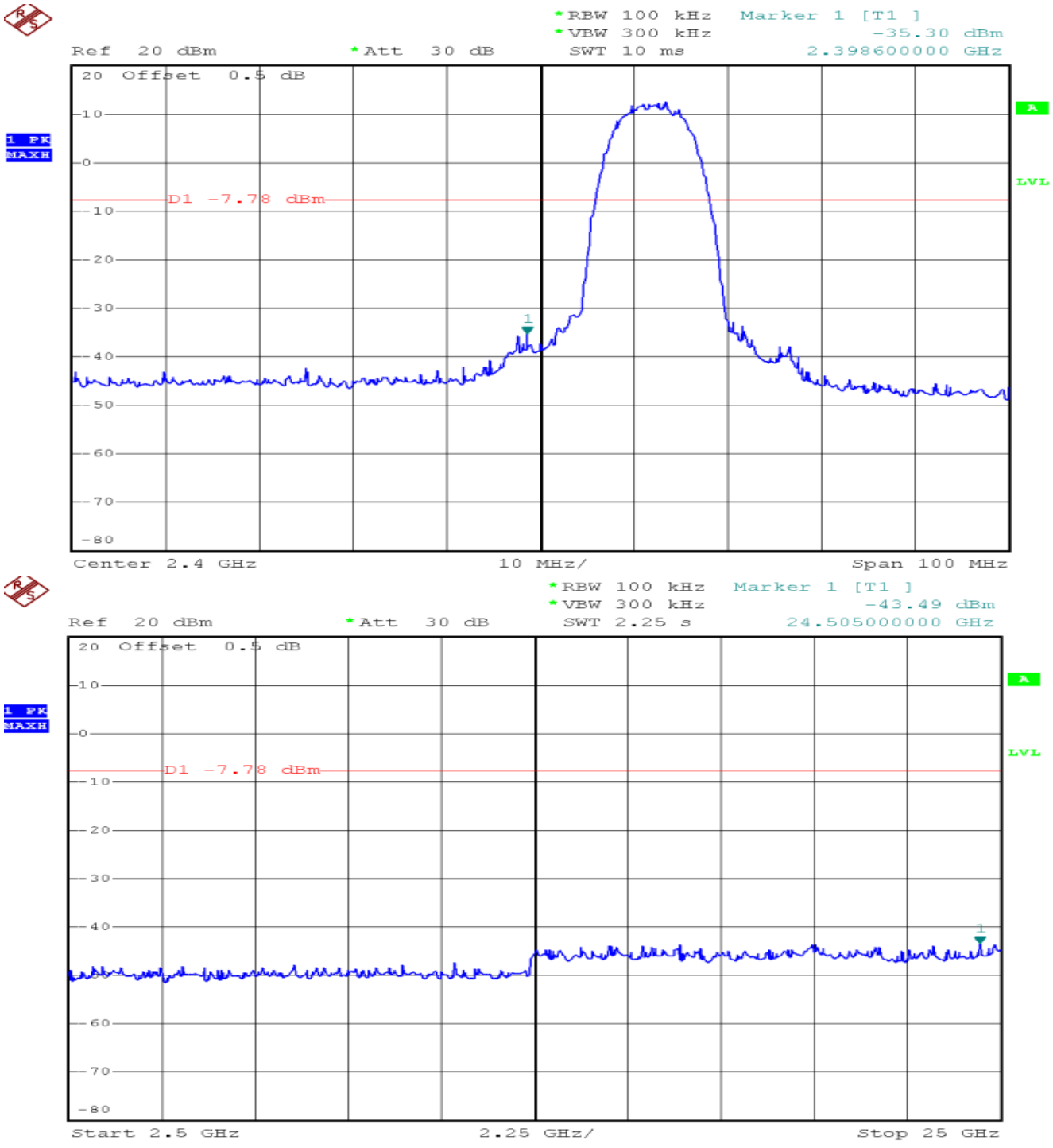
8.4. Measurement Equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

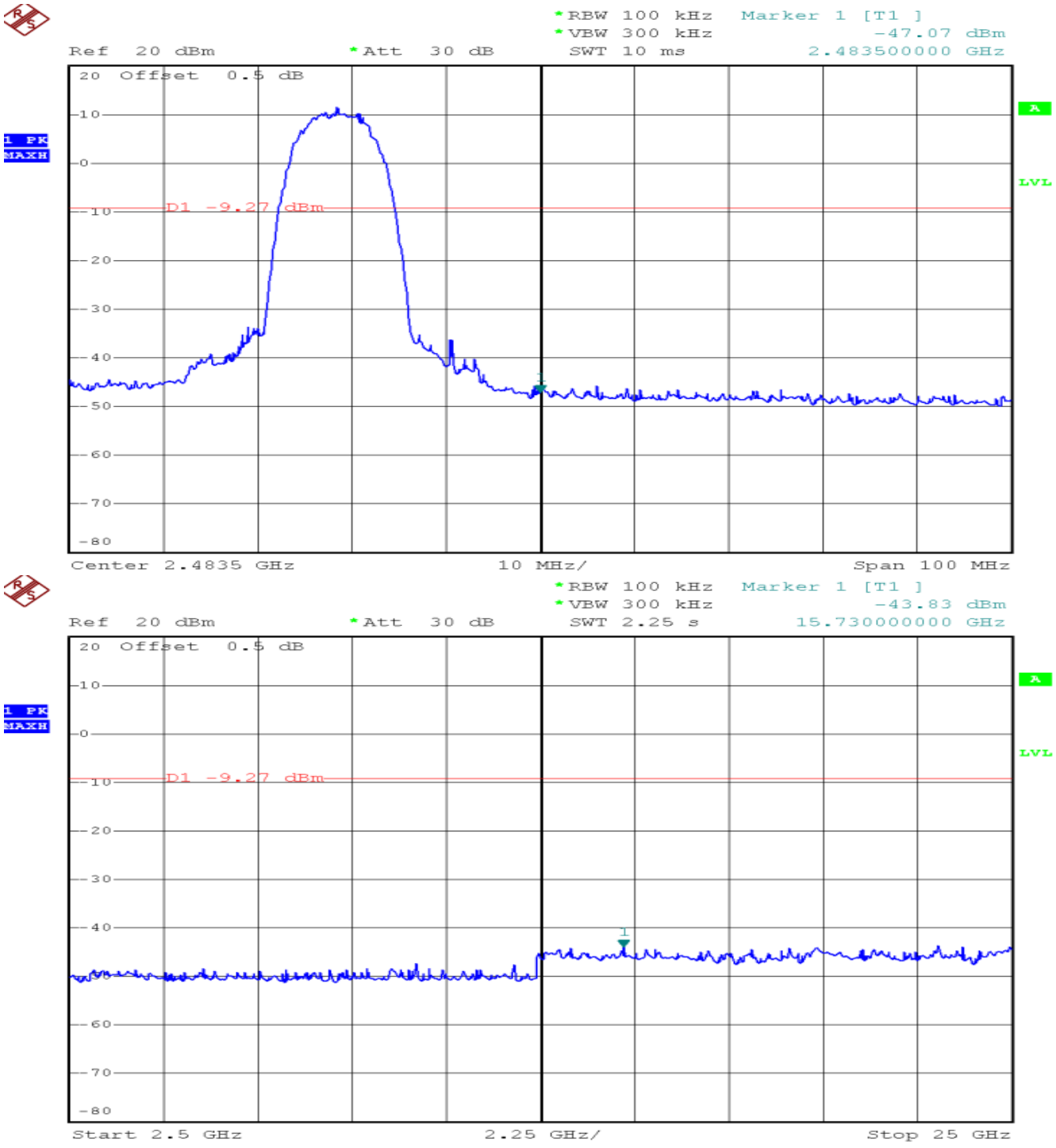
8.5. Test Result and Data

Modulation Standard	Channel	Frequency (MHz)	maximum value in frequency (MHz)	maximum value(dBm)
802.11b	01	2412	2398.6	-35.30
	11	2462	2483.5	-47.07
802.11g	01	2412	2399.8	-29.06
	11	2462	2483.5	-48.78
802.11n HT20 Chain 0	01	2412	2399.6	-29.95
	11	2462	2483.5	-48.62
802.11n HT20 Chain 1	01	2412	2399.6	-31.27
	11	2462	2483.5	-48.99
802.11n HT40 Chain 0	03	2422	2400.0	-27.64
	09	2452	2484.5	-44.14
802.11n HT40 Chain 1	03	2422	2400.2	-27.18
	09	2452	2483.5	-48.76

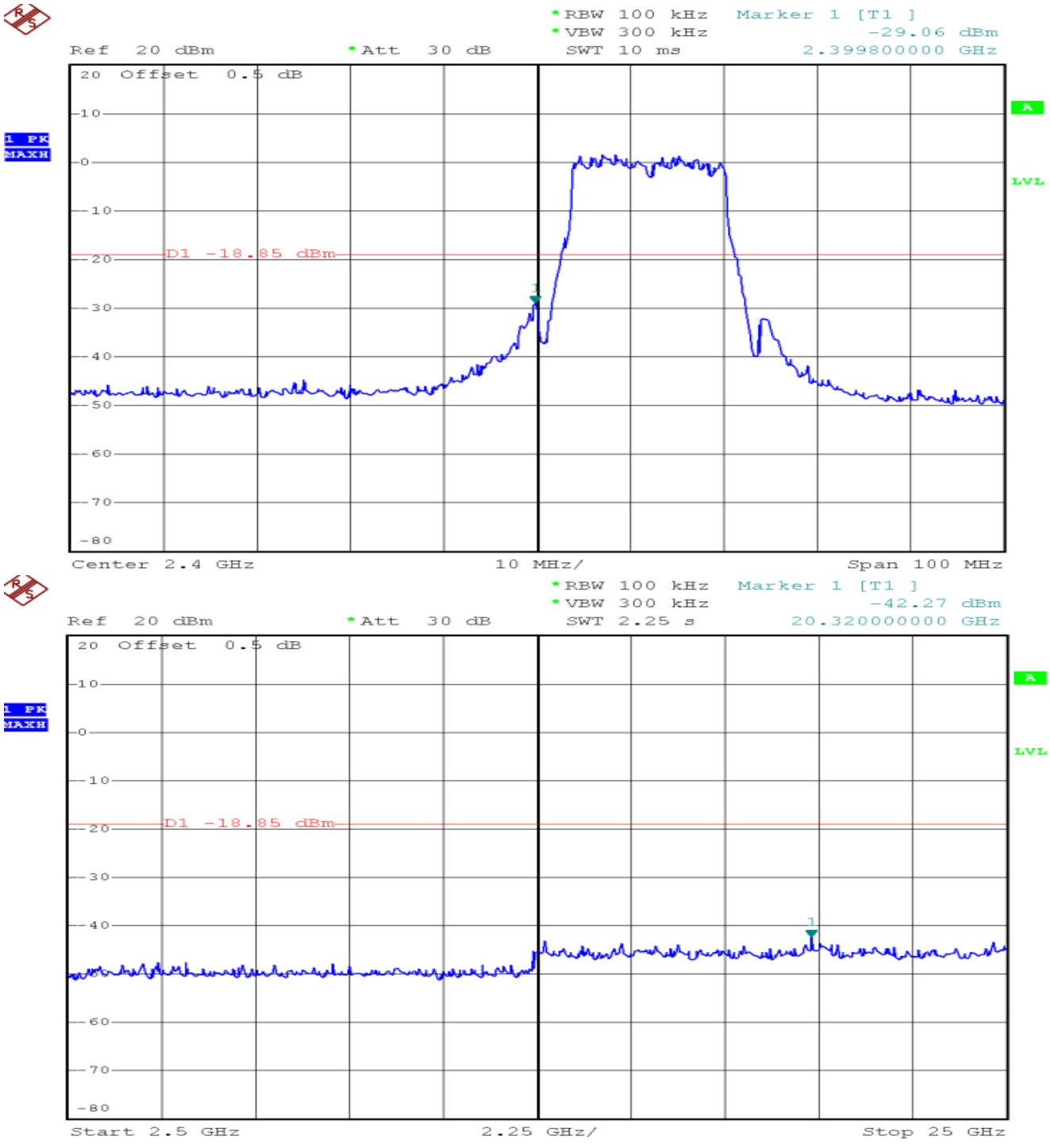
Transmit by 802.11b Channel 1



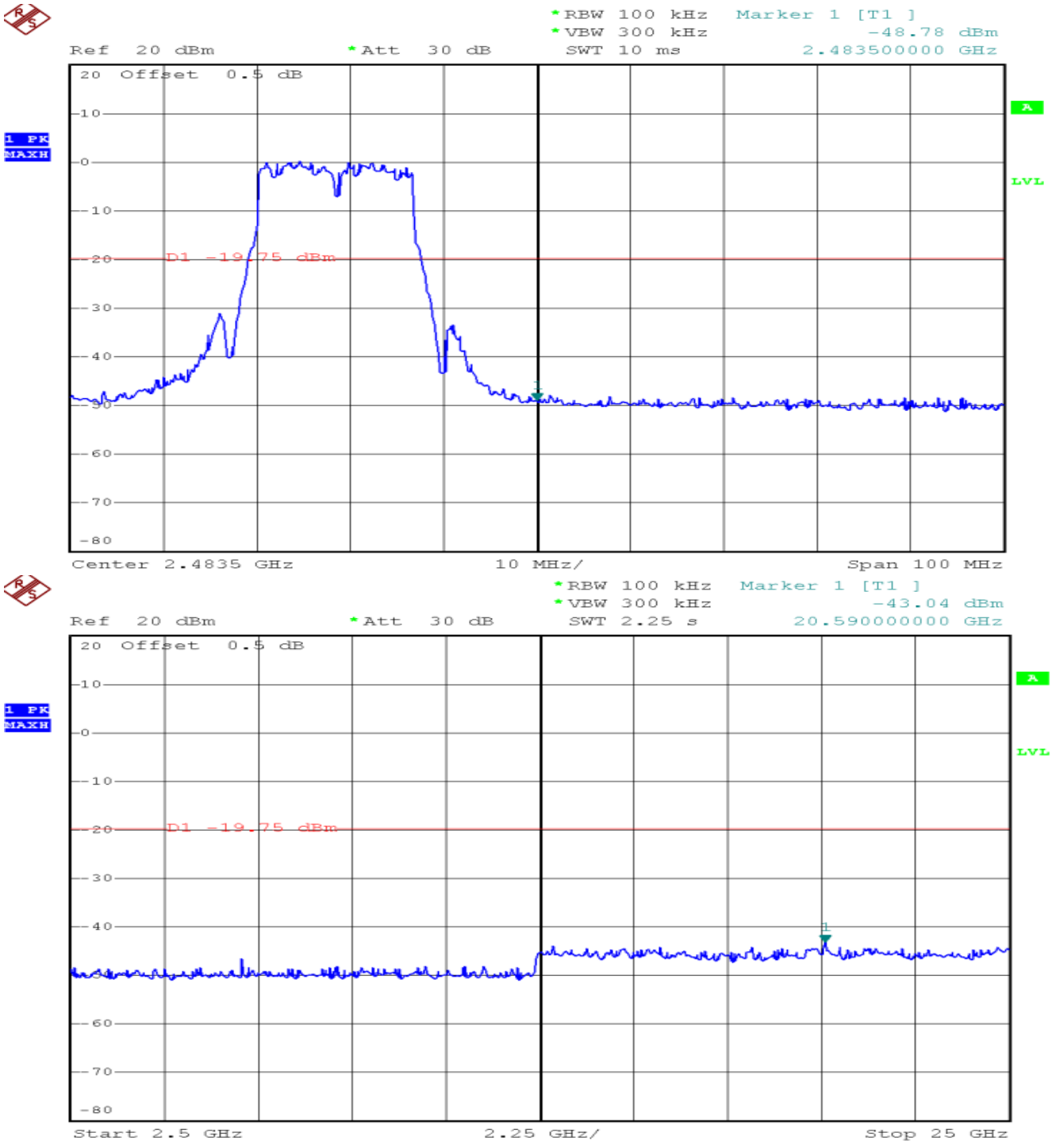
Transmit by 802.11b Channel 11



Transmit by 802.11g Channel 1

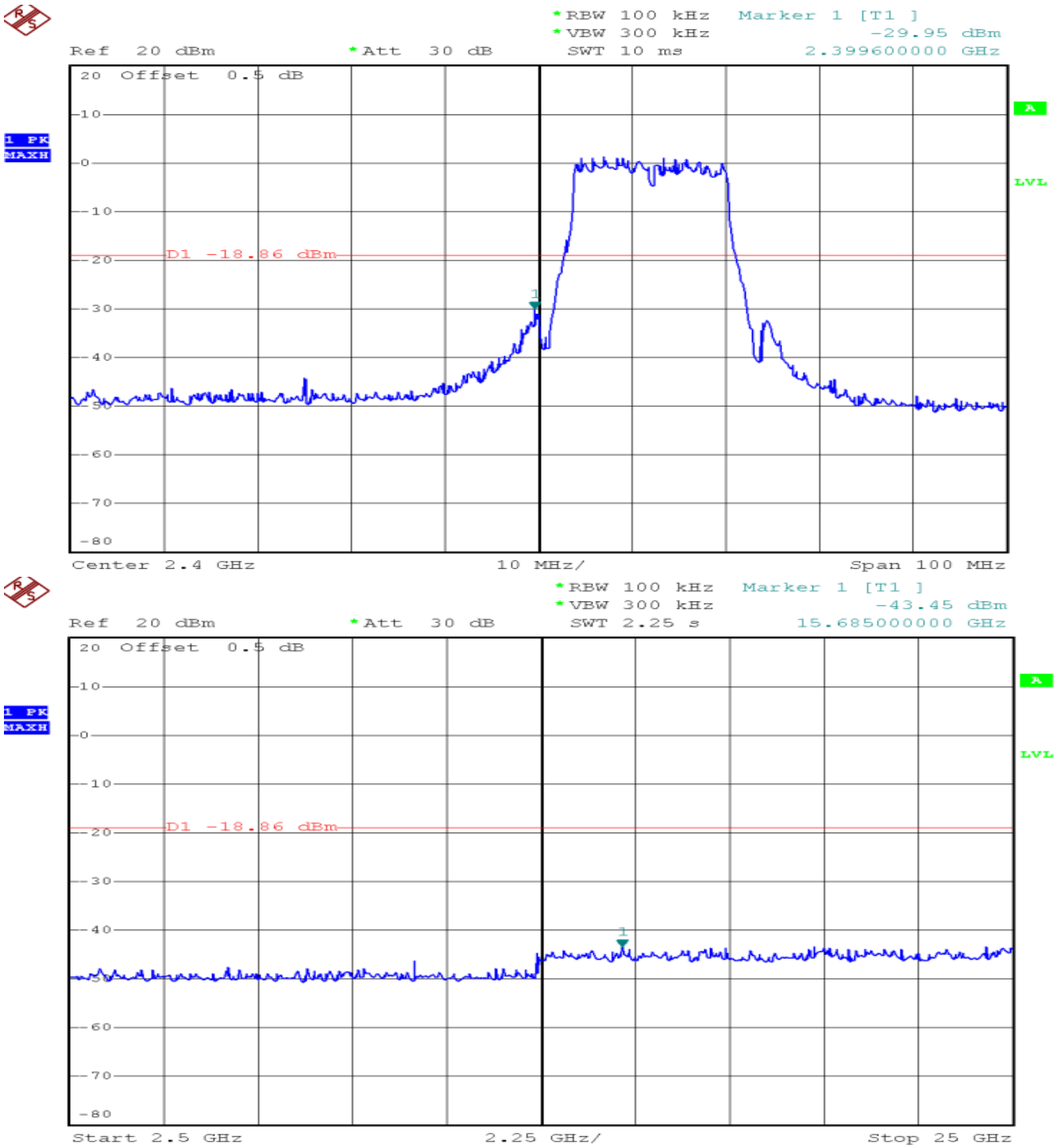


Transmit by 802.11g Channel 11



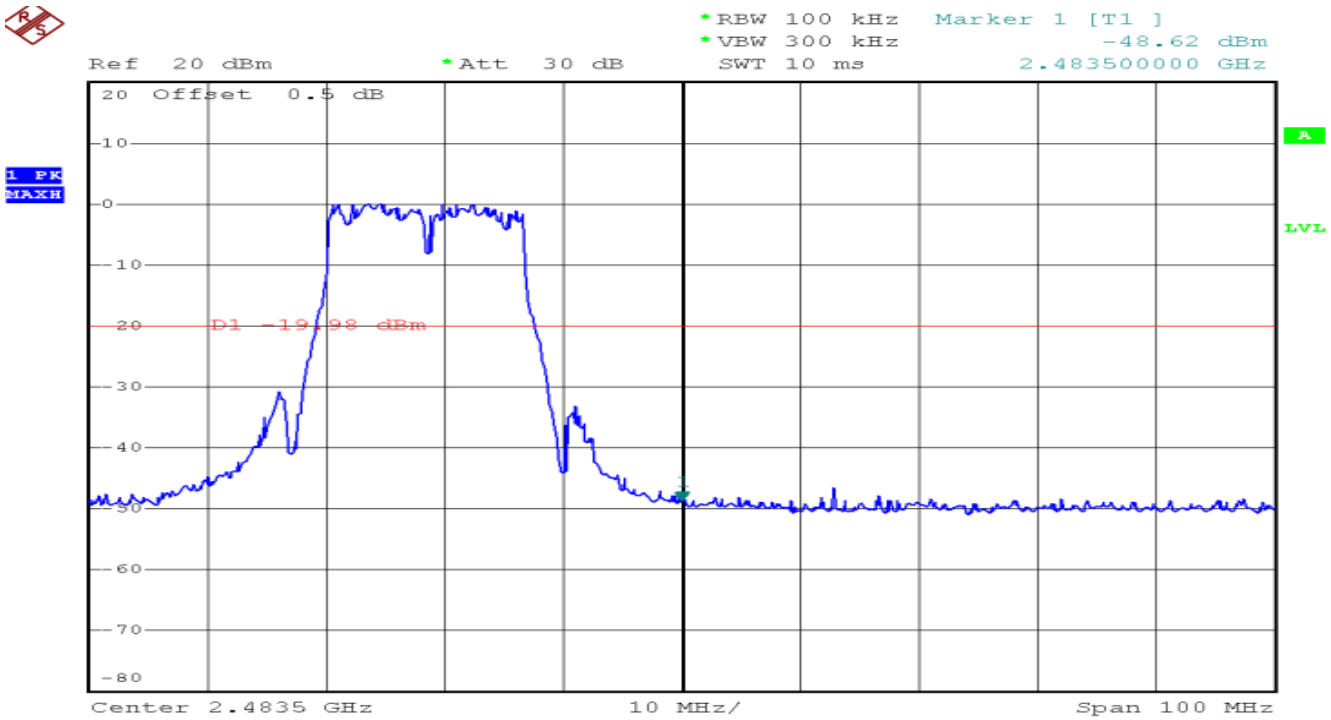
Transmit by 802.11n HT20 Channel 1

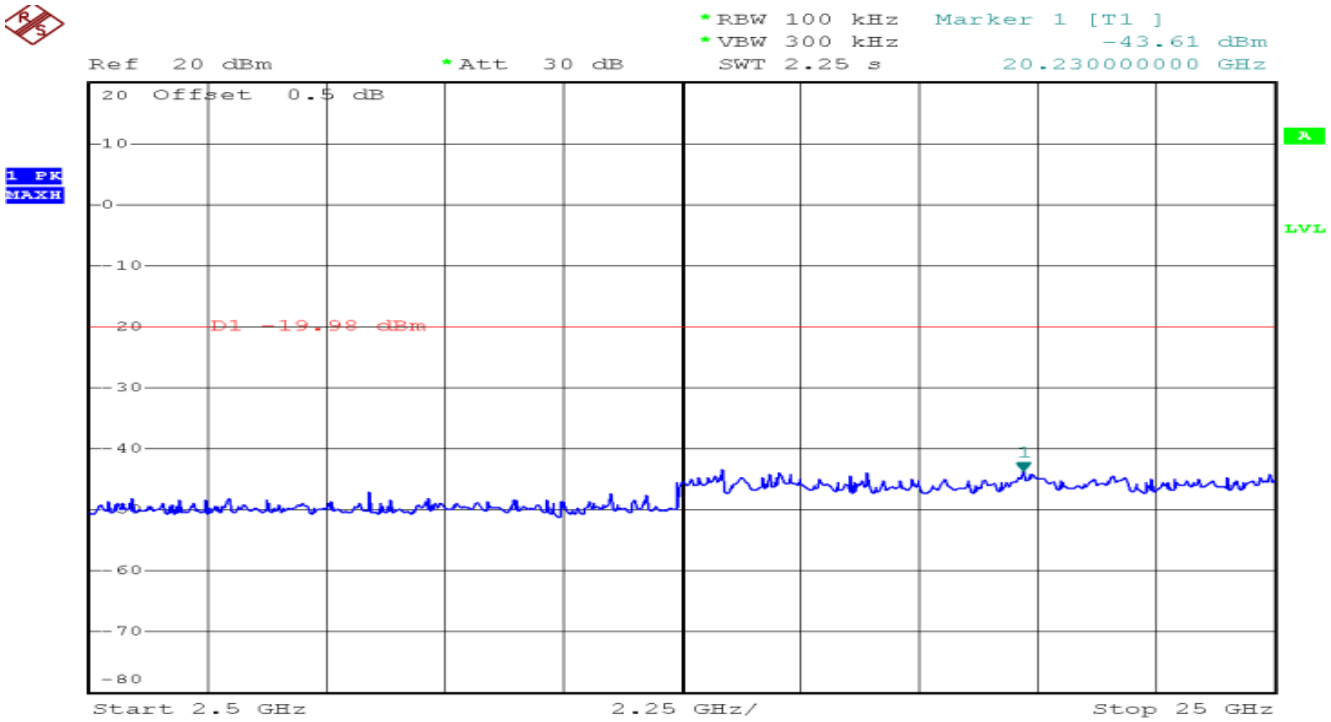
Chain0



Transmit by 802.11n HT20 Channel 11

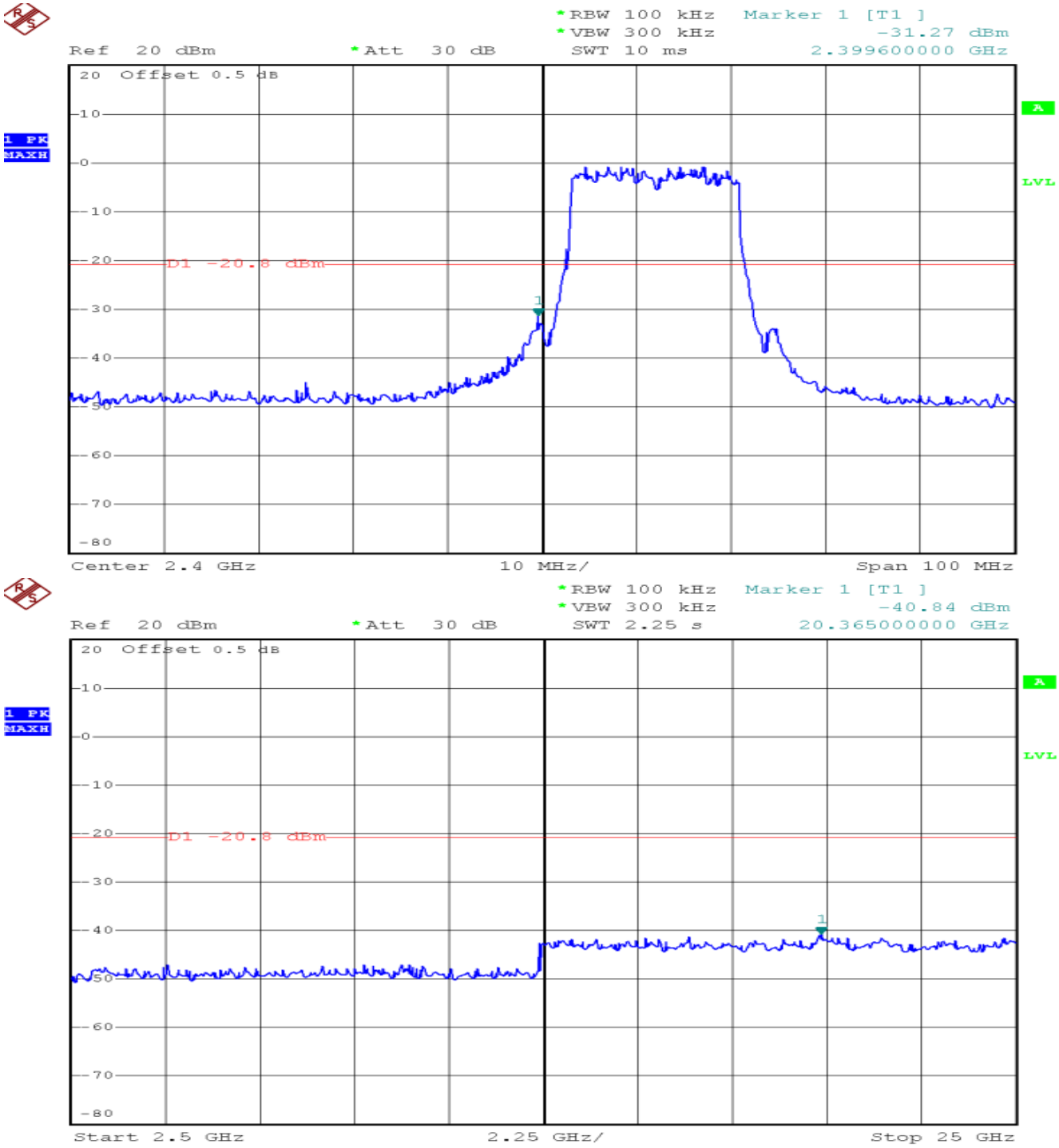
Chain 0





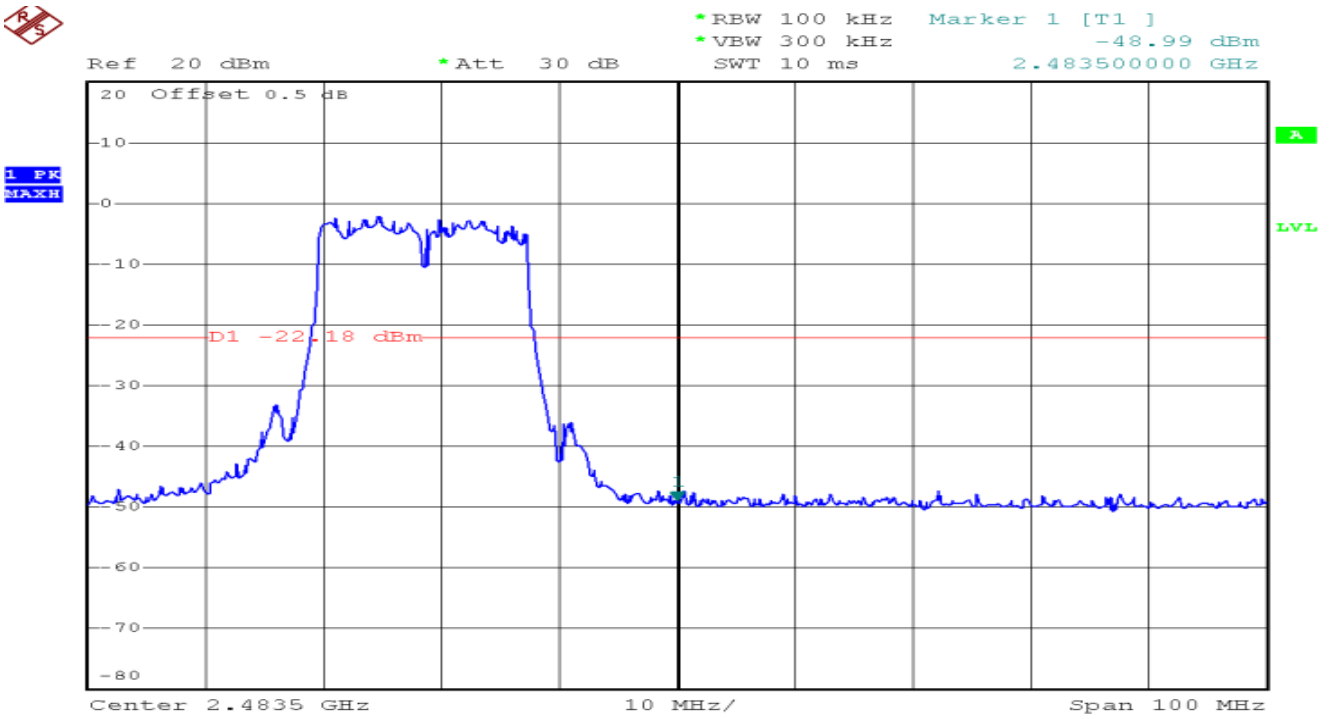
Transmit by 802.11n HT20 Channel 1

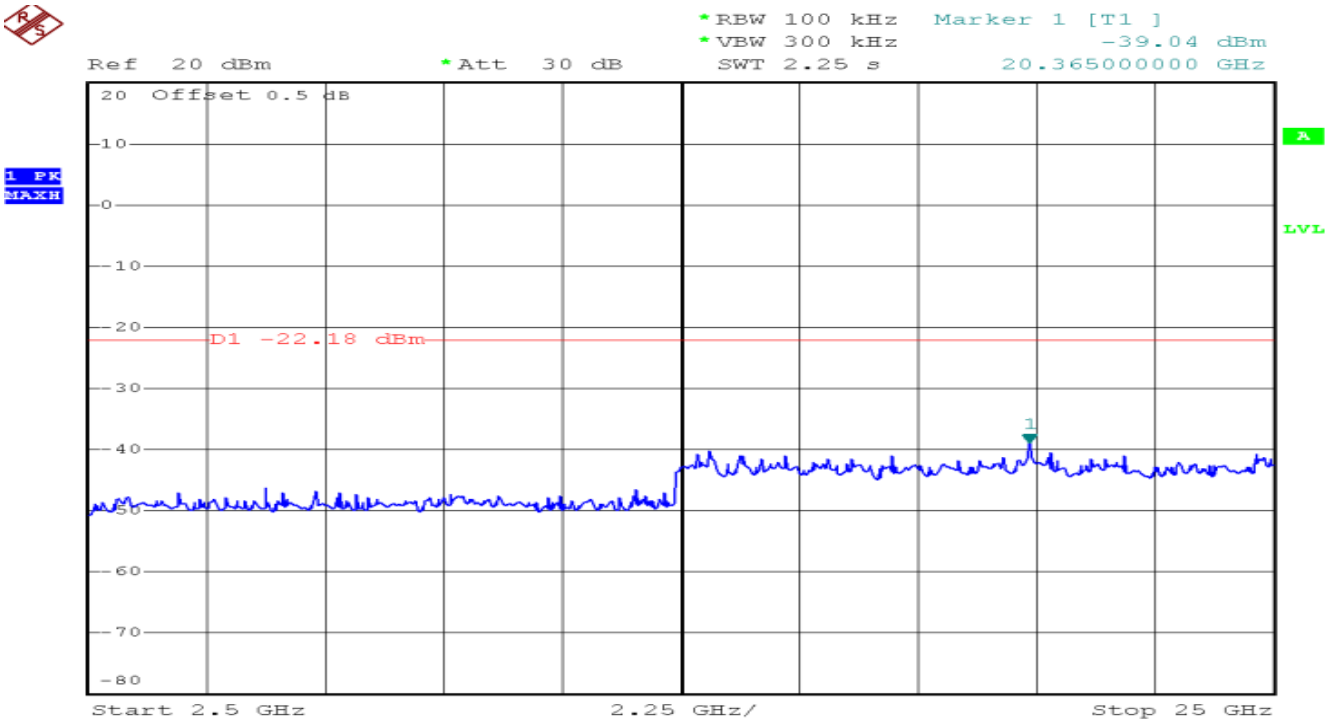
Chain 1



Transmit by 802.11n HT20 Channel 11

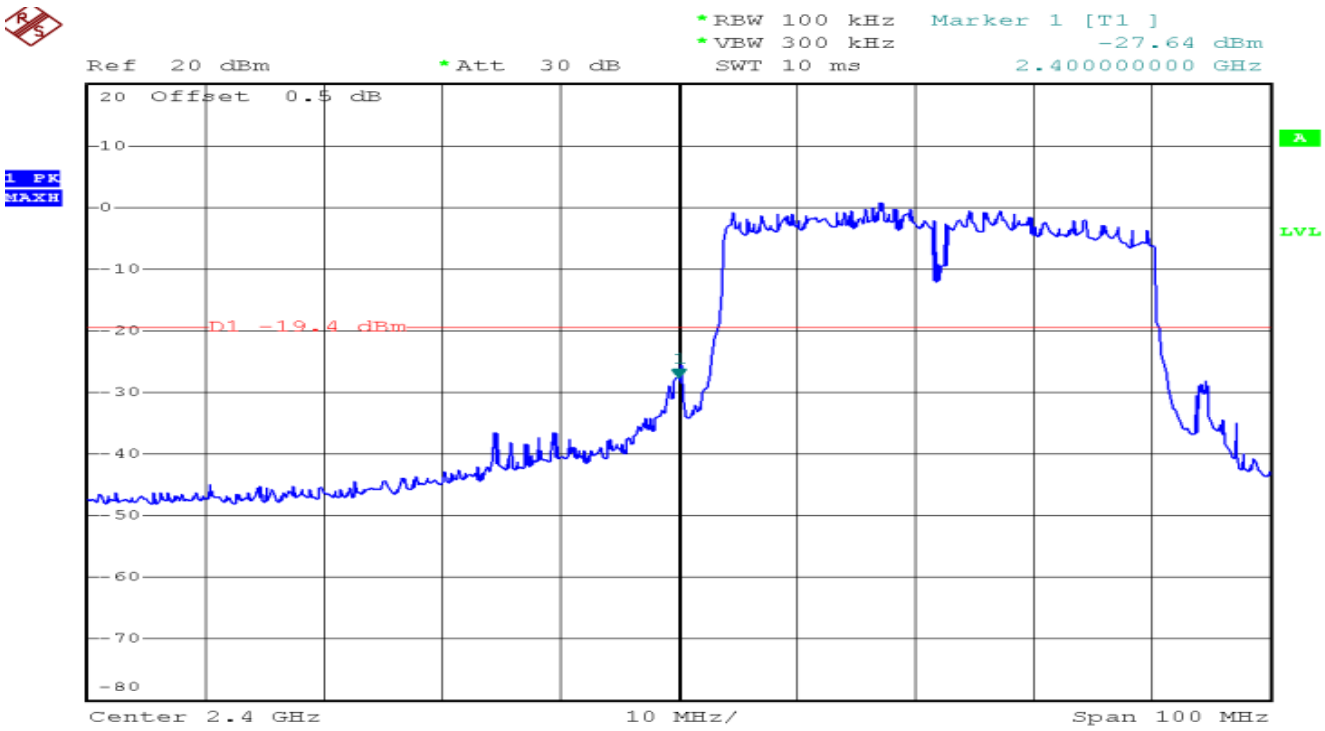
Chain 1

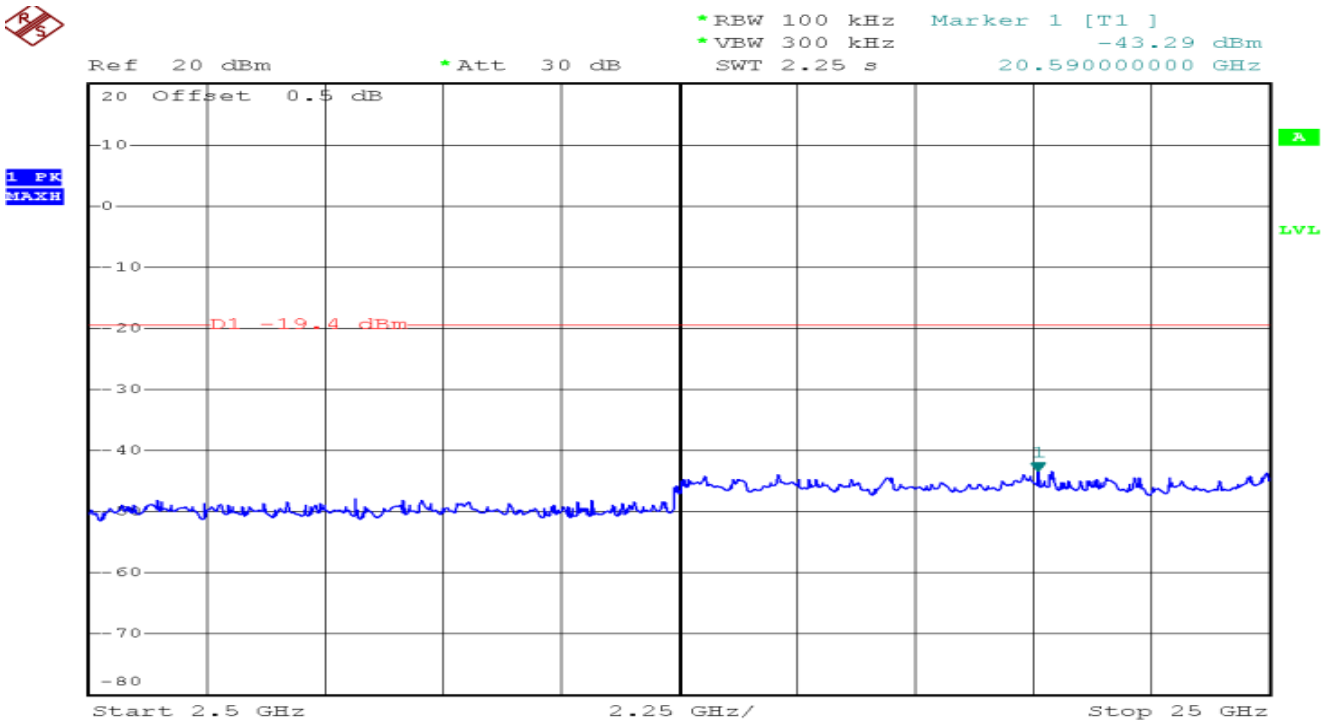




Transmit by 802.11n HT40 Channel 3

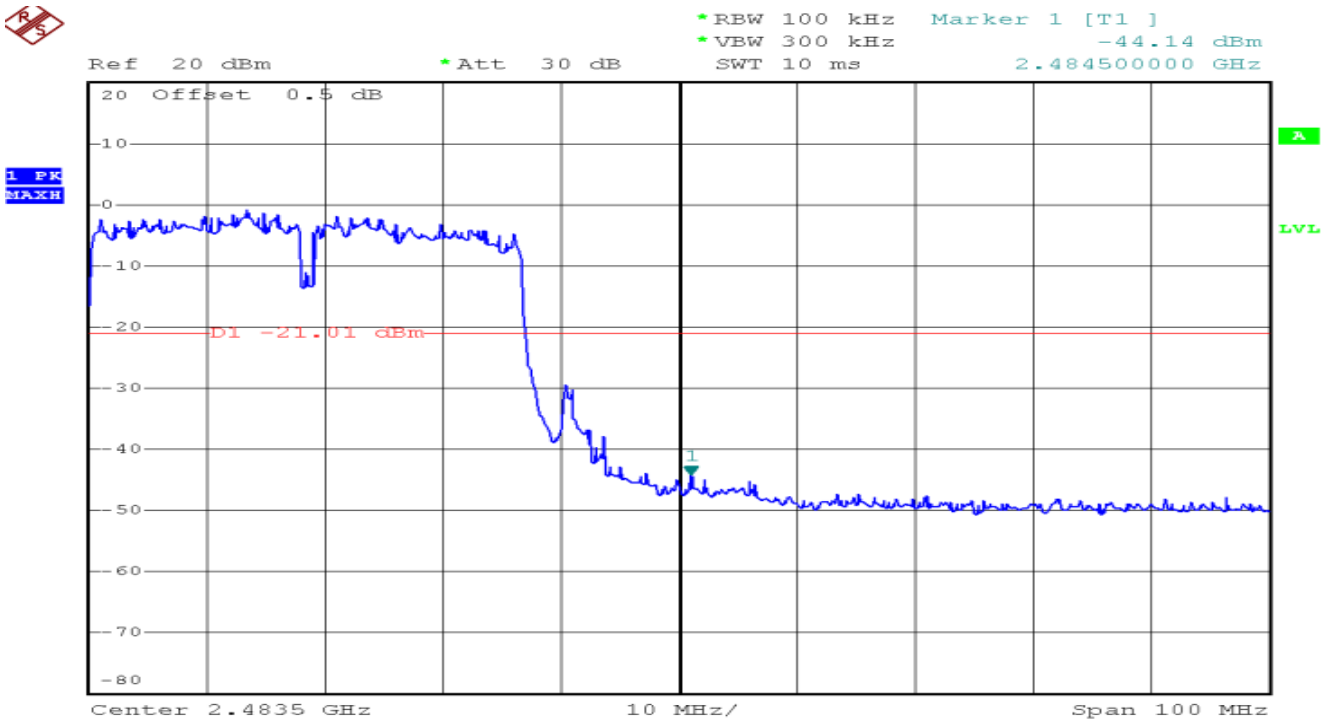
Chain 0

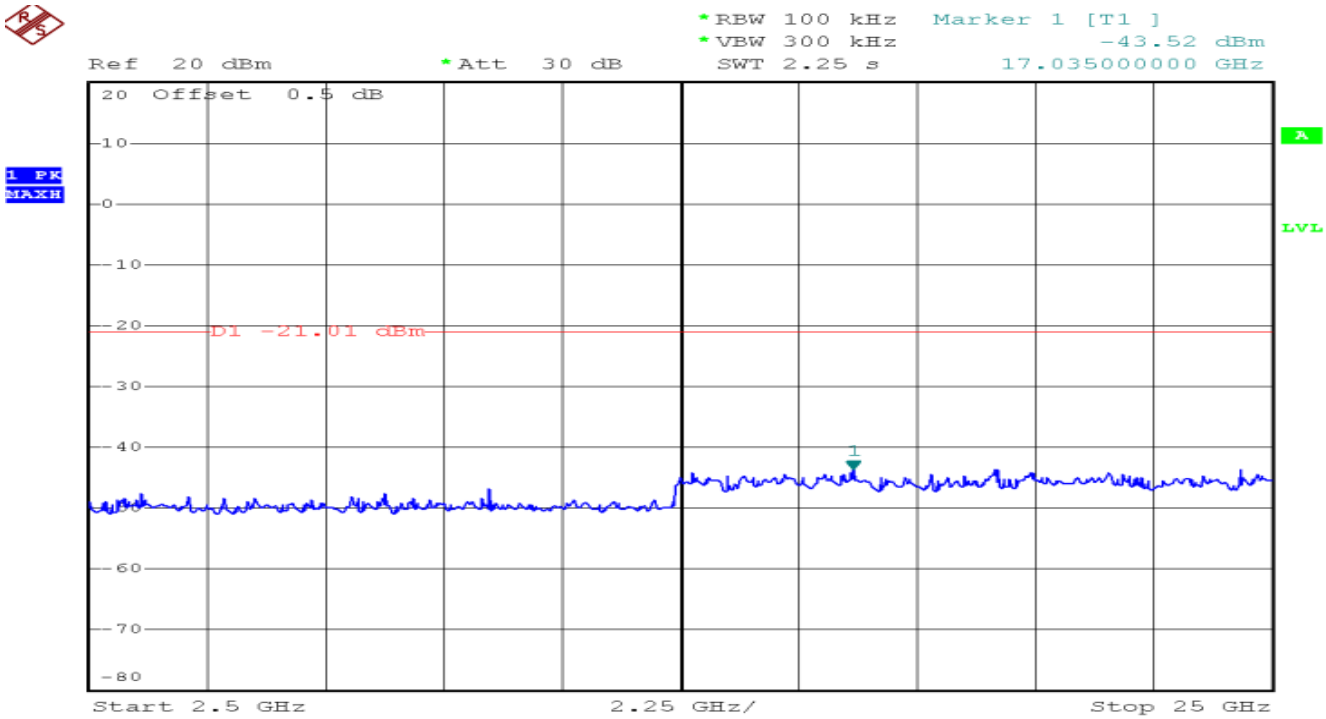




Transmit by 802.11n HT40 Channel 9

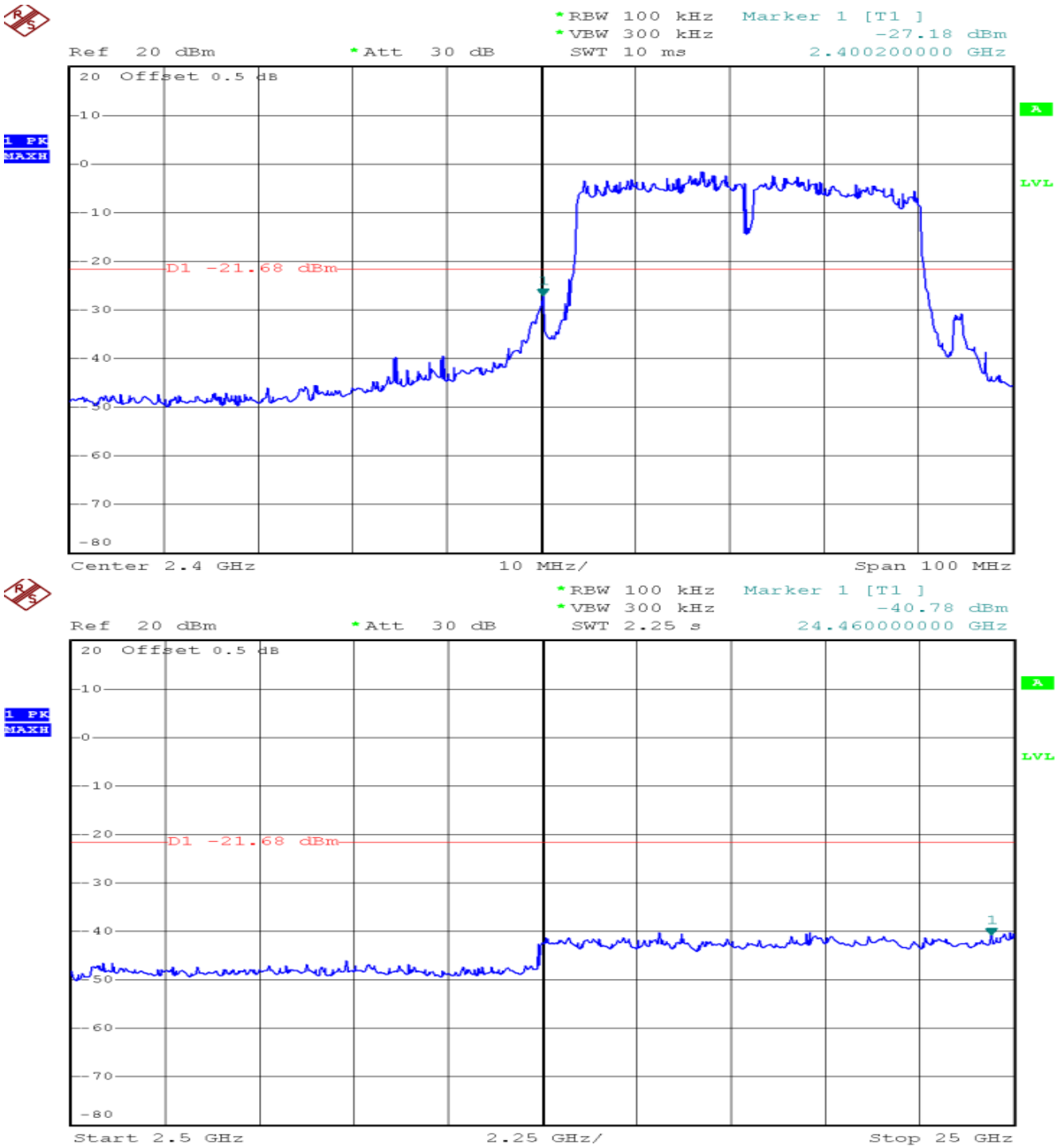
Chain 0





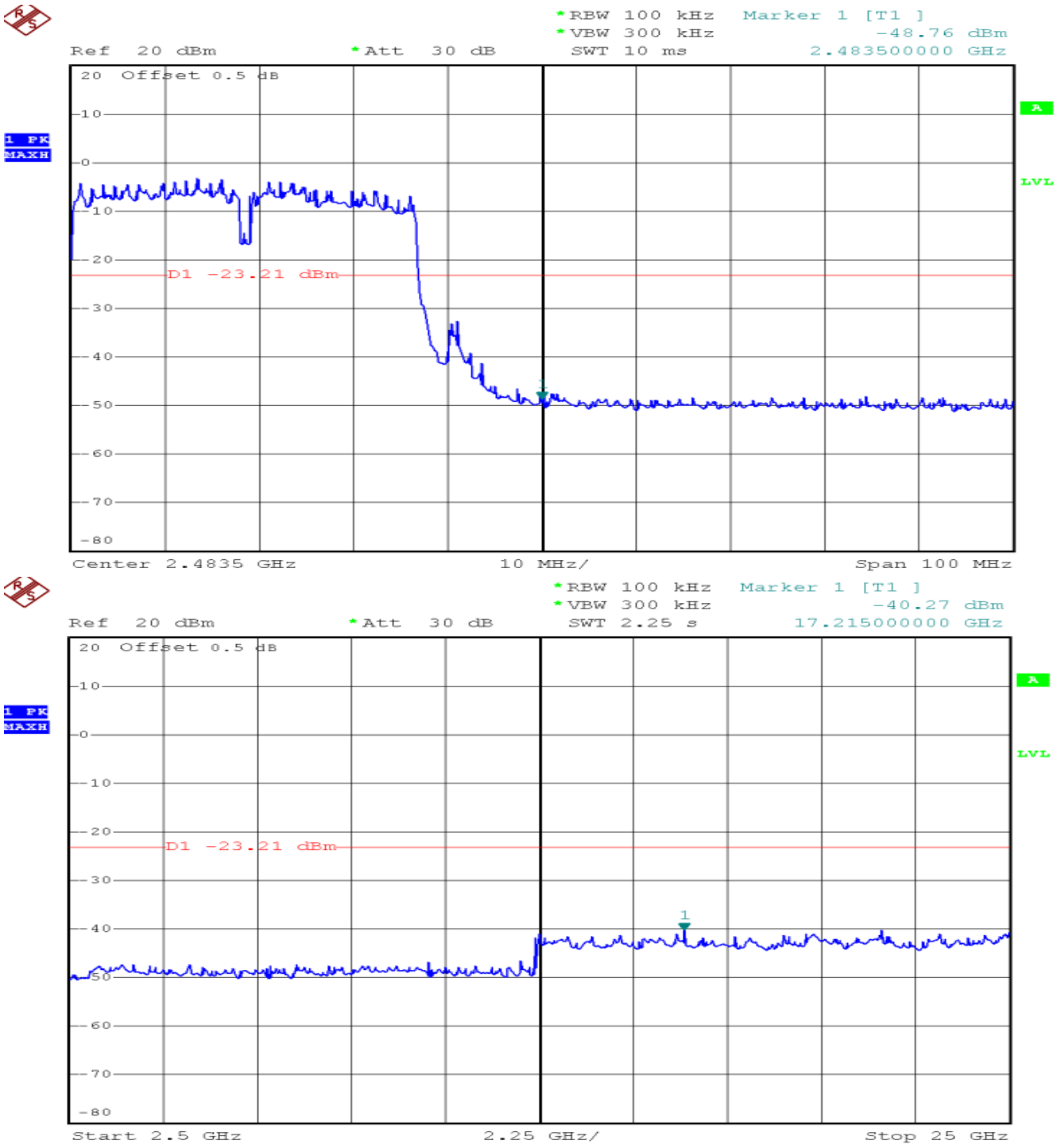
Transmit by 802.11n HT40 Channel 3

Chain 1



Transmit by 802.11n HT40 Channel 9

Chain 1



8.6. Restrict Band Emission Measurement Data

Test Date	:	2012-8-31
Temperature	:	24 ℃
Humidity	:	52 %
Atmospheric Pressure	:	1023 hPa

Modulation Standard: IEEE 802.11b (11Mbps)

Channel 1										Fundamental Frequency: 2412 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2351.71	H	53.51	10.60	64.11	Peak	74	54	-9.89	360	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2375.56	V	54.87	10.98	65.85	Peak	74	54	-8.15	360	100
2375.56	V	34.73	10.98	45.71	Ave	74	54	-8.29	0	100
Channel 11										Fundamental Frequency: 2462 MHz
2490.53	H	52.67	10.72	63.39	Peak	74	54	-10.61	50	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2485.87	V	53.77	11.02	64.79	Peak	74	54	-9.21	0	100
2485.66	V	33.67	11.02	44.69	Ave	74	54	-9.31	180	100

Modulation Standard: IEEE 802.11g (54Mbps)

Channel 1										Fundamental Frequency: 2412 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2336.98	H	51.45	10.54	61.99	Peak	74	54	-12.01	34	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2335.47	V	52.31	10.98	63.29	Peak	74	54	-10.71	266	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----
Channel 11										Fundamental Frequency: 2462 MHz
2492.88	H	51.45	10.72	62.17	Peak	74	54	-11.83	360	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2494.92	V	52.31	11.02	63.33	Peak	74	54	-10.67	103	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----

Modulation Standard: IEEE 802.11n HT20 (130Mbps)

Channel 1										Fundamental Frequency: 2412 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2345.56	H	52.45	10.55	63.00	Peak	74	54	-11.00	0	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2346.91	V	53.21	10.99	64.20	Peak	74	54	-9.80	360	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----
Channel 11										Fundamental Frequency: 2462 MHz
2495.76	H	50.56	10.71	61.27	Peak	74	54	-12.73	360	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2496.34	V	52.45	11.01	63.46	Peak	74	54	-10.54	0	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----

Modulation Standard: IEEE 802.11n HT40 (270Mbps)

Channel 3										Fundamental Frequency: 2422 MHz
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2333.91	H	51.35	10.53	61.88	Peak	74	54	-12.12	0	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2380.84	V	53.84	10.97	64.81	Peak	74	54	-9.19	360	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----
Channel 9										Fundamental Frequency: 2452 MHz
2496.12	H	52.25	10.70	62.95	Peak	74	54	-11.05	360	100
-----	H	-----	-----	-----	Ave	74	54	-----	-----	-----
2484.67	V	53.73	11.01	64.74	Peak	74	54	-9.26	360	100
-----	V	-----	-----	-----	Ave	74	54	-----	-----	-----

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.

9. Power Spectral Density

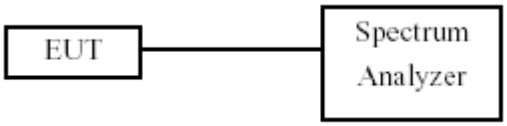
9.1. Test Limit

The Maximum of Power Spectral Density Measurement is 8dBm.

9.2. Test Procedure

a. The transmitter output was connected to spectrum analyzer.
b. The spectrum analyzer's resolution bandwidth were set at 100KHz RBW and 300KHz VBW as that of the fundamental frequency. Set the sweep time=auto couple.
c. Scale the observed power level to an equivalent value in 3 kHz by adjusting the measured power by a bandwidth correction factor (BWCF) where BWCF= 10log (3 kHz/100 = -15.2 dB).
d. The power spectral density was measured and recorded.

9.3. Test Setup Layout



9.4. Measurement Equipment

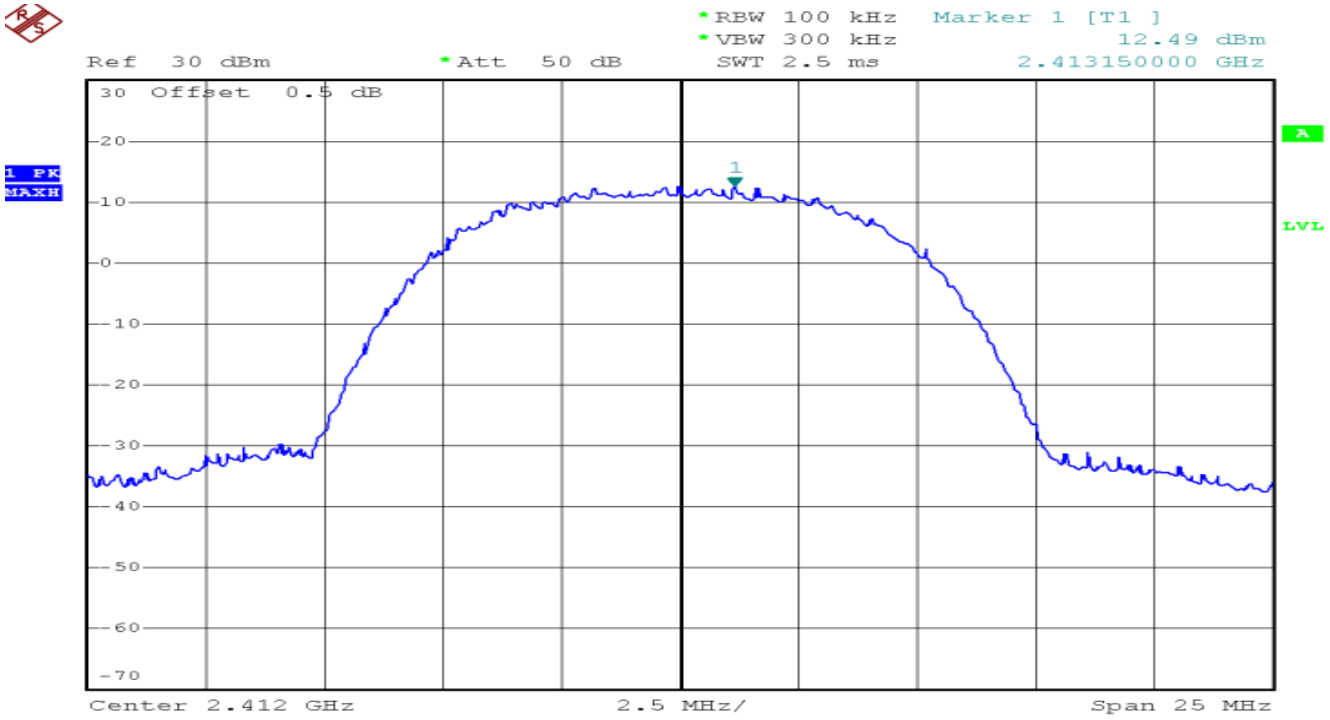
Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

9.5. Test Result and Data

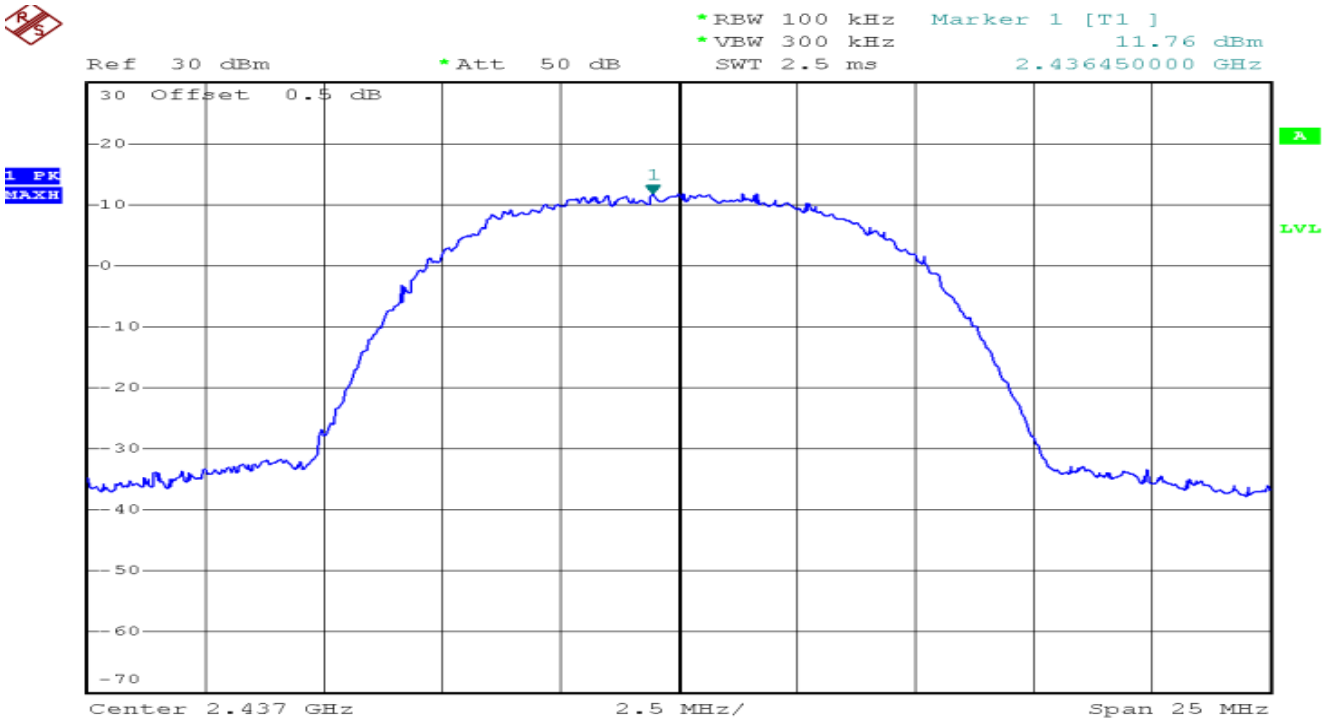
Test Item	Power Spectral Density
Test Mode	Transmit by 802.11b
Test Date	2012-8-31

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
01	2412	-2.71	8	Pass
06	2437	-3.44	8	Pass
11	2462	-4.61	8	Pass

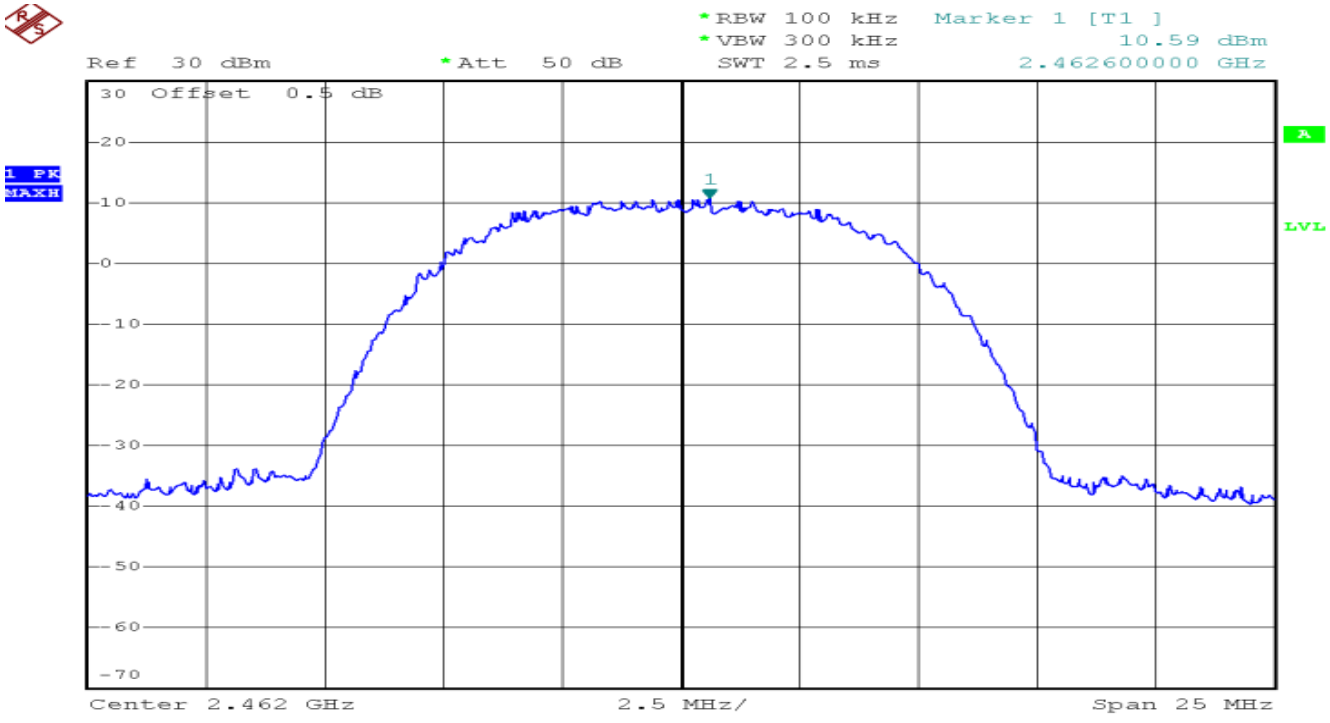
Channel 01 (2412MHz)



Channel 06 (2437MHz)



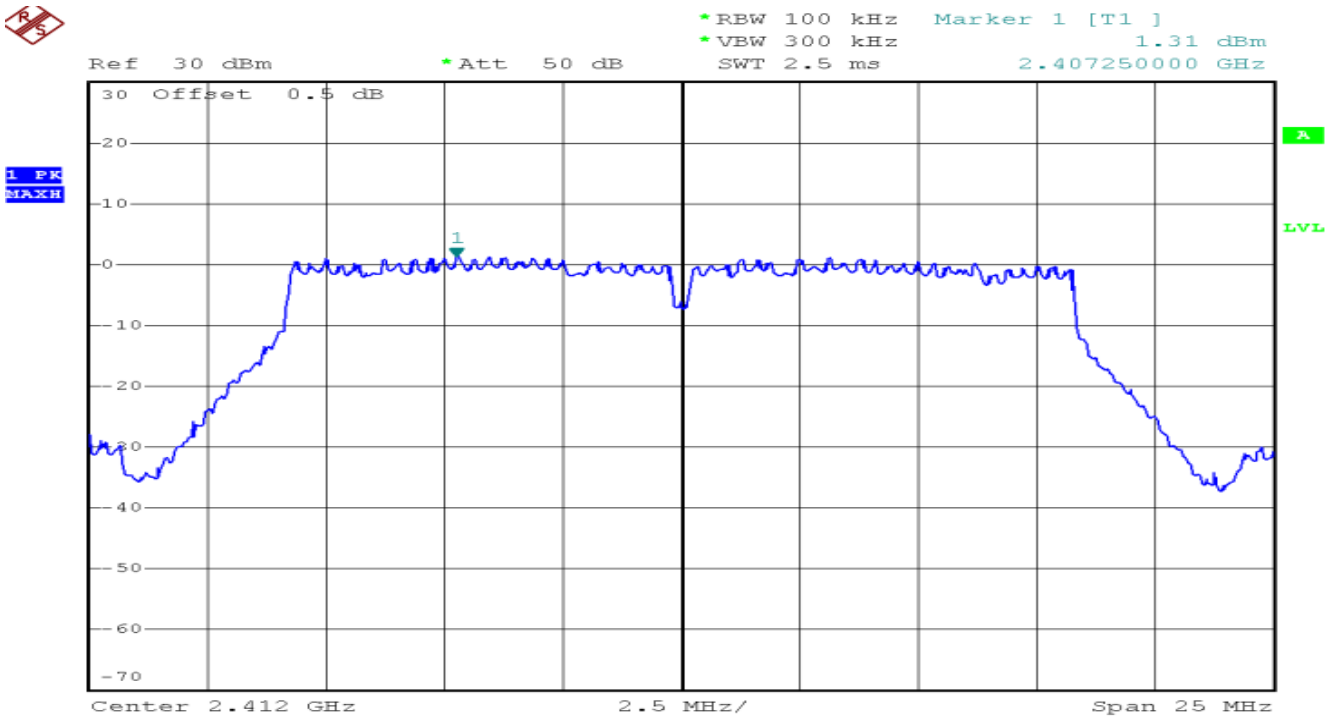
Channel 11 (2462MHz)



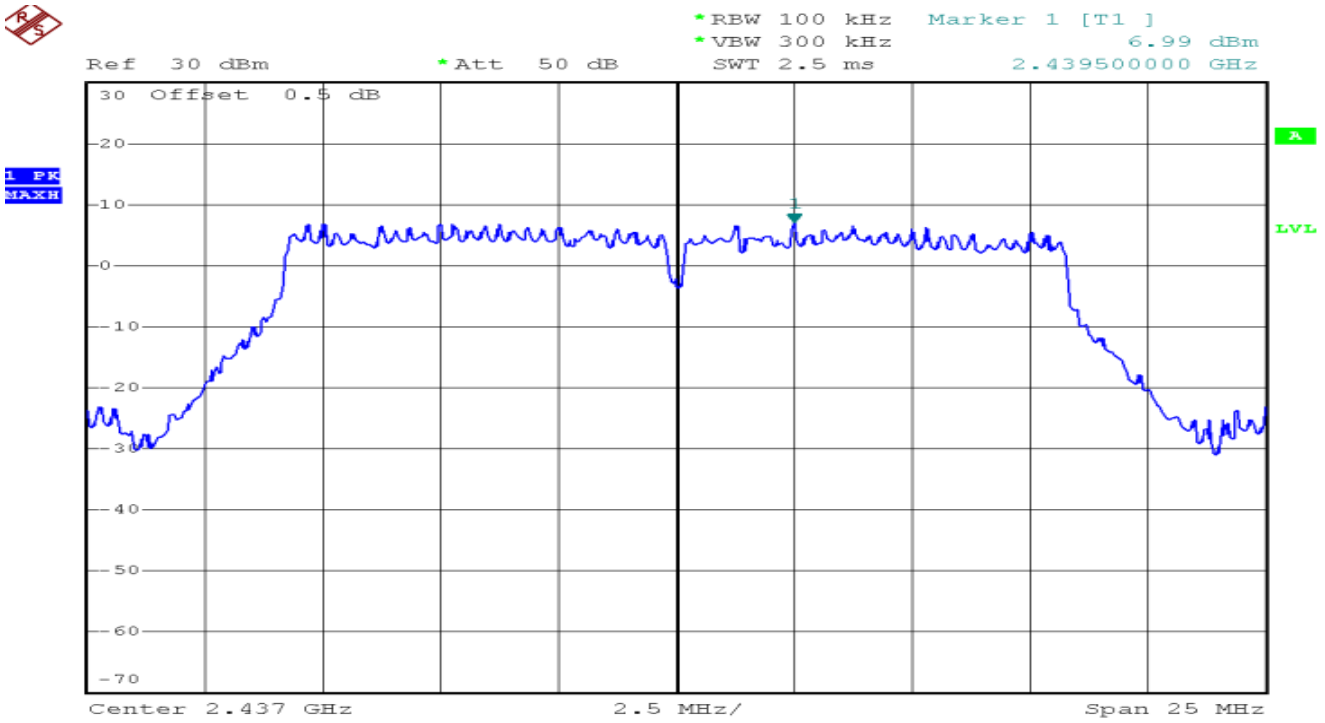
Test Item	Power Spectral Density
Test Mode	Transmit by 802.11g
Test Date	2012-8-31

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
01	2412	-13.89	8	Pass
06	2437	-8.21	8	Pass
11	2462	-14.88	8	Pass

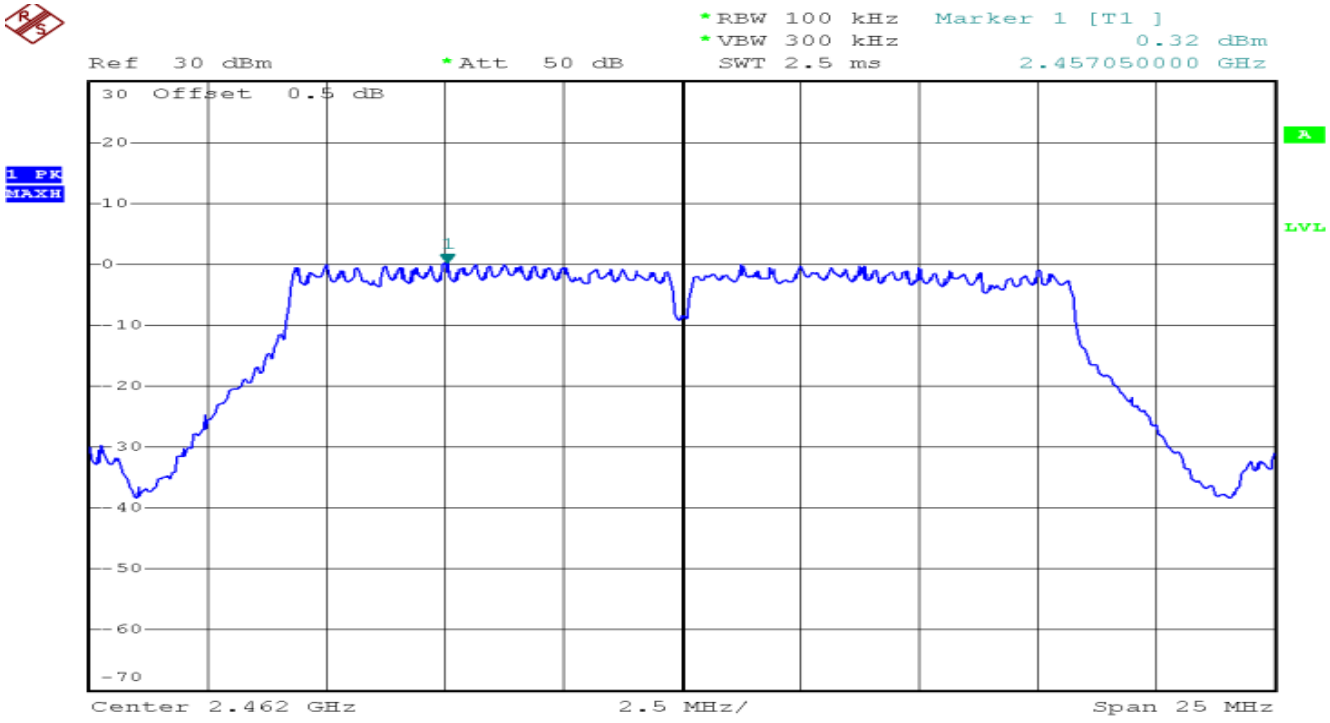
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



Test Item	Power Spectral Density
Test Mode	Transmit by 802.11n (20MHz)
Test Date	2012-8-31

Chain 0

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
01	2412	-14.07	8	Pass
06	2437	-8.10	8	Pass
11	2462	-15.14	8	Pass

Chain 1

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
01	2412	-16.08	8	Pass
06	2437	-11.73	8	Pass
11	2462	-17.73	8	Pass

Chain 0+Chain 1

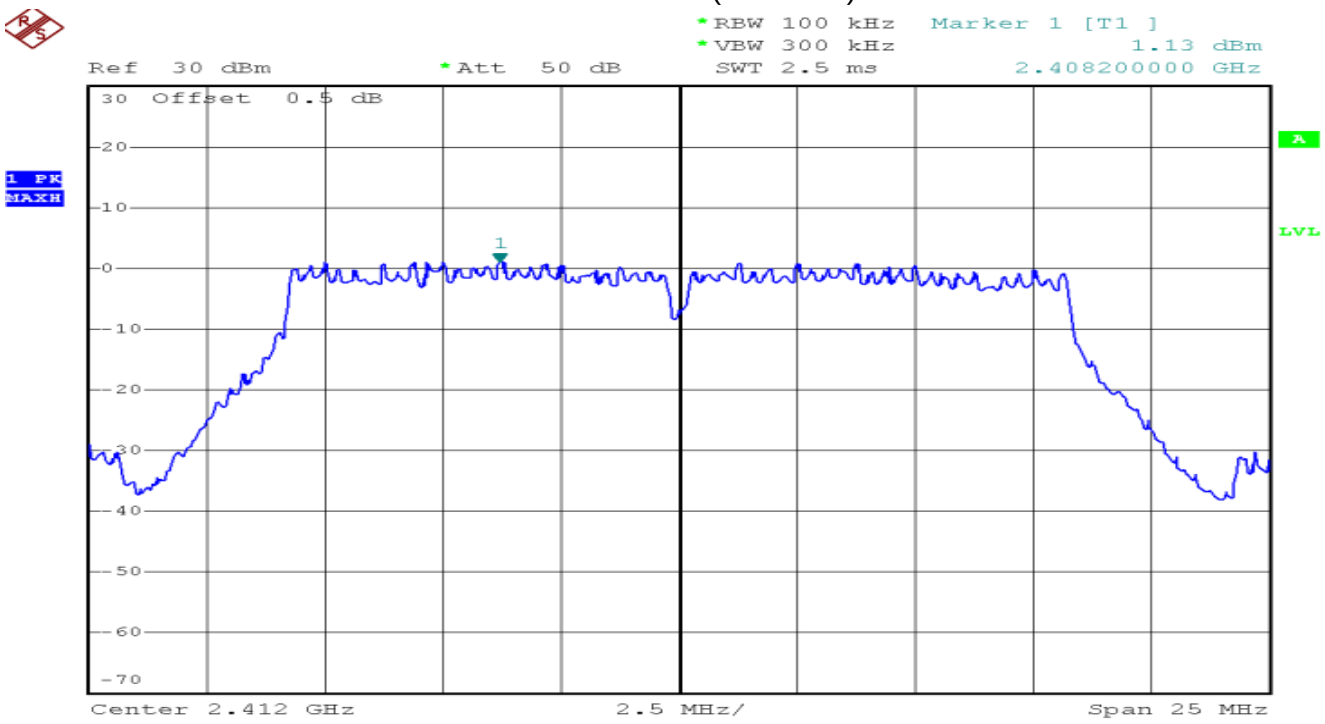
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)*	Result
03	2412	-11.95	7.99	Pass
06	2437	-6.54	7.99	Pass
09	2462	-13.23	7.99	Pass

Note: Power Spectral Density =10*LOG10(10^(Chain 0/10)+10^(Chain 1/10))

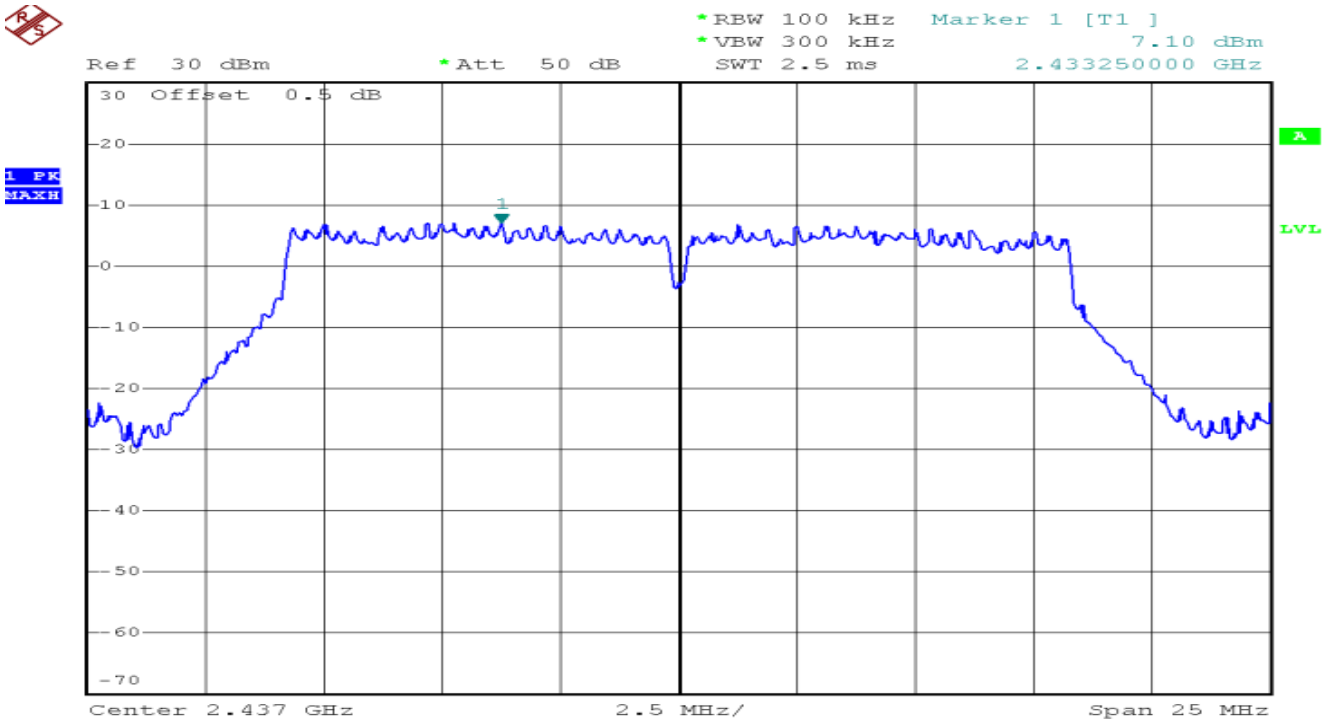
*: Required Limit=8-(6.01-6)=7.99

Chain 0

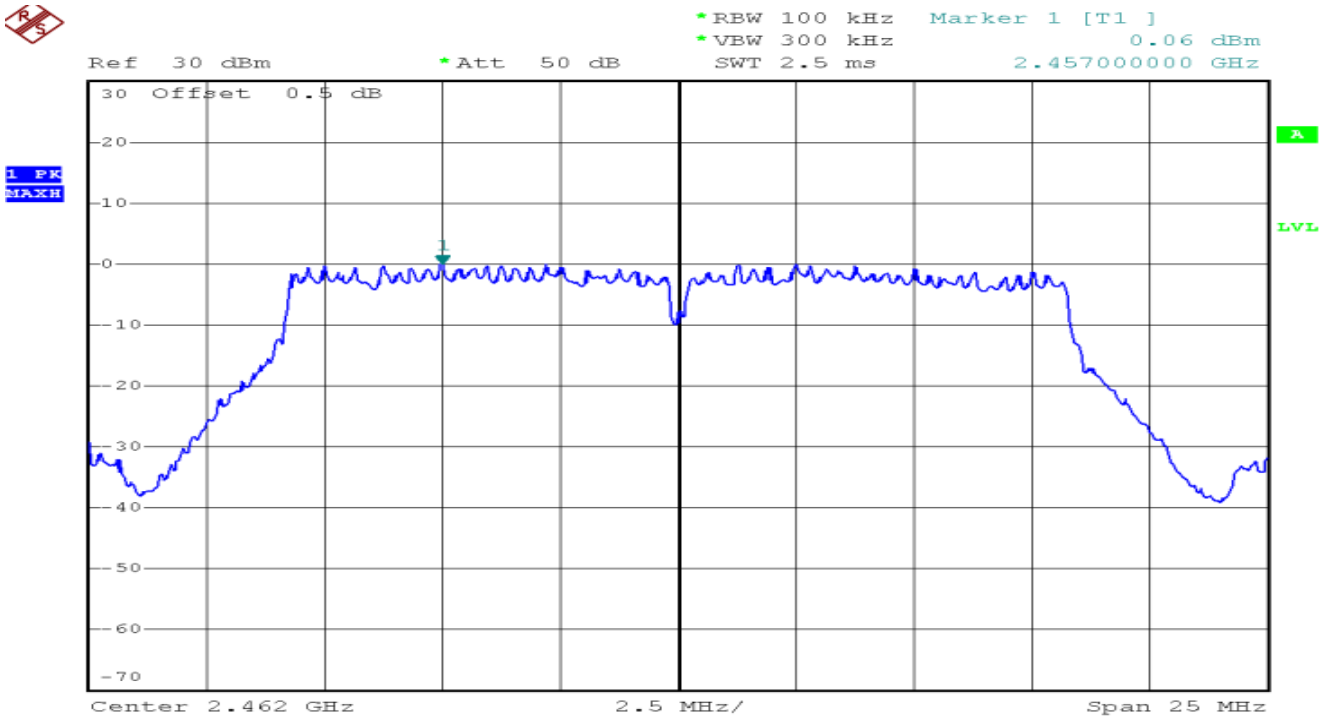
Channel 01 (2412MHz)



Channel 06 (2437MHz)

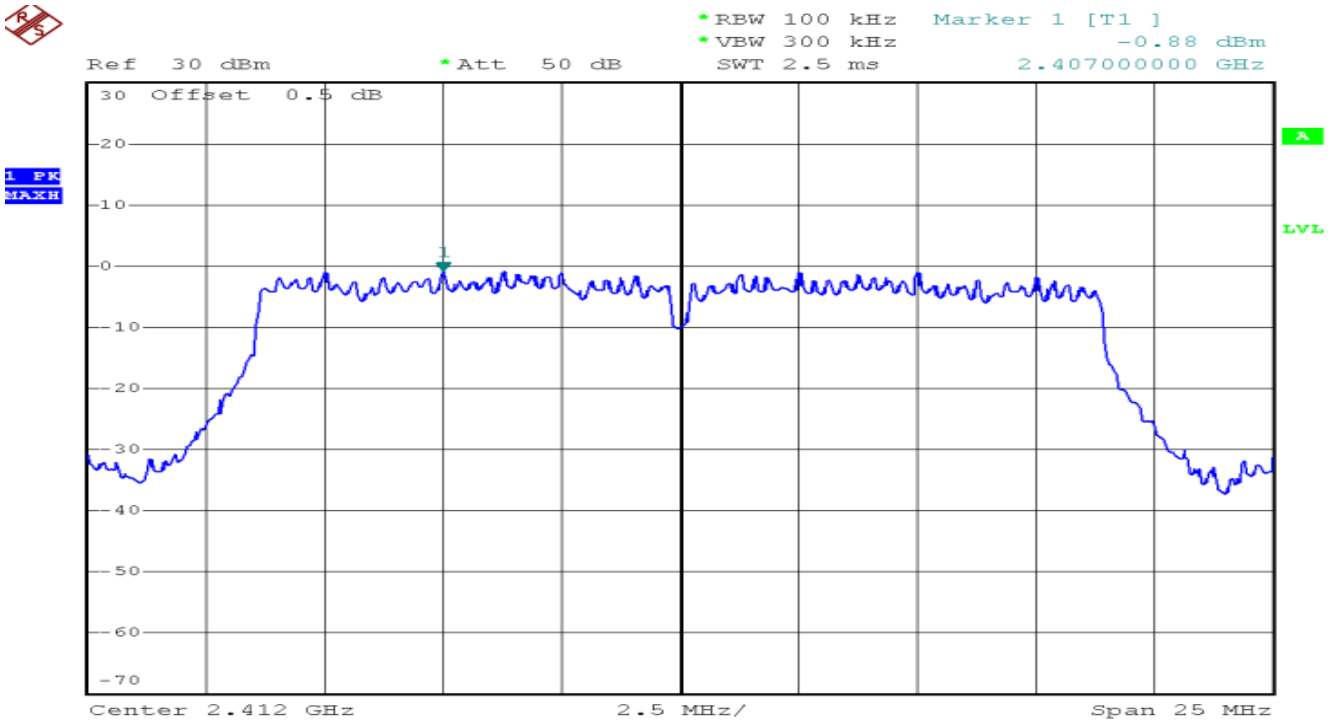


Channel 11 (2462MHz)

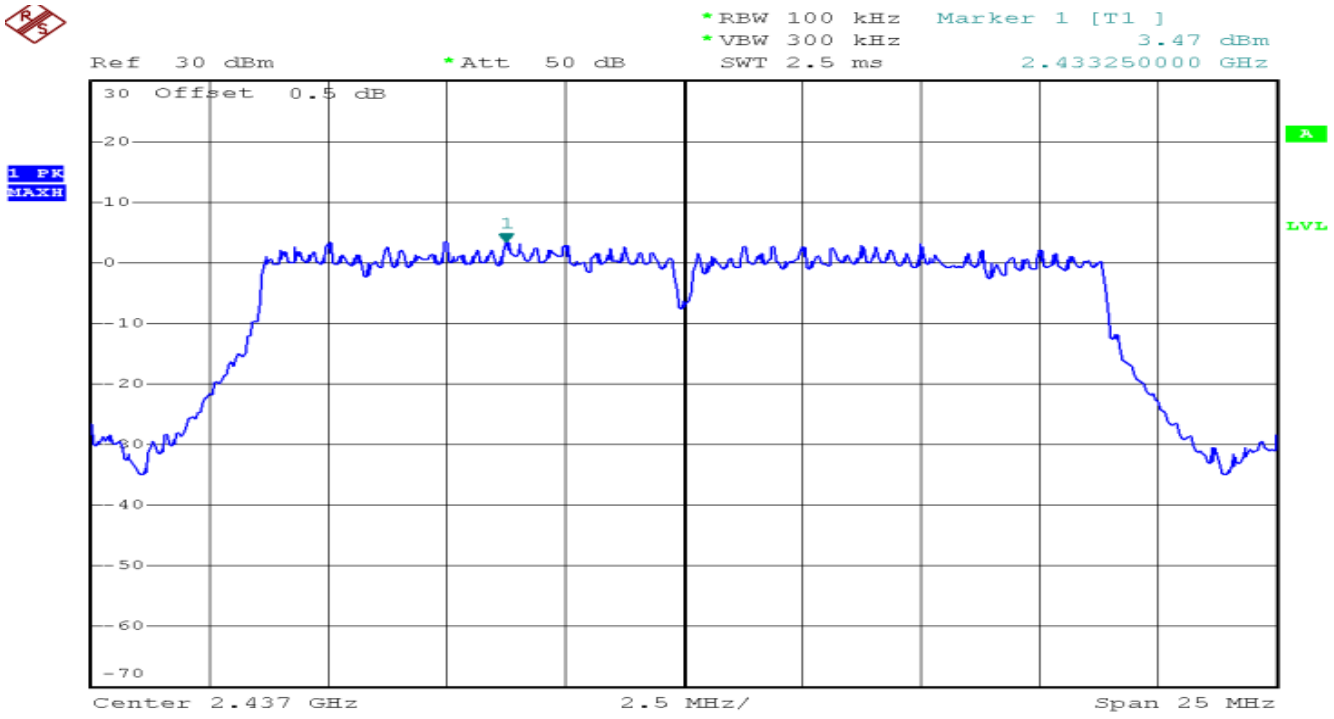


Chain 1

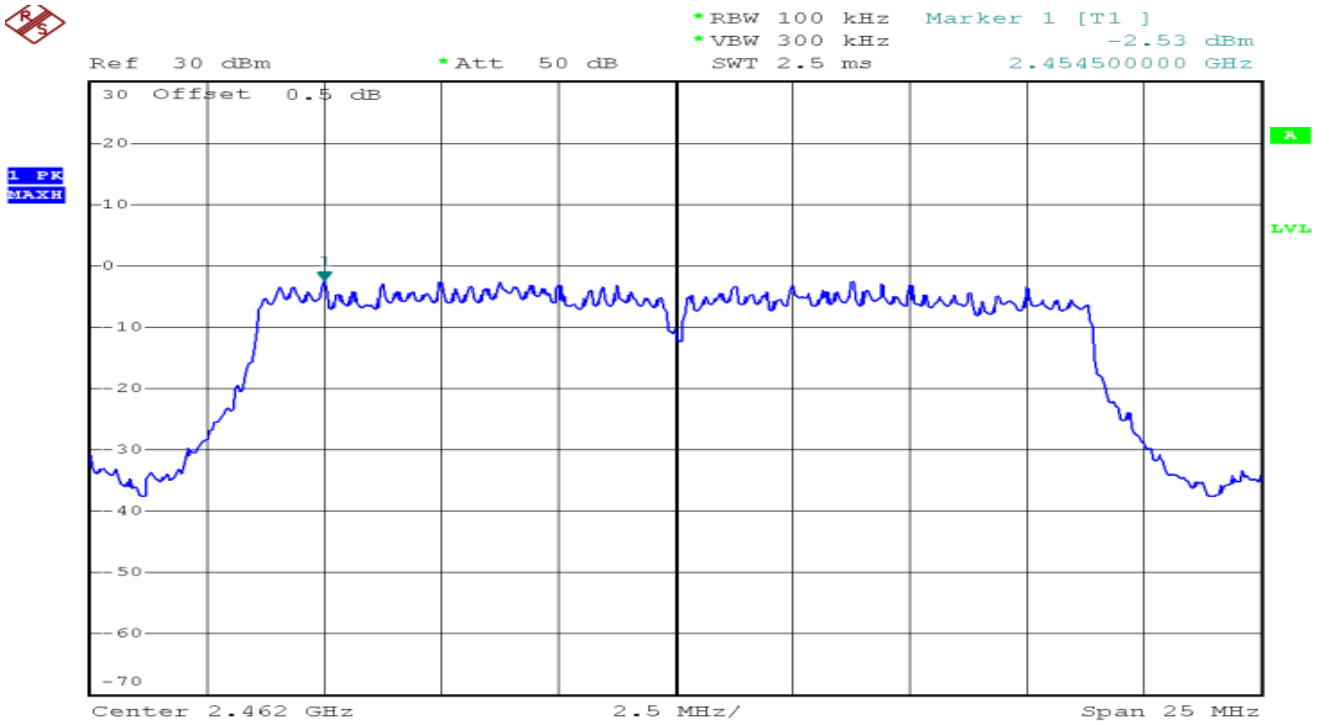
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



Test Item	Power Spectral Density
Test Mode	Transmit by 802.11n (40MHz)
Test Date	2012-8-31

Chain 0

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
03	2422	-14.21	8	Pass
06	2437	-12.03	8	Pass
09	2452	-16.28	8	Pass

Chain 1

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
03	2422	-16.89	8	Pass
06	2437	-13.70	8	Pass
09	2452	-17.46	8	Pass

Chain 0+Chain 1

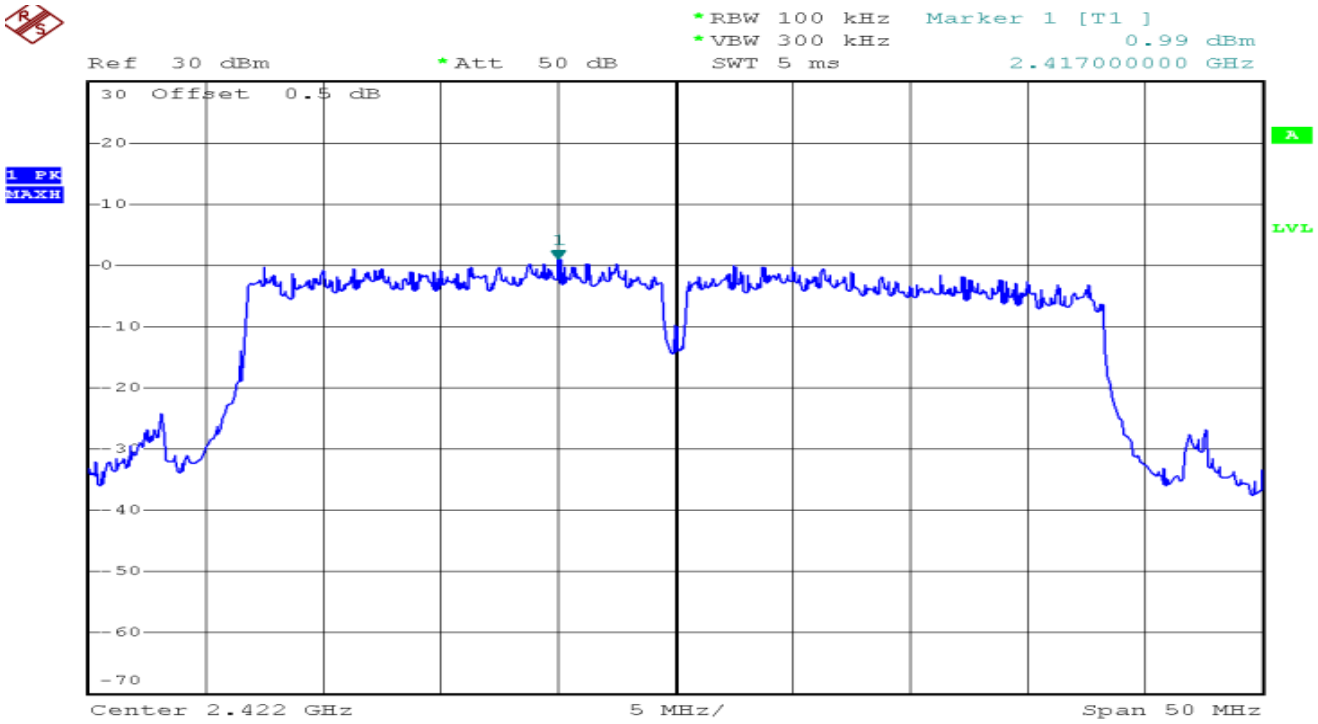
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
03	2422	-12.34	7.99	Pass
06	2437	-9.77	7.99	Pass
09	2452	-13.82	7.99	Pass

Note: Power Spectral Density =10*LOG10(10^(Chain 0/10)+10^(Chain 1/10))

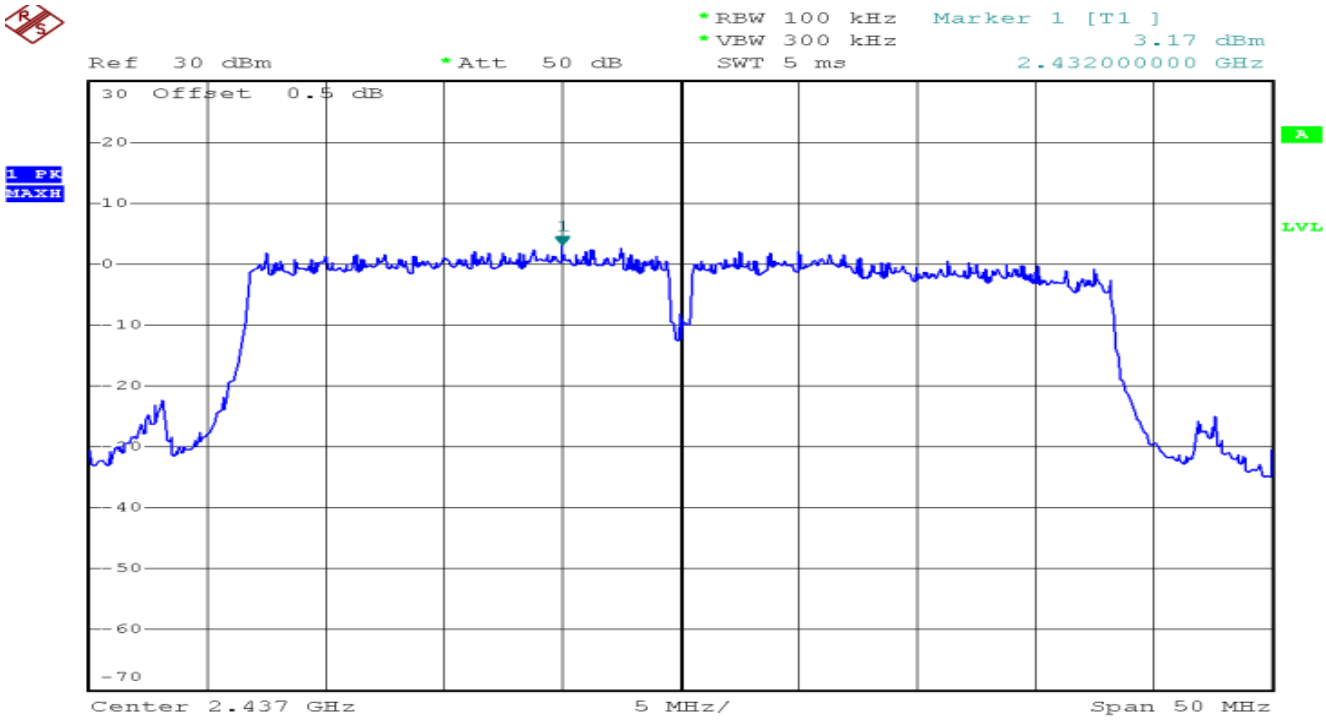
*: Required Limit=8-(6.01-6)=7.99

Chain 0

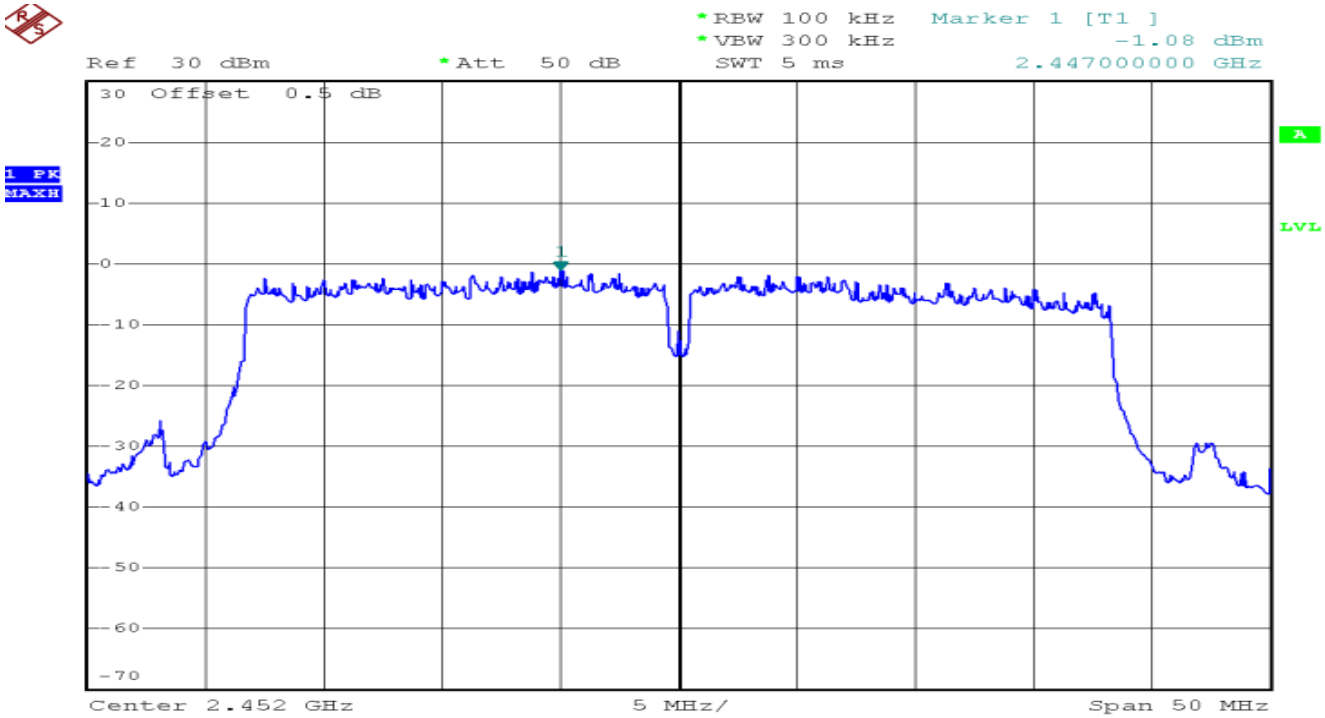
Channel 03 (2422MHz)



Channel 06 (2437MHz)

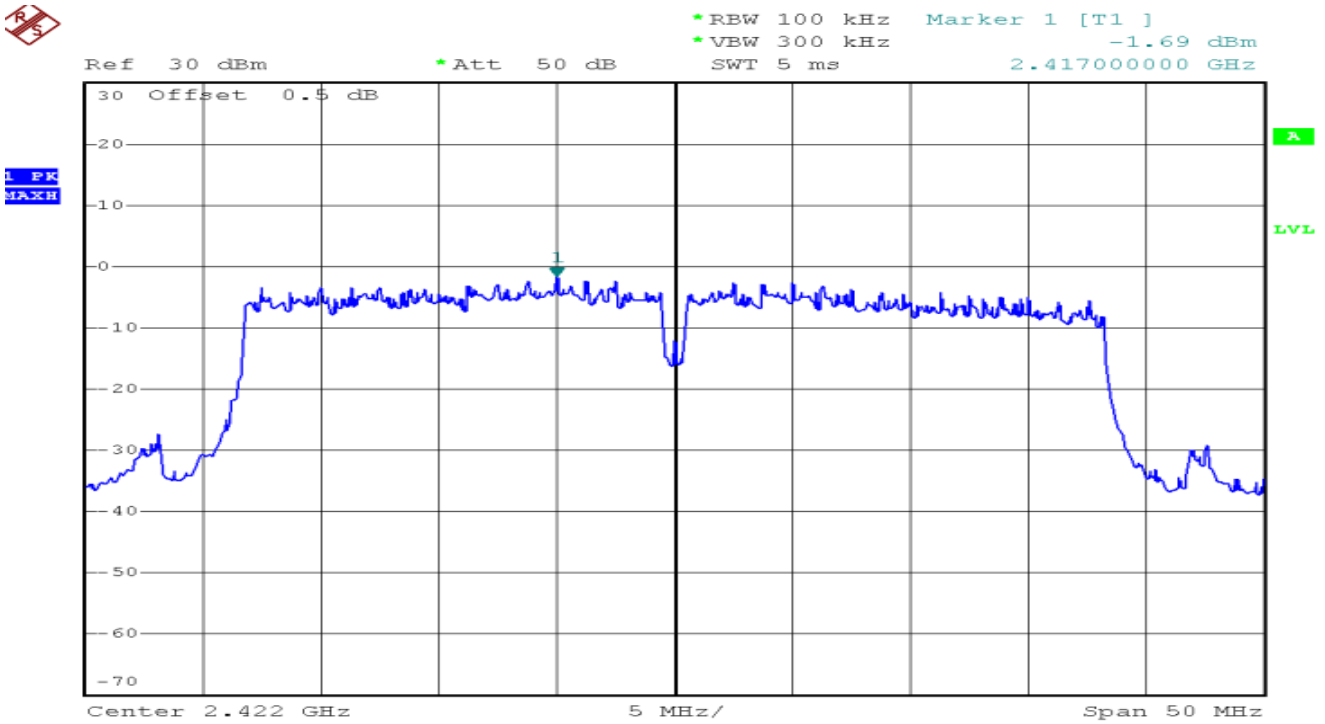


Channel 09 (2452MHz)

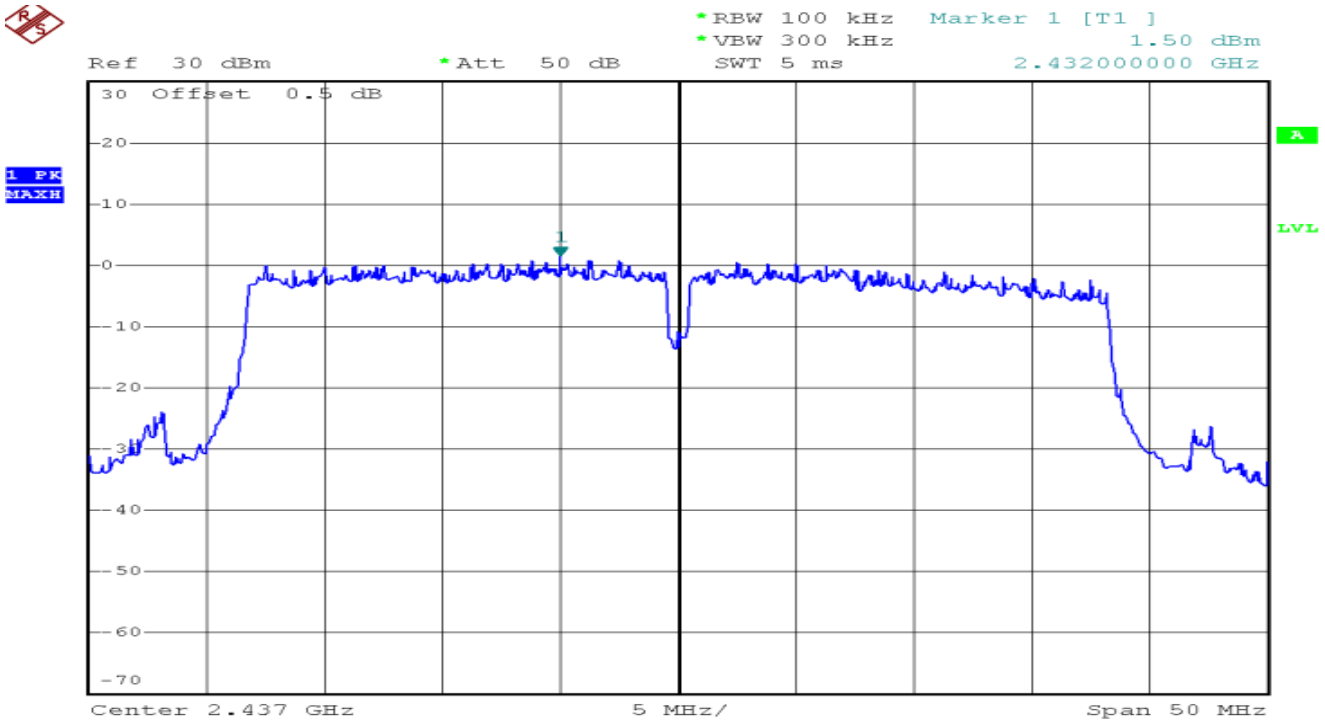


Chain 1

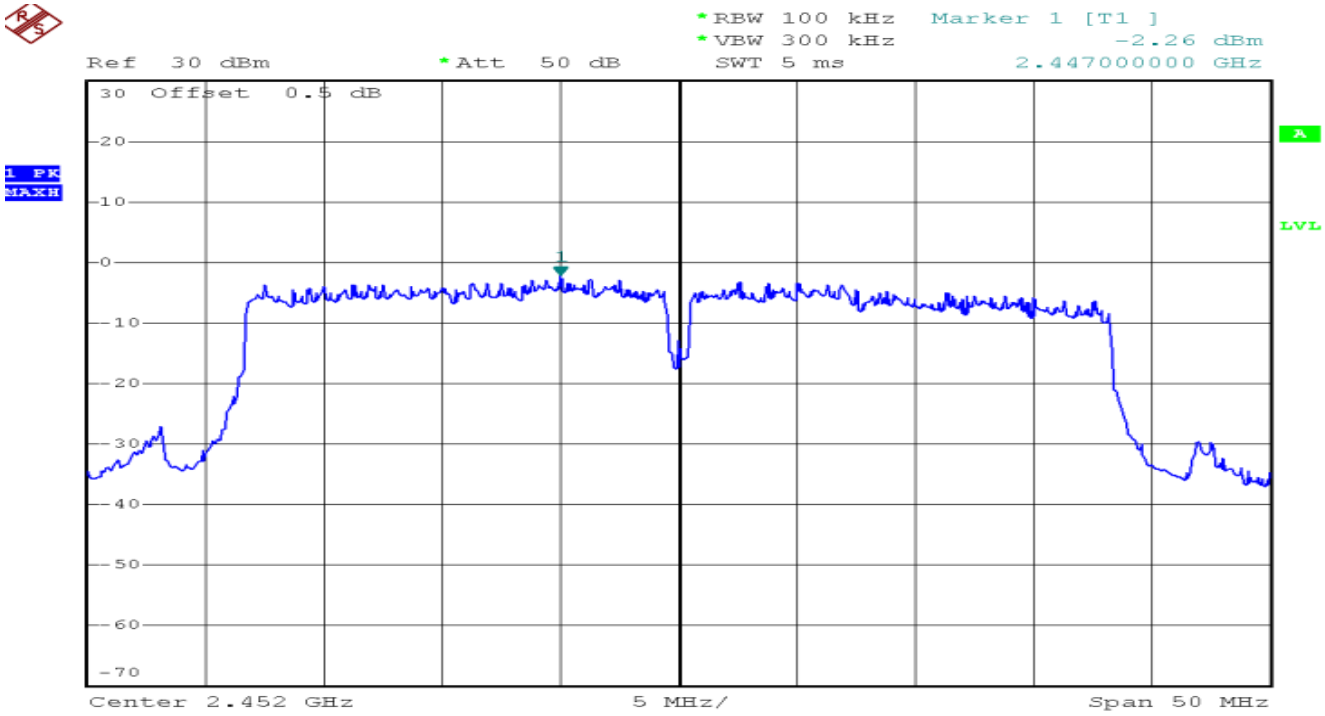
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



10. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

10.1.Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.