

# MEASUREMENT REPORT


(FCC : Part 15 Subpart C (15.247) / ANSI C63.4-2003)




Testing Laboratory  
1288

Product.....: A/VDSL Bonded Router  
Trade Name.....: COMTREND  
Model No.....: NexusLink-3111u, NexusLink-3110u  
Applicant.....: COMTREND CORPORATION  
Applicant Address.....: 3F-1, No.10, Lane 609, Chongxin Road,  
City 24159, Taiwan

<b>Report Number</b>	MLT1304P15002
<b>Applicant</b>	COMTREND CORPORATION
<b>Product</b>	A/VDSL Bonded Router
<b>Sample Received Date</b>	2013/4/1
<b>Sample Tested Date</b>	2013/4/1 ~ 2013/4/18

<b>Report Prepared By</b>	Jesse Tien
<b>Signature</b>	
<b>Date Prepared</b>	2013/4/23

<b>Report Authorized By</b>	Roger Chen
<b>Signature</b>	
<b>Date Authorized</b>	2013/4/23

Test By

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 laboratory.

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## CERTIFICATION

We here by verify that :


The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4-2003. All test were conducted by


MLT(Max Light Technology Co.,Ltd) Room 5, 8F, No.125, Section 3 Roosevelt Road, Taipei, Taiwan, R.O.C Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is in compliance with Class B radiated and conducted emission limit of FCC Rules Part 15 Subpart C (15.247).

<b>Applicant Name</b>	COMTREND CORPORATION
<b>Applicant Address</b>	3F-1, No.10, Lane 609, Chongxin Road, Section 5,Sanchong Dist, New Taipei City 24159, Taiwan
<b>Manufacturer Name</b>	COMTREND CORPORATION
<b>Manufacturer Address</b>	3F-1, No.10, Lane 609, Chongxin Road, Section 5,Sanchong Dist, New Taipei City 24159, Taiwan

<b>Equipment</b>	A/VDSL Bonded Router
<b>Model No</b>	NexusLink-3111u, NexusLink-3110u
<b>FCC ID</b>	L9VNL-3111U

<b>Report Prepared By</b>	Jesse Tien
<b>Signature</b>	

<b>Report Authorized By</b>	Roger Chen
<b>Signature</b>	

## 1. General

### 1.1 Introduction

The following measurement report is submitted on behalf of COMTREND CORPORATION In support of a Class B Digital Device certification in accordance with Part2 Subpart J and Part 15 Subpart C of the Commission's and Regulations.

### 1.2 Customer Details

<b>Applicant Name</b>	COMTREND CORPORATION
<b>Applicant Address</b>	3F-1, No.10, Lane 609, Chongxin Road, Section 5,Sanchong Dist, New Taipei City 24159, Taiwan
<b>Manufacturer Name</b>	COMTREND CORPORATION
<b>Manufacturer Address</b>	3F-1, No.10, Lane 609, Chongxin Road, Section 5,Sanchong Dist, New Taipei City 24159, Taiwan

### 1.3 Technical data of EUT

<b>Equipment</b>	A/VDSL Bonded Router
<b>Model No</b>	NexusLink-3111u, NexusLink-3110u
<b>FCC ID</b>	L9VNL-3111U
<b>Power Type</b>	Model : SYS1460-1212(EXP321) Input : AC100~240V , 50/60Hz , 1.0A Output : DC12V , 1A
<b>Type of Modulation</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>Transfer rate</b>	802.11b: 11/ 5.5/ 2/ 1Mbps 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n HT20: 130, 117, 104, 78, 52, 39, 26, 13Mbps 802.11n HT40: 270, 243, 216, 162, 108, 81, 54, 27Mbps
<b>Type of Antenna</b>	Dipole Antenna
<b>Frequency of Channel</b>	See Next page

During testing the EUT was operated at Tx or Rx mode for each emission measured. This was done in order to ensure that maximum emission levels were attained.

**802.11b & 802.11g & 802.11n HT20 Frequency of Each Channel (Working Frequency)**

Channel No.	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

**802.11n HT40 Frequency of Each Channel (Working Frequency)**

Channel No.	Frequency (MHz)
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452

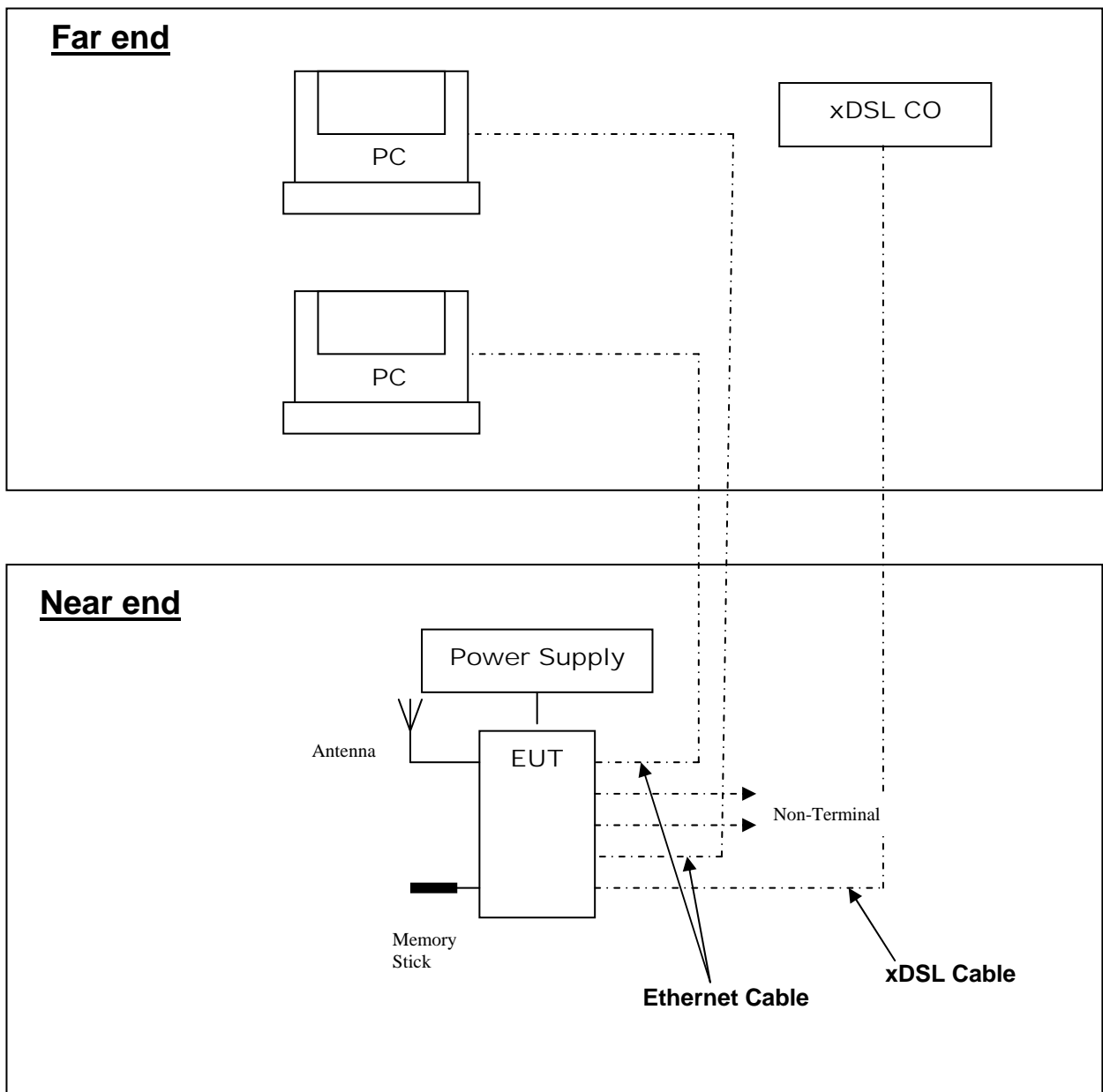
**1.4 Summary Of Tests**

47 CFR Part 15 Subpart C			
Reference	Test	Results	Note
15.207	AC Power Conducted Emission	PASS	
15.209	Radiated Emission	PASS	
15.247(c)	Transmitter Radiated Emissions	PASS	
15.247(b)	Max. Output Power	PASS	
15.247(a)(2)	6dB RF Bandwidth	PASS	
15.247(d)	Max. Power Density	PASS	
15.247(c)	Out of Band Conducted Spurious Emission	PASS	
15.247(c)	Band Edge Measurement	PASS	
15.203	Antenna Requirement	PASS	

## 1.5 Description of Support Equipment

In order to construct the minimum system which required by the ANSI C63.4-2003 / ICES-003: 2004, all the peripheral equipments were located in the far end.

## 1.6 Configuration of System Under Test





## 1.7 Test Procedure

All measurements contained in this report were performed according to the techniques described in Measurement procedure ANSI C63.4-2003 followed KDB 558074 v03r01 and KDB 662911 for this testing.

## 1.8 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests were chosen as that which produced the highest emission levels. However, only those conditions which the EUT was considered likely to encounter in normal use were investigated. The system's radiated and conducted emissions were investigated while the computer alternately transferred data to the EUT as well as to the monitor and printer. Using a test program which sent a continuous data and transferred data to and from the EUT was proven to worst case emissions. The system's physical layout and cabling was randomly arranged to ensure that maximum emission levels were attained.

This assessment of the maximum conducted output power tests is base on the minimum transfer rate will produce a maximum output power.

802.11b data rate: 5.5M

802.11g data rate: 6M

802.11gn HT20 data rate: 13M

802.11gn HT40 data rate: 27M

## 2. Conducted Emissions Requirements

### 2.1 General & Setup :

The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3825/2 Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 2.5.

### 2.2 Test Equipment List :

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	HP	Spectrum Analyzer	73412A00110	8591EM	2013/03/21	2014/03/21
2.	EMCO	LISN	2658	3825/2	2013/03/01	2014/03/01
3.	TESEQ	ISN	24801	ISN T8	2012/04/26	2013/04/26

## 2.3 Test Condition :

EUT tested in accordance with the specifications given by the manufacturer, and exercised in the most unfavorable manner.

## 2.4 Conducted Emissions Limits :

### FCC Part 15

Frequency range (MHz)	Limits (dBuV)			
	Class A		Class B	
	QP	Avg.	QP	Avg.
0.15 to 0.50	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 30	73	60	60	50

## 2.5 Measurement Data Of Conducted Emissions :

### 2.5.1 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11b CH01

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.189	44.50	--	1.12	64.06	54.06	45.62	--
	1.027	35.28	--	1.28	56	46	36.56	--
	1.184	36.85	--	1.35	56	46	38.20	--
	2.384	38.32	--	1.83	56	46	40.15	--
	3.190	35.45	--	1.95	56	46	37.40	--
	4.721	34.52	--	2.00	56	46	36.52	--
	7.566	37.25	--	1.99	60	50	39.24	--
L2	0.182	43.99	--	1.07	64.37	54.37	45.06	--
	0.953	37.04	--	1.21	56	46	38.25	--
	1.249	36.83	--	1.30	56	46	38.13	--
	1.396	36.49	--	1.32	56	46	37.81	--
	2.346	39.18	--	1.73	56	46	40.91	--
	4.598	36.01	--	1.98	56	46	37.99	--
	7.329	37.55	--	1.95	60	50	39.50	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### 2.5.2 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11b CH06

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.186	45.17	--	1.12	64.2	54.2	46.29	--
	1.027	39.58	--	1.28	56	46	40.86	--
	1.191	38.16	--	1.35	56	46	39.51	--
	1.324	37.62	--	1.34	56	46	38.96	--
	2.461	37.69	--	1.83	56	46	39.52	--
	4.598	34.46	--	2.01	56	46	36.47	--
	7.526	37.34	--	2.01	60	50	39.35	--
L2	0.182	43.08	--	1.07	64.37	54.37	44.15	--
	0.466	34.31	--	1.14	56.58	46.58	35.45	--
	0.809	35.42	--	1.18	56	46	36.60	--
	1.172	39.11	--	1.28	56	46	40.39	--
	2.358	36.74	--	1.73	56	46	38.47	--
	4.384	36.58	--	1.96	56	46	38.54	--
	7.486	38.57	--	1.95	60	50	40.52	--

**Notes :** 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.

3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.

4. The above test results are obtained under the normal condition.

5. Amplitude = Read + Factor

### 2.5.3 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11b CH11

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.186	43.15	--	1.12	64.2	54.2	44.27	--
	1.027	38.43	--	1.28	56	46	39.71	--
	1.100	37.67	--	1.30	56	46	38.97	--
	1.331	37.10	--	1.32	56	46	38.42	--
	2.321	39.59	--	1.80	56	46	41.39	--
	3.258	35.56	--	1.96	56	46	37.52	--
	4.574	34.78	--	2.05	56	46	36.83	--
L2	0.735	36.66	--	1.18	56	46	37.84	--
	1.027	39.41	--	1.23	56	46	40.64	--
	1.331	38.47	--	1.32	56	46	39.79	--
	2.099	37.24	--	1.73	56	46	38.97	--
	2.396	37.86	--	1.74	56	46	39.60	--
	4.525	37.65	--	1.99	56	46	39.64	--
	7.213	38.94	--	1.95	60	50	40.89	--

**Notes :** 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.

3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.

4. The above test results are obtained under the normal condition.

5. Amplitude = Read + Factor

### 2.5.4 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11g CH01

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.186	43.80	--	1.12	64.2	54.2	44.92	--
	1.027	41.20	--	1.28	56	46	42.48	--
	1.249	37.56	--	1.36	56	46	38.92	--
	2.155	36.98	--	1.74	56	46	38.72	--
	2.422	38.14	--	1.83	56	46	39.97	--
	4.746	34.49	--	2.01	56	46	36.50	--
	7.606	37.42	--	2.01	60	50	39.43	--
L2	0.182	42.59	--	1.07	64.37	54.37	43.66	--
	0.564	35.67	--	1.13	56	46	36.80	--
	1.106	37.90	--	1.25	56	46	39.15	--
	1.411	38.89	--	1.32	56	46	40.21	--
	2.358	38.62	--	1.73	56	46	40.35	--
	4.384	36.35	--	1.96	56	46	38.31	--
	7.566	38.08	--	1.95	60	50	40.03	--

**Notes :** 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.

3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.

4. The above test results are obtained under the normal condition.

5. Amplitude = Read + Factor

### 2.5.5 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11g CH06

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.192	41.81	--	1.12	63.93	53.93	42.93	--
	1.027	41.04	--	1.28	56	46	42.32	--
	1.249	37.30	--	1.36	56	46	38.66	--
	2.358	37.66	--	1.82	56	46	39.48	--
	3.528	34.27	--	1.99	56	46	36.26	--
	4.746	34.35	--	2.01	56	46	36.36	--
	7.566	37.19	--	1.99	60	50	39.18	--
L2	0.182	42.15	--	1.07	64.37	54.37	43.22	--
	0.466	34.29	--	1.14	56.58	46.58	35.43	--
	0.549	35.84	--	1.13	56	46	36.97	--
	1.100	38.81	--	1.25	56	46	40.06	--
	2.396	37.86	--	1.74	56	46	39.60	--
	4.338	37.44	--	1.97	56	46	39.41	--
	7.407	38.26	--	1.95	60	50	40.21	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor



### 2.5.6 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11g CH11

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	41.45	--	1.12	64.37	54.37	42.57	--
	1.027	40.69	--	1.28	56	46	41.97	--
	1.331	36.09	--	1.32	56	46	37.41	--
	2.055	39.62	--	1.73	56	46	41.35	--
	2.321	37.14	--	1.80	56	46	38.94	--
	4.721	35.24	--	2.00	56	46	37.24	--
	7.446	37.17	--	2.04	60	50	39.21	--
L2	0.549	35.55	--	1.13	56	46	36.68	--
	0.779	37.83	--	1.18	56	46	39.01	--
	1.027	40.17	--	1.23	56	46	41.40	--
	1.338	39.25	--	1.32	56	46	40.57	--
	2.358	37.89	--	1.73	56	46	39.62	--
	4.525	36.30	--	1.99	56	46	38.29	--
	7.446	39.75	--	1.95	60	50	41.70	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### 2.5.7 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT20 CH01

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	44.65	--	1.12	64.37	54.37	45.77	--
	0.242	36.69	--	1.14	62.04	52.04	37.83	--
	1.021	40.32	--	1.30	56	46	41.62	--
	1.338	37.42	--	1.32	56	46	38.74	--
	2.396	38.89	--	1.83	56	46	40.72	--
	3.156	36.64	--	1.93	56	46	38.57	--
	4.952	34.83	--	2.06	56	46	36.89	--
L2	0.186	42.55	--	1.07	64.2	54.2	43.62	--
	0.431	35.14	--	1.14	57.24	47.24	36.28	--
	0.862	36.10	--	1.21	56	46	37.31	--
	1.249	38.25	--	1.30	56	46	39.55	--
	2.384	39.23	--	1.74	56	46	40.97	--
	4.647	37.65	--	1.96	56	46	39.61	--
	7.368	37.29	--	1.95	60	50	39.24	--

**Notes :** 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.

3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.

4. The above test results are obtained under the normal condition.

5. Amplitude = Read + Factor

### 2.5.8 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT20 CH06

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	44.04	--	1.12	64.37	54.37	45.16	--
	1.021	36.95	--	1.30	56	46	38.25	--
	1.191	36.73	--	1.35	56	46	38.08	--
	2.435	38.84	--	1.83	56	46	40.67	--
	4.772	35.04	--	2.01	56	46	37.05	--
	7.446	34.86	--	2.04	60	50	36.90	--
	10.072	33.73	--	2.00	60	50	35.73	--
L2	0.182	43.53	--	1.07	64.37	54.37	44.60	--
	1.021	40.45	--	1.21	56	46	41.66	--
	1.352	36.11	--	1.32	56	46	37.43	--
	2.396	38.50	--	1.74	56	46	40.24	--
	4.647	35.09	--	1.96	56	46	37.05	--
	7.368	36.46	--	1.95	60	50	38.41	--
	19.635	34.11	--	2.18	60	50	36.29	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### 2.5.9 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT20 CH11

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	43.13	--	1.12	64.37	54.37	44.25	--
	1.021	39.60	--	1.30	56	46	40.90	--
	1.255	36.86	--	1.36	56	46	38.22	--
	2.422	39.16	--	1.83	56	46	40.99	--
	4.549	35.26	--	2.05	56	46	37.31	--
	7.290	35.17	--	1.99	60	50	37.16	--
	21.373	33.67	--	2.19	60	50	35.86	--
L2	0.182	41.99	--	1.07	64.37	54.37	43.06	--
	0.529	35.56	--	1.13	56	46	36.69	--
	1.021	42.52	--	1.21	56	46	43.73	--
	1.396	39.42	--	1.32	56	46	40.74	--
	2.396	38.52	--	1.74	56	46	40.26	--
	4.501	37.92	--	1.99	56	46	39.91	--
	7.290	37.55	--	1.95	60	50	39.50	--

**Notes :** 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.

3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.

4. The above test results are obtained under the normal condition.

5. Amplitude = Read + Factor

### 2.5.10 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT40 CH03

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	43.04	--	1.12	64.37	54.37	44.16	--
	1.021	36.21	--	1.30	56	46	37.51	--
	1.249	34.49	--	1.36	56	46	35.85	--
	1.535	34.68	--	1.44	56	46	36.12	--
	2.461	40.04	--	1.83	56	46	41.87	--
	4.772	35.11	--	2.01	56	46	37.12	--
	7.407	37.81	--	2.02	60	50	39.83	--
L2	0.564	35.18	--	1.13	56	46	36.31	--
	0.735	37.52	--	1.18	56	46	38.70	--
	1.021	40.09	--	1.21	56	46	41.30	--
	1.396	38.85	--	1.32	56	46	40.17	--
	2.384	37.13	--	1.74	56	46	38.87	--
	4.384	36.33	--	1.96	56	46	38.29	--
	7.290	38.82	--	1.95	60	50	40.77	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### 2.5.11 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT40 CH06

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	41.48	--	1.12	64.37	54.37	42.60	--
	0.804	33.43	--	1.23	56	46	34.66	--
	1.027	40.12	--	1.28	56	46	41.40	--
	2.358	37.72	--	1.82	56	46	39.54	--
	4.696	35.34	--	2.00	56	46	37.34	--
	7.526	36.23	--	2.01	60	50	38.24	--
	9.966	34.11	--	2.03	60	50	36.14	--
L2	0.598	35.41	--	1.15	56	46	36.56	--
	0.853	39.42	--	1.21	56	46	40.63	--
	1.021	40.50	--	1.21	56	46	41.71	--
	1.338	38.98	--	1.32	56	46	40.30	--
	1.918	38.16	--	1.49	56	46	39.65	--
	4.338	36.01	--	1.97	56	46	37.98	--
	7.486	38.26	--	1.95	60	50	40.21	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### 2.5.12 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : 802.11n HT40 CH09

Conducted Emissions								
Conductor	Frequency (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)	
		QP	AV		QP	AV	QP	AV
L1	0.182	42.55	--	1.12	64.37	54.37	43.67	--
	1.100	37.98	--	1.30	56	46	39.28	--
	1.331	36.41	--	1.32	56	46	37.73	--
	2.297	39.47	--	1.80	56	46	41.27	--
	3.276	34.96	--	1.96	56	46	36.92	--
	4.874	34.96	--	2.06	56	46	37.02	--
	7.368	36.04	--	2.01	60	50	38.05	--
L2	0.461	35.47	--	1.14	56.67	46.67	36.61	--
	0.549	35.60	--	1.13	56	46	36.73	--
	1.021	43.62	--	1.21	56	46	44.83	--
	1.970	38.52	--	1.49	56	46	40.01	--
	2.384	38.25	--	1.74	56	46	39.99	--
	4.525	37.16	--	1.99	56	46	39.15	--
	7.446	37.64	--	1.95	60	50	39.59	--

- Notes :**
1. L1: One end & Ground L2: The other end & Ground
  2. Height of table on which the EUT was placed : 0.8 m.
  3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
  4. The above test results are obtained under the normal condition.
  5. Amplitude = Read + Factor

### **3. Radiated Emissions Requirement**

#### **3.1 General Configuration:**

Prior to open-field testing, the EUT was placed in a shielded enclosure and scanned at a close distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration which produced the highest emissions was noted so it could be reproduced later during the open-field tests. This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, open-field test site. The EUT system was placed on a nonconductive turntable which was 0.8 meters height, top surface 1.0 x 1.5 meter. During the test, EUT was set to transmit continuously & measurements spectrum range from 30 MHz to 26.5 GHz is investigated.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

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.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in microvolts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in microvolts per meter (dBuV/m).



The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

$$\text{Amplitude (dBuV/m)} = \text{FI(dBuV)} + \text{AF(dBm)} + \text{CL(dBuV)} - \text{Gain(dB)}$$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(1) For fundamental frequency : Transmitter Output < +30dBm

(2) For spurious frequency : Spurious emission limits = fundamental emission limit /10

### 3.2 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29
2.	MLT	Pre Amplifier	20110301	PREAMP6G-02	2013/03/01	2014/03/01
3.	Agilent	Spectrum Analyzer	US40240137	E7403A	2013/01/29	2014/01/29
4.	MLT	Pre Amplifier	0.10~19.1GHz 60dBm	RF01	2012/08/24	2013/08/24
5.	MLT	Pre Amplifier	TA010-190-30	RF03	2012/07/20	2013/07/20
6.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2013/03/01	2014/03/01
7.	Herotek	Pre Amplifier	30690	A402-417	2012/11/02	2013/11/02
8.	EMCO	Biconilog Antenna	59739	3142C	2012/09/06	2013/09/06
9.	EMCO	Biconilog Antenna	44568	3142C	2012/09/06	2013/09/06
10.	SCHWARZBECK	Horn Antenna	181	BBHA 9170	2012/11/18	2013/11/18
11.	SCHWARZBECK	Horn Antenna	304	BBHA 9120D	2012/10/15	2013/10/15

### 3.3 Test condition:

EUT tested in accordance with the specifications given by the manufacturer, and exercised in the most unfavorable manner.

### 3.4 Radiated Emissions Limits:

Frequency range (MHz)	Peak(dBuV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960	54

### 3.5 Measurement Data Of Radiated Emissions:

#### 3.5.1 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11b CH01

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
10515.0	59.57	45.81	Peak	-13.76	74	-28.19
17895.0	51.57	48.87	Peak	-2.70	74	-25.13

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2000.0	47.20	44.88	Peak	-2.32	74	-29.12
17925.0	51.76	49.15	Peak	-2.61	74	-24.85

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.2 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11b CH06

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
19375.0	36.58	54.33	Peak	17.75	74	-19.67
25472.5	40.29	51.89	Peak	11.60	74	-22.11

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
17865.0	53.12	50.05	Peak	-3.07	74	-23.95
22187.5	39.24	51.28	Peak	12.04	74	-22.72

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.3 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11b CH11

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
17925.0	51.85	49.24	Peak	-2.61	74	-24.76
19712.5	38.03	55.84	Peak	17.81	74	-18.16

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
7050.0	65.79	45.49	Peak	-20.30	74	-28.51
19172.5	36.07	54.80	Peak	18.73	74	-19.20

**Notes :** 1. Margin= Amplitude – Limits

2. Distance of Measurement : 3 Meter

3. Height of table for EUT placed: 0.8 Meter.

4. ANT= Antenna height.

5. Duty= Duty cycle correction factor.

6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7. The other emission levels were very low against the limit.

### 3.5.4 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11g CH01

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1926.0	47.84	45.03	Peak	-2.81	74	-28.97
19382.5	36.81	54.56	Peak	17.75	74	-19.44

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2880.0	43.71	45.20	Peak	1.49	74	-28.80
19960.0	37.59	54.83	Peak	17.24	74	-19.17

**Notes :** 1. Margin= Amplitude – Limits

2. Distance of Measurement : 3 Meter

3. Height of table for EUT placed: 0.8 Meter.

4. ANT= Antenna height.

5. Duty= Duty cycle correction factor.

6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7. The other emission levels were very low against the limit.

### 3.5.5 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11g CH06

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
19720.0	37.71	55.52	Peak	17.8	74	-18.48
25795.0	40.77	52.28	Peak	11.5	74	-21.72

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1926.0	54.05	51.24	Peak	-2.81	74	-22.76
19285.0	36.60	54.63	Peak	18.03	74	-19.37

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.6 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11g CH11

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
19195.0	35.87	54.53	Peak	18.66	74	-19.47
25450.0	40.43	52.21	Peak	11.78	74	-21.79

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1926.0	54.05	51.24	Peak	-2.81	74	-22.76
17895.0	52.24	49.54	Peak	-2.70	74	-24.46

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.



### 3.5.7 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT20 CH01

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
10515.0	57.47	43.71	Peak	-13.76	74	-30.29
17895.0	52.05	49.35	Peak	-2.70	74	-24.65

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1928.0	50.79	47.97	Peak	-2.82	74	-26.03
19225.0	36.22	54.34	Peak	18.12	74	-19.66

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.8 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT20 CH06

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1966.0	52.87	50.34	Peak	-2.53	74	-23.66
17895.0	51.82	49.12	Peak	-2.70	74	-24.88

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
8940.0	61.63	44.56	Peak	-17.07	74	-29.44
17895.0	52.15	49.45	Peak	-2.70	74	-24.55

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.9 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT20 CH11

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
10515.0	60.72	46.96	Peak	-13.76	74	-27.04
17850.0	52.10	48.85	Peak	-3.25	74	-25.15

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
1920.0	48.32	45.41	Peak	-2.91	74	-28.59
17895.0	52.57	49.87	Peak	-2.70	74	-24.13

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.10 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT40 CH03

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2786.0	41.99	43.20	Peak	1.21	74	-30.80
10515.0	57.64	43.88	Peak	-13.76	74	-30.12

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
8940.0	61.17	44.10	Peak	-17.07	74	-29.90
17910.0	51.35	48.75	Peak	-2.60	74	-25.25

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.11 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT40 CH06

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
10515.0	59.93	46.17	Peak	-13.76	74	-27.83
17925.0	52.03	49.42	Peak	-2.61	74	-24.58

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2000.0	48.04	45.72	Peak	-2.32	74	-28.28
17895.0	52.70	50.00	Peak	-2.70	74	-24.00

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

### 3.5.12 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : 802.11n HT40 CH09

Radiated Emissions (HORIZONTAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2852.0	42.32	43.72	Peak	1.40	74	-30.28
10515.0	58.15	44.39	Peak	-13.76	74	-29.61

Radiated Emissions (VERTICAL)						
Frequency (MHz)	Read (dBuV/m)	Amplitude (dBuV/m)	Remark	Factor (dB)	Limit (dBuV/m)	Margin (dB)
2880.0	43.68	45.17	Peak	1.49	74	-28.83
17895.0	52.03	49.33	Peak	-2.70	74	-24.67

- Notes :**
1. Margin= Amplitude – Limits
  2. Distance of Measurement : 3 Meter
  3. Height of table for EUT placed: 0.8 Meter.
  4. ANT= Antenna height.
  5. Duty= Duty cycle correction factor.
  6. Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)
  7. The other emission levels were very low against the limit.

## 4. Maximum Conducted Output Power Requirements

### 4.1 Test Condition & Setup :

The tests below are run with the EUT's transmitter set at high power in TDD mode. A RJ-45 port from a computer to the EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to spectrum analyzer. The maximum peak output power shall not exceed 1 watt.

The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to  $(\text{GAIN} - 6)/3$  dBm.

Measurement procedure is followed KDB 558074 v03r01 (9.1.2 : Integrated band power method)

KDB 662911 D01 Multiple Transmitter Output v02 Method of conducted output power for power measurements on IEEE 802.11 devices,

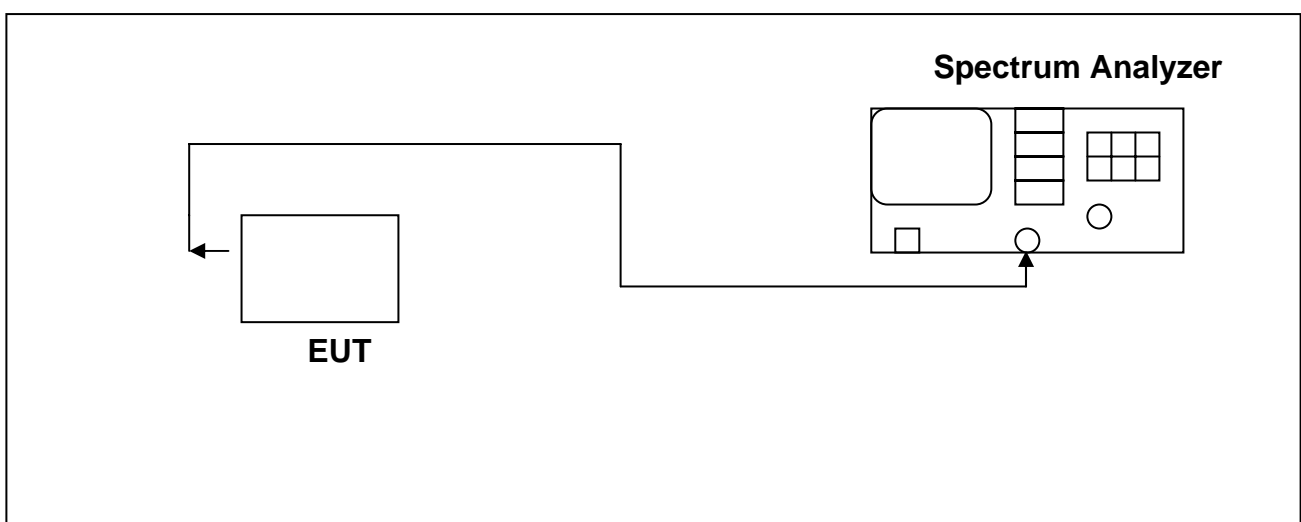
Array Gain = 0 dB (i.e., no array gain) for  $\text{NANT} \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(\text{NANT}/\text{NSS})$  dB or 3 dB, whichever is less, for 20-MHz channel widths with  $\text{NANT} \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(\text{NANT}/\text{NSS})$  dB

### 4.2 Test Instruments Configuration:



### 4.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29

### 4.4 Test Result:

#### 802.11b

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	11	20.92	<30dBm
2412	5.5	19.11	<30dBm
2412	2	18.78	<30dBm
2412	1	20.03	<30dBm

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	11	20.92	<30dBm
2437	5.5	20.57	<30dBm
2462	11	20.29	<30dBm

**Note:** Test result is the worst case of the different data rate.

#### 802.11g

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	54	18.42	<30dBm
2412	48	19.19	<30dBm
2412	36	19.35	<30dBm
2412	24	20.15	<30dBm
2412	18	20.79	<30dBm
2412	12	21.12	<30dBm
2412	9	21.10	<30dBm
2412	6	20.87	<30dBm

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	12	21.12	<30dBm
2437	6	21.57	<30dBm
2462	6	21.13	<30dBm

**Note:** Test result is the worst case of the different data rate.



**802.11n HT20**

Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2	
2412	130	130	16.71	15.43	<30dBm
2412	117	117	16.77	15.77	<30dBm
2412	104	104	17.06	16.16	<30dBm
2412	78	78	18.05	17.15	<30dBm
2412	52	52	18.70	17.60	<30dBm
2412	39	39	19.27	18.05	<30dBm
2412	26	26	20.39	19.13	<30dBm
2412	13	13	21.04	19.63	<30dBm

Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Total Output Power(dBm)	Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2		
2412	13	13	21.04	19.63	23.40	<30dBm
2437	13	13	20.44	19.73	23.11	<30dBm
2462	13	13	20.90	19.42	23.23	<30dBm

**Note:** Test result is the worst case of the different data rate.

**802.11n HT40**

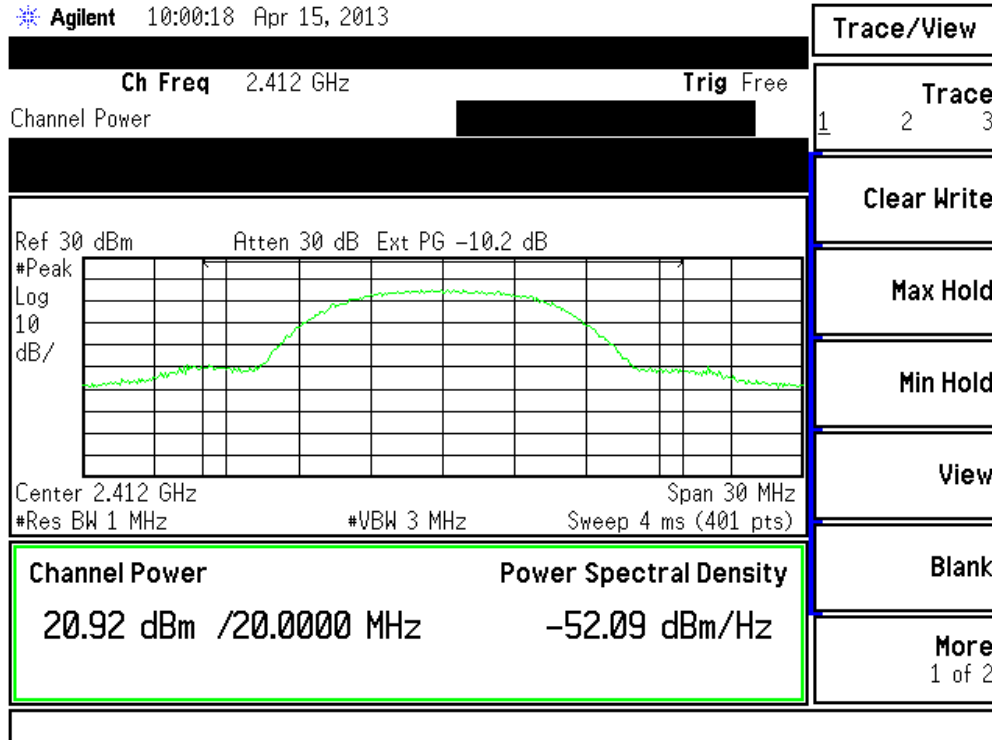
Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2	
2422	270	270	15.37	14.84	<30dBm
2422	243	243	15.58	15.68	<30dBm
2422	216	216	16.05	14.97	<30dBm
2422	162	162	16.40	15.67	<30dBm
2422	108	108	17.36	17.07	<30dBm
2422	81	81	17.21	17.01	<30dBm
2422	54	54	18.46	18.49	<30dBm
2422	27	27	19.58	19.36	<30dBm

Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Total Output Power(dBm)	Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2		
2422	27	27	19.58	19.36	22.48	<30dBm
2437	27	27	19.55	19.27	22.42	<30dBm
2452	27	27	19.84	19.63	22.75	<30dBm

**Note:** Test result is the worst case of the different data rate.

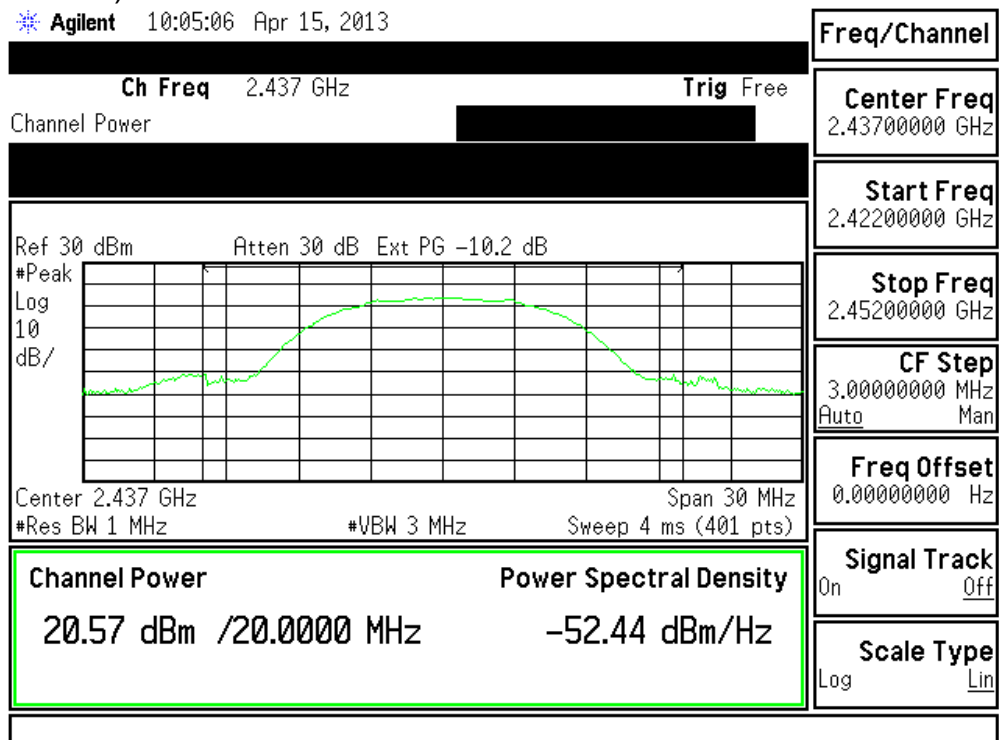
### 802.11b (2412MHz)

Agilent 10:00:18 Apr 15, 2013



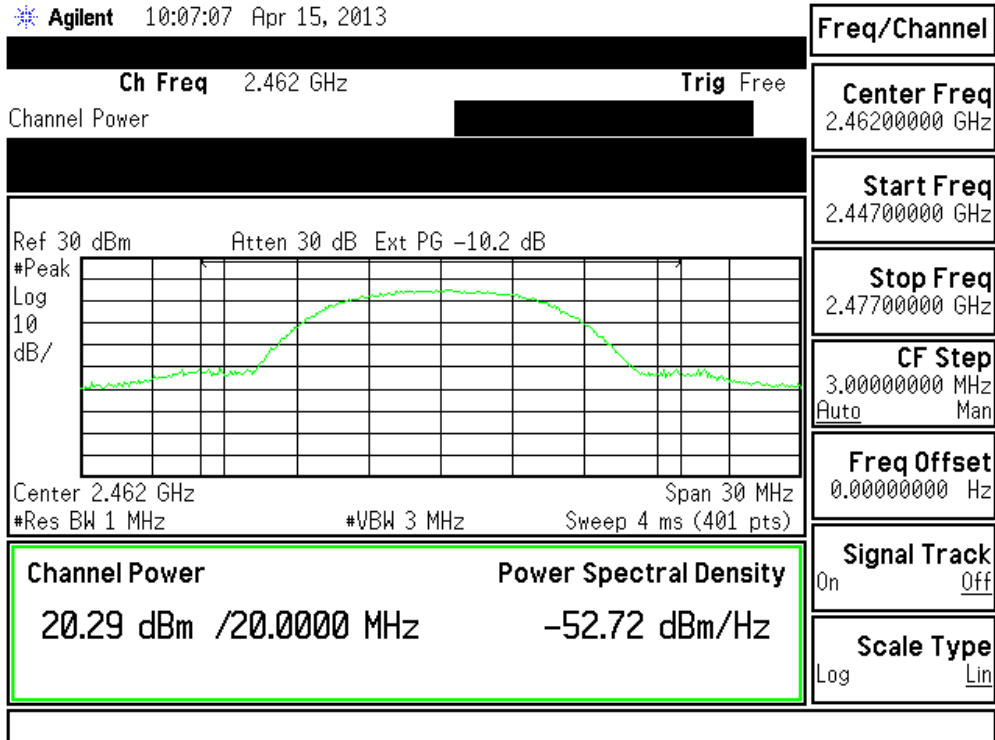
### 802.11b (2437MHz)

Agilent 10:05:06 Apr 15, 2013



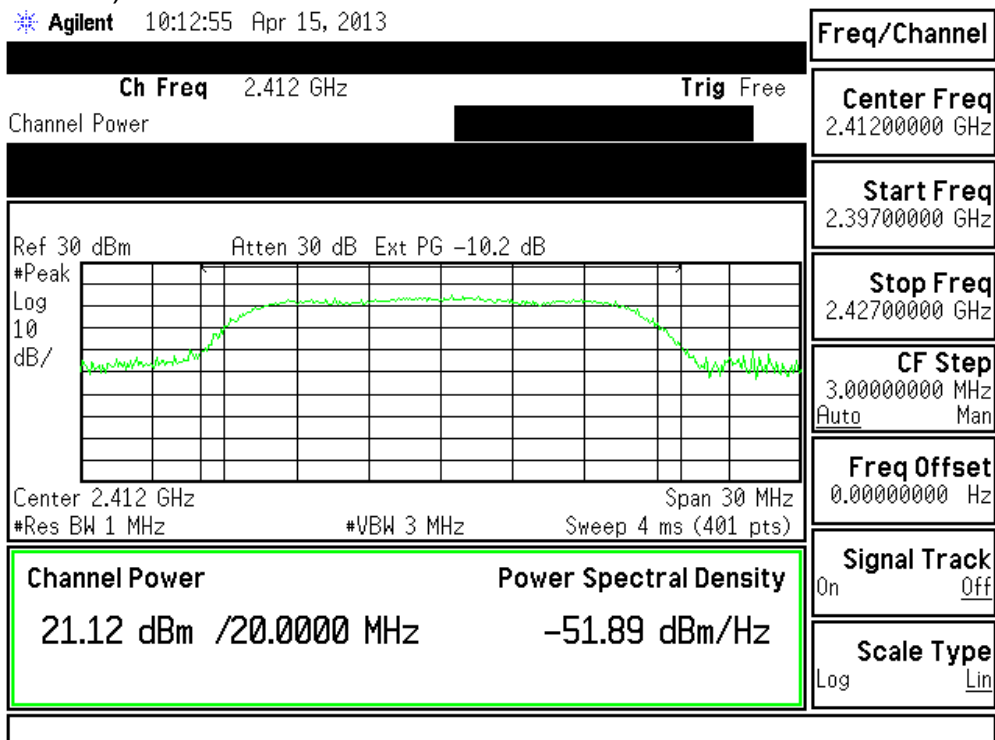
### 802.11b (2462MHz)

Agilent 10:07:07 Apr 15, 2013



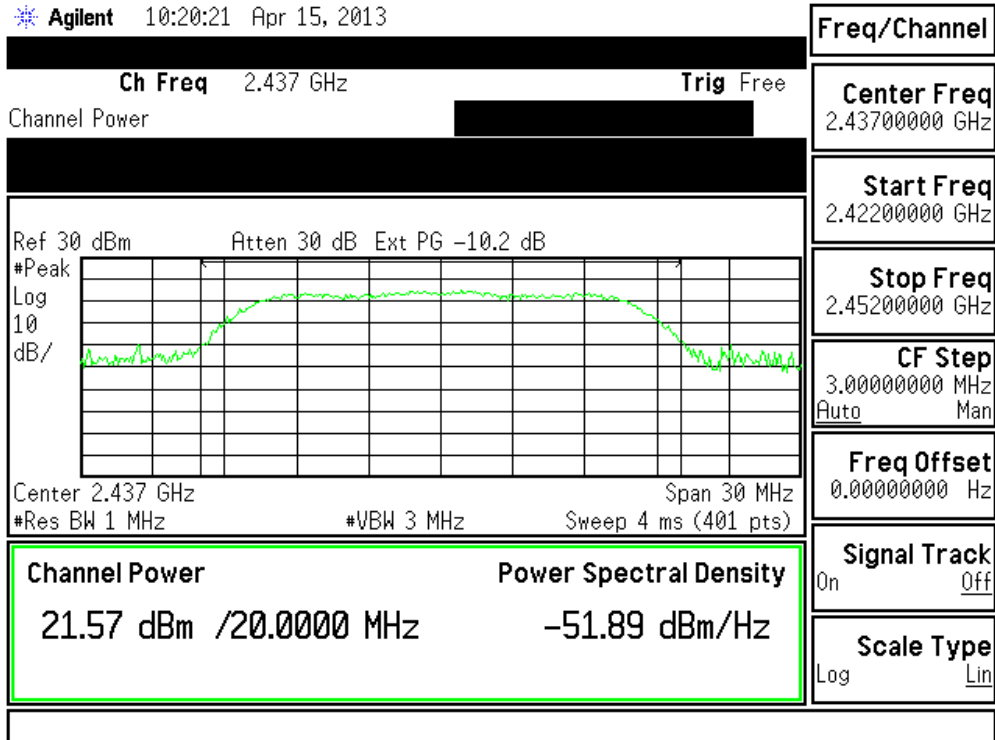
### 802.11g (2412MHz)

Agilent 10:12:55 Apr 15, 2013



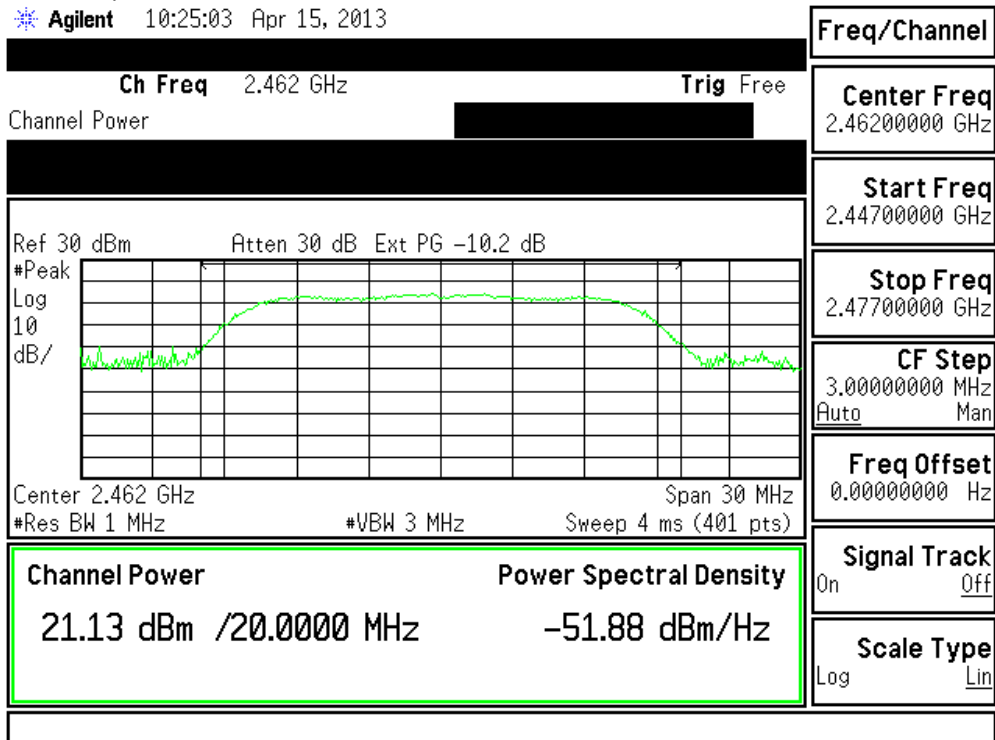
802.11g (2437MHz)

Agilent 10:20:21 Apr 15, 2013



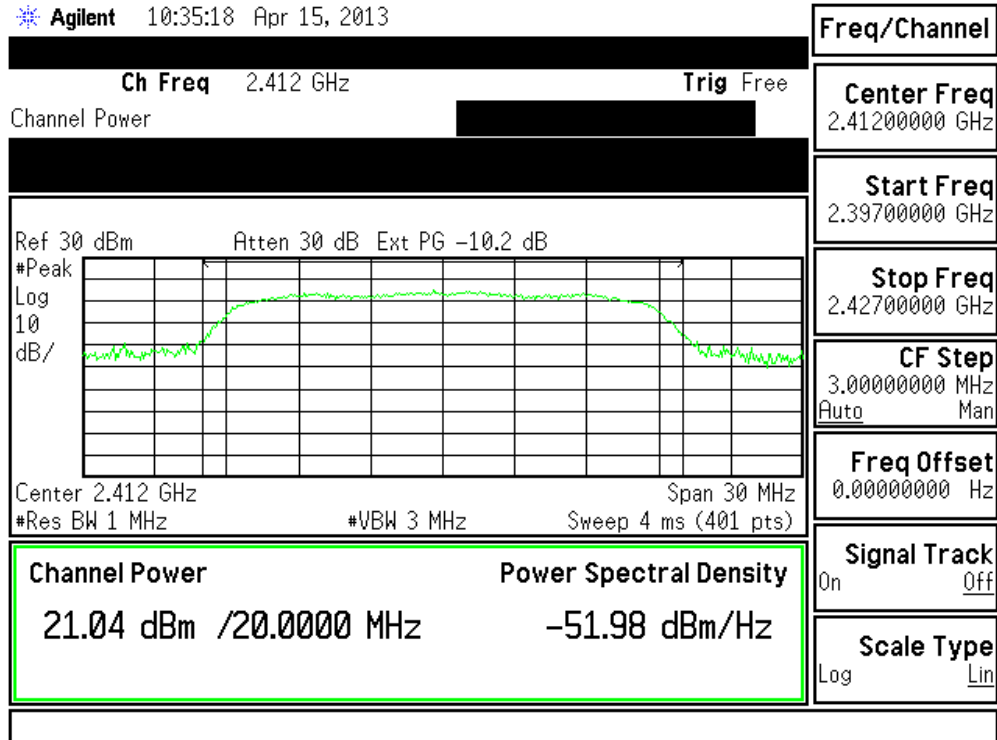
802.11g (2462MHz)

Agilent 10:25:03 Apr 15, 2013



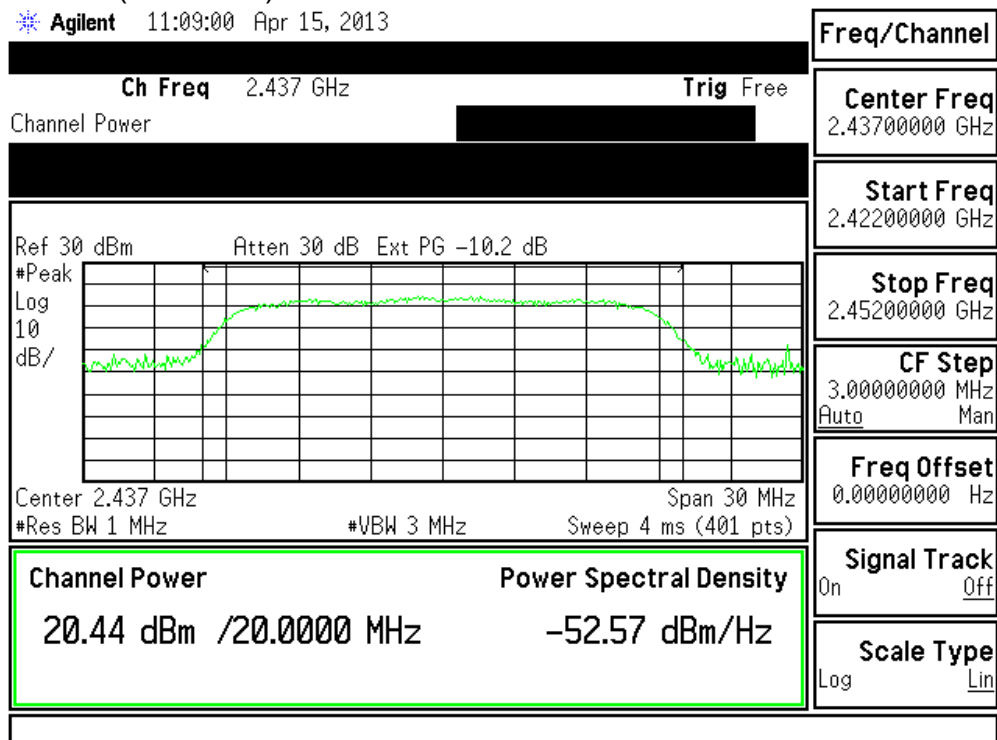
### 802.11HT20 ANT1 (2412MHz)

Agilent 10:35:18 Apr 15, 2013



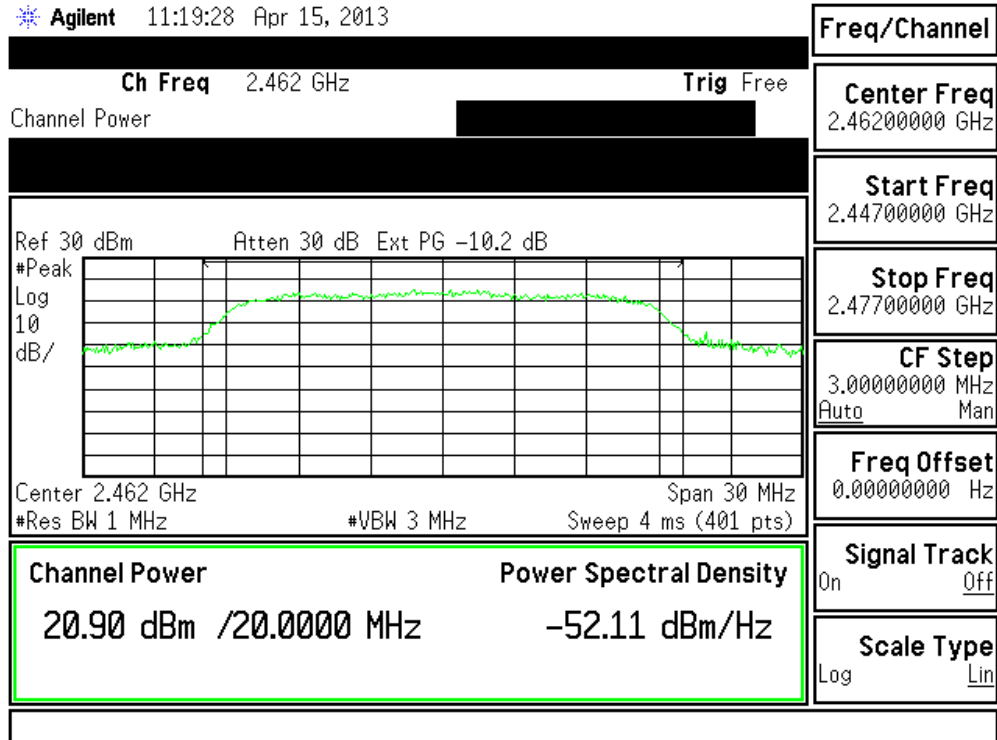
### 802.11HT20 ANT1 (2437MHz)

Agilent 11:09:00 Apr 15, 2013



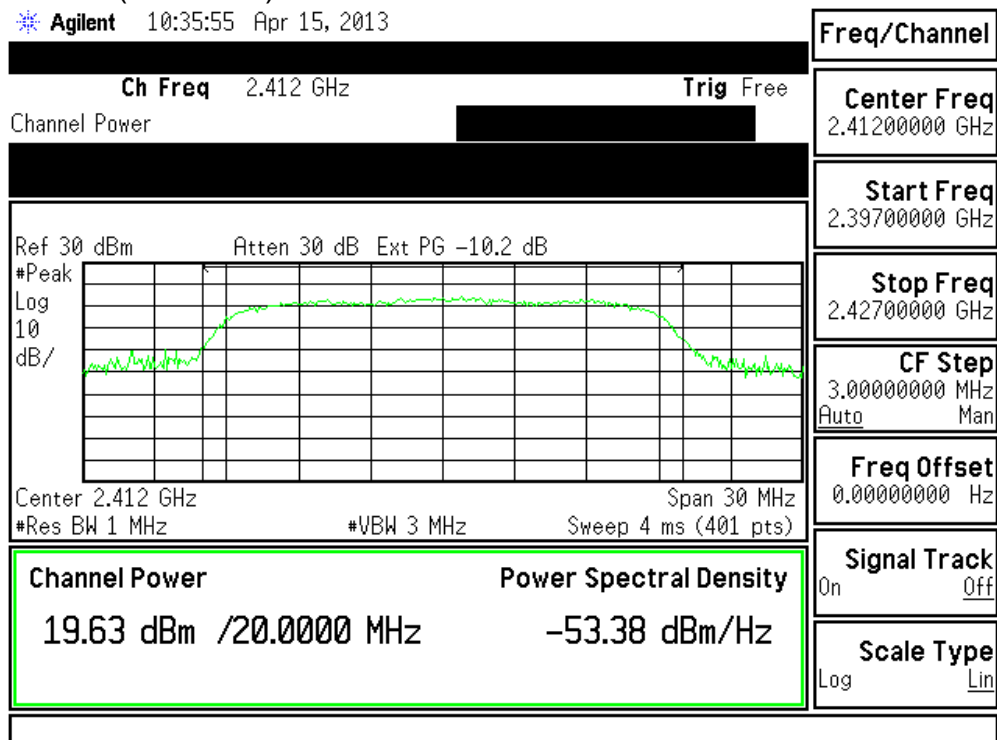
### 802.11HT20 ANT1 (2462MHz)

Agilent 11:19:28 Apr 15, 2013



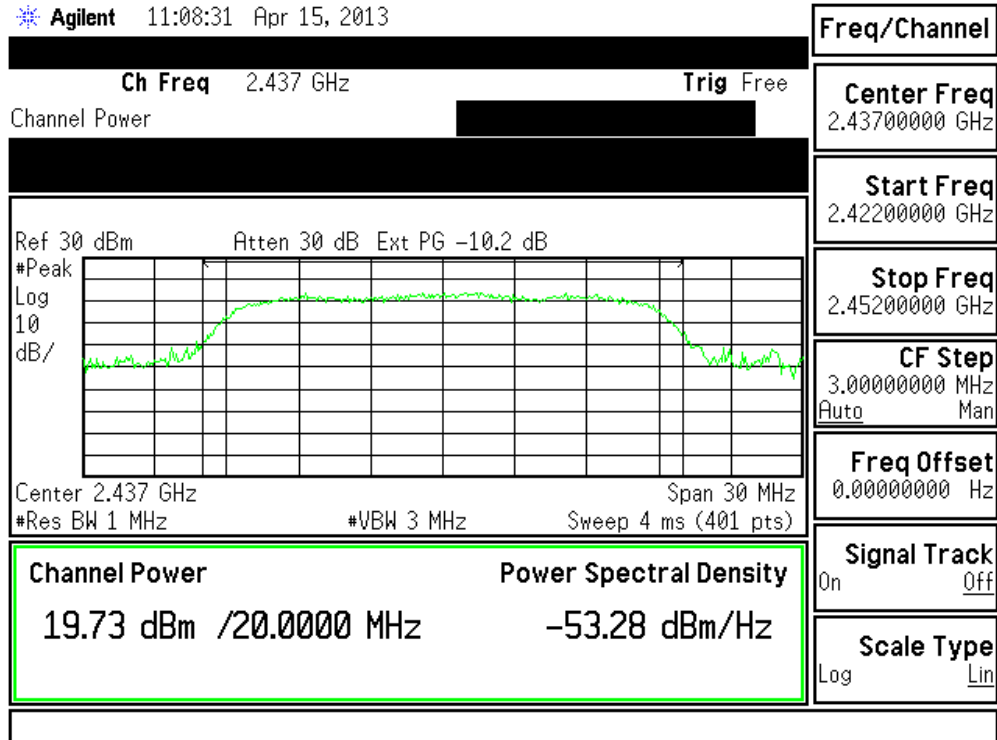
### 802.11HT20 ANT2 (2412MHz)

Agilent 10:35:55 Apr 15, 2013



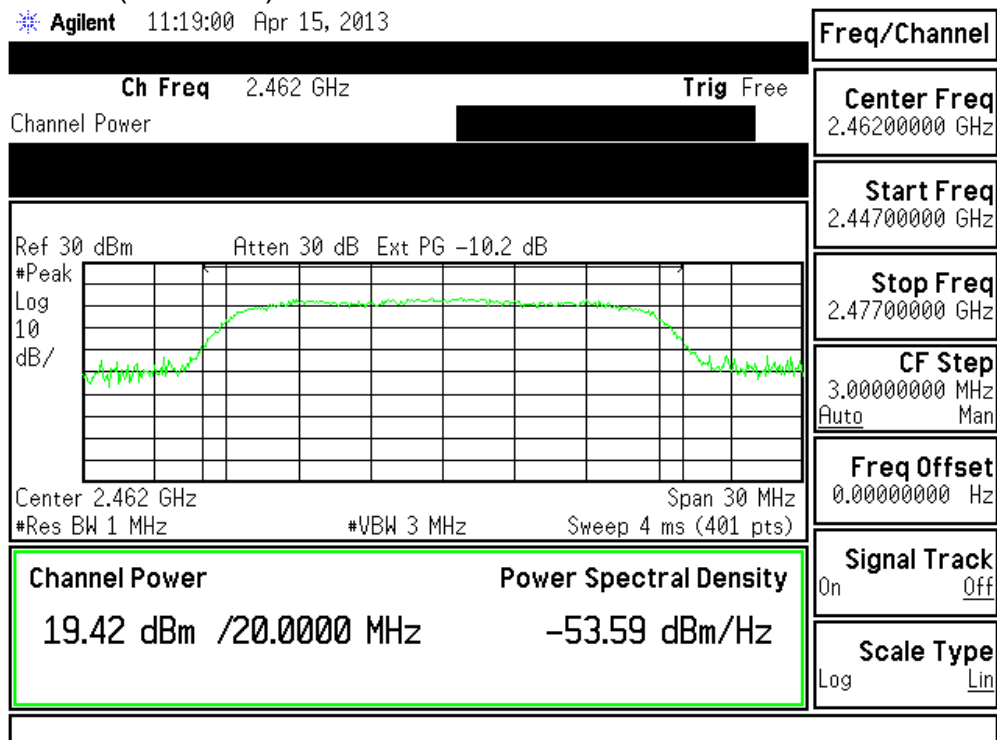
### 802.11HT20 ANT2 (2437MHz)

Agilent 11:08:31 Apr 15, 2013



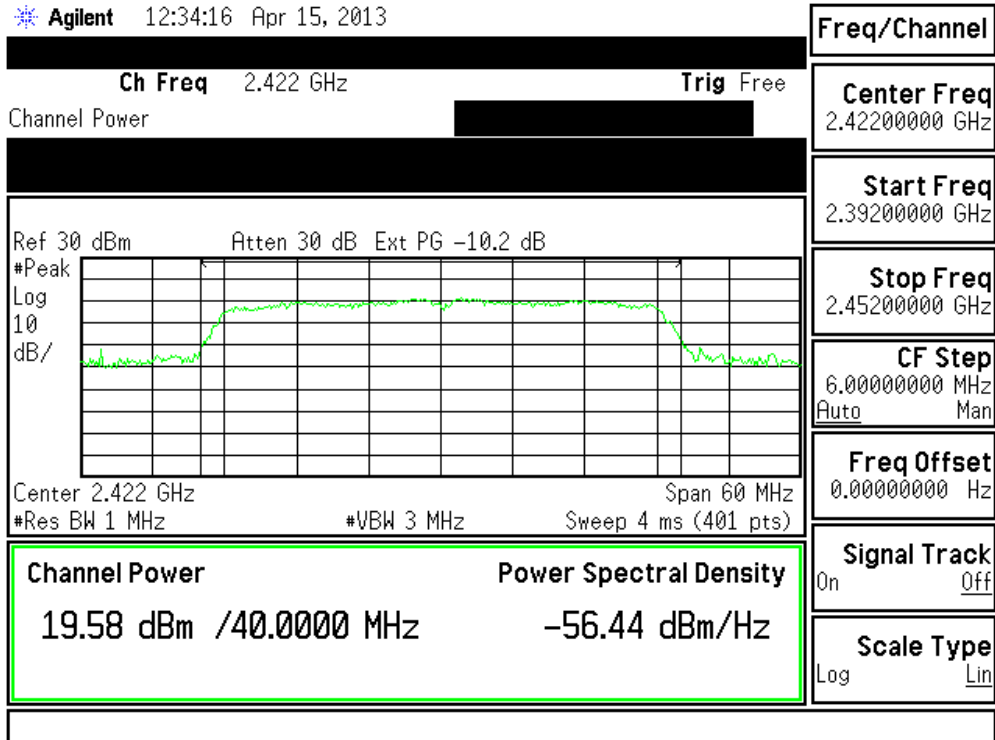
### 802.11HT20 ANT2 (2462MHz)

Agilent 11:19:00 Apr 15, 2013



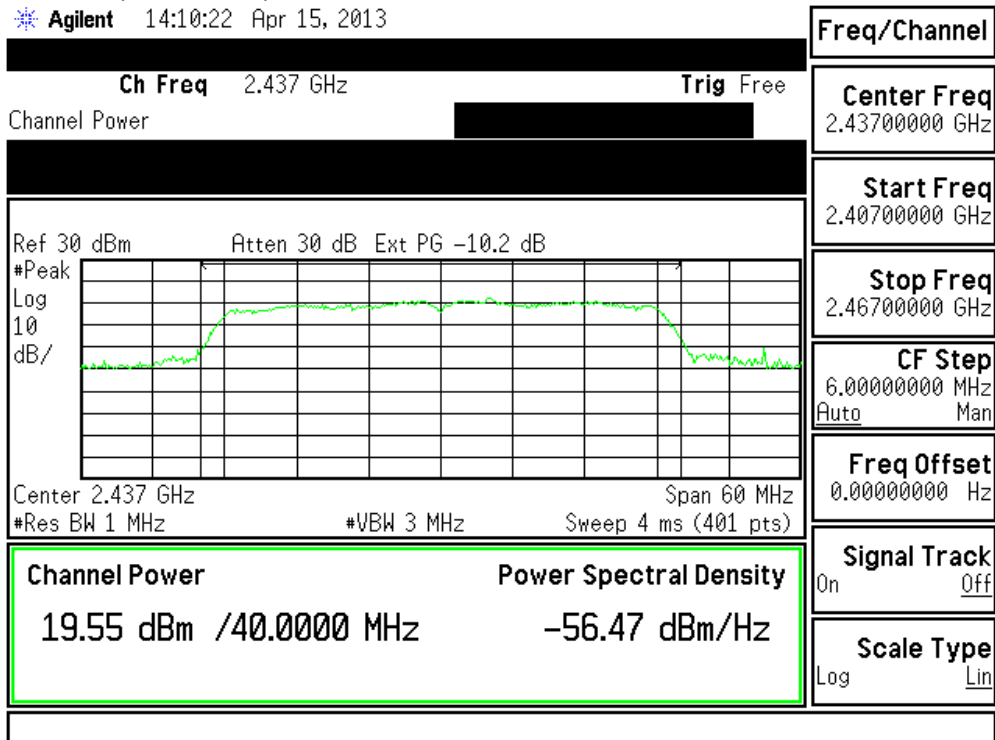
802.11HT40 ANT1 (2422MHz)

Agilent 12:34:16 Apr 15, 2013



802.11HT40 ANT1 (2437MHz)

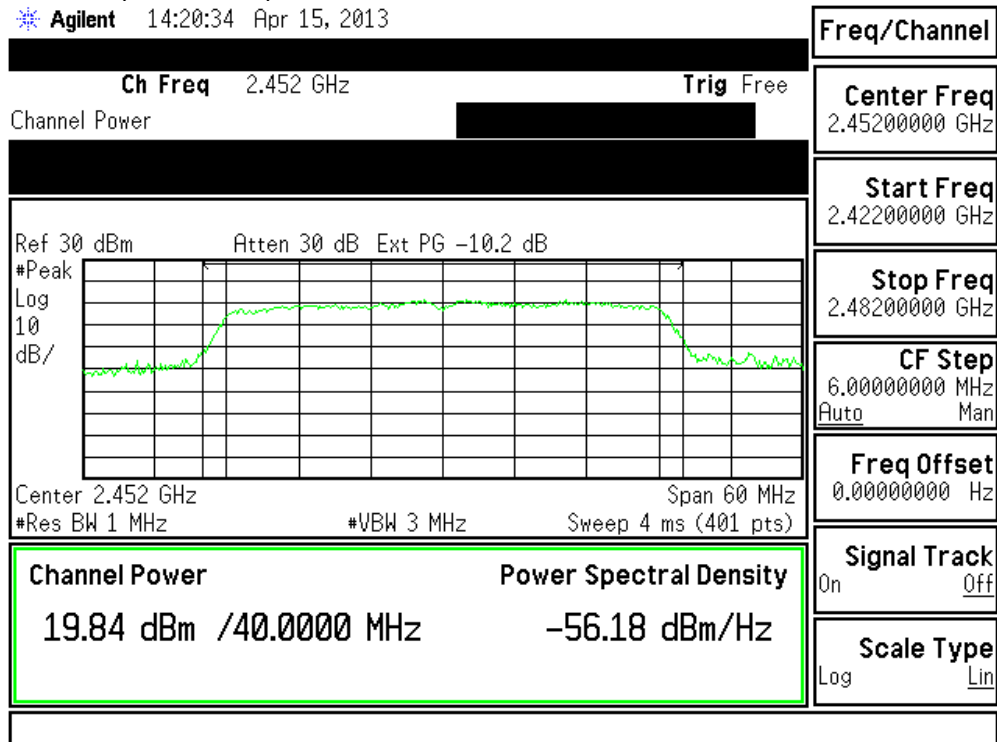
Agilent 14:10:22 Apr 15, 2013





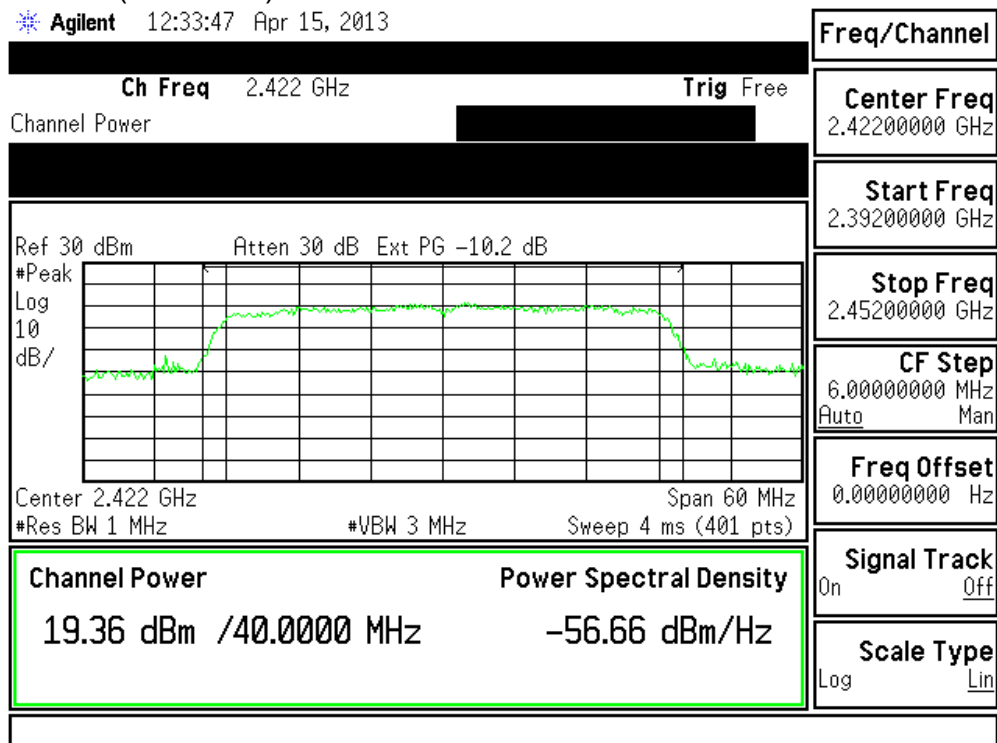
### 802.11HT40 ANT1 (2452MHz)

Agilent 14:20:34 Apr 15, 2013



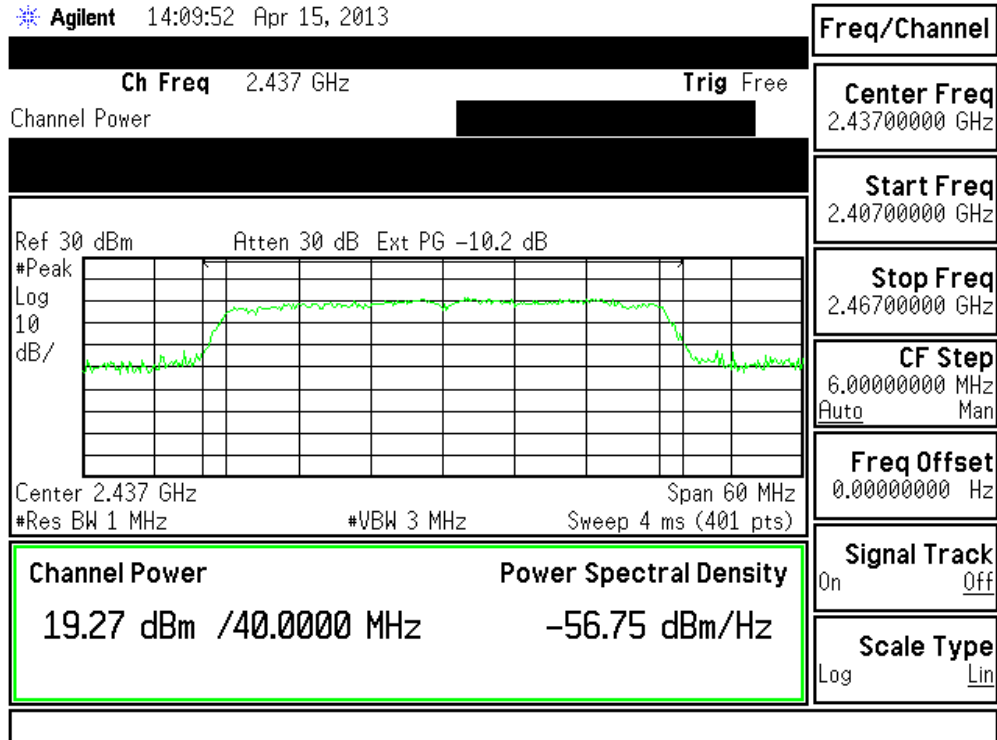
### 802.11HT40 ANT2 (2422MHz)

Agilent 12:33:47 Apr 15, 2013



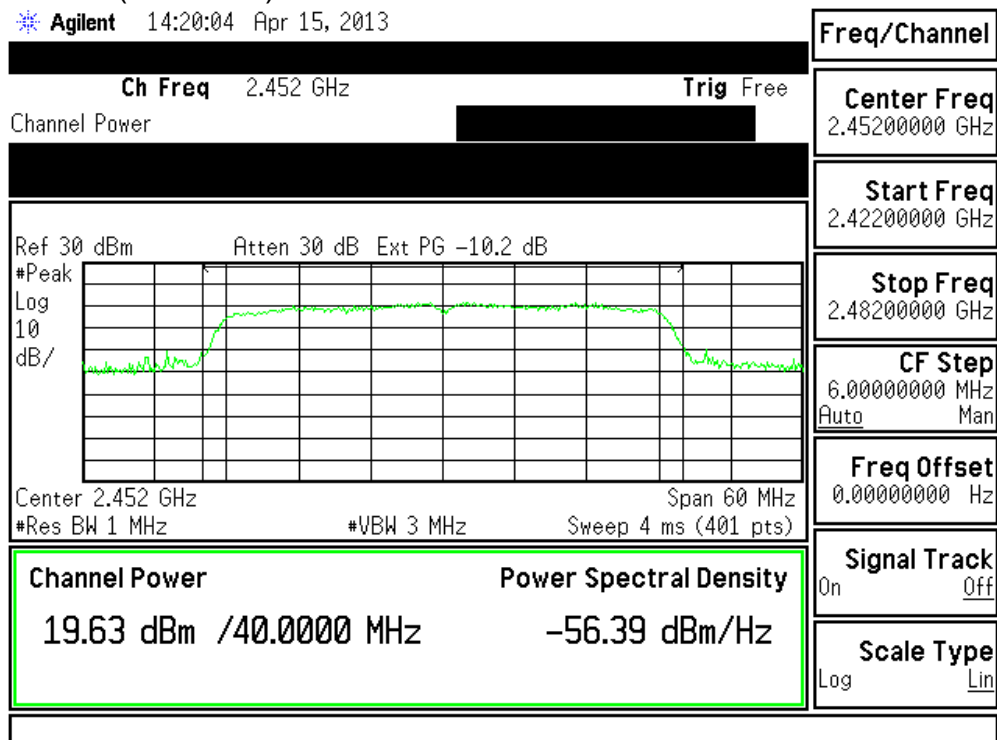
### 802.11HT40 ANT2 (2437MHz)

Agilent 14:09:52 Apr 15, 2013



### 802.11HT40 ANT2 (2452MHz)

Agilent 14:20:04 Apr 15, 2013



## 5. Minimum 6dB RF Bandwidth Requirements

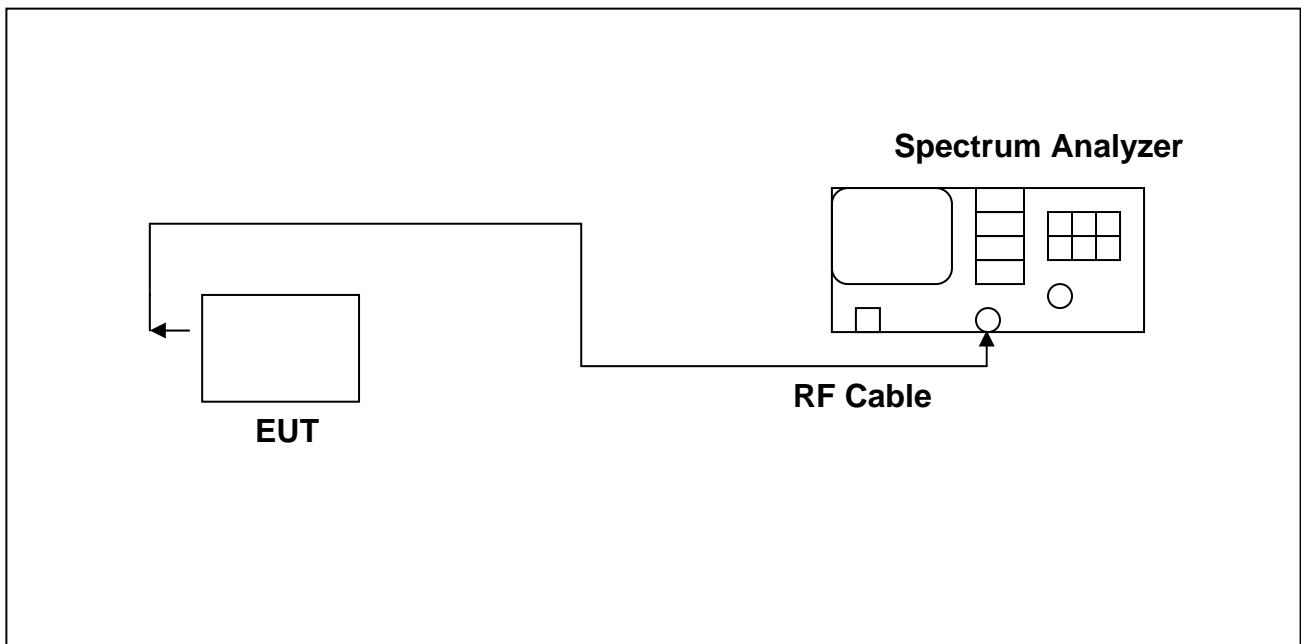
### 5.1 Test Condition & Setup :

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels (Channel 1, 6, 11)

Measurement procedure is followed KDB 558074 v03r01 (8.1 option 1: DTS bandwidth)

### 5.2 Test Instruments Configuration:



### 5.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29

## 5.4 Test Result:

### 802.11b

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	8.375	>500KHz
2437	8.625	>500KHz
2462	8.375	>500KHz

### 802.11g

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	16.000	>500KHz
2437	16.375	>500KHz
2462	15.875	>500KHz

### 802.11n HT20(Ant 1)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	15.375	>500KHz
2437	17.375	>500KHz
2462	17.500	>500KHz

### 802.11n HT20(Ant 2)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2422	36.000	>500KHz
2437	36.500	>500KHz
2452	36.500	>500KHz

### 802.11n HT40(Ant 1)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	17.250	>500KHz
2437	15.625	>500KHz
2462	15.875	>500KHz

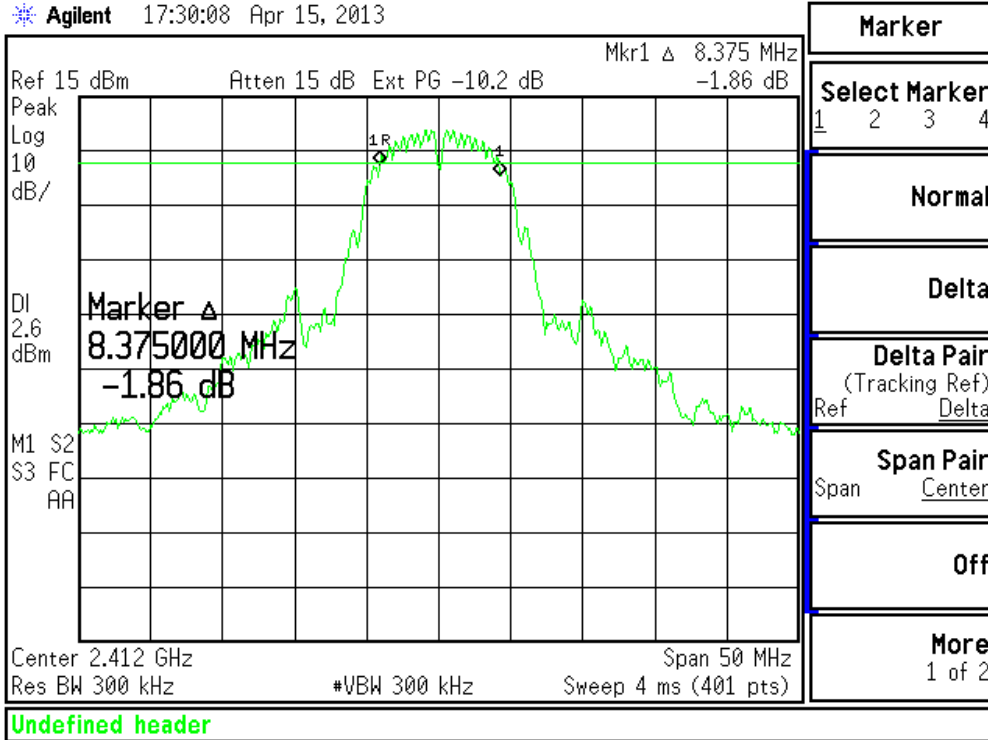
### 802.11n HT40(Ant 2)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2422	36.500	>500KHz
2437	36.500	>500KHz
2452	36.500	>500KHz

**Note:** Test Graphs See next page.

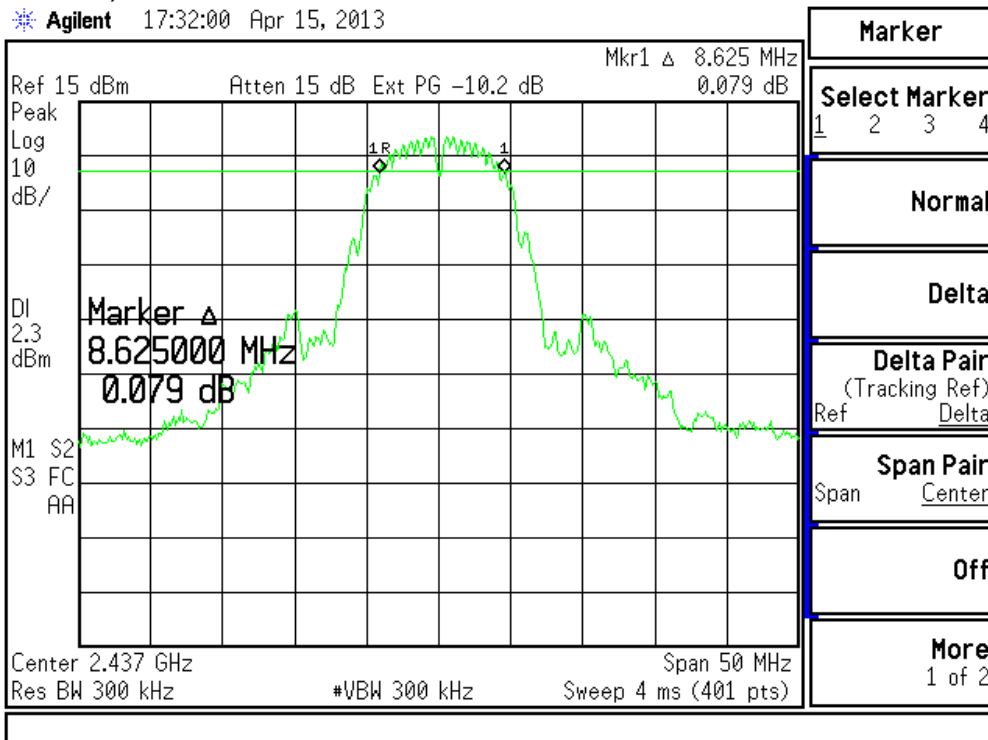
802.11b (2412MHz)

Agilent 17:30:08 Apr 15, 2013



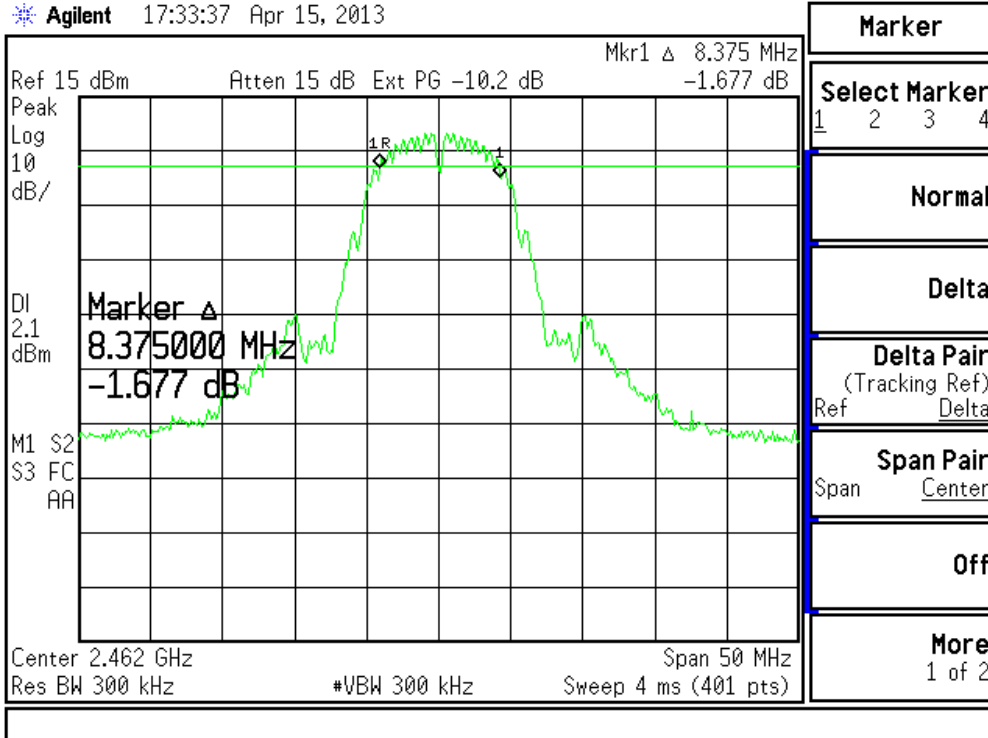
802.11b (2437MHz)

Agilent 17:32:00 Apr 15, 2013



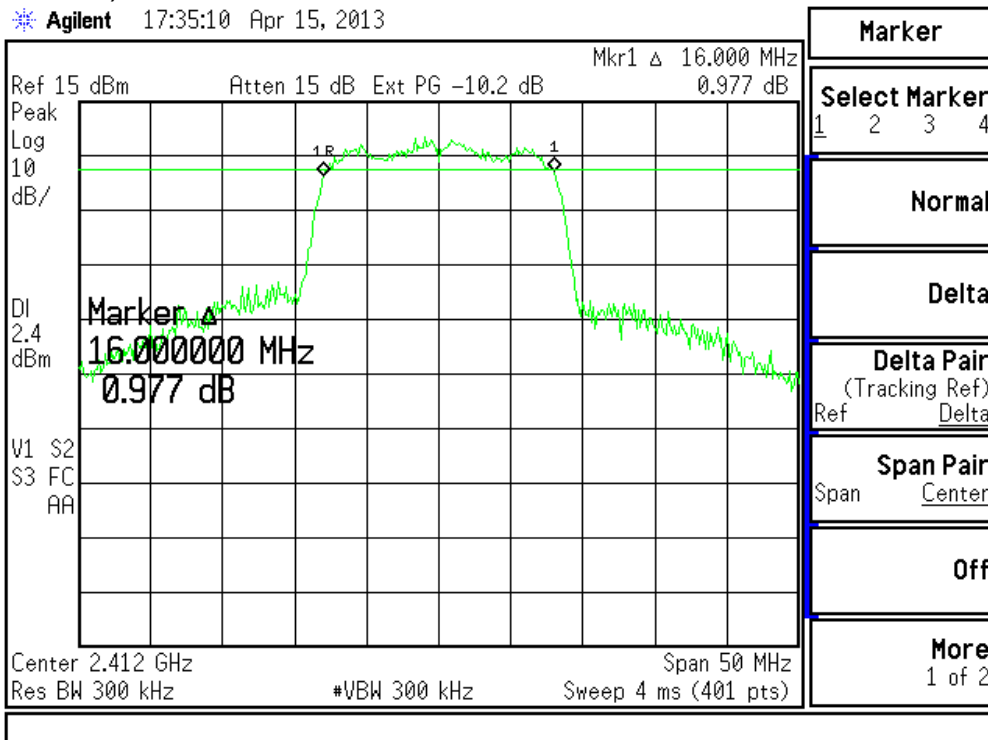
802.11b (2462MHz)

Agilent 17:33:37 Apr 15, 2013



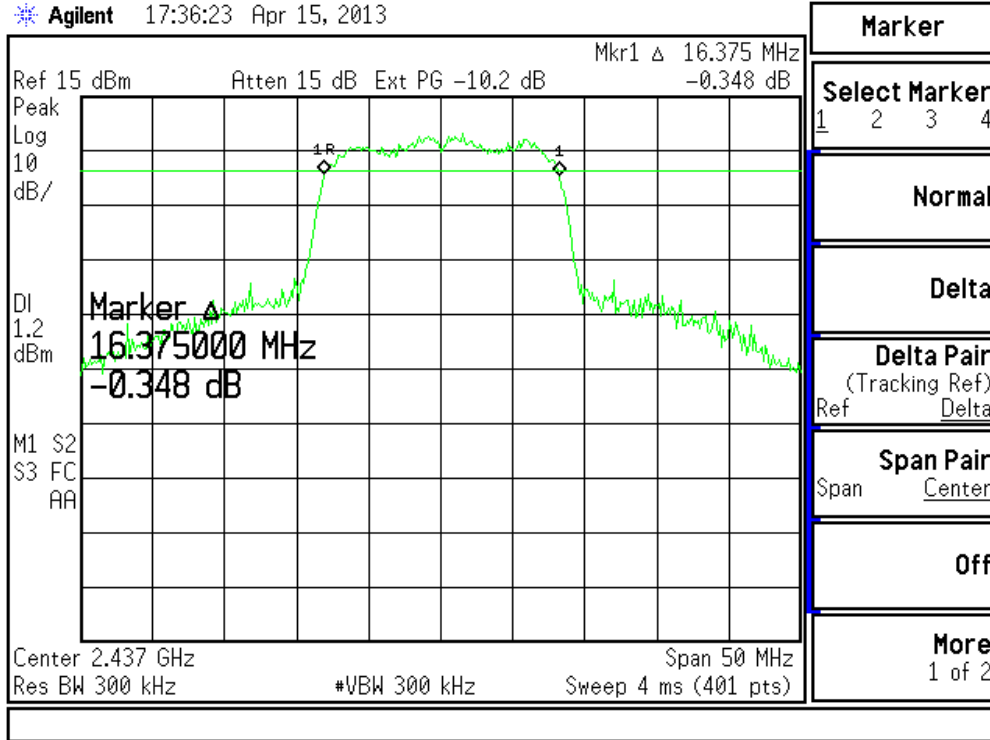
802.11g (2412MHz)

Agilent 17:35:10 Apr 15, 2013



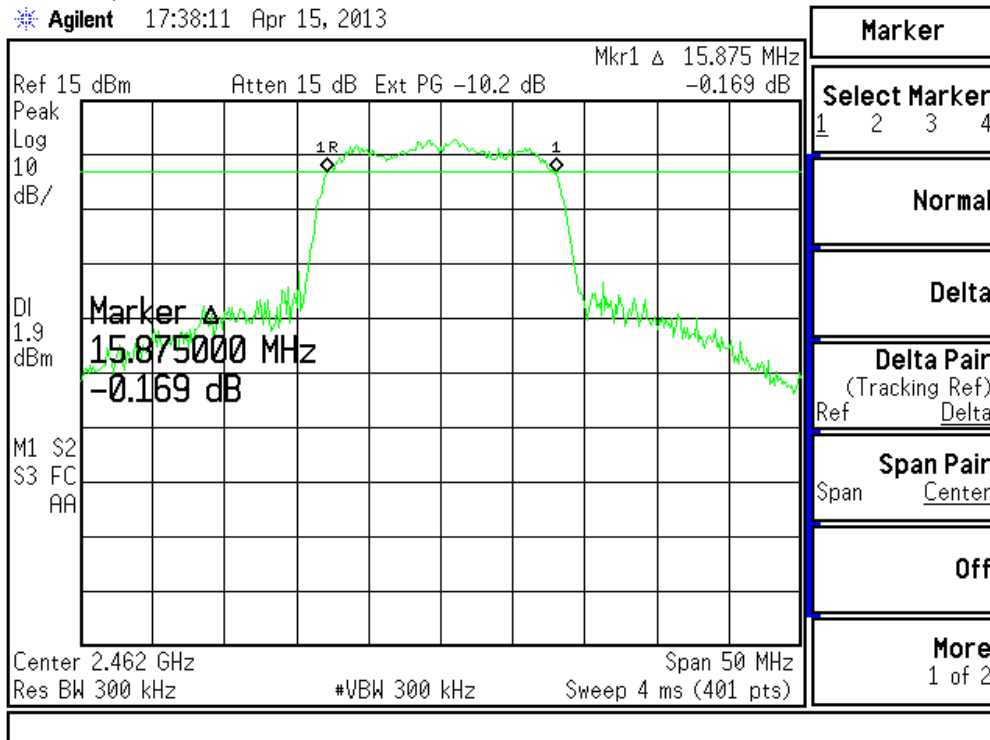
802.11g (2437MHz)

Agilent 17:36:23 Apr 15, 2013



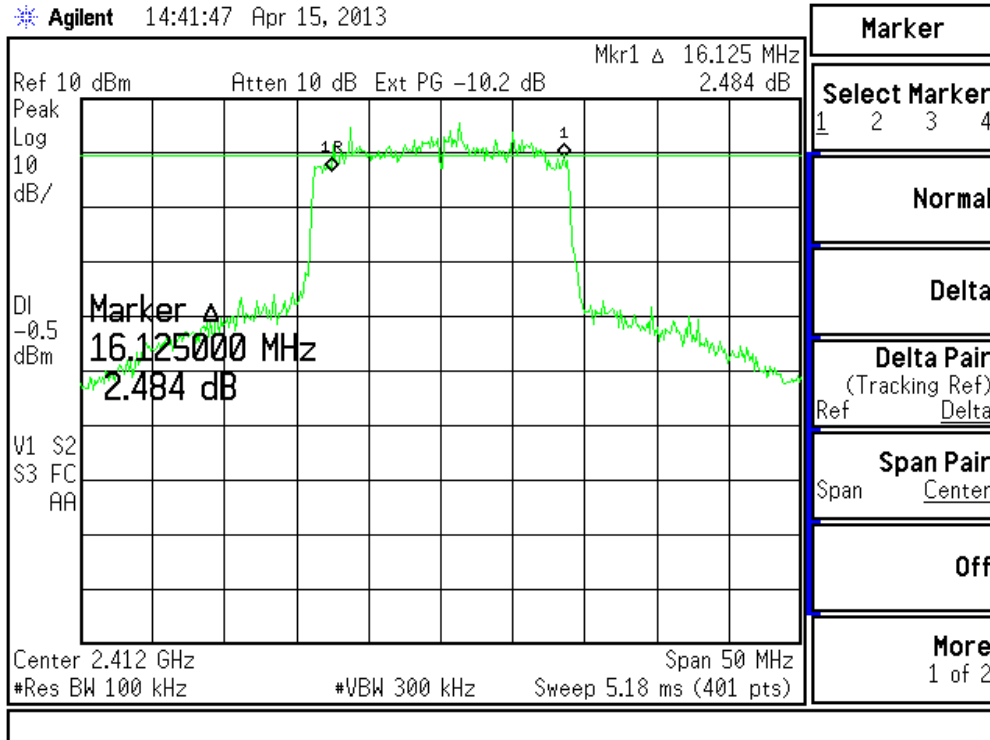
802.11g (2462MHz)

Agilent 17:38:11 Apr 15, 2013



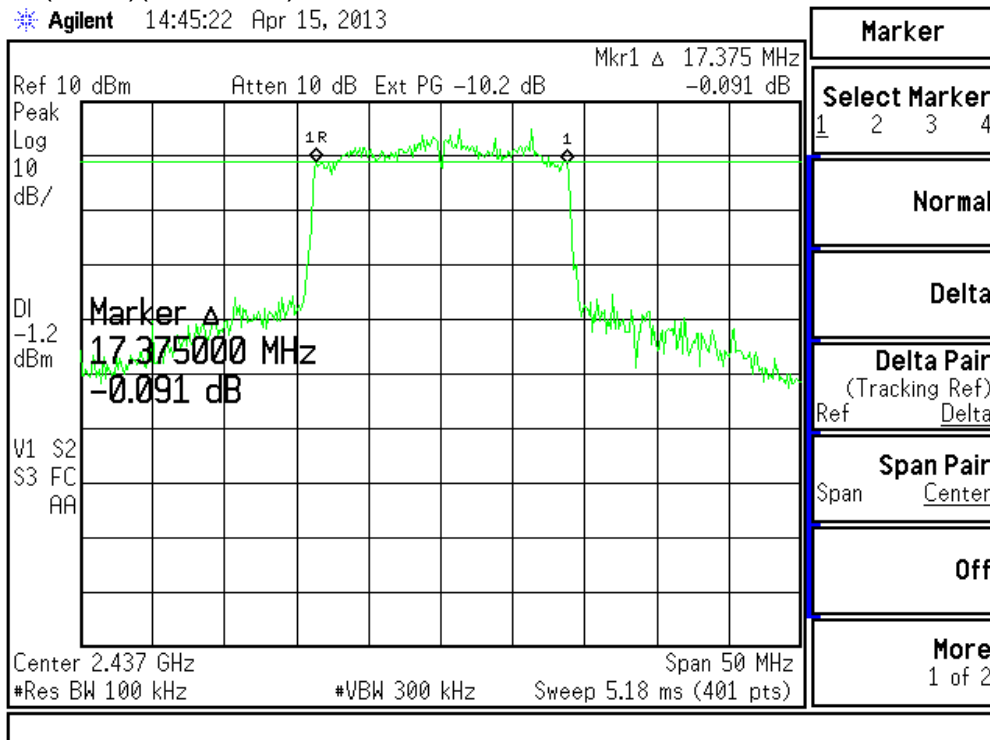
802.11n HT20(Ant 1)(2412MHz)

Agilent 14:41:47 Apr 15, 2013



802.11n HT20(Ant 1)(2437MHz)

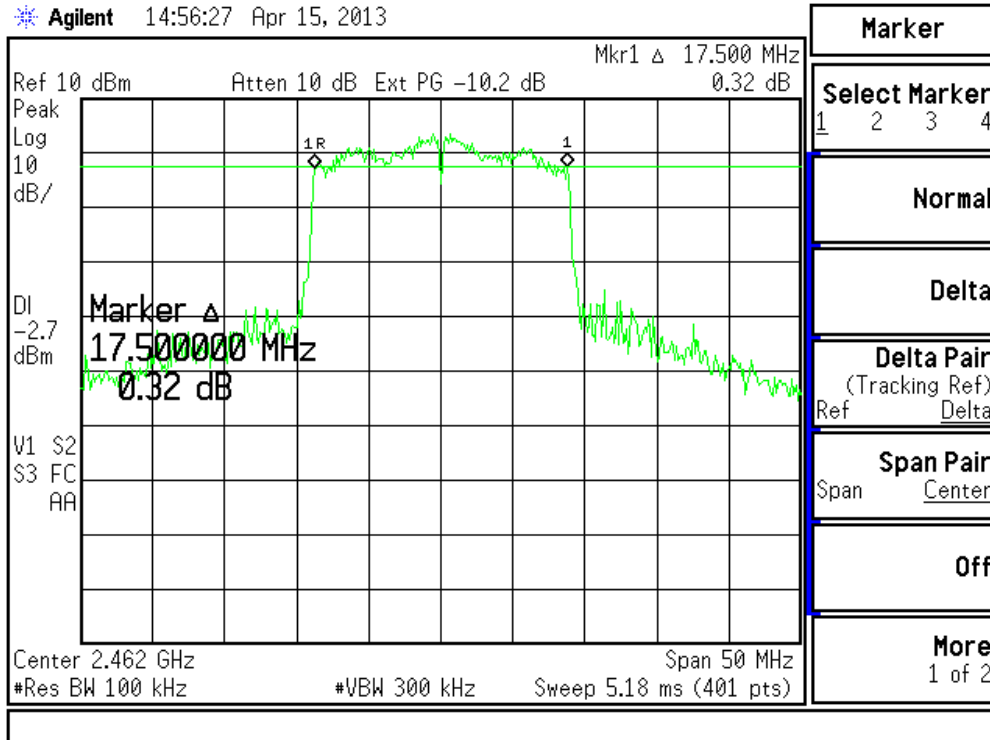
Agilent 14:45:22 Apr 15, 2013





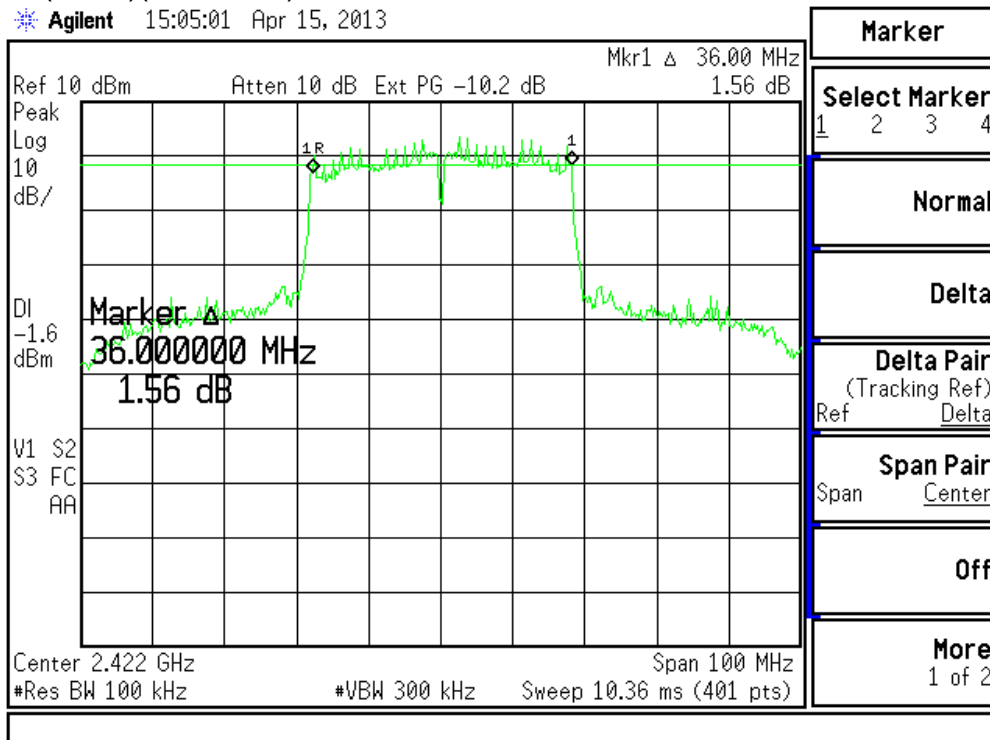
802.11n HT20(Ant 1)(2462MHz)

Agilent 14:56:27 Apr 15, 2013



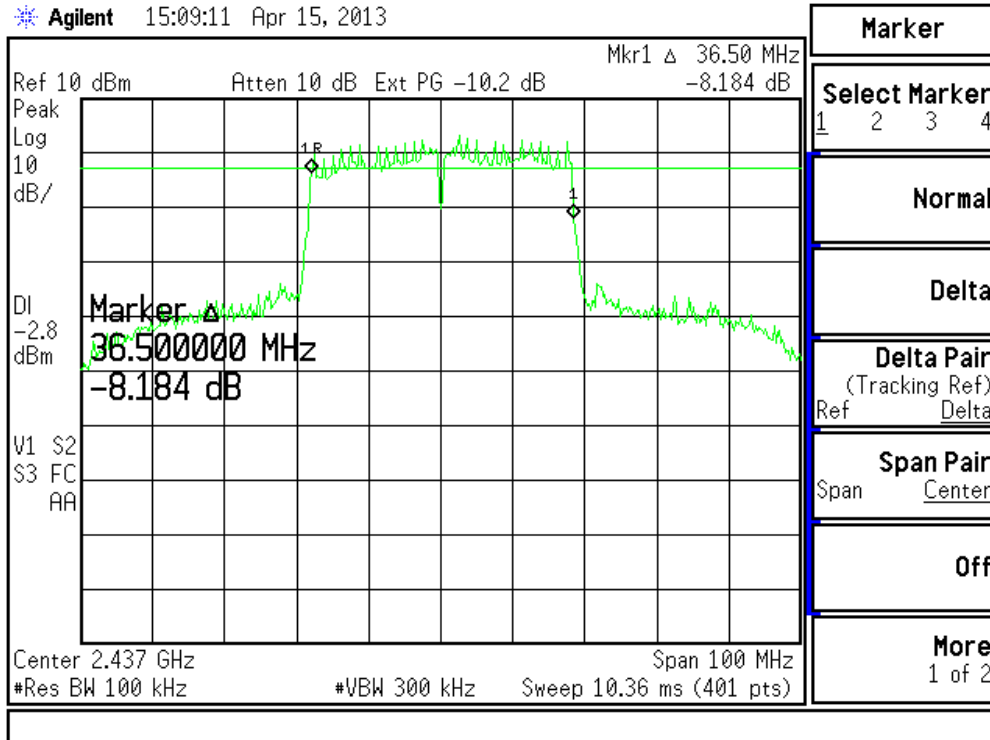
802.11n HT40(Ant 1)(2422MHz)

Agilent 15:05:01 Apr 15, 2013



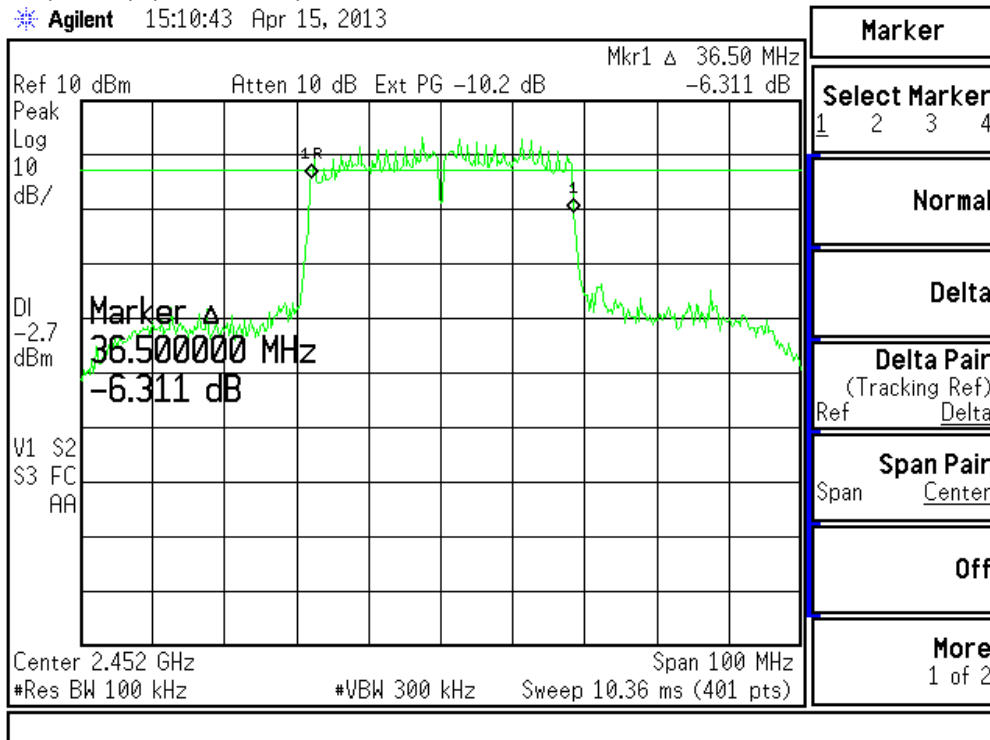
802.11n HT40(Ant 1) (2437MHz)

Agilent 15:09:11 Apr 15, 2013



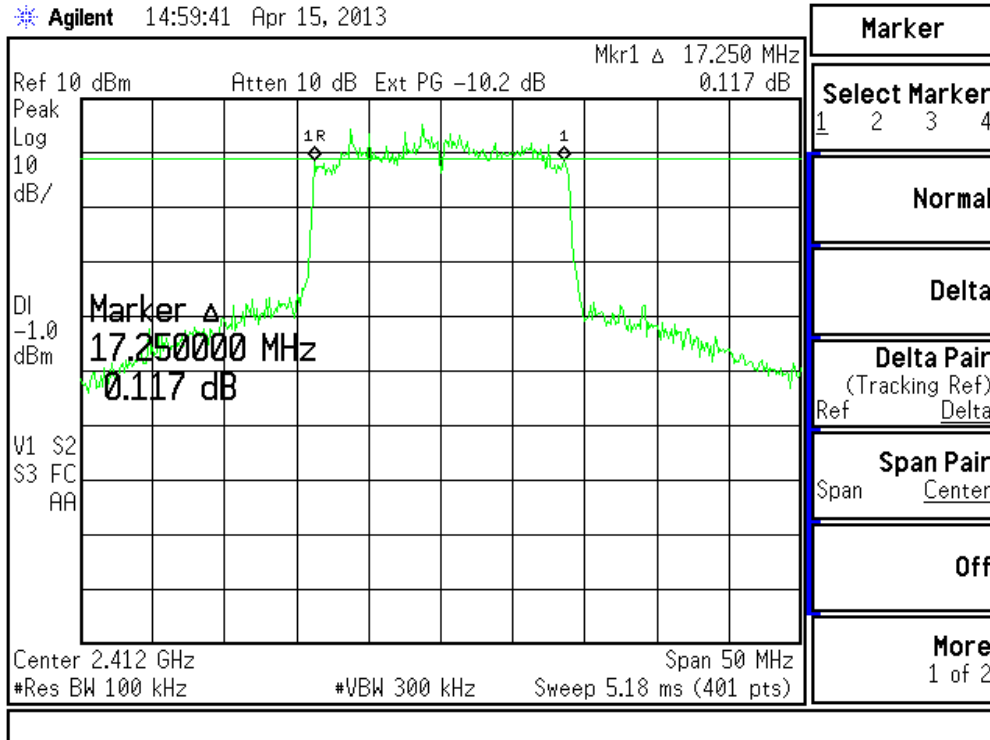
802.11n HT40(Ant 1) (2452MHz)

Agilent 15:10:43 Apr 15, 2013



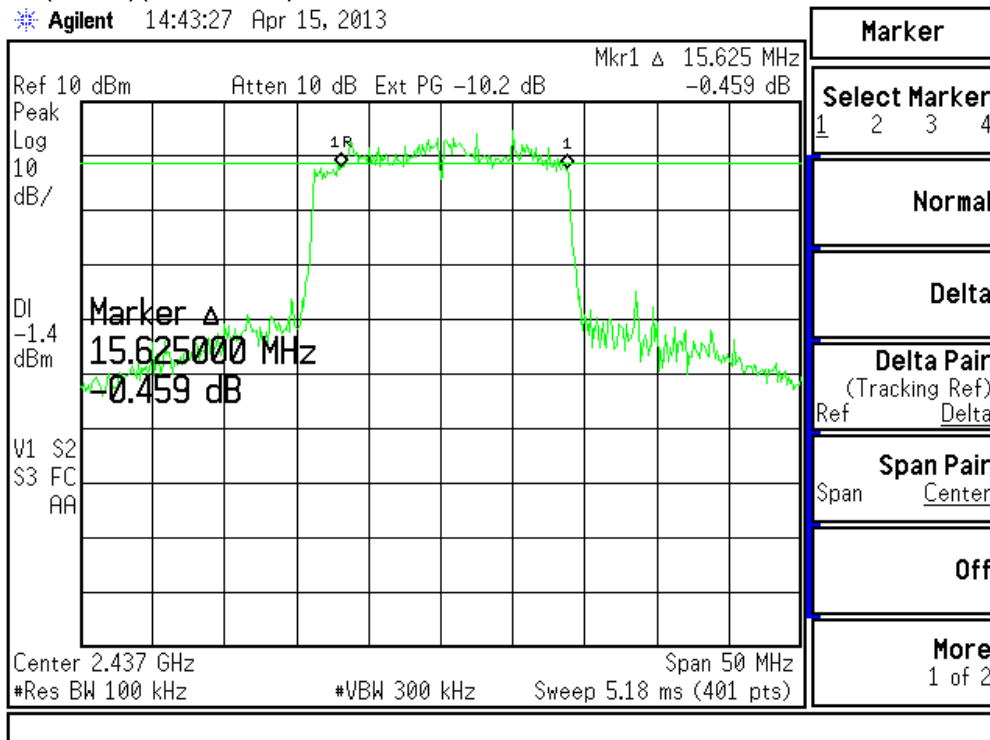
802.11n HT20(Ant 2)(2412MHz)

Agilent 14:59:41 Apr 15, 2013



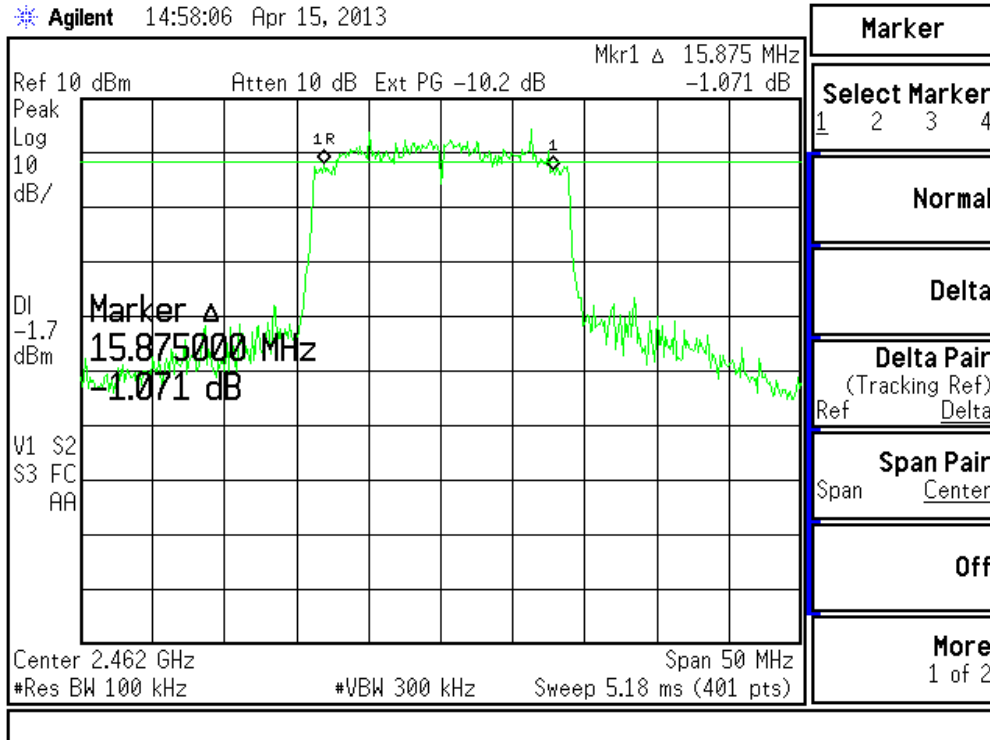
802.11n HT20(Ant 2)(2437MHz)

Agilent 14:43:27 Apr 15, 2013



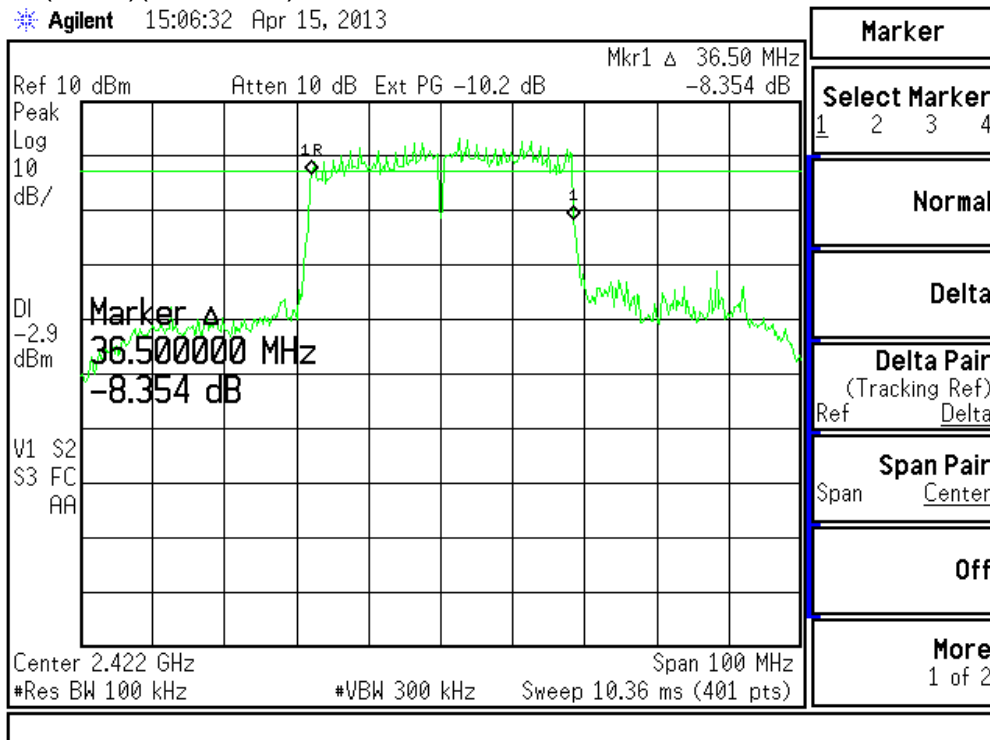
802.11n HT20(Ant 2)(2462MHz)

Agilent 14:58:06 Apr 15, 2013



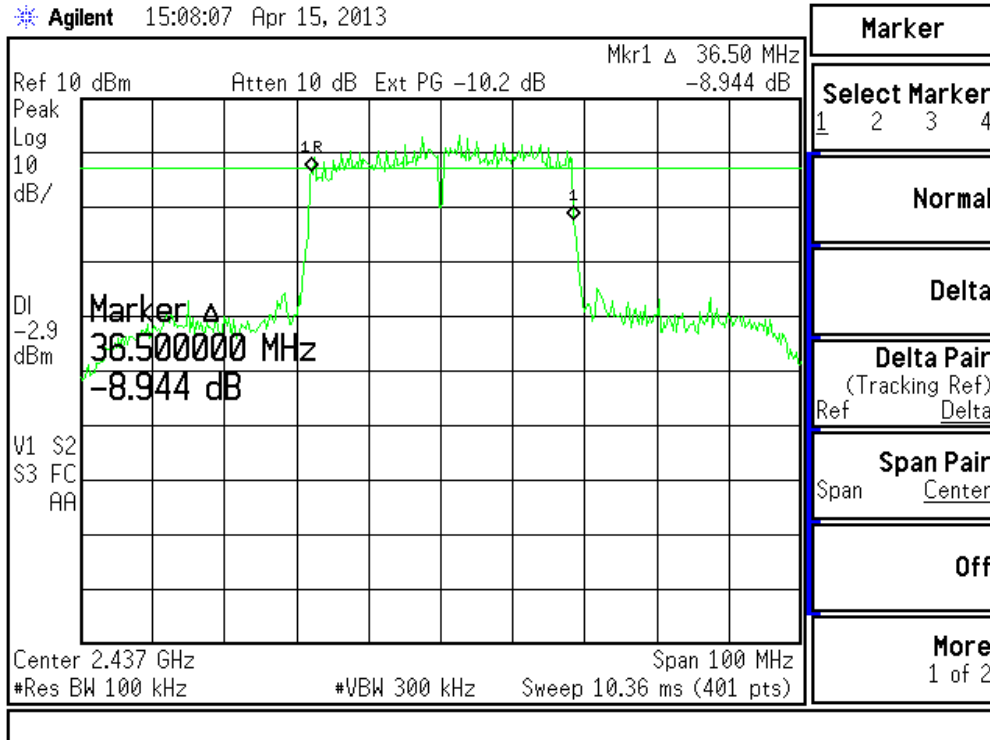
802.11n HT40(Ant 2)(2422MHz)

Agilent 15:06:32 Apr 15, 2013



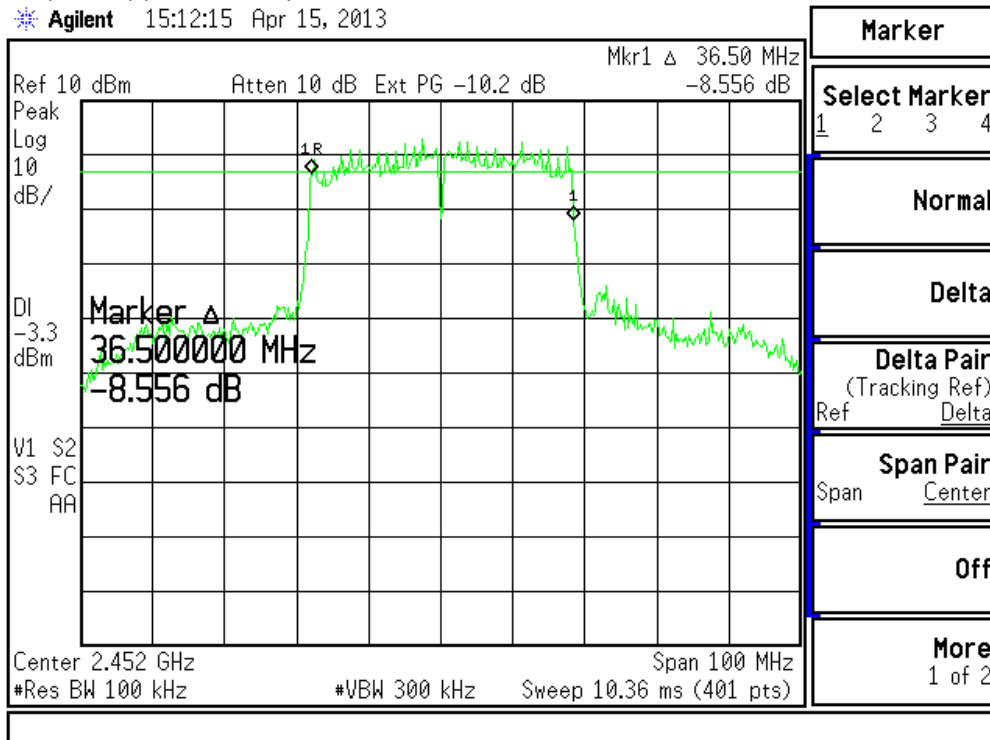
802.11n HT40(Ant 2)(2437MHz)

Agilent 15:08:07 Apr 15, 2013



802.11n HT40(Ant 2)(2452MHz)

Agilent 15:12:15 Apr 15, 2013



## 6. Maximum Power Density Requirements

### 6.1 Test Condition & Setup :

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RBW =100kHz , VBW=300kHz ,

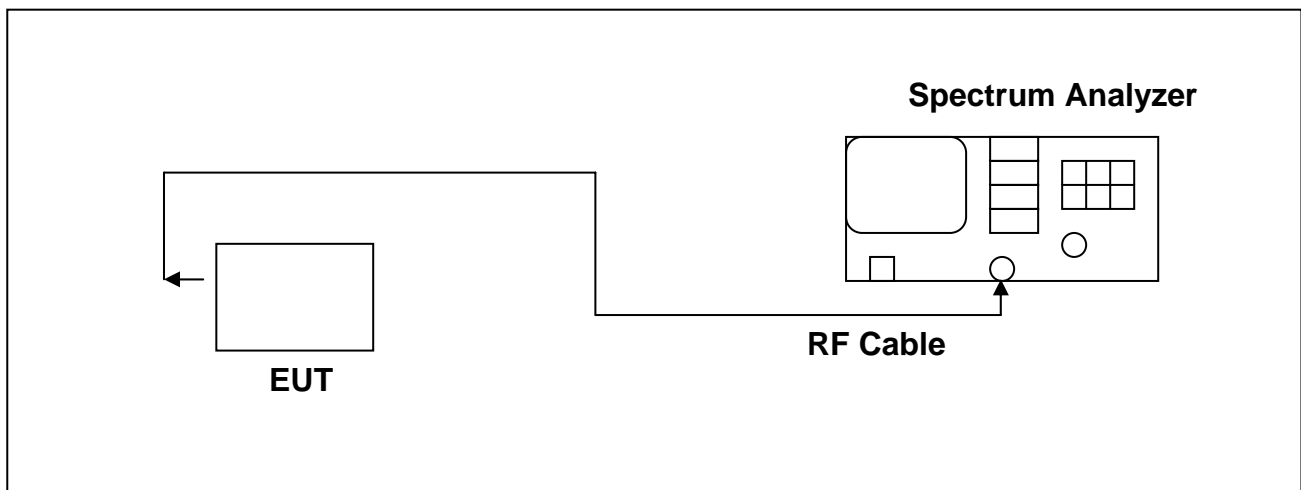
Detector = peak , Sweep time = auto couple , Trace Mode = max hold , Allow trace to fully stabilize. Use the peak marker function to determine the maximum amplitude level in any 100kHz band segment within the fundamental EBW.

Scale the observed power level to an equivalent value in 3kHz by adjusting.

Bandwidth correction factor =  $10\log(3\text{kHz} / 100\text{kHz}) = -15.2\text{dB}$

Measurement procedure is followed KDB 558074 v03r01 (10.2 Method PKPSD (peak PSD))

### 6.2 Test Instruments Configuration:



### 6.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29

## 6.4 Test Result:

### 802.11b

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2412	8.422	-6.778	<8dBm
2437	7.633	-7.567	<8dBm
2462	8.206	-6.994	<8dBm

### 802.11g

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2412	6.358	-8.842	<8dBm
2437	6.105	-9.095	<8dBm
2462	5.639	-9.561	<8dBm

### 802.11n HT20(Ant 1)

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2412	6.716	-8.484	<8dBm
2437	6.175	-9.025	<8dBm
2462	6.352	-8.848	<8dBm

### 802.11n HT40(Ant 1)

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2422	3.615	-11.585	<8dBm
2437	3.334	-11.866	<8dBm
2452	3.309	-11.891	<8dBm

### 802.11n HT20(Ant 2)

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2412	5.638	-9.562	<8dBm
2437	5.377	-9.823	<8dBm
2462	5.508	-9.692	<8dBm

**802.11n HT40(Ant 2)**

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2422	3.066	-12.134	<8dBm
2437	3.409	-11.791	<8dBm
2452	3.247	-11.953	<8dBm

**802.11n HT20(Ant1 + Ant2)**

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2412	5.195	-10.005	<8dBm
2437	6.354	-8.846	<8dBm
2462	5.635	-9.565	<8dBm

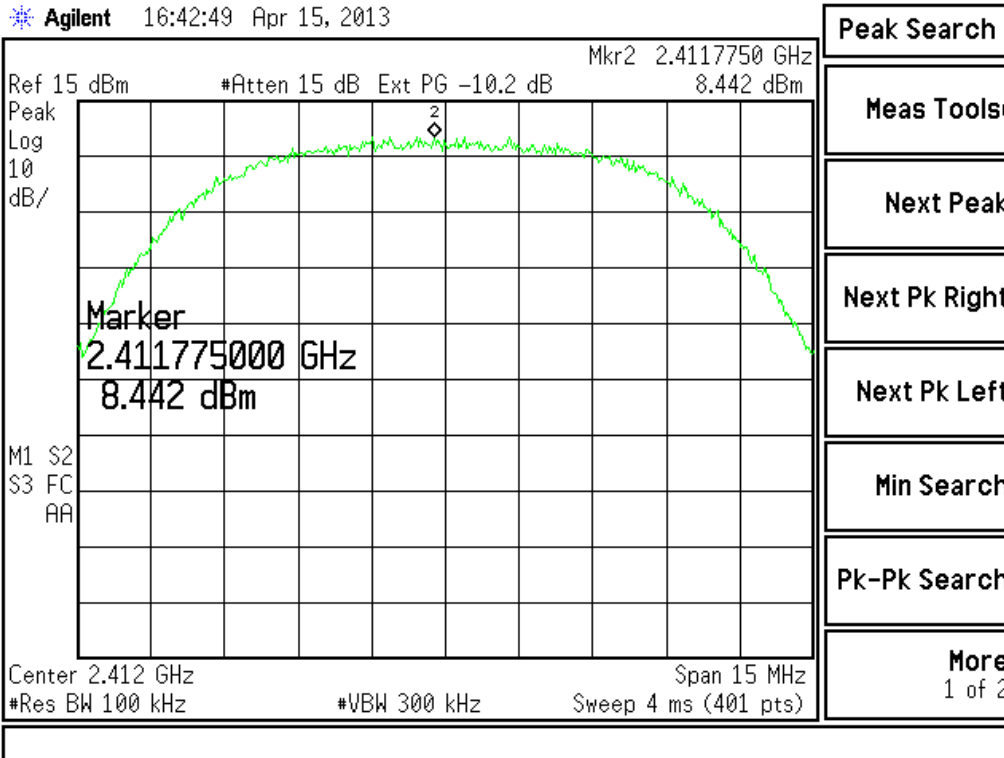
**802.11n HT40(Ant1 + Ant2)**

Frequency (MHz)	Power Density (dBm)	Results PSD/3kHz(dBm)	Required Limit
2422	3.826	-11.374	<8dBm
2437	3.467	-11.733	<8dBm
2452	4.840	-10.360	<8dBm

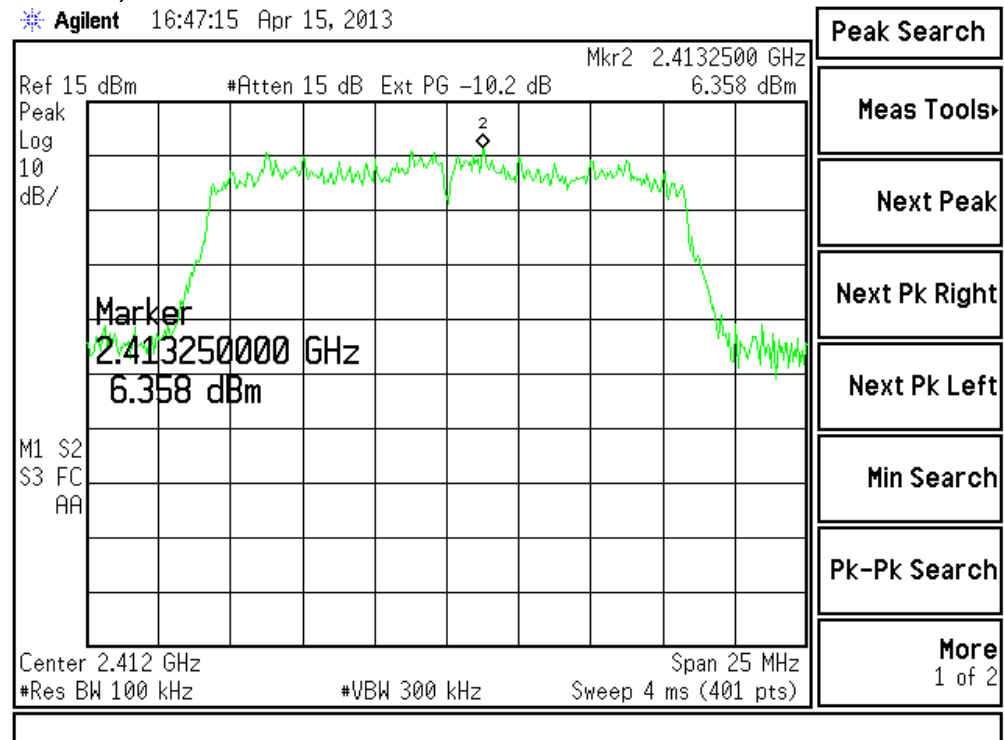
**Note:** Test Graphs See next page.



802.11b (2412MHz)

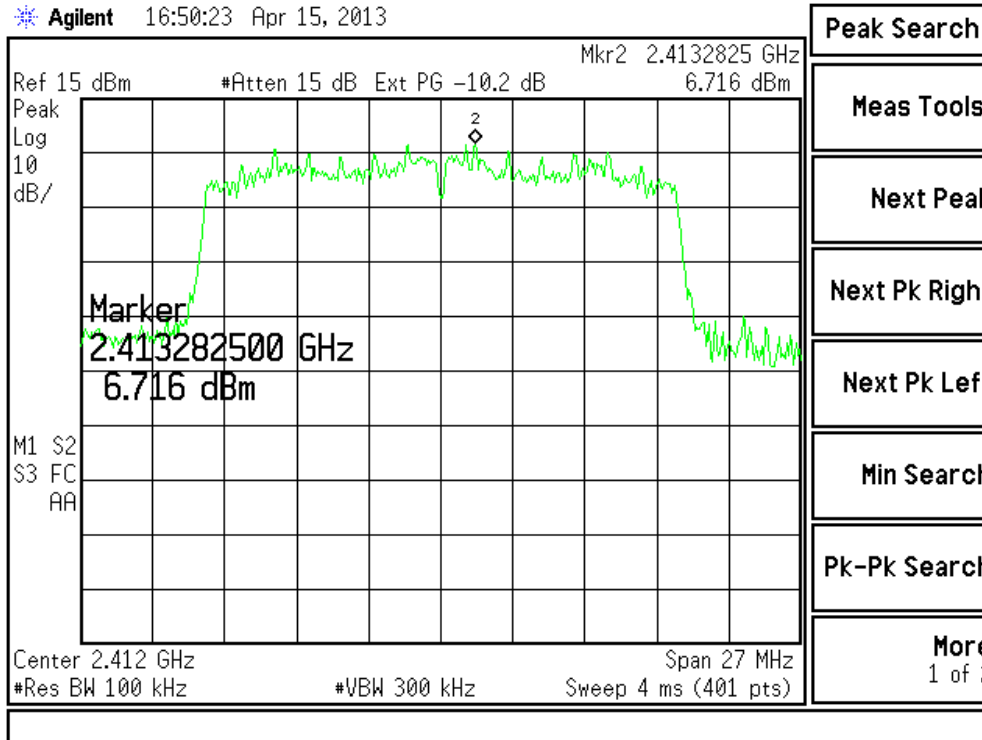


802.11g (2412MHz)



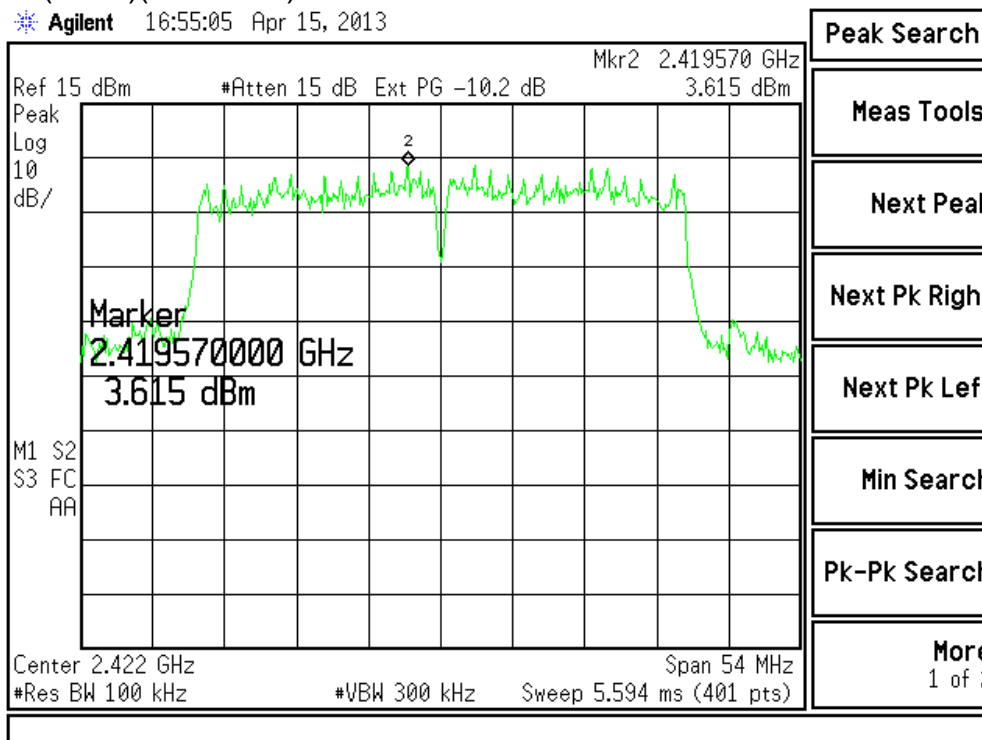
802.11n HT20(Ant 1)(2412MHz)

Agilent 16:50:23 Apr 15, 2013



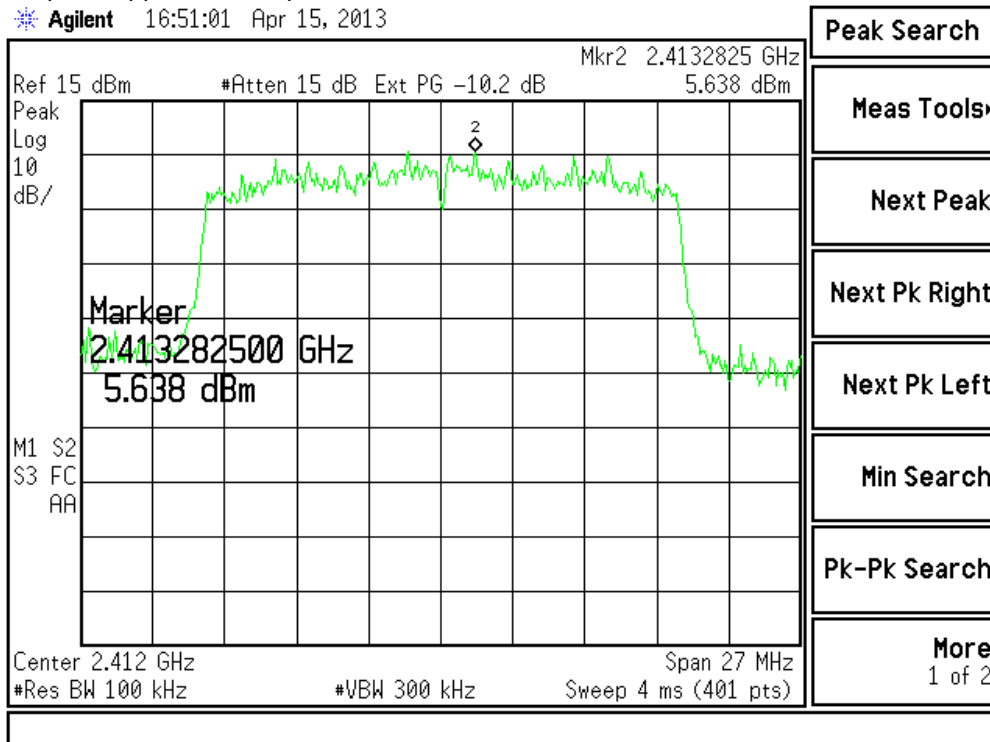
802.11n HT40(Ant 1)(2412MHz)

Agilent 16:55:05 Apr 15, 2013



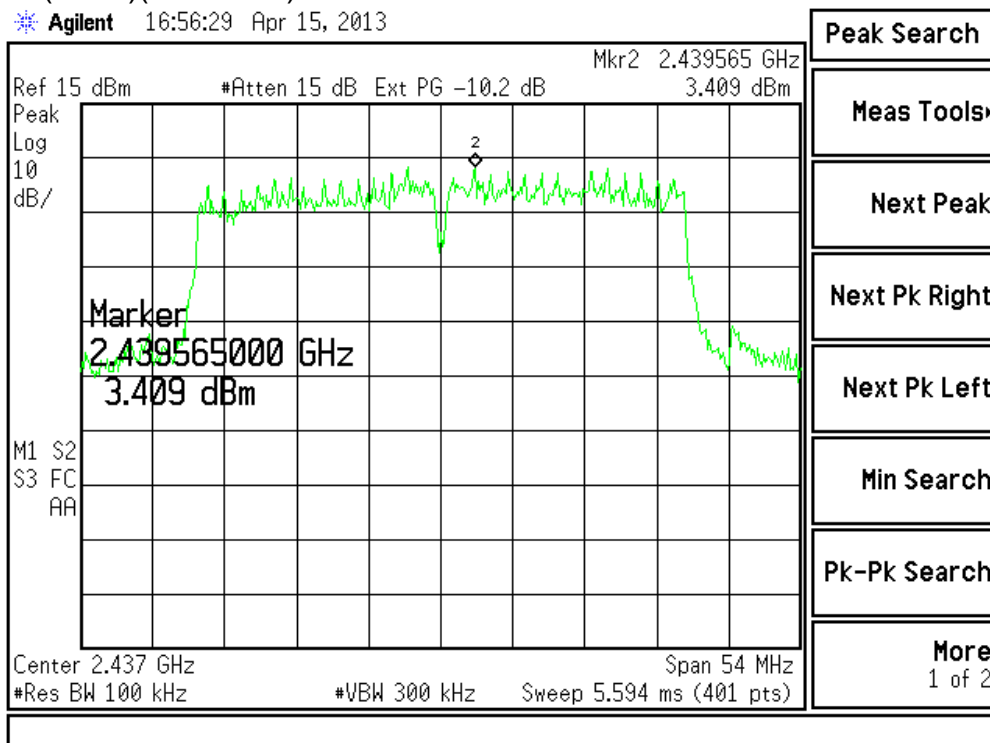
802.11n HT20(Ant 2)(2412MHz)

Agilent 16:51:01 Apr 15, 2013



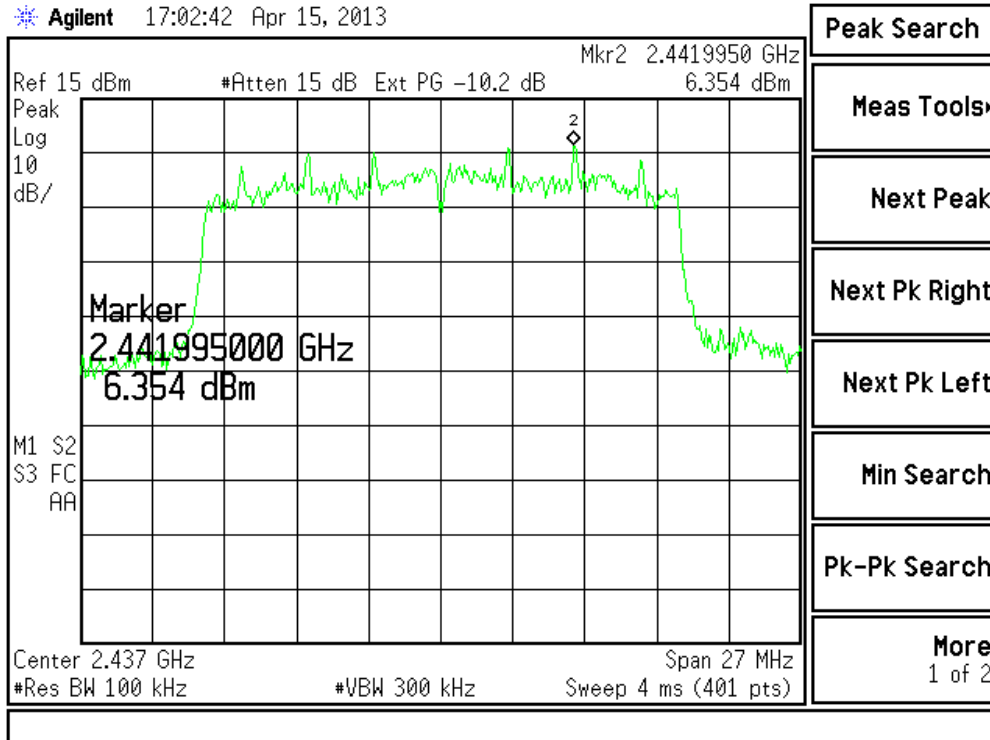
802.11n HT40(Ant 2)(2437MHz)

Agilent 16:56:29 Apr 15, 2013



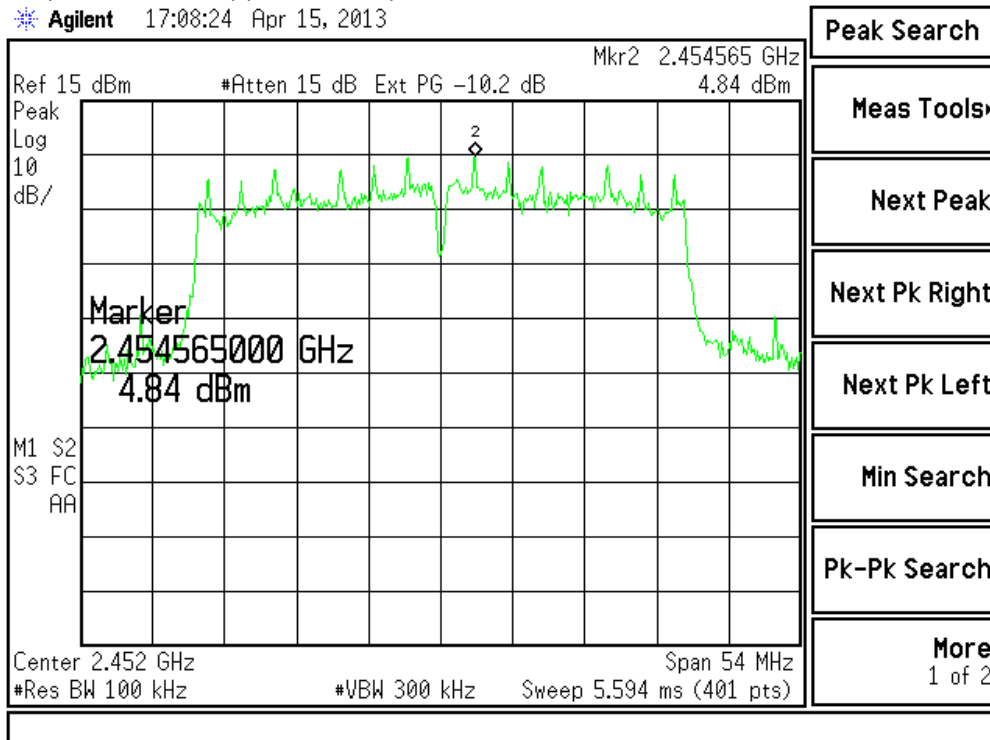
802.11n HT20(Ant1 + Ant 2)(2437MHz)

Agilent 17:02:42 Apr 15, 2013



802.11n HT40(Ant1 + Ant 2)(2452MHz)

Agilent 17:08:24 Apr 15, 2013



## 7. Out of Band Conducted Spurious Emissions Requirements

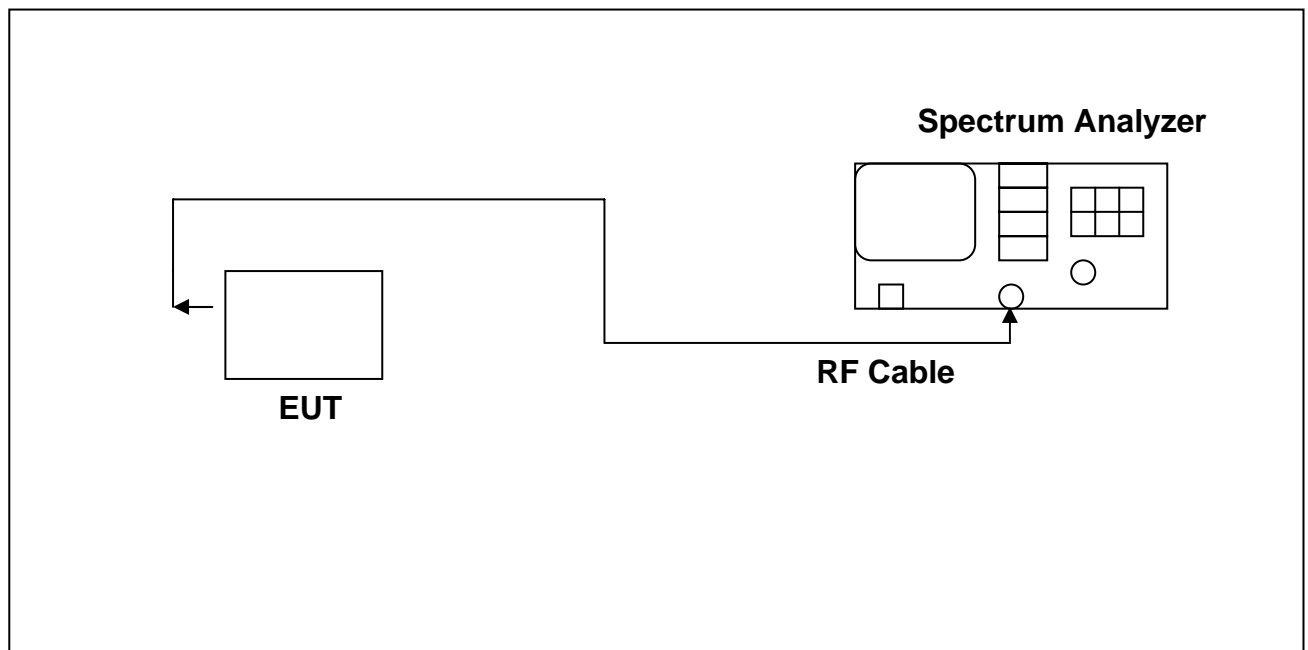
### 7.1 Test Condition & Setup :

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels.

Measurement procedure is followed KDB 558074 v03r01 (11.3 Emission level measurement)

### 7.2 Test Instruments Configuration:



### 7.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29

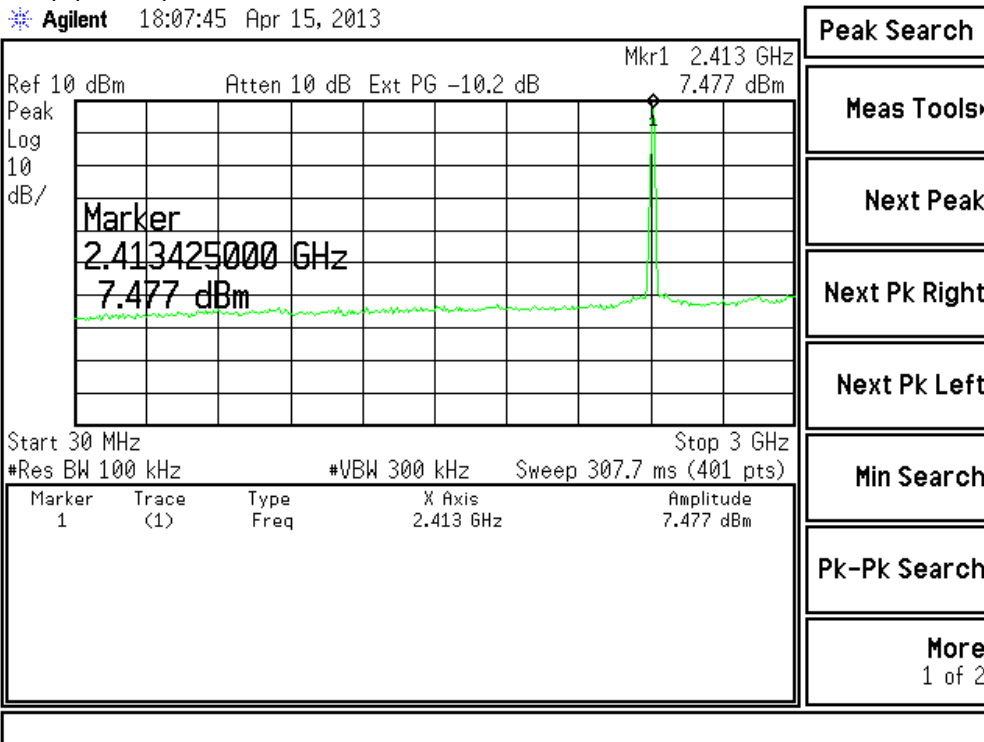
## 7.4 Test Result:

Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

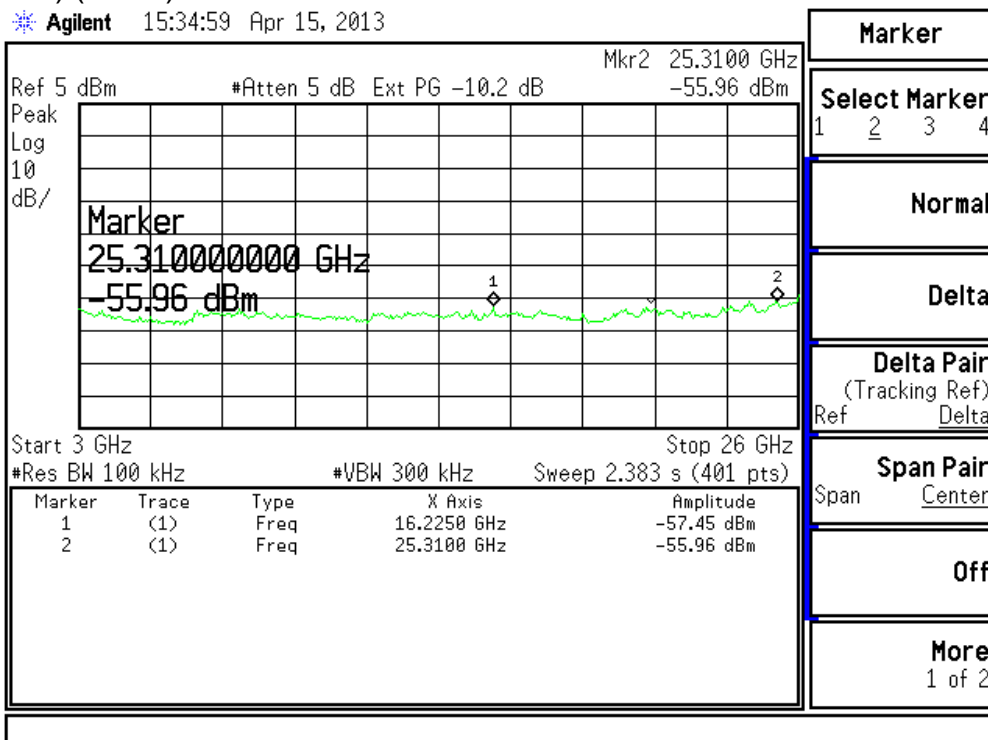
For the MIMO result, if the spurious emission of two antennas have the same frequency, we choose the worst one and add 3dB to be the final result, otherwise, use the graph to represent it.

**Note :** Test Graphs See next page.

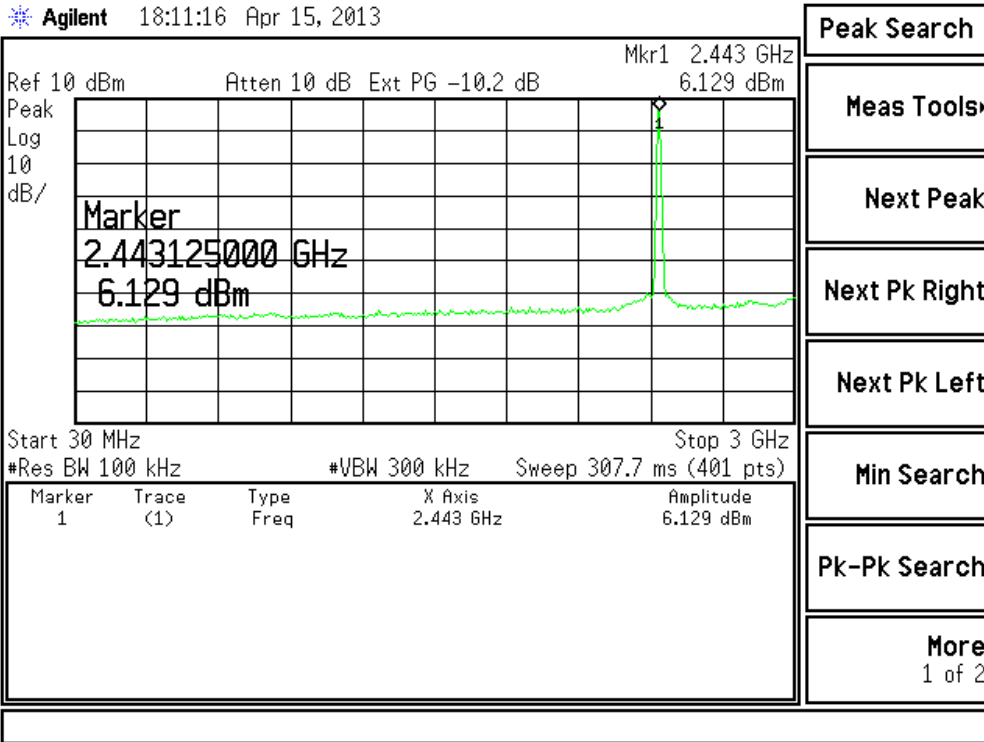
802.11b (CH01) (1 of 2)



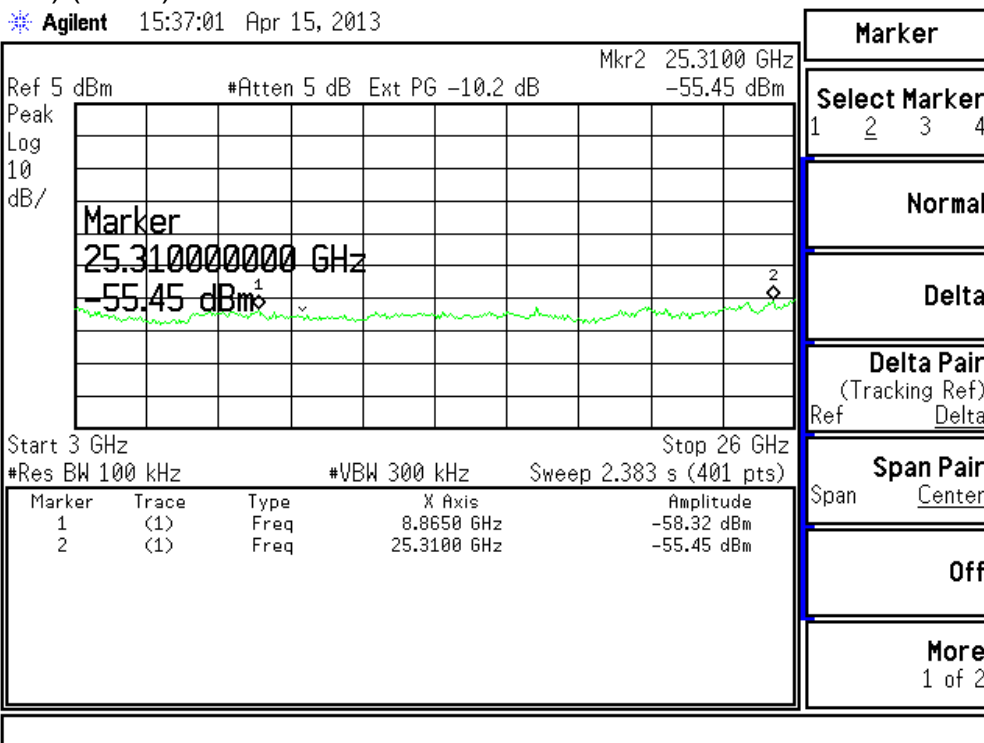
802.11b (CH01) (2 of 2)



802.11b (CH06) (1 of 2)

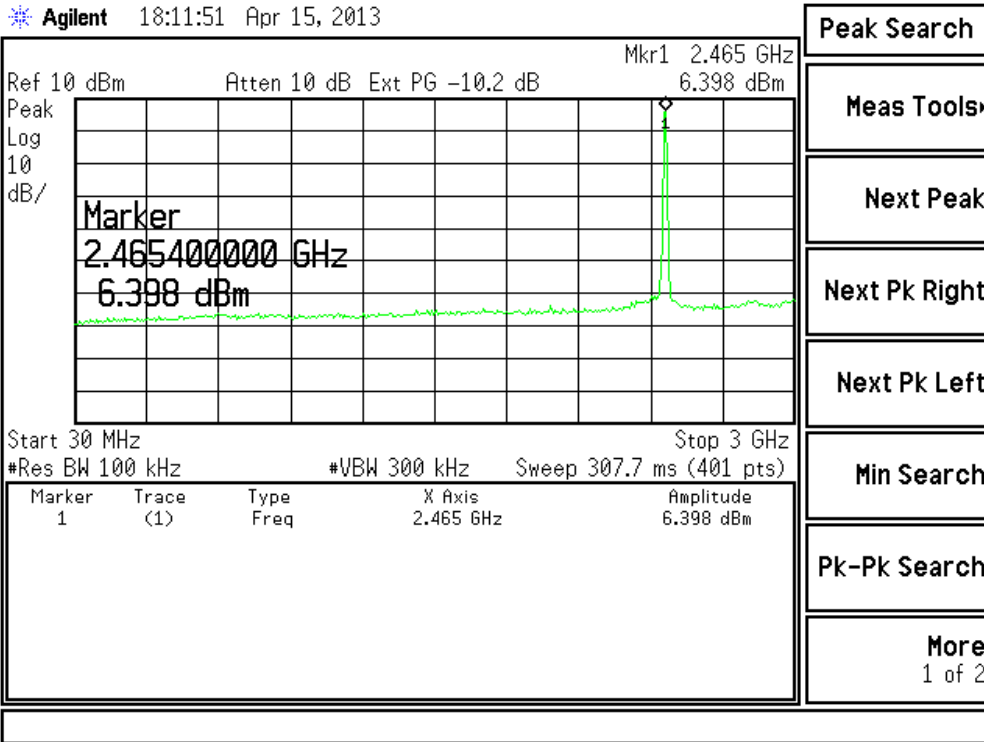


802.11b (CH06) (2 of 2)

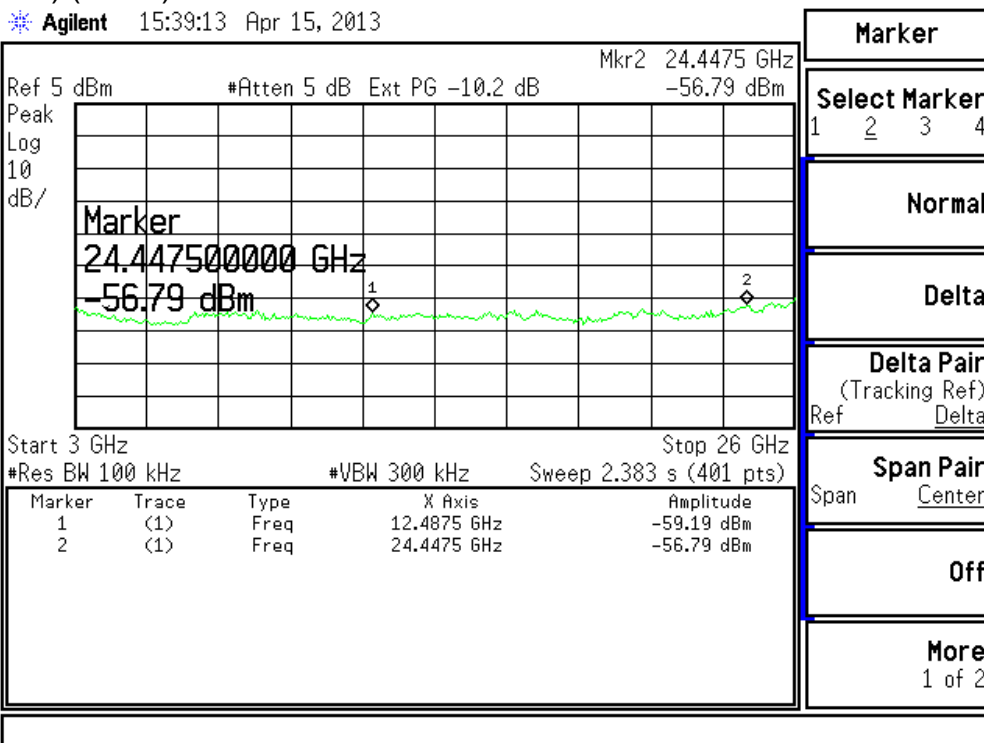




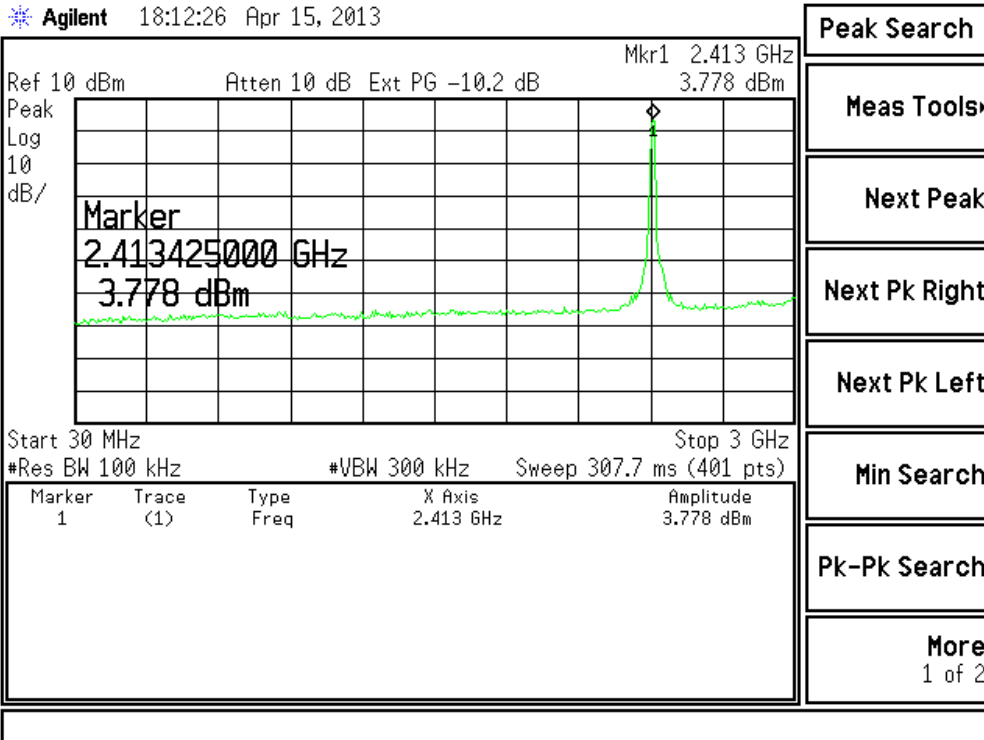
802.11b (CH11) (1 of 2)



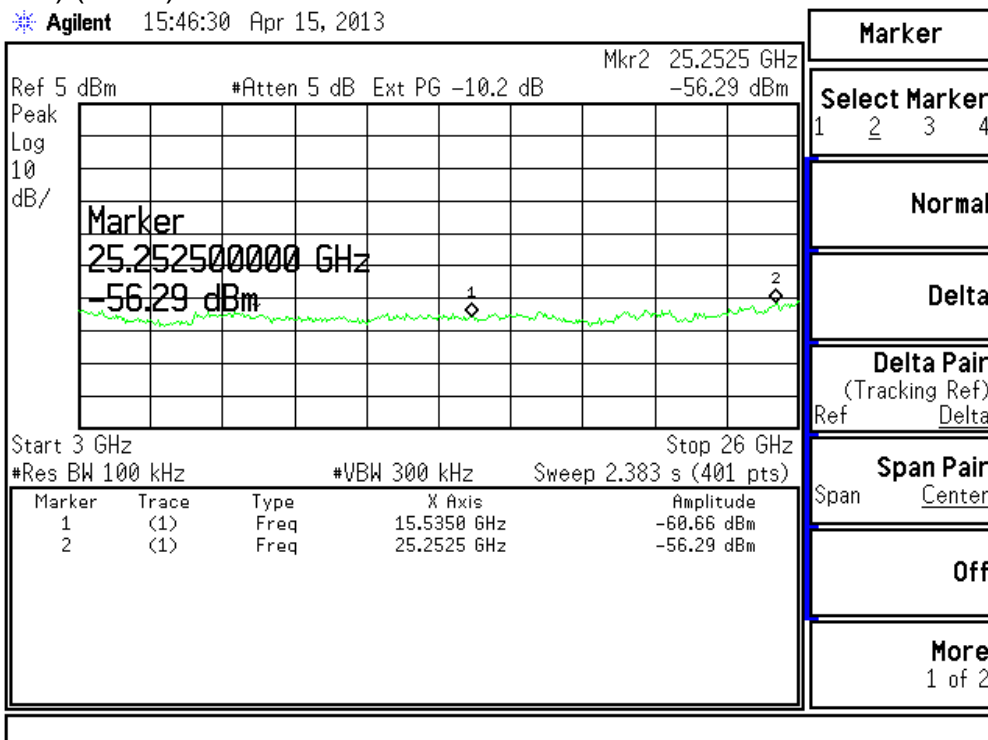
802.11b (CH11) (2 of 2)



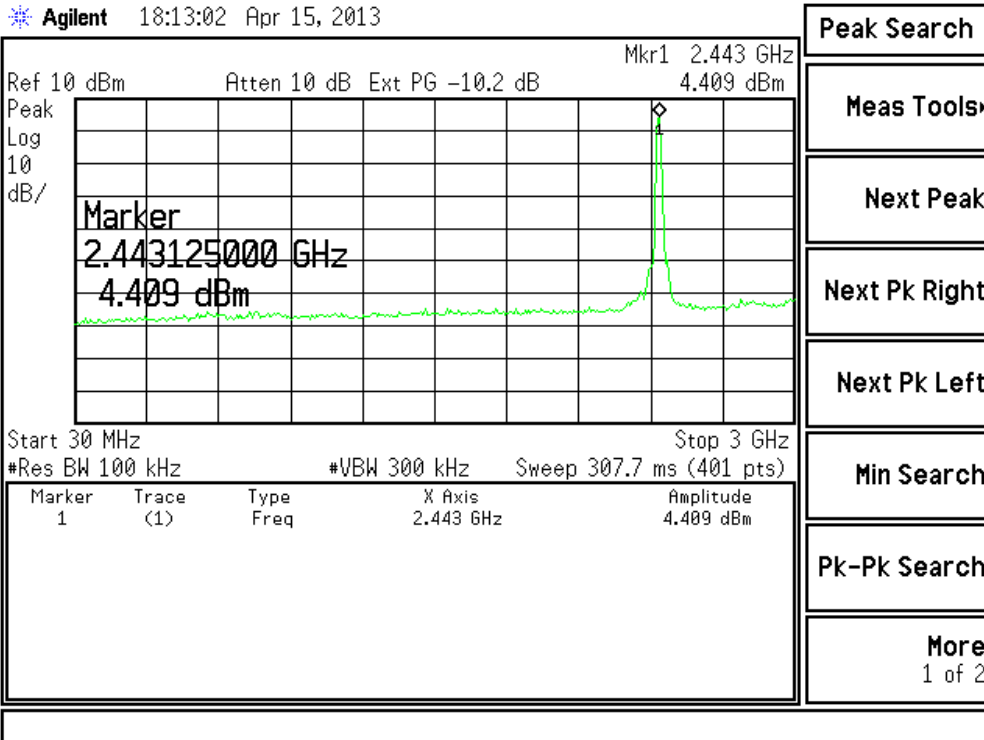
802.11g (CH01) (1 of 2)



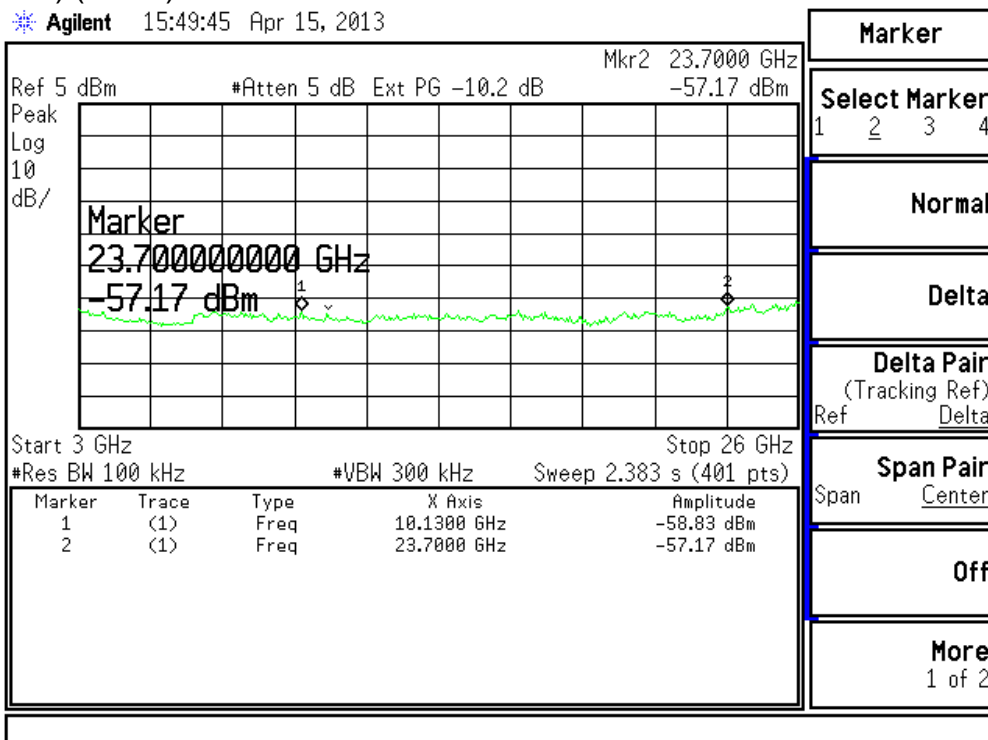
802.11g (CH01) (2 of 2)



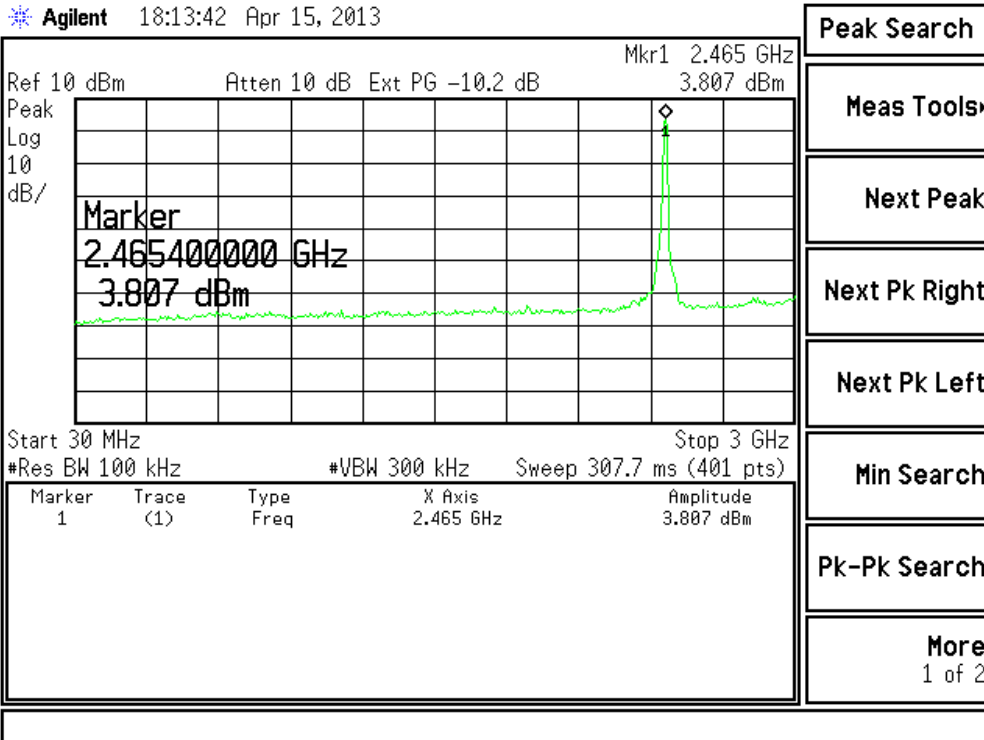
802.11g (CH06) (1 of 2)



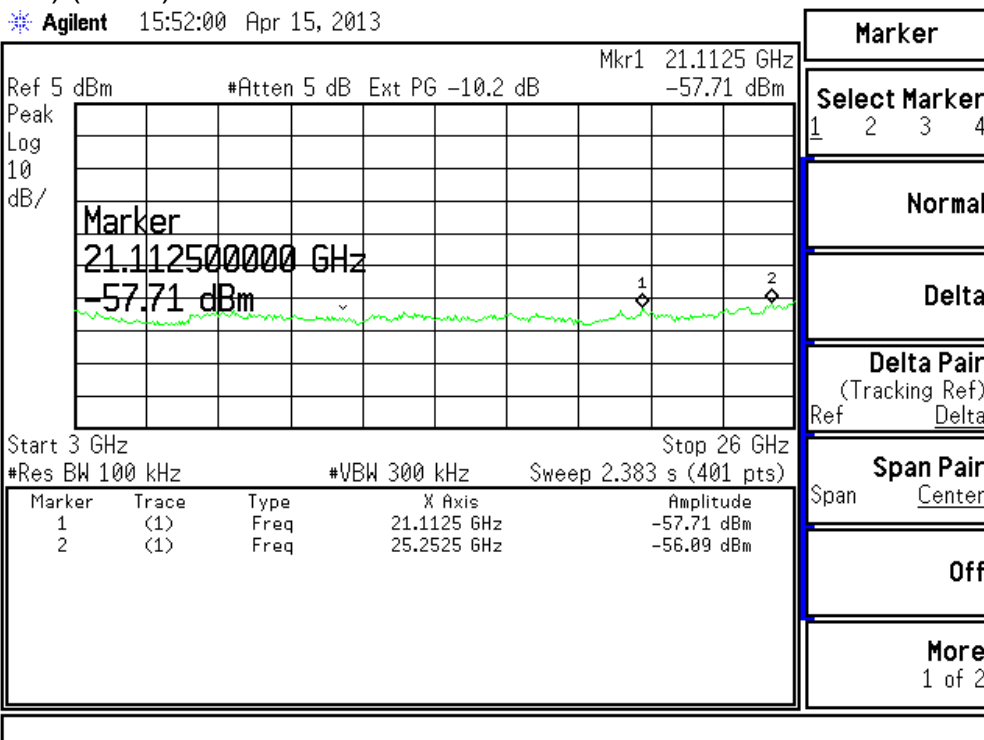
802.11g (CH06) (2 of 2)



802.11g (CH11) (1 of 2)

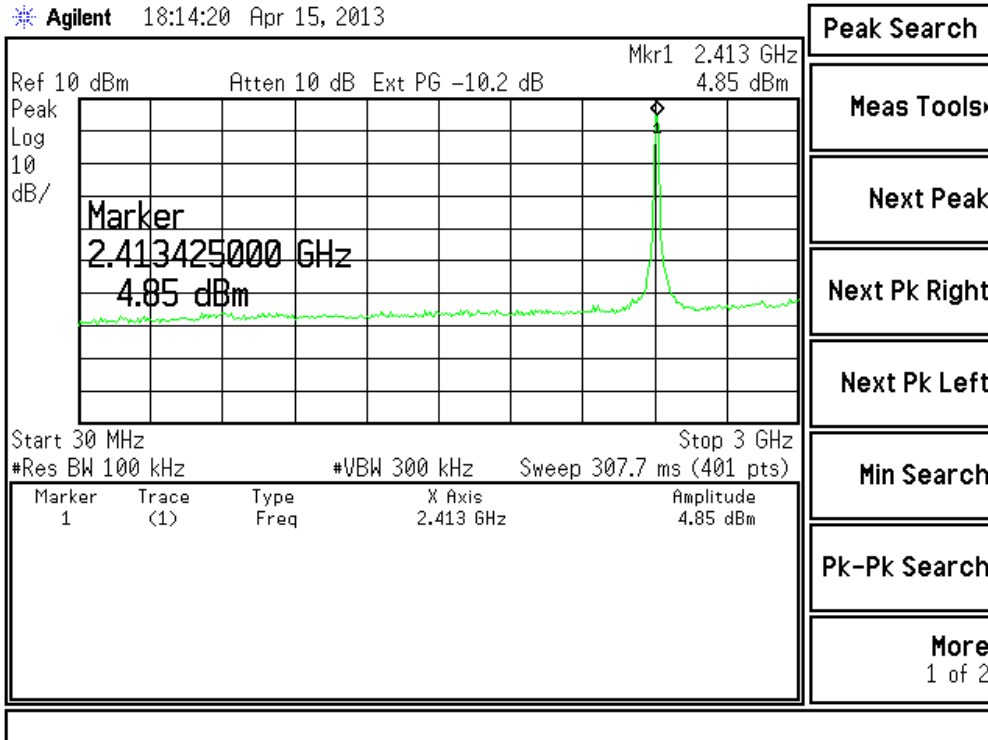


802.11g (CH11) (2 of 2)



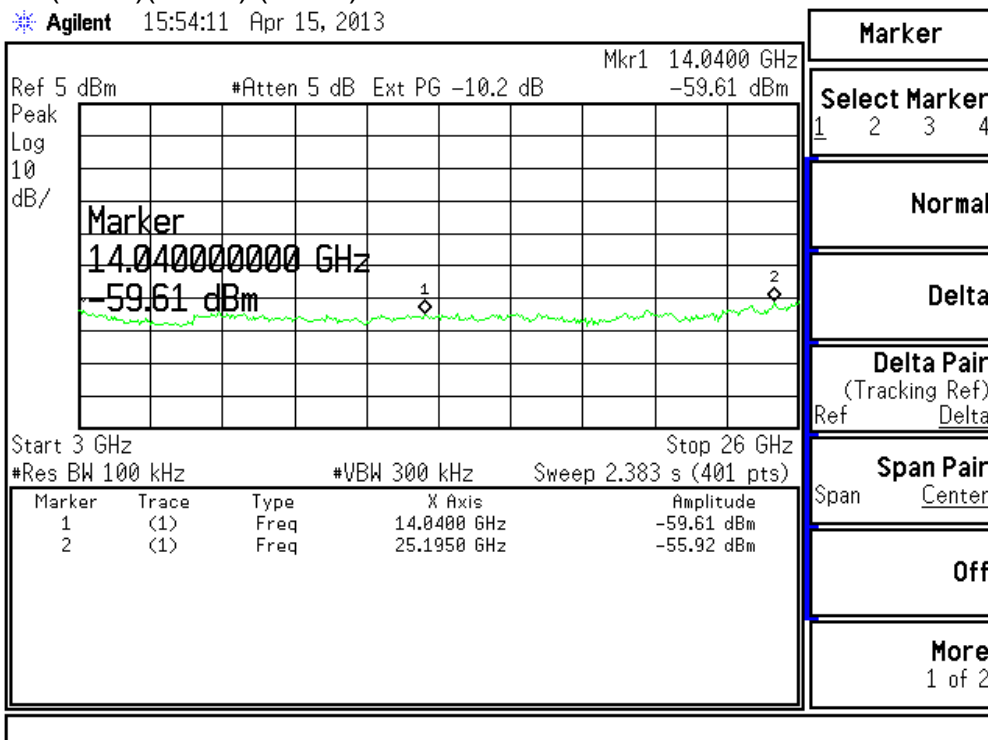
802.11n HT20 (Ant 1)(CH01) (1 of 2)

Agilent 18:14:20 Apr 15, 2013



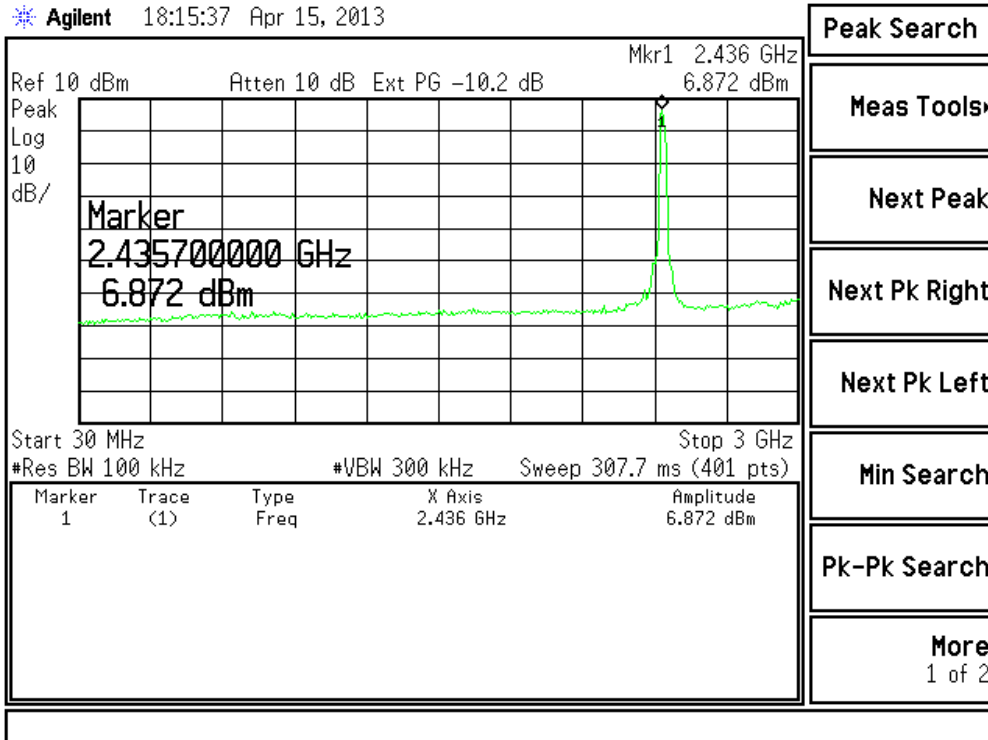
802.11n HT20 (Ant 1)(CH01) (2 of 2)

Agilent 15:54:11 Apr 15, 2013



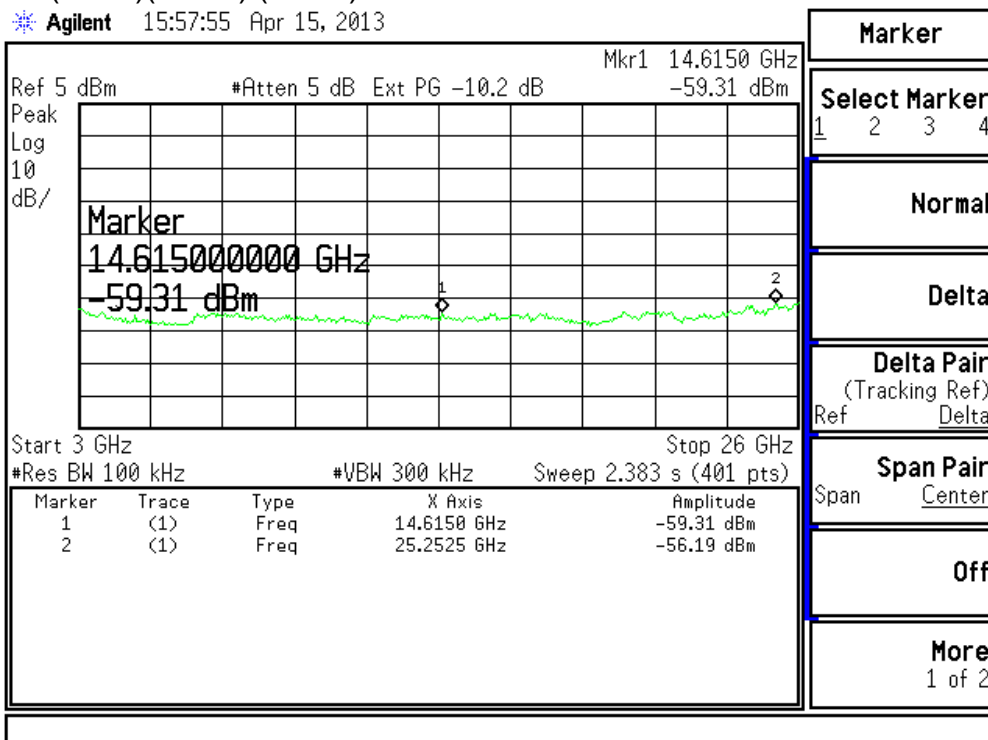
802.11n HT20 (Ant 1)(CH06) (1 of 2)

Agilent 18:15:37 Apr 15, 2013



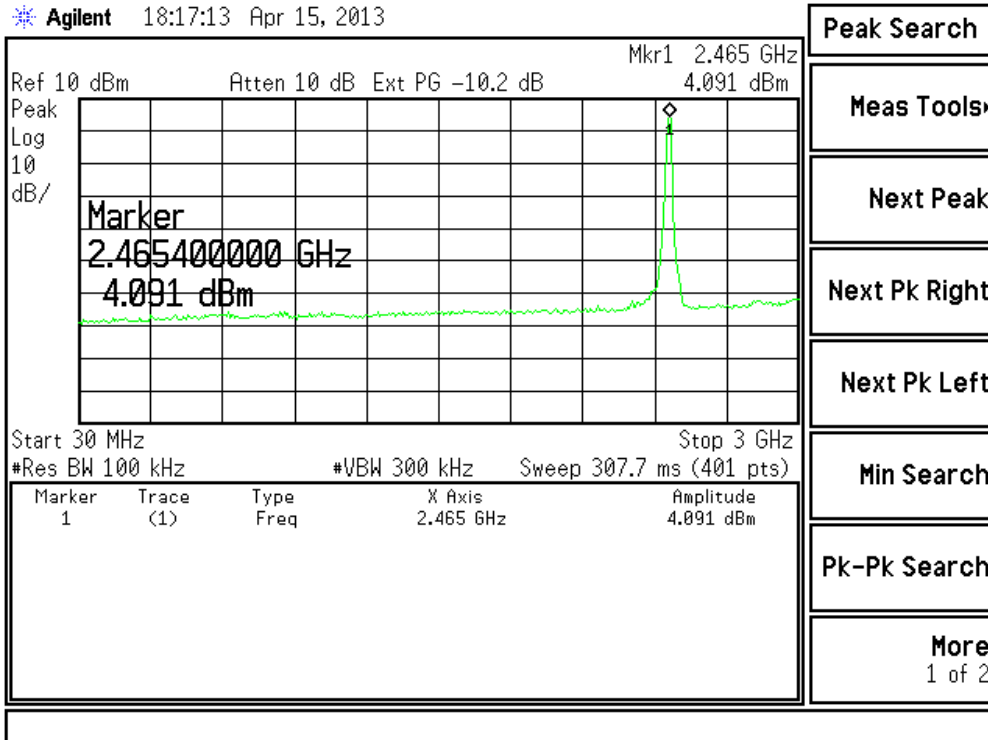
802.11n HT20 (Ant 1)(CH06) (2 of 2)

Agilent 15:57:55 Apr 15, 2013



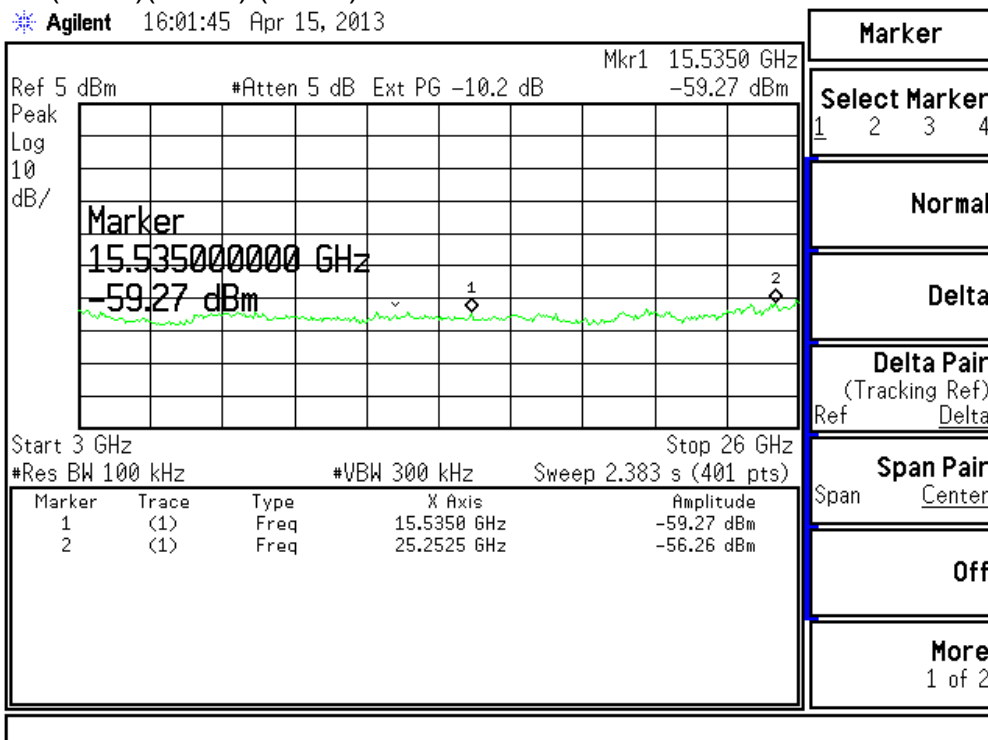
802.11n HT20 (Ant 1)(CH11) (1 of 2)

Agilent 18:17:13 Apr 15, 2013



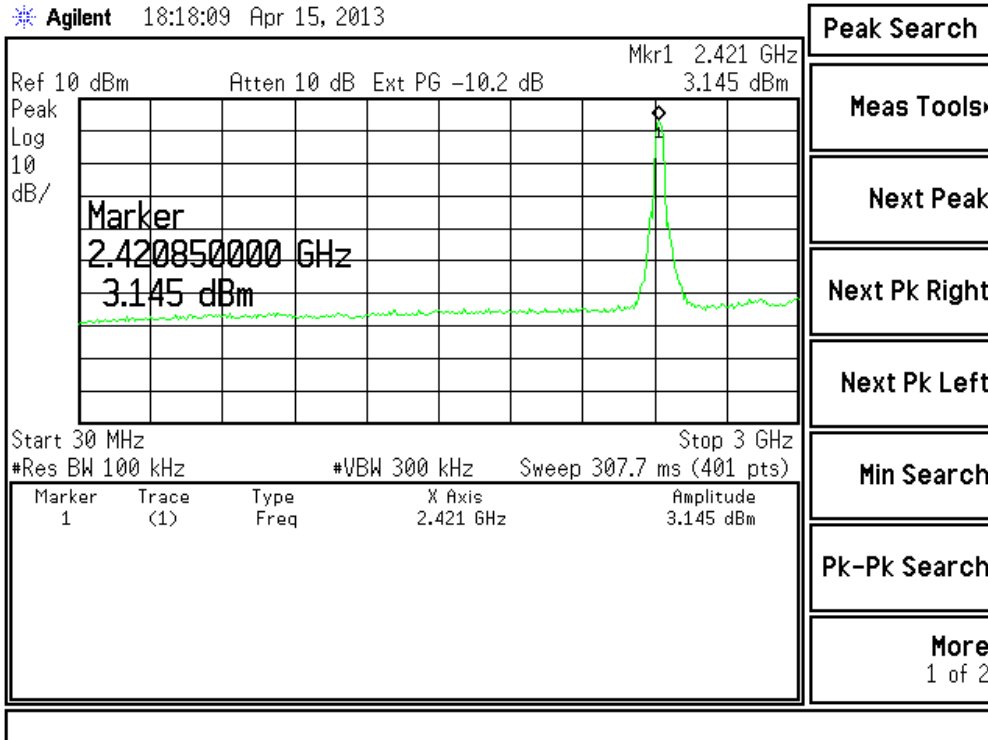
802.11n HT20 (Ant 1)(CH11) (2 of 2)

Agilent 16:01:45 Apr 15, 2013



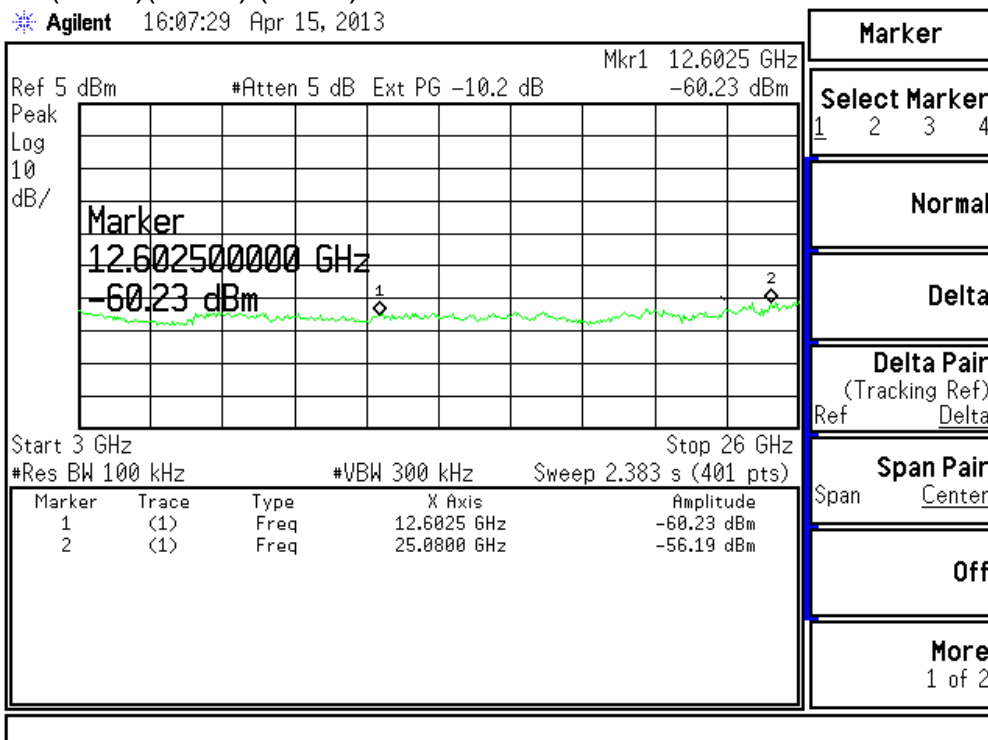
802.11n HT40 (Ant 1)(CH03) (1 of 2)

Agilent 18:18:09 Apr 15, 2013



802.11n HT40 (Ant 1)(CH03) (2 of 2)

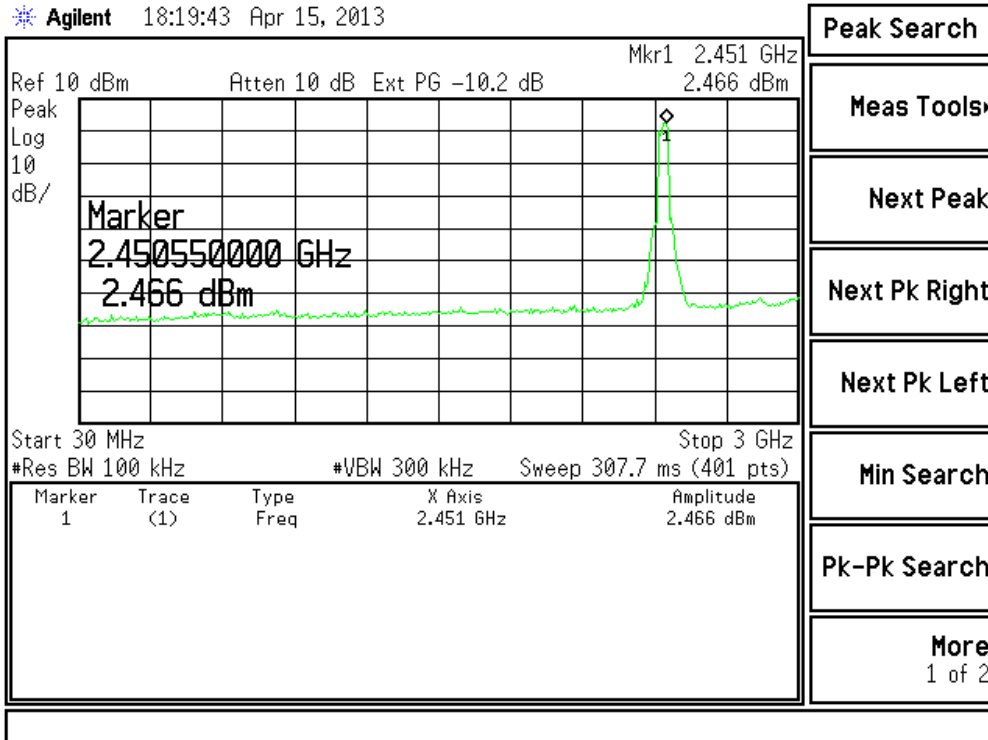
Agilent 16:07:29 Apr 15, 2013





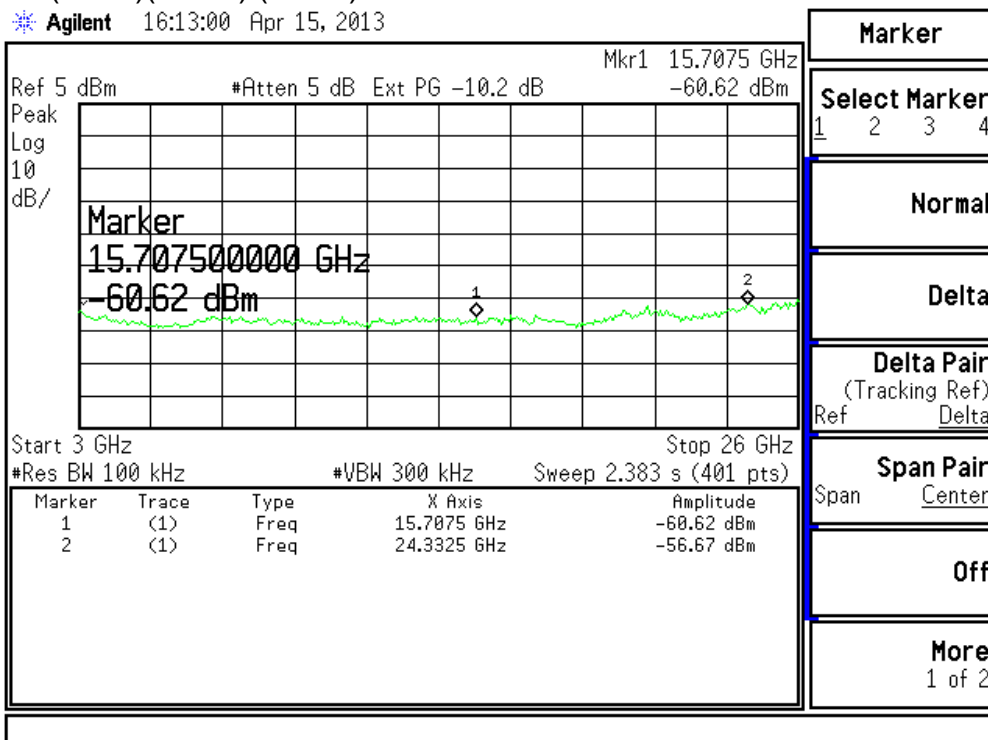
802.11n HT40 (Ant 1)(CH06) (1 of 2)

Agilent 18:19:43 Apr 15, 2013



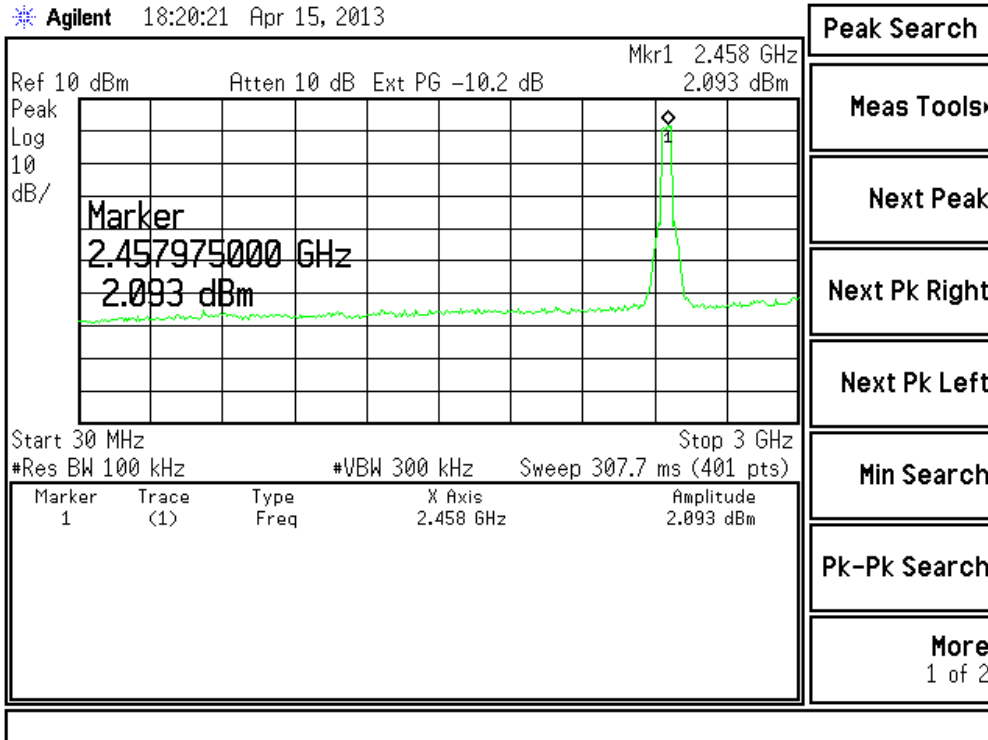
802.11n HT40 (Ant 1)(CH06) (2 of 2)

Agilent 16:13:00 Apr 15, 2013



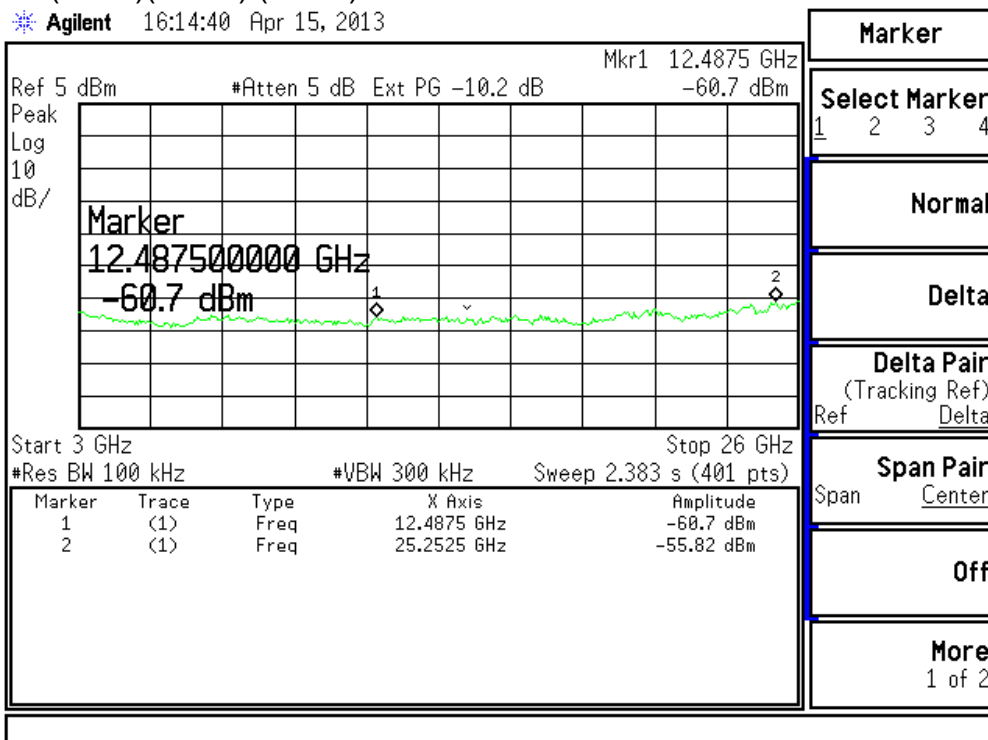
802.11n HT40 (Ant 1)(CH09) (1 of 2)

Agilent 18:20:21 Apr 15, 2013



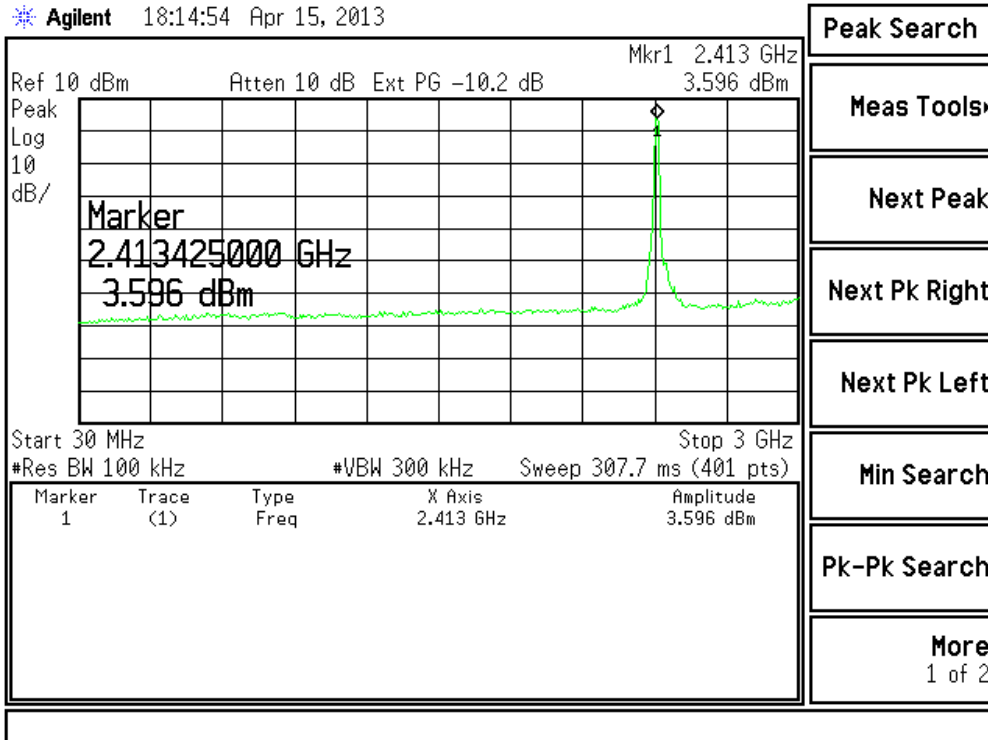
802.11n HT40 (Ant 1)(CH09) (2 of 2)

Agilent 16:14:40 Apr 15, 2013



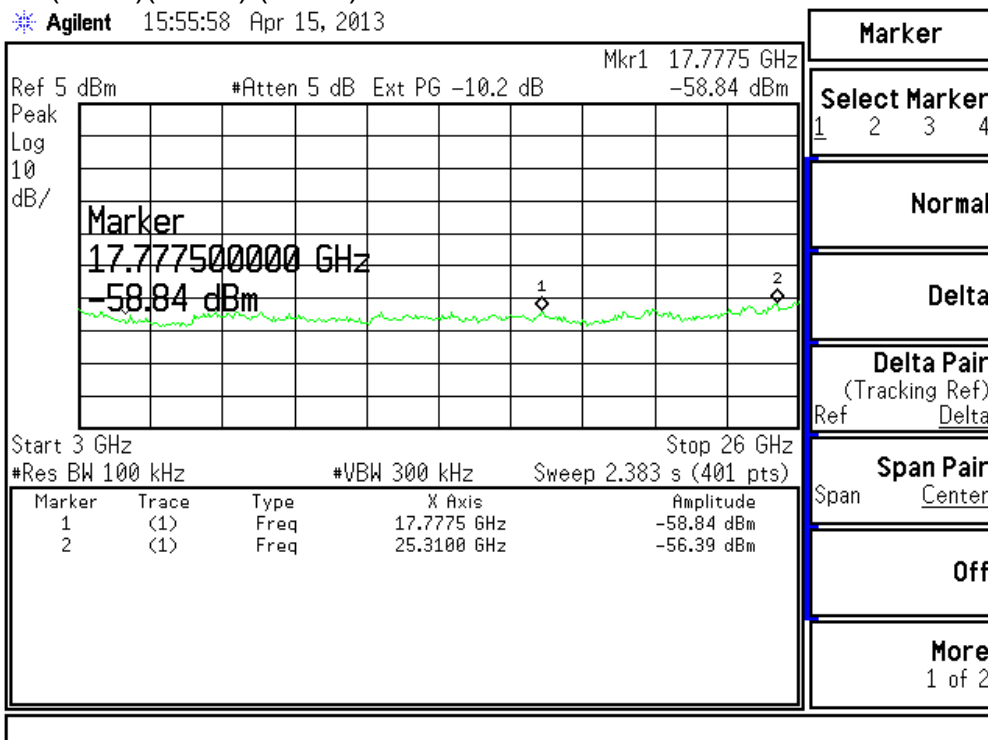
802.11n HT20 (Ant 2)(CH01) (1 of 2)

Agilent 18:14:54 Apr 15, 2013



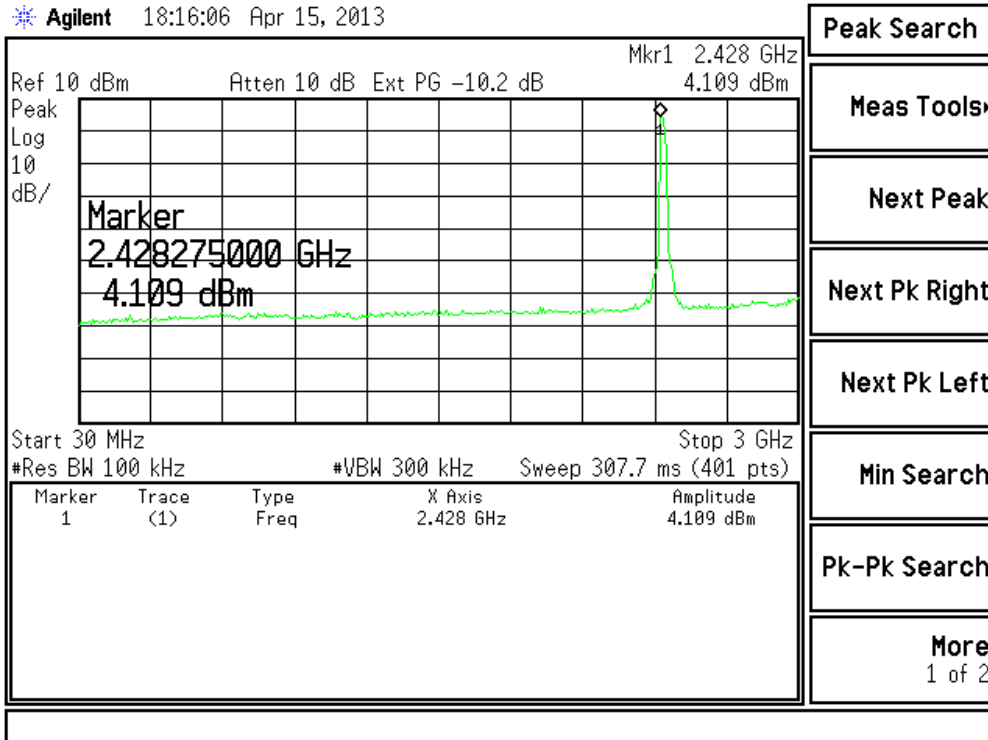
802.11n HT20 (Ant 2)(CH01) (2 of 2)

Agilent 15:55:58 Apr 15, 2013



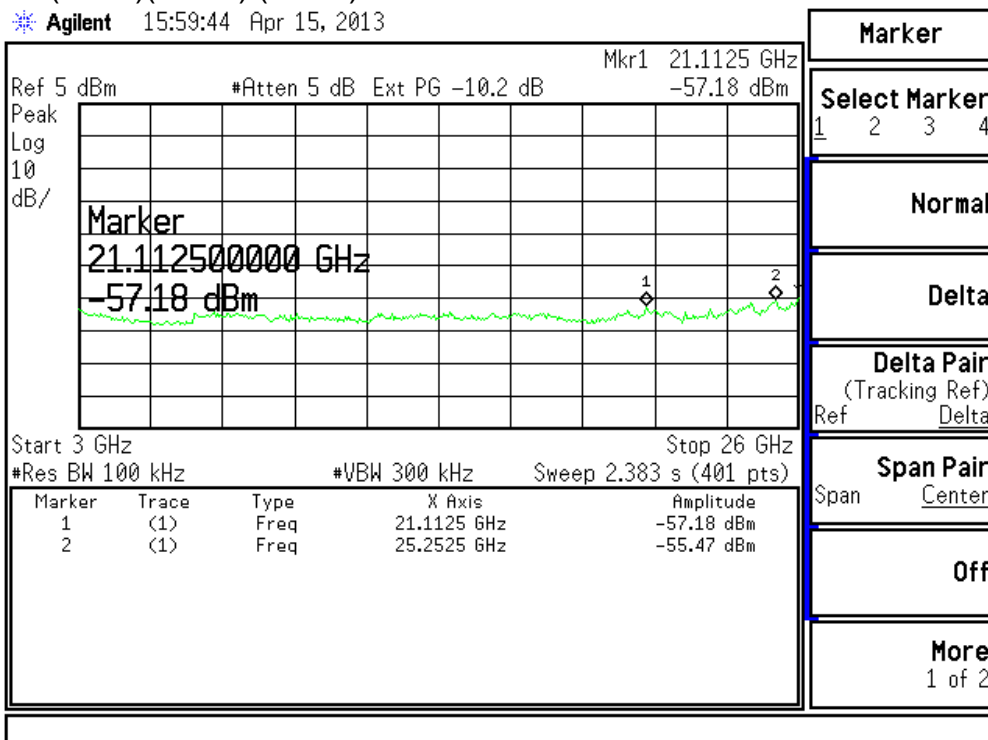
802.11n HT20 (Ant 2)(CH06) (1 of 2)

Agilent 18:16:06 Apr 15, 2013



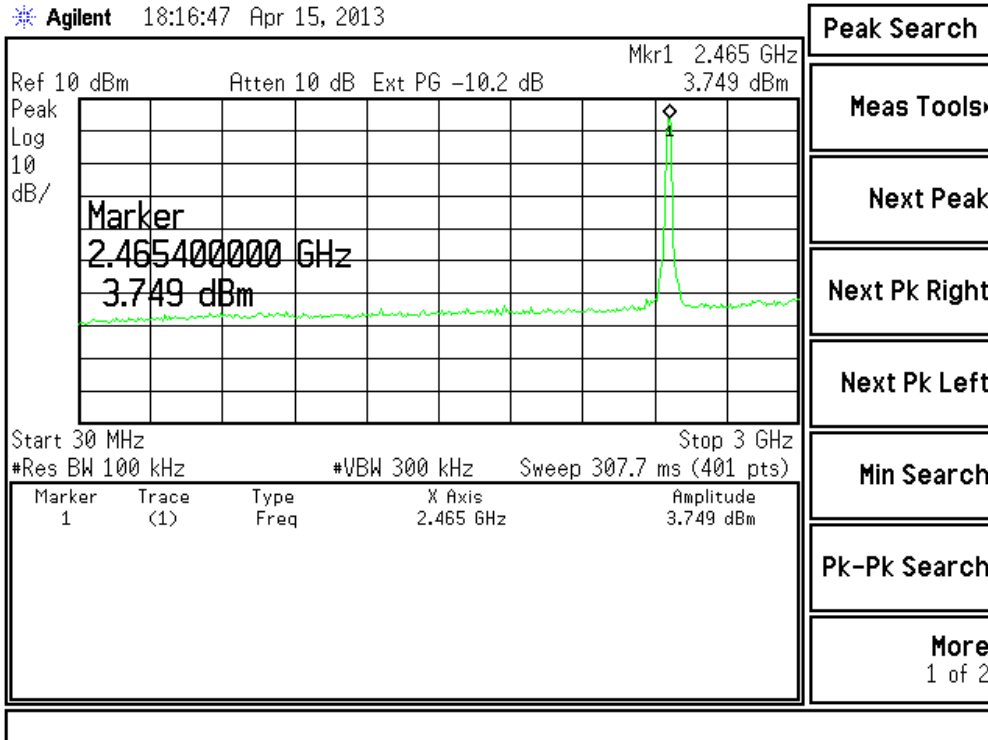
802.11n HT20 (Ant 2)(CH06) (2 of 2)

Agilent 15:59:44 Apr 15, 2013



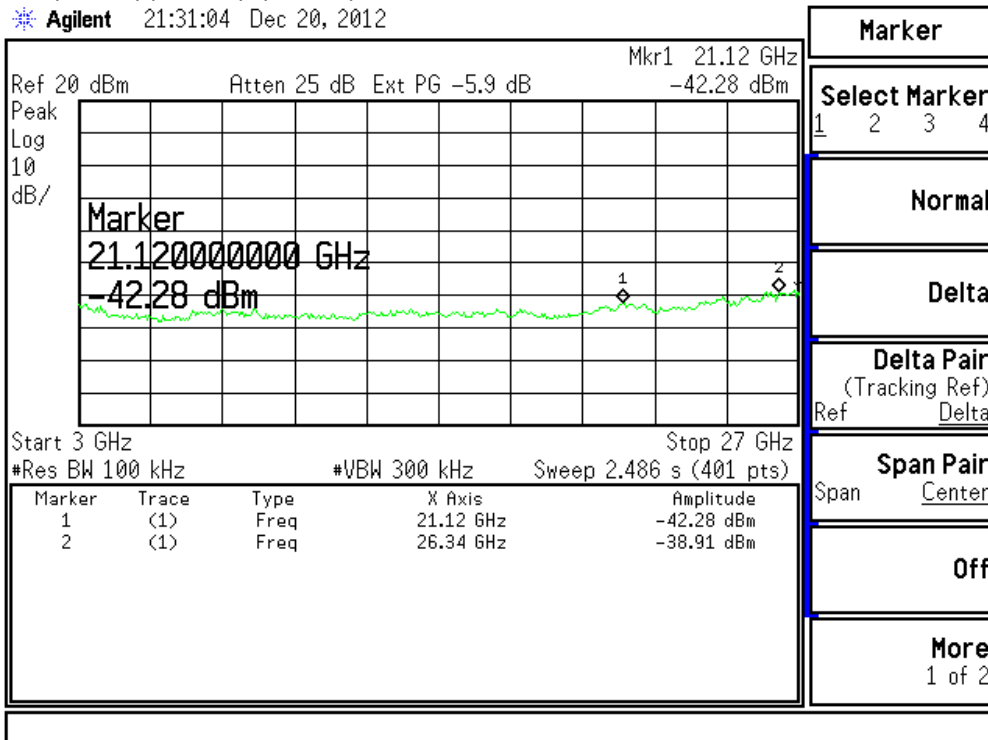
802.11n HT20 (Ant 2)(CH11) (1 of 2)

Agilent 18:16:47 Apr 15, 2013



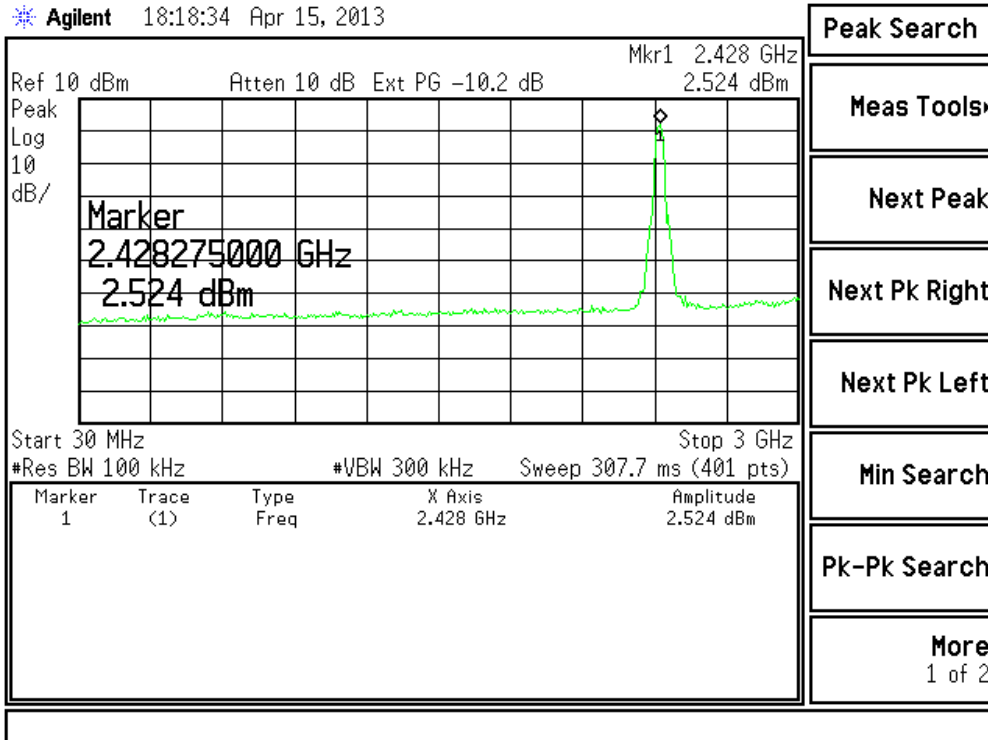
802.11n HT20 (Ant 2)(CH11) (2 of 2)

Agilent 21:31:04 Dec 20, 2012



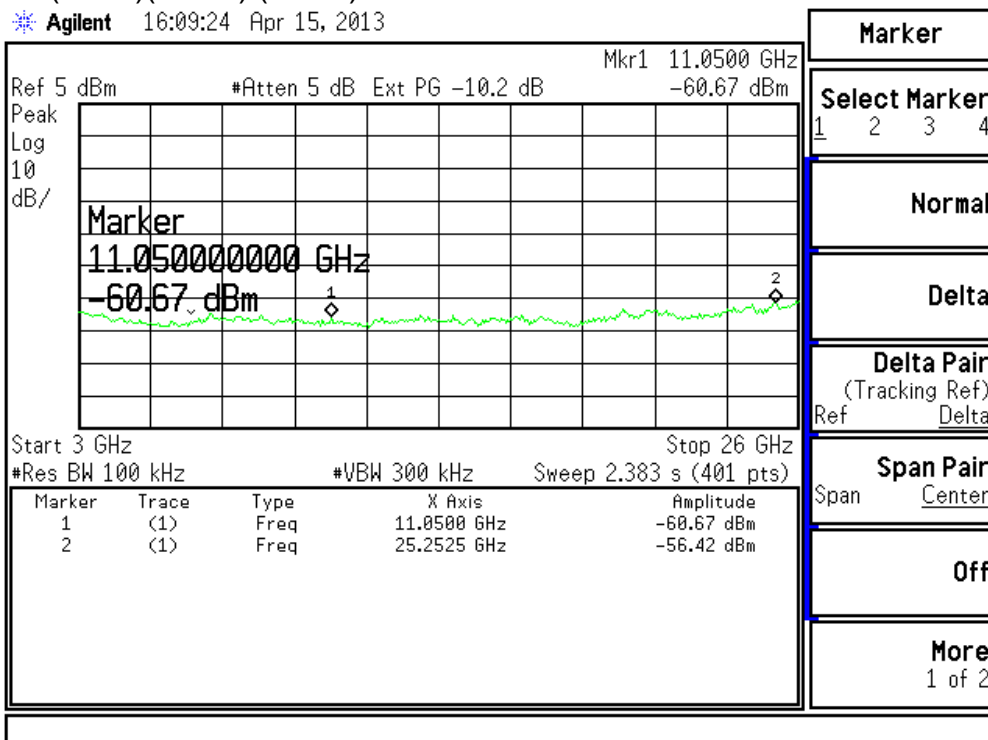
802.11n HT40 (Ant 2)(CH03) (1 of 2)

Agilent 18:18:34 Apr 15, 2013



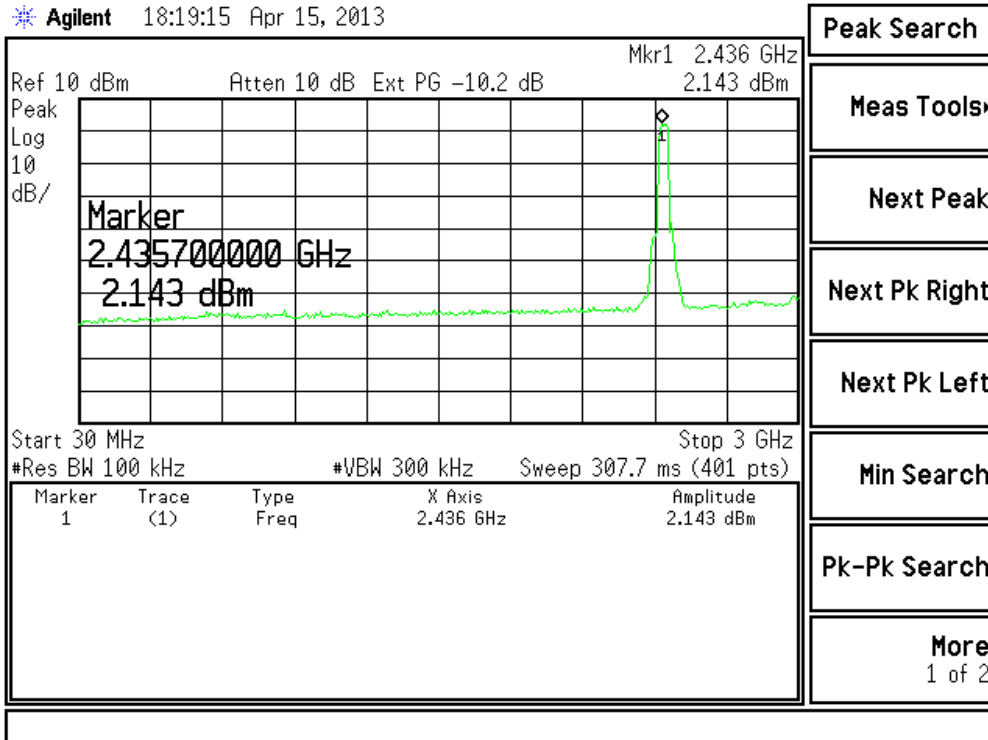
802.11n HT40 (Ant 2)(CH03) (2 of 2)

Agilent 16:09:24 Apr 15, 2013



802.11n HT40 (Ant 2)(CH06) (1 of 2)

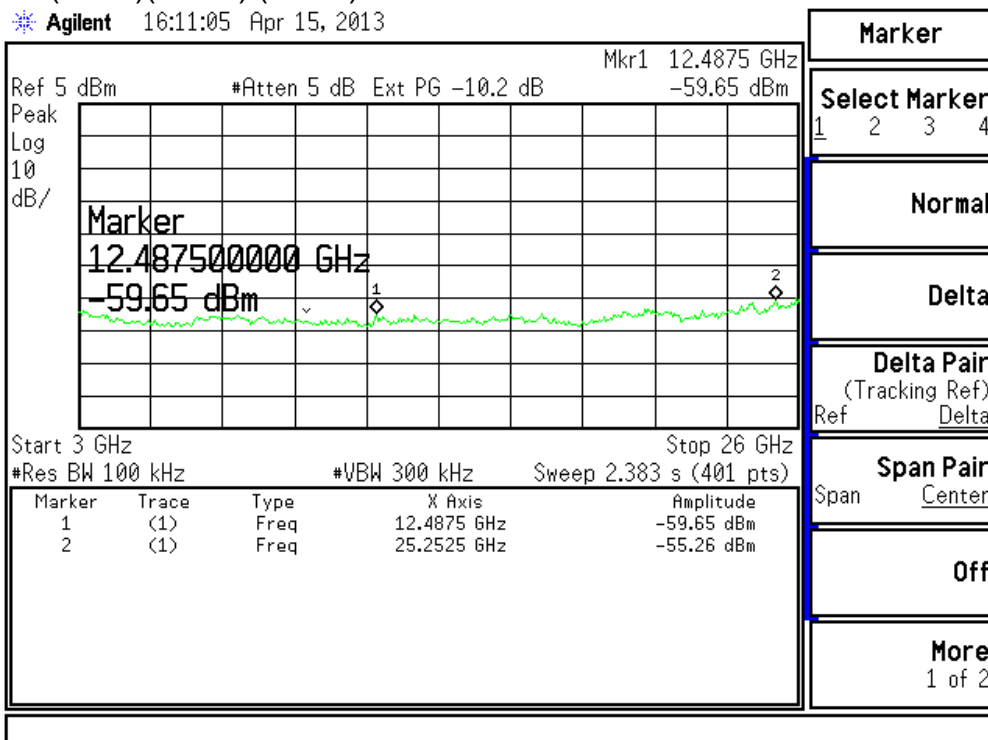
Agilent 18:19:15 Apr 15, 2013



- Peak Search
- Meas Tools
- Next Peak
- Next Pk Right
- Next Pk Left
- Min Search
- Pk-Pk Search
- More  
1 of 2

802.11n HT40 (Ant 2)(CH06) (2 of 2)

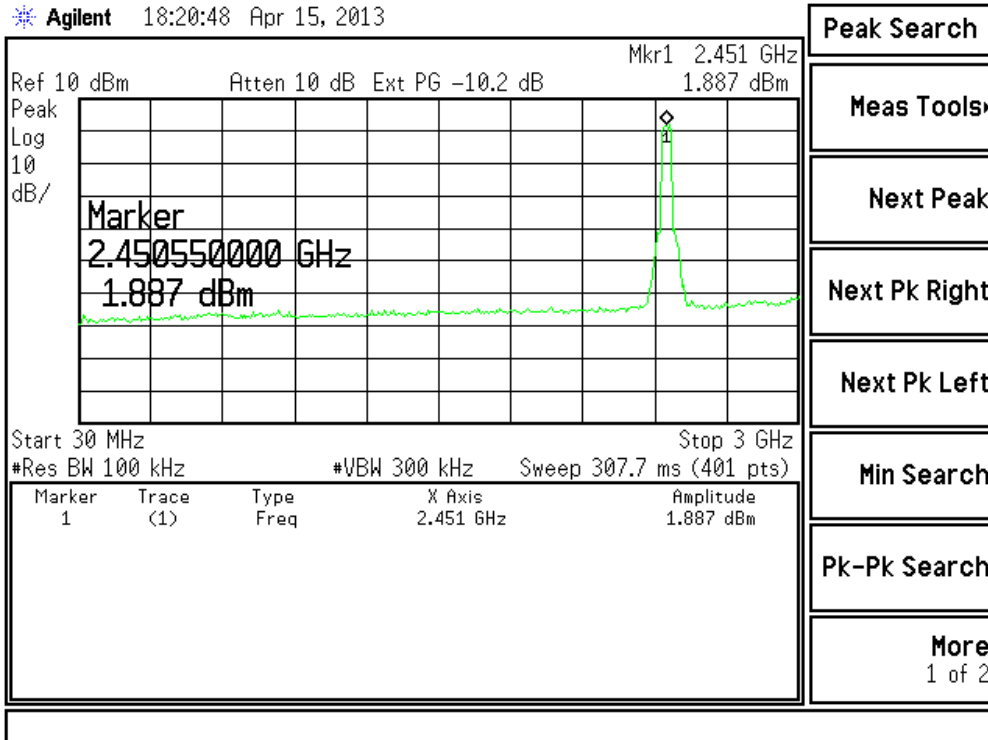
Agilent 16:11:05 Apr 15, 2013



- Marker
- Select Marker  
1 2 3 4
- Normal
- Delta
- Delta Pair  
(Tracking Ref)  
Ref Delta
- Span Pair  
Span Center
- Off
- More  
1 of 2

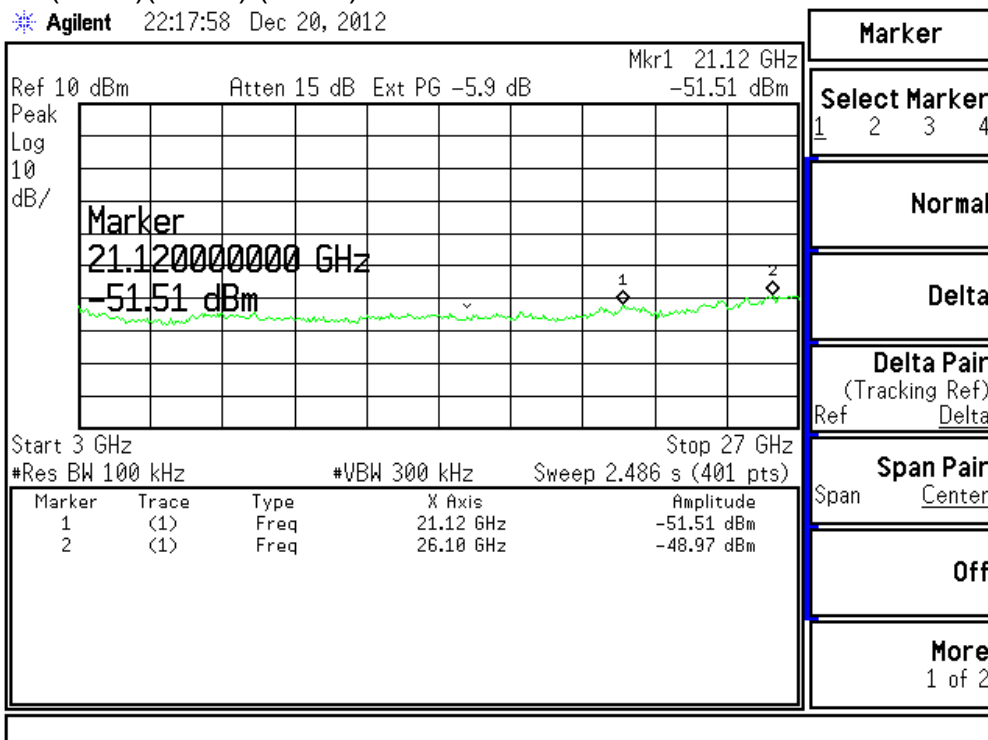
802.11n HT40 (Ant 2)(CH09) (1 of 2)

Agilent 18:20:48 Apr 15, 2013



802.11n HT40 (Ant 2)(CH09) (2 of 2)

Agilent 22:17:58 Dec 20, 2012





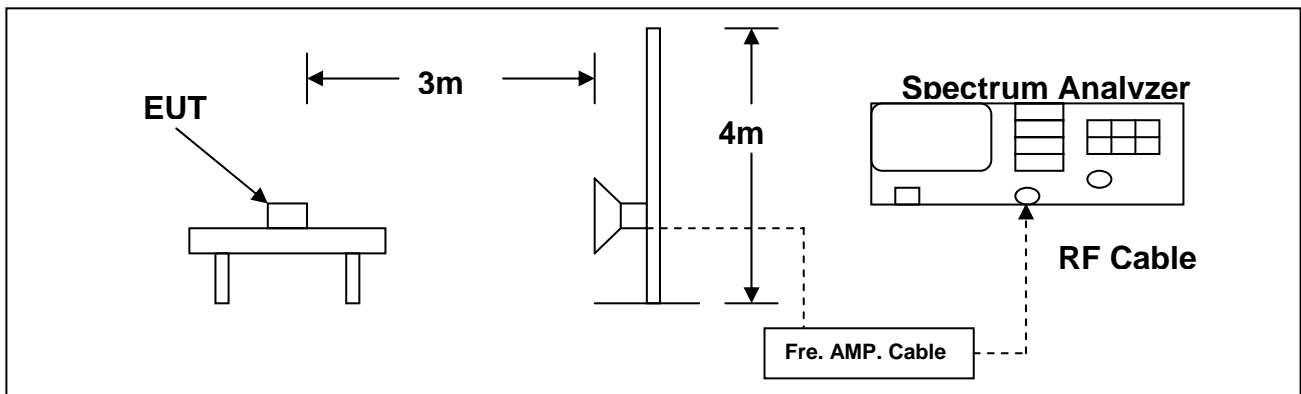
## 8. Band Edges Requirement

### 8.1 Test Condition & Setup :

According to 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 con-ducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Measurement procedure is followed KDB 558074 v03r01 (13.3.1 Peak Detection)

### 8.2 Test Instruments Configuration:



### 8.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2013/01/29	2014/01/29
2.	MLT	Pre Amplifier	0.10~19.1GHz 60dBm	RF01	2012/08/24	2013/08/24
3.	MLT	Pre Amplifier	TA010-190-30	RF03	2012/07/20	2013/07/20
4.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2013/03/01	2014/03/01
5.	SCHWARZBECK	Horn Antenna	181	BBHA 9170	2012/11/18	2013/11/18
6.	SCHWARZBECK	Horn Antenna	304	BBHA 9120D	2012/10/15	2013/10/15

## 8.4 Test Result :

(802.11b)

Radiated Emissions (HORIZONTAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.1	56.8 (PK)	1	231	0	74.0(PK)	-17.2
2399.1	43.3 (AV)	1	231	0	54.0(AV)	-10.7

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.7	67.2 (PK)	1	270	0	74.0(PK)	-6.8
2399.7	50.9 (AV)	1	270	0	54.0(AV)	-3.1

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2486.3	48.9 (PK)	1	305	0	74.0(PK)	-25.2
2486.3	36.3 (AV)	1	305	0	54.0(AV)	-17.7

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2485.6	55.4 (PK)	1	260	0	74.0(PK)	-18.6
2485.6	42.3 (AV)	1	260	0	54.0(AV)	-11.7

- Notes :**
1. Margin= Amplitude - Limits
  2. Height of table for EUT placed: 0.8 Meter.
  3. ANT= Antenna height.
  4. Duty= Duty cycle correction factor.
  5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor  
(Auto calculate in spectrum analyzer)

**(802.11g)**

Radiated Emissions (HORIZONTAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2398.5	65.7 (PK)	1	195	0	74.0(PK)	-8.3
2398.5	39.6 (AV)	1	195	0	54.0(AV)	-14.4

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.9	67.9 (PK)	1	267	0	74.0(PK)	-6.1
2399.9	45.7 (AV)	1	267	0	54.0(AV)	-8.3

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.8	55.2 (PK)	1	226	0	74.0(PK)	-18.8
2483.8	38.1 (AV)	1	226	0	54.0(AV)	-15.9

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.1	65.3 (PK)	1	263	0	74.0(PK)	-8.7
2484.1	42.6 (AV)	1	263	0	54.0(AV)	-11.4

- Notes :**
1. Margin= Amplitude - Limits
  2. Height of table for EUT placed: 0.8 Meter.
  3. ANT= Antenna height.
  4. Duty= Duty cycle correction factor.
  5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor  
(Auto calculate in spectrum analyzer)

**(802.11n HT20)**

Radiated Emissions (HORIZONTAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2394.0	61.7 (PK)	1	215	0	74.0(PK)	-12.4
2394.0	41.22 (AV)	1	215	0	54.0(AV)	-12.8

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2398.4	70.9 (PK)	1	253	0	74.0(PK)	-3.1
2398.4	42.2 (AV)	1	253	0	54.0(AV)	-11.9

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.4	54.2 (PK)	1	224	0	74.0(PK)	-19.8
2484.4	36.6 (AV)	1	224	0	54.0(AV)	-17.4

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.9	66.7 (PK)	1	263	0	74.0(PK)	-7.3
2483.9	41.9 (AV)	1	263	0	54.0(AV)	-12.1

- Notes :**
1. Margin= Amplitude - Limits
  2. Height of table for EUT placed: 0.8 Meter.
  3. ANT= Antenna height.
  4. Duty= Duty cycle correction factor.
  5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor  
(Auto calculate in spectrum analyzer)

**(802.11n HT40)**

Radiated Emissions (HORIZONTAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2400.0	59.7 (PK)	1	210	0	74.0(PK)	-14.3
2400.0	38.8 (AV)	1	210	0	54.0(AV)	-15.2

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.7	71.2 (PK)	1	230	0	74.0(PK)	-2.8
2399.7	41.6 (AV)	1	230	0	54.0(AV)	-12.4

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.7	60.5 (PK)	1	298	0	74.0(PK)	-13.6
2484.7	36.4 (AV)	1	298	0	54.0(AV)	-17.7

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.3	73.8 (PK)	1	270	0	74.0(PK)	-0.2
2484.3	40.8 (AV)	1	270	0	54.0(AV)	-13.2

- Notes :**
1. Margin= Amplitude - Limits
  2. Height of table for EUT placed: 0.8 Meter.
  3. ANT= Antenna height.
  4. Duty= Duty cycle correction factor.
  5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor  
(Auto calculate in spectrum analyzer)

## 9. Antenna Requirements

### 9.1 Standard Applicable :

For intentional device, according to 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.

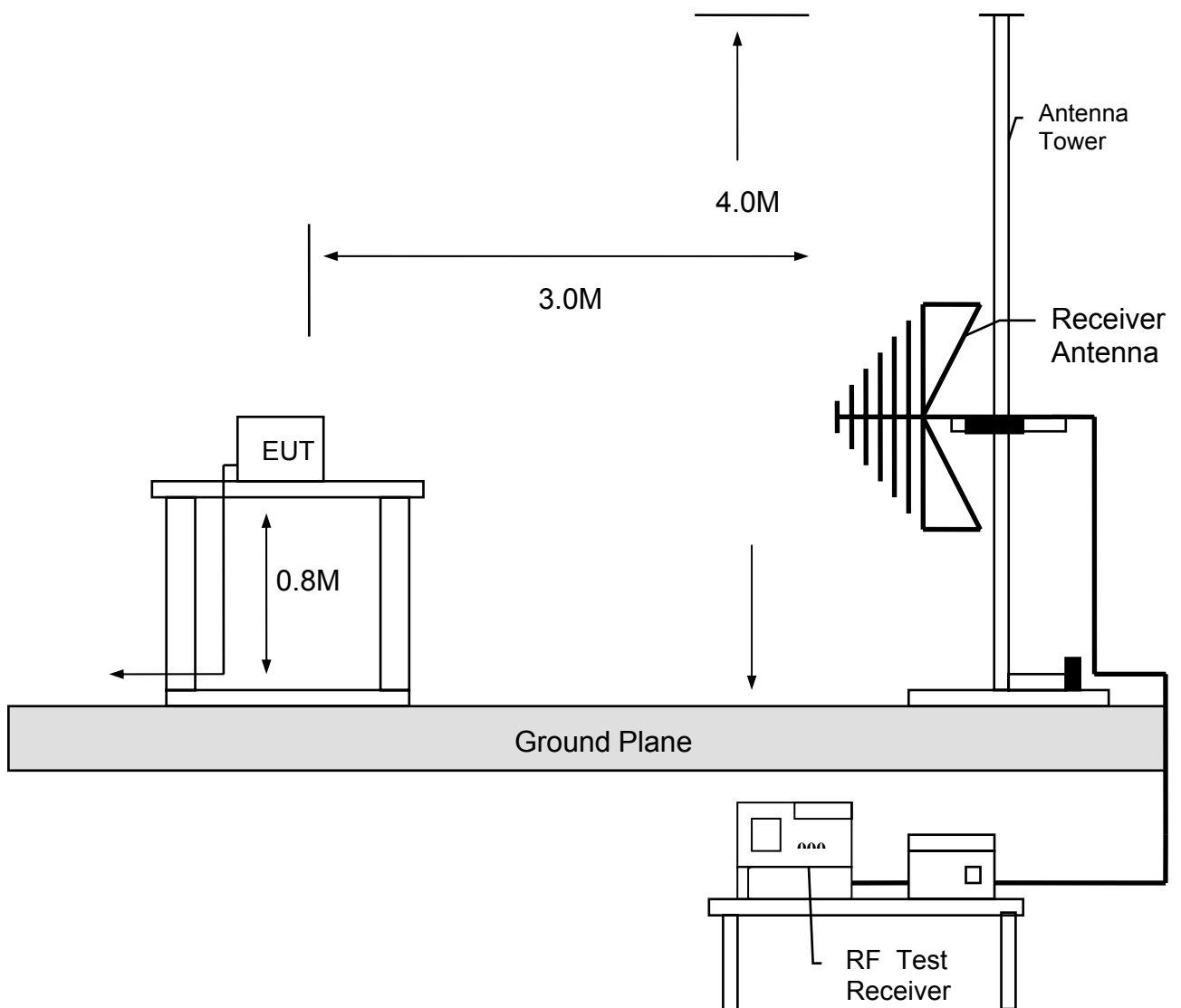
According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 9.2 Antenna Construction

	Model No	ANT TYPE	GAIN	type of connector
1	502219-184	Dipole	2.16dBi	N/A

## Appendix I - EUT Test Setup

### MEASUREMENT OF RADIATED EMISSION



## Appendix II - Brand / Trade Name & Model No. Multiple Listee

Trade Name	Model No.
COMTREND	NexusLink-3111u NexusLink-3110u

The different Model No. is for the market segmentation.