


# MEASUREMENT REPORT


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



Product.....: A/VDSL Bonded Router  
Trade Name.....: COMTREND  
Model No.....: NexusLink-3112u  
Applicant.....: COMTREND CORPORATION  
3F-1, 10 Lane 609, Chung Hsin Road,  
Applicant Address.....: Section 5 San Chung District, New Taipei  
City 24159, Taiwan

<b>Report Number</b>	MLT1404P15003
<b>Applicant</b>	COMTREND CORPORATION
<b>Product</b>	A/VDSL Bonded Router
<b>Sample Received Date</b>	2014/4/23
<b>Sample Tested Date</b>	2014/4/23 ~ 2014/6/20

<b>Report Prepared By</b>	Jesse Tien
<b>Signature</b>	
<b>Date Prepared</b>	2014/6/30

<b>Report Authorized By</b>	Roger Chen
<b>Signature</b>	
<b>Date Authorized</b>	2014/6/30

Test By

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## History of Test Report

Original Report Issue Date: 2014/6/30

No additional attachment

Additional attachments were issued as in the following record:

Attachment No.	Issue Date	Description
MLT1404P15003	2014/6/30	Original report

## 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, 10 Lane 609, Chung Hsin Road, Section 5 San Chung District, New Taipei City 24159, Taiwan
<b>Manufacturer Name</b>	COMTREND CORPORATION
<b>Manufacturer Address</b>	3F-1, 10 Lane 609, Chung Hsin Road, Section 5 San Chung District, New Taipei City 24159, Taiwan

<b>Equipment</b>	A/VDSL Bonded Router
<b>Model No</b>	NexusLink-3112u
<b>FCC ID</b>	L9VNL-3112U

<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, 10 Lane 609, Chung Hsin Road, Section 5 San Chung District, New Taipei City 24159, Taiwan
<b>Manufacturer Name</b>	COMTREND CORPORATION
<b>Manufacturer Address</b>	3F-1, 10 Lane 609, Chung Hsin Road, Section 5 San Chung District, New Taipei City 24159, Taiwan

### 1.3 Technical data of EUT

<b>Equipment</b>	A/VDSL Bonded Router
<b>Model No</b>	NexusLink-3112u
<b>FCC ID</b>	L9VNL-3112U
<b>Power Type</b>	Model : AMS3-1201500FU Input : AC100 - 240V , 50 / 60Hz , 0.5A Output : DC12V , 1.5A
<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

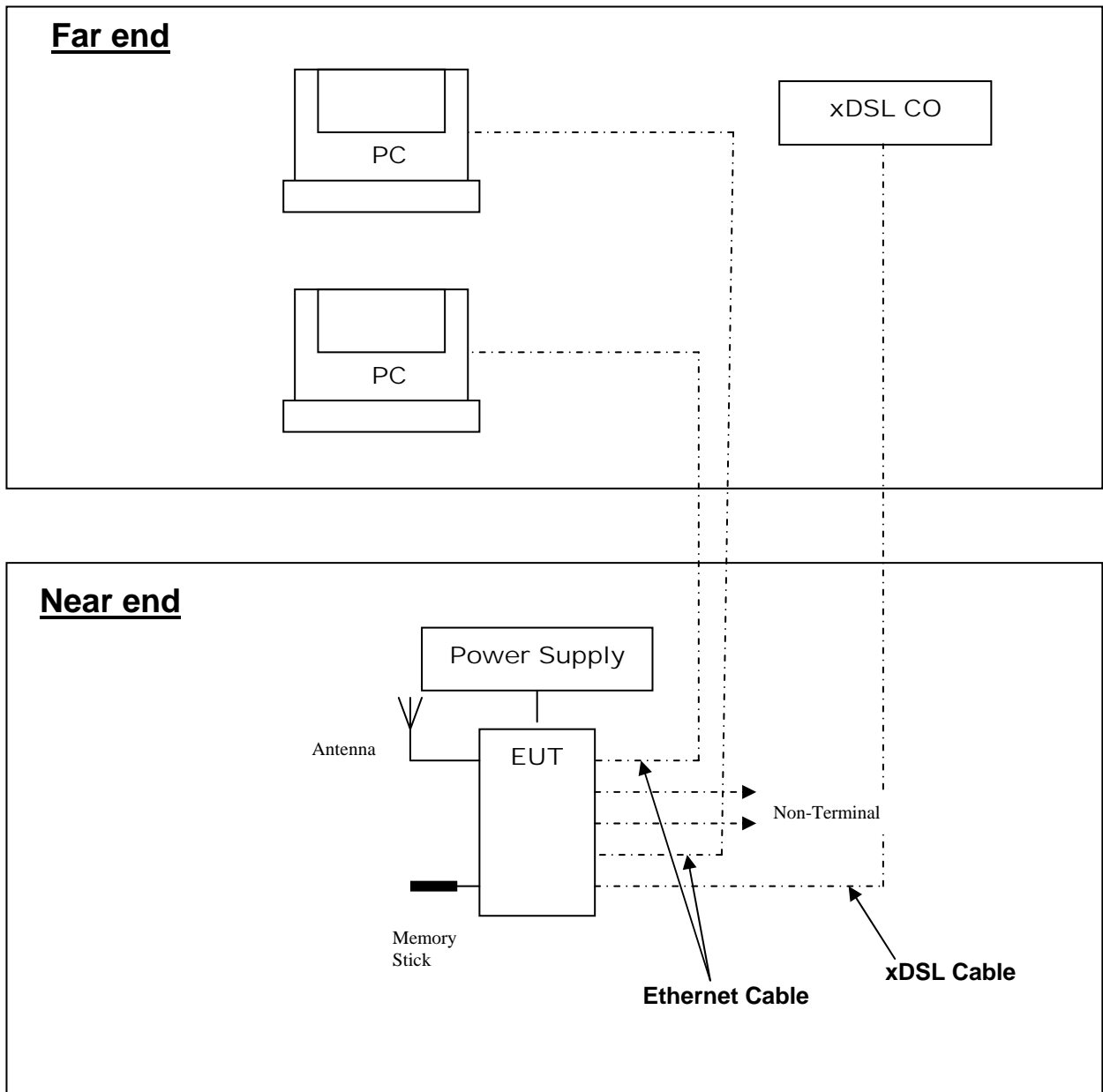
**1.4 Summary Of Tests**

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: 11M

802.11g data rate: 6M

802.11gn HT20 data rate: 13M

802.11gn HT40 data rate: 27M

**Note:** All conditions have been evaluated and the test result in this report is the worst case.

## 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	2014/04/01	2015/04/01
2.	EMCO	LISN	2658	3825/2	2014/03/12	2015/03/12
3.	TESEQ	ISN	24801	ISN T8	2014/05/16	2015/05/16

## 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	0.202	48.33	--	1.12	63.54	53.54	49.45	--
	0.348	43.76	--	1.15	59	49	44.91	--
	0.476	41.78	--	1.22	56.41	46.41	43.00	--
	0.595	41.89	--	1.24	56	46	43.13	--
	1.317	41.22	--	1.34	56	46	42.56	--
	2.110	42.37	--	1.73	56	46	44.10	--
	4.092	38.99	--	2.03	56	46	41.02	--
L2	0.202	42.86	--	1.07	63.54	53.54	43.93	--
	0.329	39.97	--	1.09	59.49	49.49	41.06	--
	0.461	40.40	--	1.14	56.67	46.67	41.54	--
	0.595	38.10	--	1.15	56	46	39.25	--
	1.426	40.46	--	1.32	56	46	41.78	--
	1.878	39.77	--	1.49	56	46	41.26	--
	6.951	41.03	--	1.95	60	50	42.98	--

- 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	0.197	48.35	--	1.12	63.76	53.76	49.47	--
	0.339	45.07	--	1.15	59.22	49.22	46.22	--
	0.461	42.82	--	1.20	56.67	46.67	44.02	--
	0.555	41.86	--	1.22	56	46	43.08	--
	0.890	40.48	--	1.25	56	46	41.73	--
	1.839	42.23	--	1.51	56	46	43.74	--
	4.136	39.96	--	2.05	56	46	42.01	--
L2	0.329	41.81	--	1.09	59.49	49.49	42.90	--
	0.476	40.61	--	1.14	56.41	46.41	41.75	--
	0.686	38.91	--	1.17	56	46	40.08	--
	1.100	39.50	--	1.25	56	46	40.75	--
	1.628	39.40	--	1.42	56	46	40.82	--
	2.435	41.35	--	1.75	56	46	43.10	--
	6.878	42.08	--	1.95	60	50	44.03	--

**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

### 2.5.3 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	0.206	47.32	--	1.12	63.36	53.36	48.44	--
	0.334	46.07	--	1.15	59.35	49.35	47.22	--
	0.452	44.01	--	1.20	56.85	46.85	45.21	--
	0.894	42.19	--	1.25	56	46	43.44	--
	1.610	41.91	--	1.42	56	46	43.33	--
	2.055	42.30	--	1.73	56	46	44.03	--
	3.985	40.21	--	2.01	56	46	42.22	--
L2	0.329	41.08	--	1.09	59.49	49.49	42.17	--
	0.476	40.73	--	1.14	56.41	46.41	41.87	--
	0.549	40.60	--	1.13	56	46	41.73	--
	0.894	41.09	--	1.23	56	46	42.32	--
	1.310	40.03	--	1.30	56	46	41.33	--
	2.023	40.49	--	1.49	56	46	41.98	--
	6.592	41.53	--	1.97	60	50	43.50	--

**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

### 2.5.4 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	0.197	48.58	--	1.12	63.76	53.76	49.70	--
	0.343	45.67	--	1.15	59.13	49.13	46.82	--
	0.479	44.00	--	1.22	56.36	46.36	45.22	--
	0.582	42.71	--	1.24	56	46	43.95	--
	1.519	43.58	--	1.39	56	46	44.97	--
	1.878	42.02	--	1.51	56	46	43.53	--
	4.027	39.99	--	2.01	56	46	42.00	--
L2	0.197	48.58	--	1.12	63.76	53.76	49.70	--
	0.343	45.67	--	1.15	59.13	49.13	46.82	--
	0.479	44.00	--	1.22	56.36	46.36	45.22	--
	0.582	42.71	--	1.24	56	46	43.95	--
	1.519	43.58	--	1.39	56	46	44.97	--
	1.878	42.02	--	1.51	56	46	43.53	--
	4.027	39.99	--	2.01	56	46	42.00	--

**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	0.197	48.46	--	1.12	63.76	53.76	49.58	--
	0.343	46.15	--	1.15	59.13	49.13	47.30	--
	0.479	44.12	--	1.22	56.36	46.36	45.34	--
	1.310	42.94	--	1.34	56	46	44.28	--
	1.519	43.36	--	1.39	56	46	44.75	--
	1.744	42.07	--	1.46	56	46	43.53	--
	2.077	42.32	--	1.73	56	46	44.05	--
L2	0.343	40.86	--	1.09	59.13	49.13	41.95	--
	0.466	40.82	--	1.14	56.58	46.58	41.96	--
	0.894	38.87	--	1.23	56	46	40.10	--
	1.317	39.73	--	1.30	56	46	41.03	--
	1.753	40.45	--	1.44	56	46	41.89	--
	2.155	40.59	--	1.74	56	46	42.33	--
	6.988	41.55	--	1.95	60	50	43.50	--

**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



### 2.5.6 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	0.339	45.51	--	1.15	59.22	49.22	46.66	--
	0.479	44.55	--	1.22	56.36	46.36	45.77	--
	0.844	41.20	--	1.23	56	46	42.43	--
	1.296	41.25	--	1.34	56	46	42.59	--
	1.707	41.99	--	1.46	56	46	43.45	--
	2.321	42.93	--	1.80	56	46	44.73	--
	4.180	40.70	--	2.05	56	46	42.75	--
L2	0.329	41.35	--	1.09	59.49	49.49	42.44	--
	0.452	41.47	--	1.14	56.85	46.85	42.61	--
	1.037	39.93	--	1.23	56	46	41.16	--
	1.519	42.15	--	1.37	56	46	43.52	--
	2.144	40.66	--	1.74	56	46	42.40	--
	4.224	38.73	--	1.98	56	46	40.71	--
	7.100	40.76	--	1.95	60	50	42.71	--

**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	0.192	48.19	--	1.12	63.93	53.93	49.31	--
	0.343	45.88	--	1.15	59.13	49.13	47.03	--
	0.476	43.11	--	1.22	56.41	46.41	44.33	--
	0.582	42.23	--	1.24	56	46	43.47	--
	0.853	41.55	--	1.23	56	46	42.78	--
	1.388	41.42	--	1.38	56	46	42.80	--
	2.273	42.42	--	1.79	56	46	44.21	--
L2	0.334	40.71	--	1.09	59.35	49.35	41.80	--
	0.479	40.82	--	1.14	56.36	46.36	41.96	--
	0.582	41.21	--	1.15	56	46	42.36	--
	1.296	40.60	--	1.30	56	46	41.90	--
	1.800	40.74	--	1.44	56	46	42.18	--
	2.237	40.29	--	1.72	56	46	42.01	--
	6.698	41.07	--	1.97	60	50	43.04	--

**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	0.202	49.09	--	1.12	63.54	53.54	50.21	--
	0.343	46.07	--	1.15	59.13	49.13	47.22	--
	0.479	43.84	--	1.22	56.36	46.36	45.06	--
	0.759	41.20	--	1.25	56	46	42.45	--
	1.725	43.30	--	1.46	56	46	44.76	--
	2.077	43.41	--	1.73	56	46	45.14	--
	4.049	41.02	--	2.01	56	46	43.03	--
L2	0.334	41.35	--	1.09	59.35	49.35	42.44	--
	0.479	40.75	--	1.14	56.36	46.36	41.89	--
	0.890	39.54	--	1.23	56	46	40.77	--
	1.680	41.49	--	1.44	56	46	42.93	--
	2.225	39.73	--	1.73	56	46	41.46	--
	4.180	37.98	--	1.98	56	46	39.96	--
	6.878	42.73	--	1.95	60	50	44.68	--

**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	0.343	46.02	--	1.15	59.13	49.13	47.17	--
	0.456	43.97	--	1.20	56.76	46.76	45.17	--
	0.759	42.19	--	1.25	56	46	43.44	--
	1.725	43.48	--	1.46	56	46	44.94	--
	2.023	43.01	--	1.51	56	46	44.52	--
	2.422	41.12	--	1.83	56	46	42.95	--
	4.092	42.05	--	2.03	56	46	44.08	--
L2	0.343	42.17	--	1.09	59.13	49.13	43.26	--
	0.452	41.81	--	1.14	56.85	46.85	42.95	--
	0.894	41.66	--	1.23	56	46	42.89	--
	1.310	41.91	--	1.30	56	46	43.21	--
	1.519	41.48	--	1.37	56	46	42.85	--
	1.939	42.48	--	1.49	56	46	43.97	--
	2.201	40.80	--	1.73	56	46	42.53	--

**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	0.192	48.56	--	1.12	63.93	53.93	49.68	--
	0.343	46.47	--	1.15	59.13	49.13	47.62	--
	0.479	44.84	--	1.22	56.36	46.36	46.06	--
	0.894	42.84	--	1.25	56	46	44.09	--
	1.662	42.68	--	1.44	56	46	44.12	--
	2.099	44.11	--	1.73	56	46	45.84	--
	3.840	40.94	--	2.01	56	46	42.95	--
L2	0.334	41.35	--	1.09	59.35	49.35	42.44	--
	0.461	42.34	--	1.14	56.67	46.67	43.48	--
	1.037	40.31	--	1.23	56	46	41.54	--
	1.310	39.89	--	1.30	56	46	41.19	--
	1.939	40.75	--	1.49	56	46	42.24	--
	6.878	41.84	--	1.95	60	50	43.79	--
	22.535	37.65	--	2.22	60	50	39.87	--

**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	0.197	49.40	--	1.12	63.76	53.76	50.52	--
	0.323	46.50	--	1.15	59.62	49.62	47.65	--
	0.479	44.64	--	1.22	56.36	46.36	45.86	--
	0.582	42.27	--	1.24	56	46	43.51	--
	1.725	43.77	--	1.46	56	46	45.23	--
	1.868	43.91	--	1.51	56	46	45.42	--
	2.225	42.91	--	1.76	56	46	44.67	--
L2	0.343	42.21	--	1.09	59.13	49.13	43.30	--
	0.486	42.27	--	1.14	56.23	46.23	43.41	--
	0.894	41.96	--	1.23	56	46	43.19	--
	1.296	40.90	--	1.30	56	46	42.20	--
	1.689	40.52	--	1.44	56	46	41.96	--
	2.321	40.11	--	1.73	56	46	41.84	--
	6.698	42.61	--	1.97	60	50	44.58	--

**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	0.343	46.54	--	1.15	59.13	49.13	47.69	--
	0.476	44.18	--	1.22	56.41	46.41	45.40	--
	0.890	41.15	--	1.25	56	46	42.40	--
	1.310	43.03	--	1.34	56	46	44.37	--
	1.734	44.18	--	1.46	56	46	45.64	--
	1.939	44.05	--	1.51	56	46	45.56	--
	4.070	41.03	--	2.01	56	46	43.04	--
L2	0.343	42.37	--	1.09	59.13	49.13	43.46	--
	0.479	42.76	--	1.14	56.36	46.36	43.90	--
	0.582	40.38	--	1.15	56	46	41.53	--
	1.172	40.31	--	1.28	56	46	41.59	--
	1.317	42.10	--	1.30	56	46	43.40	--
	2.077	40.79	--	1.73	56	46	42.52	--
	7.025	40.19	--	1.95	60	50	42.14	--

**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	US44300422	E4446A	2013/12/30	2014/12/30
2.	MLT	Pre Amplifier	20110301	PREAMP6G-02	2014/03/13	2015/03/13
3.	Agilent	Spectrum Analyzer	US40240137	E7403A	2013/12/30	2014/12/30
4.	MLT	Pre Amplifier	0.10~19.1GHz 60dBm	RF01	2013/08/23	2014/08/23
5.	MLT	Pre Amplifier	TA010-190-30	RF03	2013/07/16	2014/07/16
6.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2014/03/13	2015/03/13
7.	Herotek	Pre Amplifier	30690	A402-417	2013/11/06	2014/11/06
8.	EMCO	Biconilog Antenna	59739	3142C	2013/09/05	2014/09/05
9.	EMCO	Biconilog Antenna	44568	3142C	2013/09/05	2014/09/05
10.	SCHWARZBECK	Horn Antenna	181	BBHA 9170	2013/10/22	2014/10/22
11.	SCHWARZBECK	Horn Antenna	304	BBHA 9120D	2013/10/22	2014/10/22

### 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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7245.0	59.90	48.29	-20.03	39.87	28.26	74.00	54.00	-34.13	-25.74
19922.5	37.68	29.73	17.31	54.99	47.04	74.00	54.00	-19.01	-6.96

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7215.0	70.16	62.00	-20.03	50.13	41.97	74.00	54.00	-23.87	-12.03
19937.5	37.74	29.73	17.26	55.00	46.99	74.00	54.00	-19.00	-7.01

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4965.0	62.69	53.18	-28.19	34.50	24.99	74.00	54.00	-39.50	-29.01
19862.5	38.03	29.48	17.64	55.67	47.12	74.00	54.00	-18.33	-6.88

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4875.0	70.78	60.99	-28.42	42.36	32.57	74.00	54.00	-31.64	-21.43
19900.0	37.70	29.74	17.35	55.05	47.09	74.00	54.00	-18.95	-6.91

- 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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
10515.0	54.06	45.49	-13.76	40.30	31.73	74.00	54.00	-33.70	-22.27
19600.0	37.01	28.57	18.04	55.05	46.61	74.00	54.00	-18.95	-7.39

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7365.0	66.12	57.33	-19.78	46.34	37.55	74.00	54.00	-27.66	-16.45
19735.0	37.42	28.30	17.93	55.35	46.23	74.00	54.00	-18.65	-7.77

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
10995.0	53.08	45.51	-13.06	40.02	32.45	74.00	54.00	-33.98	-21.55
20050.0	37.85	29.67	16.92	54.77	46.59	74.00	54.00	-19.23	-7.41

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	62.57	61.62	-17.07	45.50	44.55	74.00	54.00	-28.50	-9.45
19697.5	37.68	29.37	17.69	55.37	47.06	74.00	54.00	-18.63	-6.94

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7140.0	58.12	50.05	-20.09	38.03	29.96	74.00	54.00	-35.97	-24.04
19075.0	37.28	28.84	18.53	55.81	47.37	74.00	54.00	-18.19	-6.63

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
3840.0	69.12	68.50	-31.00	38.12	37.50	74.00	54.00	-35.88	-16.50
19885.0	37.32	29.55	17.52	54.84	47.07	74.00	54.00	-19.16	-6.93

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7950.0	56.91	48.94	-18.82	38.09	30.12	74.00	54.00	-35.91	-23.88
19547.5	36.86	28.41	18.31	55.17	46.72	74.00	54.00	-18.83	-7.28

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	62.74	61.56	-17.07	45.67	44.49	74.00	54.00	-28.33	-9.51
19885.0	37.28	29.61	17.52	54.80	47.13	74.00	54.00	-19.20	-6.87

- 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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
14565.0	53.94	46.28	-11.87	42.07	34.41	74.00	54.00	-31.93	-19.59
19960.0	38.37	29.72	17.24	55.61	46.96	74.00	54.00	-18.39	-7.04

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	62.77	61.64	-17.07	45.70	44.57	74.00	54.00	-28.30	-9.43
19172.5	36.32	28.86	18.73	55.05	47.59	74.00	54.00	-18.95	-6.41

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
10980.0	52.81	45.51	-13.06	39.75	32.45	74.00	54.00	-34.25	-21.55
20125.0	38.23	29.65	16.78	55.01	46.43	74.00	54.00	-18.99	-7.57

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7050.0	62.69	61.24	-20.30	42.39	40.94	74.00	54.00	-31.61	-13.06
19832.5	37.35	29.25	17.62	54.97	46.87	74.00	54.00	-19.03	-7.13

**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.

### 3.5.9 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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
11010.0	53.03	45.77	-13.13	39.90	32.64	74.00	54.00	-34.10	-21.36
19420.0	36.97	28.32	18.10	55.07	46.42	74.00	54.00	-18.93	-7.58

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7050.0	63.33	61.26	-20.30	43.03	40.96	74.00	54.00	-30.97	-13.04
19082.5	36.31	28.90	18.53	54.84	47.43	74.00	54.00	-19.16	-6.57

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
7050.0	57.87	49.30	-20.30	37.57	29.00	74.00	54.00	-36.43	-25.00
19675.0	37.05	29.21	17.75	54.80	46.96	74.00	54.00	-19.20	-7.04

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	63.17	61.78	-17.07	46.10	44.71	74.00	54.00	-27.90	-9.29
19907.5	37.85	29.78	17.35	55.20	47.13	74.00	54.00	-18.80	-6.87

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4470.0	63.14	56.14	-29.02	34.12	27.12	74.00	54.00	-39.88	-26.88
19900.0	37.75	29.56	17.35	55.10	46.91	74.00	54.00	-18.90	-7.09

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	62.69	61.74	-17.07	45.62	44.67	74.00	54.00	-28.38	-9.33
19562.5	37.35	28.61	18.33	55.68	46.94	74.00	54.00	-18.32	-7.06

**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)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
12975.0	55.63	47.27	-14.26	41.37	33.01	74.00	54.00	-32.63	-20.99
19270.0	37.15	28.46	18.13	55.28	46.59	74.00	54.00	-18.72	-7.41

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
8940.0	62.98	61.90	-17.07	45.91	44.83	74.00	54.00	-28.09	-9.17
19562.5	37.03	28.63	18.33	55.36	46.96	74.00	54.00	-18.64	-7.04

**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.

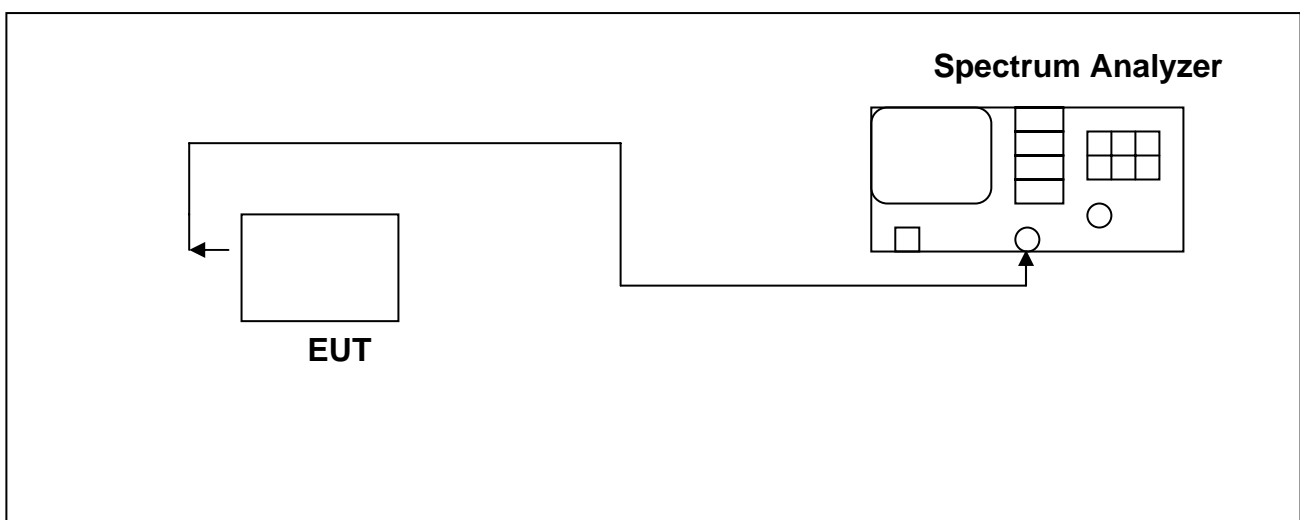
For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to  $(\text{GAIN} - 6)/3$  dBm.

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

E) Guidance for summing emission measurements from multiple outputs of a transmitter or from multiple transmitters.

### 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	US44300422	E4446A	2013/12/30	2014/12/30

### 4.4 Test Result:

#### 802.11b

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	11	21.77	<30dBm
2412	5.5	20.63	<30dBm
2412	2	19.44	<30dBm
2412	1	18.80	<30dBm

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	11	21.77	<30dBm
2437	11	21.63	<30dBm
2462	11	21.95	<30dBm

#### 802.11g

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	54	21.03	<30dBm
2412	48	21.14	<30dBm
2412	36	21.14	<30dBm
2412	24	21.31	<30dBm
2412	18	20.90	<30dBm
2412	12	20.92	<30dBm
2412	9	21.34	<30dBm
2412	6	21.46	<30dBm

Frequency (MHz)	Data Rate(Mbps)	Output(dBm)	Required Limit
2412	6	21.46	<30dBm
2437	6	21.57	<30dBm
2462	6	21.68	<30dBm



**802.11n HT20**

Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2	
2412	130	130	16.92	14.70	<30dBm
2412	117	117	17.12	14.69	<30dBm
2412	104	104	17.08	14.88	<30dBm
2412	78	78	17.19	14.84	<30dBm
2412	52	52	17.43	15.14	<30dBm
2412	39	39	17.26	15.02	<30dBm
2412	26	26	17.33	15.03	<30dBm
2412	13	13	17.75	15.74	<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	17.75	15.74	19.87	<30dBm
2437	13	13	17.76	16.02	19.99	<30dBm
2462	13	13	17.89	16.25	20.16	<30dBm

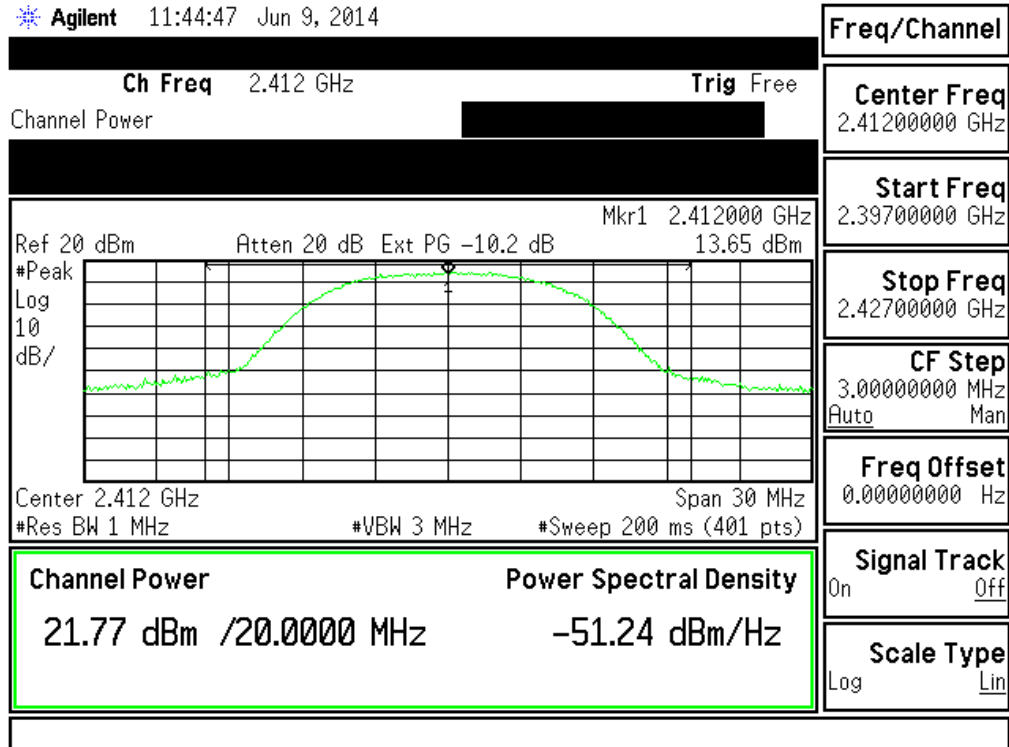
**802.11n HT40**

Frequency (MHz)	Data Rate(Mbps)		Output Power(dBm)		Required Limit
	Ant 1	Ant 2	Ant 1	Ant 2	
2422	270	270	13.21	12.47	<30dBm
2422	243	243	13.39	12.19	<30dBm
2422	216	216	13.49	12.79	<30dBm
2422	162	162	13.61	12.77	<30dBm
2422	108	108	13.75	12.96	<30dBm
2422	81	81	13.65	12.60	<30dBm
2422	54	54	14.07	13.22	<30dBm
2422	27	27	14.42	13.67	<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	14.42	13.67	17.07	<30dBm
2437	27	27	14.36	13.85	17.12	<30dBm
2452	27	27	14.59	13.95	17.29	<30dBm

802.11b (2412MHz)

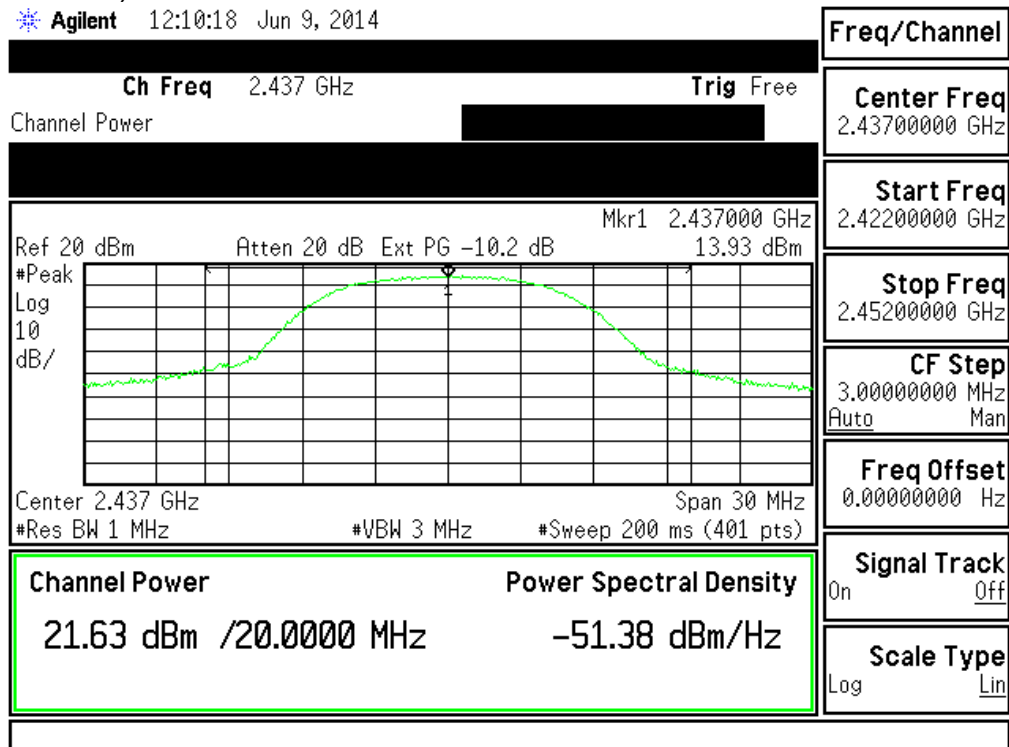
Agilent 11:44:47 Jun 9, 2014



Note: Ext PG = Attenuator + Cable loss.

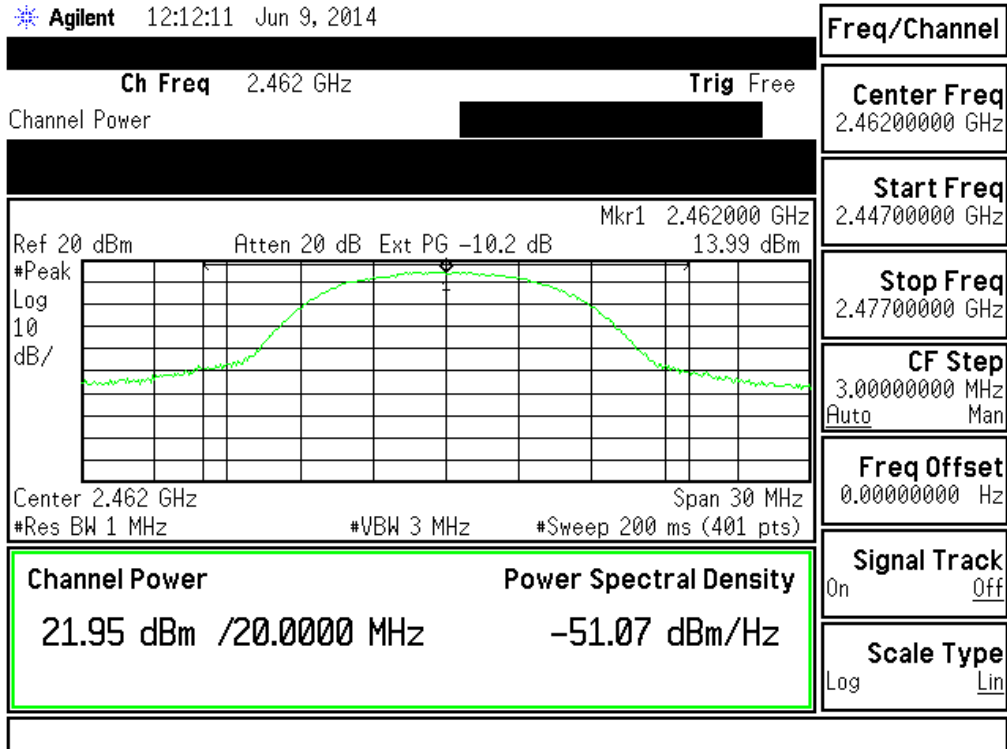
802.11b (2437MHz)

Agilent 12:10:18 Jun 9, 2014



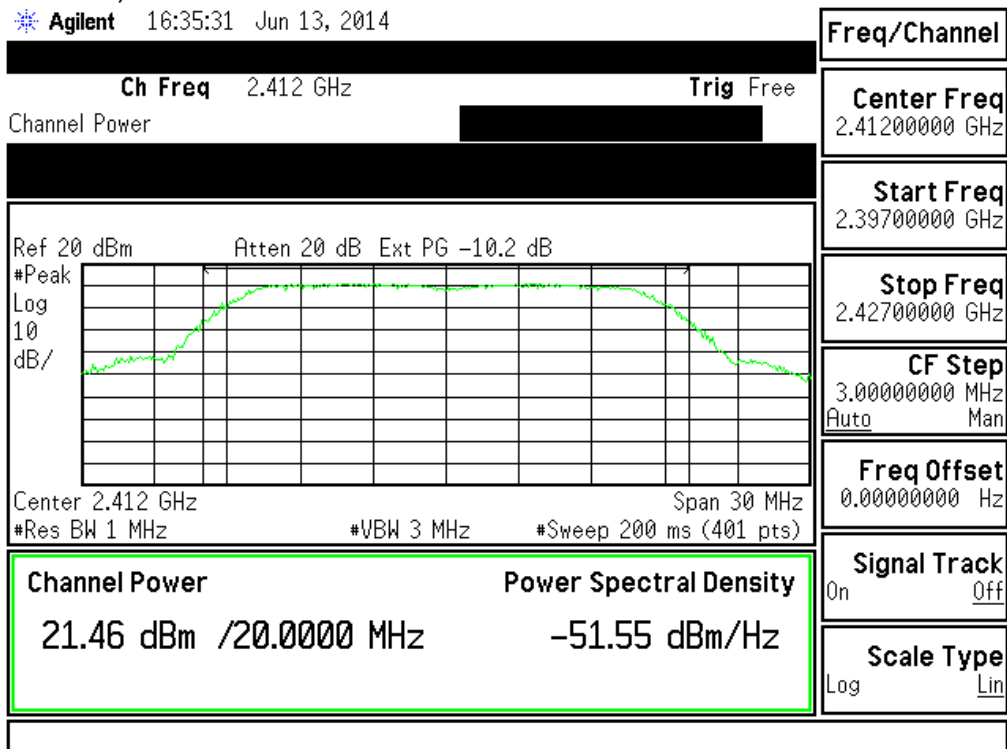
### 802.11b (2462MHz)

Agilent 12:12:11 Jun 9, 2014



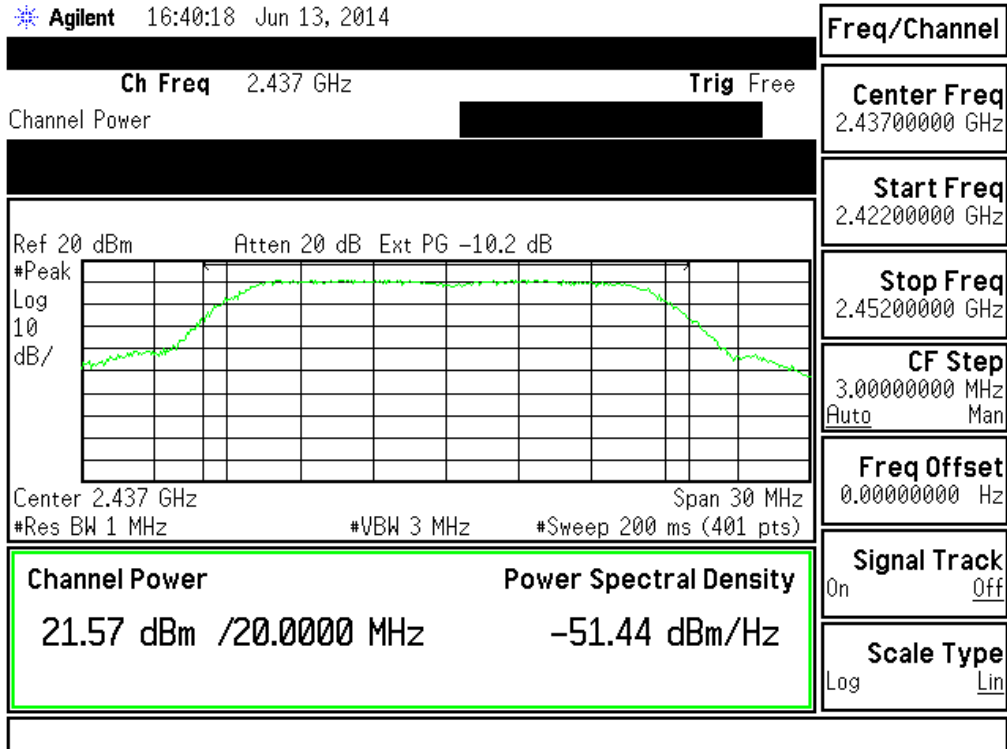
### 802.11g (2412MHz)

Agilent 16:35:31 Jun 13, 2014



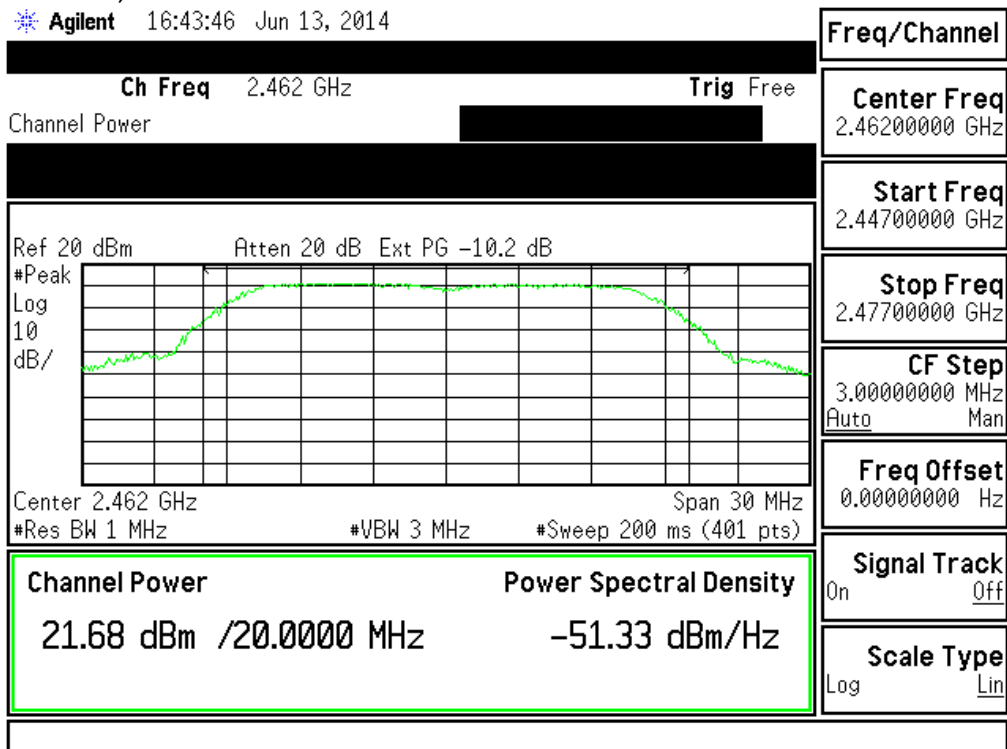
802.11g (2437MHz)

Agilent 16:40:18 Jun 13, 2014



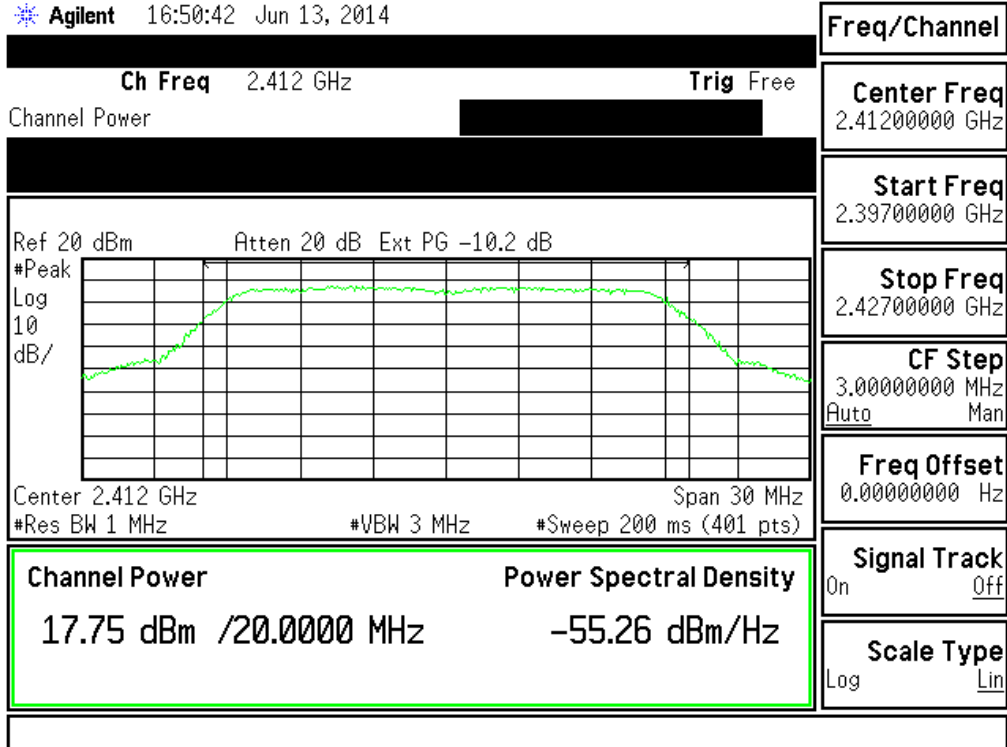
802.11g (2462MHz)

Agilent 16:43:46 Jun 13, 2014



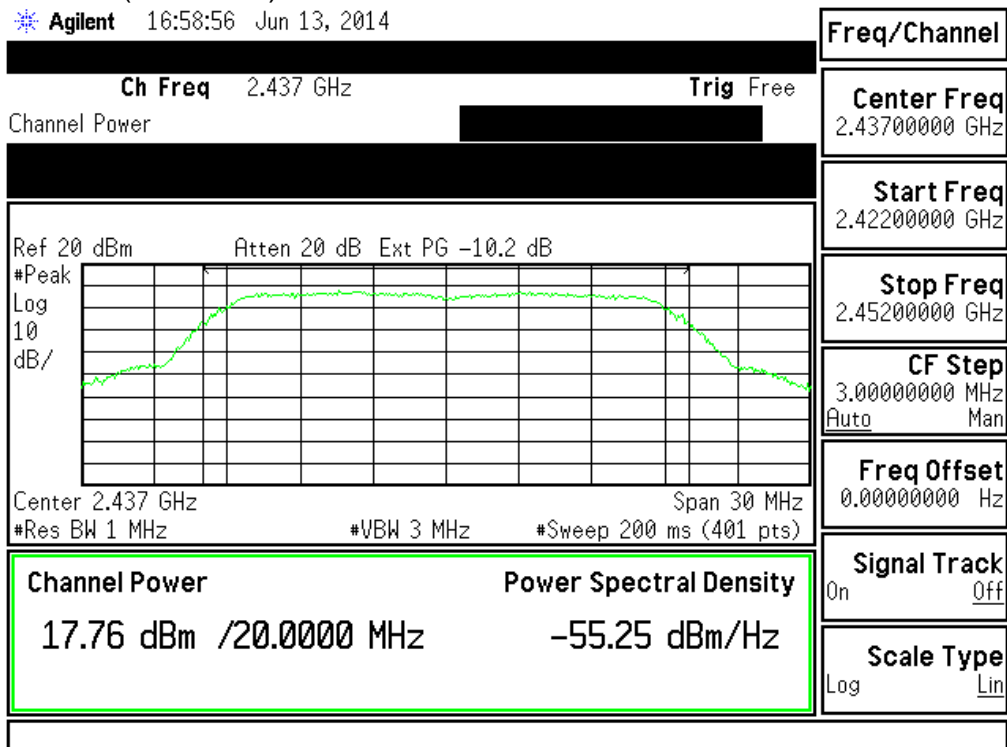
802.11HT20 ANT1 (2412MHz)

Agilent 16:50:42 Jun 13, 2014



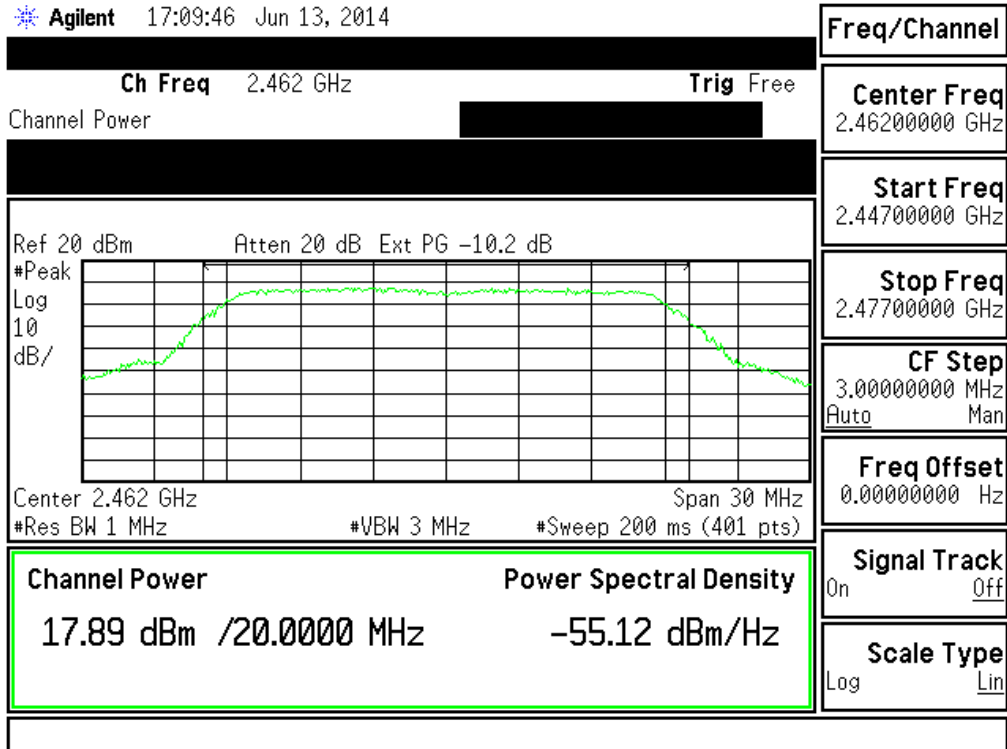
802.11HT20 ANT1 (2437MHz)

Agilent 16:58:56 Jun 13, 2014



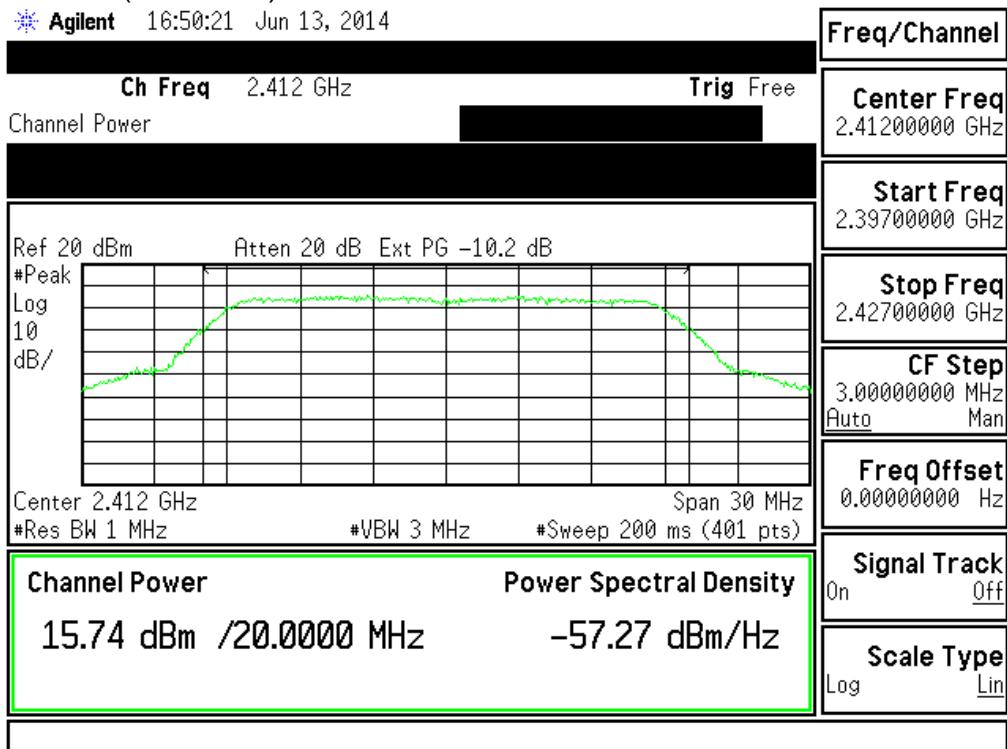
802.11HT20 ANT1 (2462MHz)

Agilent 17:09:46 Jun 13, 2014



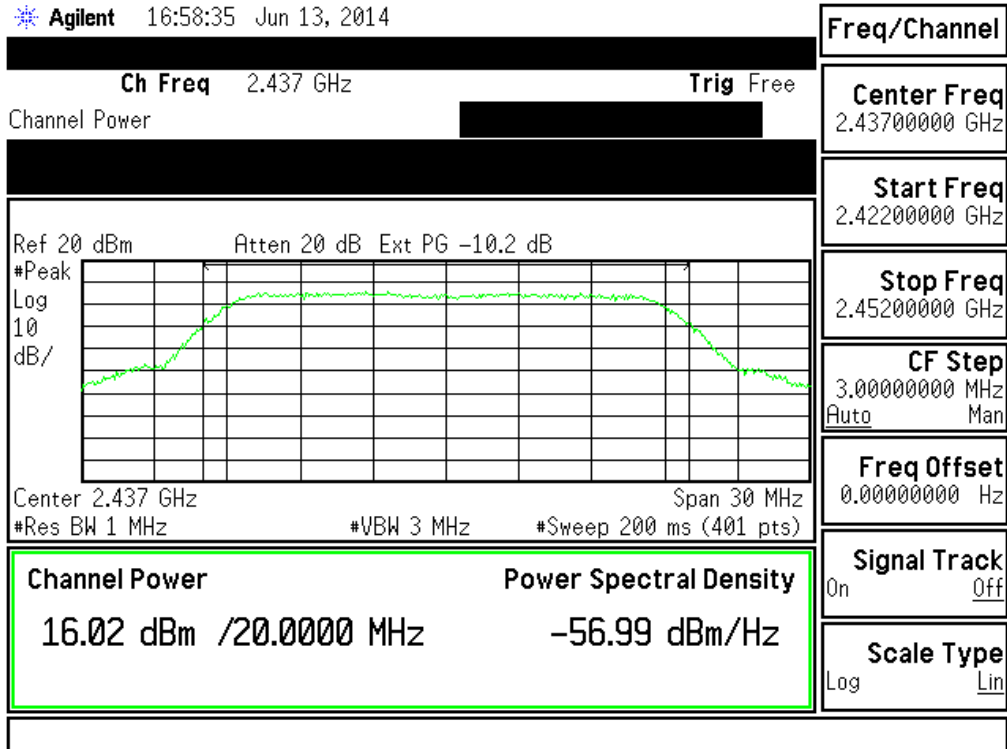
802.11HT20 ANT2 (2412MHz)

Agilent 16:50:21 Jun 13, 2014



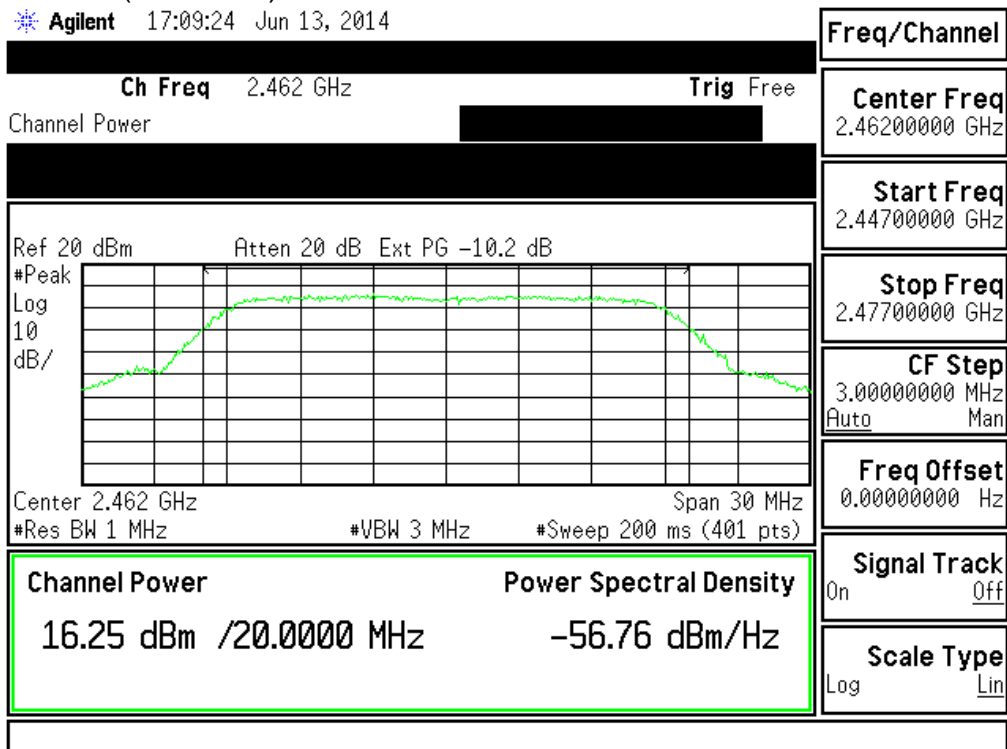
802.11HT20 ANT2 (2437MHz)

Agilent 16:58:35 Jun 13, 2014



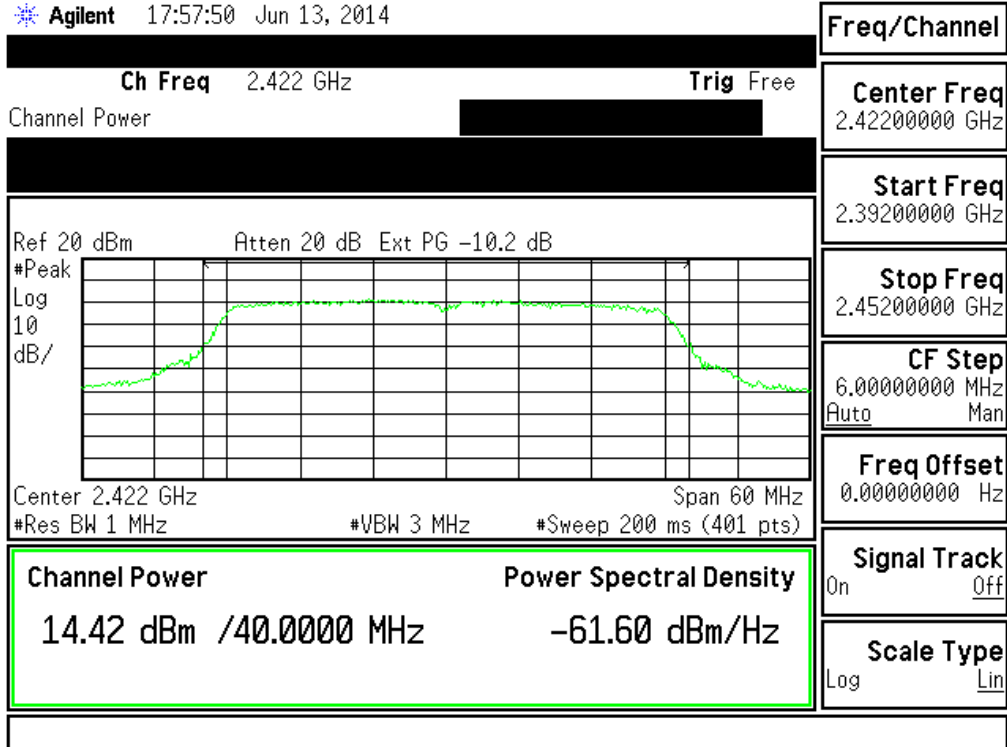
802.11HT20 ANT2 (2462MHz)

Agilent 17:09:24 Jun 13, 2014



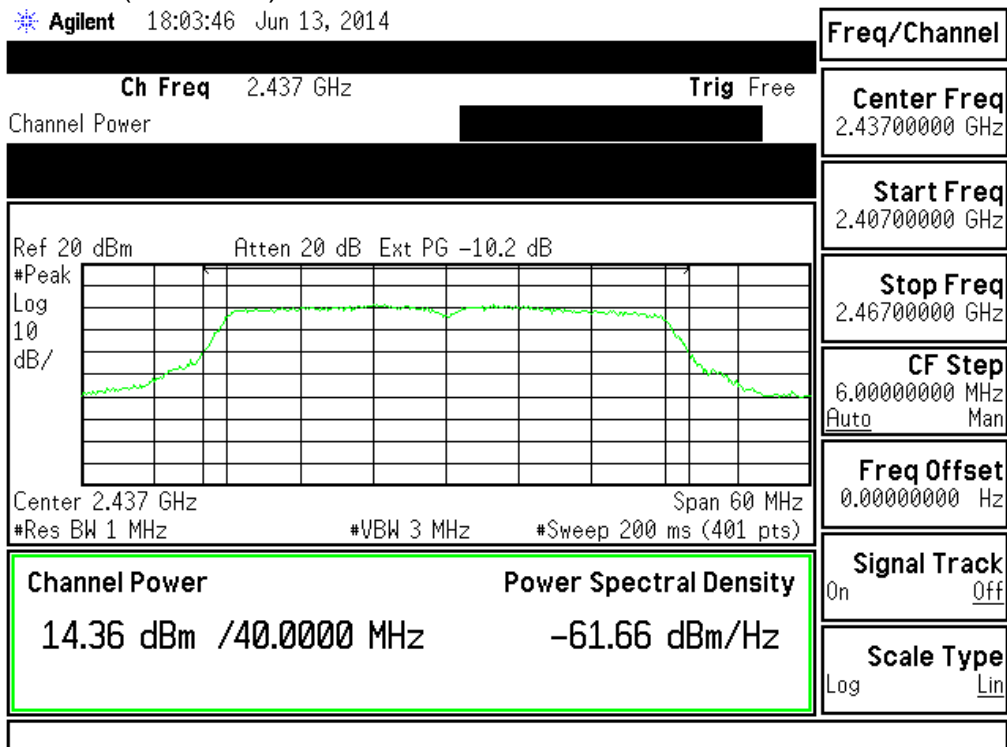
802.11HT40 ANT1 (2422MHz)

Agilent 17:57:50 Jun 13, 2014



802.11HT40 ANT1 (2437MHz)

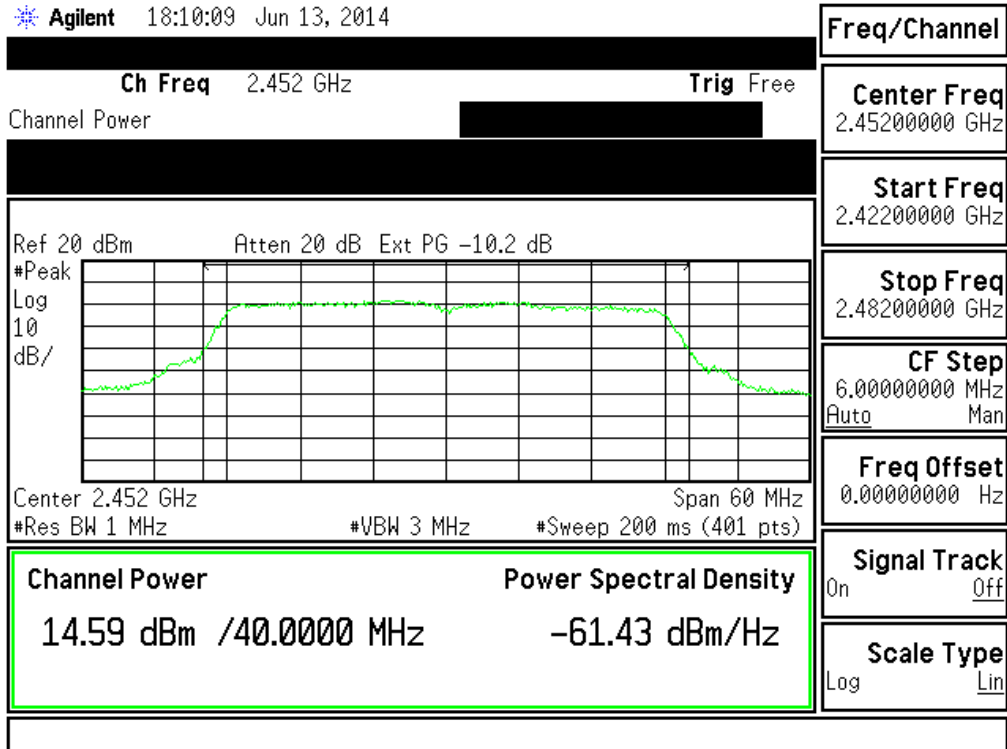
Agilent 18:03:46 Jun 13, 2014





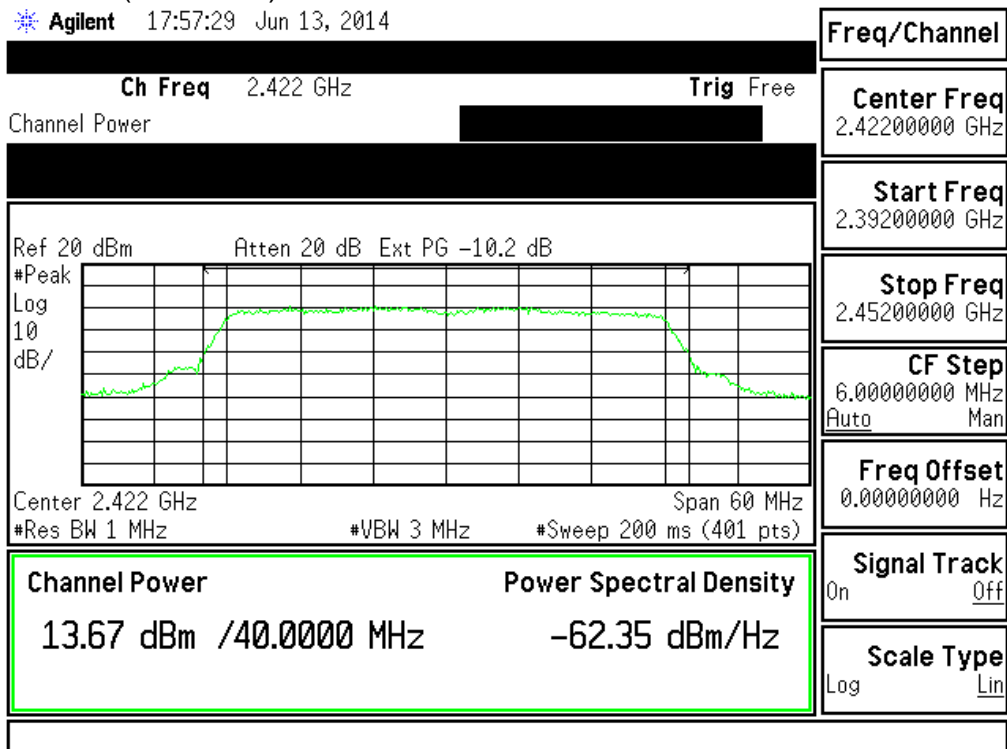
### 802.11HT40 ANT1 (2452MHz)

Agilent 18:10:09 Jun 13, 2014



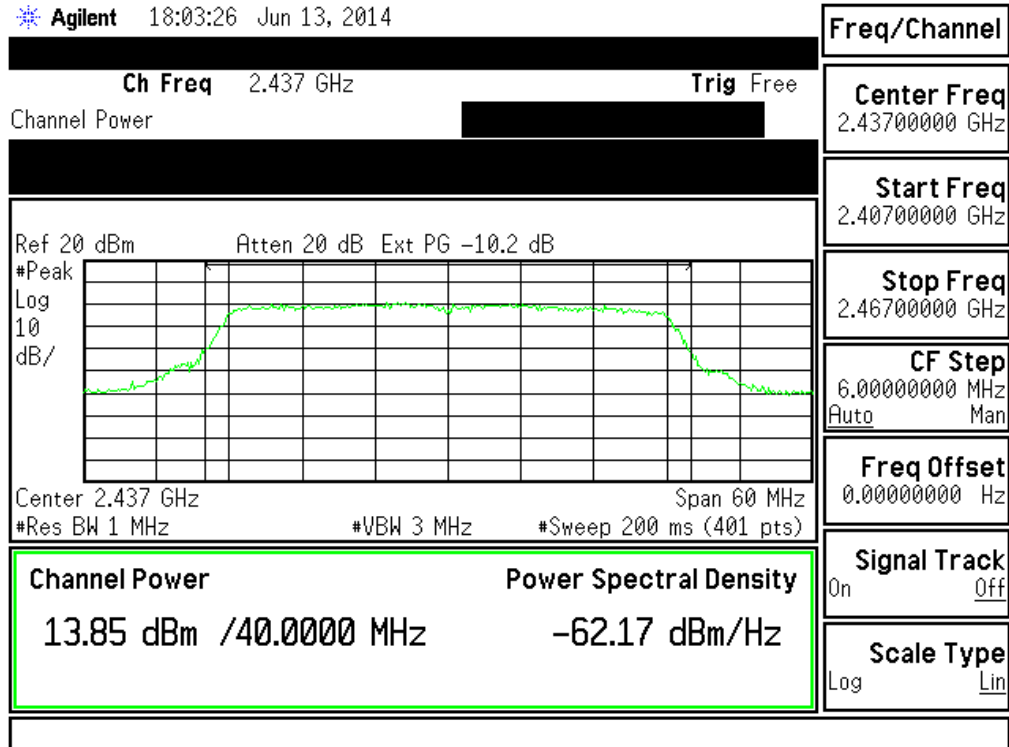
### 802.11HT40 ANT2 (2422MHz)

Agilent 17:57:29 Jun 13, 2014



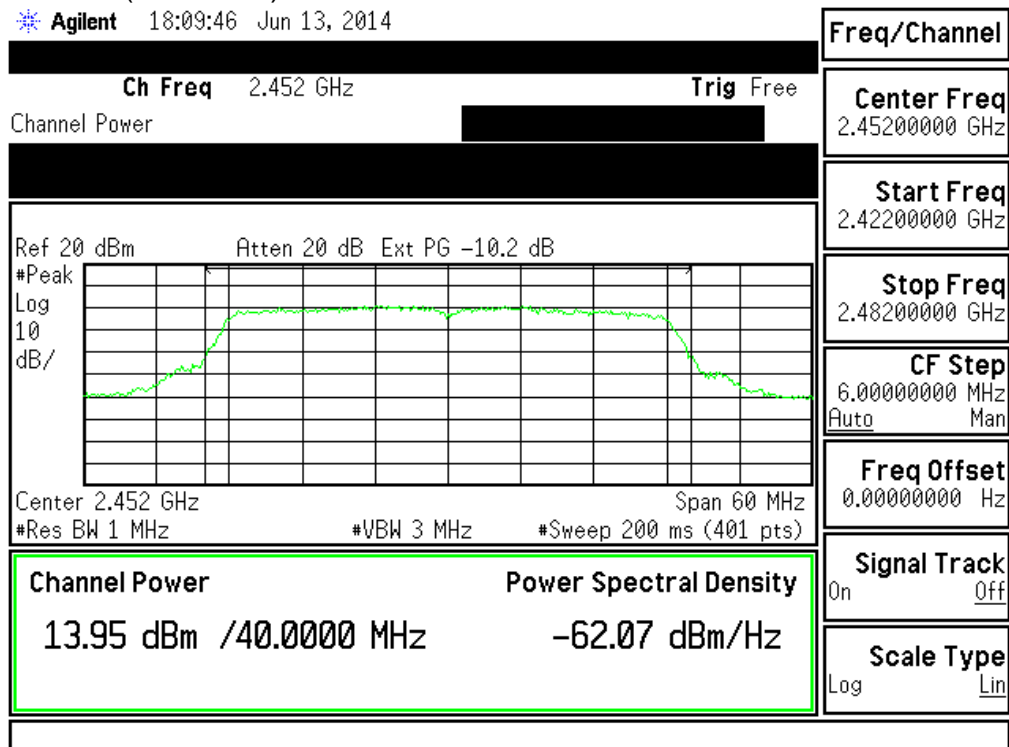
### 802.11HT40 ANT2 (2437MHz)

Agilent 18:03:26 Jun 13, 2014



### 802.11HT40 ANT2 (2452MHz)

Agilent 18:09:46 Jun 13, 2014



## 5. Minimum 6dB RF Bandwidth Requirements

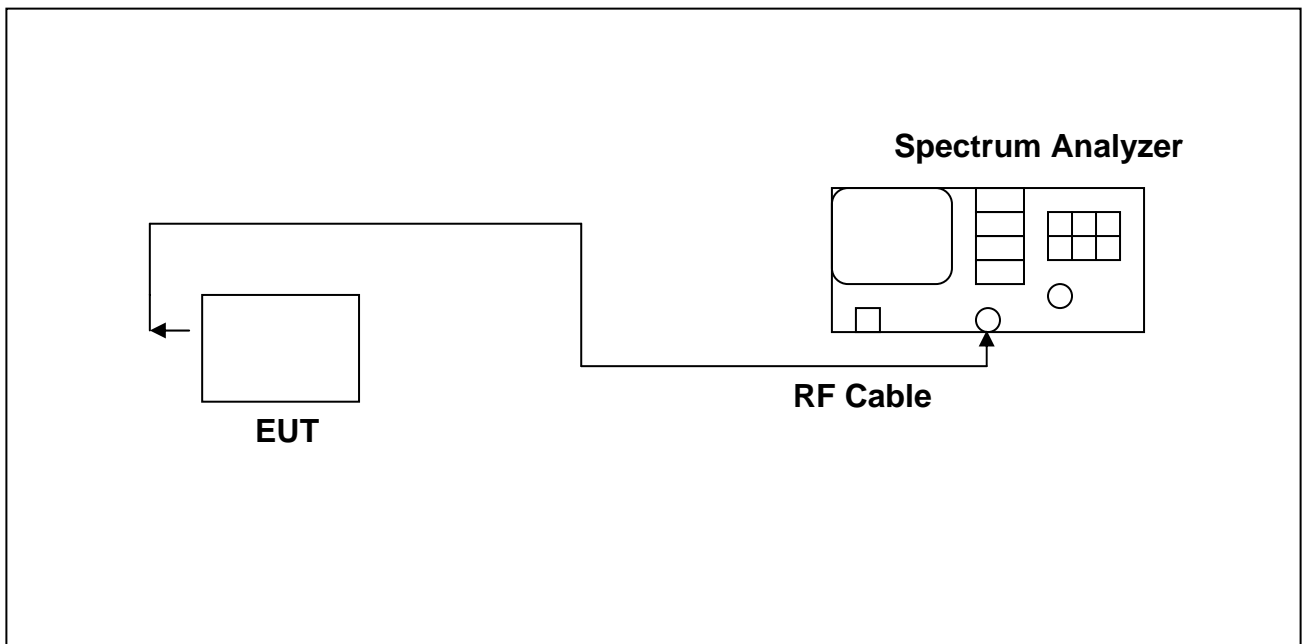
### 5.1 Test Condition & Setup :

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	US44300422	E4446A	2013/12/30	2014/12/30

## 5.4 Test Result:

### 802.11b

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	8.400	>500KHz
2437	7.950	>500KHz
2462	8.475	>500KHz

### 802.11g

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	16.650	>500KHz
2437	16.650	>500KHz
2462	16.650	>500KHz

### 802.11n HT20(Ant 1)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	17.775	>500KHz
2437	17.775	>500KHz
2462	17.775	>500KHz

### 802.11n HT40(Ant 1)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2422	35.875	>500KHz
2437	36.000	>500KHz
2452	35.875	>500KHz

### 802.11n HT20(Ant 2)

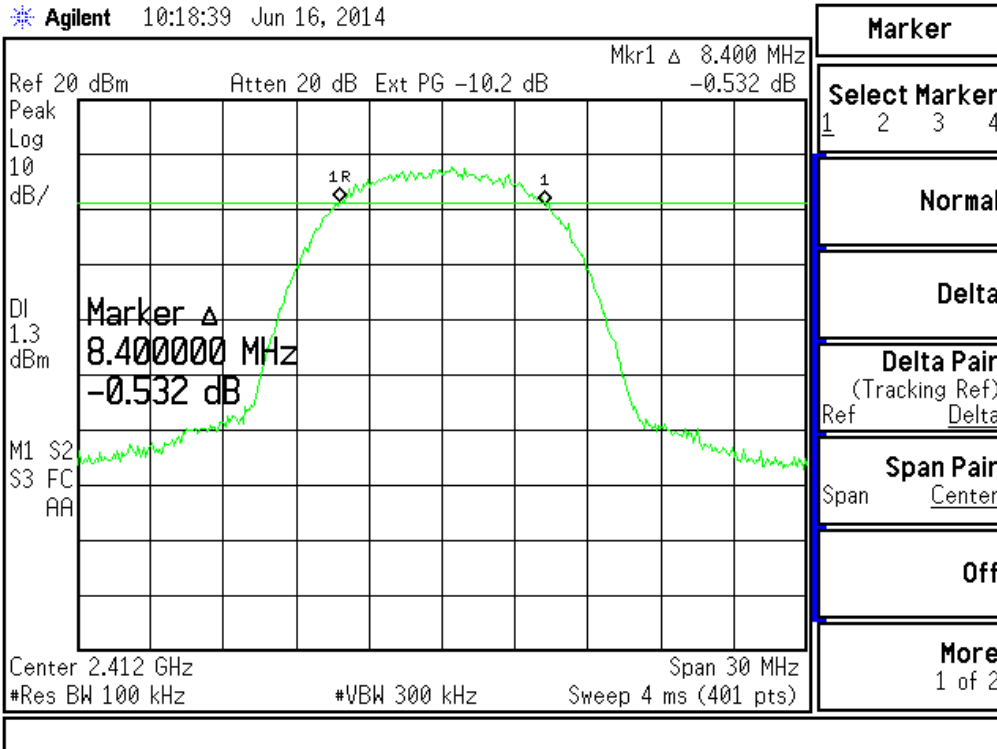
Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2412	17.775	>500KHz
2437	17.775	>500KHz
2462	17.850	>500KHz

### 802.11n HT40(Ant 2)

Frequency (MHz)	Min. 6dB Bandwidth (MHz)	Required Limit
2422	36.125	>500KHz
2437	35.750	>500KHz
2452	35.750	>500KHz

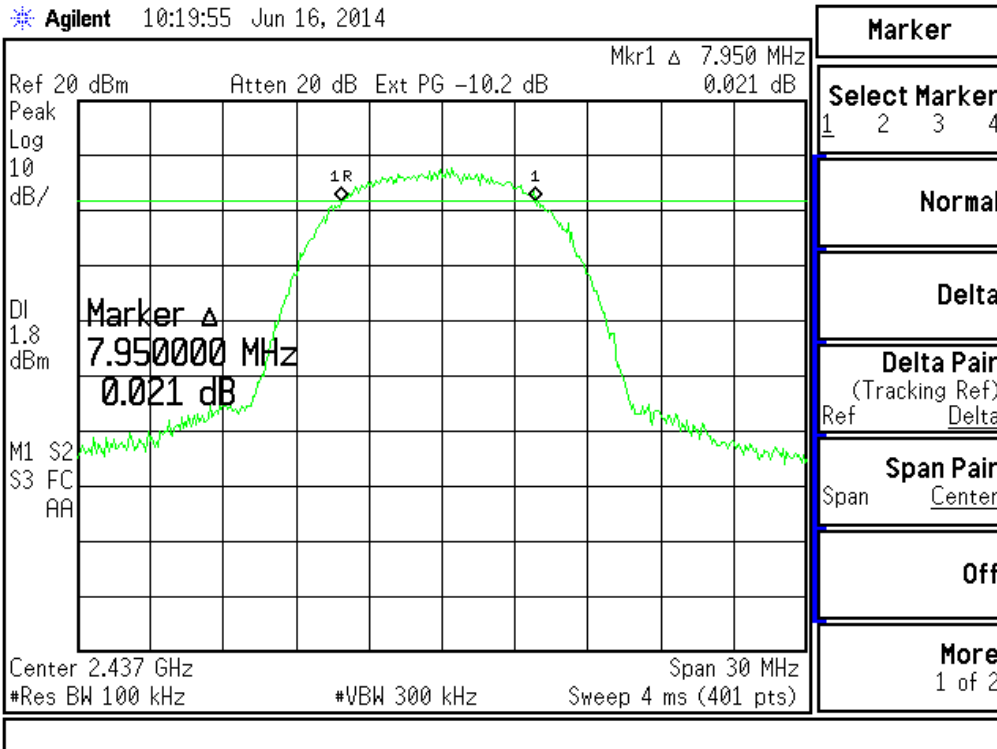
**Note:** Test Graphs See next page.

802.11b (2412MHz)



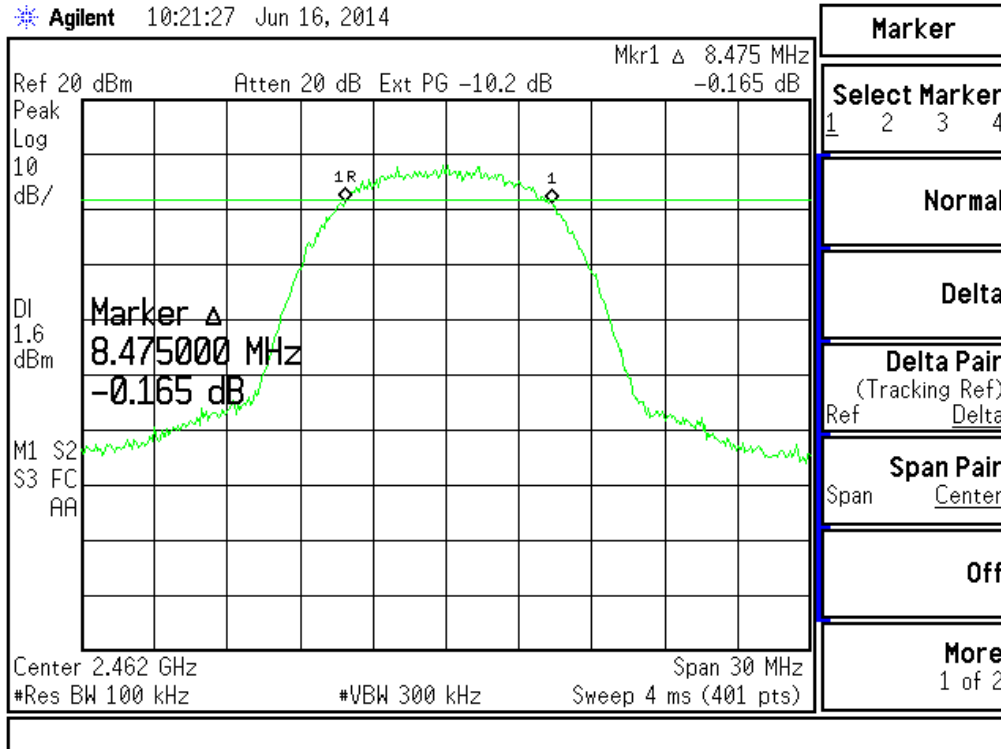
Note: Ext PG = Attenuator + Cable loss.

802.11b (2437MHz)



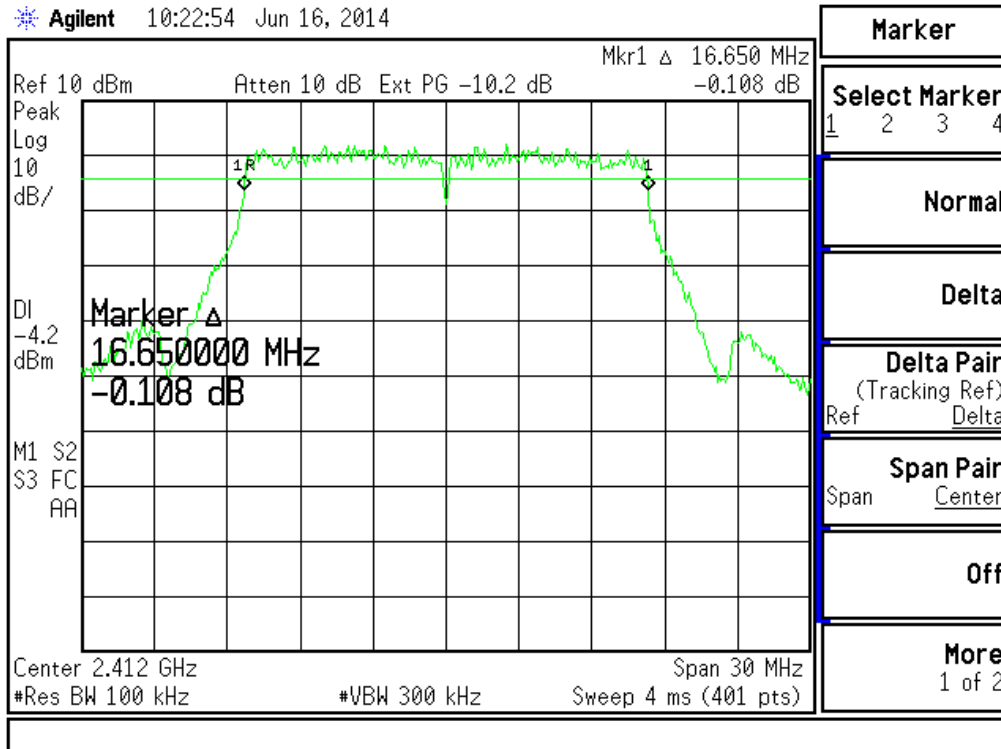
802.11b (2462MHz)

Agilent 10:21:27 Jun 16, 2014



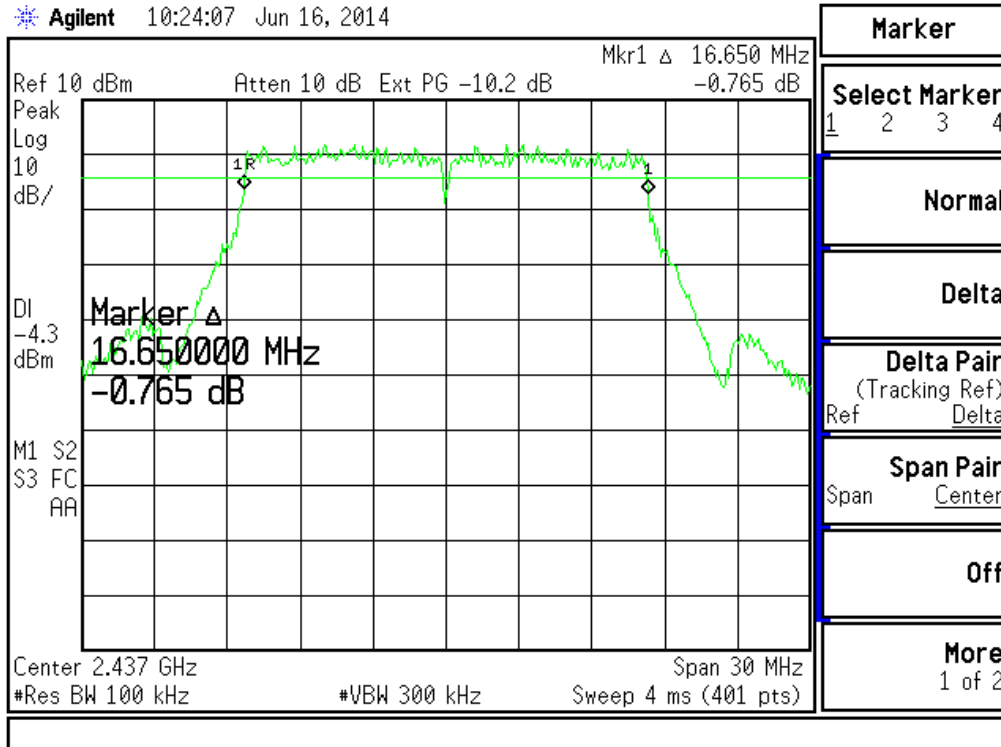
802.11g (2412MHz)

Agilent 10:22:54 Jun 16, 2014



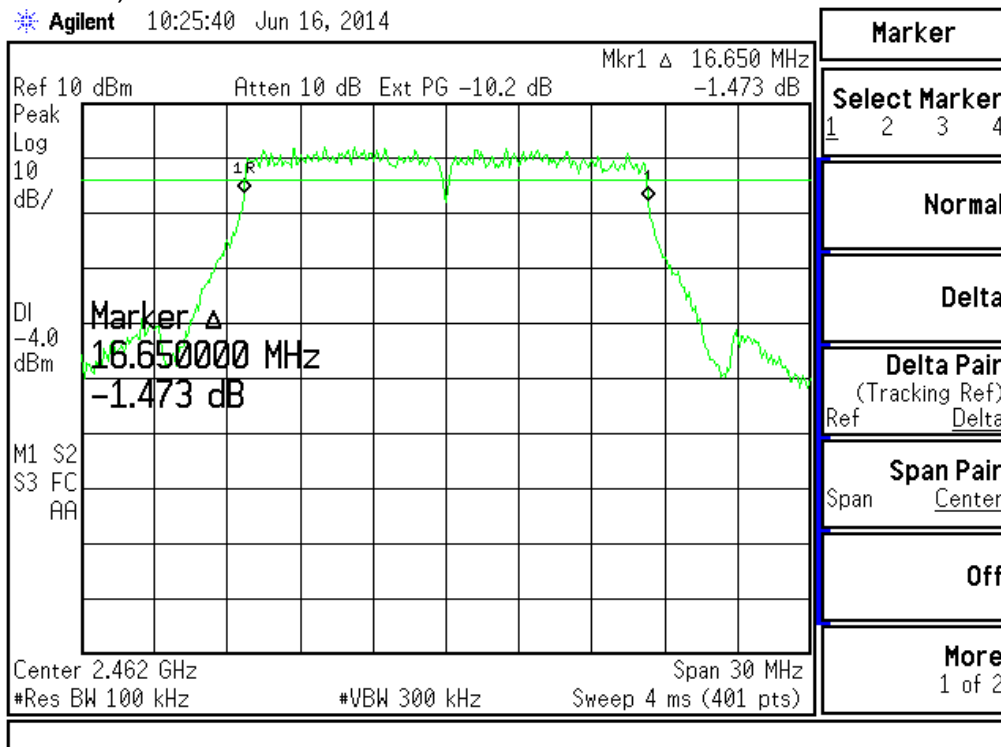
802.11g (2437MHz)

Agilent 10:24:07 Jun 16, 2014



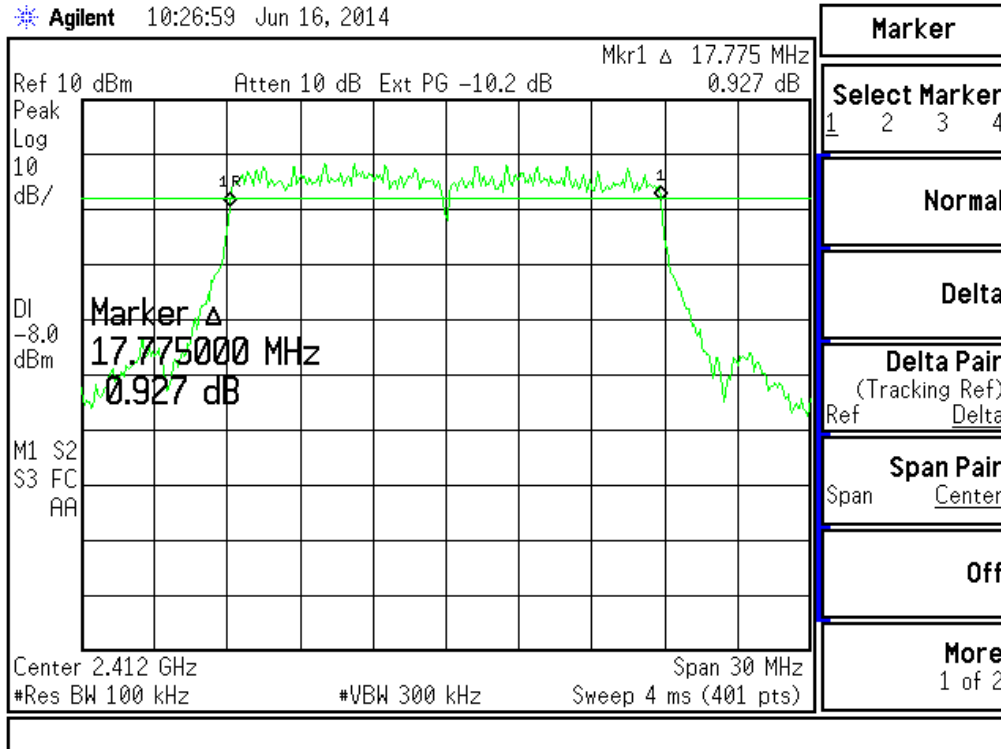
802.11g (2462MHz)

Agilent 10:25:40 Jun 16, 2014



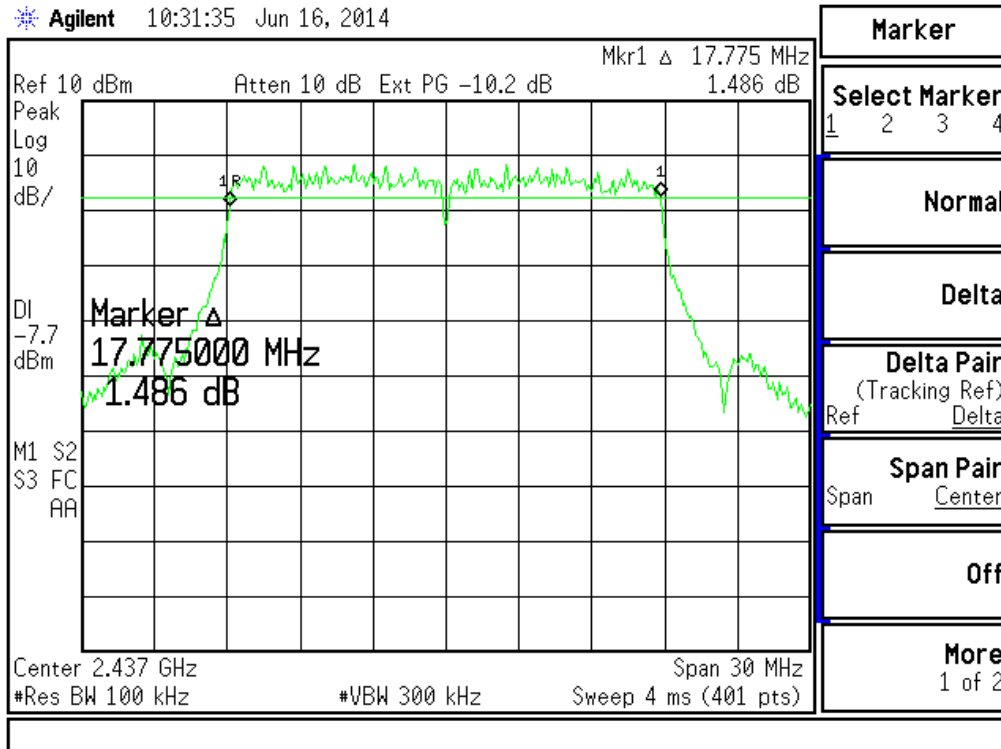
802.11n HT20(Ant 1)(2412MHz)

Agilent 10:26:59 Jun 16, 2014



802.11n HT20(Ant 1)(2437MHz)

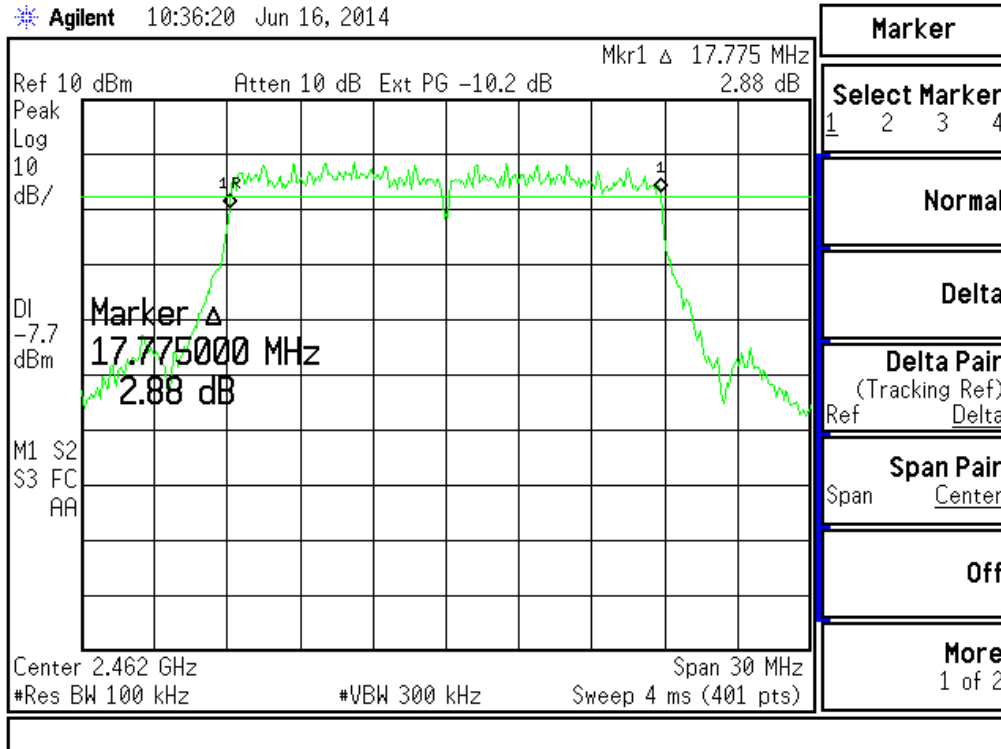
Agilent 10:31:35 Jun 16, 2014





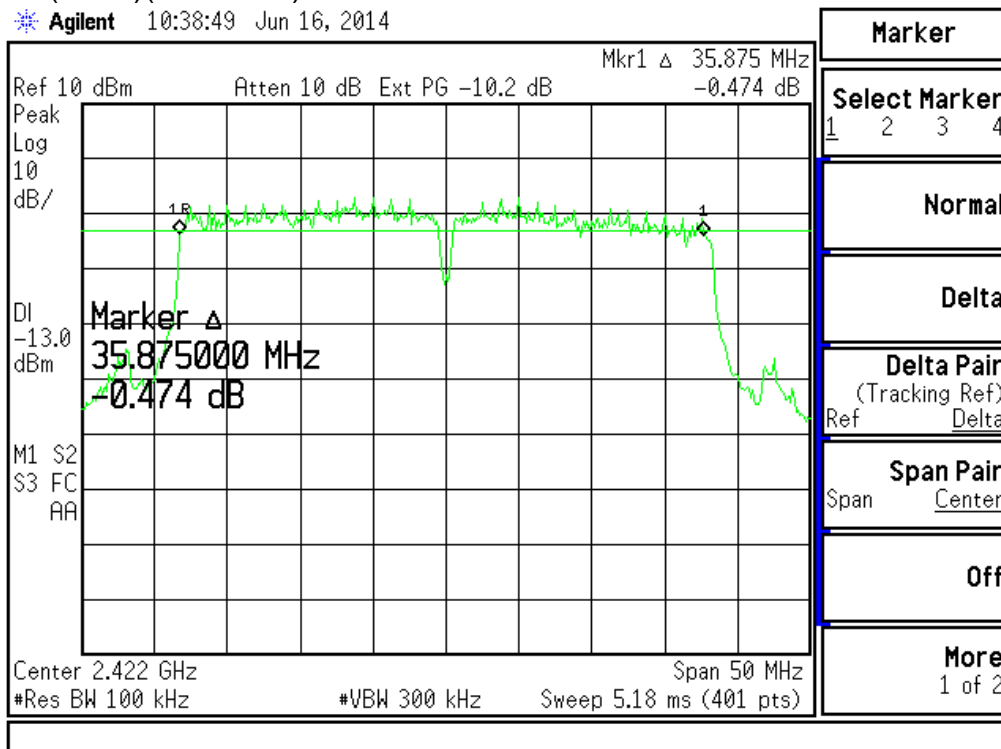
802.11n HT20(Ant 1)(2462MHz)

Agilent 10:36:20 Jun 16, 2014



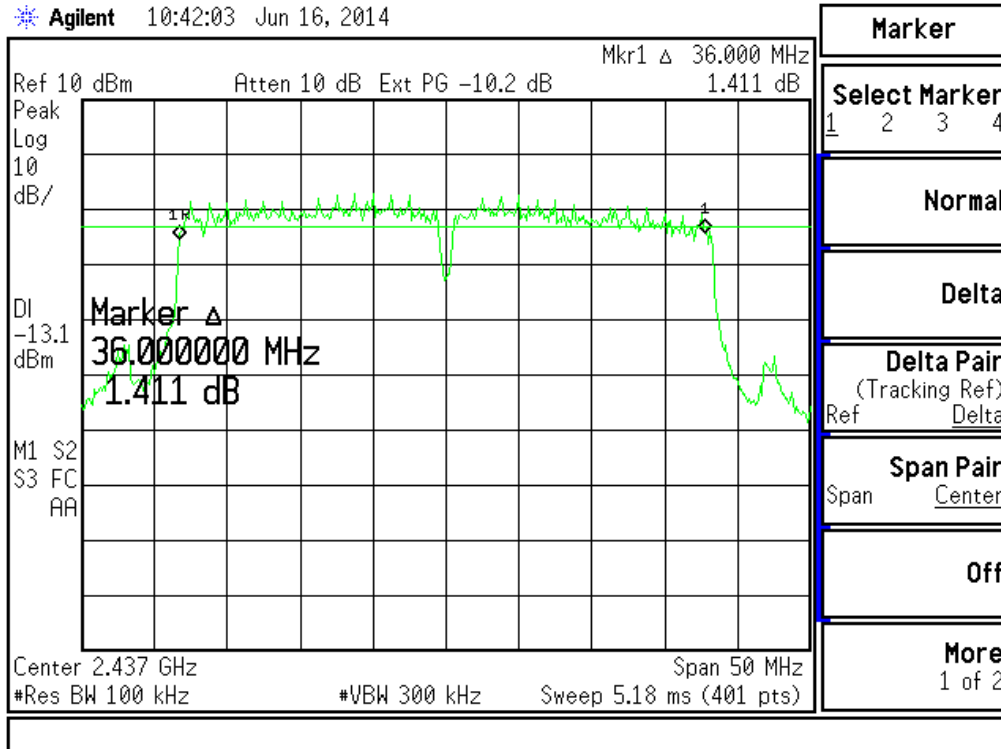
802.11n HT40(Ant 1)(2422MHz)

Agilent 10:38:49 Jun 16, 2014



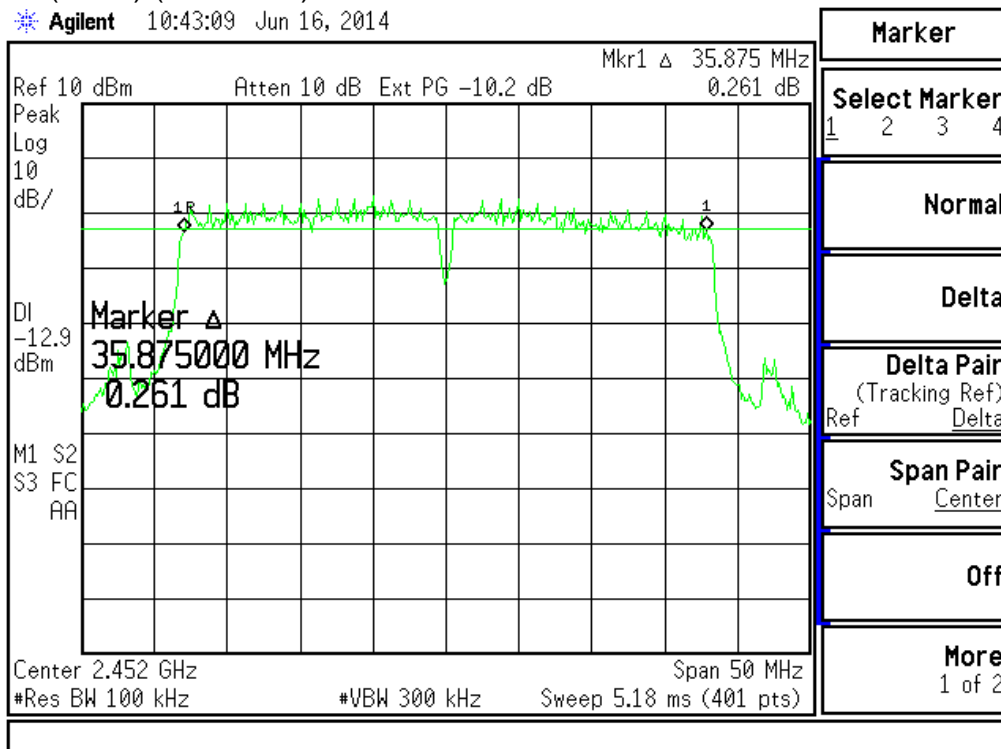
802.11n HT40(Ant 1) (2437MHz)

Agilent 10:42:03 Jun 16, 2014



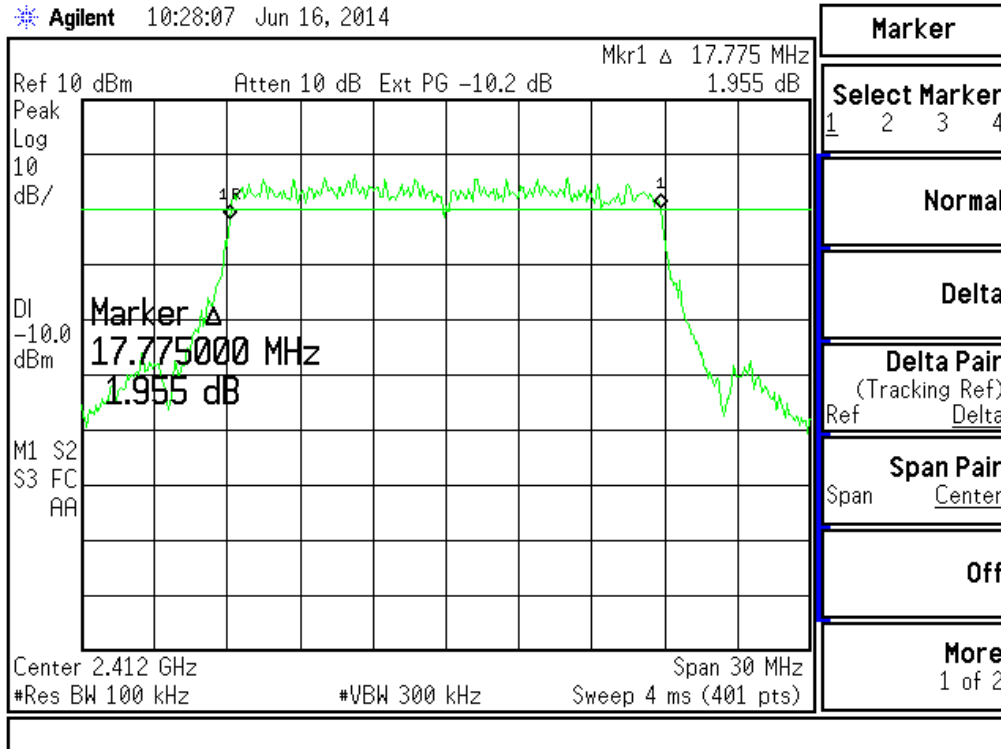
802.11n HT40(Ant 1) (2452MHz)

Agilent 10:43:09 Jun 16, 2014



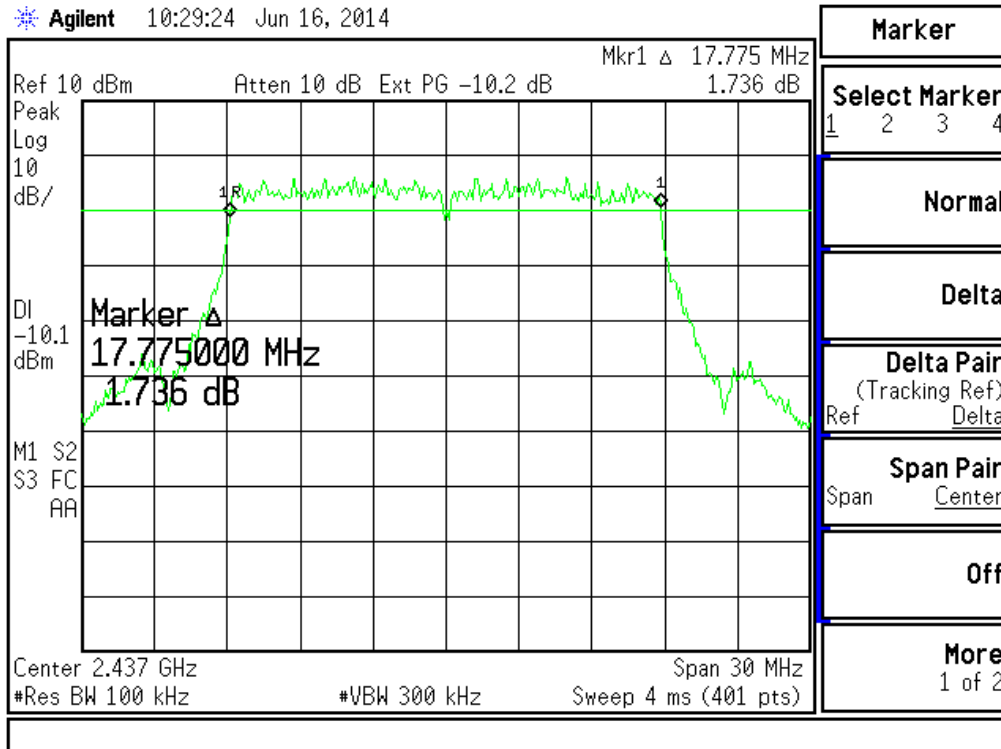
802.11n HT20(Ant 2)(2412MHz)

Agilent 10:28:07 Jun 16, 2014



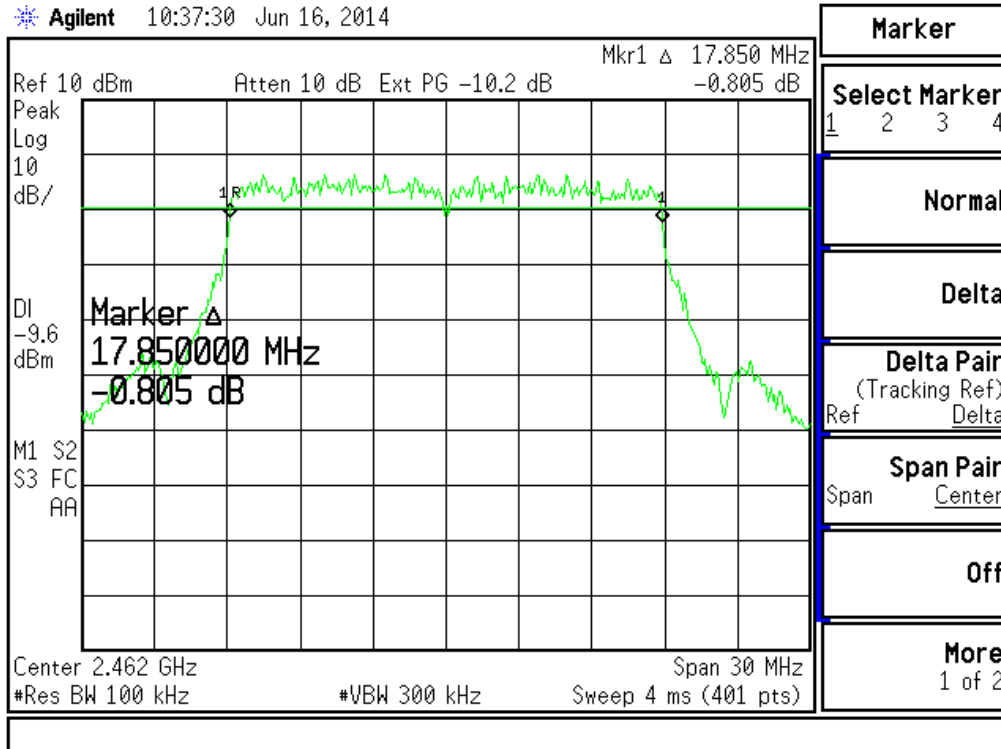
802.11n HT20(Ant 2)(2437MHz)

Agilent 10:29:24 Jun 16, 2014



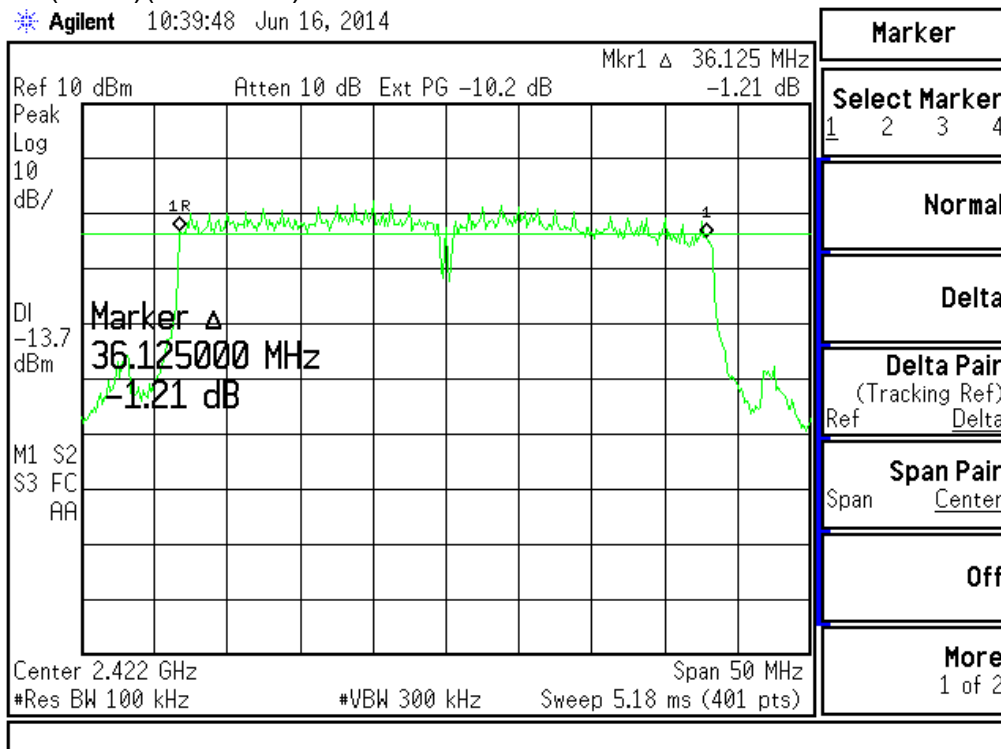
802.11n HT20(Ant 2)(2462MHz)

Agilent 10:37:30 Jun 16, 2014



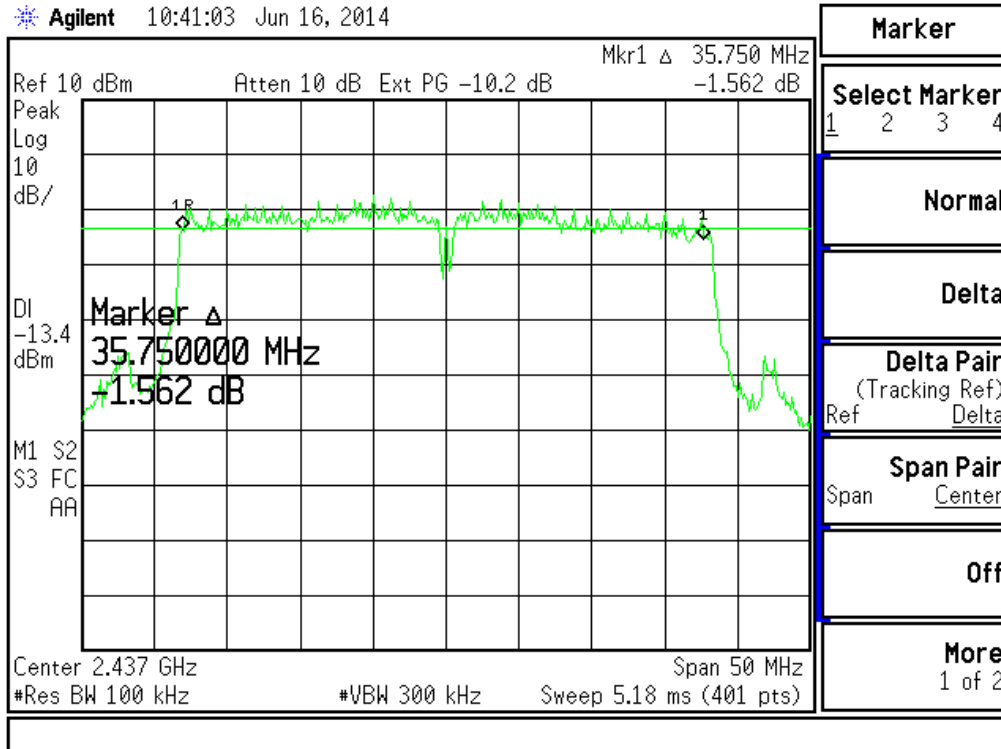
802.11n HT40(Ant 2)(2422MHz)

Agilent 10:39:48 Jun 16, 2014



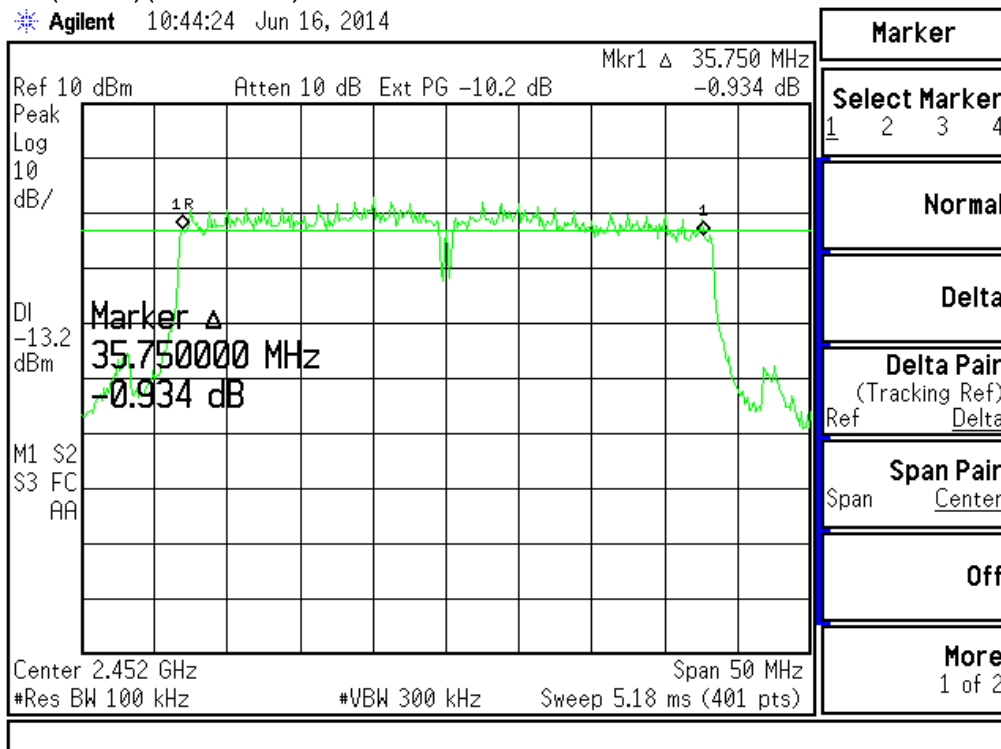
802.11n HT40(Ant 2)(2437MHz)

Agilent 10:41:03 Jun 16, 2014



802.11n HT40(Ant 2)(2452MHz)

Agilent 10:44:24 Jun 16, 2014



## 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 =3kHz , VBW=100kHz ,

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 3kHz band segment within the fundamental EBW.

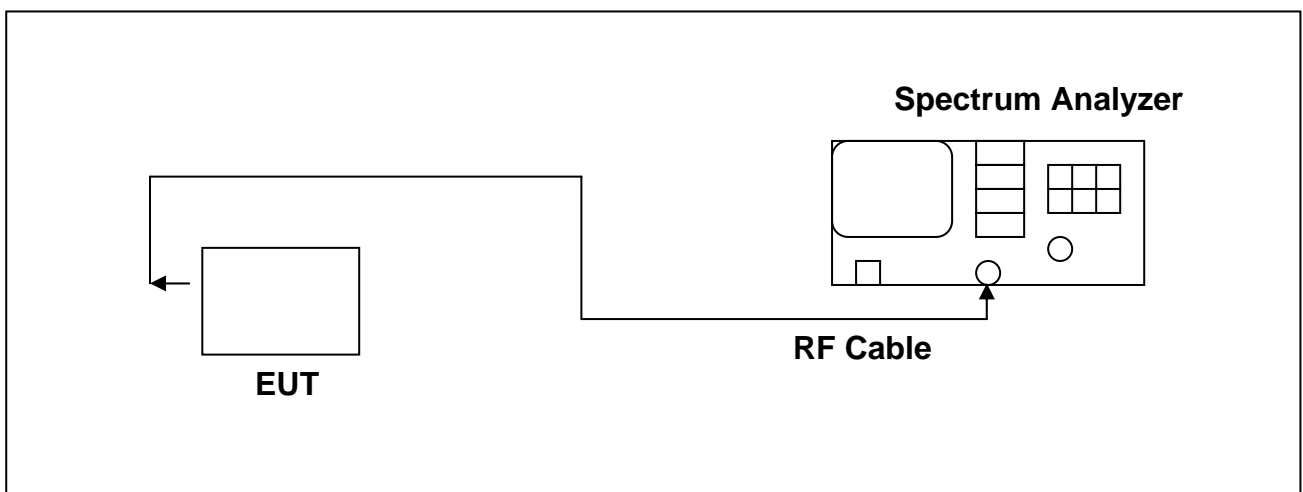
Measurement procedure is followed KDB 558074 v03r01 (10.2 Method PKPSD (peak PSD)

Measurement procedure is followed KDB 662911 D01 Multiple Transmitter Output v02 Paragraph E) Guidance for summing emission measurements from multiple outputs of a transmitter or from multiple transmitters.

2) In-Band Power Spectral Density (PSD) Measurements

- a) Measure and sum the spectra across the outputs.
- c) add 10 log(Nant) dB .

### 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	US44300422	E4446A	2013/12/30	2014/12/30

## 6.4 Test Result:

### 802.11b

Frequency (MHz)	Power Density (dBm)	Power Density (mW)
2412	0.622	<8dBm
2437	0.356	<8dBm
2462	1.084	<8dBm

### 802.11g

Frequency (MHz)	Power Density (dBm)	Power Density (mW)
2412	-5.978	<8dBm
2437	-5.562	<8dBm
2462	-6.545	<8dBm

### 802.11n HT20(Ant 1)

Frequency (MHz)	Power Density (dBm)	Power Density (mW)	Required Limit
2412	-7.550	0.08790	<8dBm
2437	-7.310	0.09290	<8dBm
2462	-7.270	0.09376	<8dBm

**Note** : Power Density = spectrum measurements value + 10log(Nant)  
Number of antenna: 2 → 10log(2)=3.01dB

### 802.11n HT40(Ant 1)

Frequency (MHz)	Power Density (dBm)	Power Density (mW)	Required Limit
2422	-12.850	0.02594	<8dBm
2437	-12.520	0.02799	<8dBm
2452	-12.810	0.02618	<8dBm

**Note** : Power Density = spectrum measurements value + 10log(Nant)  
Number of antenna: 2 → 10log(2)=3.01dB

**802.11n HT20(Ant 2)**

Frequency (MHz)	Power Density (dBm)	Power Density (mW)	Required Limit
2412	-8.840	0.06531	<8dBm
2437	-9.440	0.05689	<8dBm
2462	-8.610	0.06887	<8dBm

**Note :** Power Density = spectrum measurements value + 10log(Nant)  
Number of antenna: 2 → 10log(2)=3.01dB

**802.11n HT40(Ant 2)**

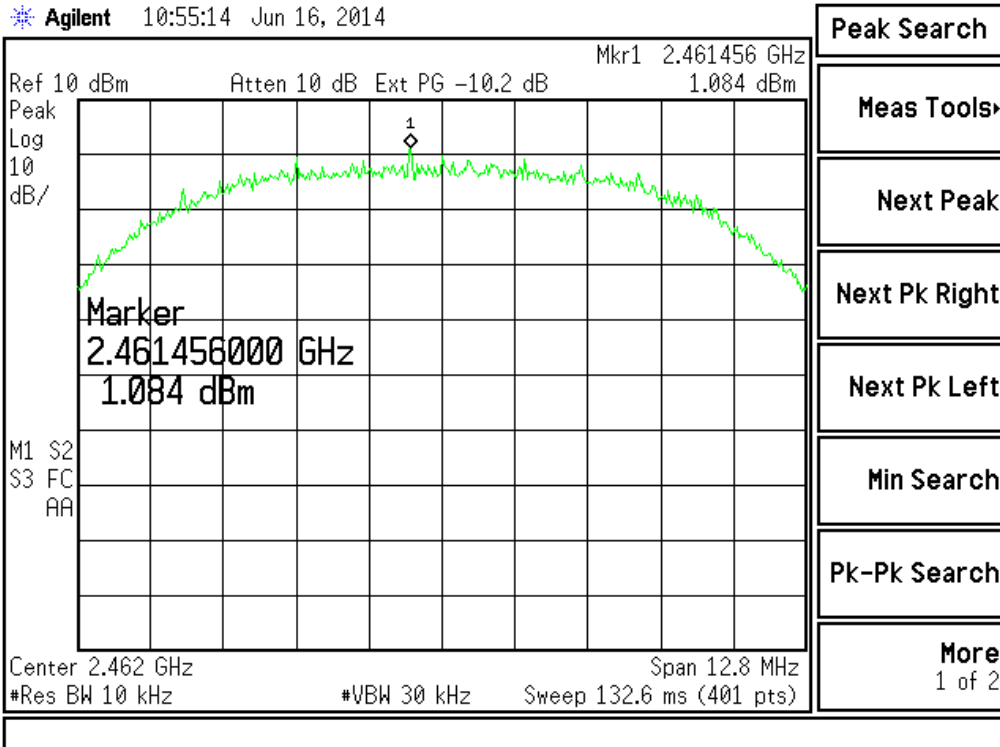
Frequency (MHz)	Power Density (dBm)	Power Density (mW)	Required Limit
2422	-11.820	0.03289	<8dBm
2437	-12.220	0.02999	<8dBm
2452	-12.600	0.02748	<8dBm

**Note :** Power Density = spectrum measurements value + 10log(Nant)  
Number of antenna: 2 → 10log(2)=3.01dB

**Note :** The graph shown below is the highest output power of all different frequency listed in the table above..

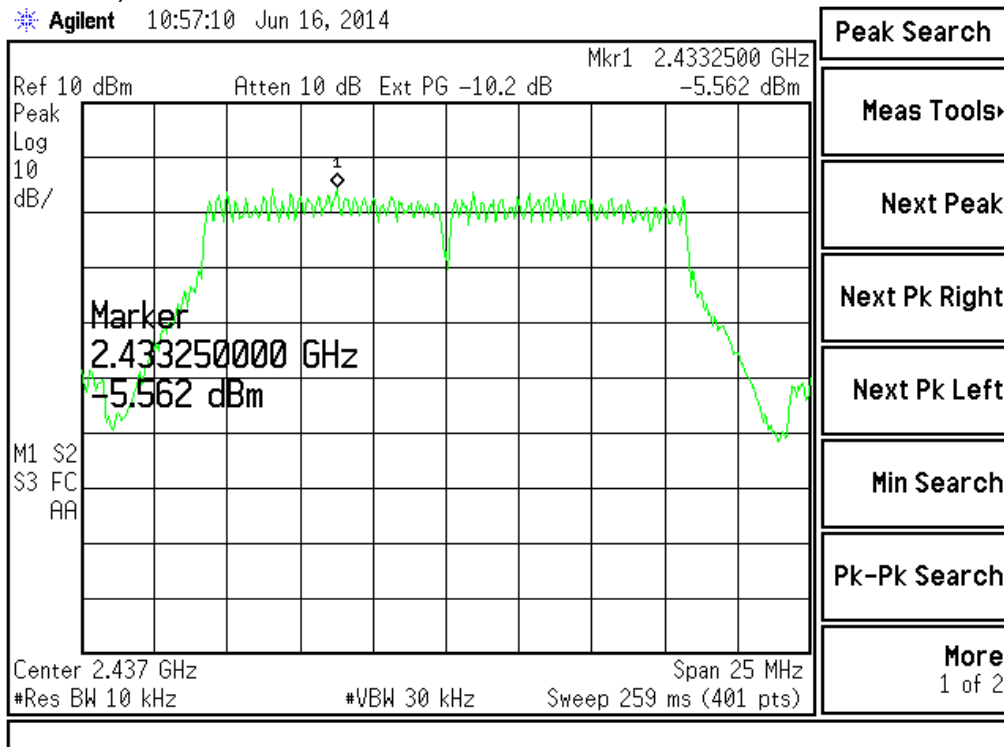


802.11b (2462MHz)



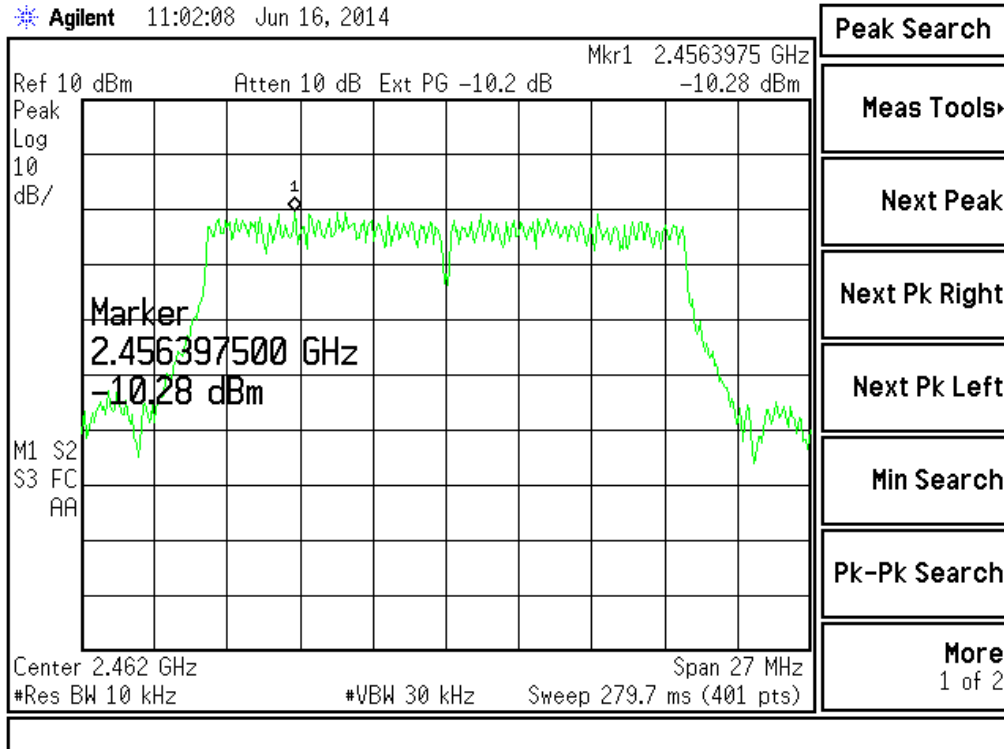
Note: Ext PG = Attenuator + Cable loss.

802.11g (2437MHz)



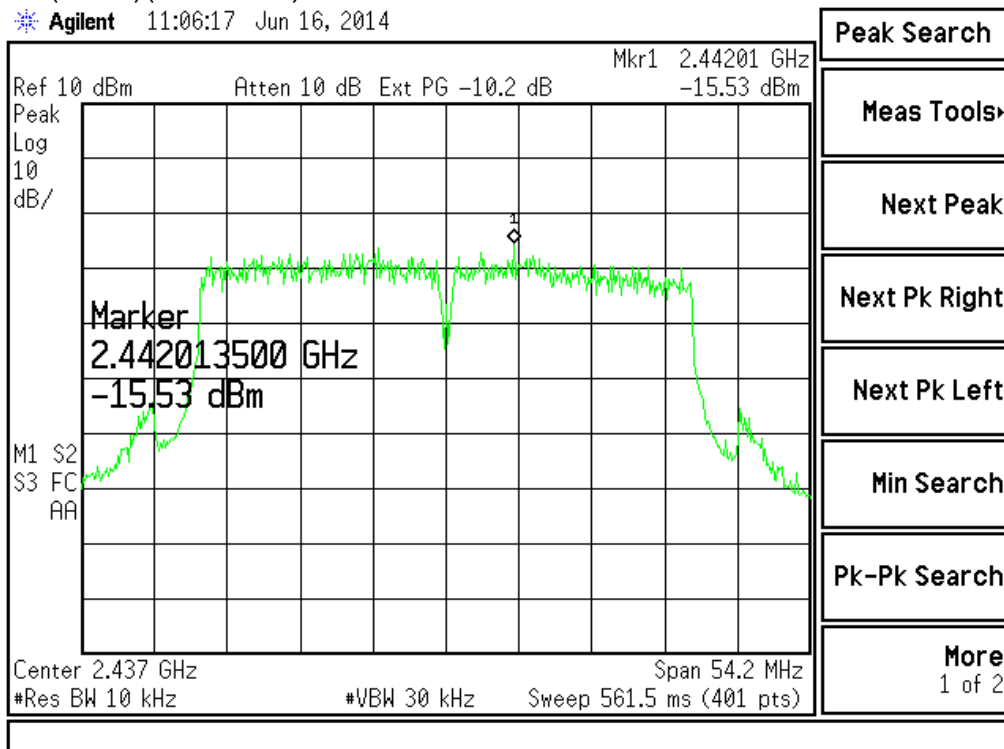
802.11n HT20(Ant 1)(2462MHz)

Agilent 11:02:08 Jun 16, 2014



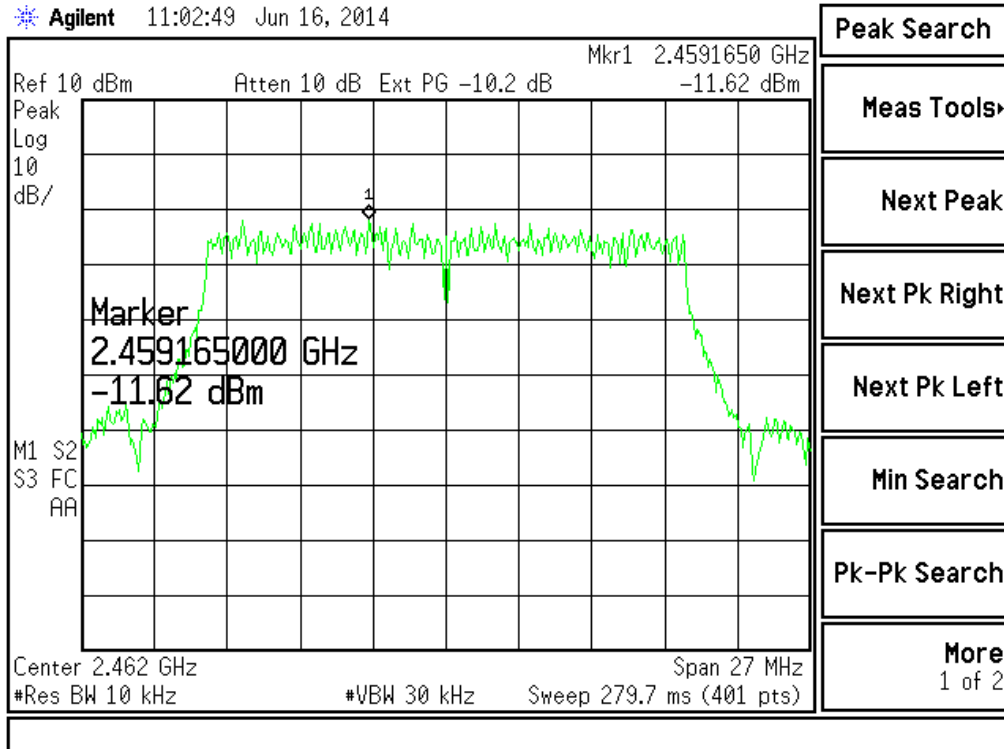
802.11n HT40(Ant 1)(2437MHz)

Agilent 11:06:17 Jun 16, 2014



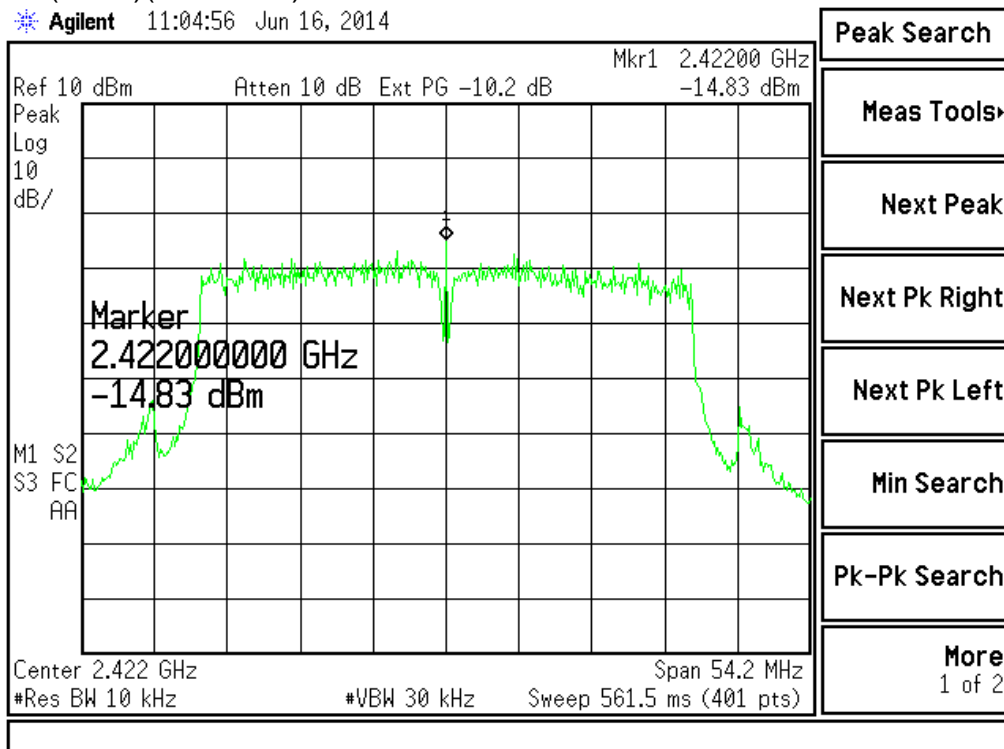
802.11n HT20(Ant 2)(2462MHz)

Agilent 11:02:49 Jun 16, 2014



802.11n HT40(Ant 2)(2422MHz)

Agilent 11:04:56 Jun 16, 2014



## 7. Out of Band Conducted Spurious Emissions Requirements

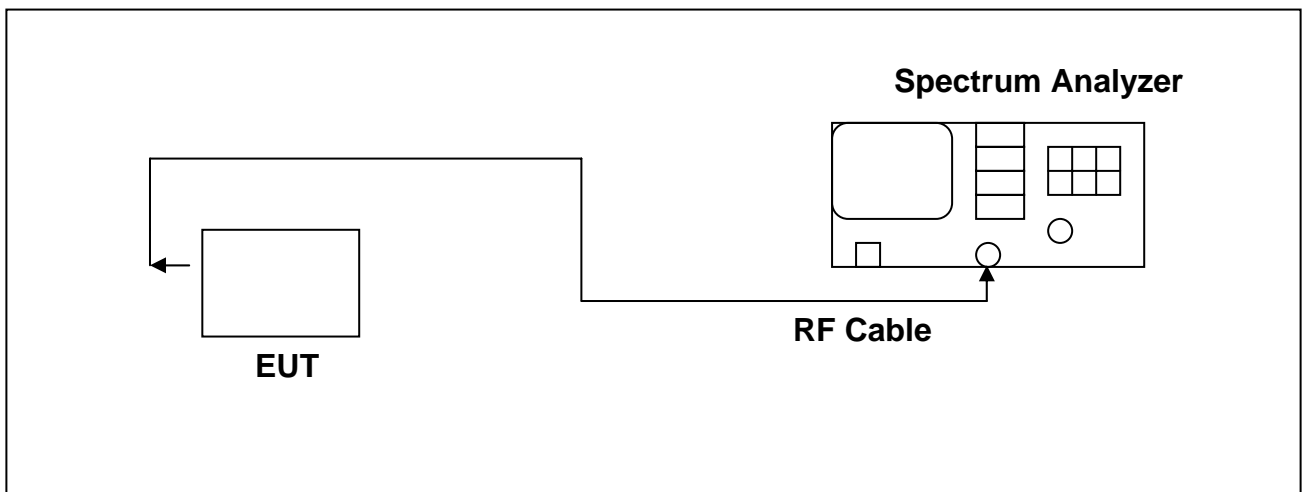
### 7.1 Test Condition & Setup :

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	US44300422	E4446A	2013/12/30	2014/12/30

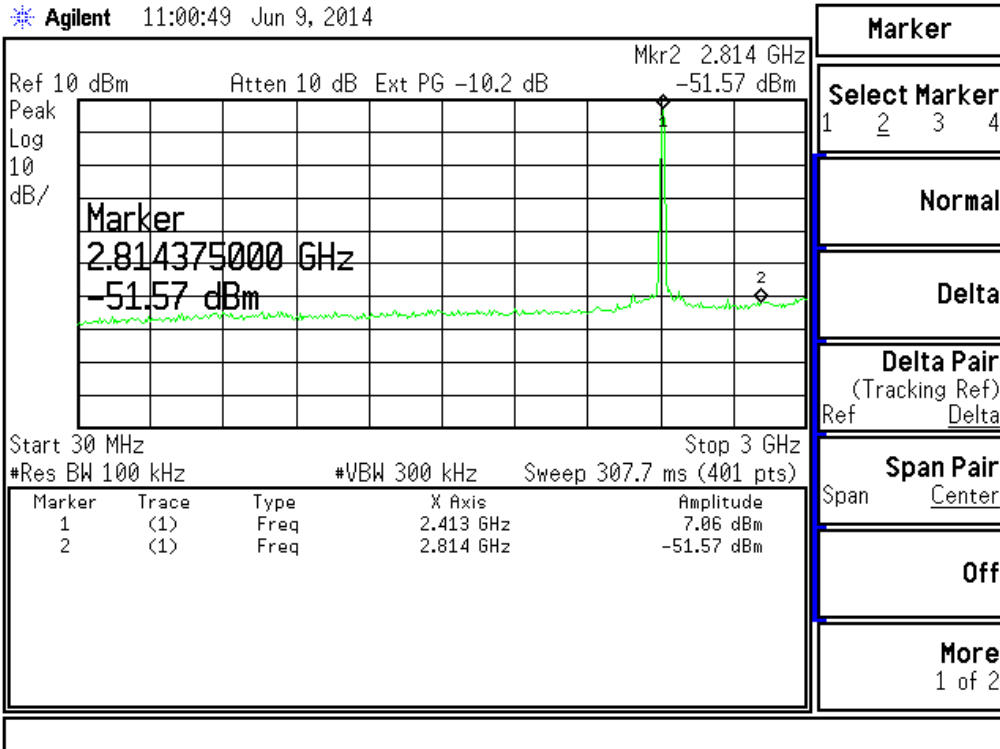
## 7.4 Test Result:

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.

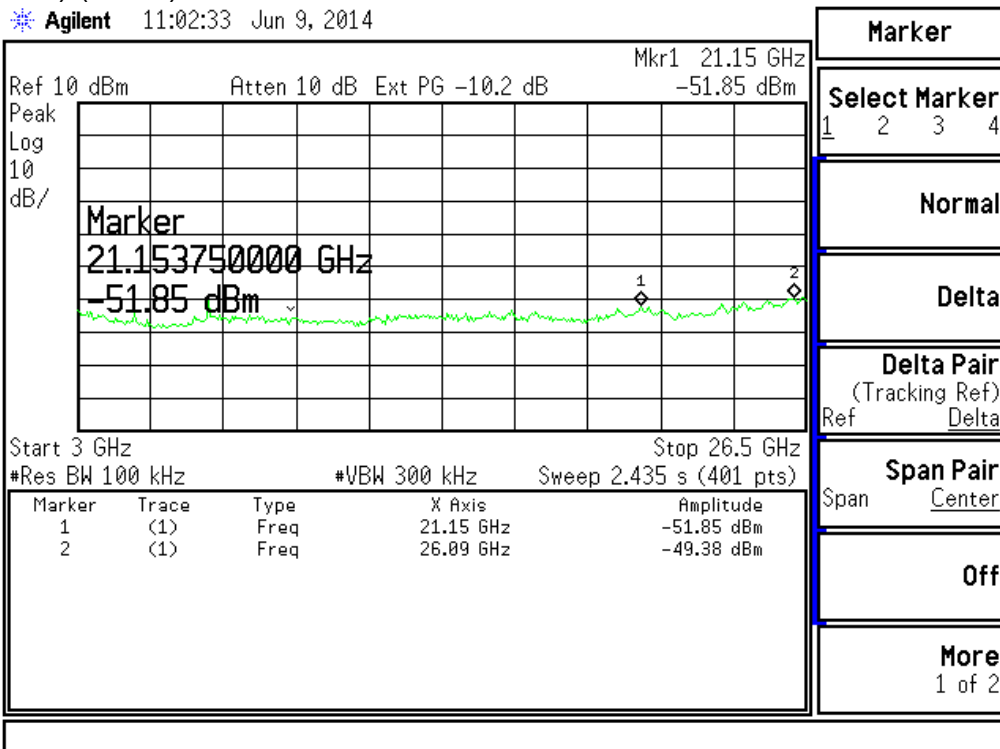
**Note :** Test Graphs See next page.

802.11b (CH01) (1 of 2)



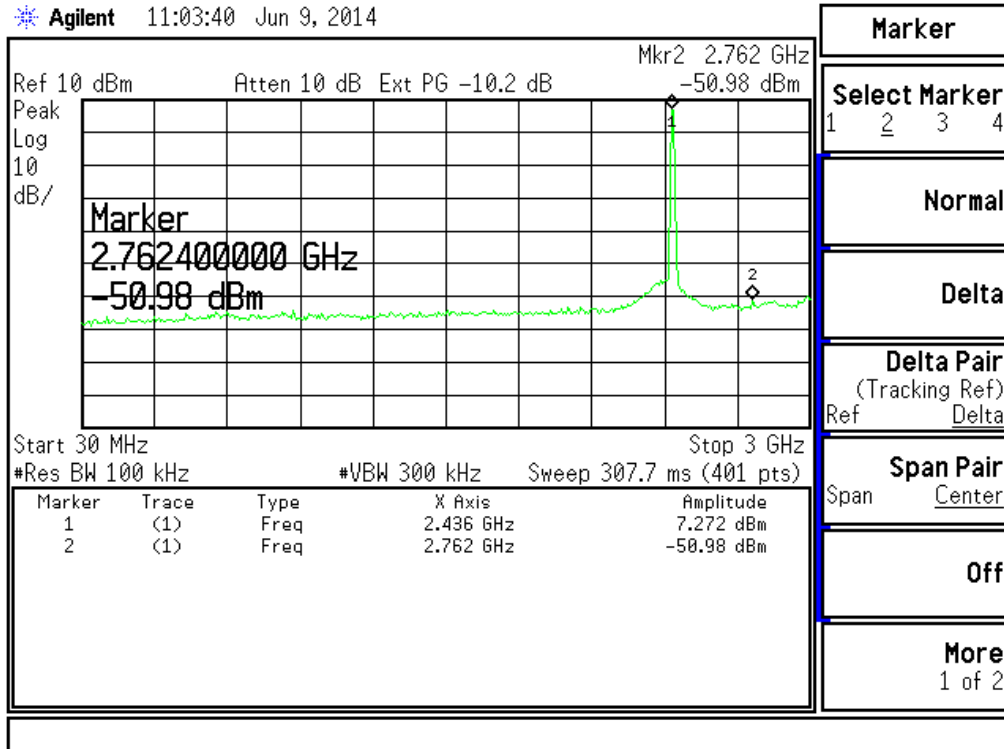
Note: Ext PG = Attenuator + Cable loss.

802.11b (CH01) (2 of 2)



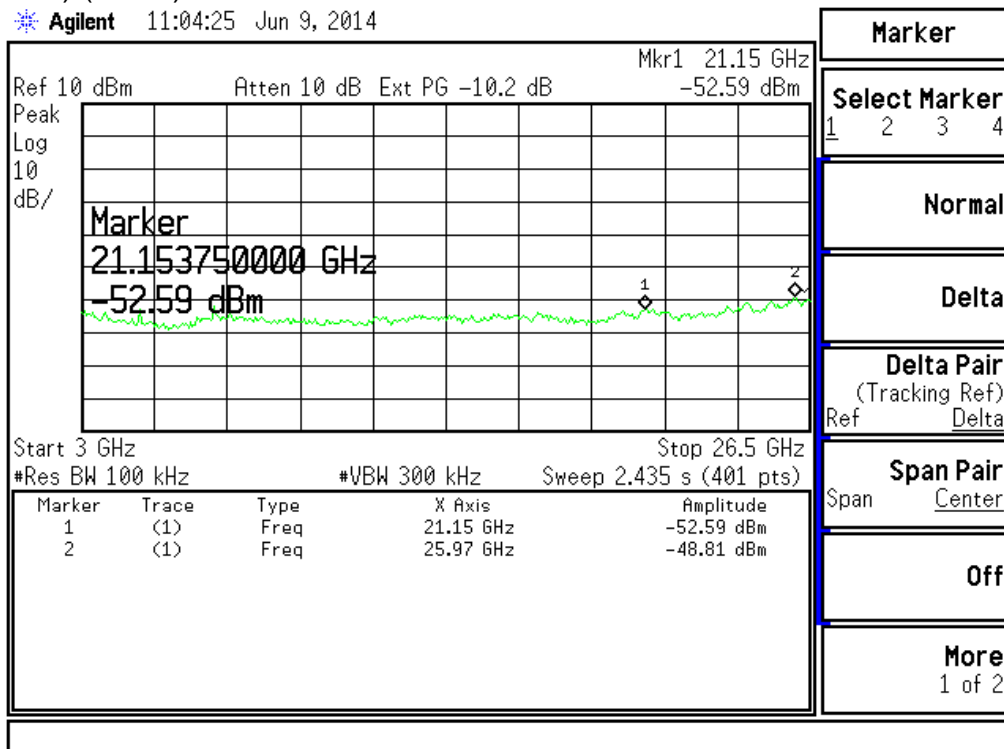
802.11b (CH06) (1 of 2)

Agilent 11:03:40 Jun 9, 2014



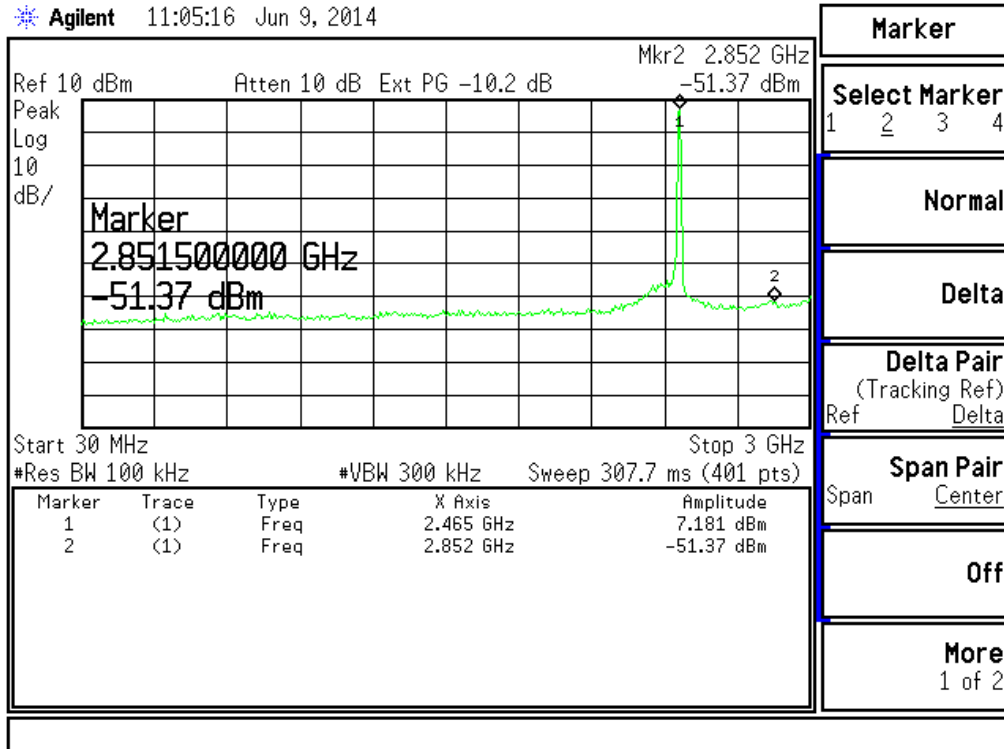
802.11b (CH06) (2 of 2)

Agilent 11:04:25 Jun 9, 2014



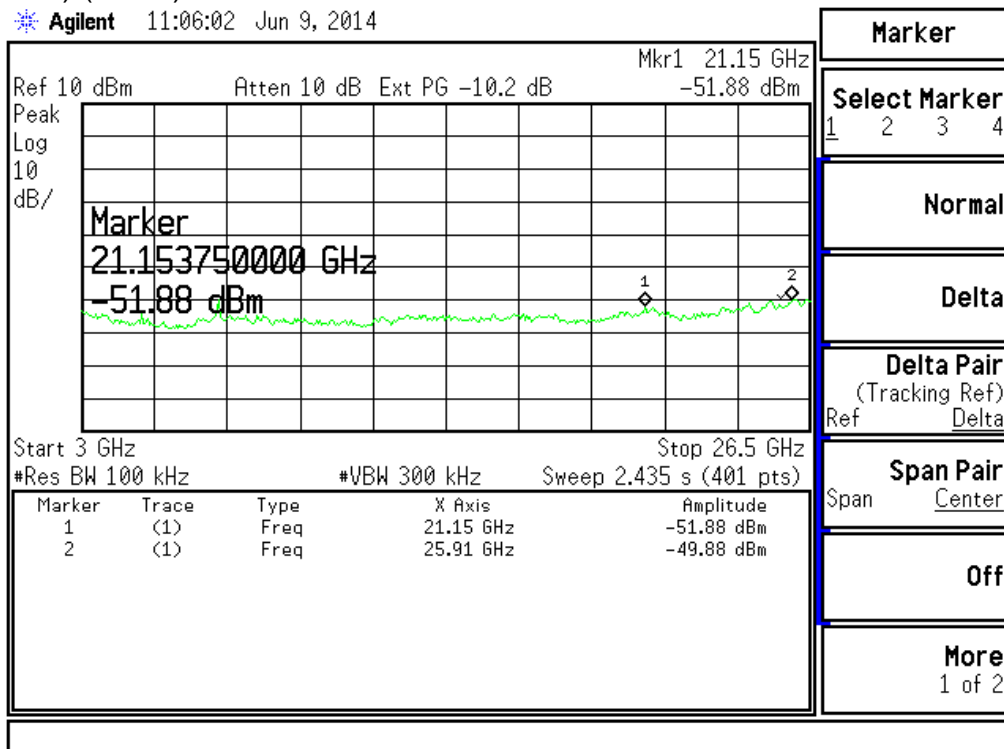
802.11b (CH11) (1 of 2)

Agilent 11:05:16 Jun 9, 2014



802.11b (CH11) (2 of 2)

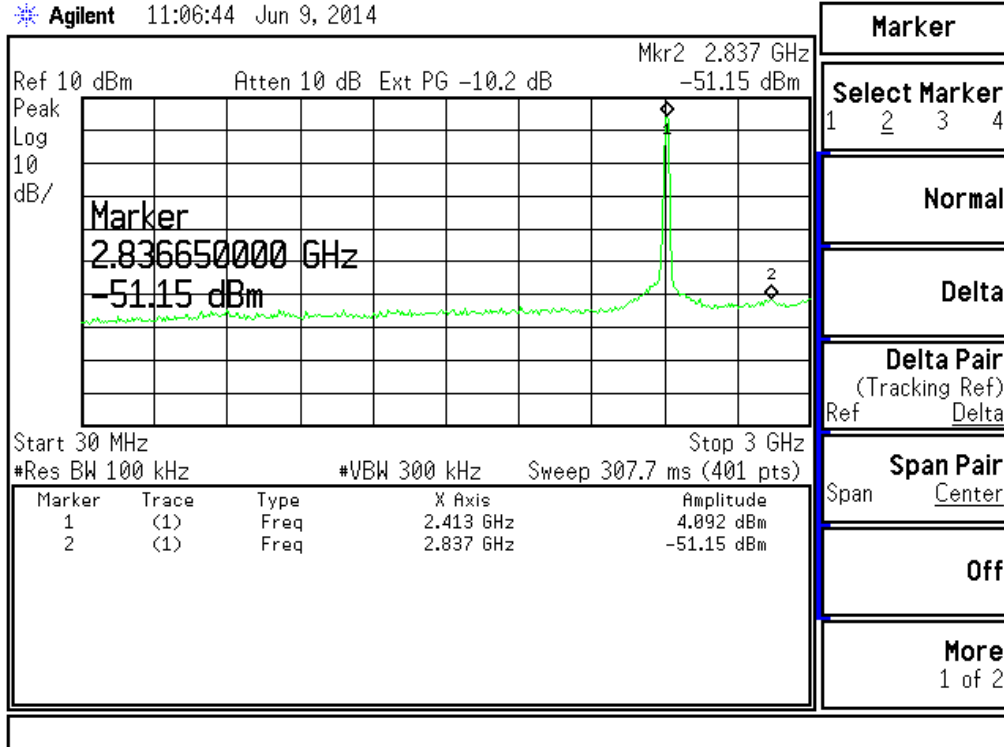
Agilent 11:06:02 Jun 9, 2014





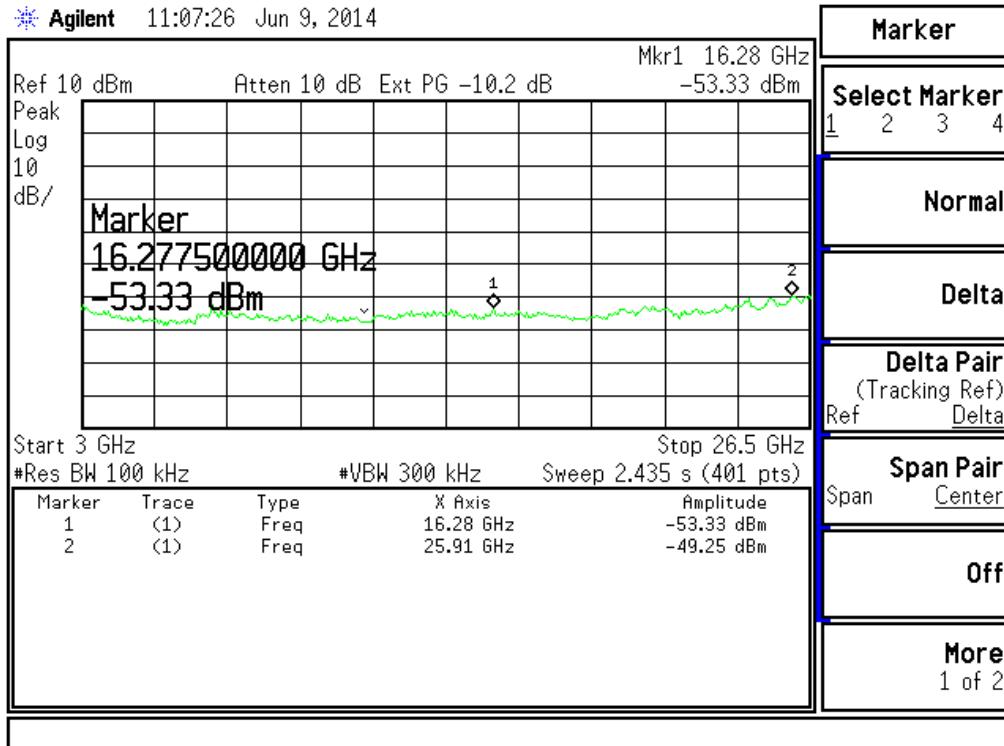
802.11g (CH01) (1 of 2)

Agilent 11:06:44 Jun 9, 2014



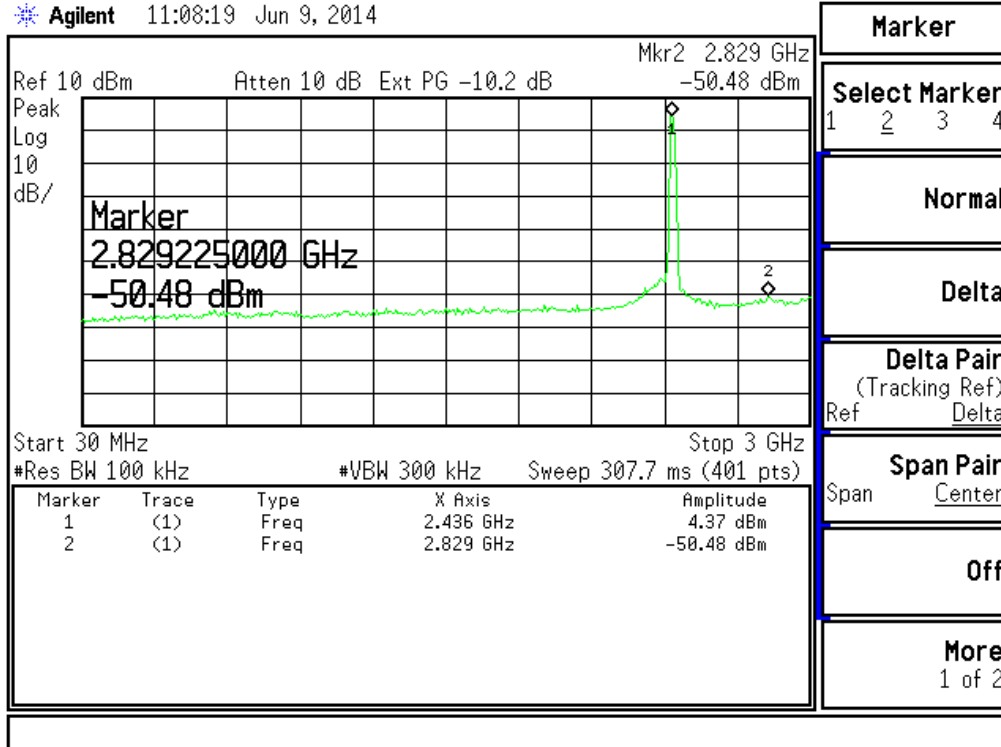
802.11g (CH01) (2 of 2)

Agilent 11:07:26 Jun 9, 2014



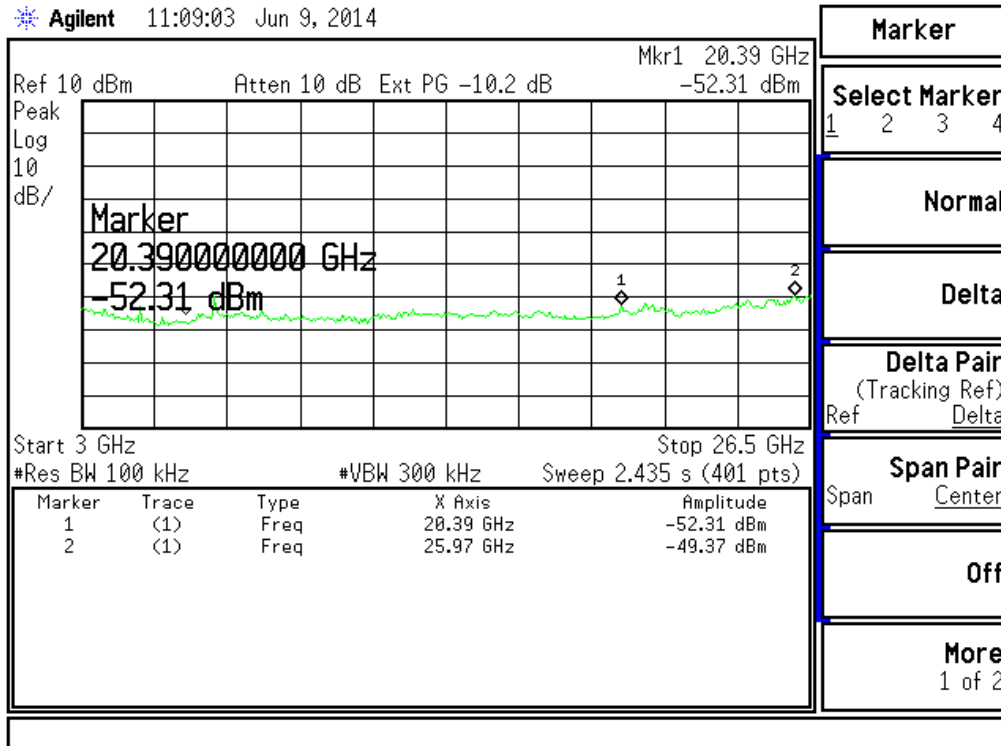
802.11g (CH06) (1 of 2)

Agilent 11:08:19 Jun 9, 2014



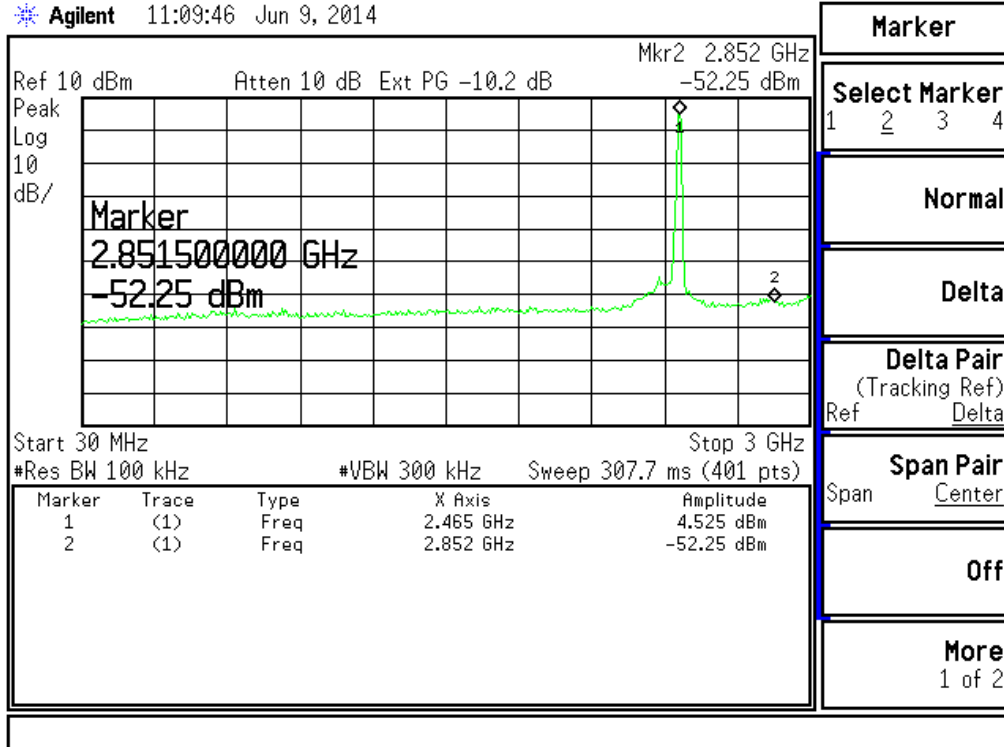
802.11g (CH06) (2 of 2)

Agilent 11:09:03 Jun 9, 2014



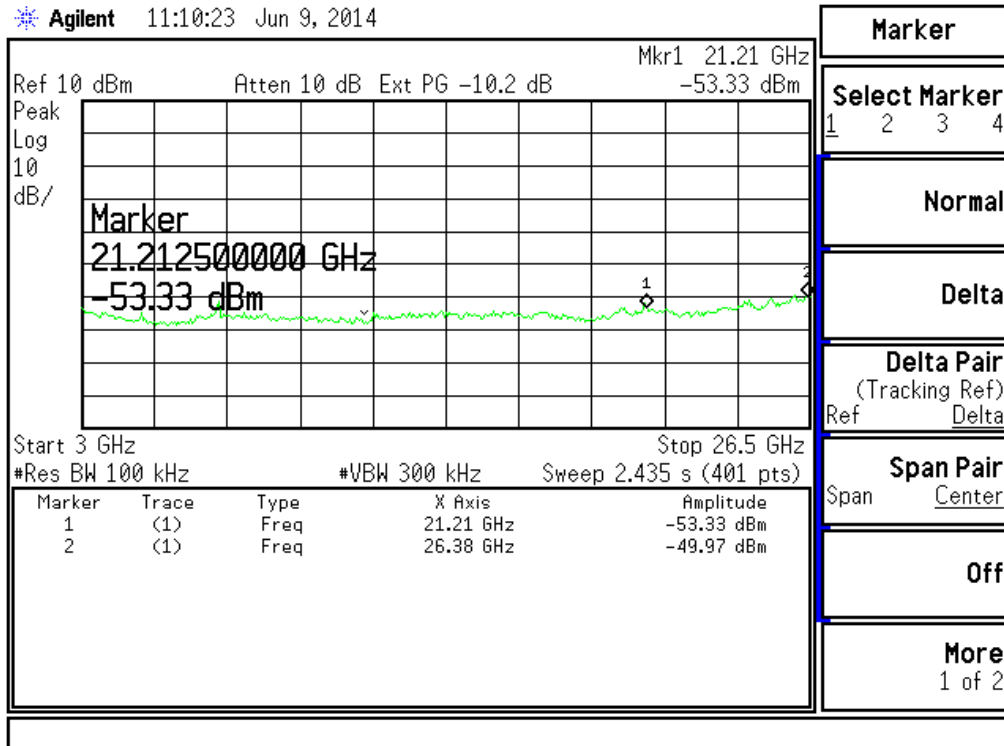
802.11g (CH11) (1 of 2)

Agilent 11:09:46 Jun 9, 2014

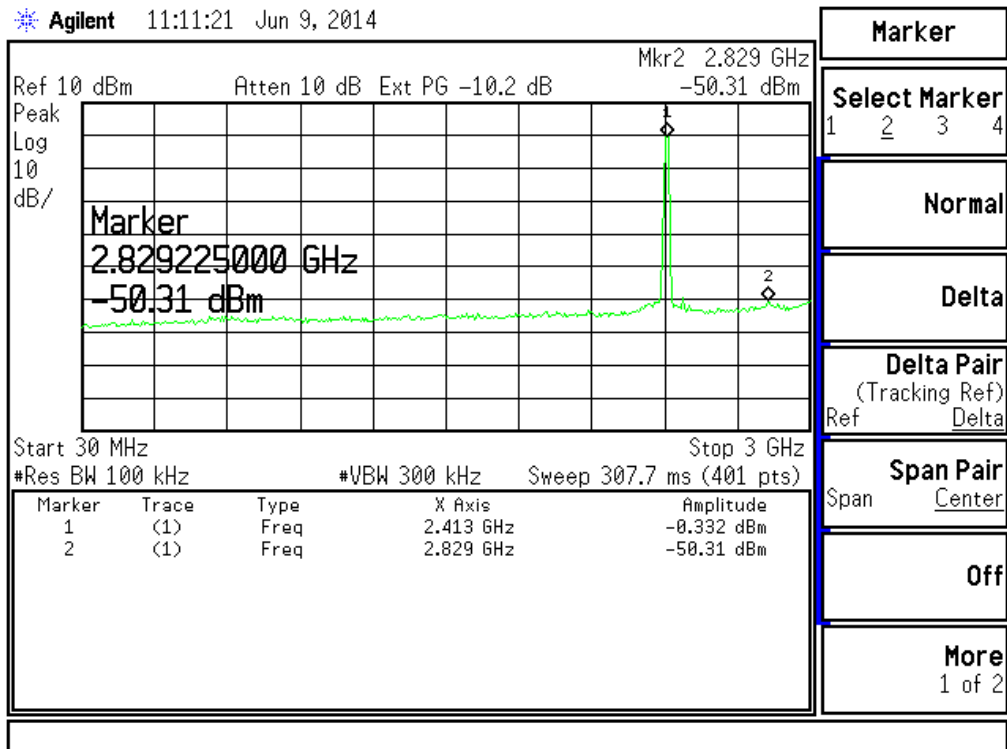


802.11g (CH11) (2 of 2)

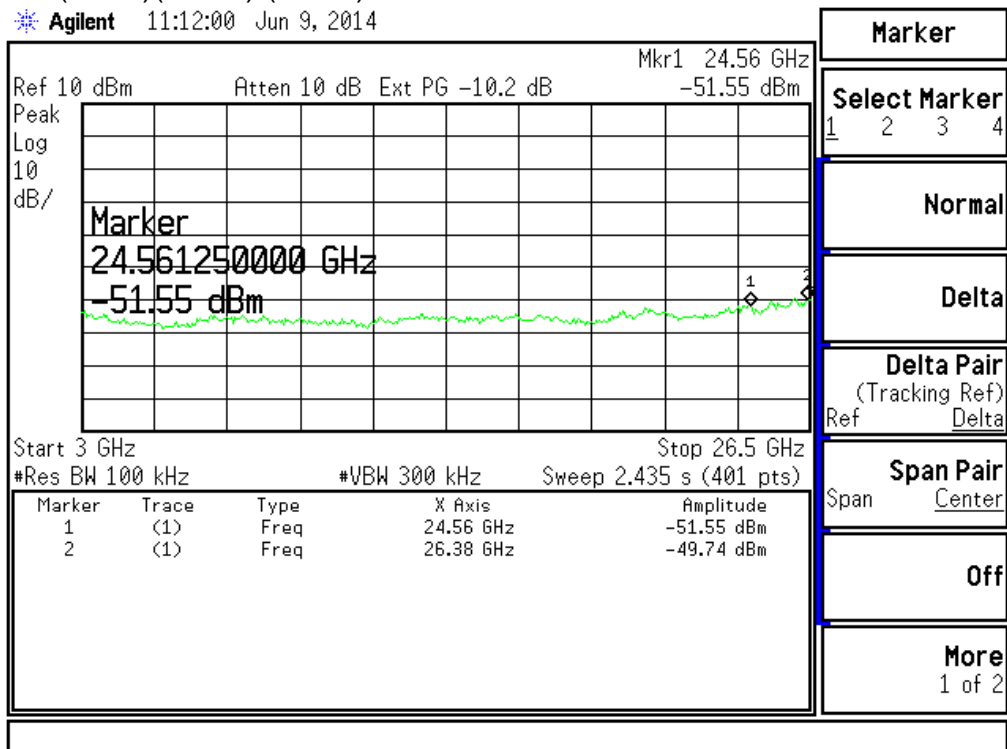
Agilent 11:10:23 Jun 9, 2014



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

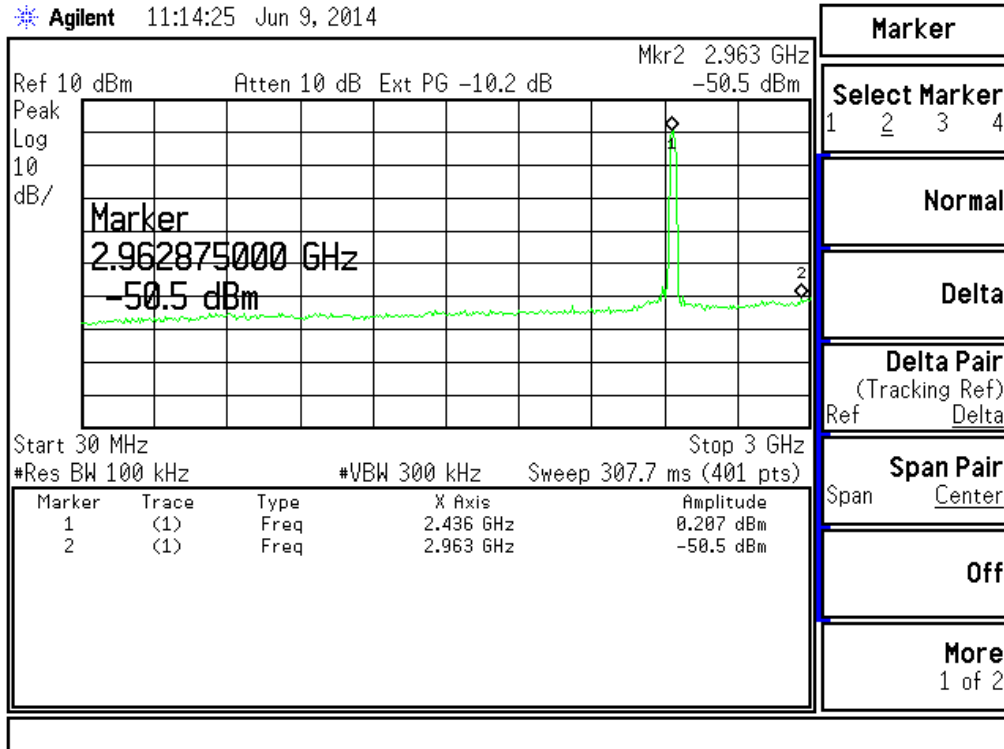


802.11n HT20 (Ant 1)(CH01) (2 of 2)



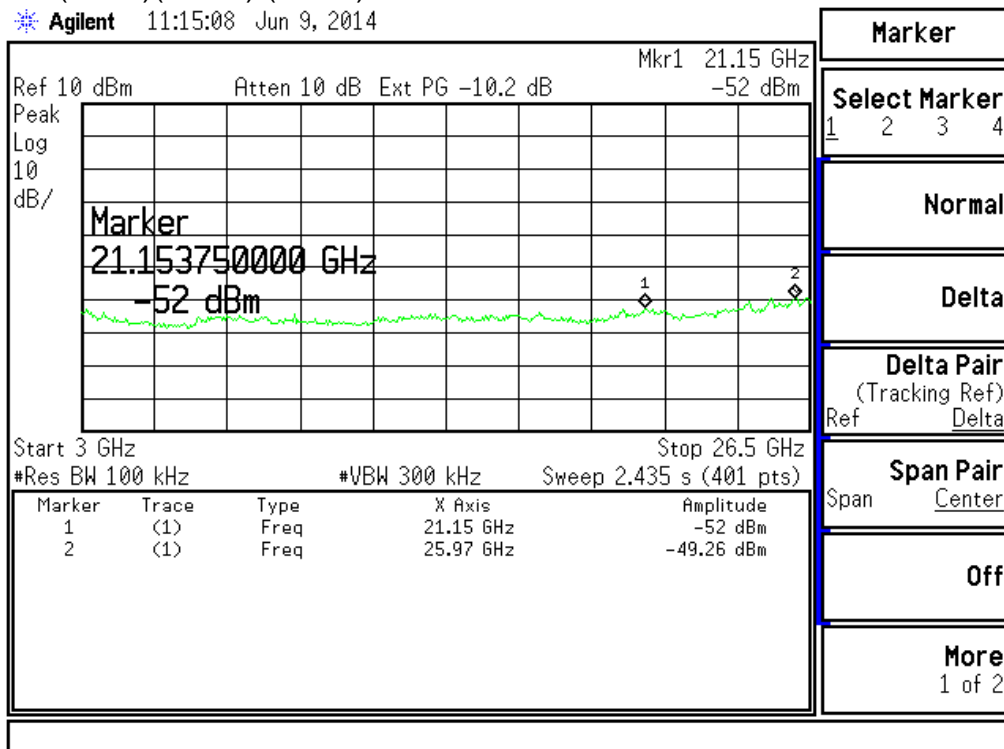
802.11n HT20 (Ant 1)(CH06) (1 of 2)

Agilent 11:14:25 Jun 9, 2014



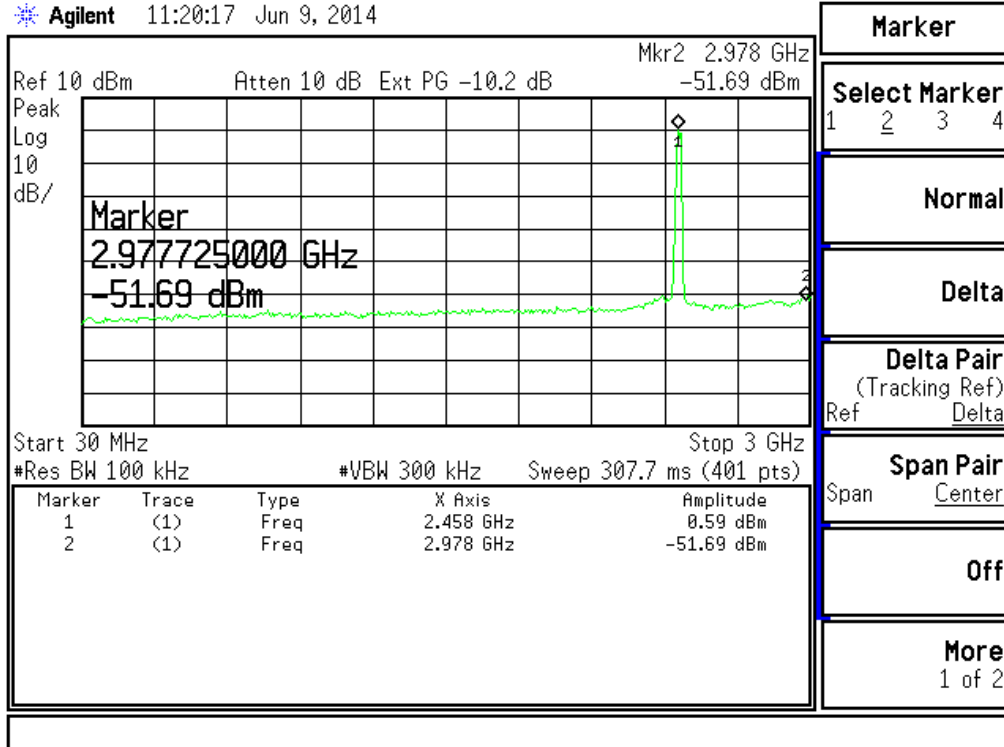
802.11n HT20 (Ant 1)(CH06) (2 of 2)

Agilent 11:15:08 Jun 9, 2014



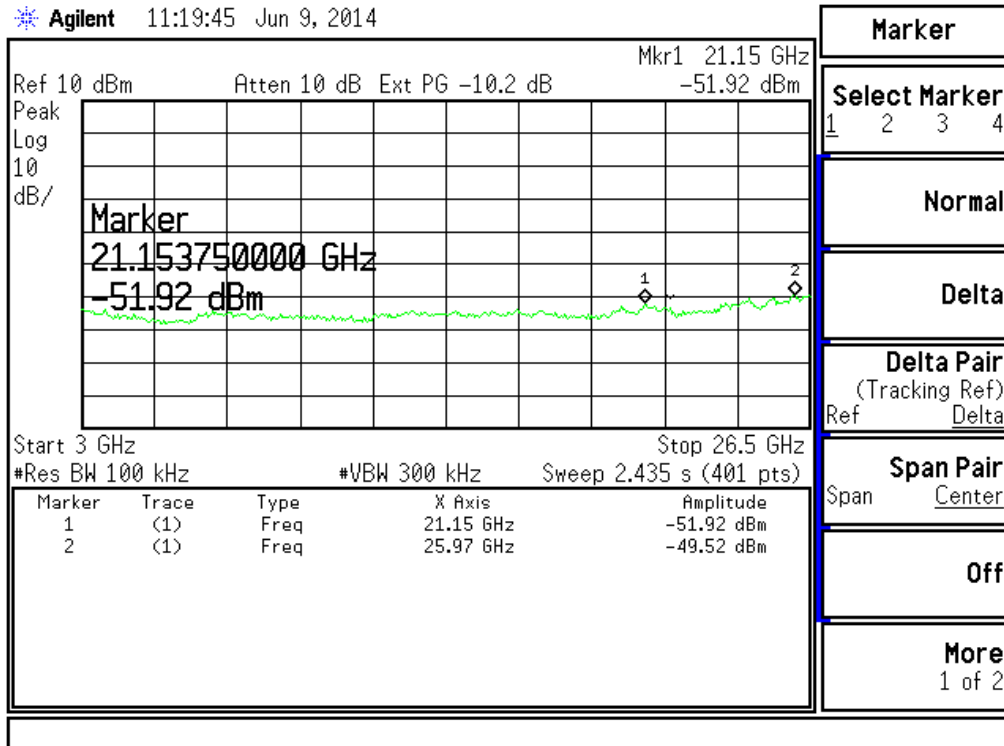
802.11n HT20 (Ant 1)(CH11) (1 of 2)

Agilent 11:20:17 Jun 9, 2014



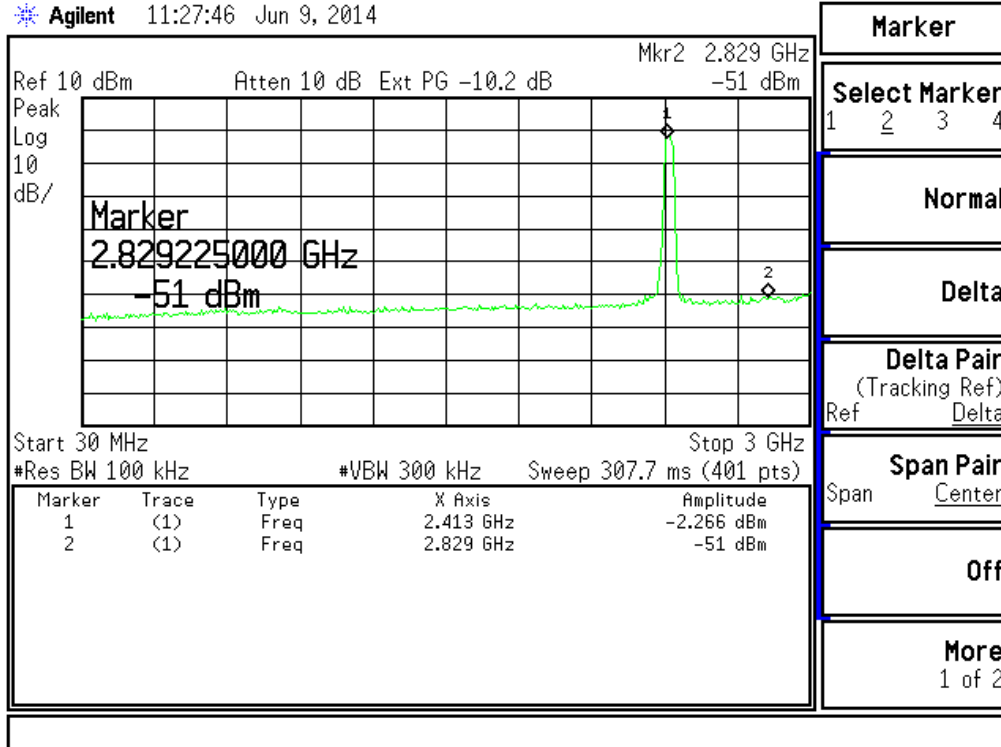
802.11n HT20 (Ant 1)(CH11) (2 of 2)

Agilent 11:19:45 Jun 9, 2014



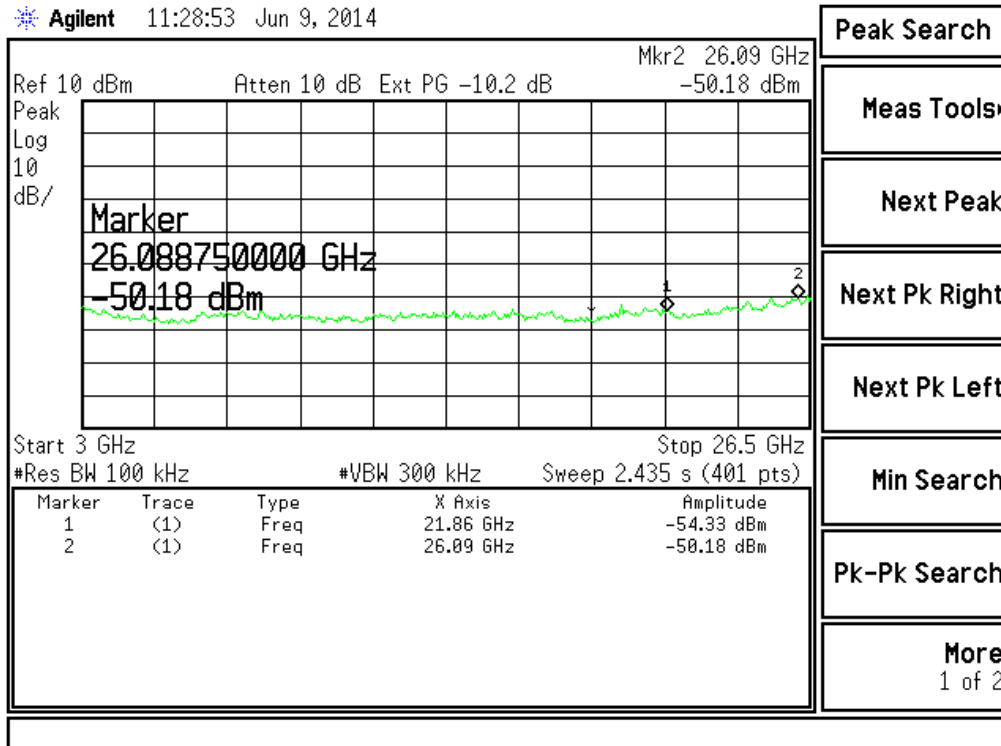
802.11n HT40 (Ant 1)(CH03) (1 of 2)

Agilent 11:27:46 Jun 9, 2014



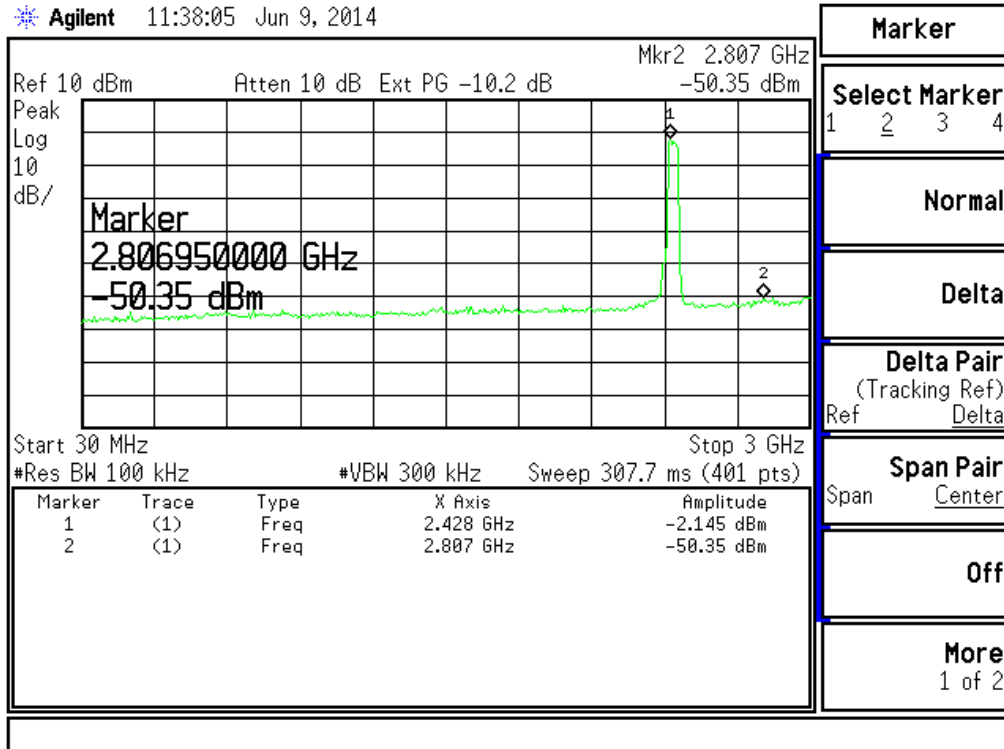
802.11n HT40 (Ant 1)(CH03) (2 of 2)

Agilent 11:28:53 Jun 9, 2014



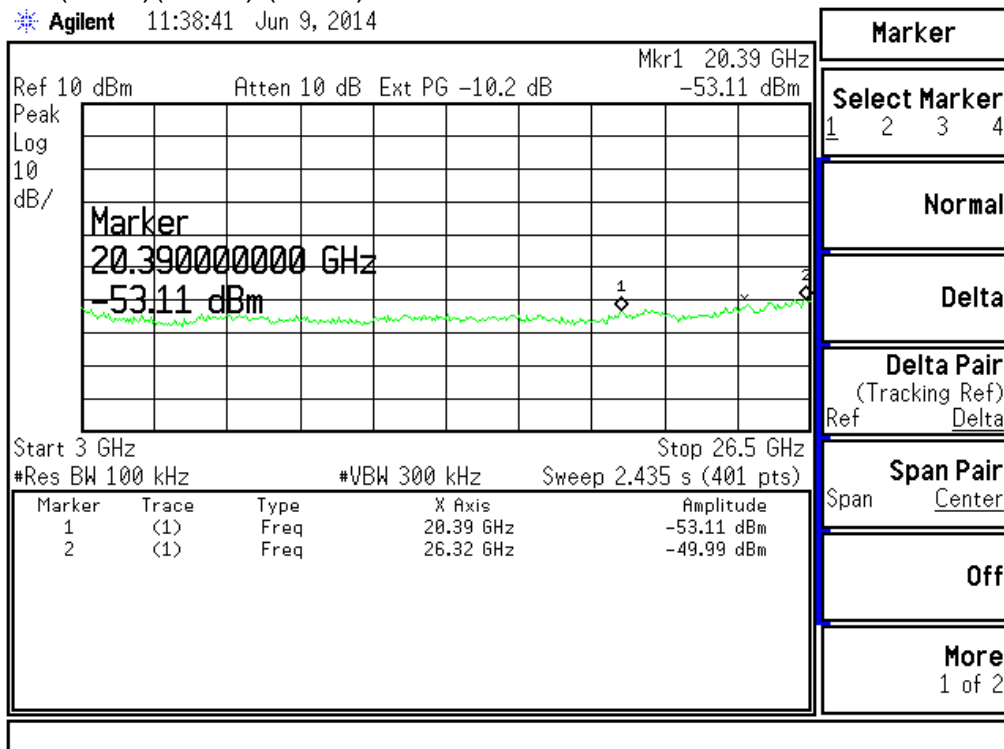
802.11n HT40 (Ant 1)(CH06) (1 of 2)

Agilent 11:38:05 Jun 9, 2014



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

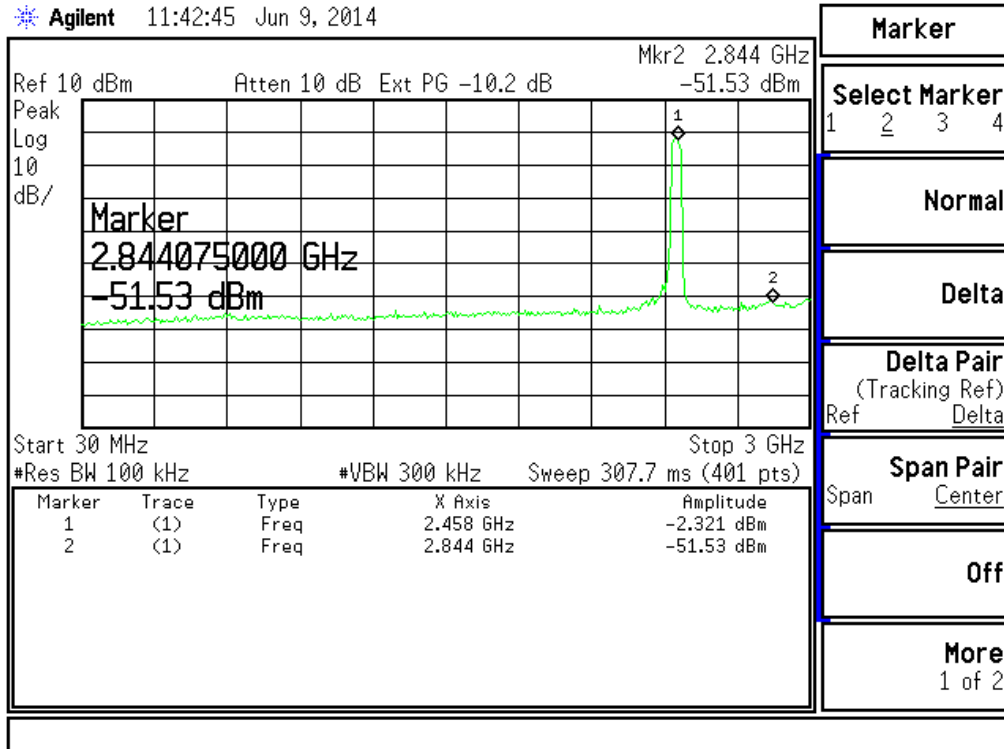
Agilent 11:38:41 Jun 9, 2014





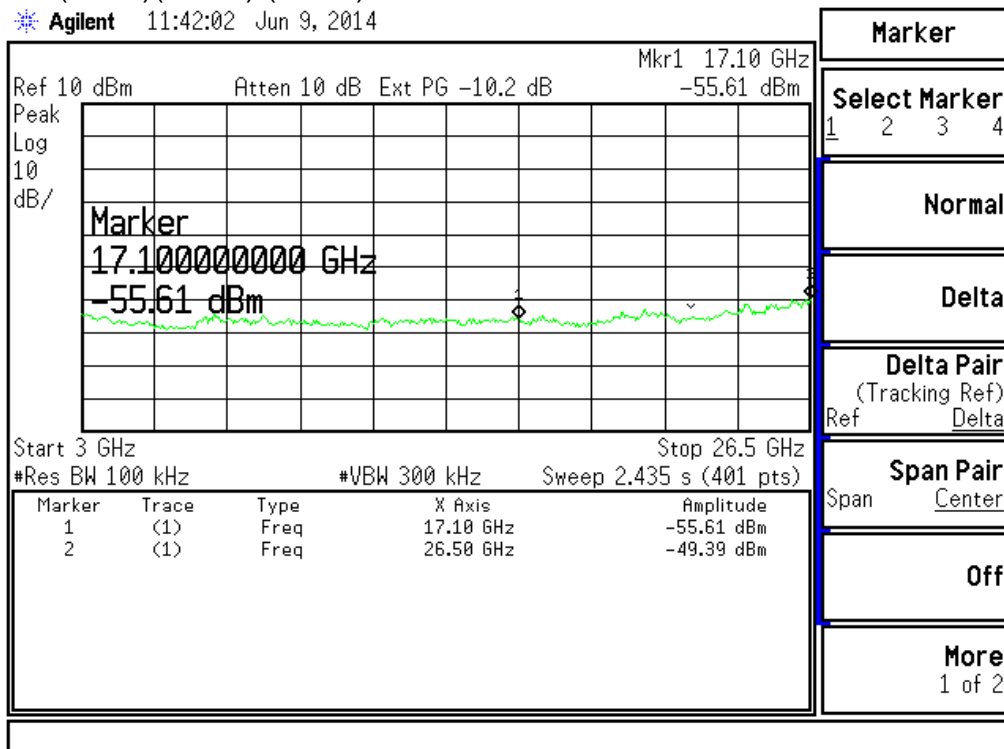
802.11n HT40 (Ant 1)(CH09) (1 of 2)

Agilent 11:42:45 Jun 9, 2014



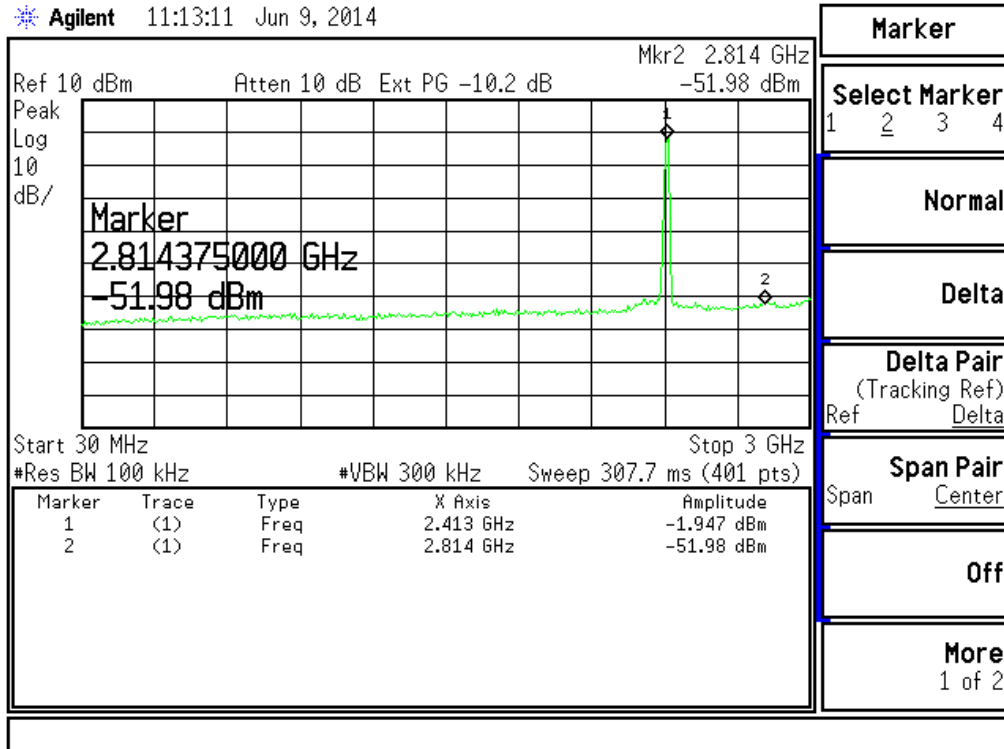
802.11n HT40 (Ant 1)(CH09) (2 of 2)

Agilent 11:42:02 Jun 9, 2014



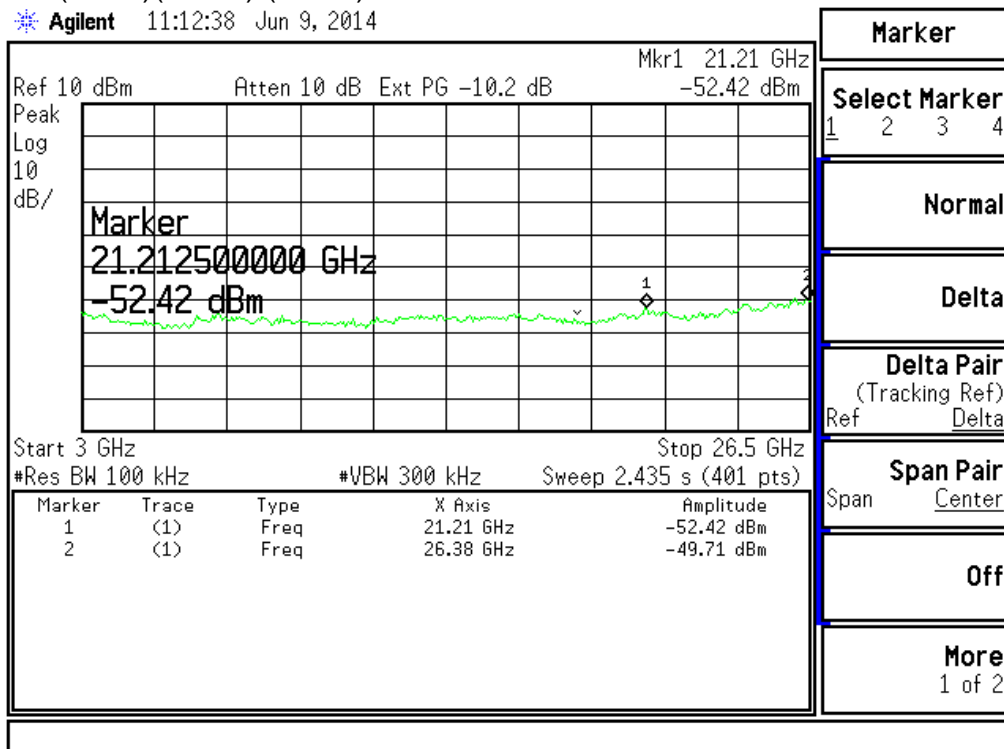
802.11n HT20 (Ant 2)(CH01) (1 of 2)

Agilent 11:13:11 Jun 9, 2014



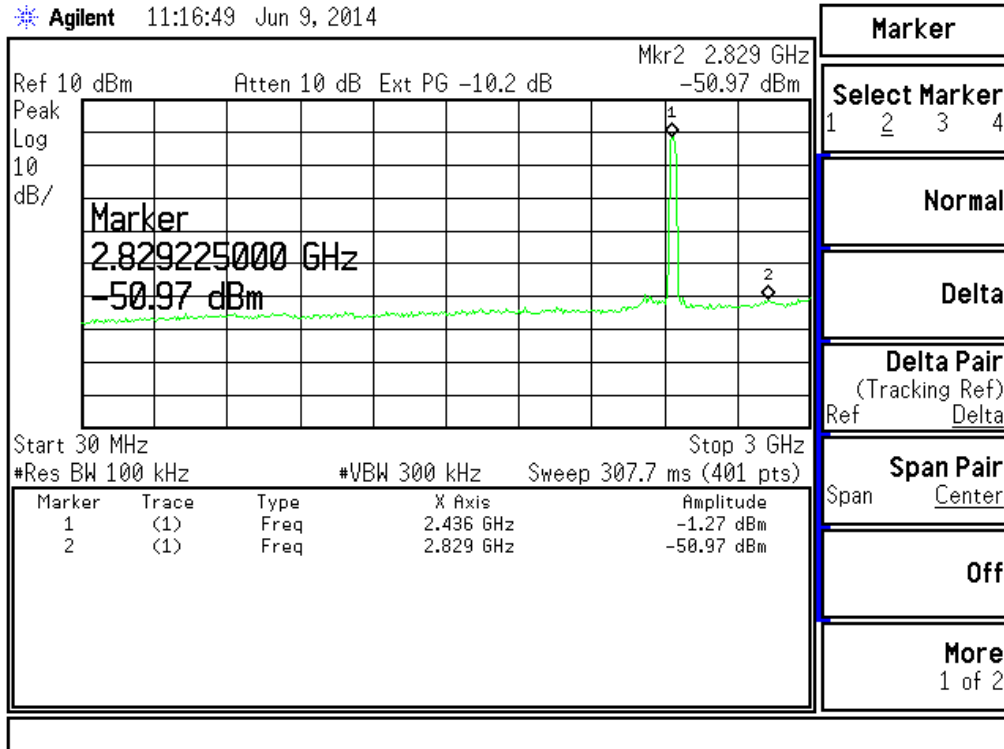
802.11n HT20 (Ant 2)(CH01) (2 of 2)

Agilent 11:12:38 Jun 9, 2014



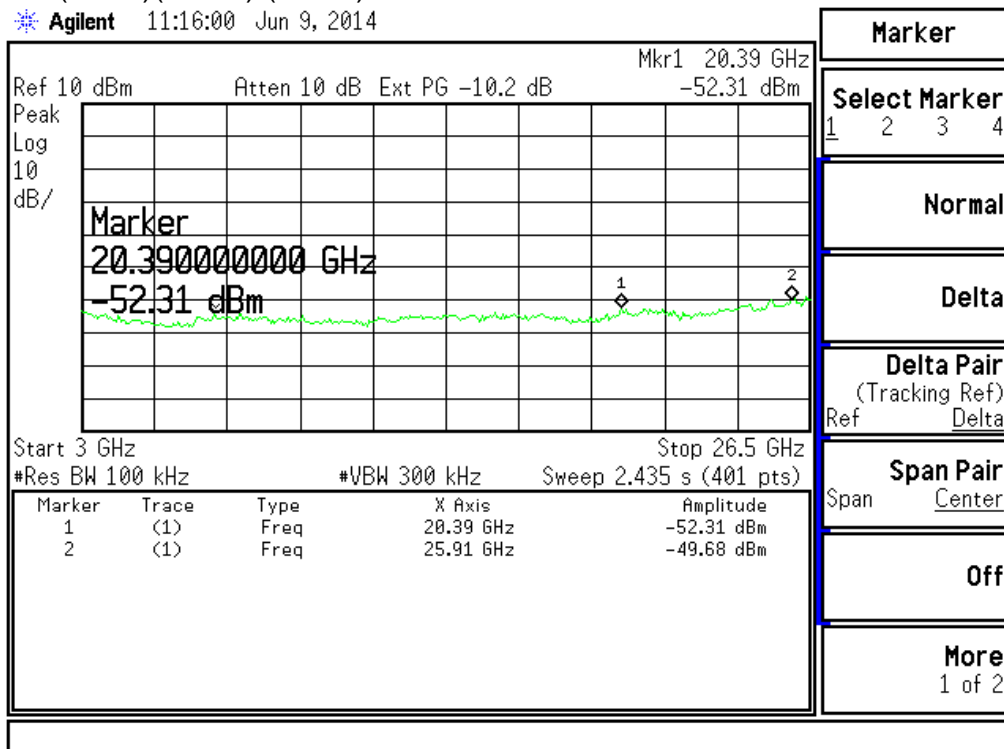
802.11n HT20 (Ant 2)(CH06) (1 of 2)

Agilent 11:16:49 Jun 9, 2014



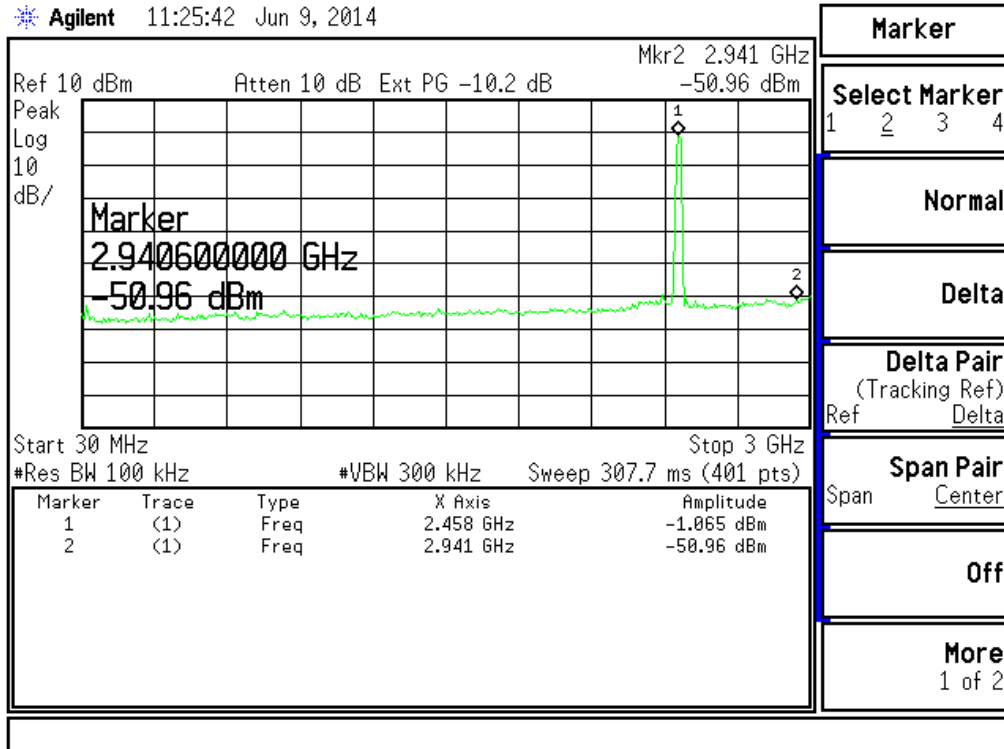
802.11n HT20 (Ant 2)(CH06) (2 of 2)

Agilent 11:16:00 Jun 9, 2014



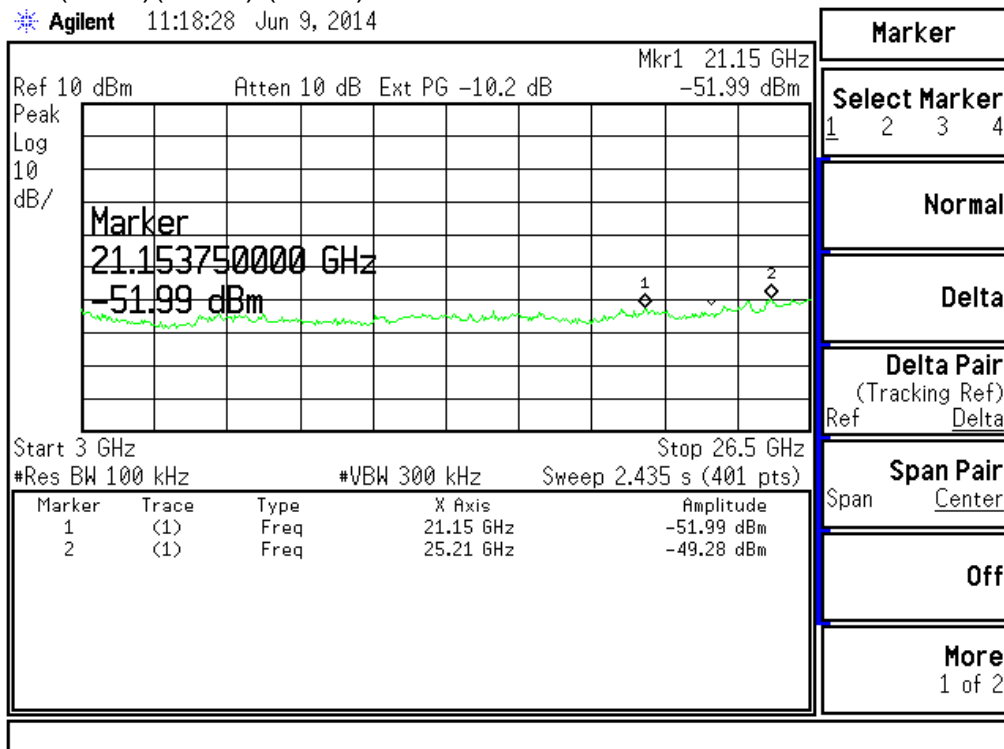
802.11n HT20 (Ant 2)(CH11) (1 of 2)

Agilent 11:25:42 Jun 9, 2014



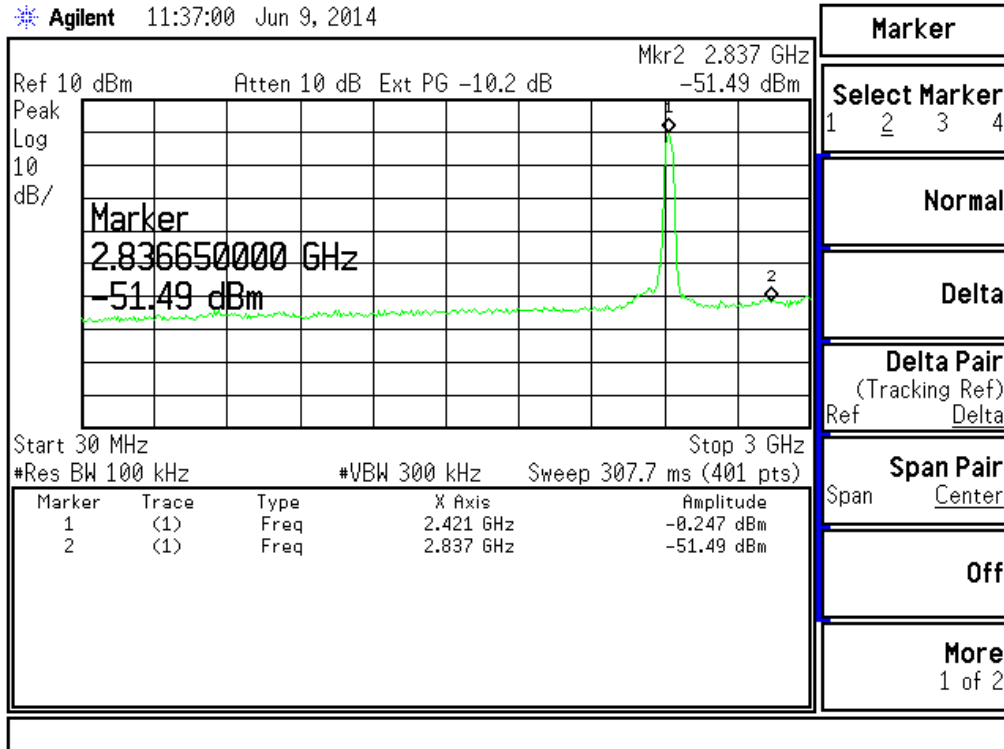
802.11n HT20 (Ant 2)(CH11) (2 of 2)

Agilent 11:18:28 Jun 9, 2014



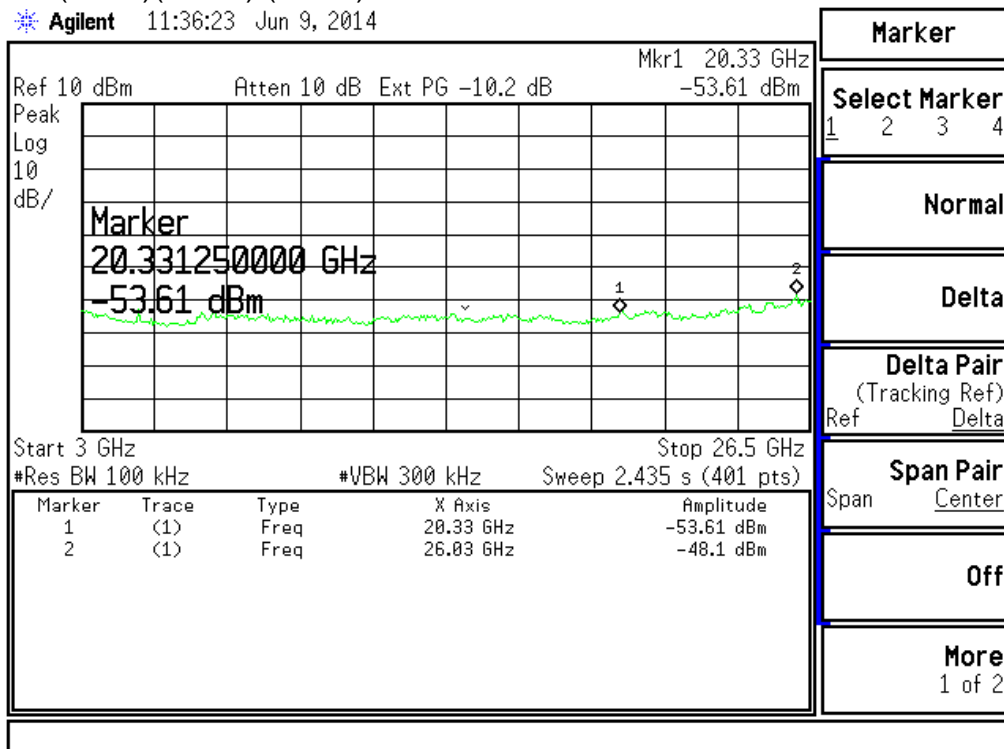
802.11n HT40 (Ant 2)(CH03) (1 of 2)

Agilent 11:37:00 Jun 9, 2014



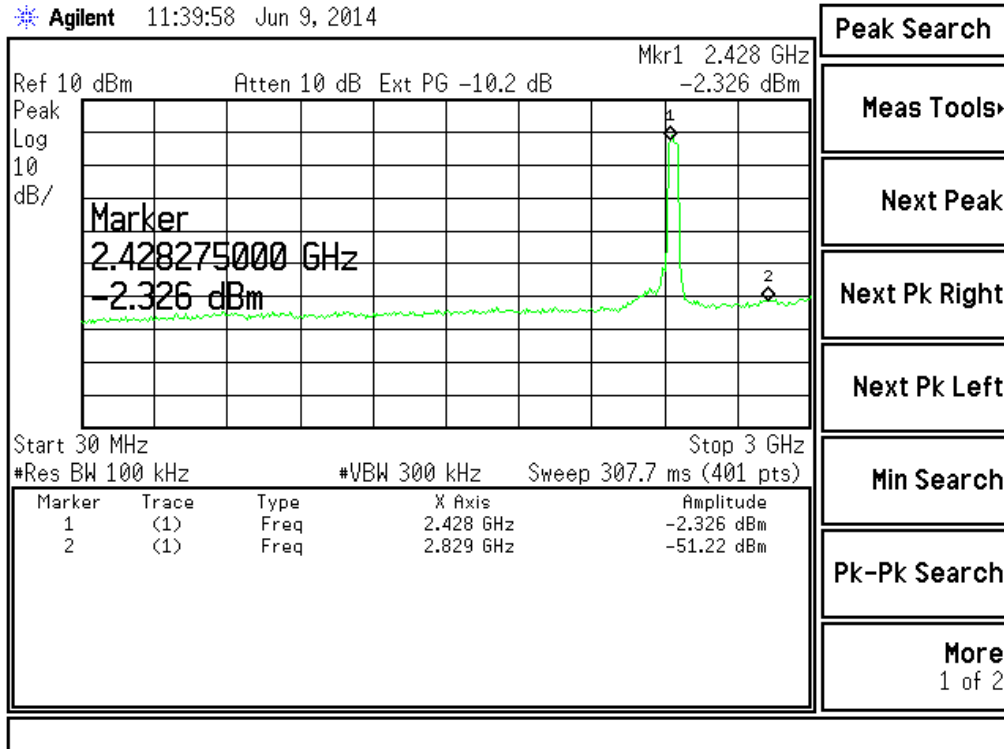
802.11n HT40 (Ant 2)(CH03) (2 of 2)

Agilent 11:36:23 Jun 9, 2014



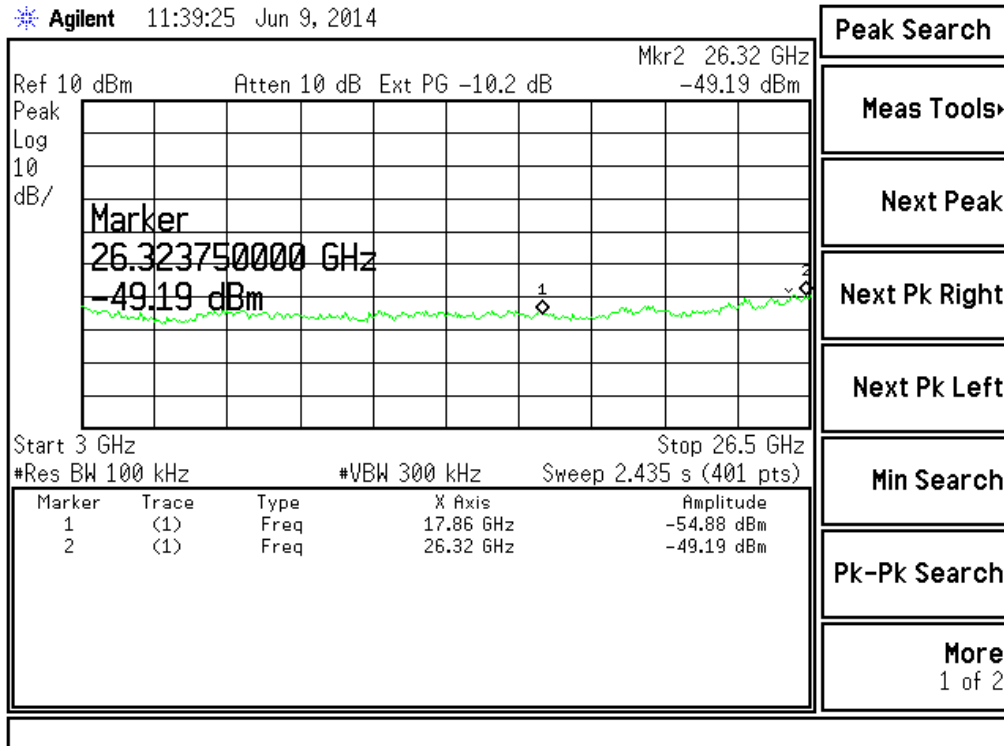
802.11n HT40 (Ant 2)(CH06) (1 of 2)

Agilent 11:39:58 Jun 9, 2014



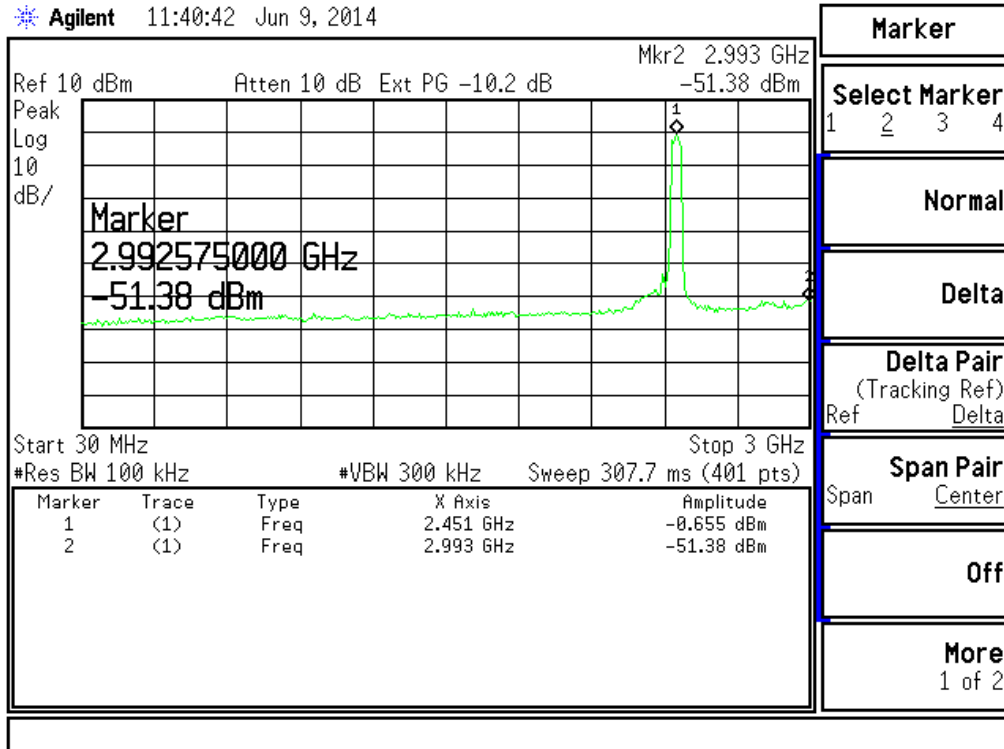
802.11n HT40 (Ant 2)(CH06) (2 of 2)

Agilent 11:39:25 Jun 9, 2014



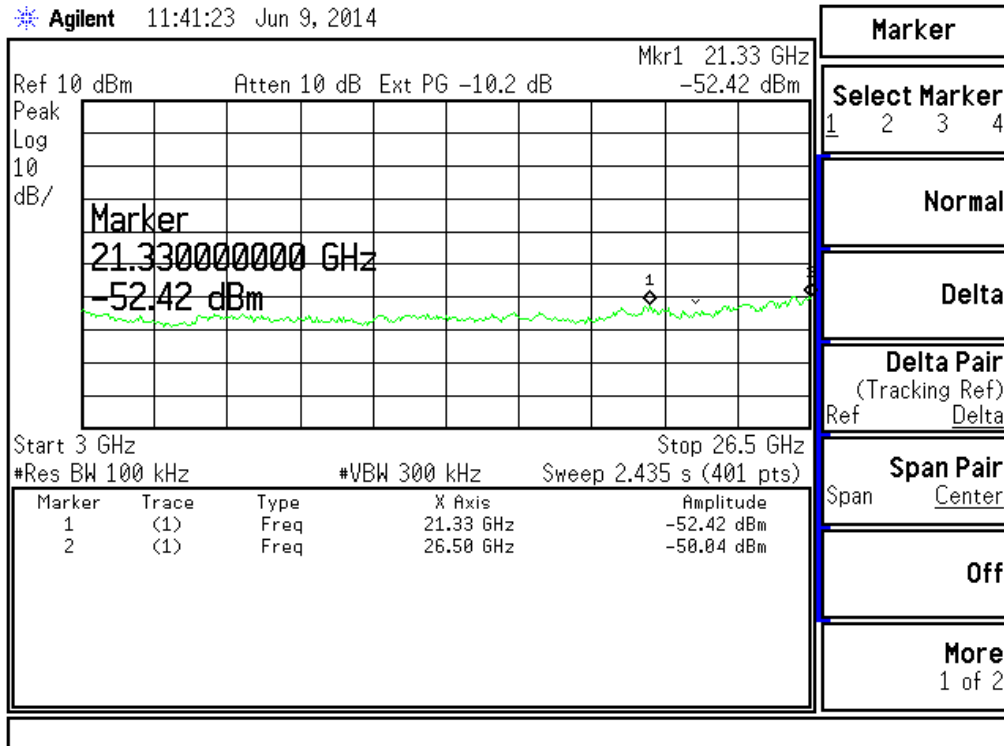
802.11n HT40 (Ant 2)(CH09) (1 of 2)

Agilent 11:40:42 Jun 9, 2014



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

Agilent 11:41:23 Jun 9, 2014



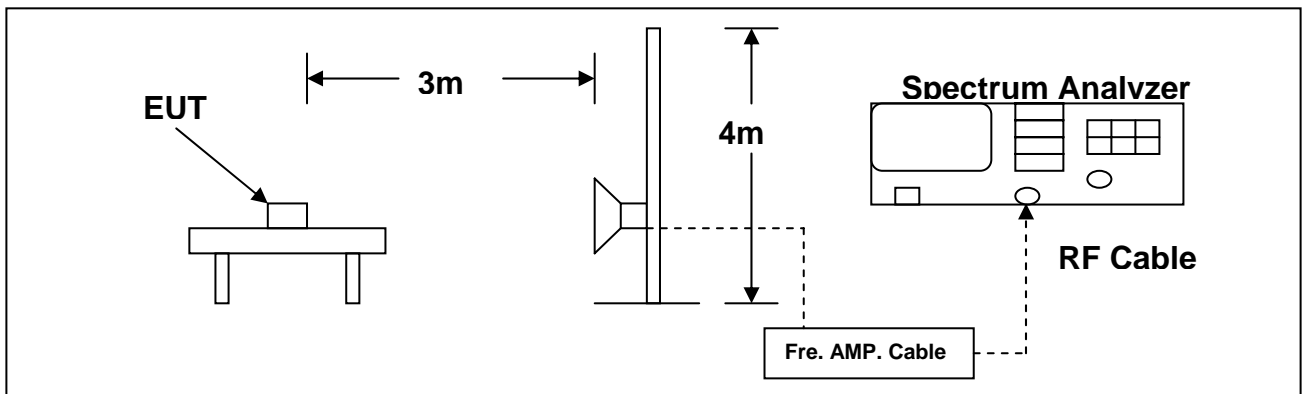
## 8. Band Edges Requirement

### 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	US44300422	E4446A	2013/12/30	2014/12/30
2.	MLT	Pre Amplifier	0.10~19.1GHz 60dBm	RF01	2013/08/23	2014/08/23
3.	MLT	Pre Amplifier	TA010-190-30	RF03	2013/07/16	2014/07/16
4.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2014/03/13	2015/03/13
5.	SCHWARZBECK	Horn Antenna	181	BBHA 9170	2013/10/22	2014/10/22
6.	SCHWARZBECK	Horn Antenna	304	BBHA 9120D	2013/10/22	2014/10/22



## 8.4 Test Result : Worst case

(802.11b)

Radiated Emissions (HORIZONTAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.6	54.7 (PK)	1	51	0	74.0(PK)	-19.3
2399.6	43.0 (AV)	1	51	0	54.0(AV)	-11.0

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.7	59.4 (PK)	1	84	0	74.0(PK)	-14.6
2399.7	46.7 (AV)	1	84	0	54.0(AV)	-7.3

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.1	48.6 (PK)	1	330	0	74.0(PK)	-25.4
2484.1	36.9 (AV)	1	330	0	54.0(AV)	-17.1

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.0	49.5 (PK)	1	278	0	74.0(PK)	-24.5
2484.0	36.5 (AV)	1	278	0	54.0(AV)	-17.5

- 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)
2399.9	65.1 (PK)	1	53	0	74.0(PK)	-8.9
2399.9	44.5 (AV)	1	53	0	54.0(AV)	-9.5

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.8	73.4 (PK)	1	80	0	74.0(PK)	-0.6
2399.8	48.9 (AV)	1	80	0	54.0(AV)	-5.1

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.0	54.3 (PK)	1	323	0	74.0(PK)	-19.7
2484.0	42.2 (AV)	1	323	0	54.0(AV)	-11.8

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.7	57.9 (PK)	1	285	0	74.0(PK)	-16.1
2483.7	39.6 (AV)	1	285	0	54.0(AV)	-14.4

- 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)
2399.6	60.5 (PK)	1	68	0	74.0(PK)	-13.5
2399.6	41 (AV)	1	68	0	54.0(AV)	-13.0

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.2	71.1 (PK)	1	68	0	74.0(PK)	-2.9
2399.2	44.2 (AV)	1	68	0	54.0(AV)	-9.8

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.8	48.5 (PK)	1	325	0	74.0(PK)	-25.5
2483.8	34.6 (AV)	1	325	0	54.0(AV)	-19.4

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.8	51.8 (PK)	1	286	0	74.0(PK)	-22.2
2483.8	37.2 (AV)	1	286	0	54.0(AV)	-16.8

- 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)
2399.8	60.3 (PK)	1	52	0	74.0(PK)	-13.7
2399.8	45.3 (AV)	1	52	0	54.0(AV)	-8.8

Radiated Emissions (VERTICAL) CH01						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.9	72.1 (PK)	1	78	0	74.0(PK)	-1.9
2399.9	52.5 (AV)	1	78	0	54.0(AV)	-1.5

Radiated Emissions (HORIZONTAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.8	47.4 (PK)	1	326	0	74.0(PK)	-26.6
2483.8	36.0 (AV)	1	326	0	54.0(AV)	-18.0

Radiated Emissions (VERTICAL) CH11						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2483.9	52.1 (PK)	1	290	0	74.0(PK)	-21.9
2483.9	37.0 (AV)	1	290	0	54.0(AV)	-17.0

- 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.

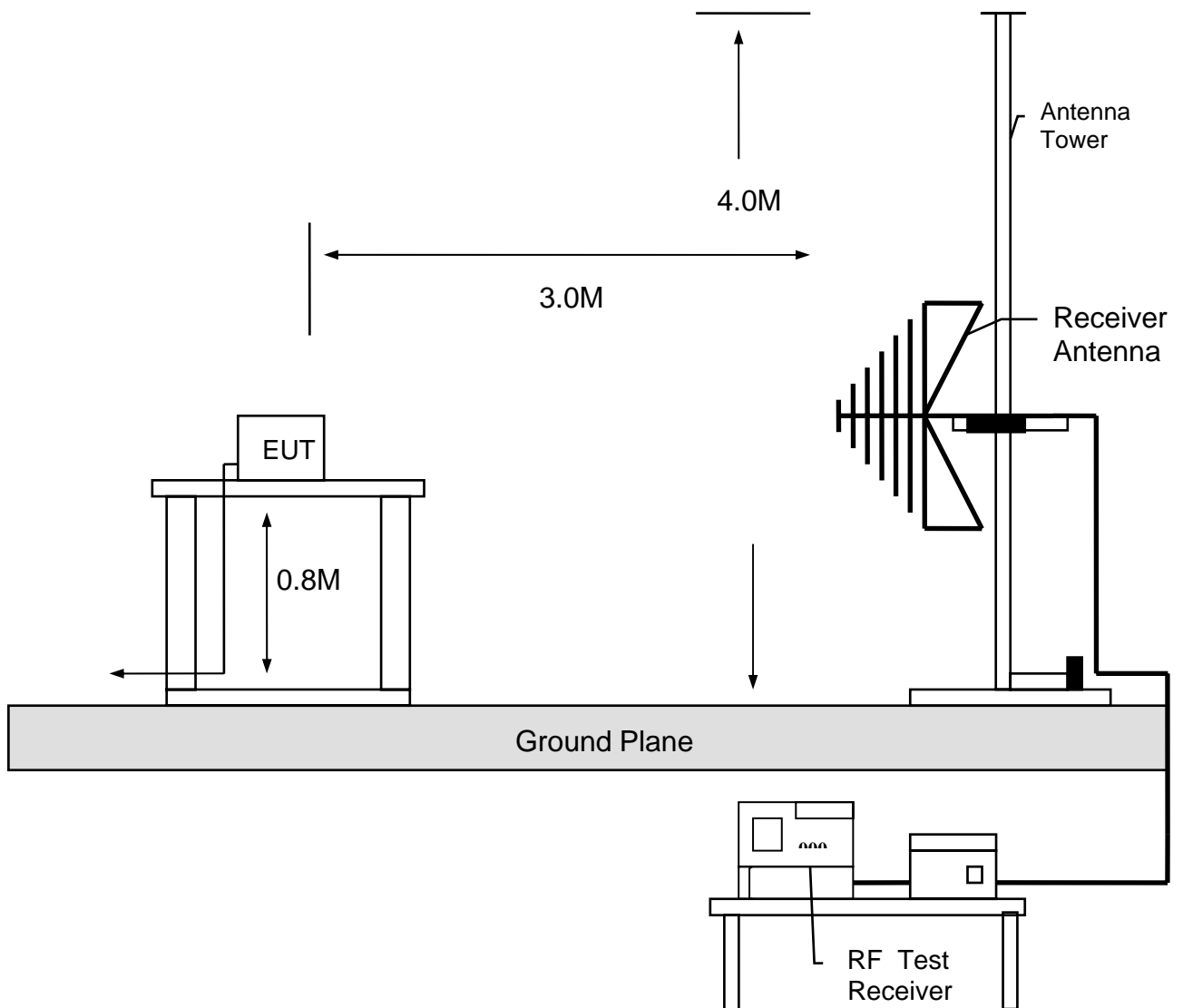
According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 9.2 Antenna Construction

	Model No	ANT TYPE	GAIN	type of connector
1	G087-310012-A	Dipole	2.0dBi	N/A

## Appendix I - EUT Test Setup

### MEASUREMENT OF RADIATED EMISSION



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

Trade Name	Model No.
N/A	N/A