

**FCC PART 15 SUBPART C TEST REPORT****FCC PART 15.247****Report Reference No.**.....: **A1310086032-1****FCC ID**.....: **2ABAB-MC600**

Compiled by

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Date of issue.....: Nov 07, 2013

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**Testing Laboratory Name** .....: DTT Services Co.,Ltd

Address .....: 1F,2 Block, Jiaquan Building, Guanlan High-tech Park, Bao'an District, Shenzhen, Guangdong, China. 518110

**Applicant's name**.....: **Sumavision Technologies Co., Ltd.**

Address .....: Sumavision Plaza, No.15, KaiTuo Road, Shangdi Information and Industry Base, Haidian District, Beijing 100085, China

**Test specification:**Standard .....: **FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz**

TRF Originator.....: Shenzhen Tian Hai Test Technology Co.,Ltd

Master TRF.....: Dated 2012-06

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**Test item description** .....: Network set-top box

Trade Mark .....: sumavision

Model/Type reference.....: MC600

**Manufacturer**.....: **Shenzhen Zowee Technologies Co., Ltd.**

Modulation Type.....: CCK,OFDM

Operation Frequency.....: From 2412MHz to 2462MHz

Rating .....: DC 5.0V Adapter from AC 120V/60Hz

Result.....: **Positive**

**TEST REPORT**

<b>Test Report No. :</b> <b>A1310086032-1</b>	Nov 07, 2013 Date of issue
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Equipment under Test                      :              Network set-top box

Model /Type                                        :              MC600

**Applicant**    :              **Sumavision Technologies Co., Ltd.**

Address    :              Sumavision Plaza, No.15, KaiTuo Road, Shangdi  
Information and Industry Base, Haidian District, Beijing  
100085, China

**Manufacturer**    :              **Shenzhen Zowee Technologies Co., Ltd.**

Address    :              Zowee Factory, Tongfuyu Industrial Zone, Songgang,  
Baoan District, Shenzhen, Guangdong, China 518105

<b>Test Result</b>	<b>Positive</b>
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB558074 D01 V03](#): Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Oct 22, 2013
Testing commenced on	:	Oct 22, 2013
Testing concluded on	:	Nov 07, 2013

### 2.2. Product Description

The **Sumavision Technologies Co., Ltd.**'s Model: MC600 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Network set-top box
Model Number	MC600
FCC ID	2ABAB- MC600
WLAN Modulation Type	IEEE 802.11 b:DSSS(CCK,DQPSK,DBPSK) IEEE 802.11 g:OFDM(64QAM,16QAM,QPSK,BPSK) IEEE 802.11 n HT20: OFDM(64QAM,16QAM,QPSK,BPSK) IEEE 802.11 n HT40: OFDM(64QAM,16QAM,QPSK,BPSK)
Antenna Type	Internal
WLAN FCC Operation Frequency	IEEE 802.11 b:2412-2462MHz IEEE 802.11 g: 2412-2462MHz IEEE 802.11 n HT20: 2412-2462MHz IEEE 802.11 n HT40: 2422-2452MHz
WLAN	Supported 802.11b/g/n
Bluetooth	Not Supported

### 2.3. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 5.00V Adapter from AC 120V/60Hz

### 2.4. Description of the test mode

IEEE 802.11b/g/n: The product support Third channels but only use Eleventh channels in USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

### 2.5. Short description of the Equipment under Test (EUT)

2.4GHz (Network set-top box (M/N: MC600))

For more details, refer to the user's manual of the EUT.

## 2.6. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides command to control the EUT for staying in continuous transmitting and receiving mode for testing.

## 2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

No.	Equipment	Manufacturer	Model No.	Serial No.	Notes
1	PC	DELL	PP26L	CNG8390Q6X	DOC
2	Printer	HP	Laserjet 6L C3990	Laserjet 6L C3990A	DOC
3	Mouse	DELL	OPTICAL MOUSE	/	DOC
4	Keyboard	DELL	KB212-B	/	DOC

Printer USB Cable*1	Shield :	Shielded
	Detachable :	Detachable
	Length (m) :	1.8m
Network Cable*1	Shield :	Unshielded
	Detachable :	Detachable
	Length (m) :	2.0m
Main Cable for PC Adaptor Line*1	Shield :	Shielded
	Detachable :	Detachable
	Length (m) :	1.0m
Adaptor Cable from PC*1	Shield :	Unshielded
	Detachable :	Detachable
	Length (m) :	1.5m
Main Cable for Printer*1	Shield :	Unshielded
	Detachable :	Detachable
	Length (m) :	1.5m
HDMI Cable	Shield :	Shielded
	Detachable :	Detachable
	Length (m) :	1.5m
AV Cable	Shield :	Shielded
	Detachable :	Detachable
	Length (m) :	1.5m

## 2.8. Internal Identification of AE used during the test

AE ID*	Description
AE2	Charger

AE2: Model: F12W3-050200SPAU  
 Manufacturer: Shenzhen Frecom Electronics Co.,Ltd.  
 Input: 100-240V~50/60Hz 0.3A  
 Output: OUTPUT: 5.0V DC 2A  
 Power Cable Length: 150cm  
 ○ Shielded      ● Unshielded

\*AE ID: is used to identify the test sample in the lab internally.

## 2.9. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2ABAB-MC600** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

## 2.10. Modifications

No modifications were implemented to meet testing criteria.

## 2.11. NOTE

1. The EUT is a Network set-top box with WLAN function, The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN	FCC Part 15 C 15.247	A1310086032-1
USB Port	FCC Part 15 B	A1310086032-2
MPE	FCC Part 2 §2.1091	A1310086032-3

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	√	—	—	—
802.11g	√	—	—	—
802.11n(20MHz)	√	—	—	—
802.11n(40MHz)	√	—	—	—

3. The EUT incorporates a SISO function, Physically, the EUT provides one completed transmitter and one completed receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

DTT Services Co.,Ltd  
1F,2 Block, Jiaquan Building, Guanlan High-tech Park, Bao'an District, Shenzhen, Guangdong, China.  
518110

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

#### 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

##### IC Registration No.: 9783A

The 3m alternate test site of DTT Services Co.,Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Aug, 2011.

##### FCC-Registration No.: 214666

DTT Services Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.  
Registration 214666, Sep 19, 2011

#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

#### 3.4. Test Description

FCC PART 15 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power	11b/DSSS	1 Mbps	1/6/11
Power Spectral Density	11g/OFDM	6 Mbps	1/6/11
6dB Bandwidth	11n(20MHz)/OFDM	6.5Mbps	1/6/11
Spurious RF conducted emission	11n(40MHz)/OFDM	13.5 Mbps	3/6/9
Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic			
Band Edge	11b/DSSS	1 Mbps	1/11



	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5 Mbps	3/9

### 3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the DTT Services Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for DTT Services Co.,Ltd is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)
Emission Mask	-----	(1)
Modulation Characteristic	-----	(1)
Transmitter Frequency Behavior	-----	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=1.96$ .

### 3.6. Equipments Used during the Test

AC Power Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2013/4/23
2	EMI Test Receiver	Rohde&Schwarz	ESCI	100106	2013/4/23
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2013/4/23
4	EMI Test Software	Audix	E3	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2013/4/23
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2013/4/23
3	EMI TEST Software	Audix	E3	N/A	2013/4/23
4	TURNTABLE	ETS	2088	2149	N/A
5	ANTENNA MAST	ETS	2075	2346	N/A
6	EMI TEST Software	Rohde&Schwarz	ESK1	N/A	N/A
7	HORN ANTENNA	ShwarzBeck	9120D	1011	2013/4/23
8	Amplifier	Sonoma	310N	E009-13	2013/4/23
9	JS amplifier	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2013/4/23
10	High pass filter	Compliance Direction systems	BSU-6	34202	2013/4/23
11	HORN ANTENNA	ShwarzBeck	9120D	1012	2013/4/23
12	Amplifier	Compliance Direction systems	PAP1-4060	120	2013/4/23
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2013/4/23
14	TURNTABLE	MATURO	TT2.0	----	N/A

15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2013/4/23
17	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2013/4/23
18	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2013/4/23
19	EMI Test Software	Audix	E3	N/A	N/A

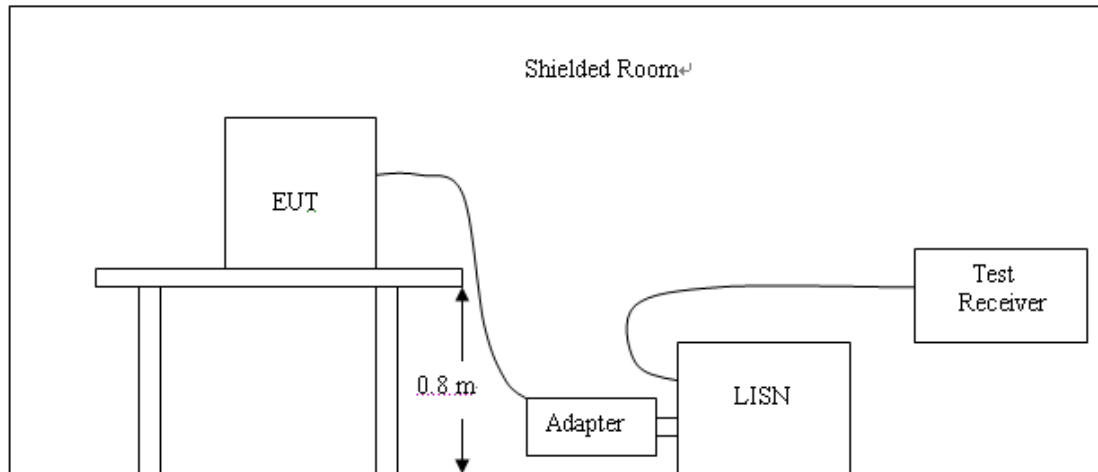
Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2013/4/23

The Cal.Interval was one year

## 4. TEST CONDITIONS AND RESULTS

### 4.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2009.
2. Support equipment, if needed, was placed as per ANSI C63.10-2009
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
4. The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

#### AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

\* Decreasing linearly with the logarithm of the frequency

#### TEST RESULTS

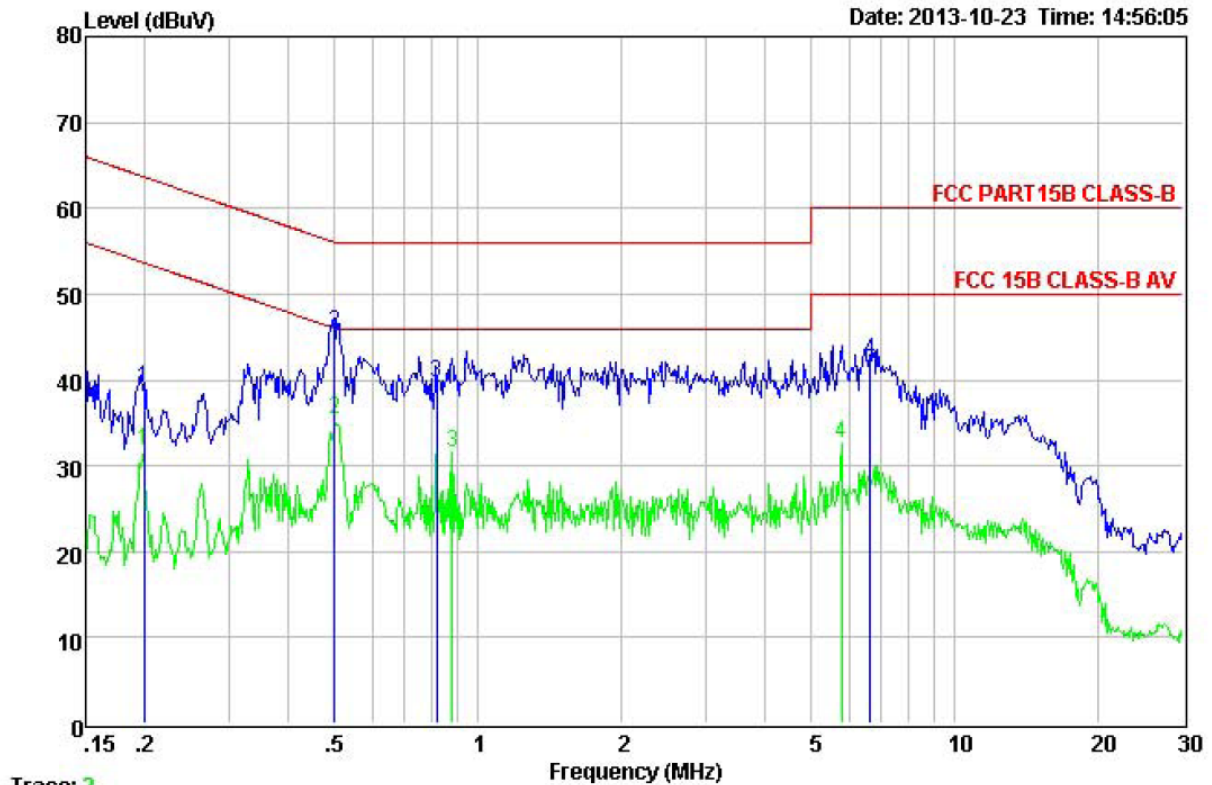
The AC Power Conducted Emission measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode,the middle channel) is the worst case for all the test modes and channels.

## Line

Data: 1

File: E:\Test Data\G\GS\2013.10.23.EM6 (4)

Date: 2013-10-23 Time: 14:56:05



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.20	29.17	9.86	39.03	63.67	-24.64	9.84	0.02	QP
2	0.50	35.48	9.91	45.39	56.01	-10.62	9.81	0.10	QP
3	0.82	29.72	10.04	39.76	56.00	-16.24	9.81	0.23	QP
4	6.63	31.60	10.61	42.21	60.00	-17.79	9.89	0.72	QP

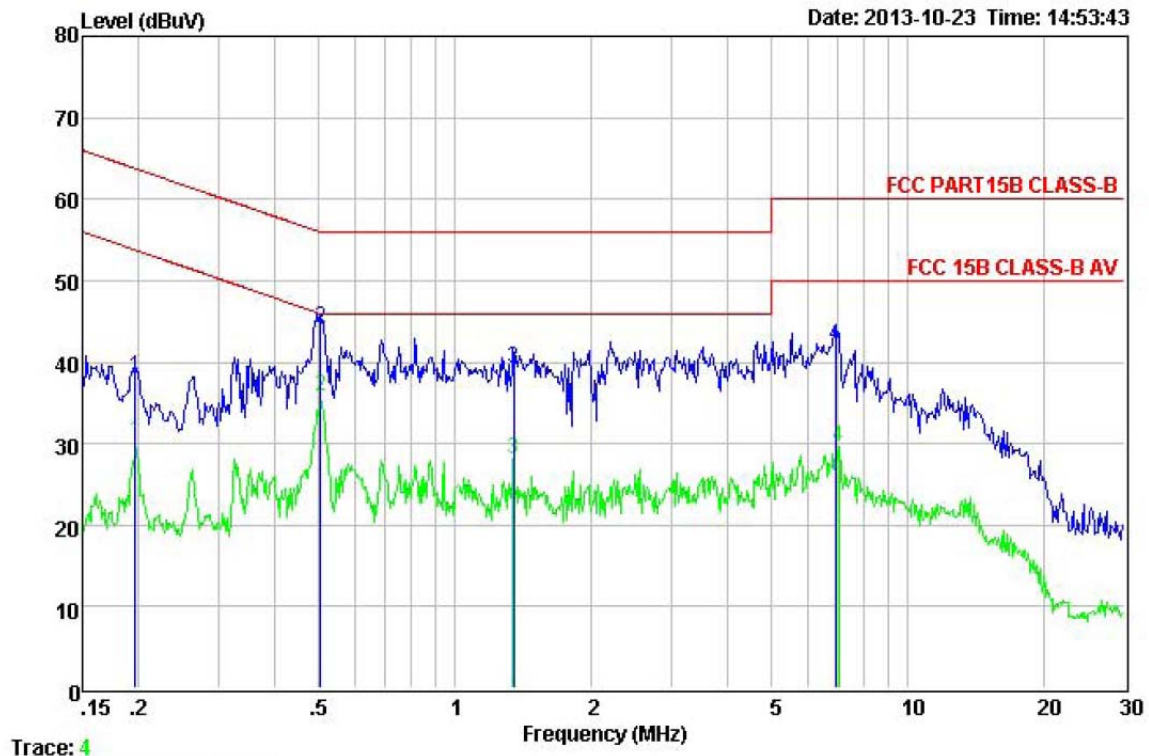
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.20	21.98	9.86	31.84	53.67	-21.83	9.84	0.02	Average
2	0.50	25.55	9.91	35.46	46.01	-10.55	9.81	0.10	Average
3	0.88	21.38	10.07	31.45	46.00	-14.55	9.82	0.25	Average
4	5.77	22.01	10.58	32.59	50.00	-17.41	9.88	0.70	Average

## Neutral

Data: 3

File: E:\Test Data\G\GS\2013.10.23.EM6 (4)

Date: 2013-10-23 Time: 14:53:43



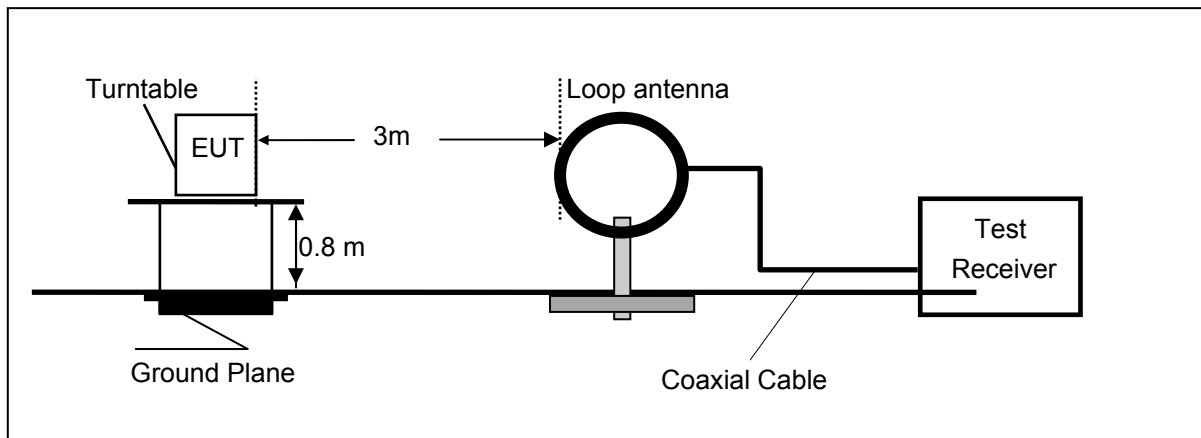
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.20	28.26	9.82	38.08	63.76	-25.68	9.80	0.02	QP
2	0.50	34.22	9.91	44.13	56.00	-11.87	9.81	0.10	QP
3	1.34	29.14	10.22	39.36	56.00	-16.64	9.83	0.39	QP
4	6.91	31.34	10.61	41.95	60.00	-18.05	9.89	0.72	QP

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.20	20.49	9.82	30.31	53.76	-23.45	9.80	0.02	Average
2	0.50	25.92	9.91	35.83	46.00	-10.17	9.81	0.10	Average
3	1.34	17.85	10.22	28.07	46.00	-17.93	9.83	0.39	Average
4	7.02	18.98	10.62	29.60	50.00	-20.40	9.89	0.73	Average

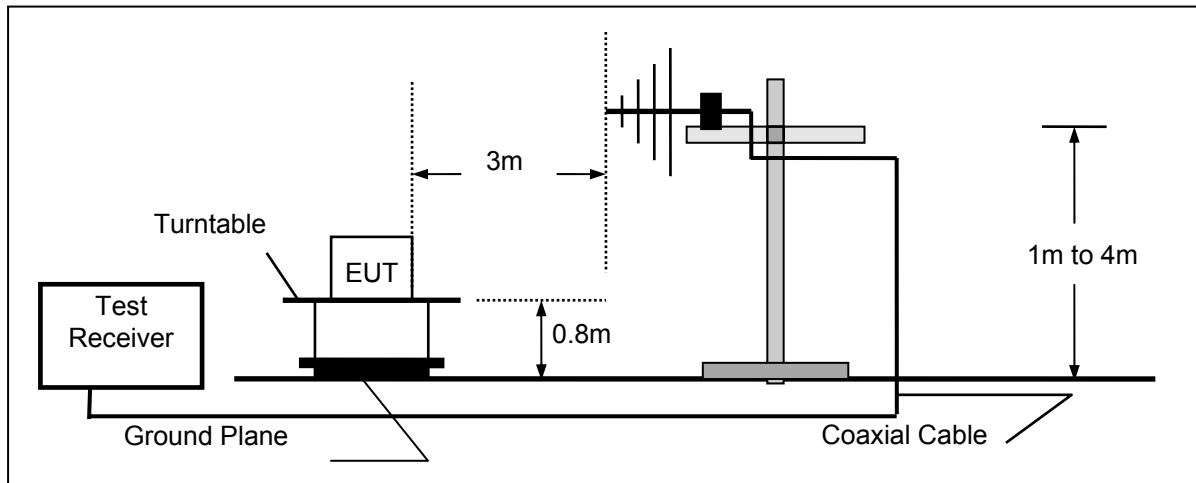
## 4.2. Radiated Emission

### TEST CONFIGURATION

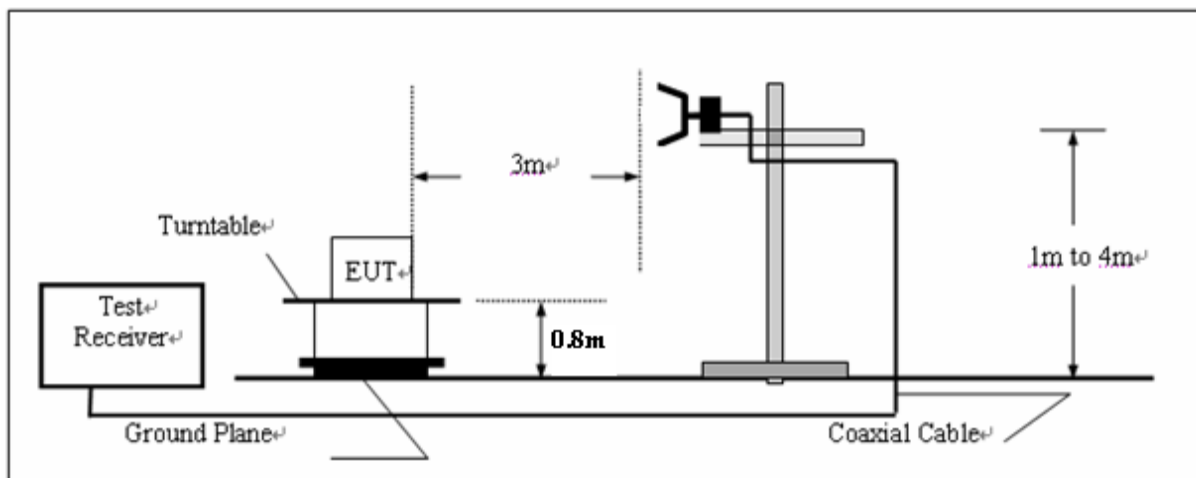
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



### TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT

3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 12MHz and maximum operation frequency was 2462MHz.so radiated emission test frequency band from 9KHz to 25GHz.

### **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

### **RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	300	$20\log(2400/F(KHz))+80$	$2400/F(KHz)$
0.49-1.705	30	$20\log(24000/F(KHz))+40$	$24000/F(KHz)$
1.705-30	30	$20\log(30)+40$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

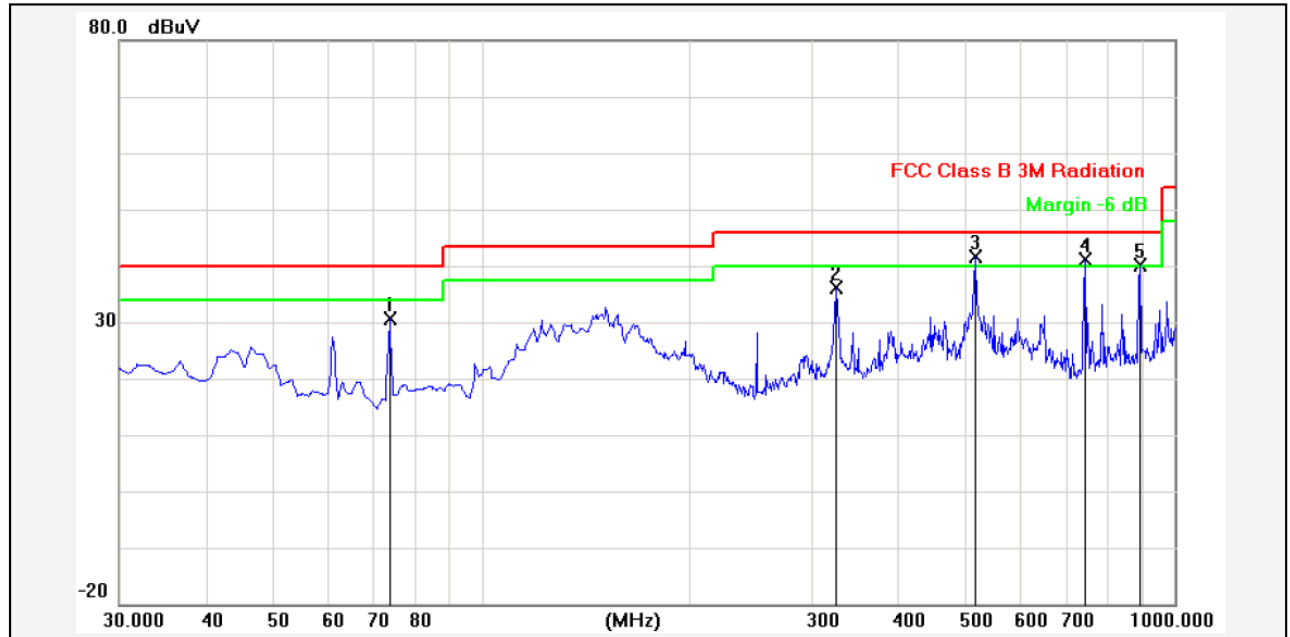
### **TEST RESULTS**

Remark:

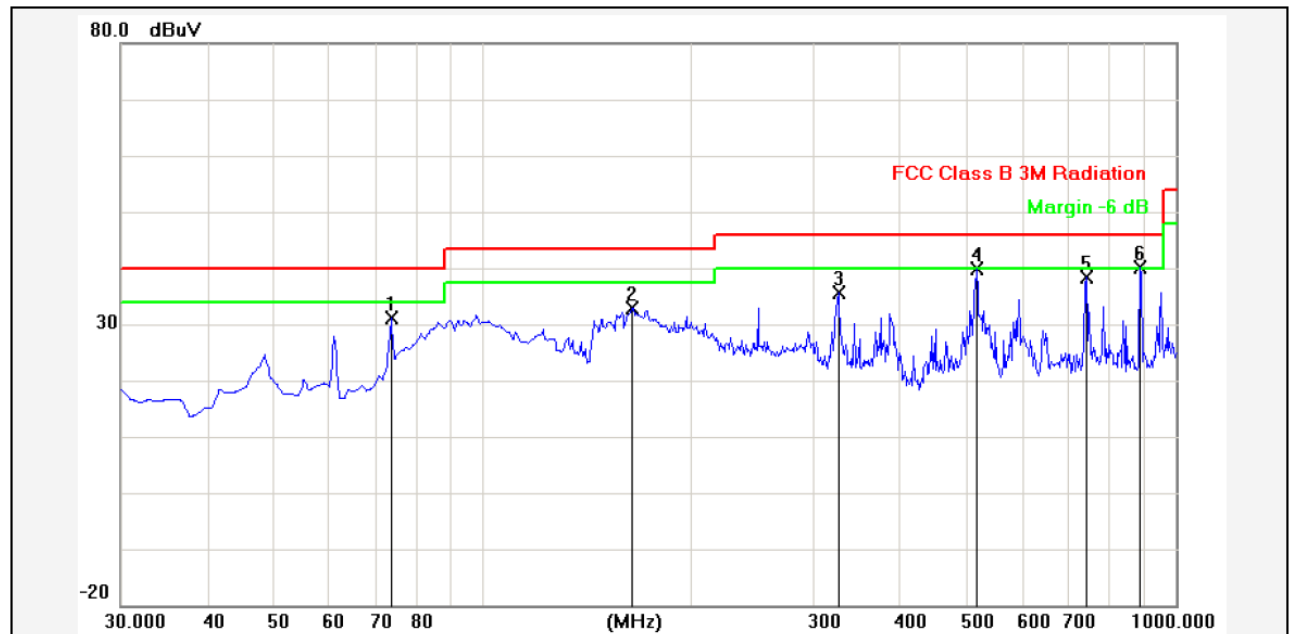
1. The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode,the middle channel) is the worst case for all the test mode and channel.
2. ULTRA-BROADBAND ANTENNA for the radiation emission test below 1G.
3. HORN ANTENNA for the radiation emission test above 1G.
4. We tested both battery powered and powered by adapter charging mode at three orientations,recored woest case at powered by adapter charging mode.

#### ***For 9KHz to 30MHz***

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
12.00	48.80	69.54	20.74	QP	PASS
24.00	46.55	69.54	22.99	QP	PASS

**For 30MHz to 1000MHz****Vertical**

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	73.6500	-23.12	53.76	30.64	40.00	-9.36	peak			P	
2	324.8800	-16.26	52.50	36.24	46.00	-9.76	peak			P	
3	515.9699	-11.81	53.47	41.66	46.00	-4.34	peak			P	
4	742.9500	-7.66	48.80	41.14	46.00	-4.86	peak			P	
5	891.3600	-6.19	46.39	40.20	46.00	-5.80	peak			P	

**Horizontal**

No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	73.6500	-23.12	54.16	31.04	40.00	-8.96	peak			P	
2	164.8300	-19.33	52.24	32.91	43.50	-10.59	peak			P	
3	325.8500	-16.22	51.73	35.51	46.00	-10.49	peak			P	
4	515.9699	-11.81	51.72	39.91	46.00	-6.09	peak			P	
5	742.9500	-7.66	46.04	38.38	46.00	-7.62	peak			P	
6	890.3900	-6.19	46.20	40.01	46.00	-5.99	peak			P	



**For 1GHz to 25GHz****802.11b Mode(above 1GHz)**

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2412MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	59.31	PK	74.00	14.69	1.00 H	326	57.21	31.60	7.00	36.5	2.10
1	4824.00	47.94	AV	54.00	6.06	1.00 H	326	45.84	31.60	7.00	36.5	2.10
2	7236.00	57.82	PK	74.00	16.18	1.00 H	271	46.89	37.33	8.90	35.3	10.93
2	7236.00	44.25	AV	54.00	9.75	1.00 H	271	33.32	37.33	8.90	35.3	10.93

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M (802.11b--2412MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	56.88	PK	74.00	17.12	1.00 H	11	54.78	31.60	7.00	36.5	2.10
1	4824.00	45.74	AV	54.00	8.26	1.00 H	11	43.64	31.60	7.00	36.5	2.10
2	7236.00	55.23	PK	74.00	18.77	1.00 H	295	44.30	37.33	8.90	35.3	10.93
2	7236.00	46.89	AV	54.00	7.11	1.00 H	295	35.96	37.33	8.90	35.3	10.93

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2437MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	57.46	PK	74.00	16.54	1.00 H	144	55.34	31.02	7.60	36.5	2.12
1	4874.00	46.92	AV	54.00	7.08	1.00 H	144	44.80	31.02	7.60	36.5	2.12
2	7311.00	55.10	PK	74.00	18.90	1.00 H	333	44.02	37.28	8.60	34.8	11.08
2	7311.00	43.35	AV	54.00	10.65	1.00 H	333	32.27	37.28	8.60	34.8	11.08

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M (802.11b--2437MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	56.28	PK	74.00	17.72	1.00 H	224	54.16	31.02	7.60	36.5	2.12
1	4874.00	43.46	AV	54.00	10.54	1.00 H	224	41.34	31.02	7.60	36.5	2.12
2	7311.00	54.55	PK	74.00	19.45	1.00 H	303	43.47	37.28	8.60	34.8	11.08
2	7311.00	42.12	AV	54.00	11.88	1.00 H	303	31.04	37.28	8.60	34.8	11.08

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2462MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	56.12	PK	74.00	17.88	1.00 H	5	53.74	31.58	7.00	36.2	2.38
1	4924.00	45.05	AV	54.00	8.95	1.00 H	5	42.67	31.58	7.00	36.2	2.38
2	7386.00	55.43	PK	74.00	18.57	1.00 H	167	43.72	38.51	8.50	35.3	11.71
2	7386.00	43.39	AV	54.00	10.61	1.00 H	167	31.68	38.51	8.50	35.3	11.71

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M (802.11b--2462MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	56.91	PK	74.00	17.09	1.00 H	219	54.53	31.58	7.00	36.2	2.38
1	4924.00	46.07	AV	54.00	7.93	1.00 H	219	43.69	31.58	7.00	36.2	2.38
2	7386.00	54.85	PK	74.00	19.15	1.00 H	158	43.14	38.51	8.50	35.3	11.71
2	7386.00	42.43	AV	54.00	11.57	1.00 H	158	30.72	38.51	8.50	35.3	11.71

- REMARKS:**
1. Emission level (dBUV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m)+CableFactor (dB)-Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value- Emission level.
  5. For Wireless 802.11b mode at 1Mbps.

**802.11g Mode(above 1GHz)**

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2412MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBUV/m)		Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	58.26	PK	74.00	15.74	1.00 H	26	56.16	31.6	7.00	36.5	2.10
1	4824.00	46.94	AV	54.00	7.06	1.00 H	26	44.84	31.6	7.00	36.5	2.10
2	7236.00	54.32	PK	74.00	19.68	1.00 H	267	43.39	37.33	8.90	35.3	10.93
2	7236.00	42.65	AV	54.00	11.35	1.00 H	267	31.72	37.33	8.90	35.3	10.93

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M (802.11g--2412MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBUV/m)		Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	57.31	PK	74.00	16.69	1.00 H	323	55.21	31.60	7.00	36.5	2.10
1	4824.00	46.02	AV	54.00	7.98	1.00 H	323	43.92	31.60	7.00	36.5	2.10
2	7236.00	55.07	PK	74.00	18.93	1.00 H	28	44.14	37.33	8.90	35.3	10.93
2	7236.00	45.13	AV	54.00	8.87	1.00 H	28	34.20	37.33	8.90	35.3	10.93

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2437MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBUV/m)		Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	57.22	PK	74.00	16.78	1.00 H	312	55.10	31.02	7.60	36.5	2.12
1	4874.00	46.14	AV	54.00	7.86	1.00 H	312	44.02	31.02	7.60	36.5	2.12
2	7311.00	55.08	PK	74.00	18.92	1.00 H	27	44.00	37.28	8.60	34.8	11.08
2	7311.00	44.85	AV	54.00	9.15	1.00 H	27	33.77	37.28	8.60	34.8	11.08

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M (802.11g--2437MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBUV/m)		Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	57.03	PK	74.00	16.97	1.00 H	300	54.91	31.02	7.60	36.5	2.12
1	4874.00	46.14	AV	54.00	7.86	1.00 H	300	44.02	31.02	7.60	36.5	2.12
2	7311.00	54.24	PK	74.00	19.76	1.00 H	182	43.16	37.28	8.60	34.8	11.08
2	7311.00	42.00	AV	54.00	12.00	1.00 H	182	30.92	37.28	8.60	34.8	11.08

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2462MHz)</b>												
No.	Frequency (MHz)	Emssion Level (dBUV/m)		Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	56.69	PK	74.00	17.31	1.00 H	124	54.31	31.58	7.00	36.2	2.38
1	4924.00	45.06	AV	54.00	8.94	1.00 H	124	42.68	31.58	7.00	36.2	2.38
2	7311.00	55.74	PK	74.00	18.26	1.00 H	128	44.03	38.51	8.50	35.3	11.71
2	7311.00	43.13	AV	54.00	10.87	1.00 H	128	31.42	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2462MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	54.11	PK	74.00	19.89	1.00 H	219	51.73	31.58	7.00	36.2	2.38
1	4924.00	45.85	AV	54.00	8.15	1.00 H	219	43.47	31.58	7.00	36.2	2.38
2	7386.00	52.63	PK	74.00	21.37	1.00 H	256	40.92	38.51	8.50	35.3	11.71
2	7386.00	41.12	AV	54.00	12.88	1.00 H	256	29.41	38.51	8.50	35.3	11.71

**REMARKS:** 1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)  
 2. Correction Factor (dB/m) = Antenna Factor (dB/m)+CableFactor (dB)-Pre-amplifier Factor  
 3. The other emission levels were very low against the limit.  
 4. Margin value = Limit value- Emission level.  
 5. For Wireless 802.11g mode at 6Mbps.

### 802.11n(20MHz) Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	57.99	PK	74.00	16.01	1.00 H	225	55.89	31.60	7.00	36.5	2.10
1	4824.00	45.17	AV	54.00	8.83	1.00 H	225	43.07	31.60	7.00	36.5	2.10
2	7236.00	55.22	PK	74.00	18.78	1.00 H	277	44.29	37.33	8.90	35.3	10.93
2	7236.00	43.63	AV	54.00	10.37	1.00 H	277	32.70	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	56.24	PK	74.00	17.76	1.00 H	3	54.14	31.60	7.00	36.5	2.10
1	4824.00	46.39	AV	54.00	7.61	1.00 H	3	44.29	31.60	7.00	36.5	2.10
2	7236.00	58.11	PK	74.00	15.89	1.00 H	175	47.18	37.33	8.90	35.3	10.93
2	7236.00	47.32	AV	54.00	6.68	1.00 H	175	36.39	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	53.52	PK	74.00	20.48	1.00 H	90	51.40	31.02	7.60	36.5	2.12
1	4874.00	42.89	AV	54.00	11.11	1.00 H	90	40.77	31.02	7.60	36.5	2.12
2	7311.00	52.14	PK	74.00	21.86	1.00 H	147	41.06	37.28	8.60	34.8	11.08
2	7311.00	40.25	AV	54.00	13.75	1.00 H	147	29.17	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	55.16	PK	74.00	18.84	1.00 H	311	53.04	31.02	7.60	36.5	2.12
1	4874.00	43.88	AV	54.00	10.12	1.00 H	311	41.76	31.02	7.60	36.5	2.12
2	7311.00	56.01	PK	74.00	17.99	1.00 H	245	44.93	37.28	8.60	34.8	11.08
2	7311.00	44.77	AV	54.00	9.23	1.00 H	245	33.69	37.28	8.60	34.8	11.08

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2462MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	53.72	PK	74.00	20.28	1.00 H	148	51.34	31.58	7.00	36.2	2.38
1	4924.00	42.86	AV	54.00	11.14	1.00 H	148	40.48	31.58	7.00	36.2	2.38
2	7386.00	51.05	PK	74.00	22.95	1.00 H	255	39.34	38.51	8.50	35.3	11.71
2	7386.00	40.37	AV	54.00	13.63	1.00 H	255	28.66	38.51	8.50	35.3	11.71

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2462MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	56.08	PK	74.00	17.92	1.00 H	37	53.70	31.58	7.00	36.2	2.38
1	4924.00	47.22	AV	54.00	6.78	1.00 H	37	44.84	31.58	7.00	36.2	2.38
2	7386.00	53.33	PK	74.00	20.67	1.00 H	144	41.62	38.51	8.50	35.3	11.71
2	7386.00	42.05	AV	54.00	11.95	1.00 H	144	30.34	38.51	8.50	35.3	11.71

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value - Emission level.
  5. For Wireless 802.11n (20MHz) mode at 6.5Mbps.

**802.11n(40MHz) Mode(above 1GHz)****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2422MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4844.00	56.16	PK	74.00	17.84	1.00 H	266	54.05	31.01	7.30	36.2	2.11
1	4844.00	43.82	AV	54.00	10.18	1.00 H	266	41.71	31.01	7.30	36.2	2.11
2	7266.00	54.08	PK	74.00	19.92	1.00 H	179	43.28	36.70	8.90	34.8	10.80
2	7266.00	46.37	AV	54.00	7.63	1.00 H	179	35.57	36.70	8.90	34.8	10.80

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2422MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4844.00	54.88	PK	74.00	19.12	1.00 H	53	52.77	31.01	7.30	36.2	2.11
1	4844.00	41.17	AV	54.00	12.83	1.00 H	53	39.06	31.01	7.30	36.2	2.11
2	7266.00	64.39	PK	74.00	9.61	1.00 H	300	53.59	36.70	8.90	34.8	10.80
2	7266.00	45.48	AV	54.00	8.52	1.00 H	300	34.68	36.70	8.90	34.8	10.80

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2437MHz)**

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	55.22	PK	74.00	18.78	1.00 H	336	53.10	31.02	7.60	36.5	2.12
1	4874.00	42.38	AV	54.00	11.62	1.00 H	336	40.26	31.02	7.60	36.5	2.12
2	7311.00	55.35	PK	74.00	18.65	1.00 H	279	44.27	37.28	8.60	34.8	11.08
2	7311.00	43.11	AV	54.00	10.89	1.00 H	279	32.03	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2437MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	53.91	PK	74.00	20.09	1.00 H	313	51.79	31.02	7.60	36.5	2.12
1	4874.00	46.14	AV	54.00	7.86	1.00 H	313	44.02	31.02	7.60	36.5	2.12
2	7311.00	55.27	PK	74.00	18.73	1.00 H	187	44.19	37.28	8.60	34.8	11.08
2	7311.00	42.88	AV	54.00	11.12	1.00 H	187	31.80	37.28	8.60	34.8	11.08

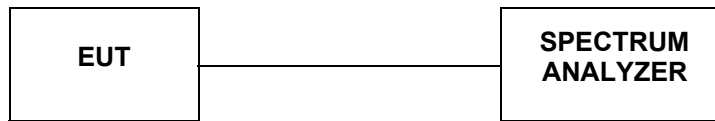
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2452MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4904.00	51.74	PK	74.00	22.26	1.00 H	353	49.47	31.47	7.00	36.2	2.27
1	4904.00	42.39	AV	54.00	11.61	1.00 H	353	40.12	31.47	7.00	36.2	2.27
2	7356.00	55.82	PK	74.00	18.18	1.00 H	19	44.17	38.45	8.50	35.3	11.65
2	7356.00	46.08	AV	54.00	7.92	1.00 H	19	34.43	38.45	8.50	35.3	11.65

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2452MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4904.00	54.38	PK	74.00	19.62	1.00 H	242	52.11	31.47	7.00	36.2	2.27
1	4904.00	42.75	AV	54.00	11.25	1.00 H	242	40.48	31.47	7.00	36.2	2.27
2	7356.00	58.01	PK	74.00	15.99	1.00 H	196	46.36	38.45	8.50	35.3	11.65
2	7356.00	46.28	AV	54.00	7.72	1.00 H	196	34.63	38.45	8.50	35.3	11.65

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value - Emission level.
  5. For Wireless 802.11n (40MHz) mode at 13.5Mbps.

### 4.3. Maximum Peak Output Power

#### TEST CONFIGURATION



#### TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Accoding to KDB558074 D01 V03 Integrated band power method for this procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

1. Set the RBW = 1 MHz.
2. Set the VBW  $\geq$  3 RBW
3. Set the span  $\geq$  1.5 x DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

#### LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

#### TEST RESULTS

Remark:We measured output power at difference data rate for each mode and recorded woest case for each mode.

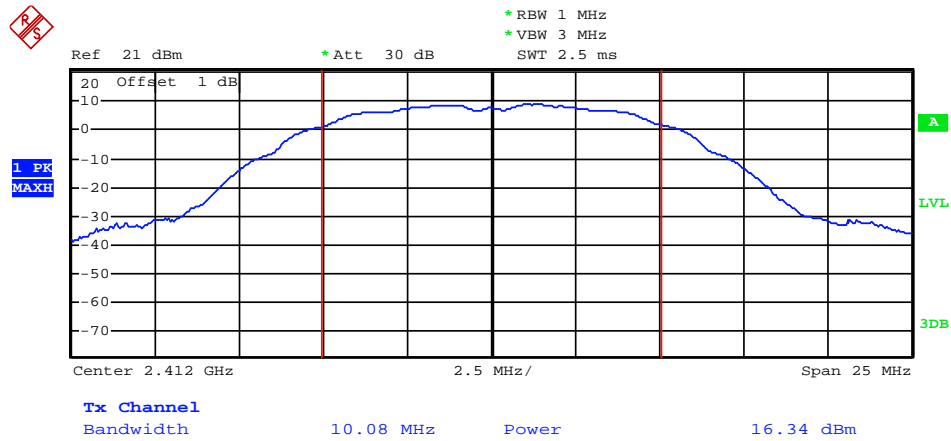
##### 4.3.1 802.11b Test Mode

###### A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	16.34	Plot 4.3.1 A	30	PASS
6	2437	15.52	Plot 4.3.1 B	30	PASS
11	2462	14.98	Plot 4.3.1 C	30	PASS

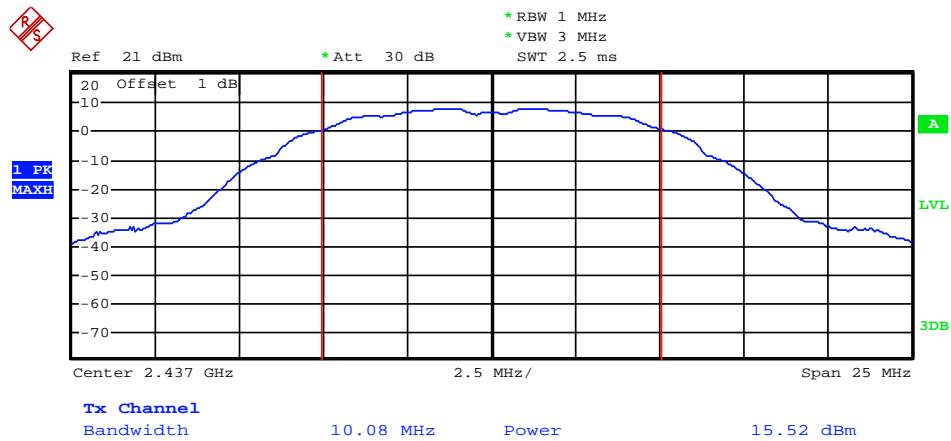
Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.  
2.The test results including the cable lose.

###### B. Test Plots



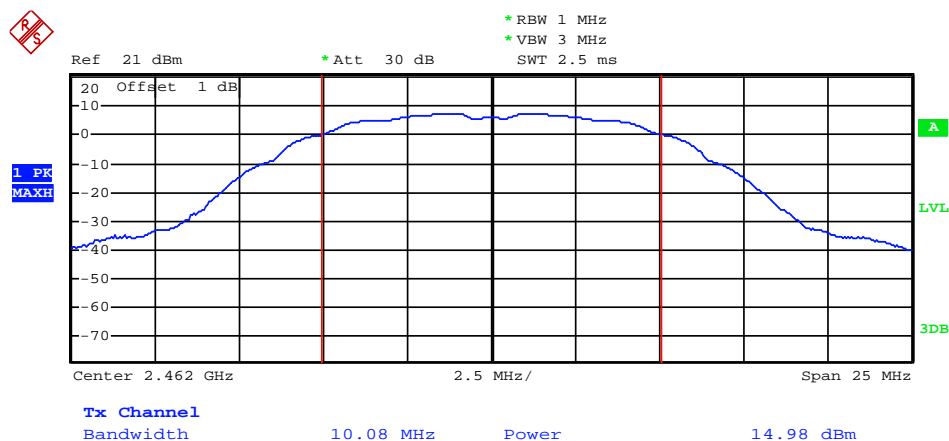
Date: 3.NOV.2013 11:14:43

(Plot 4.3.1 A: Channel 1: 2412MHz @ 802.11b)



Date: 3.NOV.2013 11:21:12

(Plot 4.3.1 B: Channel 1: 2437MHz @ 802.11b)



Date: 3.NOV.2013 11:22:14

(Plot 4.3.1 C: Channel 11: 2462MHz @ 802.11b)

#### 4.3.2 802.11g Test Mode

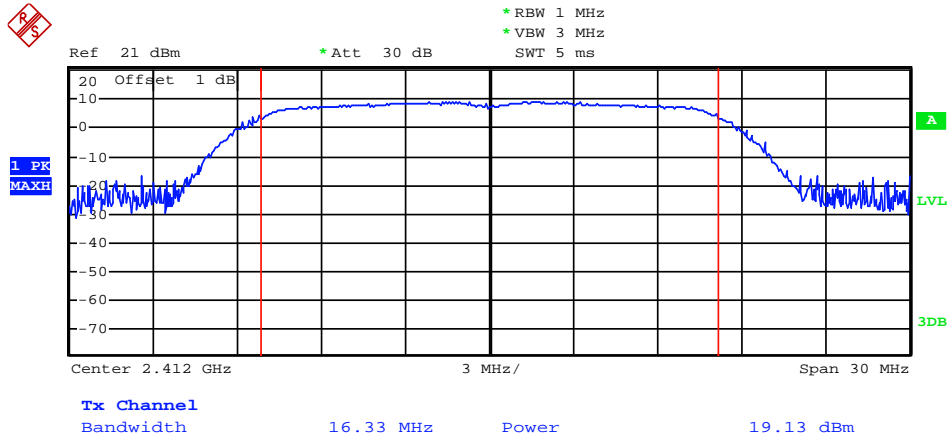
##### A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	19.13	Plot 4.3.2 A	30	PASS
6	2437	18.68	Plot 4.3.2 B	30	PASS
11	2462	18.17	Plot 4.3.2 C	30	PASS

Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.  
2. The test results including the cable loss.

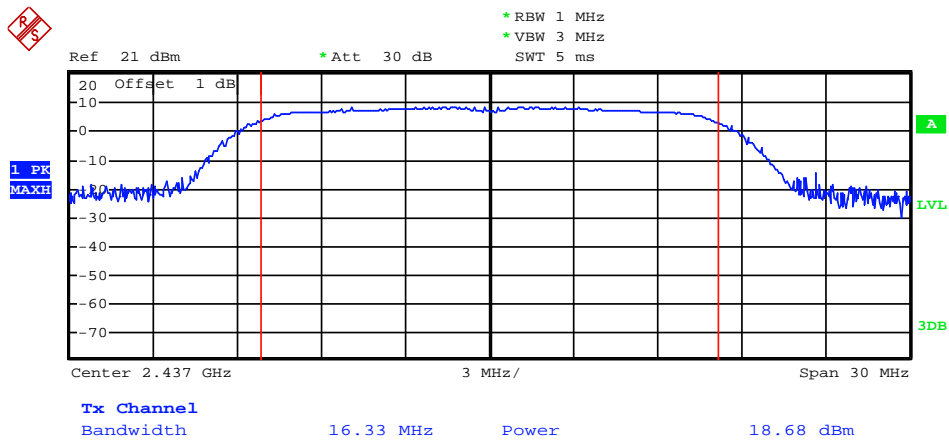
##### B. Test Plots





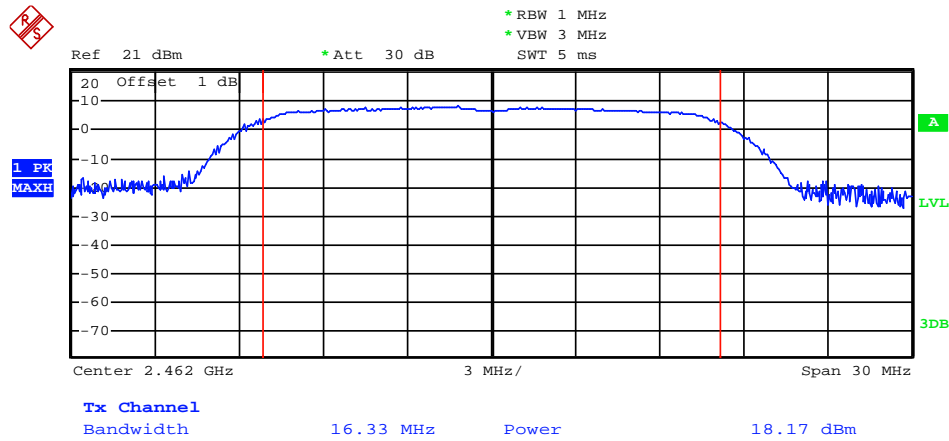
Date: 3.NOV.2013 11:31:02

(Plot 4.3.2 A: Channel 1: 2412MHz @ 802.11g)



Date: 3.NOV.2013 11:35:46

(Plot 4.3.2 B: Channel 1: 2437MHz @ 802.11g)



Date: 3.NOV.2013 11:37:10

(Plot 4.3.2 C: Channel 11: 2462MHz @ 802.11g)

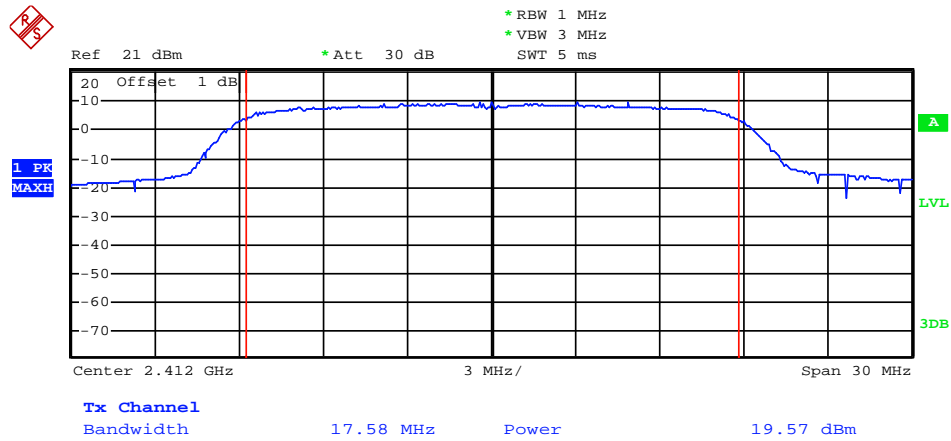
#### 4.3.3 802.11n(20MHz) Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	19.57	Plot 4.3.3 A	30	PASS
6	2437	18.85	Plot 4.3.3 B	30	PASS
11	2462	18.26	Plot 4.3.3 C	30	PASS

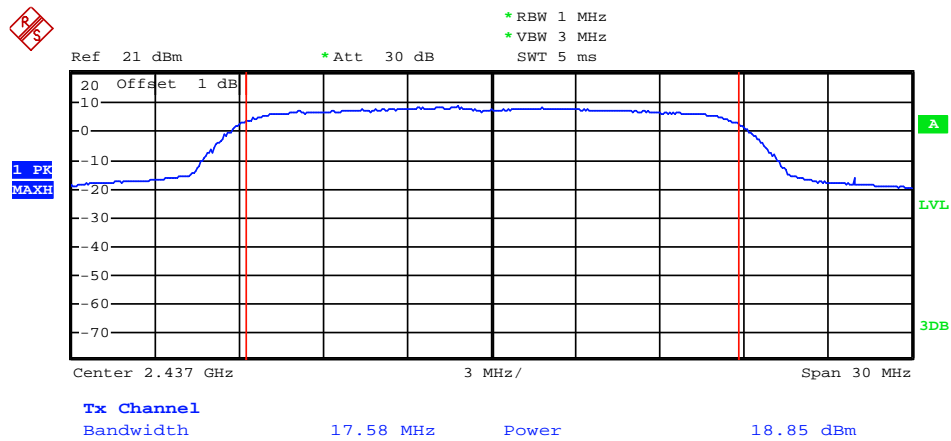
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.  
 2. The test results including the cable loss.

##### B. Test Plots



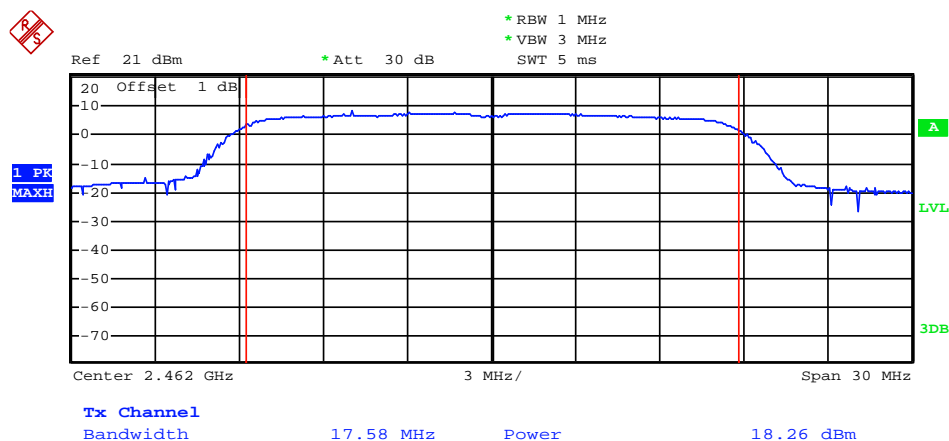
Date: 3.NOV.2013 11:51:23

(Plot 4.3.3 A: Channel 1: 2412MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 11:57:12

(Plot 4.3.3 B: Channel 6: 2437MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 11:57:53

(Plot 4.3.3 C: Channel 11: 2462MHz @ 802.11n(20MHz))

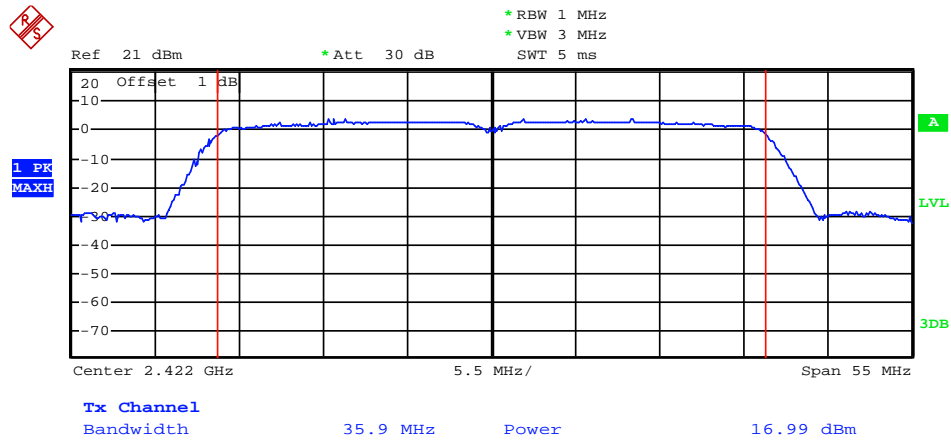
#### 4.3.4 802.11n(40MHz) Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
3	2422	16.99	Plot 4.3.4 A	30	PASS
6	2437	16.63	Plot 4.3.4 B	30	PASS
9	2452	16.60	Plot 4.3.4 C	30	PASS

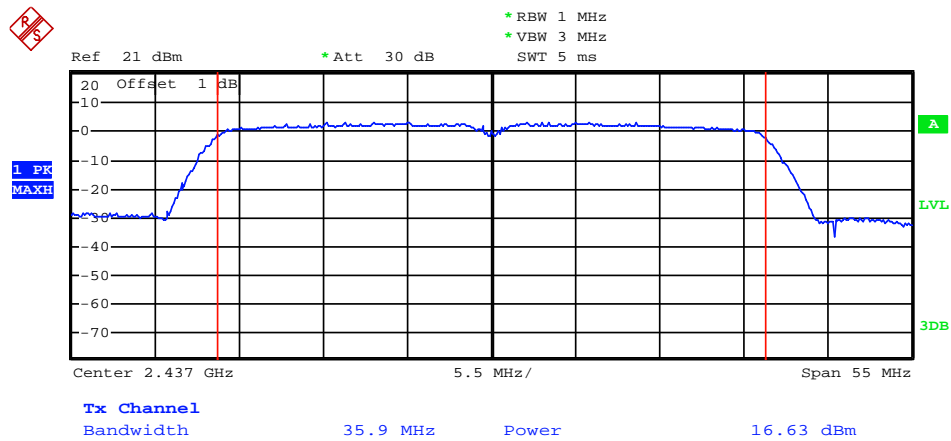
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.  
 2. The test results including the cable loss.

##### B. Test Plots



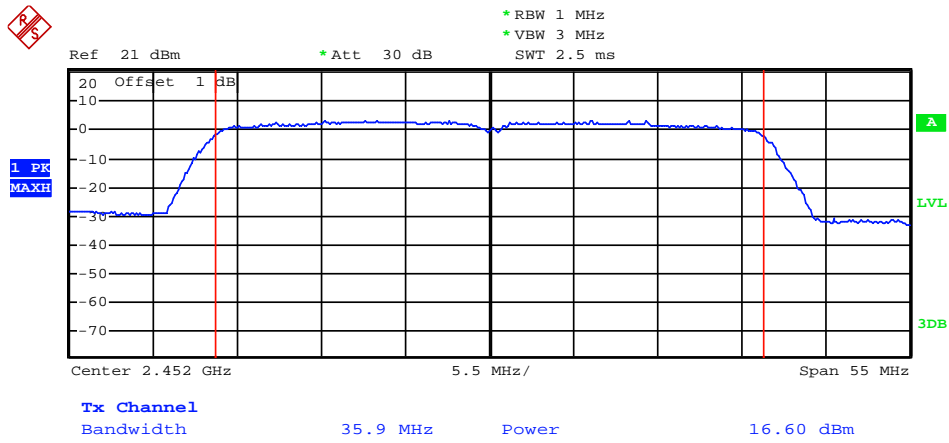
Date: 3.NOV.2013 11:59:13

(Plot 4.3.4 A: Channel 3: 2422MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 11:59:56

(Plot 4.3.4 B: Channel 6: 2437MHz @ 802.11n(40MHz))

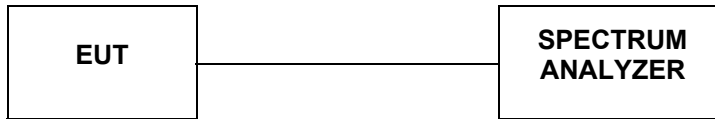


Date: 3.NOV.2013 13:37:50

(Plot 4.3.4 C: Channel 9: 2452MHz @ 802.11n(40MHz))

## 4.4. Power Spectral Density

### TEST CONFIGURATION



### TEST PROCEDURE

According to KDB 558074 D01 V03 Method PKPSD (peak PSD) This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \text{ RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### LIMIT

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.

### TEST RESULTS

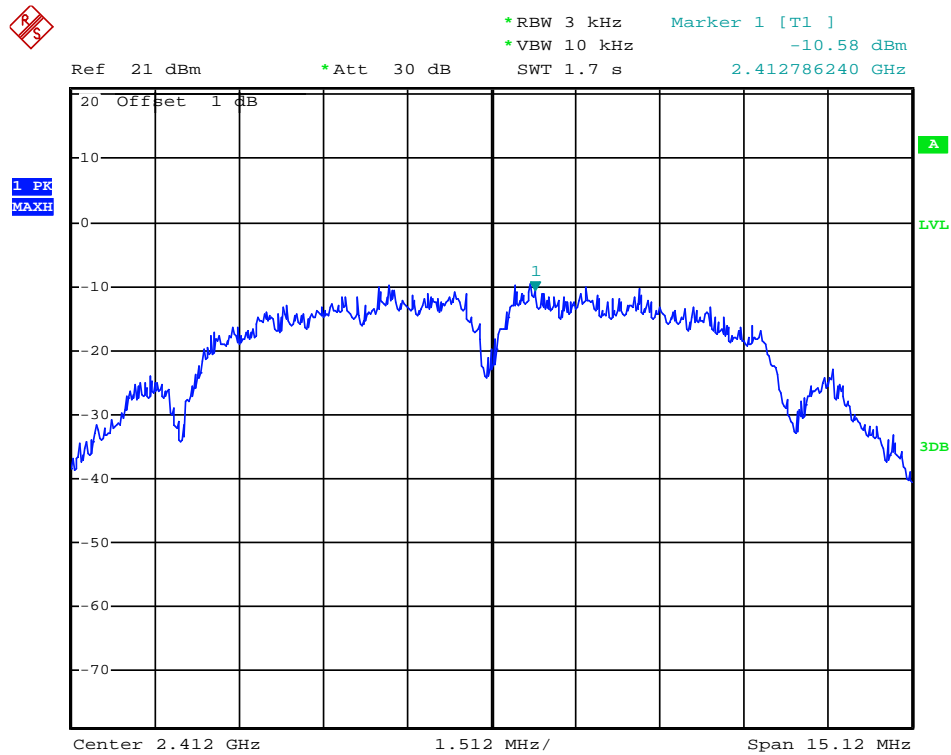
#### 4.4.1 802.11b Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-10.58	Plot 4.4.1 A	8	PASS
6	2437	-11.22	Plot 4.4.1 B	8	PASS
11	2462	-9.39	Plot 4.4.1 C	8	PASS

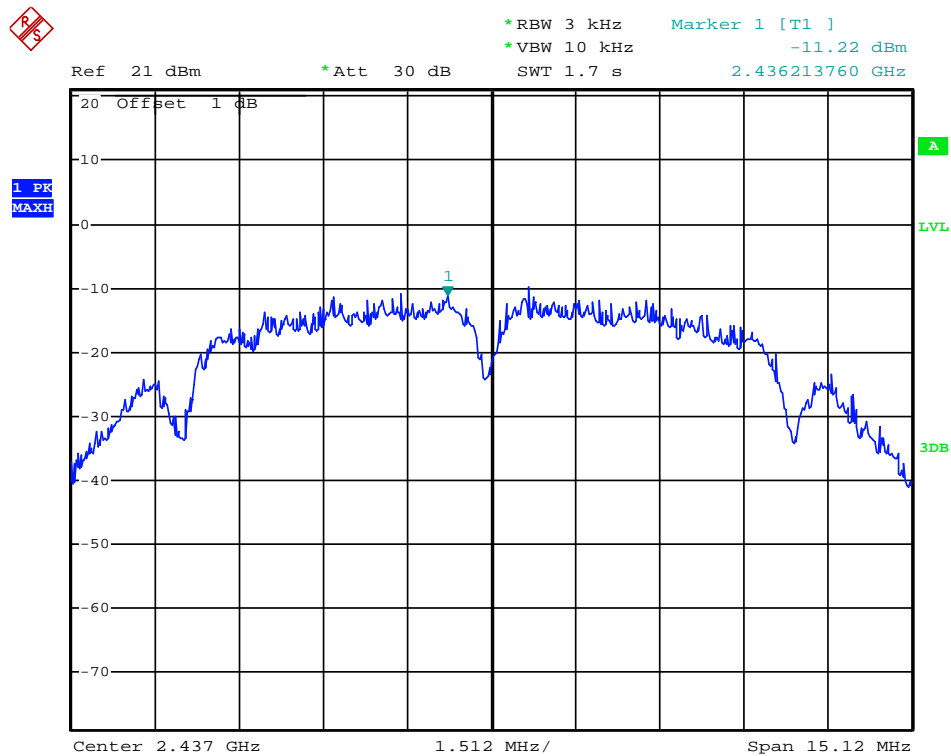
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



Date: 3.NOV.2013 12:02:52

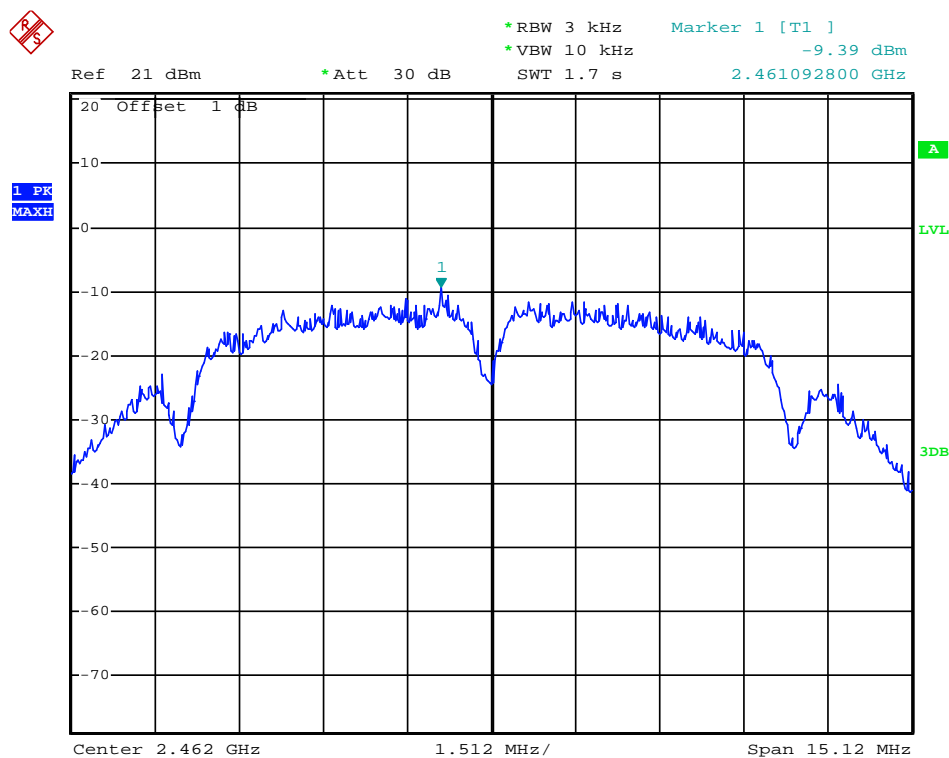
(Plot 4.4.1 A: Channel 1: 2412MHz @ 802.11b)



Date: 3.NOV.2013 12:03:27

(Plot 4.4.1 B: Channel 6: 2437MHz @ 802.11b)





Date: 3.NOV.2013 12:03:54

(Plot 4.4.1 C: Channel 11: 2462MHz @ 802.11b)

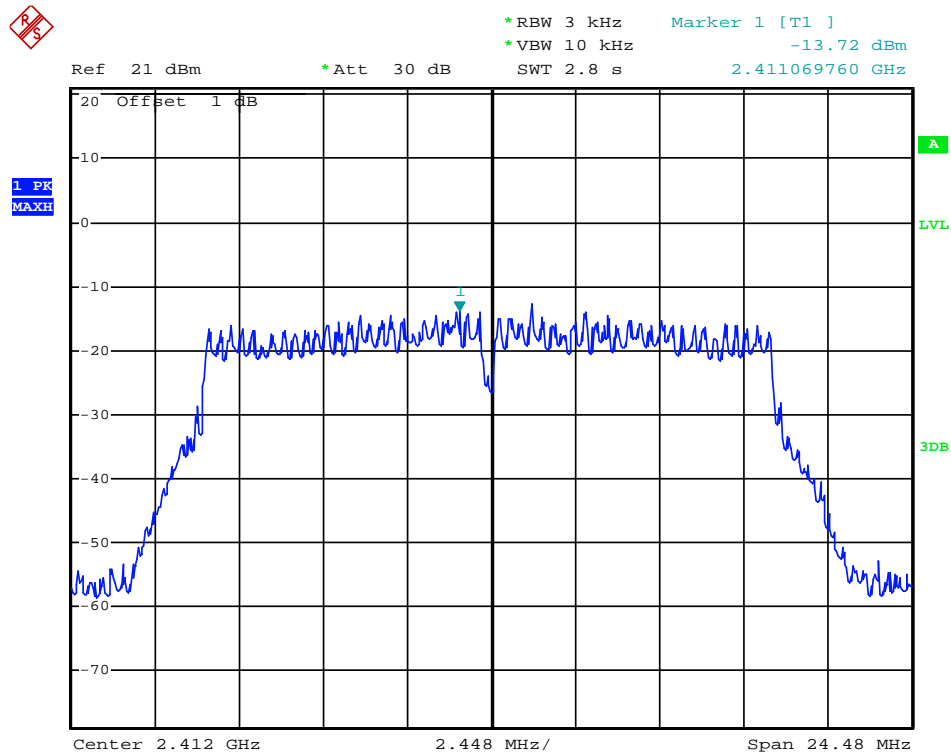
#### 4.4.2 802.11g Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-13.72	Plot 4.4.2 A	8	PASS
6	2437	-13.88	Plot 4.4.2 B	8	PASS
11	2462	-14.92	Plot 4.4.2 C	8	PASS

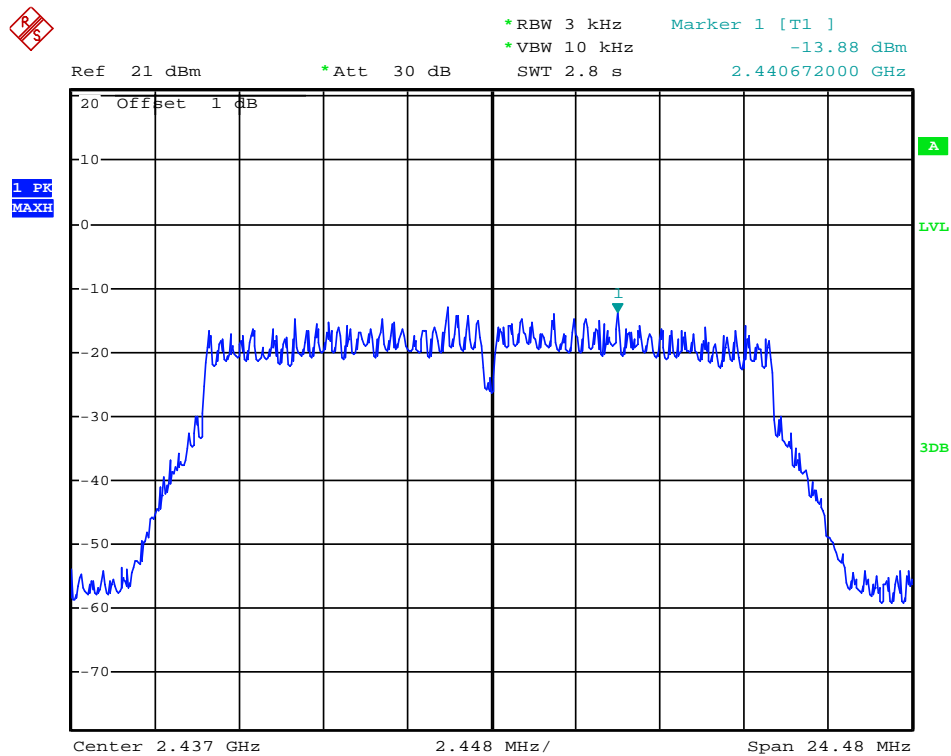
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



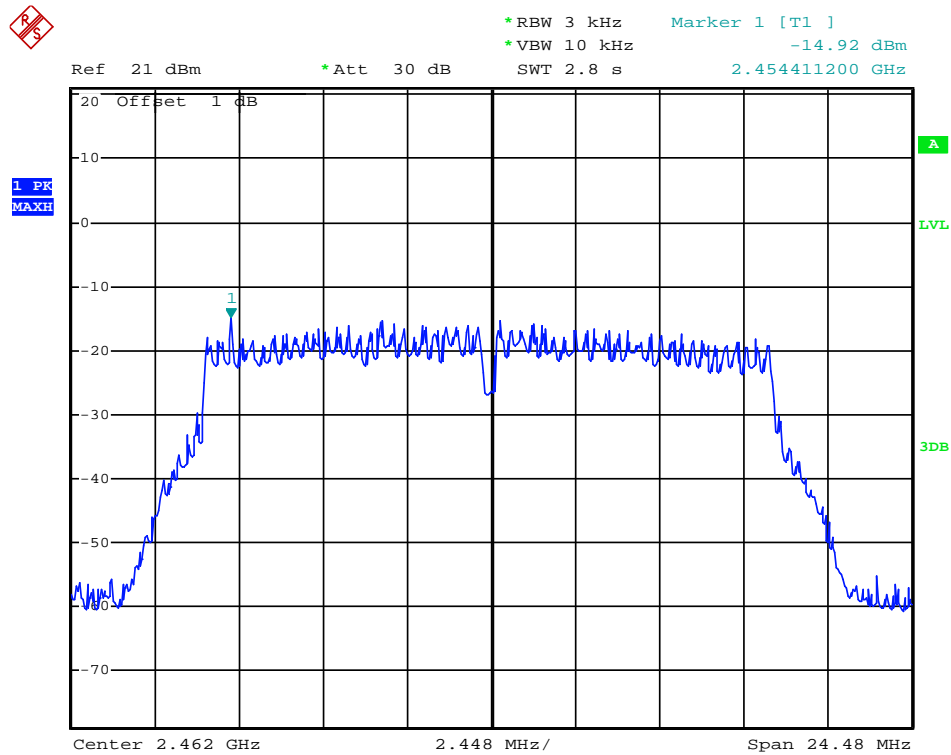
Date: 3.NOV.2013 12:05:27

(Plot 4.4.2 A: Channel 1: 2412MHz @ 802.11g)



Date: 3.NOV.2013 13:26:21

(Plot 4.4.2 B: Channel 6: 2437MHz @ 802.11g)



Date: 3.NOV.2013 13:27:17

(Plot 4.4.2 C: Channel 11: 2462MHz @ 802.11g)

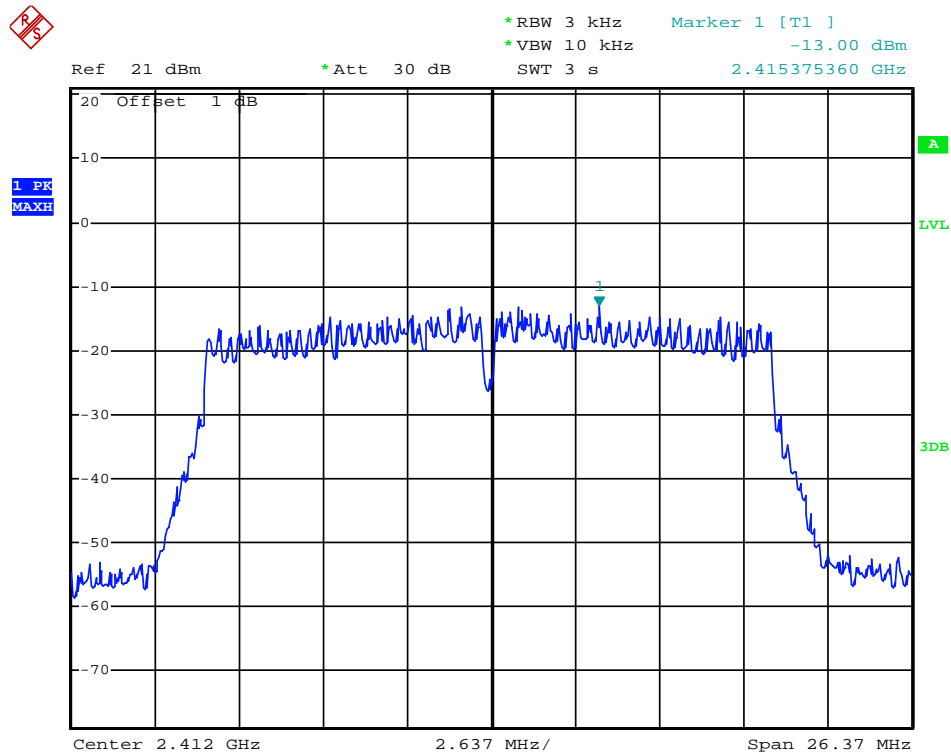
#### 4.4.3 802.11n(20MHz) Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-13.00	Plot 4.4.3 A	8	PASS
6	2437	-14.76	Plot 4.4.3 B	8	PASS
11	2462	-13.33	Plot 4.4.3 C	8	PASS

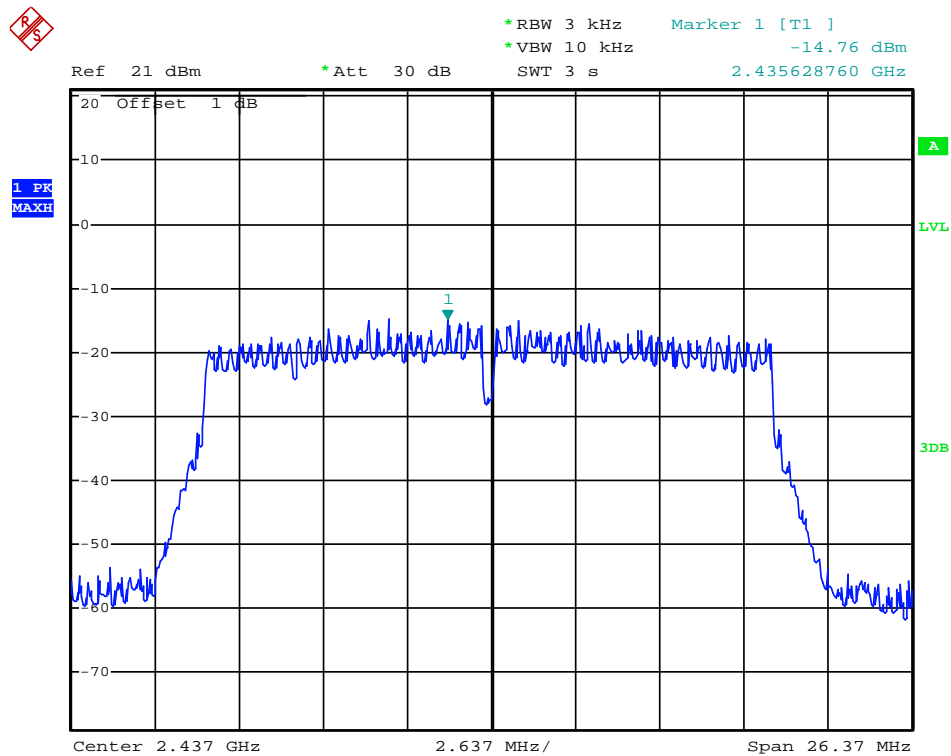
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.  
 2. The test results including the cable loss.

##### B. Test Plots



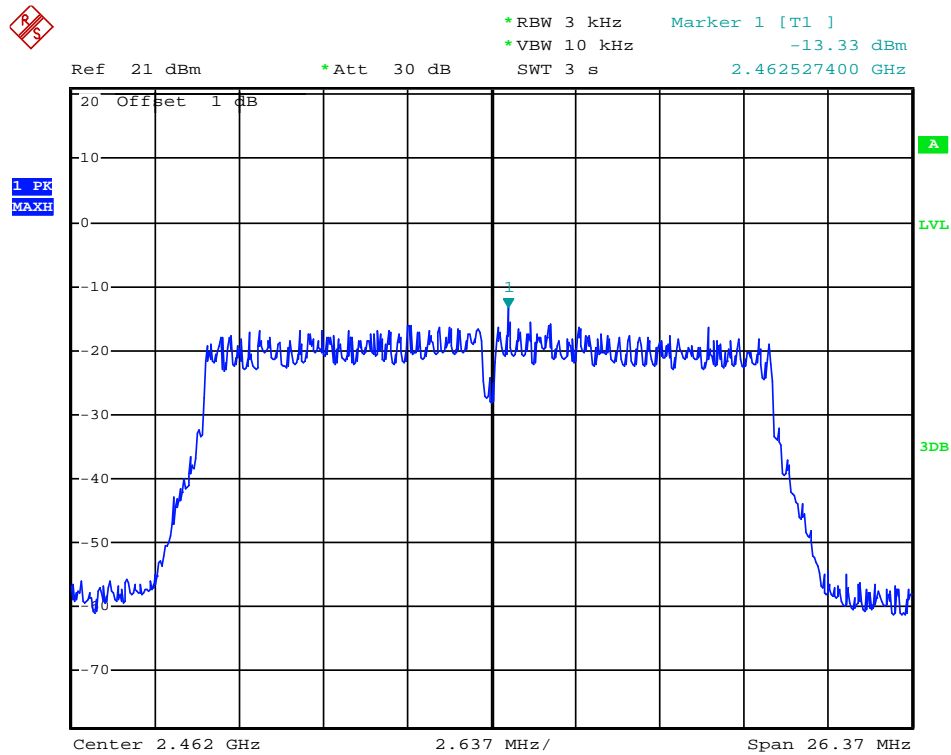
Date: 3.NOV.2013 13:29:47

(Plot 4.4.3 A: Channel 1: 2412MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 13:30:33

(Plot 4.4.3 B: Channel 6: 2437MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 13:31:27

(Plot 4.4.3 C: Channel 11: 2462MHz @ 802.11n(20MHz))

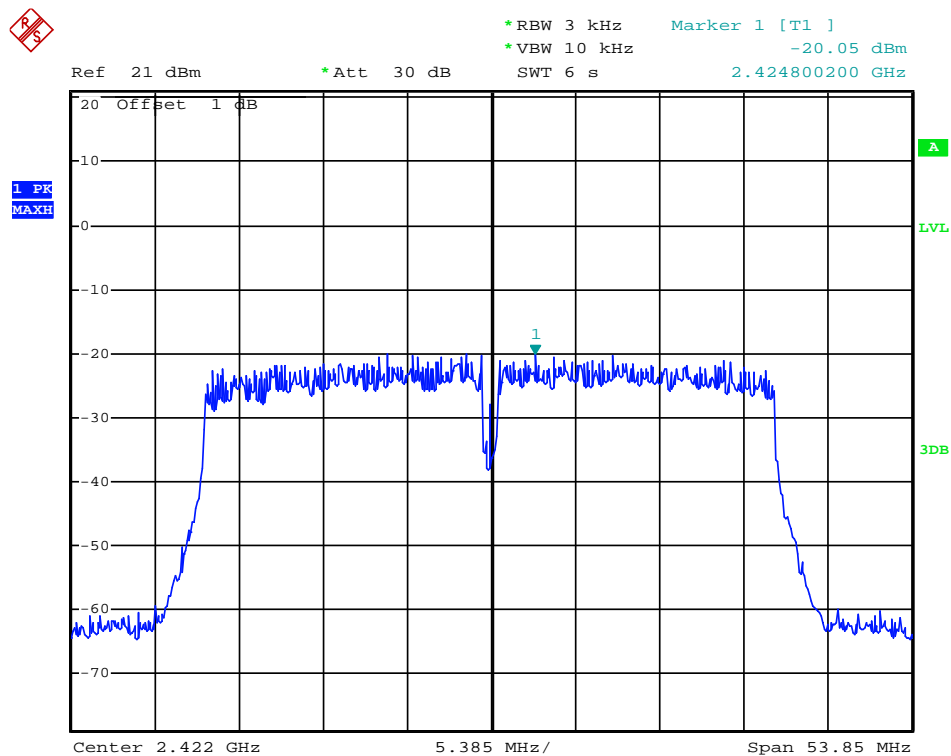
#### 4.4.4 802.11n(40MHz) Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
3	2422	-20.05	Plot 4.4.4 A	8	PASS
6	2437	-20.20	Plot 4.4.4 B	8	PASS
9	2452	-20.89	Plot 4.4.4 C	8	PASS

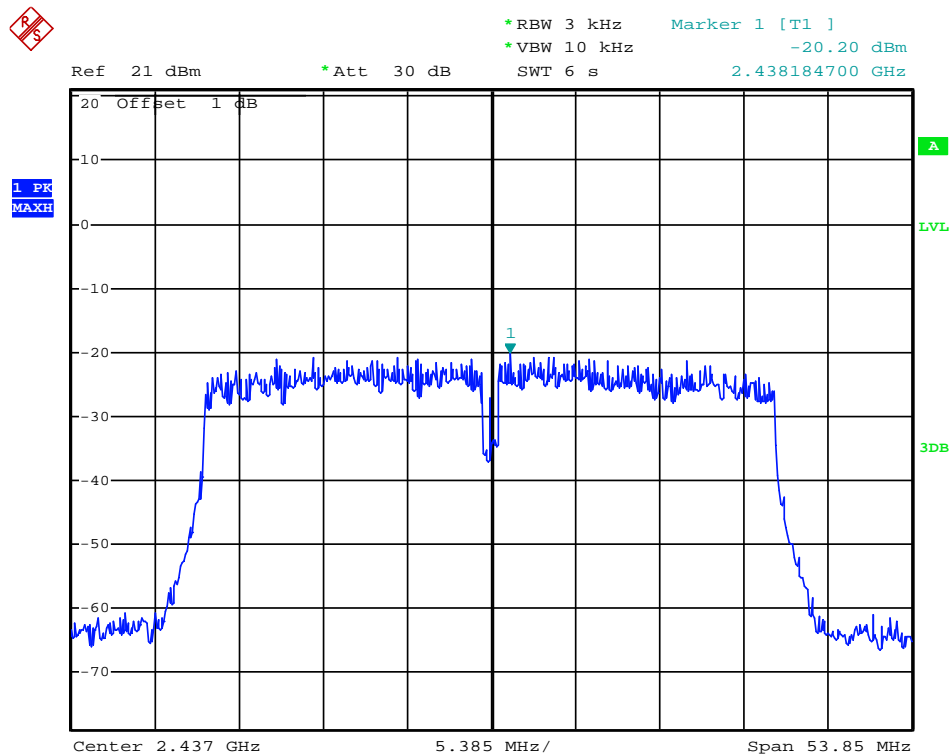
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



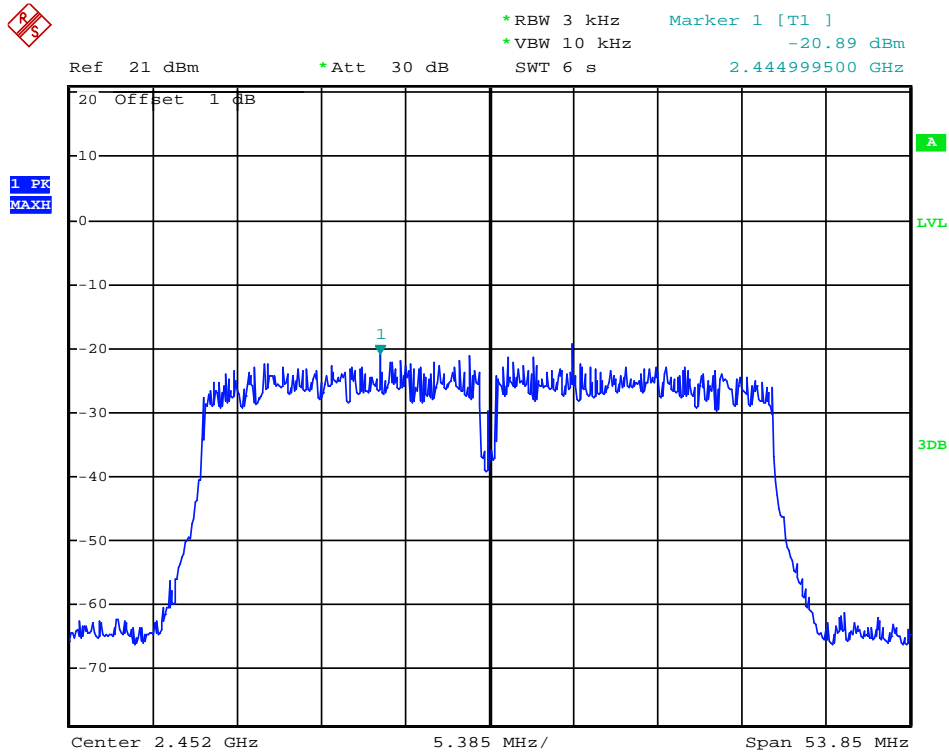
Date: 3.NOV.2013 13:32:37

(Plot 4.4.4 A: Channel 3: 2422MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 13:33:27

(Plot 4.4.4 B: Channel 6: 2437MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 13:34:22

(Plot 4.4.4 C: Channel 6: 2452MHz @ 802.11n(40MHz))

## 4.5. Band Edge Compliance of RF Emission

### **TEST REQUIREMENT**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **TEST PROCEDURE**

According to KDB 558074 D01 V03 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies  $\leq 30$  MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies  $> 1000$  MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:  
$$E = \text{EIRP} - 20\log D + 104.8$$

where:

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

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

11. Compare the resultant electric field strength level to the applicable regulatory limit.
12. Perform radiated spurious emission test

### **LIMIT**

Below -20dB of the highest emission level in operating band.

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)

### **TEST RESULTS**

Remark: The Bandedge was measured at difference data rate for each mode and recorded worst case for each mode.



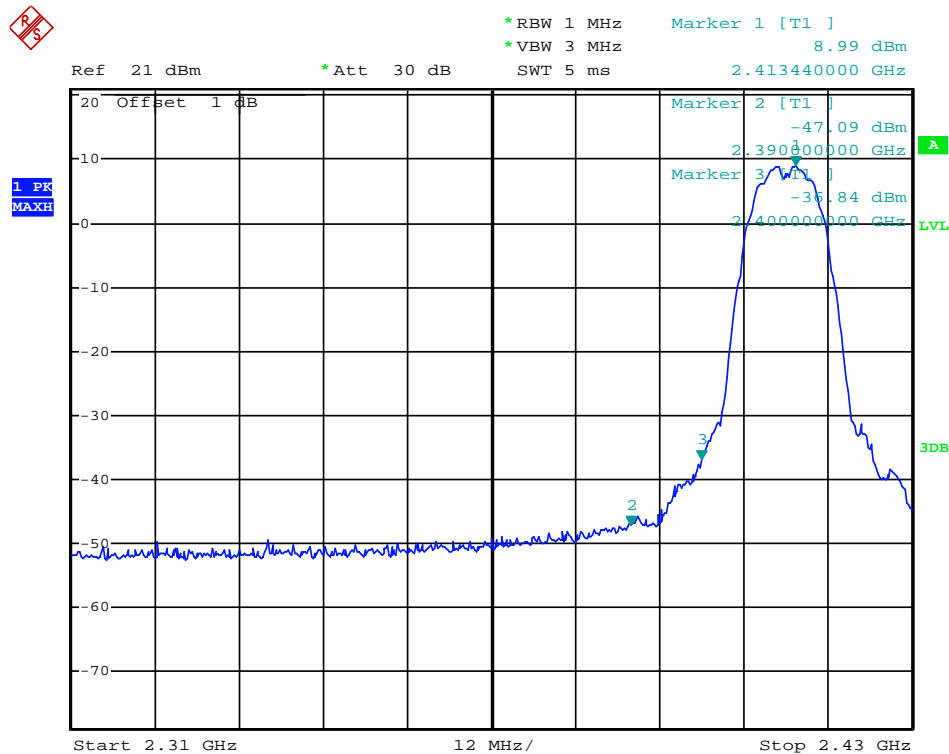
### 4.5.1 802.11b Test Mode

#### A. Test Verdict

Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-47.09	2.00	0.00	50.17	Peak	74.00	Plot 4.5.1 A1
2390.00	-58.25	2.00	0.00	39.01	AV	54.00	Plot 4.5.1 A2
2413.44	8.99	2.00	0.00	106.25	Peak	---	Plot 4.5.1 A1
2412.72	3.70	2.00	0.00	100.96	AV	---	Plot 4.5.1 A2
2460.50	7.81	2.00	0.00	105.07	Peak	---	Plot 4.5.1 A3
2461.20	2.61	2.00	0.00	99.87	AV	---	Plot 4.5.1 A4
2483.50	-45.84	2.00	0.00	51.42	Peak	74.00	Plot 4.5.1 A3
2483.50	-55.12	2.00	0.00	42.14	AV	54.00	Plot 4.5.1 A4

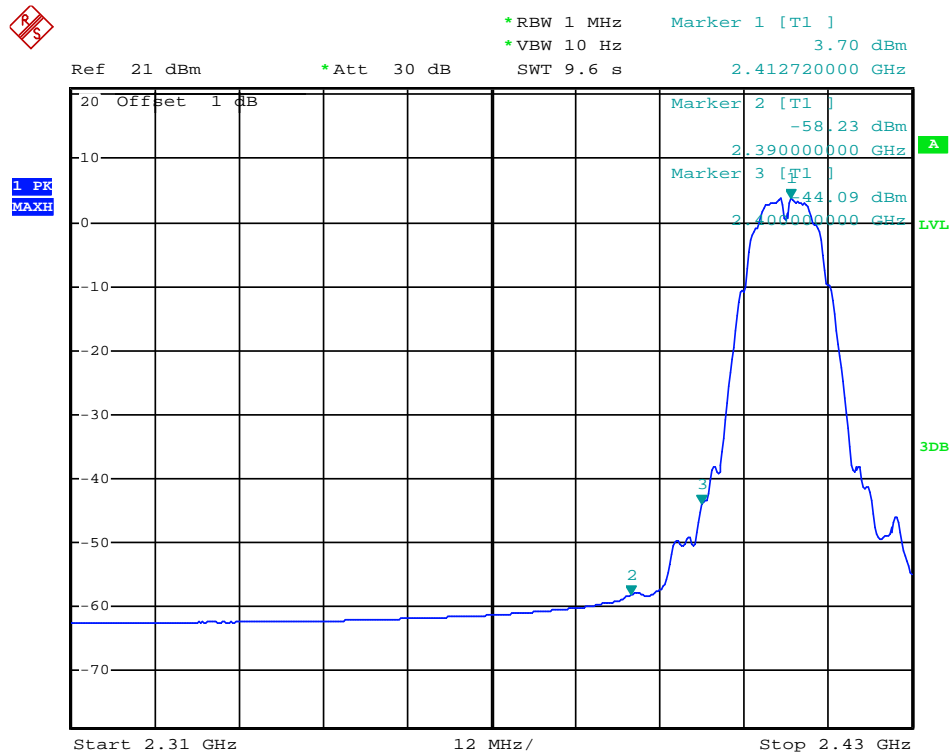
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.  
 2. The test results including the cable loss.  
 3. "----" means that the fundamental frequency not for 15.209 limits requirement.

#### B. Test Plots



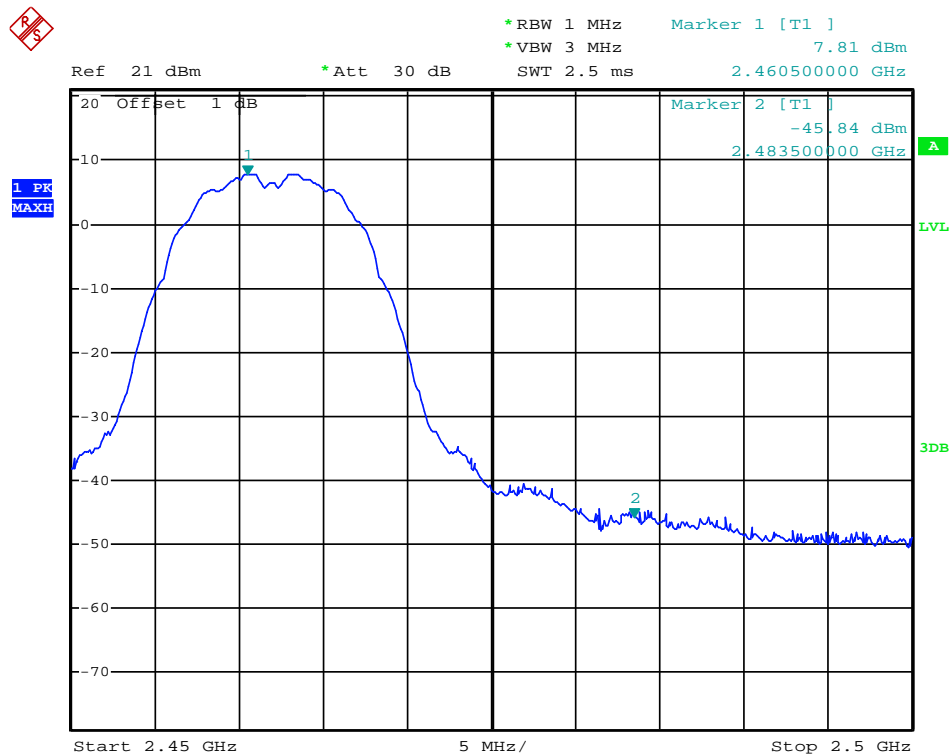
Date: 3.NOV.2013 13:52:05

(Plot 4.5.1 A1: Channel 1: 2412MHz @ 802.11b)



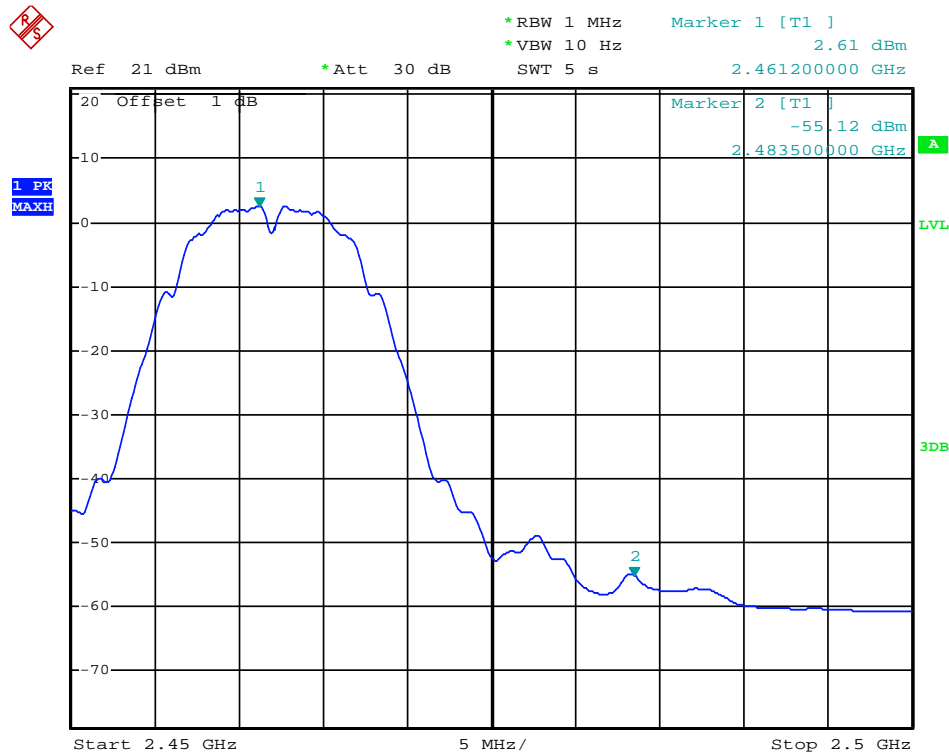
Date: 3.NOV.2013 13:53:15

(Plot 4.5.1 A2: Channel 1: 2412MHz @ 802.11b)



Date: 3.NOV.2013 13:58:04

(Plot 4.5.1 A3: Channel 11: 2462MHz @ 802.11b)



Date: 3.NOV.2013 13:58:44

(Plot 4.5.1 A4: Channel 11: 2462MHz @ 802.11b)

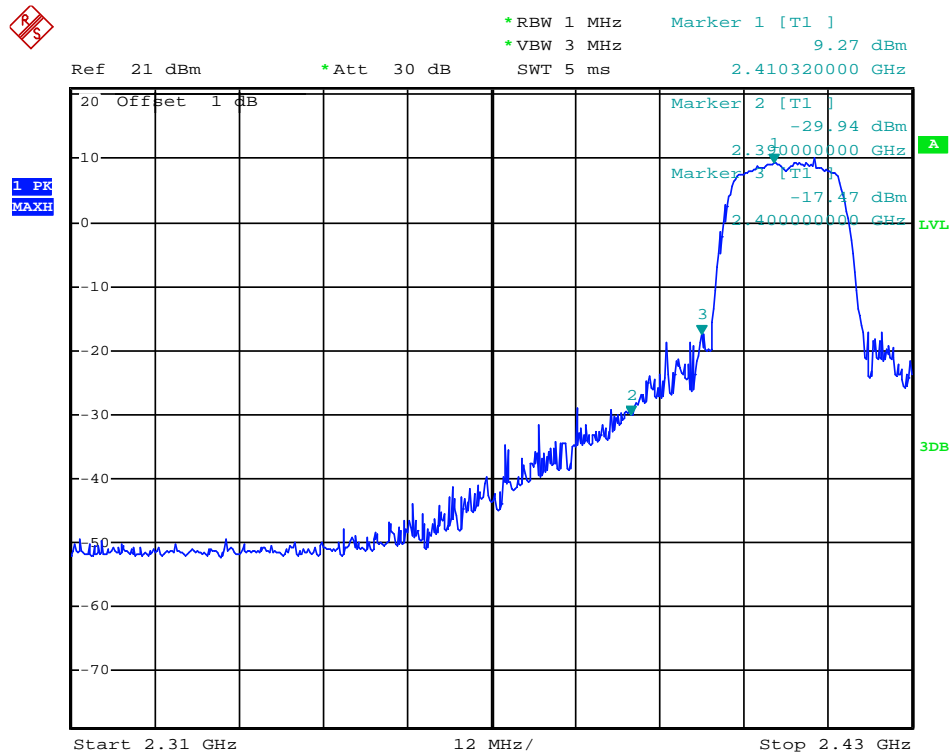
#### 4.5.2 802.11g Test Mode

##### A. Test Verdict

Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-29.94	2.00	0.00	67.32	Peak	74.00	Plot 4.5.2 A1
2390.00	-52.96	2.00	0.00	44.30	AV	54.00	Plot 4.5.2 A2
2410.32	9.32	2.00	0.00	106.58	Peak	---	Plot 4.5.2 A1
2413.20	-5.32	2.00	0.00	91.94	AV	---	Plot 4.5.2 A2
2459.10	7.57	2.00	0.00	104.83	Peak	---	Plot 4.5.2 A3
2461.00	-6.84	2.00	0.00	90.42	AV	---	Plot 4.5.2 A4
2483.50	-28.42	2.00	0.00	68.84	Peak	74.00	Plot 4.5.2 A3
2483.50	-53.40	2.00	0.00	43.86	AV	54.00	Plot 4.5.2 A4

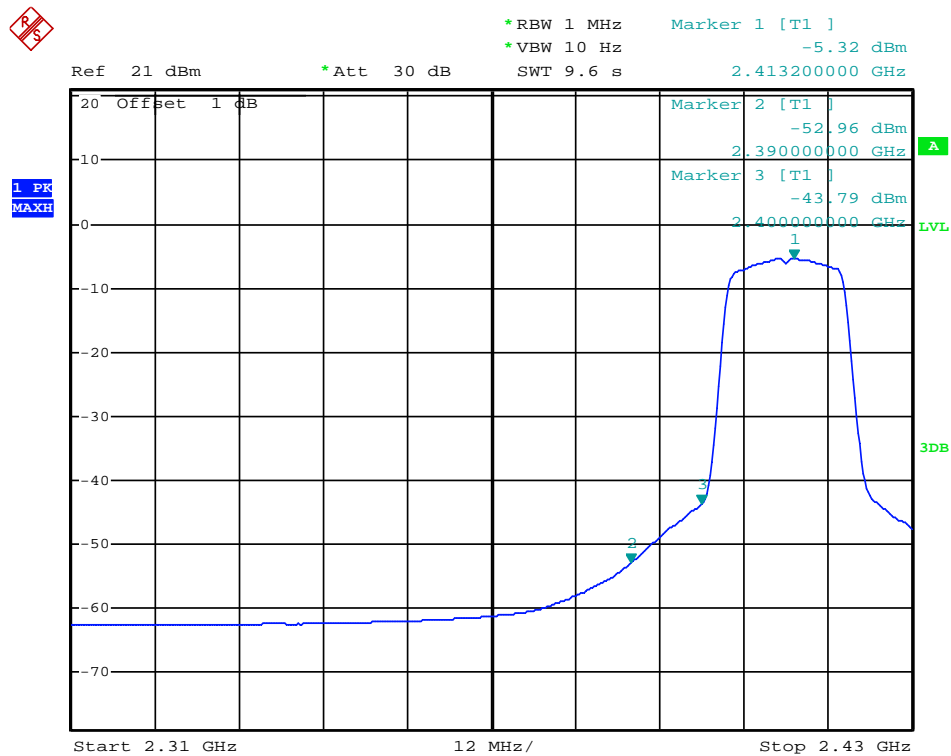
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.  
2. The test results including the cable lose.  
3. "—" means that the fundamental frequency not for 15.209 limits requirement.

##### B. Test Plots



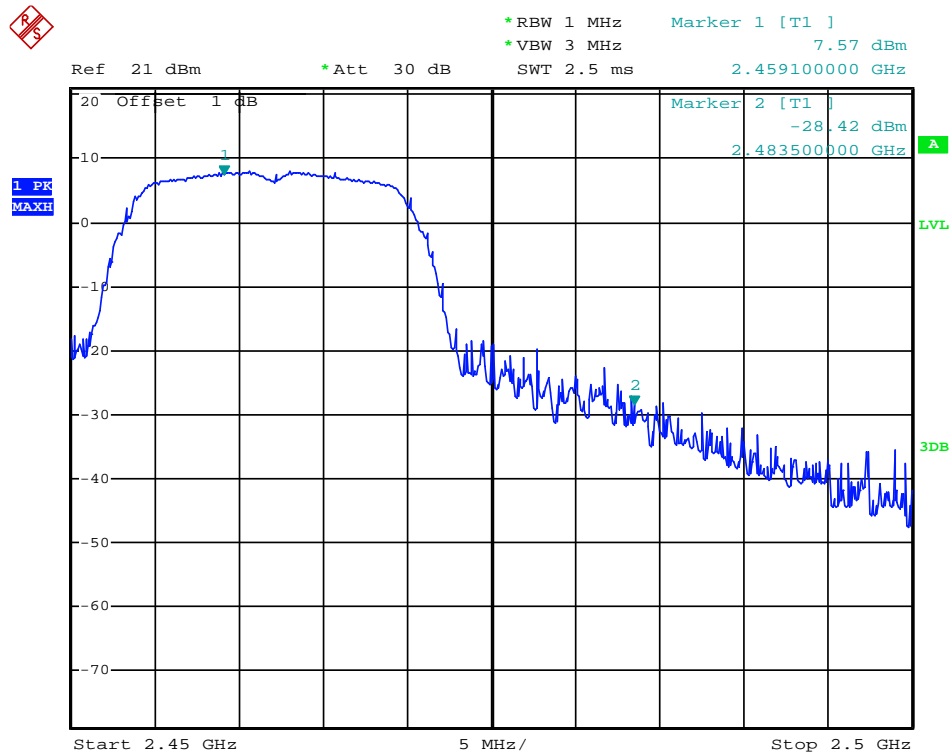
Date: 3.NOV.2013 13:55:20

(Plot 4.5.2 A1: Channel 1: 2412MHz @ 802.11g)



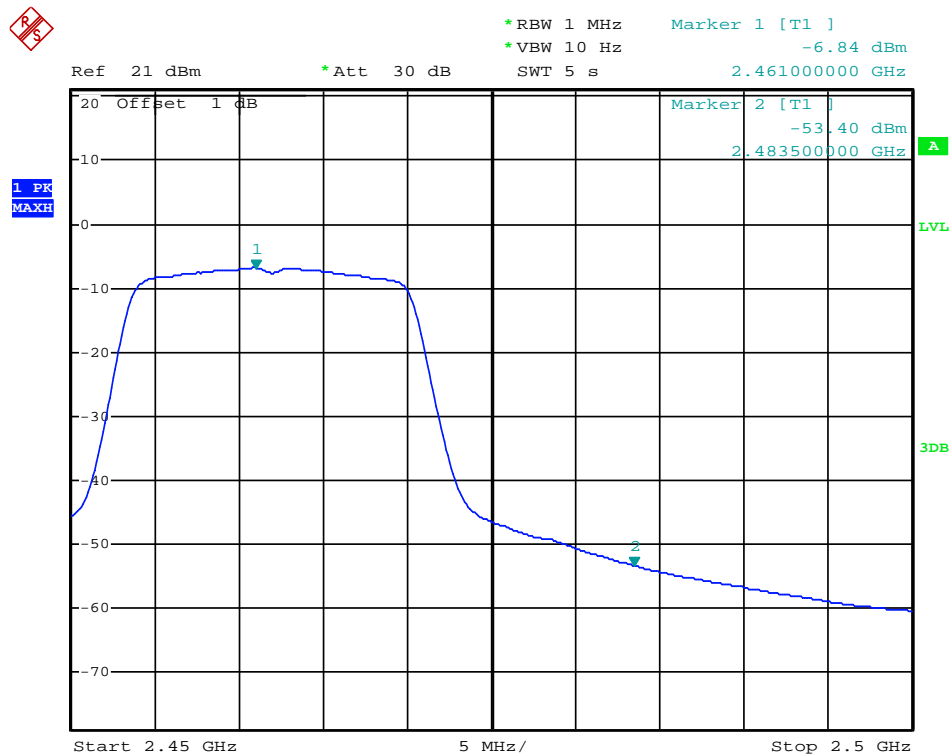
Date: 3.NOV.2013 13:54:12

(Plot 4.5.2 A2: Channel 1: 2412MHz @ 802.11g)



Date: 3.NOV.2013 14:00:44

(Plot 4.5.2 A3: Channel 11: 2462MHz @ 802.11g)



Date: 3.NOV.2013 13:59:30

(Plot 4.5.2 A4: Channel 11: 2462MHz @ 802.11g)

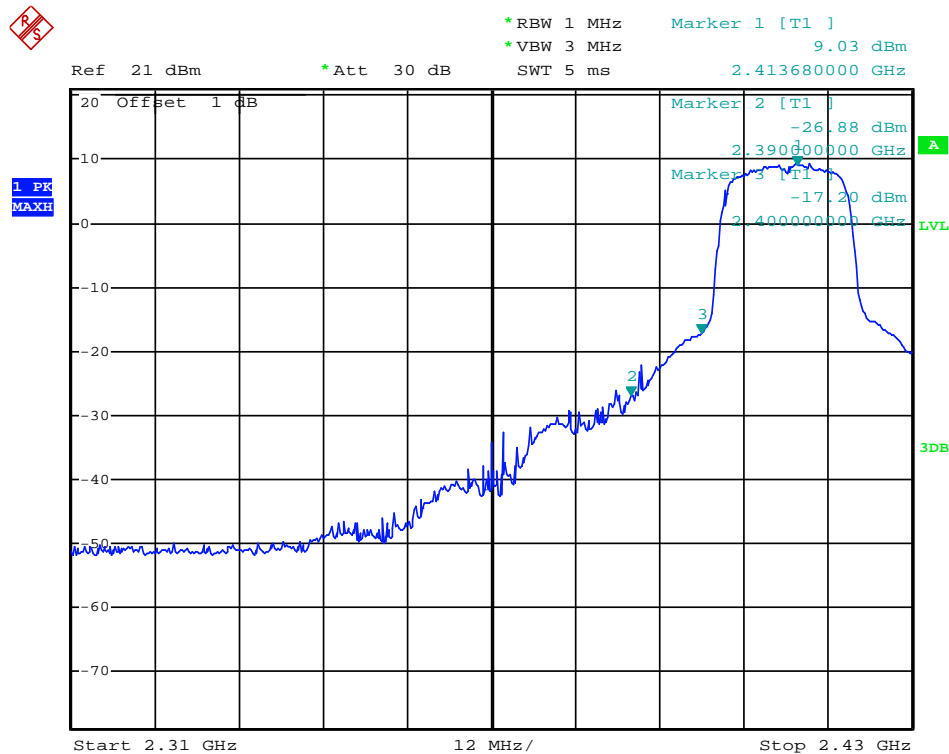
### 4.5.3 802.11n(20MHz) Test Mode

#### A. Test Verdict

Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-26.88	2.00	0.00	70.38	Peak	74.00	Plot 4.5.3 A1
2390.00	-51.93	2.00	0.00	45.33	AV	54.00	Plot 4.5.3 A2
2413.68	9.03	2.00	0.00	106.29	Peak	---	Plot 4.5.3 A1
2413.20	-5.78	2.00	0.00	91.48	AV	---	Plot 4.5.3 A2
2464.60	8.66	2.00	0.00	105.92	Peak	---	Plot 4.5.3 A3
2460.90	-7.20	2.00	0.00	90.06	AV	---	Plot 4.5.3 A4
2483.50	-24.68	2.00	0.00	72.58	Peak	74.00	Plot 4.5.3 A3
2483.50	-52.81	2.00	0.00	44.45	AV	54.00	Plot 4.5.3 A4

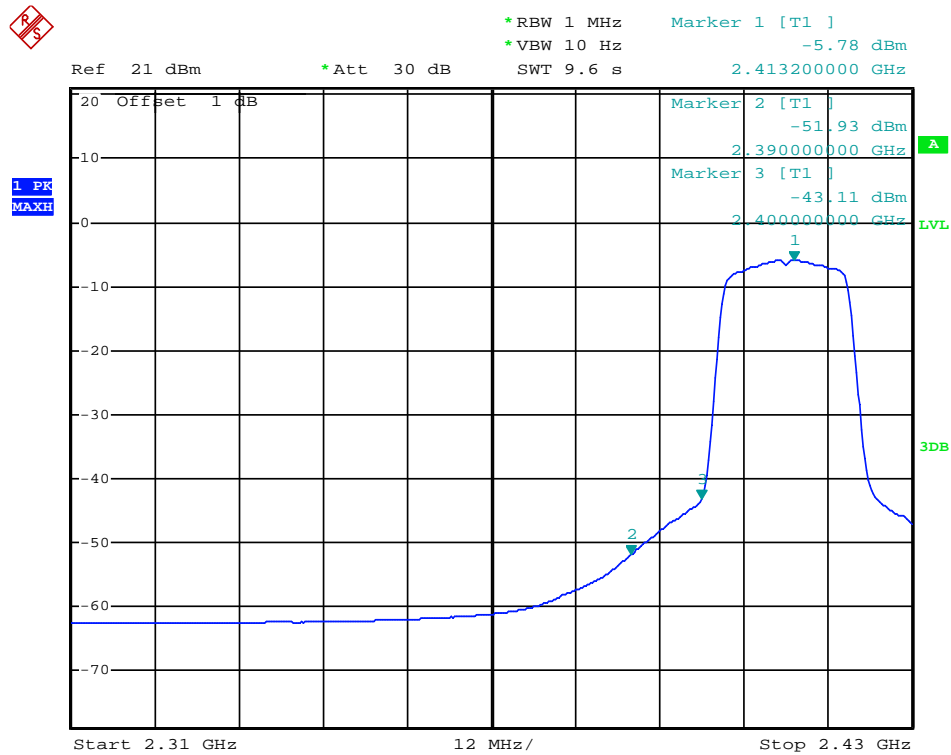
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.  
 2. The test results including the cable loss.  
 3. "----" means that the fundamental frequency not for 15.209 limits requirement.

#### B. Test Plots



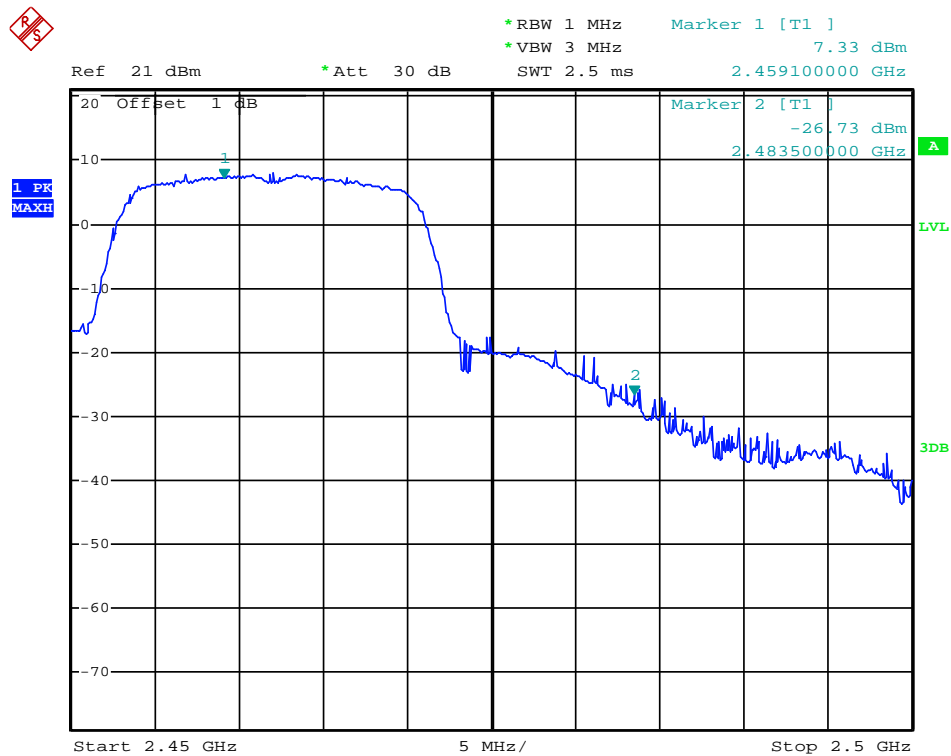
Date: 3.NOV.2013 13:56:23

(Plot 4.5.3 A1: Channel 1: 2412MHz @ 802.11n(20MHz))



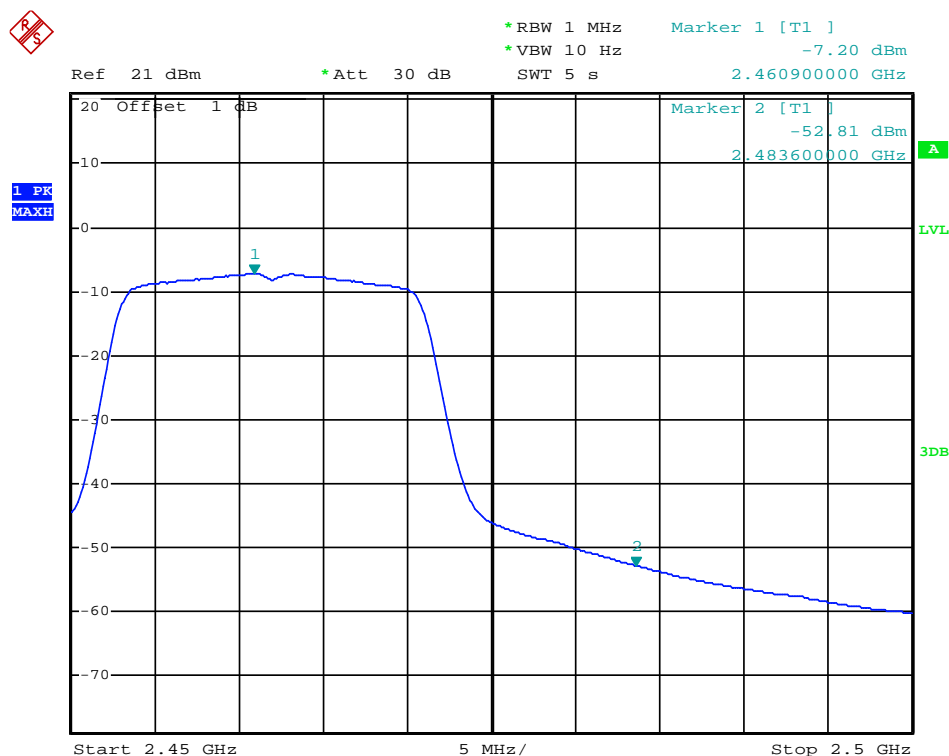
Date: 3.NOV.2013 14:04:45

(Plot 4.5.3 A2: Channel 1: 2412MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 14:01:39

(Plot 4.5.3 A3: Channel 11: 2462MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 14:03:29

(Plot 4.5.3 A4: Channel 11: 2462MHz @ 802.11n(20MHz))

#### 4.5.4 802.11n(40MHz) Test Mode

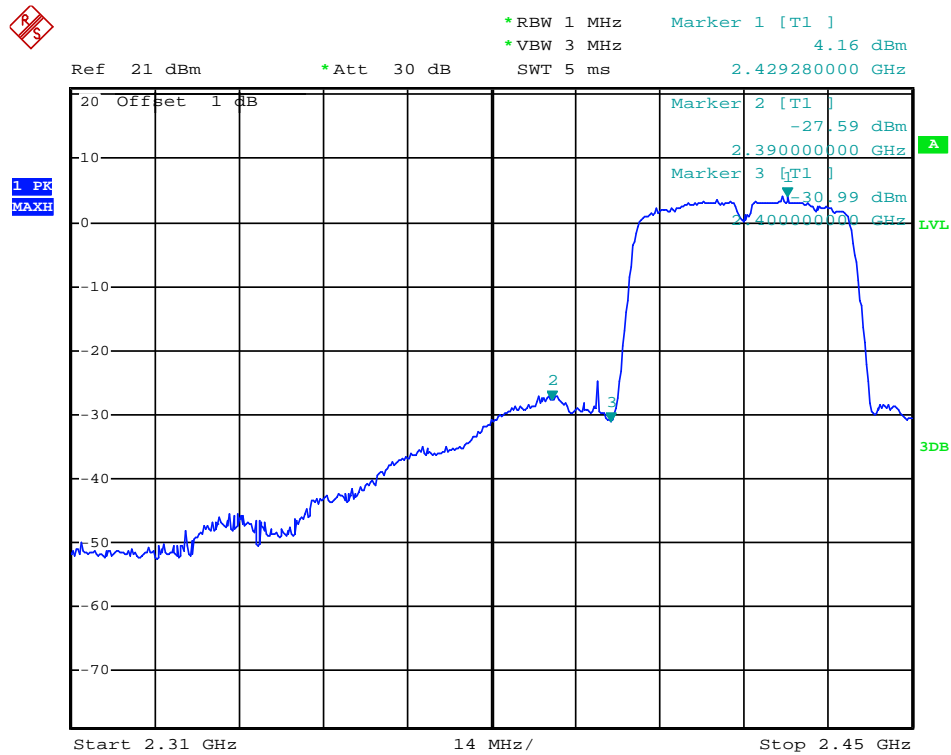
##### A. Test Verdict

Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Refer to Plot
2390.00	-27.59	2.00	0.00	69.67	Peak	74.00	Plot 4.5.4 A1
2390.00	-54.50	2.00	0.00	42.76	AV	54.00	Plot 4.5.4 A2
2429.28	4.16	2.00	0.00	101.42	Peak	---	Plot 4.5.4 A1
2428.16	-14.84	2.00	0.00	82.42	AV	---	Plot 4.5.4 A2
2444.28	2.39	2.00	0.00	99.65	Peak	---	Plot 4.5.4 A3
2445.68	-15.45	2.00	0.00	81.81	AV	---	Plot 4.5.4 A4
2483.50	-30.35	2.00	0.00	66.91	Peak	74.00	Plot 4.5.4 A3
2483.50	-55.26	2.00	0.00	42.00	AV	54.00	Plot 4.5.4 A4

Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.  
2. The test results including the cable loss.  
3. "—" means that the fundamental frequency not for 15.209 limits requirement.

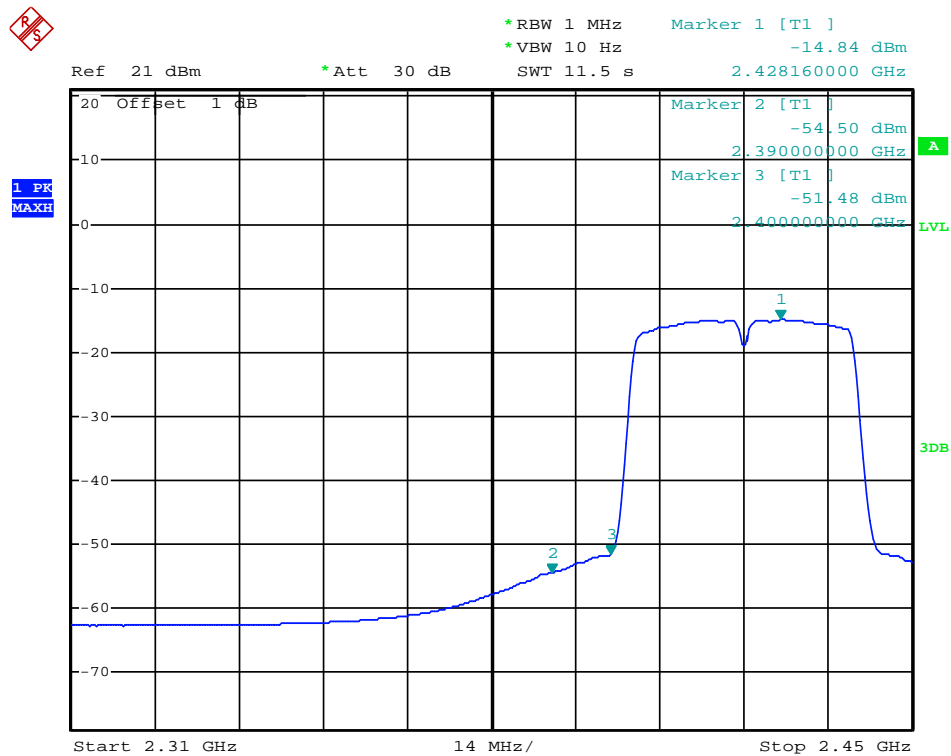
##### B. Test Plots





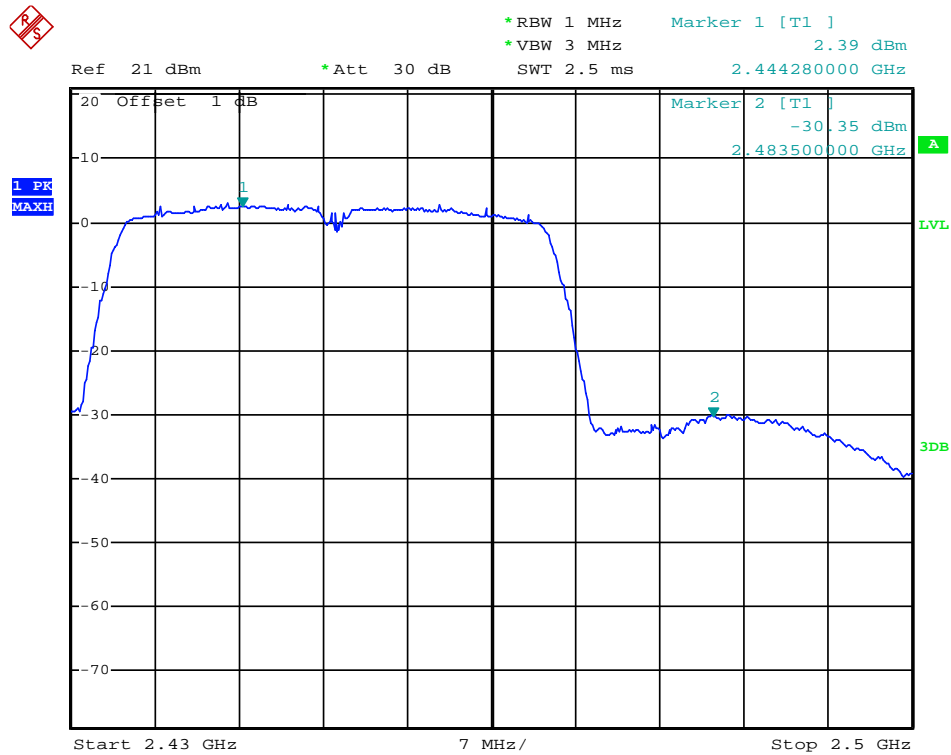
Date: 3.NOV.2013 14:07:45

(Plot 4.5.4 A1: Channel 3: 2422MHz @ 802.11n(40MHz))



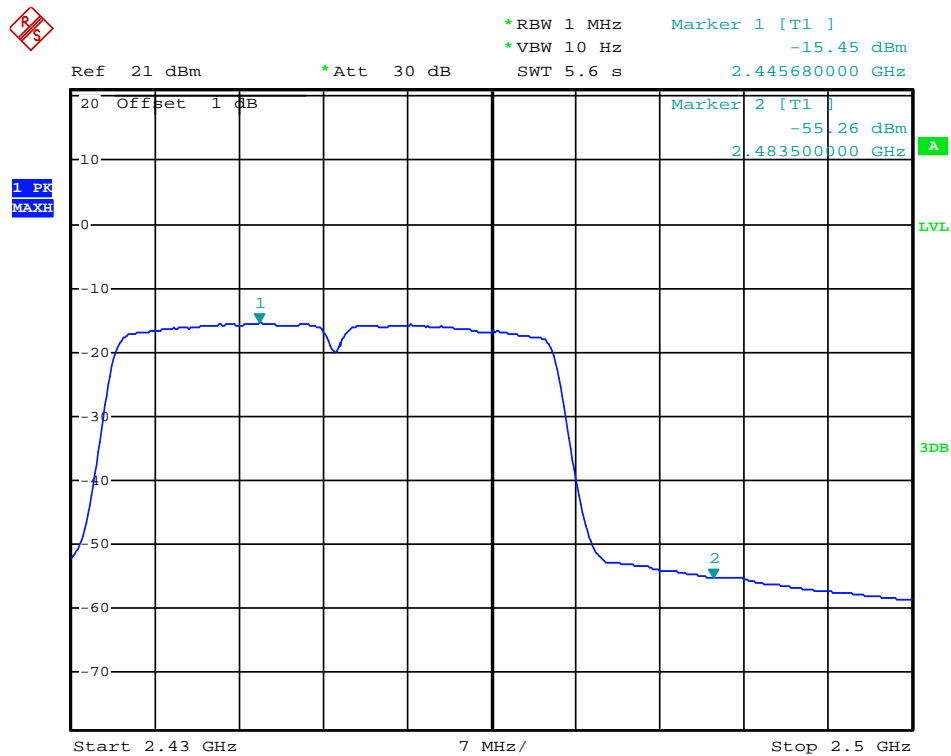
Date: 3.NOV.2013 14:06:26

(Plot 4.5.4 A2: Channel 3: 2422MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 14:09:08

(Plot 4.5.4 A3: Channel 9: 2452MHz @ 802.11n(40MHz))

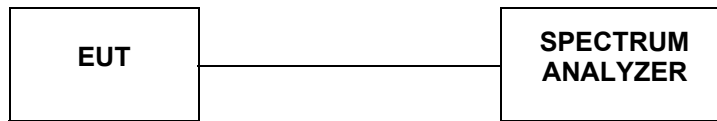


Date: 3.NOV.2013 14:10:25

(Plot 4.5.4 A4: Channel 9: 2452MHz @ 802.11n(40MHz))

## 4.6. Spurious RF Conducted Emission

### TEST CONFIGURATION



### TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

### LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

### TEST RESULTS

Remark: The measurement frequency range is from 30MHz to the 10<sup>th</sup> harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

#### 4.6.1 802.11b Test Mode

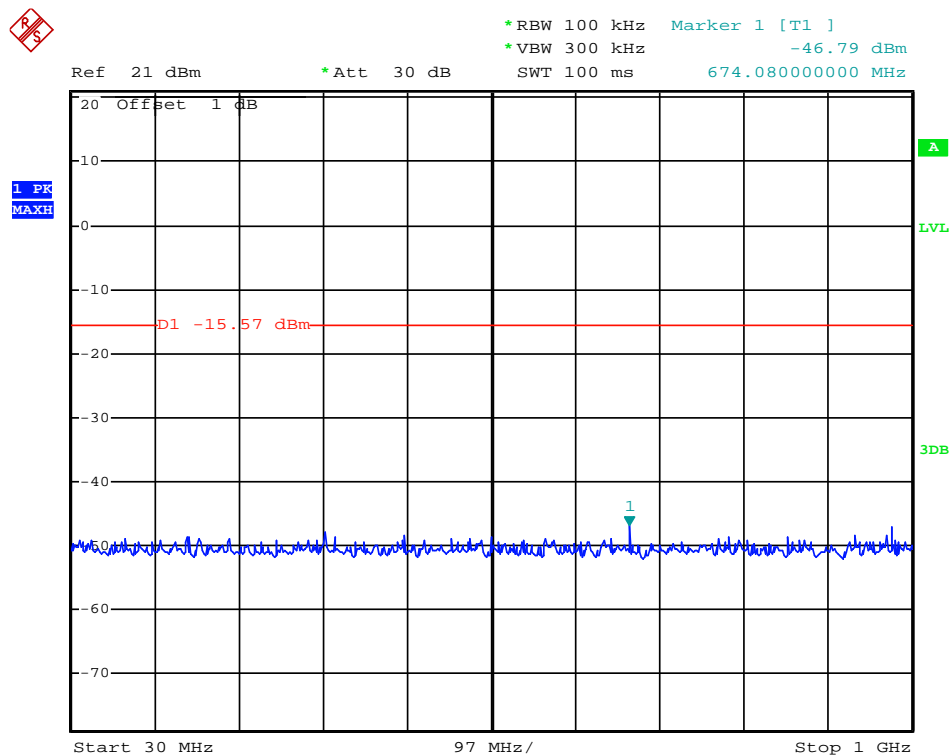
##### A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-1GHz	Plot 4.6.1 A1	-20	PASS
		1GHz-8GHz	Plot 4.6.1 A2	-20	PASS
		8GHz-16GHz	Plot 4.6.1 A3	-20	PASS
		16GHz-25GHz	Plot 4.6.1 A4	-20	PASS
6	2437	30MHz-1GHz	Plot 4.6.1 B1	-20	PASS
		1GHz-8GHz	Plot 4.6.1 B2	-20	PASS
		8GHz-16GHz	Plot 4.6.1 B3	-20	PASS
		16GHz-25GHz	Plot 4.6.1 B4	-20	PASS
11	2462	30MHz-1GHz	Plot 4.6.1 C1	-20	PASS
		1GHz-8GHz	Plot 4.6.1 C2	-20	PASS
		8GHz-16GHz	Plot 4.6.1 C3	-20	PASS
		16GHz-25GHz	Plot 4.6.1 C4	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-45.41	Peak	-20	Plot 4.6.1 D	PASS
2483.50	-52.21	Peak	-20	Plot 4.6.1 E	PASS

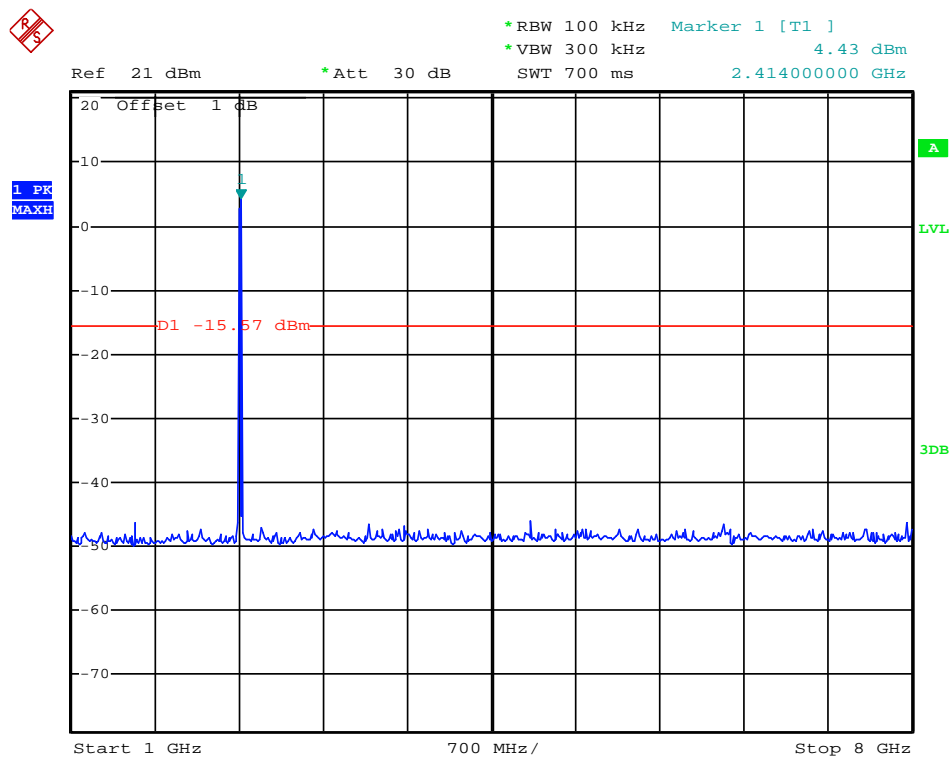
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



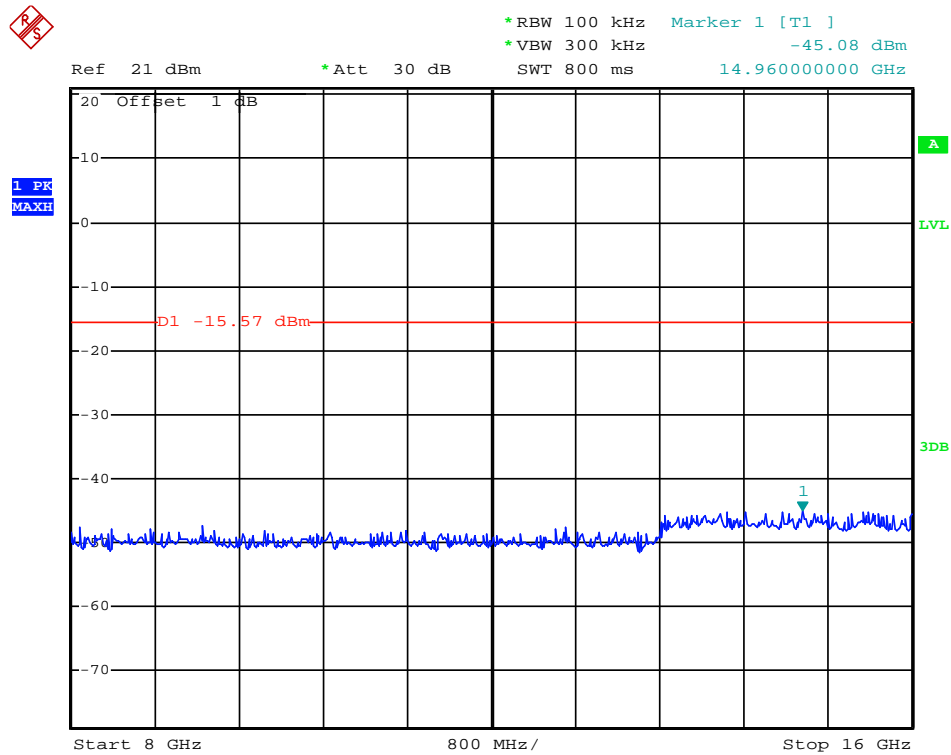
Date: 3.NOV.2013 14:35:48

(Plot 4.6.1 A1: Channel 1: 2412MHz @ 802.11b)



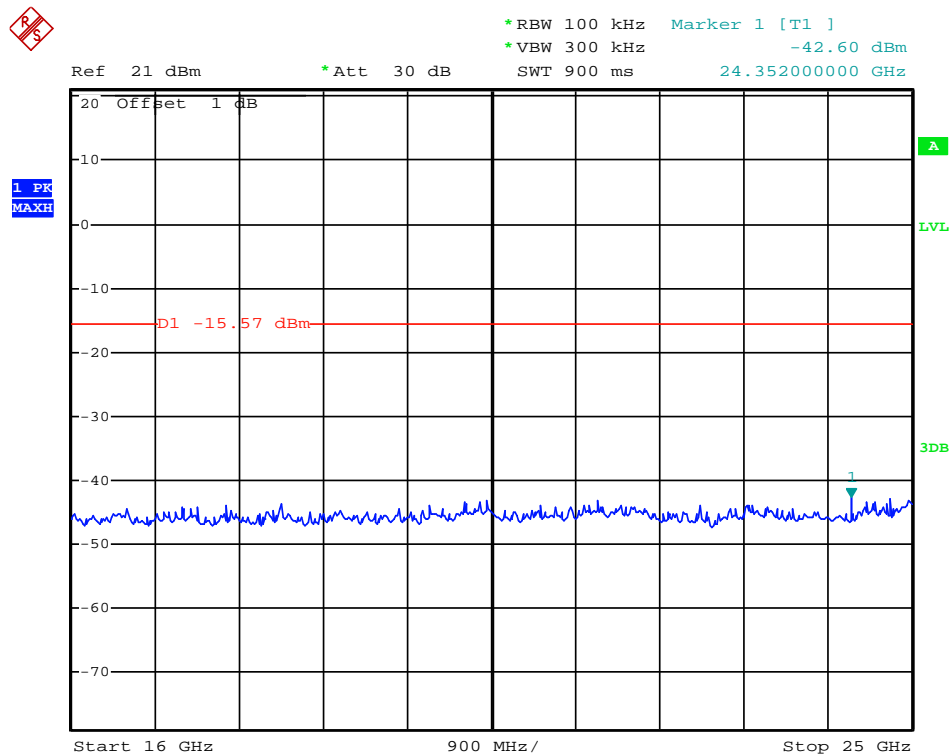
Date: 3.NOV.2013 14:35:36

(Plot 4.6.1 A2: Channel 1: 2412MHz @ 802.11b)



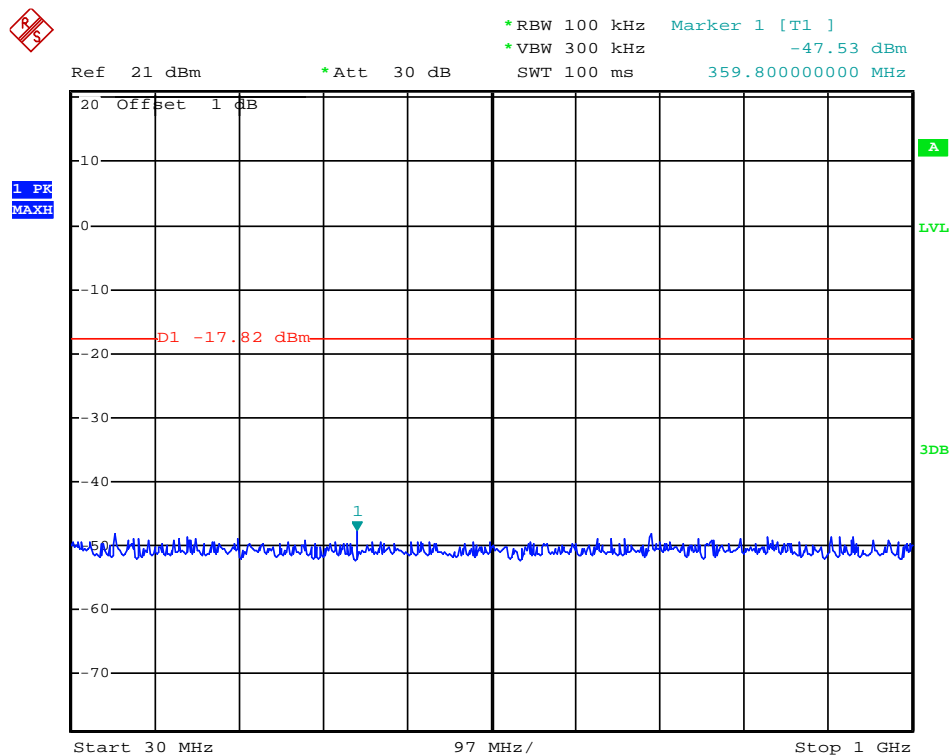
Date: 3.NOV.2013 14:36:00

(Plot 4.6.1 A3: Channel 1: 2412MHz @ 802.11b)



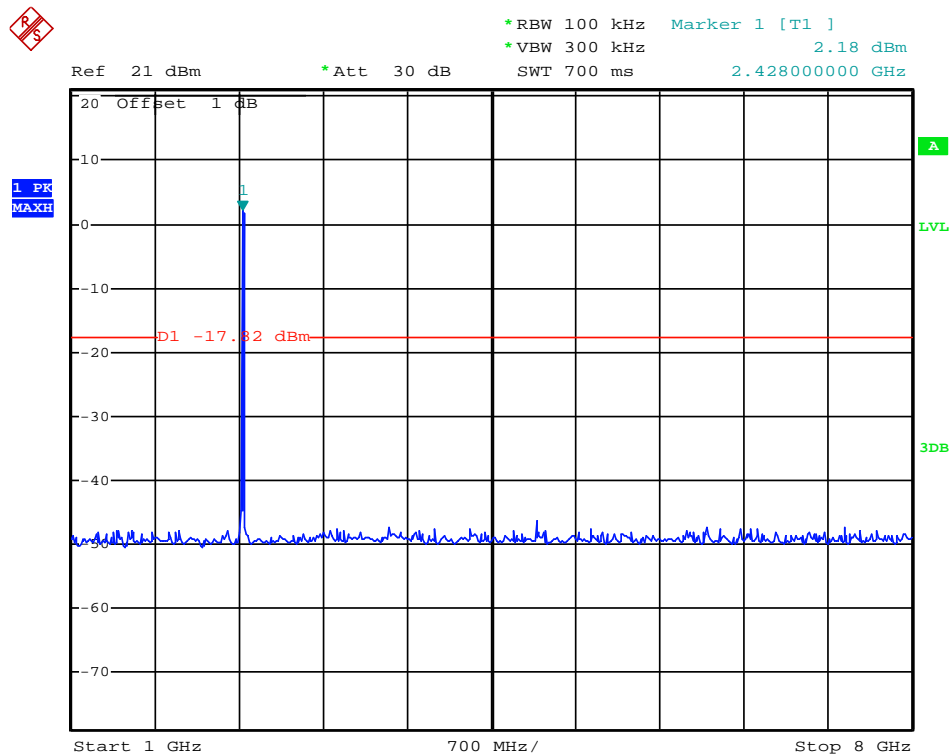
Date: 3.NOV.2013 14:36:18

(Plot 4.6.1 A4: Channel 1: 2412MHz @ 802.11b)



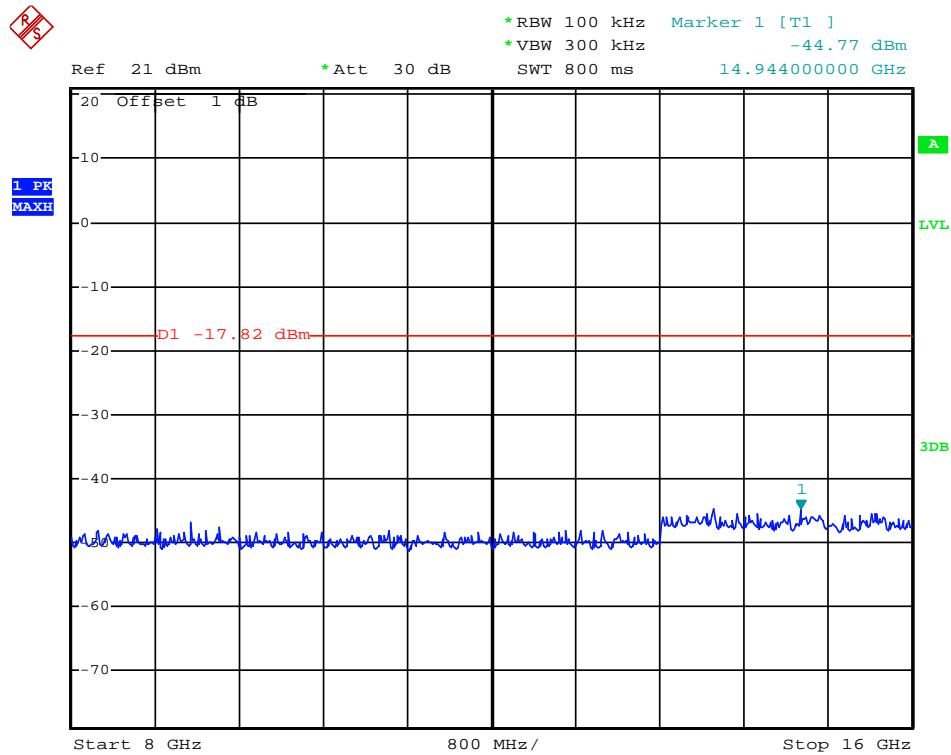
Date: 3.NOV.2013 14:36:59

(Plot 4.6.1 B1: Channel 6: 2437MHz @ 802.11b)



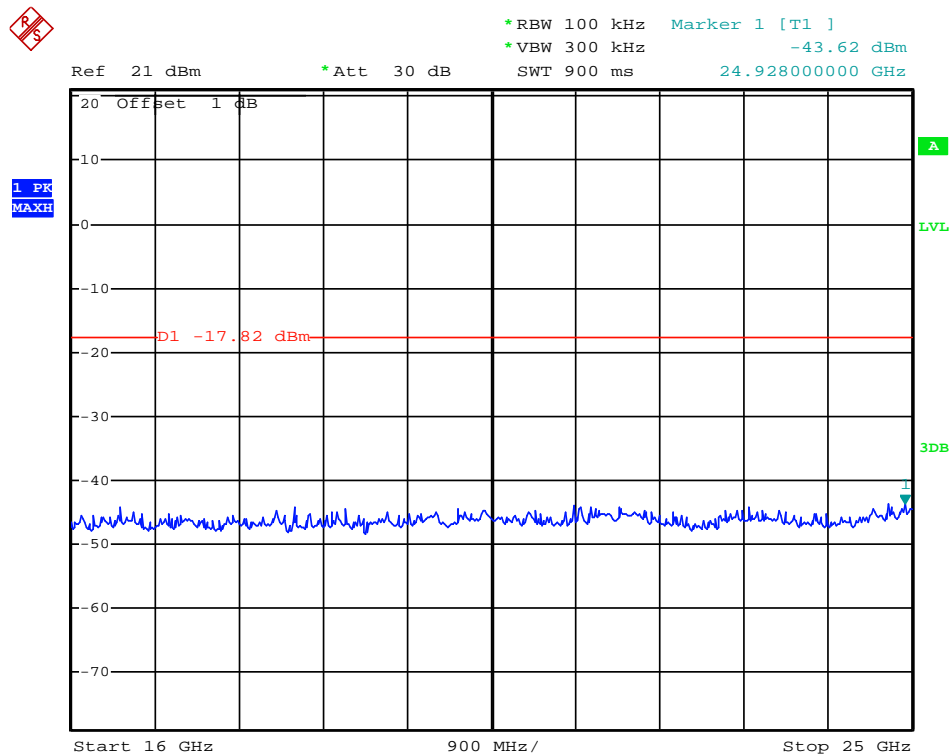
Date: 3.NOV.2013 14:36:47

(Plot 4.6.1 B2: Channel 6: 2437MHz @ 802.11b)



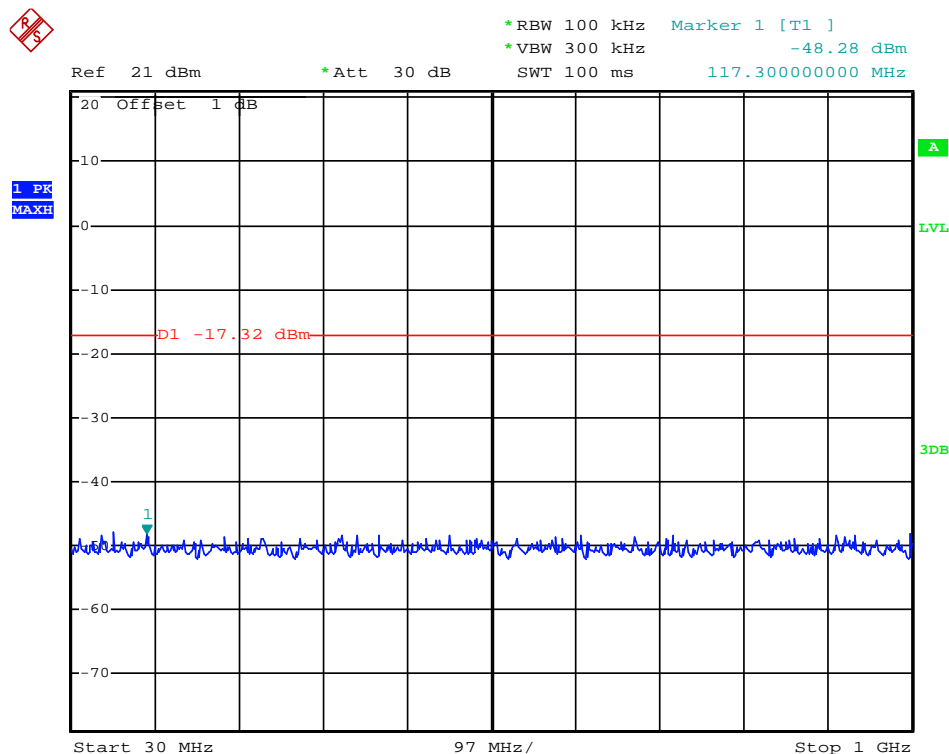
Date: 3.NOV.2013 14:37:15

(Plot 4.6.1 B3: Channel 6: 2437MHz @ 802.11b)



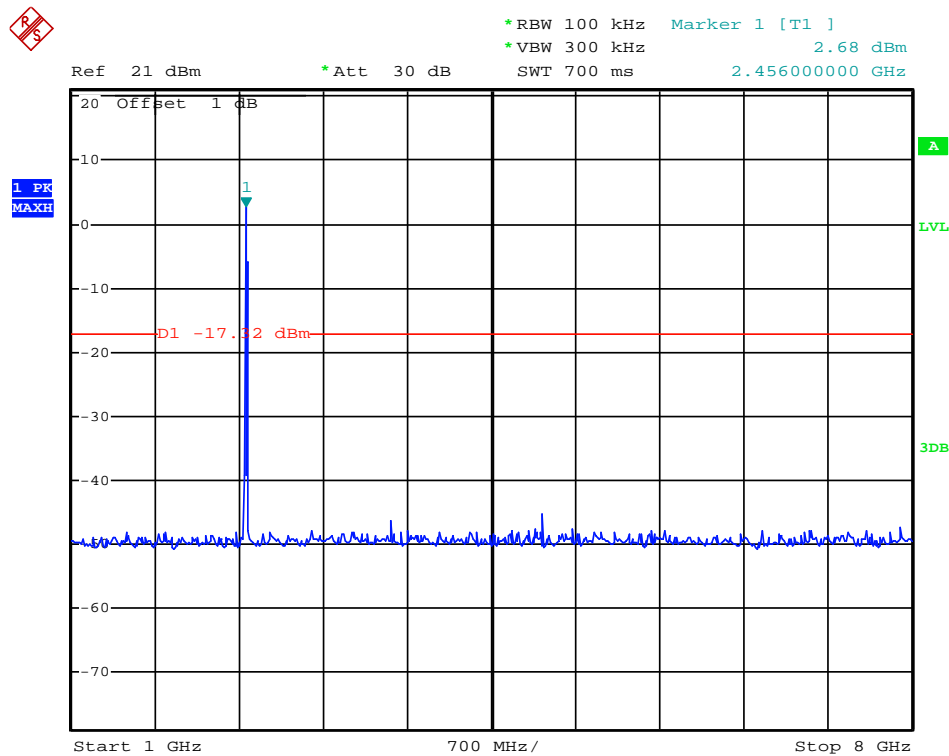
Date: 3.NOV.2013 14:37:25

(Plot 4.6.1 B4: Channel 6: 2437MHz @ 802.11b)



Date: 3.NOV.2013 14:37:58

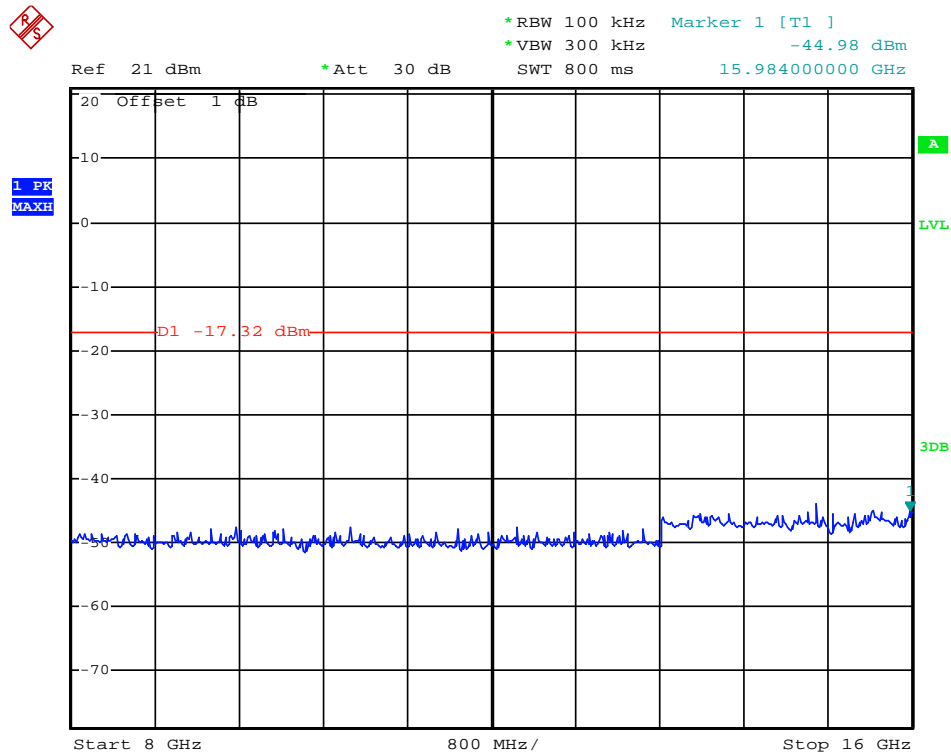
(Plot 4.6.1 C1: Channel 11: 2462MHz @ 802.11b)



Date: 3.NOV.2013 14:37:49

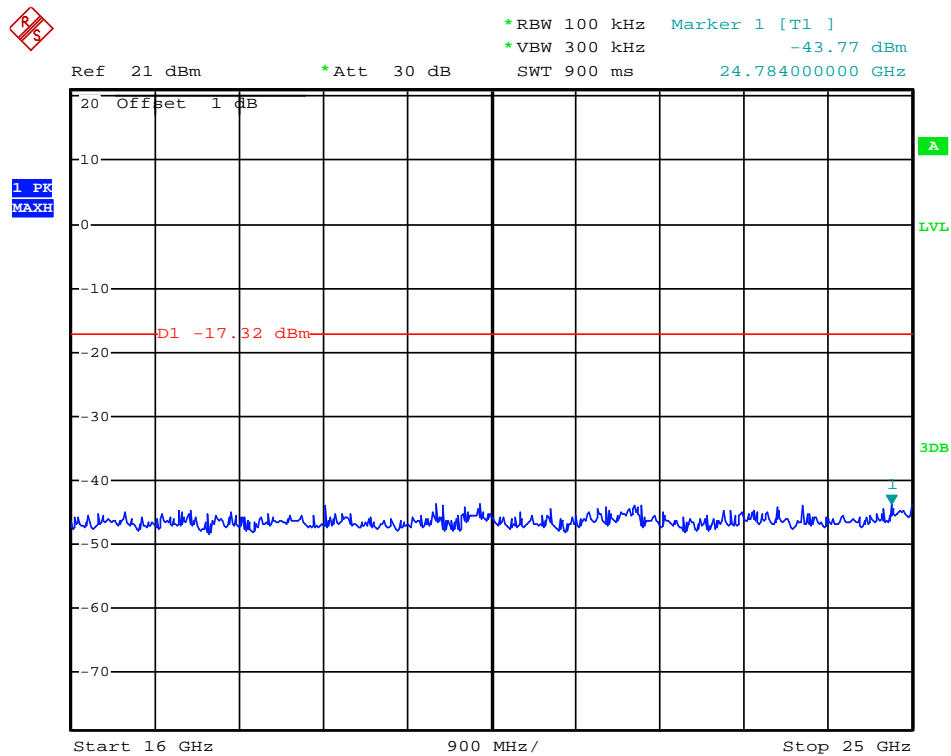
(Plot 4.6.1 C2: Channel 11: 2462MHz @ 802.11b)





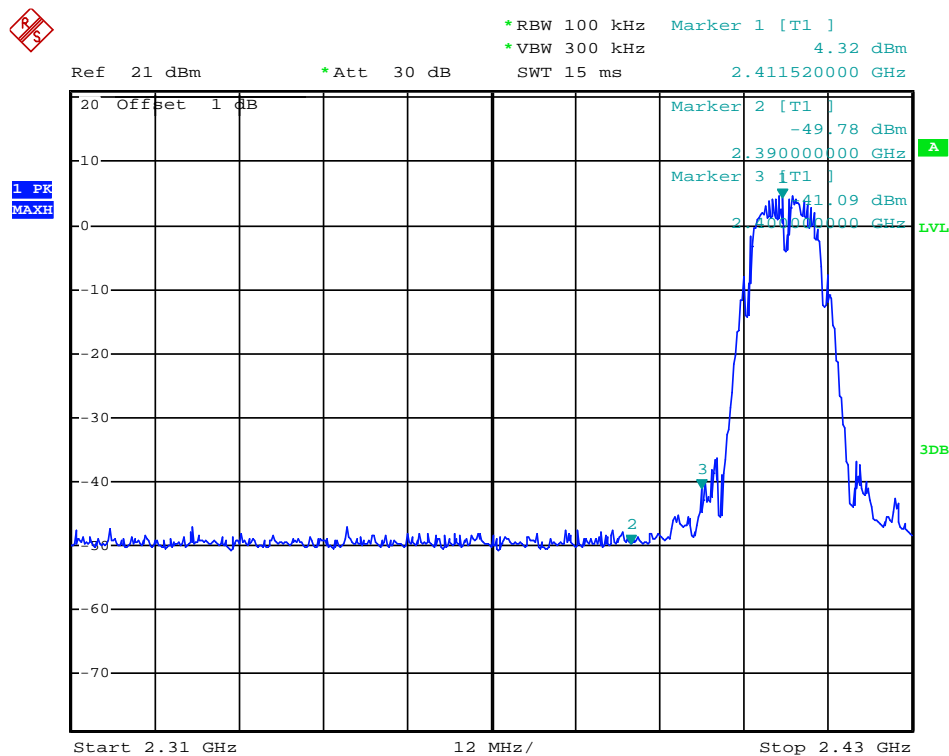
Date: 3.NOV.2013 14:38:08

(Plot 4.6.1 C3: Channel 11: 2462MHz @ 802.11b)



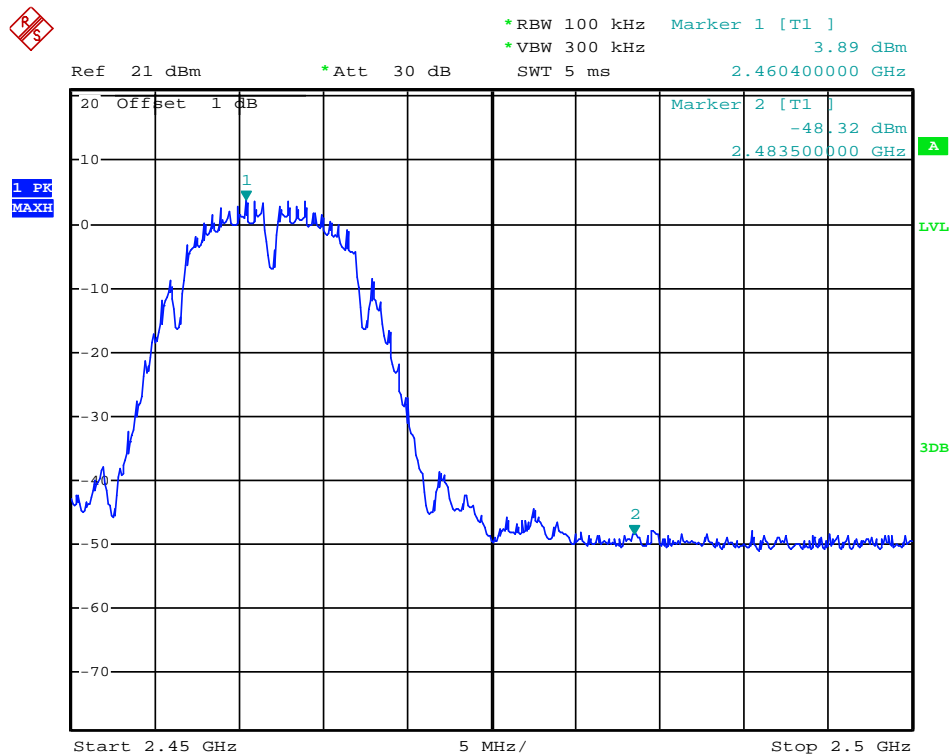
Date: 3.NOV.2013 14:38:19

(Plot 4.6.1 C4: Channel 11: 2462MHz @ 802.11b)



Date: 3.NOV.2013 13:40:35

(Plot 4.6.1 D: Channel 1: 2412MHz @ 802.11b)



Date: 3.NOV.2013 13:44:18

(Plot 4.6.1 E: Channel 11: 2462MHz @ 802.11b)

## 4.6.2 802.11g Test Mode

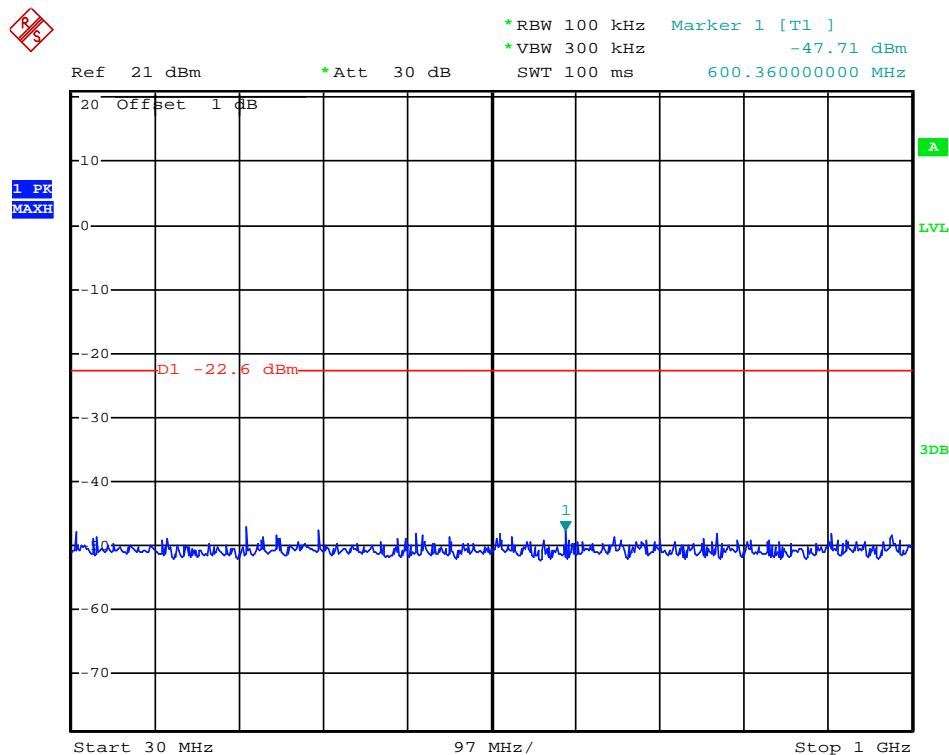
### A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-1GHz	Plot 4.6.2 A1	-20	PASS
		1GHz-8GHz	Plot 4.6.2 A2	-20	PASS
		8GHz-16GHz	Plot 4.6.2 A3	-20	PASS
		16GHz-25GHz	Plot 4.6.2 A4	-20	PASS
6	2437	30MHz-1GHz	Plot 4.6.2 B1	-20	PASS
		1GHz-8GHz	Plot 4.6.2 B2	-20	PASS
		8GHz-16GHz	Plot 4.6.2 B3	-20	PASS
		16GHz-25GHz	Plot 4.6.2 B4	-20	PASS
11	2462	30MHz-1GHz	Plot 4.6.2 C1	-20	PASS
		1GHz-8GHz	Plot 4.6.2 C2	-20	PASS
		8GHz-16GHz	Plot 4.6.2 C3	-20	PASS
		16GHz-25GHz	Plot 4.6.2 C4	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-38.37	Peak	-20	Plot 4.6.2 D	PASS
2483.50	-46.77	Peak	-20	Plot 4.6.2 E	PASS

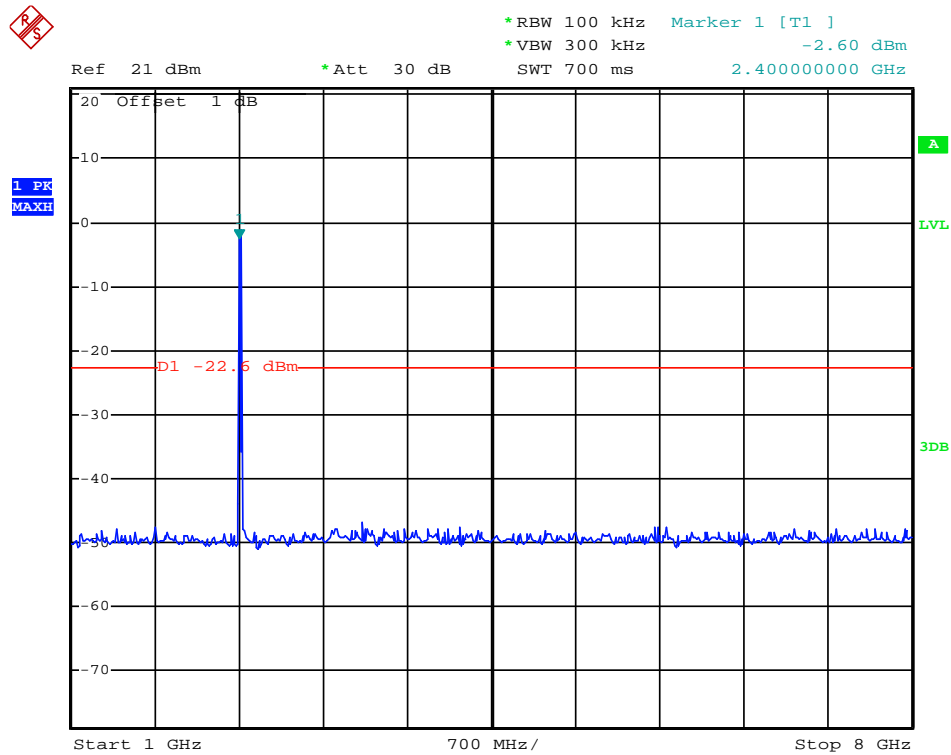
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.  
2. The test results including the cable lose.

### B. Test Plots



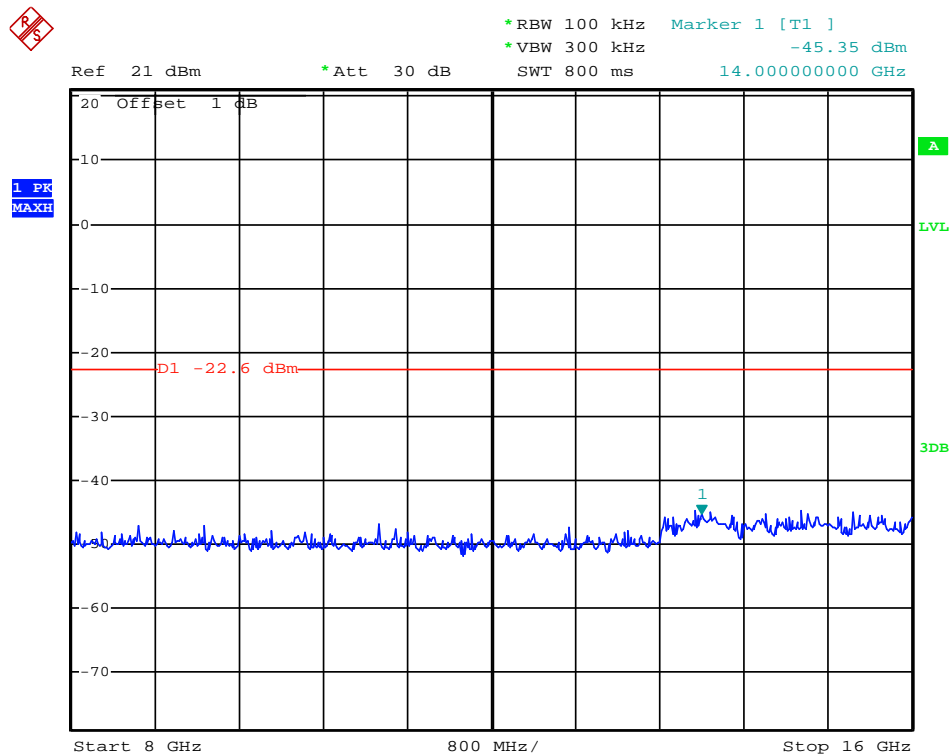
Date: 3.NOV.2013 14:38:59

(Plot 4.6.2 A1: Channel 1: 2412MHz @ 802.11g)



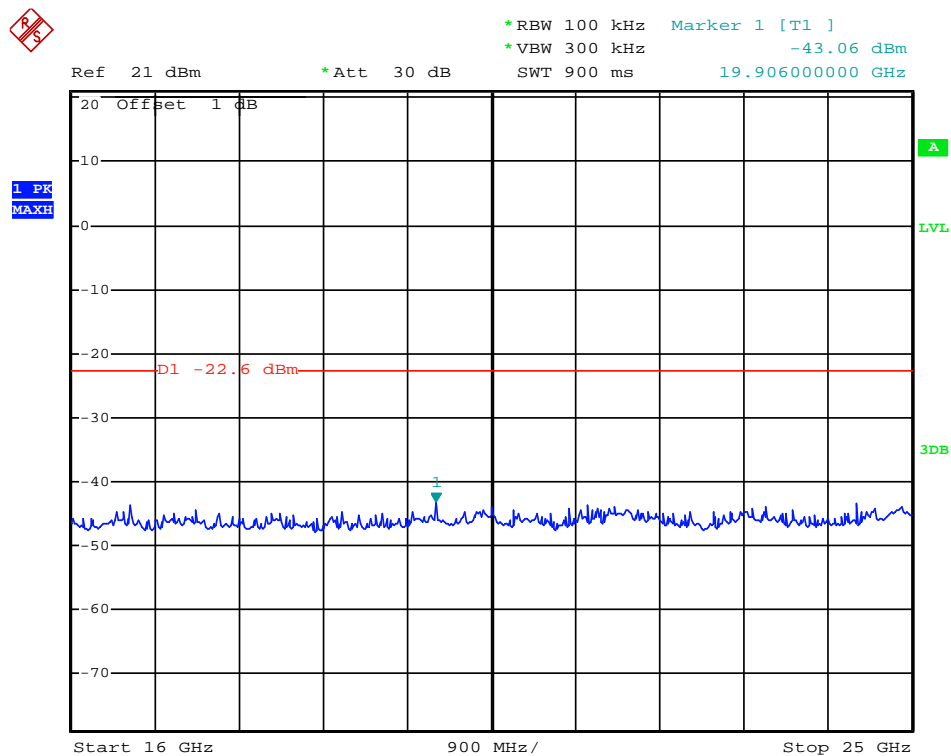
Date: 3.NOV.2013 14:38:49

(Plot 4.6.2 A2: Channel 1: 2412MHz @ 802.11g)



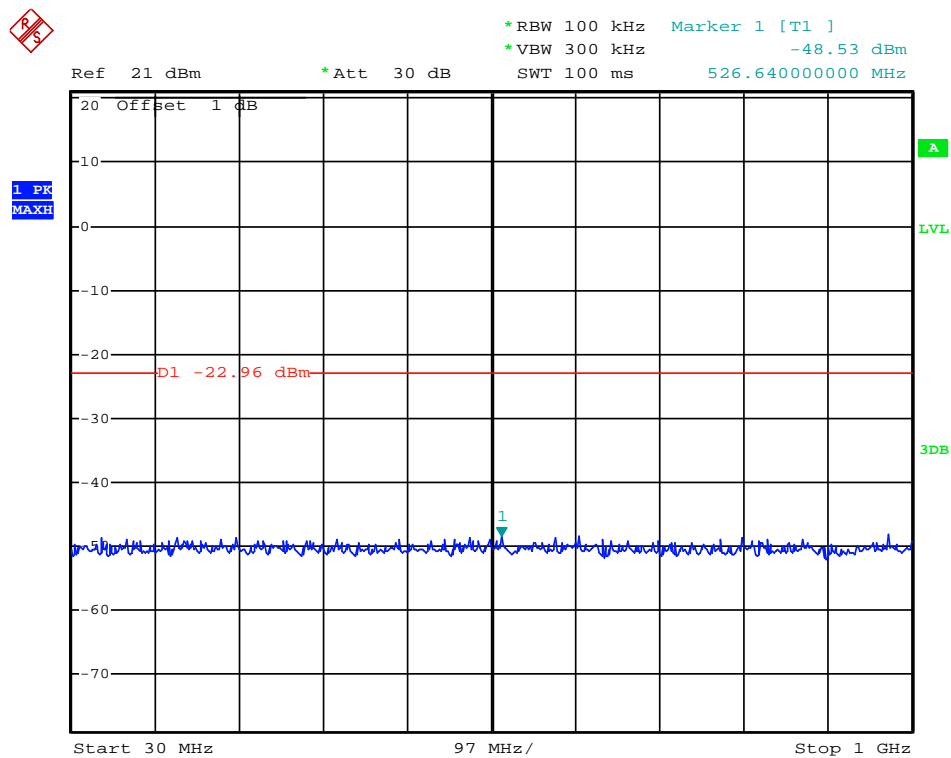
Date: 3.NOV.2013 14:39:11

(Plot 4.6.2 A3: Channel 1: 2412MHz @ 802.11g)



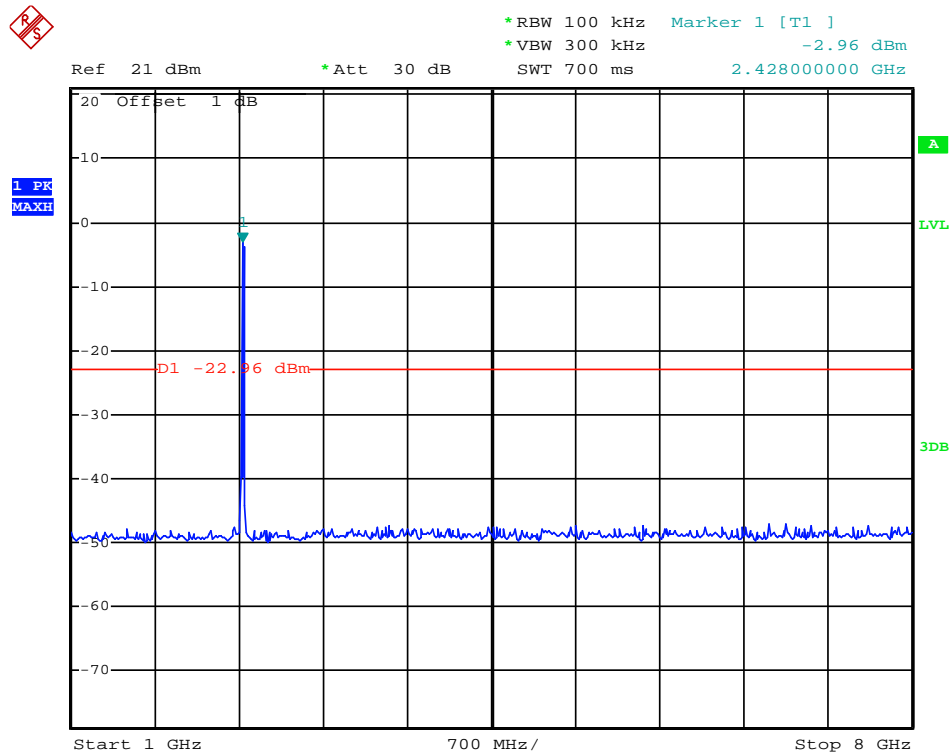
Date: 3.NOV.2013 14:39:30

(Plot 4.6.2 A4: Channel 1: 2412MHz @ 802.11g)



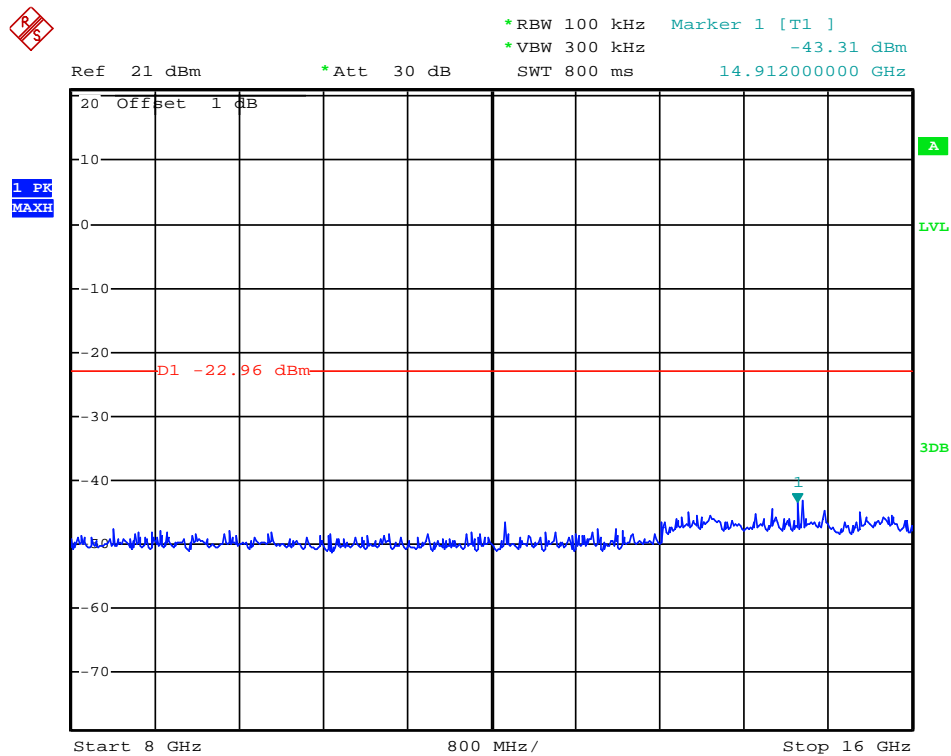
Date: 3.NOV.2013 14:40:42

(Plot 4.6.2 B1: Channel 6: 2437MHz @ 802.11g)



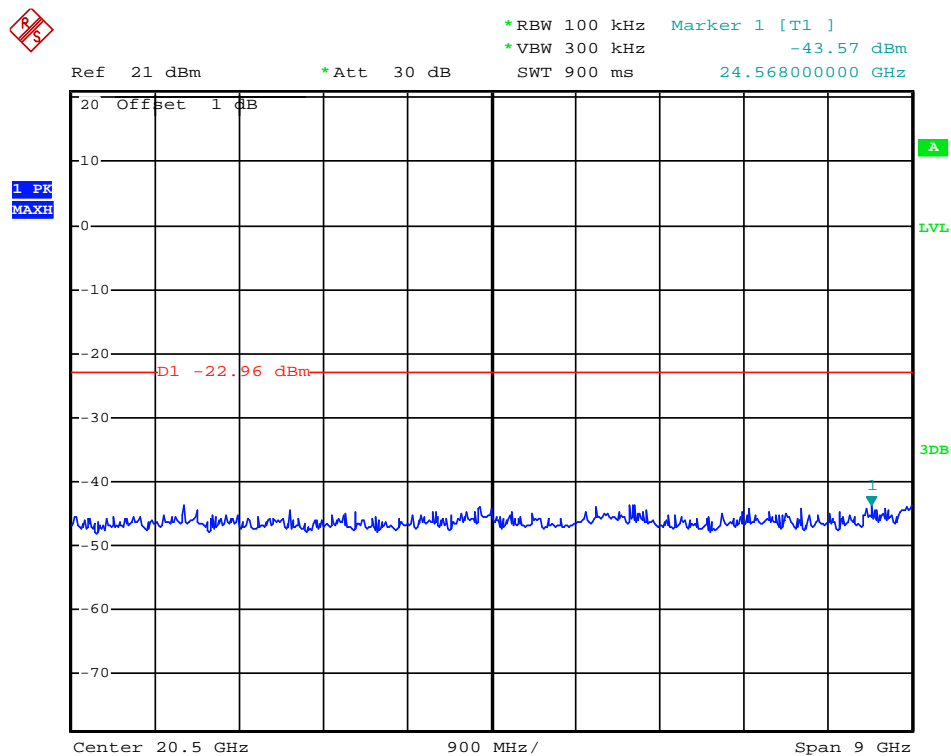
Date: 3.NOV.2013 14:40:33

(Plot 4.6.2 B2: Channel 6: 2437MHz @ 802.11g)



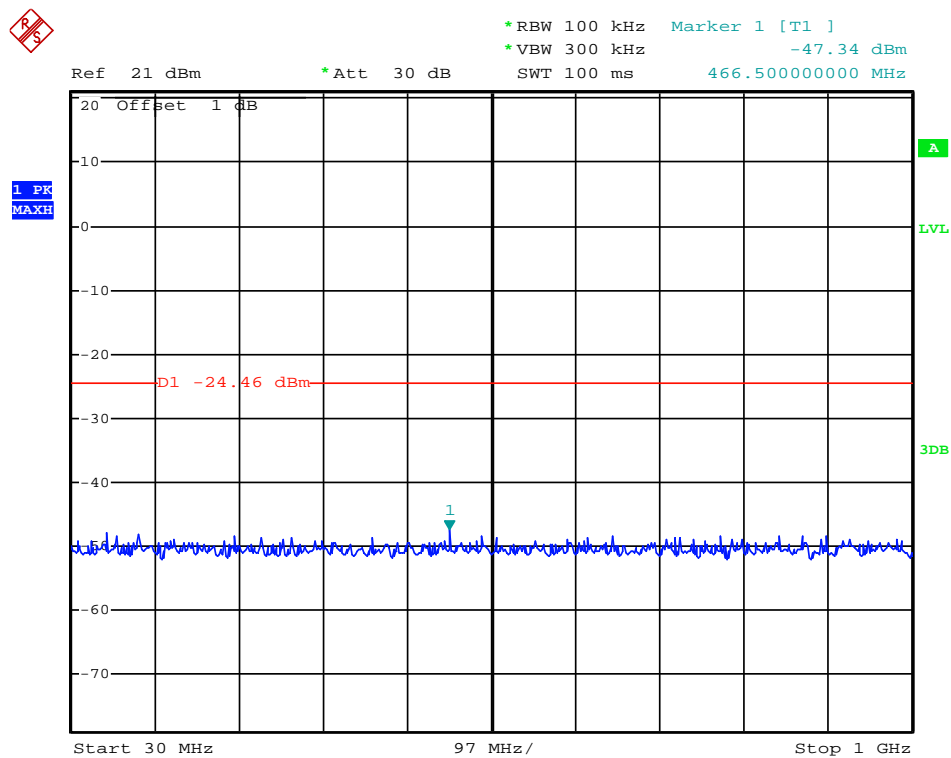
Date: 3.NOV.2013 14:40:55

(Plot 4.6.2 B3: Channel 6: 2437MHz @ 802.11g)



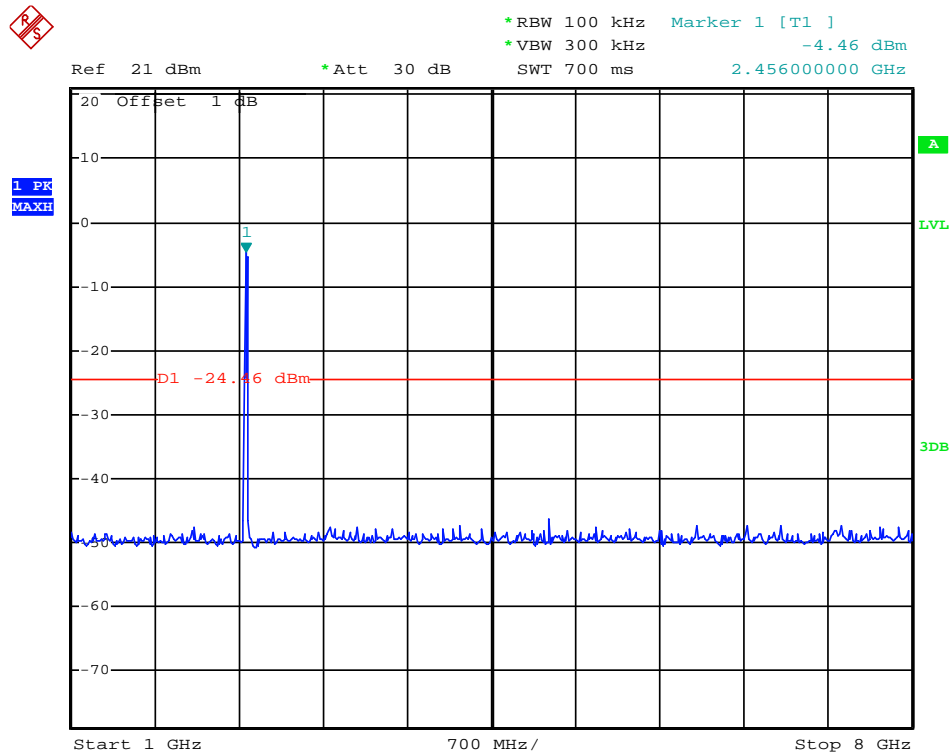
Date: 3.NOV.2013 14:41:06

(Plot 4.6.2 B4: Channel 6: 2437MHz @ 802.11g)



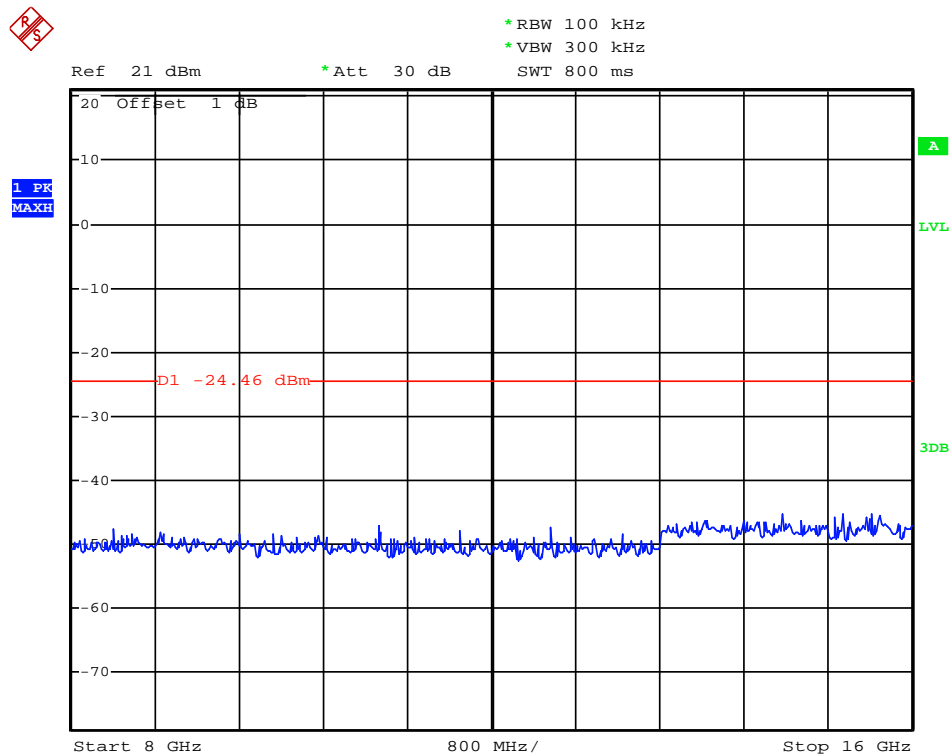
Date: 3.NOV.2013 14:41:46

(Plot 4.6.2 C1: Channel 11: 2462MHz @ 802.11g)



Date: 3.NOV.2013 14:41:36

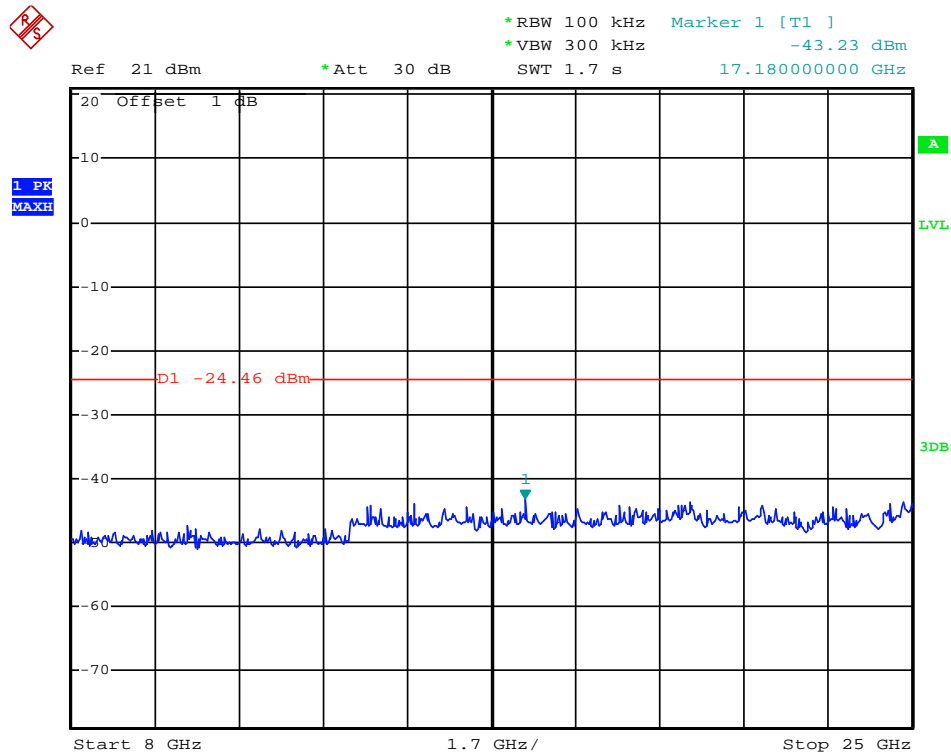
(Plot 4.6.2 C2: Channel 11: 2462MHz @ 802.11g)



Date: 3.NOV.2013 14:41:56

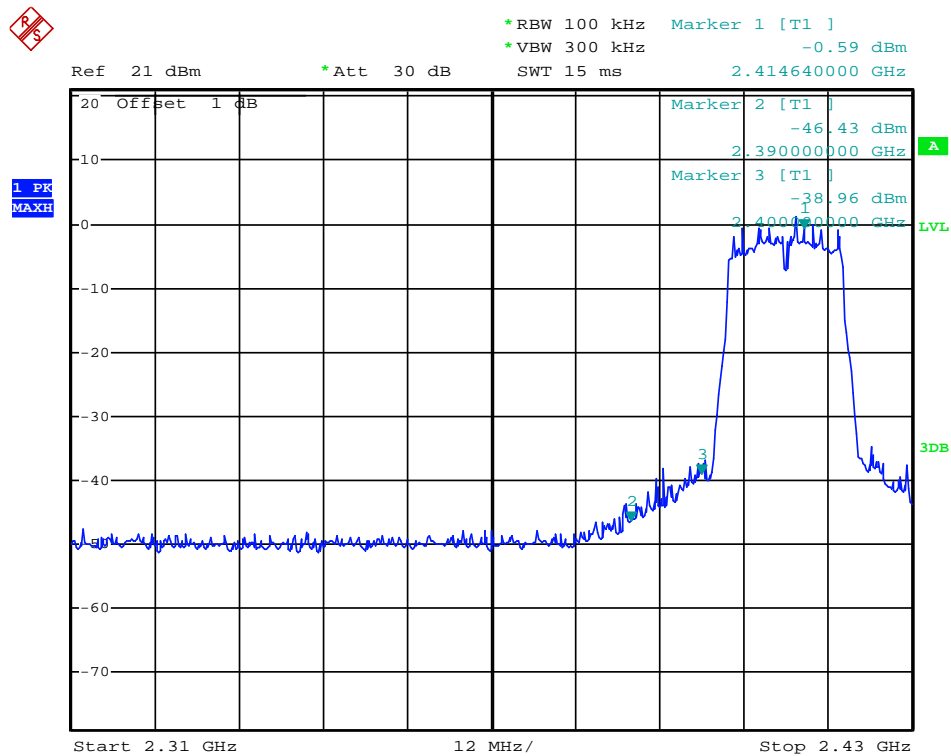
(Plot 4.6.2 C3: Channel 11: 2462MHz @ 802.11g)





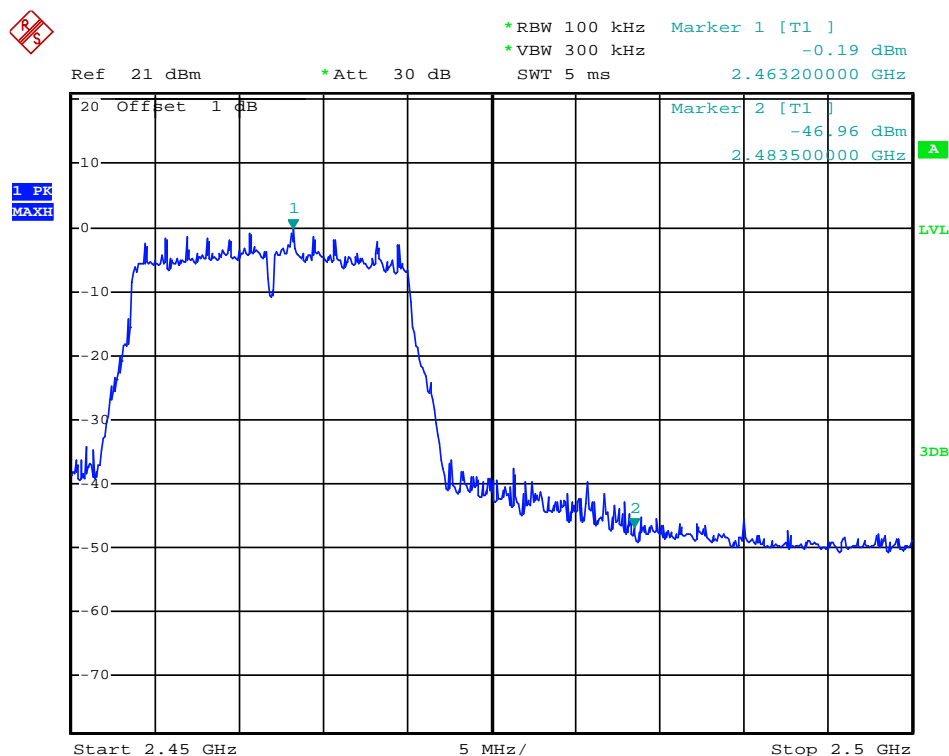
Date: 3.NOV.2013 14:42:15

(Plot 4.6.2 C3: Channel 11: 2462MHz @ 802.11g)



Date: 3.NOV.2013 13:41:45

(Plot 4.6.2 D: Channel 1: 2412MHz @ 802.11g)



Date: 3.NOV.2013 13:45:18

(Plot 4.6.2 E: Channel 11: 2462MHz @ 802.11g)

#### 4.6.3 802.11n(20MHz) Test Mode

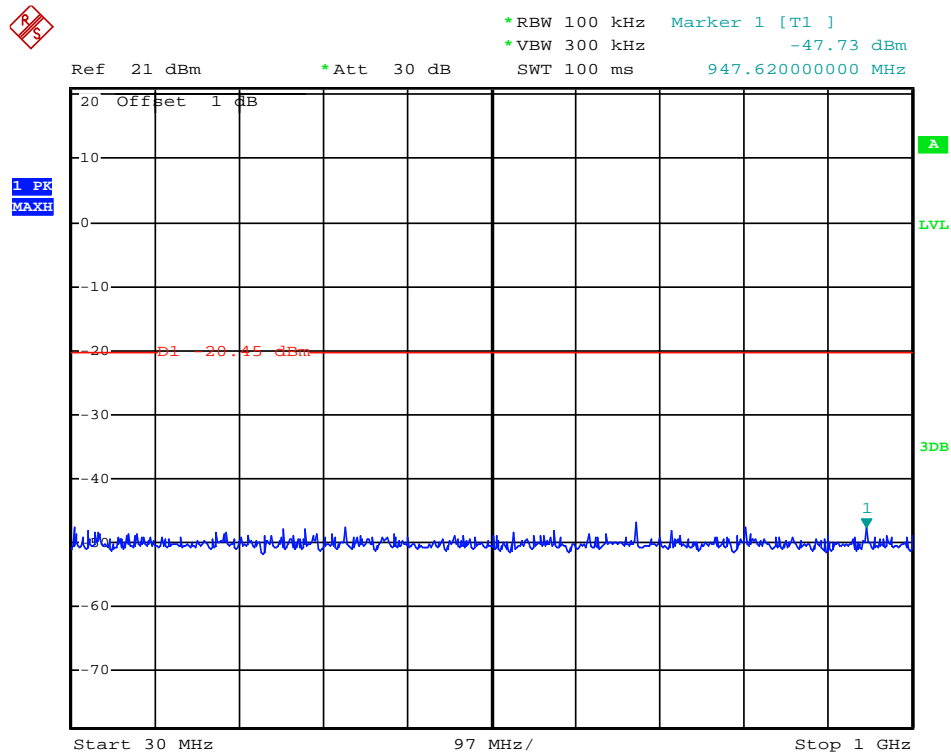
##### A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-1GHz	Plot 4.6.3 A1	-20	PASS
		1GHz-8GHz	Plot 4.6.3 A2	-20	PASS
		8GHz-16GHz	Plot 4.6.3 A3	-20	PASS
		16GHz-25GHz	Plot 4.6.3 A4	-20	PASS
6	2437	30MHz-1GHz	Plot 4.6.3 B1	-20	PASS
		1GHz-8GHz	Plot 4.6.3 B2	-20	PASS
		8GHz-16GHz	Plot 4.6.3 B3	-20	PASS
		16GHz-25GHz	Plot 4.6.3 B4	-20	PASS
11	2462	30MHz-1GHz	Plot 4.6.3 C1	-20	PASS
		1GHz-8GHz	Plot 4.6.3 C2	-20	PASS
		8GHz-16GHz	Plot 4.6.3 C3	-20	PASS
		16GHz-25GHz	Plot 4.6.3 C4	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-38.57	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-44.76	Peak	-20	Plot 4.6.3 E	PASS

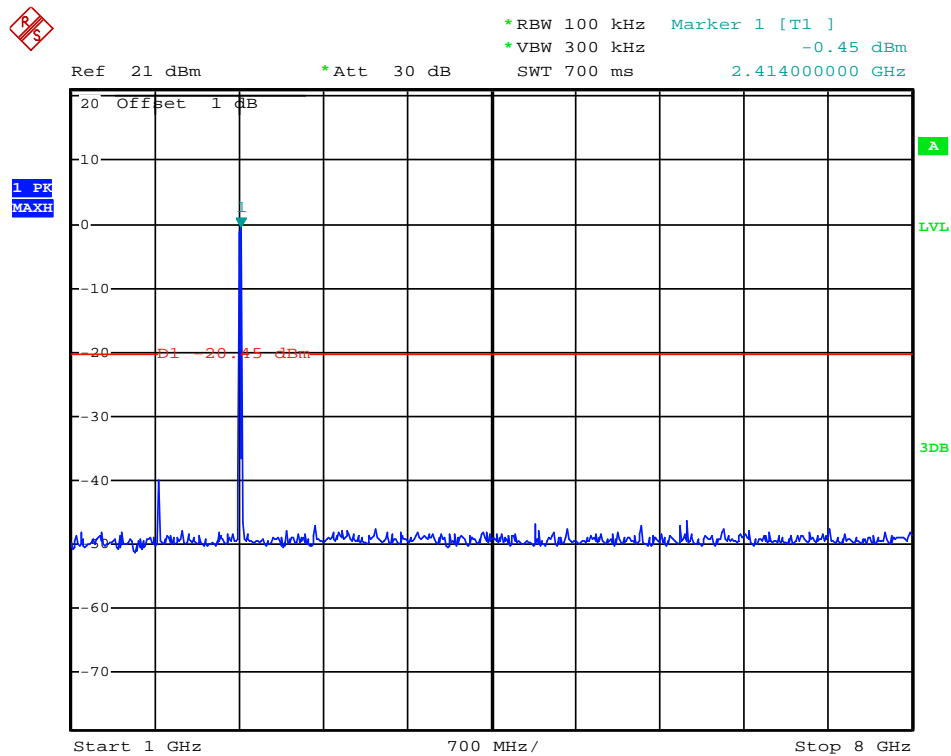
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



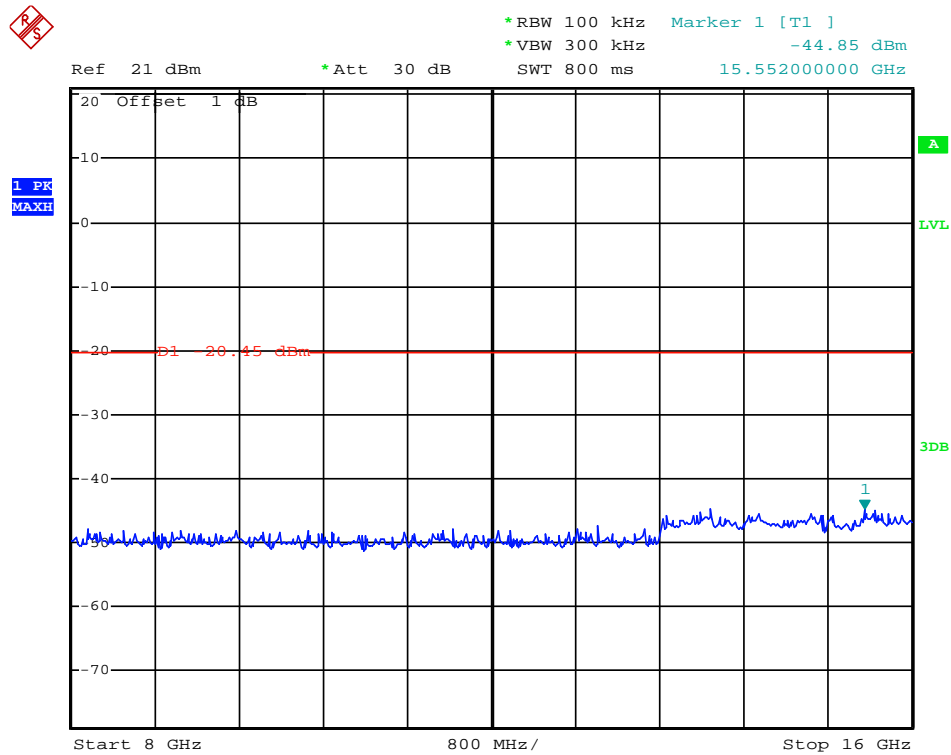
Date: 3.NOV.2013 14:42:58

(Plot 4.6.3 A1: Channel 1: 2412MHz @ 802.11n(20MHz))



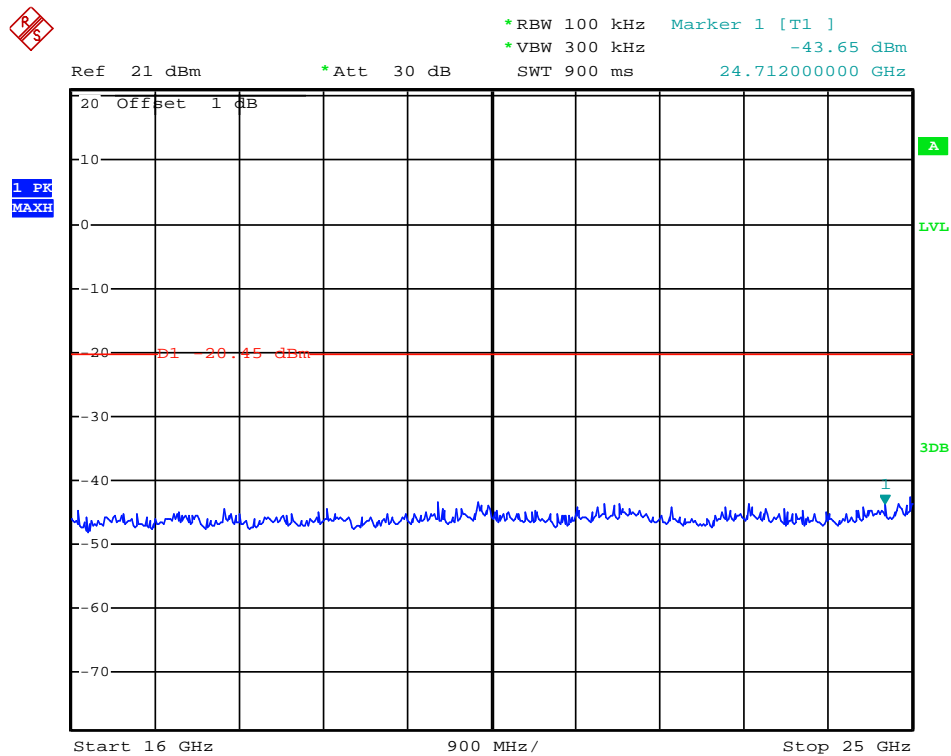
Date: 3.NOV.2013 14:42:47

(Plot 4.6.3 A2: Channel 1: 2412MHz @ 802.11n(20MHz))



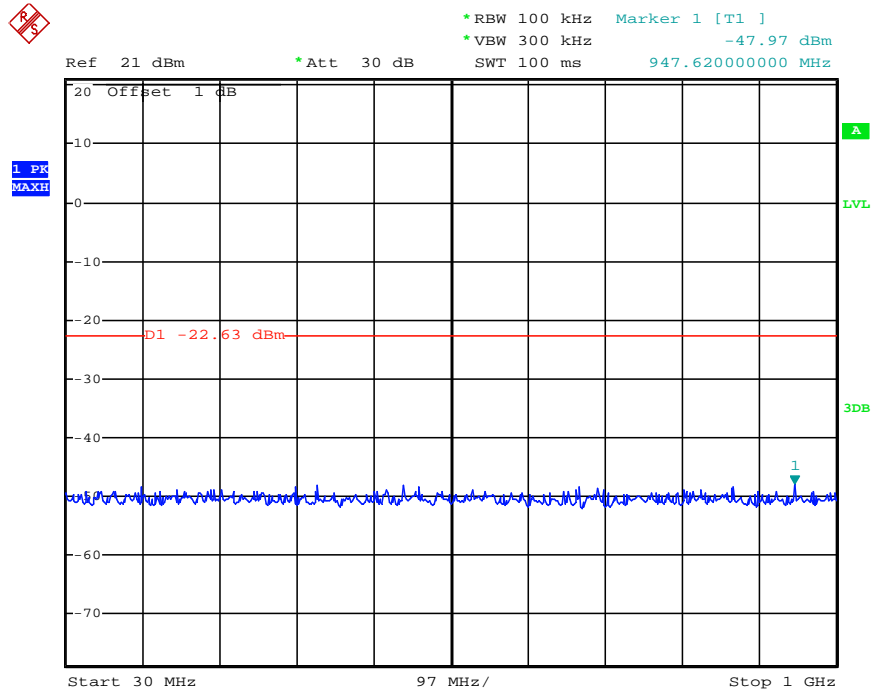
Date: 3.NOV.2013 14:43:14

(Plot 4.6.3 A3: Channel 1: 2412MHz @ 802.11n(20MHz))



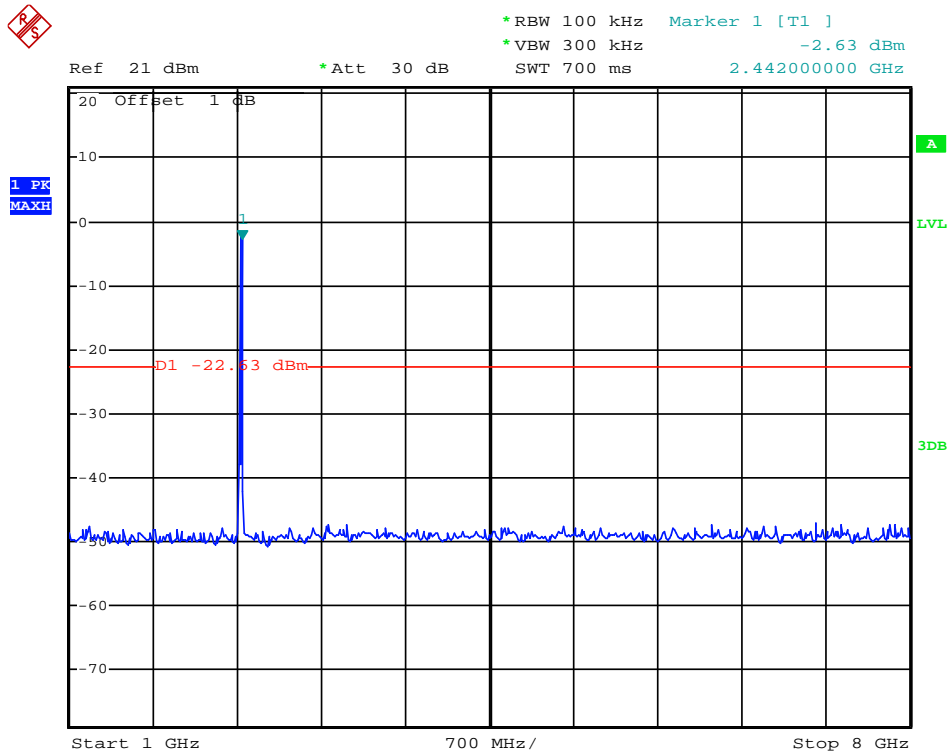
Date: 3.NOV.2013 14:43:34

(Plot 4.6.3 A4: Channel 1: 2412MHz @ 802.11n(20MHz))



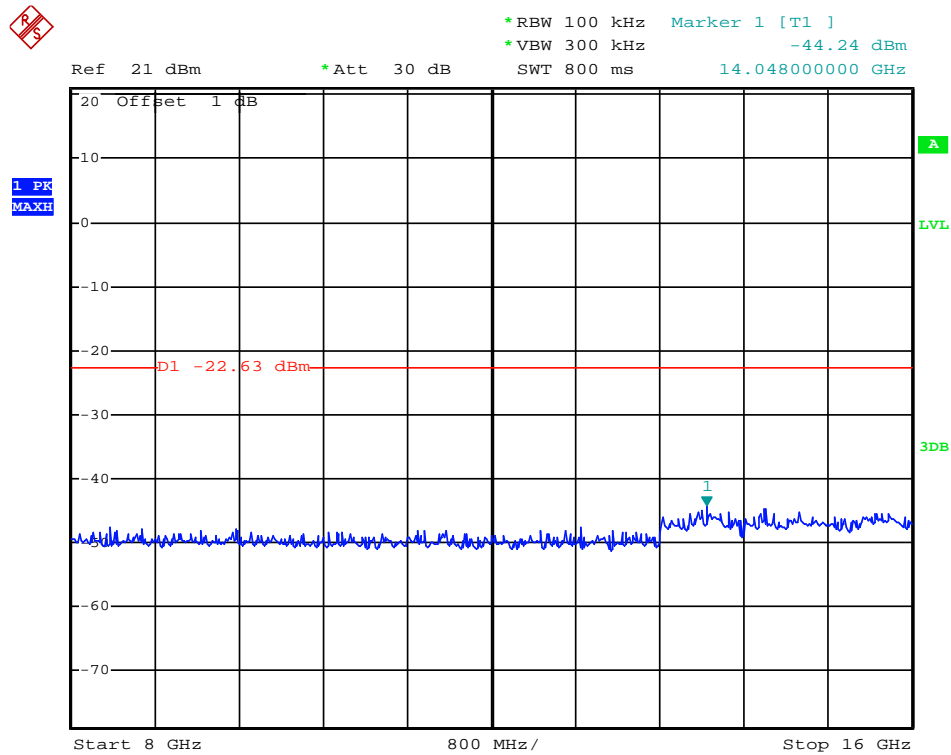
Date: 3.NOV.2013 14:44:32

(Plot 4.6.3 B1: Channel 6: 2437MHz @ 802.11n(20MHz))



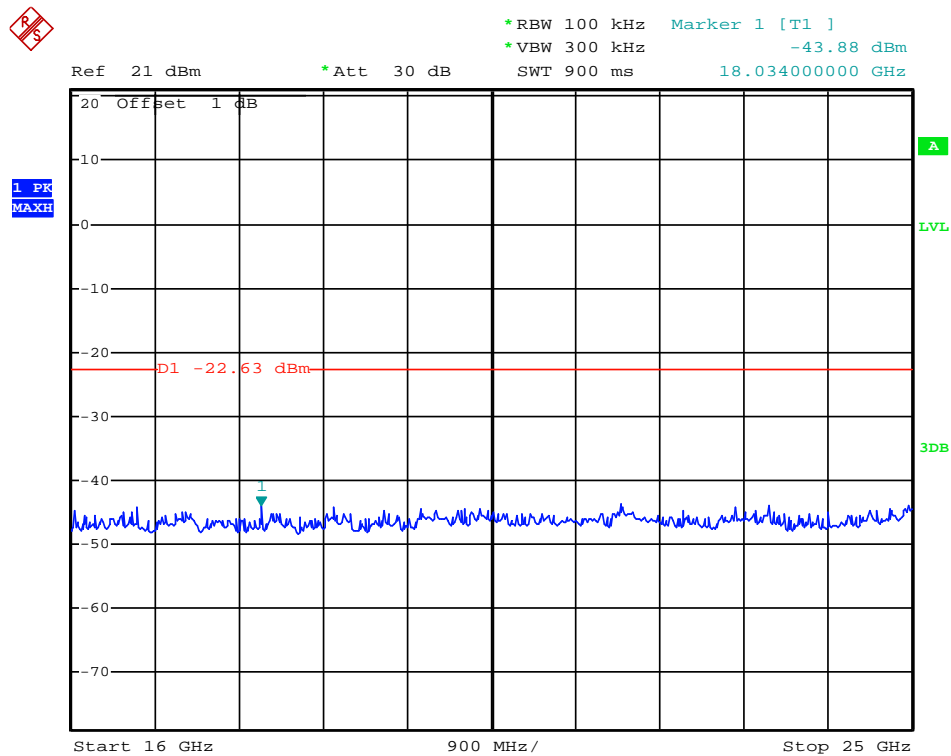
Date: 3.NOV.2013 14:44:21

(Plot 4.6.3 B2: Channel 6: 2437MHz @ 802.11n(20MHz))



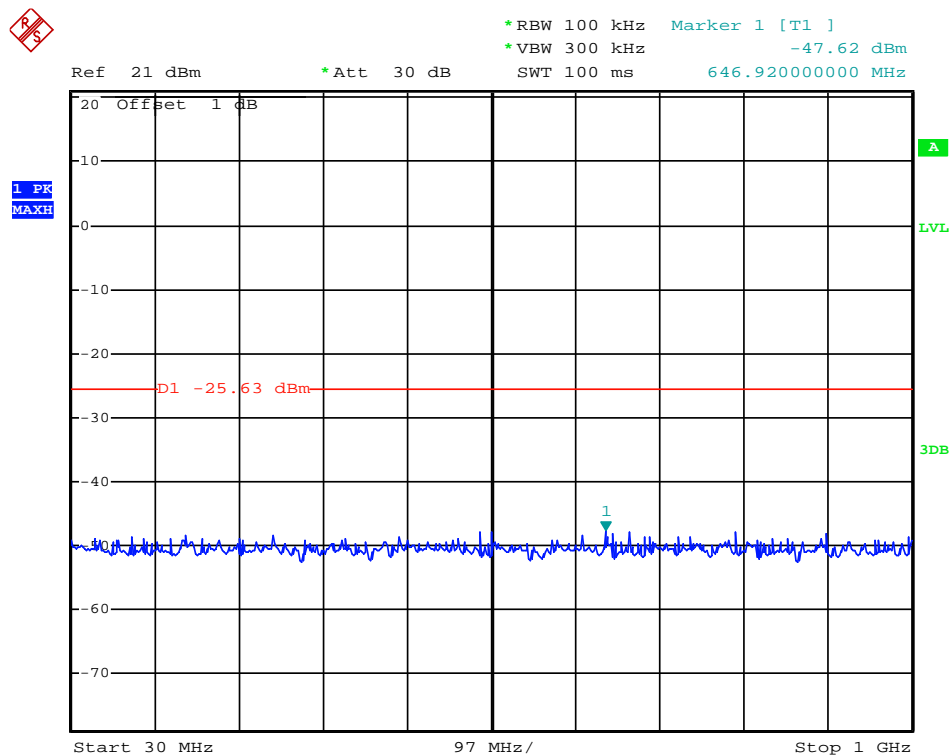
Date: 3.NOV.2013 14:44:45

(Plot 4.6.3 B3: Channel 6: 2437MHz @ 802.11n(20MHz))



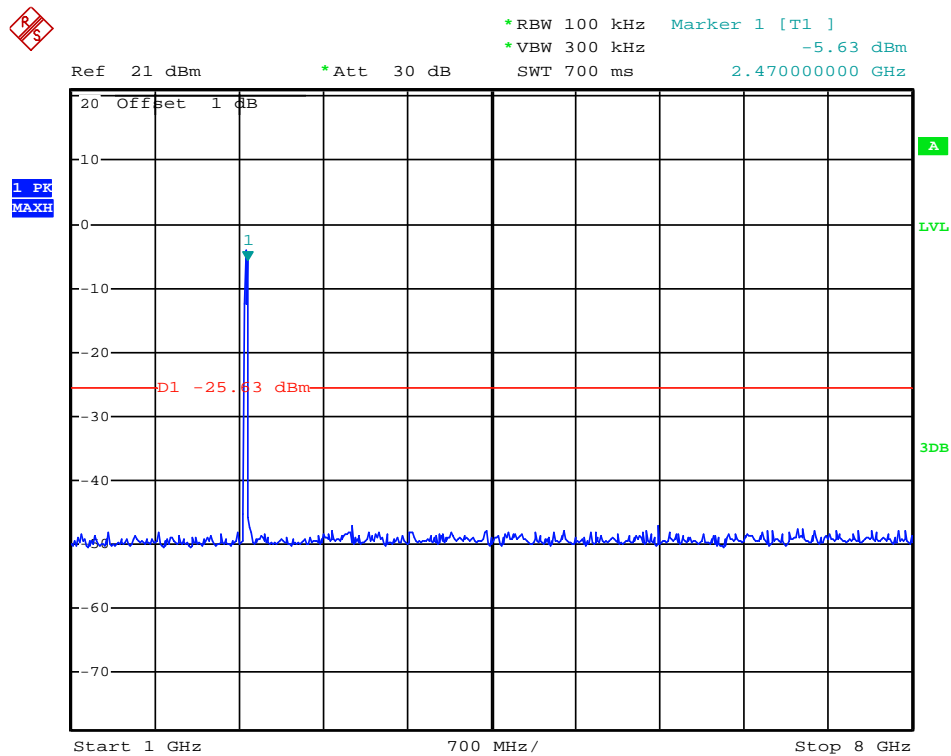
Date: 3.NOV.2013 14:44:55

(Plot 4.6.3 B4: Channel 6: 2437MHz @ 802.11n(20MHz))



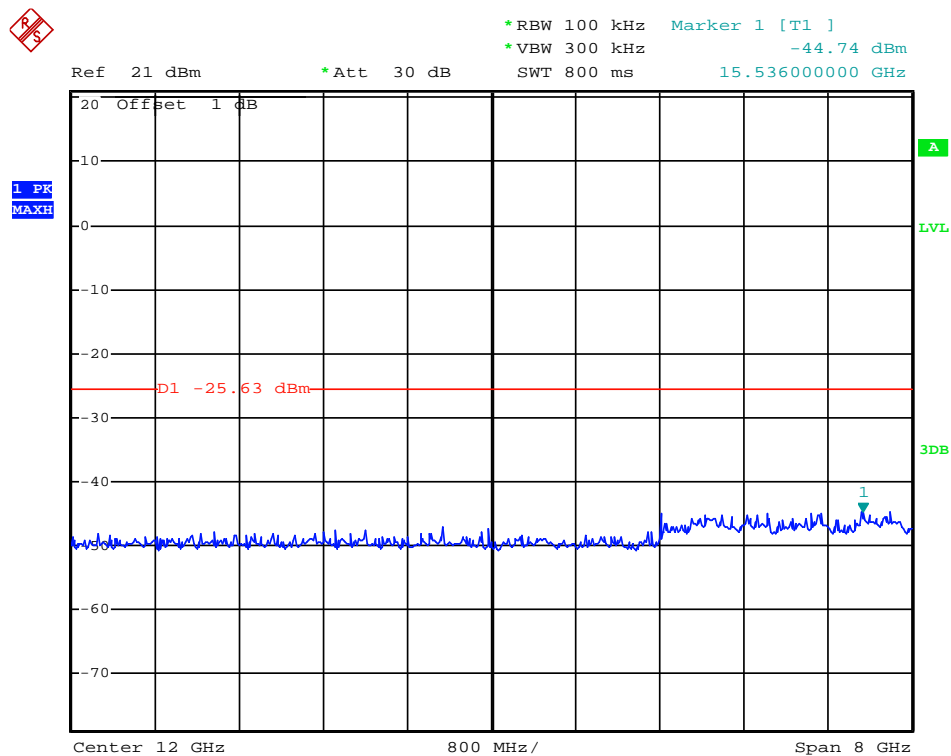
Date: 3.NOV.2013 14:45:41

(Plot 4.6.3 C1: Channel 11: 2462MHz @ 802.11n(20MHz))



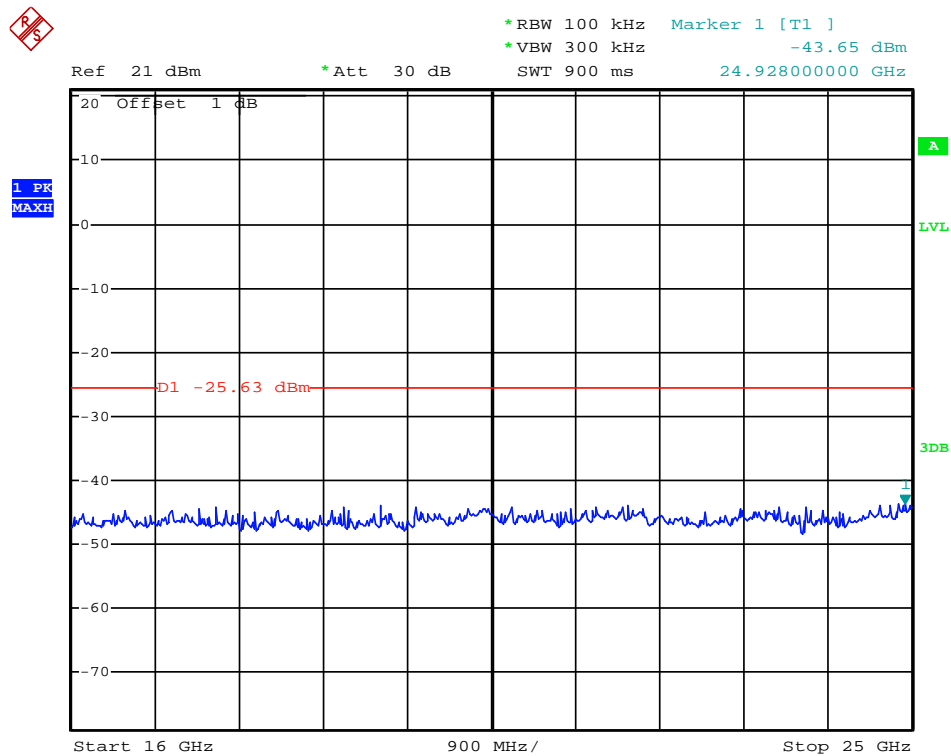
Date: 3.NOV.2013 14:45:32

(Plot 4.6.3 C2: Channel 11: 2462MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 14:45:55

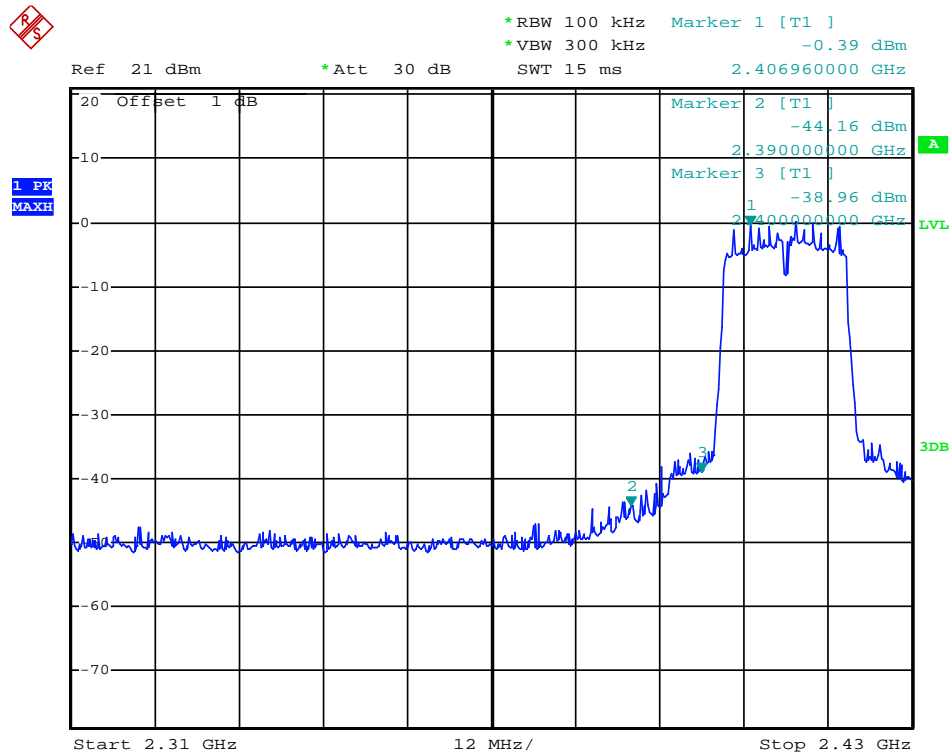
(Plot 4.6.3 C3: Channel 11: 2462MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 14:46:11

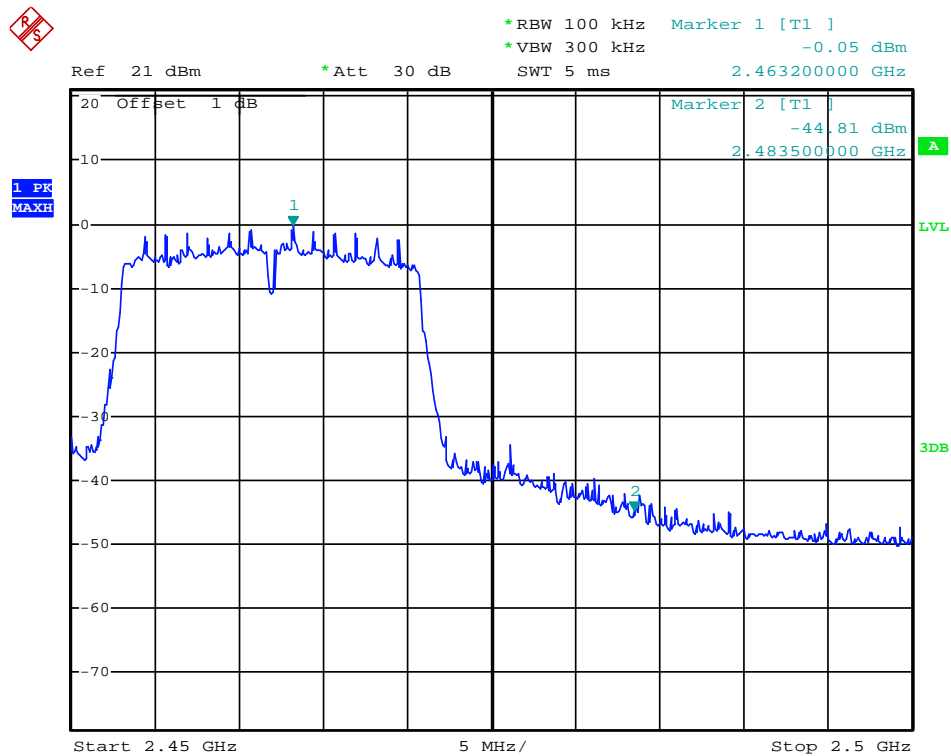
(Plot 4.6.3 C4: Channel 11: 2462MHz @ 802.11n(20MHz))





Date: 3.NOV.2013 13:42:54

(Plot 4.6.3 D: Channel 1: 2412MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 13:46:32

(Plot 4.6.3 E: Channel 11: 2462MHz @ 802.11n(20MHz))

#### 4.6.4 802.11n(40MHz) Test Mode

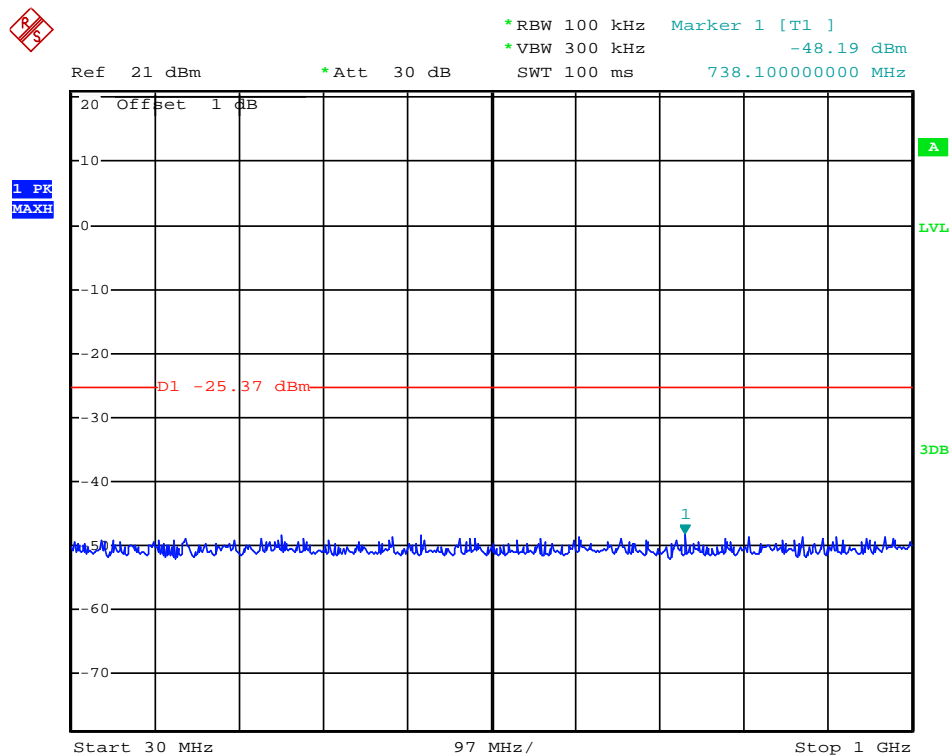
##### A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
3	2422	30MHz-1GHz	Plot 4.6. A1	-20	PASS
		1GHz-8GHz	Plot 4.6.4 A2	-20	PASS
		8GHz-16GHz	Plot 4.6.4 A3	-20	PASS
		16GHz-25GHz	Plot 4.6.4 A4	-20	PASS
6	2437	30MHz-1GHz	Plot 4.6.4 B1	-20	PASS
		1GHz-8GHz	Plot 4.6.4 B2	-20	PASS
		8GHz-16GHz	Plot 4.6.4 B3	-20	PASS
		16GHz-25GHz	Plot 4.6.4 B4	-20	PASS
9	2452	30MHz-1GHz	Plot 4.6.4 C1	-20	PASS
		1GHz-8GHz	Plot 4.6.4 C2	-20	PASS
		8GHz-16GHz	Plot 4.6.4 C3	-20	PASS
		16GHz-25GHz	Plot 4.6.4 C4	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-37.94	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-40.76	Peak	-20	Plot 4.6.3 E	PASS

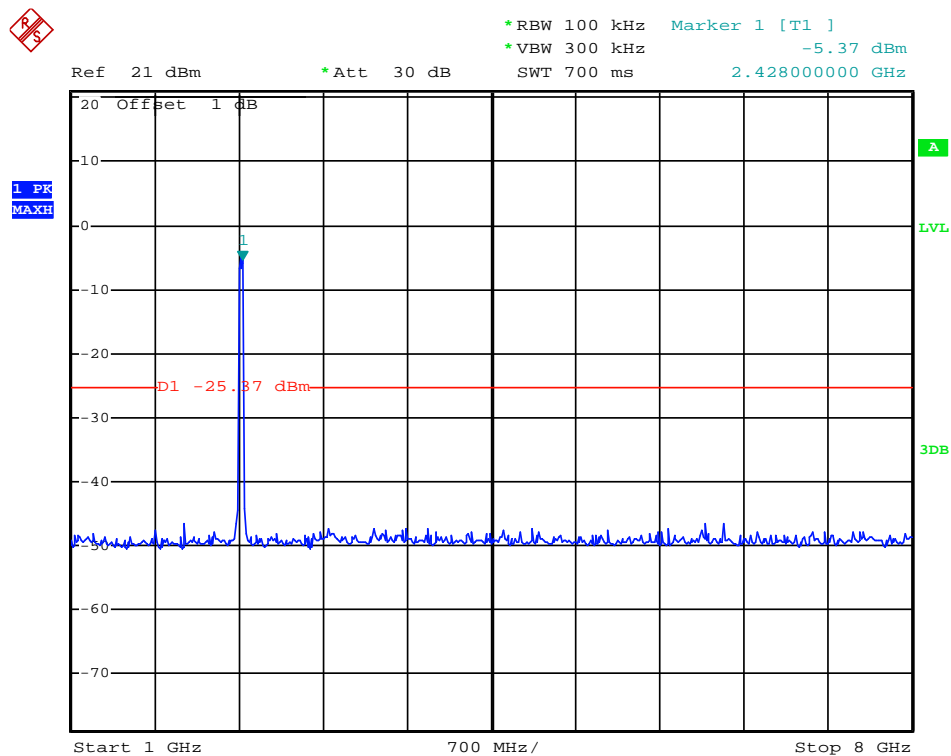
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



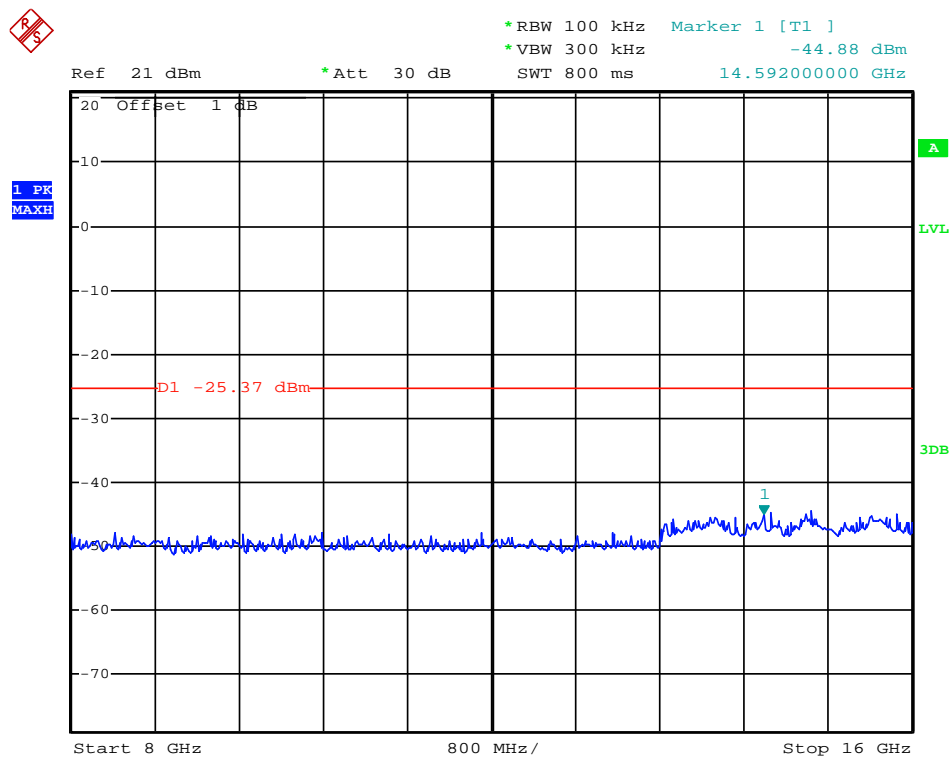
Date: 3.NOV.2013 14:46:54

(Plot 4.6.4 A1: Channel 3: 2422MHz @ 802.11n(40MHz))



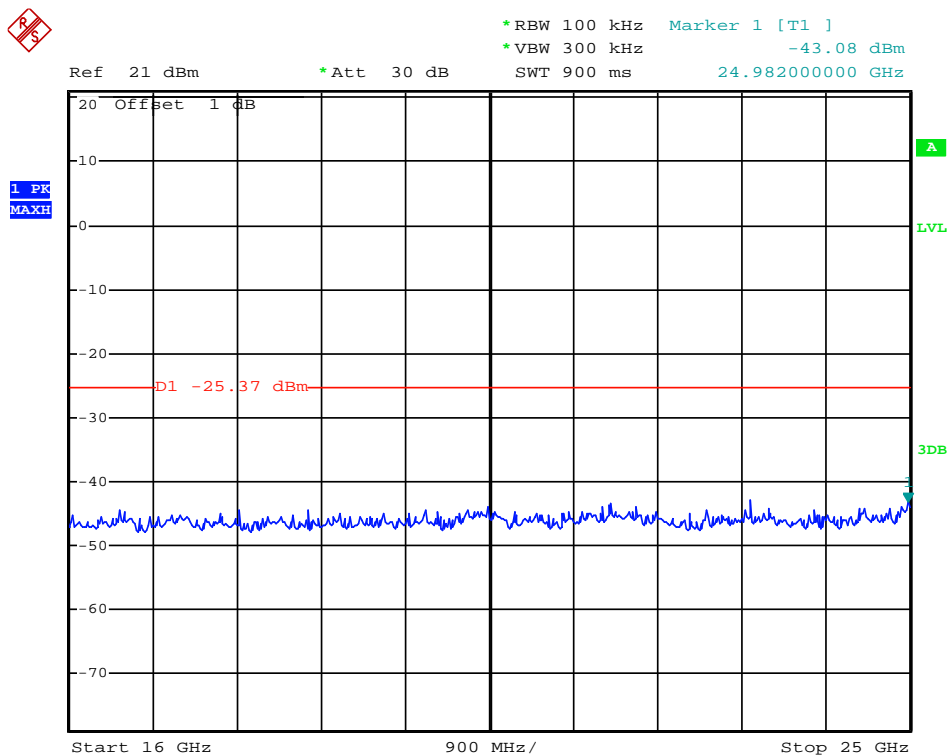
Date: 3.NOV.2013 14:46:43

(Plot 4.6.4 A2: Channel 3: 2422MHz @ 802.11n(40MHz))



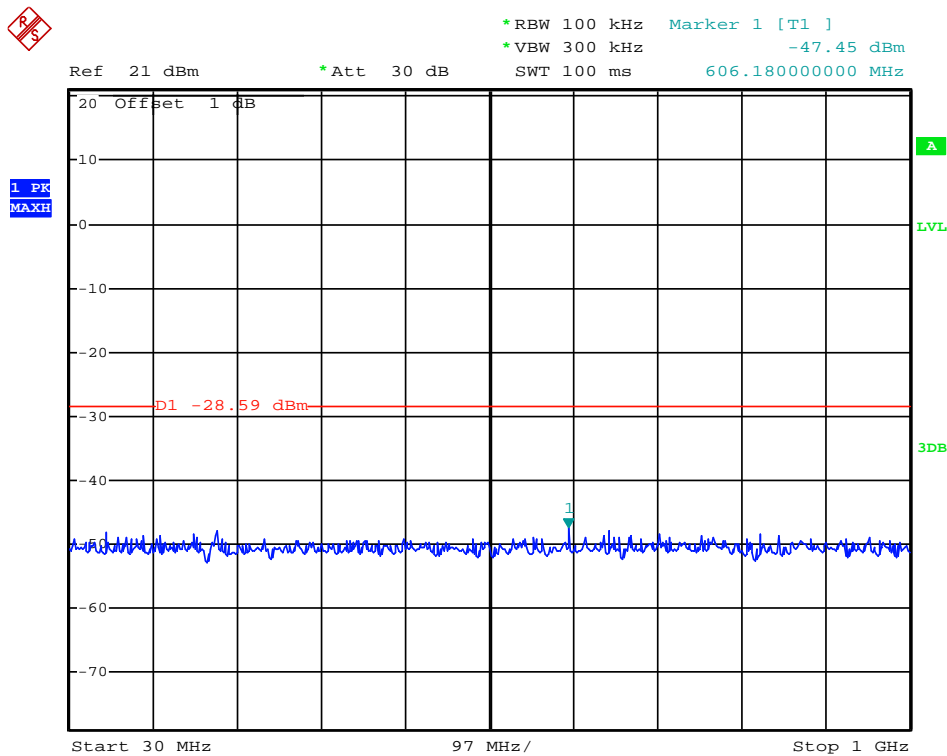
Date: 3.NOV.2013 14:47:02

(Plot 4.6.4 A3: Channel 3: 2422MHz @ 802.11n(40MHz))



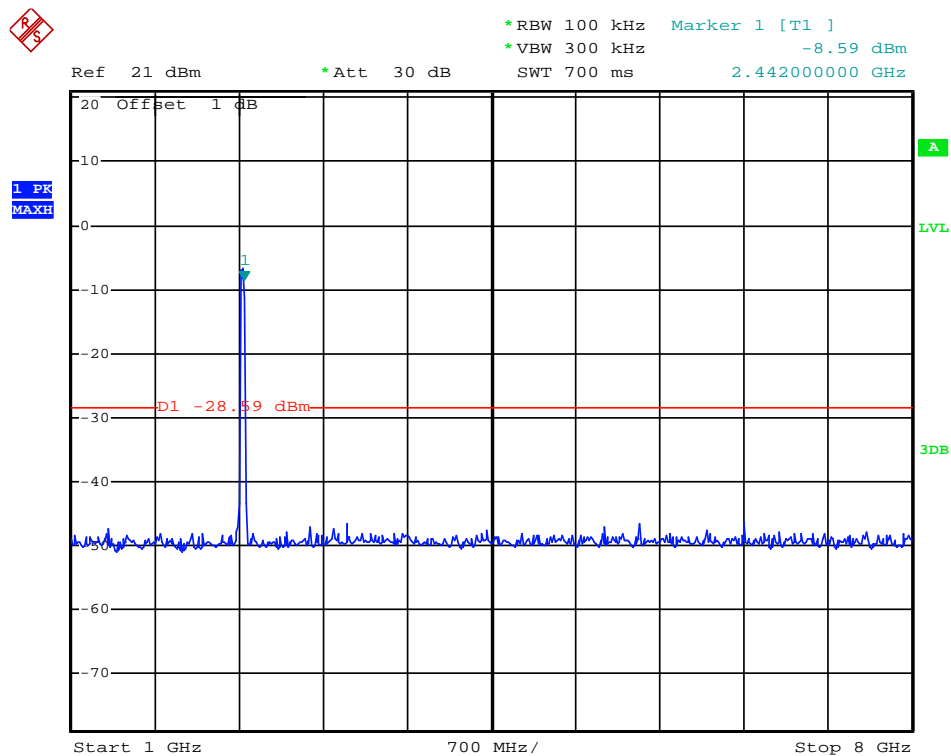
Date: 3.NOV.2013 14:47:14

(Plot 4.6.4 A4: Channel 3: 2422MHz @ 802.11n(40MHz))



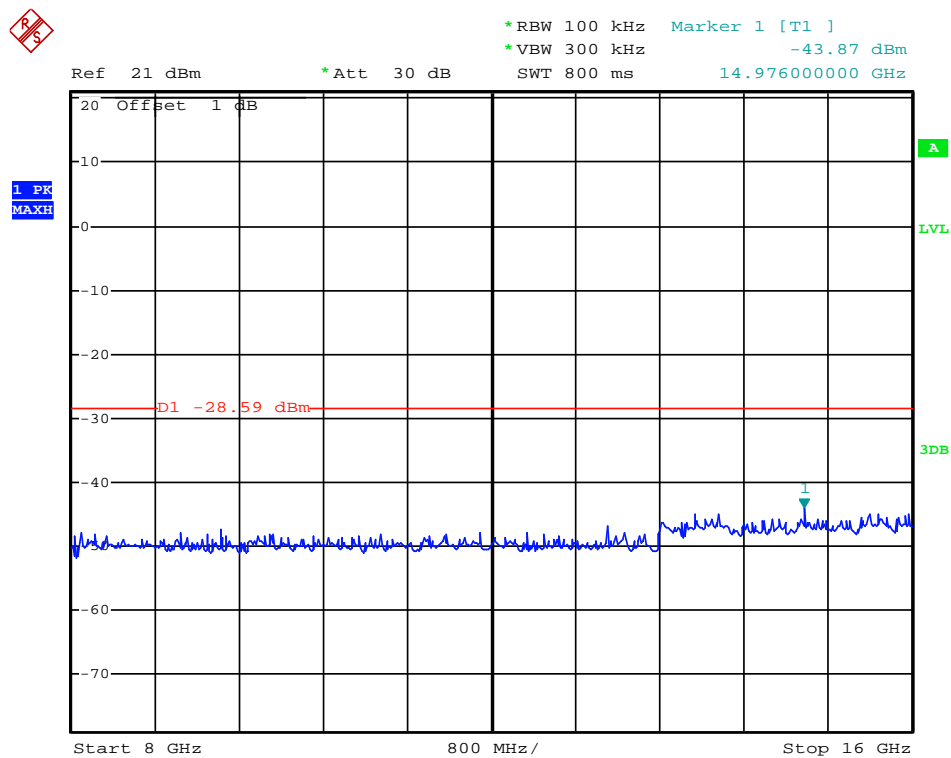
Date: 3.NOV.2013 14:47:51

(Plot 4.6.4 B1: Channel 6: 2437MHz @ 802.11n(40MHz))



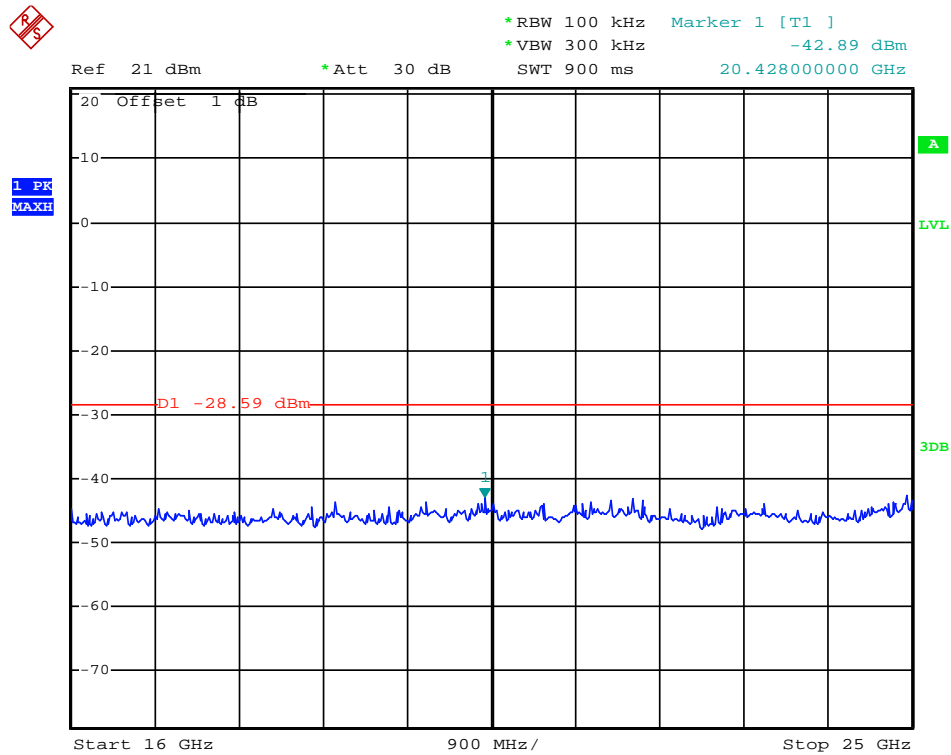
Date: 3.NOV.2013 14:47:38

(Plot 4.6.4 B2: Channel 6: 2437MHz @ 802.11n(40MHz))



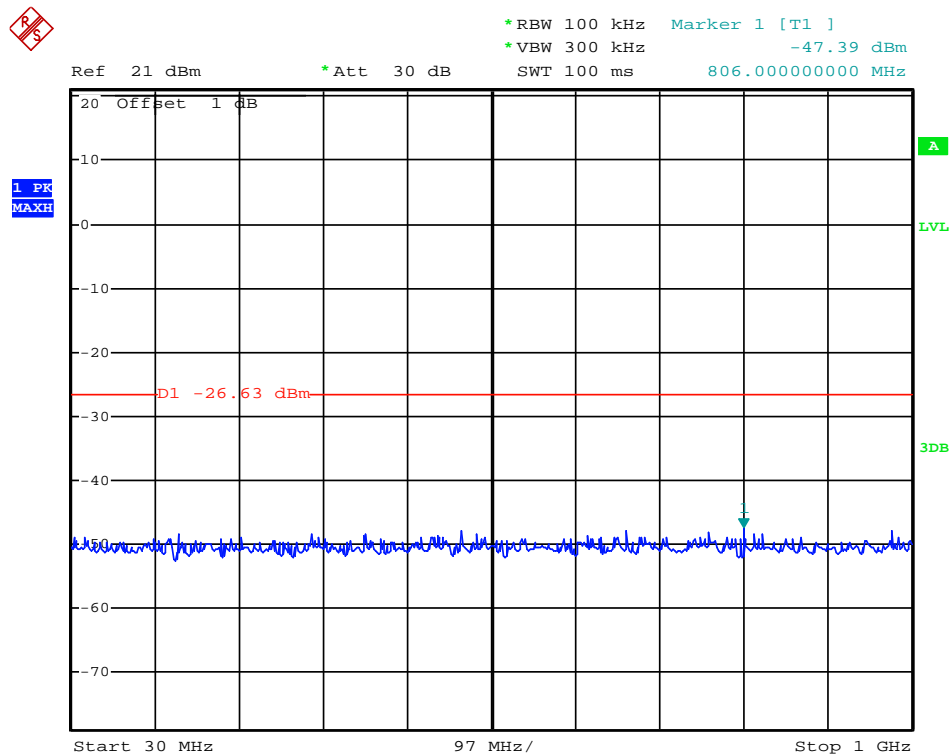
Date: 3.NOV.2013 14:48:00

(Plot 4.6.4 B3: Channel 6: 2437MHz @ 802.11n(40MHz))



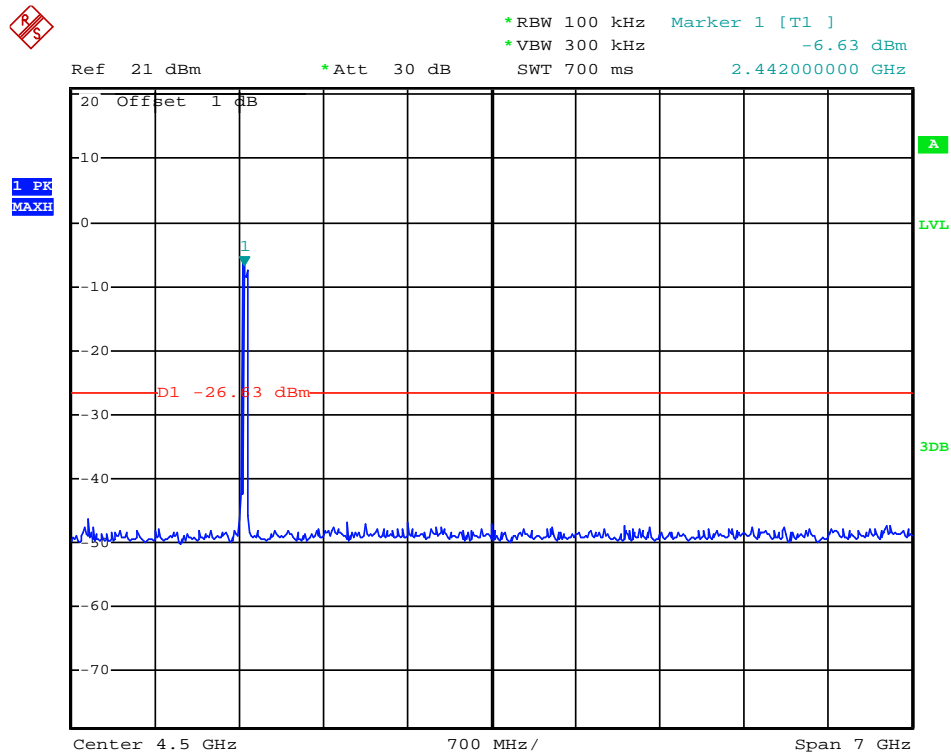
Date: 3.NOV.2013 14:48:13

(Plot 4.6.4 B4: Channel 6: 2437MHz @ 802.11n(40MHz))



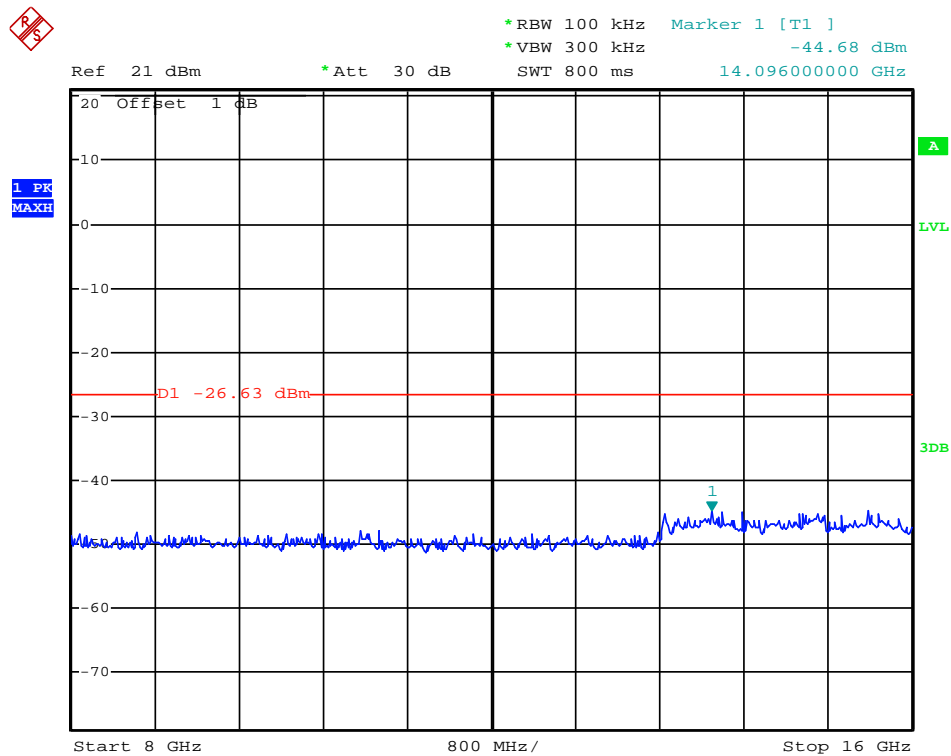
Date: 3.NOV.2013 14:49:29

(Plot 4.6.4 C1: Channel 9: 2452MHz @ 802.11n(40MHz))



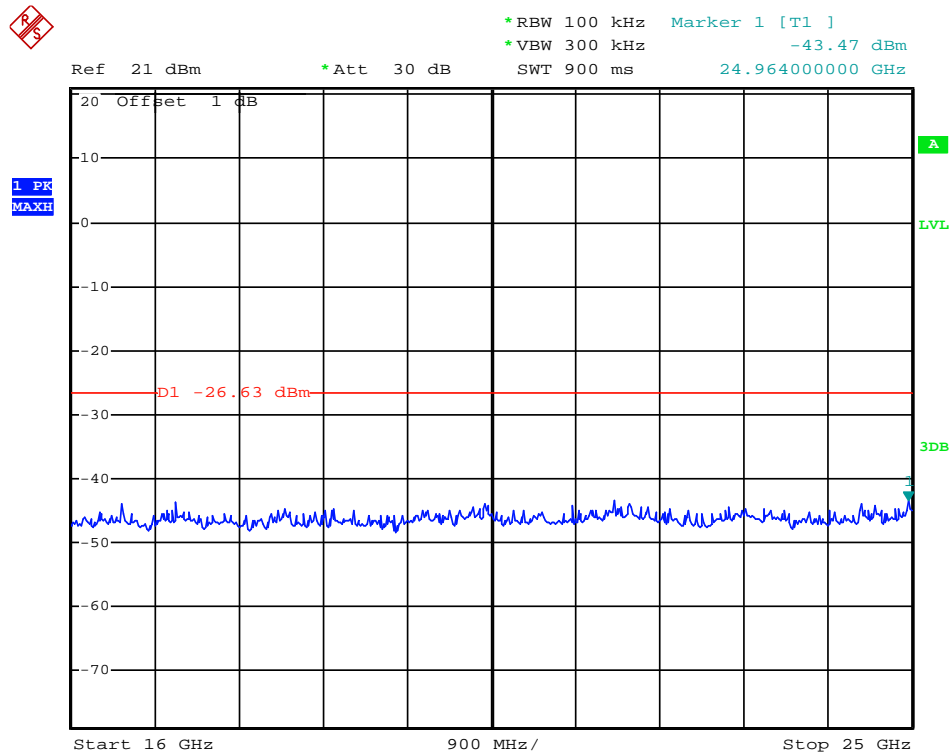
Date: 3.NOV.2013 14:48:56

(Plot 4.6.4 C2: Channel 9: 2452MHz @ 802.11n(40MHz))



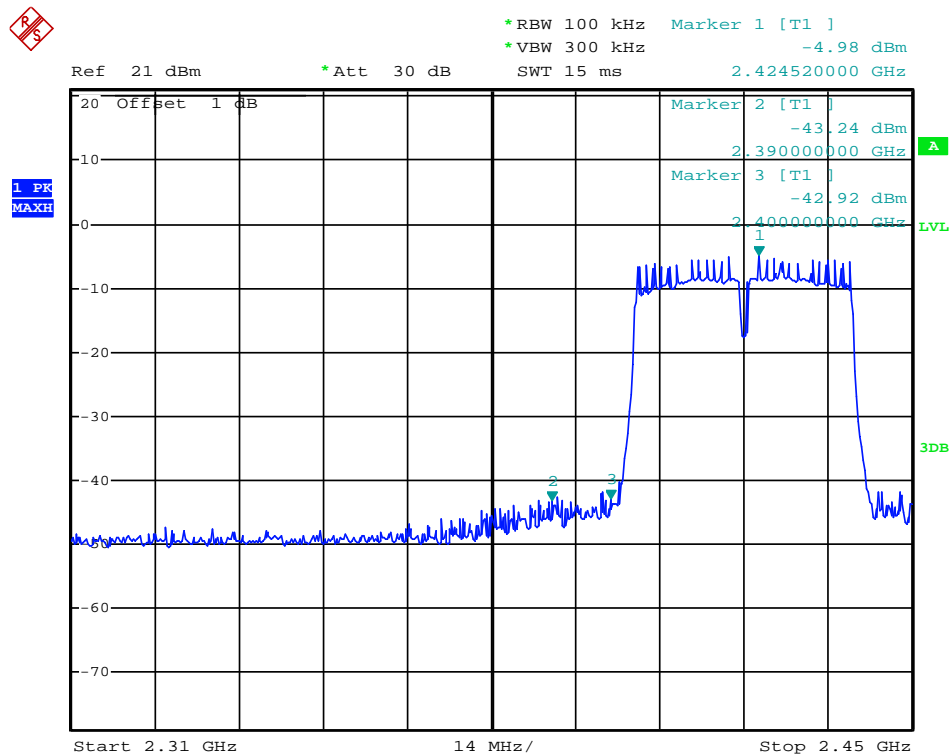
Date: 3.NOV.2013 14:49:05

(Plot 4.6.4 C3: Channel 9: 2452MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 14:49:17

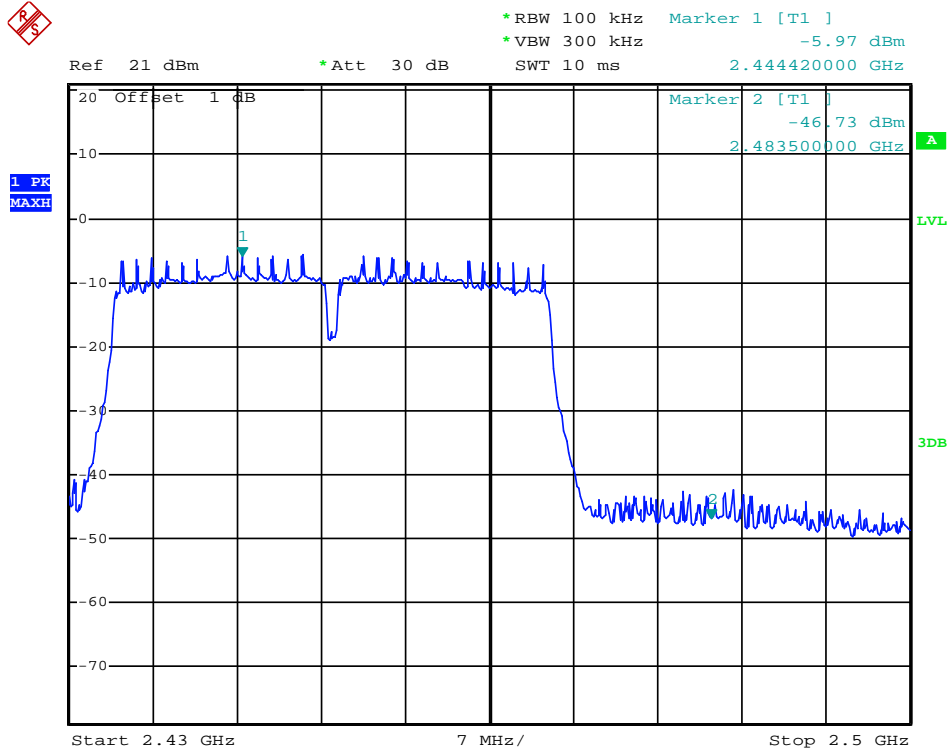
(Plot 4.6.4 C4: Channel 9: 2452MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 13:47:58

(Plot 4.6.4 D: Channel 3: 2422MHz @ 802.11n(40MHz))



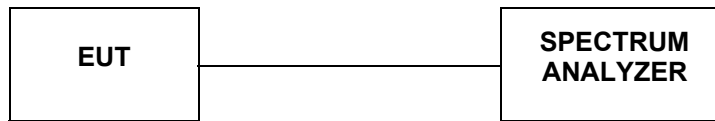


Date: 3.NOV.2013 13:50:17

(Plot 4.6.4 E: Channel 9: 2452MHz @ 802.11n(40MHz))

## 4.7. 6dB Bandwidth

### TEST CONFIGURATION



### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. According to KDB558074 D01 V03 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST RESULTS

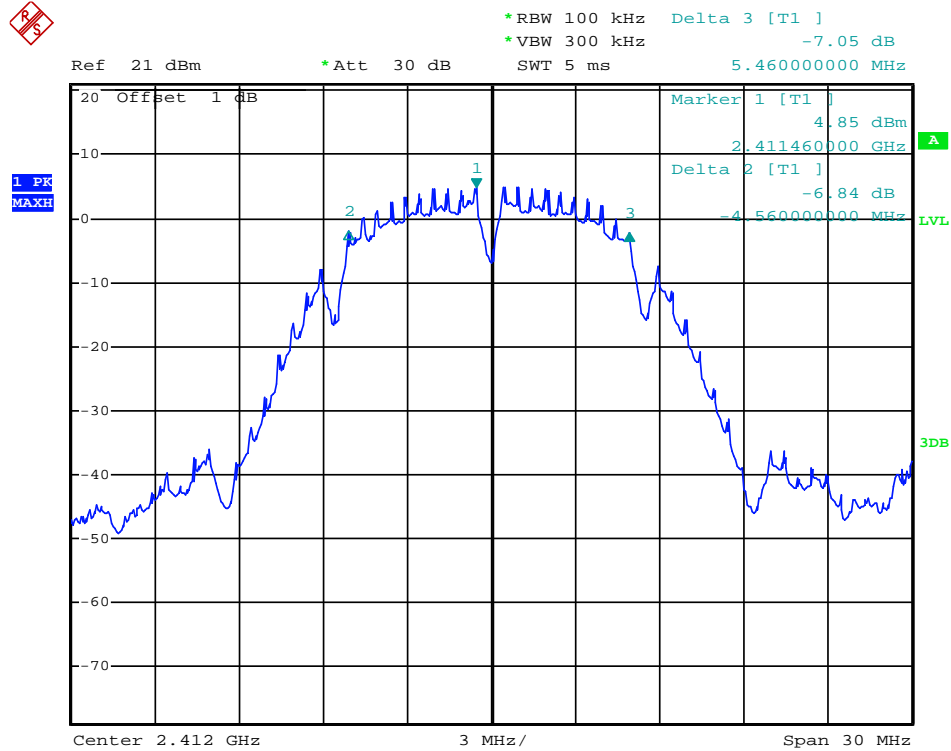
#### 4.7.1 801.11b Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	10.02	Plot 4.7.1 A	$\geq 500$	PASS
6	2437	10.08	Plot 4.7.1 B	$\geq 500$	PASS
11	2462	10.08	Plot 4.7.1 C	$\geq 500$	PASS

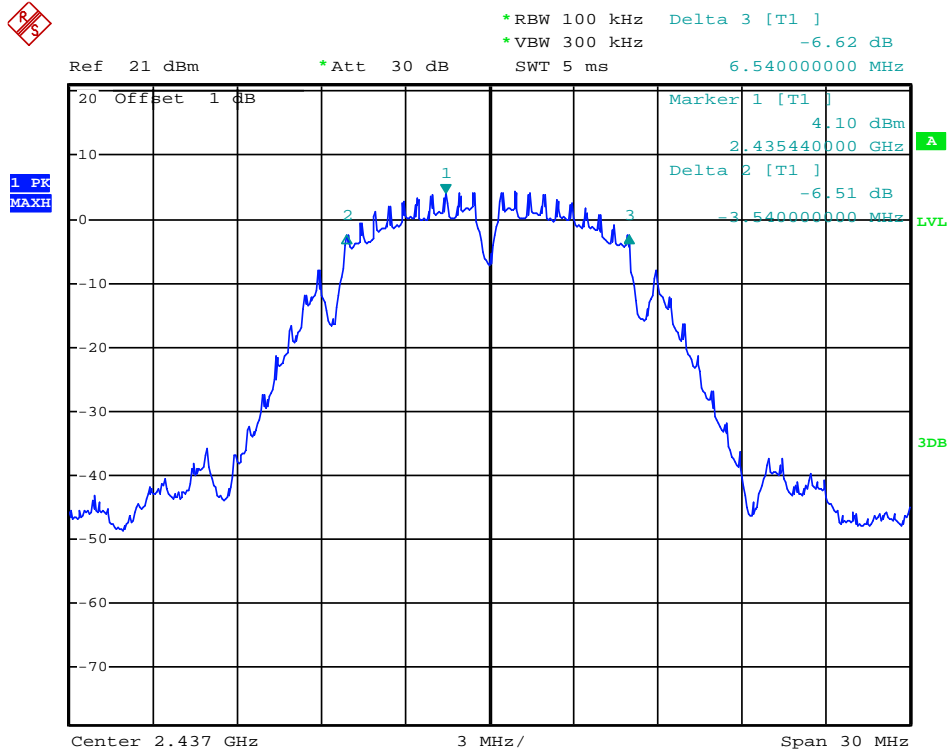
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



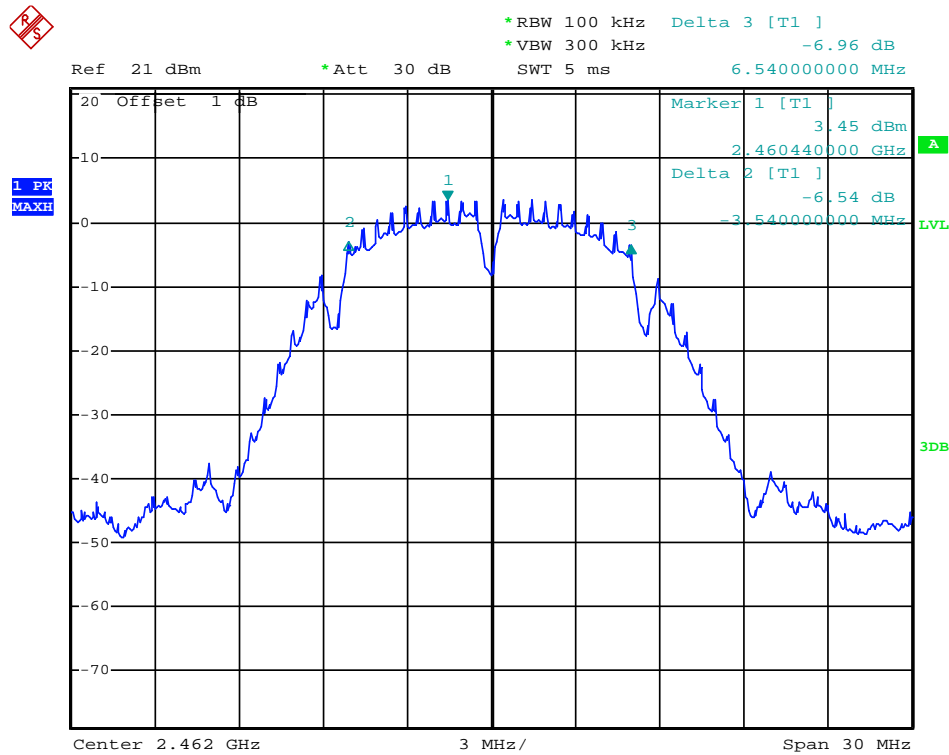
Date: 3.NOV.2013 10:53:49

(Plot 4.7.1 A: Channel 1: 2412MHz @ 802.11b)



Date: 3.NOV.2013 10:52:56

(Plot 4.7.1 B: Channel 6: 2437MHz @ 802.11b)



Date: 3.NOV.2013 10:51:58

(Plot 4.7.1 C: Channel 11: 2462MHz @ 802.11b)

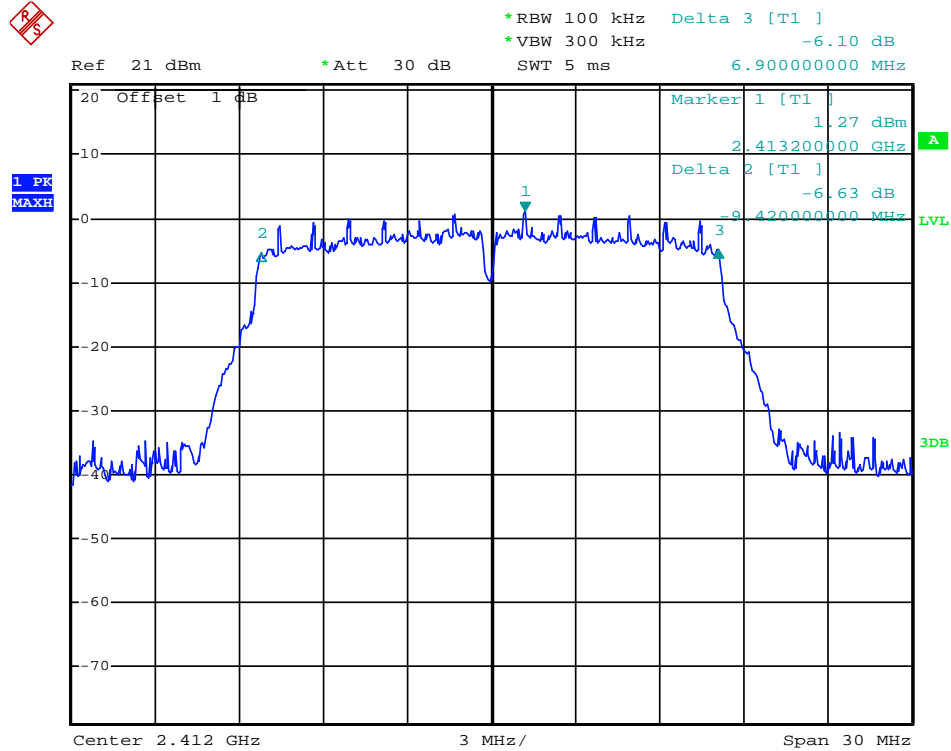
#### 4.7.2 801.11g Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	16.32	Plot 4.7.2 A	$\geq 500$	PASS
6	2437	16.32	Plot 4.7.2 B	$\geq 500$	PASS
11	2462	16.32	Plot 4.7.2 C	$\geq 500$	PASS

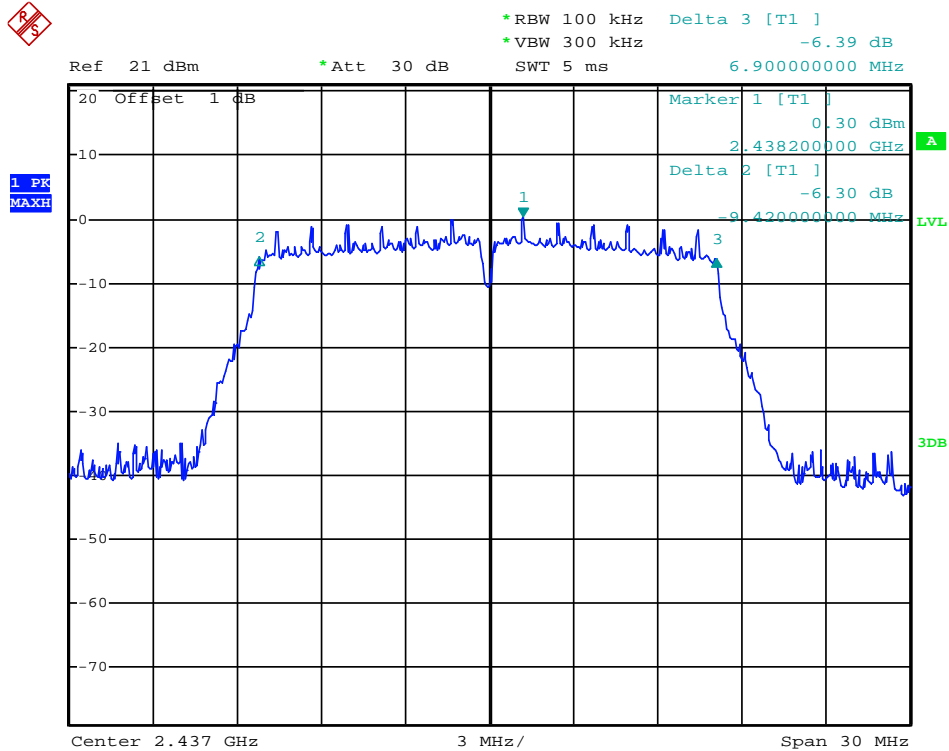
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



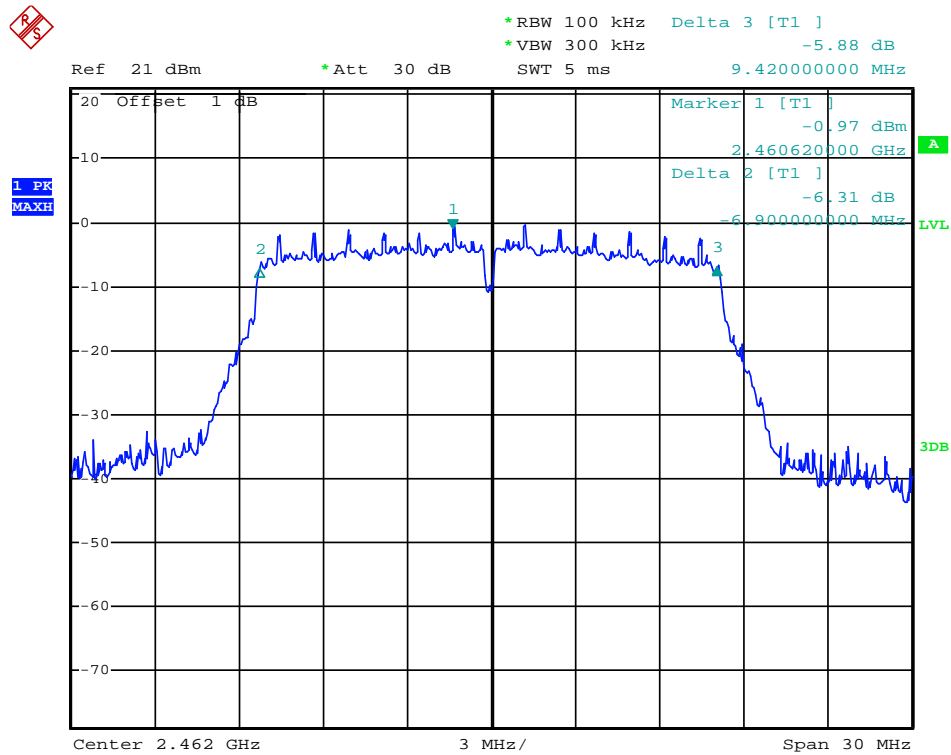
Date: 3.NOV.2013 10:56:33

(Plot 4.7.2 A: Channel 1: 2412MHz @ 802.11g)



Date: 3.NOV.2013 10:58:01

(Plot 4.7.2 B: Channel 6: 2437MHz @ 802.11g)



Date: 3.NOV.2013 10:59:27

(Plot 4.7.2 C: Channel 11: 2462MHz @ 802.11g)

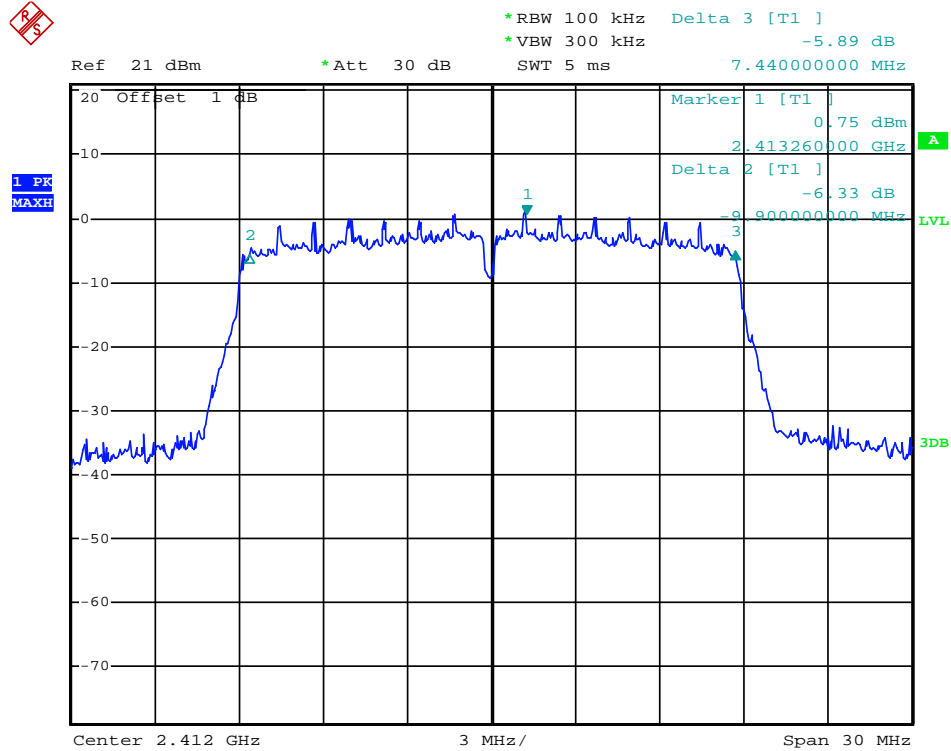
#### 4.7.3 801.11n(20MHz) Test Mode

##### A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	17.34	Plot 4.7.3 A	$\geq 500$	PASS
6	2437	17.52	Plot 4.7.3 B	$\geq 500$	PASS
11	2462	17.58	Plot 4.7.3 C	$\geq 500$	PASS

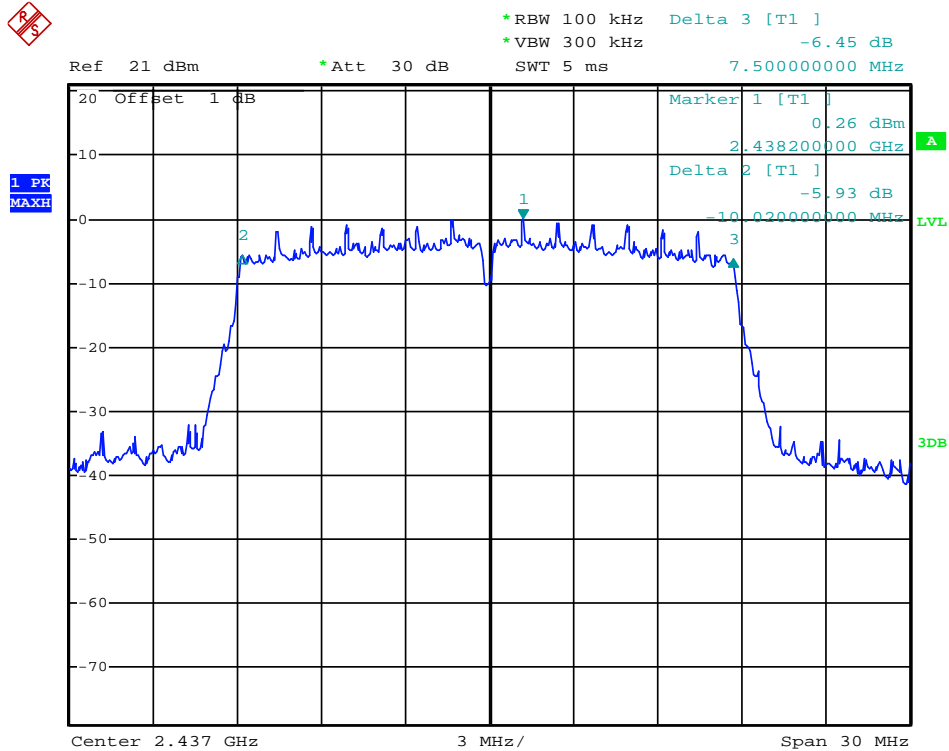
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.  
2. The test results including the cable loss.

##### B. Test Plots



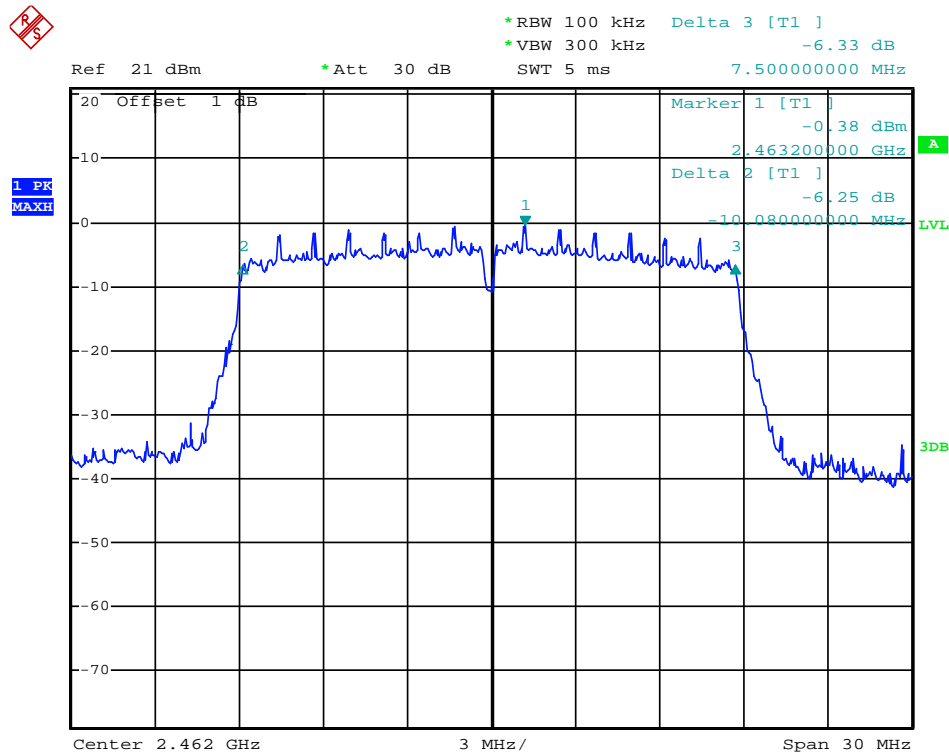
Date: 3.NOV.2013 11:02:17

(Plot 4.7.3 A: Channel 1: 2412MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 11:04:36

(Plot 4.7.3 B: Channel 6: 2437MHz @ 802.11n(20MHz))



Date: 3.NOV.2013 11:06:07

(Plot 4.7.3 C: Channel 11: 2462MHz @ 802.11n(20MHz))

#### 4.7.4 801.11n(40MHz) Test Mode

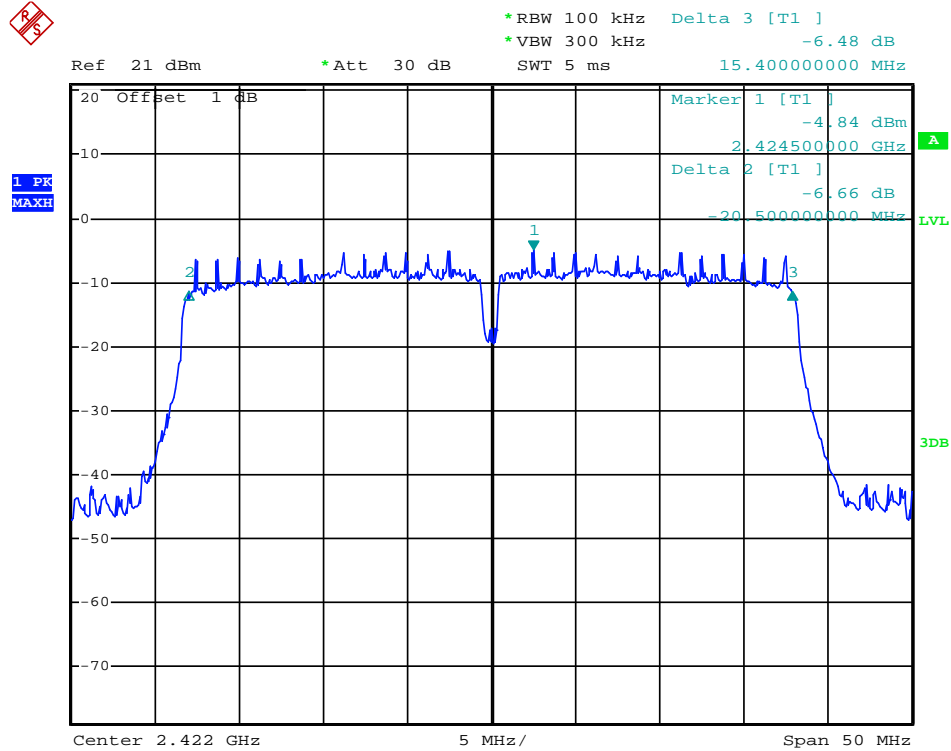
##### A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
3	2422	35.90	Plot 4.7.4 A	$\geq 500$	PASS
6	2437	35.90	Plot 4.7.4 B	$\geq 500$	PASS
9	2452	35.90	Plot 4.7.4 C	$\geq 500$	PASS

Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.  
2. The test results including the cable loss.

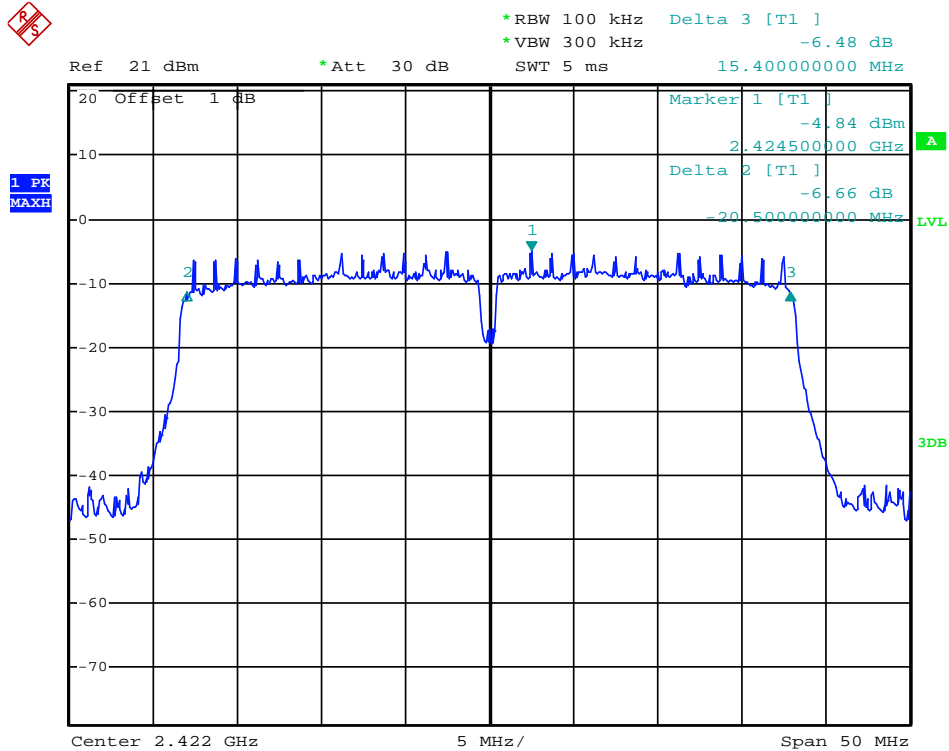
##### B. Test Plots





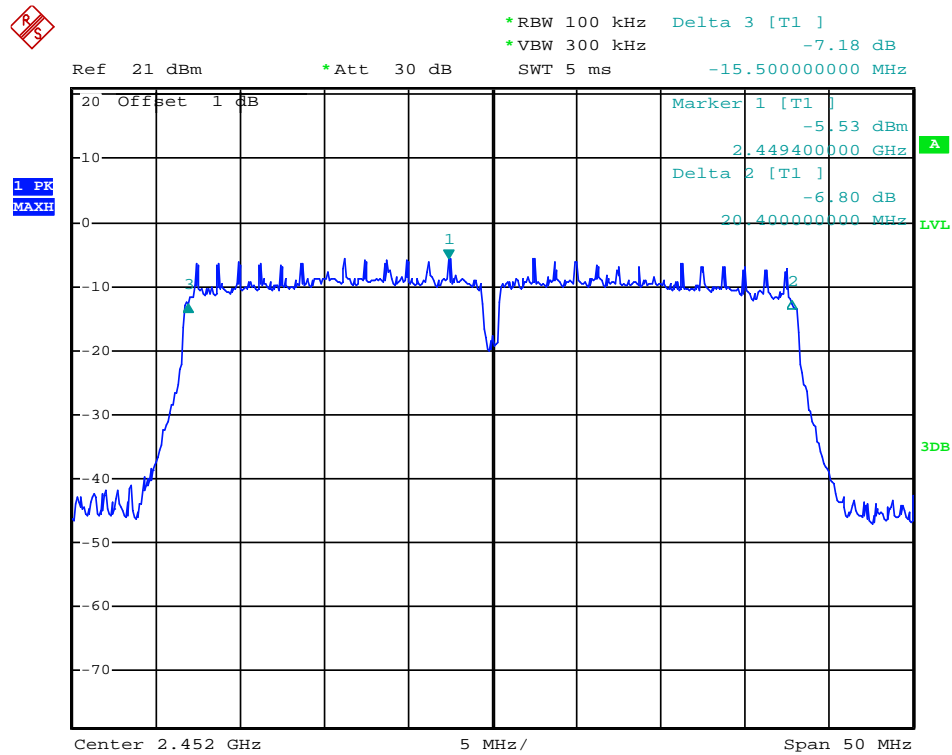
Date: 3.NOV.2013 11:08:30

(Plot 4.7.4 A: Channel 3: 2422MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 11:08:30

(Plot 4.7.3 B: Channel 6: 2437MHz @ 802.11n(40MHz))



Date: 3.NOV.2013 13:36:26

(Plot 4.7.4 C: Channel 9: 2452MHz @ 802.11n(40MHz))

## 4.8. Antenna Requirement

### Standard Applicable

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

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

### Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### Antenna Connected Construction

The maximum antenna gain of WLAN was 2.00 dBi.



## 5. Test Setup Photos of the EUT

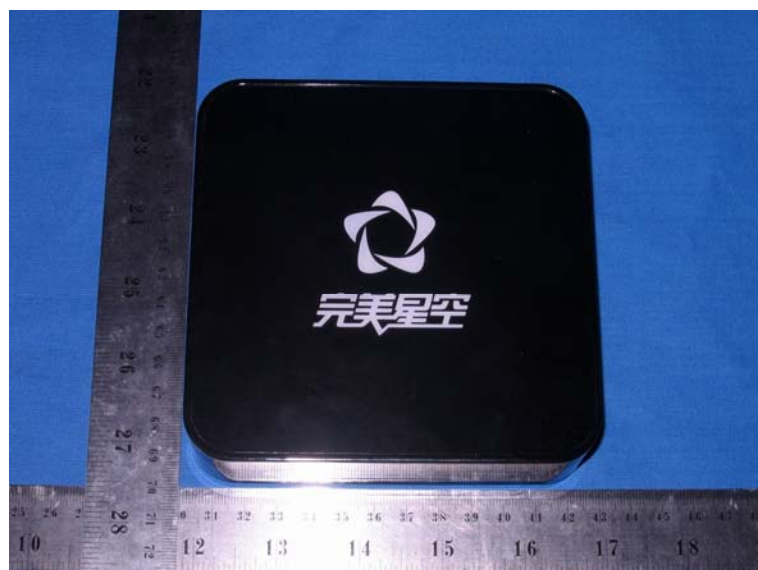






## 6. External and Internal Photos of the EUT

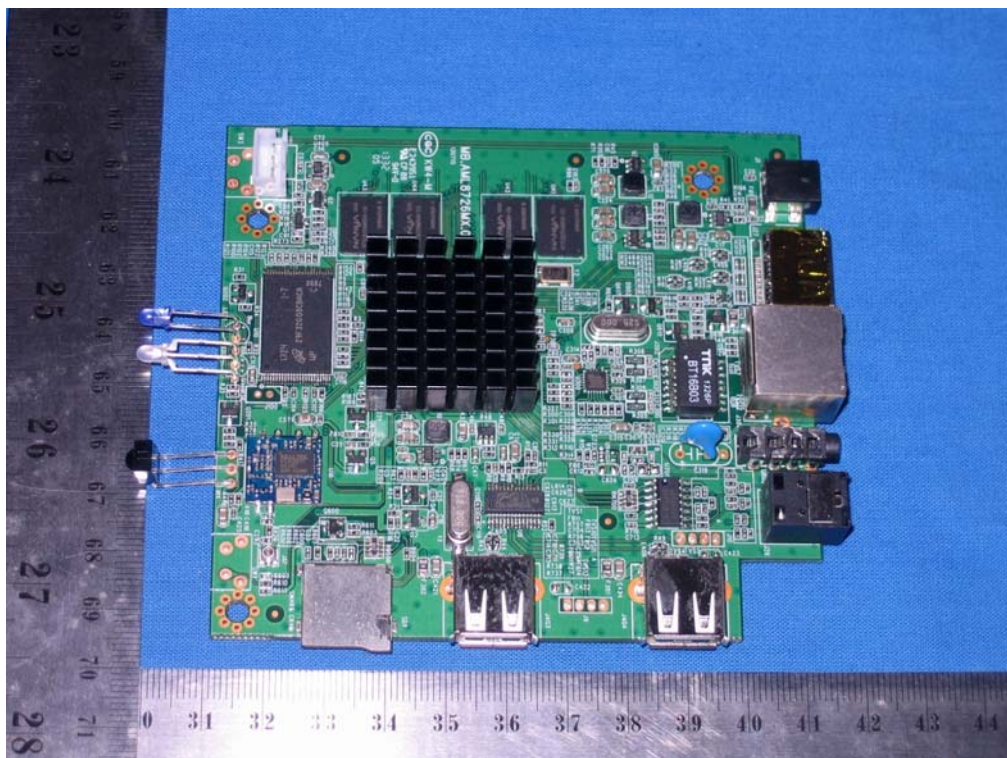
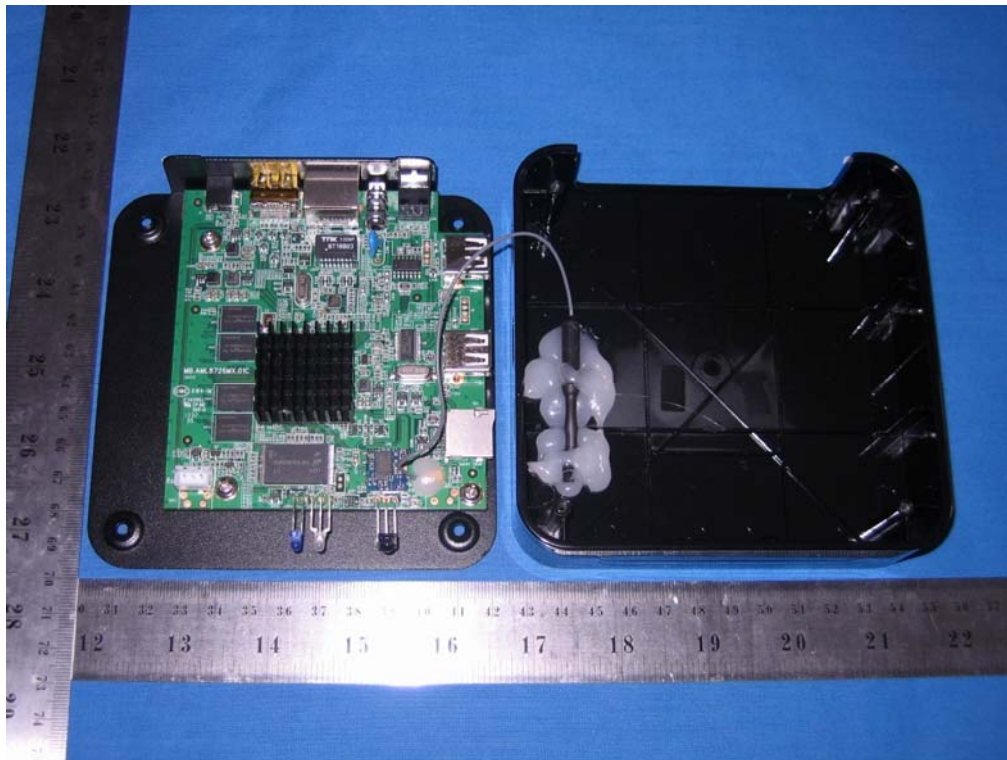
### External photos of the EUT

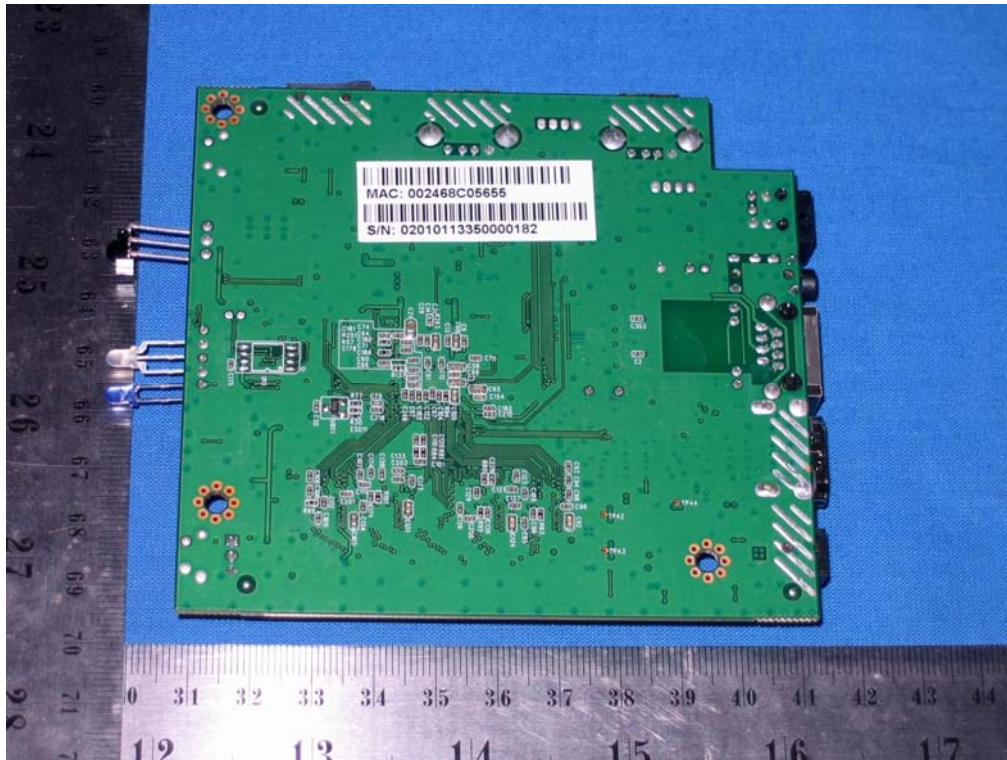








**Internal photos of the EUT**



.....End of Report.....