



FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.: TRE1309008903 R/C: 79005

FCC ID: WA6I235

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Date of issue: Nov 04, 2013

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd

Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: Verykool USA INC

Address: 3636 Nobel Drive, Suite 325, San Diego, CA 92122, USA

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 Huatongwei International Inspection CO., Ltd

Master TRF: Dated 2006-06

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Test item description: Mobile phone

Trade Mark: 

Model/Type reference: I235

Listed Models: /

Manufacturer: Verykool Wireless Technology Ltd.

Modulation Type: CCK, OFDM

Operation Frequency: From 2412MHz to 2462MHz

Rating: DC 3.80V

Hardware version: Q21_MAIN_V1.0

Software version: V1.0

Result: Positive

TEST REPORT

Test Report No. : TRE1309008903	Nov 04, 2013
	Date of issue

Equipment under Test : Mobile Phone

Model /Type : I235

Listed Models : /

Applicant : **Verykool USA INC**

Address : 3636 Nobel Drive, Suite 325, San Diego, CA 92122, USA

Manufacturer **Verykool Wireless Technology Ltd**

Address : Room 1701(5th floor).Reward Building C, No.203, 2nd section of Wang jing, Li Ze Zhong Yuan , Chaoyang District , Beijing , P.R. of China 100102

Test Result	Positive
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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	:	Sep 24, 2013
Testing commenced on	:	Sep 24, 2013
Testing concluded on	:	Nov 04, 2013

2.2. Product Description

The **Verykool USA INC's** Model: I235 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	Mobile phone
Model Number	I235
FCC ID	WA6I235
Modulation Type	GMSK for GSM/GPRS/EDGE
Antenna Type	Internal
Operation Frequency	GSM850:824MHz-849MHz/GSM1900:1850-1910MHz
WLAN	Supported 802.11b/g/n
Bluetooth	Supported Bluetooth 3.0+EDR
GSM Release Version	R99
GPRS operation mode	Class B
Hardware version	Q21_MAIN_V1.0
Software version	V1.1
GPRS Multislot Class	12
EGPRS Multislot Class	12
Extreme temp. Tolerance	-30°C to +60°C
Extreme vol. Limits	3.40VDC to 4.20VDC (nominal: 3.80VDC)
GSM/GPRS Operation Frequency Band	GSM850/PCS1900

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 3.80V

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 (Mobile Phone (M/N:I235))

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

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger and USB cable

AE1

Model: I235
 Manufacturer: verykool Wireless Technology Ltd.
 Capacitance:650mAh
 Nominal Voltage:3.70V

AE2:

Model: I235
 Manufacturer: verykool Wireless Technology Ltd.
 Input: 100-240V~50/60Hz 0.15A
 Output: OUTPUT: 5.0V DC 0.5A
 Power Cable Length: 100cm
 ○ Shielded ● Unshielded

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

Note: We not used Charger when FCC Part 15B test.

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

This submittal(s) (test report) is intended for **FCC ID: WA6I235** 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 Mobile Phone with Bluetooth and WLAN function, The functions of the EUT listed as below:

	Test Standards	Reference Report
GSM/GPRS/EGPRS	FCC Part 22/FCC Part 24	TRE1309008901
Bluetooth	FCC Part 15 C 15.247	TRE1309008902
WLAN	FCC Part 15 C 15.247	TRE1309008903
USB Port	FCC Part 15 B	TRE1309008904
SAR	FCC Part 2 §2.1093	TRE1309008905

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

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2015.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection 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 662850, Renewal date Jun. 01, 2012, valid time is until Jun. 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV

Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Environmental conditions

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

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

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 Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.5 Mbps	3/6/9
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 Shenzhen Huatongwei International Inspection 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 Shenzhen Huatongwei laboratory 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	2013/10/26
2	EMI Test Receiver	Rohde&Schwarz	ESCI	100106	2013/10/26
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2013/10/26
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2013/10/26
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2013/10/26
3	EMI TEST Software	Audix	E3	N/A	2013/10/26
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	2013/10/26
8	Amplifier	Sonoma	310N	E009-13	2013/10/26
9	JS amplifier	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2013/10/26
10	High pass filter	Compliance Direction systems	BSU-6	34202	2013/10/26
11	HORN ANTENNA	ShwarzBeck	9120D	1012	2013/10/26
12	Amplifier	Compliance Direction systems	PAP1-4060	120	2013/10/26
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2013/10/26
14	TURNTABLE	MATURO	TT2.0	----	N/A
15	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
16	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2013/10/26
17	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2013/10/26
18	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2013/10/26

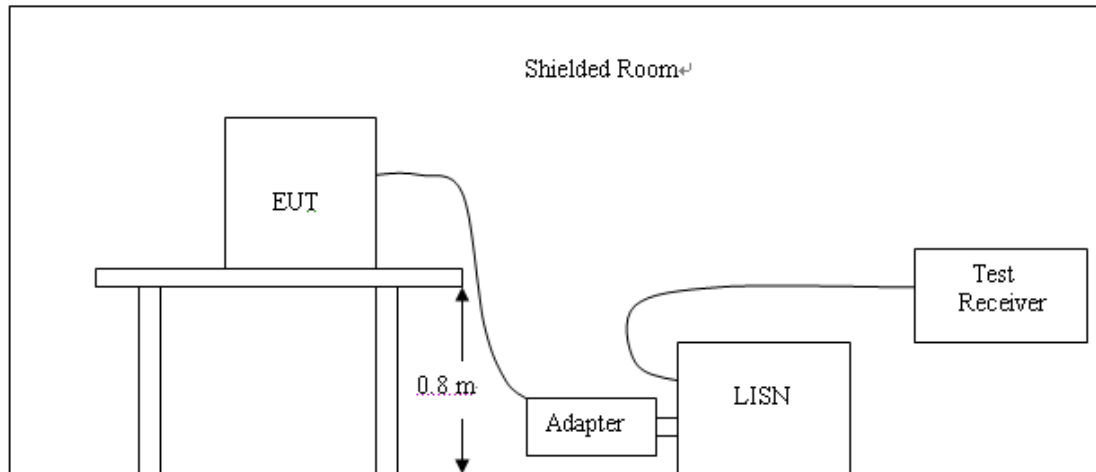
Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2013/10/26

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

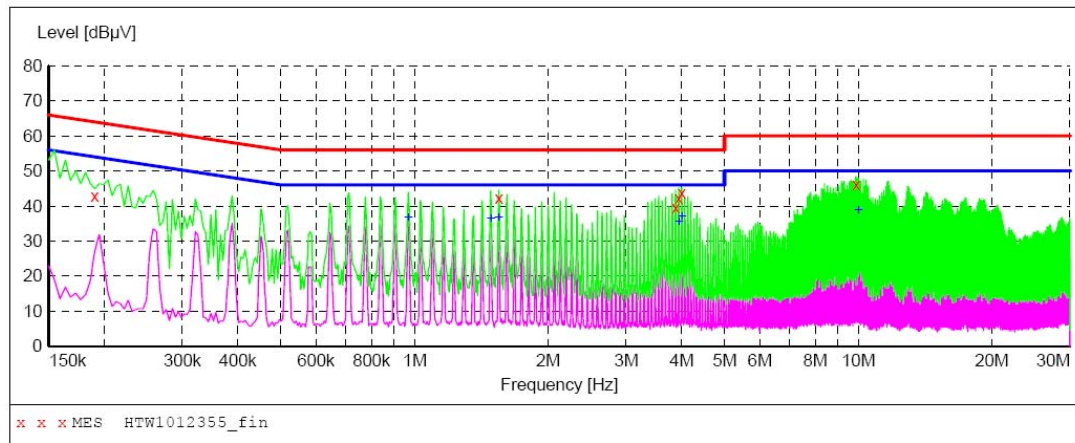
* Decreasing linearly with the logarithm of the frequency

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.

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW1012355_fin"**

10/12/2013 4:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.190500	42.90	10.1	64	21.1	QP	L1	GND
1.549500	42.40	10.3	56	13.6	QP	L1	GND
3.880500	39.70	10.3	56	16.3	QP	L1	GND
3.939000	42.20	10.3	56	13.8	QP	L1	GND
4.006500	43.80	10.3	56	12.2	QP	L1	GND
9.888000	46.10	10.5	60	13.9	QP	L1	GND

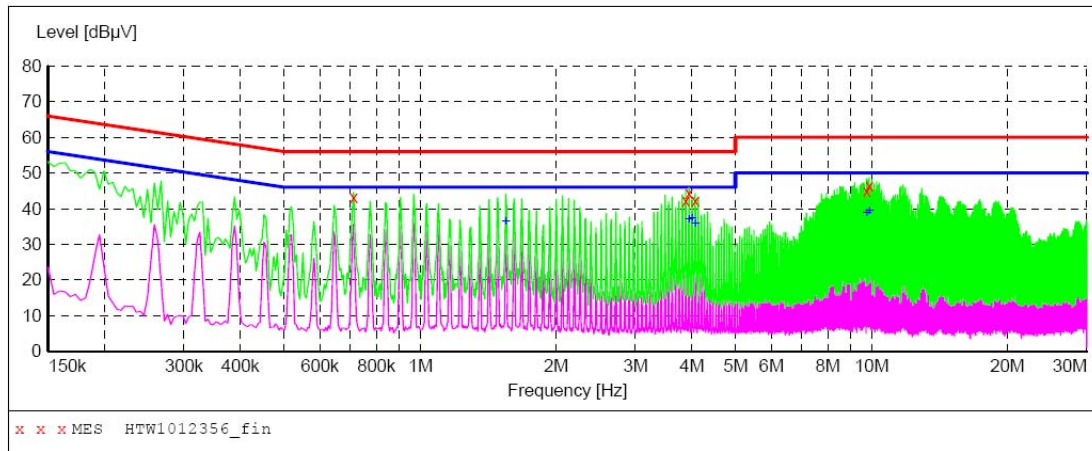
MEASUREMENT RESULT: "HTW1012355_fin2"

10/12/2013 4:35PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.969000	36.60	10.2	46	9.4	AV	L1	GND
1.486500	36.20	10.3	46	9.8	AV	L1	GND
1.549500	36.50	10.3	46	9.5	AV	L1	GND
3.943500	35.40	10.3	46	10.6	AV	L1	GND
4.006500	37.00	10.3	46	9.0	AV	L1	GND
10.014000	38.70	10.5	50	11.3	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW1012356_fin"**

10/12/2013 4:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.712500	43.20	10.2	56	12.8	QP	L1	GND
3.880500	42.40	10.3	56	13.6	QP	L1	GND
3.943500	44.30	10.3	56	11.7	QP	L1	GND
4.074000	42.20	10.3	56	13.8	QP	L1	GND
9.757500	45.00	10.5	60	15.0	QP	L1	GND
9.888000	46.50	10.5	60	13.5	QP	L1	GND

MEASUREMENT RESULT: "HTW1012356_fin2"

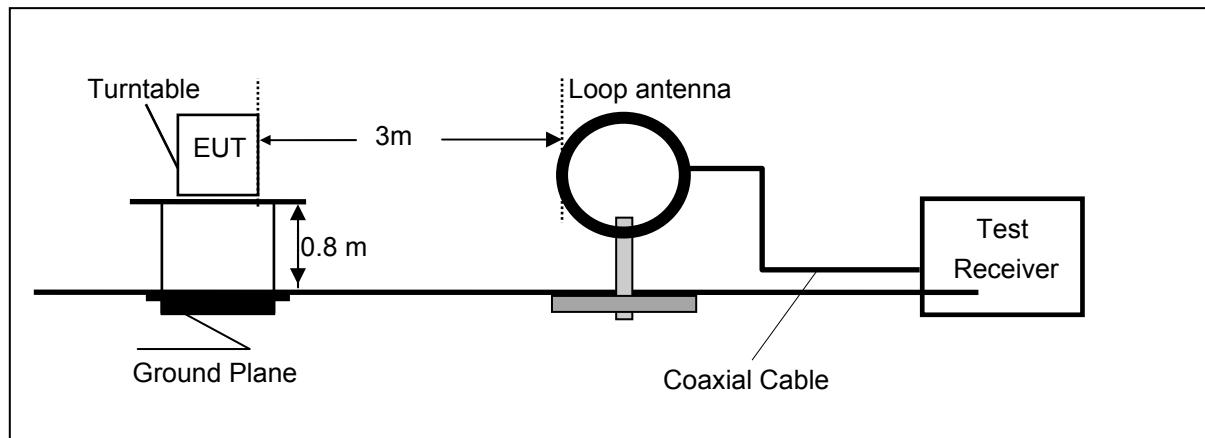
10/12/2013 4:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.549500	36.40	10.3	46	9.6	AV	L1	GND
3.943500	37.00	10.3	46	9.0	AV	L1	GND
4.006500	37.20	10.3	46	8.8	AV	L1	GND
4.074000	35.60	10.3	46	10.4	AV	L1	GND
9.762000	38.70	10.5	50	11.3	AV	L1	GND
9.888000	39.30	10.5	50	10.7	AV	L1	GND

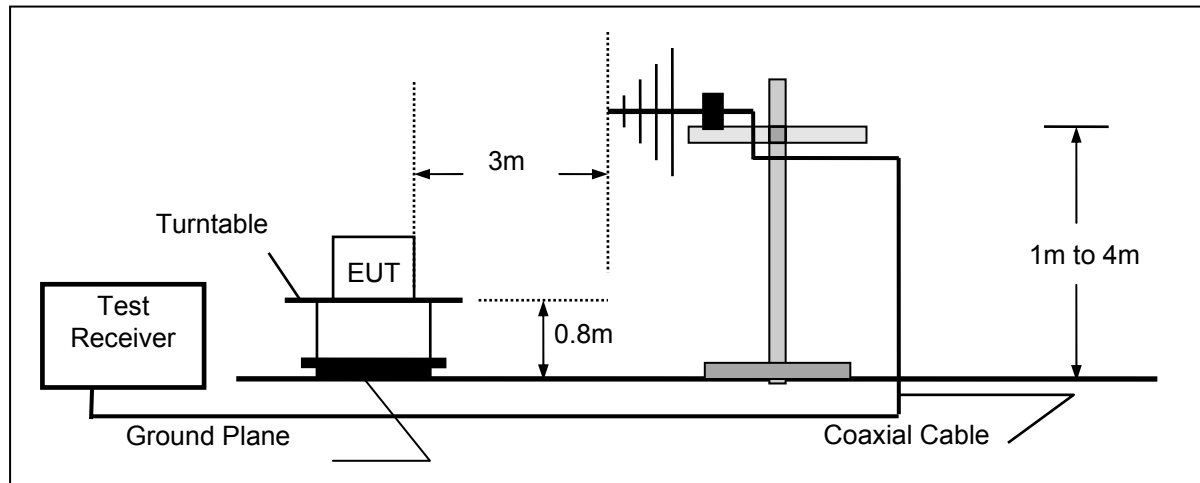
4.2. Radiated Emission

TEST CONFIGURATION

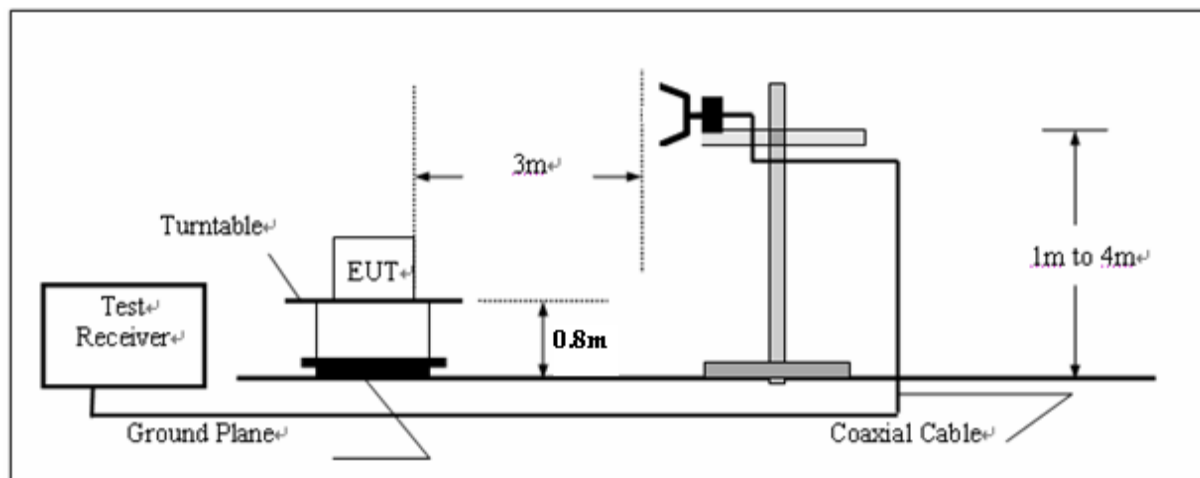
Frequency range 9KHz – 30MHz



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 26MHz 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.

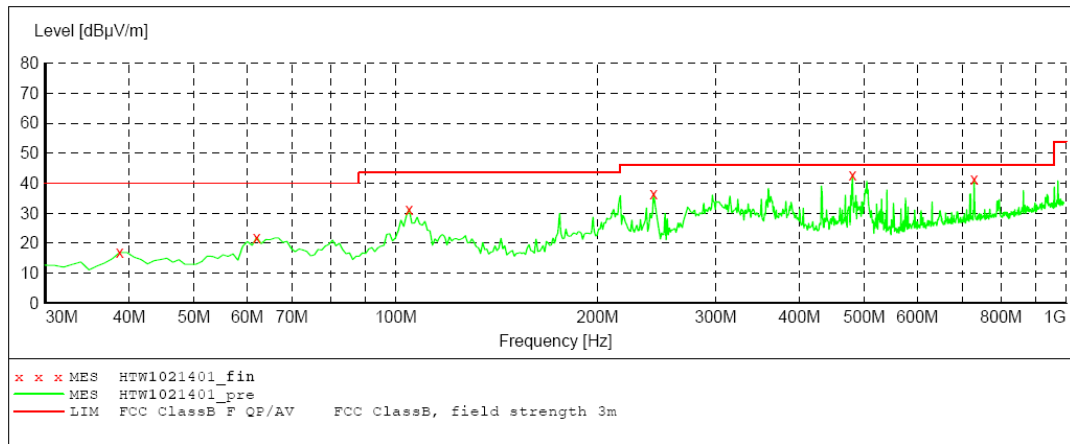
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
12.00	43.20	69.54	26.34	QP	PASS
24.00	41.68	69.54	27.86	QP	PASS

For 30MHz to 1000MHz

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 30.0 MHz	Frequency 1.1 GHz	MaxPeak	Coupled	100 kHz	VULB9163

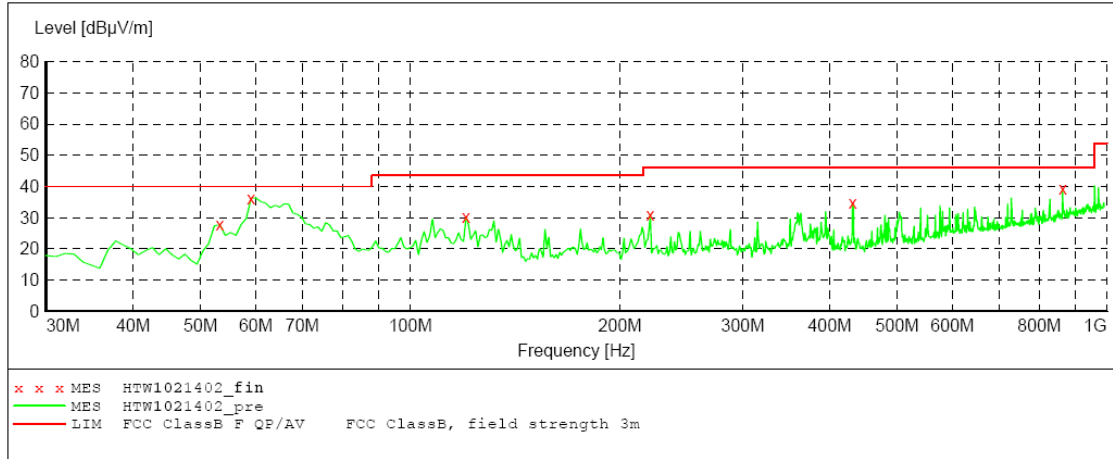
**MEASUREMENT RESULT: "HTW1021401_fin"**

10/21/2013 12:55PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
38.730000	17.00	-15.3	40.0	23.0	QP	300.0	187.00	HORIZONTAL
62.010000	22.00	-16.4	40.0	18.0	QP	100.0	106.00	HORIZONTAL
104.690000	31.40	-14.1	43.5	12.1	QP	300.0	187.00	HORIZONTAL
242.430000	36.60	-15.4	46.0	9.4	QP	100.0	232.00	HORIZONTAL
480.080000	42.90	-8.0	46.0	3.1	QP	100.0	302.00	HORIZONTAL
729.370000	41.30	-0.8	46.0	4.7	QP	100.0	207.00	HORIZONTAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 30.0 MHz	Frequency 1.1 GHz	MaxPeak	Coupled	100 kHz	VULB9163

***MEASUREMENT RESULT: "HTW1021402_fin"***

10/21/2013 12:58PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	27.80	-15.3	40.0	12.2	QP	100.0	107.00	VERTICAL
59.100000	36.30	-15.6	40.0	3.7	QP	100.0	116.00	VERTICAL
120.210000	30.20	-16.5	43.5	13.3	QP	100.0	138.00	VERTICAL
221.090000	31.00	-15.1	46.0	15.0	QP	100.0	234.00	VERTICAL
431.580000	34.70	-9.6	46.0	11.3	QP	100.0	189.00	VERTICAL
864.200000	39.20	1.8	46.0	6.8	QP	100.0	189.00	VERTICAL

For 1GHz to 25GHz

802.11b Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--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	54.00	PK	74.00	20.00	1.00 H	193	51.90	31.60	7.00	36.5	2.10
1	4824.00	41.76	AV	54.00	12.24	1.00 H	193	39.66	31.60	7.00	36.5	2.10
2	7236.00	56.14	PK	74.00	17.86	1.00 H	322	45.21	37.33	8.90	35.3	10.93
2	7236.00	43.85	AV	54.00	10.15	1.00 H	322	32.92	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--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	54.52	PK	74.00	19.48	1.00 H	289	52.42	31.60	7.00	36.5	2.10
1	4824.00	43.06	AV	54.00	10.94	1.00 H	289	40.96	31.60	7.00	36.5	2.10
2	7236.00	56.88	PK	74.00	17.12	1.00 H	44	45.95	37.33	8.90	35.3	10.93
2	7236.00	45.13	AV	54.00	8.87	1.00 H	44	34.20	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--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	55.36	PK	74.00	18.64	1.00 H	8	53.24	31.02	7.60	36.5	2.12
1	4874.00	44.20	AV	54.00	9.80	1.00 H	8	42.08	31.02	7.60	36.5	2.12
2	7311.00	53.11	PK	74.00	20.89	1.00 H	212	42.03	37.28	8.60	34.8	11.08
2	7311.00	41.88	AV	54.00	12.12	1.00 H	212	30.80	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--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	54.23	PK	74.00	19.77	1.00 H	242	52.11	31.02	7.60	36.5	2.12
1	4874.00	41.99	AV	54.00	12.01	1.00 H	242	39.87	31.02	7.60	36.5	2.12
2	7311.00	52.51	PK	74.00	21.49	1.00 H	340	41.43	37.28	8.60	34.8	11.08
2	7311.00	40.17	AV	54.00	13.83	1.00 H	340	29.09	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--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	53.97	PK	74.00	20.03	1.00 H	77	51.59	31.58	7.00	36.2	2.38
1	4924.00	42.11	AV	54.00	11.89	1.00 H	77	39.73	31.58	7.00	36.2	2.38
2	7386.00	51.35	PK	74.00	22.65	1.00 H	109	39.64	38.51	8.50	35.3	11.71
2	7386.00	40.54	AV	54.00	13.46	1.00 H	109	28.83	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--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	55.00	PK	74.00	19.00	1.00 H	203	52.62	31.58	7.00	36.2	2.38
1	4924.00	44.73	AV	54.00	9.27	1.00 H	203	42.35	31.58	7.00	36.2	2.38
2	7386.00	56.61	PK	74.00	17.39	1.00 H	144	44.90	38.51	8.50	35.3	11.71
2	7386.00	44.67	AV	54.00	9.33	1.00 H	144	32.96	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)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--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	53.28	PK	74.00	20.72	1.00 H	214	51.18	31.6	7.00	36.5	2.10
1	4824.00	42.05	AV	54.00	11.95	1.00 H	214	39.95	31.6	7.00	36.5	2.10
2	7236.00	55.66	PK	74.00	18.34	1.00 H	303	44.73	37.33	8.90	35.3	10.93
2	7236.00	43.20	AV	54.00	10.80	1.00 H	303	32.27	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--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	55.06	PK	74.00	18.94	1.00 H	201	52.96	31.60	7.00	36.5	2.10
1	4824.00	43.16	AV	54.00	10.84	1.00 H	201	41.06	31.60	7.00	36.5	2.10
2	7236.00	57.80	PK	74.00	16.20	1.00 H	50	46.87	37.33	8.90	35.3	10.93
2	7236.00	46.97	AV	54.00	7.03	1.00 H	50	36.04	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--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	56.82	PK	74.00	17.18	1.00 H	355	54.70	31.02	7.60	36.5	2.12
1	4874.00	45.36	AV	54.00	8.64	1.00 H	355	43.24	31.02	7.60	36.5	2.12
2	7311.00	53.43	PK	74.00	20.57	1.00 H	200	42.35	37.28	8.60	34.8	11.08
2	7311.00	42.14	AV	54.00	11.86	1.00 H	200	31.06	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--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	55.17	PK	74.00	18.83	1.00 H	261	53.05	31.02	7.60	36.5	2.12
1	4874.00	44.86	AV	54.00	9.14	1.00 H	261	42.74	31.02	7.60	36.5	2.12
2	7311.00	52.35	PK	74.00	21.65	1.00 H	92	41.27	37.28	8.60	34.8	11.08
2	7311.00	40.72	AV	54.00	13.28	1.00 H	92	29.64	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL 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	54.63	PK	74.00	19.37	1.00 H	48	52.25	31.58	7.00	36.2	2.38
1	4924.00	41.88	AV	54.00	12.12	1.00 H	48	39.50	31.58	7.00	36.2	2.38
2	7311.00	52.67	PK	74.00	21.33	1.00 H	276	40.96	38.51	8.50	35.3	11.71
2	7311.00	40.42	AV	54.00	13.58	1.00 H	276	28.71	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)	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	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)	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	56.08	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)	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	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)	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	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)	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	55.22	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)	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	53.91	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

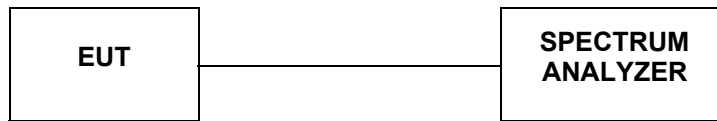
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2452MHz)												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4904.00	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)	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	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.

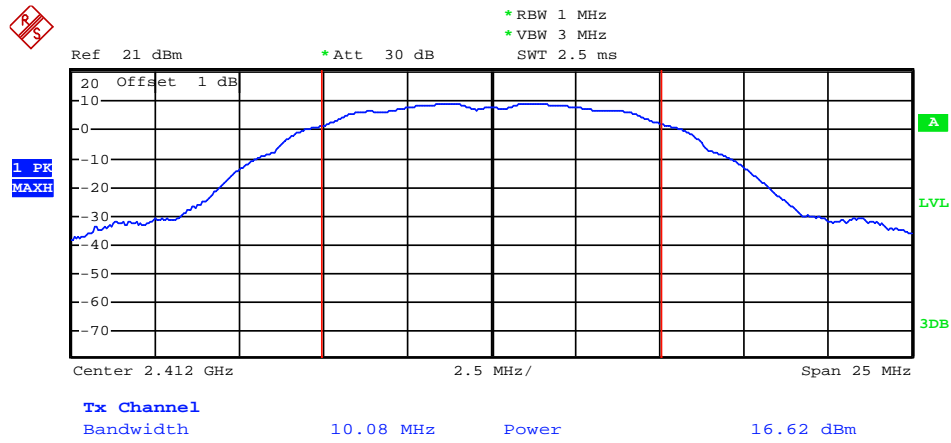
4.3.1 802.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	16.62	Plot 4.3.1 A	30	PASS
6	2437	15.55	Plot 4.3.1 B	30	PASS
11	2462	15.01	Plot 4.3.1 C	30	PASS

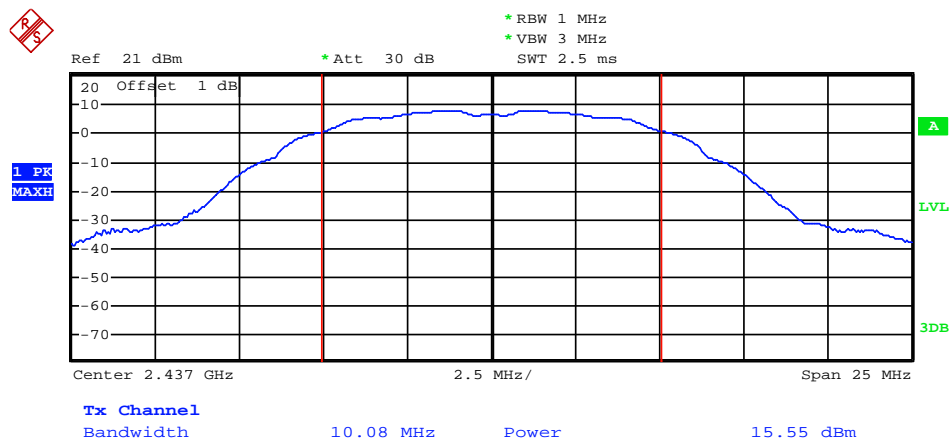
Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

B. Test Plots



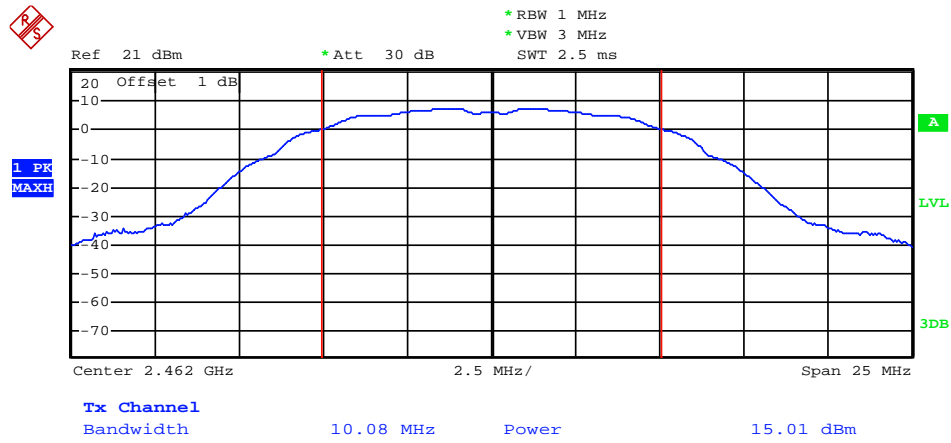
Date: 3.NOV.2013 11:14:30

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



Date: 3.NOV.2013 11:20:50

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



Date: 3.NOV.2013 11:21:46

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

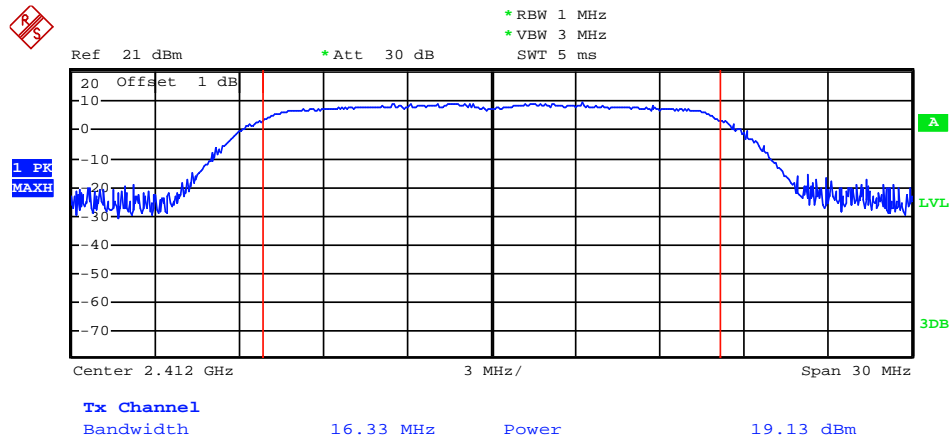
4.3.2 802.11g Test Mode

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	18.50	Plot 4.3.2 B	30	PASS
11	2462	18.24	Plot 4.3.2 C	30	PASS

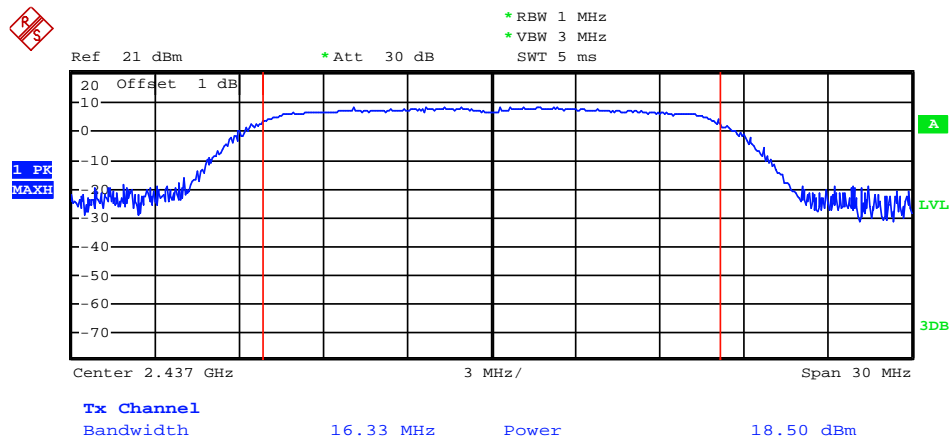
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.

B. Test Plots



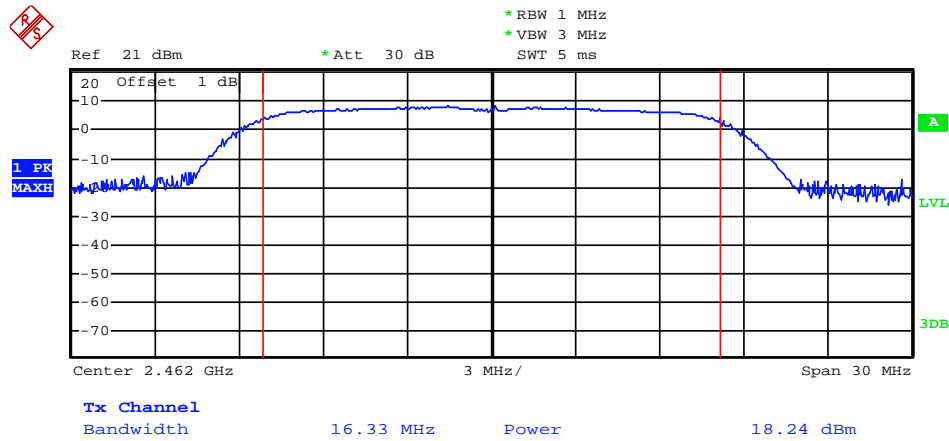
Date: 3.NOV.2013 11:30:46

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



Date: 3.NOV.2013 11:35:29

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



Date: 3.NOV.2013 11:36:44

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

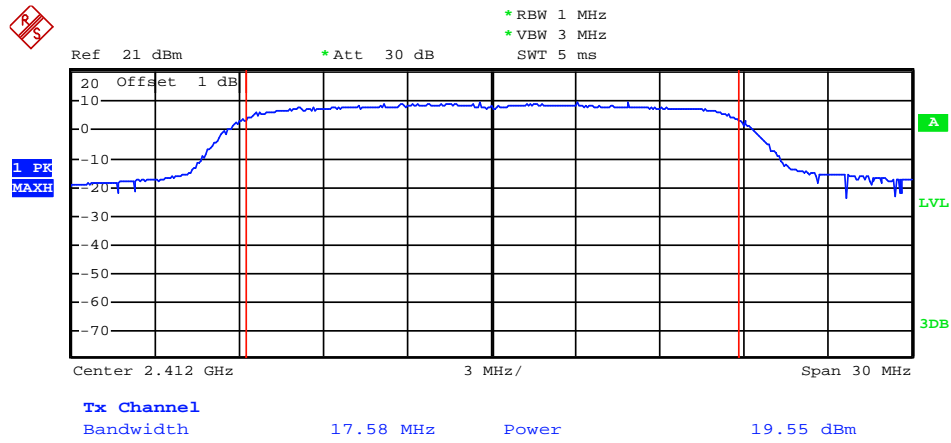
4.3.3 802.11n(20MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	19.55	Plot 4.3.3 A	30	PASS
6	2437	18.79	Plot 4.3.3 B	30	PASS
11	2462	18.12	Plot 4.3.3 C	30	PASS

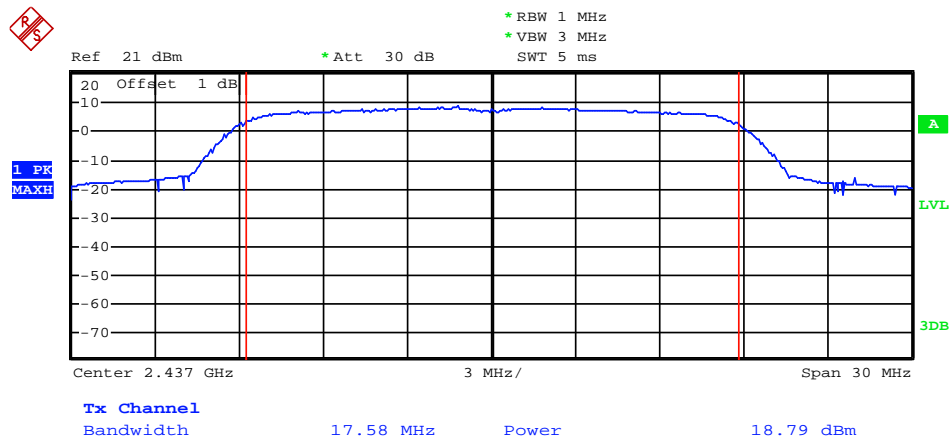
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.

B. Test Plots



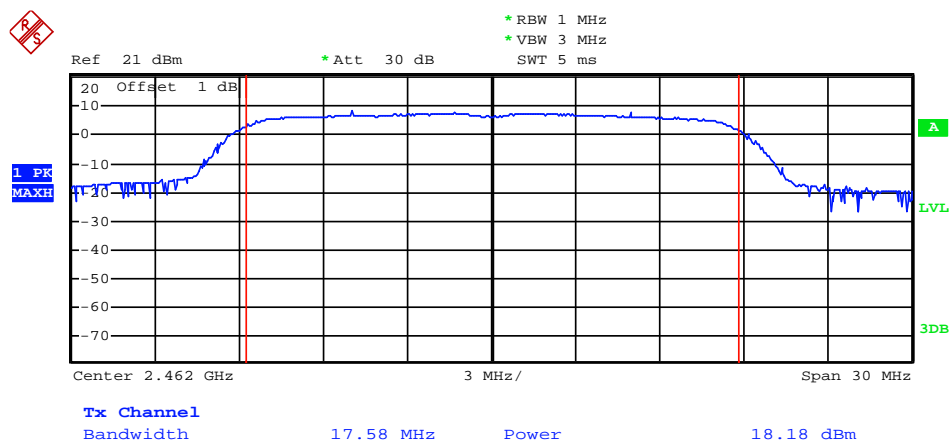
Date: 3.NOV.2013 11:51:17

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



Date: 3.NOV.2013 11:57:01

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



Date: 3.NOV.2013 11:57:46

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

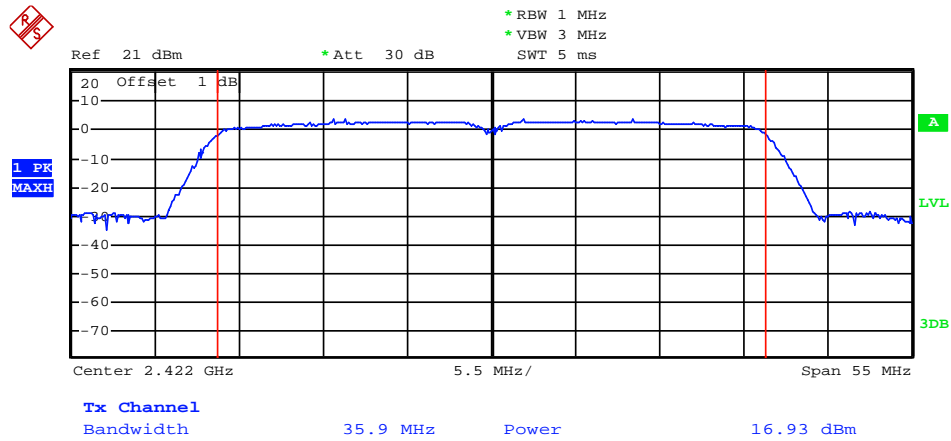
4.3.4 802.11n(40MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
3	2422	16.93	Plot 4.3.4 A	30	PASS
6	2437	16.57	Plot 4.3.4 B	30	PASS
9	2452	16.53	Plot 4.3.4 C	30	PASS

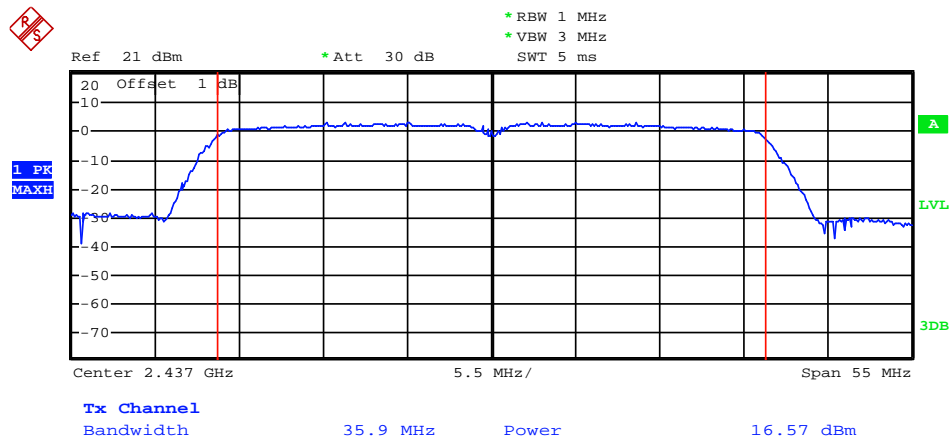
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.

B. Test Plots



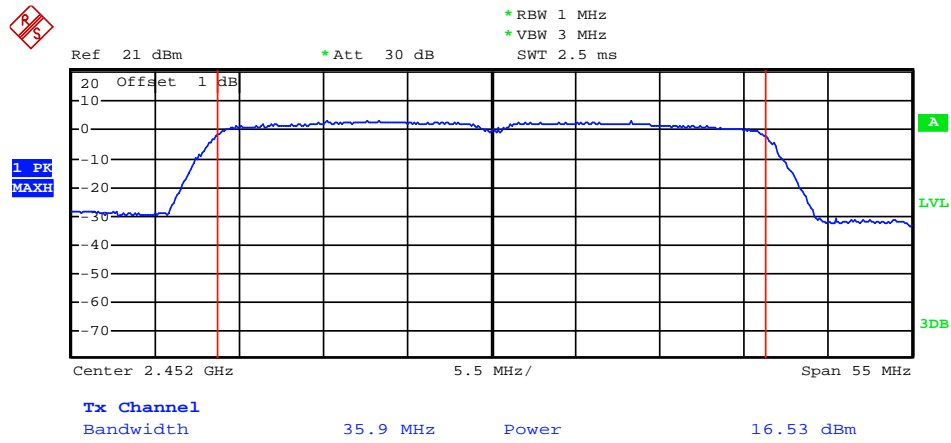
Date: 3.NOV.2013 11:59:08

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



Date: 3.NOV.2013 11:59:48

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

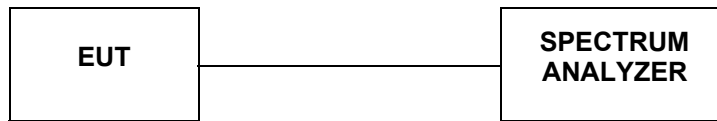


Date: 3.NOV.2013 13:37:41

(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

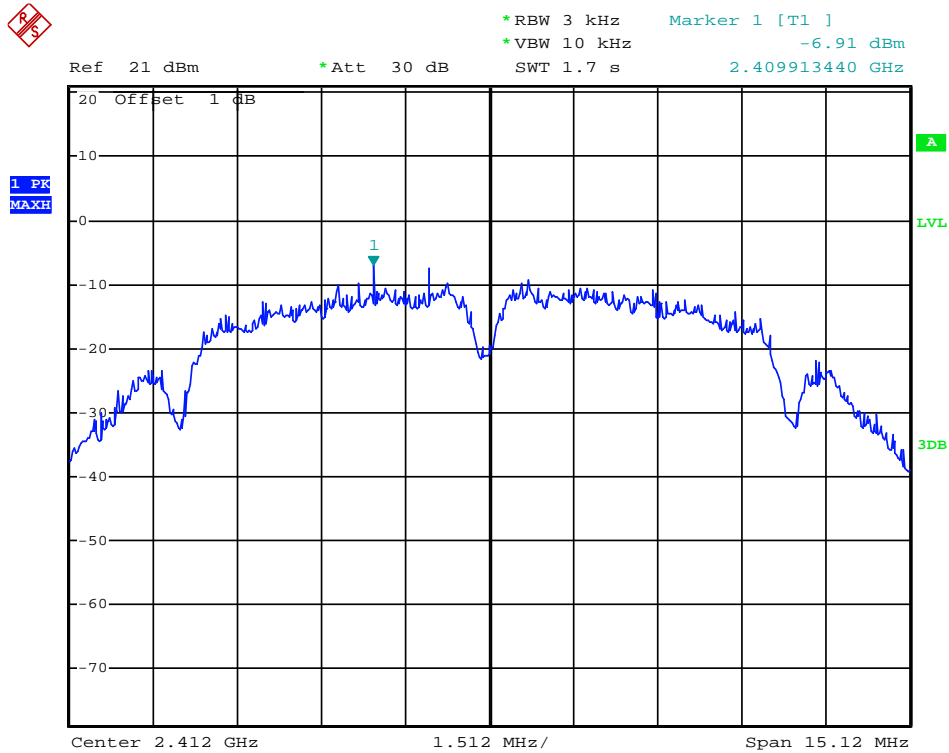
4.4.1 802.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-6.91	Plot 4.4.1 A	8	PASS
6	2437	-10.29	Plot 4.4.1 B	8	PASS
11	2462	-11.14	Plot 4.4.1 C	8	PASS

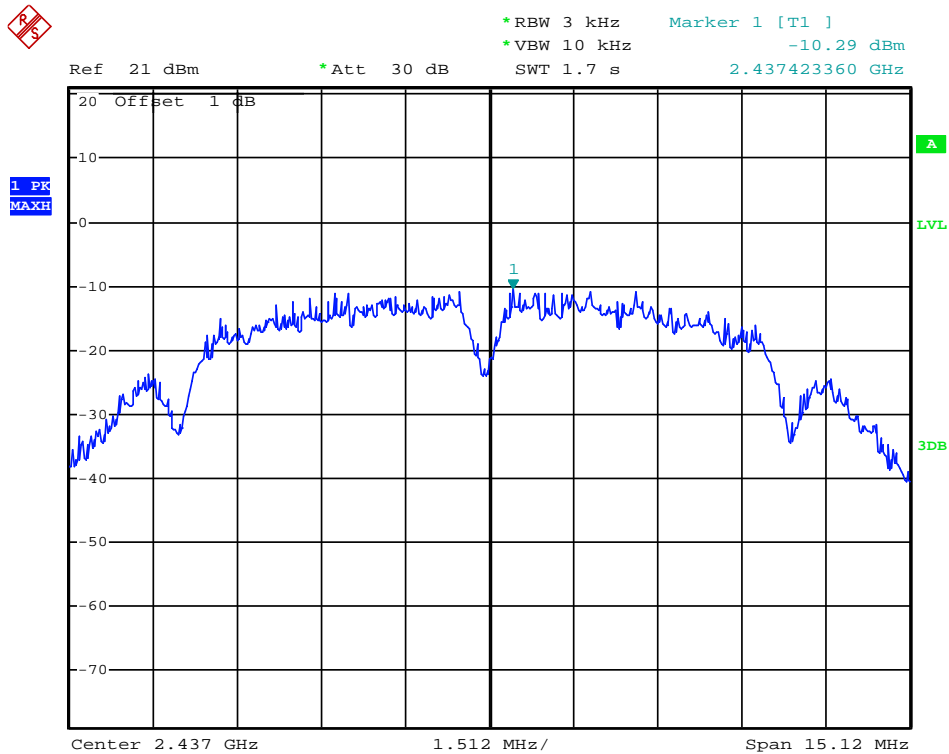
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

B. Test Plots



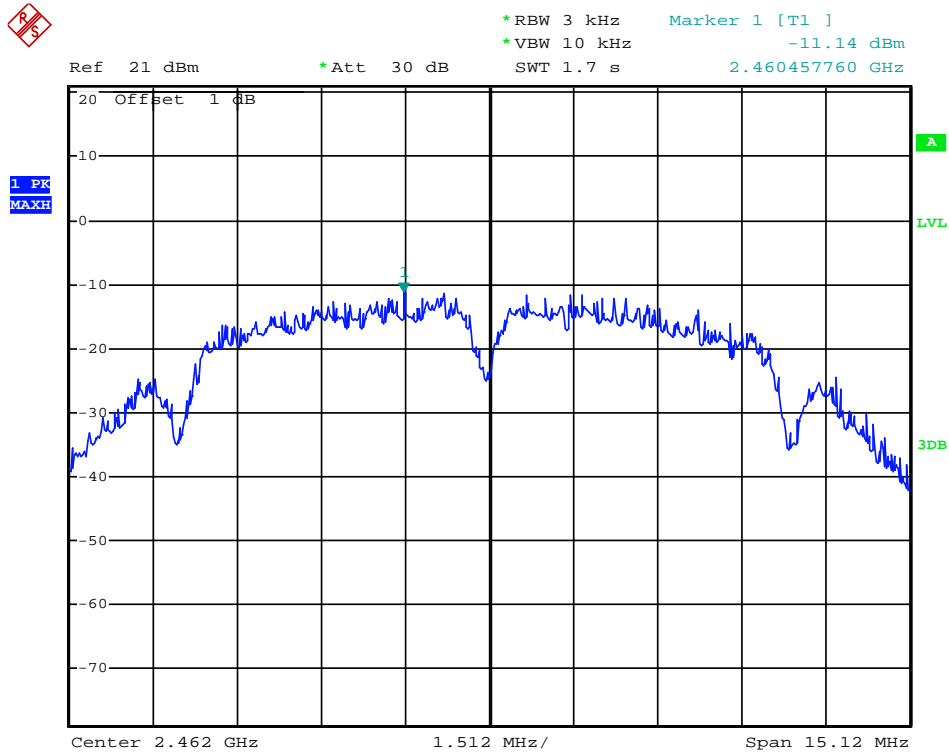
Date: 3.NOV.2013 12:02:33

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



Date: 3.NOV.2013 12:03:13

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



Date: 3.NOV.2013 12:03:47

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

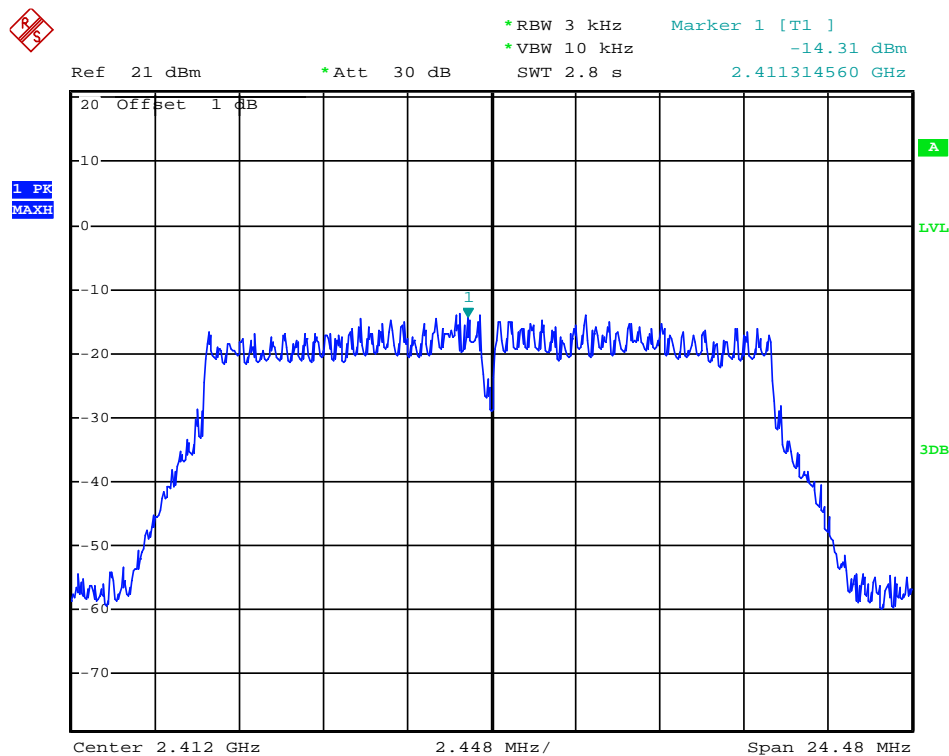
4.4.2 802.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-14.31	Plot 4.4.2 A	8	PASS
6	2437	-13.96	Plot 4.4.2 B	8	PASS
11	2462	-13.83	Plot 4.4.2 C	8	PASS

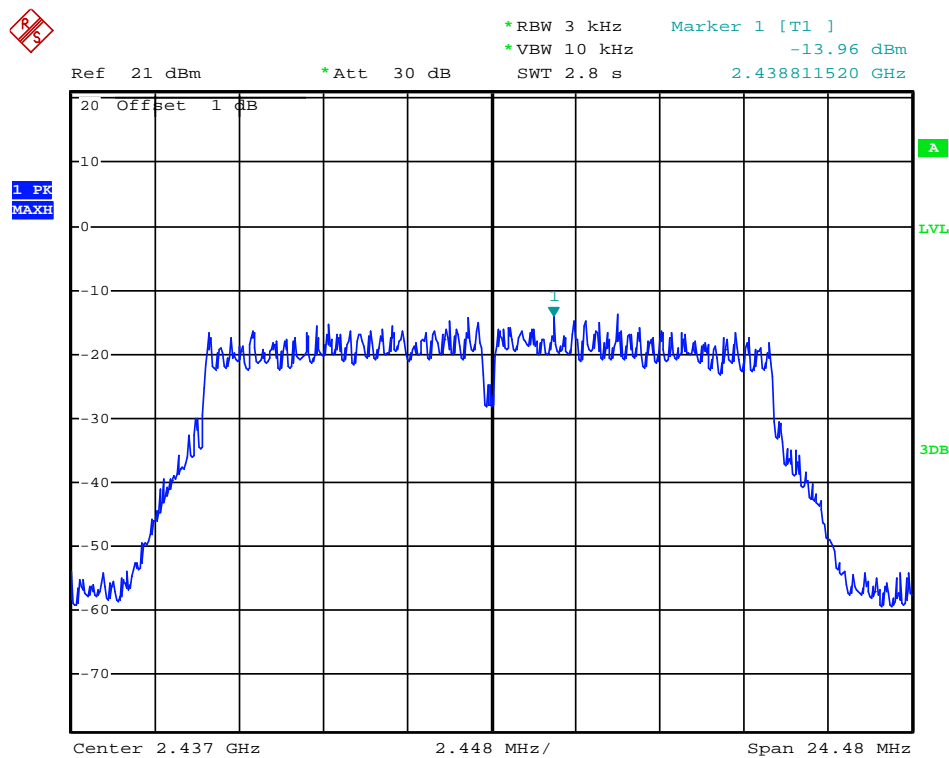
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.

B. Test Plots



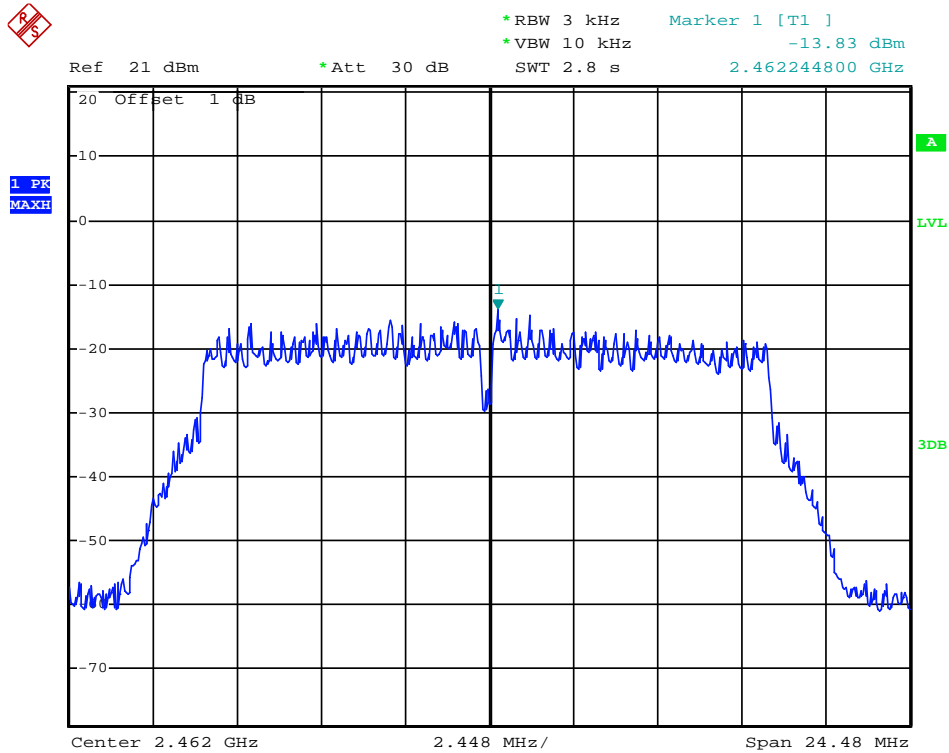
Date: 3.NOV.2013 12:05:19

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



Date: 3.NOV.2013 13:26:10

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



Date: 3.NOV.2013 13:26:51

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

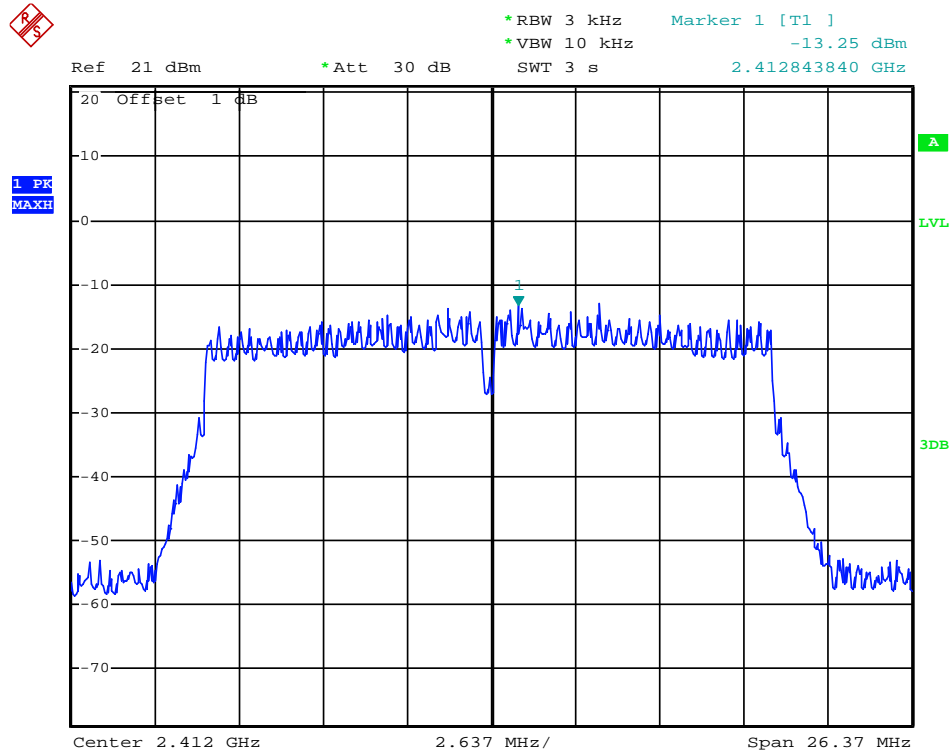
4.4.3 802.11n(20MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-13.25	Plot 4.4.3 A	8	PASS
6	2437	-13.74	Plot 4.4.3 B	8	PASS
11	2462	-14.95	Plot 4.4.3 C	8	PASS

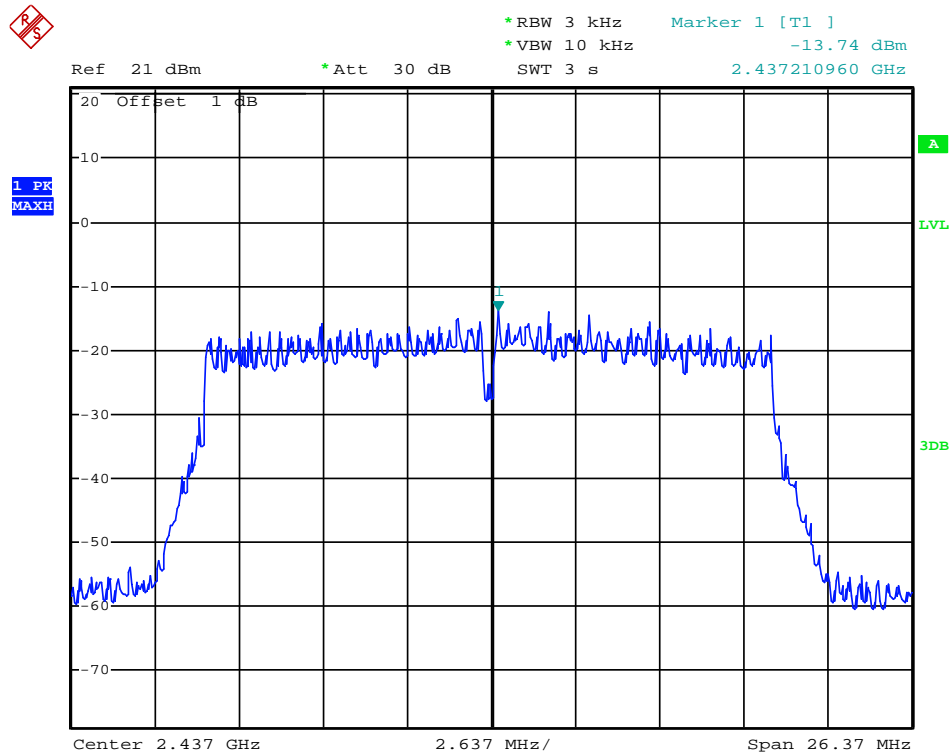
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.

B. Test Plots



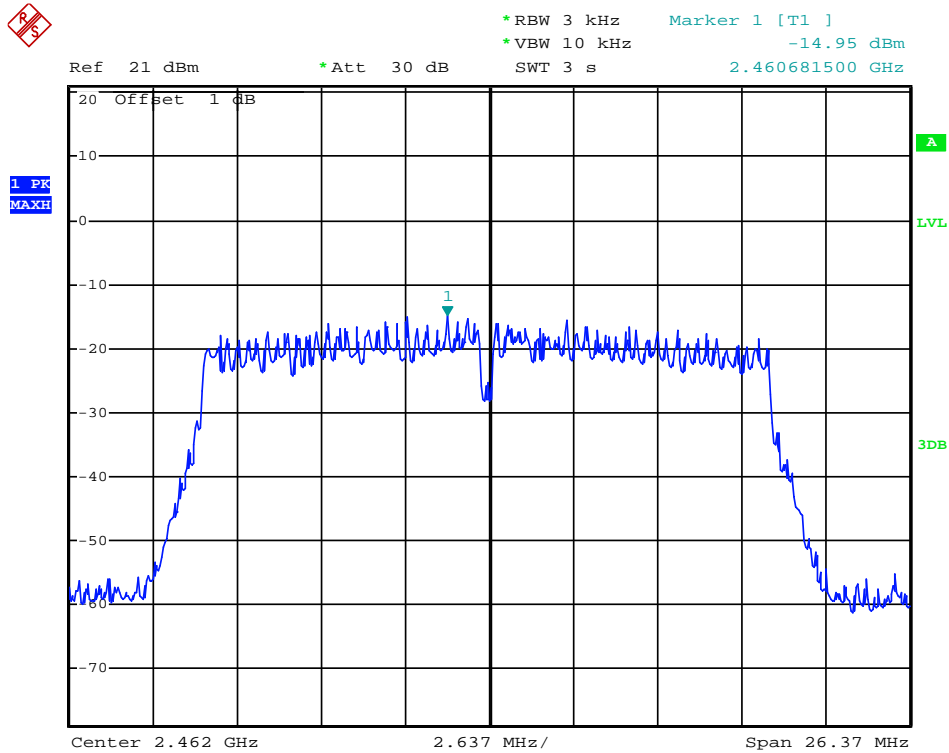
Date: 3.NOV.2013 13:29:32

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



Date: 3.NOV.2013 13:30:15

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



Date: 3.NOV.2013 13:31:08

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

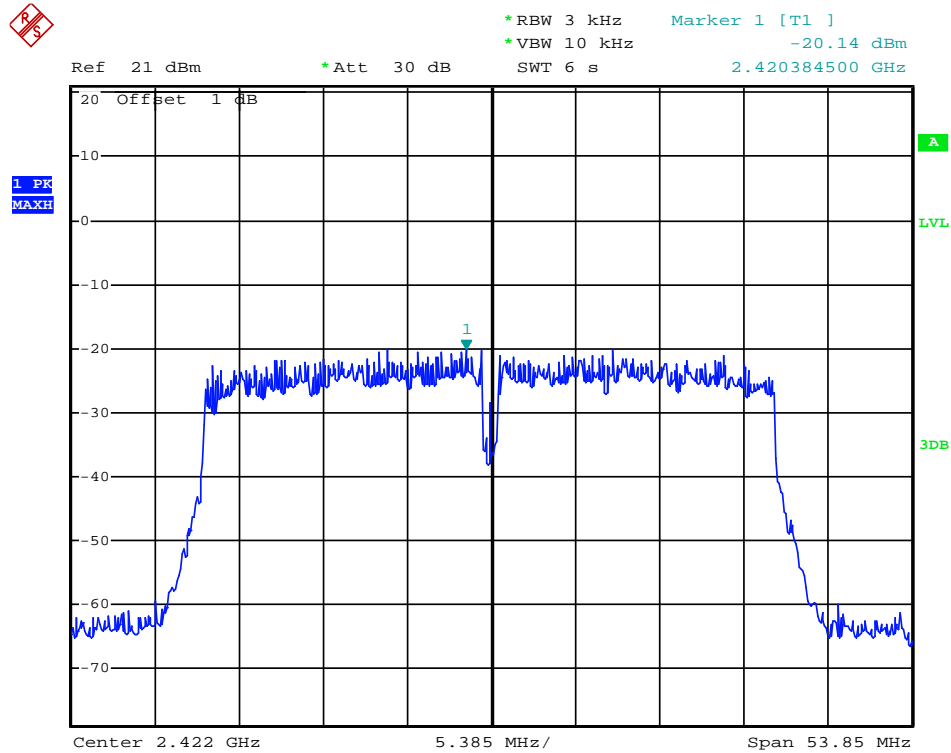
4.4.4 802.11n(40MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
3	2422	-20.14	Plot 4.4.4 A	8	PASS
6	2437	-18.47	Plot 4.4.4 B	8	PASS
9	2452	-20.34	Plot 4.4.4 C	8	PASS

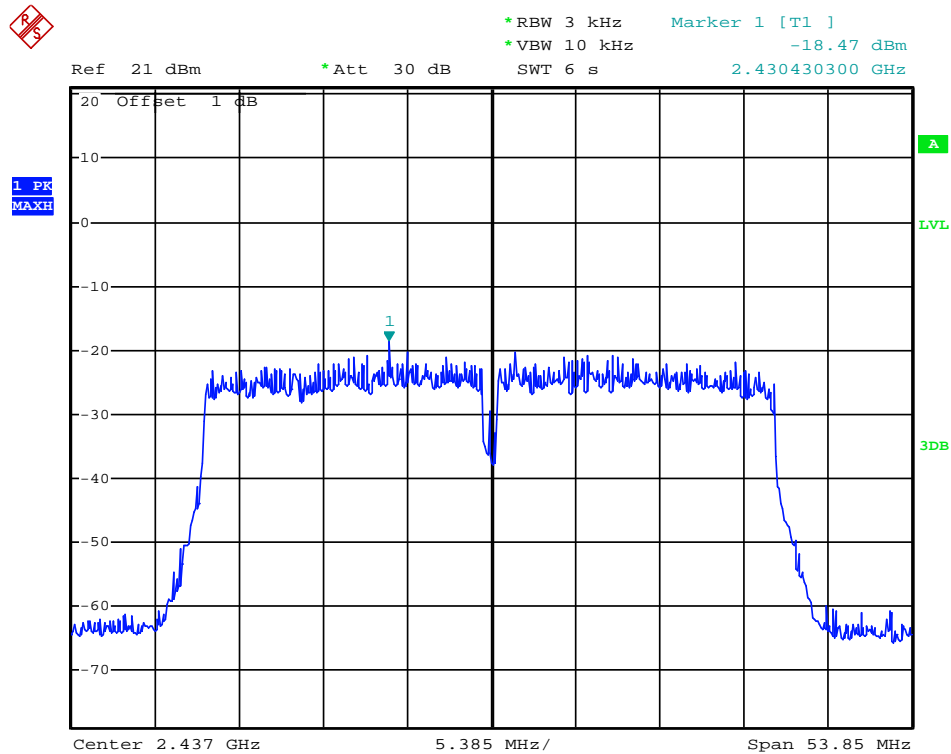
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.

B. Test Plots



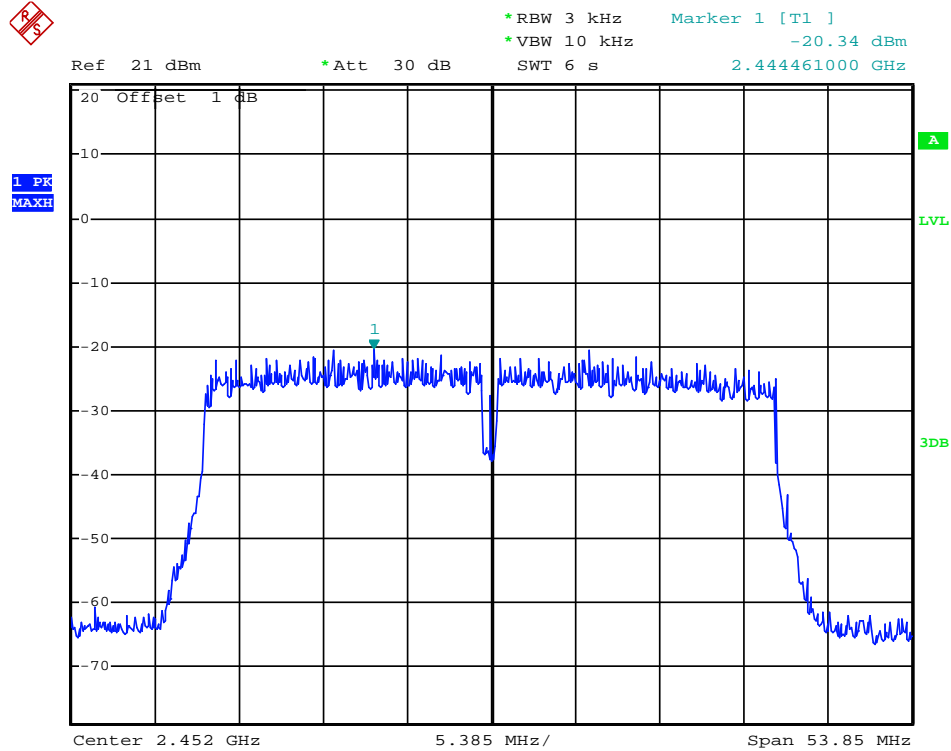
Date: 3.NOV.2013 13:32:29

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



Date: 3.NOV.2013 13:33:05

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



Date: 3.NOV.2013 13:34:00

(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 ≤ 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 μ 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.

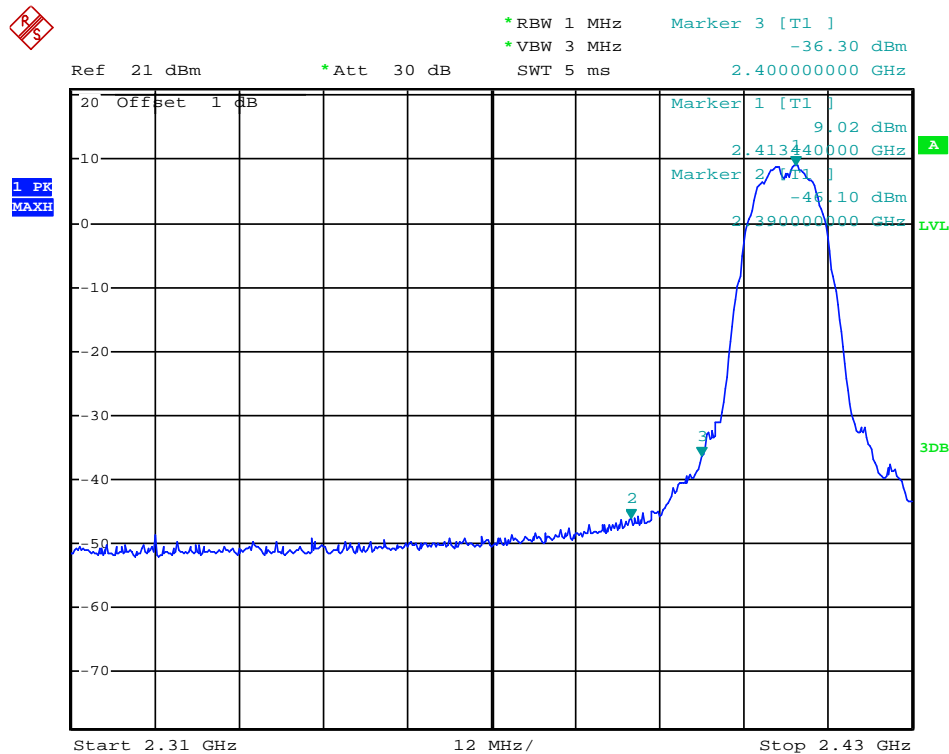
4.5.1 802.11b Test Mode

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	-46.10	2.00	0.00	51.16	Peak	74.00	Plot 4.5.1 A1
2390.00	-58.28	2.00	0.00	38.98	AV	54.00	Plot 4.5.1 A2
2413.44	9.02	2.00	0.00	106.28	Peak	---	Plot 4.5.1 A1
2411.28	3.81	2.00	0.00	101.07	AV	---	Plot 4.5.1 A2
2460.50	7.82	2.00	0.00	105.08	Peak	---	Plot 4.5.1 A3
2461.10	-2.65	2.00	0.00	94.61	AV	---	Plot 4.5.1 A4
2483.50	-44.75	2.00	0.00	52.51	Peak	74.00	Plot 4.5.1 A3
2483.50	-55.10	2.00	0.00	42.16	AV	54.00	Plot 4.5.1 A4

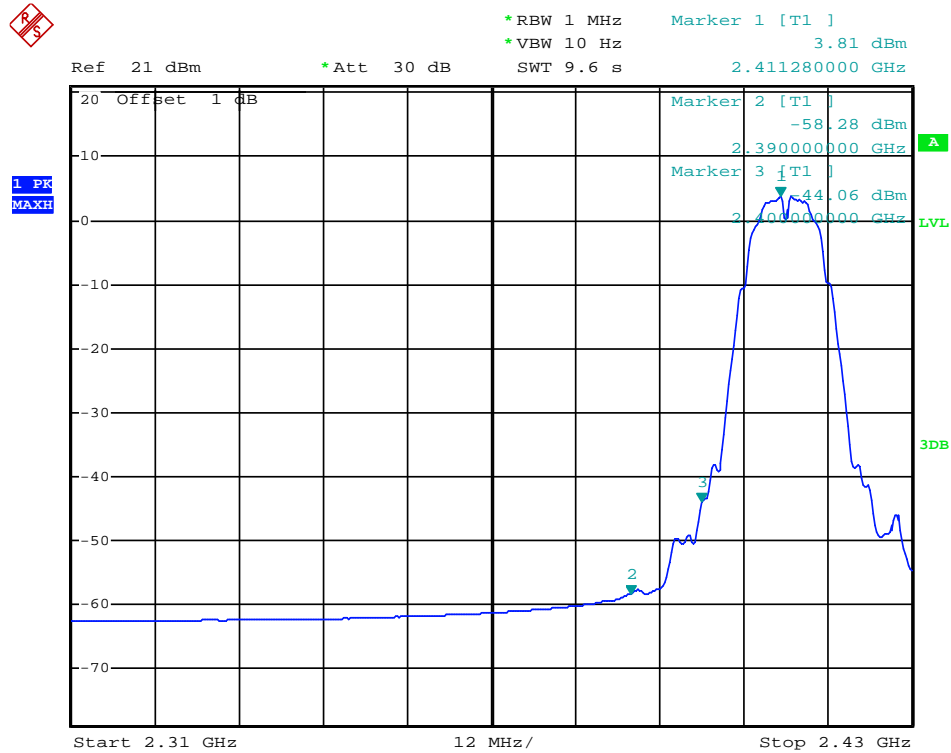
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
 2. The test results including the cable loss.
 3. "----" means that the fundamental frequency not for 15.209 limits requirement.

B. Test Plots



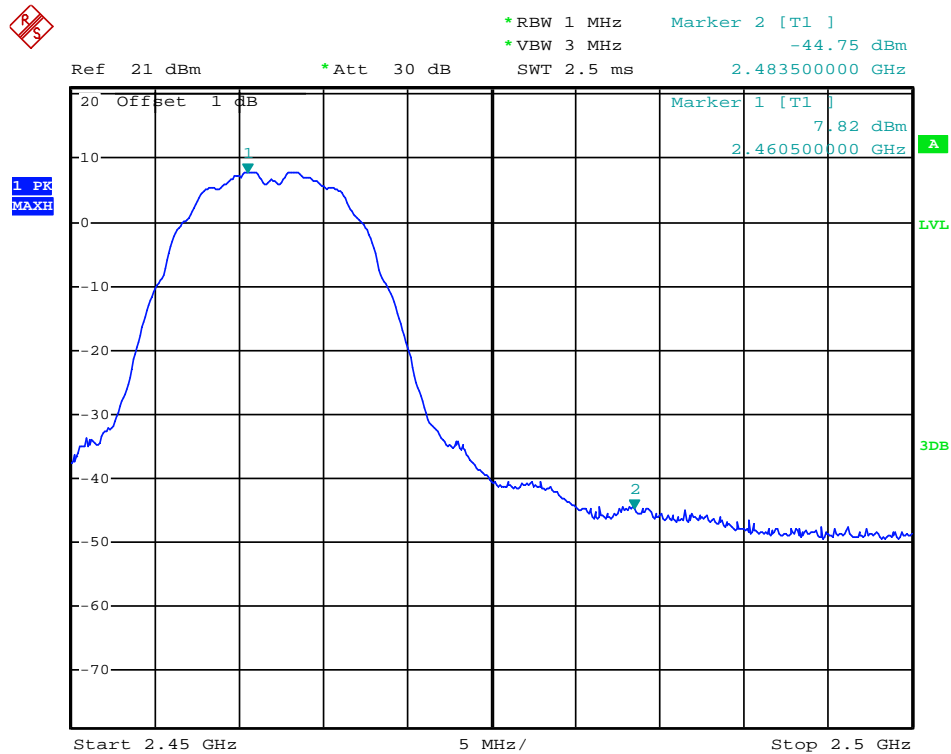
Date: 3.NOV.2013 13:51:50

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



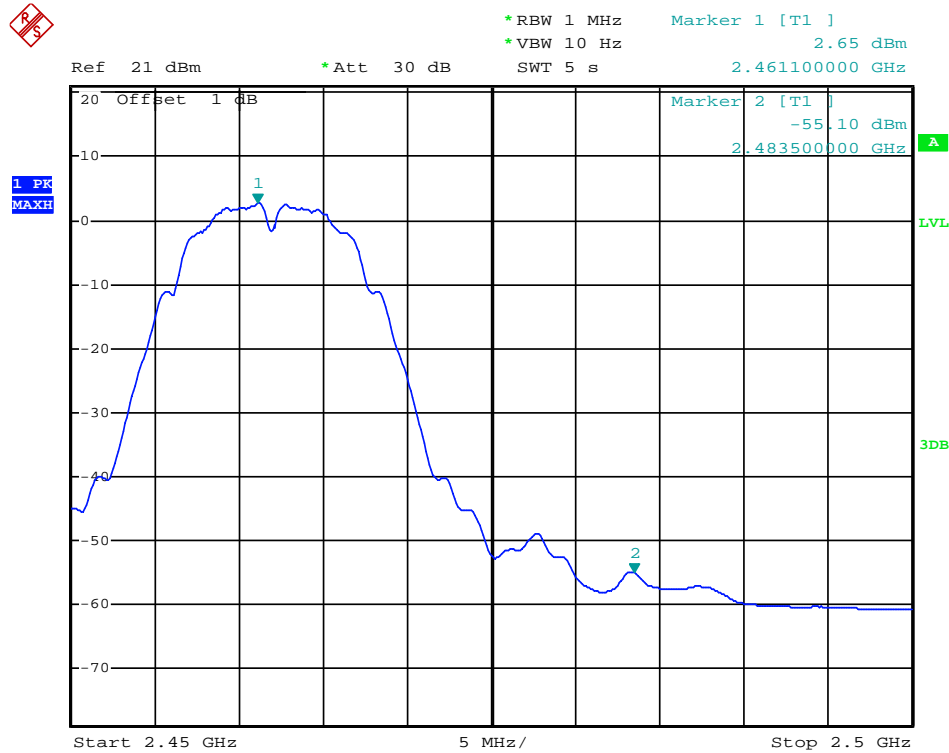
Date: 3.NOV.2013 13:52:35

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



Date: 3.NOV.2013 13:57:46

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



Date: 3.NOV.2013 13:58:28

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

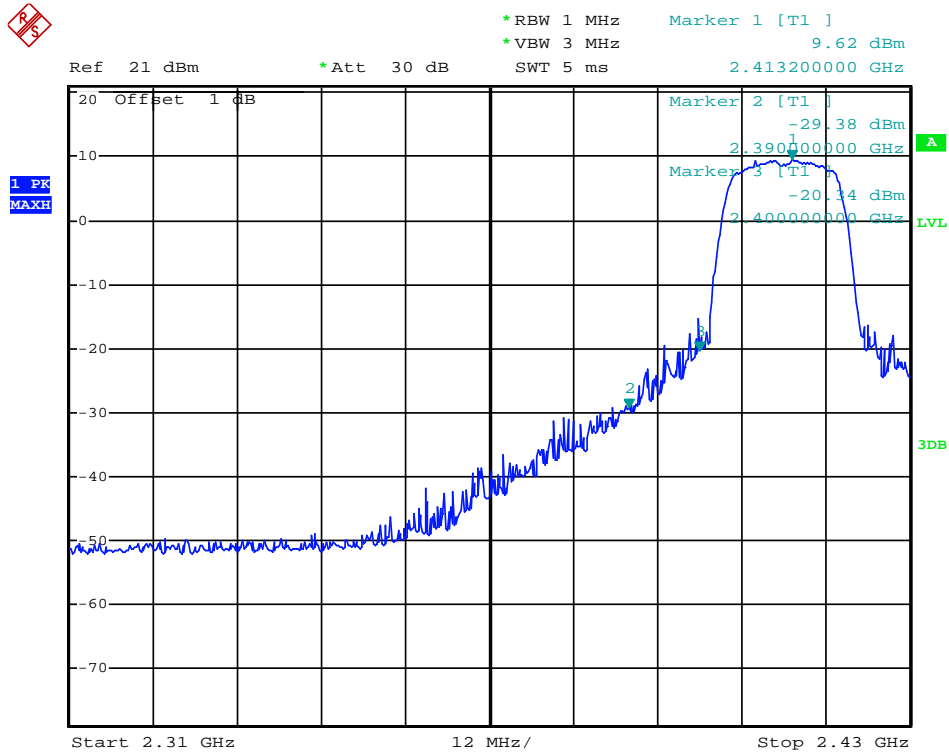
4.5.2 802.11g Test Mode

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	-29.38	2.00	0.00	67.88	Peak	74.00	Plot 4.5.2 A1
2390.00	-53.33	2.00	0.00	43.93	AV	54.00	Plot 4.5.2 A2
2413.20	9.62	2.00	0.00	106.88	Peak	---	Plot 4.5.2 A1
2413.20	-5.47	2.00	0.00	91.79	AV	---	Plot 4.5.2 A2
2459.10	7.23	2.00	0.00	104.49	Peak	---	Plot 4.5.2 A3
2460.80	-6.72	2.00	0.00	90.54	AV	---	Plot 4.5.2 A4
2483.50	-28.78	2.00	0.00	68.48	Peak	74.00	Plot 4.5.2 A3
2483.50	-53.34	2.00	0.00	43.92	AV	54.00	Plot 4.5.2 A4

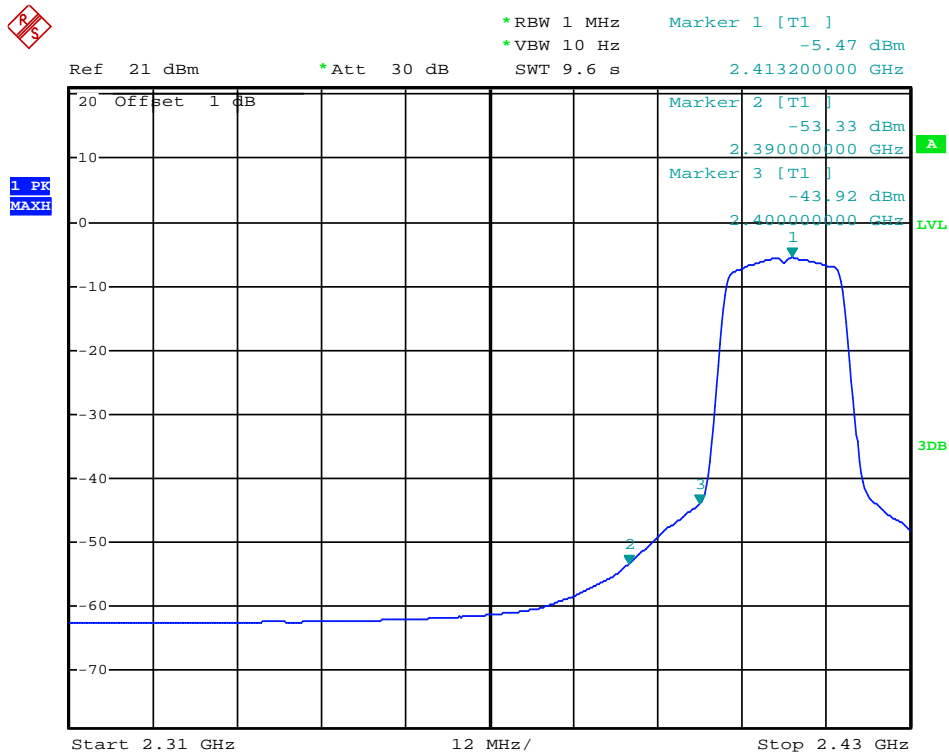
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable lose.
 3. "---" means that the fundamental frequency not for 15.209 limits requirement.

B. Test Plots



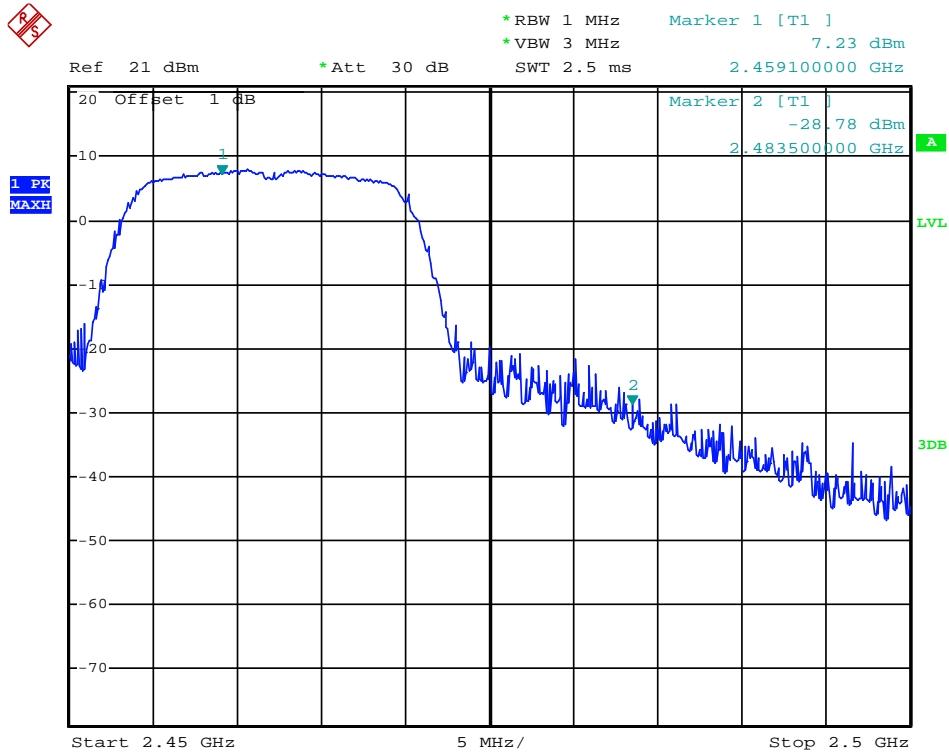
Date: 3.NOV.2013 13:54:53

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



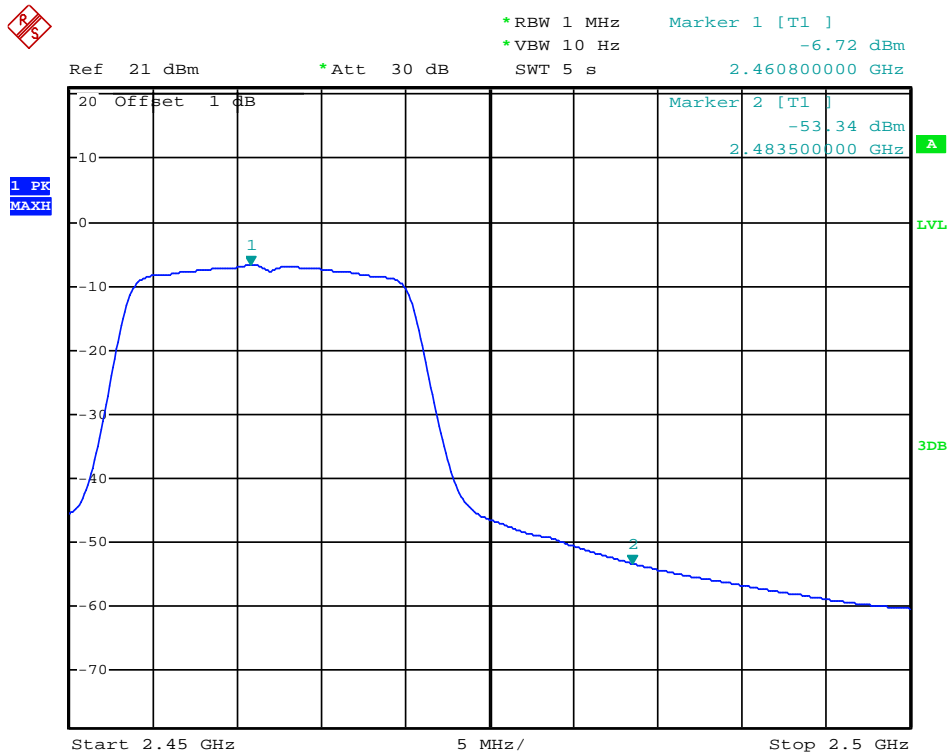
Date: 3.NOV.2013 13:53:41

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



Date: 3.NOV.2013 14:00:18

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



Date: 3.NOV.2013 13:59:14

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

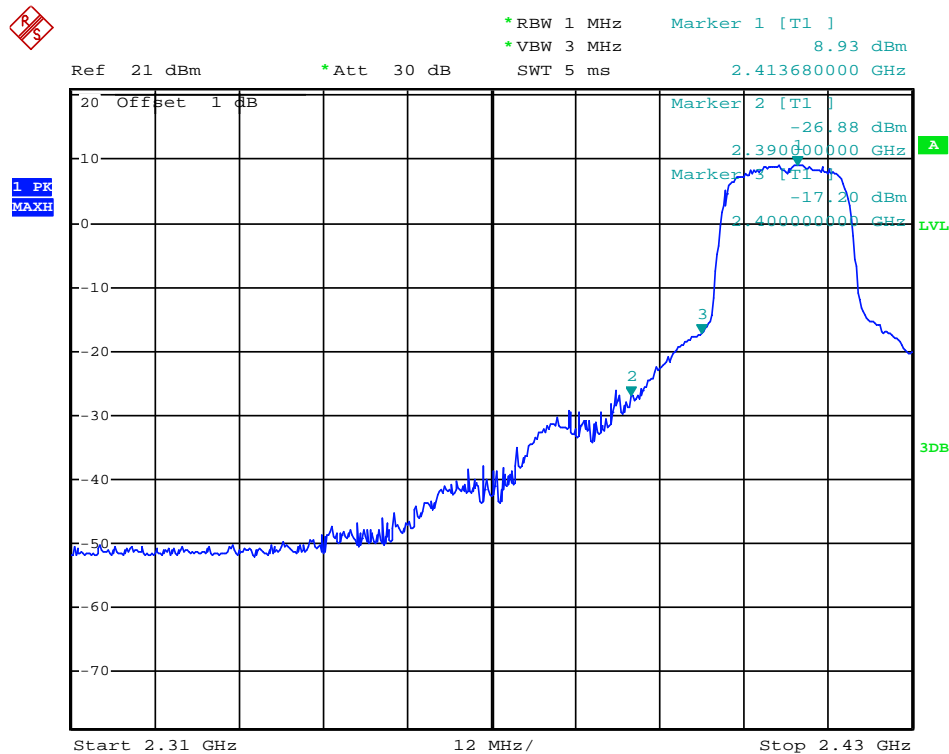
4.5.3 802.11n(20MHz) Test Mode

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	-51.87	2.00	0.00	45.39	AV	54.00	Plot 4.5.3 A2
2413.68	8.93	2.00	0.00	106.19	Peak	---	Plot 4.5.3 A1
2413.20	-5.81	2.00	0.00	91.45	AV	---	Plot 4.5.3 A2
2459.10	7.33	2.00	0.00	104.59	Peak	---	Plot 4.5.3 A3
2460.90	-7.22	2.00	0.00	90.04	AV	---	Plot 4.5.3 A4
2483.50	-26.73	2.00	0.00	70.53	Peak	74.00	Plot 4.5.3 A3
2483.50	-52.88	2.00	0.00	44.38	AV	54.00	Plot 4.5.3 A4

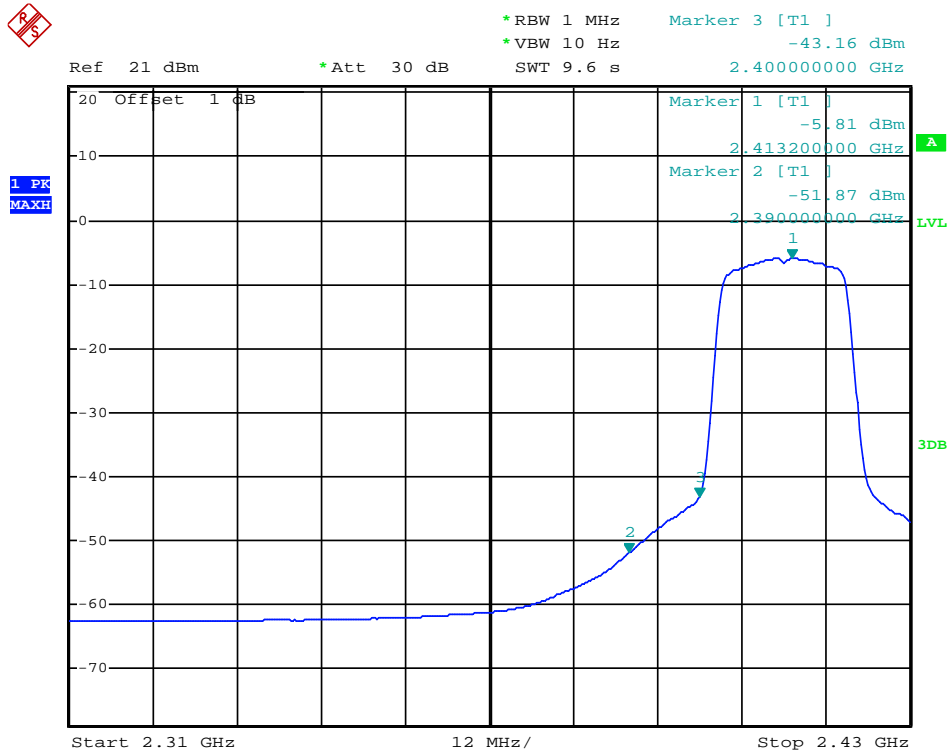
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable loss.
 3. "----" means that the fundamental frequency not for 15.209 limits requirement.

B. Test Plots



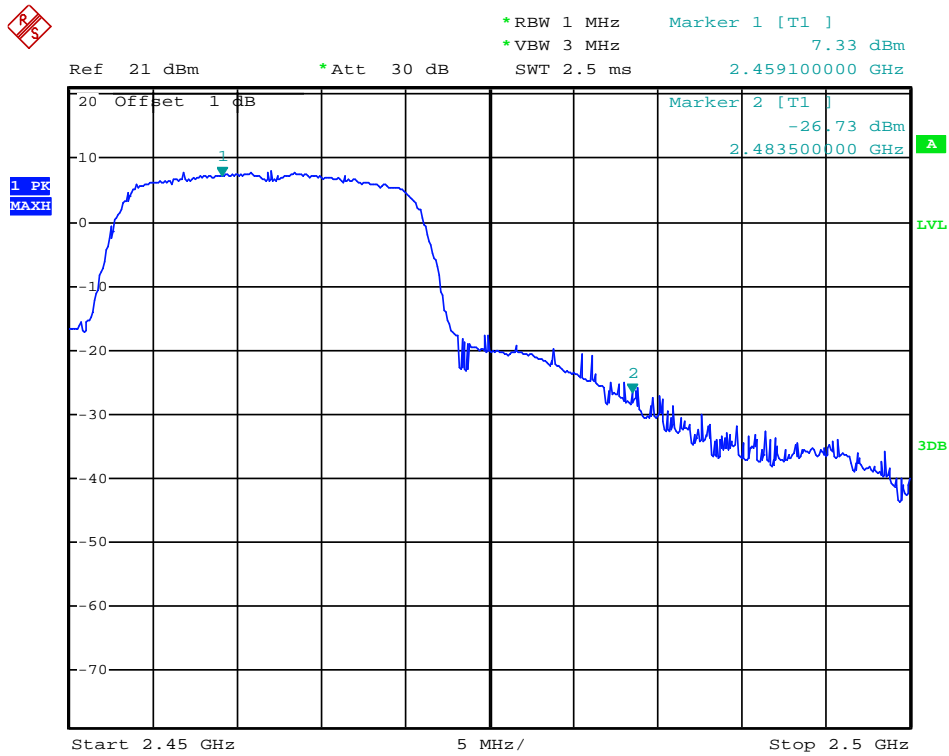
Date: 3.NOV.2013 13:56:05

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



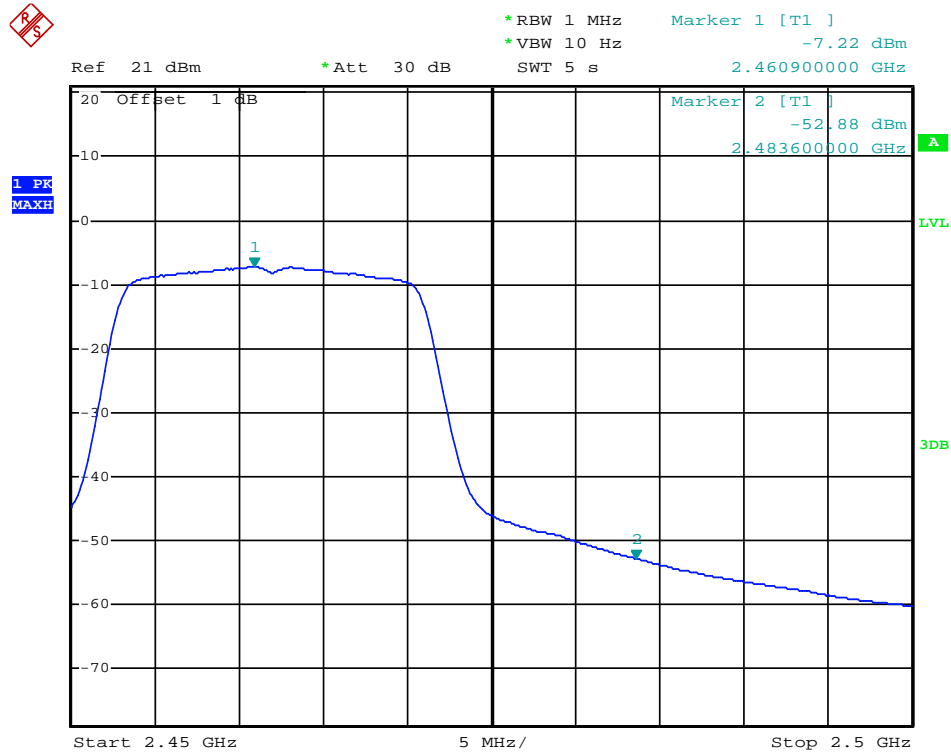
Date: 3.NOV.2013 14:04:18

(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 14:03:14

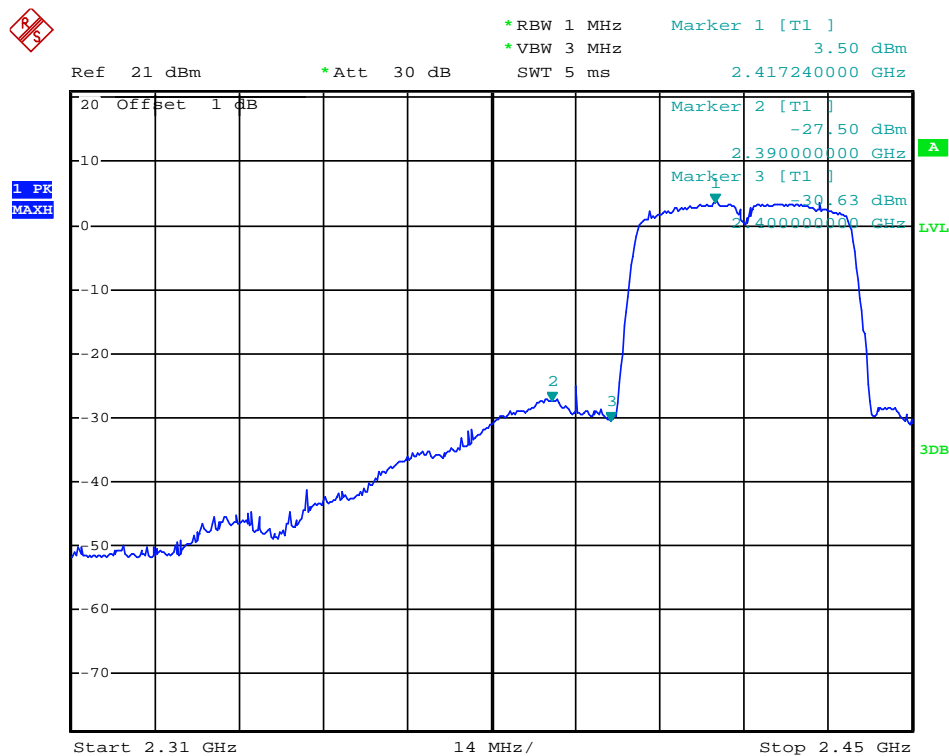
(Plot 4.5.3 A4: Channel 11: 2462MHz @ 802.11n(20MHz))

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	-27.50	2.00	0.00	69.76	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
2417.24	3.50	2.00	0.00	100.76	Peak	---	Plot 4.5.4 A1
2428.16	-14.86	2.00	0.00	82.40	AV	---	Plot 4.5.4 A2
2449.46	2.52	2.00	0.00	99.78	Peak	---	Plot 4.5.4 A3
2445.68	-15.48	2.00	0.00	81.78	AV	---	Plot 4.5.4 A4
2483.50	-30.46	2.00	0.00	66.80	Peak	74.00	Plot 4.5.4 A3
2483.50	-55.27	2.00	0.00	41.99	AV	54.00	Plot 4.5.4 A4

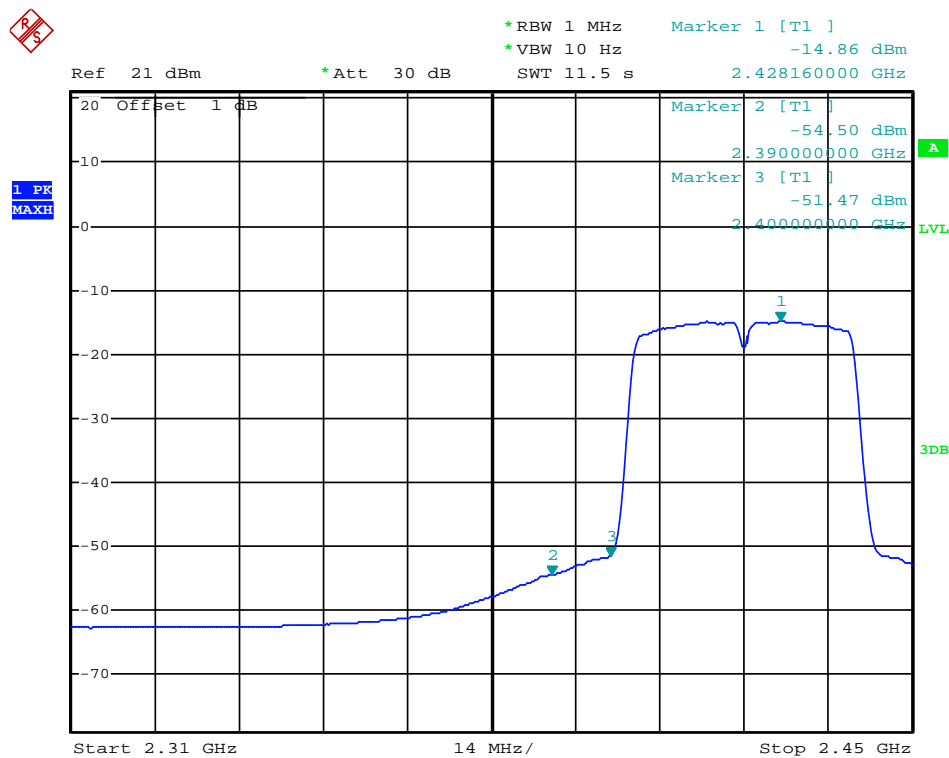
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.
 2. The test results including the cable loss.
 3. "---" means that the fundamental frequency not for 15.209 limits requirement.

B. Test Plots



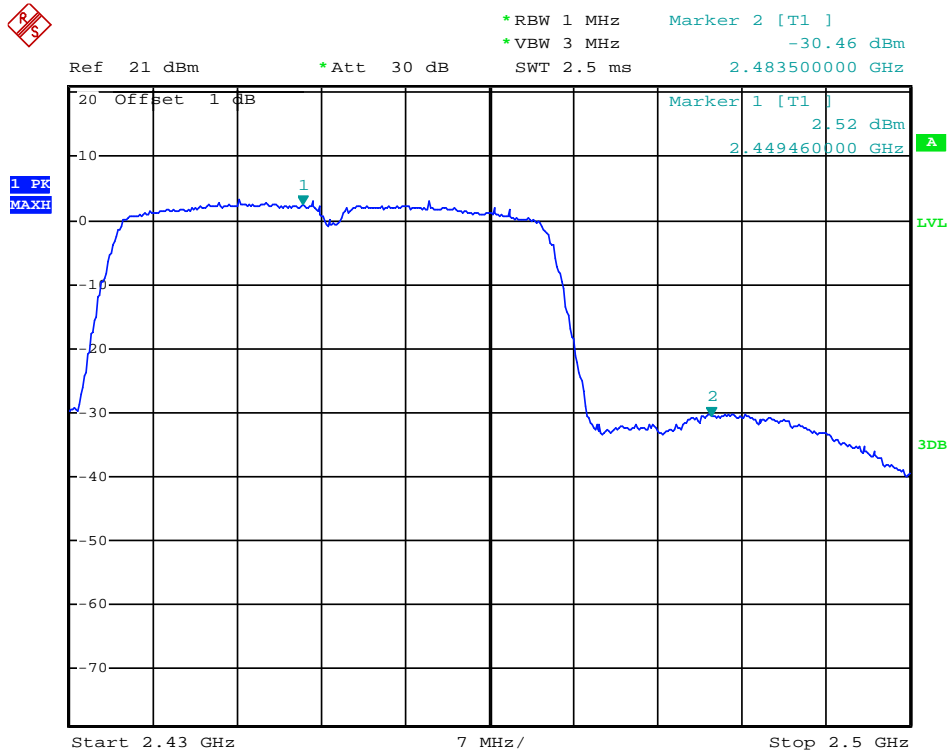
Date: 3.NOV.2013 14:07:18

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



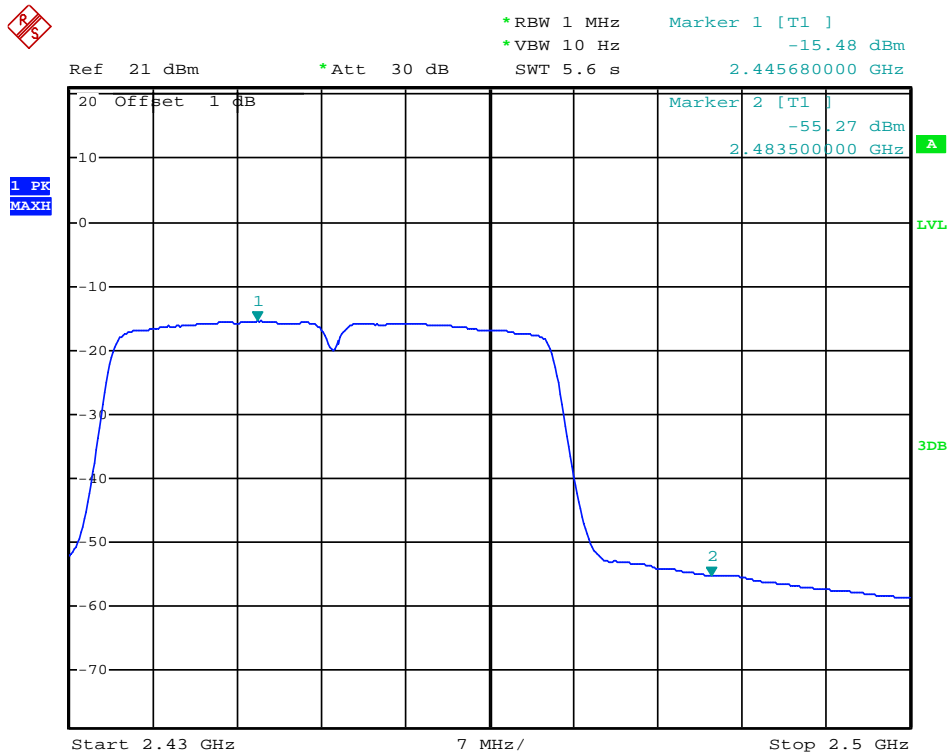
Date: 3.NOV.2013 14:06:03

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



Date: 3.NOV.2013 14:08:39

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

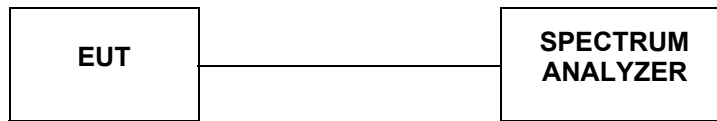


Date: 3.NOV.2013 14:10:01

(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 10th 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

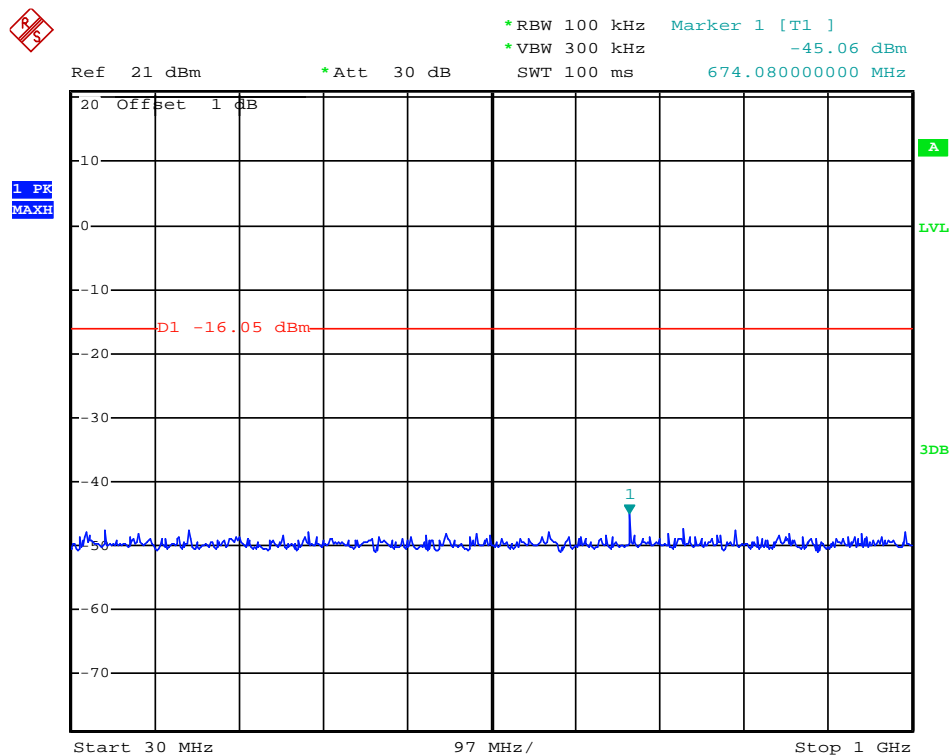
A. Test Verdict

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	-52.19	Peak	-20	Plot 4.6.1 E	PASS

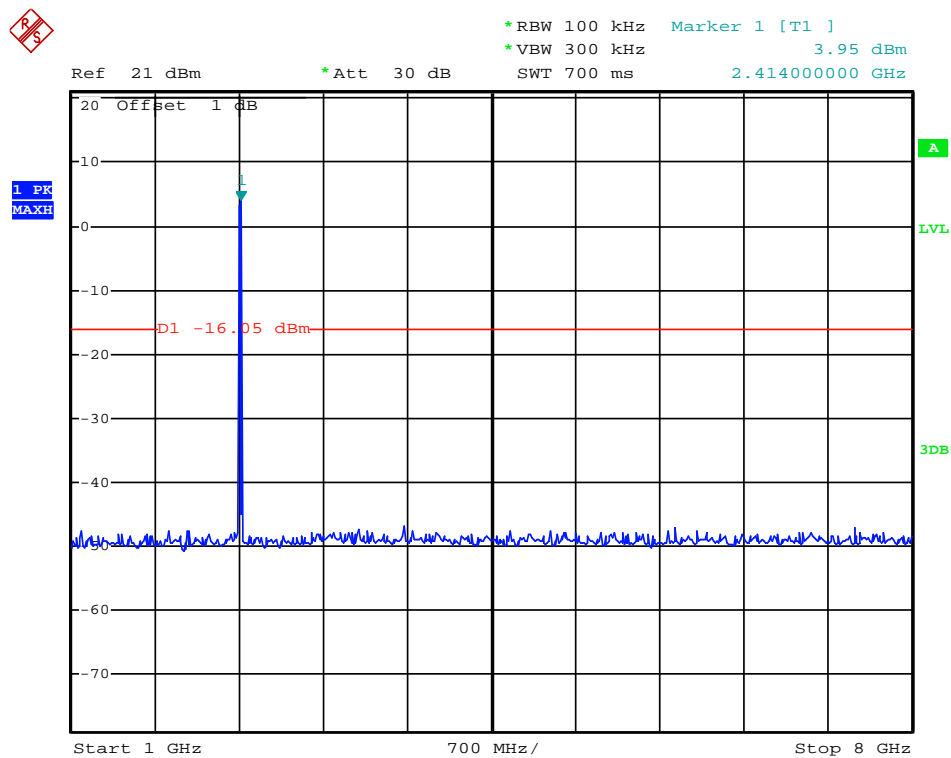
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

B. Test Plots



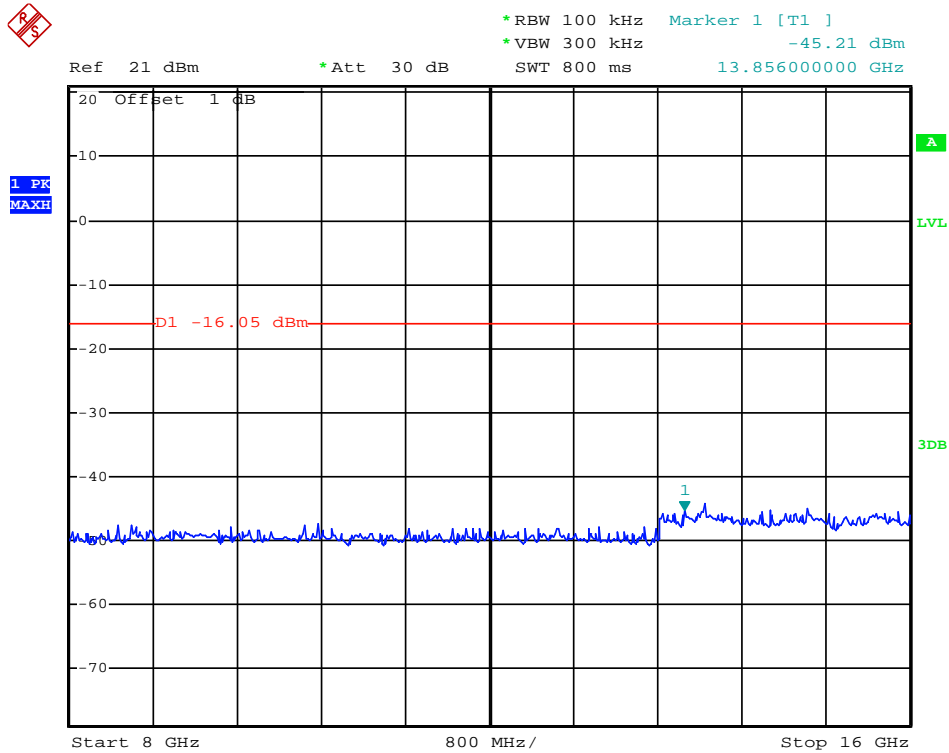
Date: 3.NOV.2013 14:13:29

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



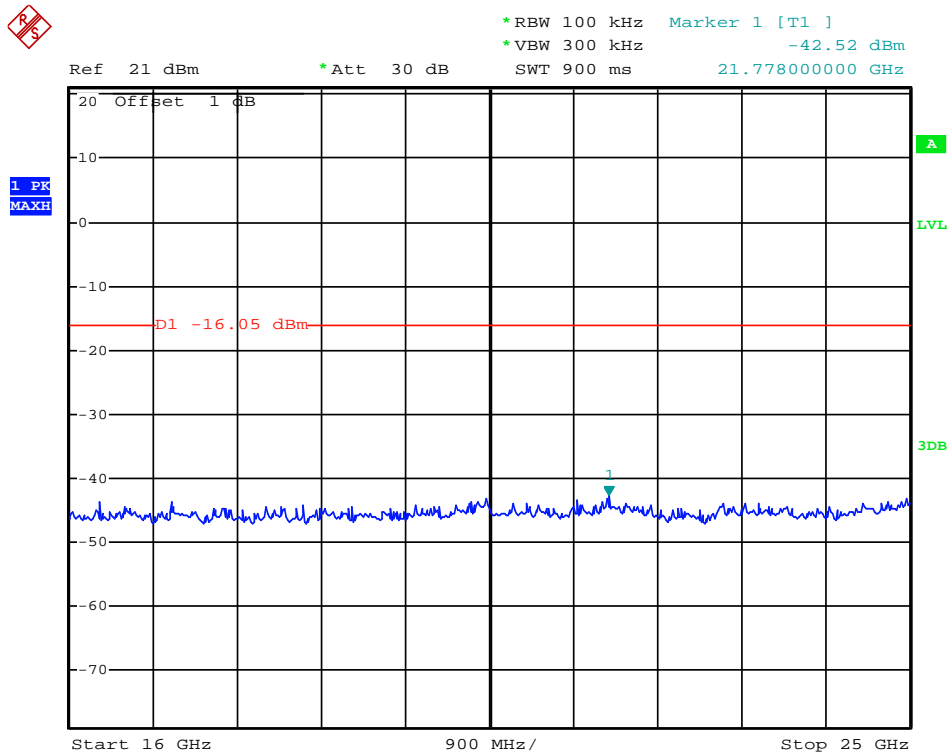
Date: 3.NOV.2013 14:11:56

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



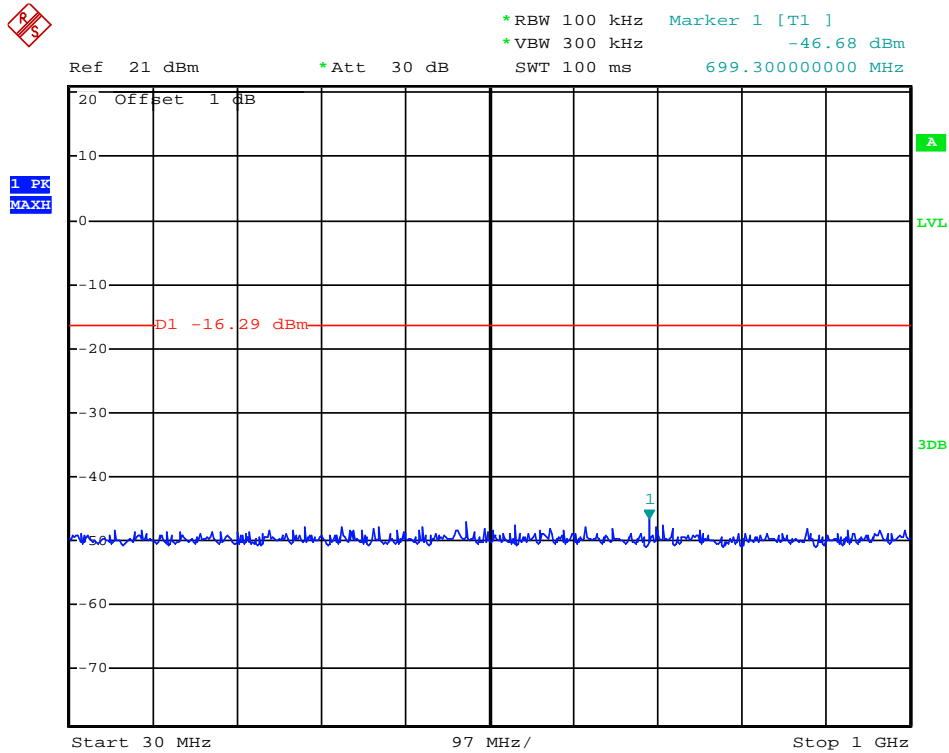
Date: 3.NOV.2013 14:12:17

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



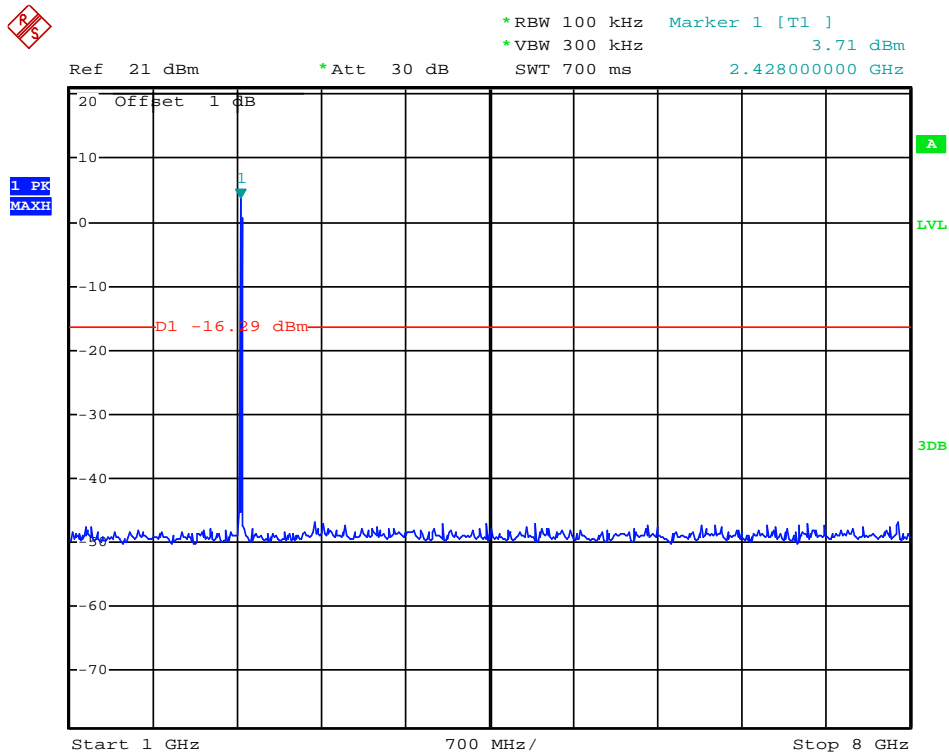
Date: 3.NOV.2013 14:13:06

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



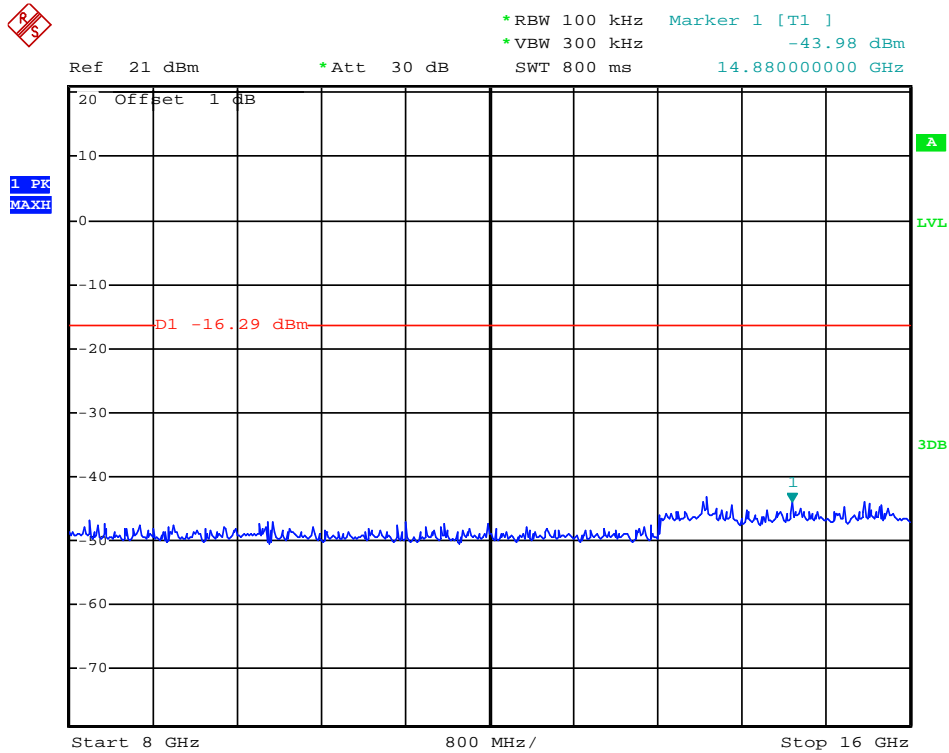
Date: 3.NOV.2013 14:14:55

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



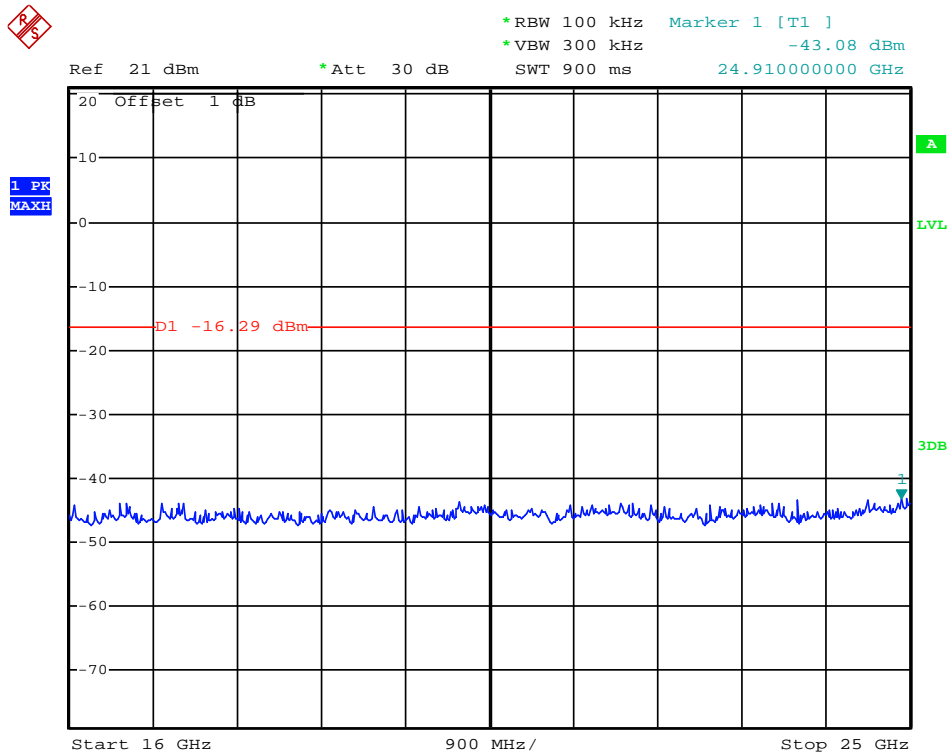
Date: 3.NOV.2013 14:14:33

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



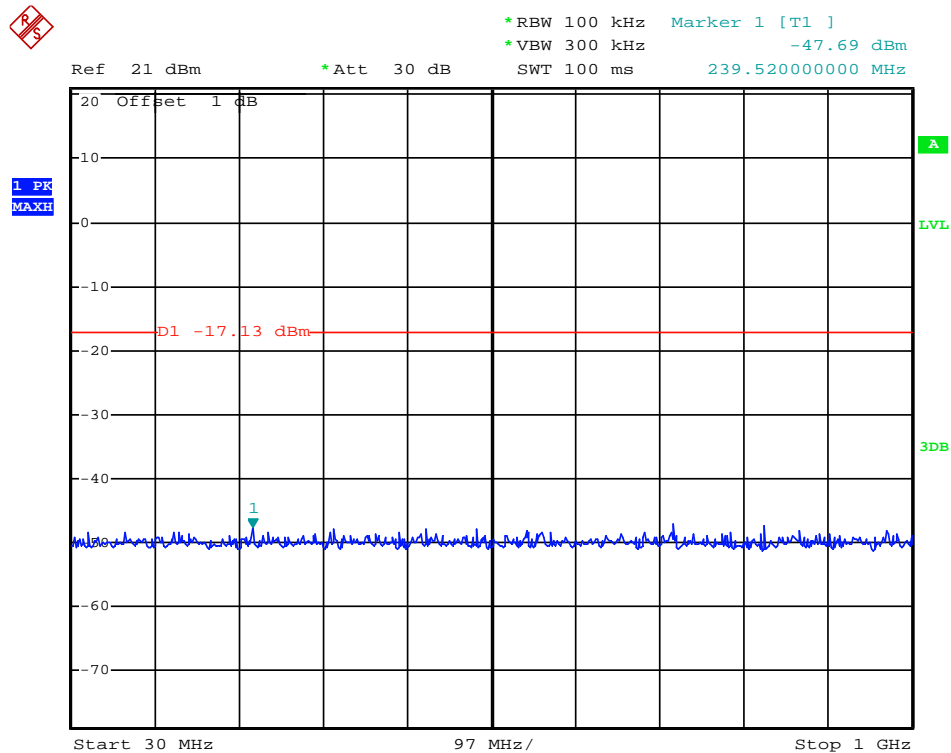
Date: 3.NOV.2013 14:15:19

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



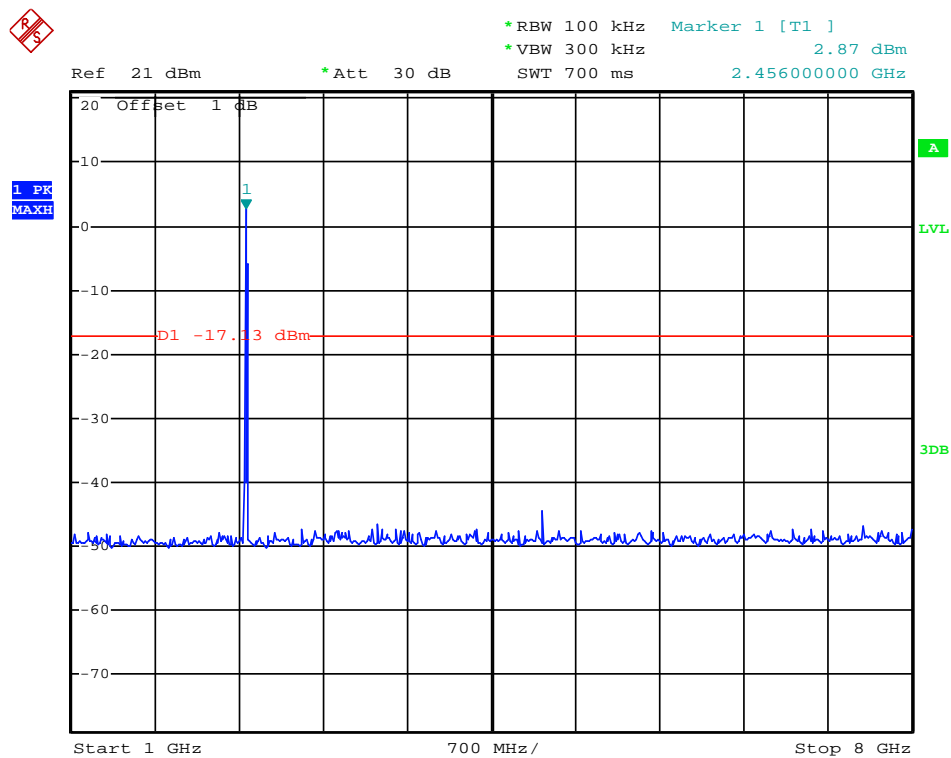
Date: 3.NOV.2013 14:15:39

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



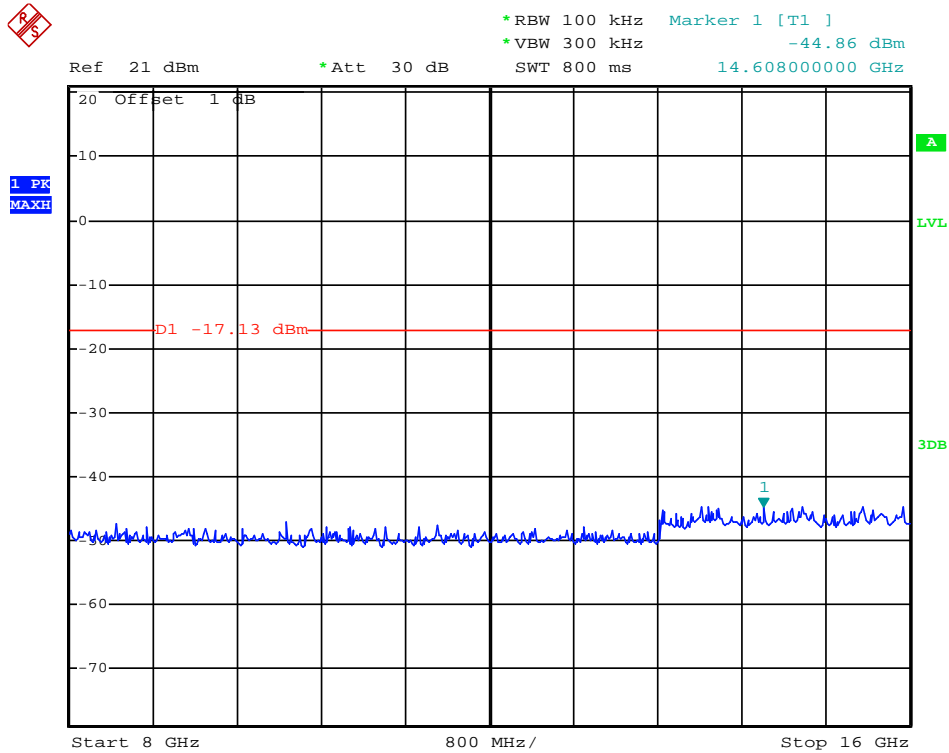
Date: 3.NOV.2013 14:16:51

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



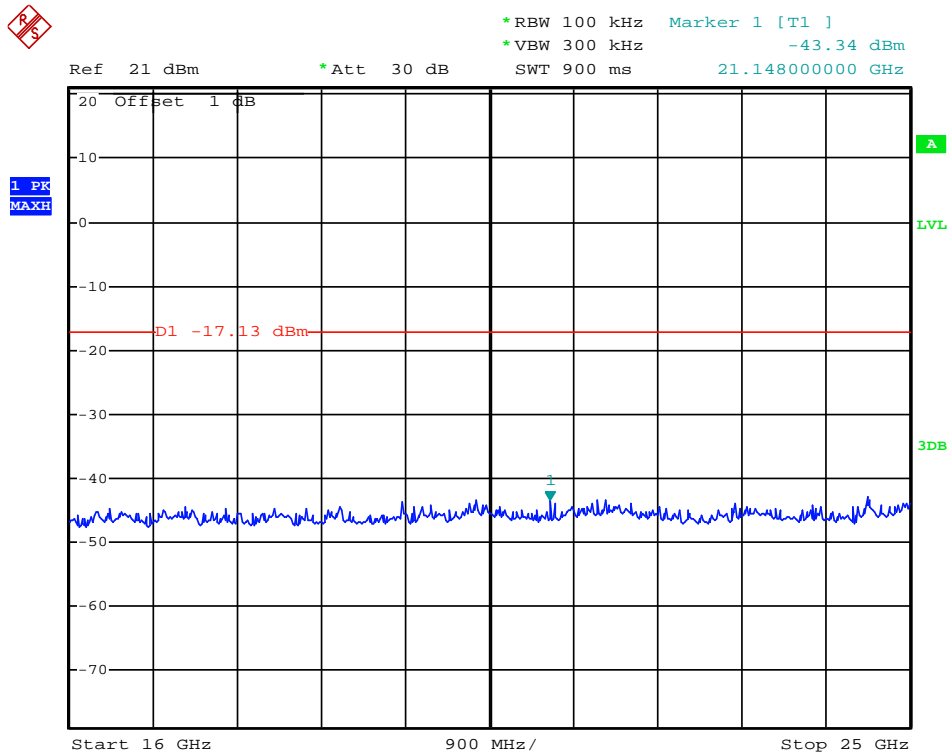
Date: 3.NOV.2013 14:16:22

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



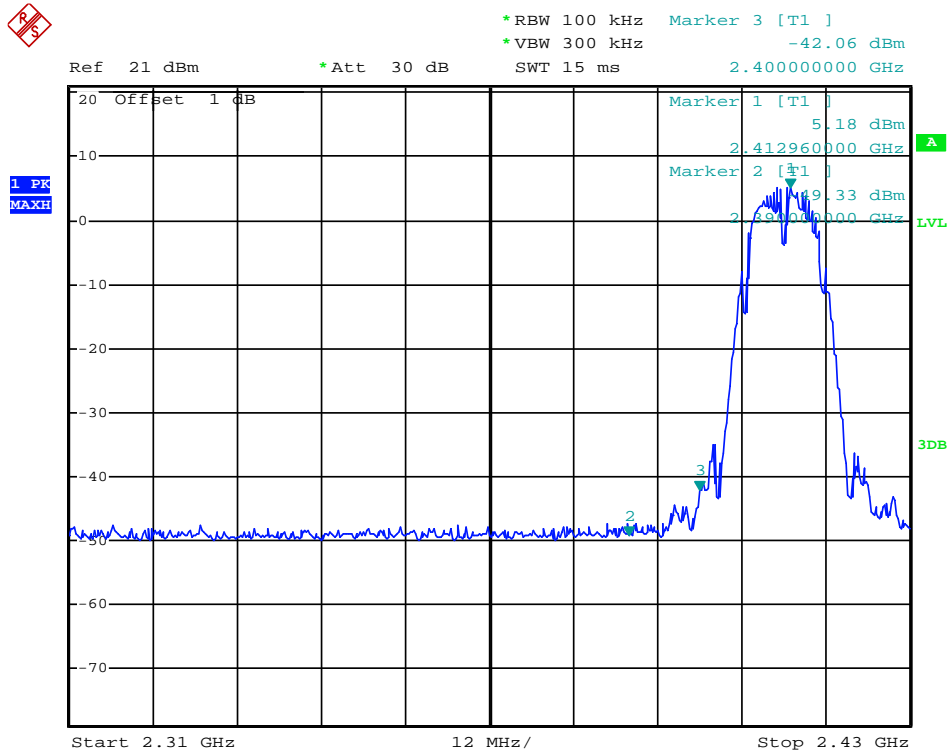
Date: 3.NOV.2013 14:17:11

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



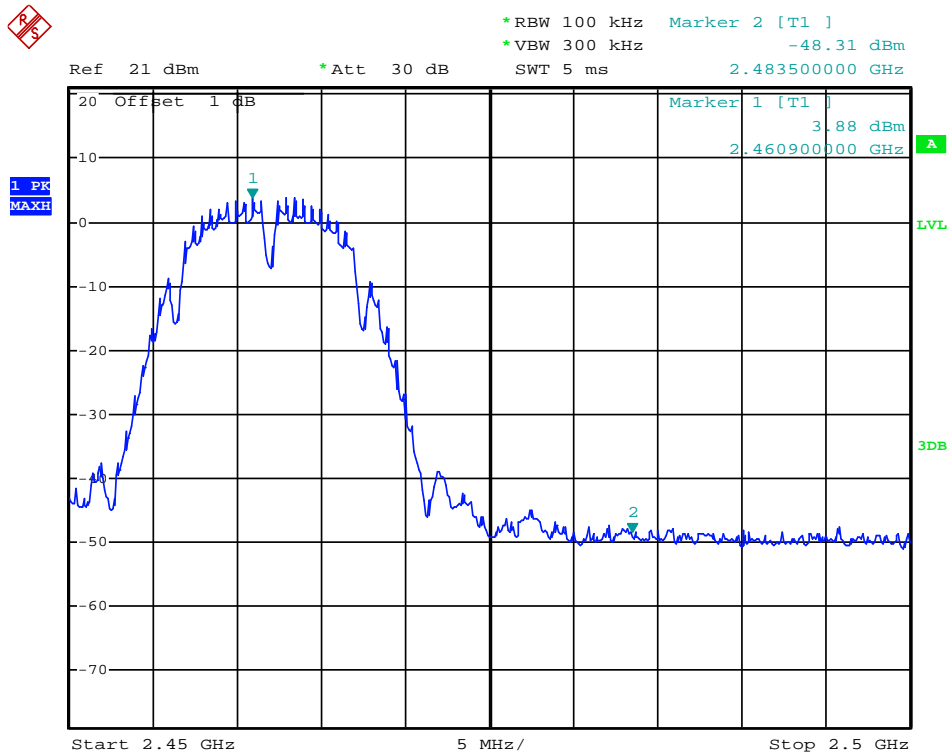
Date: 3.NOV.2013 14:17:26

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



Date: 3.NOV.2013 13:39:54

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



Date: 3.NOV.2013 13:43:58

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

4.6.2 802.11g Test Mode

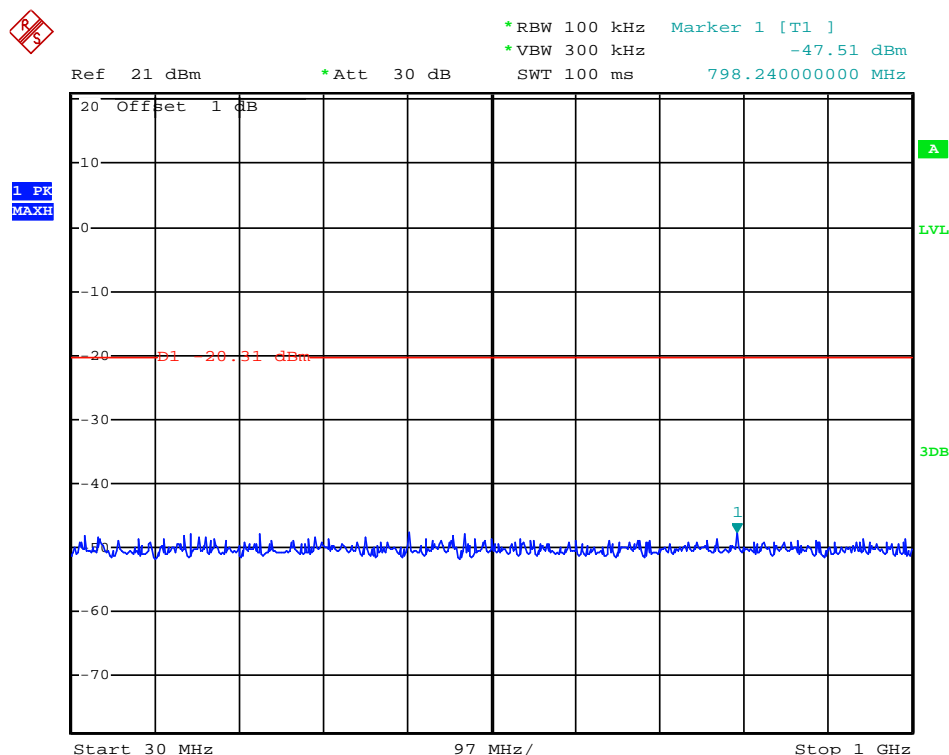
A. Test Verdict

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	-46.70	Peak	-20	Plot 4.6.2 D	PASS
2483.50	-44.30	Peak	-20	Plot 4.6.2 E	PASS

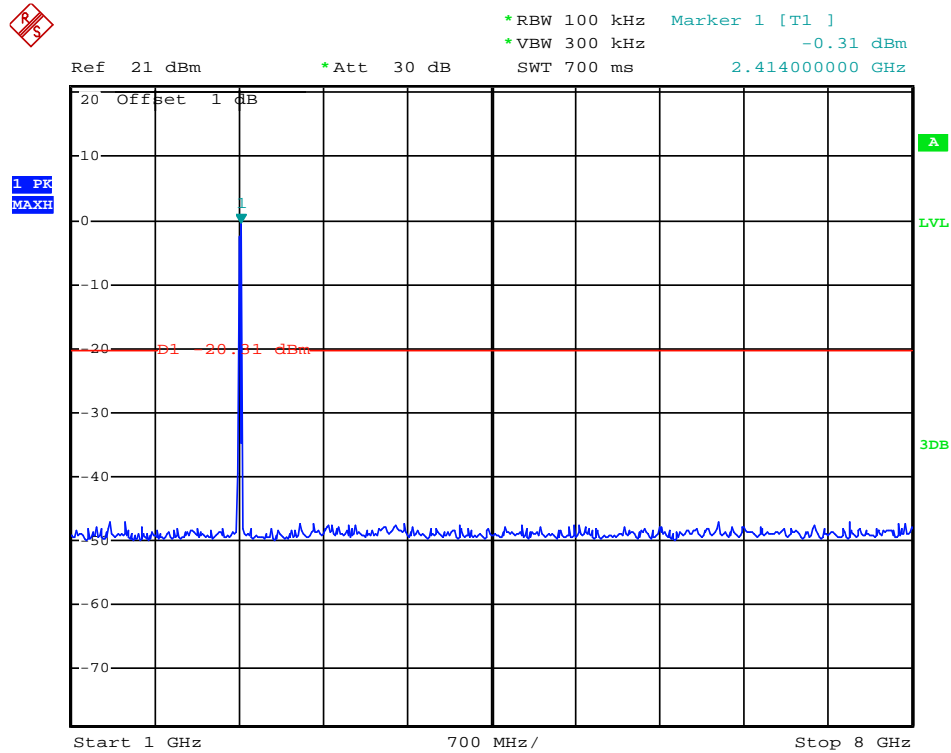
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable lose.

B. Test Plots



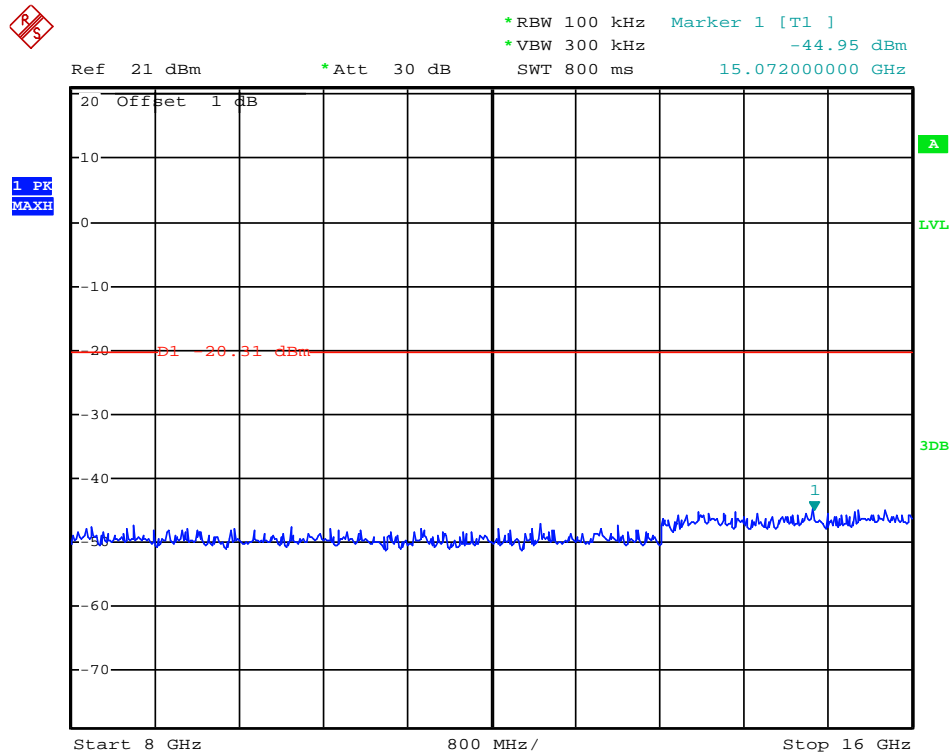
Date: 3.NOV.2013 14:18:37

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



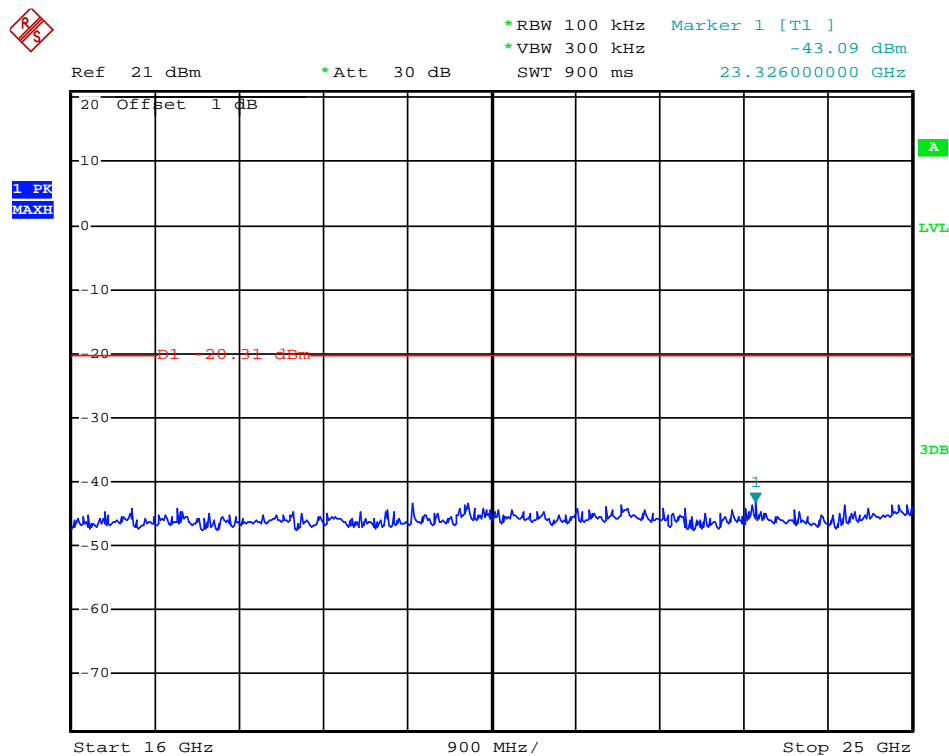
Date: 3.NOV.2013 14:18:19

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



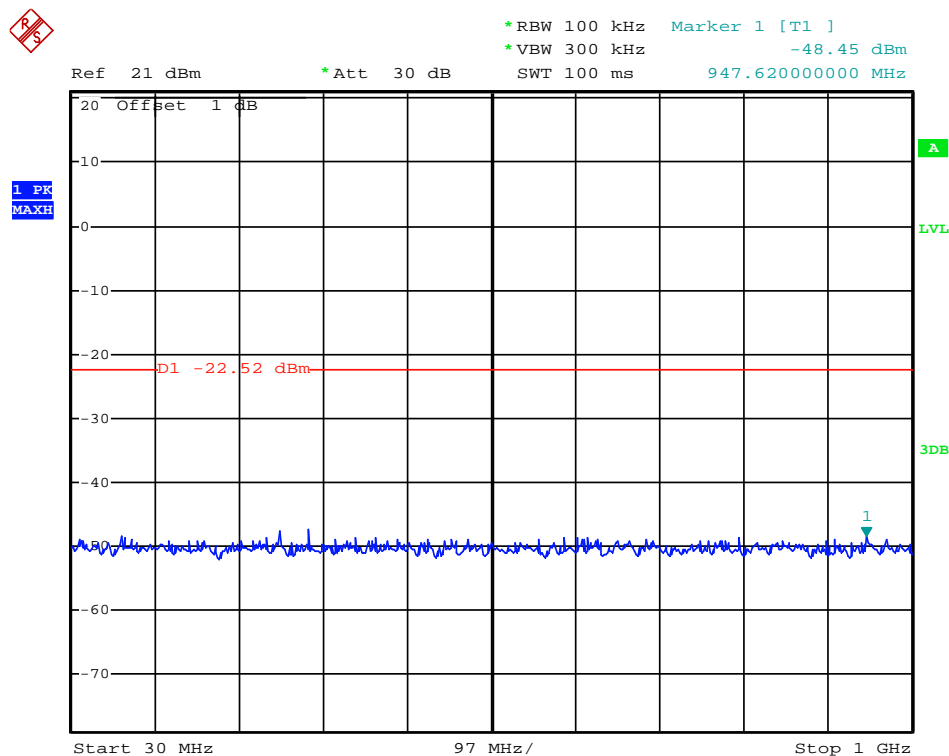
Date: 3.NOV.2013 14:18:53

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



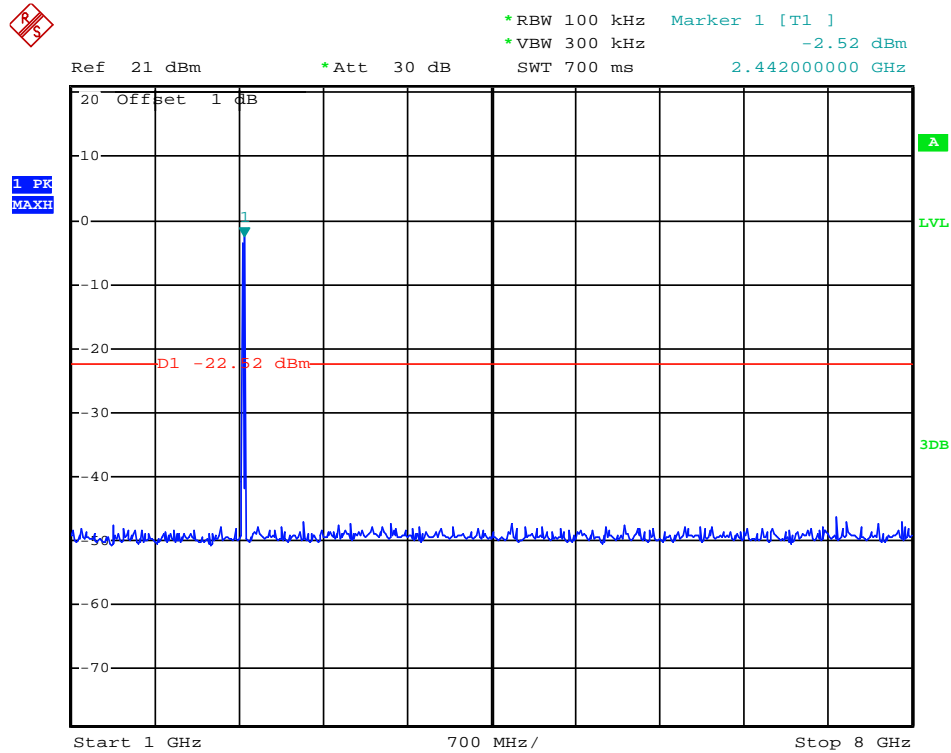
Date: 3.NOV.2013 14:19:09

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



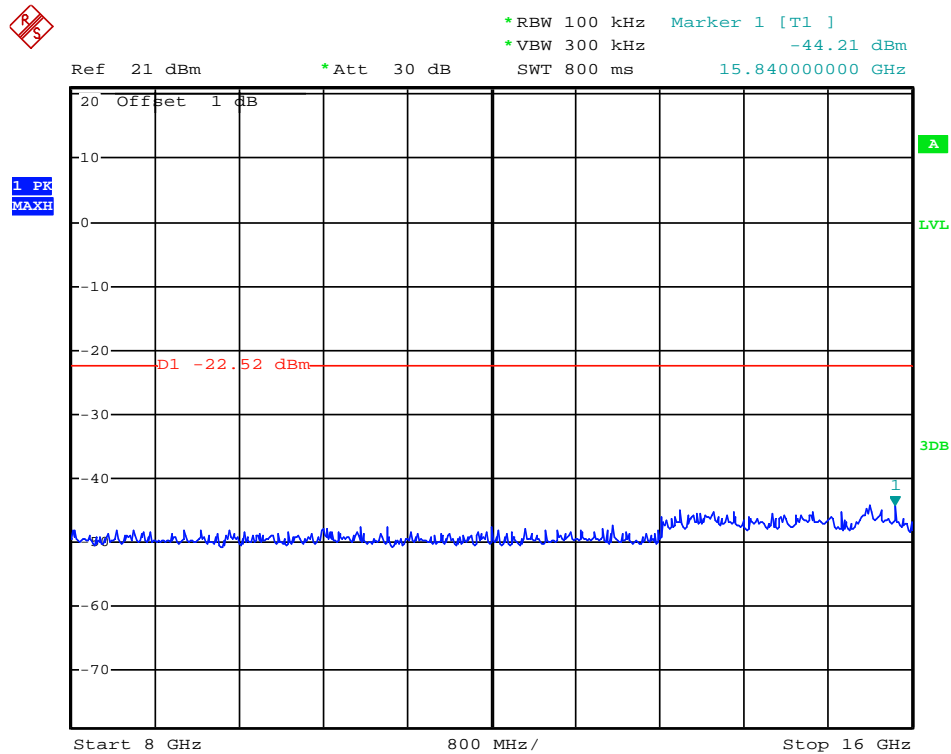
Date: 3.NOV.2013 14:20:39

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



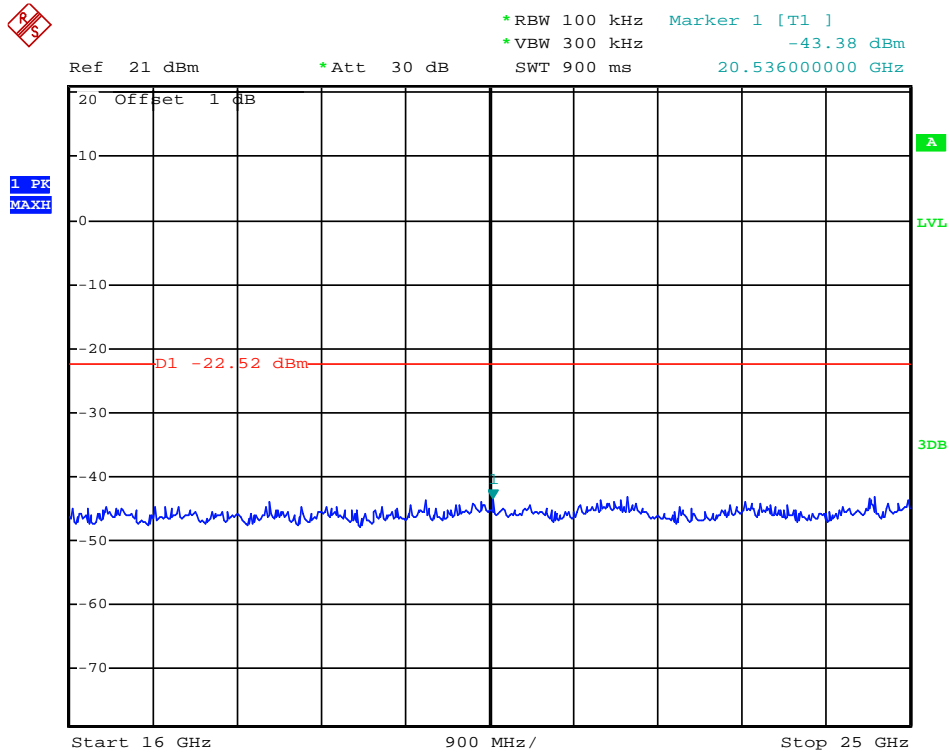
Date: 3.NOV.2013 14:19:43

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



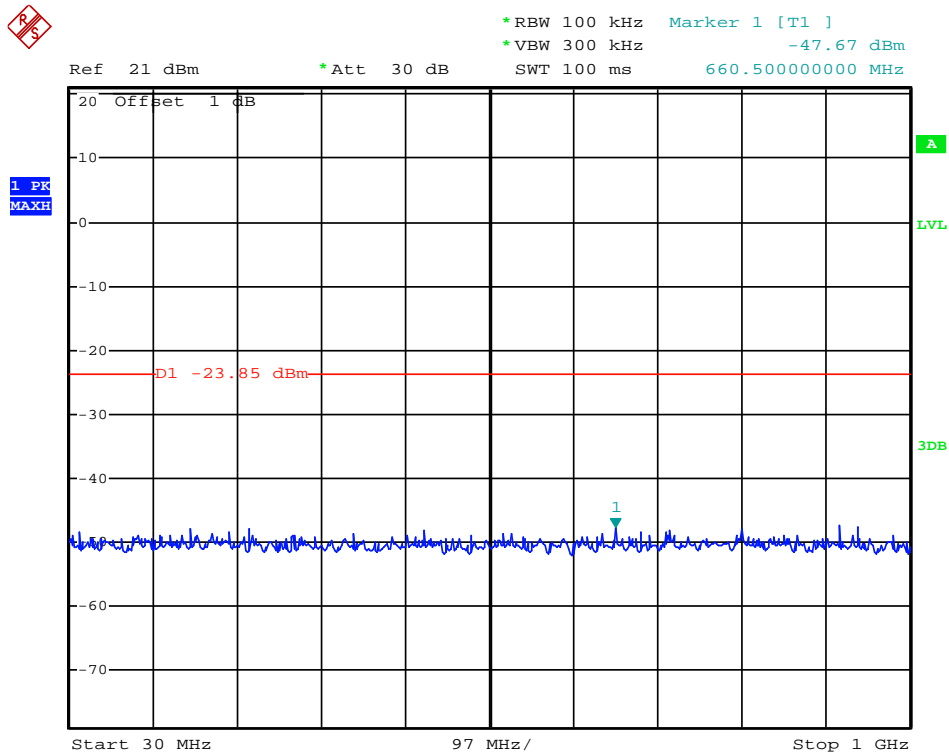
Date: 3.NOV.2013 14:19:57

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



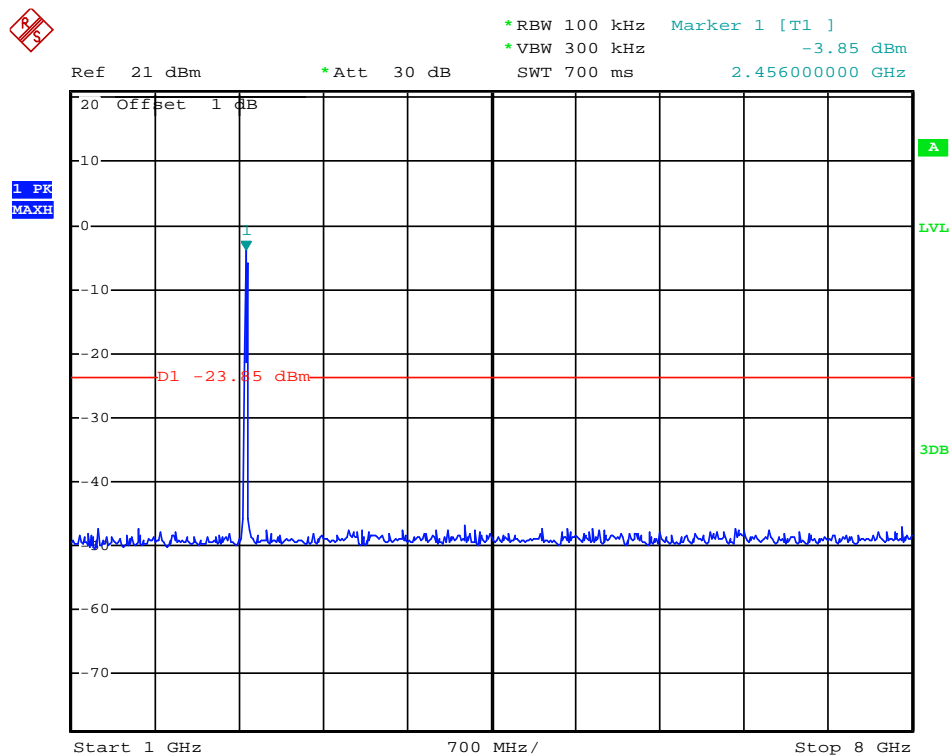
Date: 3.NOV.2013 14:20:19

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



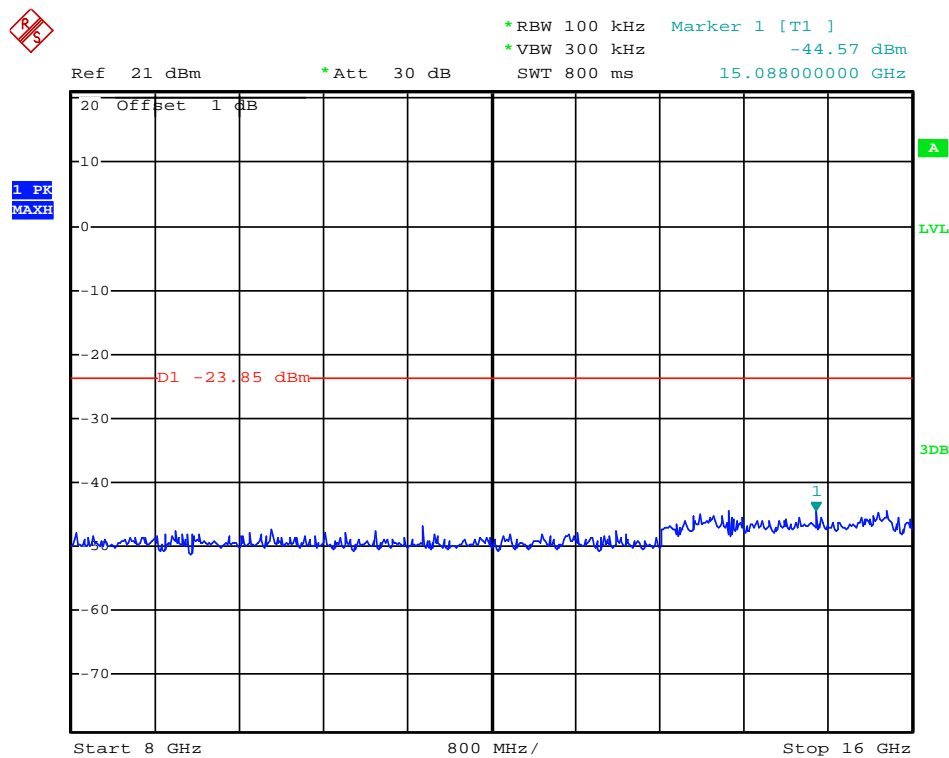
Date: 3.NOV.2013 14:22:14

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



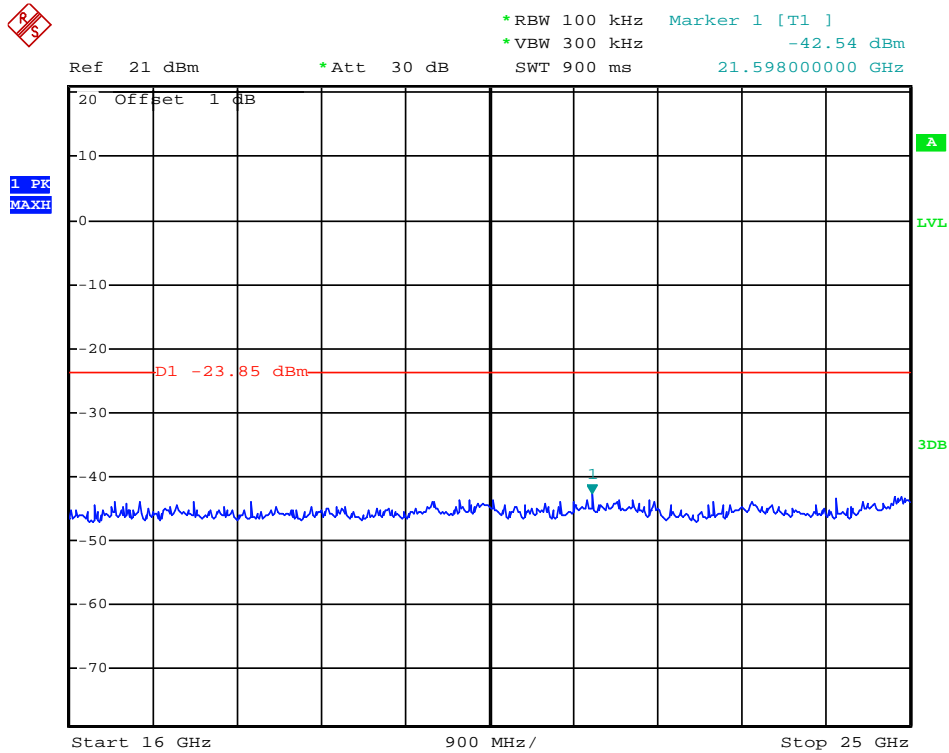
Date: 3.NOV.2013 14:21:24

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



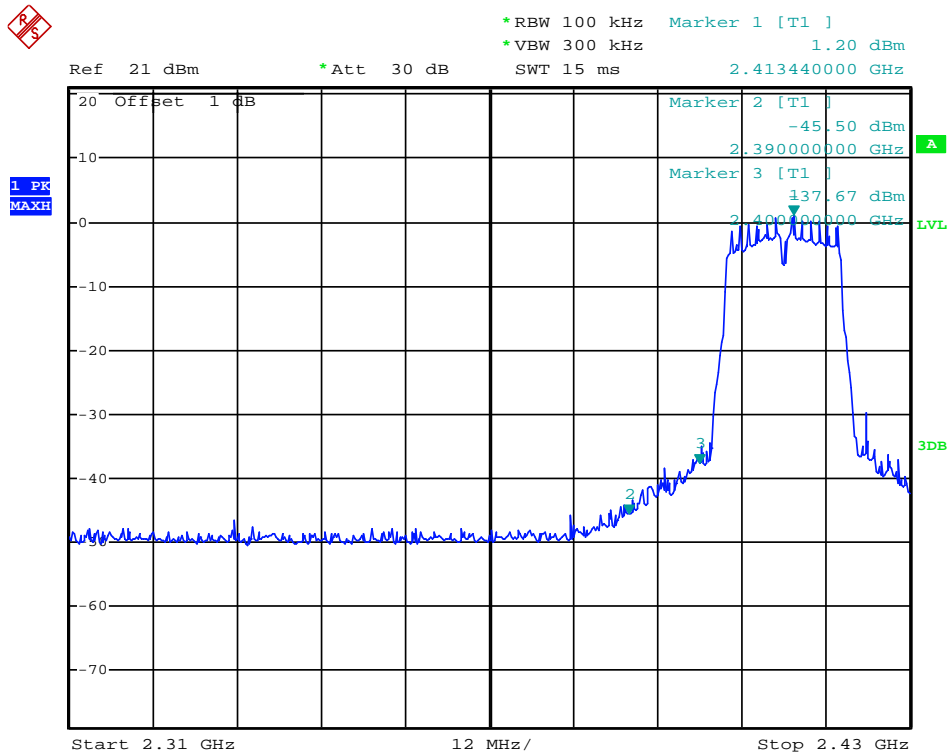
Date: 3.NOV.2013 14:22:04

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



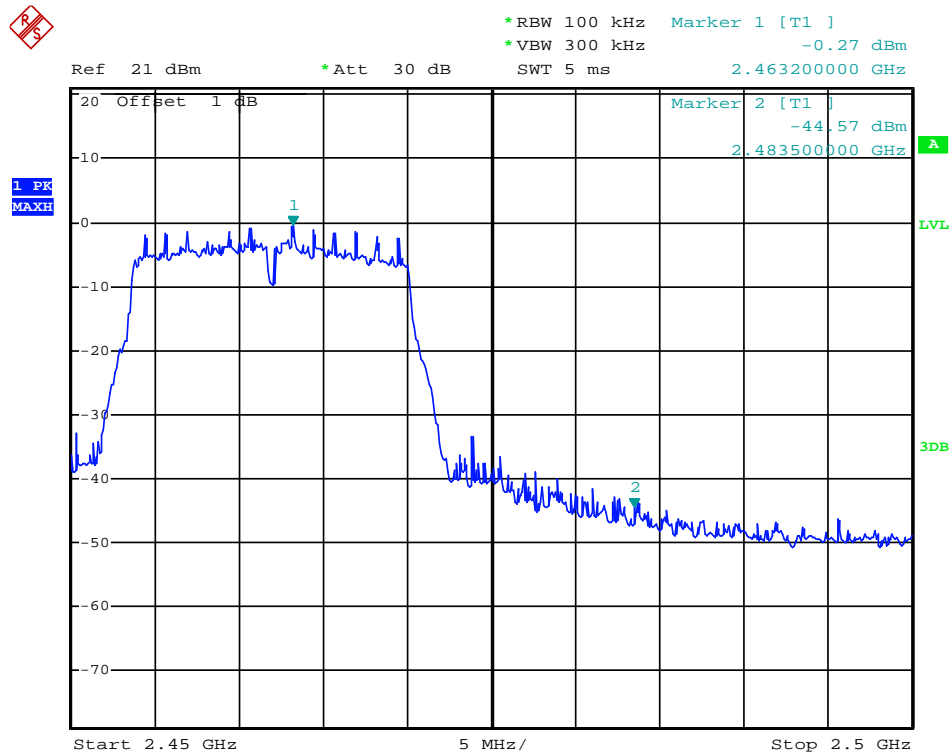
Date: 3.NOV.2013 14:21:47

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



Date: 3.NOV.2013 13:41:18

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



Date: 3.NOV.2013 13:44:56

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

4.6.3 802.11n(20MHz) Test Mode

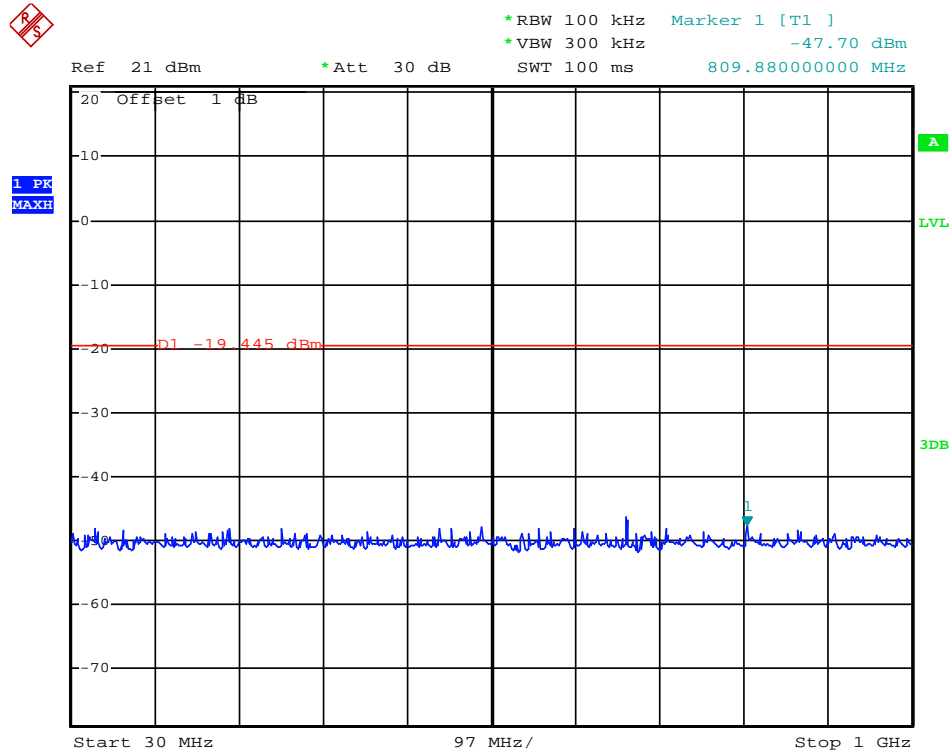
A. Test Verdict

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	-37.18	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-42.56	Peak	-20	Plot 4.6.3 E	PASS

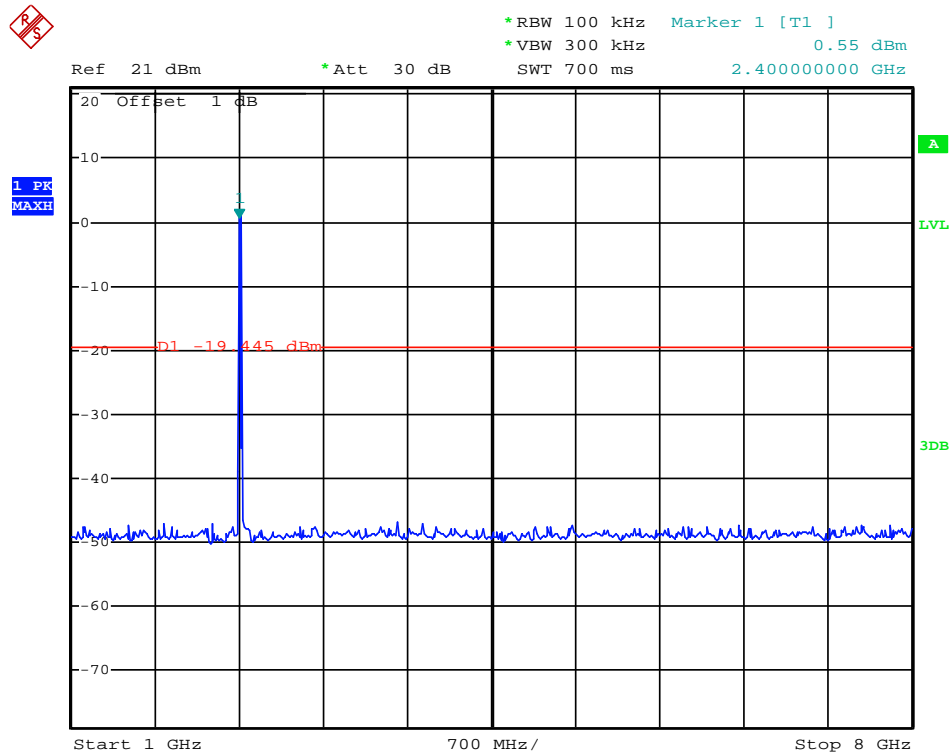
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable loss.

B. Test Plots



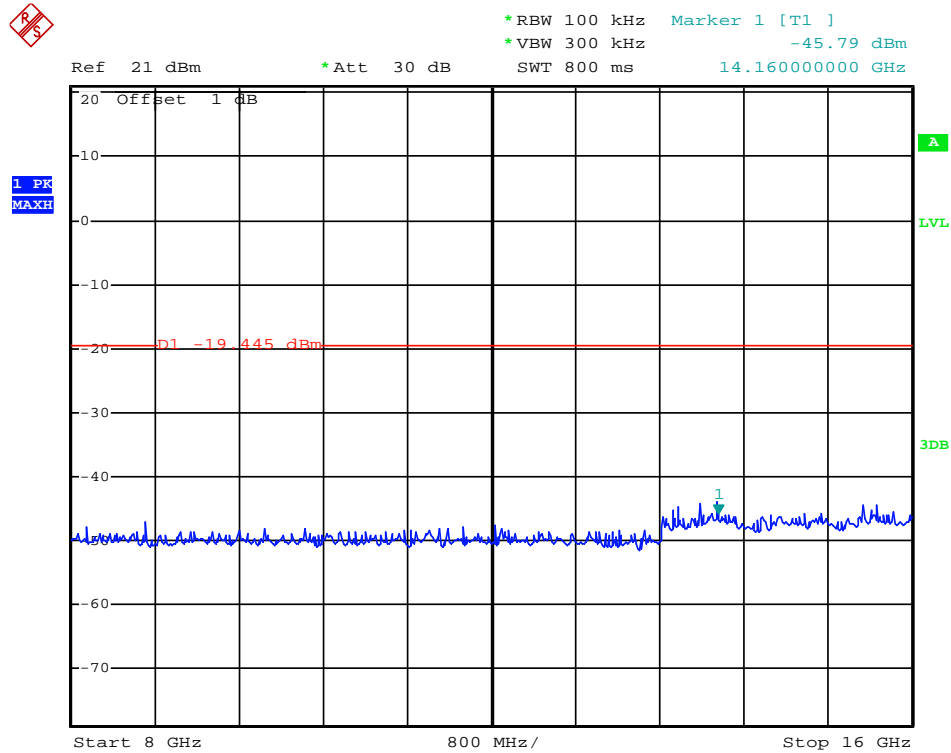
Date: 3.NOV.2013 14:24:20

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



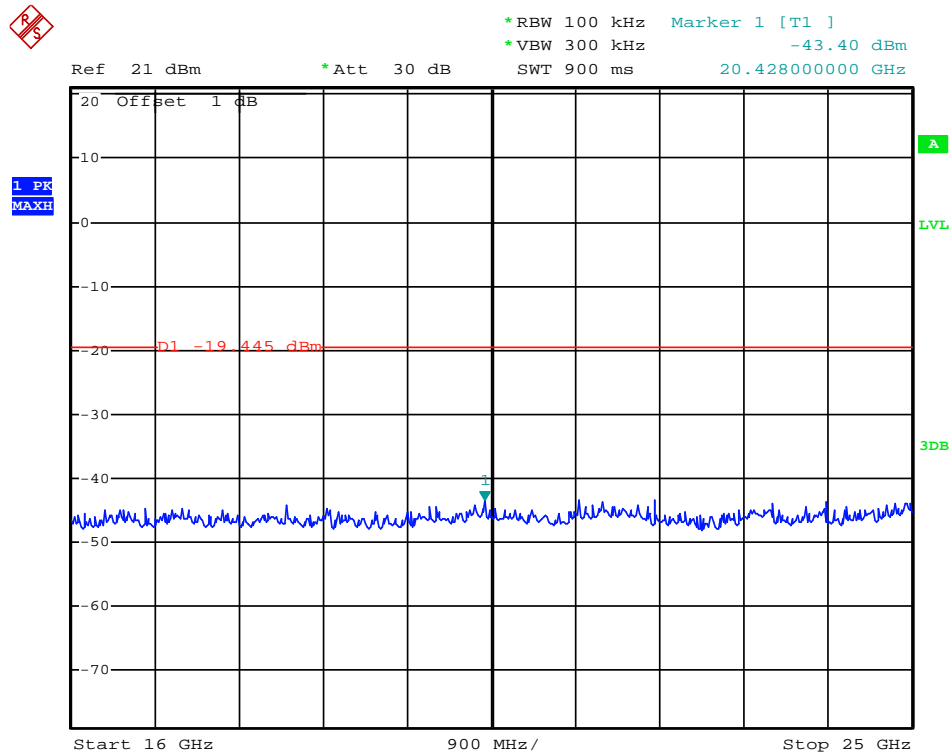
Date: 3.NOV.2013 14:24:02

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



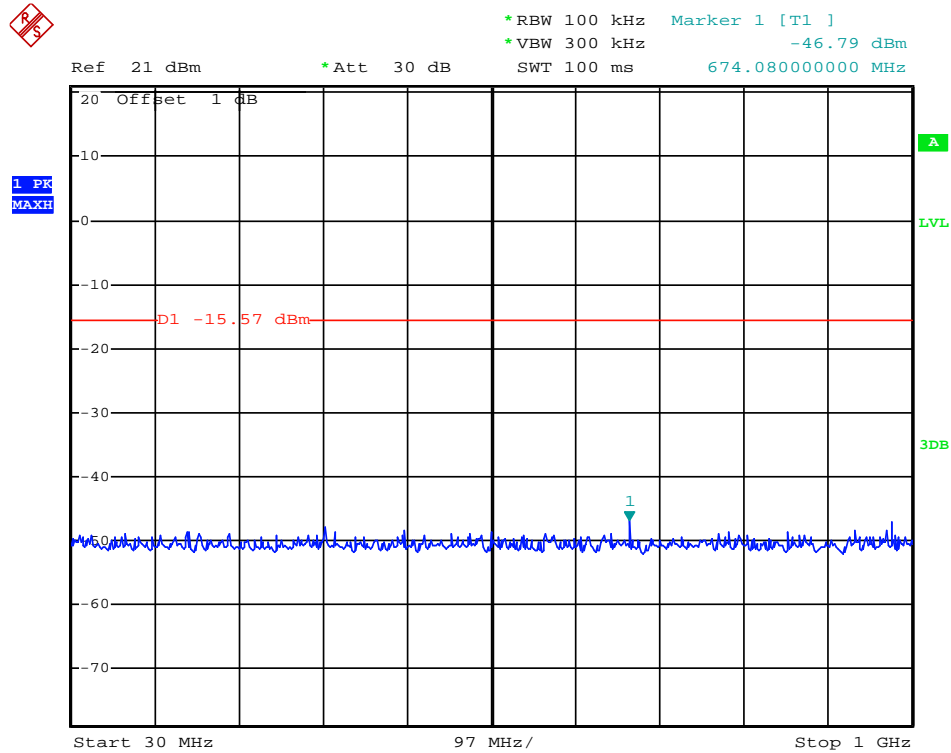
Date: 3.NOV.2013 14:24:31

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



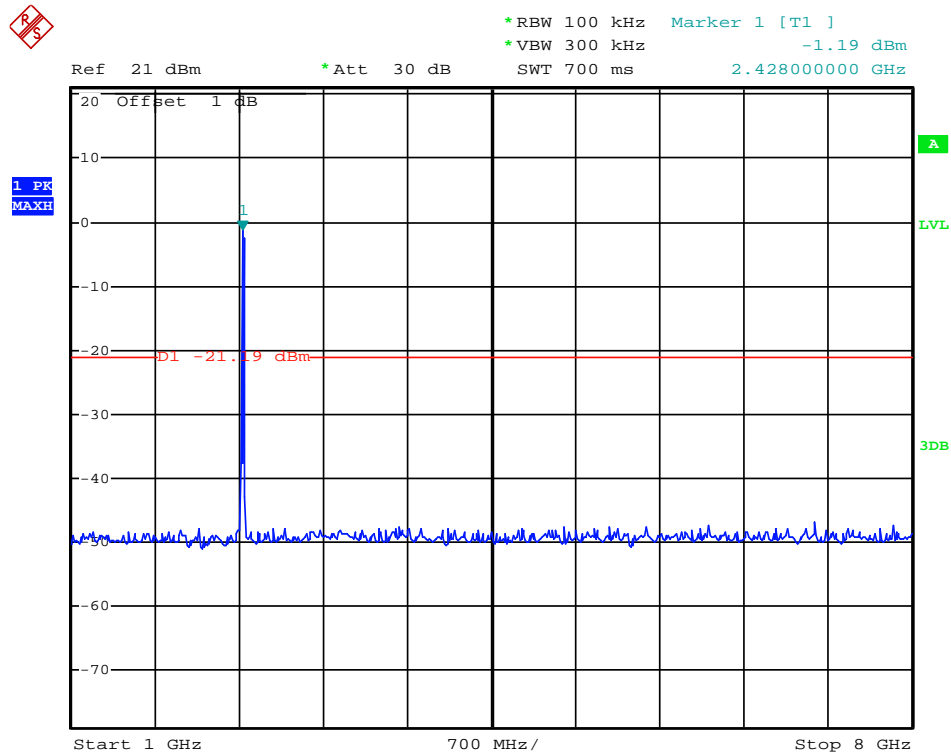
Date: 3.NOV.2013 14:24:41

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



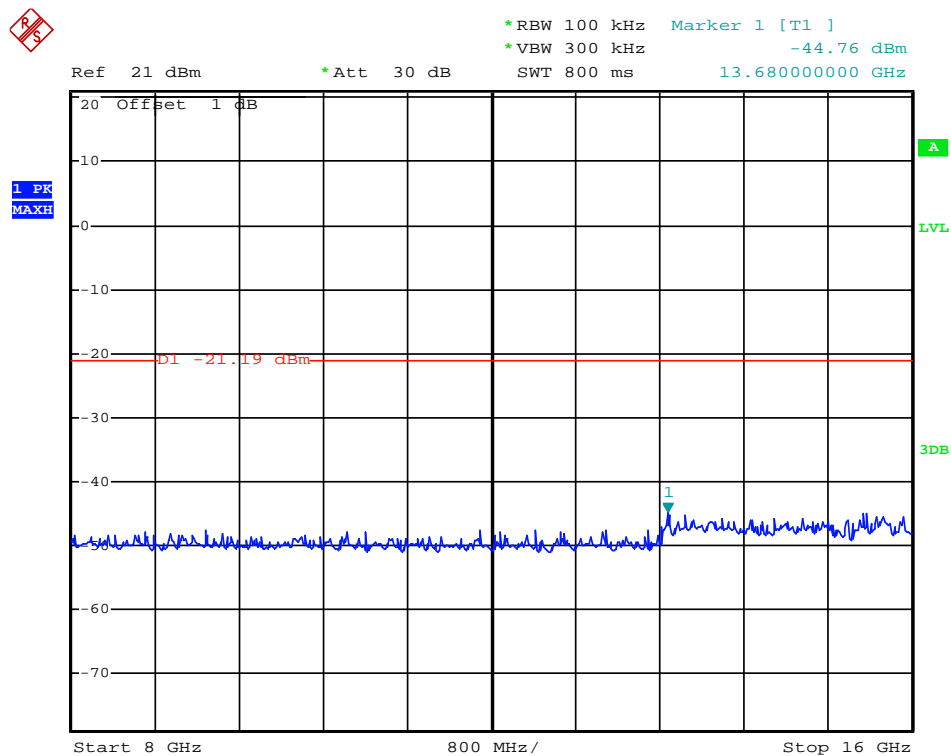
Date: 3.NOV.2013 14:35:48

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



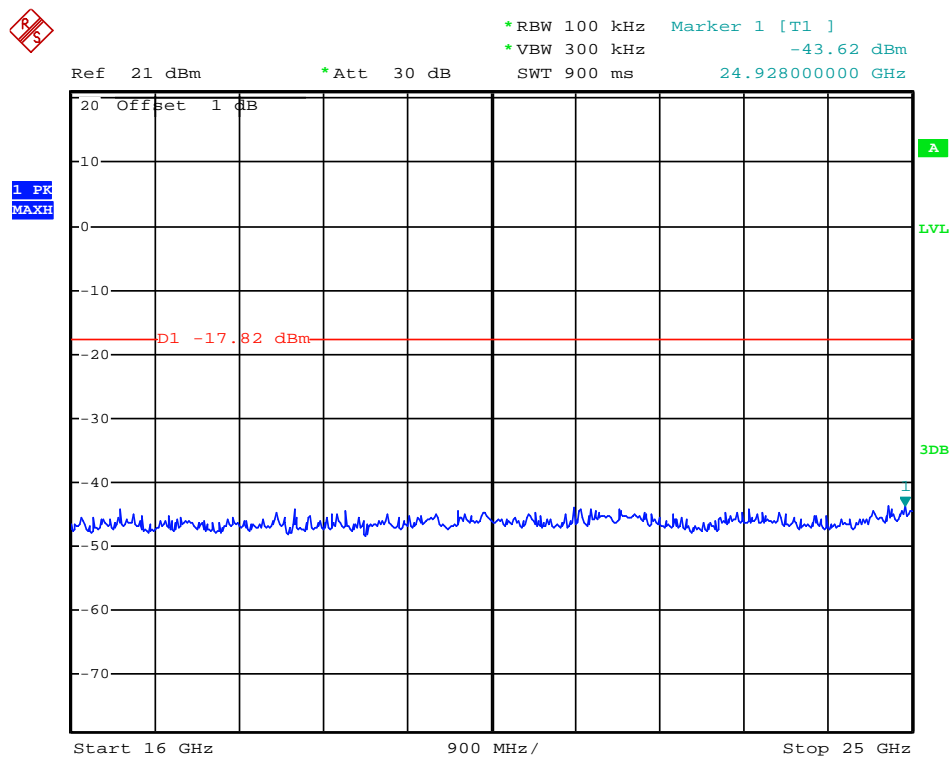
Date: 3.NOV.2013 14:25:11

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



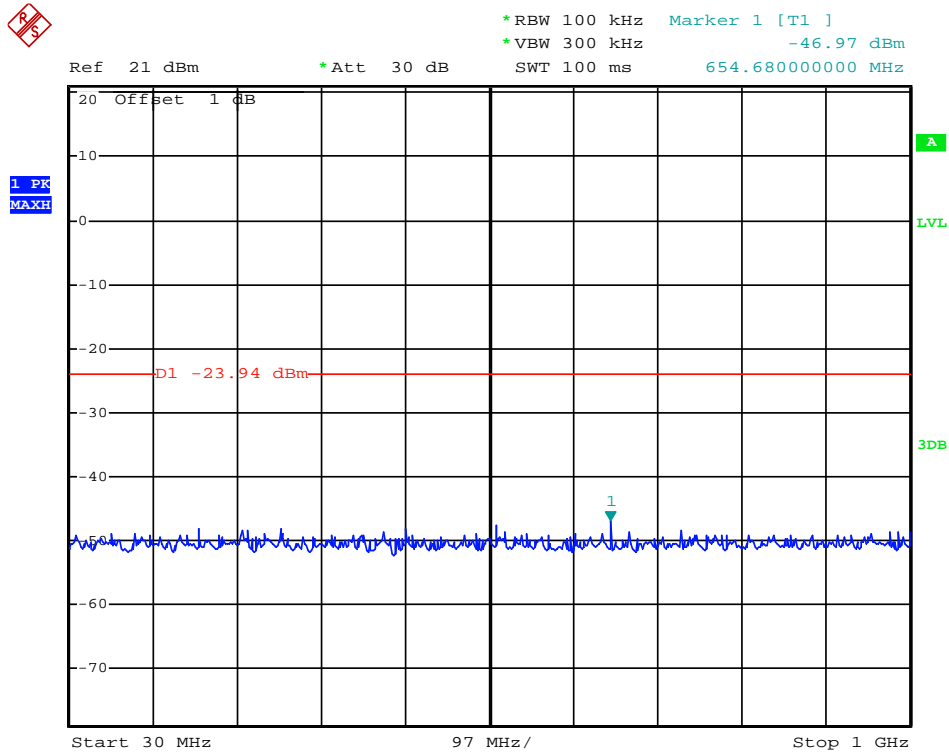
Date: 3.NOV.2013 14:25:37

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



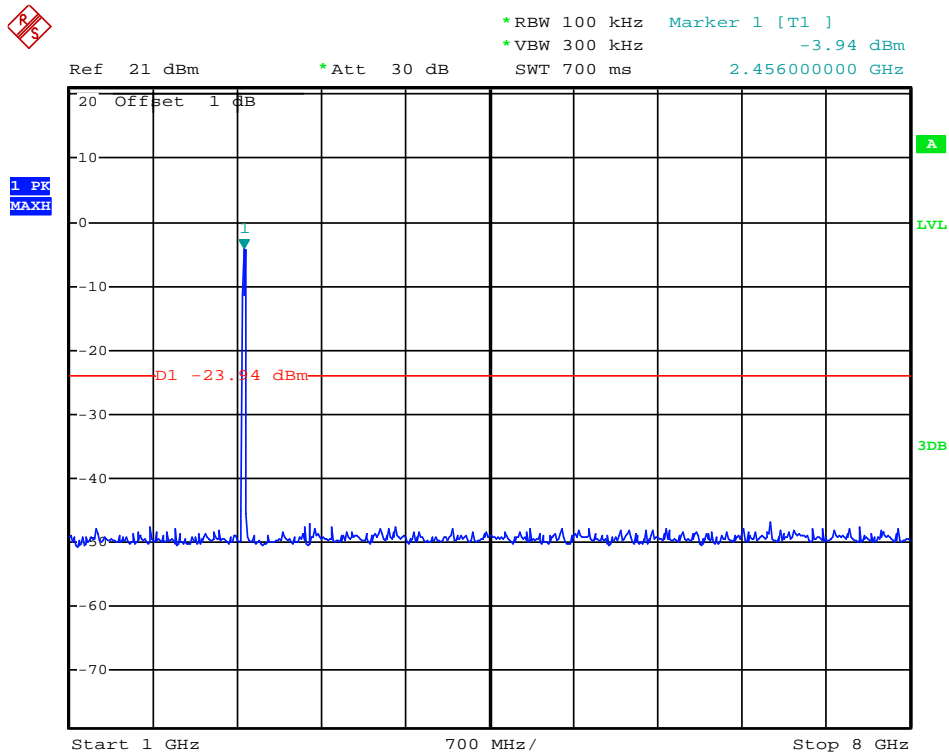
Date: 3.NOV.2013 14:37:25

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



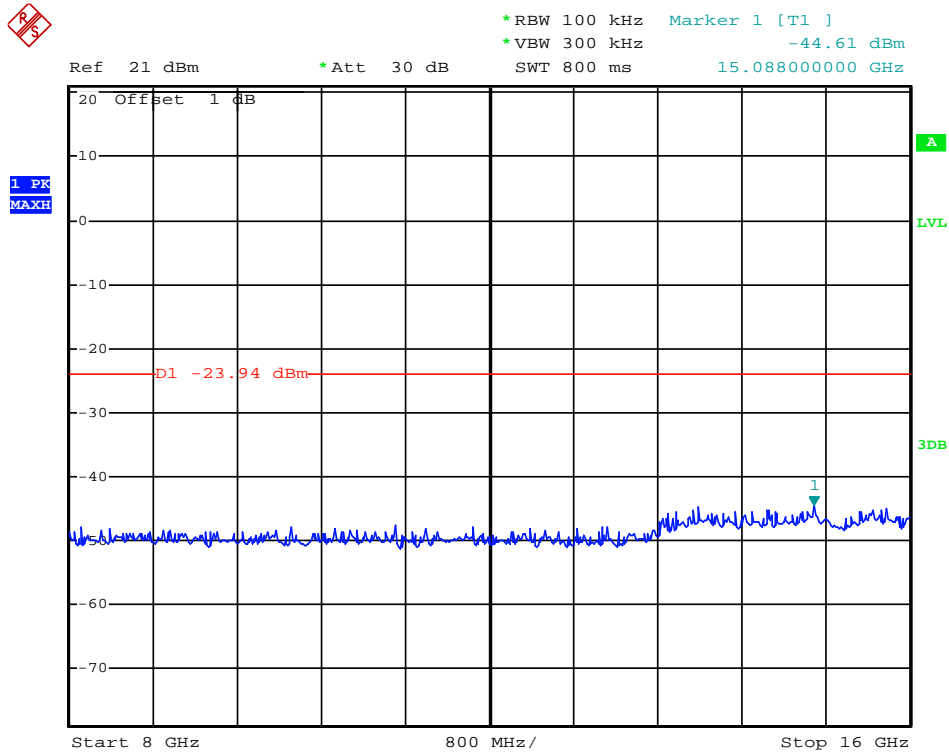
Date: 3.NOV.2013 14:26:31

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



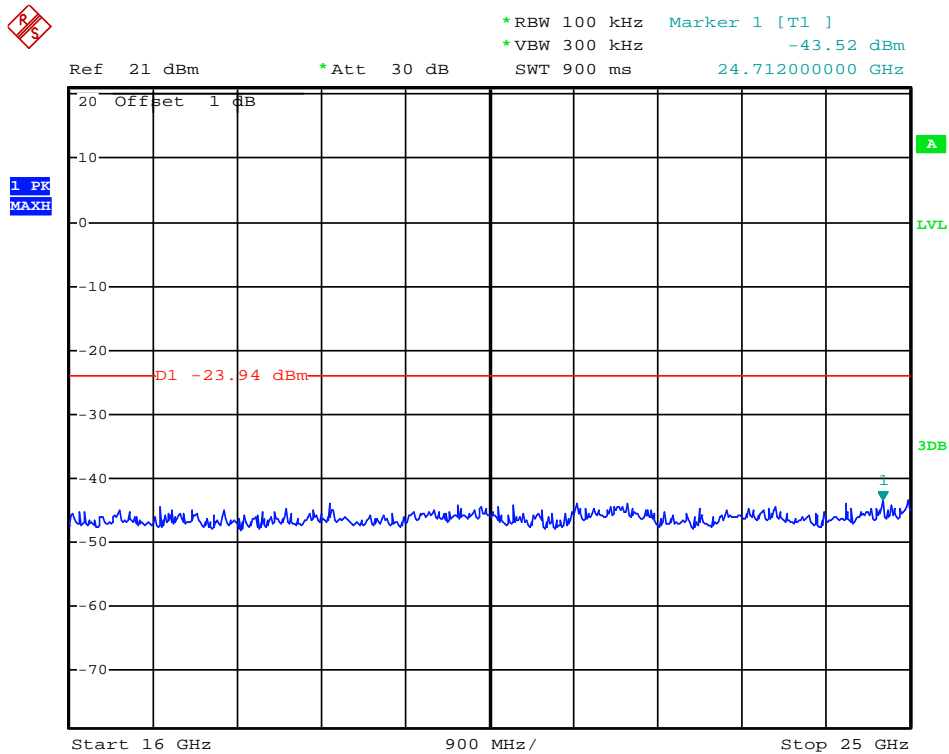
Date: 3.NOV.2013 14:26:20

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



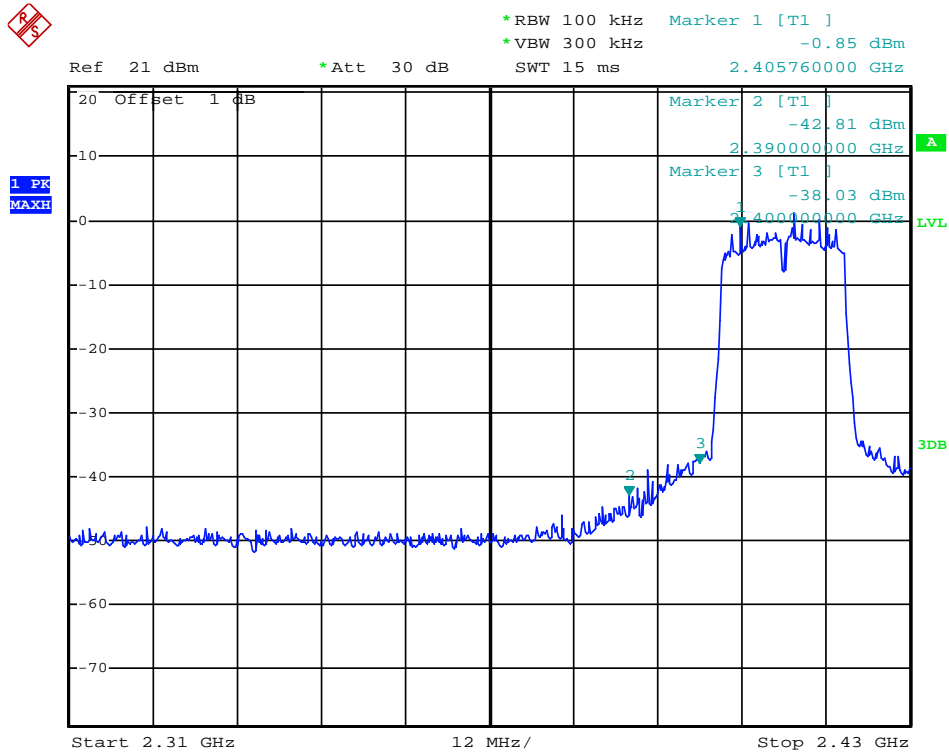
Date: 3.NOV.2013 14:26:41

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



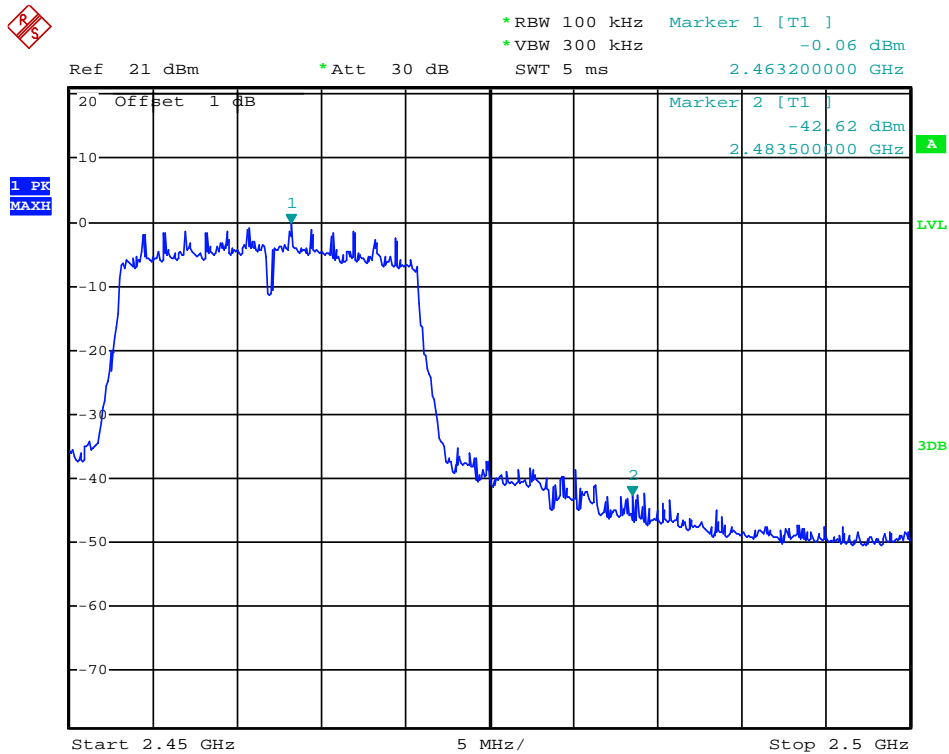
Date: 3.NOV.2013 14:27:00

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



Date: 3.NOV.2013 13:42:08

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



Date: 3.NOV.2013 13:45:57

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

4.6.4 802.11n(40MHz) Test Mode

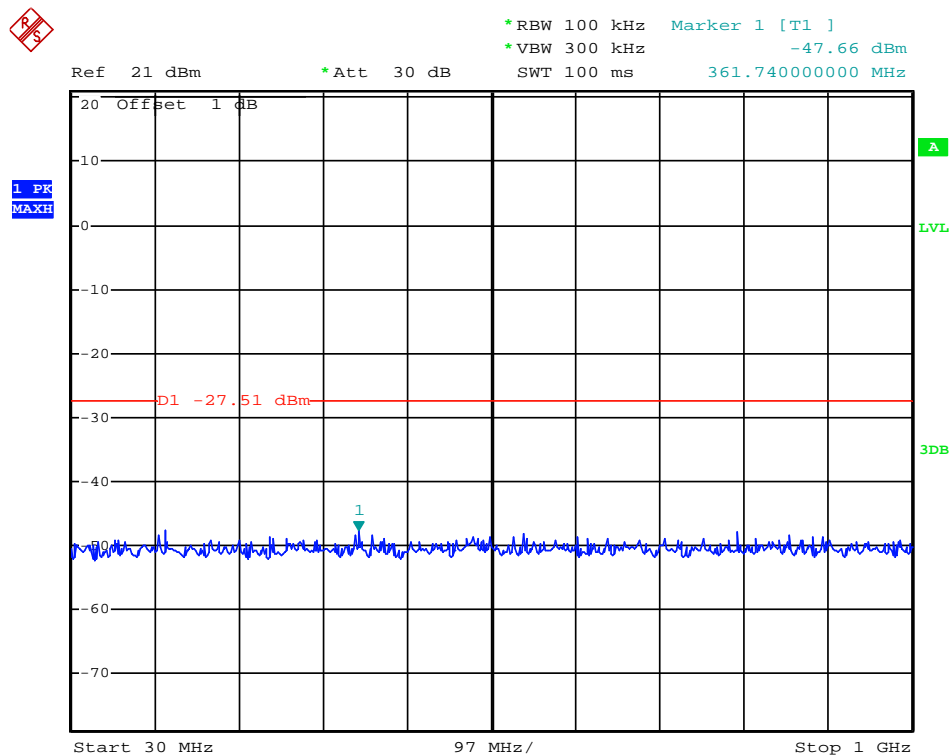
A. Test Verdict

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	-38.29	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-40.58	Peak	-20	Plot 4.6.3 E	PASS

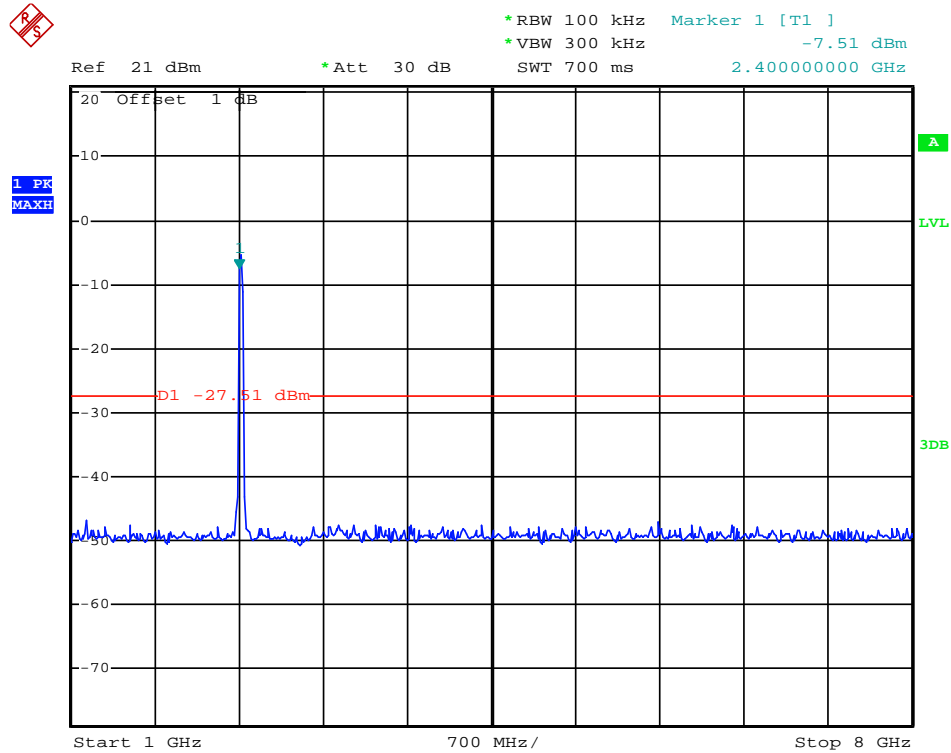
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.
 2. The test results including the cable loss.

B. Test Plots



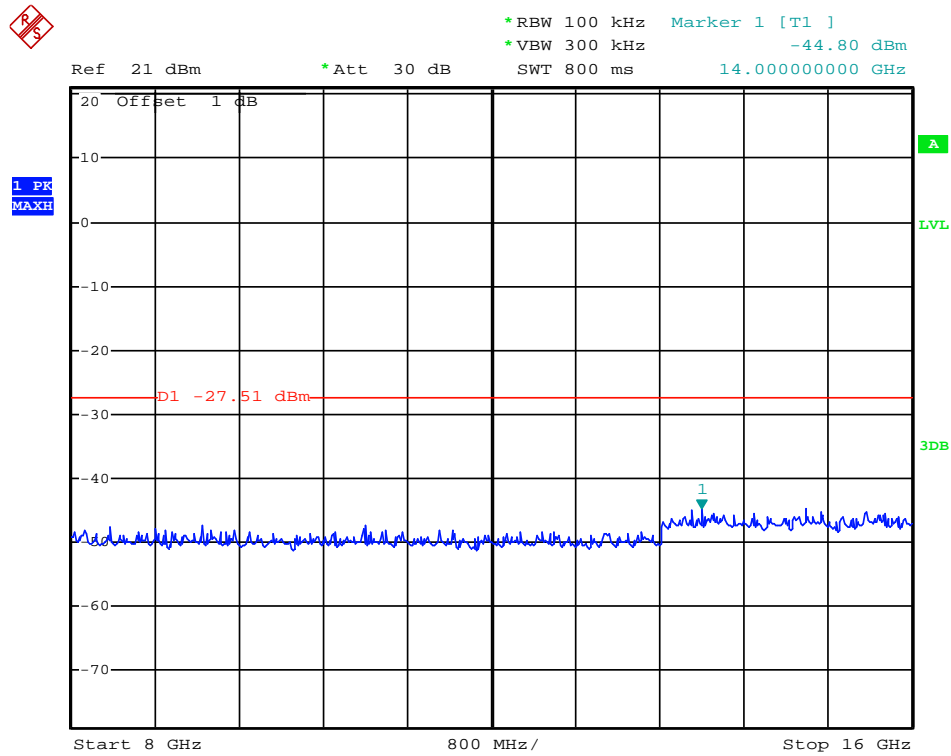
Date: 3.NOV.2013 14:27:48

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



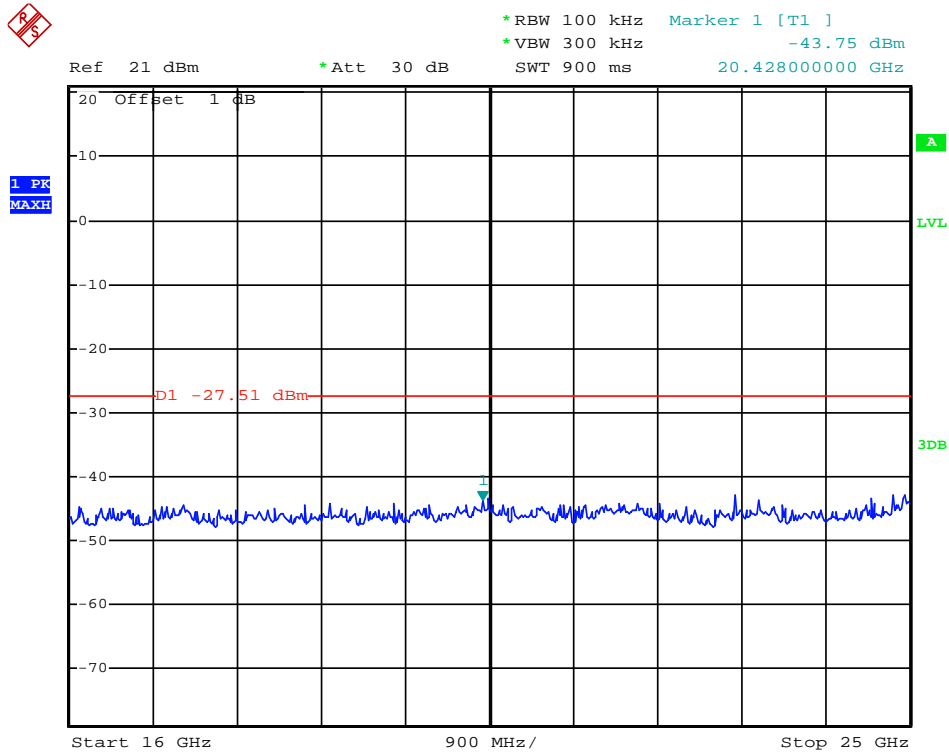
Date: 3.NOV.2013 14:27:38

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



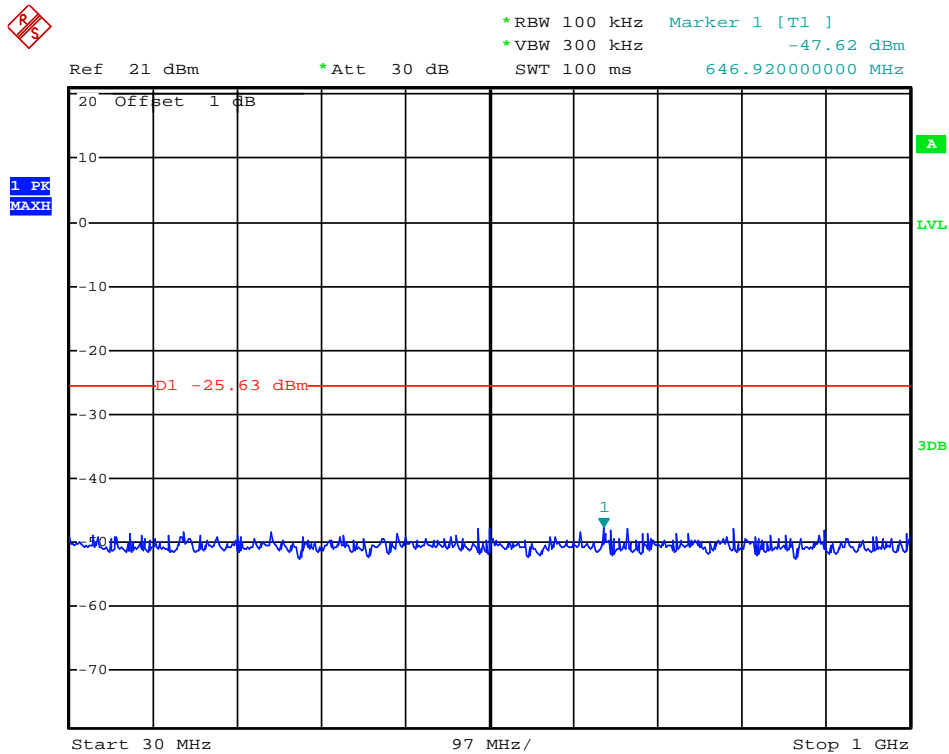
Date: 3.NOV.2013 14:27:59

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



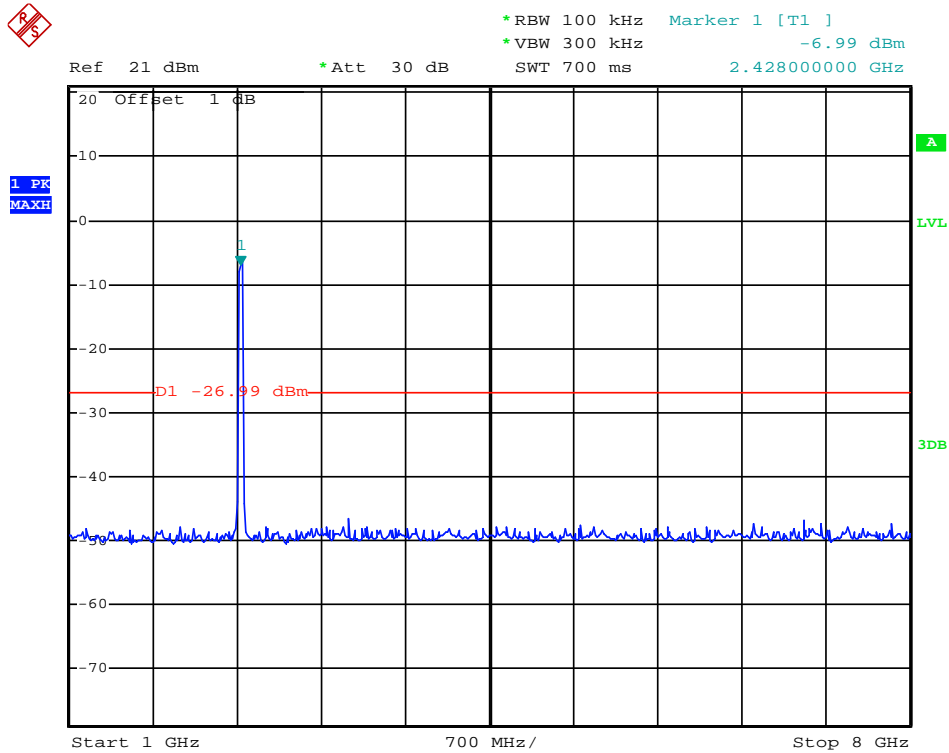
Date: 3.NOV.2013 14:28:10

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



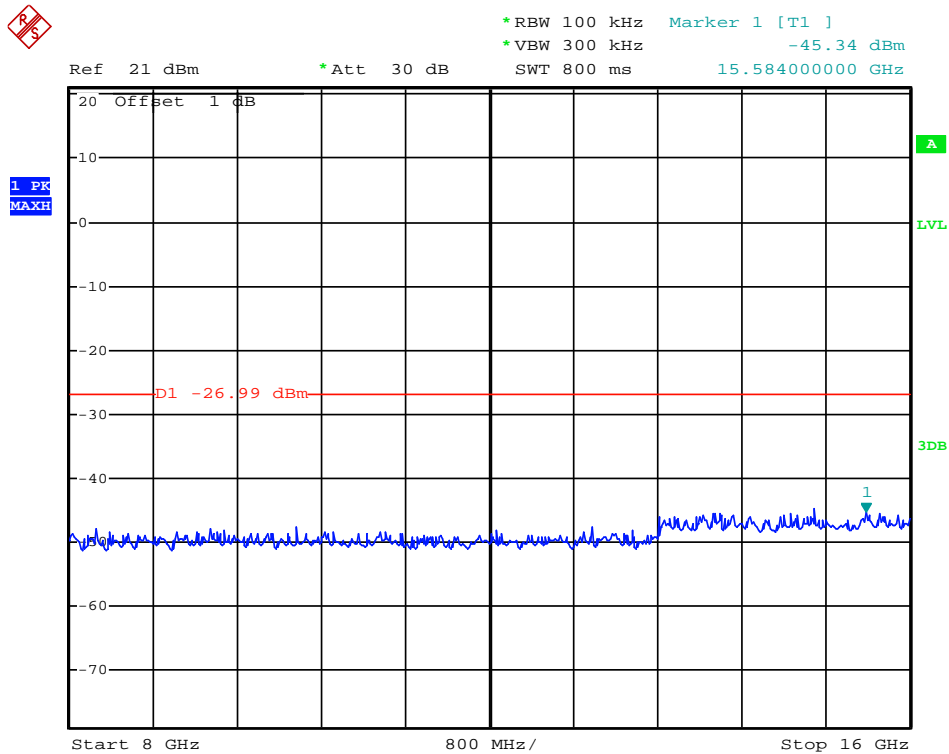
Date: 3.NOV.2013 14:45:41

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



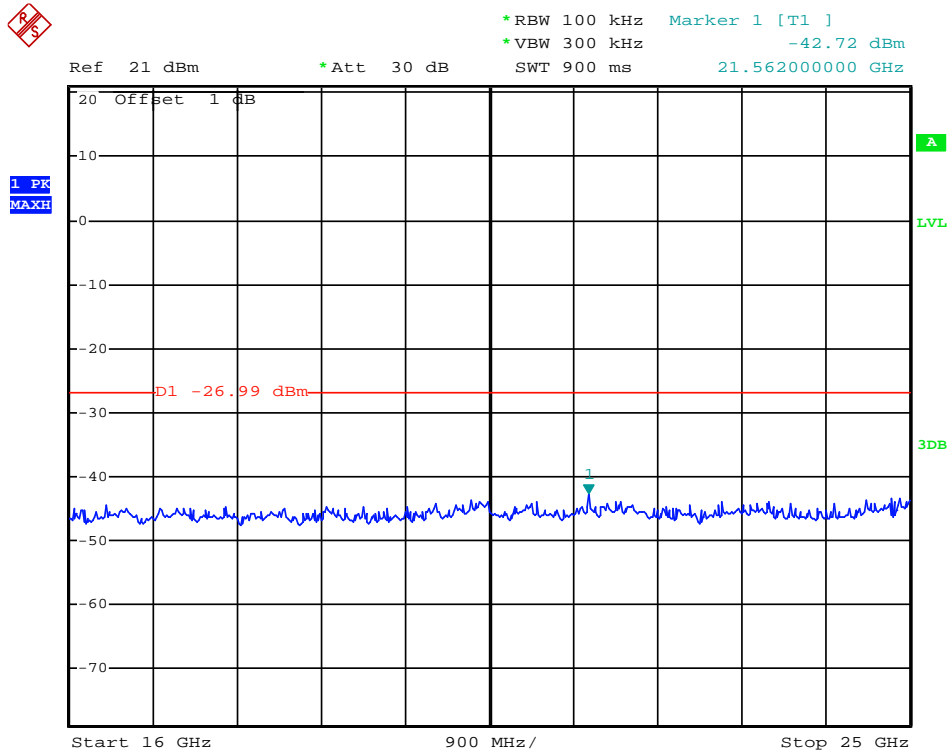
Date: 3.NOV.2013 14:28:38

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



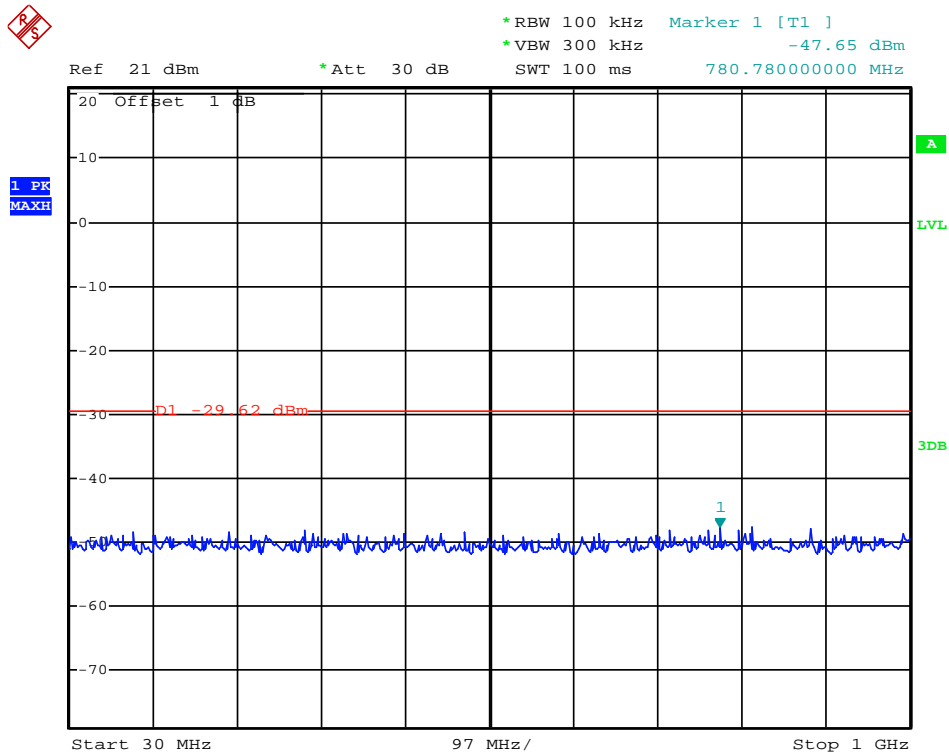
Date: 3.NOV.2013 14:28:58

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



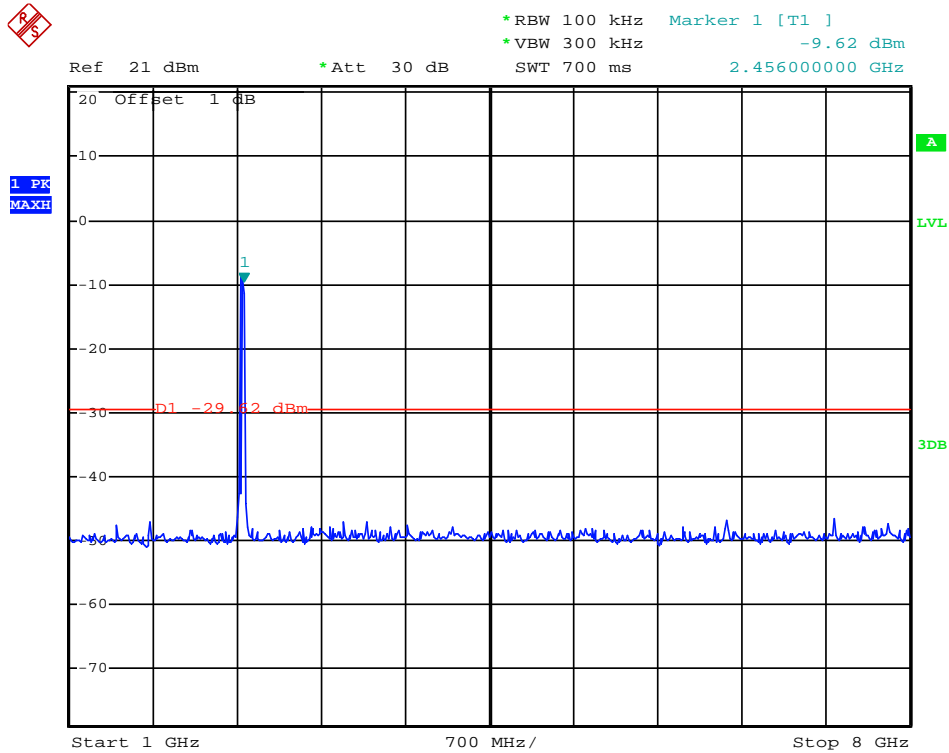
Date: 3.NOV.2013 14:29:18

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



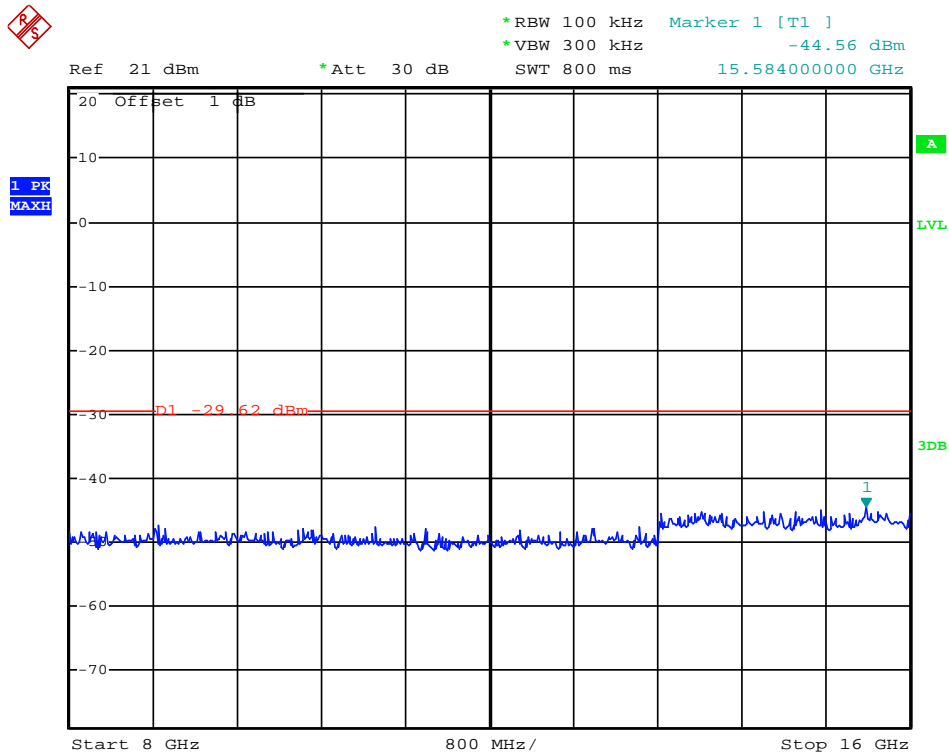
Date: 3.NOV.2013 14:30:42

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



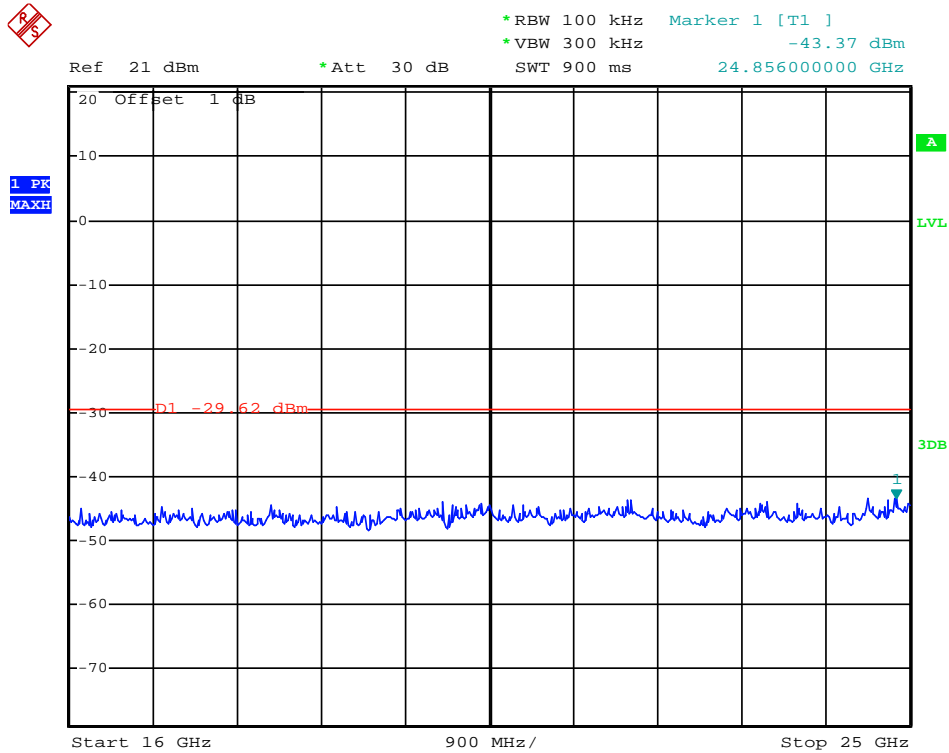
Date: 3.NOV.2013 14:30:29

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



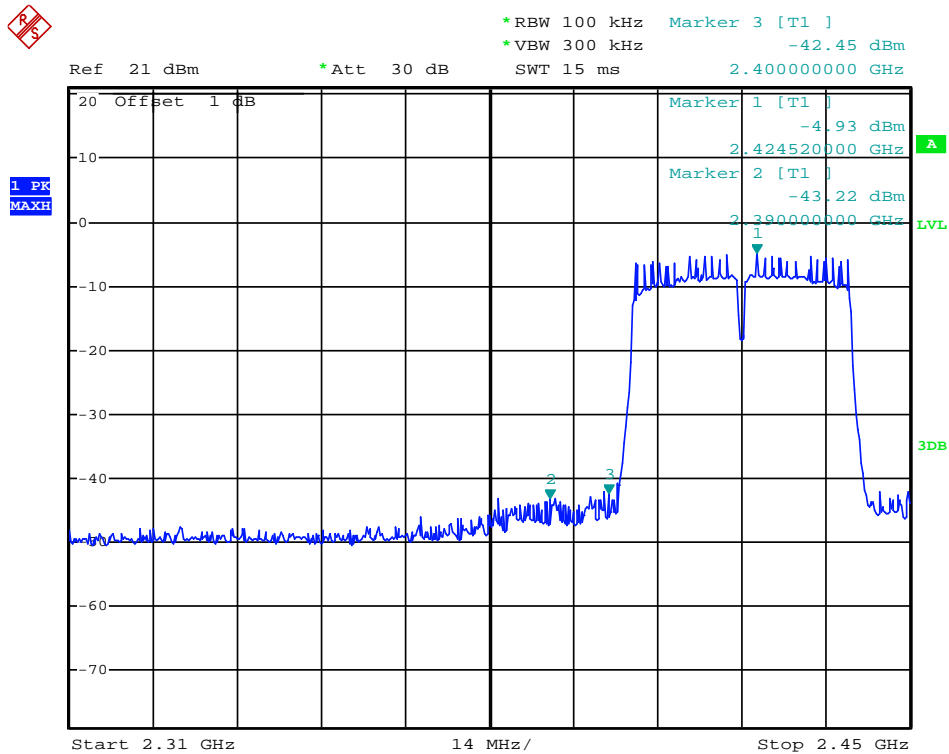
Date: 3.NOV.2013 14:30:55

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



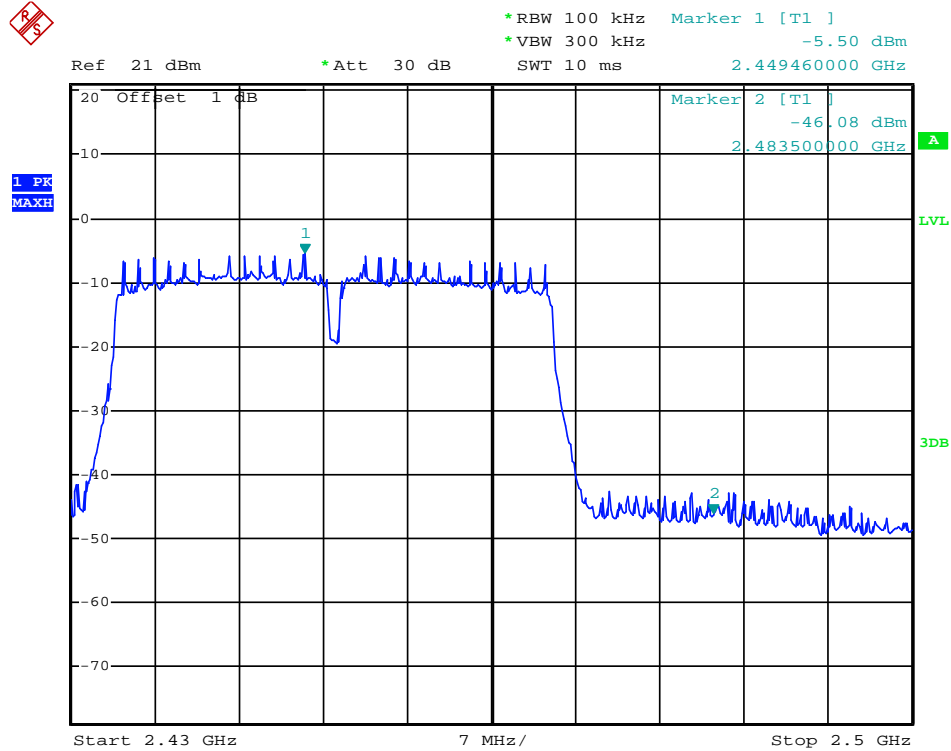
Date: 3.NOV.2013 14:31:06

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



Date: 3.NOV.2013 13:47:24

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

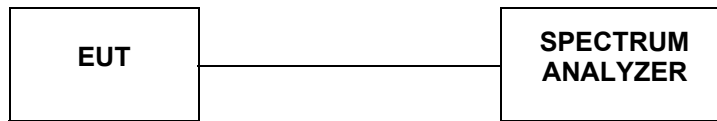


Date: 3.NOV.2013 13:49:08

(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) ≥ 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

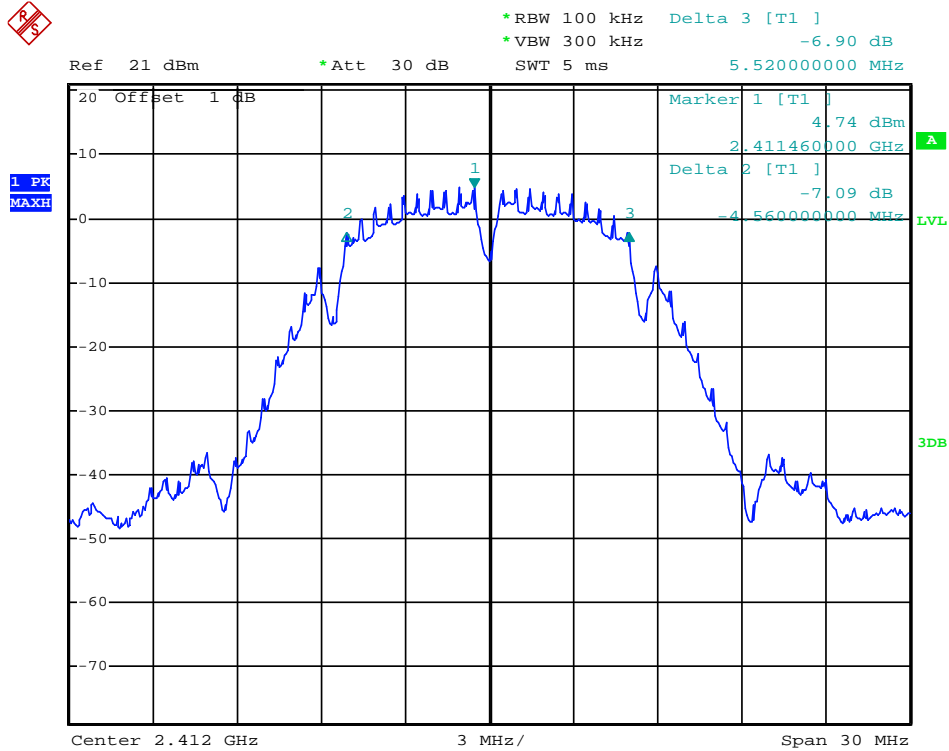
4.7.1 801.11b Test Mode

A. Test Verdict

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

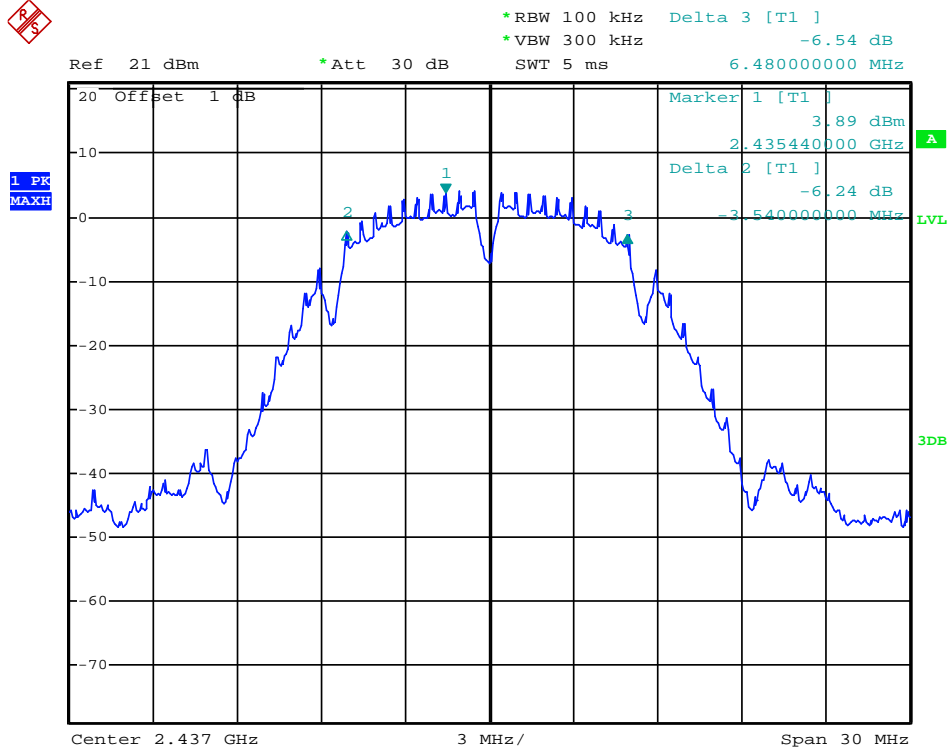
Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

B. Test Plots



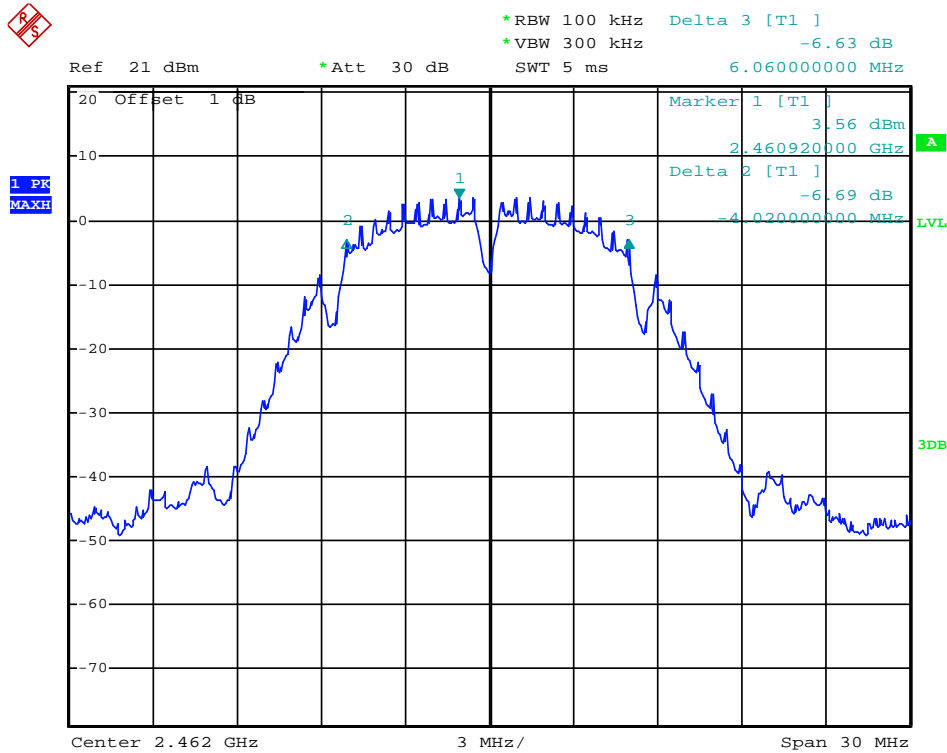
Date: 3.NOV.2013 10:48:05

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



Date: 3.NOV.2013 10:49:55

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



Date: 3.NOV.2013 10:51:01

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

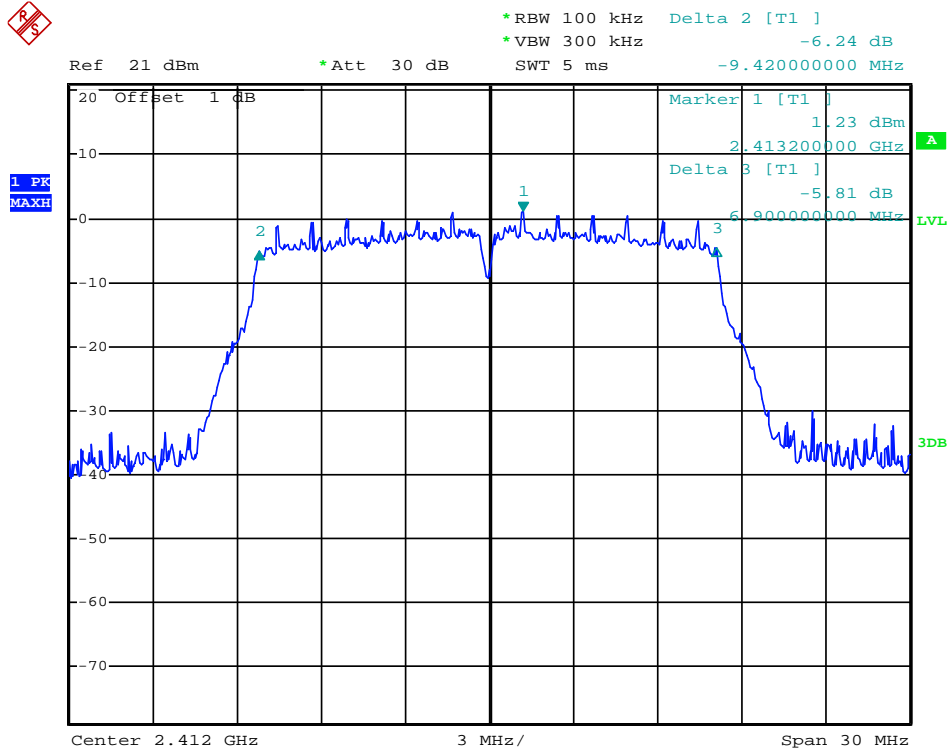
4.7.2 801.11g Test Mode

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	≥ 500	PASS
6	2437	16.32	Plot 4.7.2 B	≥ 500	PASS
11	2462	16.32	Plot 4.7.2 C	≥ 500	PASS

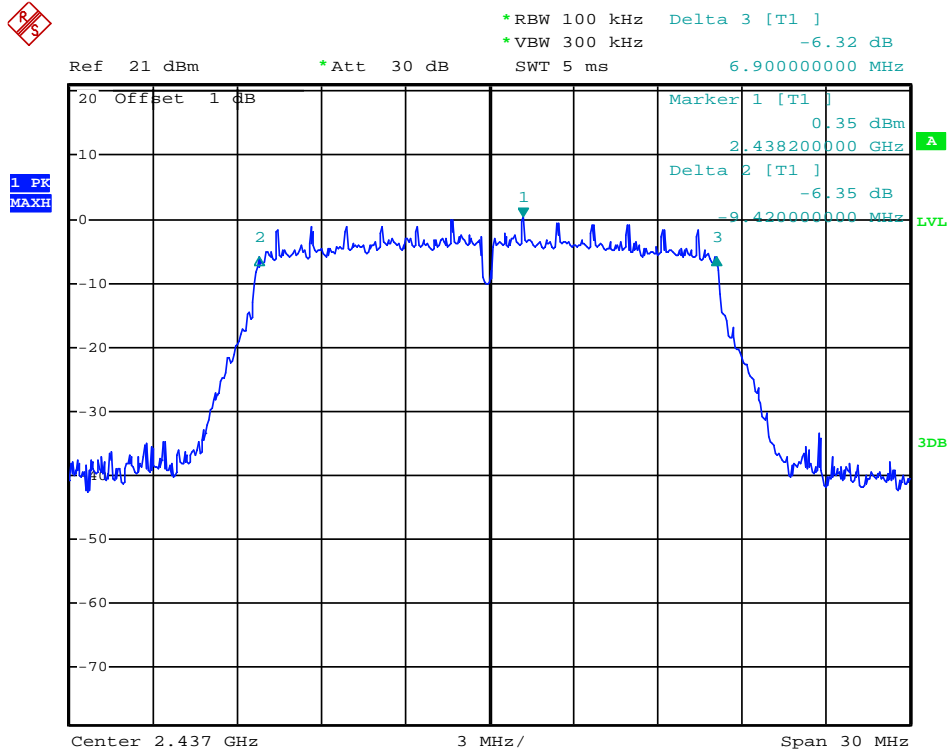
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.

B. Test Plots



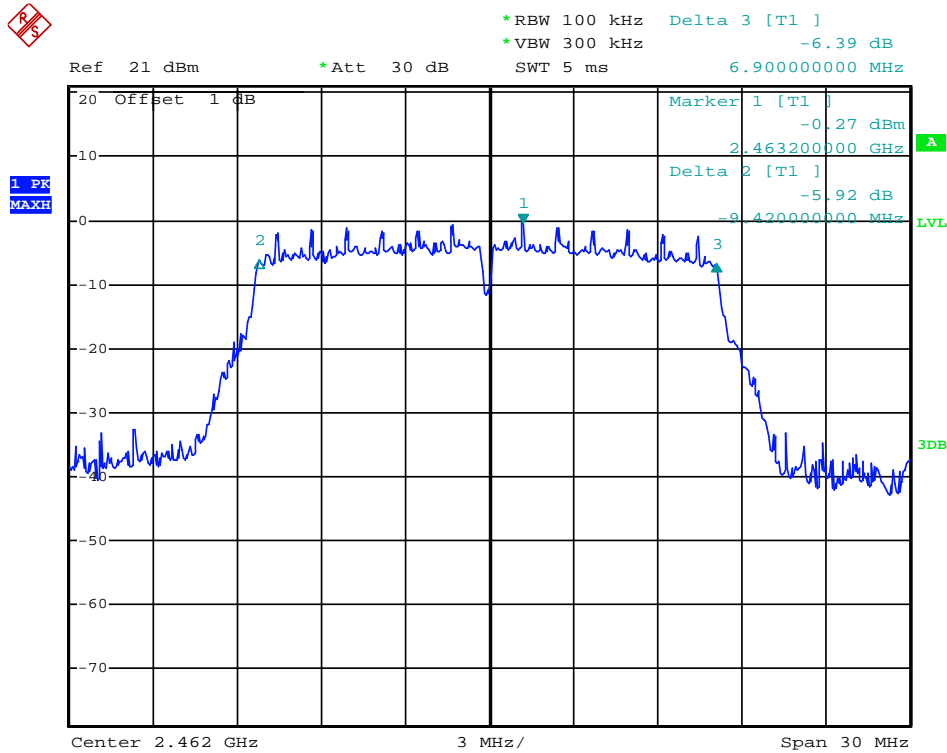
Date: 3.NOV.2013 10:55:53

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



Date: 3.NOV.2013 10:57:23

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



Date: 3.NOV.2013 10:58:49

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

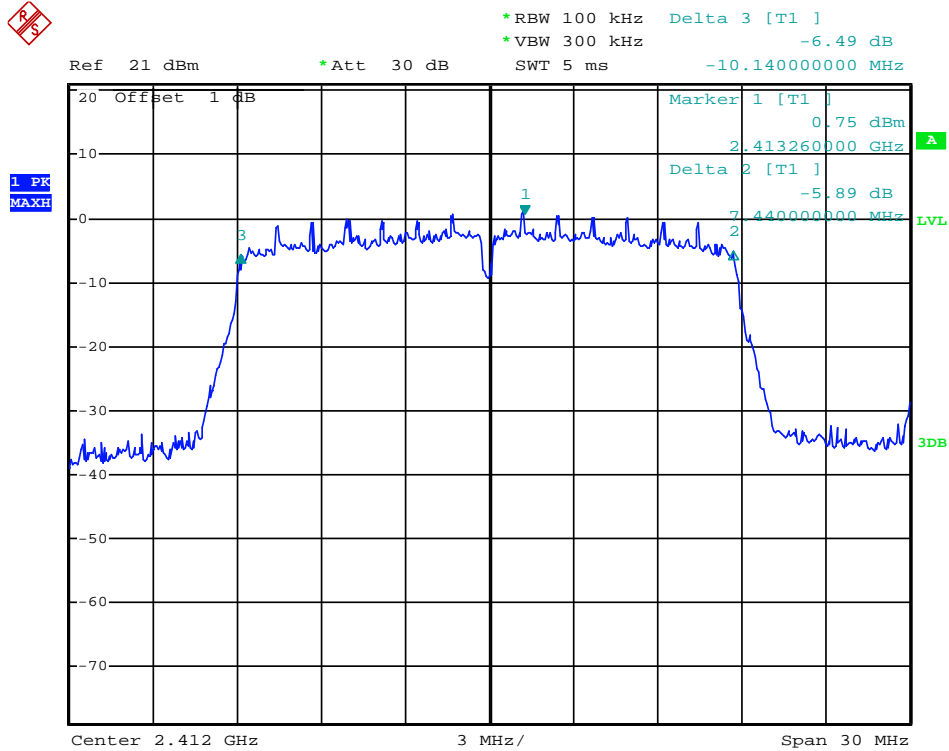
4.7.3 801.11n(20MHz) Test Mode

A. Test Verdict

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

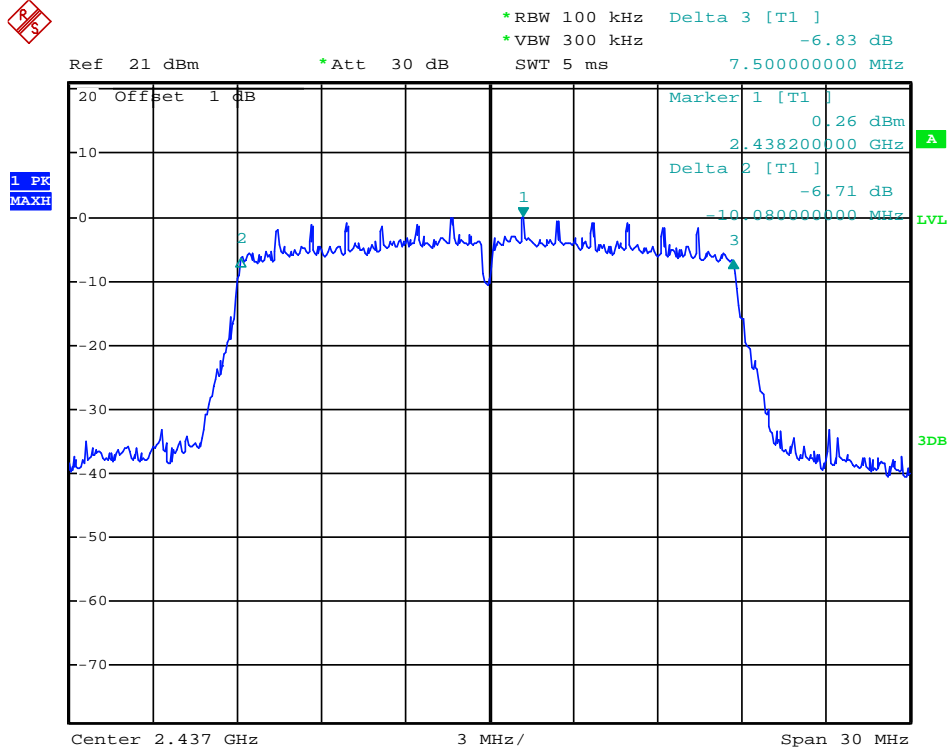
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.

B. Test Plots



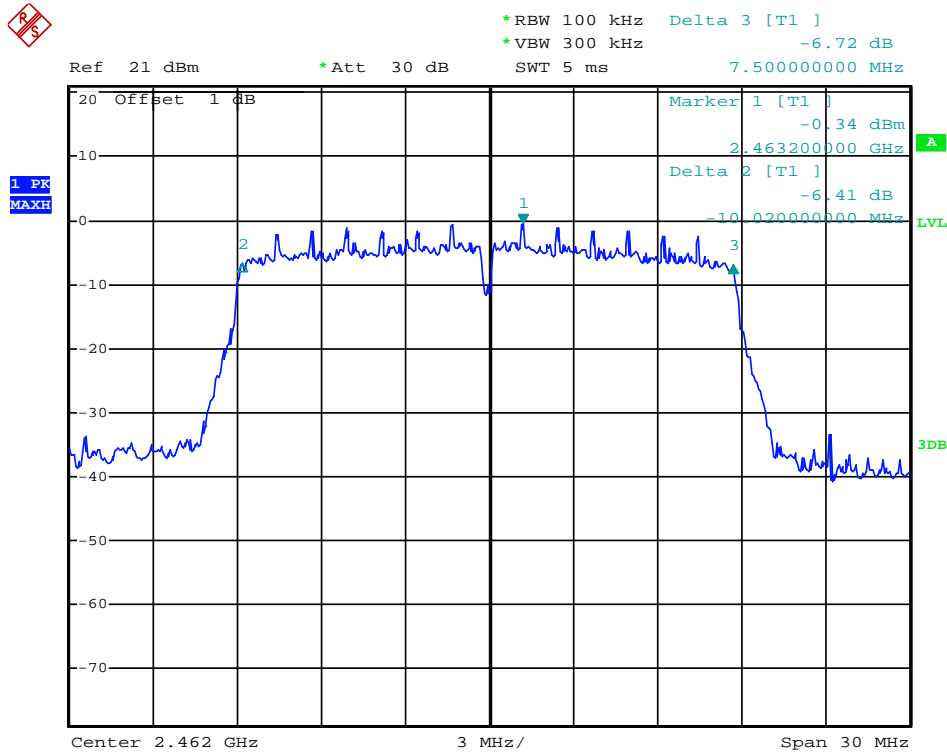
Date: 3.NOV.2013 11:03:15

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



Date: 3.NOV.2013 11:04:03

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



Date: 3.NOV.2013 11:05:27

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

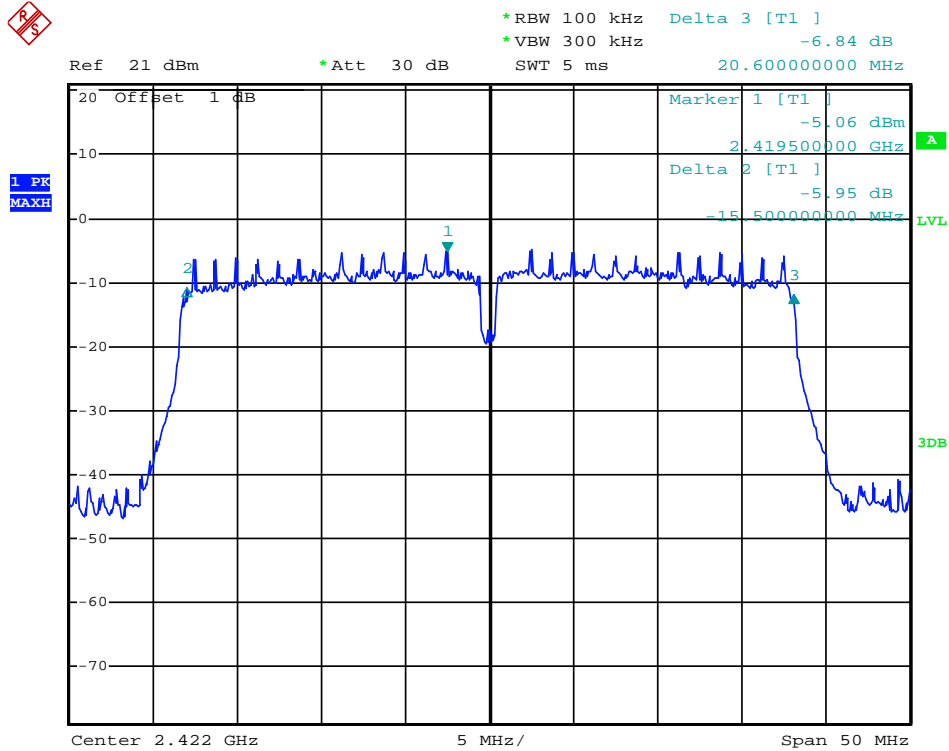
4.7.4 801.11n(40MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
3	2422	36.10	Plot 4.7.4 A	≥ 500	PASS
6	2437	35.90	Plot 4.7.4 B	≥ 500	PASS
9	2452	35.90	Plot 4.7.4 C	≥ 500	PASS

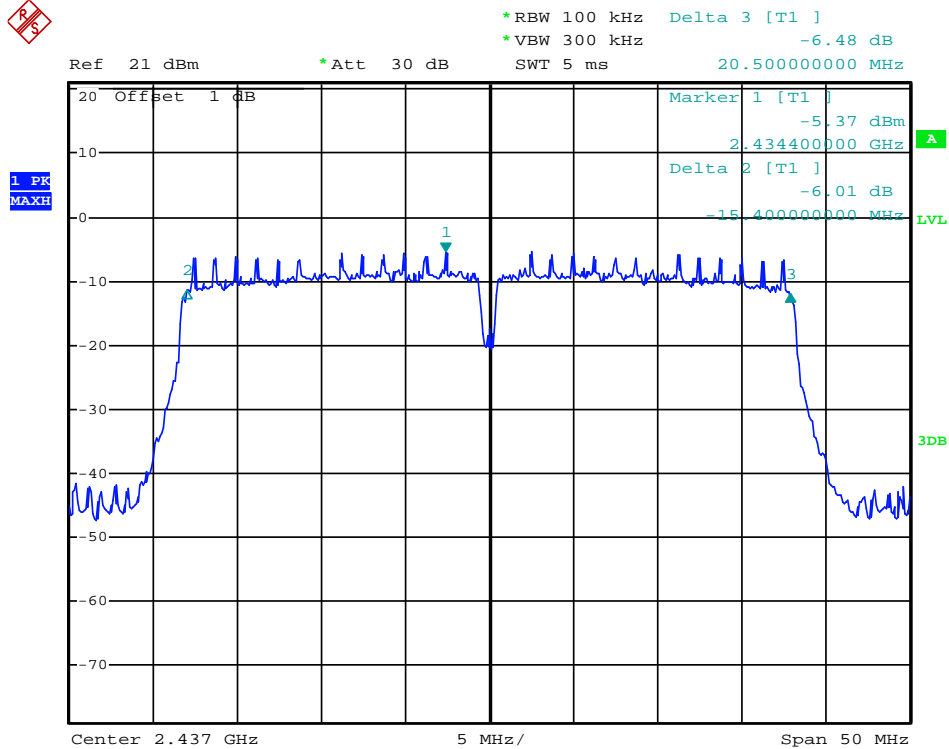
Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.

B. Test Plots



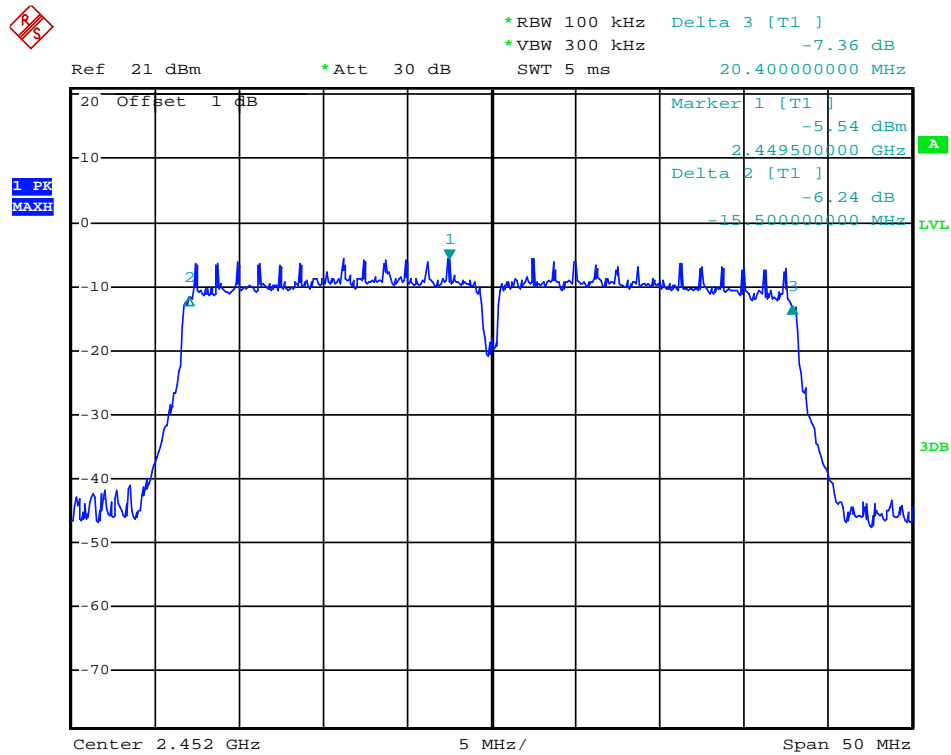
Date: 3.NOV.2013 11:07:24

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



Date: 3.NOV.2013 11:09:24

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



Date: 3.NOV.2013 13:35:52

(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.

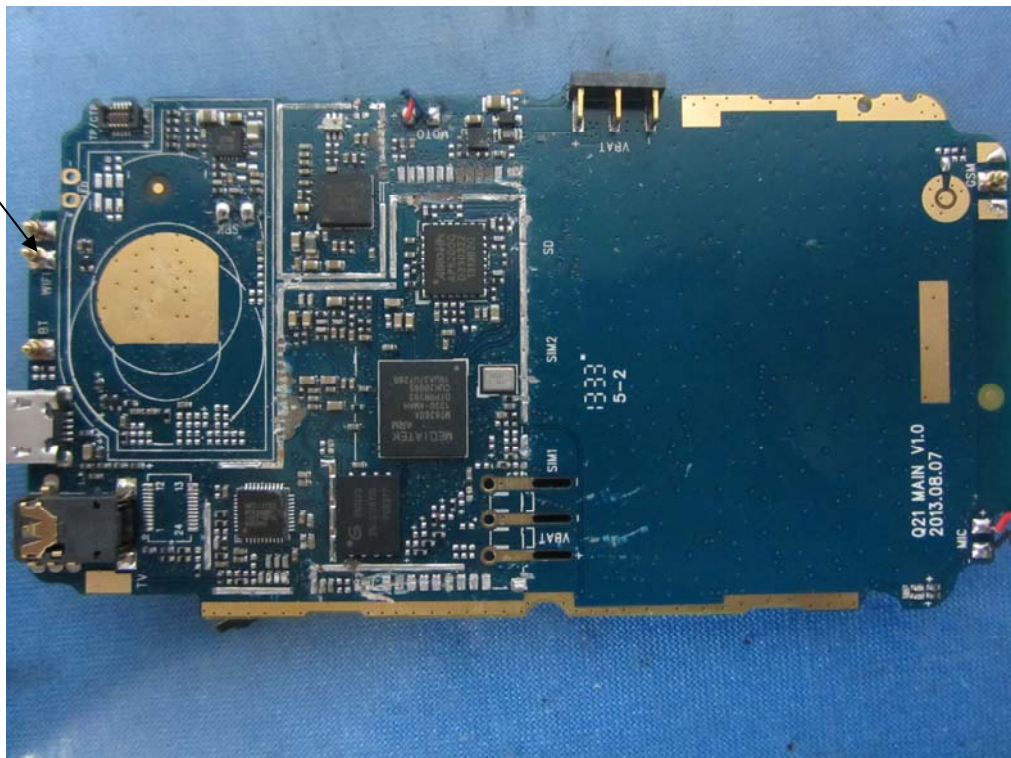
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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 WLAN and Bluetooth with same antenna and the maximum antenna gain of WLAN used was 2.00 dBi.



5. Test Setup Photos of the EUT

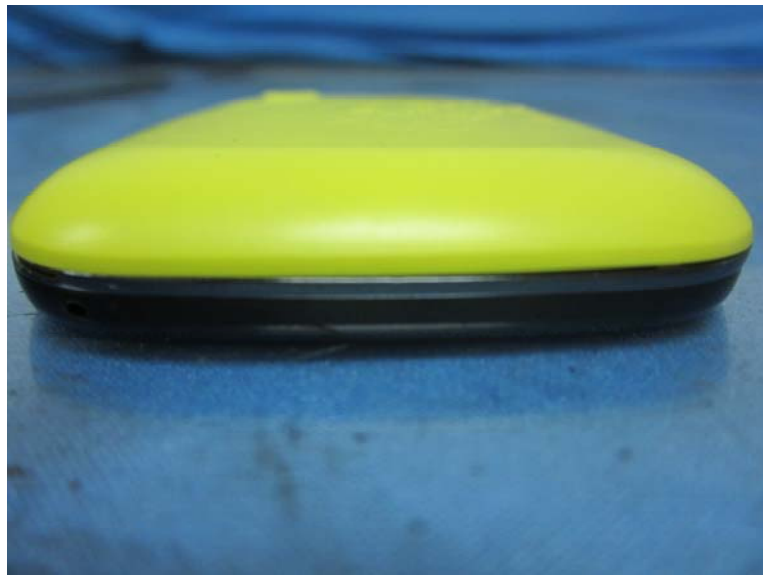




6. External and Internal Photos of the EUT

External photos of the EUT







Internal photos of the EUT



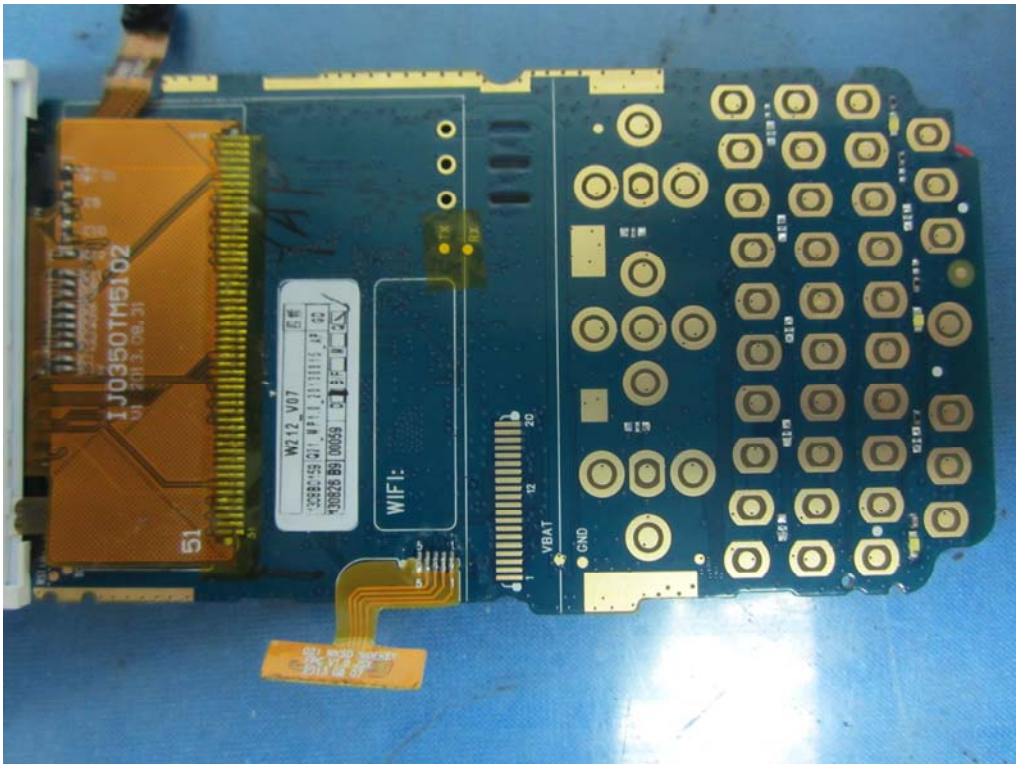


WLAN Antenna

BT Antenna

GSM Antenna







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