



FCC & IC TEST REPORT

FCC PART 15.247 and RSS-210 Annex 8

Report Reference No......: **TRE1309012001 R/C: 22180**

FCC ID.....: **P2F-FD9960**

IC: **10574A-FD9960**

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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.....: **Drift Innovation Ltd**

Address: The Light Box Unit 125, 111 Power Road ,London,UK.

Test specification:

FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

Standard: **RSS-210 Annex 8**

RSS-Gen

TRF Originator.....: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF.....: Dated 2006-06

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Test item description: Wireless Camera Ghost S with Remote Control

Trade Mark: 

Model/Type reference.....: FD9960

Listed Models: /

Manufacturer: **Foxda Technology Industrial(Shenzhen) Co.,Ltd**

Modulation Type.....: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
 IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
 IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)

Rating: DC 3.70V/DC 5.0V from USB

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

Result.....: **PASS**

TEST REPORT

Test Report No. :	TRE1309012001	Nov 04, 2013
		Date of issue

Equipment under Test : Wireless Camera Ghost S with Remote Control

Model /Type : FD9960

Listed Models : /

Applicant : **Drift Innovation Ltd**

Address : The Light Box Unit 125, 111 Power Road ,London,UK.

Manufacturer **Foxda Technology Industrial(Shenzhen) Co.,Ltd**

Address : 1F of 1st Building&1F-3F of 2nd Building, Foxda Industrial Zone,North of Lanzhu Road,Pingshan New District,Shenzhen City,Guangdong Province,P.R.China

Test Result:	PASS
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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 15.247:2012](#): 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 C63.10:2009](#): 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

[RSS-210 Issue 8 December 2010](#) –Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

[RSS-Gen Issue 3 December 2010](#) –General Requirements and Information for the Certification of Radio Apparatus

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Sep 29, 2013
Testing commenced on	:	Oct 08, 2013
Testing concluded on	:	Nov 04,2013

2.2. Product Description

The **Drift Innovation Ltd's** Model: FD9960(Wireless Camera Ghost S with Remote Control) 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	Wireless Camera Ghost S with Remote Control
Model Number	FD9960(Wireless Camera Ghost S with Remote Control Receiver Module)
WLAN	Supported 802.11b/802.11g/802.11n(20MHz)
Antenna Type	Internal
WLAN FCC Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz
Remote Operation frequency	2430MHz(RX)
Remote Modulation	GFSK(RX)
WLAN Modulation	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)

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)	

DC3.70V/DC5.0V from USB

2.4. Description of the test mode

IEEE 802.11b/g/n: The product can supported 13 channels while only 11channels are provided to use 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 (Wireless Camera Ghost S with Remote Control (M/N: FD9960))

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

Serial number: Prototype

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. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: P2P-FD9960 and IC:10574A-FD9960** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and RSS-210 Annex 8 Rules.

2.9. Modifications

No modifications were implemented to meet testing criteria.

2.10. NOTE

1. The EUT is a Wireless Camera Ghost S with Remote Control with WLAN function, The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN 802.11b/g/n	FCC Part 15 Subpart C 15.247 RSS-210 Annex 8	TRE1309012001
Remote	FCC Part 15 Subpart C 15.249 RSS-210 A2.9	TRE1309012002
SAR	FCC Part 2 §2.1093	TRE1309012003
SAR	RSS-102	TRE1309012004

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)	—

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

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Equipment Used in Tested System

3.5. Test Description

Test specification clause		Test case	Verdict
FCC Part 15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	N/A
FCC Part 15.247(a)(2)	RSS-210 Annex 8 A8.2 (a)	6dB Bandwidth	PASS
FCC Part 15.247(d)	RSS-210 Annex 8 A8.5	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	RSS-210 Annex 8 A8.4 (4)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	RSS-210 Annex 8 A8.2 (b)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	RSS-Gen 7.2.5/RSS-Gen 7.2.2	Transmitter Spurious Emission	PASS
FCC Part 15.247(d)	RSS-210 Annex 8 A8.5	Band Edge	PASS
FCC Part 15.203/15.247 (b)	RSS-Gen 7.12	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~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11

3.6. 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-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 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 $k=1.96$.

3.7. Equipments Used during the Test

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	Amplifer	Sonoma	310N	E009-13	2013/10/26
9	JS amplifer	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	Amplifer	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	EMI TEST SOFTWARE	Audix	E3	N/A	N/A

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission

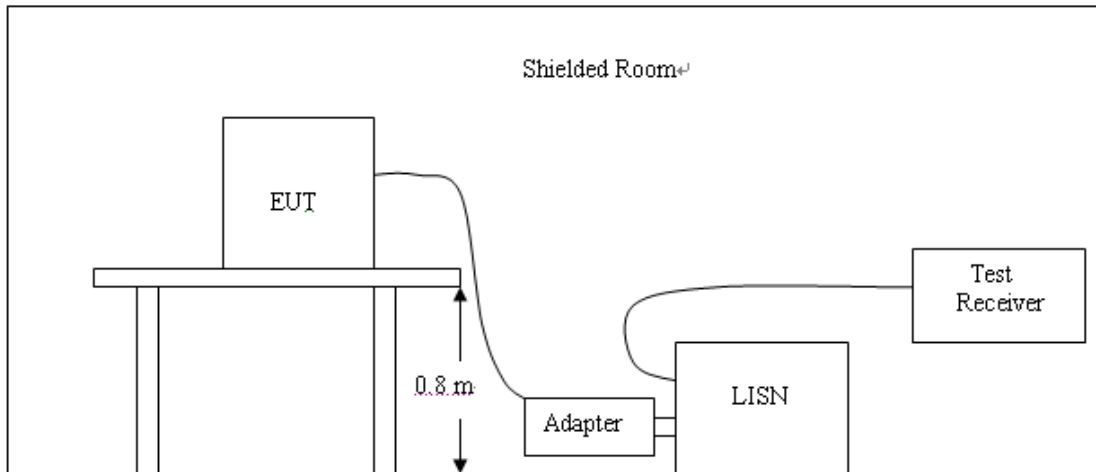
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2013/10/26

The Cal.Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission (Not Applicable)

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 C63.4-2009.
2. Support equipment, if needed, was placed as per ANSI C63.4-2009
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009
4. The EUT received DC5V power from USB and USB connect to PC, 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) and RSS-Gen Section 7.2.4 for AC Power Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	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

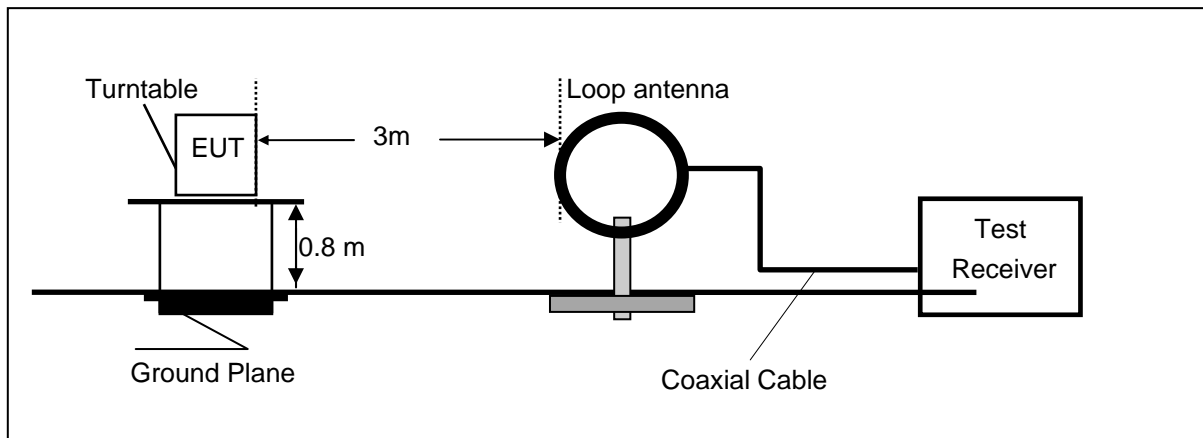
TEST RESULTS

Not Applicable (The WLAN can not operation when USB connect to PC)

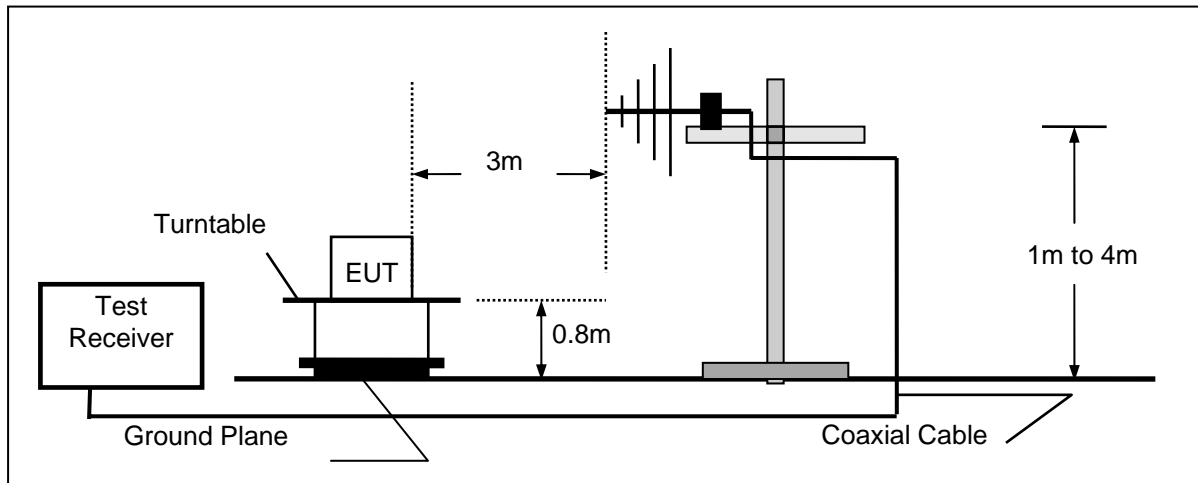
4.2. Radiated Emission

TEST CONFIGURATION

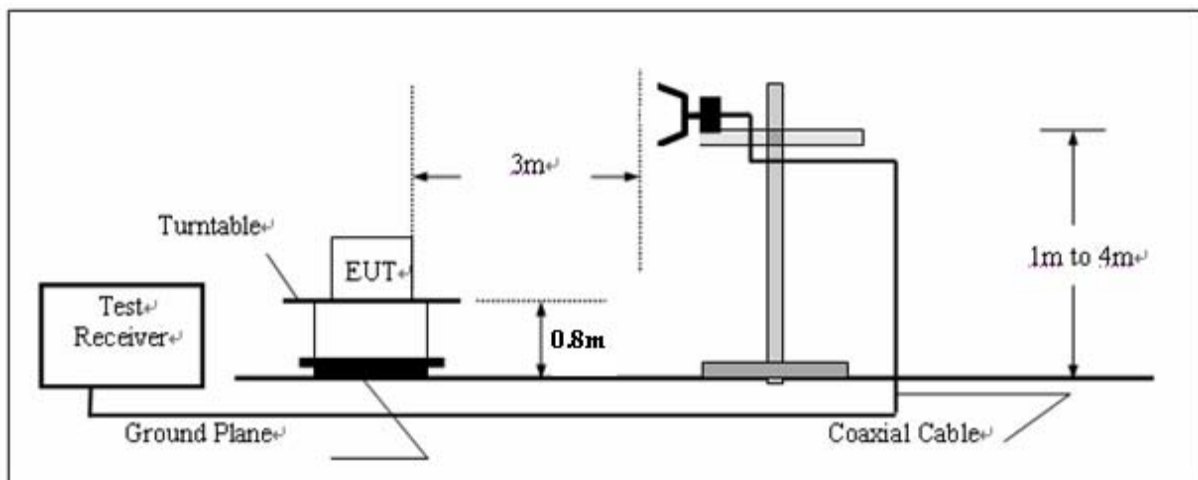
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 100MHz



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 32.768KHz 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 FCC

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	20log(2400/F(KHz))+80	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))+40	24000/F(KHz)
1.705-30	30	20log(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

For IC

Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown below. Additionally, the level of any transmitter spurious emission shall not exceed the level of the transmitter's fundamental emission. According to RSS-Gen Annex 8 A8.5 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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.

General Field Strength Limits for Transmitters at Frequencies Above 30 MHz

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Note: Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	300	$20\log(2400/F(\text{KHz}))+80$	$2400/F(\text{KHz})$
0.49-1.705	30	$20\log(24000/F(\text{KHz}))+40$	$24000/F(\text{KHz})$
1.705-30	30	$20\log(30)+40$	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

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 three orientations,recored woest case for results.

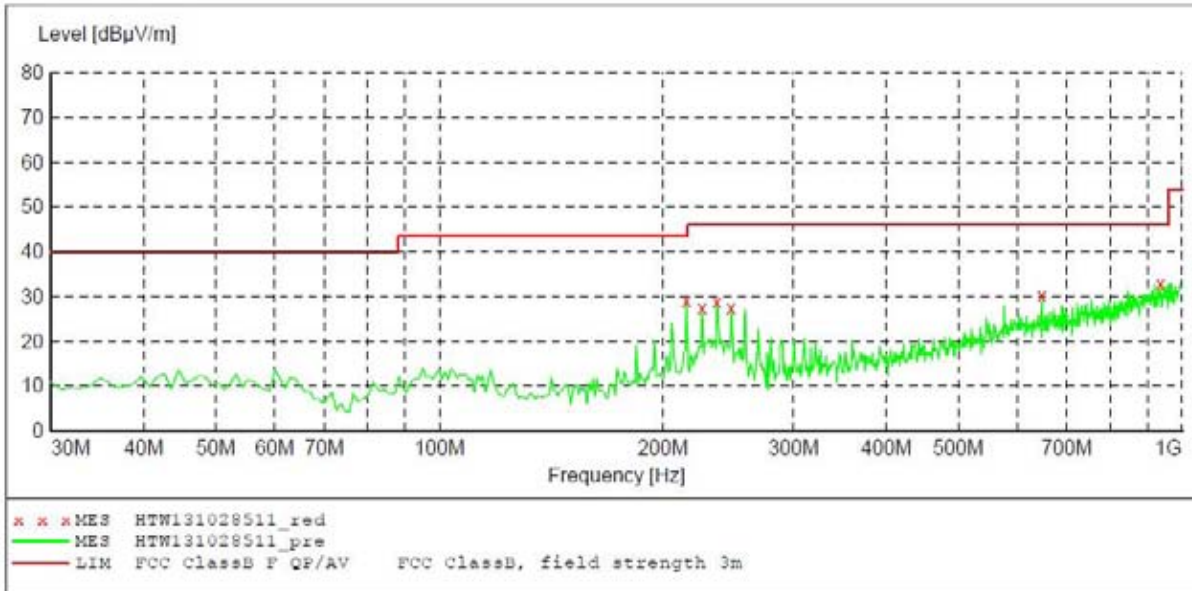
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dB μ V/m)@3m	FCC Limit (dB μ V/m) @3m	Margin (dB)	Detector	Result
0.75	51.38	91.90	40.52	QP	PASS
1.69	48.69	63.20	14.51	QP	PASS
12.38	49.73	69.54	19.81	QP	PASS
25.37	52.72	69.54	16.82	QP	PASS

For 30MHz to 1000MHz

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

Short Description: Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz VULB9163



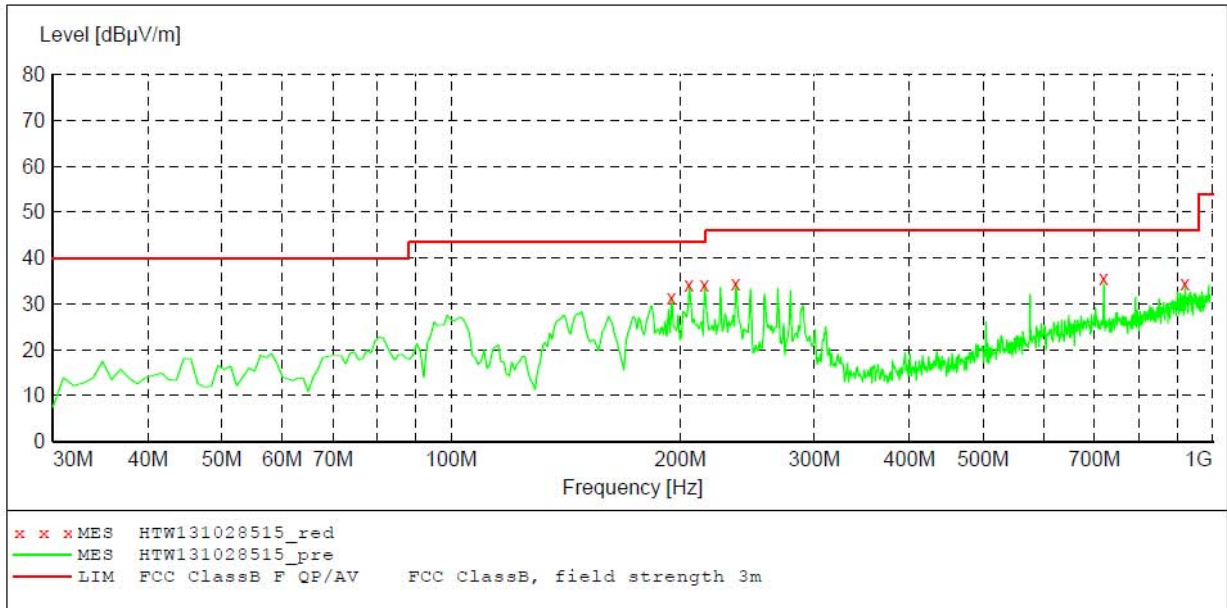
MEASUREMENT RESULT: "HTW131028511_red"

10/28/2013 10:34PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
215.270000	29.30	-15.0	43.5	14.2	PK	100.0	126.00	VERTICAL
225.940000	27.50	-15.1	46.0	18.5	PK	100.0	136.00	VERTICAL
236.610000	29.00	-15.2	46.0	17.0	PK	100.0	27.00	VERTICAL
247.280000	27.50	-15.6	46.0	18.5	PK	100.0	135.00	VERTICAL
647.890000	30.30	-2.3	46.0	15.7	PK	100.0	30.00	VERTICAL
935.980000	32.90	3.2	46.0	13.1	PK	100.0	29.00	VERTICAL

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

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163



MEASUREMENT RESULT: "HTW131028515_red"

10/28/2013 10:41PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
194.900000	31.40	-14.6	43.5	12.1	PK	100.0	123.00	HORIZONTAL
205.570000	34.10	-14.8	43.5	9.4	PK	100.0	55.00	HORIZONTAL
215.270000	34.10	-15.0	43.5	9.4	PK	100.0	120.00	HORIZONTAL
236.610000	34.60	-15.2	46.0	11.4	PK	100.0	13.00	HORIZONTAL
719.670000	35.60	-1.2	46.0	10.4	PK	100.0	59.00	HORIZONTAL
920.460000	34.50	3.0	46.0	11.5	PK	100.0	44.00	HORIZONTAL

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	65.35	PK	74.00	8.65	1.00 H	159	63.25	31.60	7.00	36.5	2.10
1	4824.00	47.76	AV	54.00	6.24	1.00 H	159	45.66	31.60	7.00	36.5	2.10
2	7236.00	56.14	PK	74.00	17.86	1.00 H	142	45.21	37.33	8.90	35.3	10.93
2	7236.00	44.38	AV	54.00	9.62	1.00 H	142	33.45	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	61.75	PK	74.00	17.02	1.00 V	112	59.65	31.60	7.00	36.5	2.10
1	4824.00	48.48	AV	54.00	9.21	1.00 V	112	46.38	31.60	7.00	36.5	2.10
2	7236.00	57.21	PK	74.00	19.30	1.00 V	120	46.28	37.33	8.90	35.3	10.93
2	7236.00	45.73	AV	54.00	9.28	1.00 V	120	34.80	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	61.75	PK	74.00	12.25	1.00 H	248	59.63	31.02	7.60	36.5	2.12
1	4874.00	47.57	AV	54.00	6.43	1.00 H	248	45.45	31.02	7.60	36.5	2.12
2	7311.00	55.72	PK	74.00	18.28	1.00 H	251	44.64	37.28	8.60	34.8	11.08
2	7311.00	46.15	AV	54.00	7.85	1.00 H	251	35.07	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	64.85	PK	74.00	9.15	1.00 V	352	62.73	31.02	7.60	36.5	2.12
1	4874.00	47.74	AV	54.00	6.26	1.00 V	352	45.62	31.02	7.60	36.5	2.12
2	7311.00	60.35	PK	74.00	13.65	1.00 V	120	49.27	37.28	8.60	34.8	11.08
2	7311.00	43.58	AV	54.00	10.42	1.00 V	120	32.50	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	61.36	PK	74.00	12.64	1.00 H	10	58.98	31.58	7.00	36.2	2.38
1	4924.00	48.39	AV	54.00	5.61	1.00 H	10	46.01	31.58	7.00	36.2	2.38
2	7386.00	58.53	PK	74.00	15.47	1.00 H	38	46.82	38.51	8.50	35.3	11.71
2	7386.00	41.67	AV	54.00	12.33	1.00 H	38	29.96	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	58.36	PK	74.00	15.64	1.00 V	110	55.98	31.58	7.00	36.2	2.38
1	4924.00	47.68	AV	54.00	6.32	1.00 V	110	45.30	31.58	7.00	36.2	2.38
2	7386.00	64.97	PK	74.00	9.03	1.00 V	132	53.26	38.51	8.50	35.3	11.71
2	7386.00	48.69	AV	54.00	5.31	1.00 V	132	36.98	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 802.11b mode at 1Mbps.

802.11g Mode(above 1GHz)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2412MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	60.71	PK	74.00	13.29	1.00 H	235	58.61	31.6	7.00	36.5	2.10
1	4824.00	48.67	AV	54.00	5.33	1.00 H	235	46.57	31.6	7.00	36.5	2.10
2	7236.00	54.67	PK	74.00	19.33	1.00 H	153	43.74	37.33	8.90	35.3	10.93
2	7236.00	43.75	AV	54.00	10.25	1.00 H	153	32.82	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2412MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	64.25	PK	74.00	15.11	1.00 V	147	62.15	31.60	7.00	36.5	2.10
1	4824.00	48.35	AV	54.00	7.00	1.00 V	147	46.25	31.60	7.00	36.5	2.10
2	7236.00	65.74	PK	74.00	9.35	1.00 V	220	54.81	37.33	8.90	35.3	10.93
2	7236.00	48.69	AV	54.00	3.09	1.00 V	220	37.76	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2437MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	60.39	PK	74.00	13.61	1.00 H	147	58.27	31.02	7.60	36.5	2.12
1	4874.00	46.37	AV	54.00	7.63	1.00 H	147	44.25	31.02	7.60	36.5	2.12
2	7311.00	63.53	PK	74.00	10.47	1.00 H	168	52.45	37.28	8.60	34.8	11.08
2	7311.00	43.74	AV	54.00	10.26	1.00 H	168	32.66	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2437MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	63.67	PK	74.00	10.33	1.00 V	136	61.55	31.02	7.60	36.5	2.12
1	4874.00	48.64	AV	54.00	5.36	1.00 V	136	46.52	31.02	7.60	36.5	2.12
2	7311.00	56.32	PK	74.00	17.68	1.00 V	145	45.24	37.28	8.60	34.8	11.08
2	7311.00	46.74	AV	54.00	7.26	1.00 V	145	35.66	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2462MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	61.57	PK	74.00	12.43	1.00 H	125	59.19	50.03	7.00	36.2	2.38
1	4924.00	46.64	AV	54.00	7.36	1.00 H	125	44.26	37.89	7.00	36.2	2.38
2	7311.00	58.76	PK	74.00	15.24	1.00 H	110	47.05	43.19	8.50	35.3	11.71
2	7311.00	44.38	AV	54.00	9.62	1.00 H	110	32.67	35.90	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2462MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	59.15	PK	74.00	14.85	1.00 V	136	56.77	31.58	7.00	36.2	2.38
1	4924.00	46.34	AV	54.00	7.66	1.00 V	136	43.96	31.58	7.00	36.2	2.38
2	7386.00	56.73	PK	74.00	17.27	1.00 V	111	45.02	38.51	8.50	35.3	11.71
2	7386.00	48.27	AV	54.00	5.73	1.00 V	111	36.56	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 802.11g mode at 6Mbps.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	62.58	PK	74.00	11.42	1.00 H	248	60.48	31.60	7.00	36.5	2.10
1	4824.00	45.48	AV	54.00	8.52	1.00 H	248	43.38	31.60	7.00	36.5	2.10
2	7236.00	60.25	PK	74.00	13.75	1.00 H	110	49.32	37.33	8.90	35.3	10.93
2	7236.00	47.46	AV	54.00	6.54	1.00 H	110	36.53	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2412MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4824.00	58.35	PK	74.00	15.65	1.00 V	104	56.25	31.60	7.00	36.5	2.10
1	4824.00	47.48	AV	54.00	6.52	1.00 V	104	45.38	31.60	7.00	36.5	2.10
2	7236.00	60.35	PK	74.00	13.65	1.00 V	68	49.42	37.33	8.90	35.3	10.93
2	7236.00	48.48	AV	54.00	5.52	1.00 V	68	37.55	37.33	8.90	35.3	10.93

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	61.15	PK	74.00	12.85	1.00 H	180	59.03	31.02	7.60	36.5	2.12
1	4874.00	47.58	AV	54.00	6.42	1.00 H	180	45.46	31.02	7.60	36.5	2.12
2	7311.00	59.35	PK	74.00	14.65	1.00 H	271	48.27	37.28	8.60	34.8	11.08
2	7311.00	47.54	AV	54.00	6.46	1.00 H	271	36.46	37.28	8.60	34.8	11.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2437MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4874.00	60.43	PK	74.00	13.57	1.00 V	120	58.31	31.02	7.60	36.5	2.12
1	4874.00	48.25	AV	54.00	5.75	1.00 V	120	46.13	31.02	7.60	36.5	2.12
2	7311.00	58.48	PK	74.00	15.52	1.00 V	25	47.40	37.28	8.60	34.8	11.08
2	7311.00	44.38	AV	54.00	9.62	1.00 V	25	33.30	37.28	8.60	34.8	11.08

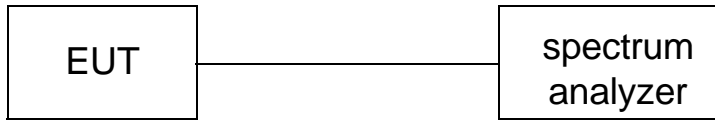
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2462MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	58.45	PK	74.00	15.55	1.00 H	360	56.07	31.58	7.00	36.2	2.38
1	4924.00	43.27	AV	54.00	10.73	1.00 H	360	40.89	31.58	7.00	36.2	2.38
2	7386.00	58.36	PK	74.00	15.64	1.00 H	178	46.65	38.51	8.50	35.3	11.71
2	7386.00	47.48	AV	54.00	6.52	1.00 H	178	35.77	38.51	8.50	35.3	11.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2462MHz)												
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	4924.00	60.38	PK	74.00	13.62	1.00 V	180	58.00	31.58	7.00	36.2	2.38
1	4924.00	45.85	AV	54.00	8.15	1.00 V	180	43.47	31.58	7.00	36.2	2.38
2	7386.00	57.25	PK	74.00	16.75	1.00 V	215	45.54	38.51	8.50	35.3	11.71
2	7386.00	45.38	AV	54.00	8.62	1.00 V	215	33.67	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.

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

According to FCC Part 15 15.247:The Maximum Peak Output Power Measurement is 30dBm and according to RSS-210 Annex 8 A8.4 (4):For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

TEST RESULTS

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

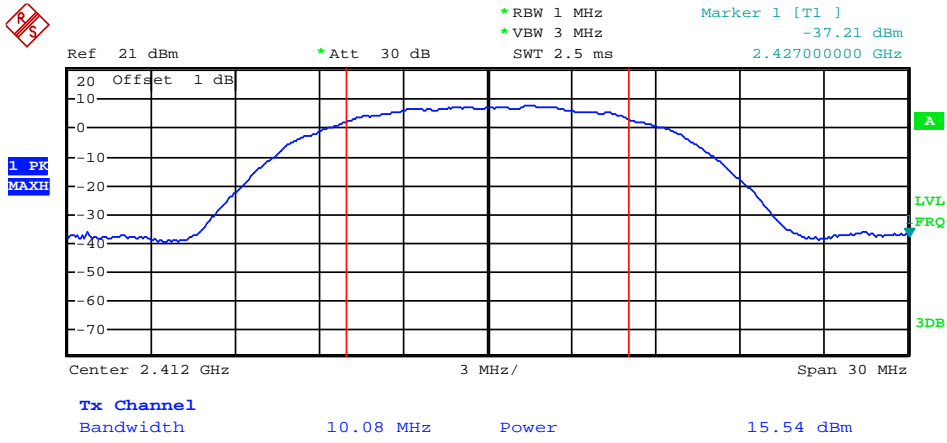
4.3.1 802.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	15.54	Plot 4.3.1 A	30	PASS
6	2437	16.39	Plot 4.3.1 B	30	PASS
11	2462	16.41	Plot 4.3.1 C	30	PASS

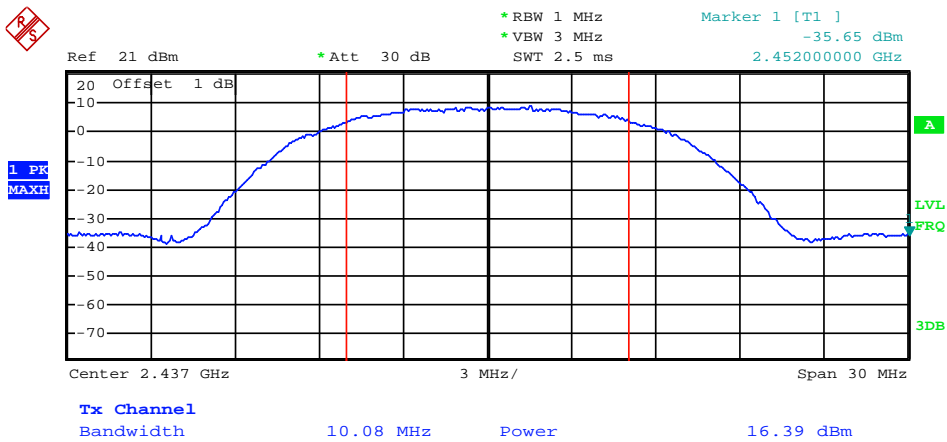
Note: 1. For 802.11b mode at finial test to get the worst-case emission at 1Mbps.
2.The test results including the cable lose.

B. Test Plots



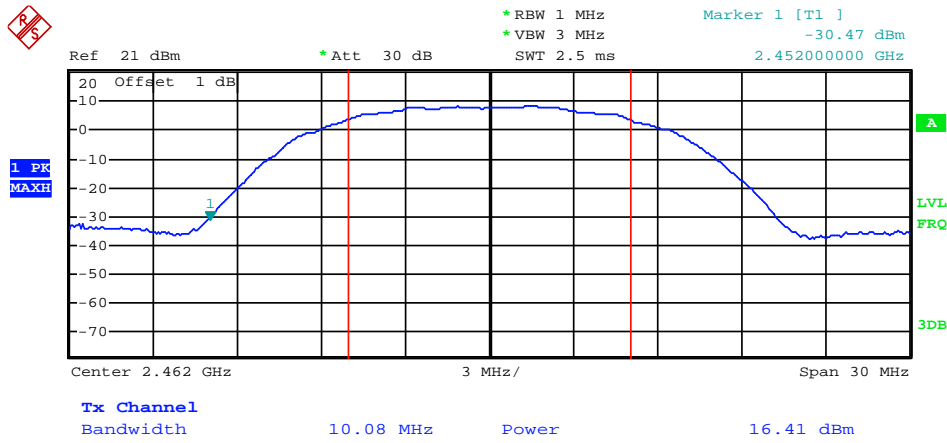
Date: 11.OCT.2013 14:50:53

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



Date: 11.OCT.2013 14:49:02

(Plot 4.3.1 B: Channel 6: 2437MHz @ 802.11b)



Date: 11.OCT.2013 14:49:32

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

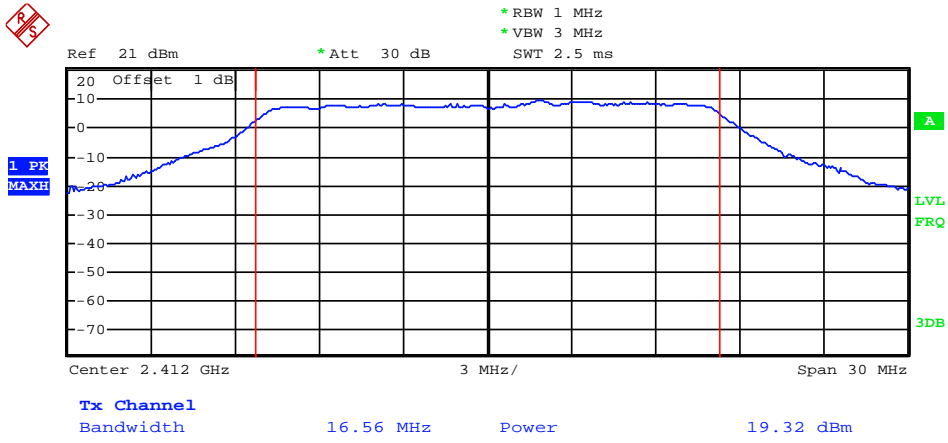
4.3.2 802.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	19.32	Plot 4.3.2 A	30	PASS
6	2437	18.39	Plot 4.3.2 B	30	PASS
11	2462	18.89	Plot 4.3.2 C	30	PASS

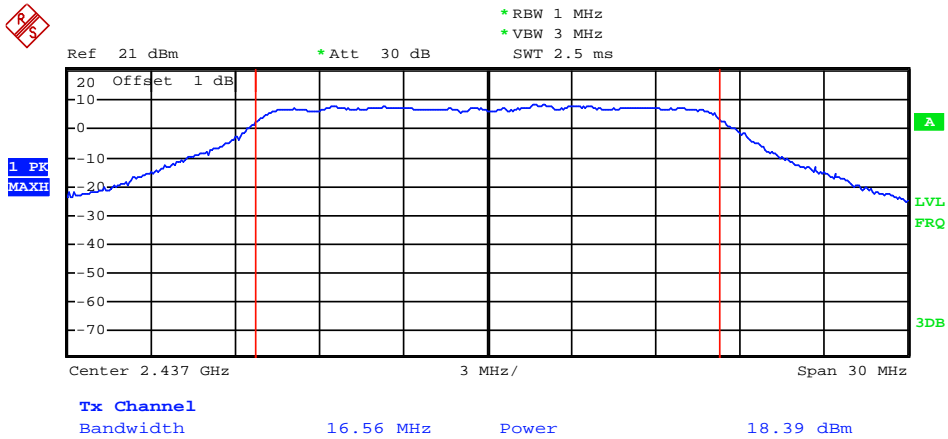
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable loss.

B. Test Plots



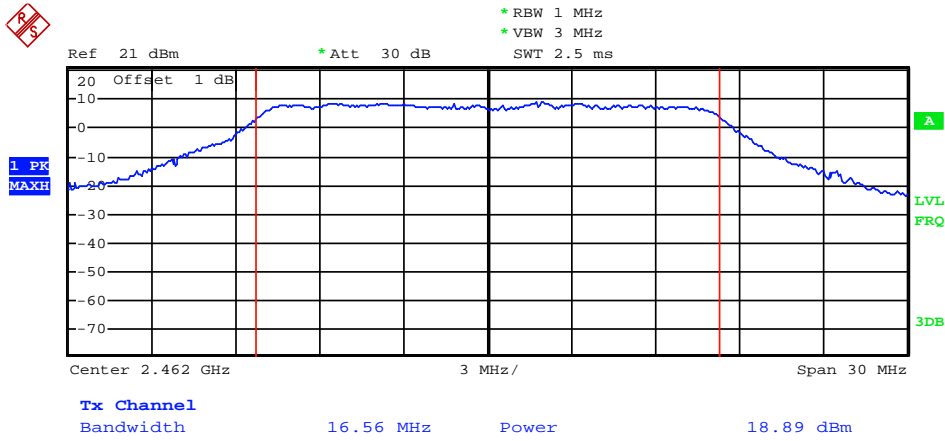
Date: 11.OCT.2013 15:58:48

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



Date: 11.OCT.2013 15:59:34

(Plot 4.3.2 B: Channel 6: 2437MHz @ 802.11g)



Date: 11.OCT.2013 15:59:59

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

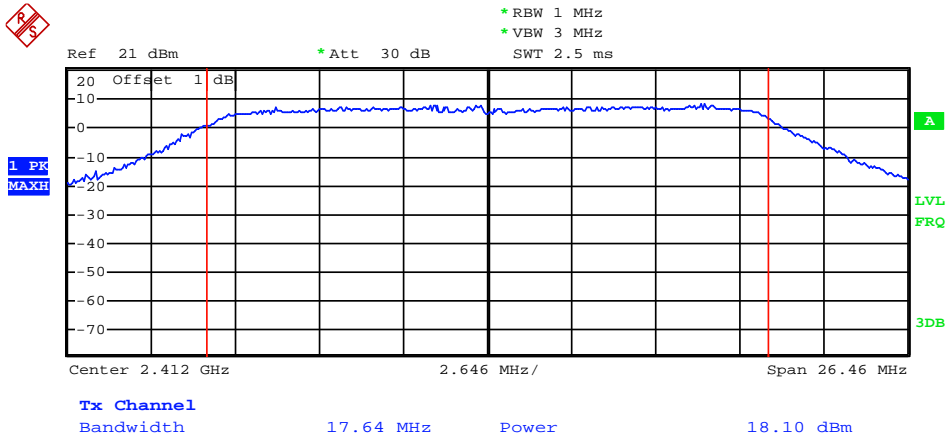
4.3.3 802.11n(20MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Refer to Plot	Limits (dBm)	Verdict
1	2412	18.10	Plot 4.3.3 A	30	PASS
6	2437	18.63	Plot 4.3.3 B	30	PASS
11	2462	18.76	Plot 4.3.3 C	30	PASS

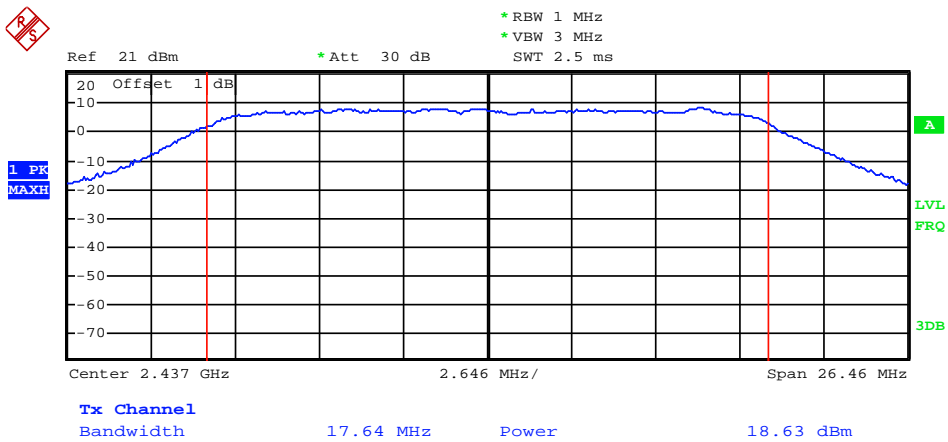
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable lose.

B. Test Plots



Date: 11.OCT.2013 16:26:25

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

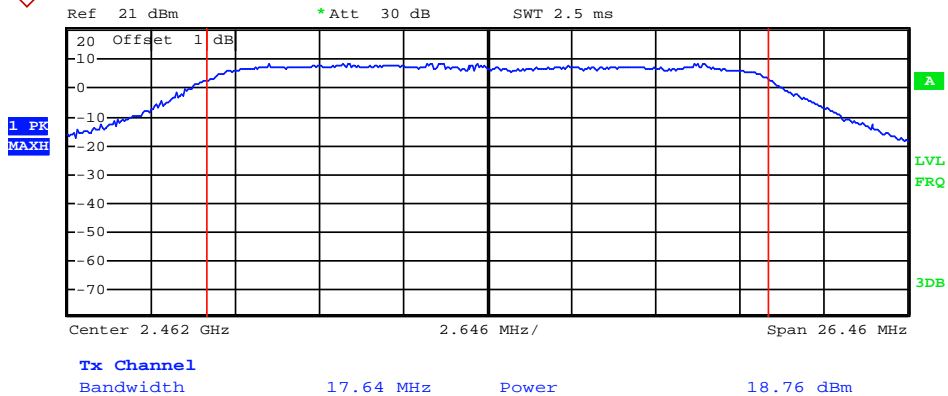


Date: 11.OCT.2013 16:27:22

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



* RBW 1 MHz
* VBW 3 MHz
SWT 2.5 ms

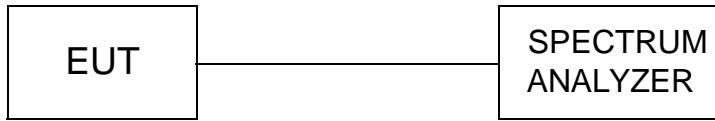


Date: 11.OCT.2013 16:27:41

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

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

According to FCC Part 15 15.247 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 and according to RSS-210 Annex 8 A8.2(b):For digitally modulated systems, The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of Section A8.4 (4), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

TEST RESULTS

4.4.1 802.11b Test Mode

A. Test Verdict

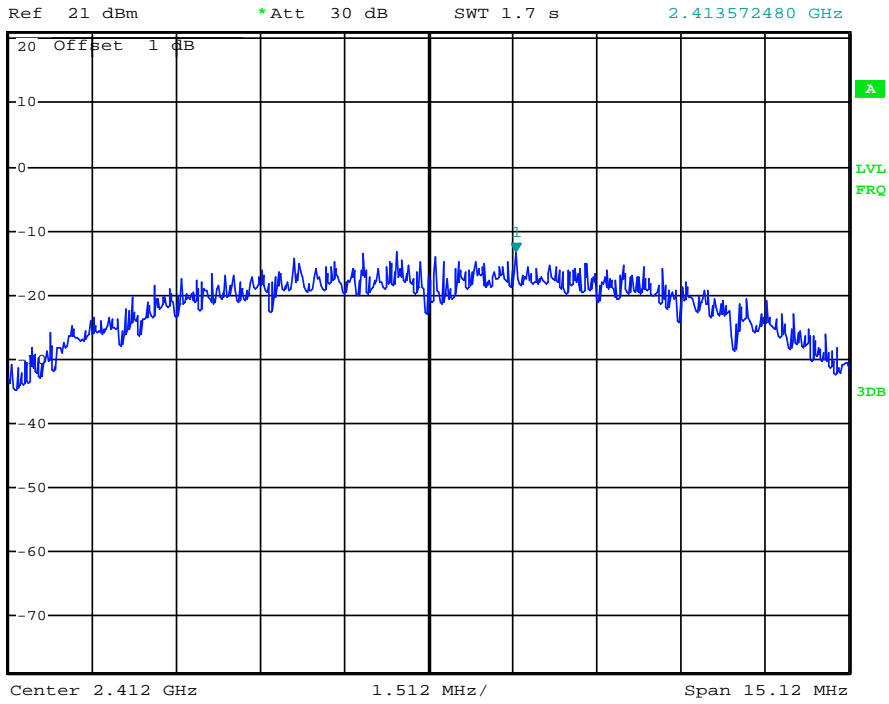
Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-13.21	Plot 4.4.1 A	8	PASS
6	2437	-12.19	Plot 4.4.1 B	8	PASS
11	2462	-12.46	Plot 4.4.1 C	8	PASS

- 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



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -13.21 dBm
SWT 1.7 s 2.413572480 GHz

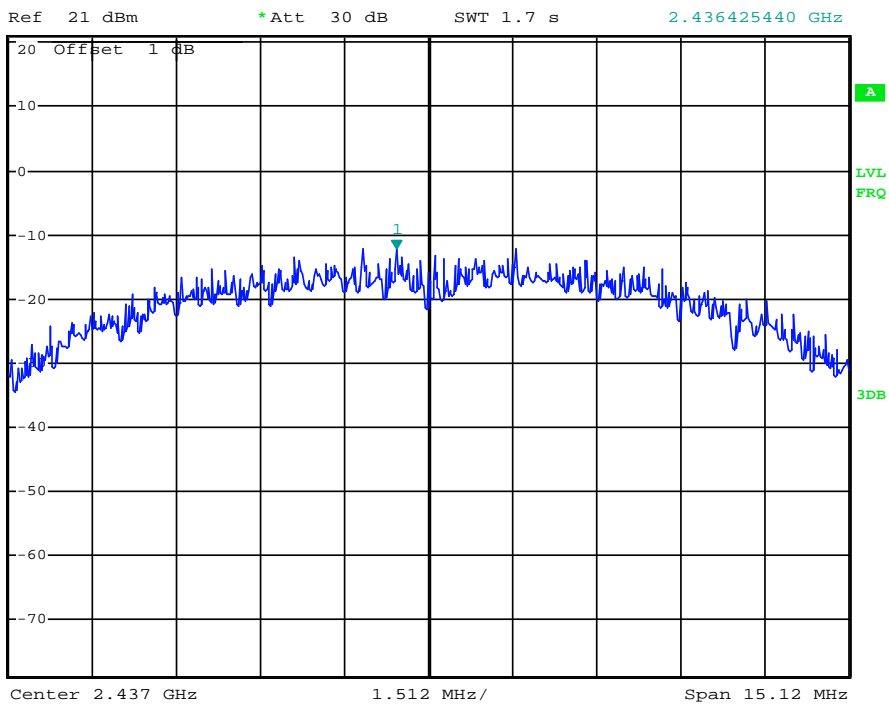


Date: 11.OCT.2013 14:55:34

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



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -12.19 dBm
SWT 1.7 s 2.436425440 GHz

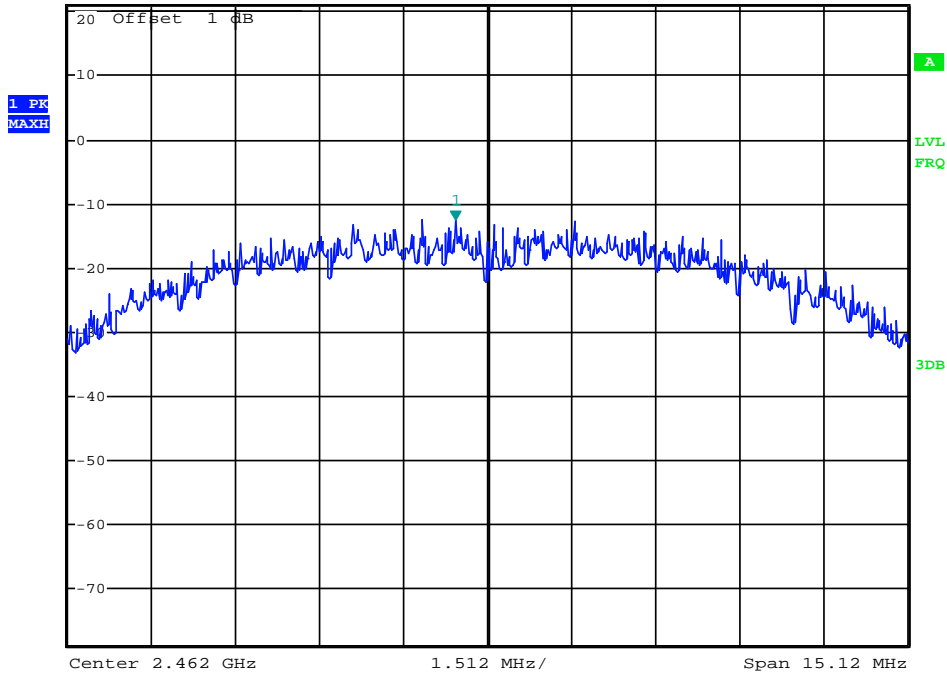


Date: 11.OCT.2013 14:57:09

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



*RBW 3 kHz Marker 1 [T1]
 *VBW 10 kHz -12.46 dBm
 Ref 21 dBm *Att 30 dB SWT 1.7 s 2.461425440 GHz



Date: 11.OCT.2013 14:58:15

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

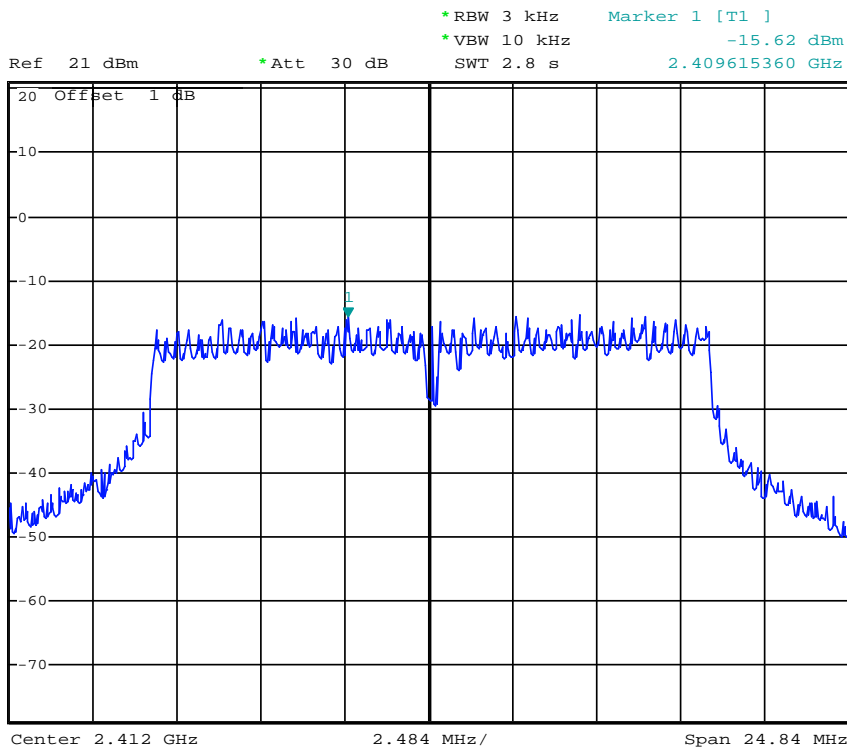
4.4.2 802.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-15.62	Plot 4.4.2 A	8	PASS
6	2437	-16.55	Plot 4.4.2 B	8	PASS
11	2462	-15.55	Plot 4.4.2 C	8	PASS

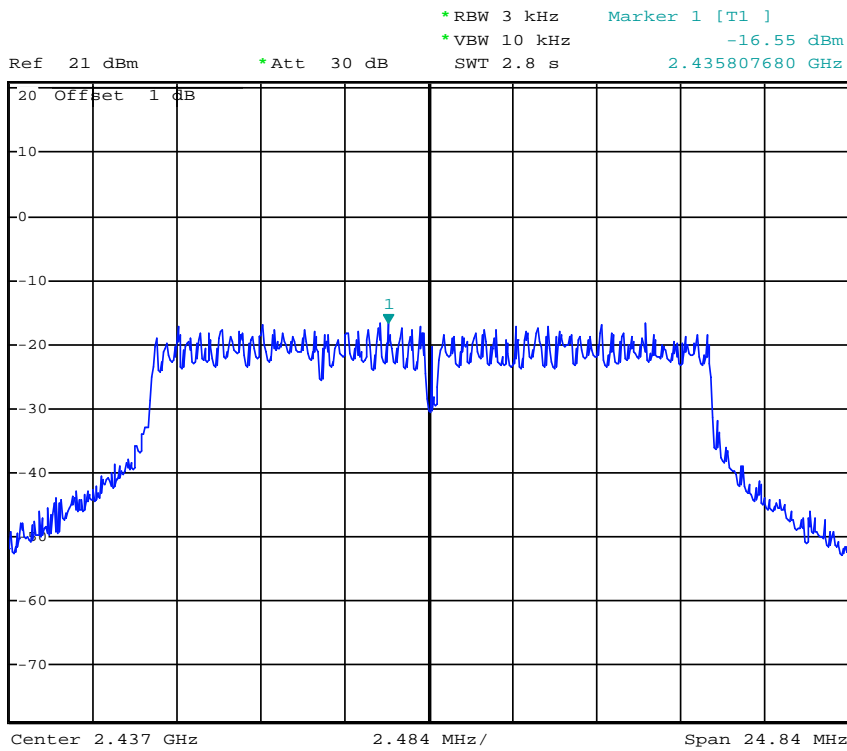
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable loss.

B. Test Plots



Date: 11.OCT.2013 16:02:51

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

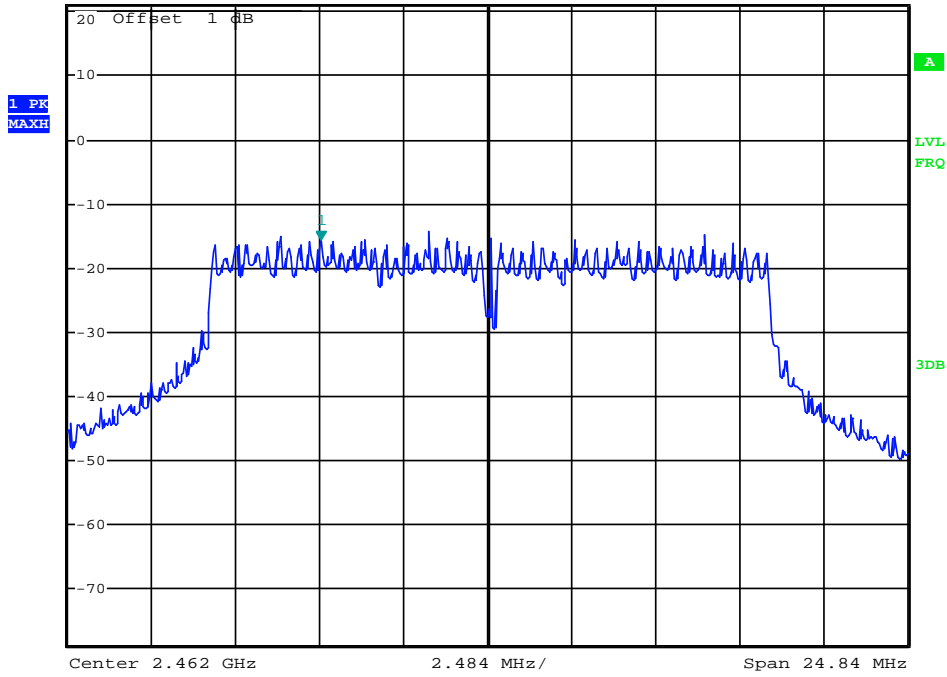


Date: 11.OCT.2013 16:04:32

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



*RBW 3 kHz Marker 1 [T1]
 *VBW 10 kHz -15.55 dBm
 Ref 21 dBm *Att 30 dB SWT 2.8 s 2.457081680 GHz



Date: 11.OCT.2013 16:01:58

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

4.4.3 802.11n(20MHz) Test Mode

A. Test Verdict

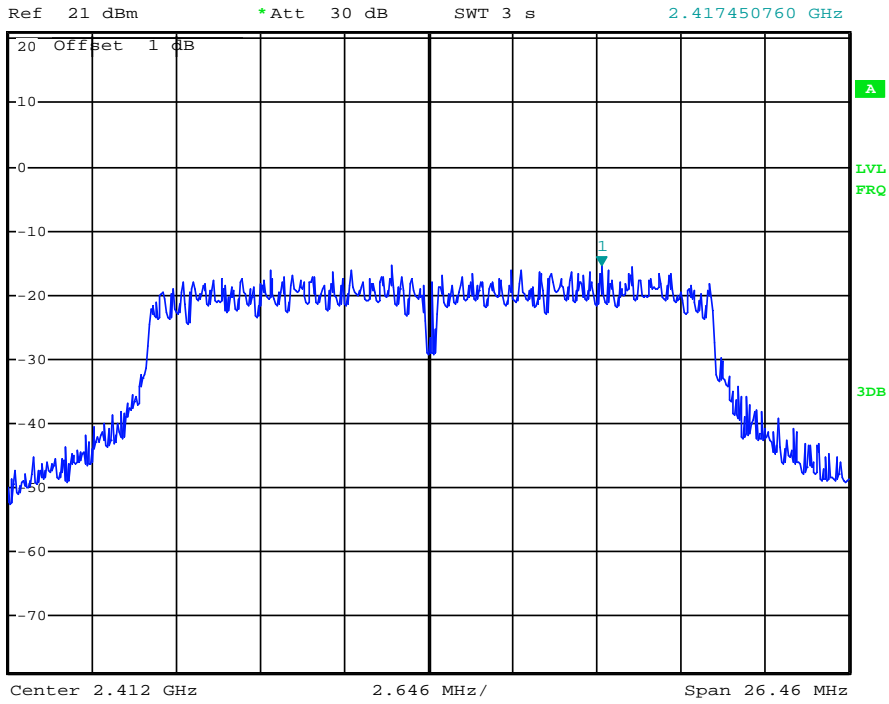
Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-15.23	Plot 4.4.3 A	8	PASS
6	2437	-15.43	Plot 4.4.3 B	8	PASS
11	2462	-15.18	Plot 4.4.3 C	8	PASS

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 lose.

B. Test Plots



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -15.32 dBm
SWT 3 s 2.417450760 GHz

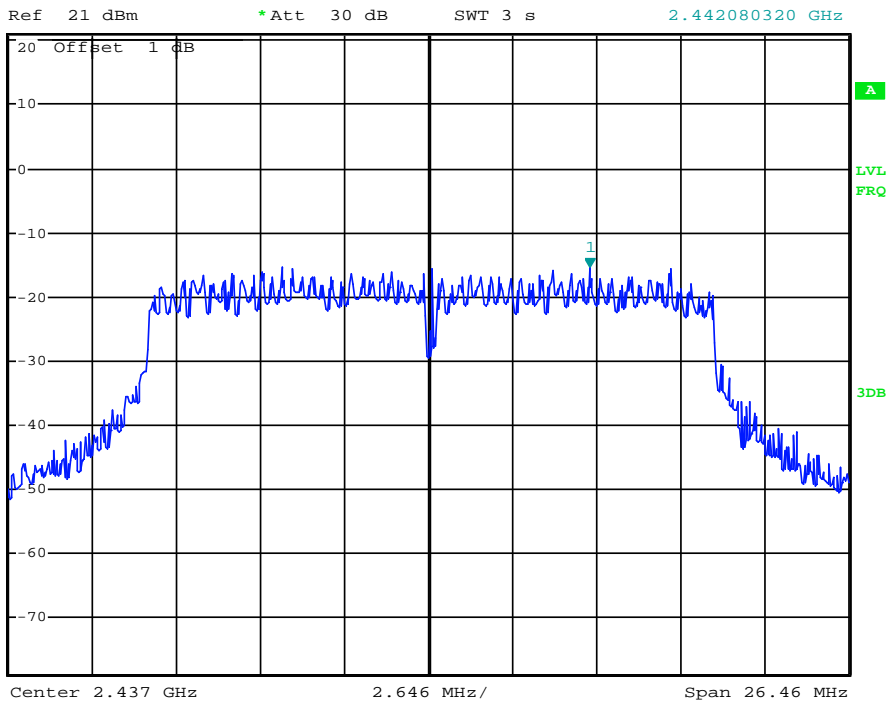


Date: 11.OCT.2013 16:18:31

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



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -15.43 dBm
SWT 3 s 2.442080320 GHz

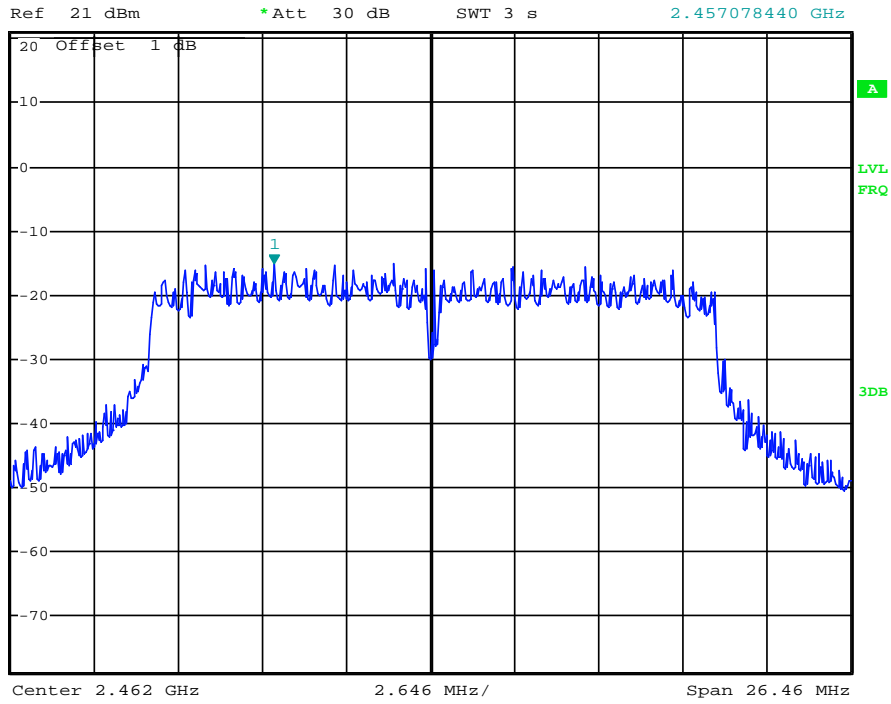


Date: 11.OCT.2013 16:19:28

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



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -15.18 dBm
SWT 3 s 2.457078440 GHz



Date: 11.OCT.2013 16:17:51

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

4.5. Band Edge Compliance of RF Emission

TEST REQUIREMENT

According to FCC Part 15 15.247 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)).

According to RSS-210 Annex 8 A8.5: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

TEST PROCEDURE

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

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

where:

E = electric field strength in dB 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

1. Below -20dB of the highest emission level in operating band.
2. Radiated emissions which fall in the restricted bands, as defined in § 15.205(a) and RSS-Gen 7.2.2., must also comply with the radiated emission limits specified in § 15.209(a) for FCC and comply

with the radiated emission limits specified in RSS-Gen 7.2.5 for IC

TEST RESULTS

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

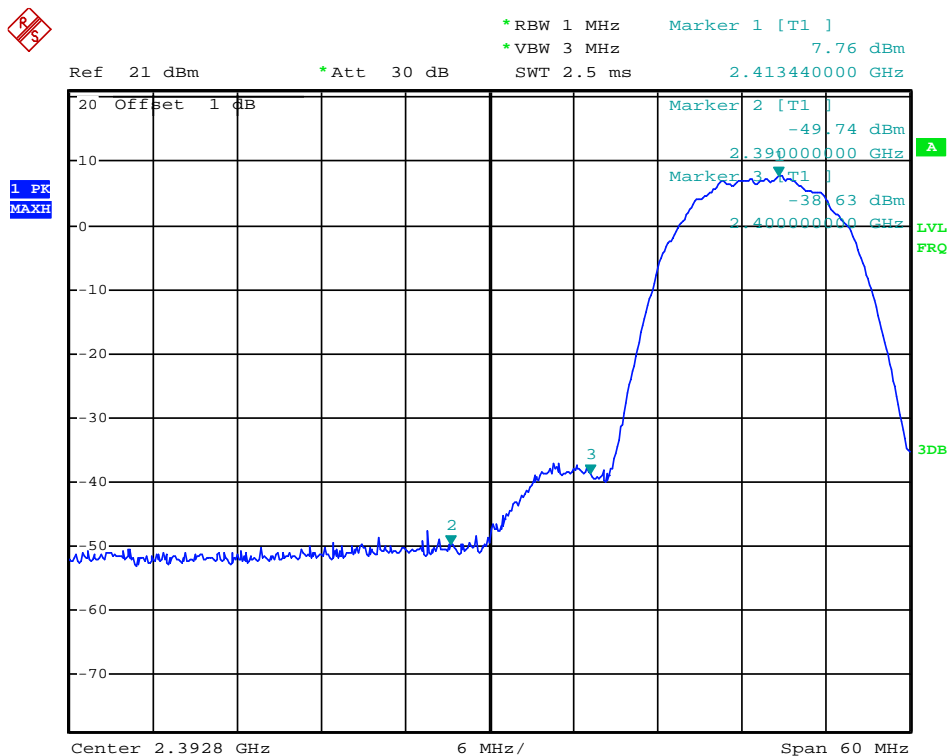
4.5.1 802.11b Test Mode

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	-49.74	0.08	0.00	45.60	Peak	74.00	Plot 4.5.1 A1
2390.00	-61.35	0.08	0.00	33.99	AV	54.00	Plot 4.5.1 A2
2413.44	7.76	0.08	0.00	103.10	Peak	---	Plot 4.5.1 A1
2413.44	-1.19	0.08	0.00	94.15	AV	---	Plot 4.5.1 A2
2463.44	8.46	0.08	0.00	103.80	Peak	---	Plot 4.5.1 A3
2461.28	-0.39	0.08	0.00	94.95	AV	---	Plot 4.5.1 A4
2483.50	-48.47	0.08	0.00	46.87	Peak	74.00	Plot 4.5.1 A3
2483.50	-59.85	0.08	0.00	35.49	AV	54.00	Plot 4.5.1 A4

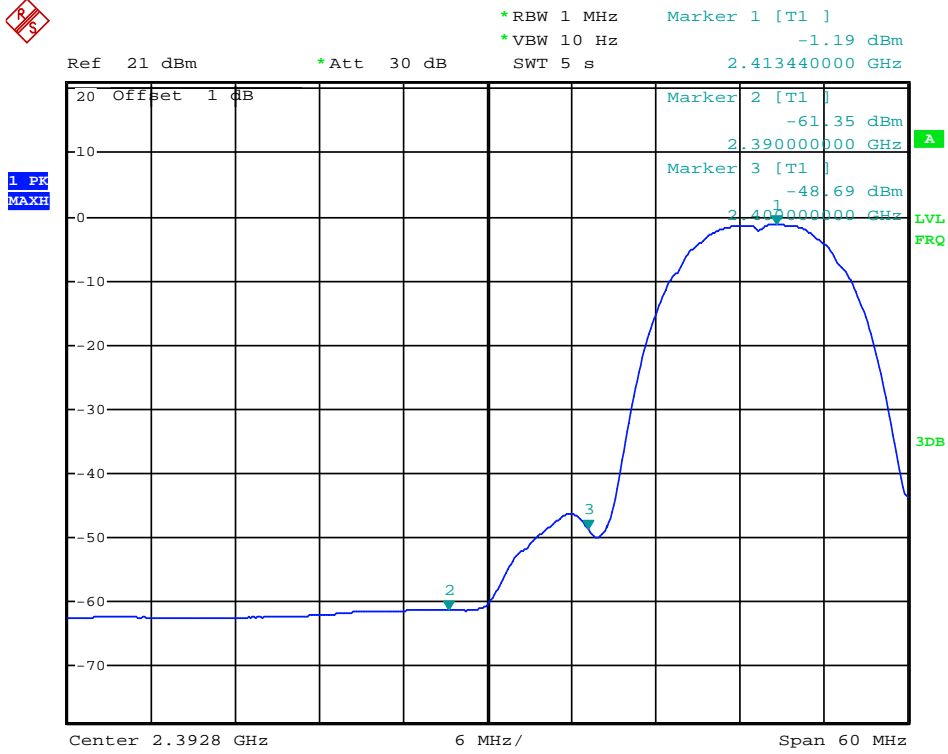
- Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
 2. The test results including the cable lose.
 3. "---" means that the fundamental frequency not for 15.209 and RSS-Gen 7.2.5 limits requirement.

B. Test Plots



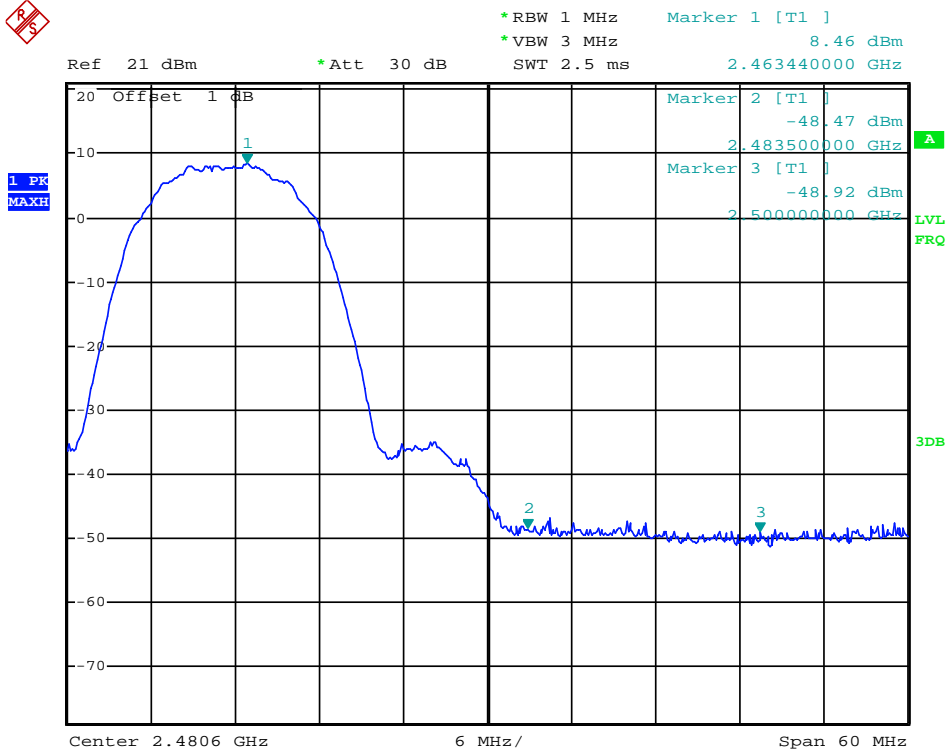
Date: 11.OCT.2013 15:04:53

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



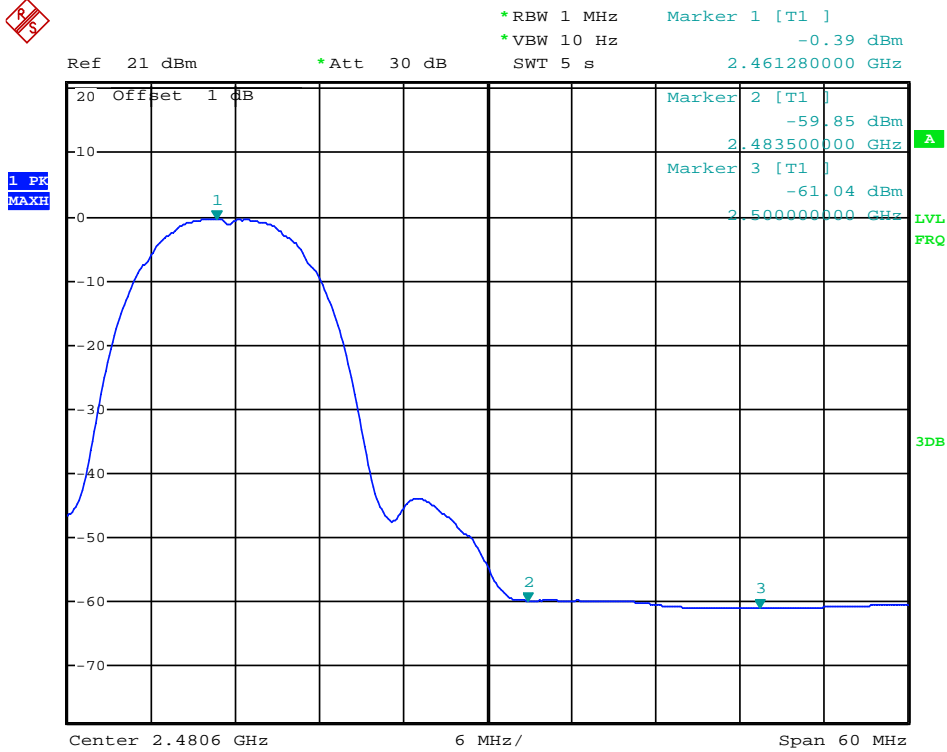
Date: 11.OCT.2013 15:05:14

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



Date: 11.OCT.2013 15:02:08

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



Date: 11.OCT.2013 15:02:33

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

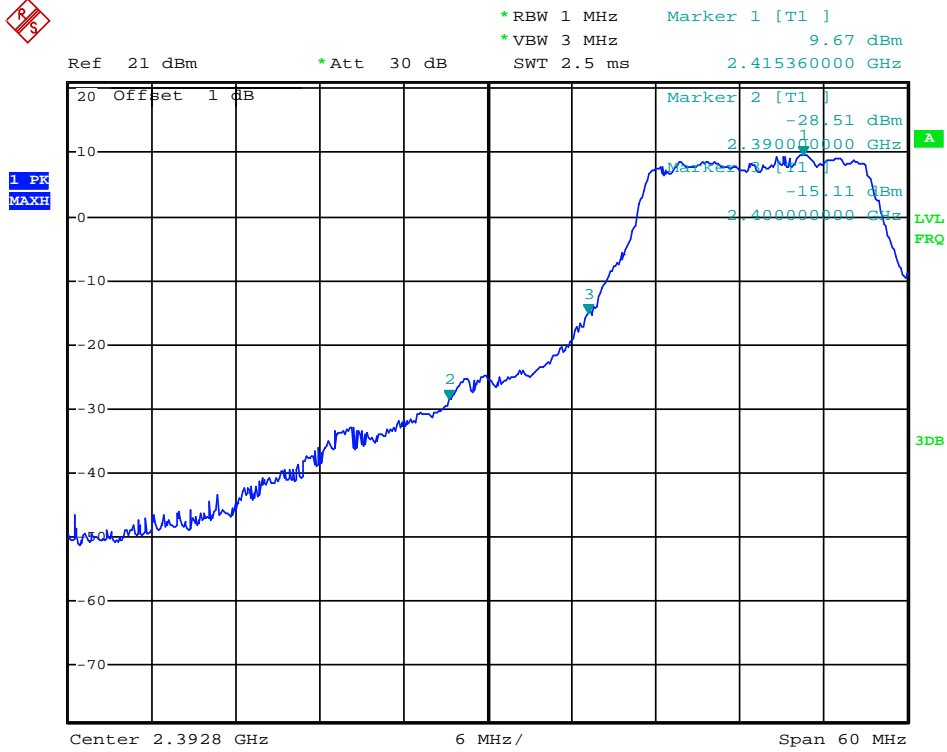
4.5.2 802.11g Test Mode

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	-28.51	0.08	0.00	66.83	Peak	74.00	Plot 4.5.2 A1
2390.00	-47.92	0.08	0.00	47.42	AV	54.00	Plot 4.5.2 A2
2415.36	9.67	0.08	0.00	105.01	Peak	---	Plot 4.5.2 A1
2415.84	-7.77	0.08	0.00	87.57	AV	---	Plot 4.5.2 A2
2463.80	9.26	0.08	0.00	104.60	Peak	---	Plot 4.5.2 A3
2456.84	-8.08	0.08	0.00	87.26	AV	---	Plot 4.5.2 A4
2483.50	-29.89	0.08	0.00	65.45	Peak	74.00	Plot 4.5.2 A3
2483.50	-47.26	0.08	0.00	48.08	AV	54.00	Plot 4.5.2 A4

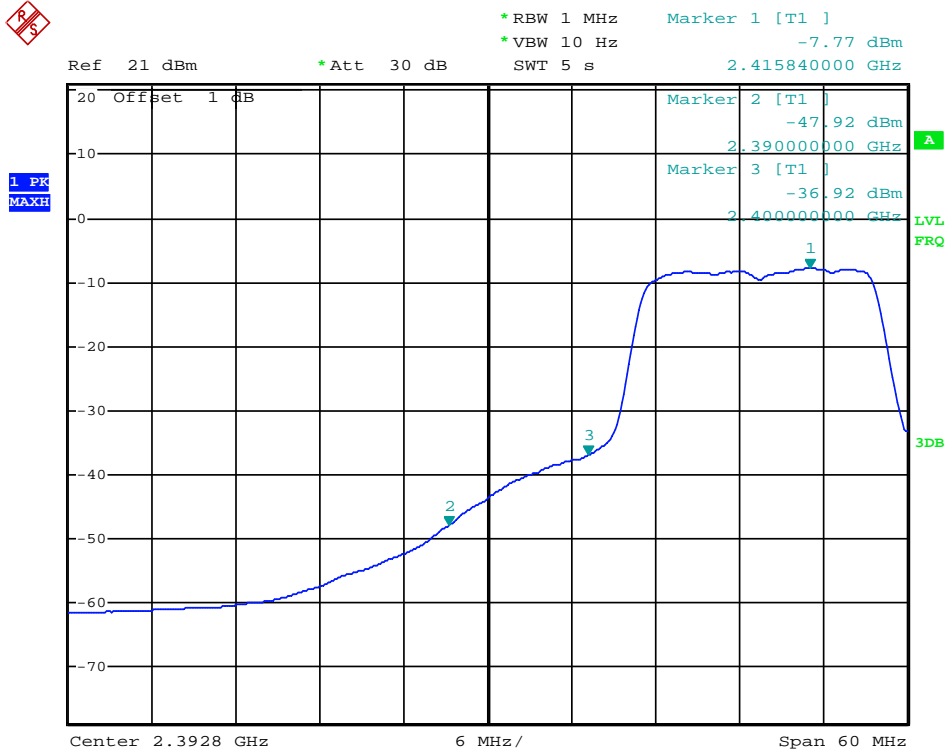
- Note:
1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable lose.
 3. "---" means that the fundamental frequency not for 15.209 and RSS-Gen 7.2.5 limits requirement.

B. Test Plots



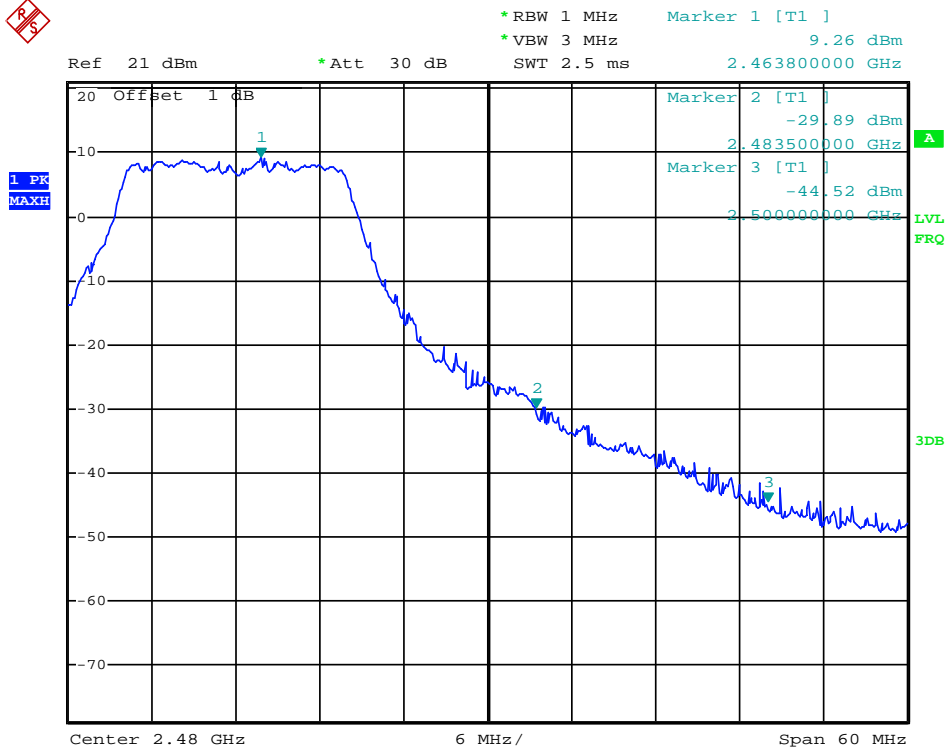
Date: 11.OCT.2013 15:27:02

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



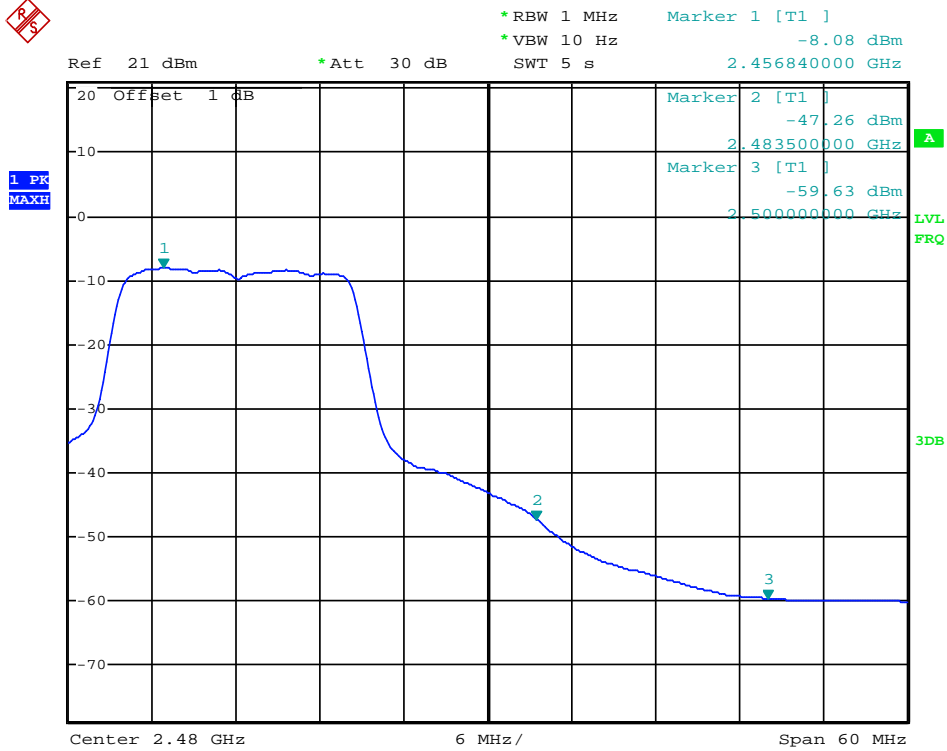
Date: 11.OCT.2013 15:27:23

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



Date: 11.OCT.2013 15:30:01

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



Date: 11.OCT.2013 15:30:25

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

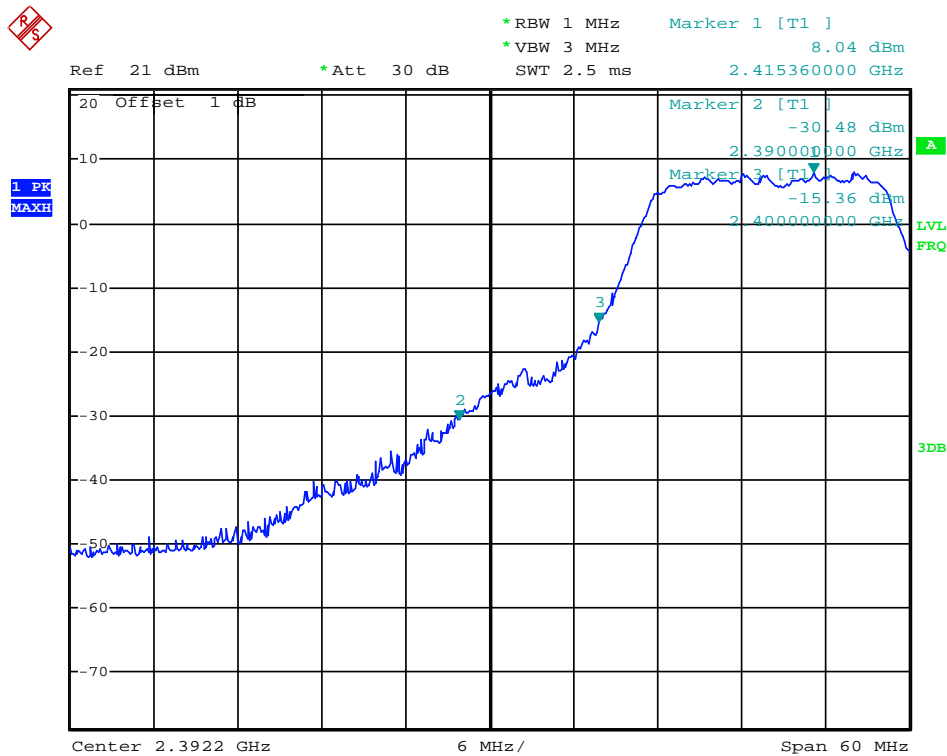
4.5.3 802.11n(20MHz) Test Mode

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	-30.48	0.08	0.00	64.86	Peak	74.00	Plot 4.5.3 A1
2390.00	-47.09	0.08	0.00	48.25	AV	54.00	Plot 4.5.3 A2
2415.36	8.04	0.08	0.00	103.38	Peak	---	Plot 4.5.3 A1
2417.04	-5.04	0.08	0.00	90.30	AV	---	Plot 4.5.3 A2
2460.20	8.25	0.08	0.00	103.59	Peak	---	Plot 4.5.3 A3
2456.72	-4.55	0.08	0.00	90.79	AV	---	Plot 4.5.3 A4
2483.50	-28.94	0.08	0.00	66.40	Peak	74.00	Plot 4.5.3 A3
2483.50	-45.05	0.08	0.00	50.29	AV	54.00	Plot 4.5.3 A4

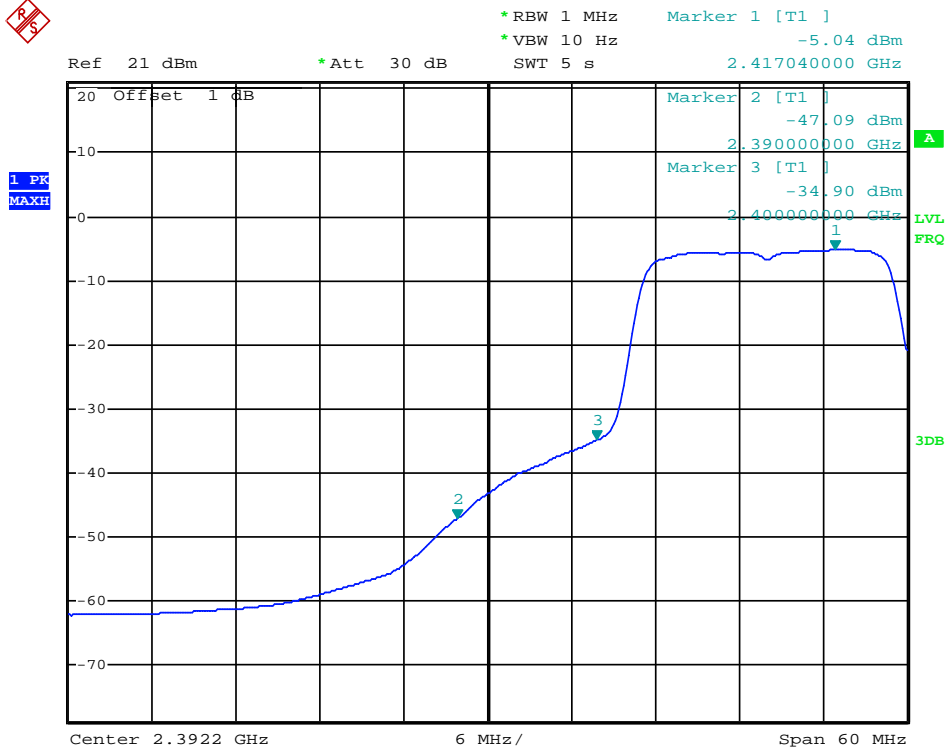
- Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable lose.
 3. "----" means that the fundamental frequency not for 15.209 and RSS-Gen 7.2.5 limits requirement.

B. Test Plots



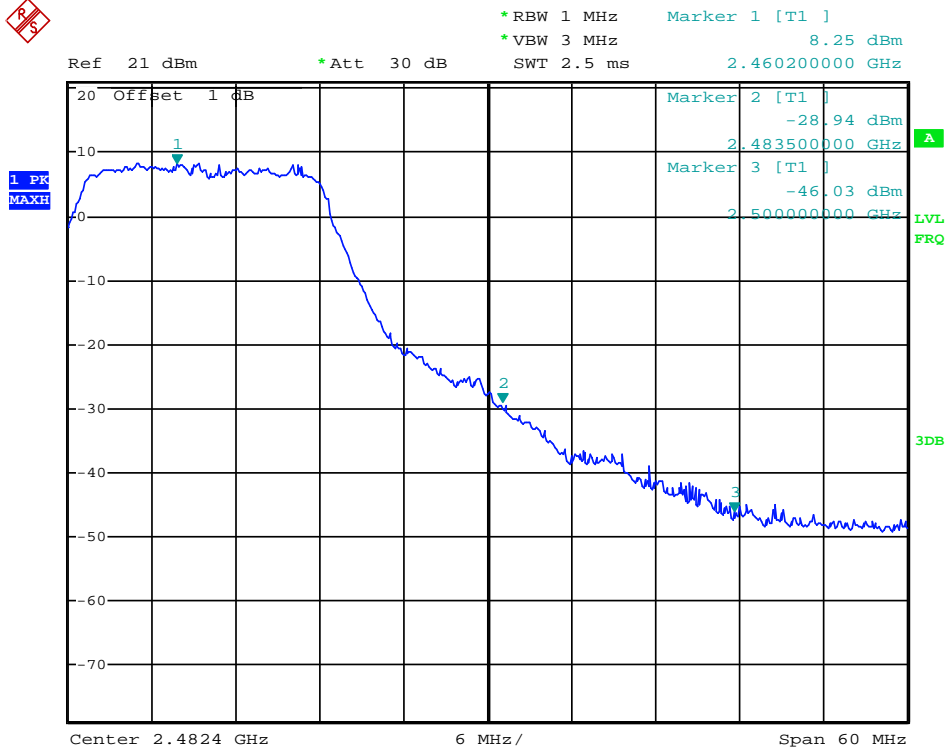
Date: 11.OCT.2013 16:47:06

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



Date: 11.OCT.2013 16:47:26

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

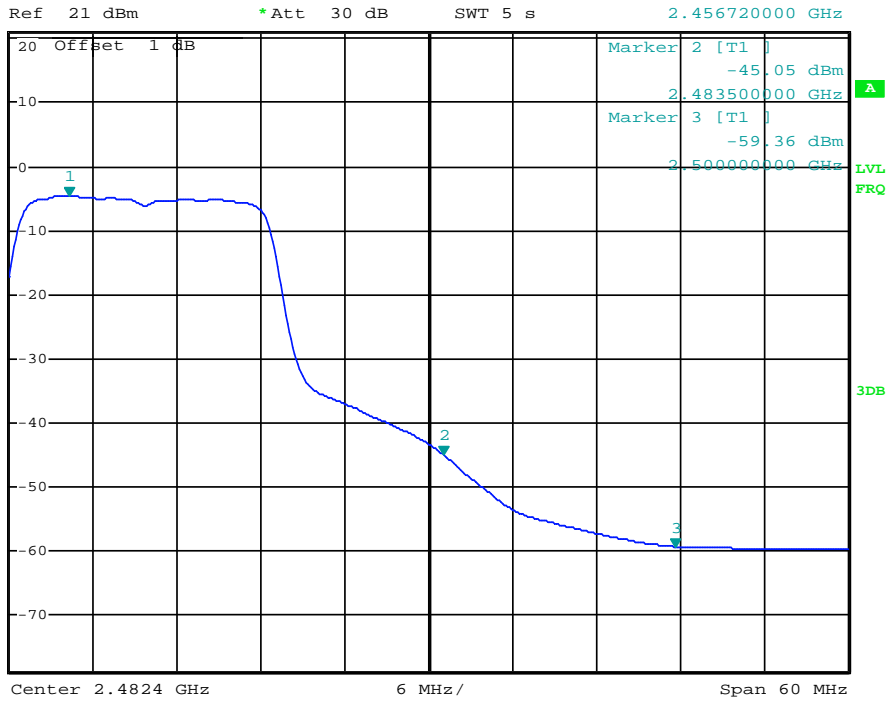


Date: 11.OCT.2013 16:40:33

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



*RBW 1 MHz Marker 1 [T1]
*VBW 10 Hz -4.55 dBm
SWT 5 s 2.456720000 GHz

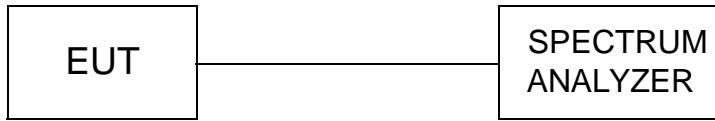


Date: 11.OCT.2013 16:40:55

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

4.6. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

According to RSS-210 Annex 8 A8.5 and FCC Part 15 15.247 requirement: 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 for FCC.
3. Fall in the restricted bands listed in RSS-Gen Table 3. The maximum permitted average field strength is listed in RSS-Gen 7.2.5 for IC

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

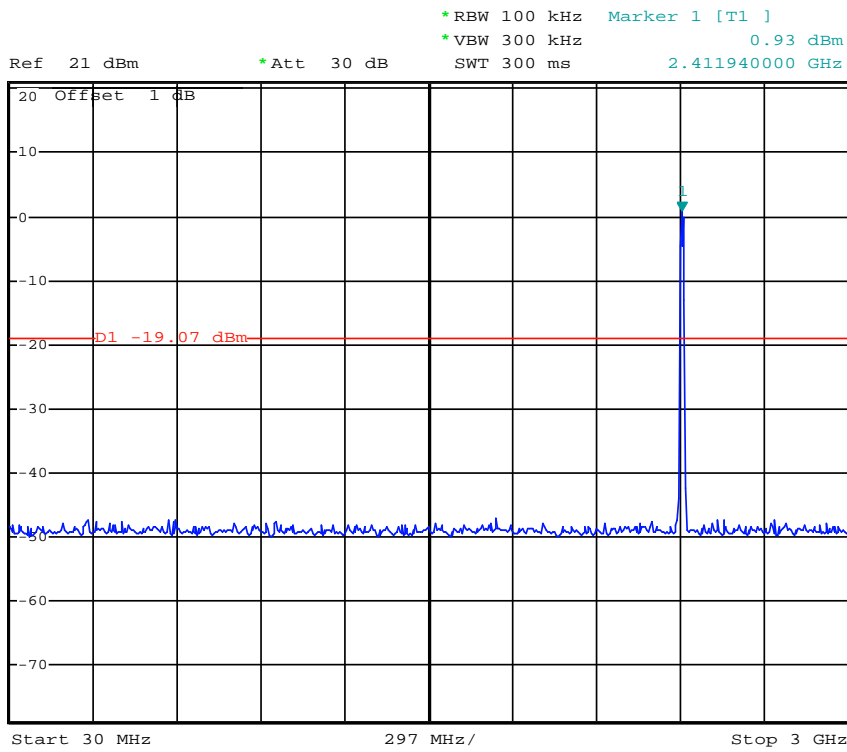
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-3GHz	Plot 4.6.1 A1	-20	PASS
		3GHz-15GHz	Plot 4.6.1 A2	-20	PASS
		15GHz-25GHz	Plot 4.6.1 A3	-20	PASS
6	2437	30MHz-3GHz	Plot 4.6.1 B1	-20	PASS
		3GHz-15GHz	Plot 4.6.1 B2	-20	PASS
		15GHz-25GHz	Plot 4.6.1 B3	-20	PASS
11	2462	30MHz-3GHz	Plot 4.6.1 C1	-20	PASS
		3GHz-15GHz	Plot 4.6.1 C2	-20	PASS
		15GHz-25GHz	Plot 4.6.1 C3	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-50.68	Peak	-20	Plot 4.6.1 D	PASS
2483.50	-50.67	Peak	-20	Plot 4.6.1 E	PASS

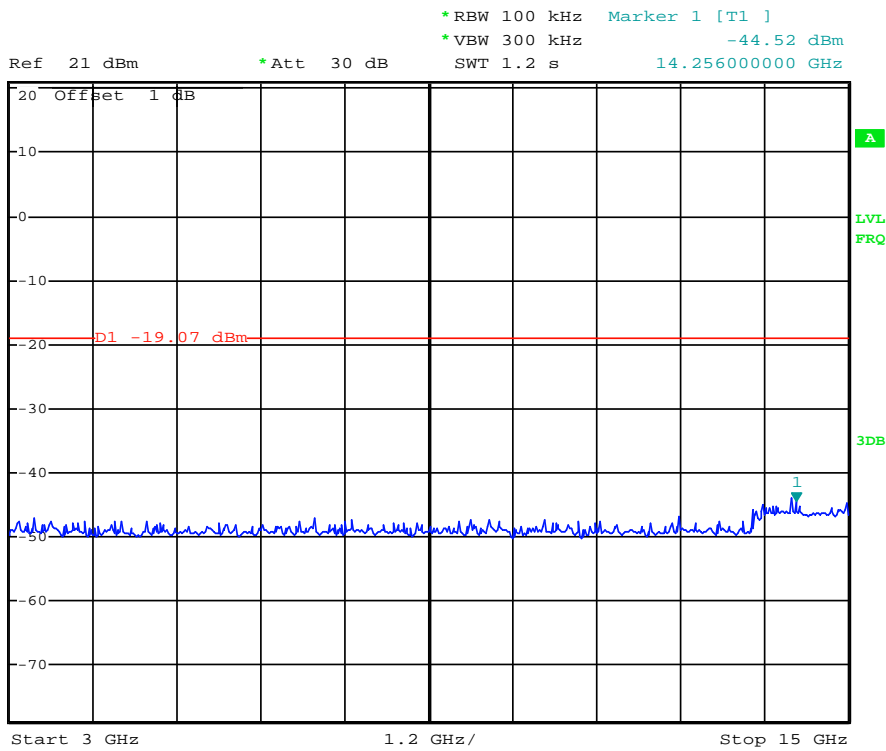
- Note: 1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

B. Test Plots



Date: 11.OCT.2013 14:41:52

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

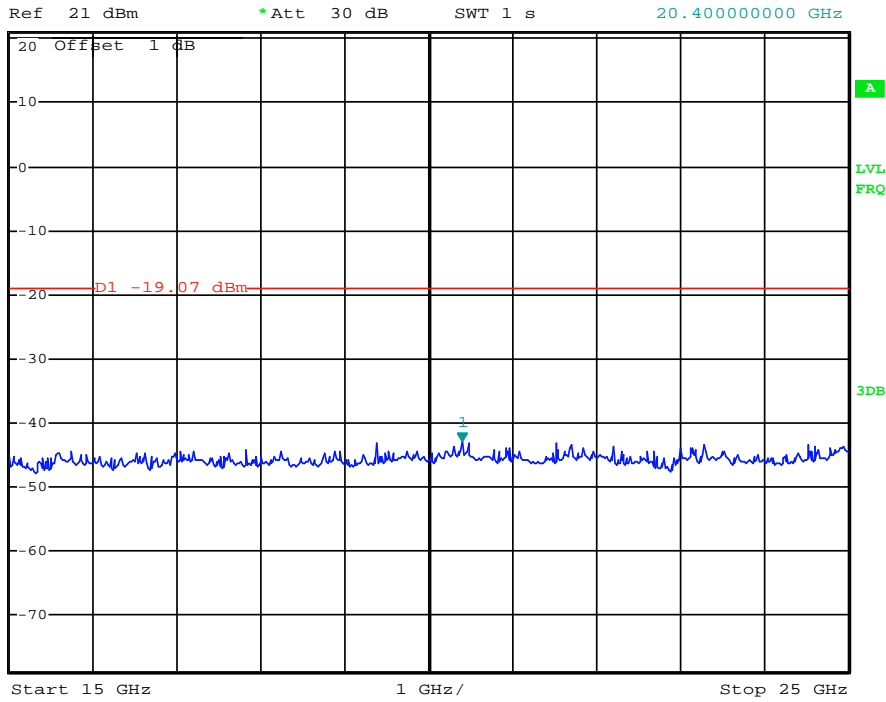


Date: 11.OCT.2013 14:42:21

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



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -42.99 dBm
SWT 1 s 20.40000000 GHz

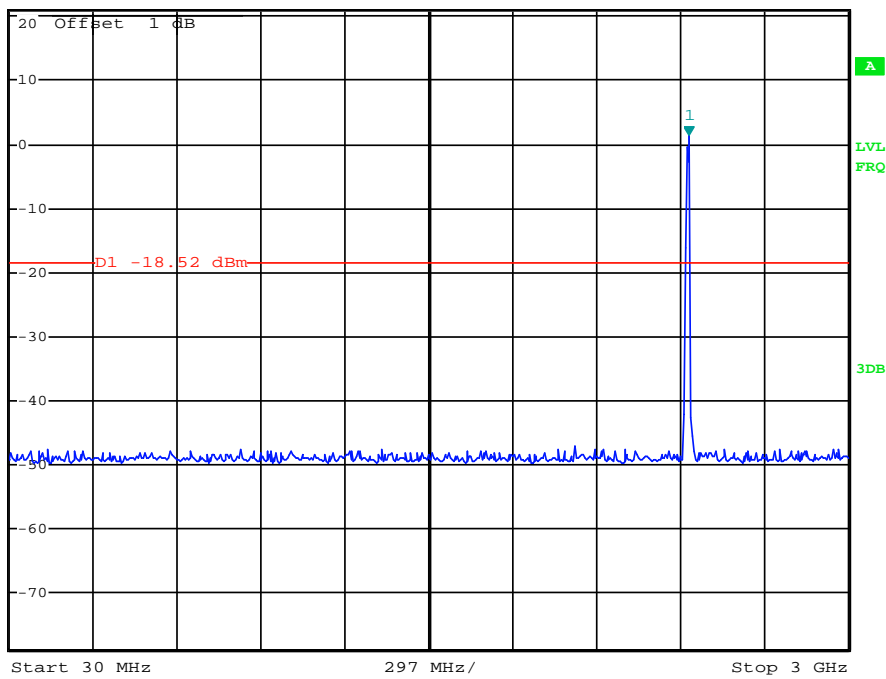


Date: 11.OCT.2013 14:42:43

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



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz 1.48 dBm
SWT 300 ms 2.43570000 GHz

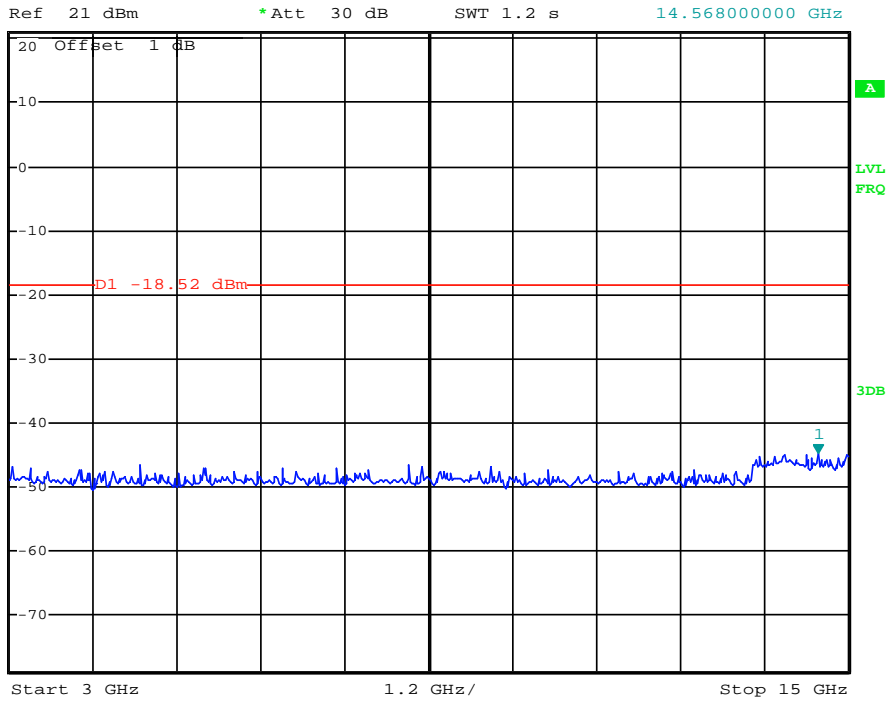


Date: 11.OCT.2013 14:44:40

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



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -44.71 dBm
SWT 1.2 s 14.568000000 GHz

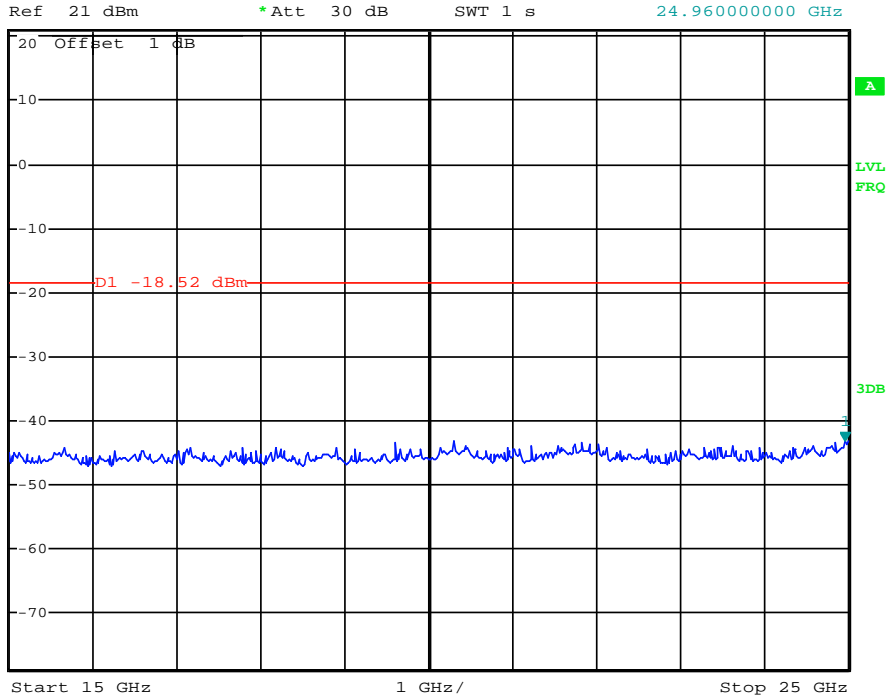


Date: 11.OCT.2013 14:45:16

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

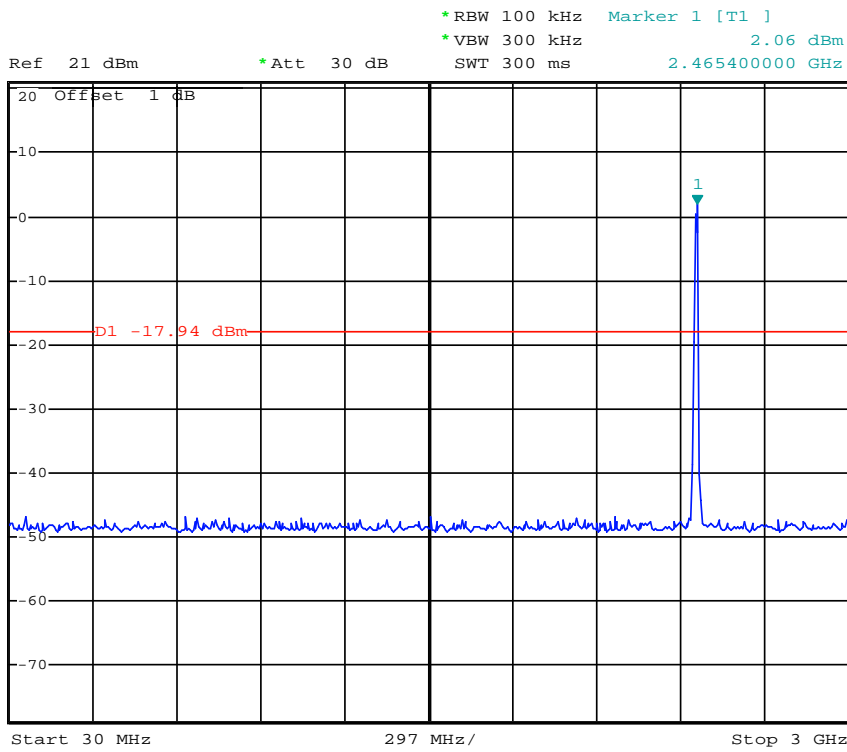


*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -43.05 dBm
SWT 1 s 24.960000000 GHz



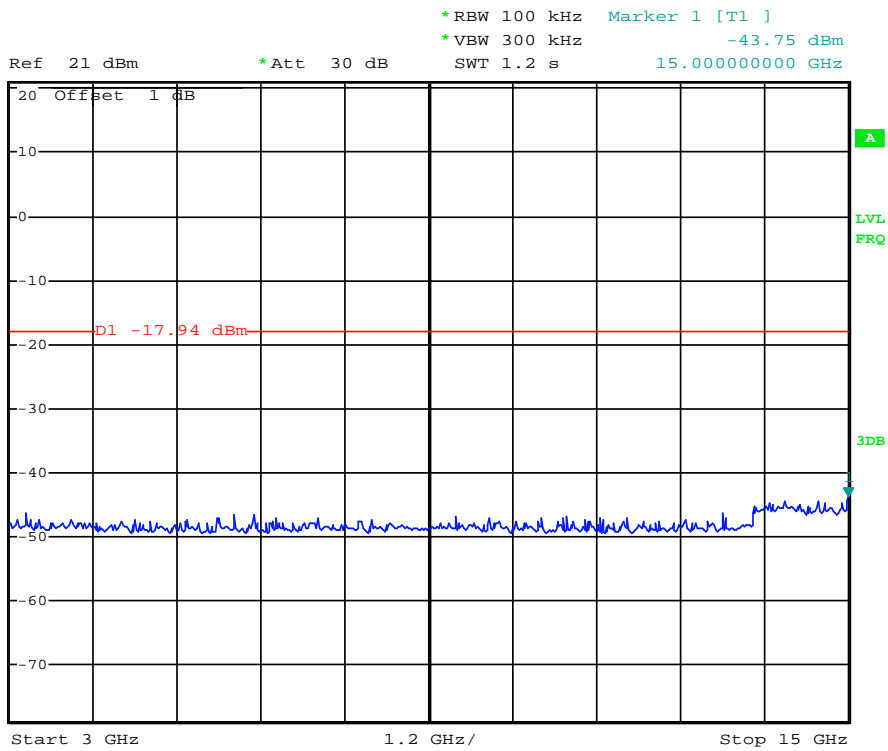
Date: 11.OCT.2013 14:45:45

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



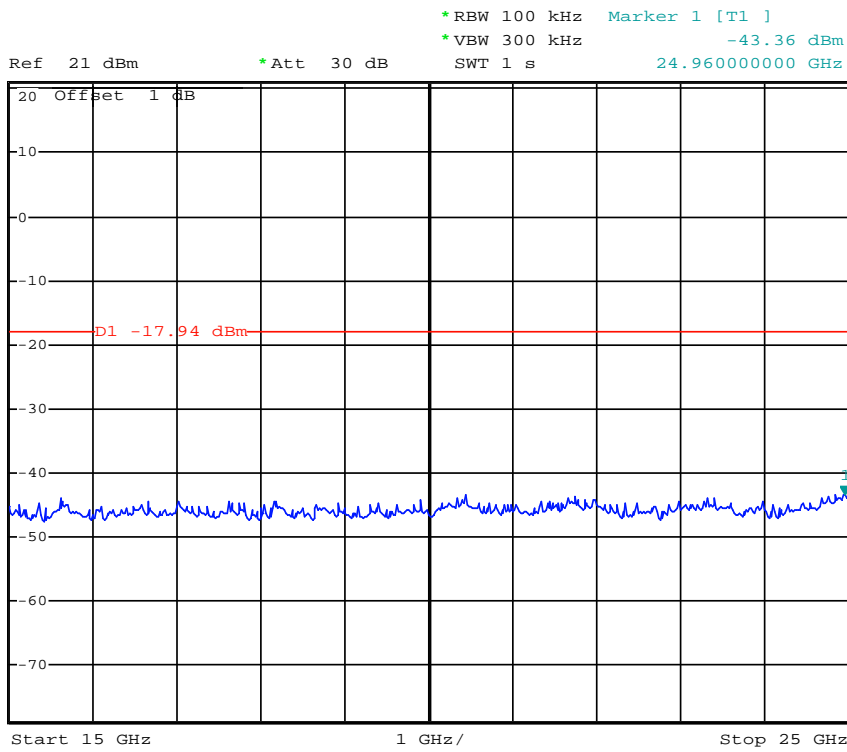
Date: 11.OCT.2013 14:37:07

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



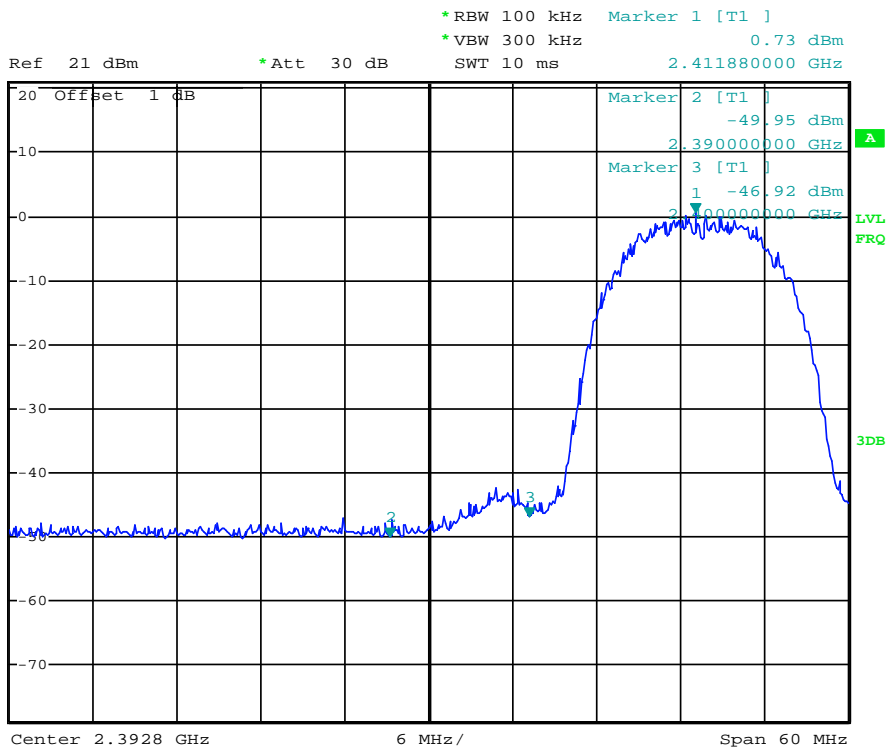
Date: 11.OCT.2013 14:39:58

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



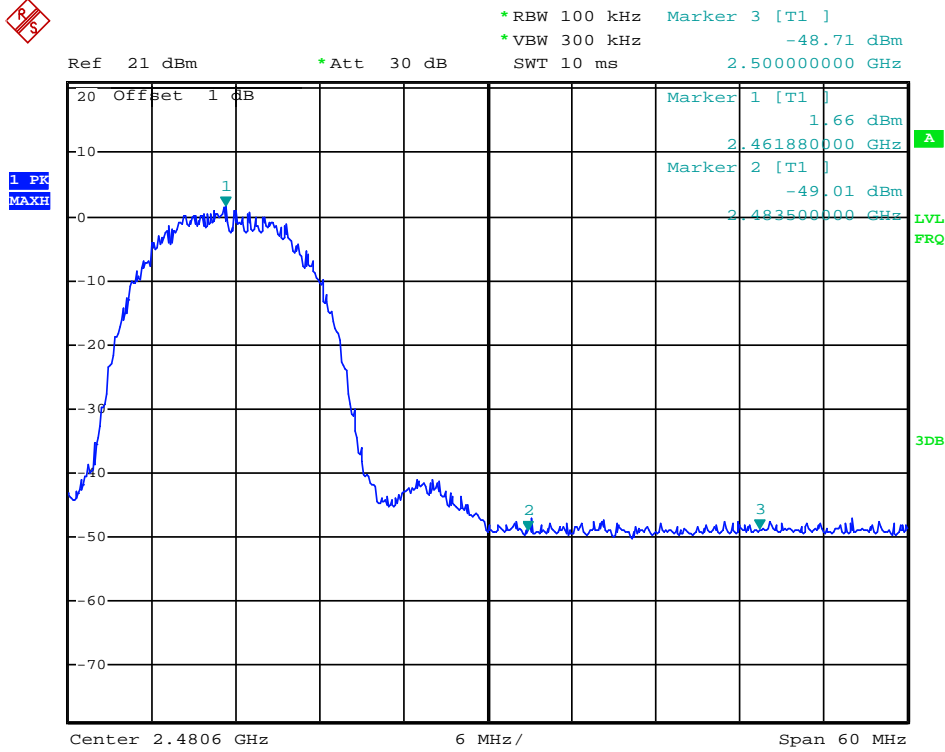
Date: 11.OCT.2013 14:40:19

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



Date: 11.OCT.2013 15:04:27

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



Date: 11.OCT.2013 15:01:42

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

4.6.2 802.11g Test Mode

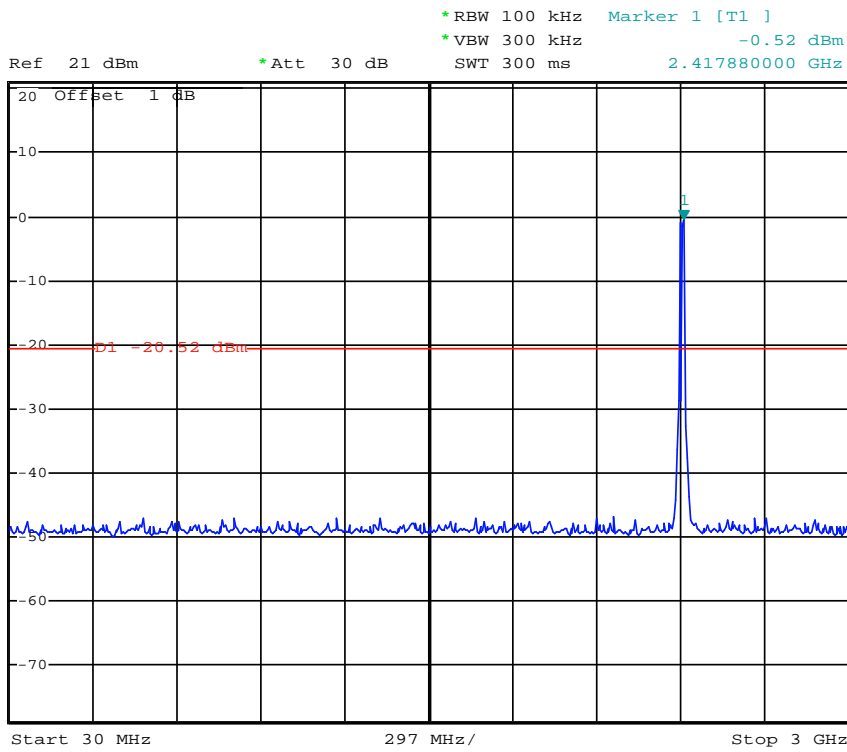
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-3GHz	Plot 4.6.2 A1	-20	PASS
		3GHz-15GHz	Plot 4.6.2 A2	-20	PASS
		15GHz-25GHz	Plot 4.6.2 A3	-20	PASS
6	2437	30MHz-3GHz	Plot 4.6.2 B1	-20	PASS
		3GHz-15GHz	Plot 4.6.2 B2	-20	PASS
		15GHz-25GHz	Plot 4.6.2 B3	-20	PASS
11	2462	30MHz-3GHz	Plot 4.6.2 C1	-20	PASS
		3GHz-15GHz	Plot 4.6.2 C2	-20	PASS
		15GHz-25GHz	Plot 4.6.2 C3	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-41.80	Peak	-20	Plot 4.6.2 D	PASS
2483.50	-42.80	Peak	-20	Plot 4.6.2 E	PASS

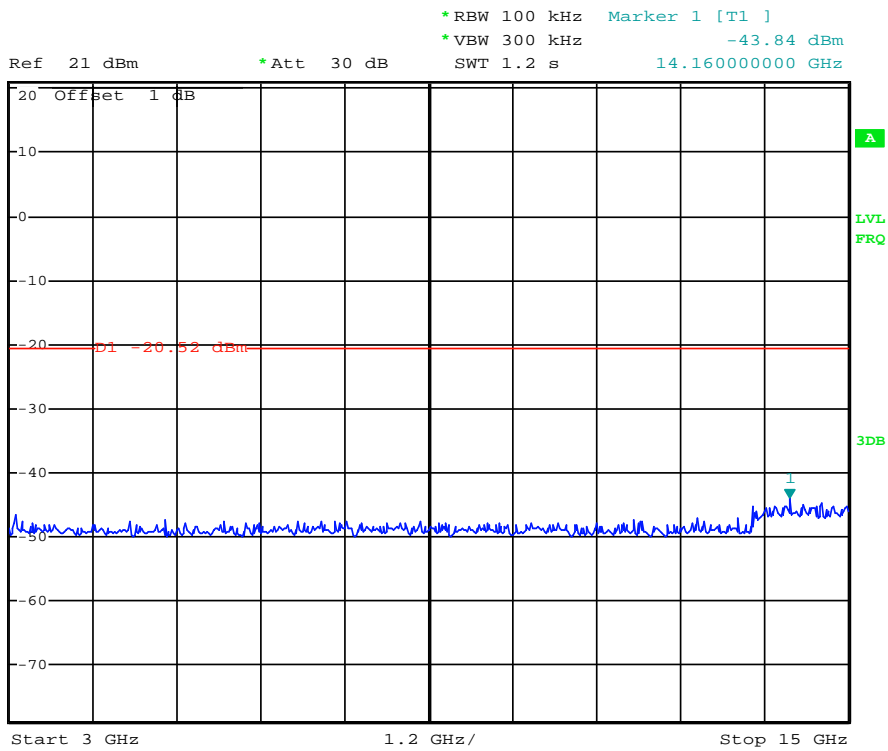
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable lose.

B. Test Plots



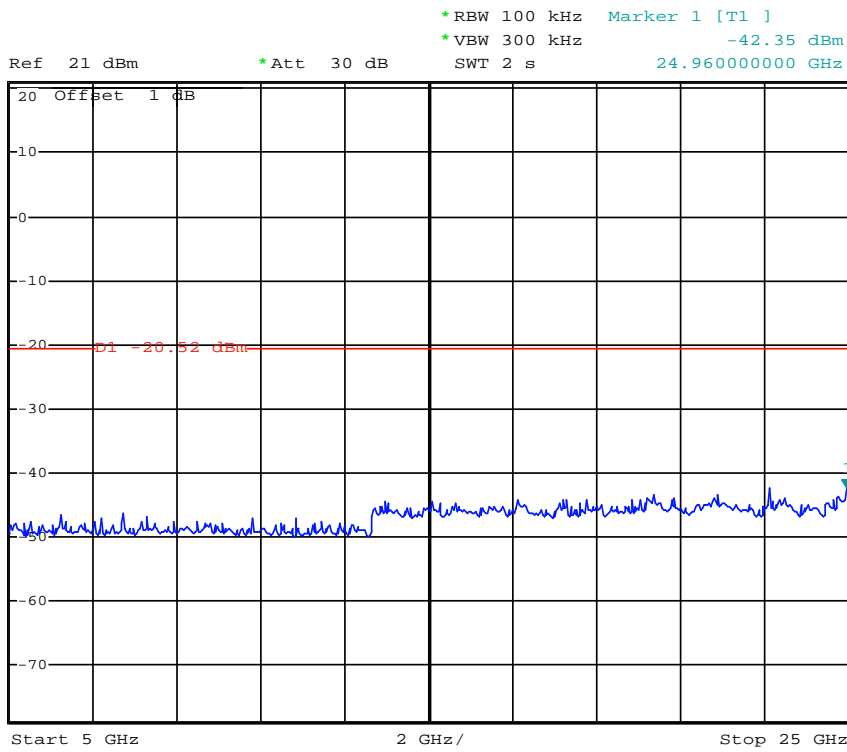
Date: 11.OCT.2013 15:37:25

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



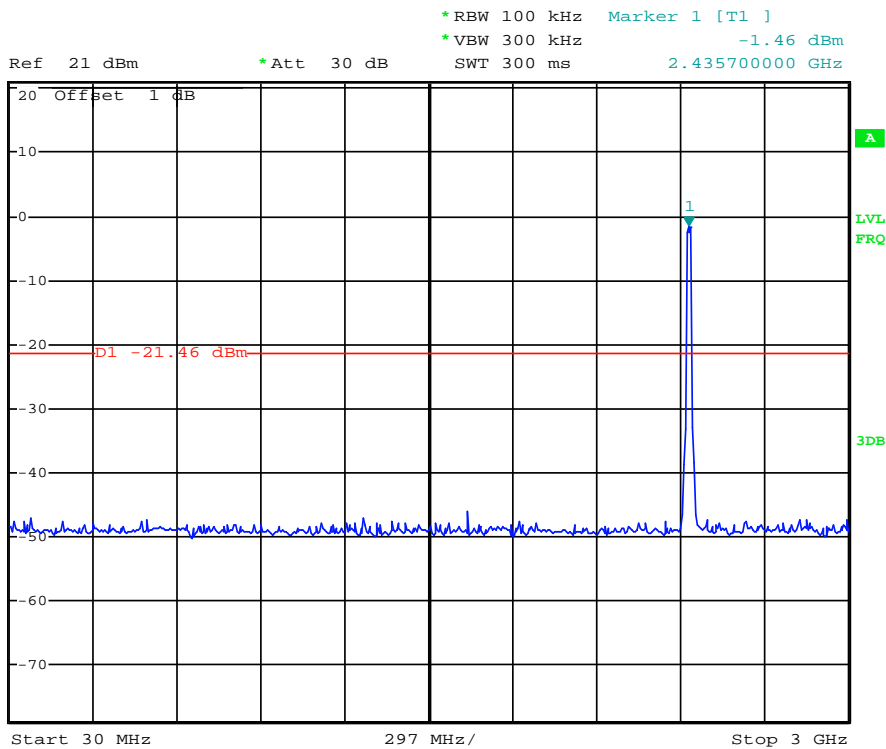
Date: 11.OCT.2013 15:38:01

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



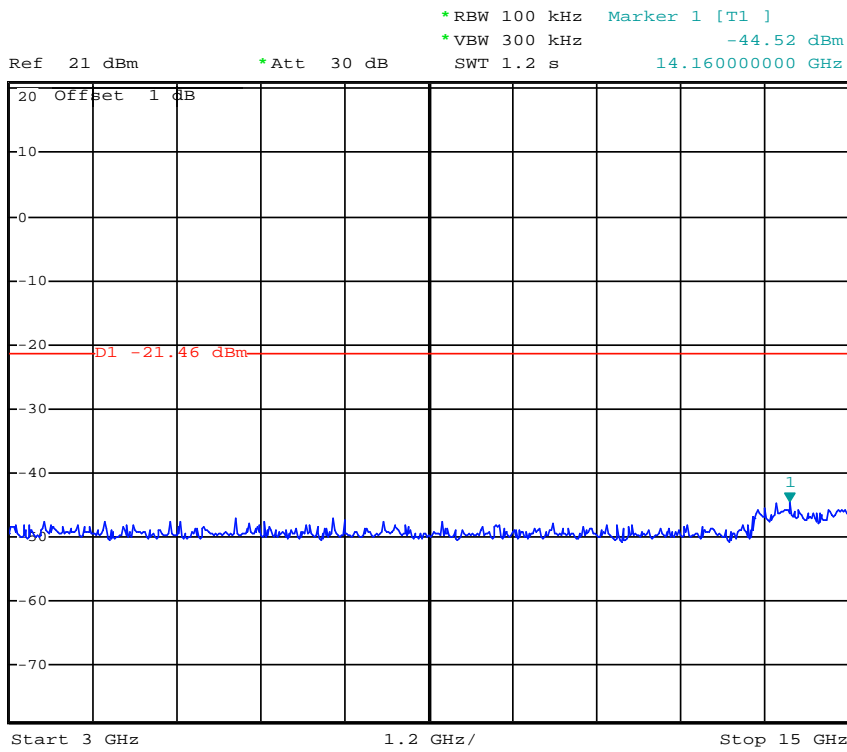
Date: 11.OCT.2013 15:38:53

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



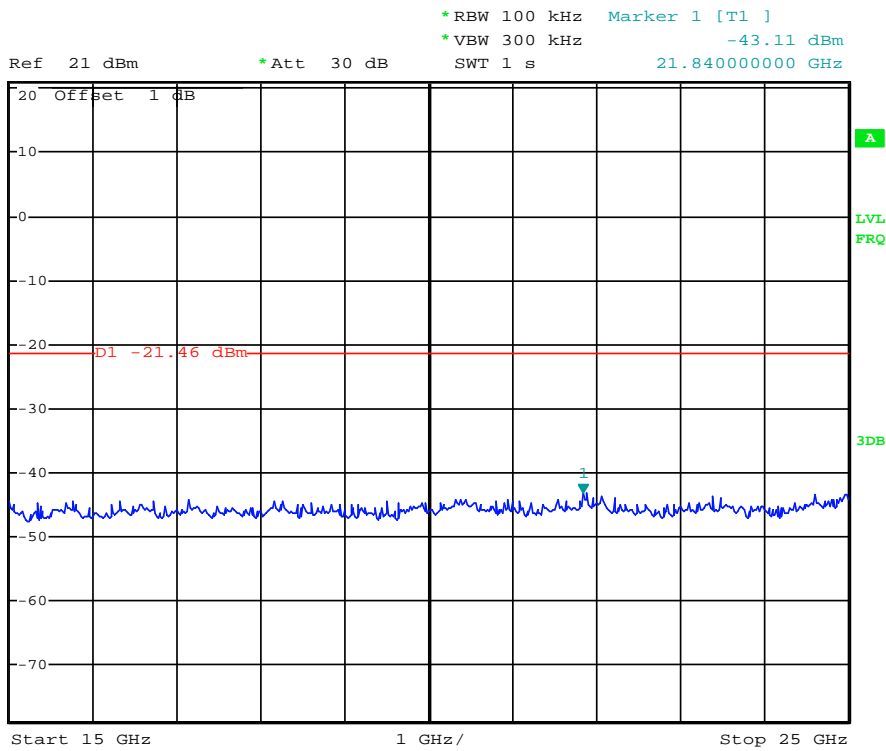
Date: 11.OCT.2013 15:41:22

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



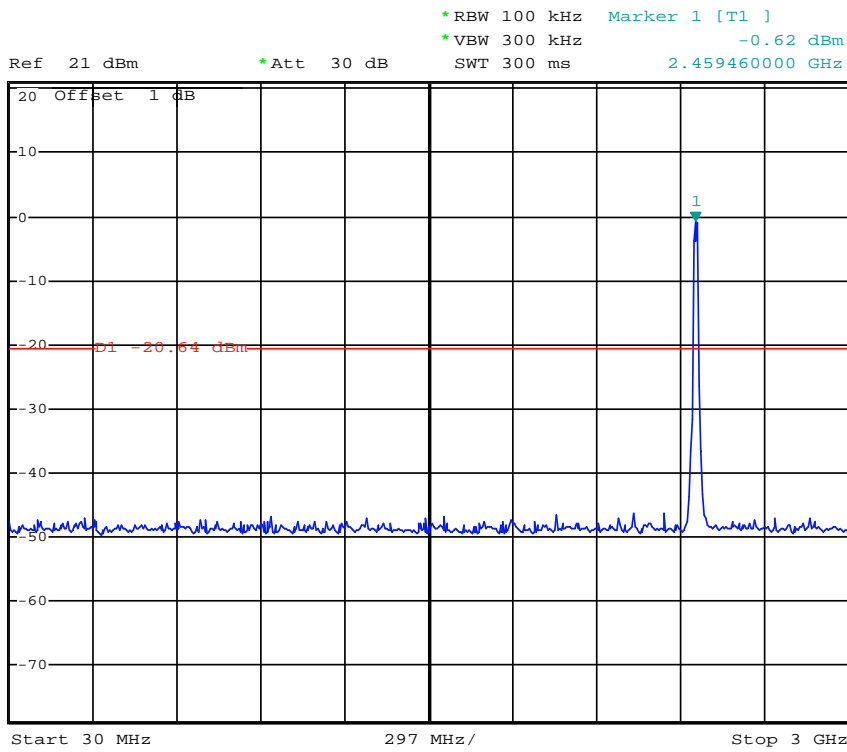
Date: 11.OCT.2013 15:41:42

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



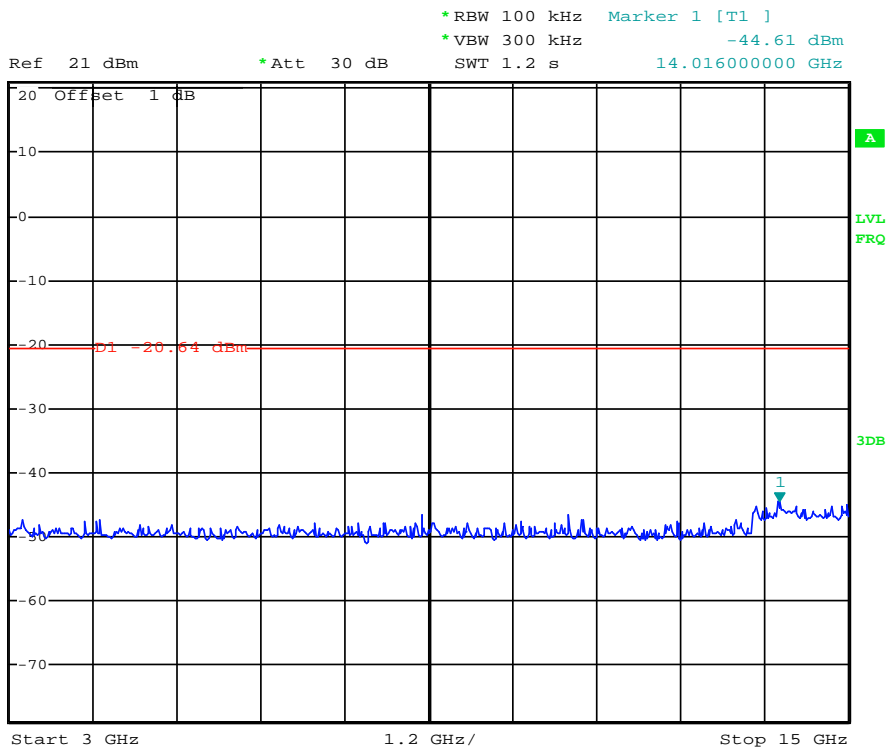
Date: 11.OCT.2013 15:42:04

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



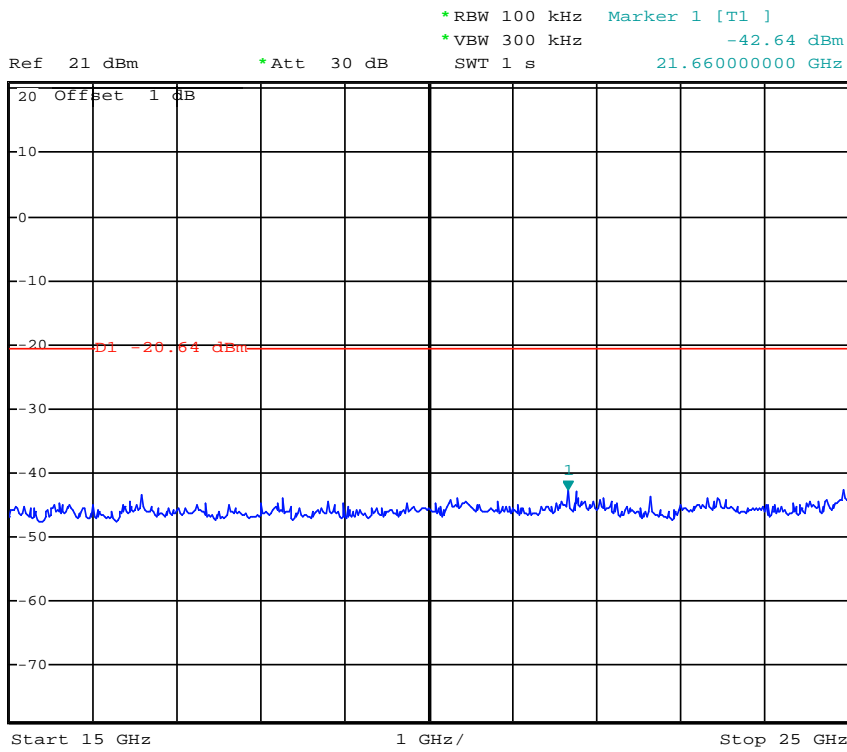
Date: 11.OCT.2013 15:34:34

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



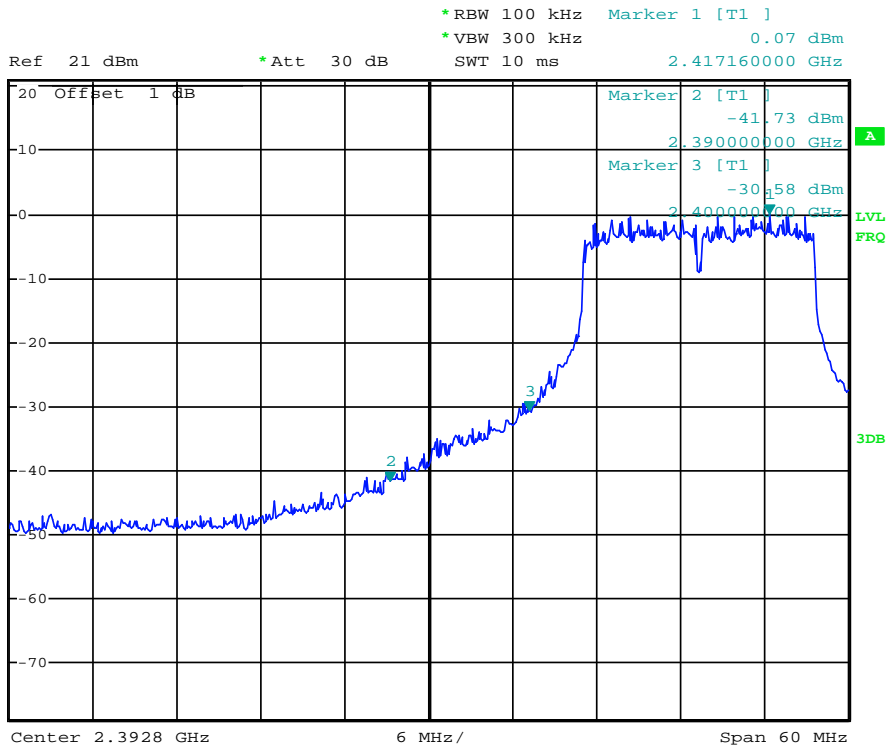
Date: 11.OCT.2013 15:34:59

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



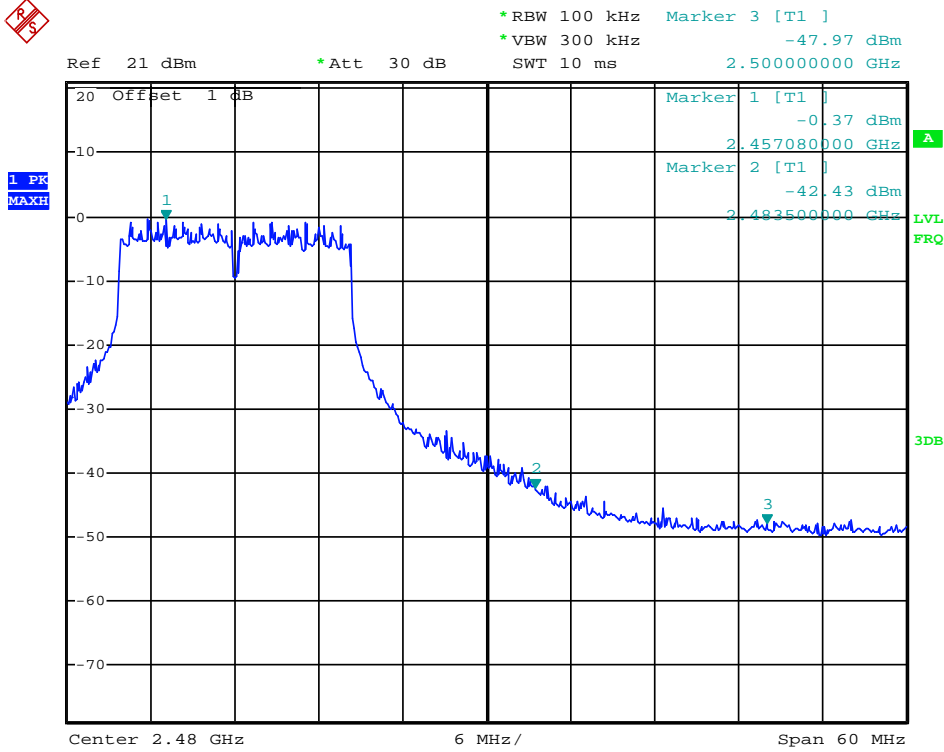
Date: 11.OCT.2013 15:35:23

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



Date: 11.OCT.2013 15:26:40

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



Date: 11.OCT.2013 15:29:24

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

4.6.3 802.11n(20MHz) Test Mode

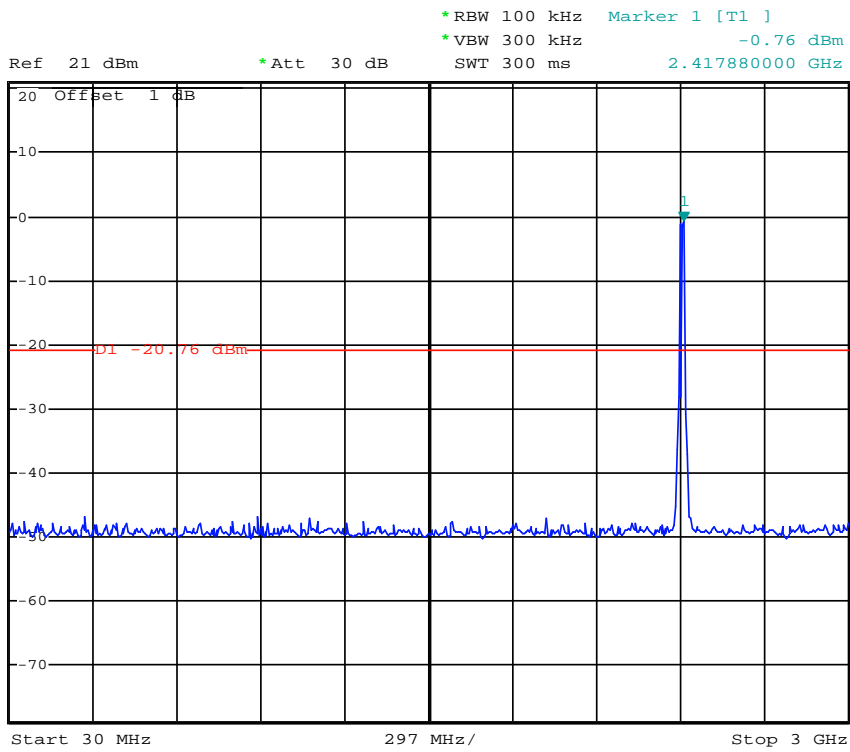
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	30MHz-3GHz	Plot 4.6.3 A1	-20	PASS
		3GHz-15GHz	Plot 4.6.3 A2	-20	PASS
		15GHz-25GHz	Plot 4.6.3 A3	-20	PASS
6	2437	30MHz-3GHz	Plot 4.6.3 B1	-20	PASS
		3GHz-15GHz	Plot 4.6.3 B2	-20	PASS
		15GHz-25GHz	Plot 4.6.3 B3	-20	PASS
11	2462	30MHz-3GHz	Plot 4.6.3 C1	-20	PASS
		3GHz-15GHz	Plot 4.6.3 C2	-20	PASS
		15GHz-25GHz	Plot 4.6.3 C3	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-41.41	Peak	-20	Plot 4.6.3 D	PASS
2483.50	-42.27	Peak	-20	Plot 4.6.3 E	PASS

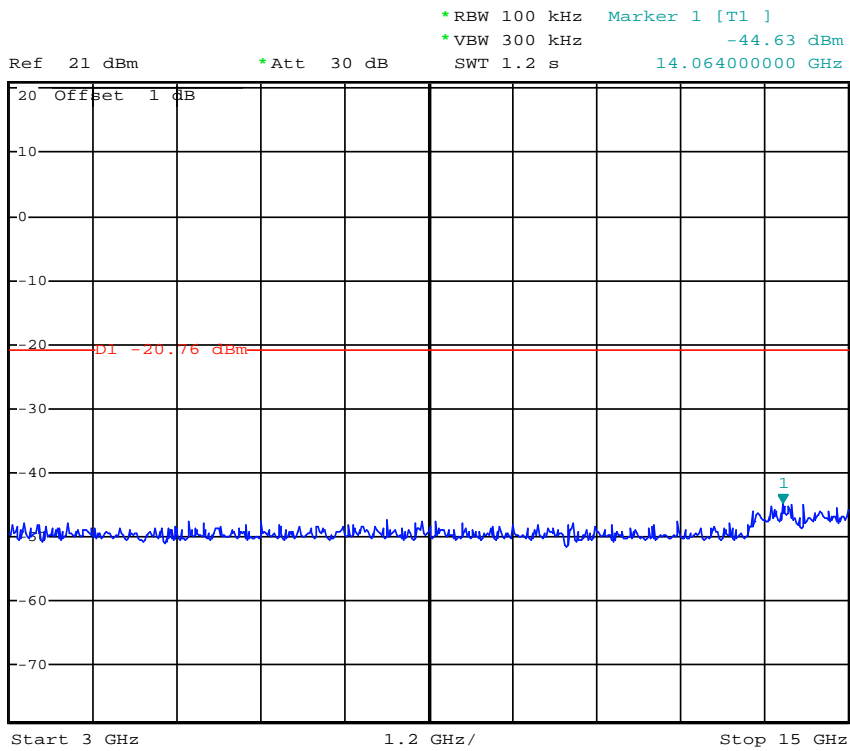
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable lose.

B. Test Plots



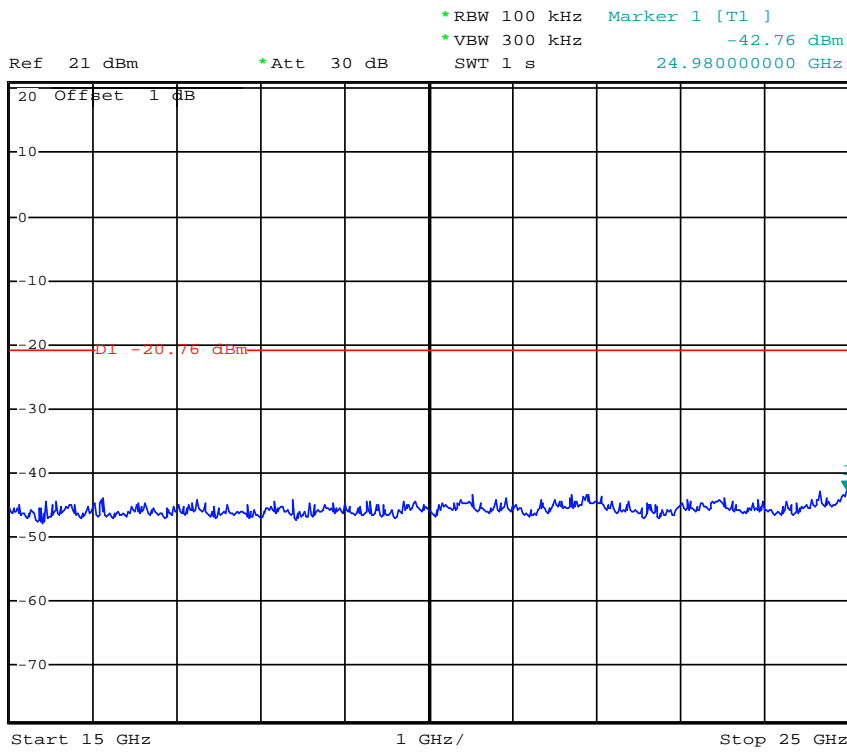
Date: 11.OCT.2013 16:34:42

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



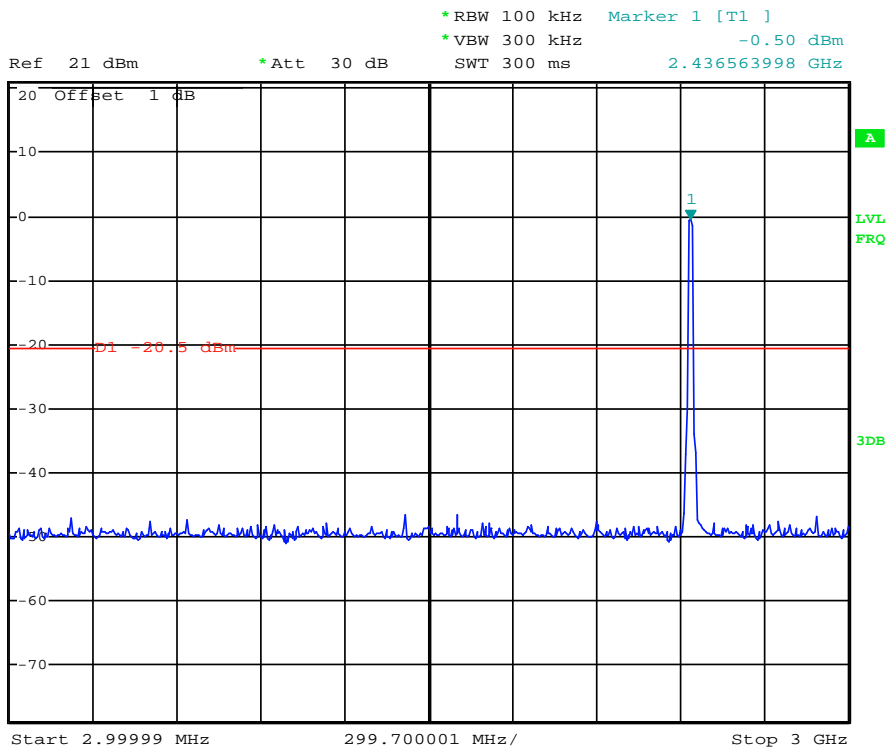
Date: 11.OCT.2013 16:34:59

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



Date: 11.OCT.2013 16:35:23

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

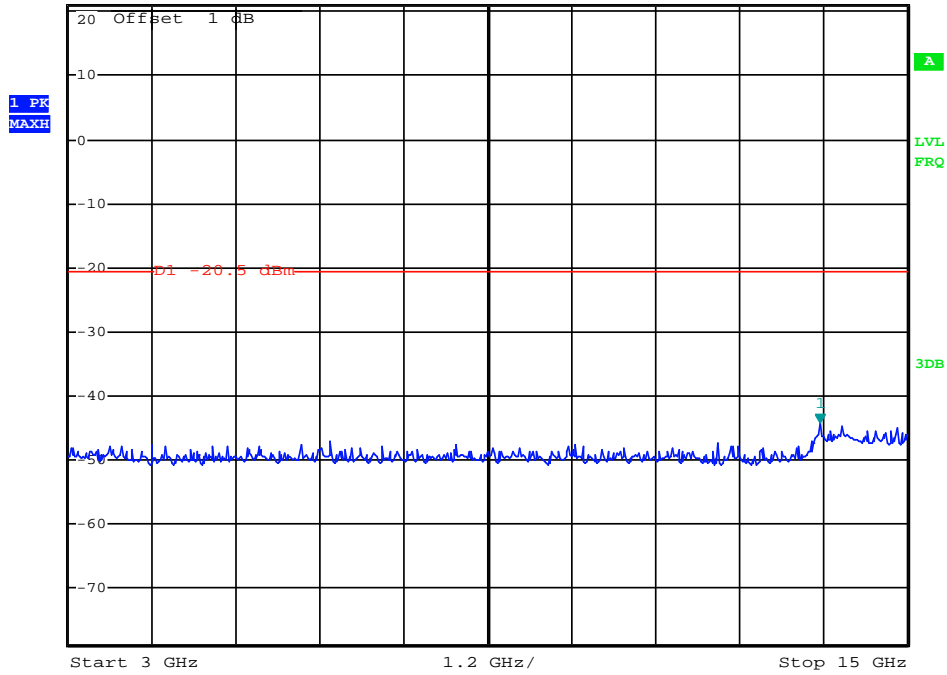


Date: 11.OCT.2013 16:37:14

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



Ref 21 dBm *Att 30 dB *RBW 100 kHz Marker 1 [T1] *VBW 300 kHz -44.26 dBm SWT 1.2 s 13.752000000 GHz

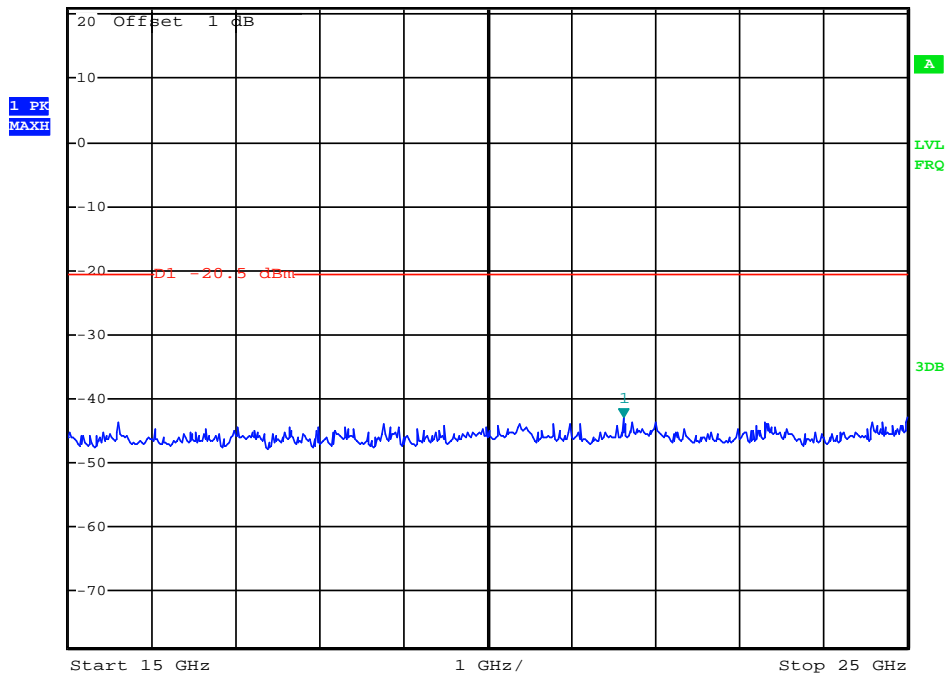


Date: 11.OCT.2013 16:37:34

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

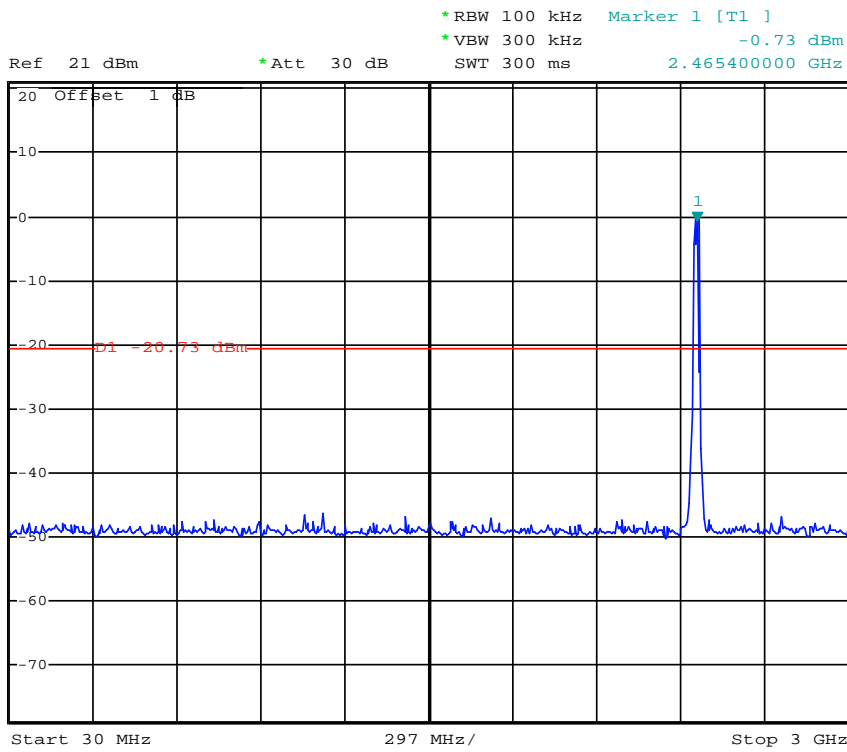


Ref 21 dBm *Att 30 dB *RBW 100 kHz Marker 1 [T1] *VBW 300 kHz -42.81 dBm SWT 1 s 21.620000000 GHz



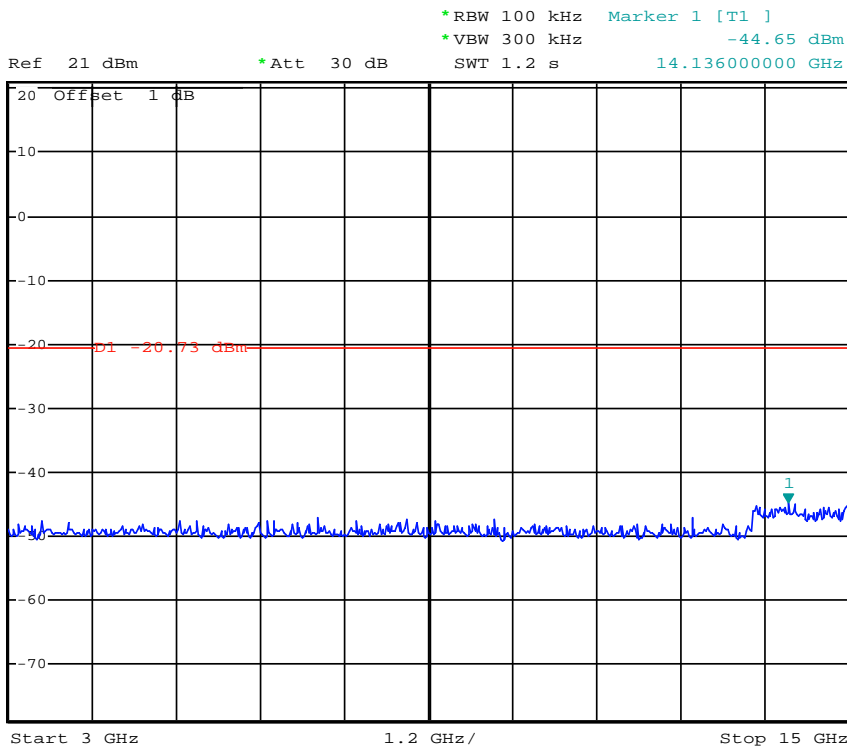
Date: 11.OCT.2013 16:37:53

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



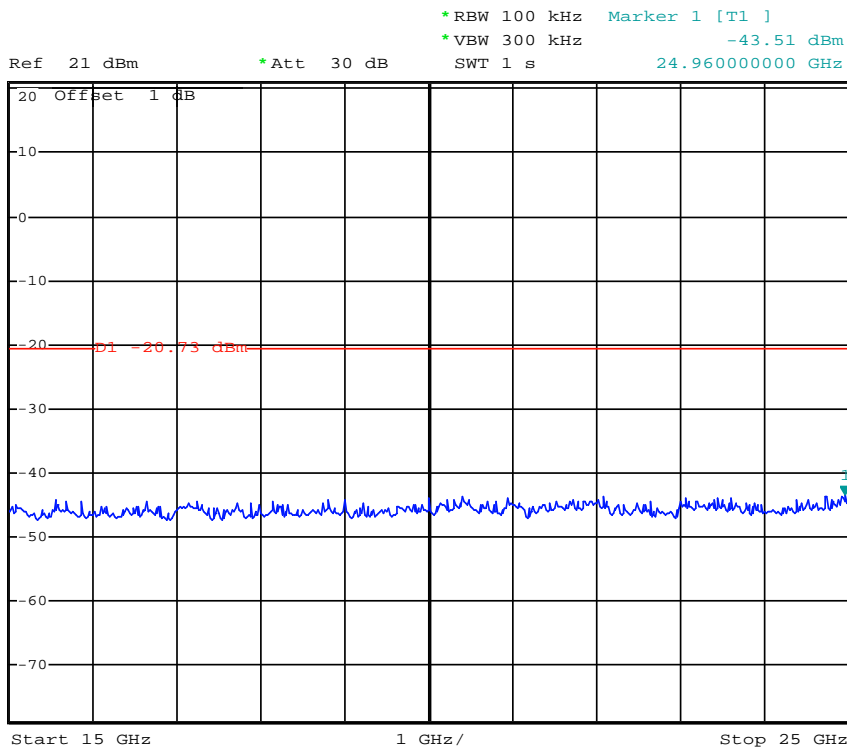
Date: 11.OCT.2013 16:29:51

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



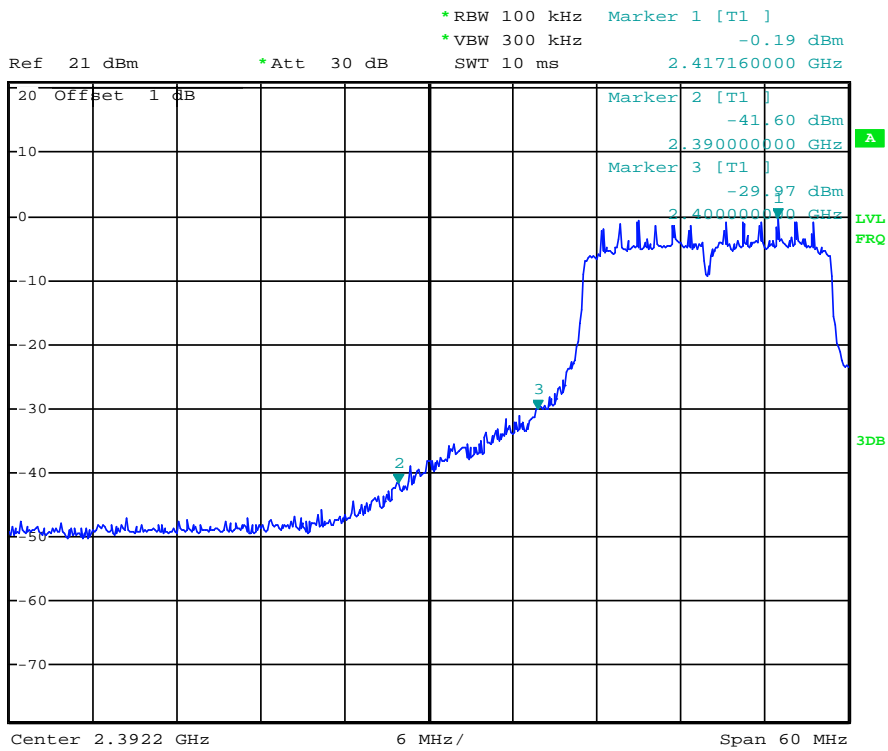
Date: 11.OCT.2013 16:30:19

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



Date: 11.OCT.2013 16:30:40

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

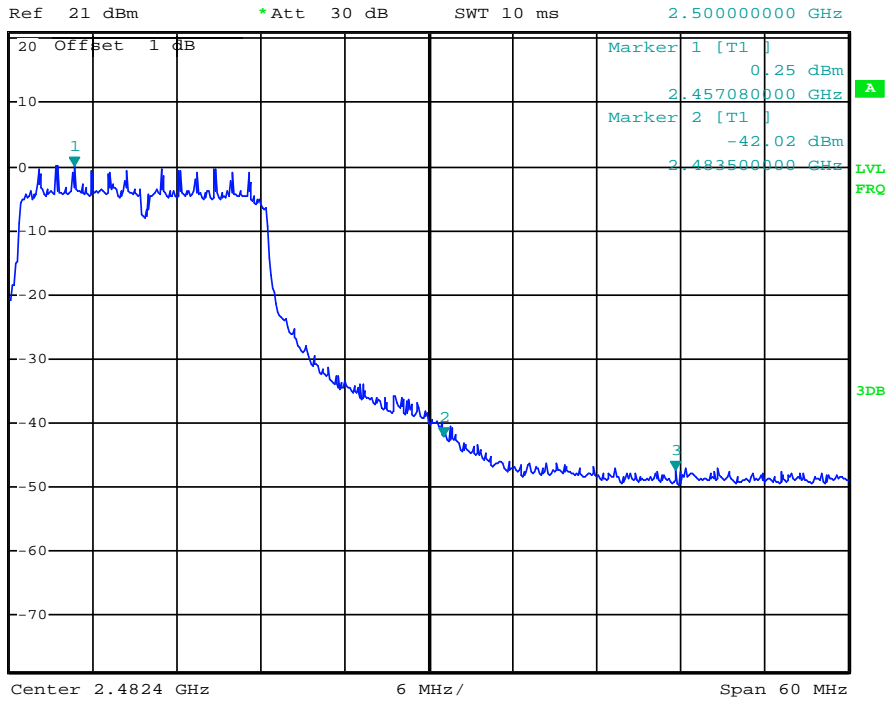


Date: 11.OCT.2013 16:46:44

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



*RBW 100 kHz Marker 3 [T1]
*VBW 300 kHz -47.50 dBm
SWT 10 ms 2.50000000 GHz

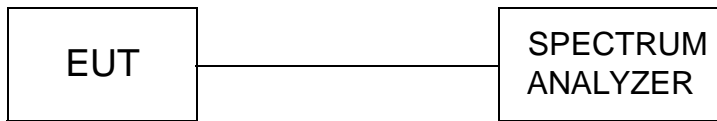


Date: 11.OCT.2013 16:40:13

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

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

According to RSS-210 Annex 8 A8.2 and FCC Part 15 15.247 requirement: For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

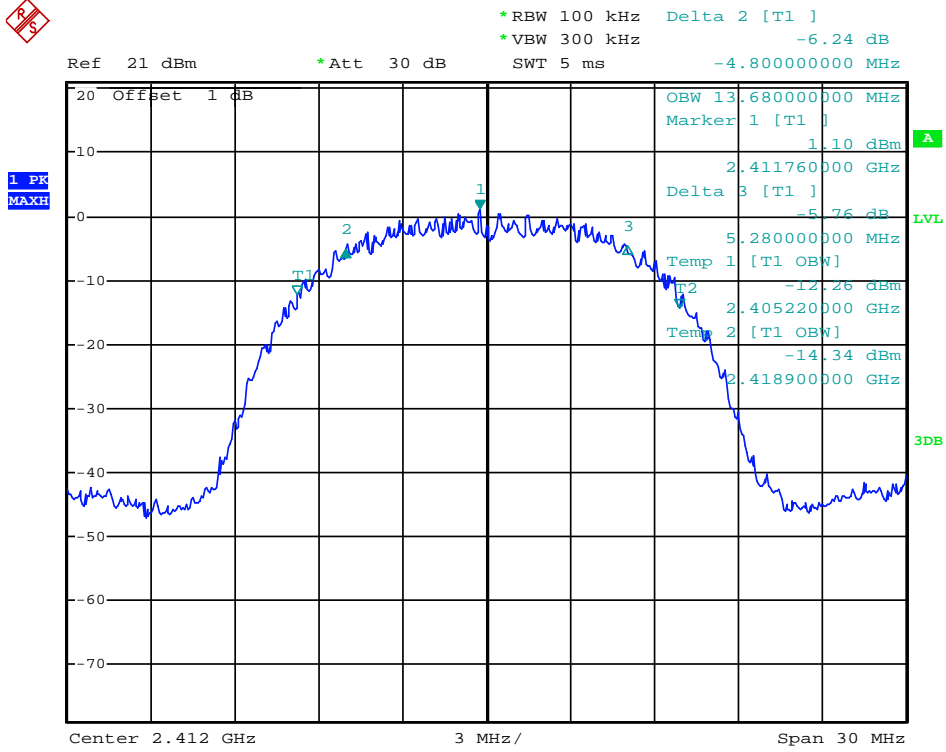
4.7.1 801.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Refer to Plot	Limits (kHz)		Verdict
					6dB	99%	
1	2412	10.08	13.68	Plot 4.7.1 A	≥ 500	---	PASS
6	2437	10.08	13.74	Plot 4.7.1 B	≥ 500	---	PASS
11	2462	10.08	13.74	Plot 4.7.1 C	≥ 500	---	PASS

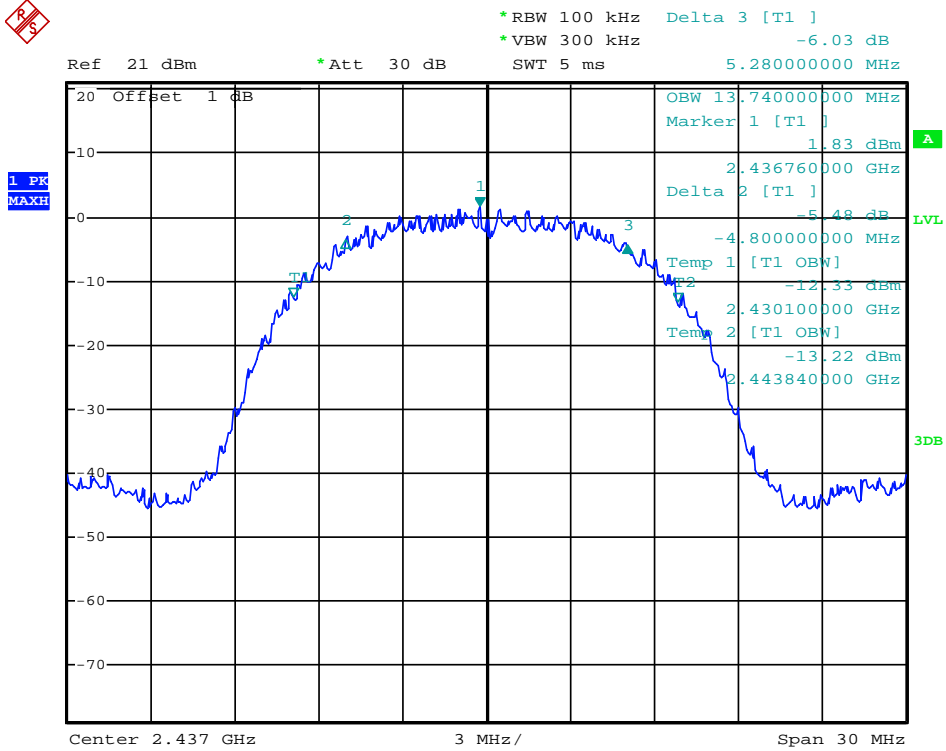
- Note:
1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
 2. The test results including the cable loss.
 3. Not limit for 99% Bandwidth and we tested for calculate Emission Designation for IC.

B. Test Plots



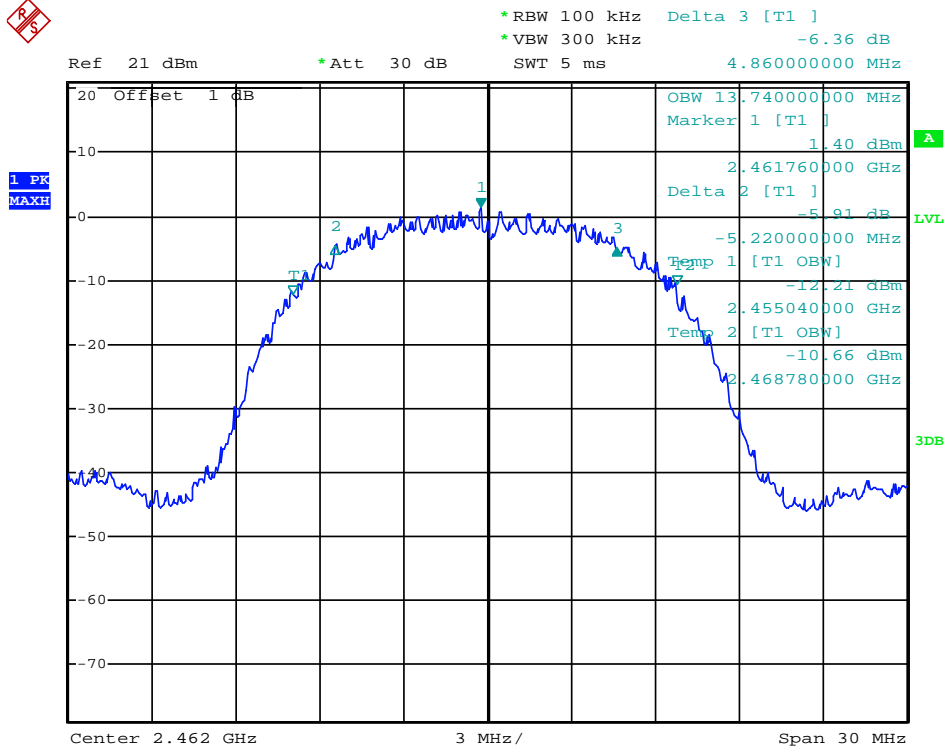
Date: 30.OCT.2013 19:30:31

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



Date: 30.OCT.2013 19:32:16

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



Date: 30.OCT.2013 19:34:05

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

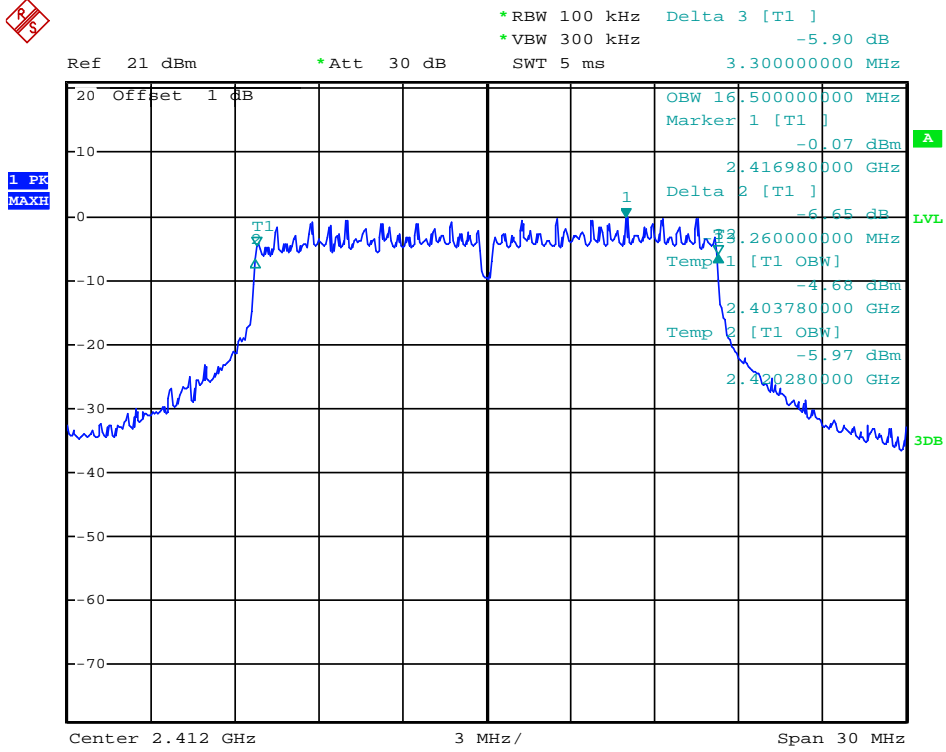
4.7.2 801.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Refer to Plot	Limits (kHz)		Verdict
					6dB	99%	
1	2412	16.56	16.50	Plot 4.7.2 A	≥ 500	---	PASS
6	2437	16.56	16.50	Plot 4.7.2 B	≥ 500	---	PASS
11	2462	16.56	16.50	Plot 4.7.2 C	≥ 500	---	PASS

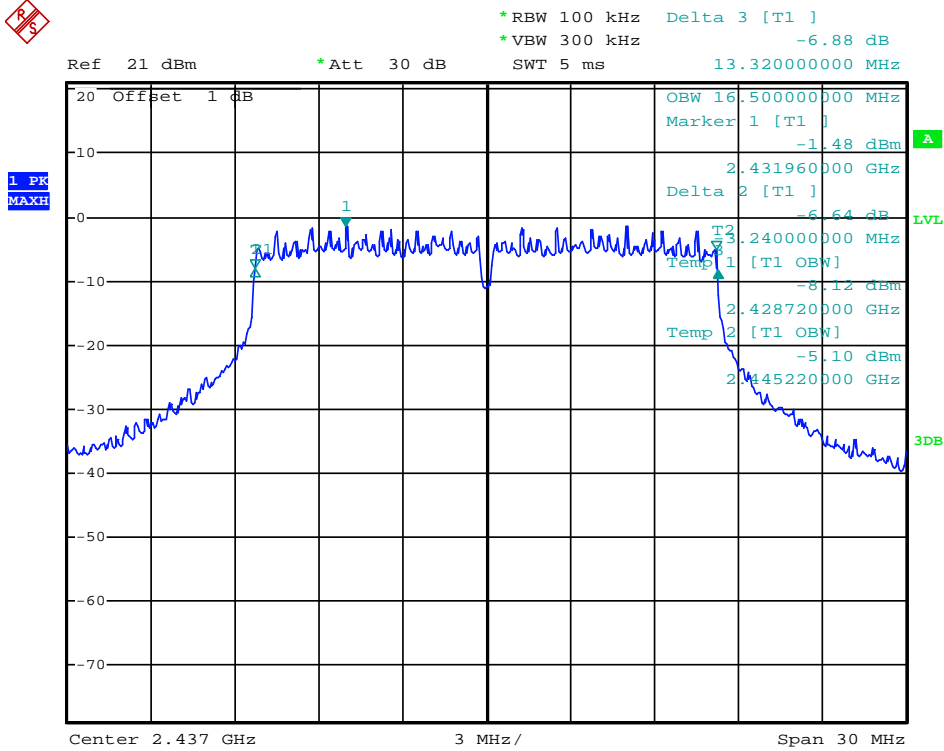
Note: 1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
 2. The test results including the cable lose.
 3. Not limit for 99% Bandwidth and we tested for calculate Emission Designation for IC.

B. Test Plots



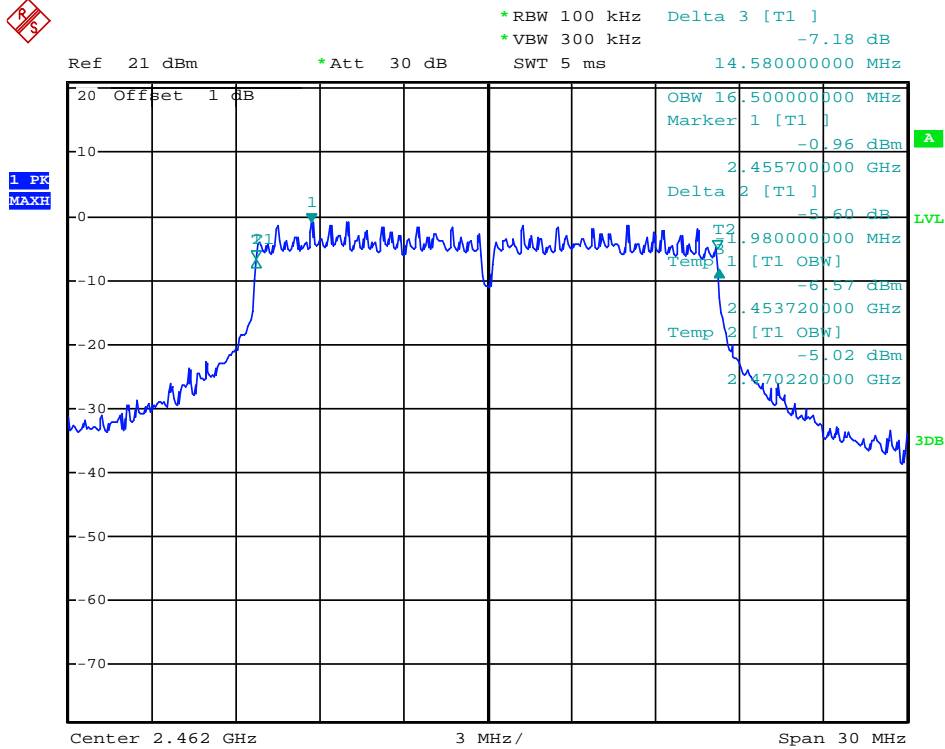
Date: 30.OCT.2013 19:21:10

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



Date: 30.OCT.2013 19:26:04

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



Date: 30.OCT.2013 19:24:51

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

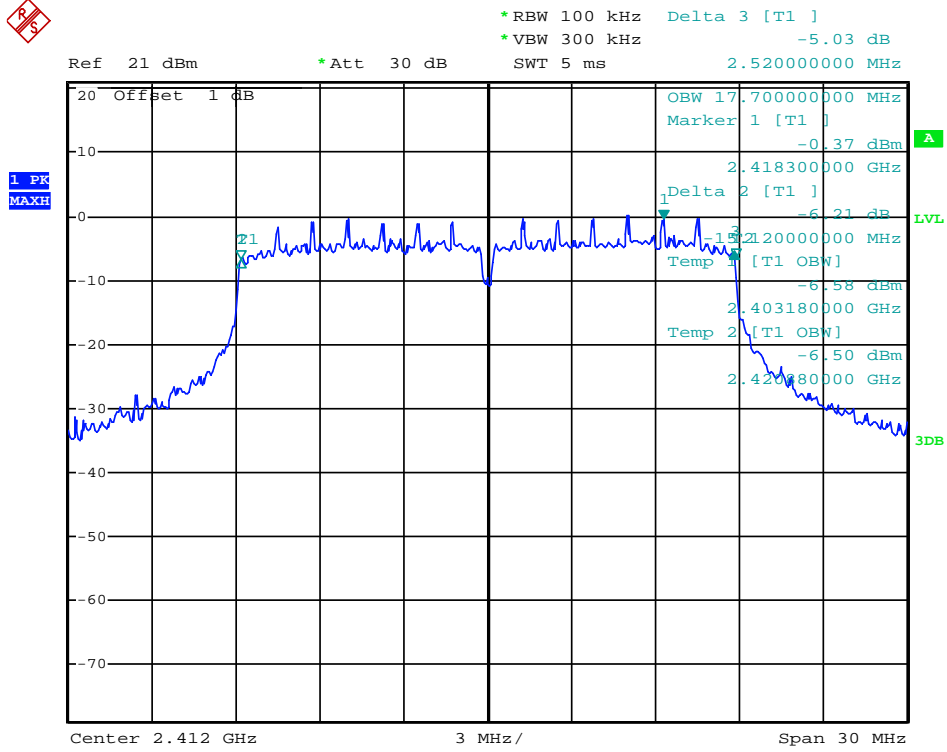
4.7.3 801.11n(20MHz) Test Mode

A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Refer to Plot	Limits (kHz)		Verdict
					6dB	99%	
1	2412	17.64	17.70	Plot 4.7.3 A	≥ 500	---	PASS
6	2437	17.64	17.70	Plot 4.7.3 B	≥ 500	---	PASS
11	2462	17.64	17.70	Plot 4.7.3 C	≥ 500	---	PASS

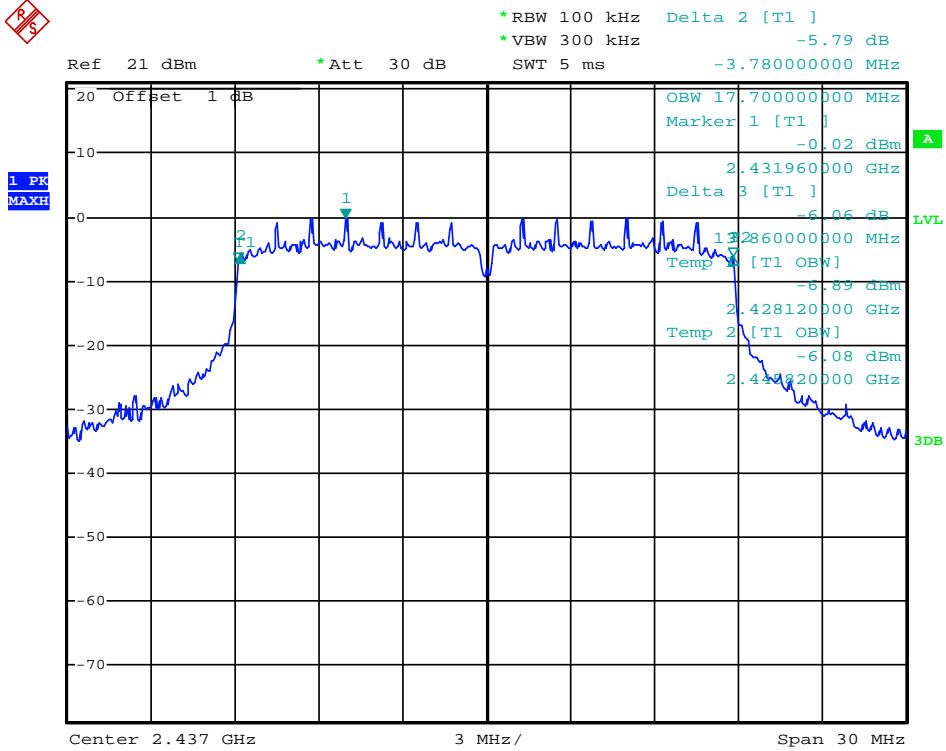
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 6.5Mbps.
 2. The test results including the cable loss.
 3. Not limit for 99% Bandwidth and we tested for calculate Emission Designation for IC.

B. Test Plots



Date: 30.OCT.2013 19:13:29

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

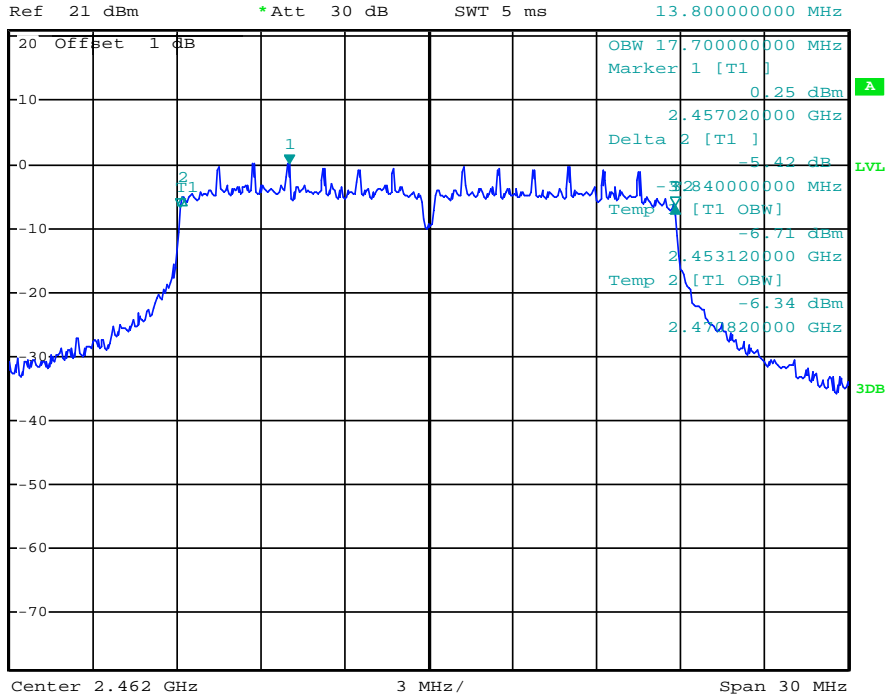


Date: 30.OCT.2013 19:15:21

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



*RBW 100 kHz Delta 3 [T1]
*VBW 300 kHz -6.59 dB
SWT 5 ms 13.800000000 MHz



Date: 30.OCT.2013 19:17:41

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

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.

According to RSS-Gen 7.1.2: A transmitter can only be sold or operated with antennas with which it was approved. Transmitter may be approved with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest gain antenna of each combination of transmitter and antenna type for which approval is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter. For Category I transmitters, the manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.

Refer to statement below for compliance

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

Antenna Connected Construction

The Maximum Gain of WLAN antenna is 0.08dBi.



5. Test Setup Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (above 1GHz)



Radiated Emission (Below 30MHz)



6. External and Internal Photos of the EUT

External Photos



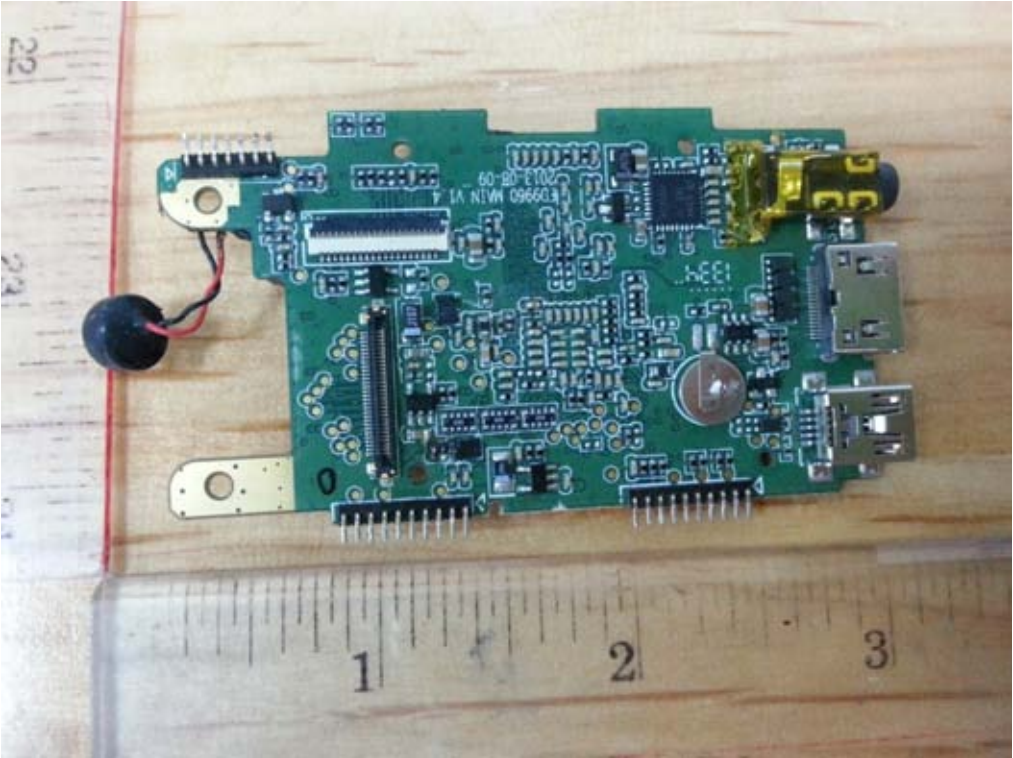


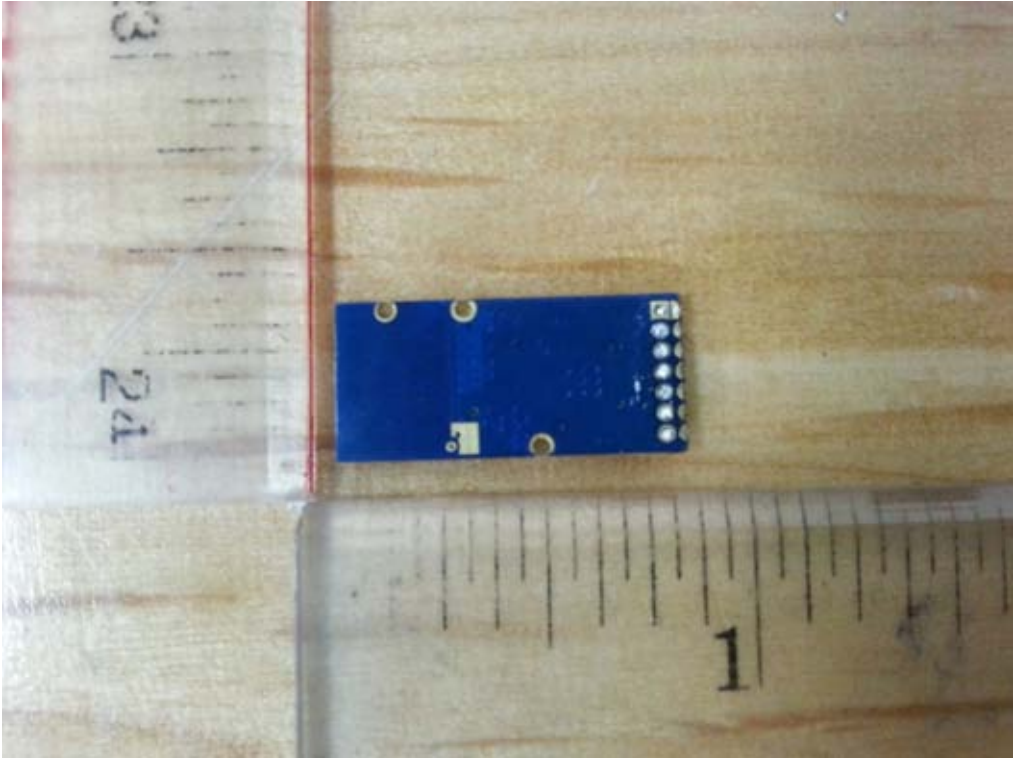
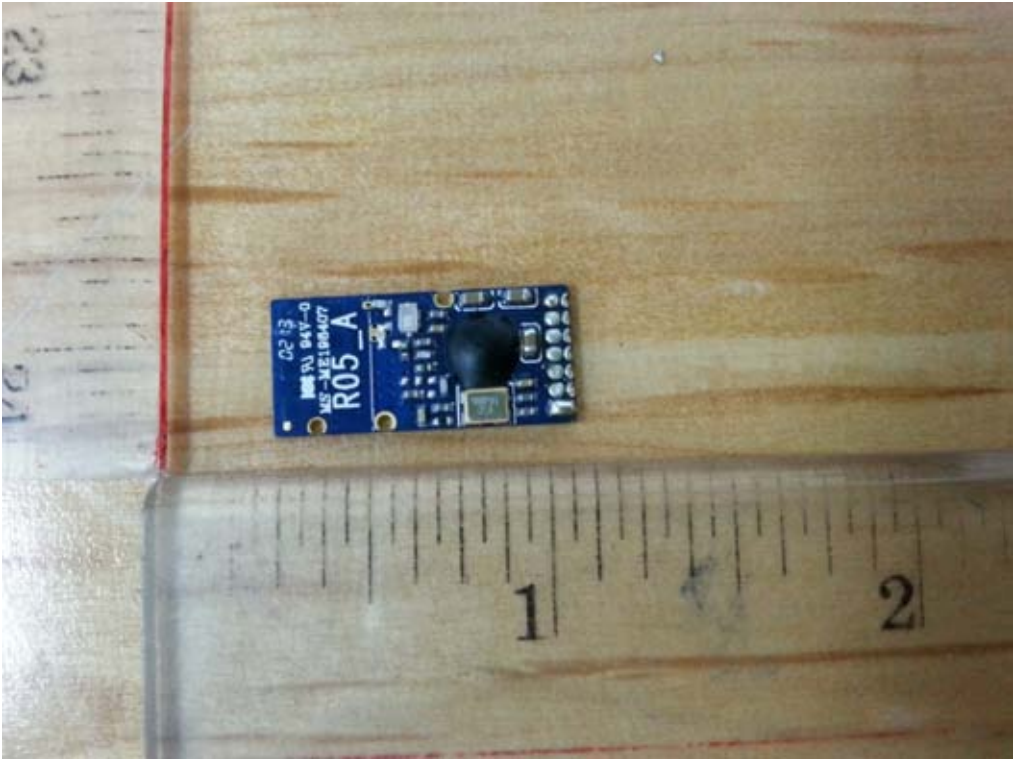


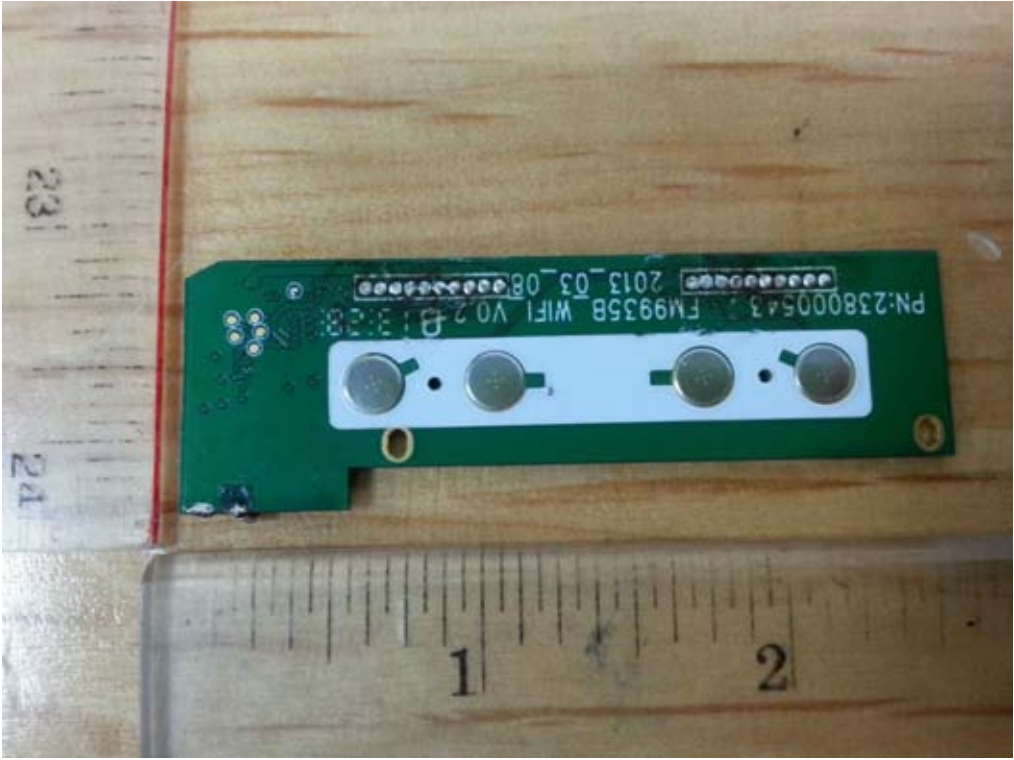
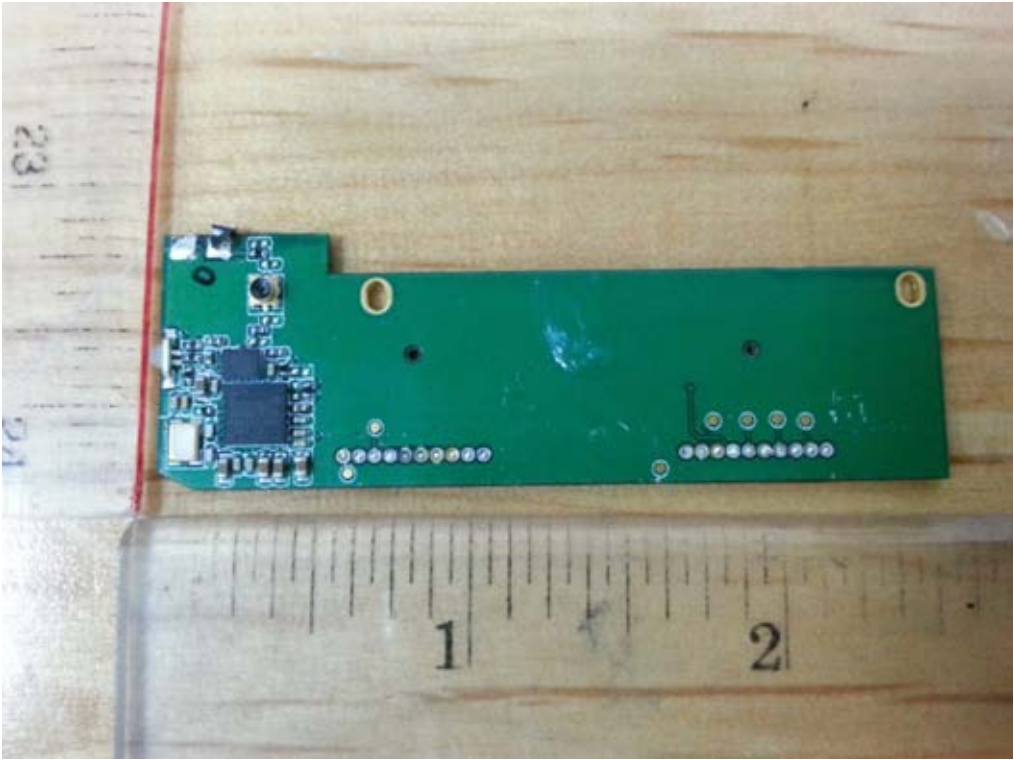
Internal Photos

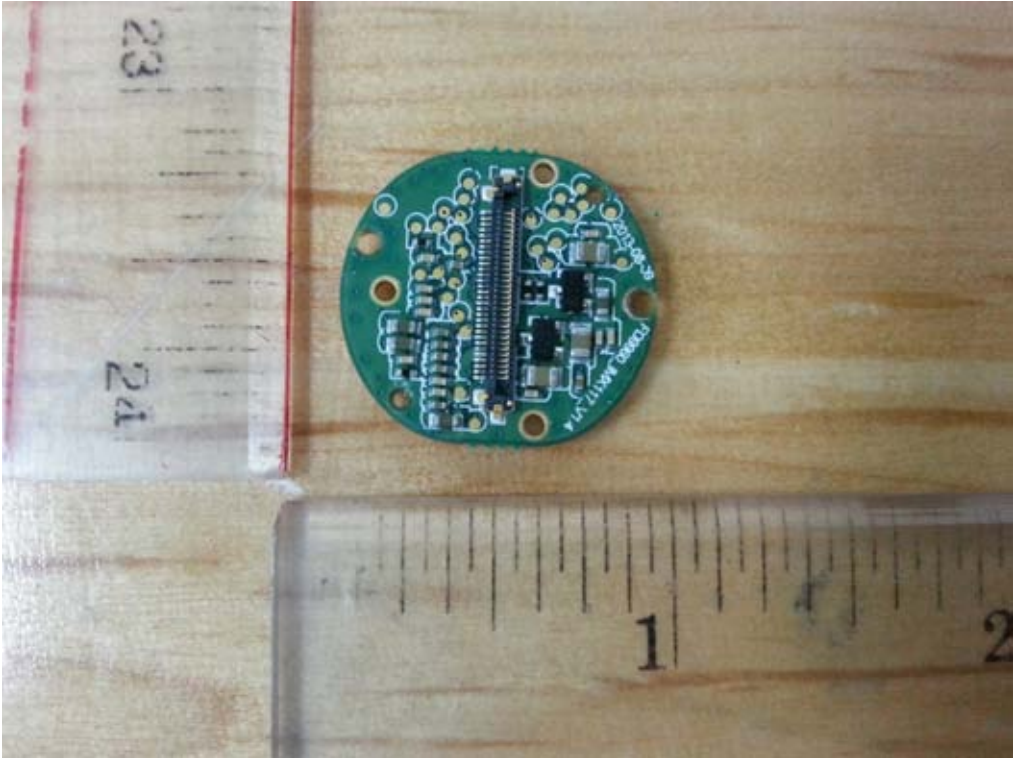
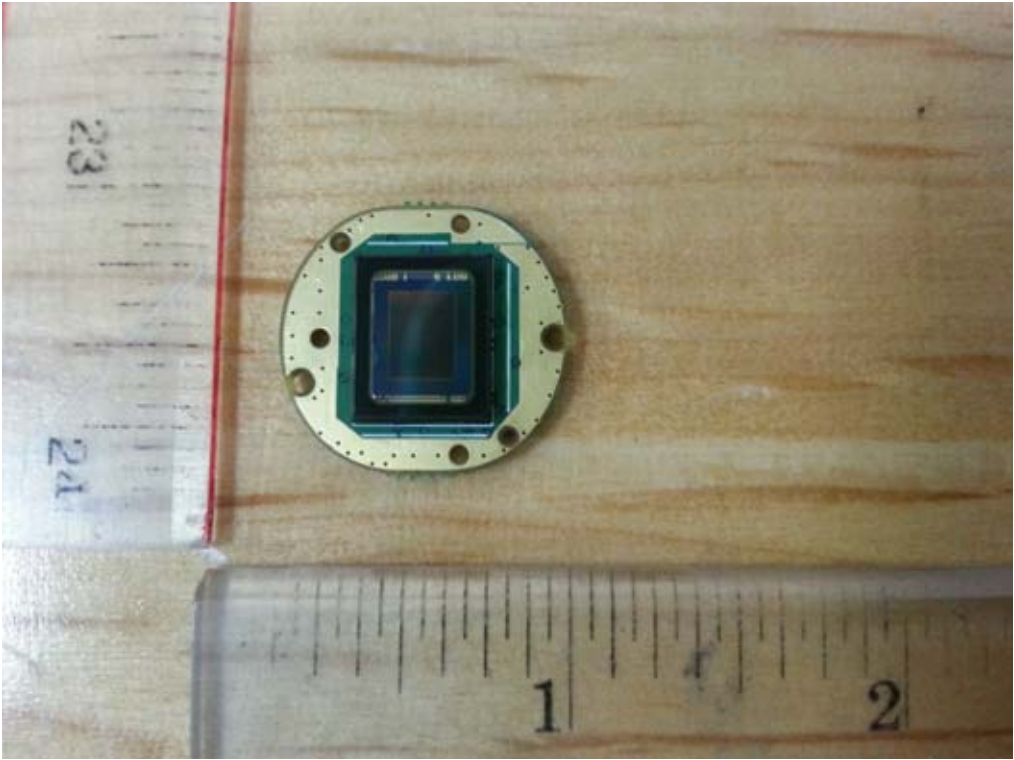














.....End of Report.....