FCC PART 15 SUBPART C MEASURMENT AND TEST REPORT

For

CDM Miami Inc

3100 NW 72nd Ave., Unit 118, Miami FL 33122

E.U.T.: GSM Cell Phone

Model Name: LAVORUM, ULTRA, STAR, MEGA, MINI X PAD, HYPER, LUX, BOOM, MIO, STILO, IDEA

Brand Name: OLA, FUN, COLA, DOLA

FCC ID: ZZRTM3458

Report Number: NTC1311477F-1

Test Date(s): November 11 2013 to December 16 2013

Report Date(s): December 17, 2013

Prepared by

Dongguan Nore Testing Center Co., Ltd.

Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan, Guangdong, China.

Tel: +86-769-22022444 **Fax: +86-769-22022799**

Prepared By	Approved & Authorized Signer
Rose Hu / Engineer	Sunm Lv / Q.A. Director

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan Nore Testing Center Co., Ltd. The test results referenced from this report are relevant only to the s ample tested.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This is a GSM cell phone with Bluetooth and WIFI functions. It's power by internal 3.7V rechargeable Li-lithium battery, and also can be charged by external adapter. For more details features, please refer to User's Manual.

Manufacturer	:	Shenzhen Baili Yongxing Technologe Co., Ltd.
Address	:	5F, Building 10 East, Heng Mingzhu Ind Park, Tongfuyu Ind Zone, ShaJing St., Bao'an Dist., Shenzhen, China
Frequency:	:	Cellular Band: 824.2-848.8MHz (TX) 869.2-893.8MHz(RX) PCS Band: 1850.2-1909.8MHz (TX) 1930.2-1989.8MHz(RX) WIFI: 2412-2462MHz, Bluetooth: 2402-2480MHz
Modulation	:	GMSK for GSM/PCS DSSS, OFDM for WIFI GFSK, π4/-DQPSK, 8DPSK for Bluetooth
Antenna Type	:	PIFA
Antenna Gain	:	0.6dBi (peak) for Cellular Band 1.6dBi (peak) for PCS Band 2.3dBi (peak) for WIFI and Bluetooth band
Power Supply	:	Li-lithium Battery 3.7V Input : AC 100-240V 50/60Hz 0.1A(Adapter) Output :DC 5V 500mA Model: US77002
Model name	:	LAVORUM, ULTRA, STAR, MEGA, MINI X PAD, HYPER, LUX, BOOM, MIO, STILO, IDEA
Model difference	:	All models are the same except appearance color, model name and trademark, we prepare LAVORUM for test.
Remark	:	This measurement and test report only pertains to the WIFI portion of the EUT. For measurement and test results to the GSM and Bluetooth functions please refer to report number NTC1311477F, NTC1311477F-2.

Technical Specification

For WIFI function

Modulation	:	CCK, DQPSK, DBPSK for 802.11b OFDM for 802.11g/n
Number of Channel	:	11 for 802.11b/g/n(HT20)
Channel space	:	5MHz
Date Rate	:	802.11b:1~11Mbps, 802.11g:6~54Mbps 802.11n: 6.5~72.2Mbps
Max RF output Power	:	14.67dBm (Peak) 7.87dBm (Average)

Channel List

802.11 b/g/n(HT20)	
Channel	**Frequency MHz**
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

Note: According to section 15.31(m), regards to the operating frequency range over 10MHz, the Lowest, middle, and the Highest frequency of channel were selected to perform the test. The selected frequency see below:

802.11b/g/n(HT20)	
Channel	**Frequency MHz**
1	2412
6	2437
11	2462

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: ZZRTM3458 filing to comply with Section 15.247 of the FCC Part 15(2012), Subpart C Rule.

1.3 Test Methodology

AC mains line-conducted, antenna port conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003) and KDB558074(v03). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

N/A

1.6 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.

Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Building D, Gaosheng Science and Technology Park,
Hongtu Road, Nancheng District, Dongguan City,
Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207 (a)	AC Power Conducted Emission	Compliance
§15.247(b)(3)	Max. Conducted Output Power	Compliance
§15.247(a)(2)	6dB&20dB Bandwidth	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band Edge and Conducted Spurious Emissions	Compliance
§15.247(d),§15.209, §15.205	Radiated Spurious Emissions and Restricted Bands	Compliance
§15.203	Antenna Requirement	Compliance

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

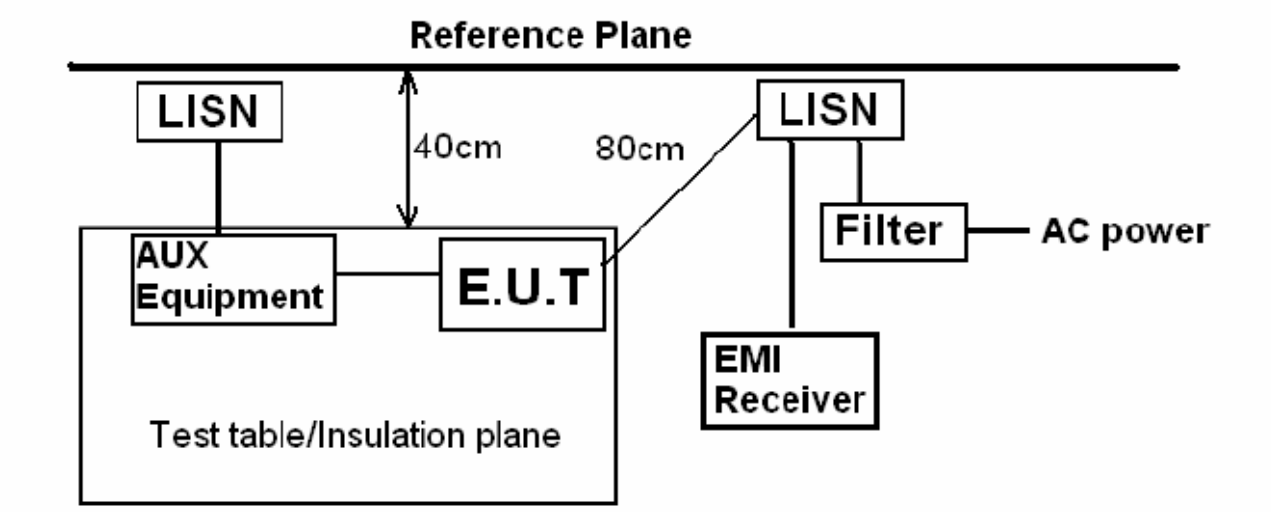
The EUT has been tested under continuous operating condition. Test program used to control the EUT staying in continuous transmitting mode. The Lowest, middle and highest channel were chosen for testing, and modulation type CCK and OFDM were tested, but only the worst case data is shown in this report.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: WIFI Mode

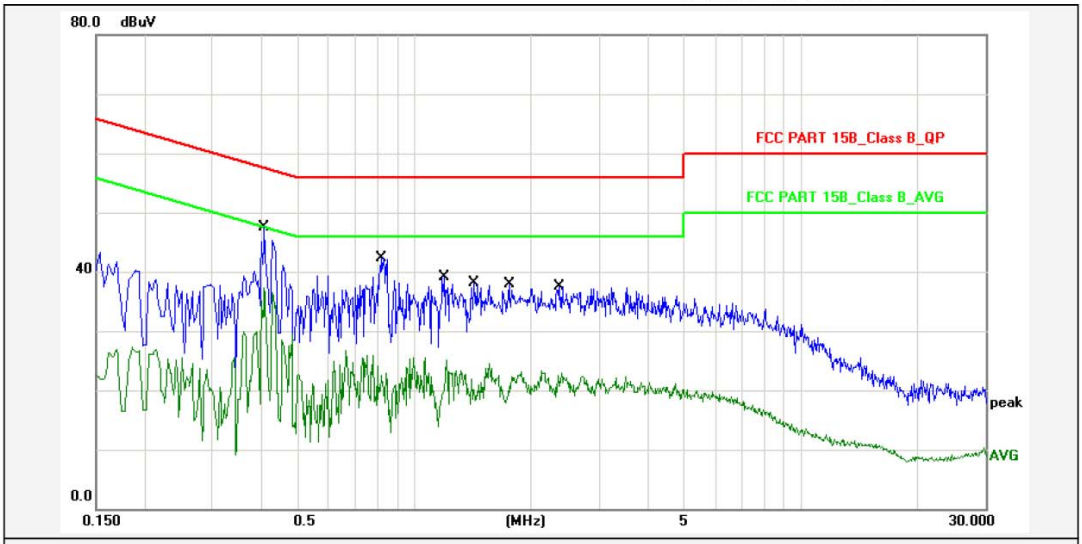
3.3 Measurement Results

For WIFI Mode:
Please refer to following the worst case (802.11b) plots.

Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: Http://www.ntc-c.com

Site: Conduction

Test Time: 2013-12-16 10:01:32



Report No.:	**LAVORUM**		
Test Standard:	**FCC PART 15B_Class B_QP**		
Test item:	**Conducted Emission**	**Phase:**	**L1**
Applicant:	**CDM Miami Inc**	**Temp.( )/Hum.(%):**	**22(C) / 54 %**
Product:	**GSM Cell Phone**	**Power Rating:**	**AC 120V/60Hz**
Model No.:	**LAVORUM**	**Test Engineer:**	**Sance**

Test Mode: **Wifi Mode**
Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.4100	10.80	33.80	44.60	57.65	-13.05	QP	P	
2	0.4100	10.80	25.00	35.80	47.65	-11.85	AVG	P	
3	0.8180	10.80	27.60	38.40	56.00	-17.60	QP	P	
4	0.8180	10.80	11.30	22.10	46.00	-23.90	AVG	P	
5	1.1939	10.80	24.30	35.10	56.00	-20.90	QP	P	
6	1.1939	10.80	10.50	21.30	46.00	-24.70	AVG	P	
7	1.4260	10.80	23.40	34.20	56.00	-21.80	QP	P	
8	1.4260	10.80	8.10	18.90	46.00	-27.10	AVG	P	
9	1.7540	10.80	23.10	33.90	56.00	-22.10	QP	P	
10	1.7540	10.80	7.50	18.30	46.00	-27.70	AVG	P	
11	2.3780	10.80	22.60	33.40	56.00	-22.60	QP	P	
12	2.3780	10.80	8.50	19.30	46.00	-26.70	AVG	P	

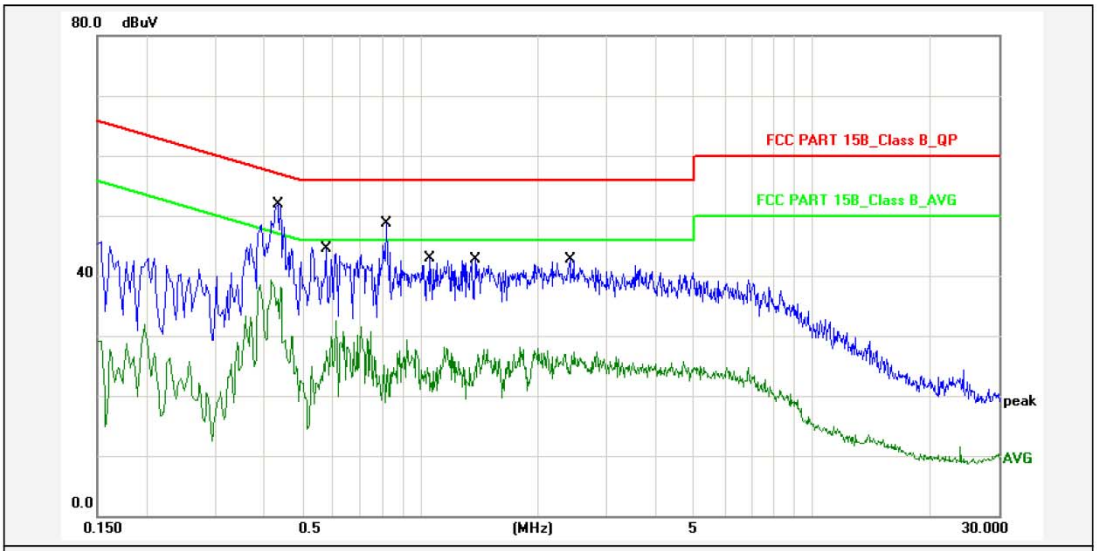
Note: Level=Reading+Factor.
Margin=Limit-Level.

File:LAVORUM\ #17 *Page: 1*

Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: Http://www.ntc-c.com

Site: Conduction

Test Time: 2013-12-16 10:06:22



Report No.:	LAVORUM		
Test Standard:	FCC PART 15B_Class B_QP		
Test item:	Conducted Emission	Phase:	N
Applicant:	CDM Miami Inc	Temp.( )/Hum.(%):	22(C) / 54 %
Product:	GSM Cell Phone	Power Rating:	AC 120V/60Hz
Model No.:	LAVORUM	Test Engineer:	Sance

Test Mode: Wifi Mode

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.4339	10.80	37.10	47.90	57.18	-9.28	QP	P	
2	0.4339	10.80	24.40	35.20	47.18	-11.98	AVG	P	
3	0.5780	10.80	25.70	36.50	56.00	-19.50	QP	P	
4	0.5780	10.80	17.70	28.50	46.00	-17.50	AVG	P	
5	0.8180	10.80	33.90	44.70	56.00	-11.30	QP	P	
6	0.8180	10.80	12.70	23.50	46.00	-22.50	AVG	P	
7	1.0580	10.80	27.70	38.50	56.00	-17.50	QP	P	
8	1.0580	10.80	10.30	21.10	46.00	-24.90	AVG	P	
9	1.3860	10.80	27.90	38.70	56.00	-17.30	QP	P	
10	1.3860	10.80	12.90	23.70	46.00	-22.30	AVG	P	
11	2.4180	10.80	27.80	38.60	56.00	-17.40	QP	P	
12	2.4180	10.80	12.50	23.30	46.00	-22.70	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

File:LAVORUM\ #18 *Page: 1*

4. Max. Conducted Output Power

4.1 Measurement Procedure

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

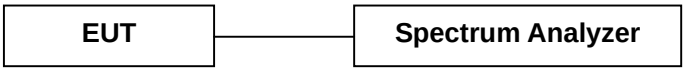
Maximum conducted (Peak) output power:

1. Set the RBW = 1MHz.
2. Set the VBW ≥ 3 x RBW
3. Set the span ≥ 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.

Maximum conducted (Average) output power:

1. Set the RBW = 1-5% of the OBW, not to exceed 1MHz.
2. Set the VBW ≥ 3 x RBW
3. Set the span ≥ 1.5 x OBW
4. Detector = RMS
5. Sweep time = auto couple.
6. Number of points in sweep ≥2x span/RBW. (This gives bin-to-bin spacing≤2, so that narrowband signals are not lost between frequency bins.)
7. Trace mode = Trace average at least 100 traces in power averaging (i.e., RMS) mode.
8. If transmit duty cycle <98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously(i.e., with no off intervals) or at duty cycle ≥98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
9. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Results

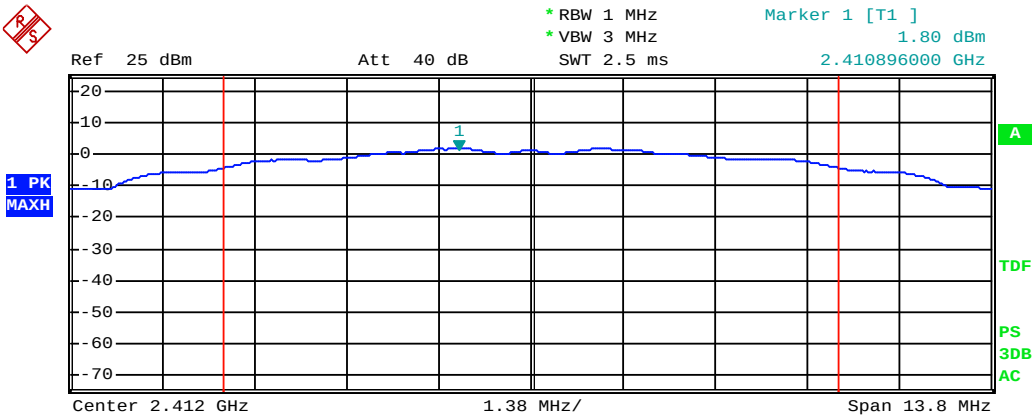
For BT Mode:

Please refer to following table and plots.

Temperature :	22 ℃	Humidity :	54 %	
Test By:	Sance	Test Date :	December 16, 2013	
Test Result:	PASS			
Frequency MHz	Data Rate Mbps	PK Output Power dBm	AV Output Power dBm	Limit dBm
IEEE 802.11b Mode (CCK, Antenna Gain=2.3dBi)				
Low Channel: 2412	1	8.78	6.38	30
Middle Channel: 2437	1	8.49	6.06	30
High Channel: 2462	1	6.90	4.40	30
IEEE 802.11g Mode (OFDM, Antenna Gain=2.3dBi)				
Low Channel: 2412	6	14.67	7.87	30
Middle Channel: 2437	6	13.26	6.36	30
High Channel: 2462	6	12.45	5.59	30
IEEE 802.11n(HT20) Mode (OFDM, Antenna Gain=2.3dBi)				
Low Channel: 2412	6.5	11.73	5.48	30
Middle Channel: 2437	6.5	10.66	4.08	30
High Channel: 2462	6.5	9.81	3.27	30

Maximum Peak Conducted Output Power

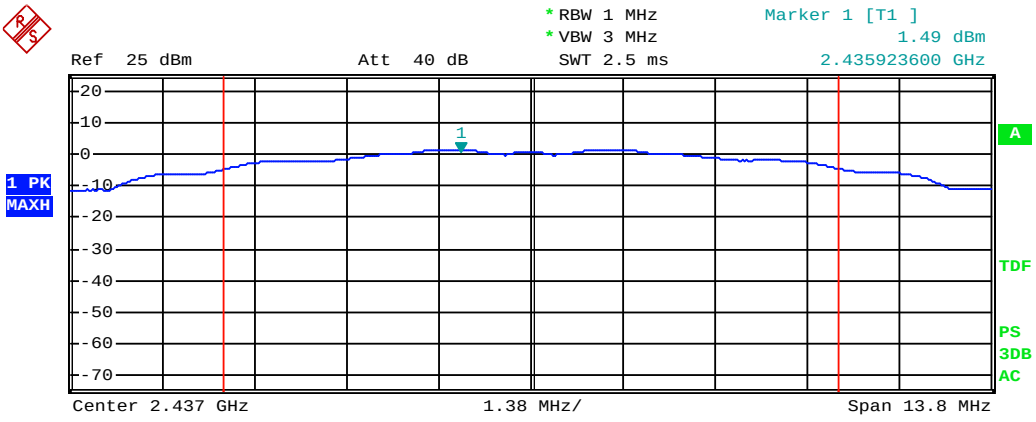
802.11b Low Channel



Tx Channel

Bandwidth	9.2 MHz	Power	8.78 dBm

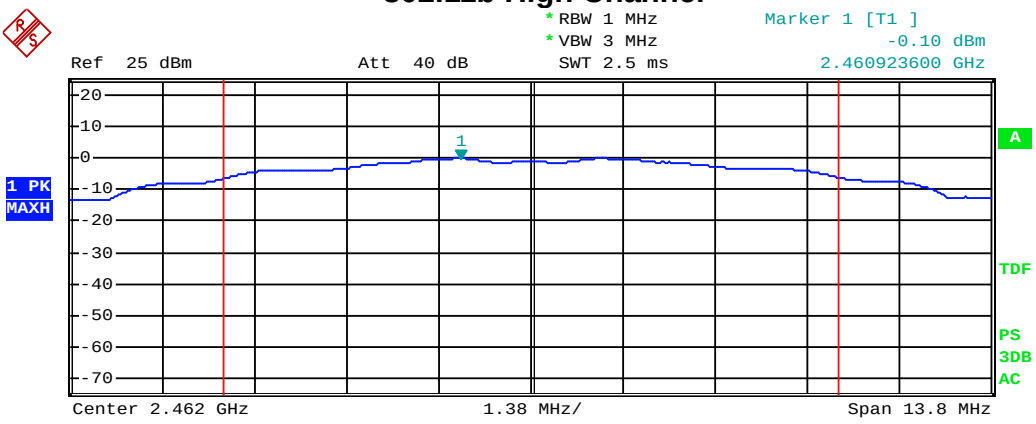
802.11b Middle Channel



Tx Channel

Bandwidth	9.2 MHz	Power	8.49 dBm

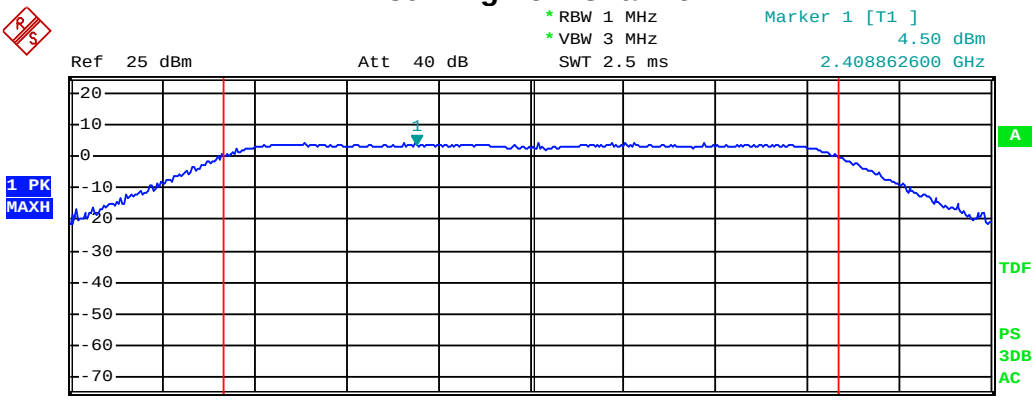
802.11b High Channel



Tx Channel

Bandwidth	9.2 MHz	Power	6.90 dBm

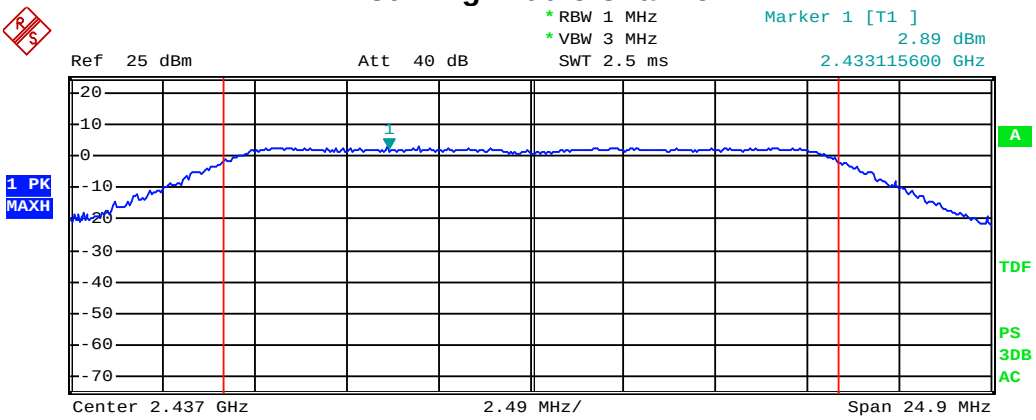
802.11g Low Channel



Tx Channel

Bandwidth	16.6 MHz	Power	14.67 dBm

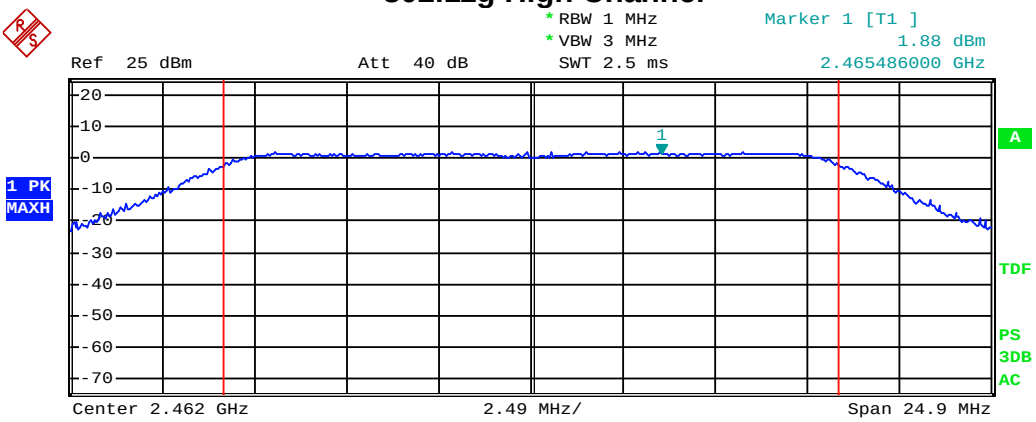
802.11g Middle Channel



Tx Channel

Bandwidth	16.6 MHz	Power	13.26 dBm

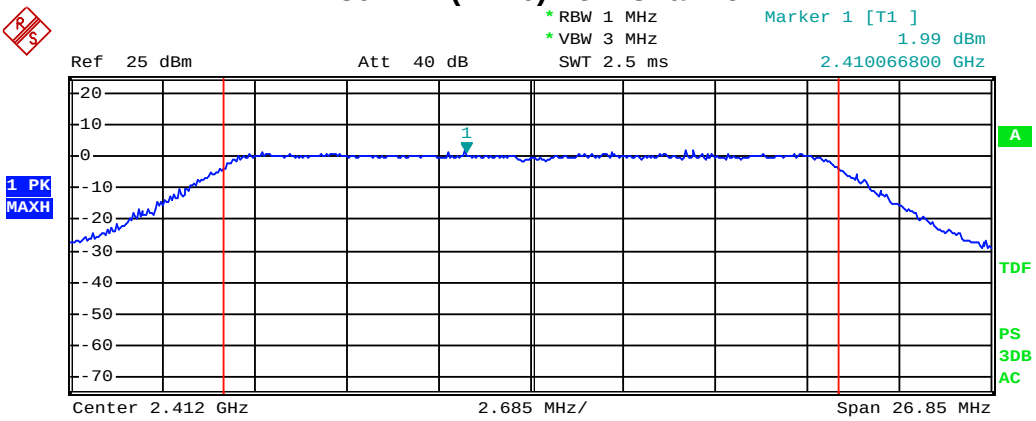
802.11g High Channel



Tx Channel

Bandwidth	16.6 MHz	Power	12.45 dBm

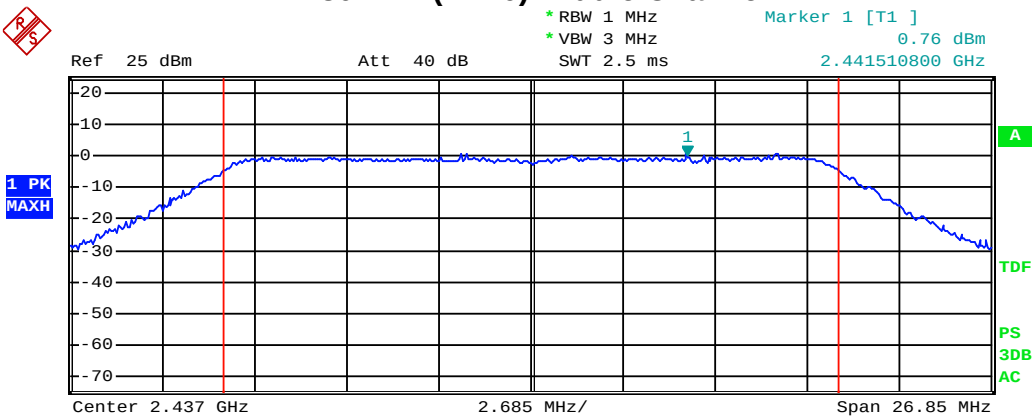
802.11n(HT20) Low Channel



Tx Channel

Bandwidth	17.9 MHz	Power	11.73 dBm

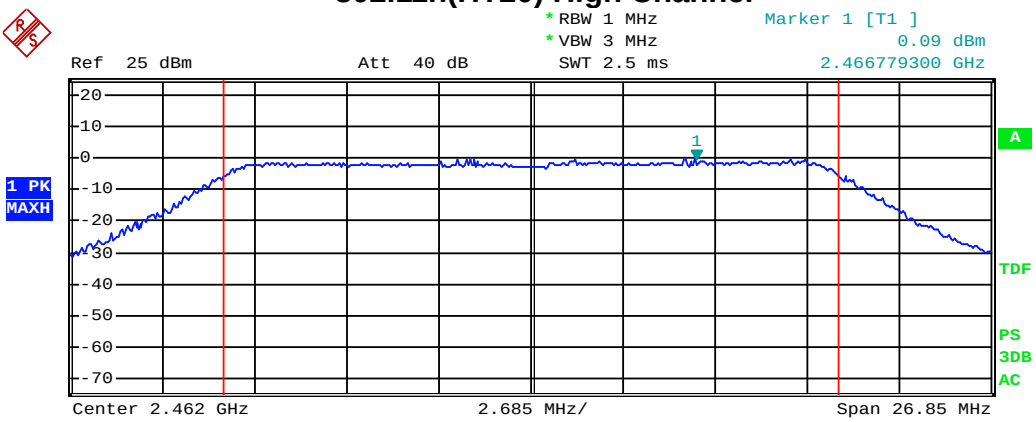
802.11n(HT20) Middle Channel



Tx Channel

Bandwidth	17.9 MHz	Power	10.66 dBm

802.11n(HT20) High Channel

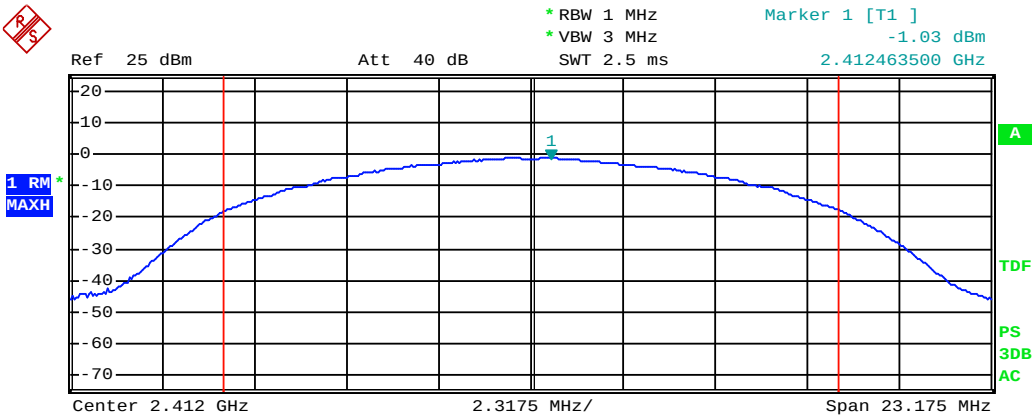


Tx Channel

Bandwidth	17.9 MHz	Power	9.81 dBm

Maximum Average Conducted Output Power

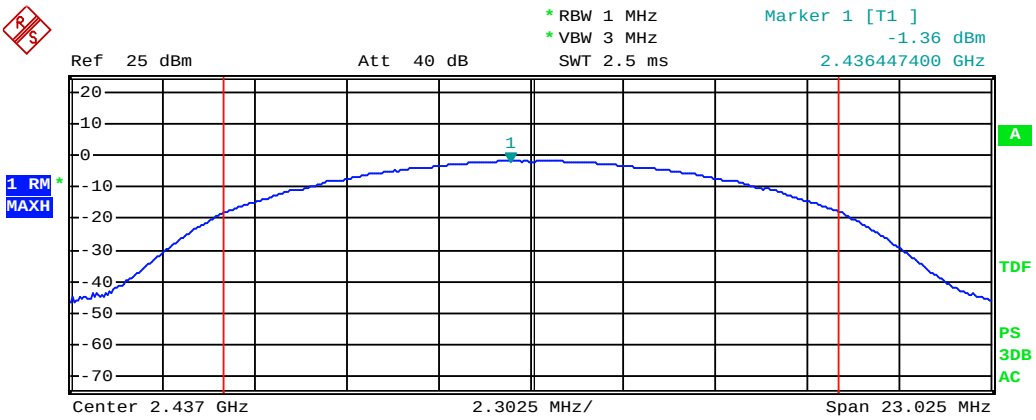
802.11b Low Channel



Tx Channel

Bandwidth	15.45 MHz	Power	6.38 dBm

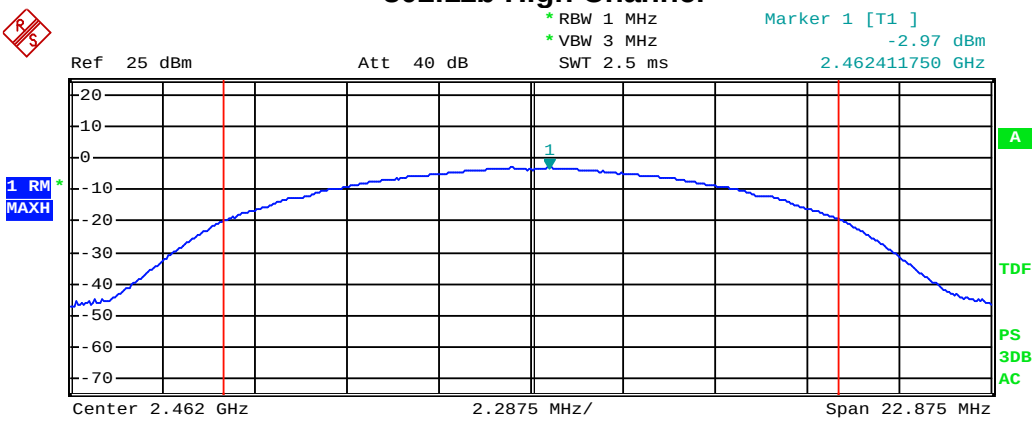
802.11b Middle Channel



Tx Channel

Bandwidth	15.35 MHz	Power	6.06 dBm

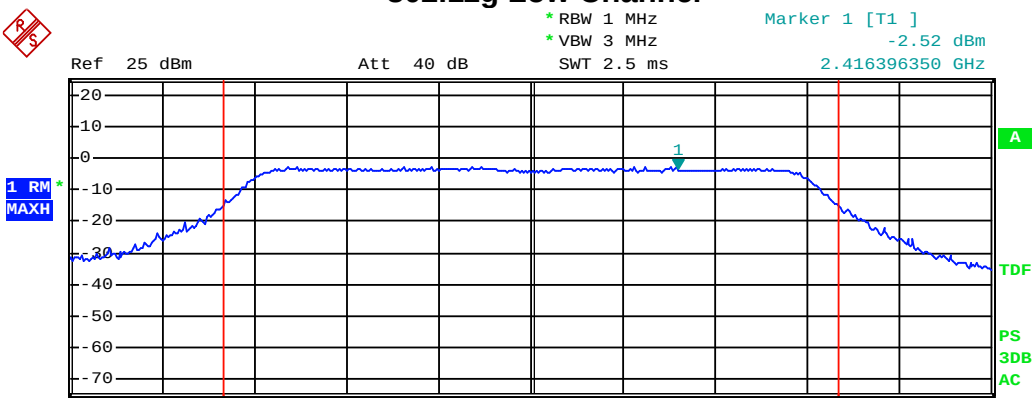
802.11b High Channel



Tx Channel

Bandwidth	15.25 MHz	Power	4.40 dBm

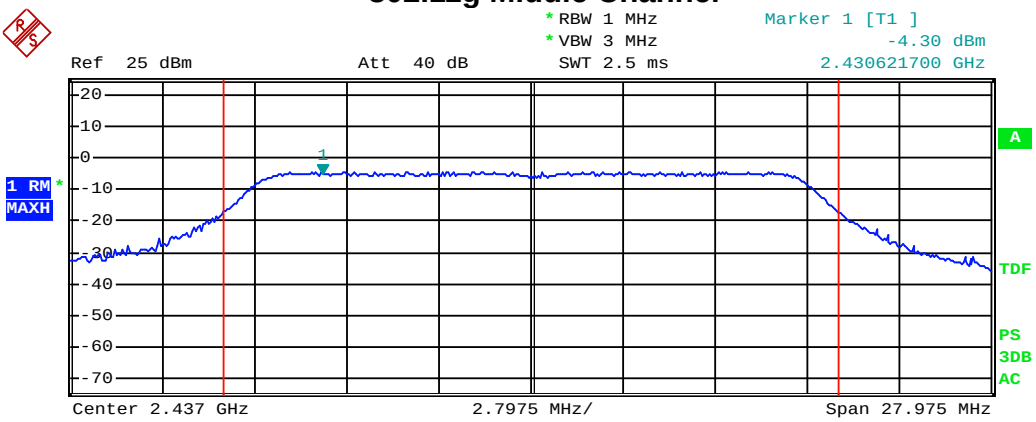
802.11g Low Channel



Tx Channel

Bandwidth	18.55 MHz	Power	7.87 dBm

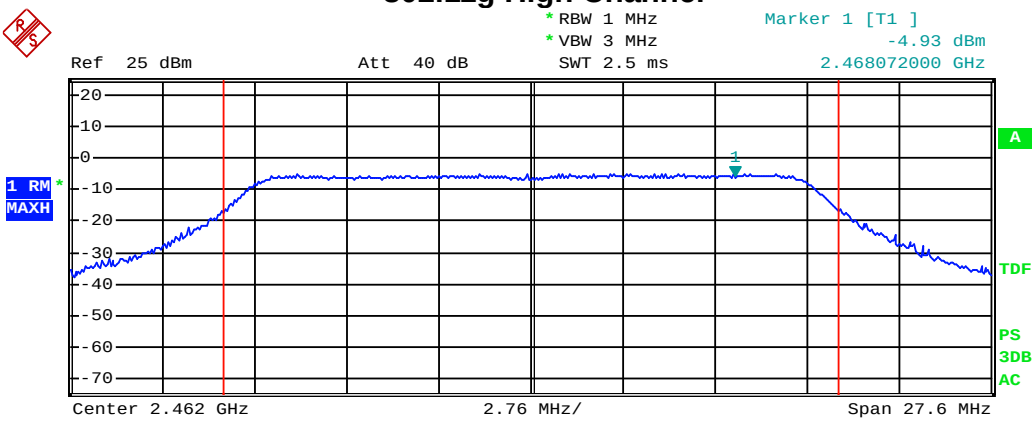
802.11g Middle Channel



Tx Channel

Bandwidth	18.65 MHz	Power	6.36 dBm

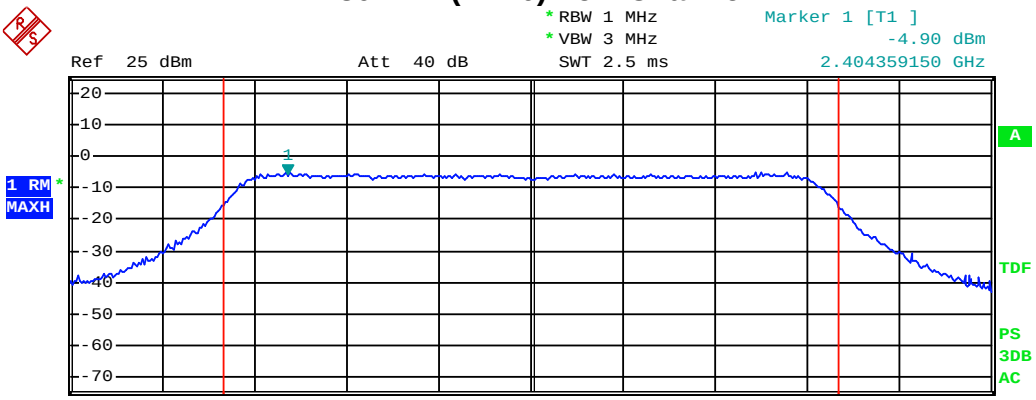
802.11g High Channel



Tx Channel

Bandwidth	18.4 MHz	Power	5.59 dBm

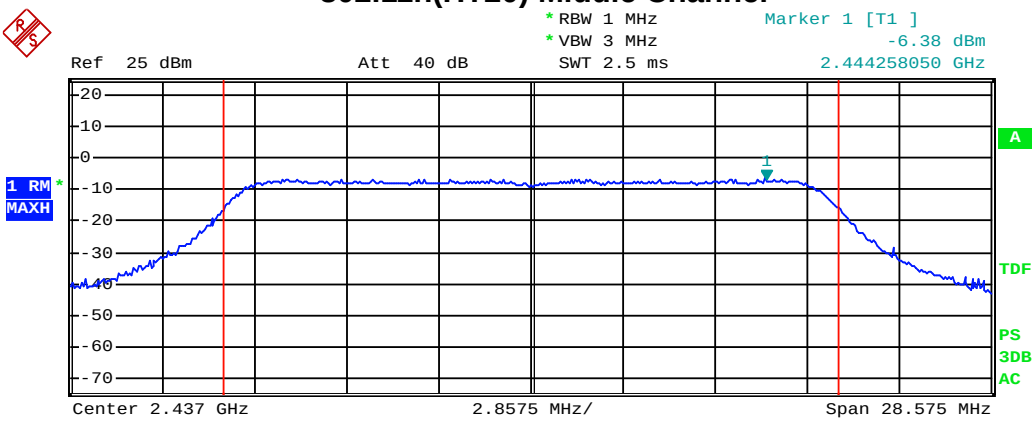
802.11n(HT20) Low Channel



Tx Channel

Bandwidth	18.95 MHz	Power	5.48 dBm

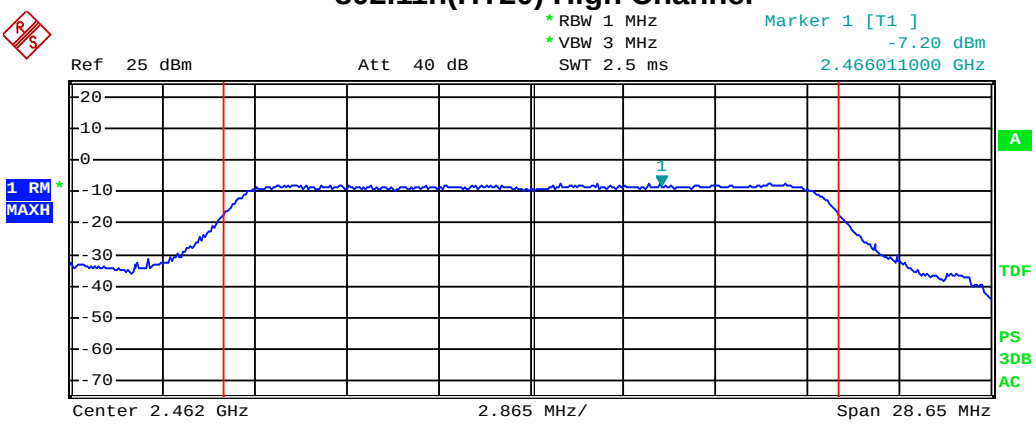
802.11n(HT20) Middle Channel



Tx Channel

Bandwidth	19.05 MHz	Power	4.08 dBm

802.11n(HT20) High Channel



Tx Channel

Bandwidth	19.1 MHz	Power	3.27 dBm

5. 6dB&20dB Bandwidth

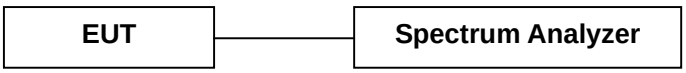
5.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

1. Set the RBW = 100KHz.
2. Set the VBW ≥ 3 x RBW
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully 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.

5.2 Test SET-UP (Block Diagram of Configuration)



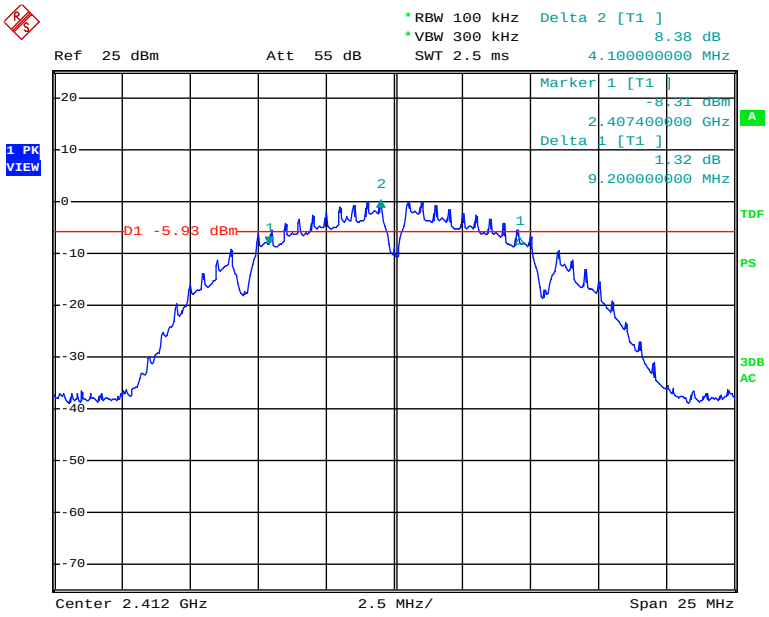
5.3 Measurement Results

Please refer to following table and plots.

Temperature :	22 ℃	Humidity : 54 %		
Test By:	Sance	Test Date : December 16, 2013		
Test Result:	PASS			
Frequency MHz	Data Rate Mbps	6dB Bandwidth MHz	20dB Bandwidth MHz	Limit
IEEE 802.11b Mode (CCK)				
Low Channel: 2412	1	9.2	15.45	>500KHz
Middle Channel: 2437	1	9.2	15.35	>500KHz
High Channel: 2462	1	9.2	15.25	>500KHz
IEEE 802.11g Mode (OFDM)				
Low Channel: 2412	6	16.6	18.55	>500KHz
Middle Channel: 2437	6	16.6	18.65	>500KHz
High Channel: 2462	6	16.6	18.40	>500KHz
IEEE 802.11n(HT20) Mode (OFDM)				
Low Channel: 2412	6.5	17.9	18.95	>500KHz
Middle Channel: 2437	6.5	17.9	19.05	>500KHz
High Channel: 2462	6.5	17.9	19.10	>500KHz

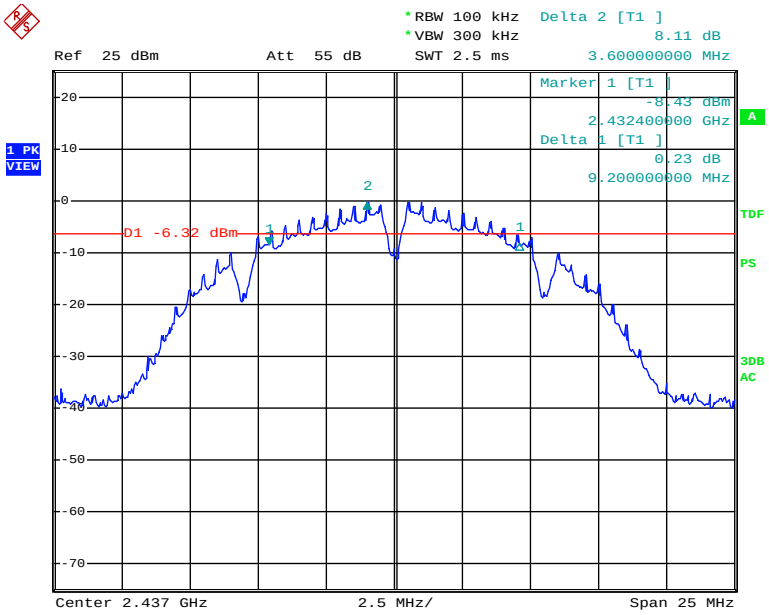
6dB Bandwidth

802.11b Low Channel



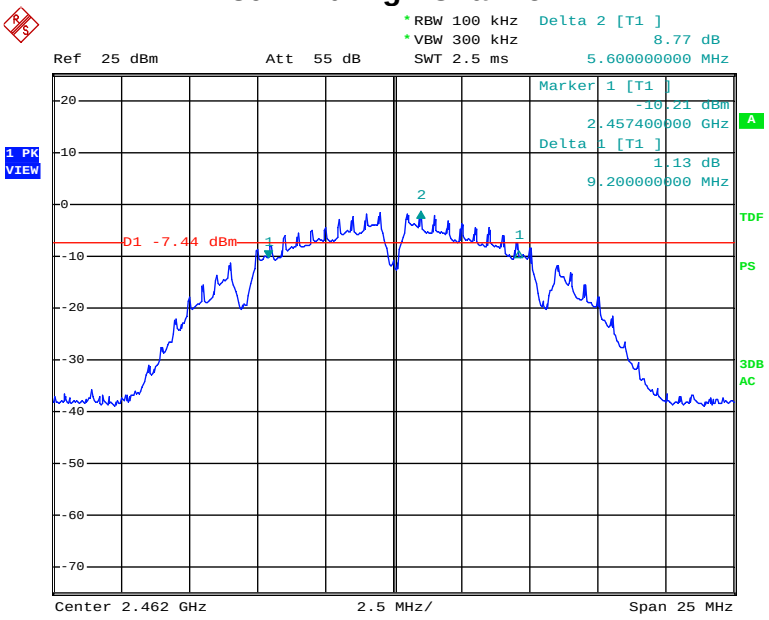
Date: 16.DEC.2013 09:24:34

802.11b Middle Channel



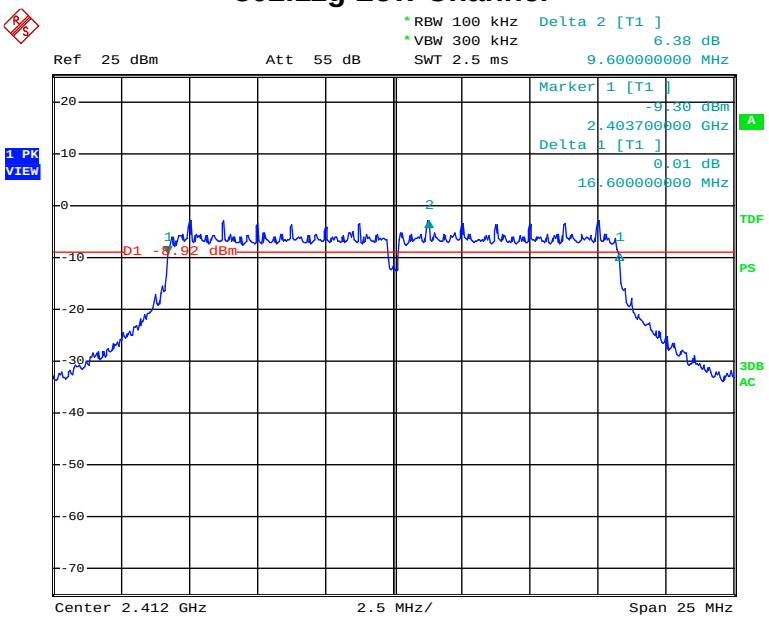
Date: 16.DEC.2013 09:53:58

802.11b High Channel



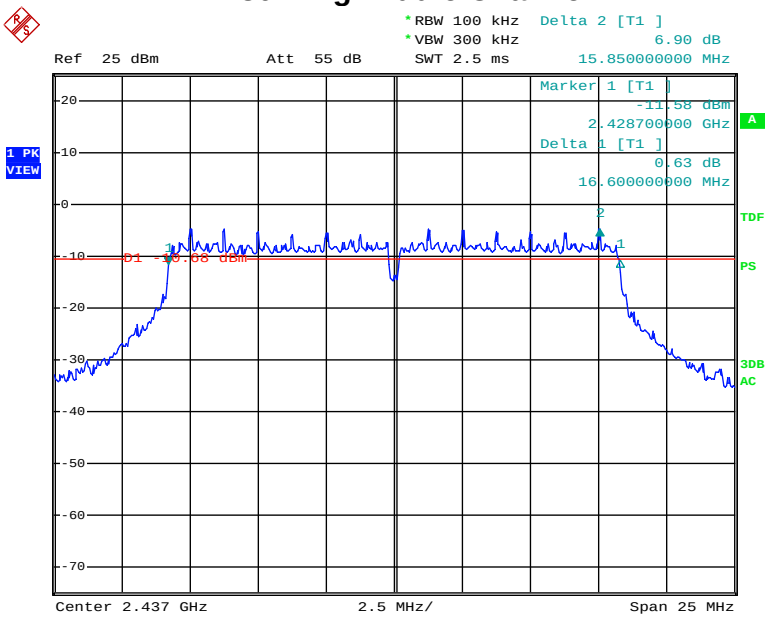
Date: 16.DEC.2013 11:43:57

802.11g Low Channel



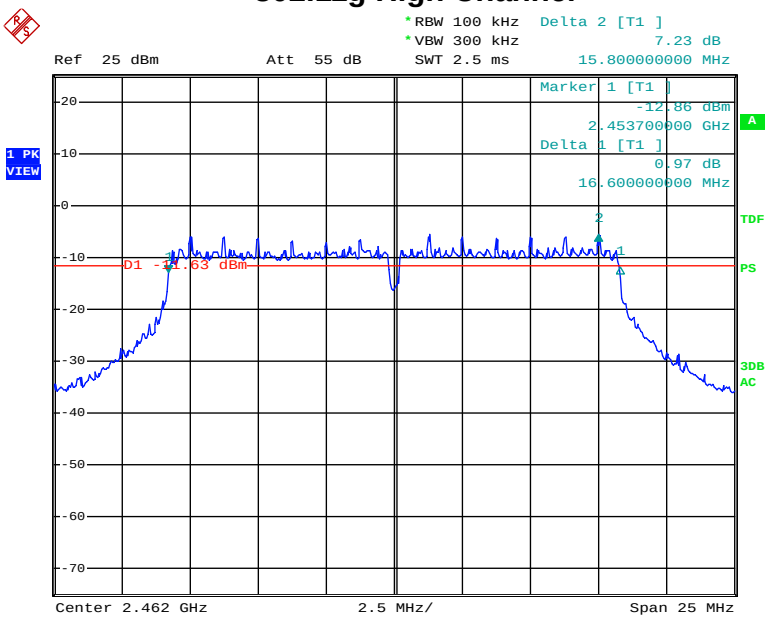
Date: 16.DEC.2013 12:01:05

802.11g Middle Channel



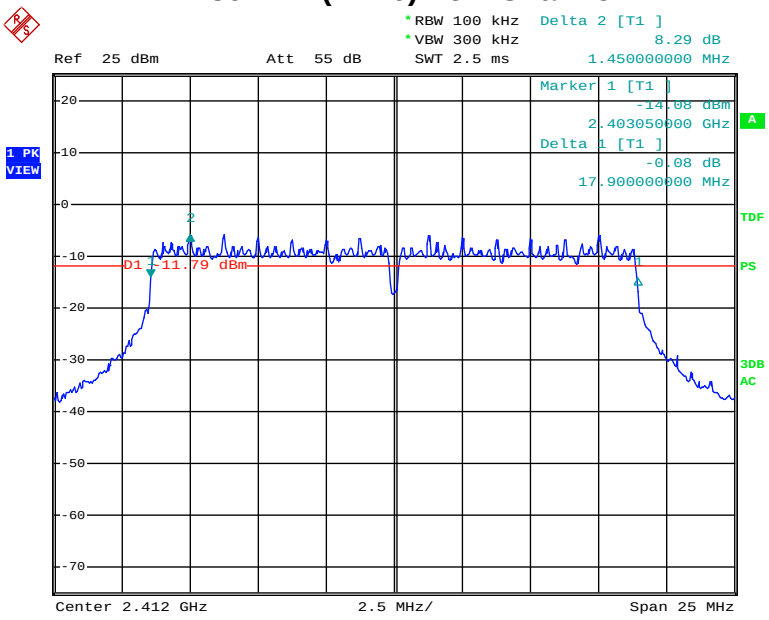
Date: 16.DEC.2013 12:23:38

802.11g High Channel



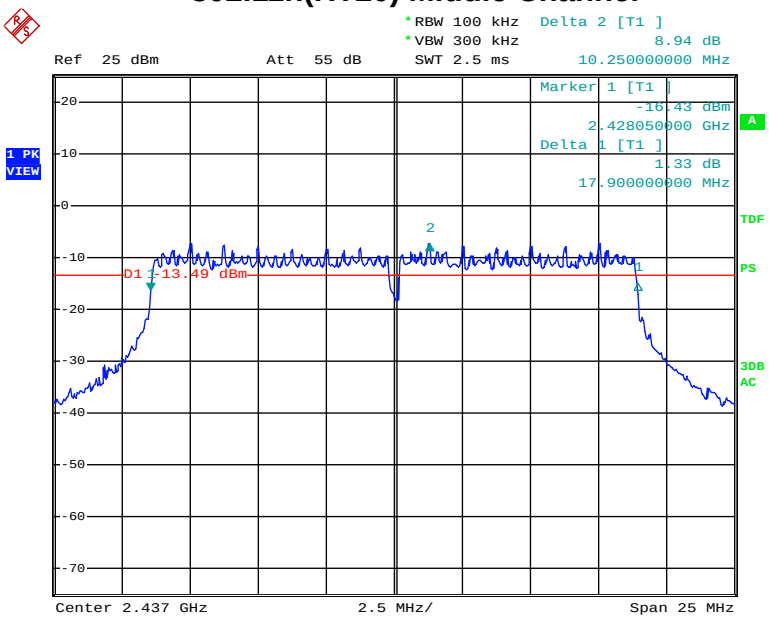
Date: 16.DEC.2013 12:31:44

802.11n(HT20) Low Channel



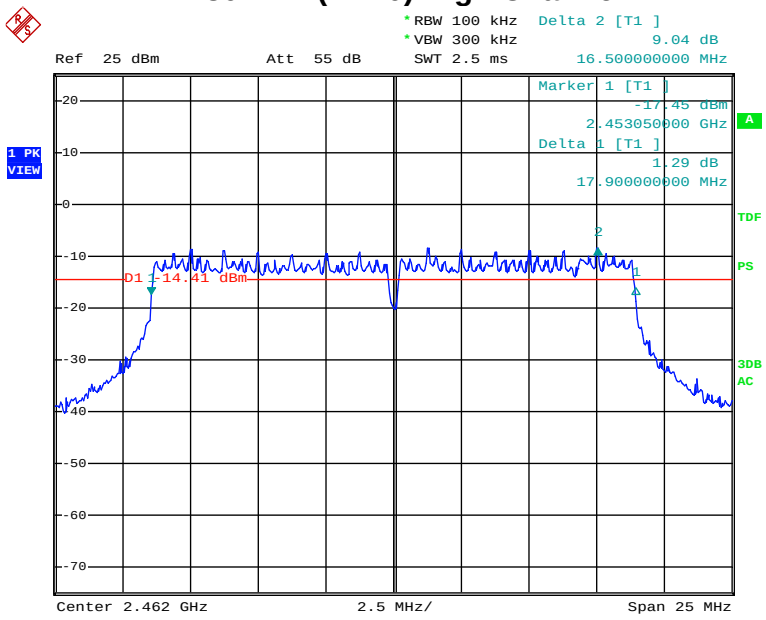
Date: 16.DEC.2013 12:41:24

802.11n(HT20) Middle Channel



Date: 16.DEC.2013 12:48:17

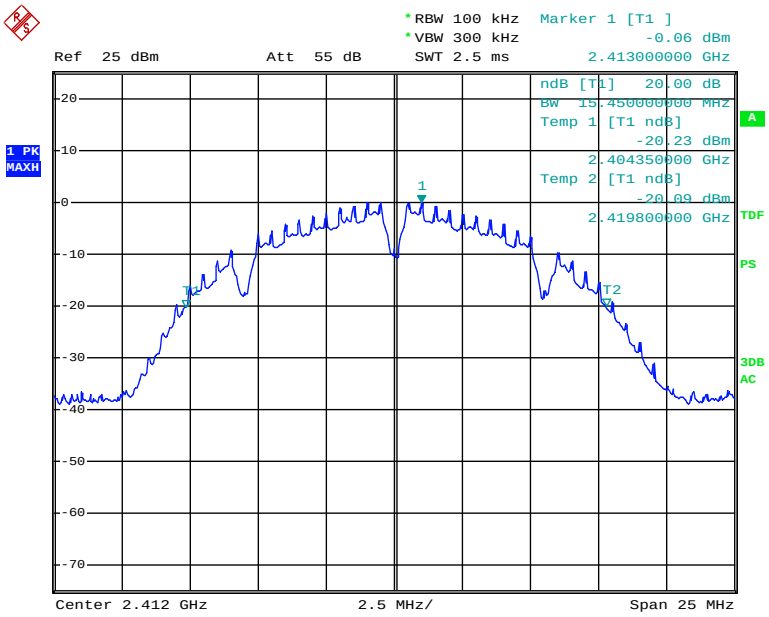
802.11n(HT20) High Channel



Date: 16.DEC.2013 12:54:21

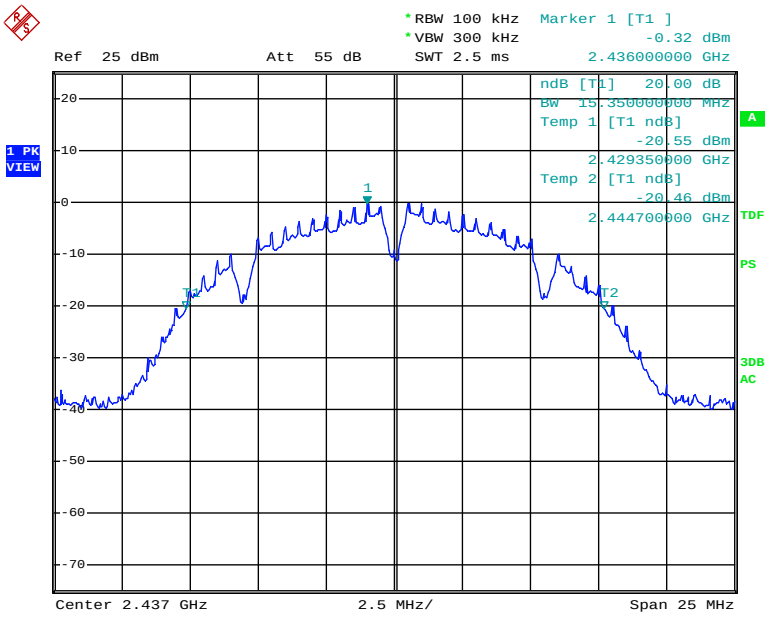
20dB Bandwidth

802.11b Low Channel



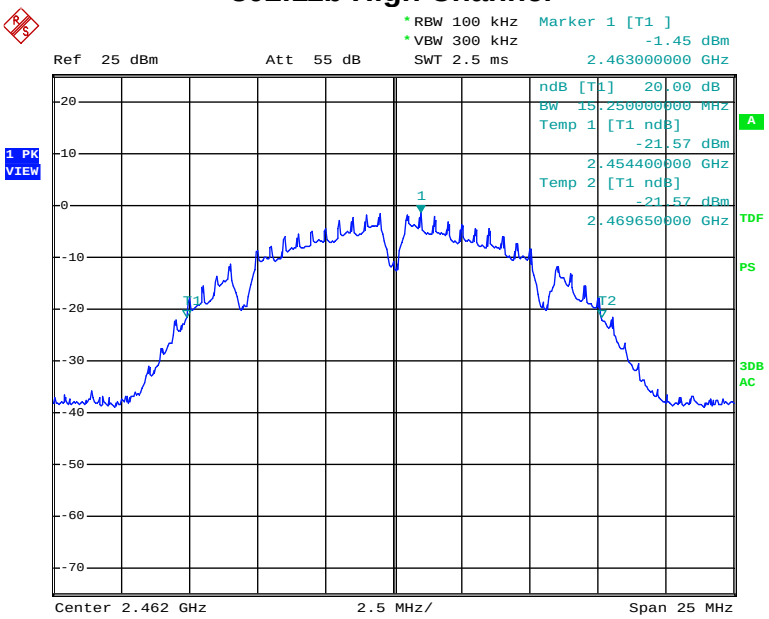
Date: 16.DEC.2013 09:23:39

802.11b Middle Channel



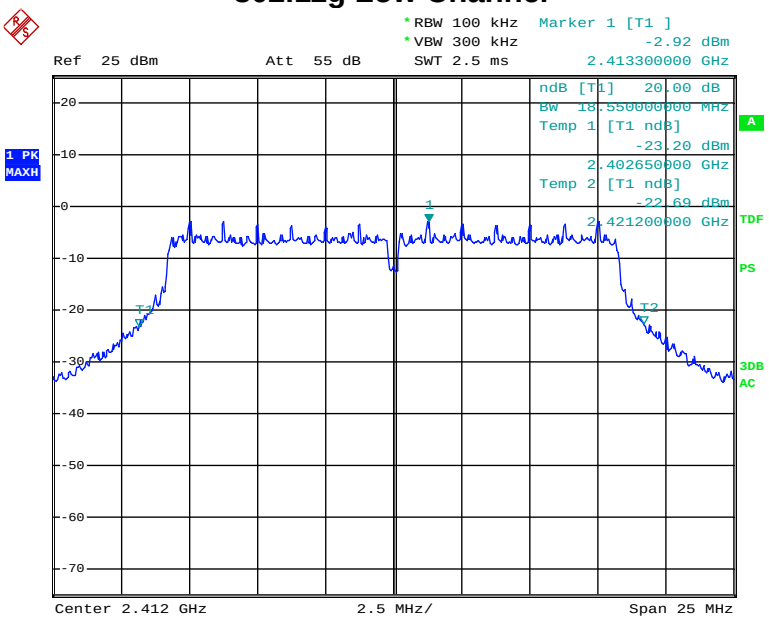
Date: 16.DEC.2013 09:52:48

802.11b High Channel



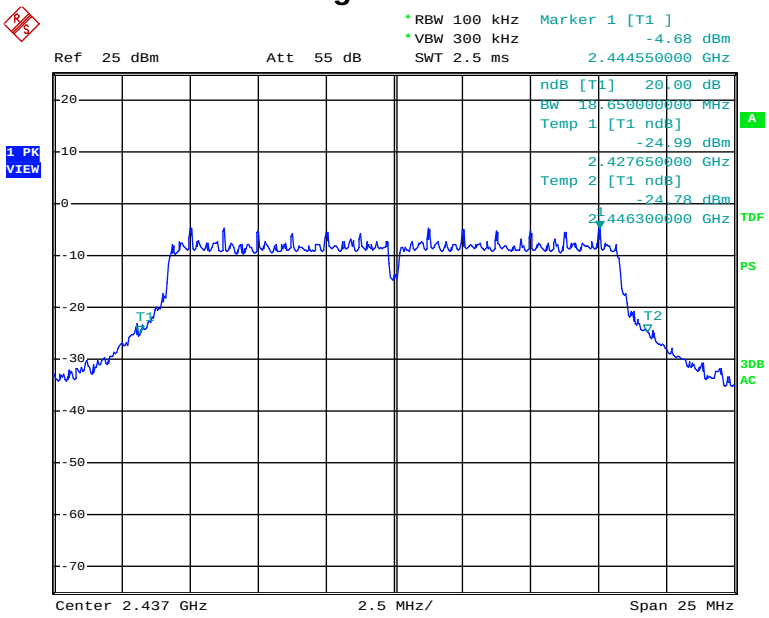
Date: 16.DEC.2013 11:42:54

802.11g Low Channel



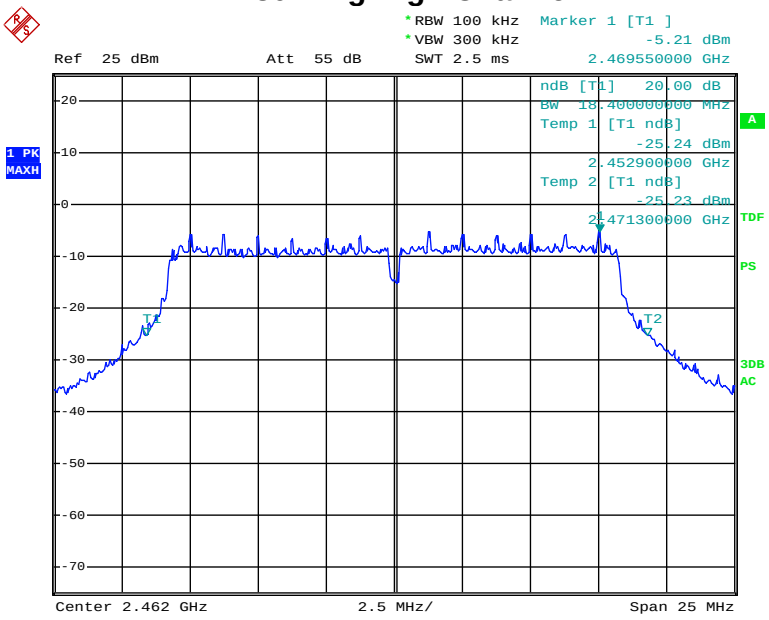
Date: 16.DEC.2013 11:59:40

802.11g Middle Channel



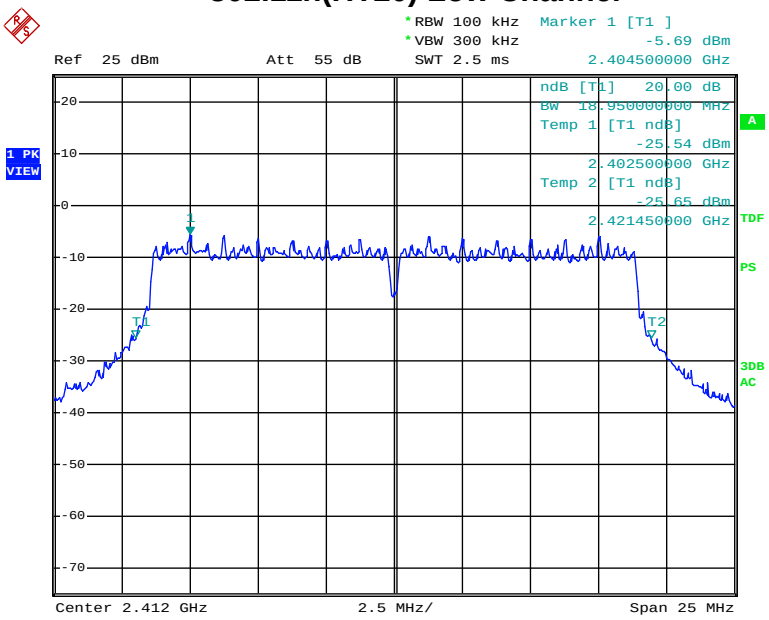
Date: 16.DEC.2013 12:22:54

802.11g High Channel



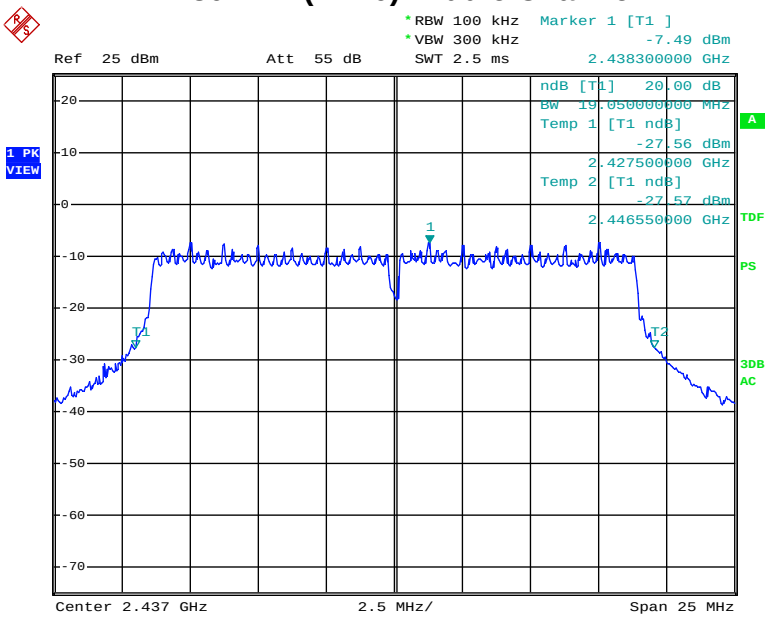
Date: 16.DEC.2013 13:23:24

802.11n(HT20) Low Channel



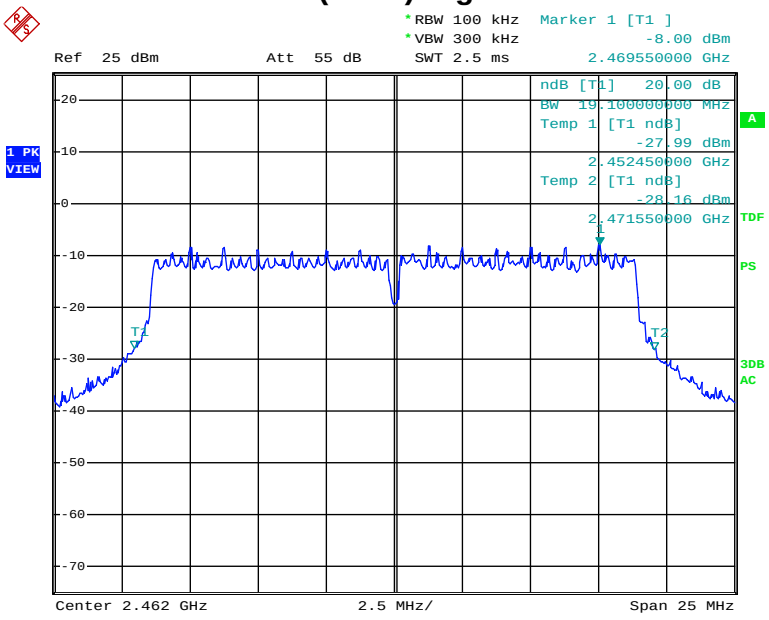
Date: 16.DEC.2013 12:39:20

802.11n(HT20) Middle Channel



Date: 16.DEC.2013 12:47:30

802.11n(HT20) High Channel



Date: 16.DEC.2013 13:19:01

6. Power Spectral Density

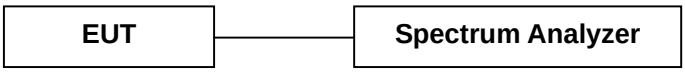
6.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

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 kHz≤RBW≤100KHz
4. Set the VBW ≥ 3 x 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.

6.2 Test SET-UP (Block Diagram of Configuration)

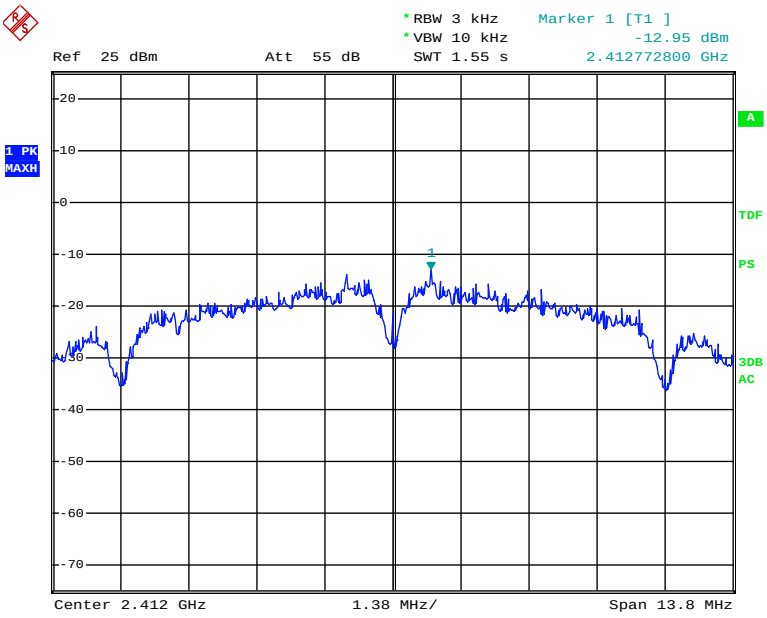


6.3 Measurement Results

Please refer to following table and plots.

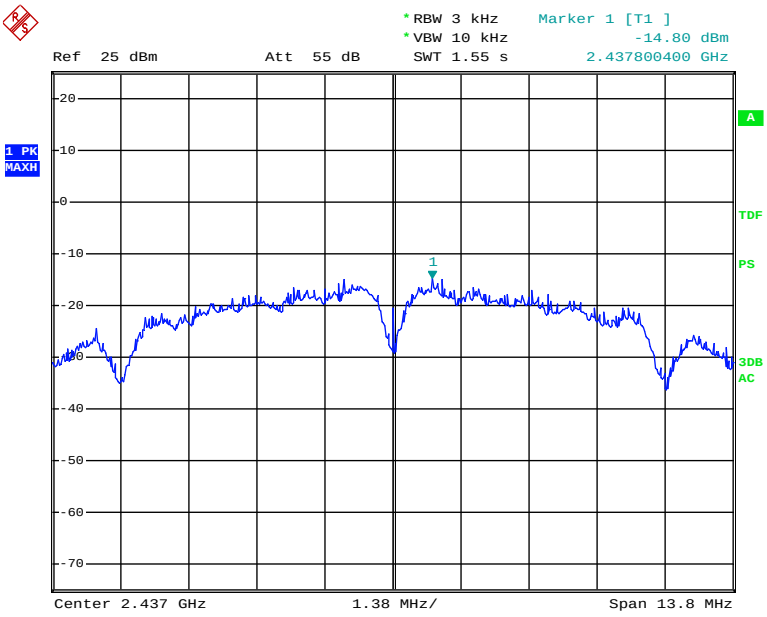
Temperature :	22 ℃	Humidity :	54 %
Test By:	Sance	Test Date :	December 16, 2013
Test Result:	PASS		
Frequency MHz	Data Rate Mbps	PSD dBm	Limit dBm
IEEE 802.11b Mode (CCK)			
Low Channel: 2412	1	-12.95	8
Middle Channel: 2437	1	-14.80	8
High Channel: 2462	1	-17.95	8
IEEE 802.11g Mode (OFDM)			
Low Channel: 2412	6	-17.08	8
Middle Channel: 2437	6	-18.60	8
High Channel: 2462	6	-19.20	8
IEEE 802.11n(HT20) Mode (OFDM)			
Low Channel: 2412	6.5	-21.72	8
Middle Channel: 2437	6.5	-22.75	8
High Channel: 2462	6.5	-19.20	8

802.11b Low Channel



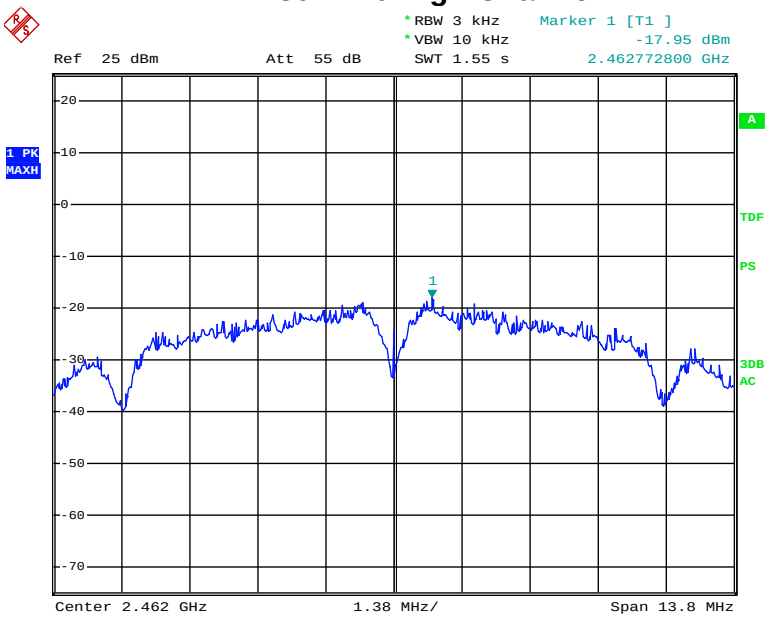
Date: 16.DEC.2013 09:32:58

802.11b Middle Channel



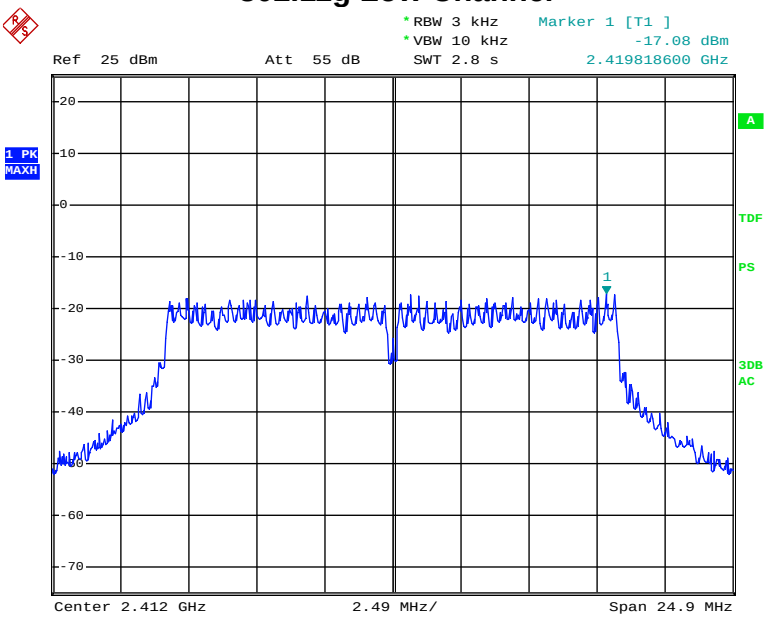
Date: 16.DEC.2013 17:04:03

802.11b High Channel



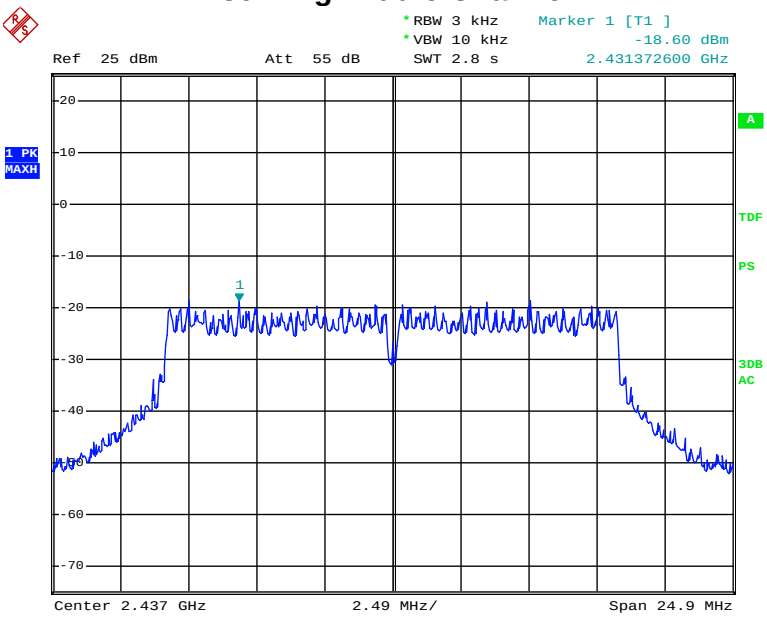
Date: 16.DEC.2013 11:46:29

802.11g Low Channel



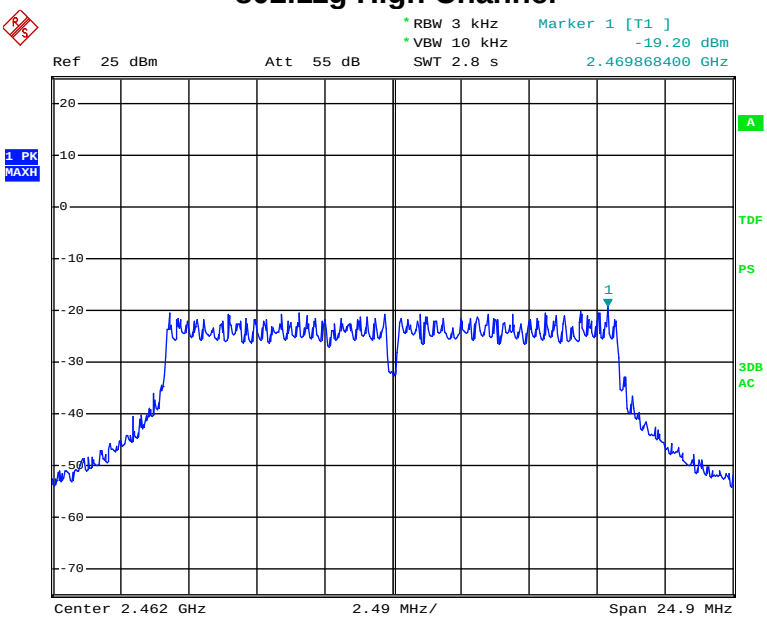
Date: 16.DEC.2013 12:06:21

802.11g Middle Channel



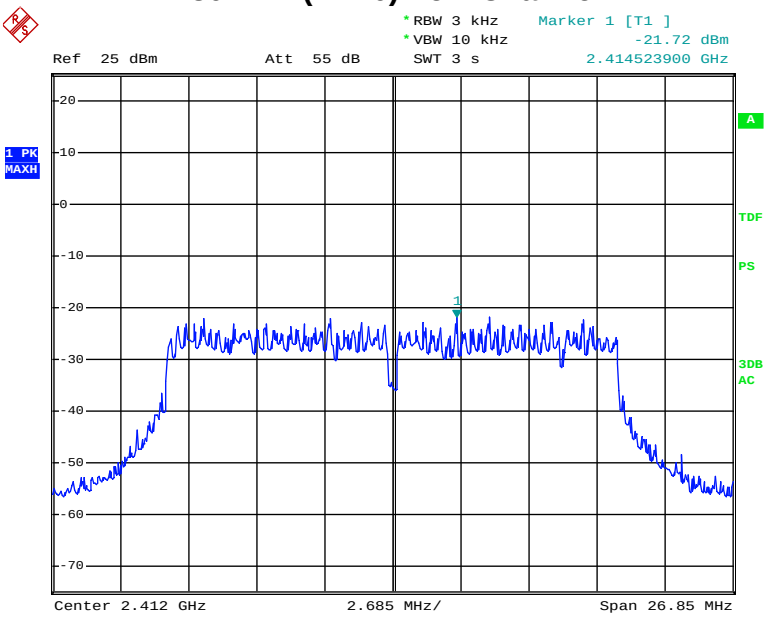
Date: 16.DEC.2013 12:27:44

802.11g High Channel



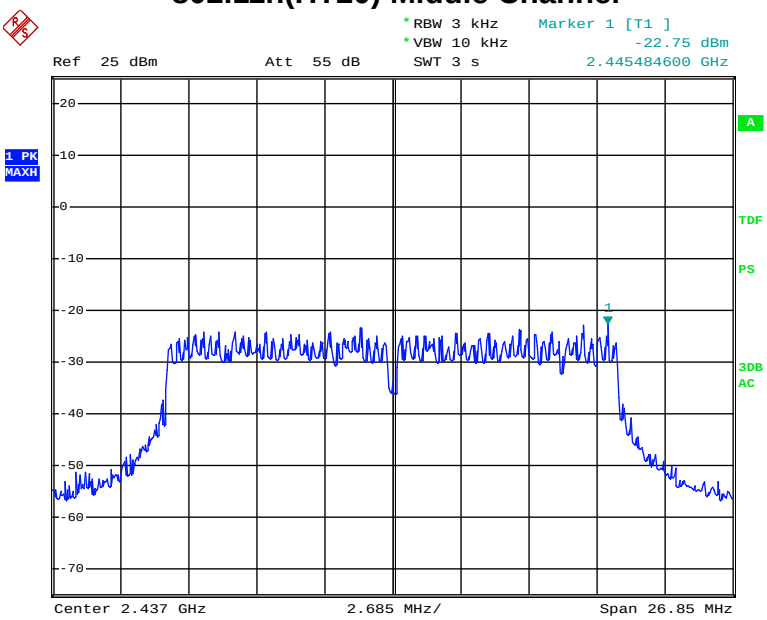
Date: 16.DEC.2013 12:36:04

802.11n(HT20) Low Channel



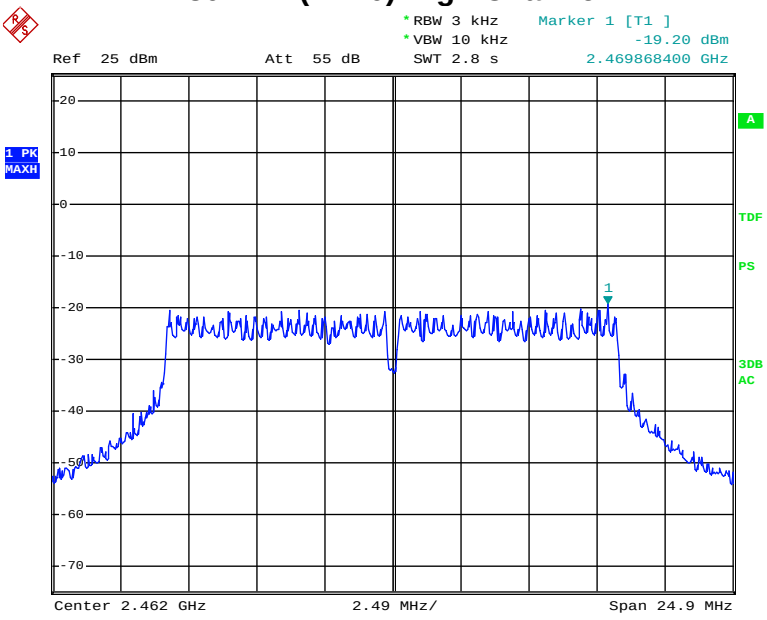
Date: 16.DEC.2013 12:44:41

802.11n(HT20) Middle Channel



Date: 16.DEC.2013 12:49:23

802.11n(HT20) High Channel



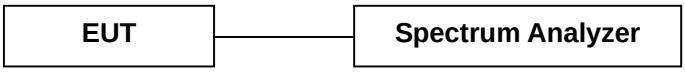
Date: 16.DEC.2013 12:36:04

7. Band Edge and Conducted Spurious Emissions

7.1 Requirement and Measurement Procedure

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator 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 the desired power, based on either an RF conducted or a radiated measurement.
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set according to FCC KDB558074(v03) clause 11.3.

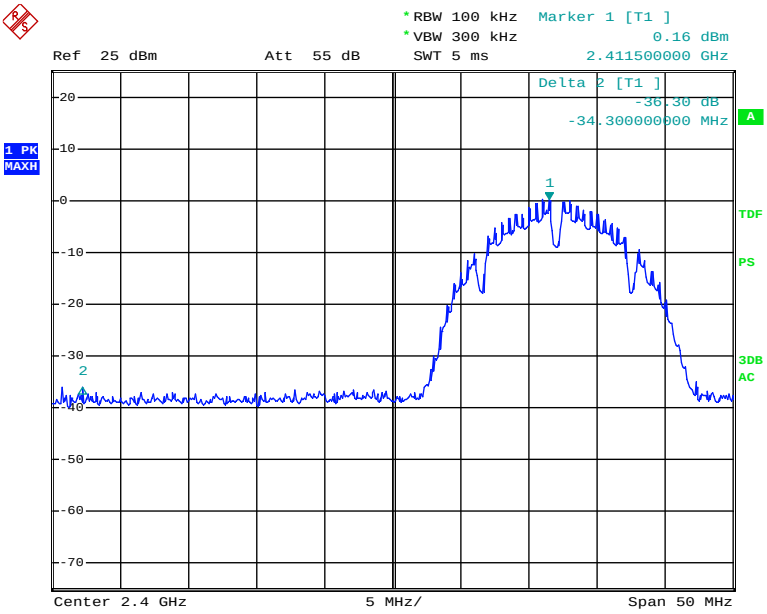
7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Results

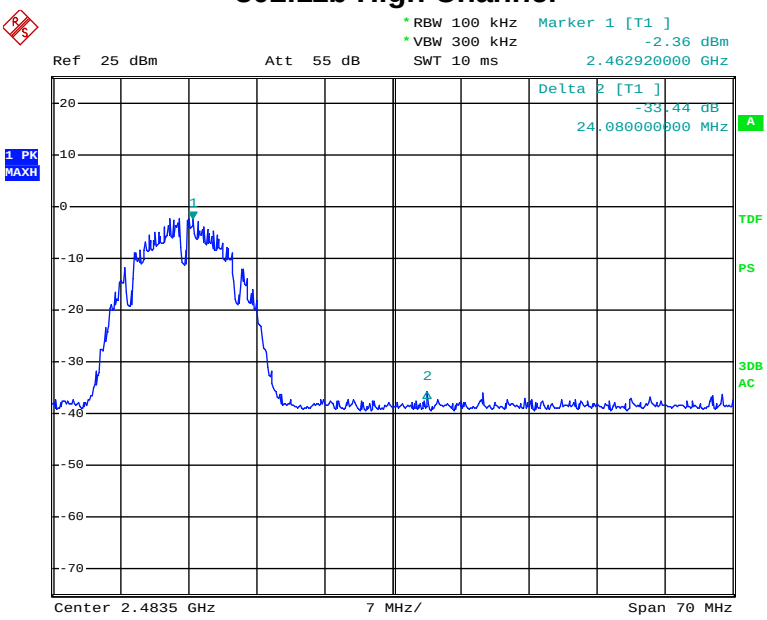
The test plots showed all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the highest level of the desired power in the passband. Please refer to below plots.

Band Edge
802.11b Low Channel



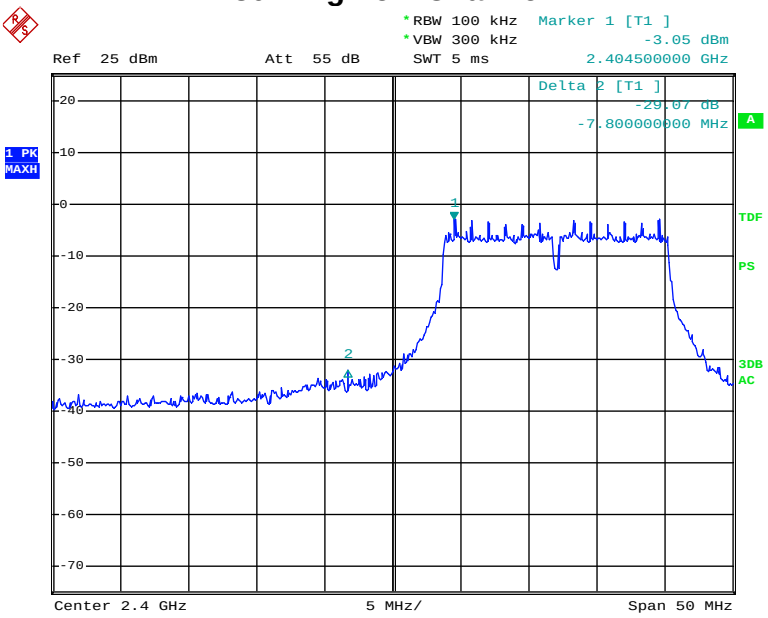
Date: 16.DEC.2013 09:32:26

802.11b High Channel



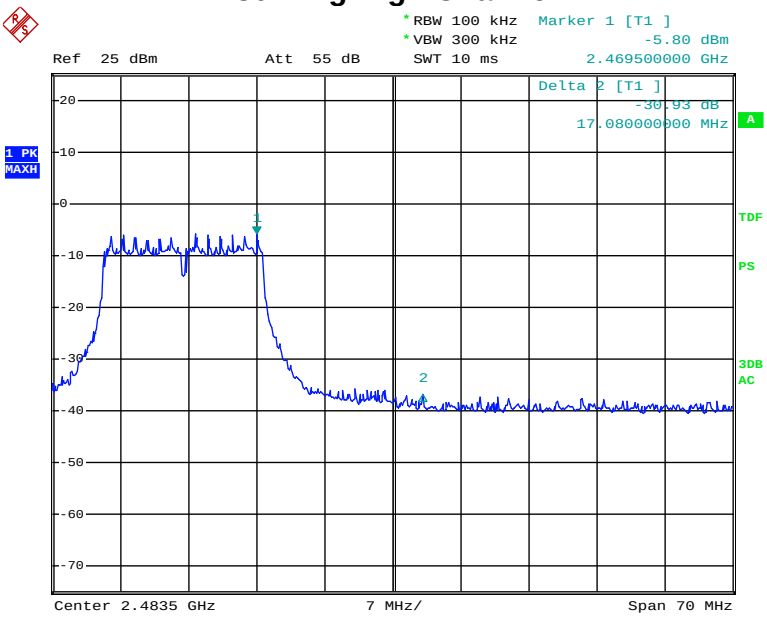
Date: 16.DEC.2013 11:47:31

802.11g Low Channel



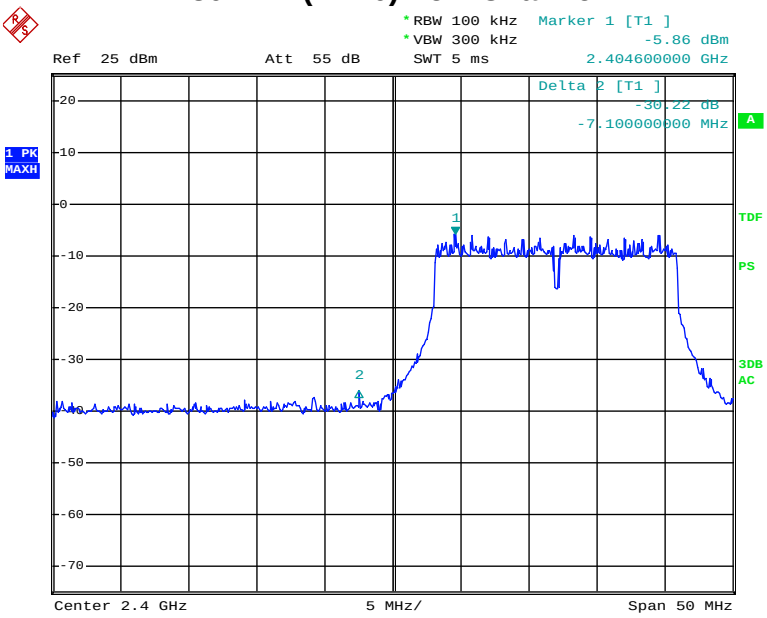
Date: 16.DEC.2013 12:05:53

802.11g High Channel



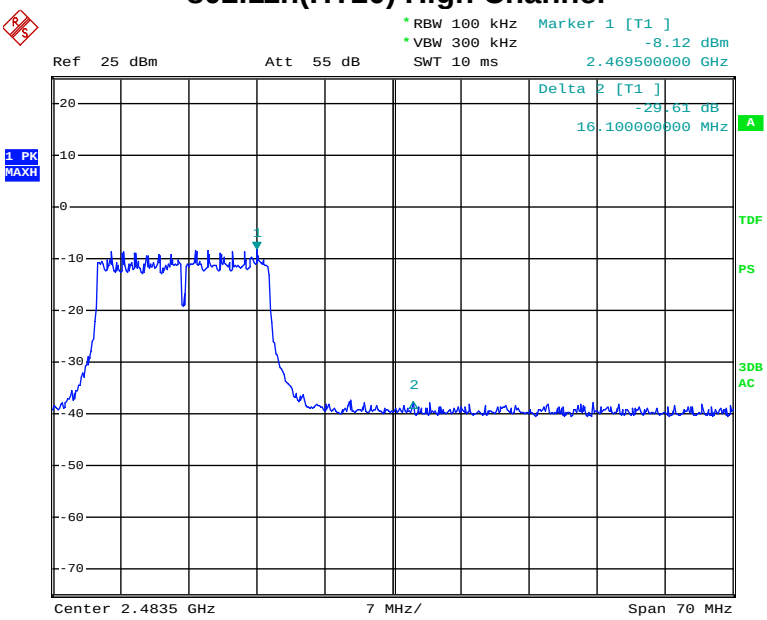
Date: 16.DEC.2013 12:37:00

802.11n(HT20) Low Channel



Date: 16.DEC.2013 12:45:34

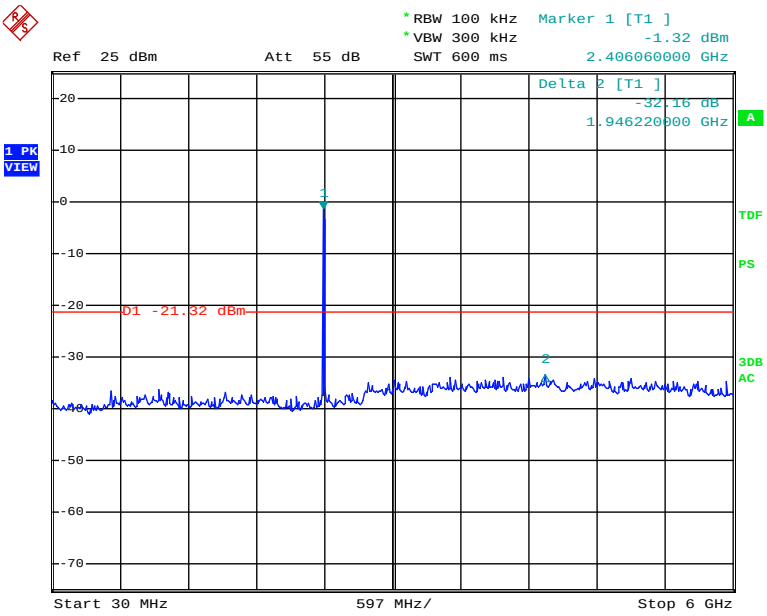
802.11n(HT20) High Channel



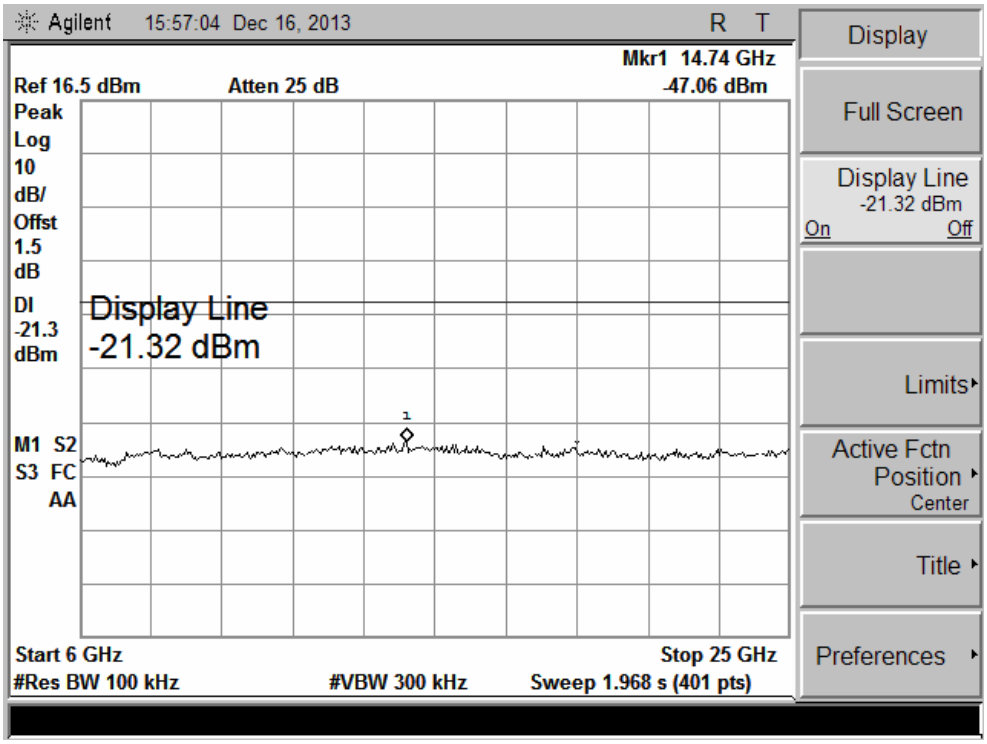
Date: 16.DEC.2013 12:55:30

Conducted Spurious Emissions

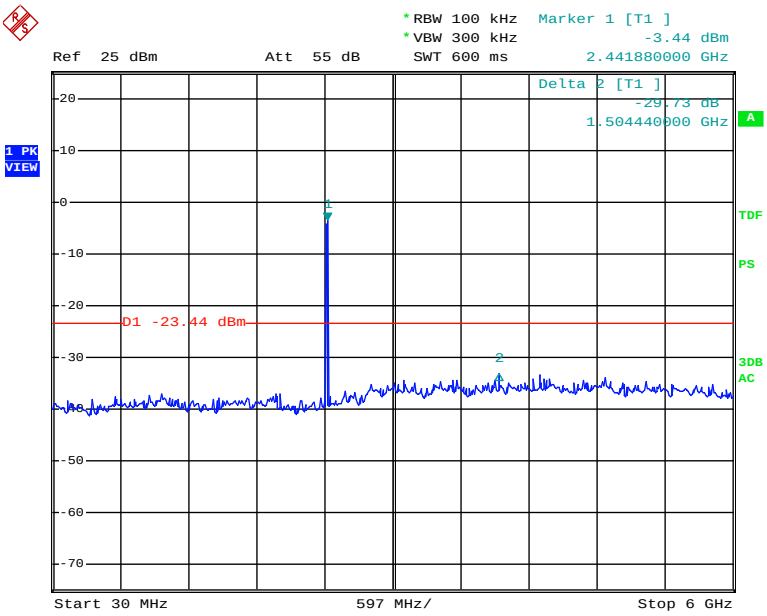
802.11b Low Channel



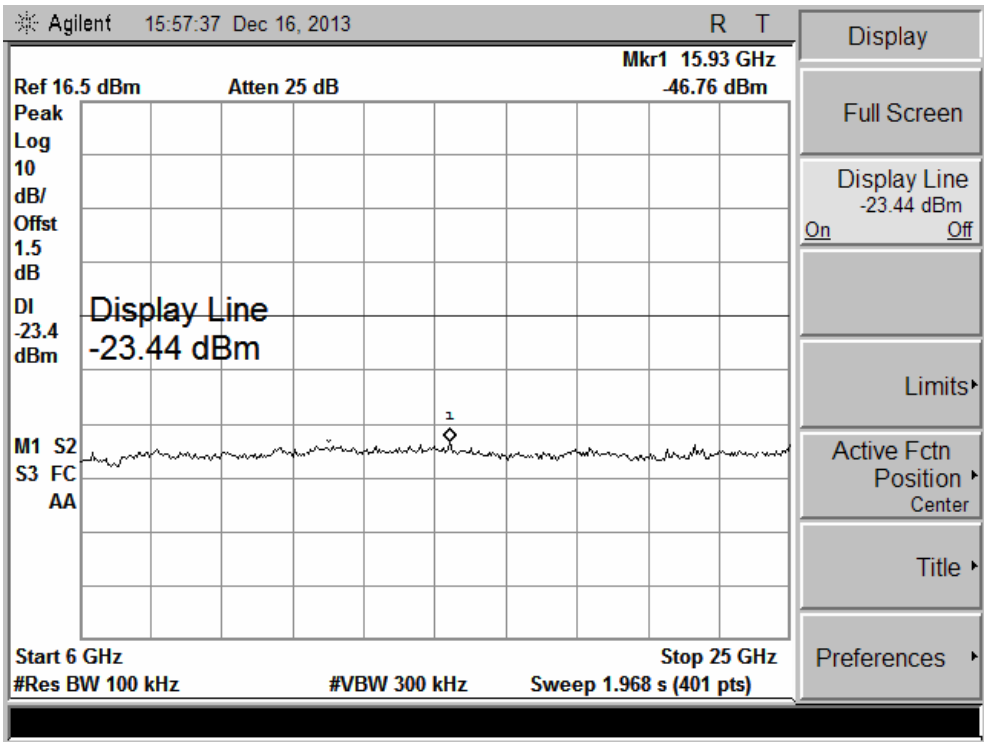
Date: 16.DEC.2013 09:33:56



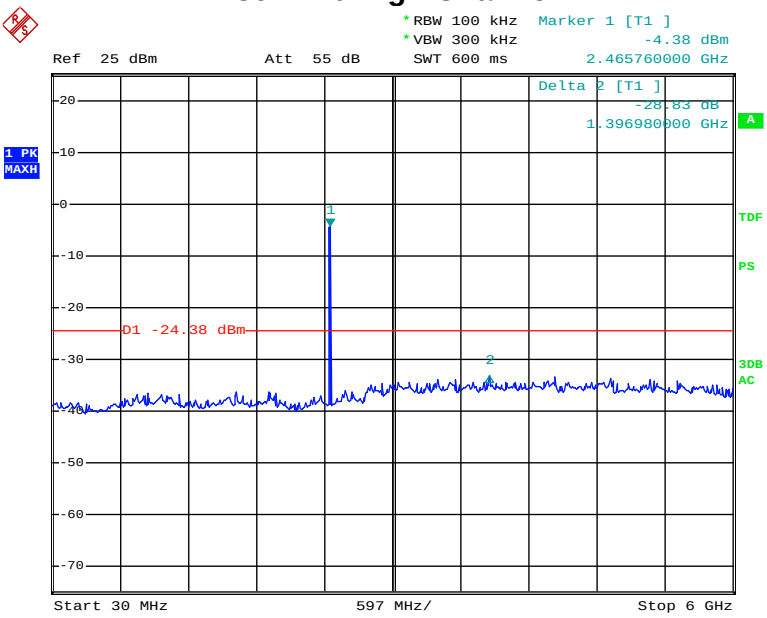
802.11b Middle Channel



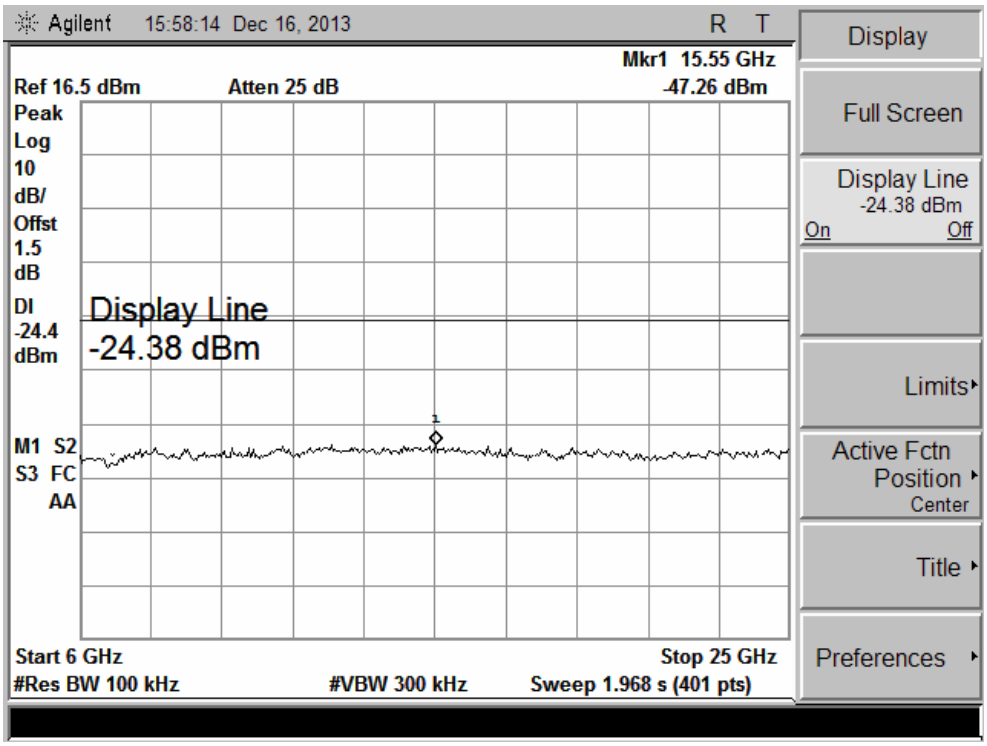
Date: 16.DEC.2013 09:35:46



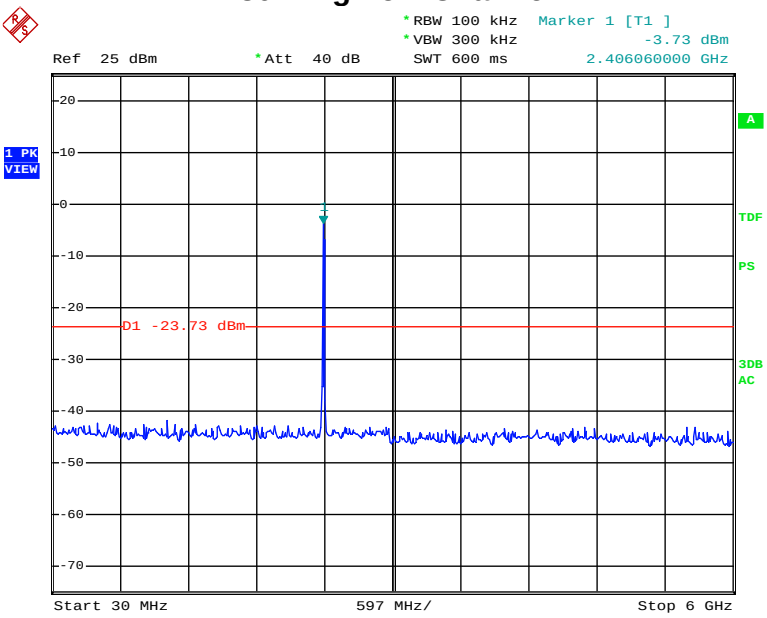
802.11b High Channel



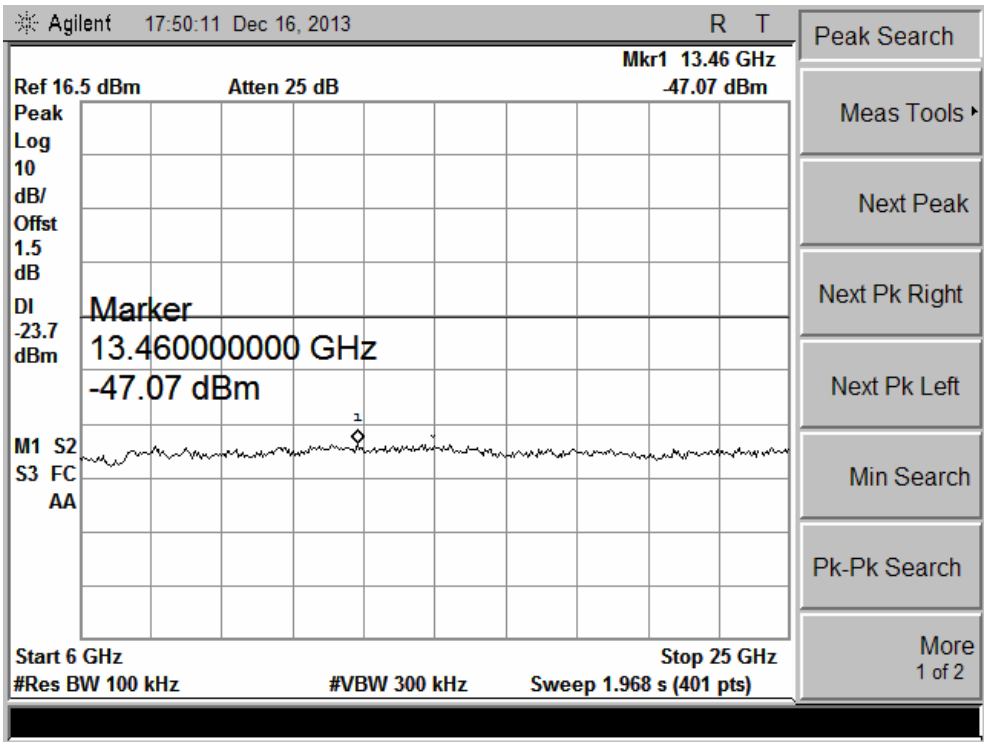
Date: 16.DEC.2013 11:48:43



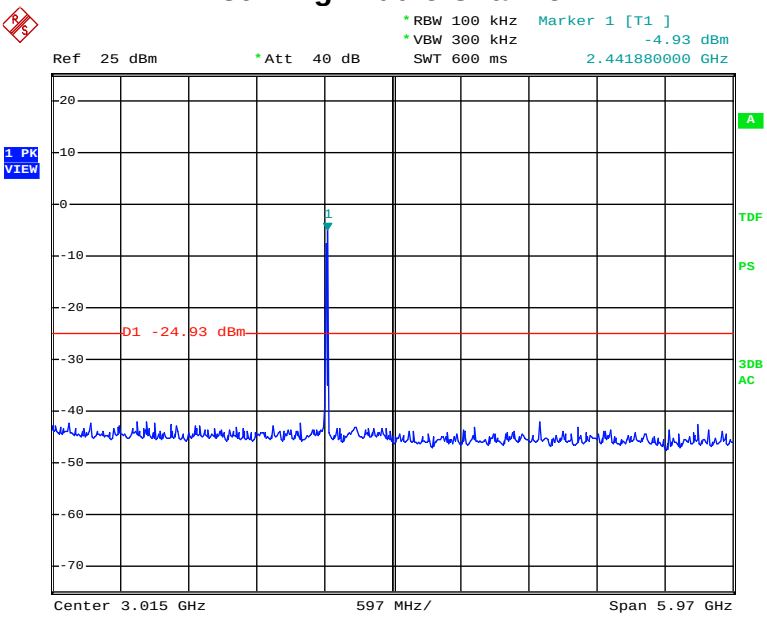
802.11g Low Channel



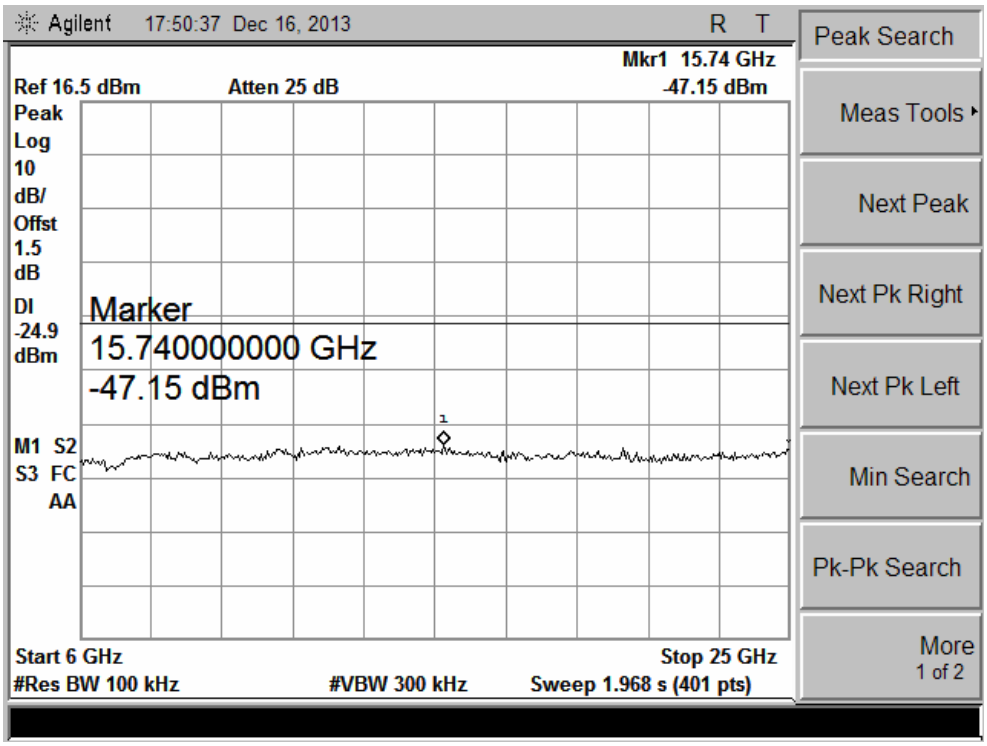
Date: 16.DEC.2013 17:30:56



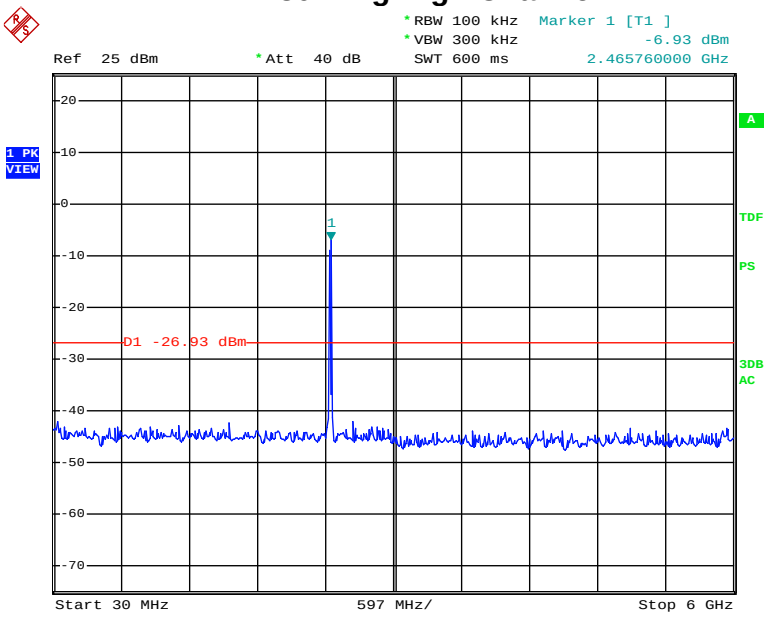
802.11g Middle Channel



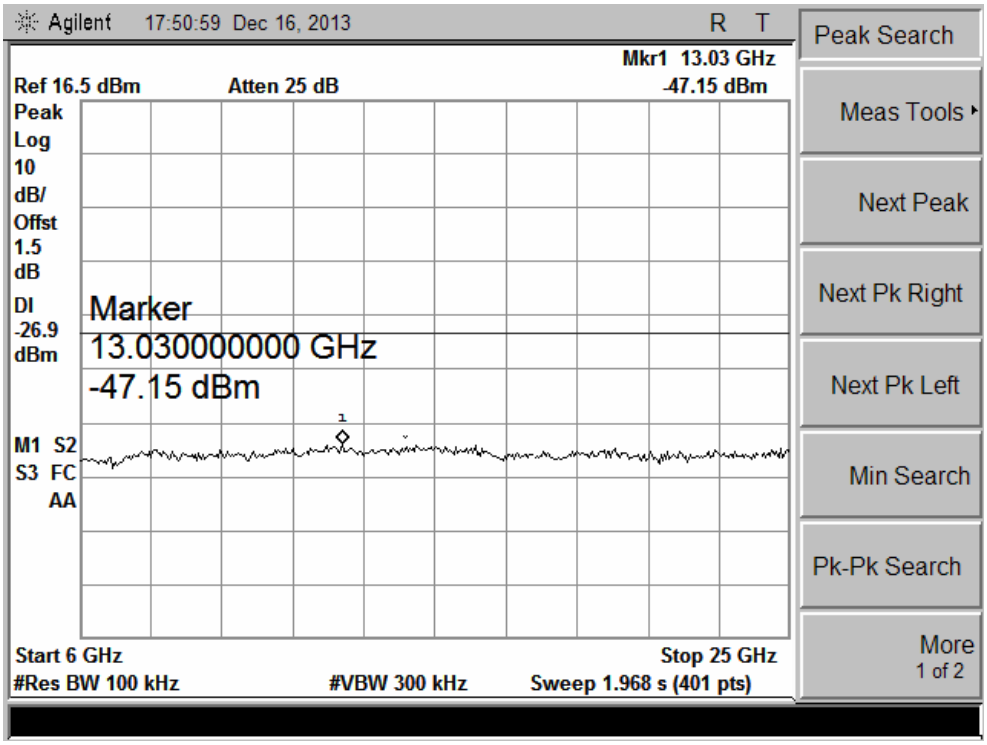
Date: 16.DEC.2013 17:30:11



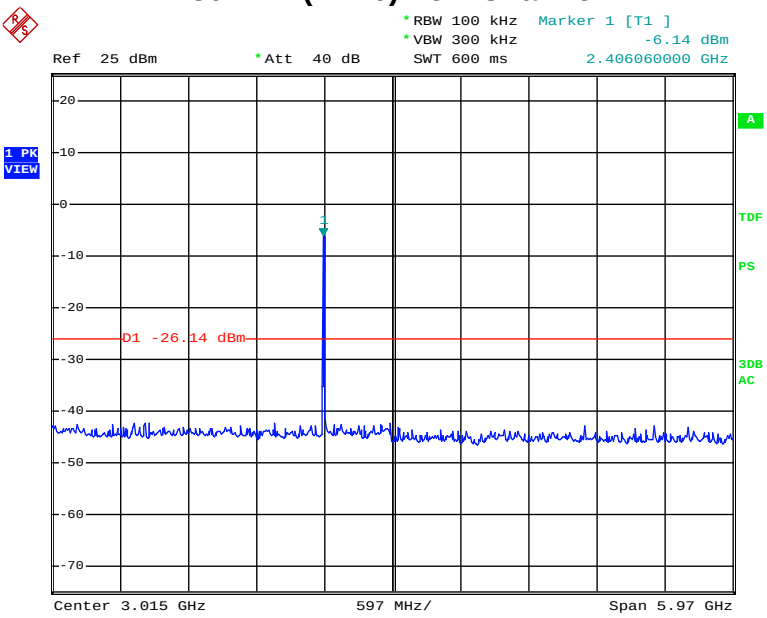
802.11g High Channel



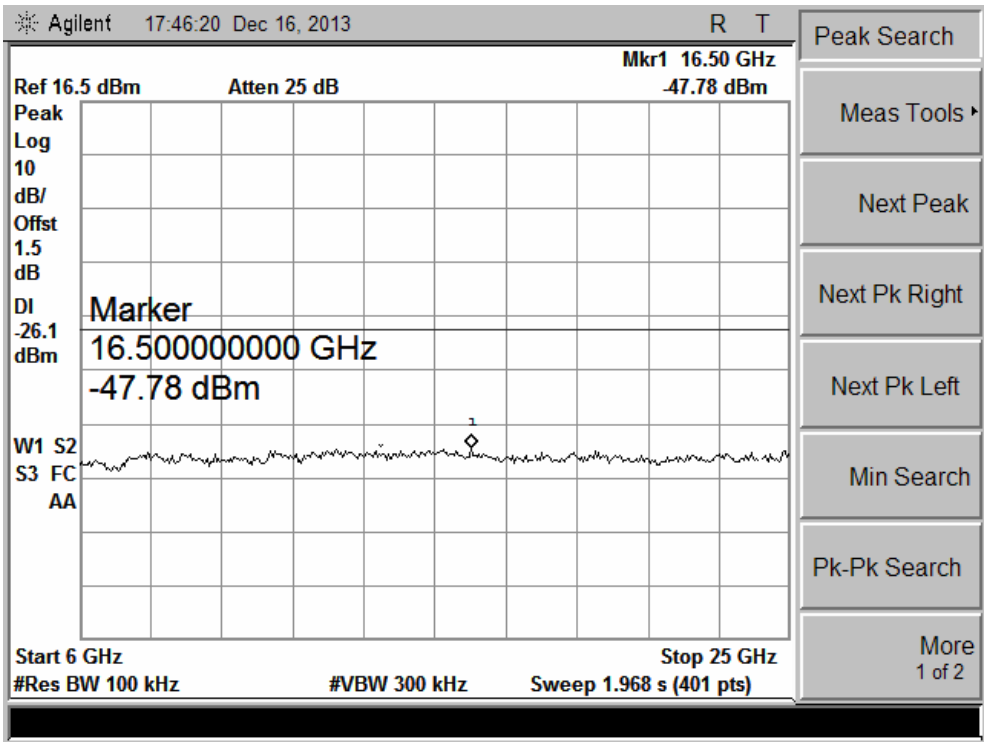
Date: 16.DEC.2013 17:29:21



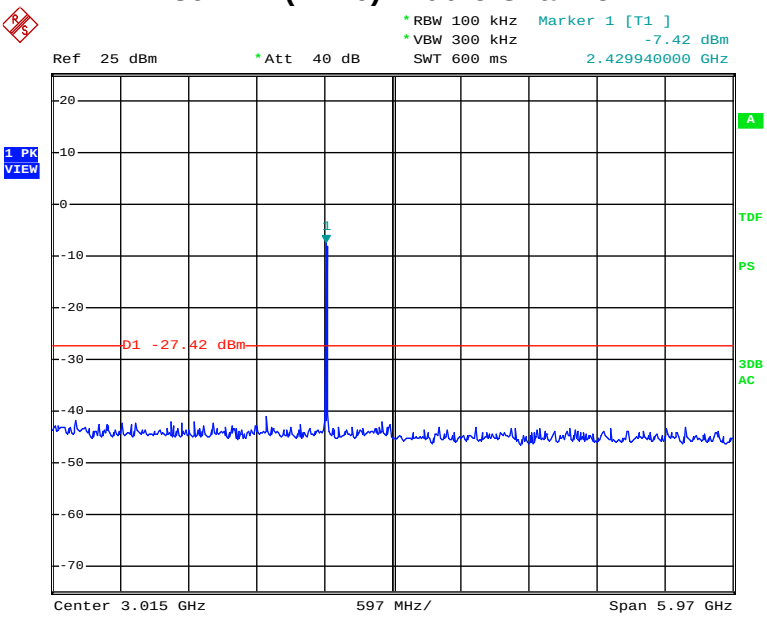
802.11n(HT20) Low Channel



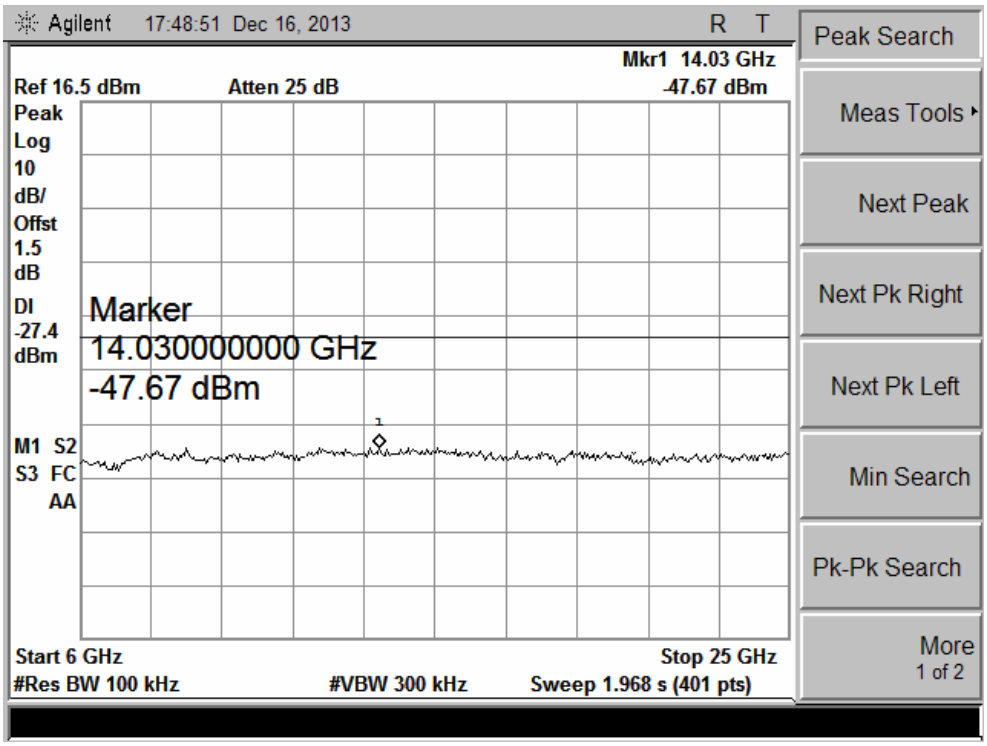
Date: 16.DEC.2013 17:32:27



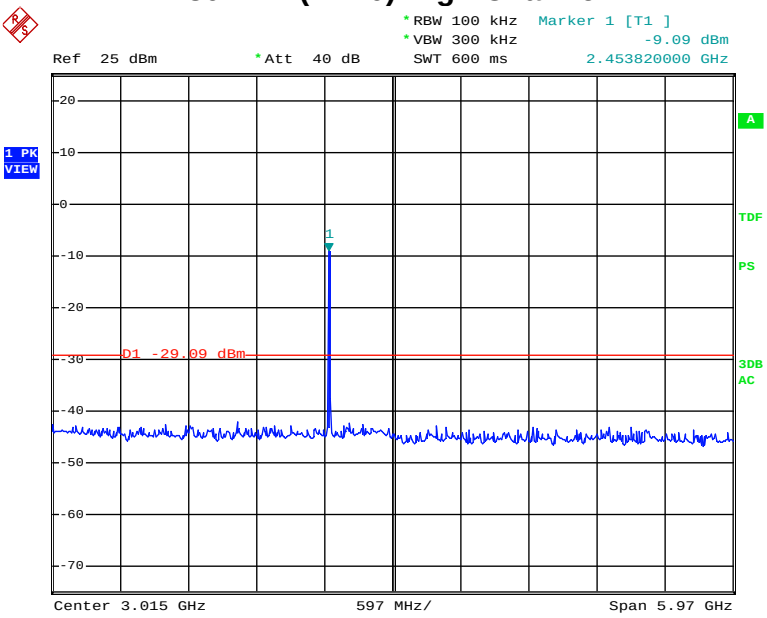
802.11n(HT20) Middle Channel



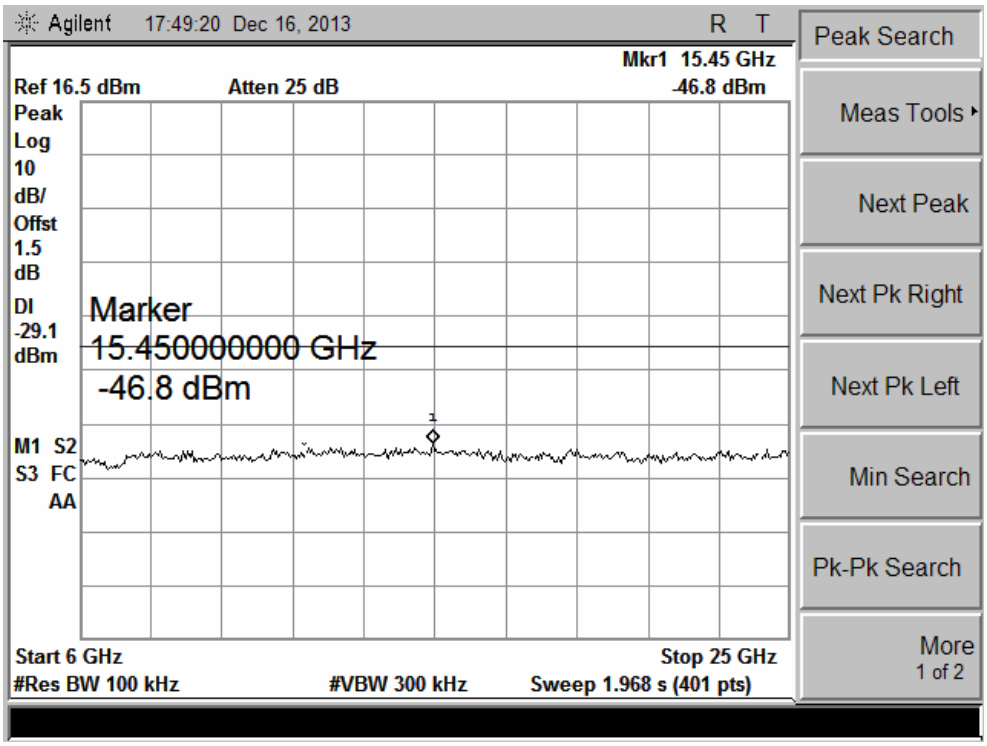
Date: 16.DEC.2013 17:33:42



802.11n(HT20) High Channel



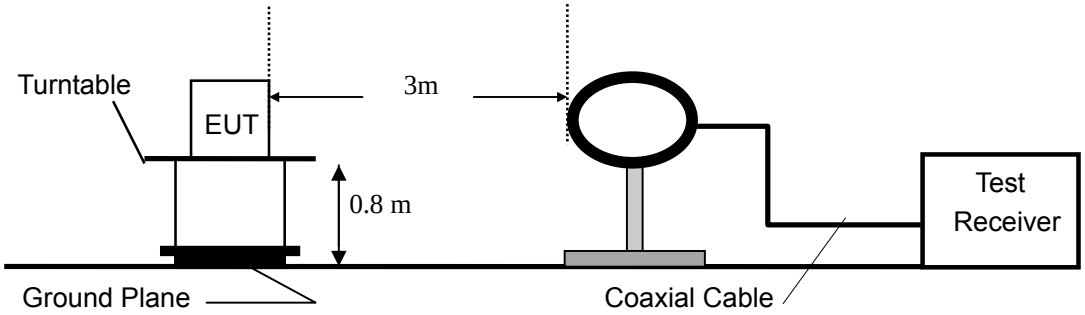
Date: 16.DEC.2013 17:34:29

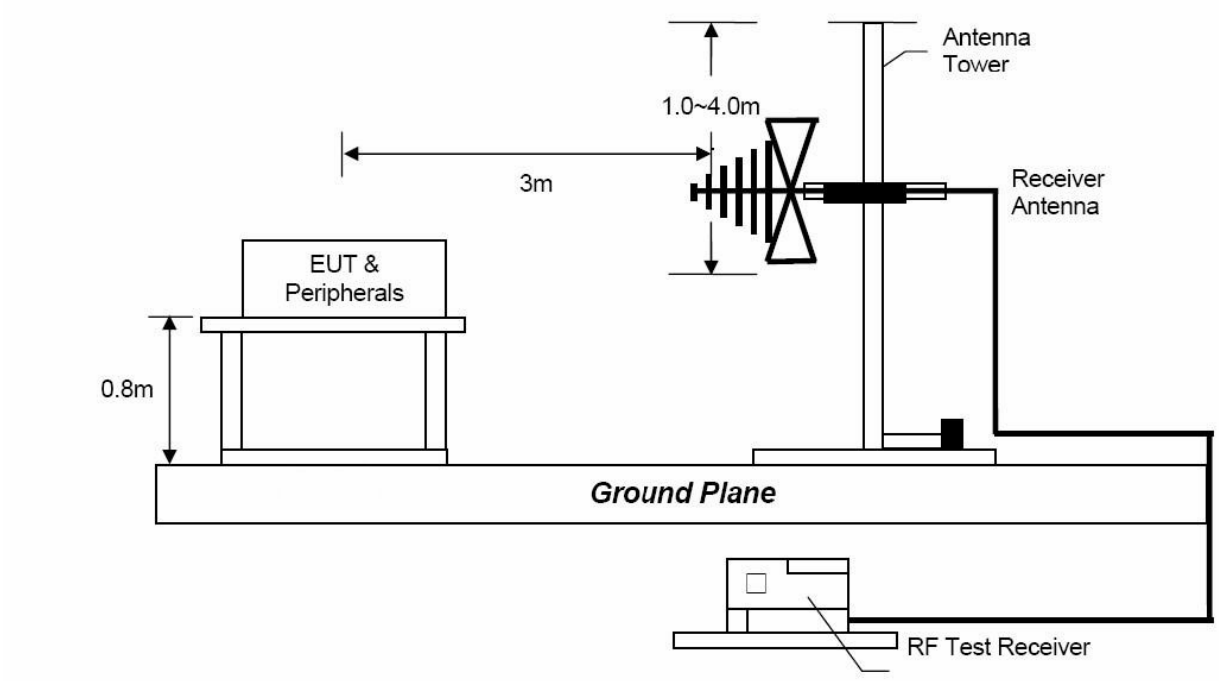


8. Radiated Spurious Emissions and Restricted Bands

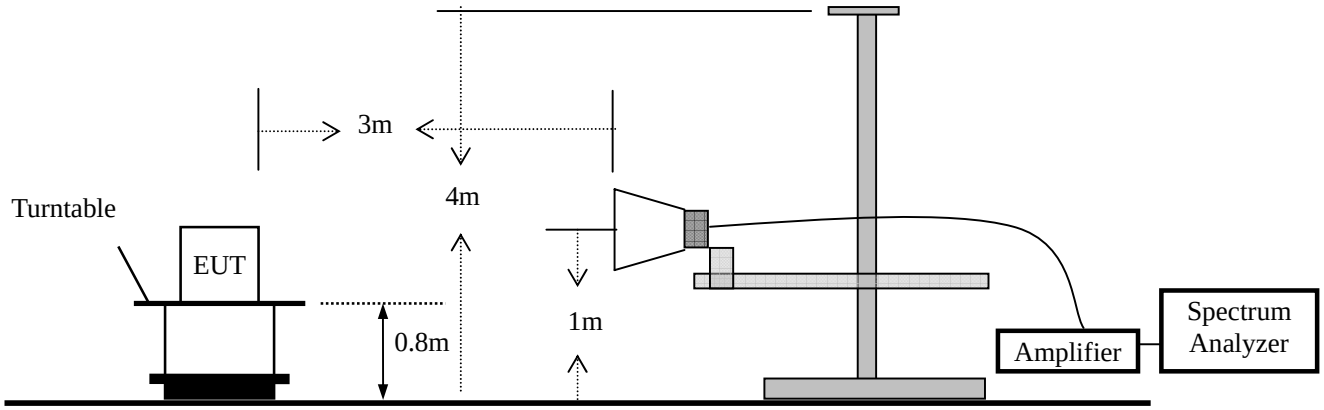
8.1 Test SET-UP (Block Diagram of Configuration)

8.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz





8.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



8.2 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

8.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209) μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
(5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

8.4 Measurement Results

Test Mode:	802.11b(the worst case)		
Frequency Range:	9KHz~1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance
Test Date :	December 16, 2013		

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
90.1400	V	21.19	43.50	-22.31	QP
312.2700	V	24.68	46.00	-21.32	QP
576.1100	V	25.12	46.00	-20.88	QP
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
191.2500	H	22.87	43.50	-20.63	QP
365.8200	H	24.54	46.00	-21.46	QP
400.7300	H	24.80	46.00	-21.20	QP
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Other emissions are lower than 20dB below the allowable limit.

Note: (1) Quasi-Peak detector is used except for others stated.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB.

Test Mode:	802.11b		
Operation Mode:	TX Mode (Low)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4824	V	58.18	46.79	74.00	54.00	-15.82	-7.21
7236	V	56.24	44.60	74.00	54.00	-17.76	-9.40
9648	V	57.35	42.94	74.00	54.00	-16.65	-11.06
4824	H	61.20	51.91	74.00	54.00	-12.80	-2.09
7236	H	59.47	48.58	74.00	54.00	-14.53	-5.42
9648	H	56.18	42.73	74.00	54.00	-17.82	-11.27

Test Mode:	802.11b		
Operation Mode:	TX Mode (Mid)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4874	V	57.42	45.44	74.00	54.00	-16.58	-8.56
7311	V	55.31	43.25	74.00	54.00	-18.69	-10.75
9748	V	56.34	42.11	74.00	54.00	-17.66	-11.89
4874	H	59.71	50.79	74.00	54.00	-14.29	-3.21
7311	H	57.99	45.82	74.00	54.00	-16.01	-8.18
9748	H	56.16	42.36	74.00	54.00	-17.84	-11.64

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

Test Mode:	802.11b		
Operation Mode:	TX Mode (High)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4924	V	56.44	44.40	74.00	54.00	-17.56	-9.60
7386	V	54.89	41.97	74.00	54.00	-19.11	-12.03
9848	V	57.04	42.88	74.00	54.00	-16.96	-11.12
4924	H	59.14	49.29	74.00	54.00	-14.86	-4.71
7386	H	56.28	44.01	74.00	54.00	-17.72	-9.99
9848	H	56.66	42.34	74.00	54.00	-17.34	-11.66

Spurious Emission in restricted band:

Test Mode:	802.11b		
Operation Mode:	TX	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
2397.000	H	50.83	39.12	74.00	54.00	-23.17	-14.88
2397.280	V	47.03	35.21	74.00	54.00	-26.97	-18.79
2485.980	H	48.93	37.27	74.00	54.00	-25.07	-16.73
2486.020	V	44.05	34.22	74.00	54.00	-29.95	-19.78

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

Test Mode:	802.11g		
Operation Mode:	TX Mode (Low)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4824	V	57.64	43.81	74.00	54.00	-16.36	-10.19
7236	V	54.22	40.59	74.00	54.00	-19.78	-13.41
9648	V	56.70	42.15	74.00	54.00	-17.30	-11.85
4824	H	59.05	46.51	74.00	54.00	-14.95	-7.49
7236	H	56.49	43.08	74.00	54.00	-17.51	-10.92
9648	H	56.17	41.96	74.00	54.00	-17.83	-12.04

Test Mode:	802.11g		
Operation Mode:	TX Mode (Mid)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4874	V	56.96	43.29	74.00	54.00	-17.04	-10.71
7311	V	54.40	40.83	74.00	54.00	-19.60	-13.17
9748	V	56.36	41.67	74.00	54.00	-17.64	-12.33
4874	H	59.37	44.88	74.00	54.00	-14.63	-9.12
7311	H	57.65	43.79	74.00	54.00	-16.35	-10.21
9748	H	56.21	41.54	74.00	54.00	-17.79	-12.46

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

Test Mode:	802.11g		
Operation Mode:	TX Mode (High)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4924	V	56.90	42.36	74.00	54.00	-17.10	-11.64
7386	V	55.08	41.33	74.00	54.00	-18.92	-12.67
9848	V	56.42	41.79	74.00	54.00	-17.58	-12.21
4924	H	58.01	43.72	74.00	54.00	-15.99	-10.28
7386	H	56.85	42.10	74.00	54.00	-17.15	-11.90
9848	H	56.74	42.03	74.00	54.00	-17.26	-11.97

Spurious Emission in restricted band:

Test Mode:	802.11g		
Operation Mode:	TX	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
2396.800	H	48.79	37.45	74.00	54.00	-25.21	-16.55
2397.200	V	45.38	34.96	74.00	54.00	-28.62	-19.04
2489.400	H	49.24	37.18	74.00	54.00	-24.76	-16.82
2485.650	V	43.86	33.40	74.00	54.00	-30.14	-20.60

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

Test Mode:	802.11n(HT20)		
Operation Mode:	TX Mode (Low)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4824	V	56.32	42.38	74.00	54.00	-17.68	-11.62
7236	V	55.23	41.13	74.00	54.00	-18.77	-12.87
9648	V	57.11	42.09	74.00	54.00	-16.89	-11.91
4824	H	58.59	44.78	74.00	54.00	-15.41	-9.22
7236	H	56.21	41.88	74.00	54.00	-17.79	-12.12
9648	H	56.34	42.05	74.00	54.00	-17.66	-11.95

Test Mode:	802.11n(HT20)		
Operation Mode:	TX Mode (Mid)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4874	V	56.71	42.31	74.00	54.00	-17.29	-11.69
7311	V	55.22	40.73	74.00	54.00	-18.78	-13.27
9748	V	56.46	41.99	74.00	54.00	-17.54	-12.01
4874	H	57.73	43.12	74.00	54.00	-16.27	-10.88
7311	H	56.66	42.87	74.00	54.00	-17.34	-11.13
9748	H	56.70	42.51	74.00	54.00	-17.30	-11.49

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

Test Mode:	802.11n(HT20)		
Operation Mode:	TX Mode (High)	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4924	V	56.74	42.06	74.00	54.00	-17.26	-11.94
7386	V	55.17	41.23	74.00	54.00	-18.83	-12.77
9848	V	56.92	42.18	74.00	54.00	-17.08	-11.82
4924	H	56.98	42.73	74.00	54.00	-17.02	-11.27
7386	H	56.30	42.12	74.00	54.00	-17.70	-11.88
9848	H	56.49	42.35	74.00	54.00	-17.51	-11.65

Spurious Emission in restricted band:

Test Mode:	802.11n(HT20)		
Operation Mode:	TX	Test Date :	December 16, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	54 %
Measured Distance:	3m	Test By:	Sance

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
2397.400	H	46.55	35.47	74.00	54.00	-27.45	-18.53
2397.000	V	43.68	32.20	74.00	54.00	-30.32	-21.80
2484.200	H	47.31	35.38	74.00	54.00	-26.69	-18.62
2486.600	V	42.76	31.23	74.00	54.00	-31.24	-22.77

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading level + Correction Factor
(3) Measurement uncertainty : ±3.7dB

9. Antenna Application

9.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

9.2 Measurement Results

The antenna is PIFA antenna that no antenna other than that furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 2.3dBi. So, the antenna is consider meet the requirement.

10. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov.05, 2013	Nov.04, 2014
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 28, 2013	Nov. 27, 2014
Positioning Controller	UC	UC 3000	N/A	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	Nov. 05, 2013	Nov. 04, 2014
Cable	Huber+Suhner	CIL02	N/A	Nov. 05, 2013	Nov. 04, 2014
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 05, 2013	Nov. 04, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct. 24, 2013	Oct. 23, 2014
Horn Antenna	COM-Power	AH-118	071078	Nov. 17, 2013	Nov. 16, 2014
Loop antenna	Daze	ZA30900A	0708	Oct.16, 2013	Oct.15, 2014
Spectrum Analyzer	Agilent	E4408B	MY414407D	Apr. 29, 2013	Apr. 28, 2014
Pre-Amplifier	Agilent	8449B	3008A02964	Apr.19, 2013	Apr.18, 2014
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	Nov. 09, 2013	Nov. 08, 2014

---End of report---