



Dates of Tests: Nov20 ~ Dec 13, 2013
Test Report S/N: LR500111312J
Test Site : LTA Co., Ltd.

CERTIFICATION OF COMPLIANCE

FCC ID.
IC
APPLICANT

A3LSPWB43143S
649E-SPWB43143S
Samsung Electronics Co., Ltd.

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	WLAN Module
Manufacturer	:	Samsung Electronics Co., Ltd.
Model name	:	SPW-B43143S
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2009 RSS-210 and ISSUE No. :8 Date :2010
Frequency Range	:	2412MHz ~ 2462MHz for 802.11b/g/n_20MHz 2422MHz ~ 2452MHz for 802.n_40MHz
Max. Output Power	:	Max 17.54dBm - Conducted (802.11b) Max 25.46dBm - Conducted (802.11g) Max 24.90dBm – Conducted (802.11n_20MHz) Max 24.30dBm – Conducted (802.11n_40MHz)
Data of issue	:	Dec 16, 2013

This test report is issued under the authority of:



Jae-Ho Lee, Manager

The test was supervised by:



Young-Jin Lee, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. GENERAL INFORMATION	3
2. INFORMATION ABOUT TEST ITEM	4
3. TEST REPORT	6
3.1 SUMMARY OF TESTS	6
3.2 TECHNICAL CHARACTERISTICS TEST	7
3.2.1 6dB BANDWIDTH	7
3.2.2 PEAK OUTPUT POWER	17
3.2.3 POWER SPECTRAL DENSITY	27
3.2.4 BAND EDGE	36
3.2.5 CONDUCTED SPURIOUS EMISSIONS	45
3.2.6 RADIATED SPURIOUS EMISSIONS	54
3.2.7 AC CONDUCTED EMISSIONS	61
3.2.8 RECEIVER SPURIOUS EMISSIONS	64
APPENDIX	
APPENDIX TEST EQUIPMENT USED FOR TESTS	66

1. General information

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2014-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	2015-03-06	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	2015-04-17	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
VCCI	JAPAN	G-563	2015-05-28	VCCI registration
IC	CANADA	5799A-1	2015-06-21	IC filing

2. Information about test item

2-1 Manufacturer

Company name : Samsung Electronics Co., Ltd
 Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742
 Korea
 Tel / Fax : Tel : +82-31-277-5665 / Fax : +82-31-200-5016

2-2 Equipment Under Test (EUT)

Trade name : Samsung Electronics Co., Ltd.
 Model name : SWP-B43143S
 Serial number : Identical prototype
 Date of receipt : Nov 18, 2013
 EUT condition : Pre-production, not damaged
 Antenna type : PCB antenna with Max. 5.30 dBi gain for 802.11b/g/n_20/n_40MHz
 Frequency Range : 2412MHz ~ 2462MHz for 802.11b/g/n_20MHz
 : 2422MHz ~ 2452MHz for 802.11n_40MHz
 RF output power : Max 17.54dBm - Conducted (802.11b)
 : Max 25.46dBm - Conducted (802.11g)
 : Max 24.90dBm - Conducted(802.11n_20MHz)
 : Max 24.30dBm - Conducted(802.11n_40MHz)
 Number of channels : 11 for 802.11b & 802.11g & 802.11n_20MHz
 : 7for 802.11n_40MHz
 Type of Modulation : CCK, DQPSK, DBPSK for DSSS
 : 64QAM, 16QAM, QPSK, BPSK for OFDM
 Transfer Rate : 11/5.5/2/1Mbps for 802.11b
 : 54/48/36/24/18/12/9/6Mbps for 802.11g
 : MCS0/MCS1/MCS2/MCS3/MCS4/MCS5/MCS6
 : /MCS7 for 802.11n_20MHz/n_40MHz
 Power Source : DC 3.3 V
 Firmware Version : V 1.0.0

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz) for 802.11b/g/n20	2412	2437	2462
Frequency (MHz) for 802.11n40	2422	2437	2452

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
WLAN Module	SPW-B43143S	N/A	Samsung Electronics Co., Ltd.

2-5 Description of Test modes

For 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n_20MHz

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

For 2.4GHz:

7 channels are provided for 802.11n_40MHz

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3. Test Report

3.1 Summary of tests

FCC Part / IC Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a) / A8.2(a)	6 dB Bandwidth	> 500kHz	Conducted	C
15.247(b) / A8.4(4)	Transmitter Peak Output Power	< 1Watt		C
15.247(d) / A8.2(b)	Transmitter Power Spectral Density	< 8dBm @ 3kHz		C
15.247(d) / Gen4.9	Band Edge & Spurious	> 20 dBc		C
15.209 / Gen7.2.5	Field Strength of Harmonics	Emission	Radiated	C
15.207 / Gen7.2.4	AC Conducted Emissions	Emissions	Conducted	C
15.203 / Gen7.2	Antenna requirement	-	-	C
15.205 / Gen7.2.2	Restricted bands of operation	Emissions	Radiated	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

→ Antenna Requirement

The **Samsung Electronics Co., Ltd FCC ID: A3LSPWB43143S** unit complies with the requirement of §15.203.

The antenna is connected to inside of EUT. And type is PCB antenna..

The sample was tested according to the following specification:

*FCC Parts 15.247; ANSI C-63.4-2009

*FCC KDB Publication No. 558074 D01 DTS Meas. Guidance V02

*FCC TCB Workshop 2012, April

3.2 Technical Characteristics Test

3.2.1 6 dB Bandwidth

Procedure:

*The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.

The bandwidth at 6dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 50 MHz

VBW = 300 kHz (VBW \geq RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data: 2.4GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	8.39	Complies
	2437	6	8.29	Complies
	2462	11	8.10	Complies
802.11g	2412	1	15.56	Complies
	2437	6	16.21	Complies
	2462	11	15.63	Complies
802.11n _20MHz	2412	1	17.58	Complies
	2437	6	17.58	Complies
	2462	11	16.60	Complies
802.11n _40MHz	2422	3	35.46	Complies
	2437	6	35.55	Complies
	2452	9	35.60	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500kHz

Measurement Setup

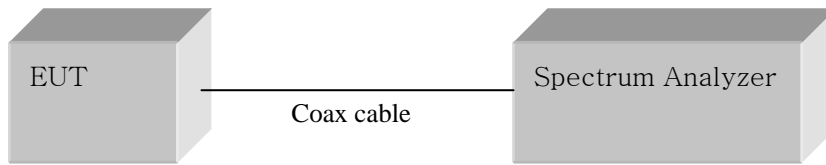
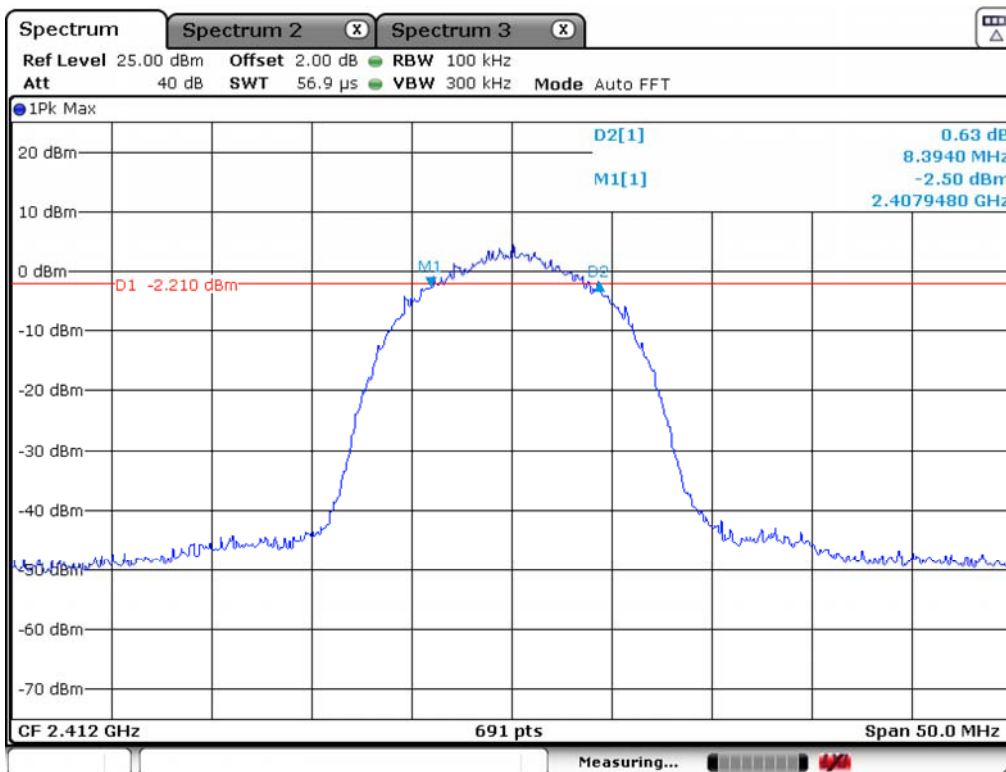


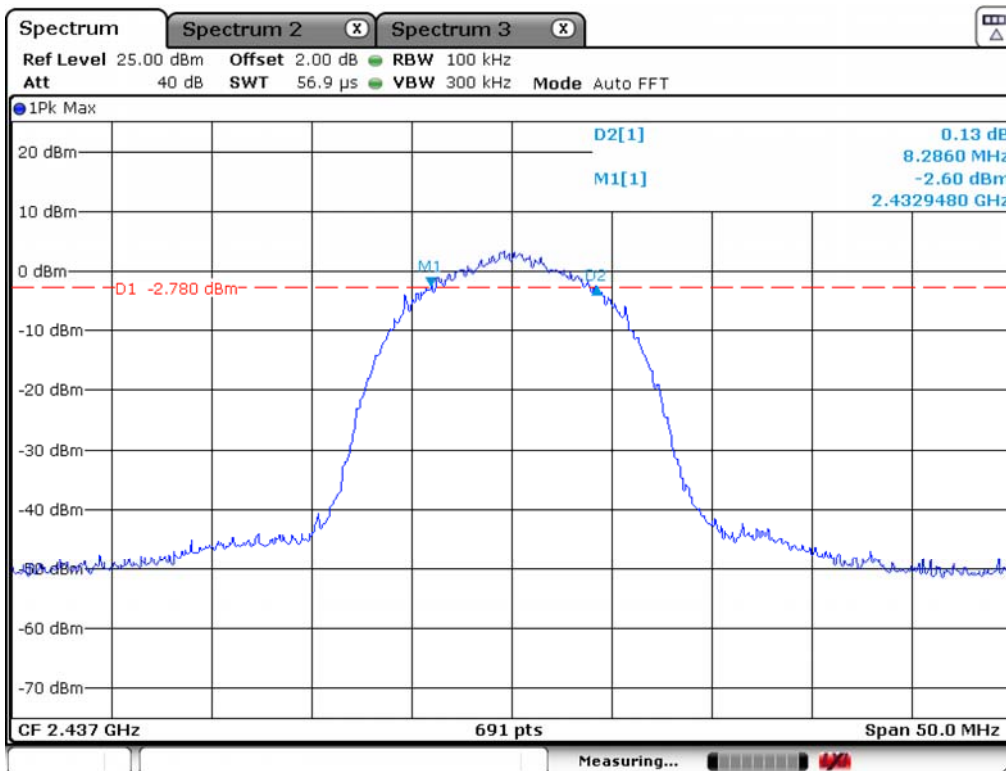
Figure 1: Measurement setup for the carrier frequency separation

802.11b CH 1



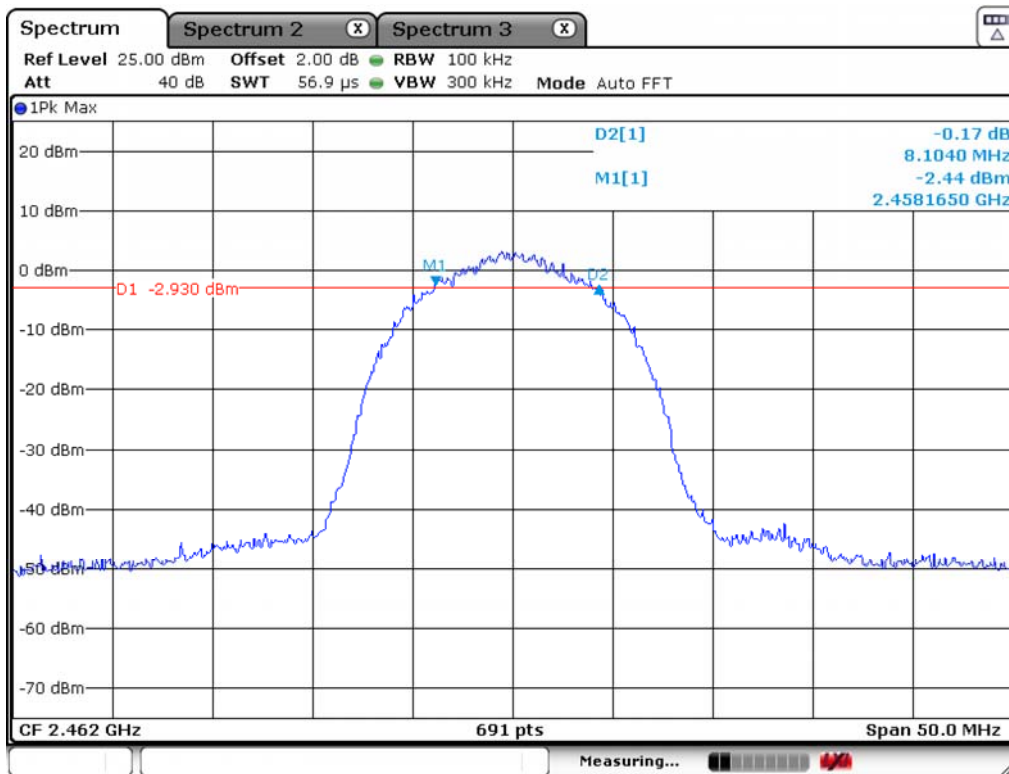
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CH 6



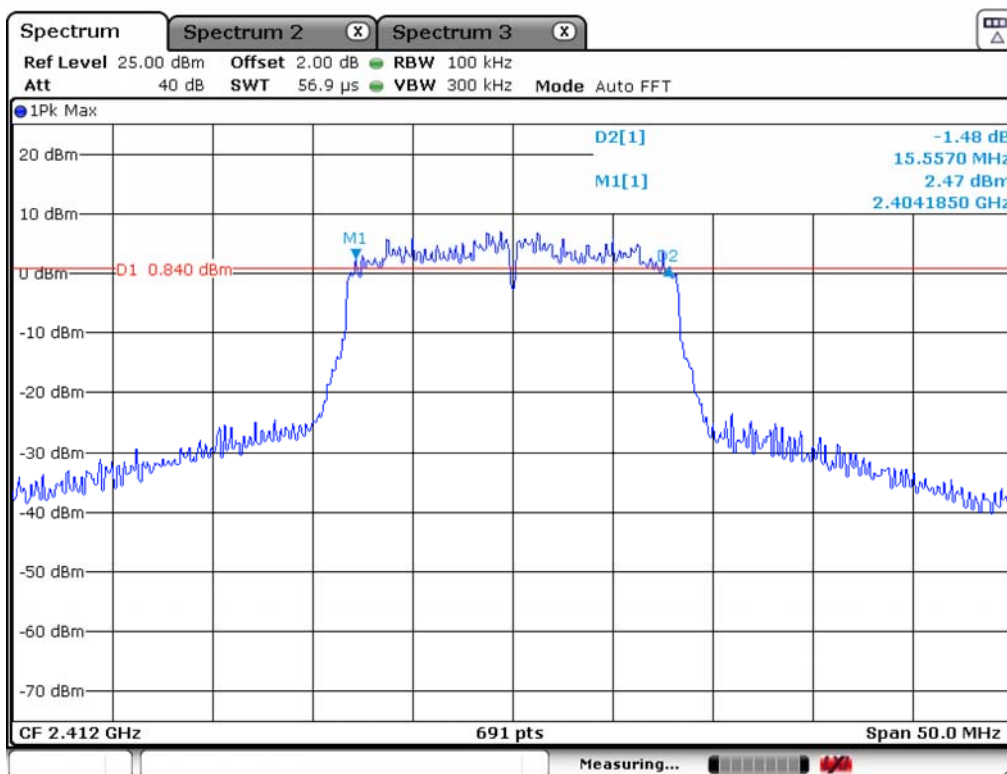
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CH 11



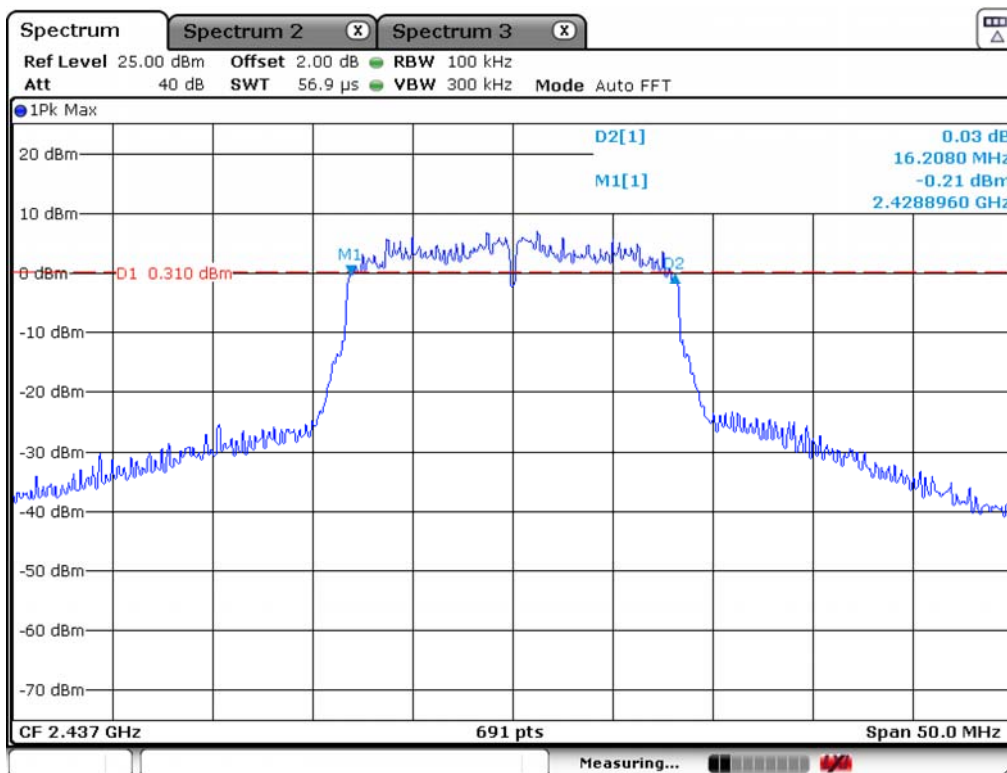
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802.11g CH 1



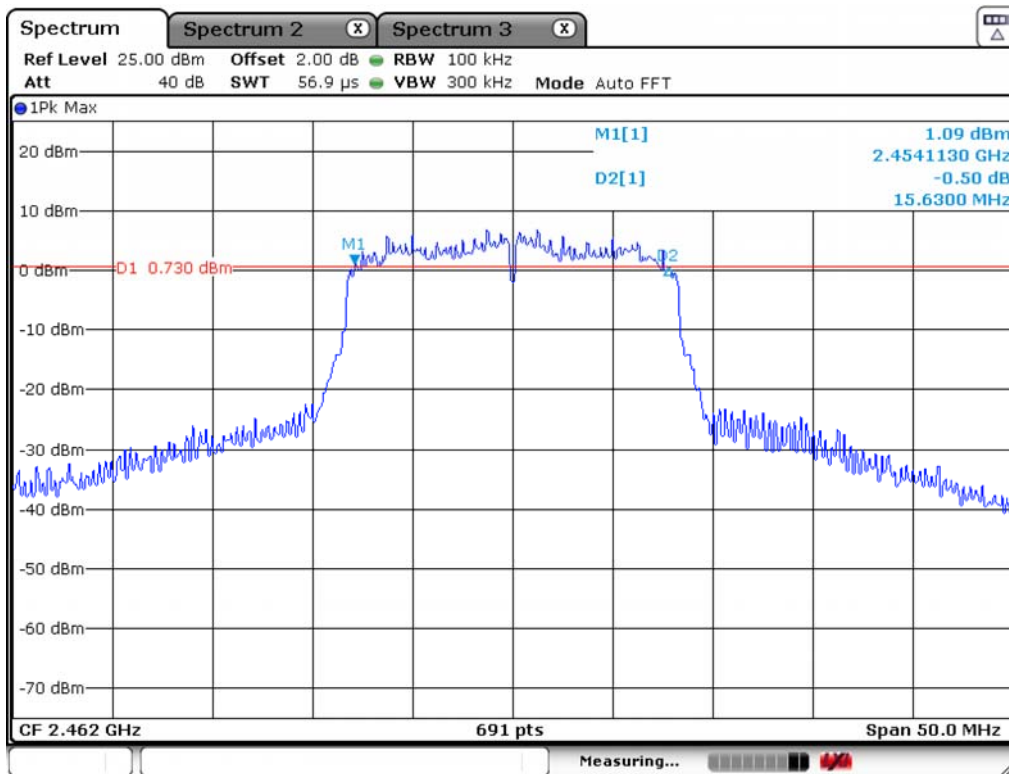
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CH 6



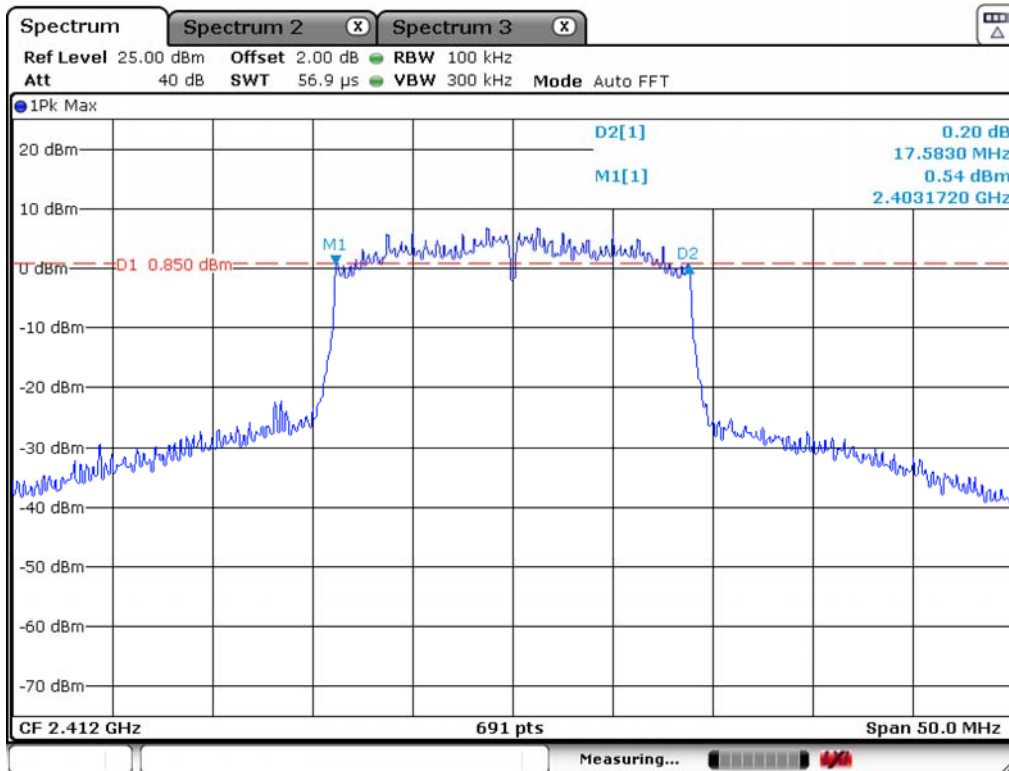
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CH 11

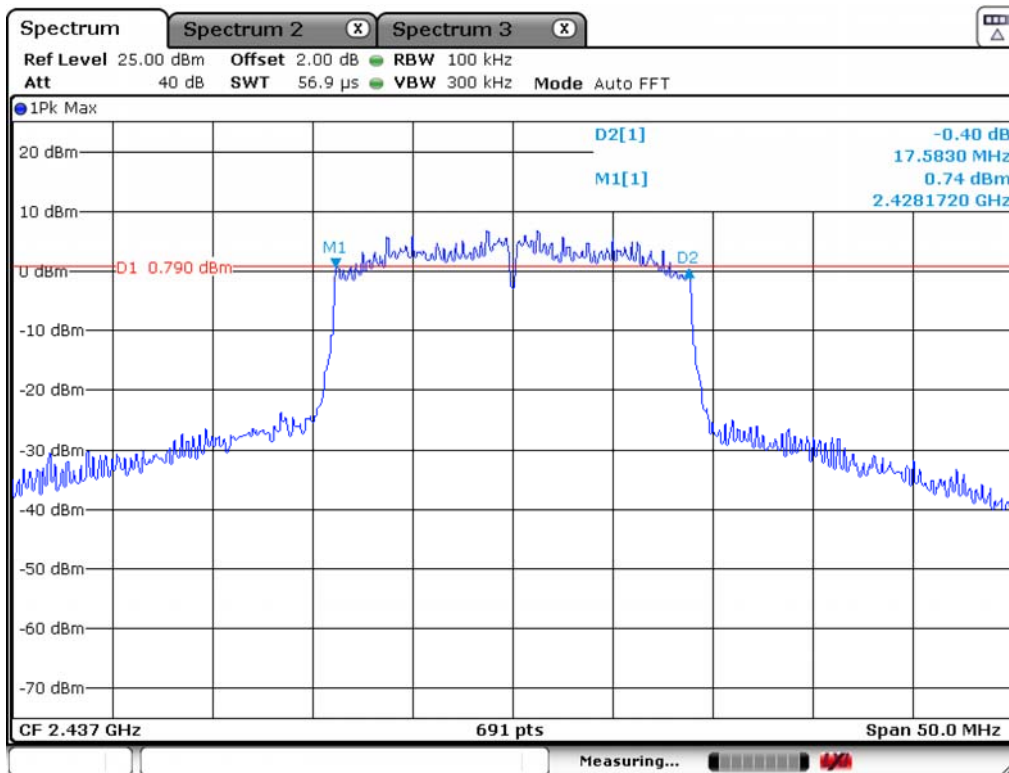


Date: 13.DEC.2013 11:45:43

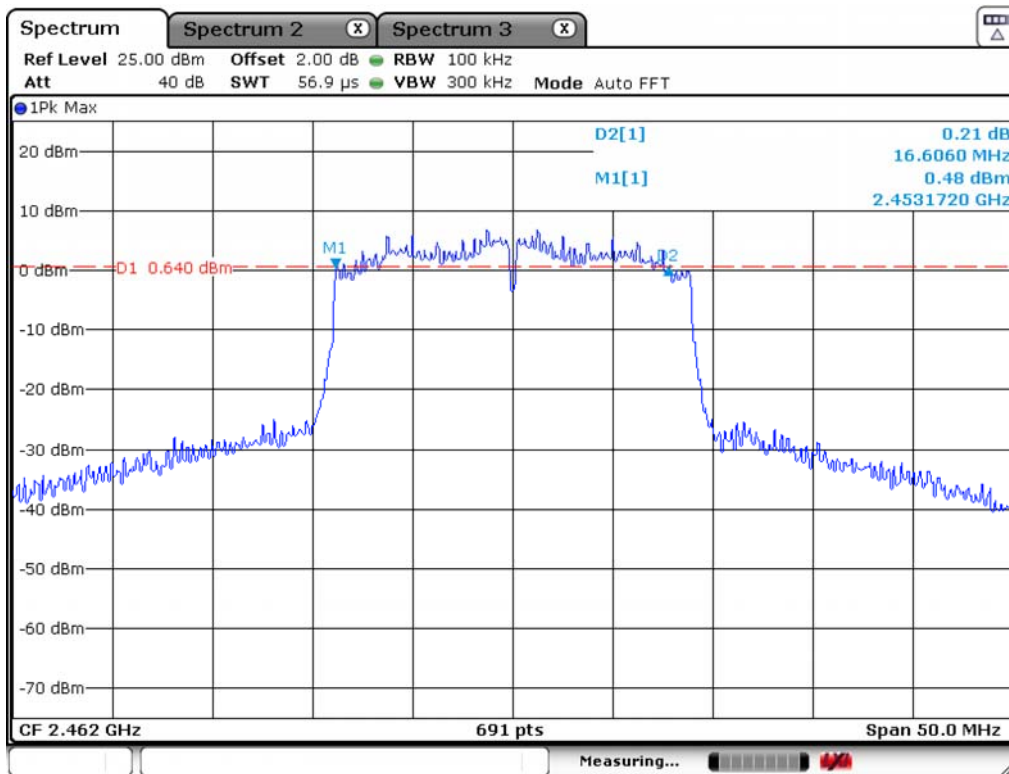
802.11n_20MHz CH 1



CH 6

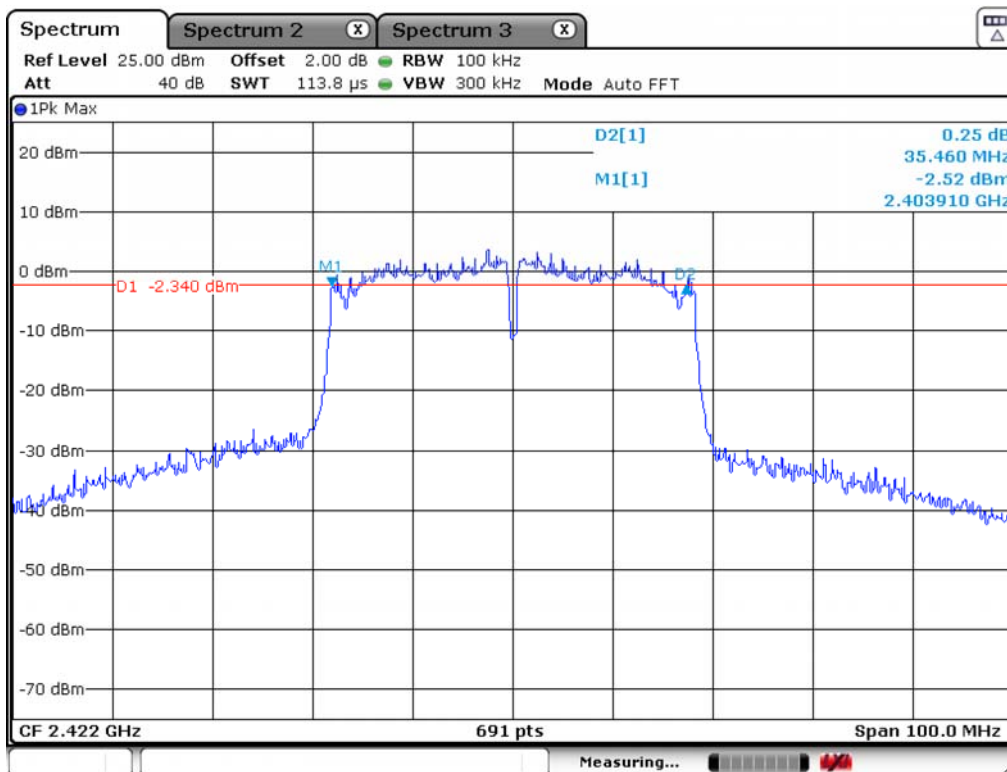


CH 11



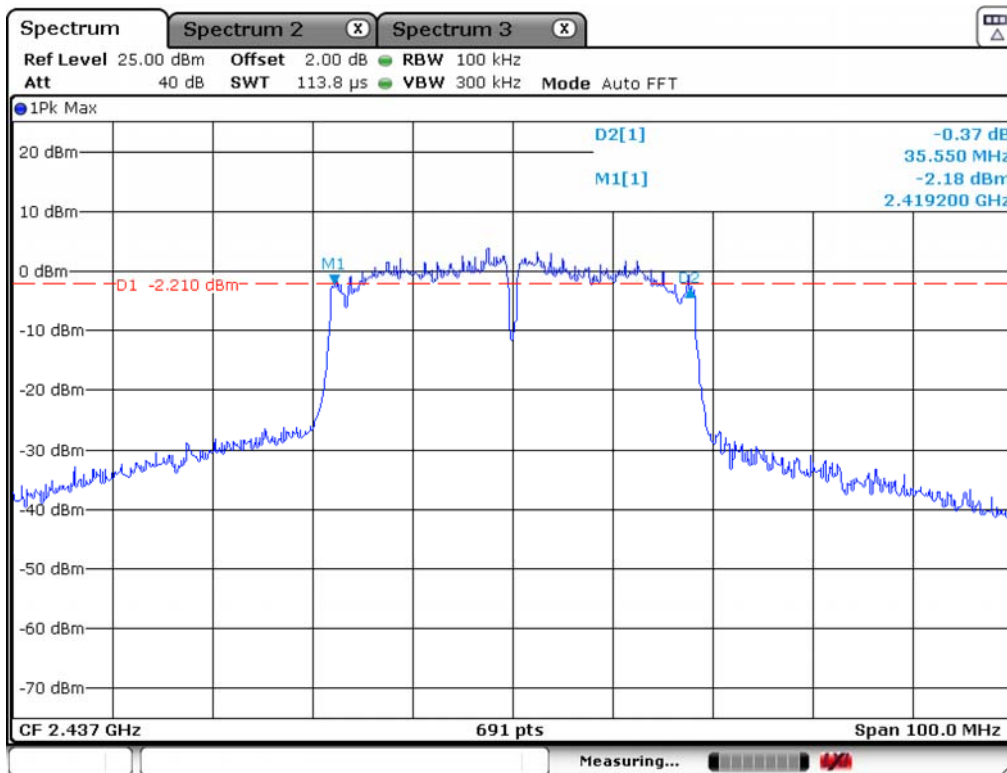
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802.11n_40MHz CH 3



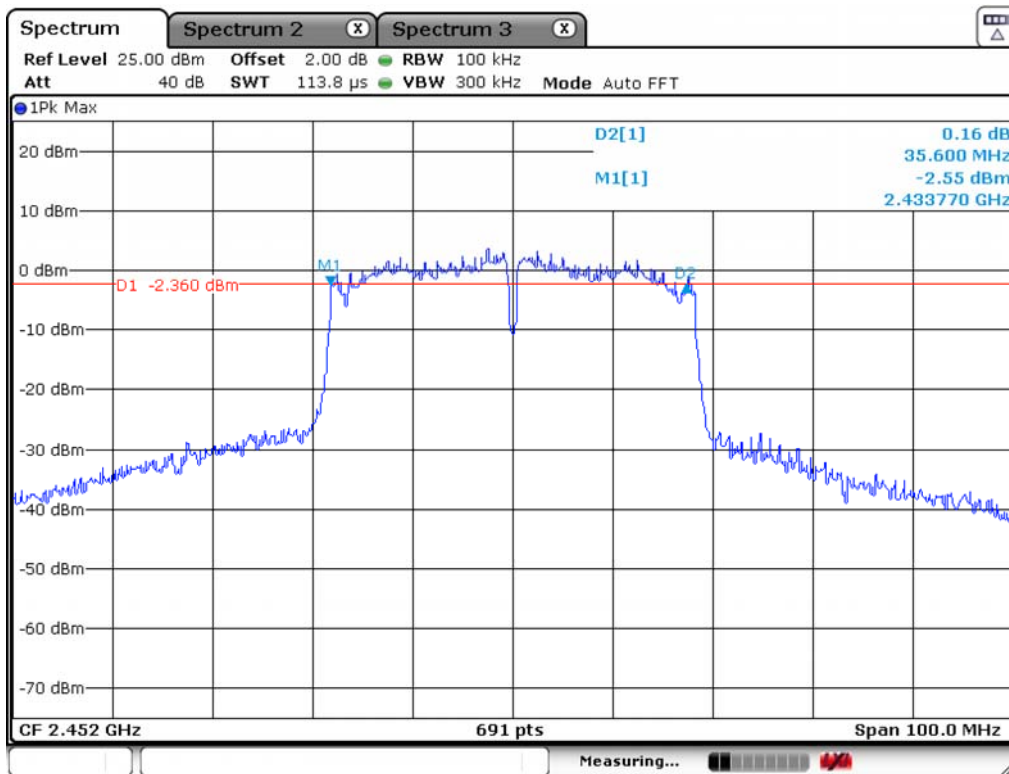
Date: 13.DEC.2013 11:28:33

CH 6



Date: 13.DEC.2013 11:27:20

CH 9



Date: 13.DEC.2013 11:25:22

3.2.2 Peak Output Power Measurement

Procedure:

*The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1MHz

Span = auto

VBW = 1MHz (VBW \geq RBW)

Sweep = auto

Detector function = peak

Measurement Data: 2.4GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Data (dBm)	Result
802.11b	2412	1	17.36	Complies
	2437	6	17.33	Complies
	2462	11	17.54	Complies
802.11g	2412	1	25.46	Complies
	2437	6	25.14	Complies
	2462	11	25.16	Complies
802.11n _20MHz	2412	1	24.89	Complies
	2437	6	24.70	Complies
	2462	11	24.90	Complies
802.11n _40MHz	2422	3	24.20	Complies
	2437	6	24.10	Complies
	2452	9	24.30	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

Peak output power	< 1W
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Measurement Setup

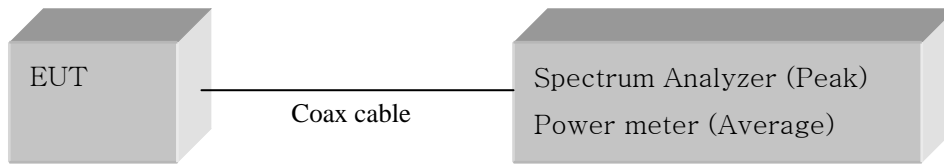
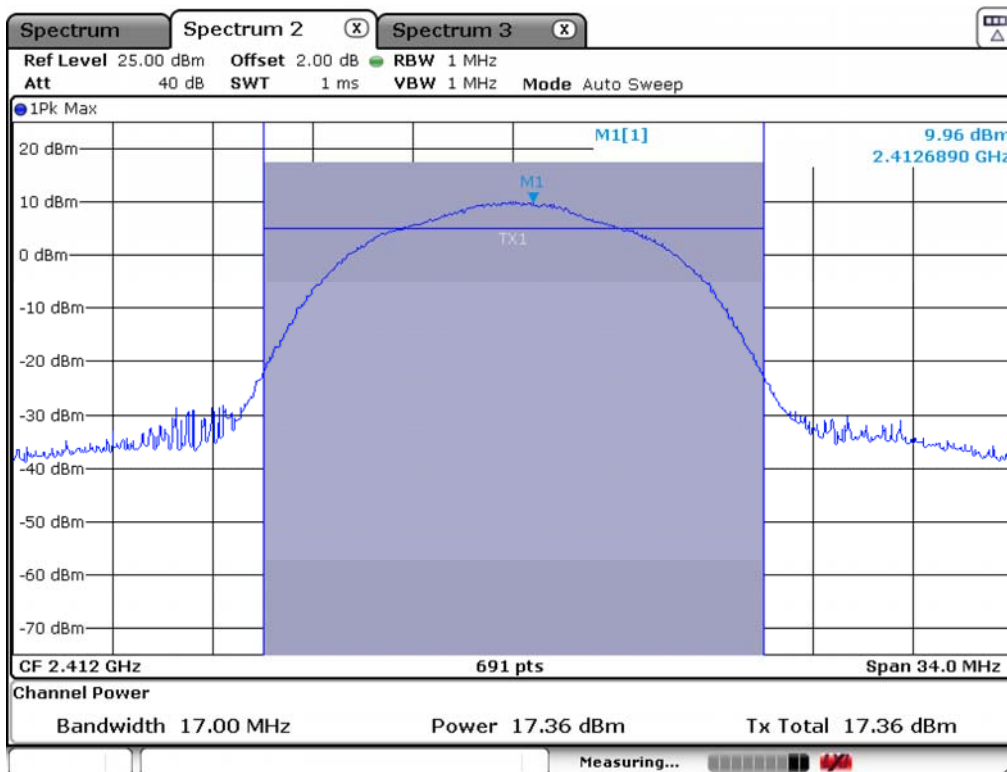


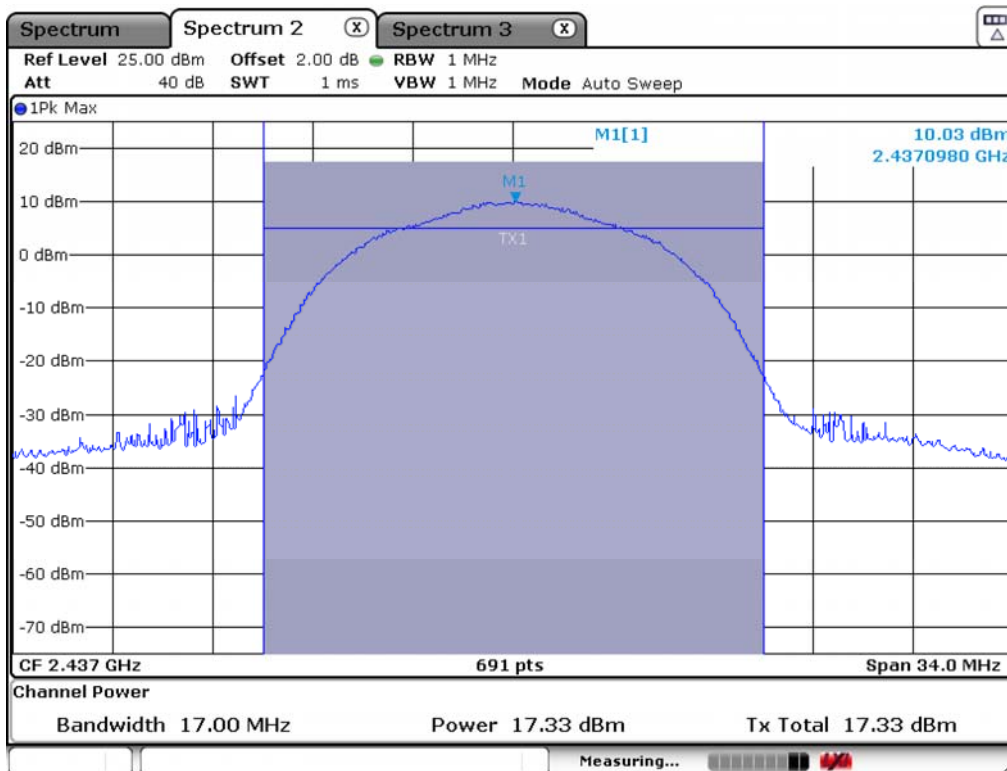
Figure 2: Measurement setup for the carrier frequency separation

802.11b CH 1



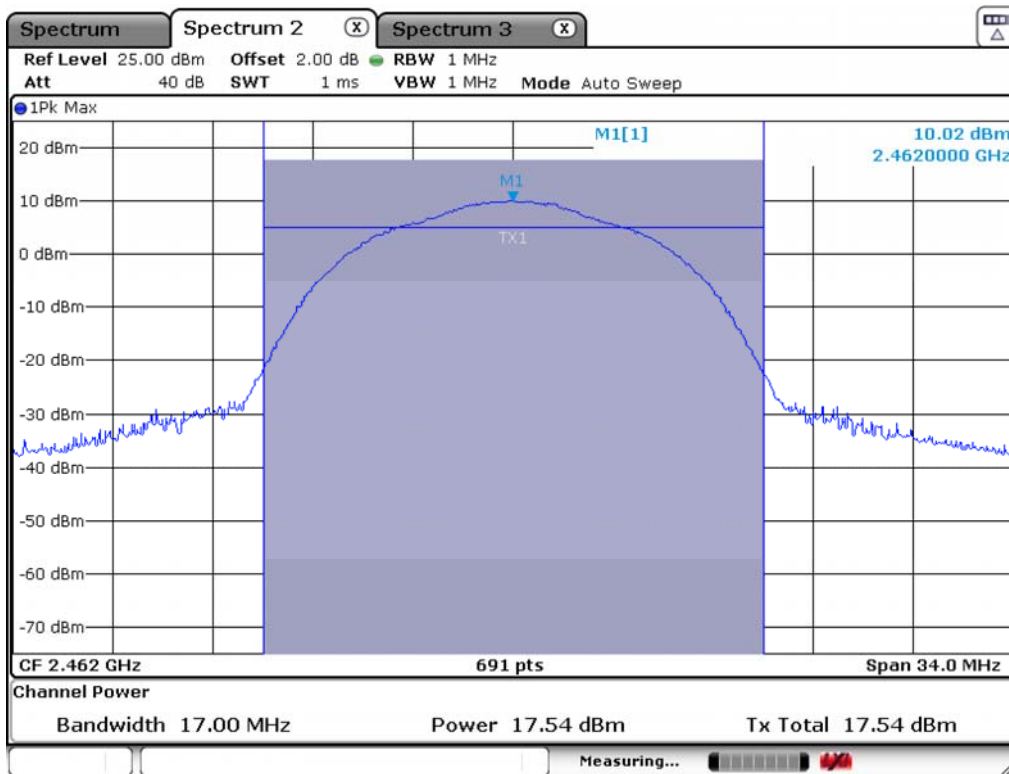
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CH 6



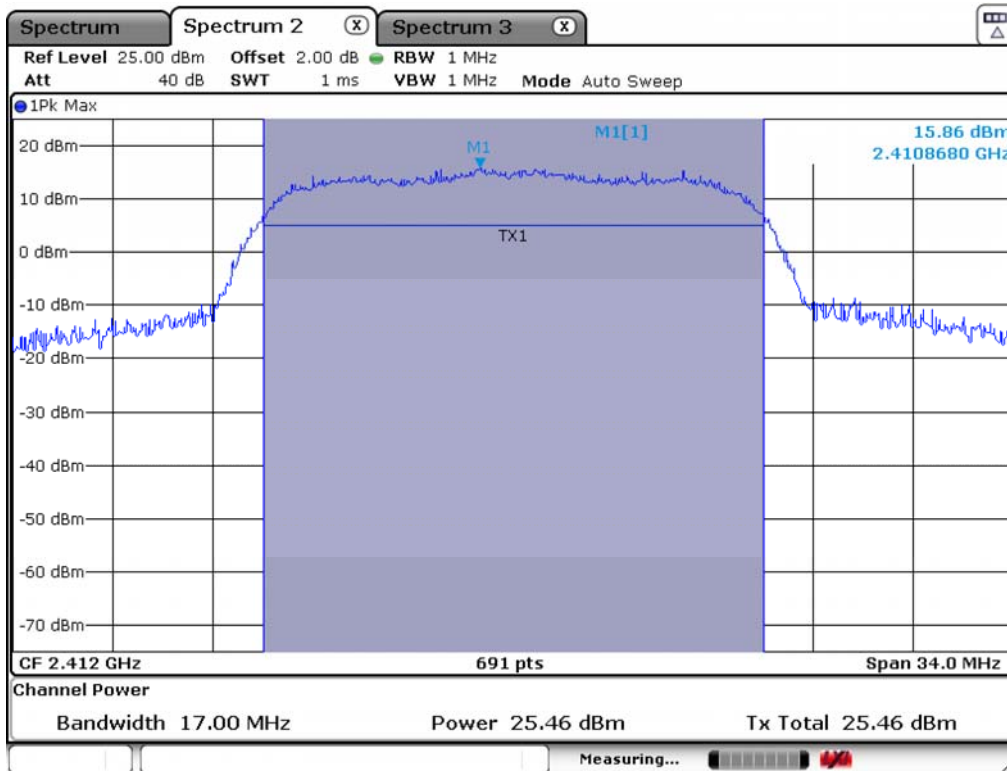
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CH 11



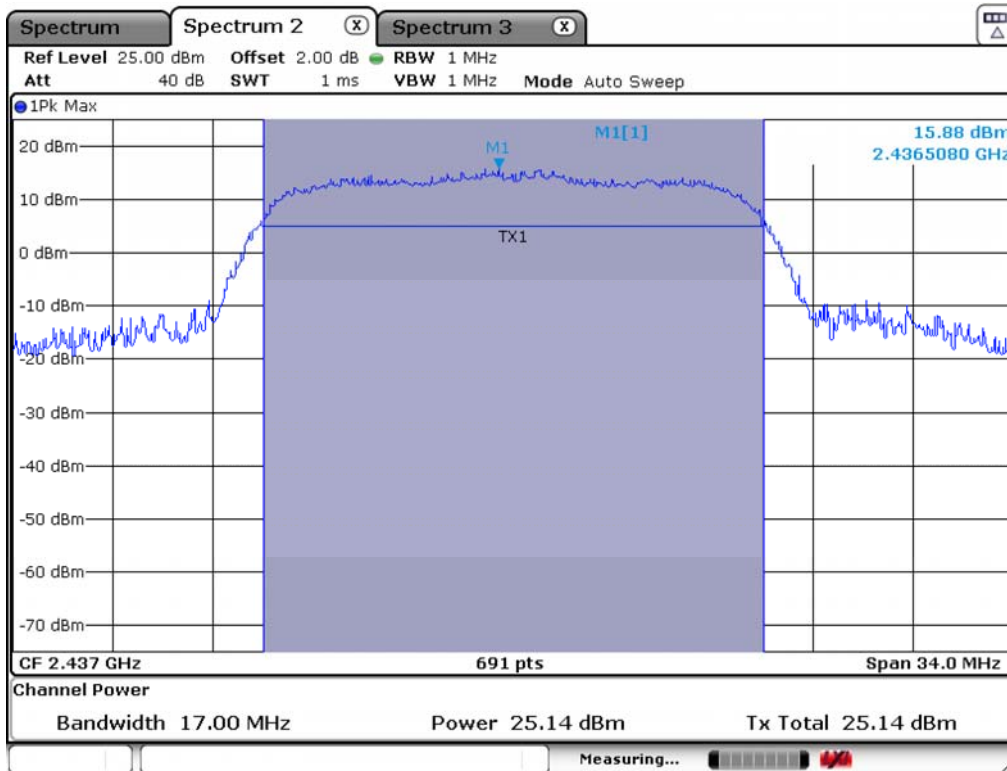
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802.11g CH 1



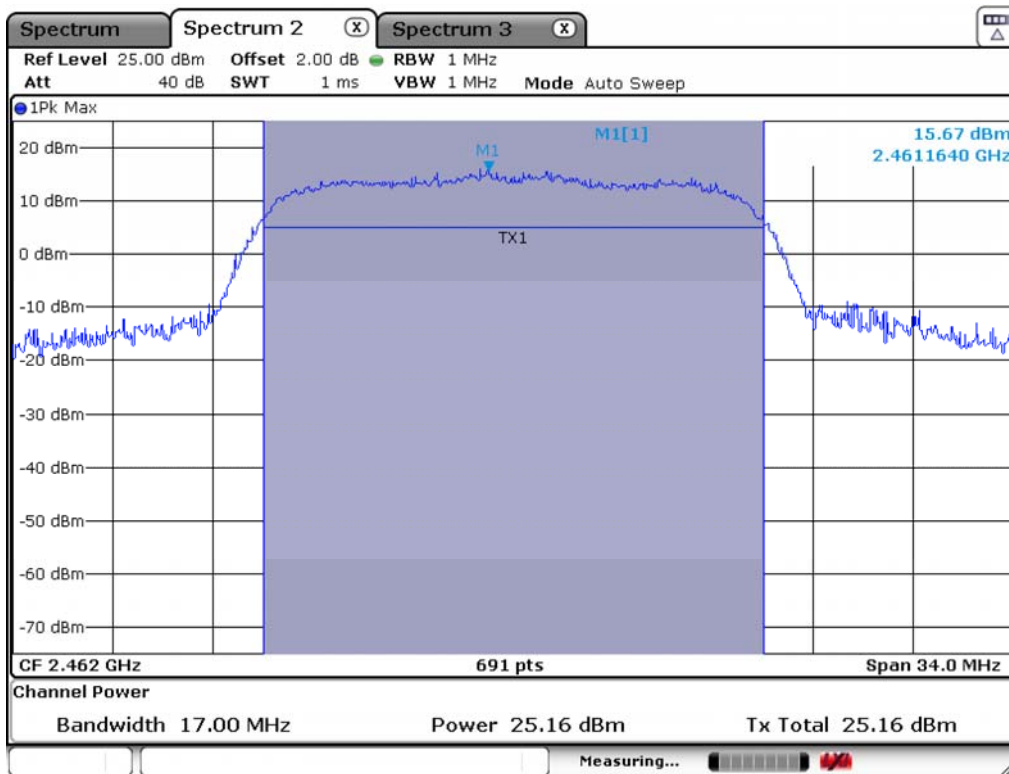
Date: 13.DEC.2013 10:40:13

CH 6



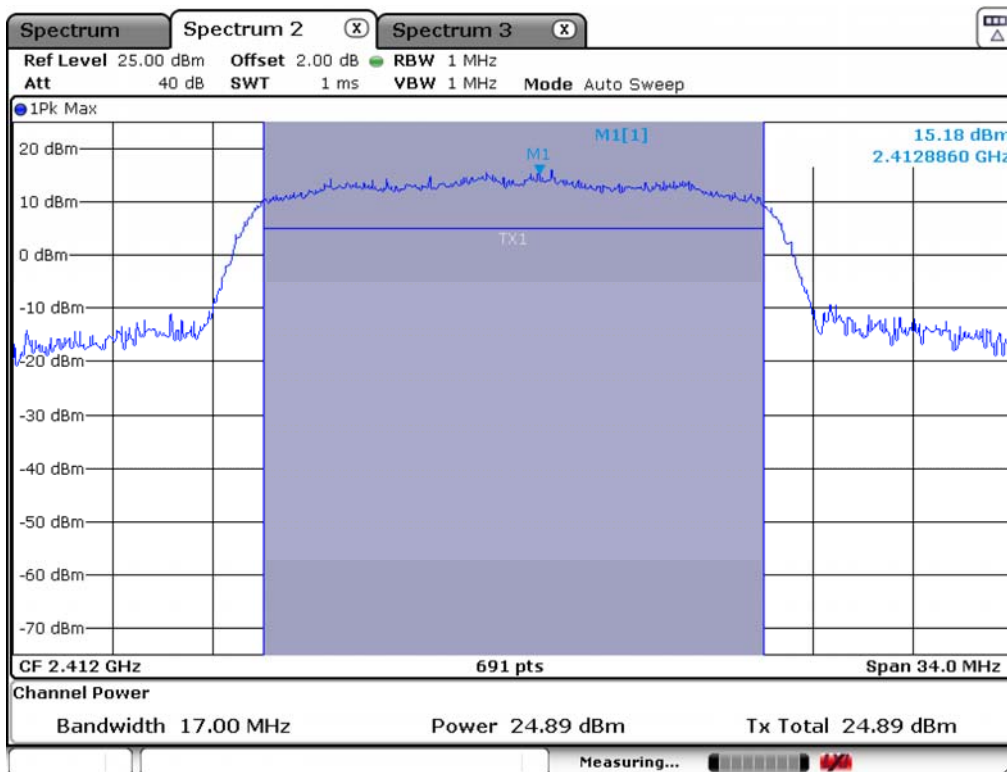
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CH 11



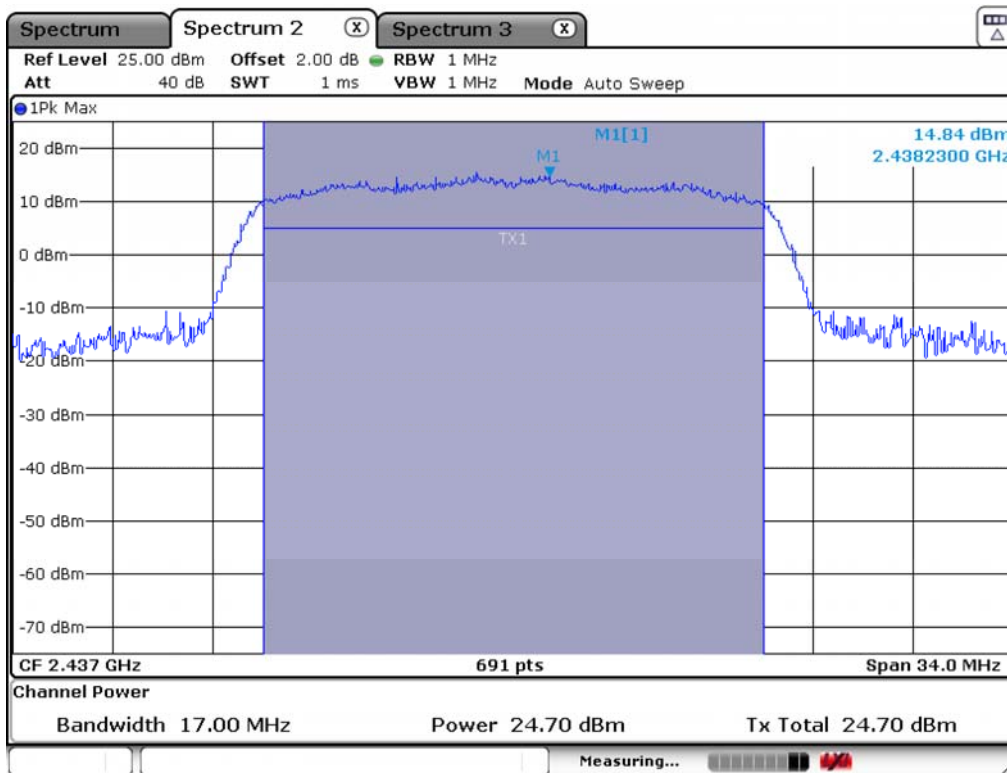
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802.11n_20MHz CH 1



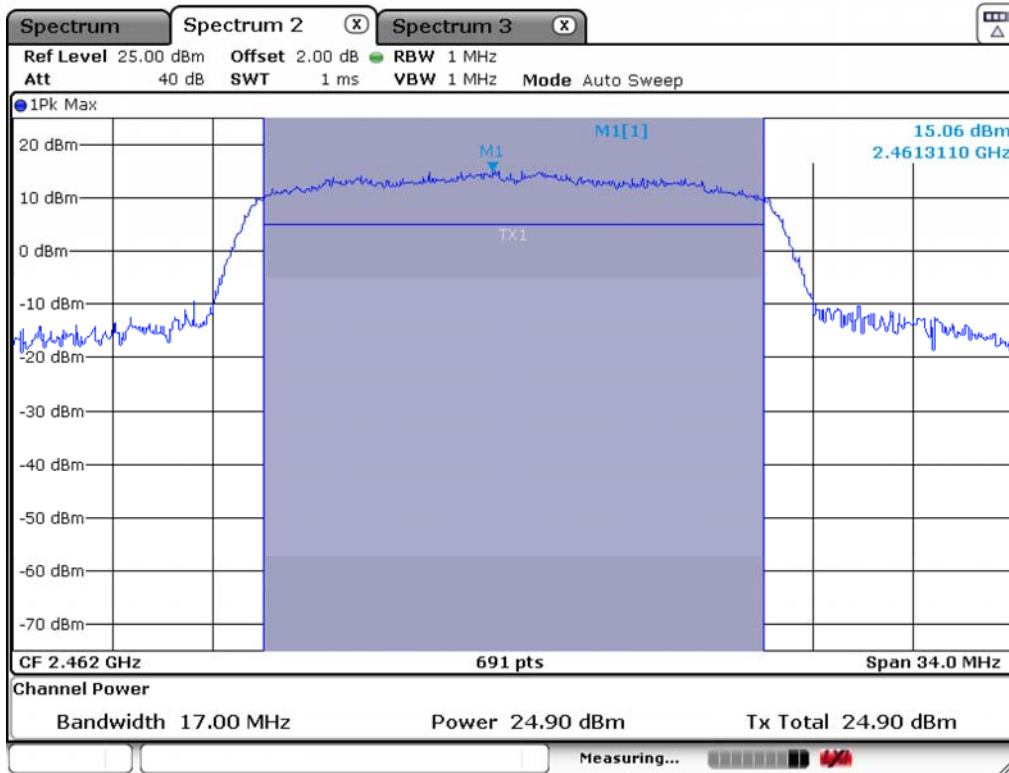
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CH 6



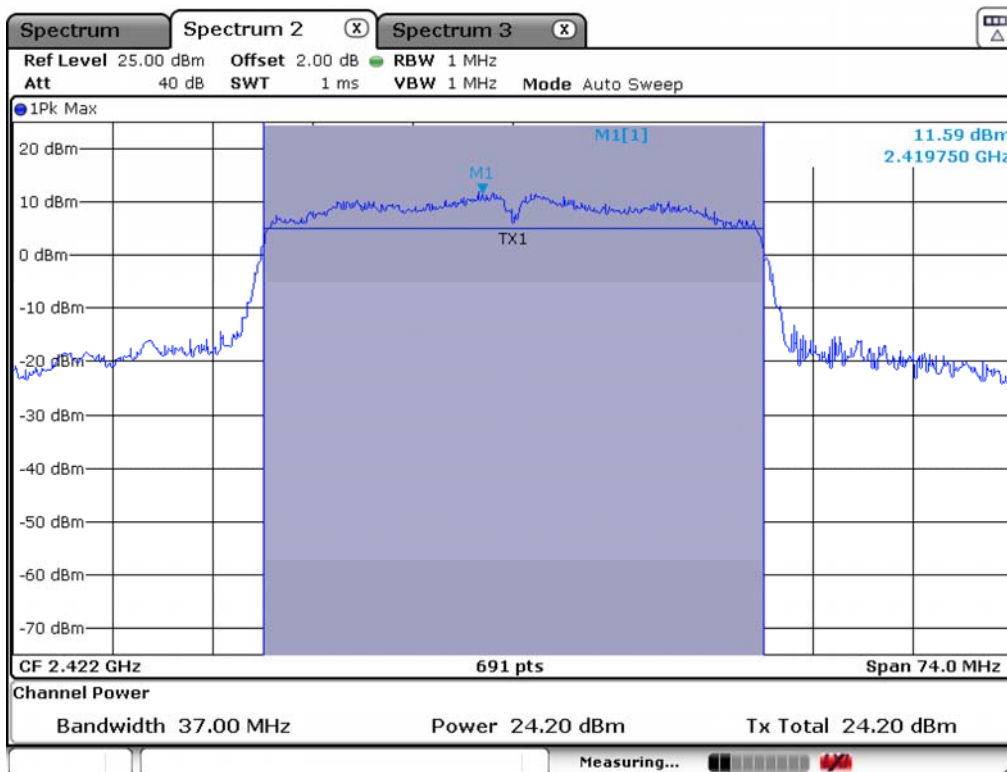
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CH 11



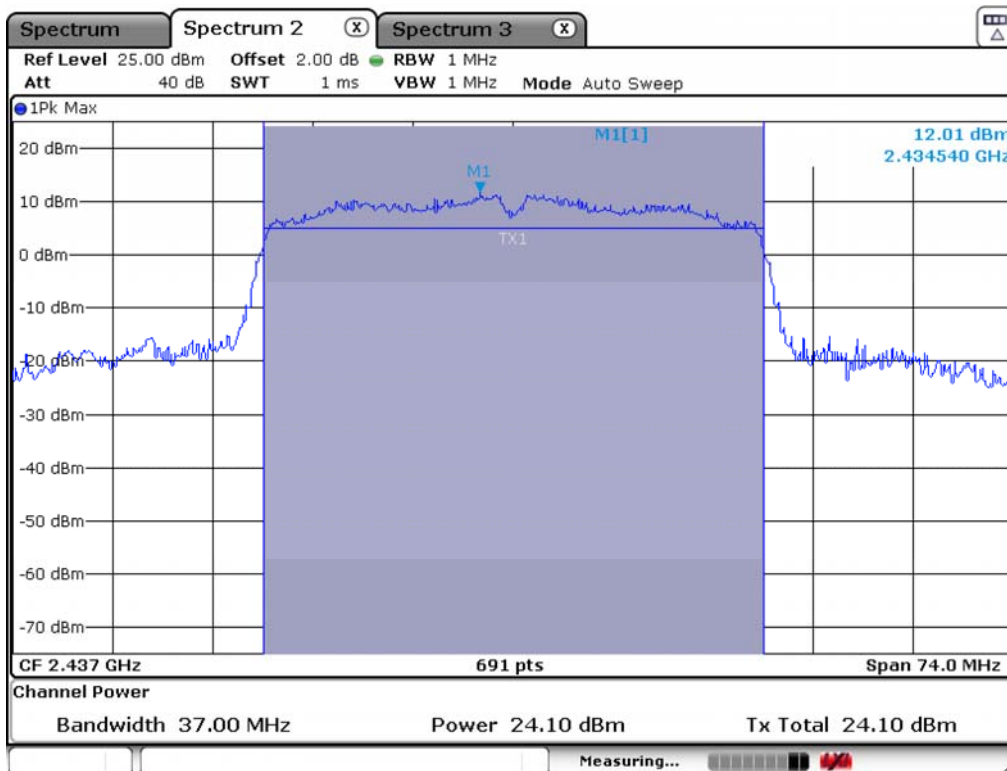
Date: 13.DEC.2013 10:49:00

802.11n_40MHz CH 3



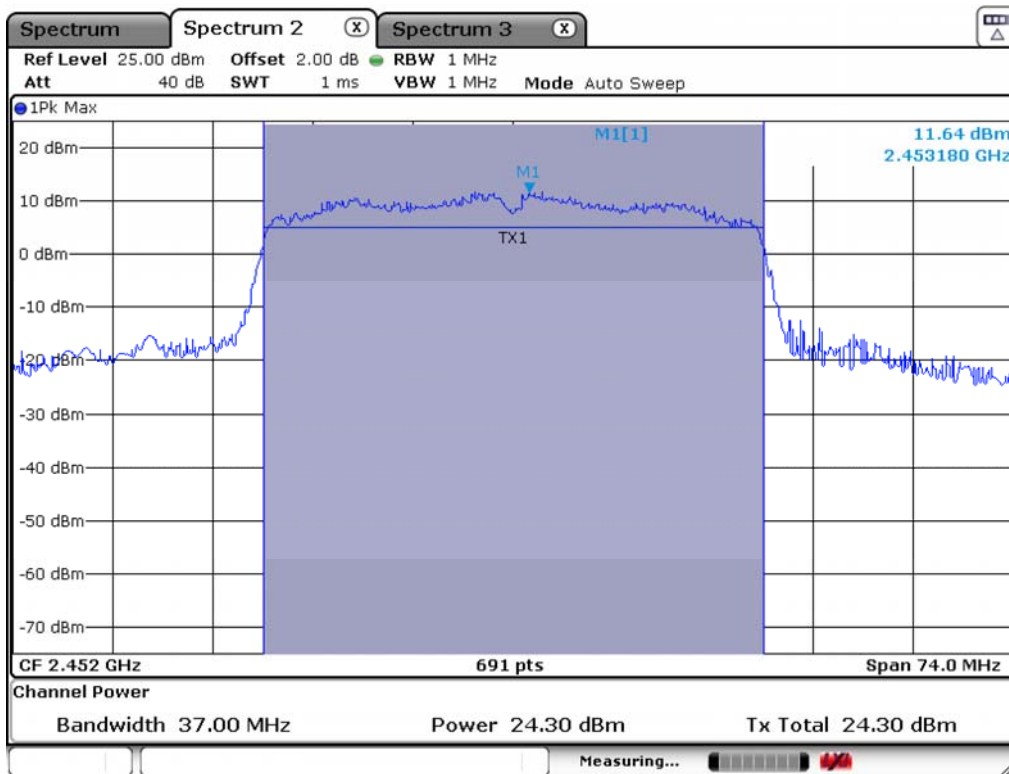
Date: 13.DEC.2013 10:59:00

CH 6



Date: 13.DEC.2013 11:04:37

CH 9



Date: 13.DEC.2013 11:19:15

3.2.3 Power Spectral Density

Procedure:

*The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz

Span = 300 kHz

VBW = 3 kHz

Sweep = 100 sec

Detector function = peak

Trace = max hold

Measurement Data: 2.4GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			dBm	Result
802.11b	2412	1	-11.10	Complies
	2437	6	-11.20	Complies
	2462	11	-11.11	Complies
802.11g	2412	1	-6.63	Complies
	2437	6	-6.69	Complies
	2462	11	-6.73	Complies
802.11n _20MHz	2412	1	-7.10	Complies
	2437	6	-7.37	Complies
	2462	11	-7.25	Complies
802.11n _40MHz	2422	3	-22.69	Complies
	2437	6	-22.40	Complies
	2452	9	-23.33	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

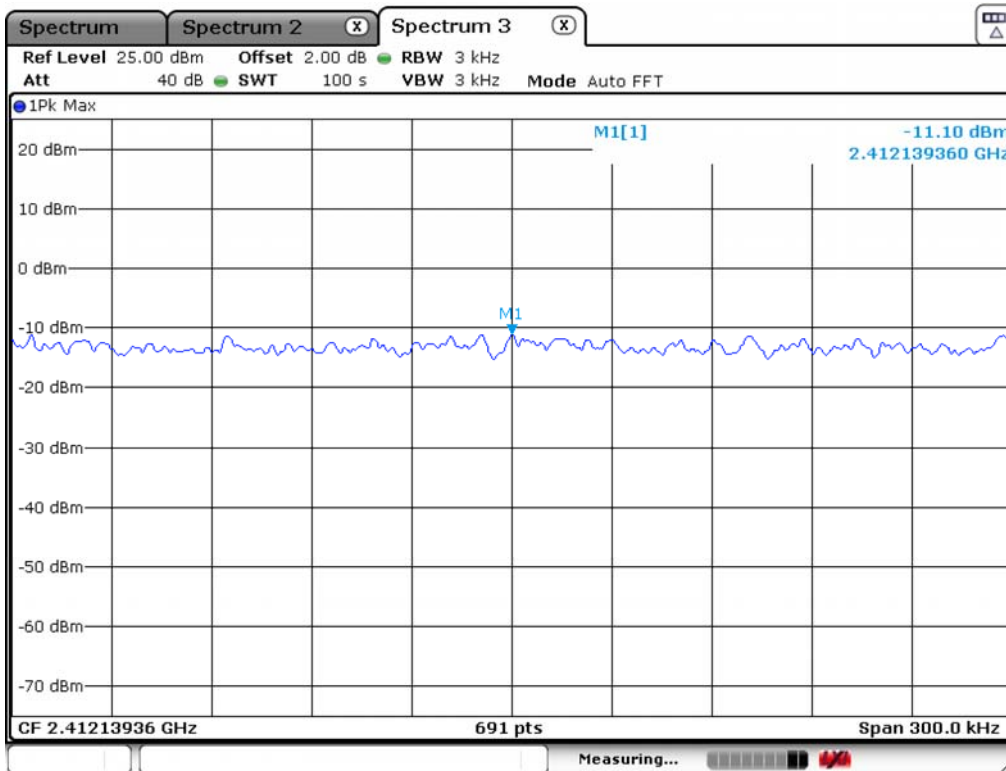
Power Spectral Density	< 8dBm @ 3kHz BW
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Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

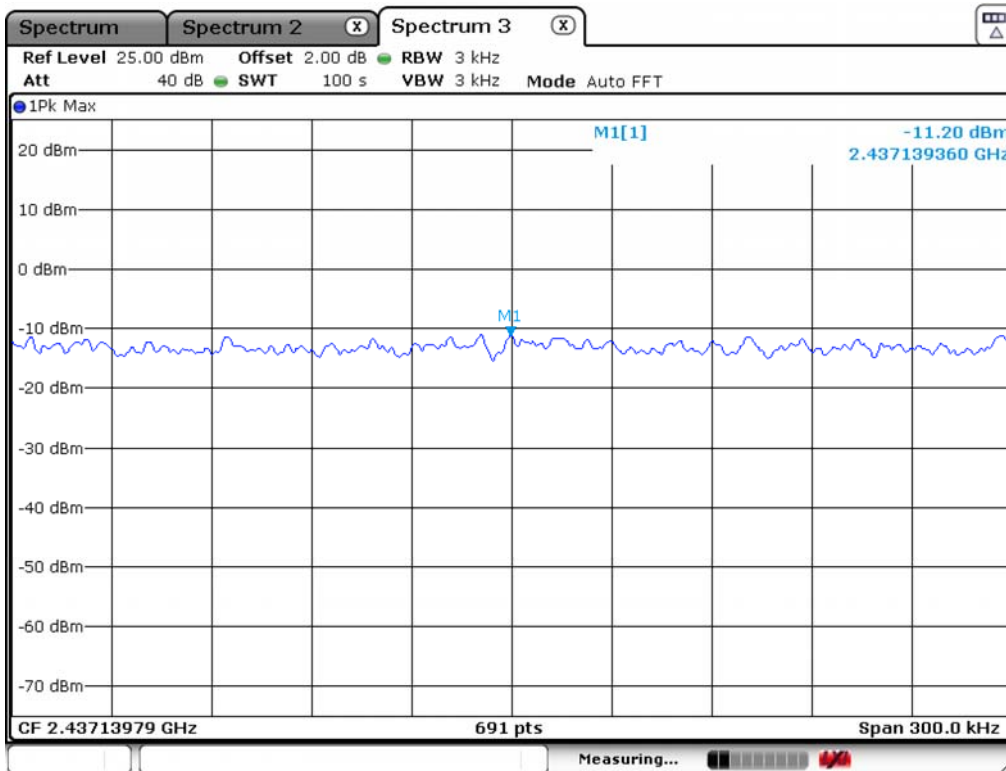
802.11b Power Density Measurement

CH 1



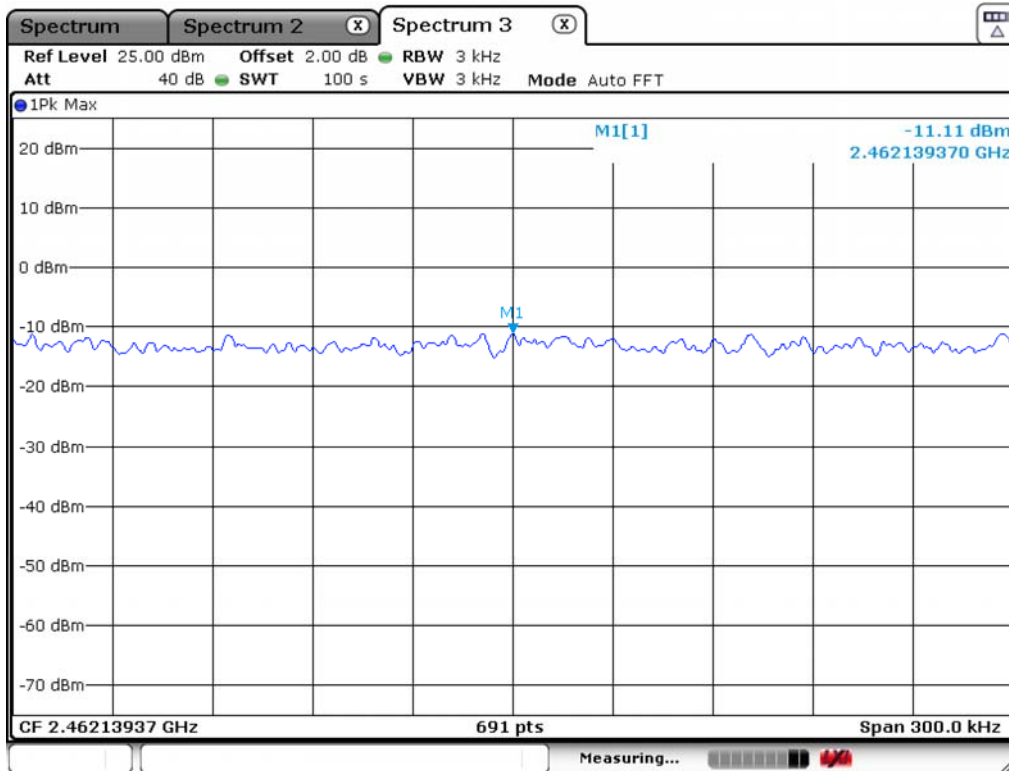
Date: 13.DEC.2013 10:25:13

CH 6



Date: 13.DEC.2013 10:26:38

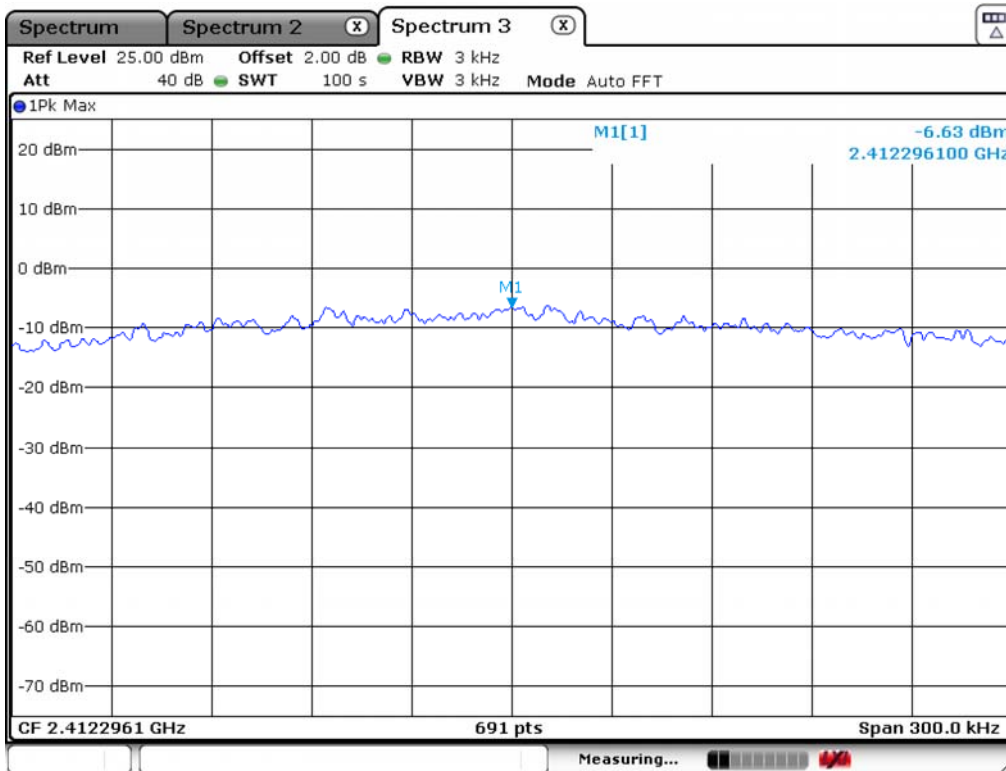
CH 11



Date: 13.DEC.2013 10:27:46

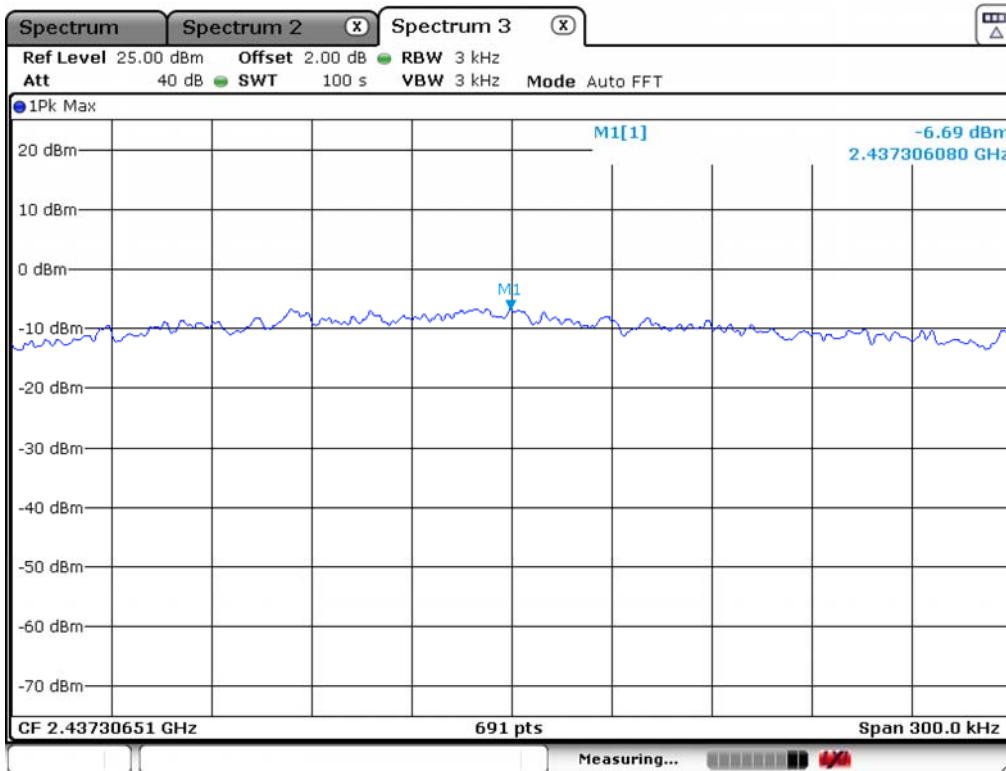
802.11g Power Density Measurement

CH 1



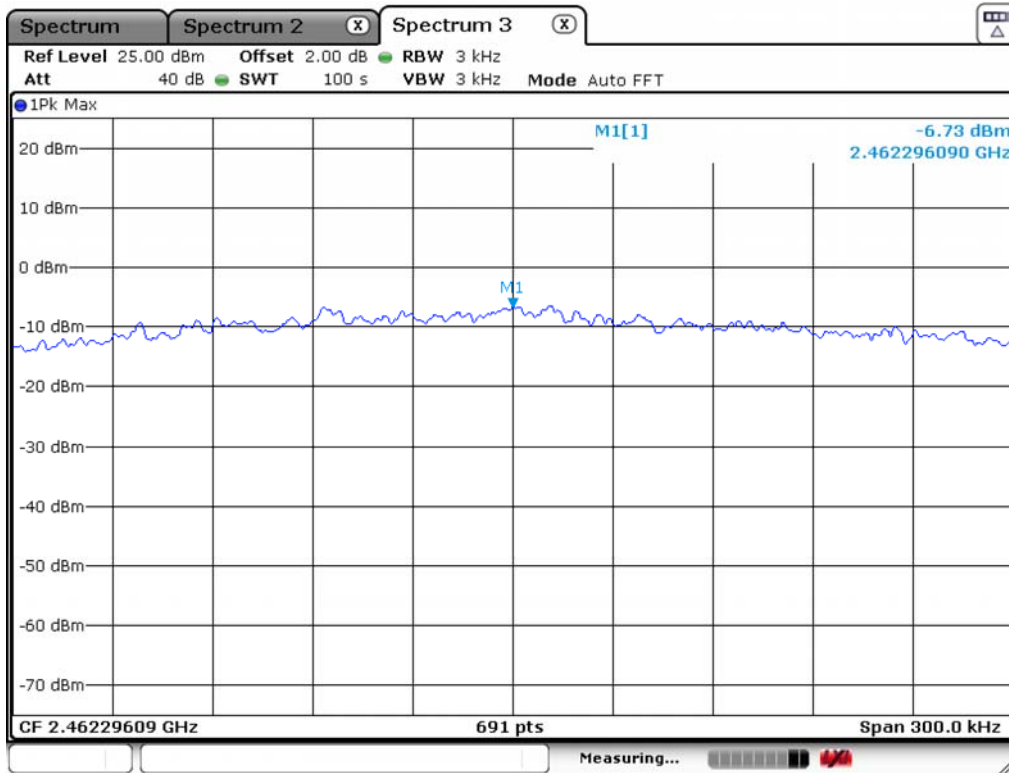
Date: 13.DEC.2013 10:47:58

CH 6



Date: 13.DEC.2013 10:46:53

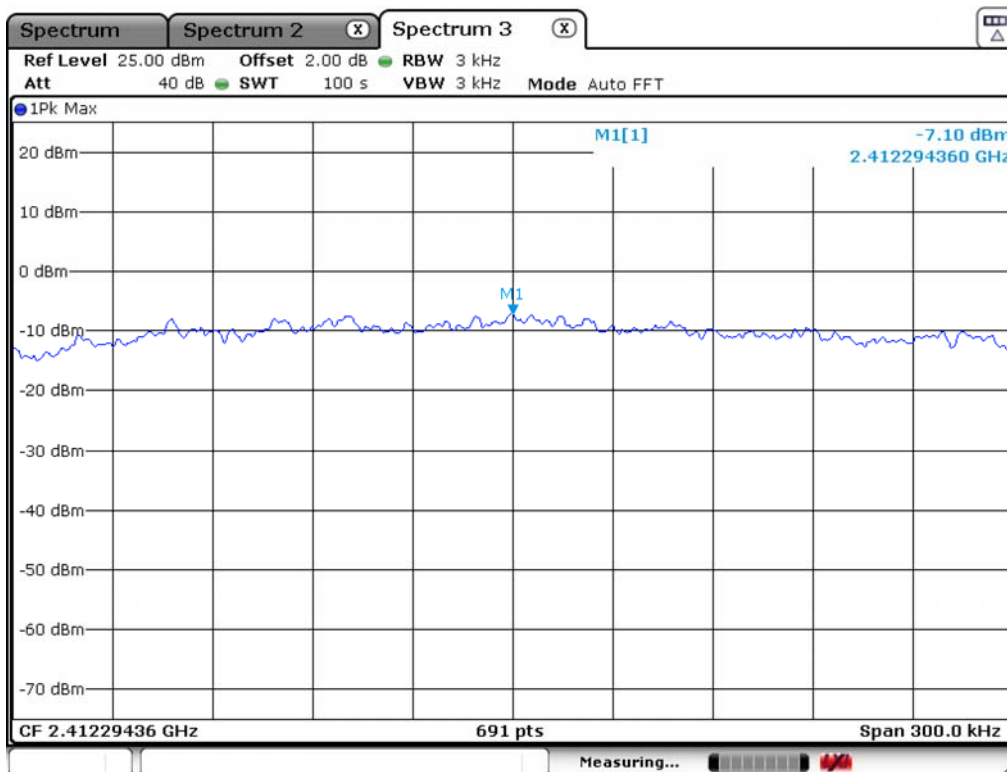
CH 11



Date: 13.DEC.2013 10:46:02

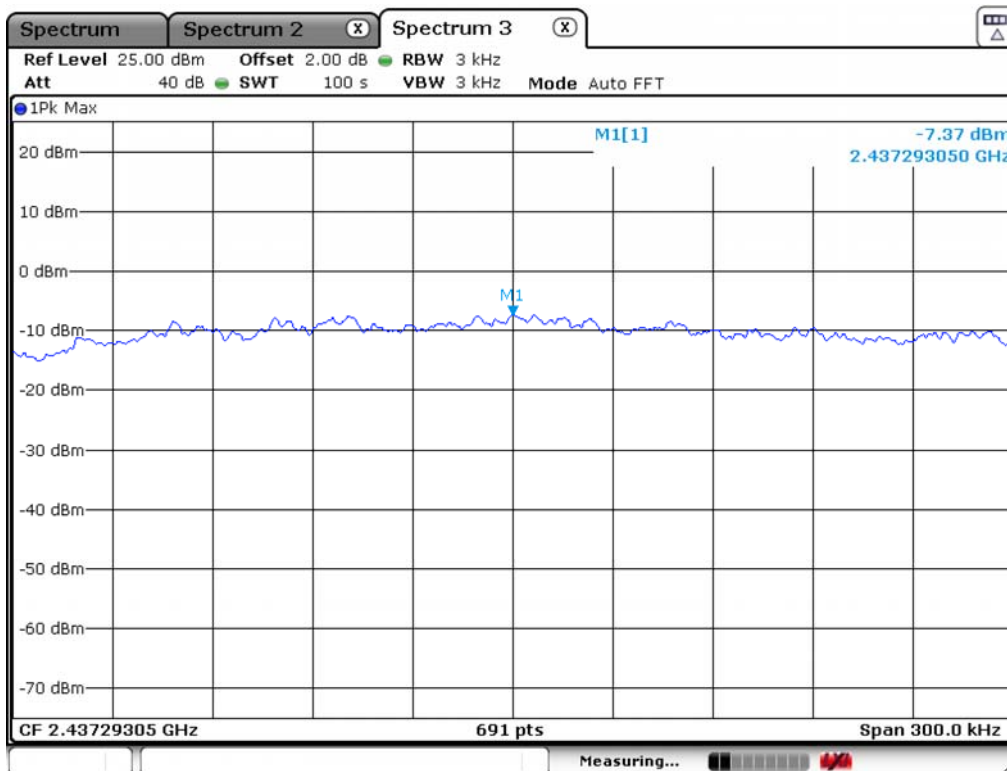
802.11n 20MHz Power Density Measurement

CH 1



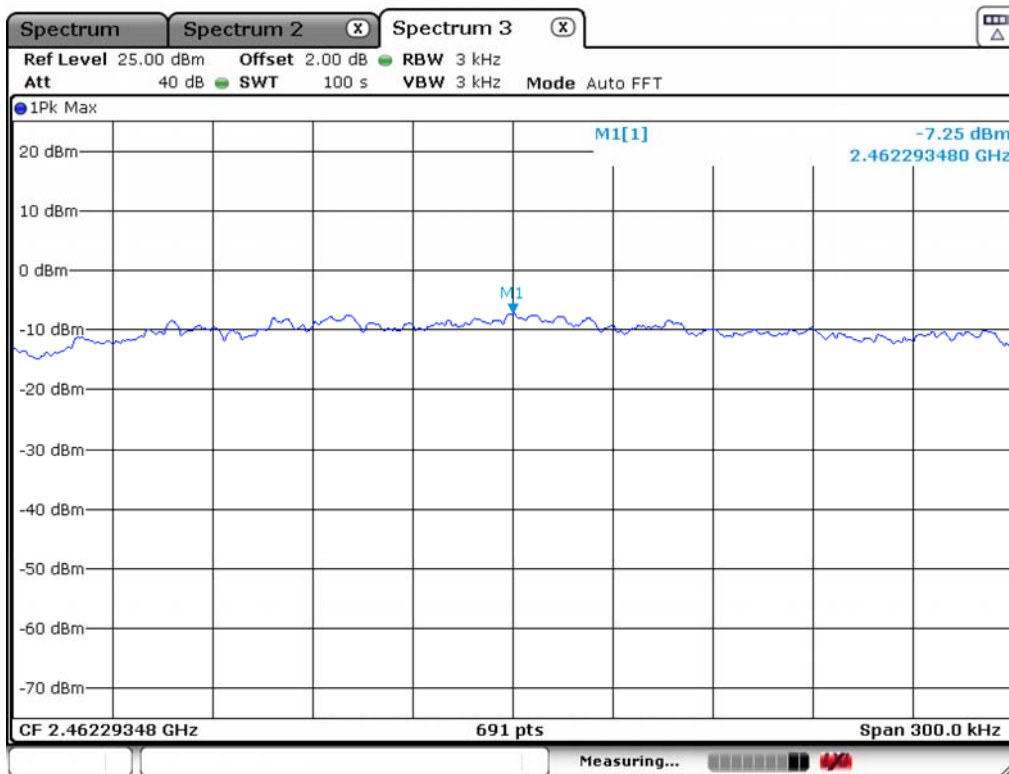
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CH 6



Date: 13.DEC.2013 10:53:35

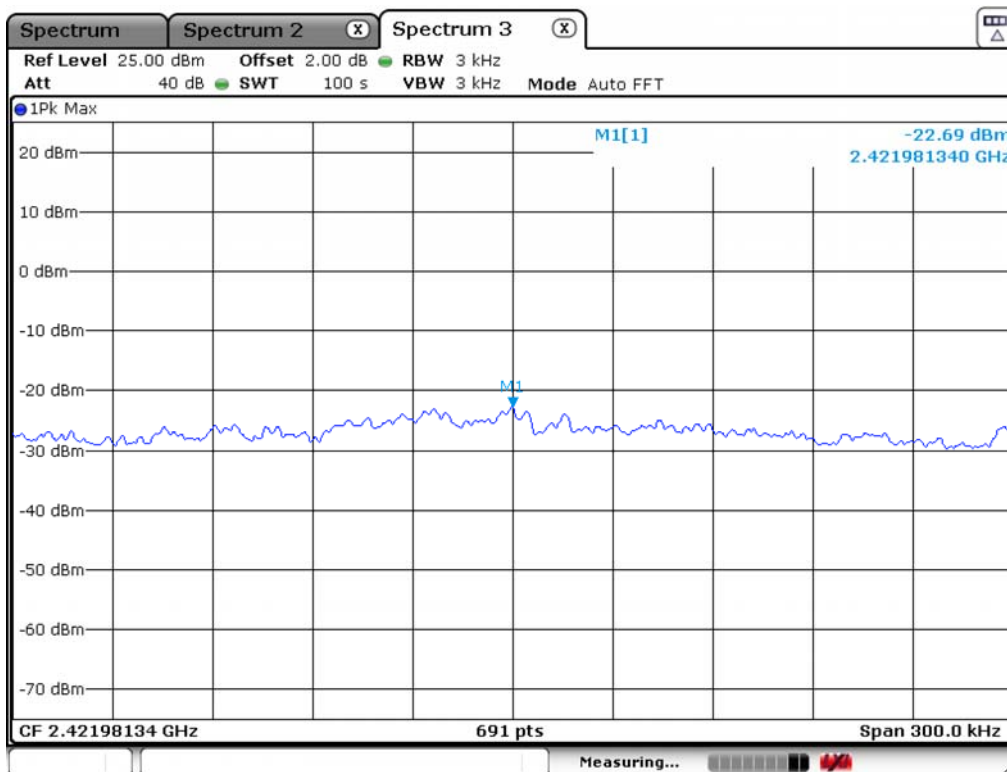
CH 11



Date: 13.DEC.2013 10:50:32

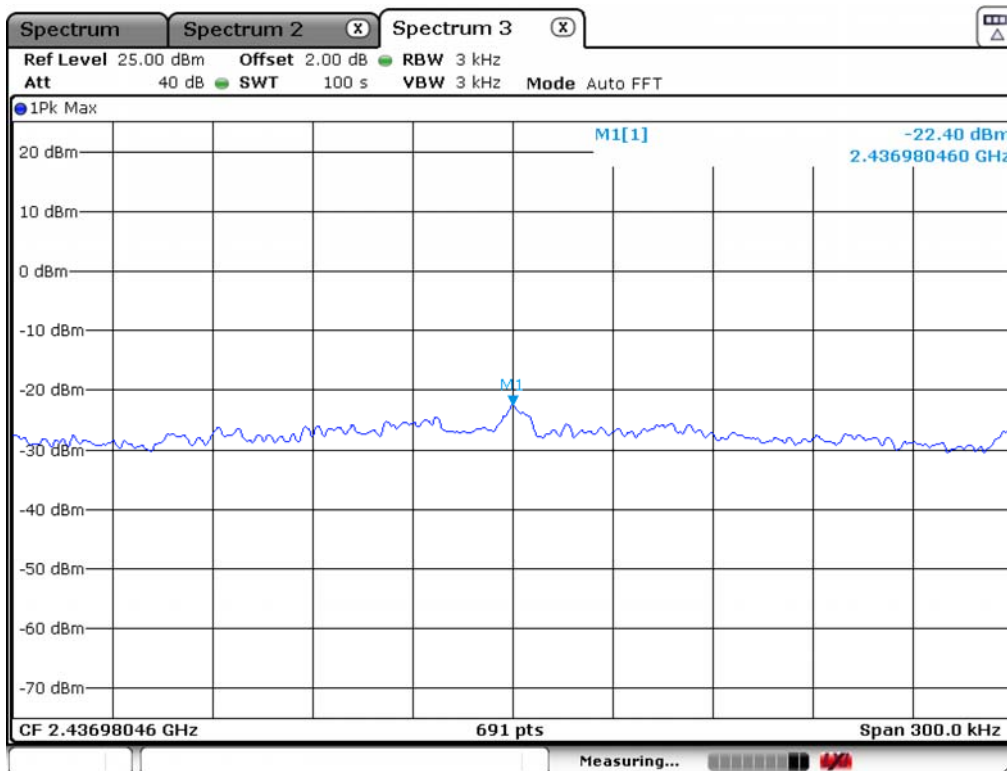
802.11n 40MHz Power Density Measurement

CH 3



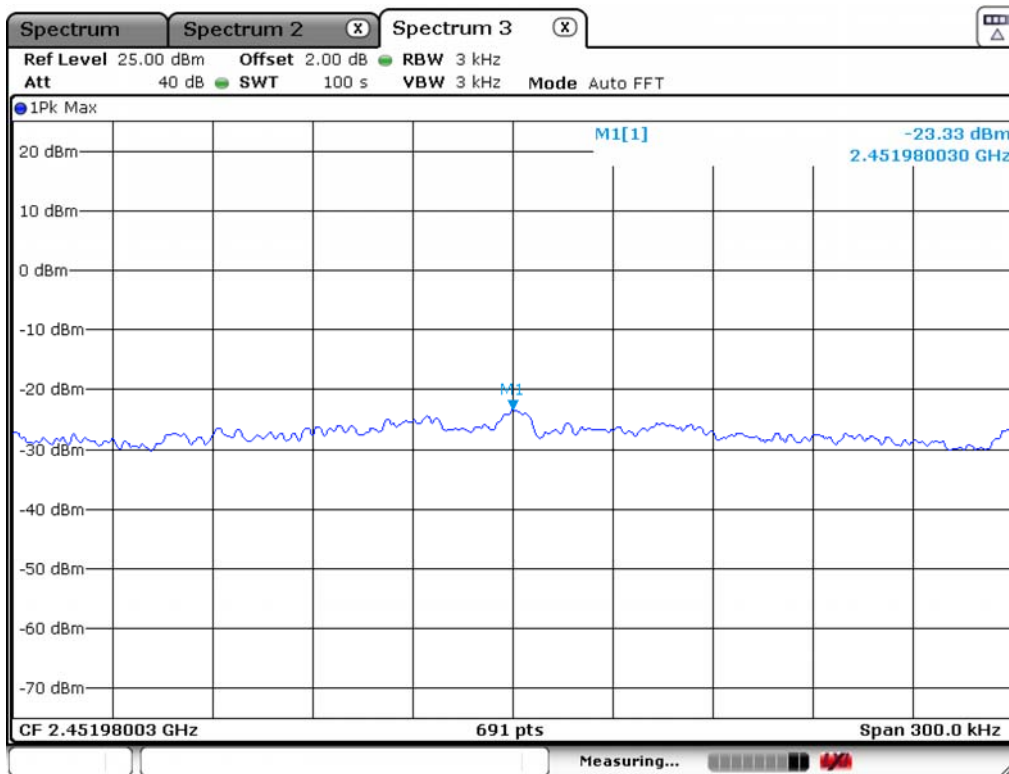
Date: 13.DEC.2013 11:03:17

CH 6



Date: 13.DEC.2013 11:04:10

CH 9



Date: 13.DEC.2013 11:20:01

3.2.4 Band Edge

Procedure:

*The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 80 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

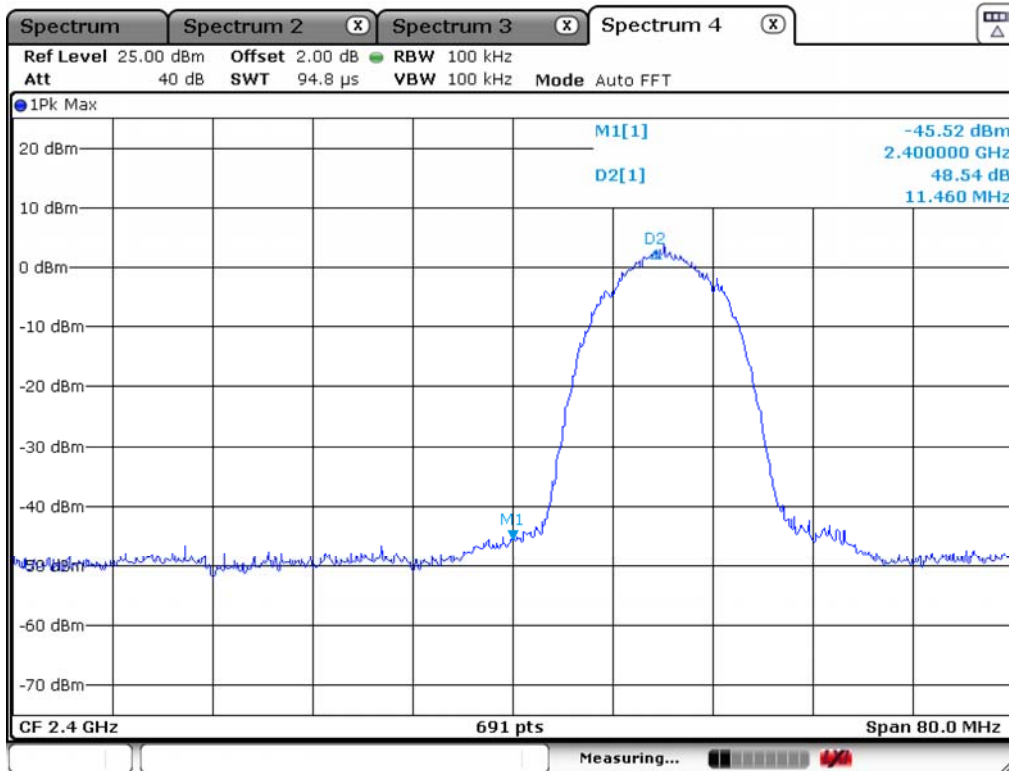
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
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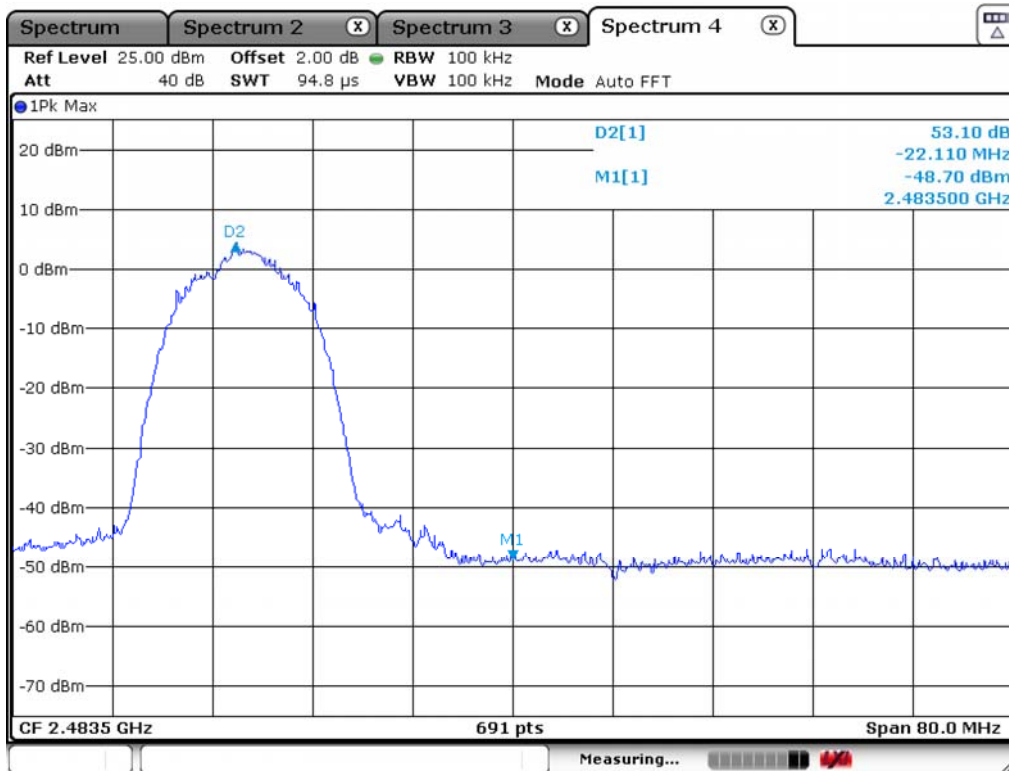
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

802.11b Band Edge : Conducted Measurements



Date: 13.DEC.2013 11:58:23



Date: 13.DEC.2013 11:57:22

Radiated Band edges in the restricted band 2310-2390 MHz measurement

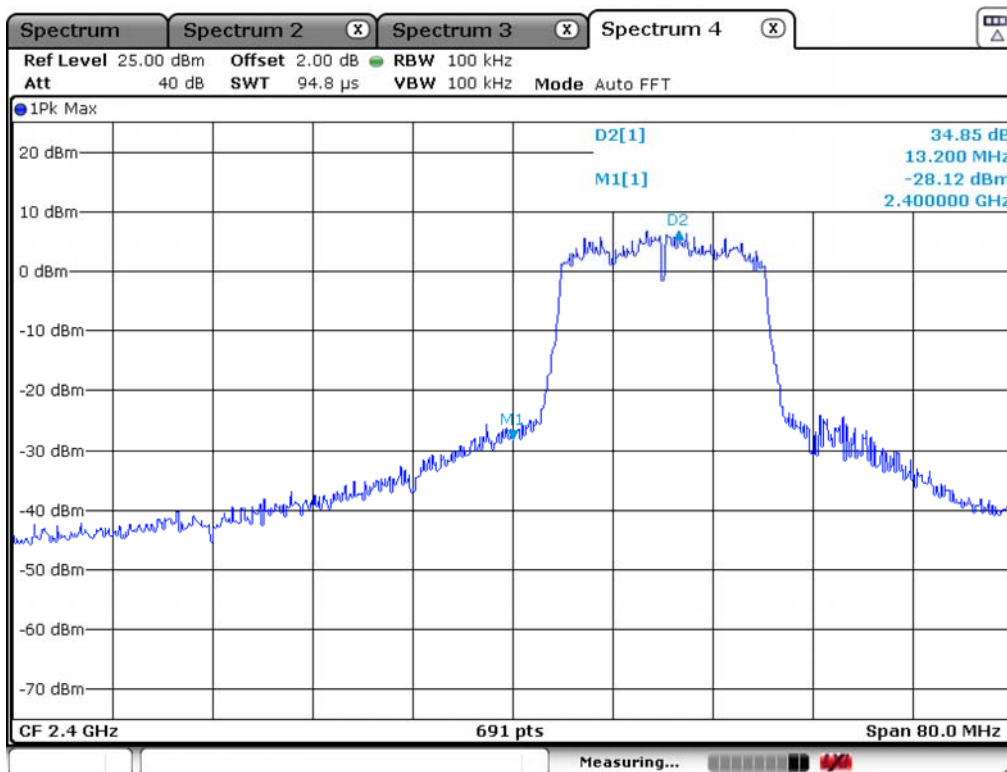
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2389.9	33.2	47.7	H	27.5	22.4	54.0	74.0	38.3	52.8	15.7	21.2

Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement

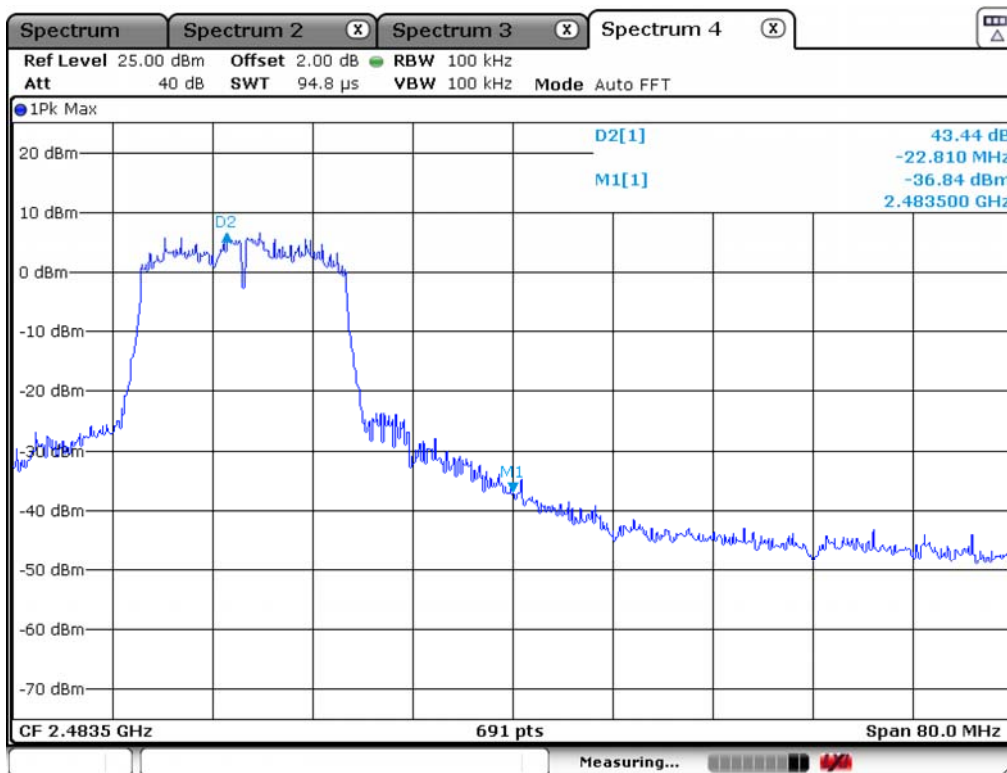
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2483.5	37.0	54.9	H	27.5	22.4	54.0	74.0	42.1	60.0	11.9	14.0

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

802.11g Band Edge : Conducted Measurements



Date: 13.DEC.2013 11:59:38



Date: 13.DEC.2013 12:00:34

Radiated Band edges in the restricted band 2310-2390 MHz measurement

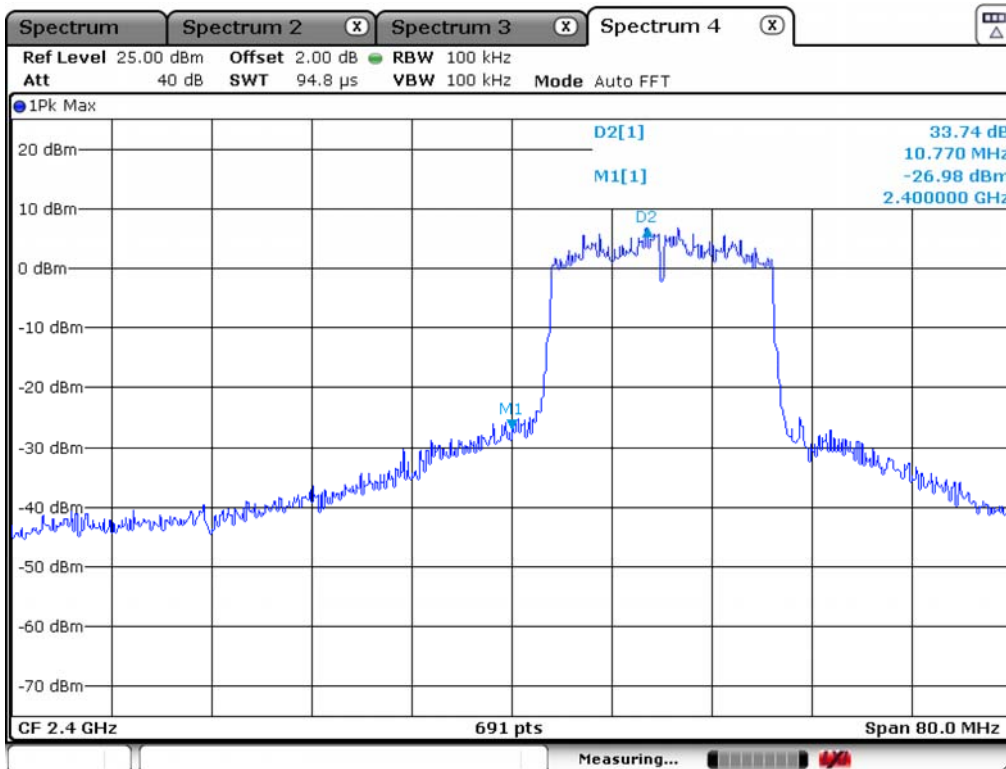
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2389.9	39.8	53.1	H	27.5	22.4	54.0	74.0	44.9	58.2	9.1	15.8

Radiated Band edges in the restricted band 2483.5-2500 MHz measurement

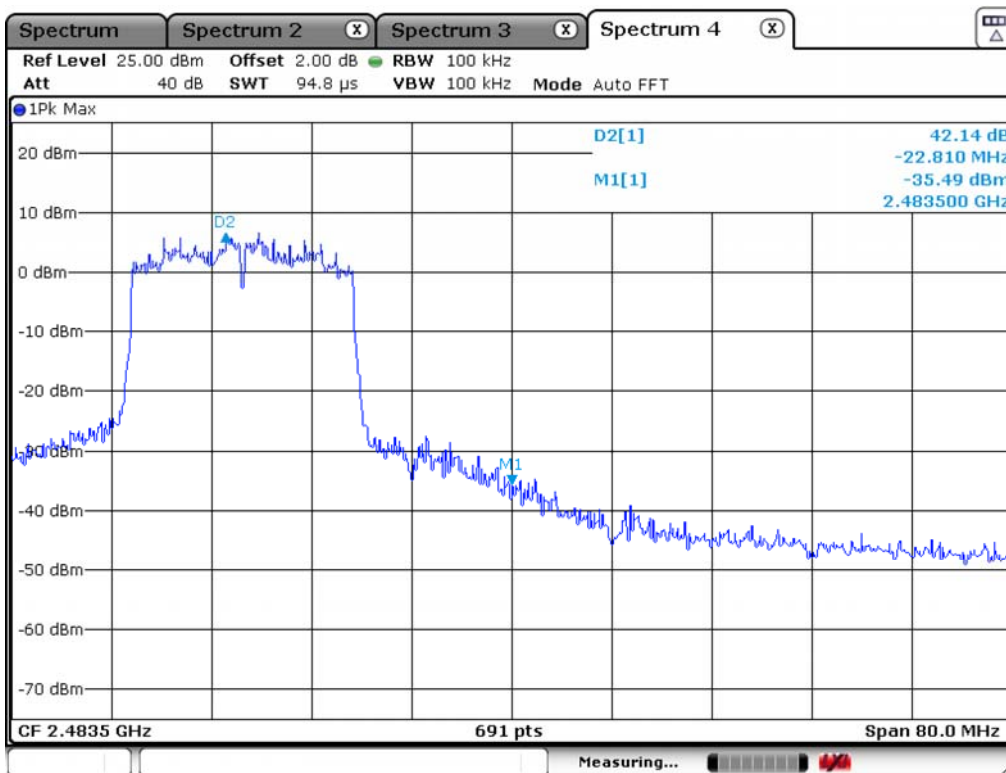
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2483.5	41.2	53.4	H	27.5	22.4	54.0	74.0	46.3	58.5	7.7	15.5

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

802.11n 20MHz Band Edge : Conducted Measurements



Date: 13.DEC.2013 12:02:16



Date: 13.DEC.2013 12:01:29

Radiated Band edges in the restricted band 2310-2390 MHz measurement

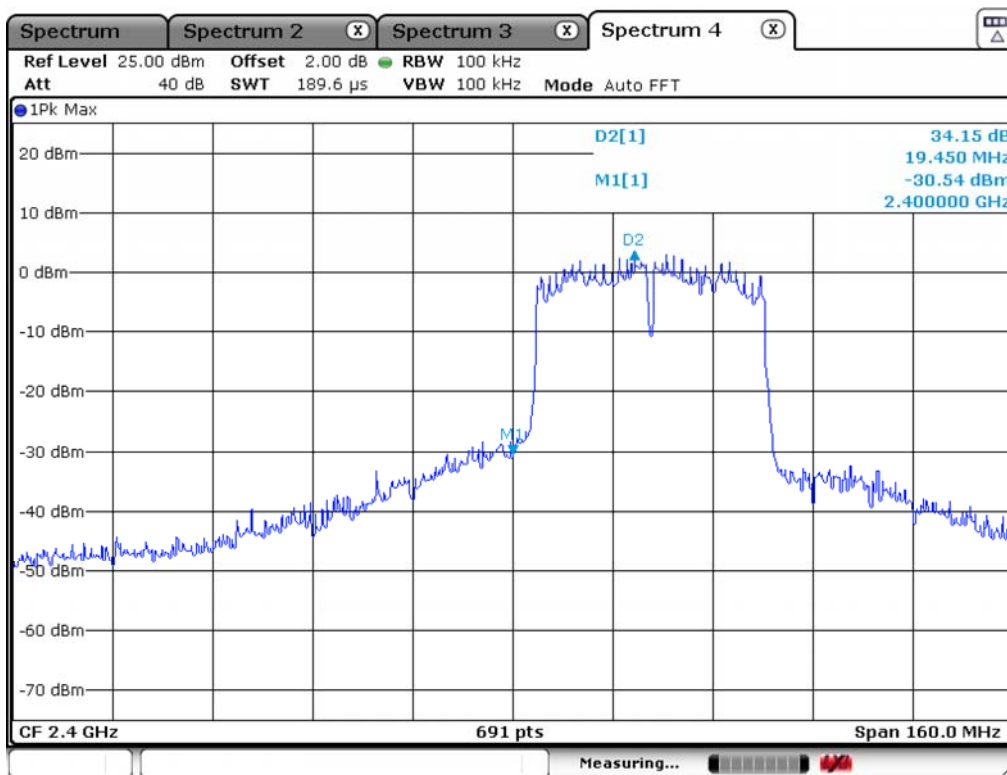
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2389.9	39.8	55.1	H	27.5	22.4	54.0	74.0	44.9	60.2	9.1	13.8

Radiated Band edges in the restricted band 2483.5-2500 MHz measurement

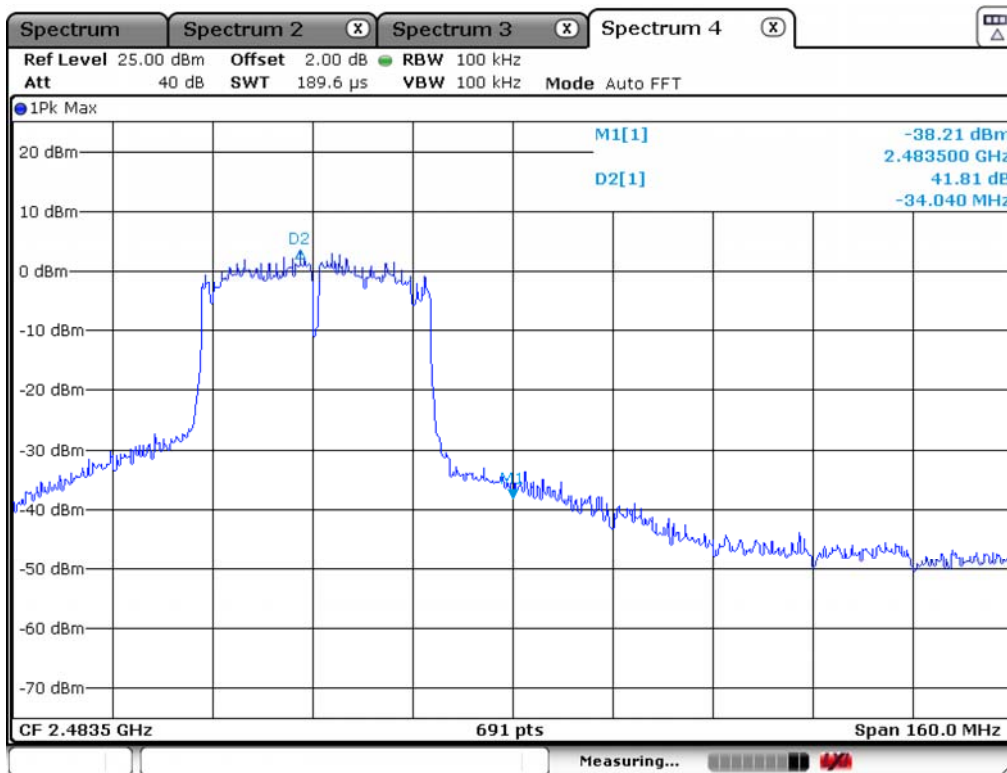
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2483.5	41.1	57.9	H	27.5	22.4	54.0	74.0	46.2	63.0	7.8	11.0

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

802.11n 40MHz Band Edge : Conducted Measurements



Date: 13.DEC.2013 12:03:33



Date: 13.DEC.2013 12:04:32

Radiated Band edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2389.9	39.8	55.1	H	27.5	22.4	54.0	74.0	44.9	60.2	9.1	13.8

Radiated Band edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain + Cable Loss	AV / Peak		AV / Peak		AV / Peak	
2483.5	44.0	57.5	V	27.5	22.4	54.0	74.0	49.1	62.6	4.9	11.4

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

3.3.5 Conducted Spurious Emissions

Procedure:

The test follows FCC KDB Publication No. 558074 D01 DTS Meas Guidance. The conducted spurious emissions were measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, set the marker on the peak of any spurious emission recorded.

The spectrum analyzer is set to:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions

RBW = 100 kHz

Sweep = auto

VBW = 100 kHz

Detector function = peak

Trace = max hold

Measurement Data: **Complies**

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

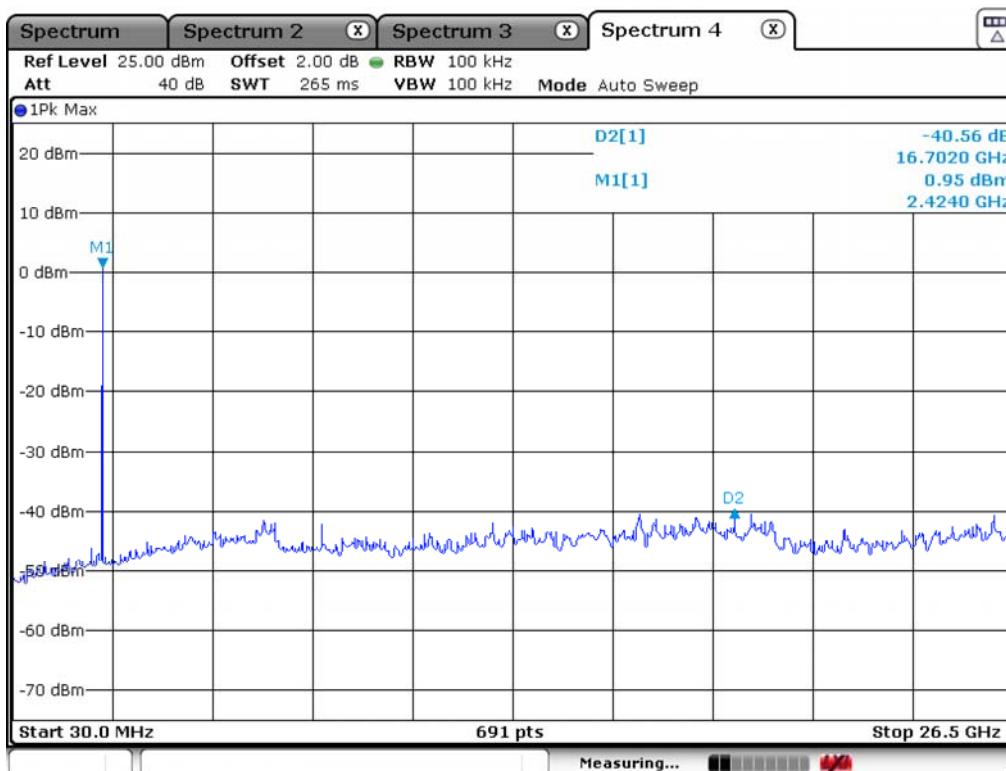
Minimum Standard:	> 20 dBc
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Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

802.11b – channel 1

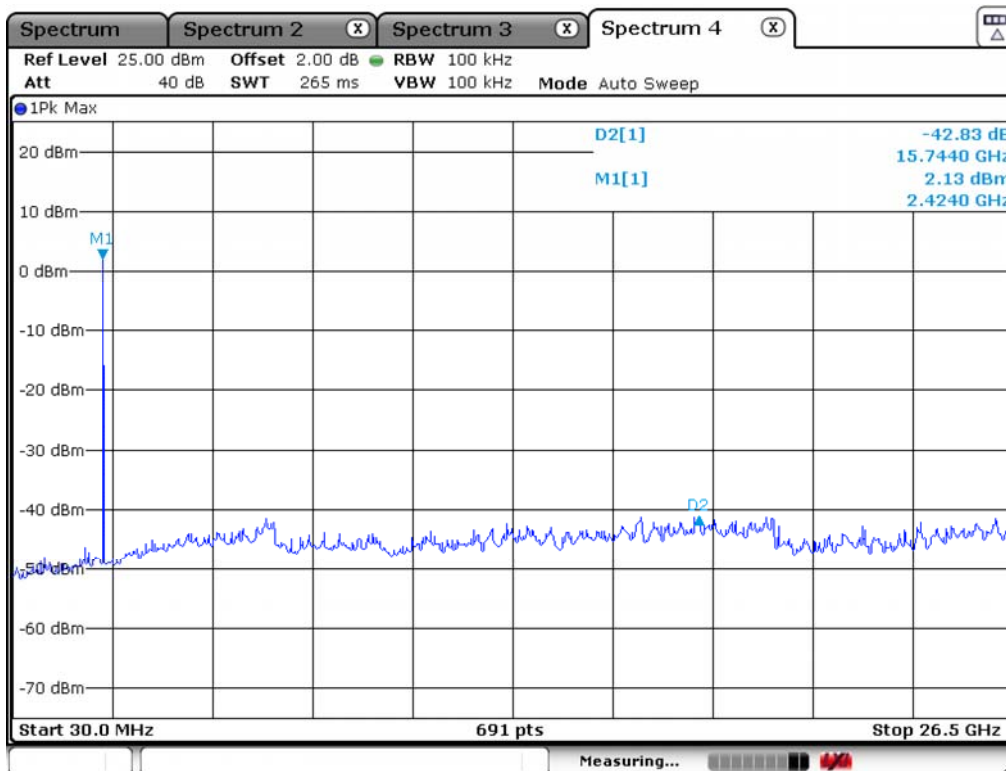
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:14:57

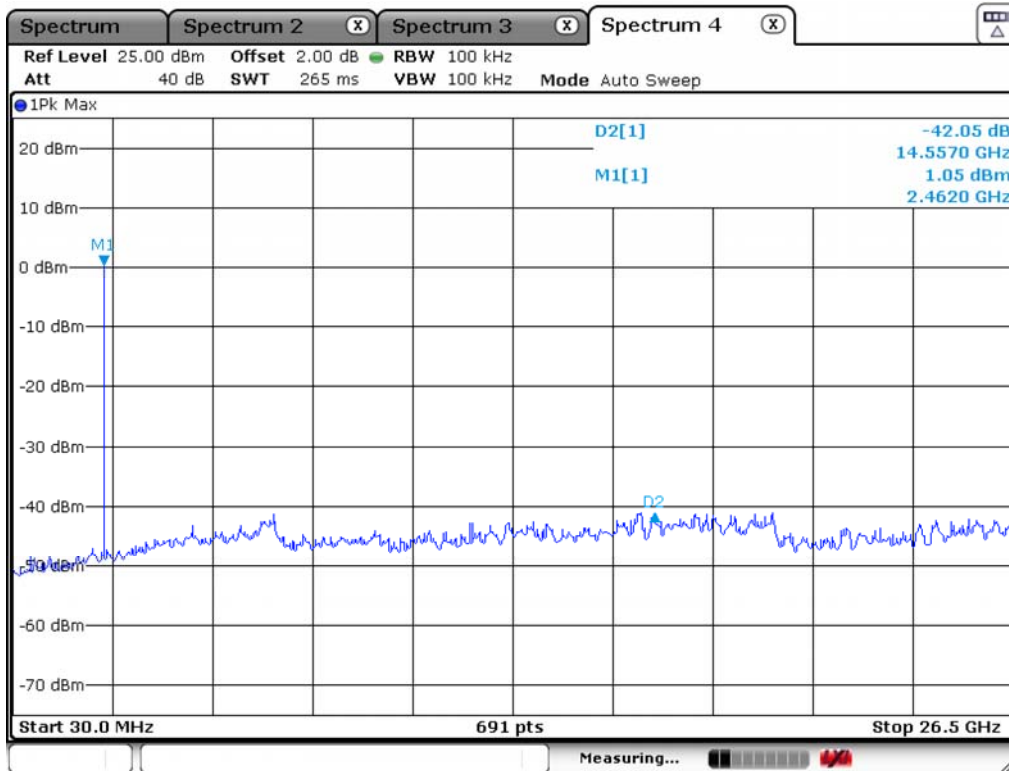
802.11b – channel 6

Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:15:30

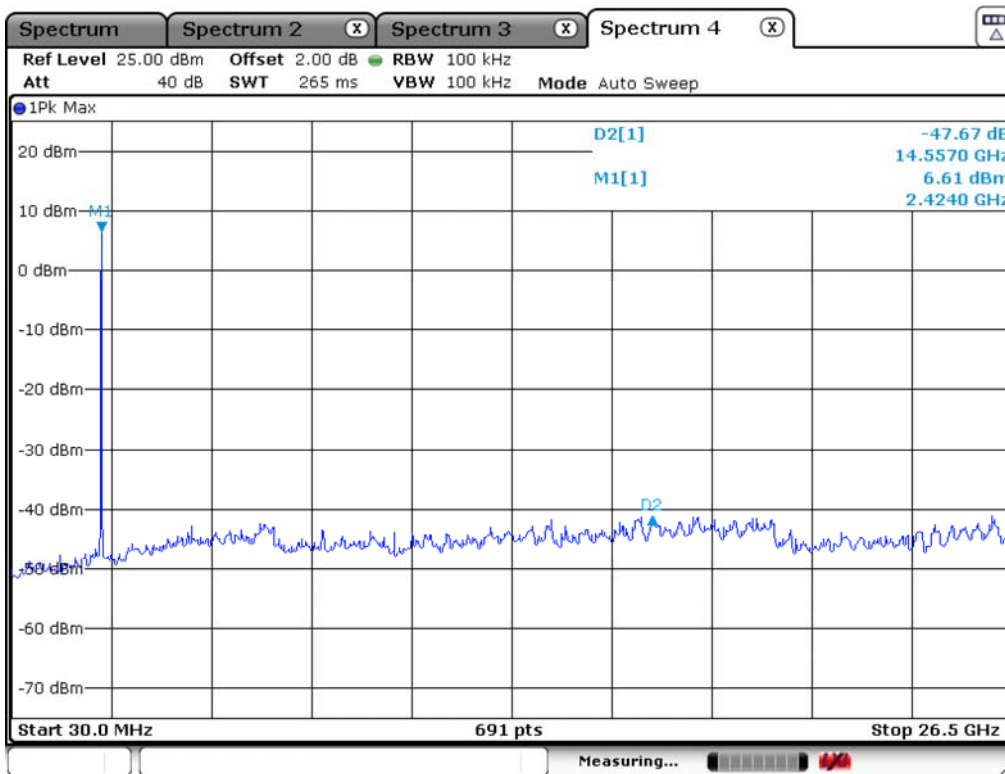
802.11b –channel 11
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:15:58

802.11g – channel 1

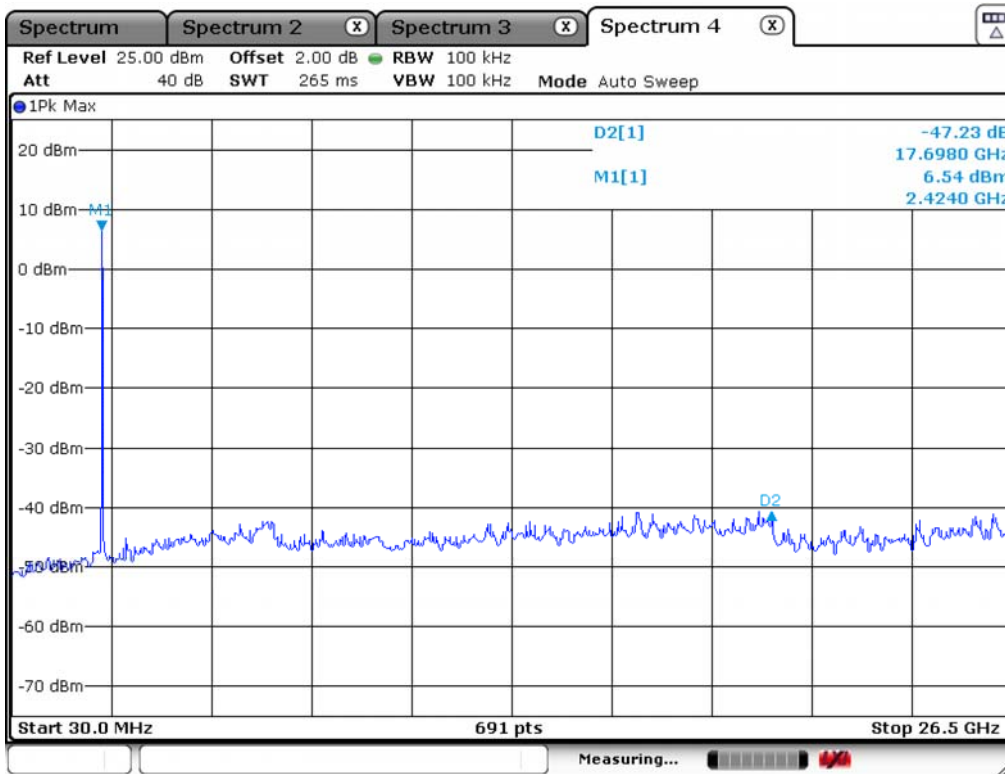
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:14:21

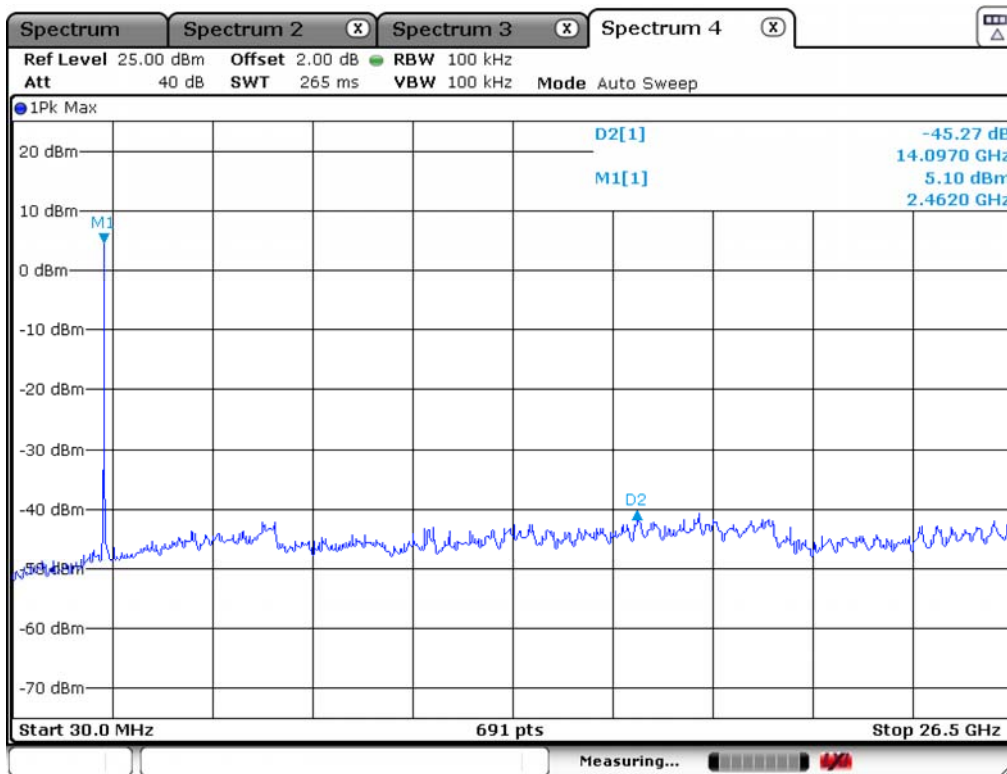
802.11g – channel 6

Frequency Range = 30 MHz ~ 10th harmonic.



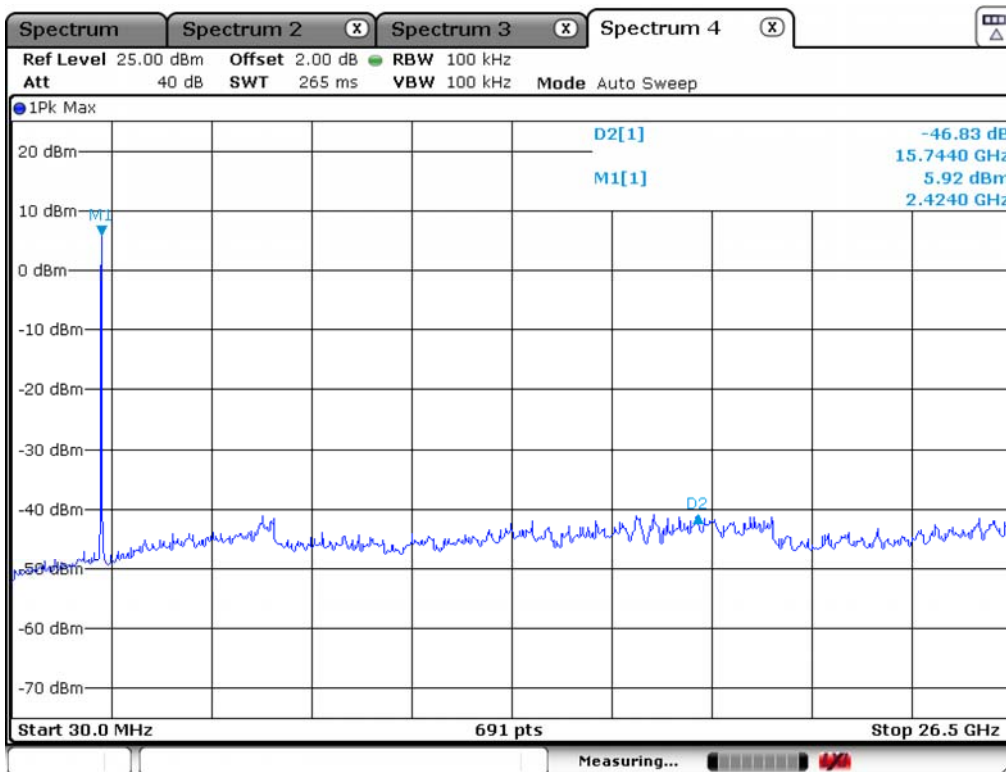
Date: 13.DEC.2013 12:13:51

802.11g –channel 11
Frequency Range = 30 MHz ~ 10th harmonic.



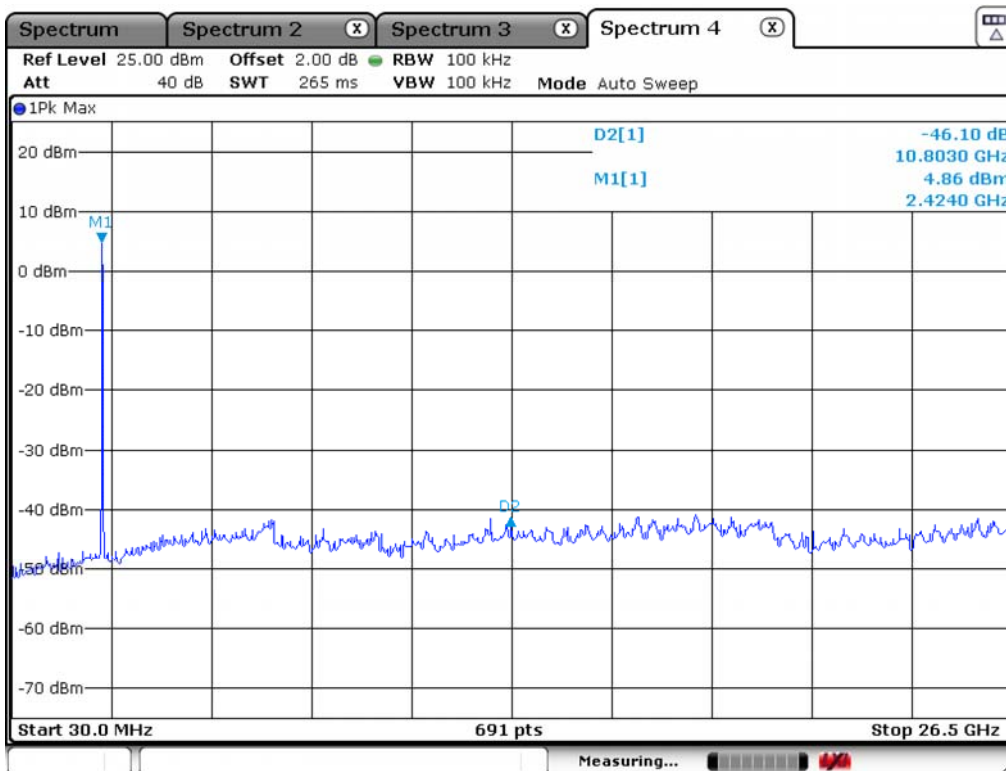
Date: 13.DEC.2013 12:13:20

802.11n_20MHz – channel 1
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:11:23

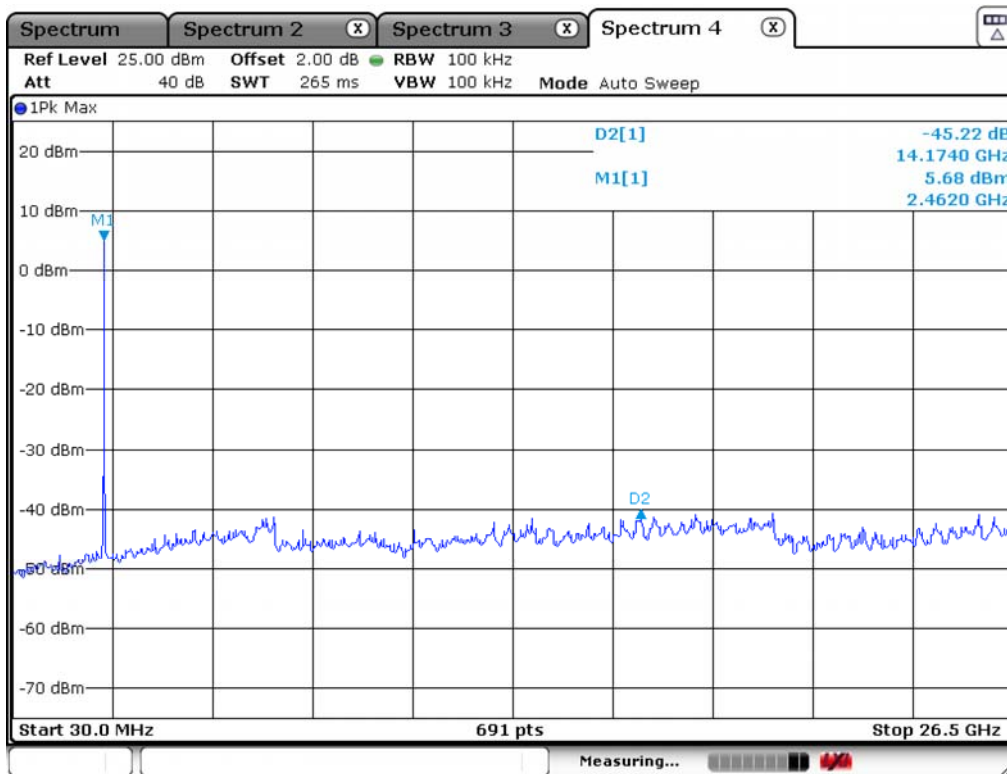
802.11n_20MHz – channel 6
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:12:06

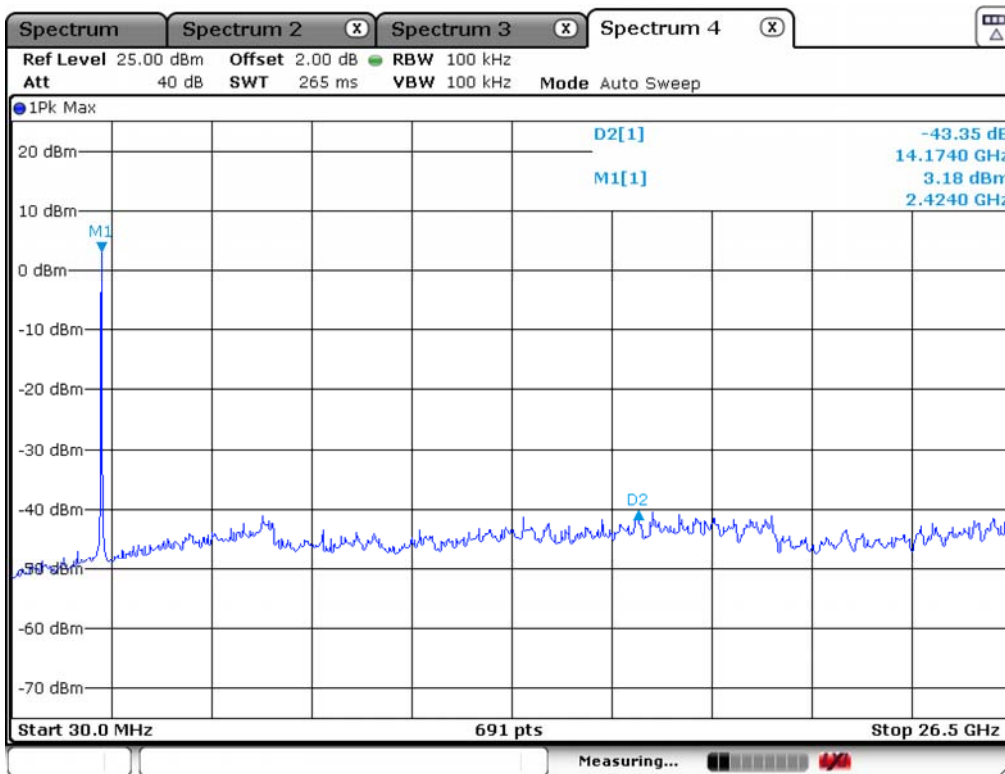
802.11n_20MHz -channel 11

Frequency Range = 30 MHz ~ 10th harmonic.



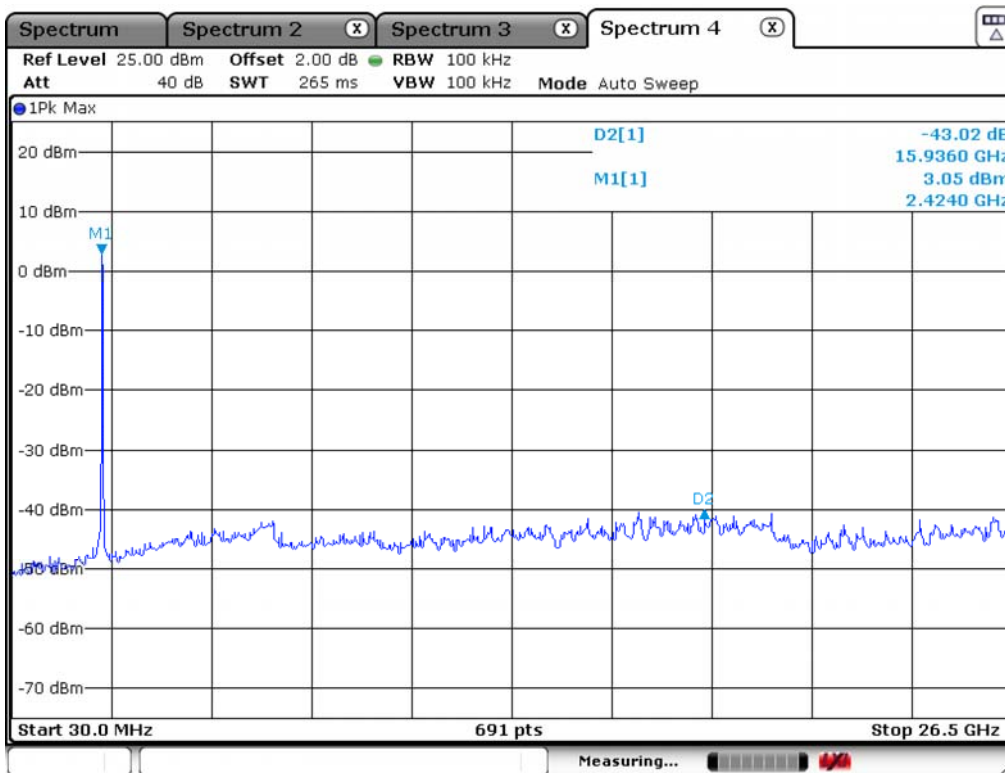
Date: 13.DEC.2013 12:12:44

802.11n_40MHz – channel 3
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:10:42

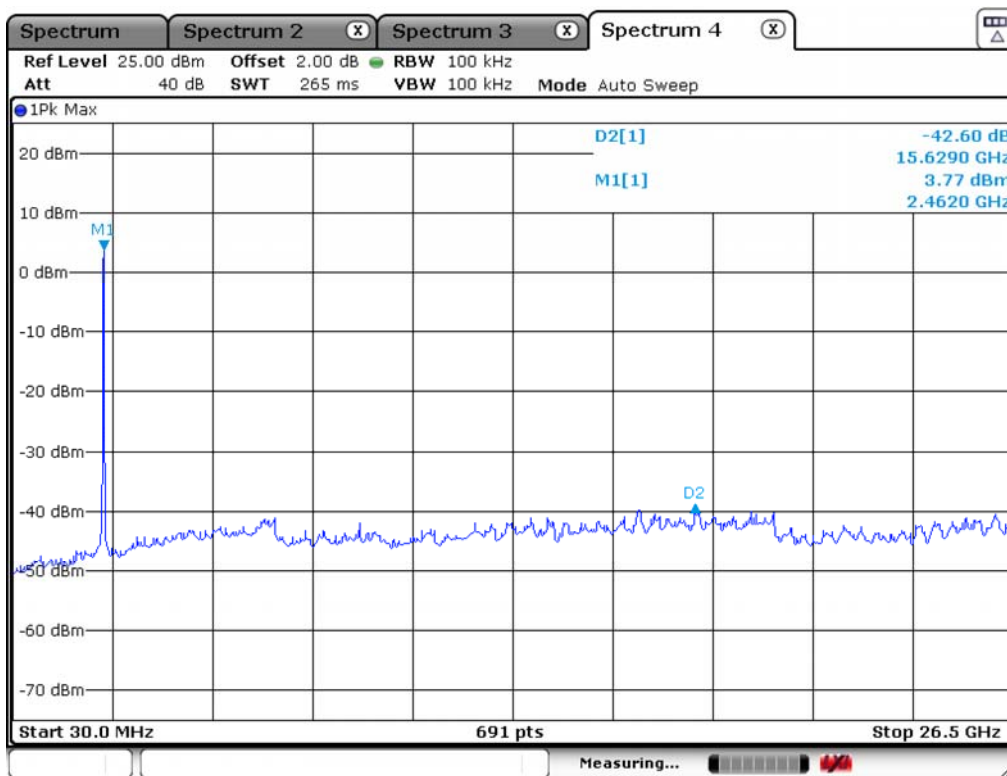
802.11n_40MHz – channel 6
Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:10:04

802.11n_40MHz – channel 9

Frequency Range = 30 MHz ~ 10th harmonic.



Date: 13.DEC.2013 12:09:11

3.2.6 Radiated Spurious Emissions

Procedure:

* The testing follows TCB Workshop 2012, April and fulfills ANSI C63.4-2009 and the guidelines in ANSI

C63.10-2009 test requirement. The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

- (a) In the frequency range of 9kHz to 30 MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 3m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- (b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 9 KHz ~ 10th harmonic.

RBW = 120 kHz (9 KHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

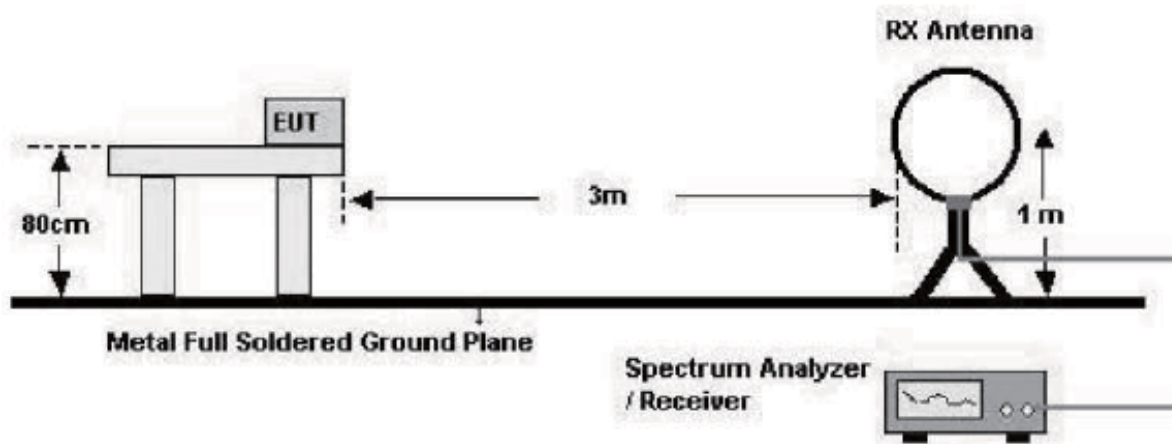
Trace = max hold

VBW \geq RBW

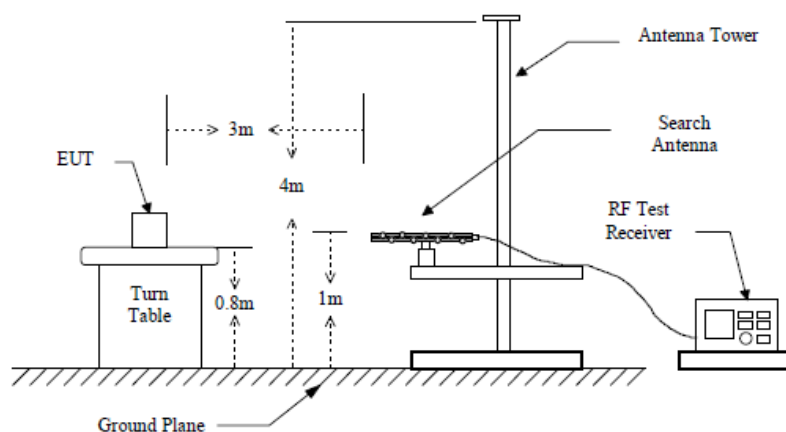
Detector function = peak

Sweep = auto

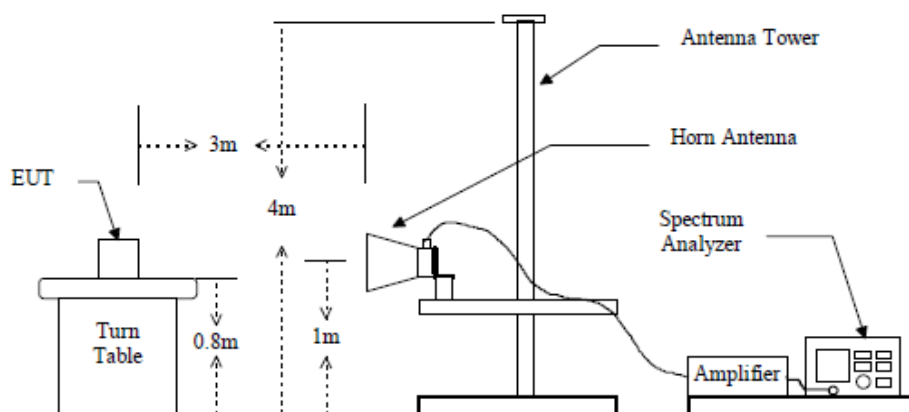
below 30MHz



below 1GHz (30MHz to 1GHz)



above 1GHz



Measurement Data: Complies

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20dB below limit include from 9KHz to 30MHz.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
0.009 ~ 0.490	2400/F(kHz) (@ 300m)
0.490 ~ 1.705	24000/F(kHz) (@ 30m)
1.705 ~ 30	30(@ 30m)
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

802.11b Measurement Data: (Above 1GHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4824	35.3	48.4	H	27.5	22.4	54.0	74.0	40.4	53.5	13.6	20.5
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
AV / Peak		Antenna		Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak		
4874	34.9	47.3	H	27.5	22.4	54.0	74.0	40.0	52.4	14.0	21.6
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
AV / Peak		Antenna		Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak		
4924	35.0	49.0	V	27.5	22.4	54.0	74.0	40.1	54.1	13.9	19.9
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

- No other emissions were detected at a level greater than 20dB below limit.

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20dB below limit.

802.11g Measurement Data: (Above 1GHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4824	35.7	48.3	H	27.5	22.4	54.0	74.0	40.8	53.4	13.2	20.6
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
AV / Peak		Antenna		Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak		
4874	35.2	47.5	H	27.5	22.4	54.0	74.0	40.3	53.4	13.7	20.6
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
AV / Peak		Antenna		Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak		
4924	35.5	47.0	V	27.5	22.4	54.0	74.0	40.6	52.1	13.4	21.9
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

- No other emissions were detected at a level greater than 20dB below limit.

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20dB below limit.

802.11n 20MHz Measurement Data: (Above 1GHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4825	35.7	47.6	H	27.5	22.4	54.0	74.0	40.8	52.7	13.2	21.3
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4874	35.1	47.2	V	27.5	22.4	54.0	74.0	40.2	52.3	13.8	21.7
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4924	35.6	47.9	V	27.5	22.4	54.0	74.0	40.7	53.0	13.3	21.0
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

- No other emissions were detected at a level greater than 20dB below limit.

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20dB below limit.

802.11n 40MHz Measurement Data: (Above 1GHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4825	34.9	48.1	H	27.5	22.4	54.0	74.0	40.0	53.2	14.0	20.8
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4874	35.0	47.2	V	27.5	22.4	54.0	74.0	40.1	52.3	13.9	21.7
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
4924	34.9	47.1	V	27.5	22.4	54.0	74.0	40.0	52.3	14.0	21.8
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

- No other emissions were detected at a level greater than 20dB below limit.

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain+Cable	AV / Peak		AV / Peak		AV / Peak	
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20dB below limit.

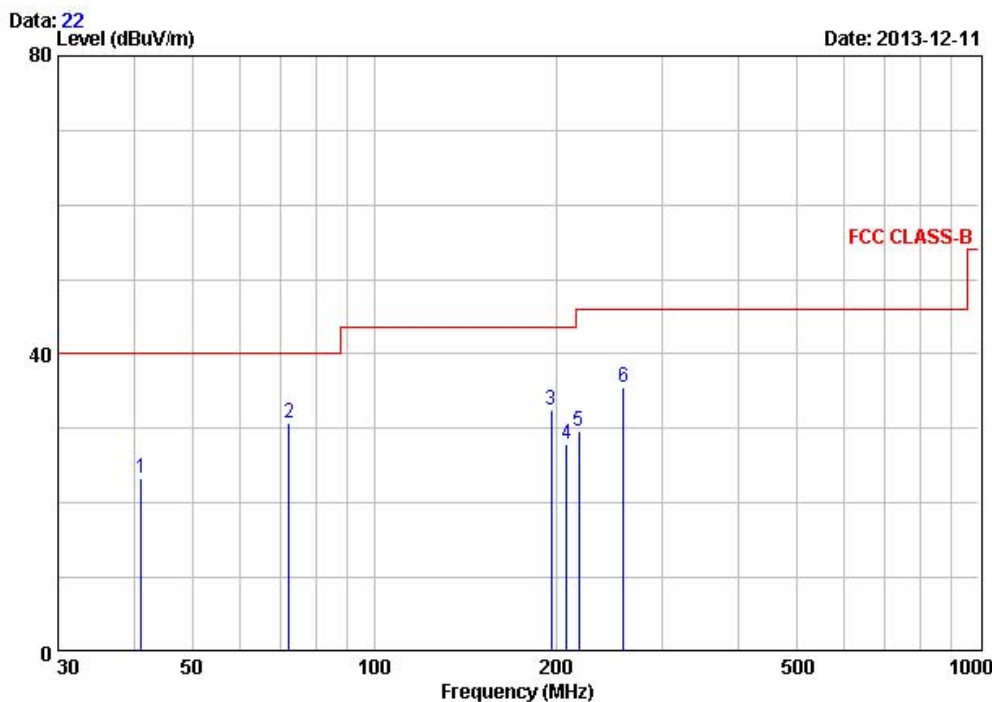
Radiated Emissions – Wi-Fi 2.4 GHz mode



243 Jubug-ri, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: SPW-B43143S TEST MODE: Wifi mode

Temp Humi : 20 / 25 Tested by: HA J M



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	41.20	-16.88	23.32	40.00	16.68	100	333	VERTICAL
2	72.30	-19.10	30.80	40.00	9.20	100	20	HORIZONTAL
3	196.40	-17.90	32.50	43.50	11.00	178	123	HORIZONTAL
4	208.40	-17.75	27.95	43.50	15.55	100	37	HORIZONTAL
5	218.30	-17.25	29.75	46.00	16.25	100	51	HORIZONTAL
6	258.90	-15.40	35.60	46.00	10.40	400	39	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.7 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- Refer to the next page.
- No other emissions were detected at a level greater than 20dB below limit
- It gave the worse case emissions

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

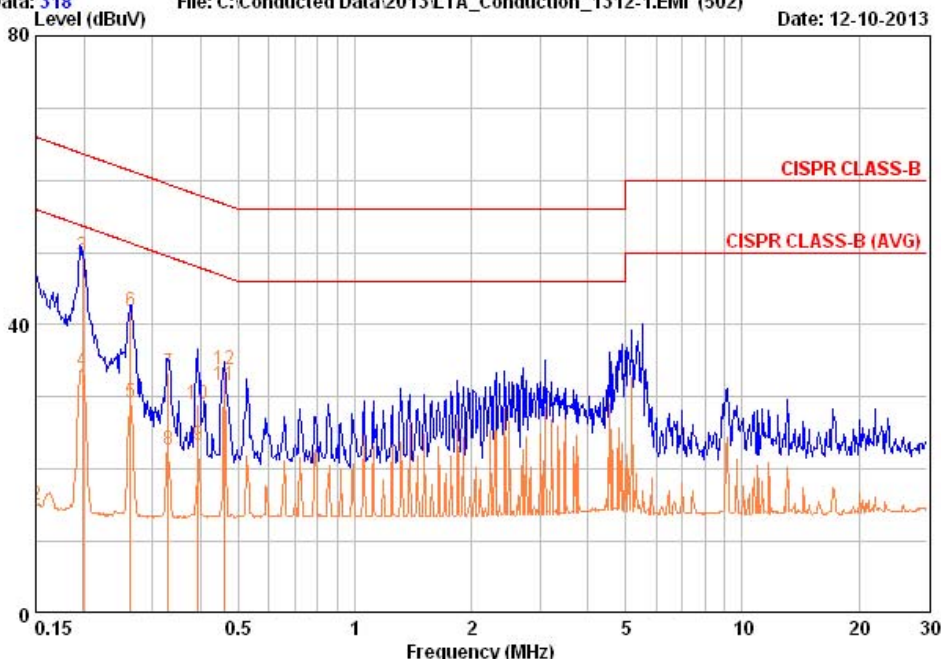
Radiated Emissions – Wi-Fi 2.4 GHz mode – LINE



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EUT / Model No. : SPW-B43143S	Phase : LINE
Test Mode : Wifi mode	Test Power : 120 / 60
Temp./Humi. : 20 / 49	Test Engineer : HA J M

Data: 318 File: C:\Conducted Data\2013\LTA_Conduction_1312-1.EMI (502) Date: 12-10-2013



Freq MHz	RD		C.F	Result		Limit		Margin	
	QP dBuV	AV dBuV		QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.150	28.14	5.44	9.55	37.69	14.99	66.00	56.00	28.31	41.01
0.198	39.85	24.05	9.56	49.41	33.61	63.69	53.69	14.28	20.08
0.264	32.35	19.75	9.56	41.91	29.31	61.30	51.30	19.39	21.99
0.330	23.75	13.15	9.57	33.32	22.72	59.45	49.45	26.13	26.73
0.393	19.45	13.75	9.57	29.02	23.32	58.00	48.00	28.98	24.68
0.462	24.25	22.05	9.57	33.82	31.62	56.66	46.66	22.84	15.04

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

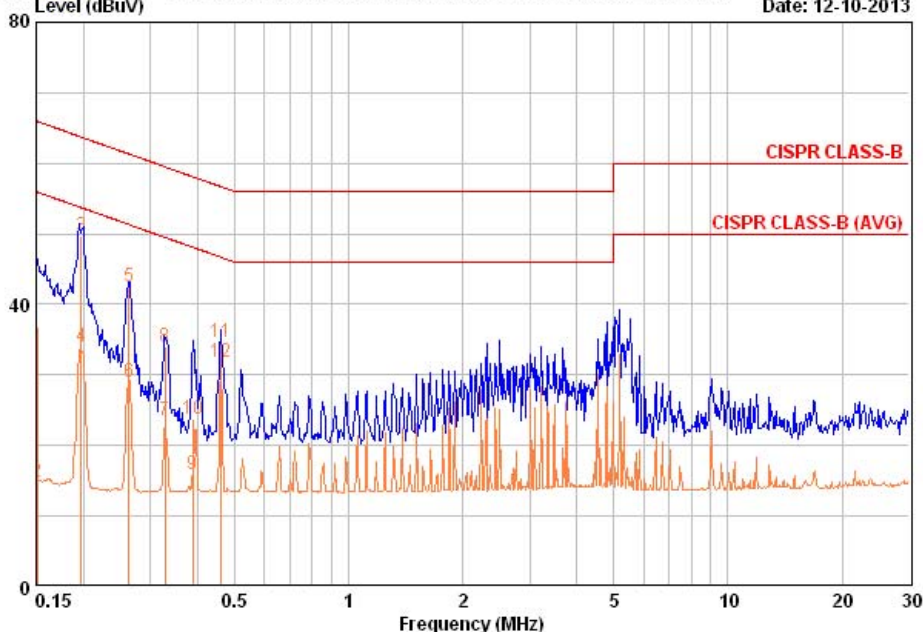
Radiated Emissions – Wi-Fi 2.4 GHz mode - NEUTRAL



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Fax:+82-31-3236010

EUT / Model No. : SPW-B43143S Phase : NEUTRAL
 Test Mode : Wifi mode Test Power : 120 / 60
 Temp./Humi. : 20 / 49 Test Engineer : HA J M

Data: 320 File: C:\Conducted Data\2013\LTA_Conduction_1312-1.EMI (502) Date: 12-10-2013
 Level (dBuV)



Freq MHz	RD		C.F	Result		Limit		Margin	
	QP dBuV	AV dBuV		QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.151	27.24	5.14	9.61	36.85	14.75	65.94	55.94	29.10	41.20
0.197	40.05	24.45	9.56	49.61	34.01	63.74	53.74	14.12	19.72
0.263	32.95	19.35	9.57	42.52	28.92	61.34	51.34	18.81	22.41
0.328	24.45	13.85	9.59	34.04	23.44	59.50	49.50	25.46	26.06
0.389	14.25	6.25	9.60	23.85	15.85	58.09	48.09	34.23	32.23
0.461	25.05	22.25	9.61	34.66	31.86	56.67	46.67	22.01	14.81

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

3.2.8 Receiver Spurious Emissions

Definition:

The field strength of emissions from intentional radiators was measured. In case of the air temperature of the test site is out of the range is 10 to 40°C before the testing proceeds the warm-up time of EUT maintain adequately

Test method	: FCC Part 15.209
Frequency Range	: 30 MHz ~ 10 th harmonic.
Bandwidth	: 120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	: 3 meters
Test mode	: Rx mode
Result	: Complies

Measurement Data:

- Refer to the next page.
- No other emissions were detected at a level greater than 20dB below limit
- It gave the worse case emissions.

Field Strength Limit

Part 15.209 LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
0.009 ~ 0.490	2400/F(kHz)
0.490 ~ 1.705	24000/F(kHz)
1.705 ~ 30	30
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data:

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
	AV / Peak			Antenna	Amp. Gain +Cable			
	No emissions were detected at a level greater than 20dB below limit.							
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
	AV / Peak			Antenna	Amp. Gain +Cable			
	No emissions were detected at a level greater than 20dB below limit.							
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
	AV / Peak			Antenna	Amp. Gain +Cable			
	No emissions were detected at a level greater than 20dB below limit.							

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Signal Analyzer (9kHz~30GHz)	FSV-30	100757	R&S	1 year	2013-01-15
2	Spectrum Analyzer (9kHz~2.9GHz)	8594E	3649A03649	HP	2 year	2012-03-26
3	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2013-03-25
4	SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	1 year	2013-03-25
5	Attenuator (3dB)	8491A	37822	HP	2 year	2012-09-22
6	Attenuator (10dB)	8491A	63196	HP	2 year	2012-09-22
7	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2013-03-25
8	EMI Test Receiver (~7GHz)	ESCI7	100722	R&S	1 year	2013-09-16
9	RF Amplifier (~1.3GHz)	8447D OPT 010	2944A07684	HP	1 year	2013-09-16
10	RF Amplifier (1~26.5GHz)	8449B	3008A02126	HP	1 year	2013-03-25
11	Horn Antenna (1~18GHz)	3115	00114105	ETS	2 year	2013-05-13
12	DRG Horn (Small)	3116B	81109	ETS-Lindgren	2 year	2012-03-15
13	DRG Horn (Small)	3116B	133350	ETS-Lindgren	2 year	2012-03-15
14	TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBECK	2 year	2013-05-03
15	Temp.Humidity Data Logger	SK-L200TH II A	00801	SATO	1 year	2013-03-14
16	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
17	Power Divider	11636A	06243	HP	2 year	2012-09-22
18	DC Power Supply	6674A	3637A01657	Agilent	-	-
19	Frequency Counter	5342A	2826A12411	HP	1 year	2013-03-25
20	Power Meter	EPM-441A	GB32481702	HP	1 year	2013-03-25
21	Power Sensor	8481A	US41030291	HP	1 year	2013-09-16
22	Audio Analyzer	8903B	3729A18901	HP	1 year	2013-09-16
23	Modulation Analyzer	8901B	3749A05878	HP	1 year	2013-09-16
24	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2013-09-16
25	Stop Watch	HS-3	601Q09R	CASIO	1 year	2013-03-15
26	LISN	KNW-407	8-1430-1	Kyoritsu	1 year	2013-09-16
27	Two-Lime V-Network	ESH3-Z5	893045/017	R&S	1 year	2013-04-25
28	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	1 year	2013-07-25
29	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
30	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-
31	Active Loop Antenna	FMZB 1519	1519-031	SCHWARZBECK	1 year	2012-12-14