243 Jubug-Ri,Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 449-822
Tel: +82-31-323-6008 Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: May 09 ~ June 24, 2013
Test Report S/N: LR500111306F
Test Site : LTA Co., Ltd.

CERTIFICATION OF COMPLIANCE

FCC ID. **SS4HM45**

APPLICANT **BLUEBIRD INC.**

Equipment Class	**:**	**Digital Transmission System (DTS)**
Manufacturing Description	**:**	**Industrial PDA**
Manufacturer	**:**	**BLUEBIRD INC.**
Model name	**:**	**HM45**
Test Device Serial No.:	**:**	**Identical prototype**
Rule Part(s)	**:**	**FCC Part 15.247 Subpart C; ANSI C-63.4-2003**
Frequency Range	**:**	**2412MHz ~ 2462MHz for 802.11b/g/n_20MHz** **5745MHz ~ 5825MHz for 802.11a/an_20MHz**
Max. Output Power	**:**	**Max 16.47dBm - Conducted (802.11b)**
	:	**Max 15.91dBm - Conducted (802.11g)** **Max 15.57dBm – Conducted (802.11n_20MHz)** **Max 7.22dBm – Conducted (802.11a)** **Max 5.24dBm – Conducted (802.11an_20MHz)**
Data of issue	**:**	**June 11, 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's

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	2013-09-30	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	Updating	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's about test item

2-1 Manufacturer

Company name	:	BLUEBIRD INC.
Address	:	(Dogok-dong, SEI Tower 13~14), ., 39, Eonju-ro30-gil, Gangnam-gu, Seoul, Korea
Tel / Fax	:	Tel : +82-70-7730-8210 / Fax :+82-2-548-0870

2-2 Equipment Under Test (EUT)

Trade name	:	PIDION by Bluebird
Model name	:	HM45
Serial number	:	Identical prototype
Date of receipt	:	April 22, 2013
EUT condition	:	Pre-production, not damaged
Antenna type	:	PCB antenna with Max. 0.4 dBi gain for 802.11b/g/n_20MHz
		PCB antenna with Max. 7.76 dBi gain for 802.11a/an_20MHz
Frequency Range	:	2412MHz ~ 2462MHz for 802.11b/g/n
	:	5745MHz ~ 5825MHz for 802.11a/an
RF output power	:	Max 16.47dBm - Conducted (802.11b)
	:	Max 15.91dBm - Conducted (802.11g)
	:	Max 15.57dBm - Conducted(802.11n_20MHz)
	:	Max 7.22dBm - Conducted(802.11a)
	:	Max 5.24dBm - Conducted(802.11an_20MHz)
Number of channels	:	13 for 802.11b & 802.11g & 802.11n_20MHz
	:	5 for 802.11a & 802.11an_20MHz
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
	:	Up to 300.0Mbps
Power Source for Batt.	:	DC 3.7 V by Battery
Power for Adaptor.	:	Input: 100-240VAC, 0.3A Output: 5.0VDC, 2A
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 802.11a/an20	5745	5785	5825

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	VOSTRO 1015	N/A	DELL

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 5.0GHz:

5 channels are provided for 802.11a and 802.11an_20MHz

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500kHz	Conducted	C
15.247(b)	Transmitter Peak Output Power	< 1Watt		C
15.247(d)	Transmitter Power Spectral Density	< 8dBm @ 3kHz		C
15.247(d)	Band Edge & Spurious	> 20 dBc		C
15.209	Field Strength of Harmonics	Emission	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	C
15.203	Antenna requirement	-	-	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 **BLUEBIRD INC., FCC ID: SS4HM45** 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-63.4-2003
*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 = 30 MHz

VBW = 100 kHz (VBW ≥ 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	8.90	Complies
	2437	6	9.20	Complies
	2462	11	9.51	Complies
802.11g	2412	1	16.54	Complies
	2437	6	16.54	Complies
	2462	11	16.59	Complies
802.11n _20MHz	2412	1	17.76	Complies
	2437	6	17.76	Complies
	2462	11	17.76	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500kHz

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Measurement Data: 5.0GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11a	5745	149	16.50	Complies
	5785	157	16.55	Complies
	5825	165	16.60	Complies
802.11an _20MHz	5745	149	17.72	Complies
	5785	157	17.72	Complies
	5825	165	17.78	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500kHz

Measurement Setup

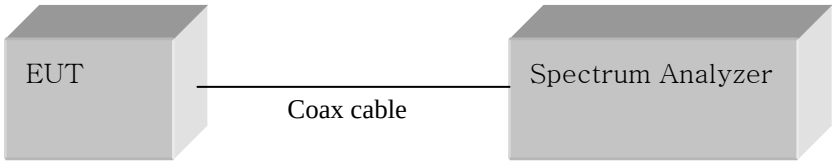
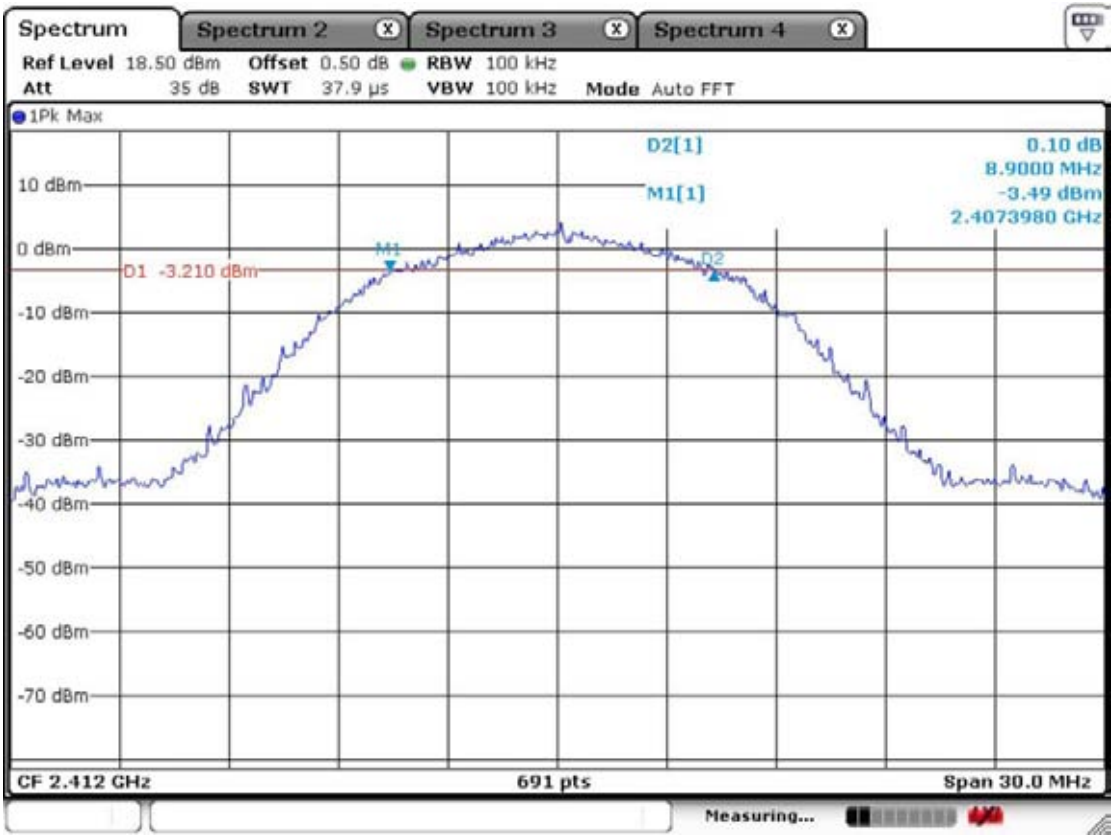
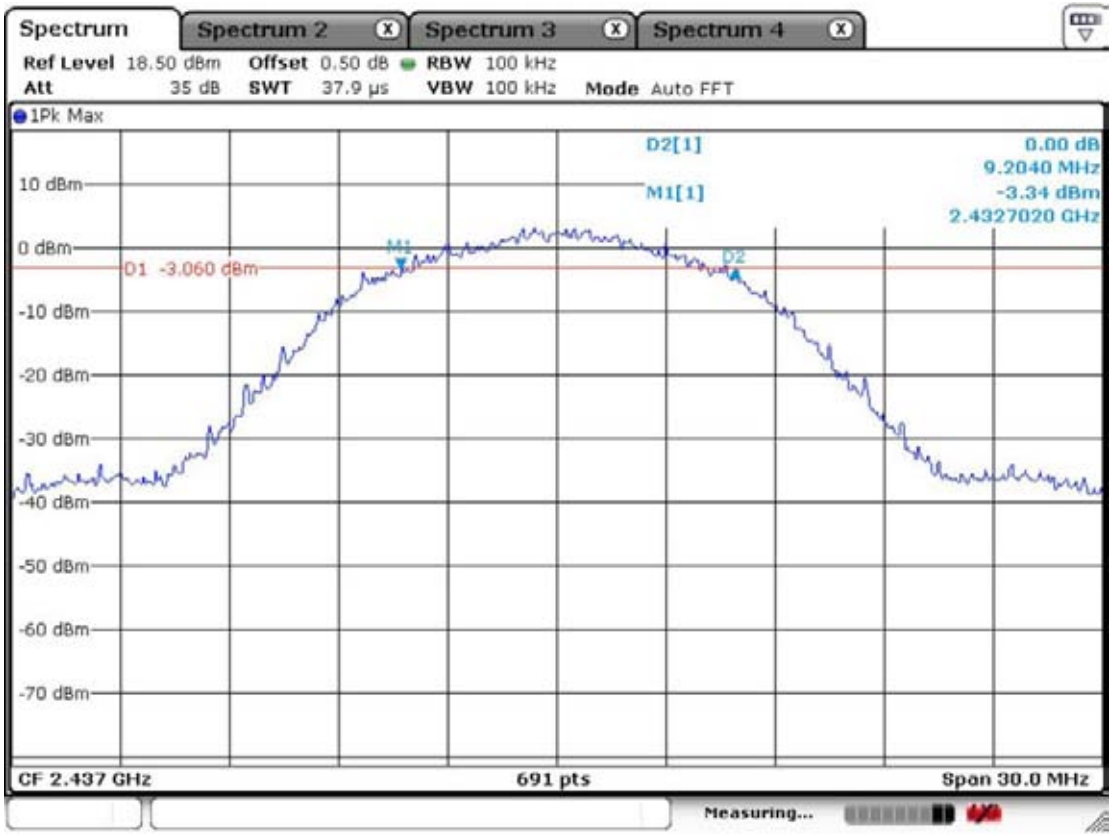


Figure 1: Measurement setup for the carrier frequency separation

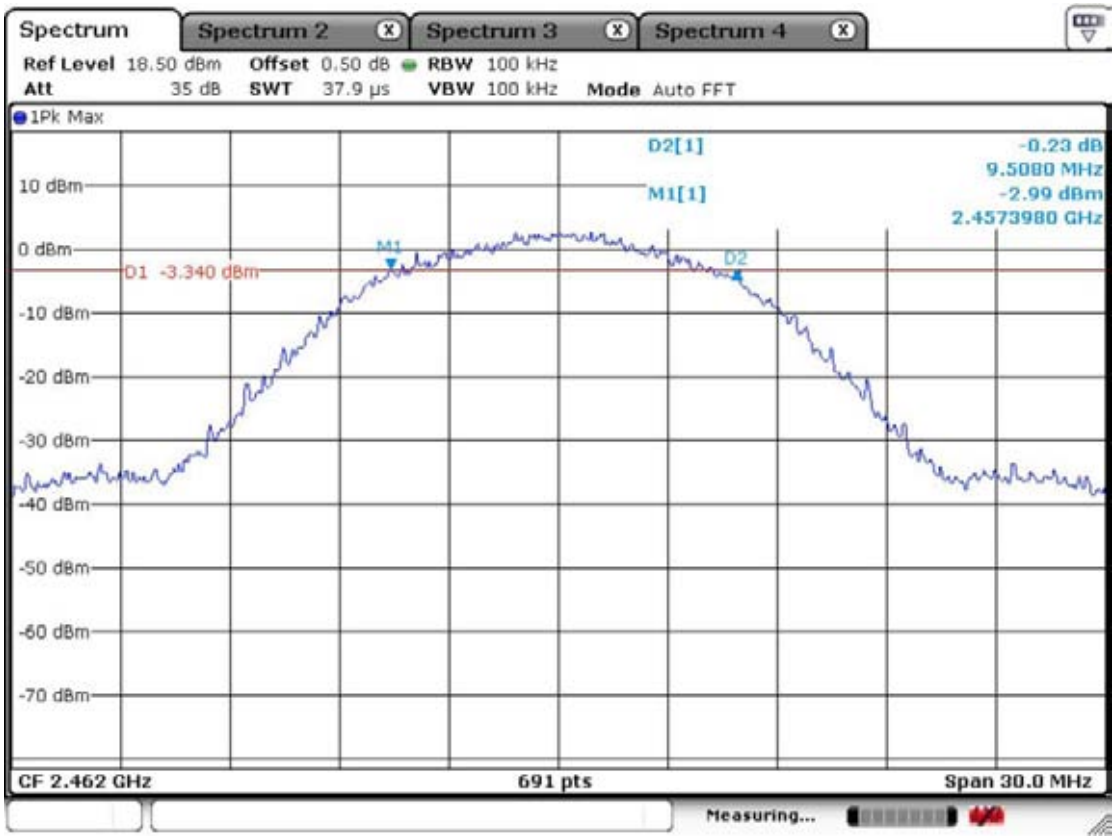
802.11b
CH 1



CH 6

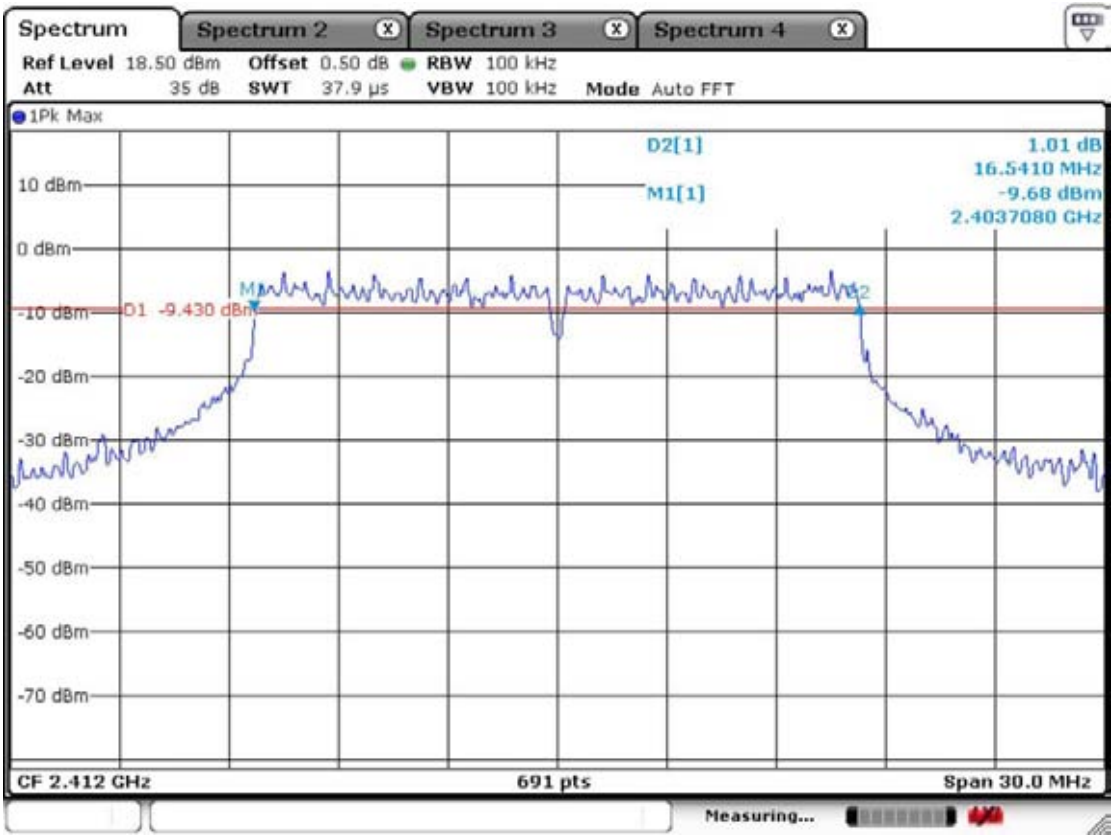


CH 11

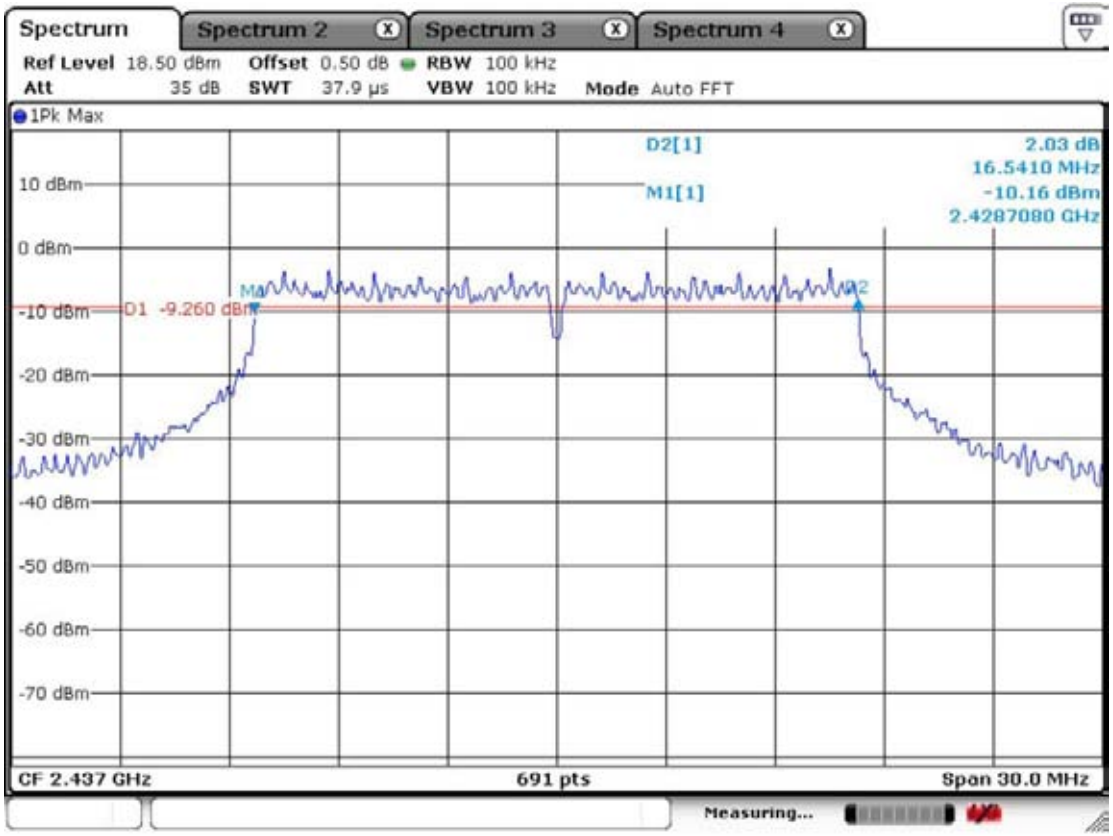

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm
Offset 0.50 dB
RBW 100 kHz
Att 35 dB
SWT 37.9 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D2[1]
-0.23 dB
9.5080 MHz
M1[1]
-2.99 dBm
2.4573980 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -3.340 dBm
M1
D2
CF 2.462 GHz
691 pts
Span 30.0 MHz
Measuring...

802.11g

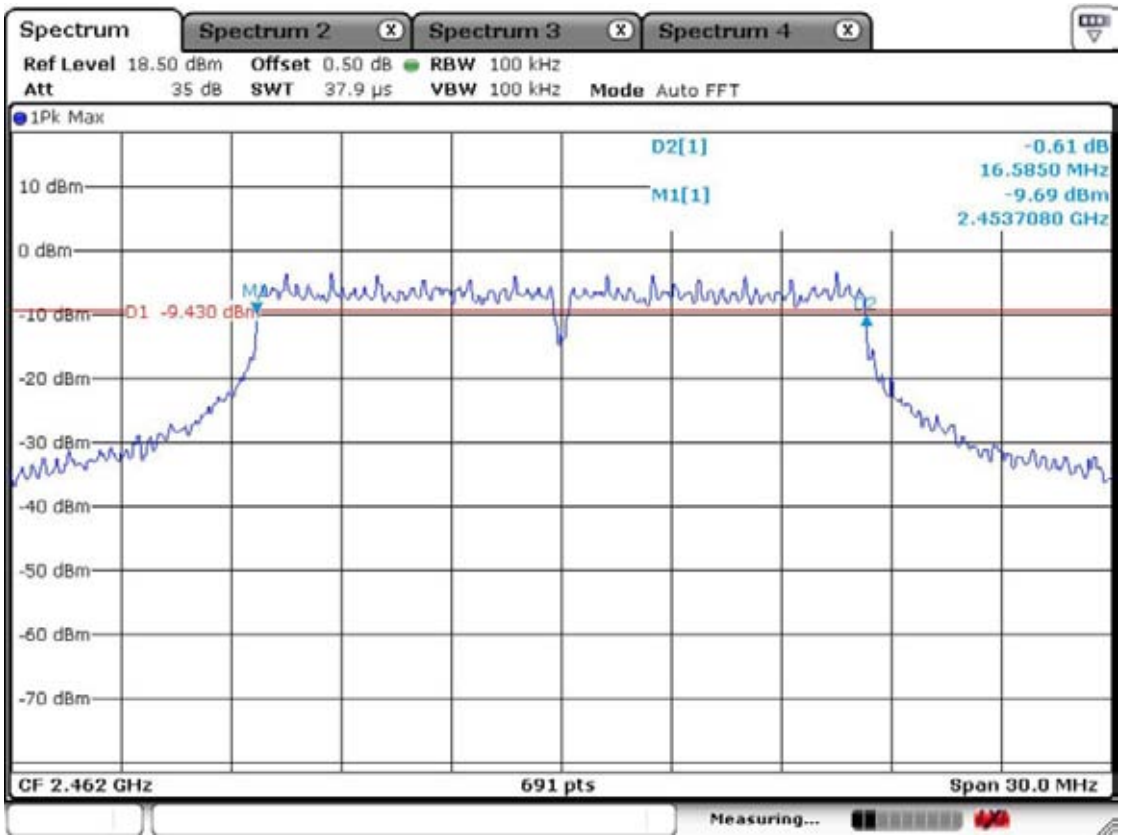
CH 1



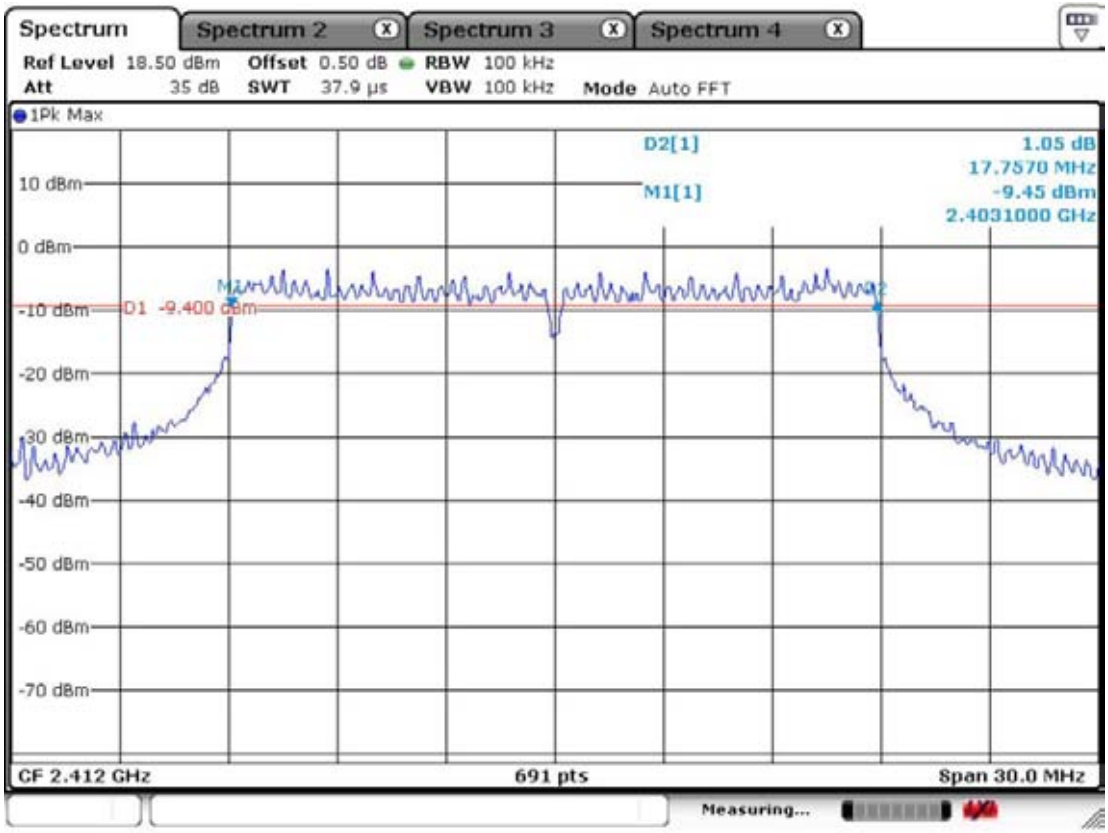
CH 6



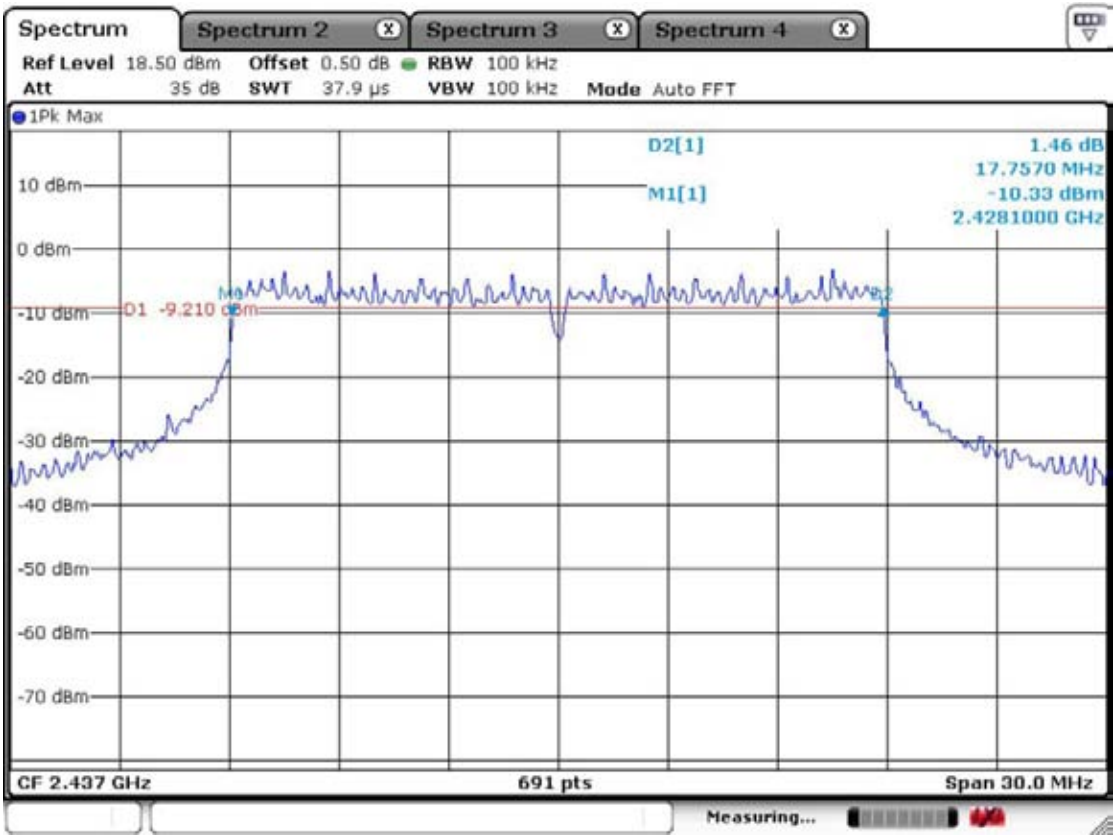
CH 11


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm
Offset 0.50 dB
RBW 100 kHz
Att 35 dB
SWT 37.9 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D2[1]
-0.61 dB
16.5850 MHz
M1[1]
-9.69 dBm
2.4537080 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -9.430 dBm
CF 2.462 GHz
691 pts
Span 30.0 MHz
Measuring...

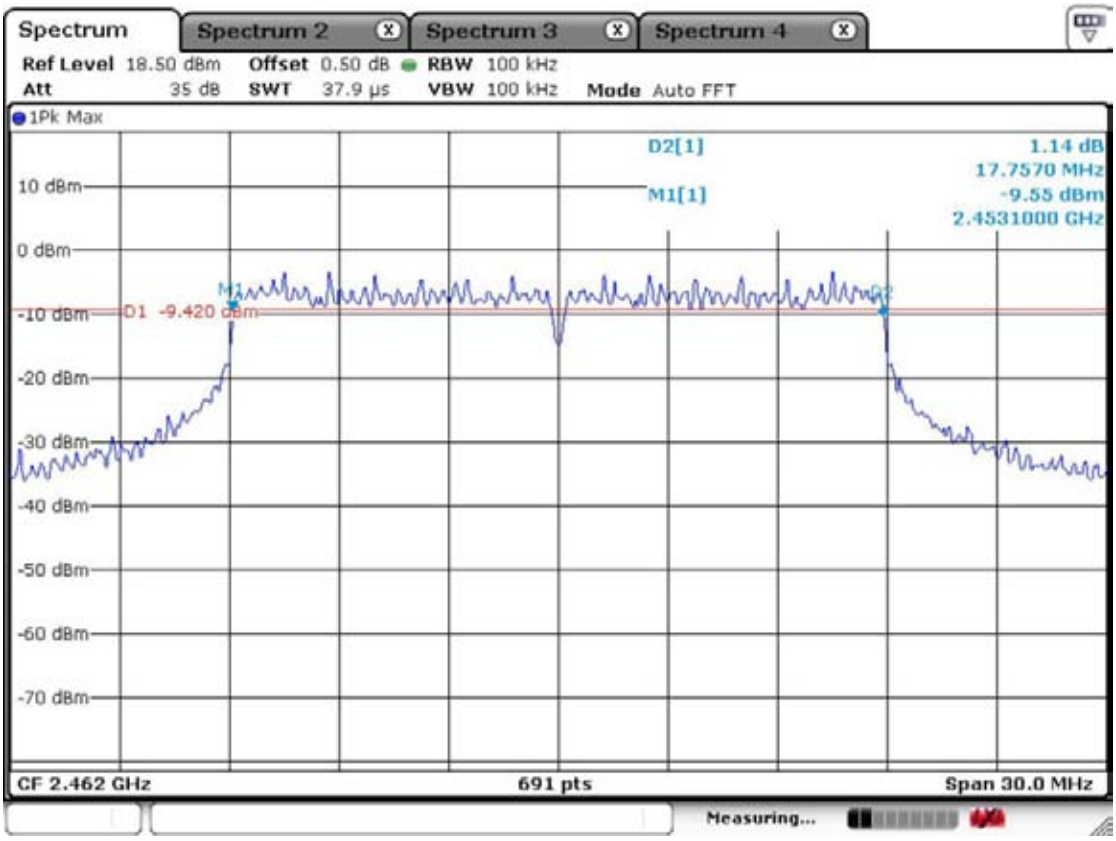
802.11n_20MHz
CH 1



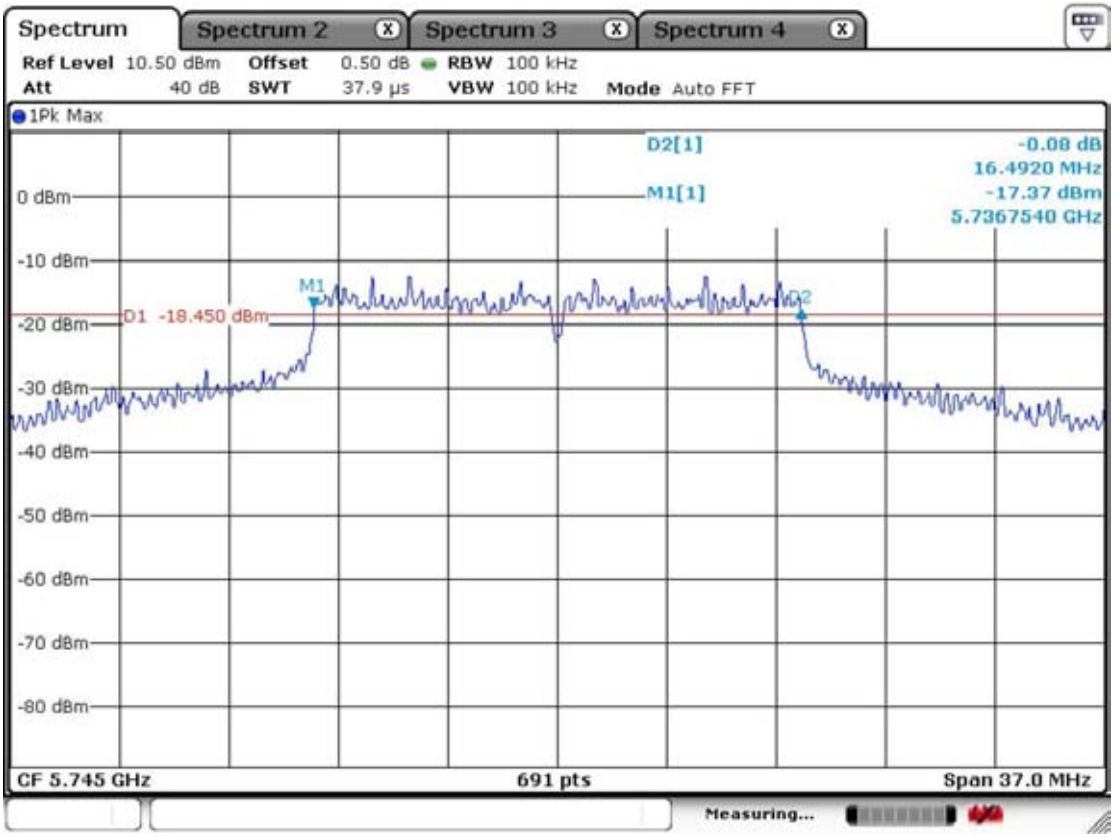
CH 6



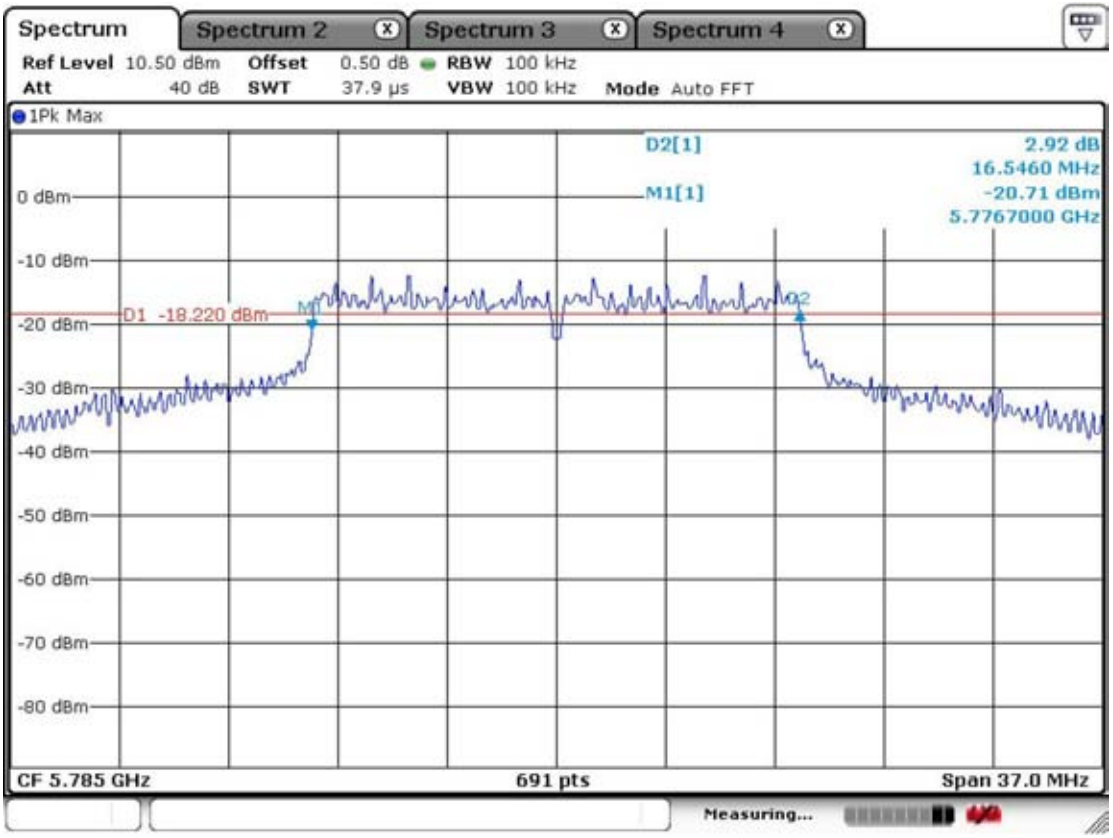
CH 11


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm Offset 0.50 dB RBW 100 kHz
Att 35 dB SWT 37.9 µs VBW 100 kHz Mode Auto FFT
1Pk Max
D2[1] 1.14 dB
17.7570 MHz
M1[1] -9.55 dBm
2.4531000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -9.420 dBm
CF 2.462 GHz
691 pts
Span 30.0 MHz
Measuring...

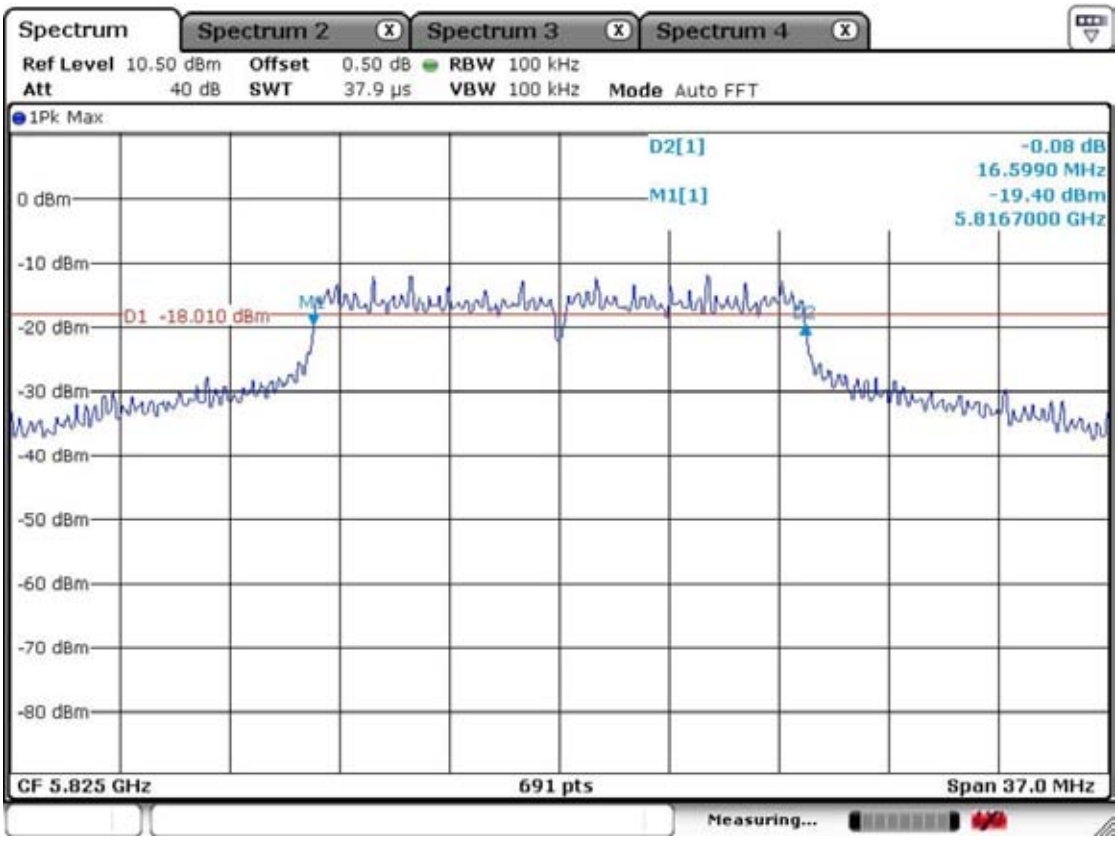
802.11a
CH 149



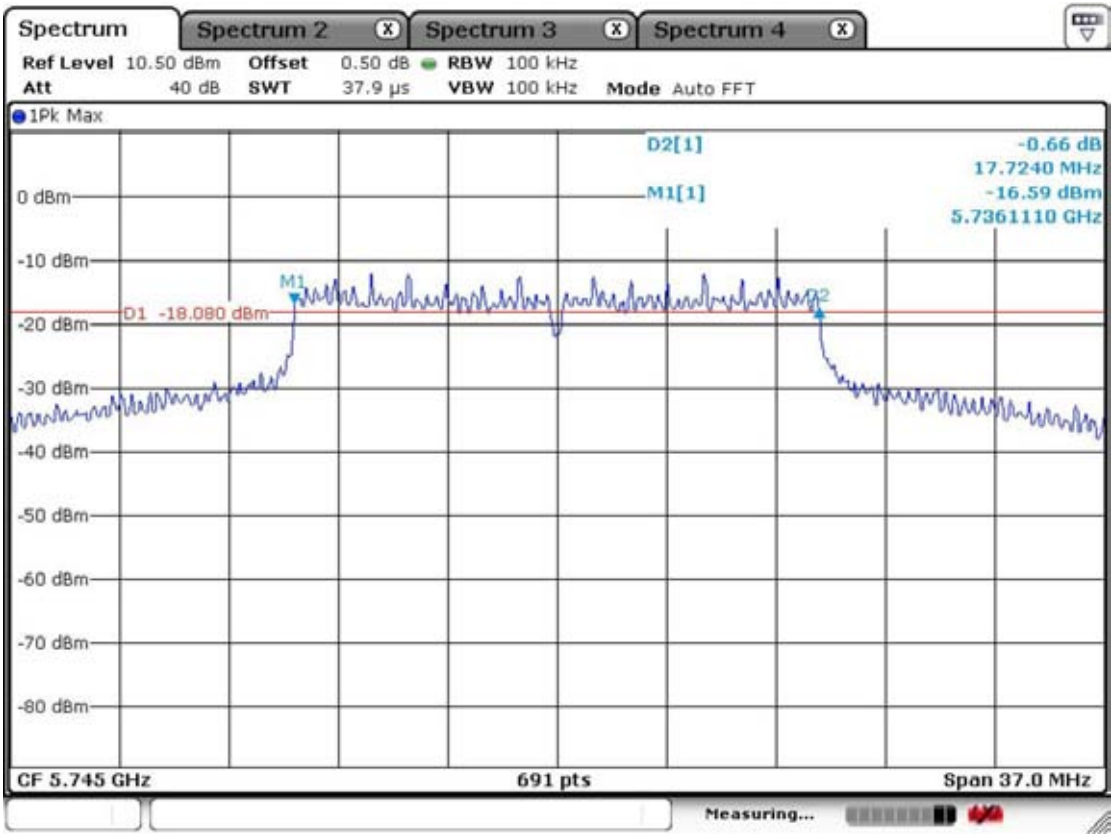
CH 157



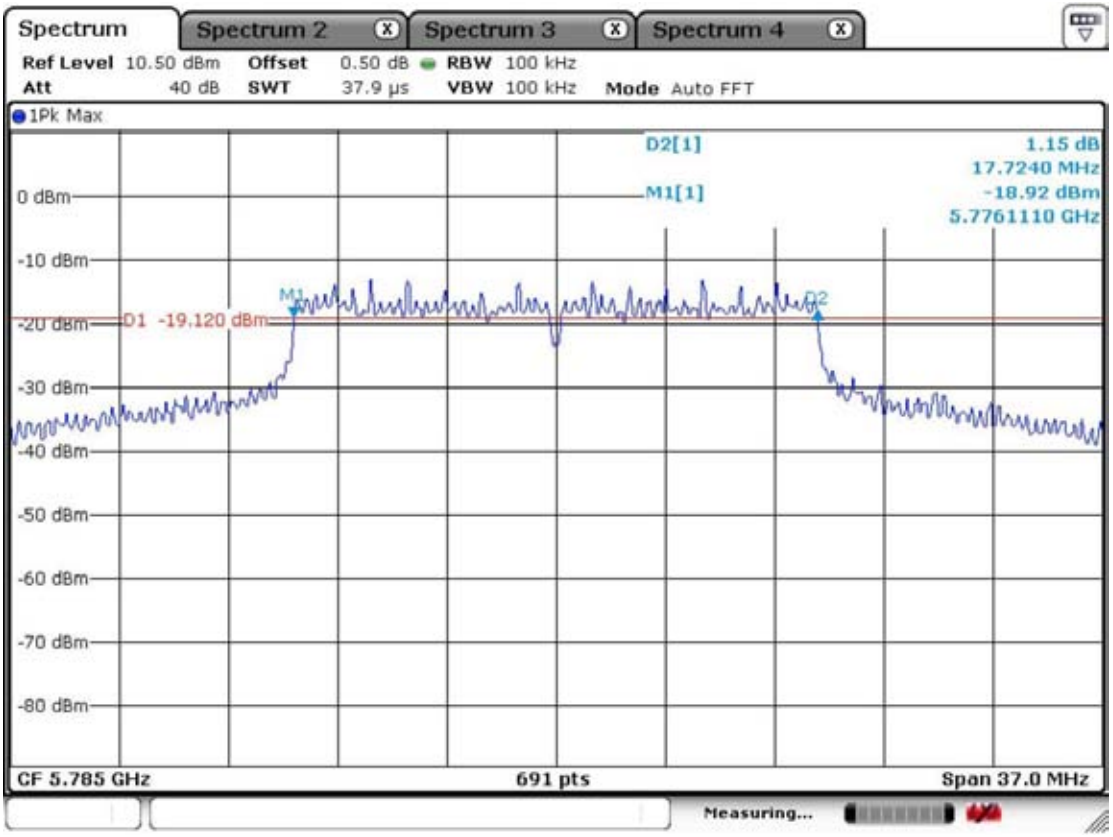
CH 165


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm
Offset 0.50 dB
RBW 100 kHz
Att 40 dB
SWT 37.9 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D2[1]
-0.08 dB
16.5990 MHz
M1[1]
-19.40 dBm
5.8167000 GHz
D1 -18.010 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 5.825 GHz
691 pts
Span 37.0 MHz
Measuring...

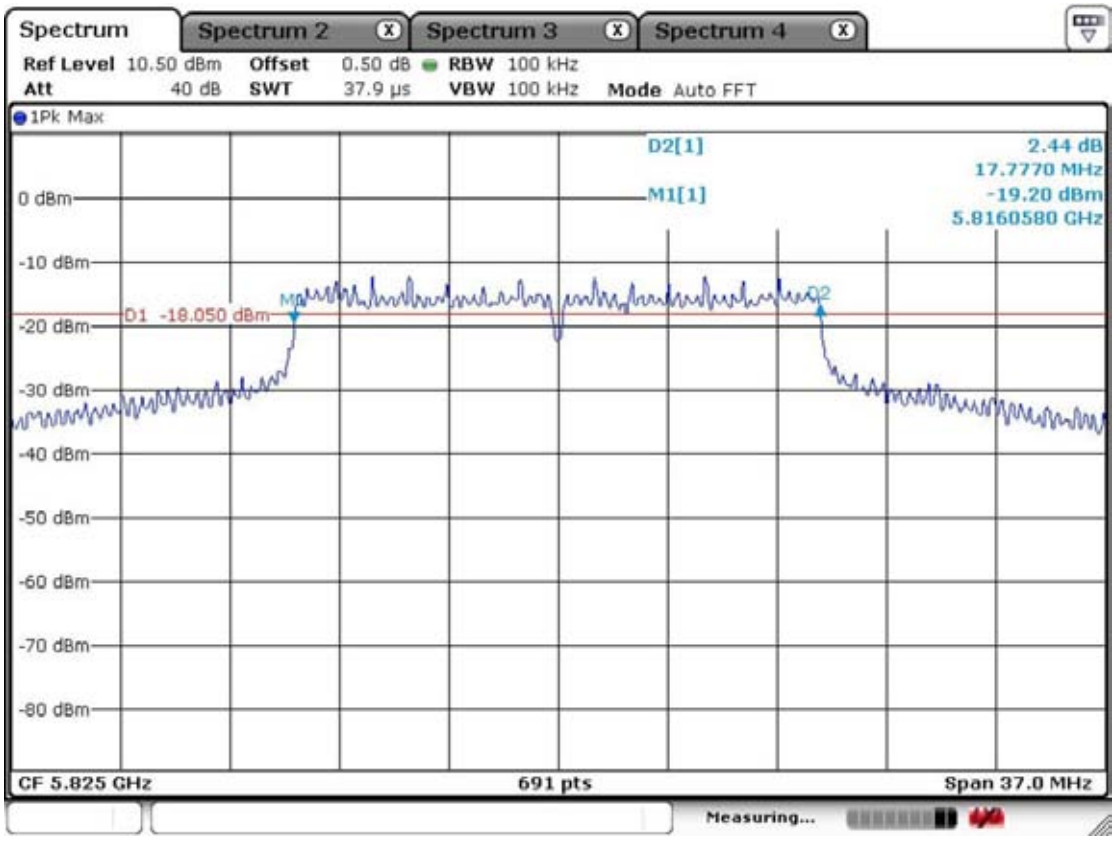
802.11an_20MHz
CH 149



CH 157



CH 165


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm
Offset 0.50 dB
RBW 100 kHz
Att 40 dB
SWT 37.9 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D2[1]
2.44 dB
17.7770 MHz
M1[1]
-19.20 dBm
5.8160580 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -18.050 dBm
CF 5.825 GHz
691 pts
Span 37.0 MHz
Measuring...

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 ≥ 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	16.47	Complies
	2437	6	16.18	Complies
	2462	11	16.40	Complies
802.11g	2412	1	15.53	Complies
	2437	6	15.51	Complies
	2462	11	15.91	Complies
802.11n _20MHz	2412	1	15.42	Complies
	2437	6	15.52	Complies
	2462	11	15.57	Complies

Measurement Data: 5.0GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Data (dBm)	Result
802.11a	5745	149	7.22	Complies
	5785	157	6.73	Complies
	5825	165	6.87	Complies
802.11an _20MHz	5745	149	5.24	Complies
	5785	157	5.02	Complies
	5825	165	5.03	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

Peak output power	< 1W

Measurement Setup

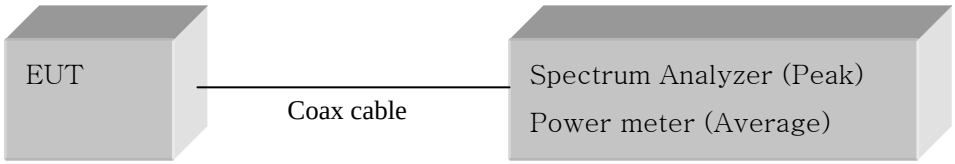
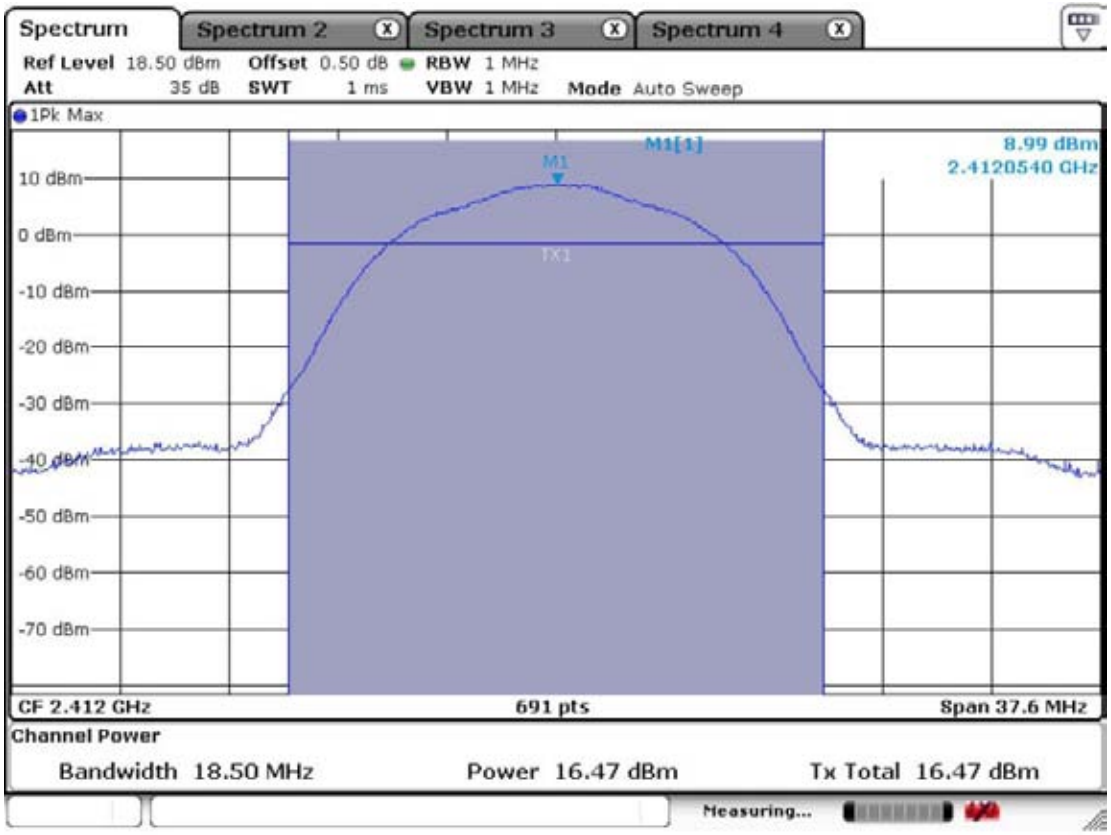
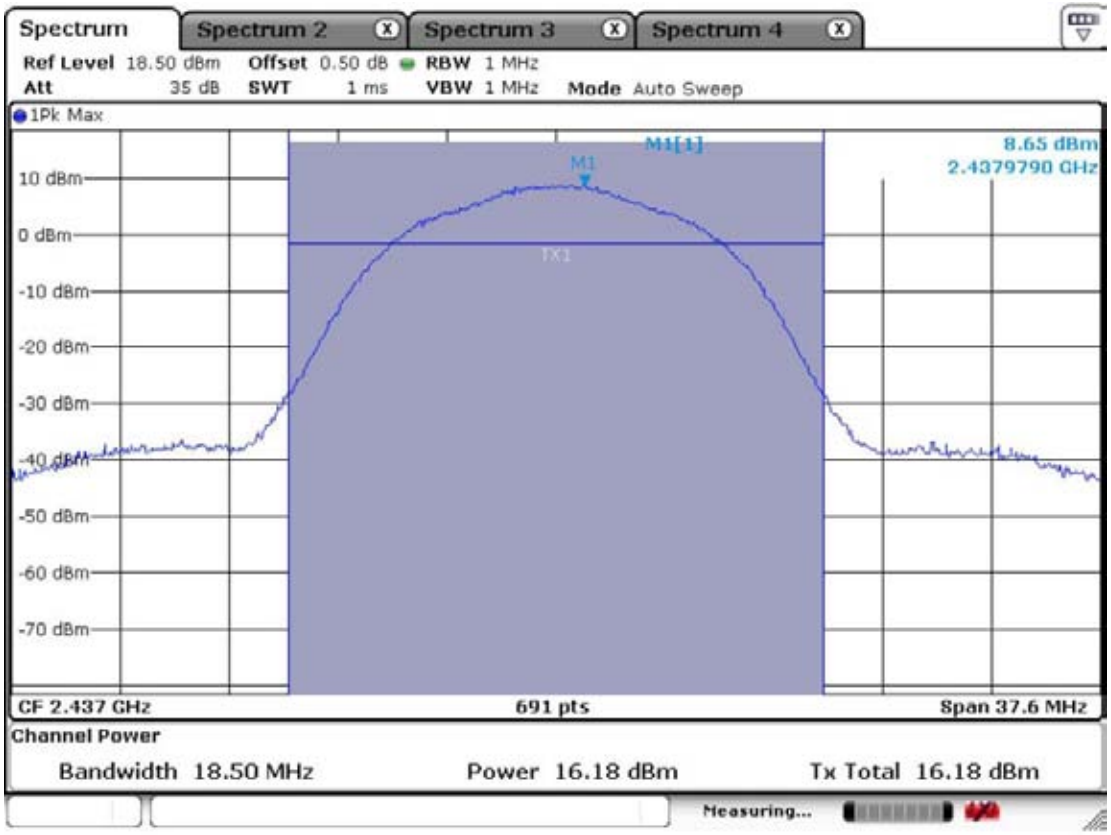


Figure 1: Measurement setup for the carrier frequency separation

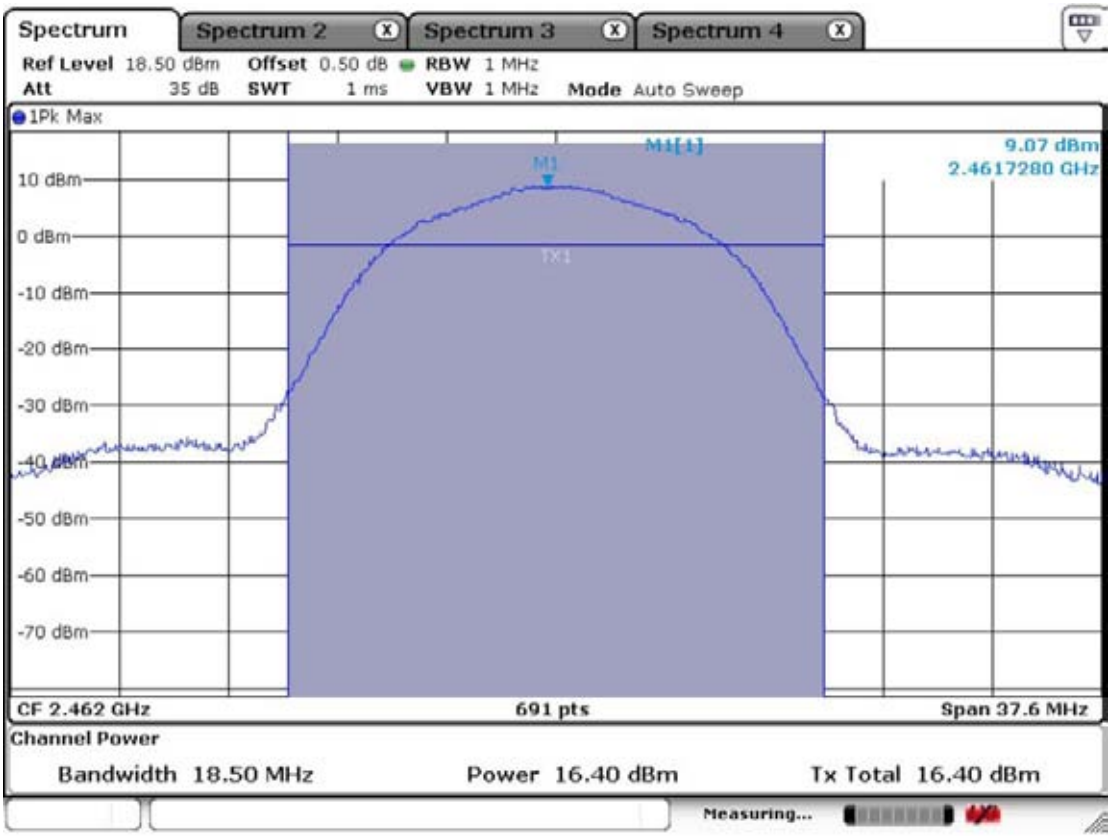
802.11b
CH 1



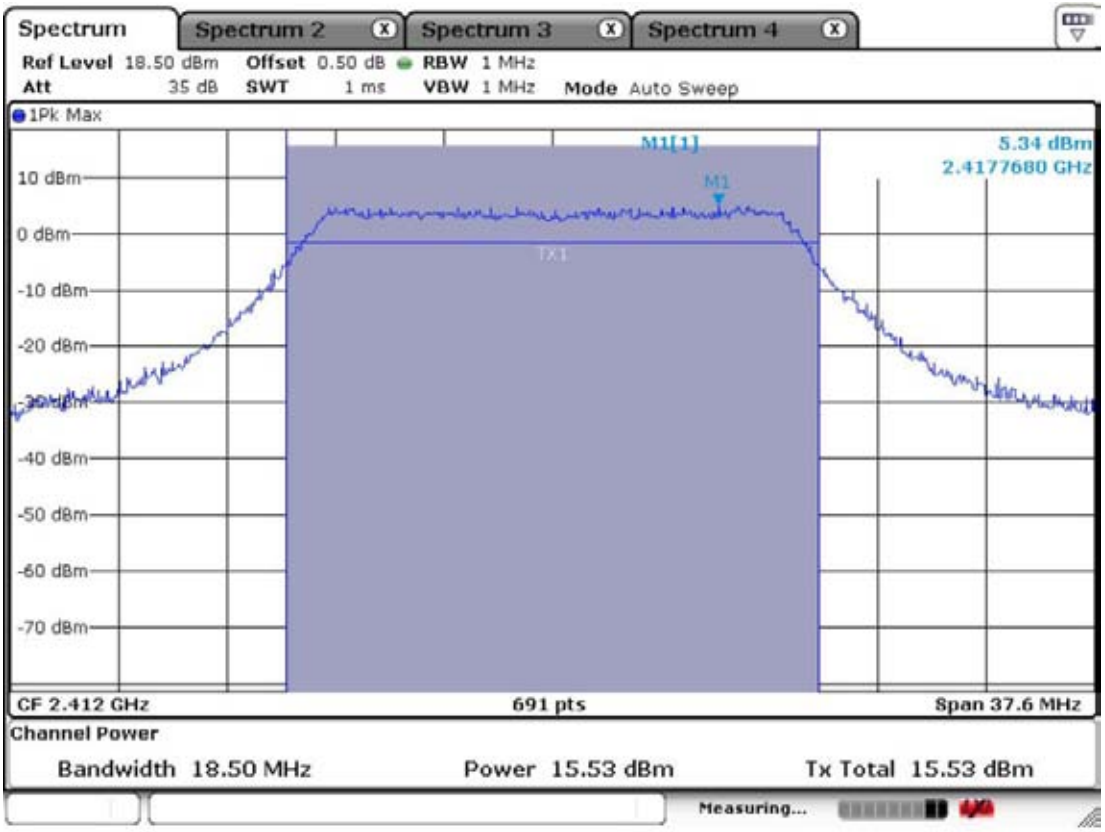
CH 6



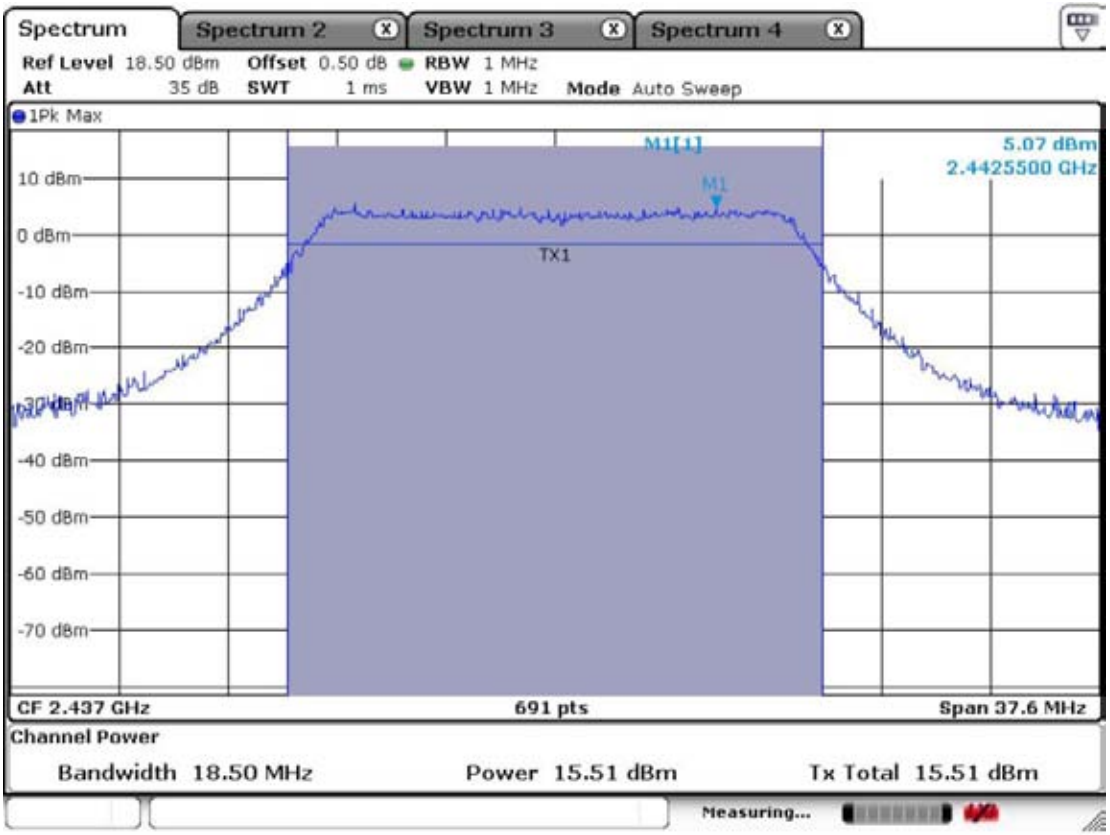
CH 11


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm Offset 0.50 dB RBW 1 MHz
Att 35 dB SWT 1 ms VBW 1 MHz Mode Auto Sweep
1Pk Max
M1[1] 9.07 dBm
2.4617280 GHz
M1
TX1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.462 GHz
691 pts
Span 37.6 MHz
Channel Power
Bandwidth 18.50 MHz
Power 16.40 dBm
Tx Total 16.40 dBm
Measuring...

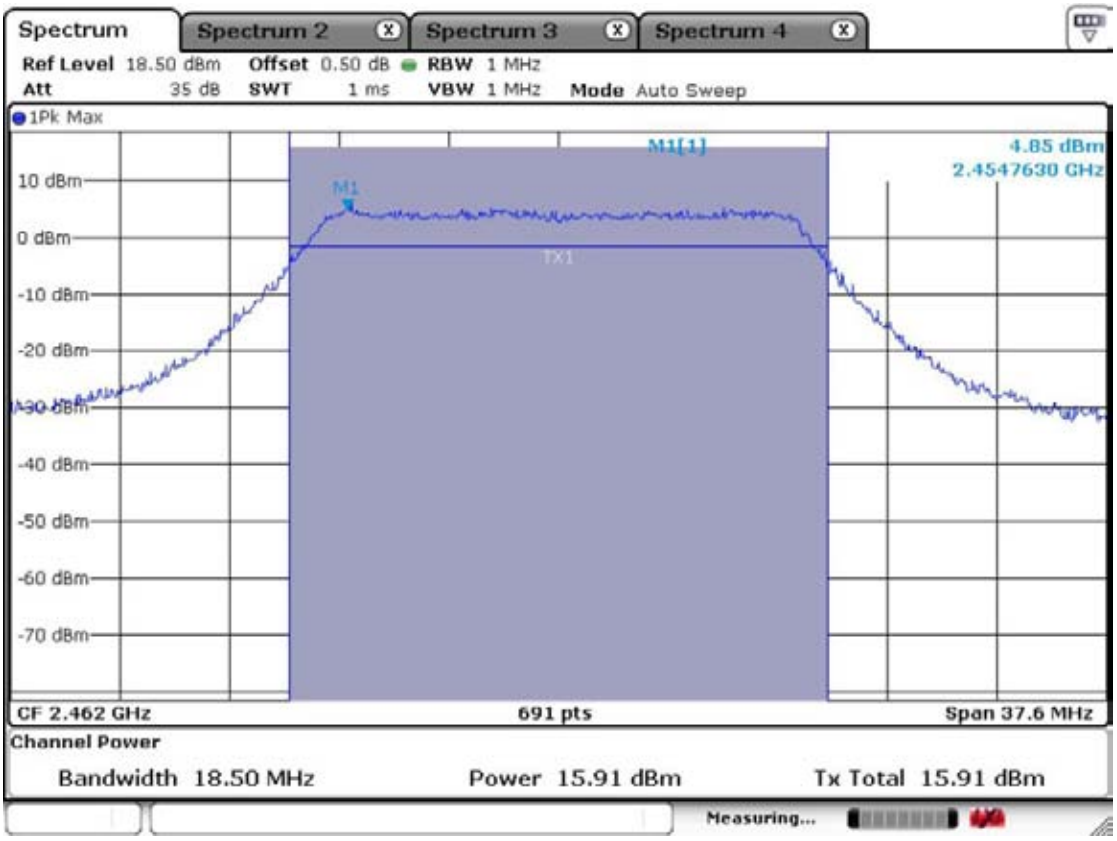
802.11g
CH 1



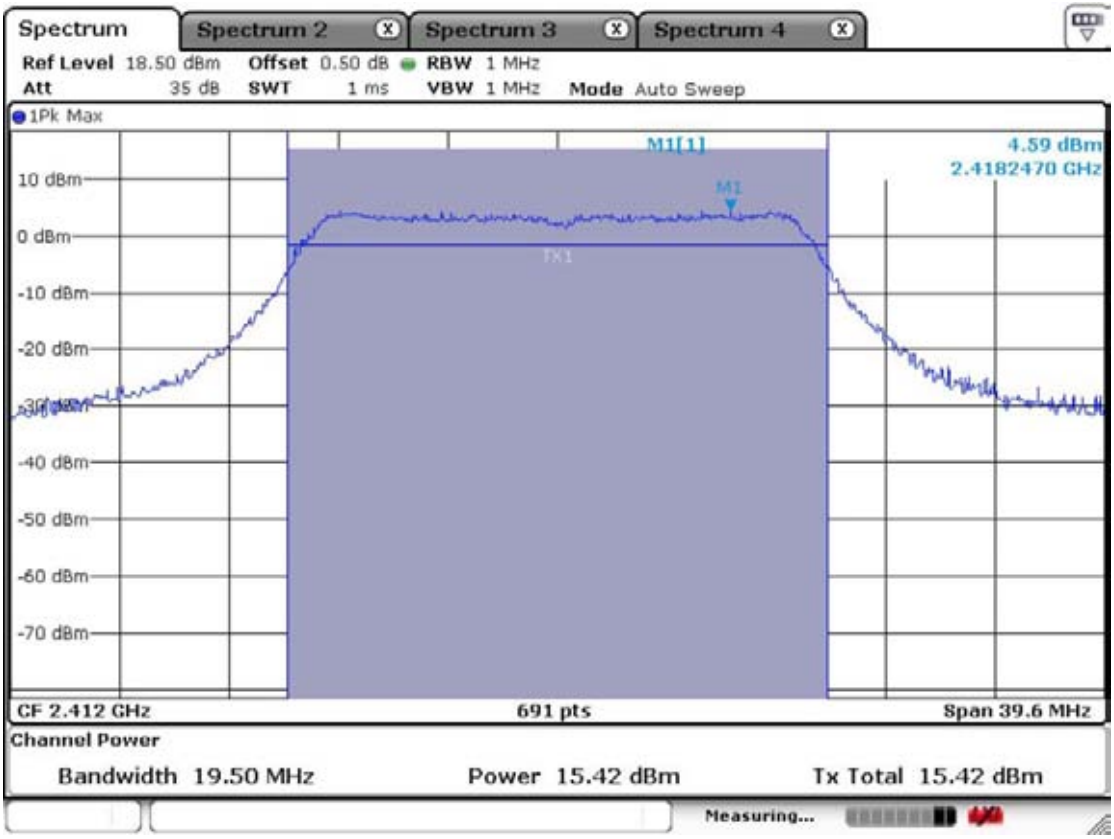
CH 6



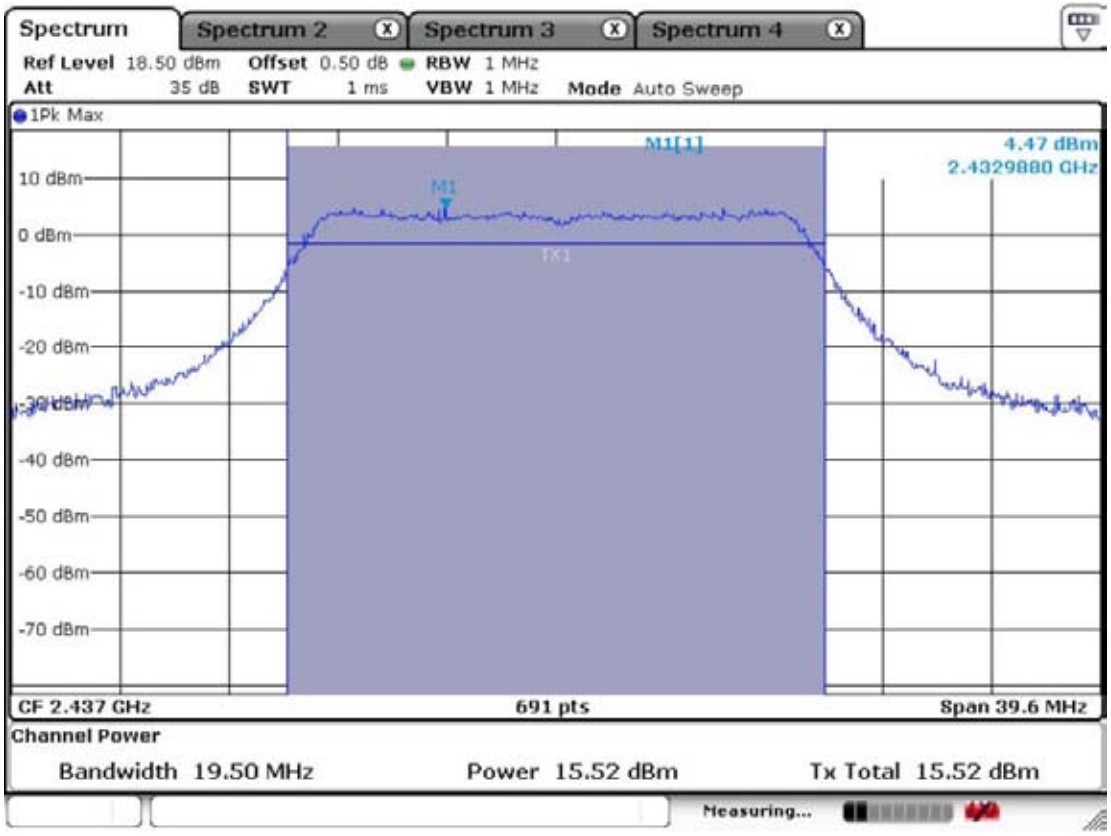
CH 11



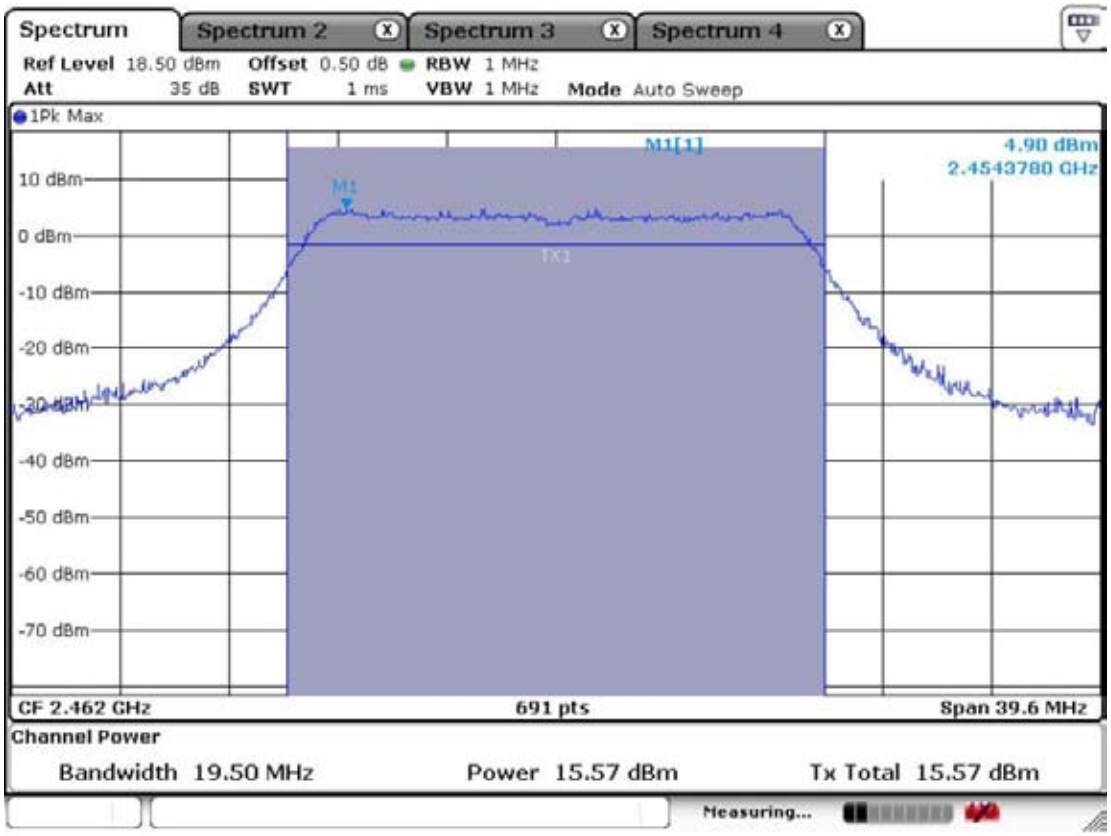
802.11n_20MHz
CH 1



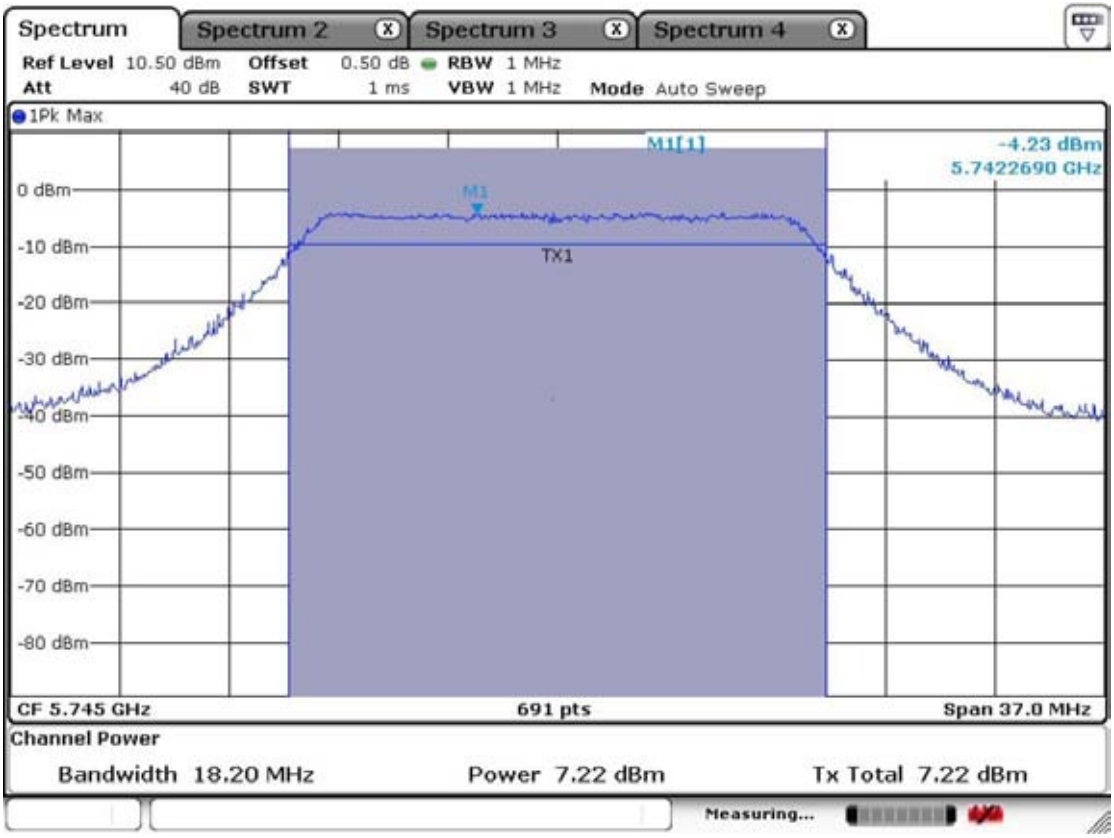
CH 6



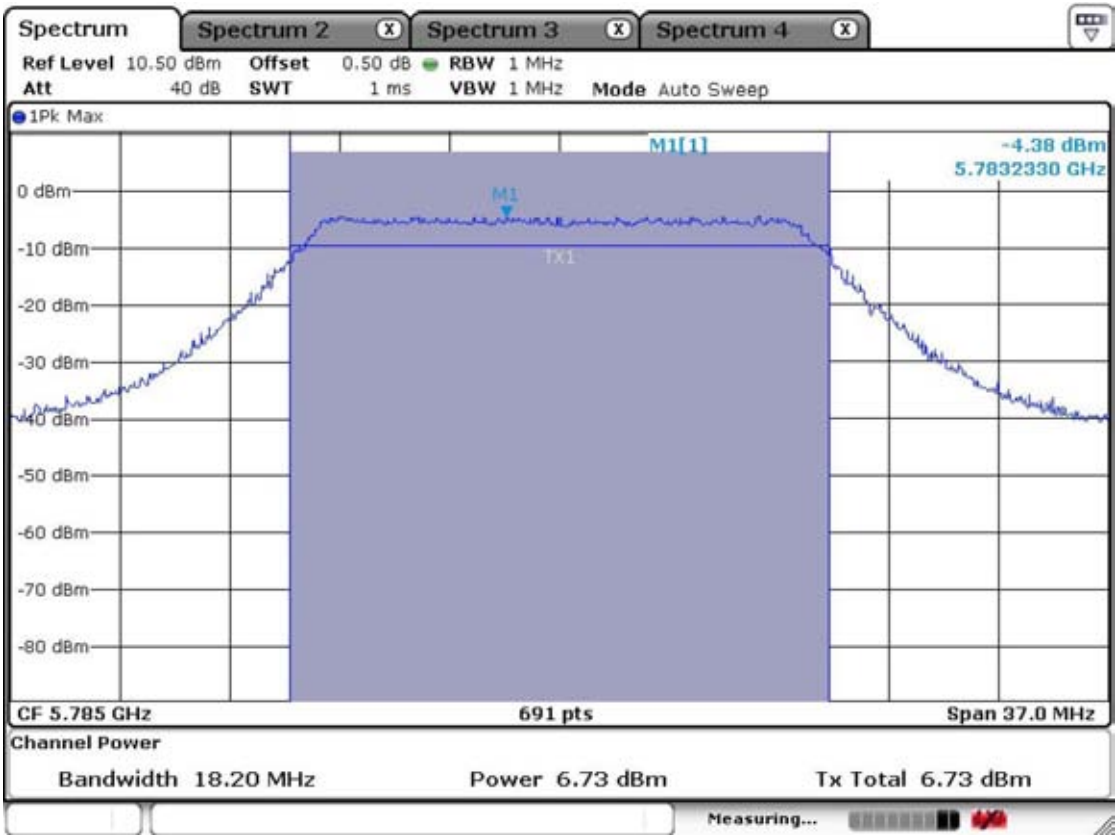
CH 11


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm Offset 0.50 dB RBW 1 MHz
Att 35 dB SWT 1 ms VBW 1 MHz Mode Auto Sweep
1Pk Max
M1[1]
4.90 dBm
2.4543780 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.462 GHz
691 pts
Span 39.6 MHz
Channel Power
Bandwidth 19.50 MHz
Power 15.57 dBm
Tx Total 15.57 dBm
Measuring...

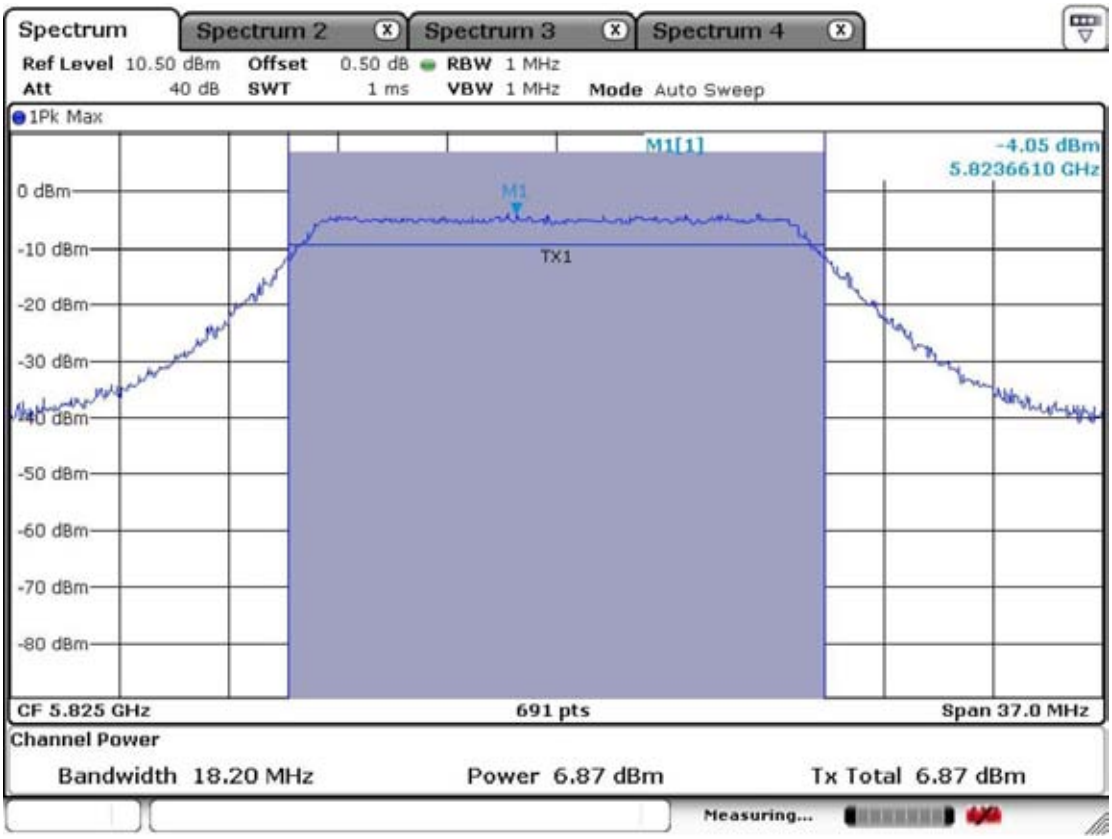
802.11a
CH 149



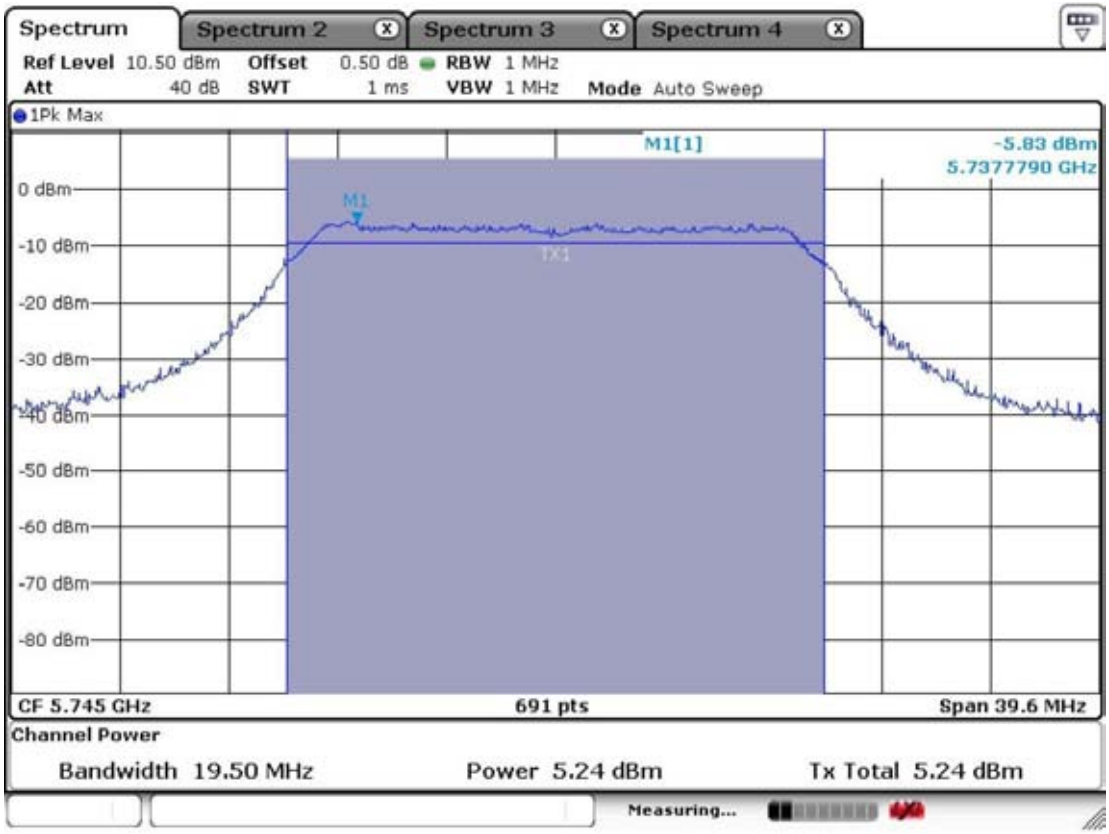
CH 157



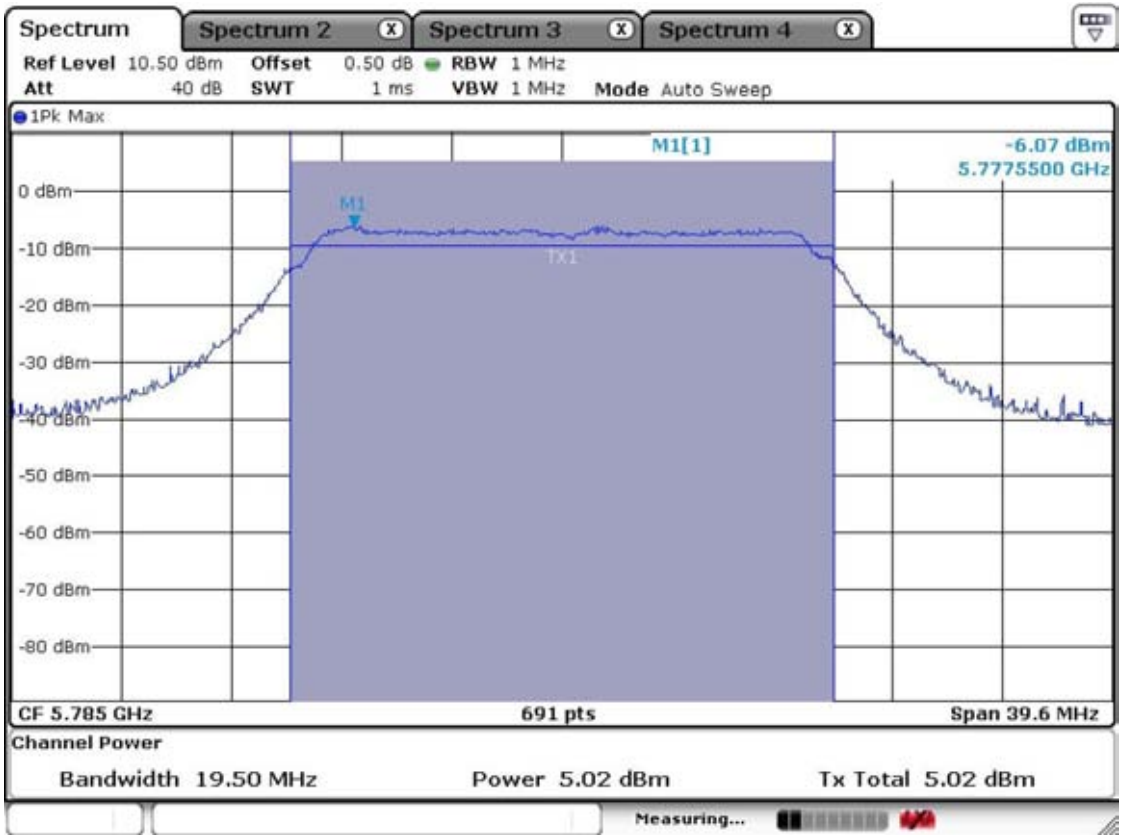
CH 165


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm Offset 0.50 dB RBW 1 MHz
Att 40 dB SWT 1 ms VBW 1 MHz Mode Auto Sweep
1Pk Max
M1[1]
-4.05 dBm
5.8236610 GHz
M1
TX1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 5.825 GHz
691 pts
Span 37.0 MHz
Channel Power
Bandwidth 18.20 MHz
Power 6.87 dBm
Tx Total 6.87 dBm
Measuring...

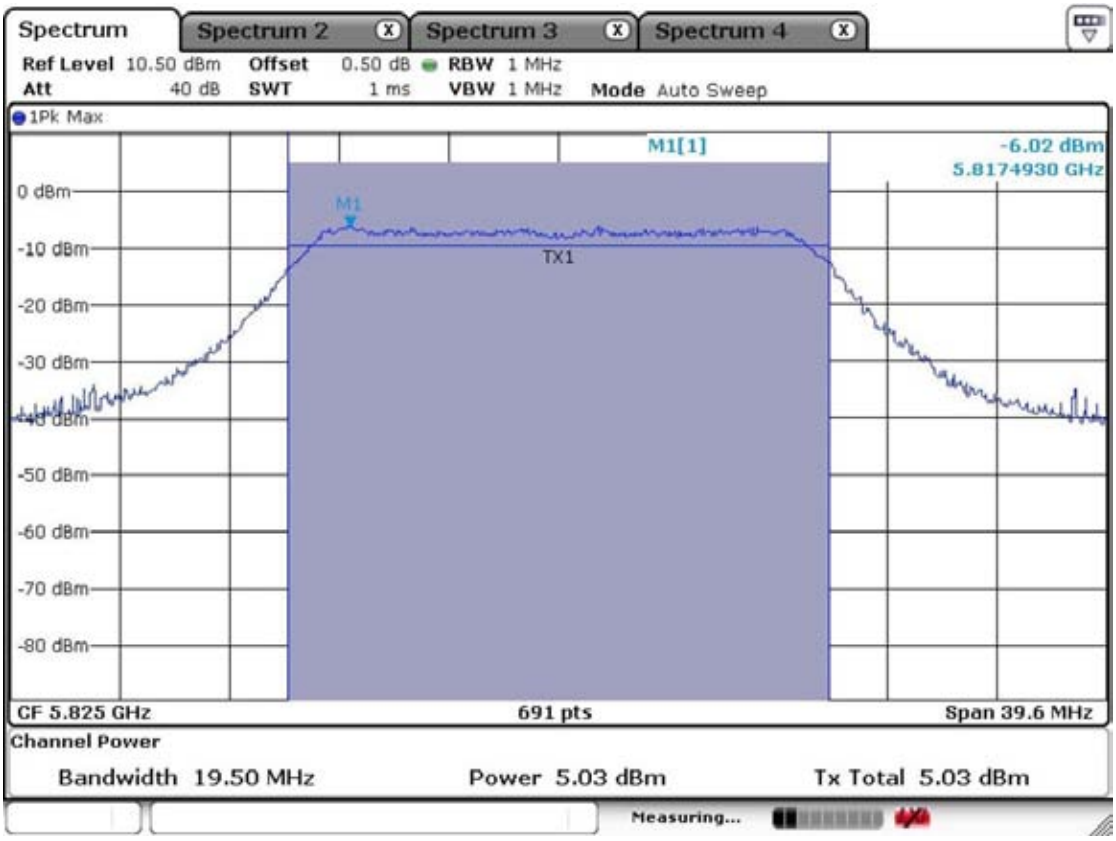
802.11an_20MHz
CH 149



CH 157



CH 165


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm
Offset 0.50 dB
RBW 1 MHz
Att 40 dB
SWT 1 ms
VBW 1 MHz
Mode Auto Sweep
1Pk Max
M1[1]
-6.02 dBm
5.8174930 GHz
M1
TX1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 5.825 GHz
691 pts
Span 39.6 MHz
Channel Power
Bandwidth 19.50 MHz
Power 5.03 dBm
Tx Total 5.03 dBm
Measuring...

3.2.3 Power Spectral Density

*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	-12.37	Complies
	2437	6	-12.44	Complies
	2462	11	-12.65	Complies
802.11g	2412	1	-21.14	Complies
	2437	6	-21.06	Complies
	2462	11	-21.14	Complies
802.11n _20MHz	2412	1	-21.07	Complies
	2437	6	-20.99	Complies
	2462	11	-21.06	Complies

Measurement Data: 5.0GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			dBm	Result
802.11a	5745	149	-26.15	Complies
	5785	157	-26.93	Complies
	5825	165	-26.92	Complies
802.11an _20MHz	5745	149	-25.75	Complies
	5785	157	-27.26	Complies
	5825	165	-26.37	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

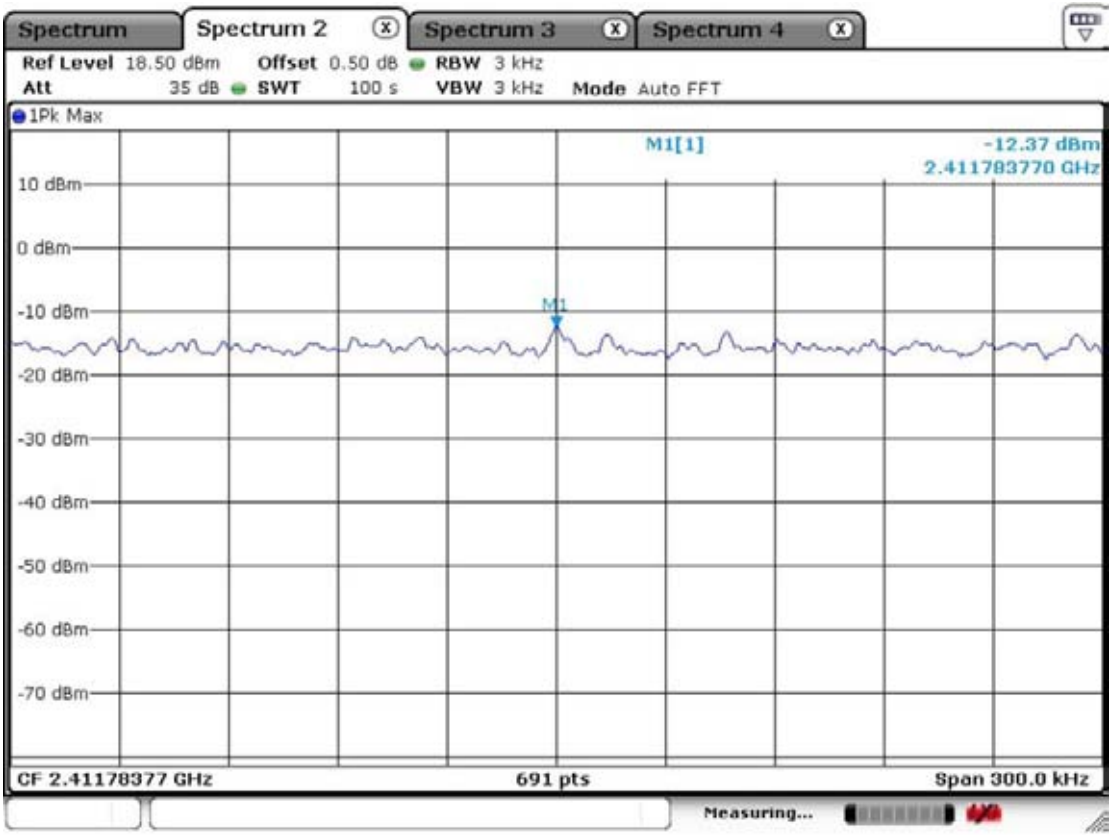
Power Spectral Density	< 8dBm @ 3kHz BW

Measurement Setup

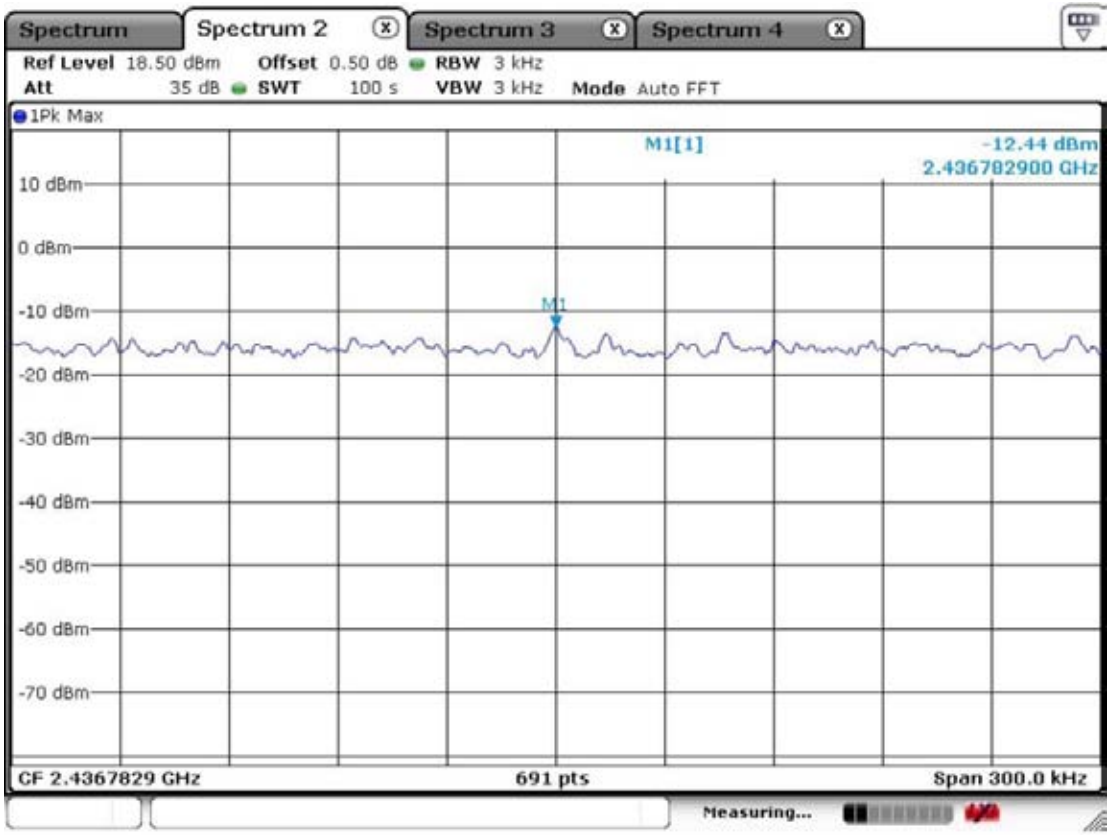
Same as the Chapter 3.2.1 (Figure 1)

802.11b Power Density Measurement

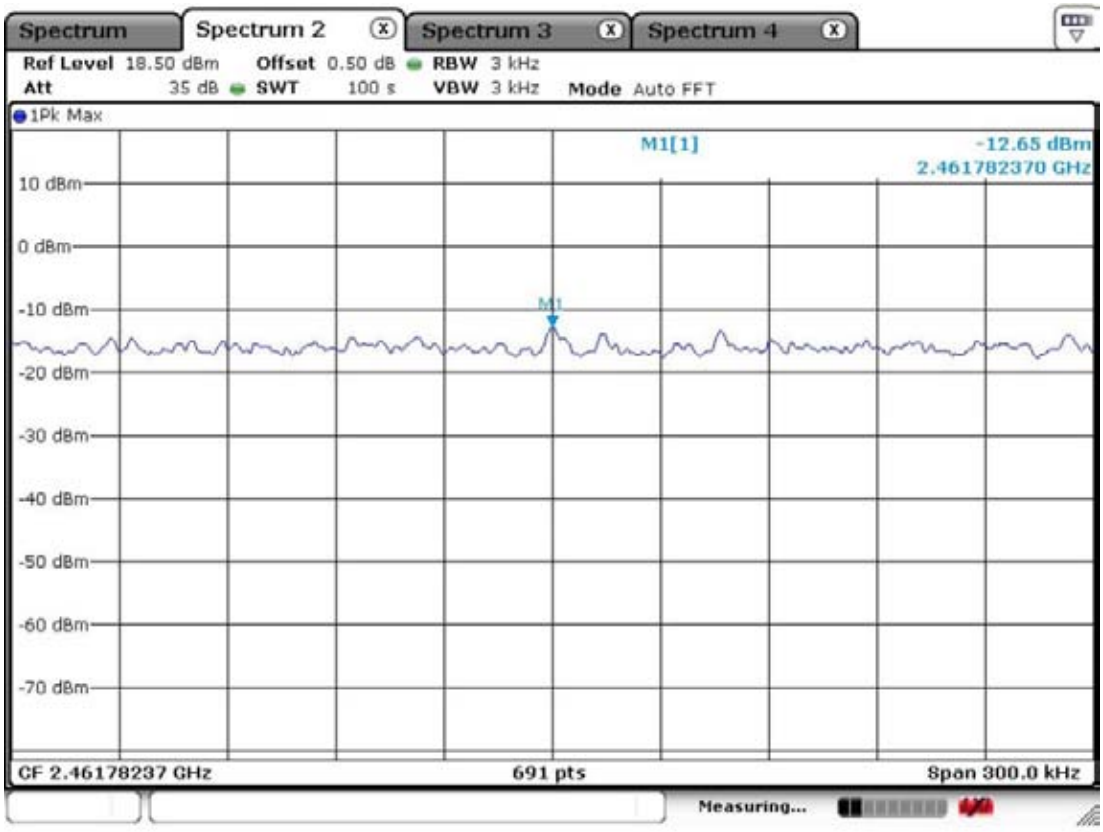
CH 1



CH 6

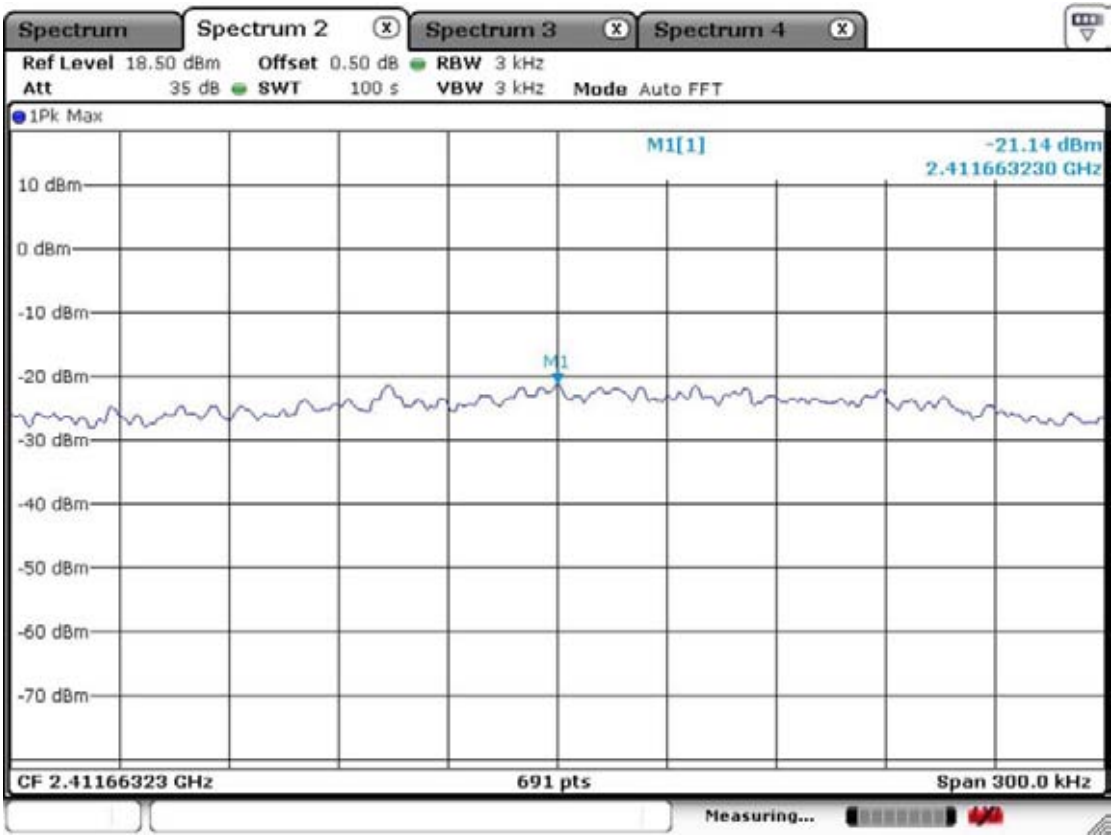


CH 11

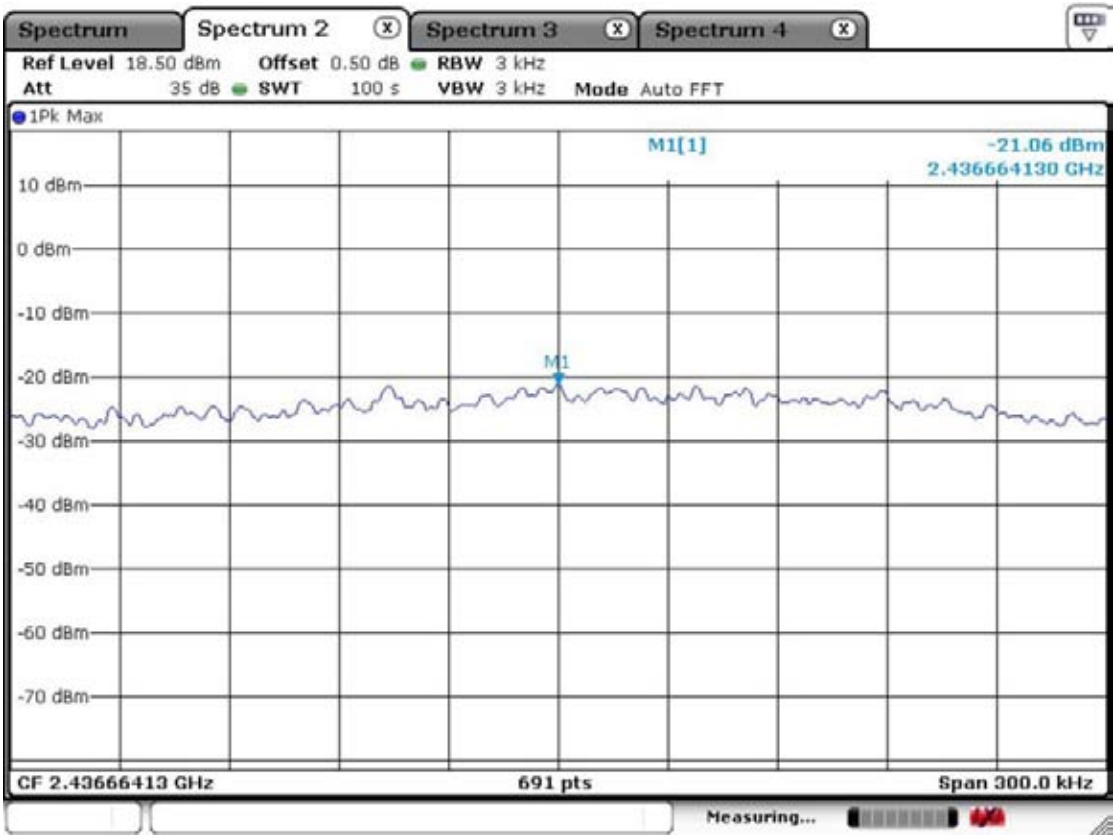

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm
Offset 0.50 dB
RBW 3 kHz
Att 35 dB
SWT 100 s
VBW 3 kHz
Mode Auto FFT
1Pk Max
M1[1]
-12.65 dBm
2.461782370 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.46178237 GHz
691 pts
Span 300.0 kHz
Measuring...

802.11g Power Density Measurement

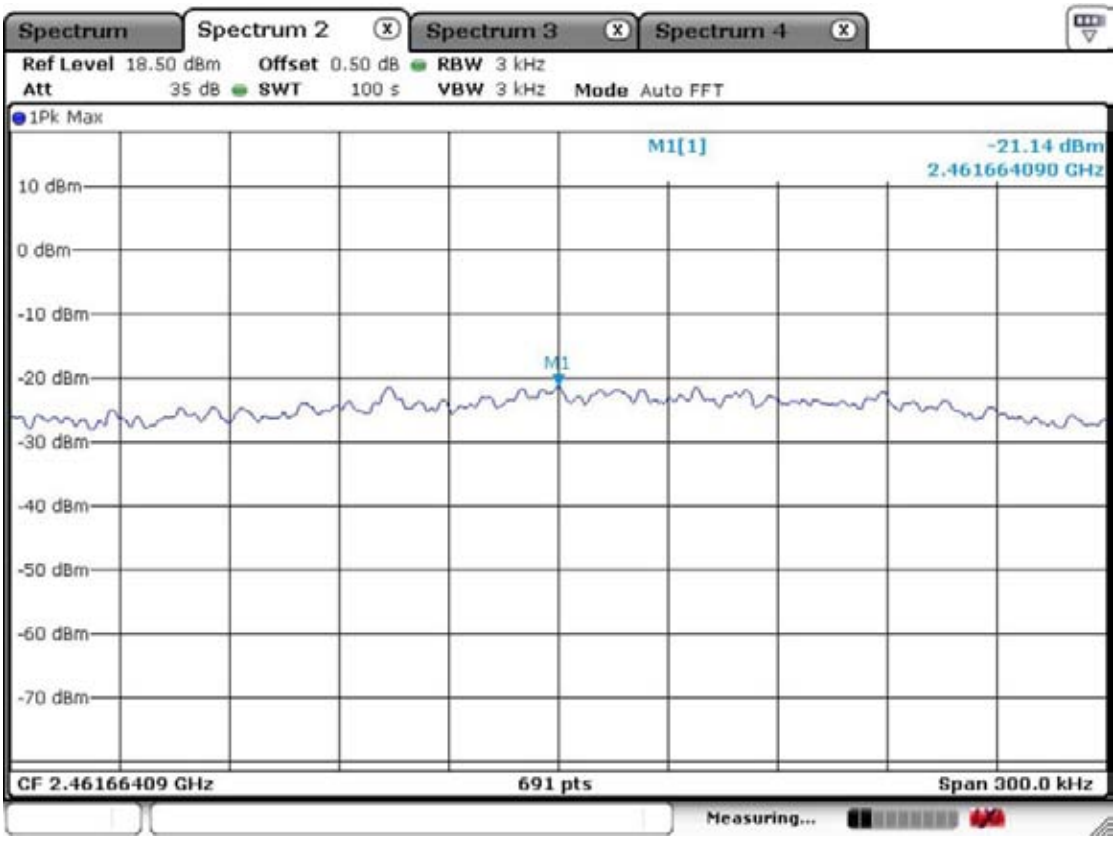
CH 1



CH 6

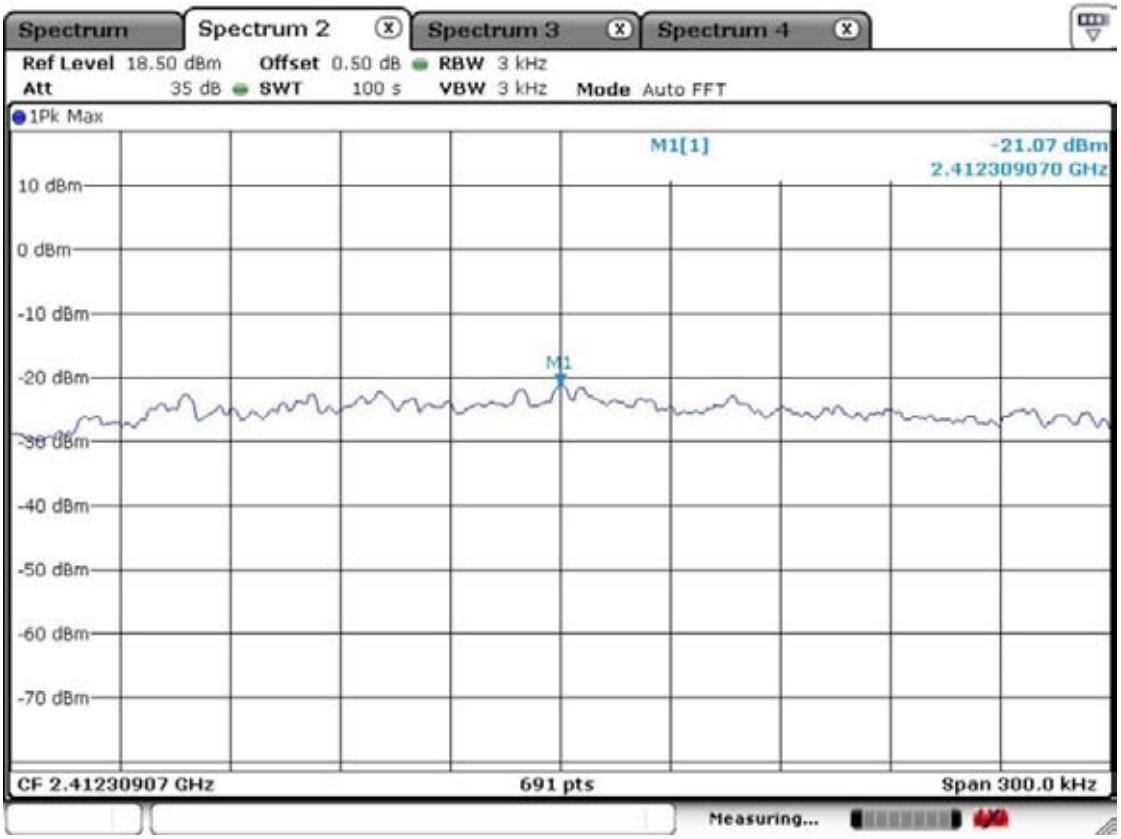


CH 11

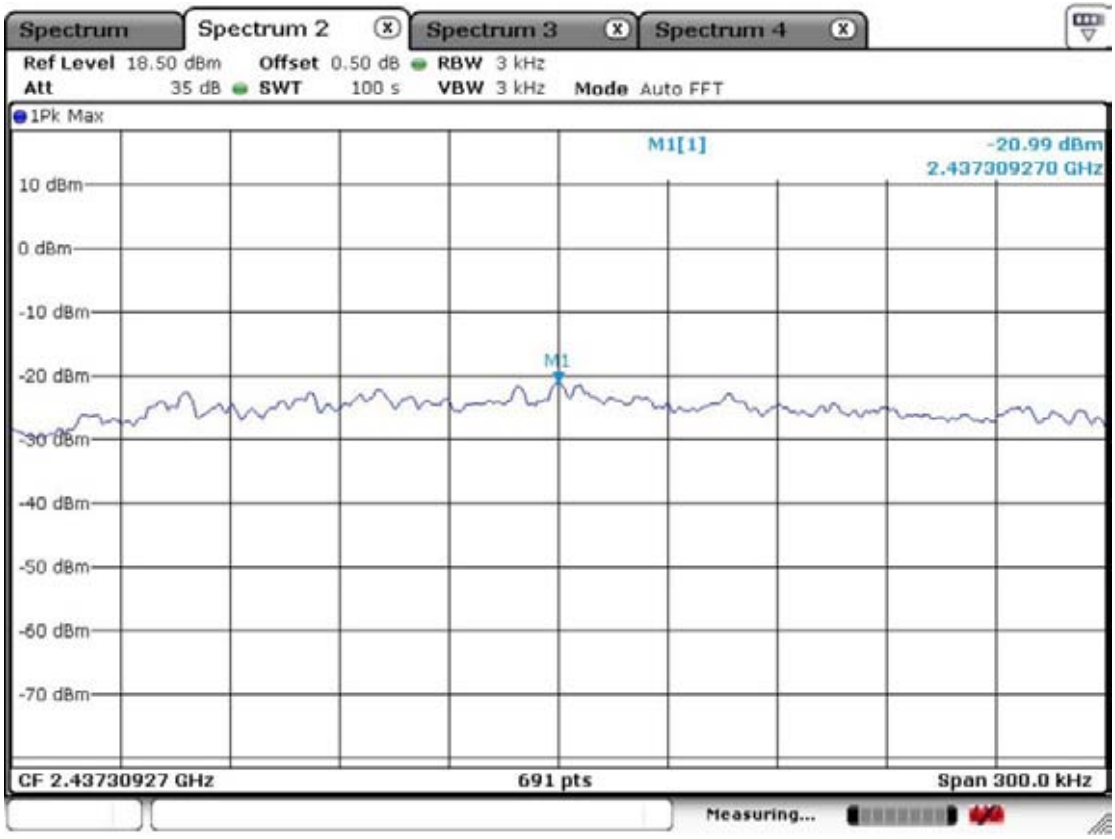

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm
Offset 0.50 dB
RBW 3 kHz
Att 35 dB
SWT 100 s
VBW 3 kHz
Mode Auto FFT
1Pk Max
M1[1]
-21.14 dBm
2.461664090 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.46166409 GHz
691 pts
Span 300.0 kHz
Measuring...

802.11n_20MHz Power Density Measurement

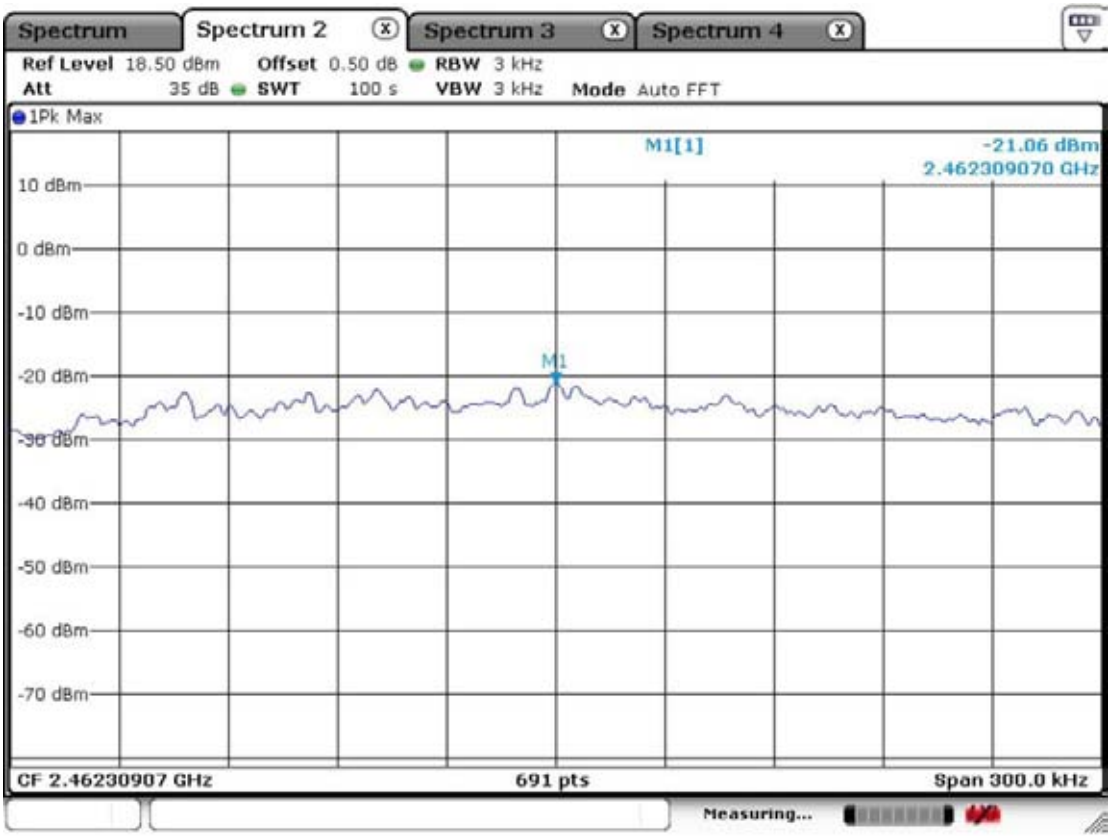
CH 1



CH 6

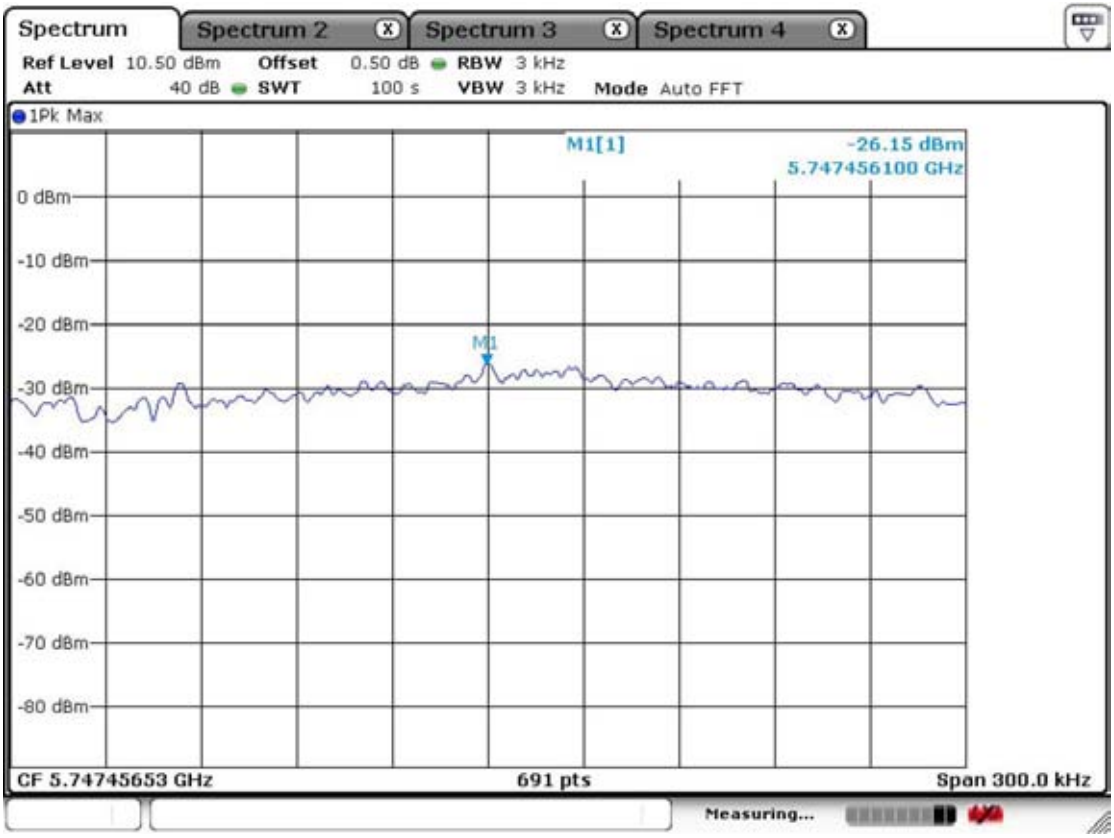


CH 11

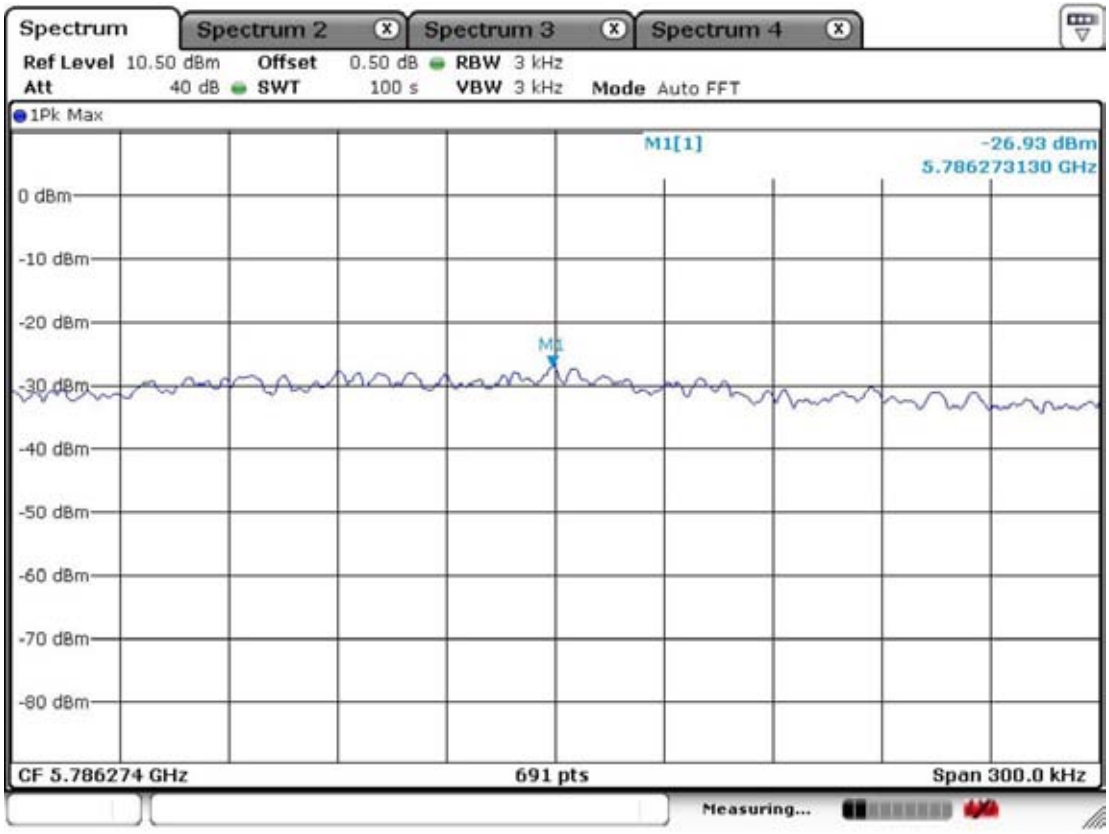

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 18.50 dBm Offset 0.50 dB RBW 3 kHz
Att 35 dB SWT 100 s VBW 3 kHz Mode Auto FFT
1Pk Max
M1[1]
-21.06 dBm
2.462309070 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.46230907 GHz
691 pts
Span 300.0 kHz
Measuring...

802.11a Power Density Measurement

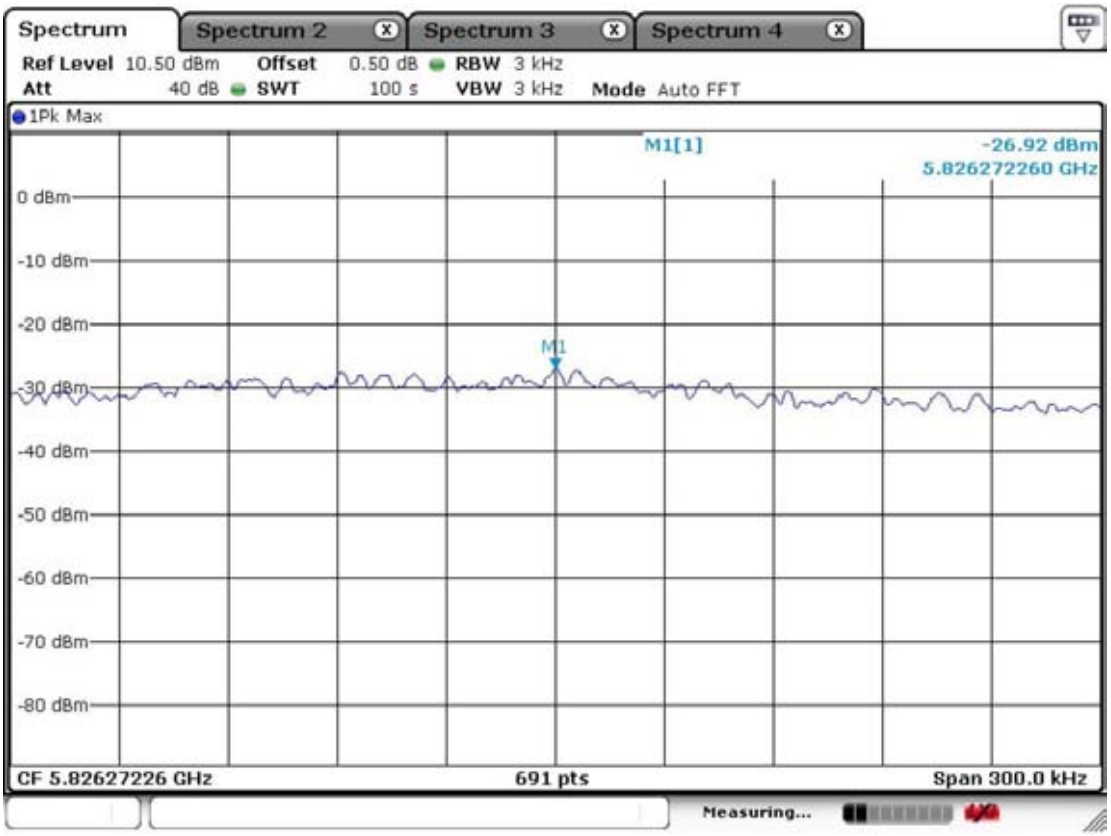
CH 149



CH 157

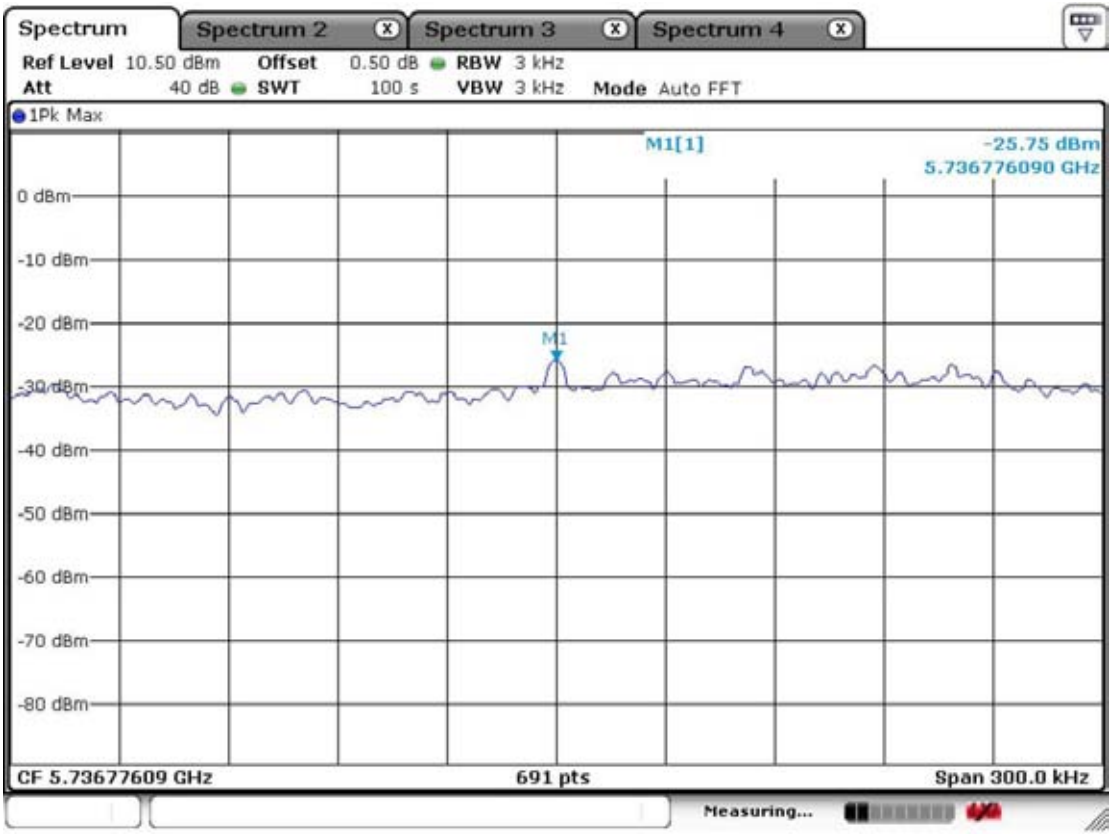


CH 165

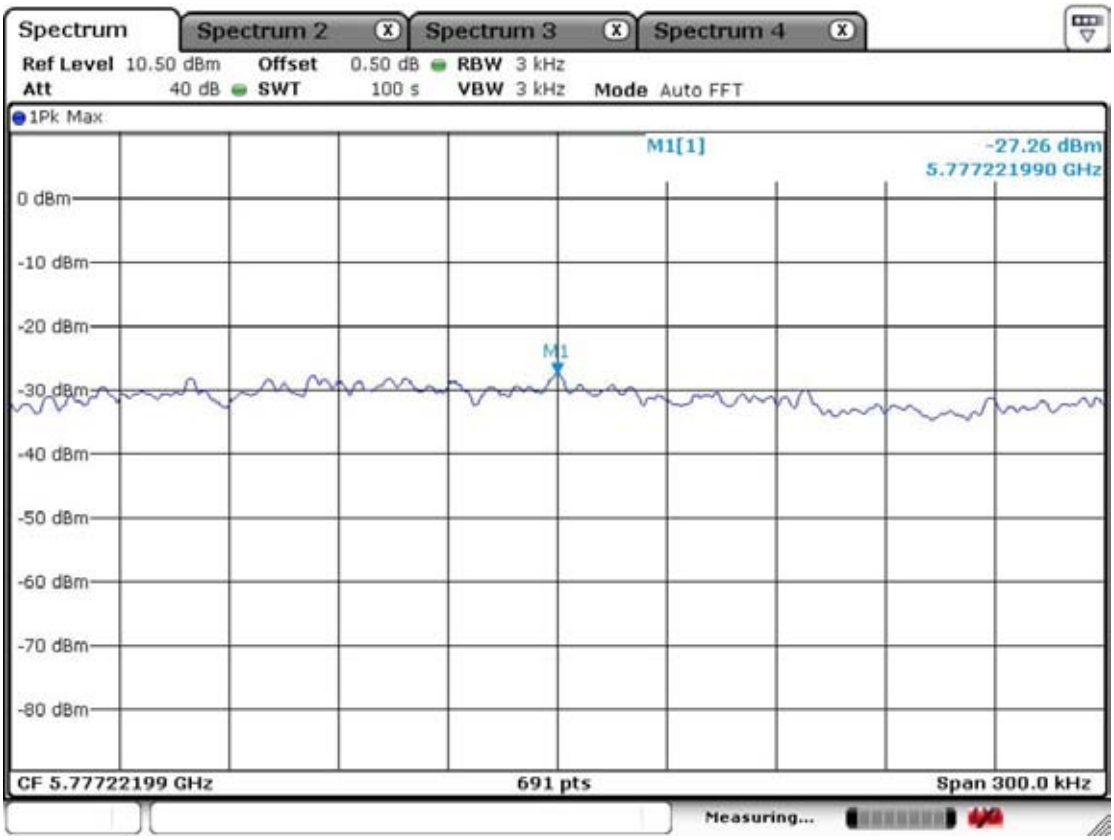

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm
Offset 0.50 dB
RBW 3 kHz
Att 40 dB
SWT 100 s
VBW 3 kHz
Mode Auto FFT
1Pk Max
M1[1]
-26.92 dBm
5.826272260 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
CF 5.82627226 GHz
691 pts
Span 300.0 kHz
Measuring...

802.11an_20MHz Power Density Measurement

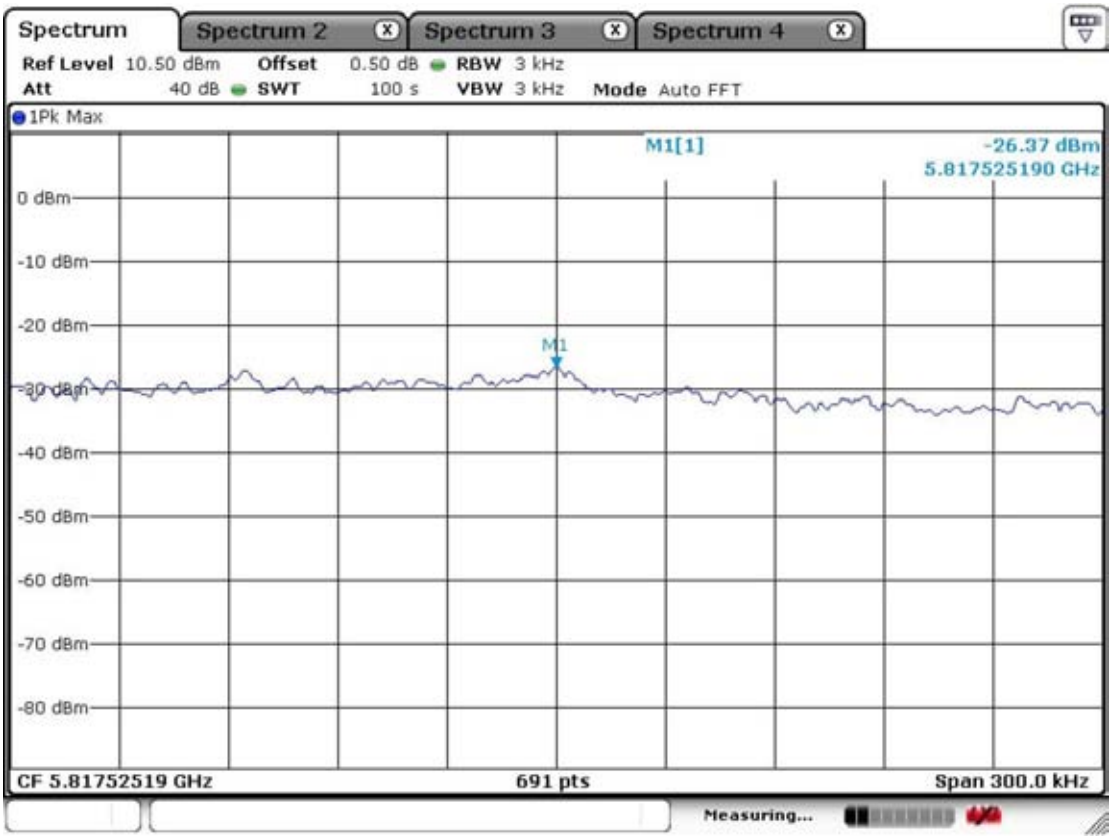
CH 149



CH 157



CH 165


Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 10.50 dBm Offset 0.50 dB RBW 3 kHz
Att 40 dB SWT 100 s VBW 3 kHz Mode Auto FFT
1Pk Max
M1[1]
-26.37 dBm
5.817525190 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
CF 5.81752519 GHz
691 pts
Span 300.0 kHz
Measuring...

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

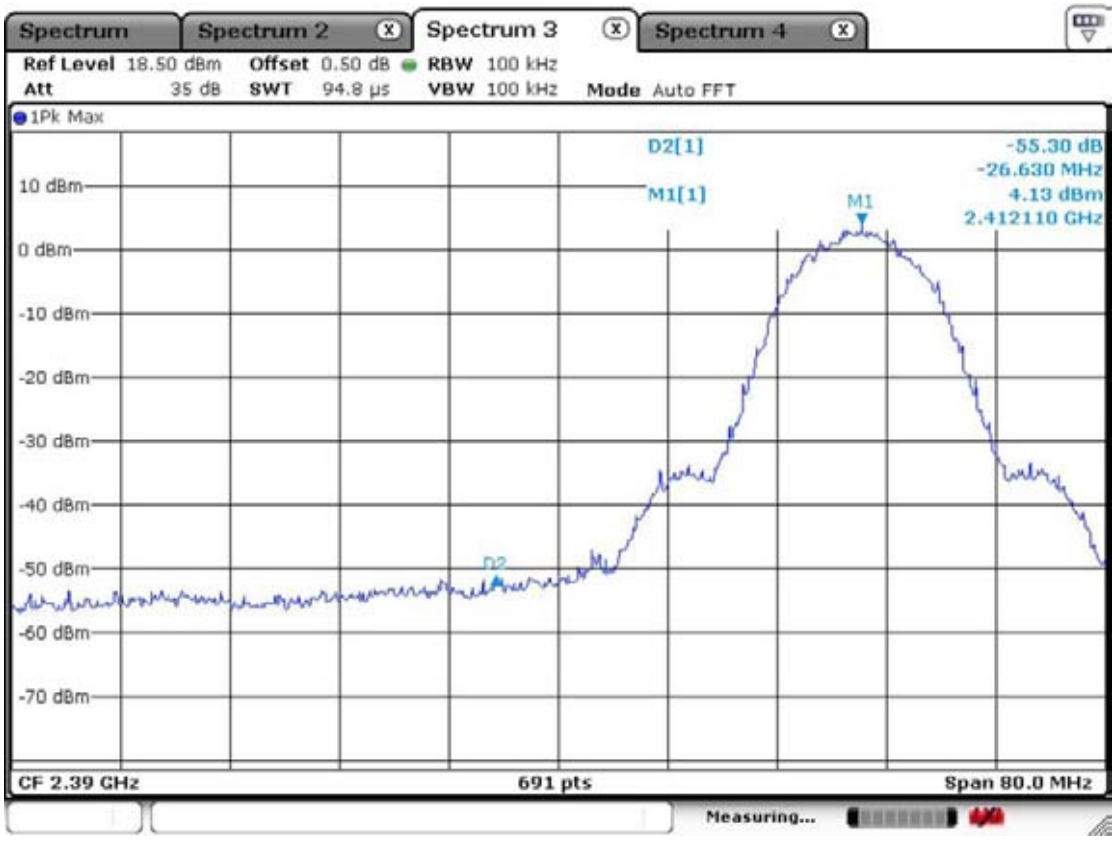
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

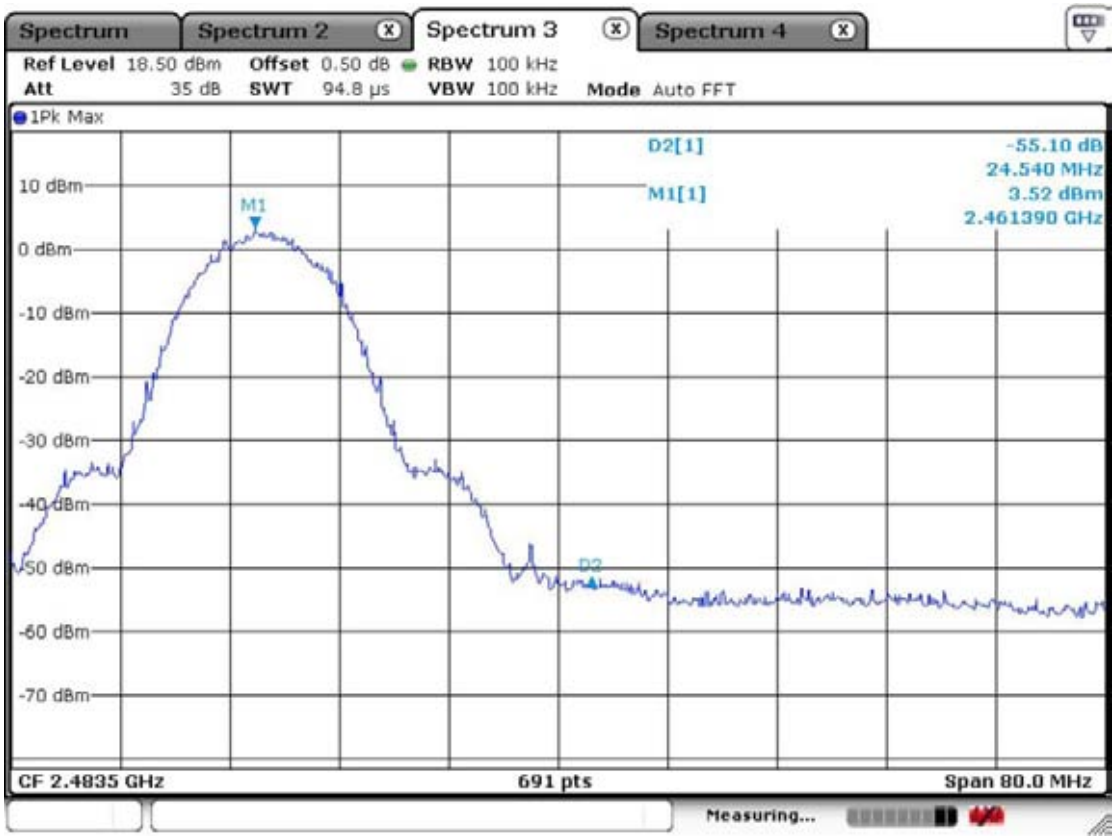
Minimum Standard:	> 20 dBc

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

802.11b Band–edge : Conducted Measurements





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

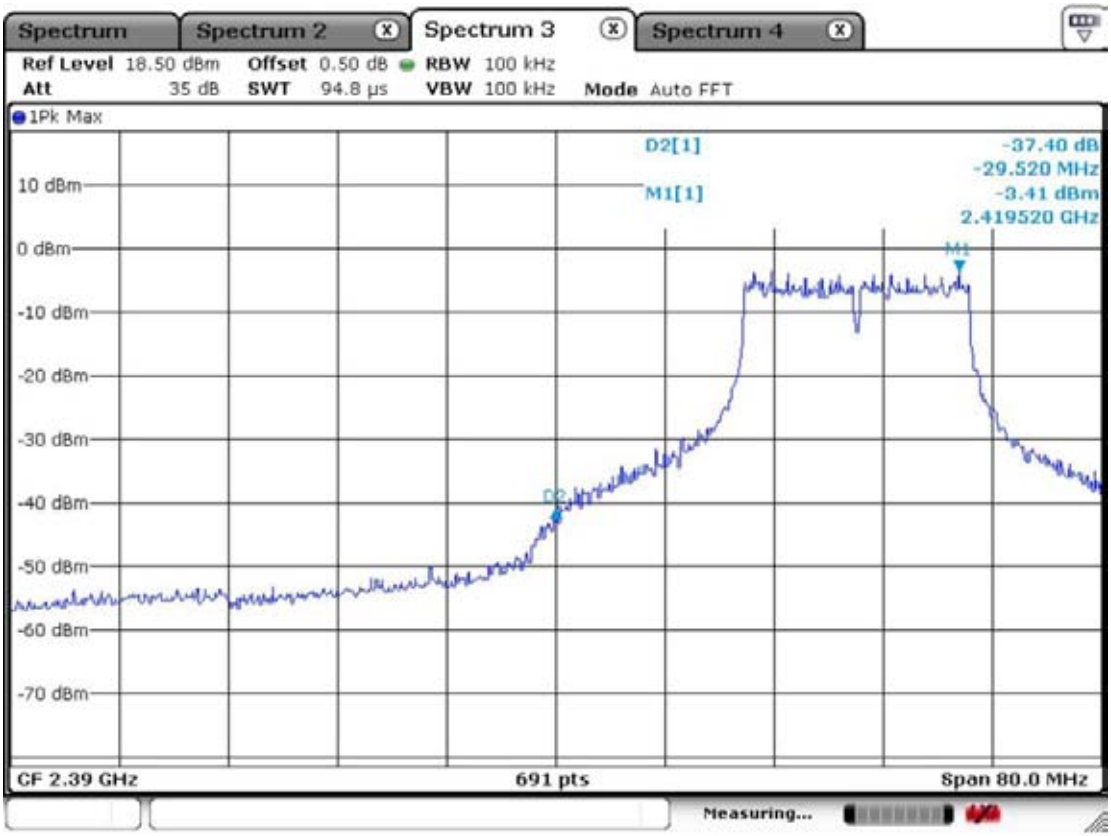
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2389.9	49.6	68.7	H	28.2	30.1	54.0	74.0	47.7	66.8	6.3	7.2

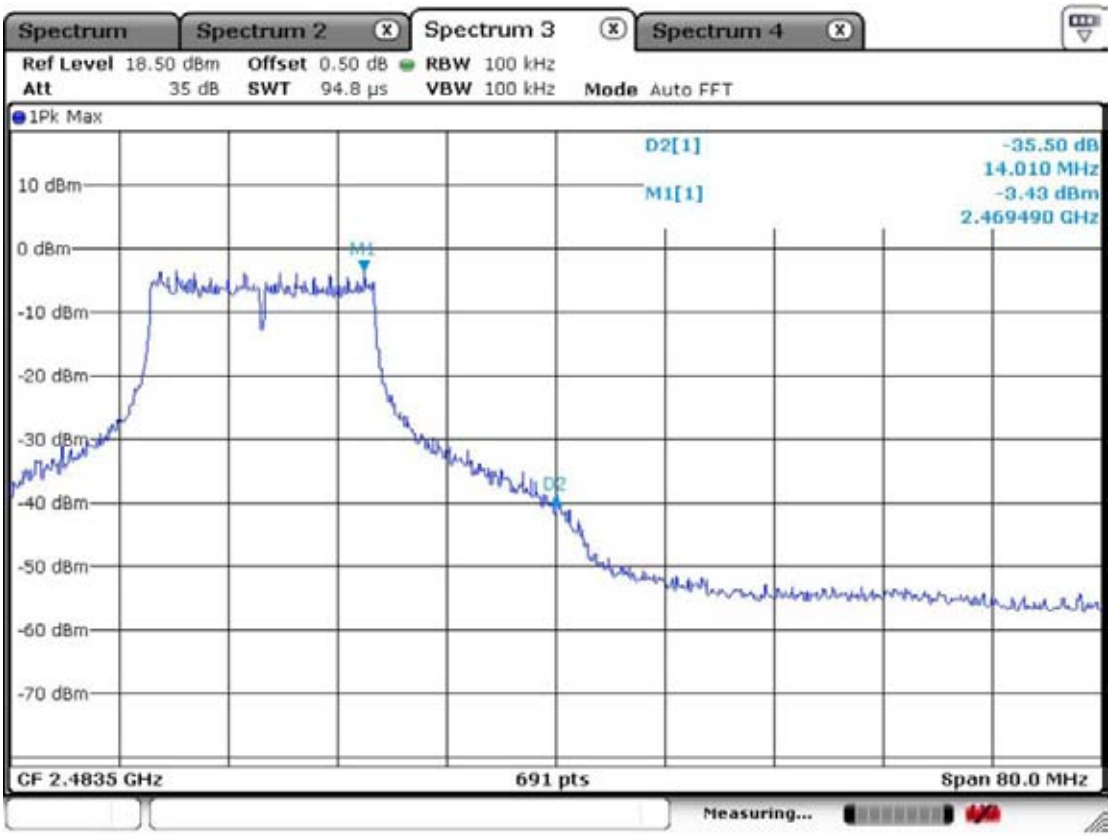
Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2483.5	48.1	67.2	H	28.2	30.1	54.0	74.0	46.2	65.3	7.8	8.7

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

802.11g Band–edge : Conducted Measurements





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

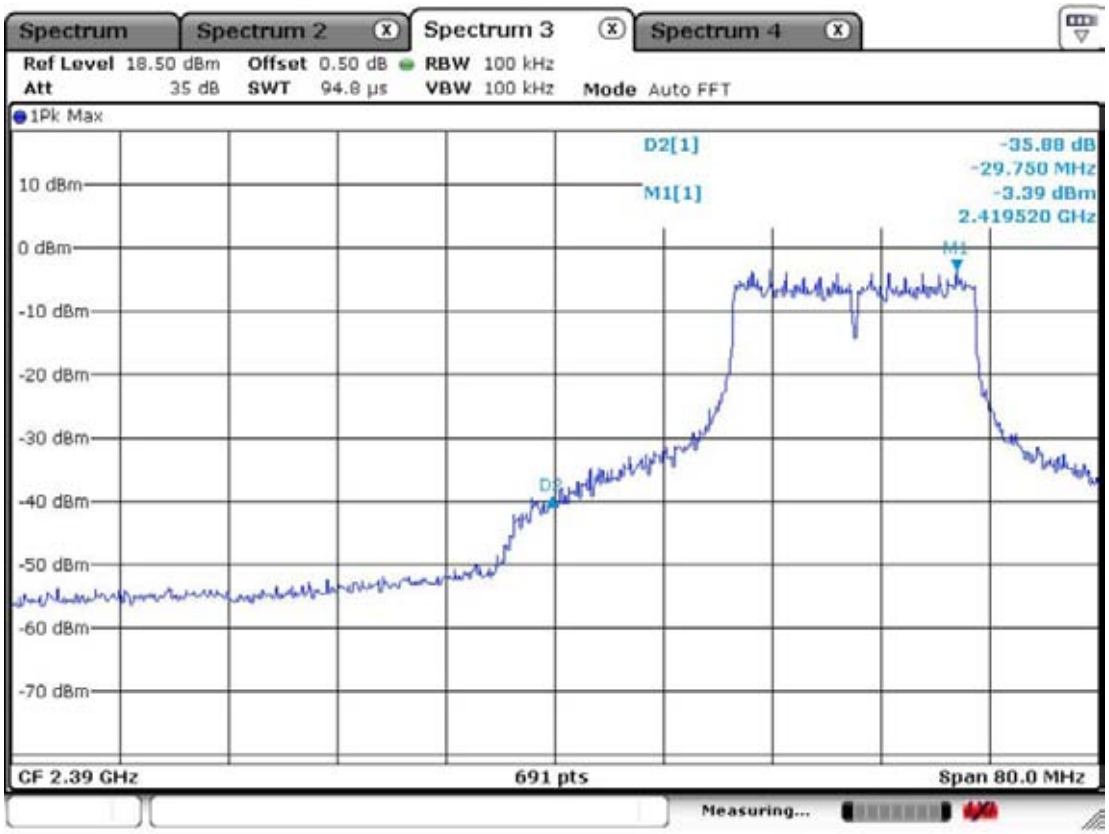
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2389.9	47.5	63.1	H	28.2	30.1	54.0	74.0	45.6	61.2	8.4	12.8

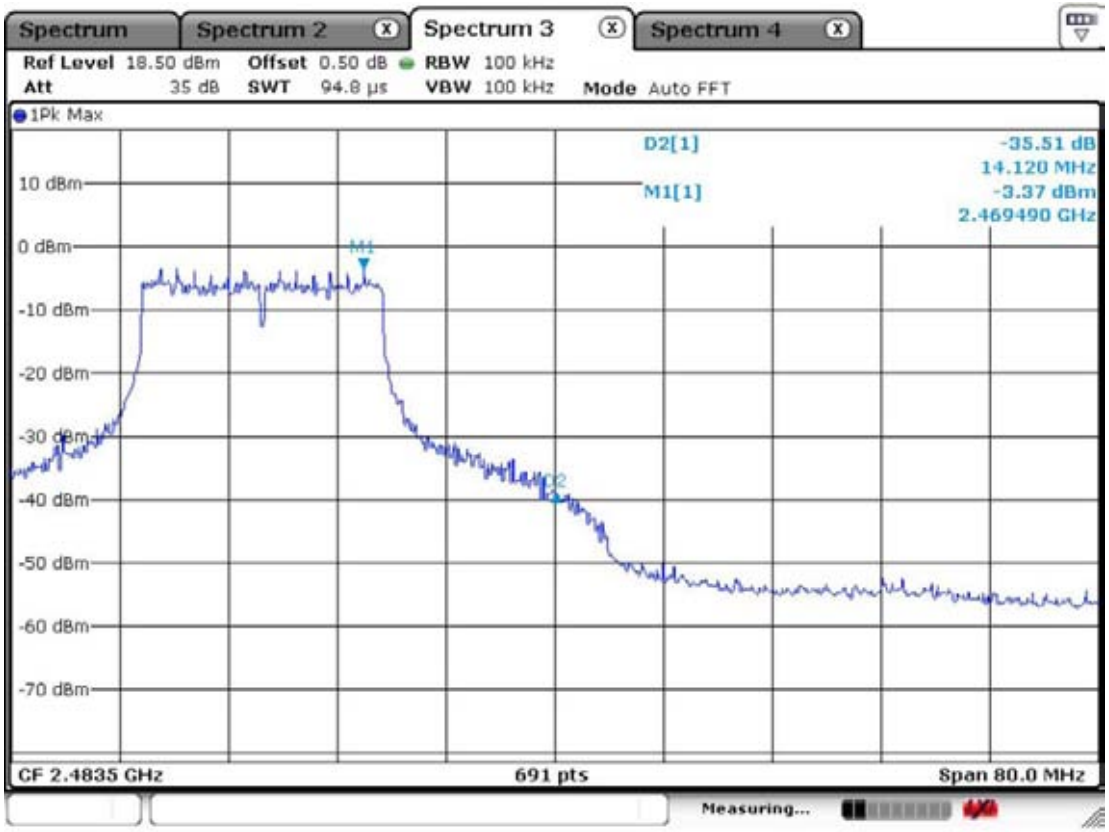
Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2483.5	48.1	64.2	H	28.2	30.1	54.0	74.0	46.2	62.3	7.8	11.7

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

802.11n_20MHz Band–edge : Conducted Measurements





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

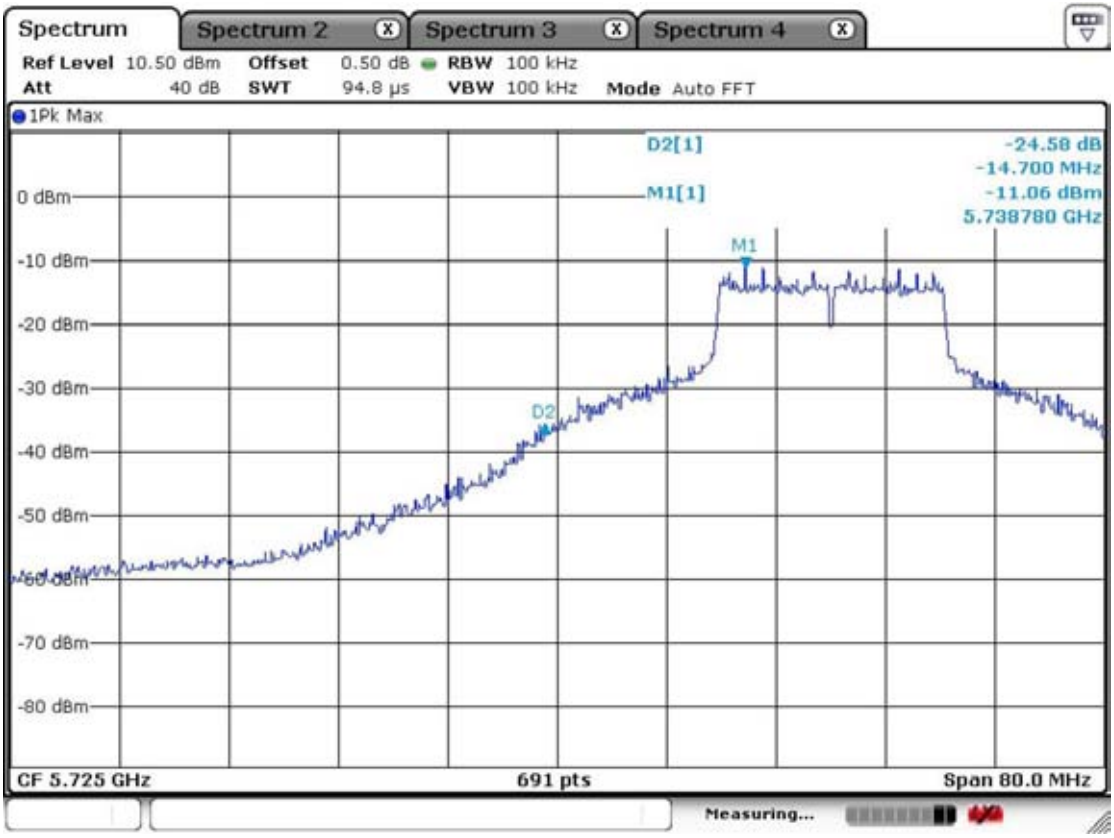
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2389.9	47.2	64.1	H	28.2	29.8	54.0	74.0	45.6	62.5	8.4	11.5

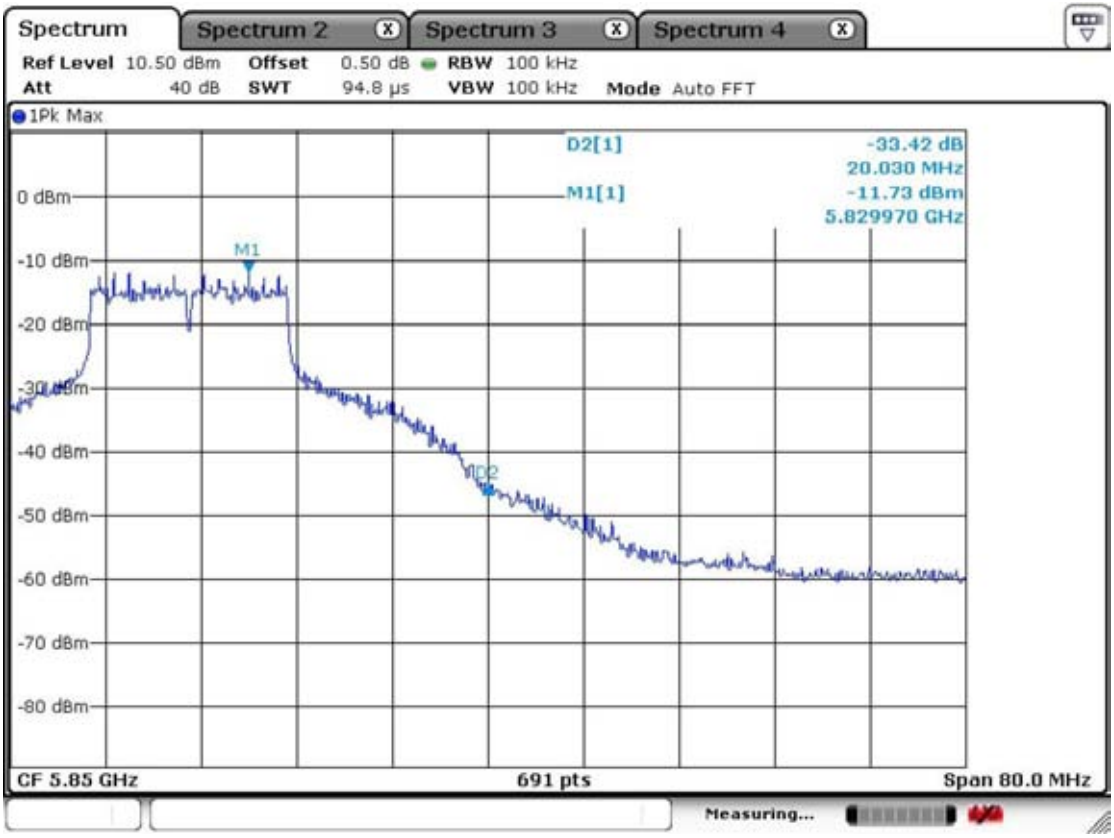
Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Antenna	Amp. Gain + Cable Loss						
2483.5	46.8	63.9	H	28.2	29.8	54.0	74.0	45.2	62.3	8.8	11.7

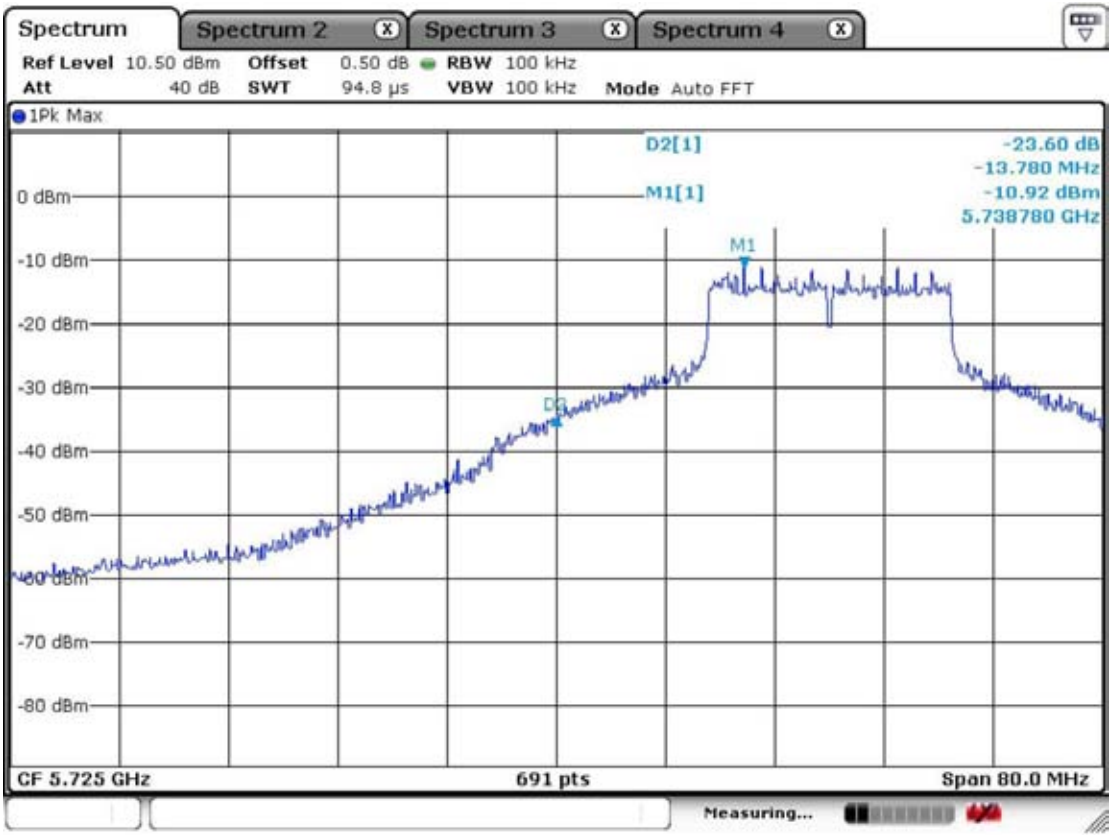
Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

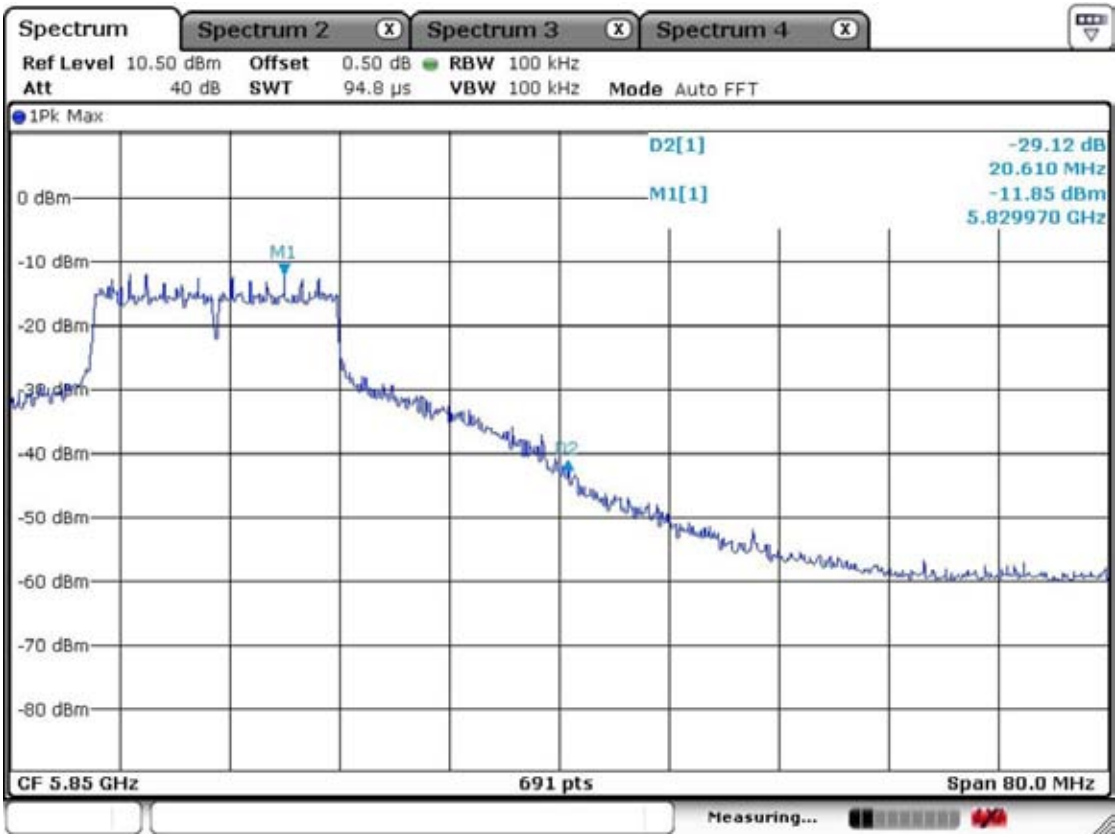
802.11a Band–edge : Conducted Measurements





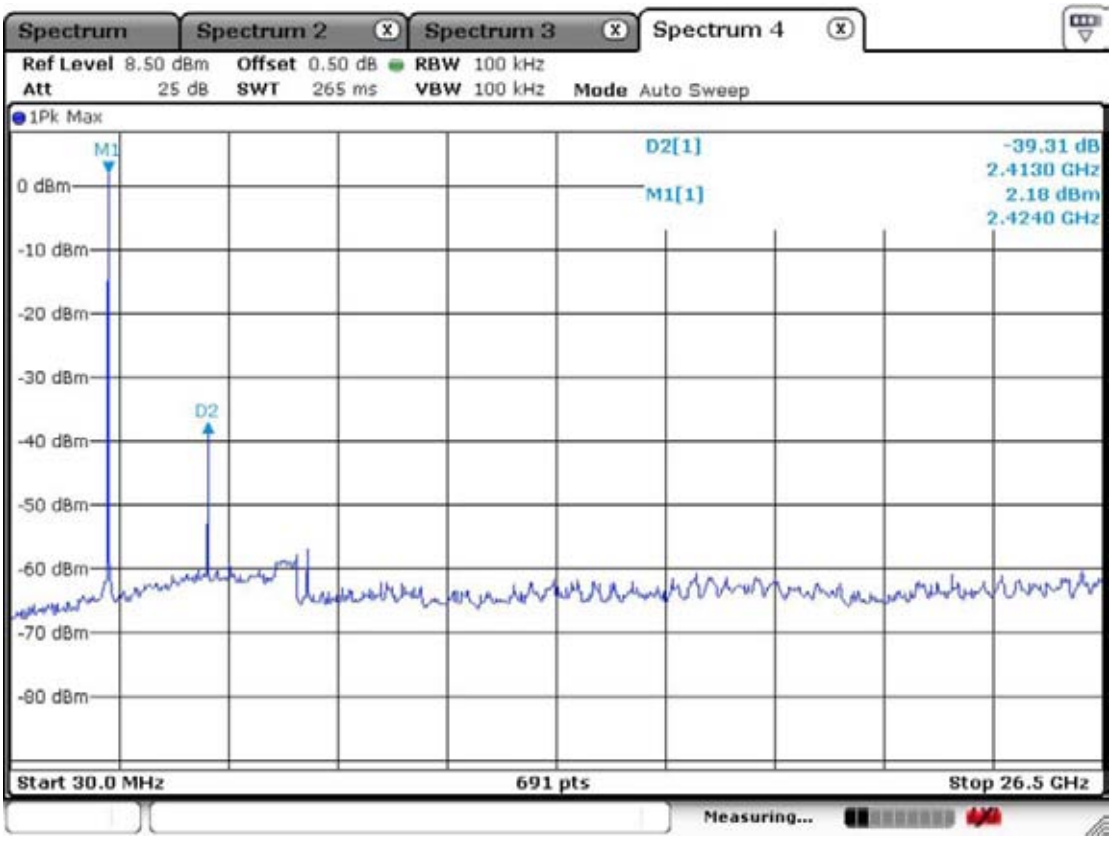
802.11an_20MHz Band–edge : Conducted Measurements





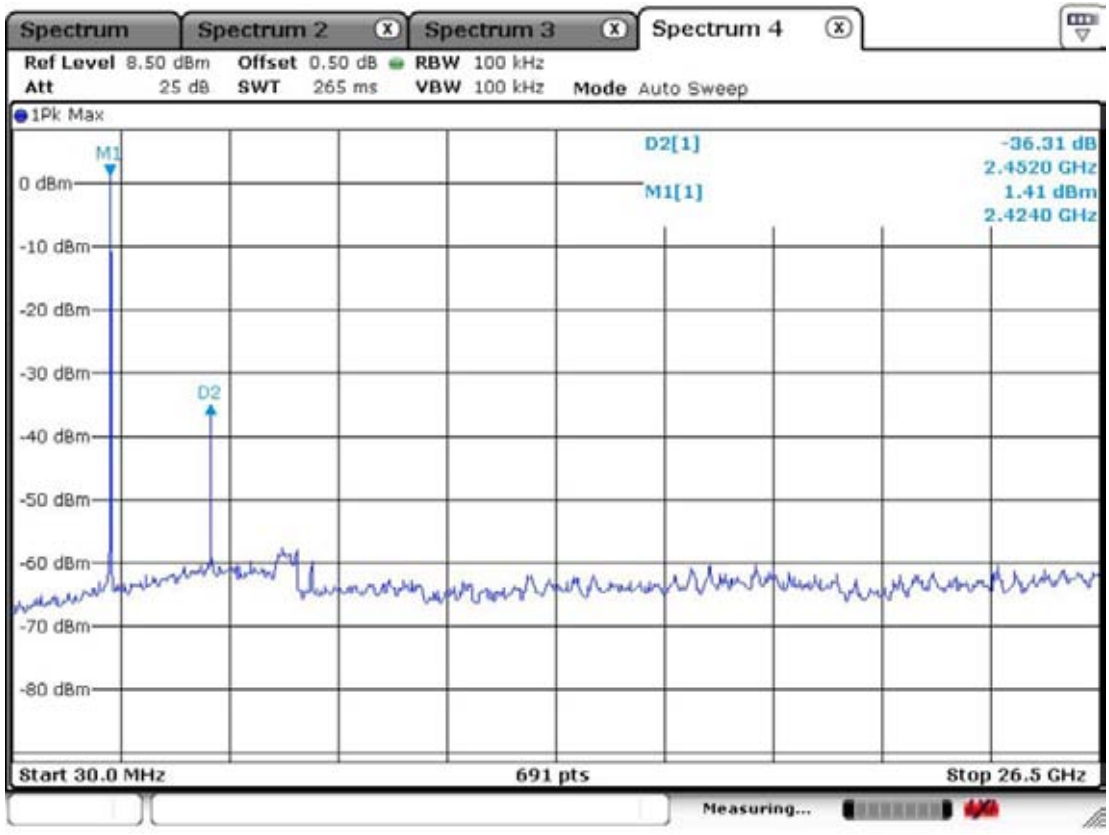
802.11b – channel 1

Frequency Range = 30 MHz ~ 10th harmonic.



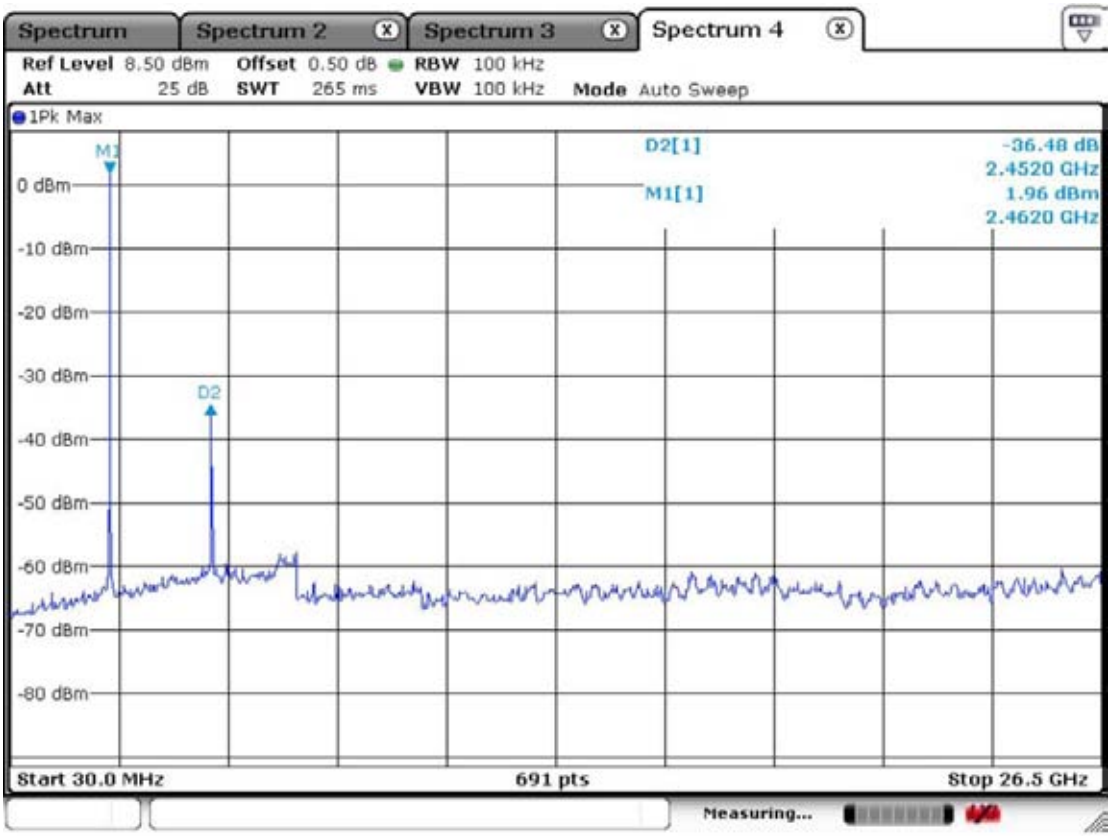
802.11b – channel 6

Frequency Range = 30 MHz ~ 10th harmonic.



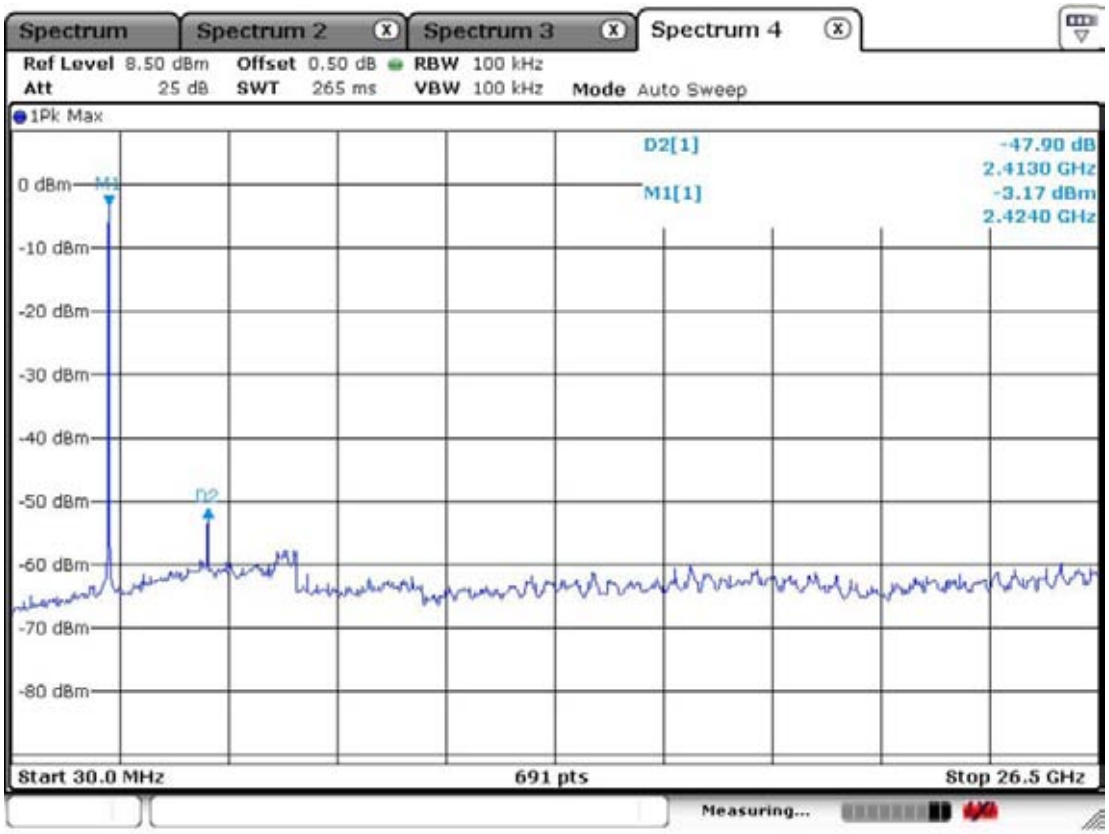
802.11b –channel 11

Frequency Range = 30 MHz ~ 10th harmonic.



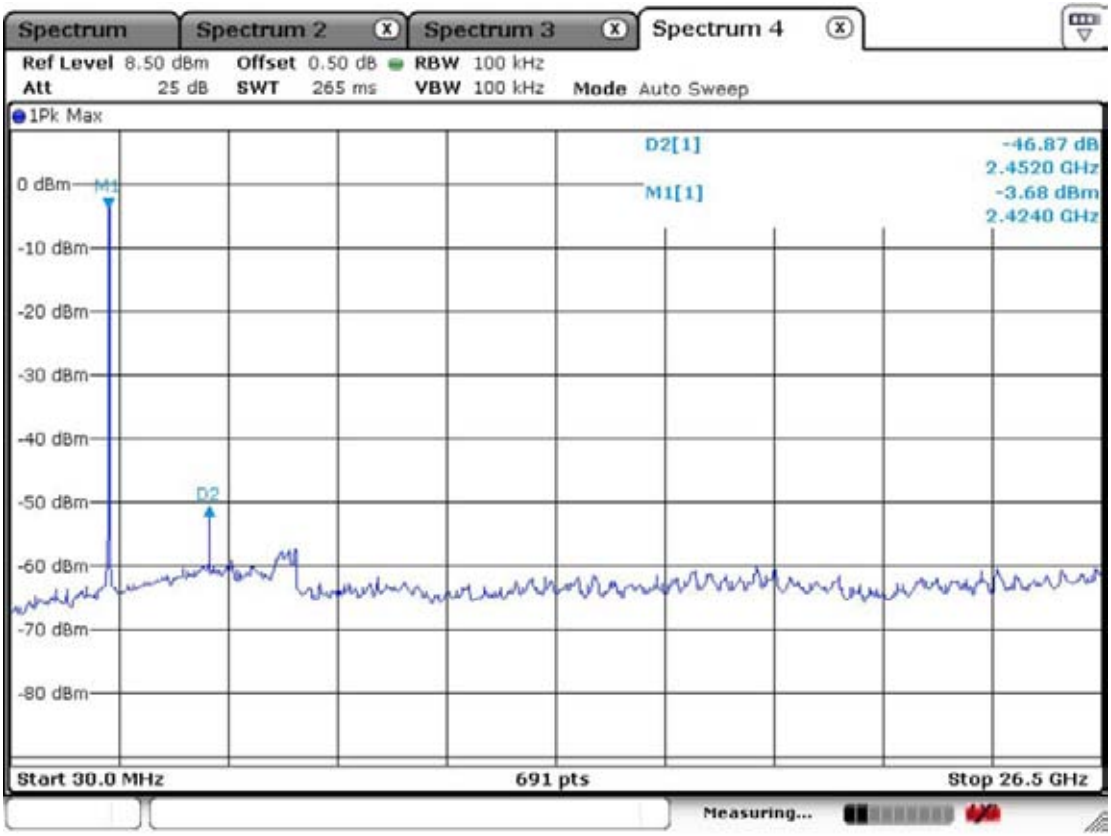
802.11g – channel 1

Frequency Range = 30 MHz ~ 10th harmonic.



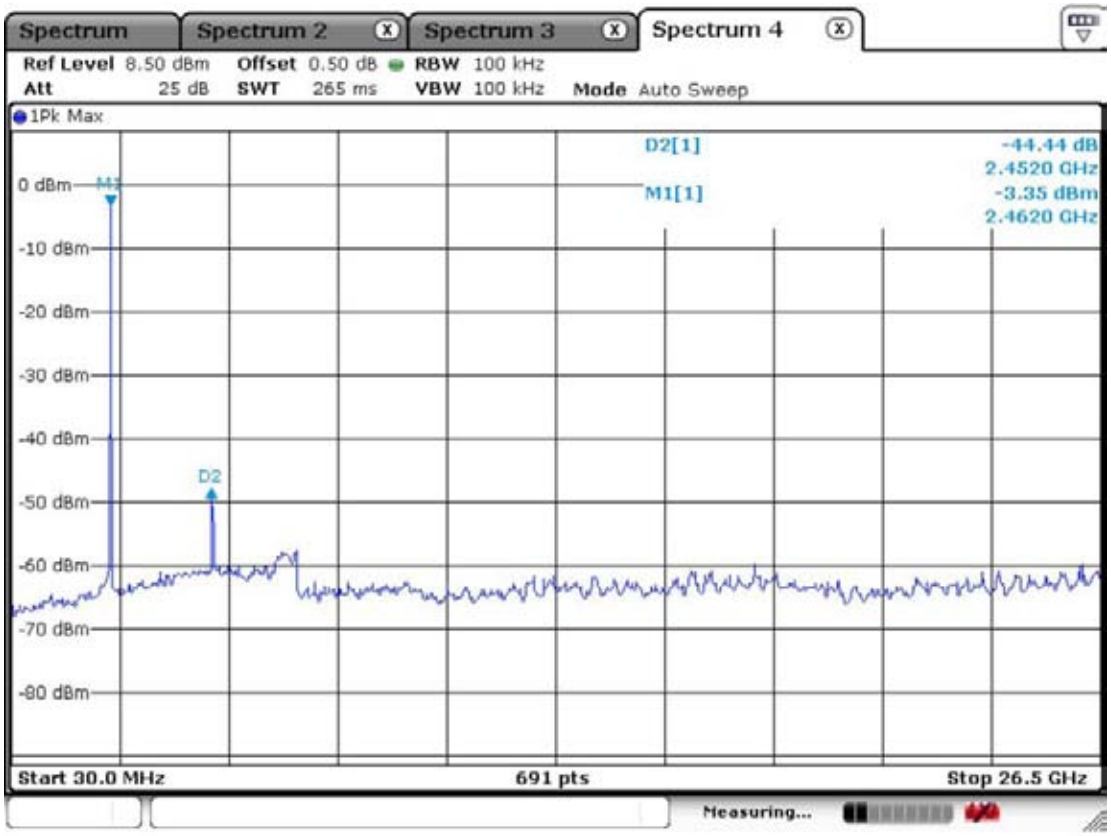
802.11g – channel 6

Frequency Range = 30 MHz ~ 10th harmonic.



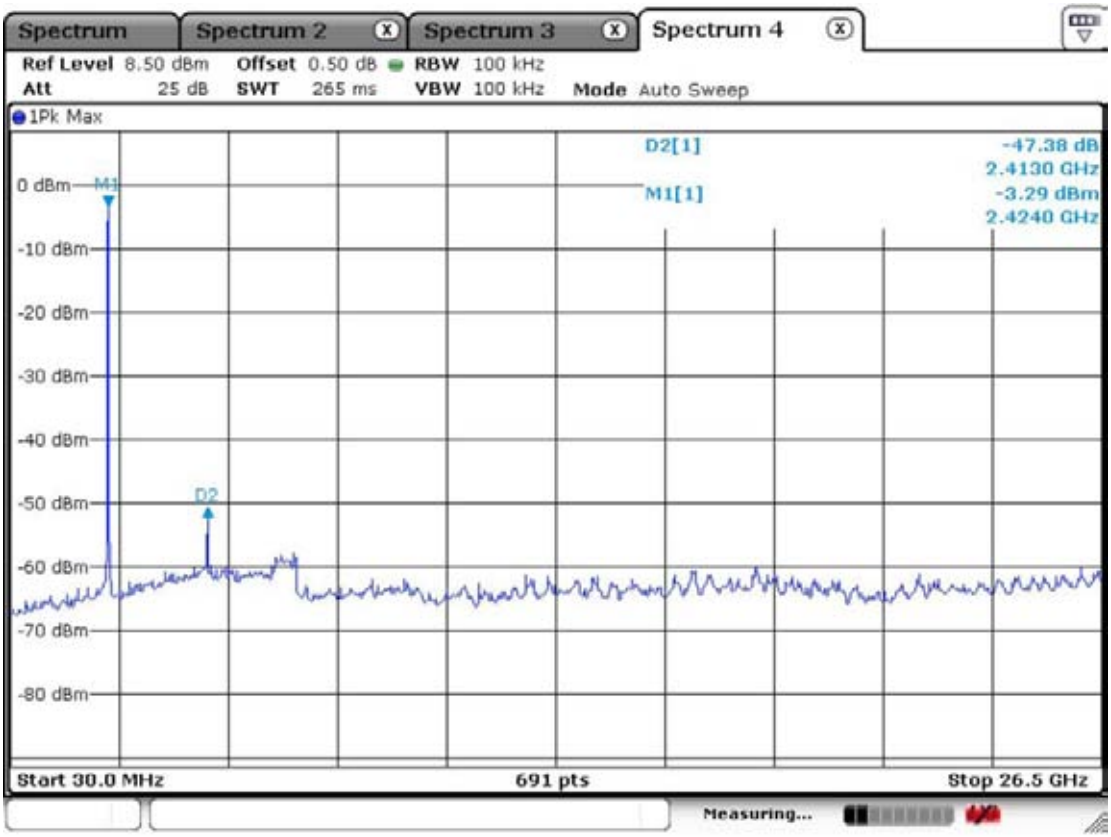
802.11g –channel 11

Frequency Range = 30 MHz ~ 10th harmonic.



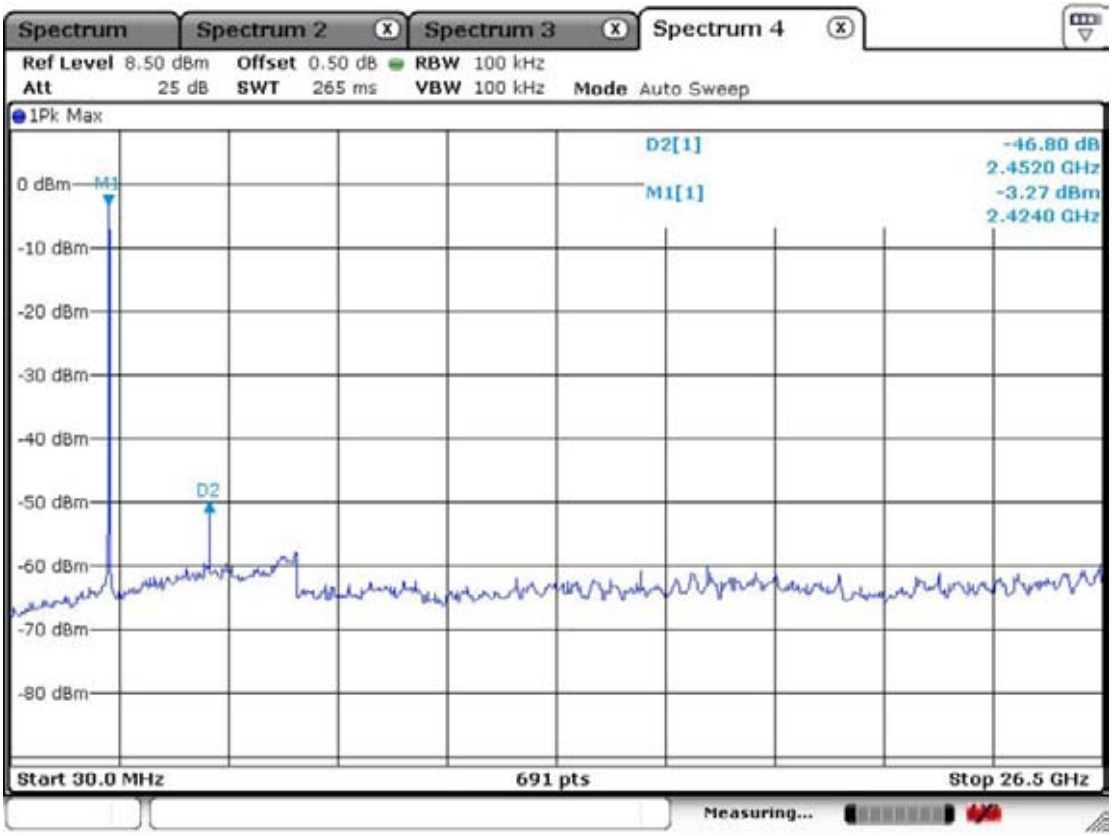
802.11n_20MHz – channel 1

Frequency Range = 30 MHz ~ 10th harmonic.



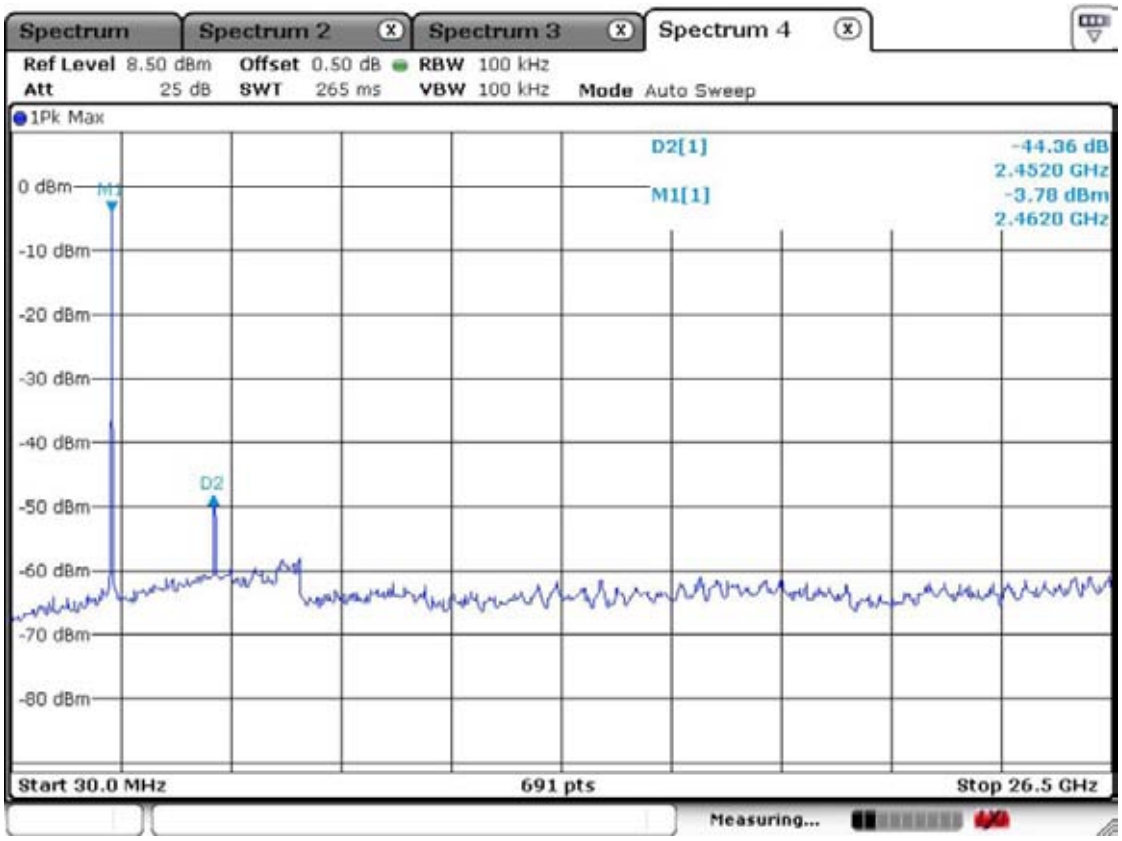
802.11n_20MHz – channel 6

Frequency Range = 30 MHz ~ 10th harmonic.



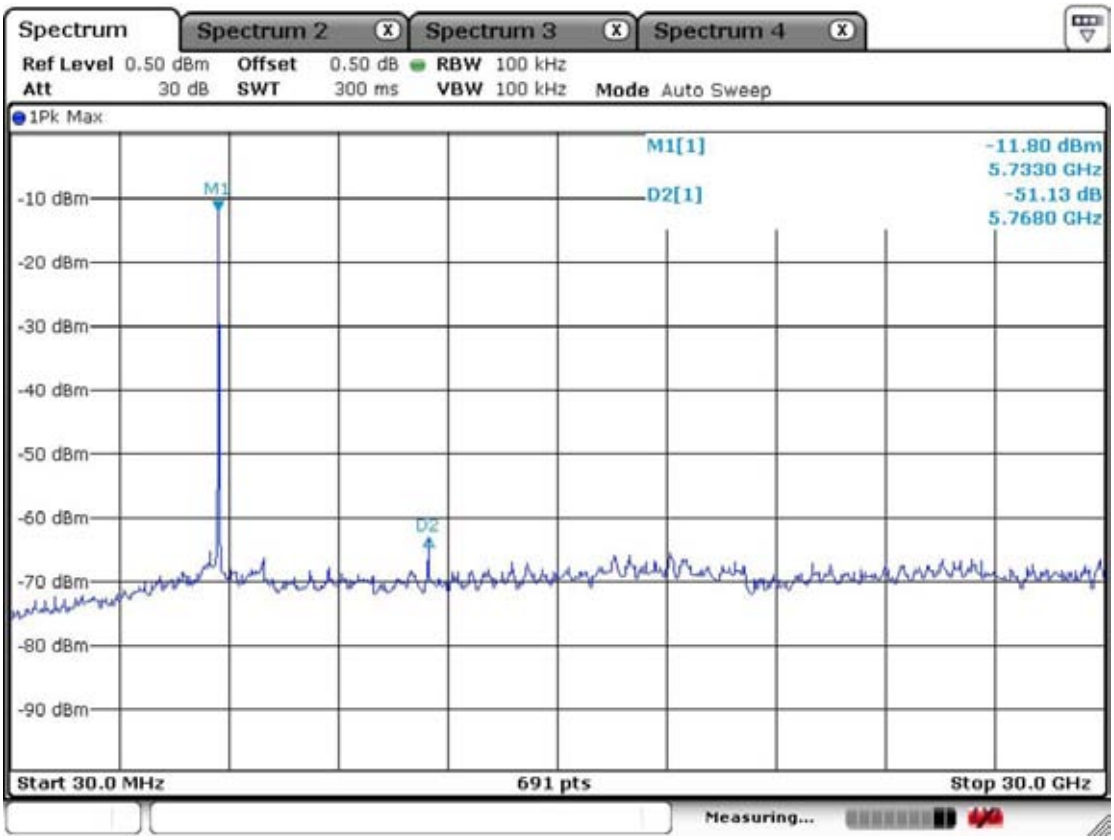
802.11n_20MHz –channel 11

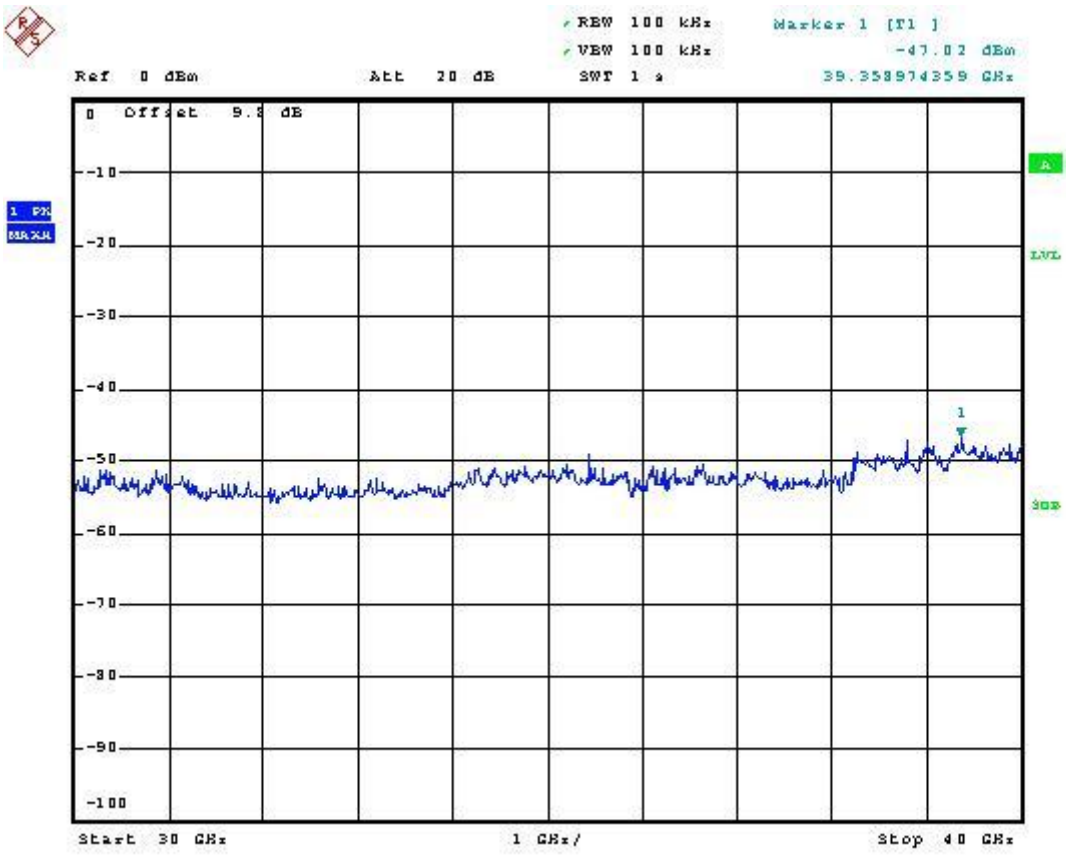
Frequency Range = 30 MHz ~ 10th harmonic.



802.11a – channel 149

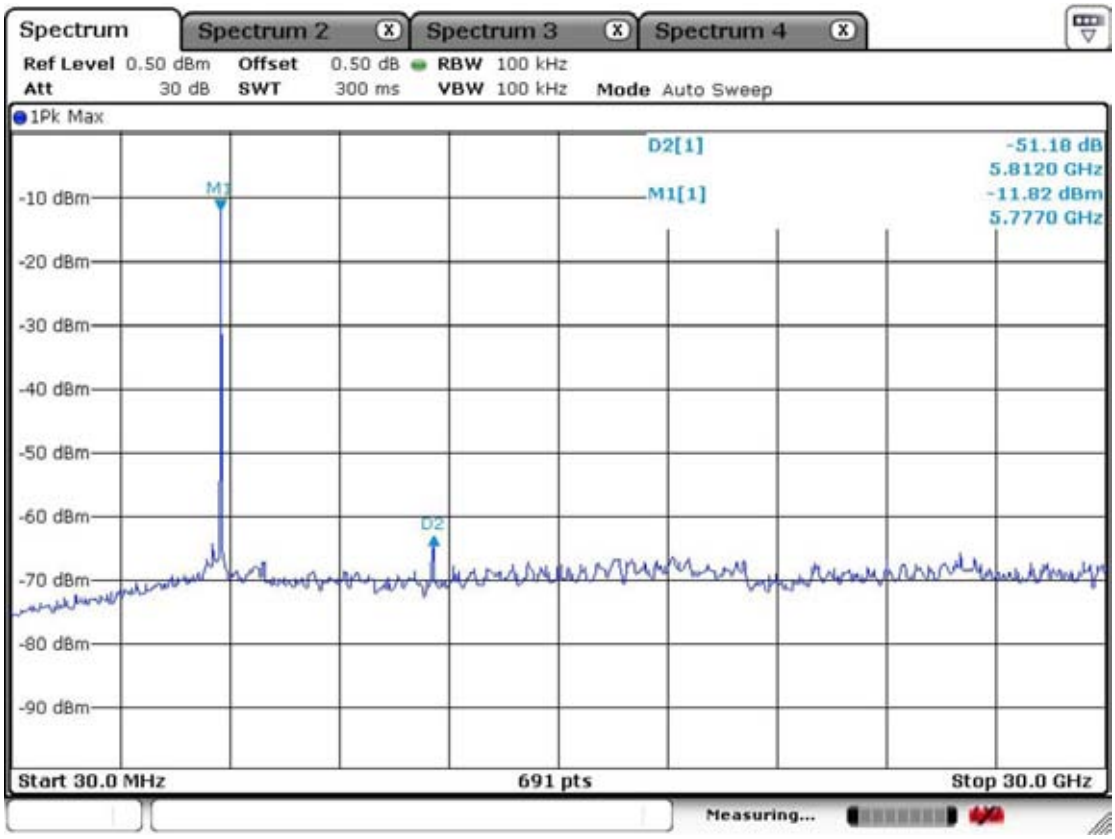
Frequency Range = 30 MHz ~ 40 GHz

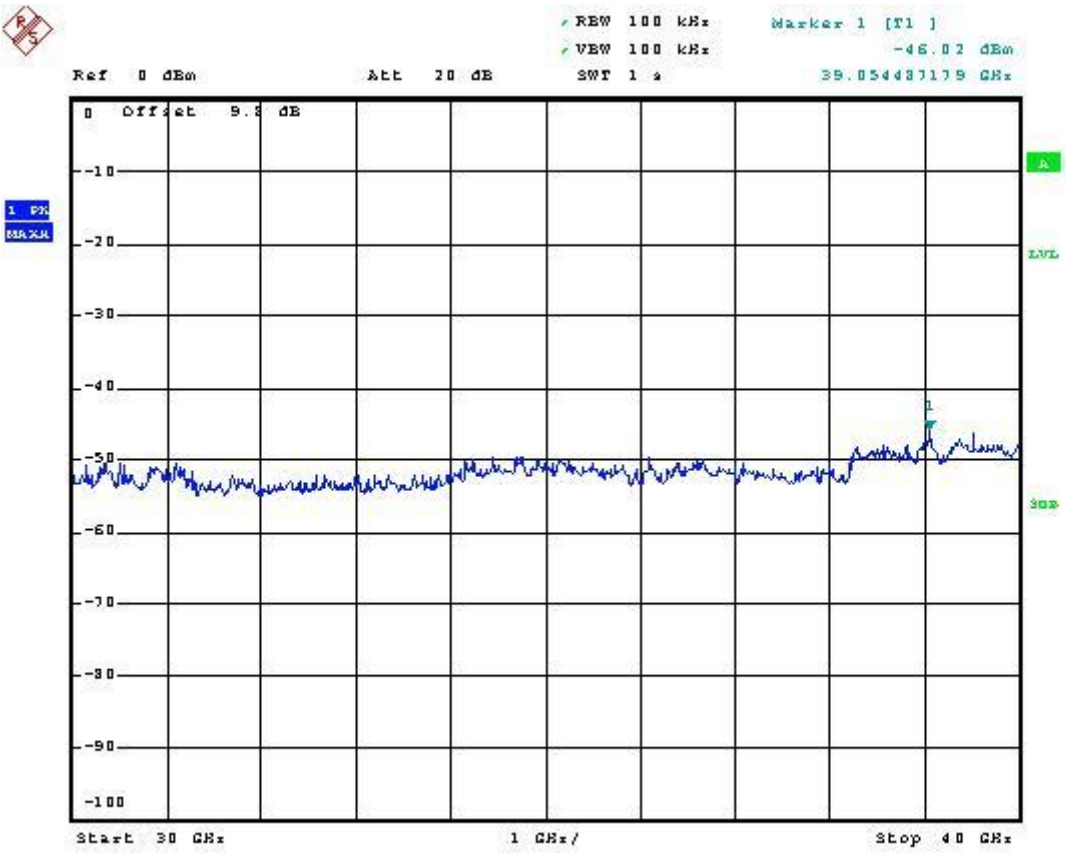




802.11a – channel 157

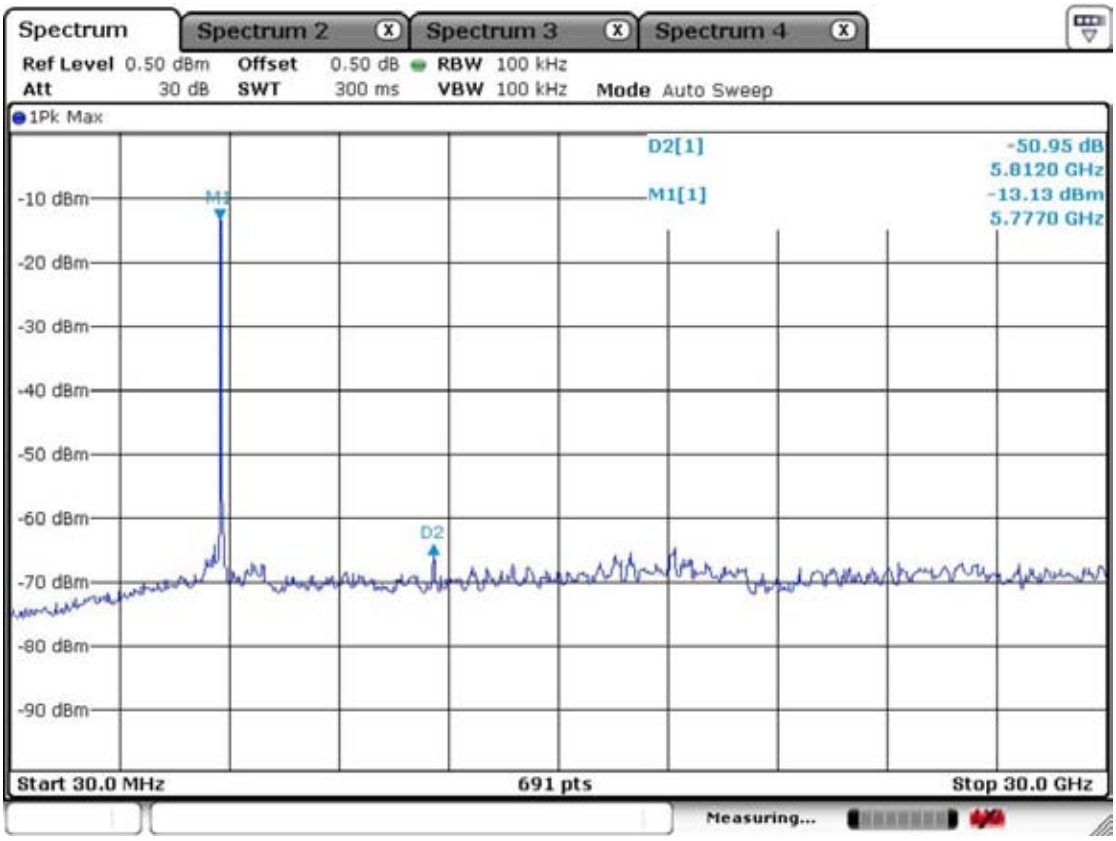
Frequency Range = 30 MHz ~ 40 GHz

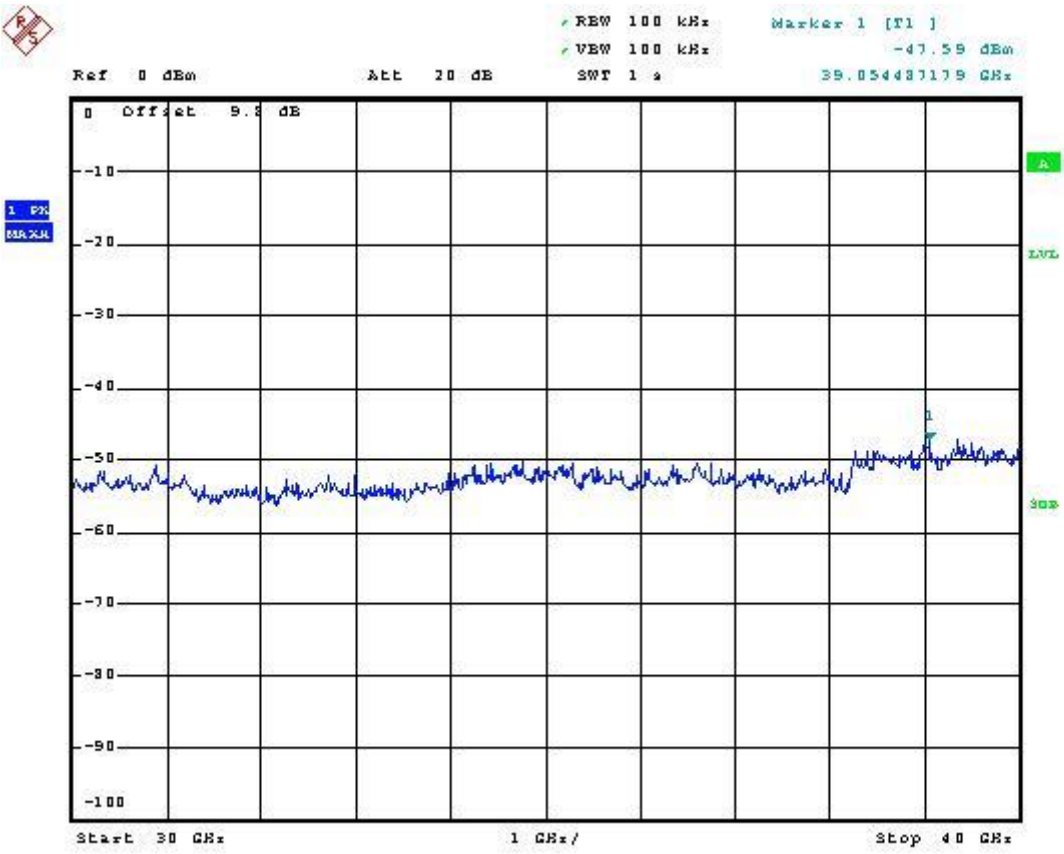




802.11a –channel 165

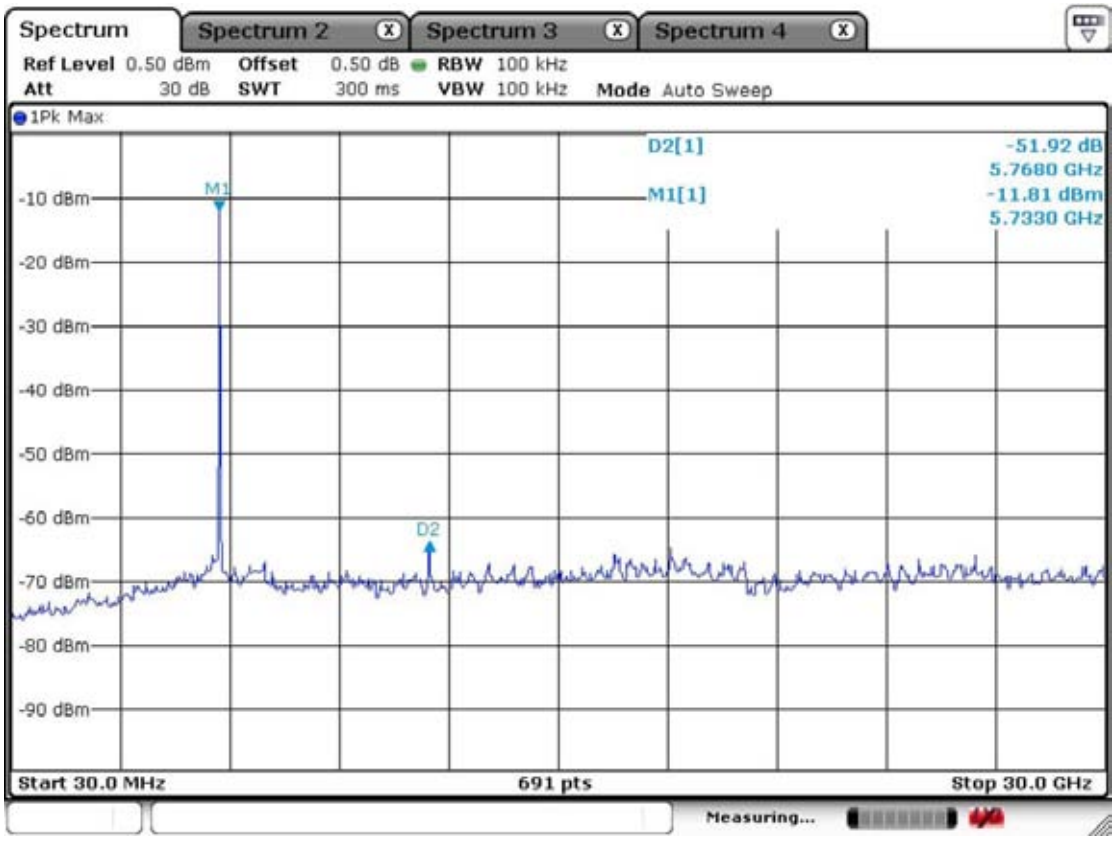
Frequency Range = 30 MHz ~ 40 GHz





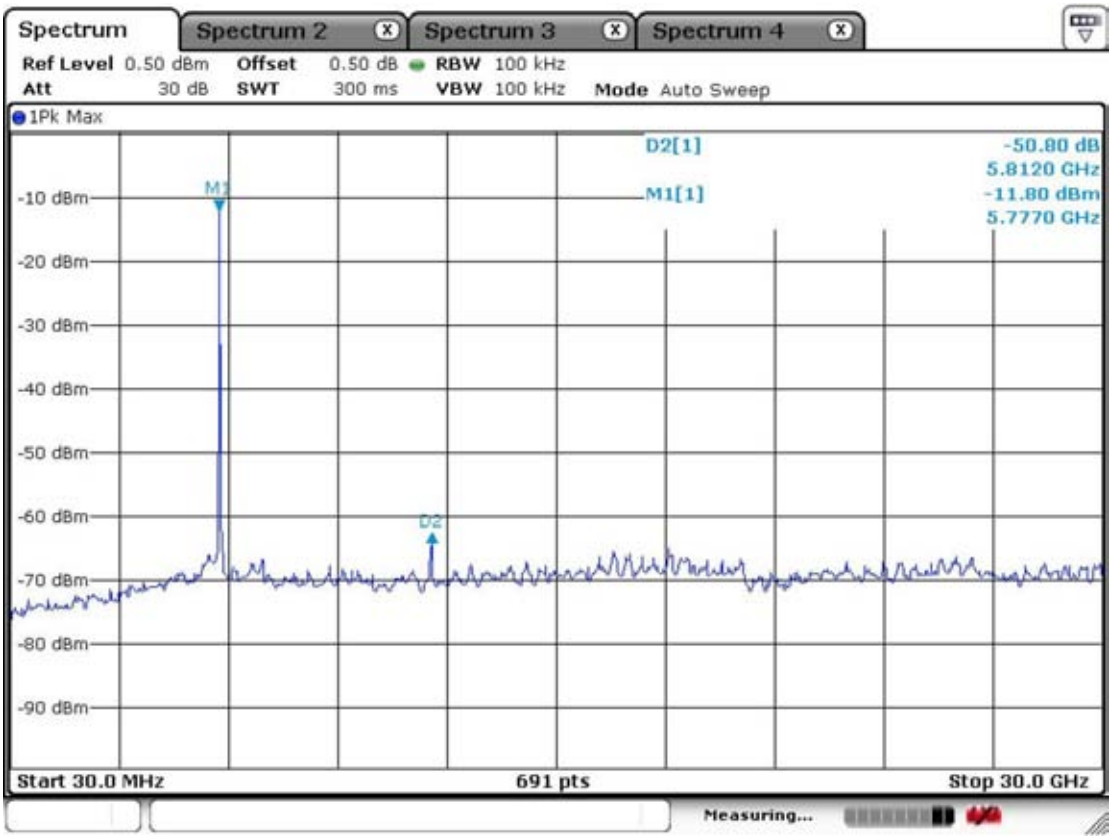
802.11an_20MHz – channel 149

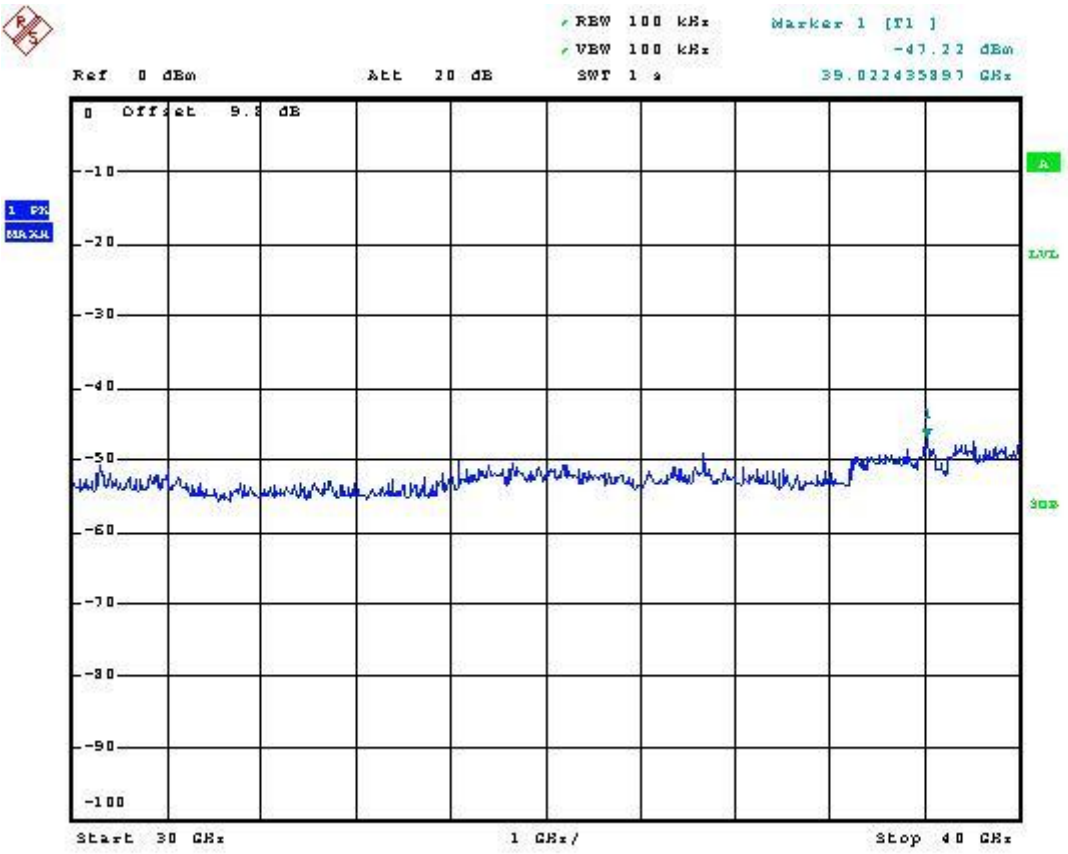
Frequency Range = 30 MHz ~ 40 GHz



802.11an_20MHz – channel 157

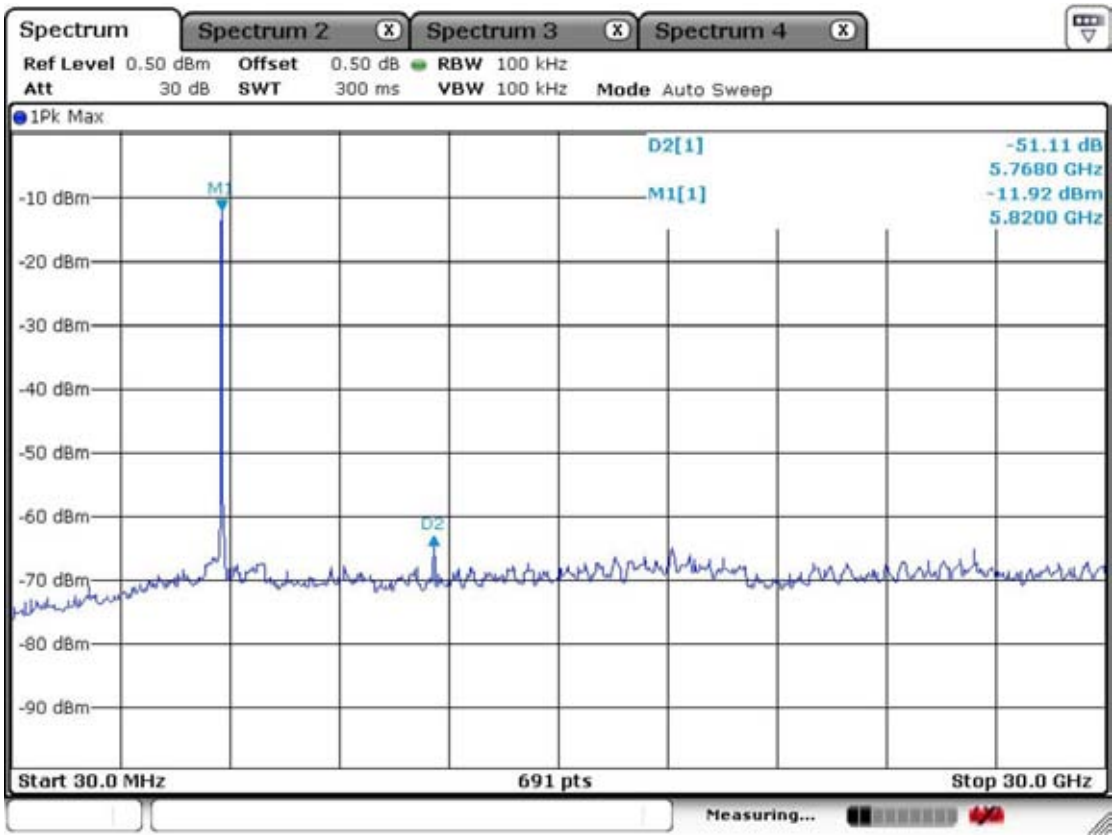
Frequency Range = 30 MHz ~ 40 GHz

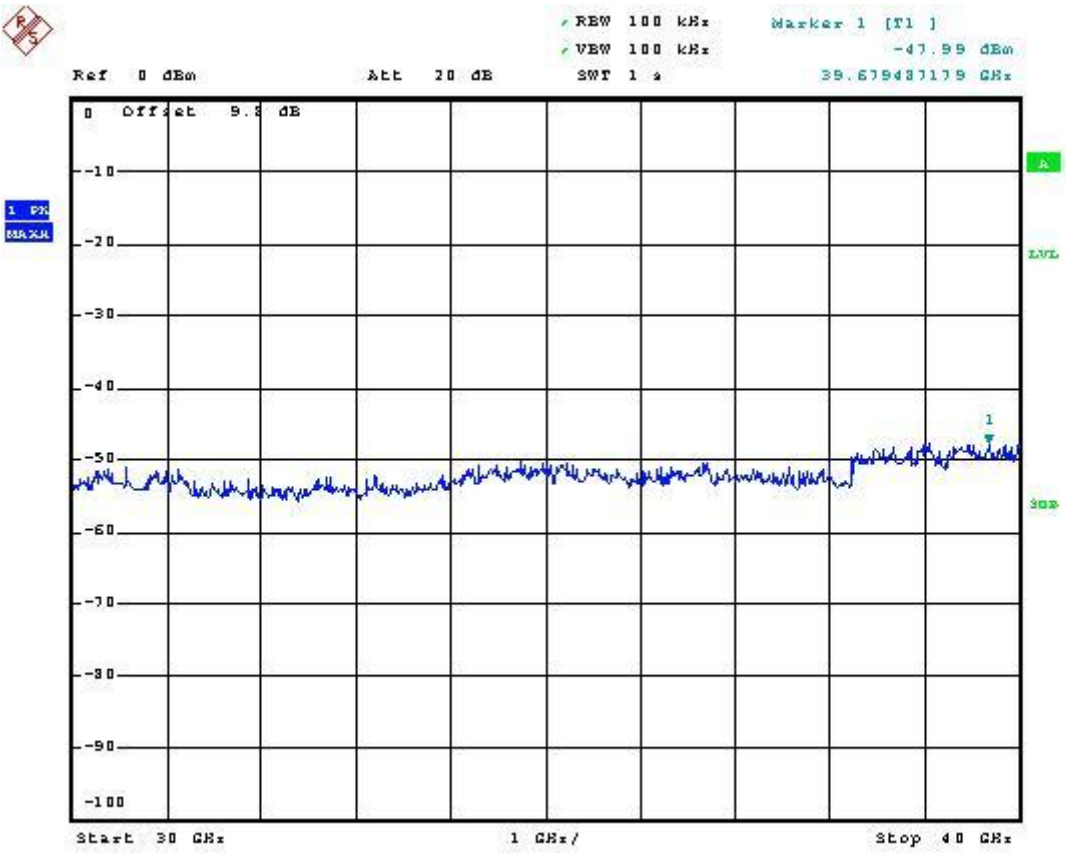




802.11an_20MHz –channel 165

Frequency Range = 30 MHz ~ 40 GHz





3.2.5 Field Strength of Harmonics

Procedure:

* The testing follows TCB Workshop 2012, April and fulfills ANSI C63.4-2003 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 ~ 10^{th} harmonic.

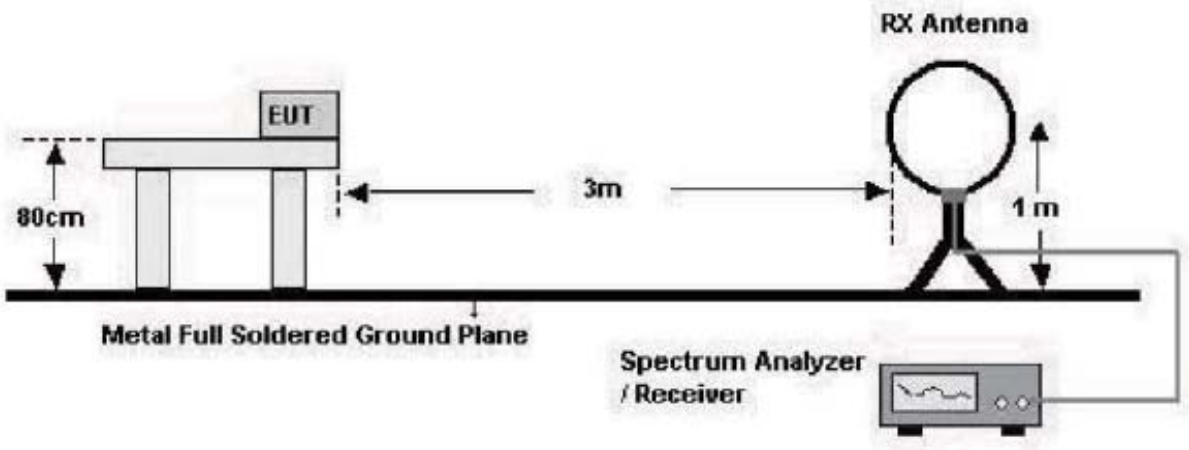
RBW = 120 kHz (9 KHz ~ 1 GHz) VBW ≥ RBW

= 1 MHz (1 GHz ~ 10^{th} harmonic)

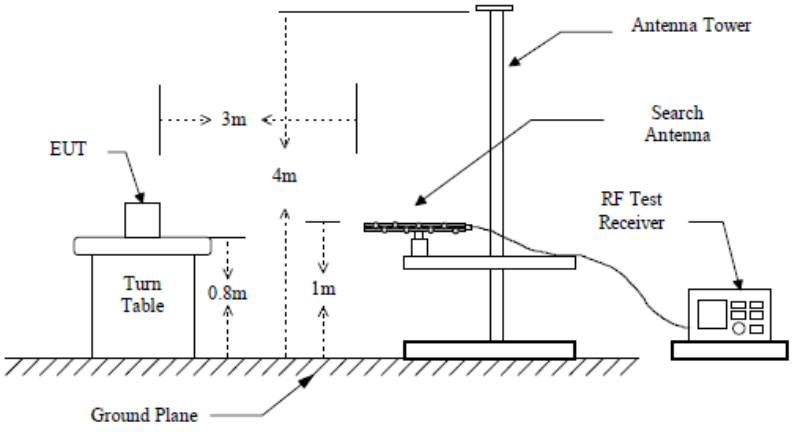
Span = 100 MHz Detector function = peak

Trace = max hold Sweep = auto

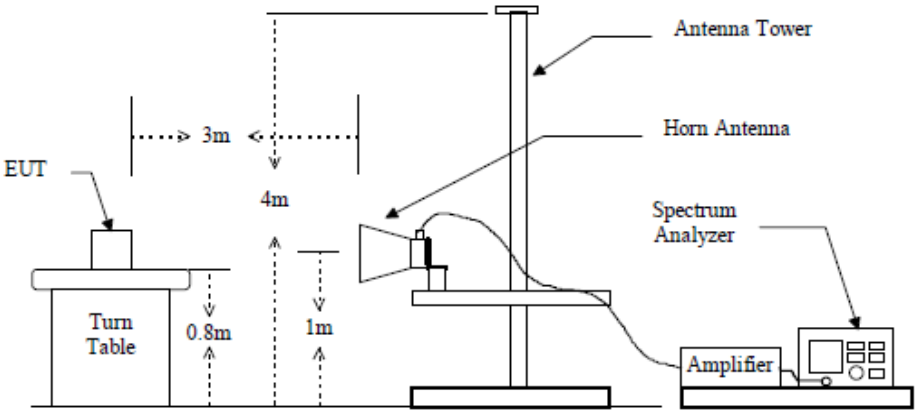
below 30MHz



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] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4824	46.1	62.3	H	33.1	31.2	54.0	74.0	48.0	64.2	6.0	9.8
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4874	45.8	61.6	H	33.1	31.2	54.0	74.0	47.7	63.5	6.3	10.5
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4924	45.6	61.2	H	33.1	31.2	54.0	74.0	47.5	63.1	6.5	10.9
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] 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] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4824	43.1	55.5	H	33.1	31.2	54.0	74.0	45.0	57.4	9.0	16.6
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4874	42.9	55.1	H	33.1	31.2	54.0	74.0	44.8	57.0	9.2	17.0
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4924	42.6	54.6	H	33.1	31.2	54.0	74.0	44.5	56.5	9.5	17.5
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] 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] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4825	42.1	53.6	H	33.1	31.2	54.0	74.0	44.0	55.5	10.0	18.5
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4874	41.7	52.5	H	33.1	31.2	54.0	74.0	43.6	54.4	10.4	19.6
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
4924	42.0	53.3	H	33.1	31.2	54.0	74.0	43.9	55.2	10.1	18.8
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor Antenna	Correction Factor Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] 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.

802.11a Measurement Data: (Above 1GHz)

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

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

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

Measurement Data: (9kHz - 30MHz)

Frequency	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
[MHz]	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.

802.11an_20MHz Measurement Data: (Above 1GHz)

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

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

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

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Correction Factor: Antenna	Correction Factor: Amp.Gain+Cable	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] 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.

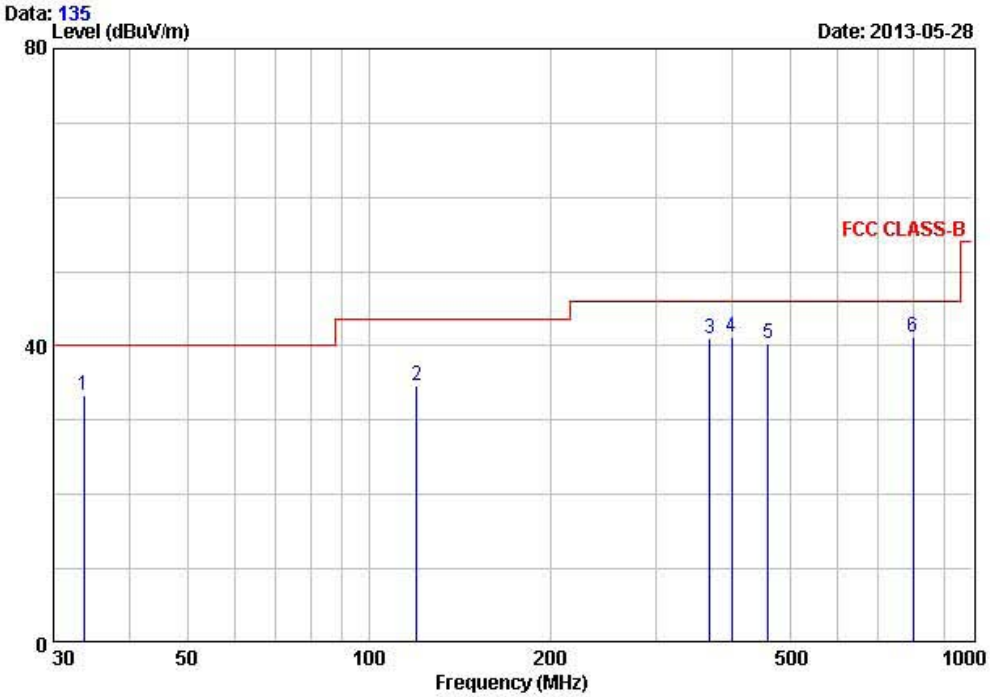
Radiated Emissions – Wi-Fi 2.4 GHz mode

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT/Model No.: HM45 TEST MODE: Wi-Fi 2.4 GHz mode

Temp Humi : 25 / 56 Tested by: PARK H W



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	33.64	50.50	-17.09	33.41	40.00	6.59	100	126	VERTICAL
2	120.03	50.10	-15.52	34.58	43.50	8.92	198	75	HORIZONTAL
3	368.00	47.10	-6.19	40.91	46.00	5.09	117	95	HORIZONTAL
4	400.00	46.30	-5.02	41.28	46.00	4.72	102	228	HORIZONTAL
5	459.93	43.30	-2.89	40.41	46.00	5.59	101	97	HORIZONTAL
6	800.04	34.30	6.96	41.26	46.00	4.74	101	117	HORIZONTAL

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

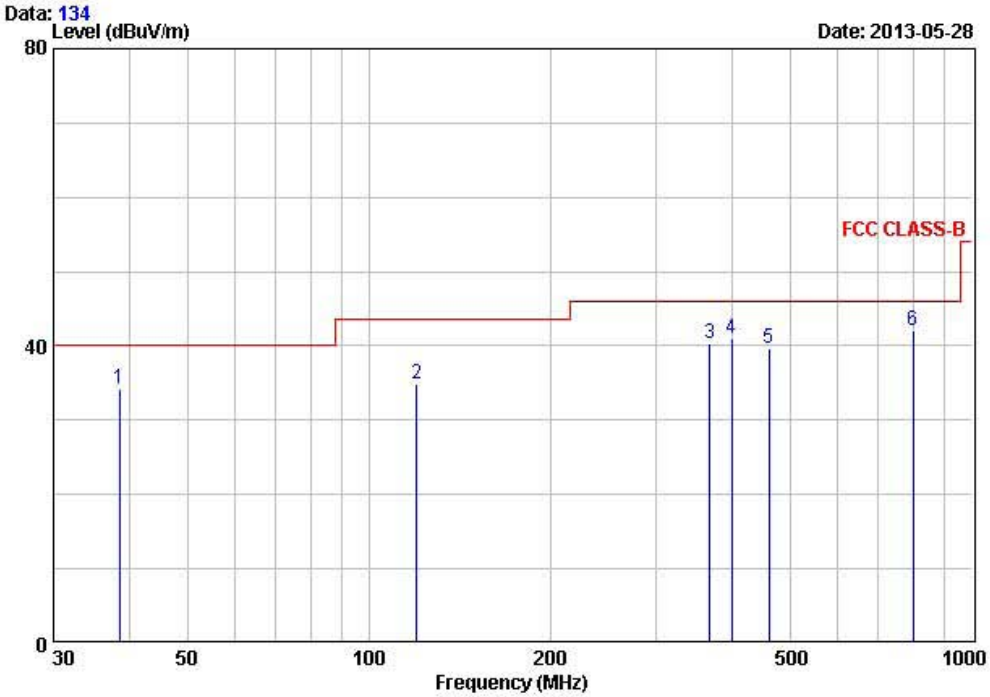
Radiated Emissions – Wi-Fi 5 GHz mode

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT/Model No.: HM45 TEST MODE: Wi-Fi 5 GHz mode

Temp Humi : 25 / 56 Tested by: PARK H W



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	38.63	50.60	-16.40	34.20	40.00	5.80	100	97	VERTICAL
2	120.00	50.30	-15.53	34.77	43.50	8.73	159	58	HORIZONTAL
3	368.20	46.50	-6.18	40.32	46.00	5.68	100	110	VERTICAL
4	400.02	45.90	-5.02	40.88	46.00	5.12	103	285	HORIZONTAL
5	460.42	42.50	-2.88	39.62	46.00	6.38	132	222	HORIZONTAL
6	800.06	35.10	6.96	42.06	46.00	3.94	100	97	HORIZONTAL

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

3.2.8 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

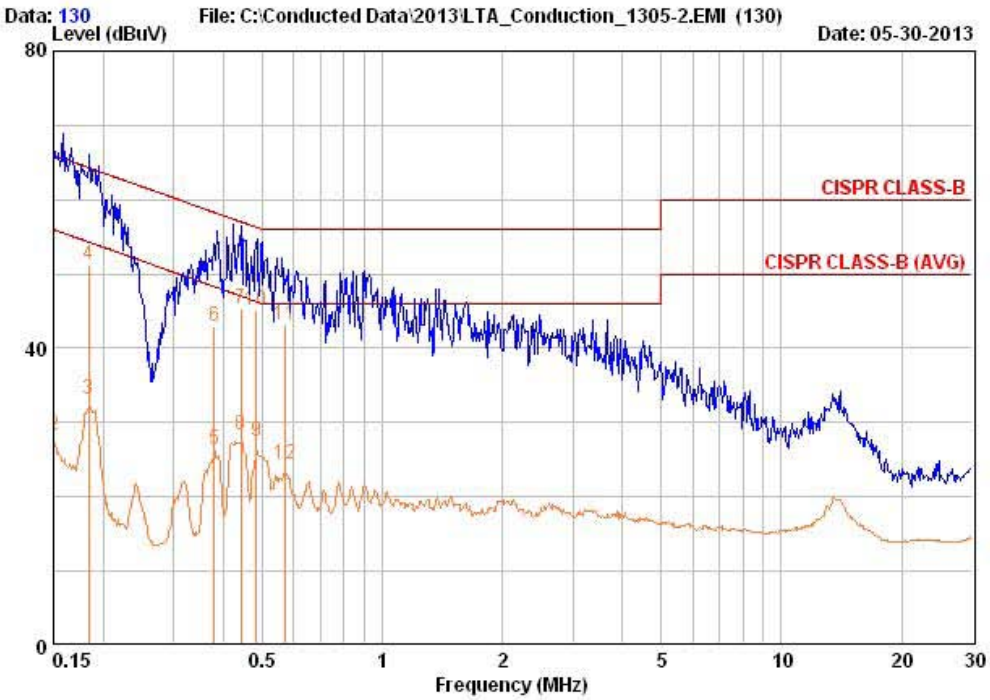
* Decreases with the logarithm of the frequency

Radiated Emissions – Wi-Fi 2.4 GHz mode - LINE

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT / Model No.	: HM45	Phase	: LINE
Test Mode	: Wi-Fi_2.4 GHz mode	Test Power	: 120 / 60
Temp./Humi.	: 21 / 62	Test Engineer	: PARK H W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	44.84	18.84	9.58	54.42	28.42	66.00	56.00	11.58	27.58
0.184	41.75	23.45	9.58	51.33	33.03	64.30	54.30	12.98	21.28
0.379	33.45	16.85	9.58	43.03	26.43	58.30	48.30	15.27	21.87
0.442	35.75	18.85	9.58	45.33	28.43	57.02	47.02	11.69	18.59
0.483	35.45	17.85	9.58	45.03	27.43	56.29	46.29	11.26	18.86
0.573	33.45	14.85	9.62	43.07	24.47	56.00	46.00	12.93	21.53

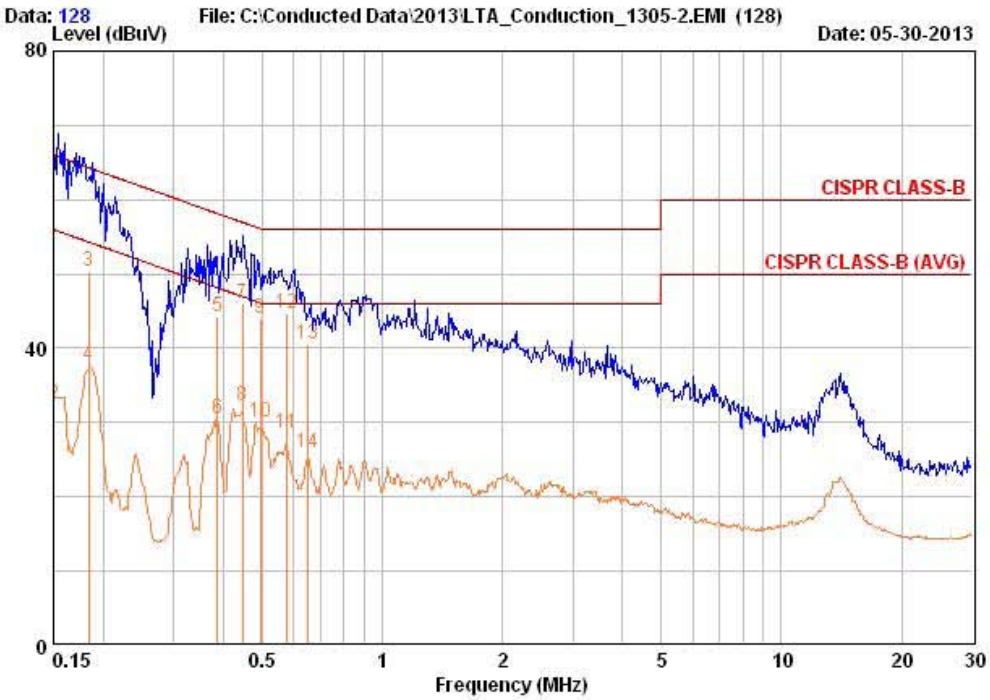
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

Radiated Emissions – Wi-Fi 2.4 GHz mode - NEUTRAL

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT / Model No.	: HM45	Phase	: NEUTRAL
Test Mode	: Wi-Fi_2.4 GHz mode	Test Power	: 120 / 60
Temp./Humi.	: 21 / 62	Test Engineer	: PARK H W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	45.74	22.94	9.62	55.36	32.56	66.00	56.00	10.64	23.44
0.184	40.75	28.15	9.59	50.33	37.73	64.30	54.30	13.97	16.57
0.387	34.75	20.85	9.60	44.35	30.45	58.13	48.13	13.78	17.68
0.446	36.45	22.75	9.62	46.07	32.37	56.95	46.95	10.88	14.58
0.494	34.35	20.45	9.63	43.98	30.08	56.10	46.10	12.12	16.02
0.576	35.15	18.85	9.61	44.76	28.46	56.00	46.00	11.24	17.54
0.650	30.85	16.45	9.59	40.44	26.04	56.00	46.00	15.56	19.96

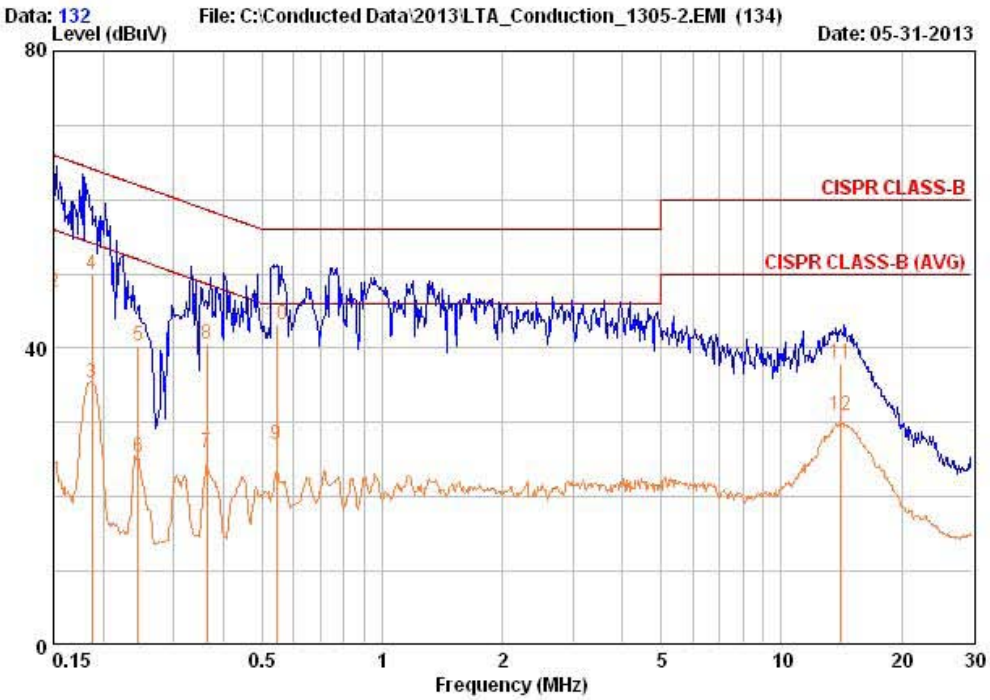
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

Radiated Emissions – Wi-Fi 5 GHz mode - LINE

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT / Model No.	: HM45	Phase	: LINE
Test Mode	: Wi-Fi_5GHz mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 46	Test Engineer	: PARK H W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	37.84	15.84	9.58	47.42	25.42	66.00	56.00	18.58	30.58
0.187	40.35	25.65	9.58	49.93	35.23	64.17	54.17	14.24	18.94
0.244	30.85	15.65	9.58	40.43	25.23	61.96	51.96	21.53	26.73
0.363	30.95	16.35	9.58	40.53	25.93	58.66	48.66	18.13	22.73
0.543	33.45	17.45	9.60	43.05	27.05	56.00	46.00	12.95	18.95
14.062	28.10	21.20	9.77	37.87	30.97	60.00	50.00	22.13	19.03

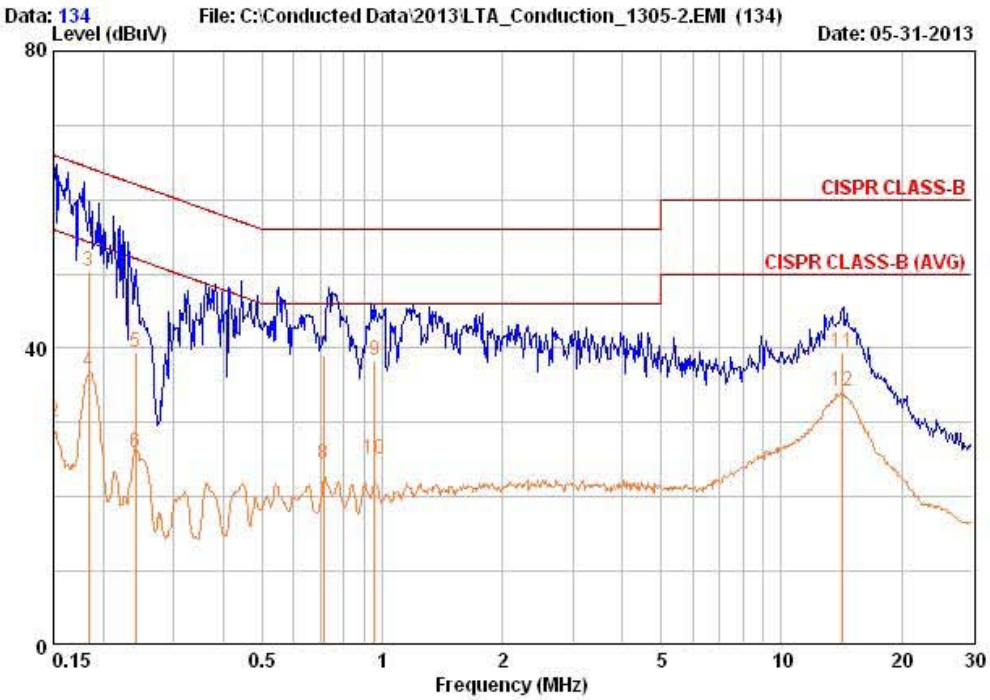
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

Radiated Emissions – Wi-Fi 5 GHz mode - NEUTRAL

LTA
Laboratory for Test & Approval Co.,Ltd.

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

EUT / Model No.	: HM45	Phase	: NEUTRAL
Test Mode	: Wi-Fi_5GHz mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 46	Test Engineer	: PARK H W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	37.44	20.44	9.62	47.06	30.06	66.00	56.00	18.94	25.94
0.184	40.85	27.35	9.59	50.43	36.93	64.30	54.30	13.87	17.37
0.241	29.85	16.45	9.58	39.43	26.03	62.06	52.06	22.63	26.03
0.712	29.45	14.75	9.58	39.03	24.33	56.00	46.00	16.97	21.67
0.958	28.75	15.45	9.58	38.33	25.03	56.00	46.00	17.67	20.97
14.212	29.51	24.41	9.92	39.42	34.32	60.00	50.00	20.58	15.68

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

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Expiration date of Calibration
1	Spectrum Analyzer	FSV-30	100757	R&S	2014-01-15
2	Spectrum Analyzer	FSQ40	200035	R&S	2014-02-11
3	Spectrum Analyzer	8594E	3649A03649	HP	2014-03-26
4	Spectrum Analyzer	8563E	3425A02505	HP	2014-03-26
5	VECTOR SIGNAL GENERATOR (~6GHz)	8648C	3623A02597	HP	2014-03-25
6	Signal Generator	83711B	US34490456	HP	2014-03-25
7	Attenuator (3dB)	8491A	37822	HP	2014-09-22
8	Attenuator (10dB)	8491A	63196	HP	2014-09-22
9	Test Receiver	ESHS10	828404/009	R&S	2014-03-25
10	EMI Test Receiver	ESCI7	100722	R&S	2013-09-22
11	RF Amplifier	8447D OPT 010	2944A07684	HP	2014-09-22
12	RF Amplifier	8449B	3008A02126	HP	2014-03-25
13	Horn Antenna (1~18GHz)	3115	114105	ETS	2014-01-26
14	DRG Horn (Small) (18~40GHz)	3116B	81109	ETS-Lindgren	2014-03-15
15	DRG Horn (Small) (18~40GHz)	3116B	133350	ETS-Lindgren	2014-03-15
16	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2014-09-20
17	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2013-10-12
18	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
19	Power Divider	11636A	06243	HP	2014-09-22
20	DC Power Supply	6674A	3637A01657	Agilent	-
21	Frequency Counter	5342A	2826A12411	HP	2014-03-25
22	Power Meter	EPM-441A	GB32481702	HP	2014-03-25
23	Power Sensor	8481A	US41030291	HP	2013-09-22
24	Audio Analyzer	8903B	3729A18901	HP	2013-09-22
25	Modulation Analyzer	8901B	3749A05878	HP	2013-09-22
26	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	2013-09-22
27	Stop Watch	HS-3	601Q09R	CASIO	2014-03-26
28	LISN	ENV216	100408	R&S	2013-09-22
29	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2014-06-27
30	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-
31	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-
32	Active Loop Antenna	FMZB 1519	1519-031	SCHWARZBECK	2014-12-14