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Dates of Tests : Nov 25~Dec 02 2010
 Test Report S/N: LR500111012A
 Test Site : LTA CO., LTD

CERTIFICATION OF COMPLIANCE

FCC ID.

RQKWUBR-506N

APPLICANT

Sammi Information Systems Co., Ltd.

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	Wireless LAN Module
Manufacturer	:	SparkLAN Communications, Inc.
Model name	:	WUBR-506N
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
	:	5745MHz ~ 5825MHz for 802.11a/an
Max. Output Power	:	Max 15.32dBm - Conducted (802.11b)
	:	Max 14.19dBm - Conducted (802.11g)
	:	Max 19.11dBm - Conducted (802.11n_20MHz)
	:	Max 18.35dBm - Conducted (802.11n_40MHz)
	:	Max 15.51dBm - Conducted (802.11a)
	:	Max 15.98dBm - Conducted (802.11an_20MHz)
	:	Max 15.97dBm - Conducted (802.11an_40MHz)
Data of issue	:	December 3, 2010

This test report is issued under the authority of:

The test was supervised by:

Kyung-Taek LEE, Technical Manager

Hyun-Chae You, 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

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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	2011-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Applicant

Company name : Sammi Information Systems Co., Ltd.
 Address : 11F Kolon Aston Bldg, 505-14, Gasan-dong, Guemcheon-Gu,
 Seoul, 153-803 KOREA
 Tel / Fax : +82 2 790-5505/ +82 2 797-9206

2-2 Manufacturer

Company name : SparkLAN Communications, Inc.
 Address : 8F, No.257, Sec.2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan
 Tel / Fax : +886-2-2659-1880/ +886-2-2659-5538

2-3 Equipment Under Test (EUT)

Trade name : Wireless LAN Module
 FCC ID : RQKWUBR-506N
 Model name : WUBR-506N
 Serial number : Identical prototype
 Date of receipt : November 25, 2010
 EUT condition : Pre-production, not damaged
 Antenna type : Dipole antenna with Max. 2.5dBi gain
 Frequency Range : 2412MHz ~ 2462MHz for 802.11b/g/n
 : 5745MHz ~ 5825MHz for 802.11a/an
 RF output power : Max 15.32dBm - Conducted (802.11b)
 : Max 14.19dBm - Conducted (802.11g)
 : Max 19.11dBm - Conducted (802.11n_20MHz)
 : Max 18.35dBm - Conducted (802.11n_40MHz)
 : Max 15.51dBm - Conducted (802.11a)
 : Max 15.98dBm - Conducted (802.11an_20MHz)
 : Max 15.97dBm - Conducted (802.11an_40MHz)
 Number of channels : 13 for 802.11b & 802.11g & 802.11n_20MHz
 : 11 for 802.11n_40MHz
 : 5 for 802.11a & 802.11an_20MHz
 : 2 for 802.11an_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 & 802.11a
 : Up to 300.0Mbps
 Power Source : DC 3.3V by main system

2-4 Tested frequency

	LOW	MID	HIGH
Frequency (MHz) for 802.11b/g/n20	2412	2437	2462
Frequency (MHz) for 802.11n40	2422	2437	2452
Frequency (MHz) for 802.11a/an20	5745	5785	5825
Frequency (MHz) for 802.11an40	5755	-	5795

2-5 Ancillary Equipment

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

2-6 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		

7 channels are provided for 802.11n_40MHz

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	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		

2 channels are provided for 802.11an_40MHz

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	165	5825MHz

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	NA ^{note3}
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.

Note 3: This device is only operated by DC

→ Antenna Requirement

The Sammi Information Systems Co., Ltd. FCC ID: RQKWUBR-506N unit complies with the requirement of §15.203. The antenna connector is the reverse polarity SMA connector.

The sample was tested according to the following specification:
FCC Parts 15.247; ANSI C-63.4-2003

3.2 Technical Characteristics Test

3.2.1 6 dB Bandwidth

Procedure:

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 = 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	10.51	Complies
	2437	6	11.25	Complies
	2462	11	11.20	Complies
802.11g	2412	1	16.54	Complies
	2437	6	16.59	Complies
	2462	11	16.59	Complies
802.11n _20MHz	2412	1	17.76	Complies
	2437	6	17.71	Complies
	2462	11	17.76	Complies
802.11n _40MHz	2422	1	36.30	Complies
	2437	4	36.30	Complies
	2452	7	36.21	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	16.67	Complies
	5785	157	16.67	Complies
	5825	165	16.59	Complies
802.11an _20MHz	5745	149	17.76	Complies
	5785	157	17.76	Complies
	5825	165	17.71	Complies
802.11an _40MHz	5745	149	36.47	Complies
	5825	165	36.56	Complies

- See next pages for actual measured spectrum plots.

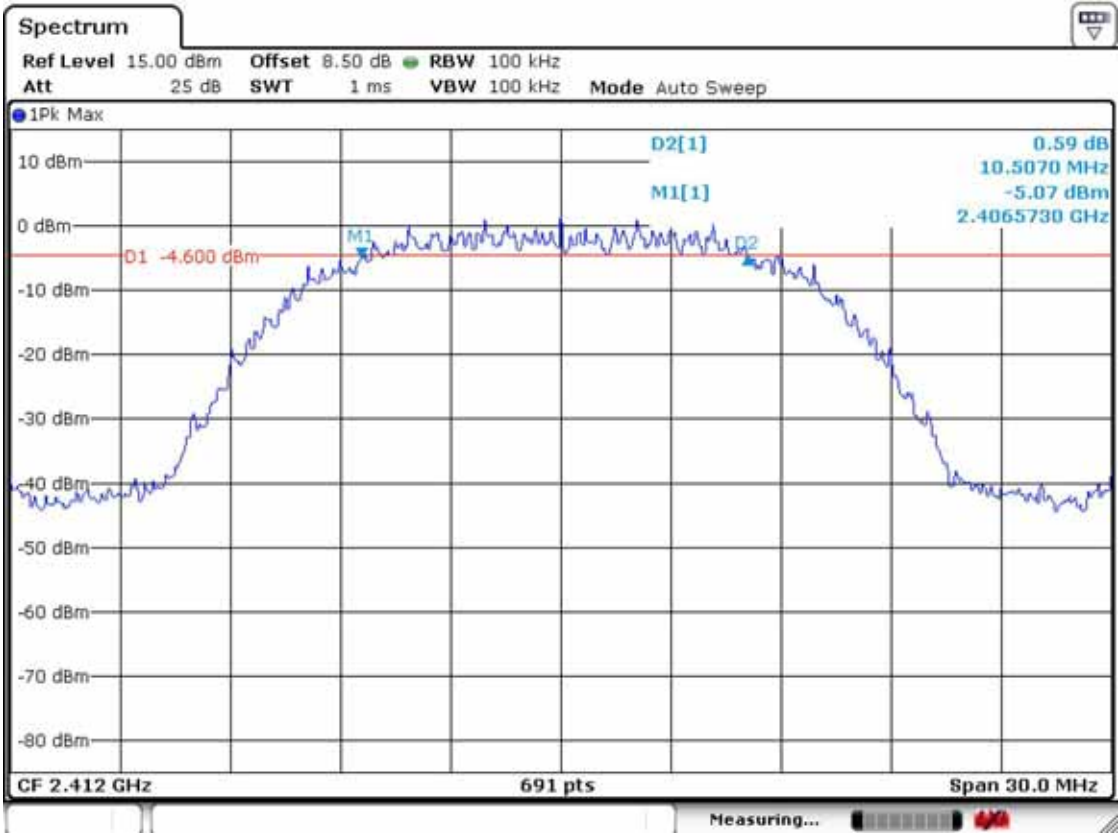
Minimum Standard:

6 dB Bandwidth > 500kHz

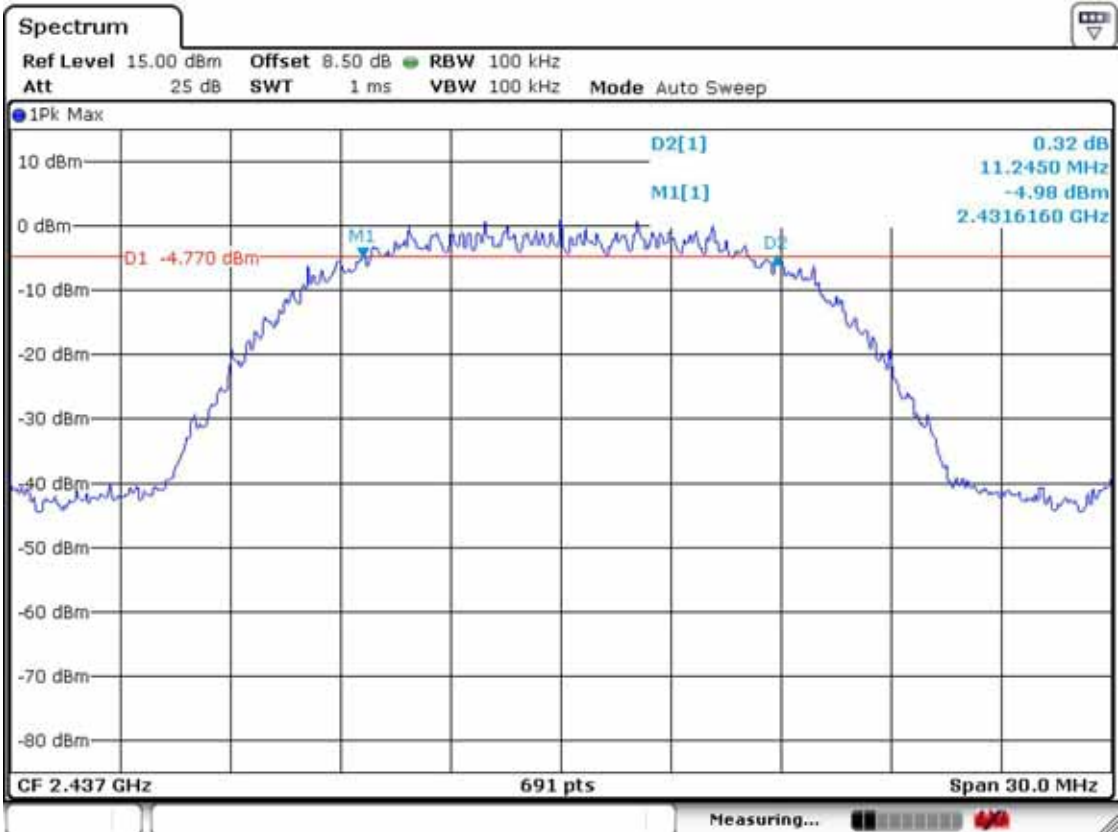
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

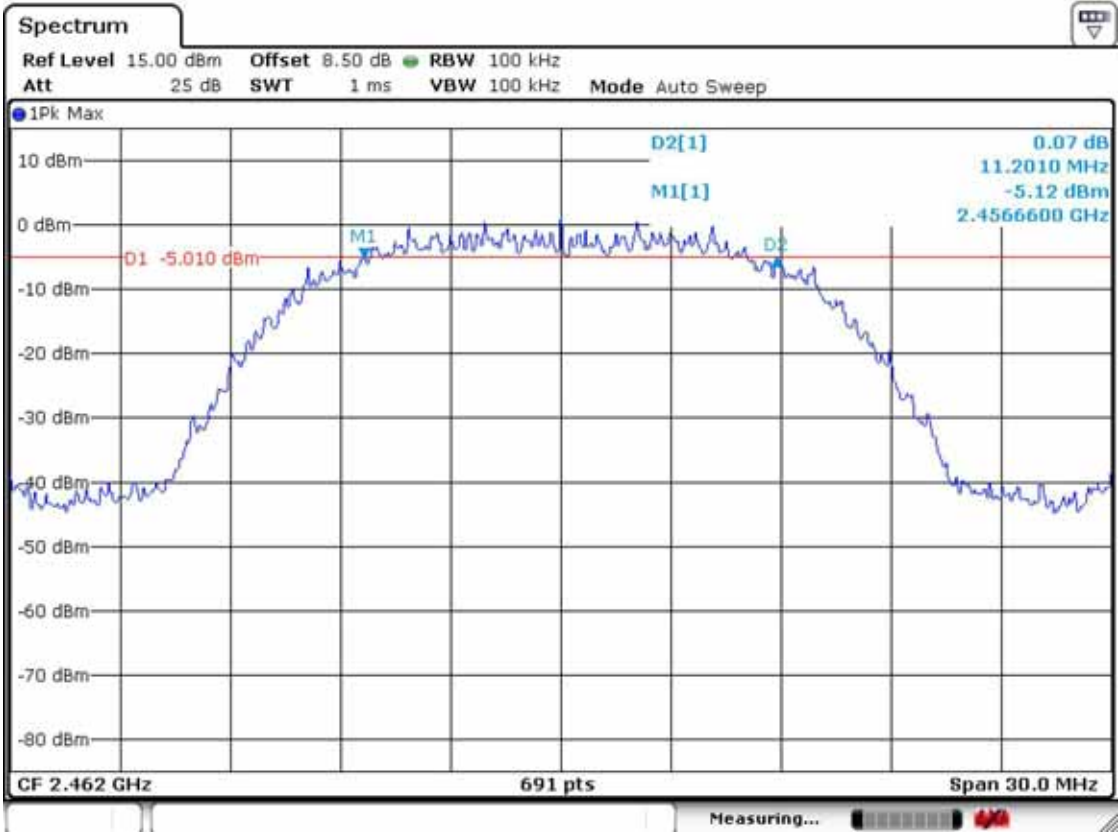
802.11b
CH 1



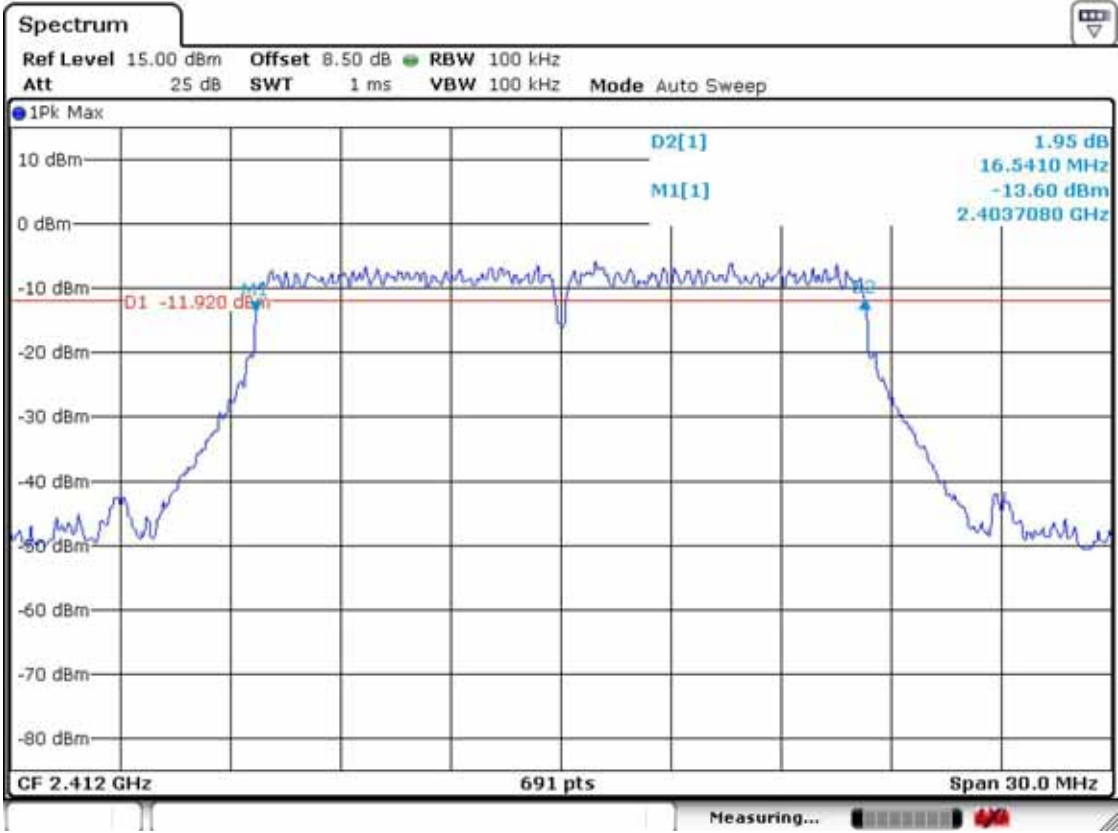
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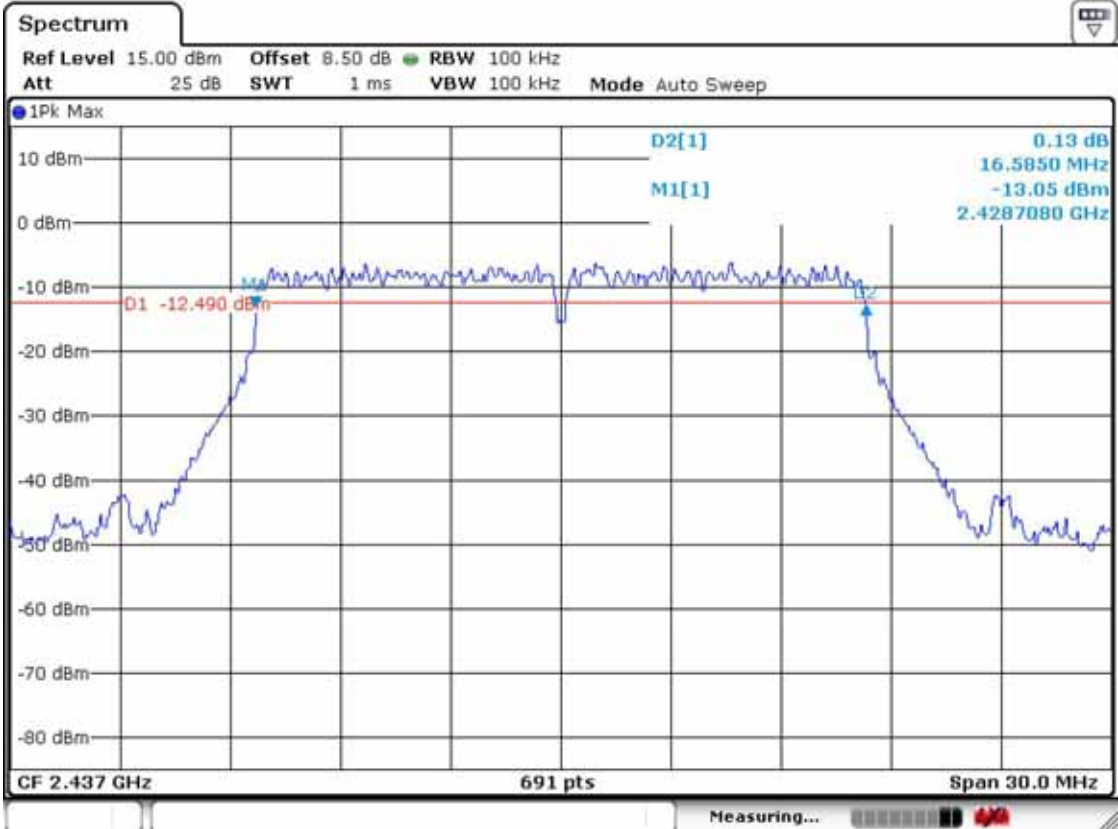
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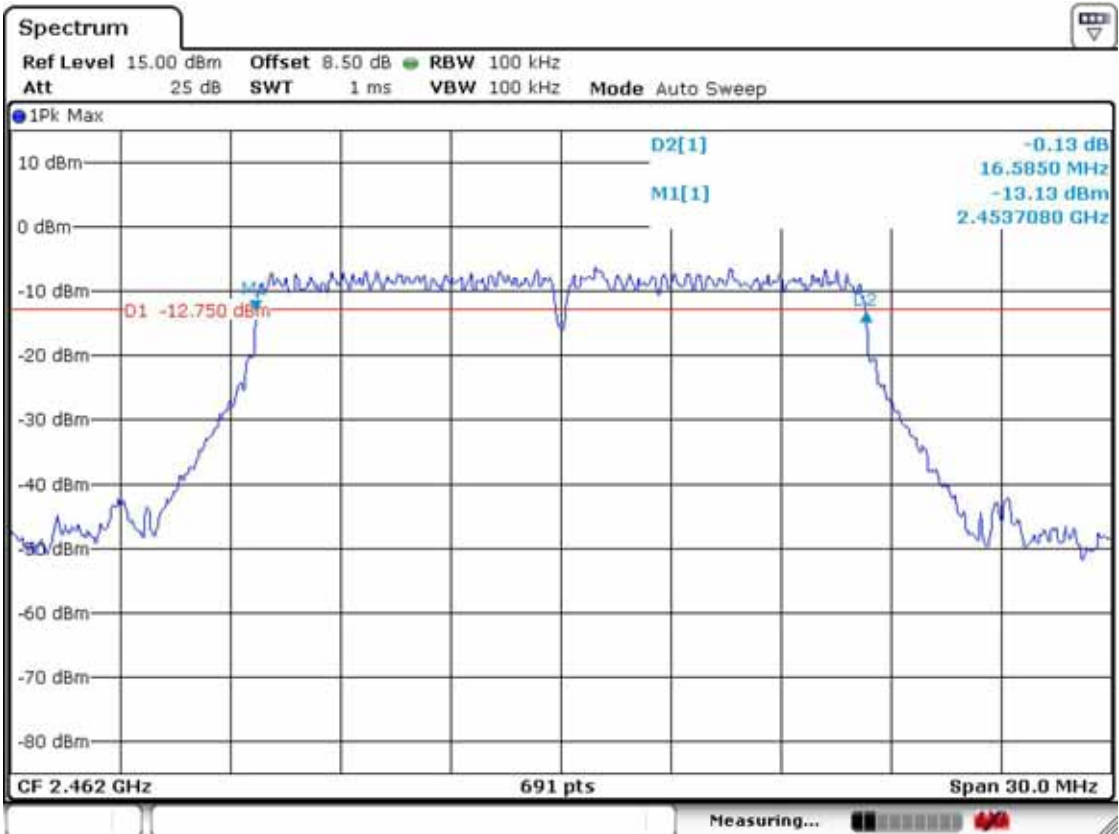
802.11g
CH 1



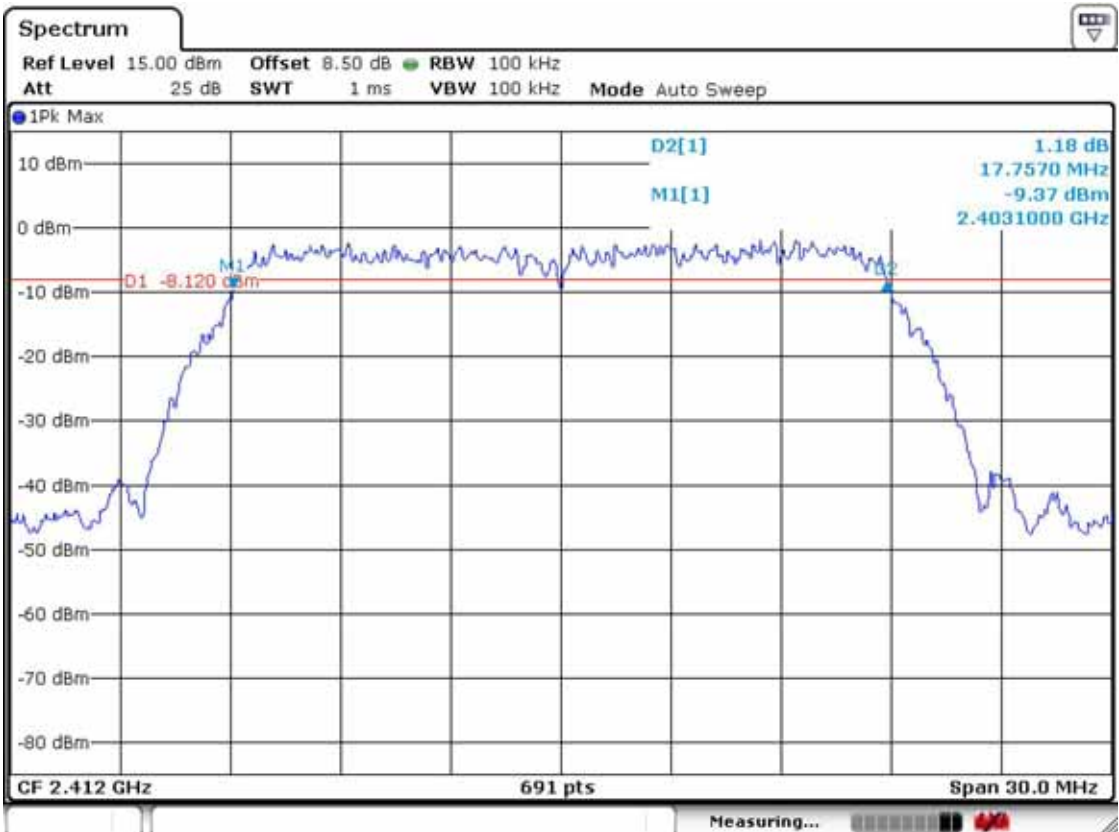
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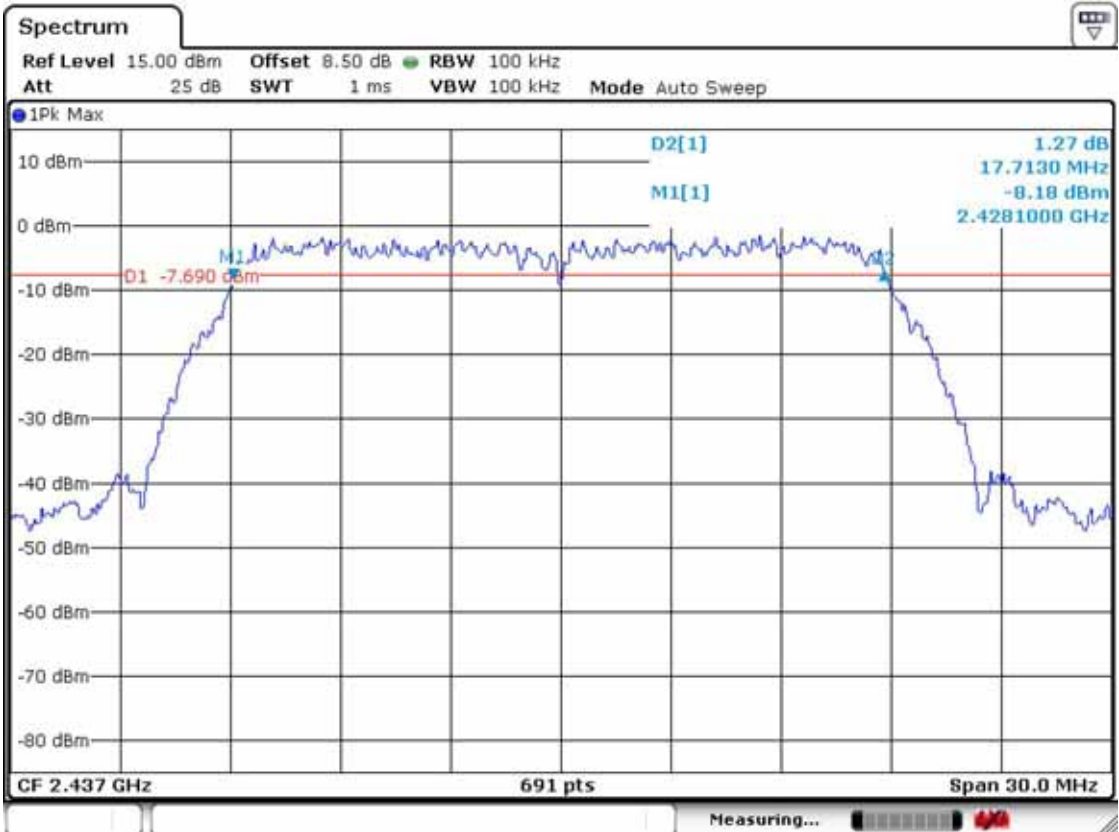
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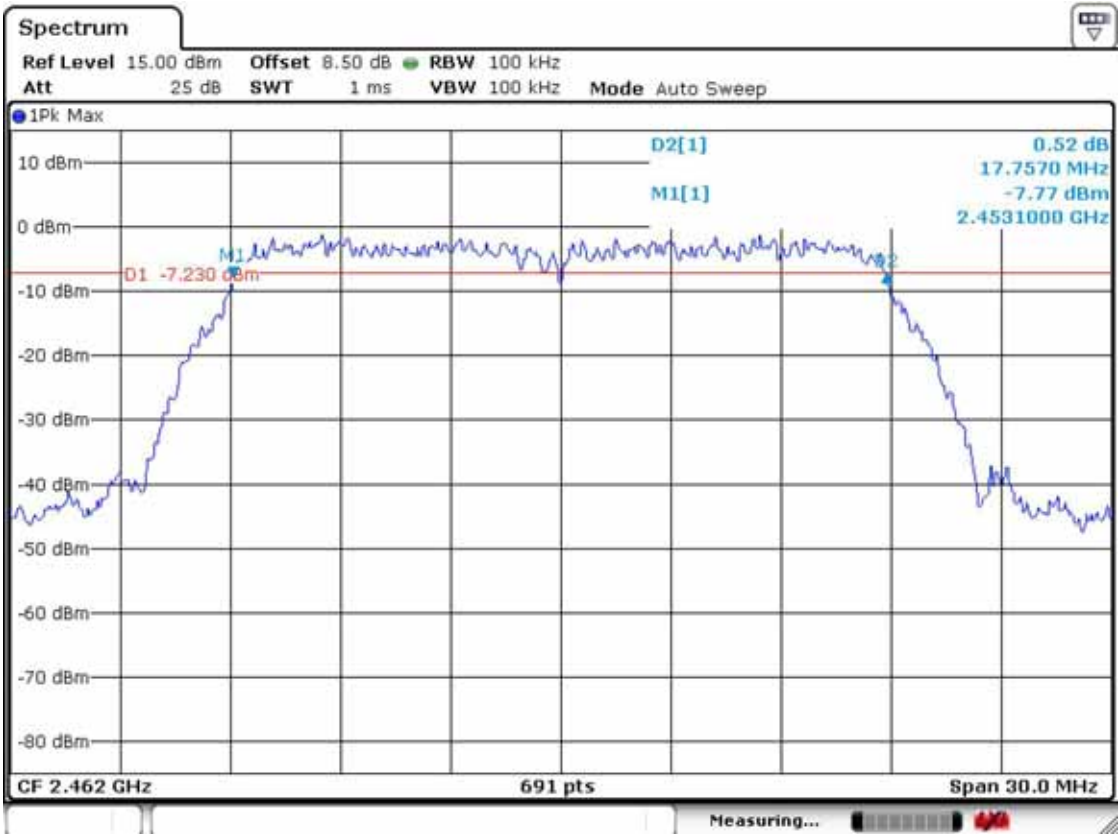
802.11n_20MHz
CH 1



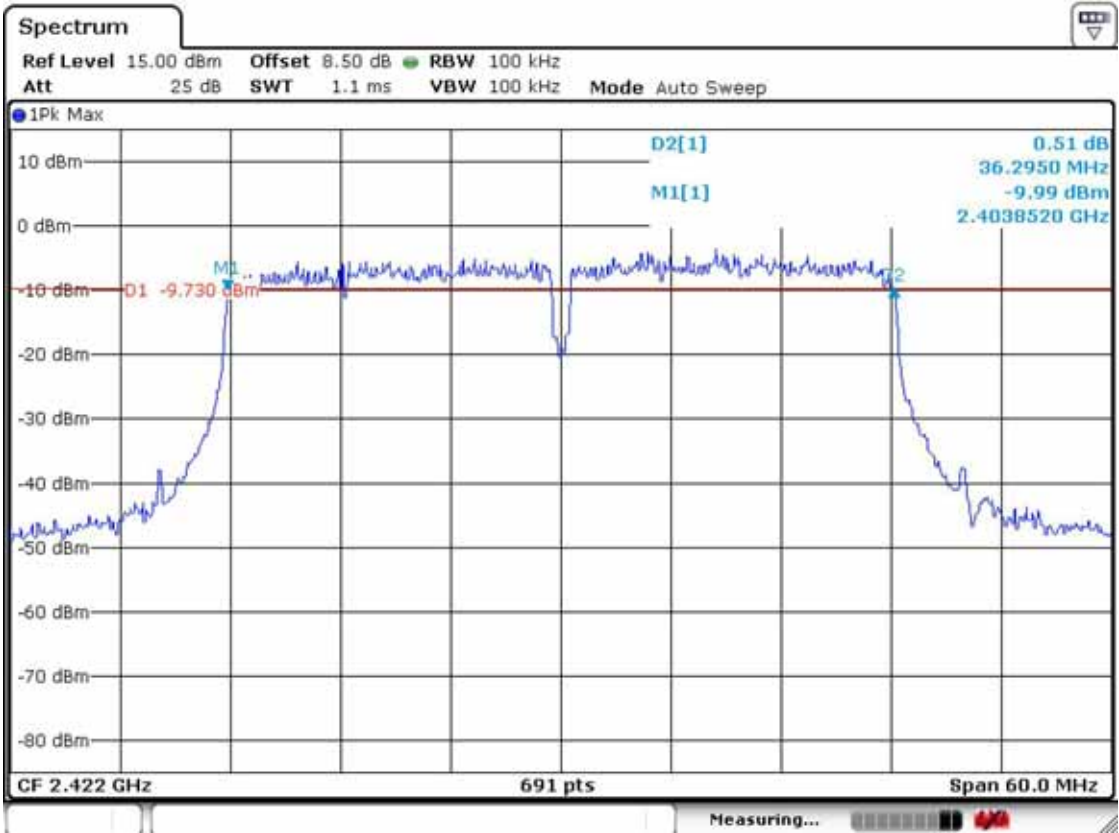
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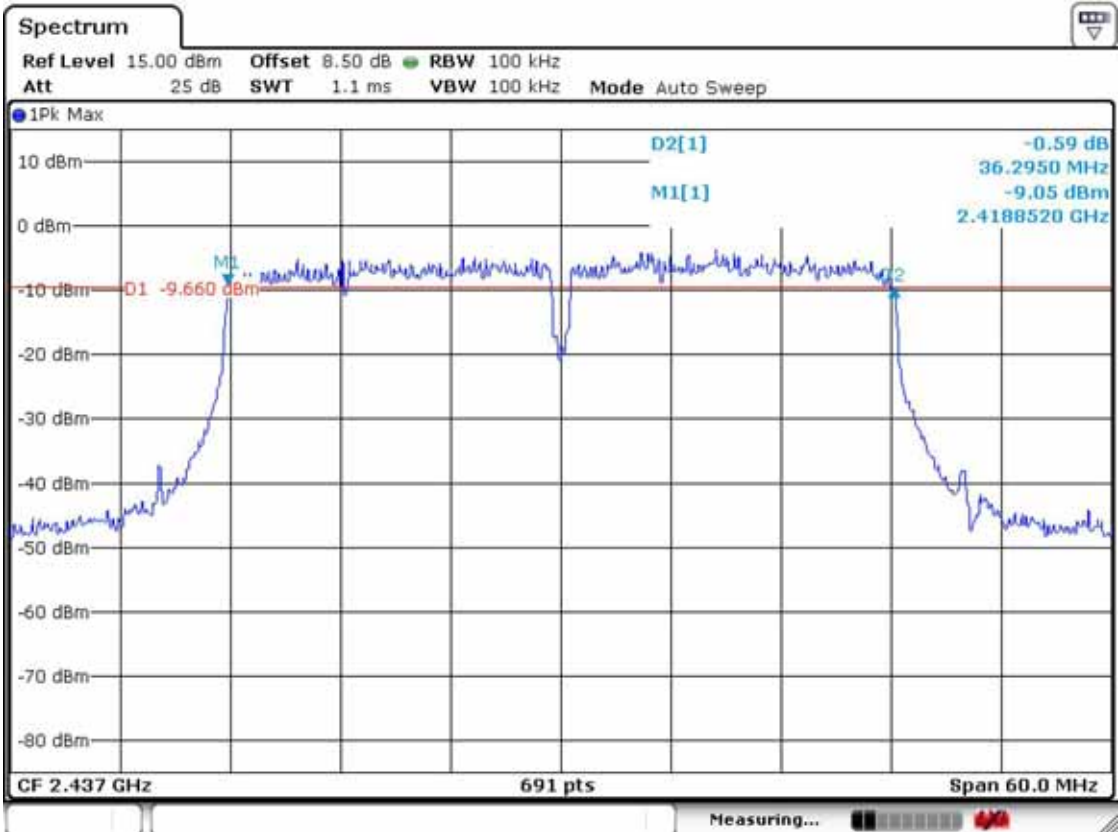
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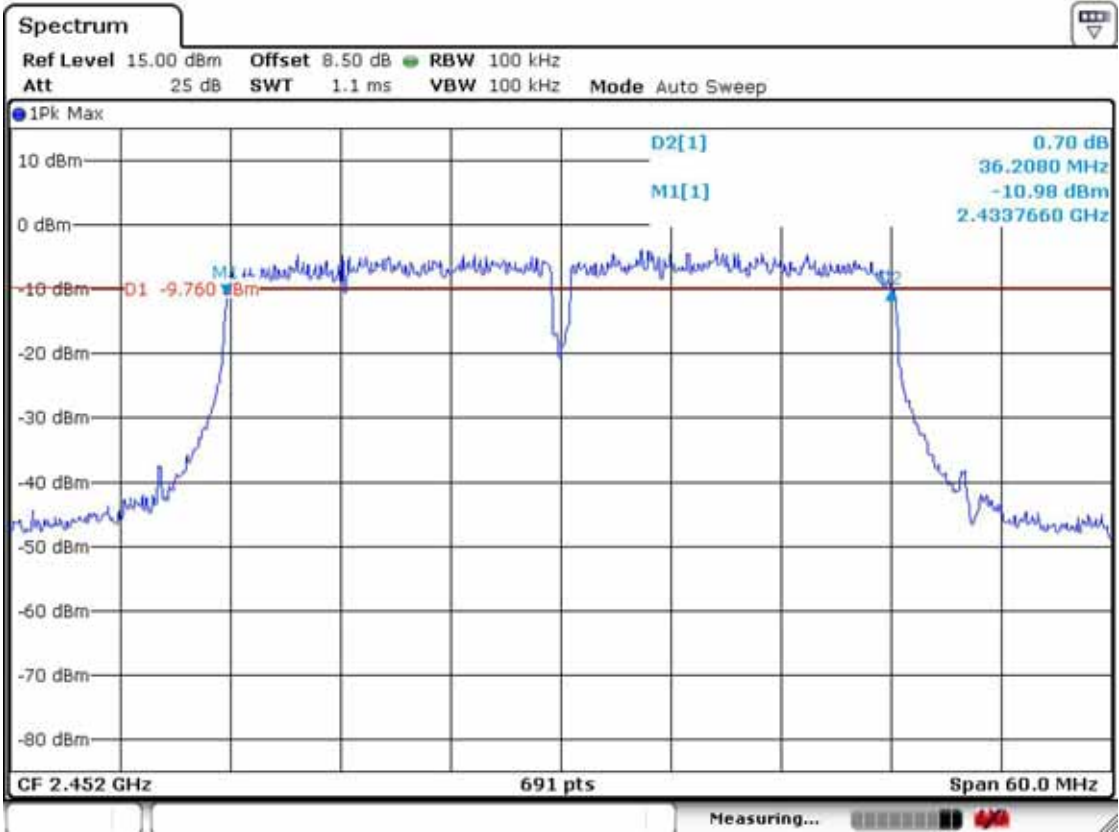
802.11n_40MHz
CH 1



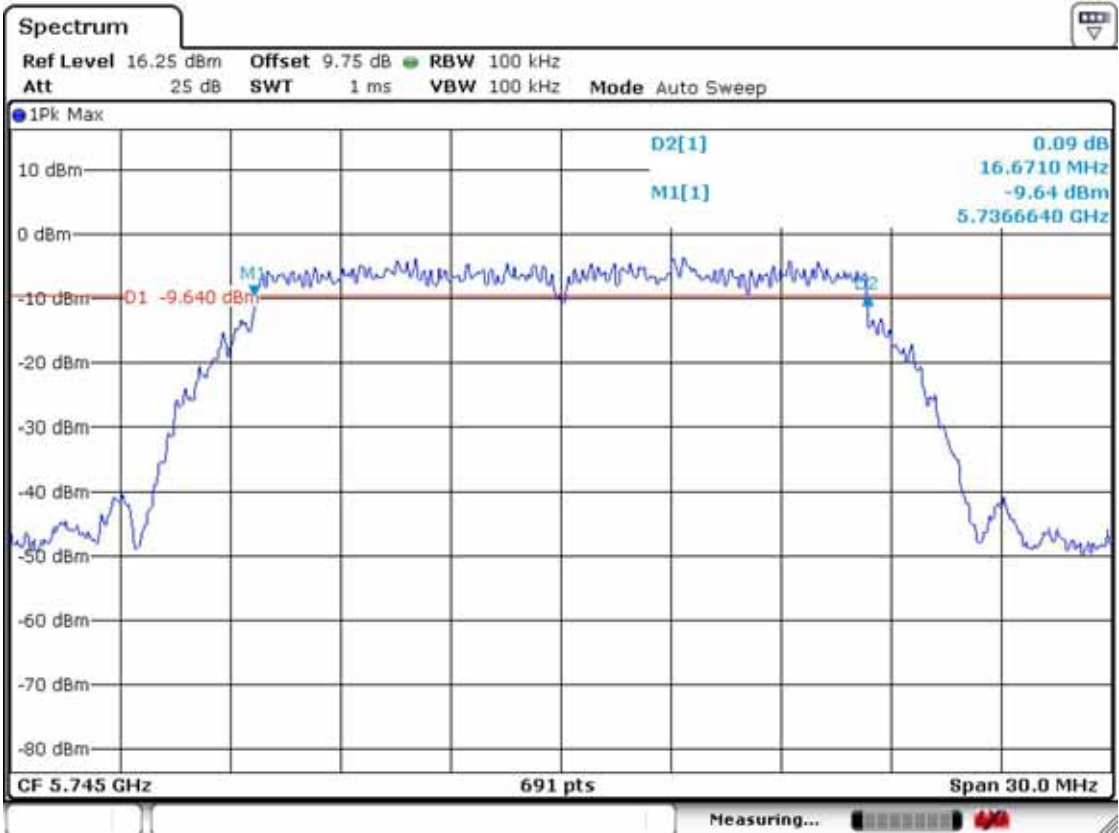
CH 4



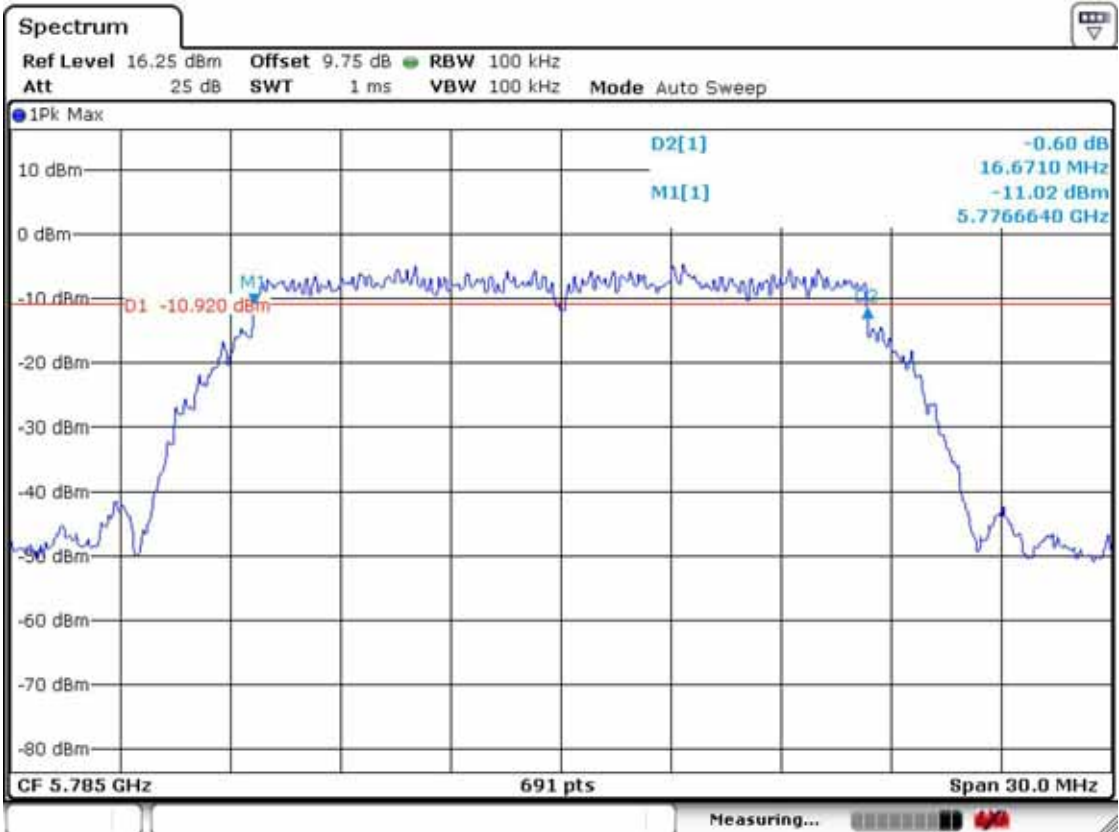
CH 7



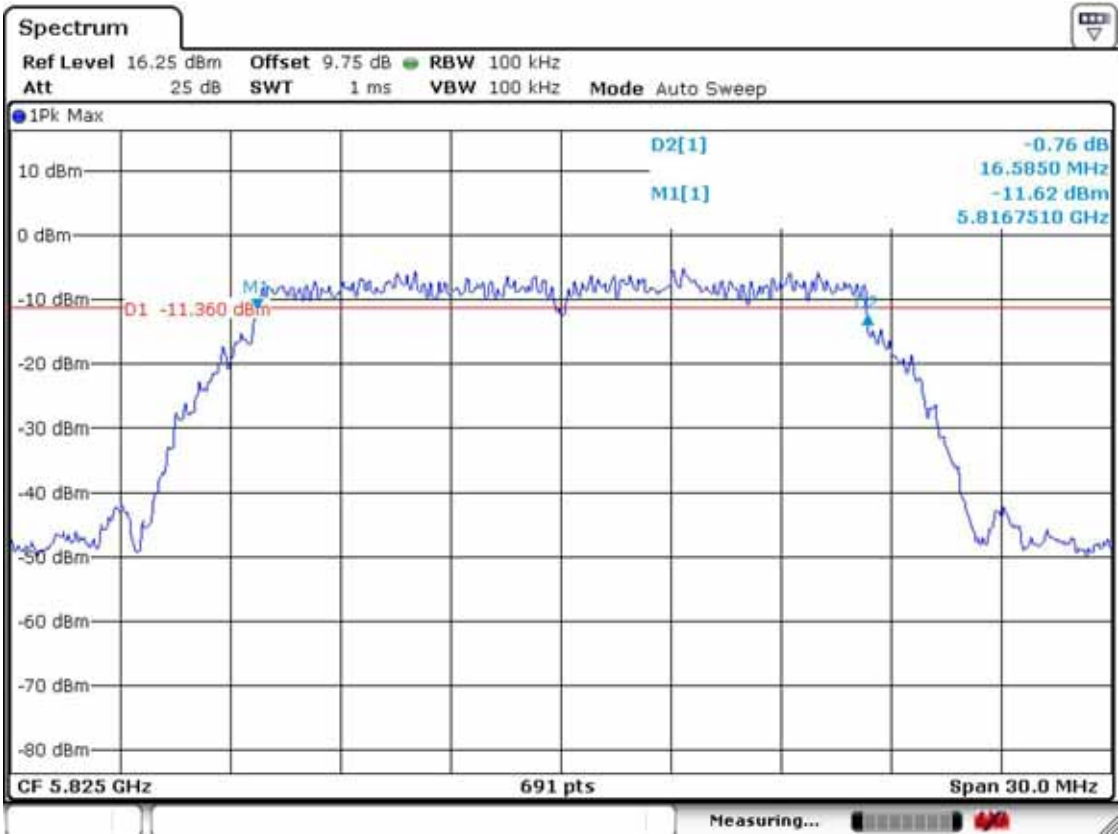
802.11a
CH 149



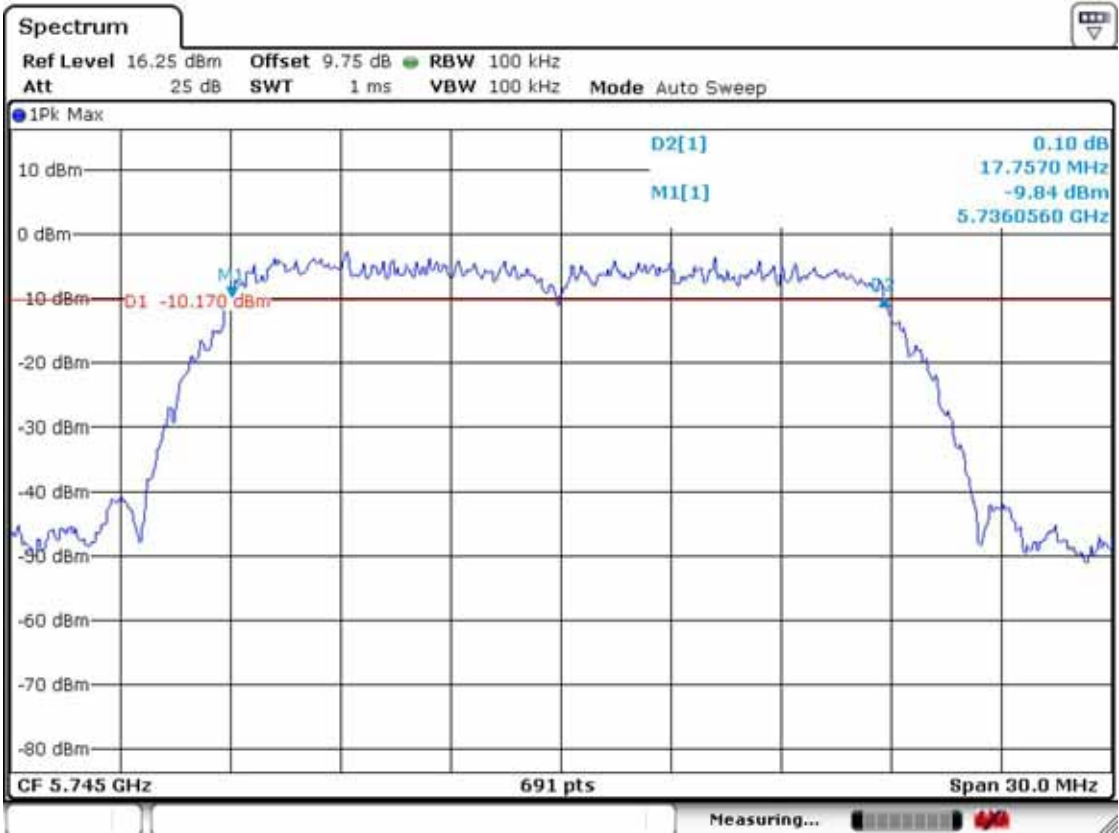
CH 157



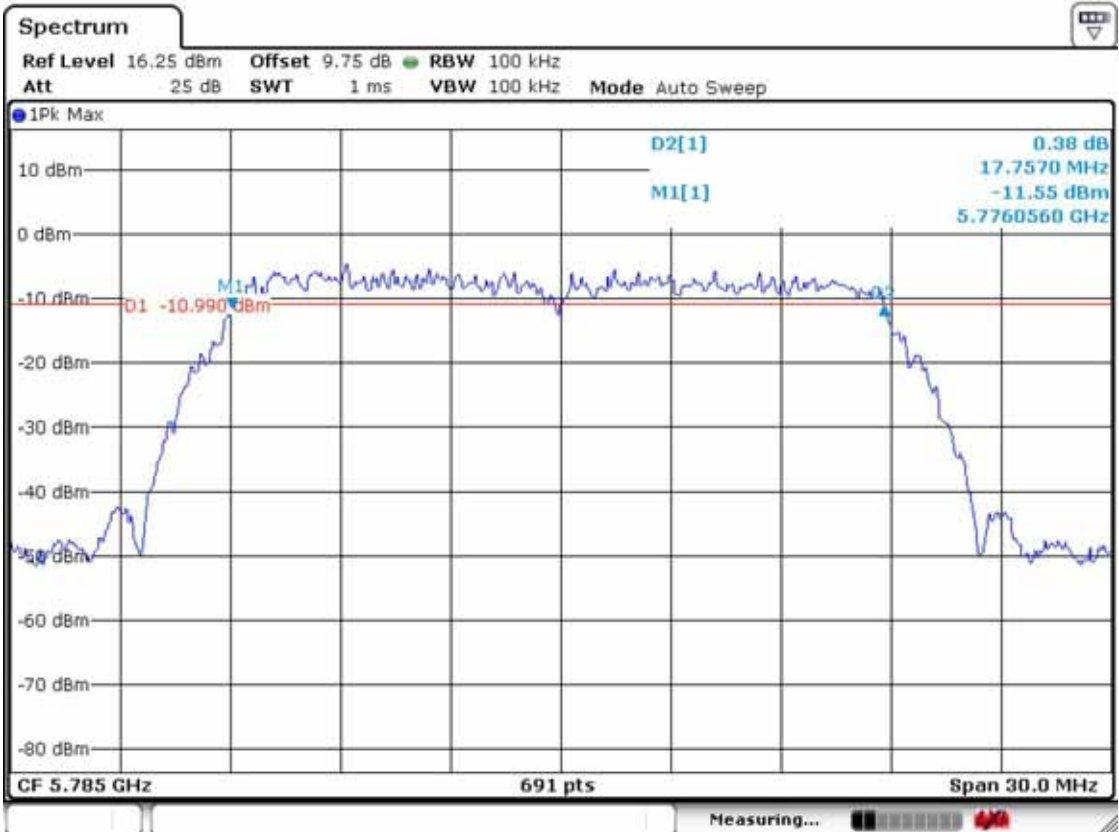
CH 165



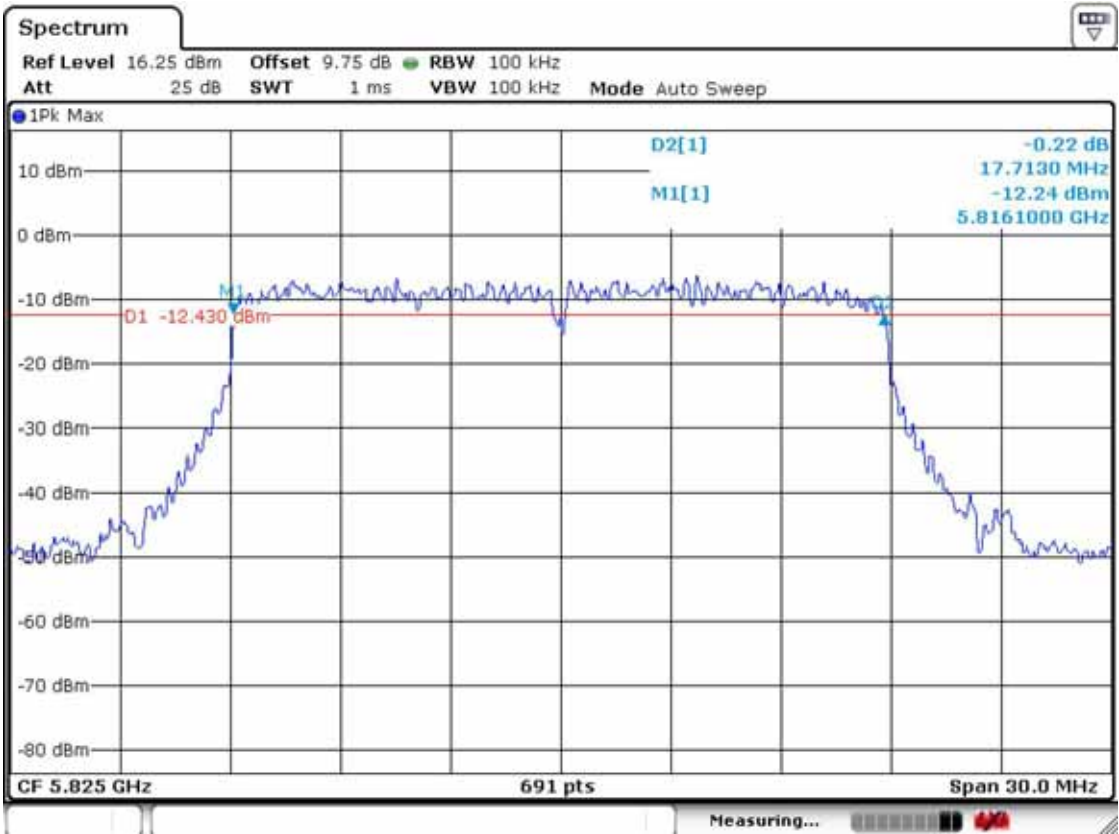
802.11an_20MHz
CH 149



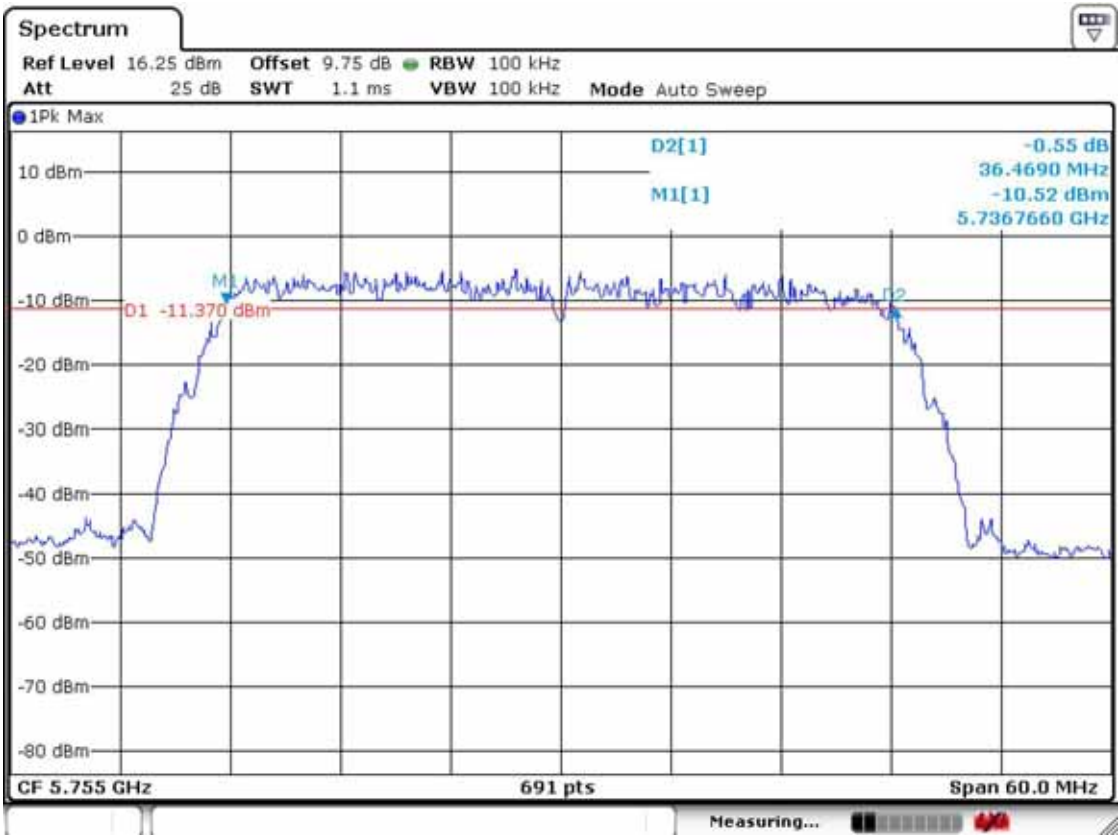
CH 157



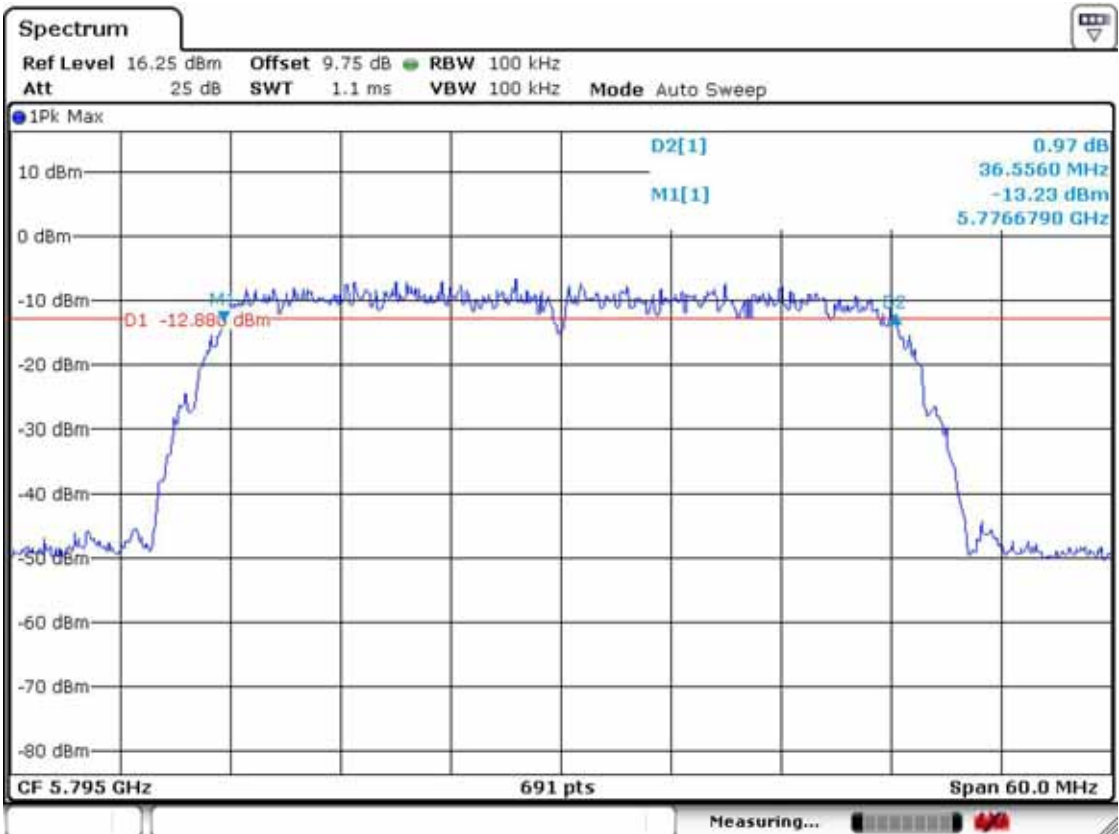
CH 165



802.11an_40MHz
CH 151



CH 159



3.2.2 Peak Output Power Measurement

Procedure:

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 = 3MHz (VBW $\geq$ RBW)

Sweep = auto

Detector function = peak

Measurement Data: 2.4GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	15.31	Complies
	2437	6	15.40	Complies
	2462	11	15.32	Complies
802.11g	2412	1	14.01	Complies
	2437	6	13.91	Complies
	2462	11	14.19	Complies
802.11n _20MHz	2412	1	17.95	Complies
	2437	6	18.83	Complies
	2462	11	19.11	Complies
802.11n _40MHz	2422	1	17.59	Complies
	2437	4	18.09	Complies
	2452	7	18.35	Complies

Measurement Data: 5.0GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11a	5745	149	15.51	Complies
	5785	157	14.44	Complies
	5825	165	13.87	Complies
802.11an _20MHz	5745	149	15.98	Complies
	5785	157	14.37	Complies
	5825	165	13.68	Complies
802.11an _40MHz	5745	149	15.97	Complies
	5825	165	14.62	Complies

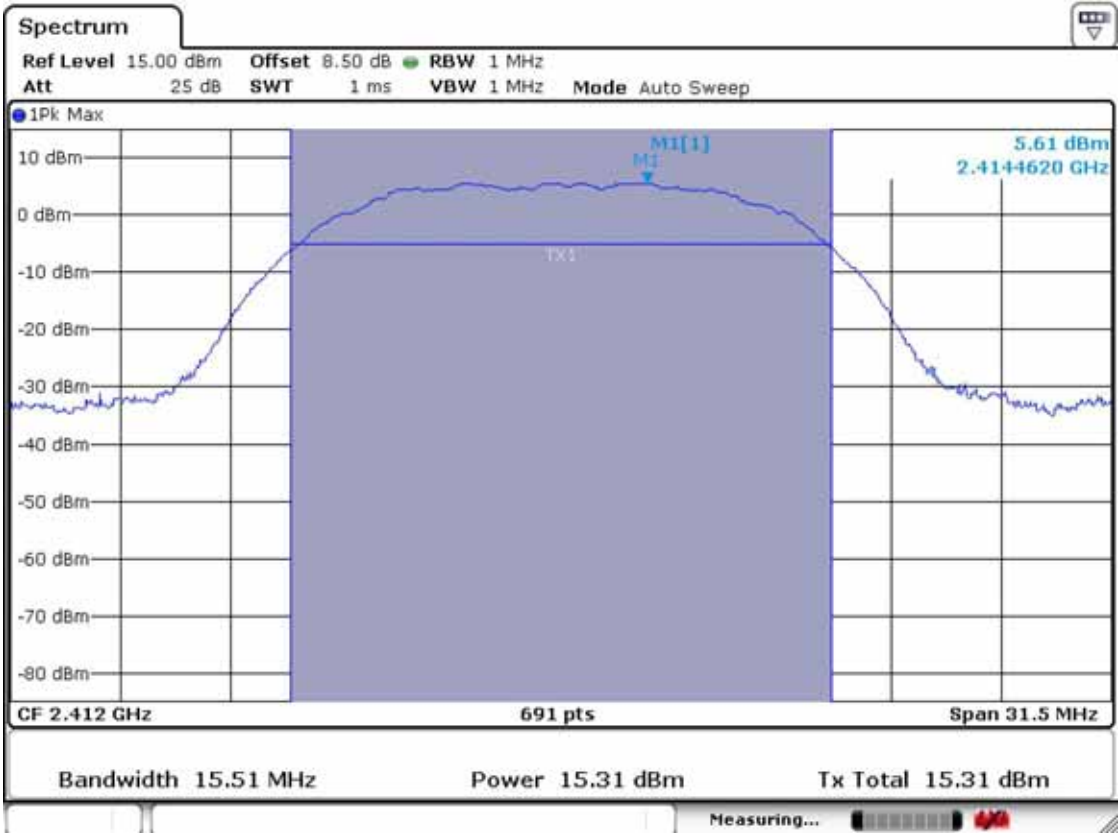
- See next pages for actual measured spectrum plots.

Minimum Standard:

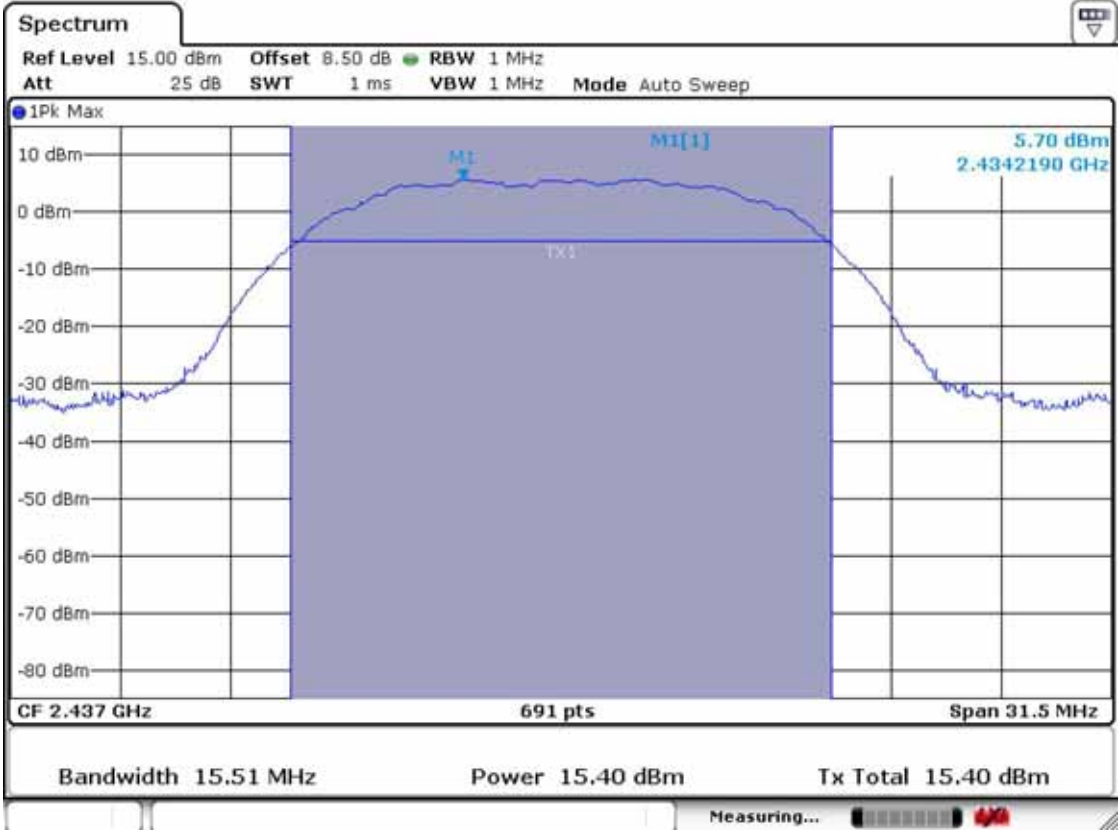
Peak output power

< 1W

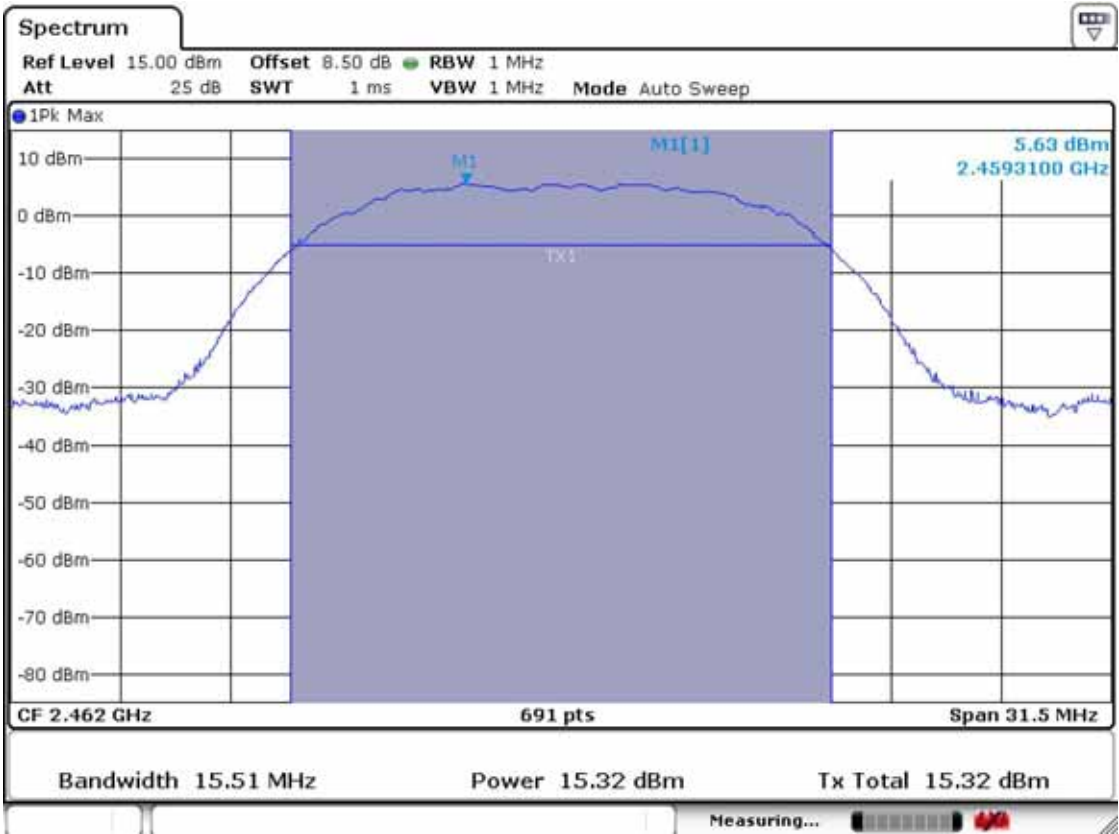
802.11b
CH 1



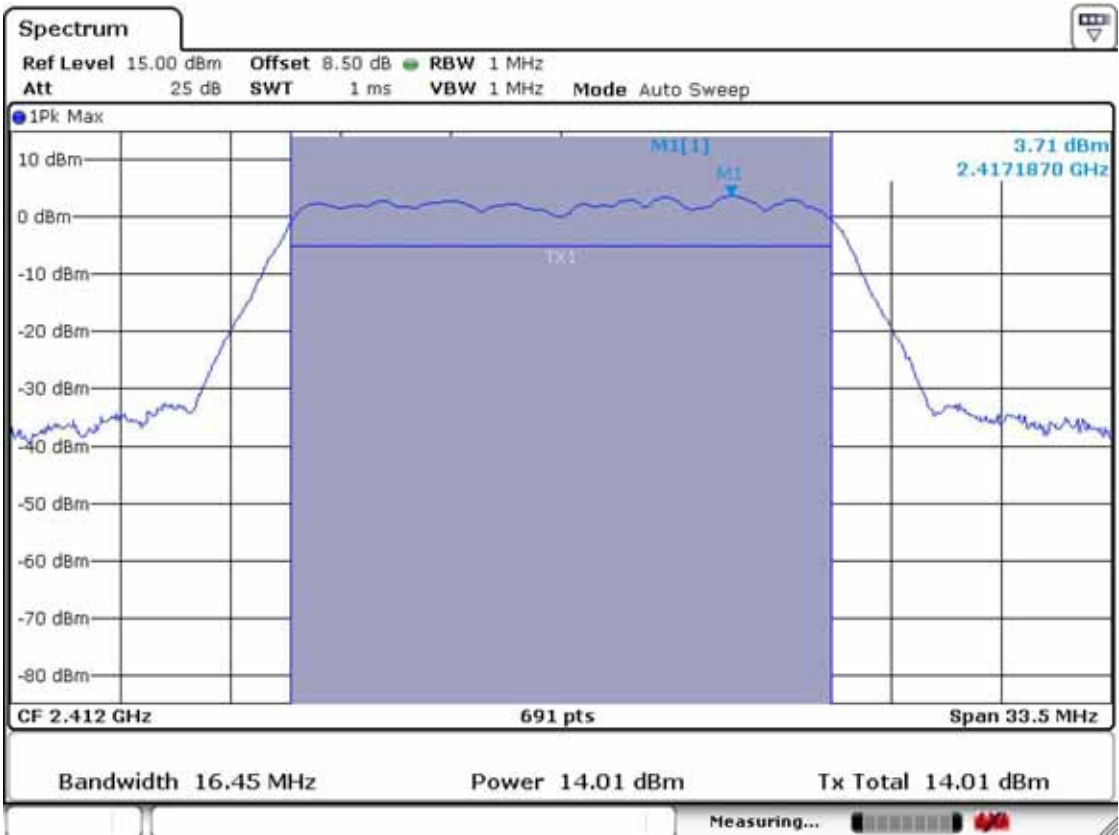
CH 6



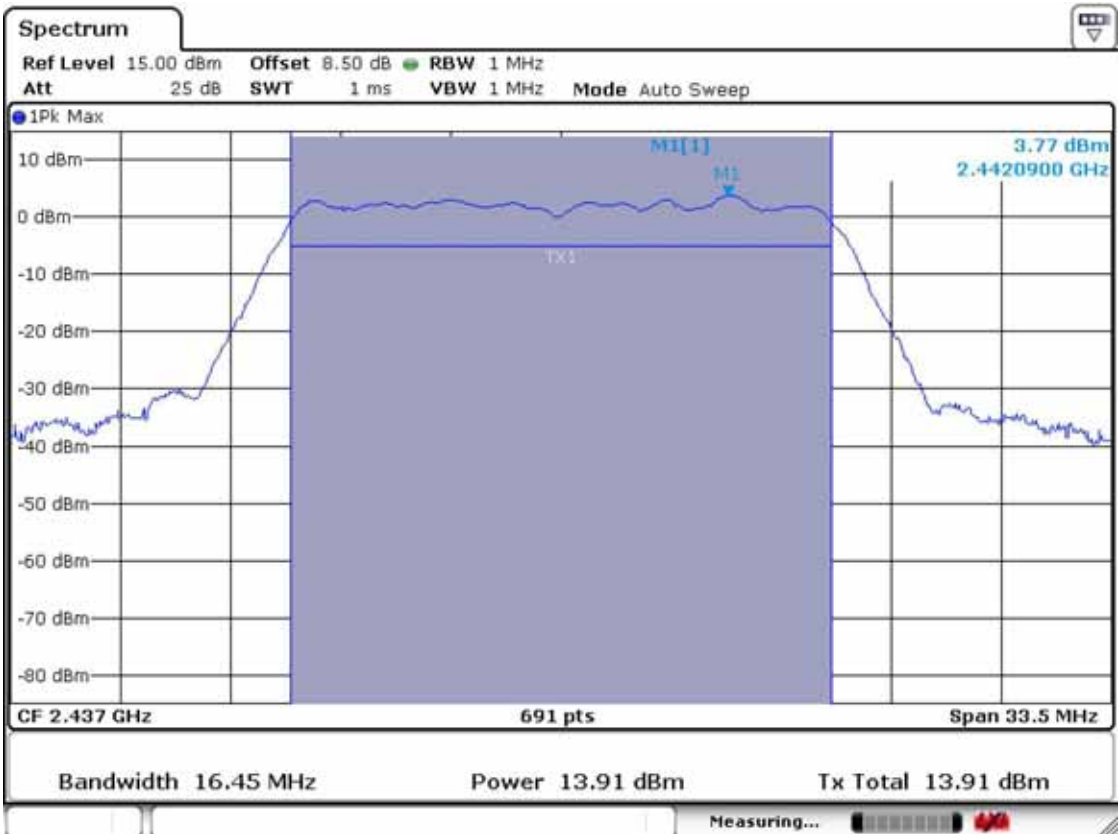
CH 11



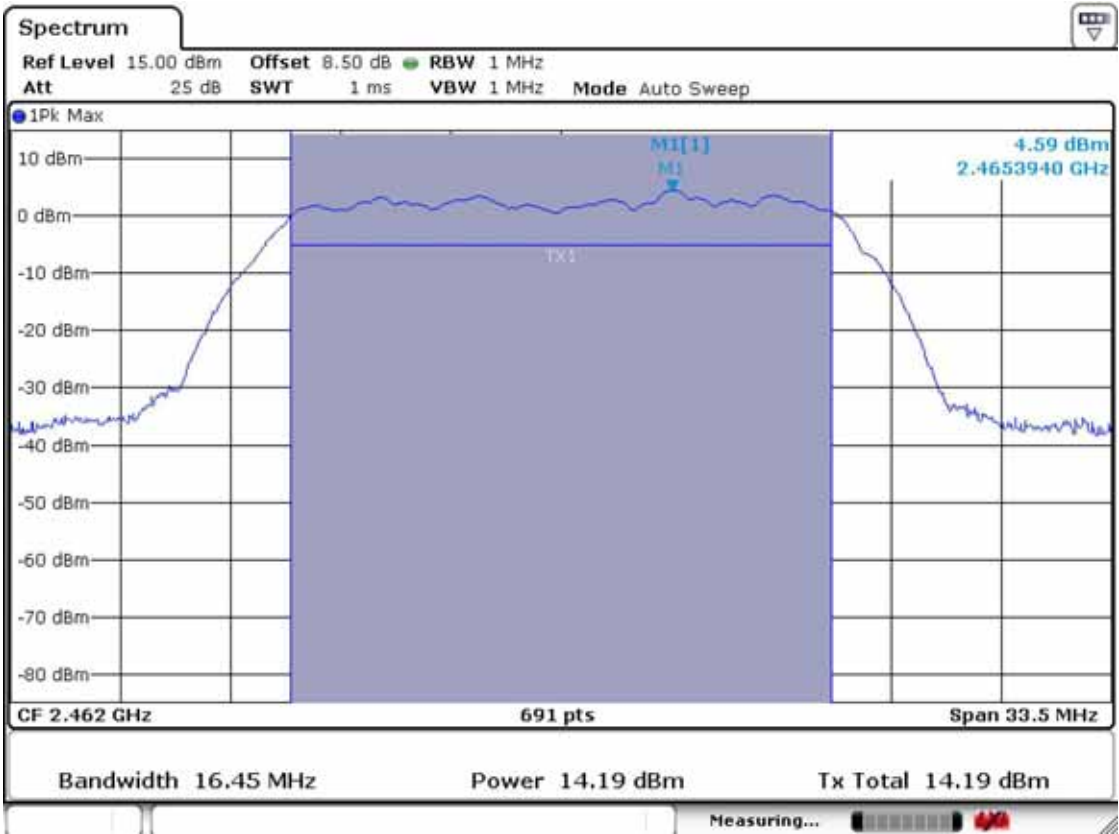
802.11g
CH 1



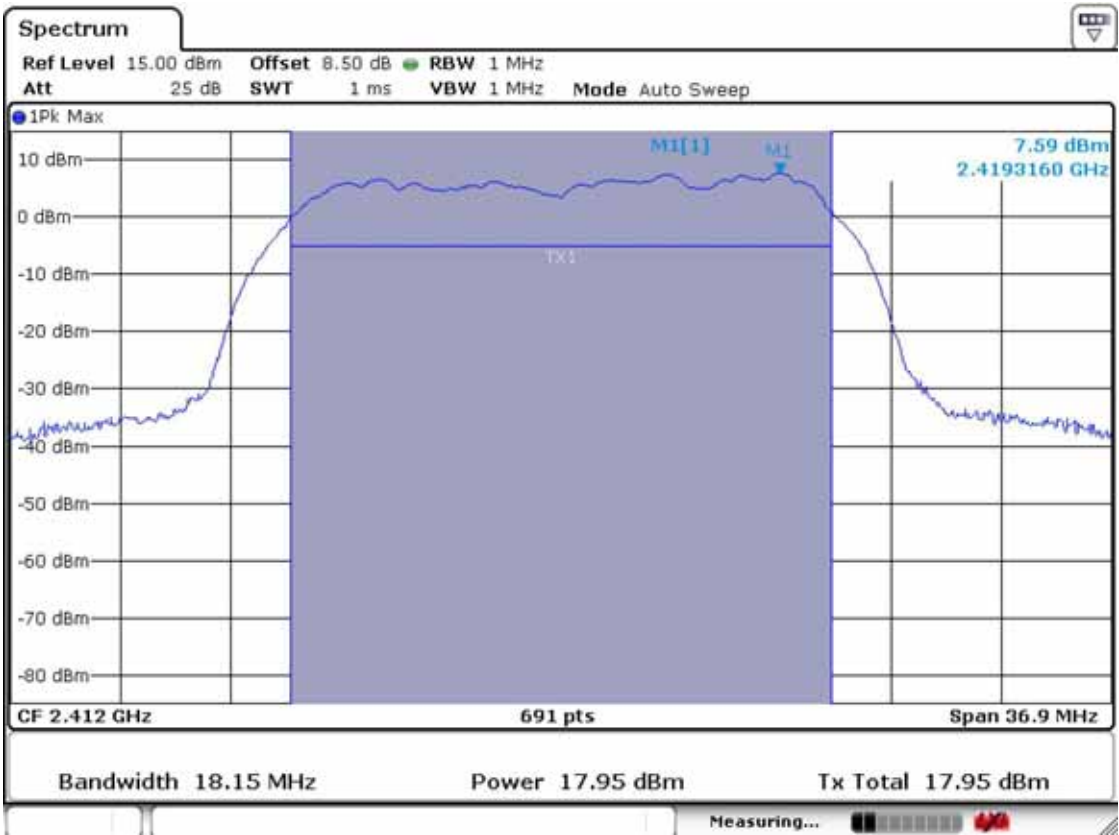
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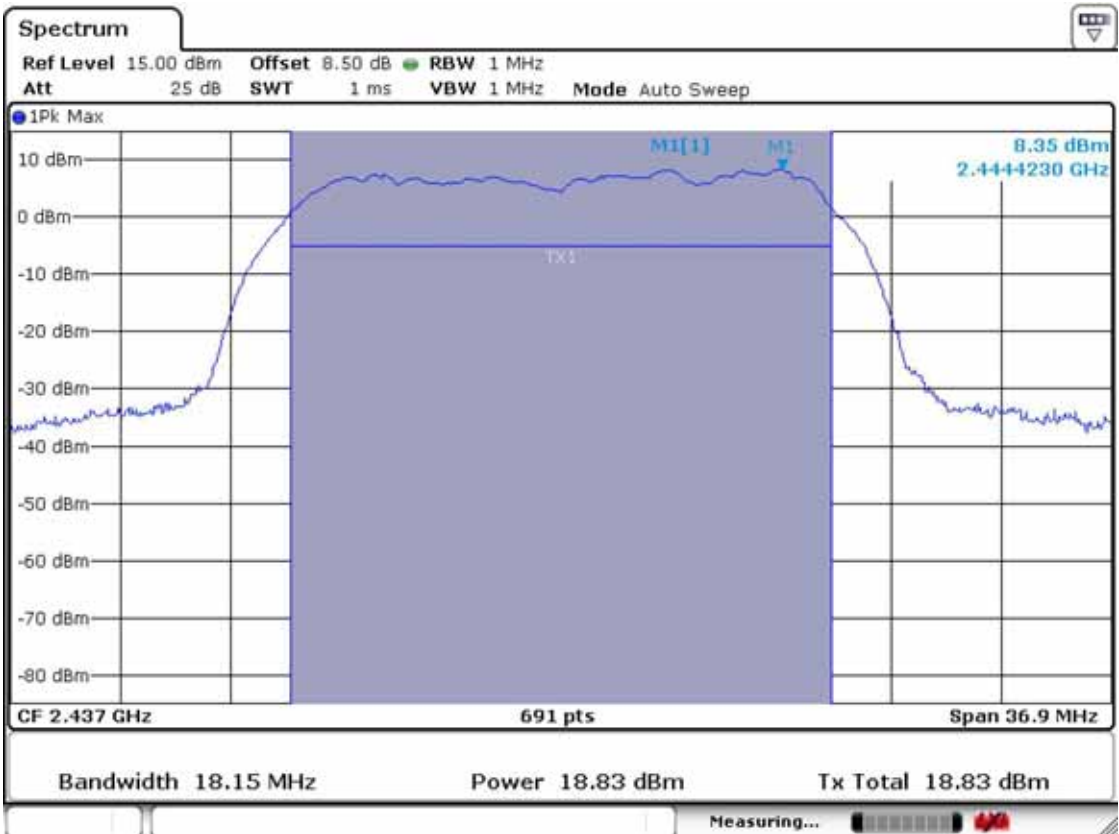
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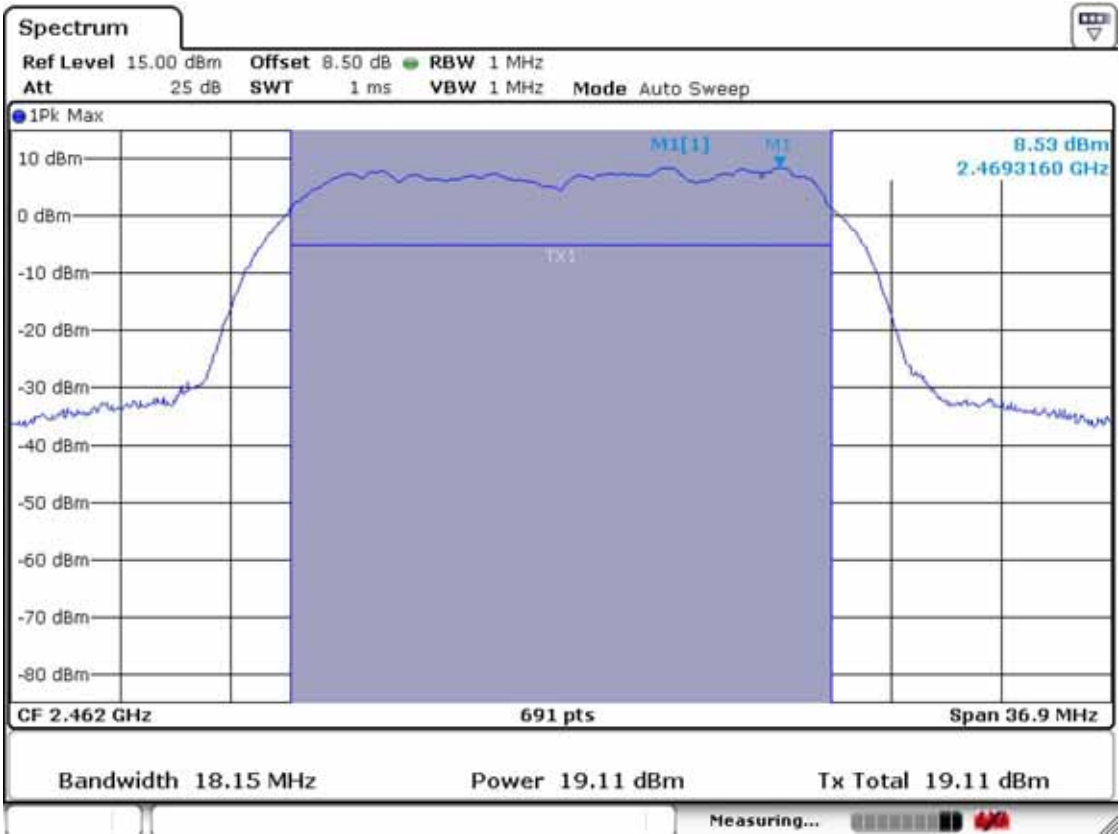
802.11n_20MHz
CH 1



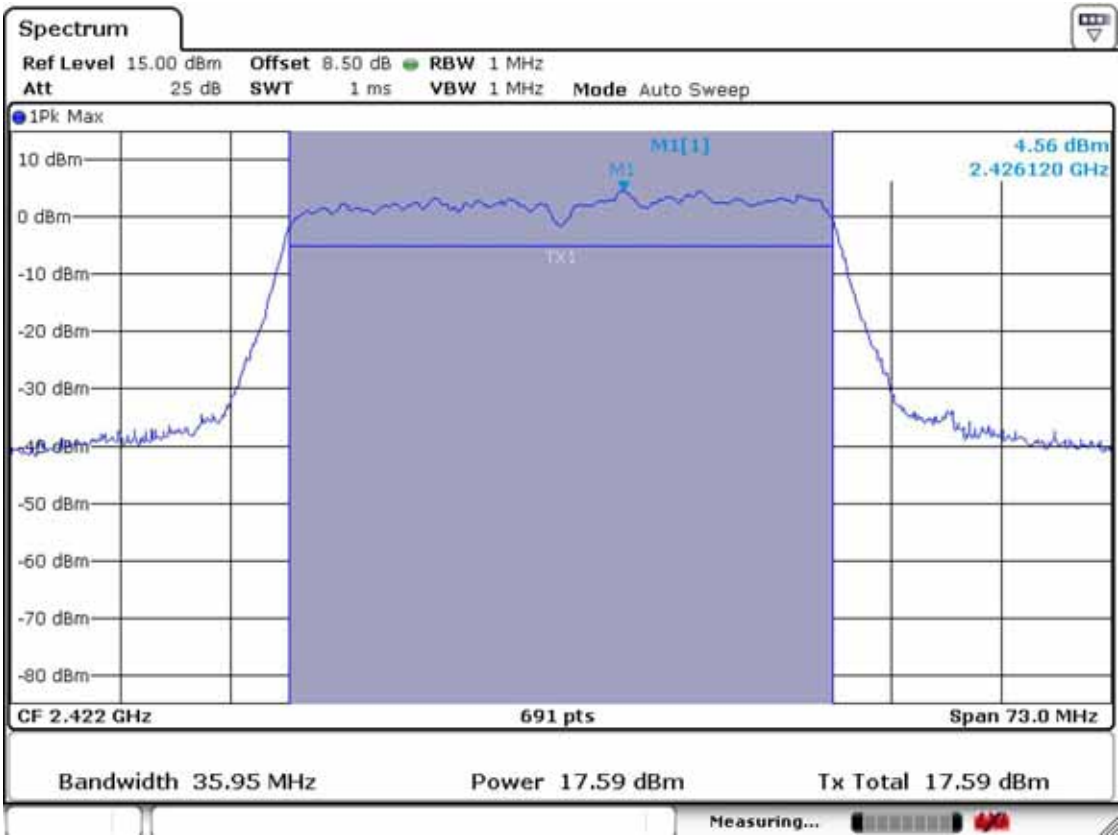
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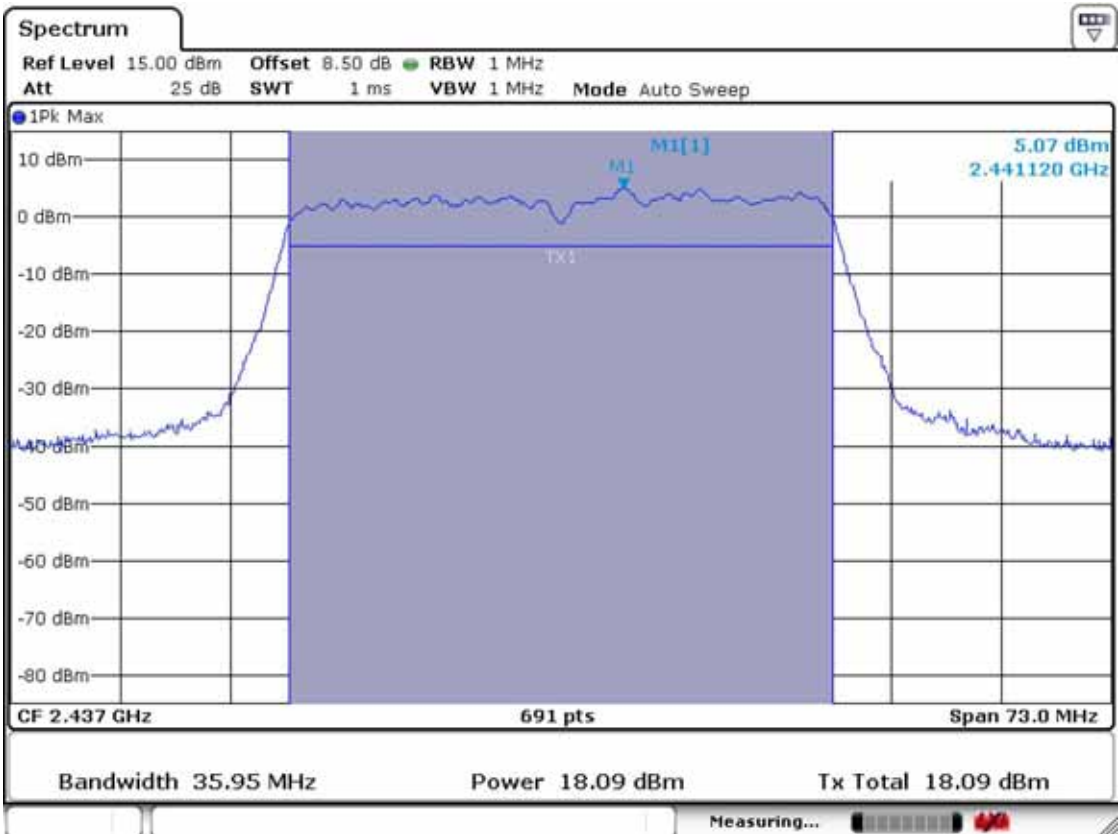
CH 11



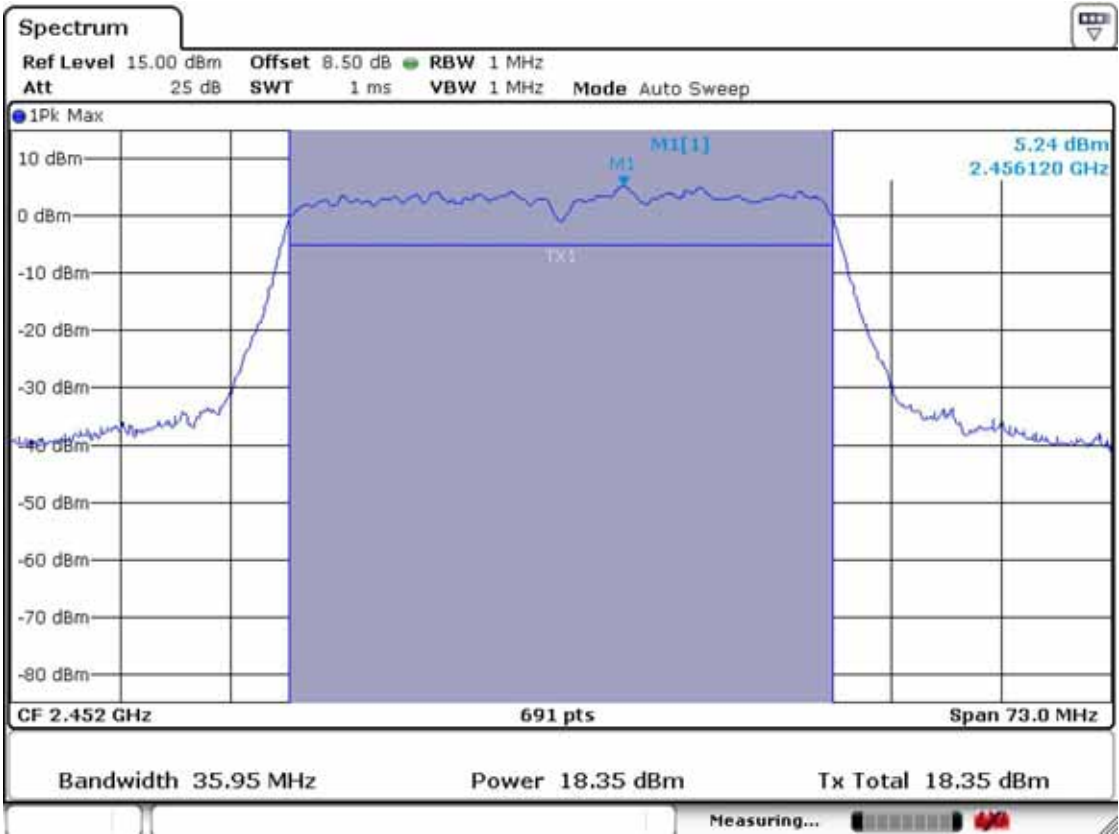
802.11n_40MHz
CH 1



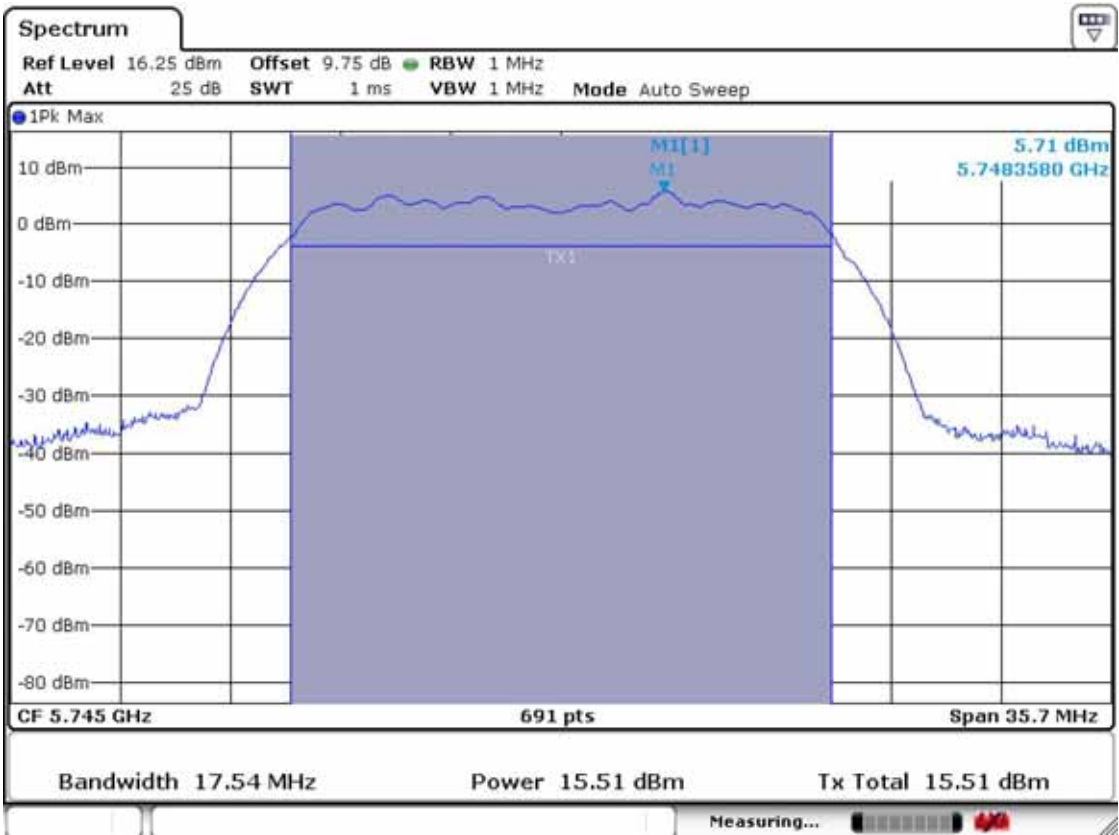
CH 4



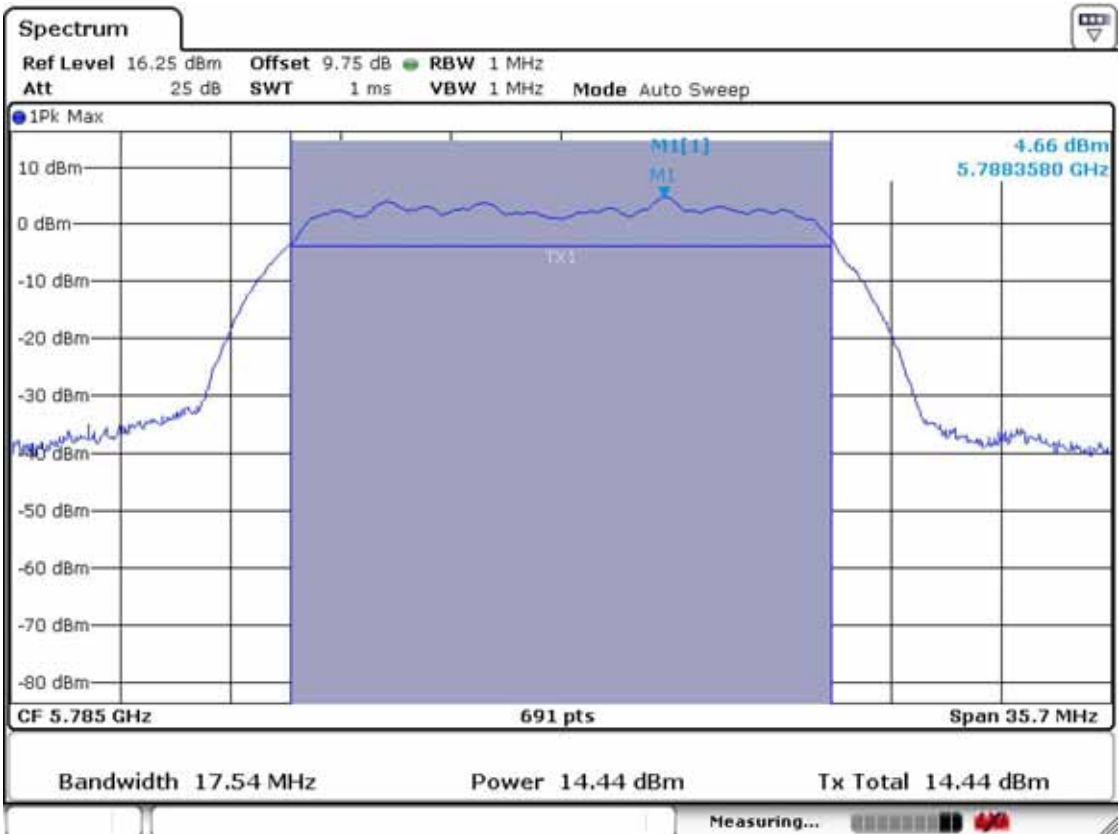
CH 7



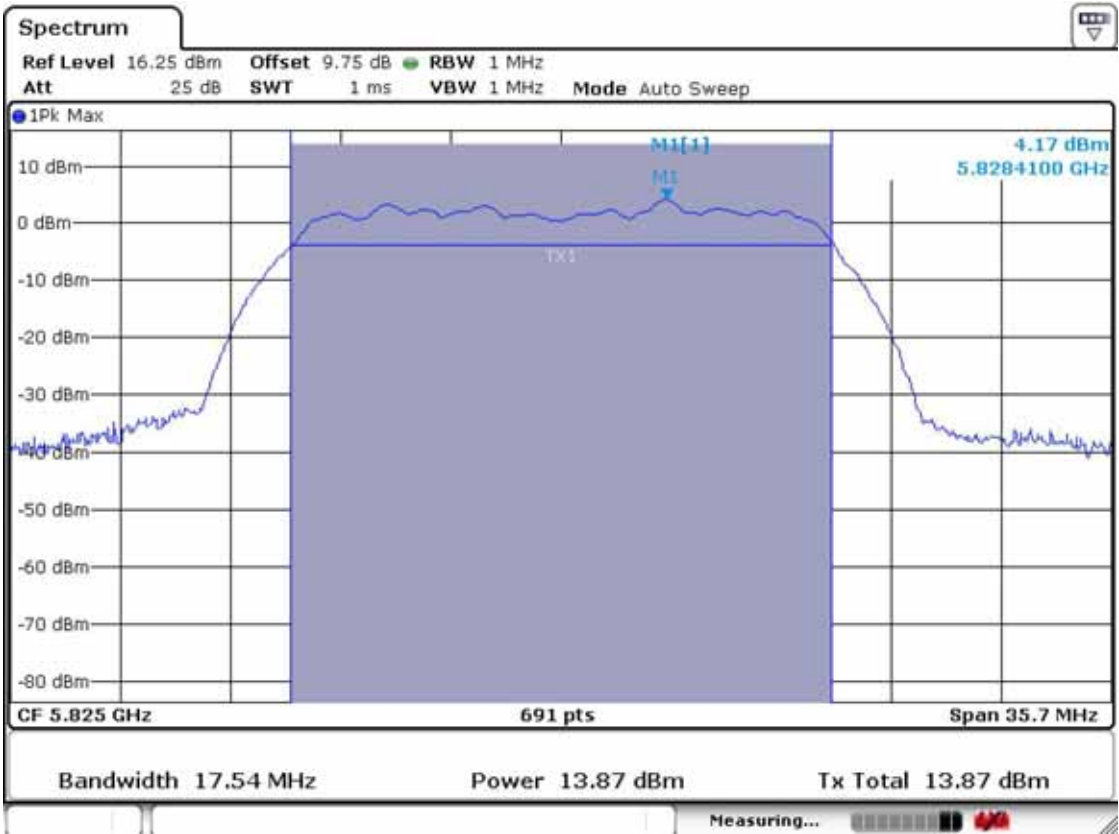
802.11a
CH 149



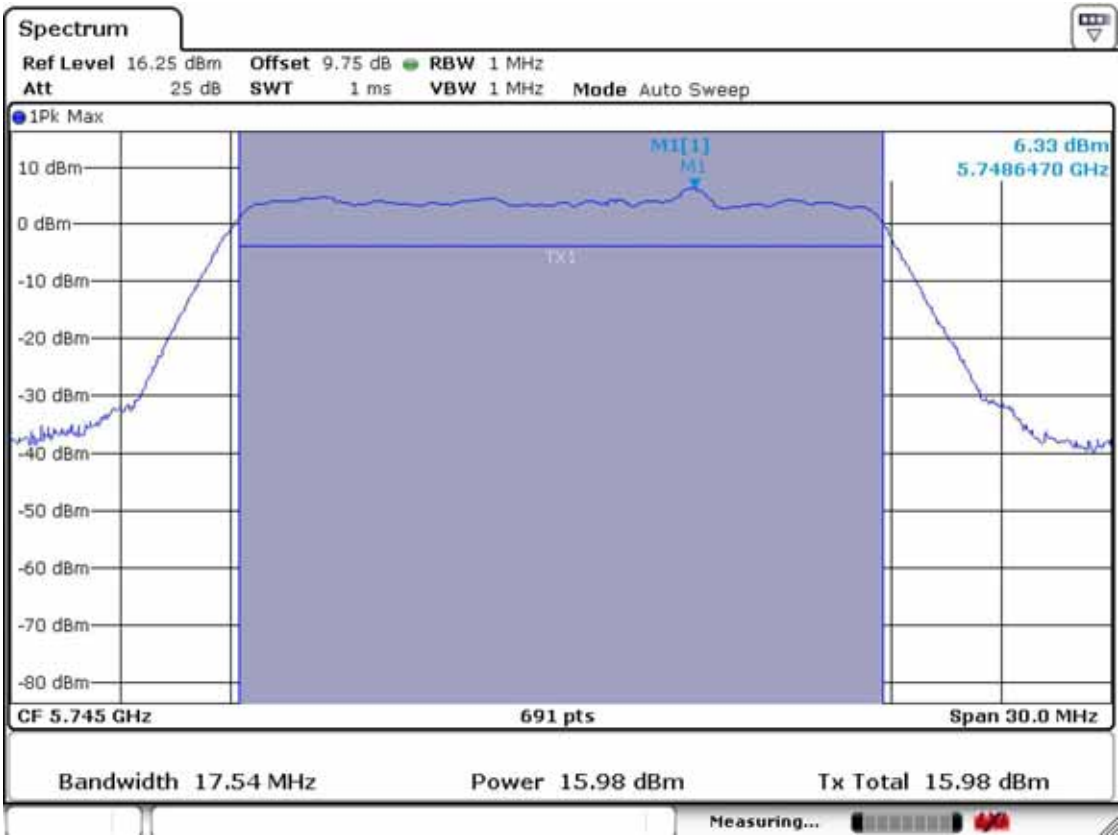
CH 157



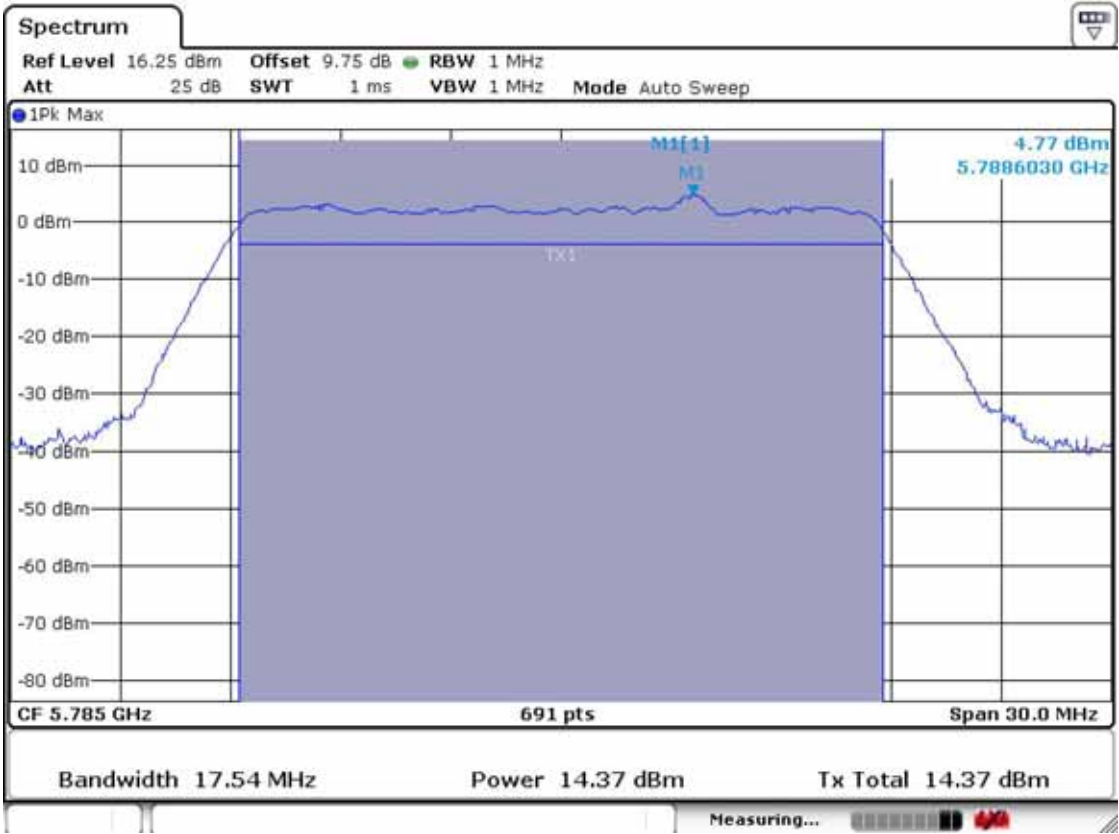
CH 165



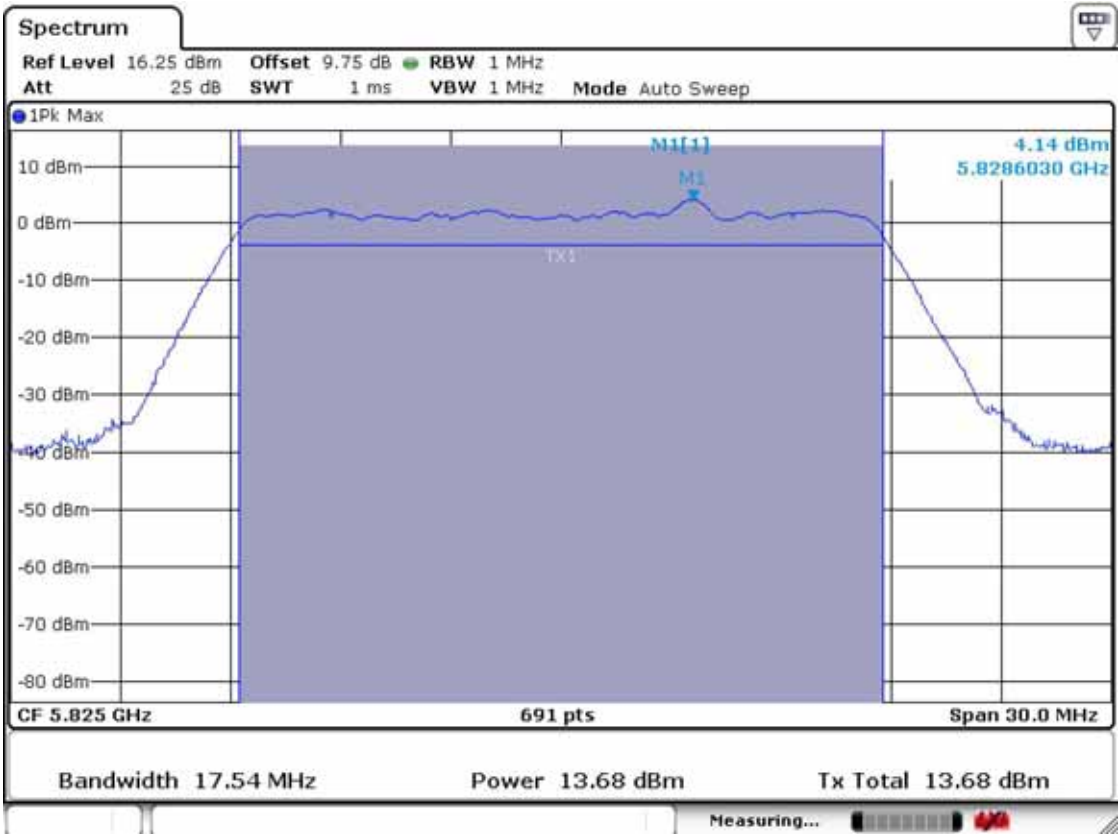
802.11an_20MHz
CH 149



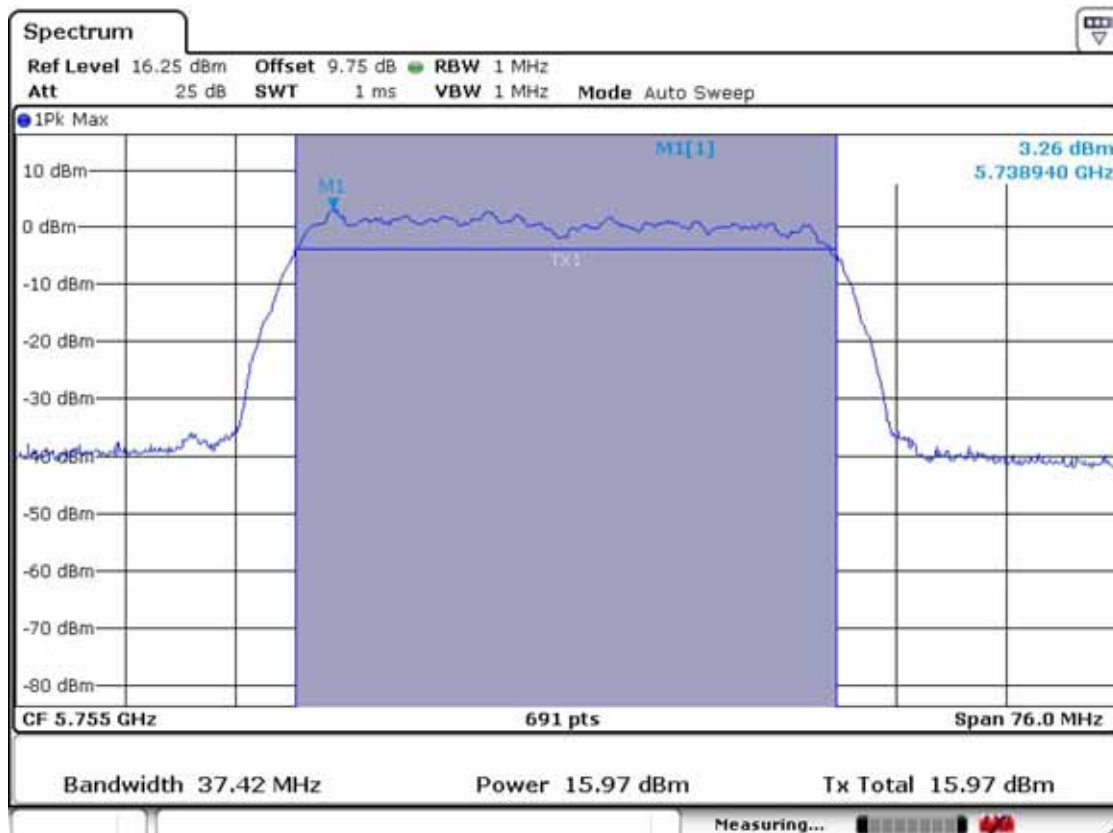
CH 157



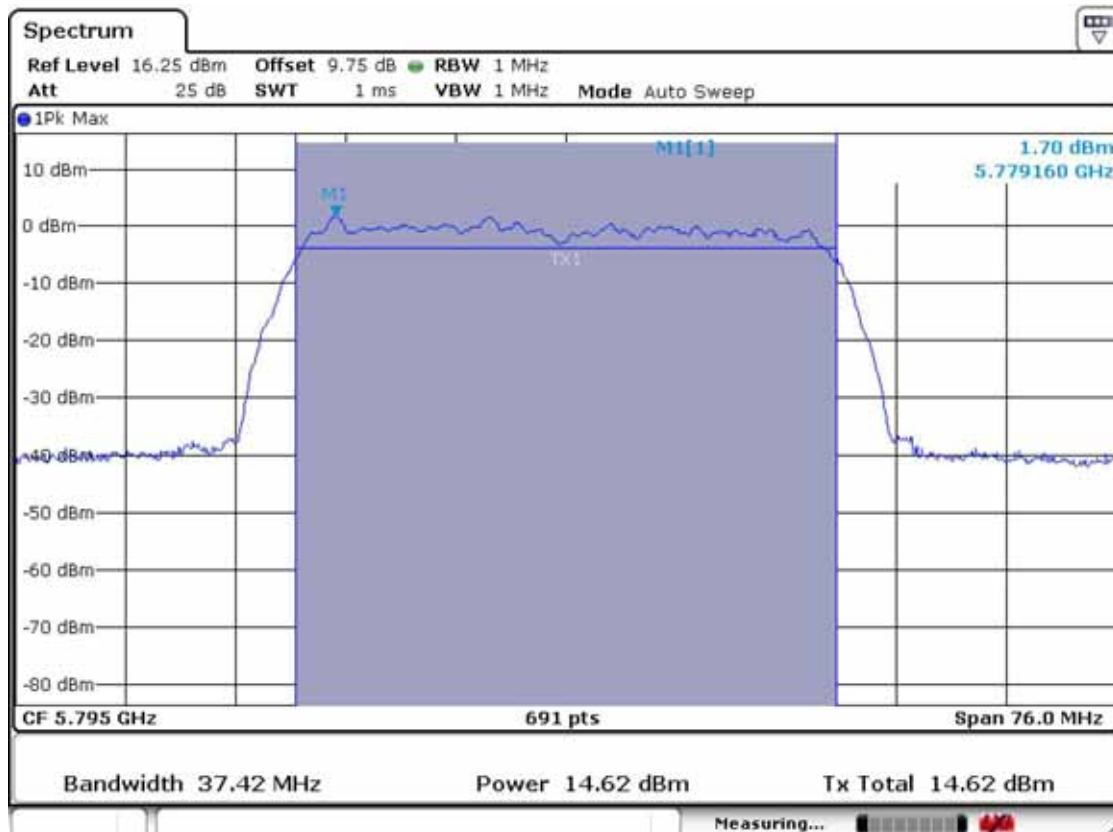
CH 165



802.11an_40MHz CH 151



CH 159



3.2.3 Power Spectral Density

Procedure:

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	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	-16.47	Complies
	2437	6	-16.45	Complies
	2462	11	-16.61	Complies
802.11g	2412	1	-21.84	Complies
	2437	6	-21.87	Complies
	2462	11	-21.87	Complies
802.11n _20MHz	2412	1	-16.57	Complies
	2437	6	-15.83	Complies
	2462	11	-15.71	Complies
802.11n _40MHz	2422	1	-19.15	Complies
	2437	4	-18.78	Complies
	2452	7	-18.60	Complies

Measurement Data: 5.0GHz Band

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11a	5745	149	-18.49	Complies
	5785	157	-19.55	Complies
	5825	165	-21.85	Complies
802.11an _20MHz	5745	149	-19.06	Complies
	5785	157	-20.99	Complies
	5825	165	-21.90	Complies
802.11an _40MHz	5745	149	-20.80	Complies
	5825	165	-22.45	Complies

- See next pages for actual measured spectrum plots.

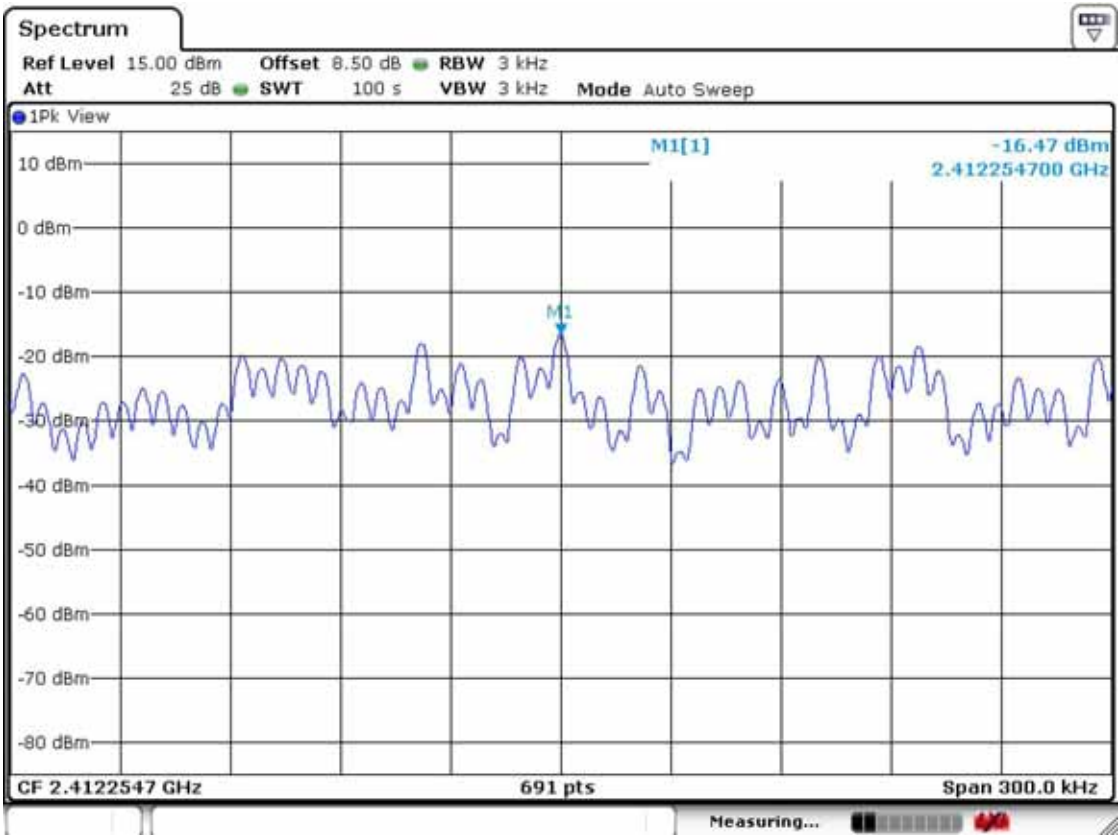
Minimum Standard:

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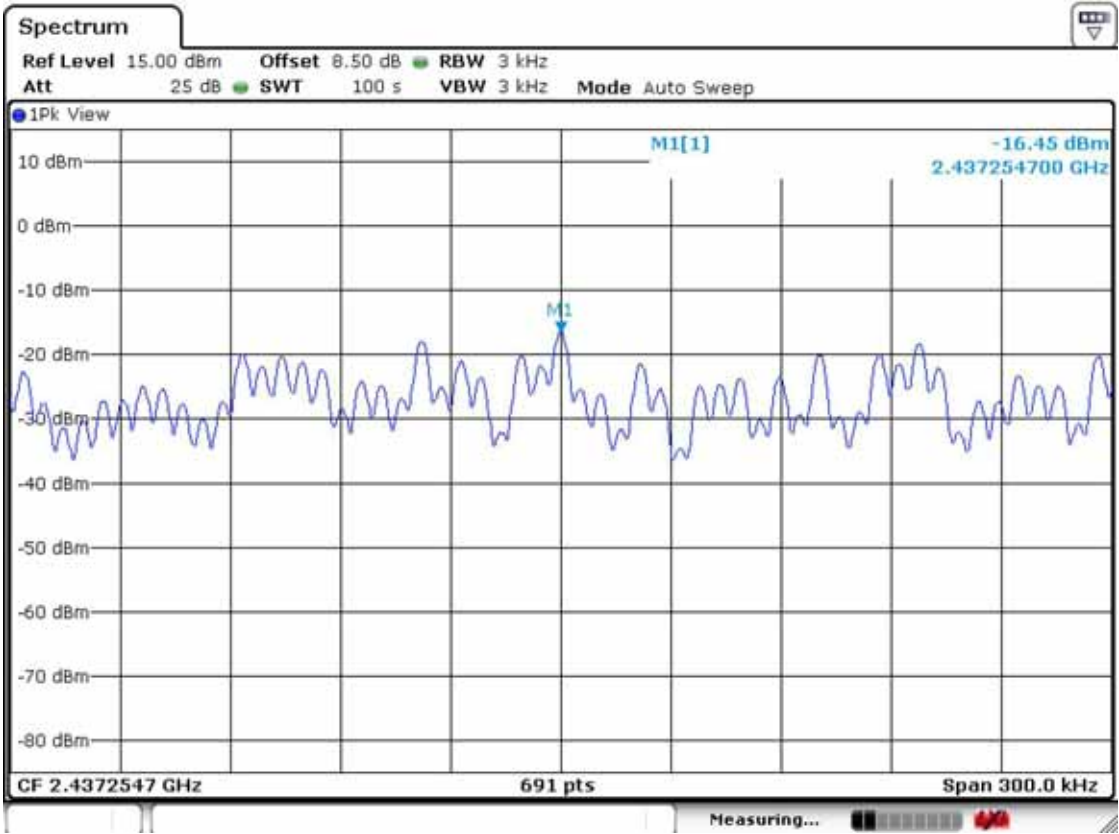
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

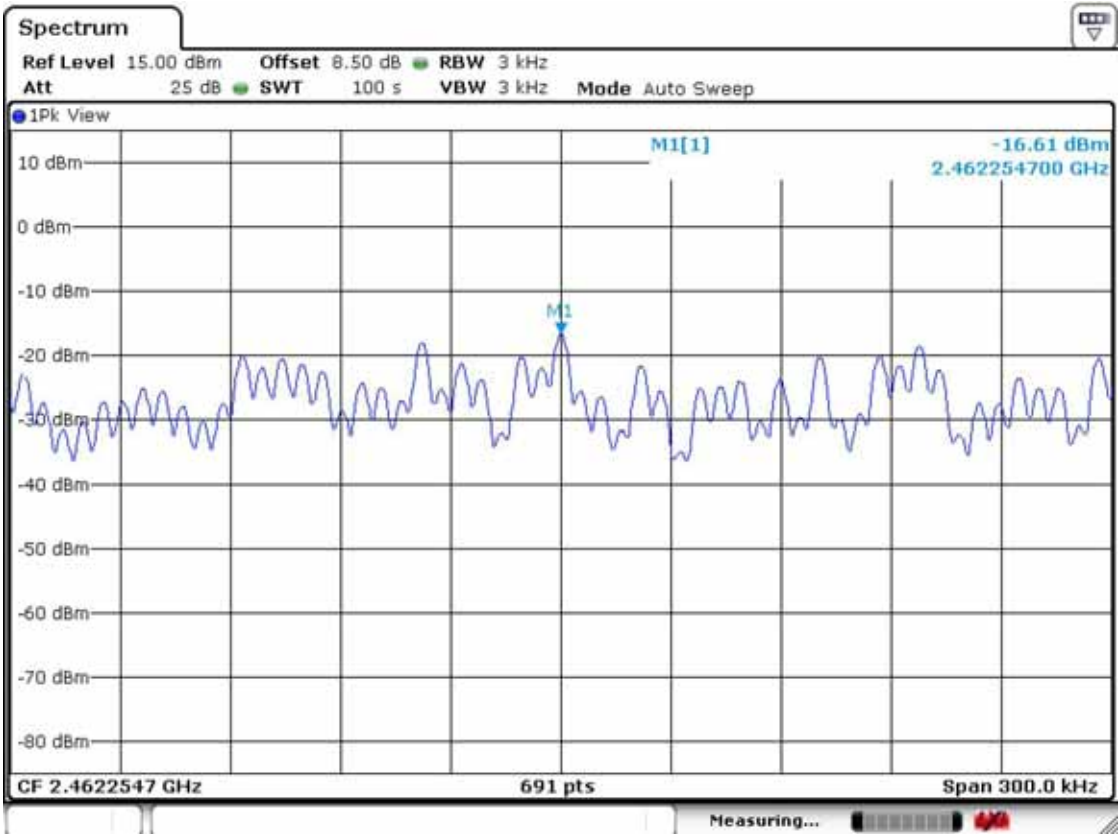
802.11b Power Density Measurement
CH 1



CH 6

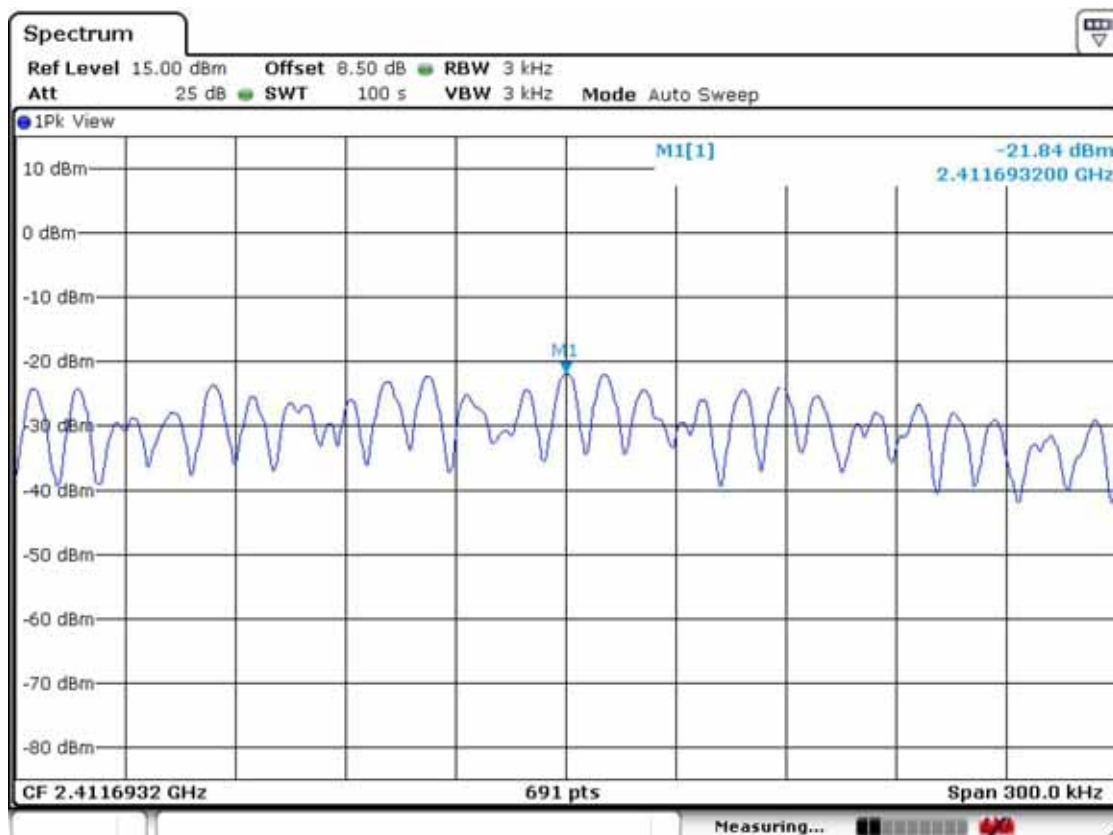


CH 11

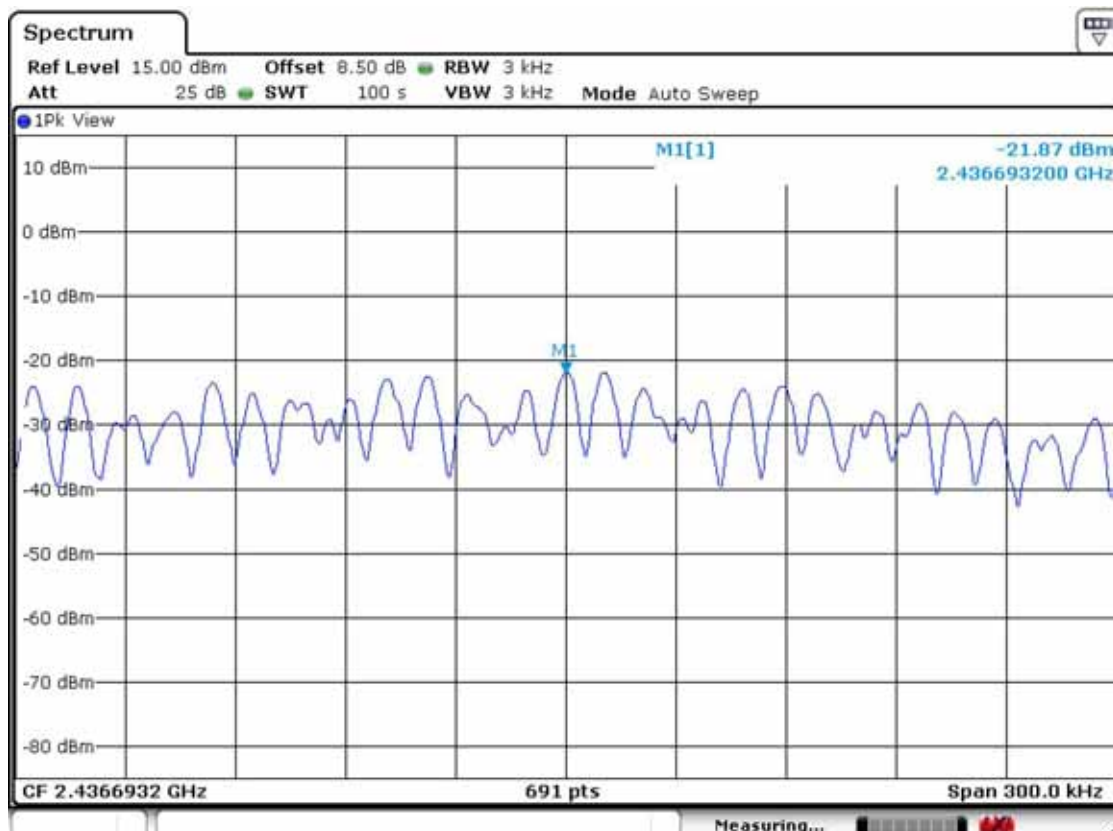


802.11g Power Density Measurement

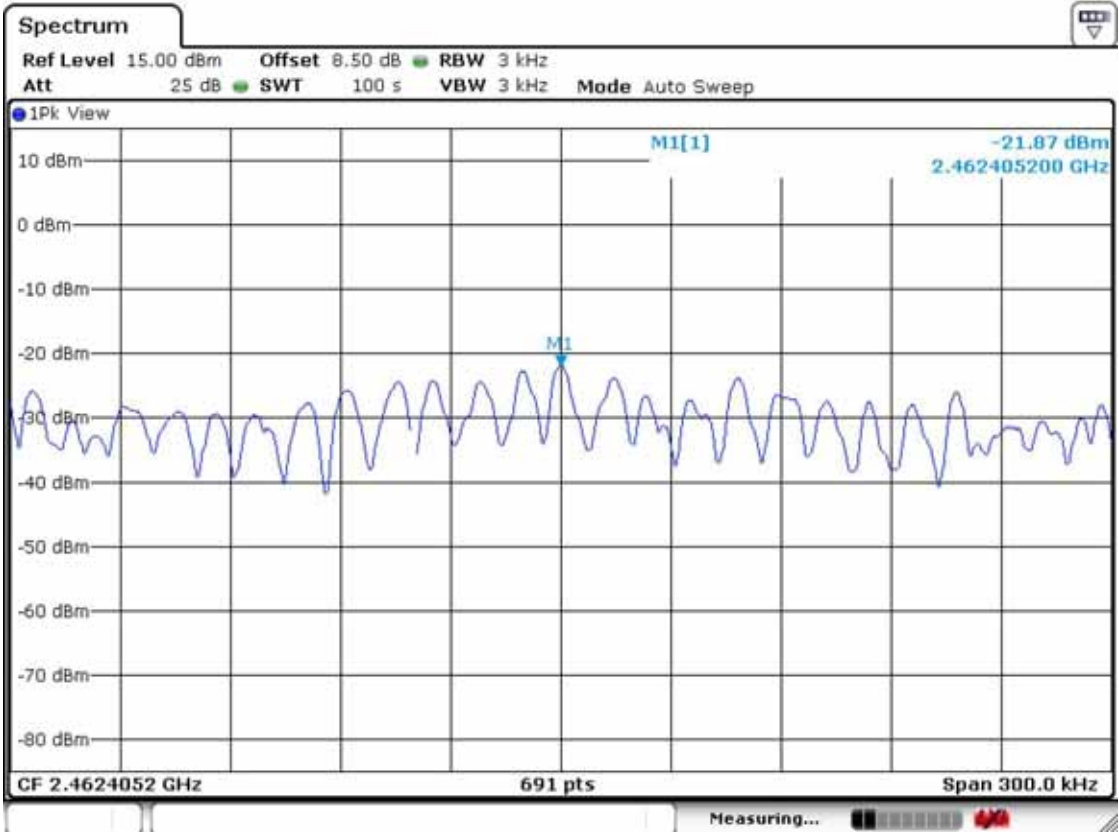
CH 1



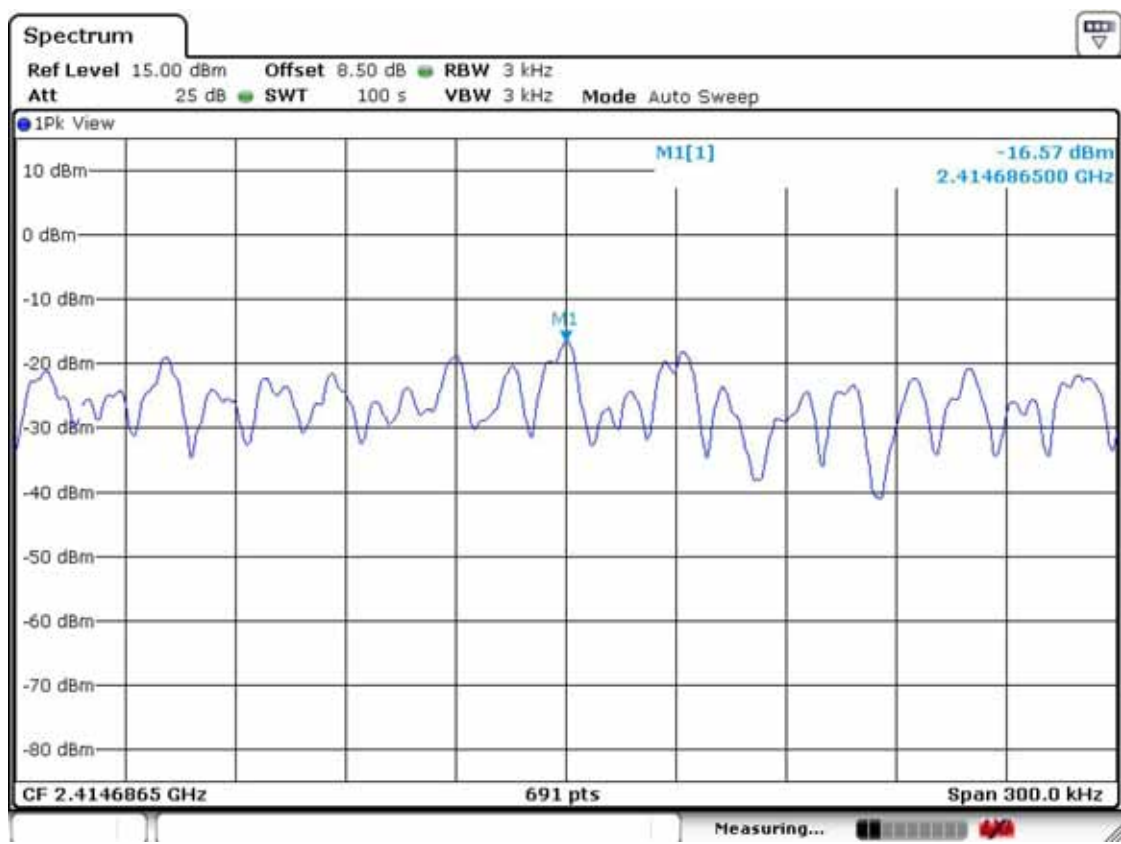
CH 6



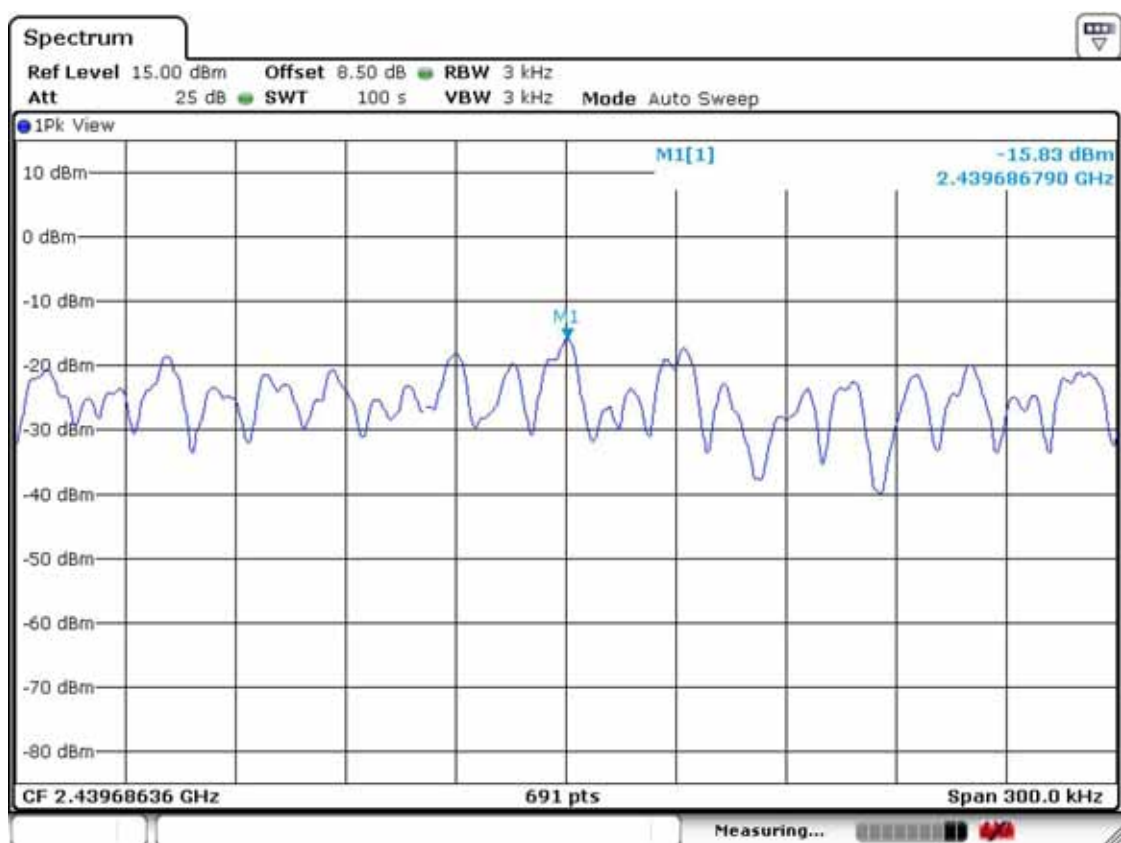
CH 11



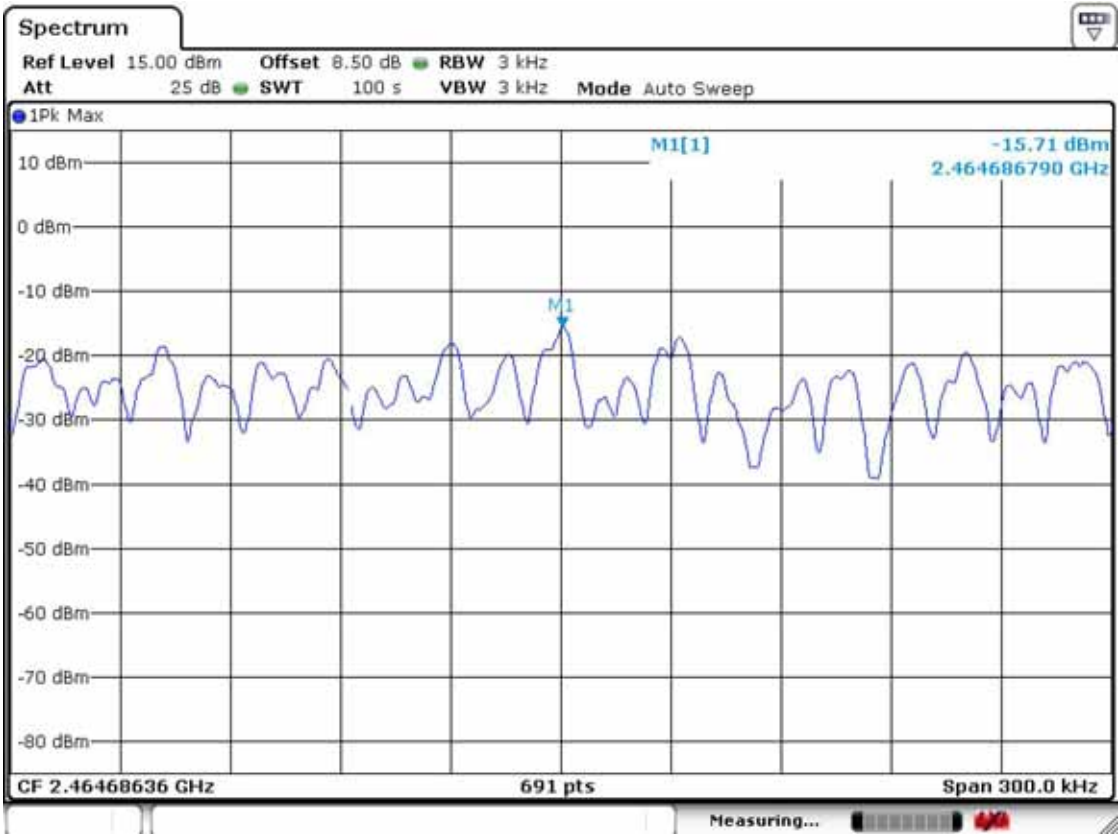
802.11n 20MHz Power Density Measurement
CH 1



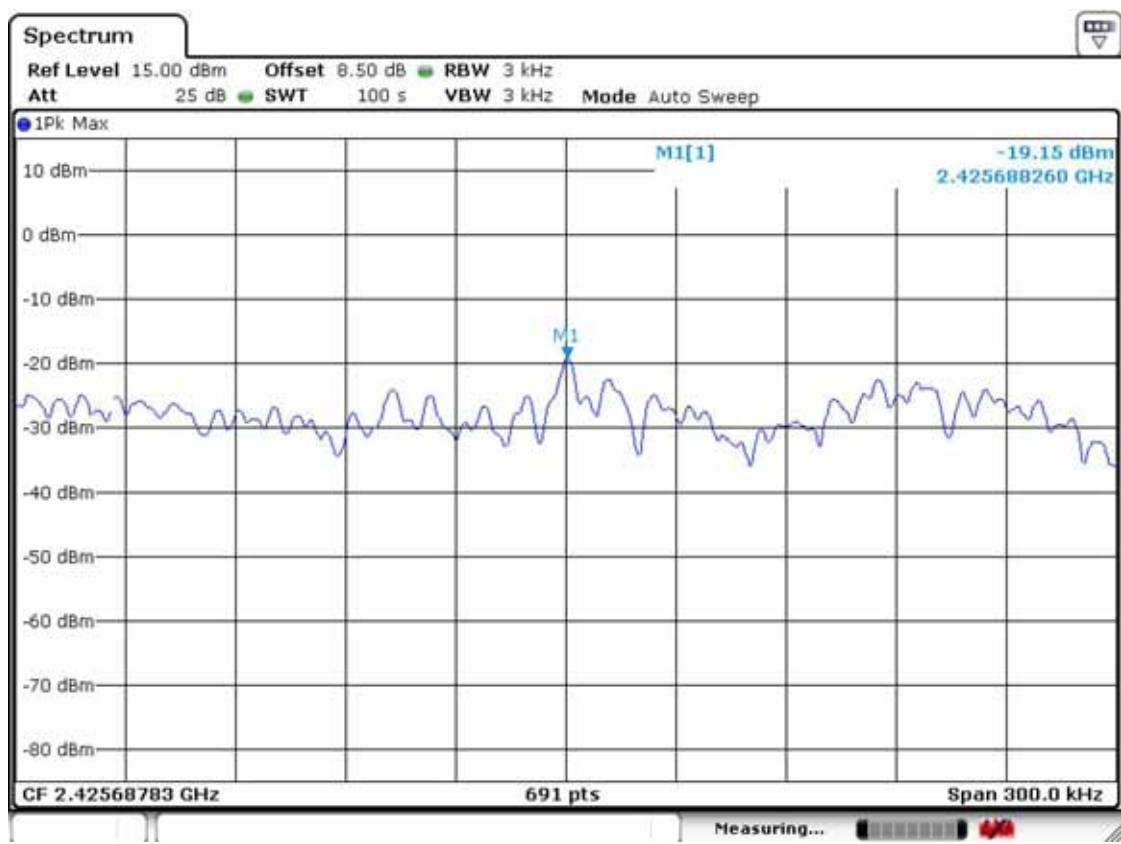
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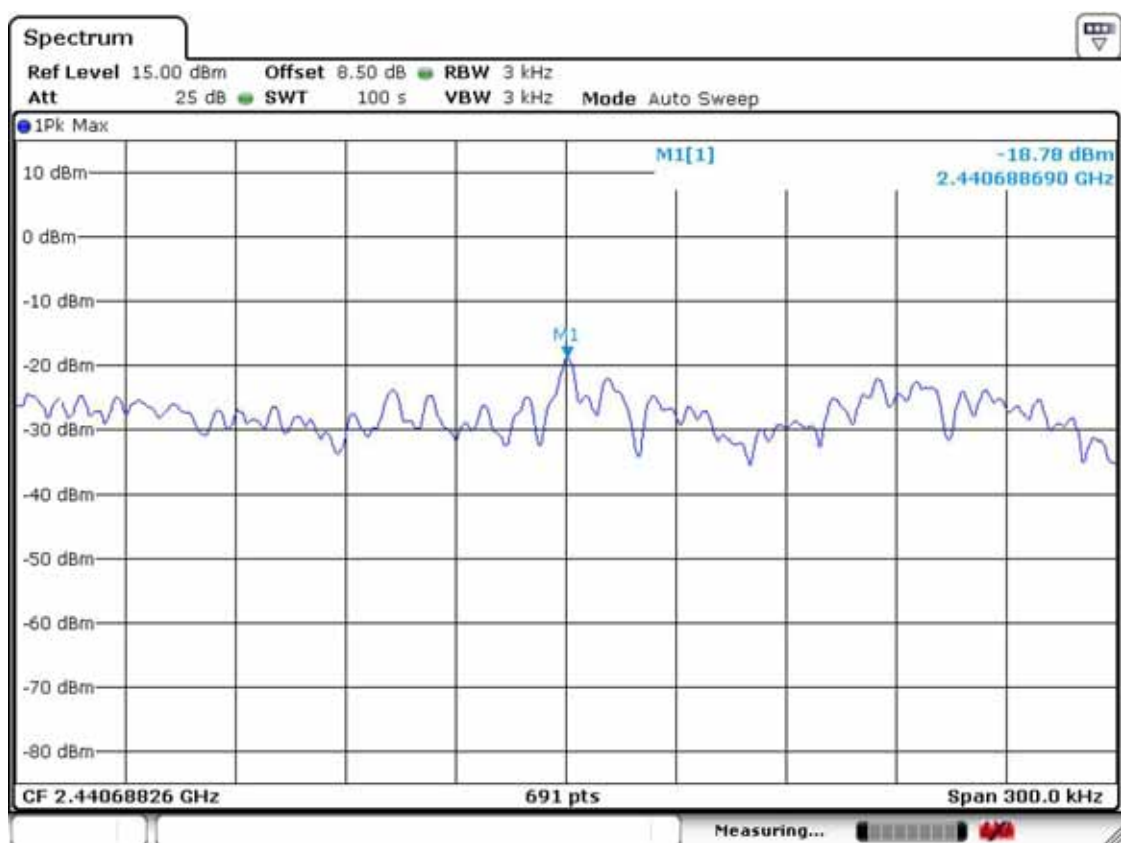
CH 11



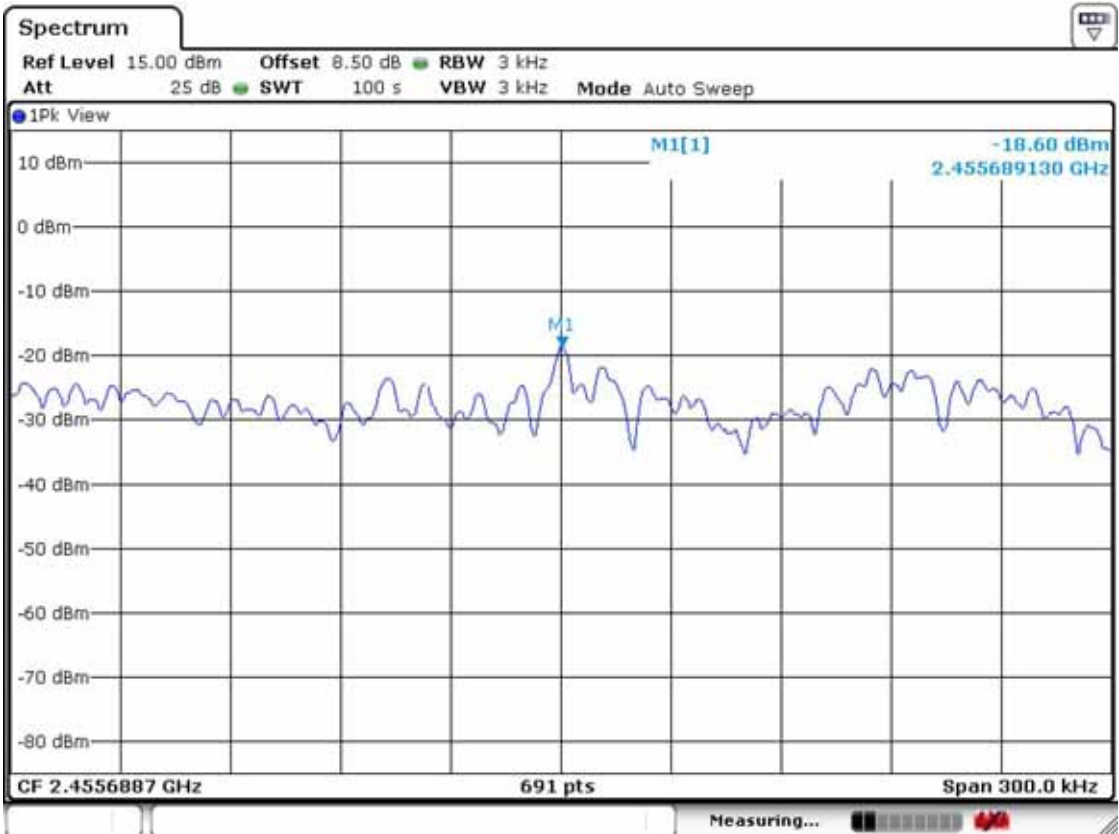
802.11n 40MHz Power Density Measurement
CH 1



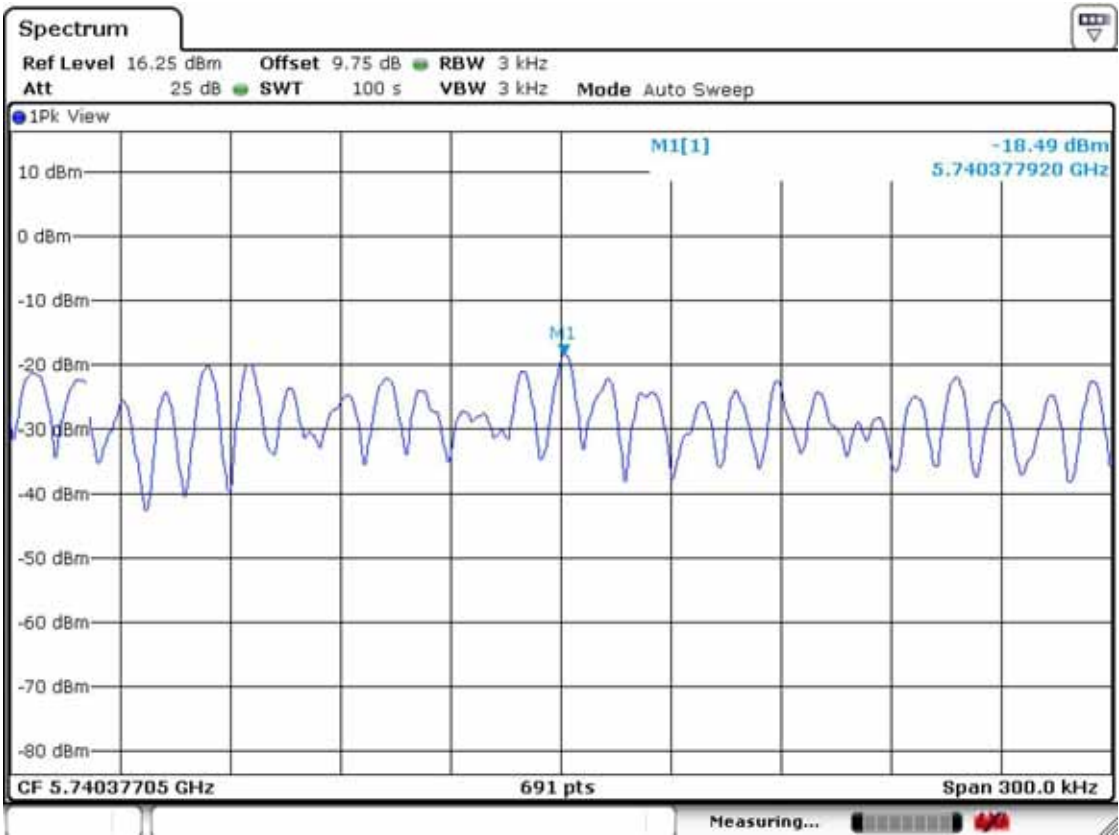
CH 4



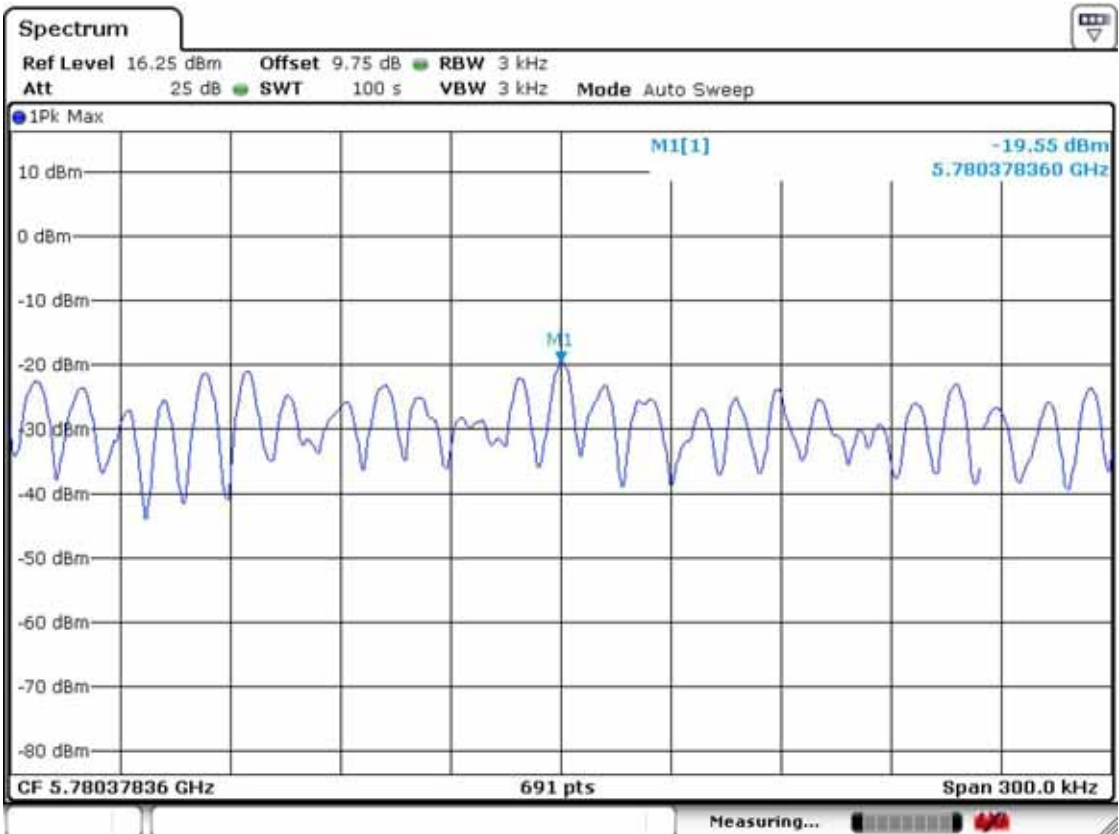
CH 7



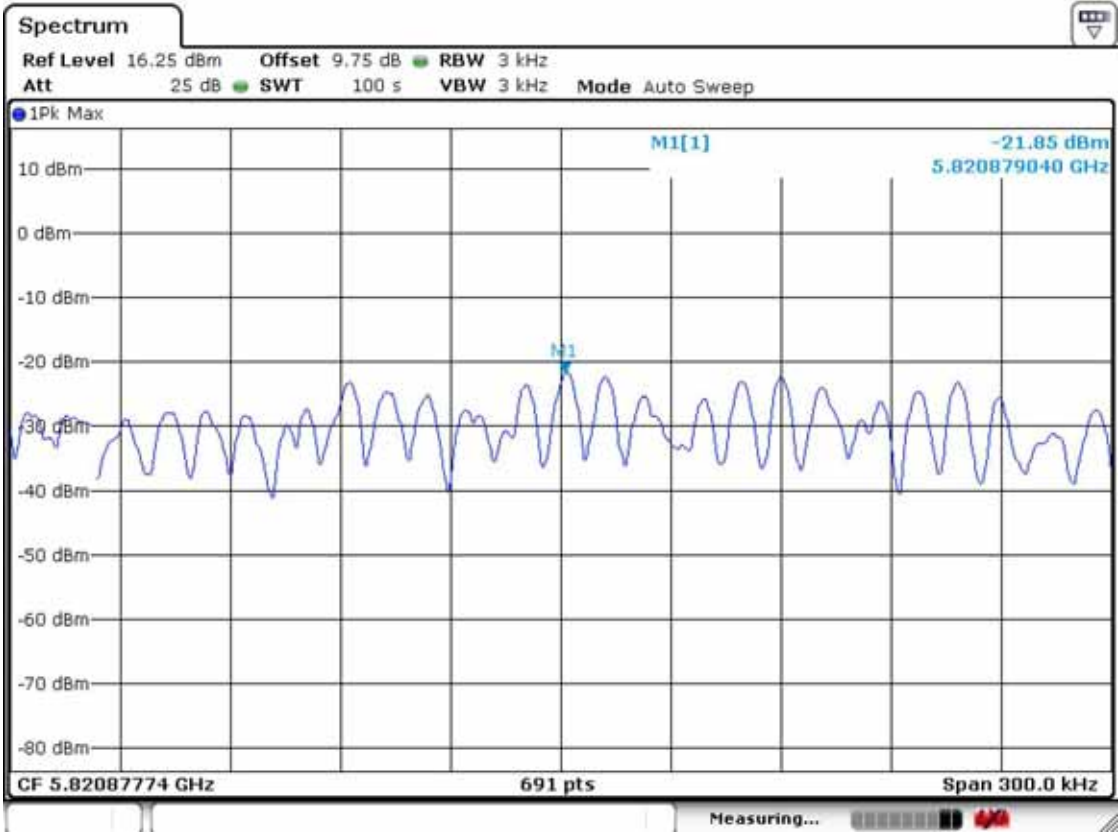
802.11a Power Density Measurement
CH 149



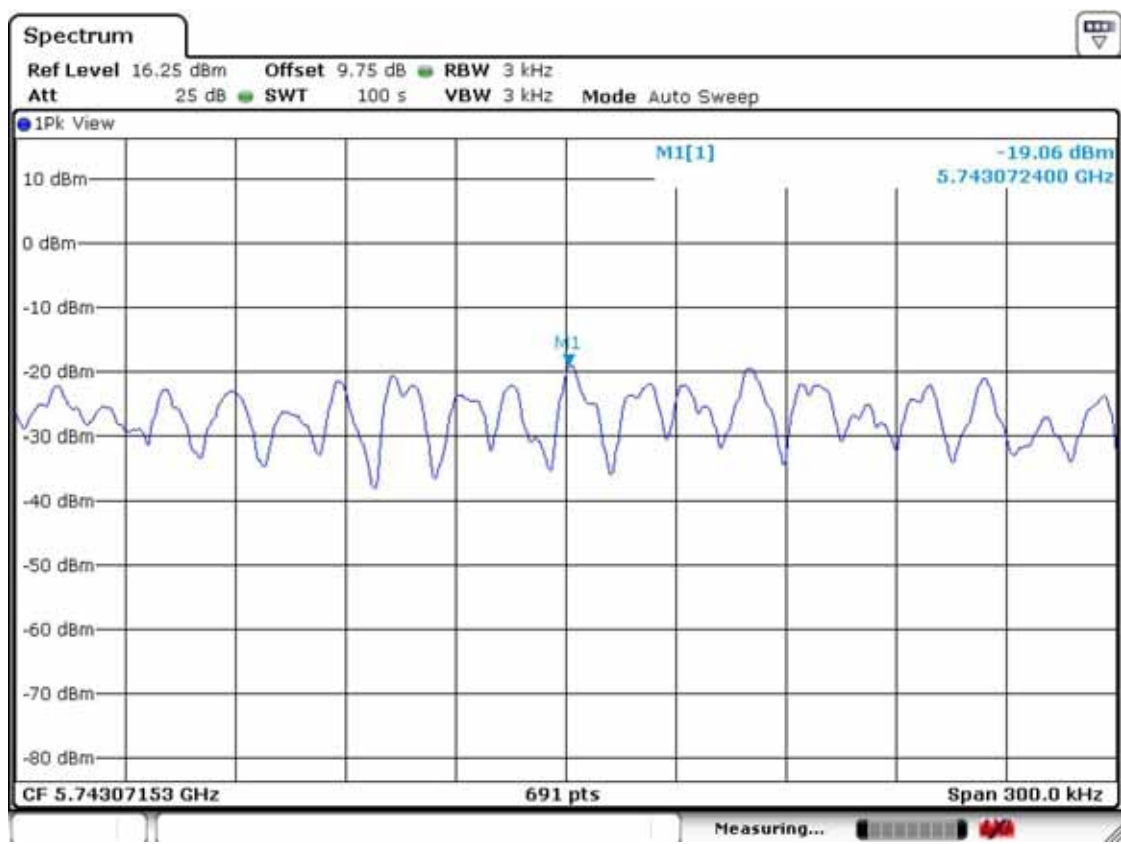
CH 157



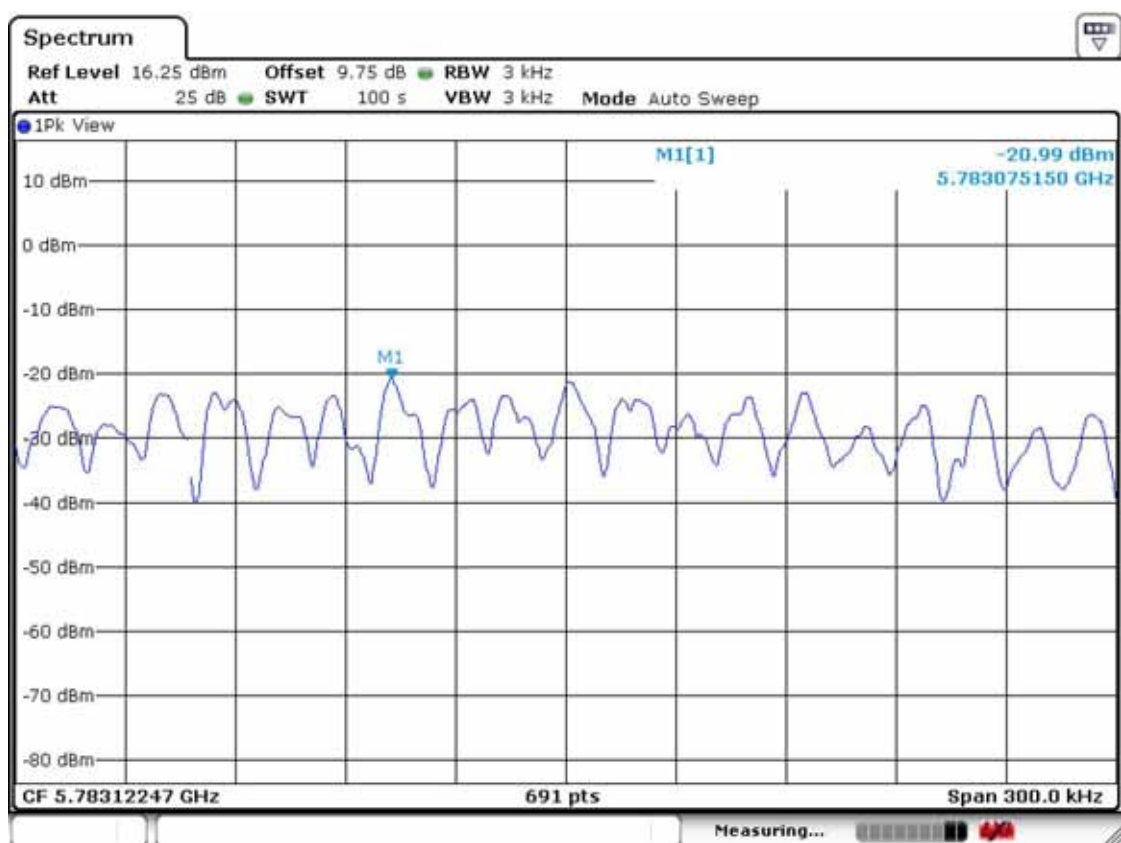
CH 165



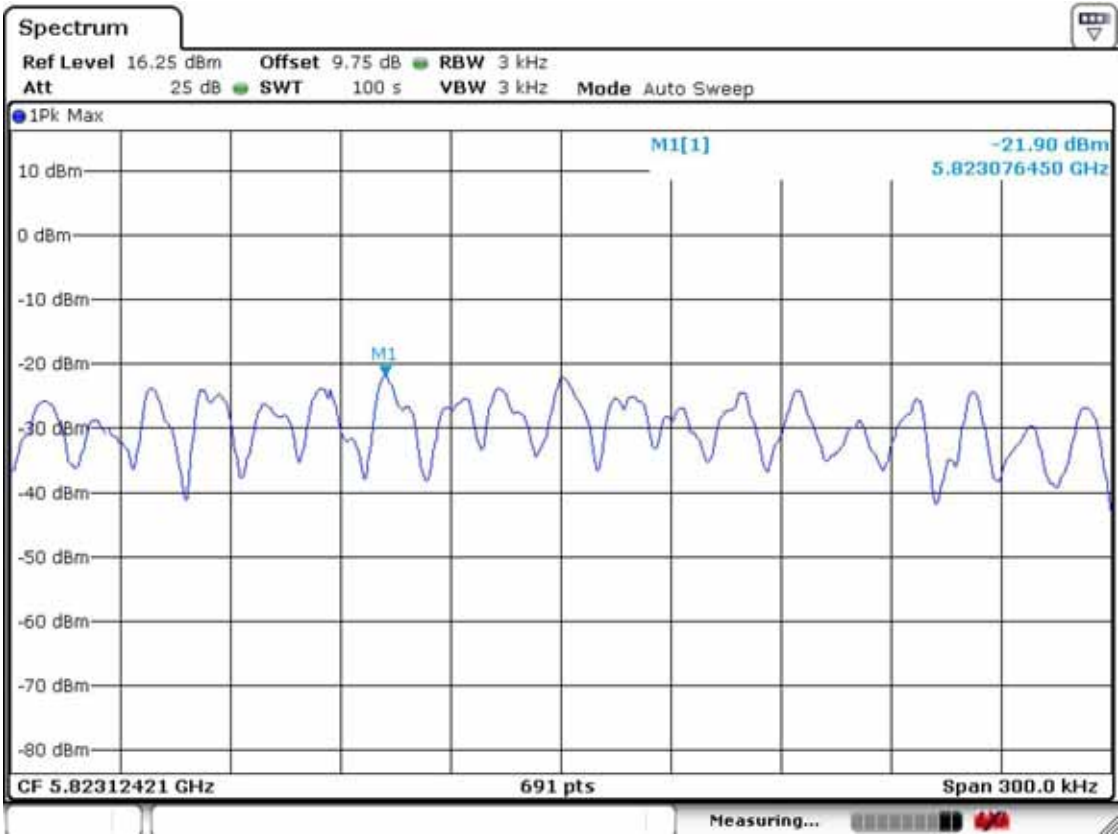
802.11an 20MHz Power Density Measurement
CH 149



CH 157

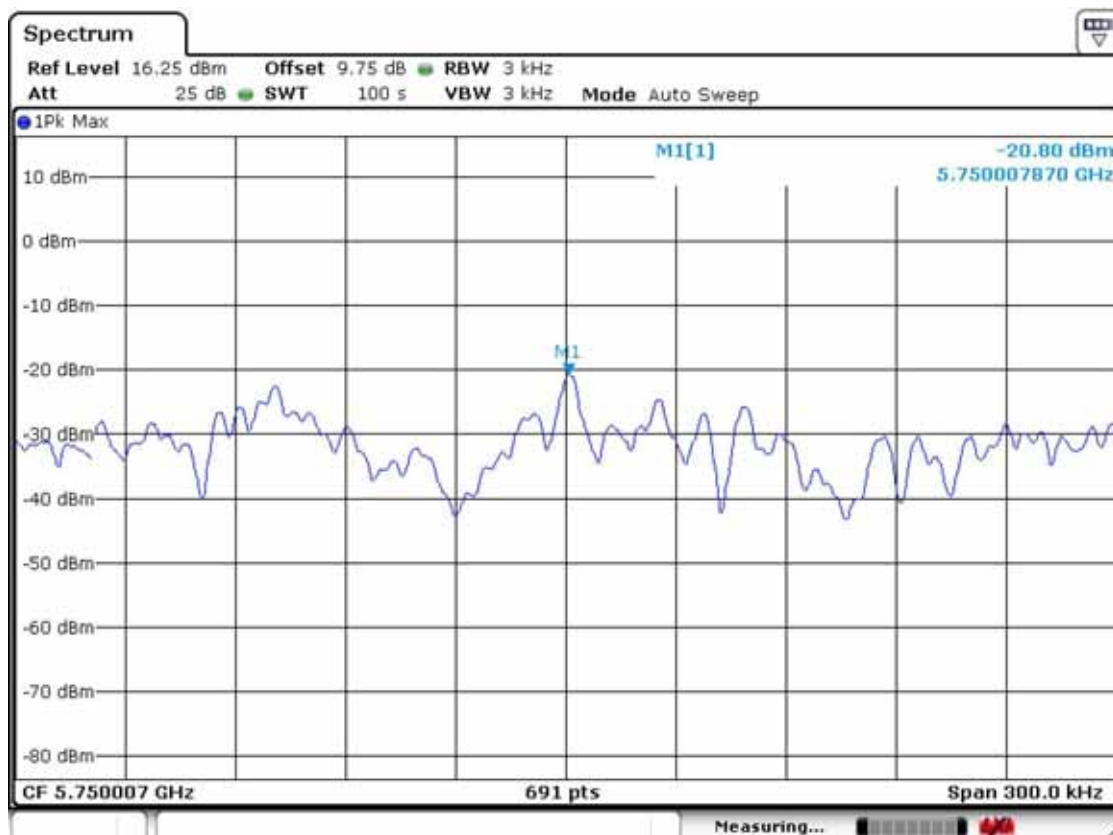


CH 165

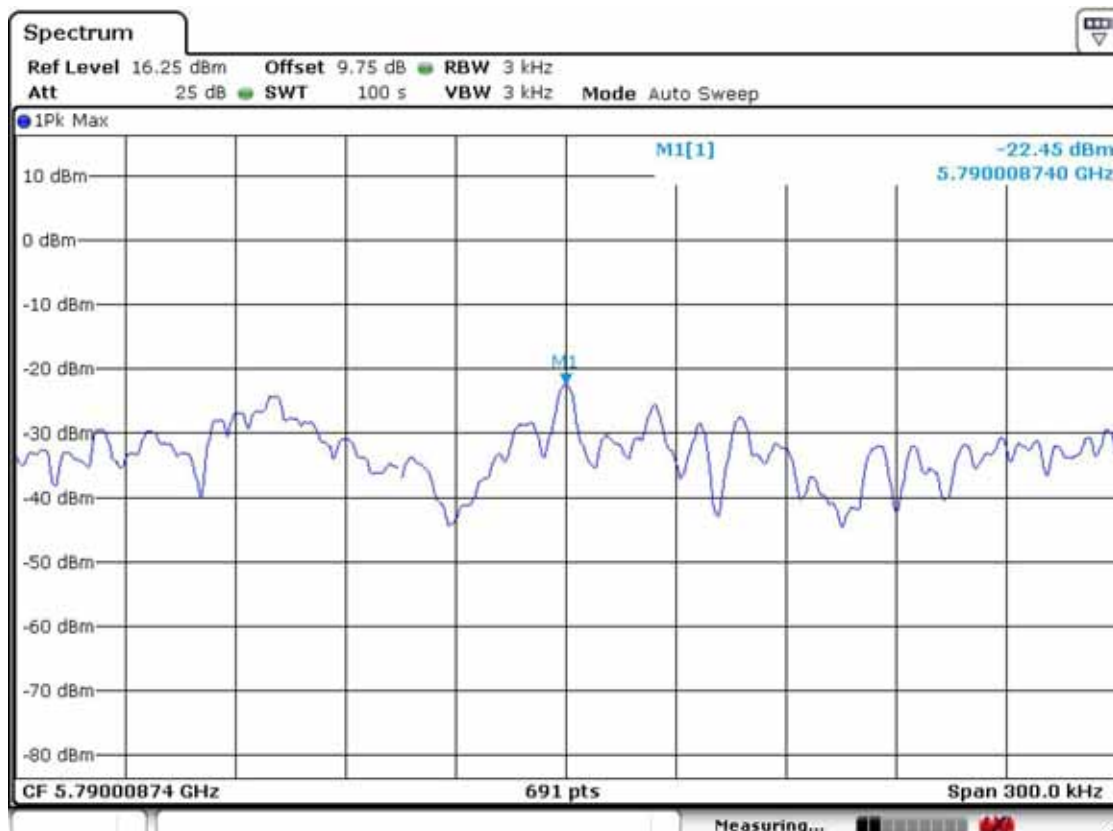


802.11an 40MHz Power Density Measurement

CH 151



CH 159



Procedure:

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

Center frequency = the highest, middle and the lowest channels

VBW = 100 kHz

Detector function = peak

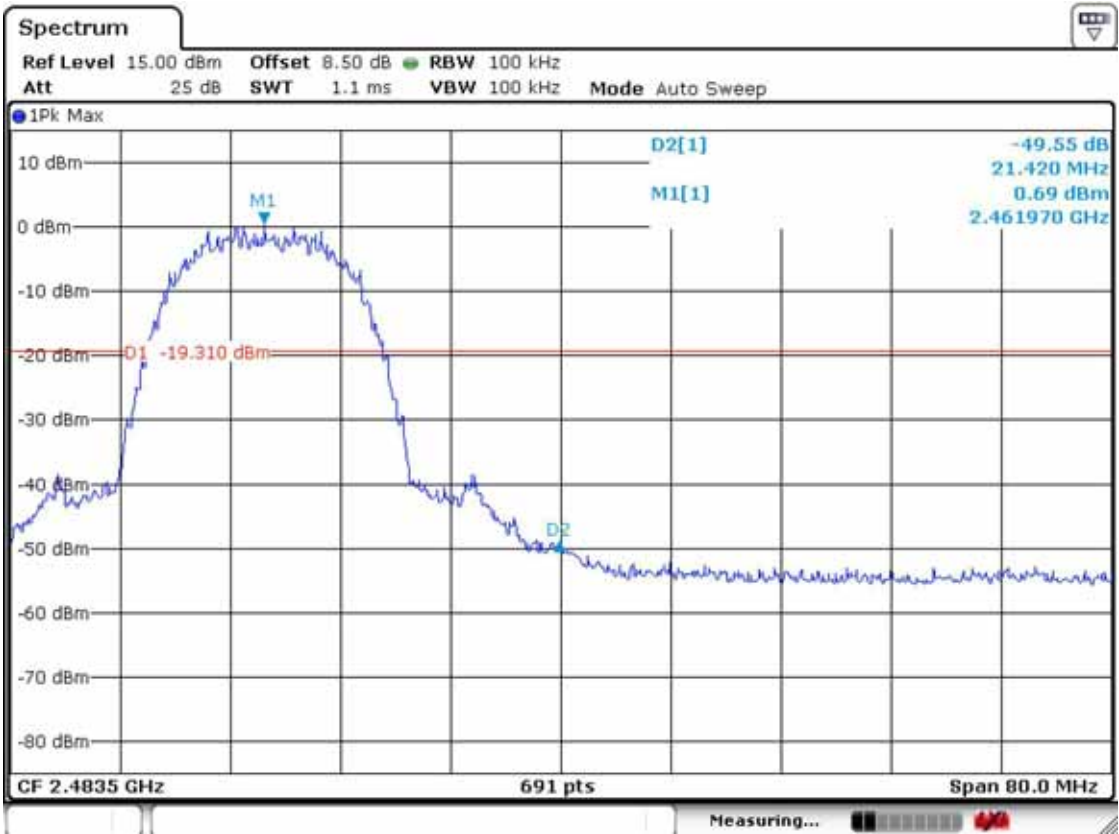
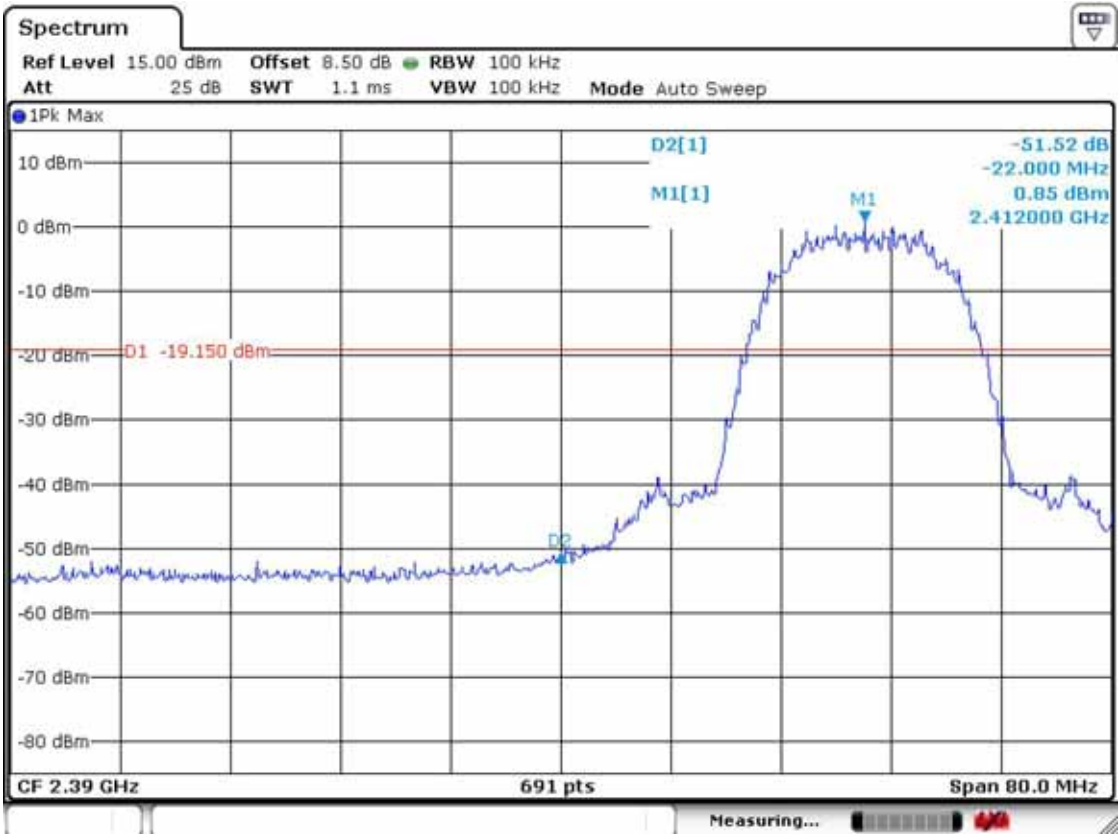
Sweep = auto

- 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.

Measurement Setup

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802.11b Band-edge : Conducted Measurements



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

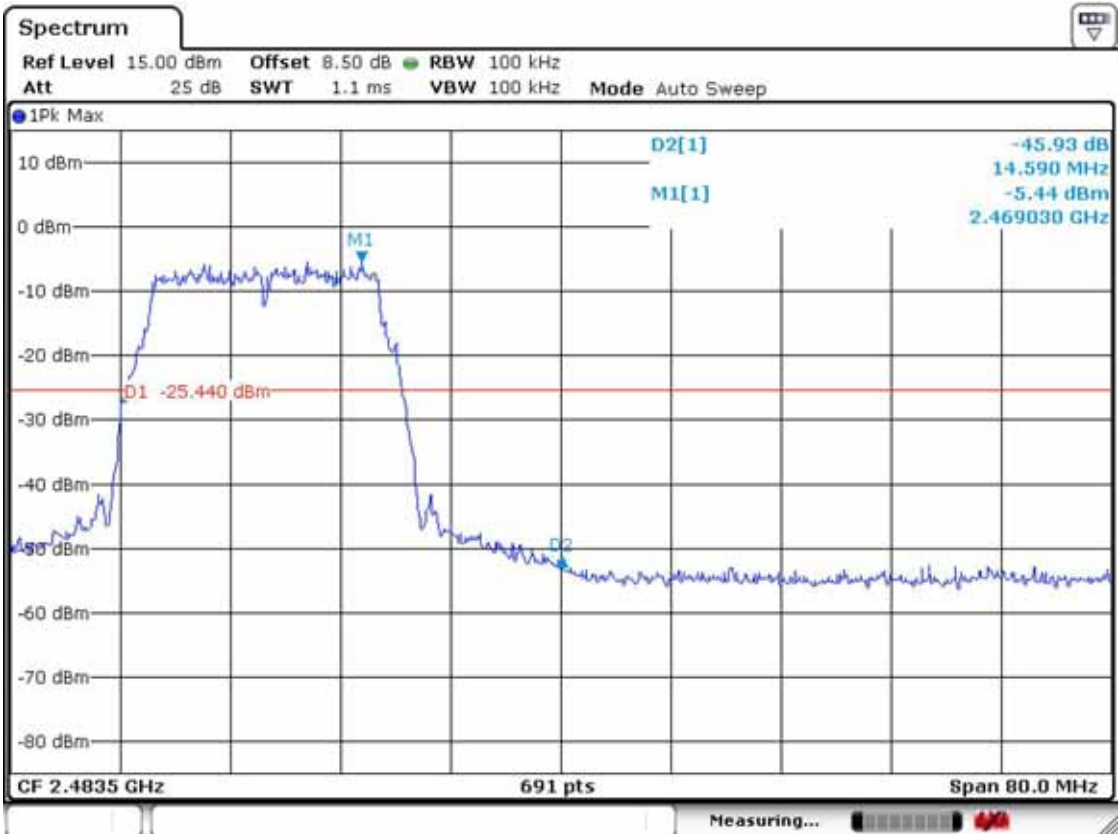
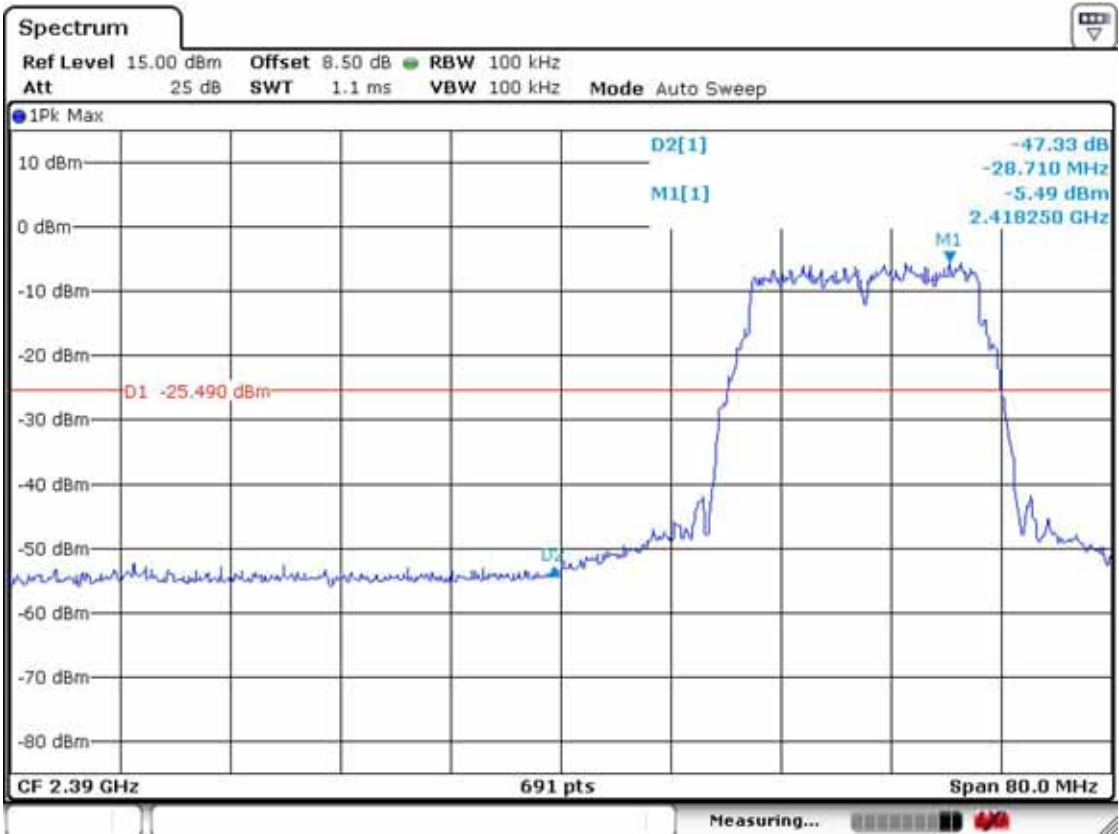
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	45.5	62.3	H	26.0	36.0	8.2	54.0	74.0	43.7	60.5	10.3	13.5

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

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	47.0	66.2	H	26.0	36.0	8.2	54.0	74.0	45.2	64.4	8.8	9.6

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

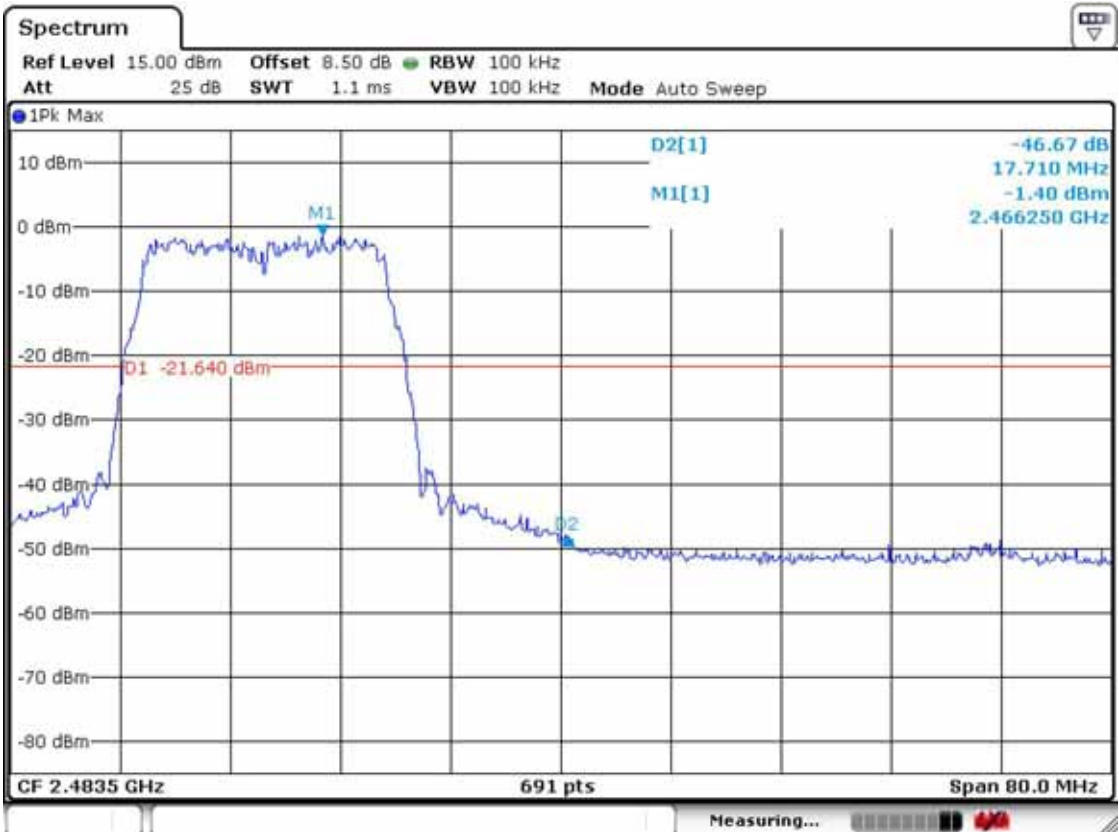
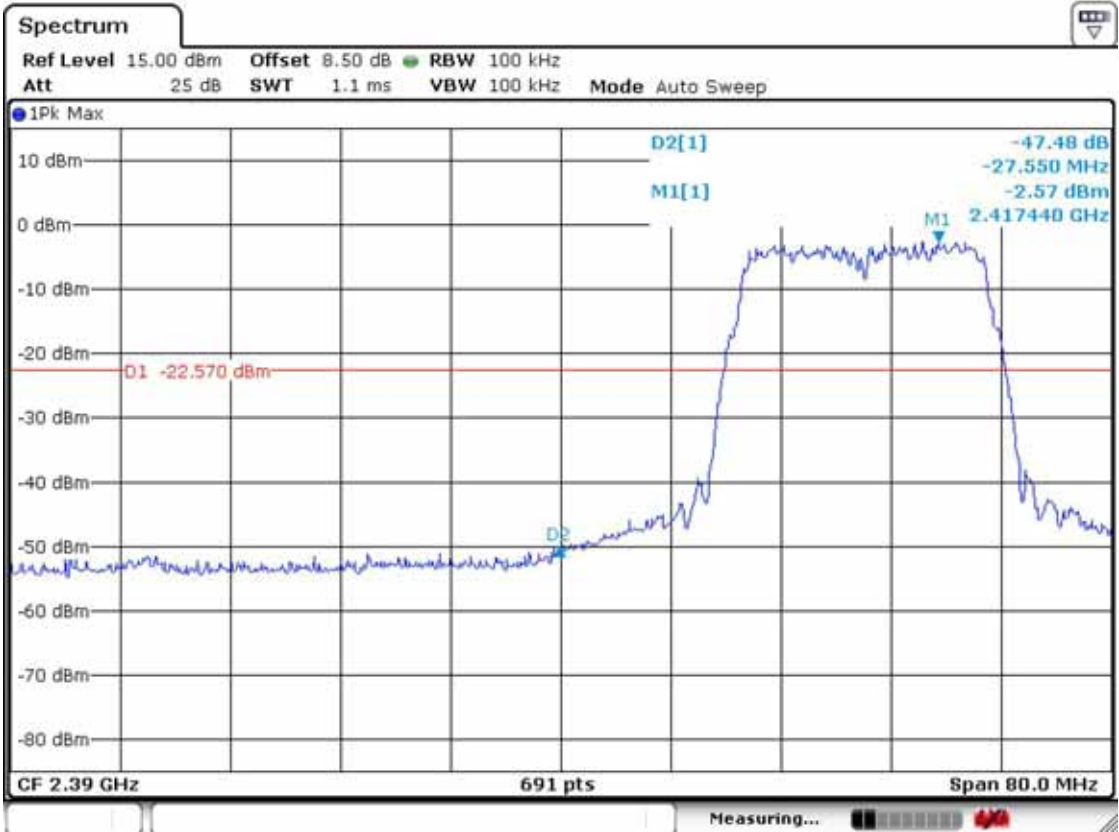
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	51.5	65.2	H	26.0	36.0	8.2	54.0	74.0	49.7	63.4	4.3	10.6

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

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	53.4	67.4	H	26.0	36.0	8.2	54.0	74.0	51.6	65.6	2.4	8.5

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	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	52.7	65.8	H	26.0	36.0	8.2	54.0	74.0	50.9	64.0	3.1	10.0

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

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	53.2	66.1	H	26.0	36.0	8.2	54.0	74.0	51.4	64.3	2.6	9.7

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

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

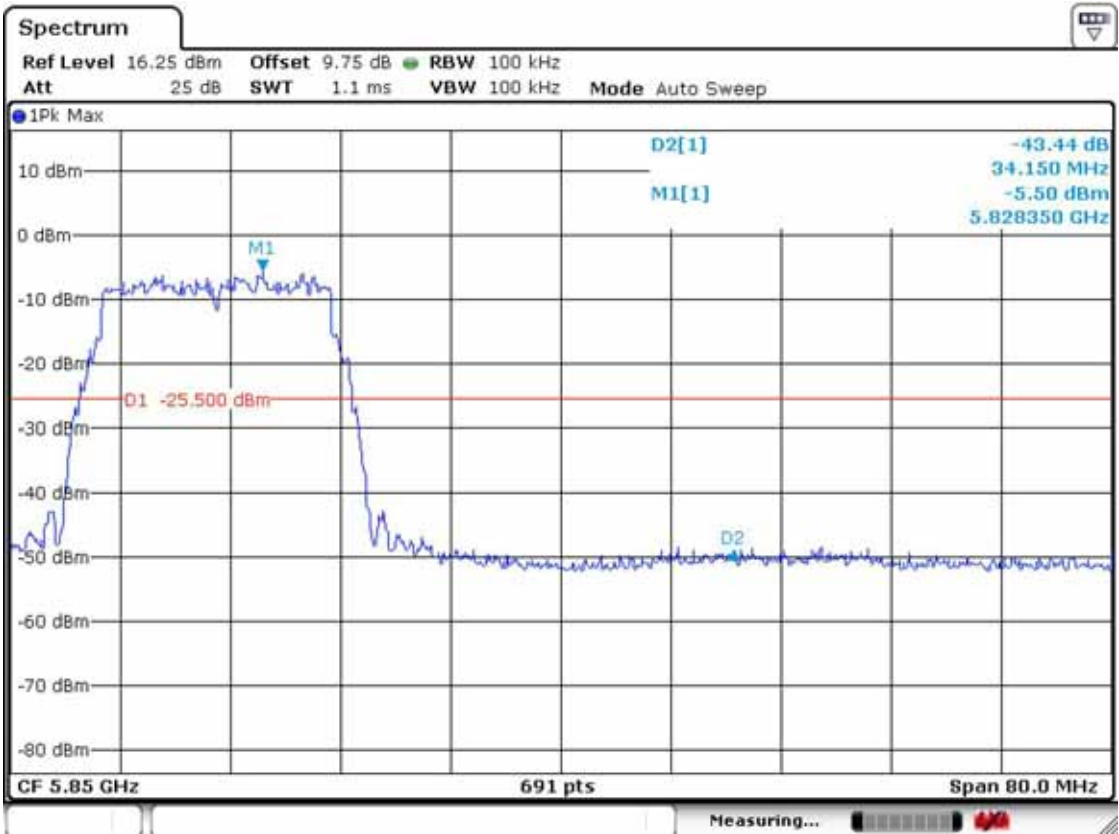
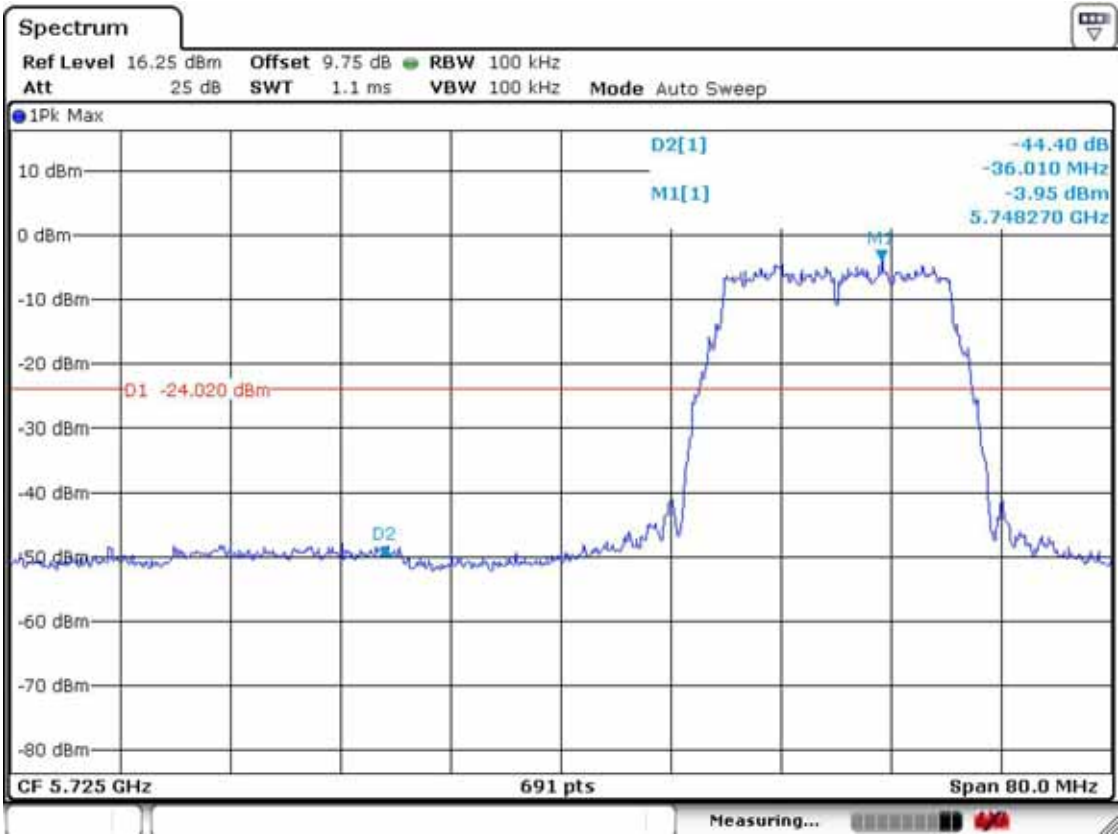
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	54.2	66.3	H	26.0	36.0	8.2	54.0	74.0	52.4	64.4	1.6	9.6

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

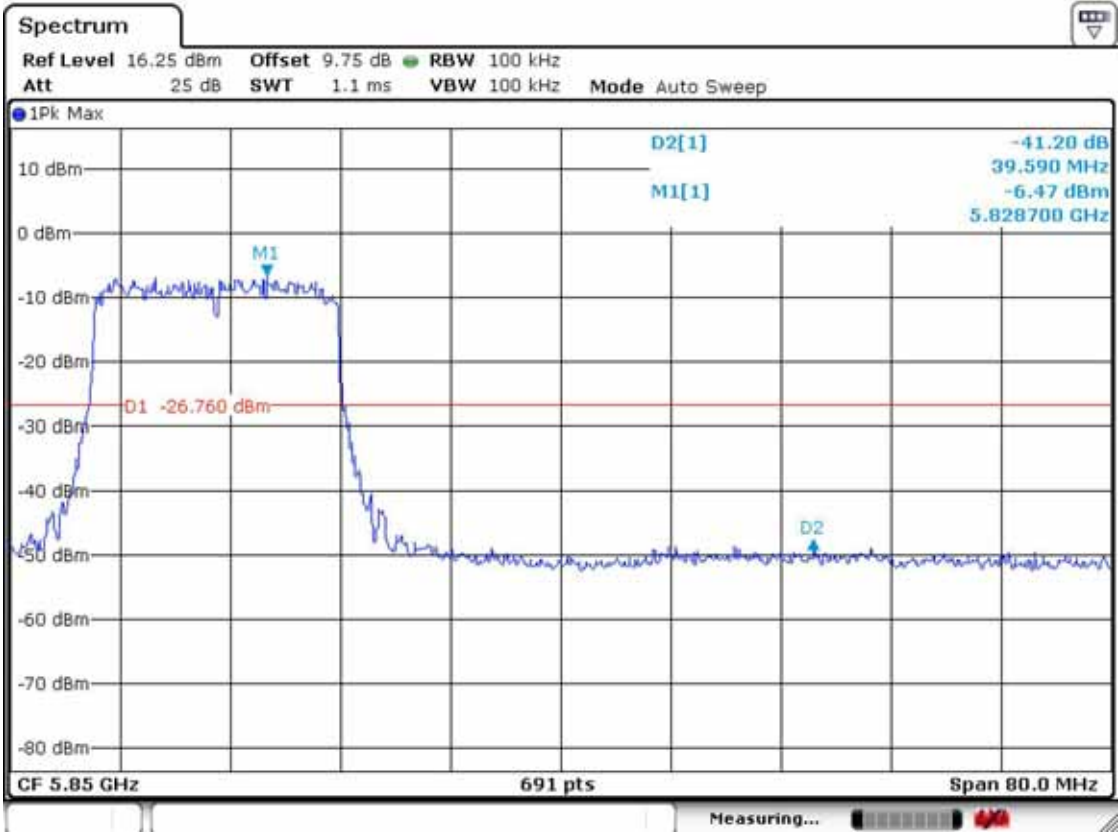
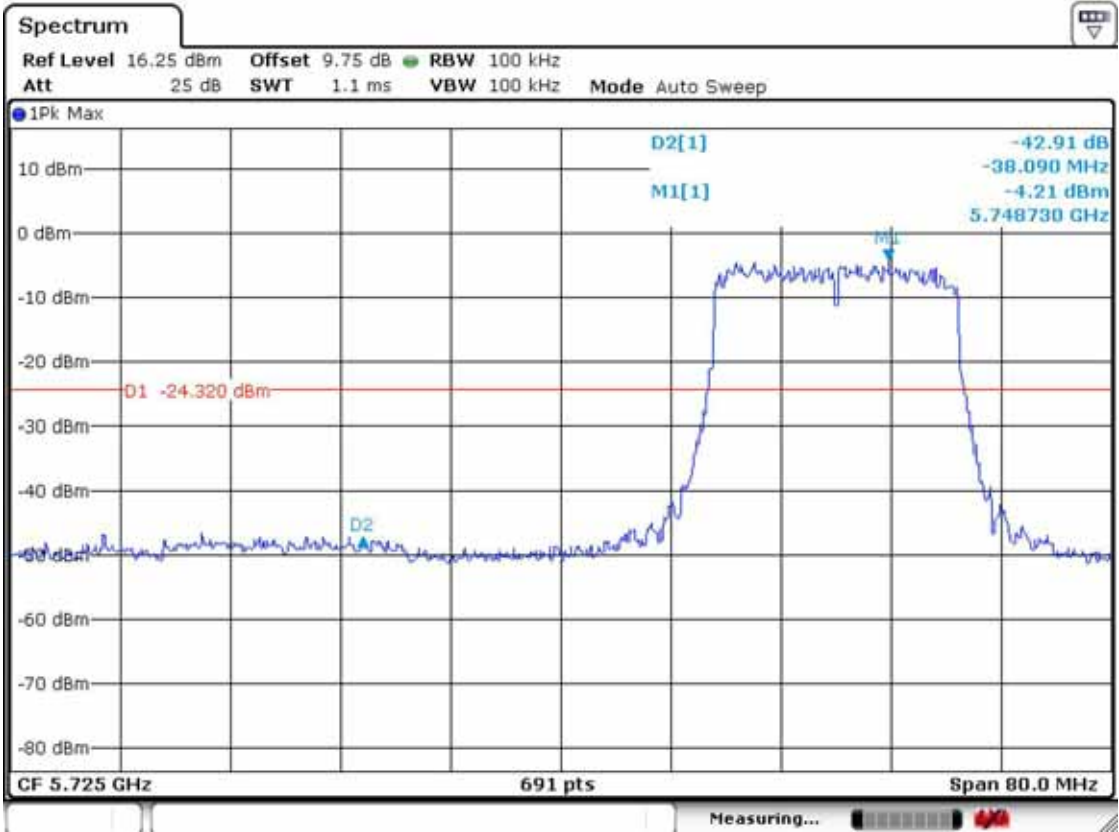
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	54.0	66.2	H	26.0	36.0	8.2	54.0	74.0	52.2	64.4	1.8	9.6

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

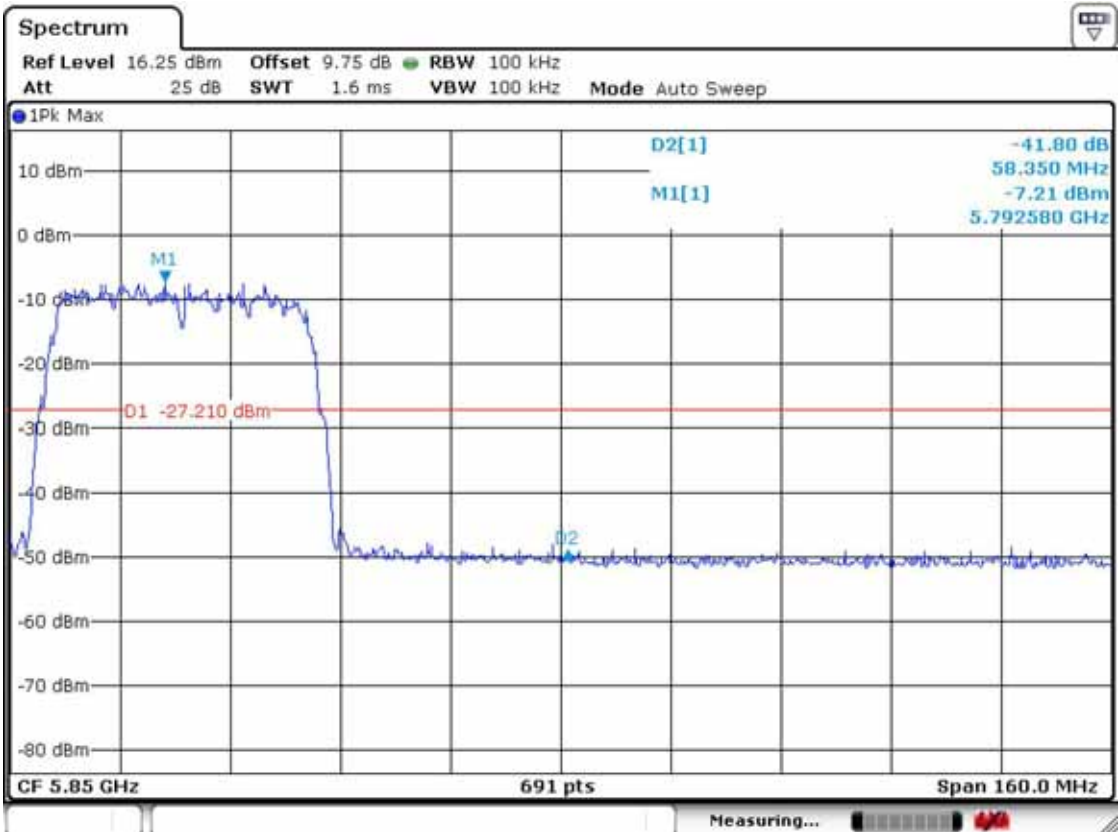
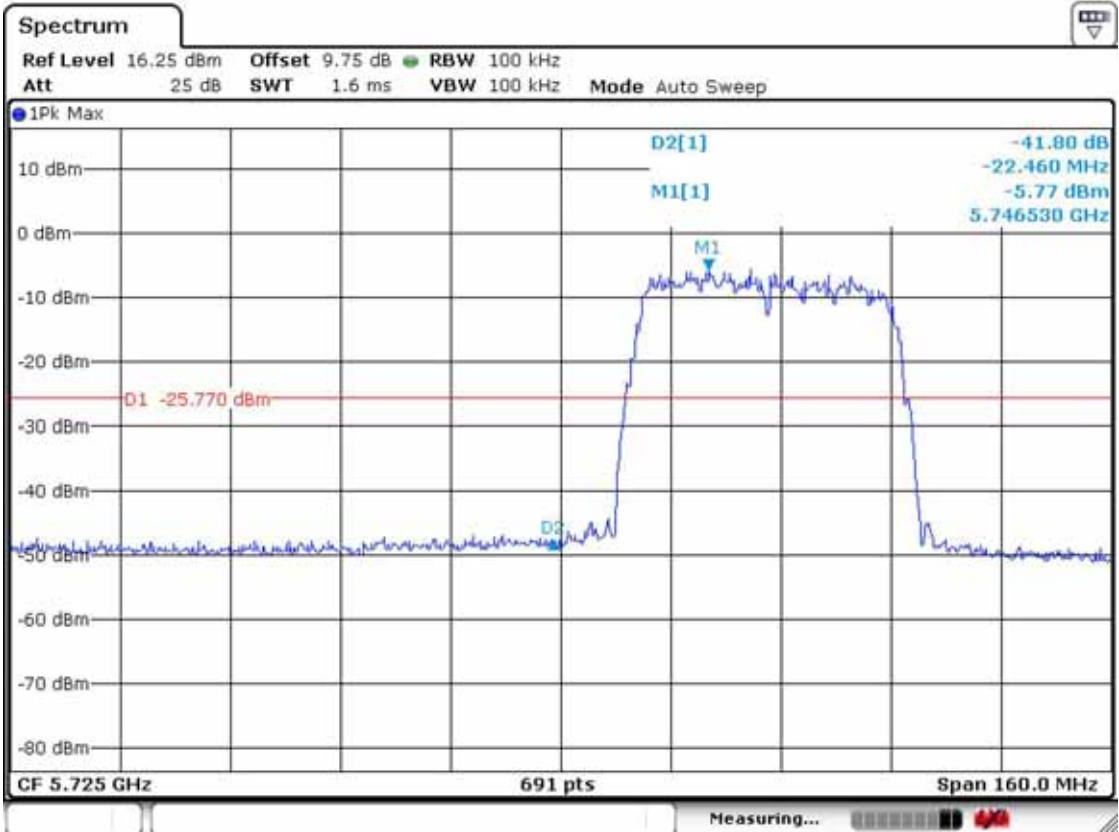
802.11a Band-edge : Conducted Measurements



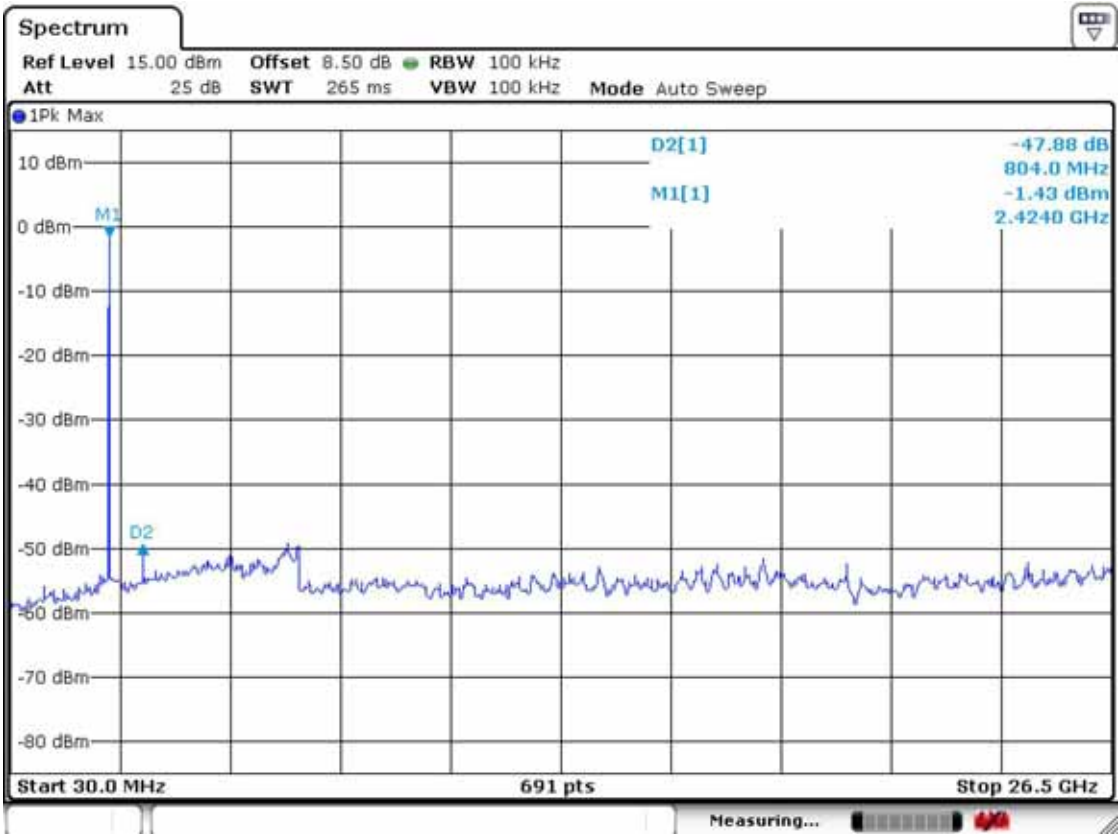
802.11an 20MHz Band-edge : Conducted Measurements



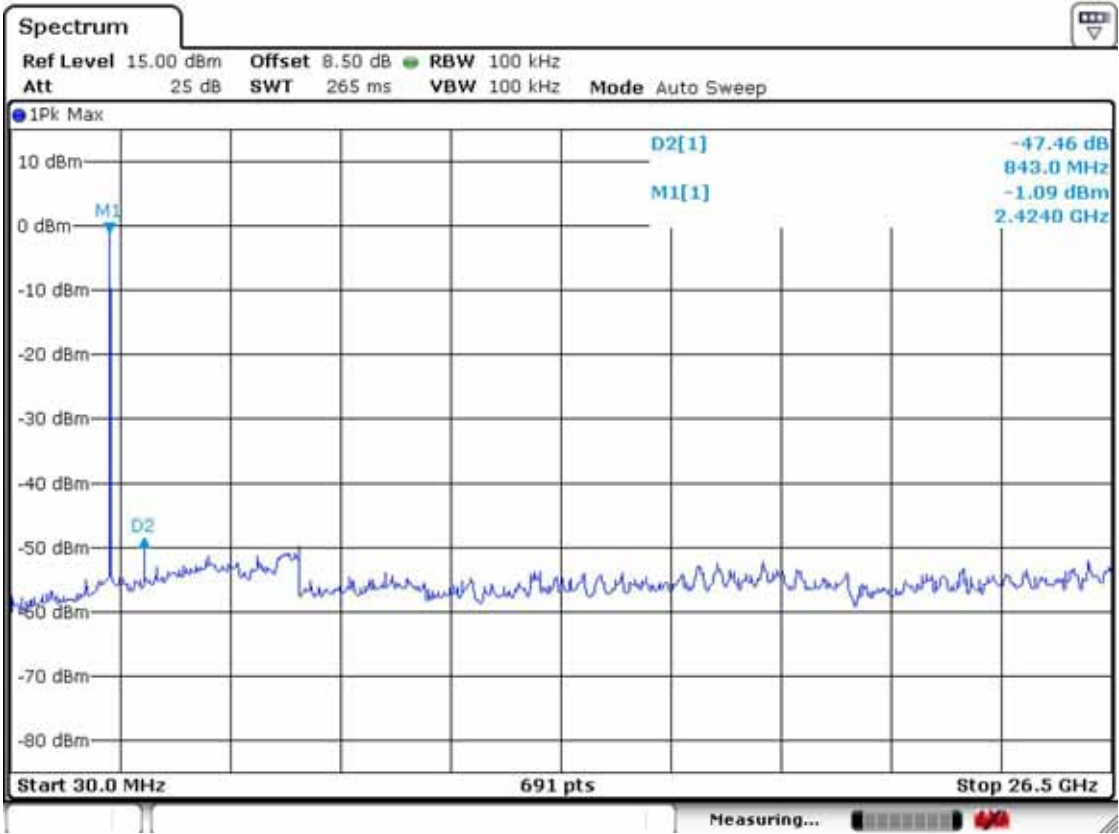
802.11an 40MHz Band-edge : Conducted Measurements



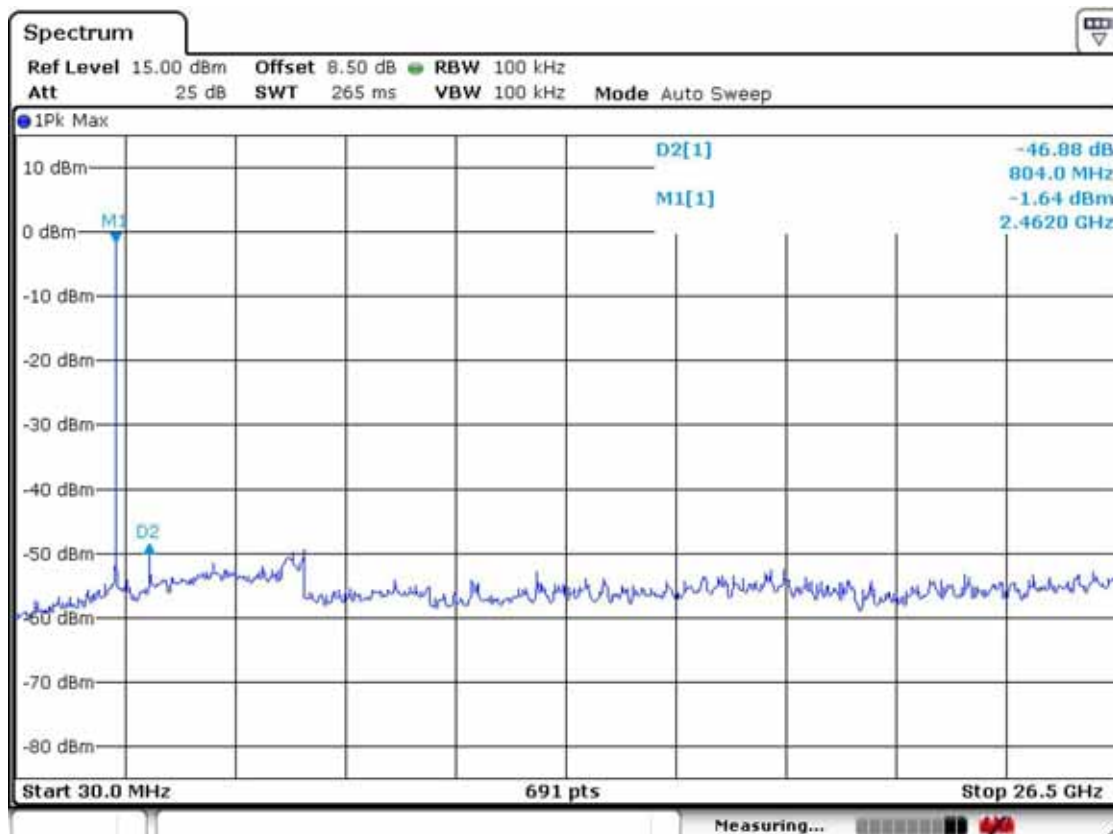
802.11b – channel 1
Frequency Range = 30 MHz ~ 10th harmonic.



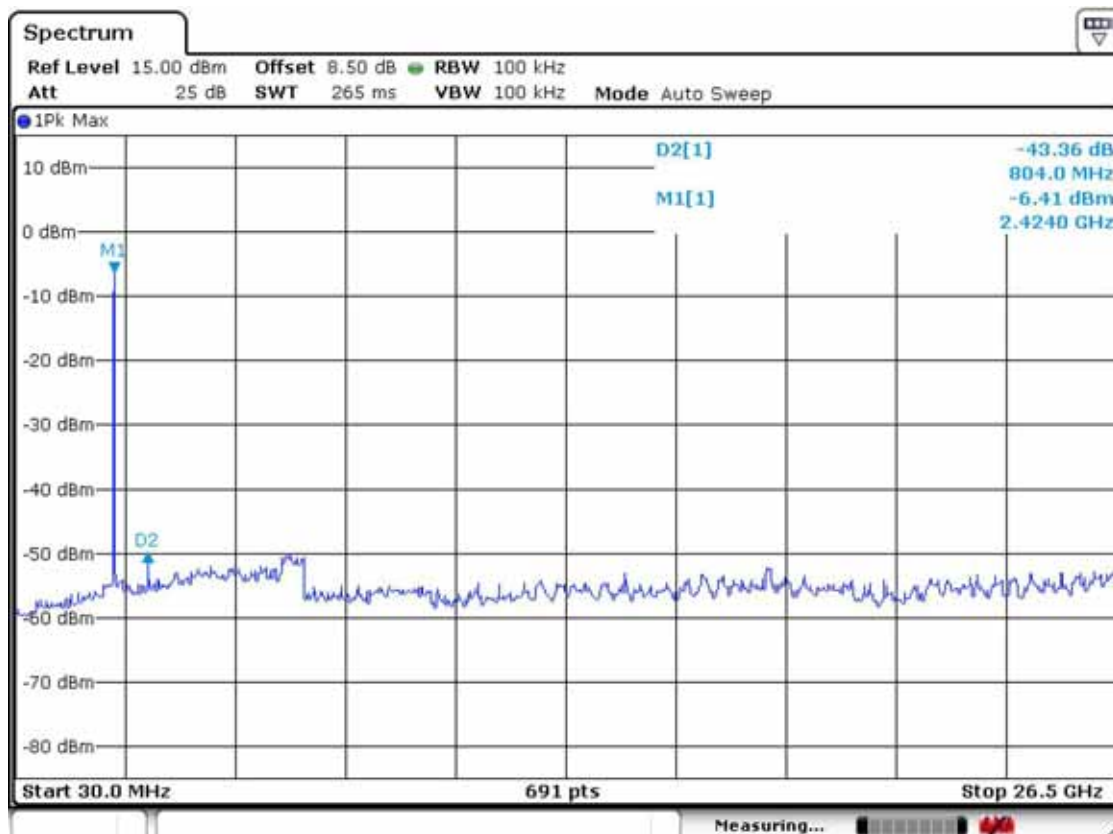
802.11b – channel 6
Frequency Range = 30 MHz ~ 10th harmonic.



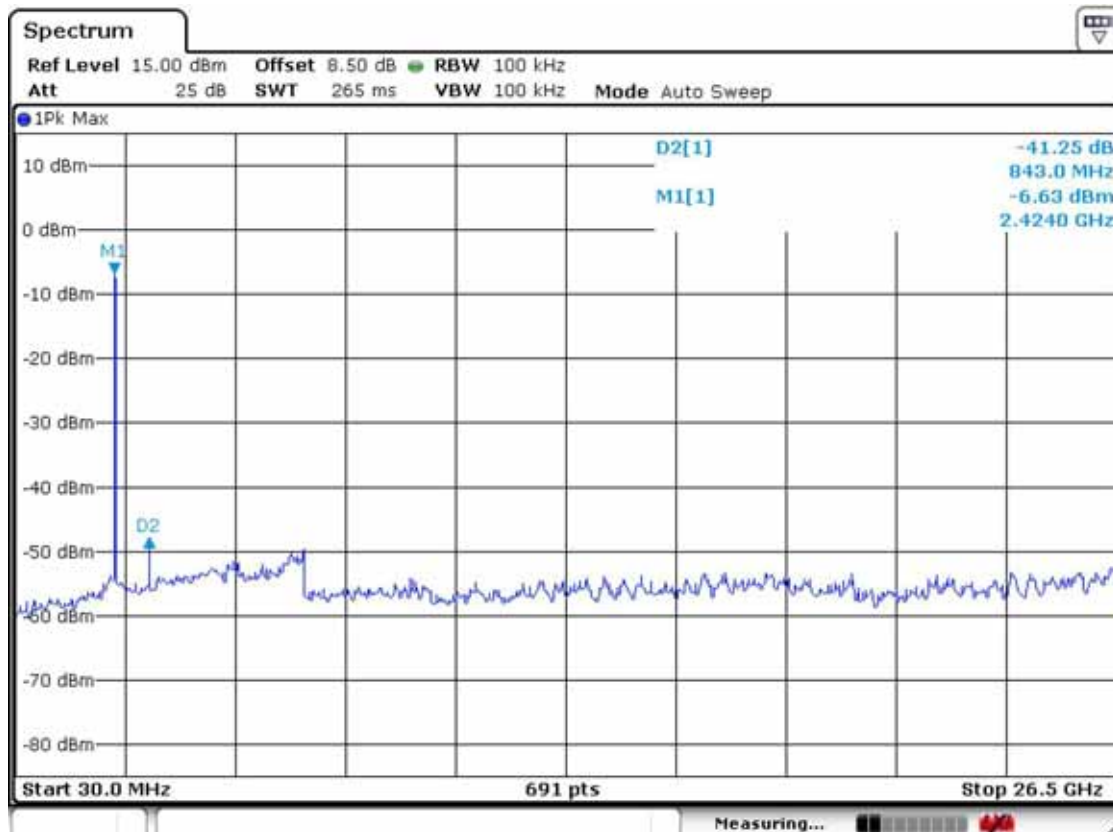
802.11b –channel 11
Frequency Range = 30 MHz ~ 10th harmonic.



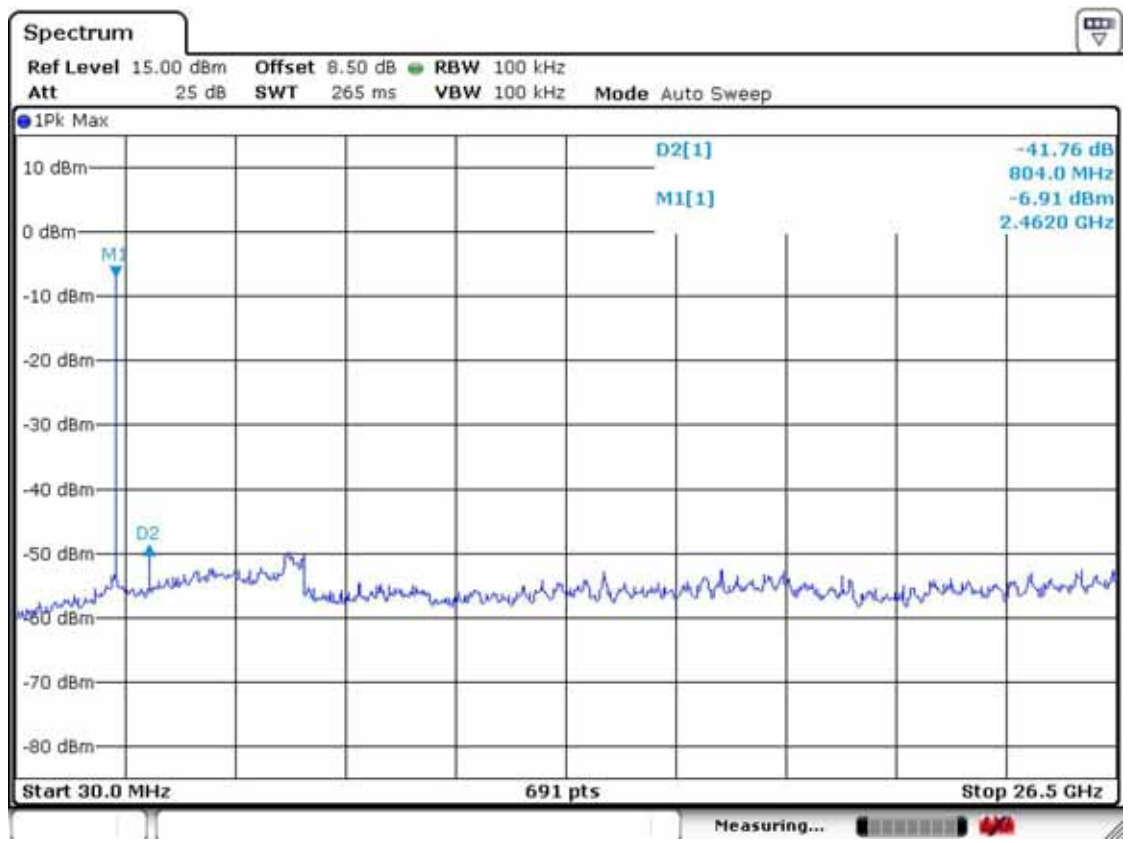
802.11g – channel 1
Frequency Range = 30 MHz ~ 10th harmonic.



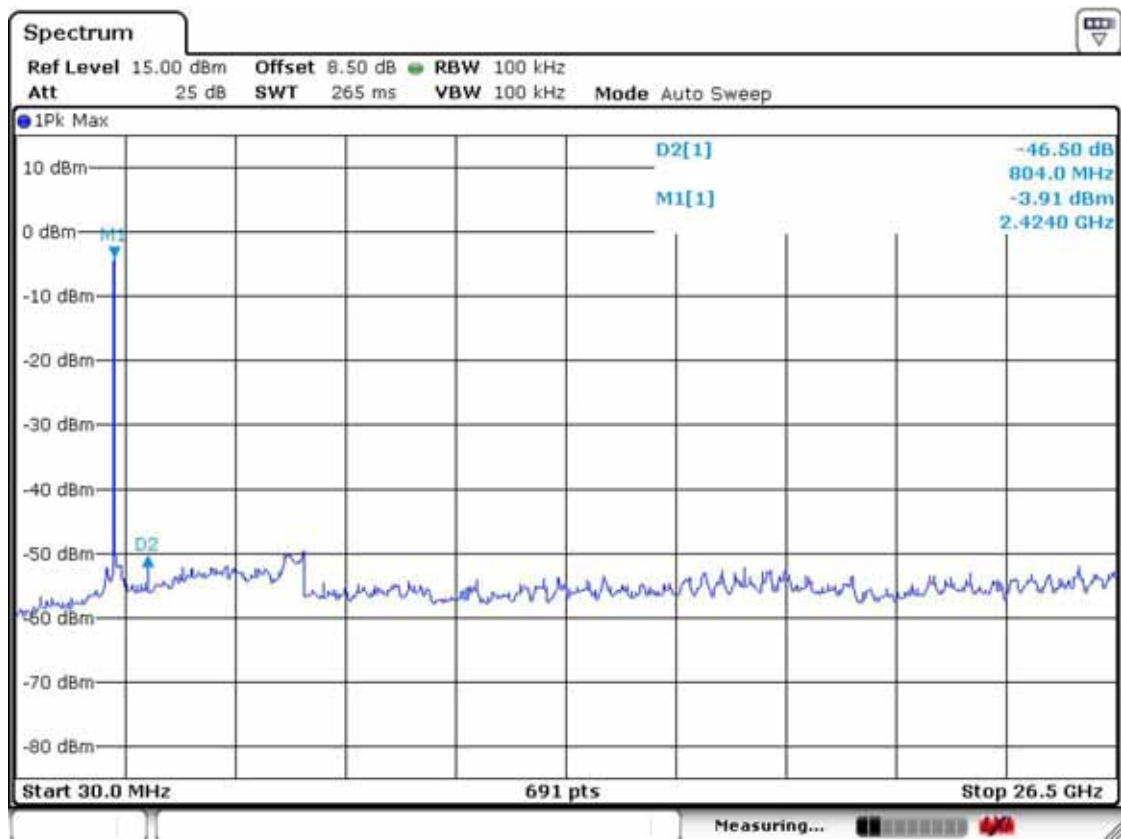
802.11g – channel 6
Frequency Range = 30 MHz ~ 10th harmonic.



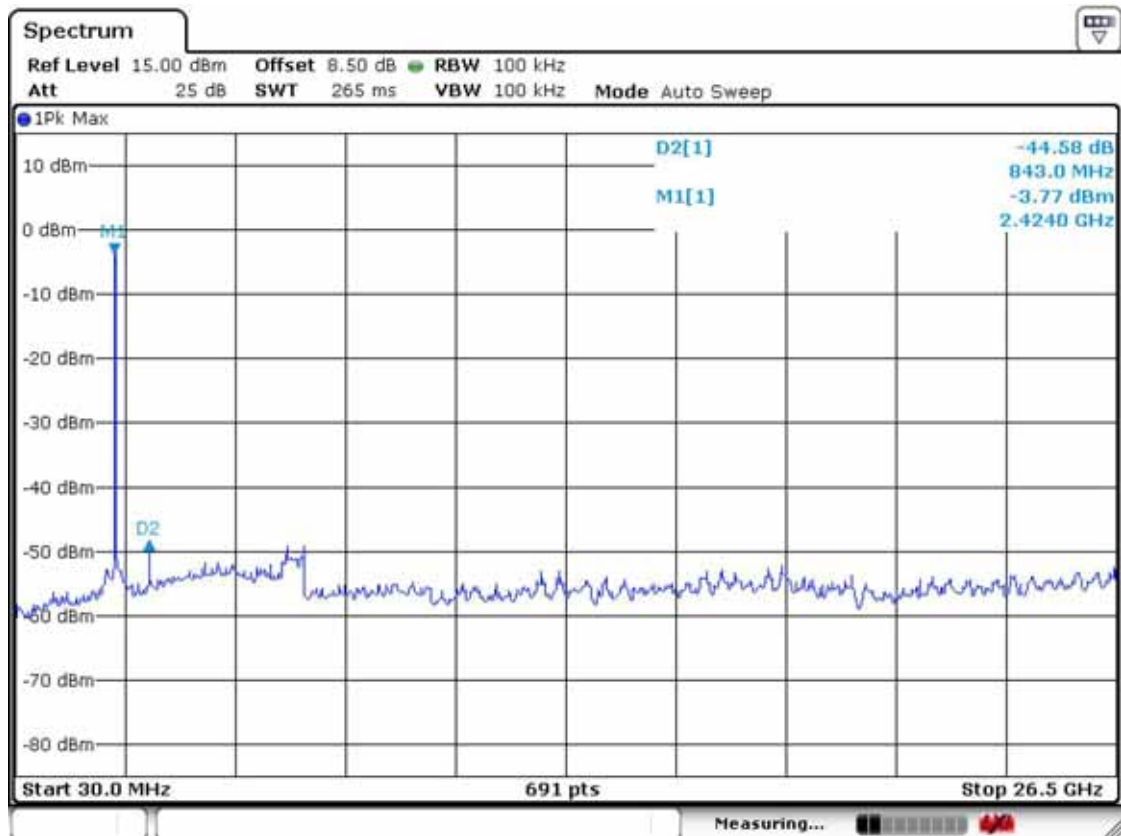
802.11g –channel 11
Frequency Range = 30 MHz ~ 10th harmonic.



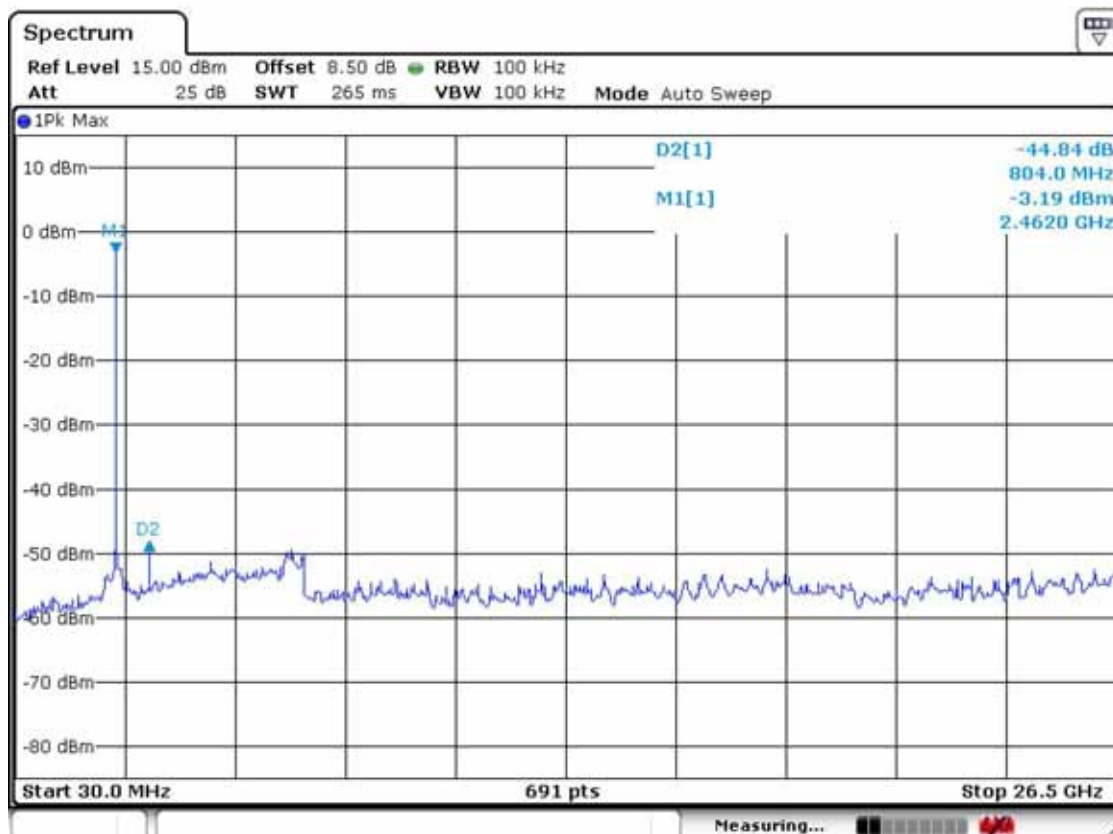
802.11n_20MHz – channel 1
Frequency Range = 30 MHz ~ 10th harmonic.



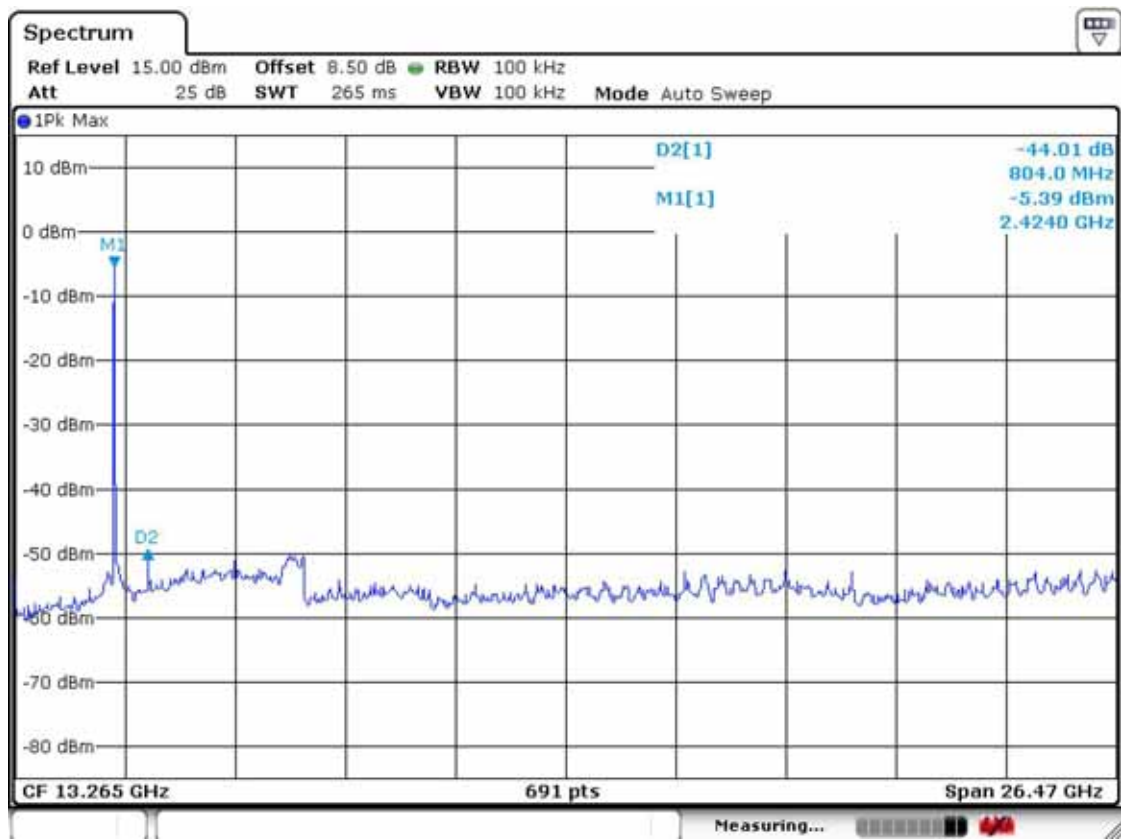
802.11n_20MHz – channel 6
Frequency Range = 30 MHz ~ 10th harmonic.



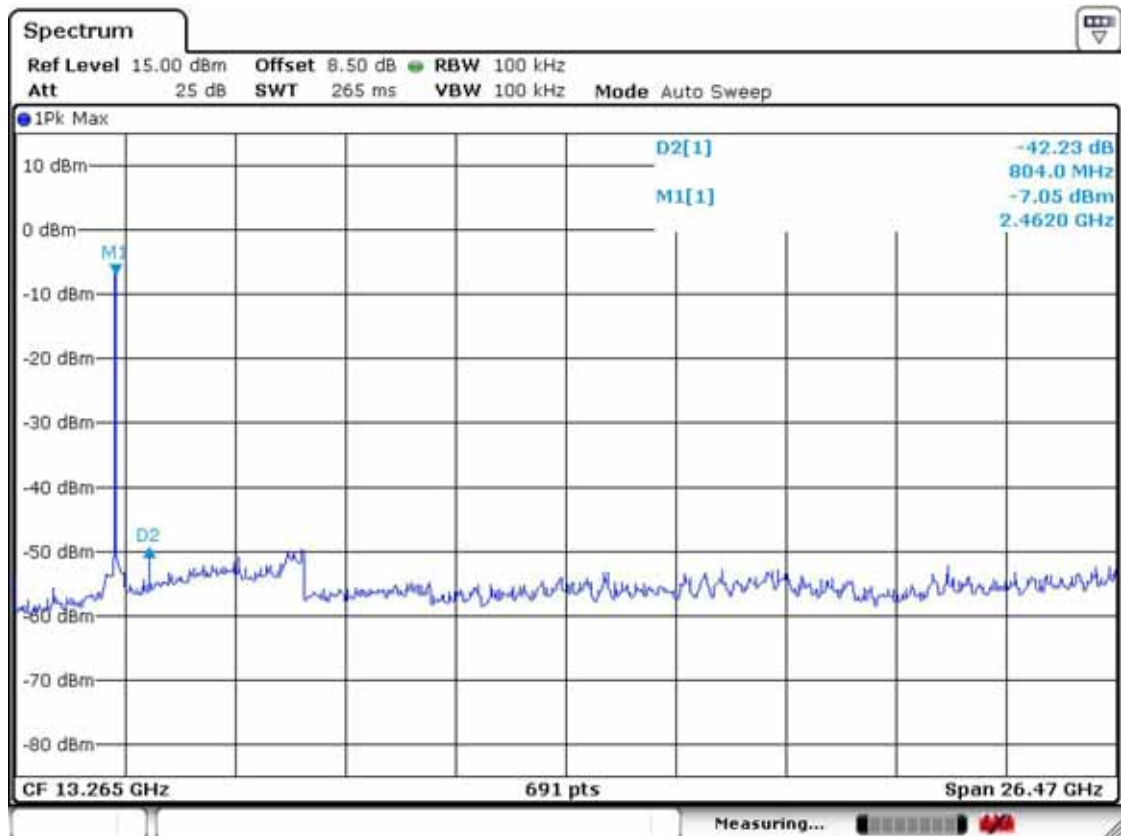
802.11n_20MHz –channel 11
Frequency Range = 30 MHz ~ 10th harmonic.



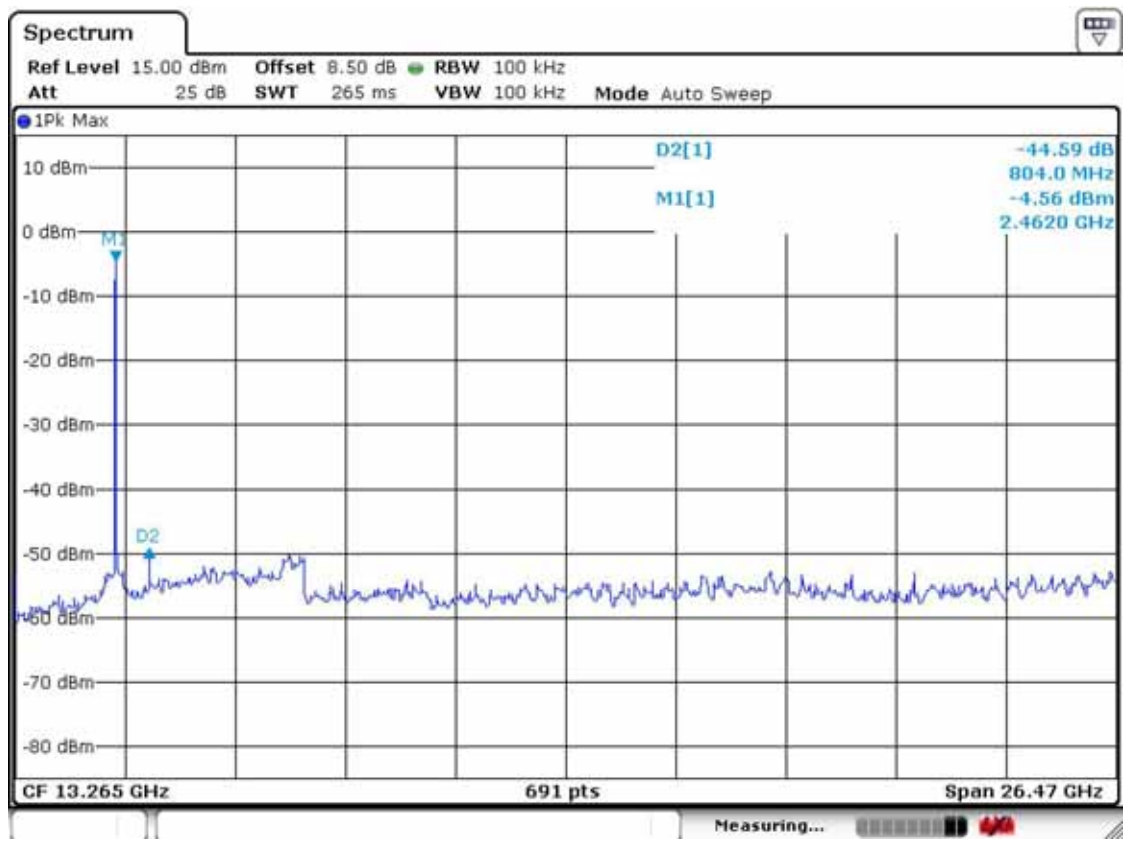
802.11n_40MHz – channel 1
Frequency Range = 30 MHz ~ 10th harmonic.



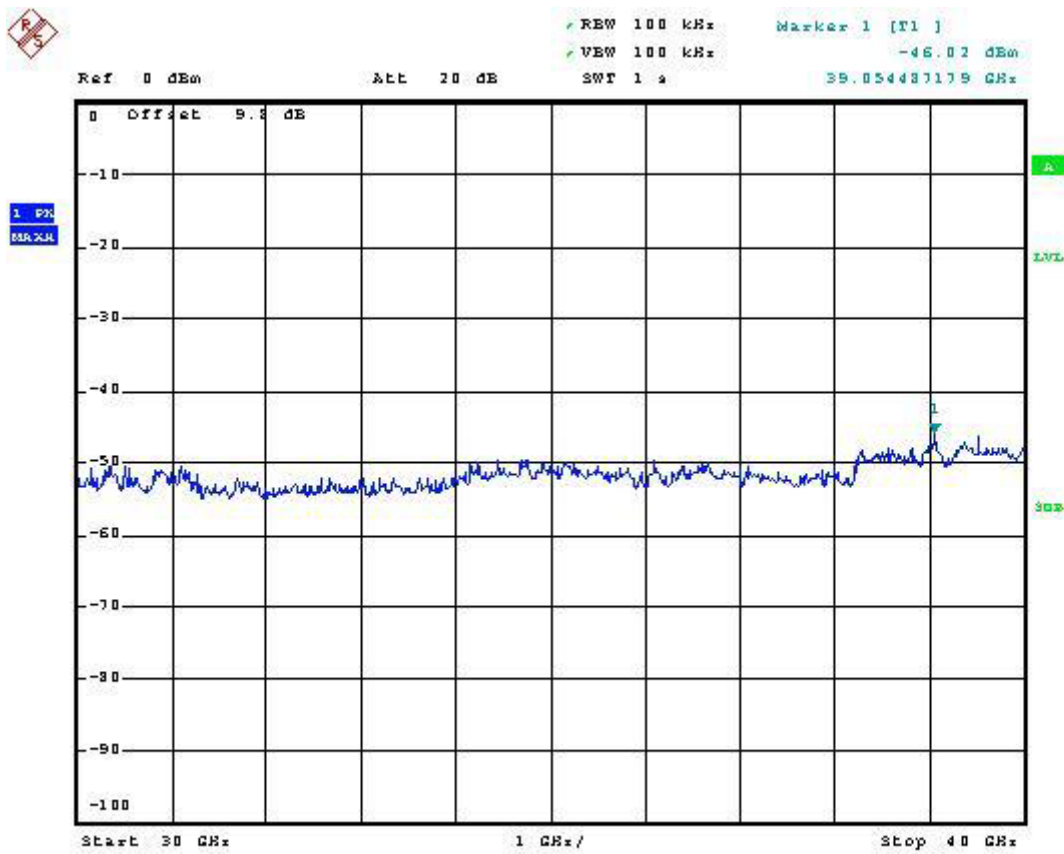
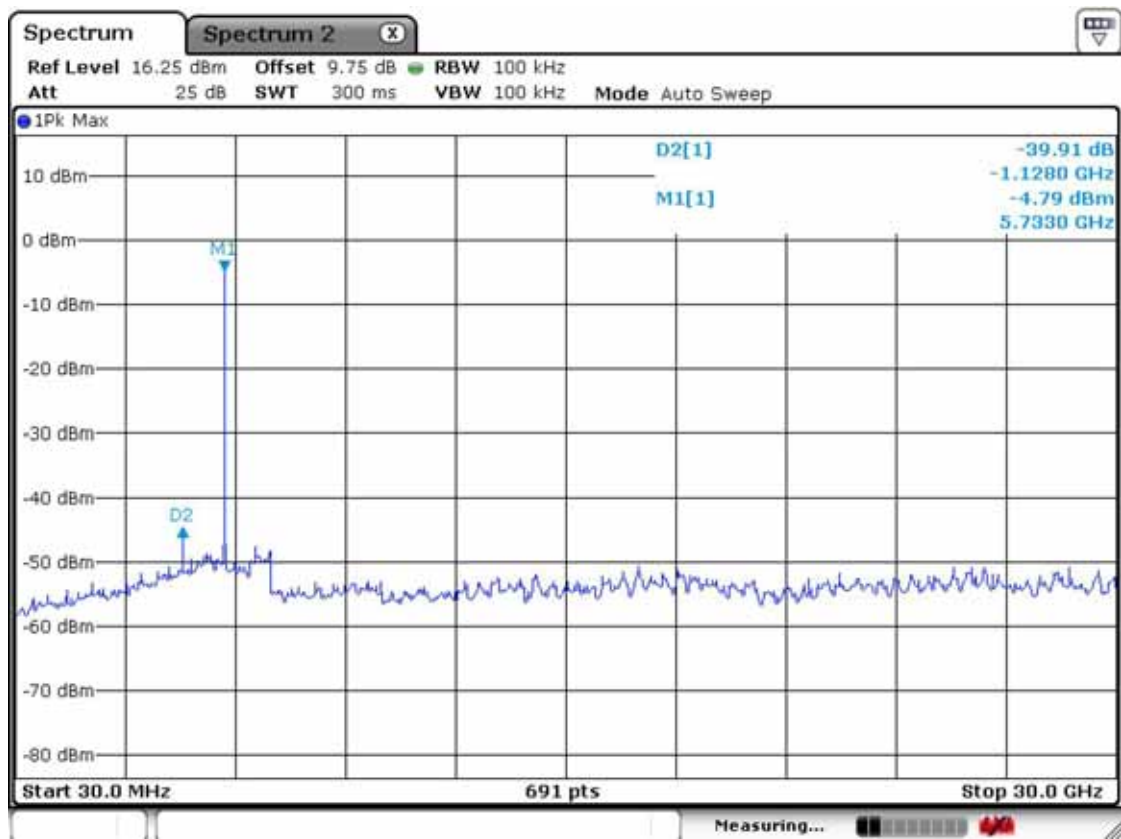
802.11n_40MHz – channel 4
Frequency Range = 30 MHz ~ 10th harmonic.



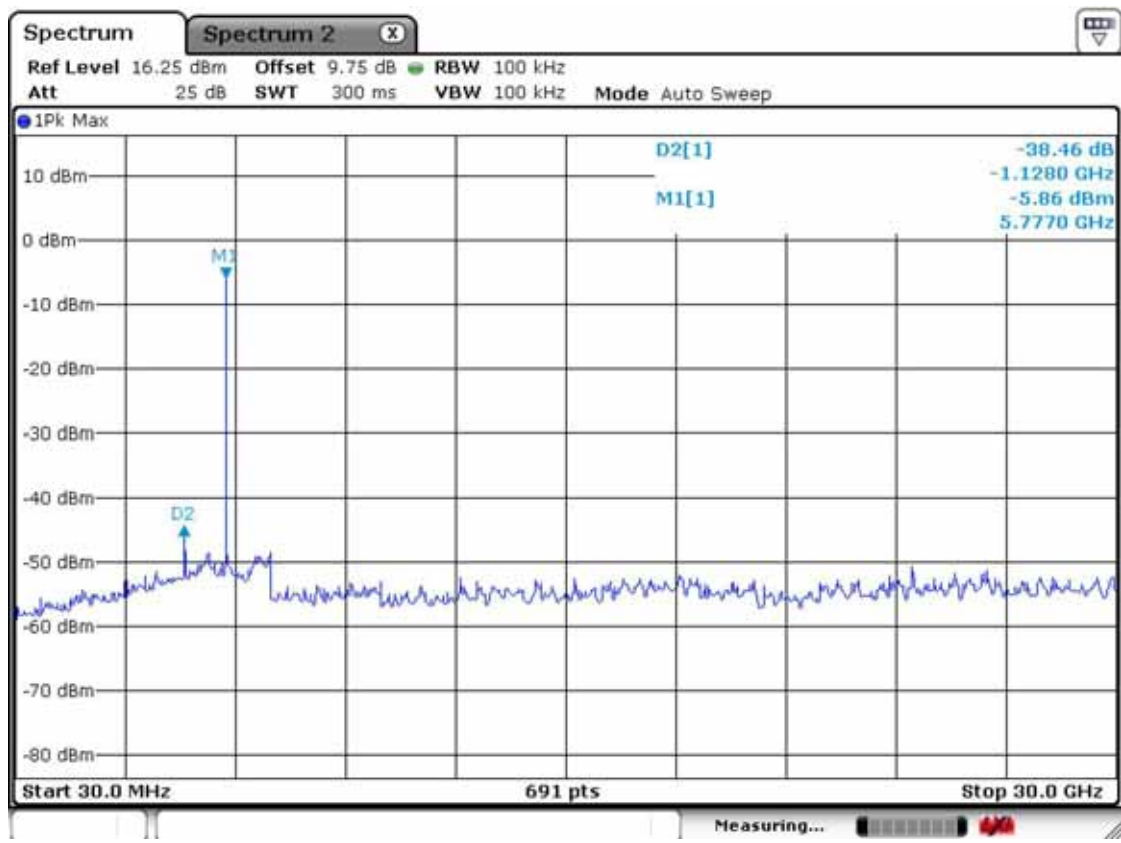
802.11n_40MHz –channel 7
Frequency Range = 30 MHz ~ 10th harmonic.



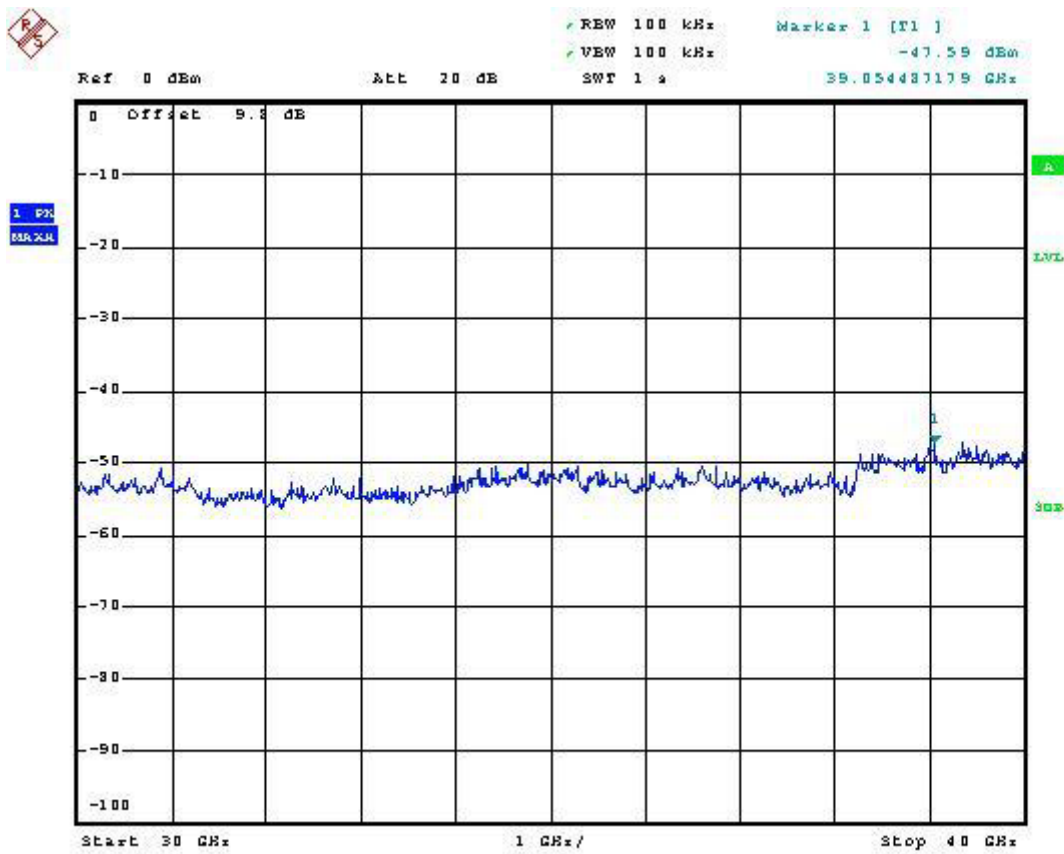
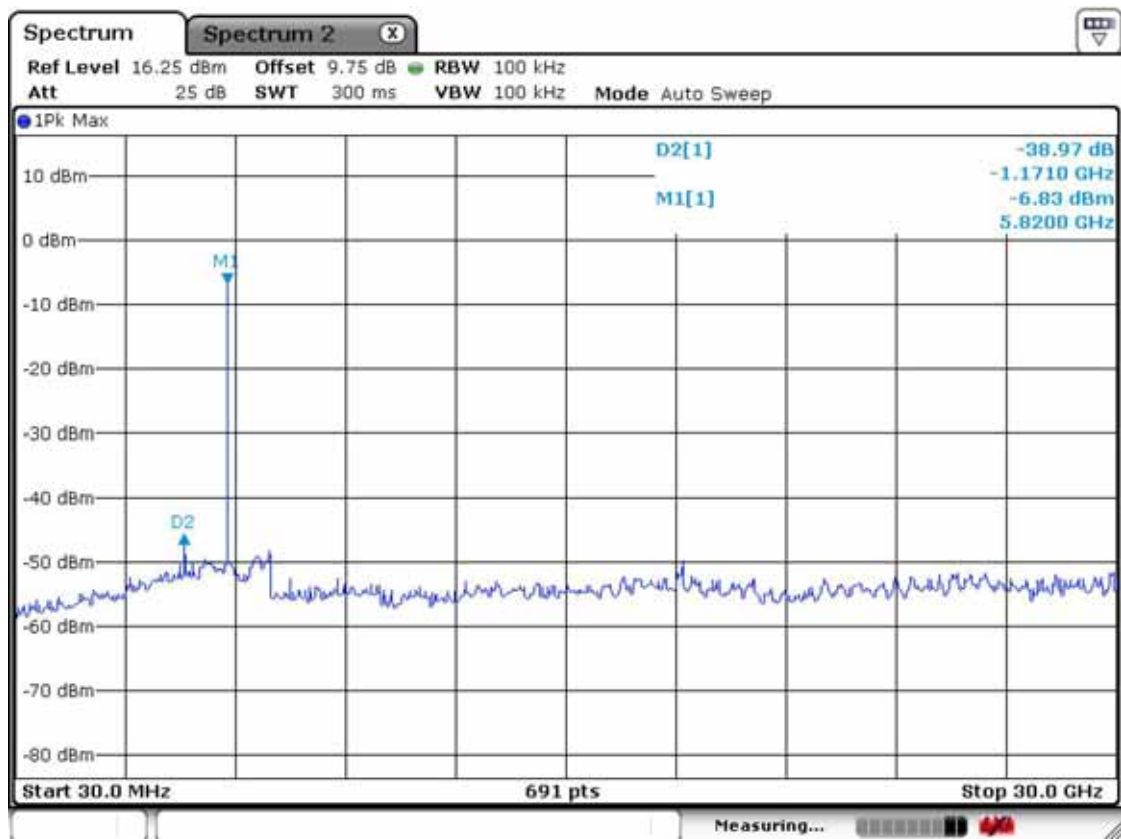
802.11a – channel 149
Frequency Range = 30 MHz ~ 40 GHz



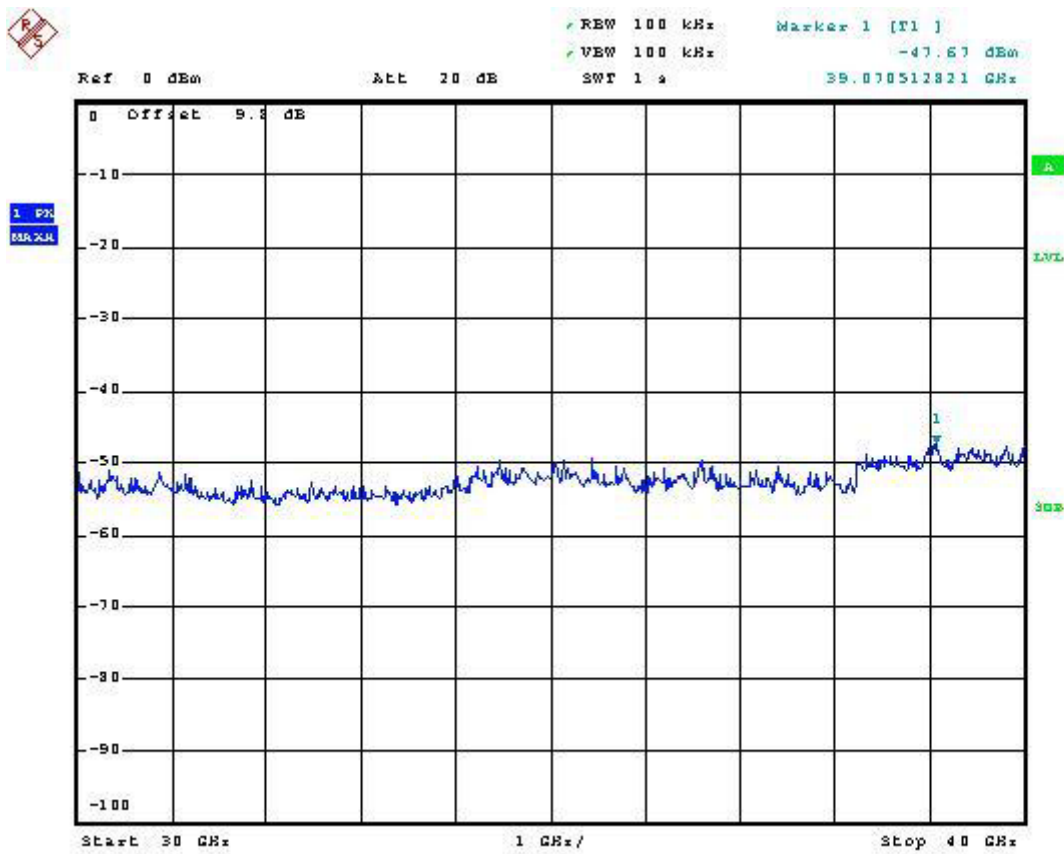
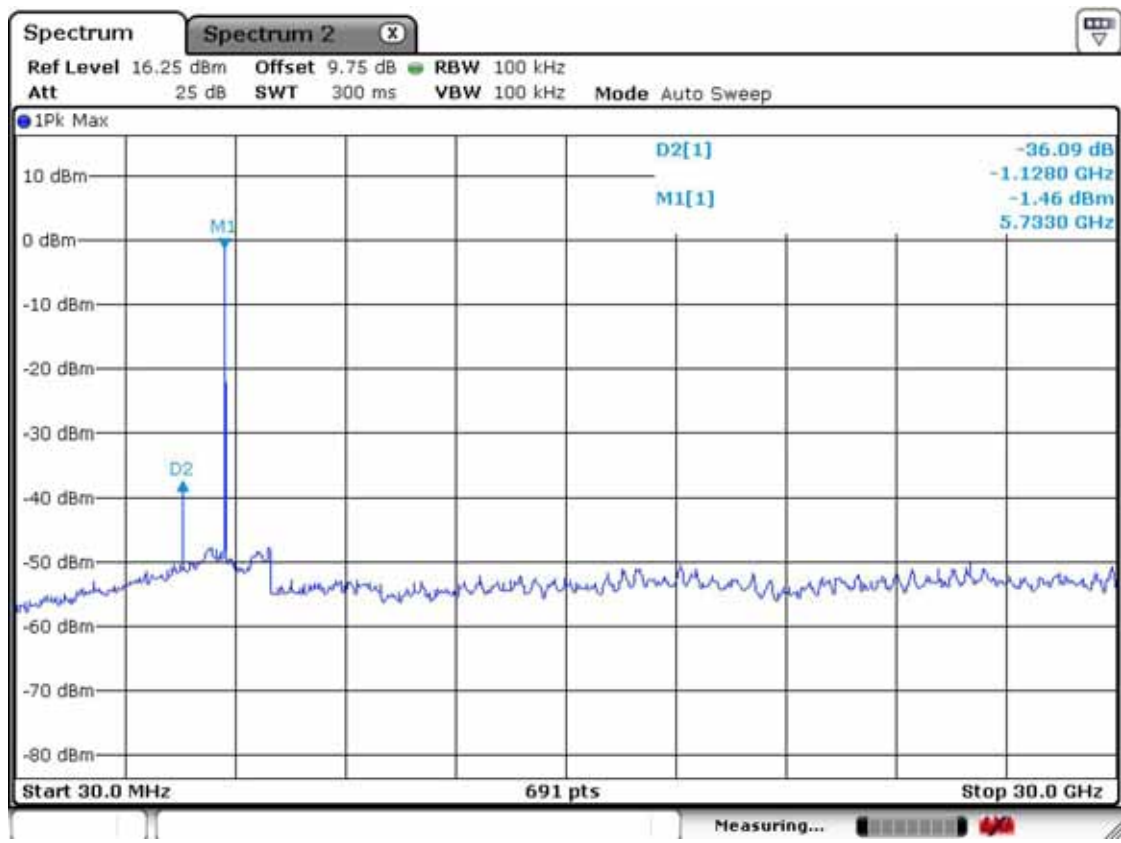
802.11a – channel 157
Frequency Range = 30 MHz ~ 40 GHz



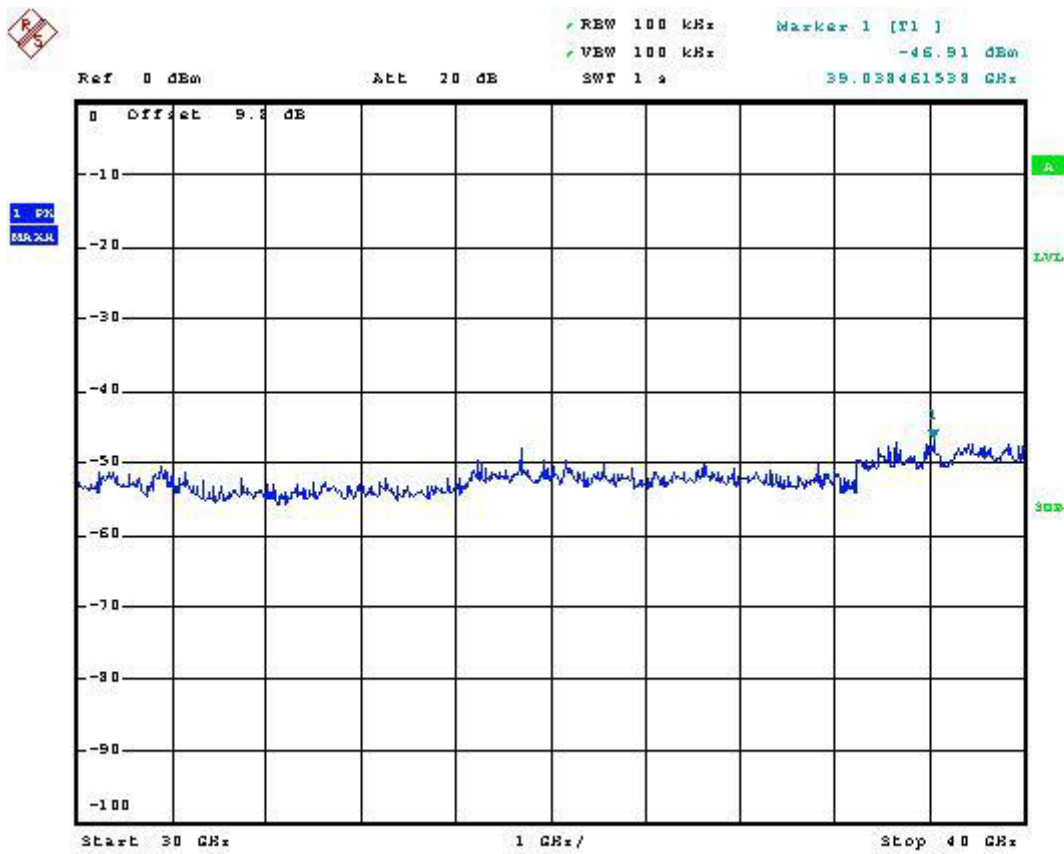
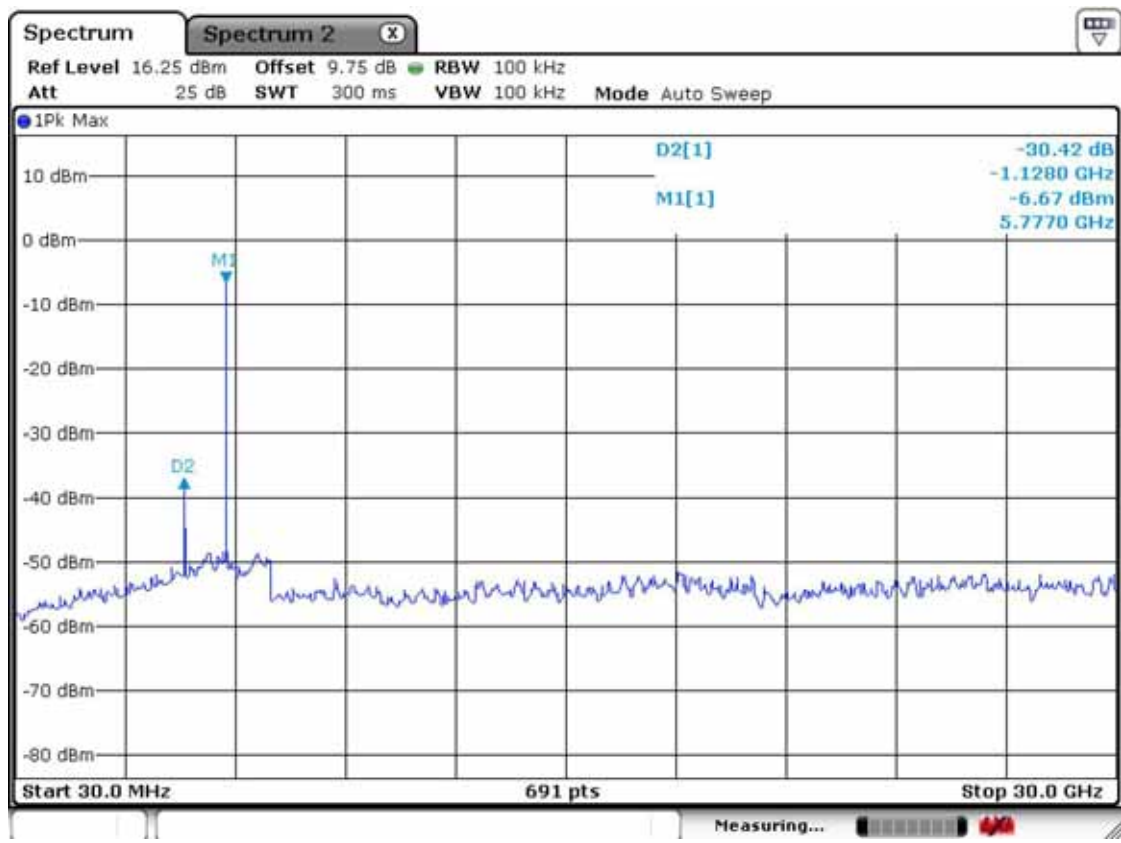
802.11a –channel 165
Frequency Range = 30 MHz ~ 40 GHz



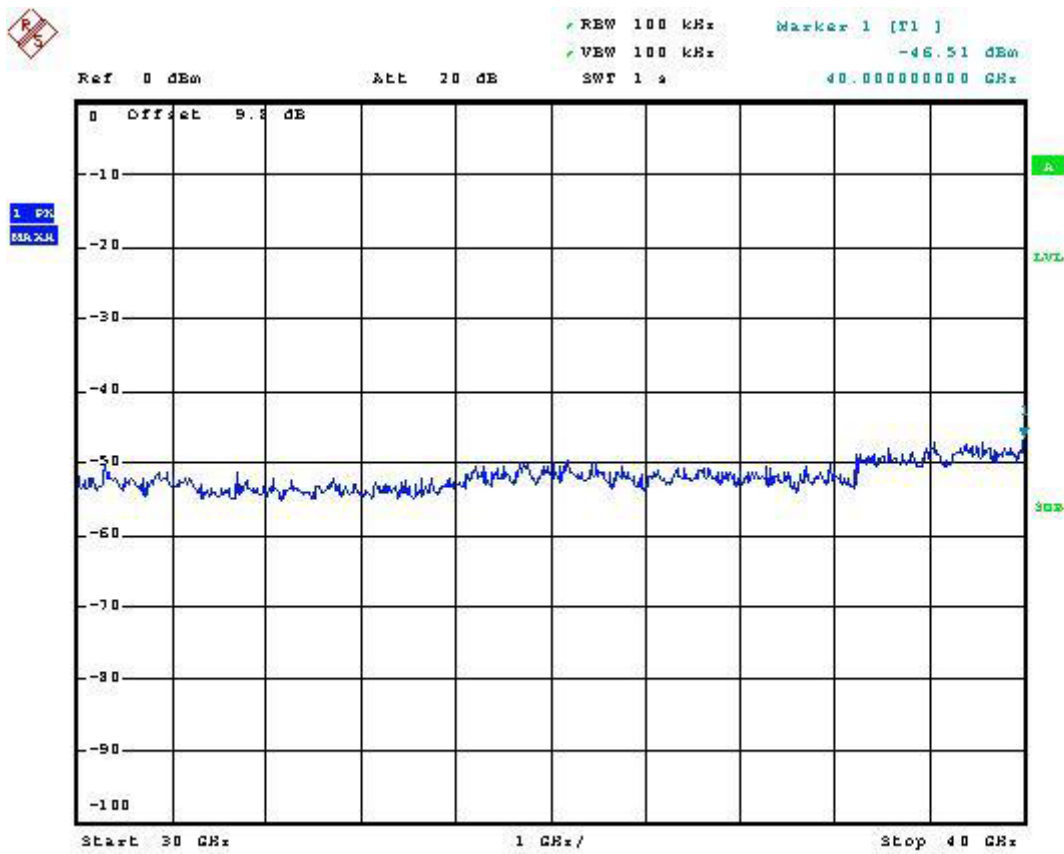
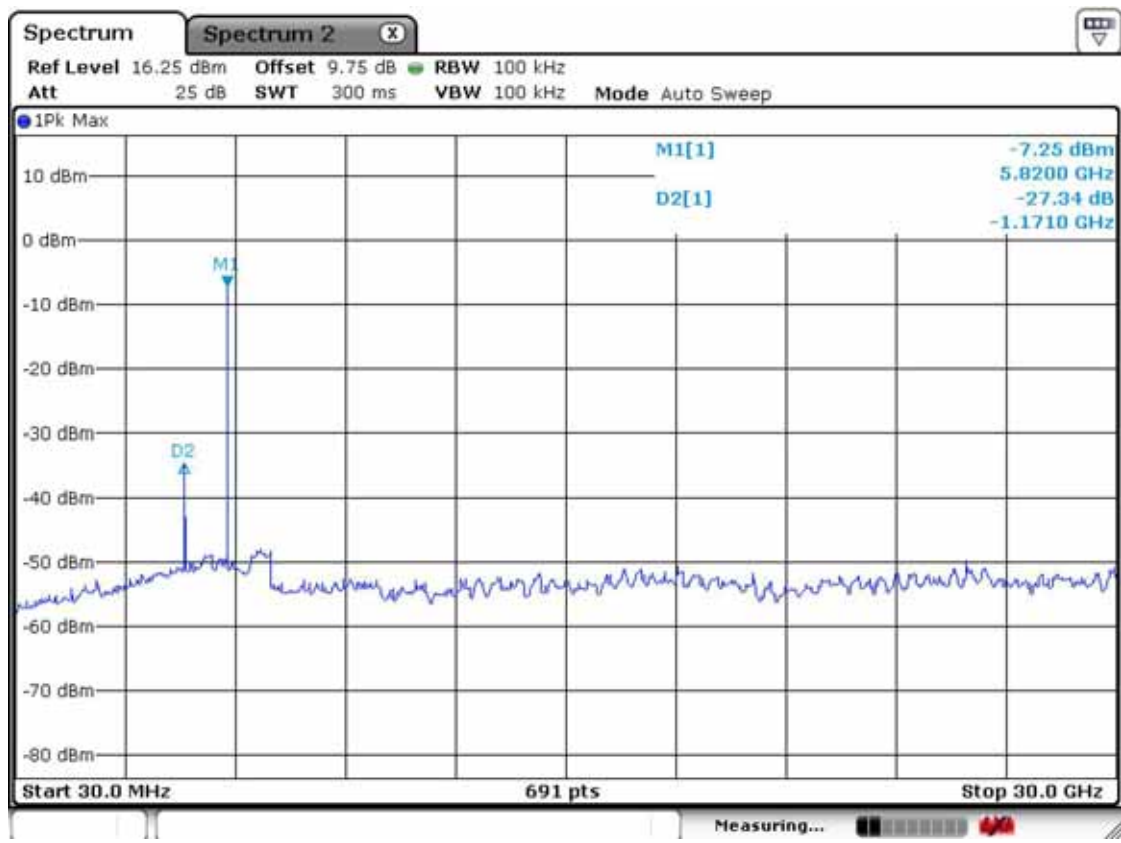
802.11an_20MHz – channel 149
Frequency Range = 30 MHz ~ 40 GHz



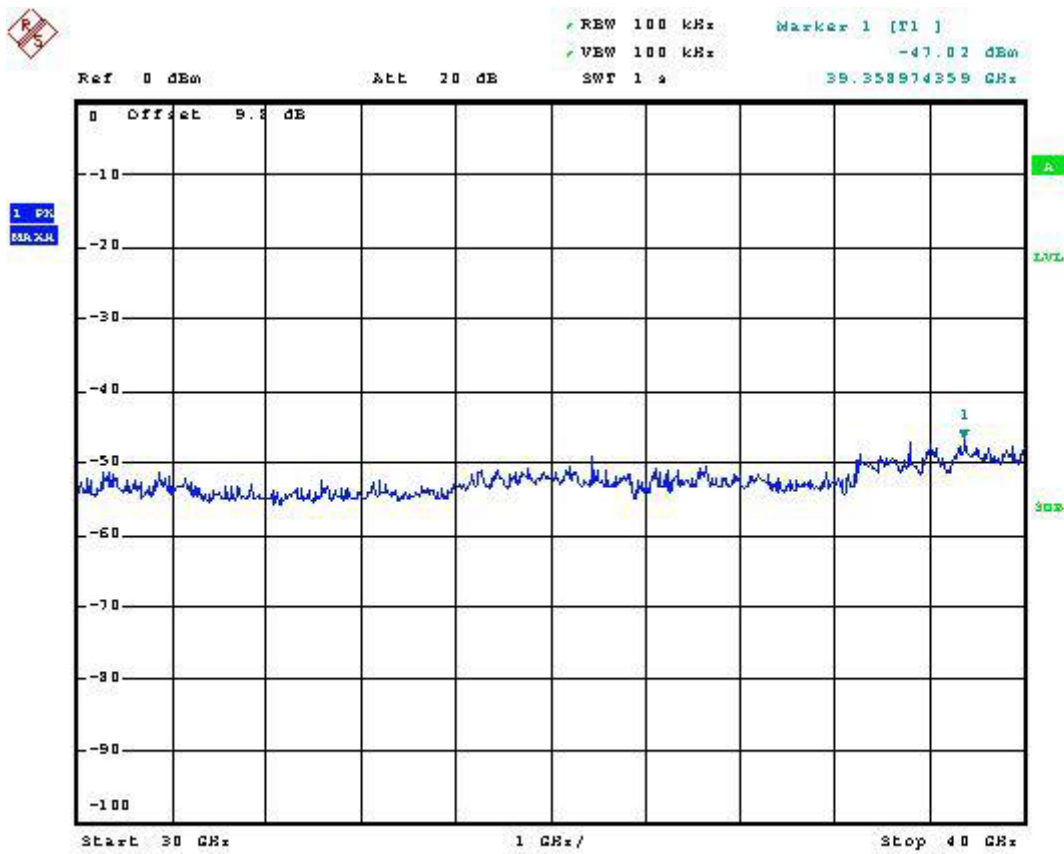
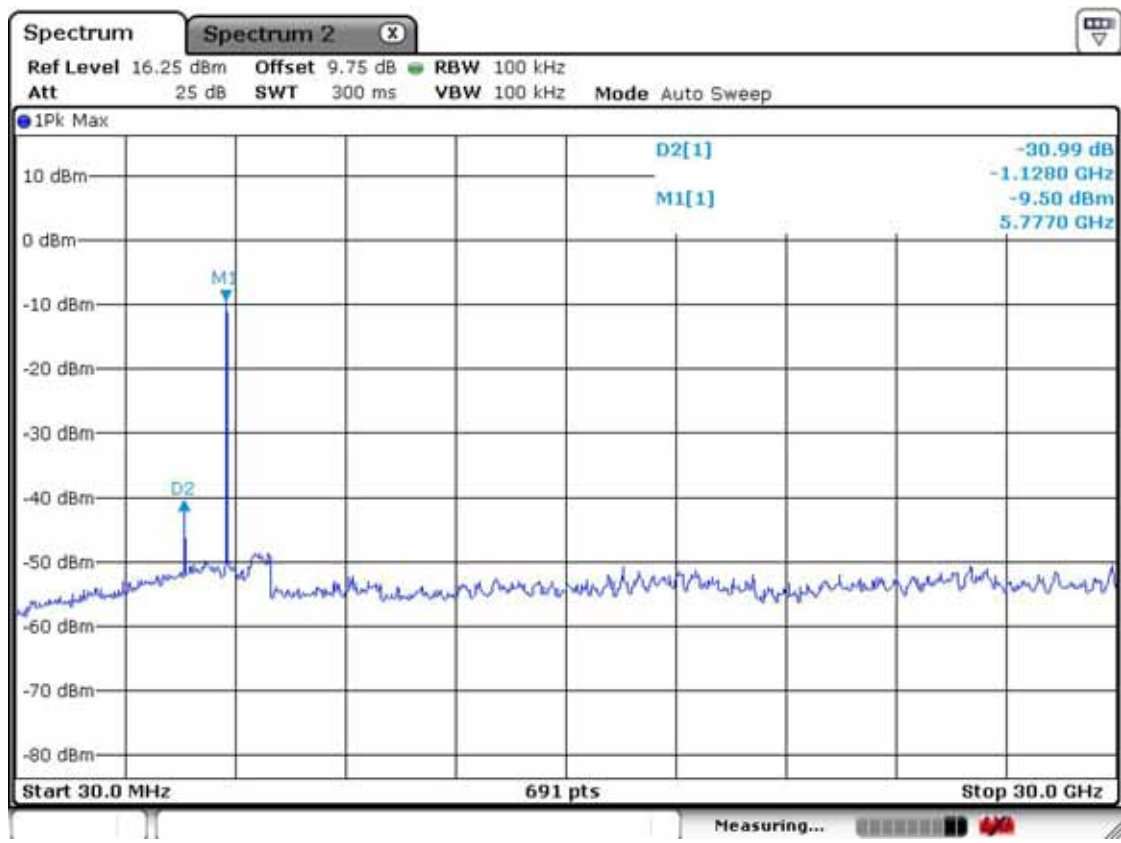
802.11an_20MHz – channel 157
Frequency Range = 30 MHz ~ 40 GHz



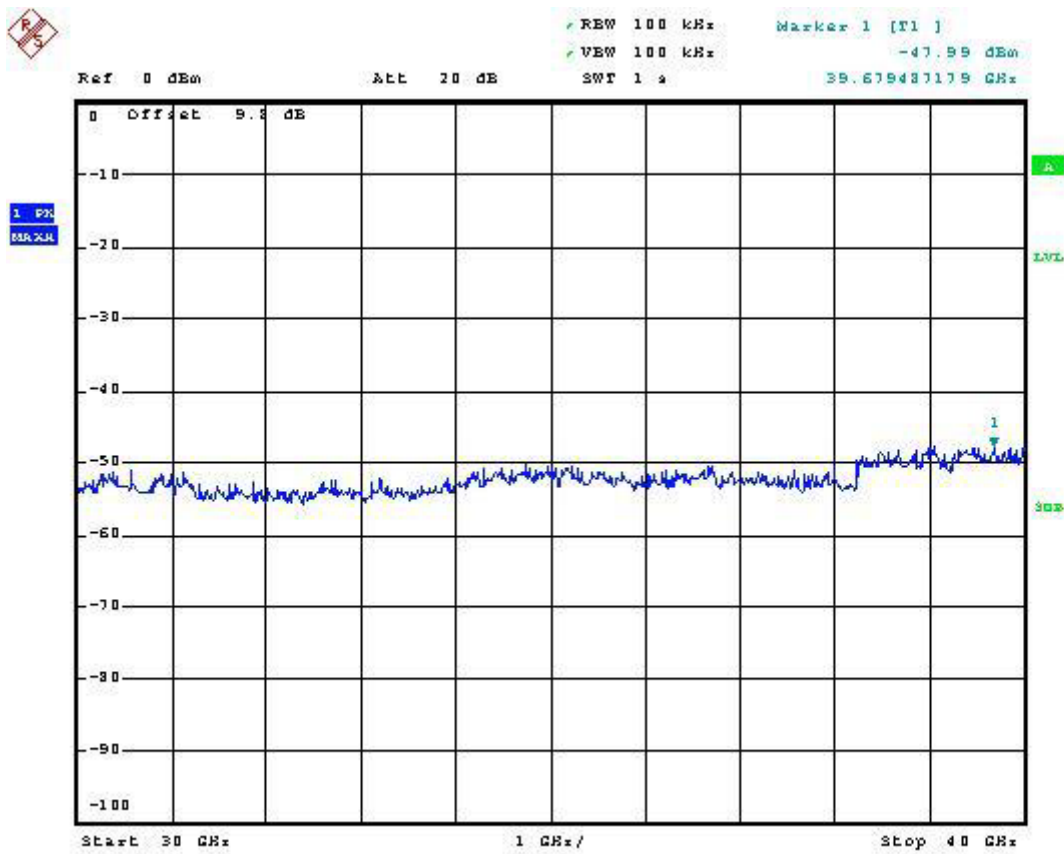
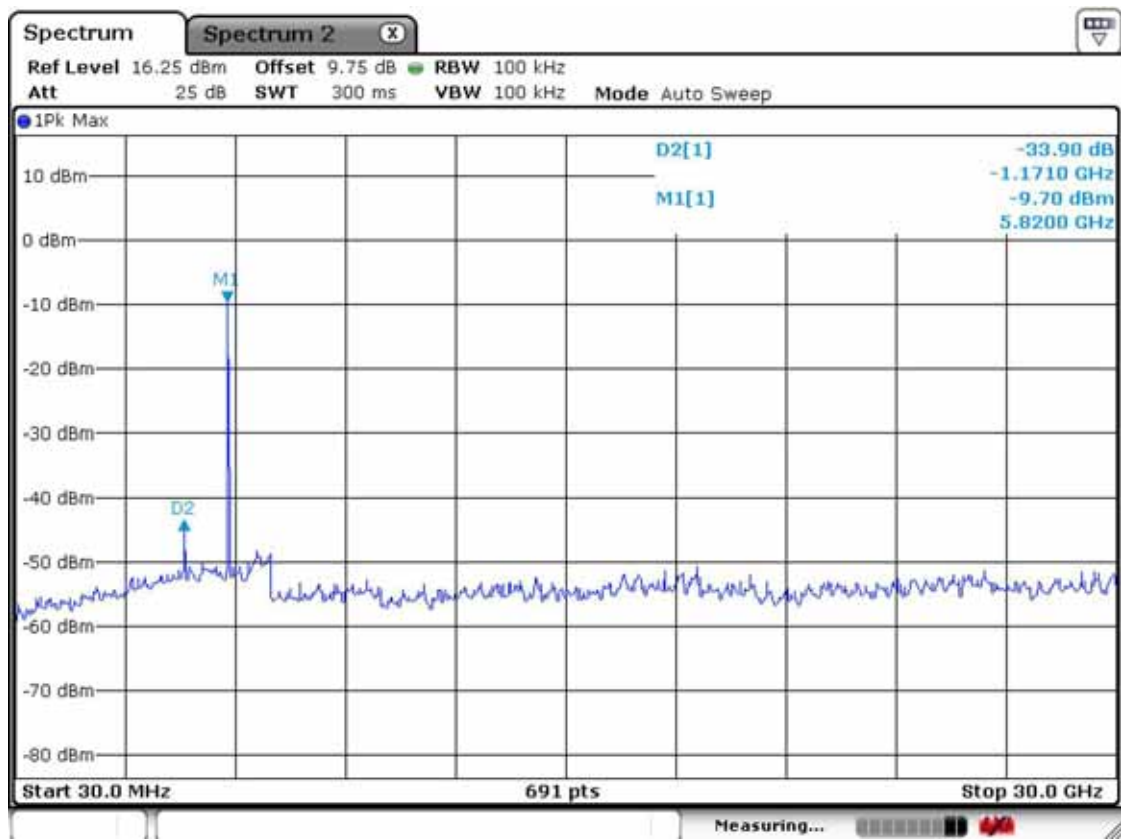
802.11an_20MHz –channel 165
Frequency Range = 30 MHz ~ 40 GHz



802.11an_40MHz – channel 151
Frequency Range = 30 MHz ~ 40 GHz



802.11an_40MHz – channel 159
Frequency Range = 30 MHz ~ 40 GHz



3.2.5 Field Strength of Harmonics

Procedure:

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.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

- See next pages for actual measured data.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
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:

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

802.11g Measurement Data:

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

802.11n 20MHz Measurement Data:

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

802.11n 40MHz Measurement Data:

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

802.11a Measurement Data:

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4596.7	38.4	50.0	H	31.4	34.6	8.7	54.0	74.0	43.9	55.5	10.2	18.6
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4627.9	37.6	49.5	H	31.4	34.6	8.7	54.0	74.0	43.1	55.0	11.0	19.1
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4659.90	38.8	50.3	H	31.4	34.6	8.7	54.0	74.0	44.3	55.8	9.8	18.3
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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

802.11an 20MHz Measurement Data:

Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4596.7	43.5	55.4	H	31.4	34.6	8.7	54.0	74.0	49.0	60.9	5.1	13.2
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4627.9	42.8	54.1	H	31.4	34.6	8.7	54.0	74.0	48.3	59.6	5.8	14.5
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV / m]			Factor			[dBuV / m]		[dBuV / m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4659.90	43.1	55.2	H	31.4	34.6	8.7	54.0	74.0	48.6	60.7	5.4	13.4
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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

802.11an 40MHz Measurement Data:

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	
4596.7	40.1	52.4	H	31.4	34.6	8.7	54.0	74.0	45.6	57.9	8.4	16.2
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4659.90	40.8	52.1	H	31.4	34.6	8.7	54.0	74.0	46.3	57.6	7.8	16.5
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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

Radiated Emissions – Below 1GHz WORST-CASE DATA : 802.11n(20MHz) CH 6 Mode

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

EUT/Model No.: WUBR-506N

TEST MODE: 802.11n(20MHz)_CH 6 mode

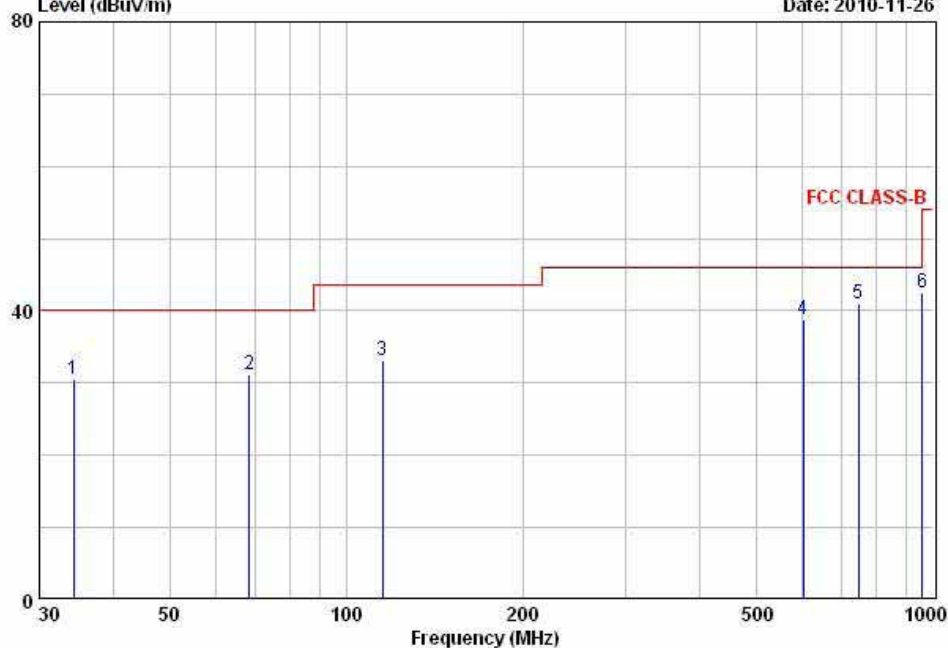
Temp Humi : 8 / 43

Tested by: KIM.K.I

Data: 71

Level (dBuV/m)

Date: 2010-11-26



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	34.31	45.90	-15.33	30.57	40.00	9.43	100	214	VERTICAL
2	68.33	46.80	-15.66	31.14	40.00	8.86	100	132	VERTICAL
3	115.20	47.60	-14.43	33.17	43.50	10.33	214	135	HORIZONTAL
4	602.15	41.50	-2.61	38.89	46.00	7.11	205	211	HORIZONTAL
5	745.58	41.20	-0.16	41.04	46.00	4.96	120	110	VERTICAL
6	960.00	40.10	2.45	42.55	46.00	3.45	240	121	HORIZONTAL

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

Radiated Emissions – Below 1GHz WORST-CASE DATA : 802.11n(20MHz) CH 149 Mode

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

EUT/Model No.: WUBR-506N

TEST MODE: 802.11n(20MHz)_CH 149 mode

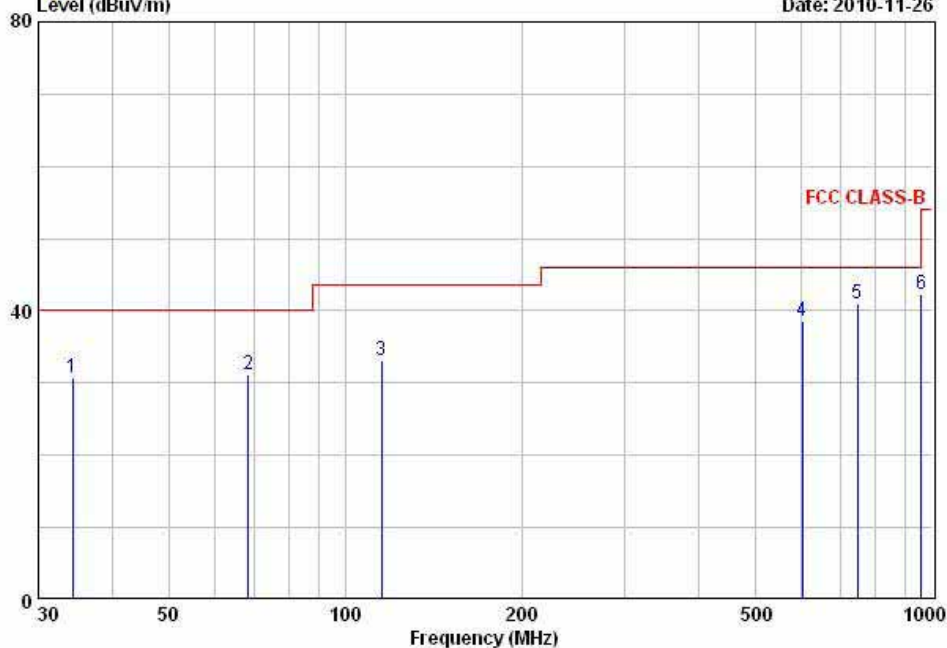
Temp Humi : 8 / 43

Tested by: KIM.K.I

Data: 72

Level (dBuV/m)

Date: 2010-11-26



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	34.32	46.00	-15.33	30.67	40.00	9.33	100	209	VERTICAL
2	68.32	46.80	-15.66	31.14	40.00	8.86	100	130	VERTICAL
3	115.21	47.60	-14.43	33.17	43.50	10.33	143	211	HORIZONTAL
4	602.15	41.30	-2.61	38.69	46.00	7.31	182	132	HORIZONTAL
5	745.57	41.10	-0.16	40.94	46.00	5.06	210	132	VERTICAL
6	959.98	39.80	2.45	42.25	46.00	3.75	210	141	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:

Not Applicable (-This product is operated by DC)

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

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	FSQ40	200035	R&S	Feb-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-11
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-11
7	Attenuator (10dB)	8491A	63196	HP	Oct-11
8	EMI Test Receiver	ESCI7	100722	R&S	Jun-11
9	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-12
10	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-12
11	RF Amplifier	8447D	2949A02670	HP	Oct-11
12	RF Amplifier	8449B	3008A02126	HP	Mar-11
13	Test Receiver	ESHS10	828404/009	R&S	Mar-11
14	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
15	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
16	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
17	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
18	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-10
19	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-12
20	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-12
21	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-12
22	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-12
23	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
24	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
25	RF Switch	MP59B	6200414971	ANRITSU	-
26	Power Divider	11636A	6243	HP	Oct-11
27	DC Power Supply	6622A	3448A03079	HP	Oct-11
28	Frequency Counter	5342A	2826A12411	HP	Mar-11
29	Power Meter	EPM-441A	GB32481702	HP	Mar-11
30	Power Sensor	8481A	US41030291	HP	Oct-11
31	Audio Analyzer	8903B	3729A18901	HP	Oct-11
32	Modulation Analyzer	8901B	3749A05878	HP	Oct-11
33	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-11
34	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
35	Stop Watch	HS-3	601Q09R	CASIO	Mar-11
36	LISN	ENV216	100408	R&S	Oct-11
37	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	May-12