



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 : Oct 10~Nov 01 2011  
 Test Report S/N: LR50011111A  
 Test Site : LTA CO., LTD

## CERTIFICATION OF COMPLIANCE

FCC ID.

**YUE-ESP-E301**

APPLICANT

**ENSPERT Inc.**

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	Tablet PC
Manufacturer	:	ENSPERT Inc.
Model name	:	ESP-E301
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
Max. Output Power	:	Max 18.87dBm - Conducted (802.11b)
	:	Max 21.03dBm - Conducted (802.11g)
	:	Max 20.32dBm - Conducted (802.11n_20MHz)
Data of issue	:	November 3, 2011

This test report is issued under the authority of:

The test was supervised by:

Hyun-Chae You, Manager

Ki-Hun Cho, 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. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB Code.: 200723-0

## **TABLE OF CONTENTS**

1. GENERAL INFORMATION'S .....	3
2. INFORMATION'S ABOUT TEST ITEM .....	4
3. TEST REPORT .....	6
3.1 SUMMARY OF TESTS .....	6
3.2 TECHNICAL CHARACTERISTICS TEST .....	7
3.2.1 6dB BANDWIDTH .....	7
3.2.2 PEAK OUTPUT POWER .....	22
3.2.3 POWER SPECTRAL DENSITY .....	36
3.2.4 BAND – EDGE & SPURIOUS .....	50
3.2.5 FIELD STRENGTH OF HARMONICS .....	78
3.2.6 AC CONDUCTED EMISSIONS .....	88
 <b>APPENDIX</b>	
APPENDIX TEST EQUIPMENT USED FOR TESTS .....	89

## 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](mailto: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	2012-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2013-04-24	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	2013-04-13	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

## **2-1 Applicant & Manufacturer**

Company name : ENSPERT Inc.  
Address : 2F, 7F DAEWHA B/D, 169 Samsung-dong, Gangnam-gu, Seoul, KOREA  
Tel / Fax : +82 2 6003 9501/ +82 2 6003 9322

## 2-2 Equipment Under Test (EUT)

Trade name	: Tablet PC
FCC ID	: YUE-ESP-E301
Model name	: ESP-E301
Serial number	: Identical prototype
Date of receipt	: Oct 10, 2011
EUT condition	: Pre-production, not damaged
Antenna type	: PiFA antenna with Max. -2.27dBi gain
Frequency Range	: 2412MHz ~ 2462MHz for 802.11b/g/n_20MHz
RF output power	: Max 18.87dBm - Conducted (802.11b) : Max 21.03dBm - Conducted (802.11g) : Max 20.32dBm - Conducted (802.11n_20MHz)
Number of channels	: 11
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 72.2Mbps for 802.11n_20MHz
Power source (Batt.)	: Battery : 3.7V (Li-Polymer Battery)
Power source (Adaptor.)	Input: 100-240VAC, 0.3A                      Output: 5.0VDC, 2A

### 2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2412	2442	2462

## 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400 dx7400 microtower	CNG8330J95	HP
MONITOR	HPL1710	CNC816QH92	HP
KEYBOARD	SK-8115	641-OEWW	DELL
MOUSE	MO56UO	520107013	DELL
PRINTER	STYLUS C65	N/A	EPSON

**2-5 Description of Test modes****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		

### 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	Line 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 ENSPERT Inc. FCC ID: YUE-ESP-E301 unit complies with the requirement of §15.203.

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

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 = 100 kHz (VBW RBW)

Sweep = auto

Trace = max hold

Detector function = peak

#### Measurement Data:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	8.68	Complies
	2442	7	8.64	Complies
	2462	11	9.82	Complies
802.11g	2412	1	16.27	Complies
	2442	7	16.38	Complies
	2462	11	16.39	Complies
802.11n _20MHz	2412	1	16.87	Complies
	2442	7	17.26	Complies
	2462	11	17.26	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



## CH 6

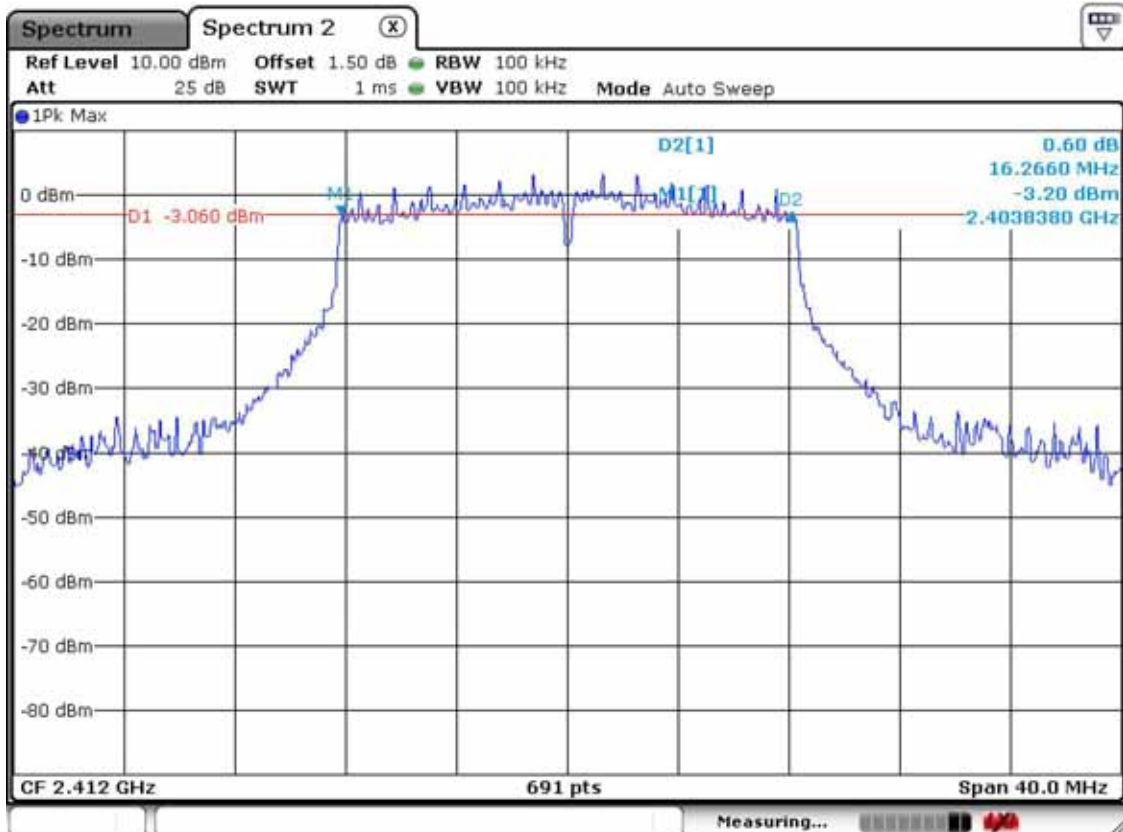




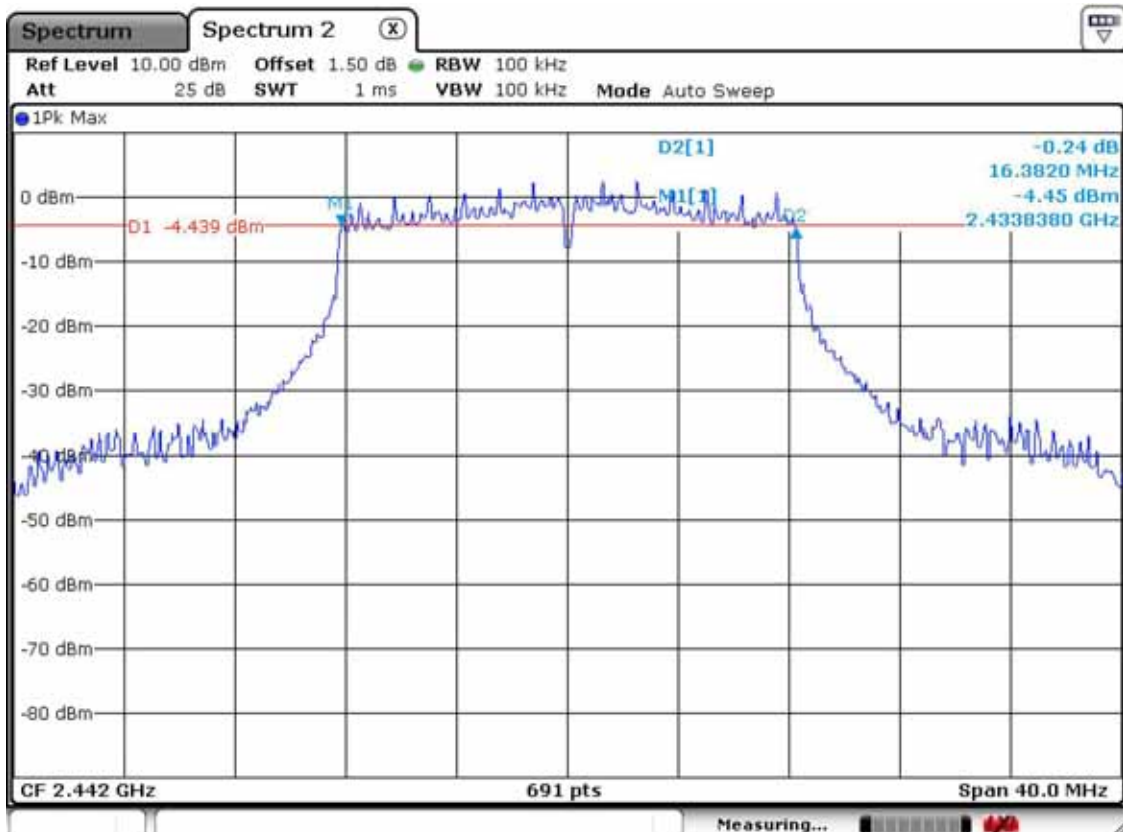
## CH 11



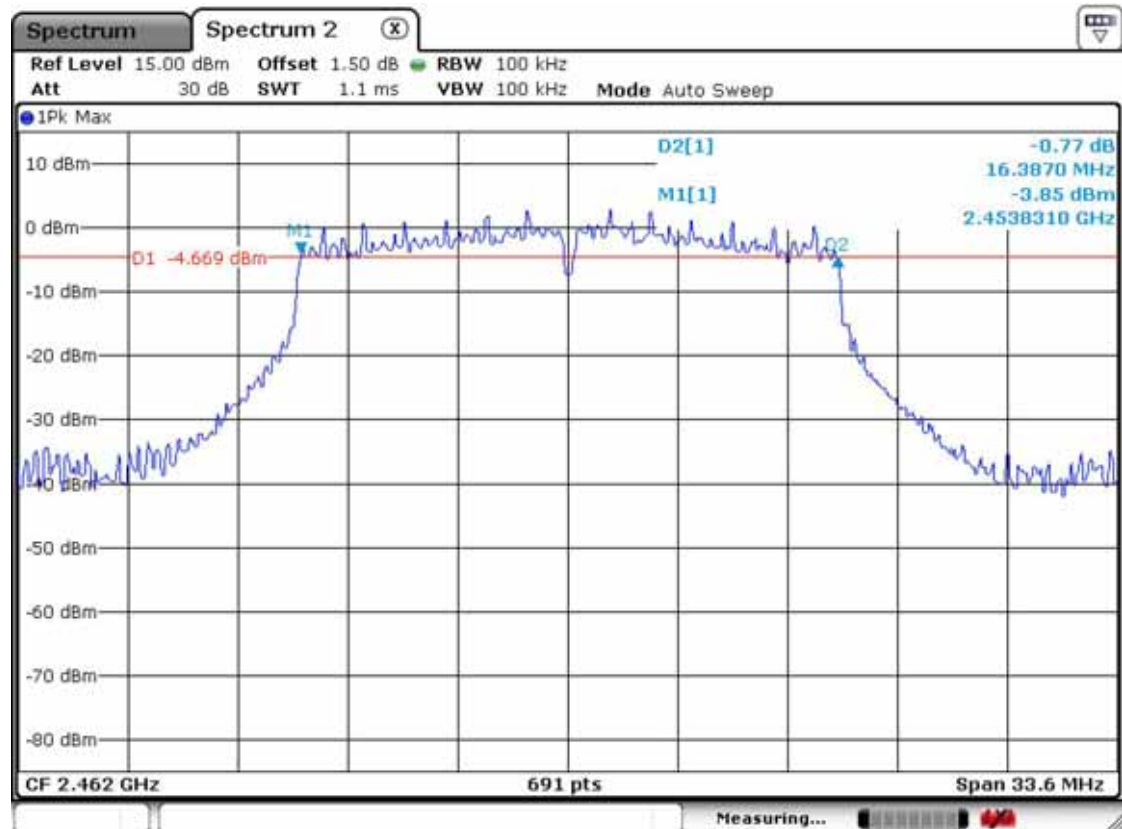
## 802.11g CH 1



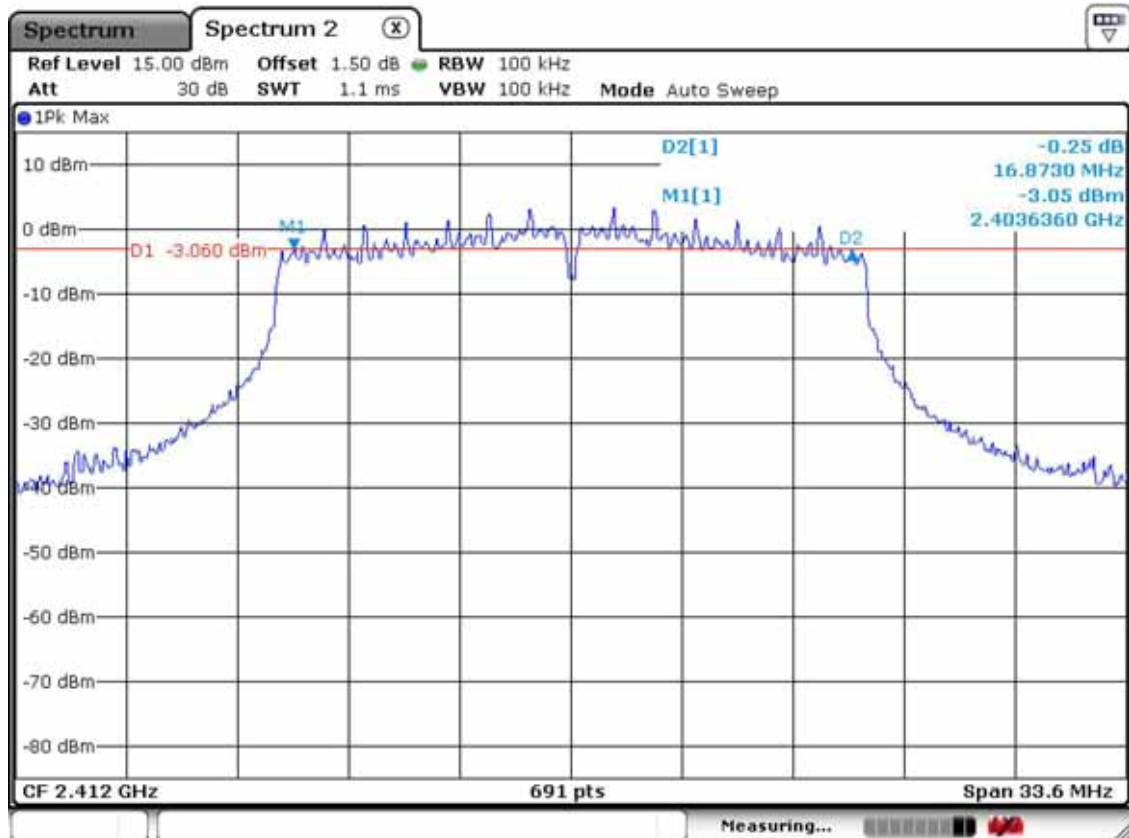
## CH 6



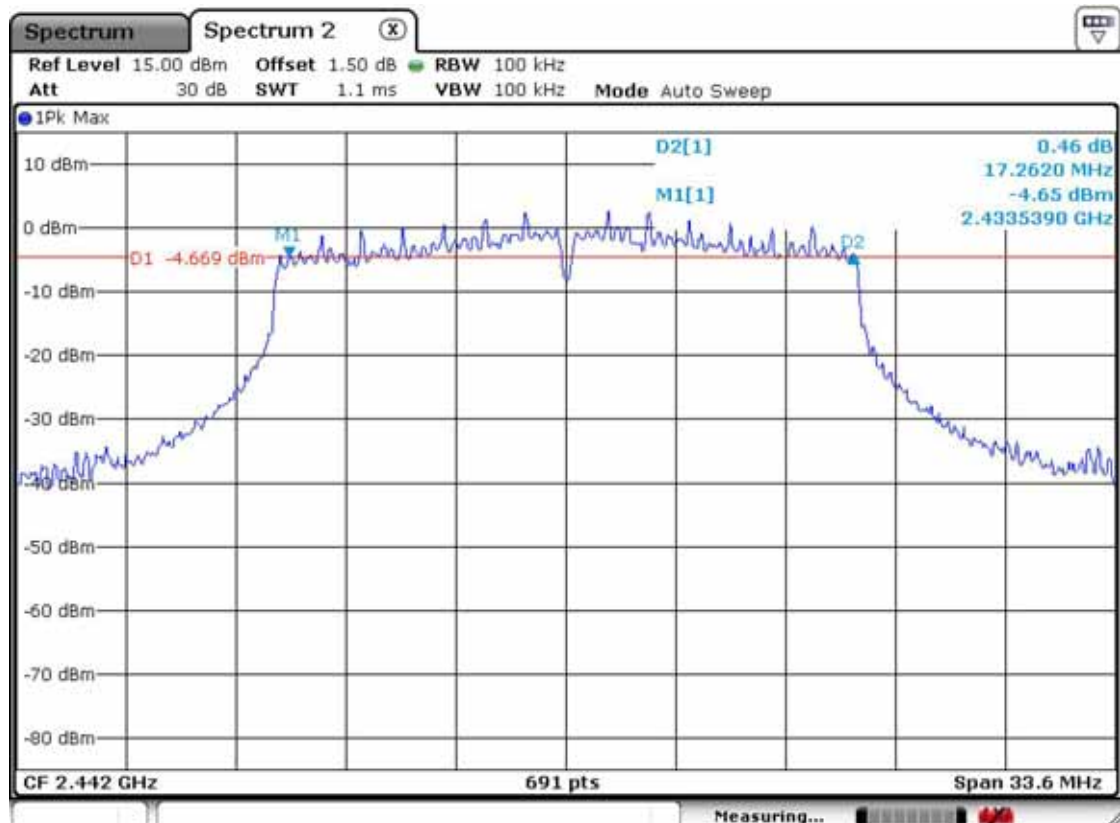
## CH 11



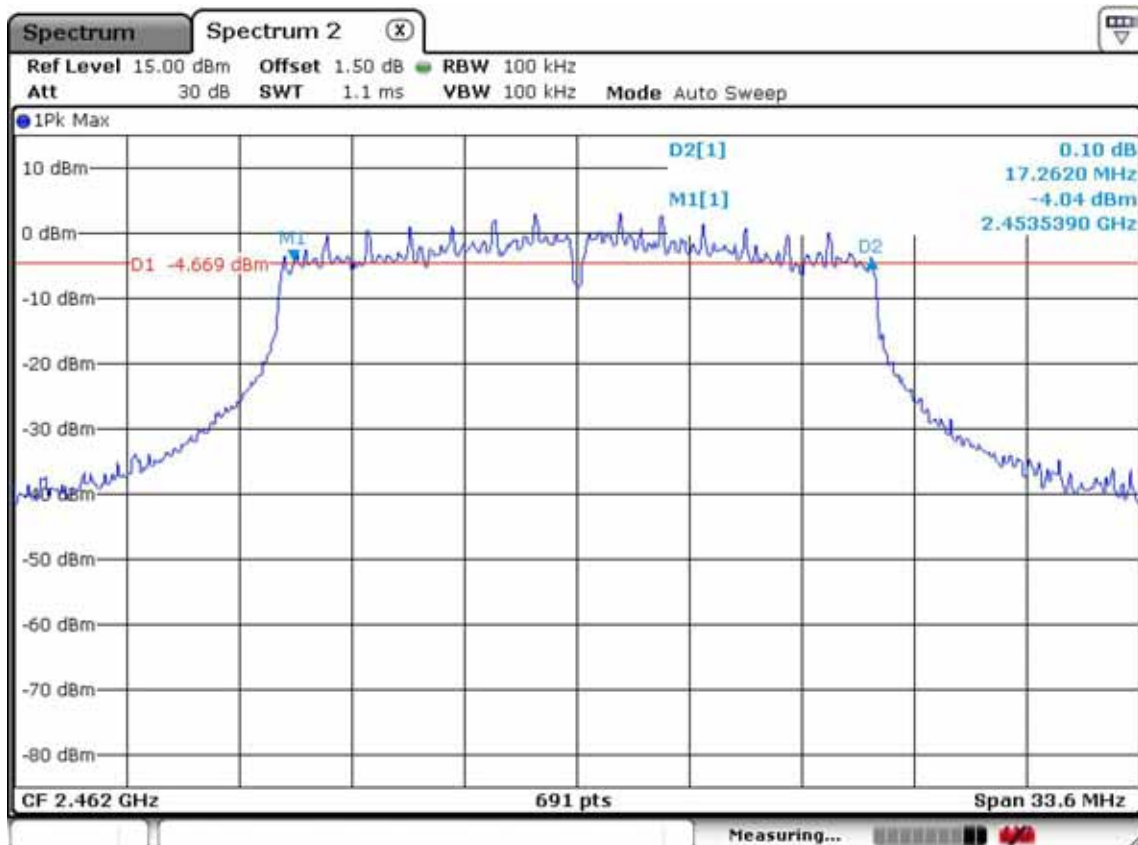
## 802.11n\_20MHz CH 1



## CH 6



## CH 11



### 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 = 1MHz (VBW RBW)

Sweep = auto

Detector function = peak

#### Measurement Data:

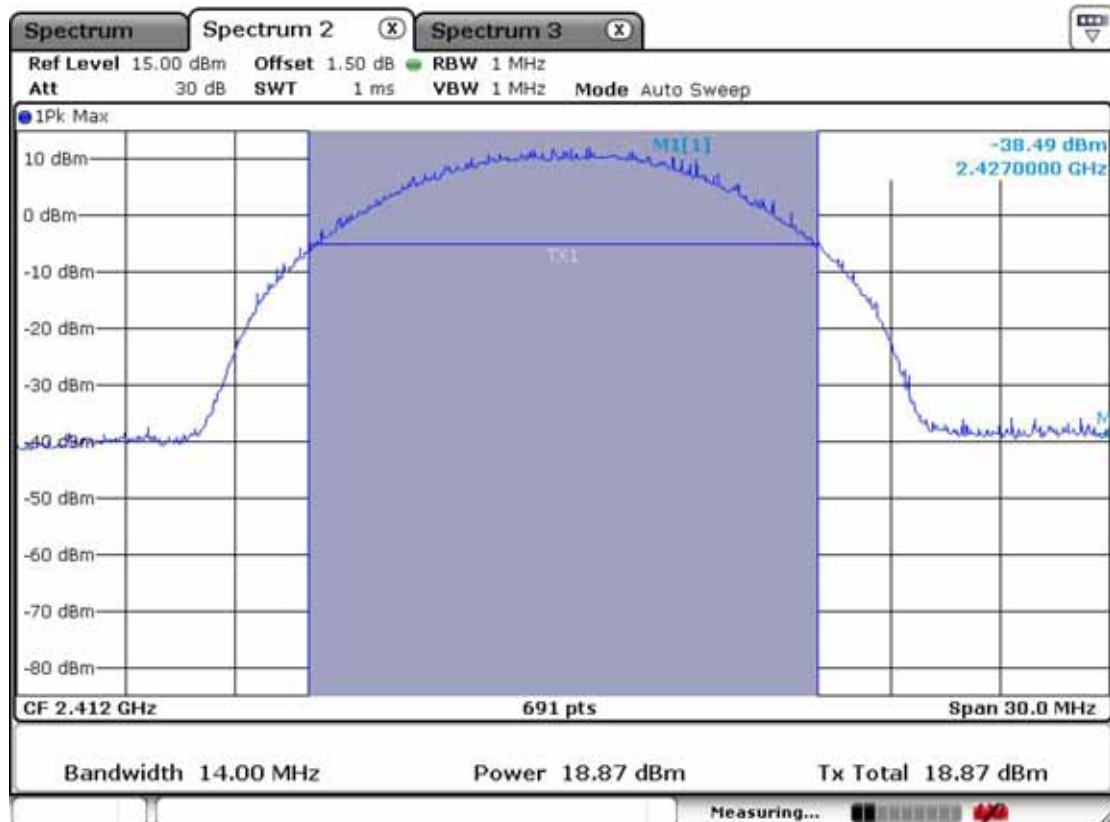
Mode	Frequency (MHz)	Channel No.	Test Results	
			Peak Output Power (dBm)	Result
802.11b	2412	1	18.87	Complies
	2442	7	17.84	Complies
	2462	11	18.20	Complies
802.11g	2412	1	21.03	Complies
	2442	7	20.43	Complies
	2462	11	20.22	Complies
802.11n _20MHz	2412	1	20.32	Complies
	2442	7	19.57	Complies
	2462	11	20.30	Complies

- See next pages for actual measured spectrum plots.

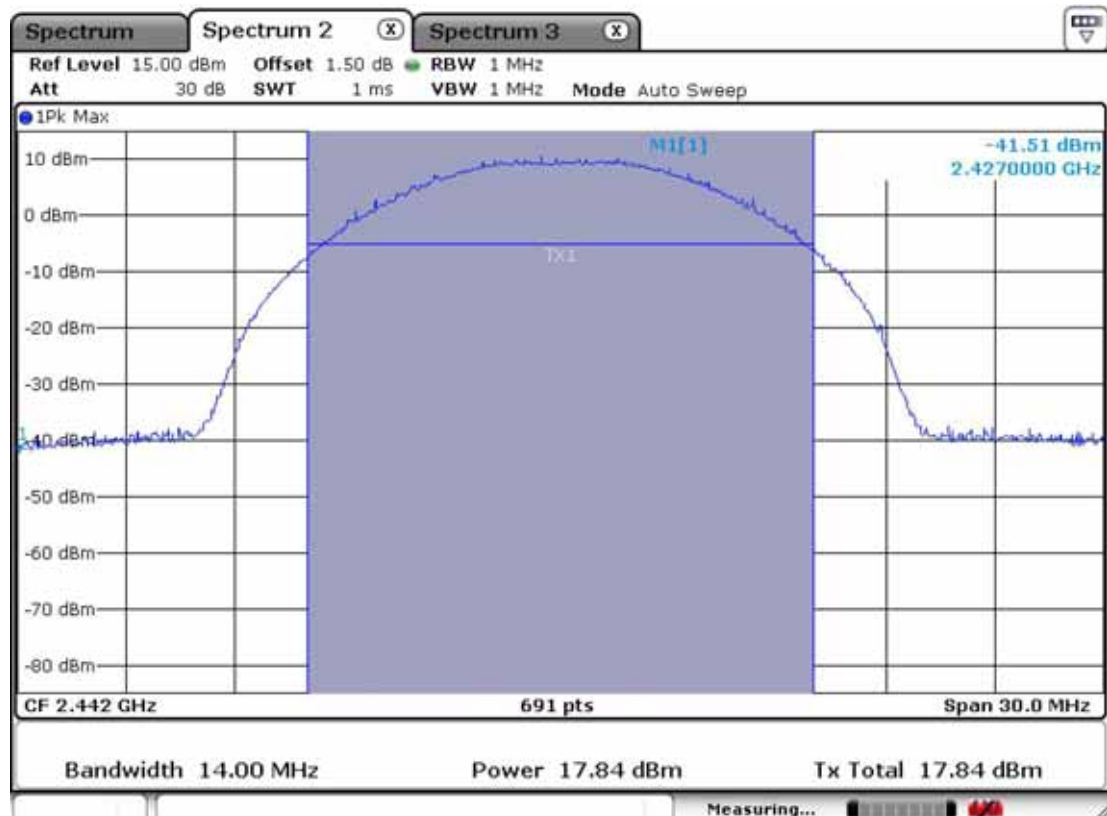
#### Minimum Standard:

Peak output power	< 1W
-------------------	------

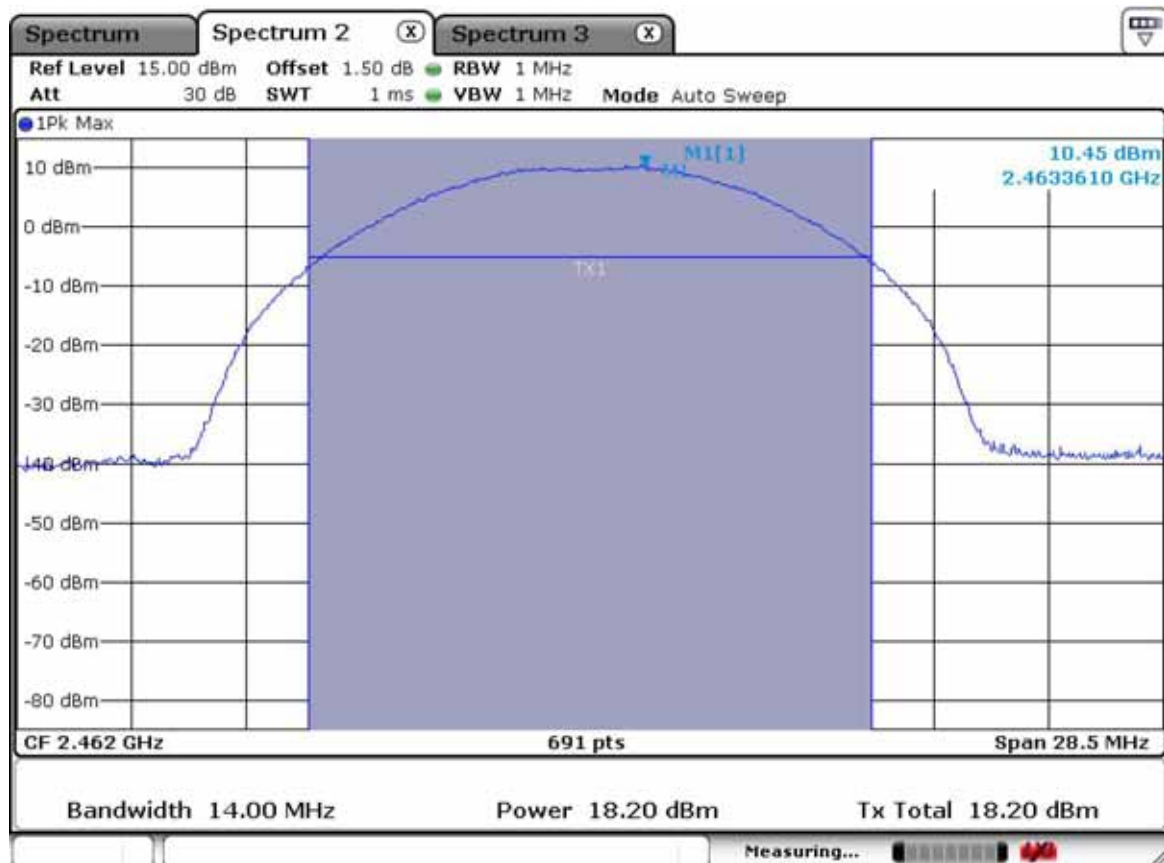
## 802.11b CH 1



## CH 6

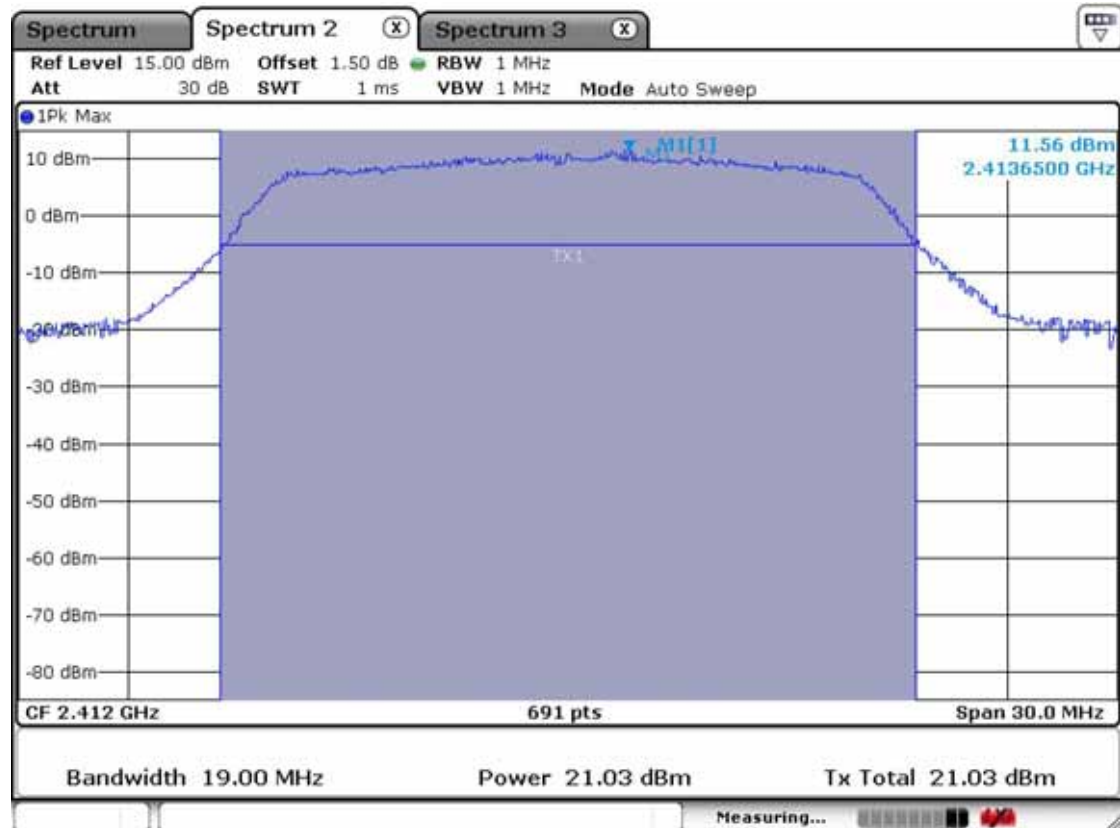


## CH 11

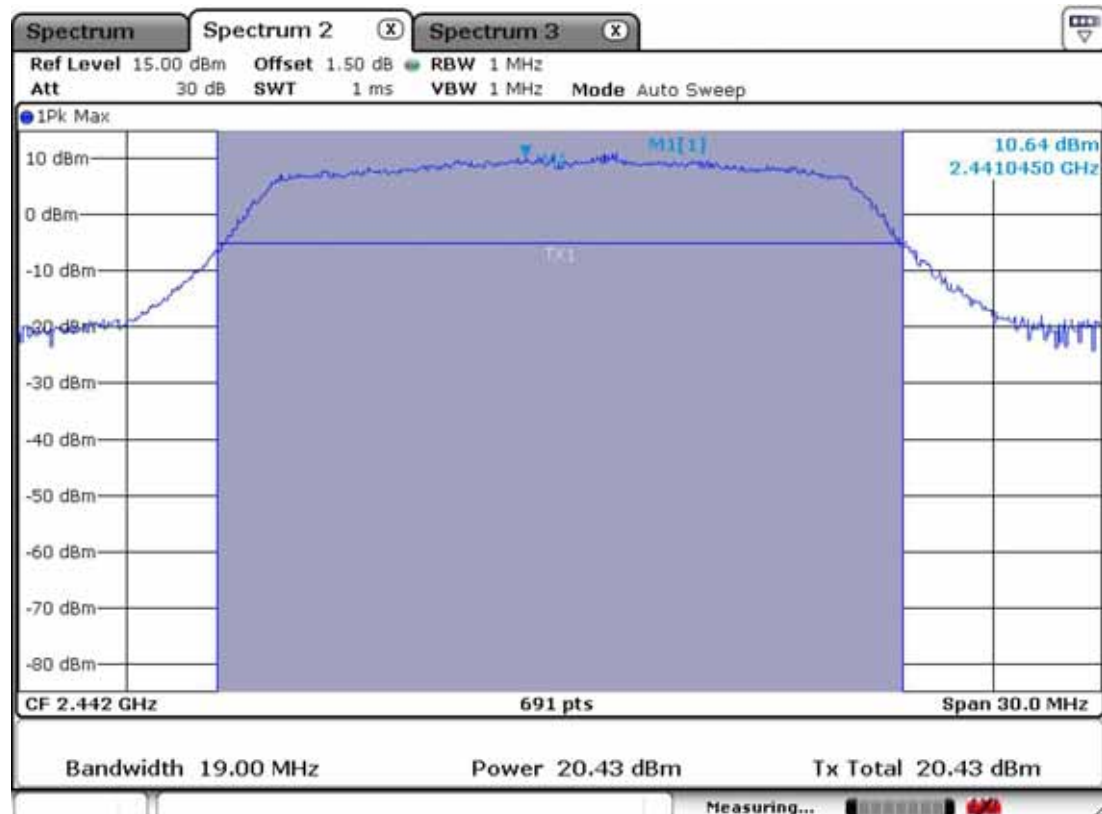




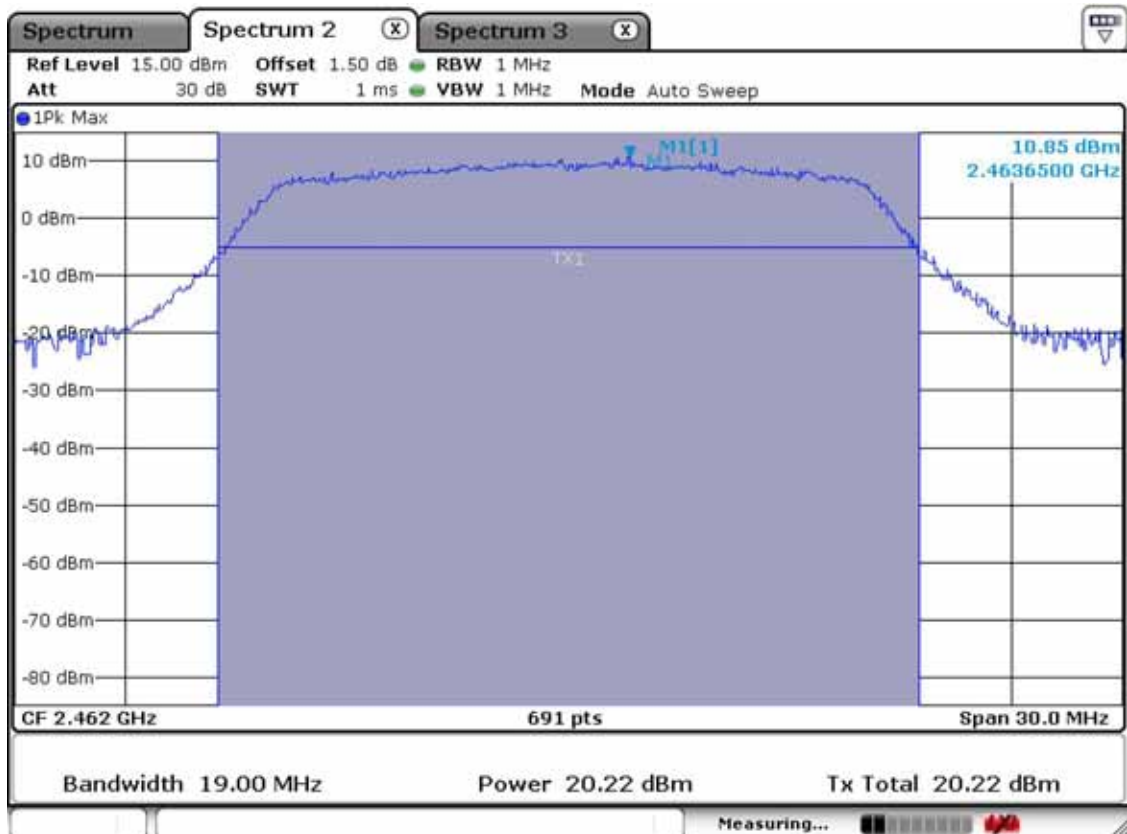
## 802.11g CH 1



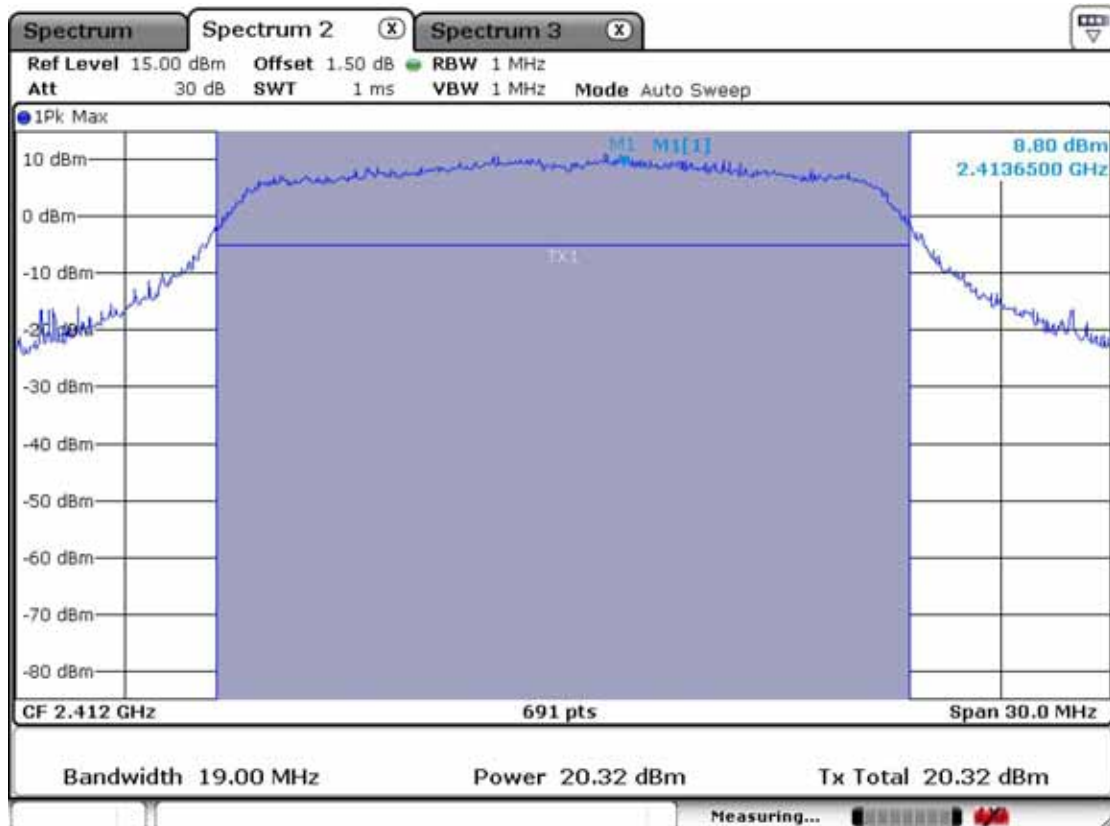
## CH 6



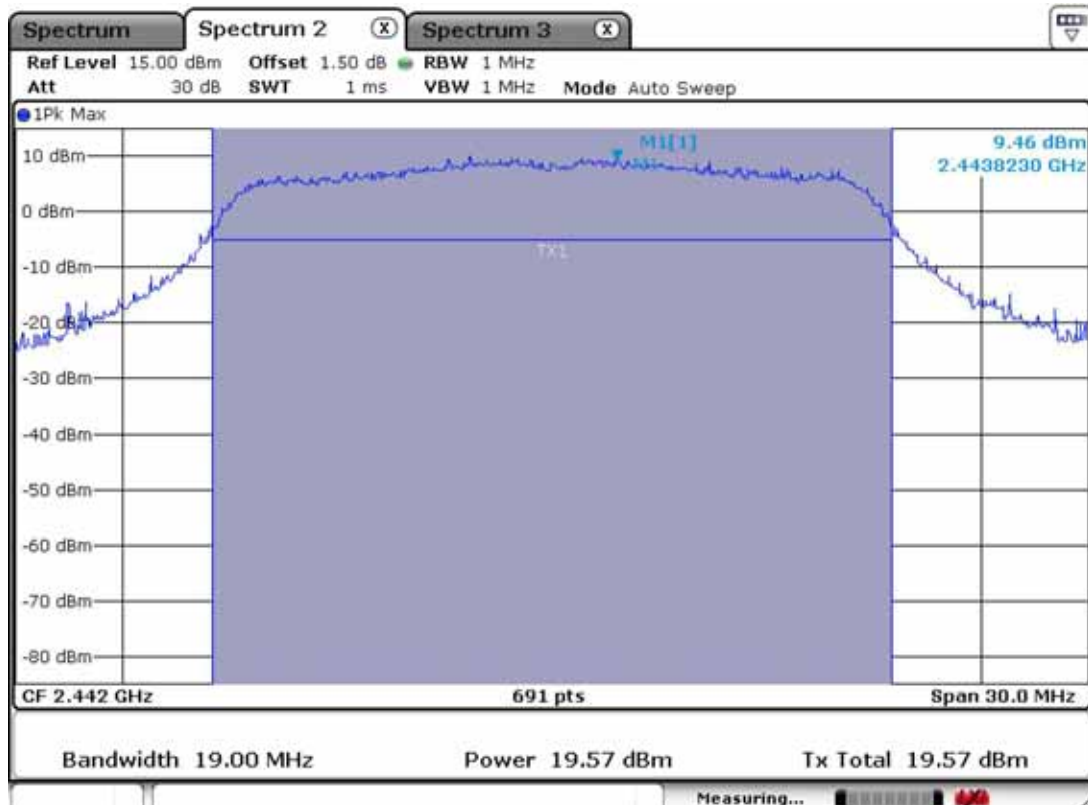
## CH 11



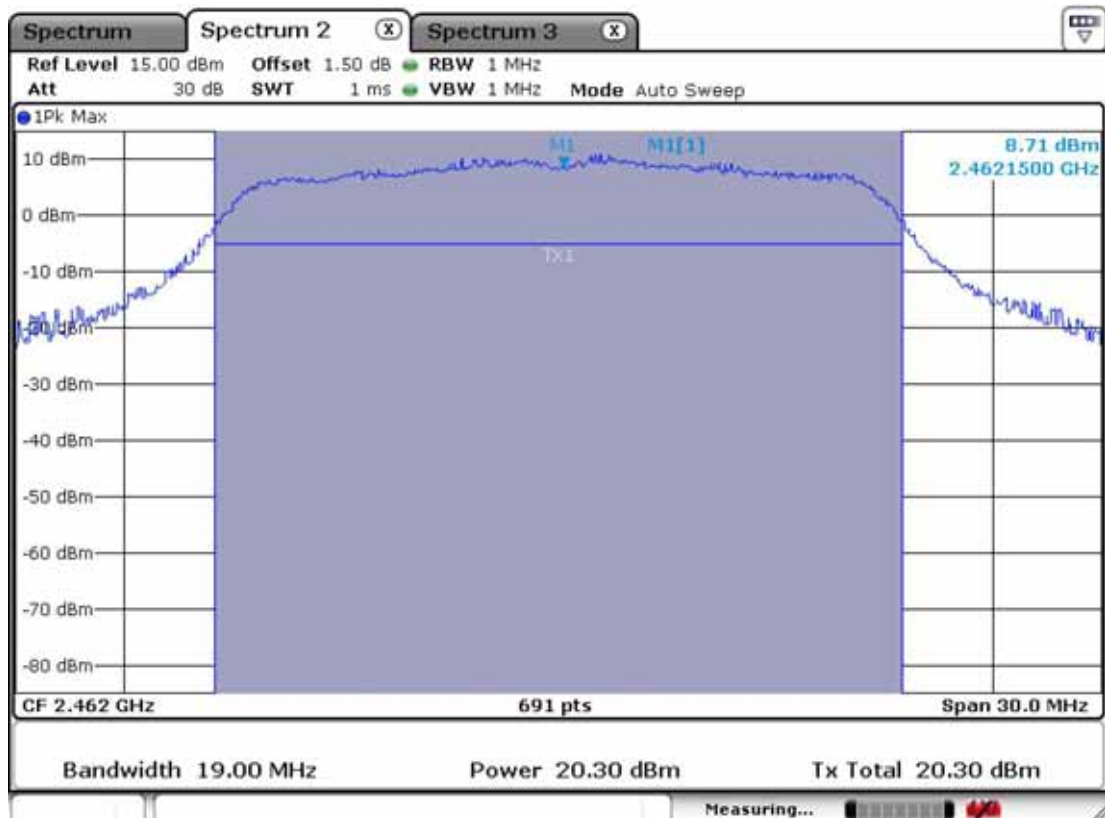
## 802.11n\_20MHz CH 1



## CH 6



## CH 11



### 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 = 10 kHz

Sweep = 100 sec

Detector function = peak

Trace = max hold

#### Measurement Data:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	-10.26	Complies
	2442	7	-11.29	Complies
	2462	11	-10.98	Complies
802.11g	2412	1	-18.94	Complies
	2442	7	-19.44	Complies
	2462	11	-19.53	Complies
802.11n _20MHz	2412	1	-18.01	Complies
	2442	7	-20.20	Complies
	2462	11	-19.07	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

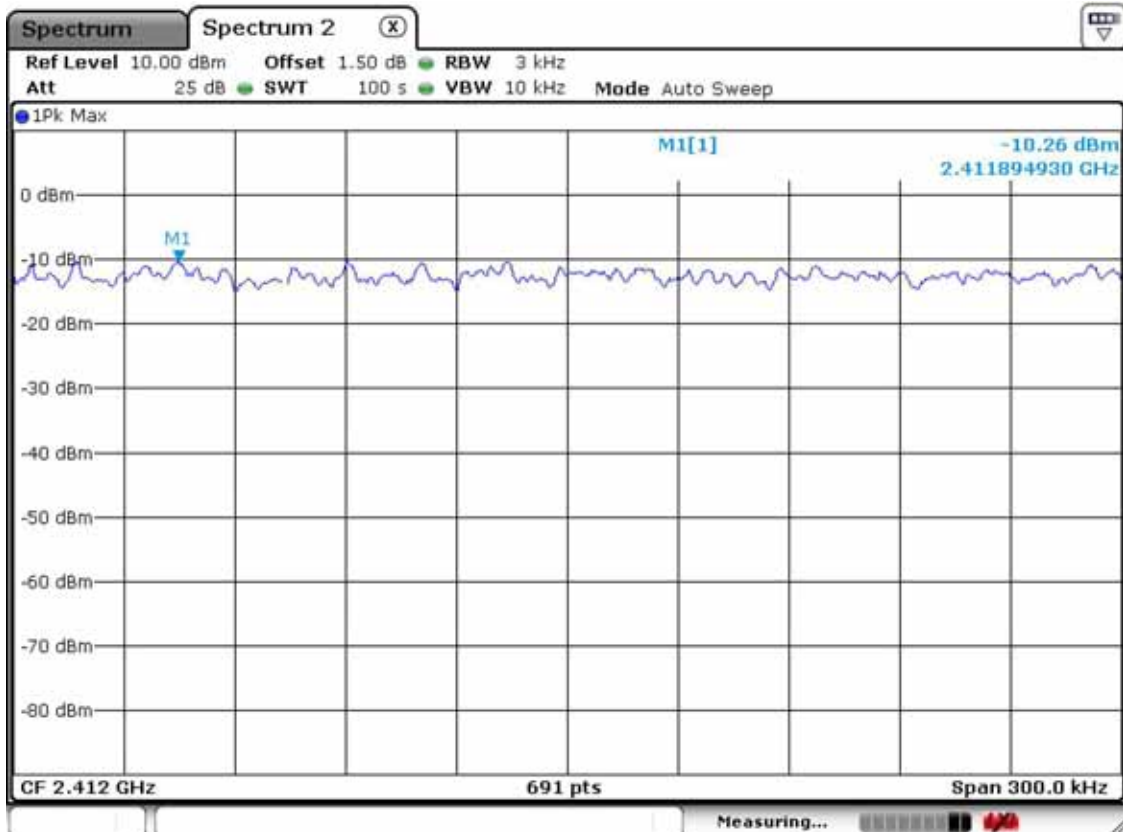
Power Spectral Density	< 8dBm @ 3kHz BW
------------------------	------------------

#### Measurement Setup

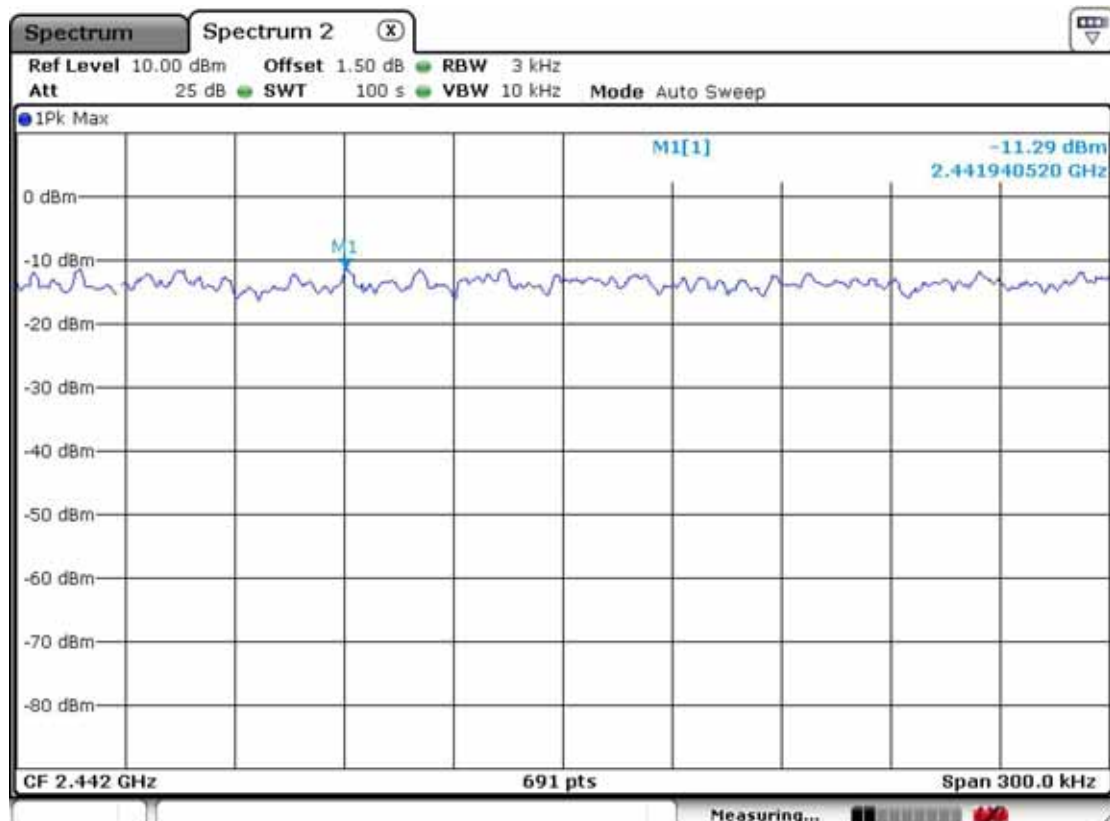
Same as the Chapter 3.2.1 (Figure 1)

## 802.11b Power Density Measurement

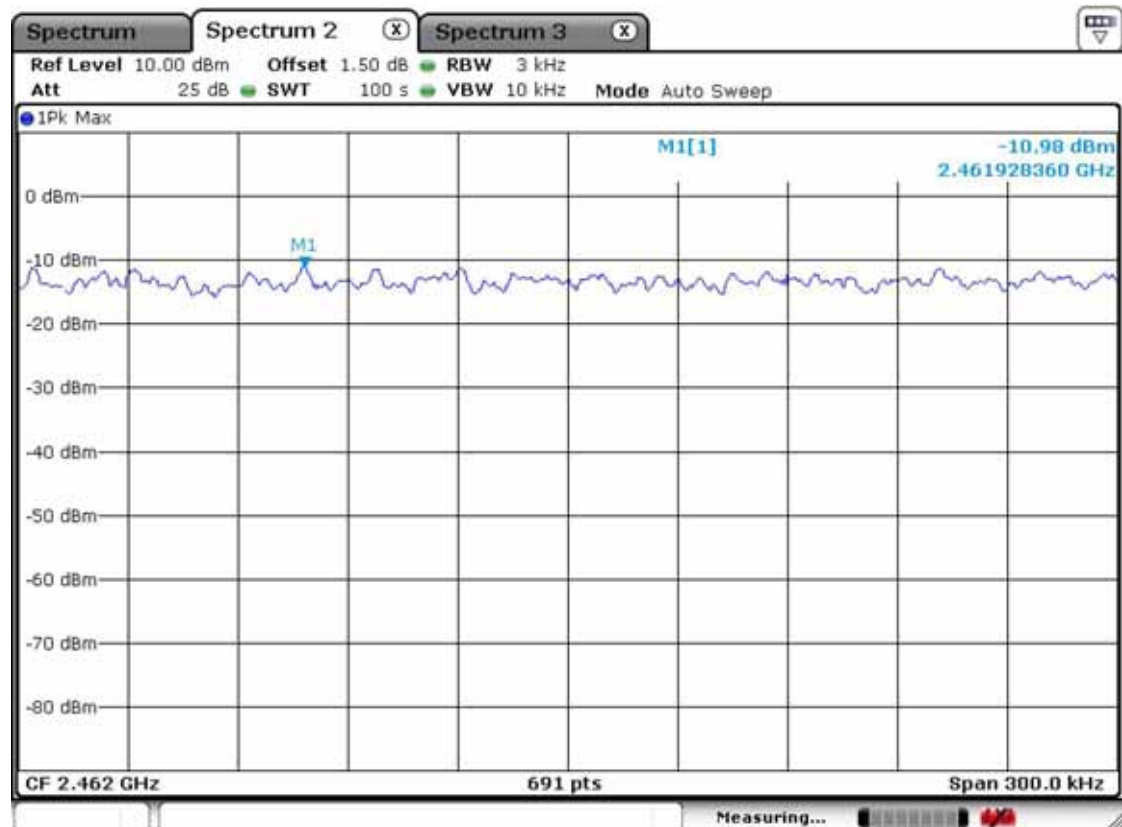
### CH 1



### CH 6



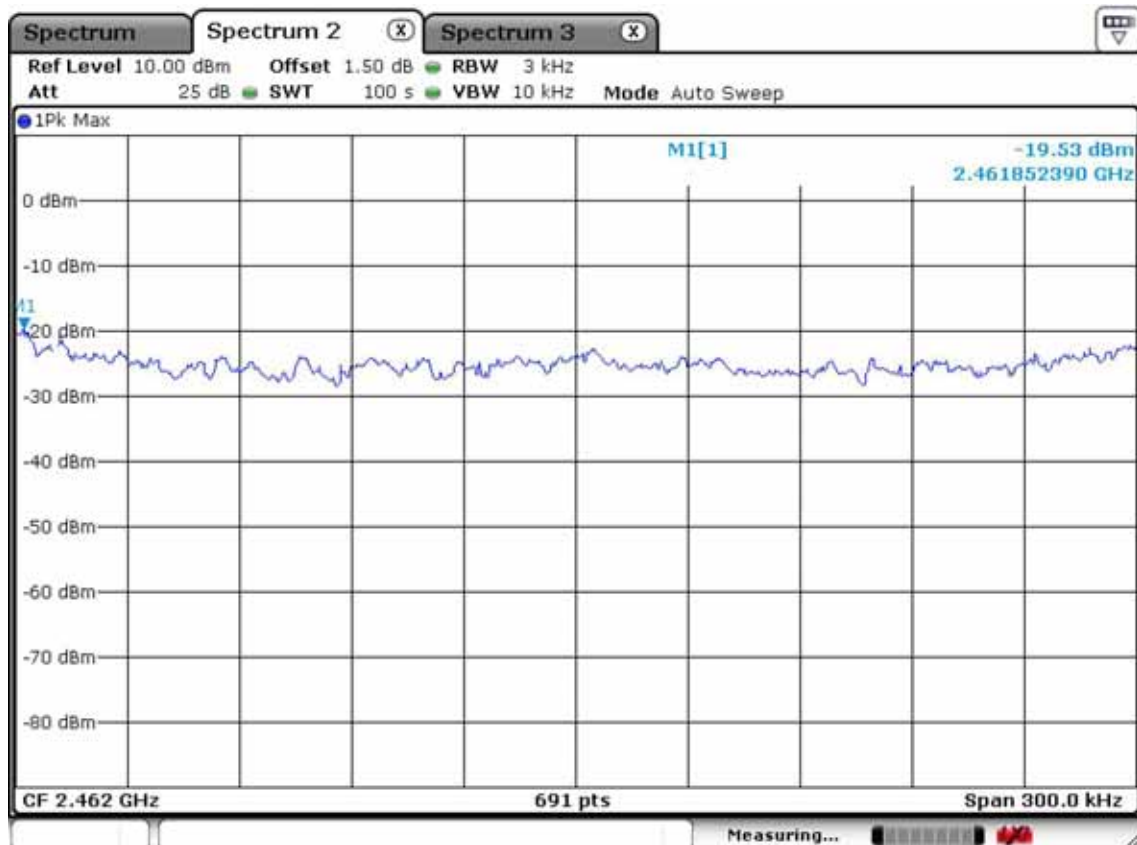
## CH 11





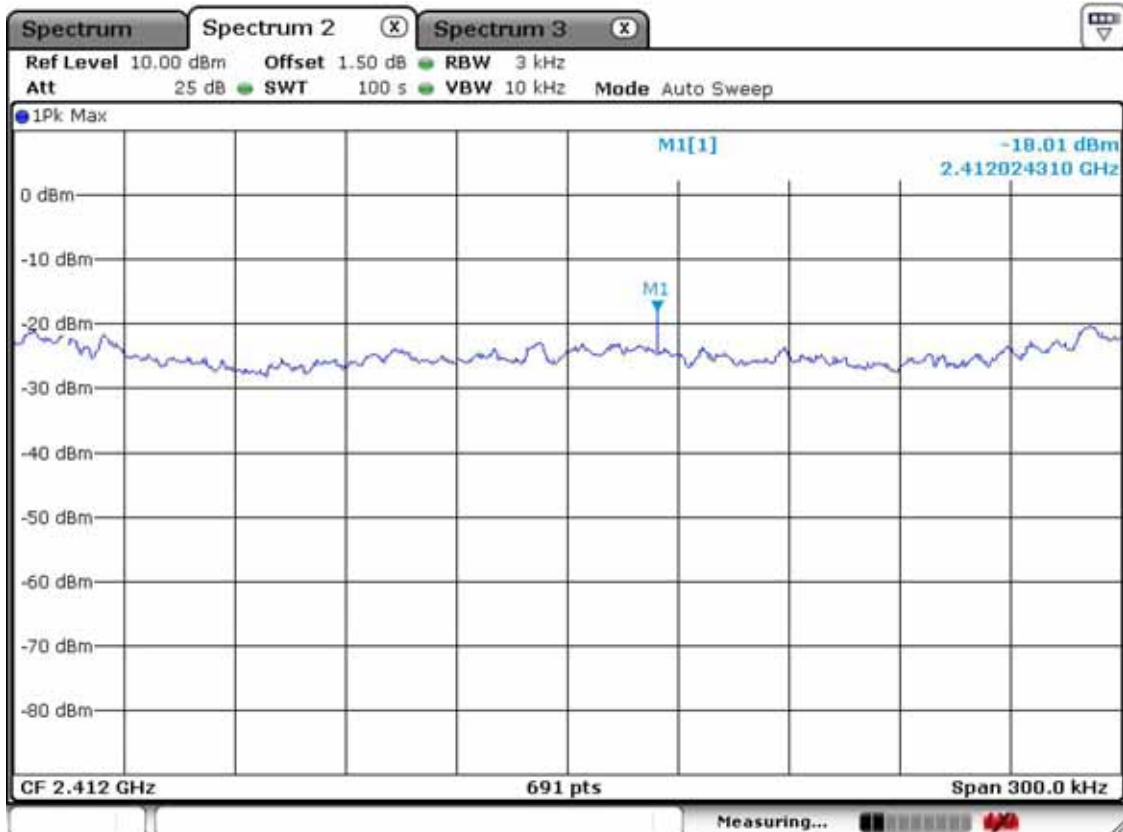


## CH 11

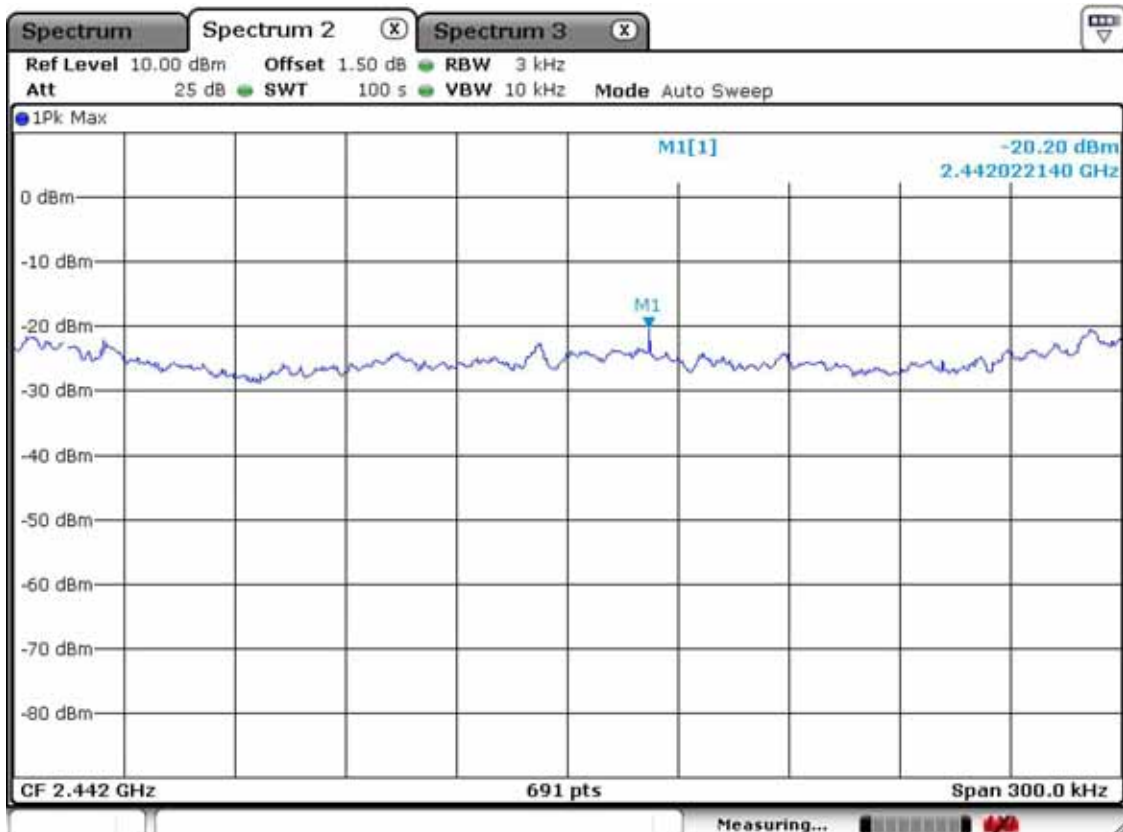


## 802.11n 20MHz Power Density Measurement

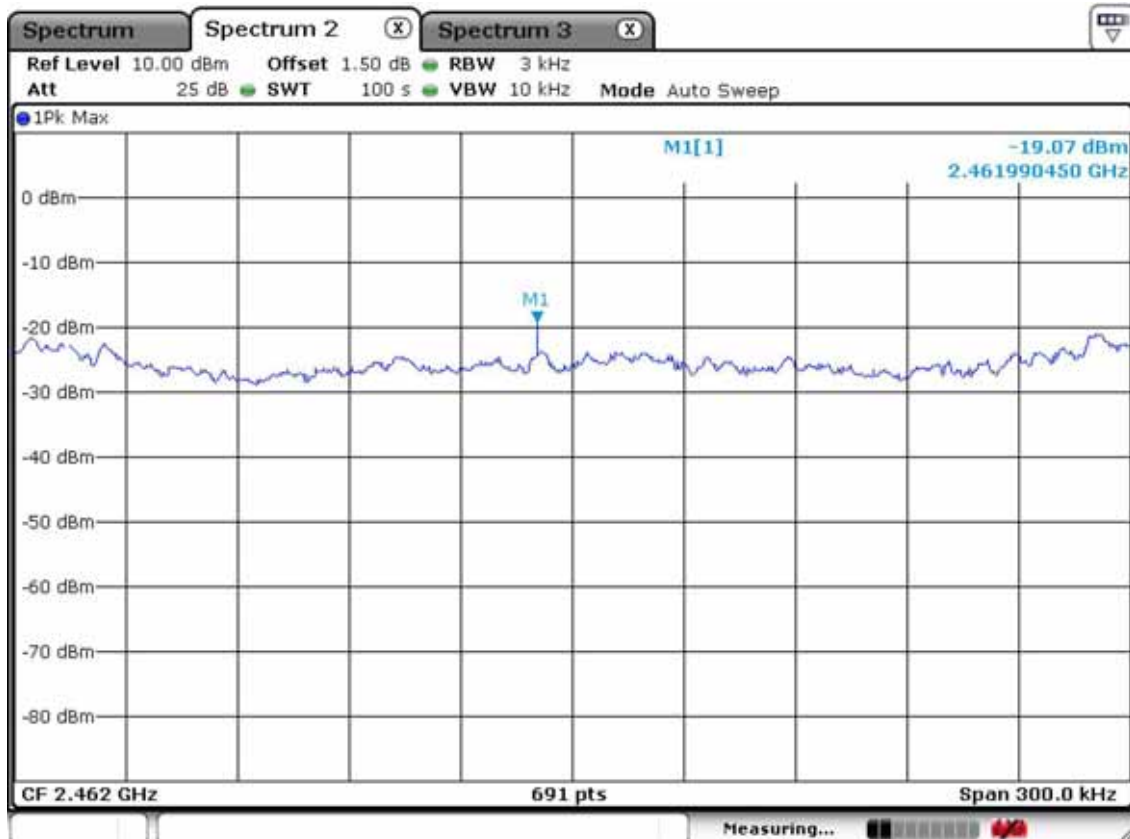
### CH 1



### CH 6



## CH 11



### 3.2.4 Band - edge

#### Procedure:

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

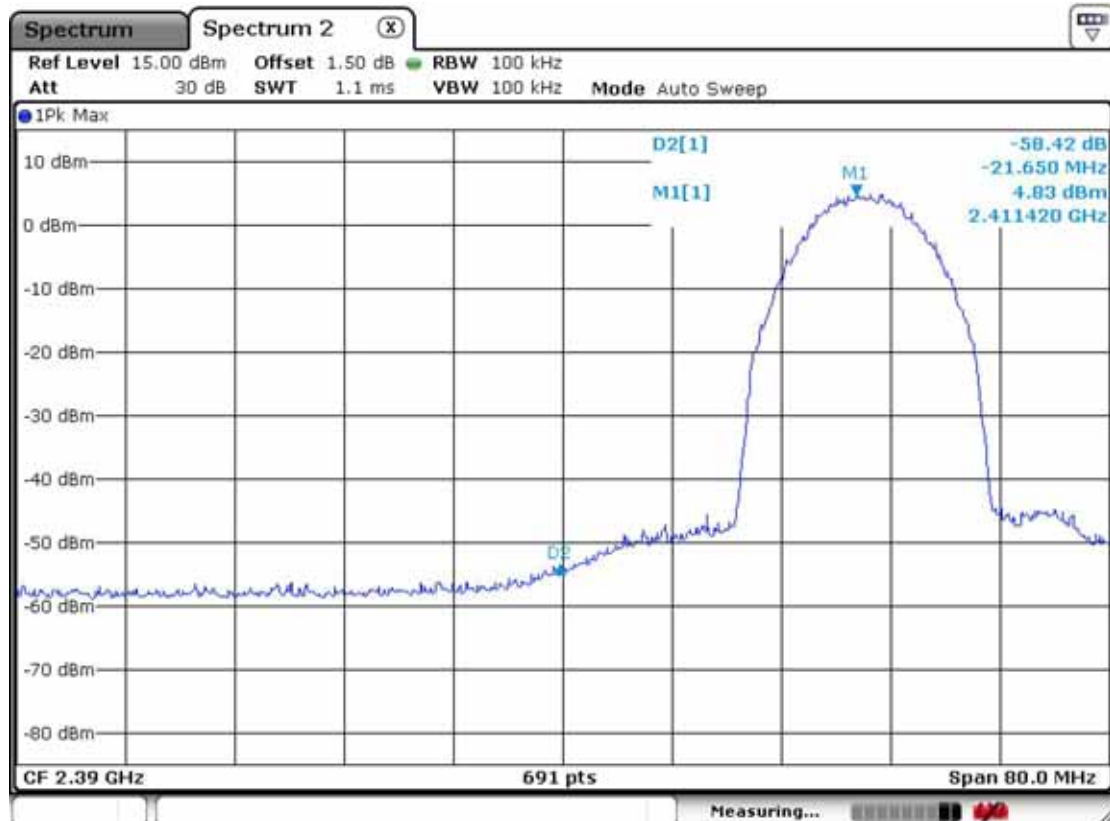
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	> 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**

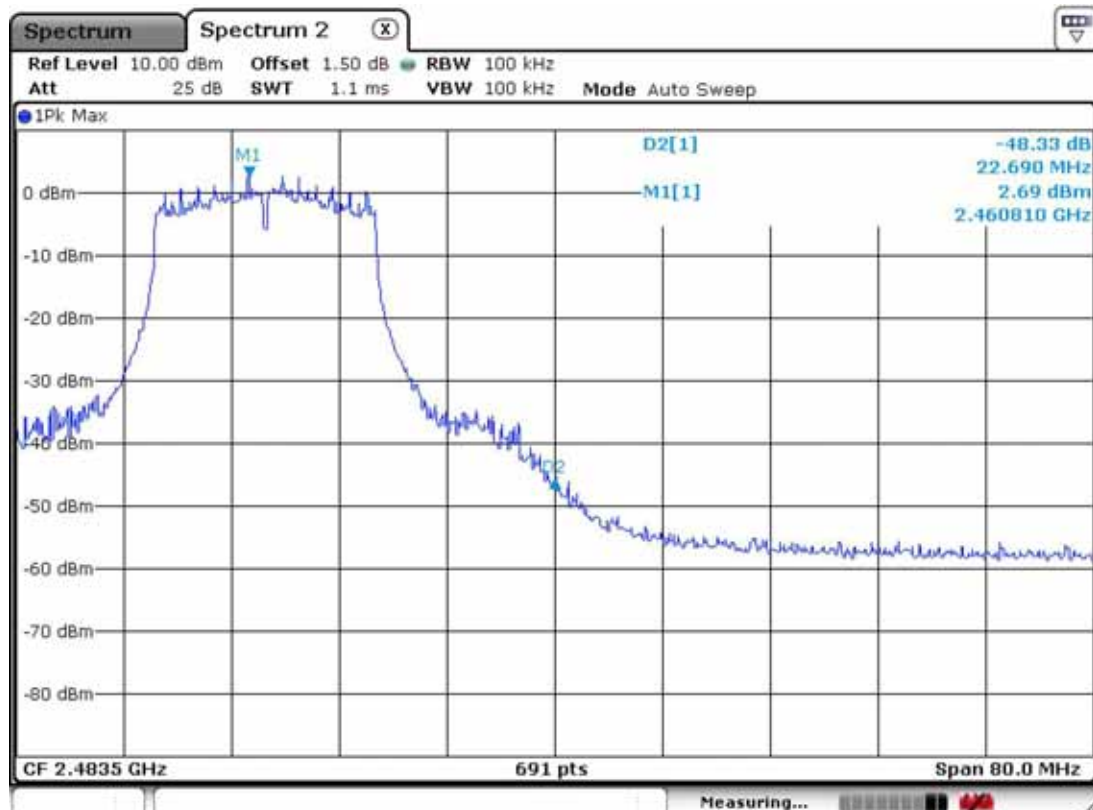
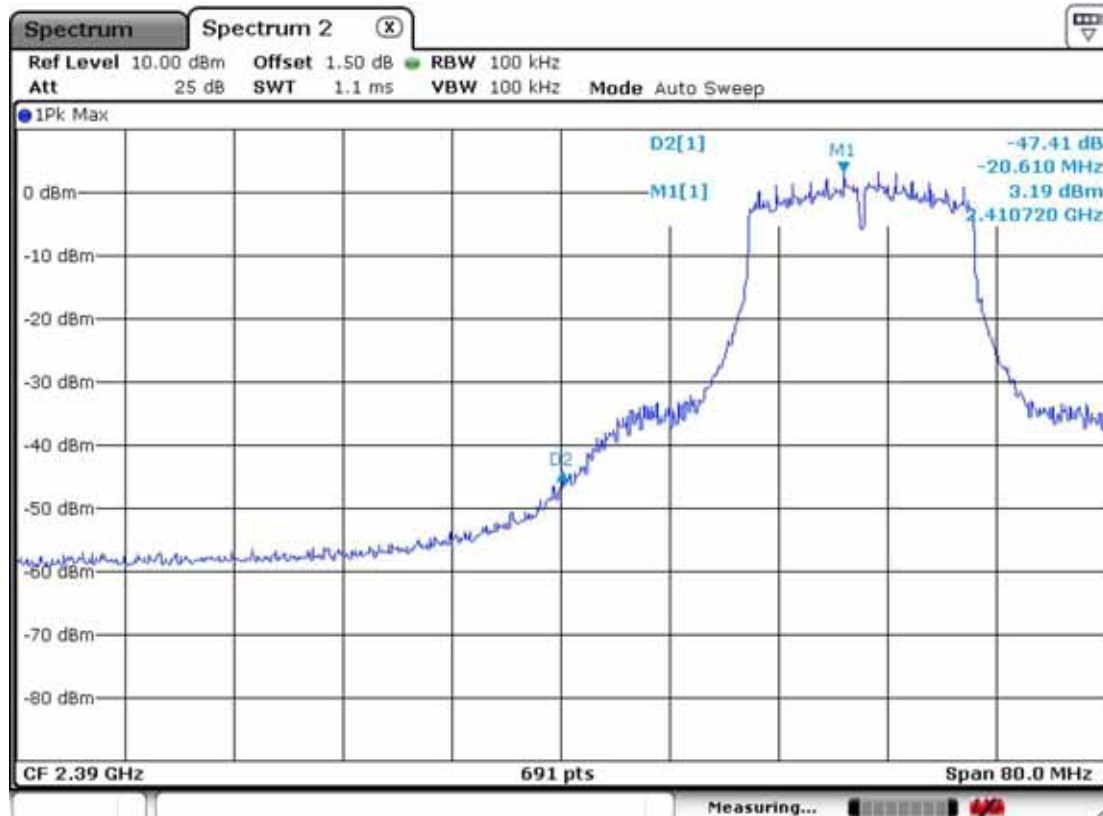
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV/m]			Factor			[dBuV/m]		[dBuV/m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	38.7	51.9	V	25.4	37.1	4.0	54.0	74.0	30.9	44.2	23.1	29.8

**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	44.7	57.3	V	25.4	37.1	4.0	54.0	74.0	36.9	49.5	17.1	24.5

**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	41.5	58.1	V	25.4	37.1	4.0	54.0	74.0	33.7	50.4	20.3	23.6

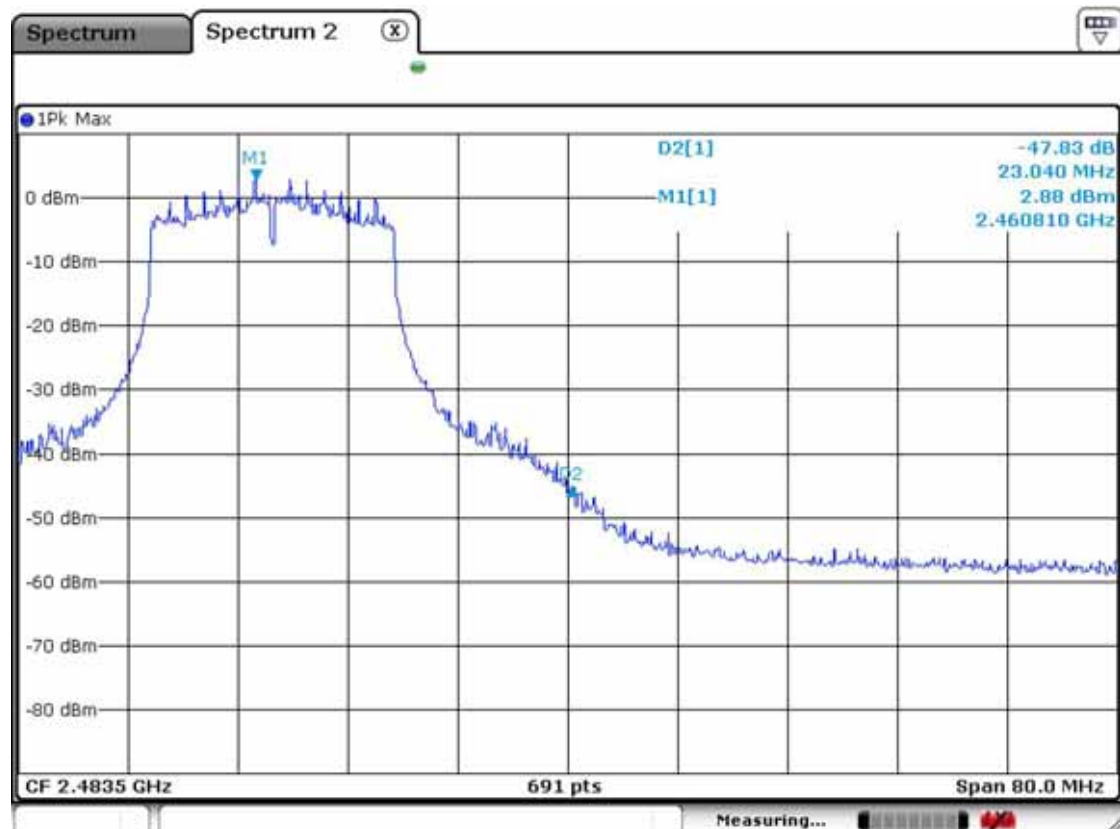
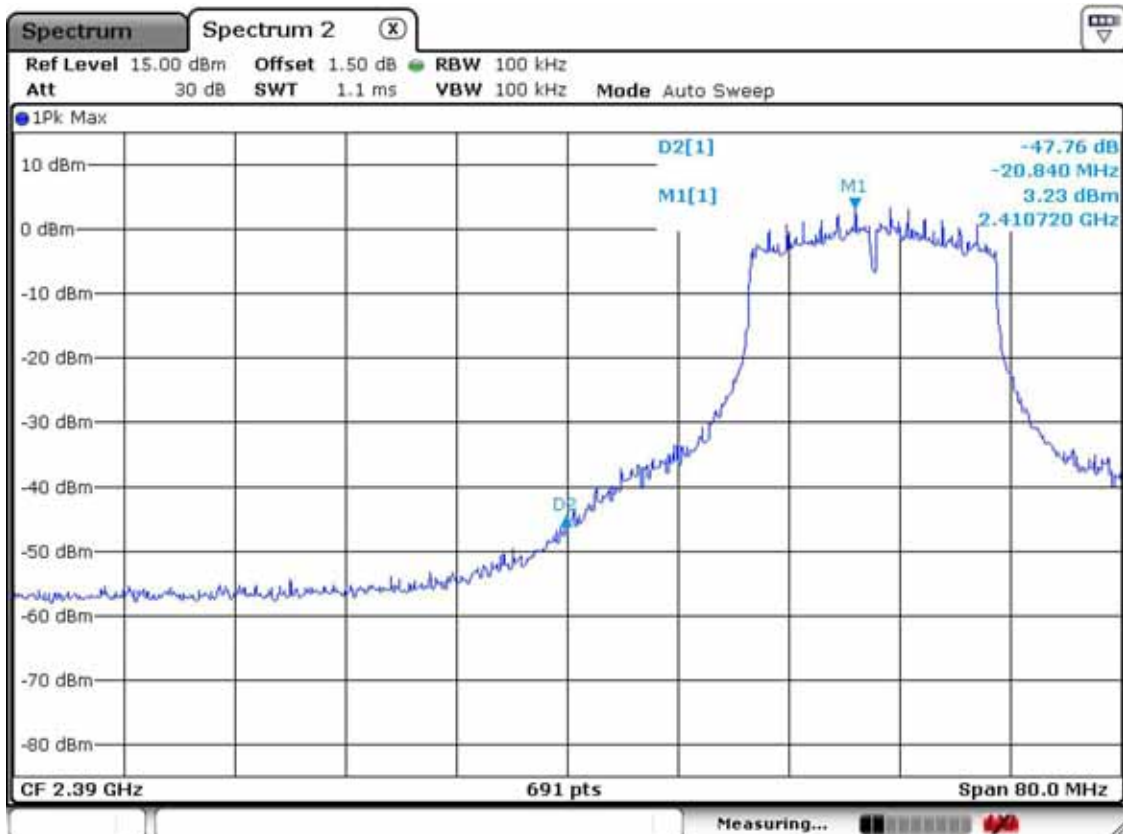
**Band-edges in the restricted band 2483.5-2500 MHz measurement**

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	43.5	65.3	V	25.4	37.1	4.0	54.0	74.0	35.7	57.6	18.3	16.4

**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**

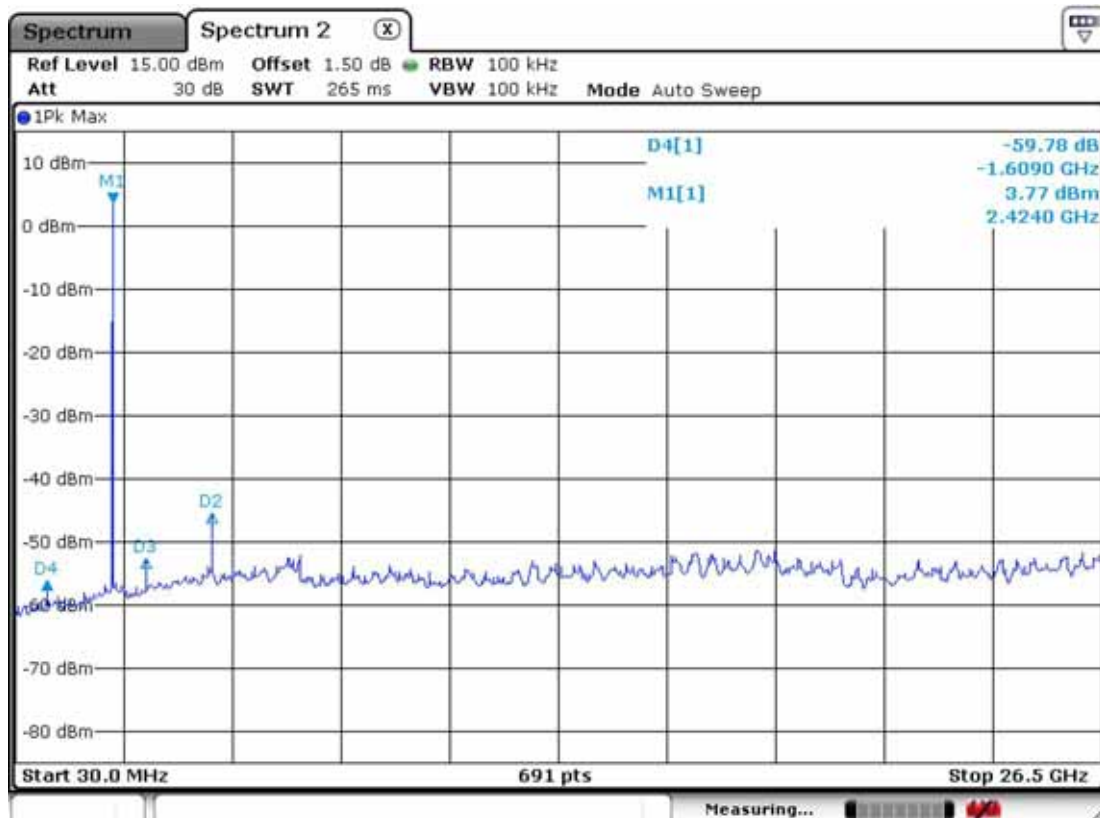
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV/m]			Factor			[dBuV/m]		[dBuV/m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2390	41.0	57.6	V	25.4	37.1	4.0	54.0	74.0	33.2	49.9	20.8	24.1

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

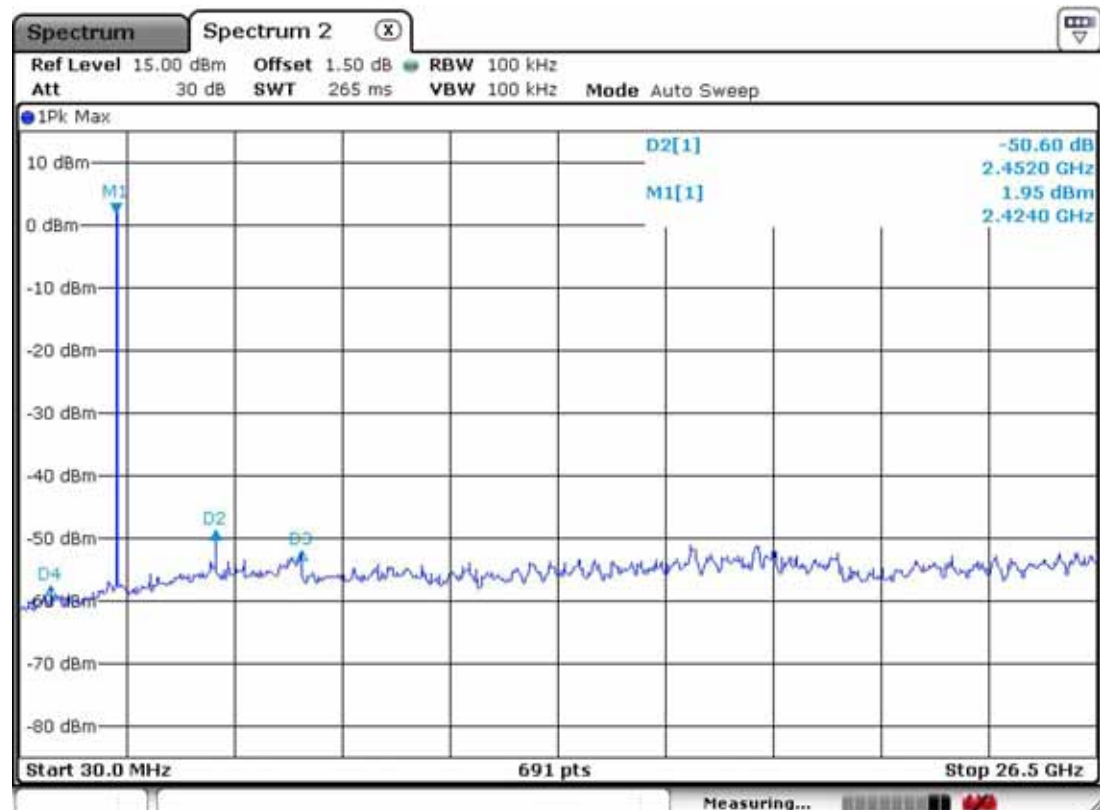
Frequency	Reading		Pol.	Correction			Limits		Result		Margin	
	[dBuV/m]			Factor			[dBuV/m]		[dBuV/m]		[dB]	
[MHz]	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	43.1	65.2	V	25.4	37.1	4.0	54.0	74.0	35.4	57.4	18.6	16.6

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

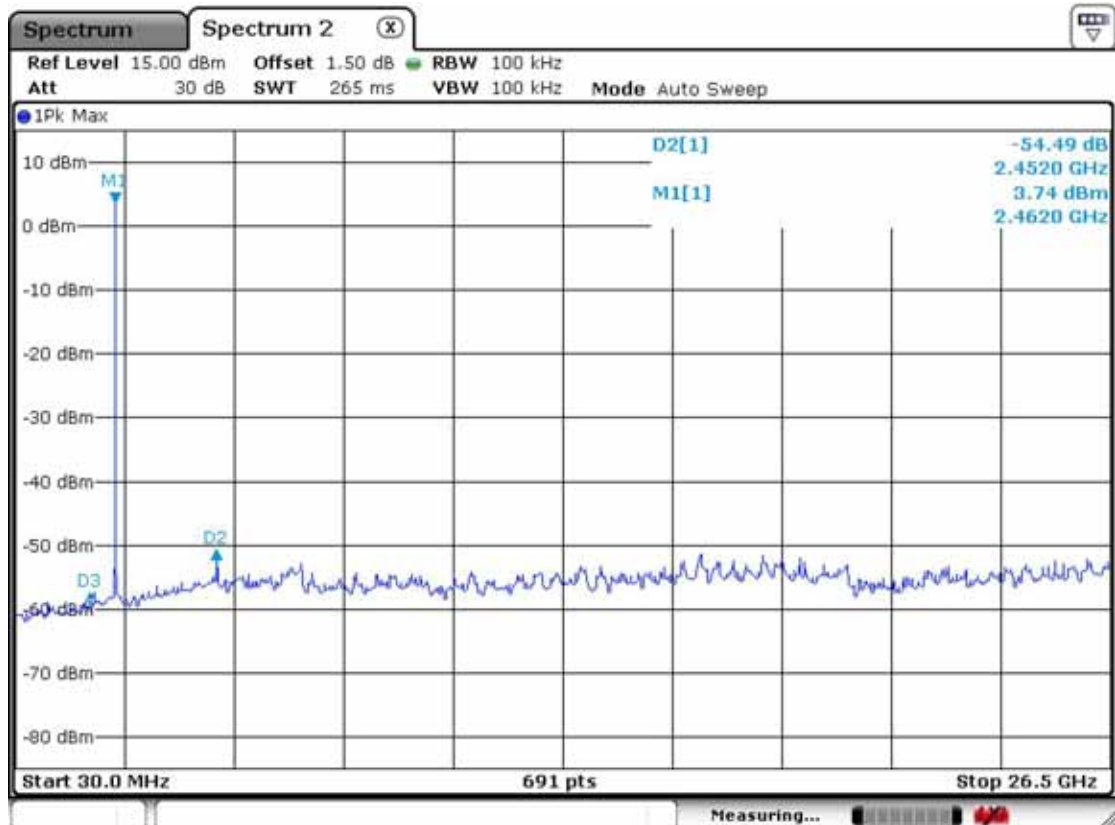
## 802.11b – channel 1

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

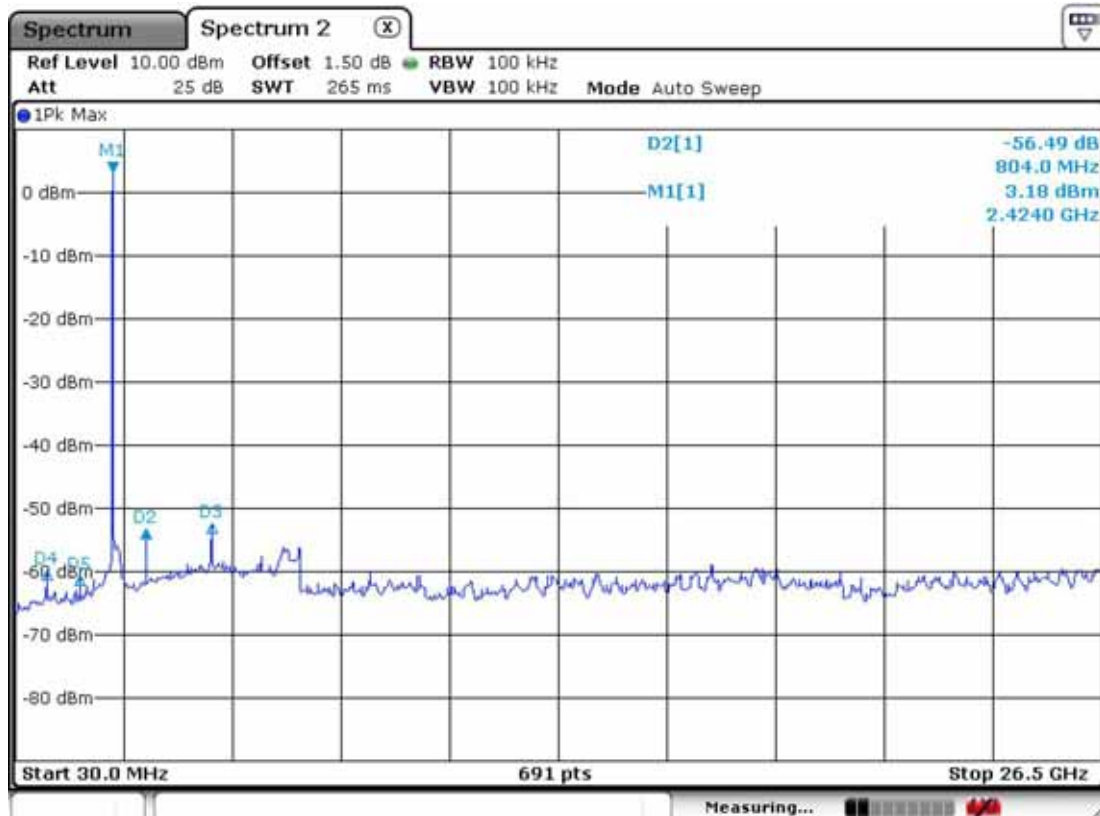
## 802.11b – channel 7

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

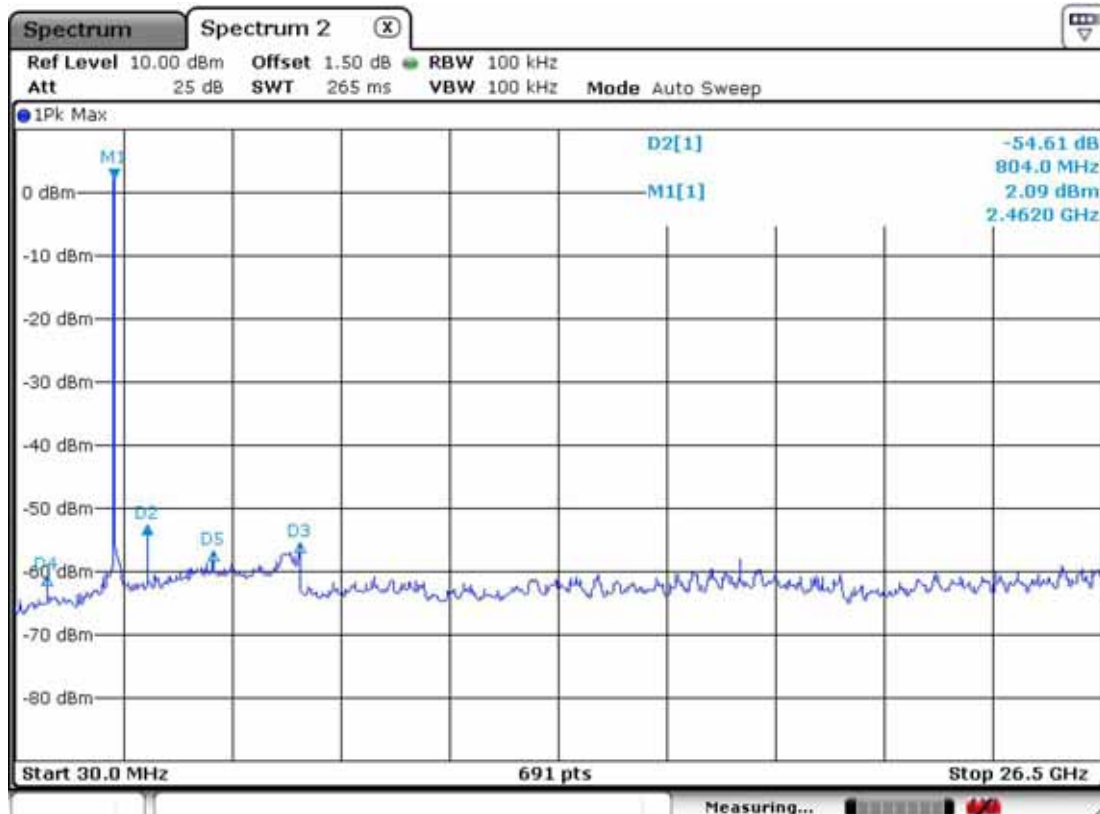
## 802.11b –channel 11

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

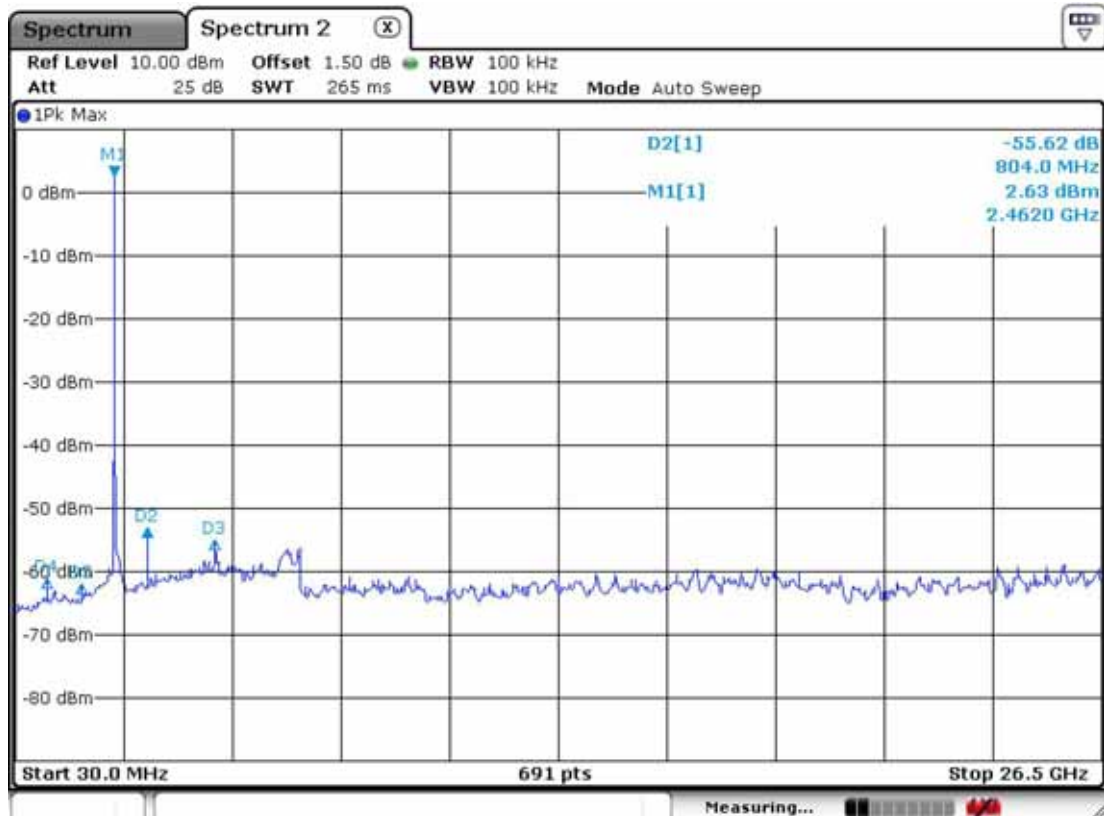
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



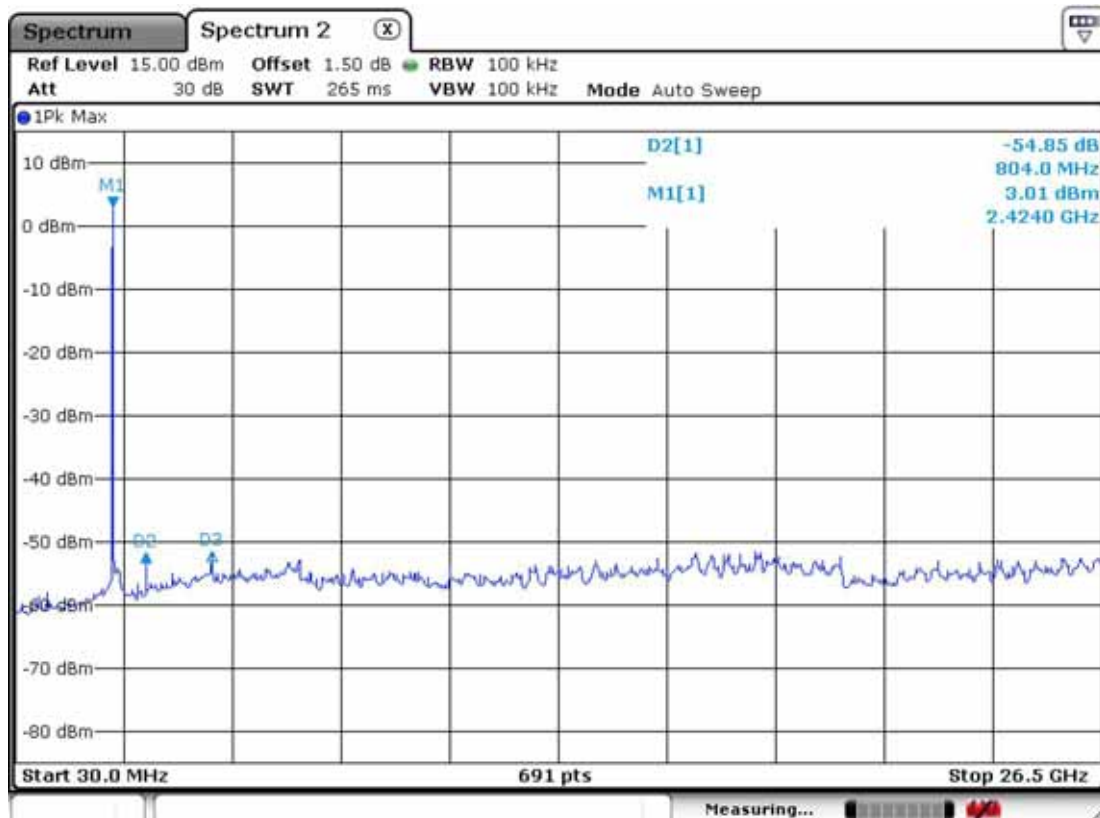
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



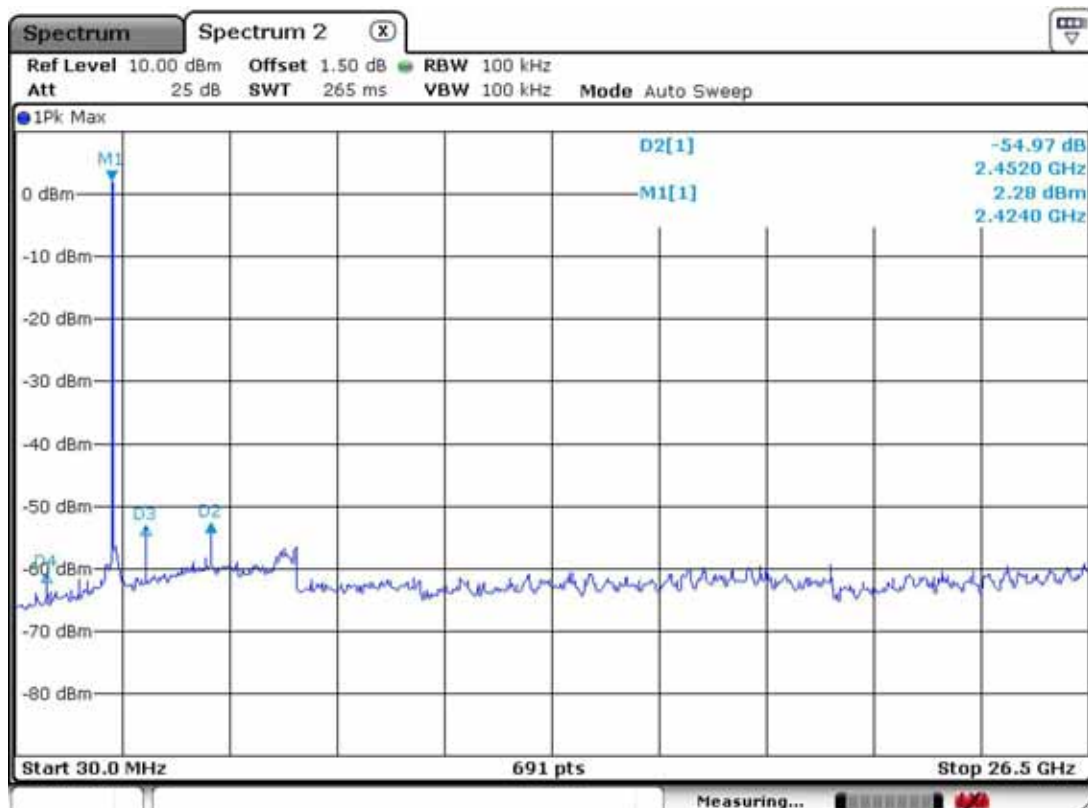
802.11g –channel 11  
Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.



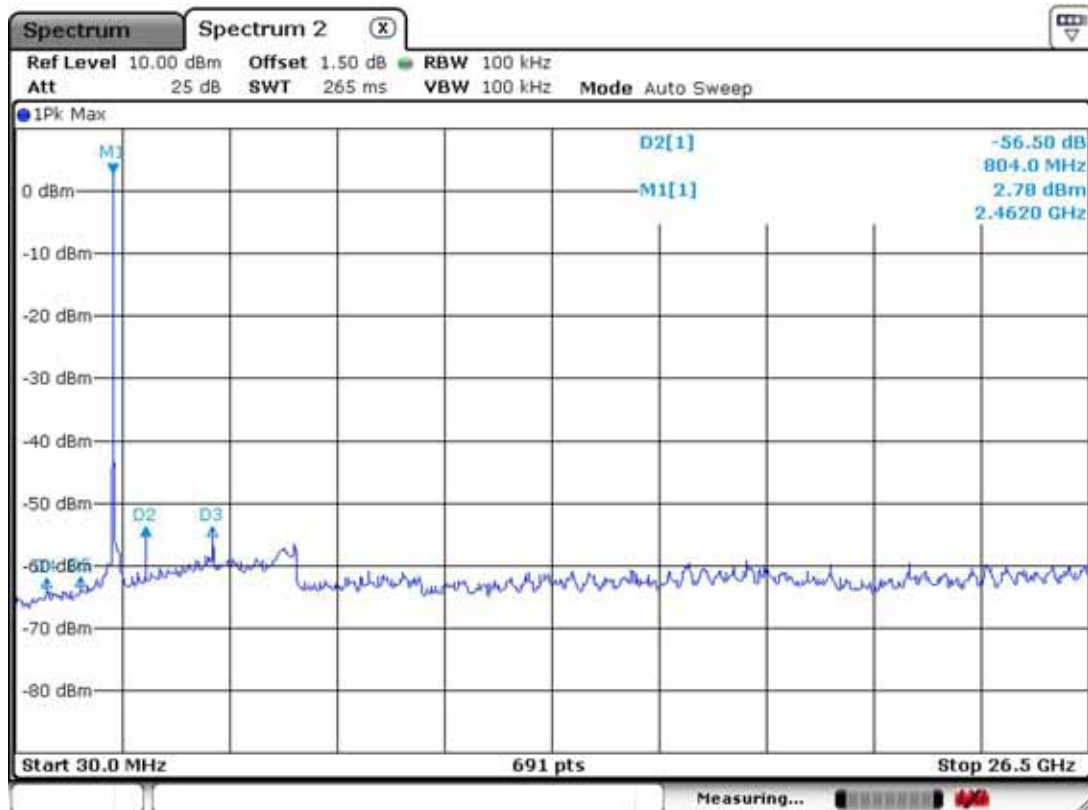
## 802.11n\_20MHz – channel 1

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

## 802.11n\_20MHz – channel 7

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

## 802.11n\_20MHz –channel 11

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.



### 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 ~ 10<sup>th</sup> harmonic.

RBW = 100 kHz ( 30MHz ~ 1 GHz)

VBW      RBW

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

#### 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:**

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	
4823.0	43.3	56.2	V	31.4	36.5	5.7	54.0	74.0	44.0	56.9	10.0	17.1
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4874.0	38.9	51.3	V	31.4	36.5	5.7	54.0	74.0	39.6	52.0	14.4	22.0
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4924.00	43.0	55.4	V	31.4	36.5	5.7	54.0	74.0	43.7	56.1	10.4	17.9
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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	
4824.0	39.4	55.6	V	31.4	36.5	5.7	54.0	74.0	40.1	56.2	14.0	17.8
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4874.0	36.7	51.7	V	31.4	36.5	5.7	54.0	74.0	37.4	52.4	16.6	21.6
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4924.00	39.1	55.2	V	31.4	36.5	5.7	54.0	74.0	39.7	55.9	14.3	18.2
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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	
4824.0	39.3	55.3	V	31.4	36.5	5.7	54.0	74.0	40.0	56.0	14.0	18.0
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4874.0	36.8	51.8	V	31.4	36.5	5.7	54.0	74.0	37.4	52.5	16.6	21.5
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
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	
4924.00	39.6	55.8	V	31.4	36.5	5.7	54.0	74.0	40.2	56.5	13.8	17.5
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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

**Radiated Emissions – Below 1GHz WORST-CASE DATA : Wifi + MP3 Play Mode**

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

EUT/Model No.: ESP-E301

TEST MODE: WiFi+MP3 play mode

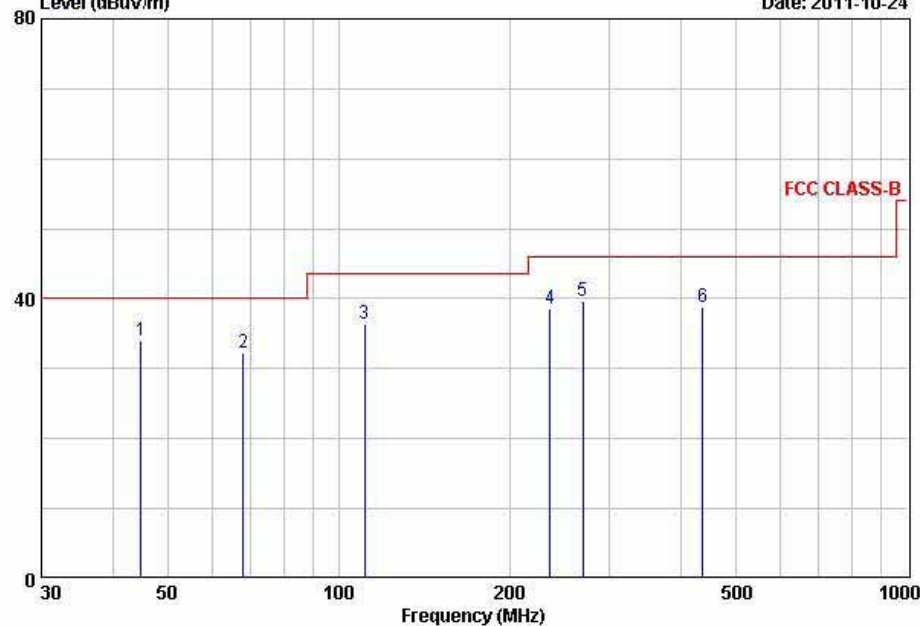
Temp Humi : 2 / 37

Tested by: PARK H W

Data: 104

Level (dBuV/m)

Date: 2011-10-24



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	44.93	44.90	-10.84	34.06	40.00	5.94	100	87	VERTICAL
2	67.96	44.40	-12.15	32.25	40.00	7.75	100	69	VERTICAL
3	111.12	49.30	-12.80	36.50	43.50	7.00	100	84	VERTICAL
4	235.77	48.30	-9.74	38.56	46.00	7.44	149	27	HORIZONTAL
5	268.72	48.10	-8.36	39.74	46.00	6.26	138	139	HORIZONTAL
6	437.20	43.40	-4.57	38.83	46.00	7.17	100	161	HORIZONTAL

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

**Radiated Emissions – Below 1GHz WORST-CASE DATA : Wifi + PC 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.: ESP-E301

TEST MODE: WiFi+PC mode

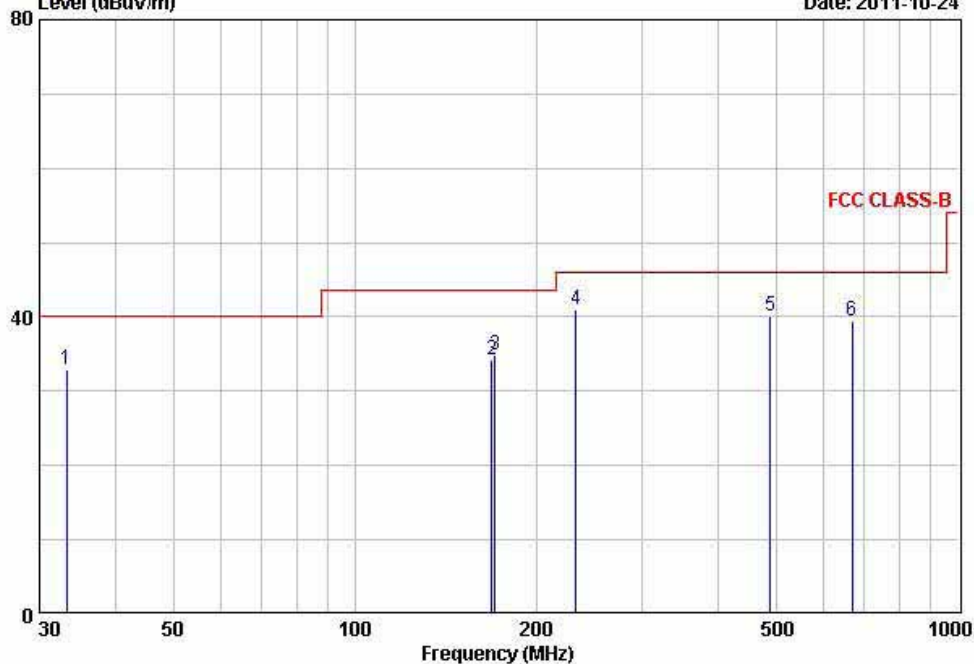
Temp Humi : 10 / 34

Tested by: PARK H W

Data: 80

Level (dBuV/m)

Date: 2011-10-24



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	33.30	45.10	-12.10	33.00	40.00	7.00	100	118	VERTICAL
2	168.67	43.50	-9.27	34.23	43.50	9.27	400	133	HORIZONTAL
3	171.03	44.30	-9.41	34.89	43.50	8.61	400	132	HORIZONTAL
4	232.61	50.80	-9.89	40.91	46.00	5.09	400	135	HORIZONTAL
5	489.37	43.60	-3.42	40.18	46.00	5.82	143	257	HORIZONTAL
6	668.48	38.40	1.12	39.52	46.00	6.48	168	47	VERTICAL

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**

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 20dB below limit.

**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

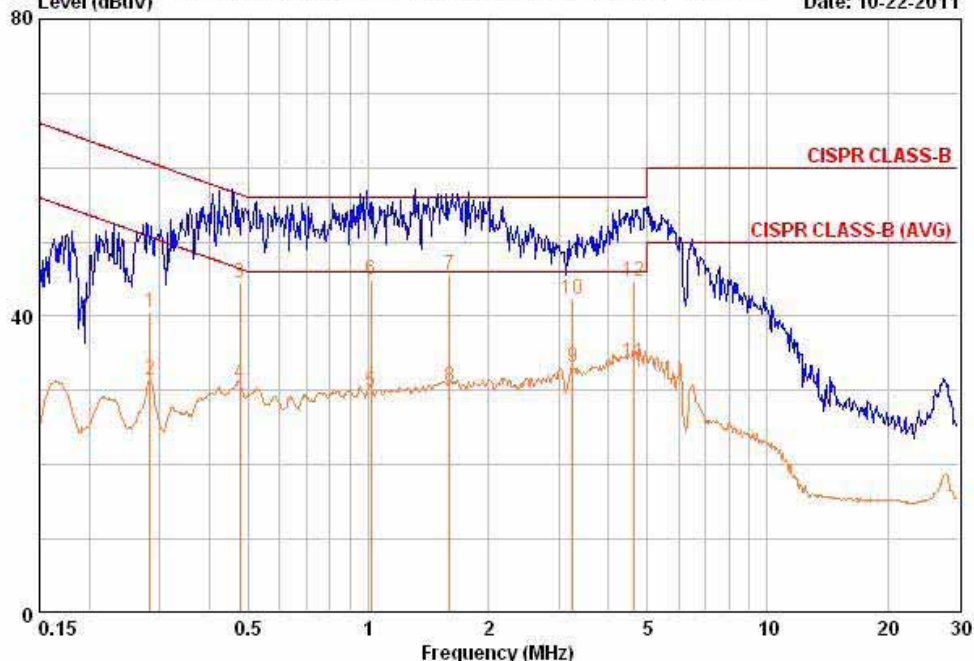
\* Decreases with the logarithm of the frequency

**AC Conducted Emissions at Wifi + MP3 Play mode – Line**

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

EUT / Model No. : ESP-E301	Phase : LINE
Test Mode : Wifi+MP3 play mode	Test Power : 120 / 60
Temp./Humi. : 19 / 23	Test Engineer : PARK.H.W

Data: 30 File: C:\Conducted Data\2011\LTA\_Conduction\_1102-1.EMI (350) Date: 10-22-2011  
Level (dBuV)



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.284	30.96	21.66	9.65	40.60	31.30	60.70	50.70	20.09	19.39
0.477	34.85	21.35	9.67	44.52	31.02	56.39	46.39	11.87	15.37
1.017	35.16	20.26	9.67	44.83	29.93	56.00	46.00	11.17	16.07
1.596	35.80	20.90	9.69	45.49	30.59	56.00	46.00	10.51	15.41
3.248	32.54	23.44	9.70	42.24	33.14	56.00	46.00	13.76	12.86
4.645	34.84	24.04	9.74	44.58	33.78	56.00	46.00	11.42	12.22

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

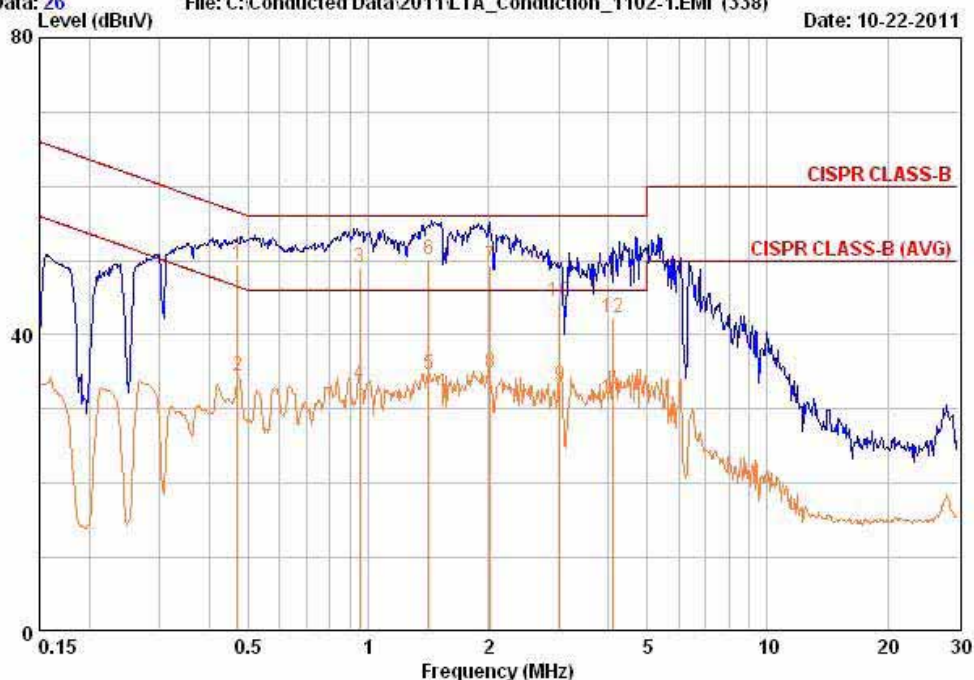


**AC Conducted Emissions at Wifi + MP3 Play mode – Neutral**

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

EUT / Model No. : ESP-E301	Phase : NEUTRAL
Test Mode : Wifi+MP3 play mode	Test Power : 120 / 60
Temp./Humi. : 19 / 23	Test Engineer : PARK.H.W

Data: 26 File: C:\Conducted Data\2011\LTA\_Conduction\_1102-1.EMI (338) Date: 10-22-2011



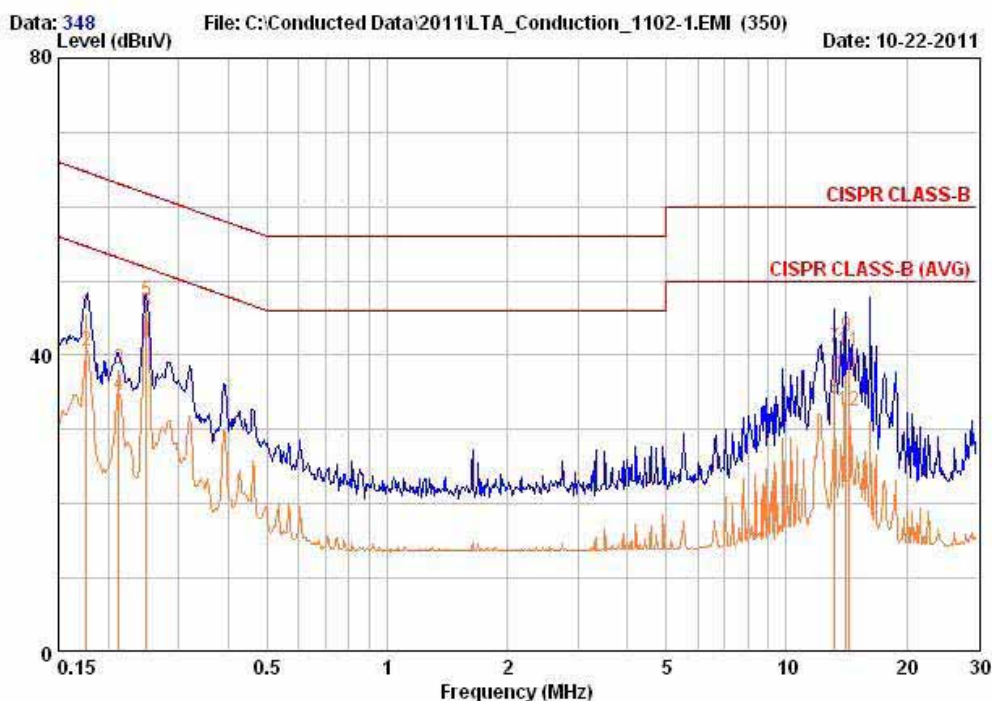
Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.471	39.85	24.75	9.66	49.51	34.41	56.50	46.50	6.98	12.08
0.954	39.36	23.76	9.67	49.03	33.43	56.00	46.00	6.97	12.57
1.413	40.39	24.89	9.68	50.06	34.56	56.00	46.00	5.94	11.44
2.016	39.63	25.23	9.68	49.31	34.91	56.00	46.00	6.69	11.09
3.021	34.84	23.34	9.70	44.54	33.04	56.00	46.00	11.46	12.96
4.104	32.63	21.63	9.73	42.36	31.36	56.00	46.00	13.64	14.64

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

**AC Conducted Emissions at Wifi + PC mode – Line**

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

EUT / Model No. : ESP-E301	Phase : LINE
Test Mode : WiFi+PC mode	Test Power : 120 / 60
Temp./Humi. : 19 / 23	Test Engineer : PARK.H.W



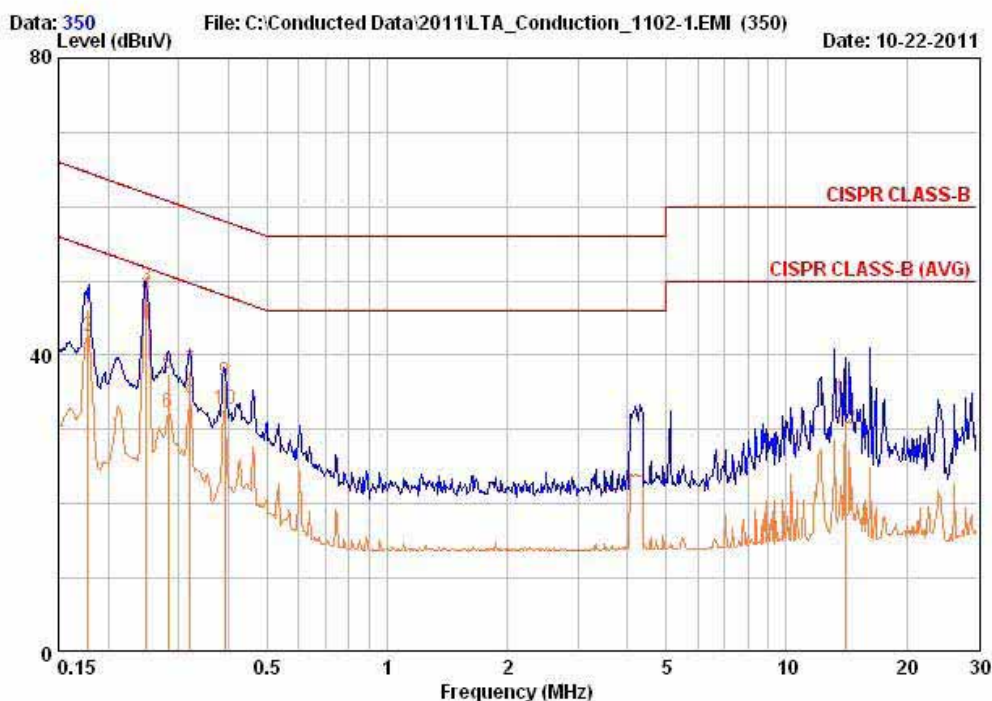
Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.176	35.86	30.86	9.65	45.50	40.50	64.67	54.67	19.17	14.17
0.212	28.46	24.96	9.64	38.10	34.60	63.13	53.13	25.03	18.53
0.249	37.65	36.15	9.64	47.29	45.79	61.79	51.79	14.50	6.00
13.211	31.10	24.40	9.89	40.99	34.29	60.00	50.00	19.01	15.71
14.078	32.70	27.40	9.90	42.61	37.31	60.00	50.00	17.39	12.69
14.369	30.61	22.61	9.91	40.51	32.51	60.00	50.00	19.49	17.49

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

**AC Conducted Emissions at Wifi + PC mode – Neutral**

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

EUT / Model No. : ESP-E301	Phase : NEUTRAL
Test Mode : WiFi+PC mode	Test Power : 120 / 60
Temp./Humi. : 19 / 23	Test Engineer : PARK.H.W



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.178	36.66	32.86	9.65	46.31	42.51	64.58	54.58	18.27	12.07
0.249	39.55	38.25	9.65	49.20	47.90	61.79	51.79	12.59	3.89
0.283	27.76	22.66	9.65	37.41	32.31	60.73	50.73	23.32	18.42
0.320	28.36	24.56	9.65	38.01	34.21	59.71	49.71	21.70	15.50
0.391	26.65	22.95	9.65	36.30	32.60	58.04	48.04	21.74	15.44
14.079	24.00	20.10	9.92	33.92	30.02	60.00	50.00	26.08	19.98

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

APPENDIX

**TEST EQUIPMENT USED FOR TESTS**

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Spectrum Analyzer (~30GHz)	FSV-30	100757	R&S	1 year	2011-01-24
2	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2011-03-30
3	Signal Generator (1~20GHz)	83711B	US34490456	HP	1 year	2011-03-30
4	Attenuator (3dB)	8491A	37822	HP	2 year	2010-10-08
5	Attenuator (10dB)	8491A	63196	HP	2 year	2010-10-08
6	Attenuator (30dB)	8498A	3318A10929	HP	2 year	2011-01-05
7	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2011-03-30
8	EMI Test Receiver (~1GHz)	ESCI7	100722	R&S	1 year	2011-10-07
9	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	2 year	2010-10-08
10	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2 year	2010-03-29
11	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
12	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
13	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
14	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2 year	2010-10-07
15	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
16	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
17	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
18	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
19	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2 year	2010-04-12
20	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
21	Power Divider	11636A	6243	HP	2 year	2010-10-08
22	DC Power Supply	6622A	3448A03079	HP	-	-
23	Frequency Counter	5342A	2826A12411	HP	1 year	2011-03-30
24	Power Meter	EPM-441A	GB32481702	HP	1 year	2011-03-30
25	Power Sensor	8481A	US41030291	HP	1 year	2011-10-07
26	Audio Analyzer	8903B	3729A18901	HP	1 year	2011-10-07
27	Modulation Analyzer	8901B	3749A05878	HP	1 year	2011-10-07
28	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2011-10-07
29	Stop Watch	HS-3	601Q09R	CASIO	2 year	2010-03-31
30	LISN	ENV216	100408	R&S	1 year	2011-10-07
31	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2 year	2010-05-13
32	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
33	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-
34	Loop Antenna	FMZB 1516	151602/94	SCHWARZBECK	2 year	2011-04-05