

Dates of Tests: April. 06 ~ 16, 2009

Test Report S/N: LR500190904B

Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**XBQ-S5**

APPLICANT

**YUKYUNG TECHNOLOGIES INC.**

<b>Equipment Class</b>	:	Digital Transmission System (DTS)
<b>Manufacturing Description</b>	:	Real Pocket PC
<b>Manufacturer</b>	:	YUKYUNG TECHNOLOGIES INC.
<b>Model name</b>	:	S5 PREMIUM H
<b>Test Device Serial No.:</b>	:	Identical prototype
<b>Rule Part(s)</b>	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2003
<b>Frequency Range</b>	:	2412MHz ~ 2462MHz
<b>Max. Output Power</b>	:	20.21dBm e.i.r.p (802.11b) 18.73dBm e.i.r.p (802.11g)
<b>Data of issue</b>	:	April 17, 2009

This test report is issued under the authority of:



Dong-Min JUNG, Technical Manager

The test was supervised by:



Kyung-Taek 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

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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](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	2009-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2009-06-20	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	2010-05-03	IC filing

## 2. Information's about test item

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

Company name : YUKYUNG TECHNOLOGIES INC.  
Address : 200-11, Anyang-Dong, Manan-Ku, Anyang-Si, Kyunggi-Do, Korea  
Tel / Fax : TEL No : +82-31-463-6906 / FAX No : +82-31-445-5995

## 2-2 Equipment Under Test (EUT)

Trade name	:	Real Pocket PC
FCC ID	:	XBQ-S5
Model name	:	S5 PREMIUM H
Serial number	:	Identical prototype
Date of receipt	:	March 31, 2009
EUT condition	:	Pre-production, not damaged
Antenna type	:	Chip antenna with Max. 2.18dBi gain
Frequency Range	:	2412MHz ~ 2462MHz (DSSS)
RF output power	:	20.21dBm e.i.r.p (802.11b) 18.73dBm e.i.r.p (802.11g)
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
Power Source for Batt.	:	Battery Pack: 3.7V (Li-Ion Polymer RECHARGEABLE BATTERY)
Power Source for Adaptor.	:	Input: 100-240VAC, 0.4A      Output: 5VDC, 3.0A

## 2-3 Tested frequency

	LOW	MID	HIGH
<b>Frequency (MHz) for 802.11b</b>	2412	2437	2462

## 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400	CNG8330J95	HP
MONITOR	LE23R18(R)	63343HDP901399E	SAMSUNG
KEYBOARD	SK-8115	641-04Q6	DELL
MOUSE	MO56UO	520107013	DELL
PRINTER	STYLUS C65	N/A	EPSON
EARPHONE	N/A	N/A	N/A

### 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 YUKYUNG TECHNOLOGIES INC. FCC ID: XBQ-S5PREMIUMH unit complies with the requirement of §15.203. The antenna is connected to inside of EUT.

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

### 3.2 Technical Characteristics Test (802.11b/g)

#### 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:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	10.333	Complies
	2437	6	10.376	Complies
	2462	11	10.333	Complies
802.11g	2412	1	16.498	Complies
	2437	6	16.541	Complies
	2462	11	16.541	Complies

- See next pages for actual measured spectrum plots.

##### Minimum Standard:

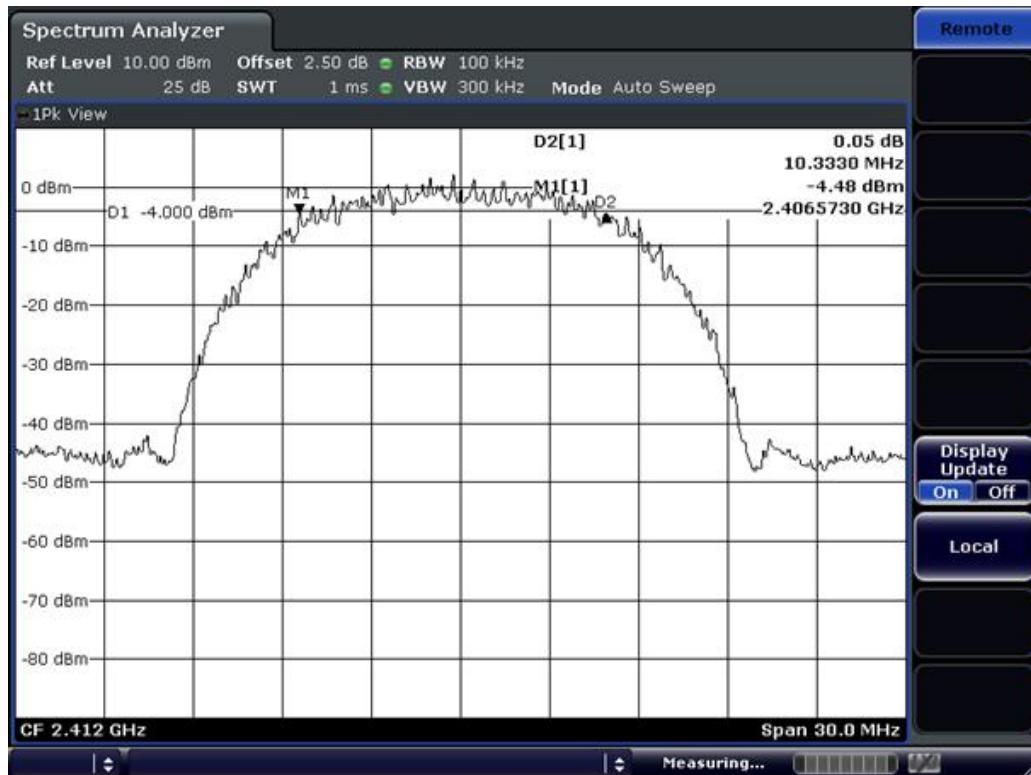
6 dB Bandwidth  $>$  500kHz

##### Measurement Setup

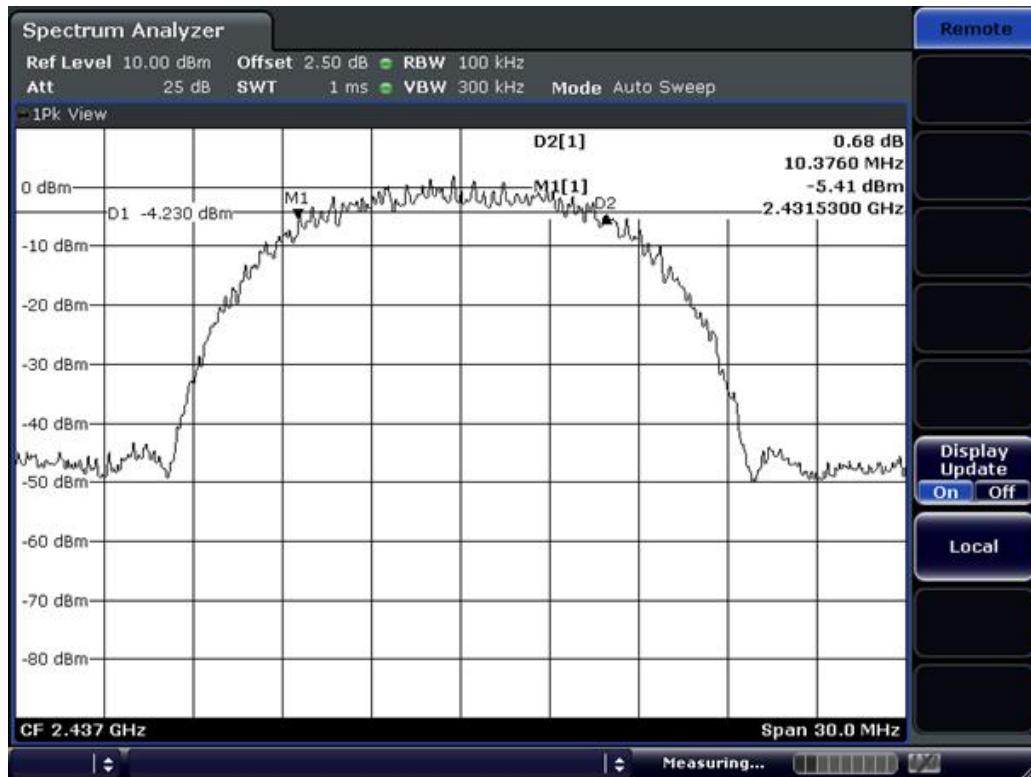
Same as the Chapter 3.2.1 (Figure 1)

## 802.11b

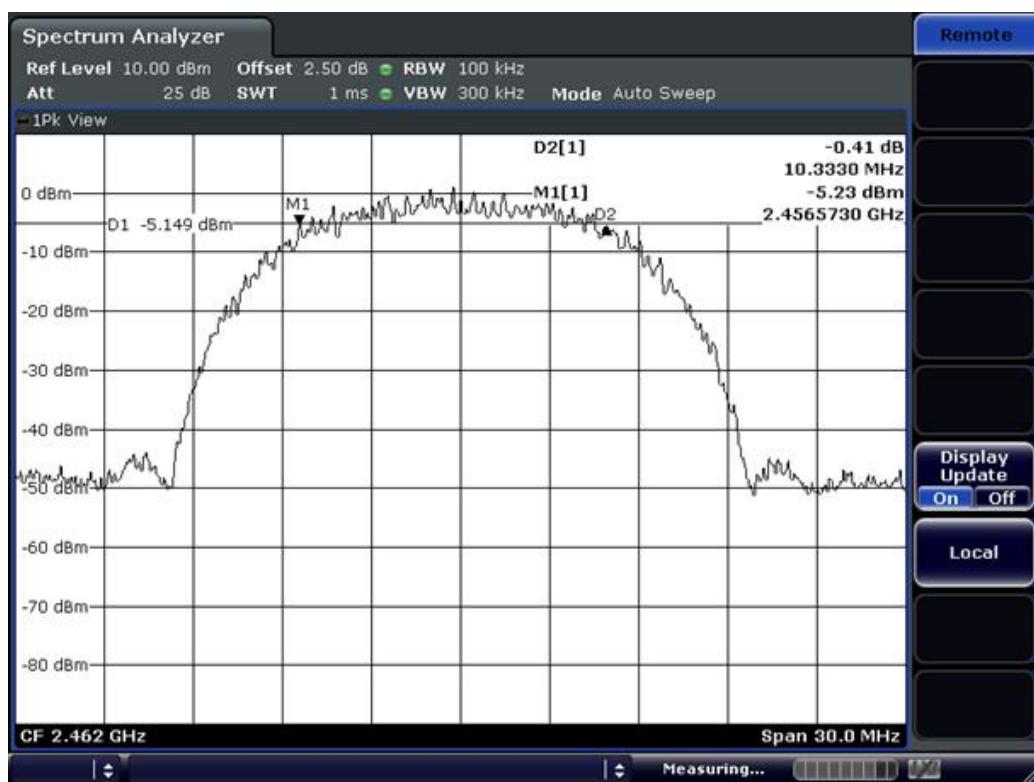
## CH 1



## CH 6

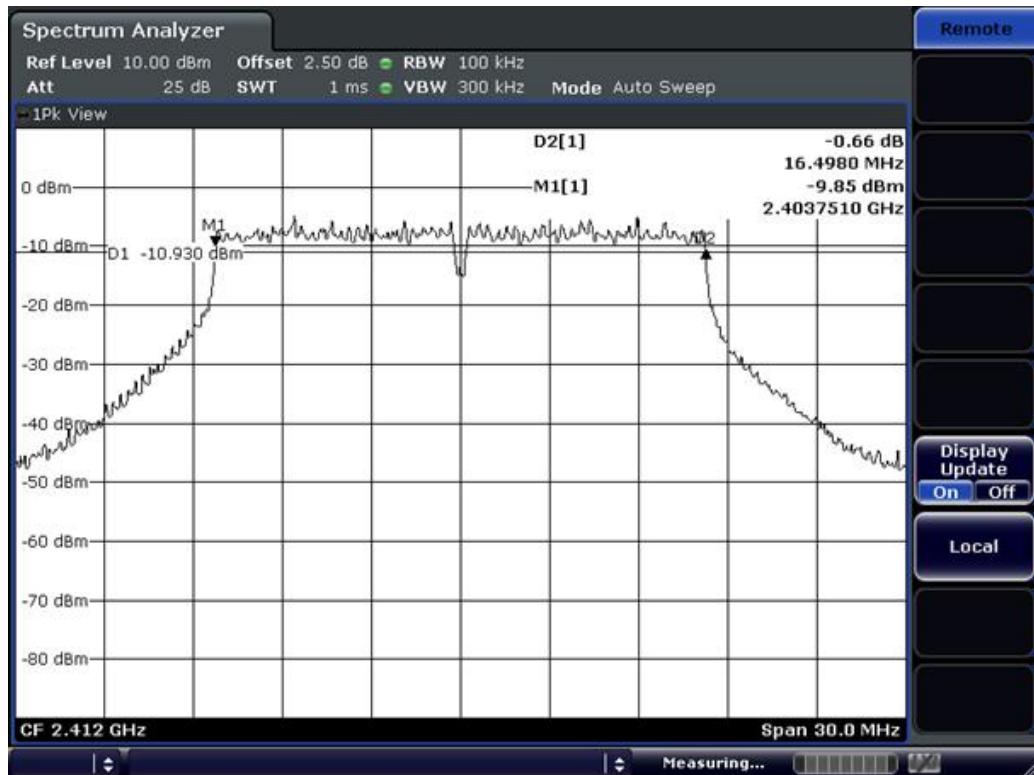


## CH 11

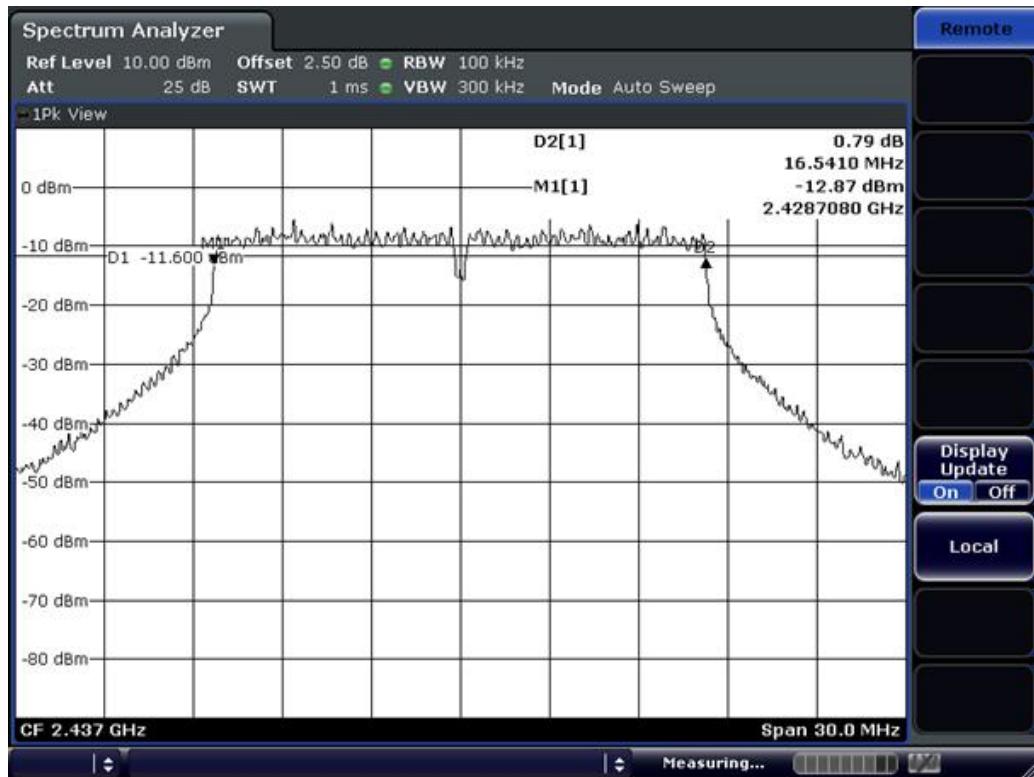


## 802.11g

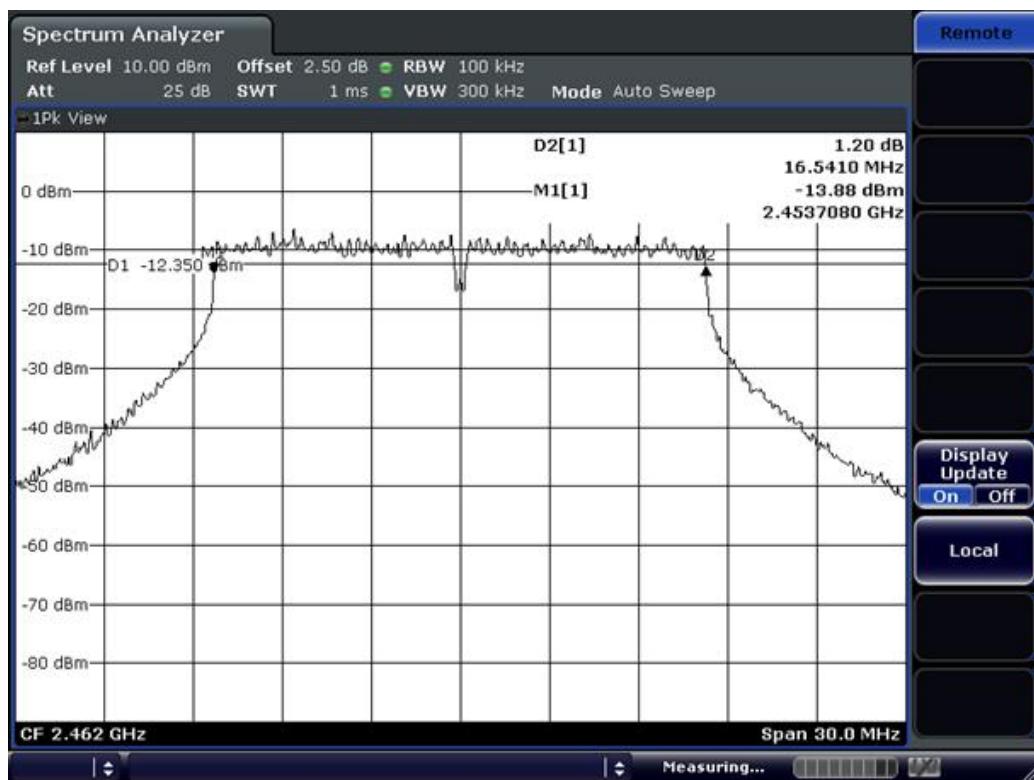
## CH 1



## CH 6



## CH 11



### 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:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Data (dBm)	Result
802.11b	2412	1	17.74	Complies
	2437	6	18.03	Complies
	2462	11	17.19	Complies
802.11g	2412	1	16.26	Complies
	2437	6	16.55	Complies
	2462	11	16.34	Complies

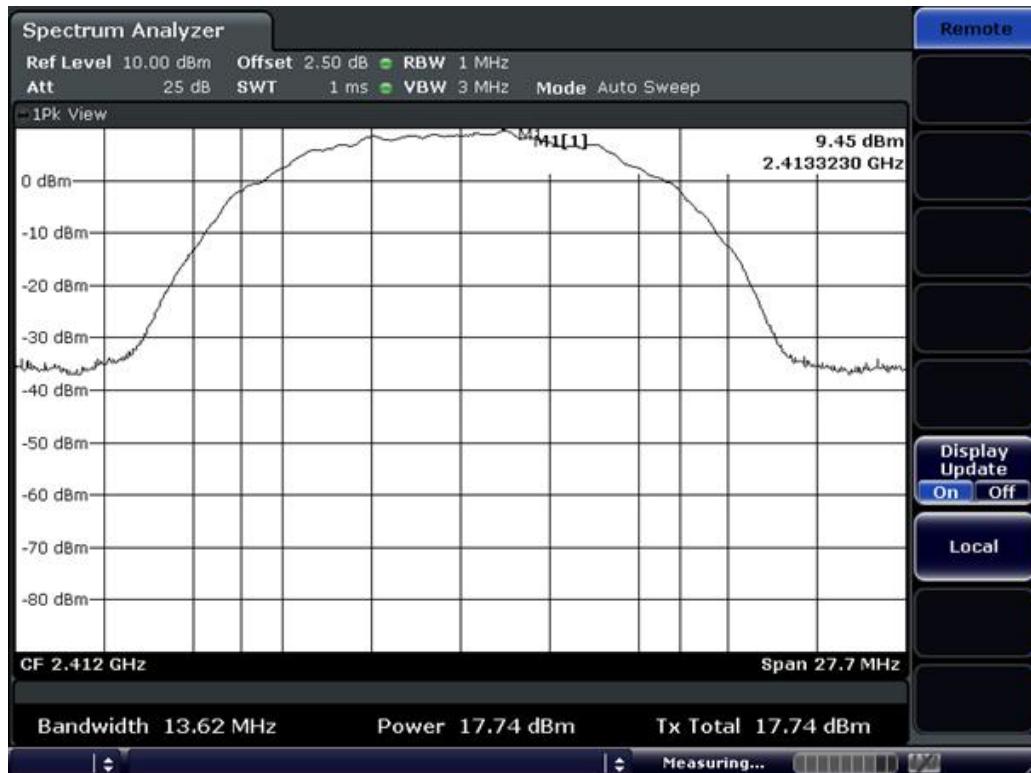
- See next pages for actual measured spectrum plots.

#### Minimum Standard:

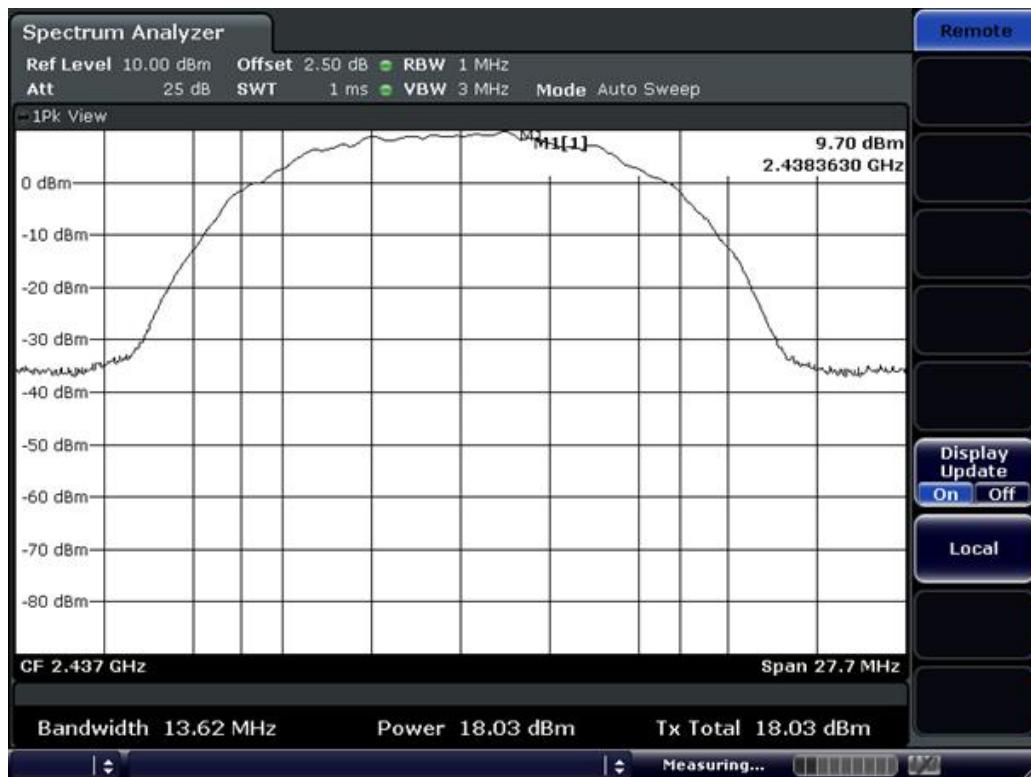
Peak output power	< 1W
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## 802.11b

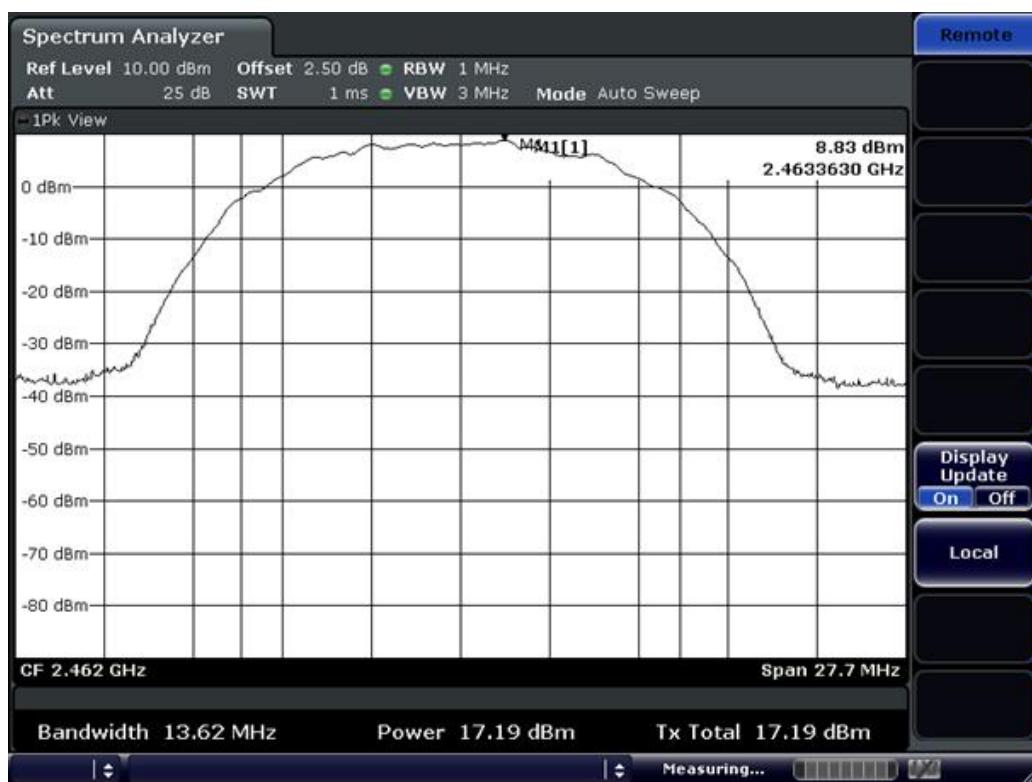
## CH 1



## CH 6

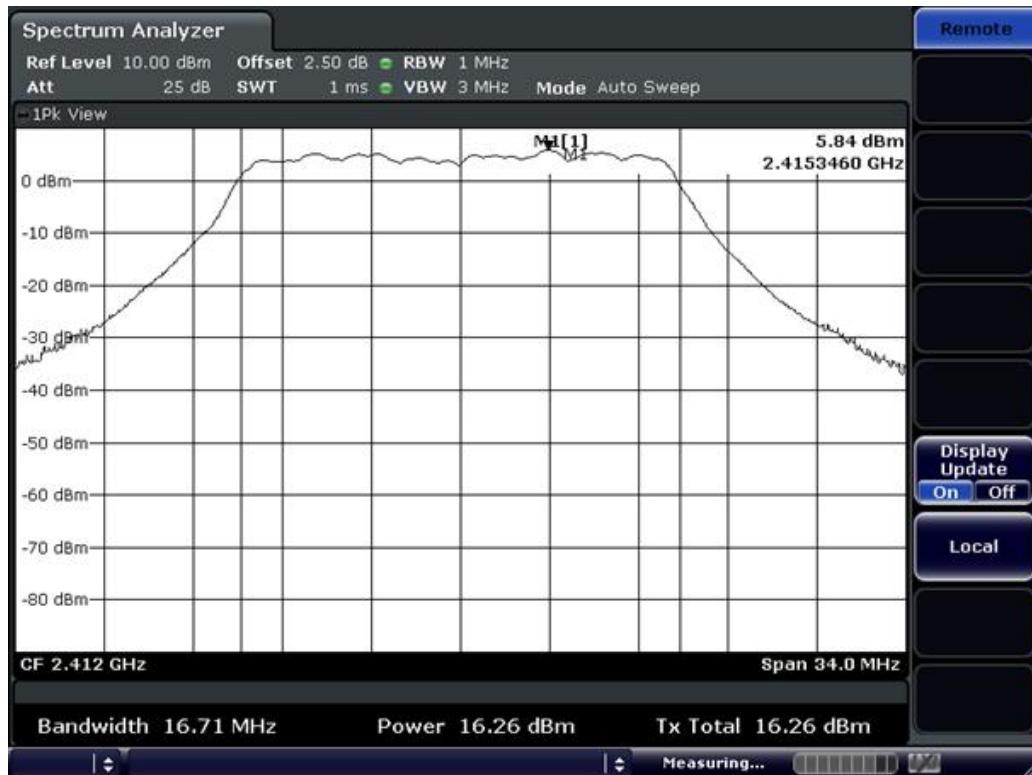


## CH 11

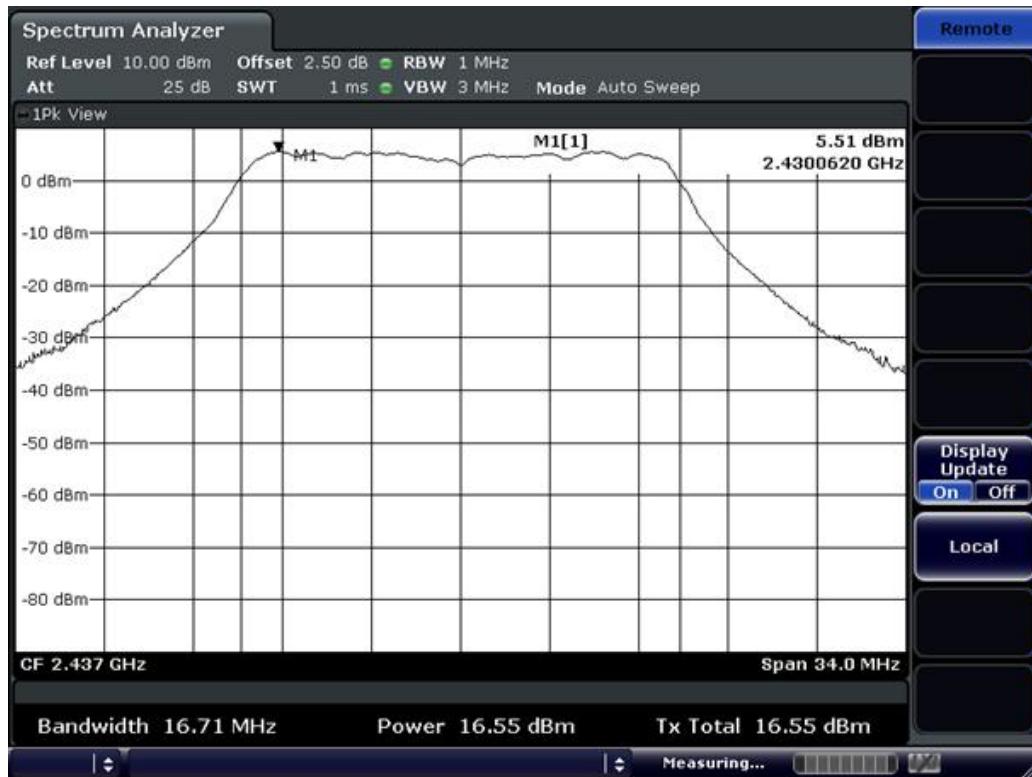


## 802.11g

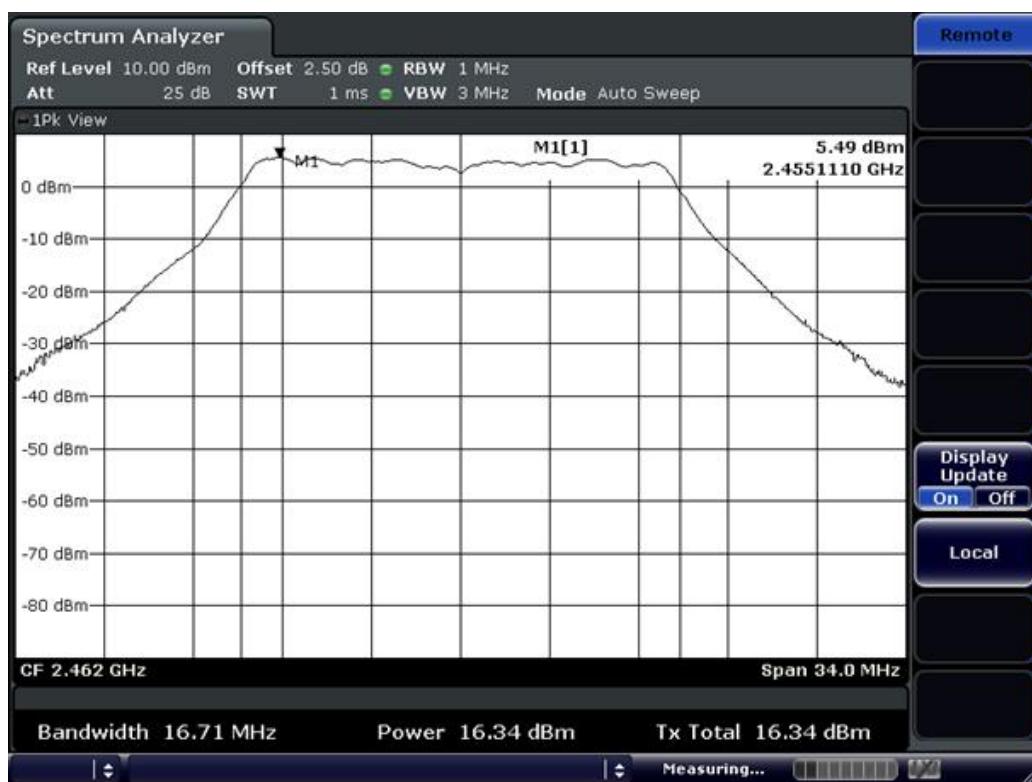
## CH 1



## 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 = 1000 sec
Detector function = peak	Trace = max hold

#### Measurement Data:

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11b	2412	1	-12.21	Complies
	2437	6	-11.46	Complies
	2462	11	-12.49	Complies
802.11b	2412	1	-18.53	Complies
	2437	6	-18.58	Complies
	2462	11	-19.72	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

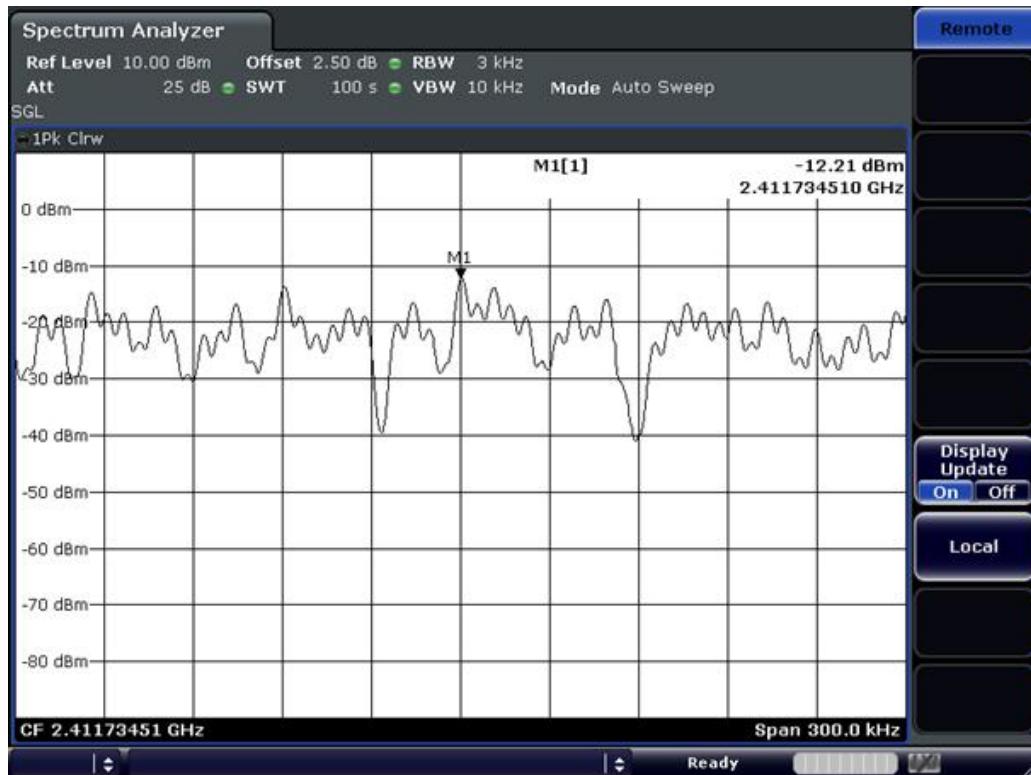
Power Spectral Density	< 8dBm @ 3kHz BW
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#### Measurement Setup

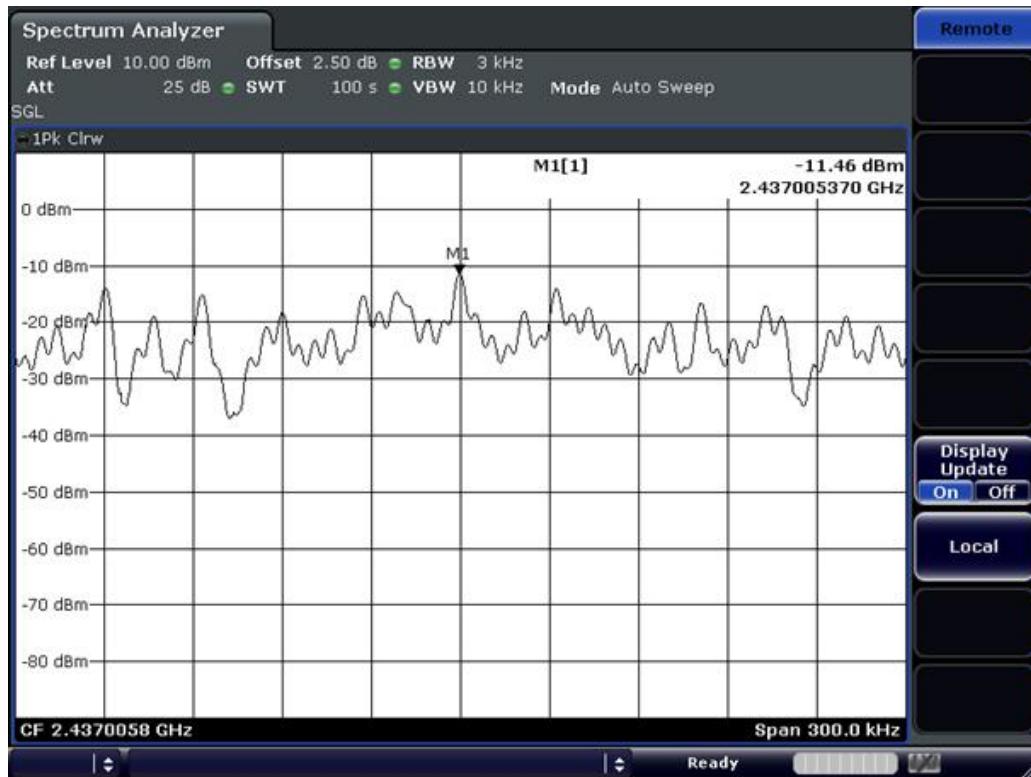
Same as the Chapter 3.2.1 (Figure 1)

## 802.11b Power Density Measurement

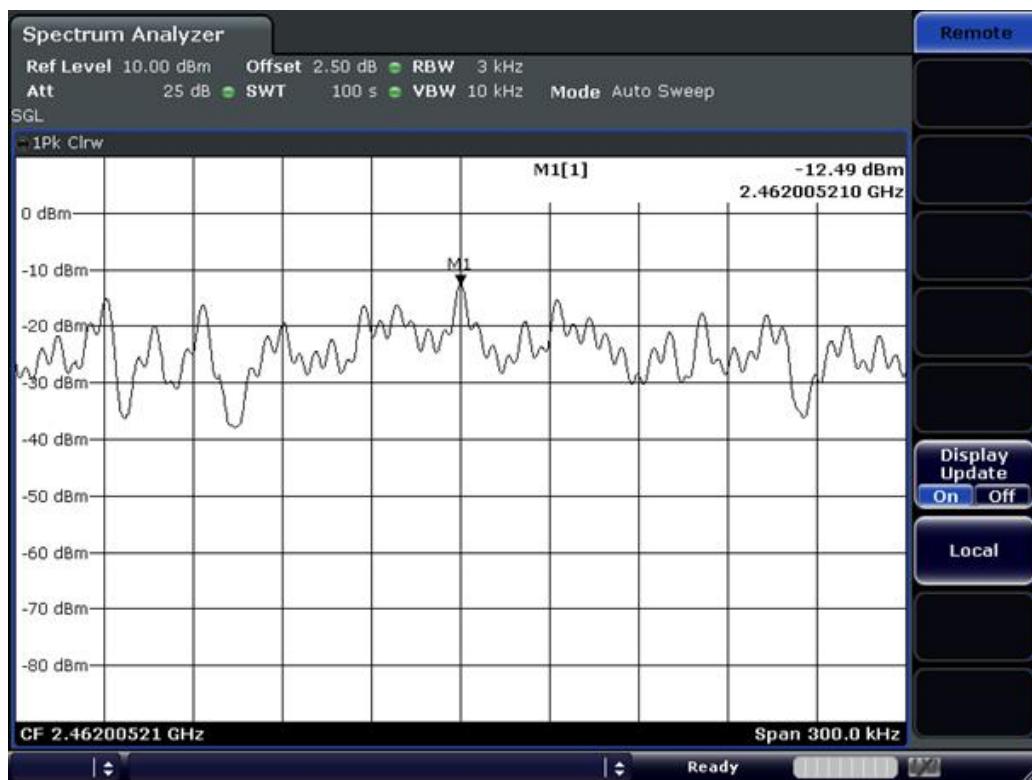
### CH 1



### CH 6

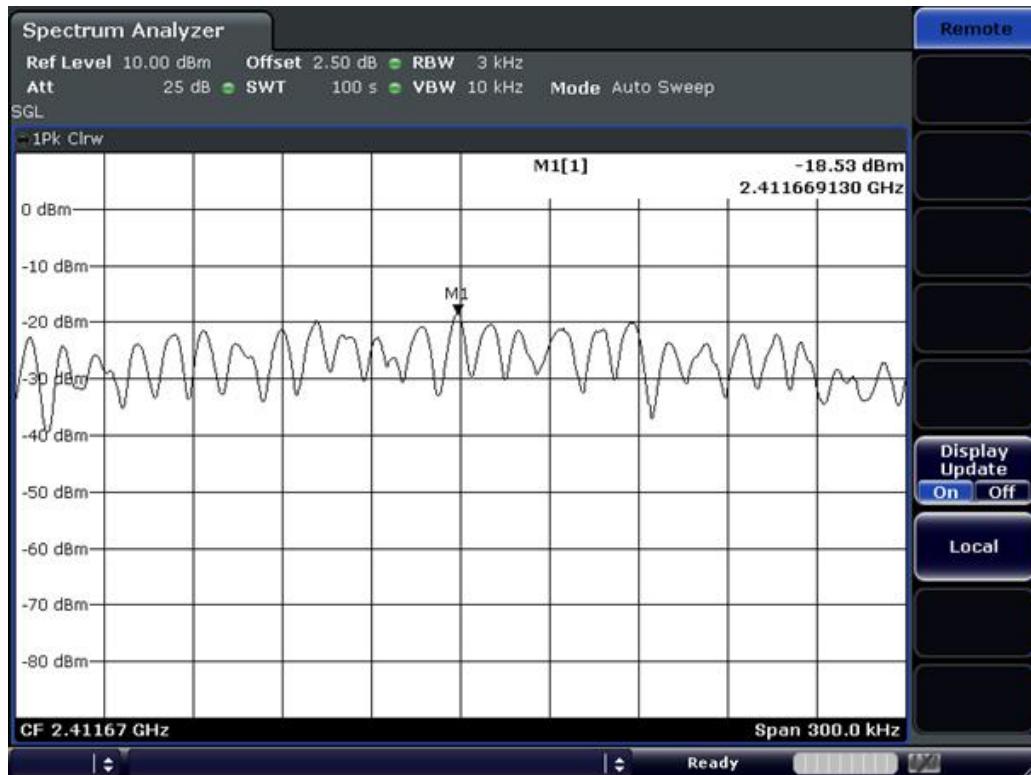


## CH 11

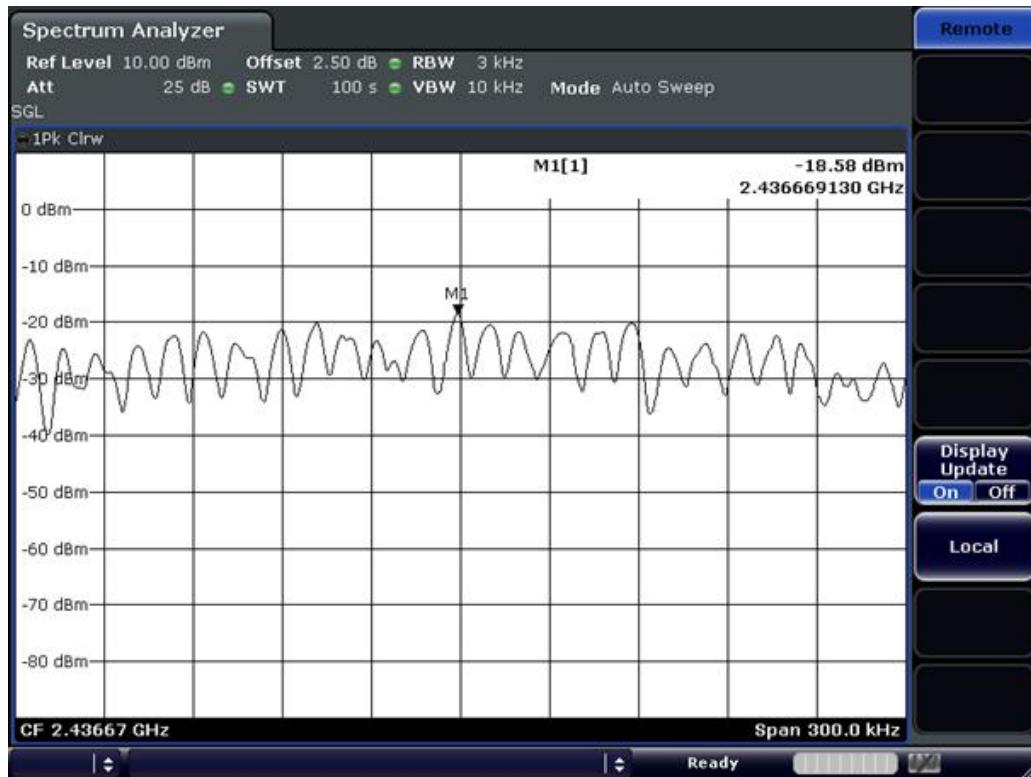


## 802.11g Power Density Measurement

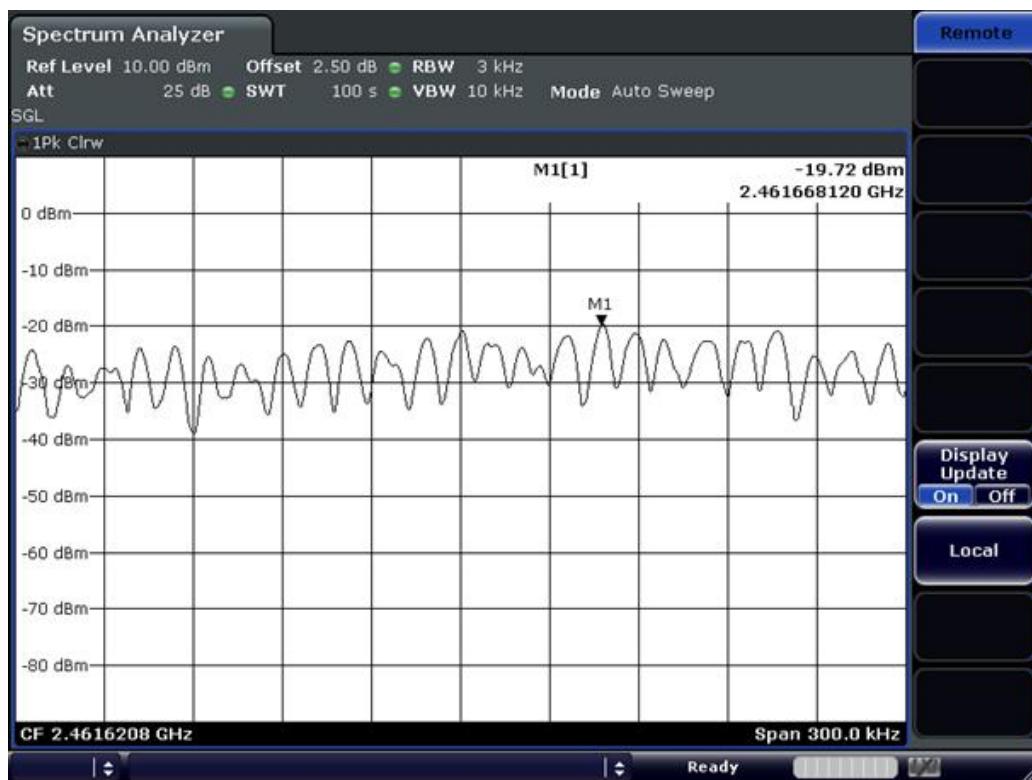
### CH 1



### CH 6



## CH 11



### 3.2.4 Band - edge & Spurious

### **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 = 40 MHz      Detector function = peak

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

PEAK: RBW = VBW = 1MHz. Sweep=Auto

Average: RBW = 1MHz, VBW=10Hz, Sweep=Auto

Measurement Distance: 3m

### 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.

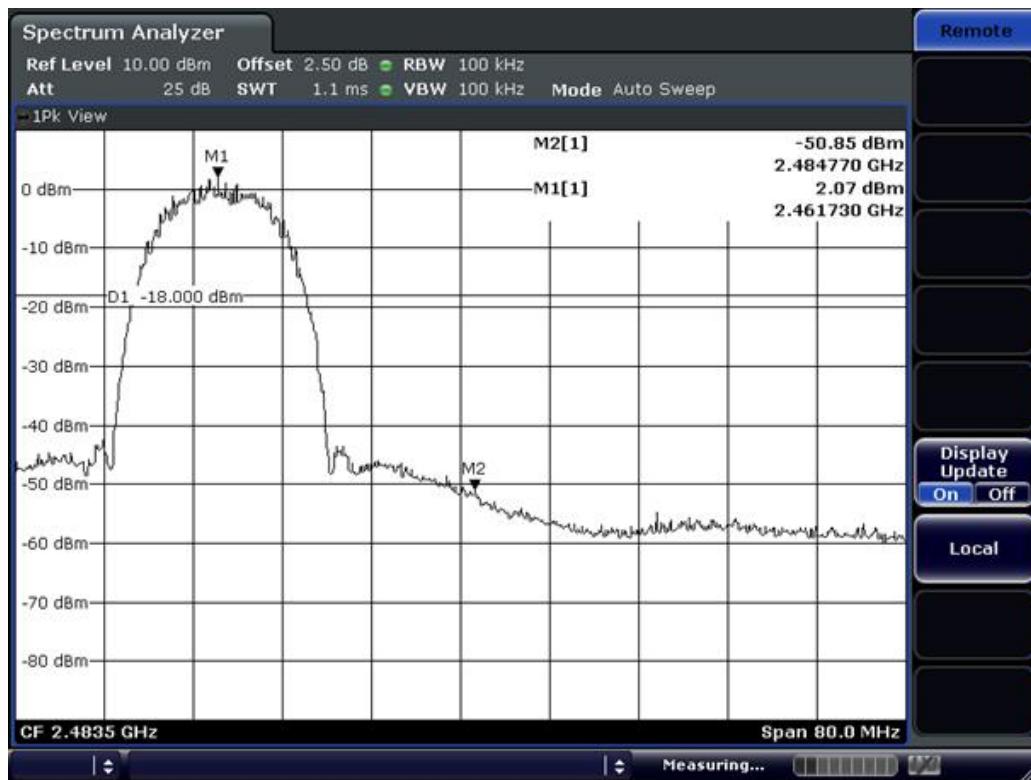
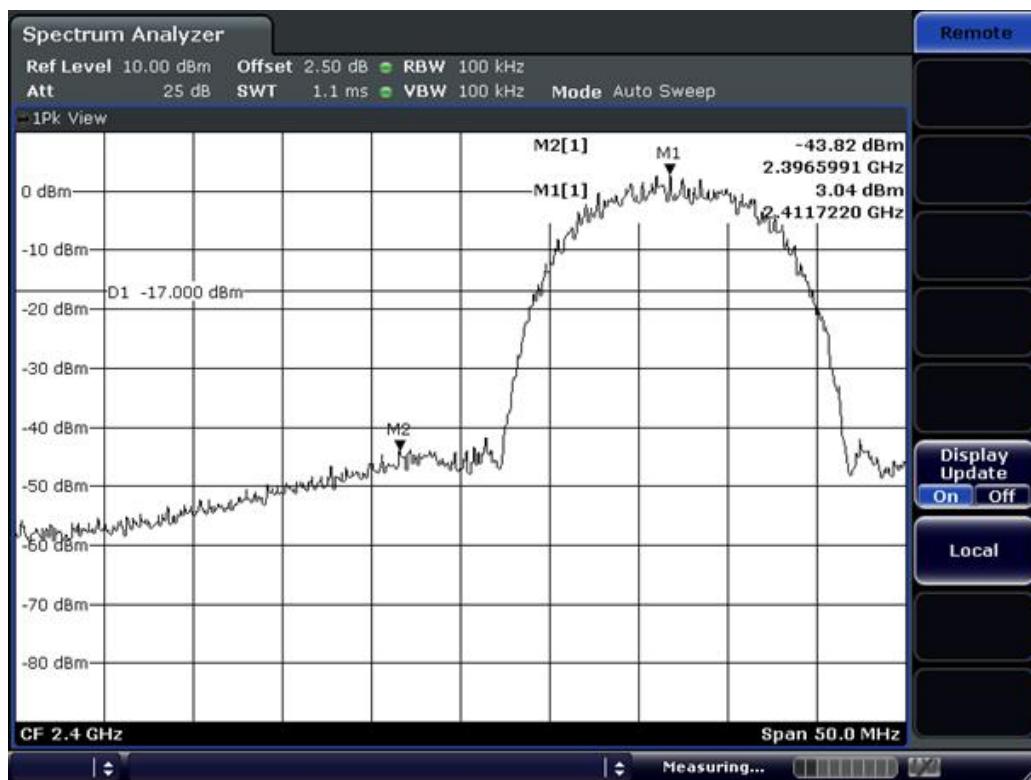
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<b>Minimum Standard:</b>	> 20 dBc
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### **Minimum Standard: FCC Part 15.209(a)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

## 802.11b Band-edge : Conducted Measurements

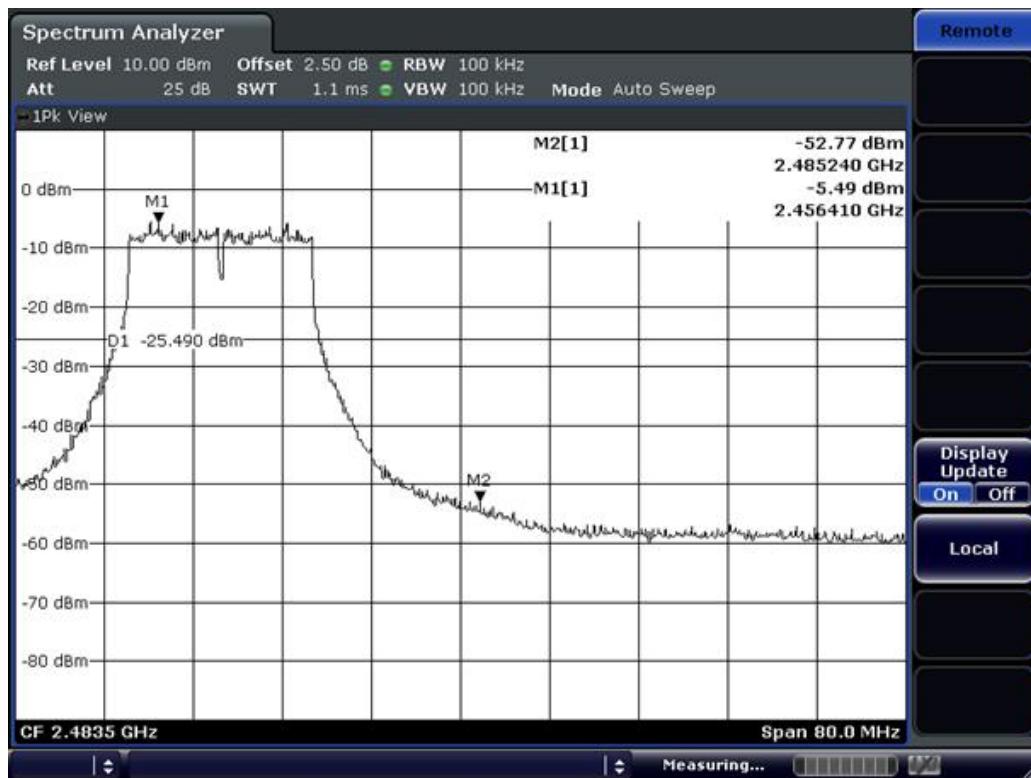
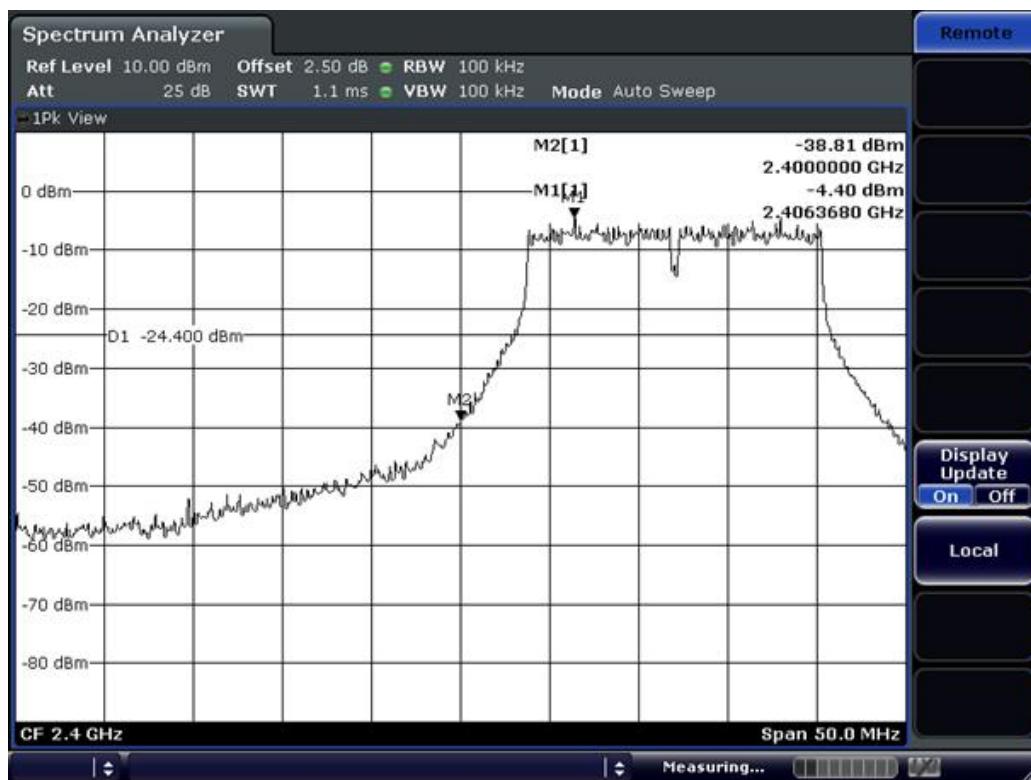


**Band-edges in the restricted band 2483.5 ~ 2500 MHz measurement****- Document DA 00-705 Marker Delta Method**

Frequency (MHz)	Detect mode	Pol.	Reading (dBuV/m)	T.F (dB)	Step 1 Data	delta	Step 3 Data	Limit
2462	PK	H	74.48	36.3	110.78	52.92	57.86	74
	AV	H	67.14	36.3	103.44	52.92	50.52	54

**Note) Step 1 = Reading + T.F****(T.F = Ant.F + Cable loss – PreAmp Gain)****Step 3 = Step 1 – Delta Value**

## 802.11g Band-edge : Conducted Measurements

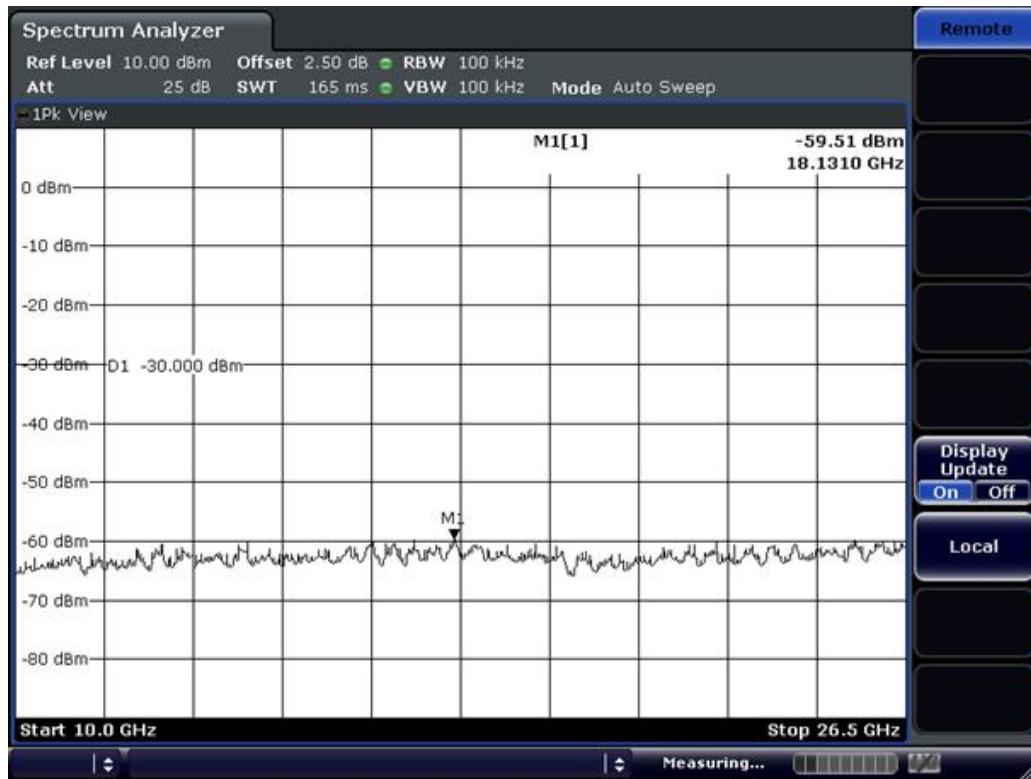
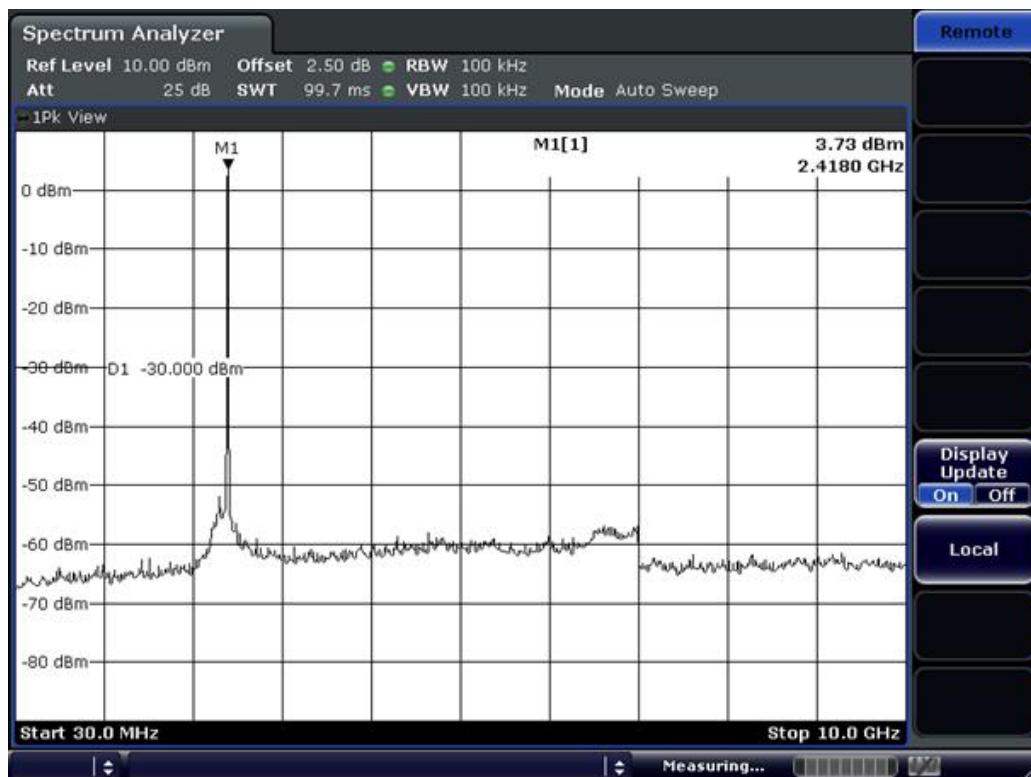


**Band-edges in the restricted band 2483.5 ~ 2500 MHz measurement****- Document DA 00-705 Marker Delta Method**

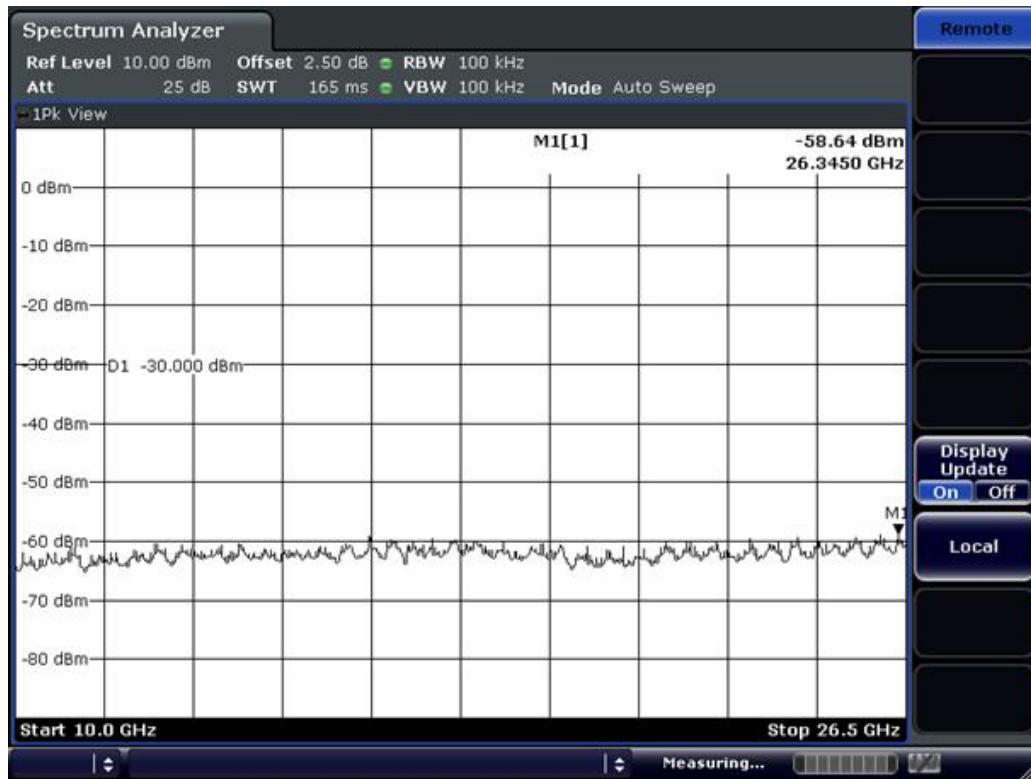
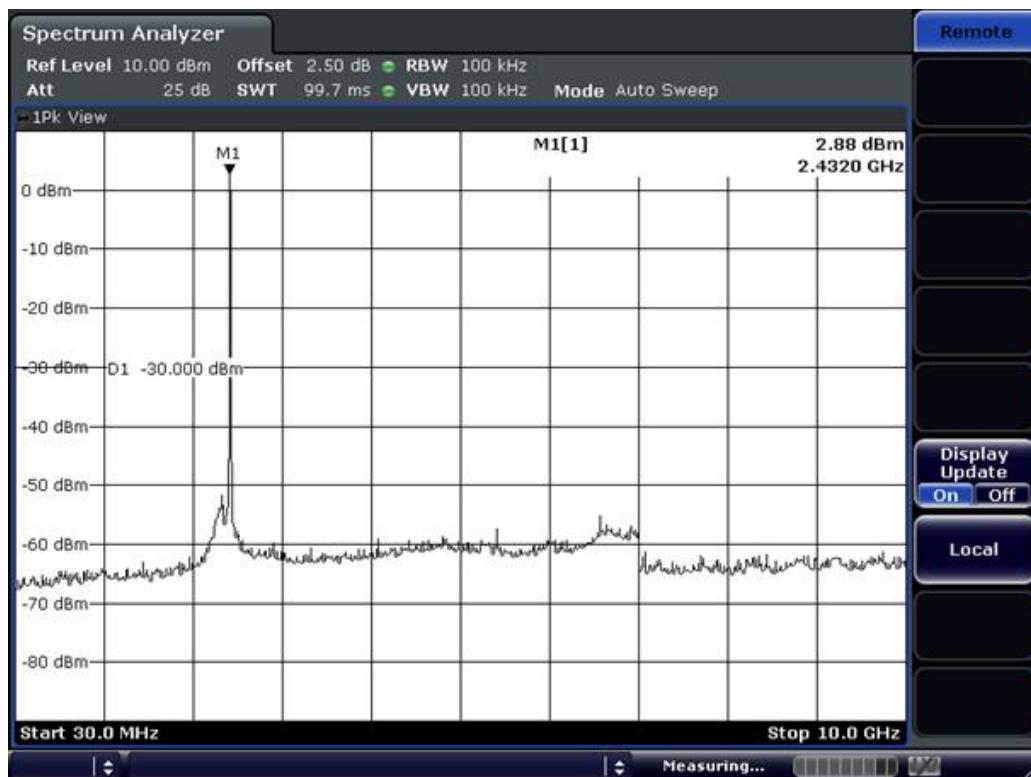
Frequency (MHz)	Detect mode	Pol.	Reading (dBuV/m)	T.F (dB)	Step 1 Data	delta	Step 3 Data	Limit
2462	PK	H	70.48	36.3	106.78	47.28	59.5	74
	AV	H	62.34	36.3	98.64	47.28	51.36	54

**Note) Step 1 = Reading + T.F****(T.F = Ant.F + Cable loss – PreAmp Gain)****Step 3 = Step 1 – Delta Value**

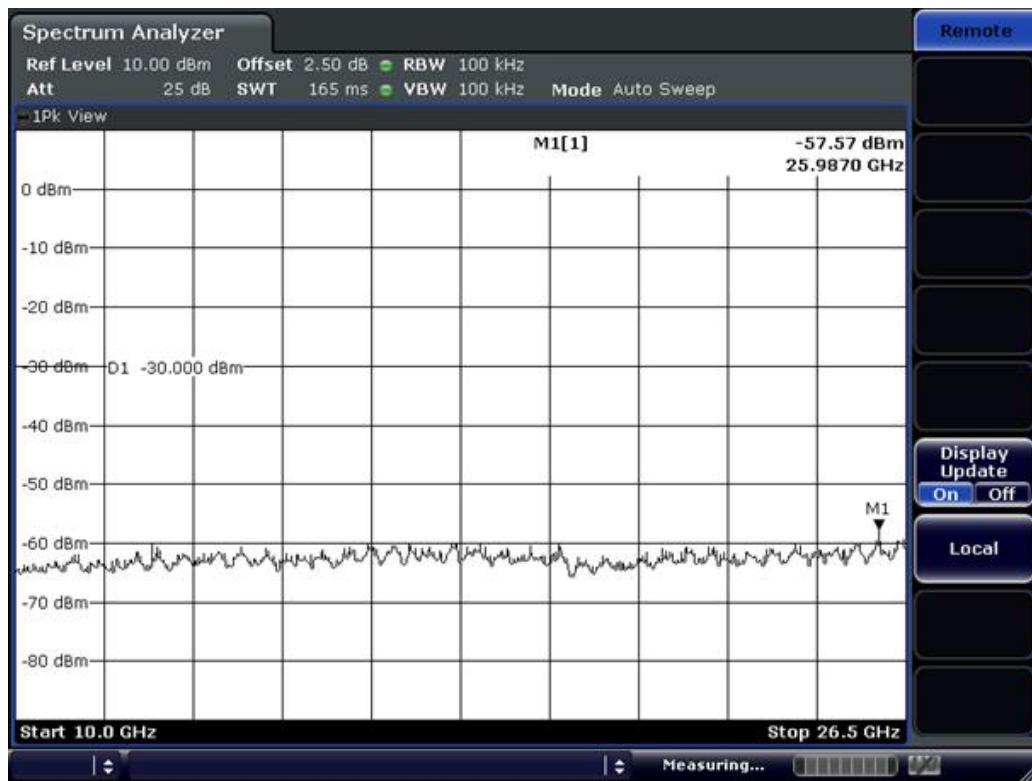
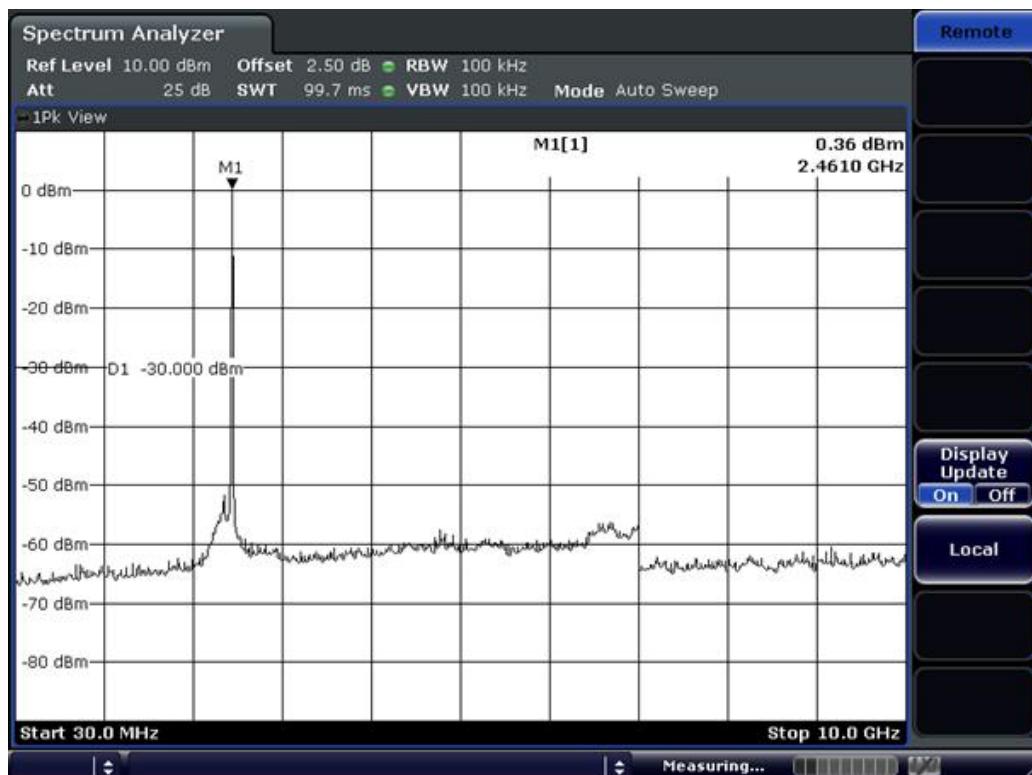
**802.11b - Low channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



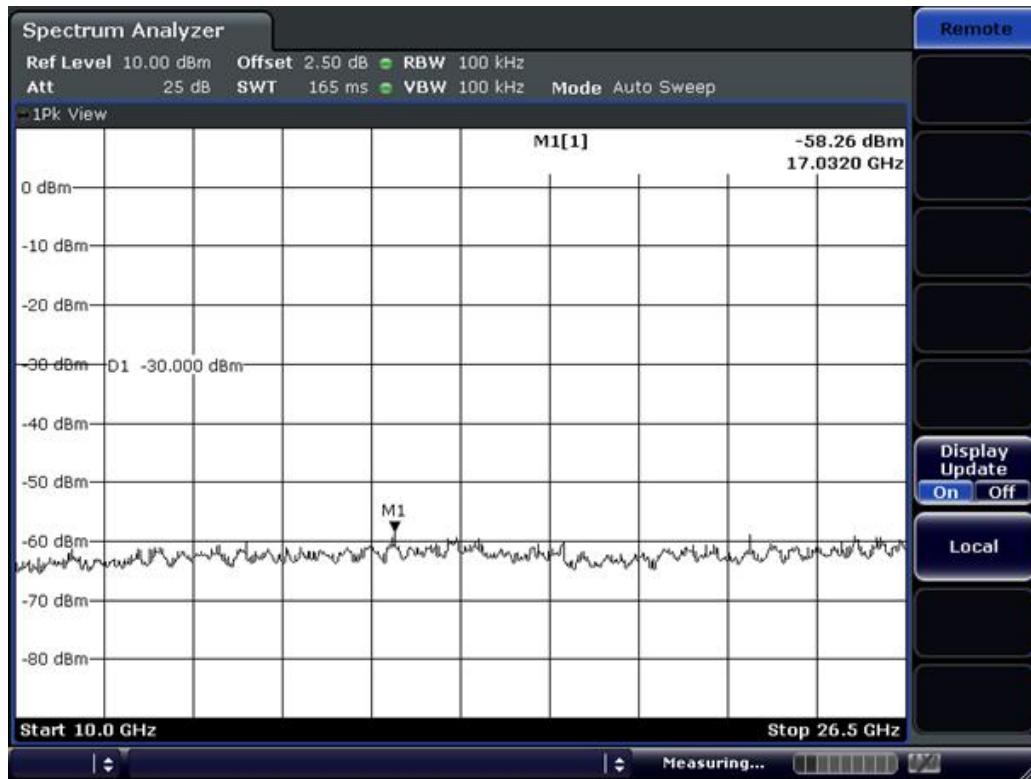
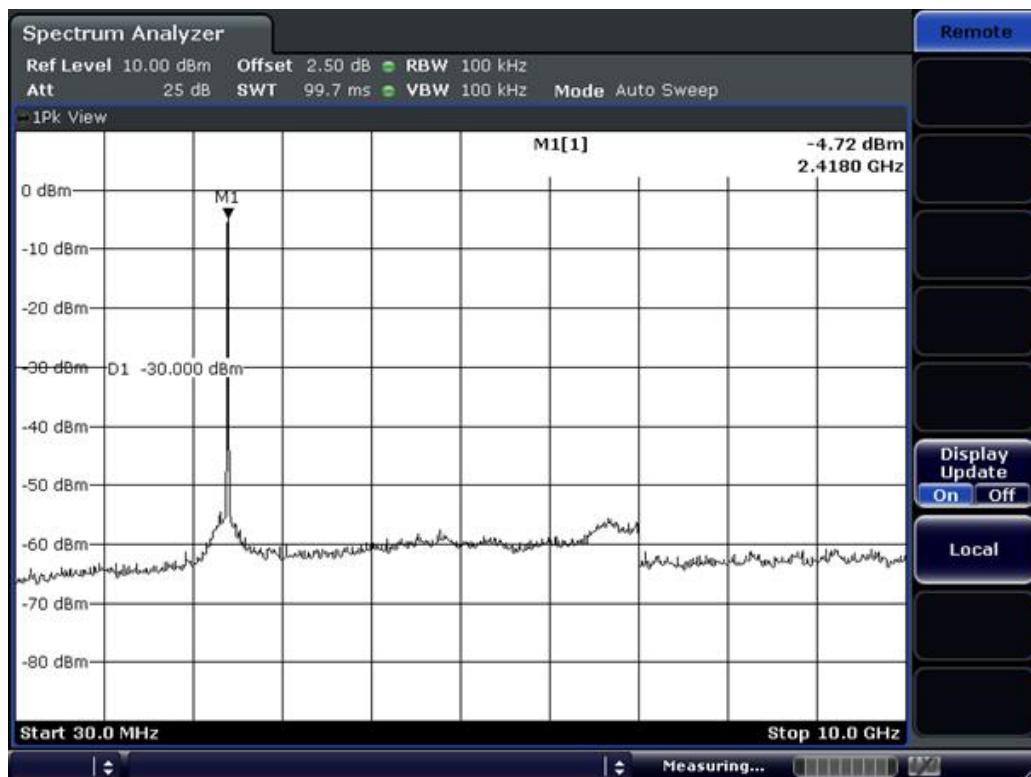
**802.11b - Mid channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



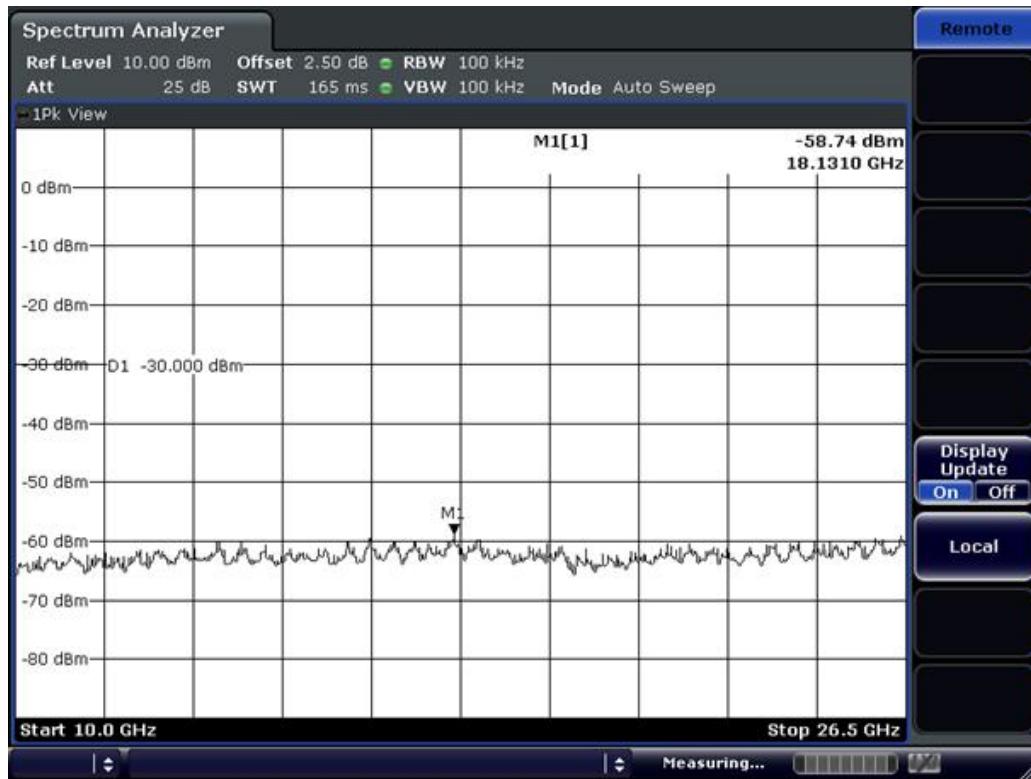
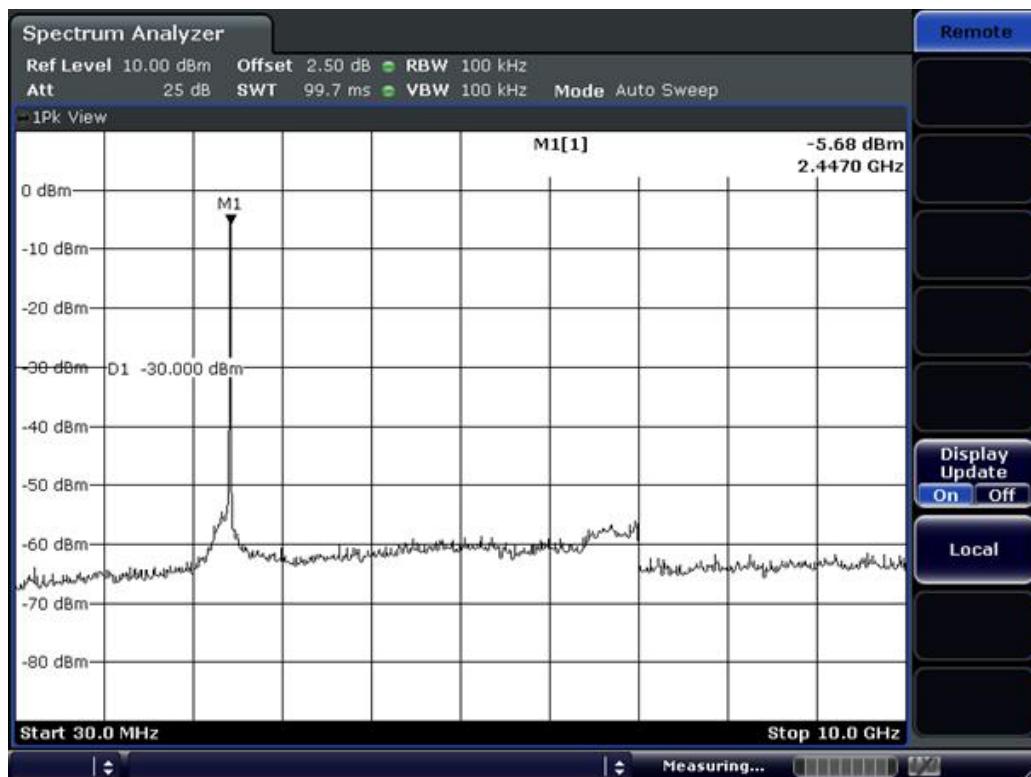
**802.11b – High channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



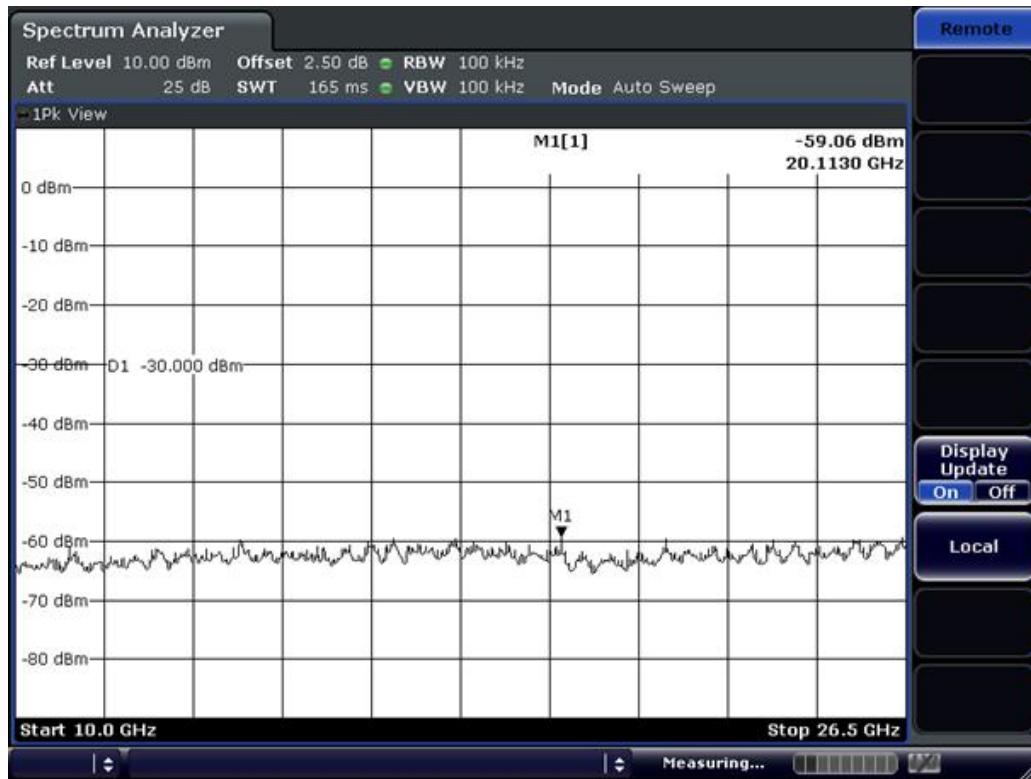
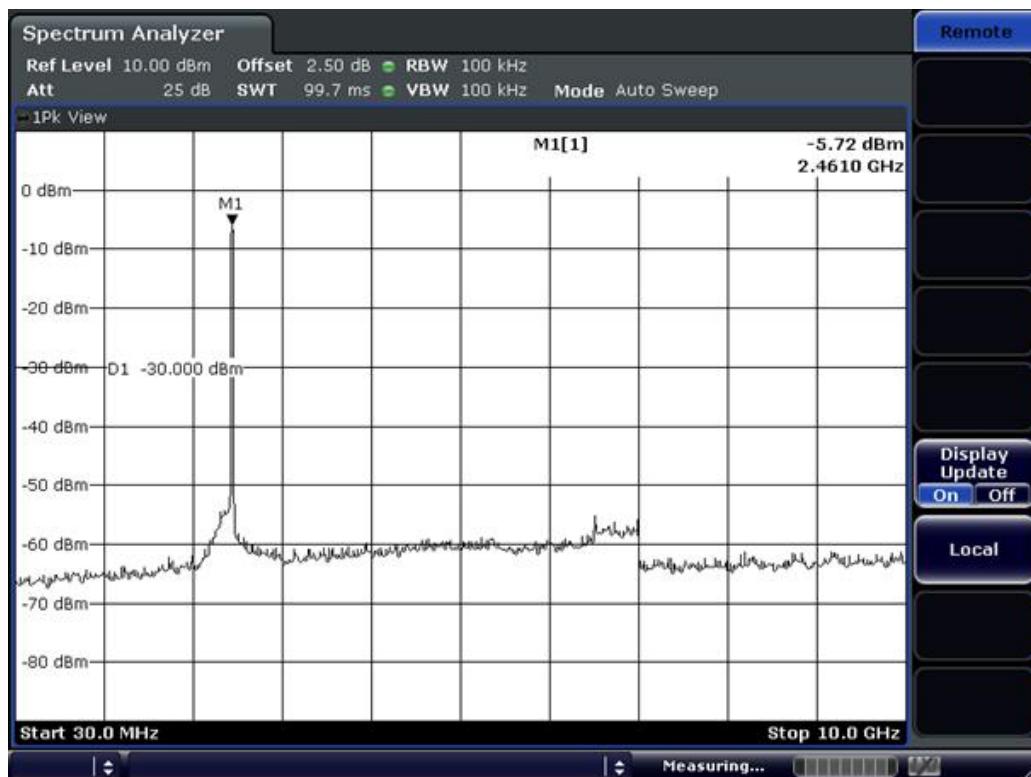
**802.11g - Low channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



**802.11g - Mid channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



**802.11g – High channel**  
**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)  
= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

VBW ≥ RBW

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.

#### Minimum Standard: FCC Part 15.109

Frequency (MHz)	Limit (uV/m) @ 10m
30 ~ 88	90
88 ~ 216	150
216 ~ 960	210
Above 960	300

**802.11b Measurement Data:**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)
-	-	-	-	-	-
-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.					
-	-	-	-	-	-
-	-	-	-	-	-
<b>Measurement uncertainty</b>		$\pm$ 6 dB			

**802.11g Measurement Data:**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)
-	-	-	-	-	-
-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.					
-	-	-	-	-	-
-	-	-	-	-	-
<b>Measurement uncertainty</b>		$\pm$ 6 dB			

Radiated Emissions

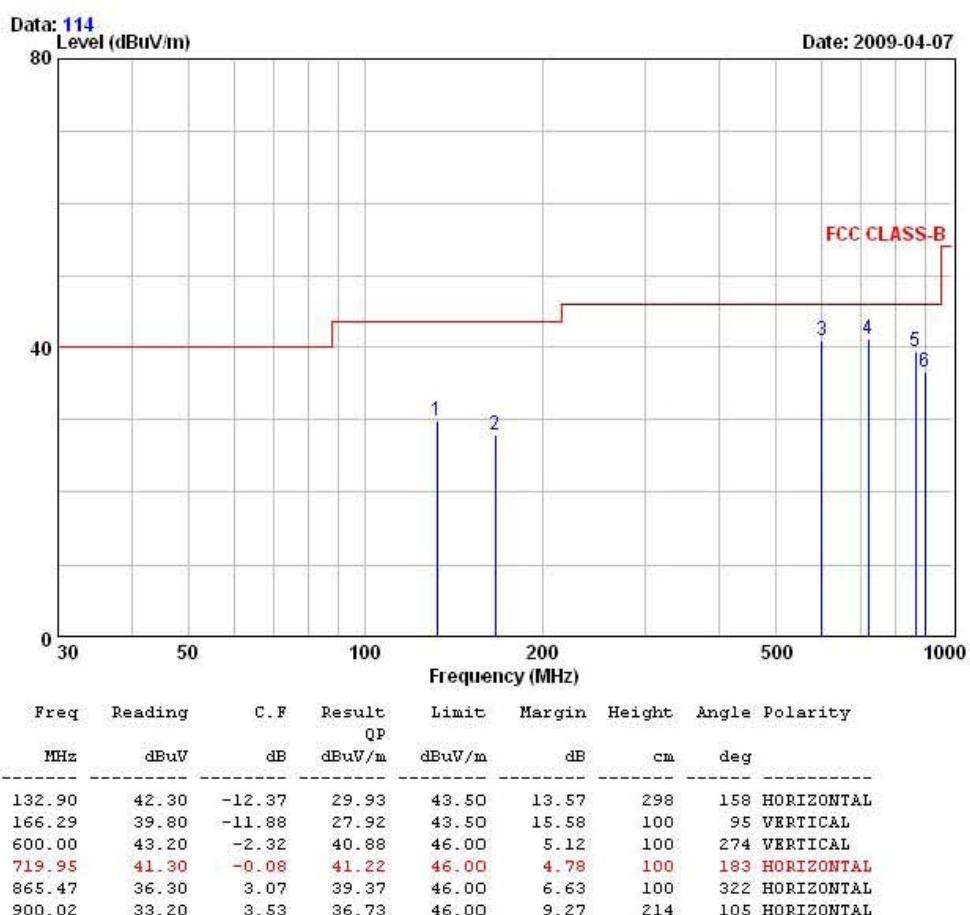
243 Jubug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel: +82-31-3236008,9  
Fax: +82-31-3236010

EUT/Model No.: S5 PREMIUM H

TEST MODE: PC+ mode

Temp Humi : 18 / 32

Tested by: KIM.K.I



### 3.2.6 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 10dB below limit.

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

##### Class B

Frequency Range	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

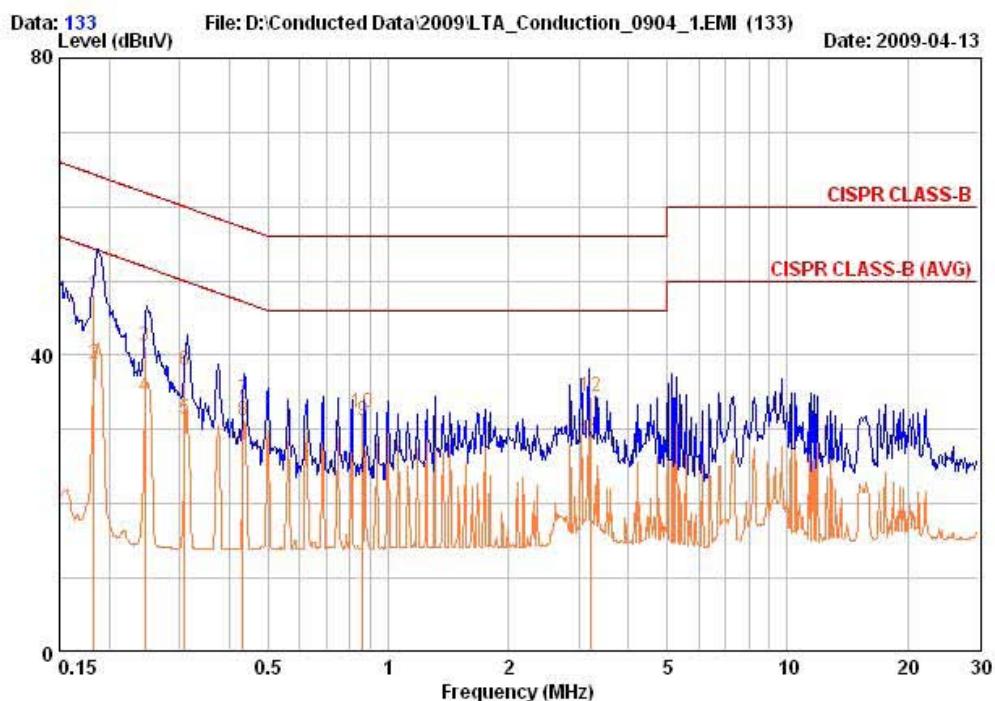
##### Class A

Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	66 dBuV
0.5 ~ 30 MHz	73 dBuV	60 dBuV

AC Conducted Emissions –Line

243 Jubug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
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EUT / Model No. : S5 PREMIUM H Phase : LINE  
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Test Mode : PC+ mode Test Power : 120 / 60  
Temp./Humi. : 23 / 27 Test Engineer : KIM.K.I  
-----



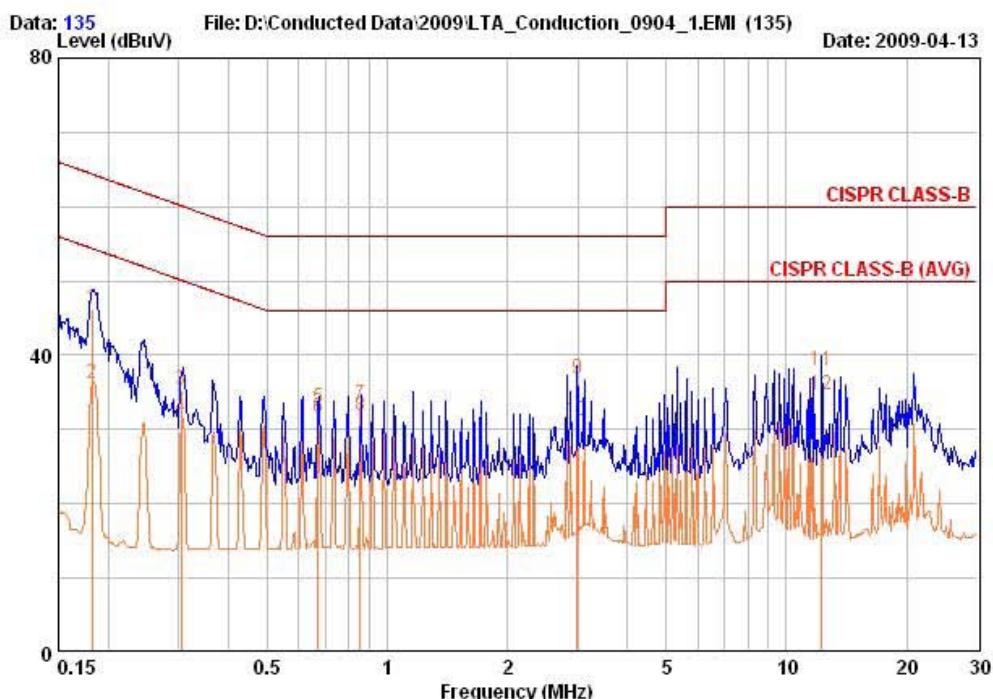
Freq MHz	RD QP dBuV	RD AV dBuV	C. F dB	Result		Limit		Margin	
				QP	AV	QP	AV	QP	AV
				dBuV	dBuV	dBuV	dBuV	dBuV	dBuV
0.183	38.30	28.80	9.97	48.27	38.77	64.35	54.35	16.08	15.58
0.245	31.40	24.60	9.84	41.24	34.44	61.92	51.92	20.69	17.49
0.309	28.00	21.50	9.87	37.87	31.37	60.00	50.00	22.13	18.63
0.432	24.10	21.20	9.92	34.02	31.12	57.21	47.21	23.19	16.09
0.864	22.30	21.10	10.03	32.33	31.13	56.00	46.00	23.67	14.87
3.215	24.30	18.40	10.21	34.51	28.61	56.00	46.00	21.49	17.39

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

AC Conducted Emissions – Neutral

243 Jubug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
Fax :+82-31-323-6010

EUT / Model No. : S5 PREMIUM H Phase : NEUTRAL  
-----  
Test Mode : PC+ mode Test Power : 120 / 60  
Temp./Humi. : 23 / 27 Test Engineer : KIM.K.I  
-----



Freq MHz	RD QP dBuV	RD AV dBuV	C.F dB	Result		Limit		Margin	
				QP	AV	QP	AV	QP	AV
				dBuV	dBuV	dBuV	dBuV	dBuV	dBuV
0.182	36.30	26.10	10.01	46.31	36.11	64.39	54.39	18.08	18.28
0.305	25.50	21.80	9.87	35.37	31.67	60.11	50.11	24.74	18.44
0.672	22.80	21.50	10.03	32.83	31.53	56.00	46.00	23.17	14.47
0.854	23.30	21.70	10.03	33.33	31.73	56.00	46.00	22.67	14.27
2.989	26.60	21.00	10.20	36.80	31.20	56.00	46.00	19.20	14.80
12.264	27.10	23.90	10.73	37.83	34.63	60.00	50.00	22.17	15.37

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

## APPENDIX

### TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-10
2	Signal Generator	8648C	3623A02597	HP	Apr-10
3	Attenuator (3dB)	8491A	37822	HP	Oct-09
4	Attenuator (10dB)	8491A	63196	HP	Oct-09
5	EMI Test Receiver	ESVD	843748/001	R&S	Aug-09
6	LISN	ENV216	100408	R&S	Oct-09
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Oct-09
8	RF Amplifier	8447D	2944A07684	HP	Oct-09
9	RF Amplifier	8447D	2439A09058	HP	Oct-09
10	RF Amplifier	8449B	3008A02126	HP	Apr-10
11	Test Receiver	ESHS10	828404009	R&S	Aug-09
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-09
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-10
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-10
15	Horn Antenna	3115	00055005	ETS LINDGREN	Apr-10
16	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-09
17	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-09
18	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-09
19	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-09
20	Spectrum Analyzer	FSV-30	100757	R&S	Feb-10
21	Spectrum Analyzer	8563E	3425A02505	HP	Apr-10
22	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Apr-10
23	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-09
24	RF Switch	MP59B	6200414971	ANRITSU	Jun-09
25	RF Switch	MP59B	6200438565	ANRITSU	Jun-09
26	Power Divider	11636A	6243	HP	Oct-09
27	DC Power Supply	6622A	3448A03079	HP	Oct-09
28	Attenuator (30dB)	11636A	6243	HP	Oct-09
29	Frequency Counter	5342A	2826A12411	HP	Apr-10
30	Power Meter	EPM-441A	GB32481702	HP	Apr-10
31	Power Sensor	8481A	2702A64048	HP	Apr-10
32	Audio Analyzer	8903B	3729A18901	HP	Oct-09
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-09
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-09
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Apr-10
36	Stop Watch	HS-3	601Q09R	CASIO	Apr-10