



Product Service

## FCC - TEST REPORT

Report Number : **68.950.11.129.01** Date of Issue: 16 November 2011

Model : **XC2900-F6C**

Product Type : XC2900-F6C Handheld RFID Reader

Applicant : Invengo Information Technology Co., Ltd.

Address : 3/F, No. T2-B, High-tech Industrial Park South, Shenzhen 518057,  
China

Production Facility : Invengo Information Technology Co., Ltd.

Address : Invengo RFID Industrial Park, Guangming Hi-Tech Zone, Tongguan  
Road, Guangming New District, Shenzhen, Guangdong 518100, PRC

Test Result :  **Positive**  **Negative**

Total pages including  
Appendices : 45

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

Test site1:

Company name: Jiangsu TÜV Product Service Ltd. – Shenzhen Branch  
6th Floor, H Hall,  
Century Craftwork Culture Square,  
No. 4001, Fuqiang Road,  
Futian District 518048,  
Shenzhen,P.R.C.

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

Test site2:

Company name: Shenzhen Emtek Co., Ltd.,  
Bldg. 69, Majialong Industry Zone, Nanshan District,  
Shenzhen, China

Telephone: 86 755 26954280

Fax: 86 755 26954282



### 3 Description of the Equipment Under Test

#### Description of the Equipment Under Test

Product: XC2900-F6C Handheld RFID Reader  
Model no.: XC2900-F6C  
Brand Name: Invengo  
Options and accessories: NIL  
Rating: DC 3.7V (Supplied by battery 1500mAh, or  
Charged by external adapter:  
Adaptor Model No.: FSP020-DGAA1  
Adaptor Input: 100-240VAC, 50-60Hz, 1.0A  
Adpator Ouput: 5.0VDC, 4.0A Max)

RF Transmission  
Frequency: 2412-2462MHz

Description of the EUT: NIL

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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## 4 Summary of Test Standards

<b>Test Standards</b>	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

**5 Summary of Test Results**

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Result			Test Location
		Pass	Fail	N/A	
15.207 Conducted Emission AC Power Port	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247 (b) (1) Conducted peak output power	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247(d) Band edge compliance of RF emissions	14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247(d) Spurious RF conducted emissions	20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247(d) 15.209 Spurious radiated emissions	25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247(a)(2) 6dB bandwidth	33	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2
15.247(e) Power spectral density	39	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test Site2

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: TQ4XC2900-F6C comply with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

### SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements.

- **Does not** fulfill the general approval requirements.

Sample Received Date: 19 August 2011

Testing Start Date: 21 August 2011

Testing End Date: 16 November 2011

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

Reviewed by:

Prepared by:

Prepared by:



Ken Li  
EMC Project Manager



Cookies Bu  
EMC Project Engineer



June Xie  
EMC Test Engineer

## 7 Technical Requirement

### 7.1 Conducted Emission

#### Test Method

- 1 The EUT was placed on a table, which is 0.8m above ground plane
- 2 The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3 Maximum procedure was performed to ensure EUT compliance
- 4 A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions from both sides of AC line

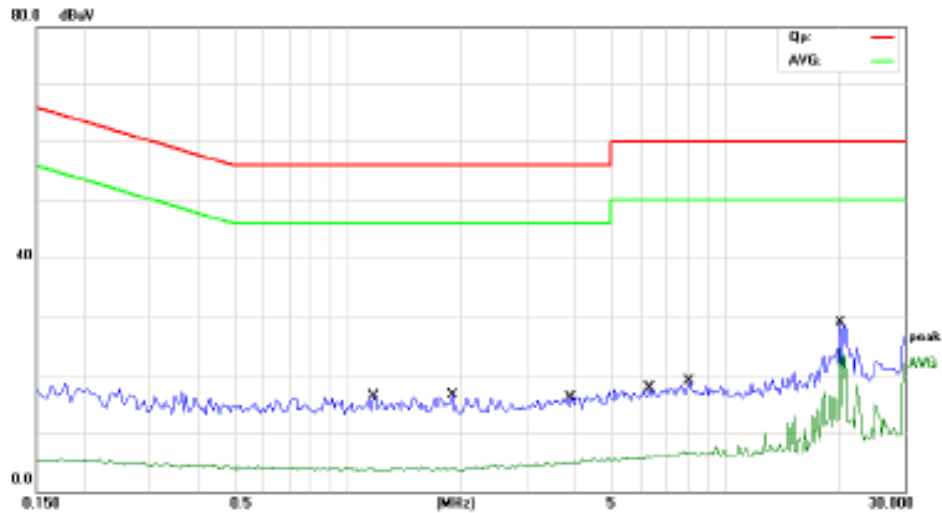
#### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency



## Conducted Emission

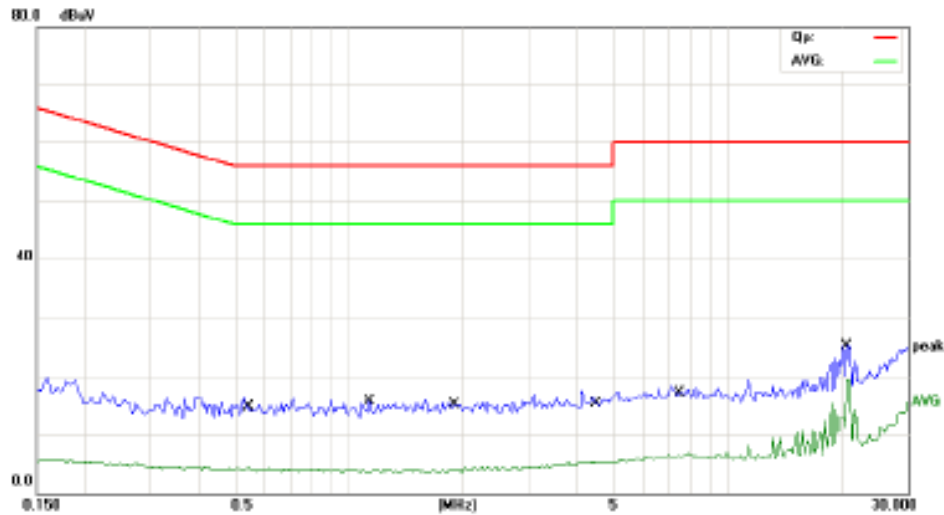


Site: Conduction #1 Phase: **L1** Temperature: 26  
 Limit: (CE)FCC PART 15 class B\_QP Power: AC 120V/60Hz Humidity: 60 %  
 EUT: Handheld Reader  
 M/N: XC2900-F6C  
 Mode: WIFI  
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		1.1750	16.37	0.00	16.37	56.00	-39.63	QP	
2		1.1750	3.99	0.00	3.99	46.00	-42.01	AVG	
3		1.9050	16.45	0.00	16.45	56.00	-39.55	QP	
4		1.9050	3.97	0.00	3.97	46.00	-42.03	AVG	
5		3.8500	15.64	0.00	15.64	56.00	-40.36	QP	
6		3.8500	4.95	0.00	4.95	46.00	-41.05	AVG	
7		6.3300	17.69	0.00	17.69	60.00	-42.31	QP	
8		6.3300	6.15	0.00	6.15	50.00	-43.85	AVG	
9		8.0300	18.90	0.00	18.90	60.00	-41.10	QP	
10		8.0300	6.79	0.00	6.79	50.00	-43.21	AVG	
11		20.3000	28.88	0.00	28.88	60.00	-31.12	QP	
12	*	20.3000	24.56	0.00	24.56	50.00	-25.44	AVG	

\*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: WOLF

## Conducted Emission



Site Conduction #1  
 Limit: (CE)FCC PART 15 class B\_QP  
 EUT: Handheld Reader  
 MN: XC2900-F6C  
 Mode: WIFI  
 Note:

Phase: **N** Temperature: 28  
 Power: AC 120V/60Hz Humidity: 60 %

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.5450	16.54	0.00	16.54	56.00	-39.46	QP	
2	0.5450	4.30	0.00	4.30	46.00	-41.70	AVG	
3	1.1400	15.62	0.00	15.62	56.00	-40.38	QP	
4	1.1400	3.99	0.00	3.99	46.00	-42.01	AVG	
5	1.8750	15.55	0.00	15.55	56.00	-40.45	QP	
6	1.8750	3.97	0.00	3.97	46.00	-42.03	AVG	
7	4.5300	17.55	0.00	17.55	56.00	-38.45	QP	
8	4.5300	5.33	0.00	5.33	46.00	-40.67	AVG	
9	7.4400	18.39	0.00	18.39	60.00	-41.61	QP	
10	7.4400	6.48	0.00	6.48	50.00	-43.52	AVG	
11	20.7750	25.15	0.00	25.15	60.00	-34.85	QP	
12 *	20.7750	19.39	0.00	19.39	50.00	-30.61	AVG	

\*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: WOLF

**Test Equipment List**

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Test Receiver	Rohde & Schwarz	ESCS30	100162	May 29, 2012
L.I.S.N.	Rohde & Schwarz	ENV216	101161	May 29, 2012
50Ω Coaxial Switch	Anritsu	MP59B	6100214550	N/A
Voltage Probe	Rohde & Schwarz	TK9416	N/A	May 29, 2012
I.S.N	Teseq GmbH	ISN T800	30327	May 29, 2012
LCL adaoter	Teseq GmbH	ADT800-Cat.5	30327.01	May 29, 2012
LCL adaoter	Teseq GmbH	ADT800-Cat.3	30327.02	May 29, 2012
LCL adaoter	Teseq GmbH	ADT800-R	30327.02	May 29, 2012

## 7.2 Conducted peak output power

### Test Method

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an Power meter
3. Add a correction factor to the display.

### Limits for conducted peak output power measurements

Frequency Range MHz	Limit W	Limit dBm
2400-2483	≤1	≤30

## Conducted peak output power

### IEEE 802.11b modulation (1Mbps) Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
CH1 2412MHz	14.95	Pass
CH6 2437MHz	14.76	Pass
CH11 2462MHz	14.87	Pass

### IEEE 802.11g modulation (6Mbps) Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
CH1 2412MHz	13.82	Pass
CH6 2437MHz	14.10	Pass
CH11 2462MHz	14.05	Pass



## Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 29, 2012
50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 29, 2012

## 7.3 Band edge compliance of RF emissions

### Test Method

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBW to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100kHz, to measure the conducted peak band edge.

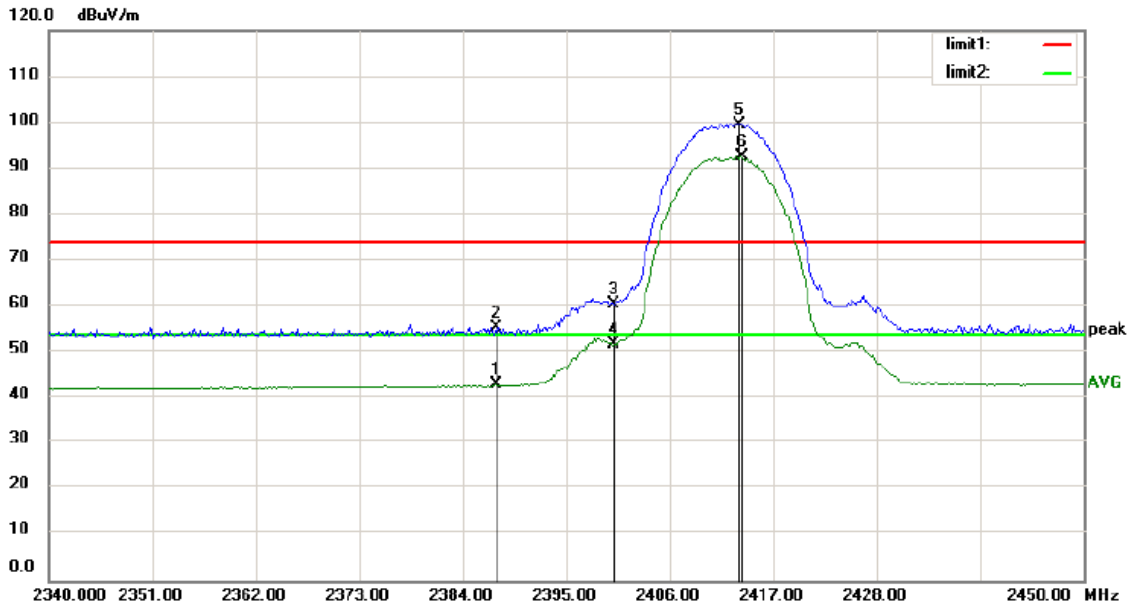
### Limits

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, 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) (see Section 15.205(c)).

Frequency MHz	Limit Average dBuV/m	Limit Peak dBuV/m
Below 2390 Above 2483.5	54	74

## Band edge compliance of RF emissions

IEEE 802.11b modulation (1 Mbps) Test Result  
Lower Edge Plot:



Site site #1 Polarization: **Vertical** Temperature: 26

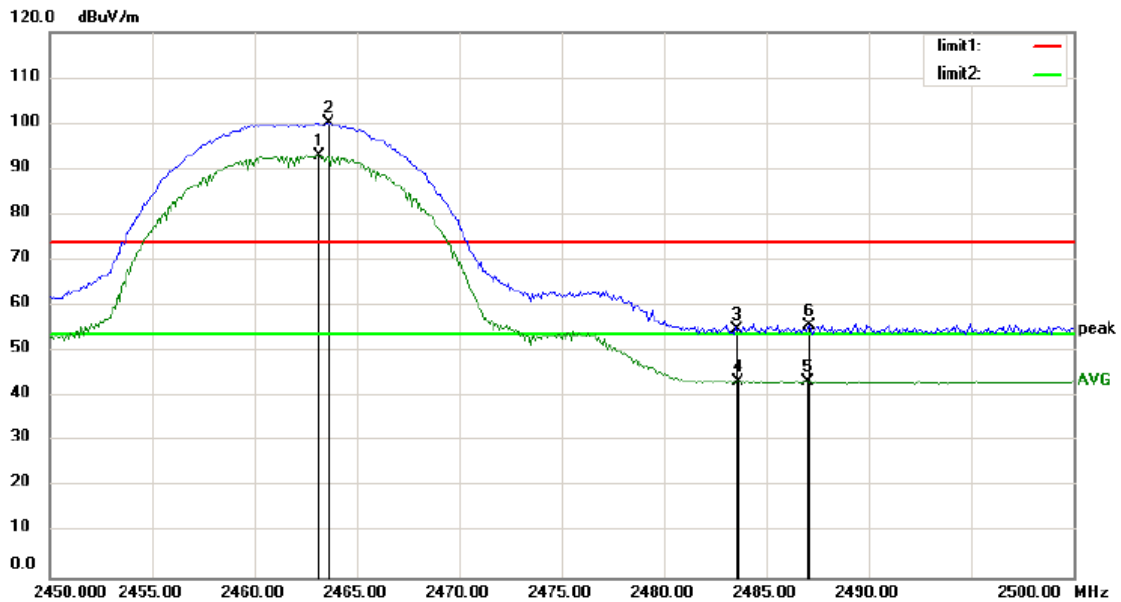
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Detector	Comment
1		2387.420	51.58	-8.66	42.92	54.00	-11.08			AVG	
2		2387.596	64.06	-8.66	55.40	74.00	-18.60			peak	
3		2400.000	69.05	-8.67	60.38	74.00	-13.62			peak	
4		2400.000	60.28	-8.67	51.61	54.00	-2.39			AVG	
5	X	2413.333	108.27	-8.67	99.60	74.00	25.60			peak	
6	*	2413.510	101.13	-8.67	92.46	54.00	38.46			AVG	

\*:Maximum data x:Over limit !:over margin

Operator: WOLF

## Band edge compliance of RF emissions

Upper Edge Plot:



Site site #1 Polarization: *Vertical* Temperature: 26

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	2463.061	101.36	-8.63	92.73	54.00	38.73	AVG			
2	X	2463.542	108.72	-8.63	100.09	74.00	26.09	peak			
3		2483.500	63.37	-8.62	54.75	74.00	-19.25	peak			
4		2483.574	51.96	-8.62	43.34	54.00	-10.66	AVG			
5		2487.019	51.91	-8.61	43.30	54.00	-10.70	AVG			
6		2487.099	64.38	-8.61	55.77	74.00	-18.23	peak			

\*:Maximum data x:Over limit l:over margin

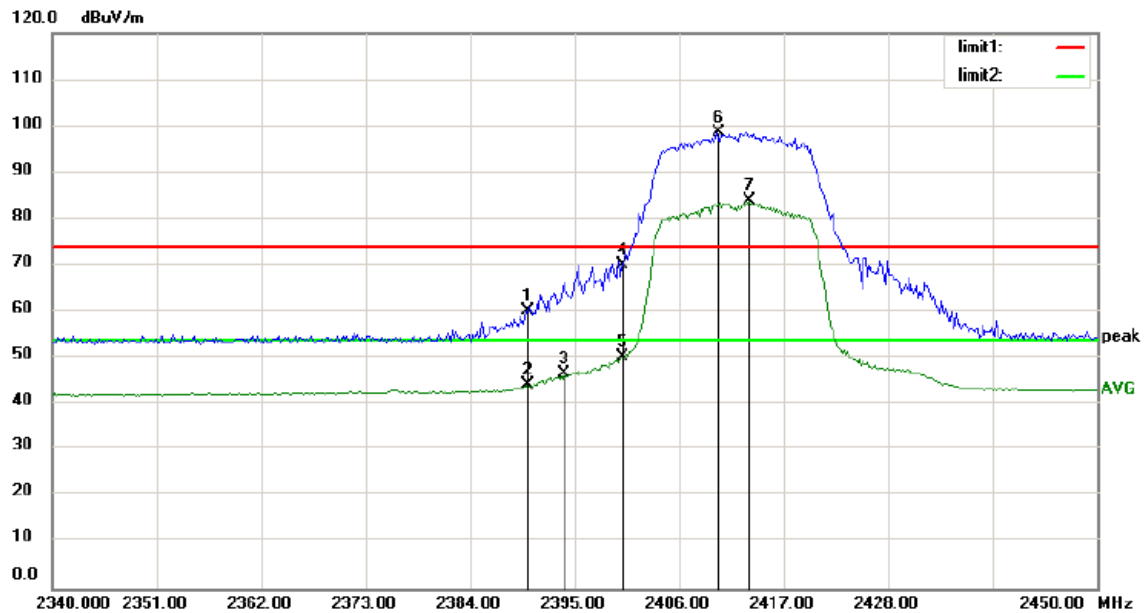
Operator: WOLF



## Band edge compliance of RF emissions

### IEEE 802.11g modulation (6 Mbps) Test Result

#### Lower Edge Plot:



Site site #1 Polarization: **Vertical** Temperature: 26

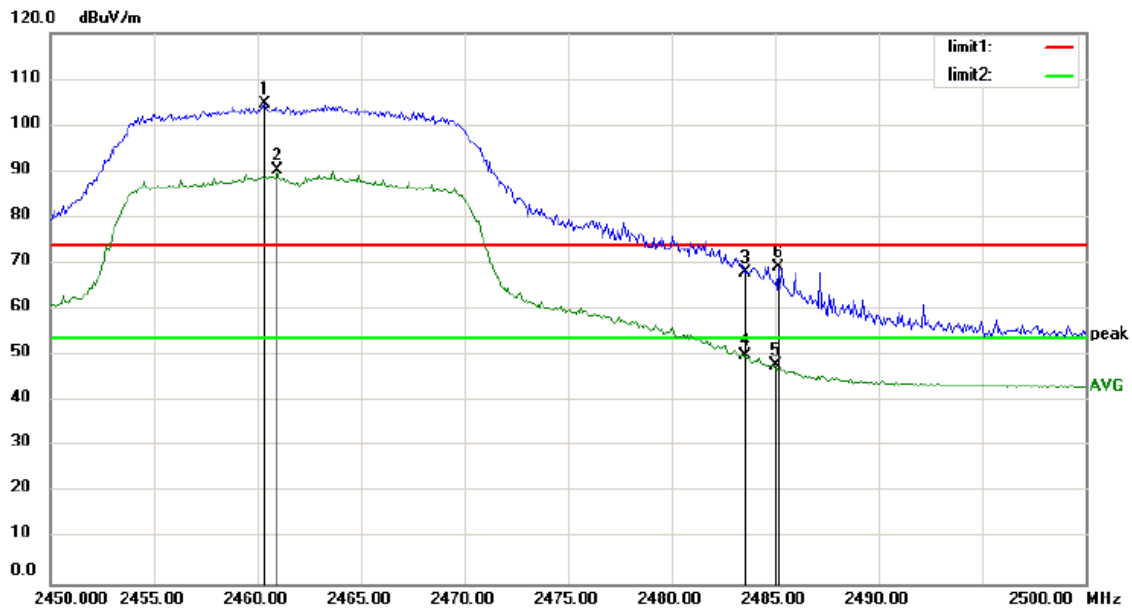
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		2389.888	68.79	-8.66	60.13	74.00	-13.87			peak
2		2389.888	52.77	-8.66	44.11	54.00	-9.89			AVG
3		2393.942	55.21	-8.66	46.55	54.00	-7.45			AVG
4		2400.000	78.80	-8.67	70.13	74.00	-3.87			peak
5		2400.000	58.88	-8.67	50.21	54.00	-3.79			AVG
6	X	2409.984	107.24	-8.66	98.58	74.00	24.58			peak
7	*	2413.333	92.45	-8.67	83.78	54.00	29.78			AVG

\*:Maximum data x:Over limit !:over margin

Operator: WOLF

## Band edge compliance of RF emissions

Upper Edge Plot:



Site site #1 Polarization: **Vertical** Temperature: 26

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	X	2460.336	113.11	-8.62	104.49	74.00	30.49	peak			
2	*	2460.977	98.66	-8.62	90.04	54.00	36.04	AVG			
3		2483.500	76.52	-8.62	67.90	74.00	-6.10	peak			
4		2483.500	58.47	-8.62	49.85	54.00	-4.15	AVG			
5		2484.936	56.38	-8.62	47.76	54.00	-6.24	AVG			
6		2485.176	77.74	-8.62	69.12	74.00	-4.88	peak			

\*:Maximum data x:Over limit !:over margin

Operator: WOLF

**Test Equipment List**

<b>DESCRIPTION</b>	<b>MANUFACTURER</b>	<b>MODEL NO.</b>	<b>SERIAL NO.</b>	<b>CAL DUE DATE</b>
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012
Pre-Amplifier	HP	8447D	2944A07999	May 29, 2012
Bilog Antenna	Schwarzbeck	VULB9163	142	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 29, 2012
Cable	Schwarzbeck	AK9513	ACRX1	May 29, 2012
Cable	Rosenberger	N/A	FP2RX2	May 29, 2012
Cable	Schwarzbeck	AK9513	CRPX1	May 29, 2012
Cable	Schwarzbeck	AK9513	CRRX2	May 29, 2012
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012

## 7.4 Spurious RF conducted emissions

### Test Method

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The resolution bandwidth(RBW) and the video bandwidth (VBW) of the spectrum analyzer were respectively set to 100kHz and 300kHz.

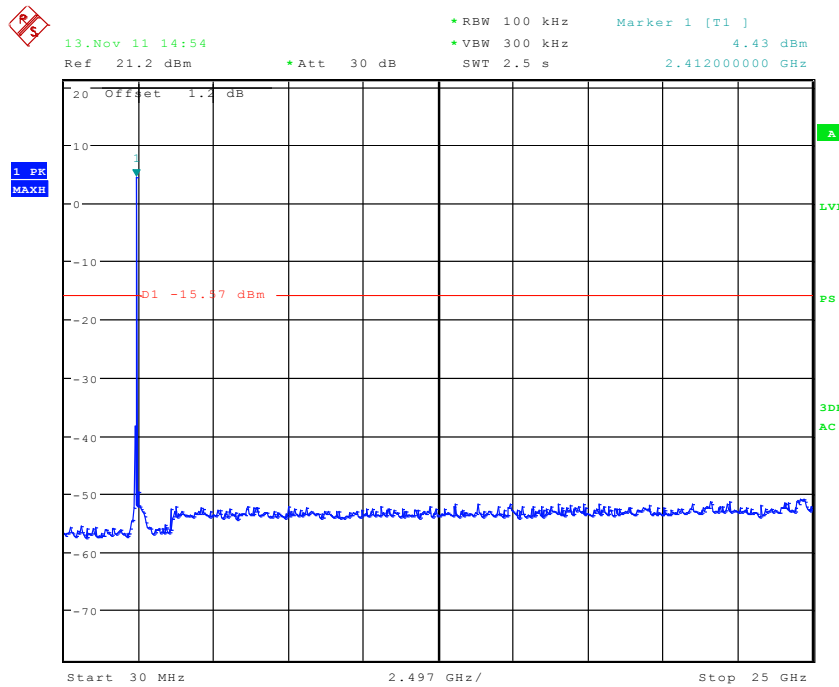
### Limit

Frequency Range MHz	Limit (dBc)
1000-25000	-20

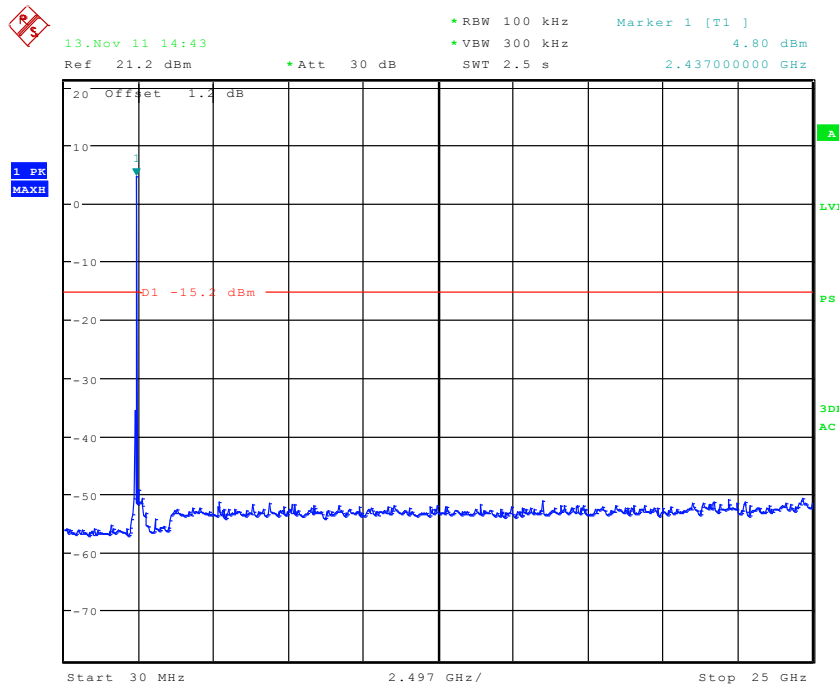
## Spurious RF conducted emissions

### IEEE 802.11b modulation (1 Mbps) Test Result

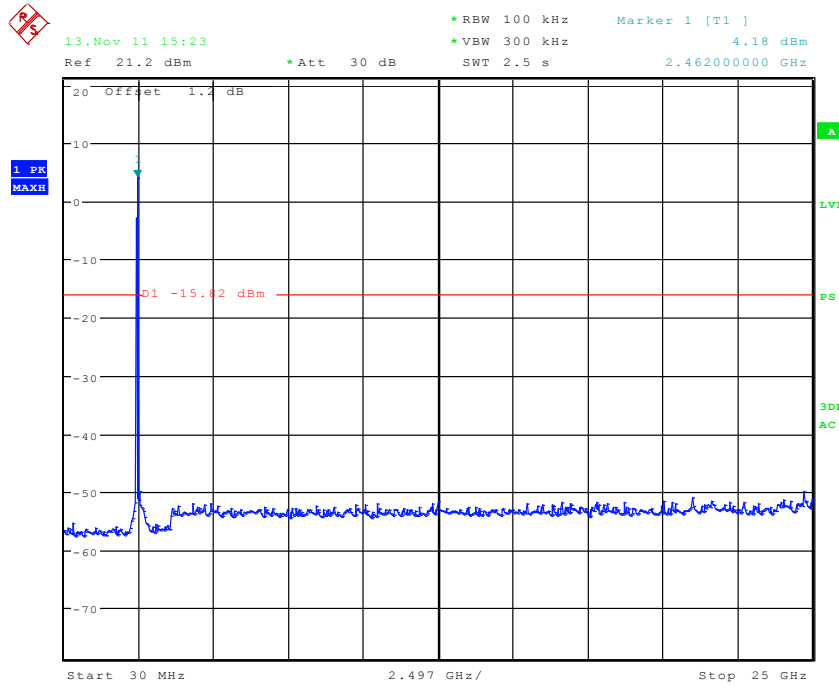
#### 2412MHz



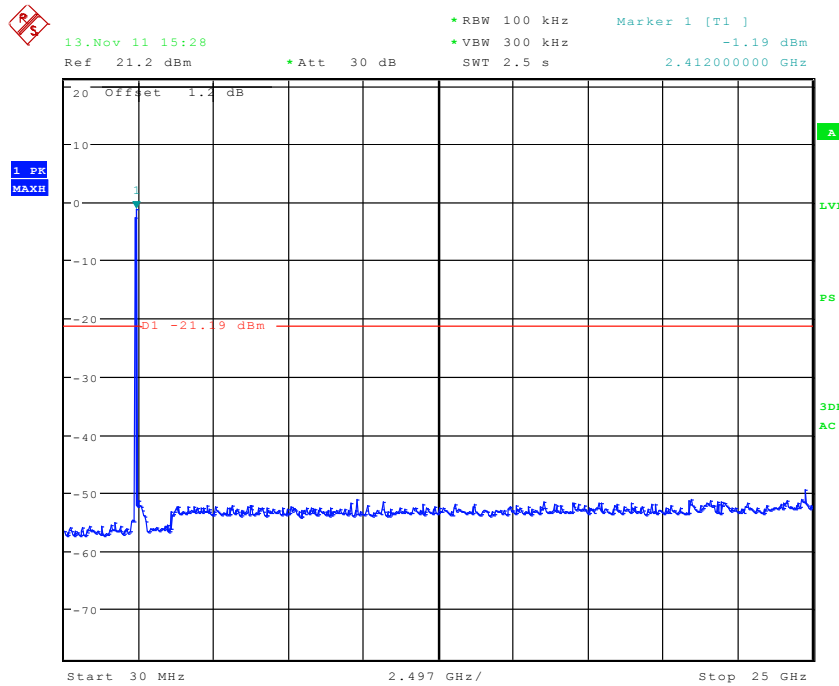
#### 2437MHz



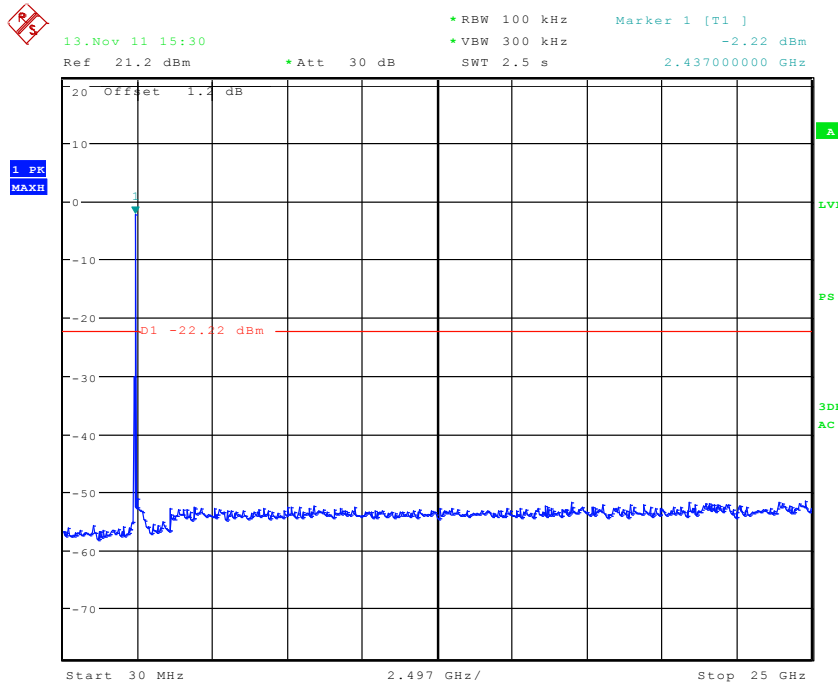
## Spurious RF conducted emissions 2462MHz



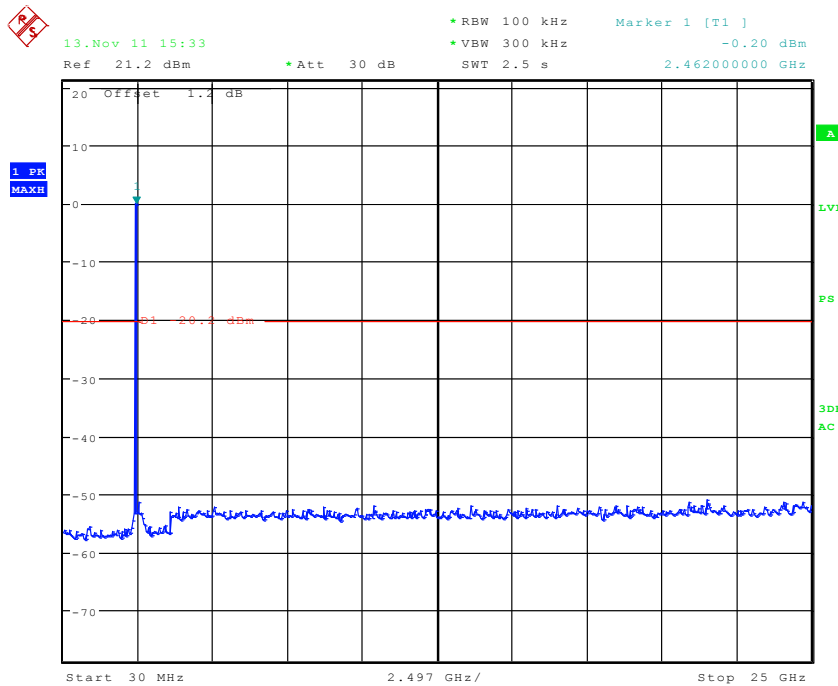
## IEEE 802.11g modulation (6 Mbps) Test Result 2412MHz



## Spurious RF conducted emissions 2437MHz



## 2462MHz





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## Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012



## 7.5 Spurious radiated emissions

### Test Method

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	AV

### Limit

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

## Radiated Emission

IEEE 802.11b modulation (1 Mbps) CH1 2412MHz Test Result

### Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
30.00	13.93	20.16	34.09	V	40.00	QP	-5.91
183.89	11.52	26.06	37.58	V	43.50	QP	-5.92
208.77	12.47	22.52	34.99	V	43.50	QP	-8.51
183.89	10.51	22.89	33.40	H	43.50	QP	-10.10
219.65	11.84	17.49	29.33	H	46.00	QP	-16.67
406.19	18.34	11.53	29.87	H	46.00	QP	-16.13

### Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
4868.59	-4.37	72.75	68.38	V	74.00	peak	-5.62
4868.59	-4.37	54.68	50.31	V	54.00	AVG	-3.69
7320.51	2.50	60.94	63.44	V	74.00	peak	-10.56
7320.51	2.50	43.91	46.41	V	54.00	AVG	-7.59
10235.57	10.92	46.72	57.64	V	74.00	peak	-16.36
10235.57	10.92	33.70	44.62	V	54.00	AVG	-9.38
11788.46	8.87	46.04	54.91	V	74.00	peak	-19.09
11788.46	8.87	34.35	43.22	V	54.00	AVG	-10.78
14512.82	11.97	50.04	62.01	V	74.00	peak	-11.99
14512.82	11.97	36.98	48.95	V	54.00	AVG	-5.05
4868.59	-4.37	74.02	69.65	H	74.00	peak	-4.35
4868.59	-4.37	52.42	48.05	H	54.00	AVG	-5.95
7320.51	2.50	68.98	71.48	H	74.00	peak	-2.52
7320.51	2.50	48.14	50.64	H	54.00	AVG	-3.36
9799.68	10.04	45.59	55.63	H	74.00	peak	-18.37
9799.68	10.04	34.35	44.39	H	54.00	AVG	-9.61

## Radiated Emission

IEEE 802.11b modulation (1 Mbps) CH6 2437MHz Test Result

Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
101.51	13.58	21.44	35.02	V	43.50	QP	-8.48
126.38	11.11	26.69	37.80	V	43.50	QP	-5.70
185.45	11.91	24.43	36.34	V	43.50	QP	-7.16
214.98	12.10	22.28	34.38	V	43.50	QP	-9.12
145.03	8.93	24.99	33.92	H	43.50	QP	-9.58
165.24	9.54	27.05	36.59	H	43.50	QP	-6.91
183.89	10.51	26.22	36.73	H	43.50	QP	-6.77
399.97	18.06	18.50	36.56	H	46.00	QP	-9.44

Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
4868.59	-4.37	72.75	68.38	V	74.00	peak	-5.62
4868.59	-4.37	54.68	50.31	V	54.00	AVG	-3.69
7320.51	2.50	60.94	63.44	V	74.00	peak	-10.56
7320.51	2.50	43.91	46.41	V	54.00	AVG	-7.59
10235.57	10.92	46.72	57.64	V	74.00	peak	-16.36
10235.57	10.92	33.70	44.62	V	54.00	AVG	-9.38
11788.46	8.87	46.04	54.91	V	74.00	peak	-19.09
11788.46	8.87	34.35	43.22	V	54.00	AVG	-10.78
14512.82	11.97	50.04	62.01	V	74.00	peak	-11.99
14512.82	11.97	36.98	48.95	V	54.00	AVG	-5.05
4868.59	-4.37	74.02	69.65	H	74.00	peak	-4.35
4868.59	-4.37	52.42	48.05	H	54.00	AVG	-5.95
7320.51	2.50	68.98	71.48	H	74.00	peak	-2.52
7320.51	2.50	48.14	50.64	H	54.00	AVG	-3.36
9799.68	10.04	45.59	55.63	H	74.00	peak	-18.37
9799.68	10.04	34.35	44.39	H	54.00	AVG	-9.61

## Radiated Emission

IEEE 802.11b modulation (1 Mbps) CH11 2462MHz Test Result

Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
126.38	11.11	25.41	36.52	V	43.50	QP	-6.98
185.45	11.91	26.01	37.92	V	43.50	QP	-5.58
224.31	12.48	26.28	38.76	V	46.00	QP	-7.24
418.62	17.38	19.84	37.22	V	46.00	QP	-8.78
477.69	18.41	17.00	35.41	V	46.00	QP	-10.59
552.31	20.02	15.71	35.73	V	46.00	QP	-10.27
126.38	10.36	24.12	34.48	H	43.50	QP	-9.02
165.24	9.54	28.45	37.99	H	43.50	QP	-5.51
183.89	10.51	26.59	37.10	H	43.50	QP	-6.40
252.29	13.73	20.43	34.16	H	46.00	QP	-11.84
399.97	18.06	16.69	34.75	H	46.00	QP	-11.25
438.83	18.86	11.52	30.38	H	46.00	QP	-15.62

Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
4923.08	-4.29	72.75	68.46	V	74.00	peak	-5.54
4923.08	-4.29	54.88	50.59	V	54.00	AVG	-3.41
7375.00	2.55	43.43	45.98	V	54.00	AVG	-8.02
7375.00	2.58	61.55	64.13	V	74.00	peak	-9.87
10208.33	10.90	45.60	56.50	V	74.00	peak	-17.50
10208.33	10.90	33.44	44.34	V	54.00	AVG	-9.66
4923.08	-4.29	73.38	69.09	H	74.00	peak	-4.91
4923.08	-4.29	52.26	47.97	H	54.00	AVG	-6.03
7375.00	2.55	66.08	68.63	H	74.00	peak	-5.37
7375.00	2.55	44.84	47.39	H	54.00	AVG	-6.61

Remark:

- (1) Emission Level= Correct Factor + Reading
- (2) Correct Factor= Cable Loss(include amplifier factor) + Antenna Factor

## Radiated Emission

IEEE 802.11g modulation (6 Mbps) CH1 2412MHz Test Result

Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
101.51	13.58	21.06	34.64	V	43.50	QP	-8.86
126.38	11.11	27.04	38.15	V	43.50	QP	-5.35
165.24	9.59	26.83	36.42	V	43.50	QP	-7.08
183.89	11.52	24.86	36.38	V	43.50	QP	-7.12
219.65	11.91	24.15	36.06	V	46.00	QP	-9.94
165.24	9.54	27.54	37.08	H	43.50	QP	-6.42
185.45	10.61	26.83	37.44	H	43.50	QP	-6.06
219.65	11.84	25.04	36.88	H	46.00	QP	-9.12
399.97	18.06	18.34	36.40	H	46.00	QP	-9.60

Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
2525.64	-8.55	60.21	51.66	V	74.00	peak	-22.34
2525.64	-8.55	46.83	38.28	V	54.00	AVG	-15.72
7320.51	2.50	49.69	52.19	V	74.00	peak	-21.81
7320.51	2.50	37.13	39.63	V	54.00	AVG	-14.37
9745.19	9.76	46.88	56.64	V	74.00	peak	-17.36
9745.19	9.76	34.14	43.90	V	54.00	AVG	-10.10
3479.17	-7.36	48.85	41.49	H	74.00	peak	-32.51
3479.17	-7.36	35.97	28.61	H	54.00	AVG	-25.39
6584.94	-0.56	50.91	50.35	H	74.00	peak	-23.65
6584.94	-0.56	37.68	37.12	H	54.00	AVG	-16.88

## Radiated Emission

### IEEE 802.11g modulation (6 Mbps) CH6 2437MHz Test Result

#### Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
96.84	13.34	20.79	34.13	V	43.50	QP	-9.37
126.38	11.11	26.99	38.10	V	43.50	QP	-5.40
165.24	9.59	25.56	35.15	V	43.50	QP	-8.35
183.89	11.52	25.37	36.89	V	43.50	QP	-6.61
145.03	8.93	25.43	34.36	H	43.50	QP	-9.14
242.96	13.30	19.84	33.14	H	46.00	QP	-12.86
281.83	14.10	19.46	33.56	H	46.00	QP	-12.44
379.76	17.23	18.21	35.44	H	46.00	QP	-10.56

#### Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dB $\mu$ V/m	Detector	Result
3860.58	-6.45	49.00	42.55	V	74.00	peak	-31.45
3860.58	-6.45	36.78	30.33	V	54.00	AVG	-23.67
6939.10	0.79	47.99	48.78	V	74.00	peak	-25.22
6939.10	0.79	37.36	38.15	V	54.00	AVG	-15.85
9772.44	9.89	45.91	55.80	V	74.00	peak	-18.20
9772.44	9.89	34.24	44.13	V	54.00	AVG	-9.87
12524.03	7.76	47.63	55.39	V	74.00	peak	-18.61
12524.03	7.76	35.12	42.88	V	54.00	AVG	-11.12
4596.15	-4.88	50.22	45.34	H	74.00	peak	-28.66
4596.15	-4.88	38.15	33.27	H	54.00	AVG	-20.73
7129.81	1.95	49.06	51.01	H	74.00	peak	-22.99
7129.81	1.95	36.86	38.81	H	54.00	AVG	-15.19
9527.24	8.81	45.23	54.04	H	74.00	peak	-19.96
9527.24	8.81	34.29	43.10	H	54.00	AVG	-10.90
11815.70	8.74	46.19	54.93	H	74.00	peak	-19.07
11815.70	8.74	34.63	43.37	H	54.00	AVG	-10.63

## Radiated Emission

IEEE 802.11g modulation (6 Mbps) CH11 2462MHz Test Result

Below 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
126.38	11.11	26.98	38.09	V	43.50	QP	-5.41
183.89	11.52	25.32	36.84	V	43.50	QP	-6.66
418.62	17.38	17.63	35.01	V	46.00	QP	-10.99
477.69	18.41	16.22	34.63	V	46.00	QP	-11.37
552.31	20.02	14.33	34.35	V	46.00	QP	-11.65
126.38	10.36	21.65	32.01	H	43.50	QP	-11.49
183.89	10.51	22.83	33.34	H	43.50	QP	-10.16
238.30	13.05	22.85	35.90	H	46.00	QP	-10.10
379.76	17.23	16.94	34.17	H	46.00	QP	-11.83

Above 1GHz:

Frequency MHz	Correct Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
5086.54	-4.13	49.45	45.32	V	74.00	peak	-28.68
5086.54	-4.13	37.69	33.56	V	54.00	AVG	-20.44
7238.78	2.41	48.87	51.28	V	74.00	peak	-22.72
7238.78	2.41	37.03	39.44	V	54.00	AVG	-14.56
8982.37	6.22	46.97	53.19	V	74.00	peak	-20.81
8982.37	6.22	34.79	41.01	V	54.00	AVG	-12.99
3451.92	-7.53	48.21	40.68	H	74.00	peak	-33.32
3451.92	-7.53	36.54	29.01	H	54.00	AVG	-24.99
5931.09	-2.99	50.60	47.61	H	74.00	peak	-26.39
5931.09	-2.99	38.64	35.65	H	54.00	AVG	-18.35
7756.41	2.93	47.58	50.51	H	74.00	peak	-23.49
7756.41	2.93	36.83	39.76	H	54.00	AVG	-14.24

Remark:

(1) Emission Level= Correct Factor + Reading

(2) Correct Factor= Cable Loss(include amplifier factor) + Antenna Factor

**Test Equipment List**

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012
Pre-Amplifier	HP	8447D	2944A07999	May 29, 2012
Bilog Antenna	Schwarzbeck	VULB9163	142	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 29, 2012
Cable	Schwarzbeck	AK9513	ACRX1	May 29, 2012
Cable	Rosenberger	N/A	FP2RX2	May 29, 2012
Cable	Schwarzbeck	AK9513	CRPX1	May 29, 2012
Cable	Schwarzbeck	AK9513	CRRX2	May 29, 2012
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012



## 7.6 6 dB bandwidth

### Test Method

- 1 Place the EUT on the table and set it in the transmitting mode.
- 2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3 Mark the peak frequency and  $-6\text{dB}$  (upper and lower) frequency.

### Limit

Limit [kHz]

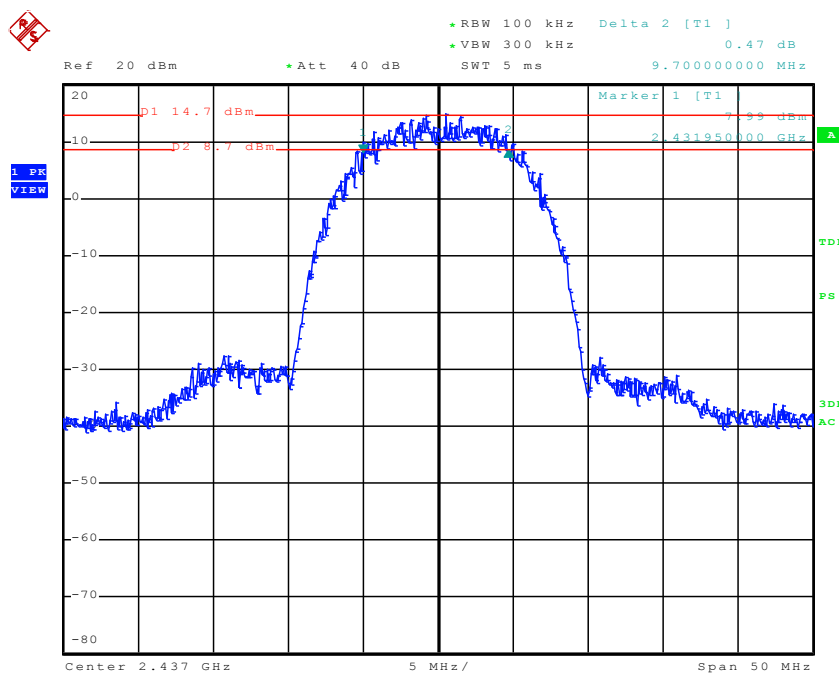
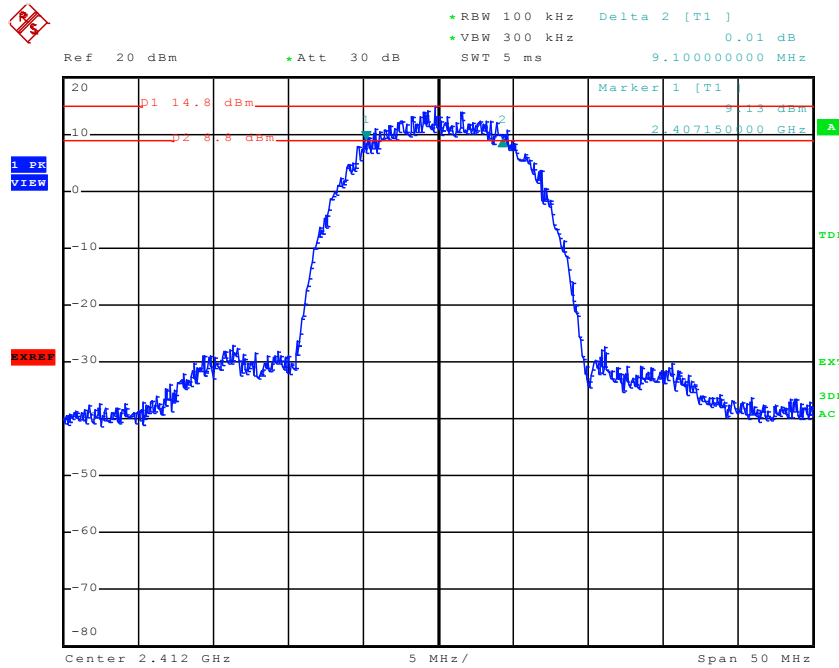
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$\geq 500$

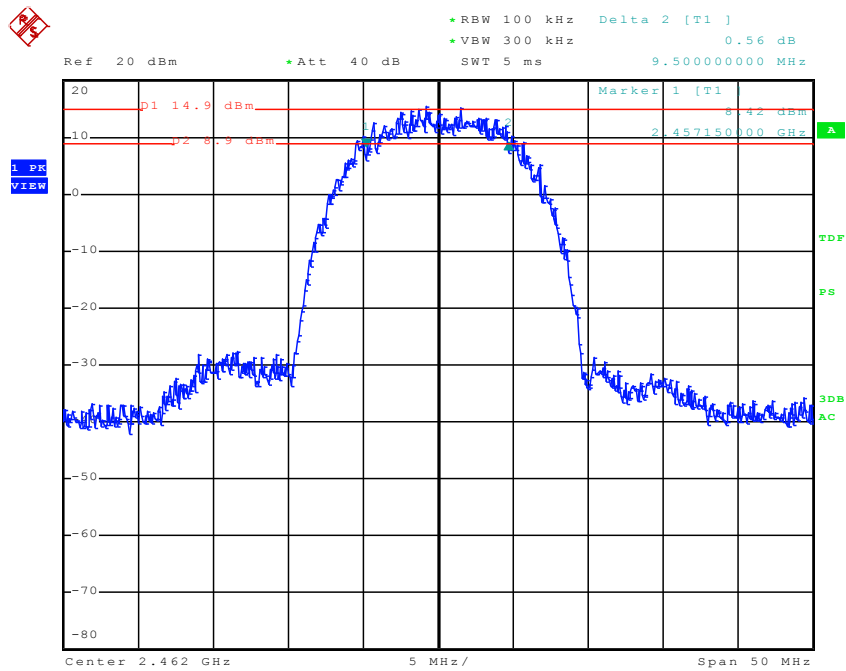
## 6 dB bandwidth

### IEEE 802.11b modulation (1Mbps) Test Result

Frequency MHz	Bandwidth kHz	Limit kHz	Result
2412	9100	≥ 500	Pass
2437	9700	≥ 500	Pass
2462	9500	≥ 500	Pass



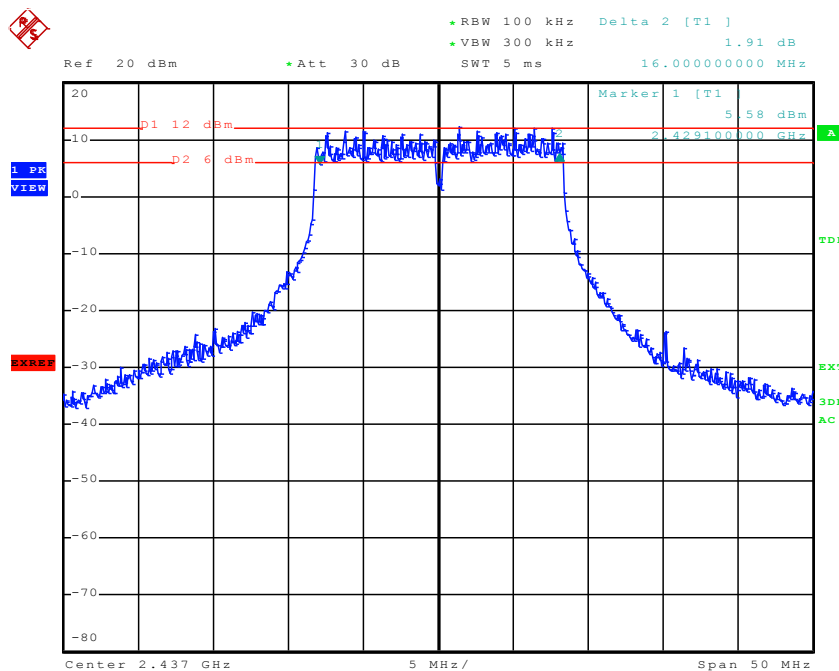
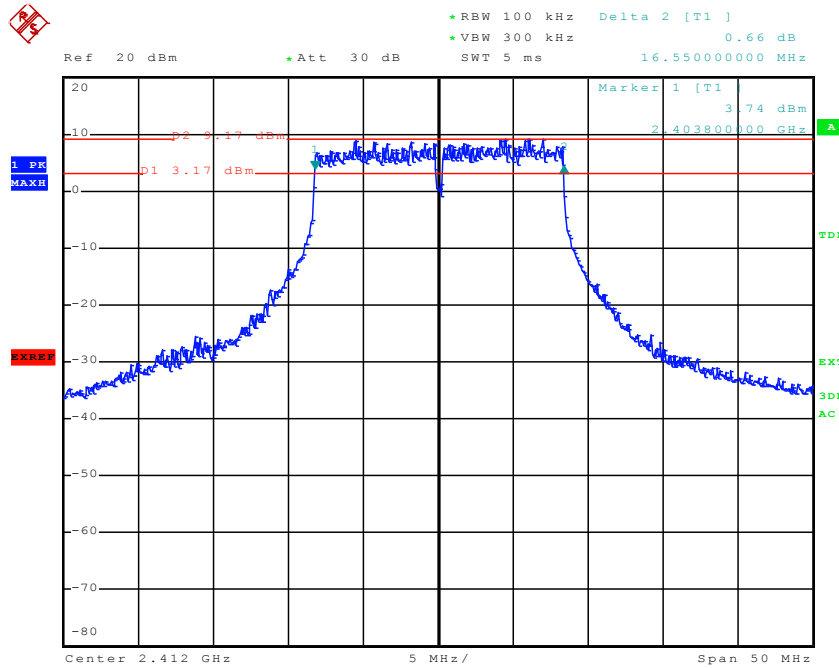
## 6 dB bandwidth



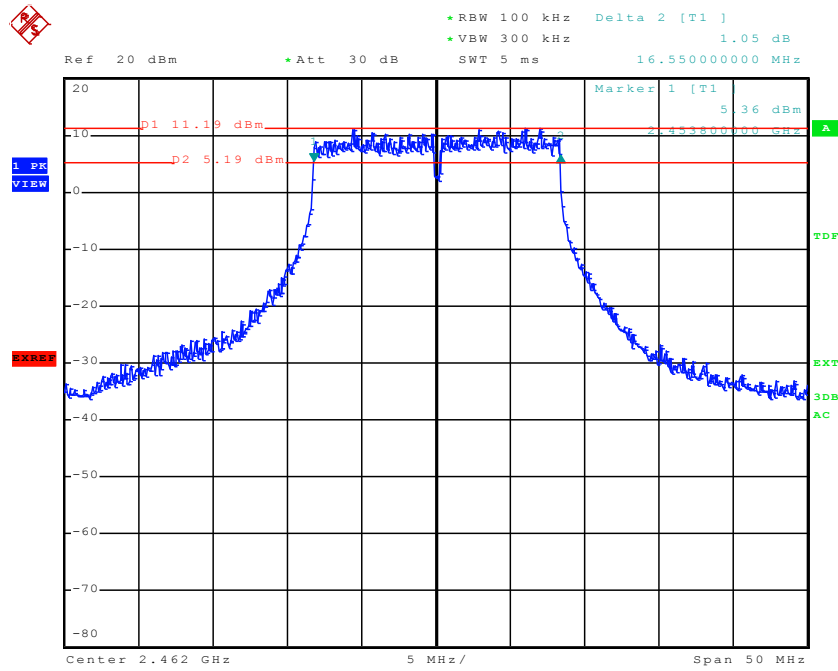
## 6 dB bandwidth

### IEEE 802.11g modulation (6Mbps) Test Result

Frequency MHz	Bandwidth kHz	Limit kHz	Result
2412	16550	≥ 500	Pass
2437	16000	≥ 500	Pass
2462	16550	≥ 500	Pass



## 6 dB bandwidth





Product Service

## Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012



## 7.7 Power spectral density

### Test Method

- 1 Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2 Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300kHz, Sweep = 100 s
- 3 Record the max reading.

### Limit

Limit  
dBm / 3 kHz

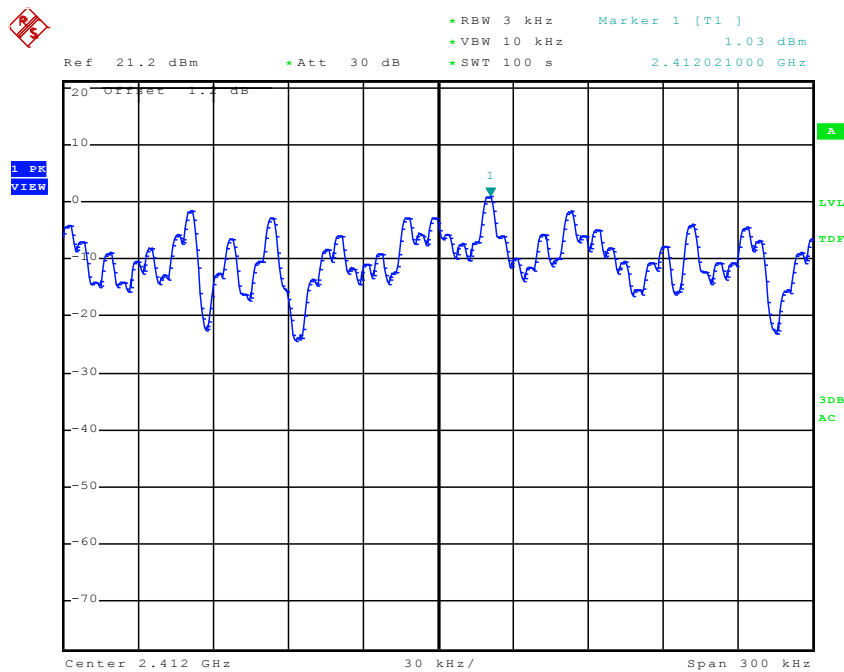
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8

## Power spectral density

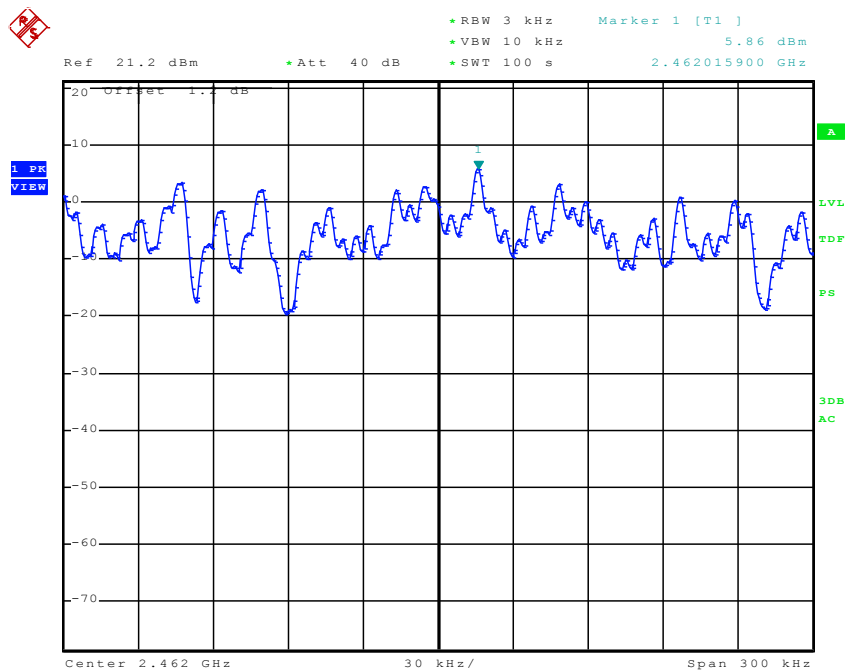
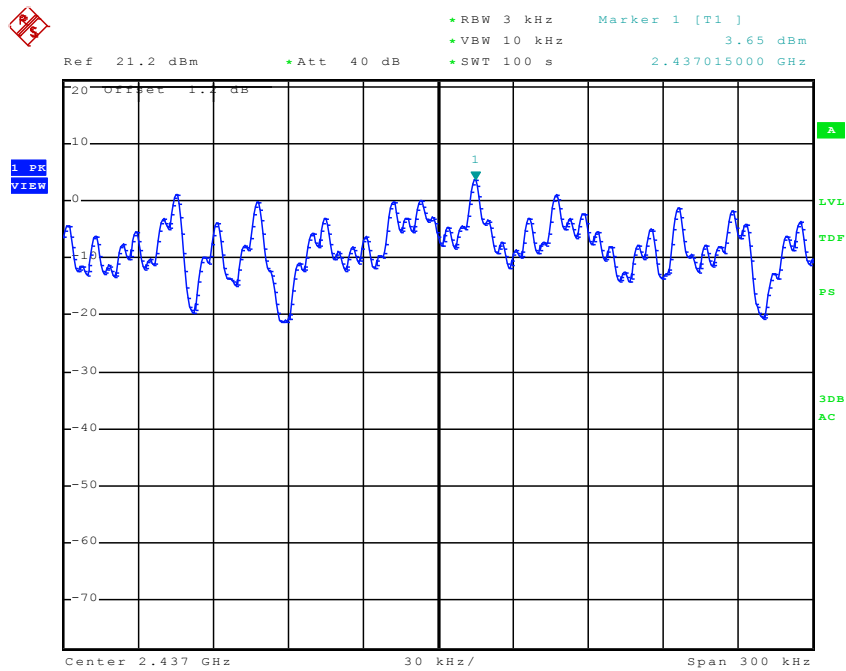
### IEEE 802.11b modulation (1Mbps) Test Result

Frequency MHz	P dBm	Result
2412	1.03	Pass
2437	3.65	Pass
2462	5.86	Pass





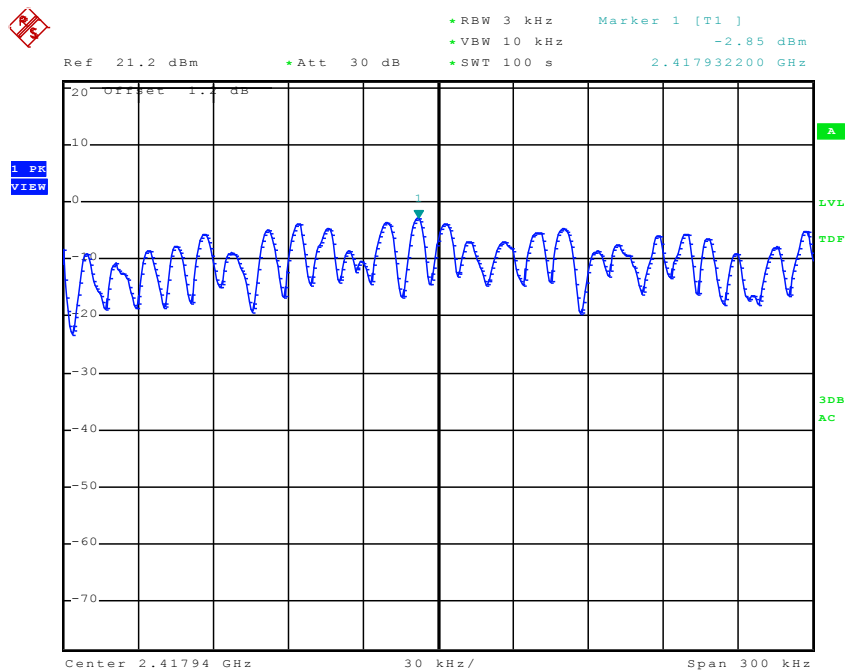
## Power spectral density



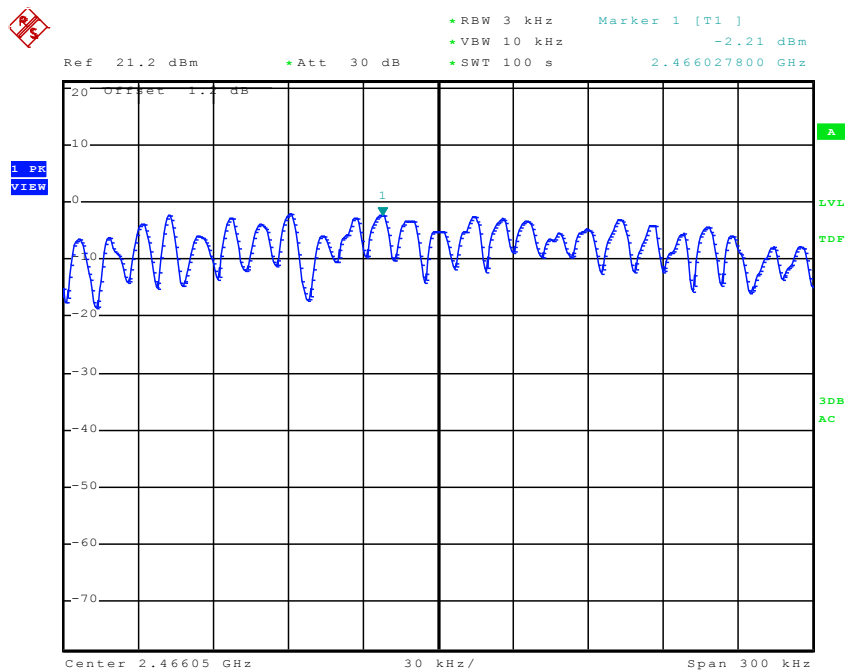
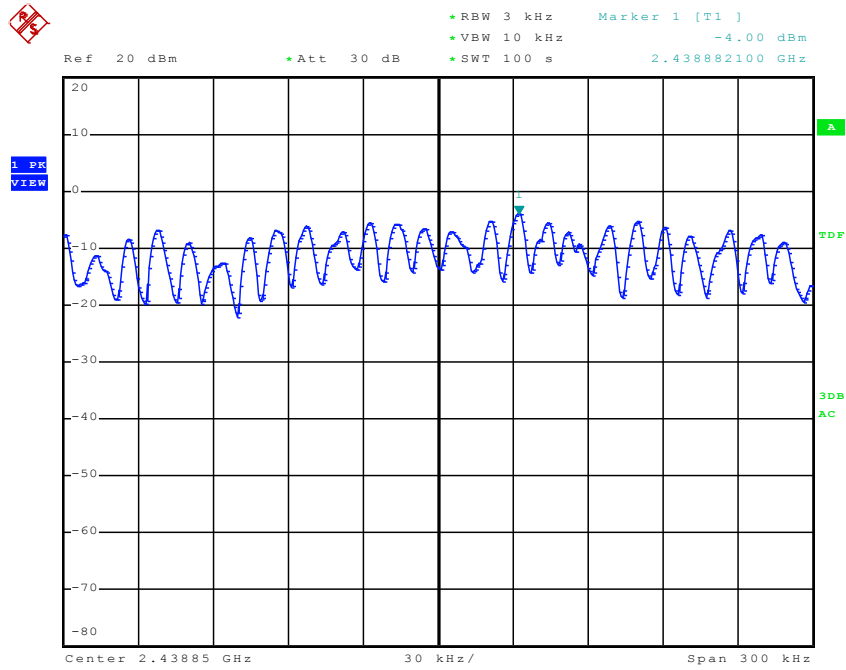
## Power spectral density

### IEEE 802.11g modulation (6Mbps) Test Result

Frequency MHz	P dBm	Result
2412	-2.85	Pass
2437	-4.0	Pass
2462	-2.21	Pass



## Power spectral density





Product Service

## Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 29, 2012



## 8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

**System Measurement Uncertainty**

Items		Extended Uncertainty
RE	Field strength (dB $\mu$ V/m)	U=4.32dB (30MHz-25GHz)
CE	Disturbance Voltage (dB $\mu$ V)	U=2.4dB