
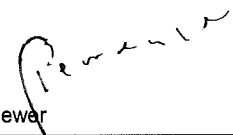


Produkte
 Products

Prüfbericht - Nr.: 12022407 001		Seite 1 von 75 Page 1 of 75	
<i>Test Report No.:</i>			
Auftraggeber: <i>Client:</i>	Topcon Corporation 75-1, Hasunuma-cho, Itabashi-ku, Tokyo 174-8580, Japan		
Gegenstand der Prüfung: <i>Test Item:</i>	Wireless Terminal		
Bezeichnung: <i>Identification:</i>	WT-100	Serien-Nr.: <i>Serial No.:</i>	W60010, W60013
Wareneingangs-Nr.: <i>Receipt No.:</i>	PT0214007952-1	Eingangsdatum: <i>Date of Receipt:</i>	2011-01-25
Prüfort: <i>Testing Location:</i>	TÜV Rheinland Japan Ltd. – Global Technology Assessment Center 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan		
Prüfgrundlage: <i>Test Specification:</i>	FCC 47 CFR Part 15, Subpart C, Section 15.247 (October 1, 2010) ANSI C63.4-2003 Measurement of Digital Transmission Systems Operating under Section 15.247 (March 23, 2005) RSS-210 (Issue 8): 2010 RSS-Gen (Issue 3): 2010 ANSI C63.4-2003		
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). The test item passed the test specification(s).		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Japan Ltd. – Global Technology Assessment Center 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan		
geprüft/ tested by:		kontrolliert/ reviewed by:	
 2011-02-15 T. Sauter / Inspector		 2011-02-15 T. Cheung / Reviewer	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
			Name/Stellung <i>Name/Position</i>
			Unterschrift <i>Signature</i>
Sonstiges / Other Aspects:			
This test report deals only with the intentional radiator portion of the tested product. Unintentional radiator aspects are covered by test report 12022407 003.			
Abkürzungen:	P(ass) = entspricht Prüfgrundlage	Abbreviations:	P(ass) = passed
	F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed
	N/A = nicht anwendbar		N/A = not applicable
	N/T = nicht getestet		N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

TEST SUMMARY

3.2.1 VOLTAGE REQUIREMENTS

RESULT: PASS

3.2.2 ANTENNA REQUIREMENTS

RESULT: PASS

5.1.1 CONDUCTED OUTPUT POWER

RESULT: PASS

5.1.2 6dB BANDWIDTH

RESULT: PASS

5.1.3 99% BANDWIDTH

5.1.4 CONDUCTED SPURIOUS EMISSION

RESULT: PASS

5.1.5 PEAK POWER SPECTRAL DENSITY

RESULT: PASS

6.1.1 BAND EDGE RADIATED EMISSION

RESULT: Pass

6.1.2 RADIATED SPURIOUS EMISSION OF TRANSMITTER

RESULT: PASS

7.1.1 AC POWER LINE CONDUCTED EMISSION OF TRANSMITTER

RESULT: N/A

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report.

2. Test Sites

2.1 Test Facilities

TÜV Rheinland Japan Ltd. – Global Technology Assessment Center
4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facilities and has found these test sites to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 299054.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facilities and has found these test sites to be in compliance with Canadian requirements. The description of the test facility is listed under OATS filing number 3466B.

The test facility is accredited by VLAC (member of ILAC) under number VLAC-017 according to ISO/IEC 17025:2005.



TÜV Rheinland Japan Ltd. is accredited by the Federal Communications Commission as a Conformity Assessment Body under Designation Number JP0017 and Test Firm Registration Number 386498.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Model Name	Serial Number	Equipment ID	Calibrated until
For Antenna Port Conducted Emission					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2011-02
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2011-12
RF Power Meter	Agilent	N1911A	MY451017 37	RF-0393	2011-11
RF Peak Power Sensor	Agilent	N1921A	MY452422 28	RF-0394	2011-11
DC Power Supply	Kikusui	PWR400L	NJ001952	Y3-0907	N/A
For Radiated Emission					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2011-02
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2011-12
RF Selector (10m)	Toyo Corporation	NS4900	0703-182	RF-0029	2011-05
Loop Antenna with power supply, 9kHz-30MHz	Rohde & Schwarz	HFH2-Z2	100139	RF-0048	2011-02
Trilog Antenna, 30-1000MHz	Schwarzbeck	VULB9168	0245	RF-0019	2011-05
3dB Attenuator 50Ohm	Tamagawa Electronics Co., Ltd.	CFA-01	-	RF-0265	2011-05
Low Noise Pre-Amplifier, 9kHz-1GHz	T SJ	MLA-10K01-B01-35	1370750	RF-0253	2011-05
Horn Antenna, 1-8GHz	Schwarzbeck	BBHA9120B	419	RF-0050	2011-05
Microwave Pre-Amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	2011-05
Band Reject Filter, 1-8GHz	Nitsuki	NF-49BT	027	RF-0131	2011-05
Horn Antenna with Pre-Amplifier, 8-18GHz	Toyo Corporation	HAP06-18W	00000025	RF-0065	2011-05
High Pass Filter, 8-18GHz	Micro-Tronics	HPM50107	006	RF-0334	2011-05
Horn Antenna with Pre-Amplifier, 18-26.5GHz	Toyo Corporation	HAP18-26N	00000010	RF-0070	2011-05
DC Power Supply	Hewlett Packard	6653A	3640A0310 2	RF-0004	N/A

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing.

2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Radiated Emission	30MHz - 1GHz	±4.7dB
	> 1GHz	±4.5dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is an IEEE 802.11b/g wireless terminal which is used to enable wireless communication between other IEEE 802.11b/g wireless apparatus via the EUT. The EUT is for outdoor use. It can be powered either by an internal battery (DC 7.4V) or by a DC power input cable connected to a vehicle battery (DC 12V).

3.2 System Details

Radio standard:	IEEE 802.11b IEEE 802.11g
RF output power:	18.55dBm (peak, 802.11b) 22.75dBm (peak, 802.11g)
Antenna gain:	+2.0dBi
Antenna type:	Sleeve antenna
Antenna mounting type:	External
Frequency range:	2412– 2462MHz
Number of channels:	11
Channel spacing:	5MHz
Modulation type:	DSSS coupled with DBPSK, DQPSK and CCK OFDM coupled with BPSK, QPSK, 16QAM and 64QAM
FCC classification:	DTS
IC classification:	Spread Spectrum/Digital Device (2400–2483.5 MHz)
Emission designator:	G1D
Rated voltage:	DC 7.4V via internal battery DC 12V via DC power input port (for external battery)
Rated power:	Max. 2W
Protection class:	III
Test voltage:	DC 7.4V via internal battery DC 12V via DC power input port

Table 3: Interfaces present on the EUT

No.	Interface	Cable Length for Testing, Shielding	Interface Classification
1.	DC Input	2m, un-shielded	DC input power port

3.2.1 Voltage Requirements

RESULT: **PASS**

Requirement:
FCC 15.31(e)

Verdict:

The EUT is battery powered and has an internal voltage regulator to supply the RF circuit. Hence it complies with the power supply requirements.

3.2.2 Antenna Requirements

RESULT: **PASS**

Requirement:
FCC 15.203, FCC 15.204 and RSS-Gen 7.1.2

Verdict:

The antenna of the EUT is permanently attached to the main unit and cannot be disconnected by the user. Hence it complies with the requirements.

3.3 Clock Frequencies and Noise Suppressing Parts

Refer to schematics.

4. Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15, Sections 15.31, 15.33, 15.35, 15.205, 15.207, 15.209 and Measurement of Digital Transmission Systems Operating under Section 15.247.

The test methods, which have been used, are based on ANSI C63.4-2003 and RSS-Gen (Issue 3).

For details, see under each test item.

4.2 Operation Modes

Testing was performed at the lowest operating frequency (2412MHz), at the operating frequency in the middle of the specified frequency band (2437MHz) and at the highest operating frequency (2462MHz).

The basic operation modes used for testing are:

- A. EUT transmits (TX mode), with full power, at lowest channel (2412MHz), a continuous modulated signal streaming with 100% duty cycle.
- B. EUT transmits (TX mode), with full power, at middle channel (2437MHz), a continuous modulated signal streaming with 100% duty cycle.
- C. EUT transmits (TX mode), with full power, at highest channel (2462MHz), a continuous modulated signal streaming with 100% duty cycle.
- D. EUT receives (RX mode), at middle channel (2437MHz), continuously.

The above operation modes were coupled with the following configurations:

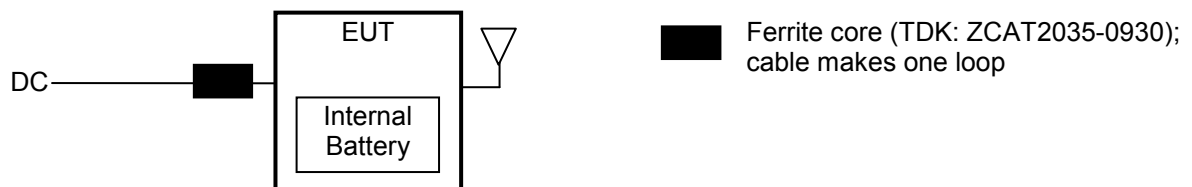
- 1. EUT operates in 802.11b radio
- 2. EUT operates in 802.11g radio
- x. The EUT is powered via internal battery
- y. The EUT is powered via DC power input port.

4.3 Physical Configuration for Testing

The test system was configured in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4:2003.

Figure 1: Block Diagram



Notes:

Two test samples were used for testing. Sample No. W60013 was used for antenna conducted measurements and sample No. W60010 was used for radiated measurements.

For antenna conducted measurements, the antenna was replaced by a 50Ω antenna connector.

The internal battery was removed when the EUT was powered via the DC power input port (configuration “y”). The DC power input cable was disconnected when the EUT was powered via internal battery (configuration “x”). Testing was done with a fully charged battery in configuration “x”.

For more details, refer to section: Photographs of the Test Set-Up.

4.4 Test Software

Software used for testing: MP_TEST MFC version 1.3.8.0.

This software was running on the laptop computer connected to the EUT. It was used to enable the test operation modes listed in section 4.2 as appropriate.

4.5 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

1. Product: Laptop Computer
Manufacturer: Fujitsu
Model: FMV-830NU/L
Rated Voltage: DC 19V
Input Current: 3.16A
Protection Class: III
Serial Number: R4Z17582

2. Product: AC Adapter for Laptop Computer
Manufacturer: Fujitsu
Model: CA01007-0930
Rated Voltage: AC 100-240V
Input Current: 1.2-0.6A
Frequency: 50-60Hz
Protection Class: II
Serial Number: 04X50391E

3. Product: Laptop Computer
Manufacturer: Fujitsu
Model: FMV-830NU/L
Rated Voltage: DC 19V
Input Current: 3.16A
Protection Class: III
Serial Number: R4Z08891

4. Product: AC Adapter for Laptop Computer
Manufacturer: Fujitsu
Model: CP196212-02
Rated Voltage: AC 100-240V
Input Current: 1.3A
Frequency: 50/60Hz
Protection Class: II
Serial Number: 04X49002A

Note:

The above accessories were only used to enable the operation modes listed in section 4.2, using the EUT internal Ethernet connector (for maintenance only, not accessible to the final user). The used laptop computer was disconnected from the EUT for radiated measurement.

4.6 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

5. Test Results of Conducted Measurements at Antenna Port

5.1 Transmitter Parameters

5.1.1 Conducted Output Power

RESULT:

PASS

Date of testing: 2011-01-28

Ambient temperature: 19°C

Relative humidity: 15%

Atmospheric pressure: 1018hPa

Requirements:

FCC 15.247(b)(3) and RSS-210 A8.4(4)

For systems using digital modulation in the 2400-2483.5MHz band, the maximum peak output power is 1W (30dBm).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.8 and Measurement of Digital Transmission Systems Operating under Section 15.247.

The maximum peak output power (conducted) was measured at the antenna connector with a power meter. The final measurement takes into account the loss generated by all the involved cables.

The measurement was performed at all the available modulations (data rates) and DC power input modes ("x" and "y") in order to identify the configuration producing the highest output power for each of the 802.11b and 802.11g radios.

Table 4: Conducted Output Power, Mode A1x (2412MHz, 802.11b Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	15.49	2.27	17.76	59.68	30.00	1000	12.24
2	15.40	2.27	17.67	58.45	30.00	1000	12.33
5.5	15.33	2.27	17.60	57.52	30.00	1000	12.40
11	15.37	2.27	17.64	58.05	30.00	1000	12.36

Table 5: Conducted Output Power, Mode B1x (2437MHz, 802.11b Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	15.85	2.32	18.17	65.56	30.00	1000	11.83
2	15.75	2.32	18.07	64.07	30.00	1000	11.93
5.5	15.71	2.32	18.03	63.48	30.00	1000	11.97
11	15.77	2.32	18.09	64.37	30.00	1000	11.91

Table 6: Conducted Output Power, Mode C1x (2462MHz, 802.11b Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	16.24	2.31	18.55	71.67	30.00	1000	11.45
2	16.13	2.31	18.44	69.88	30.00	1000	11.56
5.5	16.16	2.31	18.47	70.37	30.00	1000	11.53
11	16.18	2.31	18.49	70.69	30.00	1000	11.51

Notes: Output power = Reading + Correction factor
 Correction factor = Total cable loss
 $mW = 10^{(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Table 7: Conducted Output Power, Mode A1y (2412MHz, 802.11b Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	15.49	2.27	17.76	59.68	30.00	1000	12.24
2	15.47	2.27	17.74	59.40	30.00	1000	12.26
5.5	15.42	2.27	17.69	58.72	30.00	1000	12.31
11	15.39	2.27	17.66	58.32	30.00	1000	12.34

Table 8: Conducted Output Power, Mode B1y (2437MHz, 802.11b Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	15.77	2.32	18.09	64.37	30.00	1000	11.91
2	15.75	2.32	18.07	64.07	30.00	1000	11.93
5.5	15.71	2.32	18.03	63.48	30.00	1000	11.97
11	15.72	2.32	18.04	63.63	30.00	1000	11.96

Table 9: Conducted Output Power, Mode C1y (2462MHz, 802.11b Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	16.19	2.31	18.50	70.85	30.00	1000	11.50
2	16.16	2.31	18.47	70.37	30.00	1000	11.53
5.5	16.12	2.31	18.43	69.72	30.00	1000	11.57
11	16.12	2.31	18.43	69.72	30.00	1000	11.57

Notes: Output power = Reading + Correction factor
 Correction factor = Total cable loss
 $mW = 10^{(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Table 10: Conducted Output Power, Mode A2x (2412MHz, 802.11g Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	18.45	2.27	20.72	117.98	30.00	1000	9.28
9	18.30	2.27	20.57	113.97	30.00	1000	9.43
12	18.79	2.27	21.06	127.59	30.00	1000	8.94
18	17.52	2.27	19.79	95.24	30.00	1000	10.21
24	18.99	2.27	21.26	133.60	30.00	1000	8.74
36	18.80	2.27	21.07	127.88	30.00	1000	8.93
48	18.07	2.27	20.34	108.09	30.00	1000	9.66
54	18.50	2.27	20.77	119.34	30.00	1000	9.23

Table 11: Conducted Output Power, Mode B2x (2437MHz, 802.11g Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	18.67	2.32	20.99	125.51	30.00	1000	9.01
9	18.57	2.32	20.89	122.65	30.00	1000	9.11
12	19.09	2.32	21.41	138.25	30.00	1000	8.59
18	17.85	2.32	20.17	103.91	30.00	1000	9.83
24	19.34	2.32	21.66	146.44	30.00	1000	8.34
36	19.08	2.32	21.40	137.93	30.00	1000	8.60
48	18.39	2.32	20.71	117.67	30.00	1000	9.29
54	18.79	2.32	21.11	129.02	30.00	1000	8.89

Table 12: Conducted Output Power, Mode C2x (2462MHz, 802.11g Radio, DC 7.4V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	19.55	2.31	21.86	153.59	30.00	1000	8.14
9	19.43	2.31	21.74	149.40	30.00	1000	8.26
12	19.93	2.31	22.24	167.63	30.00	1000	7.76
18	18.57	2.31	20.88	122.56	30.00	1000	9.12
24	20.44	2.31	22.75	188.52	30.00	1000	7.25
36	19.78	2.31	22.09	161.94	30.00	1000	7.91
48	19.03	2.31	21.34	136.26	30.00	1000	8.66
54	19.52	2.31	21.83	152.53	30.00	1000	8.17

Notes: Output power = Reading + Correction factor
 Correction factor = Total cable loss
 $mW = 10^{(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Table 13: Conducted Output Power, Mode A2y (2412MHz, 802.11g Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	18.33	2.27	20.60	114.76	30.00	1000	9.40
9	18.04	2.27	20.31	107.35	30.00	1000	9.69
12	18.70	2.27	20.97	124.97	30.00	1000	9.03
18	17.37	2.27	19.64	92.00	30.00	1000	10.36
24	18.88	2.27	21.15	130.26	30.00	1000	8.85
36	18.69	2.27	20.96	124.68	30.00	1000	9.04
48	18.03	2.27	20.30	107.10	30.00	1000	9.70
54	18.52	2.27	20.79	119.90	30.00	1000	9.21

Table 14: Conducted Output Power, Mode B2y (2437MHz, 802.11g Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	18.65	2.32	20.97	124.93	30.00	1000	9.03
9	18.53	2.32	20.85	121.53	30.00	1000	9.15
12	19.00	2.32	21.32	135.42	30.00	1000	8.68
18	17.70	2.32	20.02	100.38	30.00	1000	9.98
24	19.18	2.32	21.50	141.15	30.00	1000	8.50
36	19.02	2.32	21.34	136.04	30.00	1000	8.66
48	18.34	2.32	20.66	116.32	30.00	1000	9.34
54	18.80	2.32	21.12	129.32	30.00	1000	8.88

Table 15: Conducted Output Power, Mode C2y (2462MHz, 802.11g Radio, DC 12V Input Voltage)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
6	19.94	2.31	22.25	168.02	30.00	1000	7.75
9	19.67	2.31	21.98	157.89	30.00	1000	8.02
12	20.05	2.31	22.36	172.33	30.00	1000	7.64
18	18.67	2.31	20.98	125.42	30.00	1000	9.02
24	20.09	2.31	22.40	173.93	30.00	1000	7.60
36	19.92	2.31	22.23	167.25	30.00	1000	7.77
48	19.20	2.31	21.51	141.70	30.00	1000	8.49
54	19.64	2.31	21.95	156.81	30.00	1000	8.05

Notes: Output power = Reading + Correction factor
 Correction factor = Total cable loss
 $mW = 10^{(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Remark:

The above results show that the worst case output power, indicated by shaded cells, is found at the data rate of 1Mbps for the radio 802.11b and at the data rate of 24Mbps for the radio 802.11g. Therefore, all the other measurements for the evaluation of the radio properties of the EUT have been performed using these data rates.

In addition, it was found that the DC power input method producing the highest RF output power is the configuration "x" (DC 7.4V). Therefore the other antenna port conducted measurements and the radiated band edge measurement have been performed in configuration "x".

5.1.2 6dB Bandwidth

RESULT:

PASS

Date of testing: 2011-01-29

Ambient temperature: 22°C

Relative humidity: 32%

Atmospheric pressure: 1012hPa

Requirements:

FCC 15.247(a)(2) and RSS-210 A8.2(a)

For systems using digital modulation in the 2400-2483.5MHz band, the 6dB bandwidth shall be at least 500kHz.

Test procedure:

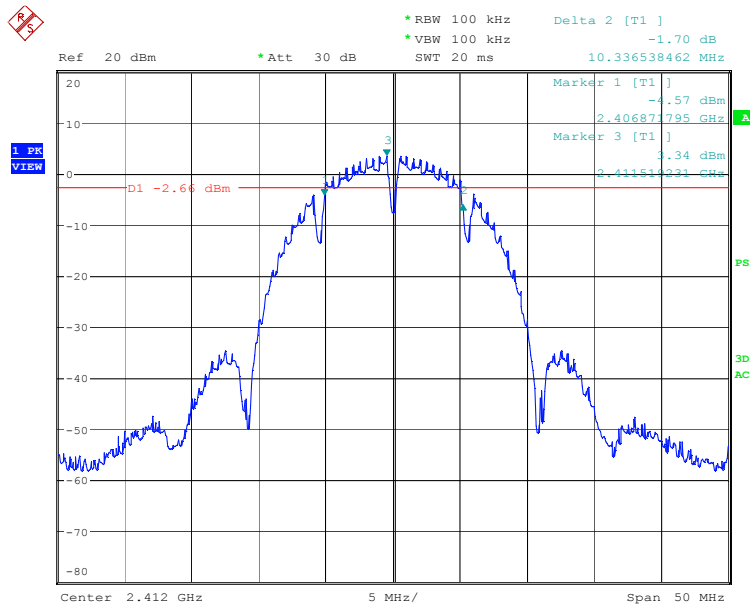
ANSI C63.4-2003, RSS-Gen 4.6.2 and Measurement of Digital Transmission Systems Operating under Section 15.247.

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 100kHz and the span to 50MHz.

Table 16: 6dB Bandwidth, Configuration 1x (Radio 802.11b, DC 7.4V Input Voltage)

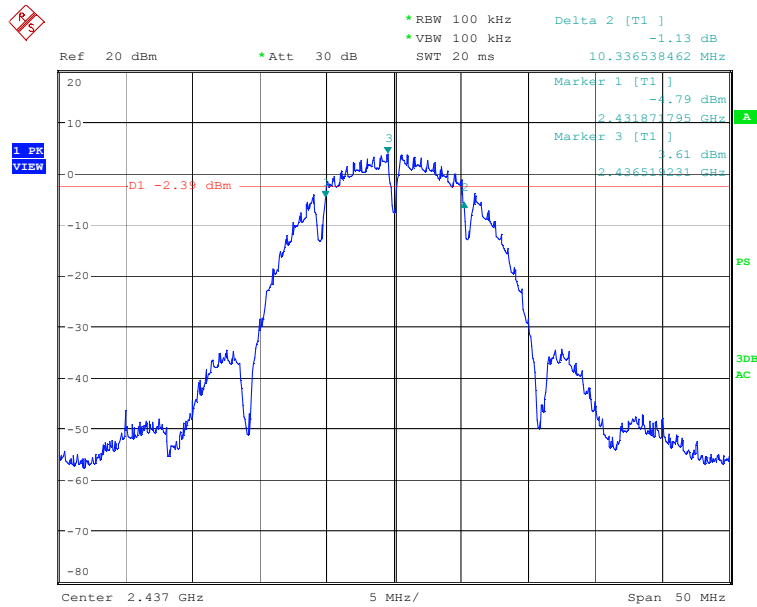
Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.34	500
2437	10.34	500
2462	10.34	500

Figure 2: 6dB Bandwidth, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)



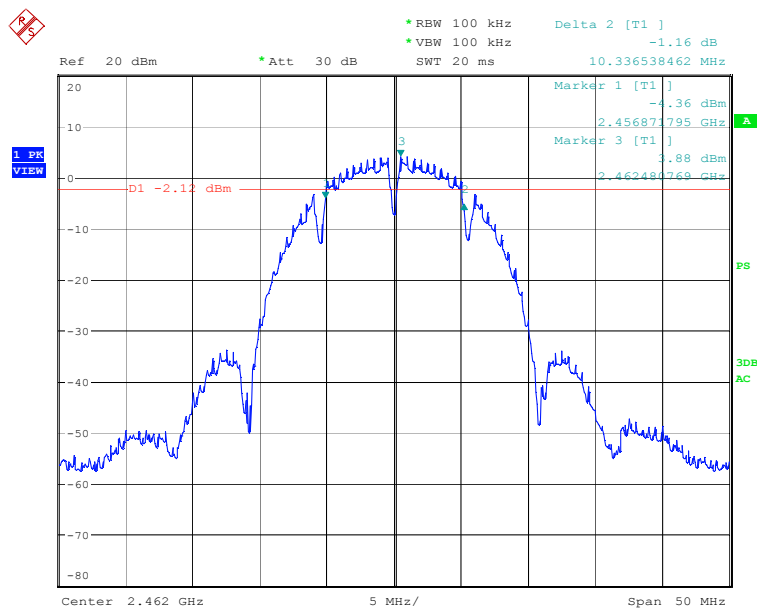
6dB Bandwidth; Mode A1x
 Date: 29.JAN.2011 17:34:19

Figure 3: 6dB Bandwidth, Mode B1x (2437MHz, Radio 802.11b, DC 7.4V Input Voltage)



6dB Bandwidth; Mode B1x
 Date: 29.JAN.2011 17:35:58

Figure 4: 6dB Bandwidth, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)

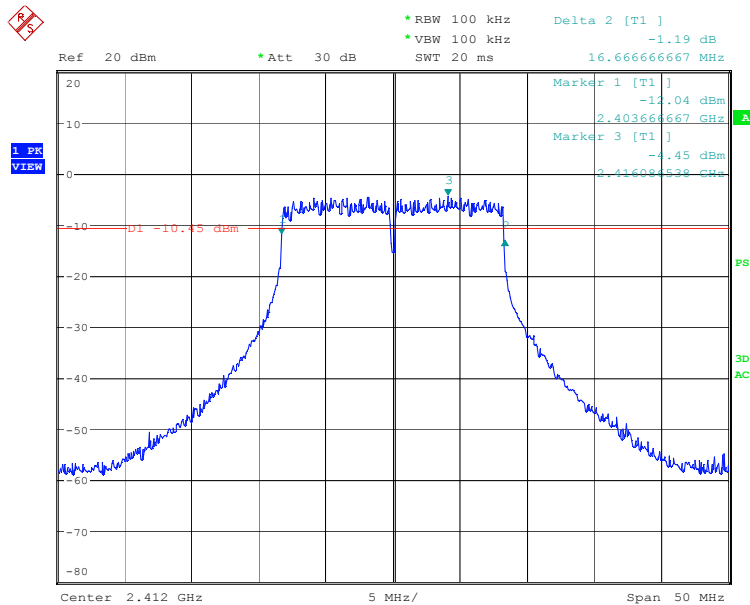


6dB Bandwidth; Mode C1x
 Date: 29.JAN.2011 17:37:22

Table 17: 6dB Bandwidth, Configuration 2x (Radio 802.11g, DC 7.4V Input Voltage)

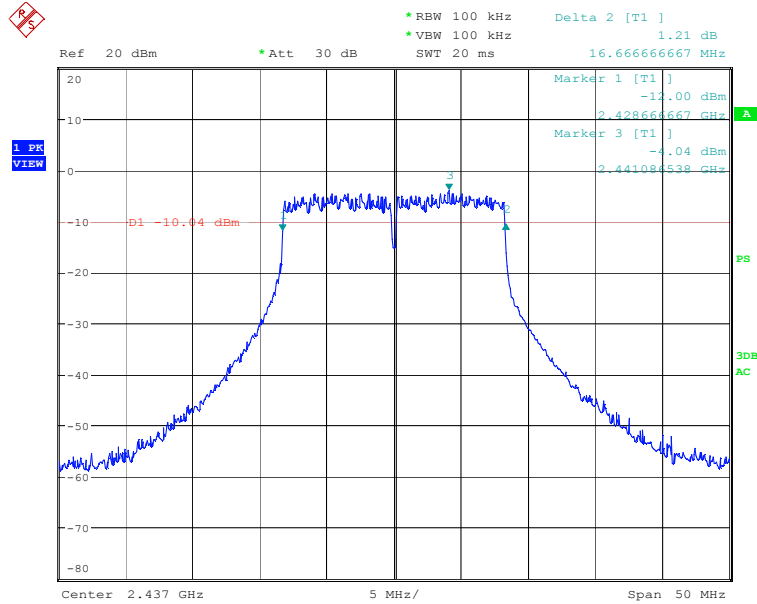
Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.67	500
2437	16.67	500
2462	16.67	500

Figure 5: 6dB Bandwidth, Mode A2x (2412MHz, Radio 802.11g, DC 7.4V Input Voltage)



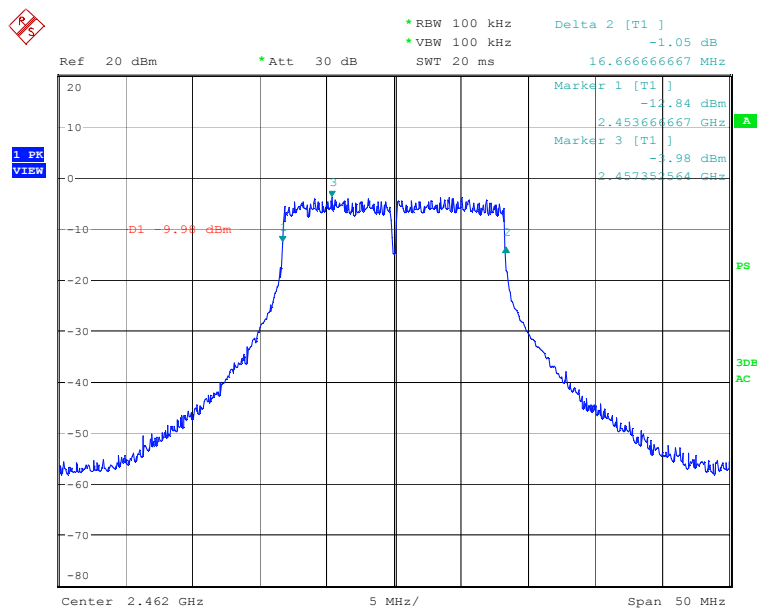
6dB Bandwidth, Mode A2x
 Date: 29.JAN.2011 17:40:11

Figure 6: 6dB Bandwidth, Mode B2x (2437MHz, Radio 802.11g, DC 7.4V Input Voltage)



6dB Bandwidth, Mode B2x
 Date: 29.JAN.2011 17:42:10

Figure 7: 6dB Bandwidth, Mode C2x (2462MHz, Radio 802.11g, DC 7.4V Input Voltage)



6dB Bandwidth, Mode C2x
 Date: 29.JAN.2011 17:43:29

5.1.3 99% Bandwidth

Date of testing: 2011-01-29

Ambient temperature: 22°C

Relative humidity: 32%

Atmospheric pressure: 1012hPa

Requirements:

RSS-Gen 4.6.1

The 99% bandwidth shall be reported according to RSS-Gen 4.6.1.

Test procedure:

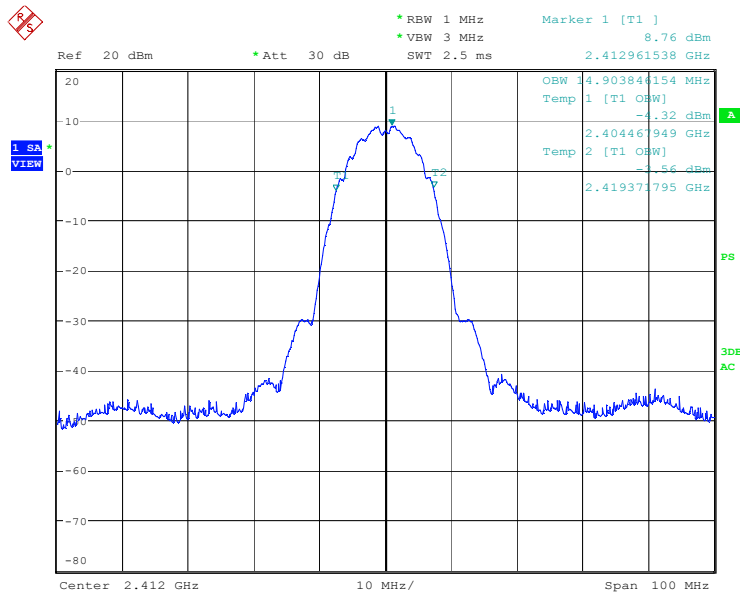
RSS-Gen 4.6.1.

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 1% of the span (100MHz). The 99% bandwidth was measured by using the OBW function of the analyzer with a 99% coverage setting.

Table 18: 99% Bandwidth, Configuration 1x (Radio 802.11b, DC 7.4V Input Voltage)

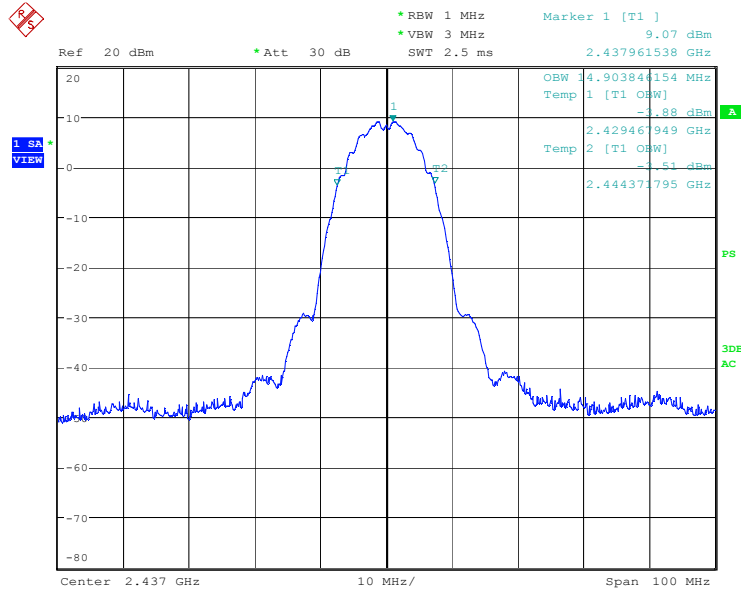
Operating Frequency [MHz]	99% Bandwidth [MHz]
2412	14.90
2437	14.90
2462	14.90

Figure 8: 99% Bandwidth, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)



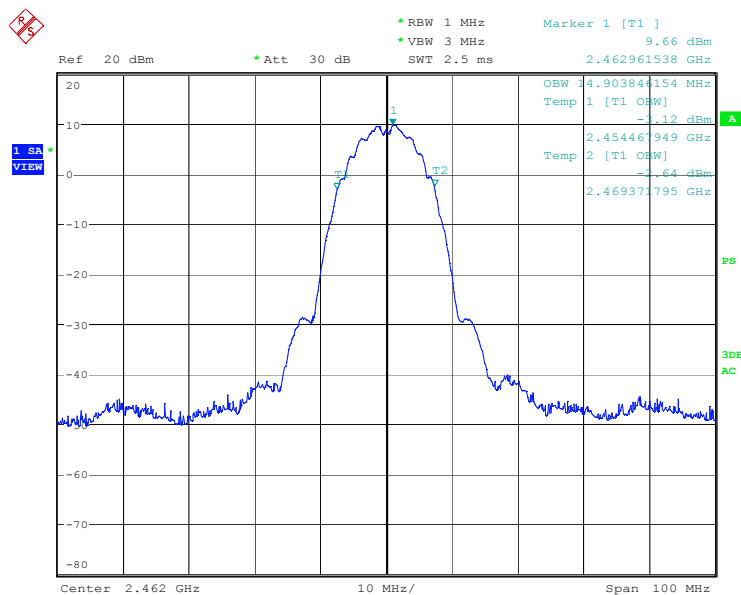
99% Bandwidth, Mode A1x
 Date: 29.JAN.2011 18:13:15

Figure 9: 99% Bandwidth, Mode B1x (2437MHz, Radio 802.11b, DC 7.4V Input Voltage)



99% Bandwidth, Mode B1x
 Date: 29.JAN.2011 18:14:01

Figure 10: 99% Bandwidth, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)

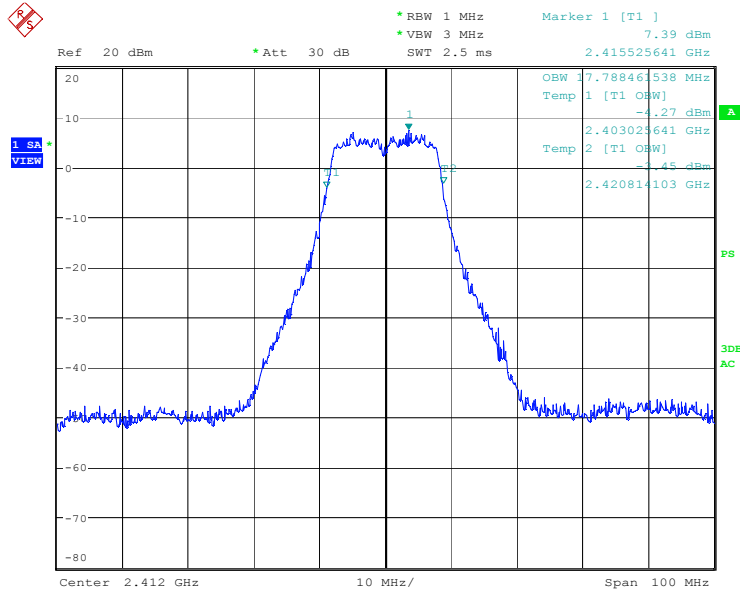


99% Bandwidth, Mode C1x
 Date: 29.JAN.2011 18:14:45

Table 19: 99% Bandwidth, Configuration 2x (Radio 802.11g, DC 7.4V Input Voltage)

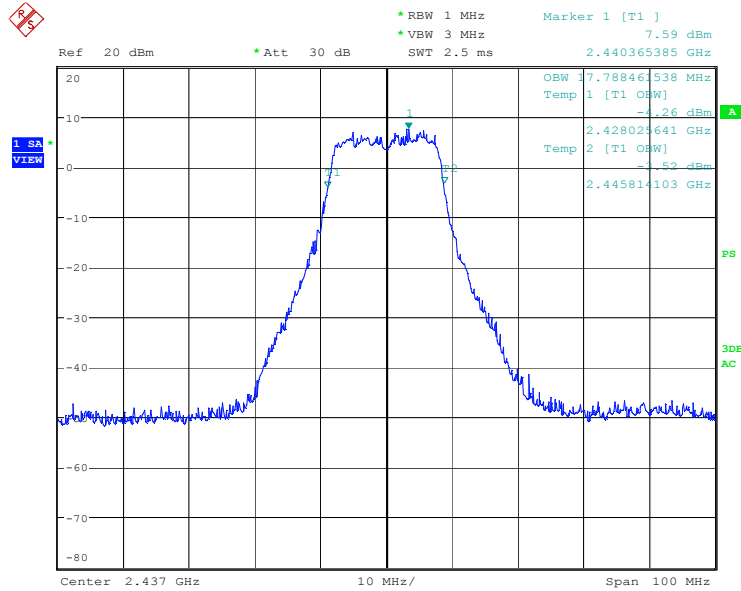
Operating Frequency [MHz]	99% Bandwidth [MHz]
2412	17.79
2437	17.79
2462	17.79

Figure 11: 99% Bandwidth, Mode A2x (2412MHz, Radio 802.11g, DC 7.4V Input Voltage)



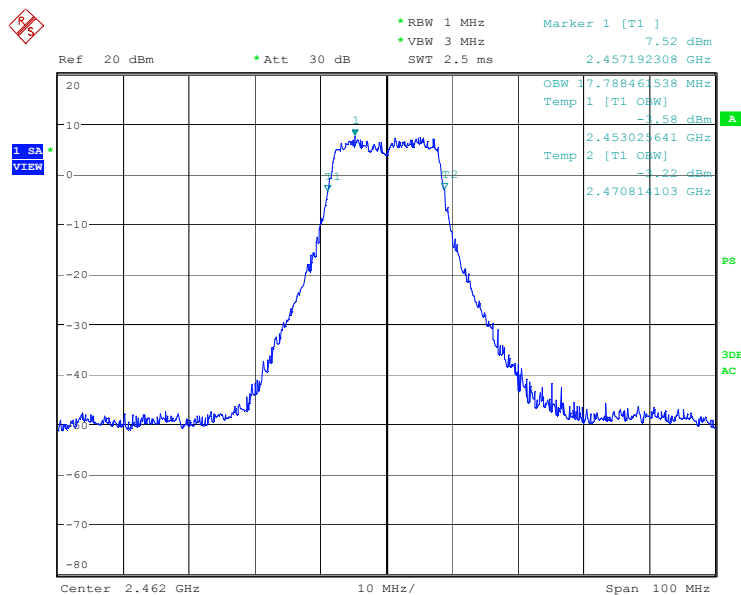
99% Bandwidth, Mode A2x
 Date: 29.JAN.2011 18:15:53

Figure 12: 99% Bandwidth, Mode B2x (2437MHz, Radio 802.11g, DC 7.4V Input Voltage)



99% Bandwidth, Mode B2x
Date: 29.JAN.2011 18:16:39

Figure 13: 99% Bandwidth, Mode C2x (2462MHz, Radio 802.11g, DC 7.4V Input Voltage)



99% Bandwidth, Mode C2x
Date: 29.JAN.2011 18:17:24

5.1.4 Conducted Spurious Emission

RESULT:

PASS

Date of testing: 2011-02-03

Ambient temperature: 23°C

Relative humidity: 28%

Atmospheric pressure: 1015hPa

Requirements:

FCC 15.247(d) and RSS-210 A8.5

In any 100kHz bandwidth outside the frequency band, the RF power shall be at least 20dB below that of the maximum in-band 100kHz emission.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9 and Measurement of Digital Transmission Systems Operating under Section 15.247.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30MHz to 25GHz (10th harmonics).

The final measurement takes into account the loss generated by all the involved cables.

Table 20: Conducted Spurious Emission, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)

Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2411.4	2.80	2.27	5.06	N/A	N/A
320.0	-57.16	1.23	-55.93	-14.94	41.00
2373.4	-53.18	2.24	-50.94	-14.94	36.00
2453.7	-52.45	2.26	-50.19	-14.94	35.26
2610.0	-53.22	2.33	-50.89	-14.94	35.95
5586.6	-55.02	3.26	-51.76	-14.94	36.83
6317.7	-54.55	3.35	-51.20	-14.94	36.26
9709.8	-55.49	4.08	-51.41	-14.94	36.47
11673.2	-54.49	4.45	-50.04	-14.94	35.10
12359.1	-54.75	4.47	-50.28	-14.94	35.34
14603.9	-54.11	5.24	-48.87	-14.94	33.94
17142.5	-53.52	5.28	-48.24	-14.94	33.30
18990.0	-54.90	5.51	-49.39	-14.94	34.45
21242.2	-54.16	5.82	-48.34	-14.94	33.40
23687.3	-53.80	6.06	-47.74	-14.94	32.81
24823.3	-53.95	6.21	-47.75	-14.94	32.81

Notes: Limit = Reading of fundamental + Correction factor – 20dB
 Emission level = Reading + Correction factor
 Correction factor = Total cable loss

Figure 14: Conducted Spurious Emission, 30MHz – 4GHz, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)

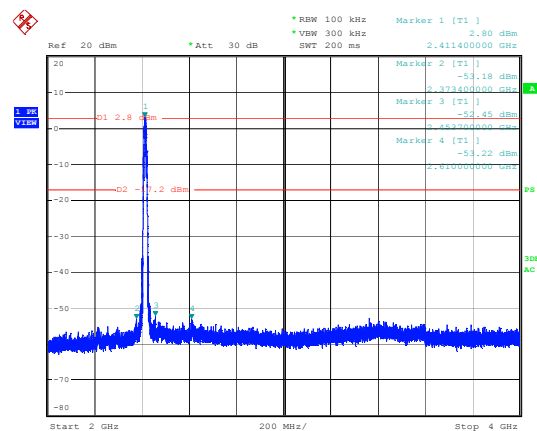
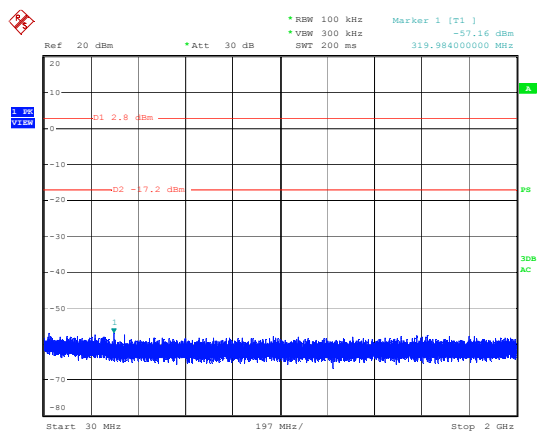
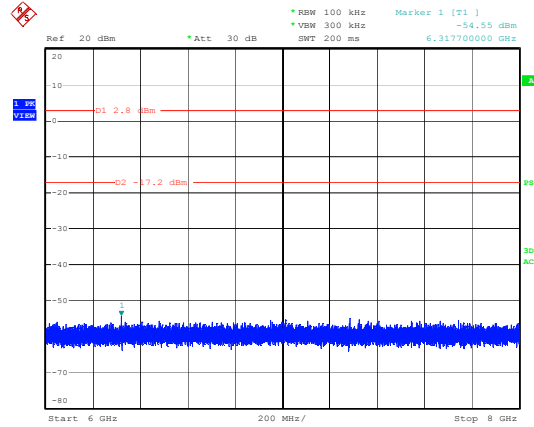
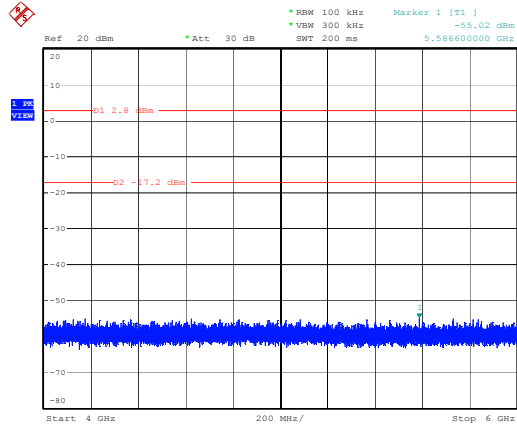
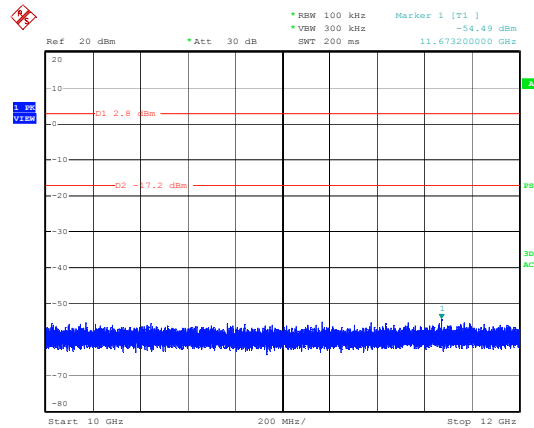
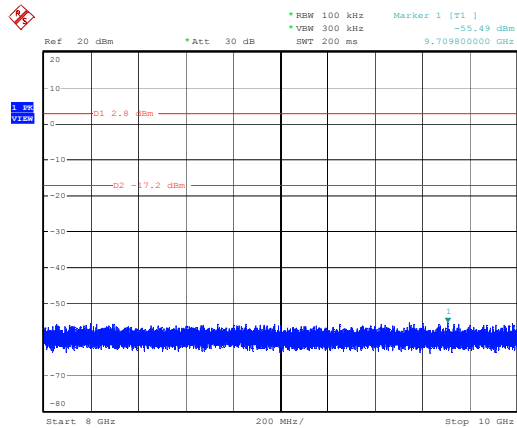


Figure 15: Conducted Spurious Emission, 4 – 16GHz, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)



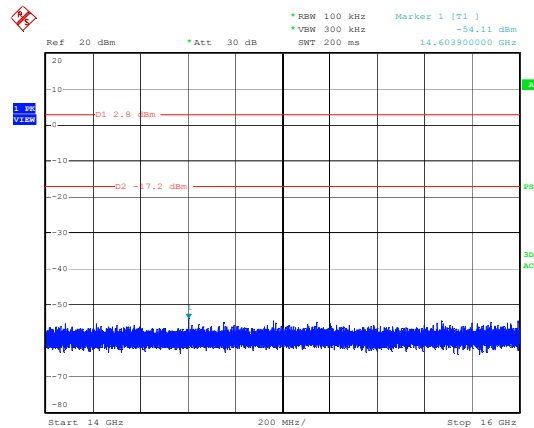
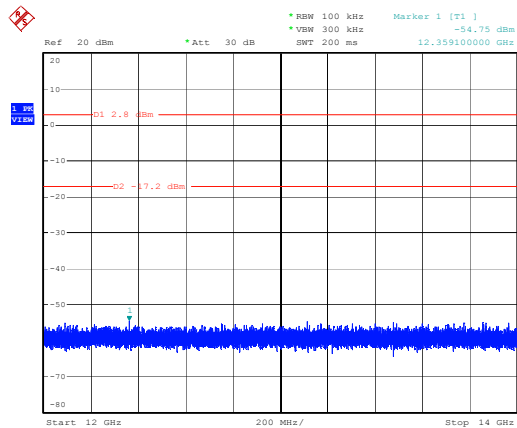
Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:41:23

Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:42:06



Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:42:30

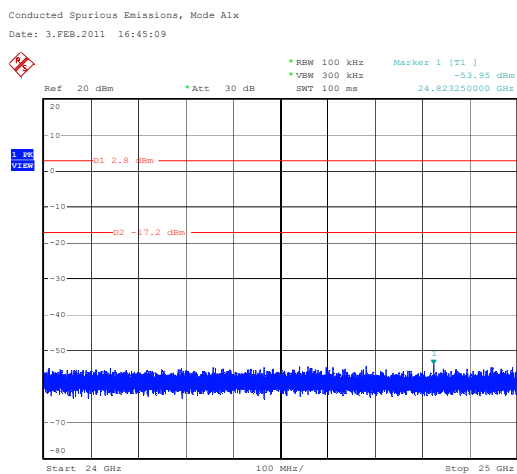
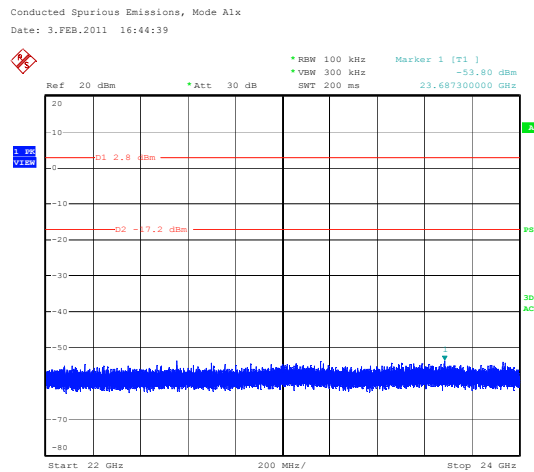
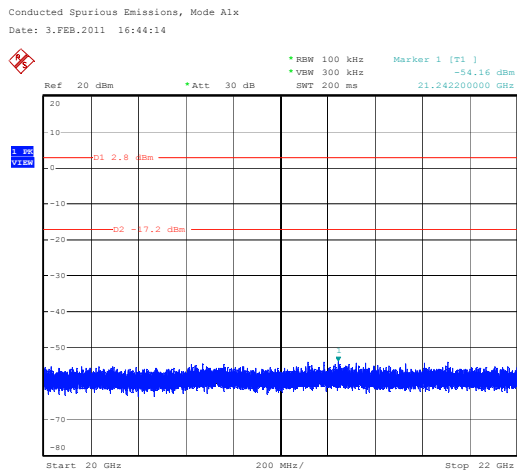
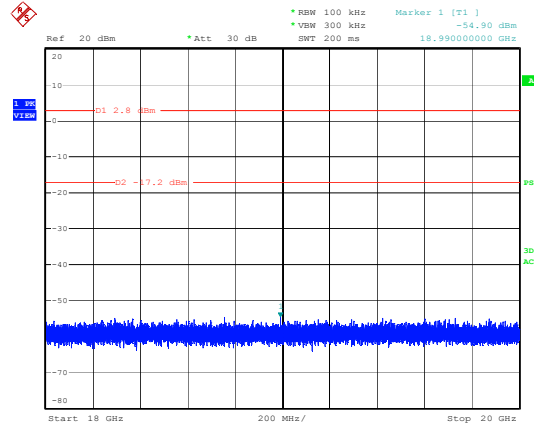
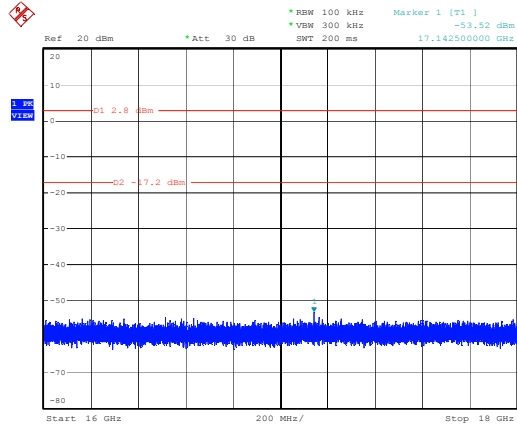
Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:42:54



Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:43:19

Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:43:48

Figure 16: Conducted Spurious Emission, 16 – 25GHz, Mode A1x (2412MHz, Radio 802.11b, DC 7.4V Input Voltage)



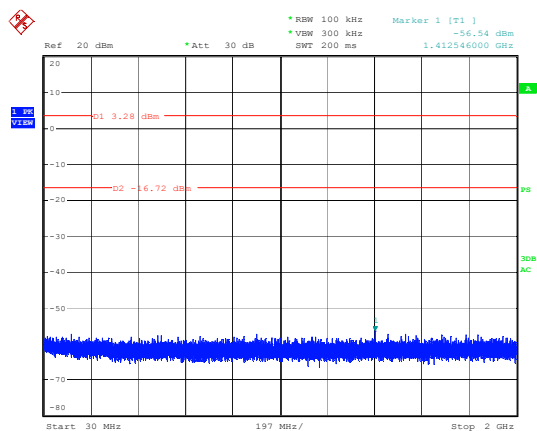
Conducted Spurious Emissions, Mode A1x
 Date: 3.FEB.2011 16:46:50

Table 21: Conducted Spurious Emission, Mode B1x (2437MHz, Radio 802.11b, DC 7.4V Input Voltage)

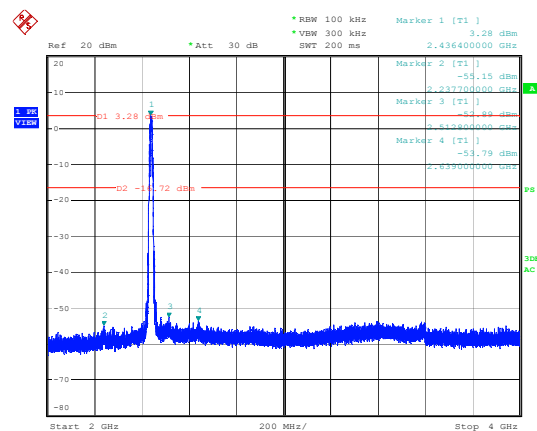
Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2436.4	3.28	2.32	5.59	N/A	N/A
1412.5	-56.54	1.87	-54.67	-14.41	40.26
2237.7	-55.15	2.22	-52.93	-14.41	38.53
2512.8	-52.89	2.31	-50.58	-14.41	36.18
2639.0	-53.79	2.34	-51.46	-14.41	37.05
4874.0	-53.37	3.08	-50.29	-14.41	35.88
6050.3	-55.05	3.33	-51.72	-14.41	37.32
9959.0	-55.02	4.13	-50.89	-14.41	36.48
10313.6	-55.25	4.17	-51.08	-14.41	36.67
13966.4	-54.82	4.77	-50.05	-14.41	35.65
14358.4	-54.84	4.84	-50.00	-14.41	35.59
16204.4	-54.53	5.22	-49.31	-14.41	34.90
18230.7	-54.98	5.48	-49.50	-14.41	35.09
21943.7	-54.67	5.97	-48.70	-14.41	34.29
23559.9	-52.92	6.13	-46.79	-14.41	32.38
24555.8	-54.18	6.23	-47.95	-14.41	33.54

Notes: Limit = Reading of fundamental + Correction factor – 20dB
 Emission level = Reading + Correction factor
 Correction factor = Total cable loss

Figure 17: Conducted Spurious Emission, 30MHz – 4GHz, Mode B1x (2437MHz, Radio 802.11b, DC 7.4V Input Voltage)

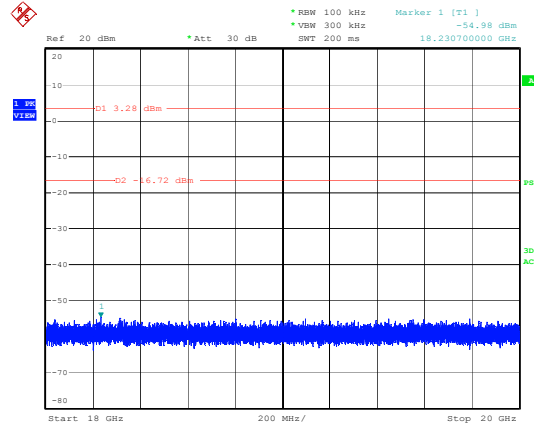
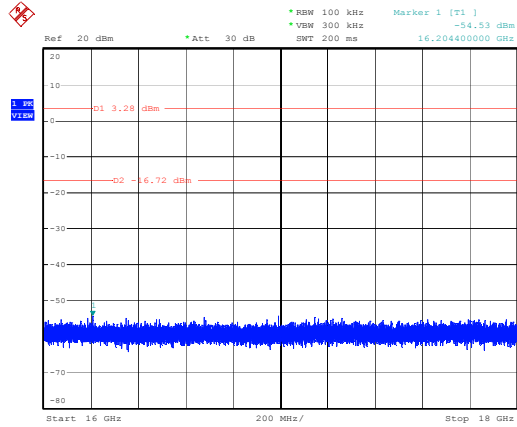


Conducted Spurious Emissions, Mode B1x
 Date: 3.FEB.2011 17:07:09



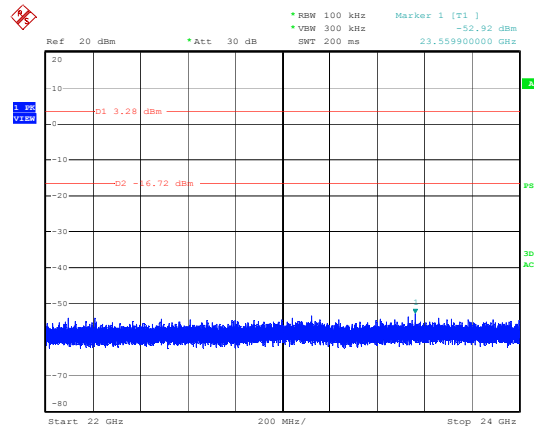
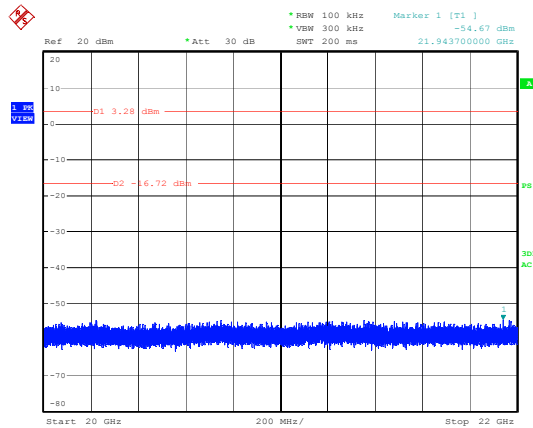
Conducted Spurious Emissions, Mode B1x
 Date: 3.FEB.2011 17:06:45

Figure 19: Conducted Spurious Emission, 16 – 25GHz, Mode B1x (2437MHz, Radio 802.11b, DC 7.4V Input Voltage)



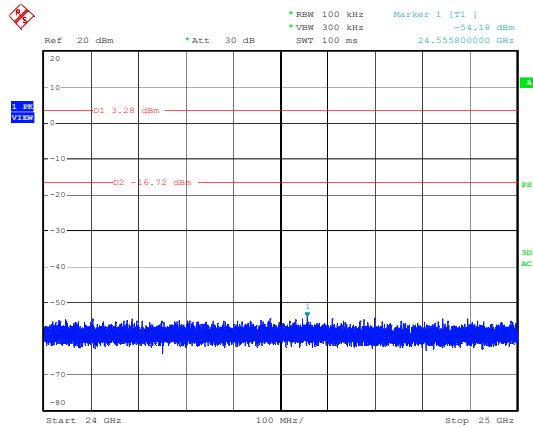
Conducted Spurious Emissions, Mode B1x
Date: 3.FEB.2011 17:10:14

Conducted Spurious Emissions, Mode B1x
Date: 3.FEB.2011 17:10:53



Conducted Spurious Emissions, Mode B1x
Date: 3.FEB.2011 17:11:19

Conducted Spurious Emissions, Mode B1x
Date: 3.FEB.2011 17:11:45



Conducted Spurious Emissions, Mode B1x
Date: 3.FEB.2011 17:12:09

Table 22: Conducted Spurious Emission, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)

Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
2461.5	3.66	2.31	5.98	N/A	N/A
1686.0	-57.42	2.01	-55.41	-14.02	41.39
2259.7	-54.38	2.18	-52.20	-14.02	38.18
2505.0	-52.68	2.31	-50.37	-14.02	36.34
2665.6	-53.97	2.31	-51.65	-14.02	37.63
4924.0	-50.99	3.04	-47.94	-14.02	33.92
6010.9	-55.32	3.30	-52.02	-14.02	38.00
8732.5	-54.39	3.56	-50.83	-14.02	36.80
11187.6	-54.95	4.46	-50.49	-14.02	36.47
13691.5	-54.41	4.89	-49.52	-14.02	35.49
14037.4	-54.79	4.93	-49.86	-14.02	35.84
17733.1	-54.72	5.37	-49.36	-14.02	35.33
18930.2	-54.46	5.55	-48.90	-14.02	34.88
21290.5	-54.08	5.79	-48.29	-14.02	34.27
22944.4	-53.85	6.09	-47.76	-14.02	33.74
24810.4	-54.00	6.14	-47.86	-14.02	33.83

Notes: Limit = Reading of fundamental + Correction factor – 20dB
 Emission level = Reading + Correction factor
 Correction factor = Total cable loss

Figure 20: Conducted Spurious Emission, 30MHz – 4GHz, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)

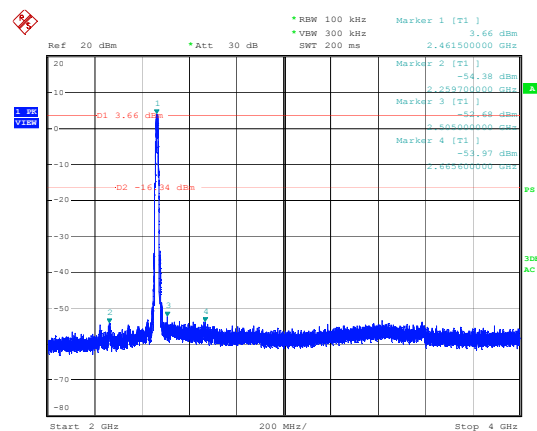
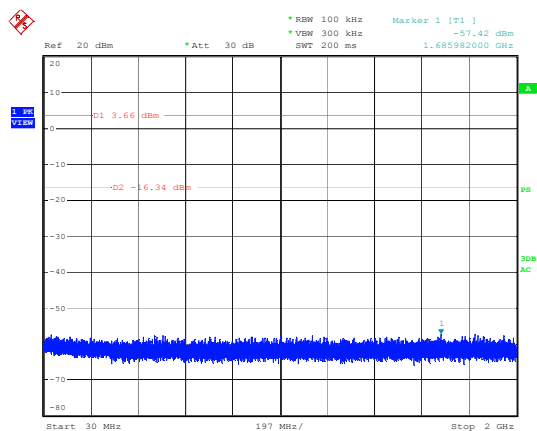
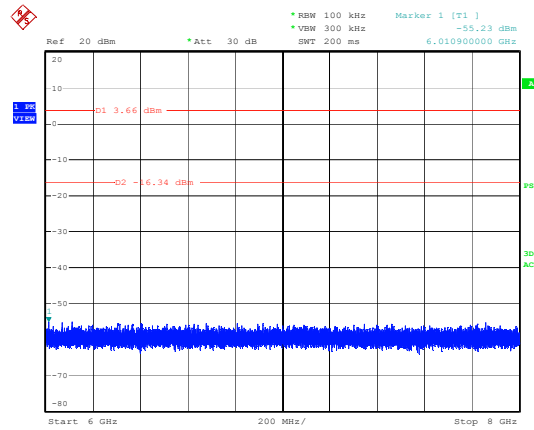
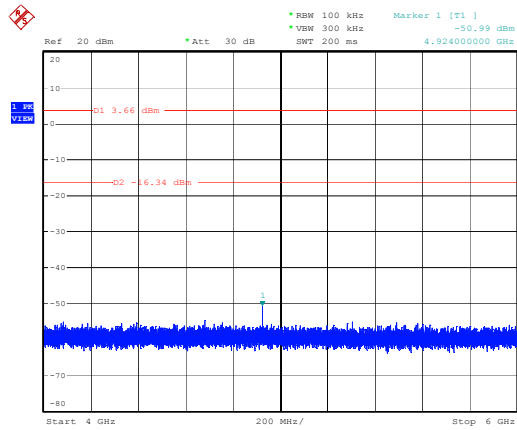
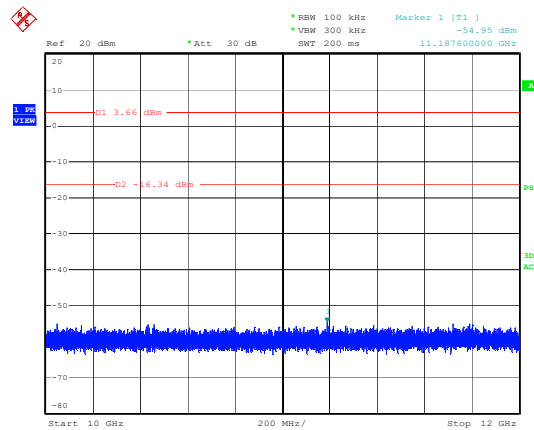
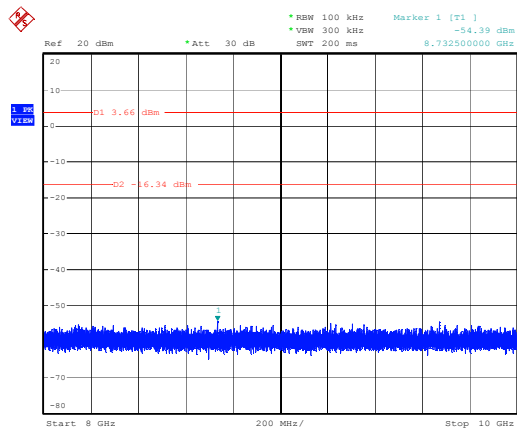


Figure 21: Conducted Spurious Emission, 4 – 16GHz, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)



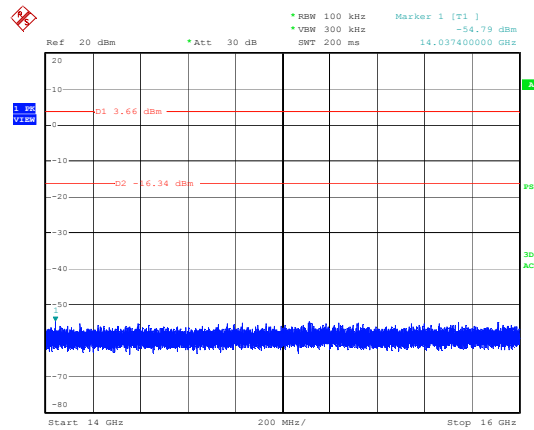
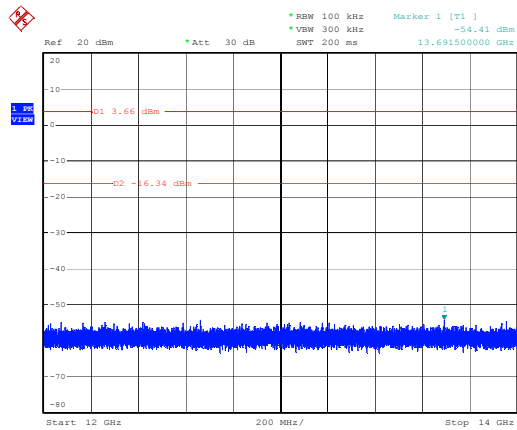
Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:16:15

Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:16:40



Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:17:05

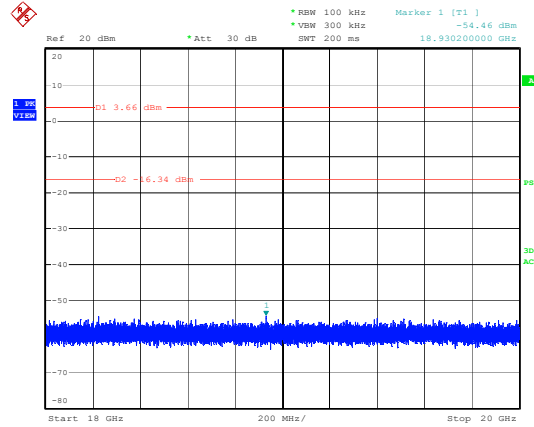
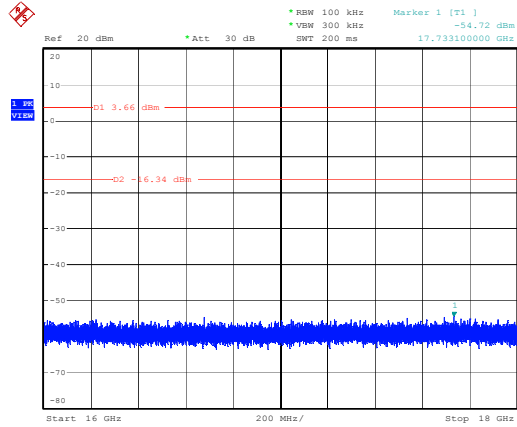
Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:17:29



Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:17:53

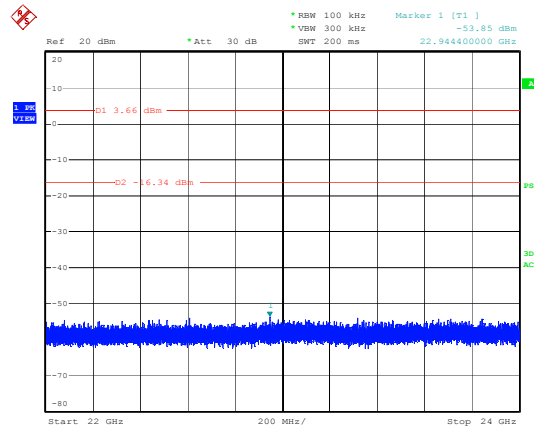
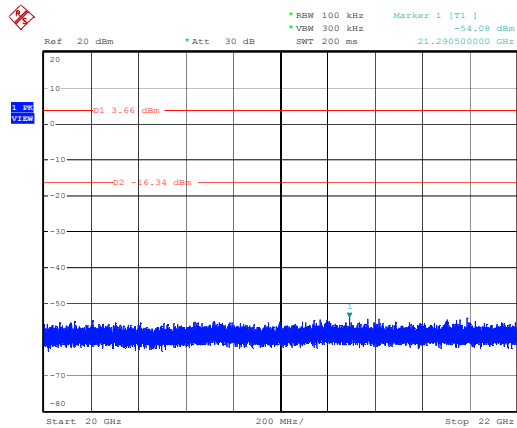
Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:18:17

Figure 22: Conducted Spurious Emission, 16 – 25GHz, Mode C1x (2462MHz, Radio 802.11b, DC 7.4V Input Voltage)



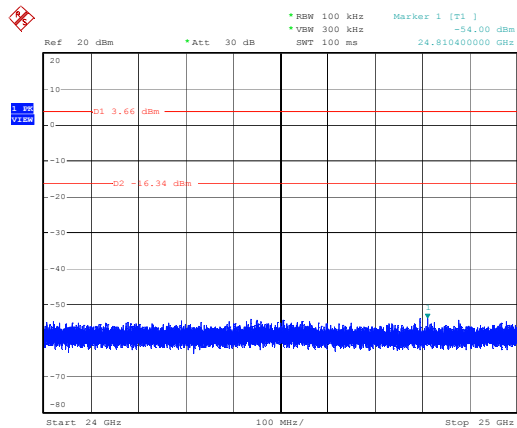
Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:18:40

Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:19:04



Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:19:27

Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:19:51



Conducted Spurious Emissions, Mode C1x
 Date: 3.FEB.2011 17:20:13