TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**12028061 001**	**Seite 1 von 126** *Page 1 of 126*
Auftraggeber: *Client:*	**Sumitomo Electric Networks Inc.** 1-1-3 Shimaya, Konohana-ku, Osaka 554-0024, Japan	
Gegenstand der Prüfung: *Test Item:*	**Service Gateway**	
Bezeichnung: *Identification:*	**MR5105**	**Serien-Nr.:** *Serial No.:* **ES3#11, ES3#12**
Wareneingangs-Nr.: *Receipt No.:*	**PT0214028911**	**Eingangsdatum:** *Date of Receipt:* **2012-09-13**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of Test Item at Delivery:*	**Good**	
Prüfort: *Testing Location:*	**TÜV Rheinland Japan Ltd. – Global Technology Assessment Center** 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan	
Prüfgrundlage: *Test Specification:*	**FCC 47 CFR Part 15, Subpart C, Section 15.247 (October 1, 2011)** ANSI C63.4-2003 KDB Publication No. 558074 D01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (v01)	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**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:*		
2012-10-15	T. Sauter / Inspector		2012-10-15	T. Cheung / Reviewer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*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*

TEST SUMMARY

5.1.1 SUPPLY VOLTAGE REQUIREMENTS
RESULT: PASS

5.1.2 ANTENNA REQUIREMENTS
RESULT: PASS

5.1.3 RESTRICTED BANDS OF OPERATION
RESULT: PASS

5.2.1 CONDUCTED OUTPUT POWER
RESULT: PASS

5.2.2 6DB BANDWIDTH
RESULT: PASS

5.2.3 CONDUCTED SPURIOUS EMISSIONS
RESULT: PASS

5.2.4 PEAK POWER SPECTRAL DENSITY
RESULT: PASS

5.3.1 RADIATED SPURIOUS EMISSIONS OF TRANSMITTER
RESULT: PASS

5.4.1 AC POWER LINE CONDUCTED EMISSION OF TRANSMITTER
RESULT: PASS

Contents

1. General Remarks

1.1 Complementary Materials

There is no attachment to 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 test facility is accredited by VLAC (member of ILAC) under number VLAC-017 according to ISO/IEC 17025:2005.

ilac-MRA VLAC Lab Accreditation VLAC-017

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 40	100029	RF-0021	2013-01
For AC Power Line Conducted Emission					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2013-02
LISN	Rohde & Schwarz	ENV216	100276	RF-0016	2013-06
LISN	Rohde & Schwarz	ENV216	101371	RF-0459	2012-12
For Radiated Emission					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2013-02
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2013-01
RF Selector (10m Chamber)	Toyo Corporation	NS4900	0703-182	RF-0029	2013-05
Loop Antenna with Amplifier, 9kHz-30MHz	Rohde & Schwarz	HFH2-Z2	100139	RF-0048	2013-02
Trilog Antenna No. 2, 30-1000MHz	Schwarzbeck	VULB9168	9168-475	RF-0462	2013-01
Biconical Antenna, 30-300MHz	EMCO	3110B	9603-2379	RF-0207	2013-08
10dB Attenuator	Hewlett Packard	8491A 10dB	58354	RF-0314	2013-05
Low Noise Pre-Amplifier, 9kHz-1GHz	TSJ	MLA-10K01-B01-35	1370750	RF-0253	2012-11
Horn Antenna, 1-8GHz	Schwarzbeck	BBHA9120B	419	RF-0050	2013-05
Microwave Pre-Amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	2012-11
Band Reject Filter, 1-8GHz	Nitsuki	NF-49BT	027	RF-0131	2012-11
Horn Antenna with Pre-Amplifier, 8-18GHz	Toyo Corporation	HAP06-18W	00000025	RF-0065	2013-05
High Pass Filter, 8-18GHz	Micro-Tronics	HPM50107	006	RF-0334	2013-05
Horn Antenna with Pre-Amplifier, 18-26.5GHz	Toyo Corporation	HAP18-26N	00000010	RF-0070	2013-05
Constant Voltage Constant Frequency Stabilizers and Power Accessories					
CVCF (Shielded Room)	NF Corporation	ESU2000S	9075612	RF-0210	N/A
CVCF Booster (Shielded Room)	NF Corporation	ESU2000B	9074403	RF-0211	N/A
CVCF (10m Chamber)	NF Corporation	ESU2000S	9067307	RF-0212	N/A
CVCF Booster (10m Chamber)	NF Corporation	ESU2000B	9074408	RF-0213	N/A
True RMS Multimeter	Fluke	87V	97680445	RF-0281	2013-01

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
AC Power Line Conducted Emission	150kHz - 30MHz	±3.0dB
Antenna Port Conducted Emission	20Hz - 40GHz	±1.5dB
Radiated Emission	150kHz - 30MHz	±4.7dB
	30MHz - 1GHz	±4.7dB
	> 1GHz	±4.7dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a service gateway which provides wired and wireless interfaces to allow communication between several external units.

3.2 System Details

Rated voltage and freq.:	AC 100 - 240V, 50/60Hz for AC Adapter DC 12V for Main Unit
Rated power:	0.65-0.35A for AC Adapter 24W for Main Unit
Protection class:	II for AC Adapter III for Main Unit
Test voltage and freq.:	AC 120V, 60Hz
AC Adapter manufacturer:	Nagano JRC
AC Adapter model:	SQN30W12P-xx; model used for testing: SQN30W12P-09 (models of SQN30W12P-xx series are identical, except for labeling)

Table 3: Radio Characteristics

Radio Standard:	IEEE 802.11b IEEE 802.11g IEEE 802.11n (20MHz) IEEE 802.11n (40MHz)
Frequency Range:	IEEE 802.11b: 2412-2462MHz IEEE 802.11g: 2412-2462MHz IEEE 802.11n (20MHz): 2412-2462MHz IEEE 802.11n (40MHz): 2422-2452MHz
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n (20MHz): 11 IEEE 802.11n (40MHz): 7
Output Power (average, declared):	IEEE 802.11b: 18dBm IEEE 802.11g: max. 18dBm IEEE 802.11n (20MHz): max. 18dBm IEEE 802.11n (40MHz): 14dBm (See section 4.4 Test Software for details)

Output Power (conducted, measured):	IEEE 802.11b: max. 23.7dBm IEEE 802.11g: max. 26.0dBm IEEE 802.11n (20MHz): max. 26.3dBm IEEE 802.11n (40MHz): max. 22.5dBm
Modulation Type:	IEEE 802.11b (DSSS): BPSK, QPSK, CCK IEEE 802.11g (OFDM): BPSK, QPSK, 16 QAM, 64QAM IEEE 802.11n (OFDM): BPSK, QPSK, 16 QAM, 64QAM
Modulation / Spreading:	DSSS and OFDM (coupled with modulation type above)
Transmit Speed:	IEEE 802.11b: 11 / 5.5 / 2 / 1Mbps IEEE 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps IEEE 802.11n (20MHz): 72.2 / 65.0 / 57.8 / 43.3 / 28.9 / 21.7 / 14.4 / 7.2Mbps IEEE 802.11n (40MHz): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps
Antenna Gain:	5.88dBi
Antenna Type:	Dielectric chip antenna
FCC Classification:	DTS
Emission designator:	G1D

3.3 Clock Frequencies

The highest frequency generated or used by the EUT is 800MHz for the digital interface.

3.4 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 KDB Publication No. 558074 D01.

The test methods, which have been used, are based on ANSI C63.4-2003.

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 a low channel, a continuous modulated signal streaming with 100% duty cycle.

   a. IEEE 802.11b: channel 1 (2412MHz)
   b. IEEE 802.11g: channel 1 (2412MHz) or 2 (2417MHz)
   c. IEEE 802.11n (20MHz): channel 1 (2412MHz) or 2 (2417MHz)
   d. IEEE 802.11n (40MHz): channel 1 (2422MHz)

B. EUT transmits (TX mode), with full power, at middle channel, a continuous modulated signal streaming with 100% duty cycle.

   a. IEEE 802.11b: channel 6 (2437MHz)
   b. IEEE 802.11g: channel 6 (2437MHz)
   c. IEEE 802.11n (20MHz): channel 6 (2437MHz)
   d. IEEE 802.11n (40MHz): channel 4 (2437MHz)

C. EUT transmits (TX mode), with full power, at a highest channel, a continuous modulated signal streaming with 100% duty cycle.

   a. IEEE 802.11b: channel 11 (2462MHz)
   b. IEEE 802.11g: channel 10 (2457MHz) or 11 (2462MHz)
   c. IEEE 802.11n (20MHz): channel 10 (2457MHz) or 11 (2462MHz)
   d. IEEE 802.11n (40MHz): channel 7 (2452MHz)

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

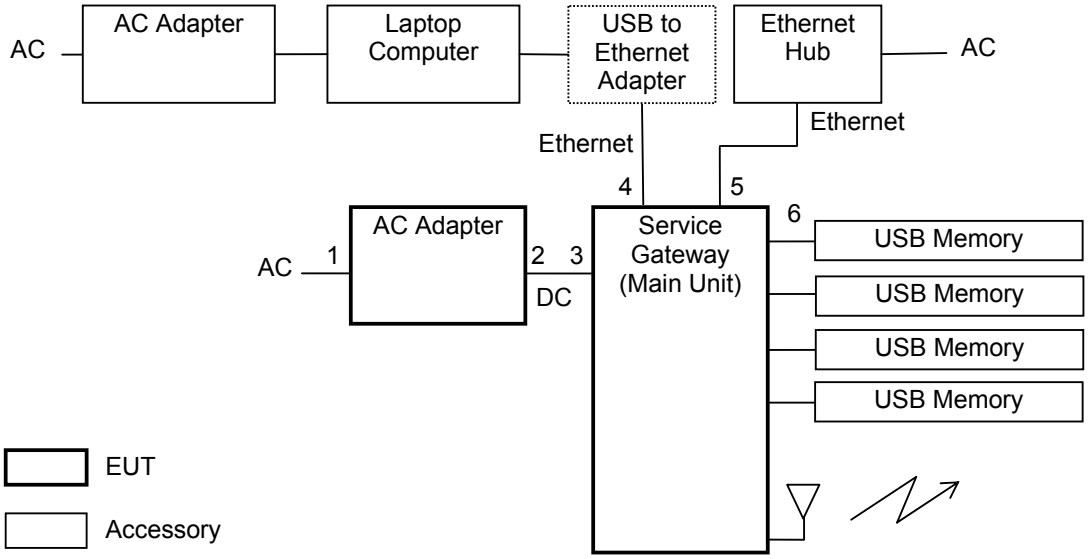


Table 4: Interfaces present on the EUT

No.	Interface	Cable Length for Testing, Shielding	Interface Classification
1.	AC Input of AC Adapter	1.5m, Un-shielded	AC Input Power Port
2.	DC Output of AC Adapter	1.8m, Un-shielded	DC Output Power Port
3.	DC Input of Main Unit	1.8m, Un-shielded	DC Input Power Port
4.	LAN (Ethernet)	2m, Un-shielded	Telecom Line
5.	WAN (Ethernet)	1m, Un-shielded	Telecom Line
6.	USB (4x)	1m, Shielded	Signal Line

Notes:

Two test samples were available. Sample No. ES3#11 (with AC Adapter No. 0001210BG) was used for antenna conducted measurements and sample No. ES3#12 (with AC Adapter No. 0001200BG) was used for AC power line conducted measurement and for radiated measurements.

For radiated emission measurements (except band edge) and for AC power line conducted emission measurements, the Ethernet cable No. 4 was connected directly to the Laptop Computer (USB to Ethernet adapter was not used).

The USB memories and the Ethernet hub were not used for conducted measurements at antenna port.

For radiated measurements, two EUT orientations were used: X-axis and Y-axis. Z-axis orientation was not used, because it is not suitable for testing and not relevant in actual use of the product (USB or Ethernet and power ports would be pointing downward and such an orientation would thus not be appropriate for the connection of cables and accessories on a table).

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

4.4 Test Software

Software used for testing: Windows Terminal (to send operation commands to EUT)

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.

The following software output power (average) settings were used for testing:

IEEE 802.11b: channel 1 to 11: 18dBm
IEEE 802.11g: channel 1: 15dBm, channel 2 to 10: 18dBm, channel 11: 15dBm
IEEE 802.11n (20MHz): channel 1: 14dBm, channel 2 to 10: 18dBm, channel 11: 14dBm
IEEE 802.11n (40MHz): channel 1 to 7: 14dBm

4.5 Special Accessories and Auxiliary Equipment

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

1. Product: Laptop computer
   Manufacturer: IBM
   Model: X41 (2525-5AE)
   Rated Voltage: DC 16V
   Input Current: 3.5 A
   Protection Class: III
   Serial Number: LV-H2424 06/02

2. Product: AC Adapter for Laptop Computer
   Manufacturer: IBM
   Model: 02K6810
   Rated Voltage: AC 100-240V
   Input Current: 1.5A
   Frequency: 50/60Hz
   Protection Class: II
   Serial Number: 11S02K6810Z1Z3BJ59G08B

3. Product: Laptop computer
   Manufacturer: Epson
   Model: Endeavor Na01 mini
   Rated Voltage: DC 12V
   Input Current: 3A
   Protection Class: III
   Serial Number: 717013706

4. Product: AC Adapter for Laptop Computer
   Manufacturer: Epson
   Model: ADP-36EH C
   Rated Voltage: AC 100-240V
   Input Current: 1.0A
   Frequency: 50/60Hz
   Protection Class: II
   Serial Number: 318W93900B6

5. Product: USB to Ethernet Adapter
   Manufacturer: I-O Data
   Model: ETG-US2
   Rated Voltage: DC 5V
   Protection Class: III
   Serial Number: V2H0004662HB

6. Product: Ethernet Hub
   Manufacturer: Buffalo
   Model: Giga Switching Hub, LSW3-GT-5NS(D1)
   Rated Voltage: AC 100V
   Input Power: 5W
   Frequency: 50/60Hz
   Protection Class: II
   Serial Number: 16485784211186

7. Product: Mouse
   Manufacturer: Elecom
   Model: Laser Mouse
   Rated Voltage: DC 5V
   Protection Class: III
   Serial Number: 5091402399A

8. Product: USB Memory 1
   Manufacturer: Sony
   Model: USM4GB 11812AGGFN
   Rated Voltage: DC 5V
   Protection Class: III

9. Product: USB Memory 2
   Manufacturer: Sony
   Model: USM4GB 11812AGGFN
   Rated Voltage: DC 5V
   Protection Class: III

10. Product: USB Memory 3
    Manufacturer: Sony
    Model: USM8GB 11620AGGFN
    Rated Voltage: DC 5V
    Protection Class: III

11. Product: USB Memory 4
    Manufacturer: Sony
    Model: USM4GB 11812AGGFN
    Rated Voltage: DC 5V
    Protection Class: III

These accessories were used for the following tests:

Accessory	Test
1, 2	Radiated spurious emissions (except band edge) and AC power line conducted emissions
3 to 5	Radiated band edge and conducted measurements at antenna port
6 to 11	Radiated spurious emissions (including band edge) and AC power line conducted emissions

4.6 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

5. Test Results RADIO

5.1 Technical Requirements

5.1.1 Supply Voltage Requirements

RESULT: **PASS**

Requirements:

FCC 15.31(e)

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Verdict:

The EUT has an internal voltage regulator to supply the RF circuit. Hence it complies with the supply voltage requirements.

5.1.2 Antenna Requirements

RESULT: **PASS**

Requirements:

FCC 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Verdict:

The EUT has an internal antenna which is not user accessible. Hence it complies with the antenna requirements.

5.1.3 Restricted Bands of Operation

RESULT: **PASS**

Requirements:

FCC 15.205

Only spurious emissions are permitted in any of the restricted frequency bands, unless otherwise specified.

Verdict:

The EUT operation frequency range is 2412-2462MHz. Therefore only spurious emissions may be found in the restricted bands of operation and the EUT complies with the restricted frequency band requirement.

5.2 Conducted Measurements at Antenna Port

5.2.1 Conducted Output Power

RESULT: **PASS**

Date of testing: 2012-09-13 till 2012-09-27

Ambient temperature: 21 to 25°C
Relative humidity: 43 to 59%
Atmospheric pressure: 1007 to 1018hPa

Requirements:

FCC 15.247(b)(3)

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

If transmitting antennas of directional gain greater than 6dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Test procedure:

ANSI C63.4-2003 and KDB Publication No. 558074 D01.

The maximum peak output power was measured at the antenna port with a spectrum analyzer using a peak detector. The resolution bandwidth was set to 1MHz and the video bandwidth to 3MHz. The measured power levels were integrated over the 6dB bandwidth of the carrier.

A precheck measurement was performed at all the available modulations (data rates) in order to identify the one producing the highest output power for each embedded radio.

The following data rates were found to produce the highest output power:

IEEE 802.11b: 11Mbps
IEEE 802.11g: 54Mbps
IEEE 802.11n (20MHz): 72.2Mbps
IEEE 802.11n (40MHz): 120Mbps

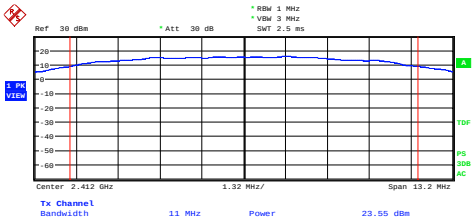
All the measurements for the evaluation of the radio properties of the EUT described in this test report have been performed using these data rates.

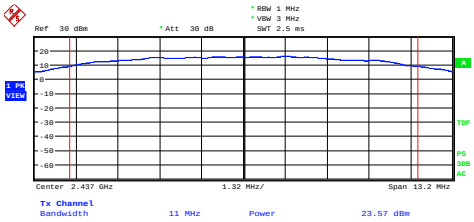
The readings of the measurements take into account the loss generated by all the involved cables.

Table 5: Conducted Output Power, IEEE 802.11b

Frequency [MHz]	Data Rate [Mbps]	Output Power [dBm]	Limit [dBm]	Margin [dB]
2412	11	23.6	30.0	6.5
2437	11	23.6	30.0	6.4
2462	11	23.7	30.0	6.3

Figure 2: Conducted Output Power, IEEE 802.11b





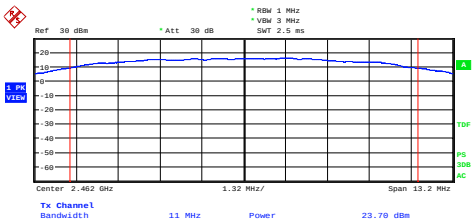
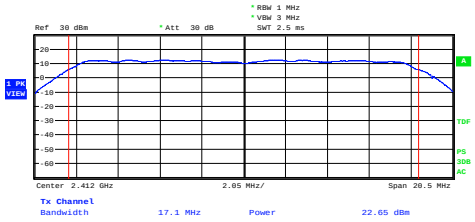
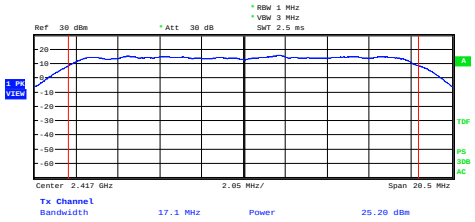


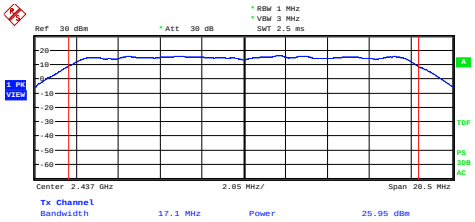
Table 6: Conducted Output Power, IEEE 802.11g

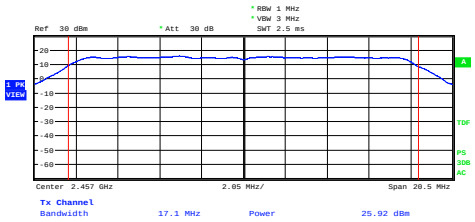
Frequency [MHz]	Data Rate [Mbps]	Output Power [dBm]	Limit [dBm]	Margin [dB]
2412	54	22.7	30.0	7.4
2417	54	25.2	30.0	4.8
2437	54	26.0	30.0	4.0
2457	54	25.9	30.0	4.1
2462	54	23.4	30.0	6.6

Figure 3: Conducted Output Power, IEEE 802.11g









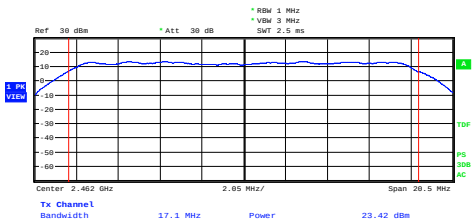
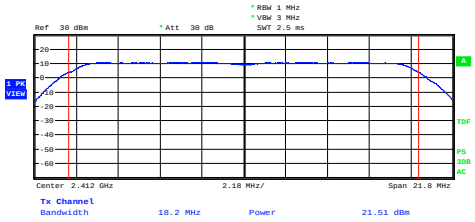
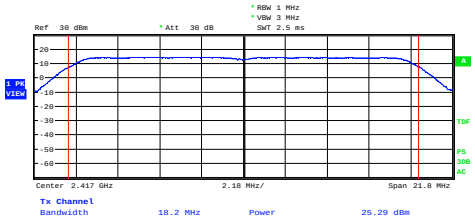


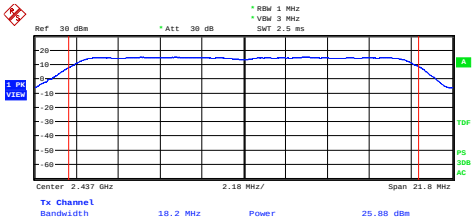
Table 7: Conducted Output Power, IEEE 802.11n (20MHz)

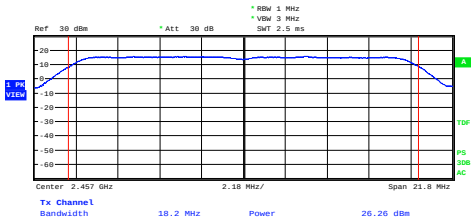
Frequency [MHz]	Data Rate [Mbps]	Output Power [dBm]	Limit [dBm]	Margin [dB]
2412	72.2	21.5	30.0	8.5
2417	72.2	25.3	30.0	4.7
2437	72.2	25.9	30.0	4.1
2457	72.2	26.3	30.0	3.7
2462	72.2	22.8	30.0	7.2

Figure 4: Conducted Output Power, IEEE 802.11n (20MHz)









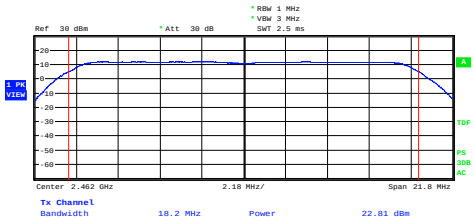
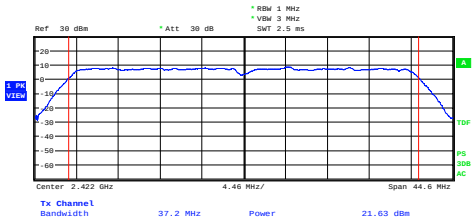
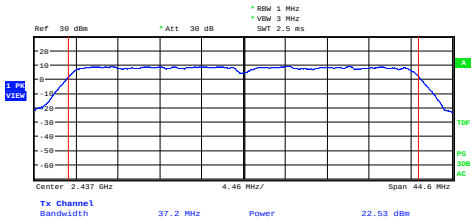


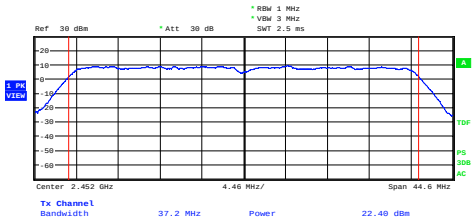
Table 8: Conducted Output Power, IEEE 802.11n (40MHz)

Frequency [MHz]	Data Rate [Mbps]	Output Power [dBm]	Limit [dBm]	Margin [dB]
2422	120	21.6	30.0	8.4
2437	120	22.5	30.0	7.5
2452	120	22.4	30.0	7.6

Figure 5: Conducted Output Power, IEEE 802.11n (40MHz)







5.2.2 6dB Bandwidth

RESULT: **PASS**

Date of testing: 2012-09-13 till 2012-09-27

Ambient temperature: 21 to 25°C
Relative humidity: 43 to 59%
Atmospheric pressure: 1007 to 1018hPa

Requirements:

FCC 15.247(a)(2)

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

Test procedure:

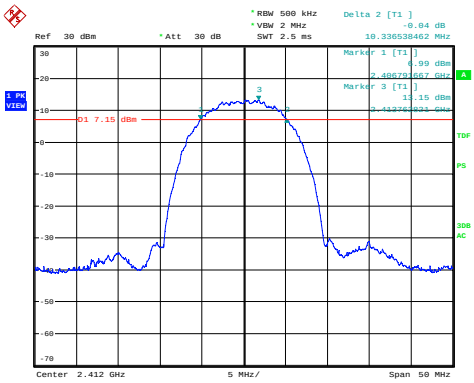
ANSI C63.4-2003 and KDB Publication No. 558074 D01.

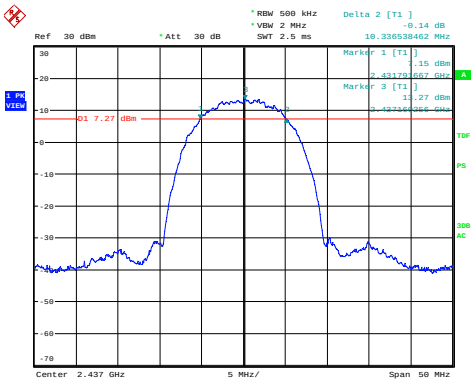
The 6dB bandwidth was measured at the antenna port with a spectrum analyzer using a peak detector. The resolution bandwidth was set to 500kHz (IEEE 802.11b, g and n 20MHz) or 1MHz (IEEE 802.11n 40MHz) and the video bandwidth to 2MHz (IEEE 802.11b, g and n 20MHz) or 3MHz (IEEE 802.11n 40MHz). Markers placed at the lowest and highest intersections of the trace with a 6dBc line were used to calculate the emission bandwidth.

Table 9: 6dB Bandwidth, IEEE 802.11b

Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
2412	10.34	0.50
2437	10.34	0.50
2462	10.34	0.50

Figure 6: 6dB Bandwidth, IEEE 802.11b





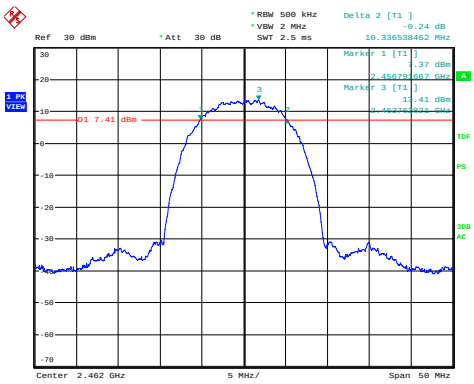


Table 10: 6dB Bandwidth, IEEE 802.11g

Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
2412	17.07	0.50
2417	16.83	0.50
2437	16.83	0.50
2457	16.99	0.50
2462	17.07	0.50

Figure 7: 6dB Bandwidth, IEEE 802.11g

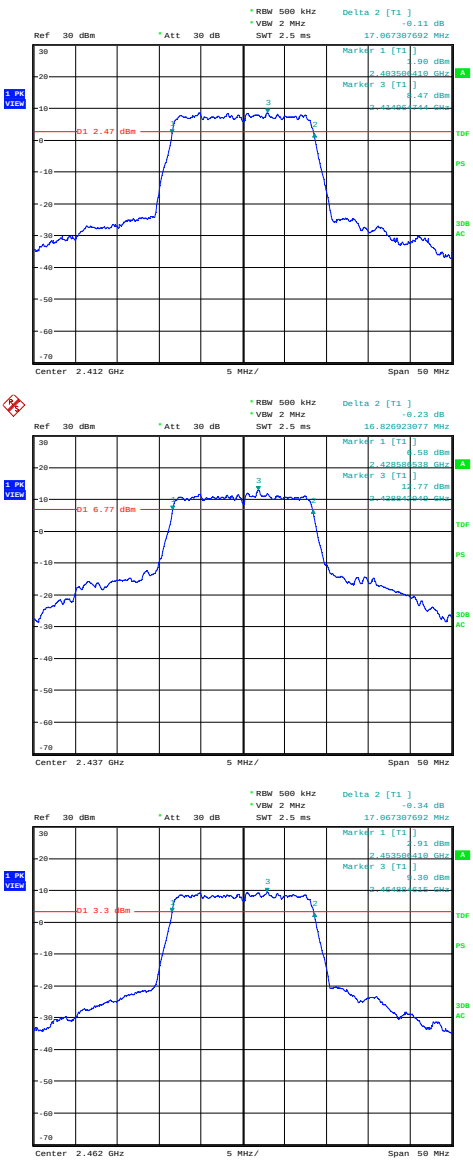


Table 11: 6dB Bandwidth, IEEE 802.11n (20MHz)

Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
2412	18.03	0.50
2427	18.11	0.50
2437	18.11	0.50
2457	18.11	0.50
2462	18.11	0.50

Figure 8: 6dB Bandwidth, IEEE 802.11n (20MHz)

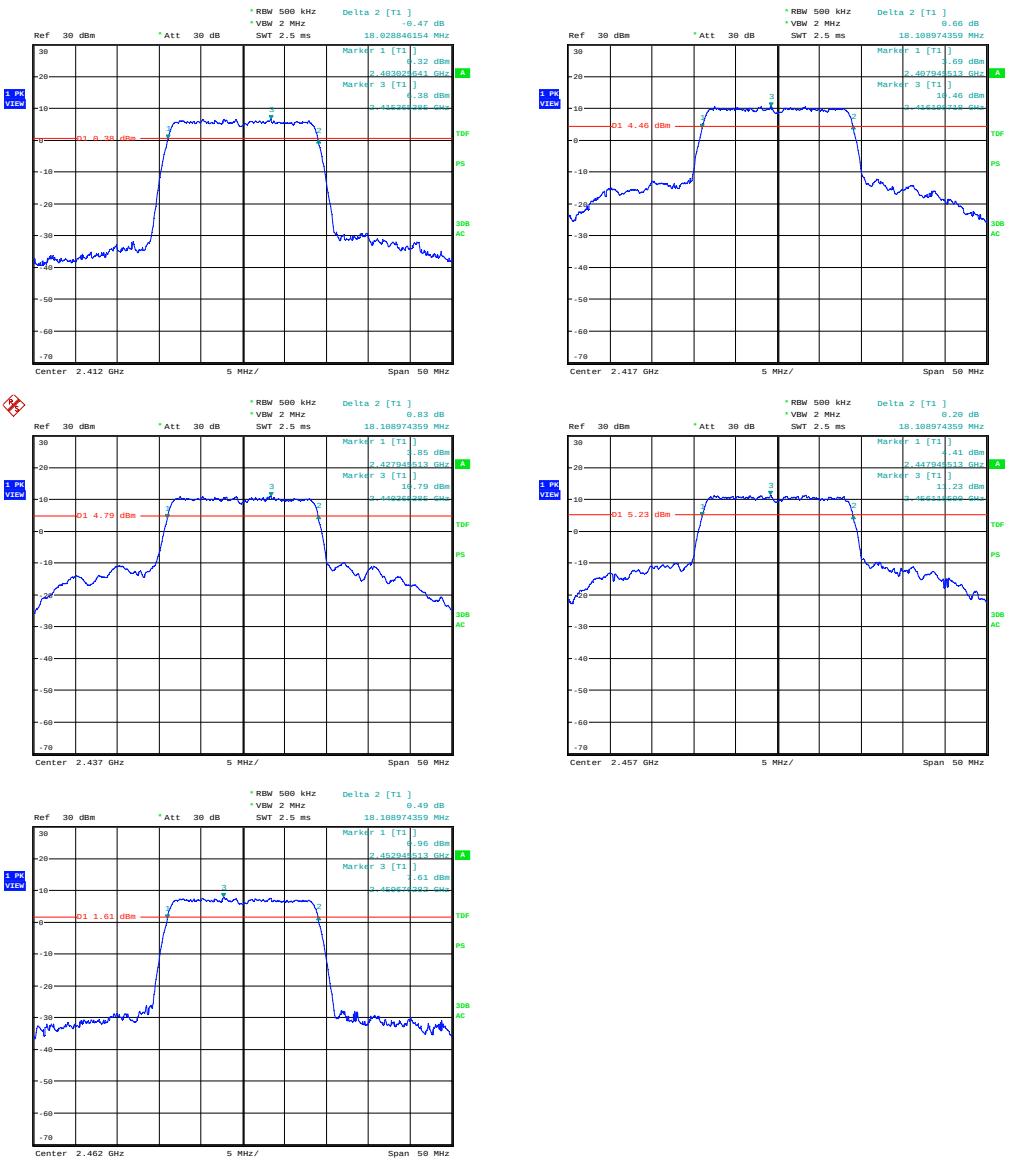
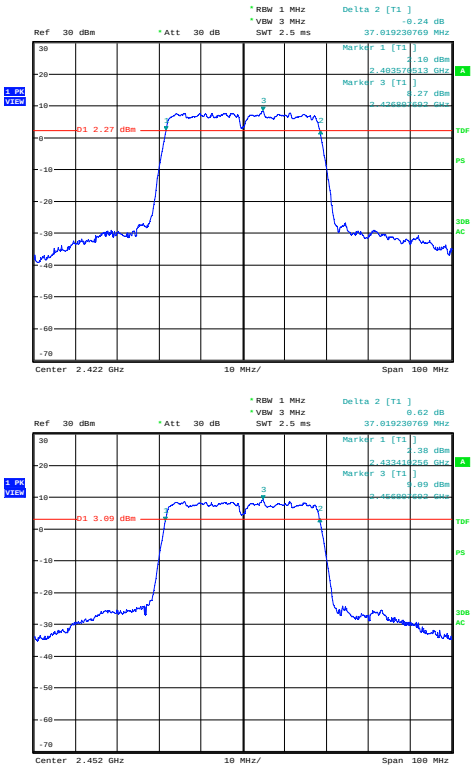
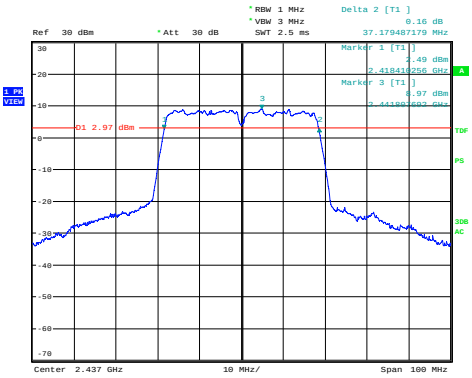


Table 12: 6dB Bandwidth, IEEE 802.11n (40MHz)

Operating Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
2422	37.02	0.50
2437	37.18	0.50
2452	37.02	0.50

Figure 9: 6dB Bandwidth, IEEE 802.11n (40MHz)





5.2.3 Conducted Spurious Emissions

RESULT: **PASS**

Date of testing: 2012-09-26, 2012-09-27

Ambient temperature: 22, 25°C
Relative humidity: 46, 43%
Atmospheric pressure: 1018, 1016hPa

Requirements:

FCC 15.247(d)

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

Test procedure:

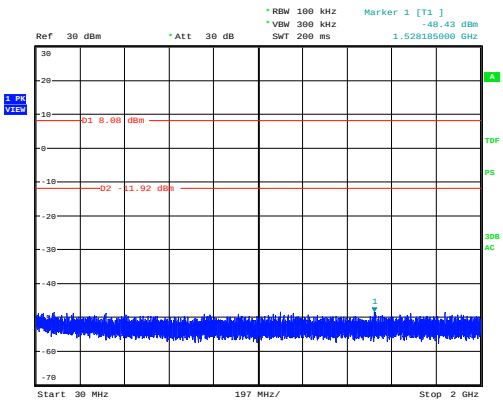
ANSI C63.4-2003 and KDB Publication No. 558074 D01.

The conducted spurious emissions were measured at the antenna port with a spectrum analyzer using a peak detector. The resolution bandwidth was set to 100kHz and the video bandwidth to 300kHz. Measurements were performed from 30MHz to 25GHz (10^{th} harmonics).

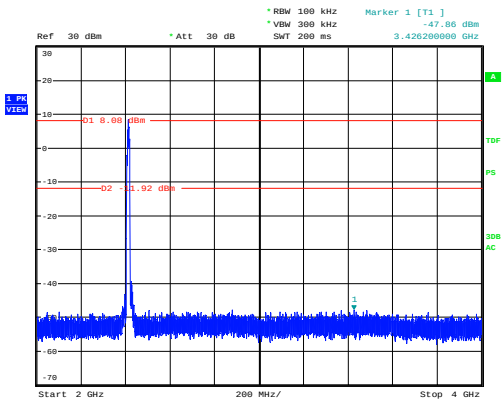
The maximum in-band 100kHz emission was determined with the Peak Power Spectral Density test.

The readings of the measurements take into account the loss generated by all the involved cables.

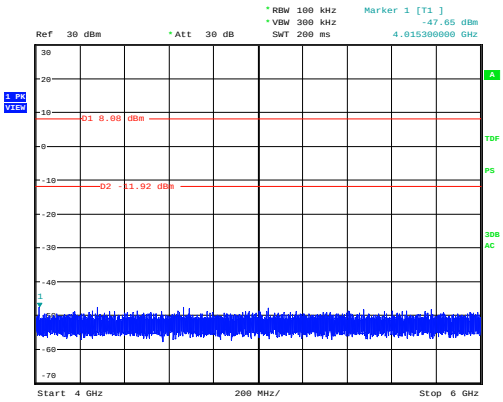
Figure 10: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11b, Channel 1 (2412MHz)



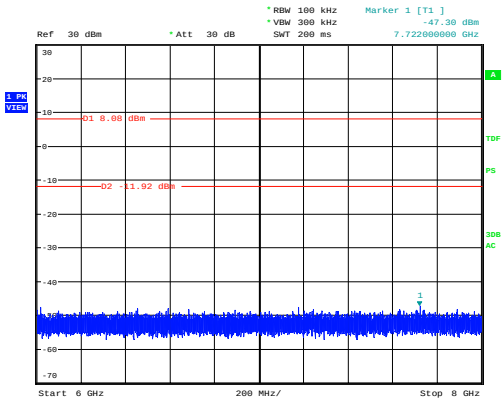
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:30:50



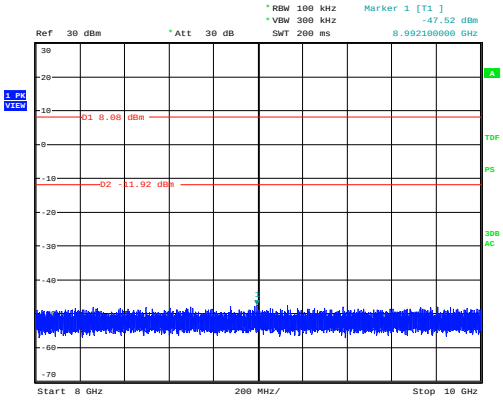
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:31:23



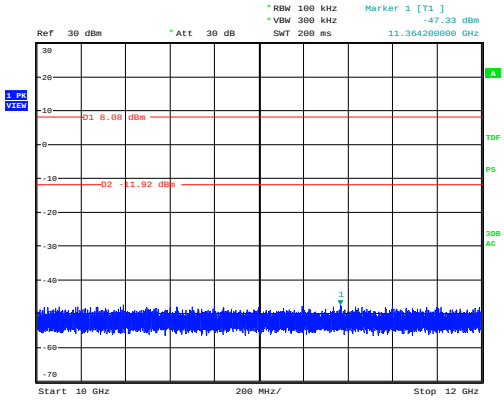
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:31:40



Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:31:56

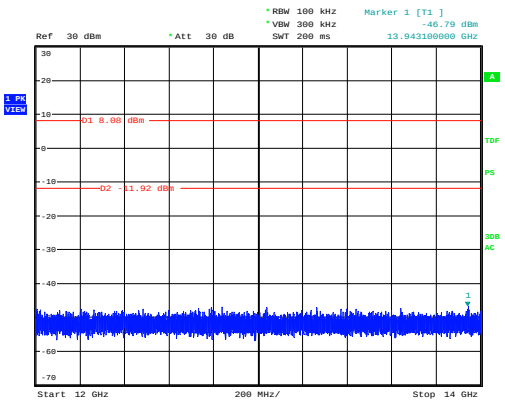


Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:32:12

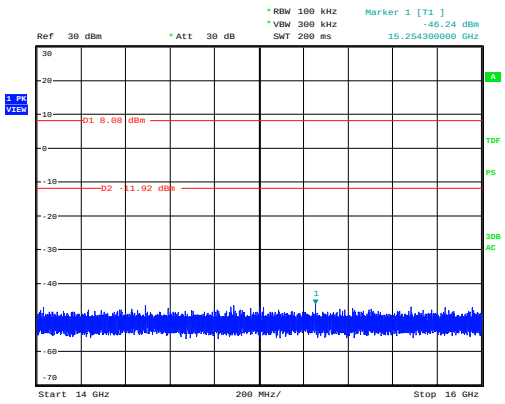


Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:32:28

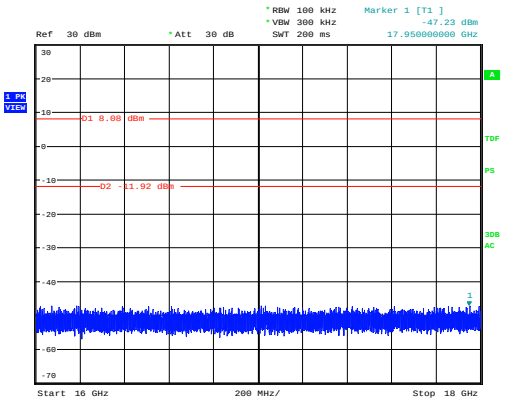
Figure 11: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11b, Channel 1 (2412MHz)



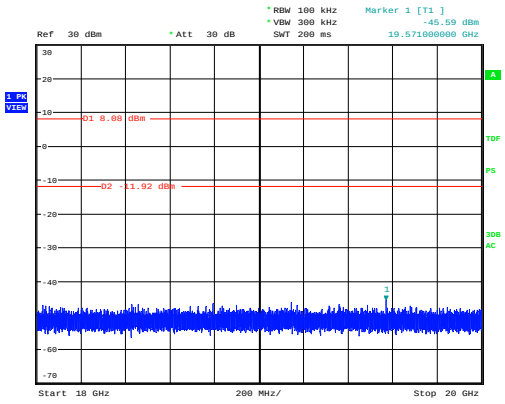
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:32:45



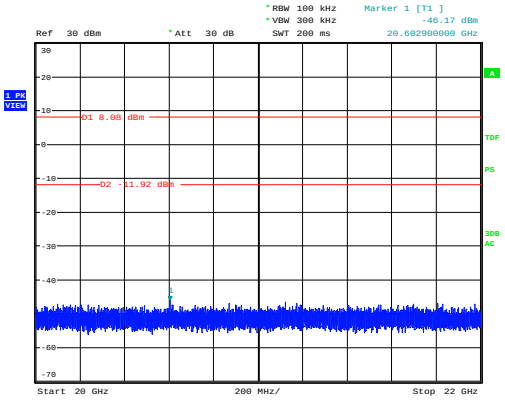
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:33:01



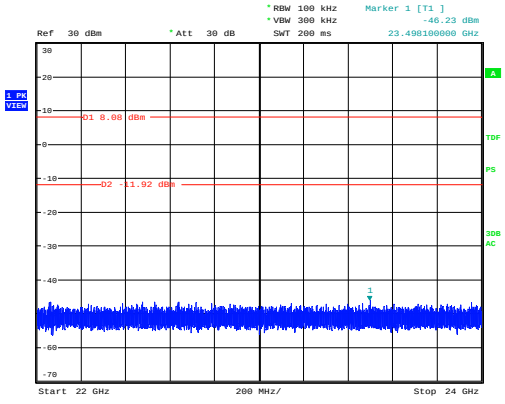
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:33:18



Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:33:35

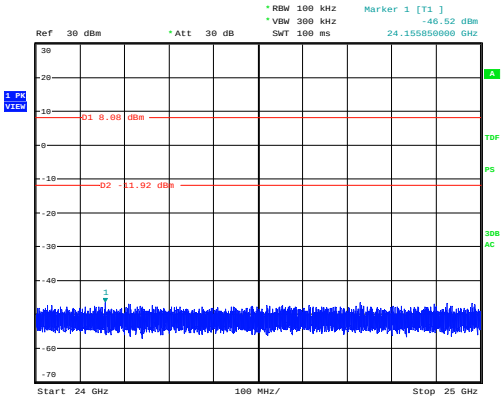


Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:33:51



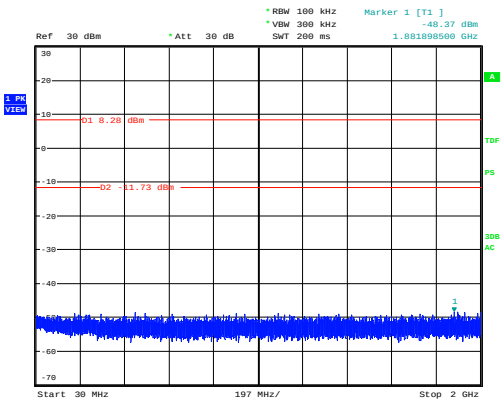
Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:34:06

Figure 12: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11b, Channel 1 (2412MHz)

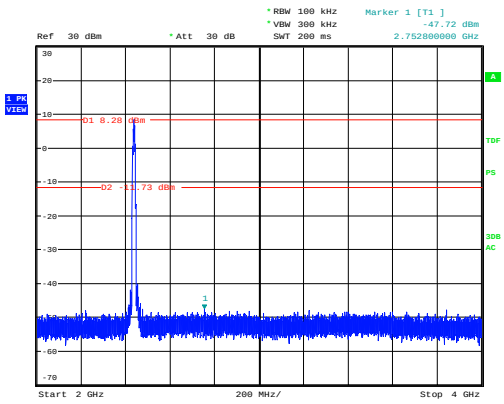


Conducted spurious emissions, mode Aa
Date: 26.SEP.2012 15:34:23

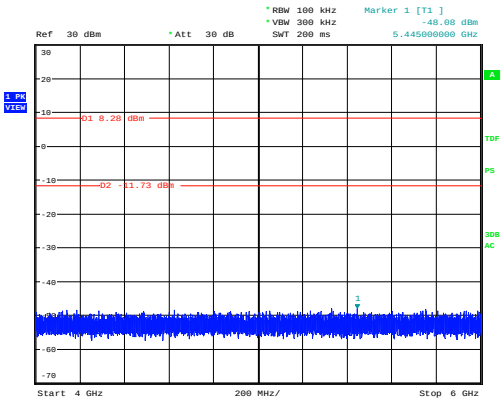
Figure 13: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11b, Channel 6 (2437MHz)



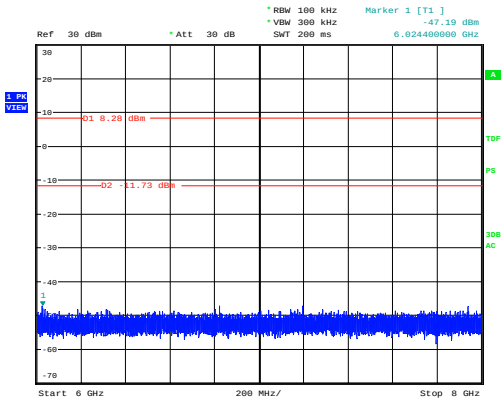
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:37:39



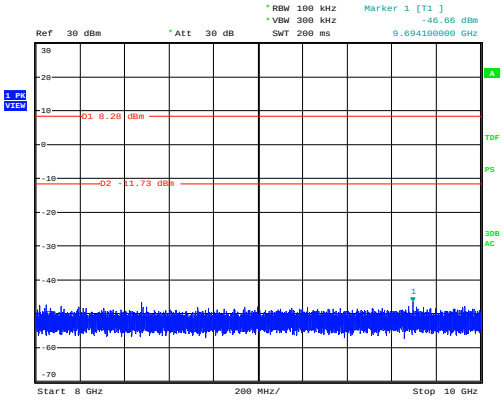
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:38:21



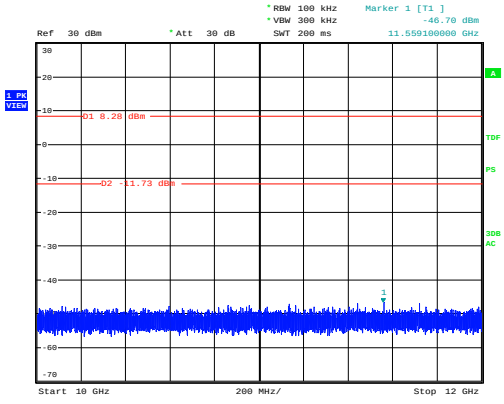
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:38:55



Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:39:16

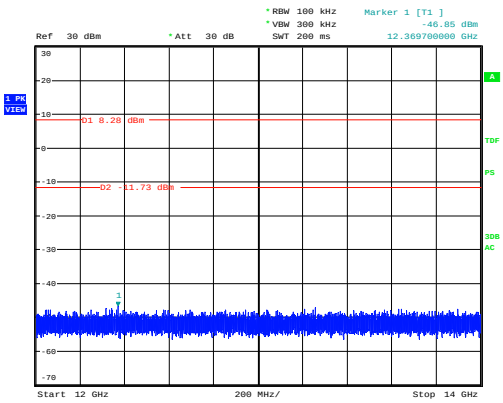


Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:39:33

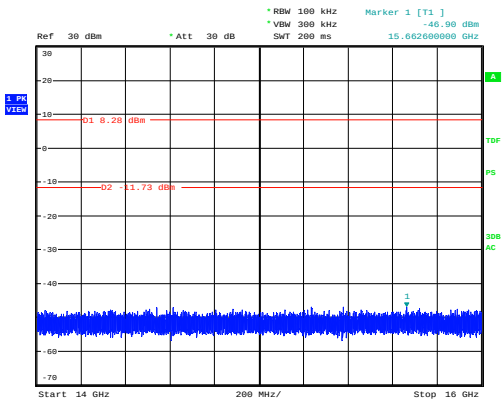


Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:39:49

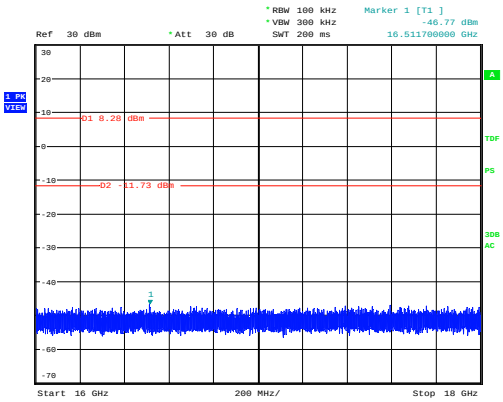
Figure 14: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11b, Channel 6 (2437MHz)



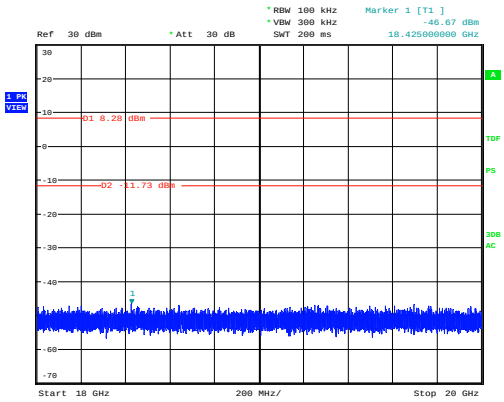
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:40:05



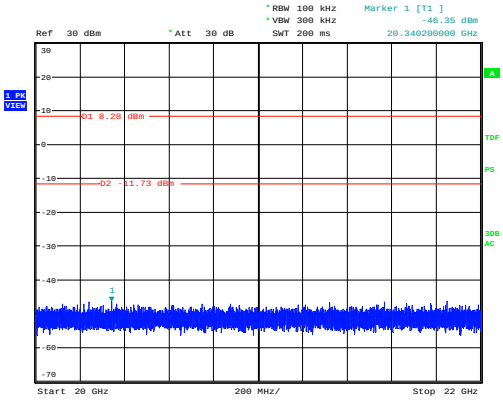
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:40:28



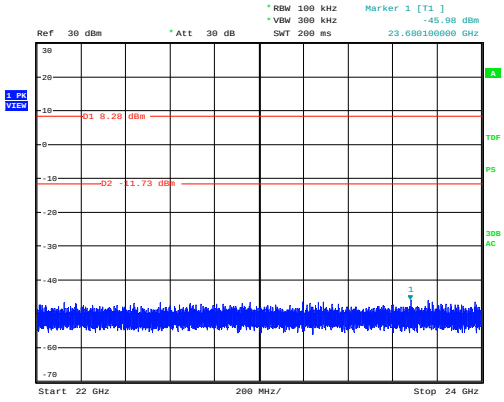
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:40:44



Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:41:01

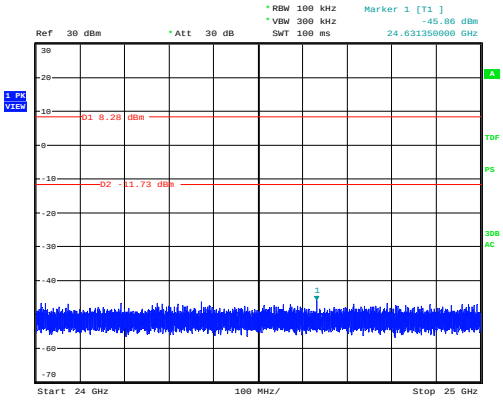


Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:41:20



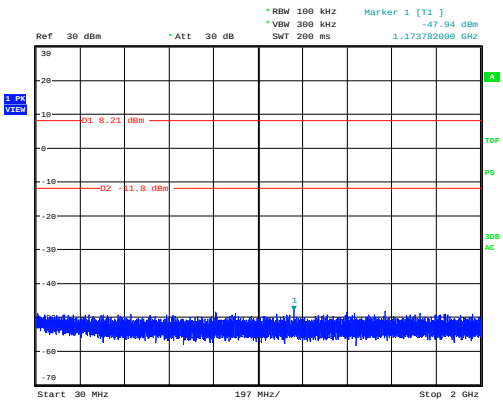
Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:41:36

Figure 15: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11b, Channel 6 (2437MHz)

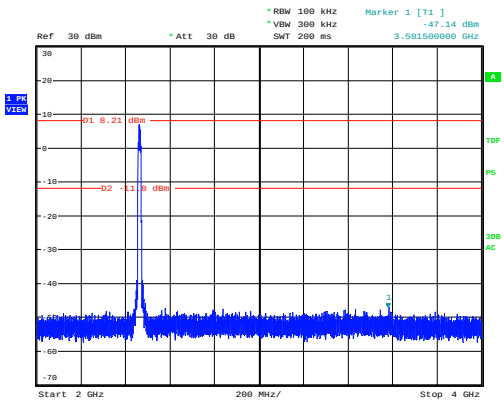


Conducted spurious emissions, mode Ba
Date: 26.SEP.2012 15:41:51

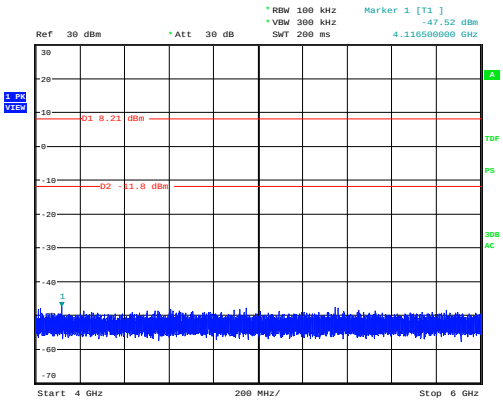
Figure 16: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11b, Channel 11 (2462MHz)



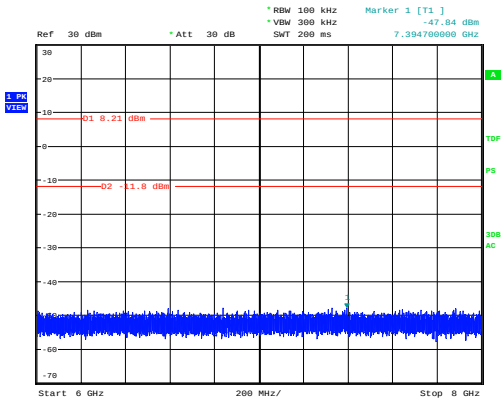
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:46:06



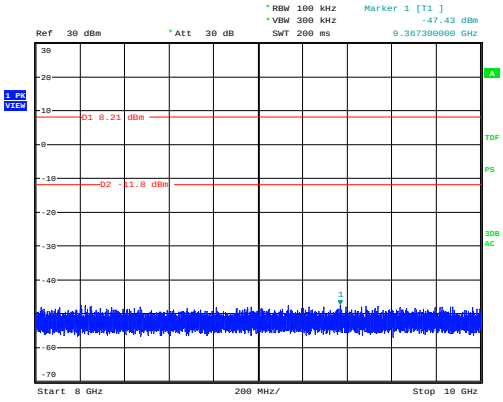
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:46:37



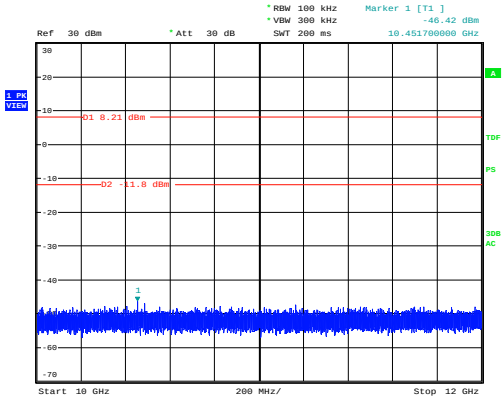
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:46:54



Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:47:10

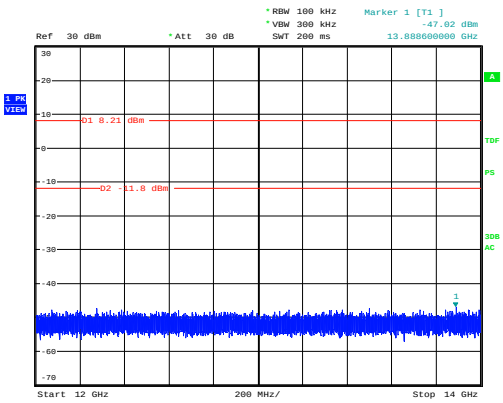


Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:47:26

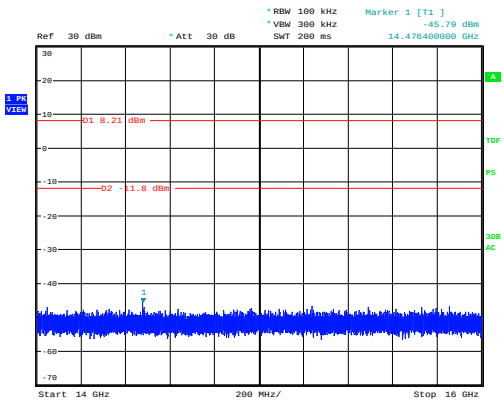


Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:48:20

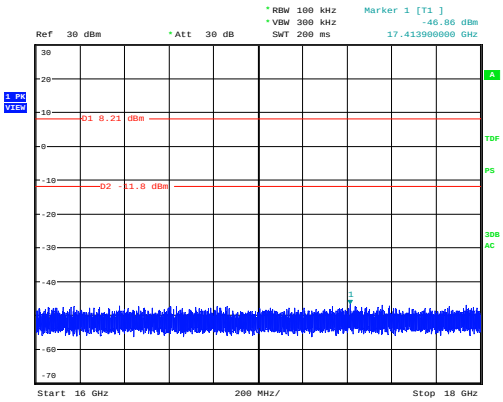
Figure 17: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11b, Channel 11 (2462MHz)



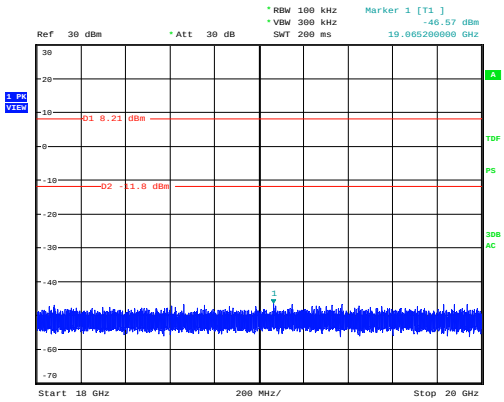
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:48:38



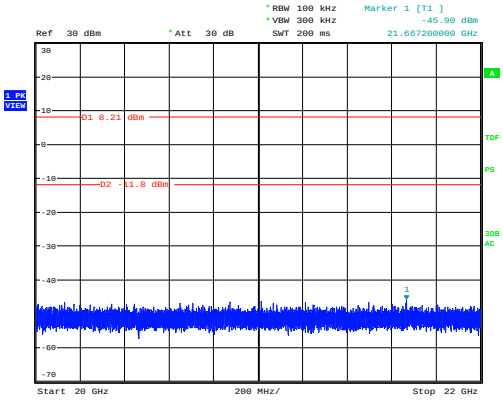
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:48:54



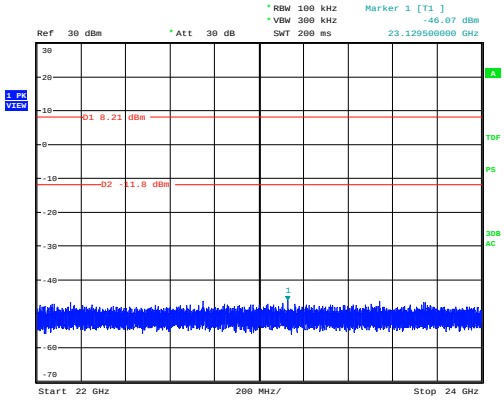
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:49:09



Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:49:25

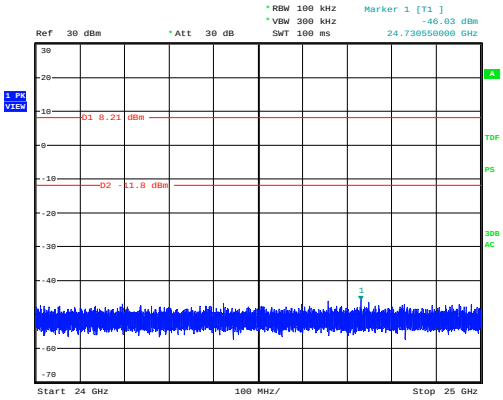


Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:49:40



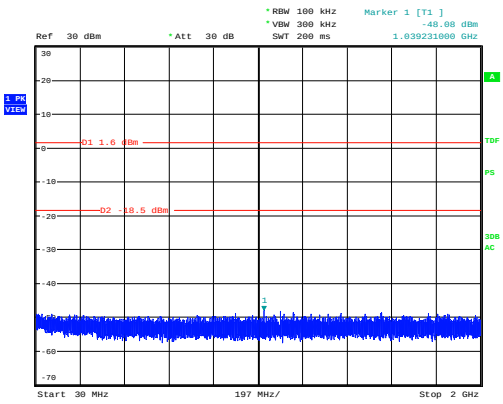
Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:49:56

Figure 18: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11b, Channel 11 (2462MHz)

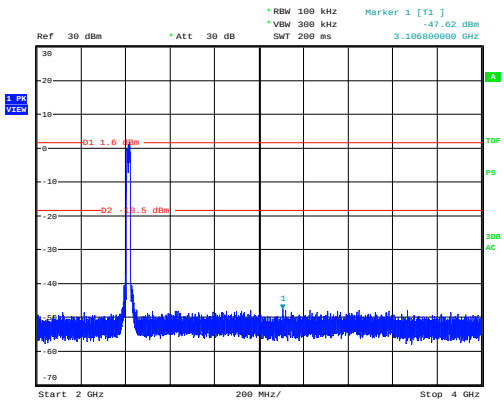


Conducted spurious emissions, mode Ca
Date: 26.SEP.2012 15:50:11

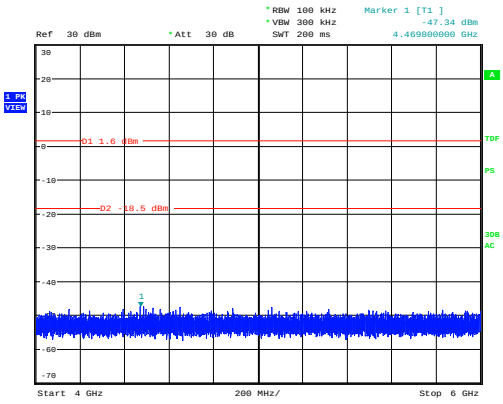
Figure 19: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11g, Channel 1 (2412MHz)



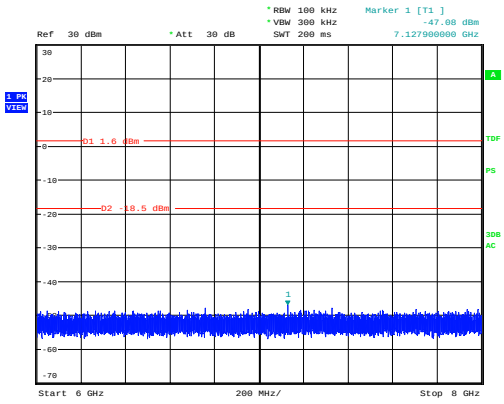
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:17:49



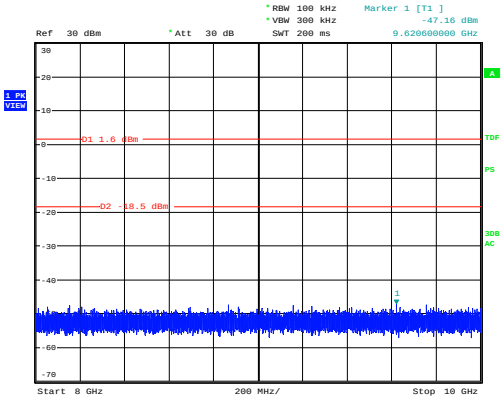
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:19:03



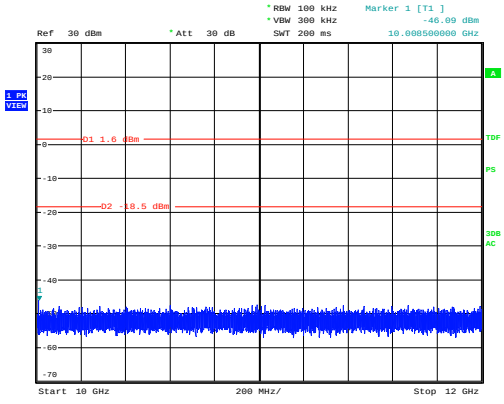
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:19:22



Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:19:38

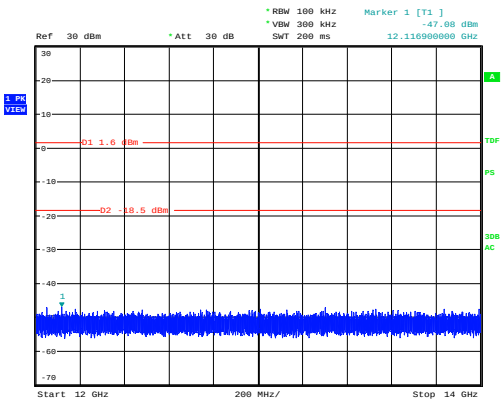


Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:19:54

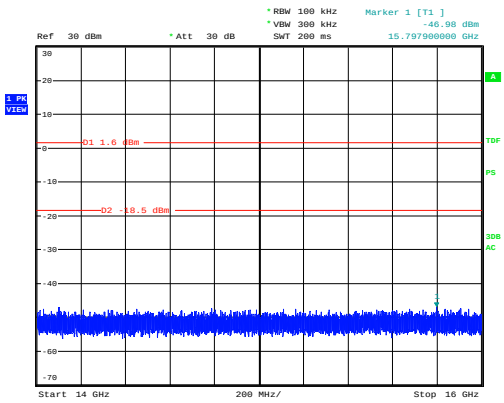


Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:20:11

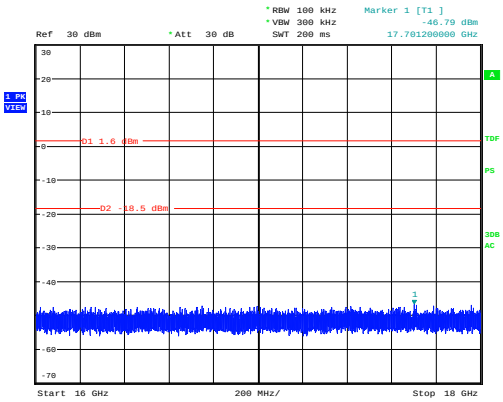
Figure 20: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11g, Channel 1 (2412MHz)



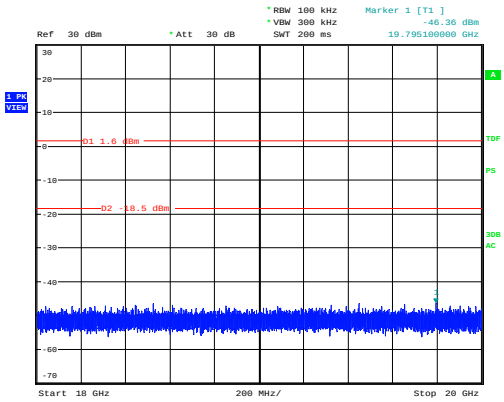
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:20:26



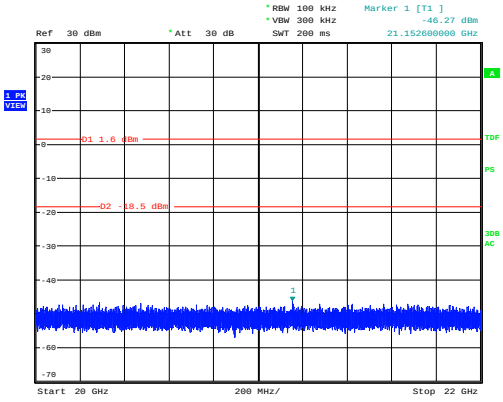
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:20:58



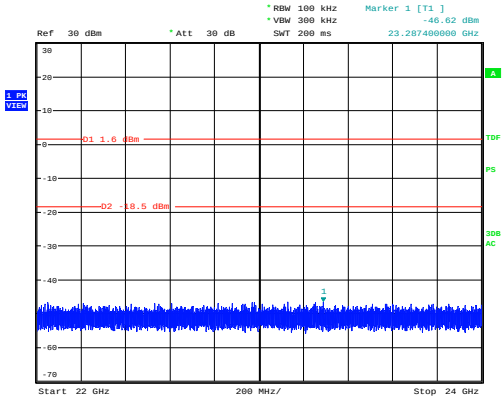
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:21:15



Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:21:31

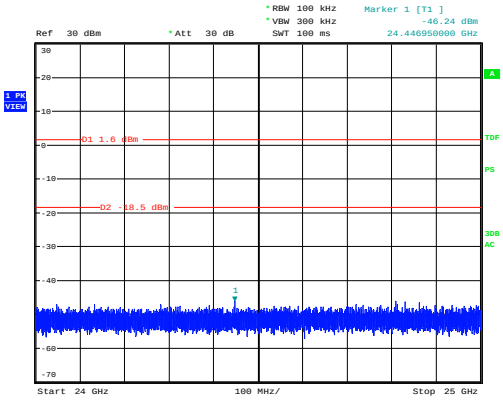


Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:21:47



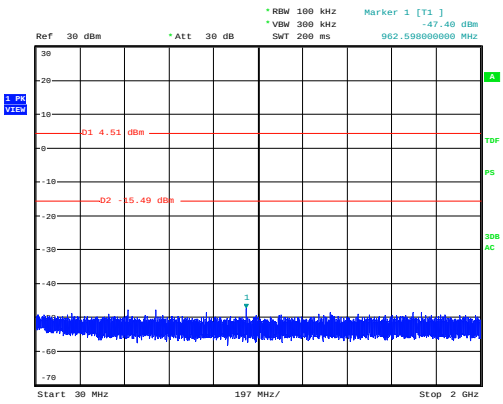
Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:22:03

Figure 21: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11g, Channel 1 (2412MHz)

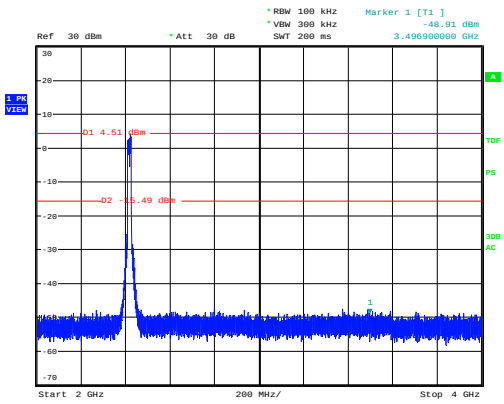


Conducted spurious emissions, mode Ab
Date: 26.SEP.2012 15:22:19

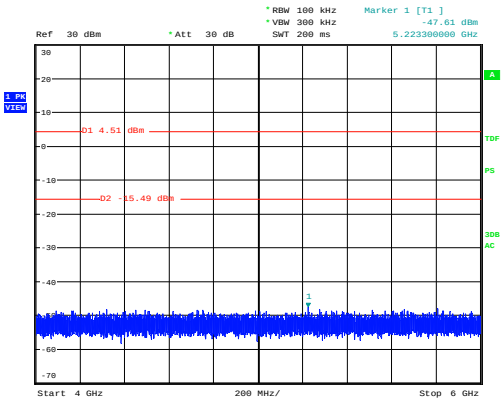
Figure 22: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11g, Channel 2 (2417MHz)



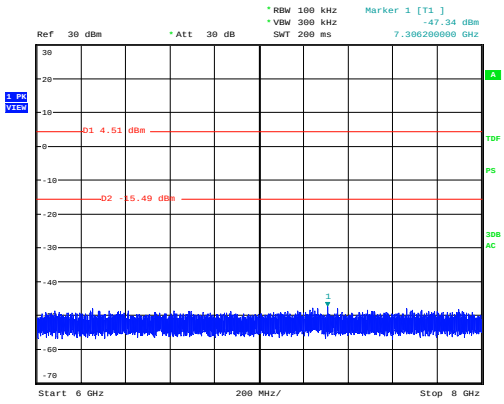
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:01:07



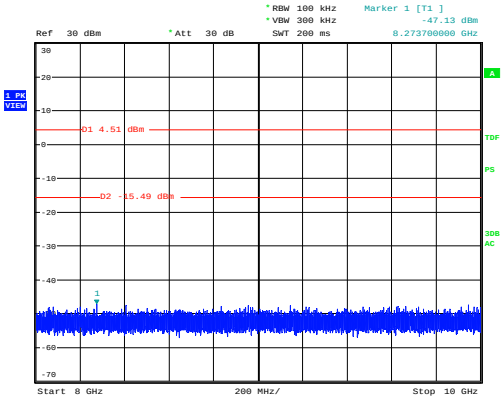
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:01:40



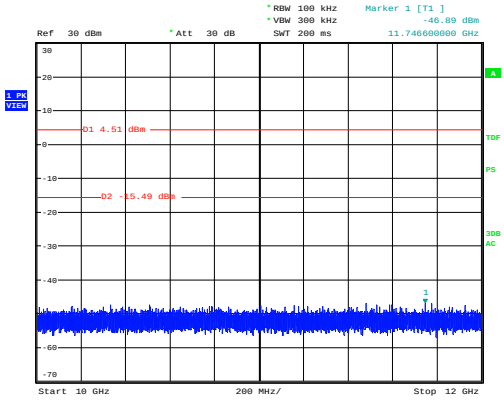
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:01:57



Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:02:13

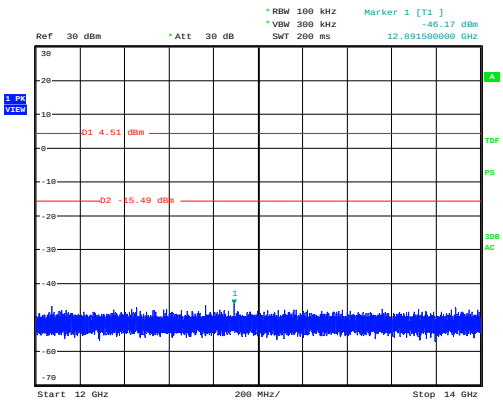


Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:02:40

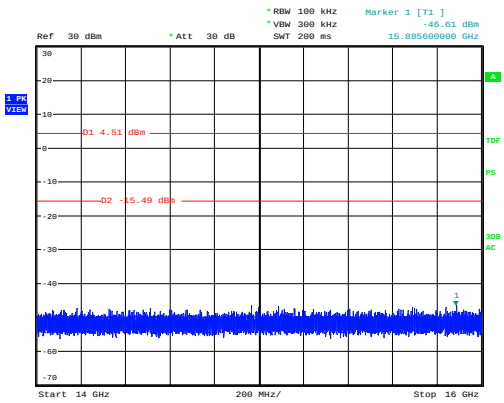


Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:02:56

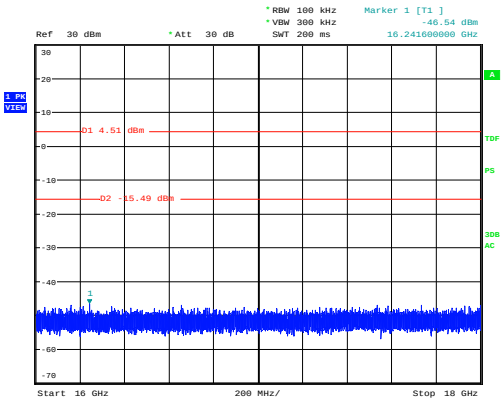
Figure 23: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11g, Channel 2 (2417MHz)



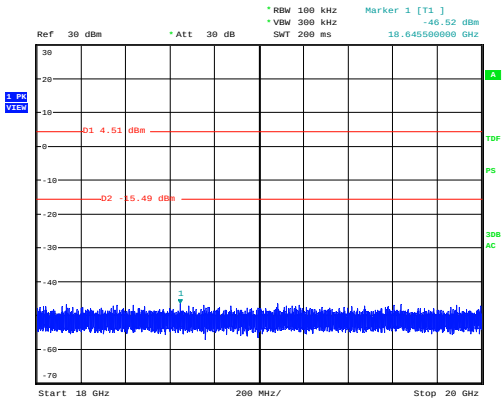
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:03:12



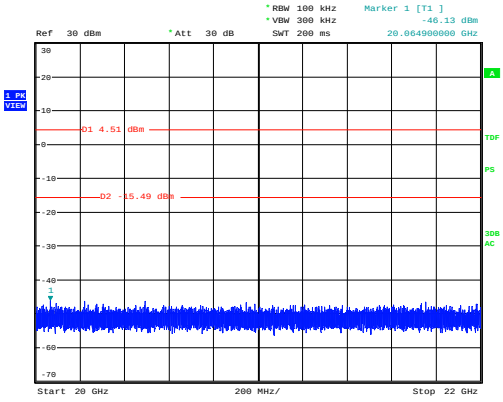
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:03:30



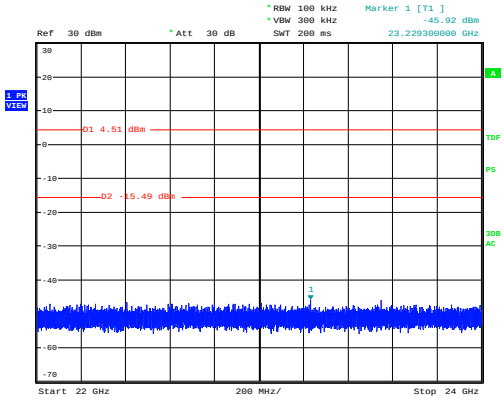
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:03:46



Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:04:02

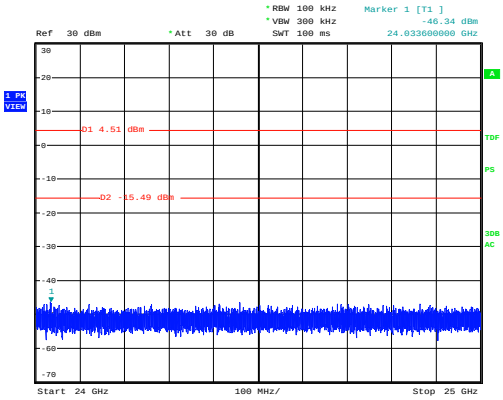


Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:04:18



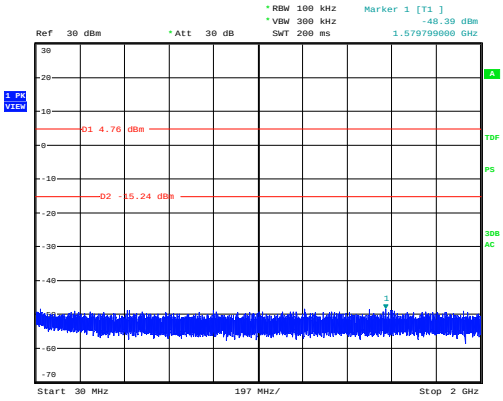
Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:04:33

Figure 24: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11g, Channel 2 (2417MHz)

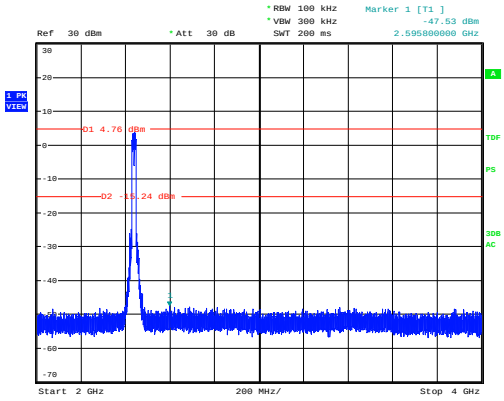


Conducted spurious emissions, mode Ab, 2ch
Date: 26.SEP.2012 16:04:48

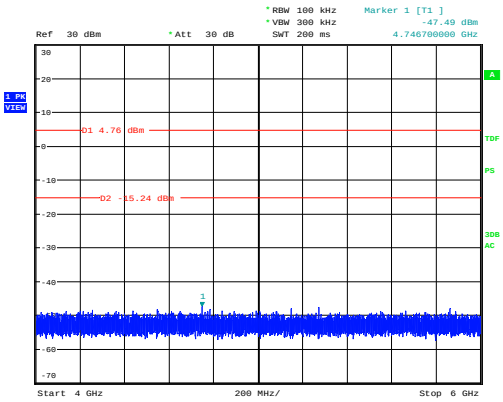
Figure 25: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11g, Channel 6 (2437MHz)



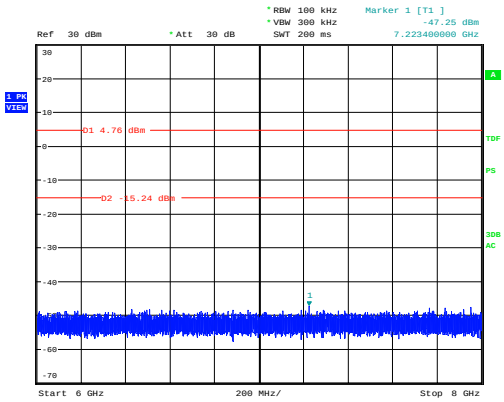
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:08:43



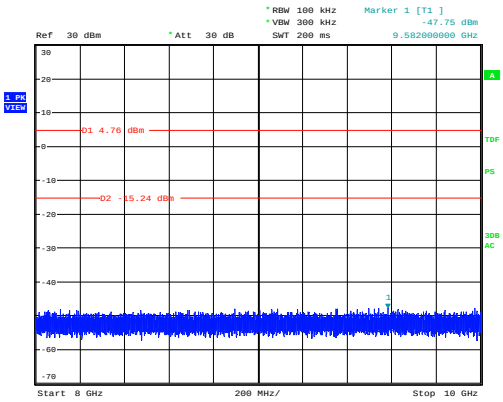
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:14:53



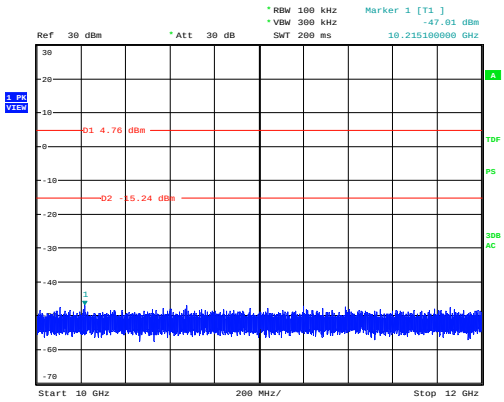
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:09:39



Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:09:56

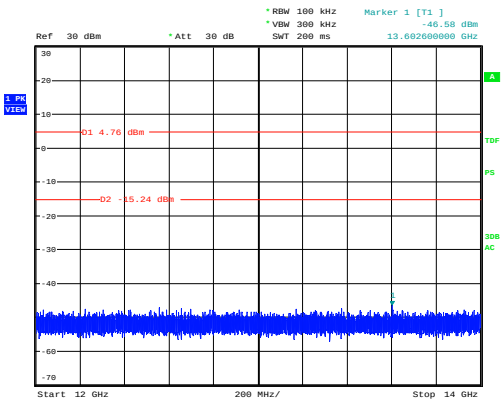


Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:10:13

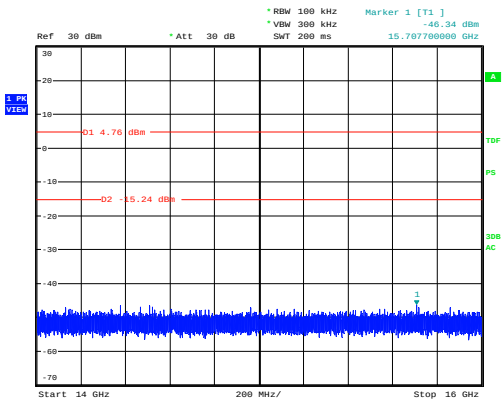


Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:10:29

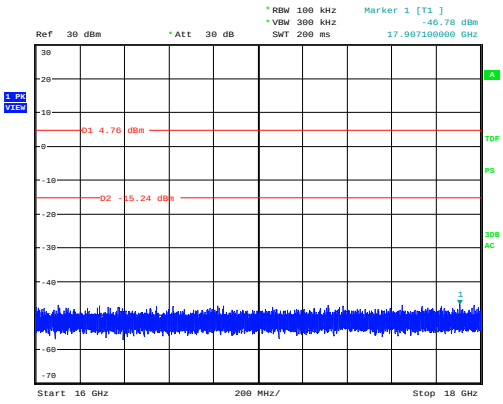
Figure 26: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11g, Channel 6 (2437MHz)



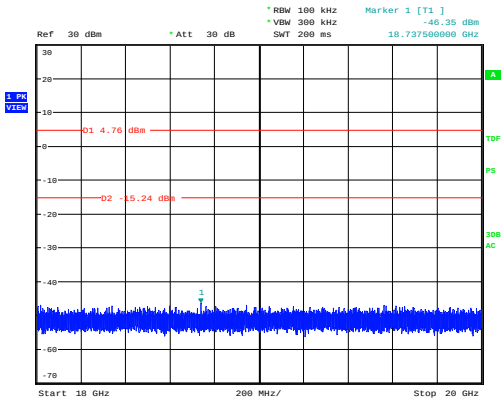
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:10:45



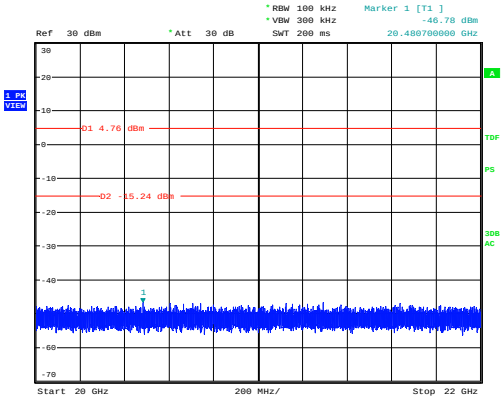
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:11:00



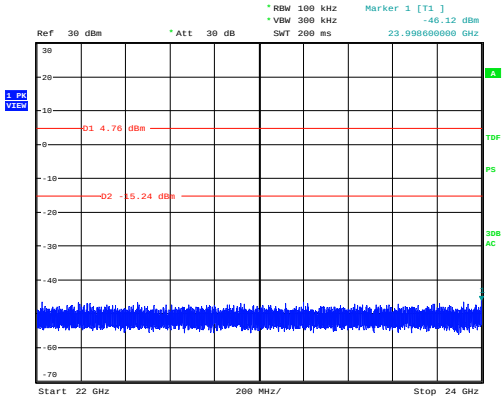
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:11:16



Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:11:32

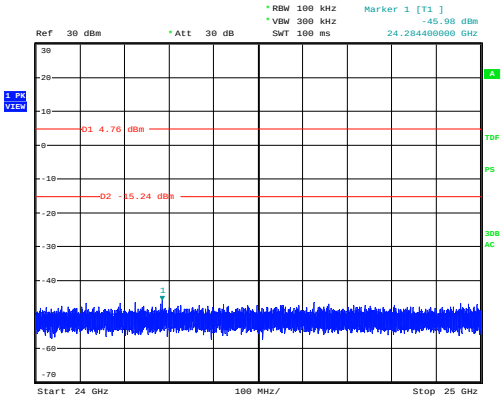


Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:11:48



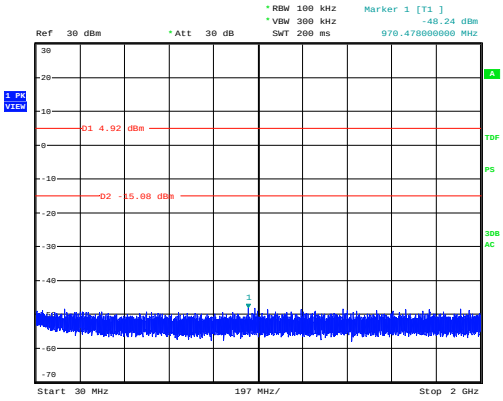
Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:12:03

Figure 27: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11g, Channel 6 (2437MHz)

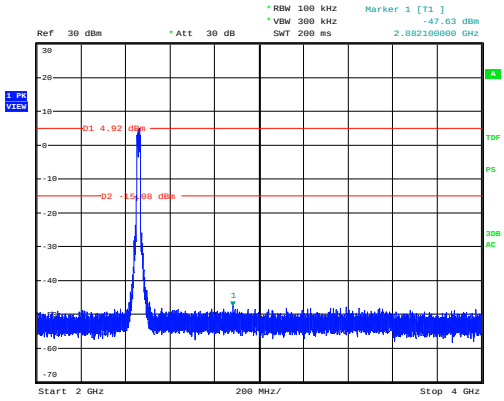


Conducted spurious emissions, mode Bb
Date: 26.SEP.2012 16:12:20

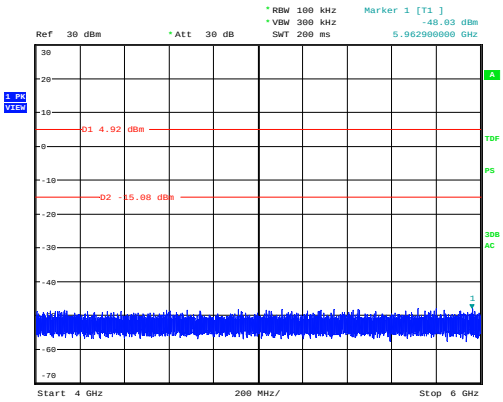
Figure 28: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11g, Channel 10 (2457MHz)



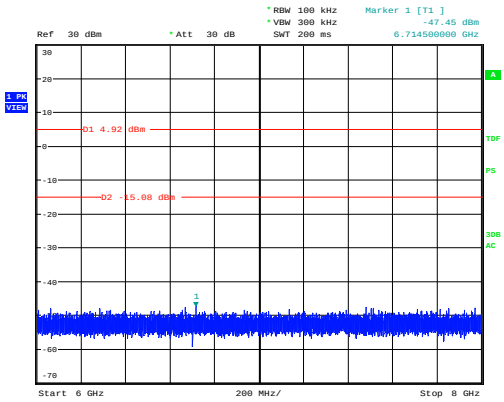
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:23:43



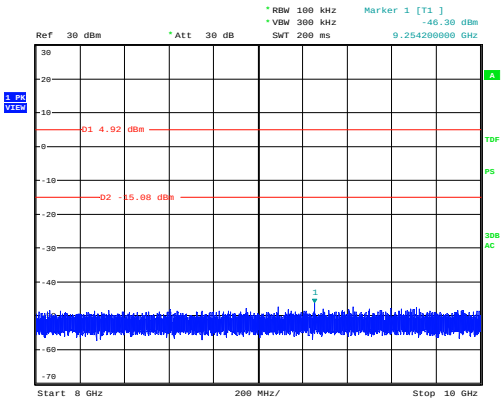
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:24:22



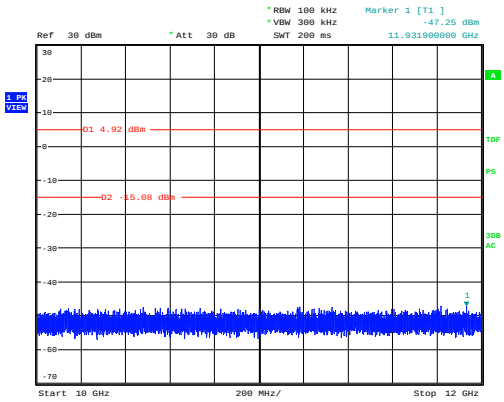
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:24:55



Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:25:20

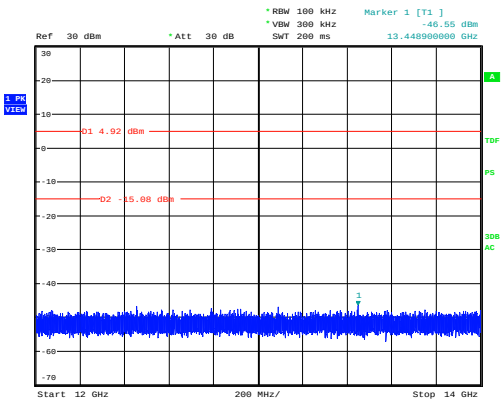


Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:25:37

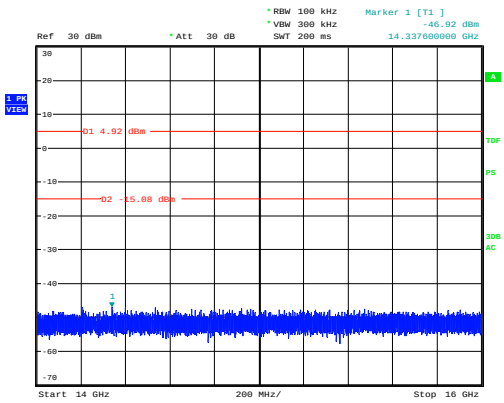


Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:25:54

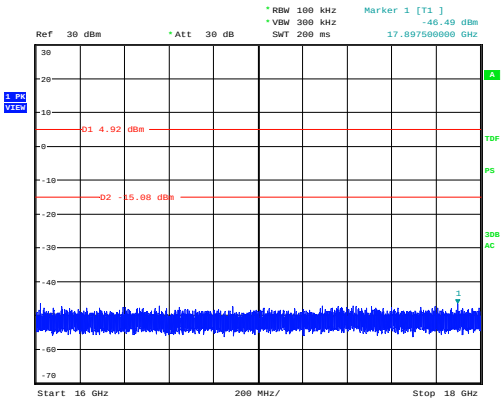
Figure 29: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11g, Channel 10 (2457MHz)



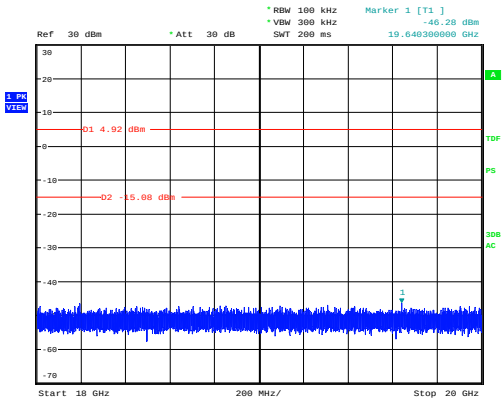
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:26:10



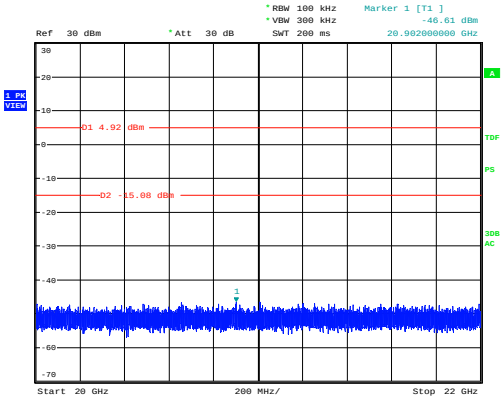
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:26:26



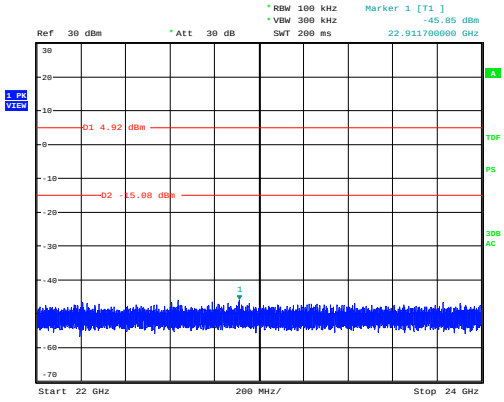
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:26:42



Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:26:58

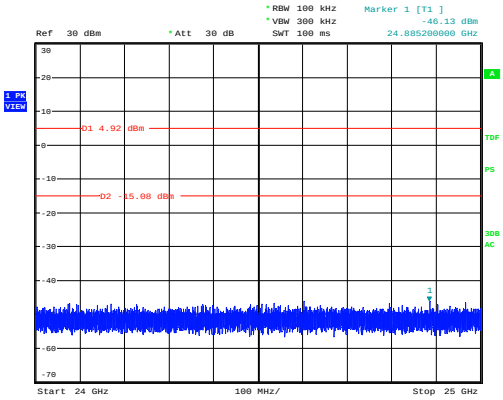


Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:27:16



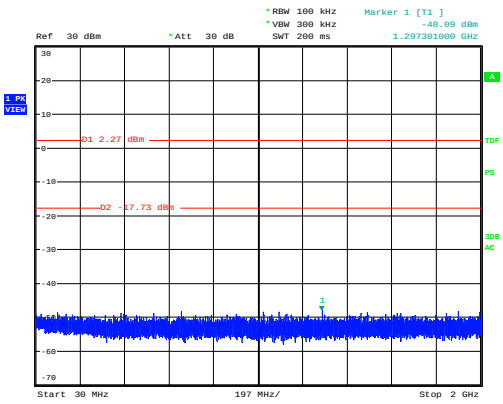
Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:27:33

Figure 30: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11g, Channel 10 (2457MHz)

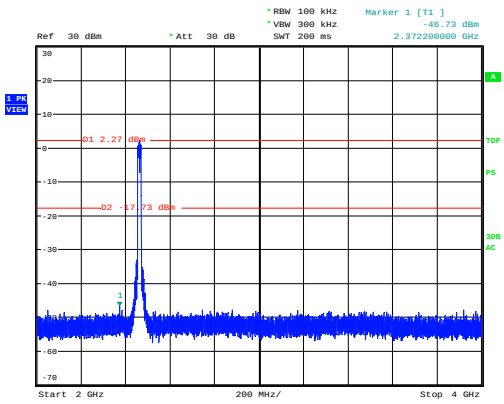


Conducted spurious emissions, mode Cb, 10ch
Date: 26.SEP.2012 16:27:49

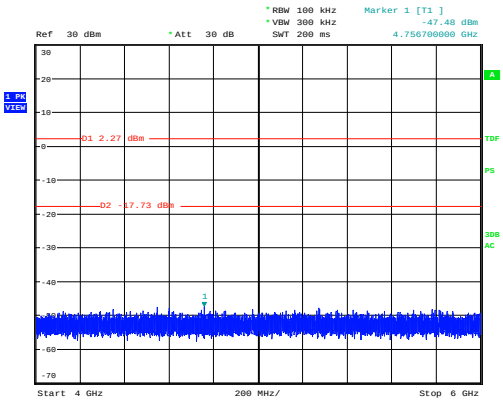
Figure 31: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11g, Channel 11 (2462MHz)



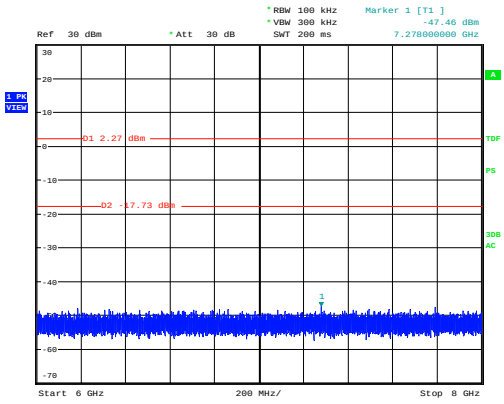
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:36:10



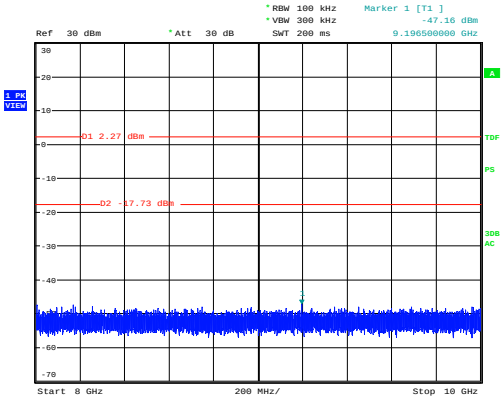
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:36:47



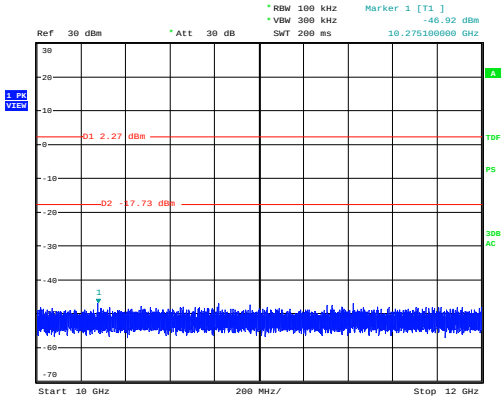
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:37:04



Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:37:20

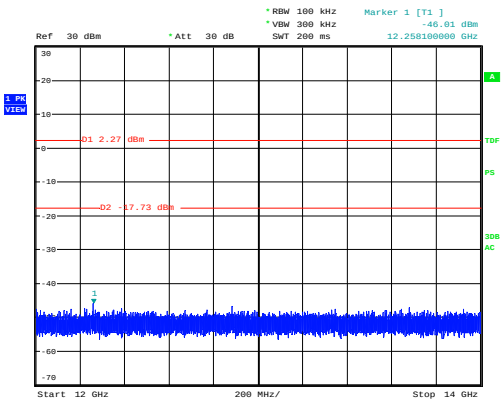


Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:37:36

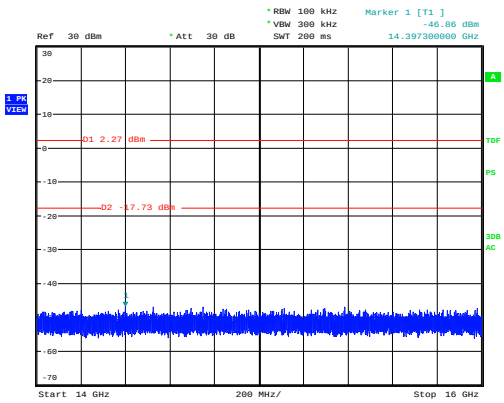


Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:37:52

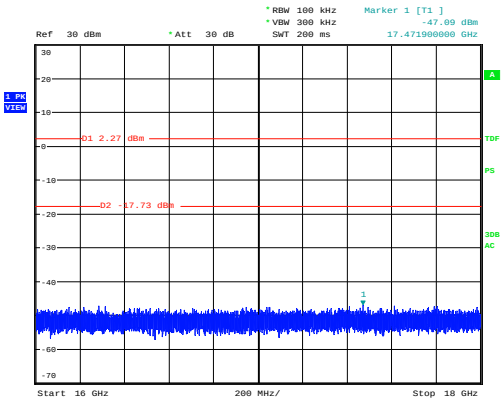
Figure 32: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11g, Channel 11 (2462MHz)



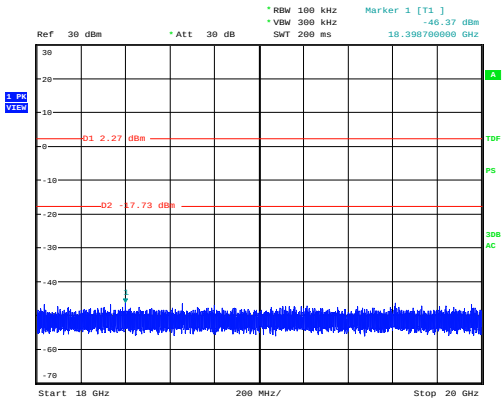
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:38:08



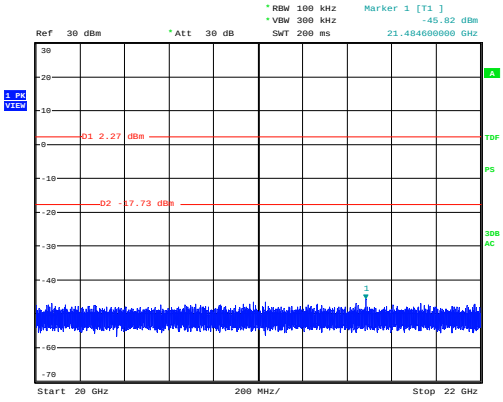
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:38:23



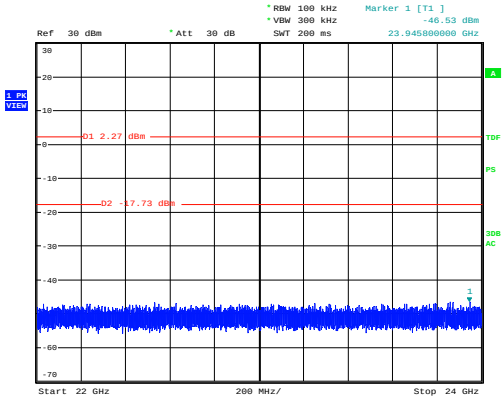
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:38:41



Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:38:58

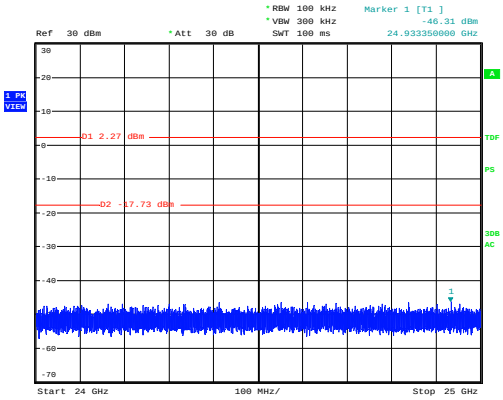


Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:39:14



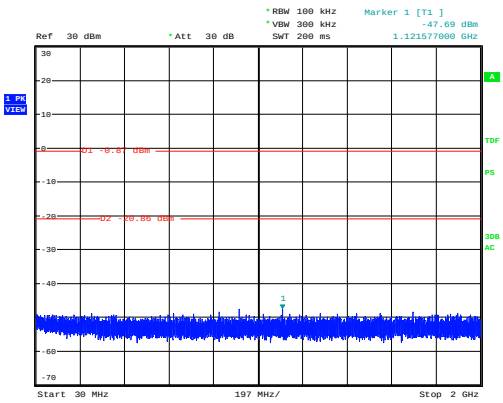
Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:39:41

Figure 33: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11g, Channel 11 (2462MHz)

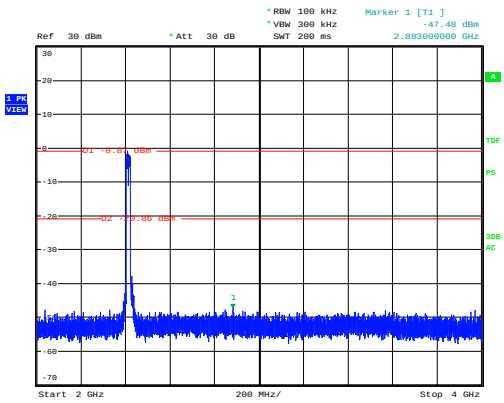


Conducted spurious emissions, mode Cb
Date: 26.SEP.2012 16:39:58

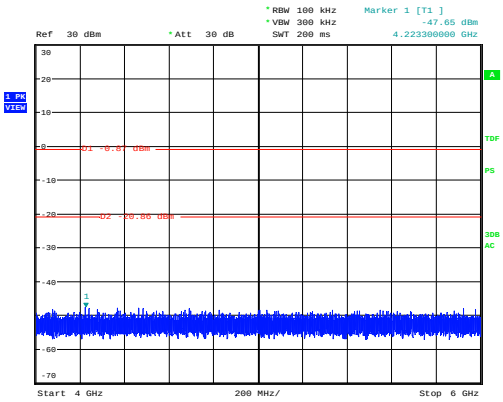
Figure 34: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (20MHz), Channel 1 (2412MHz)



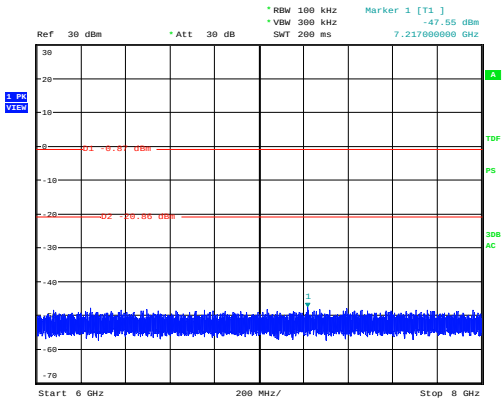
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:47:51



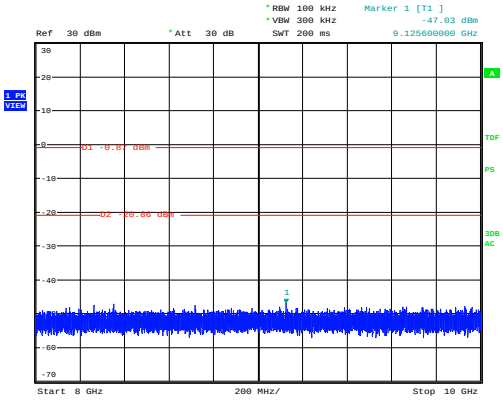
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:48:22



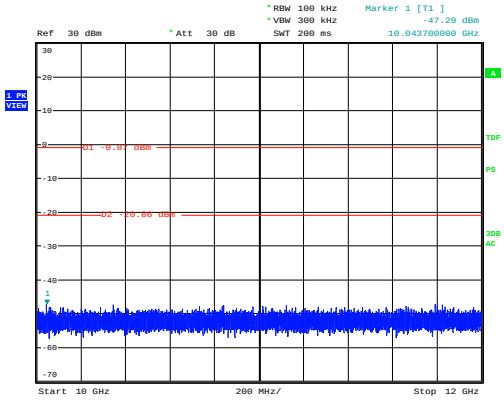
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:50:28



Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:50:48

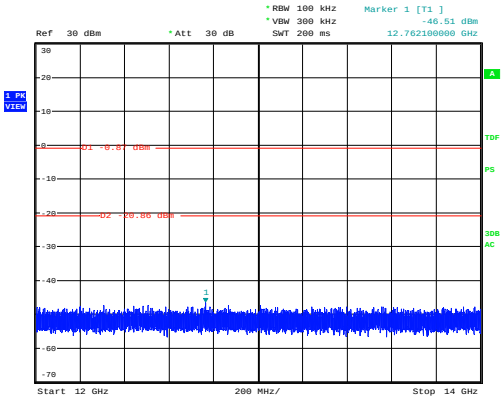


Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:51:04

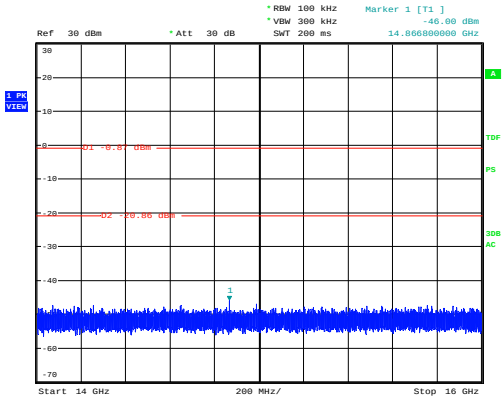


Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:51:20

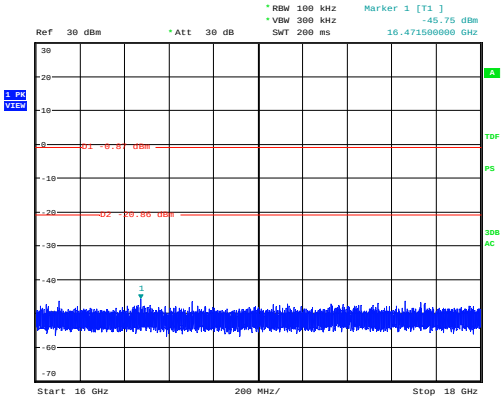
Figure 35: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (20MHz), Channel 1 (2412MHz)



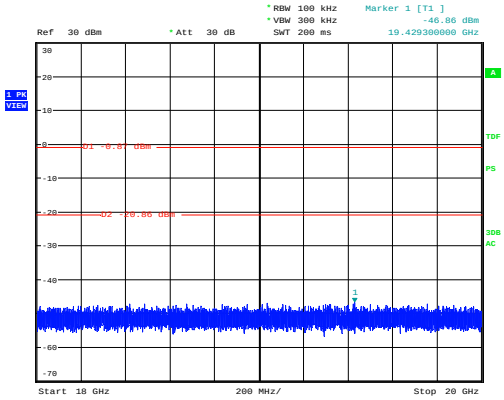
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:51:41



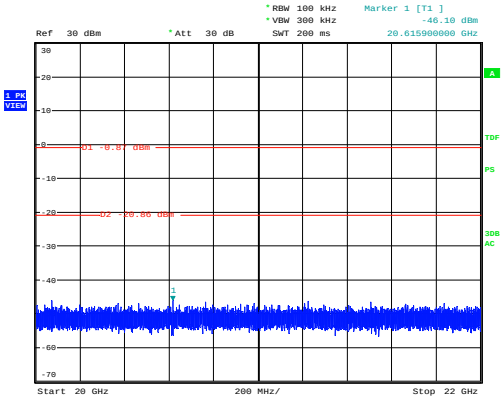
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:51:56



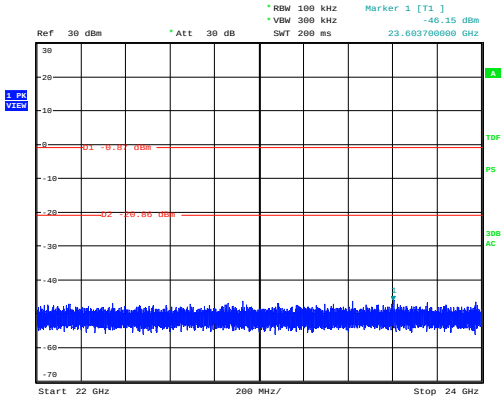
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:52:12



Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:52:30

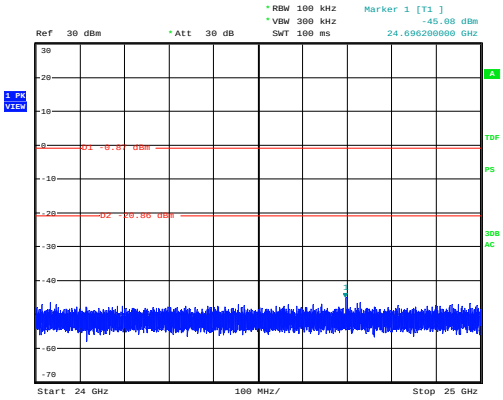


Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:52:46



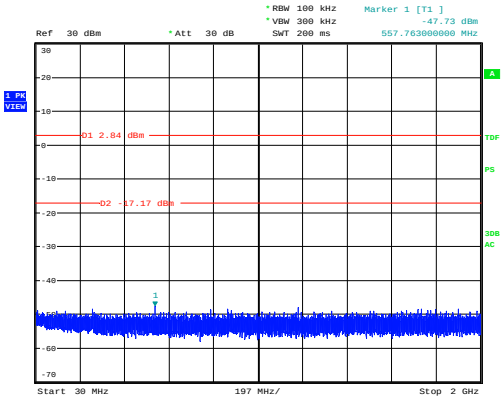
Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:53:01

Figure 36: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (20MHz), Channel 1 (2412MHz)

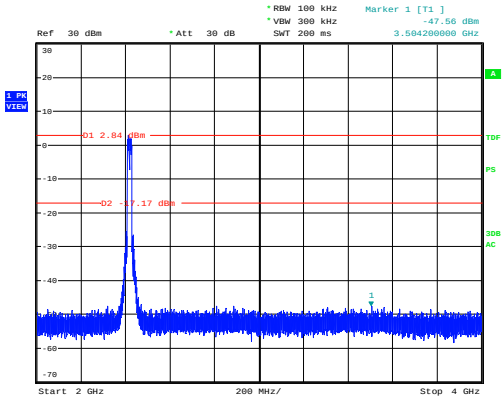


Conducted spurious emissions, mode Ac
Date: 26.SEP.2012 16:53:17

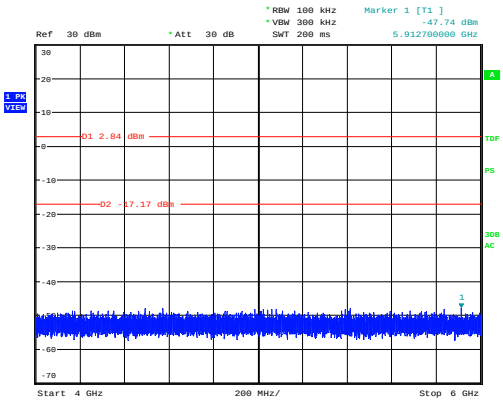
Figure 37: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (20MHz), Channel 2 (2417MHz)



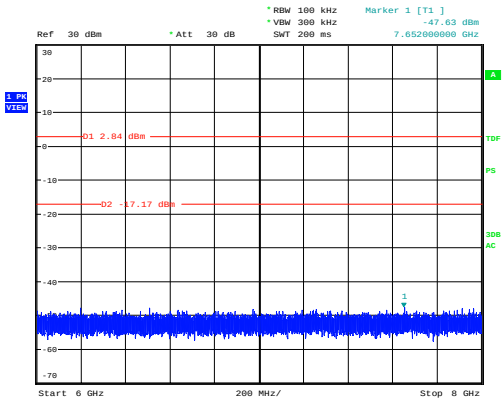
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 16:58:36



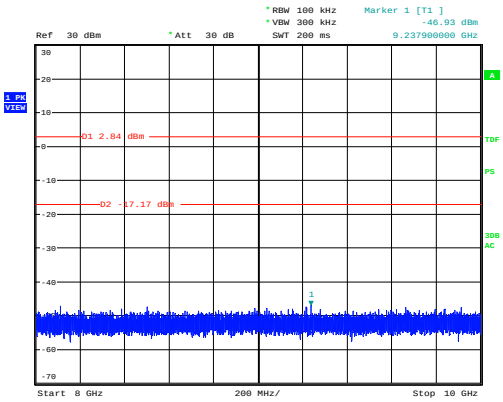
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 16:59:16



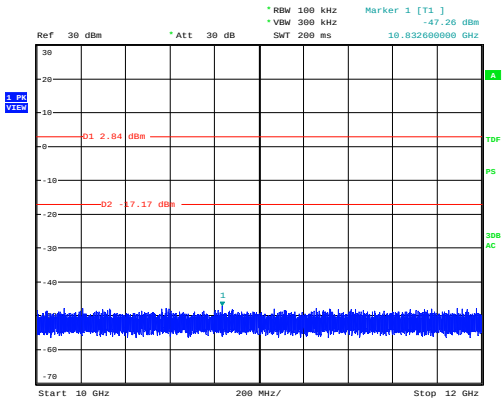
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 16:59:31



Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 16:59:47

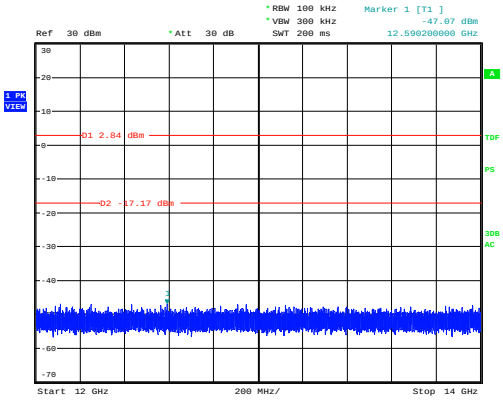


Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:00:04

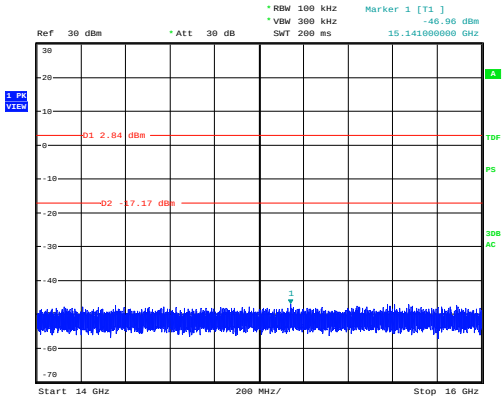


Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:00:20

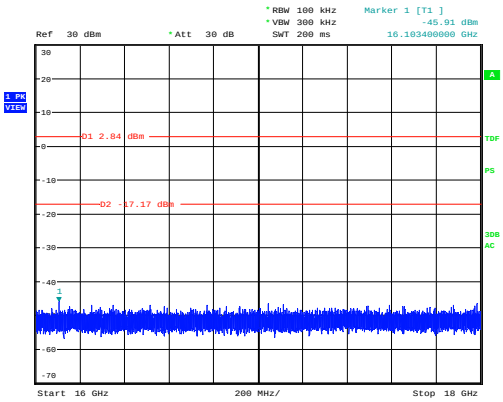
Figure 38: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (20MHz), Channel 2 (2417MHz)



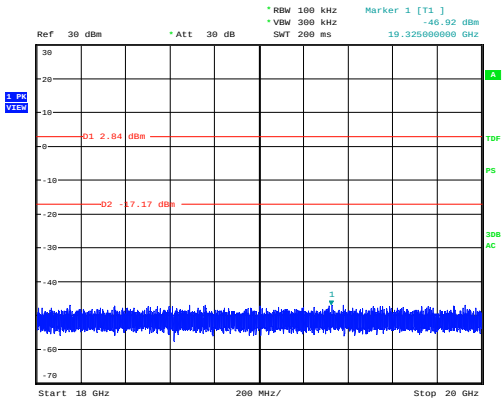
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:00:36



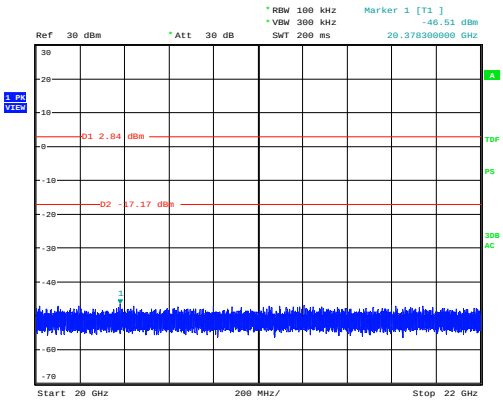
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:00:52



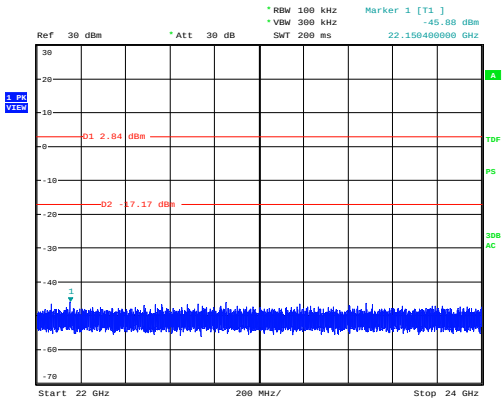
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:01:10



Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:01:25

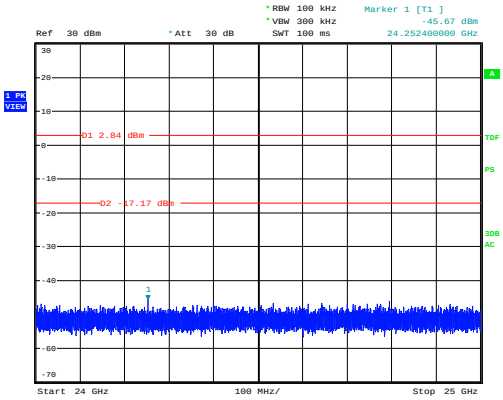


Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:01:41



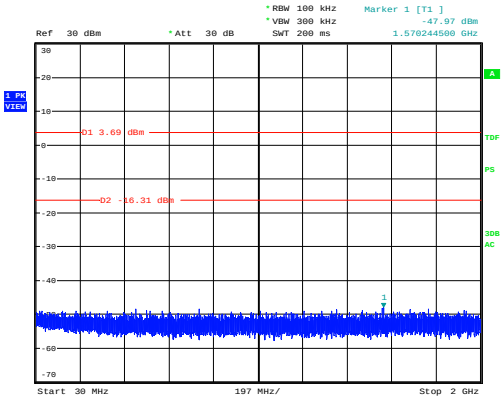
Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:01:57

Figure 39: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (20MHz), Channel 2 (2417MHz)

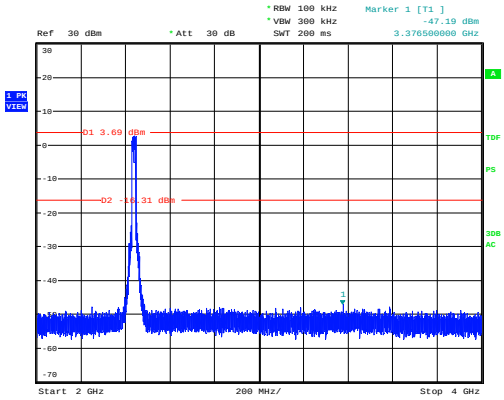


Conducted spurious emissions, mode Ac, 2ch
Date: 26.SEP.2012 17:02:12

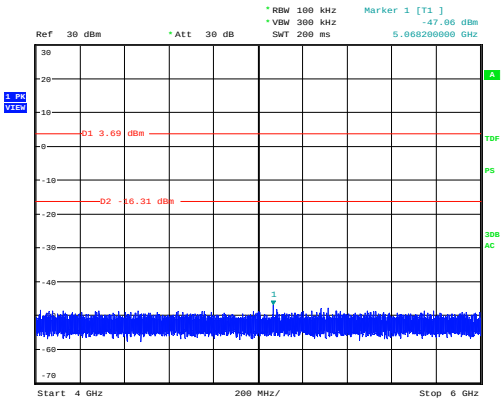
Figure 40: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (20MHz), Channel 6 (2437MHz)



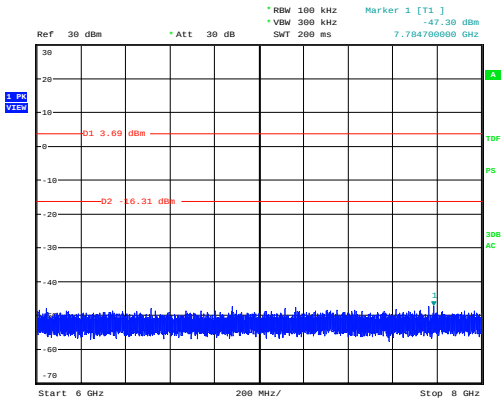
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:39:08



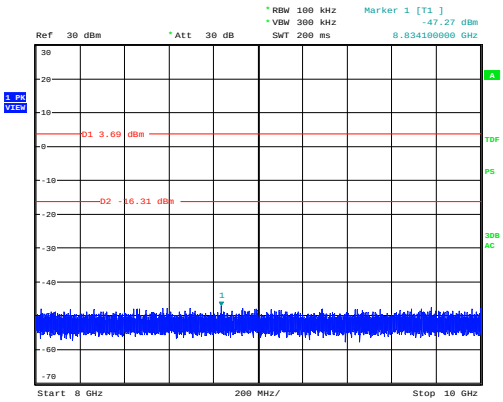
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:39:46



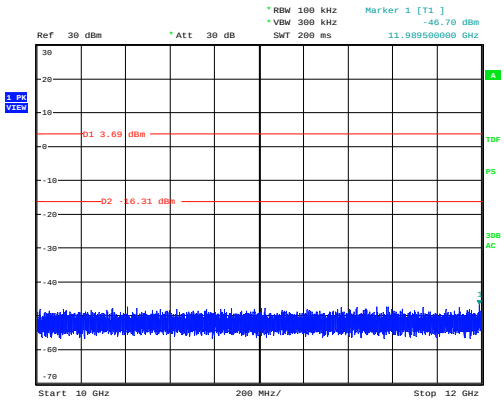
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:40:06



Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:40:21

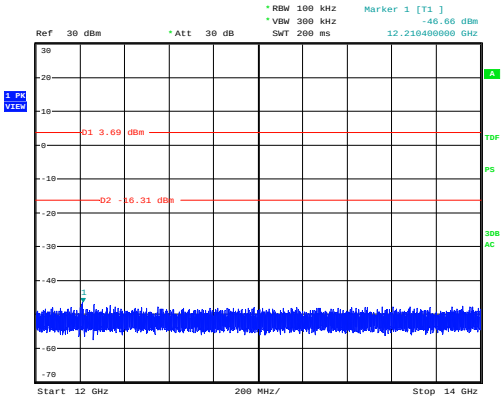


Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:40:38

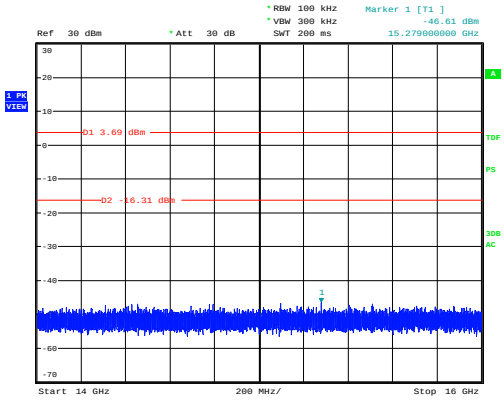


Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:40:53

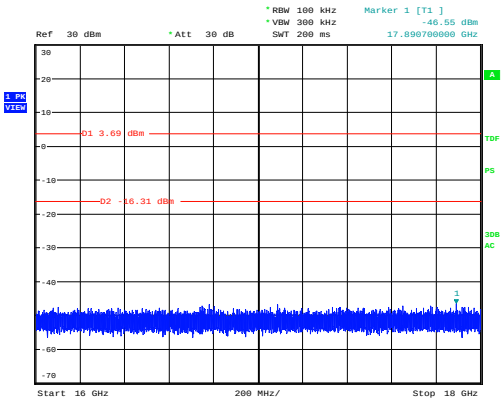
Figure 41: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (20MHz), Channel 6 (2437MHz)



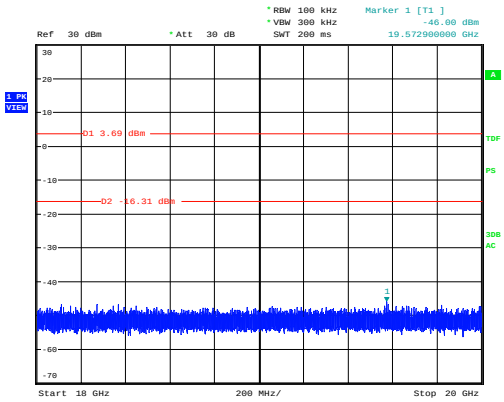
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:41:09



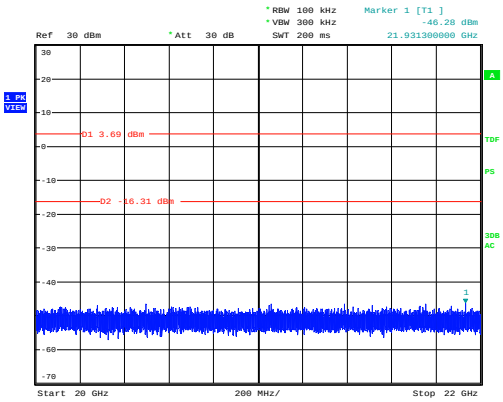
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:41:26



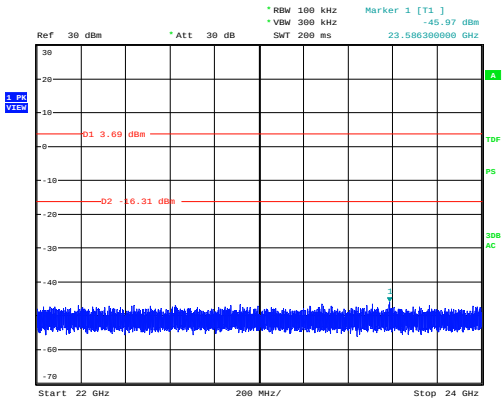
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:41:42



Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:41:58

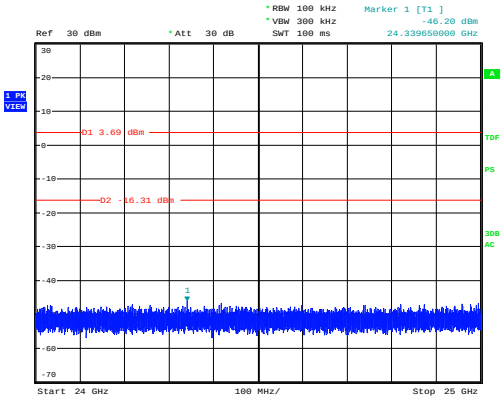


Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:42:13



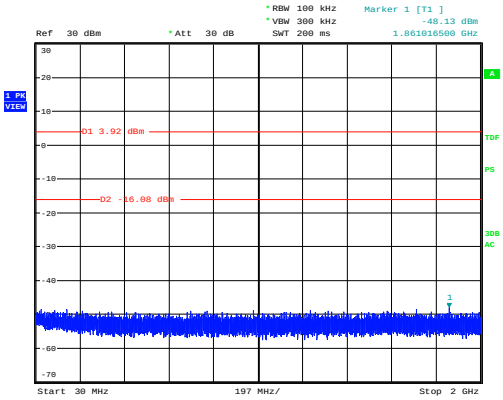
Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:42:29

Figure 42: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (20MHz), Channel 6 (2437MHz)

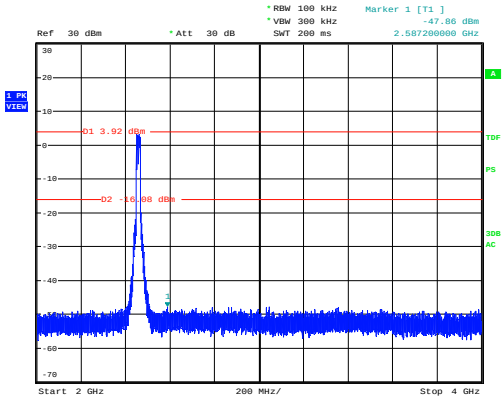


Conducted spurious emissions, mode Bc
Date: 27.SEP.2012 09:42:46

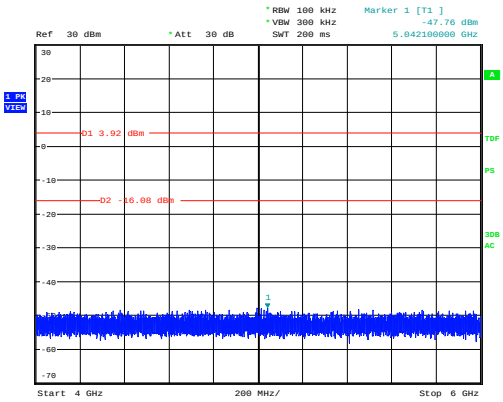
Figure 43: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (20MHz), Channel 10 (2457MHz)



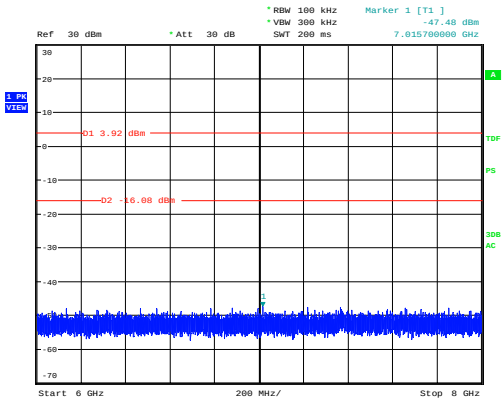
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:50:39



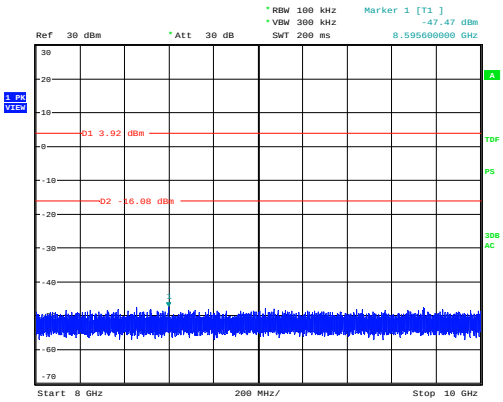
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:51:09



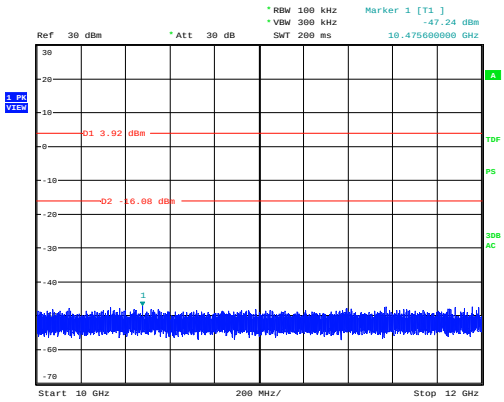
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:51:27



Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:51:42

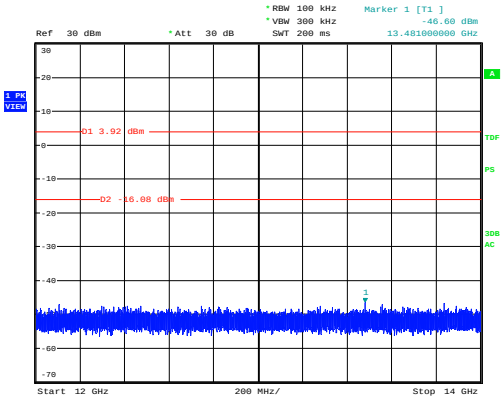


Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:52:00

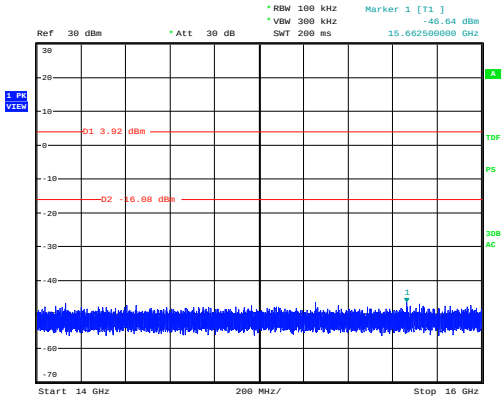


Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:52:17

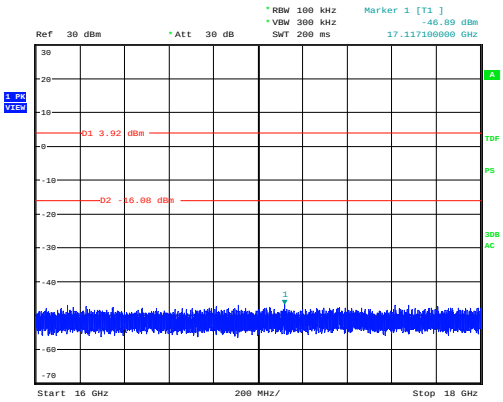
Figure 44: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (20MHz), Channel 10 (2457MHz)



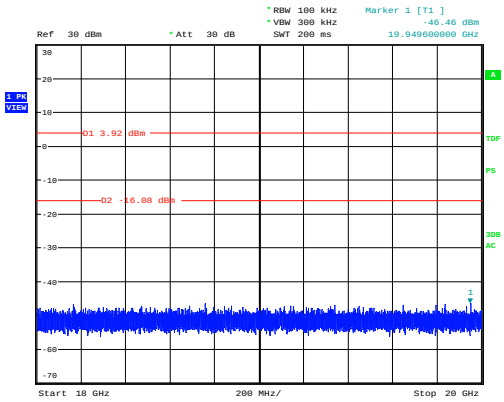
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:52:33



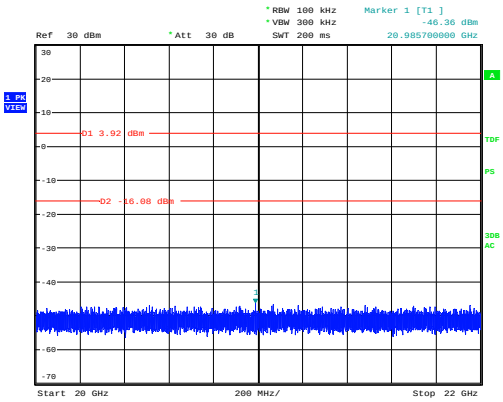
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:52:48



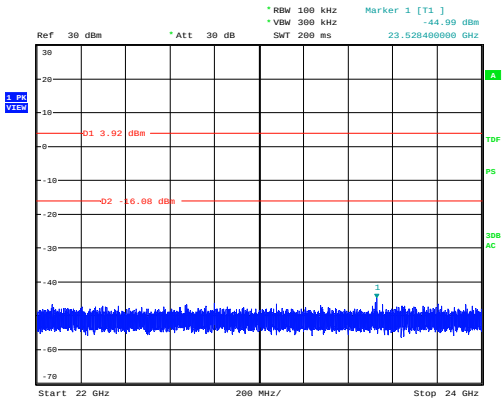
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:53:04



Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:53:20

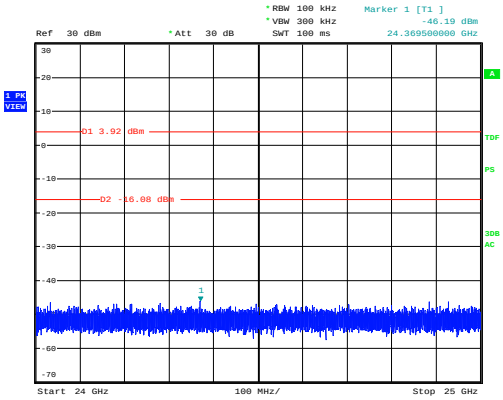


Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:53:36



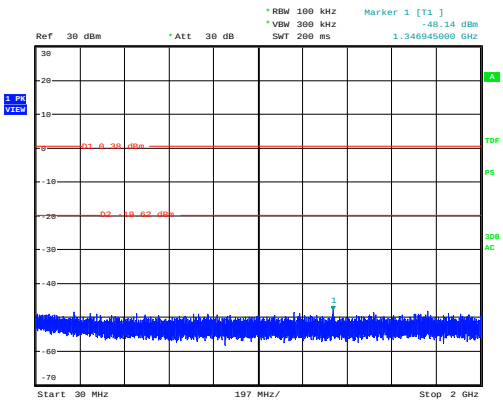
Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:53:51

Figure 45: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (20MHz), Channel 10 (2457MHz)

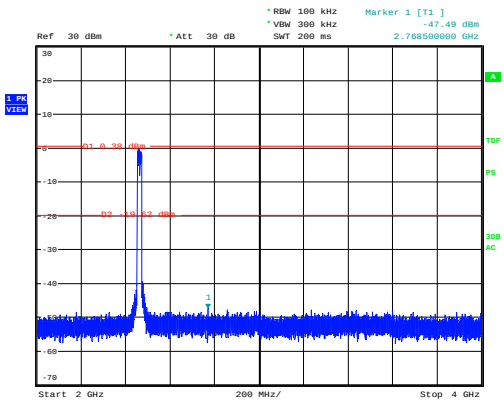


Conducted spurious emissions, mode Cc, 10ch
Date: 27.SEP.2012 09:54:07

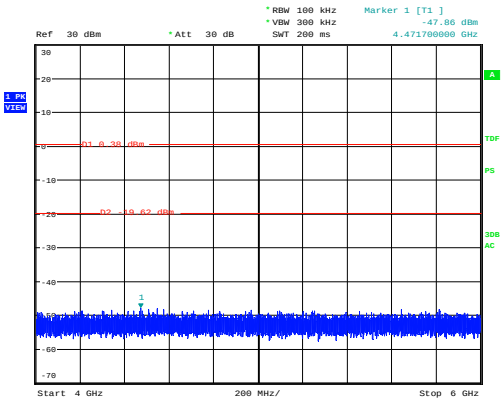
Figure 46: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (20MHz), Channel 11 (2462MHz)



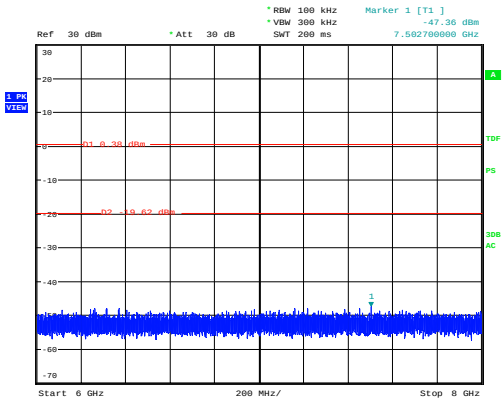
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 09:59:33



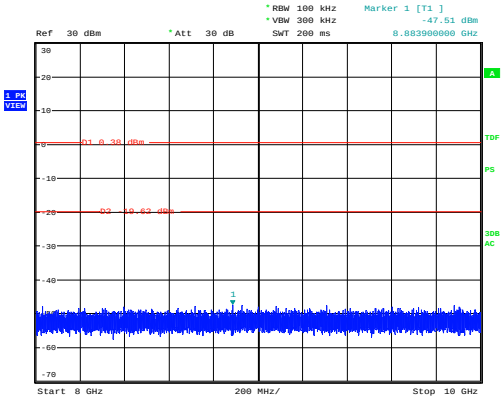
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:00:02



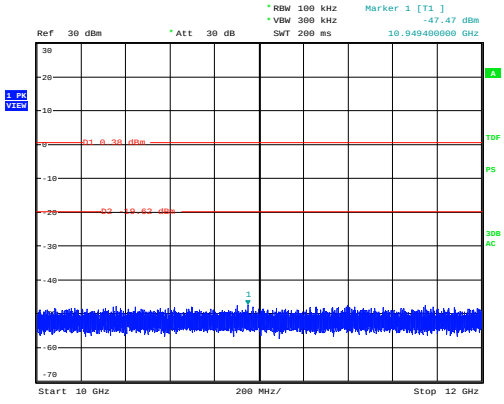
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:00:18



Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:00:36

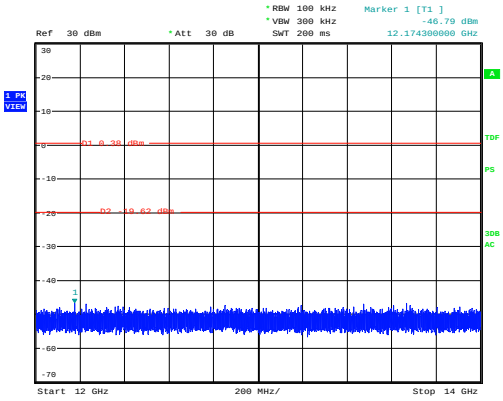


Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:00:51

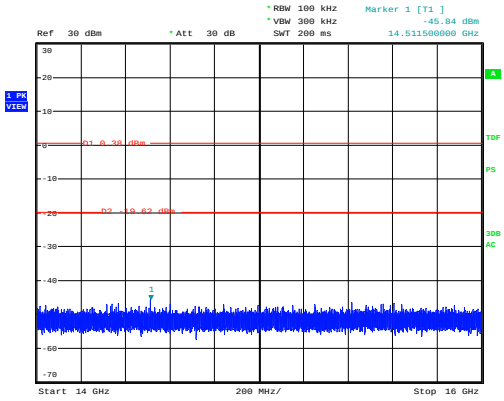


Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:01:07

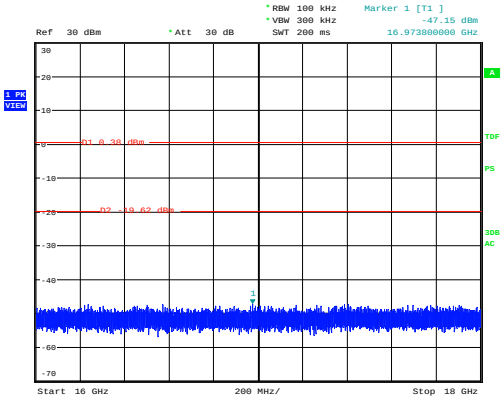
Figure 47: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (20MHz), Channel 11 (2462MHz)



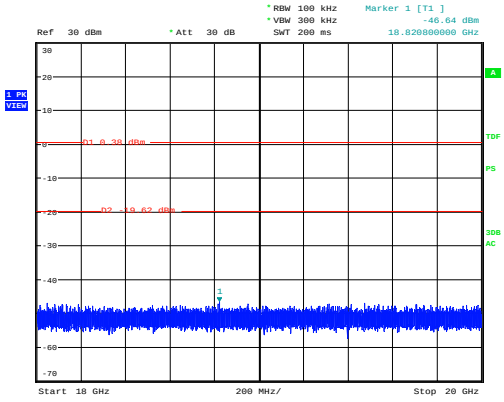
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:01:23



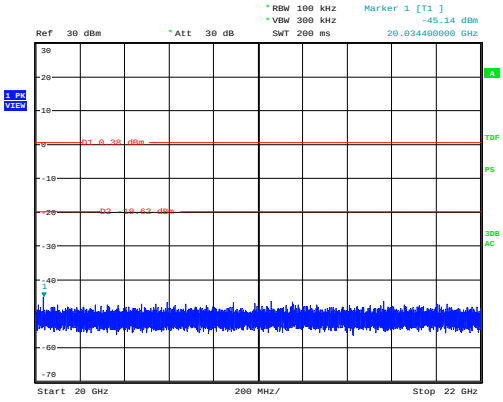
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:01:40



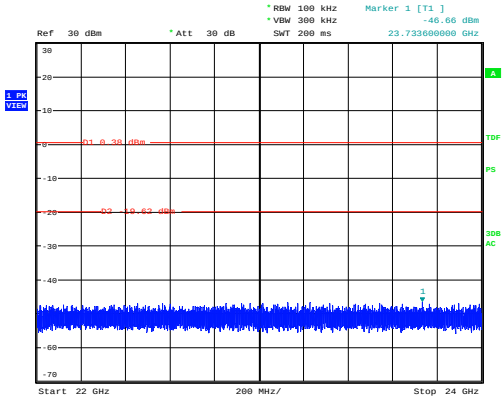
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:01:59



Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:02:15

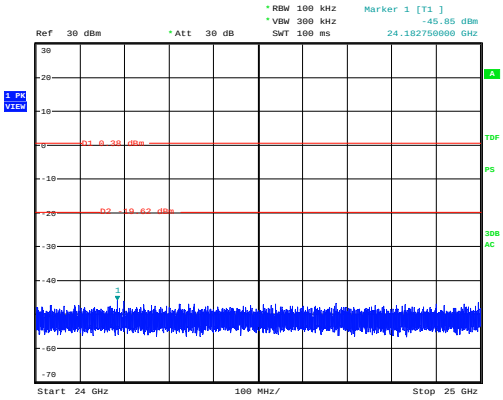


Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:02:33



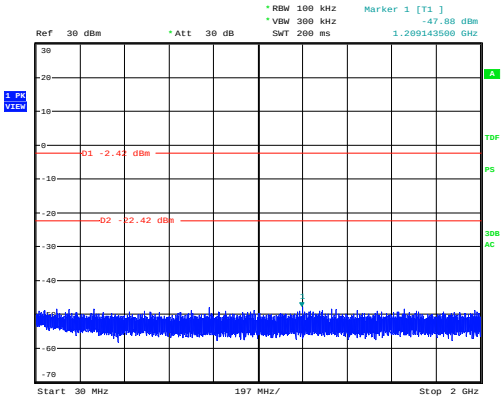
Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:02:50

Figure 48: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (20MHz), Channel 11 (2462MHz)

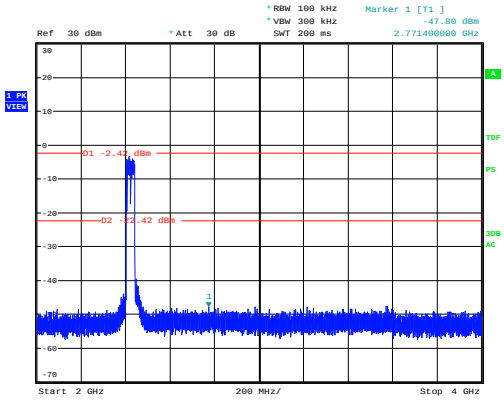


Conducted spurious emissions, mode Cc
Date: 27.SEP.2012 10:03:20

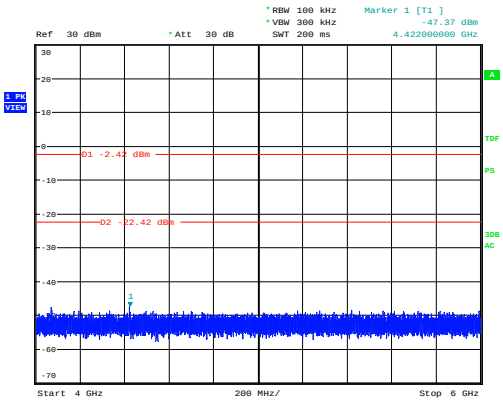
Figure 49: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (40MHz), Channel 1 (2422MHz)



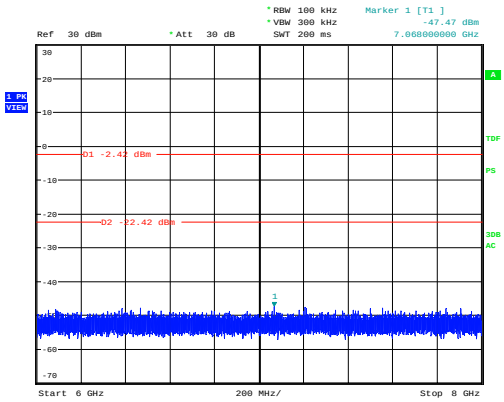
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:17:04



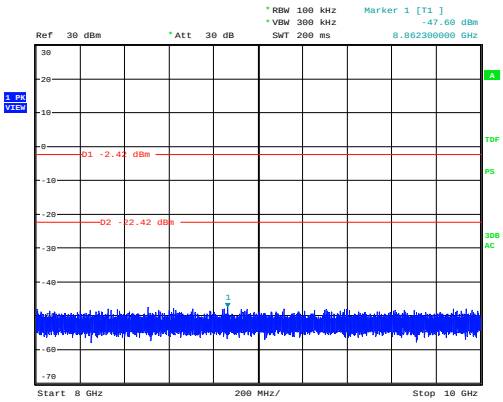
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:17:41



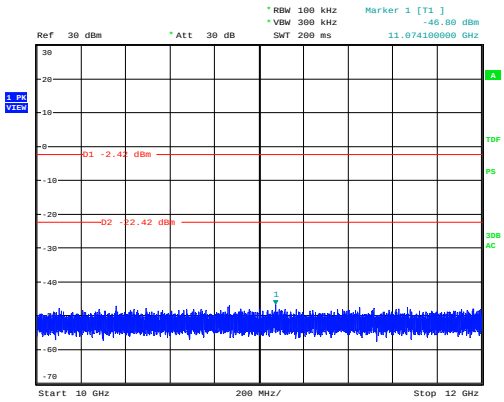
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:17:58



Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:18:15

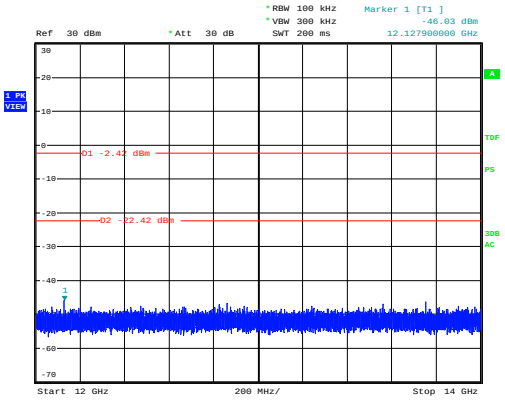


Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:18:32

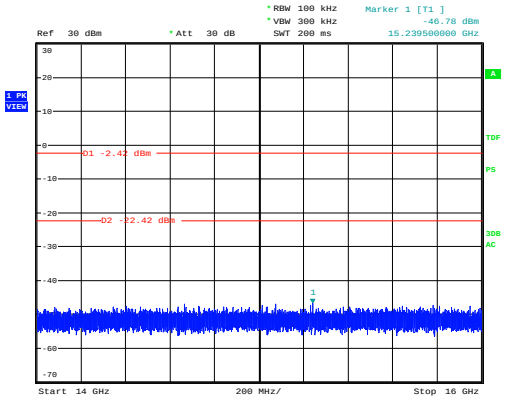


Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:18:47

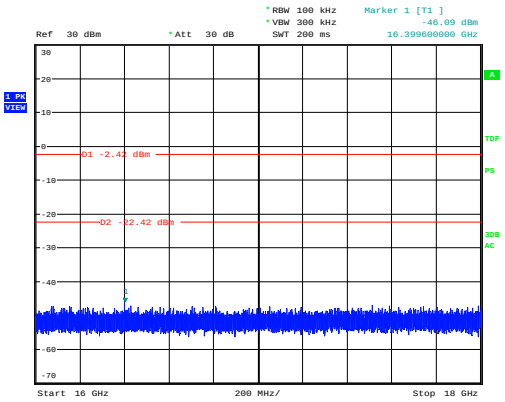
Figure 50: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (40MHz), Channel 1 (2422MHz)



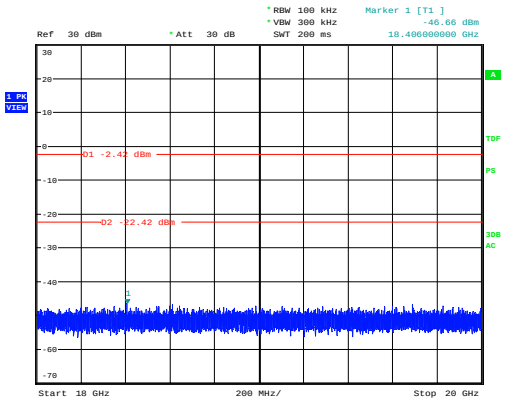
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:19:05



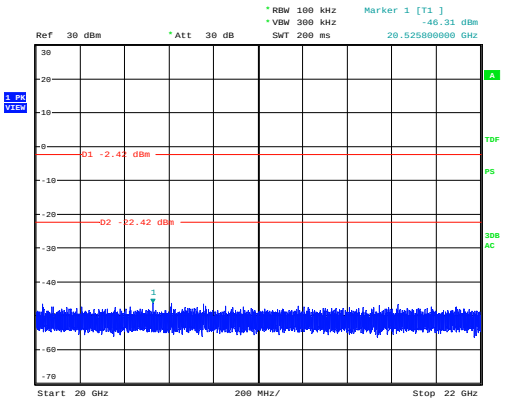
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:19:24



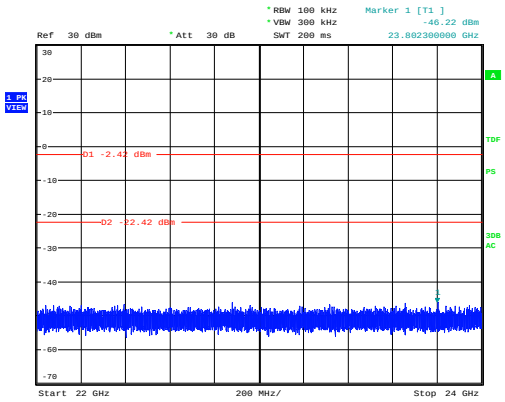
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:19:41



Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:20:02

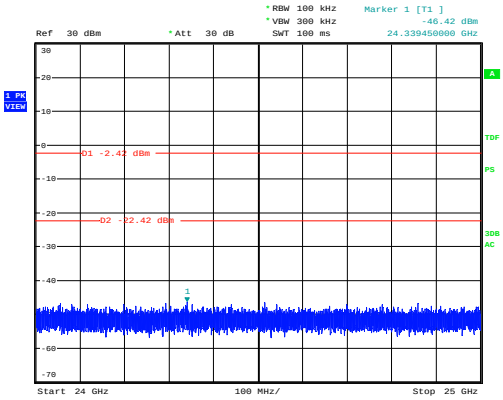


Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:20:19



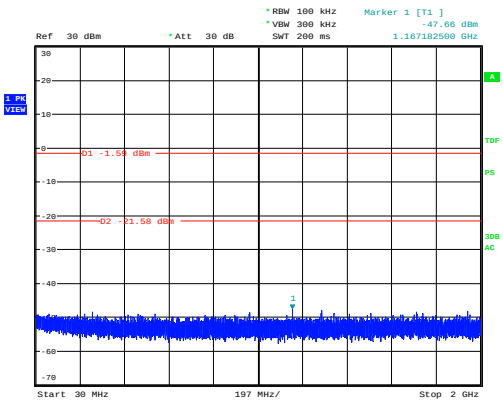
Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:20:36

Figure 51: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (40MHz), Channel 1 (2422MHz)

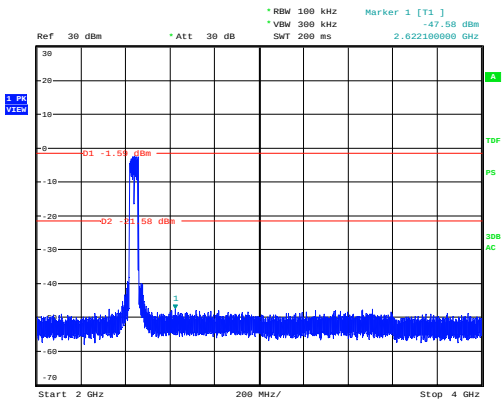


Conducted spurious emissions, mode Ad
Date: 27.SEP.2012 10:20:51

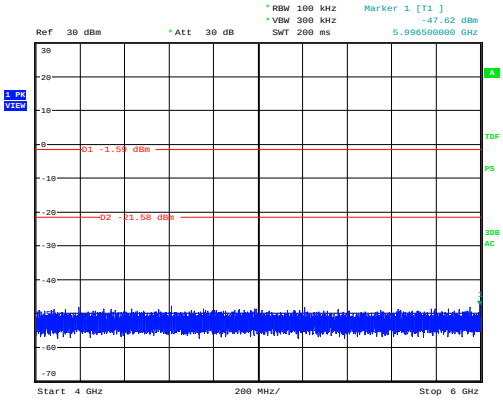
Figure 52: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (40MHz), Channel 4 (2437MHz)



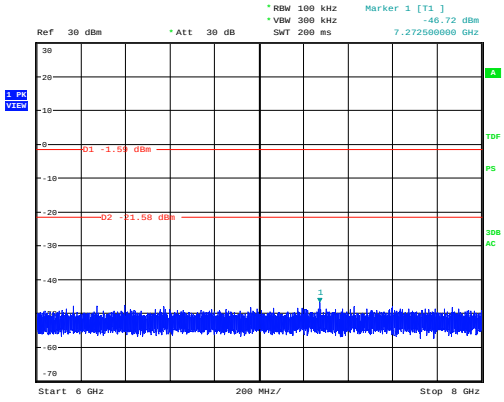
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:26:28



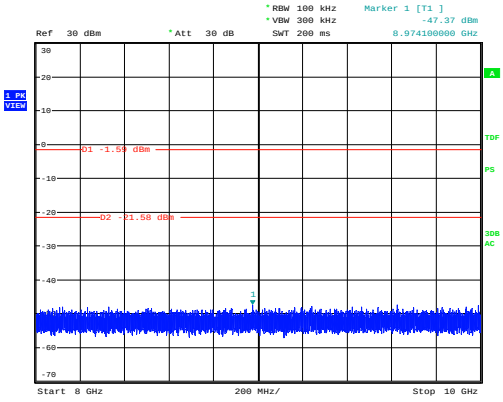
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:27:13



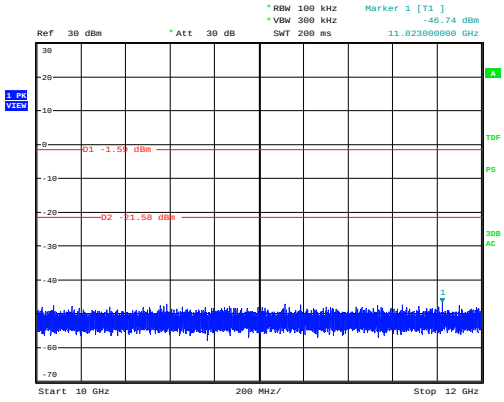
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:27:35



Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:27:51

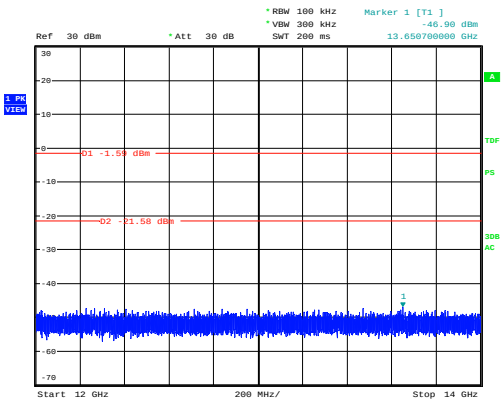


Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:28:08

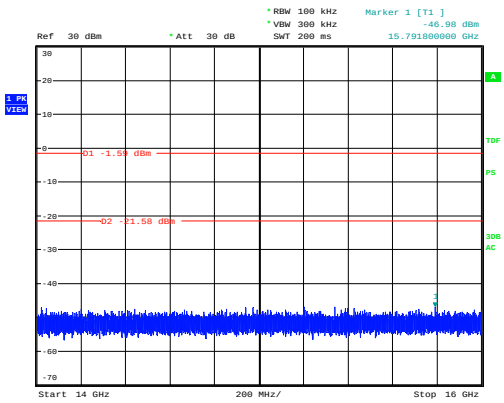


Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:28:24

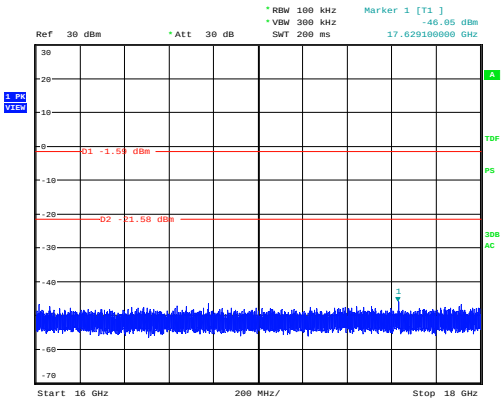
Figure 53: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (40MHz), Channel 4 (2437MHz)



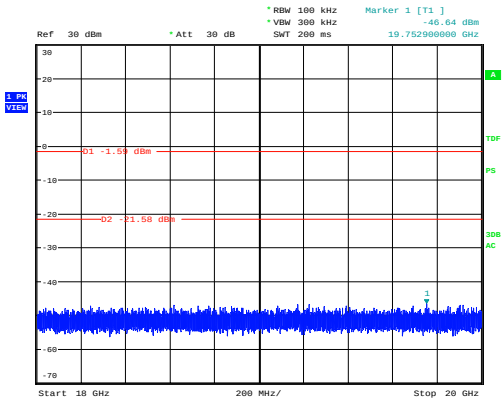
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:28:42



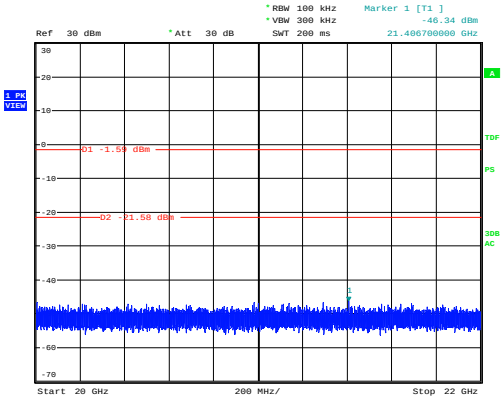
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:28:58



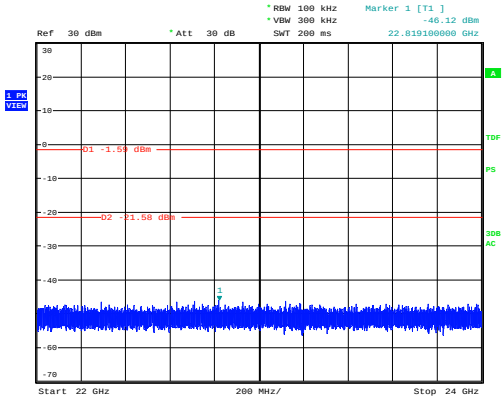
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:29:15



Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:29:32

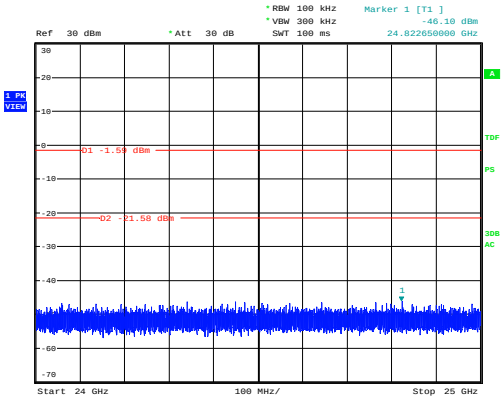


Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:29:48



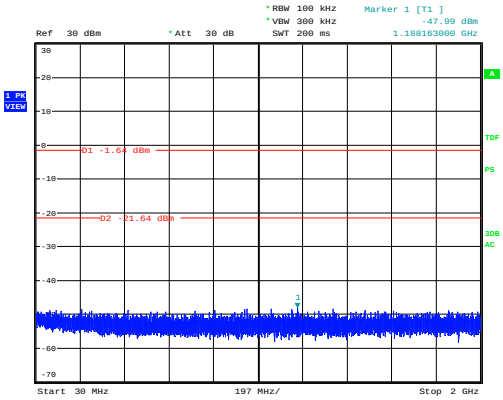
Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:30:04

Figure 54: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (40MHz), Channel 4 (2437MHz)

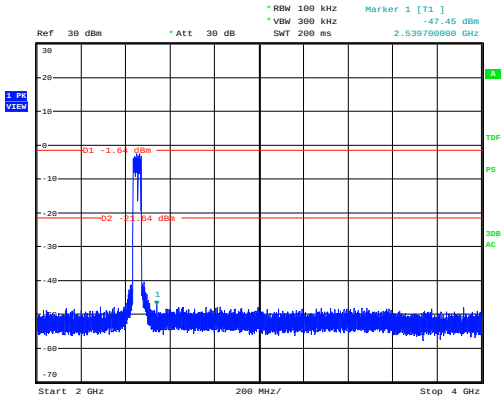


Conducted spurious emissions, mode Bd
Date: 27.SEP.2012 10:30:20

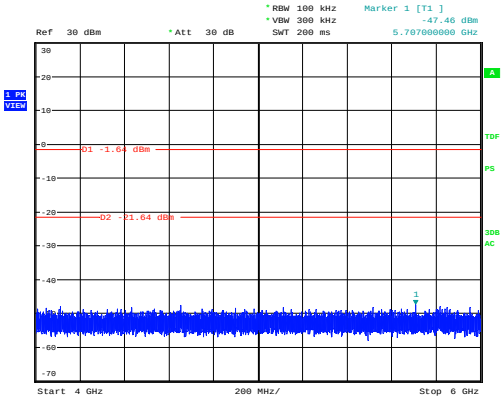
Figure 55: Conducted Spurious Emissions, 30MHz - 12GHz, IEEE 802.11n (40MHz), Channel 7 (2452MHz)



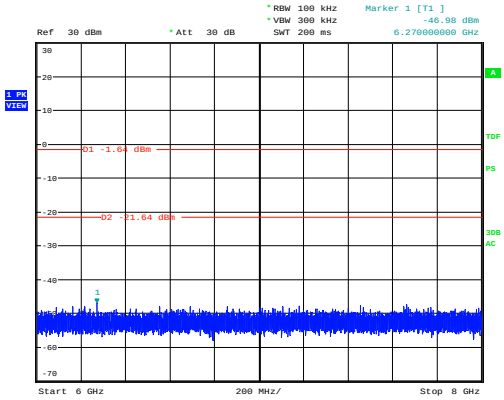
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:36:25



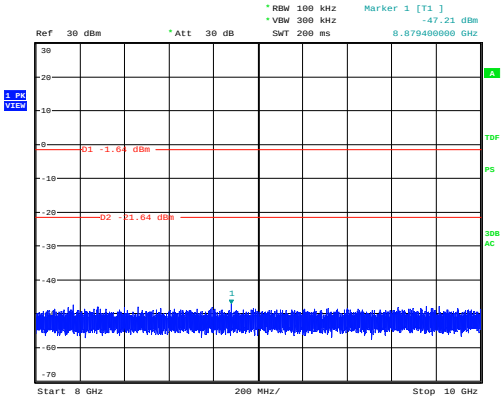
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:37:55



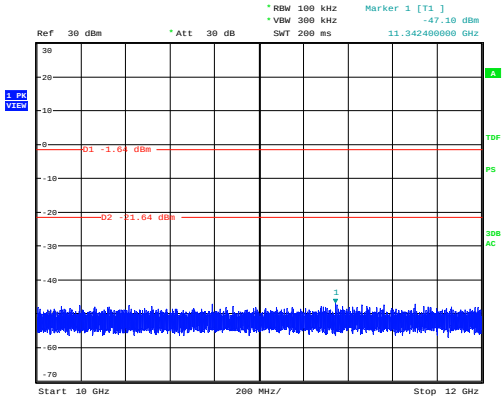
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:38:22



Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:38:39

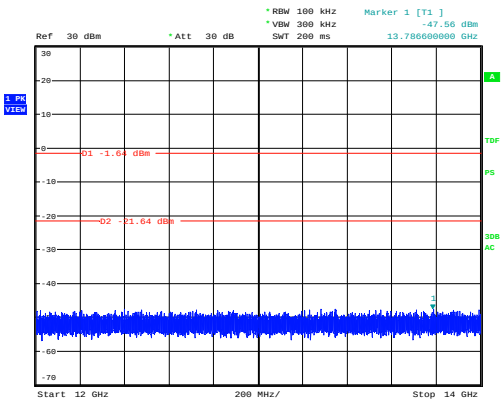


Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:38:57

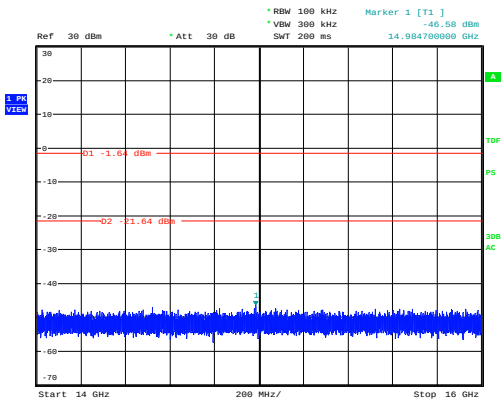


Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:39:15

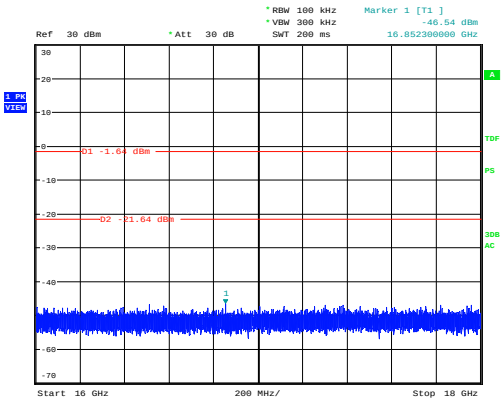
Figure 56: Conducted Spurious Emissions, 12 - 24GHz, IEEE 802.11n (40MHz), Channel 7 (2452MHz)



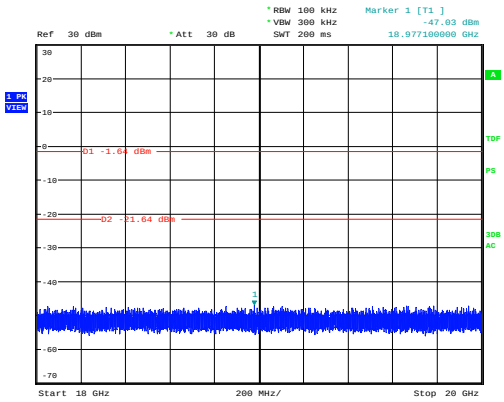
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:39:32



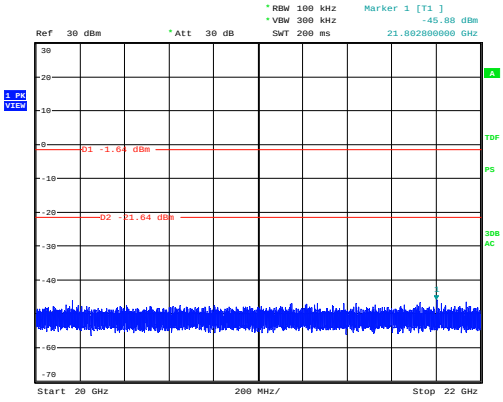
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:39:49



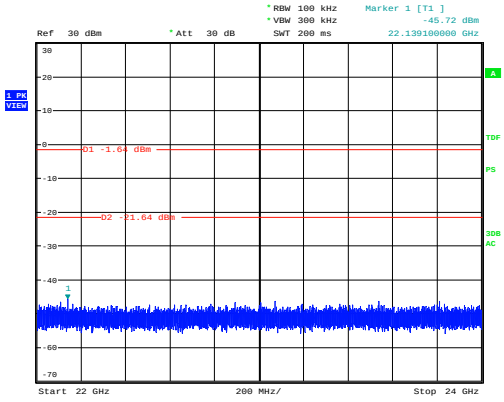
Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:40:05



Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:40:21

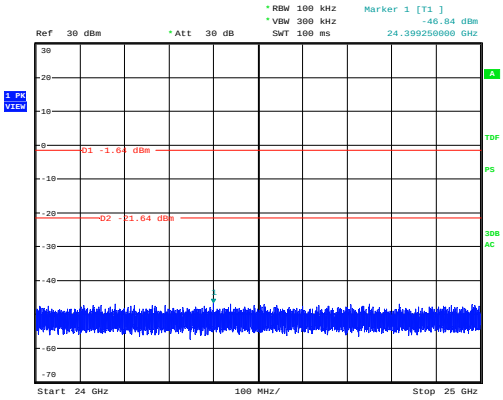


Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:40:37



Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:40:52

Figure 57: Conducted Spurious Emissions, 24 - 25GHz, IEEE 802.11n (40MHz), Channel 7 (2452MHz)



Conducted spurious emissions, mode Cd
Date: 27.SEP.2012 10:41:08

5.2.4 Peak Power Spectral Density

RESULT: **PASS**

Date of testing: 2012-09-26, 2012-09-27

Ambient temperature: 22, 25°C
Relative humidity: 46, 43%
Atmospheric pressure: 1018, 1016hPa

Requirements:

FCC 15.247(e)

For digitally modulated systems, the power spectral density (PSD) conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

Test procedure:

ANSI C63.4-2003 and KDB Publication No. 558074 D01.

The peak power spectral density was measured at the antenna port with a spectrum analyzer using a peak detector with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz. The observed highest power level in a 100kHz band was scaled to an equivalent value in a 3kHz band by adjusting the measured power by a bandwidth correction factor.

The readings of the measurements take into account the loss generated by all the involved cables.

Note:

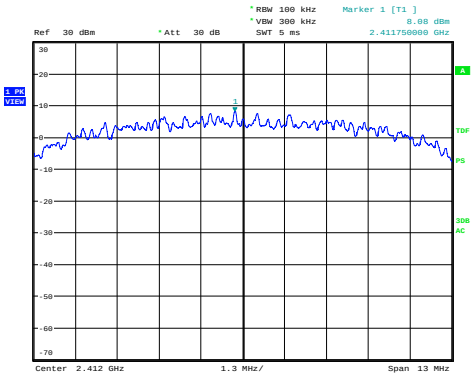
In the tables here below:

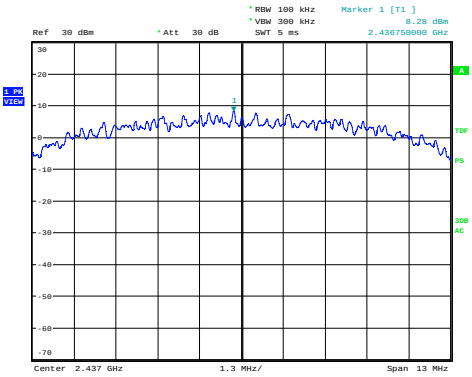
Max PSD in 3kHz band = Max PSD in 100kHz band + Bandwidth correction factor
Bandwidth correction factor = 100kHz to 3kHz bandwidth conversion factor = 10 x log(3kHz / 100kHz)

Table 13: Peak Power Spectral Density, IEEE 802.11b

Operating Frequency [MHz]	Max PSD Frequency [MHz]	Max PSD in 100kHz Band [dBm]	Bandwidth Correction Factor [dB]	Max PSD in 3kHz Band [dBm]	Limit [dBm]	Margin [dB]
2412	2411.8	8.1	-15.2	-7.1	8.0	15.1
2437	2436.8	8.3	-15.2	-6.9	8.0	14.9
2462	2461.8	8.2	-15.2	-7.0	8.0	15.1

Figure 58: Power Spectral Density, IEEE 802.11b





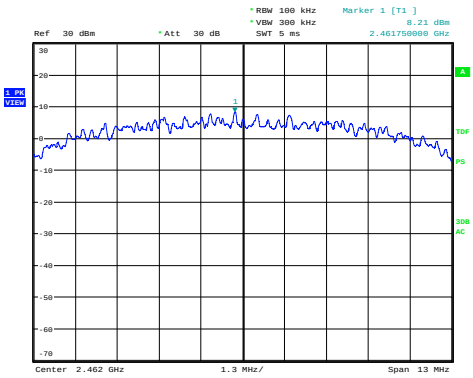


Table 14: Peak Power Spectral Density, IEEE 802.11g

Operating Frequency [MHz]	Max PSD Frequency [MHz]	Max PSD in 100kHz Band [dBm]	Bandwidth Correction Factor [dB]	Max PSD in 3kHz Band [dBm]	Limit [dBm]	Margin [dB]
2412	2406.4	1.6	-15.2	-13.6	8.0	21.6
2417	2411.4	4.5	-15.2	-10.7	8.0	18.7
2437	2431.4	4.8	-15.2	-10.4	8.0	18.4
2457	2450.7	4.9	-15.2	-10.3	8.0	18.3
2462	2456.4	2.3	-15.2	-12.9	8.0	20.9

Figure 59: Power Spectral Density, IEEE 802.11g

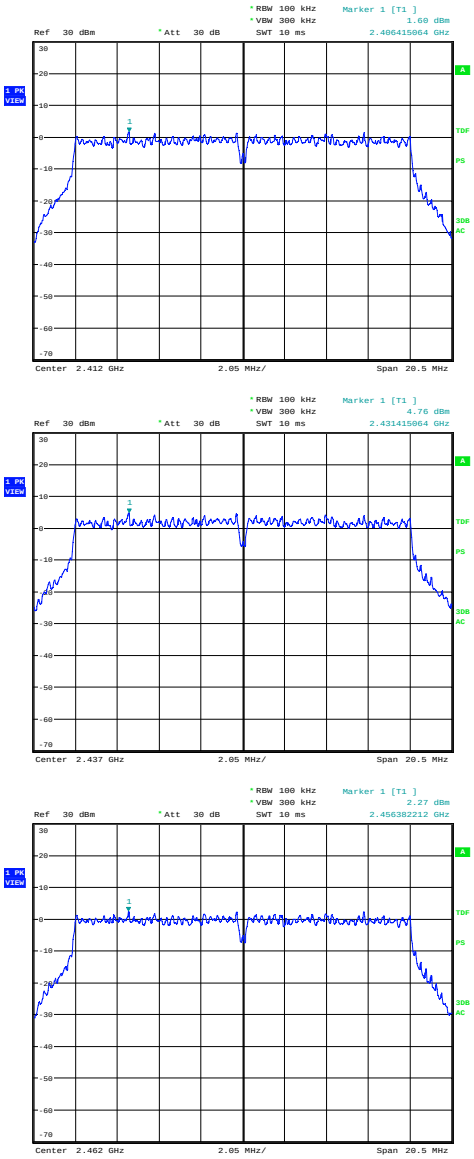


Table 15: Peak Power Spectral Density, IEEE 802.11n (20MHz)

Operating Frequency [MHz]	Max PSD Frequency [MHz]	Max PSD in 100kHz Band [dBm]	Bandwidth Correction Factor [dB]	Max PSD in 3kHz Band [dBm]	Limit [dBm]	Margin [dB]
2412	2409.1	-0.9	-15.2	-16.1	8.0	24.1
2417	2411.6	2.8	-15.2	-12.4	8.0	20.4
2437	2434.1	3.7	-15.2	-11.5	8.0	19.5
2457	2454.1	3.9	-15.2	-11.3	8.0	19.3
2462	2459.1	0.4	-15.2	-14.8	8.0	22.8

Figure 60: Power Spectral Density, IEEE 802.11n (20MHz)

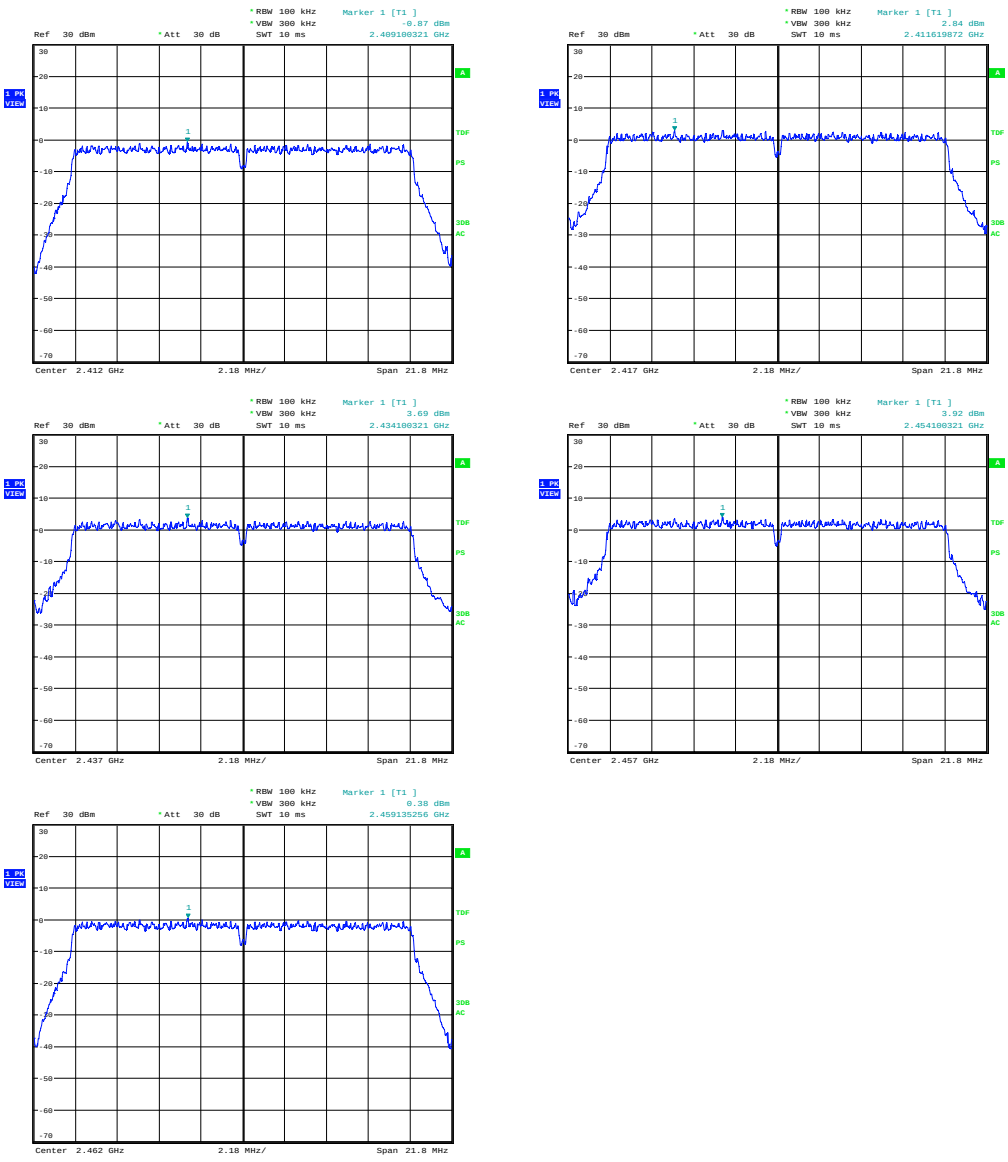
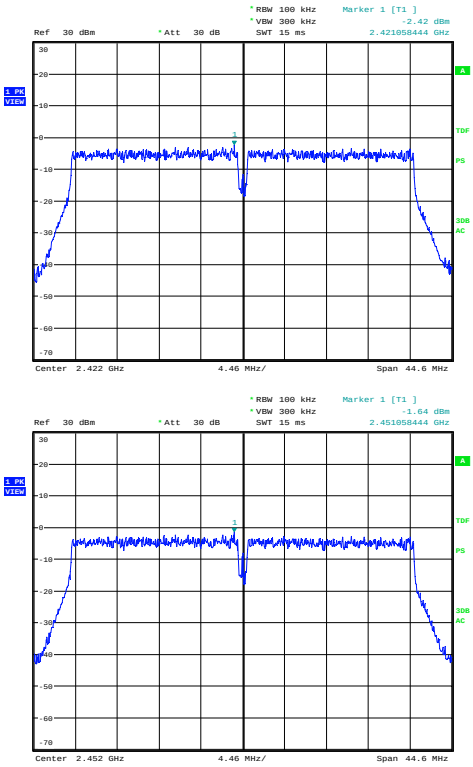


Table 16: Peak Power Spectral Density, IEEE 802.11n (40MHz)

Operating Frequency [MHz]	Max PSD Frequency [MHz]	Max PSD in 100kHz Band [dBm]	Bandwidth Correction Factor [dB]	Max PSD in 3kHz Band [dBm]	Limit [dBm]	Margin [dB]
2422	2421.1	-2.4	-15.2	-17.6	8.0	25.6
2437	2436.1	-1.6	-15.2	-16.8	8.0	24.8
2452	2451.1	-1.6	-15.2	-16.8	8.0	24.8

Figure 61: Power Spectral Density, IEEE 802.11n (40MHz)



5.3 Radiated Measurements

5.3.1 Radiated Spurious Emissions of Transmitter

RESULT: **PASS**

Date of testing:	2012-09-14 till 2012-09-26
Ambient temperature:	20 to 23°C
Relative humidity:	46 to 61%
Atmospheric pressure:	1003 to 1018hPa
Frequency range:	9kHz - 25GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

FCC 15.205, FCC 15.209 and FCC 15.247(d)

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

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a) or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

Test procedure:

ANSI C63.4-2003 and KDB Publication No. 558074 D01.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X, Y) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 9kHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

For emissions between 30MHz and 1GHz, measurements were performed with a test receiver operating in the CISPR quasi-peak detection mode. The receiver's 6dB bandwidth was set to 120kHz. For emissions above 1GHz, measurements were

performed with a spectrum analyzer using the following settings: for peak field strength: RBW = 1MHz & VBW ≥ 1MHz; for average field strength: RBW = 1MHz & VBW = 10Hz.

Prechecks were performed in all radio protocols and channels specified in section 4.2 in the range 30MHz-1GHz. Since similar results were obtained for all channels, final data was taken with each radio protocol for the middle channel only (mode B) in the range 30MHz-1GHz. Final data was taken with each radio protocol for all channels in the range 1-25GHz (modes A, B, C).

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

No spurious emission was found in the range 9kHz - 30MHz.

Table 17: Radiated Emissions, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dBµV]	Factor [dB(1/m)]	Level QP [dBµV/m]	Limit [dBµV/m]	Margin QP [dB]	Height [cm]	Angle [°]
32.048	Y / V	45.9	-16.3	29.6	40.0	10.4	100	359
42.410	Y / V	46.0	-18.6	27.4	40.0	12.6	179	303
54.068	Y / H	50.6	-20.0	30.6	40.0	9.4	399	188
55.248	Y / V	57.8	-20.2	37.6	40.0	2.4 (*)	100	299
58.799	Y / V	52.9	-20.5	32.4	40.0	7.6	106	93
59.702	Y / H	46.3	-20.3	26.0	40.0	14.0	276	198
66.542	Y / V	53.4	-20.2	33.2	40.0	6.8	101	72
66.663	Y / H	49.2	-20.3	28.9	40.0	11.1	399	359
71.408	Y / V	52.2	-20.1	32.1	40.0	7.9	100	181
95.605	Y / V	45.5	-18.8	26.7	43.5	16.8	102	268
105.788	Y / H	45.3	-18.5	26.8	43.5	16.7	287	286
115.221	Y / H	57.6	-17.6	40.0	43.5	3.5 (*)	178	257
127.957	Y / H	49.8	-16.8	33.0	43.5	10.5	249	235
139.387	Y / H	46.3	-16.3	30.0	43.5	13.5	350	124
152.061	Y / H	52.2	-15.8	36.4	43.5	7.1	221	104
170.066	Y / V	48.5	-14.7	33.8	43.5	9.7	100	226
176.141	Y / H	47.4	-15.0	32.4	43.5	11.1	107	281
176.829	Y / V	39.2	-14.1	25.1	43.5	18.4	102	218
182.106	Y / V	47.5	-13.5	34.0	43.5	9.5	101	221
188.728	Y / V	41.6	-13.1	28.5	43.5	15.0	102	247
188.869	Y / H	45.3	-14.0	31.3	43.5	12.2	184	176
195.024	Y / H	46.1	-13.5	32.6	43.5	10.9	175	169
201.191	Y / V	37.1	-12.4	24.7	43.5	18.8	101	1
250.030	Y / H	51.2	-10.9	40.3	46.0	5.7	140	89
374.996	Y / H	52.8	-11.6	41.2	46.0	4.8	100	1
480.035	Y / V	42.8	-8.5	34.3	46.0	11.7	115	57
500.065	Y / H	47.0	-8.6	38.4	46.0	7.6	101	45
625.006	Y / V	44.1	-5.8	38.3	46.0	7.7	174	132
750.100	Y / H	44.5	-4.6	39.9	46.0	6.1	100	226
874.994	Y / H	40.5	-3.1	37.4	46.0	8.6	101	22

Note: Level QP = Reading QP + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 18: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1439.994	X / H	51.9	-15.1	36.8	54.0	17.2	103	197
1589.795	X / V	49.2	-14.4	34.8	54.0	19.2	145	285
1919.964	X / H	64.5	-14.0	50.5	54.0	3.5 (*)	104	70
1919.990	X / V	63.0	-14.0	49.0	54.0	5.0	150	236

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 19: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1439.994	X / H	60.2	-15.1	45.1	74.0	28.9	103	197
1589.795	X / V	57.5	-14.4	43.1	74.0	30.9	145	285
1919.964	X / H	72.4	-14.0	58.4	74.0	15.6	104	70
1919.990	X / V	71.0	-14.0	57.0	74.0	17.0	150	236

Note: Level PK = Reading PK + Factor

Table 20: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1199.856	Y / V	42.7	-15.8	26.9	54.0	27.1	196	228
1439.915	Y / V	48.0	-15.1	32.9	54.0	21.1	144	152
1499.793	Y / V	45.1	-14.7	30.4	54.0	23.6	100	286
1589.787	Y / V	49.4	-14.4	35.0	54.0	19.0	100	288
1589.787	Y / V	49.9	-14.4	35.5	54.0	18.5	139	285
1919.990	Y / H	62.6	-14.0	48.6	54.0	5.4	104	193
1919.995	Y / V	63.7	-14.0	49.7	54.0	4.3 (*)	104	226
4872.023	Y / H	44.4	-9.2	35.2	54.0	18.8	114	204
6498.547	Y / V	49.9	-6.0	43.9	54.0	10.1	100	161

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 21: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1199.856	Y / V	56.4	-15.8	40.6	74.0	33.4	196	228
1439.915	Y / V	58.2	-15.1	43.1	74.0	30.9	144	152
1499.793	Y / V	57.9	-14.7	43.2	74.0	30.8	100	286
1589.787	Y / V	60.2	-14.4	45.8	74.0	28.2	100	288
1589.787	Y / V	57.8	-14.4	43.4	74.0	30.6	139	285
1919.990	Y / H	70.6	-14.0	56.6	74.0	17.4	104	193
1919.995	Y / V	72.1	-14.0	58.1	74.0	15.9	104	226
4872.023	Y / H	57.6	-9.2	48.4	74.0	25.6	114	204
6498.547	Y / V	55.9	-6.0	49.9	74.0	24.1	100	161

Note: Level PK = Reading PK + Factor

Table 22: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1440.006	X / H	49.8	-15.1	34.7	54.0	19.3	105	208
1499.867	X / V	47.8	-14.7	33.1	54.0	20.9	148	286
1589.781	X / V	49.4	-14.4	35.0	54.0	19.0	101	279
1589.799	X / V	49.8	-14.4	35.4	54.0	18.6	128	251
1919.979	X / H	66.3	-14.0	52.3	54.0	1.7 (*)	105	58
1920.026	X / V	65.2	-14.0	51.2	54.0	2.8 (*)	107	235

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 23: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1440.006	X / H	59.3	-15.1	44.2	74.0	29.8	105	208
1499.867	X / V	56.0	-14.7	41.3	74.0	32.7	148	286
1589.781	X / V	60.5	-14.4	46.1	74.0	27.9	101	279
1589.799	X / V	58.8	-14.4	44.4	74.0	29.6	128	251
1919.979	X / H	74.6	-14.0	60.6	74.0	13.4	105	58
1920.026	X / V	73.5	-14.0	59.5	74.0	14.5	107	235

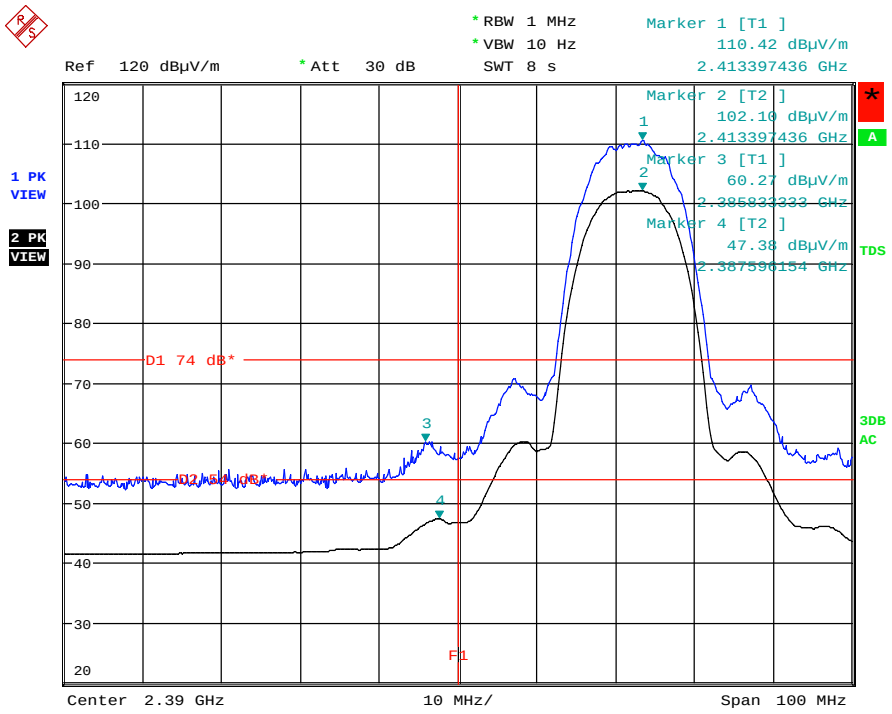
Note: Level PK = Reading PK + Factor

Table 24: Radiated Emissions at Band Edge, Average and Peak Data, Horizontal and Vertical Antenna Orientations, IEEE 802.11b, Channel 1 (2412MHz) and 11 (2462MHz)

Operating Frequency [MHz]	EUT / Antenna Orientation	Level AV [dBµV/m]	Level PK [dBµV/m]	Limit AV [dBµV/m]	Limit PK [dBµV/m]	Margin AV [dB]	Margin PK [dB]
2412	Y / V	47.38	60.27	54.00	74.00	6.62	13.73
2462	Y / V	44.85	58.65	54.00	74.00	9.15	15.35

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
Average limit in dBµV/m is calculated as follows: Average limit = 20 x log(500µV/m).
Peak limit in dBµV/m is calculated as follows: Peak limit = Average limit + 20dB.

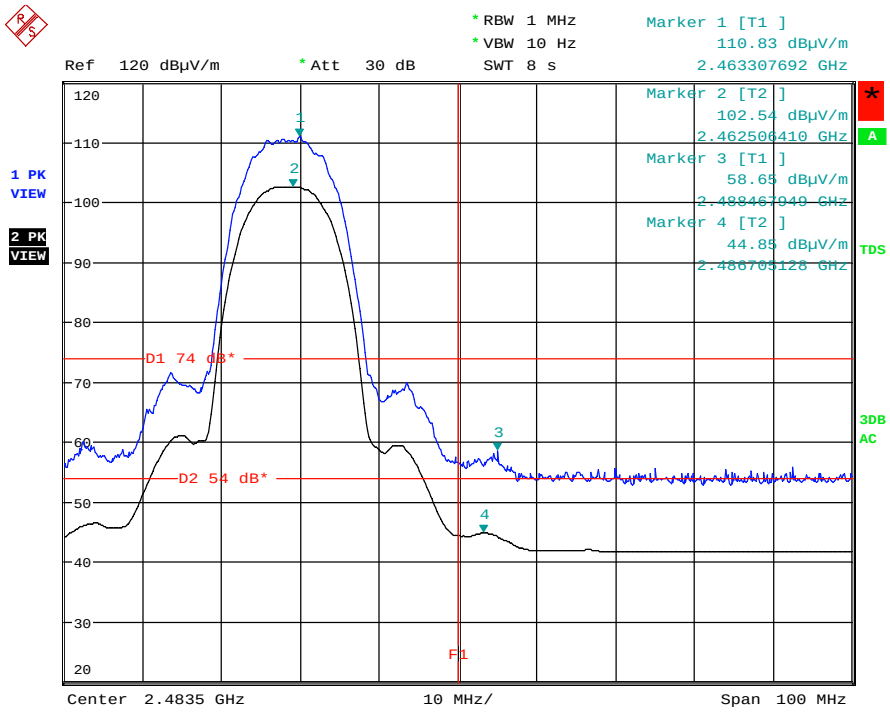
Figure 62: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11b, Channel 1 (2412MHz)



Band Edge, Vert, Mode Aa, Pos. Y
Date: 14.SEP.2012 17:53:00

Note: The upper trace shows the peak value and the lower trace shows the average value.

Figure 63: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11b, Channel 11 (2462MHz)



Band Edge, Vert, Mode Ca, Pos. Y
Date: 14.SEP.2012 17:56:19

Note: The upper trace shows the peak value and the lower trace shows the average value.

Table 25: Radiated Emissions, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dBµV]	Factor [dB(1/m)]	Level QP [dBµV/m]	Limit [dBµV/m]	Margin QP [dB]	Height [cm]	Angle [°]
32.053	Y / V	47.1	-16.4	30.7	40.0	9.3	100	199
42.127	Y / V	50.5	-18.6	31.9	40.0	8.1	101	279
54.075	Y / H	51.0	-20.0	31.0	40.0	9.0	231	189
55.250	Y / V	57.8	-20.2	37.6	40.0	2.4 (*)	100	306
58.722	Y / V	52.8	-20.5	32.3	40.0	7.7	100	89
58.901	Y / H	47.9	-20.2	27.7	40.0	12.3	269	203
66.663	Y / V	53.3	-20.2	33.1	40.0	6.9	101	89
66.665	Y / H	49.2	-20.3	28.9	40.0	11.1	400	351
72.800	Y / V	52.3	-20.1	32.2	40.0	7.8	100	177
96.420	Y / V	45.9	-18.7	27.2	43.5	16.3	100	277
105.302	Y / H	46.7	-18.5	28.2	43.5	15.3	285	285
115.779	Y / H	54.1	-17.6	36.5	43.5	7.0	179	255
127.847	Y / H	49.3	-16.8	32.5	43.5	11.0	254	242
139.191	Y / H	49.3	-16.3	33.0	43.5	10.5	253	116
151.277	Y / V	47.0	-16.0	31.0	43.5	12.5	237	211
151.324	Y / H	52.2	-15.8	36.4	43.5	7.1	171	114
169.942	Y / V	48.6	-14.7	33.9	43.5	9.6	102	224
175.930	Y / V	49.4	-14.2	35.2	43.5	8.3	101	218
176.345	Y / H	45.6	-15.0	30.6	43.5	12.9	124	288
181.950	Y / V	47.6	-13.5	34.1	43.5	9.4	102	226
188.316	Y / V	47.9	-13.1	34.8	43.5	8.7	104	231
189.480	Y / H	45.7	-14.0	31.7	43.5	11.8	182	175
195.326	Y / V	33.5	-12.8	20.7	43.5	22.8	101	187
250.034	Y / H	51.2	-10.9	40.3	46.0	5.7	139	87
374.999	Y / H	52.6	-11.6	41.0	46.0	5.0	100	238
480.025	Y / V	42.3	-8.5	33.8	46.0	12.2	101	60
500.066	Y / H	47.6	-8.6	39.0	46.0	7.0	101	46
625.000	Y / V	43.9	-5.8	38.1	46.0	7.9	171	162
750.008	Y / V	42.6	-4.5	38.1	46.0	7.9	167	179
750.095	Y / H	44.6	-4.6	40.0	46.0	6.0	100	228
851.173	Y / H	39.9	-3.3	36.6	46.0	9.4	102	193

Note: Level QP = Reading QP + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 26: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1439.967	X / V	48.4	-15.1	33.3	54.0	20.7	104	159
1589.774	X / V	47.1	-14.4	32.7	54.0	21.3	100	267
1919.923	X / H	64.4	-14.0	50.4	54.0	3.6 (*)	101	72
1919.977	X / V	62.4	-14.0	48.4	54.0	5.6	134	139

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 27: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1439.967	X / V	58.4	-15.1	43.3	74.0	30.7	104	159
1589.774	X / V	58.2	-14.4	43.8	74.0	30.2	100	267
1919.923	X / H	72.9	-14.0	58.9	74.0	15.1	101	72
1919.977	X / V	70.9	-14.0	56.9	74.0	17.1	134	139

Note: Level PK = Reading PK + Factor

Table 28: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 2 (2417MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1199.879	X / V	41.6	-15.8	25.8	54.0	28.2	169	318
1439.964	X / H	48.5	-15.1	33.4	54.0	20.6	133	121
1559.756	X / V	51.4	-14.5	36.9	54.0	17.1	135	285
1593.818	X / V	42.3	-14.4	27.9	54.0	26.1	107	286
1919.961	X / H	65.8	-14.0	51.8	54.0	2.2 (*)	101	54
1920.035	X / V	64.8	-14.0	50.8	54.0	3.2 (*)	100	310
7257.059	X / V	39.9	-4.7	35.2	54.0	18.8	149	149

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 29: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 2 (2417MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1199.879	X / V	54.6	-15.8	38.8	74.0	35.2	169	318
1439.964	X / H	58.7	-15.1	43.6	74.0	30.4	133	121
1559.756	X / V	57.7	-14.5	43.2	74.0	30.8	135	285
1593.818	X / V	58.3	-14.4	43.9	74.0	30.1	107	286
1919.961	X / H	74.2	-14.0	60.2	74.0	13.8	101	54
1920.035	X / V	72.3	-14.0	58.3	74.0	15.7	100	310
7257.059	X / V	53.1	-4.7	48.4	74.0	25.6	149	149

Note: Level PK = Reading PK + Factor

Table 30: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1395.278	Y / V	42.4	-15.2	27.2	54.0	26.8	100	258
1439.930	Y / H	51.0	-15.1	35.9	54.0	18.1	101	197
1559.809	Y / V	48.8	-14.5	34.3	54.0	19.7	192	283
1919.929	Y / V	64.5	-14.0	50.5	54.0	3.5 (*)	101	299
1919.979	Y / H	63.6	-14.0	49.6	54.0	4.4 (*)	105	48
2314.587	Y / H	47.1	-13.5	33.6	54.0	20.4	128	120
4875.630	Y / V	41.5	-9.1	32.4	54.0	21.6	126	144
6498.541	Y / V	49.4	-6.0	43.4	54.0	10.6	100	204
7307.568	Y / H	43.0	-4.6	38.4	54.0	15.6	121	214

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 31: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1395.278	Y / V	59.0	-15.2	43.8	74.0	30.2	100	258
1439.930	Y / H	59.6	-15.1	44.5	74.0	29.5	101	197
1559.809	Y / V	55.8	-14.5	41.3	74.0	32.7	192	283
1919.929	Y / V	71.5	-14.0	57.5	74.0	16.5	101	299
1919.979	Y / H	71.4	-14.0	57.4	74.0	16.6	105	48
2314.587	Y / H	60.9	-13.5	47.4	74.0	26.6	128	120
4875.630	Y / V	54.4	-9.1	45.3	74.0	28.7	126	144
6498.541	Y / V	56.2	-6.0	50.2	74.0	23.8	100	204
7307.568	Y / H	57.4	-4.6	52.8	74.0	21.2	121	214
1395.278	Y / V	59.0	-15.2	43.8	74.0	30.2	100	258

Note: Level PK = Reading PK + Factor

Table 32: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 10 (2457MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1394.818	Y / V	42.4	-15.2	27.2	54.0	26.8	100	260
1439.941	Y / H	49.7	-15.1	34.6	54.0	19.4	101	86
1919.932	Y / H	65.2	-14.0	51.2	54.0	2.8 (*)	102	83
1919.936	Y / V	64.6	-14.0	50.6	54.0	3.4 (*)	102	231

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 33: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 10 (2457MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1394.818	Y / V	59.9	-15.2	44.7	74.0	29.3	100	260
1439.941	Y / H	59.5	-15.1	44.4	74.0	29.6	101	86
1919.932	Y / H	73.1	-14.0	59.1	74.0	14.9	102	83
1919.936	Y / V	70.9	-14.0	56.9	74.0	17.1	102	231

Note: Level PK = Reading PK + Factor

Table 34: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1374.985	Y / H	46.6	-15.2	31.4	54.0	22.6	101	1
1395.207	Y / V	41.4	-15.2	26.2	54.0	27.8	101	255
1439.915	Y / H	51.8	-15.1	36.7	54.0	17.3	102	210
1589.825	Y / V	49.1	-14.4	34.7	54.0	19.3	102	287
1590.290	Y / V	46.7	-14.4	32.3	54.0	21.7	101	275
1860.131	Y / V	40.1	-14.0	26.1	54.0	27.9	133	134
1919.931	Y / V	62.8	-14.0	48.8	54.0	5.2	102	223
1919.976	Y / H	65.4	-14.0	51.4	54.0	2.6 (*)	101	84
6565.213	Y / V	47.1	-5.9	41.2	54.0	12.8	102	152

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 35: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11g, Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1374.985	Y / H	56.6	-15.2	41.4	74.0	32.6	101	1
1395.207	Y / V	55.3	-15.2	40.1	74.0	33.9	101	255
1439.915	Y / H	59.9	-15.1	44.8	74.0	29.2	102	210
1589.825	Y / V	60.0	-14.4	45.6	74.0	28.4	102	287
1590.290	Y / V	59.6	-14.4	45.2	74.0	28.8	101	275
1860.131	Y / V	61.4	-14.0	47.4	74.0	26.6	133	134
1919.931	Y / V	71.0	-14.0	57.0	74.0	17.0	102	223
1919.976	Y / H	72.5	-14.0	58.5	74.0	15.5	101	84
6565.213	Y / V	54.9	-5.9	49.0	74.0	25.0	102	152

Note: Level PK = Reading PK + Factor

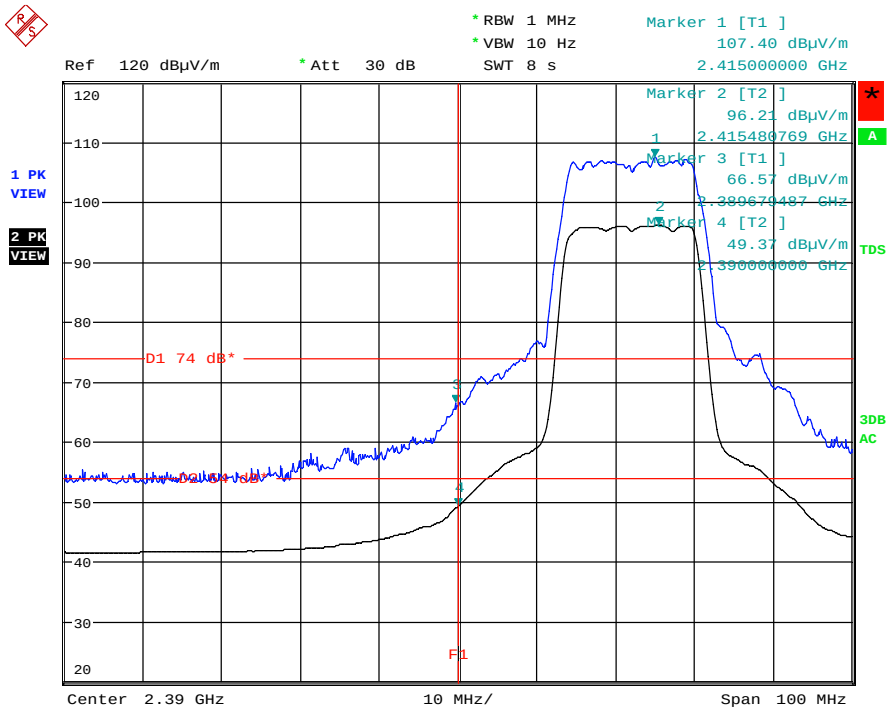
Table 36: Radiated Emissions at Band Edge, Average and Peak Data, Horizontal and Vertical Antenna Orientations, IEEE 802.11g

Operating Frequency [MHz]	EUT / Antenna Orientation	Level AV [dBµV/m]	Level PK [dBµV/m]	Limit AV [dBµV/m]	Limit PK [dBµV/m]	Margin AV [dB]	Margin PK [dB]
2412	Y / V	49.37	66.57	54.00	74.00	4.63 (*)	7.43
2417	Y / V	49.17	65.98	54.00	74.00	4.83	8.02
2457	Y / V	51.27	70.11	54.00	74.00	2.73 (*)	3.89 (*)
2462	Y / V	50.85	71.49	54.00	74.00	3.15 (*)	2.51 (*)

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
Average limit in dBµV/m is calculated as follows: Average limit = 20 x log(500µV/m).
Peak limit in dBµV/m is calculated as follows: Peak limit = Average limit + 20dB.

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

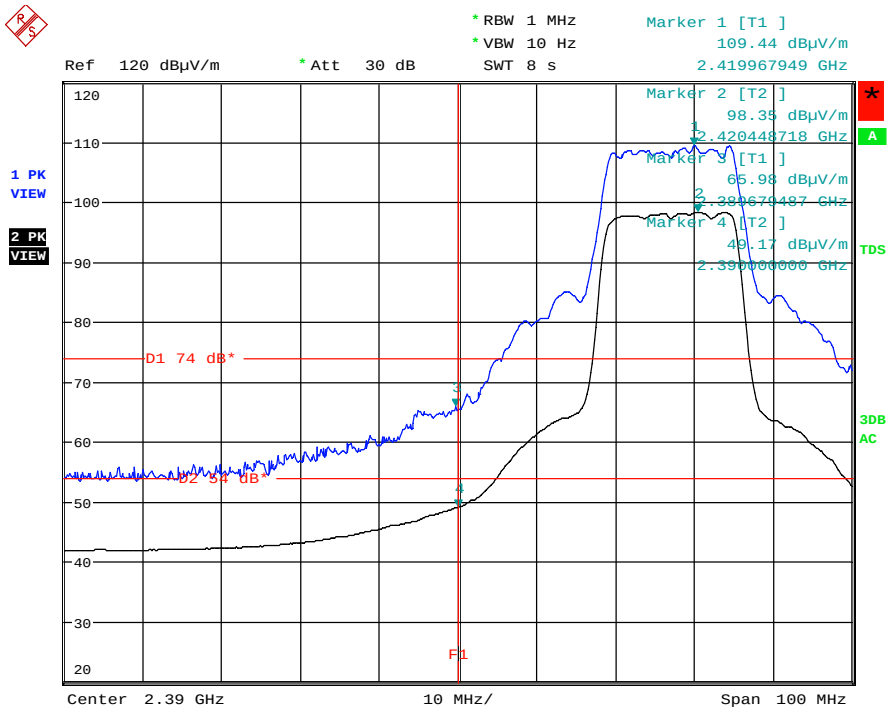
Figure 64: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11g, Channel 1 (2412MHz)



Band Edge, Vert, Mode Ab, Pos. Y
Date: 14.SEP.2012 17:45:00

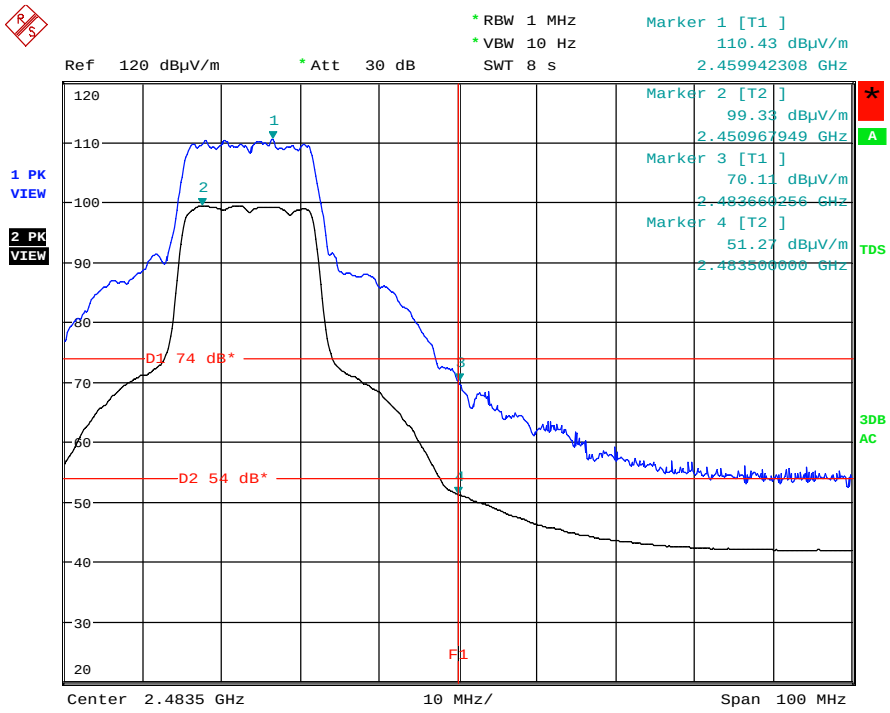
Note: The upper trace shows the peak value and the lower trace shows the average value.

Figure 65: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11g, Channel 2 (2417MHz)



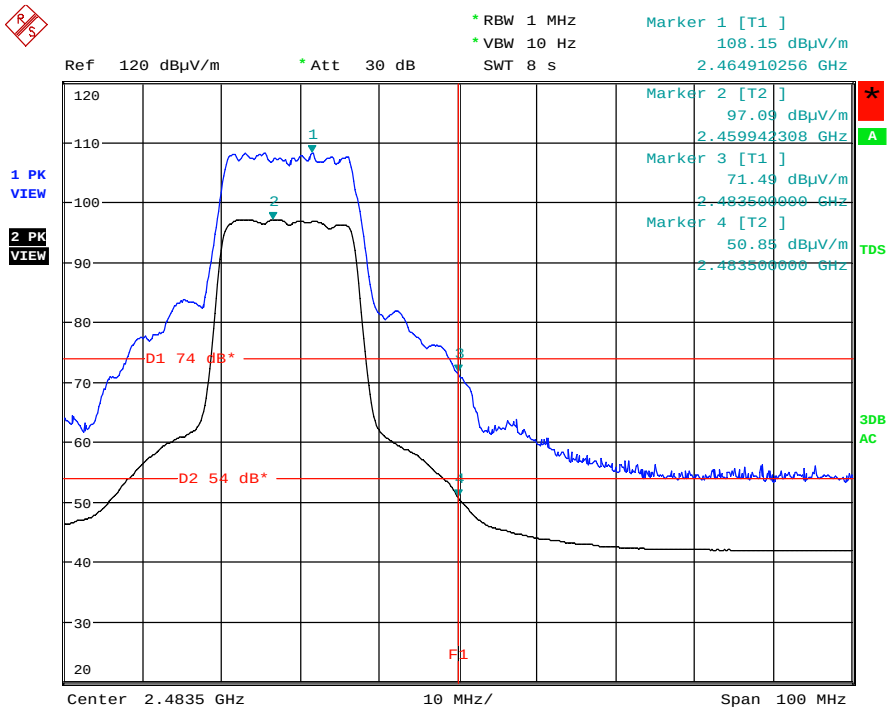
Band Edge, Vert, 2ch, Pos. Y
Date: 14.SEP.2012 18:19:09

Figure 66: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11g, Channel 10 (2457MHz)



Band Edge, Vert, 10ch, Pos. Y
Date: 14.SEP.2012 18:22:09

Figure 67: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11g, Channel 11 (2462MHz)



Band Edge, Vert, Mode Cb, Pos. Y
Date: 14.SEP.2012 17:48:48

Note: The upper trace shows the peak value and the lower trace shows the average value.

Table 37: Radiated Emissions, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dBµV]	Factor [dB(1/m)]	Level QP [dBµV/m]	Limit [dBµV/m]	Margin QP [dB]	Height [cm]	Angle [°]
30.559	Y / V	42.0	-16.1	25.9	40.0	14.1	102	179
32.058	Y / H	44.1	-16.2	27.9	40.0	12.1	102	359
42.063	Y / V	50.1	-18.6	31.5	40.0	8.5	100	281
54.081	Y / H	50.3	-20.0	30.3	40.0	9.7	399	186
55.243	Y / V	58.0	-20.2	37.8	40.0	2.2 (*)	100	305
59.475	Y / V	52.8	-20.6	32.2	40.0	7.8	115	78
59.589	Y / H	49.0	-20.3	28.7	40.0	11.3	274	210
66.515	Y / V	53.6	-20.2	33.4	40.0	6.6	101	94
66.758	Y / H	49.8	-20.3	29.5	40.0	10.5	277	1
74.462	Y / V	52.7	-20.1	32.6	40.0	7.4	200	115
95.955	Y / V	44.8	-18.8	26.0	43.5	17.5	100	188
105.311	Y / H	52.0	-18.5	33.5	43.5	10.0	291	288
115.967	Y / H	43.4	-17.5	25.9	43.5	17.6	183	268
127.068	Y / H	45.8	-16.8	29.0	43.5	14.5	258	242
139.174	Y / H	46.0	-16.3	29.7	43.5	13.8	234	268
151.258	Y / H	48.4	-15.9	32.5	43.5	11.0	118	222
151.852	Y / V	38.8	-16.0	22.8	43.5	20.7	195	208
170.370	Y / V	48.1	-14.7	33.4	43.5	10.1	102	228
176.324	Y / V	40.1	-14.1	26.0	43.5	17.5	100	220
177.112	Y / H	43.2	-14.9	28.3	43.5	15.2	132	280
182.458	Y / V	48.9	-13.5	35.4	43.5	8.1	102	228
188.851	Y / H	45.5	-14.0	31.5	43.5	12.0	181	316
188.950	Y / V	39.3	-13.0	26.3	43.5	17.2	129	227
194.627	Y / V	44.7	-12.8	31.9	43.5	11.6	100	240
250.028	Y / H	50.4	-10.9	39.5	46.0	6.5	138	90
295.700	Y / H	39.5	-7.7	31.8	46.0	14.2	123	348
374.997	Y / H	52.6	-11.6	41.0	46.0	5.0	100	238
480.024	Y / V	42.4	-8.5	33.9	46.0	12.1	120	58
500.067	Y / H	47.9	-8.6	39.3	46.0	6.7	100	45
624.998	Y / V	43.8	-5.8	38.0	46.0	8.0	169	162
750.005	Y / V	42.4	-4.5	37.9	46.0	8.1	156	177
850.925	Y / H	40.3	-3.3	37.0	46.0	9.0	159	287

Note: Level QP = Reading QP + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 38: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1399.117	X / V	41.1	-15.2	25.9	54.0	28.1	100	271
1439.987	X / H	51.6	-15.1	36.5	54.0	17.5	101	207
1593.361	X / H	43.2	-14.4	28.8	54.0	25.2	171	216
1919.939	X / H	65.8	-14.0	51.8	54.0	2.2 (*)	100	83
1919.965	X / V	63.1	-14.0	49.1	54.0	4.9	106	162

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 39: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 1 (2412MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1399.117	X / V	59.3	-15.2	44.1	74.0	29.9	100	271
1439.987	X / H	60.4	-15.1	45.3	74.0	28.7	101	207
1593.361	X / H	60.1	-14.4	45.7	74.0	28.3	171	216
1919.939	X / H	73.6	-14.0	59.6	74.0	14.4	100	83
1919.965	X / V	71.1	-14.0	57.1	74.0	16.9	106	162

Note: Level PK = Reading PK + Factor

Table 40: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 2 (2417MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1919.941	Y / V	65.9	-14.0	51.9	54.0	2.1 (*)	104	308
1920.032	Y / H	64.7	-14.0	50.7	54.0	3.3 (*)	101	85
7246.764	Y / H	44.1	-4.7	39.4	54.0	14.6	101	24
7246.910	Y / V	44.0	-4.7	39.3	54.0	14.7	104	345

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 41: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 2 (2417MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1919.941	Y / V	73.2	-14.0	59.2	74.0	14.8	104	308
1920.032	Y / H	72.9	-14.0	58.9	74.0	15.1	101	85
7246.764	Y / H	59.6	-4.7	54.9	74.0	19.1	101	24
7246.910	Y / V	59.2	-4.7	54.5	74.0	19.5	104	345

Note: Level PK = Reading PK + Factor

Table 42: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1199.492	Y / V	43.1	-15.8	27.3	54.0	26.7	104	156
1439.976	Y / H	51.3	-15.1	36.2	54.0	17.8	103	194
1499.832	Y / V	47.7	-14.7	33.0	54.0	21.0	104	270
1589.835	Y / V	50.1	-14.4	35.7	54.0	18.3	138	281
1860.073	Y / V	39.9	-14.0	25.9	54.0	28.1	195	177
1920.047	Y / H	62.9	-14.0	48.9	54.0	5.1	124	87
1920.049	Y / V	65.3	-14.0	51.3	54.0	2.7 (*)	100	301
4873.852	Y / V	40.1	-9.2	30.9	54.0	23.1	100	253
6498.550	Y / V	49.3	-6.0	43.3	54.0	10.7	100	155
7306.158	Y / H	43.2	-4.6	38.6	54.0	15.4	101	16
7313.003	Y / V	43.8	-4.6	39.2	54.0	14.8	136	339

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 43: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 6 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1199.492	Y / V	61.3	-15.8	45.5	74.0	28.5	104	156
1439.976	Y / H	59.7	-15.1	44.6	74.0	29.4	103	194
1499.832	Y / V	58.1	-14.7	43.4	74.0	30.6	104	270
1589.835	Y / V	57.9	-14.4	43.5	74.0	30.5	138	281
1860.073	Y / V	61.4	-14.0	47.4	74.0	26.6	195	177
1920.047	Y / H	70.9	-14.0	56.9	74.0	17.1	124	87
1920.049	Y / V	72.2	-14.0	58.2	74.0	15.8	100	301
4873.852	Y / V	53.6	-9.2	44.4	74.0	29.6	100	253
6498.550	Y / V	55.5	-6.0	49.5	74.0	24.5	100	155
7306.158	Y / H	58.4	-4.6	53.8	74.0	20.2	101	16
7313.003	Y / V	59.5	-4.6	54.9	74.0	19.1	136	339

Note: Level PK = Reading PK + Factor

Table 44: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 10 (2457MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1439.962	Y / H	50.2	-15.1	35.1	54.0	18.9	100	190
1559.821	Y / V	50.8	-14.5	36.3	54.0	17.7	100	284
1859.621	Y / V	40.1	-14.0	26.1	54.0	27.9	133	169
1919.933	Y / H	65.3	-14.0	51.3	54.0	2.7 (*)	101	84
1920.039	Y / V	63.7	-14.0	49.7	54.0	4.3 (*)	104	304
6551.965	Y / V	49.6	-5.9	43.7	54.0	10.3	100	179
7369.242	Y / V	42.5	-4.7	37.8	54.0	16.2	100	116
7375.639	Y / H	42.3	-4.7	37.6	54.0	16.4	112	259

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 45: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 10 (2457MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1439.962	Y / H	59.1	-15.1	44.0	74.0	30.0	100	190
1559.821	Y / V	57.6	-14.5	43.1	74.0	30.9	100	284
1859.621	Y / V	58.5	-14.0	44.5	74.0	29.5	133	169
1919.933	Y / H	73.3	-14.0	59.3	74.0	14.7	101	84
1920.039	Y / V	71.4	-14.0	57.4	74.0	16.6	104	304
6551.965	Y / V	56.3	-5.9	50.4	74.0	23.6	100	179
7369.242	Y / V	57.5	-4.7	52.8	74.0	21.2	100	116
7375.639	Y / H	57.6	-4.7	52.9	74.0	21.1	112	259

Note: Level PK = Reading PK + Factor

Table 46: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1327.425	X / V	40.1	-15.2	24.9	54.0	29.1	165	225
1395.681	X / V	42.8	-15.2	27.6	54.0	26.4	104	268
1439.988	X / V	49.5	-15.1	34.4	54.0	19.6	144	175
1559.852	X / V	51.0	-14.5	36.5	54.0	17.5	101	287
1589.844	X / V	49.8	-14.4	35.4	54.0	18.6	141	287
1860.292	Y / H	39.4	-14.0	25.4	54.0	28.6	169	321
1919.945	Y / H	65.3	-14.0	51.3	54.0	2.7 (*)	100	83
1919.970	X / H	66.1	-14.0	52.1	54.0	1.9 (*)	104	59
1920.013	X / V	63.2	-14.0	49.2	54.0	4.8	100	333
6565.198	Y / V	48.7	-5.9	42.8	54.0	11.2	100	147

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 47: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz), Channel 11 (2462MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1327.425	X / V	56.3	-15.2	41.1	74.0	32.9	165	225
1395.681	X / V	59.9	-15.2	44.7	74.0	29.3	104	268
1439.988	X / V	59.3	-15.1	44.2	74.0	29.8	144	175
1559.852	X / V	57.2	-14.5	42.7	74.0	31.3	101	287
1589.844	X / V	57.8	-14.4	43.4	74.0	30.6	141	287
1919.970	X / H	74.2	-14.0	60.2	74.0	13.8	104	59
1860.292	Y / H	60.0	-14.0	46.0	74.0	28.0	169	321
1919.945	Y / H	72.6	-14.0	58.6	74.0	15.4	100	83
1920.013	X / V	71.3	-14.0	57.3	74.0	16.7	100	333
6565.198	Y / V	55.3	-5.9	49.4	74.0	24.6	100	147

Note: Level PK = Reading PK + Factor

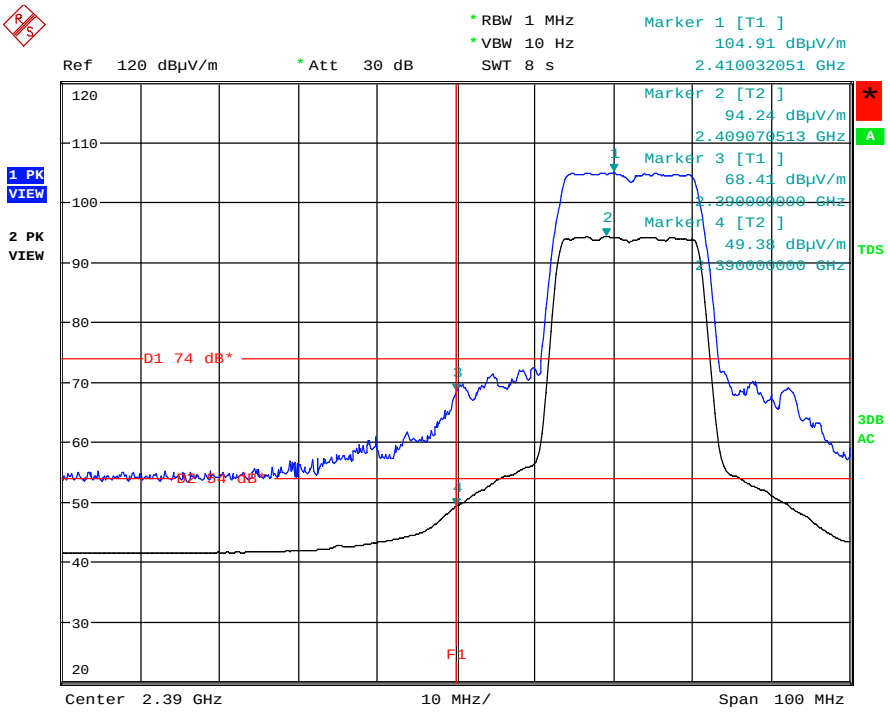
Table 48: Radiated Emissions at Band Edge, Average and Peak Data, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (20MHz)

Operating Frequency [MHz]	EUT / Antenna Orientation	Level AV [dBµV/m]	Level PK [dBµV/m]	Limit AV [dBµV/m]	Limit PK [dBµV/m]	Margin AV [dB]	Margin PK [dB]
2412	Y / V	49.38	68.41	54.00	74.00	4.62 (*)	5.59
2417	Y / V	51.12	68.10	54.00	74.00	2.88 (*)	5.90
2457	Y / V	52.62	70.65	54.00	74.00	1.38 (*)	3.35 (*)
2462	Y / V	48.62	70.90	54.00	74.00	5.38	3.10 (*)

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
Average limit in dBµV/m is calculated as follows: Average limit = 20 x log(500µV/m).
Peak limit in dBµV/m is calculated as follows: Peak limit = Average limit + 20dB.

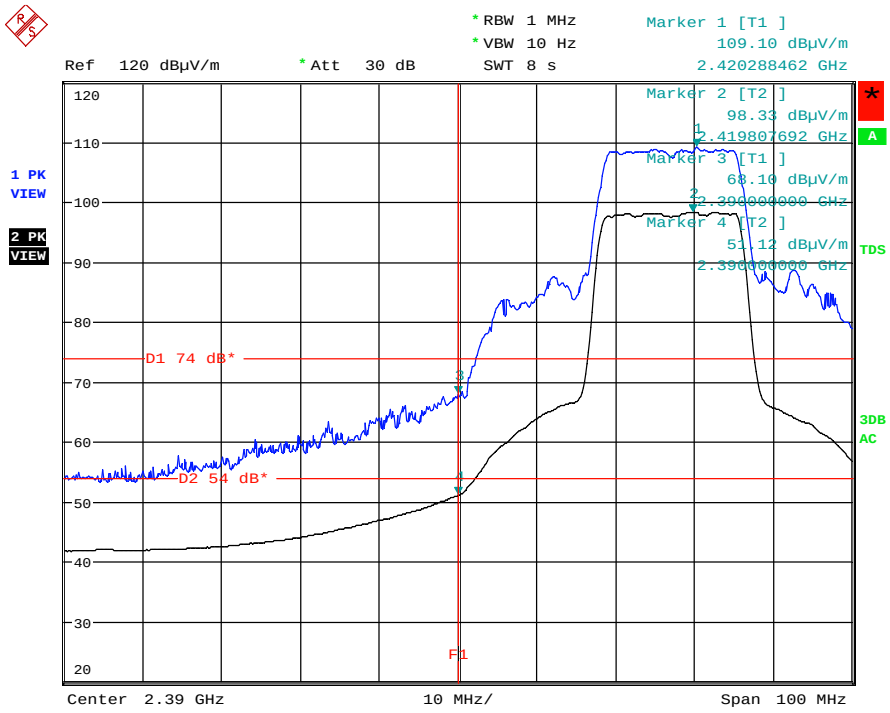
(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Figure 68: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (20MHz), Channel 1 (2412MHz)



Band Edge, Vert, Mode Ac, Pos. Y
Date: 14.SEP.2012 14:49:58

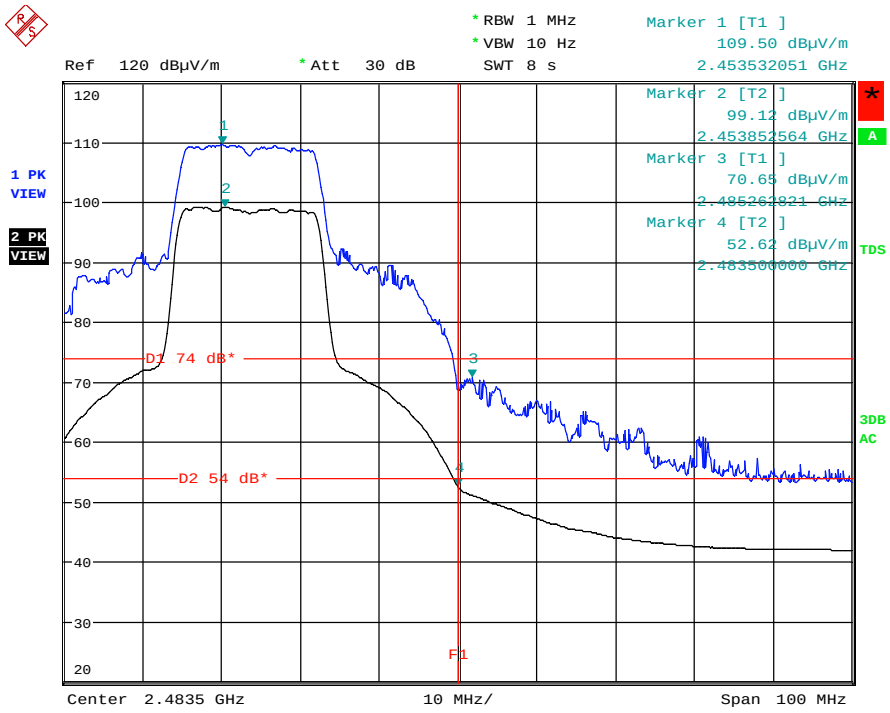
Figure 69: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (20MHz), Channel 2 (2417MHz)



Band Edge, Vert, 2ch, Pos. Y
Date: 14.SEP.2012 18:27:42

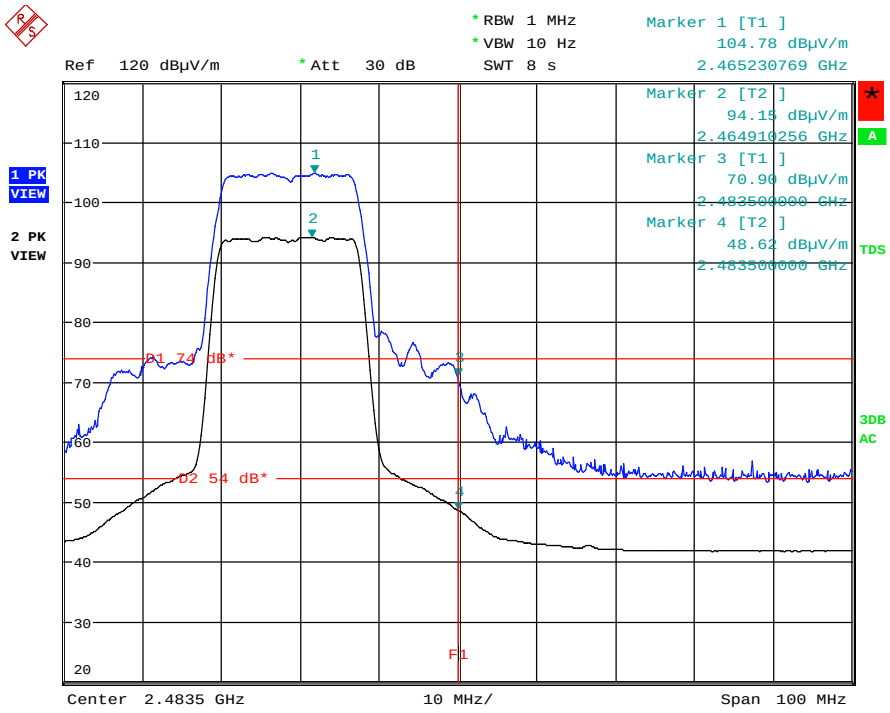
Note: The upper trace shows the peak value and the lower trace shows the average value.

Figure 70: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (20MHz), Channel 10 (2457MHz)



Band Edge, Vert, 10ch, Pos. Y
Date: 14.SEP.2012 18:25:12

Figure 71: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (20MHz), Channel 11 (2462MHz)



Band Edge, Vert, Mode Cc, Pos. Y
Date: 14.SEP.2012 14:28:06

Note: The upper trace shows the peak value and the lower trace shows the average value.

Table 49: Radiated Emissions, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 4 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dBµV]	Factor [dB(1/m)]	Level QP [dBµV/m]	Limit [dBµV/m]	Margin QP [dB]	Height [cm]	Angle [°]
32.057	Y / H	44.1	-16.2	27.9	40.0	12.1	100	359
32.063	Y / V	46.3	-16.4	29.9	40.0	10.1	100	359
41.974	Y / V	50.5	-18.5	32.0	40.0	8.0	100	269
54.078	Y / H	51.0	-20.0	31.0	40.0	9.0	218	185
58.782	Y / H	47.2	-20.2	27.0	40.0	13.0	271	195
58.909	Y / V	53.3	-20.5	32.8	40.0	7.2	106	98
66.063	Y / V	52.6	-20.2	32.4	40.0	7.6	100	92
66.346	Y / H	46.7	-20.3	26.4	40.0	13.6	399	1
73.391	Y / V	52.5	-20.1	32.4	40.0	7.6	100	167
96.728	Y / V	46.3	-18.7	27.6	43.5	15.9	102	277
108.575	Y / H	44.5	-18.2	26.3	43.5	17.2	308	273
115.386	Y / H	57.9	-17.6	40.3	43.5	3.2 (*)	174	257
127.378	Y / H	53.0	-16.8	36.2	43.5	7.3	249	250
139.339	Y / H	51.6	-16.3	35.3	43.5	8.2	253	219
151.316	Y / H	54.5	-15.9	38.6	43.5	4.9	226	109
151.328	Y / V	50.3	-16.0	34.3	43.5	9.2	193	217
170.344	Y / V	47.9	-14.7	33.2	43.5	10.3	104	211
176.376	Y / V	49.1	-14.1	35.0	43.5	8.5	106	224
182.330	Y / V	45.9	-13.5	32.4	43.5	11.1	108	239
188.345	Y / V	47.5	-13.1	34.4	43.5	9.1	100	247
188.948	Y / H	45.7	-14.0	31.7	43.5	11.8	100	187
194.336	Y / V	42.4	-12.8	29.6	43.5	13.9	100	245
200.642	Y / V	41.1	-12.5	28.6	43.5	14.9	100	311
250.033	Y / H	51.2	-10.9	40.3	46.0	5.7	138	89
374.996	Y / H	52.6	-11.6	41.0	46.0	5.0	100	238
480.022	Y / V	42.4	-8.5	33.9	46.0	12.1	116	60
500.065	Y / H	49.5	-8.6	40.9	46.0	5.1	156	221
624.997	Y / V	43.9	-5.8	38.1	46.0	7.9	172	162
728.983	Y / H	30.9	-4.9	26.0	46.0	20.0	102	205
750.097	Y / H	44.4	-4.6	39.8	46.0	6.2	102	228
850.594	Y / H	34.5	-3.3	31.2	46.0	14.8	152	284
874.993	Y / H	41.1	-3.1	38.0	46.0	8.0	157	1

Note: Level QP = Reading QP + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 50: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 1 (2422MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1395.469	X / V	42.4	-15.2	27.2	54.0	26.8	120	279
1439.940	X / V	47.0	-15.1	31.9	54.0	22.1	115	168
1589.796	X / V	46.2	-14.4	31.8	54.0	22.2	150	71
1862.556	X / V	39.3	-14.0	25.3	54.0	28.7	152	71
1919.982	X / V	61.9	-14.0	47.9	54.0	6.1	138	149
1919.991	X / H	65.3	-14.0	51.3	54.0	2.7 (*)	101	61
2307.647	X / V	42.4	-13.5	28.9	54.0	25.1	114	86
2625.292	X / V	39.6	-13.2	26.4	54.0	27.6	169	54
7312.211	X / H	47.5	-4.6	42.9	54.0	11.1	106	115

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 51: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 1 (2422MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1395.469	X / V	60.7	-15.2	45.5	74.0	28.5	120	279
1439.940	X / V	57.4	-15.1	42.3	74.0	31.7	115	168
1589.796	X / V	56.3	-14.4	41.9	74.0	32.1	150	71
1862.556	X / V	57.3	-14.0	43.3	74.0	30.7	152	71
1919.982	X / V	70.2	-14.0	56.2	74.0	17.8	138	149
1919.991	X / H	73.1	-14.0	59.1	74.0	14.9	101	61
2307.647	X / V	55.0	-13.5	41.5	74.0	32.5	114	86
2625.292	X / V	53.8	-13.2	40.6	74.0	33.4	169	54
7312.211	X / H	69.3	-4.6	64.7	74.0	9.3	106	115

Note: Level PK = Reading PK + Factor

Table 52: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 4 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1395.478	X / V	42.8	-15.2	27.6	54.0	26.4	106	264
1440.024	X / H	52.2	-15.1	37.1	54.0	16.9	100	197
1499.899	X / V	45.3	-14.7	30.6	54.0	23.4	111	181
1559.854	X / V	51.0	-14.5	36.5	54.0	17.5	141	280
1594.218	X / V	43.1	-14.4	28.7	54.0	25.3	110	251
1920.001	X / H	65.3	-14.0	51.3	54.0	2.7 (*)	101	66
1920.055	X / V	65.1	-14.0	51.1	54.0	2.9 (*)	109	234

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 53: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 4 (2437MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1395.478	X / V	60.6	-15.2	45.4	74.0	28.6	106	264
1440.024	X / H	60.2	-15.1	45.1	74.0	28.9	100	197
1499.899	X / V	56.0	-14.7	41.3	74.0	32.7	111	181
1559.854	X / V	57.5	-14.5	43.0	74.0	31.0	141	280
1594.218	X / V	59.6	-14.4	45.2	74.0	28.8	110	251
1920.001	X / H	73.9	-14.0	59.9	74.0	14.1	101	66
1920.055	X / V	73.5	-14.0	59.5	74.0	14.5	109	234

Note: Level PK = Reading PK + Factor

Table 54: Radiated Emissions, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 7 (2452MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1195.862	Y / V	42.8	-15.8	27.0	54.0	27.0	101	165
1440.015	Y / H	49.2	-15.1	34.1	54.0	19.9	101	92
1589.779	Y / V	48.0	-14.4	33.6	54.0	20.4	172	283
1589.834	Y / V	49.8	-14.4	35.4	54.0	18.6	101	287
1590.013	Y / V	46.2	-14.4	31.8	54.0	22.2	199	293
1919.865	Y / H	65.1	-14.0	51.1	54.0	2.9 (*)	101	85
1920.038	Y / V	63.8	-14.0	49.8	54.0	4.2 (*)	103	162
6538.640	Y / V	47.1	-5.9	41.2	54.0	12.8	119	183
7371.523	Y / H	43.0	-4.7	38.3	54.0	15.7	122	154

Note: Level AV = Reading AV + Factor

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

Table 55: Radiated Emissions, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 7 (2452MHz)

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1195.862	Y / V	58.9	-15.8	43.1	74.0	30.9	101	165
1440.015	Y / H	59.1	-15.1	44.0	74.0	30.0	101	92
1589.779	Y / V	57.4	-14.4	43.0	74.0	31.0	172	283
1589.834	Y / V	60.0	-14.4	45.6	74.0	28.4	101	287
1590.013	Y / V	55.8	-14.4	41.4	74.0	32.6	199	293
1919.865	Y / H	72.7	-14.0	58.7	74.0	15.3	101	85
1920.038	Y / V	71.7	-14.0	57.7	74.0	16.3	103	162
6538.640	Y / V	54.8	-5.9	48.9	74.0	25.1	119	183
7371.523	Y / H	61.8	-4.7	57.1	74.0	16.9	122	154

Note: Level PK = Reading PK + Factor

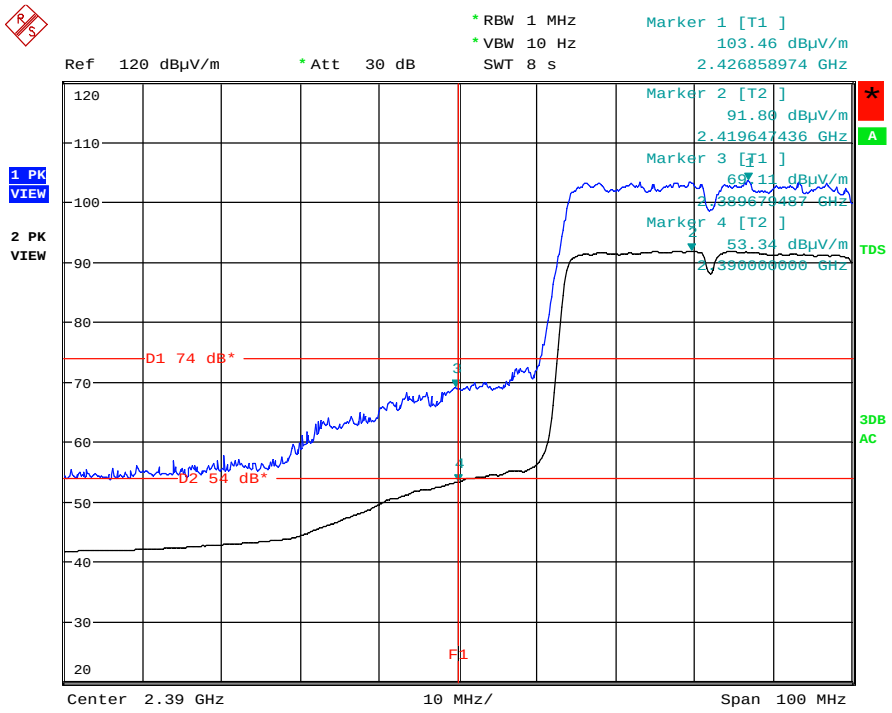
Table 56: Radiated Emissions at Band Edge, Average and Peak Data, Horizontal and Vertical Antenna Orientations, IEEE 802.11n (40MHz), Channel 1 (2422MHz) and 7 (2452MHz)

Operating Frequency [MHz]	EUT / Antenna Orientation	Level AV [dBµV/m]	Level PK [dBµV/m]	Limit AV [dBµV/m]	Limit PK [dBµV/m]	Margin AV [dB]	Margin PK [dB]
2422	Y / V	53.34	69.11	54.00	74.00	0.66 (*)	4.89
2452	Y / V	51.89	72.11	54.00	74.00	2.11 (*)	1.89 (*)

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
Average limit in dBµV/m is calculated as follows: Average limit = 20 x log(500µV/m).
Peak limit in dBµV/m is calculated as follows: Peak limit = Average limit + 20dB.

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a high probability that the tested product complies with the specification limit.

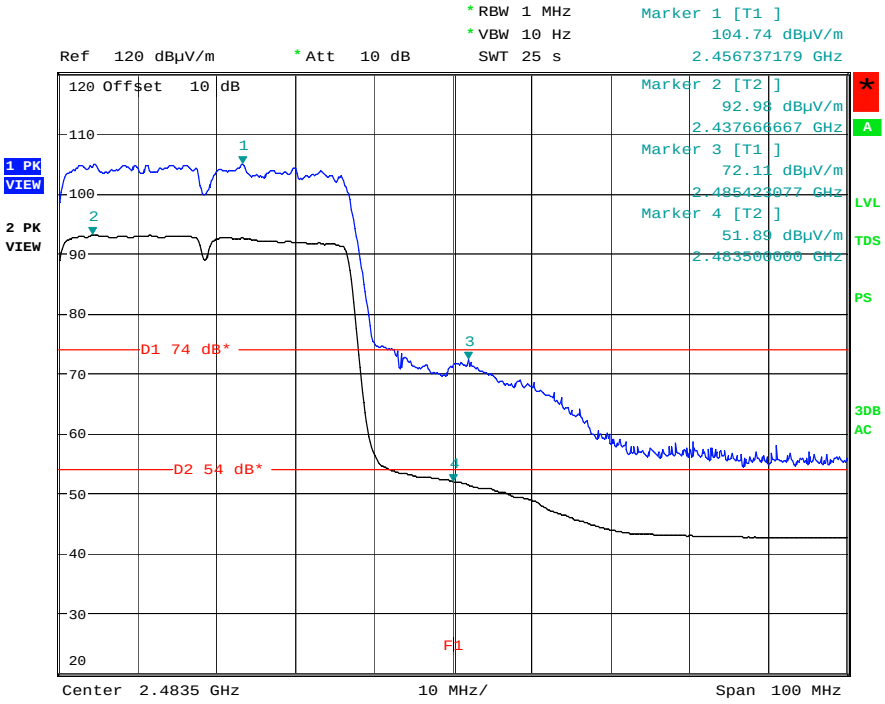
Figure 72: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (40MHz), Channel 1 (2422MHz)



Band Edge, Vert, Mode Ad, Pos. Y
Date: 14.SEP.2012 15:31:41

Note: The upper trace shows the peak value and the lower trace shows the average value.

Figure 73: Radiated Emissions at Band Edge, Spectral Diagram, IEEE 802.11n (40MHz), Channel 7 (2452MHz)



Band Edge, Vert, Mode Cd, Pos. Y
Date: 25.SEP.2012 12:36:05

Note: The upper trace shows the peak value and the lower trace shows the average value.

5.4 AC Power Line Conducted Measurements

5.4.1 AC Power Line Conducted Emission of Transmitter

RESULT: **PASS**

Date of testing:	2012-09-19
Ambient temperature:	25°C
Relative humidity:	69%
Atmospheric pressure:	1006hPa
Frequency range:	0.15 - 30MHz
Kind of test site:	Shielded Room

Requirements:

FCC 15.207

The AC power line conducted emission on any frequency within the band 150kHz to 30MHz shall not exceed the limits specified in FCC 15.207.

Test procedure:

ANSI C63.4-2003

The EUT was placed on a wooden table raised 80cm above the reference ground plane. A vertical conducting plane of the screened room was located 40cm to the rear of the EUT. The AC adapter of the EUT was connected to a Line Impedance Stabilization Network (LISN).

The physical arrangement of the test system and associated cabling was varied to determine the effect on the EUT's emissions in amplitude and frequency in order to ensure that maximum emission amplitudes were attained.

The measurements were performed with a test receiver operating in the CISPR quasi-peak and average detection modes. The receiver’s 6dB bandwidth was set to 9kHz.

Prechecks were performed in all radio protocols and channels specified in section 4.2. Since similar results were obtained for all channels, final data was taken for the middle channel only (mode B).

Disturbances other than those mentioned are small or not detectable.

Table 57: AC Power Line Conducted Emission, Quasi Peak and Average Data, 0.15 - 30MHz, Phase N (N) and L1 (L), IEEE 802.11b, Channel 6 (2437MHz)

Freq. [MHz]	Phase	Reading QP [dBµV]	Reading AV [dBµV]	Factor [dB]	Level QP [dBµV]	Level AV [dBµV]	Limit QP [dBµV]	Limit AV [dBµV]	Margin QP [dB]	Margin AV [dB]
0.17579	L1	32.0	23.4	9.6	41.6	33.0	64.7	54.7	23.1	21.7
0.17610	N	35.3	25.0	9.6	44.9	34.6	64.7	54.7	19.8	20.1
0.21961	N	30.0	23.4	9.6	39.6	33.0	62.8	52.8	23.2	19.8
0.21964	L1	25.9	18.2	9.6	35.5	27.8	62.8	52.8	27.3	25.0
0.26386	N	27.0	21.6	9.6	36.6	31.2	61.3	51.3	24.7	20.1
0.43892	N	25.6	23.8	9.6	35.2	33.4	57.1	47.1	21.9	13.7
4.79087	L1	21.9	7.7	9.9	31.8	17.6	56.0	46.0	24.2	28.4
4.79137	N	21.8	8.7	9.9	31.7	18.6	56.0	46.0	24.3	27.4
10.7421	N	19.8	7.0	10.1	29.9	17.1	60.0	50.0	30.1	32.9
11.2114	L1	22.5	13.3	10.1	32.6	23.4	60.0	50.0	27.4	26.6

Note: Level QP = Reading QP + Factor, Level AV = Reading AV + Factor

Table 58: AC Power Line Conducted Emission, Quasi Peak and Average Data, 0.15 - 30MHz, Phase N (N) and L1 (L), IEEE 802.11g, Channel 6 (2437MHz)

Freq. [MHz]	Phase	Reading QP [dBµV]	Reading AV [dBµV]	Factor [dB]	Level QP [dBµV]	Level AV [dBµV]	Limit QP [dBµV]	Limit AV [dBµV]	Margin QP [dB]	Margin AV [dB]
0.17557	N	35.3	25.0	9.6	44.9	34.6	64.7	54.7	19.8	20.1
0.17601	L1	31.9	23.3	9.6	41.5	32.9	64.7	54.7	23.2	21.8
0.21915	L1	25.8	18.1	9.6	35.4	27.7	62.9	52.9	27.5	25.2
0.22000	N	29.9	23.3	9.6	39.5	32.9	62.8	52.8	23.3	19.9
0.26346	N	27.0	21.6	9.6	36.6	31.2	61.3	51.3	24.7	20.1
0.43842	N	25.5	23.6	9.6	35.1	33.2	57.1	47.1	22.0	13.9
4.74635	L1	20.7	5.7	9.9	30.6	15.6	56.0	46.0	25.4	30.4
4.79212	N	21.2	7.4	9.9	31.1	17.3	56.0	46.0	24.9	28.7
10.8603	L1	22.7	12.3	10.1	32.8	22.4	60.0	50.0	27.2	27.6
10.9040	N	22.8	13.1	10.1	32.9	23.2	60.0	50.0	27.1	26.8

Note: Level QP = Reading QP + Factor, Level AV = Reading AV + Factor

Table 59: AC Power Line Conducted Emission, Quasi Peak and Average Data, 0.15 - 30MHz, Phase N (N) and L1 (L), IEEE 802.11n (20MHz), Channel 6 (2437MHz)

Freq. [MHz]	Phase	Reading QP [dBµV]	Reading AV [dBµV]	Factor [dB]	Level QP [dBµV]	Level AV [dBµV]	Limit QP [dBµV]	Limit AV [dBµV]	Margin QP [dB]	Margin AV [dB]
0.17615	N	35.2	24.9	9.6	44.8	34.5	64.7	54.7	19.9	20.2
0.17665	L1	31.7	23.1	9.6	41.3	32.7	64.6	54.6	23.3	21.9
0.22007	L1	25.8	18.1	9.6	35.4	27.7	62.8	52.8	27.4	25.1
0.22022	N	29.9	23.4	9.6	39.5	33.0	62.8	52.8	23.3	19.8
0.44022	N	25.5	23.7	9.7	35.2	33.4	57.1	47.1	21.9	13.7
4.44579	L1	21.7	10.9	9.9	31.6	20.8	56.0	46.0	24.4	25.2
4.75425	N	21.9	8.8	9.9	31.8	18.7	56.0	46.0	24.2	27.3
10.8324	N	22.7	13.8	10.1	32.8	23.9	60.0	50.0	27.2	26.1
11.2253	L1	22.2	14.3	10.1	32.3	24.4	60.0	50.0	27.7	25.6

Note: Level QP = Reading QP + Factor, Level AV = Reading AV + Factor

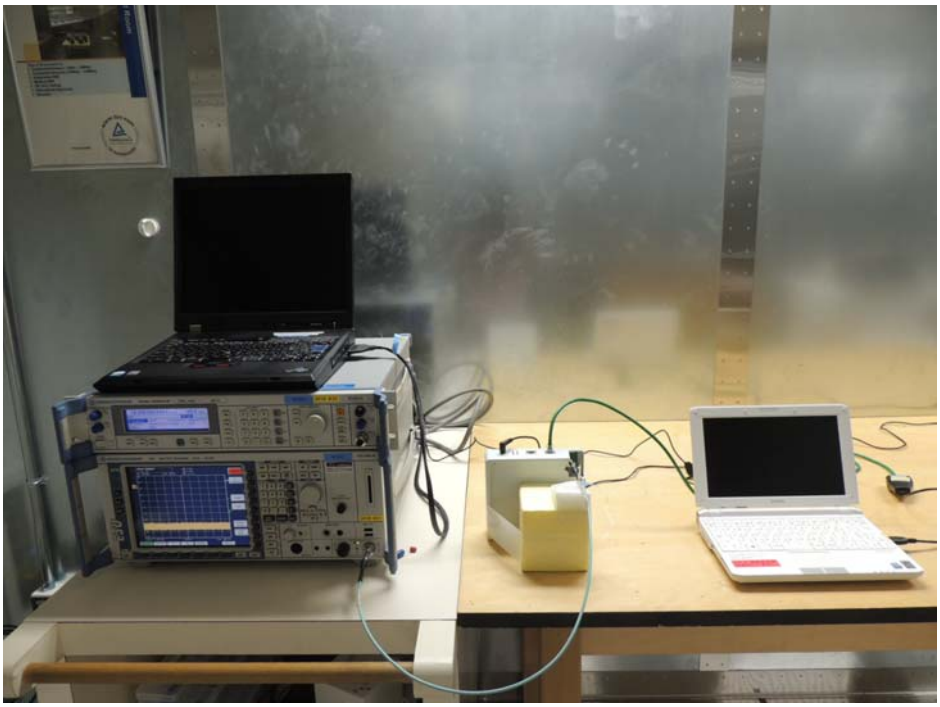
Table 60: AC Power Line Conducted Emission, Quasi Peak and Average Data, 0.15 - 30MHz, Phase N (N) and L1 (L), IEEE 802.11n (40MHz), Channel 4 (2437MHz)

Freq. [MHz]	Phase	Reading QP [dBµV]	Reading AV [dBµV]	Factor [dB]	Level QP [dBµV]	Level AV [dBµV]	Limit QP [dBµV]	Limit AV [dBµV]	Margin QP [dB]	Margin AV [dB]
0.17371	N	35.5	24.9	9.6	45.1	34.5	64.8	54.8	19.7	20.3
0.17415	L1	31.9	23.4	9.6	41.5	33.0	64.8	54.8	23.3	21.8
0.21764	N	30.0	23.2	9.6	39.6	32.8	62.9	52.9	23.3	20.1
0.21818	L1	26.0	18.2	9.6	35.6	27.8	62.9	52.9	27.3	25.1
0.26135	N	27.1	21.8	9.6	36.7	31.4	61.4	51.4	24.7	20.0
0.43588	N	25.5	23.6	9.6	35.1	33.2	57.1	47.1	22.0	13.9
4.57709	N	20.1	5.3	9.9	30.0	15.2	56.0	46.0	26.0	30.8
4.62179	L1	21.2	7.6	9.9	31.1	17.5	56.0	46.0	24.9	28.5
10.9023	N	22.7	12.0	10.1	32.8	22.1	60.0	50.0	27.2	27.9
11.5998	L1	21.6	11.5	10.1	31.7	21.6	60.0	50.0	28.3	28.4

Note: Level QP = Reading QP + Factor, Level AV = Reading AV + Factor

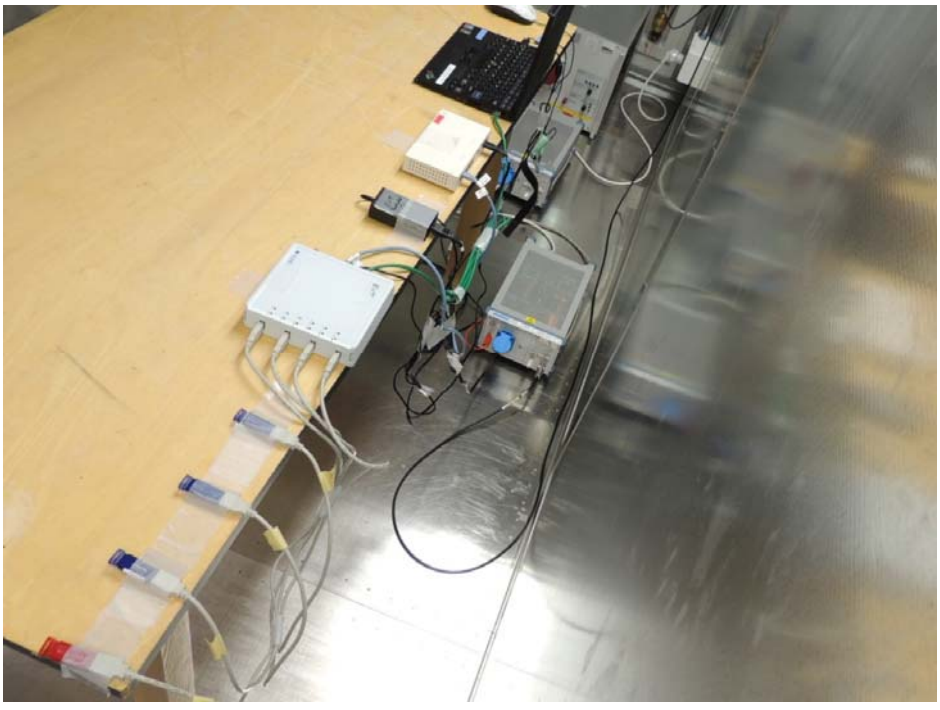
6. Photographs of the Test Setup

Photograph 1: Set-up for Conducted Emissions at Antenna Port



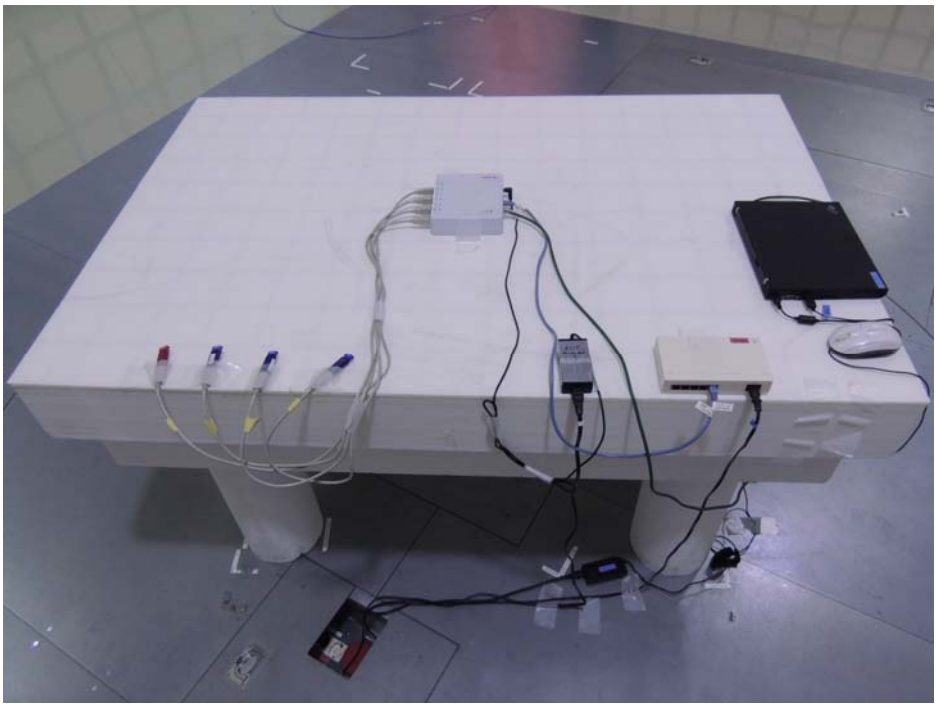
Photograph 2: Set-up for AC Power Line Conducted Emission of Transmitter, Front View

Photograph 3: Set-up for AC Power Line Conducted Emission of Transmitter, Rear View



Photograph 4: Set-up for Radiated Emission of Transmitter, Front View

Photograph 5: Set-up for Radiated Emission of Transmitter, Rear View



Photograph 6: Set-up for Radiated Emission, EUT Configuration X-Axis

Photograph 7: Set-up for Radiated Emission, EUT Configuration Y-Axis

7. List of Tables

8. List of Figures

9. List of Photographs