Prüfbericht-Nr.: *Test Report No.:*	**10044136 001**	**Auftrags-Nr.:** *Order No.:*	113154149	Seite 1 von 43 *Page 1 of 43*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	March 8, 2013	
Auftraggeber: *Client:*	Schneider Electric (Australia) Pty. Ltd., 33-37 Port Wakefield Road, Gepps Cross, 5094, Australia			
Prüfgegenstand: *Test item:*	Wiser Home Controller MKII			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	WHC2_5918			
Auftrags-Inhalt: *Order content:*	NCC Test report FCC Part 15C Test report	(IEEE 802.11b/g Portion of the Device)		
Prüfgrundlage: *Test specification:*	NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2011) FCC 47CFR Part 15: Subpart C Section 15.247			

Wareneingangsdatum: *Date of receipt:*	7/2/2013
Prüfmuster-Nr.: *Test sample No.:*	TPE81936 TPE81935
Prüfzeitraum: *Testing period:*	August 1, 2013 - October 22, 2013
Ort der Prüfung: *Place of testing:*	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von / *tested by:*			**kontrolliert von** / *reviewed by:*		
2013-10-30	Danny S. C. Sung/Project Manager		2013-10-30	Rene Charton/Senior Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 PEAK OUTPUT POWER
RESULT: Passed

5.1.3 6DB BANDWIDTH AND 99% BANDWIDTH
RESULT: Passed

5.1.4 POWER DENSITY
RESULT: Passed

5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100KHZ BANDWIDTH
RESULT: Passed

5.1.6 SPURIOUS EMISSION
RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: Photo Documentation external view
(File Name: 10044136APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 10044136APPENDIX D)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2011)(100年6月28日) FCC CFR47 Part 15: Subpart C Section 15.247 ANSI C63.10:2009, KDB558074 D01 DTS Meas Guidance v02

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC Registration No.: 365730
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2013-Jul-1st to 2016-Jun-30th

Testing Laboratory
0759

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until	Used for test items
EMI Test Receiver	R&S	ESCI 7	1166.5950K07-100797-Pt	20-Dec-13	Spurious Emission and Frequency Band Edge
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-14	Spurious Emission and Frequency Band Edge
Pre-Amplifier	HP	8447F	2805A03335	13-Dec-13	Spurious Emission and Frequency Band Edge
Spectrum Analyzer	R&S	FSV 40	100921	10-Jan-14	6dB Bandwidth Output Power Power Density Conducted Spurious Emissions Spurious Emission
Horn Antenna (1GHz~18GHz)	COM-POWER	AHA118	701251	2-Nov-13	Spurious Emission and Frequency Band Edge
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	2-Sep-14	Spurious Emission and Frequency Band Edge
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2-Sep-14	Spurious Emission and Frequency Band Edge
Preamplifier (18 GHz -40 GHz)	COMPOWER	PAM-840	461257	12-Nov-13	Spurious Emission and Frequency Band Edge
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-14	Spurious Emission and Frequency Band Edge
EMI Test Receiver	R&S	ESCI	101094	29-Aug-14	Mains Spurious Emission
LISN (1 phase)	R&S	ENV216	101243	5-Jun-14	Mains Spurious Emission
LISN	Rolf Heine	NNB-2/16Z	99080	30-Aug-14	Mains Spurious Emission

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ±3dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-7}
RF power, conducted	± 1 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The device is a Controller for home use with a BT and WiFi RF interface. This test report refers to the BT portion of the device.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Wiser Home Controller MKII
Type Designation	WHC2_5918
Brand Name	Schneider Electric
FCC ID	WZCWHC25918

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2412~2462 MHz
Channel Spacing	5 MHz
Channel number	11
Operation Voltage	220 V
Modulation	802.11b: DSSS 802.11g: OFDM with BPSK, QPSK, QAM
Antenna gain	1.97 dBi

3.3 Independent Operation Modes

Basic operation modes are:

A. Transmitting
    1. Low channel
    2. Middle channel
    3. High channel
B. Receiving
C. Standby
D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing:

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:
Conducted: TPE81935
Radiation: TPE81936

Full test was applied on all test modes, but only worst case was shown

4.3 Special Accessories and Auxiliary Equipment

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

Kind of Equipment	Manufacturer	Model Name	S/N
Laptop	MSI	MS-1453	MX-233TWK1008000096

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

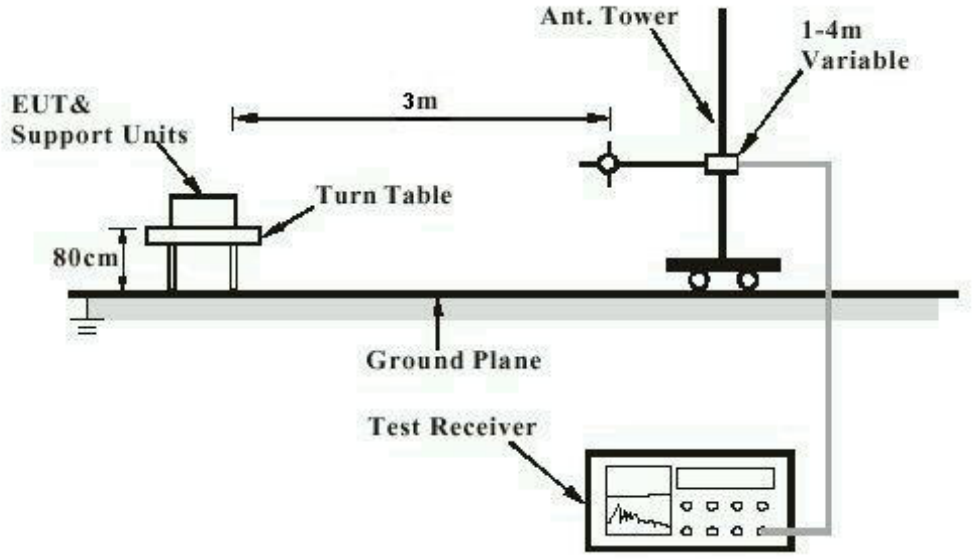


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

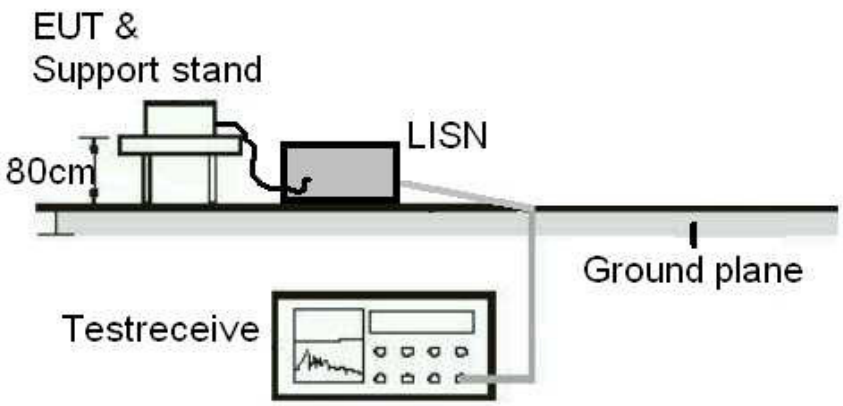
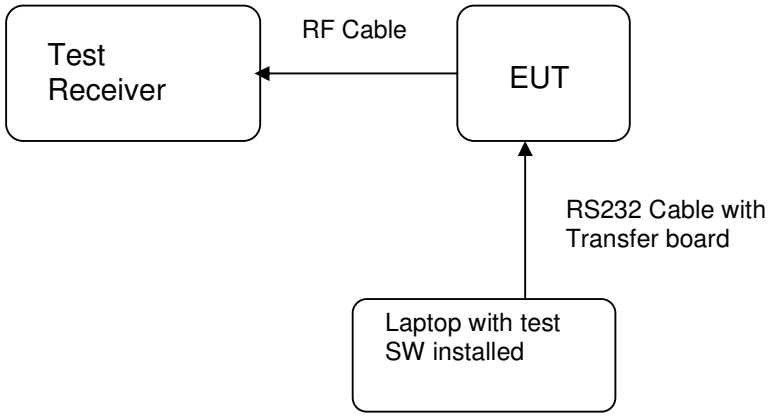


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (3) FCC Part 15.247(b)(4), Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 1.97 dBi dBi. The antenna is a printed PCB trace with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (2) FCC Part 15.247(b)(3)
Basic standard	:	LP0002(2011) Appendix II ANSI C63.10:2009, KDB558074
Limit	:	1 Watt
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 6: Test result of Peak Output Power (802.11B)

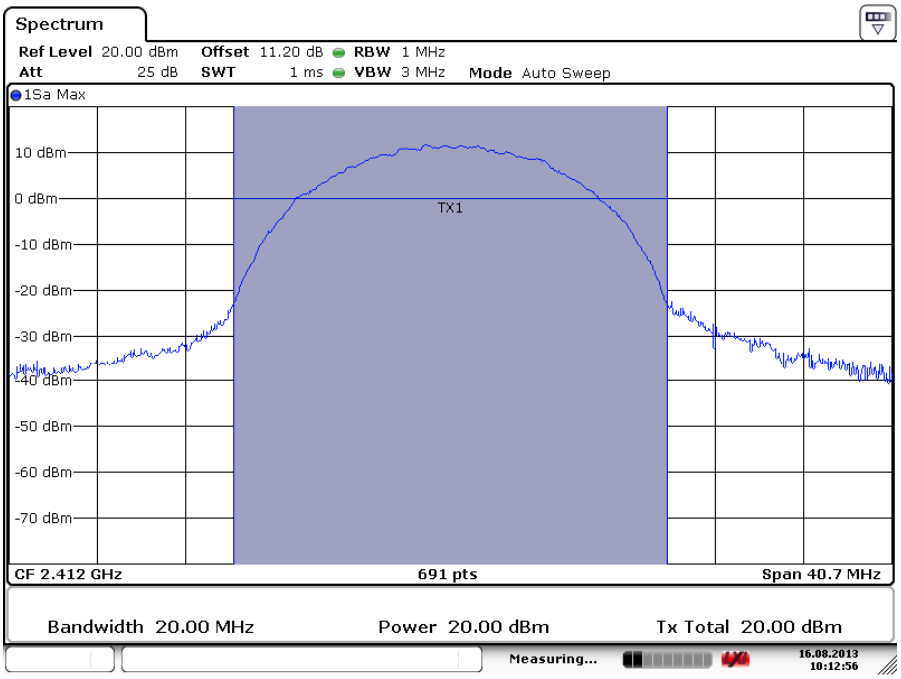
Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2412	20	0.1000	1
Middle Channel	2437	21.1	0.1288	1
High Channel	2462	19.73	0.0940	1

Table 7: Test result of Peak Output Power (802.11G)

Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2412	20.27	0.1064	1
Middle Channel	2437	20.03	0.1007	1
High Channel	2462	19.94	0.0986	1

Test Plot of Output Power (802.11B)

Low Channel



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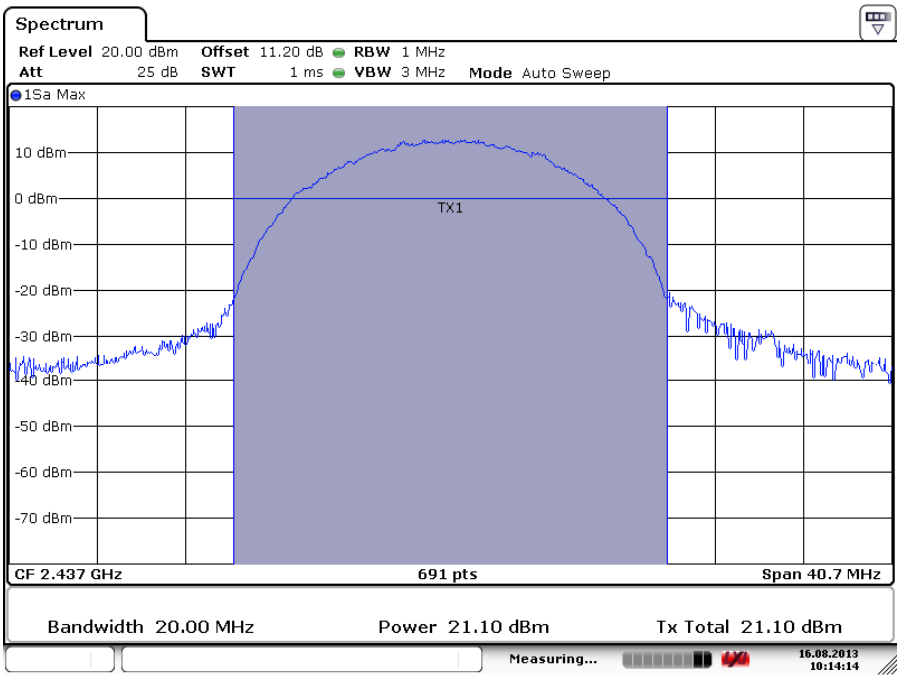
Middle Channel



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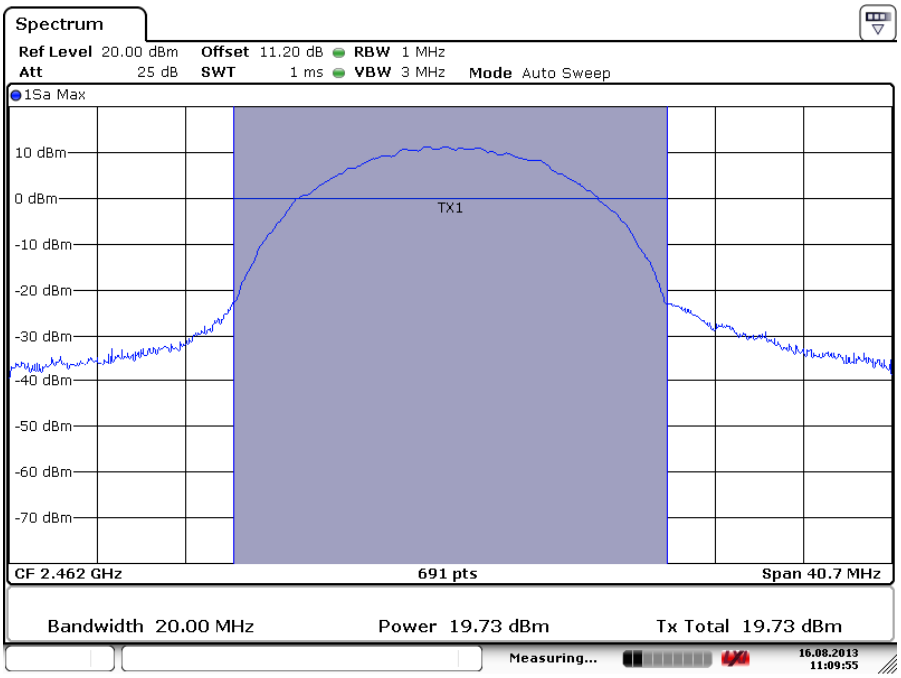
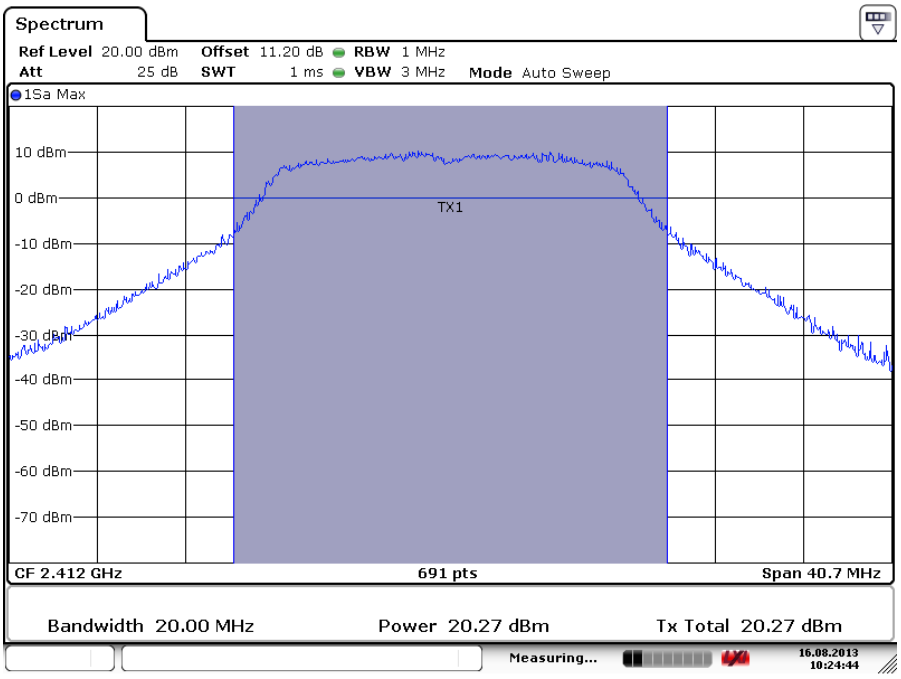
High Channel



Test Plot of Output Power (802.11G)

Low Channel



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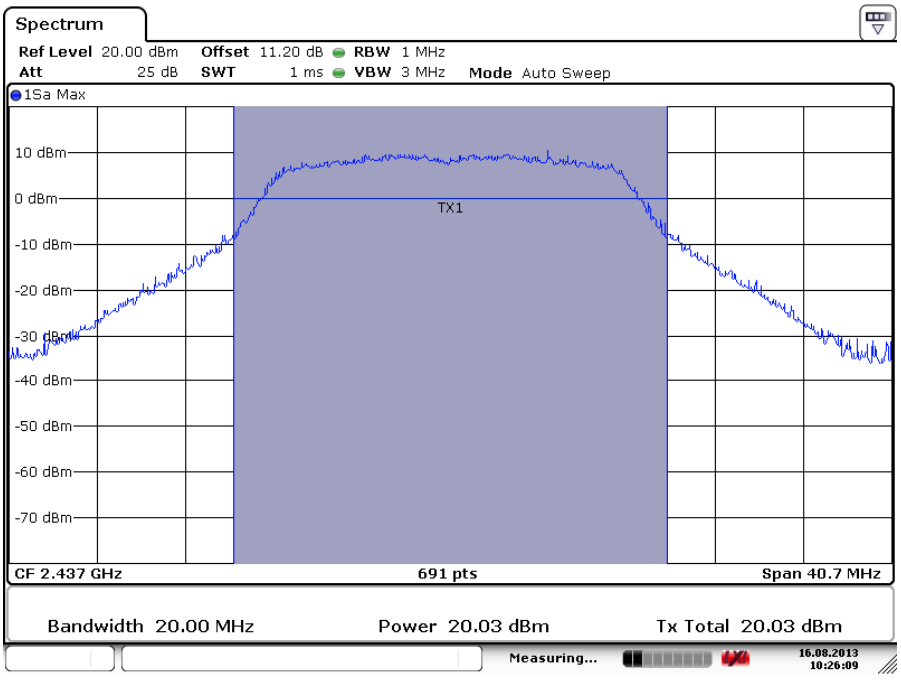
Middle Channel



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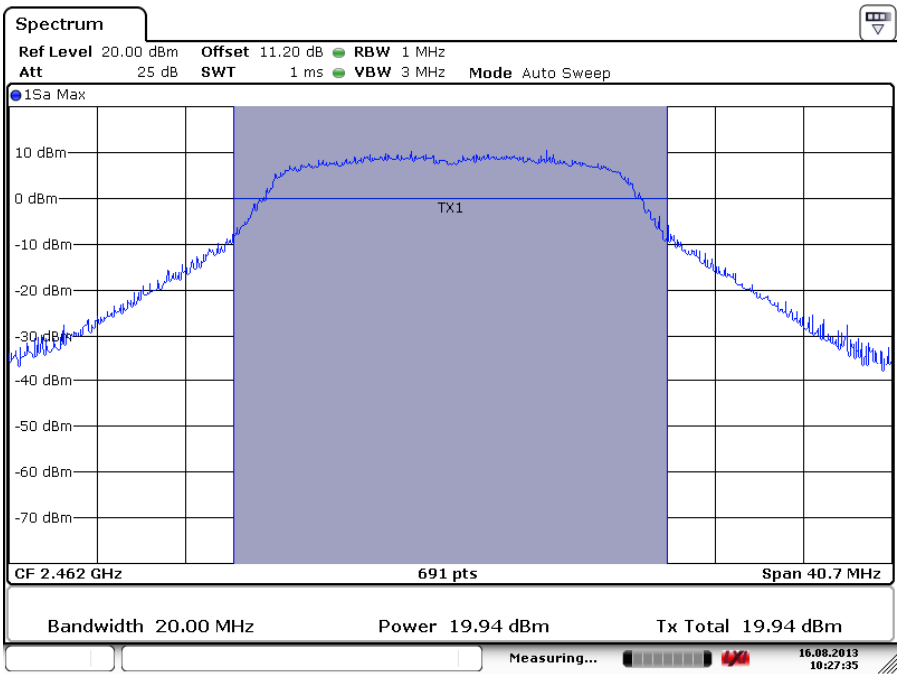
High Channel



5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (5), FCC Part 15.247(a)(2)
Basic standard	:	LP0002(2011) Appendix II ANSI C63.10:2009, KDB558074
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 8: Test result of 6dB Bandwidth (802.11B)

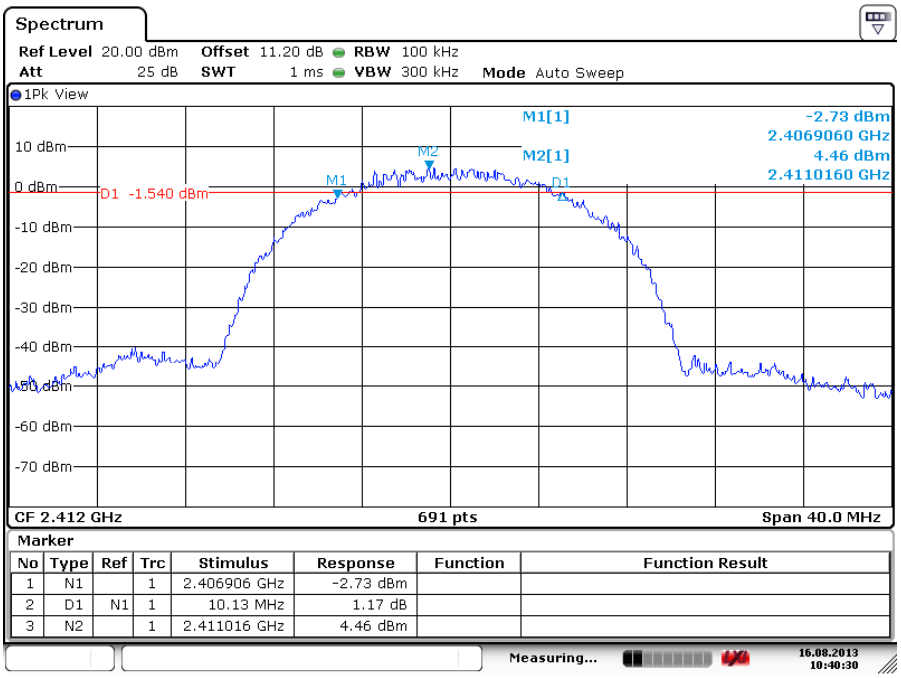
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	10.13	0.5	Pass
Mid Channel	2437	10.13	0.5	Pass
High Channel	2462	10.13	0.5	Pass

Table 9: Test result of 6dB Bandwidth (802.11G)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	16.208	0.5	Pass
Mid Channel	2437	16.331	0.5	Pass
High Channel	2462	16.281	0.5	Pass

Test Plot of 6dB Bandwidth (802.11B)

Low Channel



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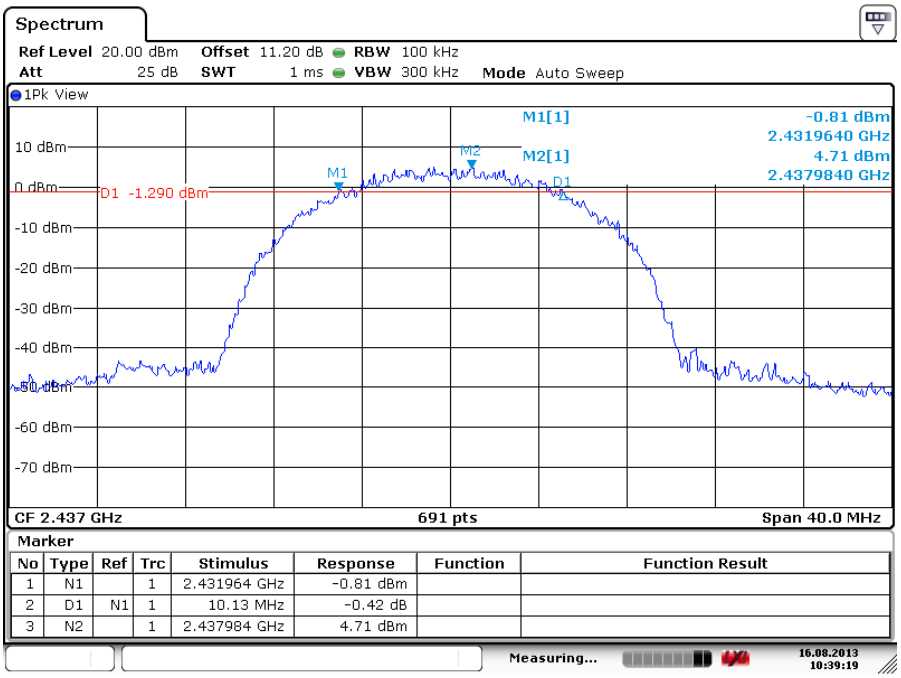
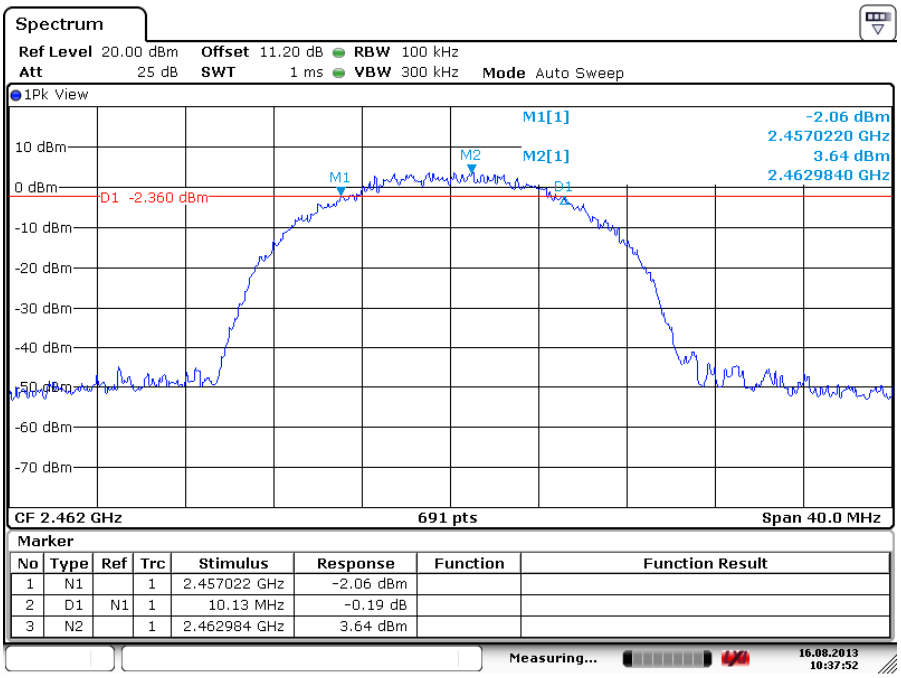
Middle Channel



Date: 16.AUG.2013 10:39:19

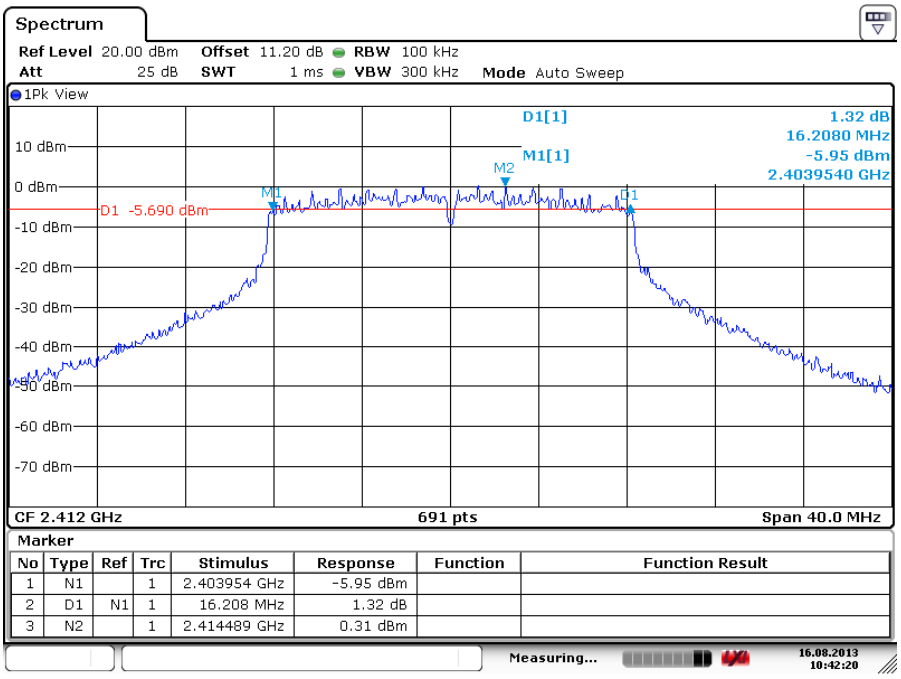
High Channel



Date: 16.AUG.2013 10:37:52

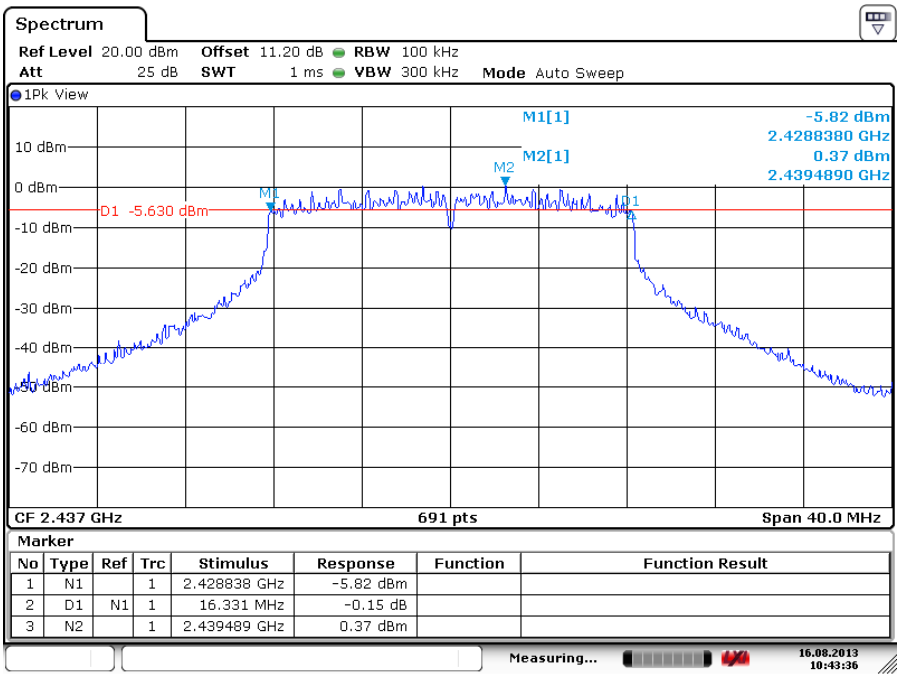
Test Plot of 6dB Bandwidth (802.11G)

Low Channel



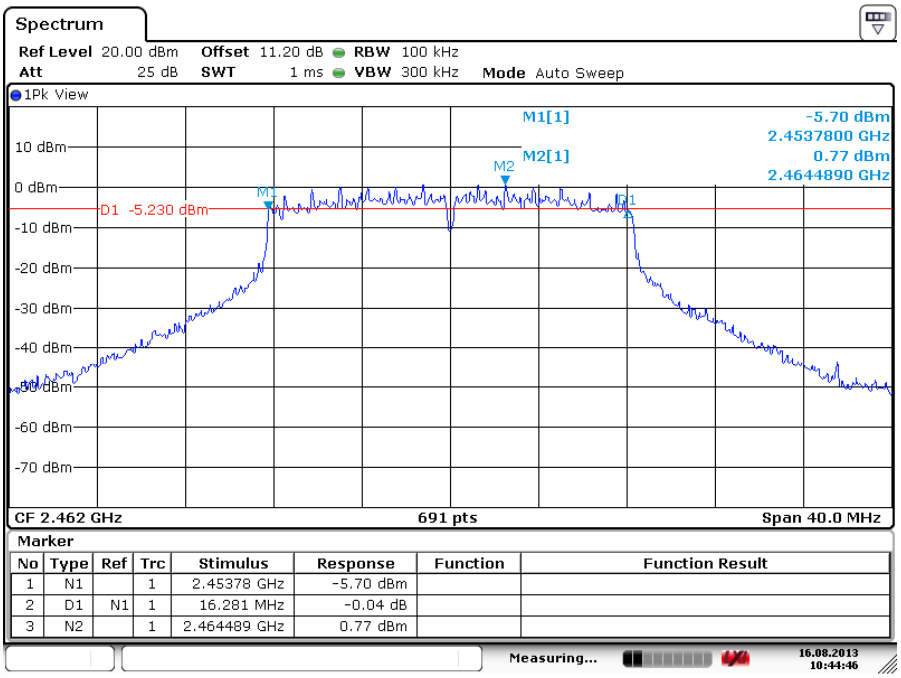
Date: 16.AUG.2013 10:42:20

Middle Channel



Date: 16.AUG.2013 10:43:36

High Channel



Date: 16.AUG.2013 10:44:46

5.1.4 Power Density

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (6.2.2), FCC Part 15.247(e)
Basic standard	:	LP0002(2011) Appendix II ANSI C63.10:2009, KDB558074
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 10: Test result of Power Density (802.11B)

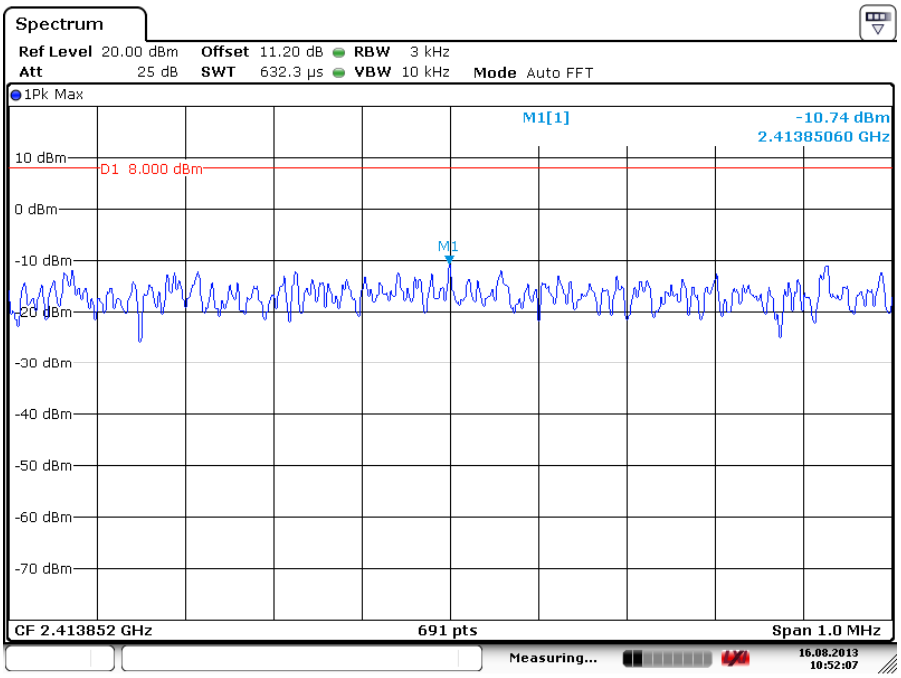
Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2412	-10.74	8
Middle Channel	2437	-10.45	8
High Channel	2462	-10.25	8

Table 11: Test result of Power Density (802.11G)

Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2412	-13.21	8
Middle Channel	2437	-12.79	8
High Channel	2462	-13.22	8

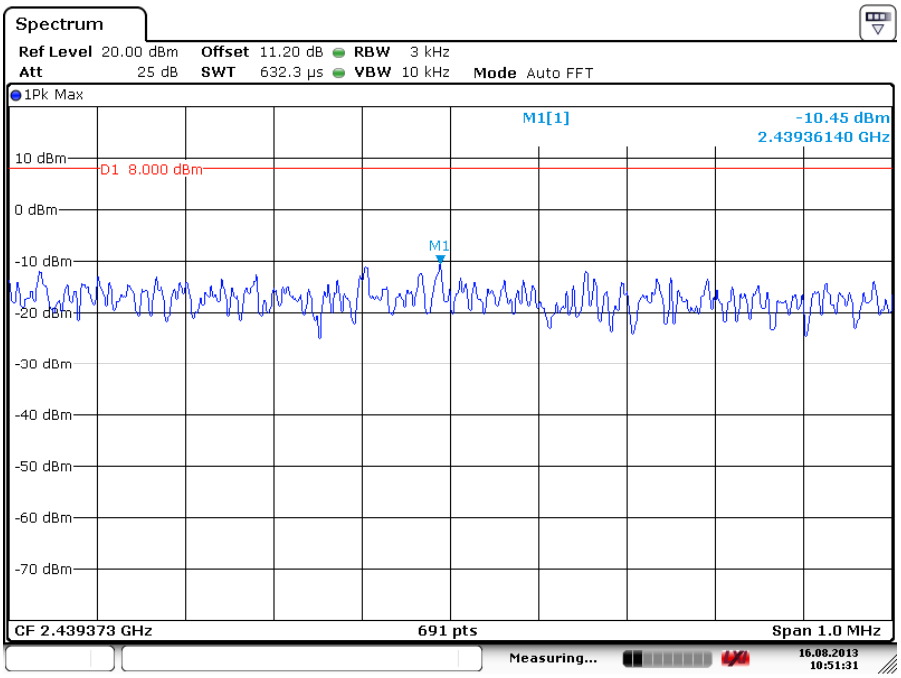
Test Plot of Power Density (802.11B)

Low Channel



Date: 16.AUG.2013 10:52:07

Middle Channel



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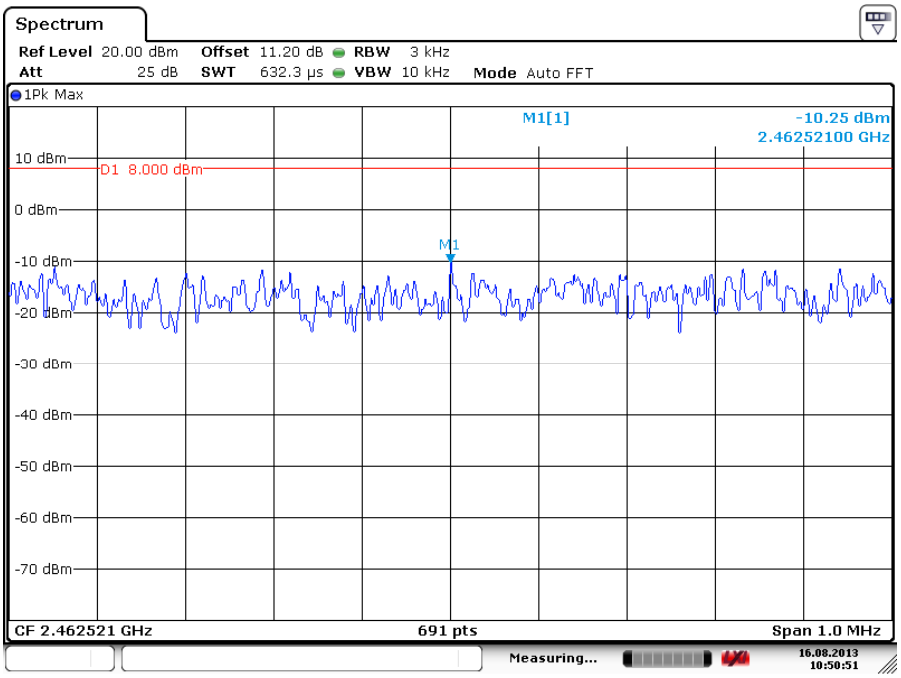
High Channel



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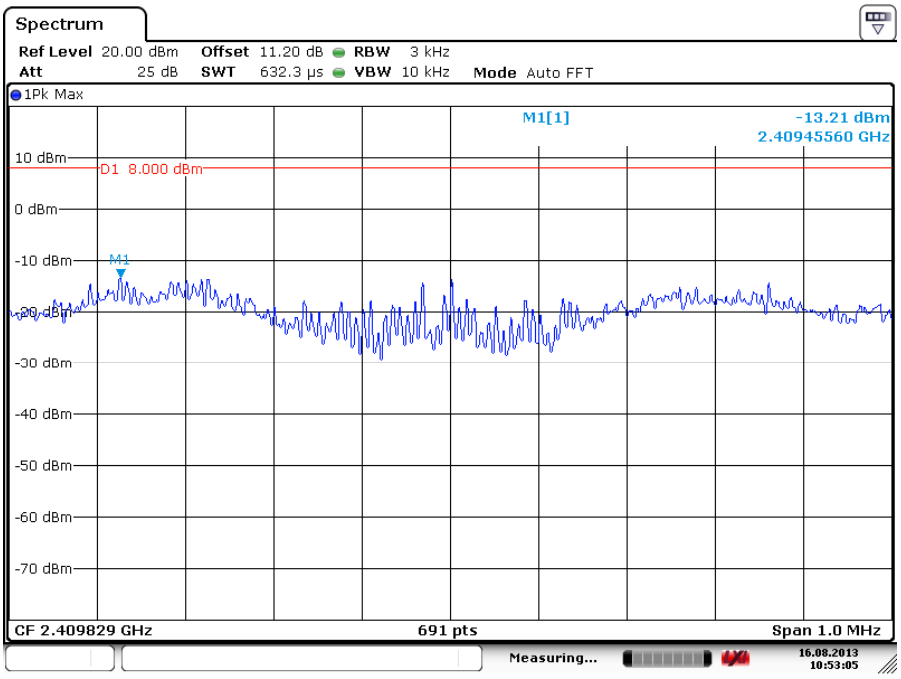
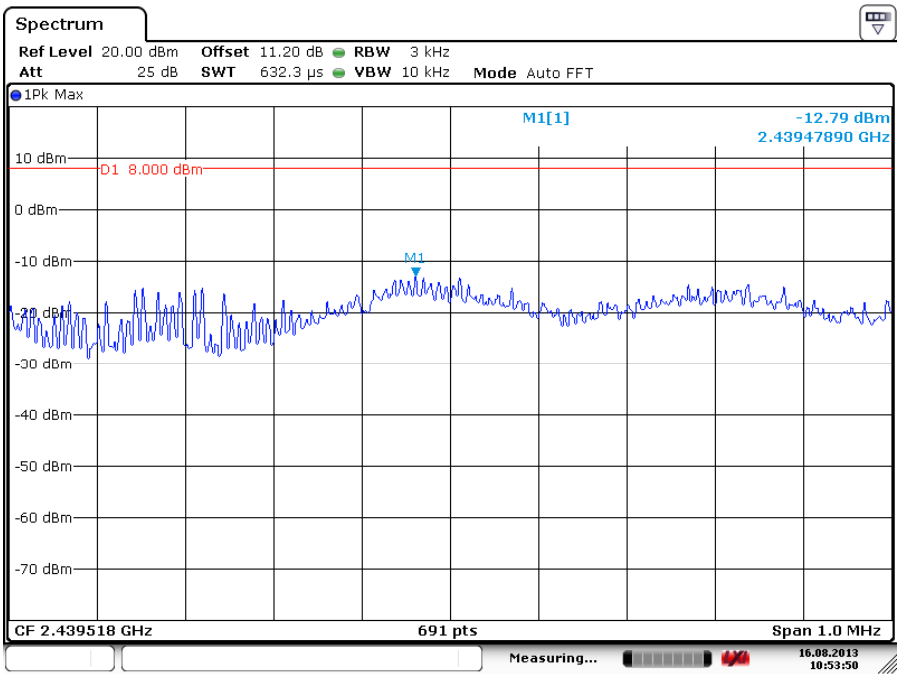
Test Plot of Power Density (802.11G)

Low Channel



Date: 16.AUG.2013 10:53:05

Middle Channel



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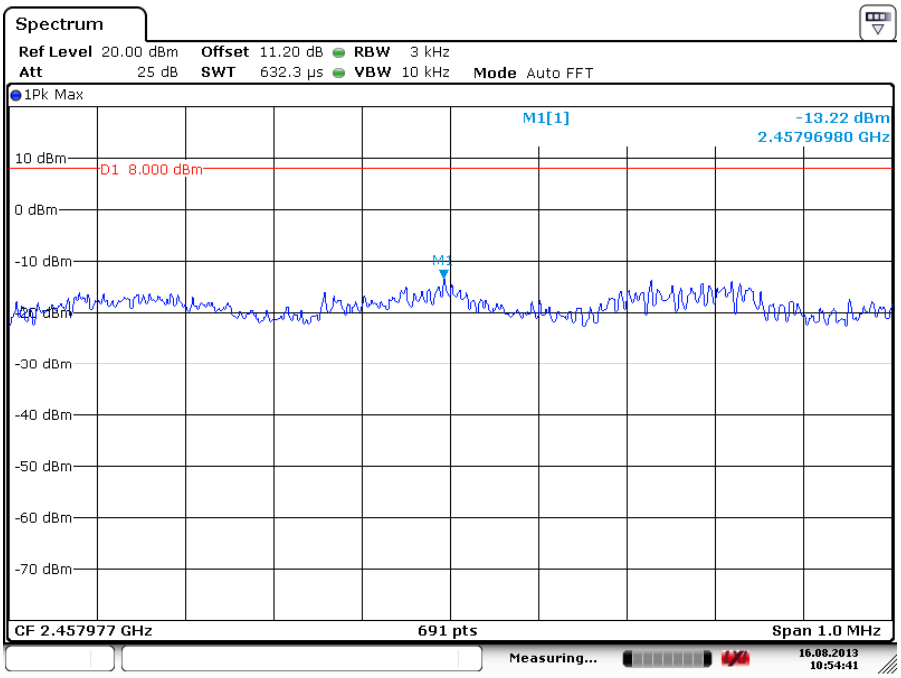
High Channel



Date: 16.AUG.2013 10:54:40

5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (5), FCC part 15.247(d)
Basic standard	:	LP0002(2011) Appendix II ANSI C63.10:2009, KDB558074
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site	:	Shielded room

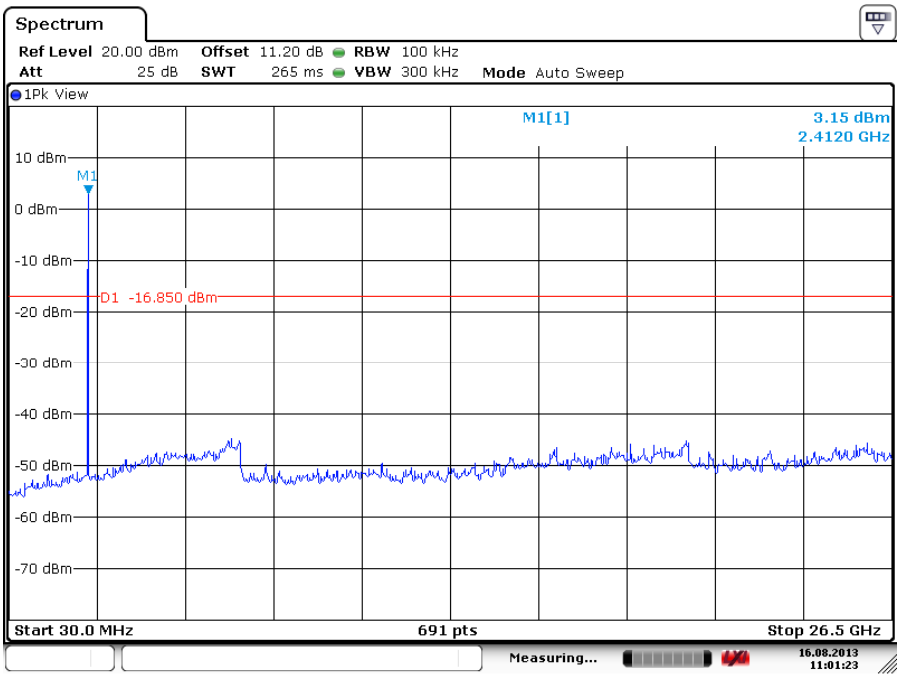
Test setup

Test Channel	:	Low/ High
Operation mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achived as well.
Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

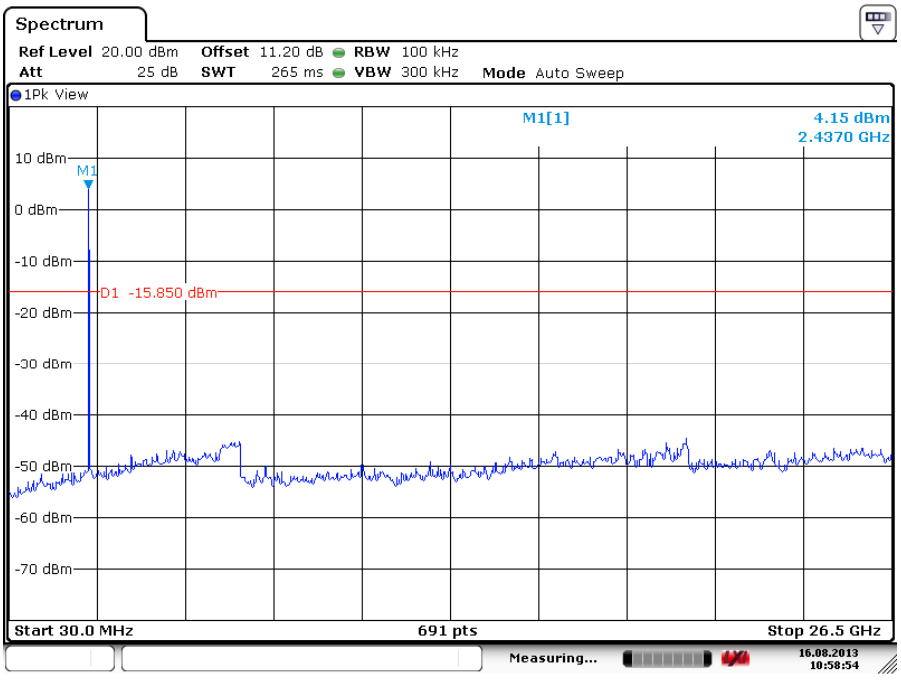
Test Plot 100kHz Conducted Emissions (802.11B)

Low Channel



Date: 16.AUG.2013 11:01:23

Middle Channel



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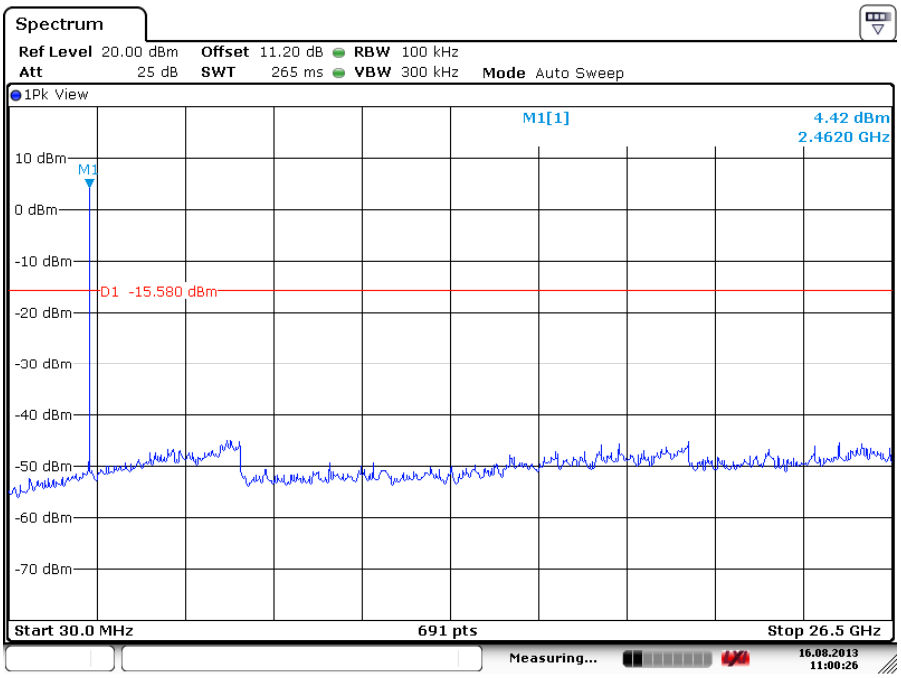
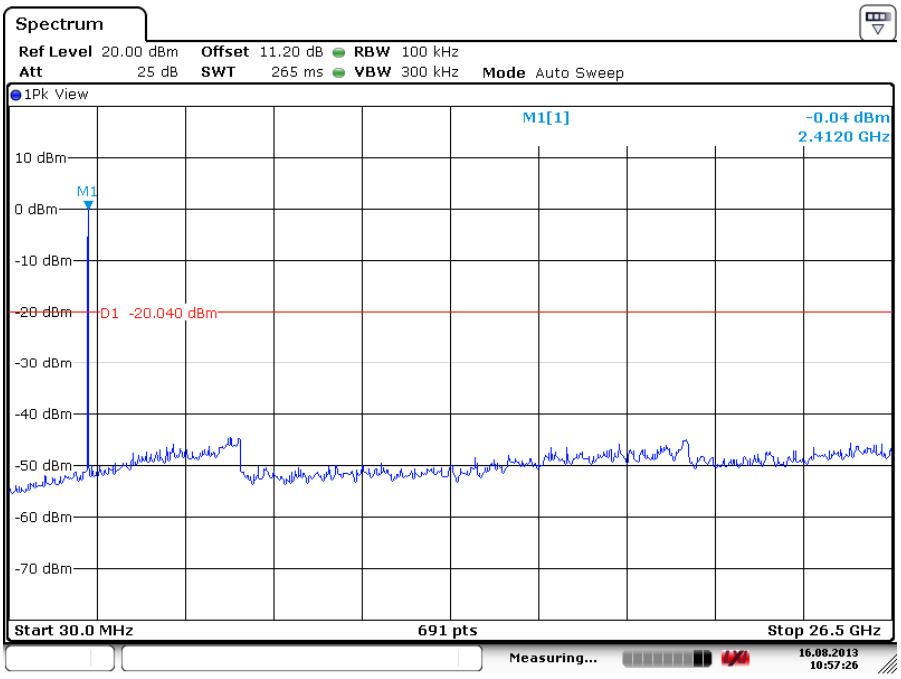
High Channel



Date: 16.AUG.2013 11:00:26

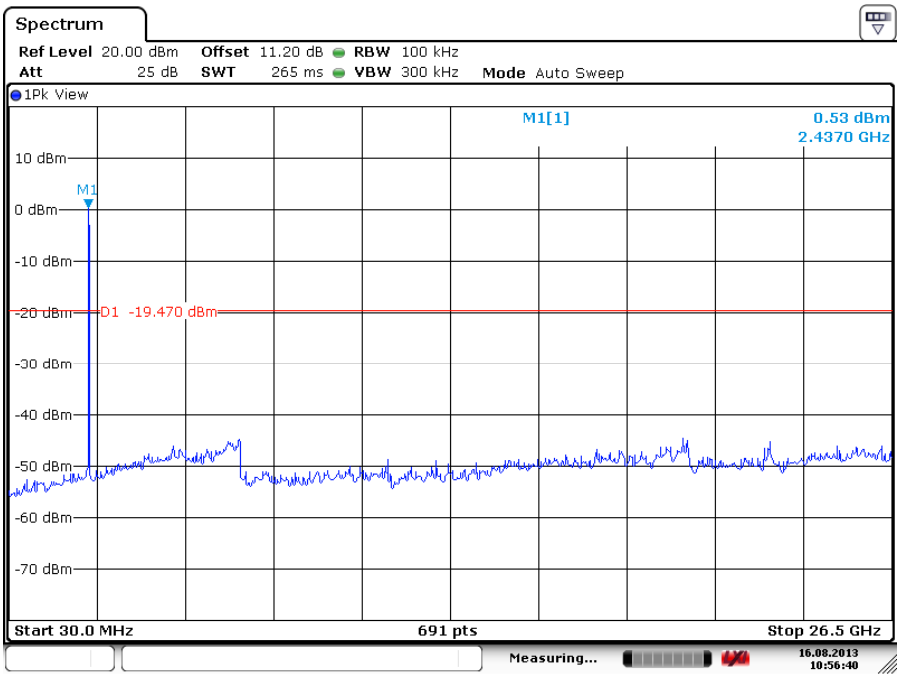
Test Plot 100kHz Conducted Emissions (802.11G)

Low Channel



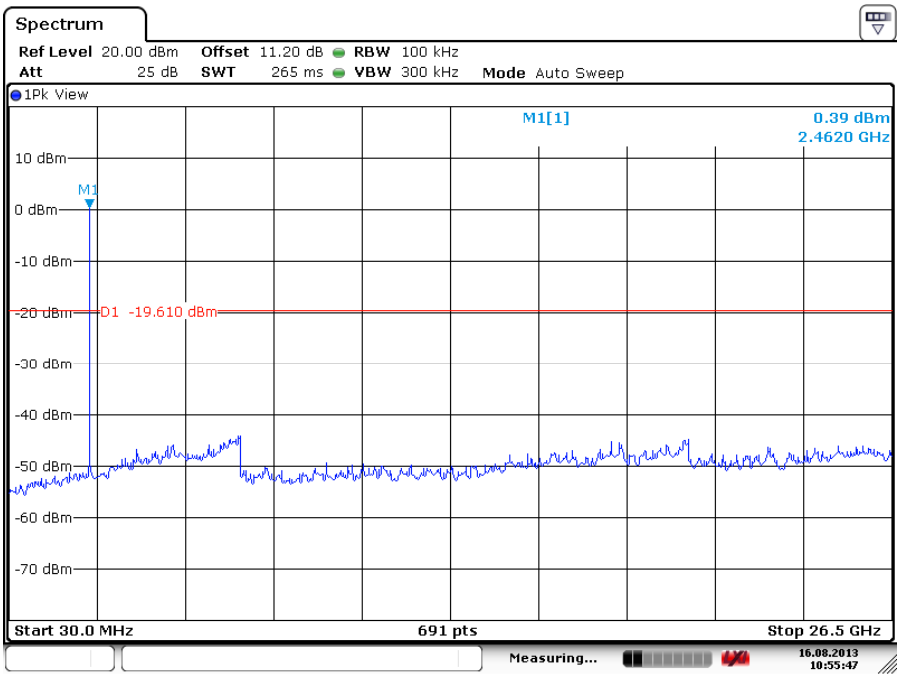
Date: 16.AUG.2013 10:57:25

Middle Channel



Date: 16.AUG.2013 10:56:39

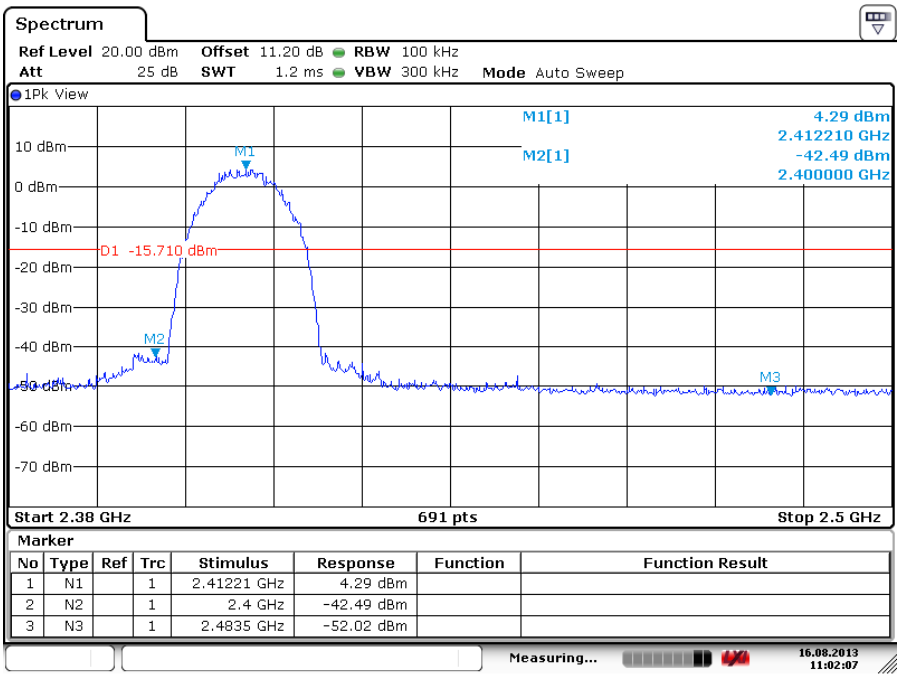
High Channel



Date: 16.AUG.2013 10:55:47

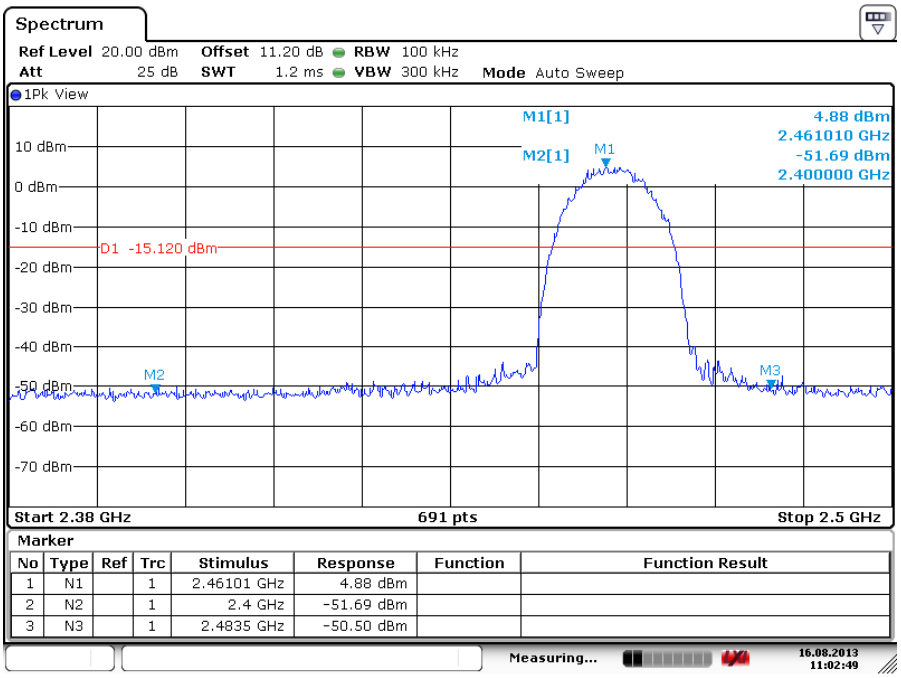
Test Plot 100kHz RBW of Band Edge (802.11B)

Low Channel



Date: 16.AUG.2013 11:02:07

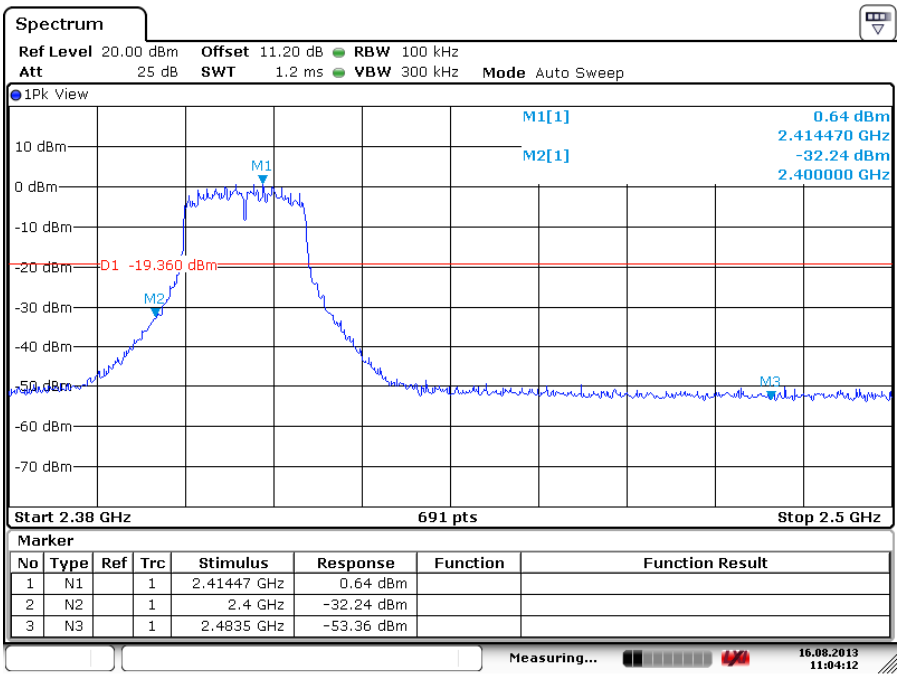
High Channel



Date: 16.AUG.2013 11:02:49

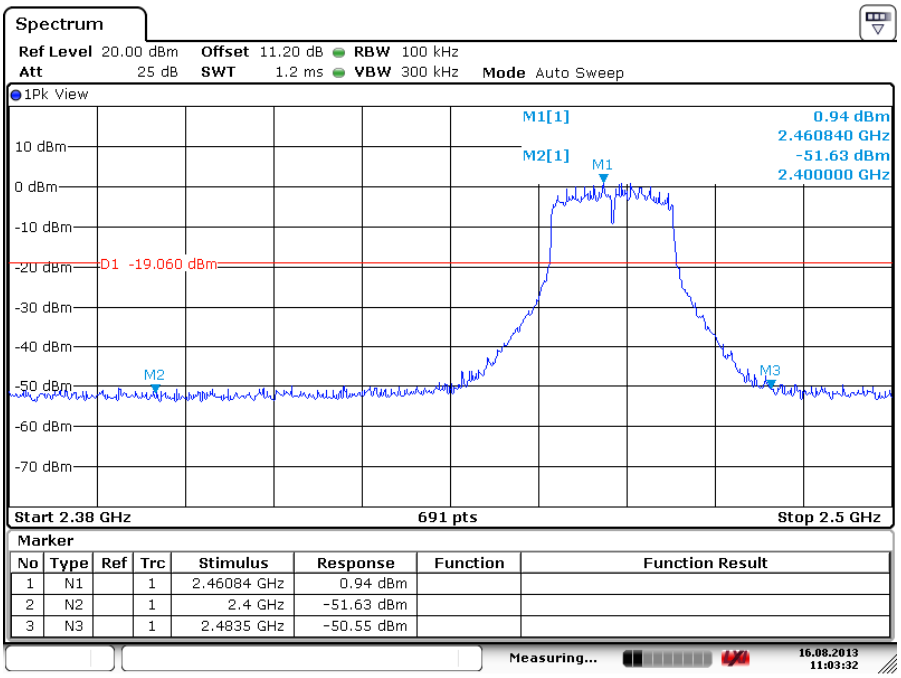
Test Plot 100kHz RBW of Band Edge (802.11G)

Low Channel



Date: 16.AUG.2013 11:04:12

High Channel



Date: 16.AUG.2013 11:03:32

5.1.6 Spurious Emission

RESULT: **Passed**

Test standard	:	LP0002(2011): 3.10.1, (5), FCC part 15.247(d), FCC 15.205, FCC 15.209
Basic standard	:	LP0002(2011) Appendix II ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in LP0002(2011): 2.7 , must comply with the radiated emission limits specified in LP0002(2011): 2.8 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). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in LP0002(2011): 2.8 Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT: **Passed**

Test standard	:	LP0002(2011): 2.3 FCC Part 15.207 FCC Part 15.107
Limits	:	Mains Conducted emissions as defined in above standards
Kind of test site	:	Shielded Room

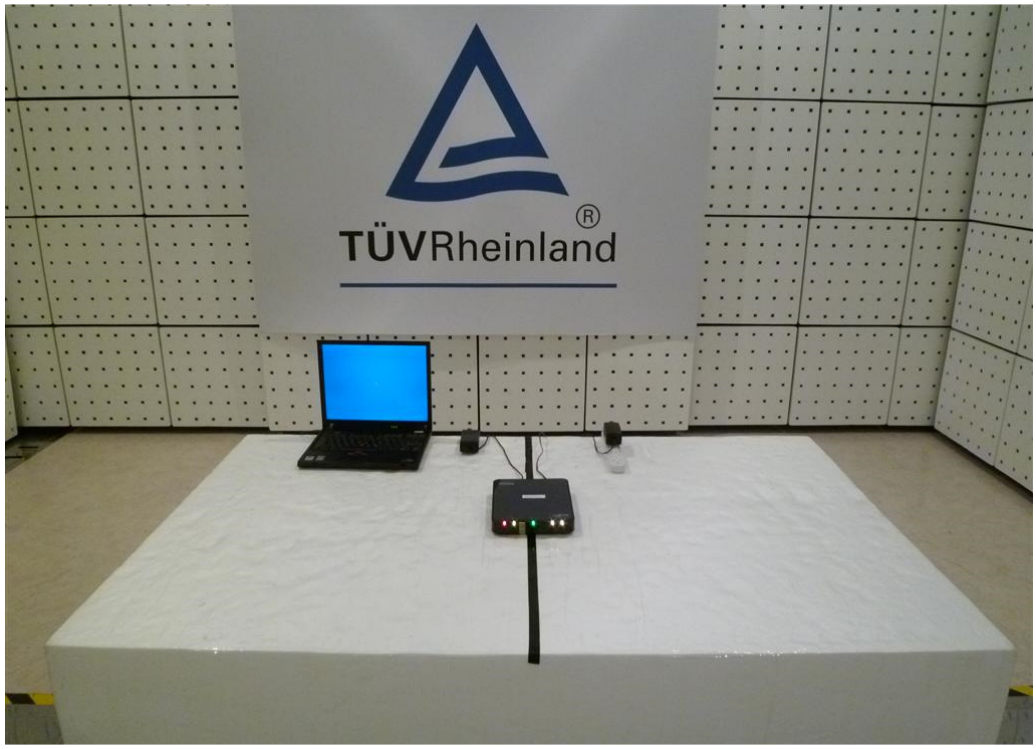
Test setup

Test Channel	:	Middle
Operation mode	:	A

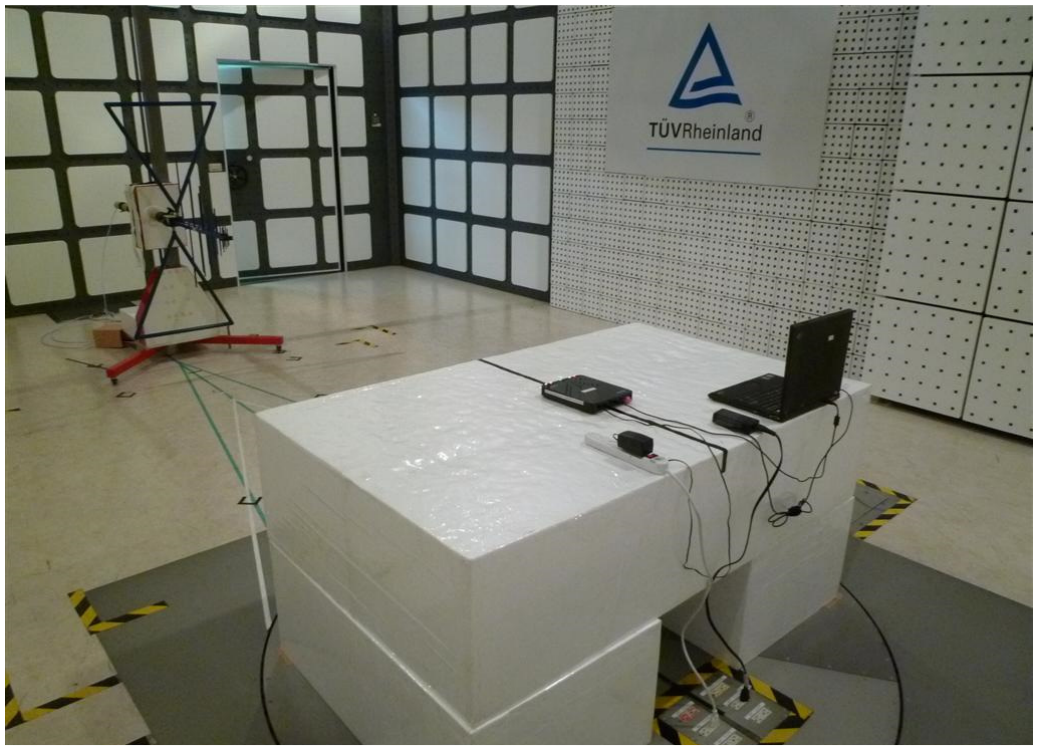
Remark: For details refer to Appendix D.

6. Photographs of the Test Set-Up

Photograph 1: Set-up for Spurious Emissions (Front View)



Photograph 2: Set-up for Spurious Emissions (Back View 1)

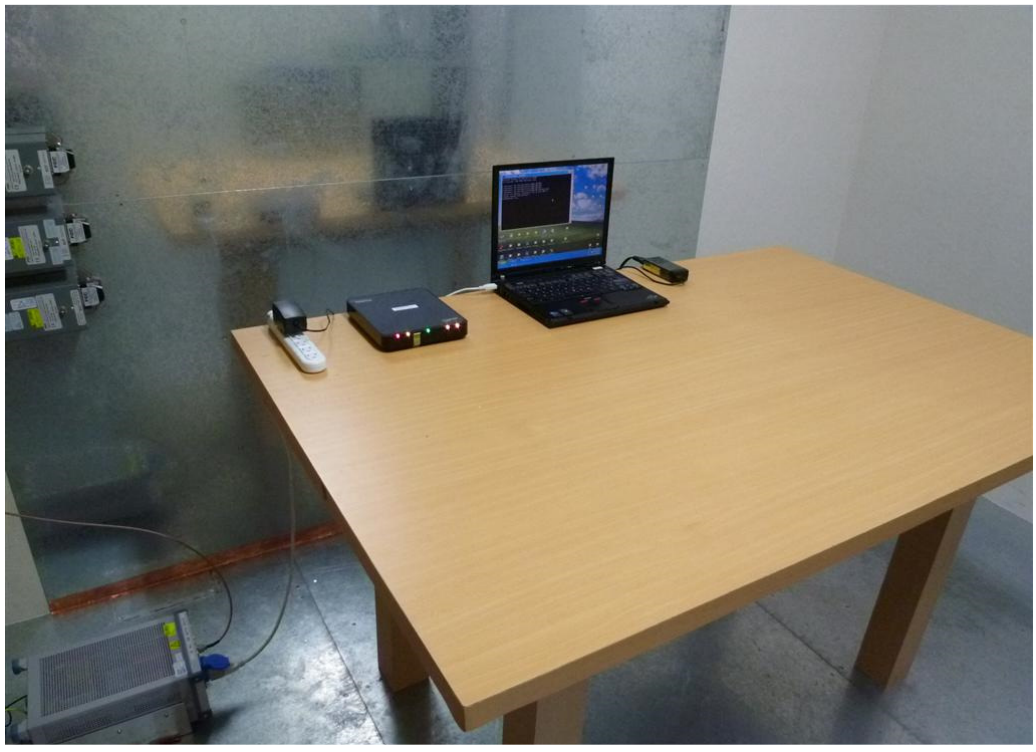


Photograph 3: Set-up for Spurious Emissions (Back View 2)

Photograph 4: Set-up for Conducted testing

Photograph 5: Set-up for for Mains Conducted testing Back

Photograph 6: Set-up for for Mains Conducted testing Front



7. List of Tables

8. List of Photographs