

Prüfbericht-Nr.: <i>Test Report No.:</i>	10046115 001	Auftrags-Nr.: <i>Order No.:</i>	114019337	Seite 1 von 64 Page 1 of 64
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	February 24, 2014	
Auftraggeber: <i>Client:</i>	Hon Hai Precision Industry Co., Ltd., No.151,Sec.1,Nankan Rd.,Lujhu Township,Taoyuan County 33859,Taiwan			
Prüfgegenstand: <i>Test item:</i>	802.11b/g/n 1T1R WLAN Module			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	WFUR7			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247 RSS-210 (12-2010) A8			
Wareneingangsdatum: <i>Date of receipt:</i>	3/5/2014			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000039923-001 A000039923-002			
Prüfzeitraum: <i>Testing period:</i>	6-Mar-2014 - 7-Mar-2014			
Ort der Prüfung: <i>Place of testing:</i>	EMC Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
2014-03-12 Danny S. C. Sung/Project Manager Datum Name / Stellung Unterschrift Date Name / Position Signature		2014-03-12 Arvin S.P. Ho/ Manager Datum Name / Stellung Unterschrift Date Name / Position Signature		
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* 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				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

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*

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: *Passed*

Contents

1.	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS.....	5
2.	TEST SITES	6
2.1	TEST FACILITIES	6
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	7
2.3	TRACEABILITY	8
2.4	CALIBRATION	8
2.5	MEASUREMENT UNCERTAINTY	8
3.	GENERAL PRODUCT INFORMATION.....	9
3.1	PRODUCT FUNCTION AND INTENDED USE	9
3.2	SYSTEM DETAILS AND RATINGS.....	9
3.3	INDEPENDENT OPERATION MODES.....	10
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	10
3.5	SUBMITTED DOCUMENTS.....	10
4.	TEST SET-UP AND OPERATION MODES.....	11
4.1	PRINCIPLE OF CONFIGURATION SELECTION	11
4.2	TEST OPERATION AND TEST SOFTWARE.....	11
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	11
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	12
4.5	TEST SETUP DIAGRAM	12
5.	TEST RESULTS	14
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	14
5.1.1	<i>Antenna Requirement</i>	<i>14</i>
5.1.2	<i>Peak Output Power</i>	<i>15</i>
5.1.3	<i>6dB Bandwidth and 99% Bandwidth.....</i>	<i>23</i>
5.1.4	<i>Power Density</i>	<i>38</i>
5.1.5	<i>Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth.....</i>	<i>46</i>
5.1.6	<i>Spurious Emission</i>	<i>57</i>
5.2	MAINS EMISSIONS.....	58
5.2.1	<i>Mains Conducted Emissions.....</i>	<i>58</i>
6.	SAFETY HUMAN EXPOSURE	59
6.1	RADIO FREQUENCY EXPOSURE COMPLIANCE	59
6.1.1	<i>Electromagnetic Fields.....</i>	<i>59</i>

7.	PHOTOGRAPHS OF THE TEST SET-UP.....	60
8.	LIST OF TABLES	64
9.	LIST OF PHOTOGRAPHS.....	64

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: 10046115APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 10046115APPENDIX D)

Test Specifications

Table 1: Applied Standard and Test Levels

Radio
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
EMI Test Receiver	R&S	ESR	101062	1-Sep-14
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-14
Spectrum Analyzer	R&S	FSV 40	100921	9-Dec-14
Horn Antenna	ETS-Lindgren	3117	00138160	10-Jan-15
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	29-Oct-15
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2-Sep-14
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2-Sep-14
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	060558	24-Oct-14
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-14
EMI Test Receiver	R&S	ESCI	101094	29-Aug-14
LISN (1 phase)	R&S	ENV216	101243	5-Jun-14
LISN	Rolf Heine	NNB-2/16Z	99080	30-Aug-14

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 basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1.5 \text{ dB}$
Adjacent channel power	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6 \text{ dB}$
Radiated emission of receiver, valid up to 26 GHz	$\pm 6 \text{ dB}$
Temperature	$\pm 2 \text{ }^{\circ}\text{C}$
Humidity	$\pm 10 \text{ \%}$

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a 802.11b/g/n 1T1R WLAN Module which is designed to work mount on other 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	802.11b/g/n 1T1R WLAN Module
Type Designation	WFUR7
FCC ID	RX3-WFUR7 IC: 2878F-WFUR7

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2412~2462 MHz
Channel Spacing	1 MHz , 5 MHz for highest and lowest channel
Channel number	11
Operation Voltage	3.3 V
Modulation	CCK, DQPSK, DBPSK for DSSS; QAM, QPSK, BPSK for OFDM
Antenna gain	1.22 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

- Circuit Diagram
- Instruction Manual
- Technical Description
- 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: **Test samples are provided with a** UART interface which makes it possible to control them through a test software installed on a notebook computer.

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: A000039923-002

Radiation: A000039923-001

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	HP	HSTNN-Q78C-3	CNF0339QBM

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

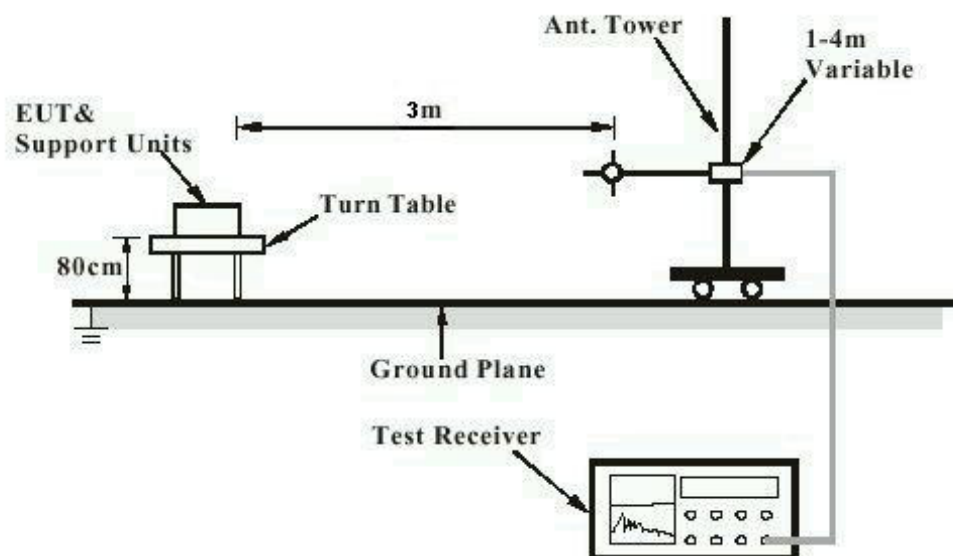


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

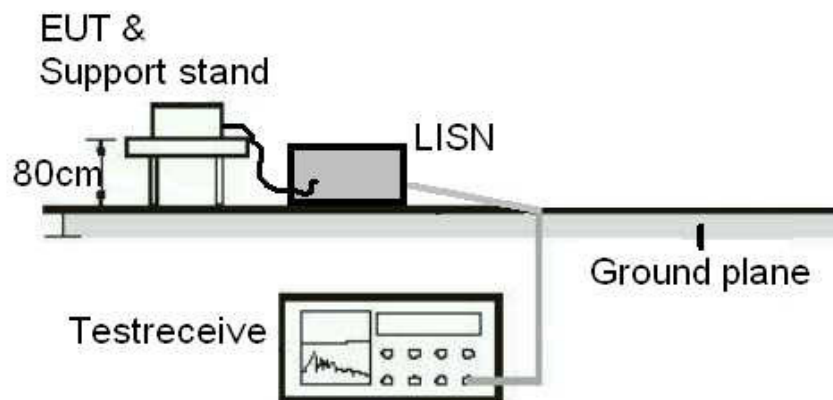
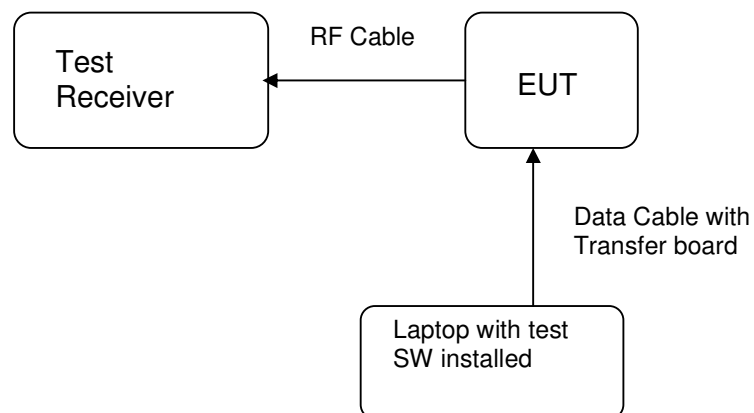


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and RSS-Gen 7.1.4
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 1.22 dBi. The antenna is a PIFA antenna 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	:	FCC Part 15.247(b)(3), RSS-210 A8.4(4)
Basic standard	:	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	17.75	0.0596	1
Middle Channel	2437	17.56	0.0570	1
High Channel	2462	17.52	0.0565	1

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

Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2412	16.63	0.0460	1
Middle Channel	2437	16.74	0.0472	1
High Channel	2462	16.86	0.0485	1

Table 8: Test result of Peak Output Power (802.11n 20MHz)

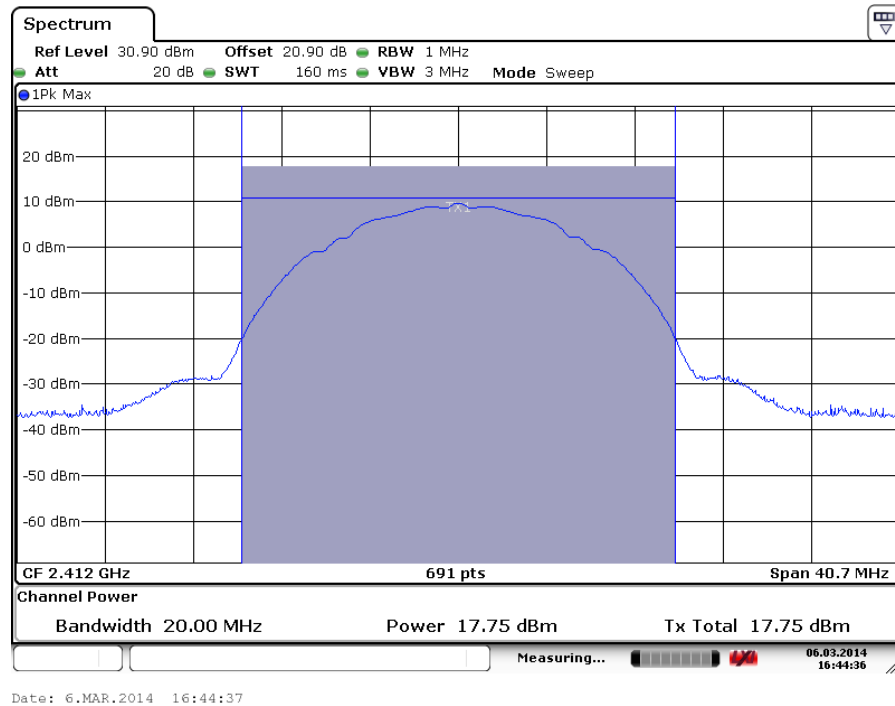
Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2412	15.35	0.0343	1
Middle Channel	2437	15.39	0.0346	1
High Channel	2462	15.97	0.0395	1

Table 9: Test result of Peak Output Power (802.11n 40MHz)

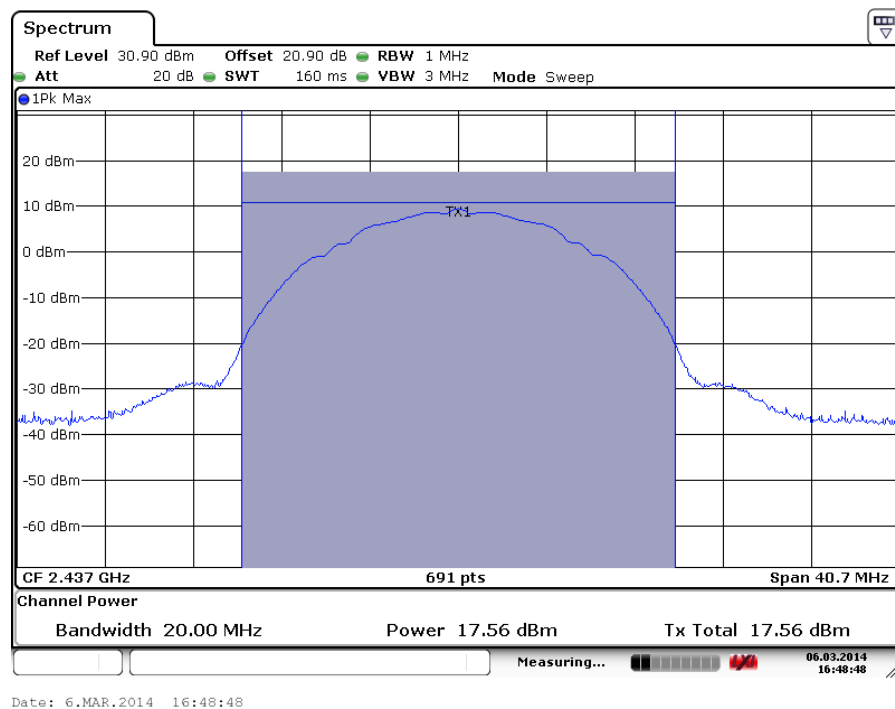
Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2422	14.95	0.0313	1
Middle Channel	2437	15.25	0.0335	1
High Channel	2452	15.41	0.0348	1

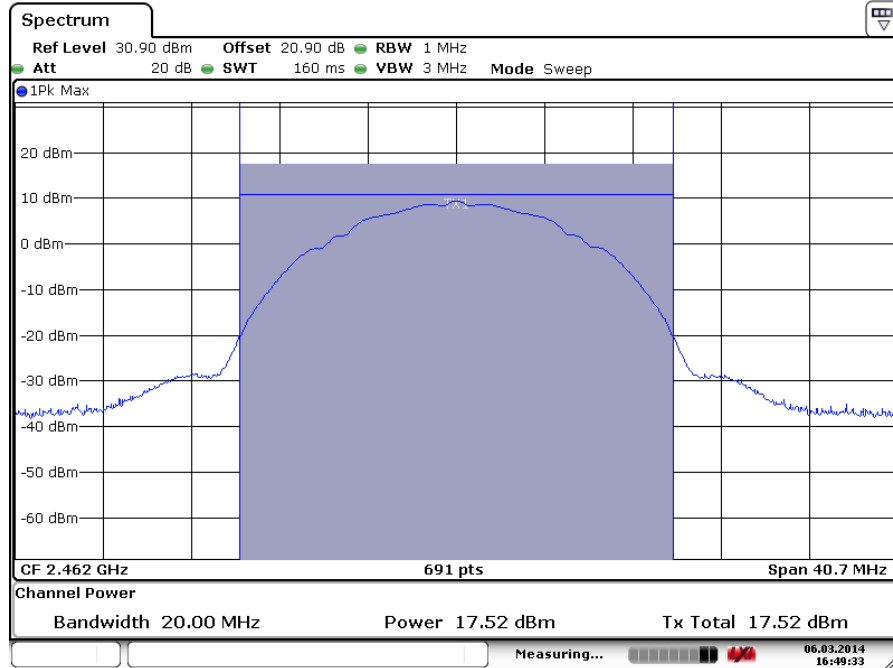
Test Plot of Output Power (802.11b)

Low Channel

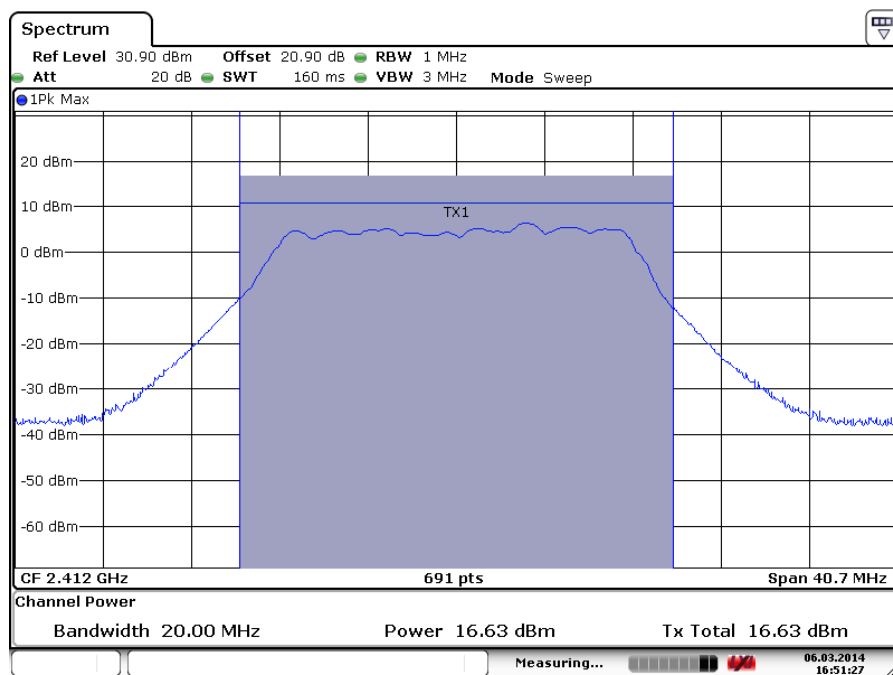


Middle Channel

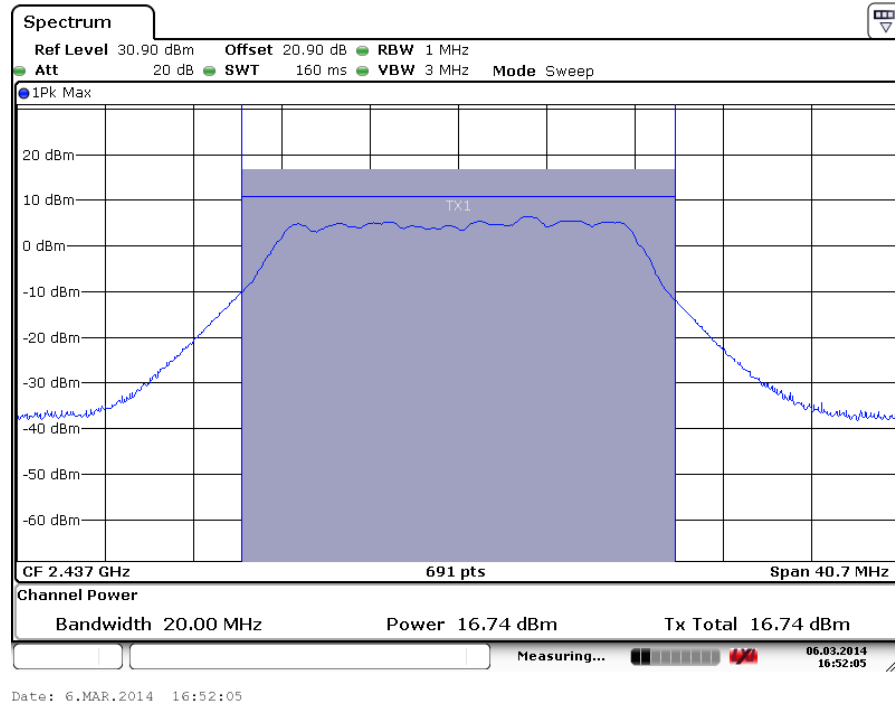
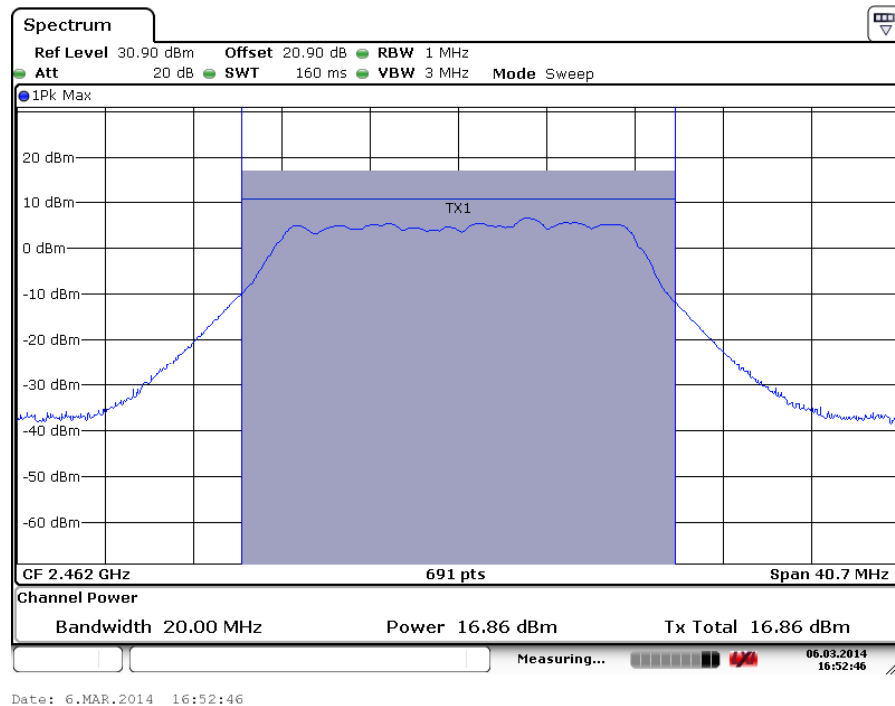


High Channel


Date: 6.MAR.2014 16:49:33

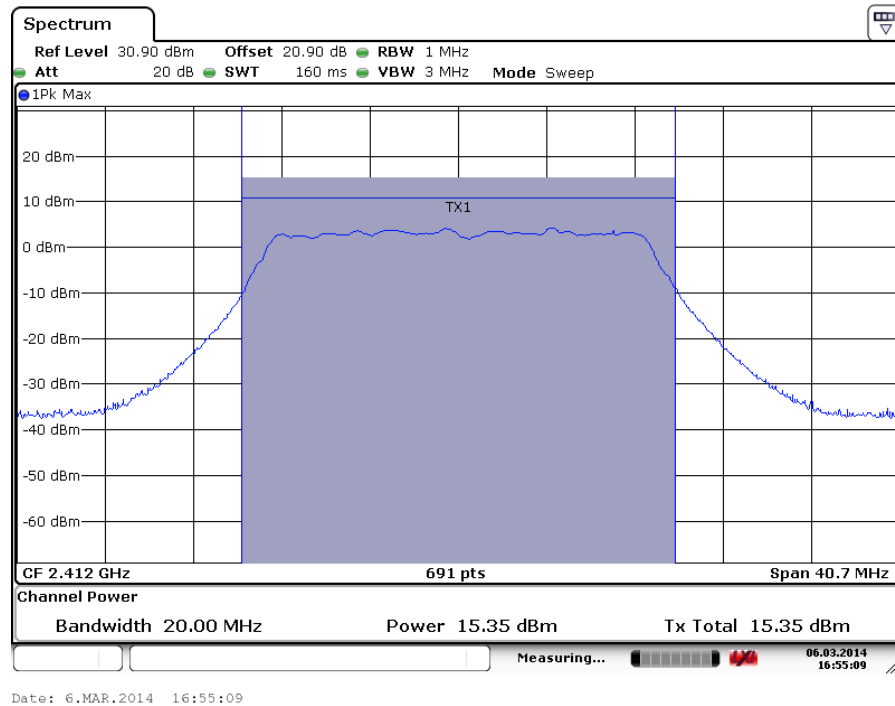
Test Plot of Output Power (802.11g)
Low Channel


Date: 6.MAR.2014 16:51:27

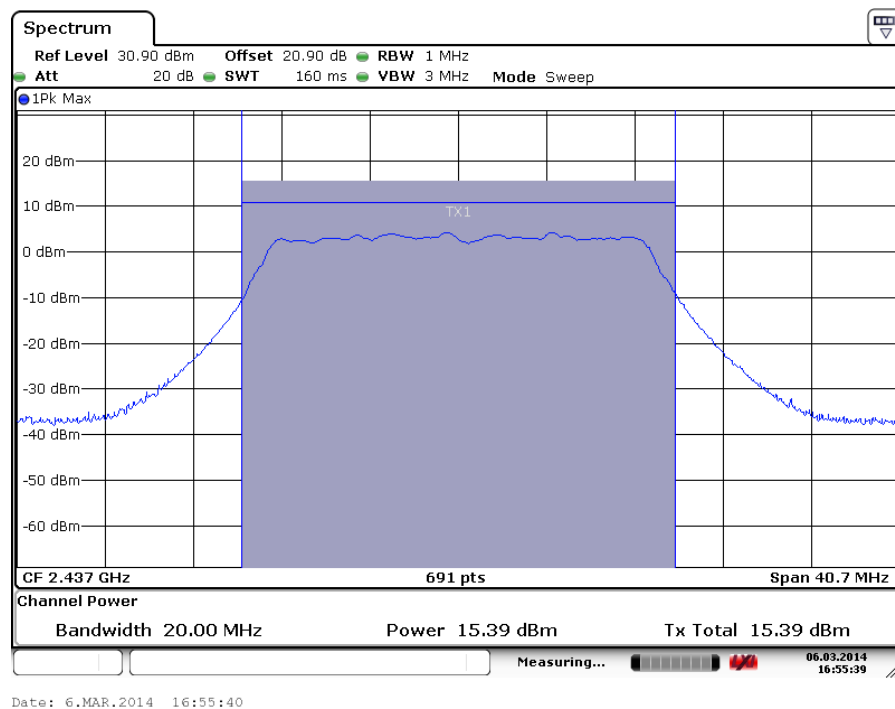
Middle Channel

High Channel


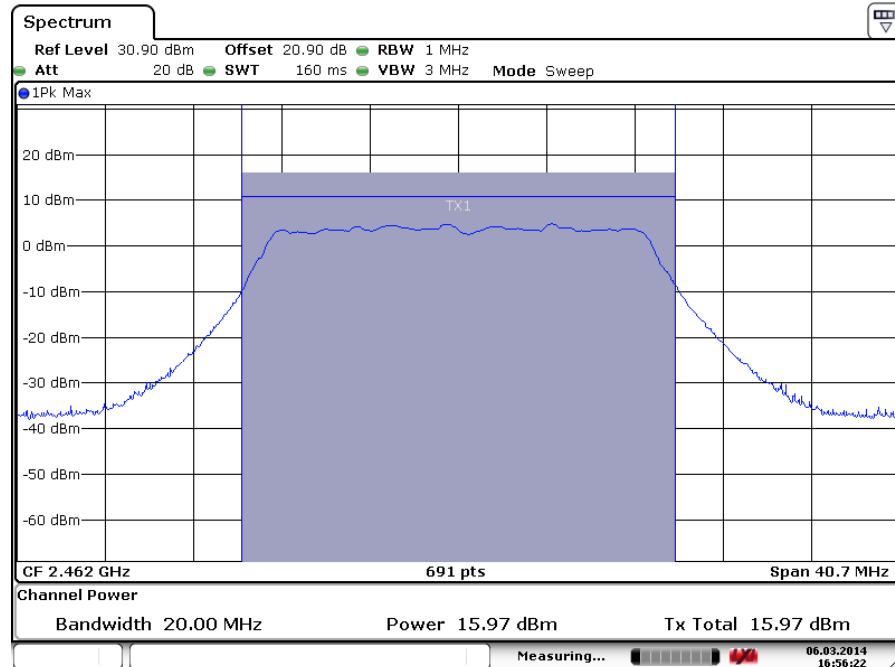
Test Plot of Output Power (802.11n 20MHz)

Low Channel

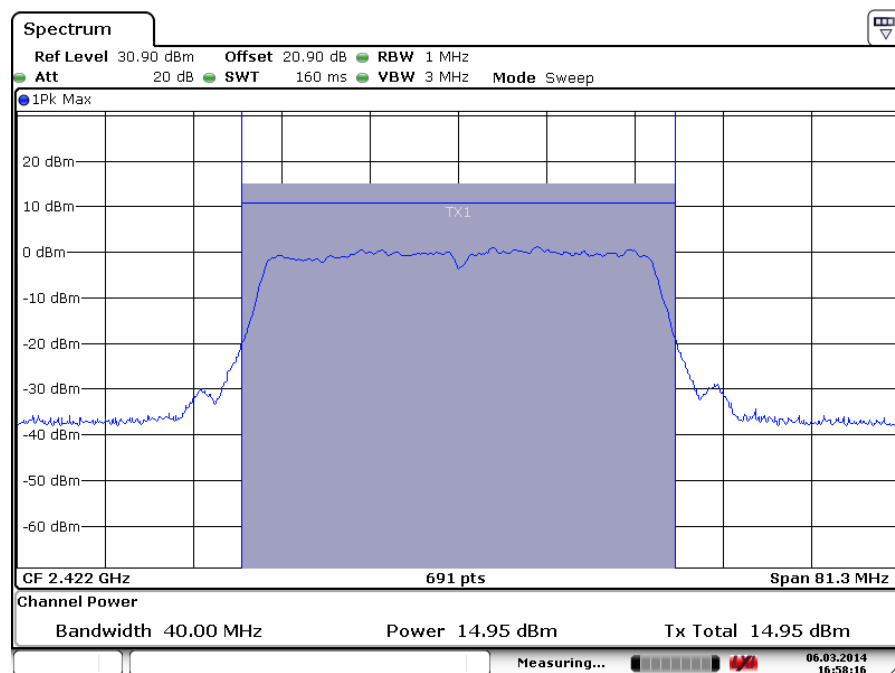


Middle Channel

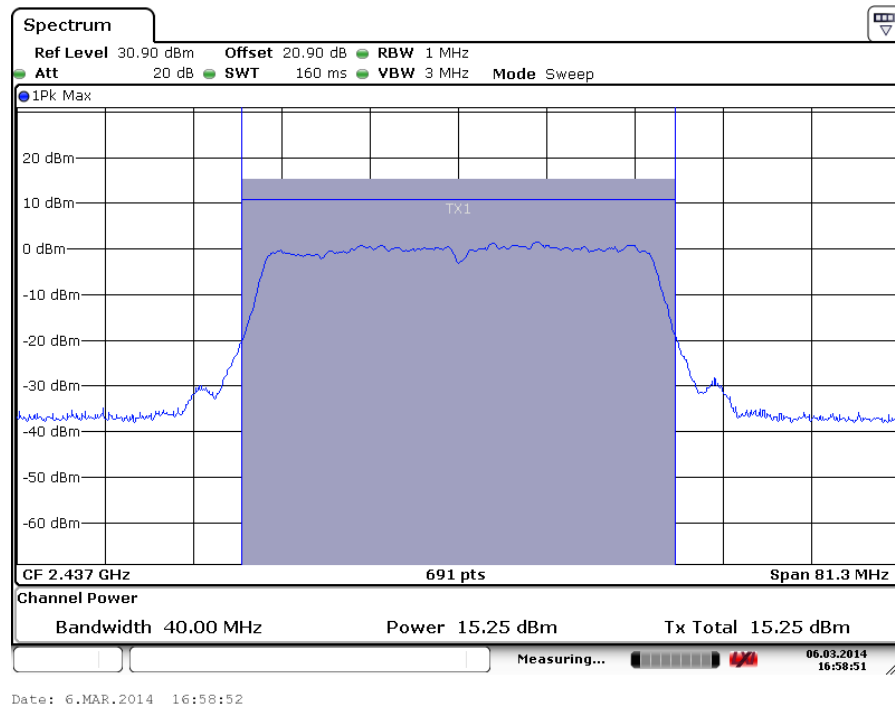
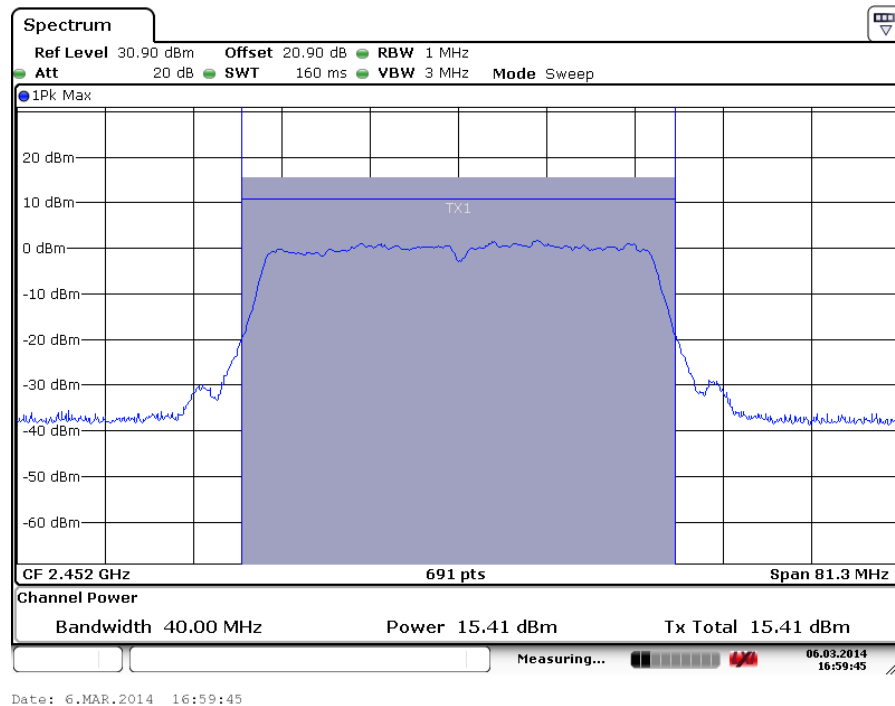


High Channel


Date: 6.MAR.2014 16:56:22

Test Plot of Output Power (802.11n 40MHz)
Low Channel


Date: 6.MAR.2014 16:58:16

Middle Channel

High Channel


5.1.3 6dB Bandwidth and 99% Bandwidth**RESULT:****Passed**

Test standard	:	FCC Part 15.247(a)(2), RSS-210 A8.2(1)
Basic standard	:	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 6dB Bandwidth (802.11b)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	10.072	0.5	Pass
Mid Channel	2437	10.029	0.5	Pass
High Channel	2462	10.072	0.5	Pass

Table 11: Test result of 6dB Bandwidth (802.11g)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	16.541	0.5	Pass
Mid Channel	2437	16.541	0.5	Pass
High Channel	2462	16.541	0.5	Pass

Table 12: Test result of 6dB Bandwidth (802.11n 20MHz)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	17.8	0.5	Pass
Mid Channel	2437	17.8	0.5	Pass
High Channel	2462	17.8	0.5	Pass

Table 13: Test result of 6dB Bandwidth (802.11n 40MHz)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2422	36.397	0.5	Pass
Mid Channel	2437	36.469	0.5	Pass
High Channel	2452	36.447	0.5	Pass

Table 14: Test result of 99% Bandwidth (802.11b)

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)
Low Channel	2412	14.978	/
Mid Channel	2437	14.978	/
High Channel	2462	14.978	/

Table 15: Test result of 99% Bandwidth (802.11g)

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)
Low Channel	2412	16.714	/
Mid Channel	2437	16.758	/
High Channel	2462	16.758	/

Table 16: Test result of 99% Bandwidth (802.11n 20MHz)

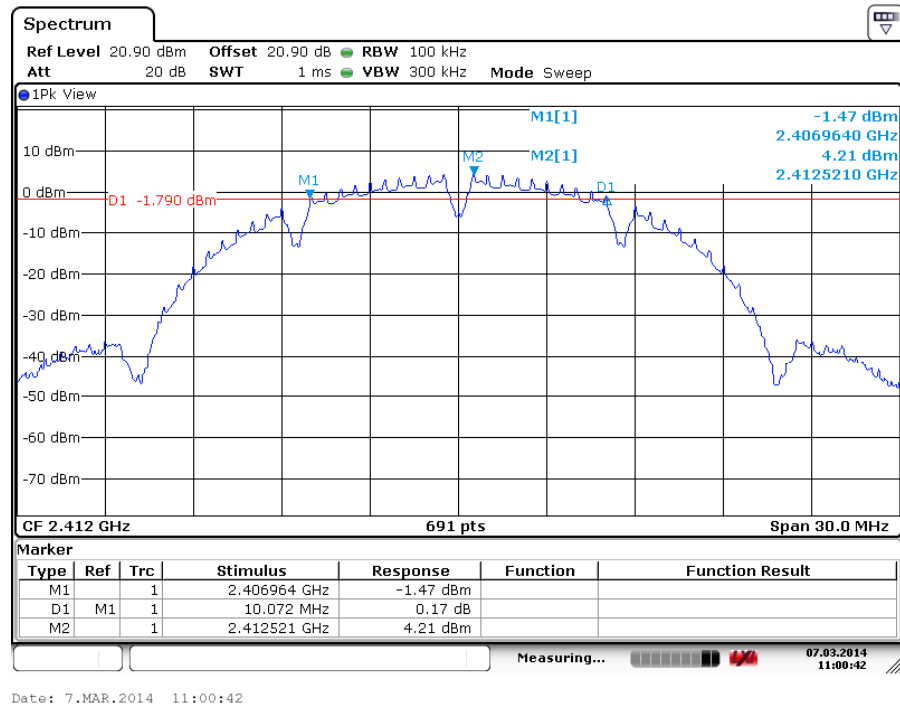
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)
Low Channel	2412	17.843	/
Mid Channel	2437	17.843	/
High Channel	2462	17.843	/

Table 17: Test result of 99% Bandwidth (802.11n 40MHz)

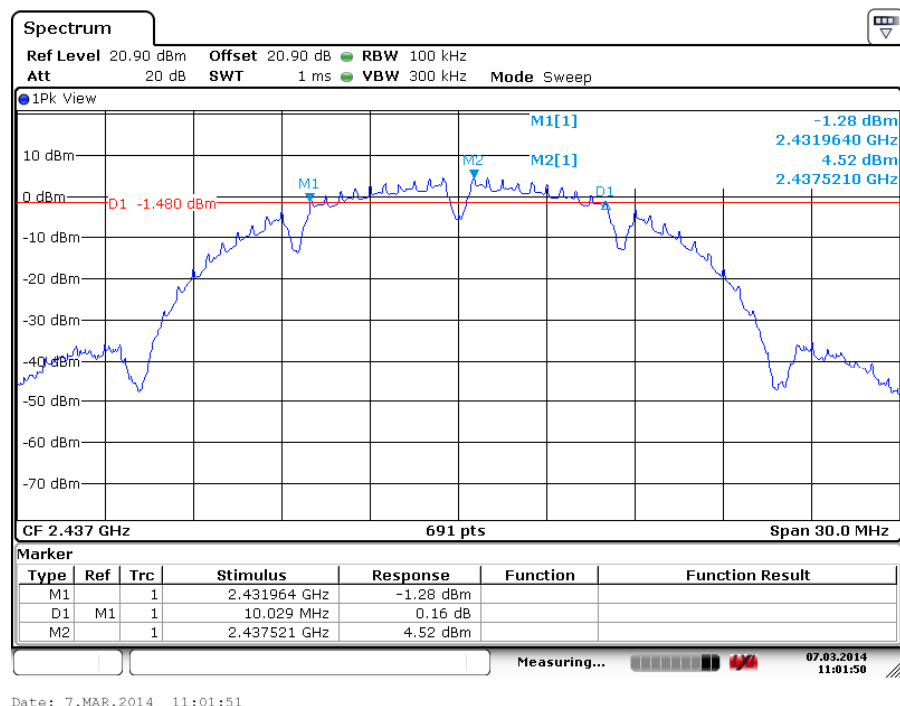
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	Limit (MHz)
Low Channel	2422	36.179	/
Mid Channel	2437	36.179	/
High Channel	2452	36.179	/

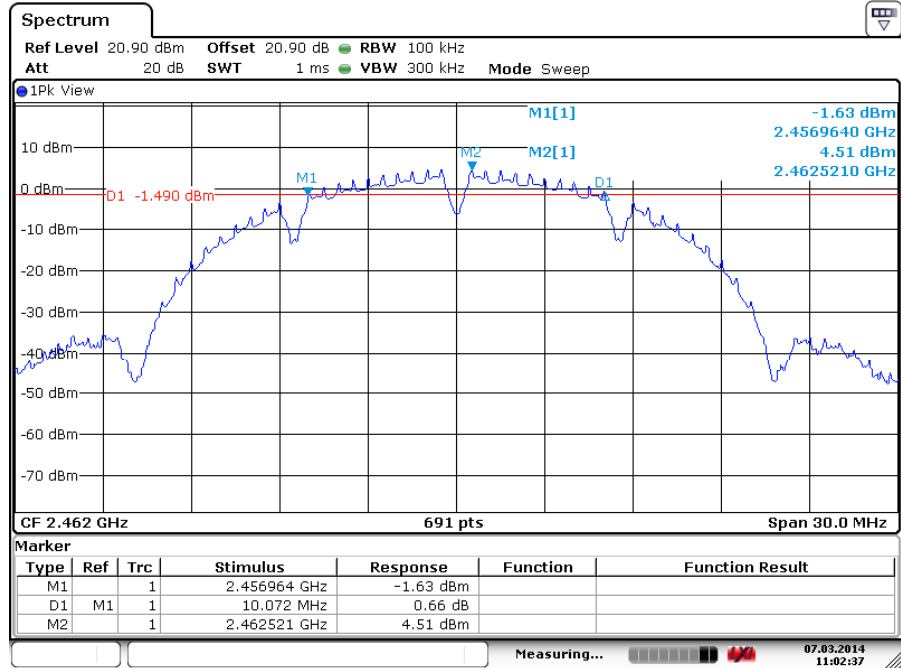
Test Plot of 6dB Bandwidth (802.11b)

Low Channel

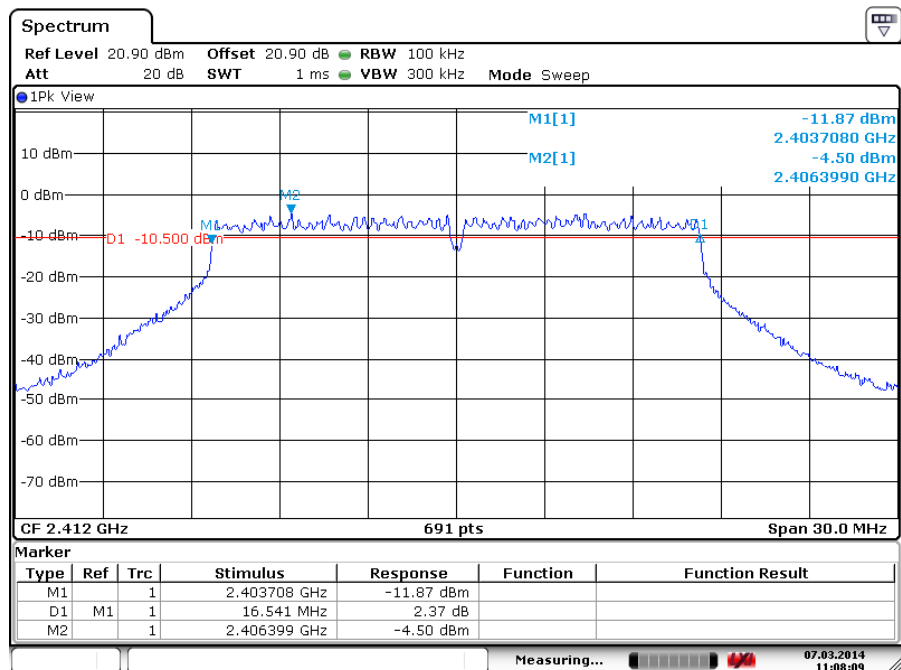


Middle Channel

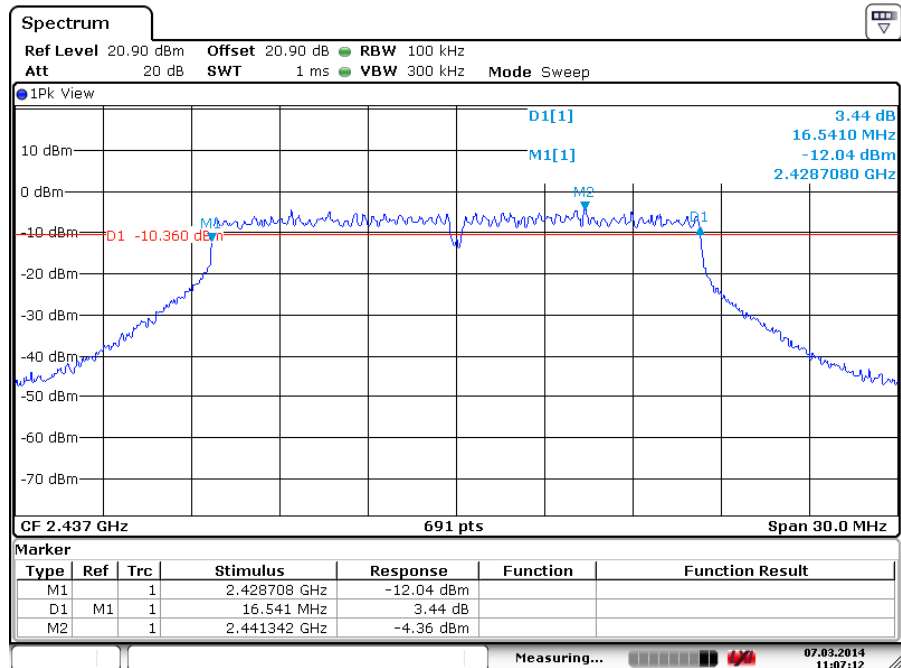


High Channel


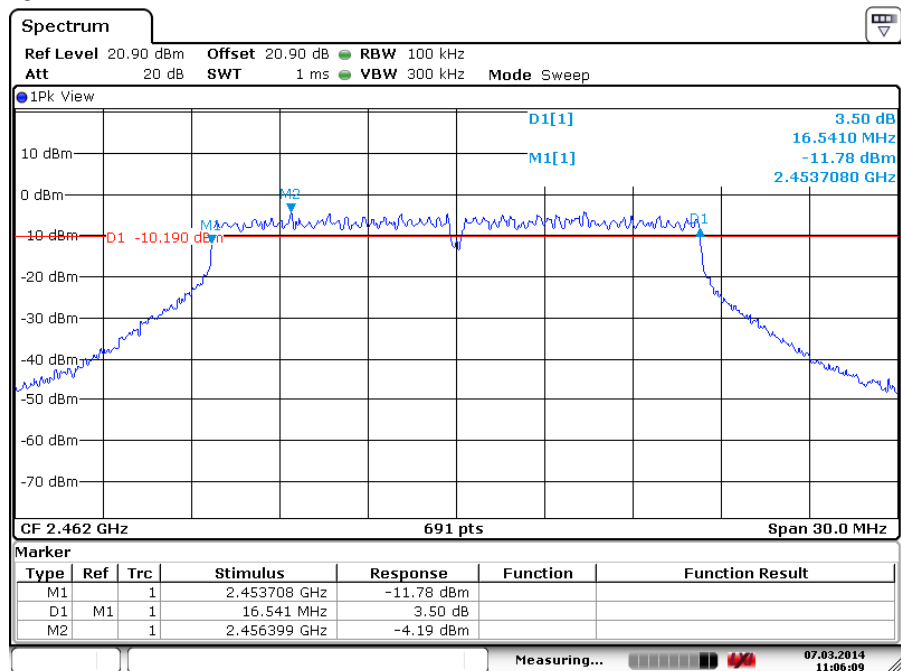
Date: 7.MAR.2014 11:02:37

Test Plot of 6dB Bandwidth (802.11g)
Low Channel


Date: 7.MAR.2014 11:08:09

Middle Channel


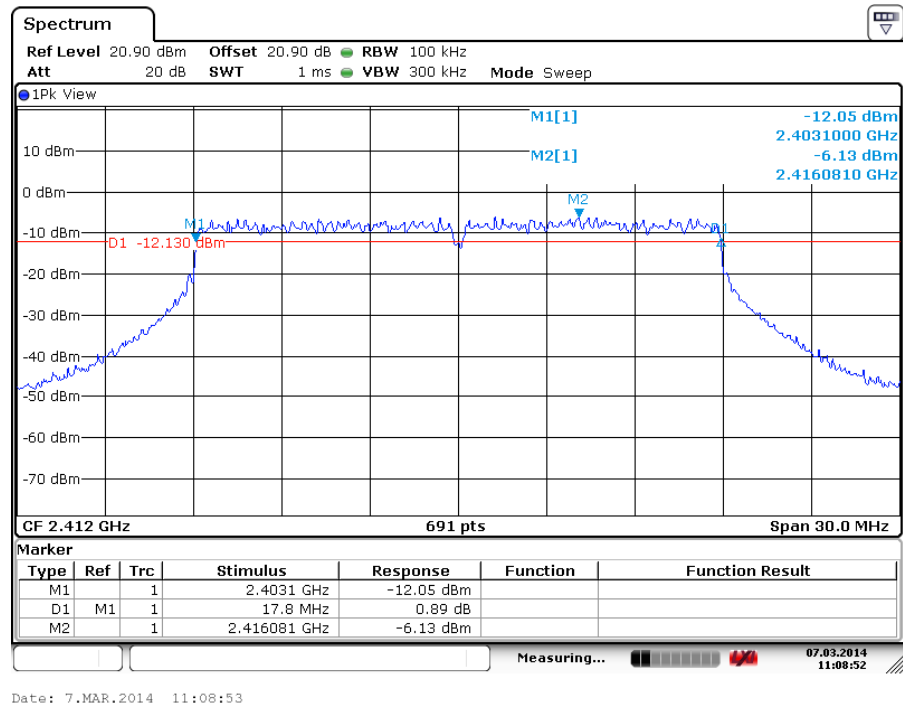
Date: 7.MAR.2014 11:07:13

High Channel


Date: 7.MAR.2014 11:06:09

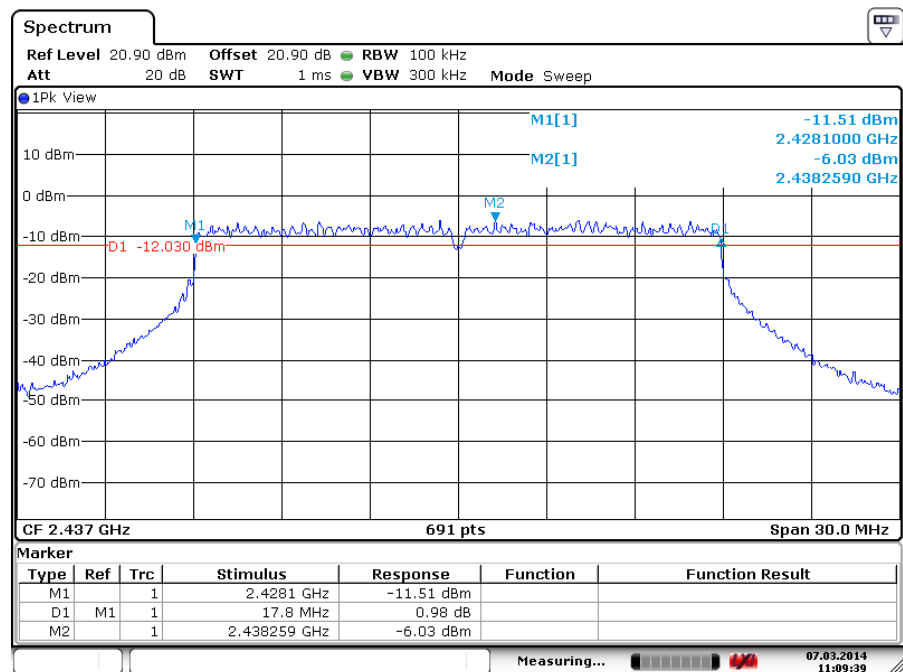
Test Plot of 6dB Bandwidth (802.11n 20MHz)

Low Channel

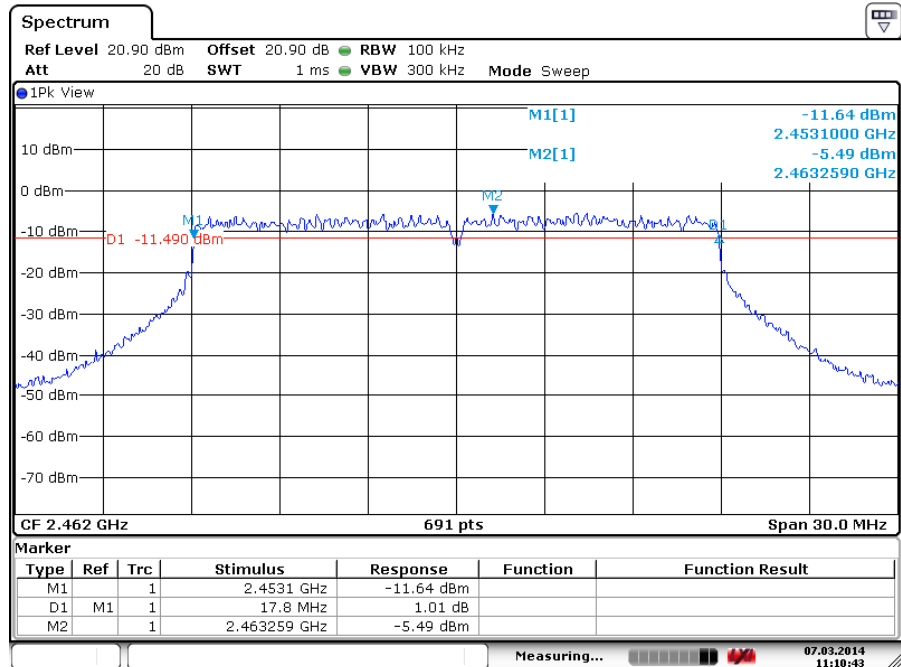


Date: 7.MAR.2014 11:08:53

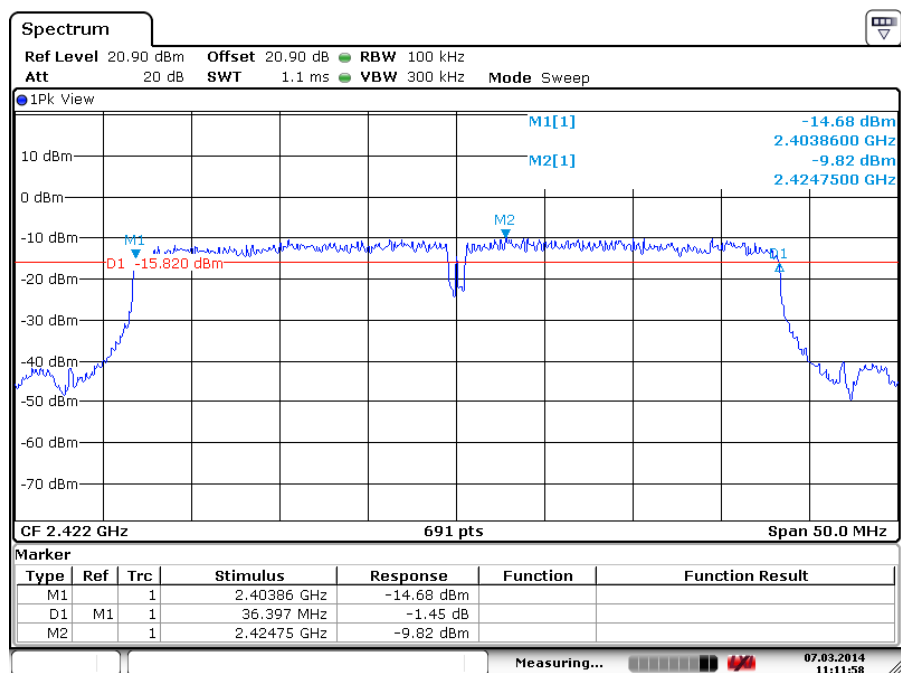
Middle Channel



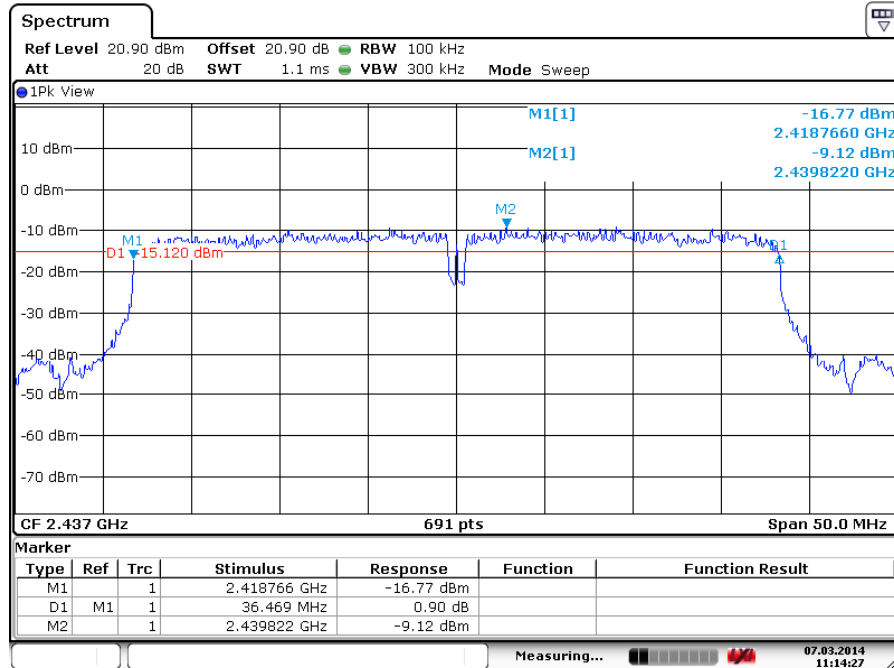
Date: 7.MAR.2014 11:09:40

High Channel


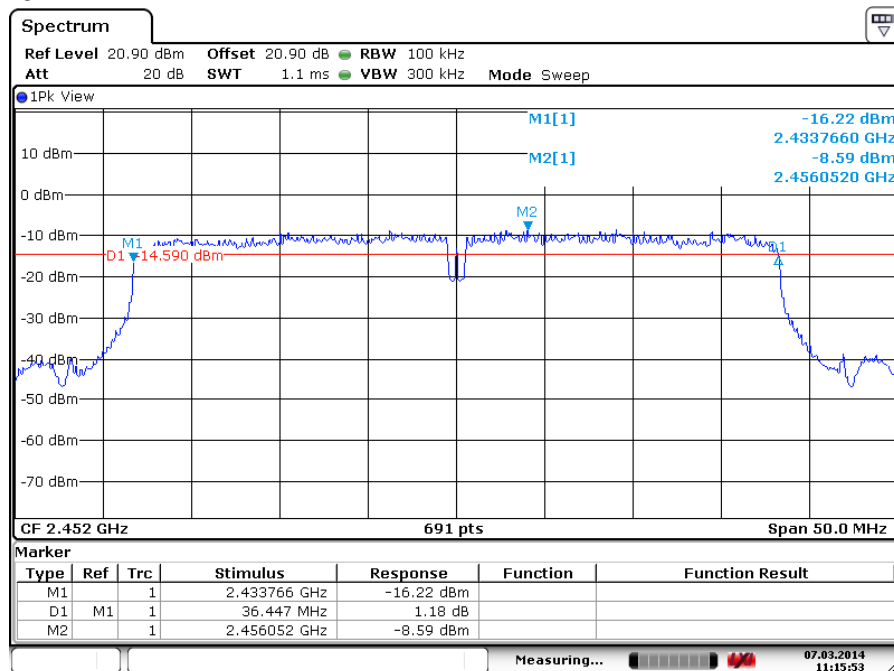
Date: 7.MAR.2014 11:10:43

Test Plot of 6dB Bandwidth (802.11n 40MHz)
Low Channel


Date: 7.MAR.2014 11:11:59

Middle Channel


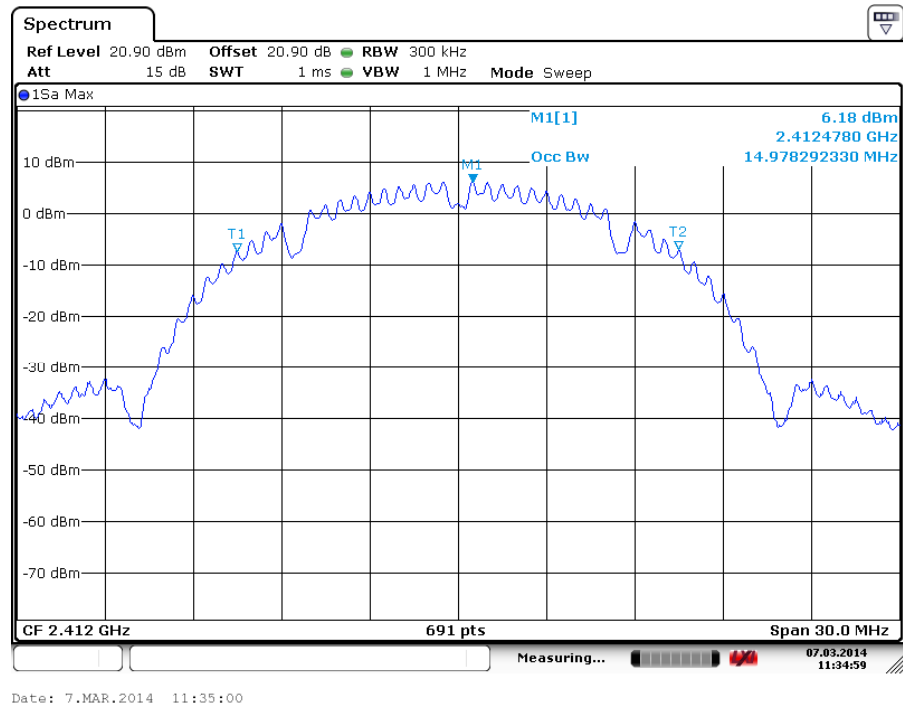
Date: 7.MAR.2014 11:14:28

High Channel


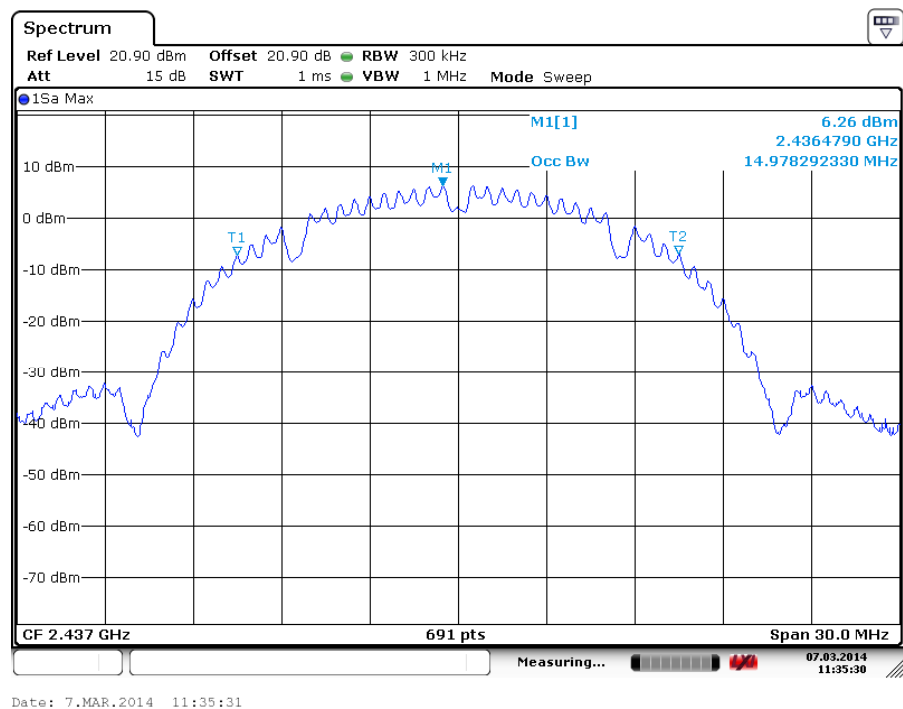
Date: 7.MAR.2014 11:15:53

Test Plot of 99% Bandwidth (802.11b)

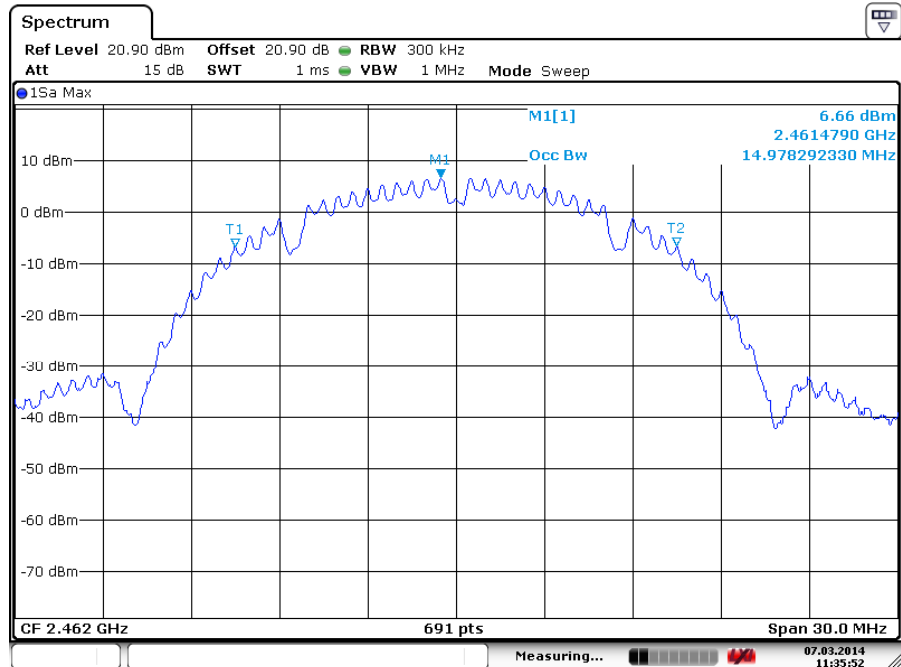
Low Channel



Middle Channel



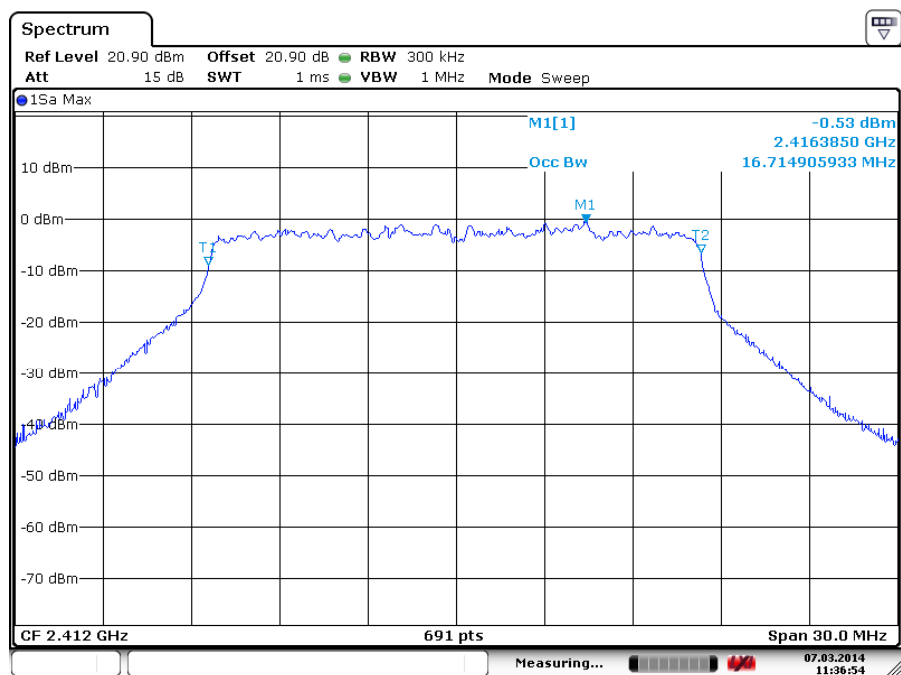
High Channel



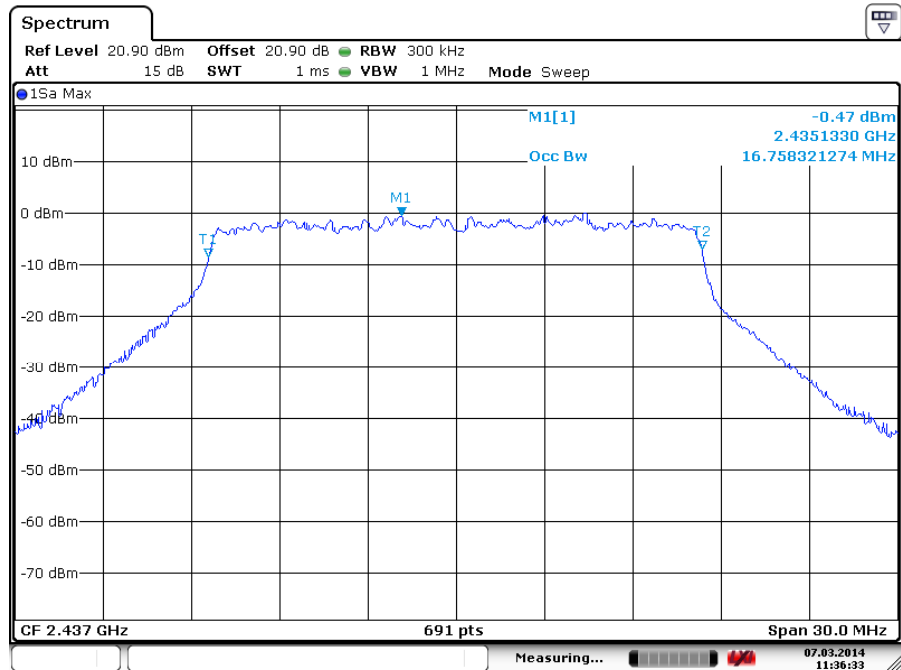
Date: 7.MAR.2014 11:35:53

Test Plot of 99% Bandwidth (802.11g)

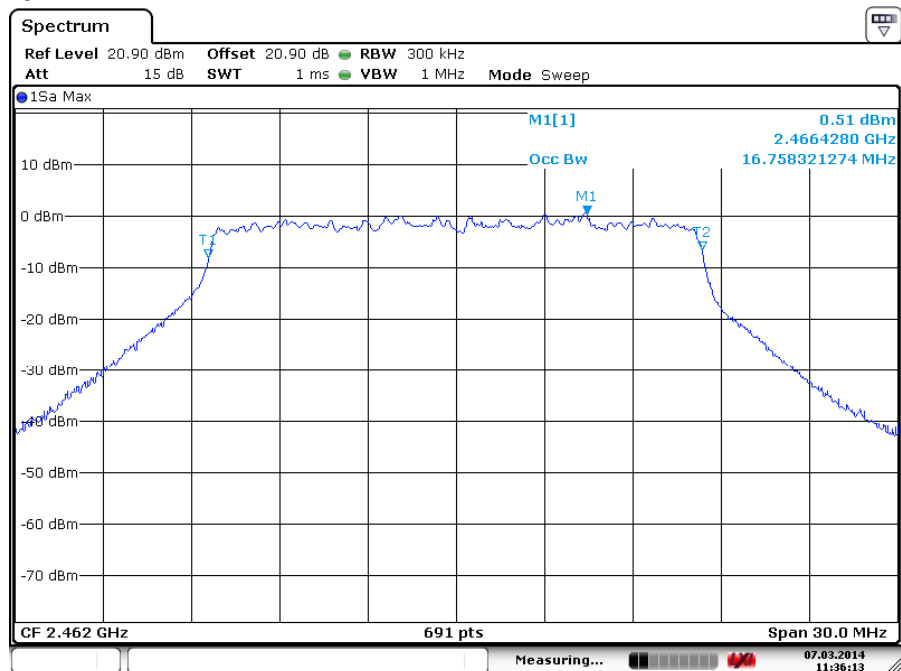
Low Channel



Date: 7.MAR.2014 11:36:54

Middle Channel


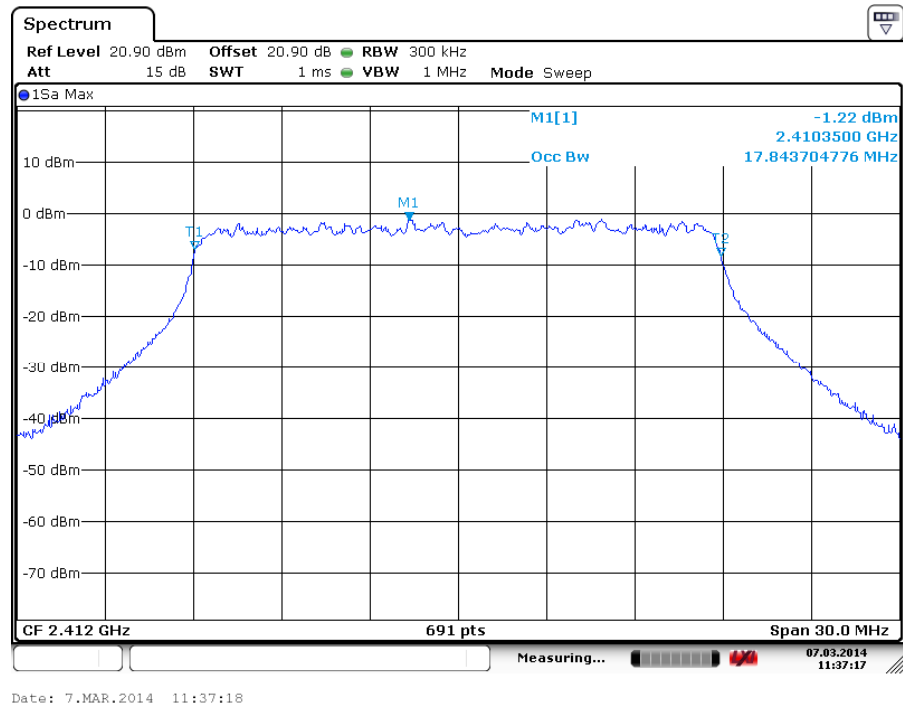
Date: 7.MAR.2014 11:36:33

High Channel


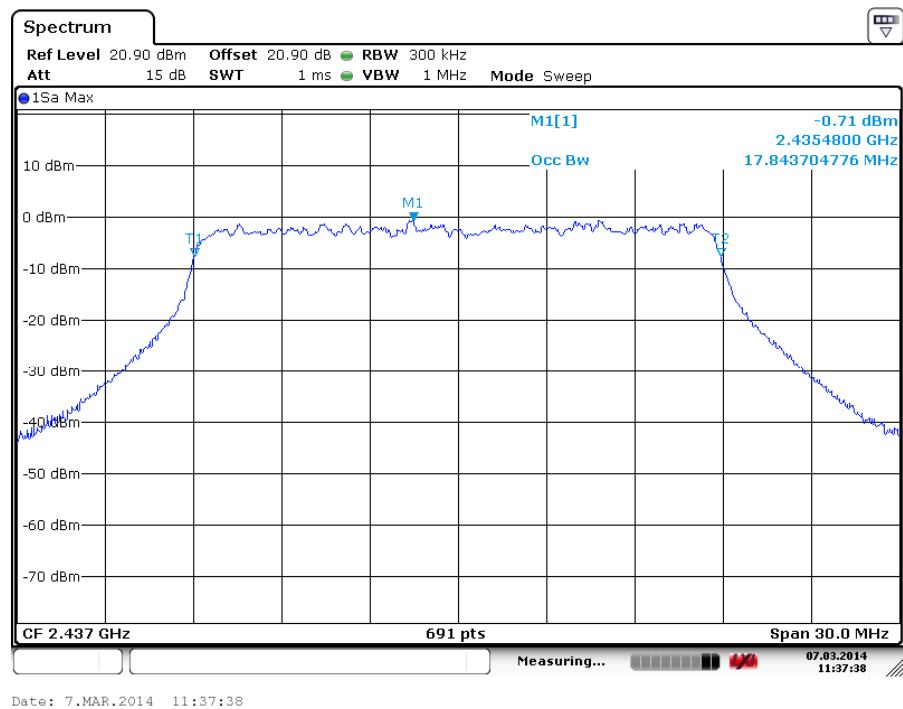
Date: 7.MAR.2014 11:36:14

Test Plot of 99% Bandwidth (802.11n 20MHz)

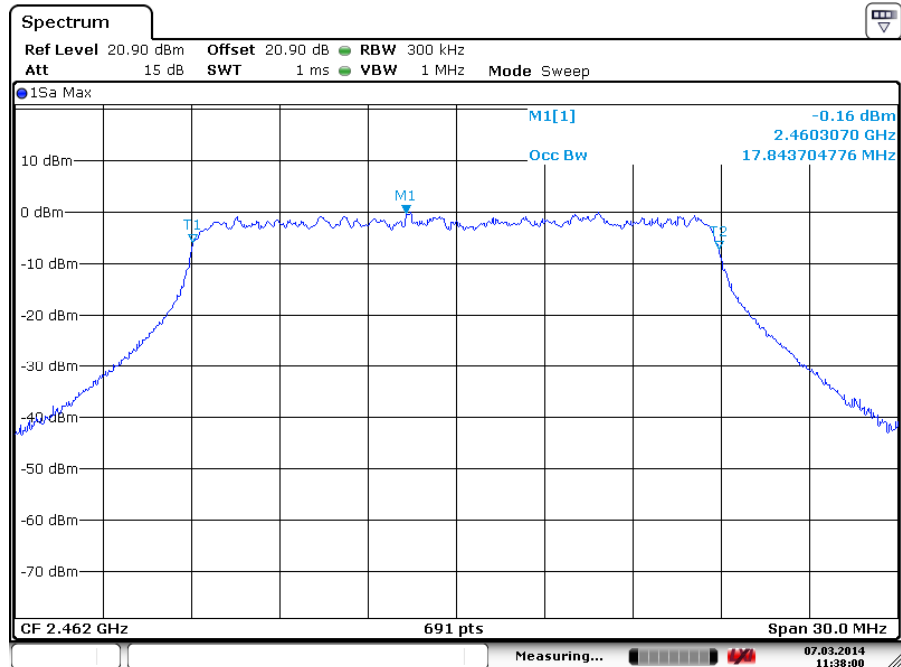
Low Channel



Middle Channel



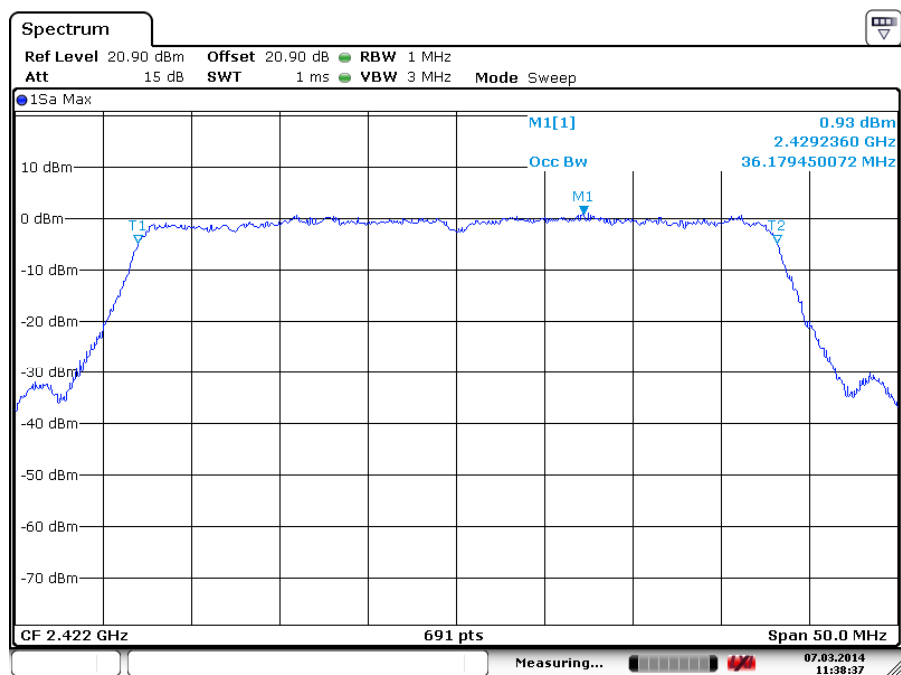
High Channel



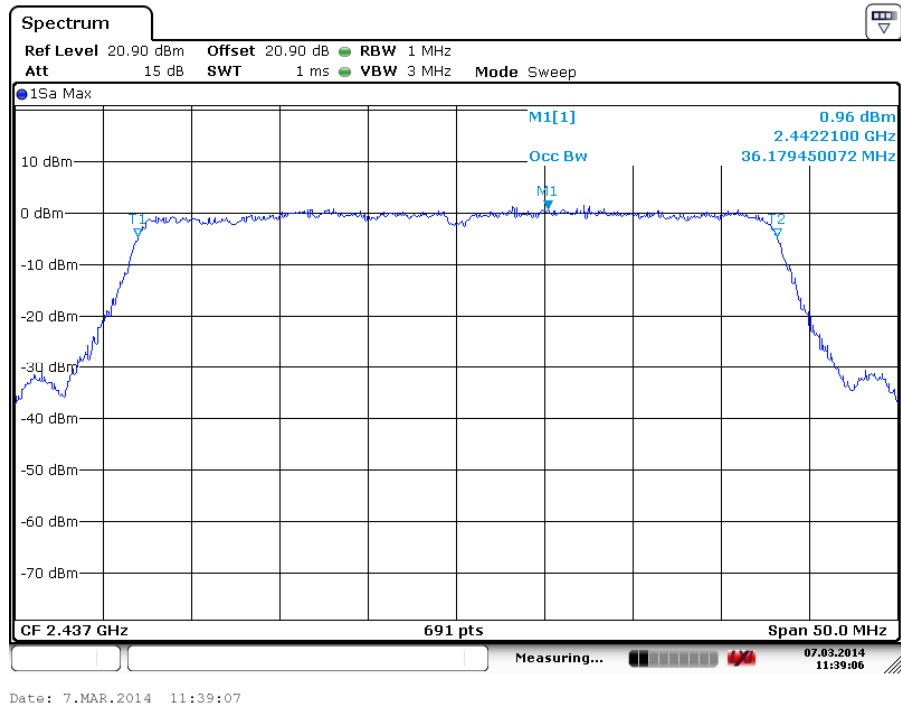
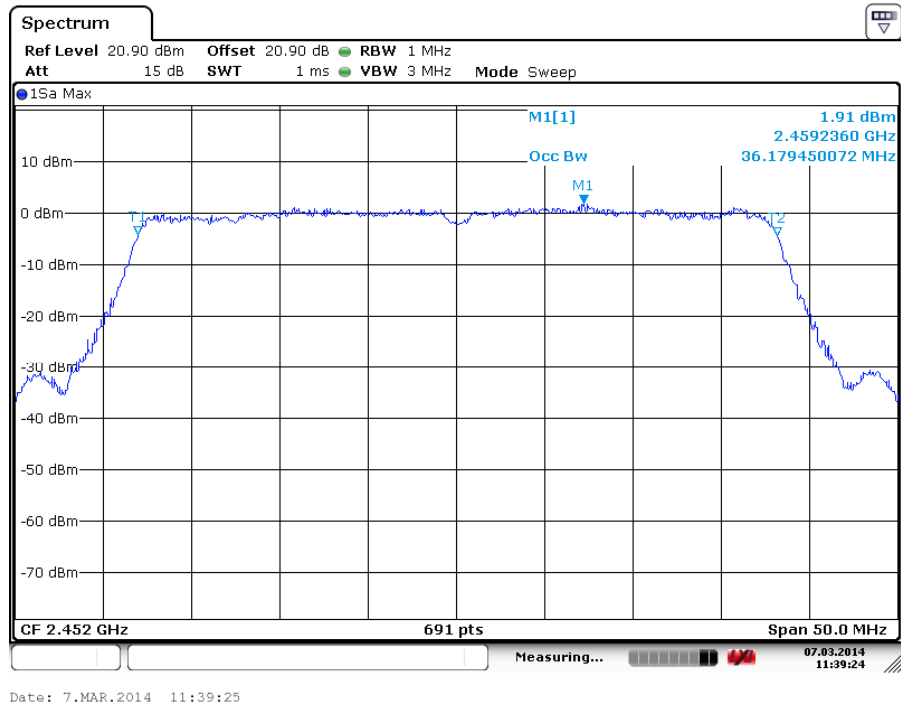
Date: 7.MAR.2014 11:38:01

Test Plot of 99% Bandwidth (802.11n 40MHz)

Low Channel



Date: 7.MAR.2014 11:38:37

Middle Channel

High Channel


5.1.4 Power Density**RESULT:****Passed**

Test standard : FCC Part 15.247(e) , RSS-210 A8.2(2)
Basic standard : 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 18: Test result of Power Density (802.11b)

Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2412	-11.22	8
Middle Channel	2437	-10.64	8
High Channel	2462	-10.1	8

Table 19: Test result of Power Density (802.11g)

Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2412	-11.13	8
Middle Channel	2437	-10.53	8
High Channel	2462	-9.97	8

Table 20: Test result of Power Density (802.11n 20MHz)

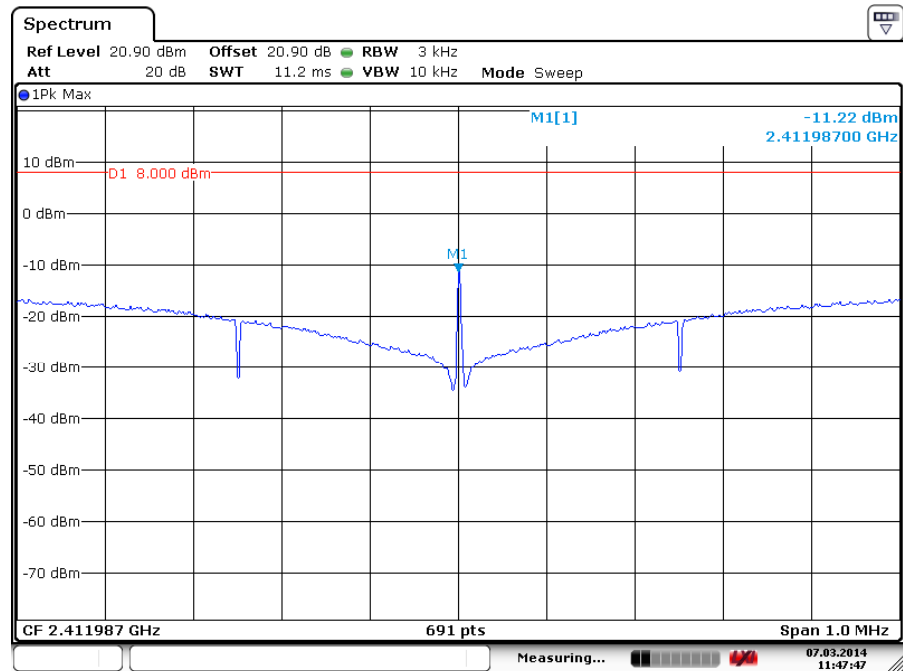
Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2412	-11.14	8
Middle Channel	2437	-10.52	8
High Channel	2462	-9.98	8

Table 21: Test result of Power Density (802.11n 40MHz)

Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2422	-10.98	8
Middle Channel	2437	-10.67	8
High Channel	2452	-10.34	8

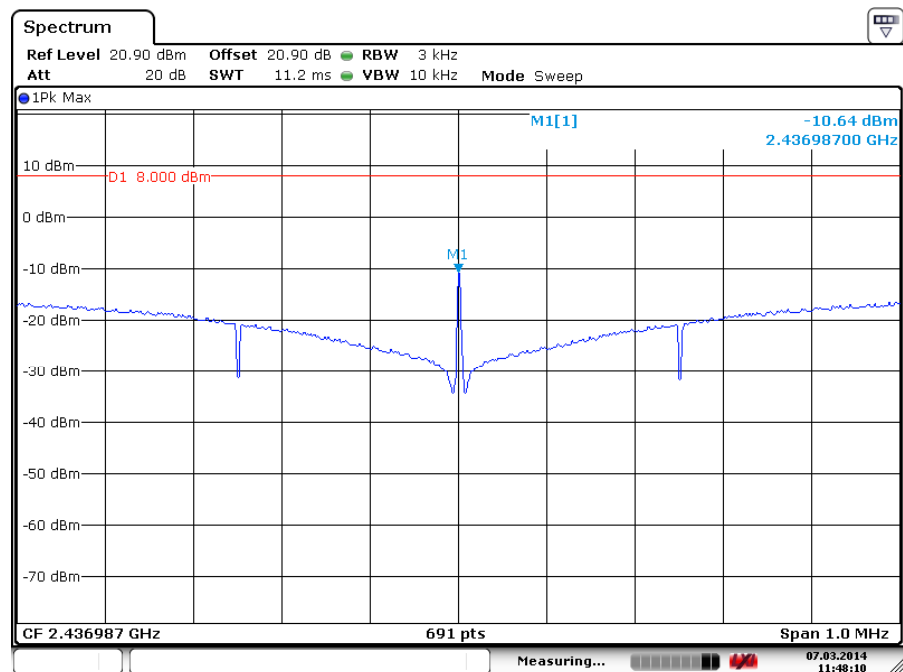
Test Plot of Power Density (802.11b)

Low Channel

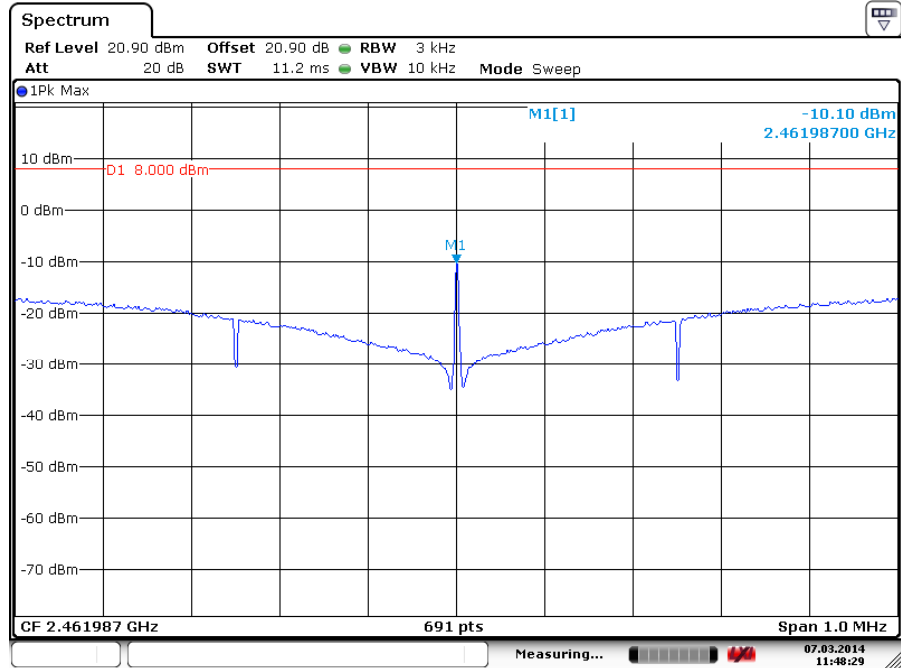


Date: 7.MAR.2014 11:47:47

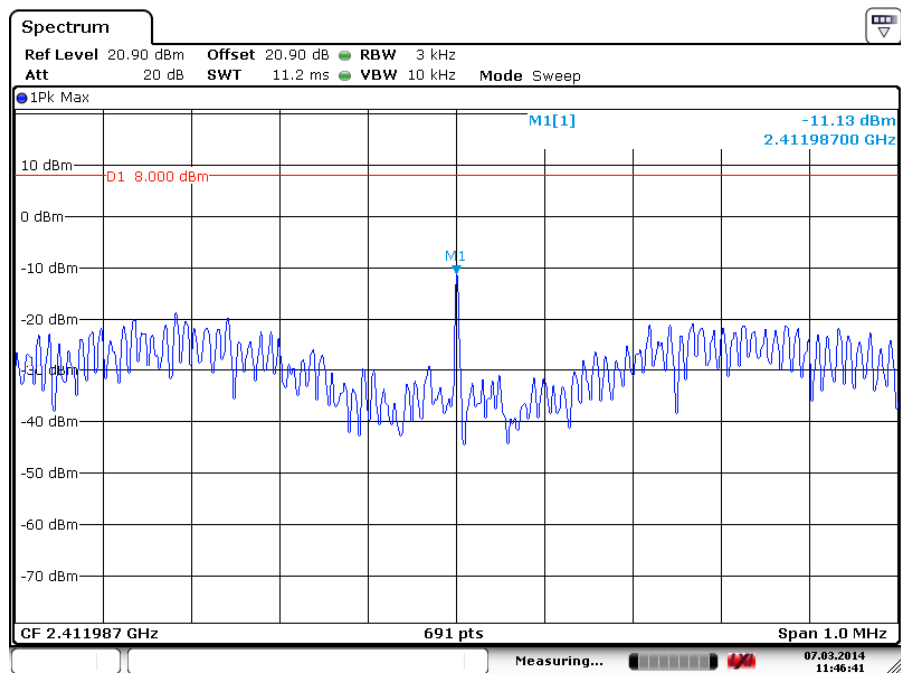
Middle Channel



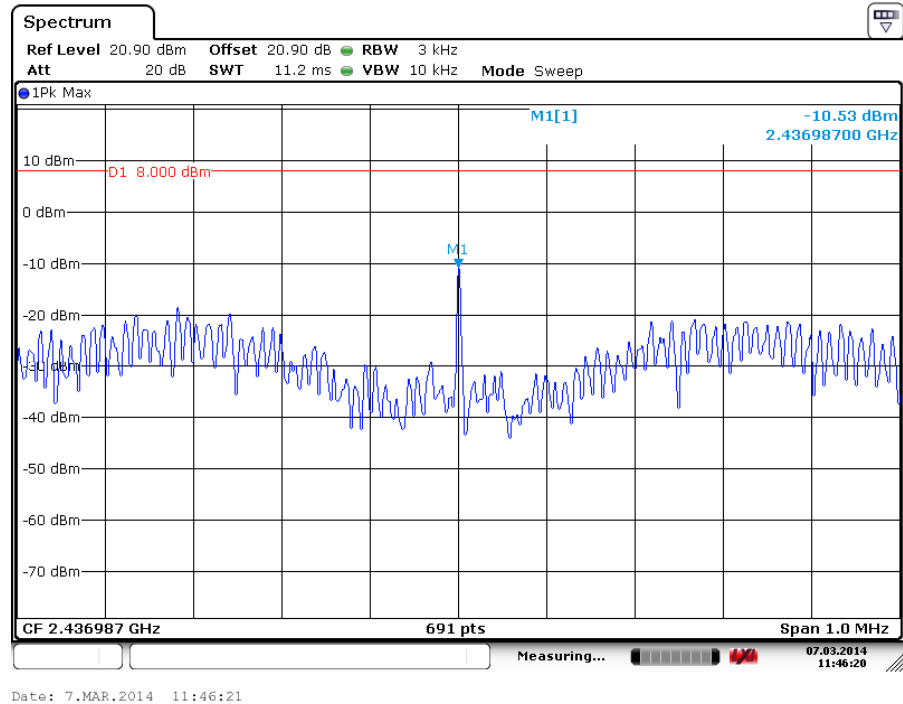
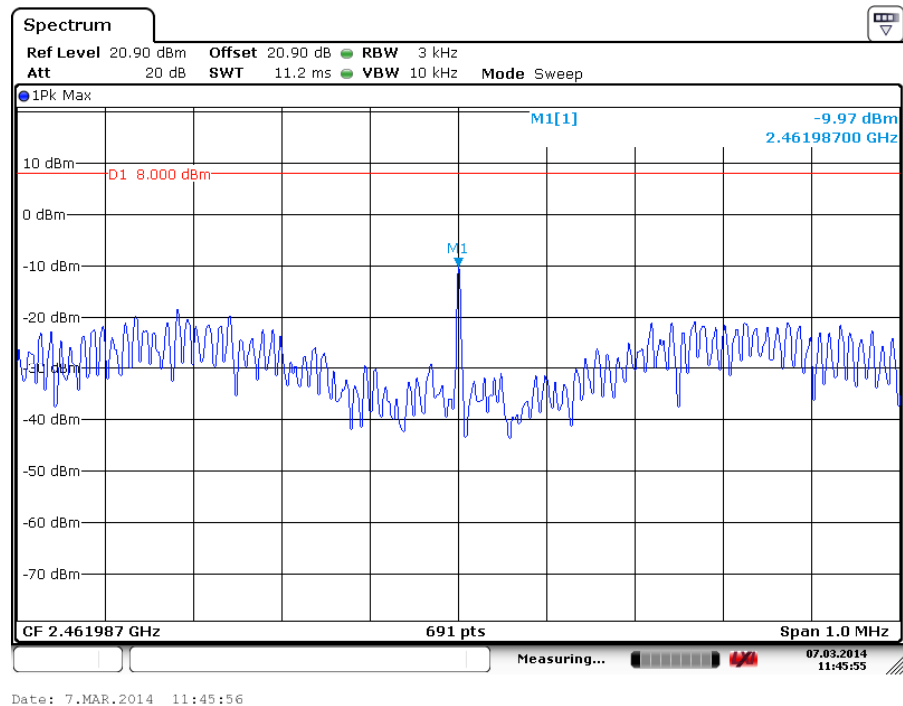
Date: 7.MAR.2014 11:48:10

High Channel


Date: 7.MAR.2014 11:48:30

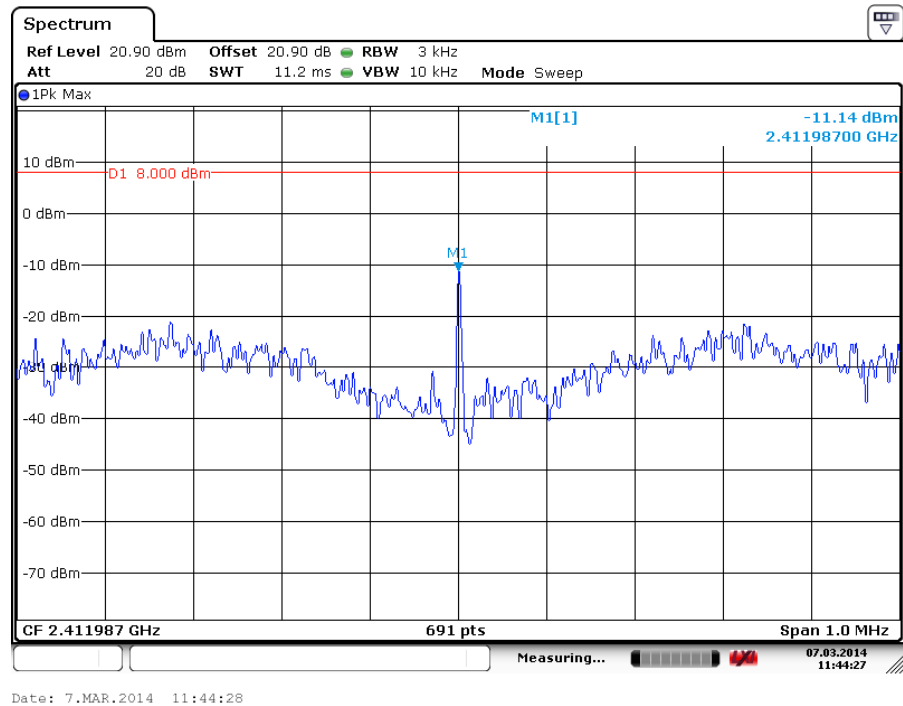
Test Plot of Power Density (802.11g)
Low Channel


Date: 7.MAR.2014 11:46:41

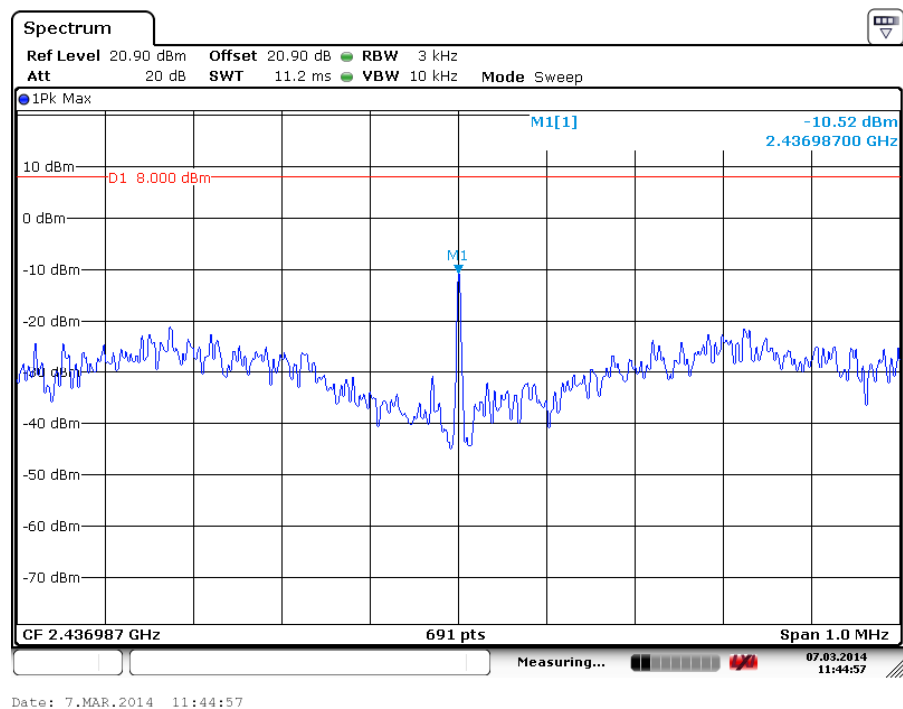
Middle Channel

High Channel


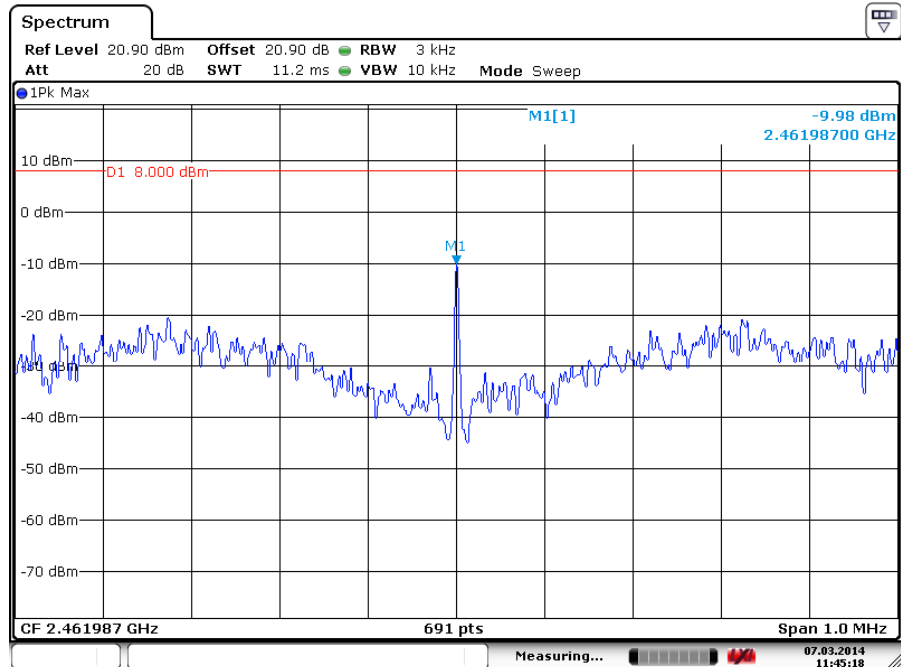
Test Plot of Power Density (802.11n 20MHz)

Low Channel

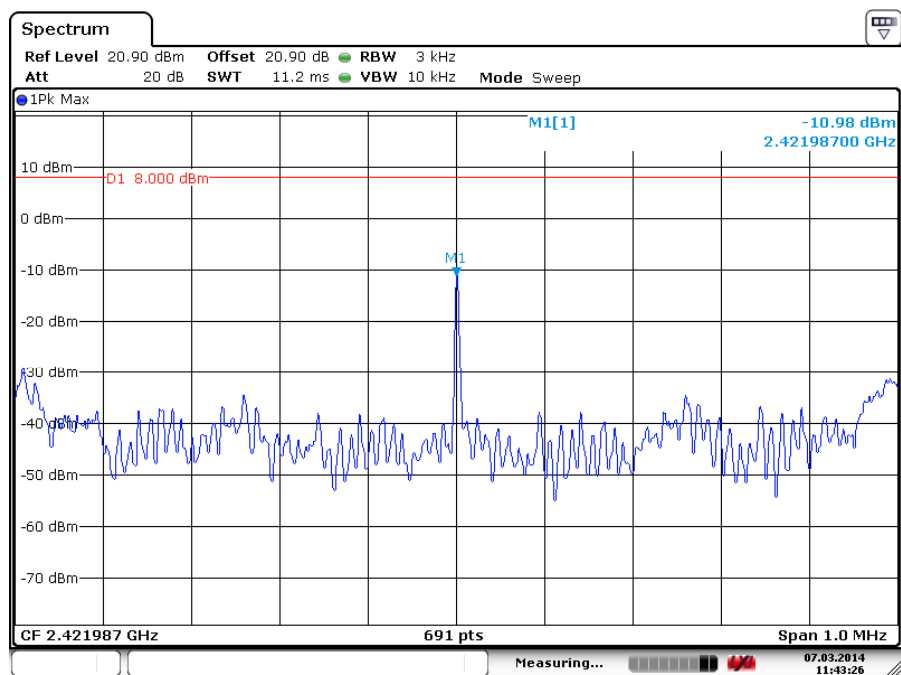


Middle Channel

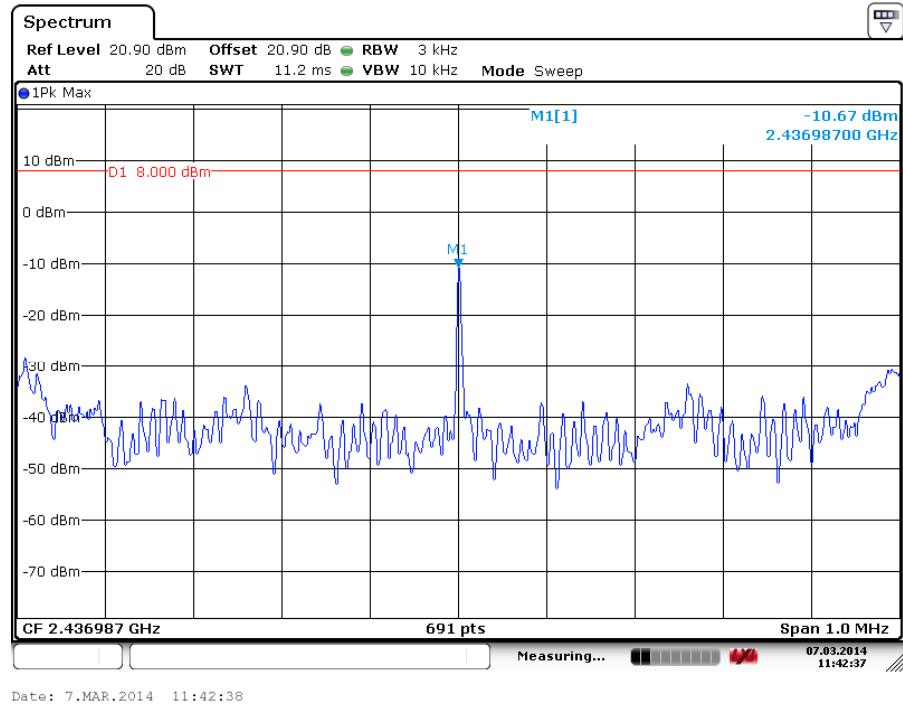
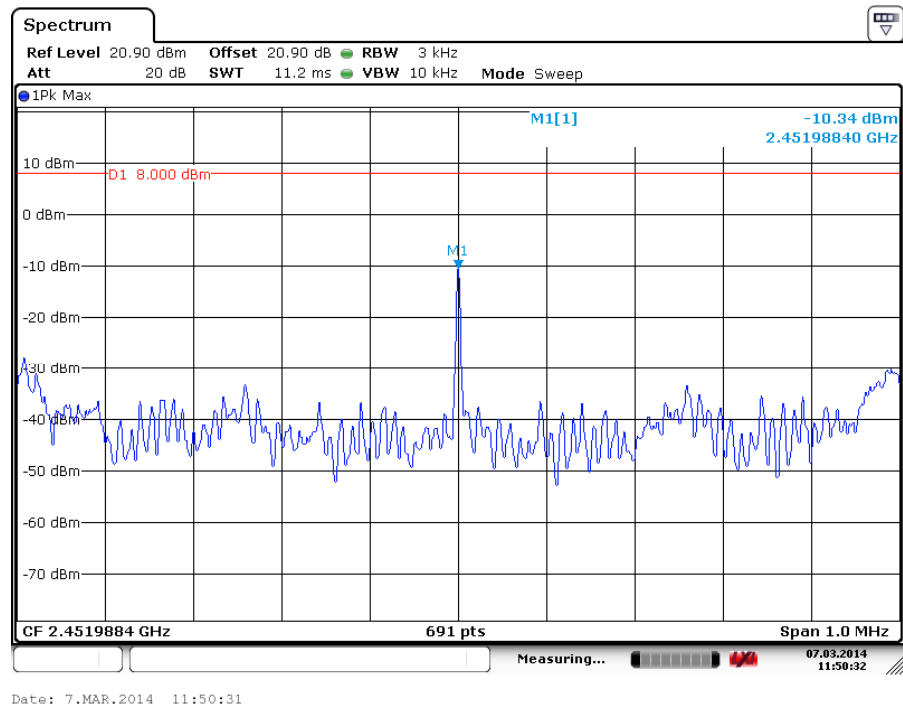


High Channel


Date: 7.MAR.2014 11:45:19

Test Plot of Power Density (802.11n 40MHz)
Low Channel


Date: 7.MAR.2014 11:43:26

Middle Channel

High Channel


**5.1.5 Conducted spurious emissions and Frequency Band Edge
measured in 100kHz Bandwidth****RESULT:****Passed**

Test standard	:	FCC part 15.247(d), RSS-210 A8.5
Basic standard	:	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

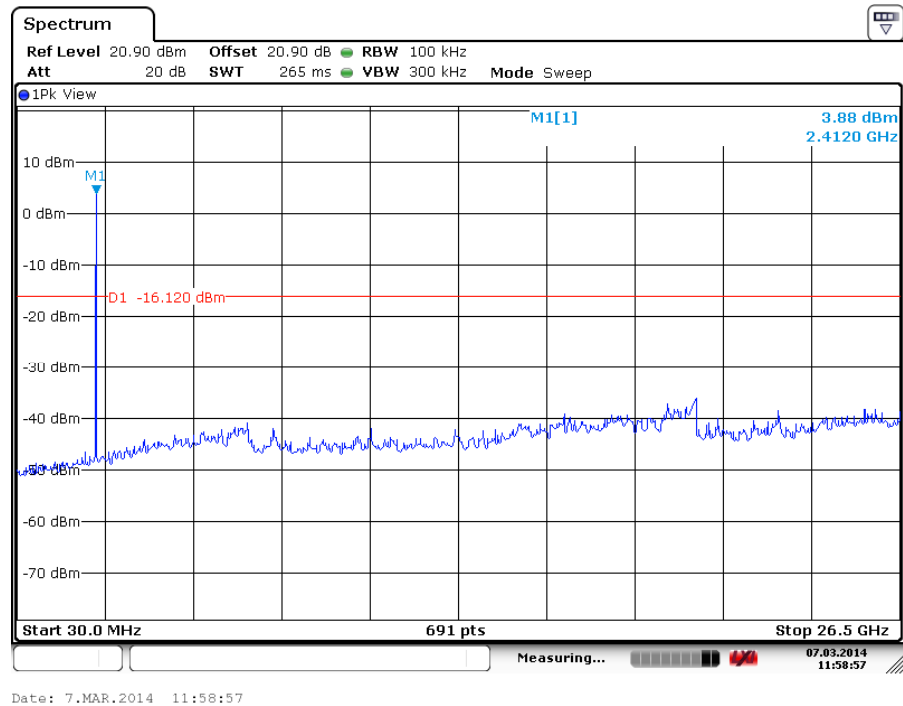
Test Channel	:	Low/ High
Operation mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

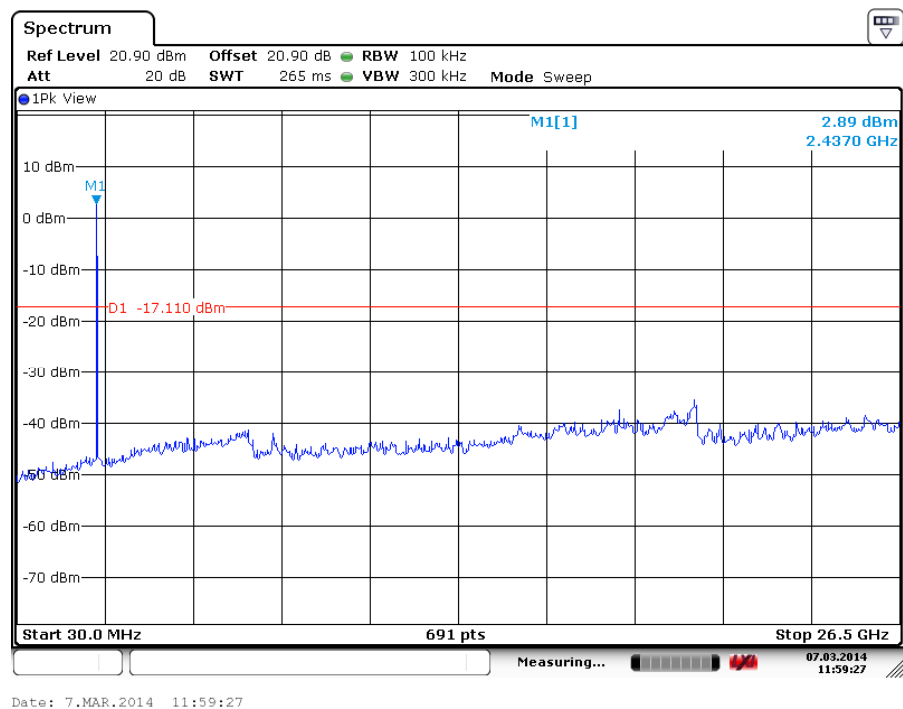
Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

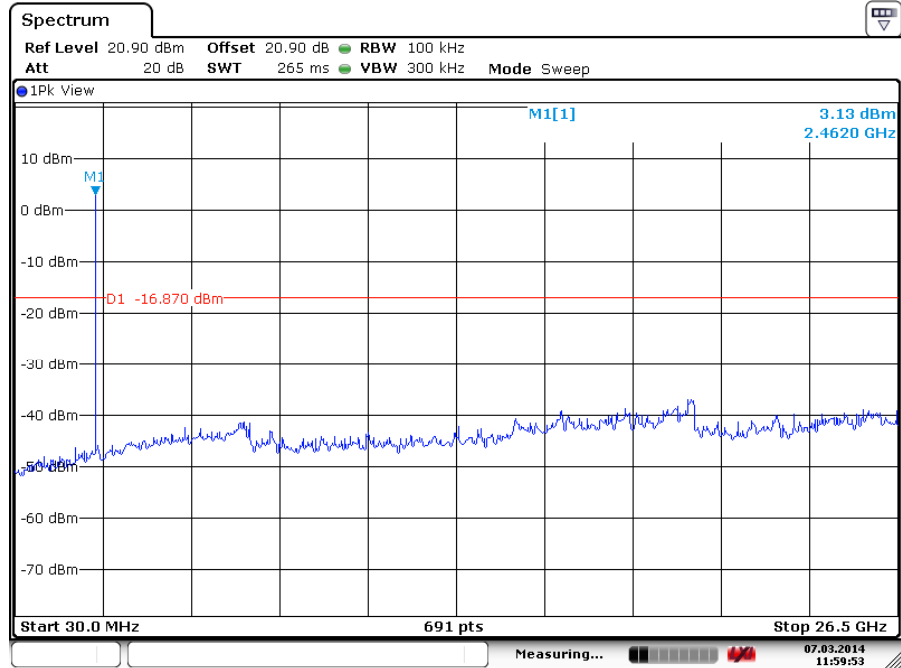
Test Plot 100kHz Conducted Emissions (802.11b)

Low Channel

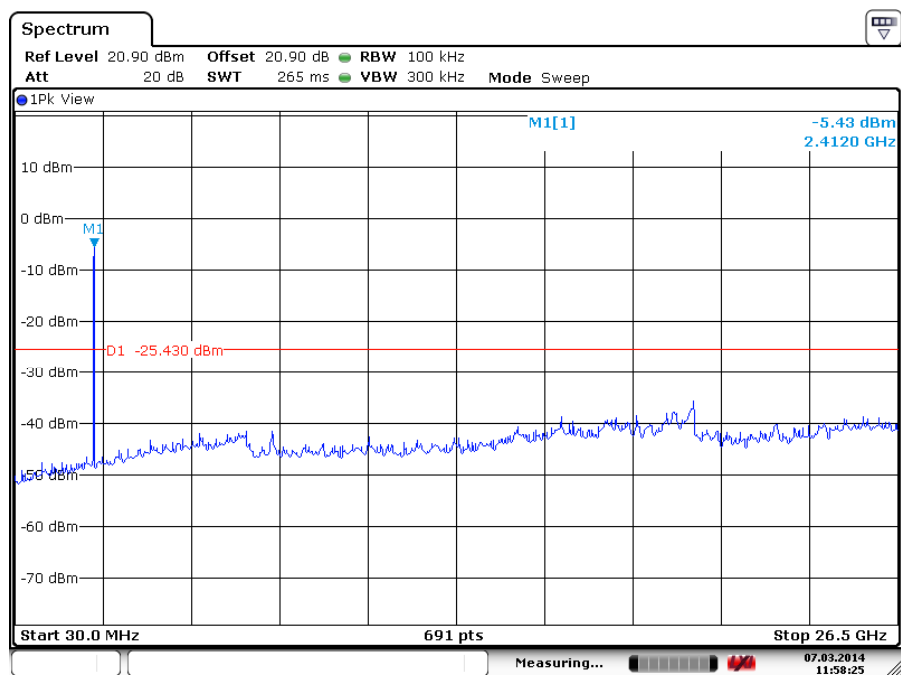


Middle Channel

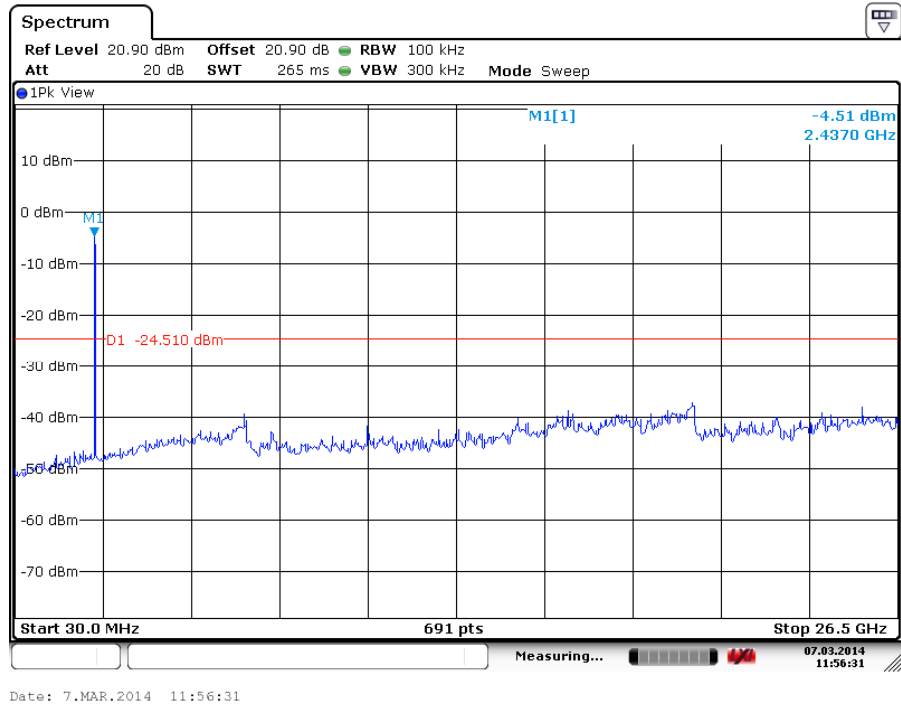
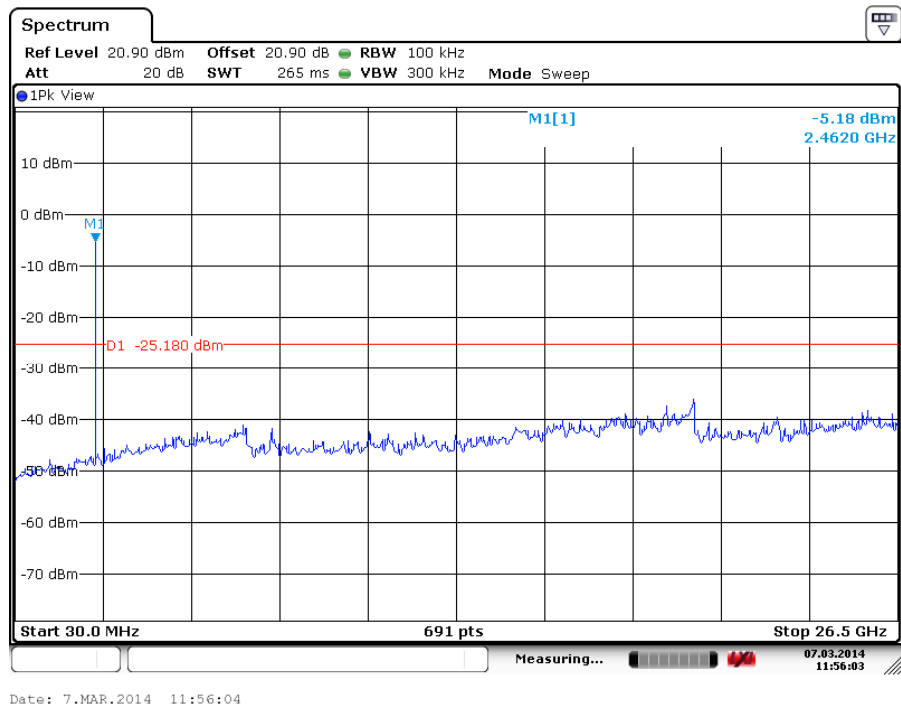


High Channel


Date: 7.MAR.2014 11:59:54

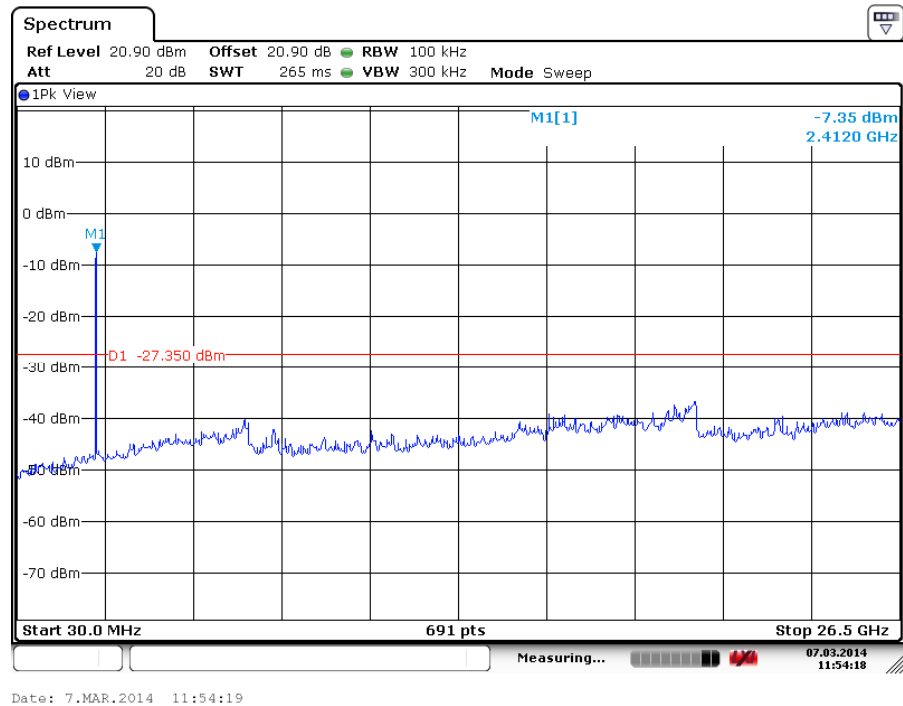
Test Plot 100kHz Conducted Emissions (802.11g)
Low Channel


Date: 7.MAR.2014 11:58:26

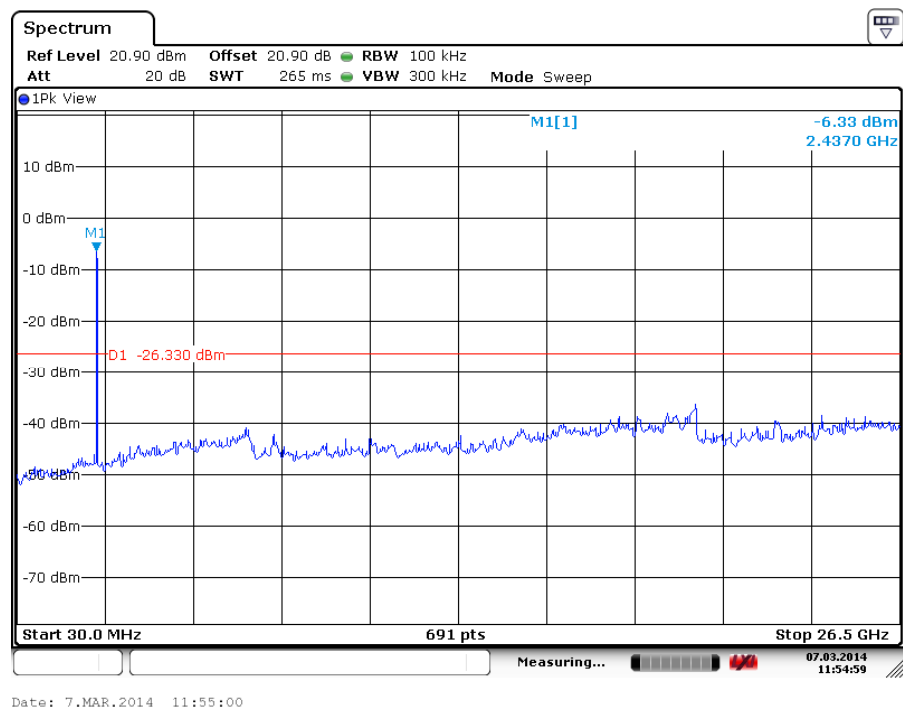
Middle Channel

High Channel


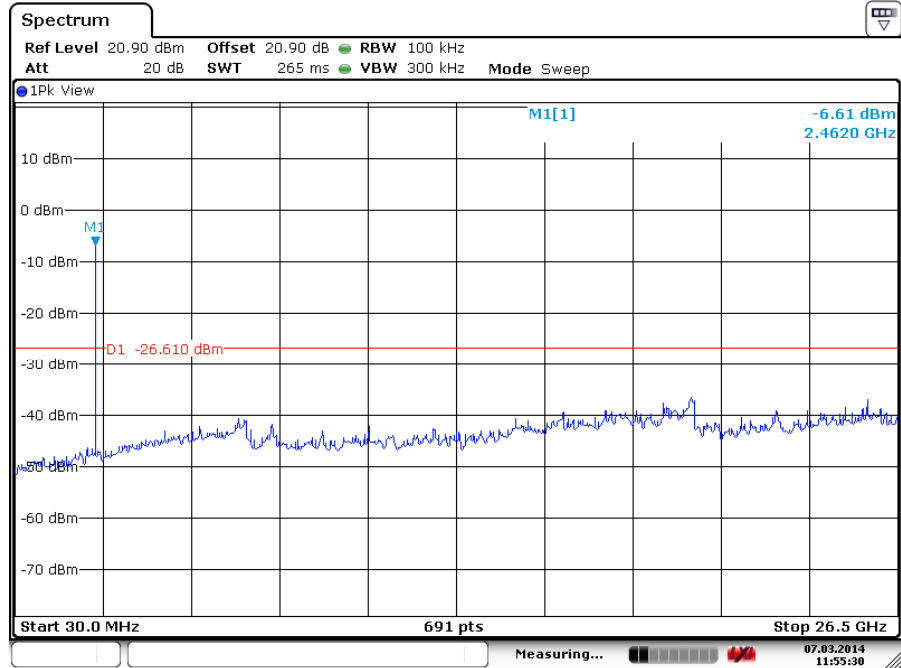
Test Plot 100kHz Conducted Emissions (802.11n 20MHz)

Low Channel

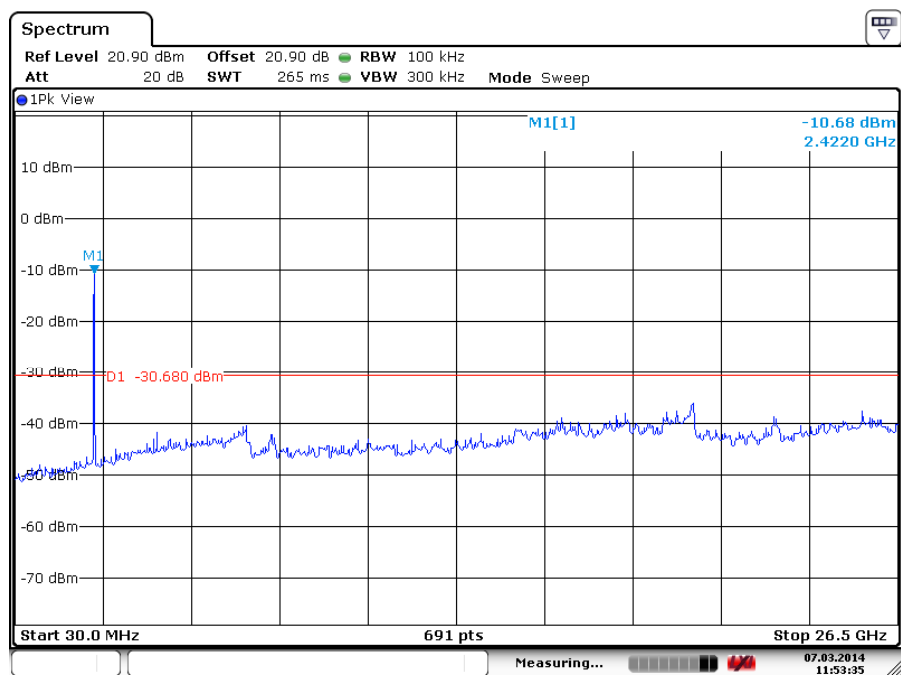


Middle Channel

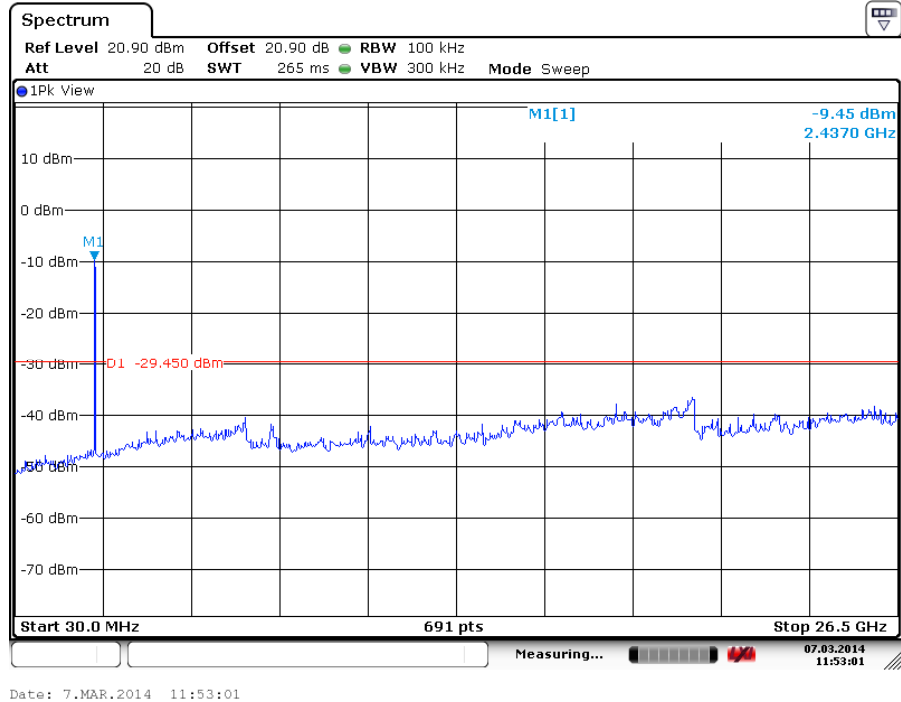
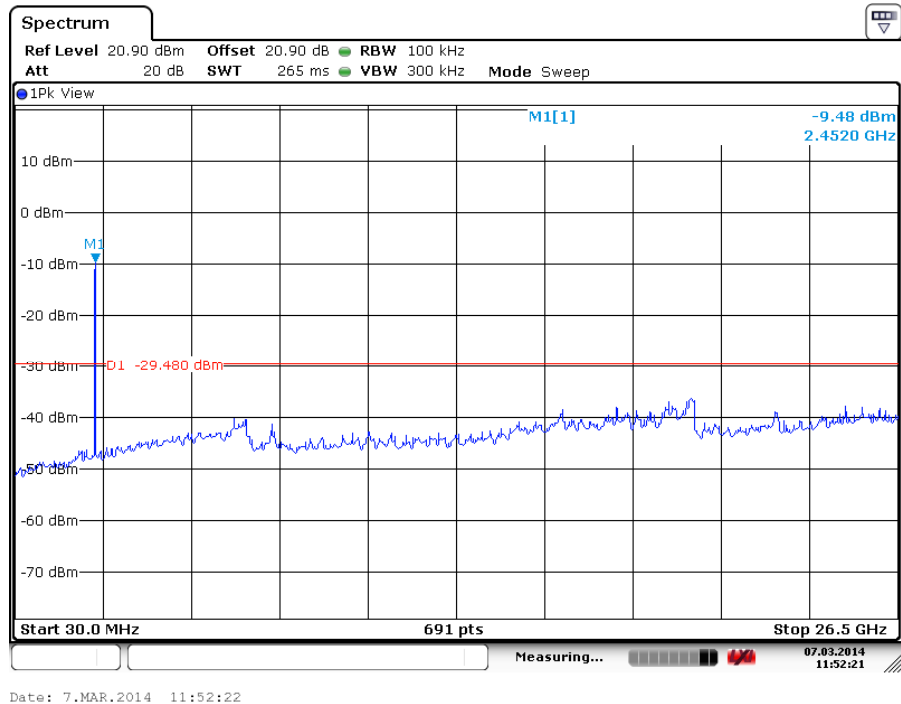


High Channel


Date: 7.MAR.2014 11:55:31

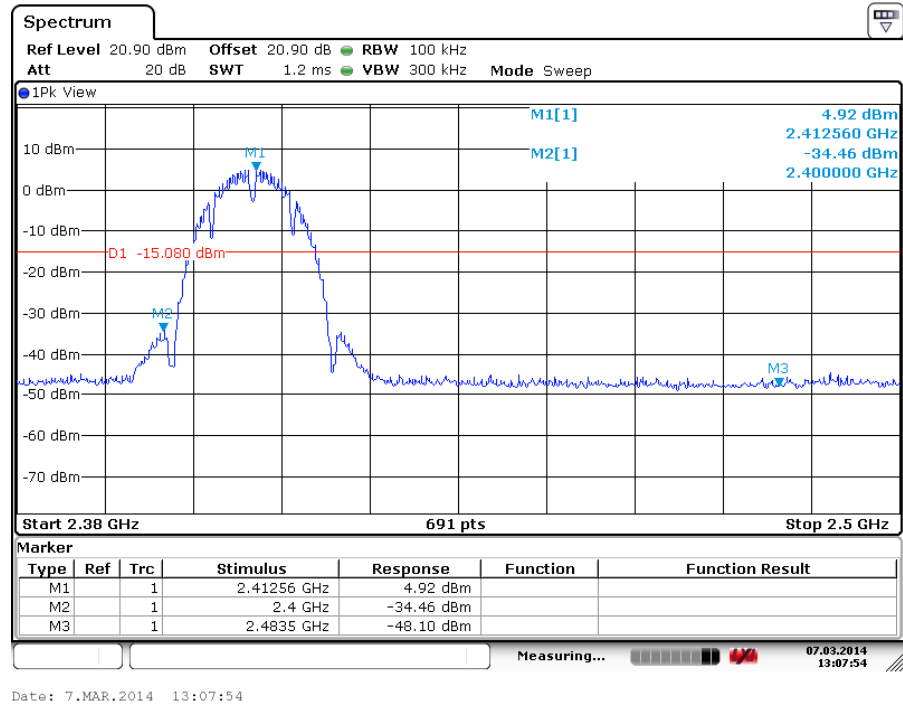
Test Plot 100kHz Conducted Emissions (802.11n 40MHz)
Low Channel


Date: 7.MAR.2014 11:53:36

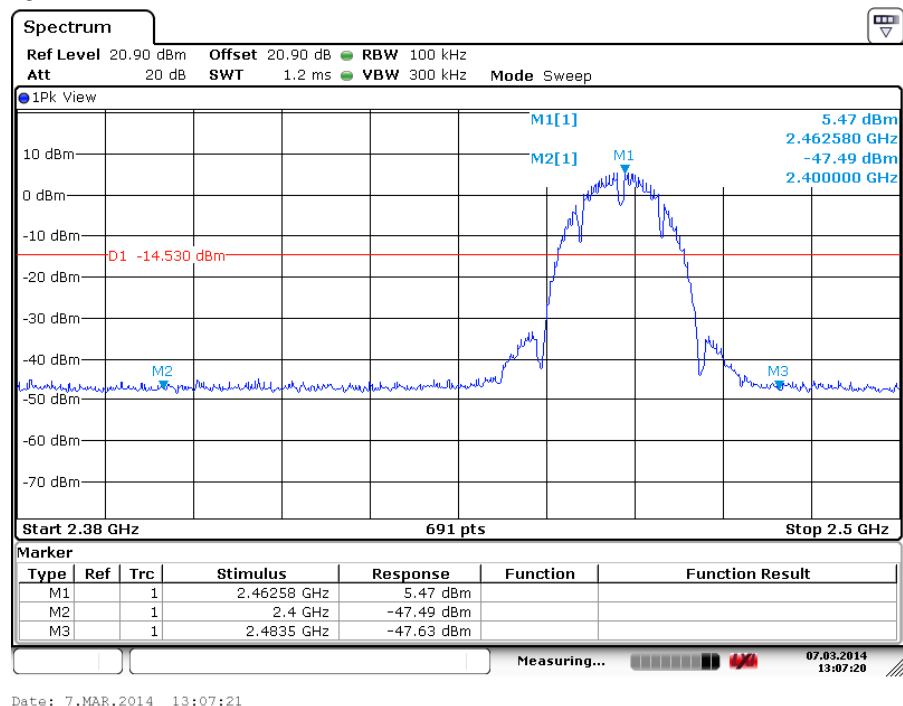
Middle Channel

High Channel


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

Low Channel

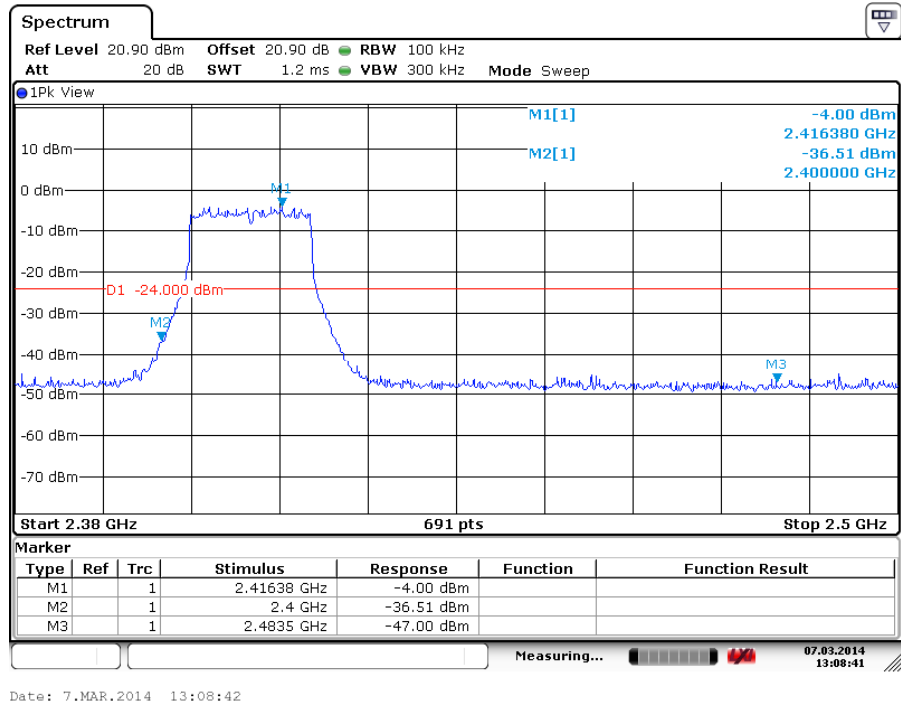


High Channel

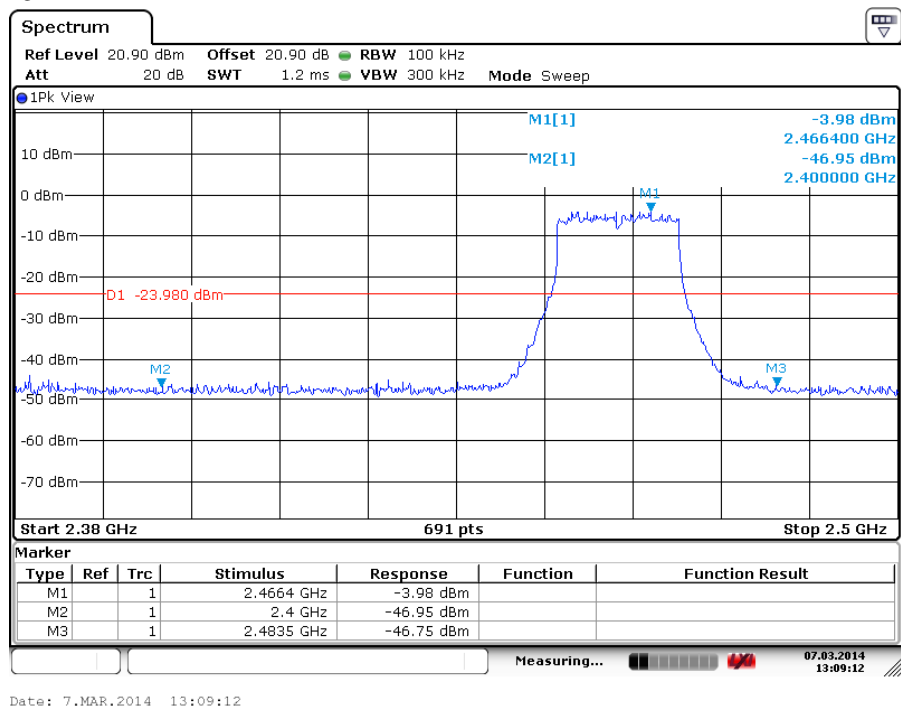


Test Plot 100kHz RBW of Band Edge (802.11g)

Low Channel

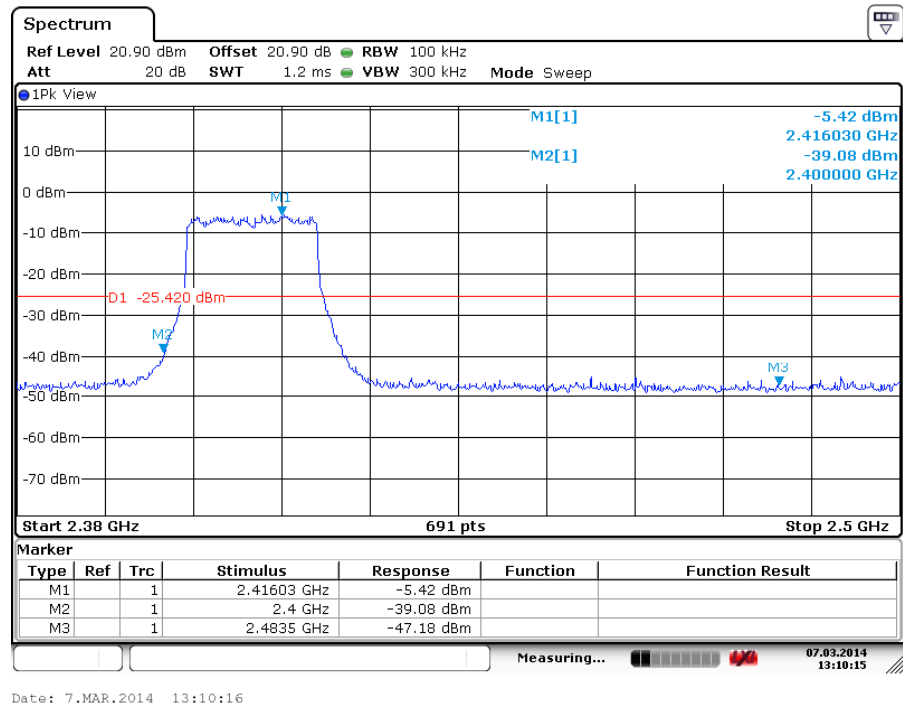


High Channel

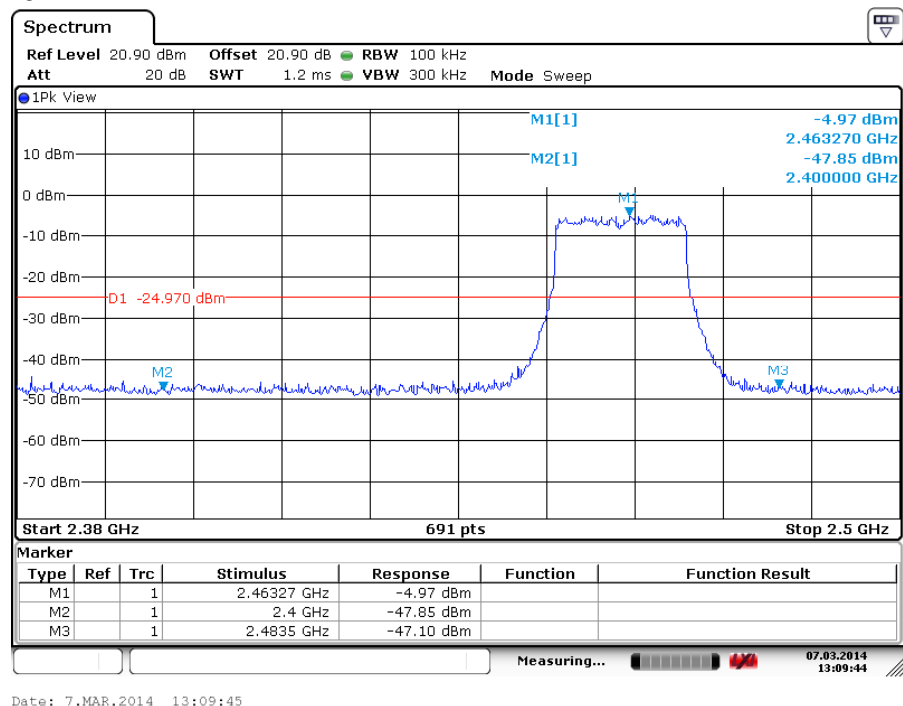


Test Plot 100kHz RBW of Band Edge (802.11n 20MHz)

Low Channel

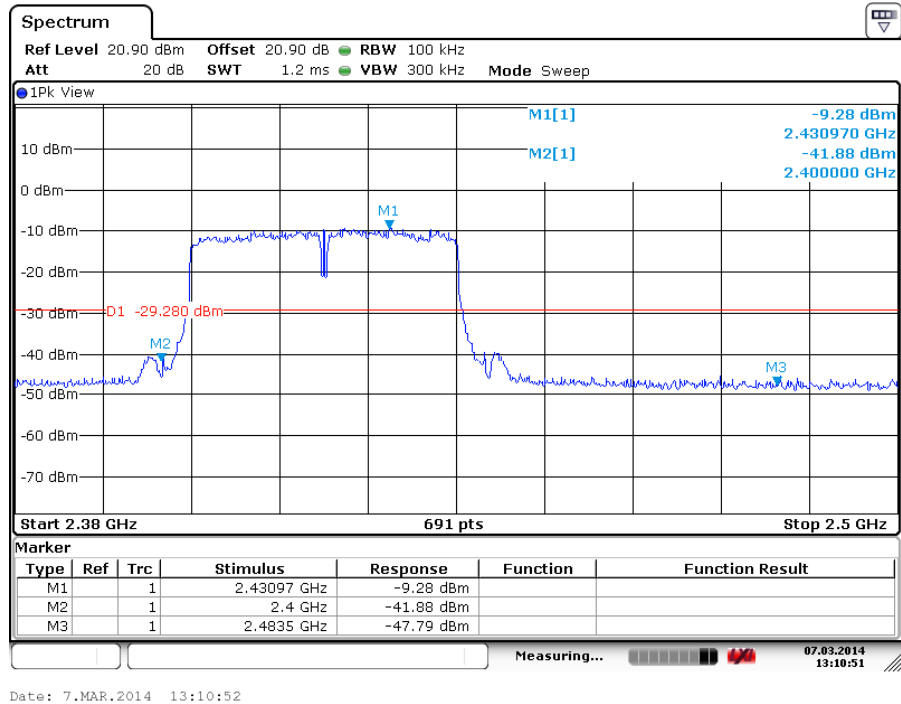


High Channel

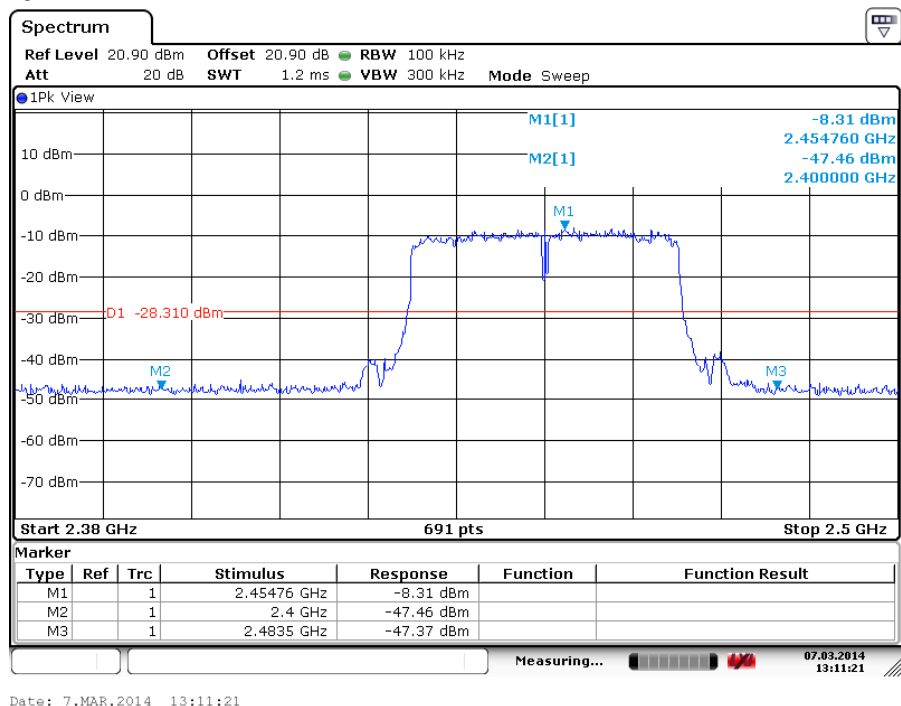


Test Plot 100kHz RBW of Band Edge (802.11n 40MHz)

Low Channel



High Channel



5.1.6 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 7.2.1
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3). 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), RSS-210 2.7 (Table 2 and 3) and RSS-210 A2.9(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	:	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. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

Test standard : FCC KDB Publication 447498

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The gain of the antennas used in the product is extracted from the Antenna information provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the exposure at a distance of 20 cm away from the product and compare it to the limit of MPE.

Frequency Band: 2400-2483.5 MHz

$$S = PG / 4\pi R^2$$

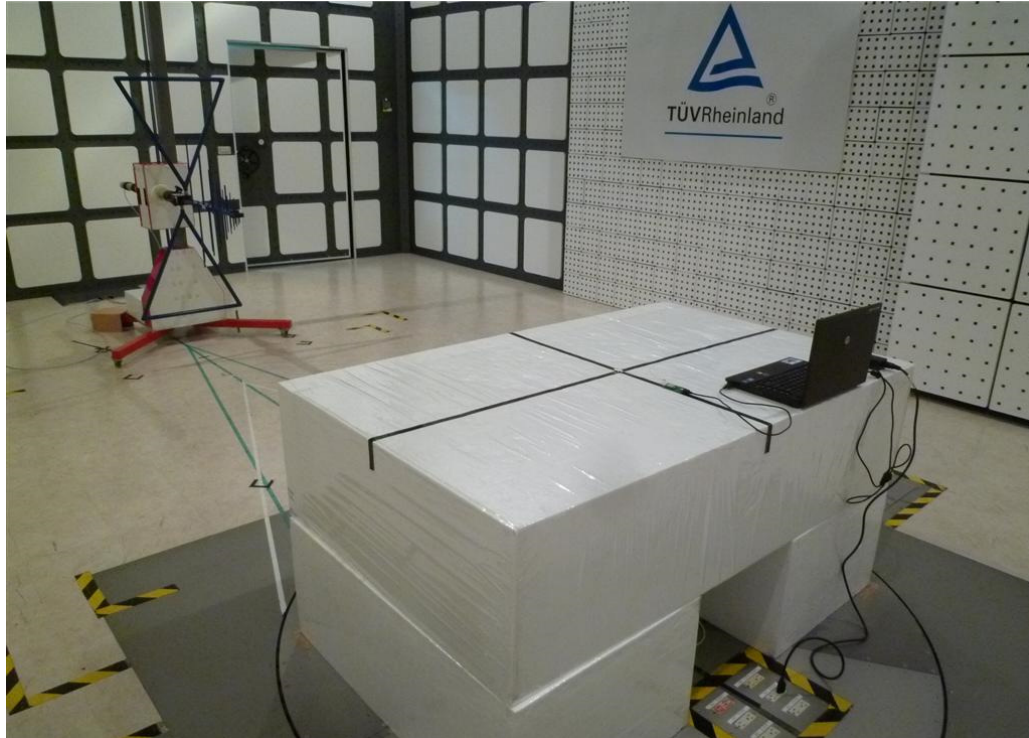
Max Power to Antenna (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Result
59.6	1.22	1.324	0.016	1	Pass

7. Photographs of the Test Set-Up

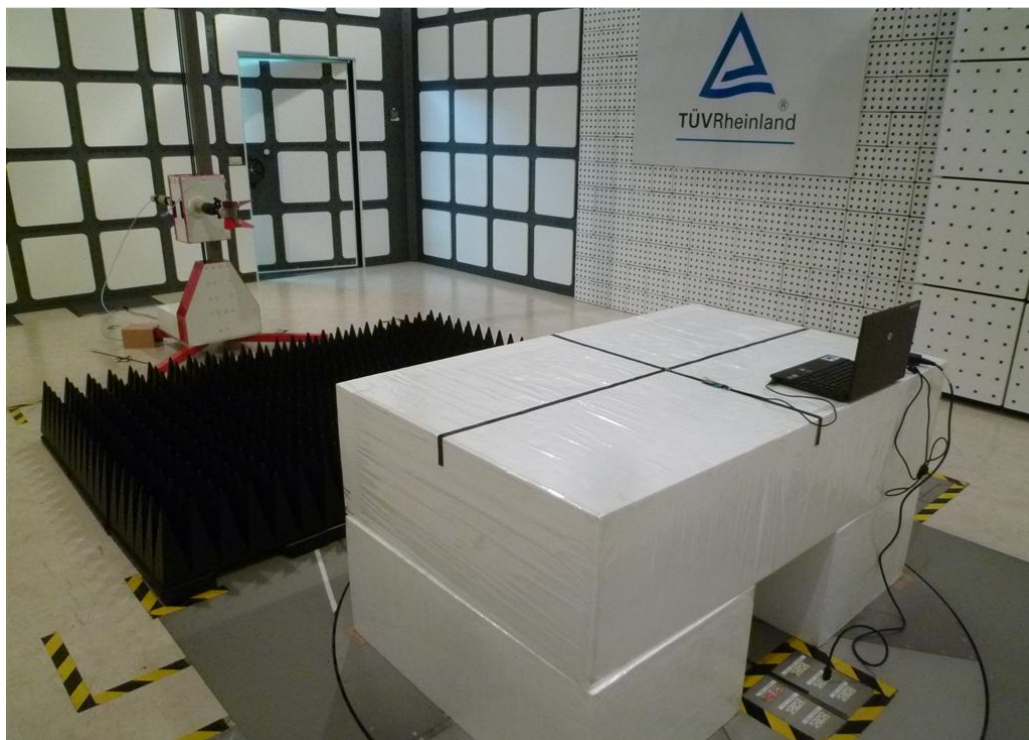
Photograph 1: Set-up for Spurious Emissions (Front View)



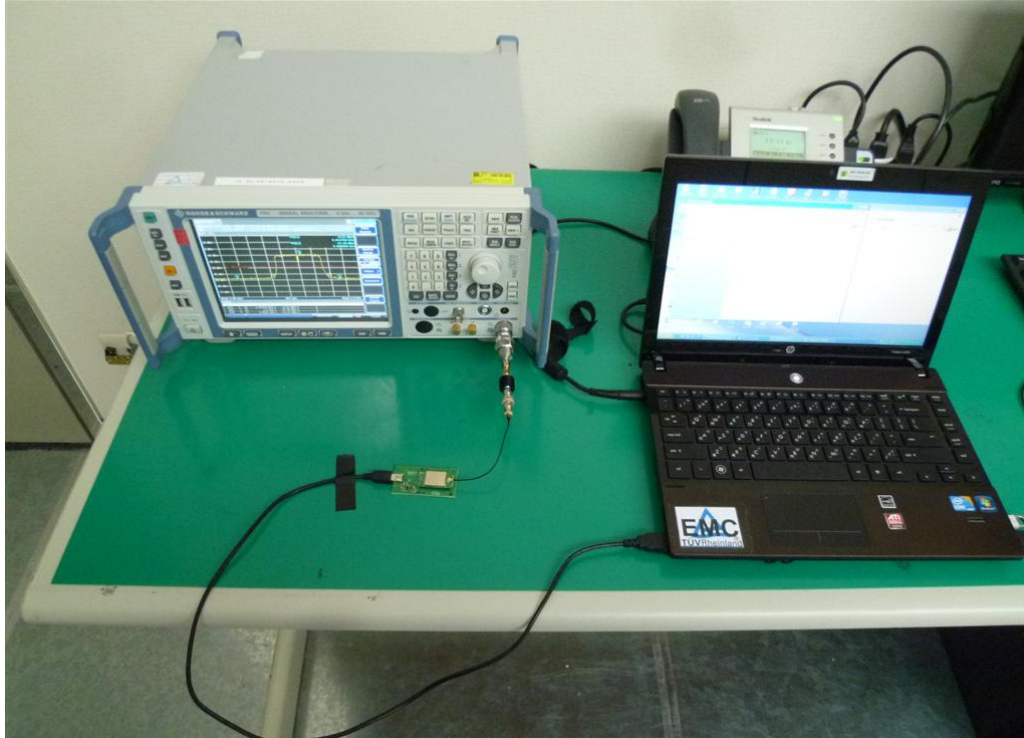
Photograph 2: Set-up for Spurious Emissions (Back View 1)



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



8. List of Tables

Table 1: Applied Standard and Test Levels	5
Table 2: List of Test and Measurement Equipment	7
Table 3: Emission Measurement Uncertainty.....	8
Table 4: Basic Information of EUT	9
Table 5: Technical Specification of EUT	9
Table 6: Test result of Peak Output Power (802.11b)	16
Table 7: Test result of Peak Output Power (802.11g)	16
Table 8: Test result of Peak Output Power (802.11n 20MHz)	16
Table 9: Test result of Peak Output Power (802.11n 40MHz)	16
Table 10: Test result of 6dB Bandwidth (802.11b)	24
Table 11: Test result of 6dB Bandwidth (802.11g)	24
Table 12: Test result of 6dB Bandwidth (802.11n 20MHz)	24
Table 13: Test result of 6dB Bandwidth (802.11n 40MHz)	24
Table 14: Test result of 99% Bandwidth (802.11b)	25
Table 15: Test result of 99% Bandwidth (802.11g)	25
Table 16: Test result of 99% Bandwidth (802.11n 20MHz)	25
Table 17: Test result of 99% Bandwidth (802.11n 40MHz)	25
Table 18: Test result of Power Density (802.11b)	39
Table 19: Test result of Power Density (802.11g)	39
Table 20: Test result of Power Density (802.11n 20MHz)	39
Table 21: Test result of Power Density (802.11n 40MHz)	39

9. List of Photographs

Photograph 1: Set-up for Spurious Emissions (Front View).....	60
Photograph 2: Set-up for Spurious Emissions (Back View 1)	61
Photograph 3: Set-up for Spurious Emissions (Back View 2)	61
Photograph 4: Set-up for Conducted testing	62
Photograph 5: Set-up for for Mains Conducted testing Back	63
Photograph 6: Set-up for for Mains Conducted testing Front.....	63