

Produkte
Products

Prüfbericht - Nr.: 10039978 001			Seite 1 von 83 Page 1 of 83		
Test Report No.:					
Auftraggeber: Lite-On Technology Corporation Client: 90, Chien I Road, Chung Ho, Taipei Hsien 203, Taiwan, R.O.C. 光寶科技股份有限公司, 臺北市內湖區瑞光路 392 號 22 樓					
Gegenstand der Prüfung: 802.11 a/b/g/n, 2.4G/5G 1T1R Wireless+BT Module Test item:					
Bezeichnung: WCBN603MH Identification:		Serien-Nr.: N/A Serial No.:			
Wareneingangs-Nr.: TPE81101 Receipt No.:		Eingangsdatum: 2012-12-20 Date of receipt:			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of test item at delivery:			The sample is ok for testing and not damaged		
Prüfört: TÜV Rheinland Taiwan Ltd. Testing location:			11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105 Taiwan FCC Registration No.: 365730		
Prüfgrundlage: FCC CFR47 Part 15: Subpart C Section 15.247 Test specification:			NCC LP0002: 2011-Jun		
Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). Test Result:			The test item passed the test specification(s).		
Prüflaboratorium: TÜV Rheinland Taiwan Ltd. Testing Laboratory:			11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C.		
geprüft/ tested by:			kontrolliert/ reviewed by:		
 2013-01-23 Arvin Ho/Department Manager			 2013-01-28 Rene Charton/Senior Project Manager		
Datum Date	Name/Stellung Name/Position	Unterschrift Signature	Datum Date	Name/Stellung Name/Position	Unterschrift Signature
Sonstiges/ Other Aspects:					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet					
Abbreviations: P(ass) = passed F(ail) = failed 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 relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.					

TEST SUMMARY

5.1.1 ANTENNA PORT (2.4GHz BAND)

5.1.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.1.2 OUTPUT POWER

RESULT: Passed

5.1.1.3 6dB BANDWIDTH

RESULT: Passed

5.1.1.4 POWER DENSITY

RESULT: Passed

5.1.1.5 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100kHz BANDWIDTH

RESULT: Passed

5.1.2 SPURIOUS EMISSION

RESULT: Passed

5.2.1 ANTENNA PORT (5GHz BAND)

5.2.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.2.1.2 OUTPUT POWER

RESULT: Passed

5.2.1.3 6dB BANDWIDTH

RESULT: Passed

5.2.1.4 POWER DENSITY

RESULT: Passed

5.2.1.5 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100kHz BANDWIDTH

RESULT: Passed

5.2.2 SPURIOUS EMISSION

RESULT: Passed

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7. LIST OF PHOTOGRAPHS83

1. General Remarks

1.1 Complementary Materials

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

Appendix 1: Photo

(File: 10039978APPENDIX1)

Appendix 2: Test Result of Radiated Emissions

(File: 10039978APPENDIX2)

Test Specifications

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

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247 KDB 558074 of March 23, 2005 NCC LP0002

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: 2010-Jul-1st to 2013-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	ESCI 7	1166.5950K07-100797-Pt	20-Dec-13
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-13
Pre-Amplifier	HP	8447F	2805A03335	14-Sep-13
Spectrum Analyzer	R&S	FSV 40	100921	13-Dec-13
Horn Antenna (1GHz~18GHz)	COM-POWER	AHA118	701251	28-Sep-13
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	2-Nov-13
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	14-Sep-13
Preamplifier (18 GHz -40 GHz)	COMPOWER	PAM-840	461257	17-Sep-13
Power meter	R&S	NRVD	100439	27-Mar-13
Power sensor	R&S	NRV-Z1	100013	27-Mar-13
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-May-13
Signal Generator	R&S	SMU200	104260	13-Aug-13
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-13

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	$\pm 1 \text{ dB}$
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 tested sample is a Combo module, which is designed to work mount on other device. The module has two antenna ports, and it is has two work functions (Bluetooth and Wireless function)."

For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Combo module
Brand Name	Lite-On Technology Corporation
FCC ID	PPQ-WCBN603MH
Type Designation	WCBN603MH
Operating Frequency	2402 MHz ~ 2480 MHz, 5725 MHz ~ 5850 MHz
Channel Spacing	5 MHz
Operation Voltage	3.3Vdc (Via Mini PCI-E port)
Modulation	OFDM,DSSS
Antenna gain	2.4GHz Band: 2.95 dBi, 5GHz Band:1.49 dBi
Antenna Type	Monopole (Chant Sincere: 341AWAE11111004)

Table 5: Channel information**2.4GHz Band**

802.11b/g, 802.11n (20MHz)

-Low Channel: 2412MHz

-Mid Channel: 2437MHz

-High Channel: 2462MHz

802.11n (40MHz)

-Low Channel: 2422MHz

-Mid Channel: 2437MHz

-High Channel: 2452MHz

5GHz (Band 4)

802.11a, 802.11n (20MHz)

-Low Channel: 5745MHz

-Mid Channel: 5785MHz

-High Channel: 5825MHz

802.11n (40MHz)

-Low Channel: 5755MHz

-High Channel: 5795MHz

3.3 Independent Operation Modes

The 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

Test operation refers to test setup in chapter 4. All testing were performed according to the procedures in ANSI C63.10: 2009 and DA 00-705 of March 30, 2000.

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

Band	Date Rate or Sub-test	Worst
802.11b	1M	
802.11b	11M	V
802.11g	6M	
802.11g	54M	V
802.11n20	MCS0	V
802.11n20	MCS7	
802.11n40	MCS0	
802.11n40	MCS7	V
802.11a	6M	
802.11a	54M	V
802.11a20	MCS0	
802.11a20	MCS7	V
802.11a40	MCS0	
802.11a40	MCS7	V

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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	MSI4532 (CX420MX)	CX420 MX-233TWK 1008000096

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

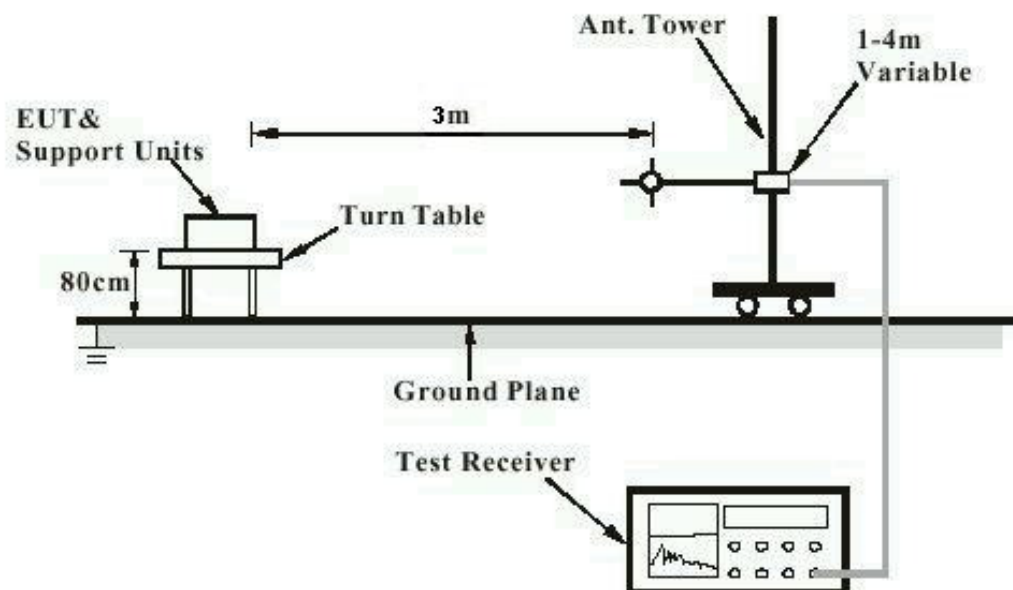


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement

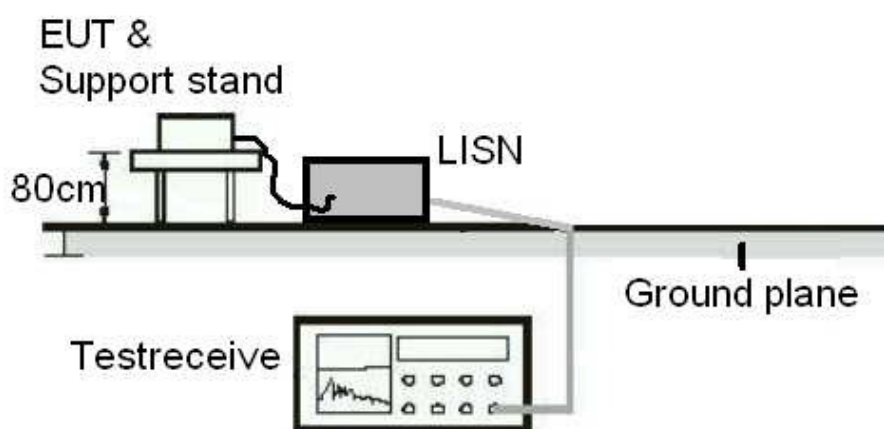
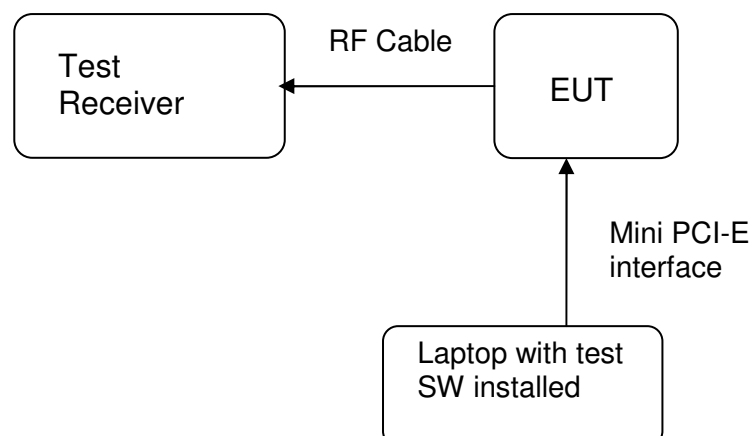


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Port (2.4GHz Band)

5.1.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	2013-01-02
Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and LP0002 3.10.1
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an internal antenna with an directional gain of 2.95 dBi, and the antenna is a chip antenna. The EUT is considered to comply the provision.

Refer to EUT photo and Antenna datasheet for details.

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*Page 17 of 83***5.1.1.2 Output Power****RESULT:****Passed**

Test date : 2013-01-02
Test standard : FCC Part 15.247(b)(3), LP0002 3.10.1
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 22°C
Relative humidity : 52%
Atmospheric pressure : 102 kPa

Table 6: Test result of Output Power, 802.11b

Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	2412	22.04	0.1600	1	PASS
Middle Channel	2437	22.96	0.1977	1	PASS
High Channel	2462	22.16	0.1644	1	PASS

Table 7: Test result of Output Power, 802.11g

Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	2412	23.02	0.2004	1	PASS
Middle Channel	2437	23.91	0.2460	1	PASS
High Channel	2462	23.63	0.2307	1	PASS

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

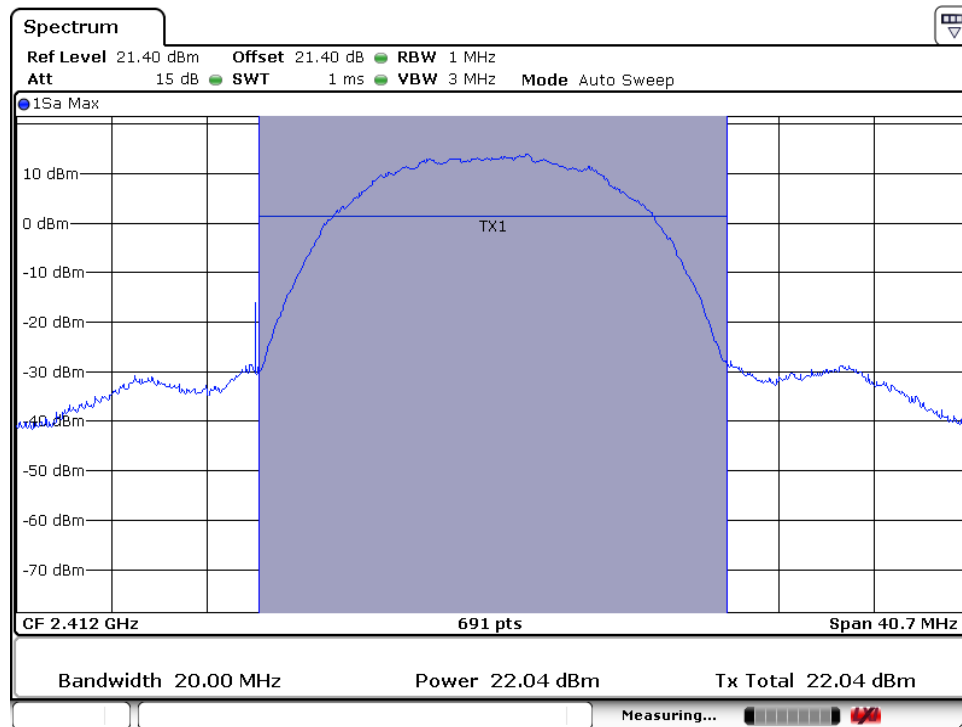
Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	2412	22.08	0.1614	1	PASS
Middle Channel	2437	22.87	0.1936	1	PASS
High Channel	2462	22.67	0.1849	1	PASS

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

Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	2422	22.11	0.1626	1	PASS
Middle Channel	2437	22.39	0.1734	1	PASS
High Channel	2452	22.71	0.1866	1	PASS

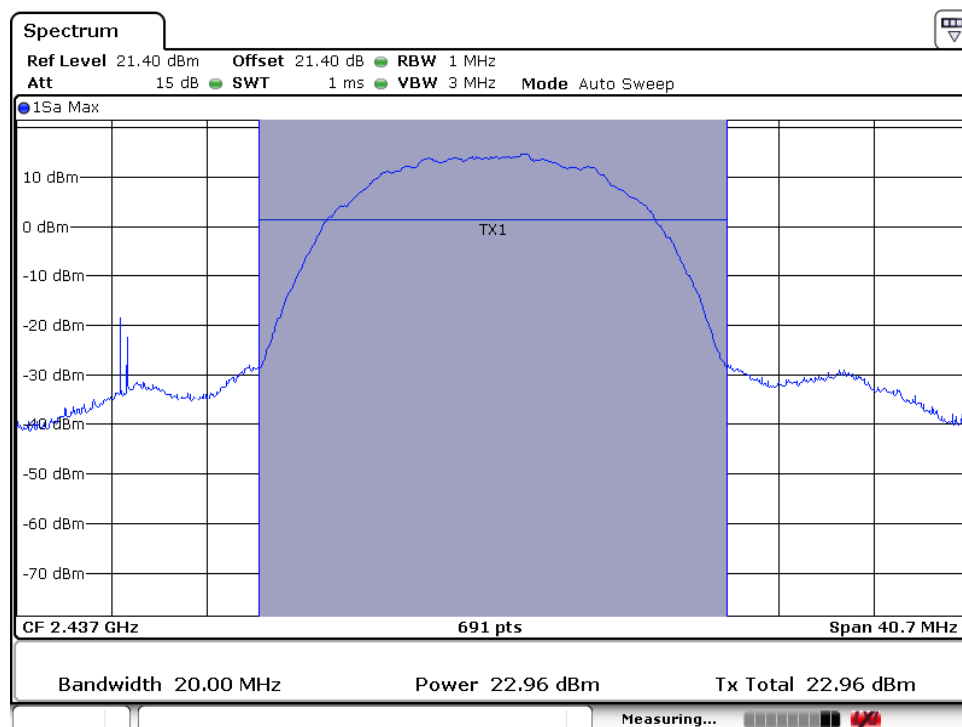
Test Plot of Output Power, 802.11b

Low Channel

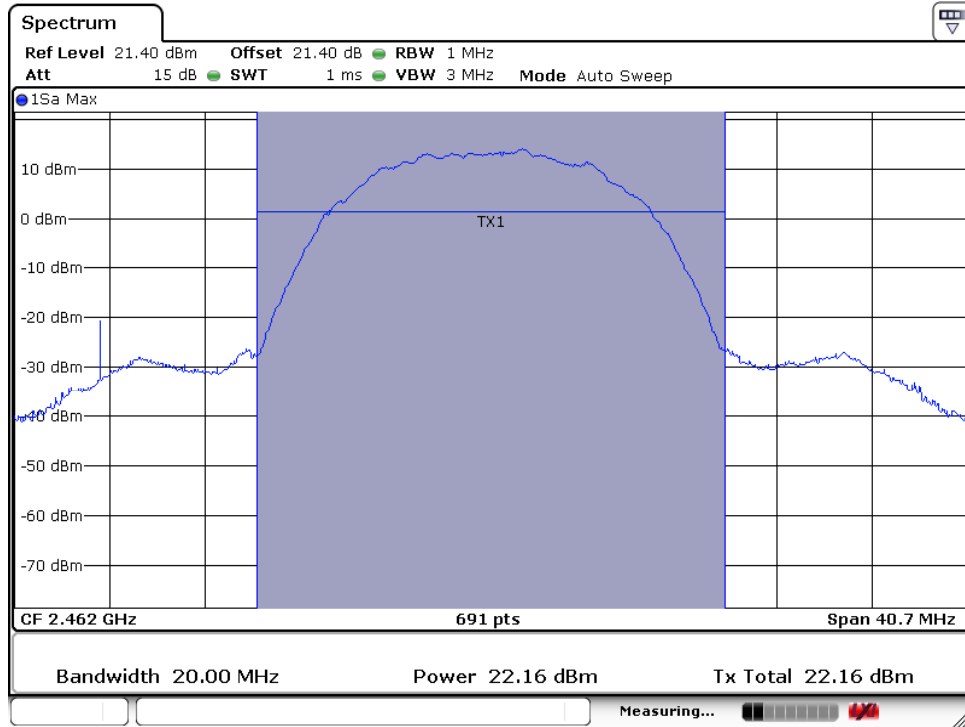


Date: 2.JAN.2013 09:44:44

Middle Channel



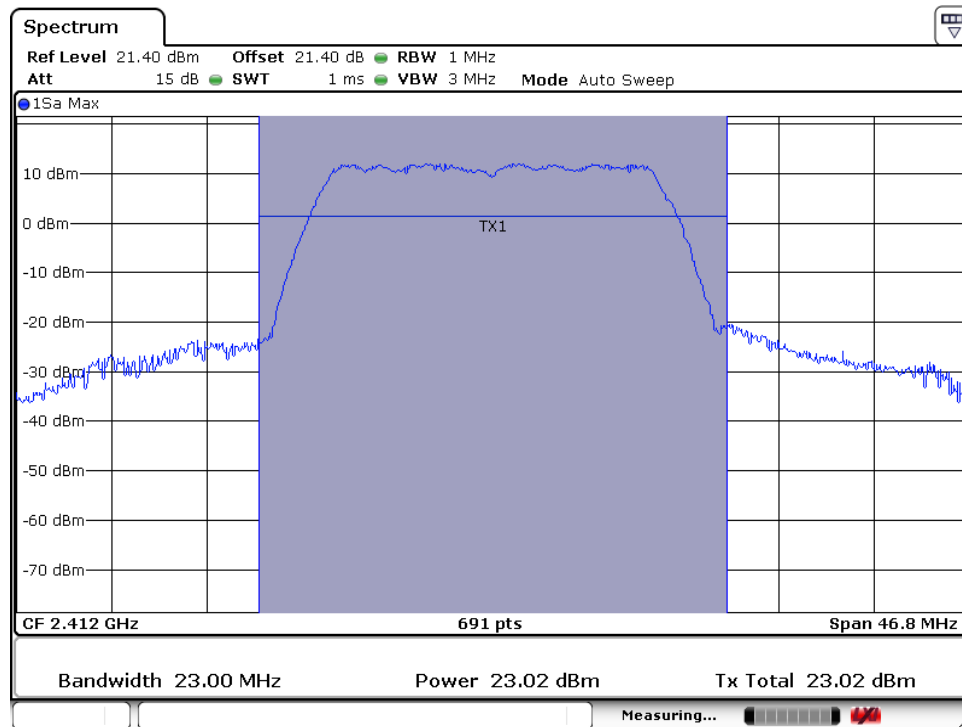
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High Channel


Date: 2.JAN.2013 09:45:41

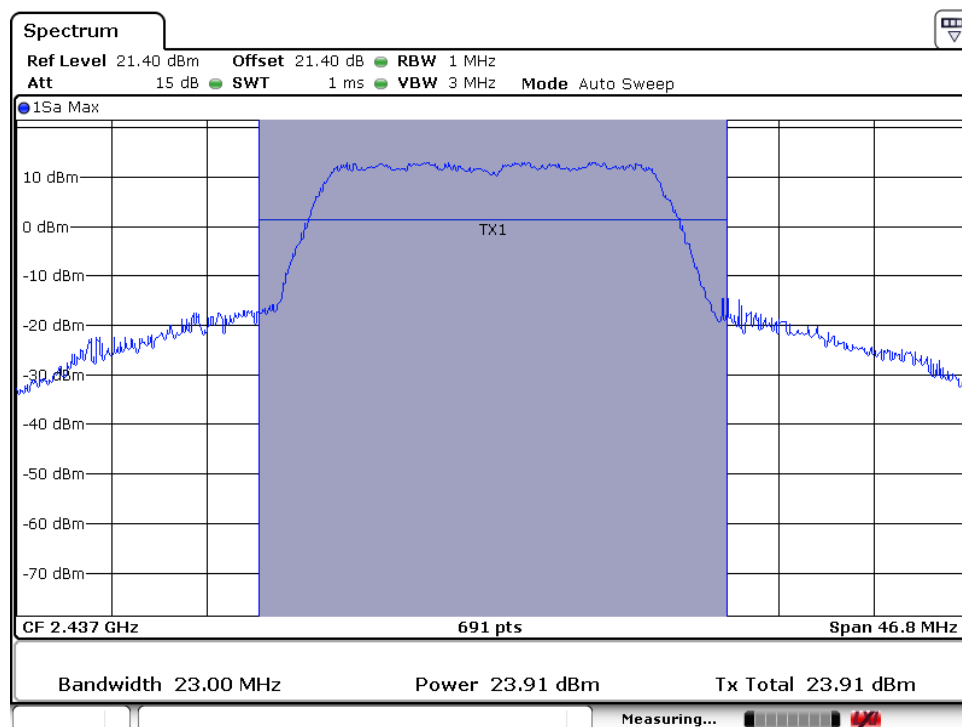
Test Plot of Output Power, 802.11g

Low Channel

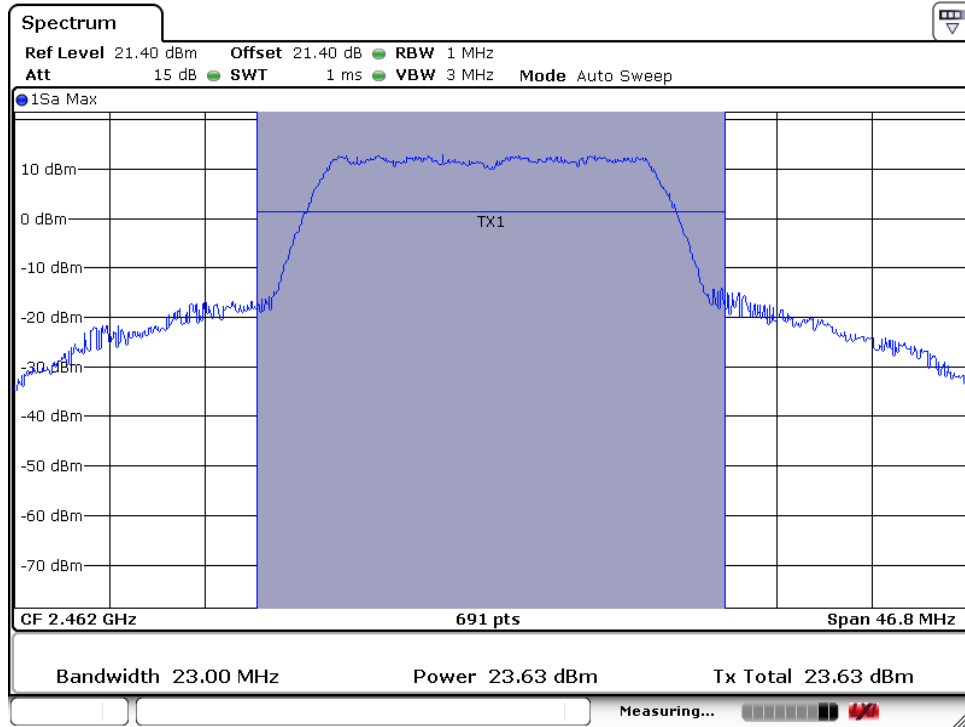


Date: 2.JAN.2013 09:46:34

Middle Channel



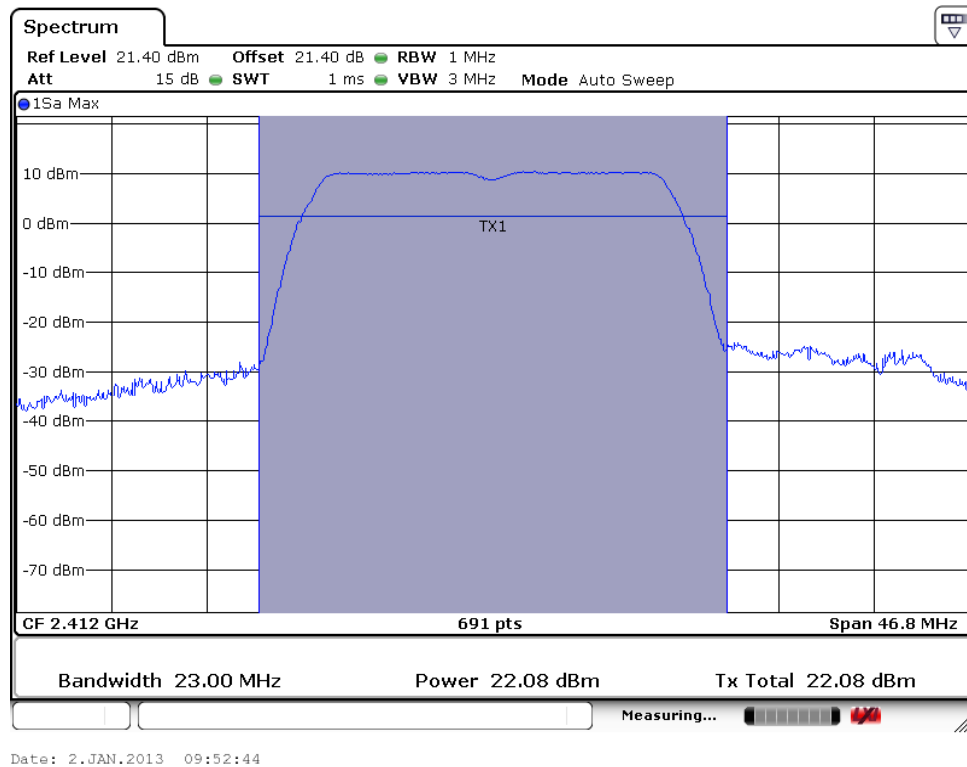
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High Channel


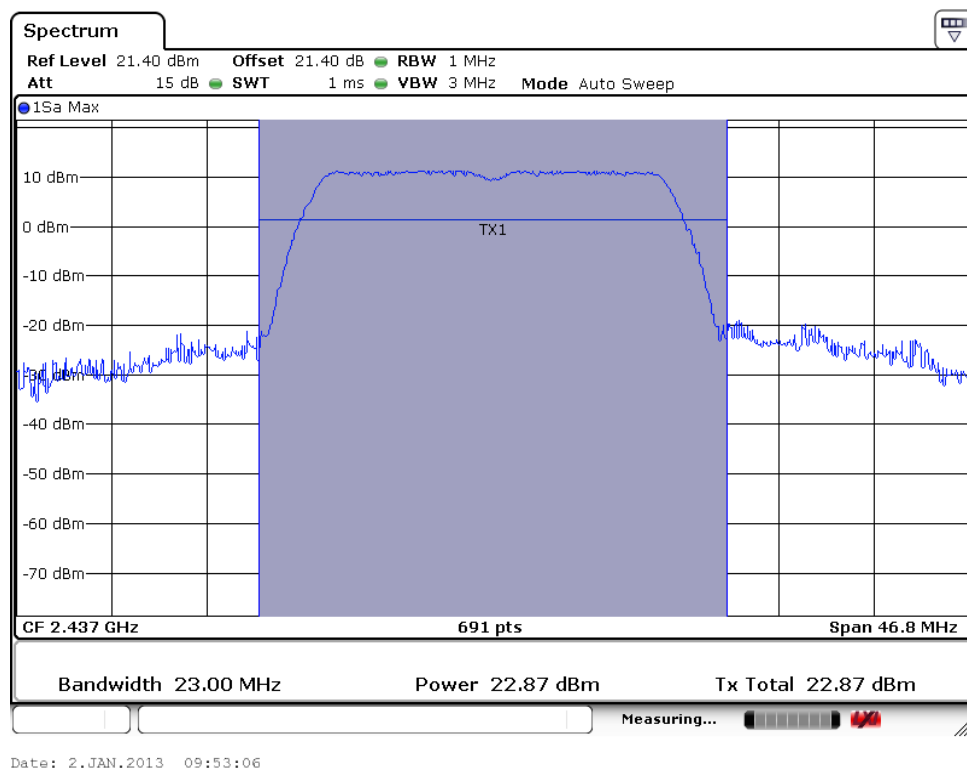
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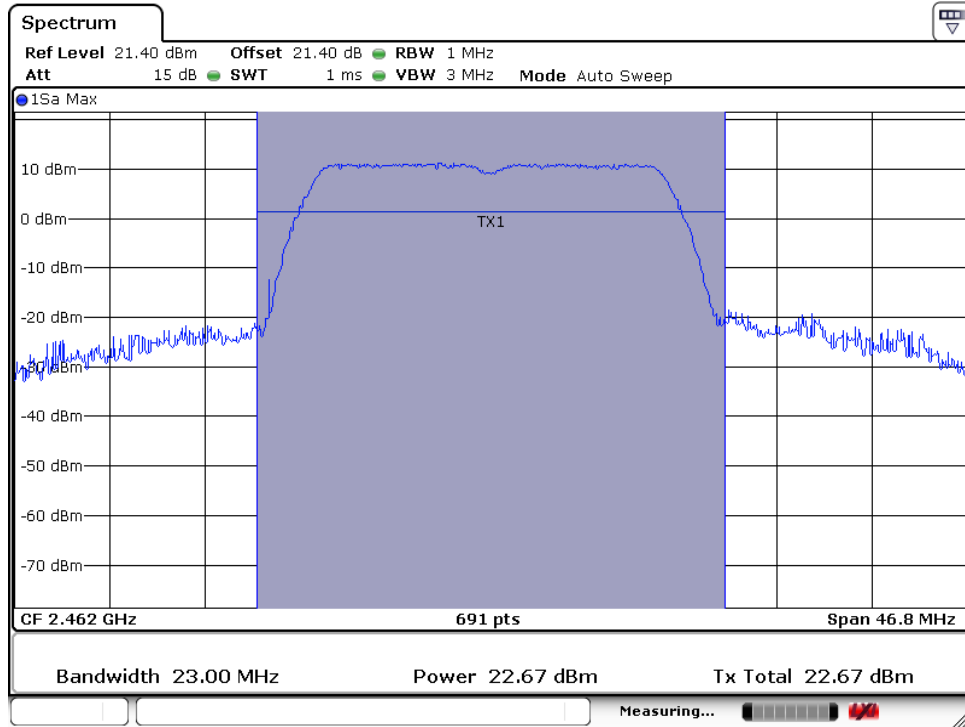
Test Plot of Output Power, 802.11n (20MHz)

Low Channel



Middle Channel

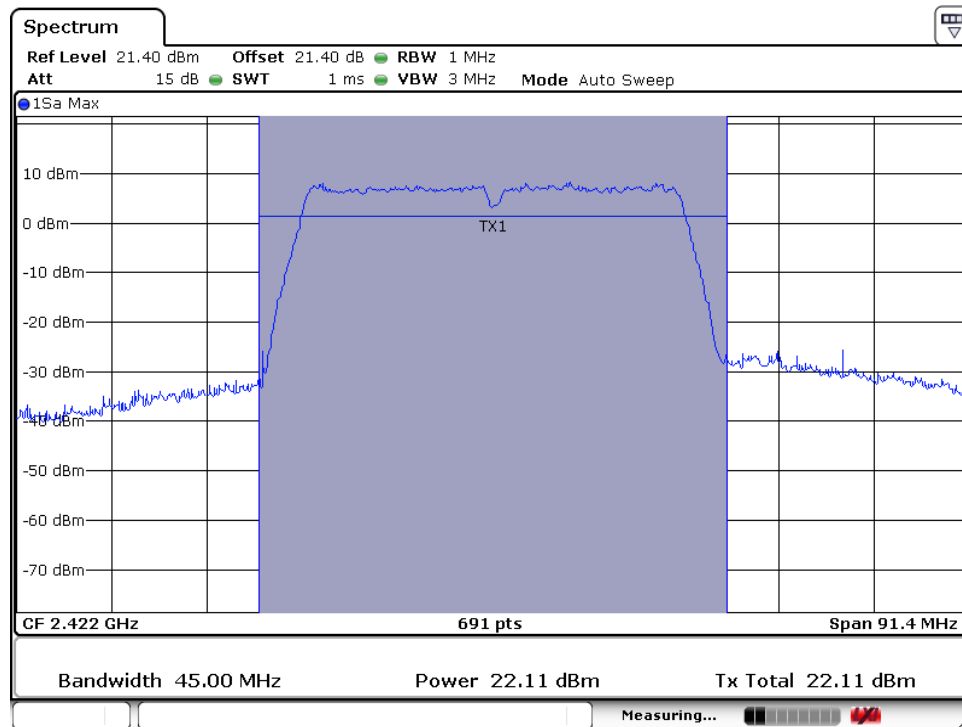


High Channel


Date: 2.JAN.2013 09:53:21

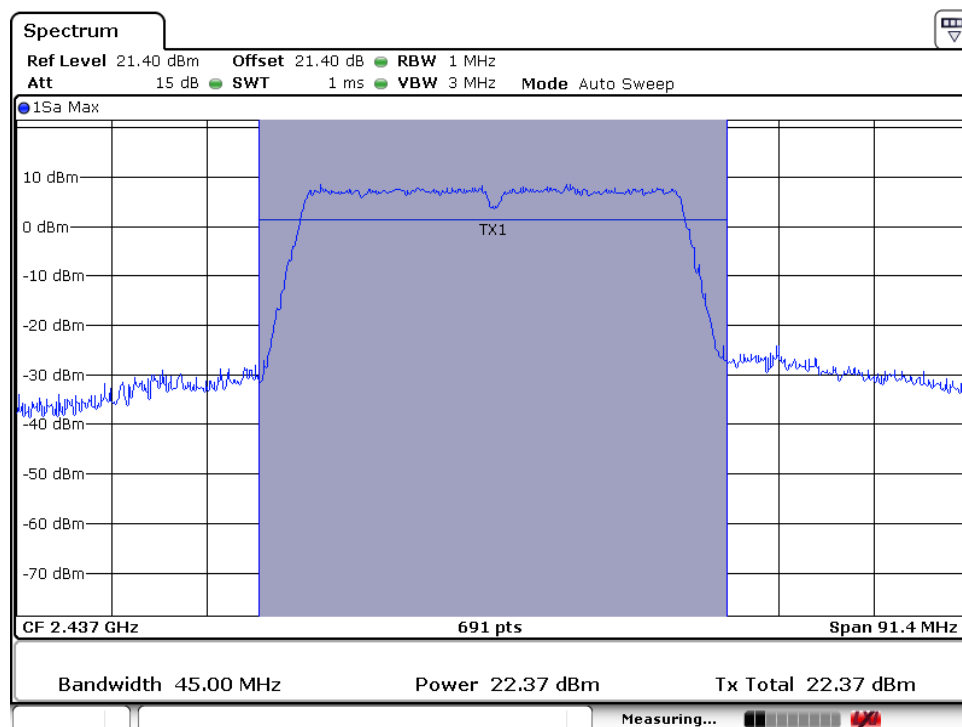
Test Plot of Output Power, 802.11n (40MHz)

Low Channel

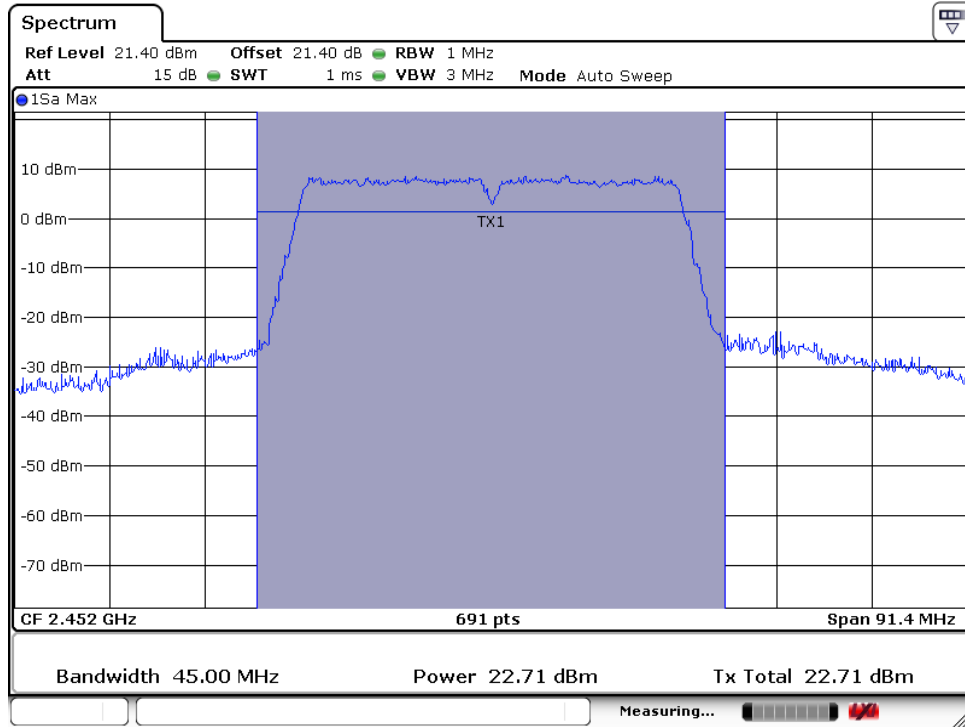


Date: 2.JAN.2013 10:06:08

Middle Channel



Date: 2.JAN.2013 10:07:47

High Channel


Date: 2.JAN.2013 10:08:08

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*Page 27 of 83***5.1.1.3 6dB Bandwidth****RESULT:****Passed**

Date of testing : 2013-01-02
Test standard : FCC Part 15.247(a)(2), LP0002 3.10.1
Basic standard : KDB 558074 of March 23, 2005
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 24°C
Relative humidity : 53%
Atmospheric pressure : 102 kPa

Table 10: Test result of 6dB Bandwidth, 802.11b

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	10.02	≥ 0.5	Pass
Mid Channel	2437	10.09	≥ 0.5	Pass
High Channel	2462	10.06	≥ 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	16.5	≥ 0.5	Pass
Mid Channel	2437	16.54	≥ 0.5	Pass
High Channel	2462	16.57	≥ 0.5	Pass

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

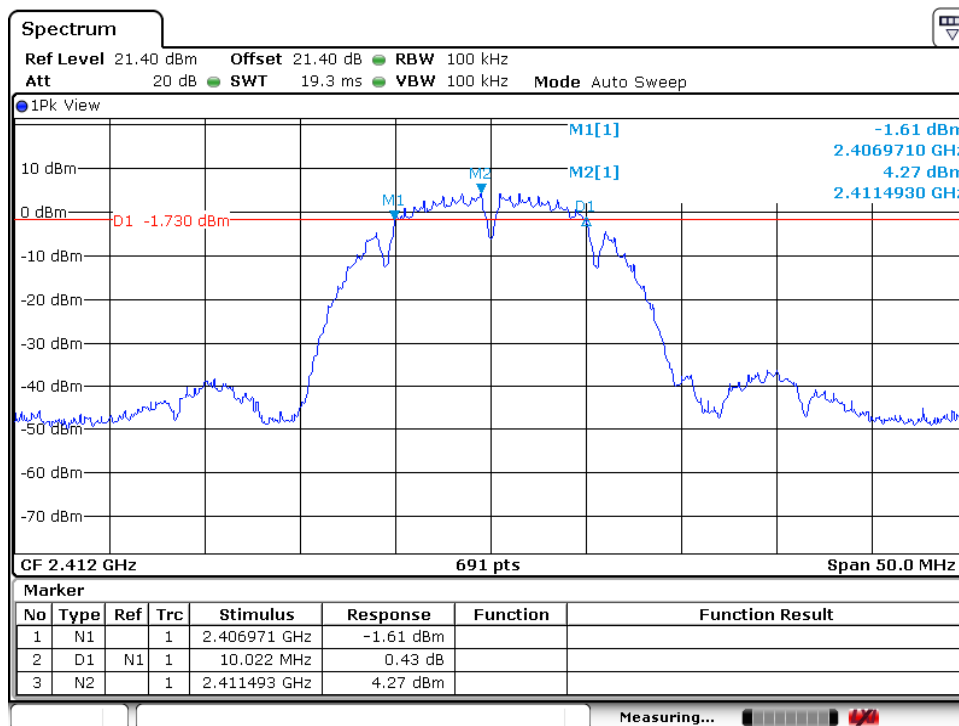
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2412	17.8	≥ 0.5	Pass
Mid Channel	2437	17.84	≥ 0.5	Pass
High Channel	2462	17.8	≥ 0.5	Pass

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

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	2422	36.64	≥ 0.5	Pass
Mid Channel	2437	36.57	≥ 0.5	Pass
High Channel	2452	36.51	≥ 0.5	Pass

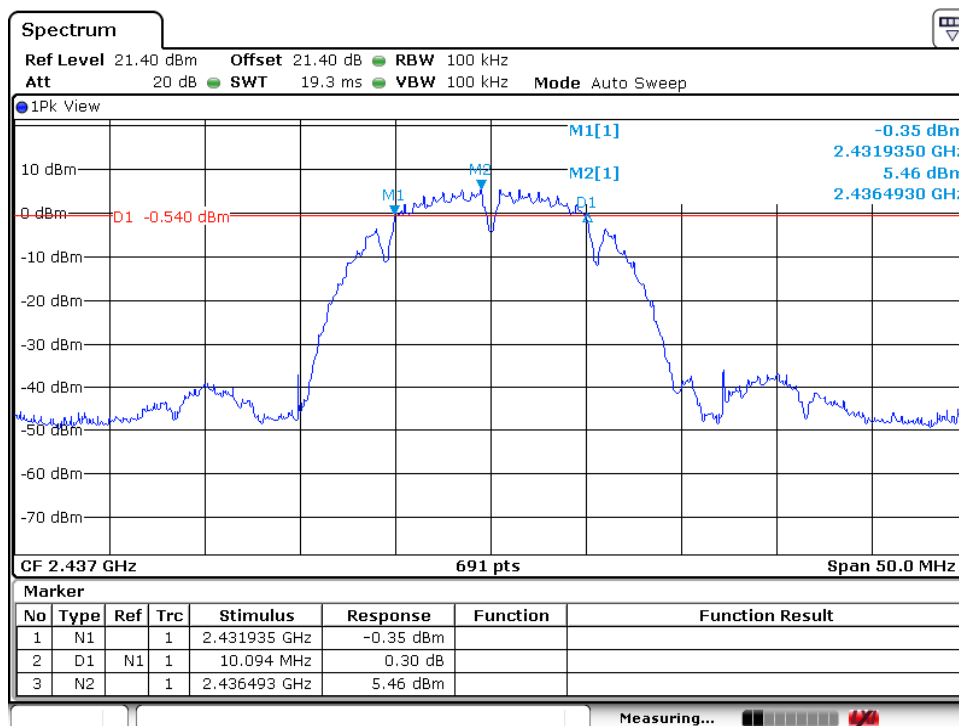
Test Plot of 6dB Bandwidth, 802.11b

Low Channel

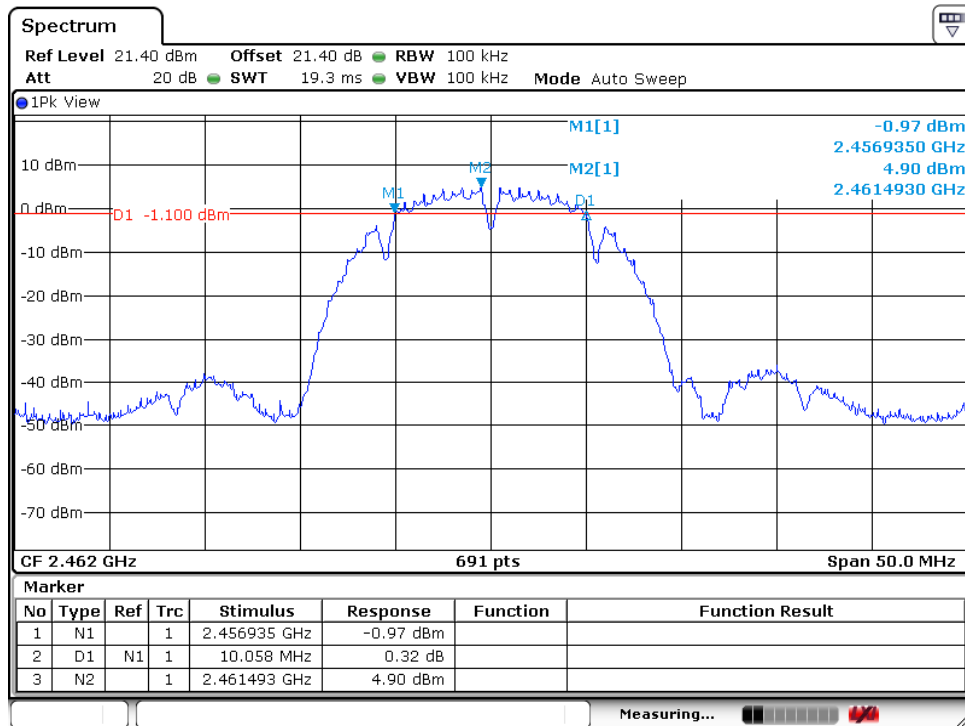


Date: 2.JAN.2013 10:26:46

Middle Channel



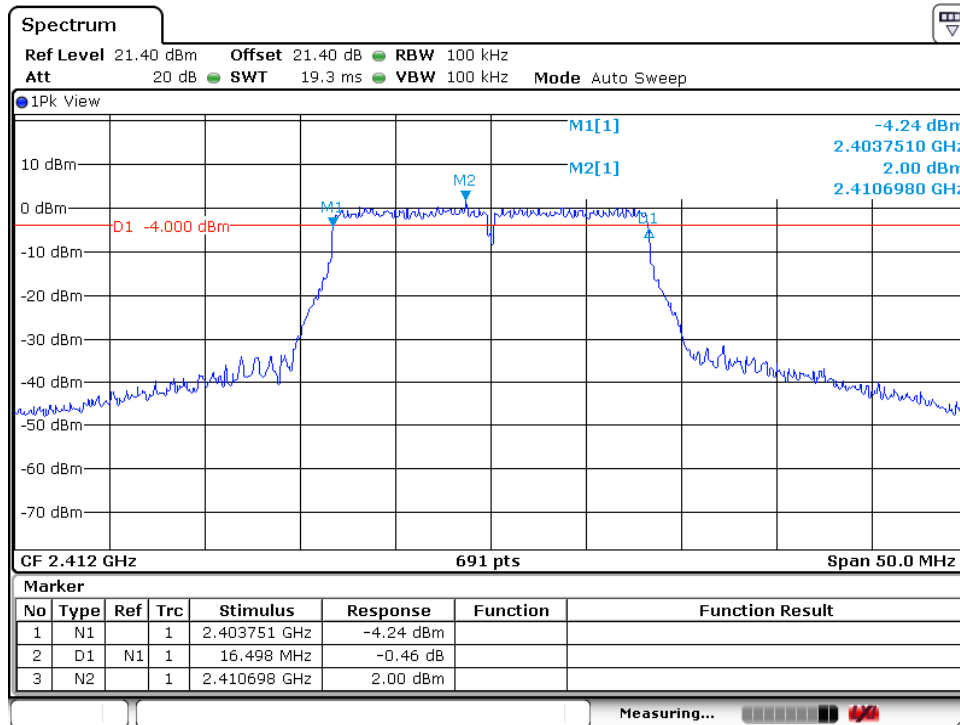
Date: 2.JAN.2013 10:24:06

High Channel


Date: 2.JAN.2013 10:27:23

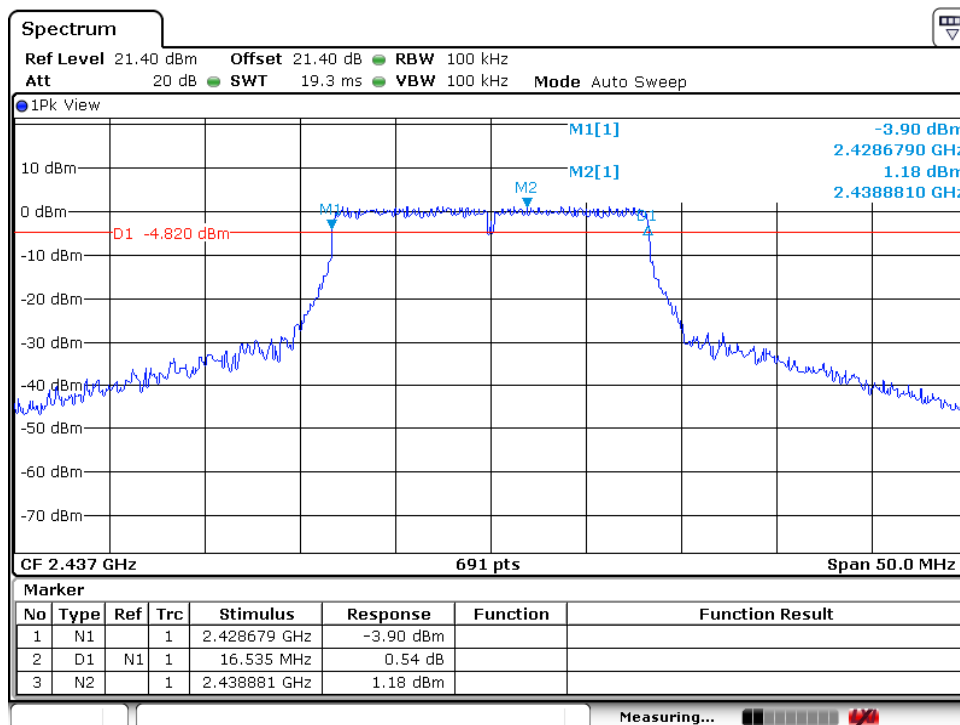
Test Plot of 6dB Bandwidth, 802.11g

Low Channel

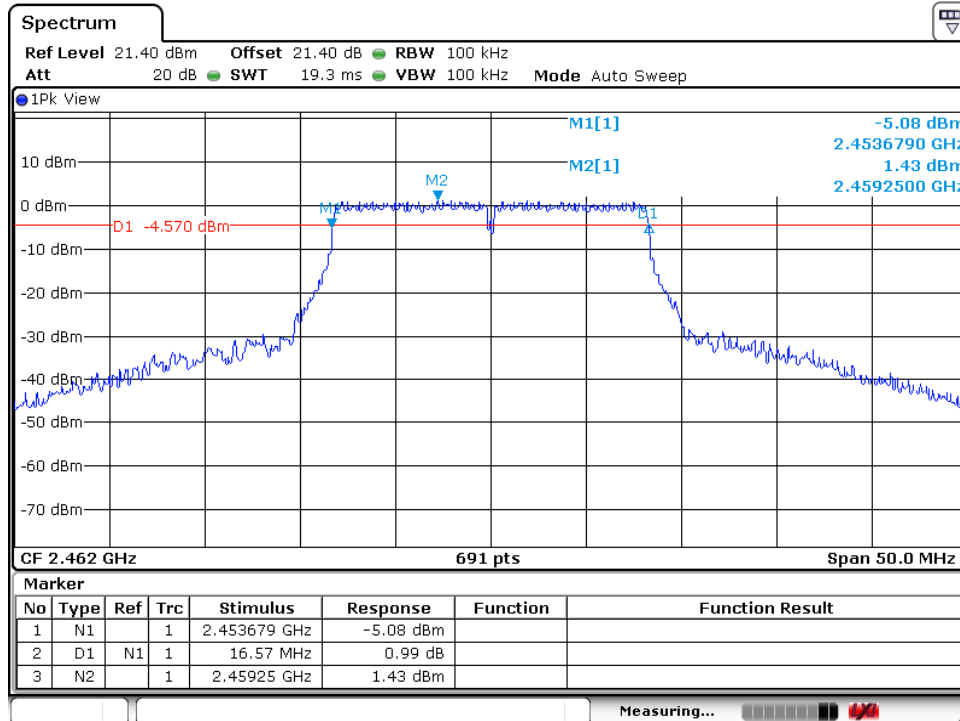


Date: 2.JAN.2013 10:29:03

Middle Channel



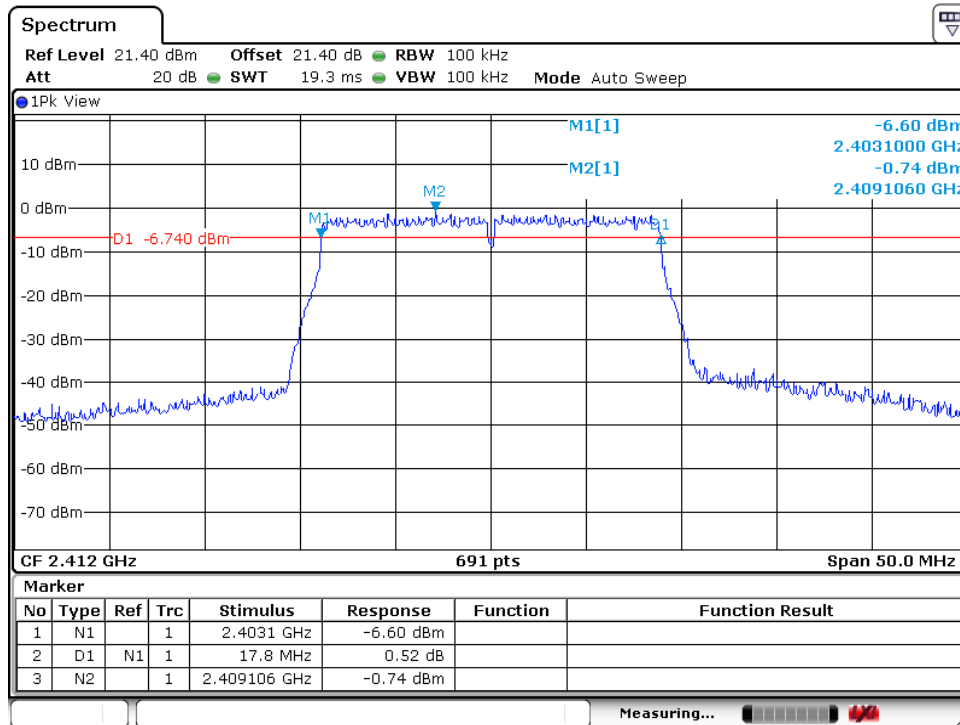
Date: 2.JAN.2013 10:29:58

High Channel


Date: 2.JAN.2013 10:30:56

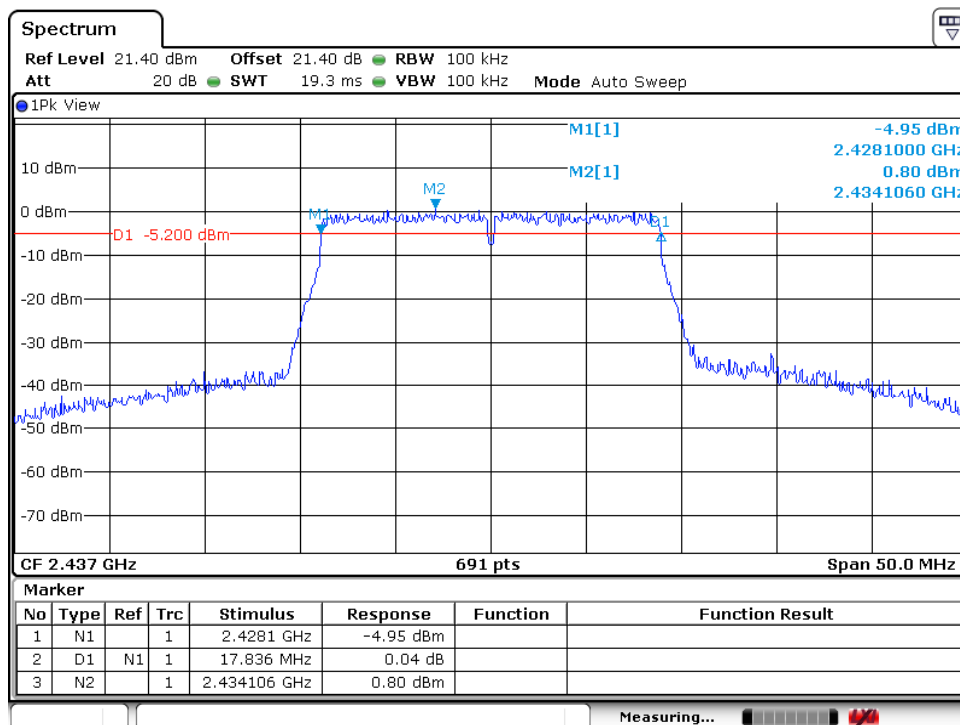
Test Plot of 6dB Bandwidth, 802.11n (20MHz)

Low Channel

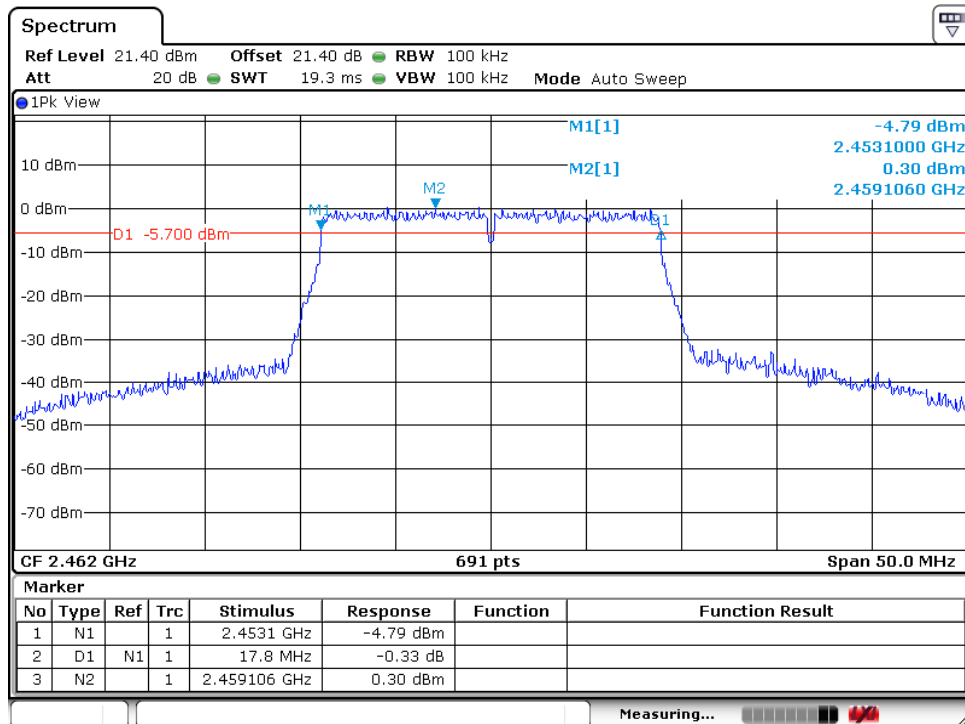


Date: 2.JAN.2013 10:32:31

Middle Channel



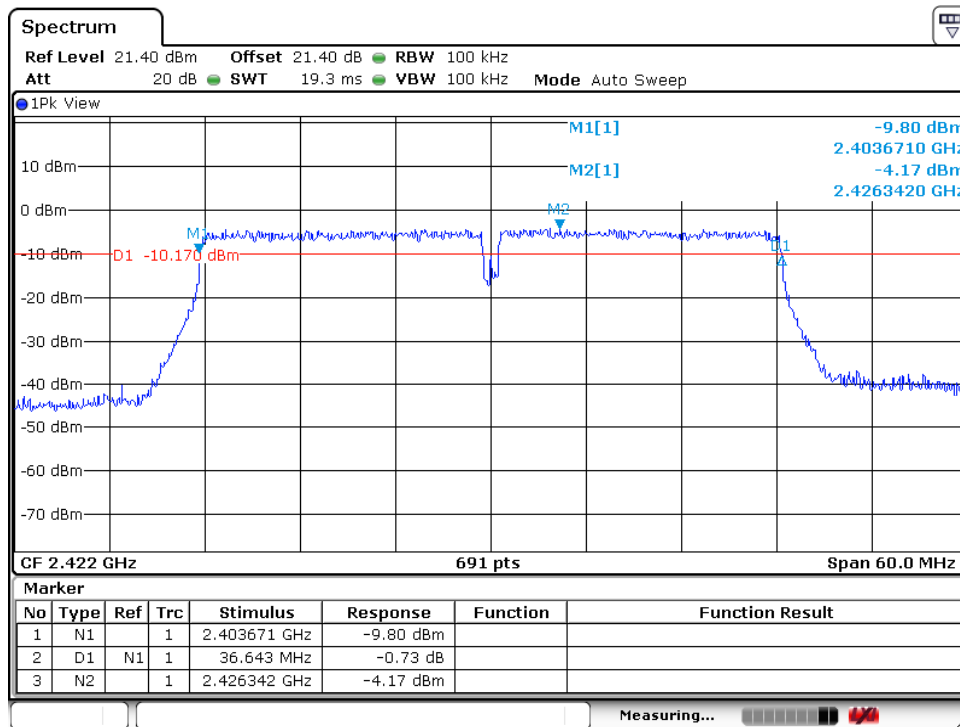
Date: 2.JAN.2013 10:33:14

High Channel


Date: 2.JAN.2013 10:33:47

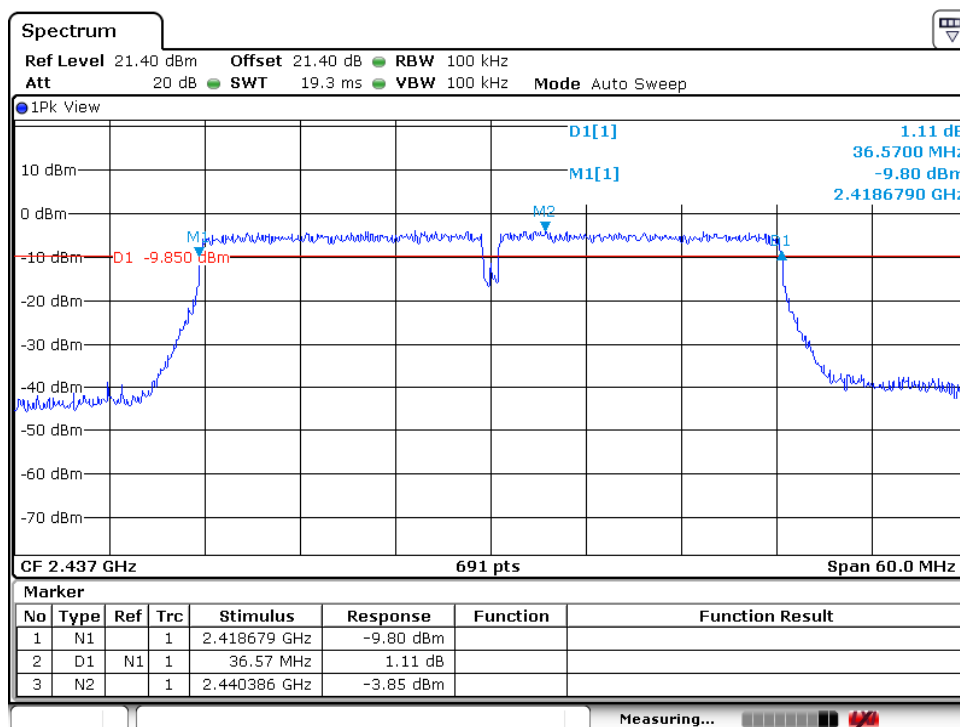
Test Plot of 6dB Bandwidth, 802.11n (40MHz)

Low Channel

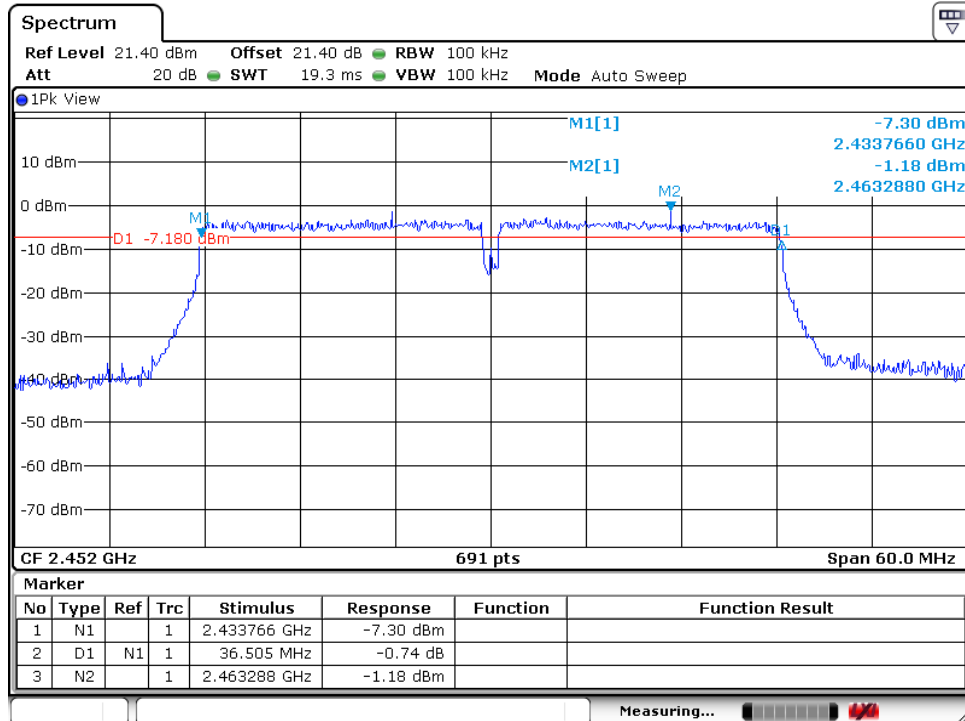


Date: 2.JAN.2013 10:34:49

Middle Channel



Date: 2.JAN.2013 10:36:01

High Channel


Date: 2.JAN.2013 10:37:41

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*Page 37 of 83***5.1.1.4 Power Density****RESULT:****Passed**

Date of testing : 2013-01-02
Test standard : FCC Part 15.247(e), LP0002 3.10.1
Basic standard : KDB 558074 of March 23, 2005
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 24°C
Relative humidity : 53%
Atmospheric pressure : 102 kPa

Table 14: Test result of Power Density, 802.11b

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2412	-10.46	8	Pass
Mid Channel	2437	-9.39	8	Pass
High Channel	2462	-10.27	8	Pass

Table 15: Test result of Power Density, 802.11g

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2412	-14.23	8	Pass
Mid Channel	2437	-14.51	8	Pass
High Channel	2462	-13.26	8	Pass

Table 16: Test result of Power Density, 802.11n (20MHz)

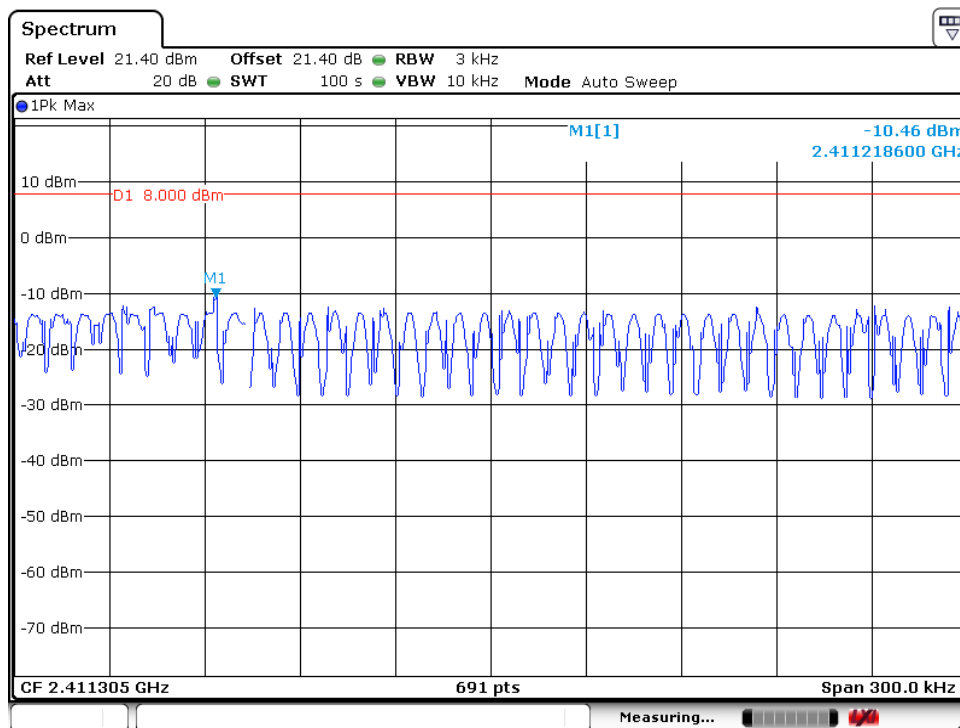
Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2412	-16.37	8	Pass
Mid Channel	2437	-15.57	8	Pass
High Channel	2462	-15.33	8	Pass

Table 17: Test result of Power Density, 802.11n (40MHz)

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2412	-21.23	8	Pass
Mid Channel	2437	-20.58	8	Pass
High Channel	2462	-13.43	8	Pass

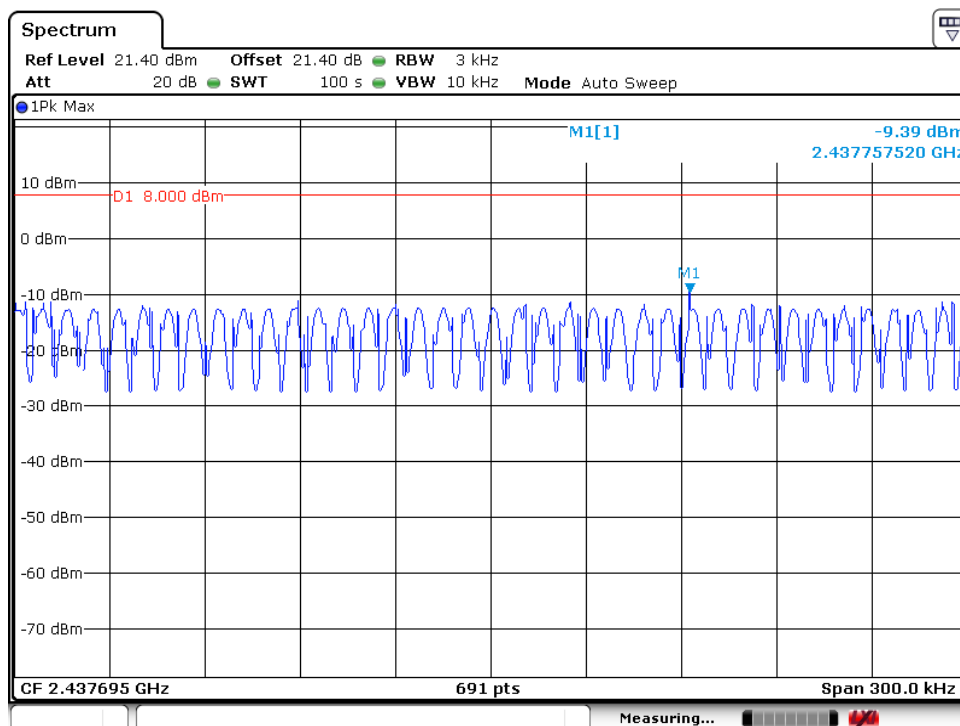
Test Plot of Power Density, 802.11b

Low Channel

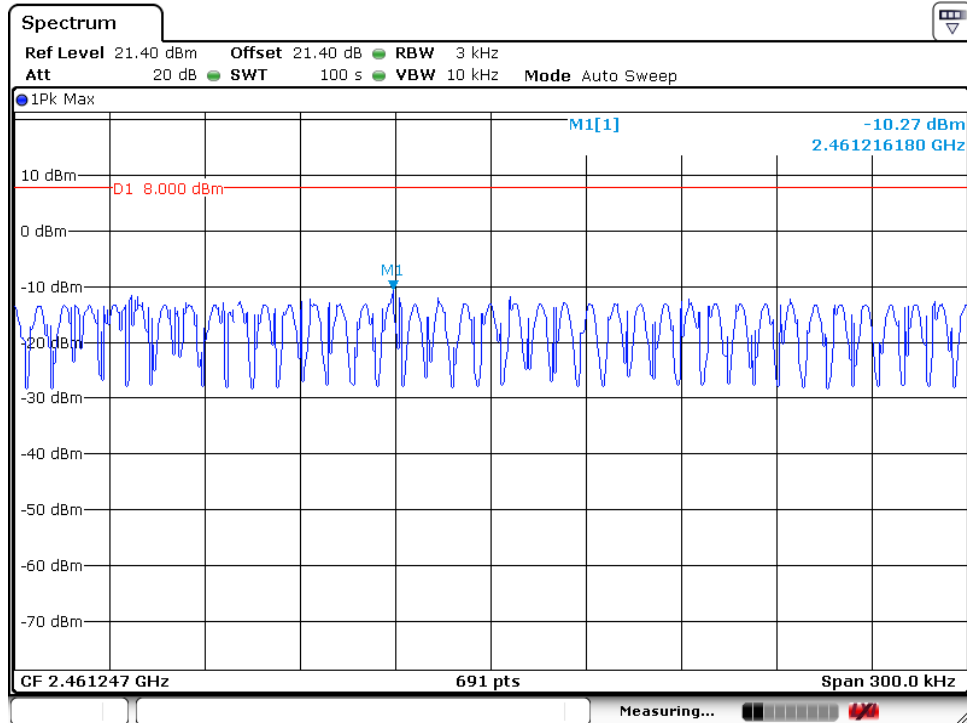


Date: 2.JAN.2013 11:14:55

Middle Channel



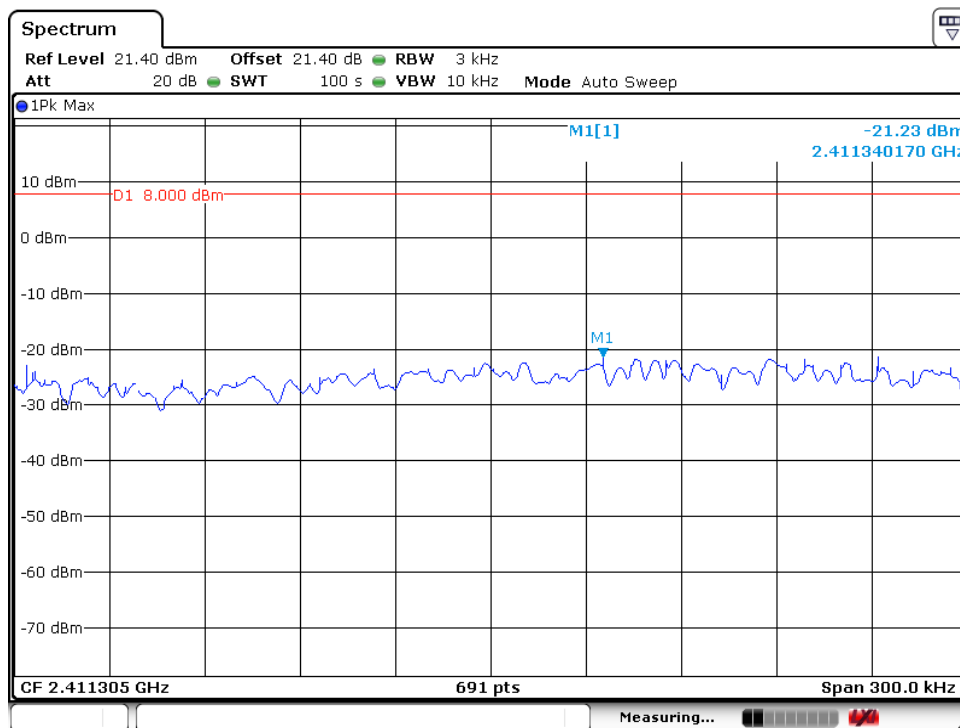
Date: 2.JAN.2013 11:17:12

High Channel


Date: 2.JAN.2013 11:19:41

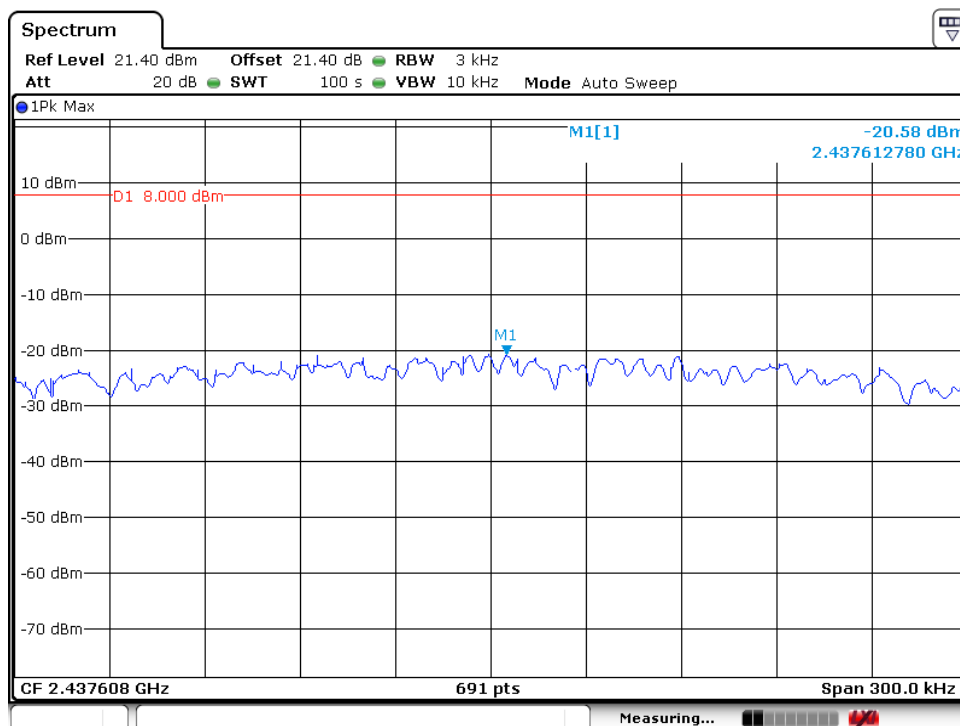
Test Plot of Power Density, 802.11g

Low Channel

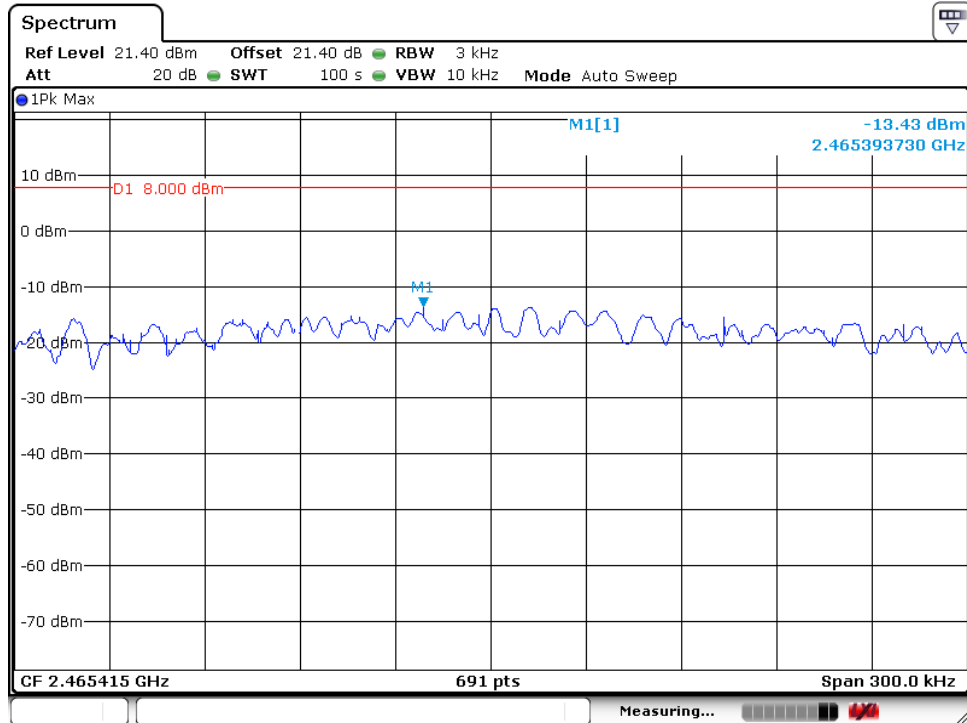


Date: 2.JAN.2013 11:22:07

Middle Channel



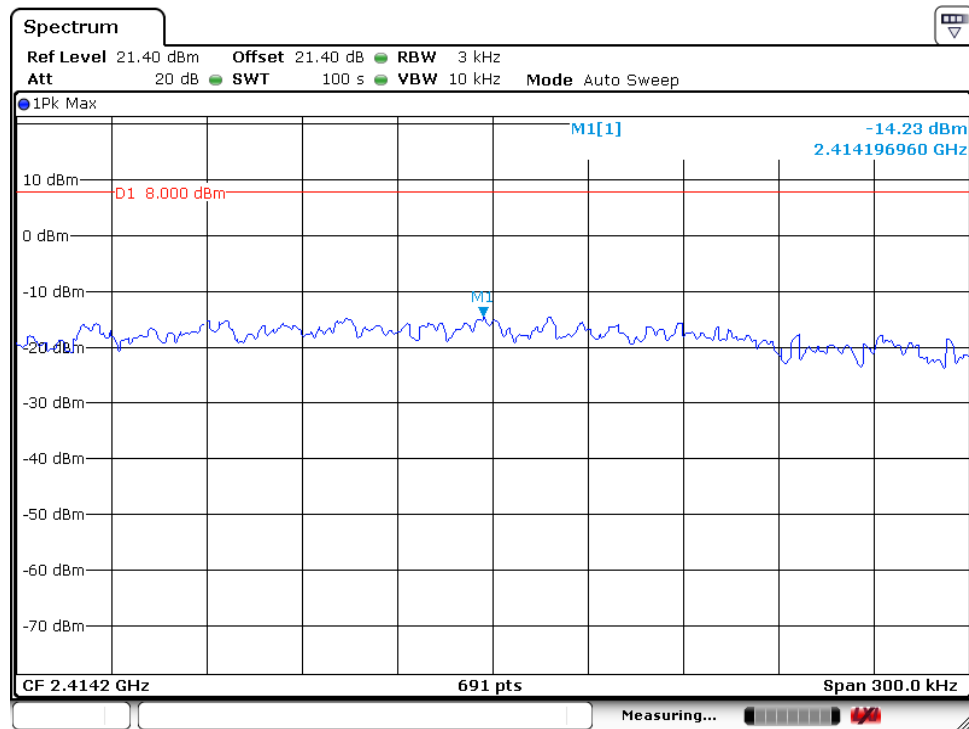
Date: 2.JAN.2013 11:25:16

High Channel


Date: 2.JAN.2013 11:28:14

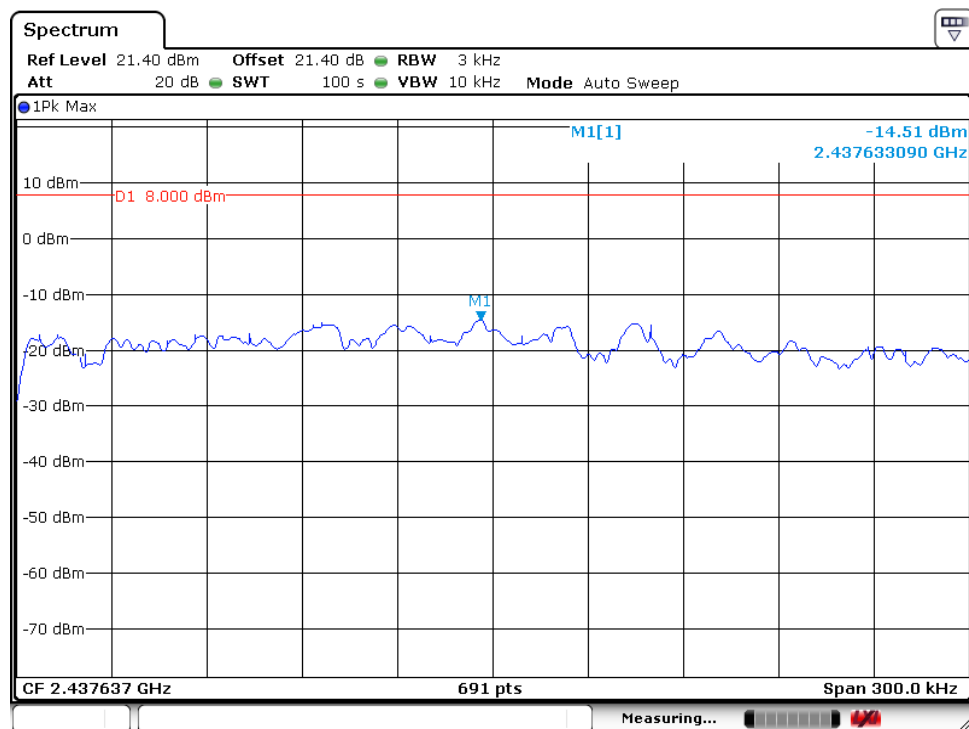
Test Plot of Power Density, 802.11n (20MHz)

Low Channel

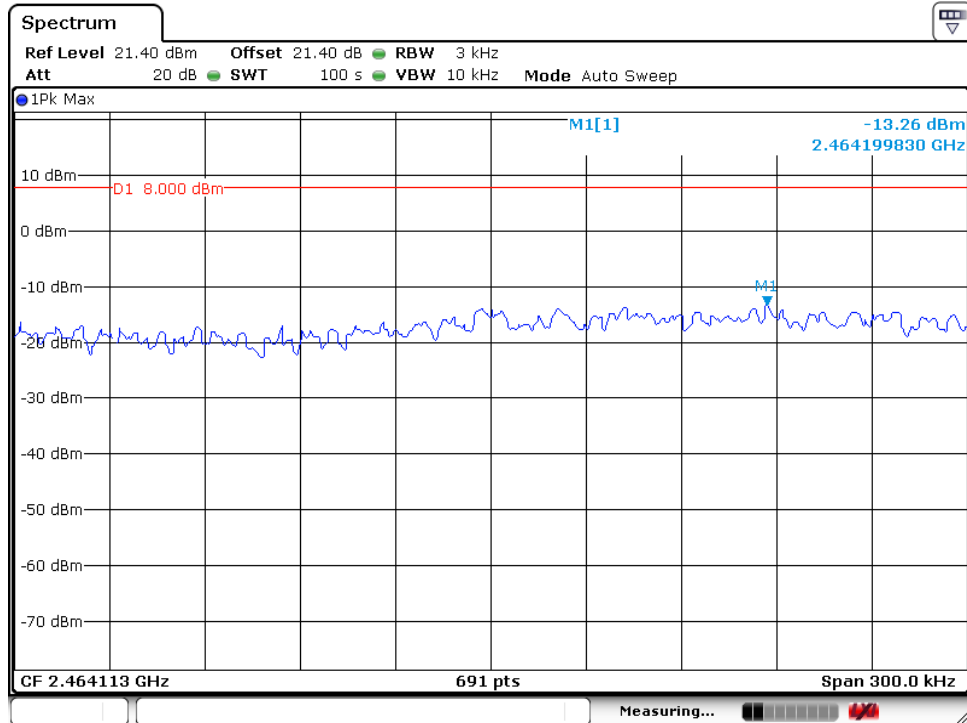


Date: 2.JAN.2013 11:30:50

Middle Channel



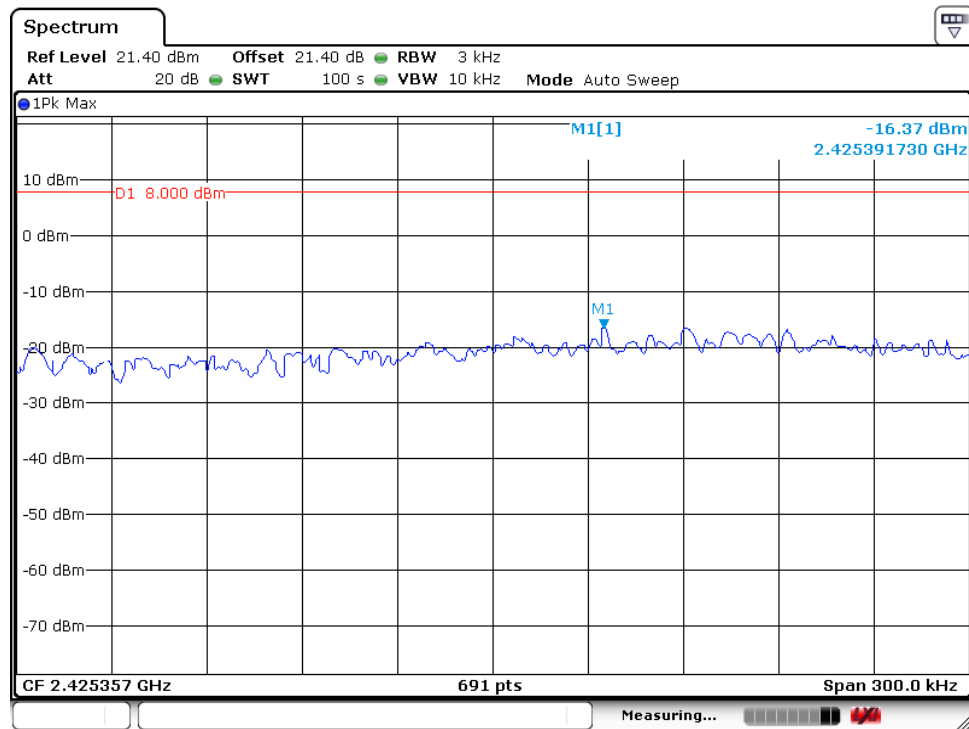
Date: 2.JAN.2013 11:33:06

High Channel


Date: 2.JAN.2013 11:35:24

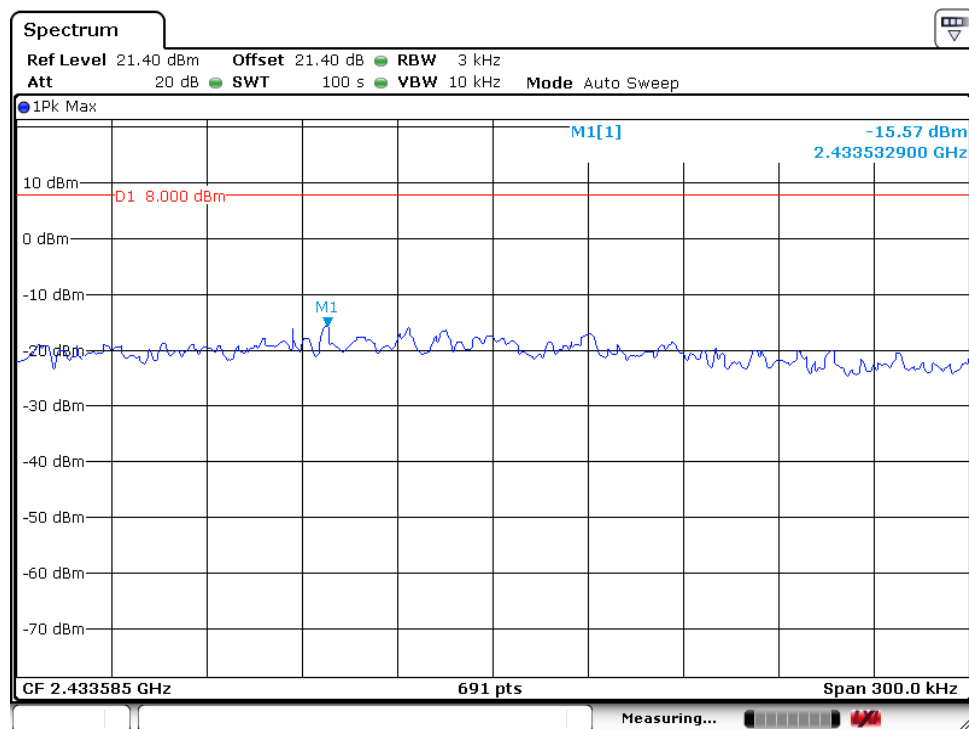
Test Plot of Power Density, 802.11n (40MHz)

Low Channel

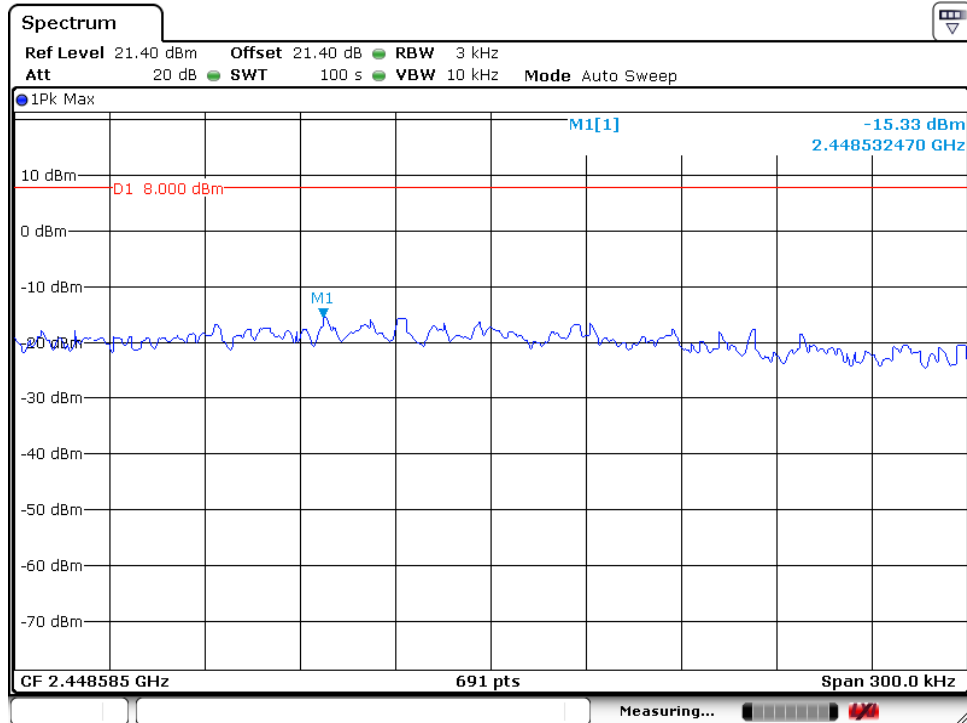


Date: 2.JAN.2013 11:38:00

Middle Channel



Date: 2.JAN.2013 11:40:42

High Channel


Date: 2.JAN.2013 11:43:10

5.1.1.5 Conducted spurious emissions measured in 100kHz Bandwidth**RESULT:****Passed**

Date of testing	:	2013-01-02
Test standard	:	FCC part 15.247(d), LP0002 3.10.1
Basic standard	:	KDB 558074 of March 23, 2005
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

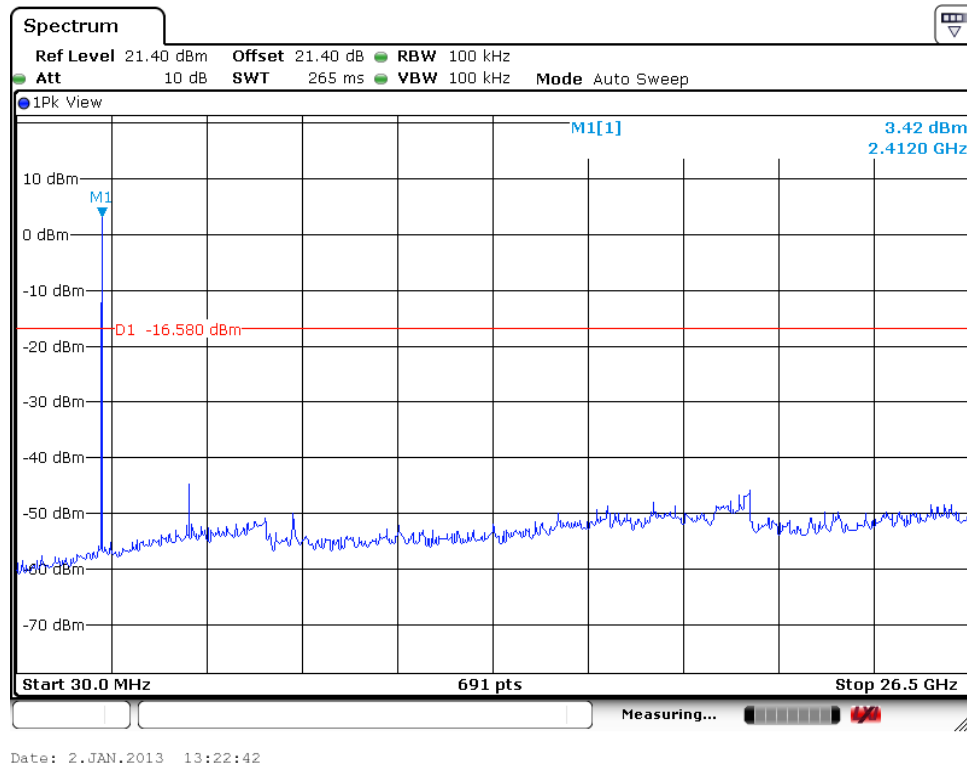
Test Channel	:	Low/ High
Operation mode	:	A
Ambient temperature	:	22°C
Relative humidity	:	52%
Atmospheric pressure	:	102 kPa

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

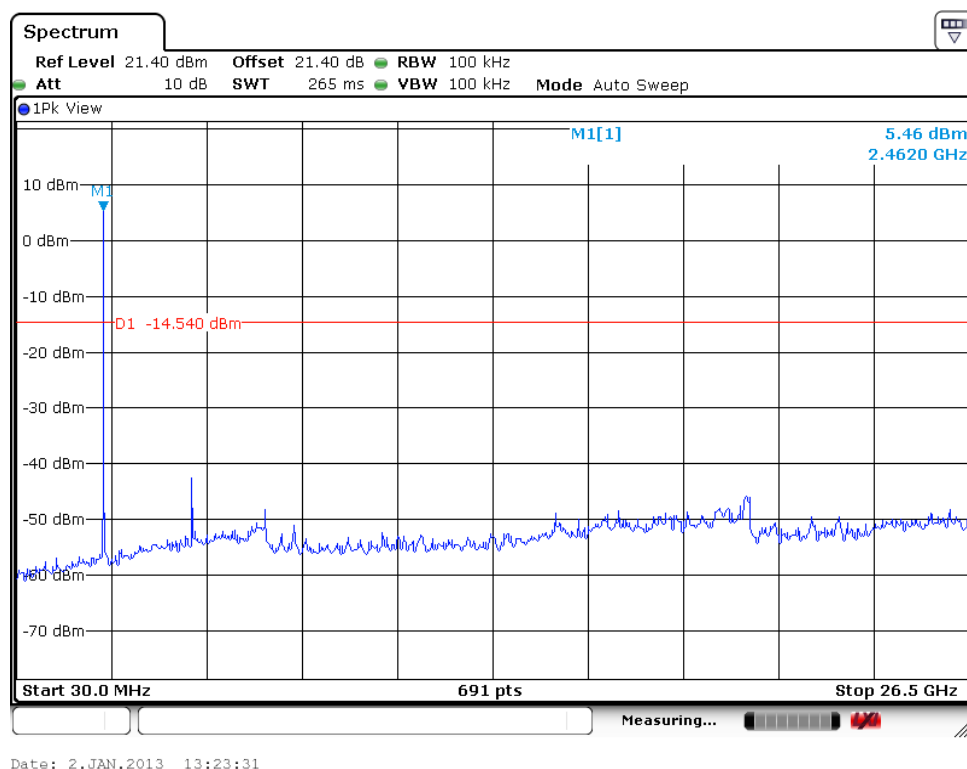
Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

Test Plot of 100kHz Conducted Emissions, 802.11b

Low Channel

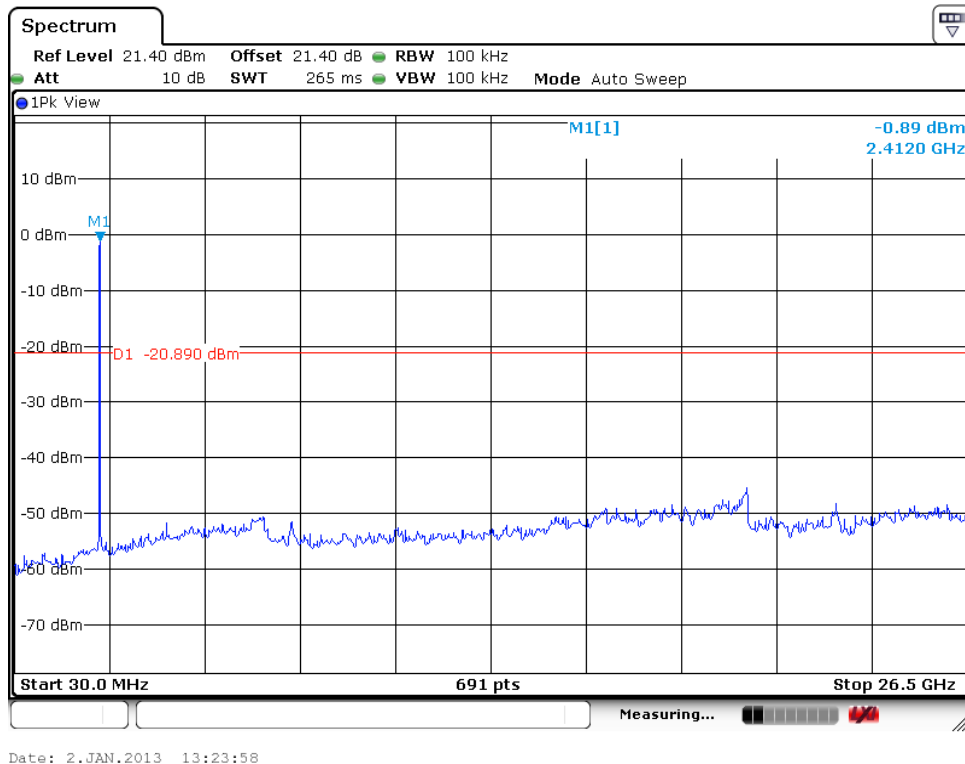


High Channel

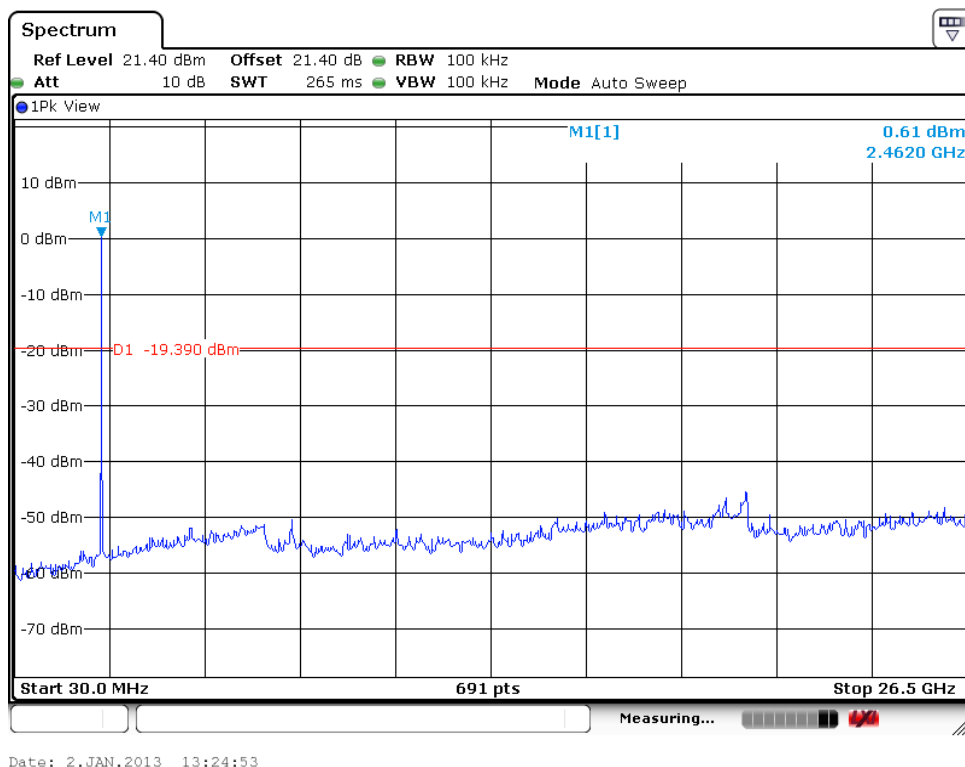


Test Plot of 100kHz Conducted Emissions, 802.11g

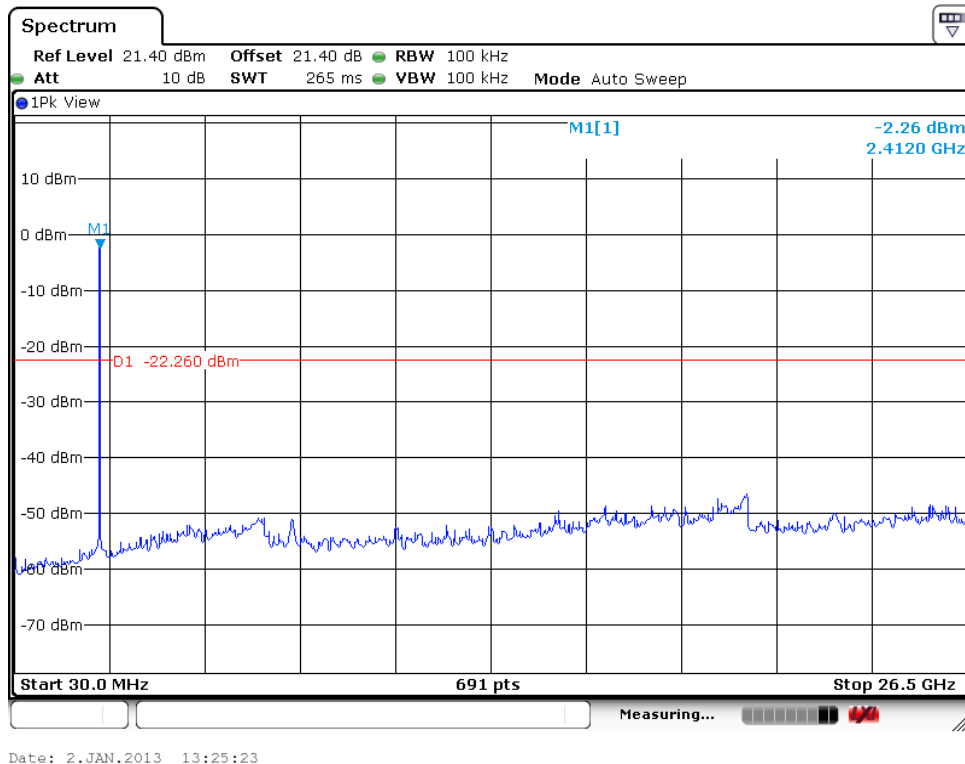
Low Channel



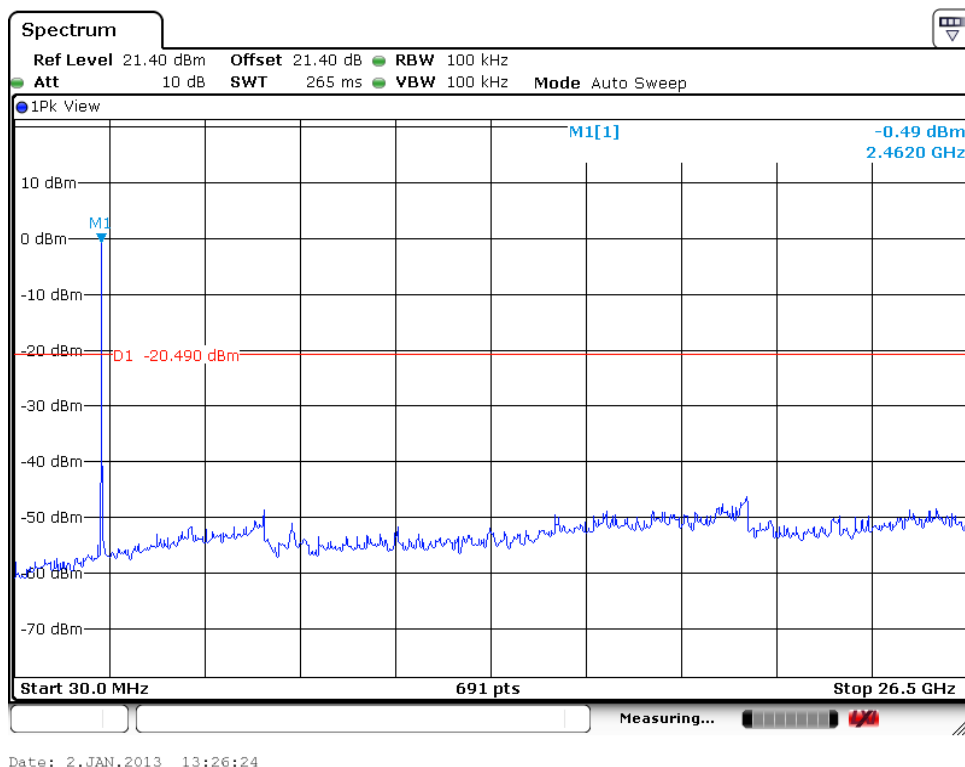
High Channel



Test Plot of 100kHz Conducted Emissions, 802.11n (20MHz) Low Channel

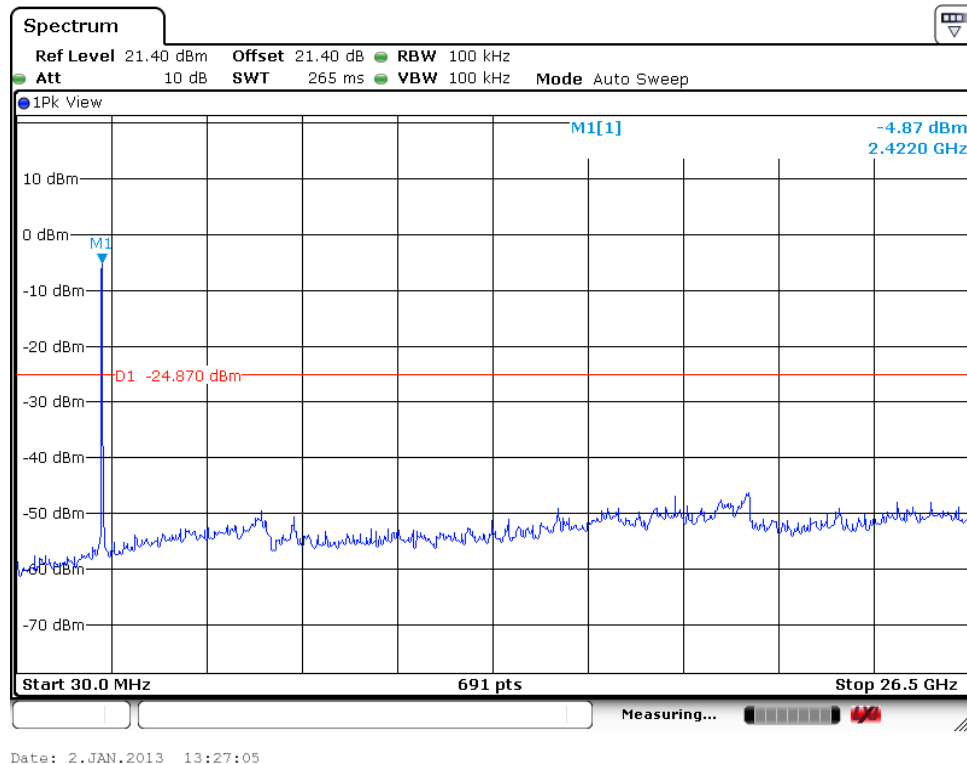


High Channel

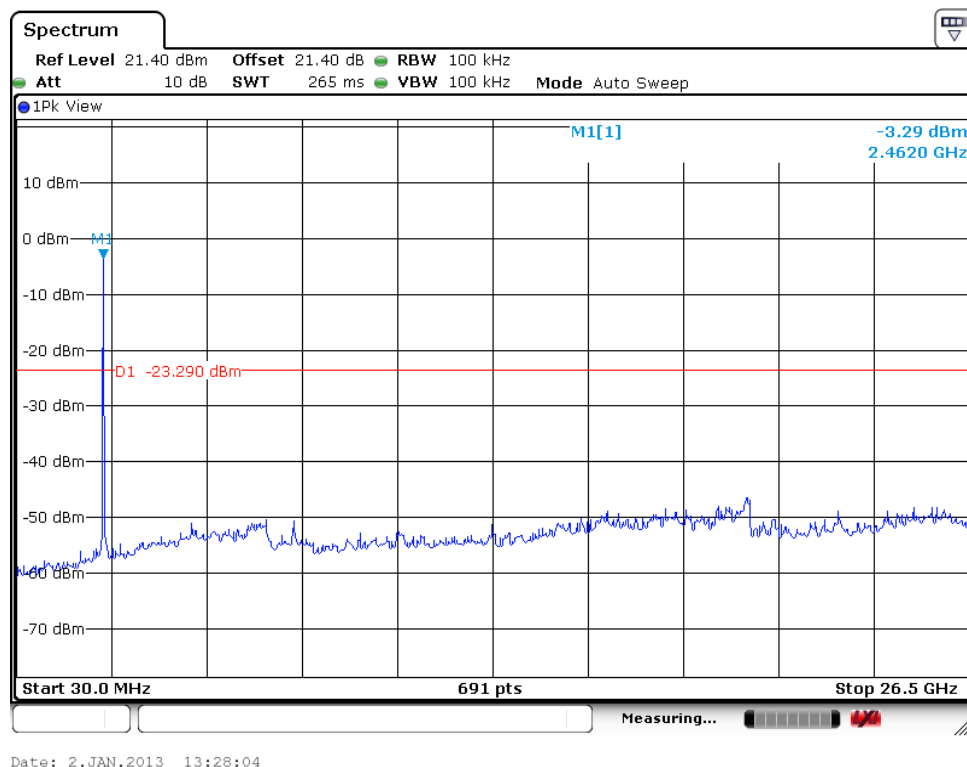


Test Plot of 100kHz Conducted Emissions, 802.11n (40MHz)

Low Channel



High Channel



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5.1.2 Spurious Emission

RESULT:**Passed**

Date of testing	:	2012-12-18 ~ 2012-12-31
Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, LP0002 2.7,2.8
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and LP0002 2.7, 2.8, must comply with the radiated emission limits specified in FCC 15.209(a) and LP0002 2.7, 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), LP0002 2.7.
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C
Ambient temperature	:	24°C
Relative humidity	:	56%
Atmospheric pressure	:	102 kPa

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic. For details refer to Appendix 2. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The Z 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 5GHz Band Transmitter Requirement & Test Suites

5.2.1 Antenna Port (5GHz Band)

5.2.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	2013-01-02
Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and LP0002 3.10.3
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an internal antenna with an directional gain of 1.49 dBi, and the antenna is a chip antenna. The EUT is considered to comply the provision.

Refer to EUT photo and Antenna datasheet for details.

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*Test Report No.***Seite 54 von 83**
*Page 54 of 83***5.2.1.2 Output Power****RESULT:****Passed**

Test date : 2013-01-02
Test standard : FCC Part 15.247(b)(3), LP0002 3.10.1
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 22°C
Relative humidity : 52%
Atmospheric pressure : 102 kPa

Table 18: Test result of Output Power, 802.11a

Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	5745	19.98	0.0995	1	PASS
Middle Channel	5785	21.08	0.1282	1	PASS
High Channel	5825	20.58	0.1143	1	PASS

Table 19: Test result of Output Power, 802.11n (20MHz)

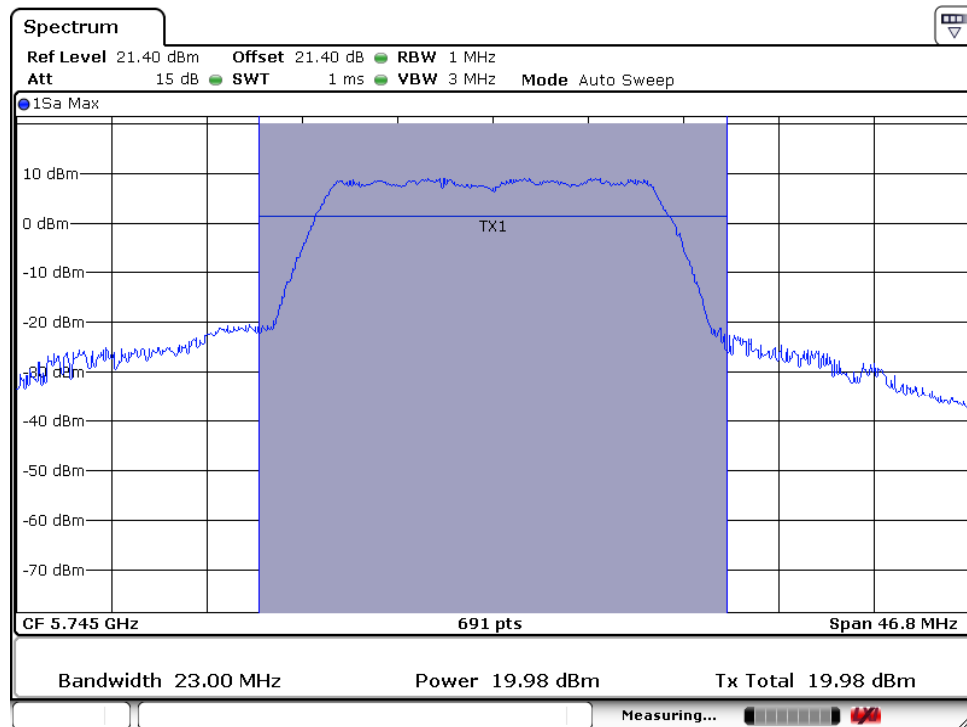
Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	5745	29.65	0.0923	1	PASS
Middle Channel	5785	20.75	0.1189	1	PASS
High Channel	5825	20.28	0.1067	1	PASS

Table 20: Test result of Output Power, 802.11n (40MHz)

Channel	Channel Frequency (MHz)	Peak Output Power		Limit	Result
		(dBm)	(W)	(W)	
Low Channel	5755	19.73	0.0940	1	PASS
High Channel	5795	20.73	0.1183	1	PASS

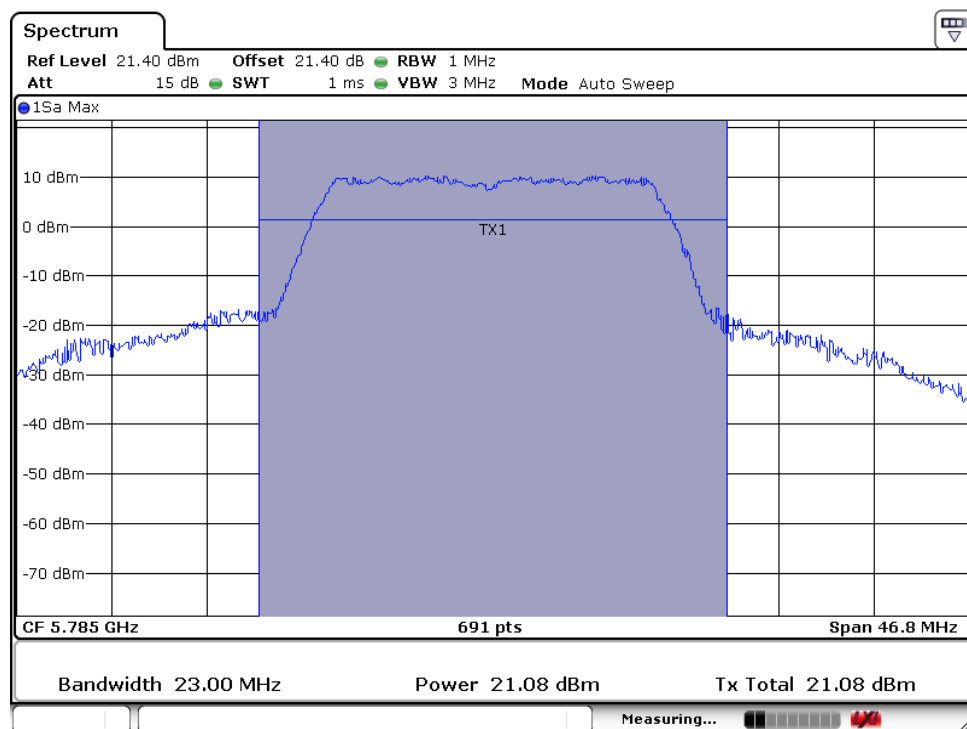
Test Plot of Output Power, 802.11a

Low Channel

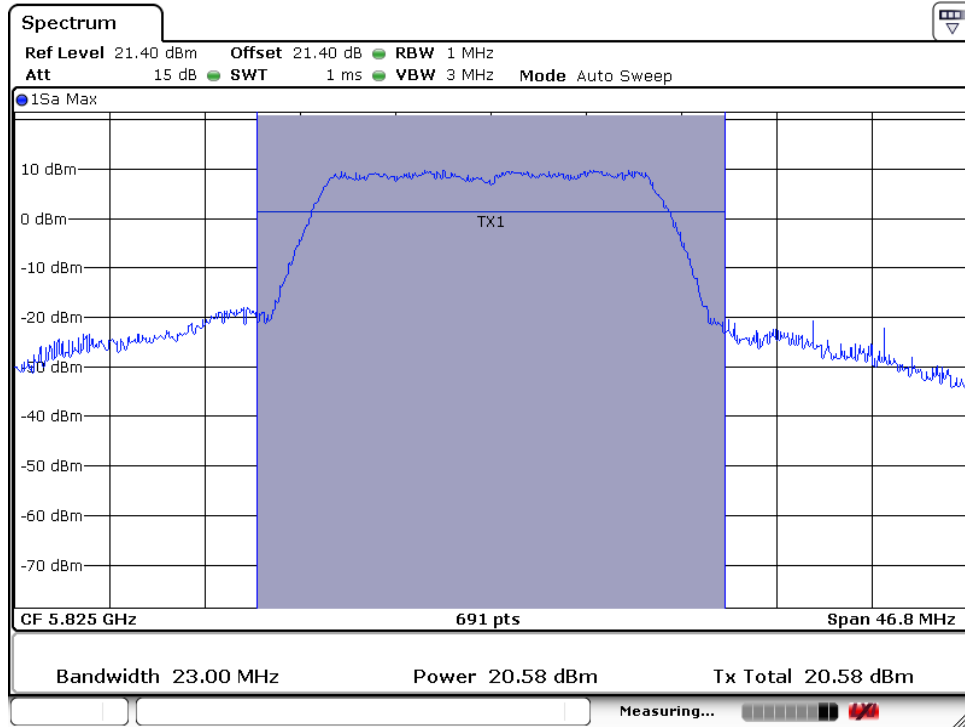


Date: 2.JAN.2013 10:11:33

Middle Channel



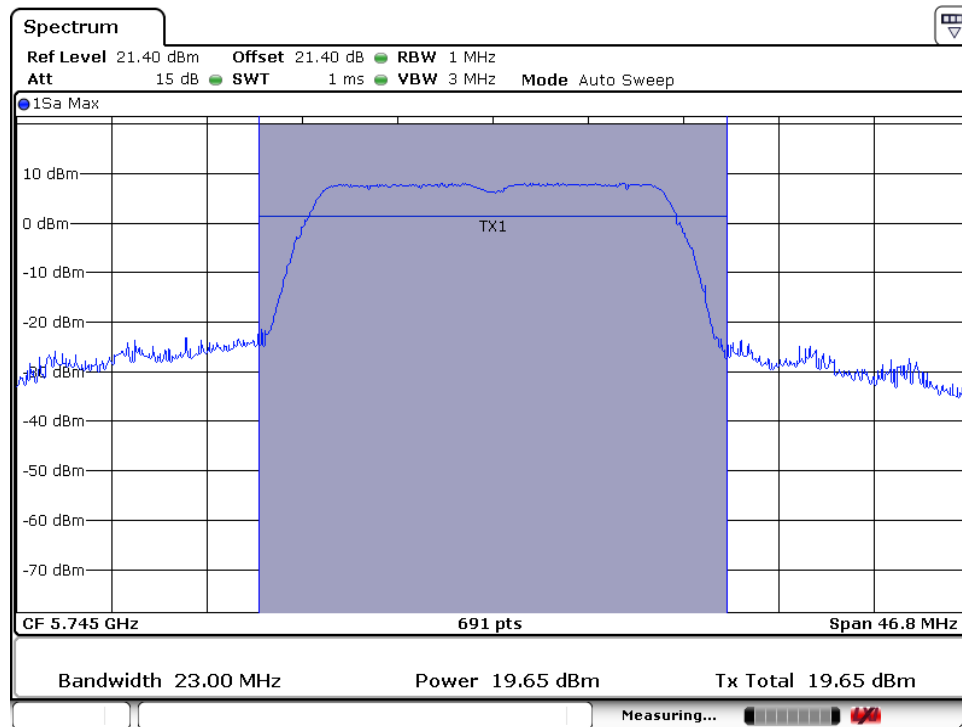
Date: 2.JAN.2013 10:12:00

High Channel


Date: 2.JAN.2013 10:12:22

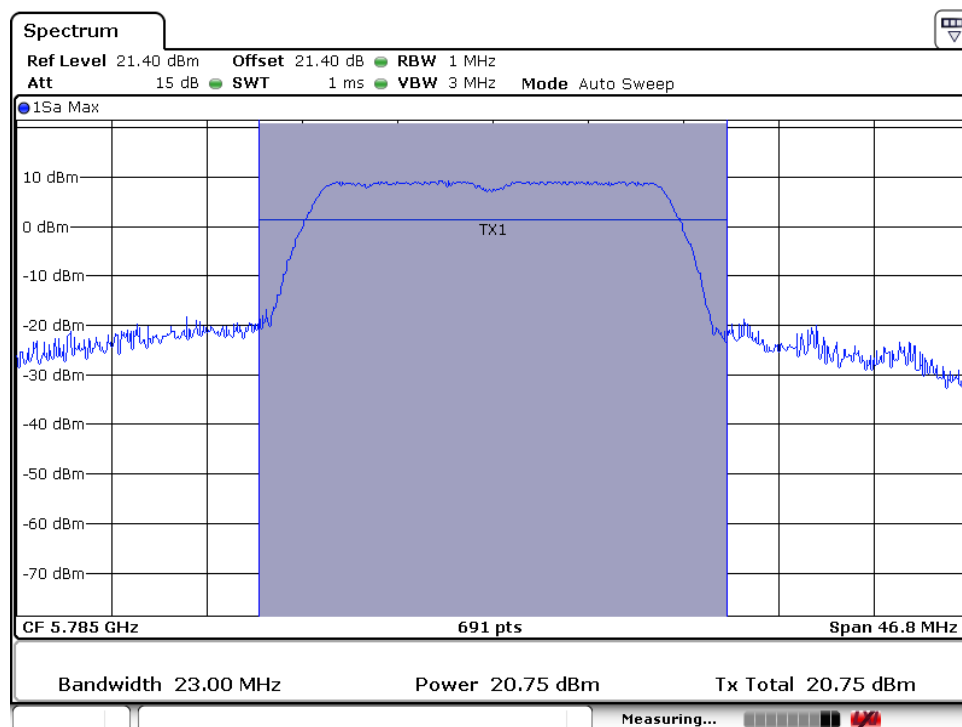
Test Plot of Output Power, 802.11n (20MHz)

Low Channel

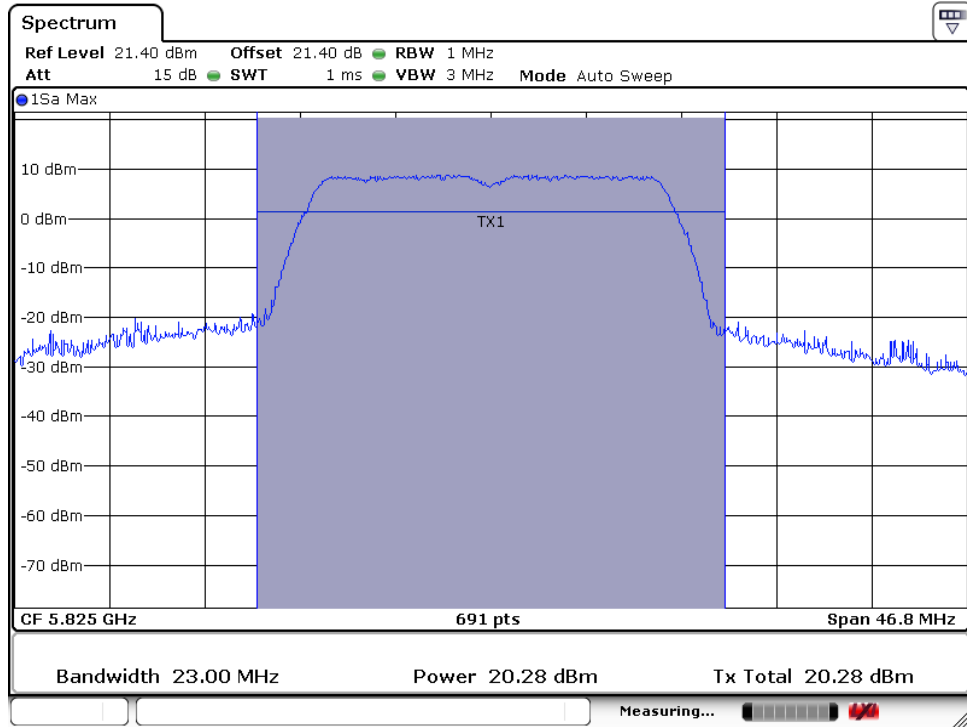


Date: 2.JAN.2013 10:13:06

Middle Channel



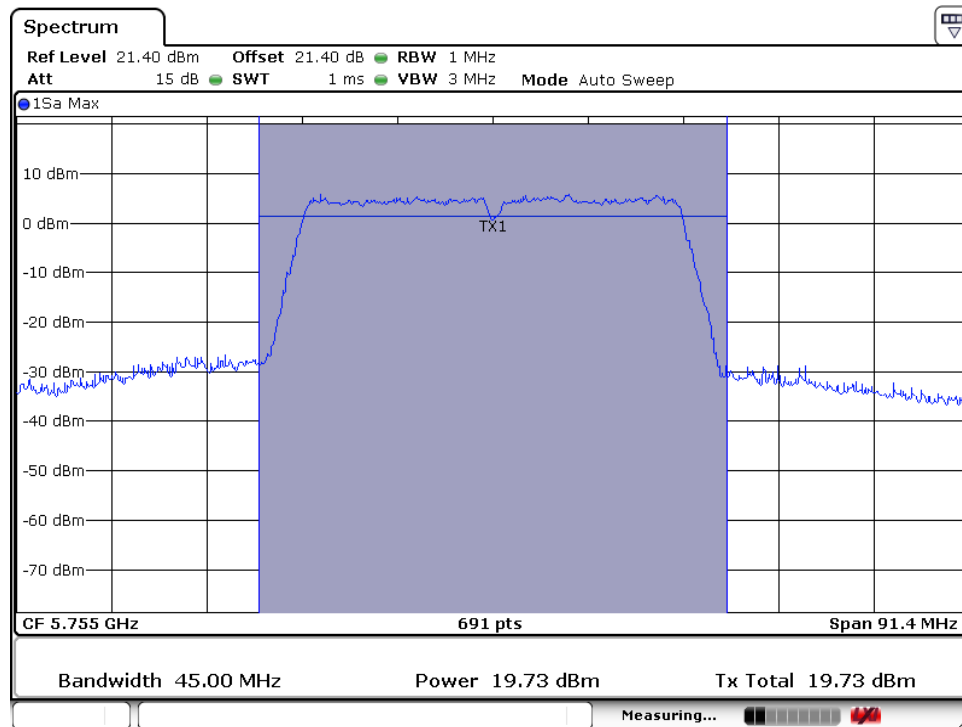
Date: 2.JAN.2013 10:13:28

High Channel


Date: 2.JAN.2013 10:13:45

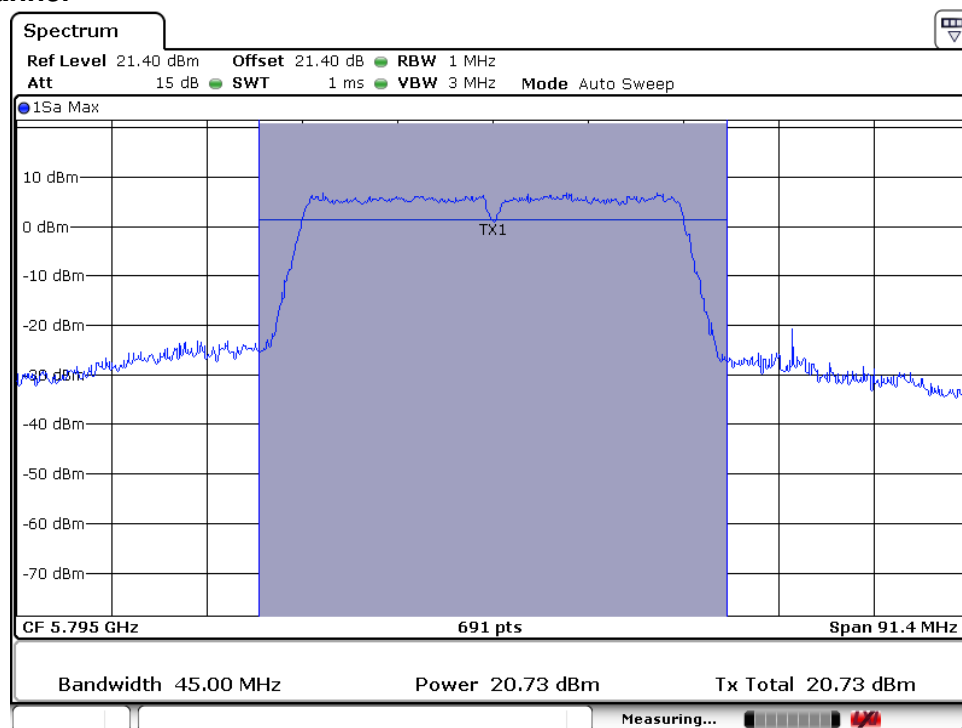
Test Plot of Output Power, 802.11n (40MHz)

Low Channel



Date: 2.JAN.2013 10:15:34

High Channel



Date: 2.JAN.2013 10:16:01

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*Test Report No.***Seite 61 von 83**
*Page 61 of 83***5.2.1.3 6dB Bandwidth****RESULT:****Passed**

Date of testing : 2013-01-02
Test standard : FCC Part 15.247(a)(2), LP0002 3.10.1
Basic standard : KDB 558074 of March 23, 2005
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 24°C
Relative humidity : 53%
Atmospheric pressure : 102 kPa

Table 21: Test result of 6dB Bandwidth, 802.11a

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	5745	16.54	≥ 0.5	Pass
Mid Channel	5785	16.57	≥ 0.5	Pass
High Channel	5825	16.57	≥ 0.5	Pass

Table 22: Test result of 6dB Bandwidth, 802.11n (20MHz)

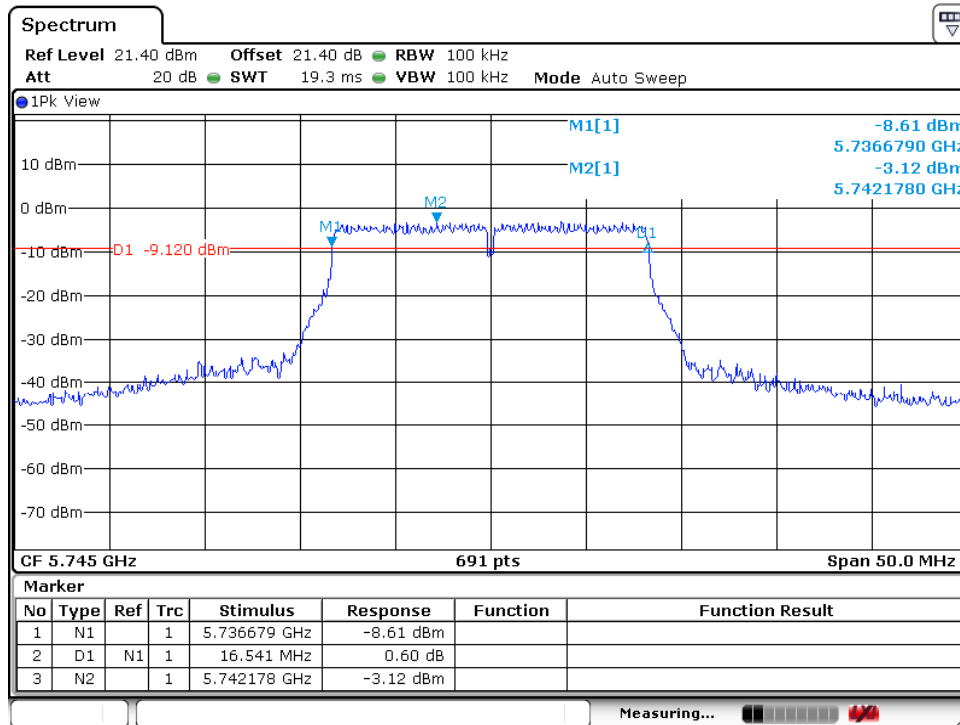
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	5745	17.87	≥ 0.5	Pass
Mid Channel	5785	17.8	≥ 0.5	Pass
High Channel	5825	17.87	≥ 0.5	Pass

Table 23: Test result of 6dB Bandwidth, 802.11n (40MHz)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Low Channel	5755	36.56	≥ 0.5	Pass
High Channel	5795	36.58	≥ 0.5	Pass

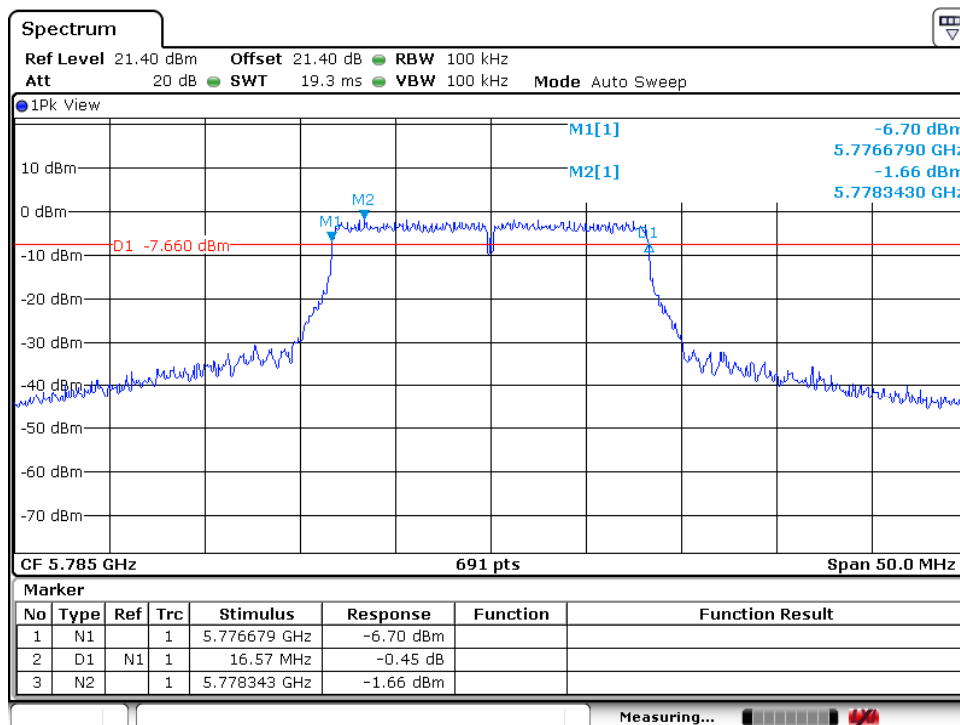
Test Plot of 6dB Bandwidth, 802.11a

Low Channel

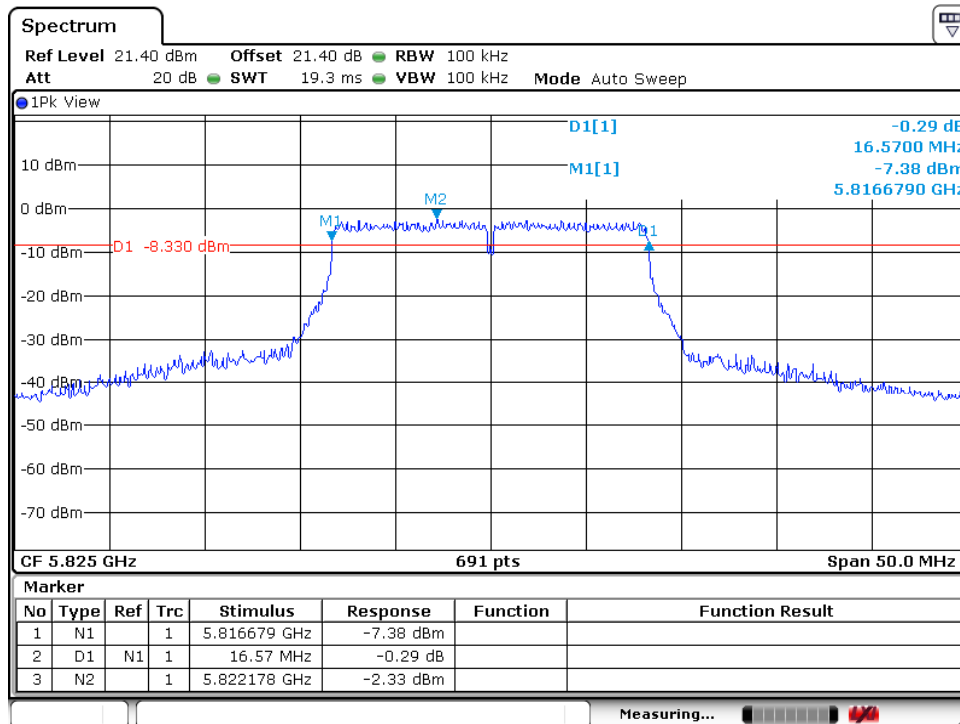


Date: 2.JAN.2013 10:40:21

Middle Channel



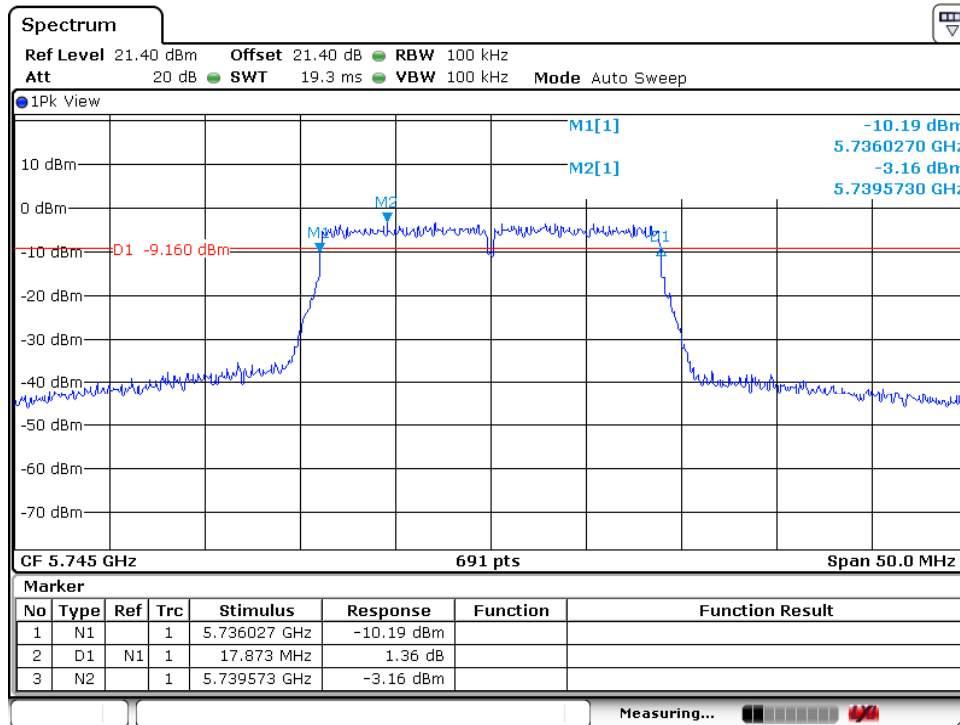
Date: 2.JAN.2013 10:41:19

High Channel


Date: 2.JAN.2013 10:42:04

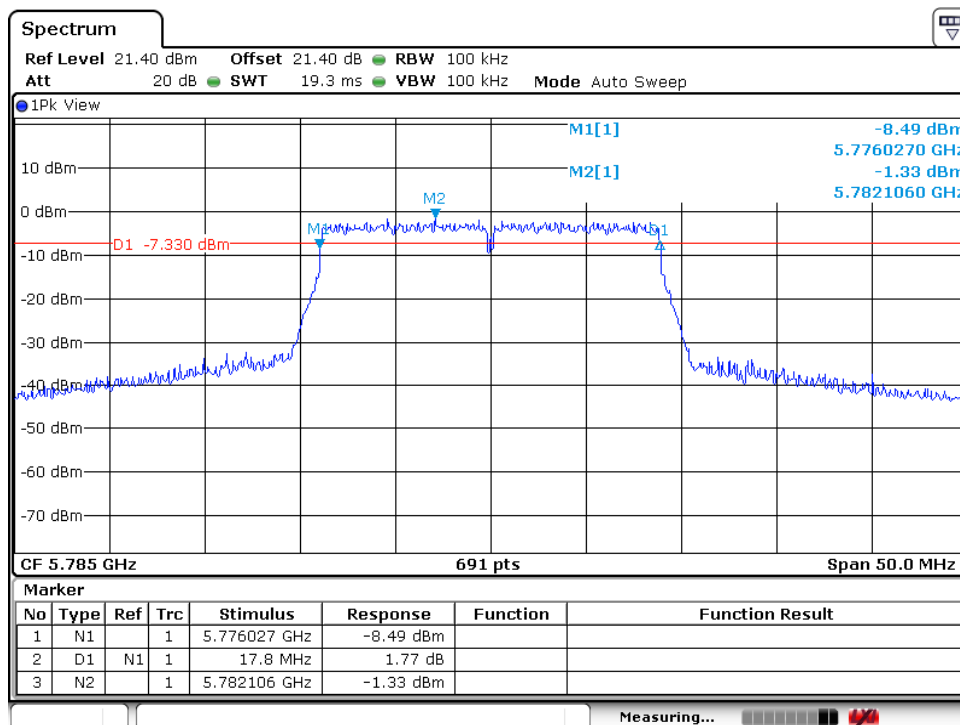
Test Plot of 6dB Bandwidth, 802.11n (20MHz)

Low Channel

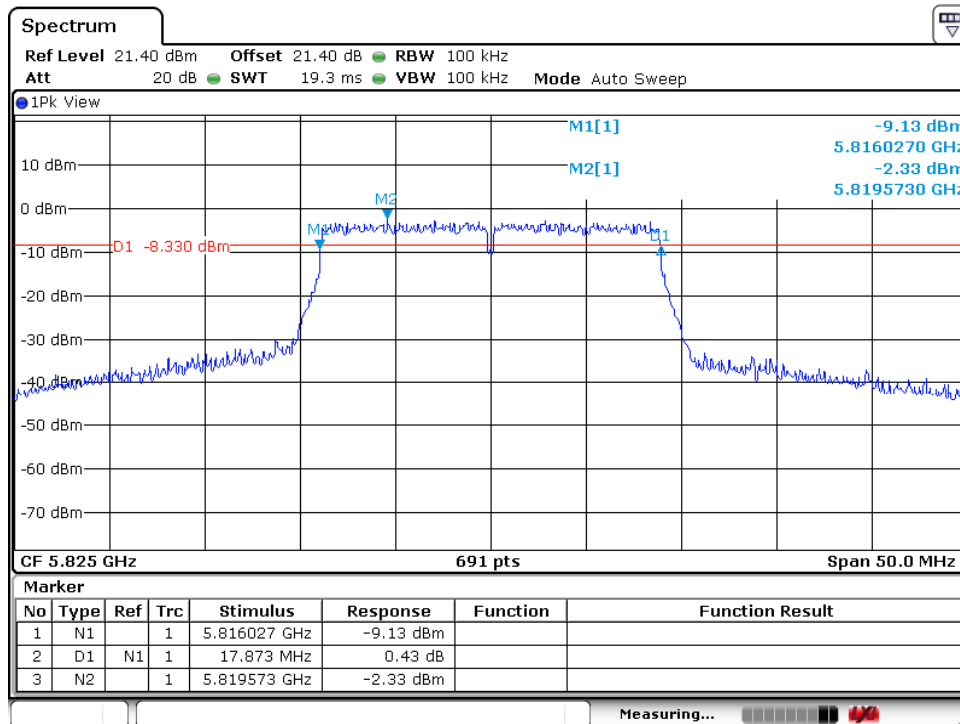


Date: 2.JAN.2013 10:42:53

Middle Channel



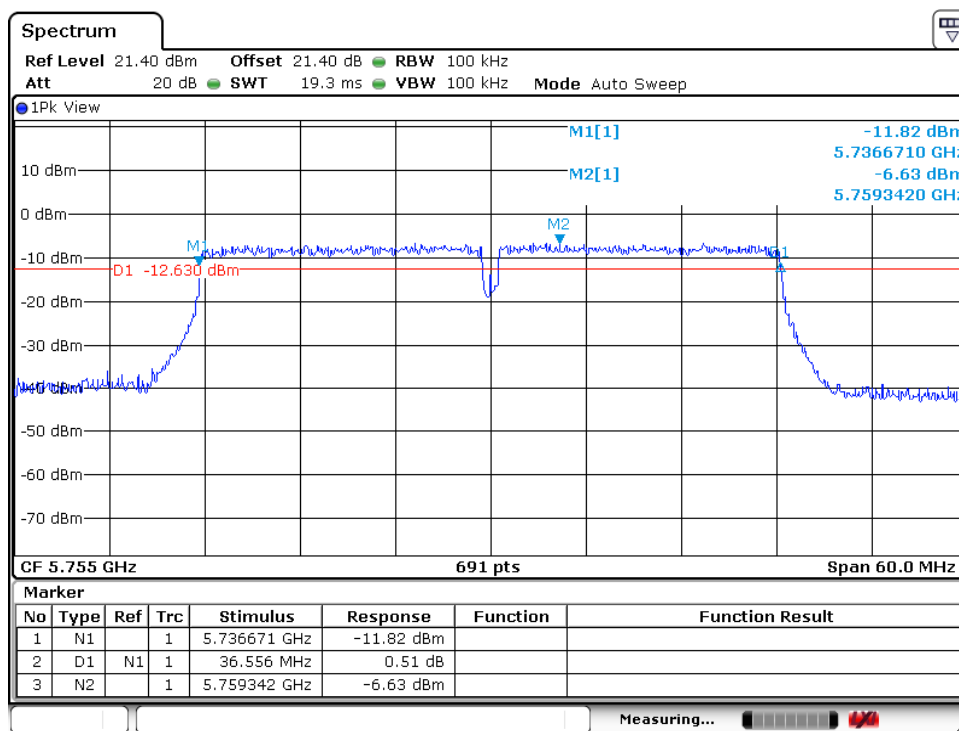
Date: 2.JAN.2013 10:43:41

High Channel


Date: 2.JAN.2013 10:44:27

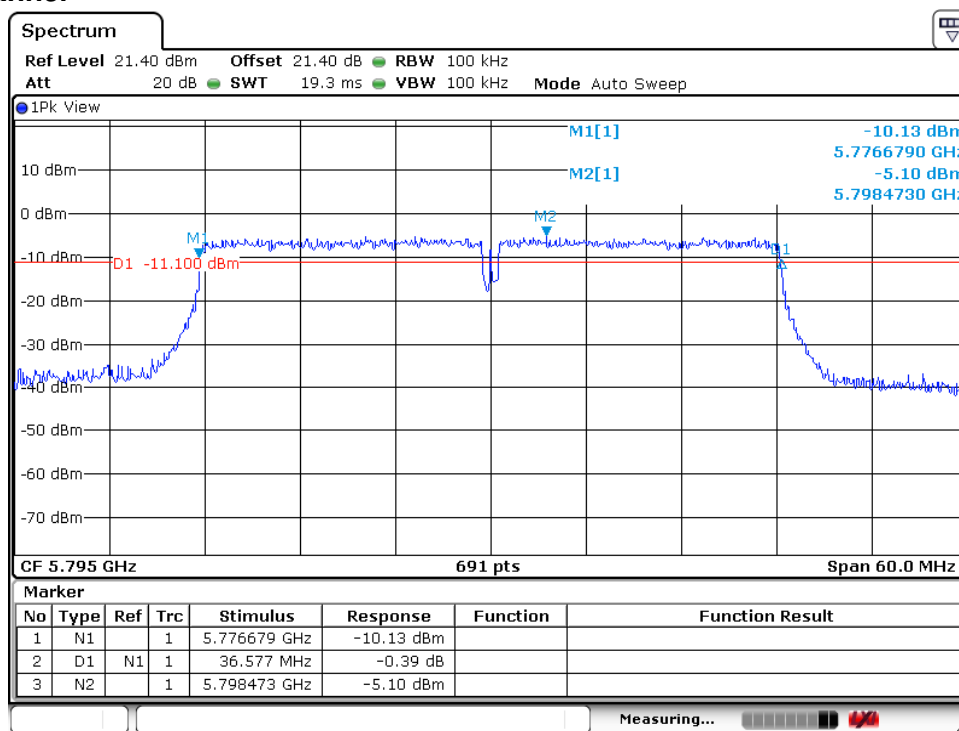
Test Plot of 6dB Bandwidth, 802.11n (40MHz)

Low Channel



Date: 2.JAN.2013 10:45:21

High Channel



Date: 2.JAN.2013 10:45:59

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*Test Report No.***Seite 68 von 83**
*Page 68 of 83***5.2.1.4 Power Density****RESULT:****Passed**

Date of testing : 2013-01-02
Test standard : FCC Part 15.247(e), LP0002 3.10.1
Basic standard : KDB 558074 of March 23, 2005
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 24°C
Relative humidity : 53%
Atmospheric pressure : 102 kPa

Table 24: Test result of Power Density, 802.11a

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	5745	-17.13	8	Pass
Mid Channel	5785	-15.91	8	Pass
High Channel	5825	-16.22	8	Pass

Table 25: Test result of Power Density, 802.11n (20MHz)

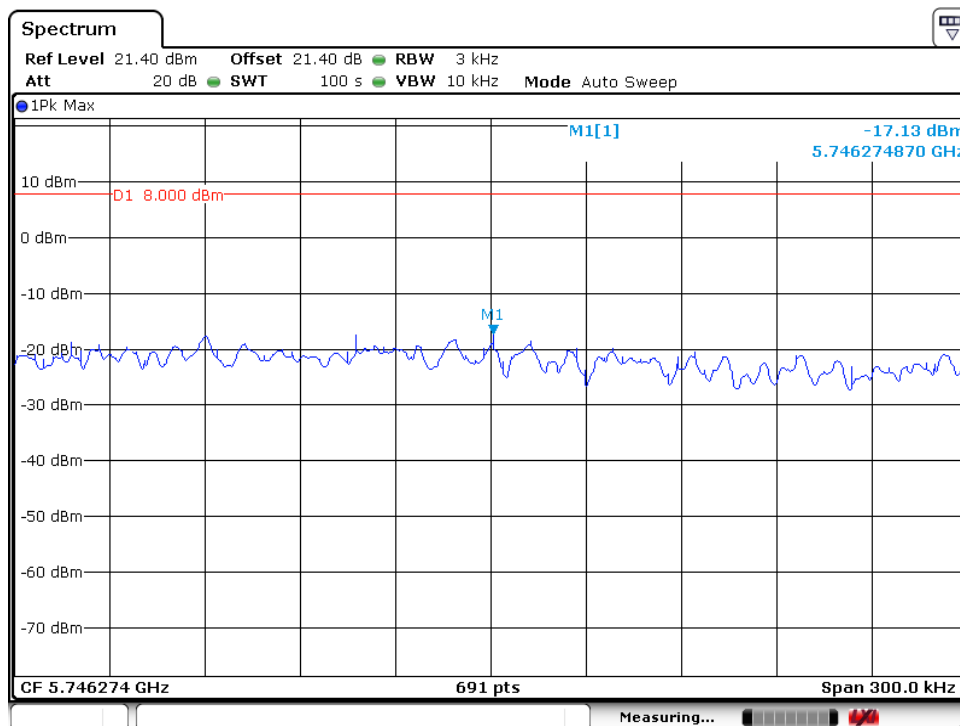
Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	5745	-18.2	8	Pass
Mid Channel	5785	-16.45	8	Pass
High Channel	5825	-15	8	Pass

Table 26: Test result of Power Density, 802.11n (40MHz)

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	5755	-18.47	8	Pass
High Channel	5795	-17.33	8	Pass

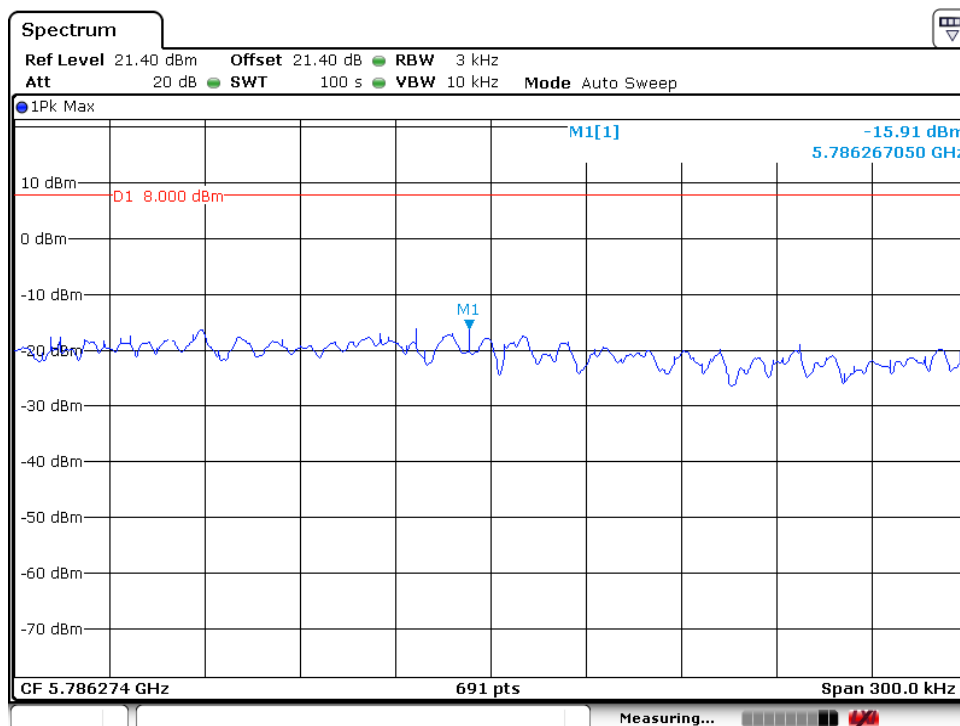
Test Plot of Power Density, 802.11a

Low Channel

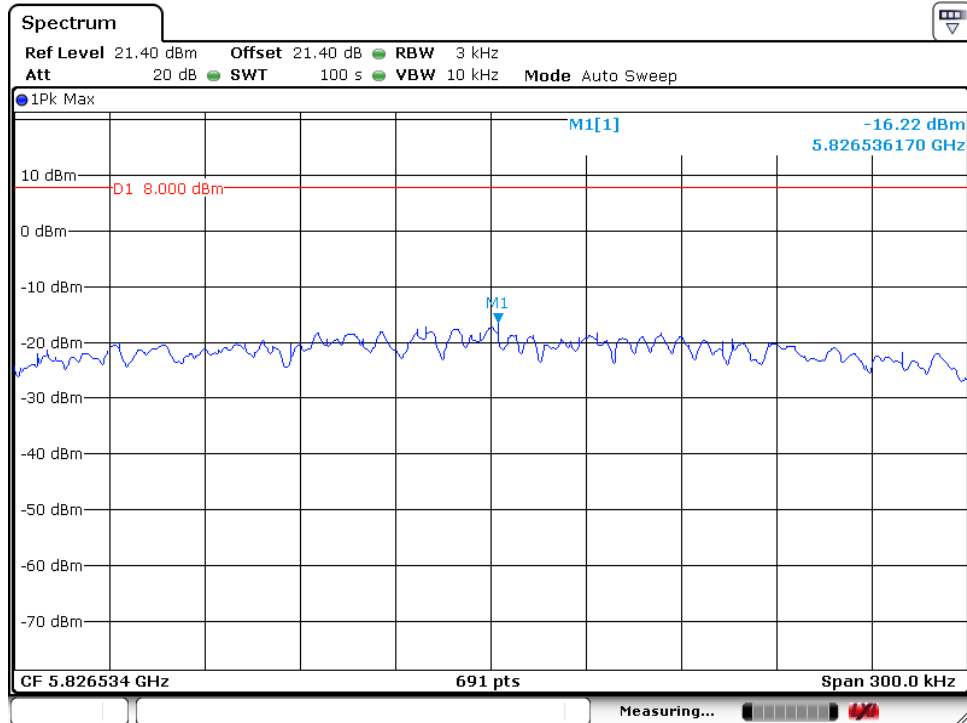


Date: 2.JAN.2013 11:45:51

Middle Channel



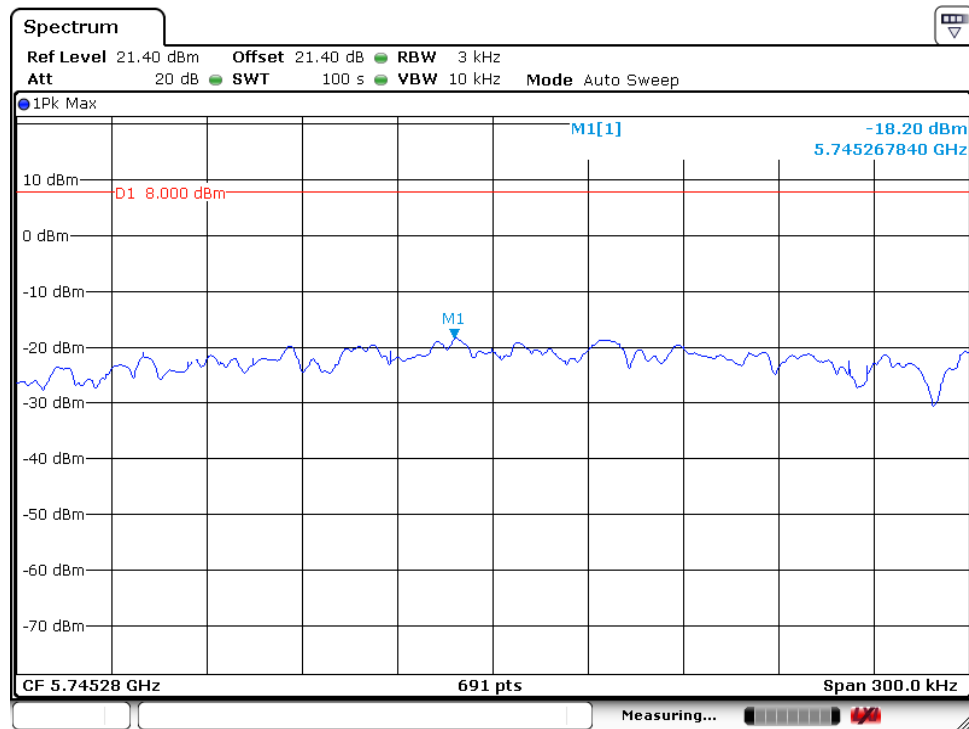
Date: 2.JAN.2013 11:48:22

High Channel


Date: 2.JAN.2013 11:50:45

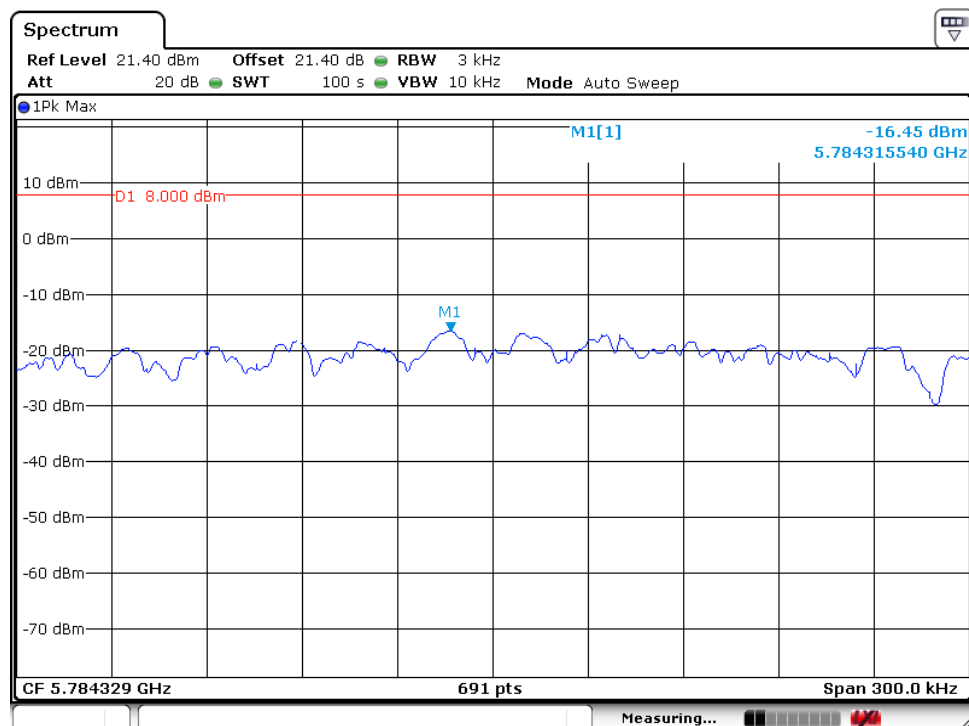
Test Plot of Power Density, 802.11n (20MHz)

Low Channel

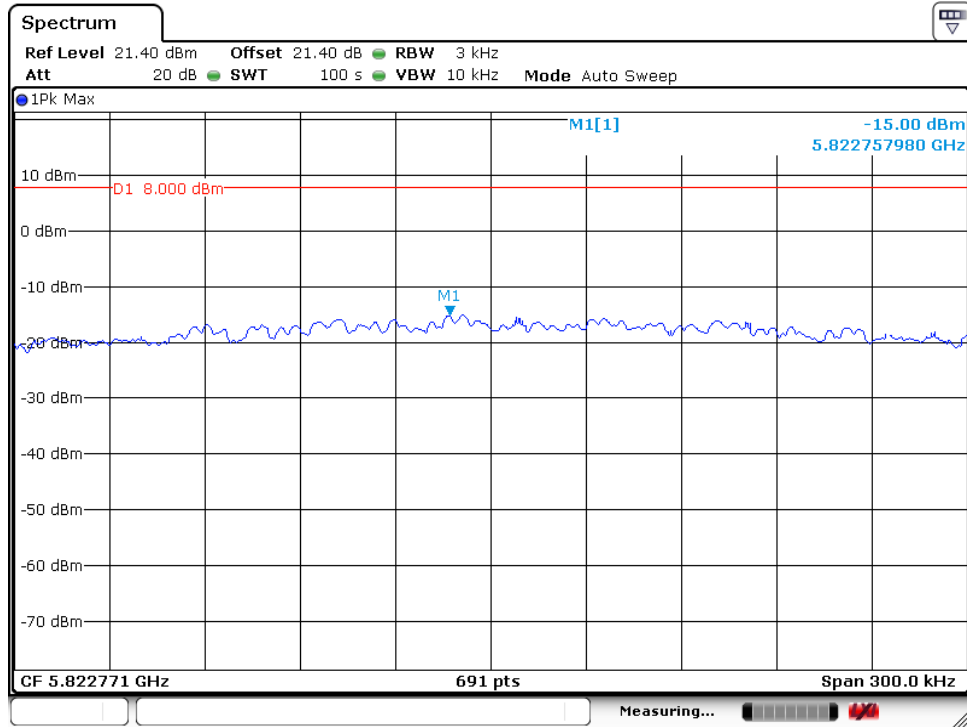


Date: 2.JAN.2013 11:53:21

Middle Channel



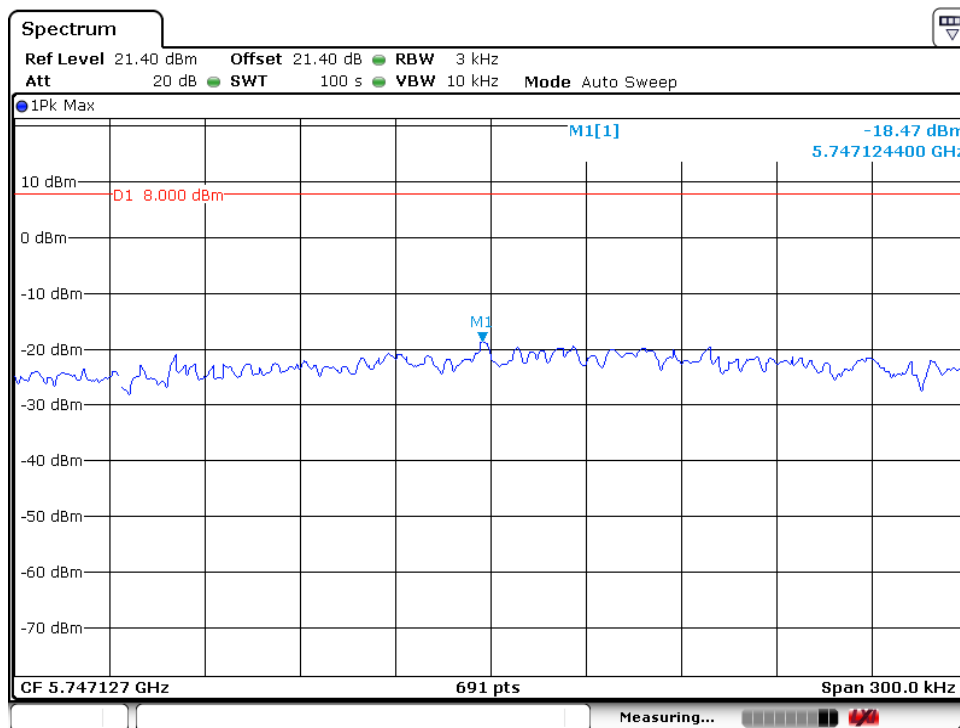
Date: 2.JAN.2013 11:56:01

High Channel


Date: 2.JAN.2013 13:03:46

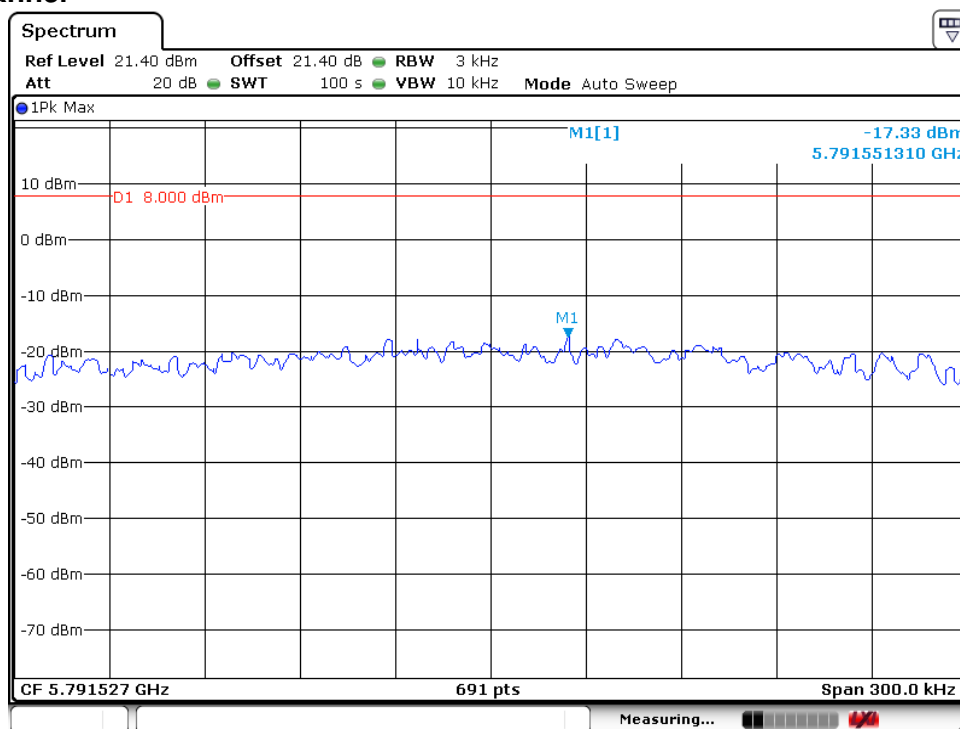
Test Plot of Power Density, 802.11n (40MHz)

Low Channel



Date: 2.JAN.2013 13:06:16

High Channel



Date: 2.JAN.2013 13:08:42

5.2.1.5 Conducted spurious emissions measured in 100kHz Bandwidth**RESULT:****Passed**

Date of testing	:	2013-01-02
Test standard	:	FCC part 15.247(d), LP0002 3.10.1
Basic standard	:	KDB 558074 of March 23, 2005
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

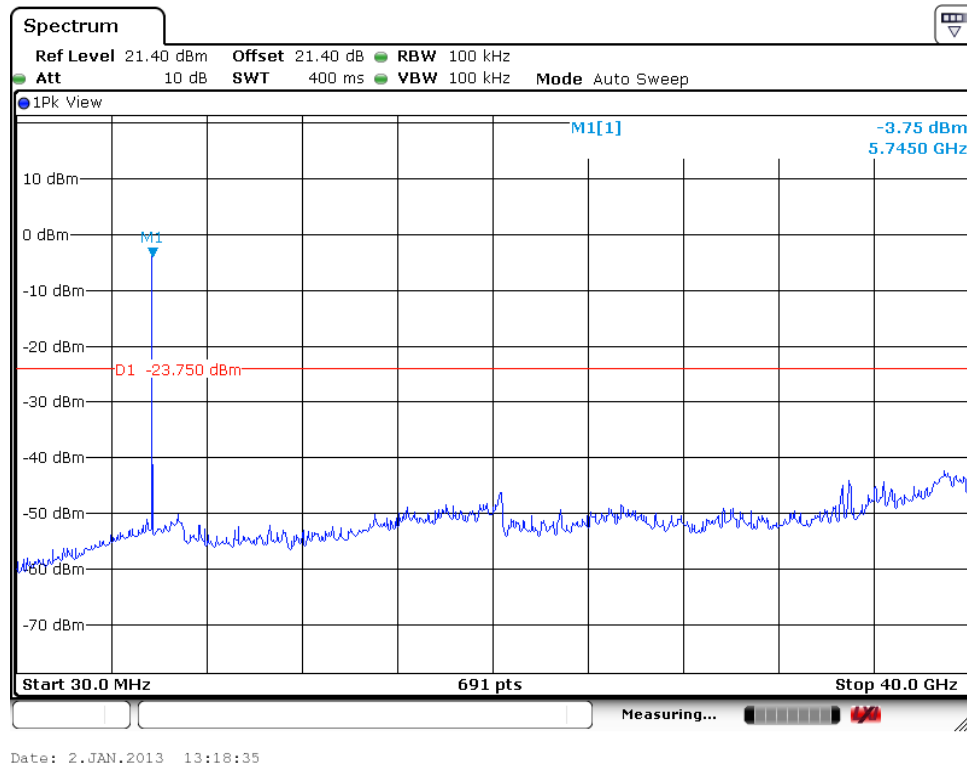
Test Channel	:	Low/ High
Operation mode	:	A
Ambient temperature	:	22°C
Relative humidity	:	52%
Atmospheric pressure	:	102 kPa

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

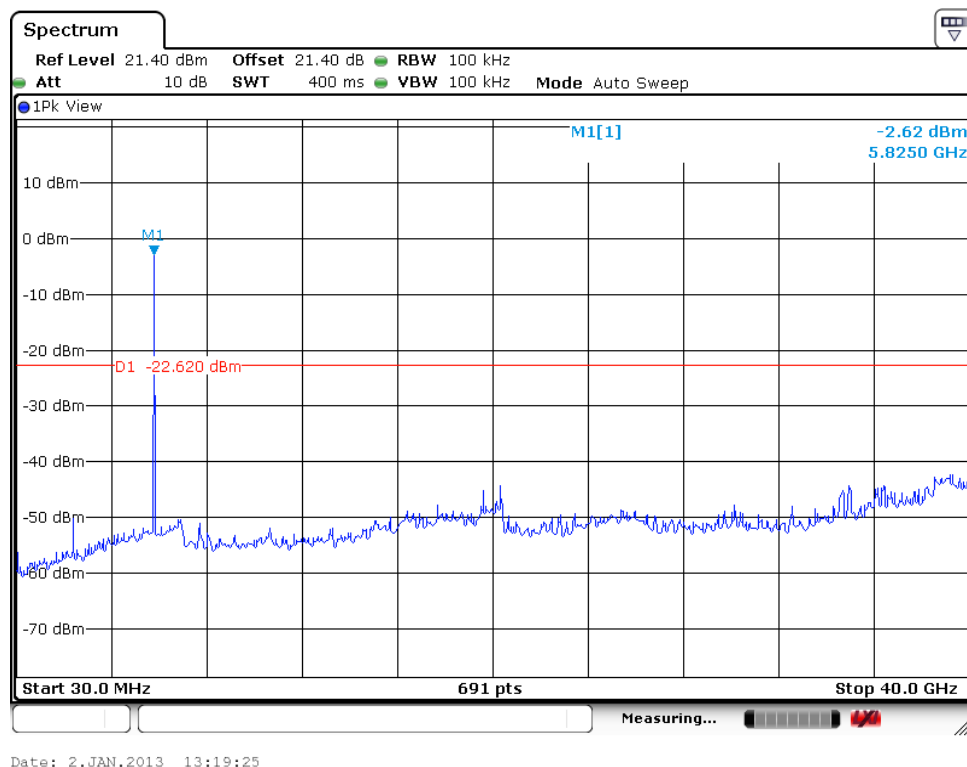
Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

Test Plot of 100kHz Conducted Emissions, 802.11a

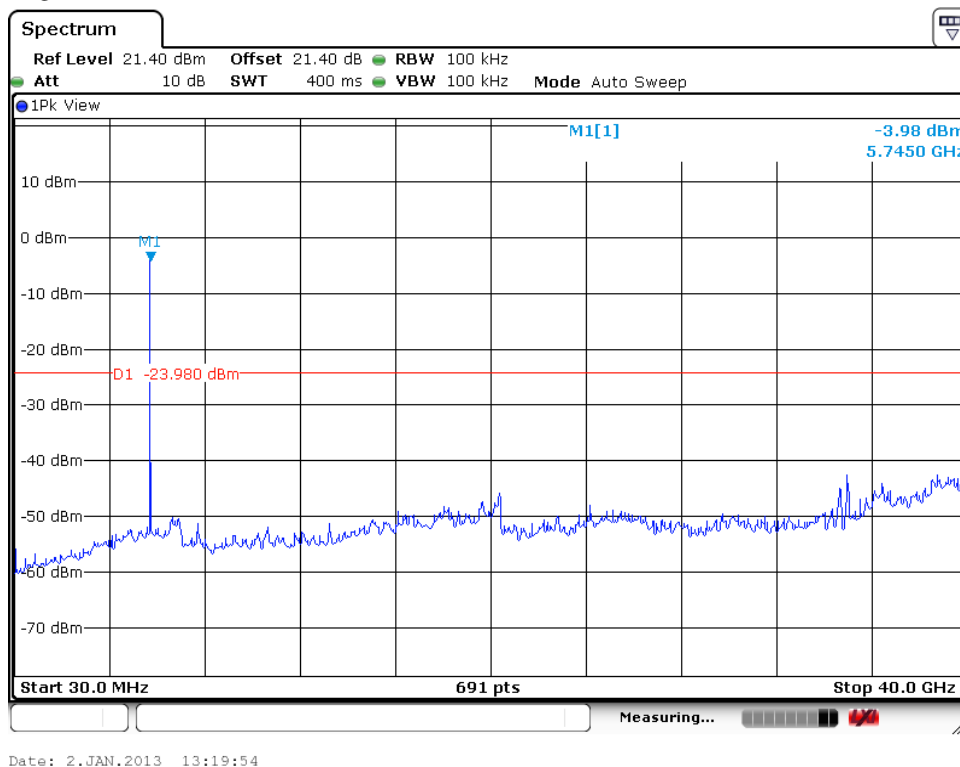
Low Channel



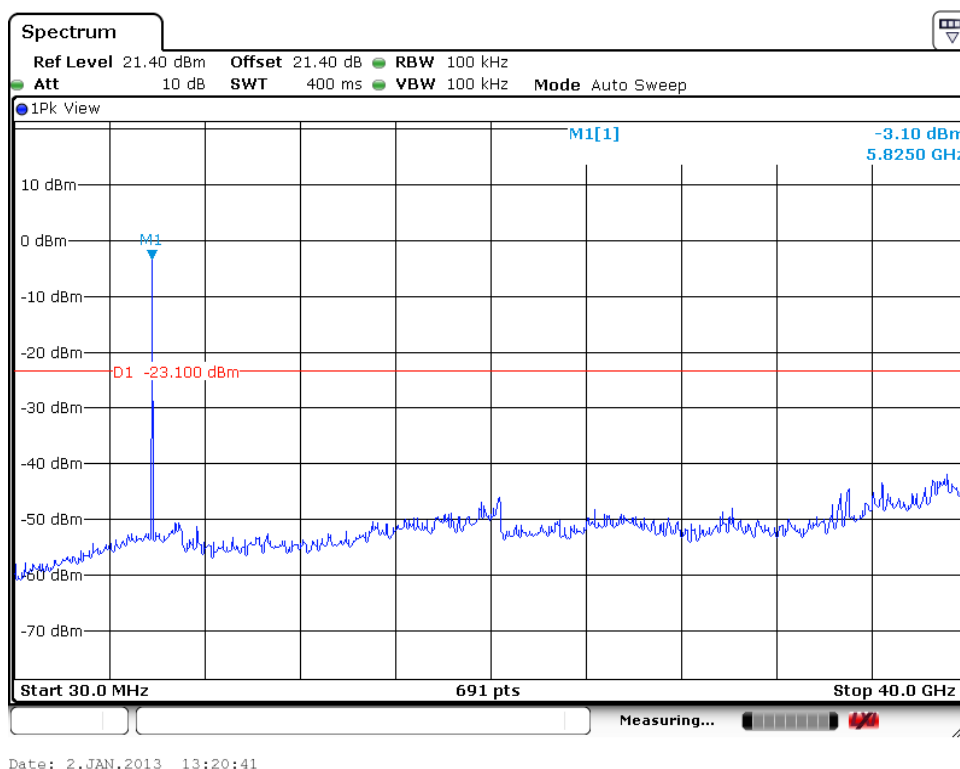
High Channel



Test Plot of 100kHz Conducted Emissions, 802.11n (20MHz) Low Channel

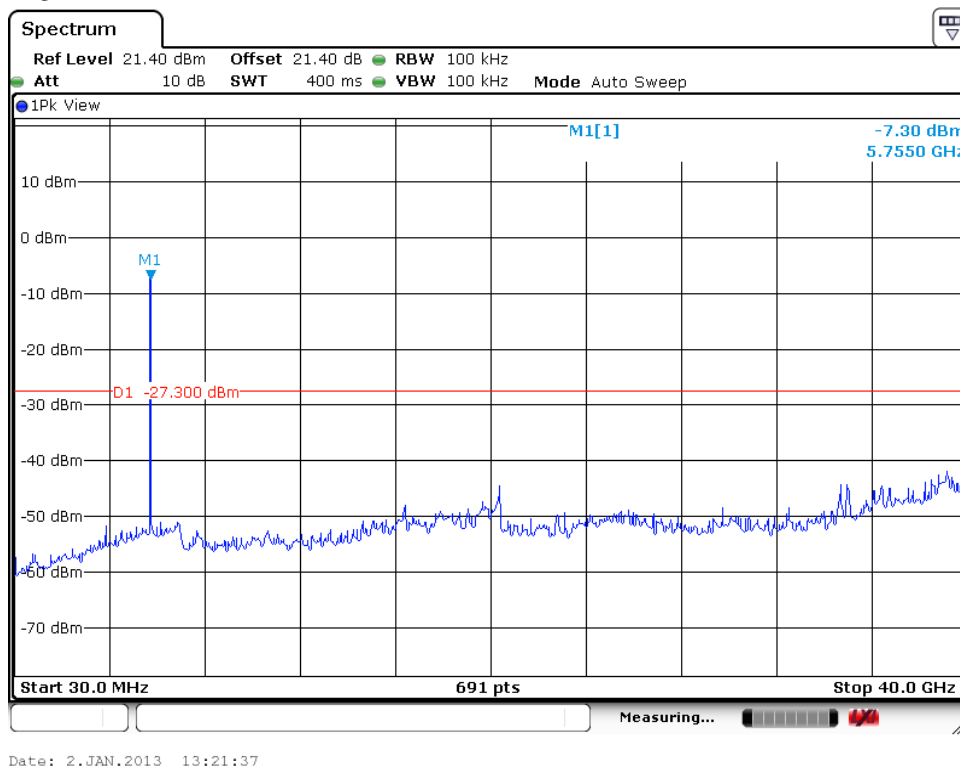


High Channel

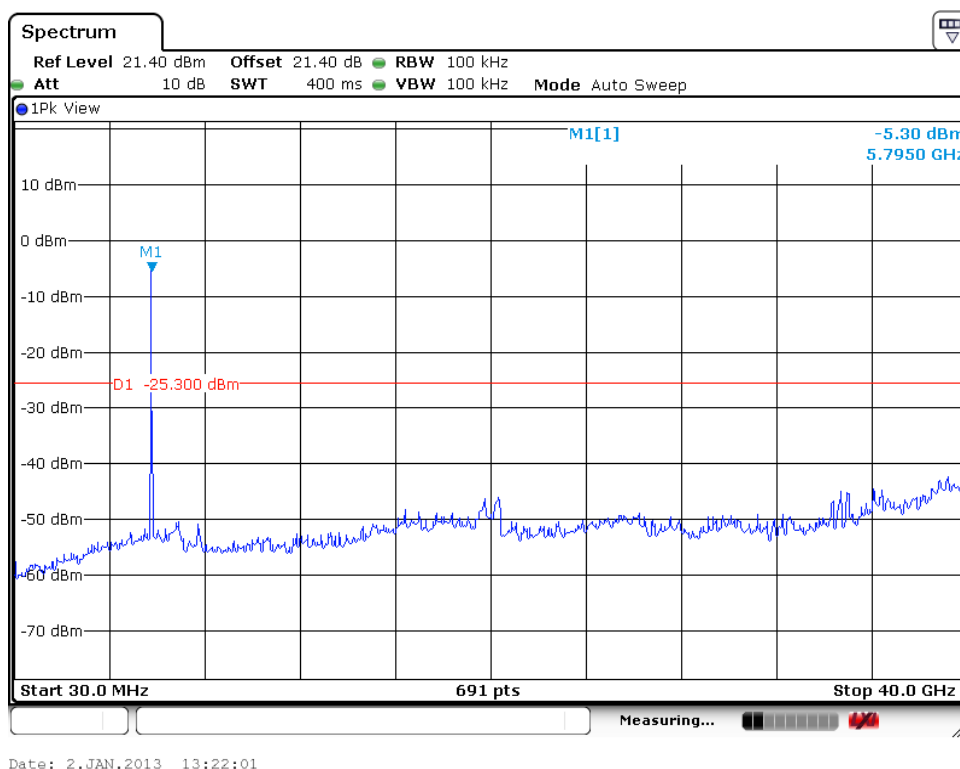


Test Plot of 100kHz Conducted Emissions, 802.11n (40MHz)

Low Channel



High Channel



5.2.2 Spurious Emission

RESULT:**Passed**

Date of testing	:	2012-12-31 ~ 2012-01-03
Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, LP0002 2.7, 2.8
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and LP0002 2.7 must comply with the radiated emission limits specified in FCC 15.209(a) and LP0002 2.8. Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a), LP0002 2.8 and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

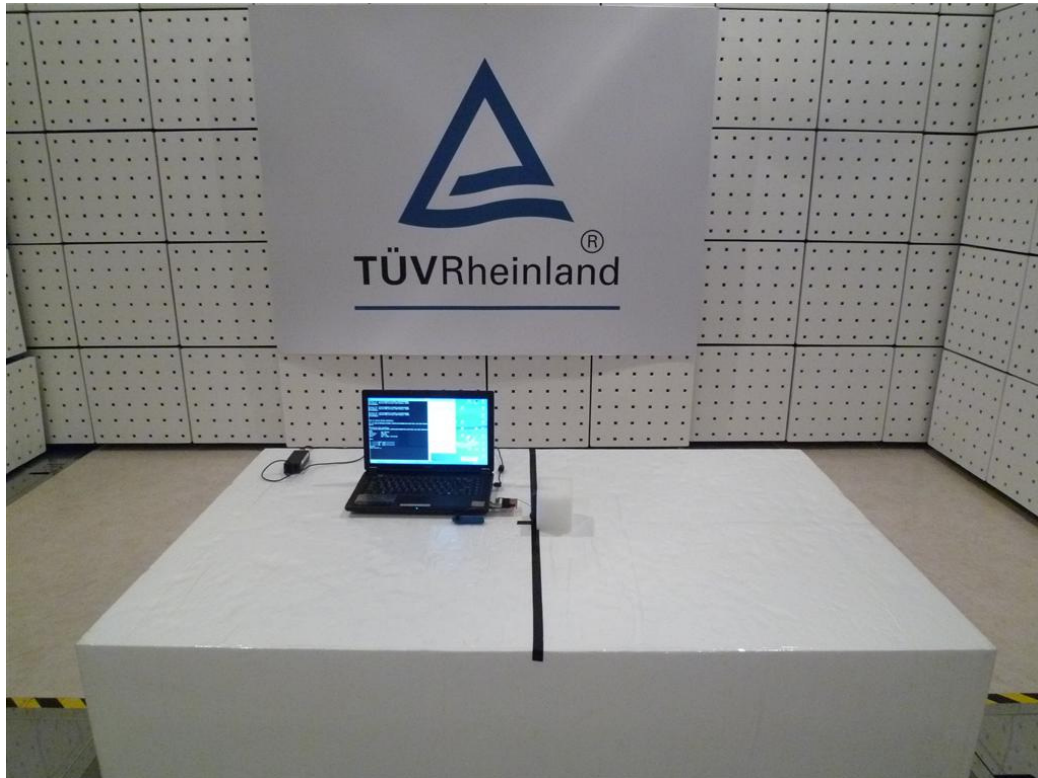
Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C
Ambient temperature	:	24°C
Relative humidity	:	56%
Atmospheric pressure	:	102 kPa

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic. For details refer to Appendix 2. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The Z 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.

Photographs of the Test Set-Up

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



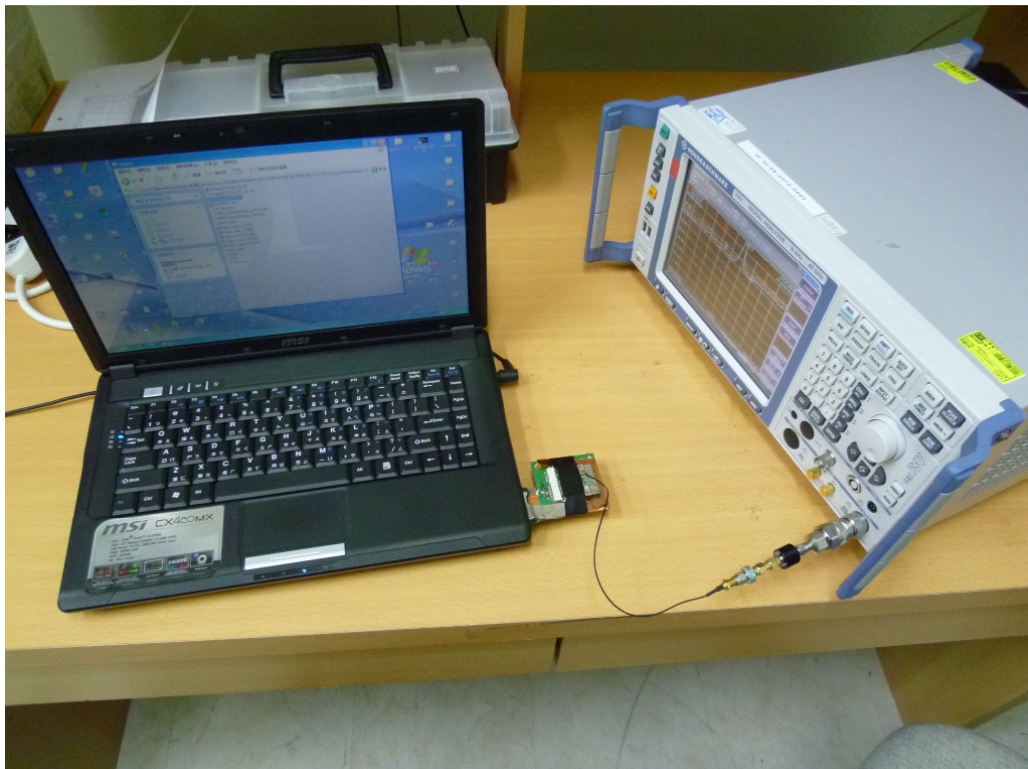
Photograph 2: Set-up for Spurious Emissions (Back View 1)



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



Photograph 4: Set-up for Conducted testing



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