



731 Enterprise Drive
Lexington, KY 40510

Telephone: 859-226-1000
Facsimile: 859-226-1040
www.intertek-etlsemko.com

TEST REPORT

Report Number: 100350432LEX-002
Project Number: G100350432

Report Issue Date: 9/12/2011
Product Name: Wireless Control Tablet
Model Number: TCA200
FCCID: G95TCA200XX
ICID: 431C-TCA200XX
FCC Standards: Title 47 CFR Part 15 Subpart B and C
Industry Canada Standards: RSS-210 Issue 8 & RSS-GEN Issue 3

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
Technicolor USA, Inc.
101 W 103rd Street
Indianapolis, IN 46290

Report prepared by

Jason Centers, Senior Project Engineer

Report reviewed by

Jeremy Pickens, Senior Staff Engineer



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1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Conducted Power	§ 15.247(b)(3)(4)	RSS-210 (A8.4)	Pass
9	Occupied Bandwidth	§ 15.247(a)(2)	RSS-210 (A8.2), RSS-GEN (4.6.1)	Pass
18	Conducted Spurious Emissions	§ 15.247(d)	RSS-210 (A8.5)	Pass
35	Power Spectral Density	§ 15.247(e)	RSS-210 (A8.2b)	Pass
42	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-210 (2.2) (A8.5)	Pass
56	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (6.1)	Pass
58	AC Powerline Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (7.2.4)	Pass
64	Antenna Requirement per FCC Part 15.203	§ 15.203	RSS-Gen (7.1.2)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	Technicolor USA, Inc.
Model Number	TCA200
Serial Number	TCA2001281001000103
FCC Identifier	G95TCA200XX
IC Identifier	431C-TCA200XX
Receive Date	8/1/2011
Test Start Date	8/1/2011
Test End Date	9/10/2011
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	2412MHz – 2462MHz
Mode(s) of Operation	802.11b/g/n
Modulation Type	BPSK, QPSK, CCK, OFDM
Duty Cycle	100%
Transmission Control	Test Commands
Test Channels	1, 6, 11 (3, 6, 9 for the 40MHz wide 802.11n mode)
Antenna Type (15.203)	Internal
Antenna Gain	2.04 dBi
Power Supply	AC Bel, Model: WAA019, Sn: V123400271

Description of Equipment Under Test

The Wireless Control Tablet was a touch screen alarm panel.

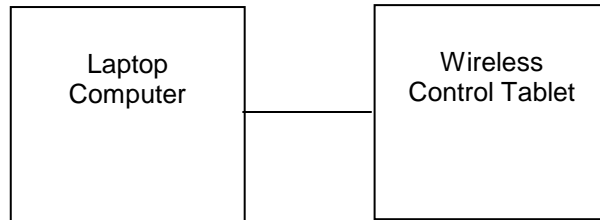
Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting on low mid or high channels
2	Receive / idle mode

3.1 System setup including cable interconnection details, support equipment and simplified block diagram

3.2 EUT Block Diagram:

During the testing the sample was connected to a laptop computer via a USB cable.



3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Power Cable	6 ft	No	Yes	AC/DC Power Converter	DC Input
Ethernet Cable	25 ft	No	No	Ethernet Port	Ethernet Switch
Speaker Cable	3 ft	No	No	Headphone Port	Headphones

3.4 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop Computer	Toshiba	Tecra PTA83U-03202C	76104530H

4 Peak Conducted Power

4.1 Test Limits

§ 15.247(b)(3): For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

§ 15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247). The peak output power was measured using the channel power function of the spectrum analyzer.

4.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012

4.4 Results:

Mode	Channel Number	Frequency (MHz)	Data Rate	Average Conducted Power (dBm)	Peak Conducted Power (dBm)	Peak Conducted Power Limit (dBm)	Margin (dB)	Result
802.11b	1	2412	1	17.74	25.77	30	-4.23	Pass
			2	16.37	25.71	30	-4.29	Pass
			5.5	15.06	26.51	30	-3.49	Pass
			11	13.54	25.98	30	-4.02	Pass
802.11b	6	2437	1	17.11	25.16	30	-4.84	Pass
			2	16.11	25.49	30	-4.51	Pass
			5.5	14.73	26.24	30	-3.76	Pass
			11	13.36	25.76	30	-4.24	Pass
802.11b	11	2462	1	17.07	25.12	30	-4.88	Pass
			2	16.42	24.45	30	-5.55	Pass
			5.5	14.7	26.13	30	-3.87	Pass
			11	13.18	25.66	30	-4.34	Pass
802.11g	1	2412	6	13.57	23.57	30	-6.43	Pass
			9	13.21	24.01	30	-5.99	Pass
			12	12.37	23.87	30	-6.13	Pass
			18	11.44	23.73	30	-6.27	Pass
			24	9.18	23.1	30	-6.9	Pass
			36	7.86	22.86	30	-7.14	Pass
			48	6.77	23.01	30	-6.99	Pass
			54	6.49	22.93	30	-7.07	Pass
802.11g	6	2437	6	13.77	23.82	30	-6.18	Pass
			9	13.09	23.91	30	-6.09	Pass
			12	12.24	23.79	30	-6.21	Pass
			18	11.6	24.16	30	-5.84	Pass
			24	8.96	22.89	30	-7.11	Pass
			36	7.69	22.27	30	-7.73	Pass
			48	6.58	22.71	30	-7.29	Pass
			54	6.28	22.6	30	-7.4	Pass
802.11g	11	2462	6	13.62	23.66	30	-6.34	Pass
			9	12.77	23.59	30	-6.41	Pass
			12	12.76	23.56	30	-6.44	Pass
			18	11.09	23.66	30	-6.34	Pass
			24	8.95	22.87	30	-7.13	Pass
			36	7.51	22.55	30	-7.45	Pass
			48	6.62	22.66	30	-7.34	Pass
			54	6.31	22.72	30	-7.28	Pass

802.11b and g results

Mode	Channel Number	Frequency (MHz)	Data Rate	Average Conducted Power (dBm)	Peak Conducted Power (dBm)	Peak Conducted Power Limit (dBm)	Margin (dB)	Result
802.11n (20MHz)	1	2412	MCS0	9.65	19.98	30	-10.02	Pass
			MCS1	7.72	19.64	30	-10.36	Pass
			MCS2	6.4	19.24	30	-10.76	Pass
			MCS3	5.68	19.84	30	-10.16	Pass
			MCS4	4.37	19.54	30	-10.46	Pass
			MCS5	3.47	19.52	30	-10.48	Pass
			MCS6	3.13	19.41	30	-10.59	Pass
802.11n (20MHz)	6	2437	MCS7	2.81	19.55	30	-10.45	Pass
			MCS0	8.96	19.34	30	-10.66	Pass
			MCS1	7.35	19.26	30	-10.74	Pass
			MCS2	6.22	19.09	30	-10.91	Pass
			MCS3	5.29	19.38	30	-10.62	Pass
			MCS4	3.98	19.17	30	-10.83	Pass
			MCS5	3.1	19.32	30	-10.68	Pass
802.11n (20MHz)	11	2462	MCS6	2.84	19.26	30	-10.74	Pass
			MCS7	2.52	19.28	30	-10.72	Pass
			MCS0	8.76	19.14	30	-10.86	Pass
			MCS1	7.22	19.11	30	-10.89	Pass
			MCS2	6.05	18.95	30	-11.05	Pass
			MCS3	5.34	19.53	30	-10.47	Pass
			MCS4	4.07	19.27	30	-10.73	Pass
802.11n (40MHz)	3	2422	MCS5	3.06	19.19	30	-10.81	Pass
			MCS6	2.79	19.12	30	-10.88	Pass
			MCS7	2.5	19.16	30	-10.84	Pass
			MCS0	6.58	14.85	30	-15.15	Pass
			MCS1	6.69	15.09	30	-14.91	Pass
			MCS2	6.6	15.07	30	-14.93	Pass
			MCS3	7.2	16.09	30	-13.91	Pass
802.11n (40MHz)	6	2437	MCS4	7.25	15.97	30	-14.03	Pass
			MCS5	6.88	16.27	30	-13.73	Pass
			MCS6	6.83	16.21	30	-13.79	Pass
			MCS7	6.83	16.21	30	-13.79	Pass
			MCS0	11.71	20.64	30	-9.36	Pass
			MCS1	10.9	19.96	30	-10.04	Pass
			MCS2	10.82	19.95	30	-10.05	Pass
802.11n (40MHz)	9	2452	MCS3	12.11	21.56	30	-8.44	Pass
			MCS4	11.28	20.72	30	-9.28	Pass
			MCS5	11.04	20.89	30	-9.11	Pass
			MCS6	10.85	20.81	30	-9.19	Pass
			MCS7	11.53	21.59	30	-8.41	Pass
			MCS0	10.85	19.71	30	-10.29	Pass
			MCS1	10.83	19.91	30	-10.09	Pass
802.11n (40MHz)	9	2452	MCS2	10.77	19.94	30	-10.06	Pass
			MCS3	11.34	20.78	30	-9.22	Pass
			MCS4	11.02	20.52	30	-9.48	Pass
			MCS5	10.84	20.7	30	-9.3	Pass
			MCS6	10.78	20.75	30	-9.25	Pass
			MCS7	10.77	20.72	30	-9.28	Pass

802.11n results

5 Occupied Bandwidth

5.1 Test Limits

§ 15.247(a)(2): For digital modulation systems, the minimum 6dB bandwidth shall be at least 500kHz.

5.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

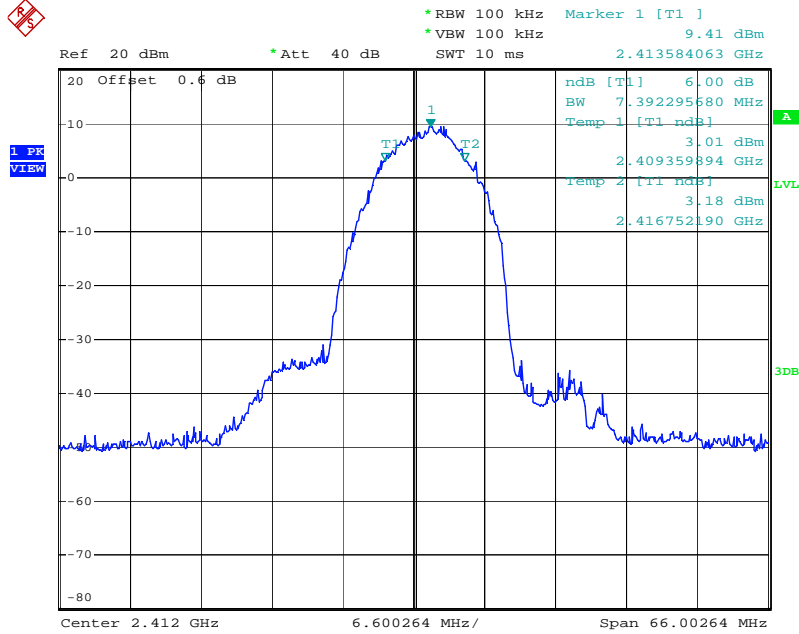
5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012

5.4 Results:

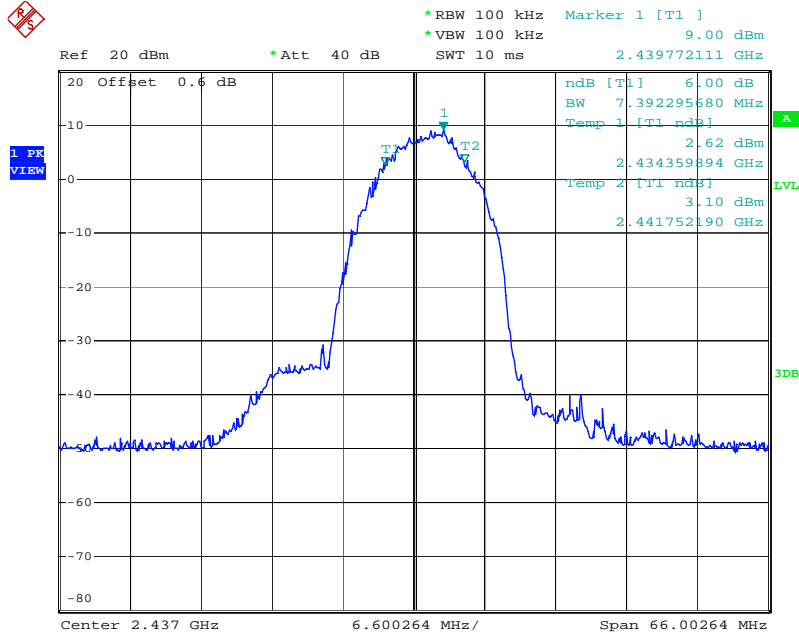
Mode	Channel Number	Frequency (MHz)	6dB Bandwidth	99% Power Bandwidth	Result
802.11b	1	2412	7.39 MHz	---	Pass
802.11b	6	2437	7.39 MHz	15.44 MHz	Pass
802.11b	11	2462	7.26 MHz	---	Pass
802.11g	1	2412	16.24 MHz	---	Pass
802.11g	6	2437	16.24 MHz	16.39 MHz	Pass
802.11g	11	2462	16.24 MHz	---	Pass
802.11n (20MHz)	1	2412	17.54 MHz	---	Pass
802.11n (20MHz)	6	2437	17.8 MHz	17.69 MHz	Pass
802.11n (20MHz)	11	2462	17.6 MHz	---	Pass
802.11n (40MHz)	3	2422	36.43 MHz	---	Pass
802.11n (40MHz)	6	2437	36.43 MHz	36.17 MHz	Pass
802.11n (40MHz)	9	2452	36.17 MHz	---	Pass

6dB Bandwidth Plot (Channel 1) – 802.11b mode



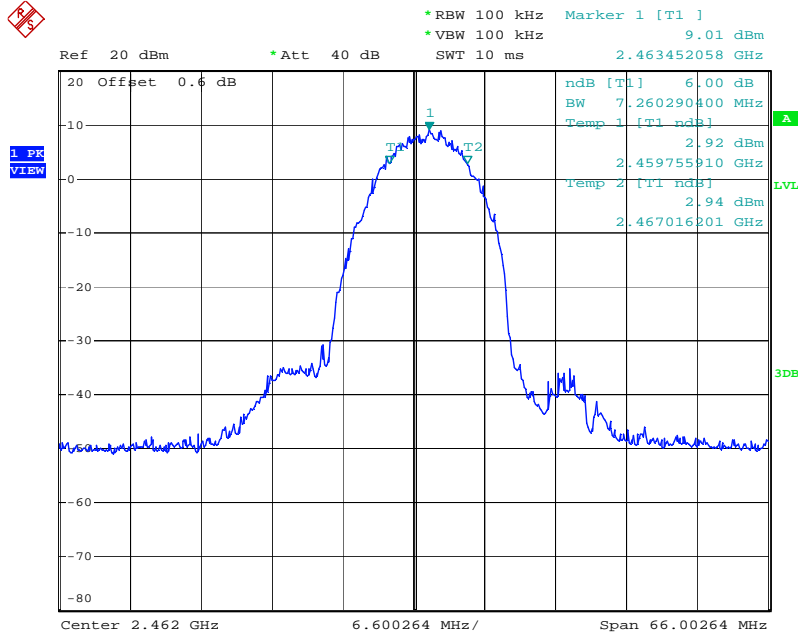
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6dB Bandwidth Plot (Channel 6) – 802.11b mode



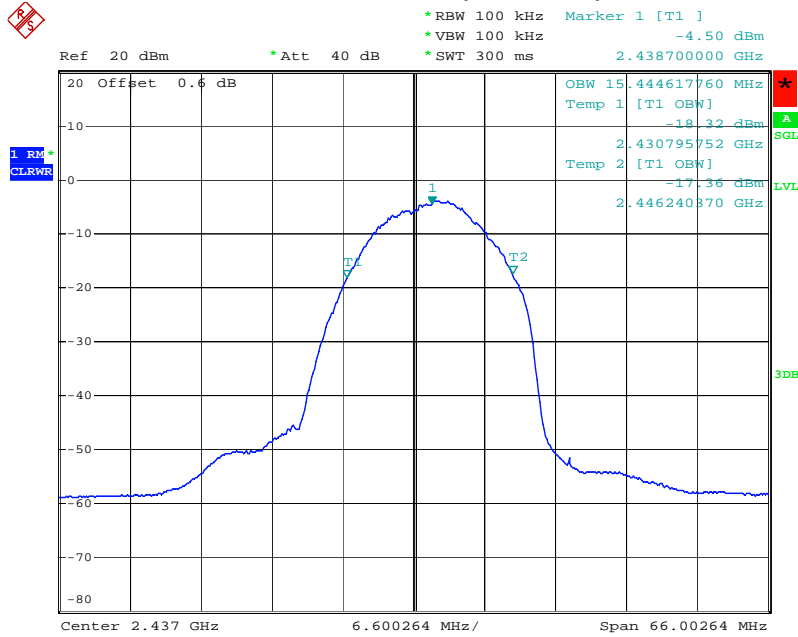
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6dB Bandwidth Plot (Channel 11) – 802.11b mode



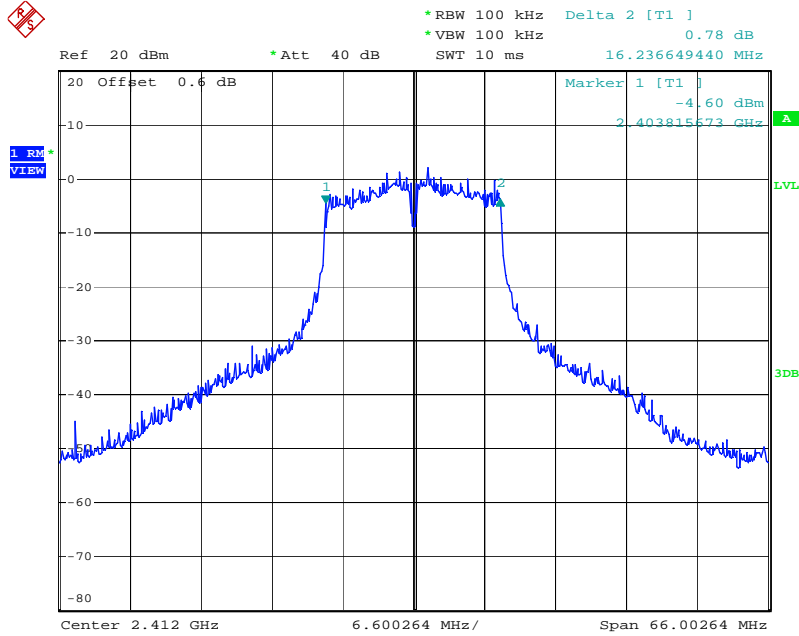
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99% Power Bandwidth Plot (Channel 6) – 802.11b mode



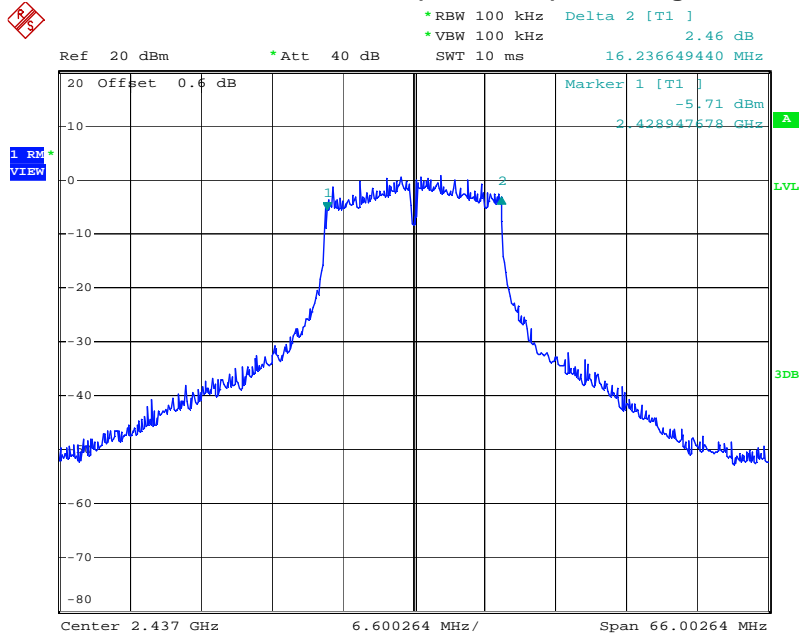
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6dB Bandwidth Plot (Channel 1) – 802.11g mode



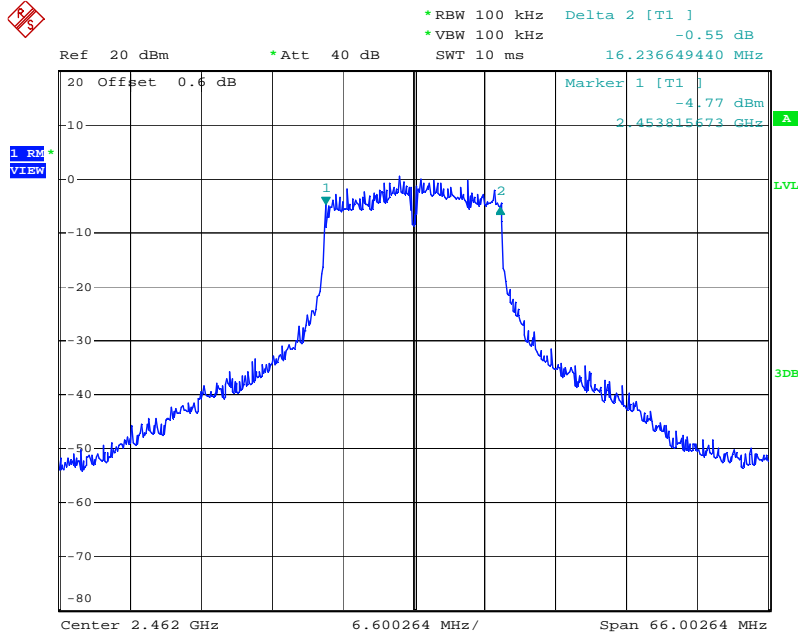
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6dB Bandwidth Plot (Channel 6) – 802.11g mode



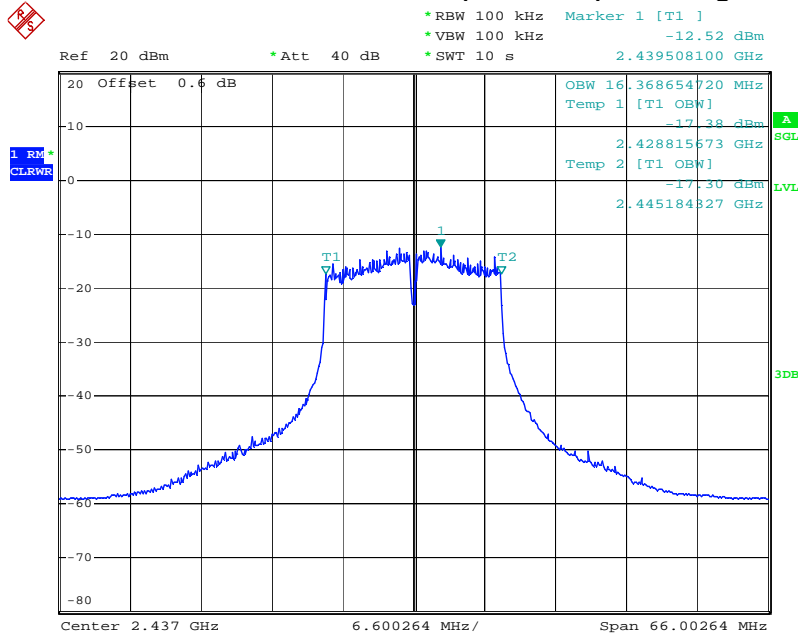
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6dB Bandwidth Plot (Channel 11) – 802.11g mode



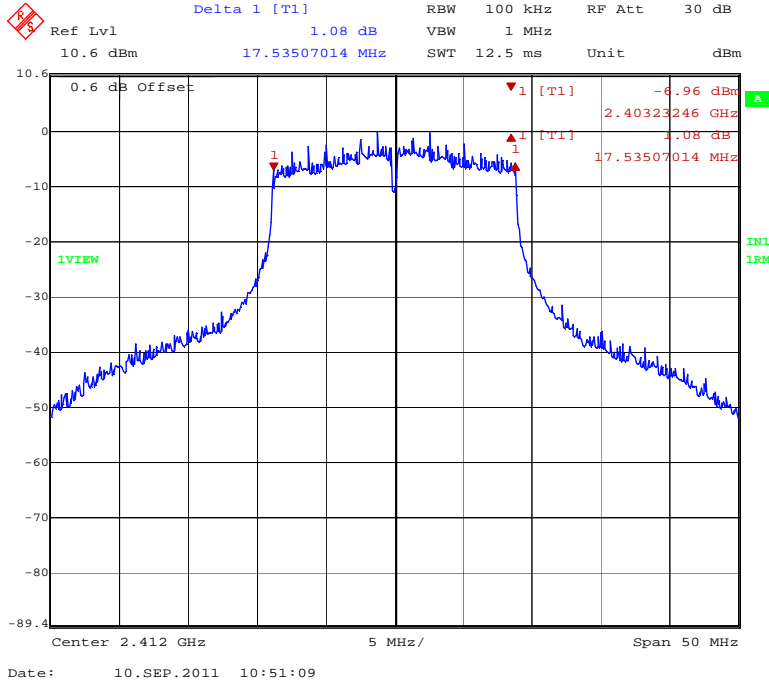
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99% Power Bandwidth Plot (Channel 6) – 802.11g mode

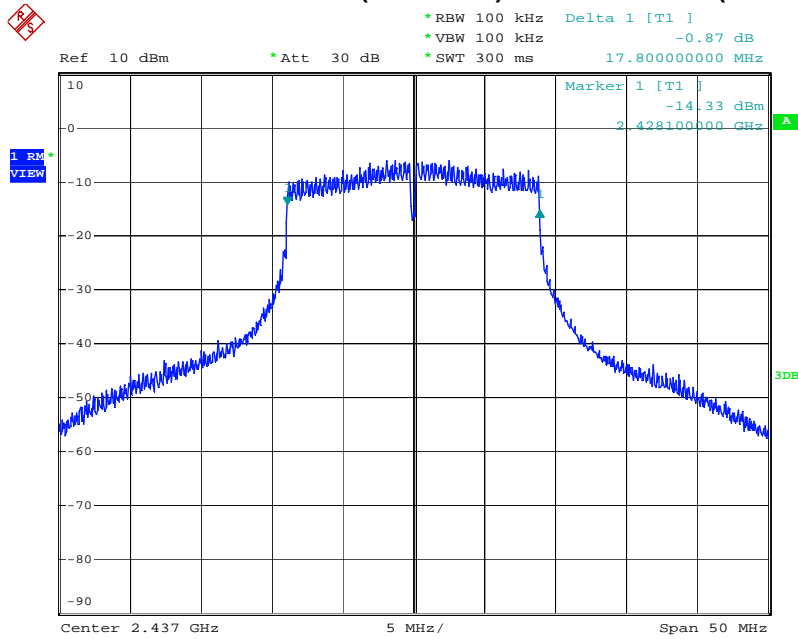


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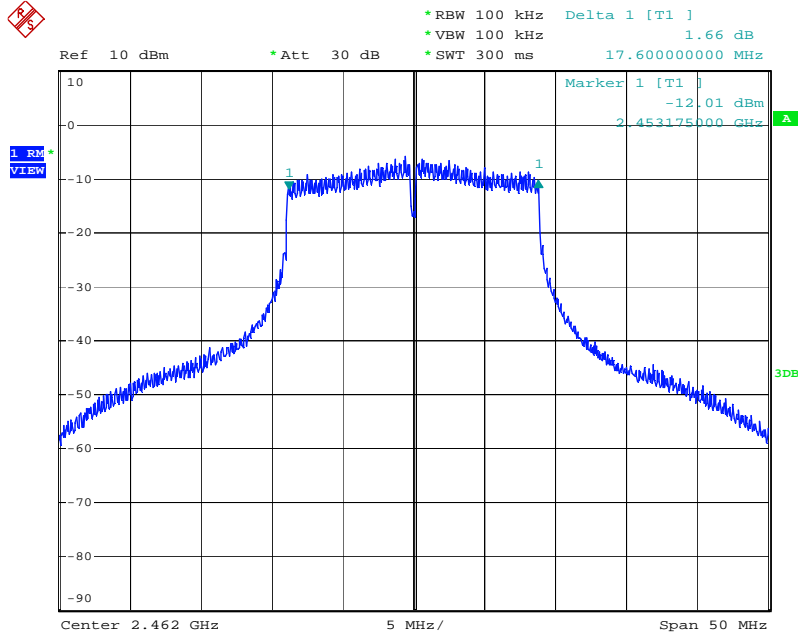
6dB Bandwidth Plot (Channel 1) – 802.11n mode (20MHz)



6dB Bandwidth Plot (Channel 6) – 802.11n mode (20MHz)

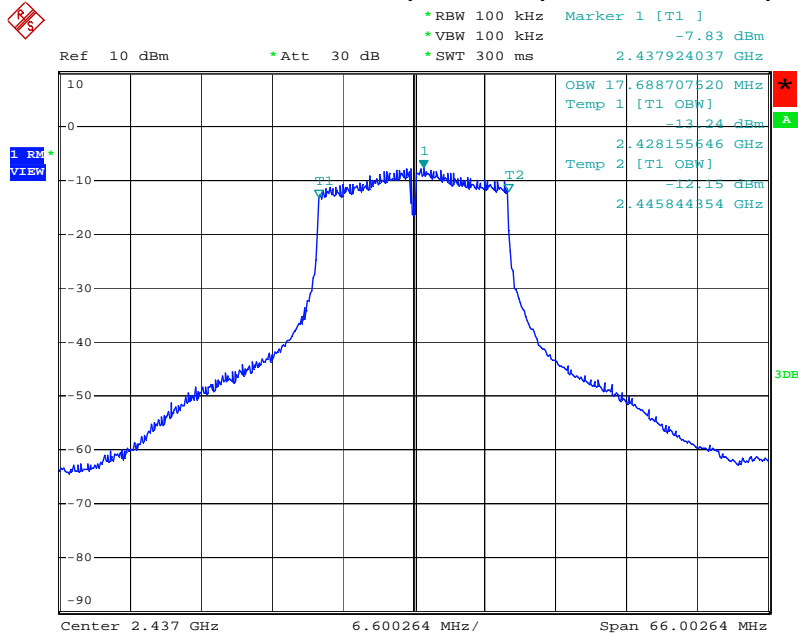


6dB Bandwidth Plot (Channel 11) – 802.11n mode (20MHz)



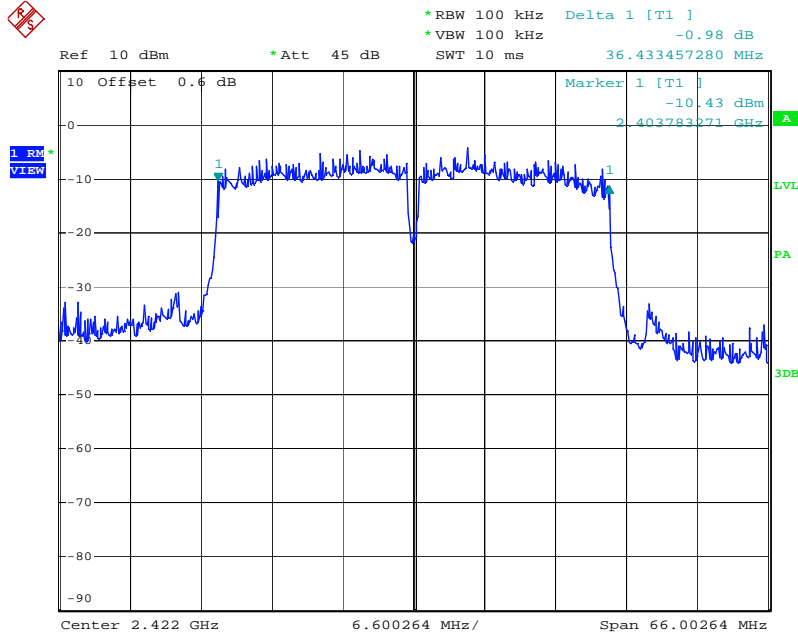
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99% Power Bandwidth Plot (Channel 6) – 802.11n mode (20MHz)



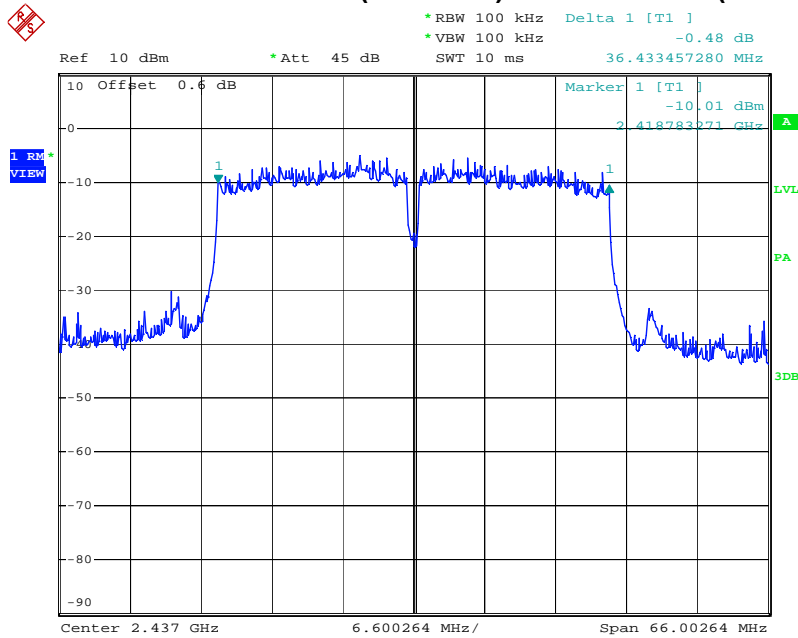
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6dB Bandwidth Plot (Channel 3) – 802.11n mode (40MHz)



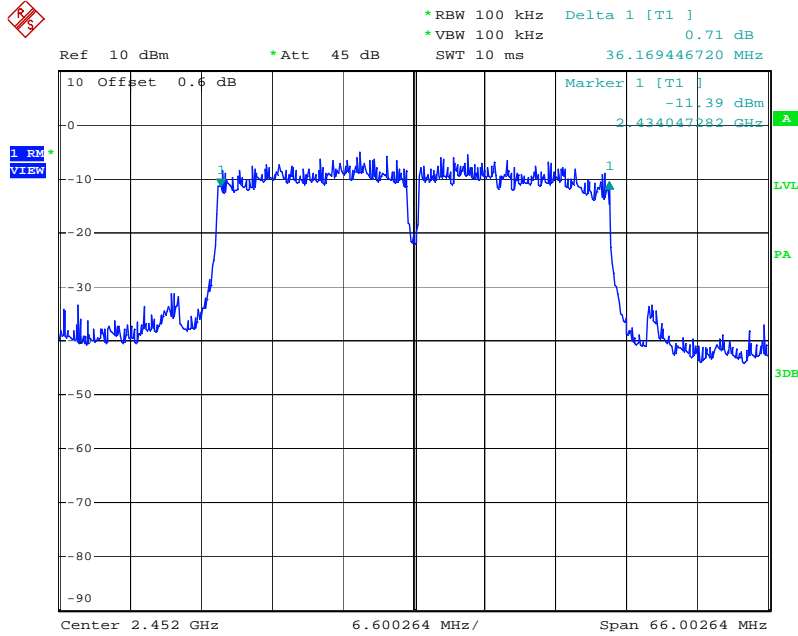
Date: 31.AUG.2011 11:31:20

6dB Bandwidth Plot (Channel 6) – 802.11n mode (40MHz)



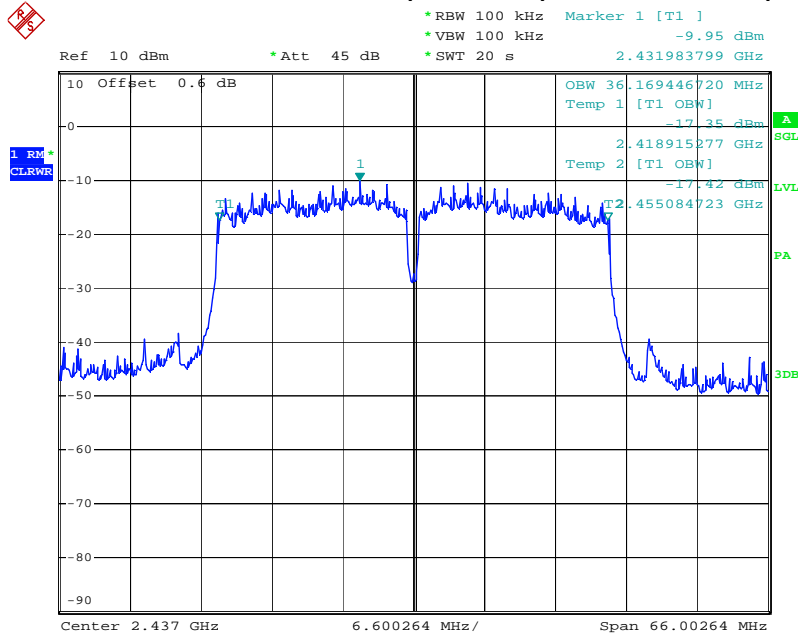
Date: 31.AUG.2011 11:29:17

6dB Bandwidth Plot (Channel 9) – 802.11n mode (40MHz)



Date: 31.AUG.2011 11:32:34

99% Power Bandwidth Plot (Channel 6) – 802.11n mode (40MHz)



Date: 31.AUG.2011 11:02:22

6 Conducted Spurious Emissions

6.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

6.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

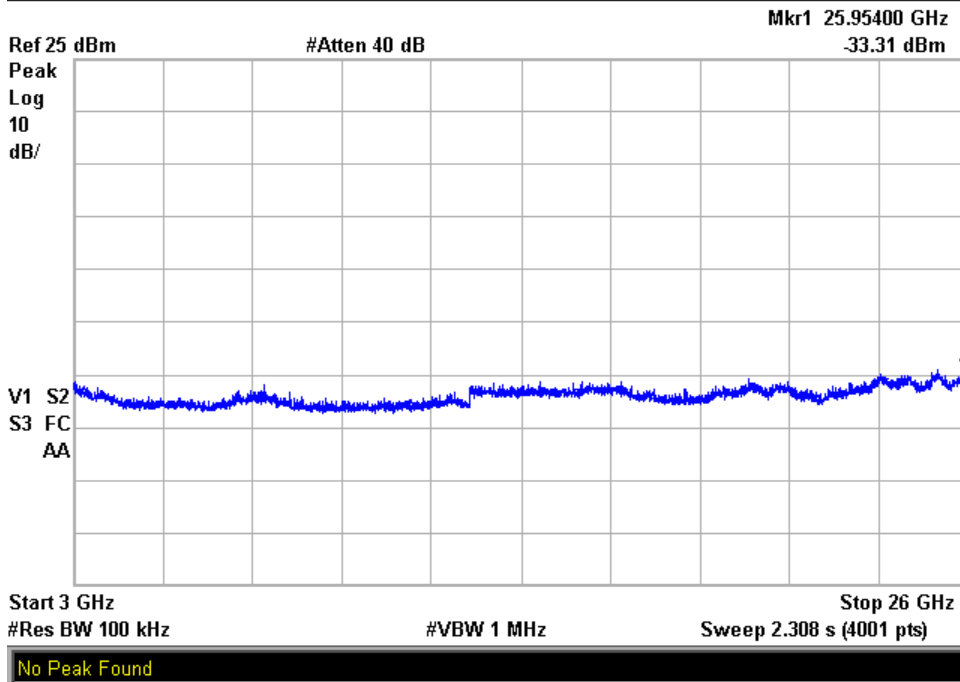
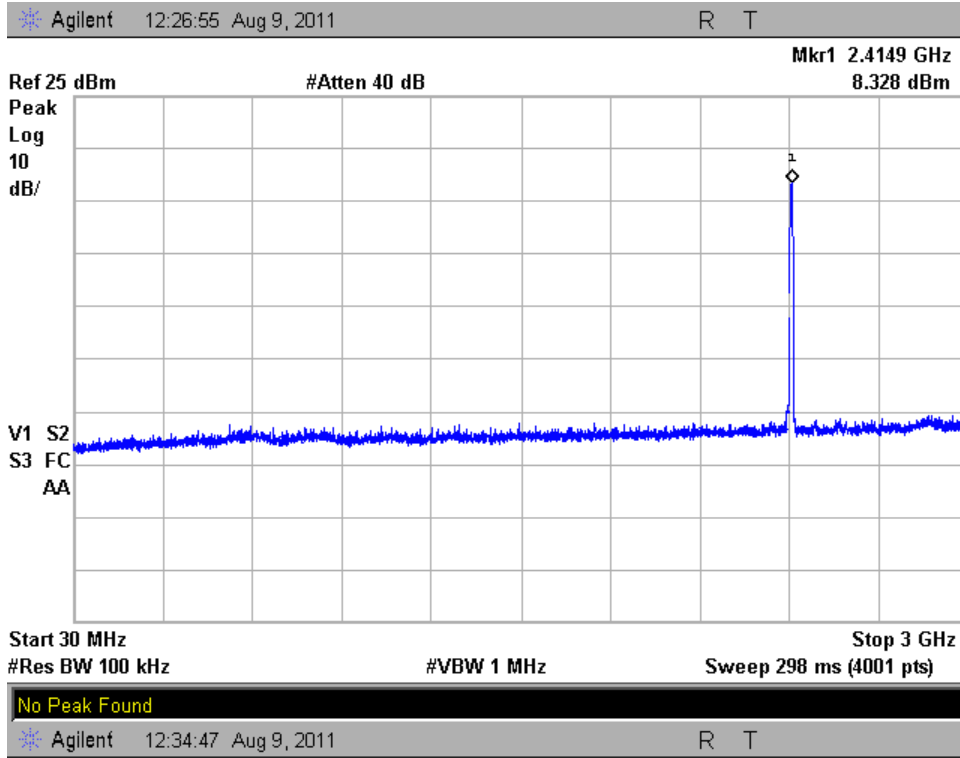
6.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMC Analyzer	2142	HP	E7405	9/1/2010	9/1/2011
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012

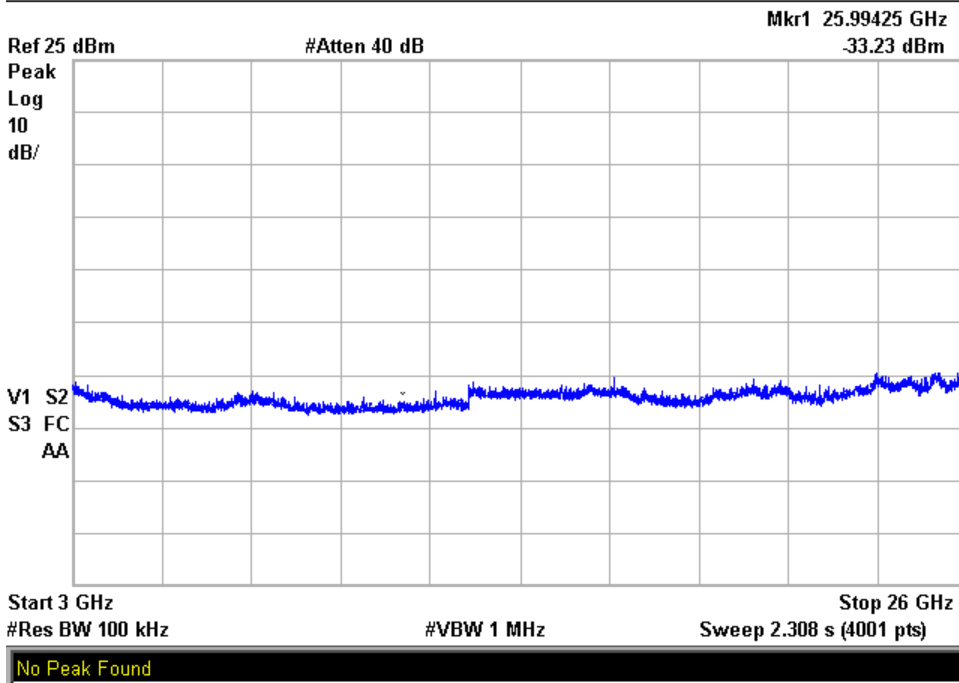
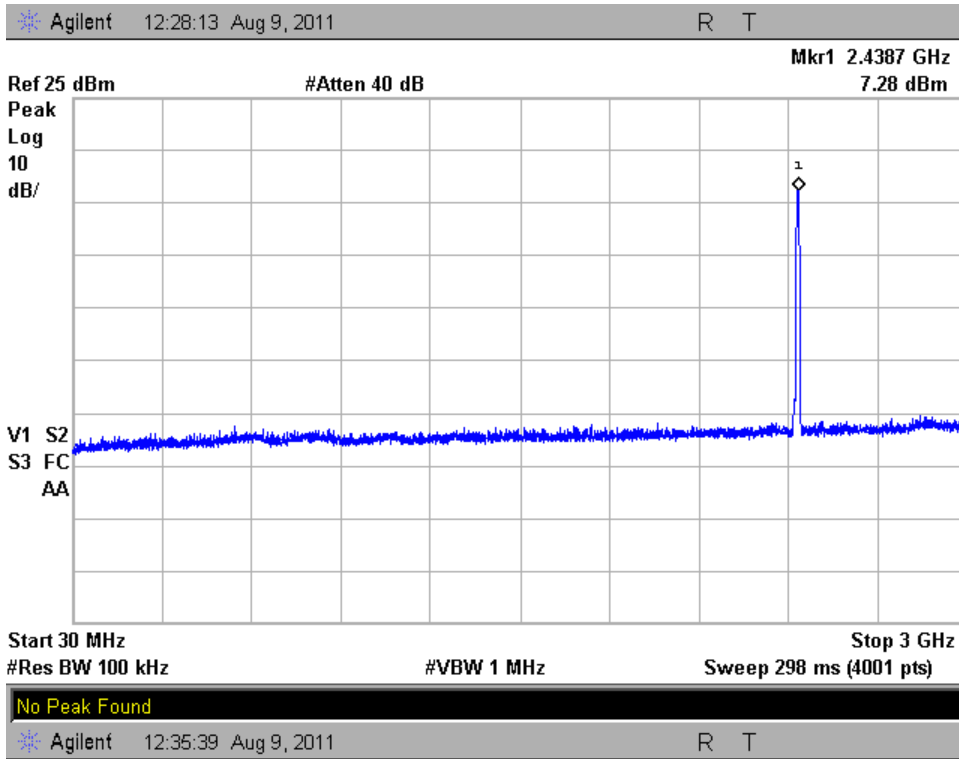
6.4 Results:

The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria.

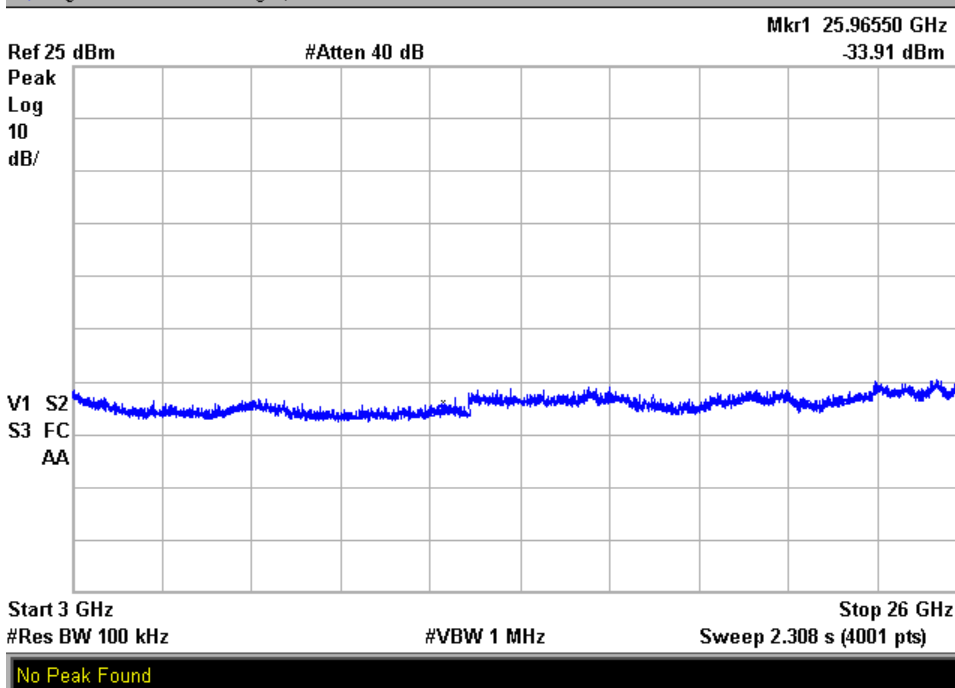
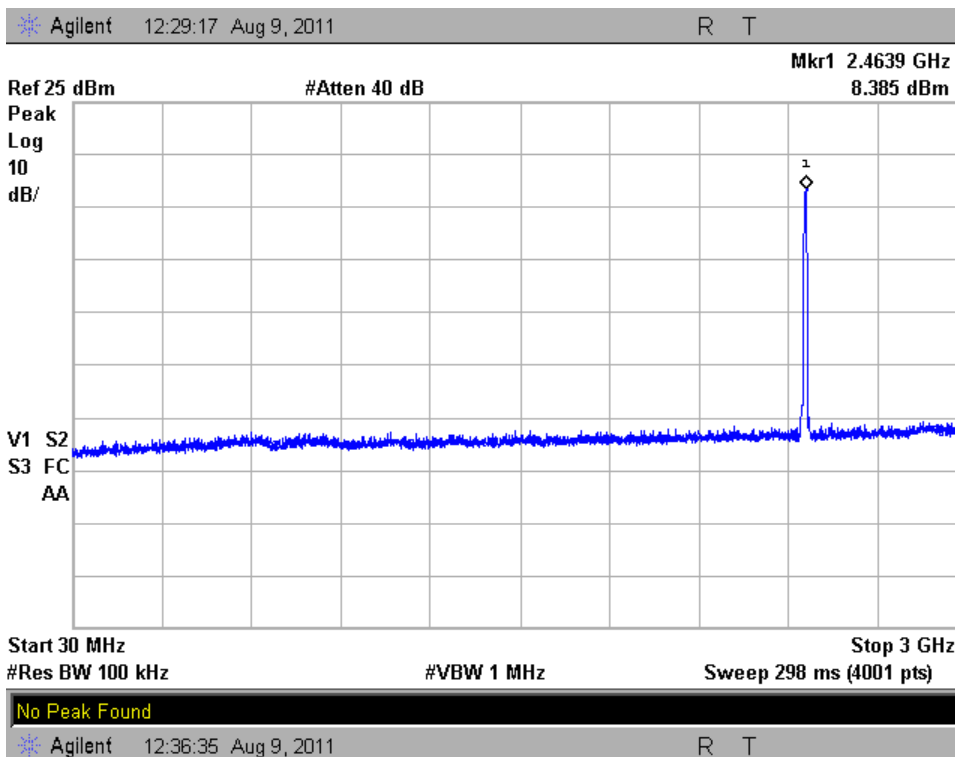
Conducted Spurious Emissions - 802.11b Mode Low Channel



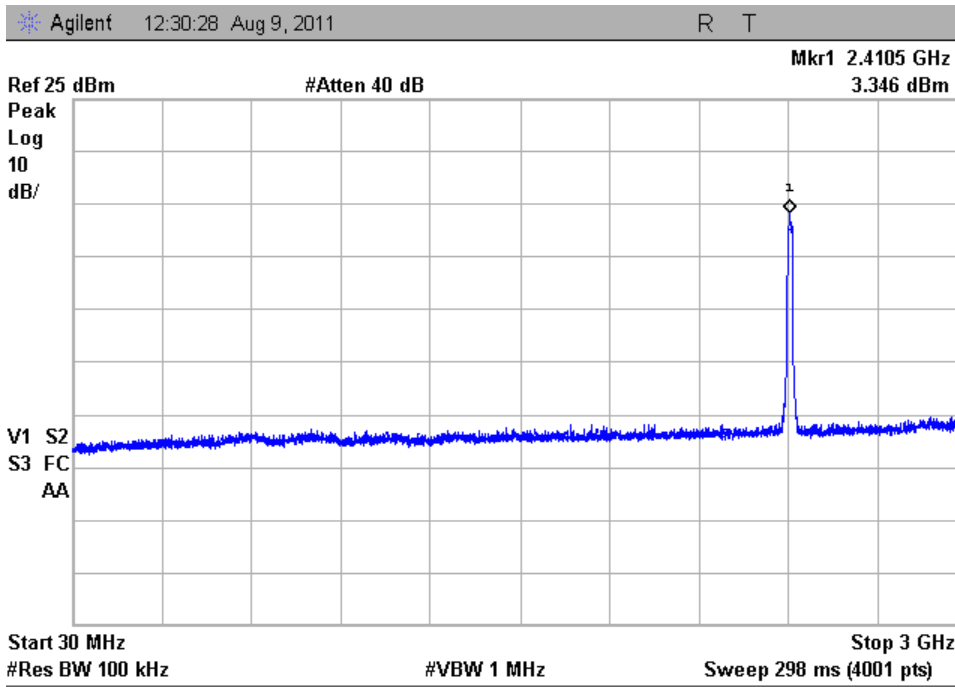
Conducted Spurious Emissions - 802.11b Mode Mid Channel



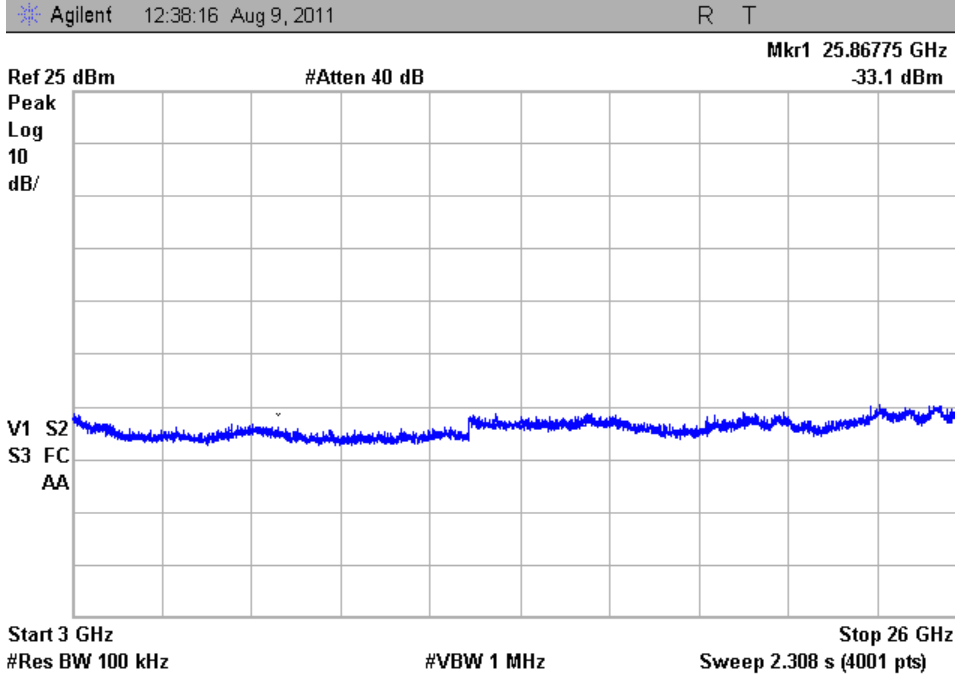
Conducted Spurious Emissions - 802.11b Mode High Channel



Conducted Spurious Emissions - 802.11g Mode Low Channel

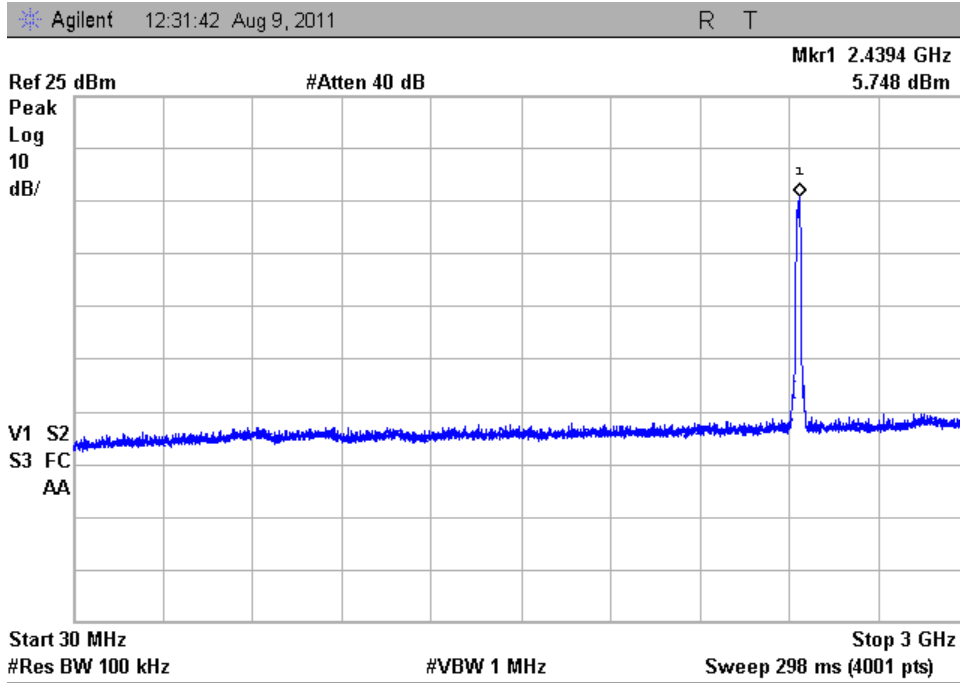


No Peak Found

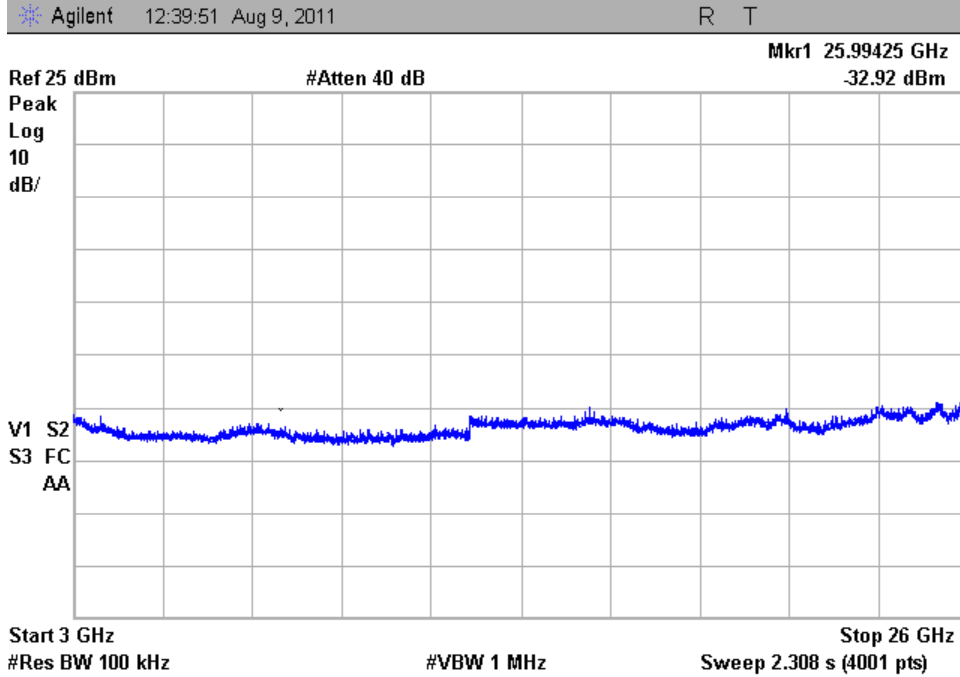


No Peak Found

Conducted Spurious Emissions - 802.11g Mode Mid Channel

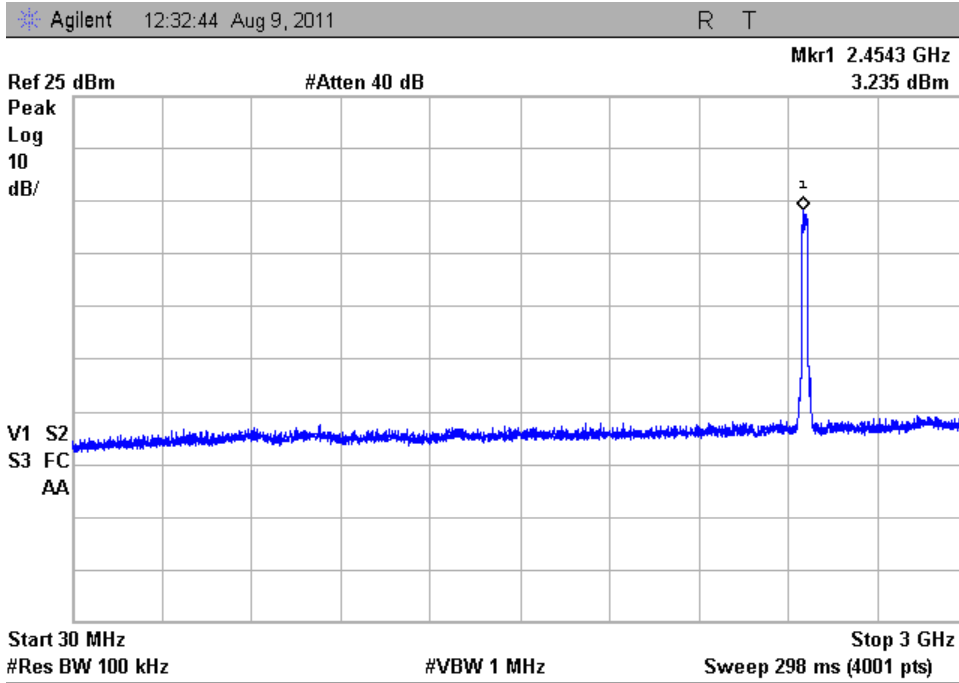


No Peak Found

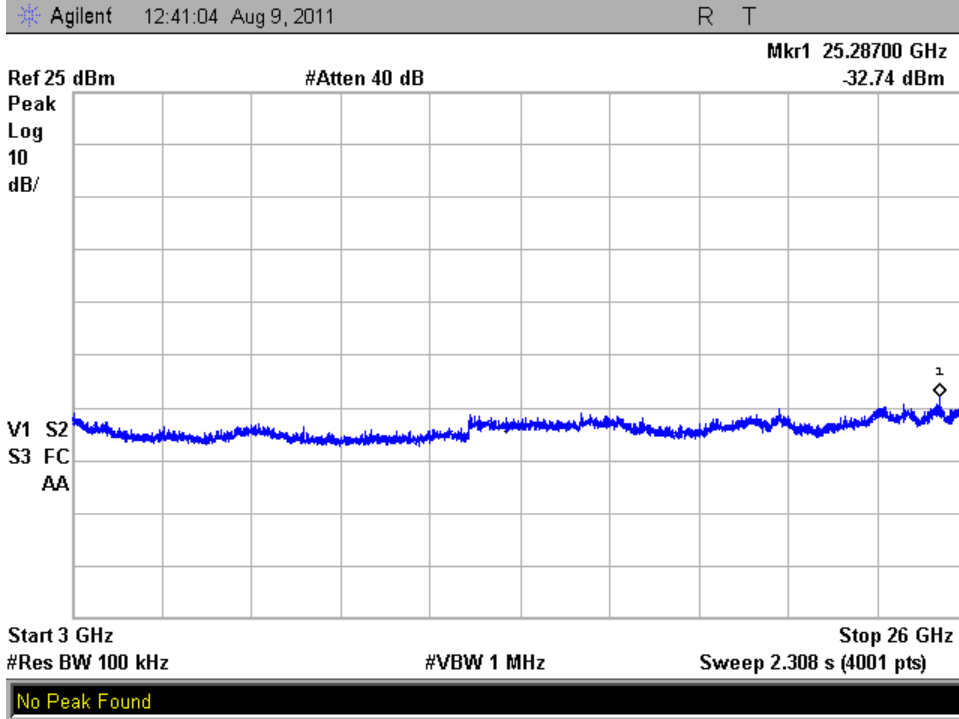


No Peak Found

Conducted Spurious Emissions - 802.11g Mode High Channel

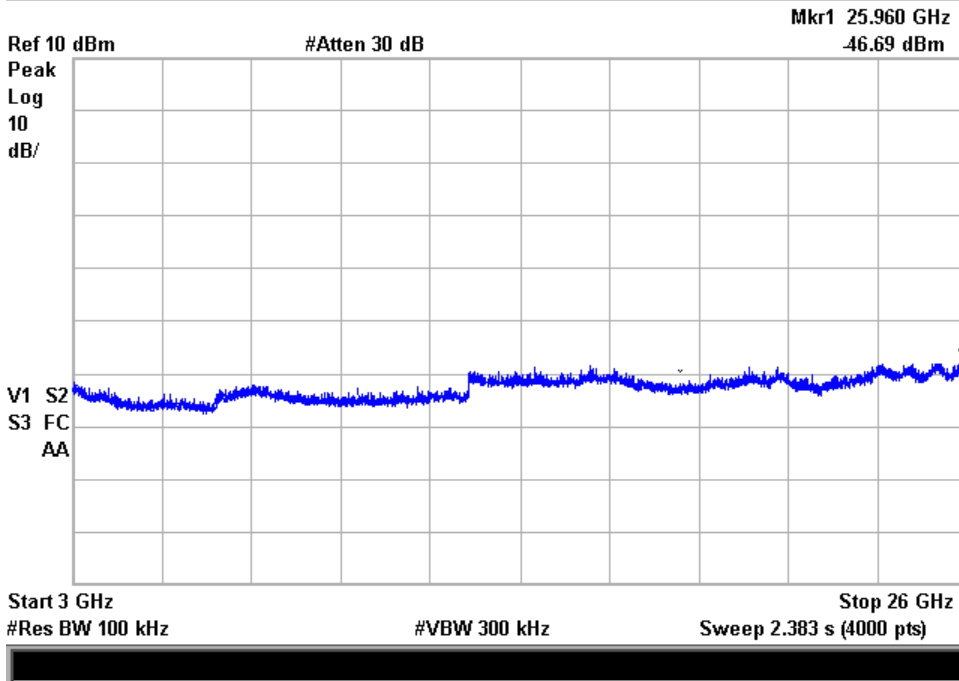
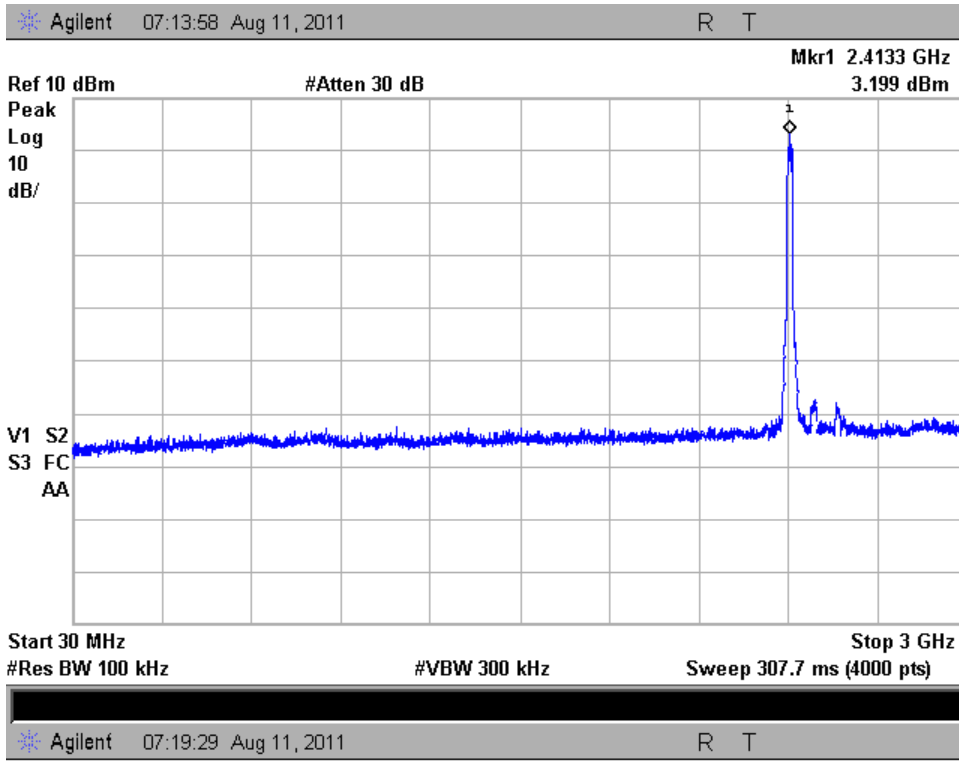


No Peak Found

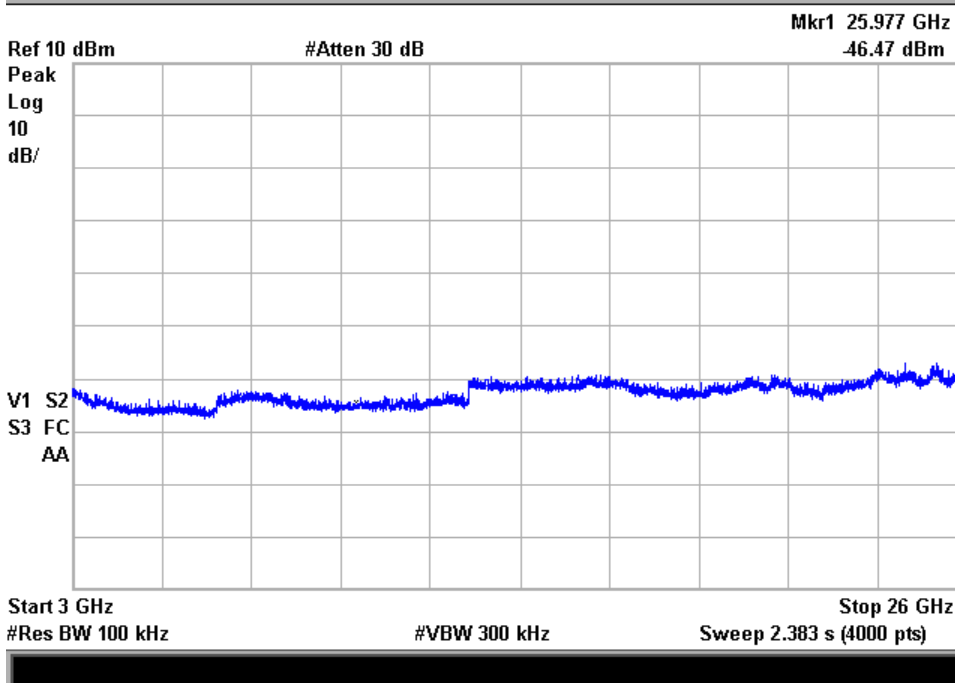
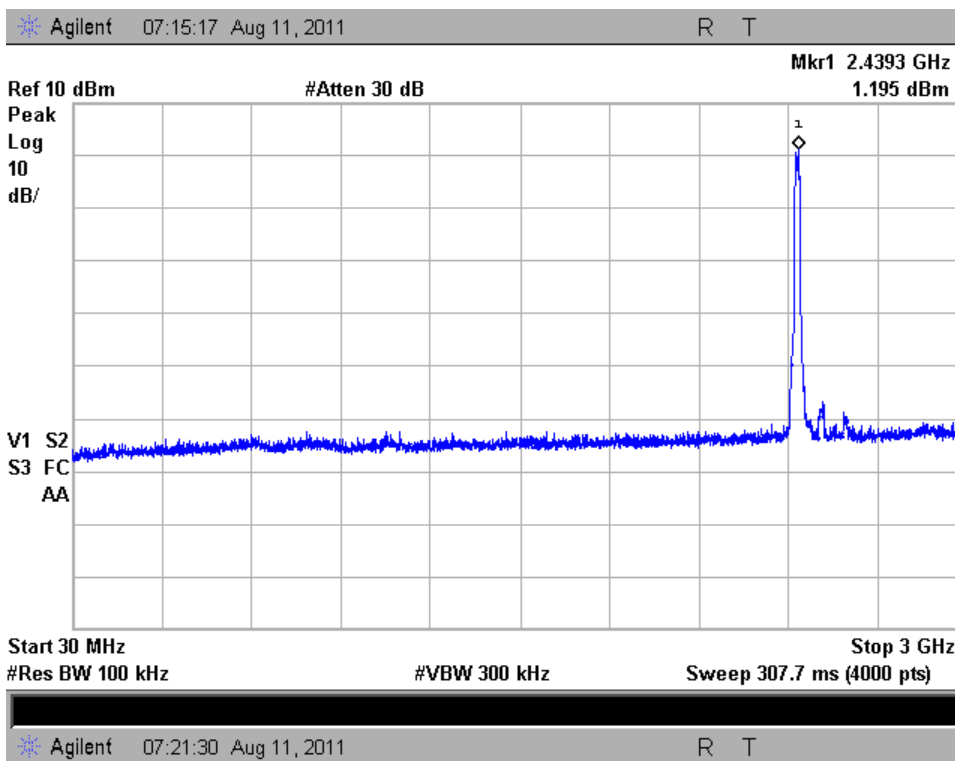


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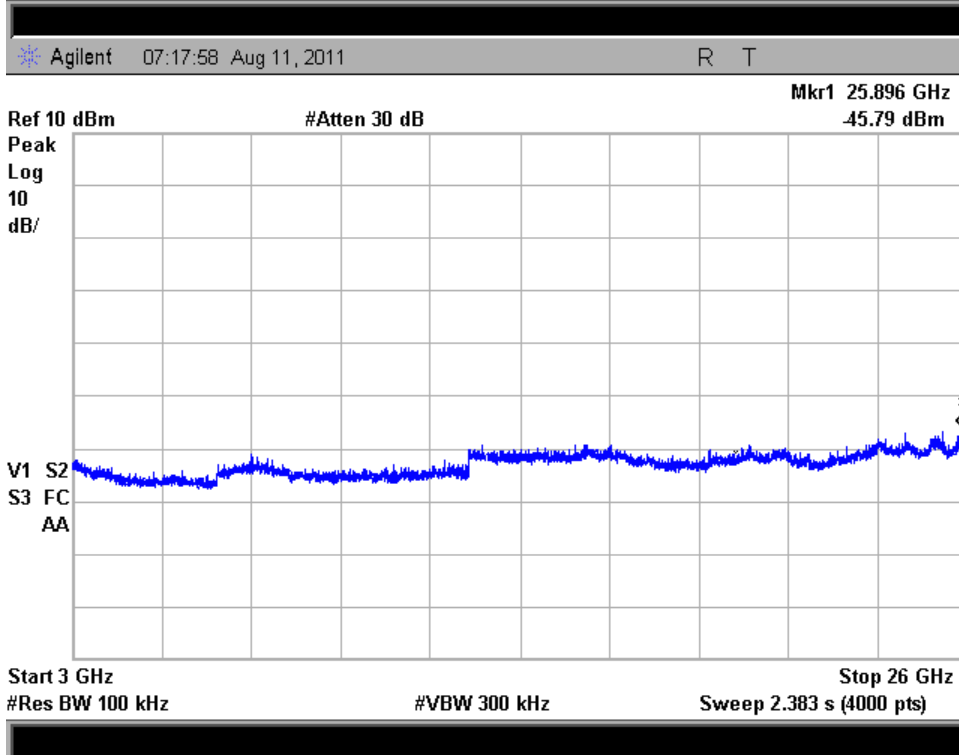
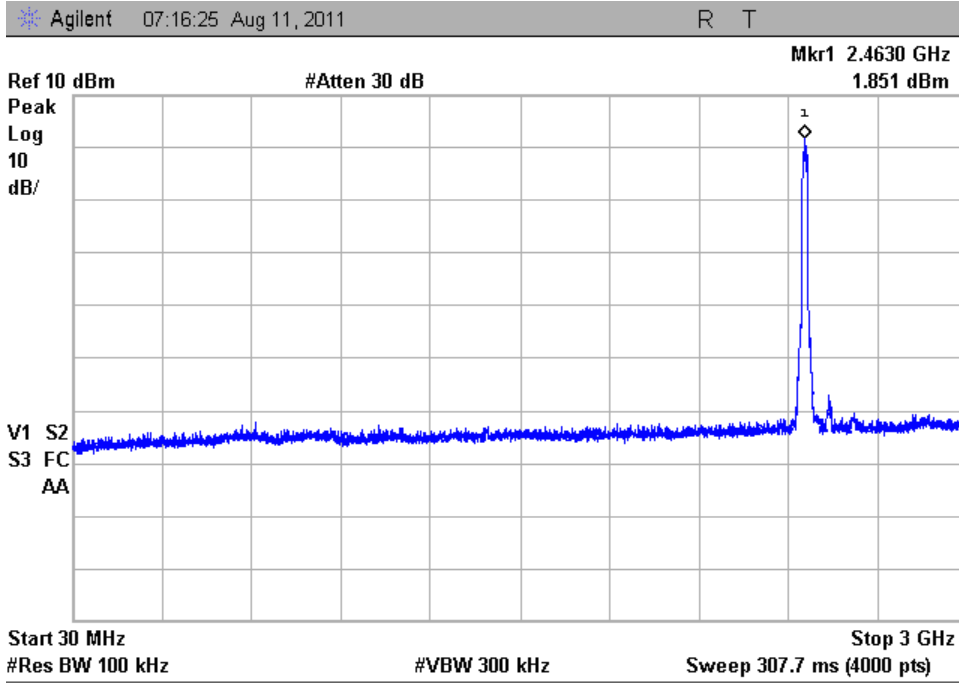
Conducted Spurious Emissions - 802.11n Mode (20MHz) Low Channel



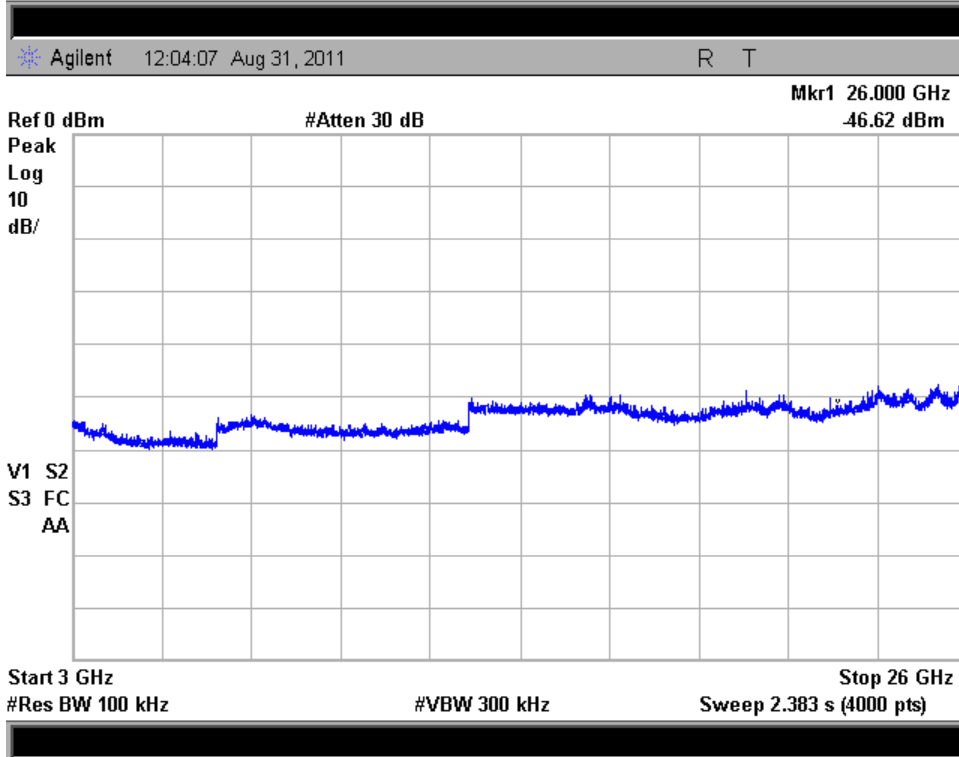
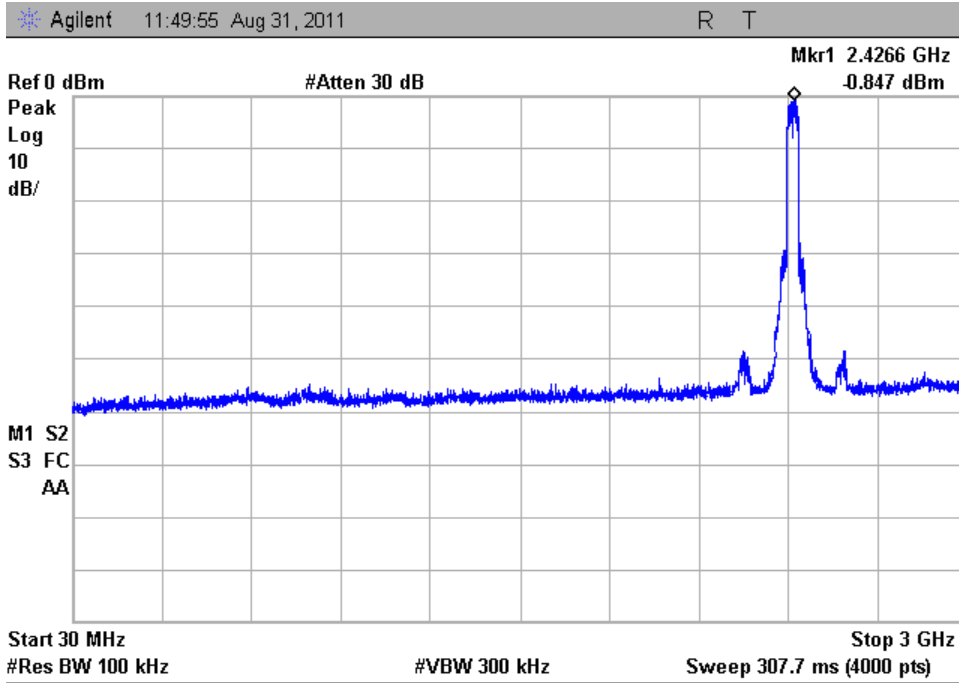
Conducted Spurious Emissions - 802.11n Mode (20MHz) Mid Channel



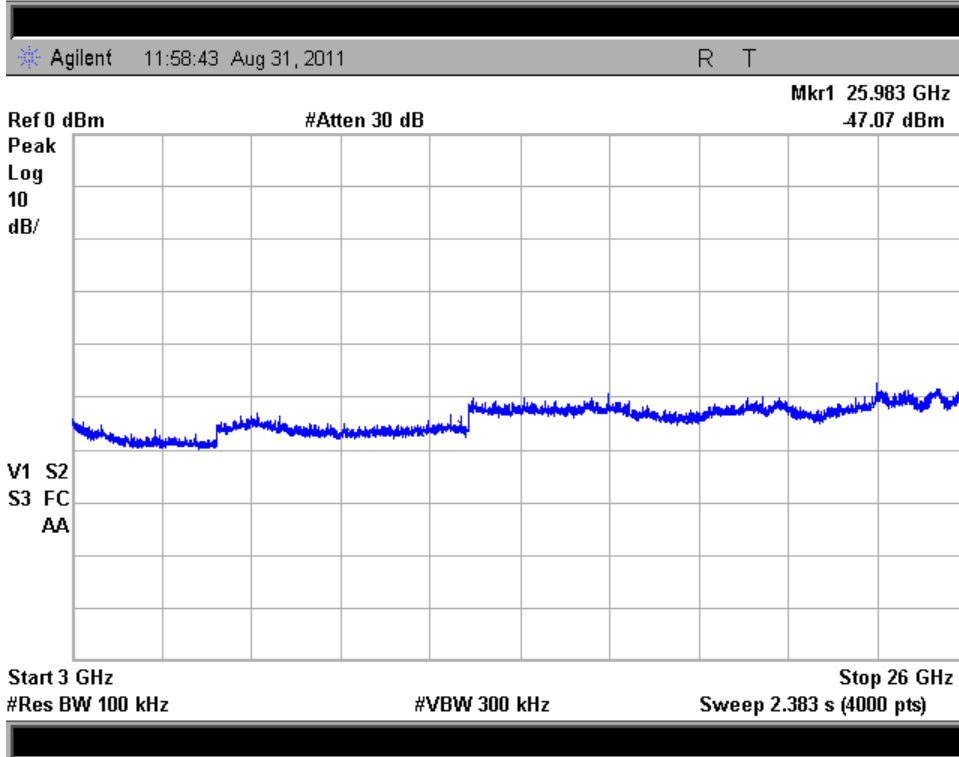
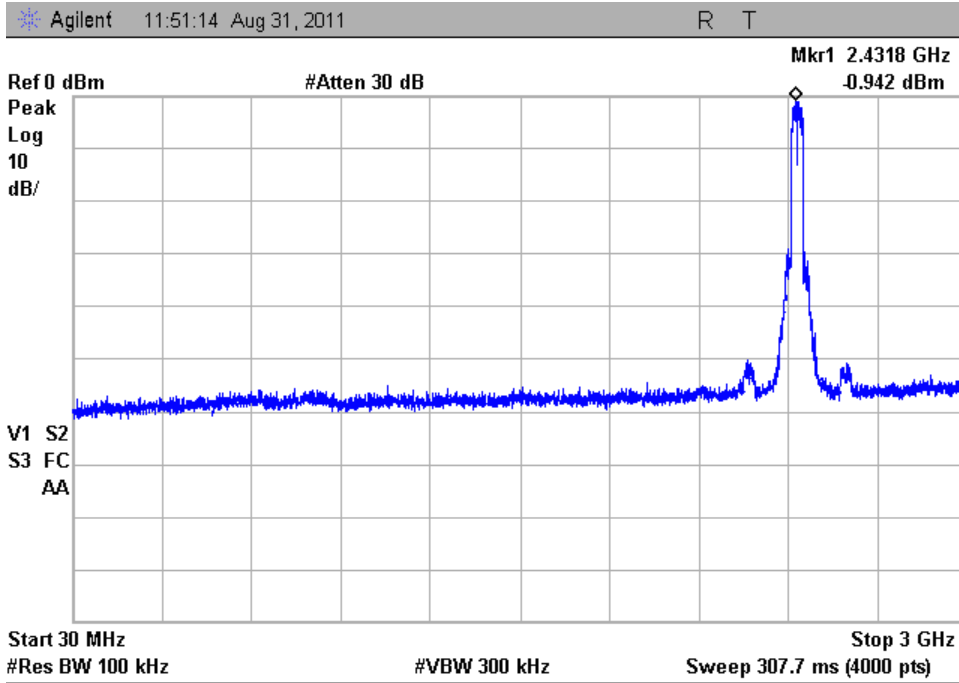
Conducted Spurious Emissions - 802.11n (20MHz) Mode High Channel



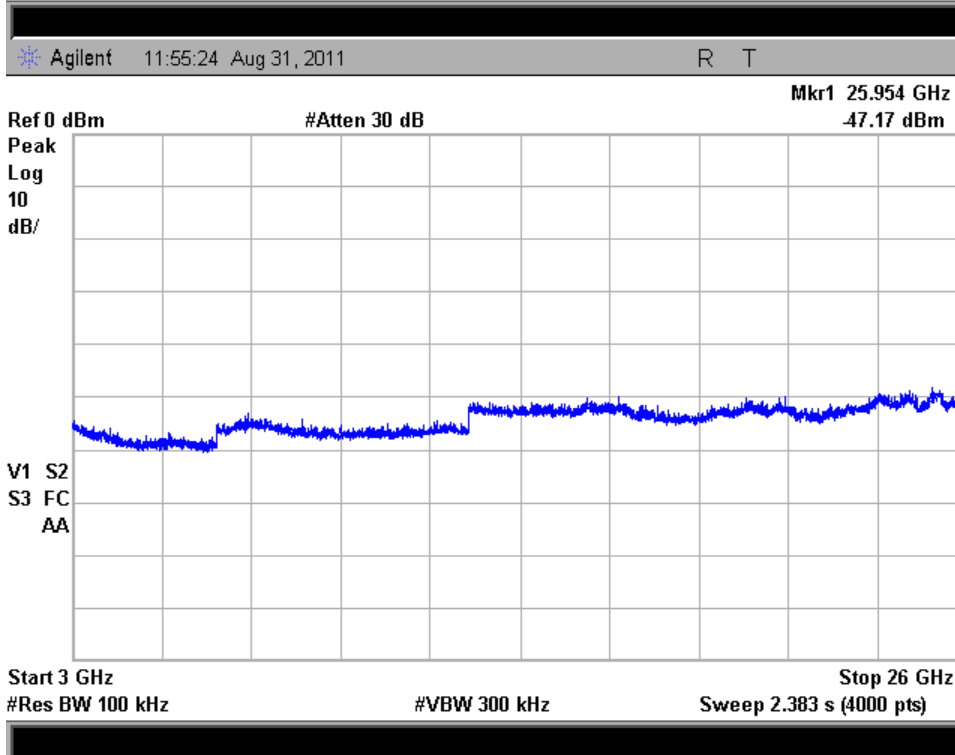
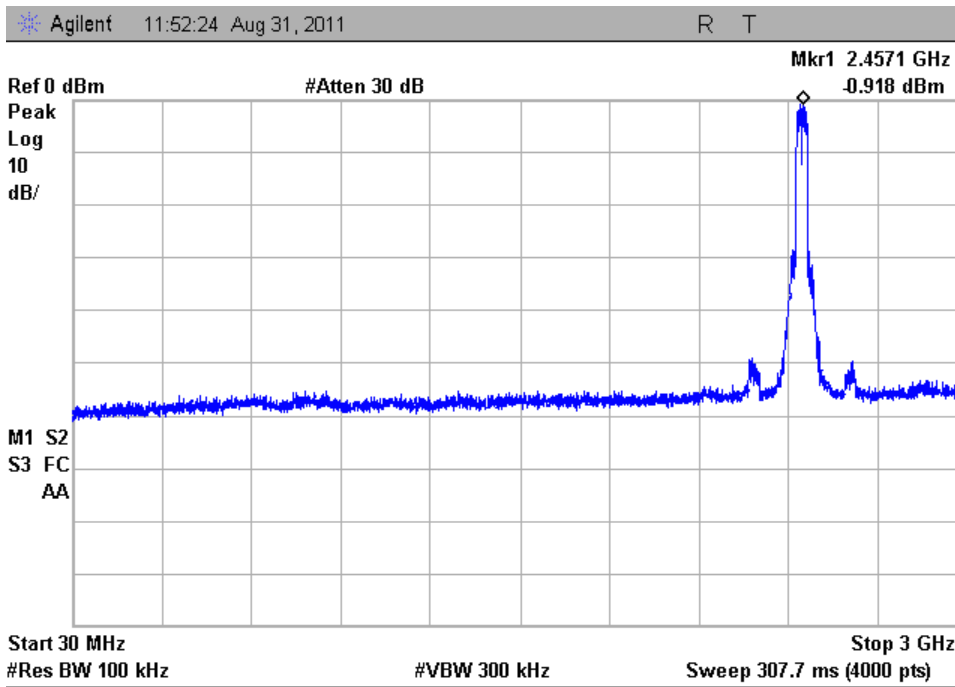
Conducted Spurious Emissions - 802.11n Mode (40MHz) Low Channel



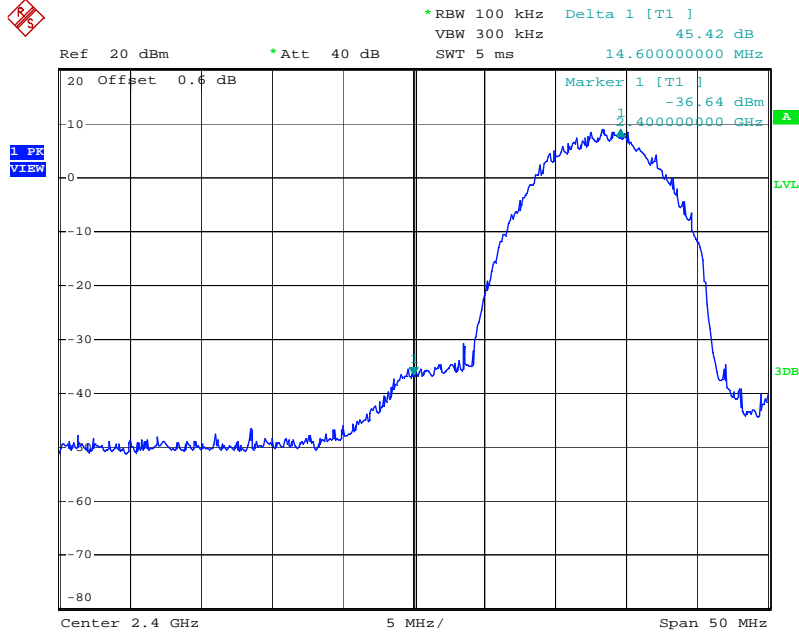
Conducted Spurious Emissions - 802.11n Mode (40MHz) Mid Channel



Conducted Spurious Emissions - 802.11n (40MHz) Mode High Channel

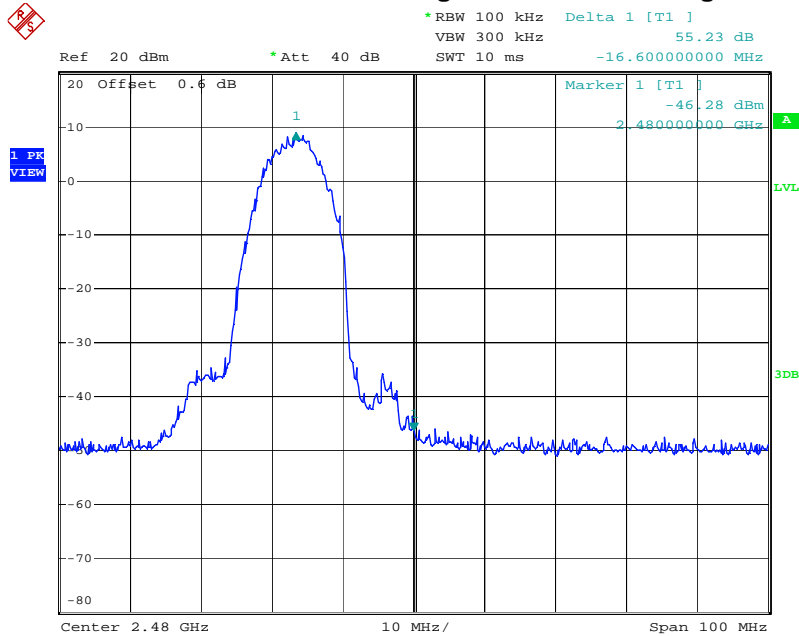


Emissions Close to Band Edge - 802.11b Mode Low Channel



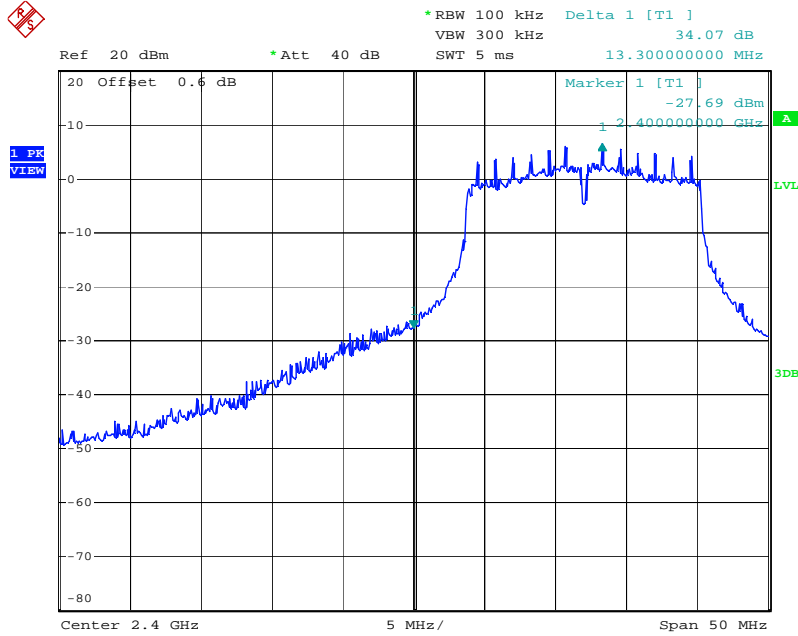
Date: 9.AUG.2011 15:05:32

Emissions Close to Band Edge - 802.11b Mode High Channel



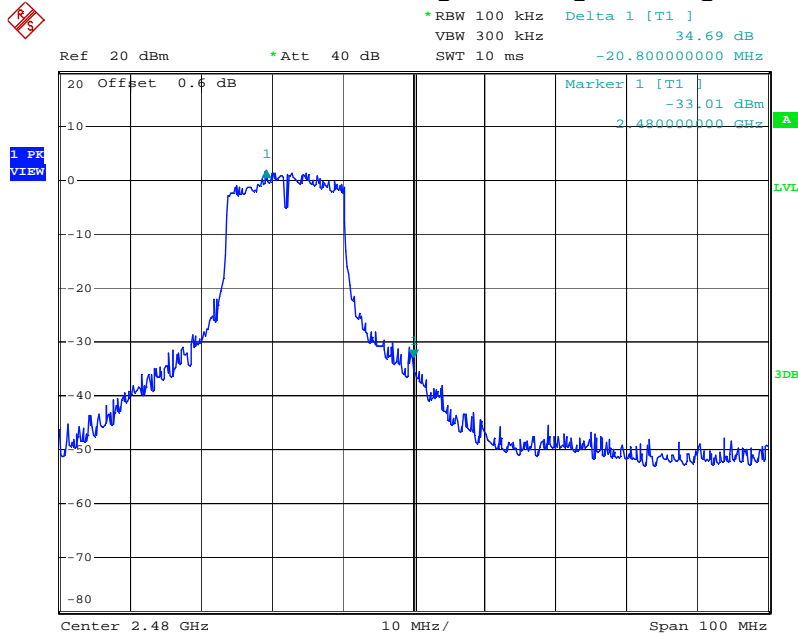
Date: 9.AUG.2011 15:11:07

Emissions Close to Band Edge - 802.11g Mode Low Channel



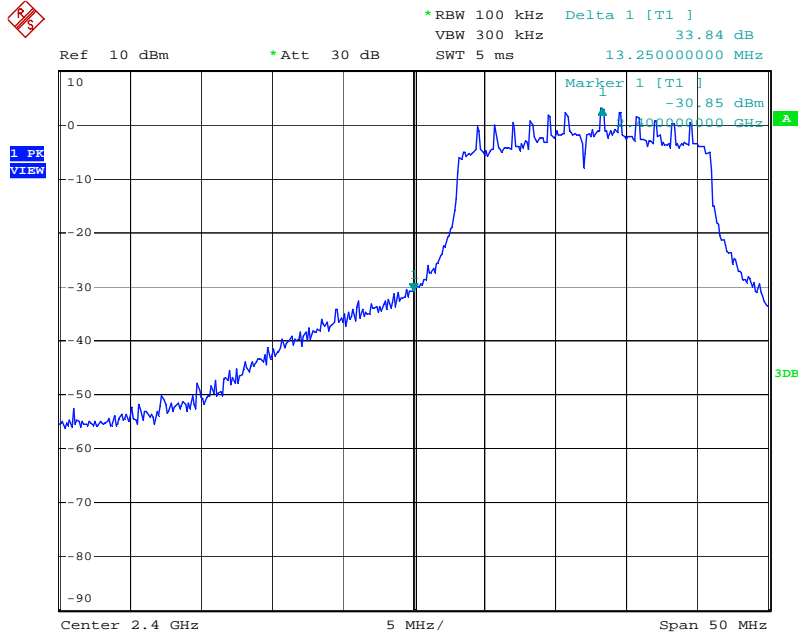
Date: 9.AUG.2011 15:07:48

Emissions Close to Band Edge - 802.11g Mode High Channel



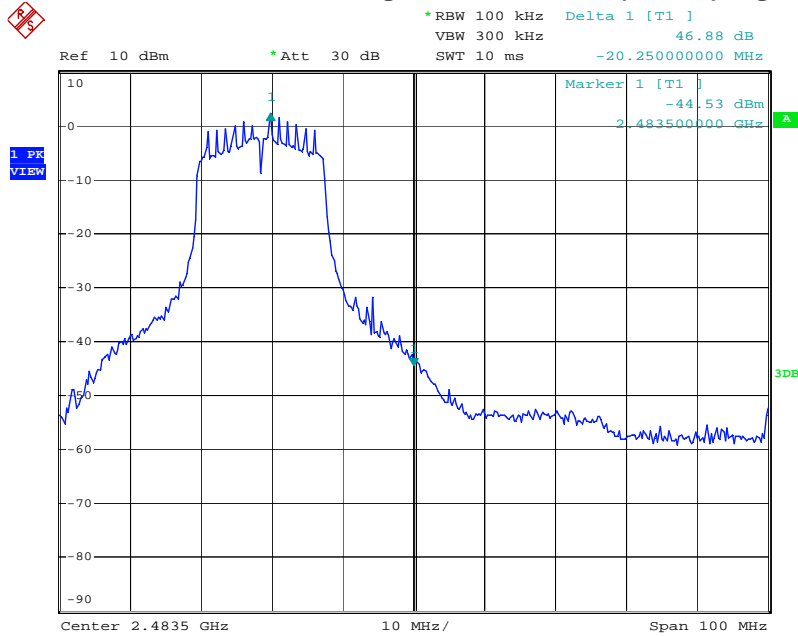
Date: 9.AUG.2011 15:10:07

Emissions Close to Band Edge - 802.11n Mode (20MHz) Low Channel



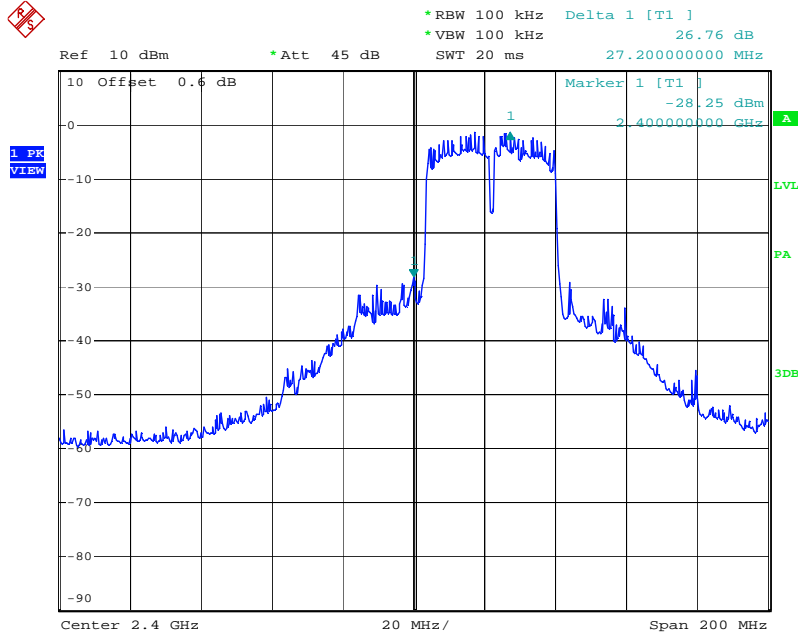
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Emissions Close to Band Edge - 802.11n Mode (20MHz) High Channel



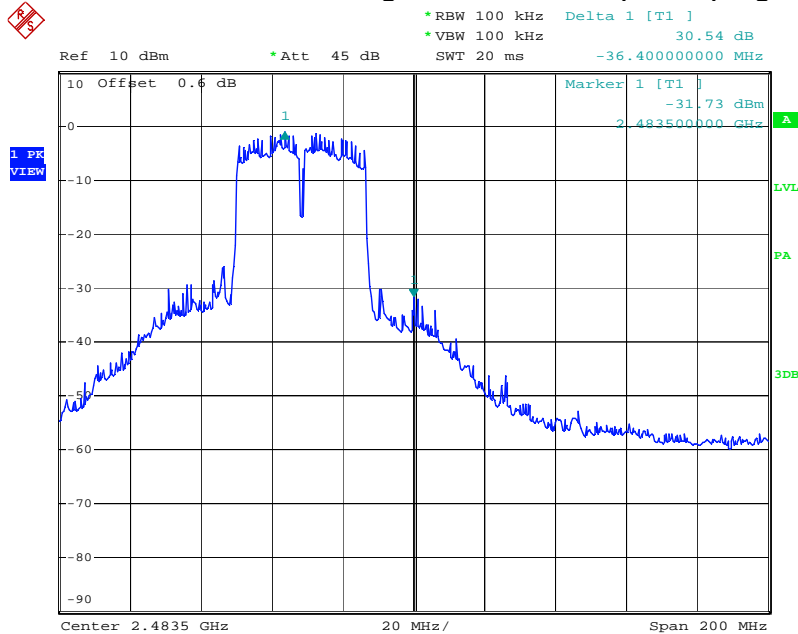
Date: 11.AUG.2011 10:04:22

Emissions Close to Band Edge - 802.11n Mode (40MHz) Low Channel



Date: 31.AUG.2011 13:38:33

Emissions Close to Band Edge - 802.11n Mode (40MHz) High Channel



Date: 31.AUG.2011 13:36:51

7 Power Spectral Density

7.1 Test Limits

§ 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

7.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

7.3 Test Equipment Used:

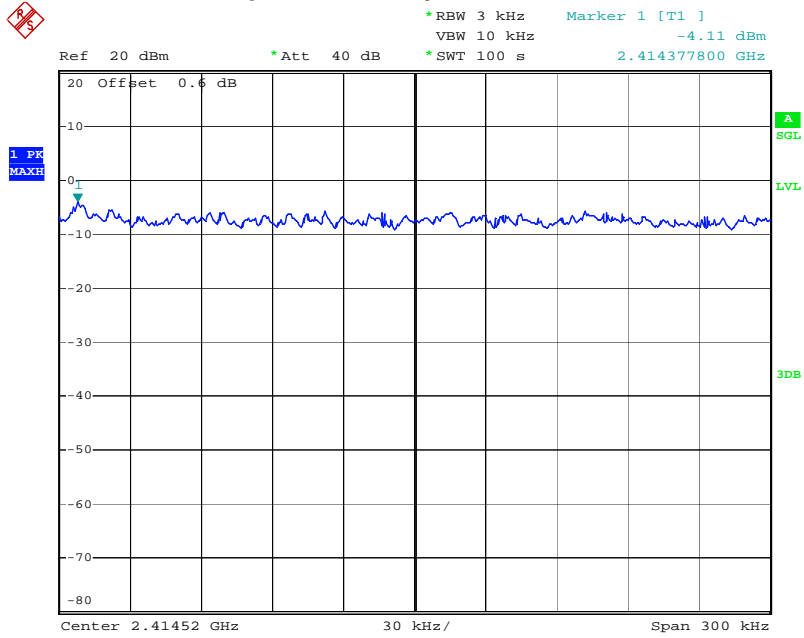
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	8/27/2010	8/27/2011
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012

7.4 Results:

*PSD Option 1 Method

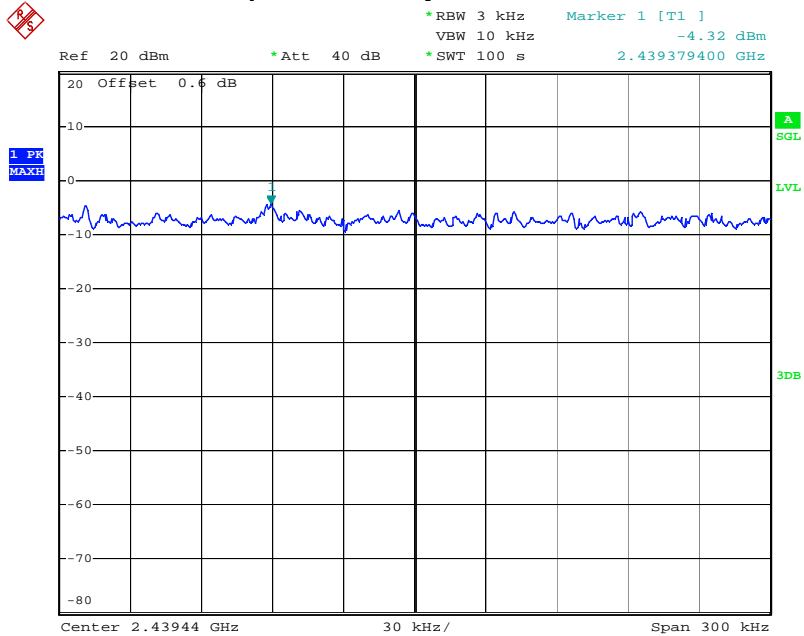
Mode	Channel Number	Frequency (MHz)	PSD in 3kHz BW (dBm)	Limit (dBm)	Margin (dBm)	Result
802.11b	1	2414.5	-4.11	8.0	-12.11	Pass
802.11b	6	2439.4	-4.32	8.0	-12.32	Pass
802.11b	11	2464.4	-4.28	8.0	-12.28	Pass
802.11g	1	2413.3	-7.4	8.0	-15.4	Pass
802.11g	6	2438.2	-7.99	8.0	-15.99	Pass
802.11g	11	2460.9	-8.00	8.0	-16.00	Pass
802.11n (20MHz)	1	2413.25	-11.82	8.0	-19.82	Pass
802.11n (20MHz)	6	2436.1	-12.53	8.0	-20.53	Pass
802.11n (20MHz)	11	2463.2	-12.09	8.0	-20.09	Pass
802.11n (40MHz)	3	2461.8	-14.58	8.0	-22.58	Pass
802.11n (40MHz)	6	2432	-12.6	8.0	-20.6	Pass
802.11n (40MHz)	9	2447	-13.32	8.0	-21.32	Pass

Power Spectral Density – Channel 1 802.11b mode



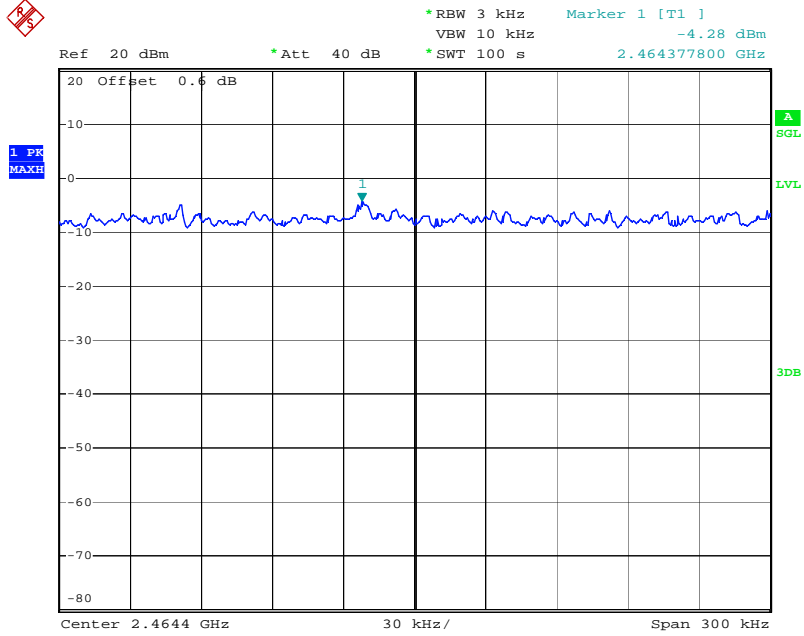
Date: 9.AUG.2011 15:03:37

Power Spectral Density – Channel 6 802.11b mode



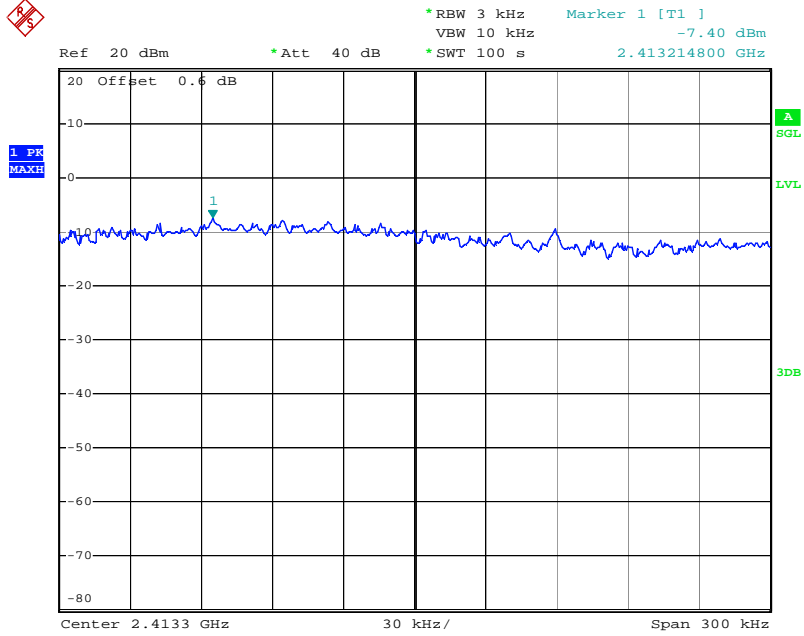
Date: 9.AUG.2011 15:00:16

Power Spectral Density – Channel 11 802.11b mode



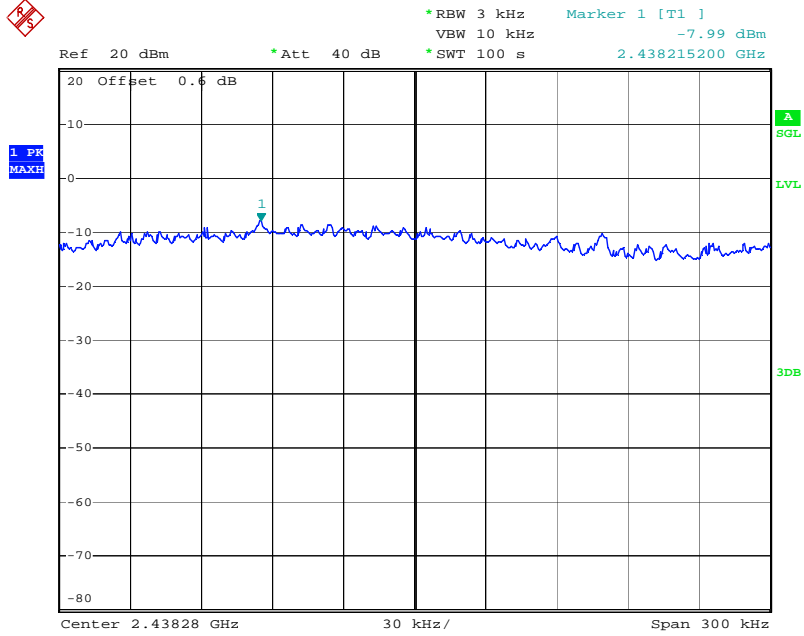
Date: 9.AUG.2011 14:54:39

Power Spectral Density – Channel 1 802.11g mode



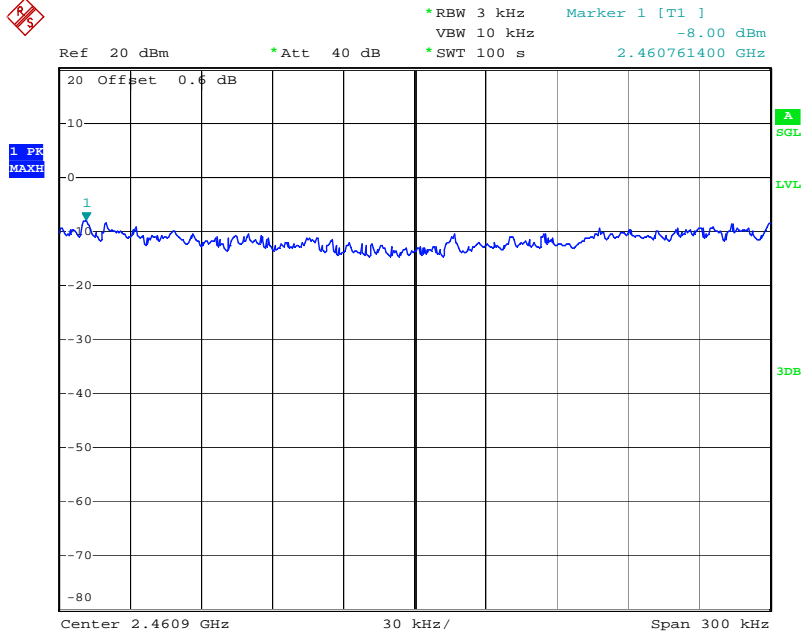
Date: 9.AUG.2011 14:41:24

Power Spectral Density – Channel 6 802.11g mode



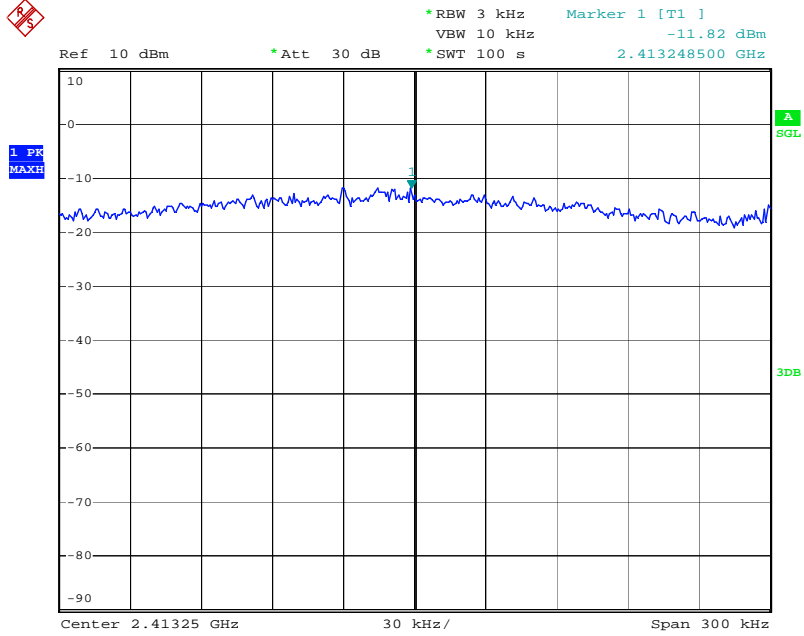
Date: 9.AUG.2011 14:46:16

Power Spectral Density – Channel 11 802.11g mode



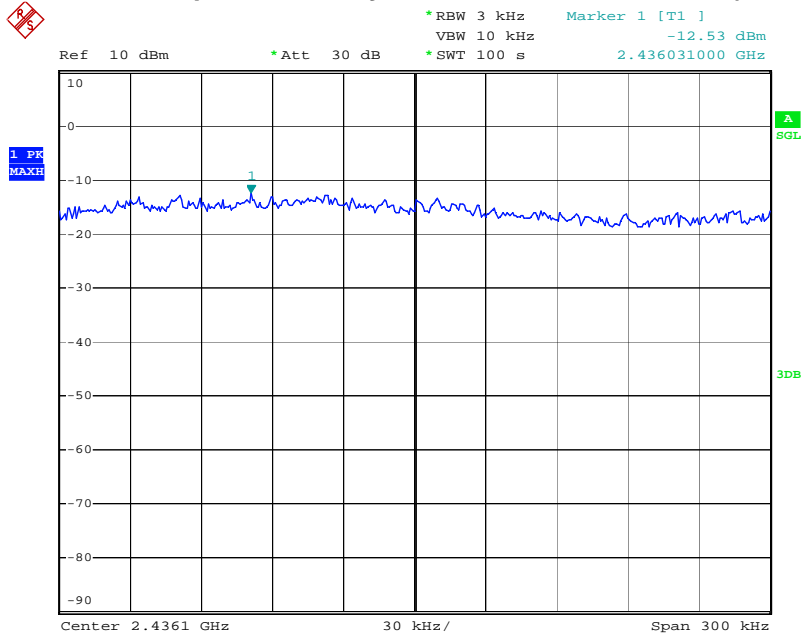
Date: 9.AUG.2011 14:49:42

Power Spectral Density – Channel 1 802.11n mode (20MHz)



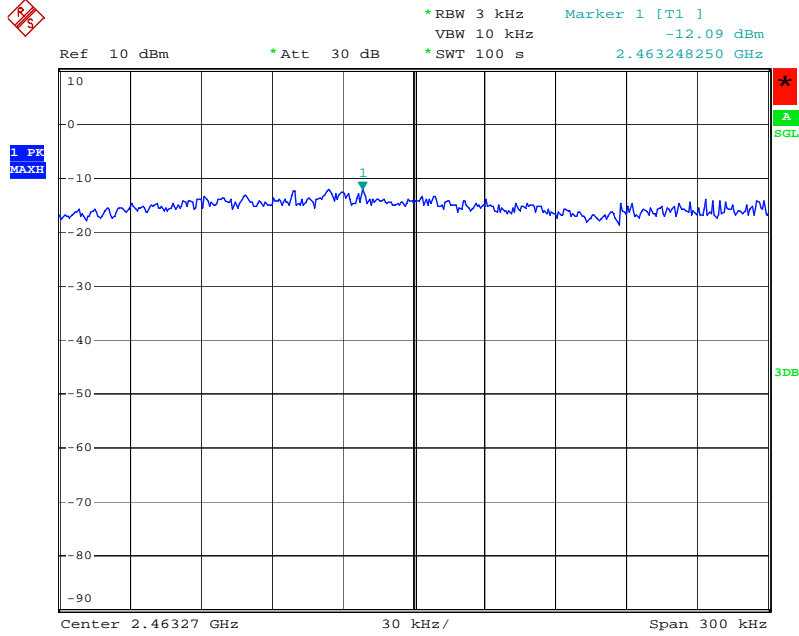
Date: 11.AUG.2011 09:54:45

Power Spectral Density – Channel 6 802.11n mode (20MHz)



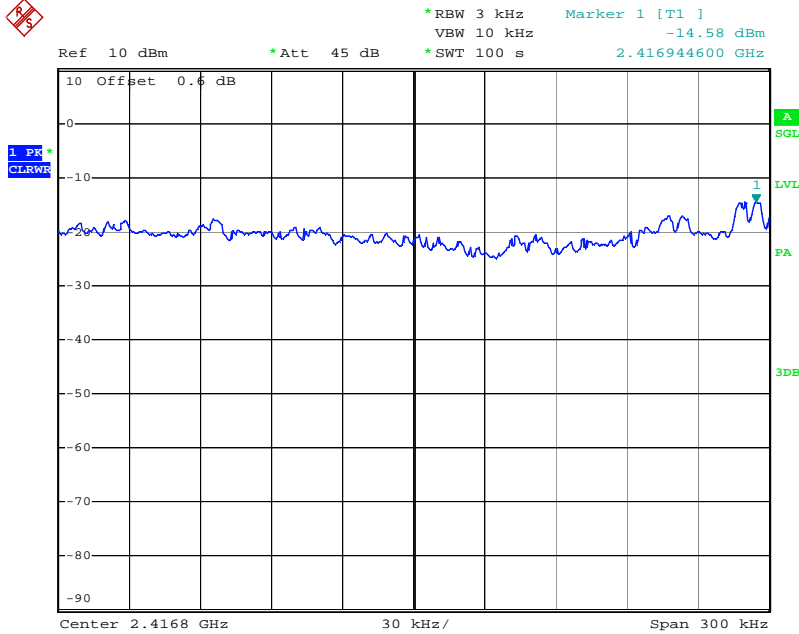
Date: 11.AUG.2011 09:58:39

Power Spectral Density – Channel 11 802.11n mode (20MHz)



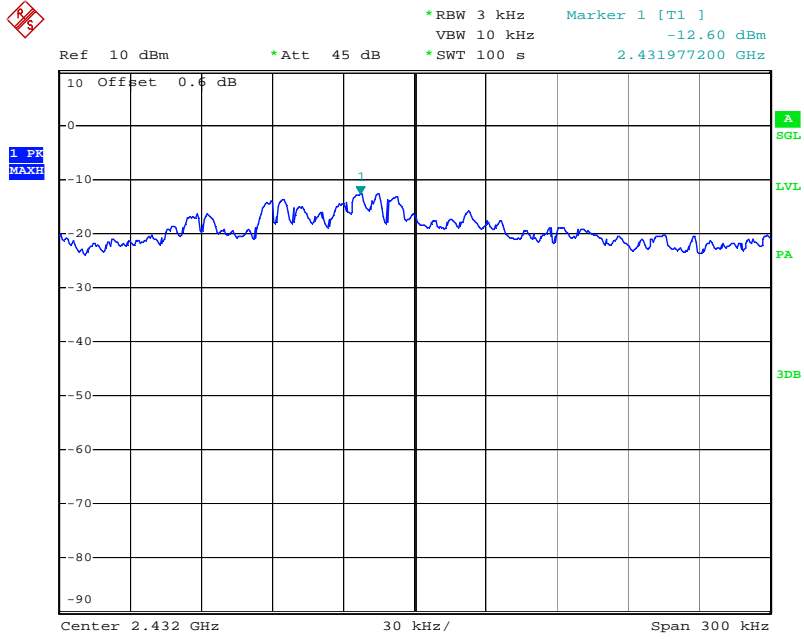
Date: 11.AUG.2011 09:49:51

Power Spectral Density – Channel 3 802.11n mode (40MHz)



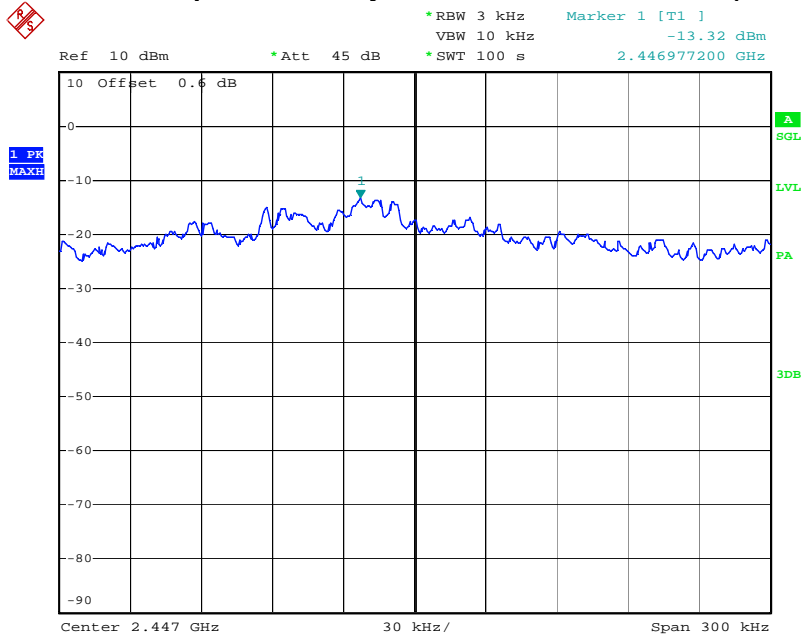
Date: 31.AUG.2011 14:06:57

Power Spectral Density – Channel 6 802.11n mode (40MHz)



Date: 31.AUG.2011 14:36:01

Power Spectral Density – Channel 9 802.11n mode (40MHz)



Date: 31.AUG.2011 14:40:29

8 Radiated Spurious Emissions (Transmitter)

8.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Part 15.205(a): Restricted Bands of Operations

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
10.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

Part 15.209(a): Field Strength Limits for Restricted Bands of Operation

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

8.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

8.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

8.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012
Preamplifier	987410	Miteq	AFS44-00102000-30-10P-44	2/4/2011	2/4/2012
Biconnilog Antenna	00051864	ETS	3142C	12/20/2010	12/20/2011
Horn Antenna	6556	ETS	3115	8/24/2011	8/24/2012
Horn Antenna	1096	Antenna Research	DRG118A	7/20/2011	7/20/2012
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
High Pass Filter	3986-01 DC0408	Microwave Circuits, Inc.	H3G020G2	Time of Use	Time of Use

8.5 Results:

All spurious emissions were attenuated by at least 20dB below the level of the fundamental as required by Part 15.247(d). Additionally, all emissions falling within restricted bands of operation and at the band edges were found to be below the limit specified in Part 15.209(a). The spurious emissions listed in the following tables are the worst case emissions.

Worst Case Spurious Measurements (802.11b Mode)

TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
1	4.9422 GHz	H	46.62	37.571	74	54	Compliant	
1	3.2161 GHz	V	45.407	33.539	74	54	Compliant	
1	4.9421 GHz	V	47.543	39.38	74	54	Compliant	
1	3.2495 GHz	V	44.982	32.433	74	54	Compliant	
1	4.824 GHz	V	54.787	51.329	74	54	Compliant	
1	7.2368 GHz	V	55.817	49.017	74	54	Compliant	
1	9.6479 GHz	V	51.188	38.877	74	54	Compliant	
1	12.062 GHz	V	54.31	43.03	74	54	Compliant	
1	14.471 GHz	V	52.399	40.349	74	54	Compliant	
1	4.8239 GHz	H	52.874	48.974	74	54	Compliant	
1	7.2375 GHz	H	54.987	47.206	74	54	Compliant	
1	9.648 GHz	H	51.448	39.188	74	54	Compliant	
1	12.062 GHz	H	54.583	43.619	74	54	Compliant	
1	14.479 GHz	H	52.897	40.477	74	54	Compliant	
6	3.2493 GHz	V	46.662	35.142	74	54	Compliant	
6	4.874 GHz	V	54.961	50.2	74	54	Compliant	
6	7.3129 GHz	V	54.099	46.209	74	54	Compliant	
6	9.7481 GHz	V	52.326	40.526	74	54	Compliant	
6	12.187 GHz	V	53.021	40.181	74	54	Compliant	
6	14.622 GHz	V	53.22	41	74	54	Compliant	
6	3.2493 GHz	H	44.121	33.591	74	54	Compliant	
6	4.874 GHz	H	51.411	46.801	74	54	Compliant	
6	7.3124 GHz	H	54.222	46.489	74	54	Compliant	
6	9.7479 GHz	H	51.915	40.29	74	54	Compliant	
6	12.187 GHz	H	55.558	46.088	74	54	Compliant	
6	14.621 GHz	H	53.504	41.184	74	54	Compliant	
11	4.924 GHz	V	49.86	45.06	74	54	Compliant	
11	7.3875 GHz	V	55.78	48.9	74	54	Compliant	
11	9.8535 GHz	V	49.738	37.208	74	54	Compliant	
11	12.316 GHz	V	51.154	38.234	74	54	Compliant	
11	14.772 GHz	V	50.538	40.348	74	54	Compliant	
11	4.9239 GHz	H	49.6	42.381	74	54	Compliant	
11	7.3875 GHz	H	55.239	48.009	74	54	Compliant	
11	9.8481 GHz	H	46.701	37.441	74	54	Compliant	
11	12.312 GHz	H	50.404	40.364	74	54	Compliant	
11	14.772 GHz	H	51.018	40.398	74	54	Compliant	

Worst Case Spurious Measurements (802.11g Mode)

TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
1	4.8243 GHz	V	55.789	36.579	74	54	Compliant	
1	4.942 GHz	V	45.623	36.982	74	54	Compliant	
1	7.236 GHz	V	51.726	34.186	74	54	Compliant	
1	9.648 GHz	V	47.073	37.453	74	54	Compliant	
1	12.06 GHz	V	48.283	38.493	74	54	Compliant	
1	12.375 GHz	V	48.568	39.128	74	54	Compliant	
1	14.472 GHz	V	55.867	45.667	74	54	Compliant	
1	4.8241 GHz	H	51.833	35.293	74	54	Compliant	
1	7.2361 GHz	H	50.567	33.88	74	54	Compliant	
1	9.648 GHz	H	48.193	37.493	74	54	Compliant	
1	12.06 GHz	H	54.133	38.973	74	54	Compliant	
1	12.375 GHz	H	49.098	39.398	74	54	Compliant	
1	14.472 GHz	H	56.537	45.737	74	54	Compliant	
6	3.2493 GHz	V	47.652	36.602	74	54	Compliant	
6	4.8751 GHz	V	55.09	37.991	74	54	Compliant	
6	7.311 GHz	V	55.152	37.152	74	54	Compliant	
6	9.748 GHz	V	47.264	36.804	74	54	Compliant	
6	12.185 GHz	V	47.472	37.582	74	54	Compliant	
6	14.622 GHz	V	50.361	40.851	74	54	Compliant	
6	3.2249 GHz	H	36.842	27.282	74	54	Compliant	
6	4.874 GHz	H	50.551	34.681	74	54	Compliant	
6	7.311 GHz	H	52.423	35.593	74	54	Compliant	
6	9.748 GHz	H	46.344	37.164	74	54	Compliant	
6	9.8985 GHz	H	46.853	37.483	74	54	Compliant	
6	12.185 GHz	H	47.362	38.222	74	54	Compliant	
6	12.379 GHz	H	47.798	38.348	74	54	Compliant	
6	14.622 GHz	H	50.221	41.311	74	54	Compliant	
11	3.2826 GHz	V	45.182	34.902	74	54	Compliant	
11	4.925 GHz	V	49.65	31.992	74	54	Compliant	
11	7.3861 GHz	V	50.396	35.036	74	54	Compliant	
11	9.848 GHz	V	48.44	37.75	74	54	Compliant	
11	12.31 GHz	V	49.759	39.079	74	54	Compliant	
11	14.772 GHz	V	53.038	43.108	74	54	Compliant	

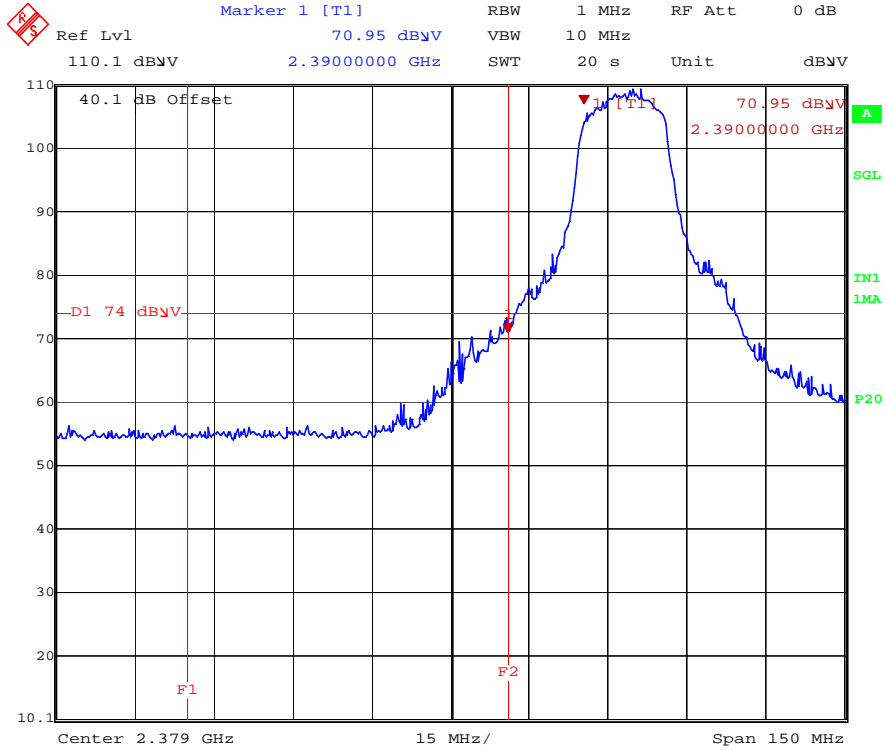
Worst Case Spurious Measurements (802.11n (20MHz) Mode)

TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
1	3.216 GHz	V	43	31.141	74	54	Compliant	
1	4.824 GHz	V	49.412	30.822	74	54	Compliant	
1	4.942 GHz	V	44.782	37.292	74	54	Compliant	
1	7.236 GHz	V	42.967	33.177	74	54	Compliant	
1	9.6481 GHz	V	48.583	37.243	74	54	Compliant	
1	12.06 GHz	V	48.783	38.293	74	54	Compliant	
1	12.375 GHz	V	50.008	38.968	74	54	Compliant	
1	14.472 GHz	V	57.287	45.387	74	54	Compliant	
1	3.2484 GHz	H	37.684	27.394	74	54	Compliant	
1	4.824 GHz	H	46.892	30.112	74	54	Compliant	
1	4.942 GHz	H	44.082	33.562	74	54	Compliant	
1	7.236 GHz	H	42.198	33.198	74	54	Compliant	
1	9.6481 GHz	H	45.654	37.194	74	54	Compliant	
1	12.06 GHz	H	46.873	38.213	74	54	Compliant	
1	14.472 GHz	H	55.867	45.197	74	54	Compliant	
6	3.2493 GHz	V	45.601	35.251	74	54	Compliant	
6	4.874 GHz	V	47.475	31.315	74	54	Compliant	
6	4.942 GHz	V	44.901	36.672	74	54	Compliant	
6	7.311 GHz	V	43.112	33.552	74	54	Compliant	
6	9.748 GHz	V	47.888	37.688	74	54	Compliant	
6	12.185 GHz	V	47.94	38.72	74	54	Compliant	
6	14.622 GHz	V	54.564	45.324	74	54	Compliant	
6	3.2493 GHz	H	41.581	32.171	74	54	Compliant	
6	4.874 GHz	H	44.615	29.435	74	54	Compliant	
6	4.9419 GHz	H	44.223	35.473	74	54	Compliant	
6	7.311 GHz	H	45.283	33.943	74	54	Compliant	
6	9.748 GHz	H	47.619	37.809	74	54	Compliant	
6	12.185 GHz	H	50.71	38.69	74	54	Compliant	
6	14.622 GHz	H	58.793	45.343	74	54	Compliant	
11	3.2827 GHz	V	43.682	31.202	74	54	Compliant	
11	4.9258 GHz	V	43.3	27.416	74	54	Compliant	
11	7.386 GHz	V	41.654	32.734	74	54	Compliant	
11	9.848 GHz	V	50.121	37.781	74	54	Compliant	
11	12.31 GHz	V	48.637	39.087	74	54	Compliant	
11	14.772 GHz	V	53.287	43.067	74	54	Compliant	
11	3.2826 GHz	H	42.382	31.522	74	54	Compliant	
11	4.924 GHz	H	41.39	28.03	74	54	Compliant	
11	7.386 GHz	H	45.236	34.036	74	54	Compliant	
11	9.8481 GHz	H	47.969	38.139	74	54	Compliant	
11	12.31 GHz	H	49.007	39.277	74	54	Compliant	
11	14.72 GHz	H	55.621	43.991	74	54	Compliant	

Worst Case Spurious Measurements (802.11n (40MHz)Mode)

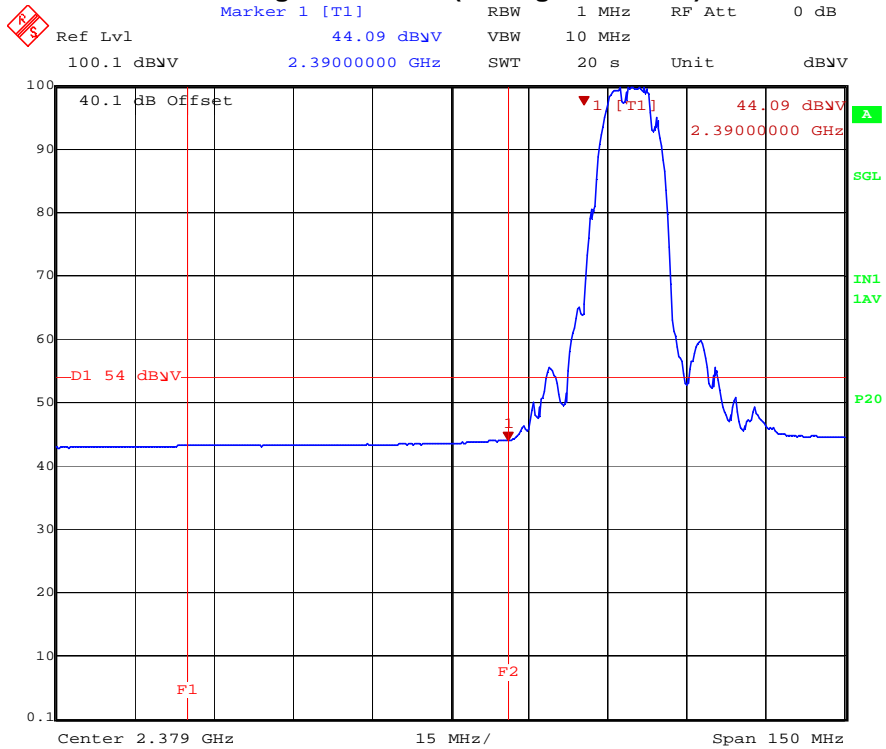
TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
3	3.2482 GHz	V	38.489	28.809	74	54	Compliant	
3	4.8426 GHz	V	48.636	34.906	74	54	Compliant	
3	7.2664 GHz	V	51.127	36.177	74	54	Compliant	
3	9.6881 GHz	V	48.464	38.884	74	54	Compliant	
3	12.11 GHz	V	48.127	39.367	74	54	Compliant	
3	14.532 GHz	V	52.059	42.369	74	54	Compliant	
3	3.2485 GHz	H	38.601	29.181	74	54	Compliant	
3	4.8426 GHz	H	48.757	35.027	74	54	Compliant	
3	7.2668 GHz	H	54.981	37.483	74	54	Compliant	
3	9.688 GHz	H	47.654	38.294	74	54	Compliant	
3	12.11 GHz	H	48.487	38.557	74	54	Compliant	
3	14.532 GHz	H	50.94	41.52	74	54	Compliant	
6	3.2493 GHz	V	46.426	32.796	74	54	Compliant	
6	4.8705 GHz	V	48.326	33.071	74	54	Compliant	
6	7.3111 GHz	V	49.128	35.218	74	54	Compliant	
6	9.748 GHz	V	47.65	38.18	74	54	Compliant	
6	12.185 GHz	V	47.076	38.086	74	54	Compliant	
6	14.622 GHz	V	50.714	41.184	74	54	Compliant	
6	3.2492 GHz	H	45.505	31.466	74	54	Compliant	
6	4.8728 GHz	H	48.453	34.853	74	54	Compliant	
6	7.3114 GHz	H	49.352	36.942	74	54	Compliant	
6	9.7481 GHz	H	46.311	38.101	74	54	Compliant	
6	12.185 GHz	H	48.736	38.446	74	54	Compliant	
6	14.622 GHz	H	54.074	41.574	74	54	Compliant	
9	3.2694 GHz	V	44.835	30.925	74	54	Compliant	
9	4.9051 GHz	V	50.49	35.43	74	54	Compliant	
9	7.3557 GHz	V	50.565	35.815	74	54	Compliant	
9	9.8081 GHz	V	48.277	37.767	74	54	Compliant	
9	12.26 GHz	V	48.877	39.357	74	54	Compliant	
9	14.712 GHz	V	51.309	41.679	74	54	Compliant	
9	3.2694 GHz	H	44.835	30.425	74	54	Compliant	
9	4.905 GHz	H	48.279	34.68	74	54	Compliant	
9	7.3559 GHz	H	54.415	38.182	74	54	Compliant	
9	9.808 GHz	H	47.386	37.706	74	54	Compliant	
9	12.26 GHz	H	49.138	38.938	74	54	Compliant	
9	14.712 GHz	H	50.69	41.45	74	54	Compliant	

Low Channel Band Edge Emissions (Peak Detection) – 802.11b Mode



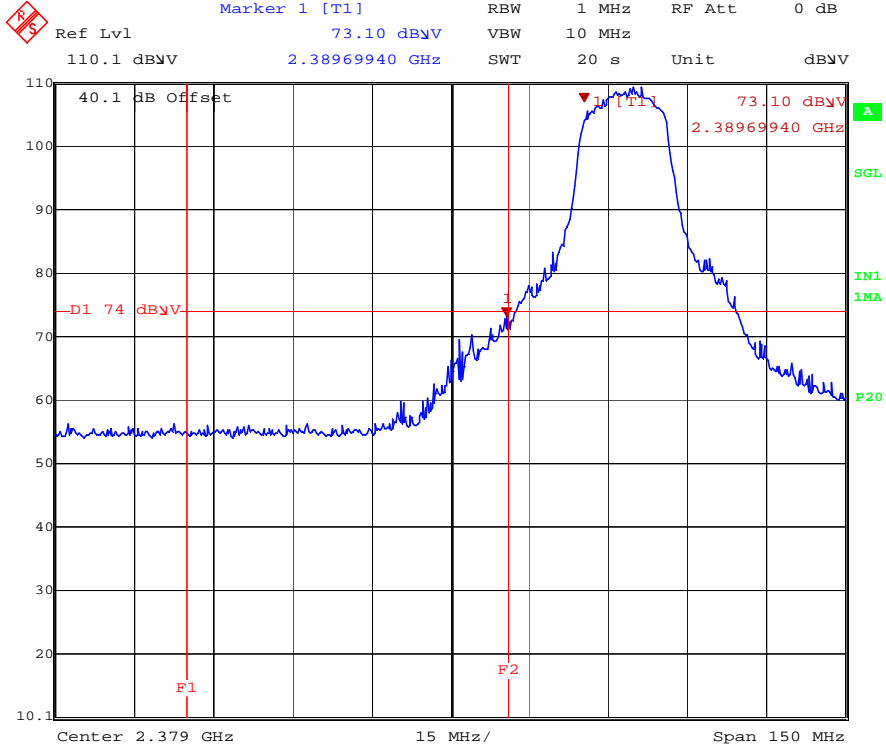
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Low Channel Band Edge Emissions (Average Detection) – 802.11b Mode



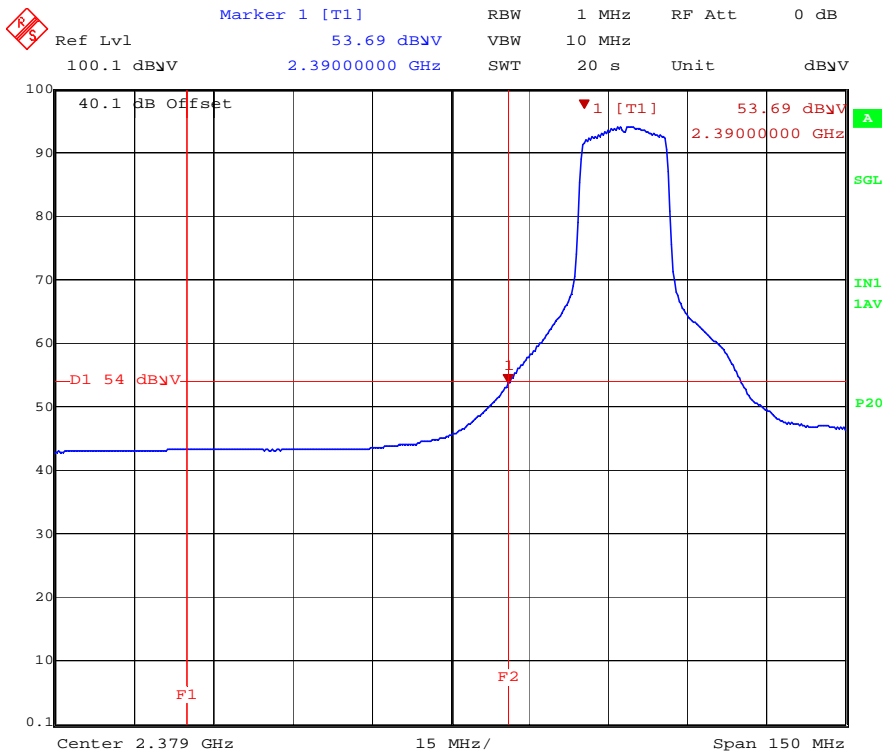
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Low Channel Band Edge Emissions (Peak Detection) – 802.11g Mode



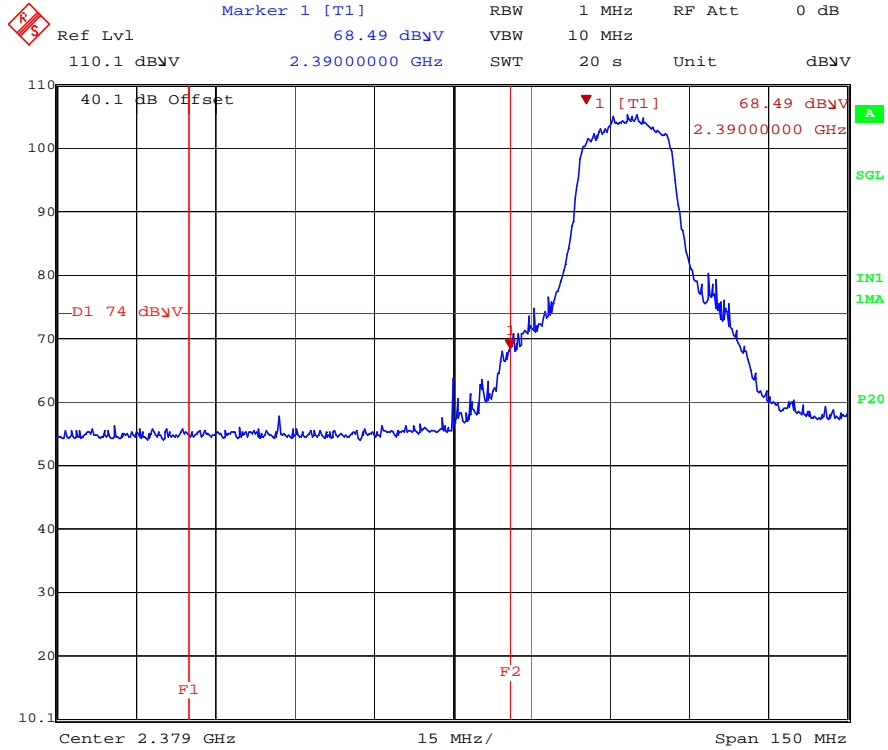
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Low Channel Band Edge Emissions (Average Detection) – 802.11g Mode



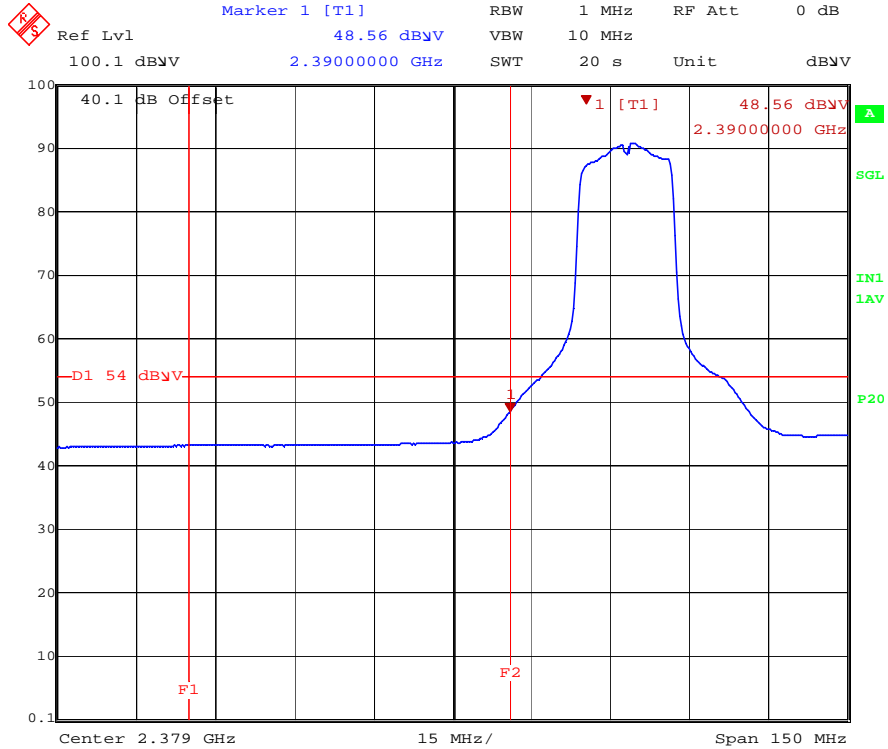
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Low Channel Band Edge Emissions (Peak Detection) – 802.11n (20MHz)



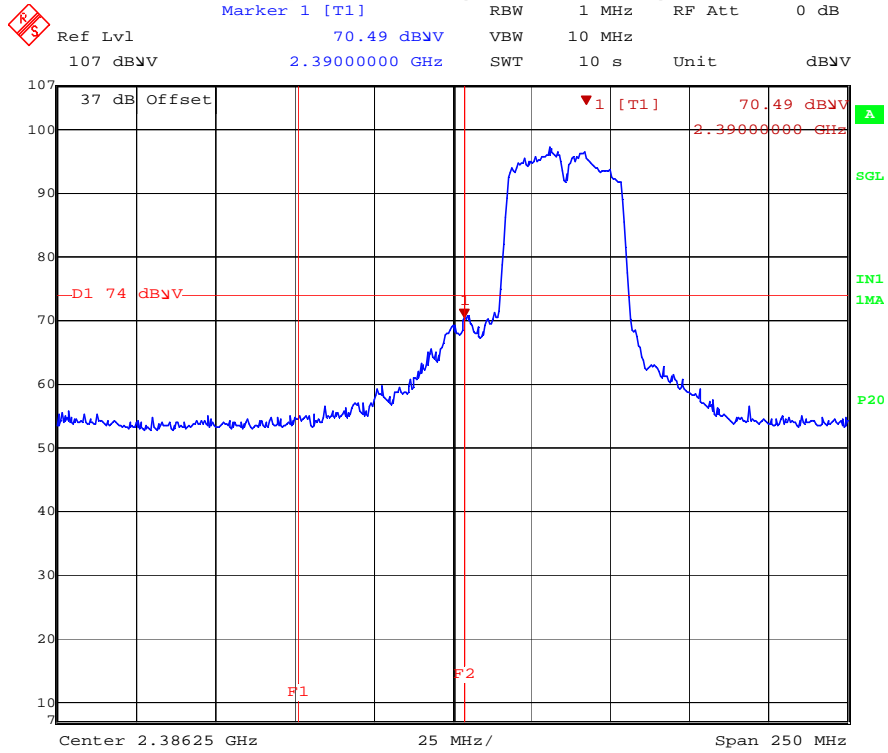
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Low Channel Band Edge Emissions (Average Detection) – 802.11n (20MHz)



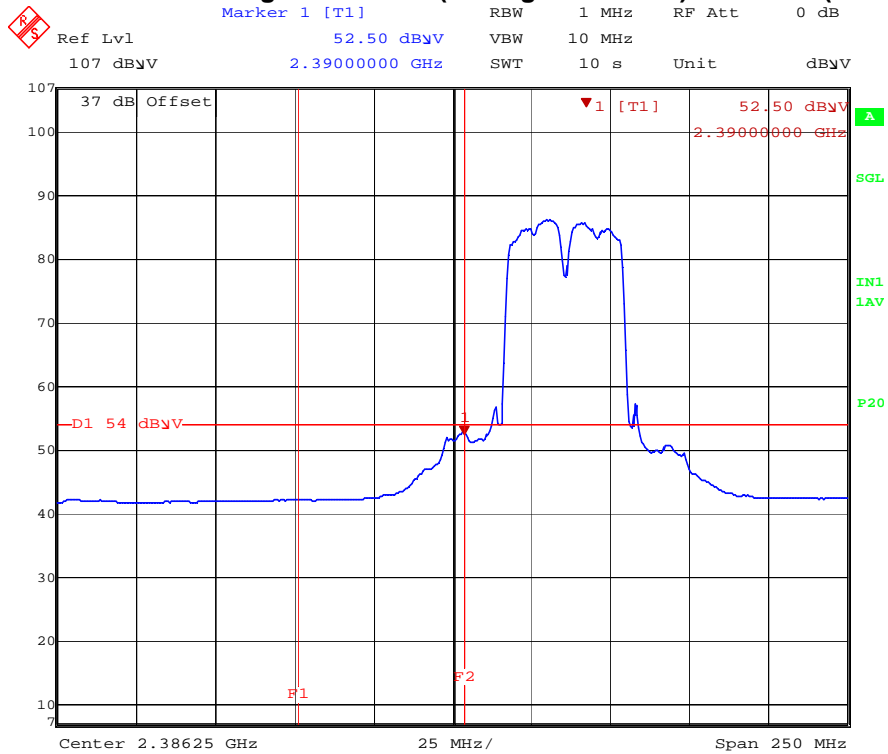
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Low Channel Band Edge Emissions (Peak Detection) – 802.11n (40MHz)



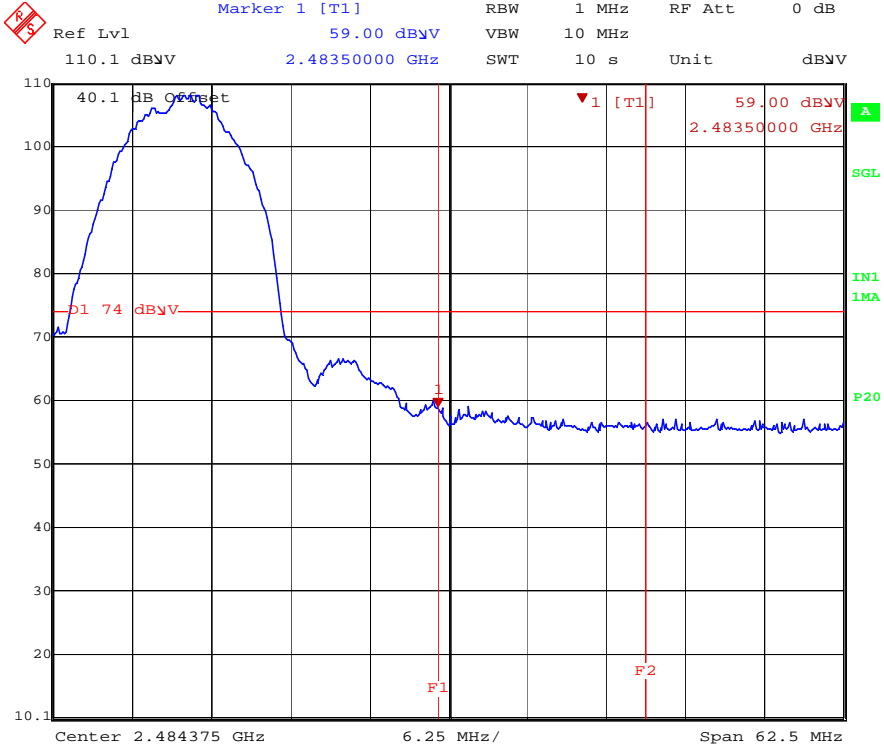
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Low Channel Band Edge Emissions (Average Detection) – 802.11n (40MHz)



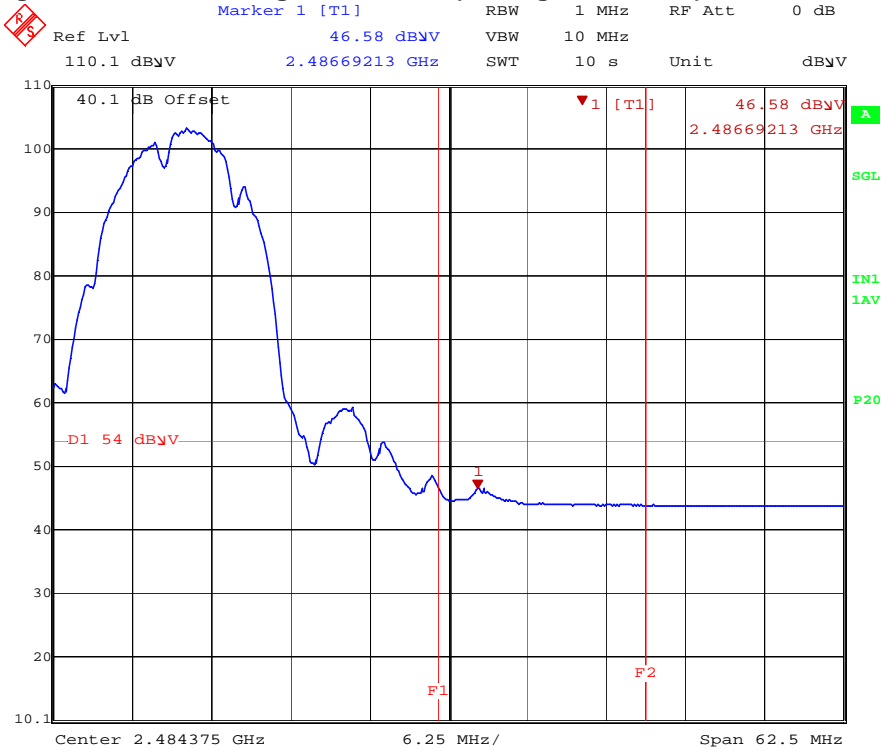
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High Channel Band Edge Emissions (Peak Detection) – 802.11b Mode



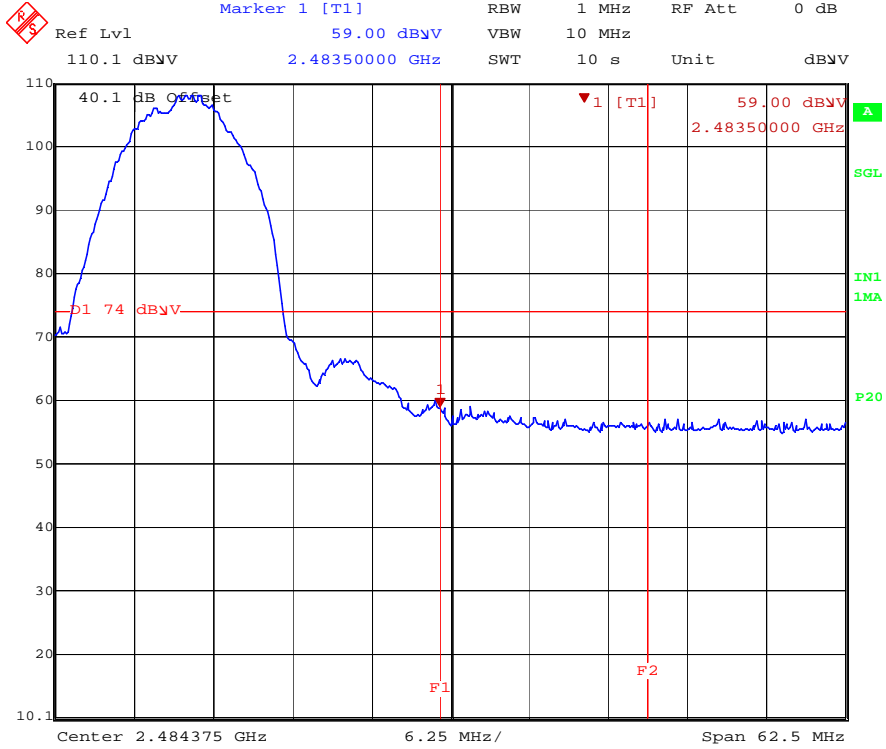
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High Channel Band Edge Emissions (Average Detection) – 802.11b Mode



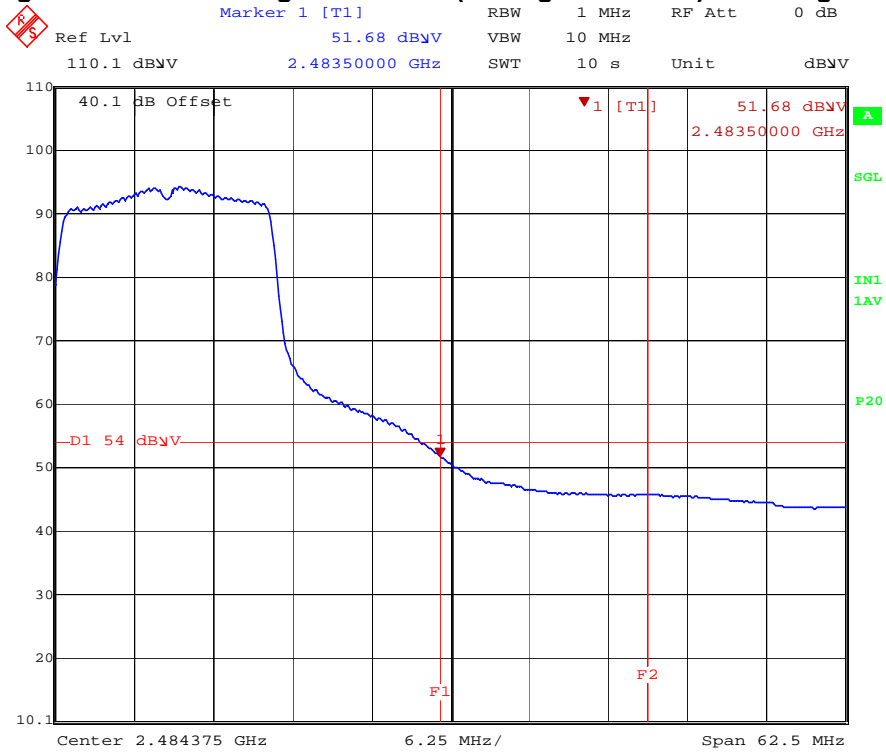
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High Channel Band Edge Emissions (Peak Detection) – 802.11g Mode



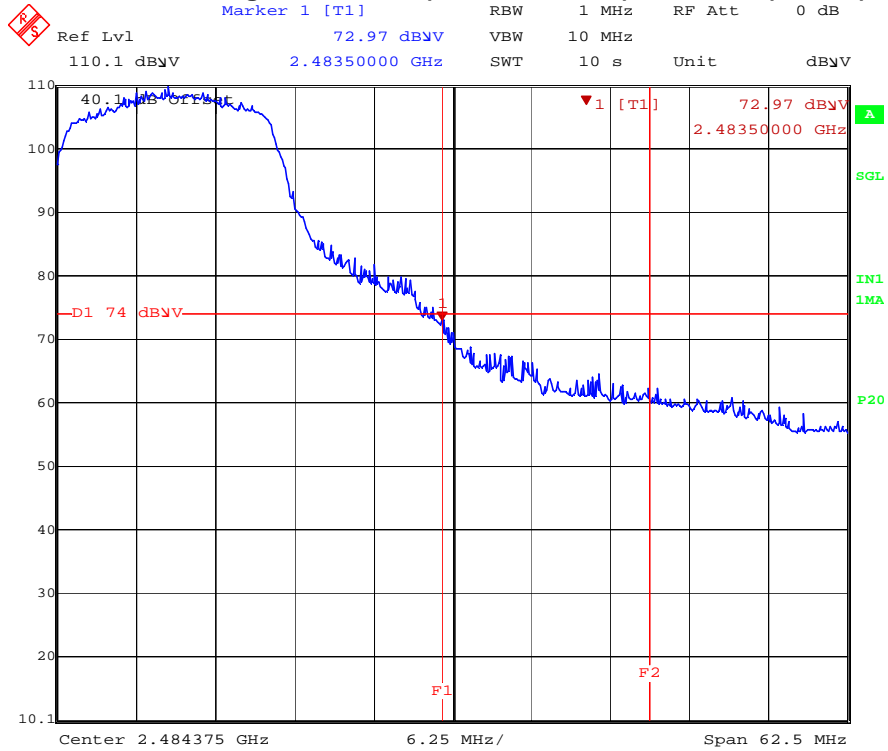
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High Channel Band Edge Emissions (Average Detection) – 802.11g Mode

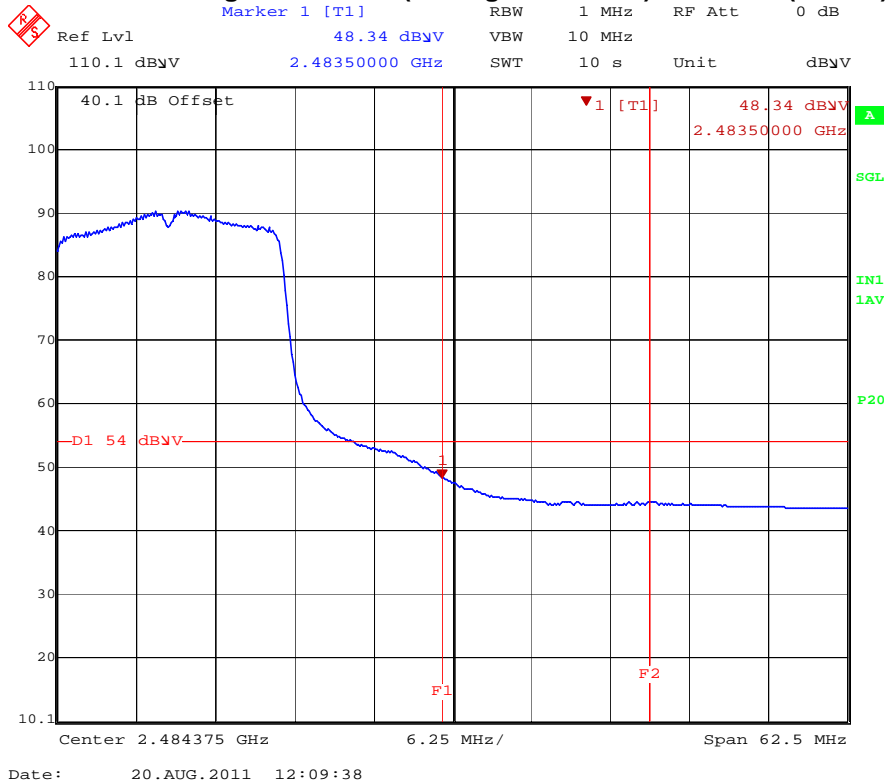


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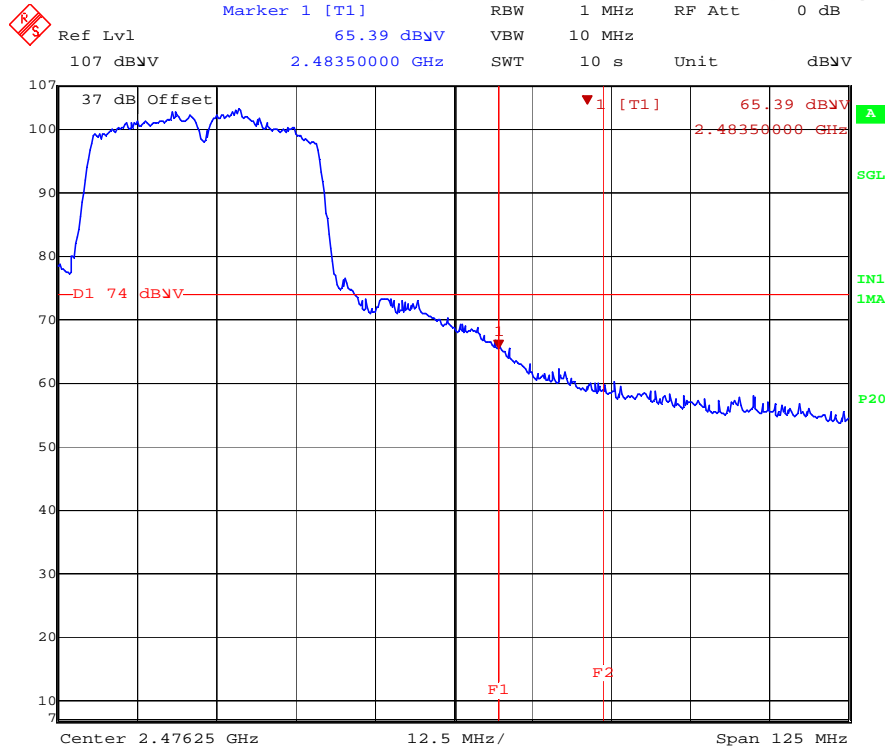
High Channel Band Edge Emissions (Peak Detection) – 802.11n (20MHz) Mode



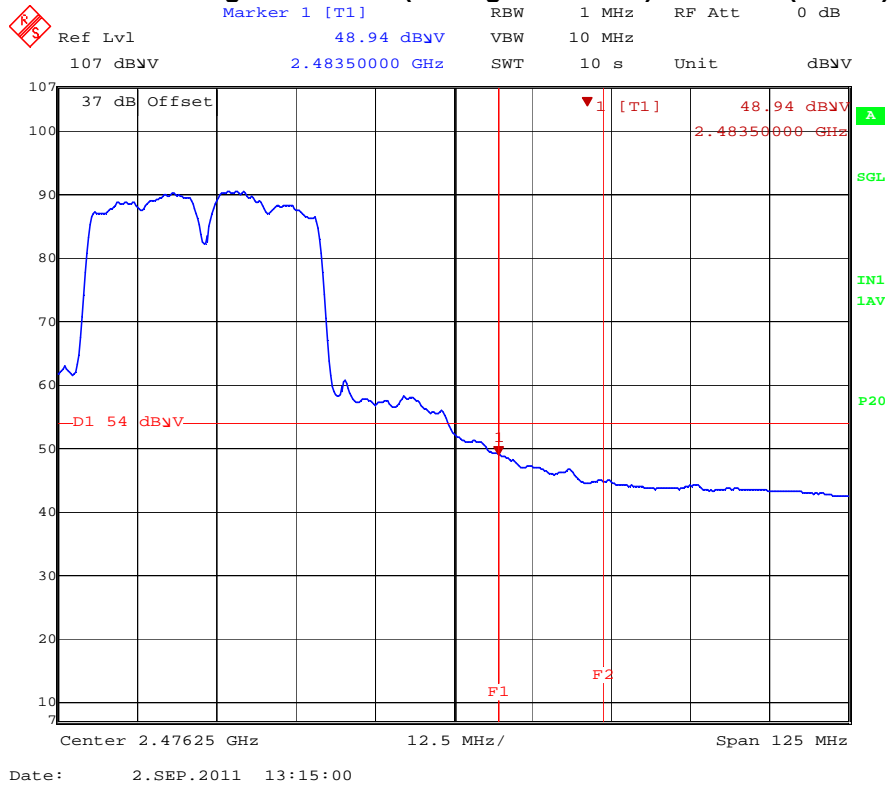
High Channel Band Edge Emissions (Average Detection) – 802.11n (20MHz) Mode



High Channel Band Edge Emissions (Peak Detection) – 802.11n (40MHz) Mode



High Channel Band Edge Emissions (Average Detection) – 802.11n (40MHz) Mode



9 Radiated Spurious Emissions (Receiver)

9.1 Test Limits

§ 15.109: Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBuV/m)
30–88	100	40
88–216	150	43.5
216–960	200	46
Above 960	500	54

These limits are identical to those in RSS-GEN

9.2 Test Procedure

ANSI C63.4: 2009

9.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

9.4 Test Equipment Used:

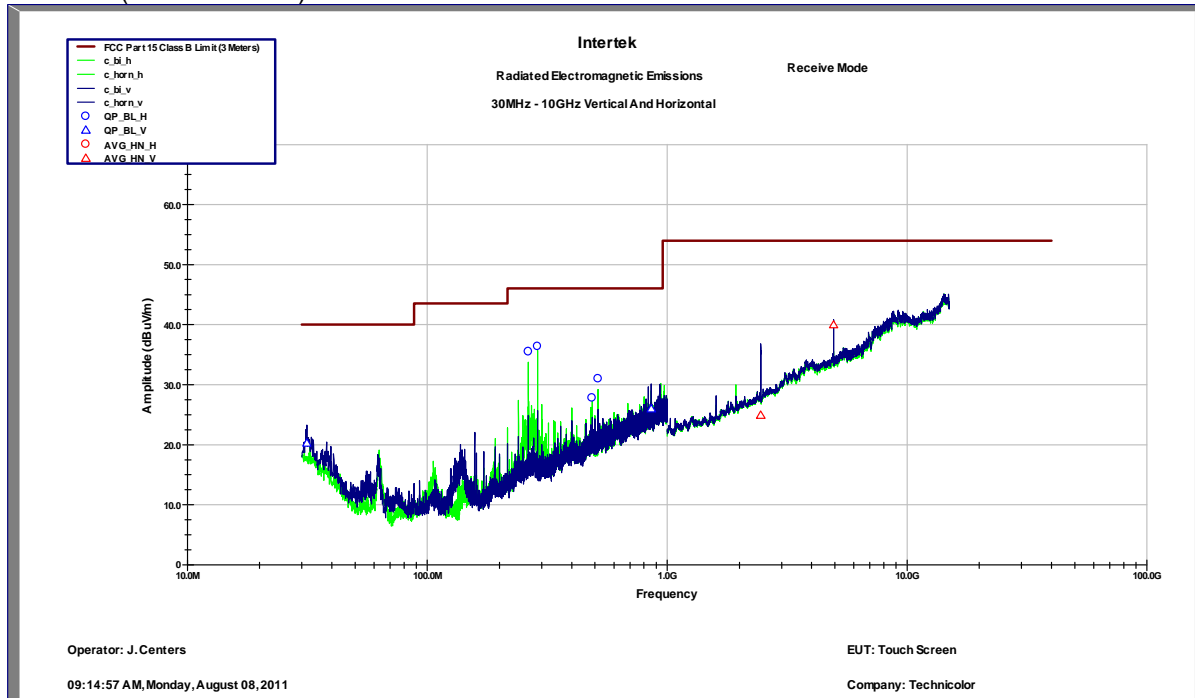
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012
Biconnilog Antenna	00051864	ETS	3142C	12/20/2010	12/20/2011
Horn Antenna	6556	ETS	3115	8/24/2011	8/24/2012
Horn Antenna	1096	Antenna Research	DRG118A	7/20/2011	7/20/2012
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use

9.5 Results:

All spurious emissions with the test sample in receive mode were below the limits specified in Part 15.109 for a class B digital device and RSS-GEN Section 6.1.

Radiated Emissions										
Test Engineer: J. Centers		Start Date: 8/8/2011		End Date: 8/8/2011						
Temperature: 24.8C		Humidity: 47.30%		Pressure: 978.67 mbar						
Specification: FCC Part 15B		Test Limit: Class B								
Notes:										
A	B	C	D	E	F	G	H	I	J	K
Frequency	Polarity (H/V)	Raw Reading (dBuV)	Cab. (dB)	Ant. (dB)	Corr. Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	RBW / Detector	Test Distance	Results
31.5 MHz	V	19.14	-16.13	17.25	20.26	40	-19.74	120kHz/QP	3m	Compliant
859.1 MHz	V	14.41	-11.4	22.95	25.96	46.02	-20.06	120kHz/QP	3m	Compliant
264.01 MHz	H	36.64	-14.26	13.12	35.5	46.02	-10.52	120kHz/QP	3m	Compliant
288.0 MHz	H	37.44	-14.19	13.12	36.38	46.02	-9.64	120kHz/QP	3m	Compliant
486.85 MHz	H	22.41	-13.13	18.5	27.78	46.02	-18.24	120kHz/QP	3m	Compliant
515.47 MHz	H	25.62	-13.01	18.35	30.96	46.02	-15.06	120kHz/QP	3m	Compliant
2.455 GHz	V	29.47	-33.12	28.54	24.89	53.98	-29.09	1MHz/AVG	3m	Compliant
4.9421 GHz	V	35.14	-28.28	33.1	39.96	53.98	-14.02	1MHz/AVG	3m	Compliant
Calculations:					F = C + D + E		H = F - G			

Peak Scan (Receive Mode)



10 AC Powerline Conducted Emissions

10.1 Test Limits

§ 15.107(e): Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

10.2 Test Procedure

ANSI C63.4: 2003

10.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012
LISN	3333	Teseq	NNB52	3/3/2011	3/3/2012

10.4 Results:

Quasi-Peak and Average Measurements (802.11b,Mode)

Conducted Voltage Emissions on Power Lines								
Test Engineer:	J. Centers	Start Date:	8/22/2011	End Date:	8/22/2011			
Temperature:	24.7C	Humidity:	48.50%	Pressure:	985.4mbar			
Specification:	FCC Part 15	Test Limit:	15.107/15.207	RBW:	9kHz			
Notes:								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
L1	167.8 KHz	50.21	65.07	-14.85	29.7	55.07	-25.36	Compliant
L1	187.3 KHz	47.95	64.16	-16.2	32.4	54.16	-21.75	Compliant
L1	282.4 KHz	50.3	60.74	-10.44	42.69	50.74	-8.05	Compliant
L2	159.0 KHz	53.36	65.52	-12.16	35.59	55.52	-19.93	Compliant
L2	185.3 KHz	47.8	64.24	-16.44	30.09	54.24	-24.15	Compliant
L2	280.7 KHz	49.3	60.8	-11.5	41.06	50.8	-9.74	Compliant

Quasi-Peak and Average Measurements (802.11g,Mode)

Conducted Voltage Emissions on Power Lines								
Test Engineer:	J. Centers	Start Date:	8/22/2011	End Date:	8/22/2011			
Temperature:	24.7C	Humidity:	48.50%	Pressure:	985.4mbar			
Specification:	FCC Part 15	Test Limit:	15.107/15.207	RBW:	9kHz			
Notes:								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
L1	150.0 KHz	52.36	66	-13.64	31.39	56	-24.61	Compliant
L1	159.0 KHz	52.44	65.52	-13.08	32.05	55.52	-23.47	Compliant
L1	200.2 KHz	43.89	63.6	-19.71	28.57	53.6	-25.03	Compliant
L1	276.1 KHz	47.77	60.93	-13.16	38.5	50.93	-12.43	Compliant
L1	276.1 KHz	47.77	60.93	-13.16	38.5	50.93	-12.43	Compliant
L1	1.1323 MHz	34.47	56	-21.53	25.8	46	-20.2	Compliant
L2	150.0 KHz	52.79	66	-13.21	33.05	56	-22.95	Compliant
L2	160.5 KHz	52.62	65.44	-12.82	33.37	55.44	-22.07	Compliant
L2	177.0 KHz	47.09	64.63	-17.54	27.3	54.63	-27.33	Compliant
L2	277.0 KHz	48.95	60.91	-11.96	40.74	50.91	-10.17	Compliant
L2	293.3 KHz	48.31	60.43	-12.12	37.98	50.43	-12.45	Compliant
L2	1.1317 MHz	33.06	56	-22.94	23.61	46	-22.39	Compliant

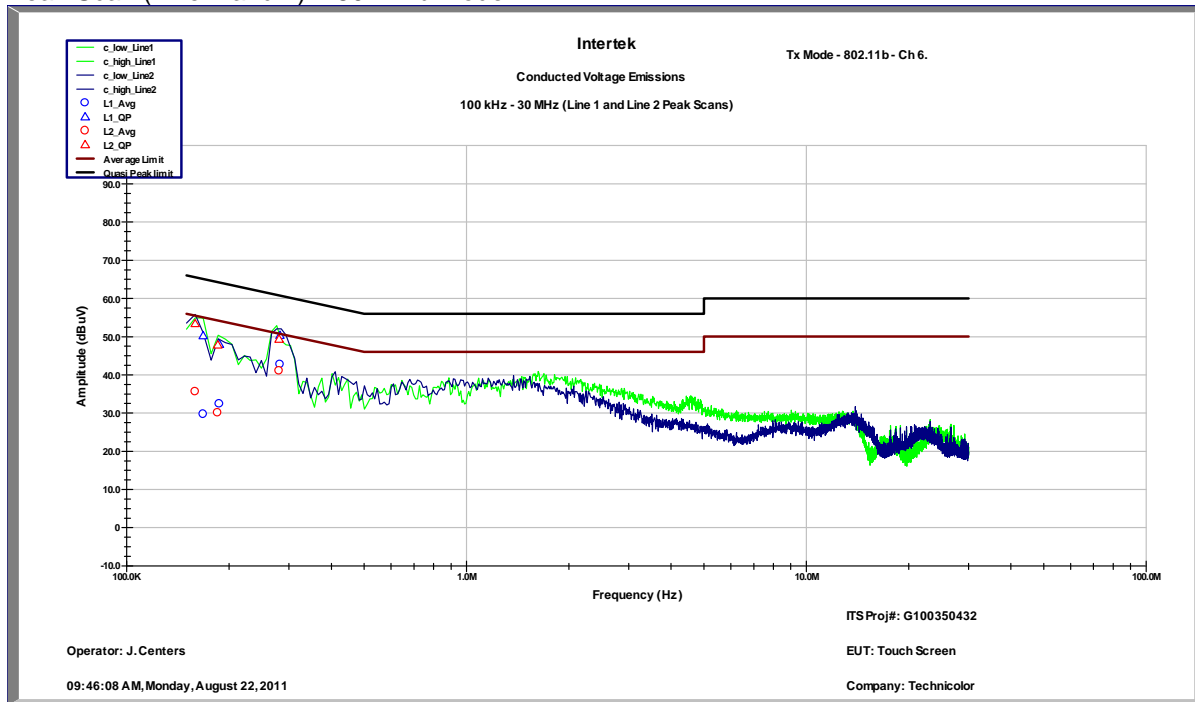
Quasi-Peak and Average Measurements (802.11n,Mode)

Conducted Voltage Emissions on Power Lines								
Test Engineer: J. Centers			Start Date: 8/22/2011			End Date: 8/22/2011		
Temperature: 24.7C			Humidity: 48.50%			Pressure: 985.4mbar		
Specification: FCC Part 15			Test Limit: 15.107/15.207			RBW: 9kHz		
Notes:								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
L1	150.0 KHz	53.42	66	-12.58	34.61	56	-21.39	Compliant
L1	175.3 KHz	47.78	64.71	-16.93	28.31	54.71	-26.4	Compliant
L1	283.0 KHz	49.83	60.73	-10.9	40.74	50.73	-9.99	Compliant
L2	150.0 KHz	53.28	66	-12.72	33.19	56	-22.81	Compliant
L2	175.0 KHz	47.99	64.72	-16.73	26.95	54.72	-27.77	Compliant
L2	283.1 KHz	48.88	60.72	-11.84	38.85	50.72	-11.87	Compliant

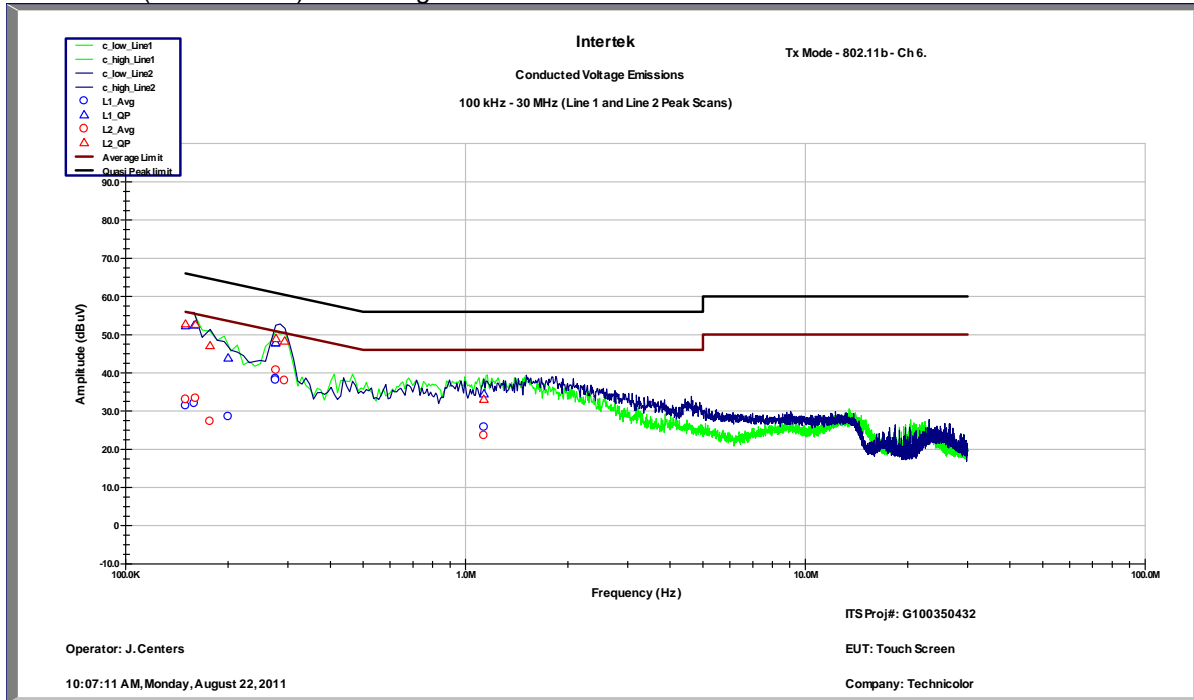
Quasi-Peak and Average Measurements (Receive Mode)

Conducted Voltage Emissions on Power Lines								
Test Engineer: J. Centers			Start Date: 8/22/2011			End Date: 8/22/2011		
Temperature: 24.7C			Humidity: 48.50%			Pressure: 985.4mbar		
Specification: FCC Part 15			Test Limit: 15.107/15.207			RBW: 9kHz		
Notes:								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
L1	150.0 KHz	47.2	66	-18.8	28.19	56	-27.81	Compliant
L1	171.7 KHz	49.67	64.88	-15.21	35.63	54.88	-19.25	Compliant
L1	198.7 KHz	44.1	63.66	-19.57	31.7	53.66	-21.97	Compliant
L1	286.3 KHz	50.57	60.63	-10.06	44.72	50.63	-5.91	Compliant
L2	158.7 KHz	42.89	65.53	-22.64	21.07	55.53	-34.46	Compliant
L2	167.6 KHz	49.09	65.08	-15.98	32.47	55.08	-22.6	Compliant
L2	199.2 KHz	43.67	63.64	-19.97	31.01	53.64	-22.63	Compliant
L2	284.0 KHz	49.25	60.7	-11.45	43	50.7	-7.7	Compliant

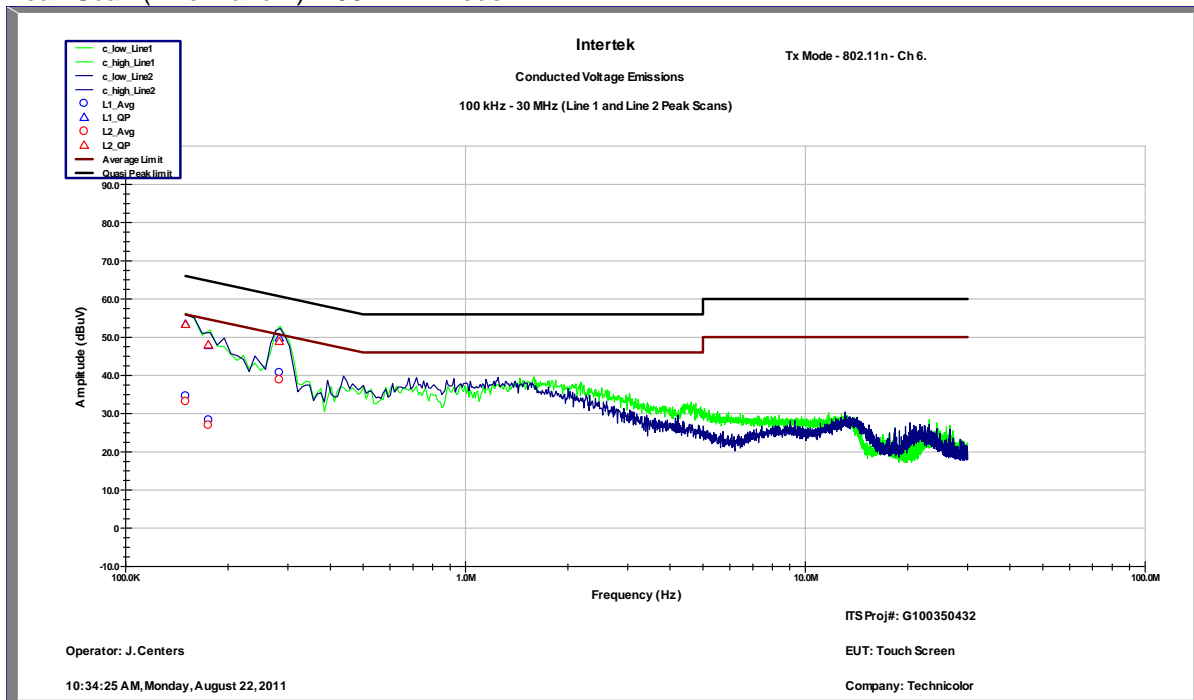
Peak Scan (Line 1 and 2) – 802.11b Mode



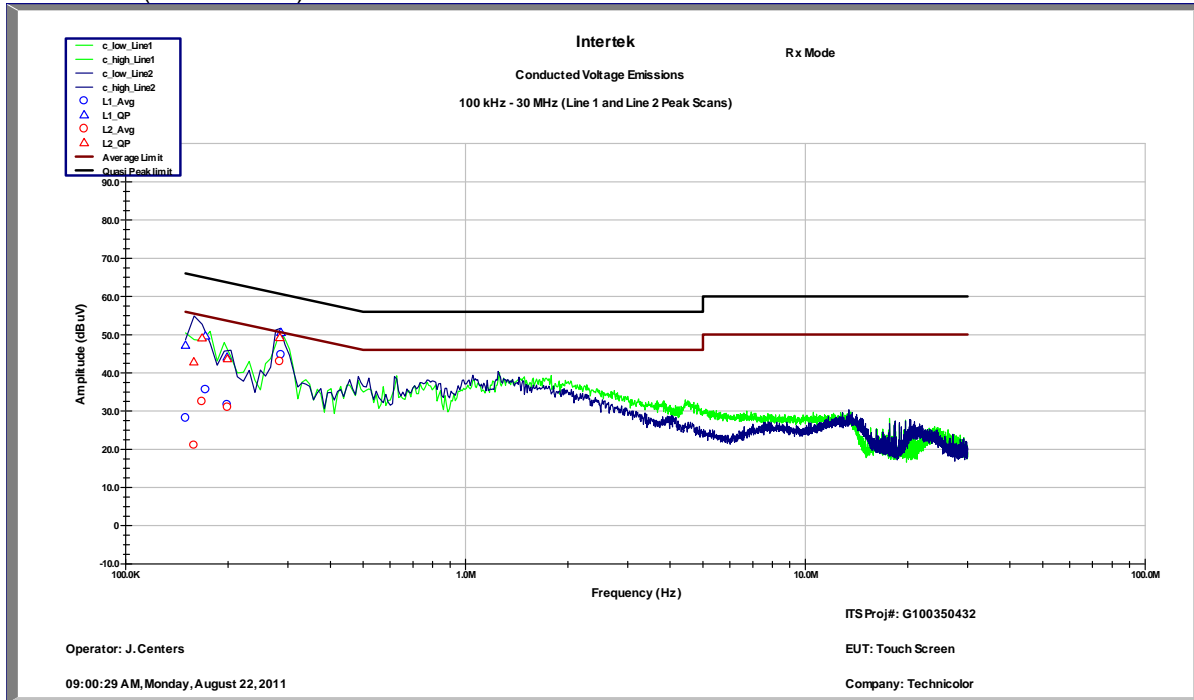
Peak Scan (Line 1 and 2) – 802.11g Mode



Peak Scan (Line 1 and 2) – 802.11n Mode



Peak Scan (Line 1 and 2) – Receive Mode



11 Antenna Requirement per FCC Part 15.203**11.1 Test Limits**

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

11.2 Results:

The sample tested met the antenna requirement. The antenna utilized a U.fl connector for connection to the PCB.

12 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of $k = 2$, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	+3.9dB	
Radiated emissions, 1 to 18 GHz	+4.2dB	
Radiated emissions, 18 to 40 GHz	+4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	+2.8dB	

13 Revision History

Revision Level	Date	Report Number	Notes
0	9/12/2011	100350432LEX-002	Original Issue
1	10/1/2011	100350432LEX-002	Editorial Corrections
2	3/14/2012	100350432LEX-002	Change FCC & IC ID