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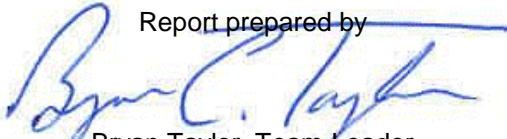
TEST REPORT

Report Number: 100596665LEX-001
Project Number: G100596665

Report Issue Date: 7/16/2012
Product Name: LEX-M01-005
FCCID: IYLLEXM01005
ICID: 2376A-M01005
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:
Lexmark International, Inc.
740 New Circle Road, NW F61/004-2
Lexington, KY 40511

Report prepared by

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Report reviewed by

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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 facility 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
33	Power Spectral Density	§ 15.247(e)	RSS-210 (A8.2b)	Pass
40	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-210 (2.2) (A8.5)	Pass
66	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (6.1)	Pass
69	AC Powerline Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (7.2.4)	Pass
72	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	Lexmark International, Inc.
Model Number	LEX-M01-005
Serial Number	Test Sample 1
FCC Identifier	IYLLEXM01005
IC Identifier	2376A-M01005
Receive Date	12/19/2011
Test Start Date	12/19/2011
Test End Date	1/29/2012
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 PCB and External Monopole
Antenna Gain (in 2.4GHz Band)	3.55dBi (Internal) and 2.0dBi (External)
Power Supply	USB Cable

Description of Equipment Under Test	
The product under test was a wireless print server (module) which will install in various printer models.	

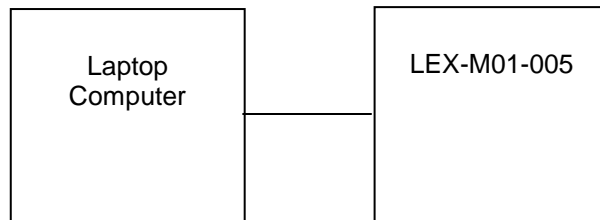
Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting on low mid or high channels
2	Receive / idle mode
3	Radiated spurious emissions and band edge testing was performed with the onboard PCB antenna as well as the external monopole antenna.

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
USB Cable	3 ft	Yes	None	Laptop Computer	Test Sample

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	9/23/2011	9/23/2012

4.4 Results:

Mode	Channel Number	Frequency (MHz)	Data Rate	Peak Conducted Power (dBm)	Peak Conducted Power Limit (dBm)	Margin (dB)	Result
802.11b	1	2412	1	20.74	30	-9.26	Pass
			2	20.2	30	-9.8	Pass
			5.5	20.23	30	-9.77	Pass
			11	20.45	30	-9.55	Pass
802.11b	6	2437	1	21.13	30	-8.87	Pass
			2	20.75	30	-9.25	Pass
			5.5	21.19	30	-8.81	Pass
			11	21.01	30	-8.99	Pass
802.11b	11	2462	1	21.25	30	-8.75	Pass
			2	20.26	30	-9.74	Pass
			5.5	20.55	30	-9.45	Pass
			11	20.81	30	-9.19	Pass
802.11g	1	2412	6	20.21	30	-9.79	Pass
			9	20.18	30	-9.82	Pass
			12	19.95	30	-10.05	Pass
			18	19.94	30	-10.06	Pass
			24	20.21	30	-9.79	Pass
			36	20.2	30	-9.8	Pass
			48	20.04	30	-9.96	Pass
			54	19.95	30	-10.05	Pass
802.11g	6	2437	6	19.8	30	-10.2	Pass
			9	19.63	30	-10.37	Pass
			12	19.68	30	-10.32	Pass
			18	19.58	30	-10.42	Pass
			24	19.85	30	-10.15	Pass
			36	19.91	30	-10.09	Pass
			48	20.3	30	-9.7	Pass
			54	20.35	30	-9.65	Pass
802.11g	11	2462	6	19.41	30	-10.59	Pass
			9	19.38	30	-10.62	Pass
			12	19.45	30	-10.55	Pass
			18	19.5	30	-10.5	Pass
			24	19.8	30	-10.2	Pass
			36	20.2	30	-9.8	Pass
			48	20.2	30	-9.8	Pass
			54	20.18	30	-9.82	Pass

802.11b and g results

Mode	Channel Number	Frequency (MHz)	Data Rate	Peak Conducted Power (dBm)	Peak Conducted Power Limit (dBm)	Margin (dB)	Result
802.11n (20MHz)	1	2412	MCS0	20.02	30	-9.98	Pass
			MCS1	19.89	30	-10.11	Pass
			MCS2	19.94	30	-10.06	Pass
			MCS3	20.02	30	-9.98	Pass
			MCS4	20.12	30	-9.88	Pass
			MCS5	19.89	30	-10.11	Pass
			MCS6	20.1	30	-9.9	Pass
			MCS7	20.1	30	-9.9	Pass
802.11n (20MHz)	6	2437	MCS0	20.1	30	-9.9	Pass
			MCS1	19.94	30	-10.06	Pass
			MCS2	20.04	30	-9.96	Pass
			MCS3	20.1	30	-9.9	Pass
			MCS4	20.11	30	-9.89	Pass
			MCS5	20.3	30	-9.7	Pass
			MCS6	20.05	30	-9.95	Pass
			MCS7	20.13	30	-9.87	Pass
802.11n (20MHz)	11	2462	MCS0	19.73	30	-10.27	Pass
			MCS1	19.78	30	-10.22	Pass
			MCS2	19.56	30	-10.44	Pass
			MCS3	19.38	30	-10.62	Pass
			MCS4	19.29	30	-10.71	Pass
			MCS5	19.31	30	-10.69	Pass
			MCS6	19.52	30	-10.48	Pass
			MCS7	19.33	30	-10.67	Pass
802.11n (40MHz)	3	2422	MCS0	15.1	30	-14.9	Pass
			MCS1	15.12	30	-14.88	Pass
			MCS2	15.13	30	-14.87	Pass
			MCS3	15.05	30	-14.95	Pass
			MCS4	15.14	30	-14.86	Pass
			MCS5	15.17	30	-14.83	Pass
			MCS6	15.2	30	-14.8	Pass
			MCS7	15.07	30	-14.93	Pass
802.11n (40MHz)	6	2437	MCS0	15.12	30	-14.88	Pass
			MCS1	15.69	30	-14.31	Pass
			MCS2	15.34	30	-14.66	Pass
			MCS3	15.4	30	-14.6	Pass
			MCS4	15.25	30	-14.75	Pass
			MCS5	15.12	30	-14.88	Pass
			MCS6	15.32	30	-14.68	Pass
			MCS7	15.16	30	-14.84	Pass
802.11n (40MHz)	9	2452	MCS0	14.9	30	-15.1	Pass
			MCS1	14.87	30	-15.13	Pass
			MCS2	14.68	30	-15.32	Pass
			MCS3	14.71	30	-15.29	Pass
			MCS4	14.68	30	-15.32	Pass
			MCS5	14.74	30	-15.26	Pass
			MCS6	14.48	30	-15.52	Pass
			MCS7	14.46	30	-15.54	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

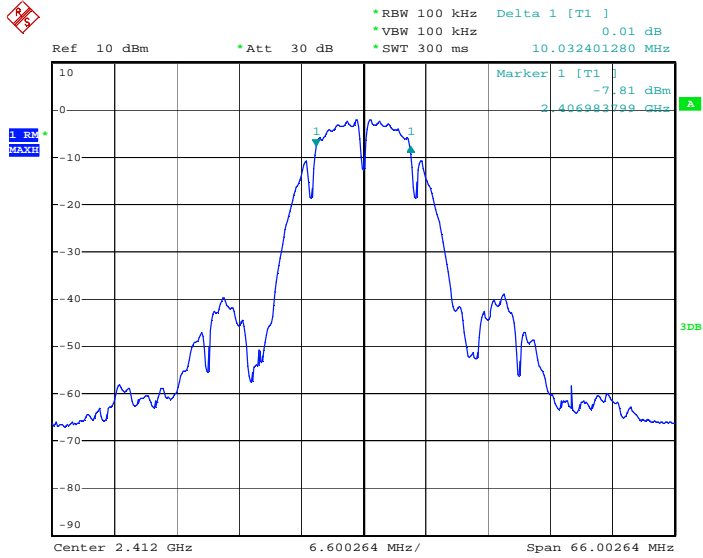
ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	9/23/2011	9/23/2012

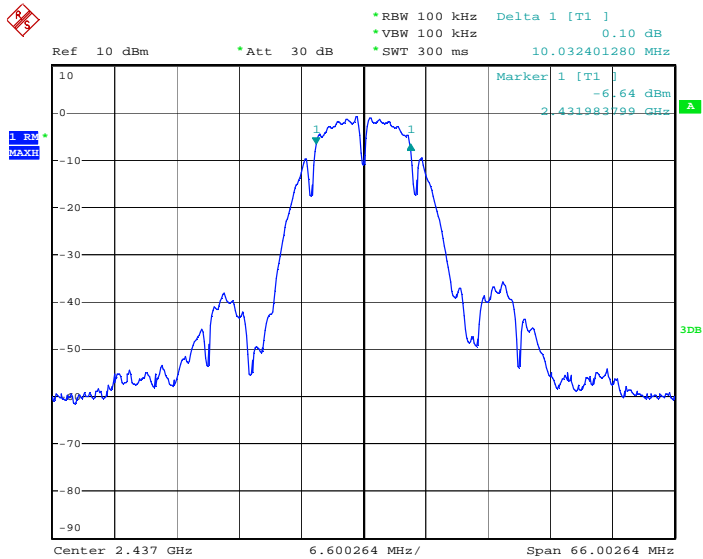
5.4 Results:

The following plots clearly show that the minimum 6dB bandwidth is at least 500kHz.



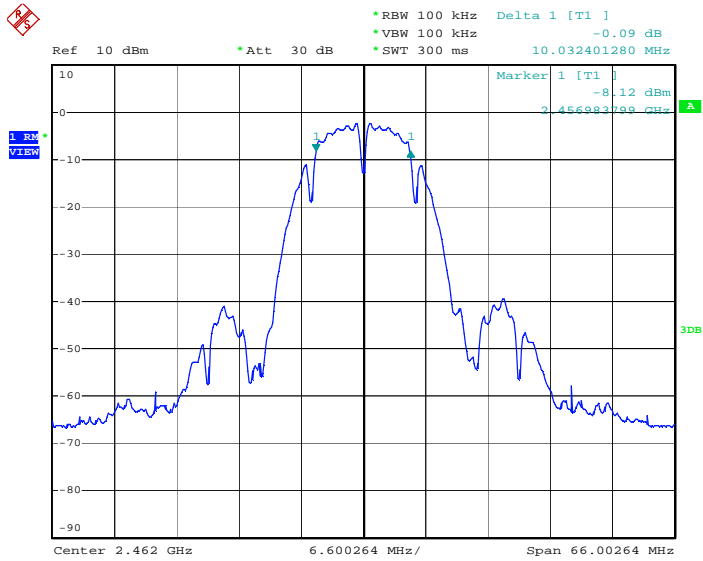
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Occupied Bandwidth B Mode: Low Channel



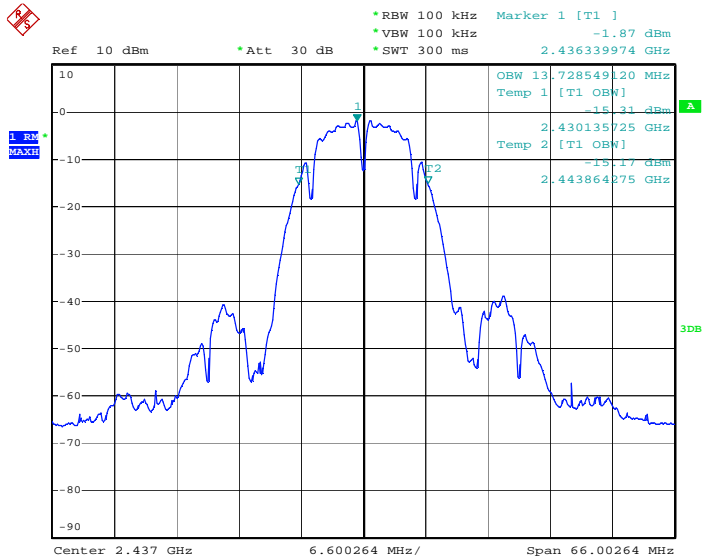
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Occupied Bandwidth B Mode: Middle Channel



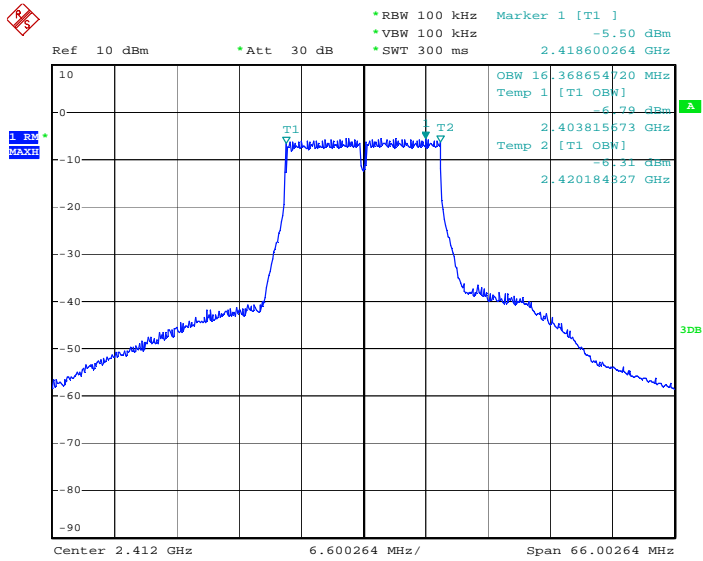
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Occupied Bandwidth B Mode: High Channel



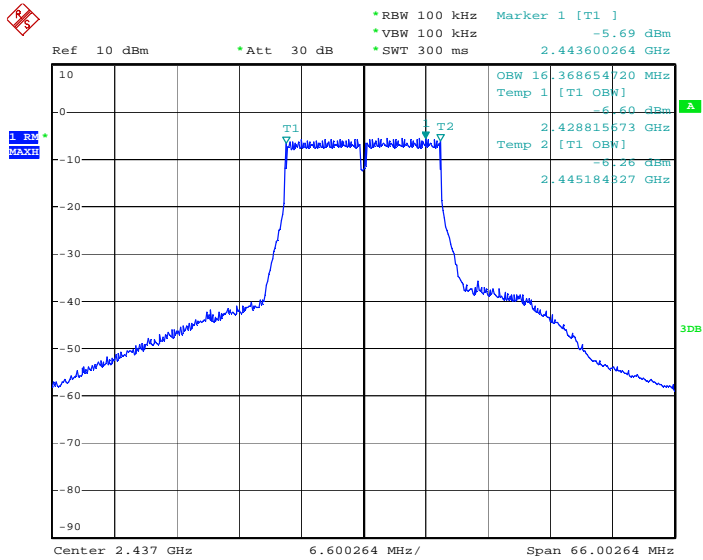
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99% Bandwidth: B Mode: Middle Channel



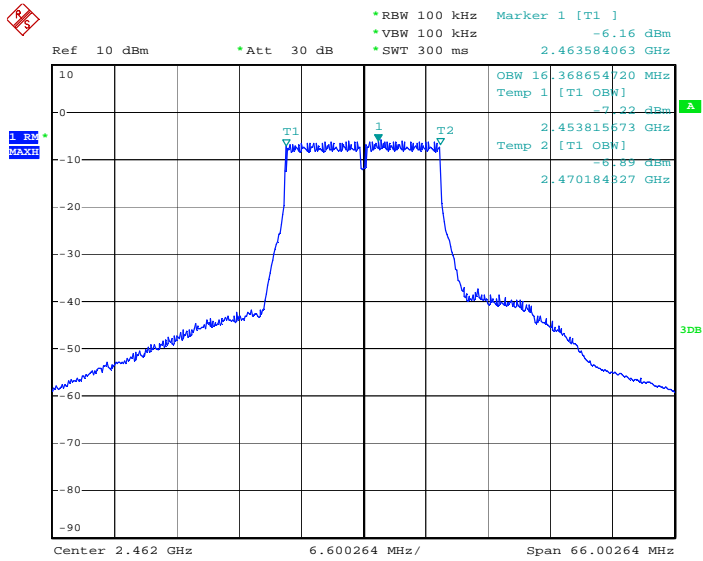
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Occupied Bandwidth G Mode: Low Channel



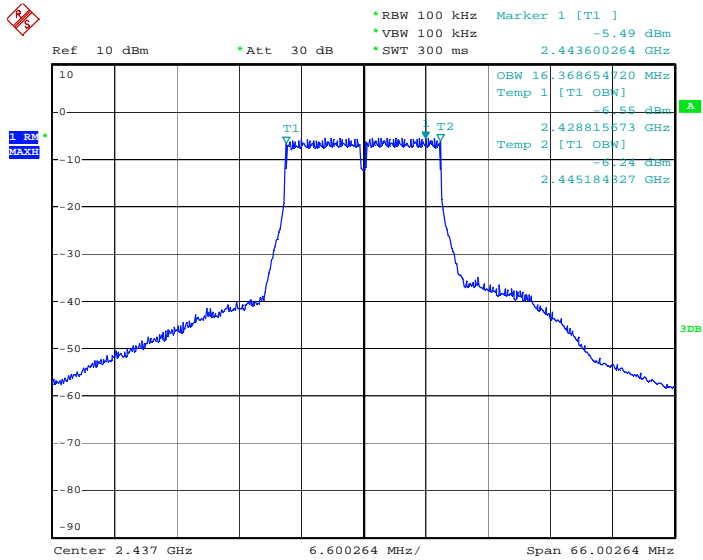
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Occupied Bandwidth G Mode: Middle Channel



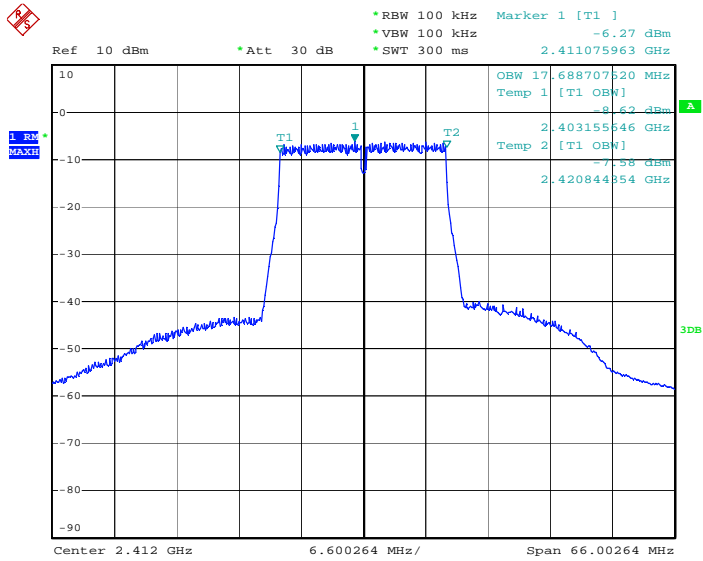
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Occupied Bandwidth G Mode: High Channel



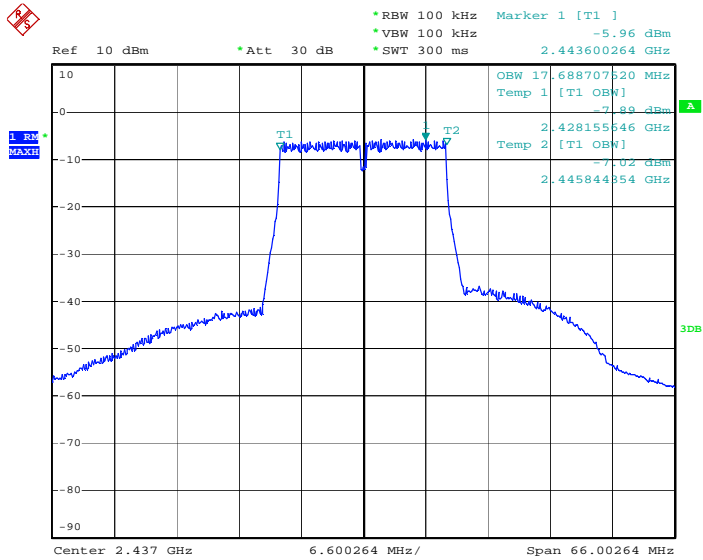
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99% Bandwidth: G Mode: Middle Channel



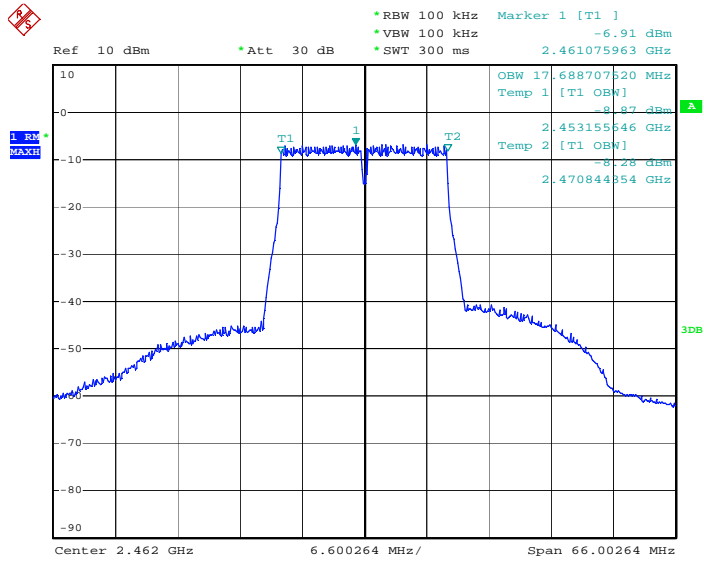
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Occupied Bandwidth 20MHz N Mode: Low Channel



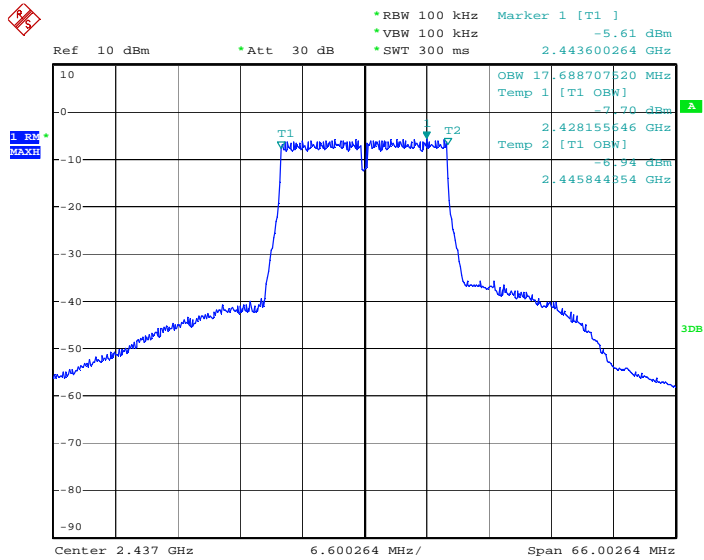
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Occupied Bandwidth 20MHz N Mode: Middle Channel



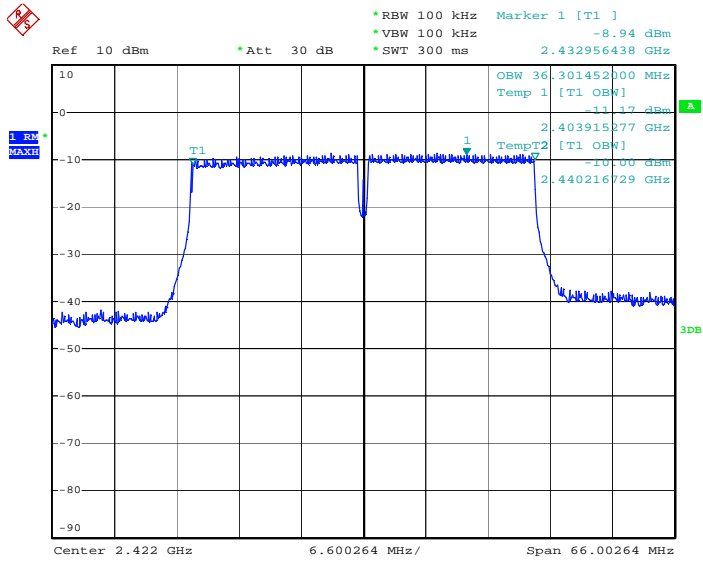
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Occupied Bandwidth 20MHz N Mode: High Channel



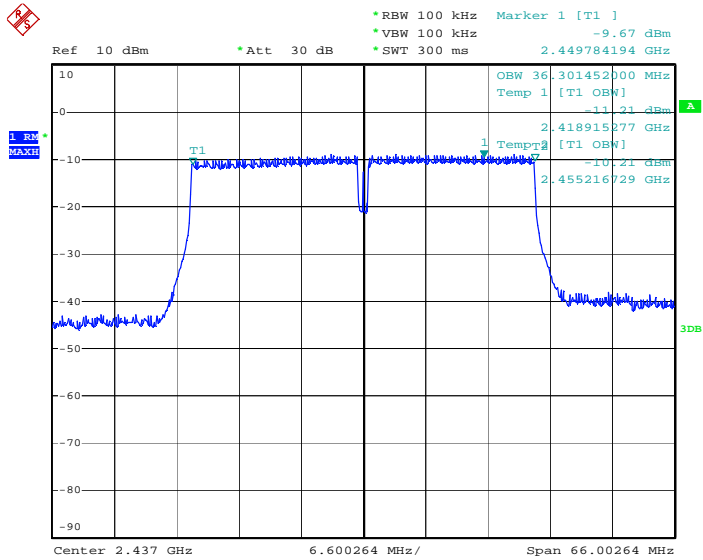
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99% Bandwidth: 20MHz N Mode: Middle Channel



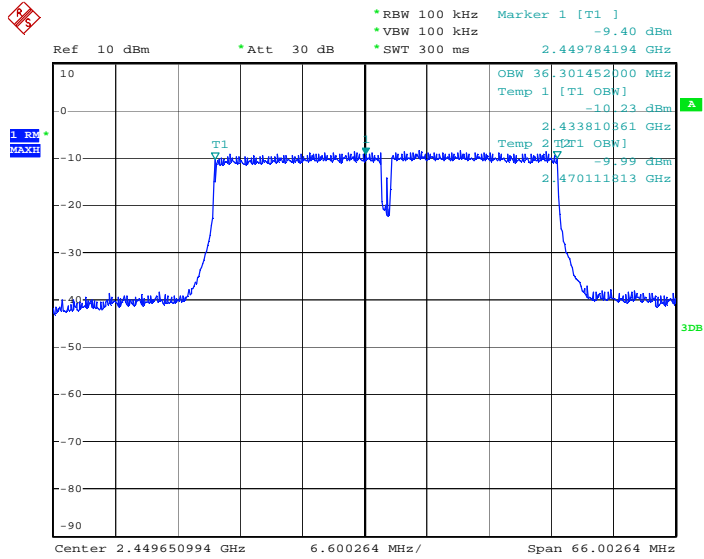
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Occupied Bandwidth 40MHz N Mode: Low Channel



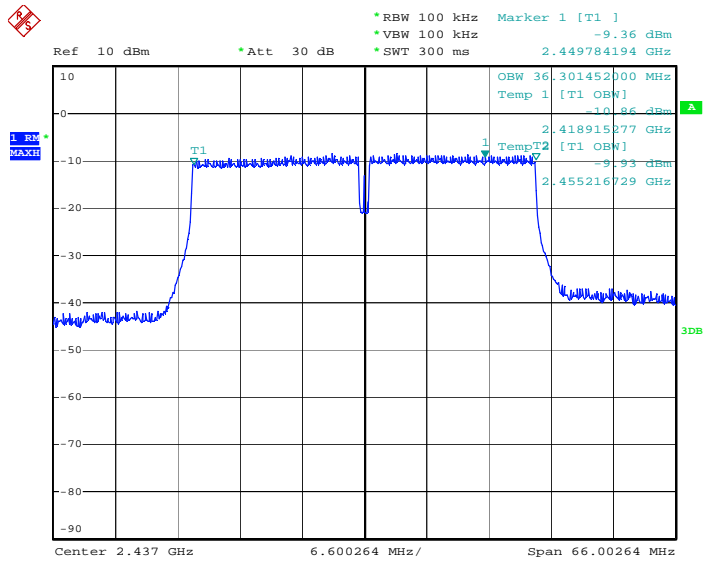
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Occupied Bandwidth 40MHz N Mode: Middle Channel



Date: 20.JAN.2012 12:14:20

Occupied Bandwidth 40MHz N Mode: High Channel



Date: 20.JAN.2012 12:21:38

99% Bandwidth: 40MHz N Mode: Middle Channel

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

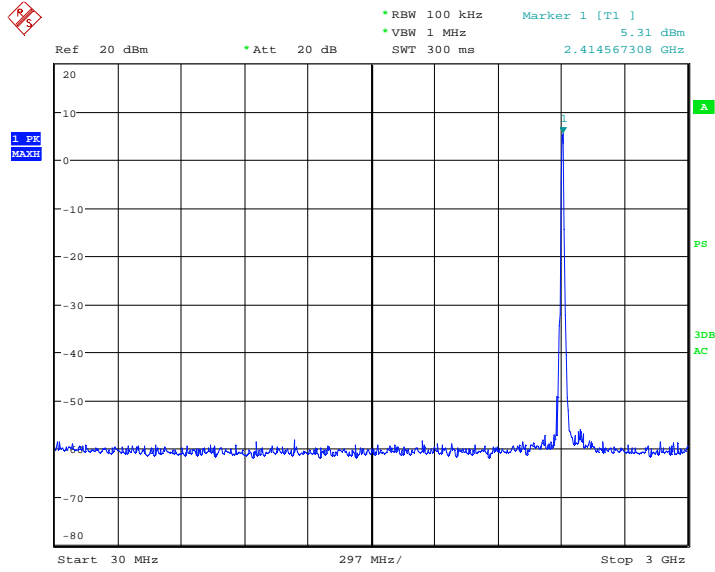
ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

6.3 Test Equipment Used:

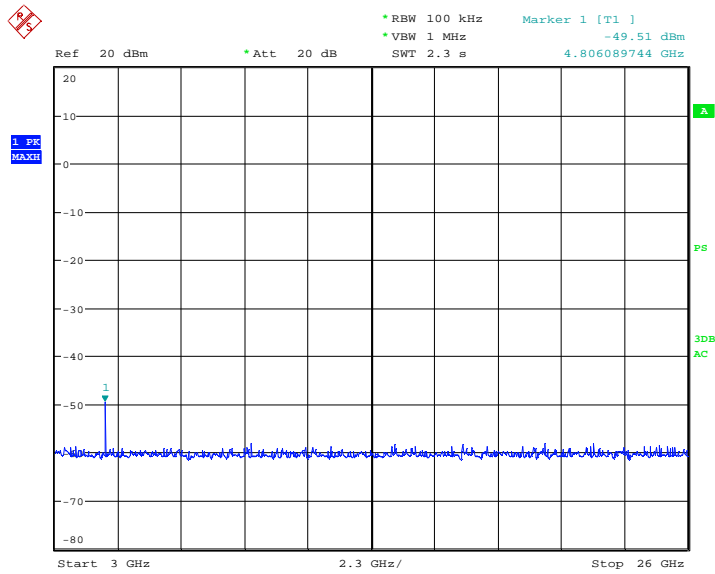
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012

6.4 Results:

The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria. The transmit mode which produced the highest conducted output power was used during the conducted spurious emissions testing.

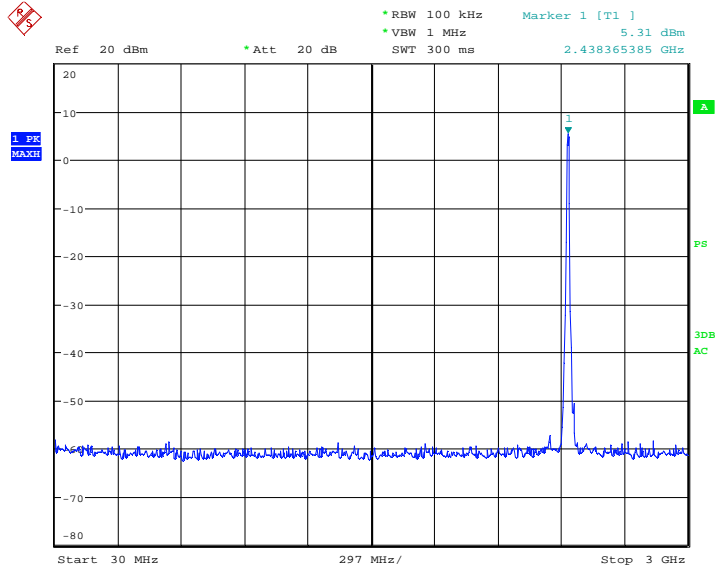


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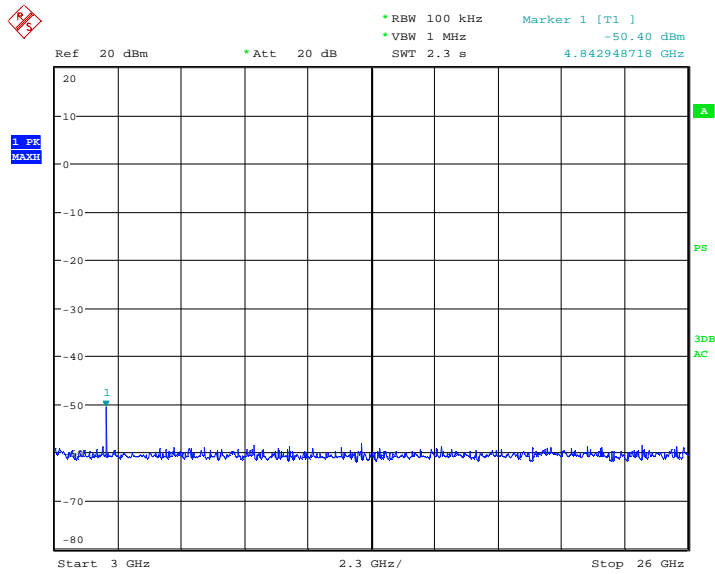


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B Mode: Low Channel

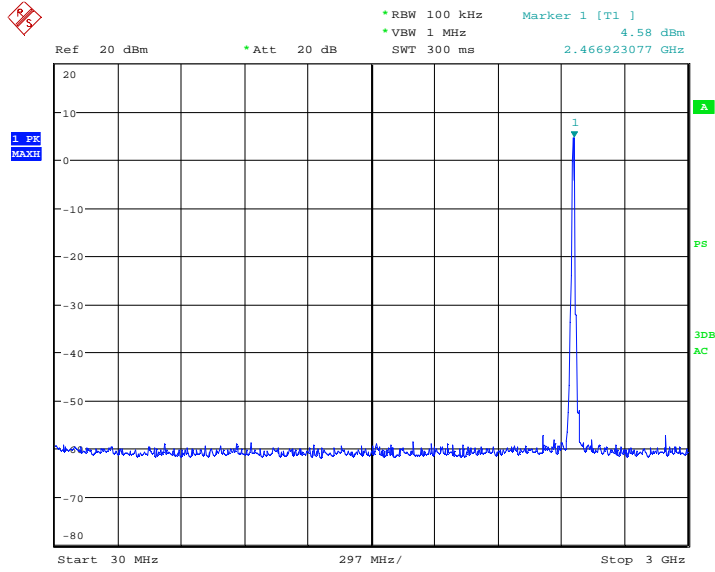


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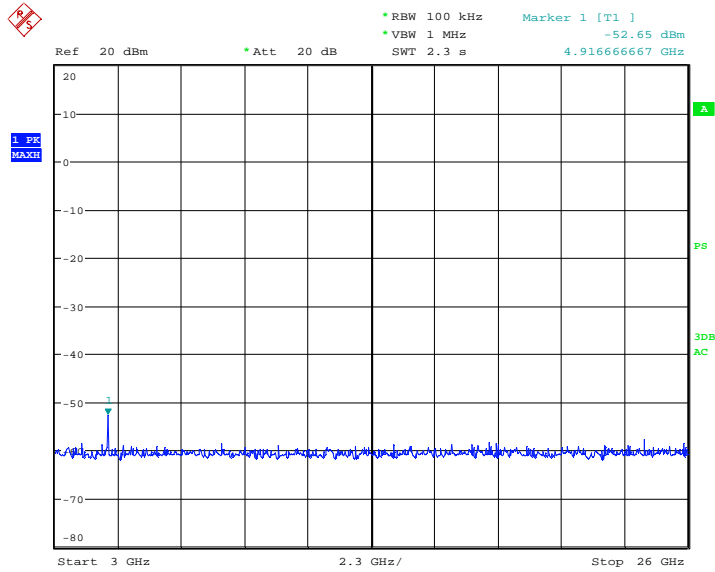


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B Mode: Middle Channel

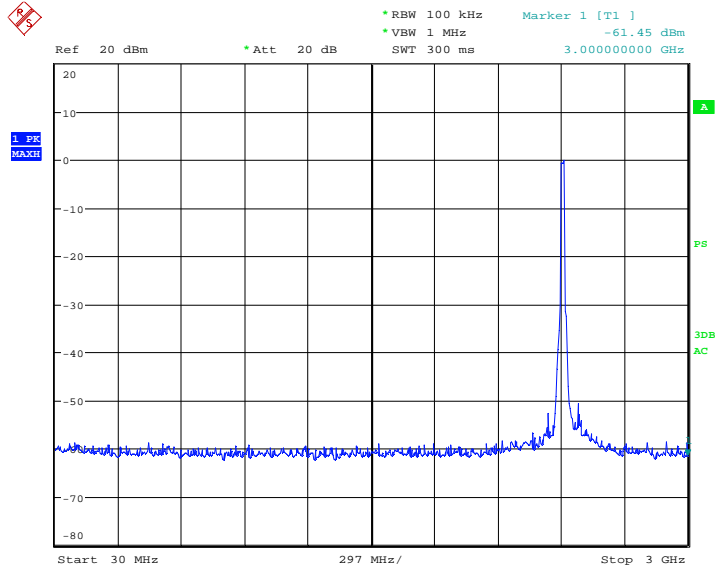


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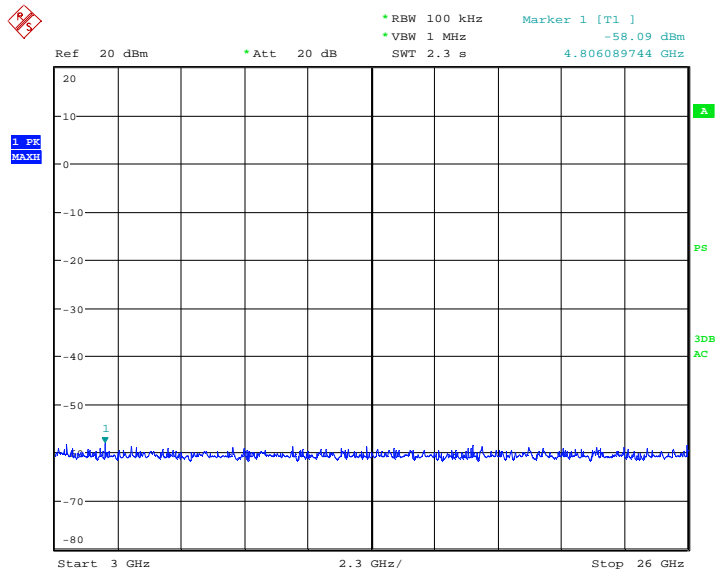


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B Mode: High Channel

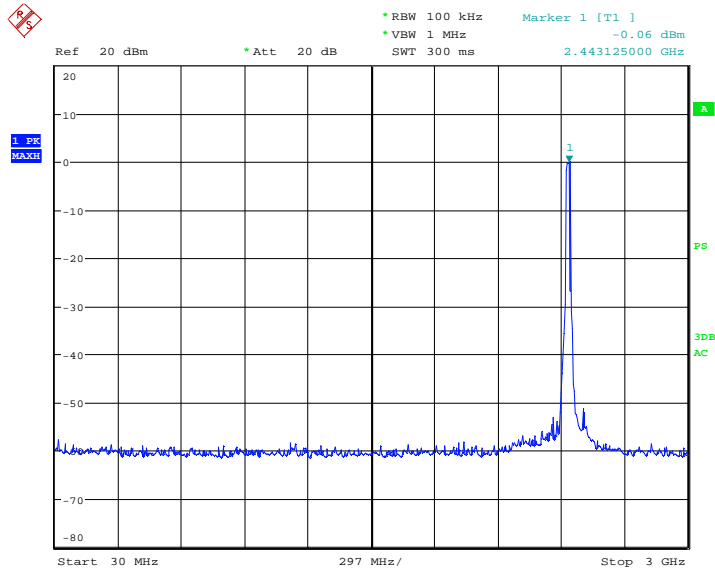


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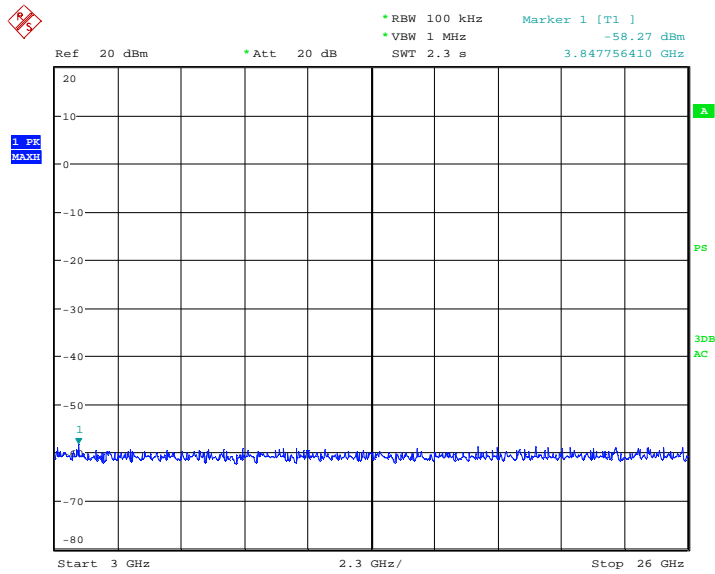


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G Mode: Low Channel

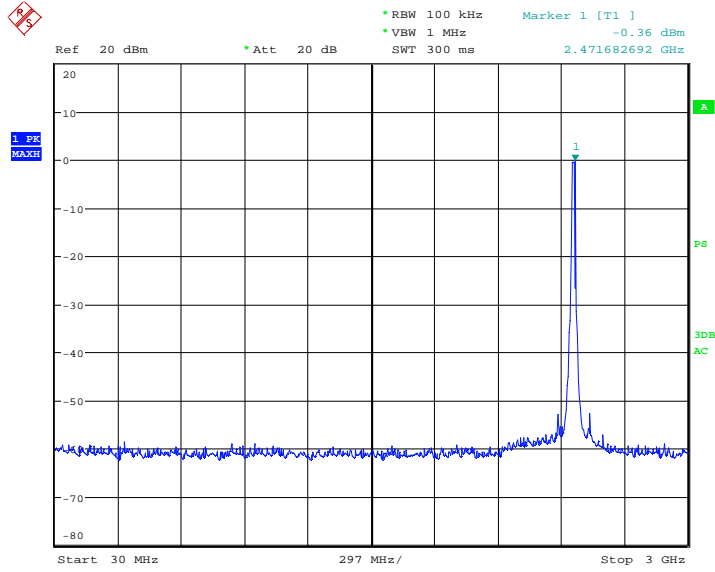


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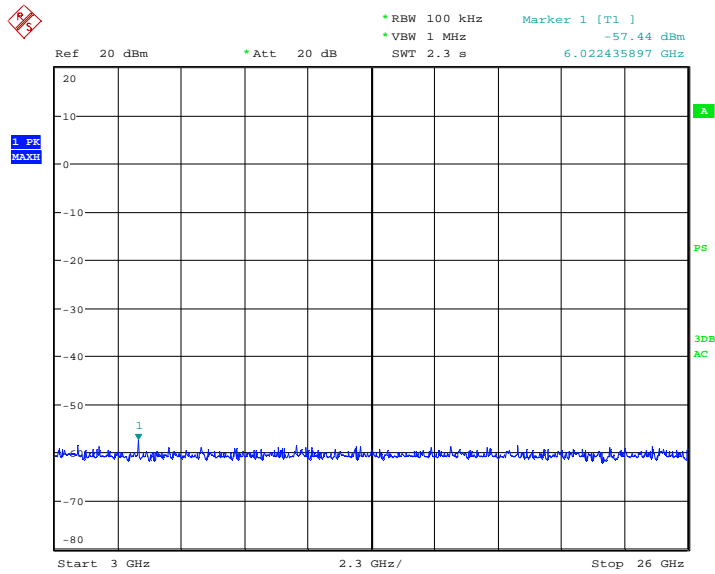


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G Mode: Middle Channel

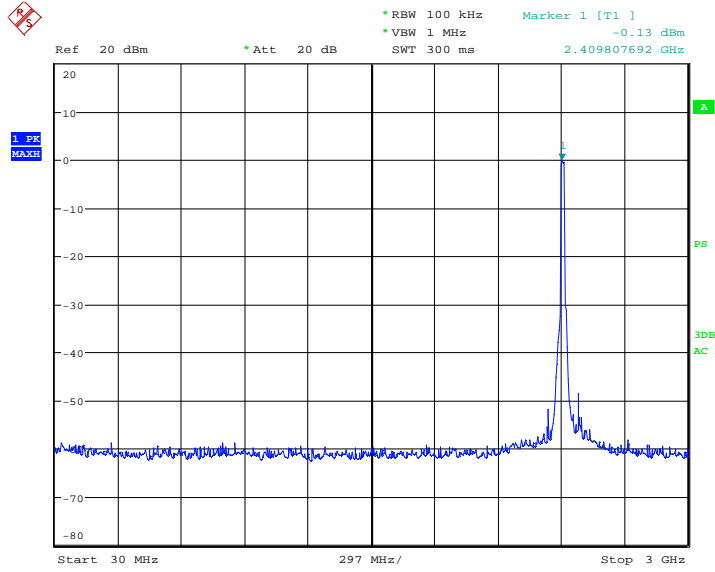


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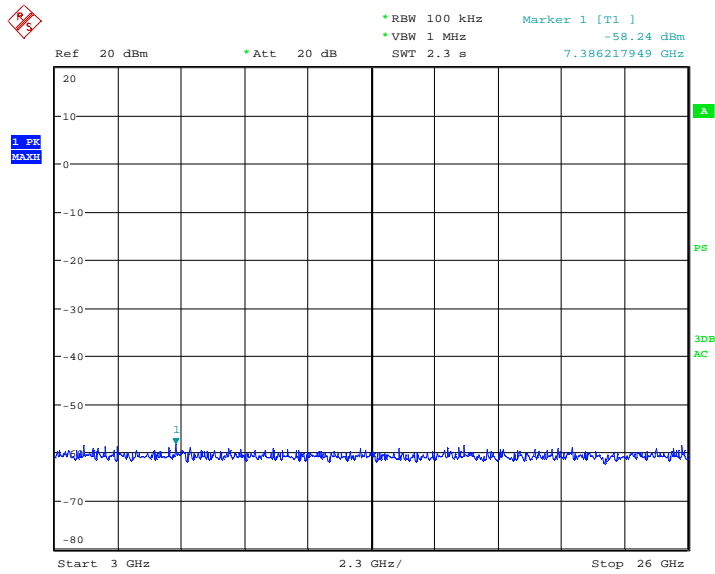


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G Mode: High Channel

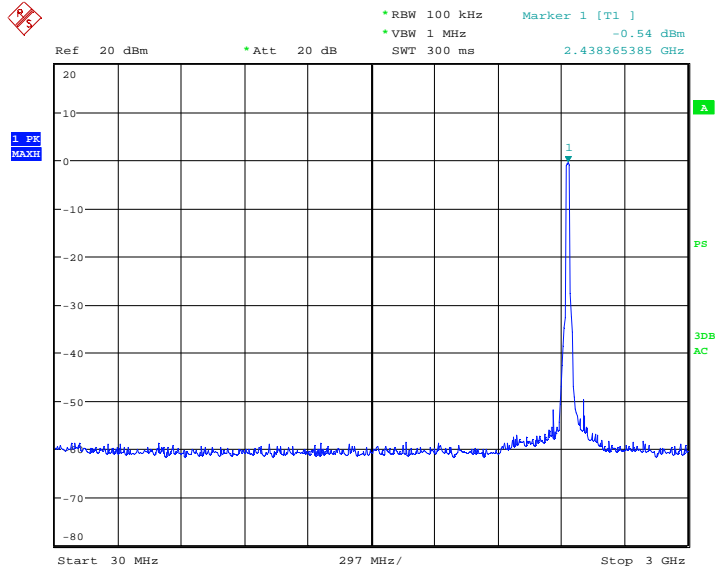


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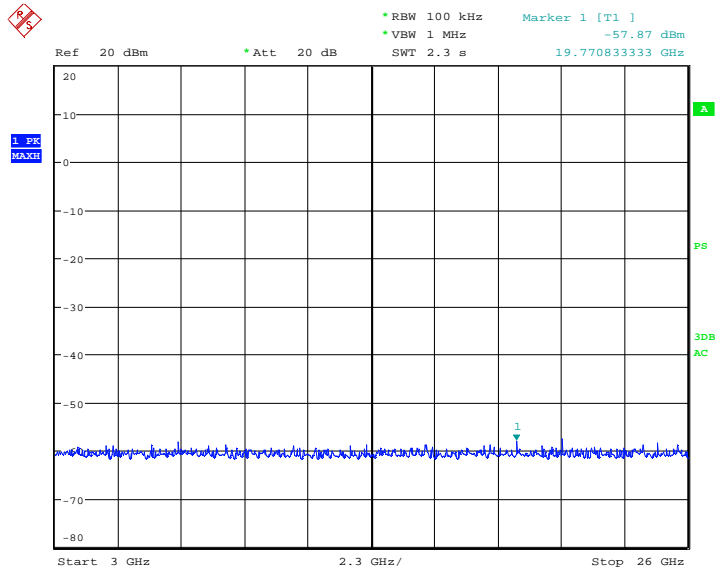


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20MHz N Mode: Low Channel

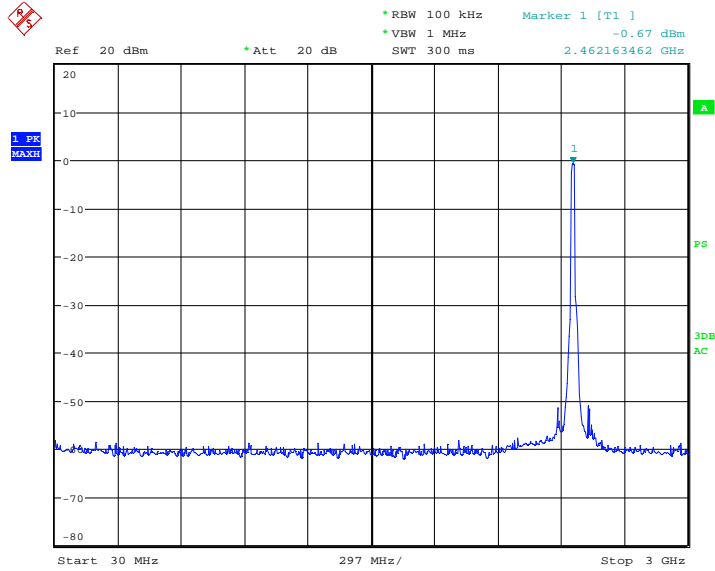


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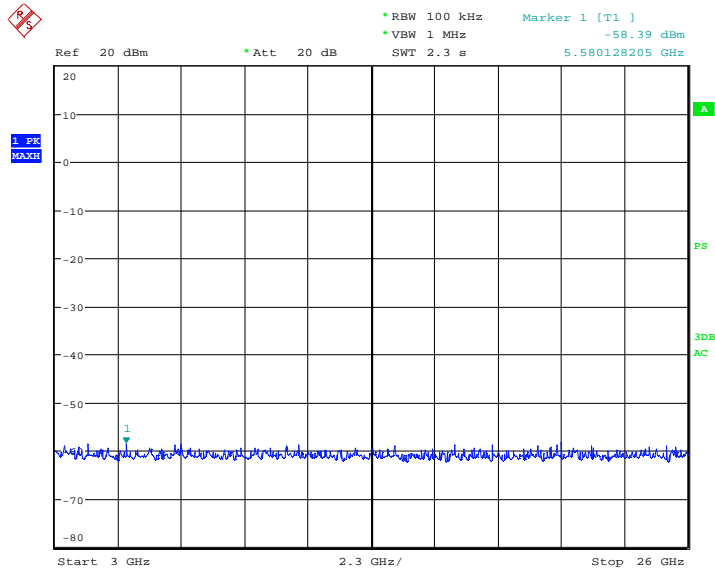


Date: 17.JAN.2012 16:36:37

20MHz N Mode: Middle Channel

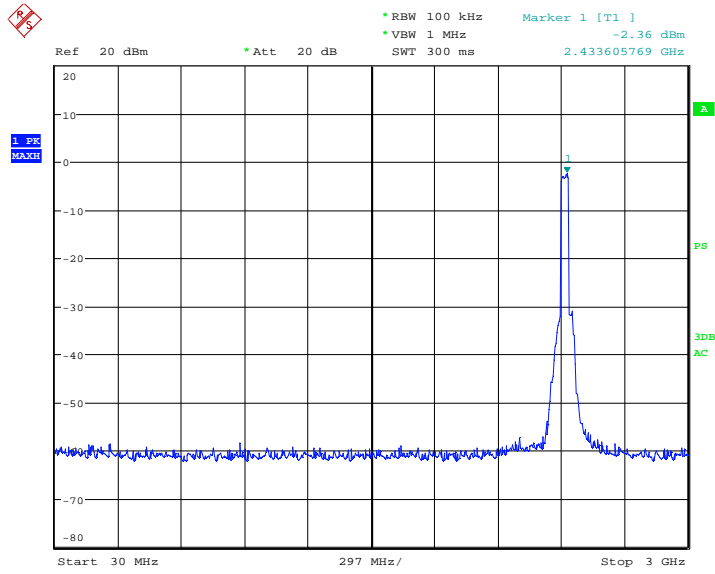


Date: 17.JAN.2012 16:38:38

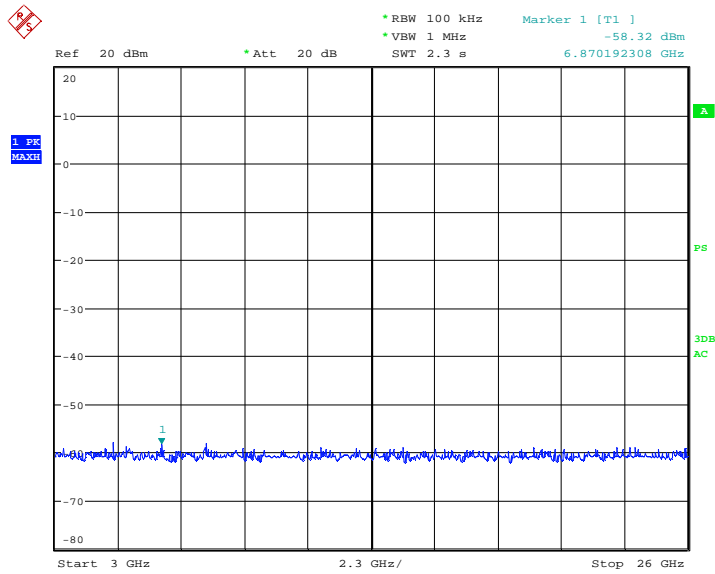


Date: 17.JAN.2012 16:39:02

20MHz N Mode: High Channel

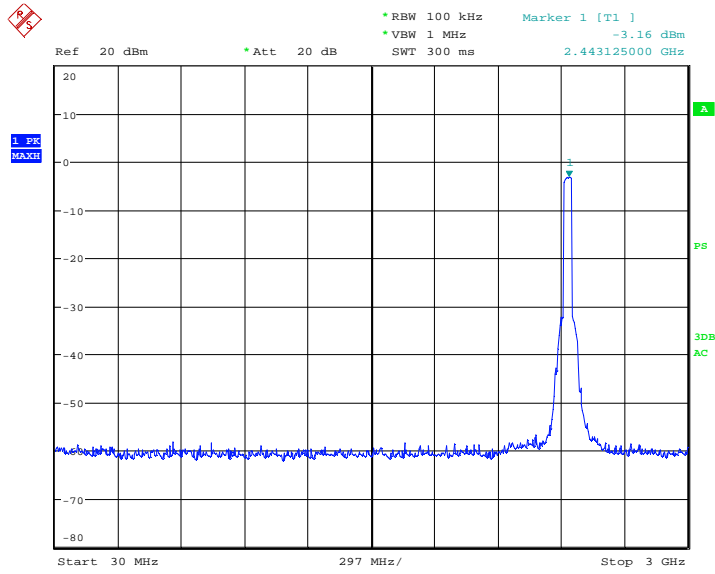


Date: 17.JAN.2012 17:07:25

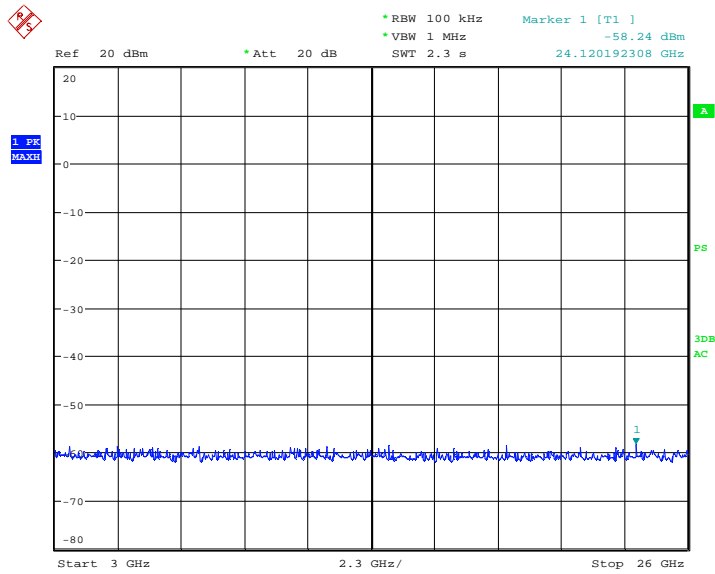


Date: 17.JAN.2012 17:07:53

40MHz N Mode: Low Channel

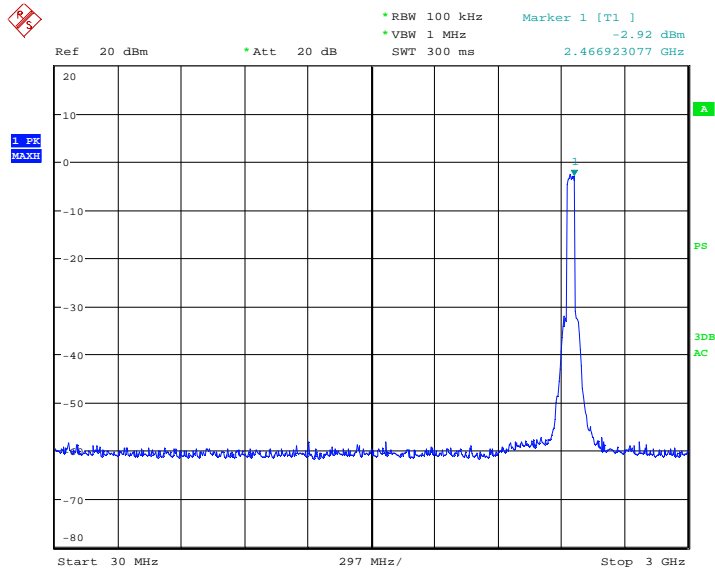


Date: 17.JAN.2012 17:09:58

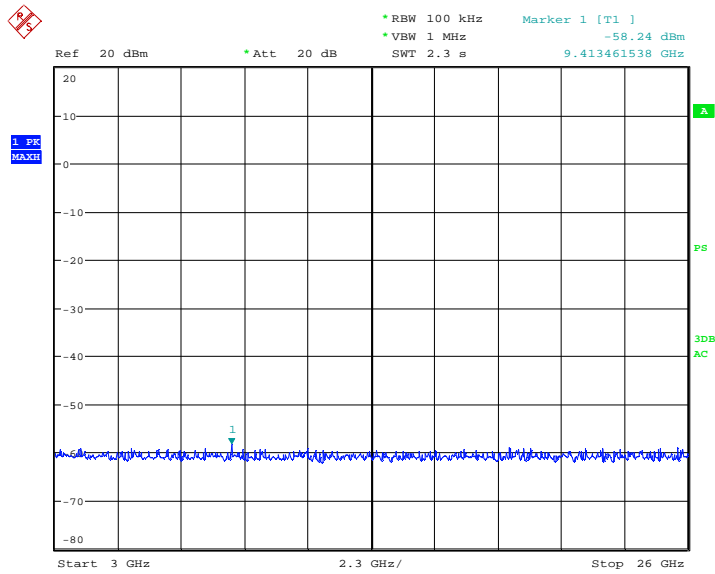


Date: 17.JAN.2012 17:10:23

40MHz N Mode: Middle Channel



Date: 17.JAN.2012 17:11:53

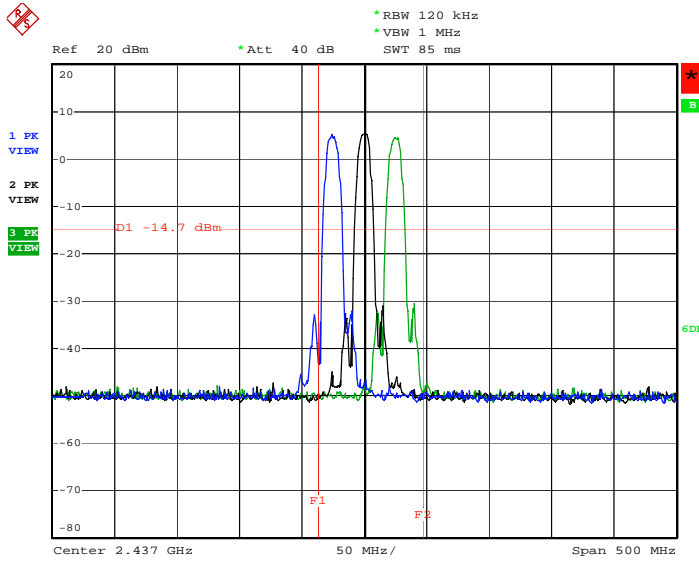


Date: 17.JAN.2012 17:12:20

40MHz N Mode: High Channel

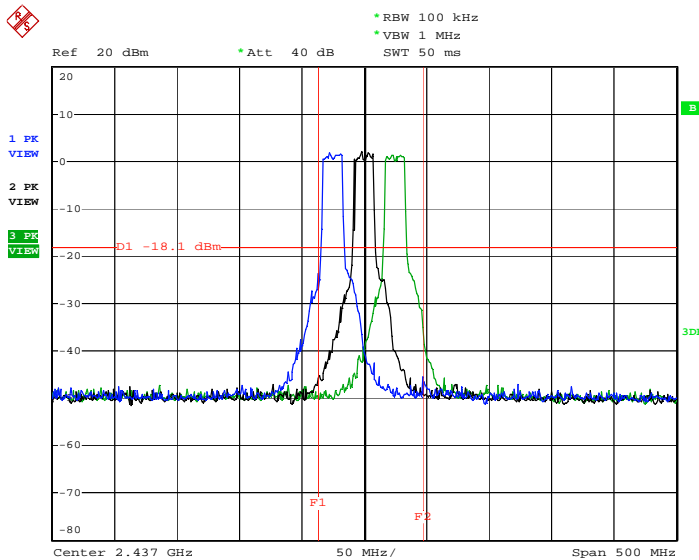
Conducted Spurious Emissions Close to the Transmit Band:

In the following plots, the vertical frequency lines denote the transmit band (2400 – 2483.5MHz) and the amplitude line denotes the 20dB down limit from the fundamental. The plots clearly show that spurious emissions close to the transmit band meet the 20dB down criteria.



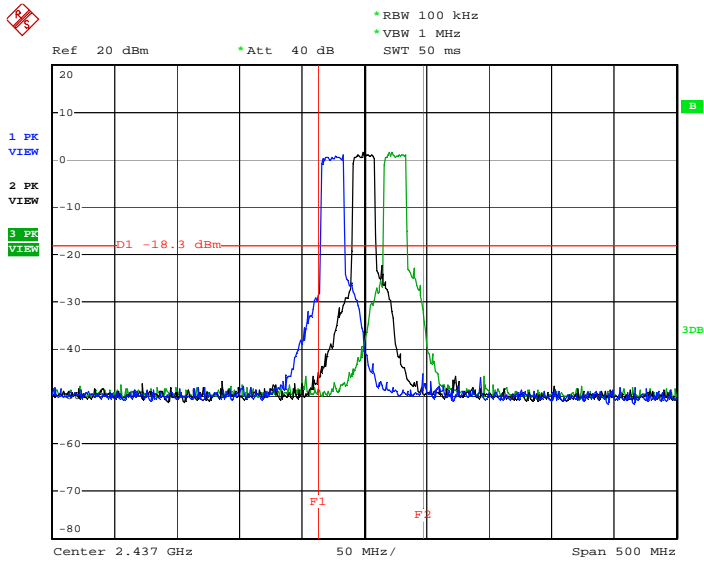
Date: 17.FEB.2012 10:28:25

Conducted Spurious Emissions Close to the Transmit Band (B Mode)



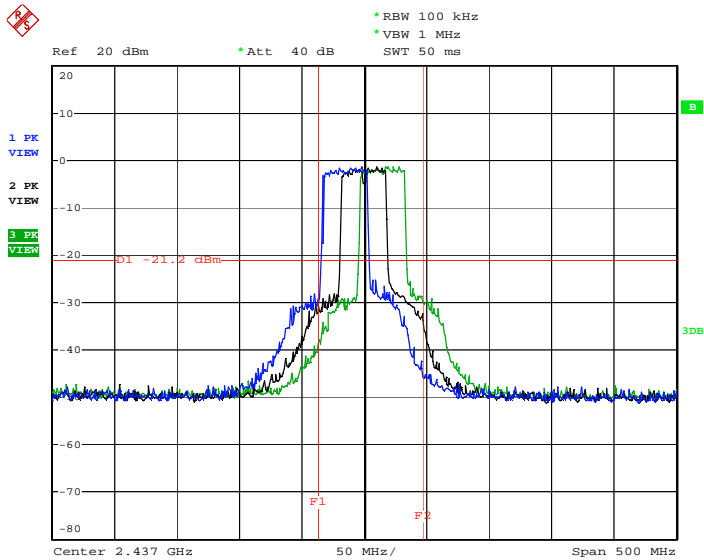
Date: 17.FEB.2012 10:36:49

Conducted Spurious Emissions Close to the Transmit Band (G Mode)



Date: 17.FEB.2012 10:40:29

Conducted Spurious Emissions Close to the Transmit Band (20MHz N Mode)



Date: 17.FEB.2012 10:46:19

Conducted Spurious Emissions Close to the Transmit Band (40MHz N Mode)

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:

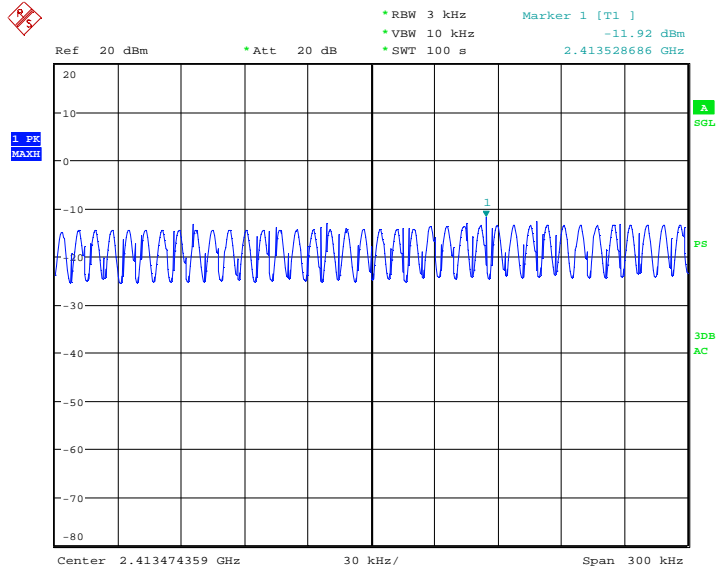
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	9/23/2011	9/23/2012

7.4 Results:

All power spectral density measurements were less than the 8dBm limit.

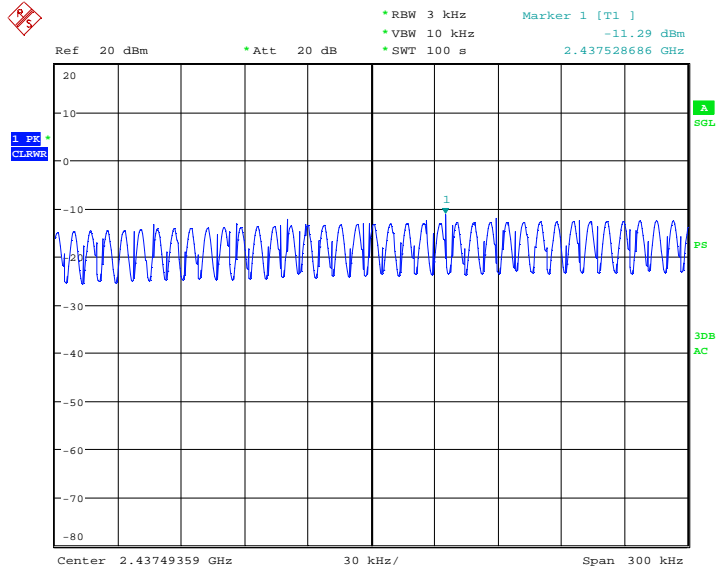
*PSD Option 1 Method

Mode	Channel Number	PSD in 3kHz BW (dBm)	Limit (dBm)	Margin (dBm)	Result
802.11b	1	-11.92	8.0	-19.92	Pass
802.11b	6	-11.29	8.0	-19.29	Pass
802.11b	11	-12.53	8.0	-20.53	Pass
802.11g	1	-14.9	8.0	-22.9	Pass
802.11g	6	-14.83	8.0	-22.83	Pass
802.11g	11	-15.25	8.0	-23.25	Pass
802.11n (20MHz)	1	-14.81	8.0	-22.81	Pass
802.11n (20MHz)	6	-15.24	8.0	-23.24	Pass
802.11n (20MHz)	11	-14.89	8.0	-22.89	Pass
802.11n (40MHz)	3	-21.51	8.0	-29.51	Pass
802.11n (40MHz)	6	-20.17	8.0	-28.17	Pass
802.11n (40MHz)	9	-20.98	8.0	-28.98	Pass



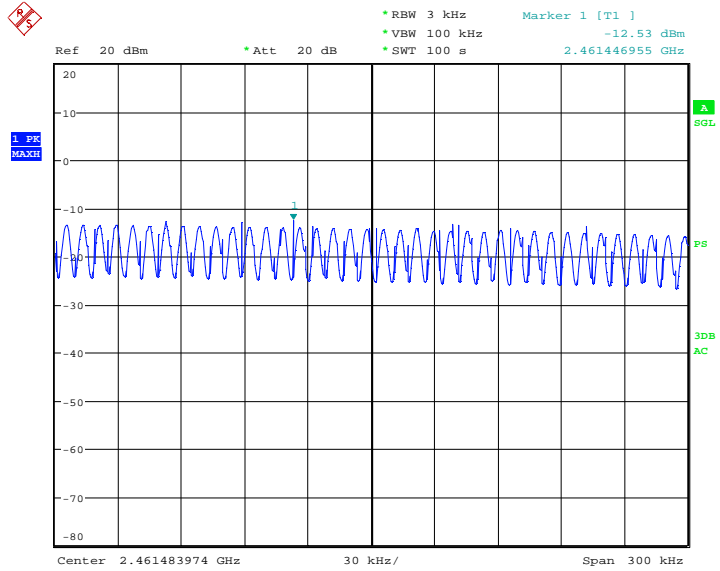
Date: 17.JAN.2012 17:29:58

PSD B Mode: Low Channel



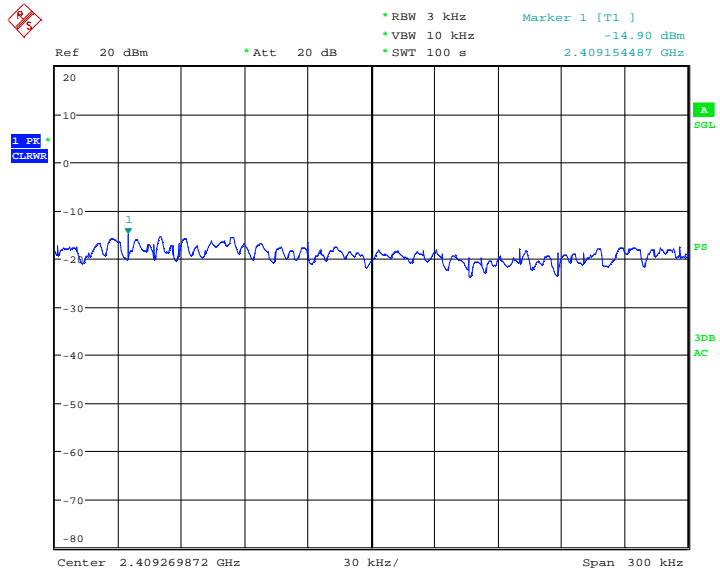
Date: 17.JAN.2012 17:34:54

PSD B Mode: Middle Channel



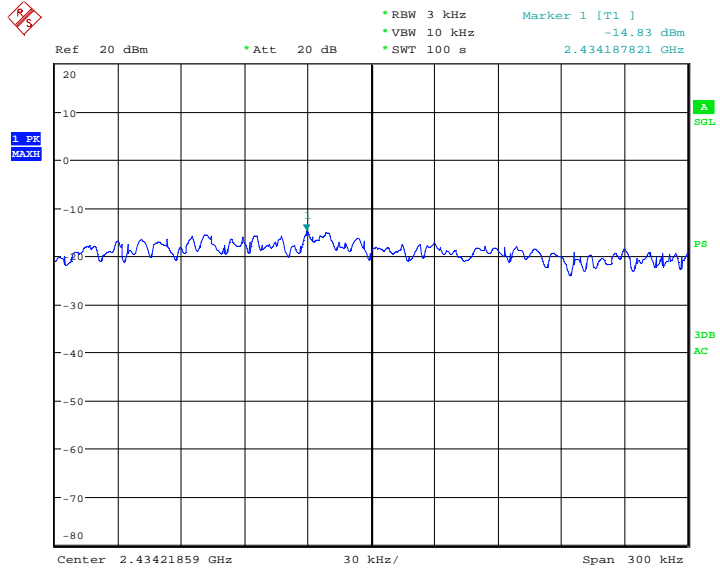
Date: 17.JAN.2012 17:40:24

PSD B Mode: High Channel



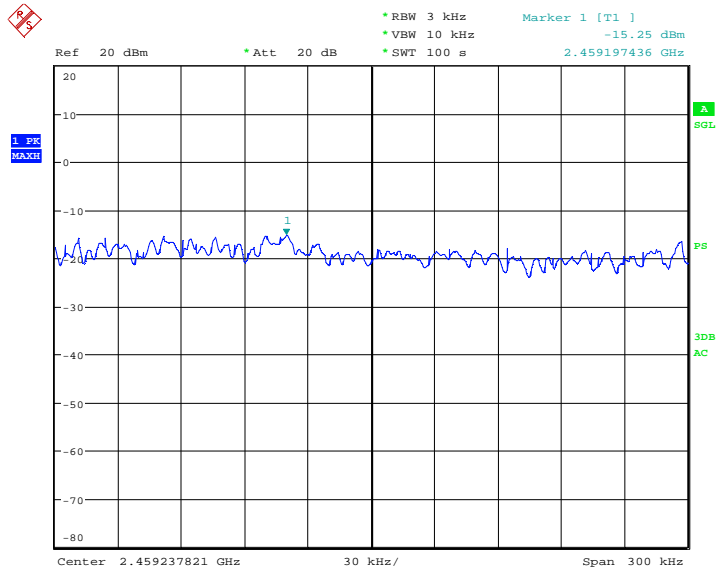
Date: 17.JAN.2012 19:12:19

PSD G Mode: Low Channel



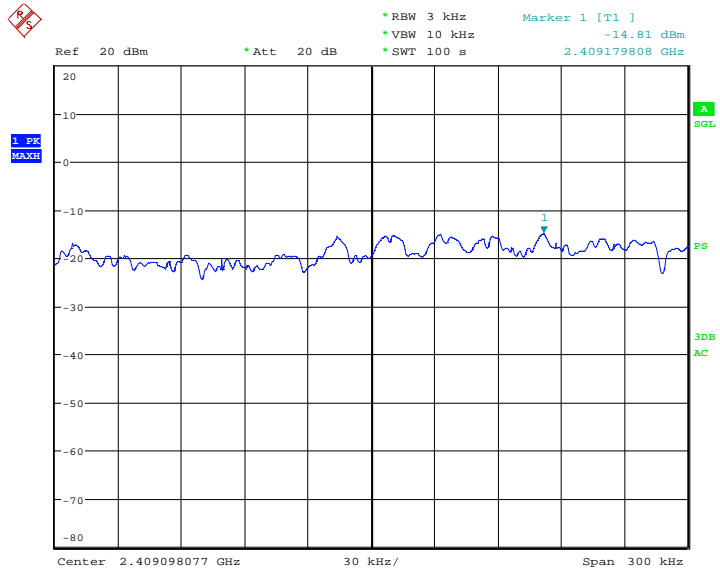
Date: 17.JAN.2012 19:17:19

PSD G Mode: Middle Channel



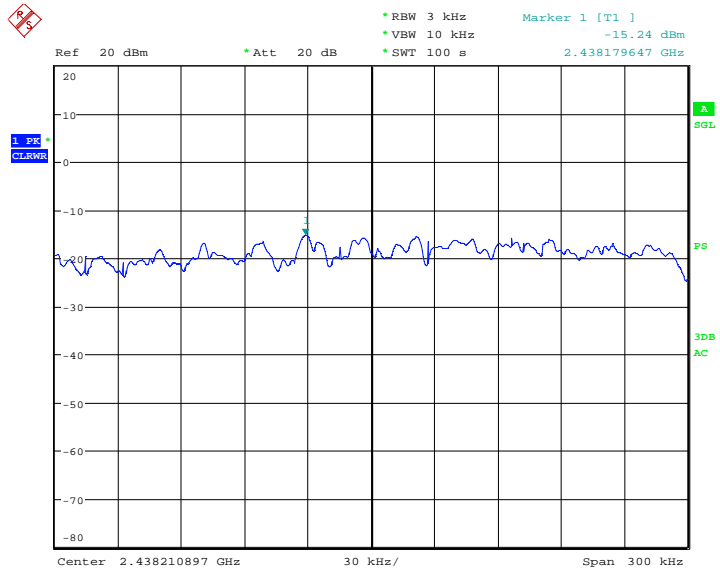
Date: 17.JAN.2012 17:57:56

PSD G Mode: High Channel



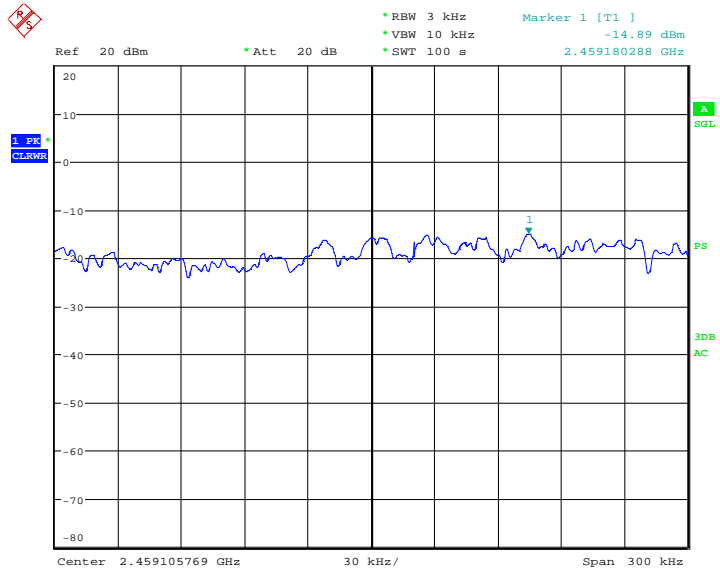
Date: 17.JAN.2012 18:07:11

PSD 20MHz N Mode: Low Channel



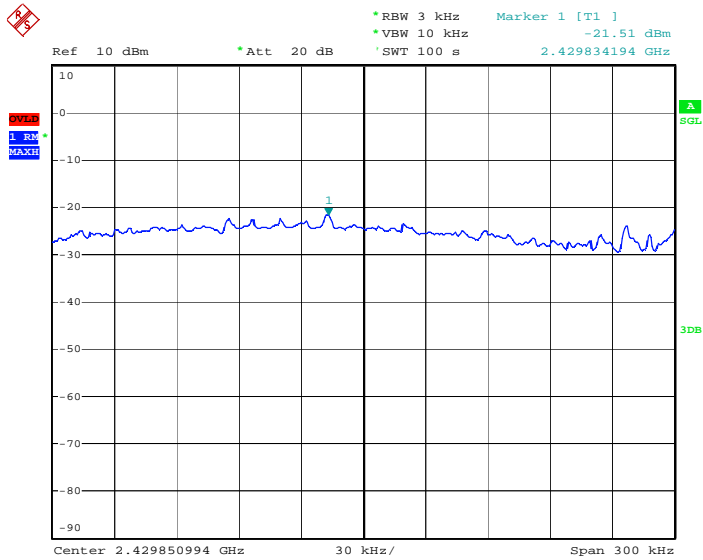
Date: 17.JAN.2012 19:25:57

PSD 20MHz N Mode: Middle Channel



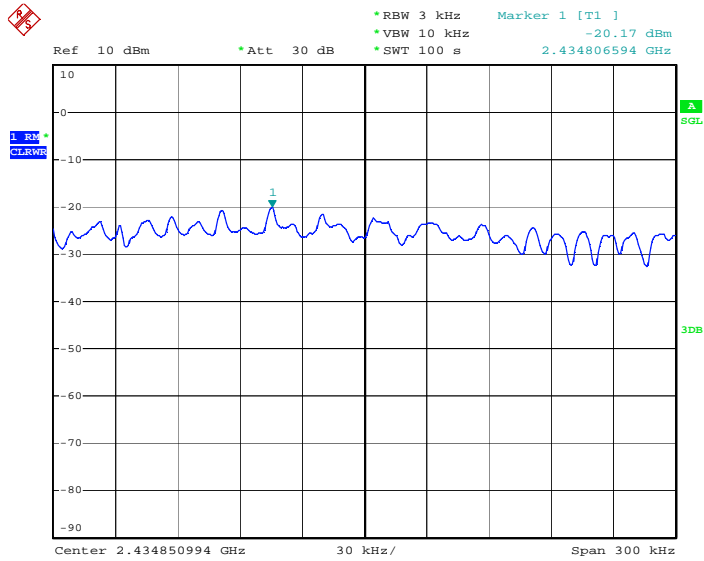
Date: 17.JAN.2012 19:29:41

PSD 20MHz N Mode: High Channel



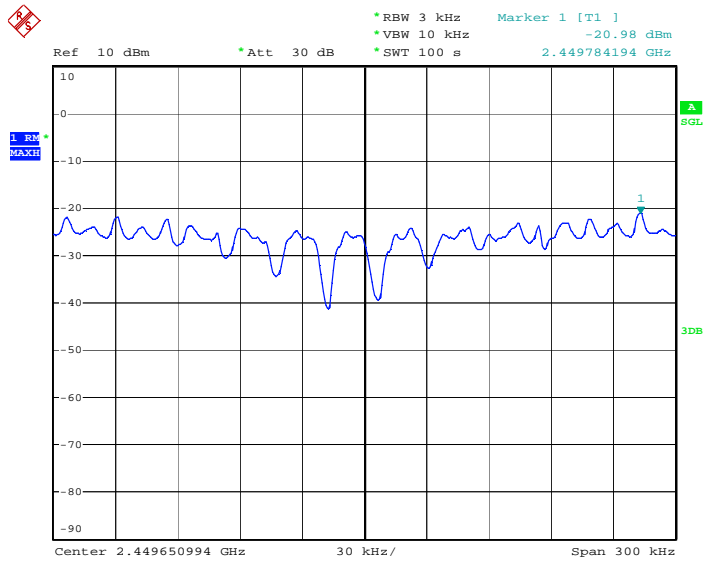
Date: 20.JAN.2012 11:48:41

PSD 40MHz N Mode: Low Channel



Date: 20.JAN.2012 11:58:10

PSD 40MHz N Mode: Middle Channel



Date: 20.JAN.2012 12:03:28

PSD 40MHz N Mode: High Channel

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 dB μ V

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dB μ V/m

Level in μ V/m = Common Antilogarithm [(38.78 dB μ V/m)/20] = 86.89 μ 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	12/20/2011	12/20/2012
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 transmit mode which produced the highest conducted output power was used during the radiated spurious emissions testing. Testing was performed to the 10th harmonic of the fundamental emission. The spurious emissions listed in the following tables are the worst case emissions.

Worst Case Spurious Measurements (802.11b Mode, Onboard Antenna)

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	4.824 GHz	V	46.03	43.11	74	54	Compliant	
	12.059 GHz	V	43.464	35.024	74	54	Compliant	
	14.472 GHz	V	45.314	35.884	74	54	Compliant	
	4.8239 GHz	H	45.779	41.069	74	54	Compliant	
	12.06 GHz	H	43.854	34.184	74	54	Compliant	
	14.472 GHz	H	45.314	36.144	74	54	Compliant	
6	4.874 GHz	V	50.209	45.749	74	54	Compliant	
	7.311 GHz	V	47.12	34.04	74	54	Compliant	
	12.185 GHz	V	49.043	37.273	74	54	Compliant	
	14.622 GHz	V	51.144	38.104	74	54	Compliant	
	4.874 GHz	H	50.969	45.069	74	54	Compliant	
	7.311 GHz	H	43.54	31.7	74	54	Compliant	
	12.185 GHz	H	50.413	38.653	74	54	Compliant	
11	14.622 GHz	H	51.664	37.954	74	54	Compliant	
	4.9239 GHz	V	46.825	42.785	74	54	Compliant	
	7.3867 GHz	V	44.65	29.69	74	54	Compliant	
	12.31 GHz	V	43.483	34.053	74	54	Compliant	
	14.772 GHz	V	46.654	36.714	74	54	Compliant	
	4.924 GHz	H	45.965	41.925	74	54	Compliant	
	7.3868 GHz	H	44.92	31.36	74	54	Compliant	
	12.311 GHz	H	43.977	36.097	74	54	Compliant	
14.772 GHz	H	45.604	36.844	74	54	Compliant		

Worst Case Spurious Measurements (802.11g Mode, Onboard Antenna)

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	4.824 GHz	V	43.64	28.2	74	54	Compliant	
	12.06 GHz	V	43.953	34.203	74	54	Compliant	
	14.472 GHz	V	47.074	36.394	74	54	Compliant	
	4.824 GHz	H	48.32	32.1	74	54	Compliant	
	12.06 GHz	H	43.743	34.143	74	54	Compliant	
6	14.472 GHz	H	45.194	36.464	74	54	Compliant	
	4.874 GHz	V	45.399	32.269	74	54	Compliant	
	7.311 GHz	V	39.01	30.05	74	54	Compliant	
	12.185 GHz	V	43.403	33.633	74	54	Compliant	
	14.622 GHz	V	45.794	37.014	74	54	Compliant	
	4.8741 GHz	H	46.279	31.439	74	54	Compliant	
	7.311 GHz	H	40.42	30.44	74	54	Compliant	
11	12.185 GHz	H	43.003	33.363	74	54	Compliant	
	14.622 GHz	H	45.914	36.984	74	54	Compliant	
	4.924 GHz	V	43.305	30.865	74	54	Compliant	
	7.386 GHz	V	38.758	29.908	74	54	Compliant	
	12.31 GHz	V	43.363	34.263	74	54	Compliant	
	14.772 GHz	V	47.024	37.324	74	54	Compliant	
	4.9263 GHz	H	44.855	29.485	74	54	Compliant	
	7.3902 GHz	H	39.837	30.787	74	54	Compliant	
12.31 GHz	H	43.483	34.343	74	54	Compliant		
14.772 GHz	H	46.654	37.004	74	54	Compliant		

Worst Case Spurious Measurements (802.11n (20MHz) Mode, Onboard Antenna)

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	4.824 GHz	V	45.4	30.42	74	54	Compliant	
	12.06 GHz	V	44.723	34.513	74	54	Compliant	
	14.472 GHz	V	46.604	36.344	74	54	Compliant	
	4.824 GHz	H	45.03	29.72	74	54	Compliant	
	12.06 GHz	H	43.743	33.643	74	54	Compliant	
6	14.472 GHz	H	46.094	36.004	74	54	Compliant	
	4.874 GHz	V	45.399	30.349	74	54	Compliant	
	7.311 GHz	V	39.26	30.4	74	54	Compliant	
	12.185 GHz	V	42.893	33.593	74	54	Compliant	
	14.622 GHz	V	50.284	37.094	74	54	Compliant	
	4.874 GHz	H	47.429	31.269	74	54	Compliant	
	7.3136 GHz	H	45.445	29.075	74	54	Compliant	
11	12.185 GHz	H	45.793	32.813	74	54	Compliant	
	14.621 GHz	H	49.084	36.534	74	54	Compliant	
	4.924 GHz	V	46.475	28.885	74	54	Compliant	
	7.386 GHz	V	40.308	29.278	74	54	Compliant	
	12.31 GHz	V	43.763	33.823	74	54	Compliant	
	14.772 GHz	V	47.134	36.994	74	54	Compliant	
	4.924 GHz	H	46.715	27.915	74	54	Compliant	
	7.386 GHz	H	40.688	31.228	74	54	Compliant	
12.31 GHz	H	45.273	34.363	74	54	Compliant		
14.772 GHz	H	48.304	37.274	74	54	Compliant		

Worst Case Spurious Measurements (802.11n (40MHz)Mode, Onboard Antenna)

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	4.844 GHz	V	42.888	27.538	74	54	Compliant	
	7.2661 GHz	V	38.148	28.578	74	54	Compliant	
	12.11 GHz	V	43.657	33.617	74	54	Compliant	
	14.532 GHz	V	46.487	36.767	74	54	Compliant	
	4.844 GHz	H	40.497	26.888	74	54	Compliant	
	7.266 GHz	H	44.577	30.377	74	54	Compliant	
	12.11 GHz	H	43.257	34.687	74	54	Compliant	
6	14.532 GHz	H	47.467	37.657	74	54	Compliant	
	4.874 GHz	V	40.309	24.249	74	54	Compliant	
	7.311 GHz	V	38.78	29.41	74	54	Compliant	
	12.185 GHz	V	43.123	33.353	74	54	Compliant	
	14.622 GHz	V	49.744	37.014	74	54	Compliant	
	4.874 GHz	H	40.719	31.229	74	54	Compliant	
	7.311 GHz	H	38.77	30.27	74	54	Compliant	
9	12.185 GHz	H	42.893	33.173	74	54	Compliant	
	14.622 GHz	H	46.794	36.804	74	54	Compliant	
	4.904 GHz	V	41.142	30.982	74	54	Compliant	
	7.356 GHz	V	39.489	29.999	74	54	Compliant	
	12.26 GHz	V	43.451	34.001	74	54	Compliant	
	14.718 GHz	V	49.509	37.229	74	54	Compliant	
	4.904 GHz	H	44.072	27.632	74	54	Compliant	
7.356 GHz	H	39.769	28.669	74	54	Compliant		
12.26 GHz	H	42.381	33.371	74	54	Compliant		
14.712 GHz	H	46.67	36.67	74	54	Compliant		

Worst Case Spurious Measurements (802.11b Mode, External Antenna)

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	4.824 GHz	H	50.47	46	74	54	Compliant	
	7.236 GHz	H	40.978	32.198	74	54	Compliant	
	12.06 GHz	H	45.723	35.413	74	54	Compliant	
	14.472 GHz	H	49.374	37.424	74	54	Compliant	
	4.824 GHz	V	45.6	40.17	74	54	Compliant	
	7.236 GHz	V	40.058	30.708	74	54	Compliant	
	12.06 GHz	V	43.683	34.983	74	54	Compliant	
6	14.472 GHz	V	47.184	37.124	74	54	Compliant	
	4.8741 GHz	H	45.59	41.06	74	54	Compliant	
	7.311 GHz	H	39.24	31.08	74	54	Compliant	
	12.185 GHz	H	47.063	33.843	74	54	Compliant	
	14.622 GHz	H	47.364	37.544	74	54	Compliant	
	4.8741 GHz	V	46.94	41.83	74	54	Compliant	
	7.311 GHz	V	43.06	31.56	74	54	Compliant	
11	12.185 GHz	V	44.613	35.113	74	54	Compliant	
	14.622 GHz	V	47.754	38.864	74	54	Compliant	
	4.924 GHz	H	47.985	44.795	74	54	Compliant	
	7.386 GHz	H	41.978	32.128	74	54	Compliant	
	12.31 GHz	H	45.233	34.593	74	54	Compliant	
	14.772 GHz	H	48.764	37.614	74	54	Compliant	
	4.924 GHz	V	45.165	38.885	74	54	Compliant	
7.386 GHz	V	40.538	30.568	74	54	Compliant		
12.31 GHz	V	43.453	35.163	74	54	Compliant		
14.772 GHz	V	46.594	38.034	74	54	Compliant		

Worst Case Spurious Measurements (802.11g Mode, External Antenna)

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	4.824 GHz	H	50.2	38.21	74	54	Compliant	
	7.236 GHz	H	41.258	31.768	74	54	Compliant	
	12.06 GHz	H	43.313	34.423	74	54	Compliant	
	14.472 GHz	H	47.574	36.624	74	54	Compliant	
	4.824 GHz	V	46.45	33.69	74	54	Compliant	
	7.236 GHz	V	45.018	30.808	74	54	Compliant	
	12.06 GHz	V	44.173	34.853	74	54	Compliant	
6	14.472 GHz	V	45.304	36.824	74	54	Compliant	
	4.874 GHz	H	50.309	36.179	74	54	Compliant	
	7.311 GHz	H	40.52	32.24	74	54	Compliant	
	12.185 GHz	H	42.843	33.713	74	54	Compliant	
	14.622 GHz	H	46.234	37.494	74	54	Compliant	
	4.874 GHz	V	43.819	30.819	74	54	Compliant	
	7.311 GHz	V	40.52	31.88	74	54	Compliant	
11	12.185 GHz	V	44.873	34.333	74	54	Compliant	
	14.622 GHz	V	47.494	37.974	74	54	Compliant	
	4.924 GHz	H	49.745	36.415	74	54	Compliant	
	7.386 GHz	H	46.548	32.348	74	54	Compliant	
	12.31 GHz	H	43.203	34.403	74	54	Compliant	
	14.772 GHz	H	46.344	37.554	74	54	Compliant	
	4.924 GHz	V	44.415	31.755	74	54	Compliant	
7.386 GHz	V	43.078	31.608	74	54	Compliant		
12.31 GHz	V	43.953	34.813	74	54	Compliant		
14.772 GHz	V	48.124	37.864	74	54	Compliant		

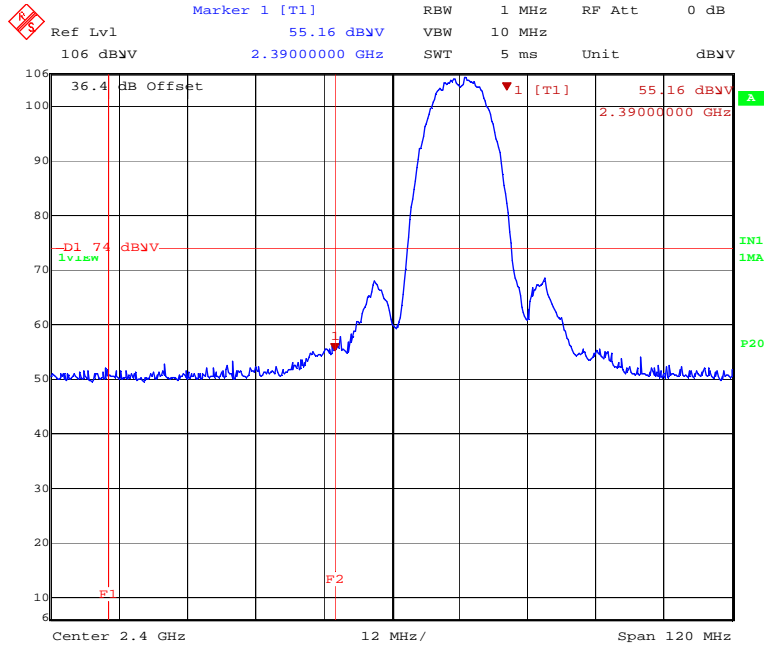
Worst Case Spurious Measurements (802.11n (20MHz) Mode, External Antenna)

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	4.824 GHz	H	51.51	37.69	74	54	Compliant	
	7.236 GHz	H	47.178	33.358	74	54	Compliant	
	12.06 GHz	H	46.233	35.933	74	54	Compliant	
	14.472 GHz	H	47.054	37.814	74	54	Compliant	
	4.824 GHz	V	44.72	30.22	74	54	Compliant	
	7.236 GHz	V	40.568	31.768	74	54	Compliant	
	12.06 GHz	V	44.433	35.653	74	54	Compliant	
6	14.472 GHz	V	48.094	37.654	74	54	Compliant	
	4.874 GHz	H	49.929	35.699	74	54	Compliant	
	7.311 GHz	H	45.74	30.3	74	54	Compliant	
	12.185 GHz	H	41.963	33.253	74	54	Compliant	
	14.772 GHz	H	48.124	37.254	74	54	Compliant	
	4.874 GHz	V	44.599	30.259	74	54	Compliant	
	7.311 GHz	V	46.4	32.7	74	54	Compliant	
11	12.185 GHz	V	43.473	34.363	74	54	Compliant	
	14.622 GHz	V	47.624	38.144	74	54	Compliant	
	4.924 GHz	H	47.985	31.825	74	54	Compliant	
	7.386 GHz	H	40.798	31.838	74	54	Compliant	
	12.31 GHz	H	43.203	34.643	74	54	Compliant	
	14.772 GHz	H	48.124	37.664	74	54	Compliant	
	4.924 GHz	V	42.755	28.945	74	54	Compliant	
7.3818 GHz	V	44.41	30.79	74	54	Compliant		
12.31 GHz	V	42.953	34.743	74	54	Compliant		
14.772 GHz	V	46.844	37.704	74	54	Compliant		

Worst Case Spurious Measurements (802.11n (40MHz)Mode, External Antenna)

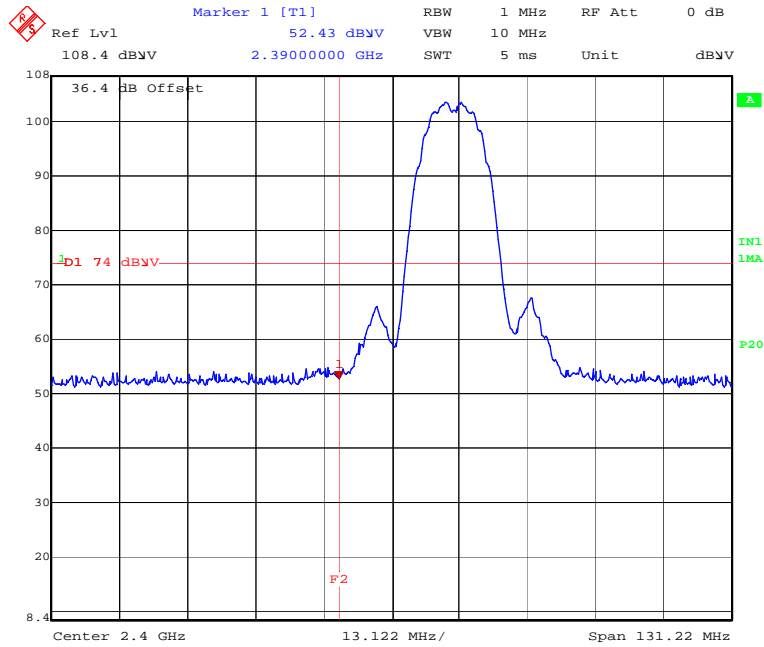
TX Channel	Spurious Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
3	4.844 GHz	H	48.818	35.378	74	54	Compliant	
	7.266 GHz	H	44.747	31.487	74	54	Compliant	
	12.11 GHz	H	44.867	35.307	74	54	Compliant	
	14.532 GHz	H	47.437	38.307	74	54	Compliant	
	4.844 GHz	V	42.957	31.377	74	54	Compliant	
	7.266 GHz	V	39.547	30.497	74	54	Compliant	
	12.11 GHz	V	44.477	34.907	74	54	Compliant	
6	14.532 GHz	V	47.437	38.227	74	54	Compliant	
	4.874 GHz	H	47.059	30.419	74	54	Compliant	
	7.311 GHz	H	39.76	31.5	74	54	Compliant	
	12.185 GHz	H	43.343	33.773	74	54	Compliant	
	14.622 GHz	H	46.364	37.444	74	54	Compliant	
	4.874 GHz	V	43.179	30.249	74	54	Compliant	
	7.311 GHz	V	40.65	30.98	74	54	Compliant	
9	12.185 GHz	V	42.723	33.813	74	54	Compliant	
	14.622 GHz	V	49.424	37.754	74	54	Compliant	
	4.904 GHz	H	47.722	33.992	74	54	Compliant	
	7.356 GHz	H	40.739	32.319	74	54	Compliant	
	12.26 GHz	H	43.501	35.021	74	54	Compliant	
	14.712 GHz	H	46.63	37.89	74	54	Compliant	
	4.904 GHz	H	47.722	33.992	74	54	Compliant	
7.356 GHz	H	40.739	32.319	74	54	Compliant		
12.26 GHz	H	43.501	35.021	74	54	Compliant		
14.712 GHz	H	46.63	37.89	74	54	Compliant		

Radiated Restricted Band Edge Emissions:



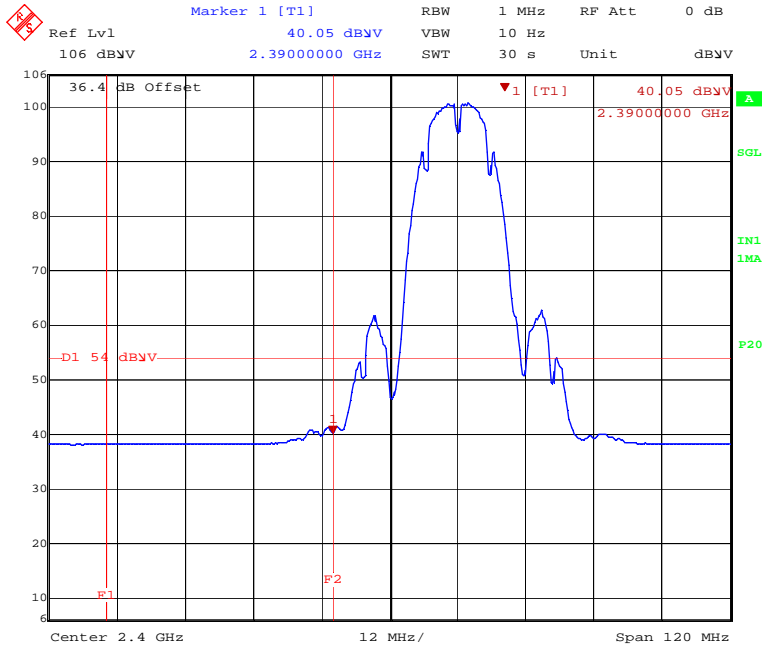
Date: 21.DEC.2011 12:59:21

Low Band Edge Onboard Antenna (B Mode Peak)



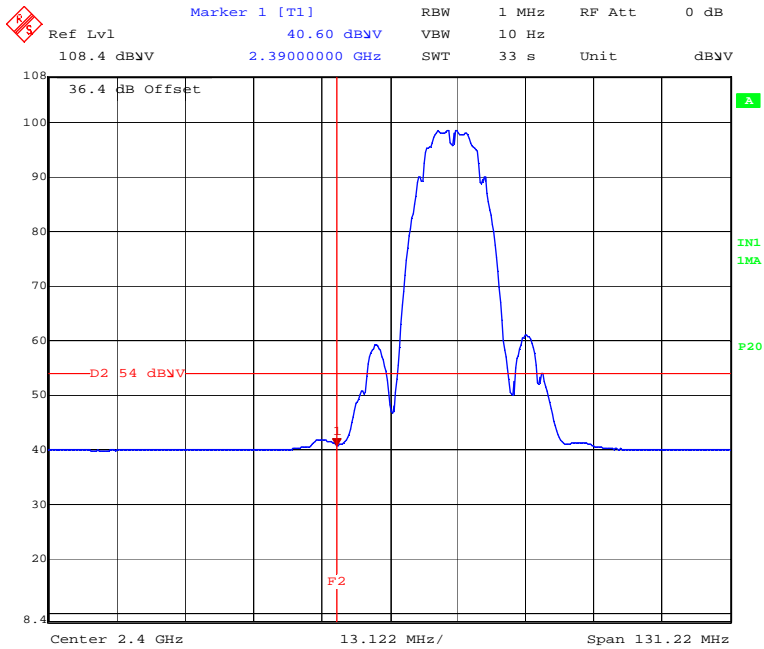
Date: 15.JUN.2012 08:32:35

Low Band Edge External Antenna (B Mode Peak)



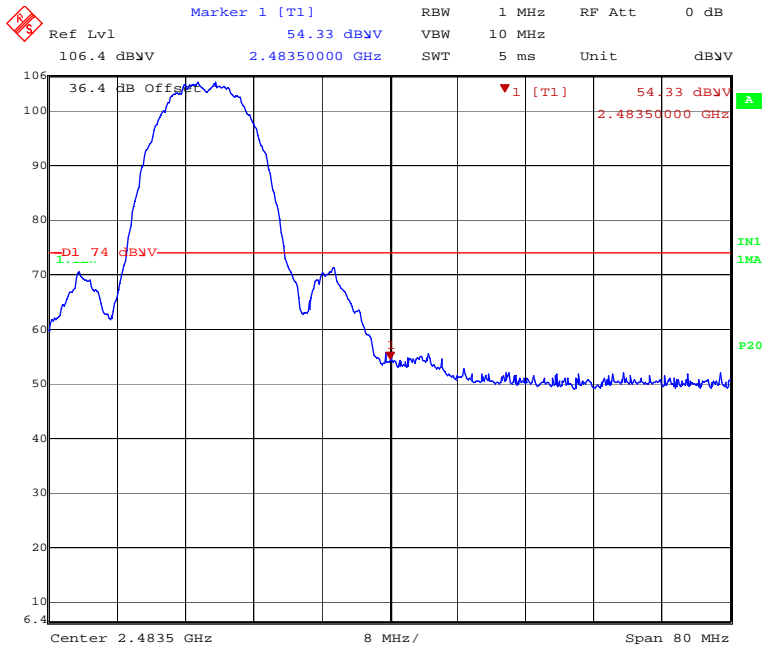
Date: 21.DEC.2011 12:57:29

Low Band Edge Onboard Antenna (B Mode Average)



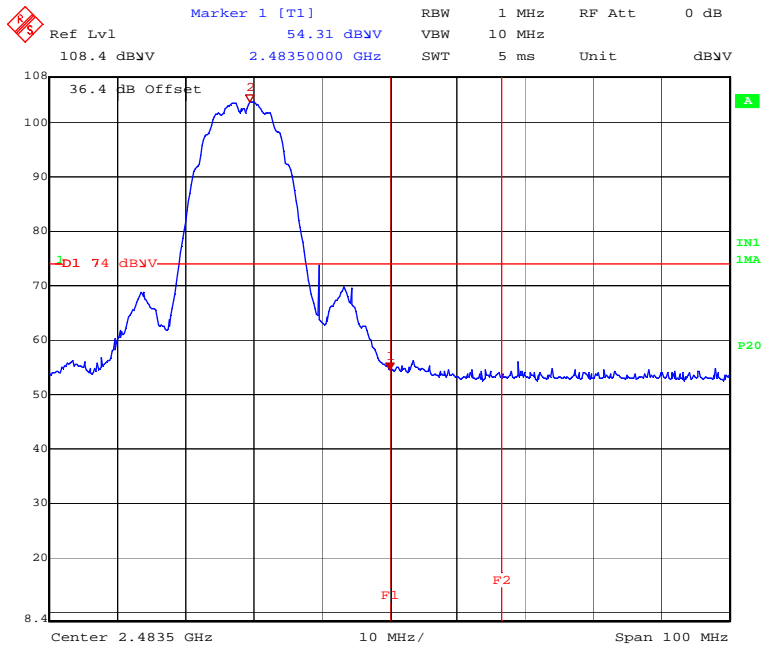
Date: 15.JUN.2012 08:34:44

Low Band Edge External Antenna (B Mode Average)



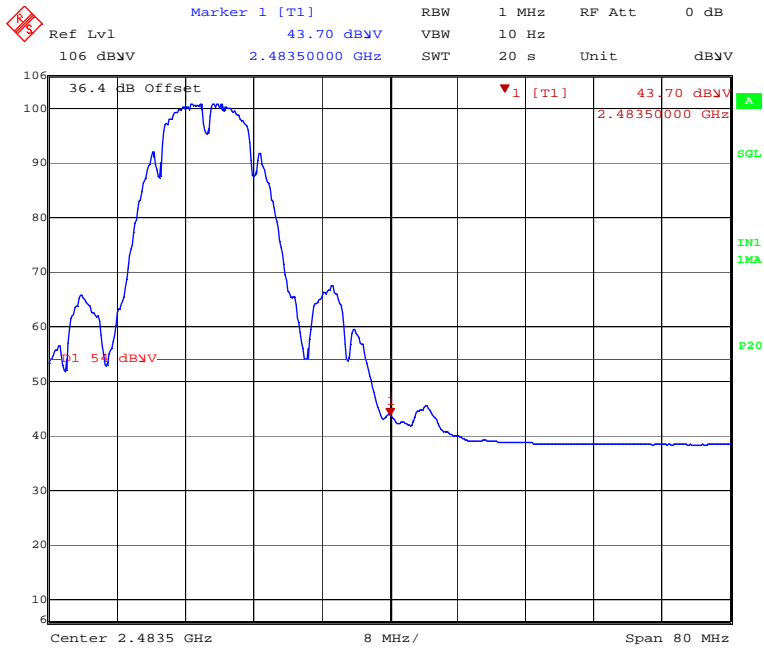
Date: 21.DEC.2011 06:46:47

High Band Edge Onboard Antenna (B Mode Peak)



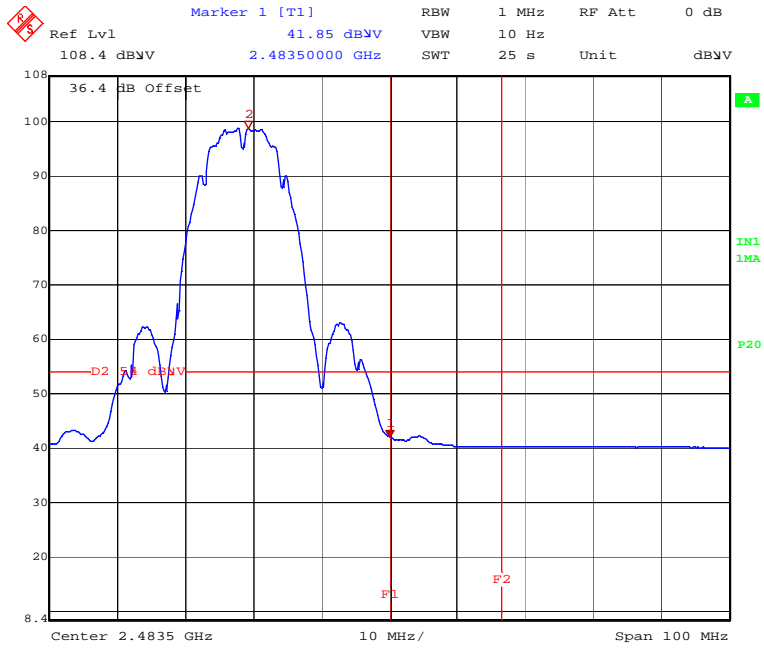
Date: 15.JUN.2012 11:06:46

High Band Edge External Antenna (B Mode Peak)



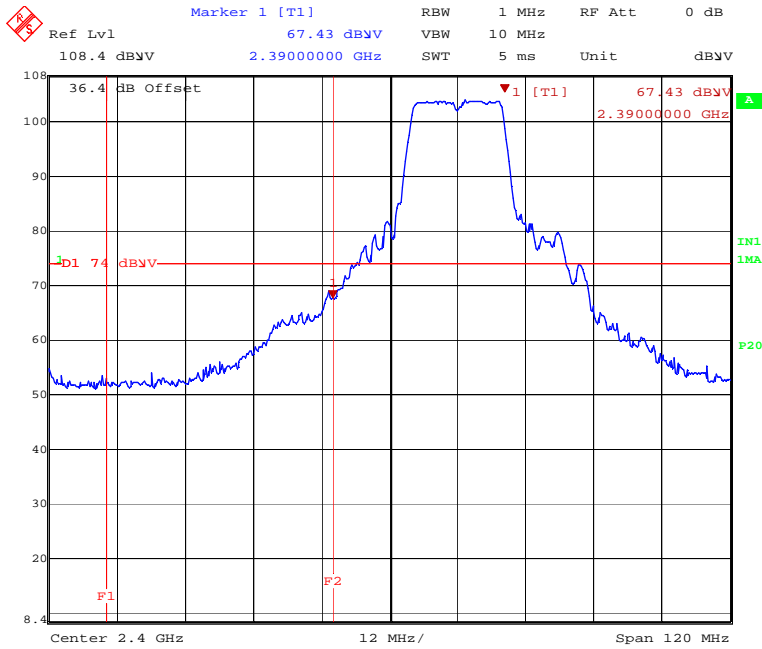
Date: 21.DEC.2011 12:33:31

High Band Edge Onboard Antenna (B Mode Average)

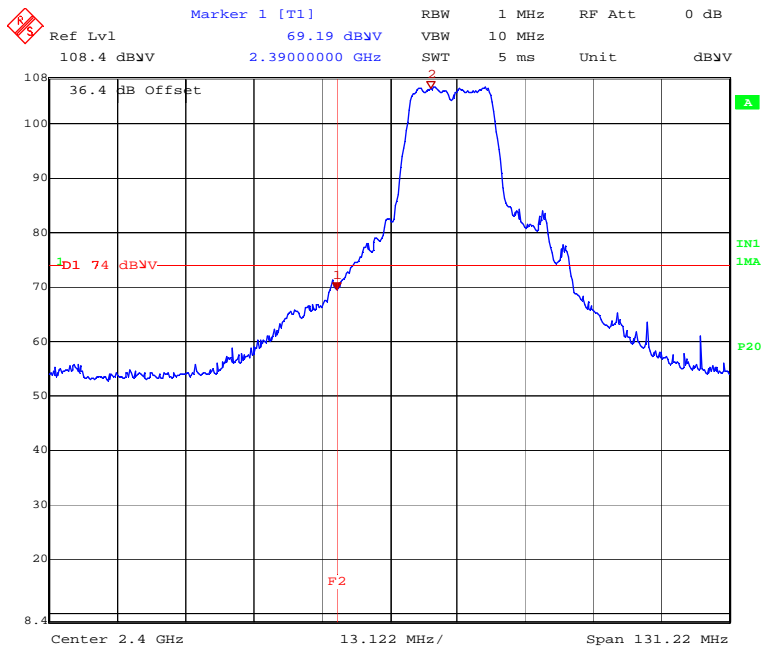


Date: 15.JUN.2012 11:07:54

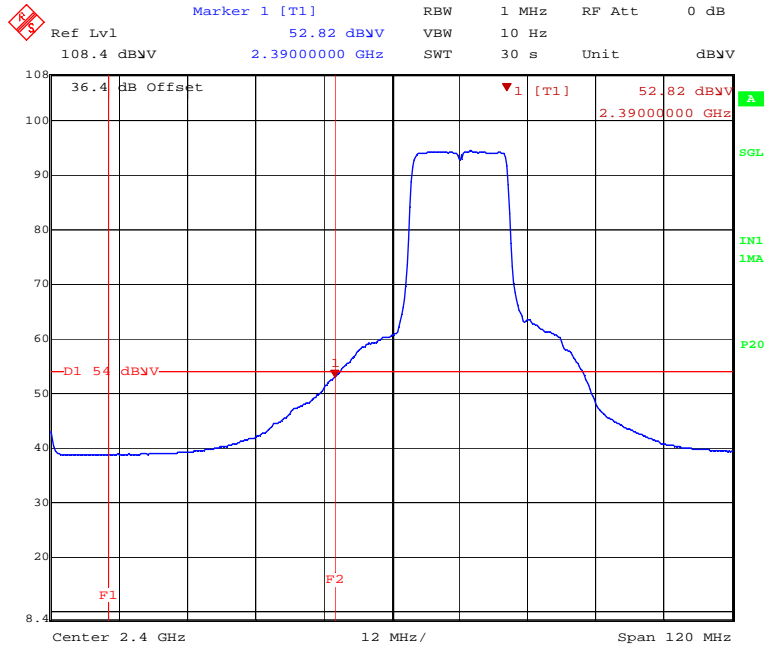
High Band Edge External Antenna (B Mode Average)



Low Band Edge Onboard Antenna (G Mode Peak)

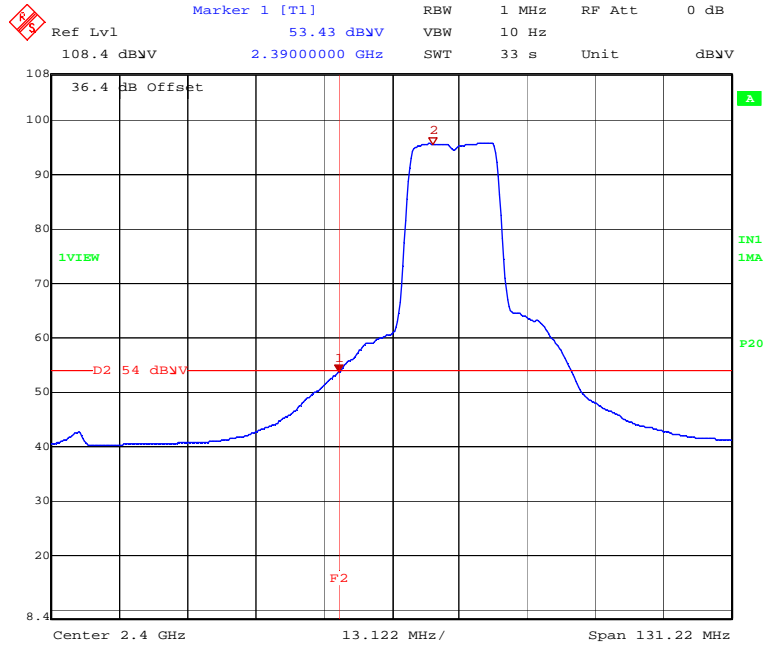


Low Band Edge External Antenna (G Mode Peak)



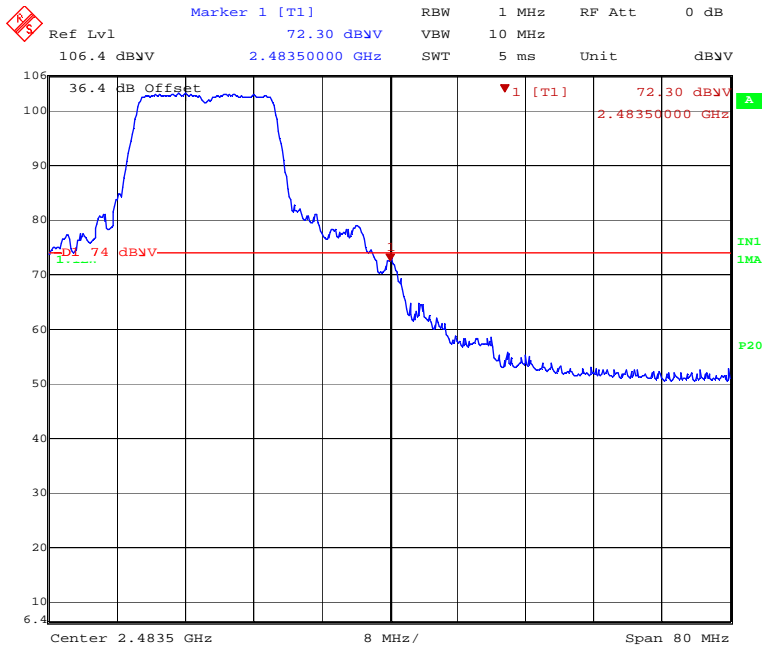
Date: 21.DEC.2011 13:17:42

Low Band Edge Onboard Antenna (G Mode Average)

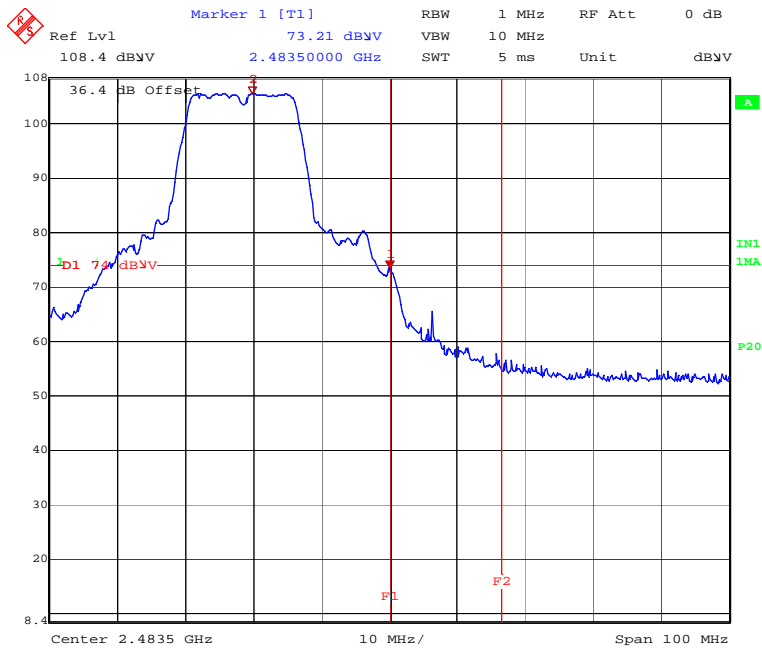


Date: 15.JUN.2012 10:10:44

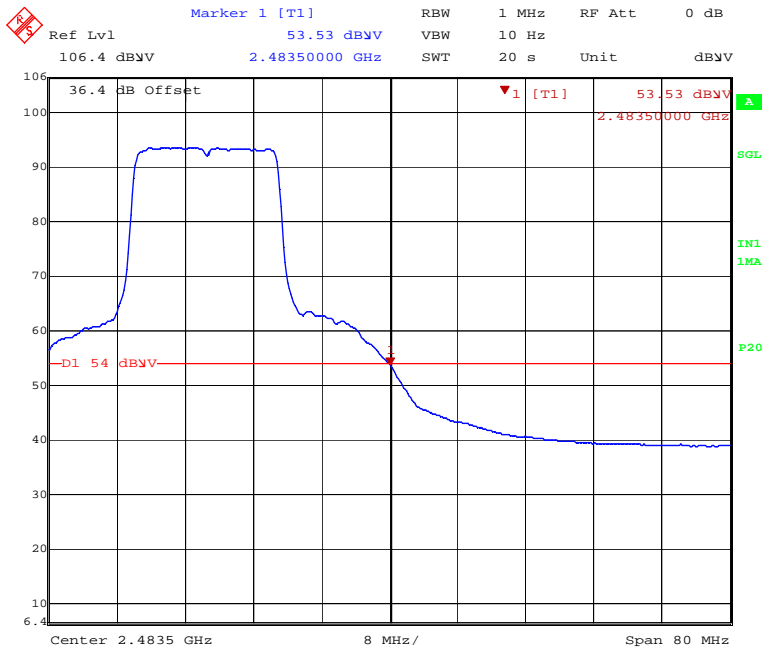
Low Band Edge External Antenna (G Mode Average)



High Band Edge Onboard Antenna (G Mode Peak)

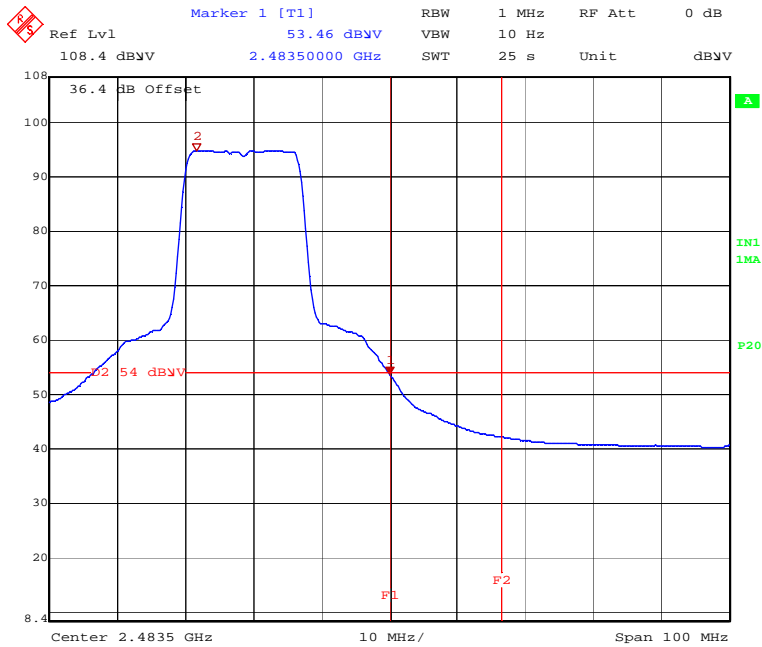


High Band Edge External Antenna (G Mode Peak)



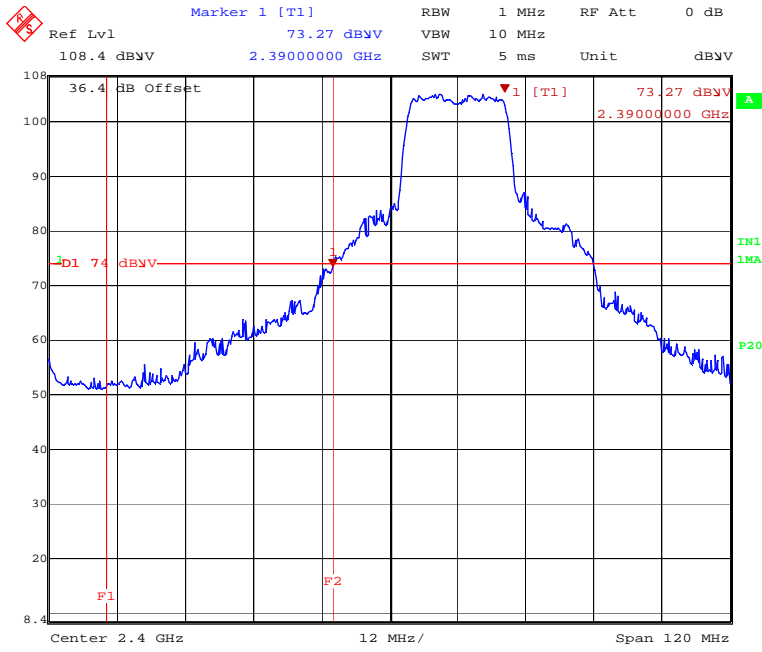
Date: 21.DEC.2011 07:09:48

High Band Edge Onboard Antenna (G Mode Average)



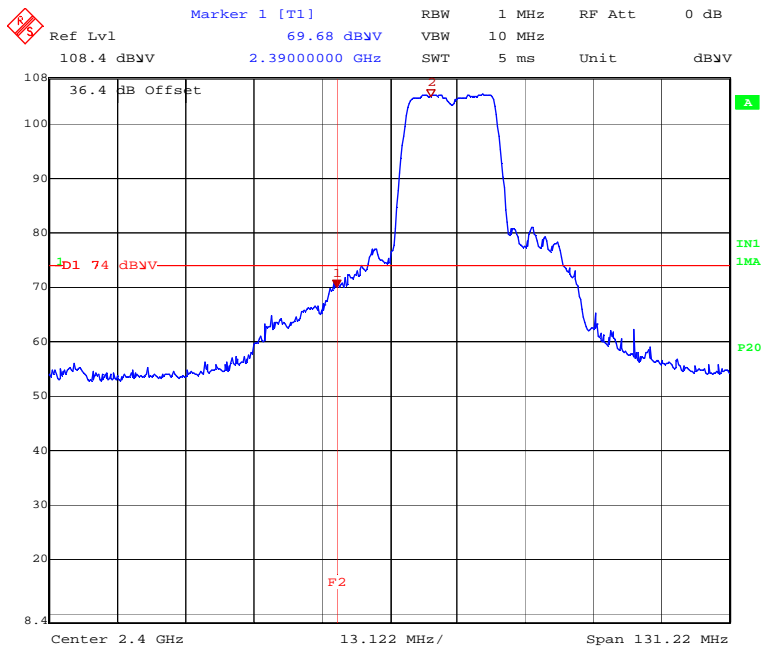
Date: 15.JUN.2012 10:58:16

High Band Edge External Antenna (G Mode Average)



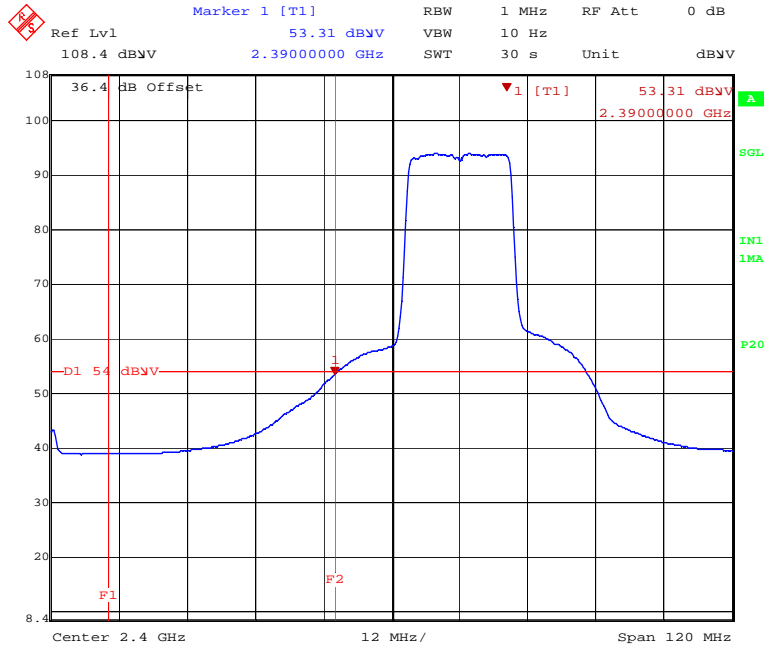
Date: 21.DEC.2011 13:25:57

Low Band Edge Onboard Antenna (20MHz N Mode Peak)



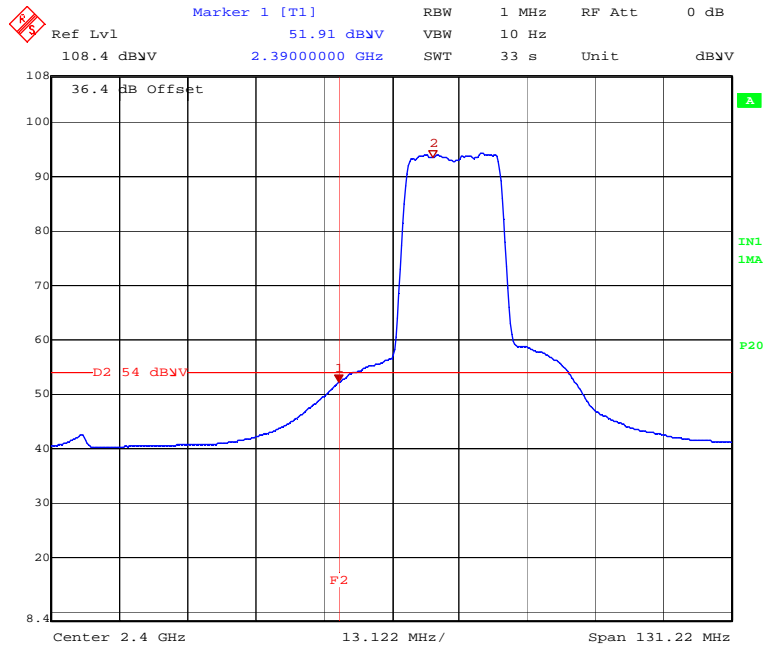
Date: 15.JUN.2012 10:17:12

Low Band Edge External Antenna (20MHz N Mode Peak)



Date: 21.DEC.2011 13:25:00

Low Band Edge Onboard Antenna (20MHz N Mode Average)



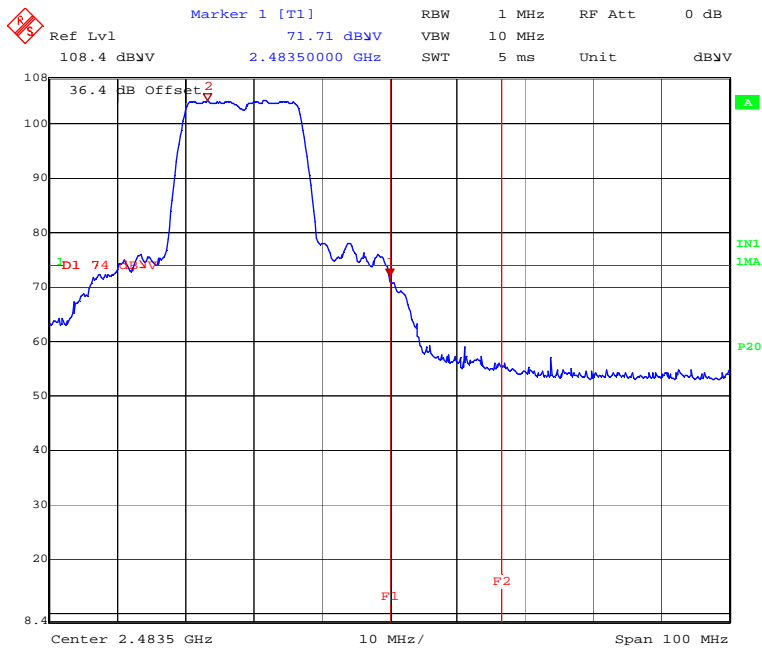
Date: 15.JUN.2012 10:18:16

Low Band Edge External Antenna (20MHz N Mode Average)



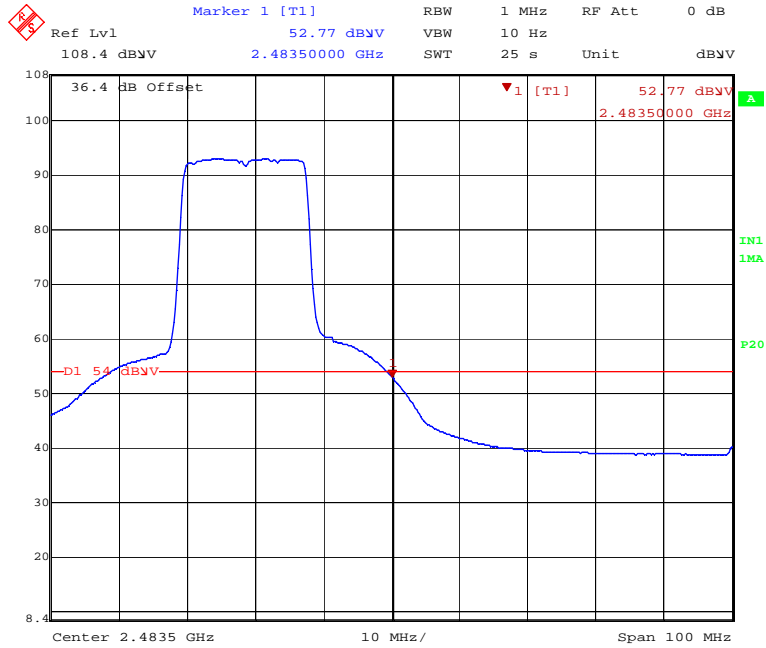
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High Band Edge Onboard Antenna (20MHz N Mode Peak)



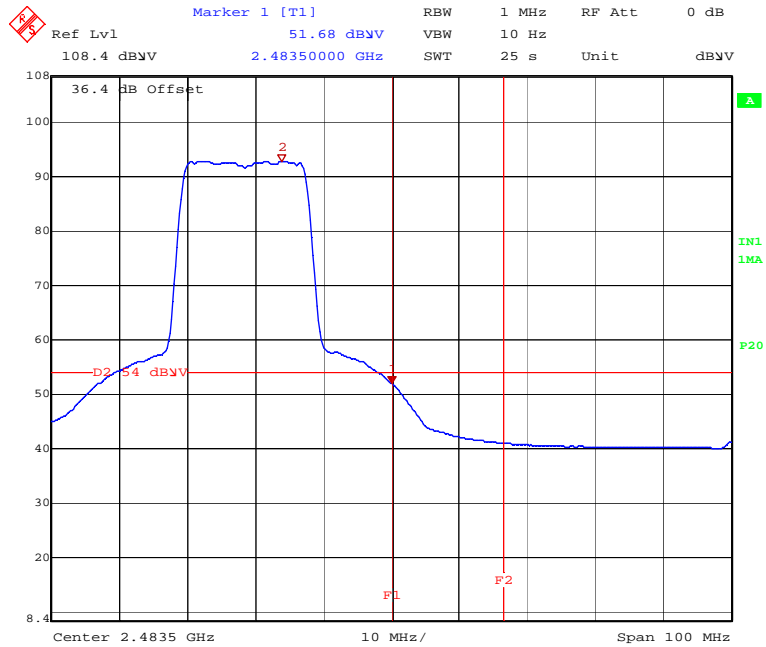
Date: 15.JUN.2012 10:49:27

High Band Edge External Antenna (20MHz N Mode Peak)



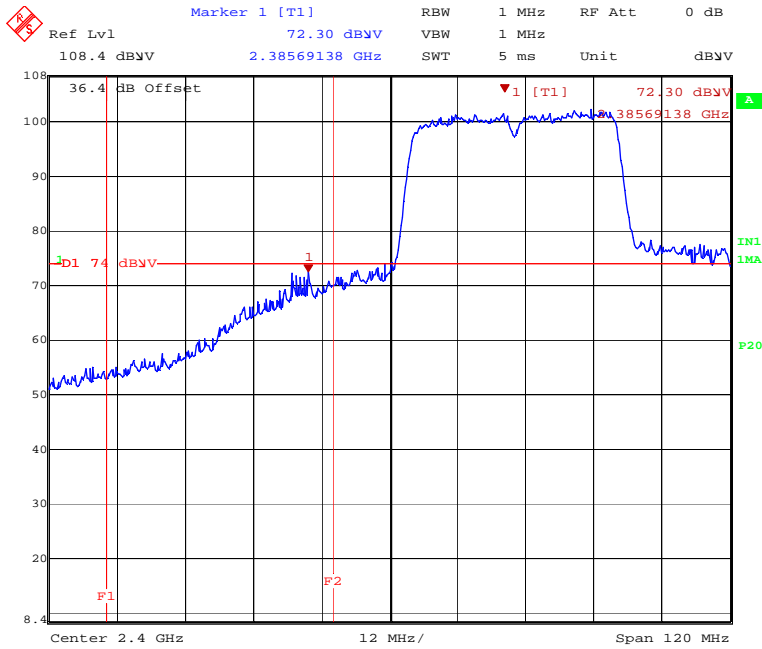
Date: 27.DEC.2011 13:19:40

High Band Edge Onboard Antenna (20MHz N Mode Average)



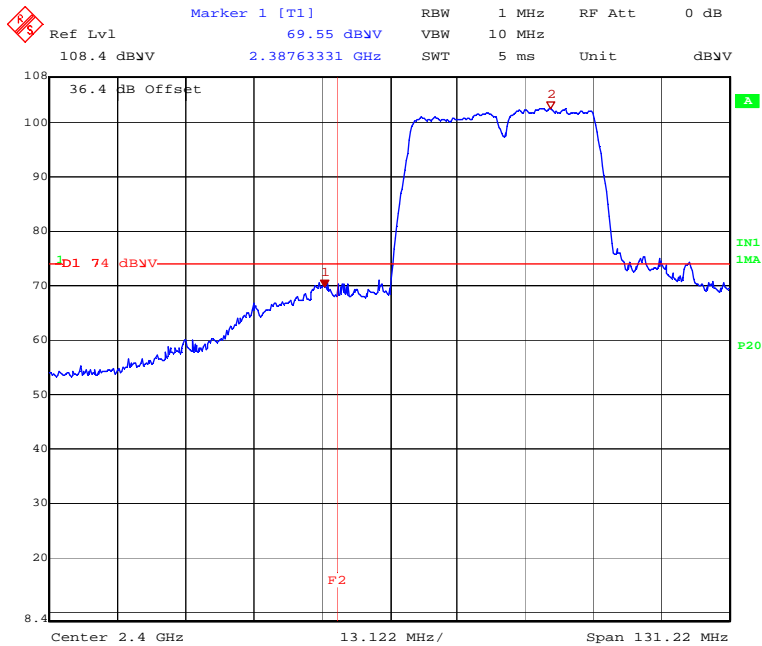
Date: 15.JUN.2012 10:51:20

High Band Edge External Antenna (20MHz N Mode Average)



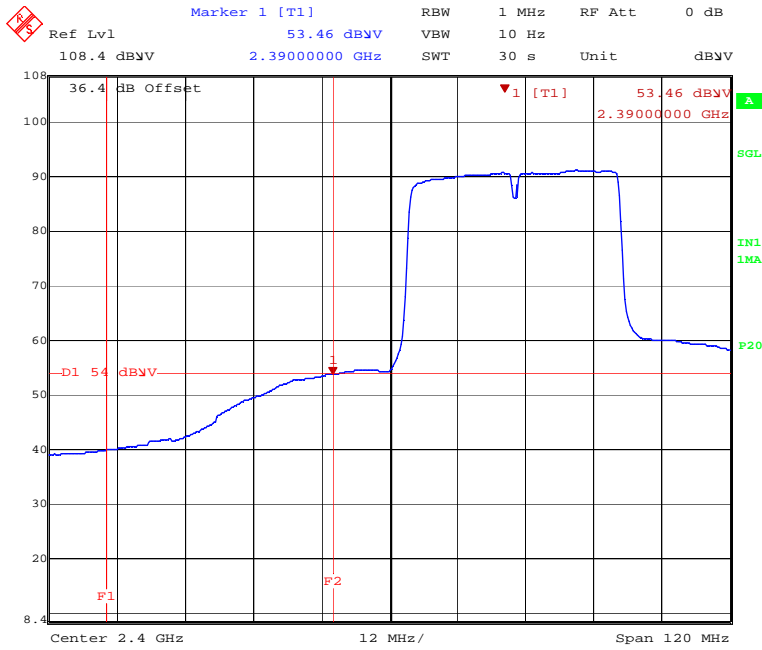
Date: 27.DEC.2011 12:52:33

Low Band Edge Onboard Antenna (40MHz N Mode Peak)



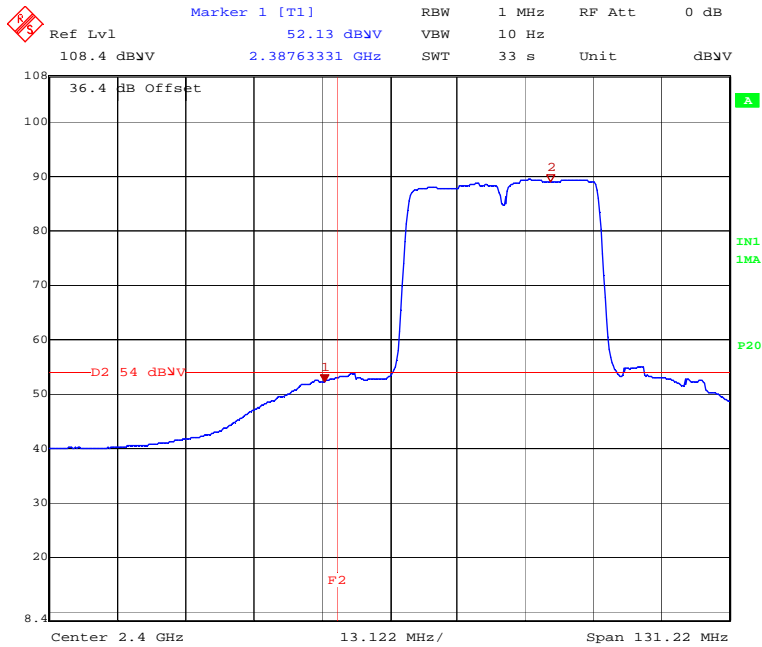
Date: 15.JUN.2012 10:22:33

Low Band Edge External Antenna (40MHz N Mode Peak)



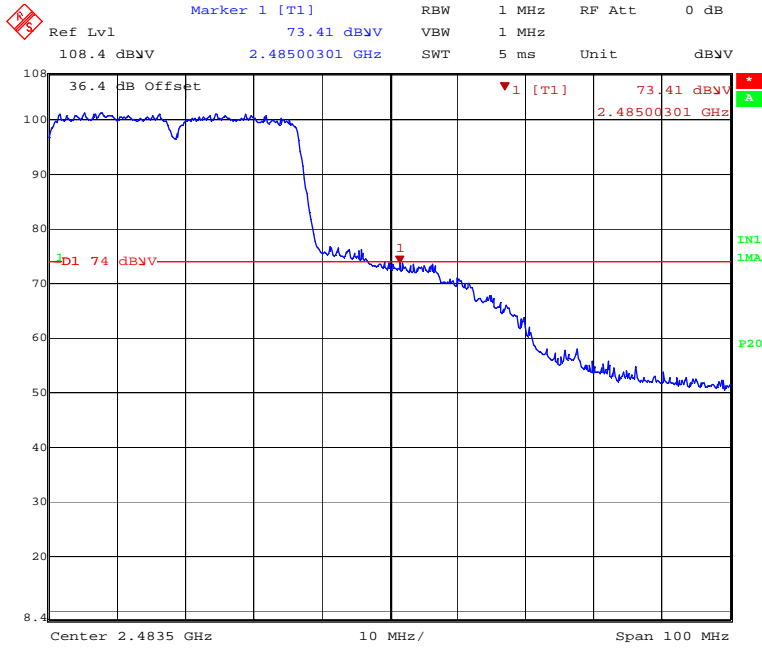
Date: 27.DEC.2011 12:49:35

Low Band Edge Onboard Antenna (40MHz N Mode Average)



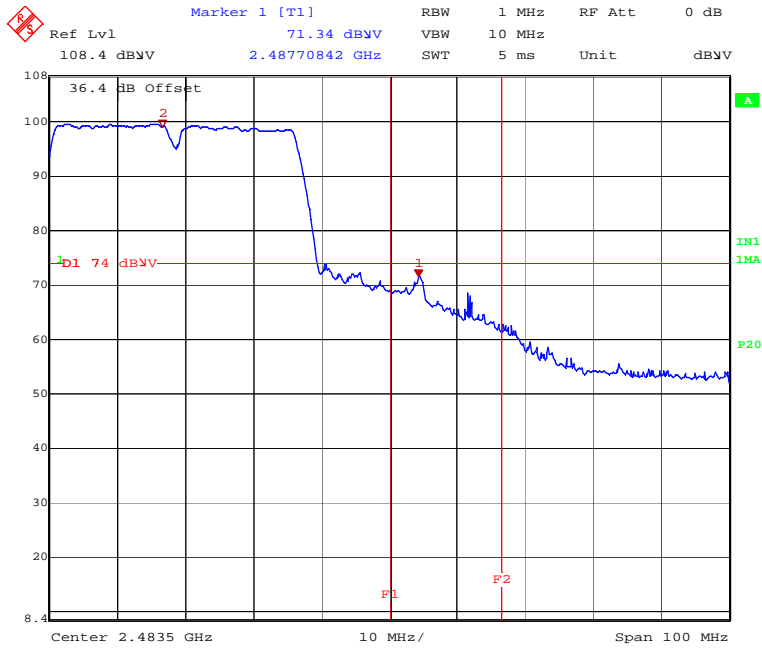
Date: 15.JUN.2012 10:28:35

Low Band Edge External Antenna (40MHz N Mode Average)



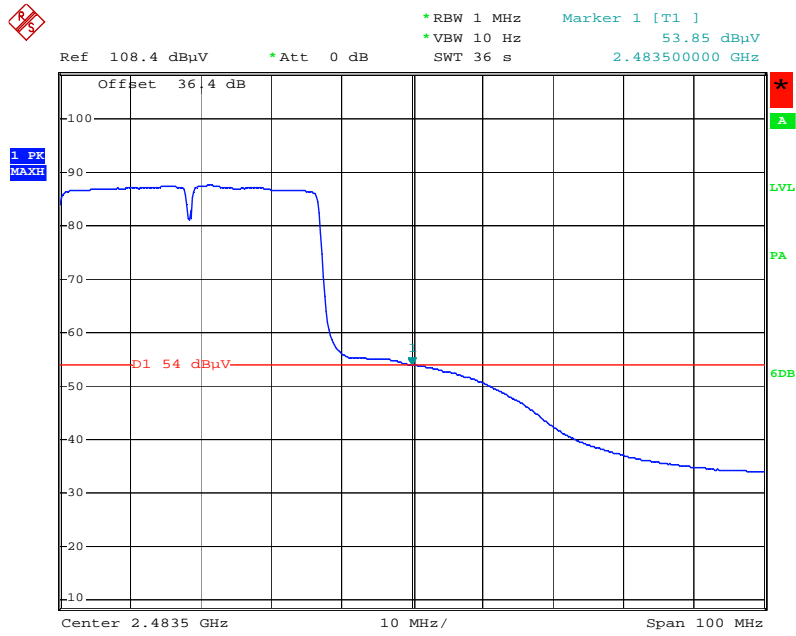
Date: 27.DEC.2011 13:07:29

High Band Edge Onboard Antenna (40MHz N Mode Peak)



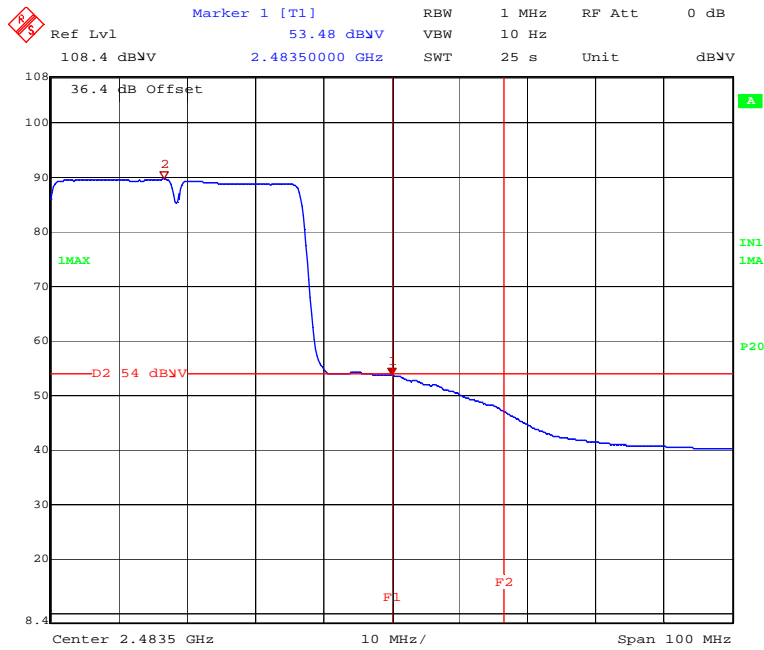
Date: 15.JUN.2012 10:46:23

High Band Edge External Antenna (40MHz N Mode Peak)



Date: 2.JAN.2012 16:38:41

High Band Edge Onboard Antenna (40MHz N Mode Average)



Date: 15.JUN.2012 10:43:14

High Band Edge External Antenna (40MHz N Mode Average)

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:

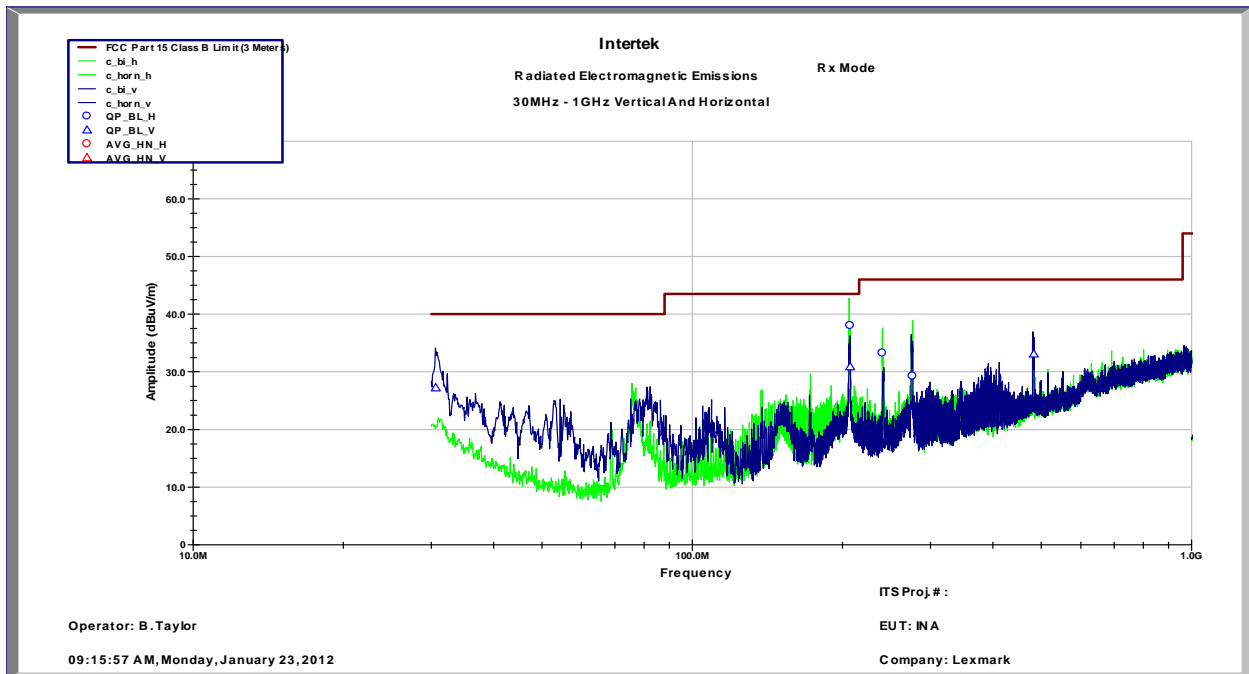
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012
Biconnilog Antenna	00051864	ETS	3142C	12/20/2011	12/20/2012
Horn Antenna	6556	ETS	3115	8/24/2011	8/24/2012
Horn Antenna	1096	Antenna Research	DRG118A	7/20/2011	7/20/2012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

9.5 Results:

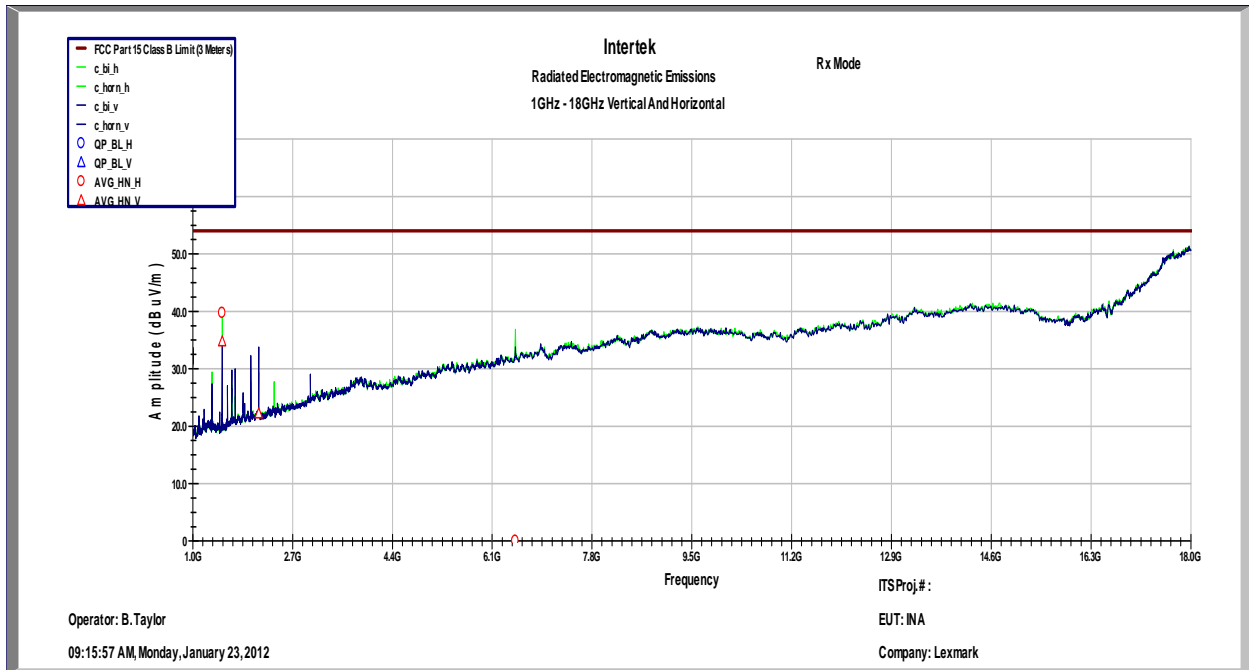
All spurious emissions with the test sample in receive mode were below the limits specified in Part 15.109 for a class B digital device and RSS-GEN Section 6.1.

Radiated Emissions										
Test Engineer: Bryan Taylor		Start Date: 12/19/2012		End Date: 1/23/2012						
Temperature: 23.2C		Humidity: 46.20%		Pressure: 984.6mBar						
Specification: FCC Part 15B		Test Limit: Class B								
Notes: Constant Receive Mode										
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
1.5 GHz	V	47.22	-37.69	25.18	34.71	53.98	-19.27	1MHz / Avg	3m	Compliant
2.12 GHz	V	31.25	-36.57	27.53	22.2	53.98	-31.78	1MHz / Avg	3m	Compliant
1.5 GHz	H	52.2	-37.69	25.18	39.69	53.98	-14.29	1MHz / Avg	3m	Compliant
207.19 MHz	H	24.56	2.62	10.82	38	43.52	-5.52	120kHz / QP	3m	Compliant
240.39 MHz	H	18.19	2.8	12.21	33.19	46.02	-12.83	120kHz / QP	3m	Compliant
276.36 MHz	H	13.39	2.98	12.9	29.27	46.02	-16.75	120kHz / QP	3m	Compliant
30.62 MHz	V	8.65	0.82	17.76	27.24	40	-12.76	120kHz / QP	3m	Compliant
207.22 MHz	V	17.39	2.62	10.82	30.83	43.52	-12.69	120kHz / QP	3m	Compliant
483.33 MHz	V	10.77	3.84	18.47	33.07	46.02	-12.95	120kHz / QP	3m	Compliant
Calculations:					F = C + D + E		H = F - G			

Constant Receive Mode



Peak Scan (Bilog)



Peak Scan (Horn)

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.

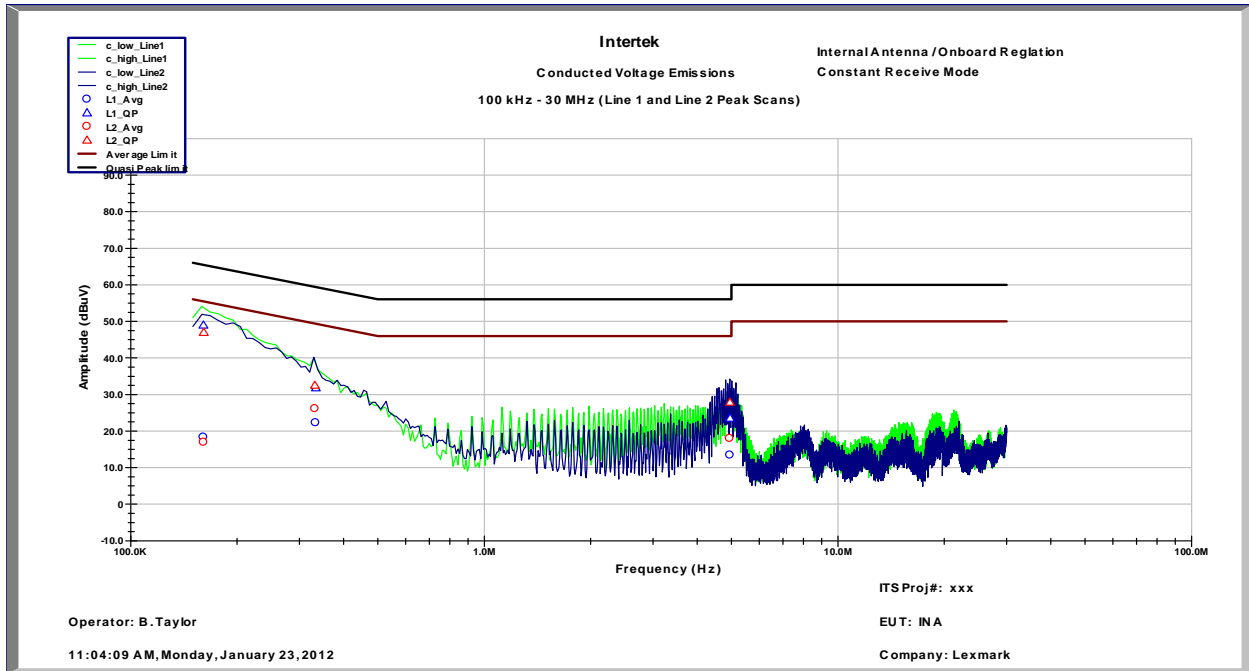
10.2 Test Procedure

ANSI C63.4: 2009

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

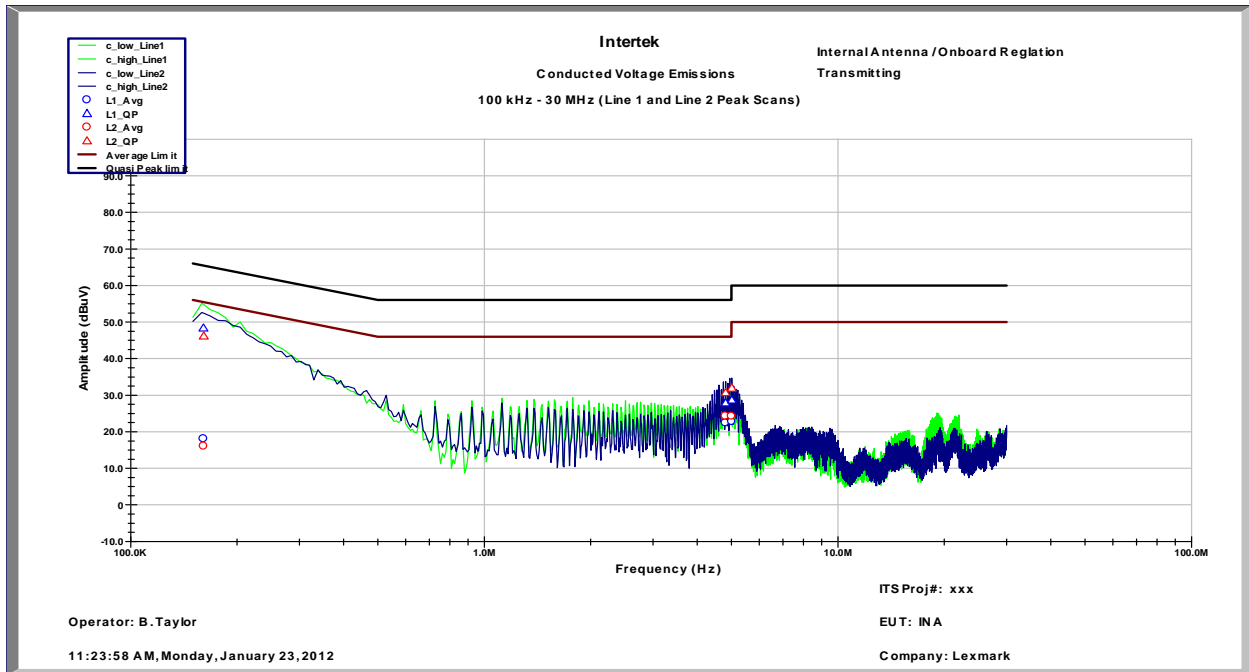
10.4 Results:



Constant Receive Mode

Conducted Voltage Emissions on Power Lines								
Test Engineer: Bryan Taylor		Start Date: 1/23/2012		End Date: 1/23/2012				
Temperature: 23.3C		Humidity: 45.60%		Pressure: 986.8mBar				
Specification: FCC Part 15		Test Limit: Class B		RBW: 9kHz				
Notes: Constant Receive Mode								
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line 1	160.75 KHz	48.95	65.43	-16.48	18.31	55.43	-37.12	Compliant
Line 1	334.0 KHz	31.78	59.35	-27.57	22.2	49.35	-27.15	Compliant
Line 1	4.954 MHz	23.53	56	-32.47	13.38	46	-32.62	Compliant
Line 2	161.0 KHz	46.99	65.41	-18.43	16.89	55.41	-38.53	Compliant
Line 2	332.0 KHz	32.52	59.4	-26.88	26.08	49.4	-23.32	Compliant
Line 2	4.952 MHz	27.89	56	-28.11	17.93	46	-28.07	Compliant

Constant Receive Mode



Transmit Mode

Conducted Voltage Emissions on Power Lines								
Test Engineer:	Bryan Taylor	Start Date:	1/23/2012	End Date:	1/23/2012			
Temperature:	23.3C	Humidity:	45.60%	Pressure:	986.8mBar			
Specification:	FCC Part 15	Test Limit:	Class B	RBW:	9kHz			
Notes:	Transmitting							
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line 1	160.75 KHz	48.36	65.43	-17.07	18.04	55.43	-37.39	Compliant
Line 1	4.8108 MHz	27.87	56	-28.13	22.39	46	-23.61	Compliant
Line 1	5.013 MHz	28.67	60	-31.33	22.73	50	-27.27	Compliant
Line 2	161.0 KHz	46.13	65.41	-19.29	16.01	55.41	-39.41	Compliant
Line 2	4.811 MHz	30.68	56	-25.32	24.23	46	-21.77	Compliant
Line 2	5.0087 MHz	31.94	60	-28.06	24.2	50	-25.8	Compliant

Transmit 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	7/16/2012	100596665LEX-001	Original Issue