COMPLIANCE WORLDWIDE INC.
TEST REPORT 461-12R4

In Accordance with the Requirements of
Federal Communications Commission CFR Title 47 Part 15.249, Subpart C
Industry Canada RSS 310

Low Power License-Exempt Radio Communication Devices
Intentional Radiators

Issued to

Autoliv Active Safety
1001 Pawtucket Blvd
Lowell, MA 01854
978-674-6500

For the

24 GHz Honda Sensor (BSD & RCTA Versions)
Autoliv Part Number: 6234734

FCC ID: WU8NB24BS
IC: CANADA 310

Report Issued on March 20, 2013

Tested by

Brian F. Breault

Reviewed by

Larry K. Stillings

Table of Contents

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(603) 887 3903 Fax 887 6445
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1. Scope

This test report certifies that the Autoliv Electronics 24 GHz NB BSD & RCTA Sensors, as tested, meets the FCC Part 15, Subpart C and Industry Canada RSS 310, Section 3.10 requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

Revision R1 – Radiated field strength of fundamental was revised. Revision R2 – Corrects Doppler Frequency for RCTA Mode in tables. Revision R3 – Corrects calculations for RF Exposure. Revision R4 – Adds Photographs, Updates Loop Antenna in Equipment List

2. Product Details

2.1. Manufacturer: Autoliv Electronics
2.2. Model Number: 6234734
2.3. Serial Number: 144 (RCTA), 1B01-B0150 (BSD)
2.4. Description: Vehicular Radar Sensor (Rear Cross Traffic Alert)
2.5. Power Source: DC 13.5 volts nominal – Automotive power system.
2.6. Hardware Revision: 1C01
2.7. Software Revision: N/A
2.8. Modulation Type: Pulse Modulation
2.9. Operating Frequency: 24.15 GHz Nominal Center Frequency (RCTA), 24.1005 to 24.2289 GHz Nominal (BSD)
2.10. EMC Modifications: None

3. Product Configuration

3.1. Support Equipment

Manufacturer	Model/Part #	Serial Number	Input Voltage	Input Frq.	Description/Function
NA	NA	NA	12	VDC	Automotive Battery

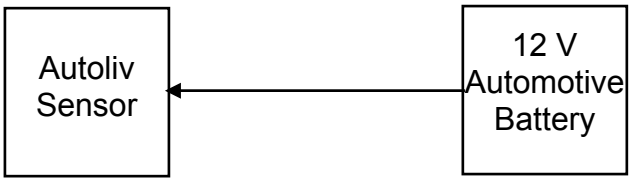
3.2. Cables

Manufacturer	Model/Part #	Length (m)	Shield Y/N	Description/Function
Custom	NA	10	N	Power and signal cable used for power only

3.3. Operational Characteristics & Software

Hardware Setup:
The Autoliv 24 GHz BSD and/or RCTA Sensor is configured to operate in its normal state when power is applied.

3.4. Test Setup Diagram



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4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
Spectrum Analyzer 100 Hz to 26.5 GHz	Agilent Tech	E4407B	MY45104493	12/22/2012
Spectrum Analyzer 100 Hz to 26.5 GHz	Agilent Tech	E7405A	MY45115430	5/11/2014
Spectrum Analyzer 20 Hz to 40 GHz	Rohde & Schwarz	FSV40	100899	5/26/2013
EMI Receiver 9 kHz to 6.5 GHz	Hewlett Packard	8546A	3330A00115	6/8/2014
Microwave Preamp 1 to 26.5 GHz	Hewlett Packard	8449B	3008A01323	12/1/2012
Microwave Preamp 2 to 50 GHz	Hewlett Packard	83050A	3331A00404	10/20/2012
Notch Filter 24.0 – 24.25 GHz	K&L Microwave	5NSP-00002	001	CBU
Bilog Antenna 30 MHz – 2 GHz	Com-Power	AC-220	25509	8/31/2013
Horn Antenna 1 to 18 GHz	Electro-Metrics	EM-6961	6337	10/19/2012
Horn Antenna 1 to 18 GHz	Com-Power	AH-118	10078	8/28/2014
Horn Antenna 18 to 26.5 GHz	Com-Power	AH-826	081051	8/27/2014
Horn Antenna 18 to 40 GHz	Com-Power	AH-840	03075	8/27/2014
Horn Antenna 18 to 40 GHz	Com-Power	AH-840	101032	04/6/2013
Loop Antenna 9 kHz to 30 MHz	EMCO	6512	9309-1139	8/28/2014
Horn Antenna 18 to 26.5 GHz WR42 to 3.5mm Adapter	Hughes Hewlett Packard	45820H-2020 K281C	037 3032A10738	Not Req'd
External Mixer WR28 Horn Antenna 26.5 to 40 GHz WR28 to 3.5mm Adapter	Hewlett Packard Alpha Industries Hewlett Packard	11970A 861A/599 R281A	3003A08210 324 03197	Not Req'd
External Mixer WR22 Horn Antenna 33 to 50 GHz WR22 to 3.5mm Adapter	Hewlett Packard Alpha Industries Hewlett Packard	11970Q 861B/383 Q281B	3003A01273 133 00116	Not Req'd
External Mixer WR19 External Mixer WR19 Horn Antenna 40 to 60 GHz WR19 to 1.85mm Adapter	Hewlett Packard Rohde & Schwarz M/A Com Baytron Hewlett Packard	11970U FS-Z60 3-19-720 U281A	2332A00425 100128 N/A 00209	Not Req'd
External Mixer WR12 Horn Antenna 50 to 75 GHz WR12 to 1.85mm Adapter	Hewlett Packard Aerowave Hewlett Packard	11970V 15-7025 V281B	2521A00357 N/A 00369	Not Req'd
External Mixer WR10 Horn Antenna 75 to 110 GHz	Hewlett Packard Alpha Industries	11970W 861A/387	2521A00230 359	Not Req'd
Anechoic Chamber 3 Meter – Free Space	Keene Ray Proof	S-81	R-2338	Not Req'd
RF Signal Generator 100 kHz to 40 GHz	Rohde & Schwarz	SMB 100A	175352	5/14/2014
DC Variable Source 60 Volt, 3 Amp	Hewlett Packard	6296A	7M0599	1/5/2013
3 dB & 10 dB Attenuators DC to 40 GHz	Narda	4768-3 4768-10	9610 9806	Not Req'd
Barometric Pressure / Humidity / Temperature Data Logger	Extech Instruments	SD700	Q590483	5/1/2013

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4. Measurements Parameters (cont)

4.2. Measurement & Equipment Setup

Test Dates:	06/22/2012, 06/28/2012, 06/29/2012, 07/12/2012, 08/03/2012 to 08/17/2012, 10/05/2012, 10/10/2012, 10/11/2012, 11/19/2012, 11/30/2012
Test Engineer:	Brian Breault
Normal Site Temperature (15 - 35°C):	26.0
Relative Humidity (20 -75%RH):	35
Frequency Range:	30 MHz to 50 GHz
Measurement Distance:	3.0 and/or 0.5 Meters
EMI Receiver IF Bandwidth:	120 kHz - 30 MHz to 1 GHz 1 MHz - Above 1 GHz
EMI Receiver Avg Bandwidth:	300 kHz - 30 MHz to 1 GHz 3 MHz - Above 1 GHz
Detector Function:	Peak, RMS Average

4.3. Measurement Procedure

Test measurements were made in accordance FCC Part 15.249 and IC RSS-310, Section 3.10 “24.00-24.25 GHz.”

The test methods used to generate the data in this test report is in accordance with ANSI C63.4:2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

4.4. Choice of Operating Frequencies

The Autoliv 24 GHz RCTA mode sensor employs a modulated ISM Signal that operates over the range of 24.0522 to 24.227 GHz.

The Autoliv 24 GHz BSD mode Sensor employs a modulated ISM Signal at 24.199 GHz.

BSD is the normal mode of operation, RCTA is when the automobile is placed in reverse and the sensor is used as a backup sensor.

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5. Measurement Summary

Test Requirement	FCC Rule Requirement	IC Rule Requirement	Test Report Section	Result	Comment
Antenna Requirement	15.203	RSS-GEN 7.1.4	6.1	Compliant	Unit has an internal PCB antenna.
Radiated Field Strength of Fundamental	15.249 (a),(c)	RSS-310 3.10	6.2	Compliant	
Radiated Field Strength of Harmonics	15.249 (a),(c)	N/A	6.3	Compliant	
Band Edge Measurements	15.249 (d) 15.209	RSS-310 3.10	6.4	Compliant	
Spurious Radiated Emissions	15.249 (d), 15.209	RSS-GEN 4.9	6.5	Compliant	
Occupied Bandwidth	ANSI C63.4 § 13.1.7	N/A	6.6	Compliant	
99% Bandwidth	N/A	RSS-GEN 4.6.1	6.7	Compliant	
Conducted Emissions	15.207	RSS-GEN 7.2.4	N/A	Not Required	DUT uses an automotive battery only.
Public Exposure to Radio Frequency Energy Levels	15.319 (i) 2.1091 FCC OET Bulletin 65	RSS-GEN 5.5, RSS 102	6.8	Compliant	

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6. Measurement Data

6.1. Antenna Requirement (Section 15.203, RSS-GEN 7.1.4)

Requirement: 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.

Result: The unit under test employs a permanent, non-user accessible internal PCB antenna.

6.2. Radiated Field Strength of Fundamental (15.249, Section (a), (c)), IC RSS-310 3.10

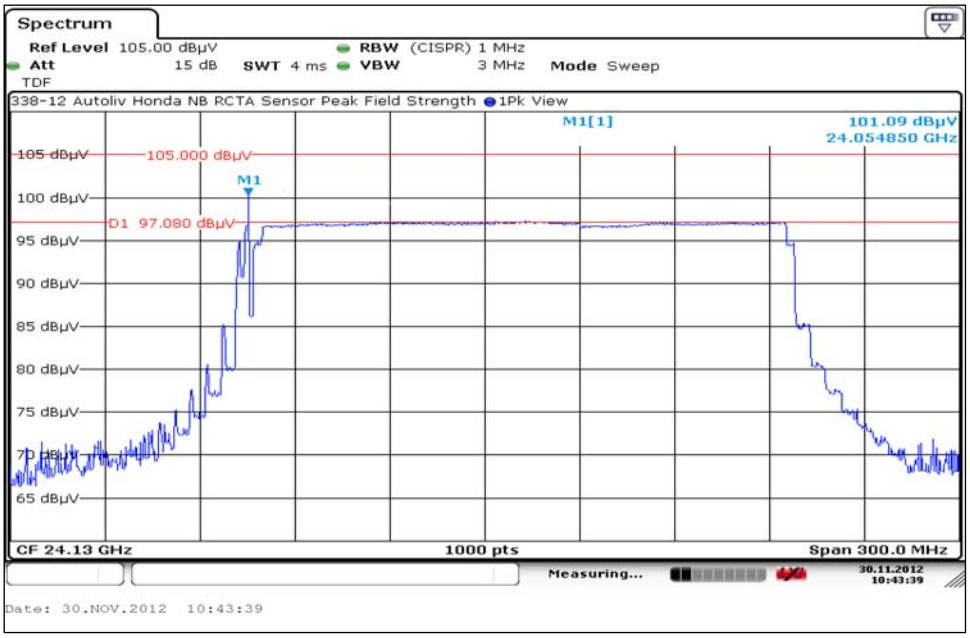
Requirement: The 3 meter field strength of the fundamental emissions from intentional radiators operated within the 24.00 – 24.25 GHz frequency bands shall comply with the following requirement: 250 millivolts/meter (108 dBµV/m), average mode, (128 dBµV/m) peak mode measurements.

Results: The unit under test meets the 3-meter 108 dBµV/m average and 128 dBµV/m peak requirements.

Frequency (GHz)	Amplitude[1] (dBµV/m) at 3 Meters		Limit (dBµV/m) at 3 Meters		Margin (dBµV/m) at 3 Meters		Ant Polarity	Ant Height	Turntable Azimuth	Result
	Peak	Average	Peak	Average	Peak	Average	H/V	cm	Deg	
24.054850	101.09	77.61	128.00	108.00	-26.91	-30.39	V	109	10	Compliant

[1] All correction factors are included in the measurement values

6.2.1. Worst Case Field Strength – Peak - RCTA



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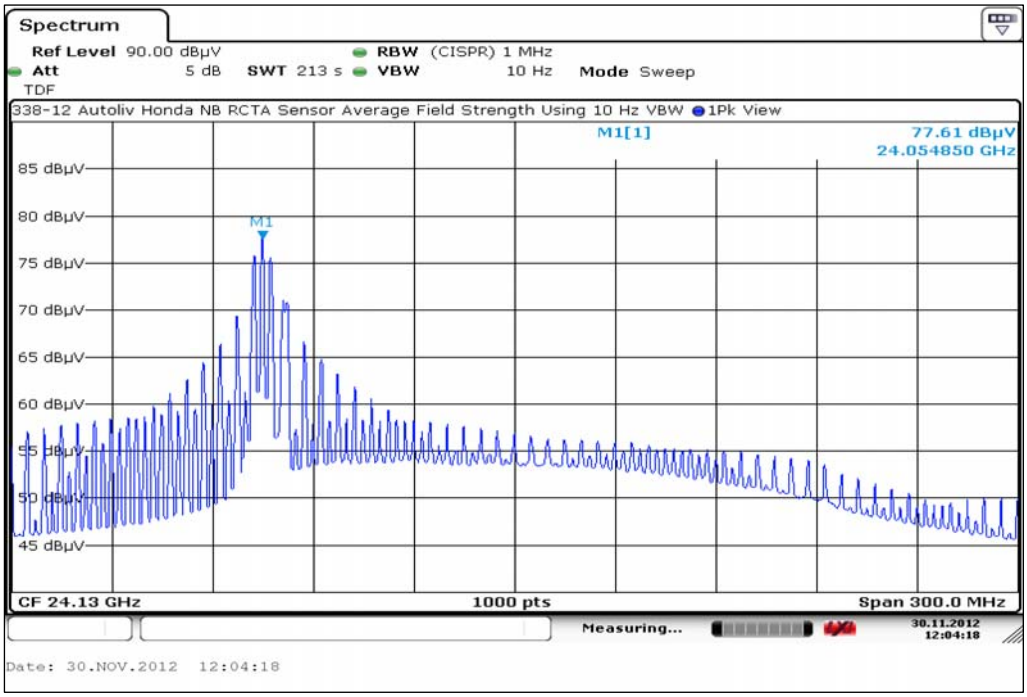
6. Measurement Data

6.2. Radiated Field Strength of Fundamental (15.249, Section (a), (c)), IC RSS-310 3.10

6.2.2. Worst Case Field Strength – Average – RCTA



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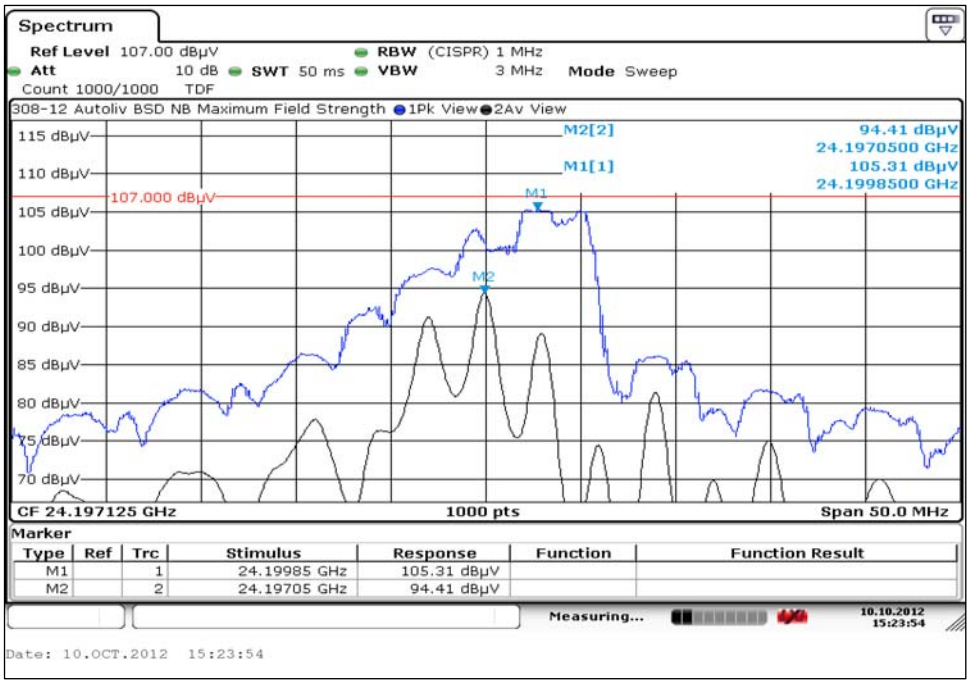
6. Measurement Data

6.2. Radiated Field Strength of Fundamental (15.249, Section (a), (c)), IC RSS-310 3.10

Frequency (GHz)	Amplitude[1] (dBµV/m) at 3 Meters		Limit (dBµV/m) at 3 Meters		Margin (dBµV/m) at 3 Meters		Ant Polarity	Ant Height	Turntable Azimuth	Result
	Peak	Average	Peak	Average	Peak	Average	H/V	cm	Deg	
24.199850	105.31	N/A	128.00	N/A	-22.69	N/A	V	104	12	Compliant
24.197050	N/A	94.41	N/A	108.00	N/A	-13.59	V	104	12	Compliant

[1] All correction factors are included in the measurement values

6.2.3. Worst Case Field Strength – Peak and Average – BSD



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6. Measurement Data (continued)

6.3. Radiated Field Strength of Harmonics (15.249, Section (a))

Requirement: Emissions radiated outside of the specified frequency band of 24 GHz to 24.25 GHz, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation

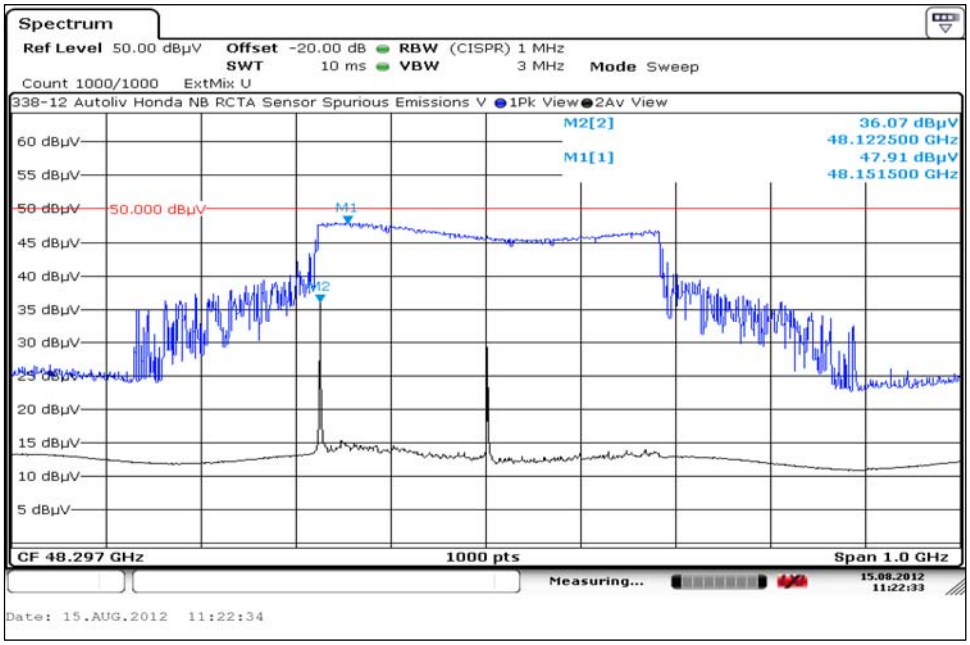
Result: Compliant

6.3.1. 2nd Harmonic Peak and Average Field Strength (**RCTA Version**)

Detector	Frequency (GHz)	Amplitude[1] (dBµV/m) at 3 Meters		Limit (dBµV/m) at 3 Meters		Margin (dBµV/m) at 3 Meters		Ant Polarity	Result
		Peak	Average	Peak	Average	Peak	Average	H/V	
Peak	48.1515	47.91	N/A	78.00	N/A	-30.09	N/A	V	Compliant
Average	48.1225	N/A	36.07	N/A	58.00	N/A	-21.93	V	Compliant

[1] Measurements were taken at a distance of 30 centimeters and extrapolated to the 3-meter distance.

6.3.2. 2nd Harmonic Peak and Average Field Strength



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6. Measurement Data (continued)

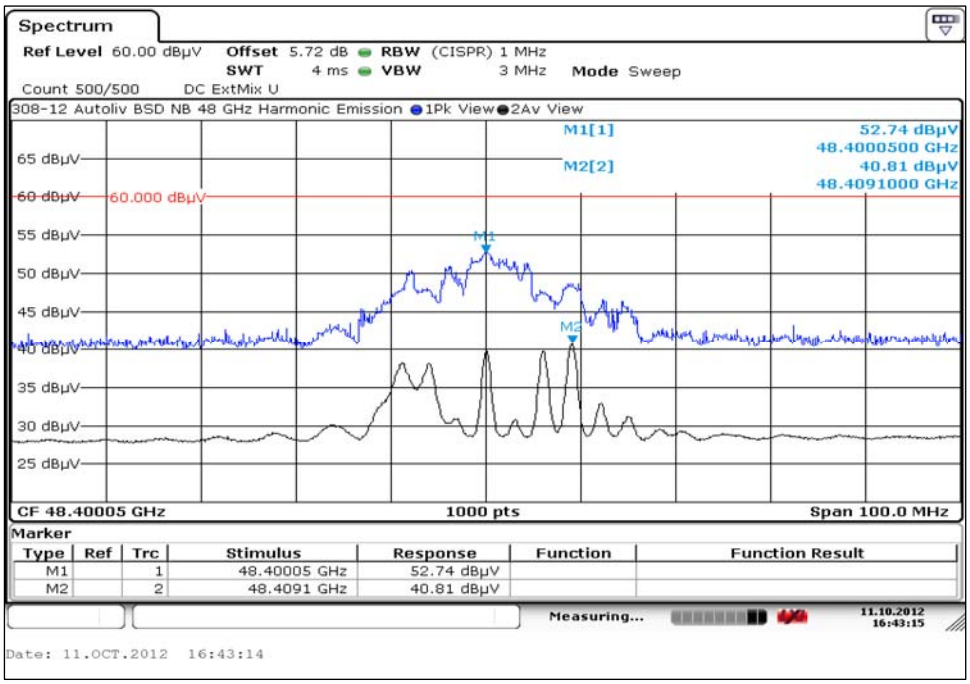
6.3. Radiated Field Strength of Harmonics (15.249, Section (a))

6.3.3. 2nd Harmonic Peak and Average Field Strength (**BSD Version**)

Frequency (GHz)	Amplitude[1] (dBµV/m) at 3 Meters		Limit (dBµV/m) at 3 Meters		Margin (dBµV/m) at 3 Meters		Ant Polarity	Ant Height	Turntable Azimuth	Result
	Peak	Average	Peak	Average	Peak	Average	H/V	cm	Deg	
48.4000	52.74	N/A	78.00	N/A	-25.26	N/A	V	150	355	Compliant
48.4091	48.4091	N/A	40.81	N/A	58.00	N/A	V	150	355	Compliant

[1] Measurements were taken at a distance of 1 meter and field strength was adjusted by -9.56 dB for comparison to the 3 meter limit.

6.3.4. 2nd Harmonic Peak and Average Field Strength



6.3.5 There were no other measurable harmonic emissions below 100 GHz.

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6. Measurement Data (continued)

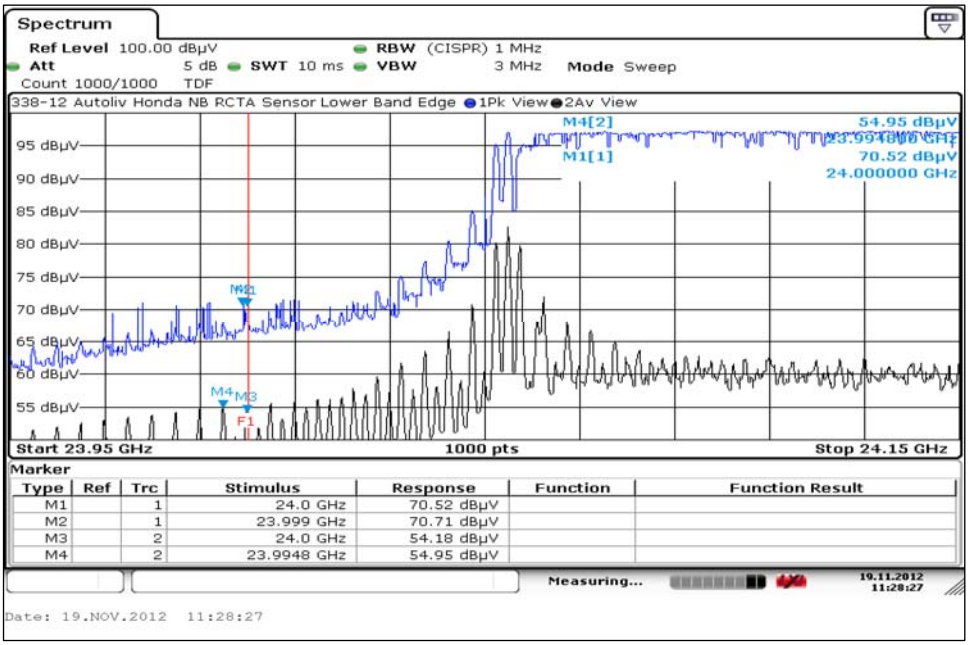
6.4. Band Edge Measurements (15.249, Section (a))

Requirement: Emissions radiated outside of the specified frequency band of 24 GHz to 24.25 GHz, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Results: The unit under test meets the Part 15.209 radiated emissions limit.

Frequency (GHz)	Band Edge (dBµV/m)				Limit (dBµV/m)		Margin (dBµV/m)		Result
		Freq GHz	Peak	Average	Peak	Average	Peak	Average	
24.054850	Lower	24.00	70.52	54.18	78.0	58.0	-7.48	-3.82	Compliant
	Upper	24.25	72.69	49.41	78.0	58.0	-5.31	-8.59	Compliant

6.4.1. Band Edge Measurements - Lower Band Edge (RCTA)



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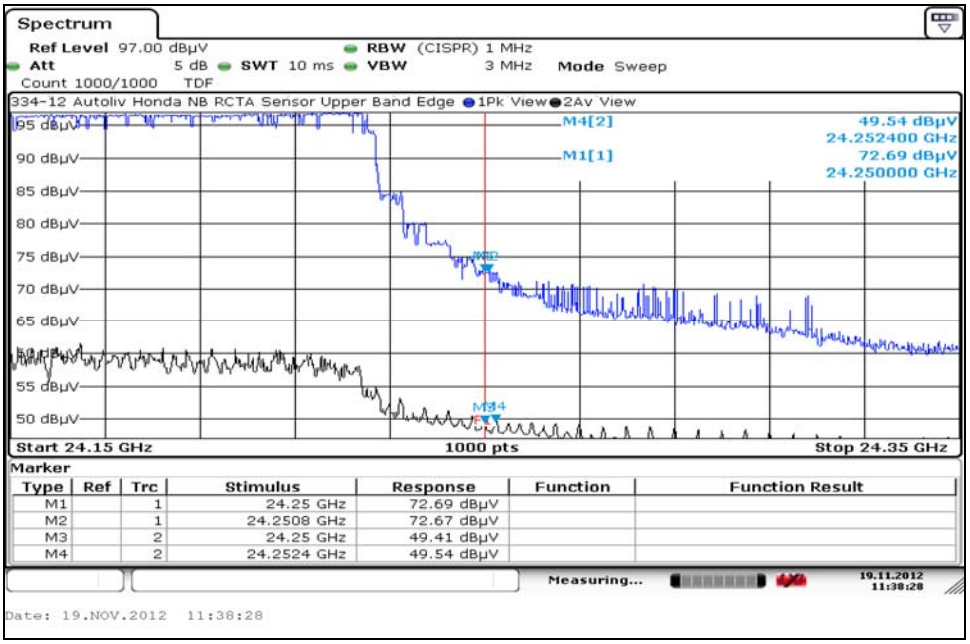
6. Measurement Data (continued)

6.4. Band Edge Measurements (continued)

6.4.2. Band Edge Measurements - Upper Band Edge (RCTA)



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6. Measurement Data (continued)

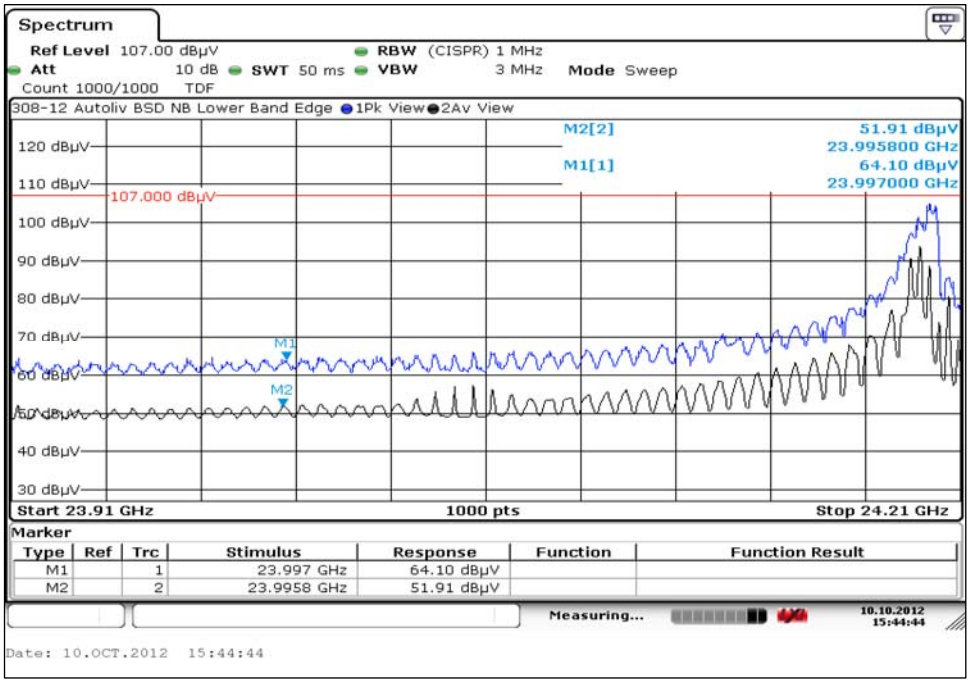
6.4. Band Edge Measurements

Requirement: Emissions radiated outside of the specified frequency band of 24 GHz to 24.25 GHz, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Results: The device under test falls well within the measurement band.

Frequency (GHz)	Band Edge (dBµV/m)				Limit (dBµV/m)		Margin (dBµV/m)		Result
		Freq GHz	Peak	Average	Peak	Avg	Peak	Avg	
24.20	Lower	24.00	64.10	51.91	78.0	58.0	-13.90	-6.09	Compliant
	Upper	24.25	70.20	57.10	78.0	58.0	-7.80	-0.90	Compliant

6.4.3. Band Edge Measurements - Lower Band Edge



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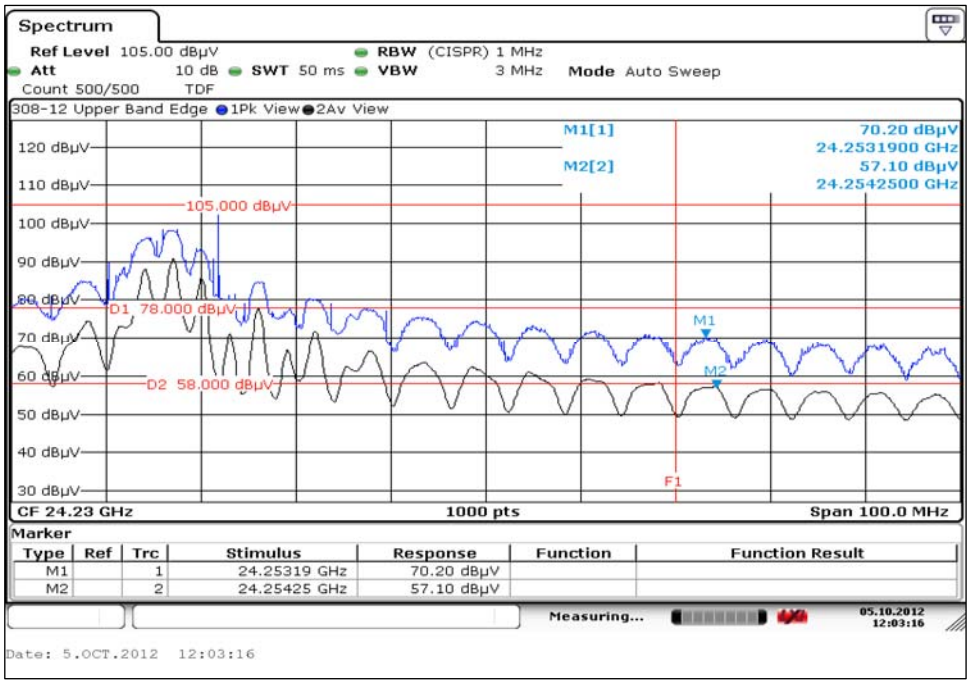
6. Measurement Data (continued)

6.4. Band Edge Measurements (continued)

6.4.4. Band Edge Measurements - Upper Band Edge



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6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

Requirement: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

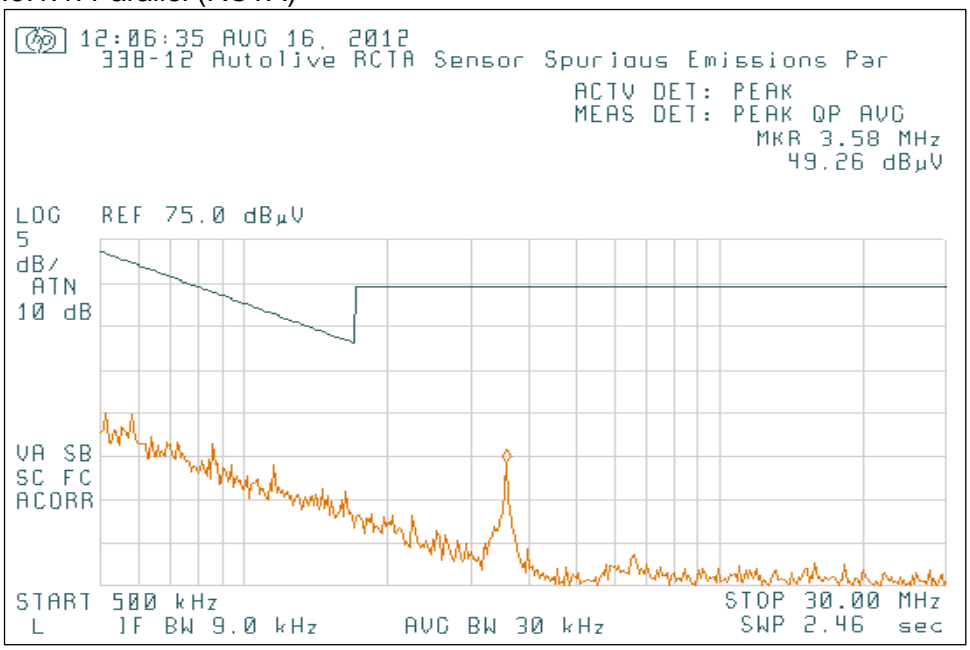
Frequency Range (MHz)	Distance (Meters)	Limit (dBµV/m)
0.009 to 0.490	3	128.5 to 93.8[2]
0.490 to 1.705	3	73.8 to 63.0[3]
1.705 to 30	3	69.5
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
Above 960	3	54.0*

*Note: Use of average detector above 1 GHz

Results: The unit under test meets the Part 15.209 radiated emissions limit.

6.5.1. Test Results, 500 kHz to 30 MHz

6.5.1.1. Parallel (RCTA)



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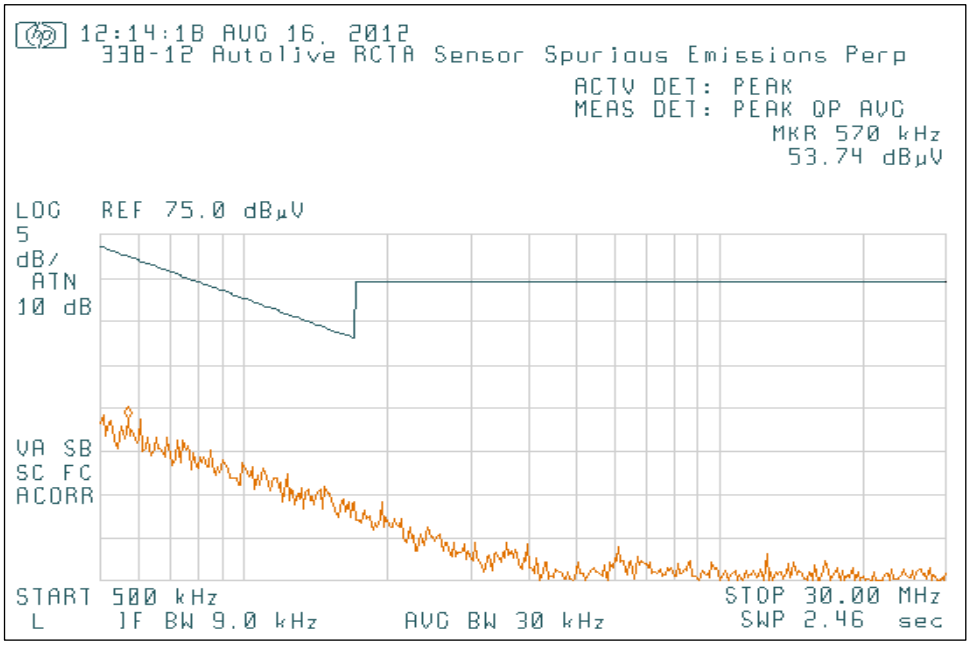
6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

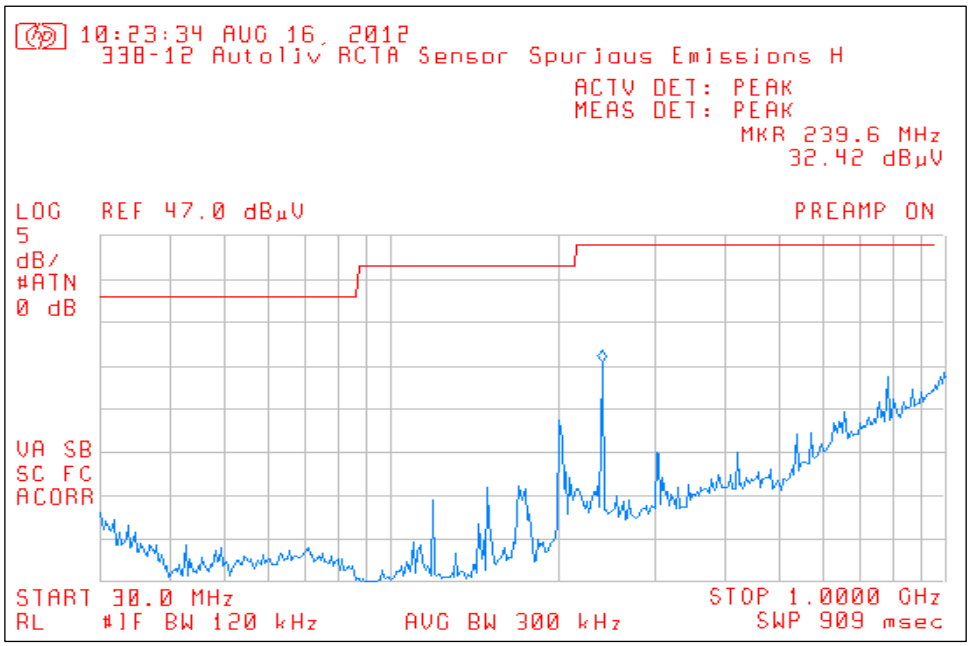
6.5.1. Test Results, 500 kHz to 30 MHz (continued)

6.5.1.2. Perpendicular (RCTA)



6.5.2. Test Results, 30 MHz to 960 MHz

6.5.2.1. Horizontal (RCTA)



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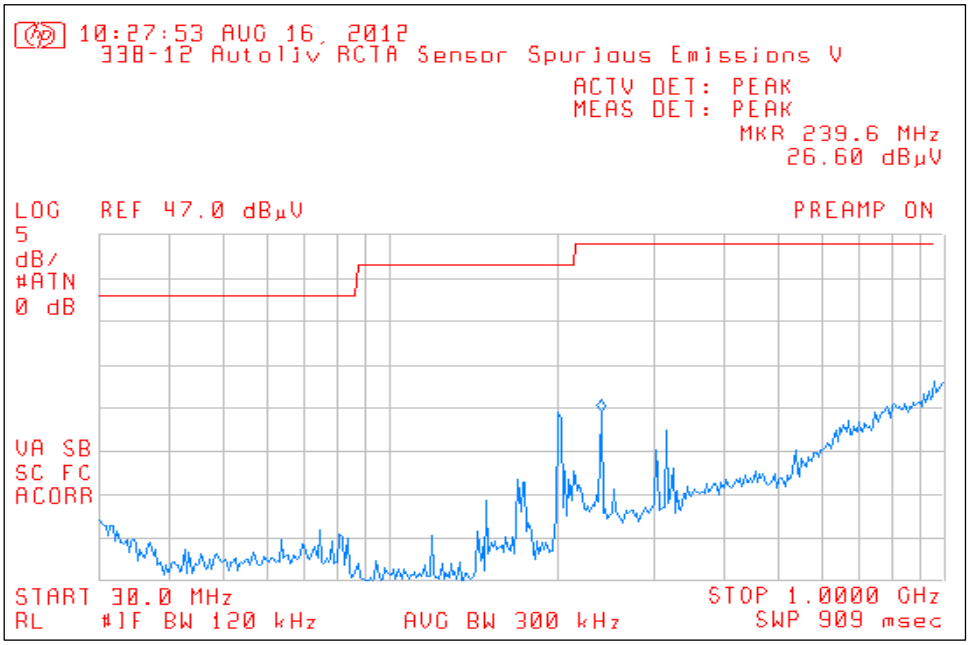
6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.2. Test Results, 30 MHz to 960 MHz (continued)

6.5.2.2. Vertical (RCTA)



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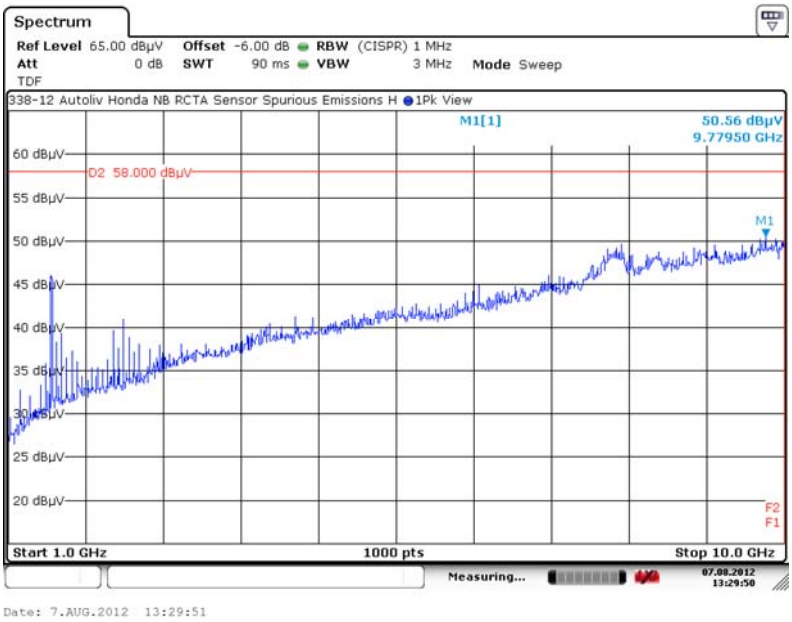
6. Measurement Data (continued)

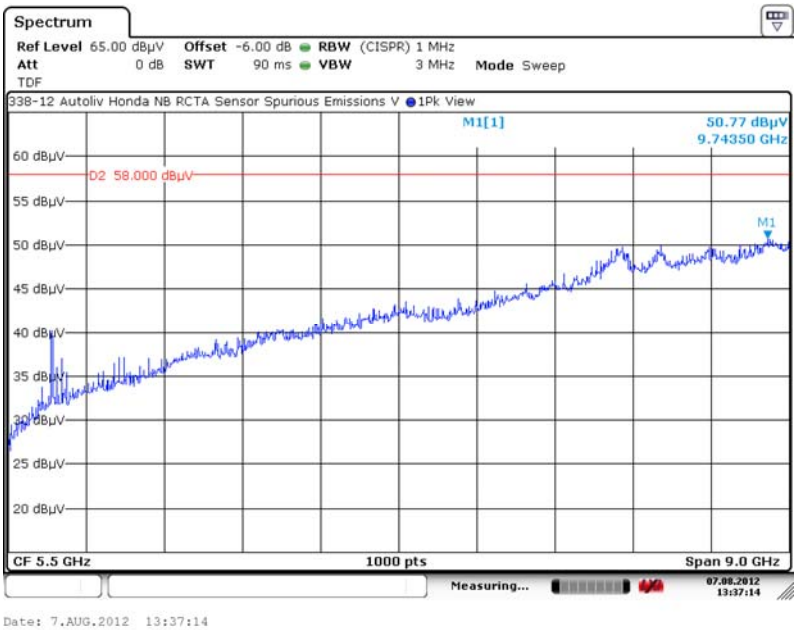
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.3. Test Results, 1 to 10 GHz

6.5.3.1. Horizontal (RCTA)



6.5.3.2. Vertical (RCTA)



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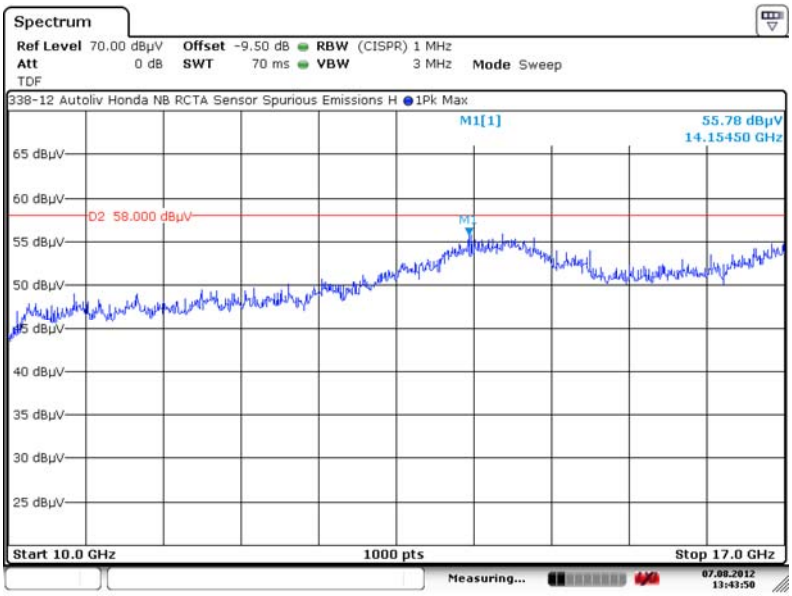
6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

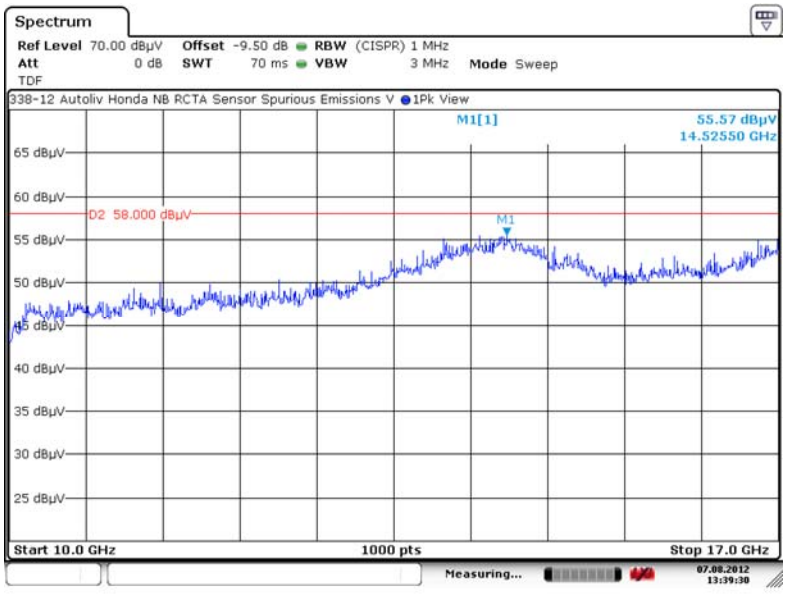
6.5.4. Test Results, 10 to 17 GHz

6.5.4.1. Horizontal (RCTA)



Date: 7.AUG.2012 13:43:50

6.5.4.2. Vertical (RCTA)



Date: 7.AUG.2012 13:39:30

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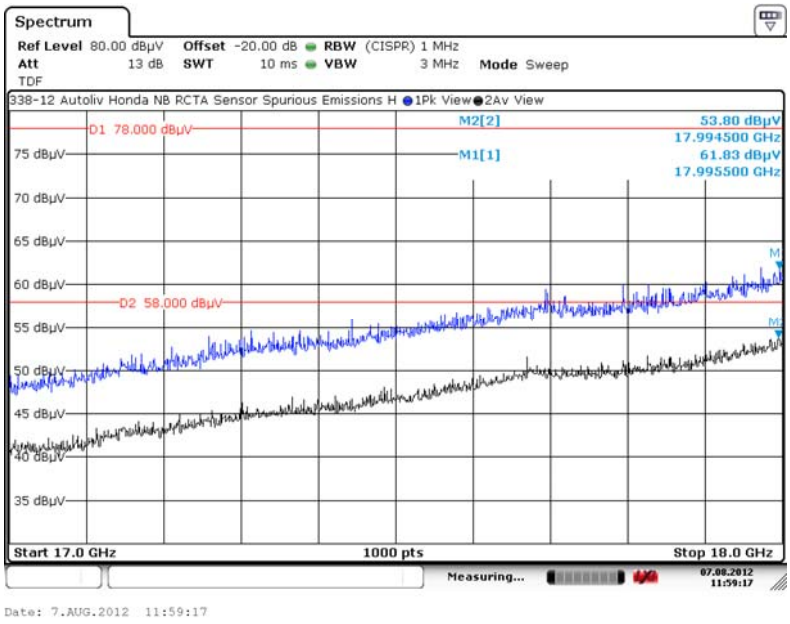
6. Measurement Data (continued)

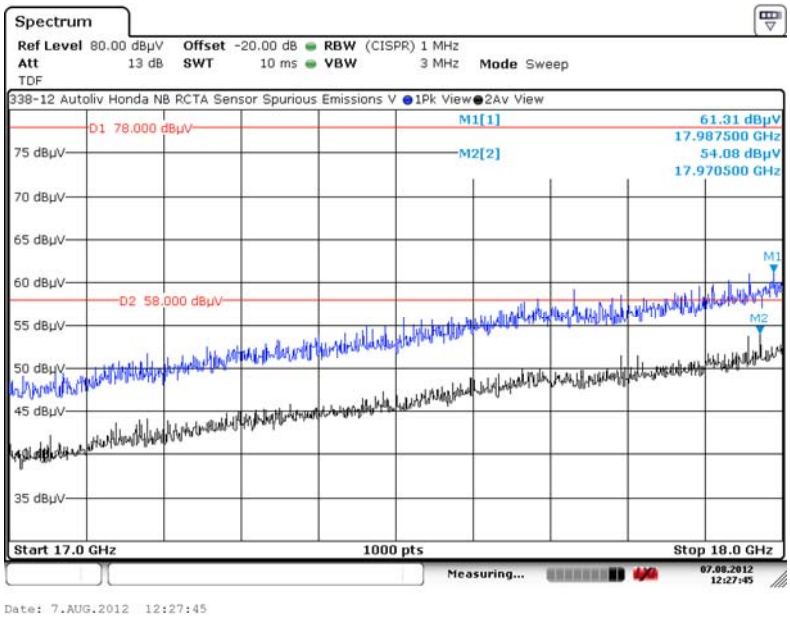
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.5. Test Results, 17 to 18 GHz

6.5.5.1. Horizontal (RCTA)



6.5.5.2. Vertical (RCTA)



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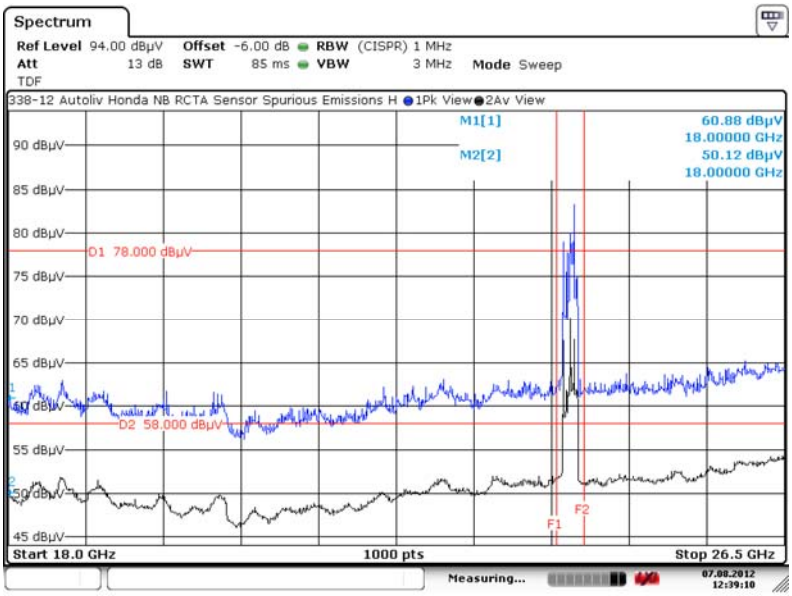
6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

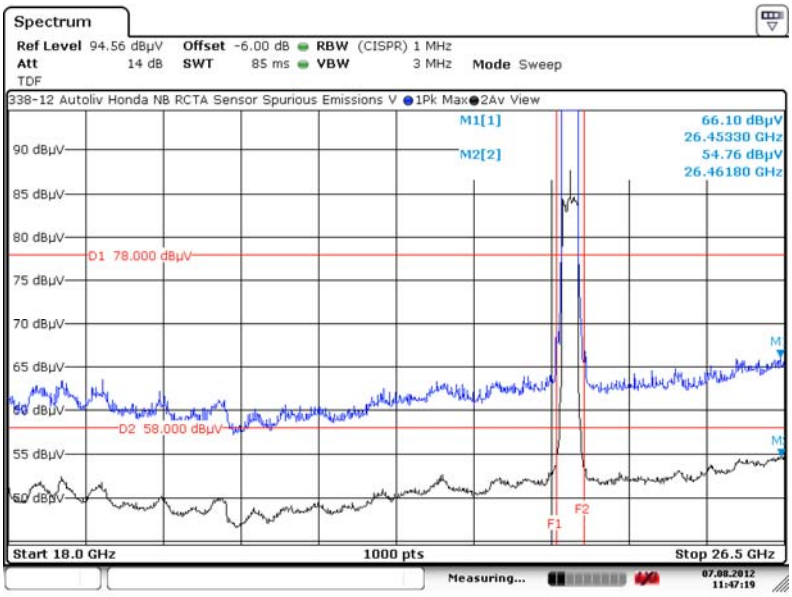
6.5.6. Test Results, 18 to 16.5 GHz

6.5.6.1. Horizontal (RCTA)



Date: 7.AUG.2012 12:39:10

6.5.6.2. Vertical (RCTA)



Date: 7.AUG.2012 11:47:20

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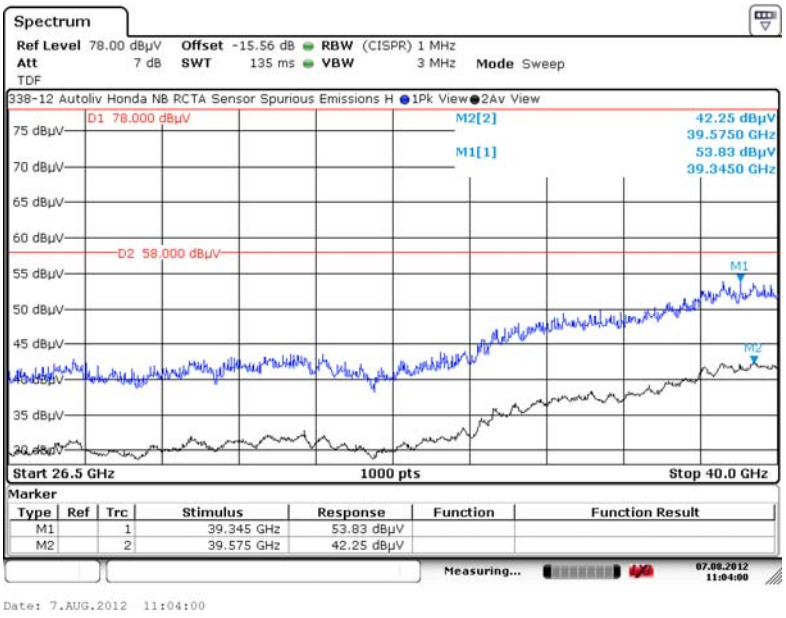
6. Measurement Data (continued)

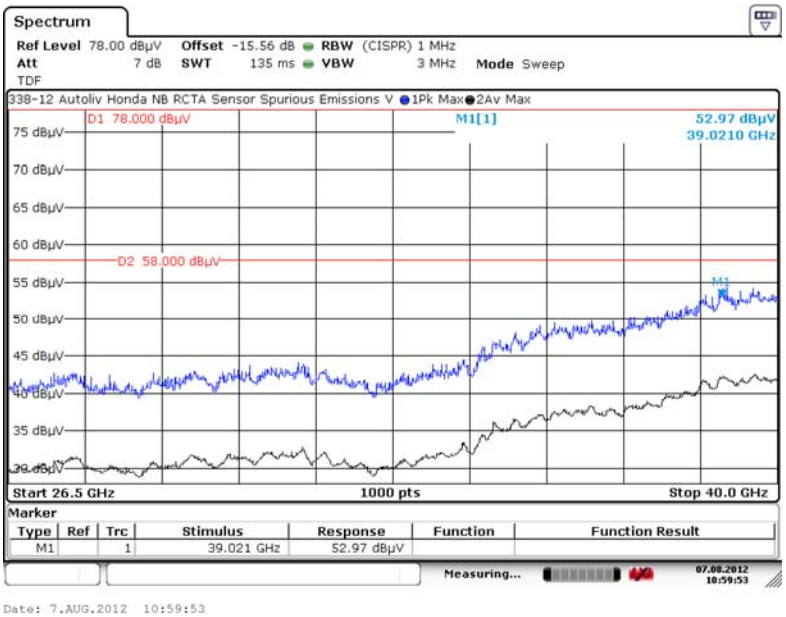
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.7. Test Results, 26.5 to 40 GHz

6.5.7.1. Horizontal (RCTA)



6.5.7.2. Vertical (RCTA)



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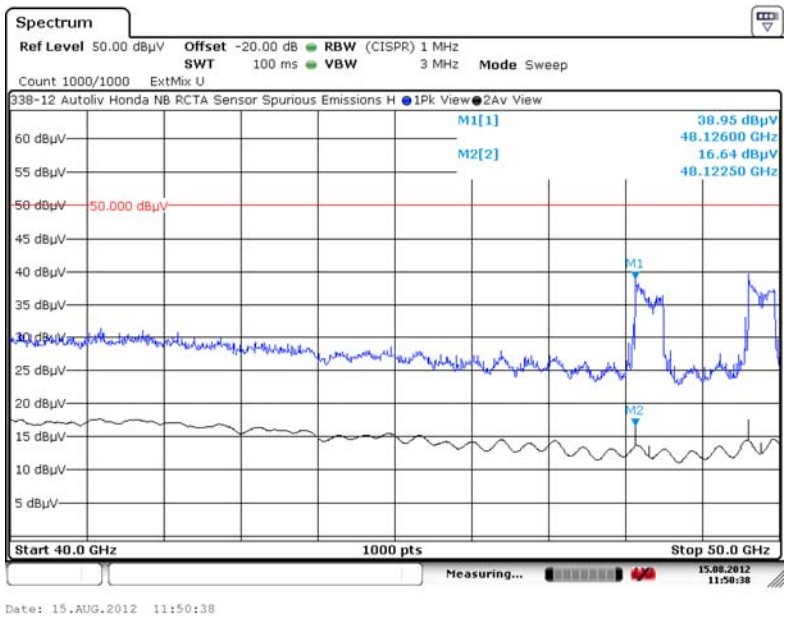
6. Measurement Data (continued)

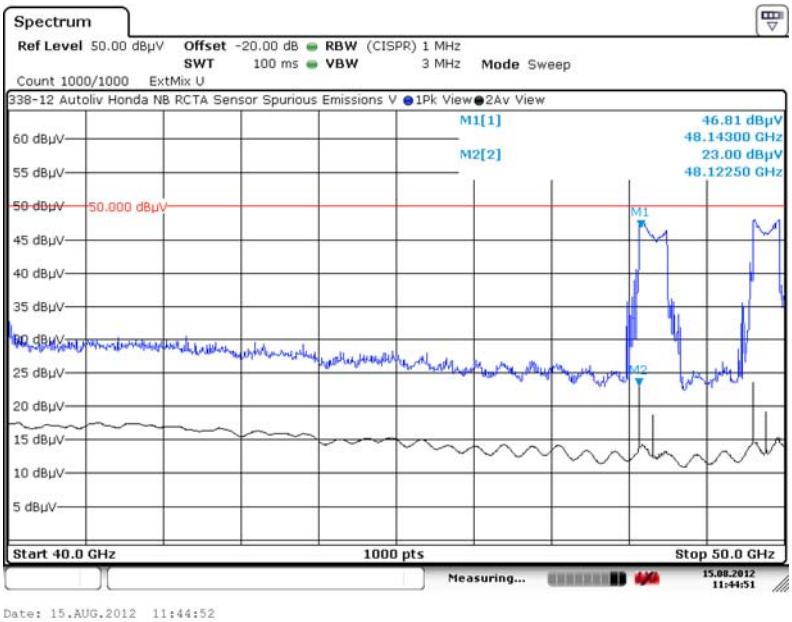
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.8. Test Results, 40 to 50 GHz

6.5.8.1. Horizontal (RCTA)



6.5.8.2. Vertical (RCTA)



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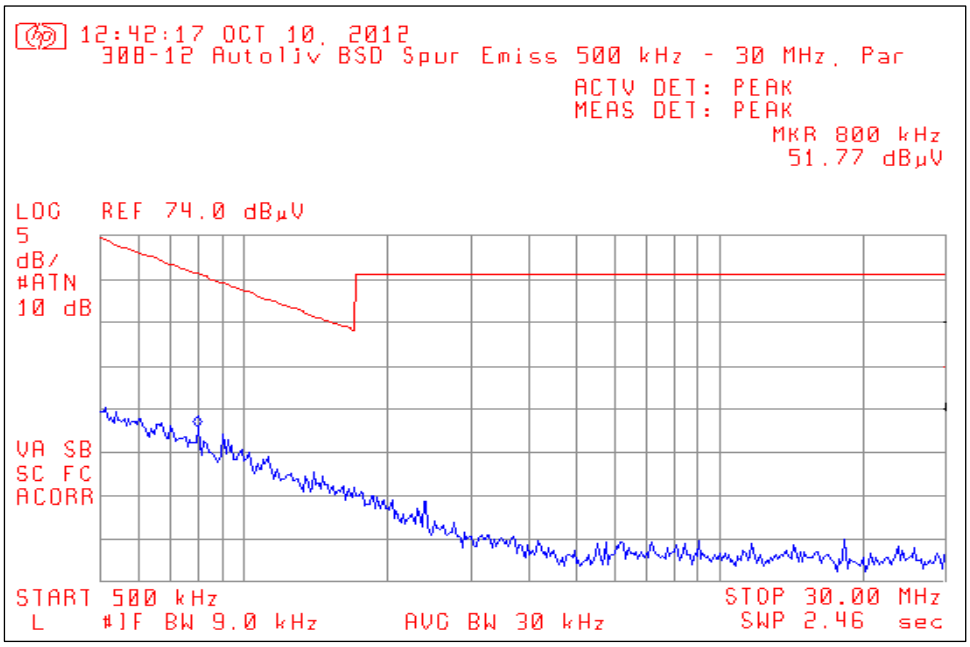
6. Measurement Data (continued)

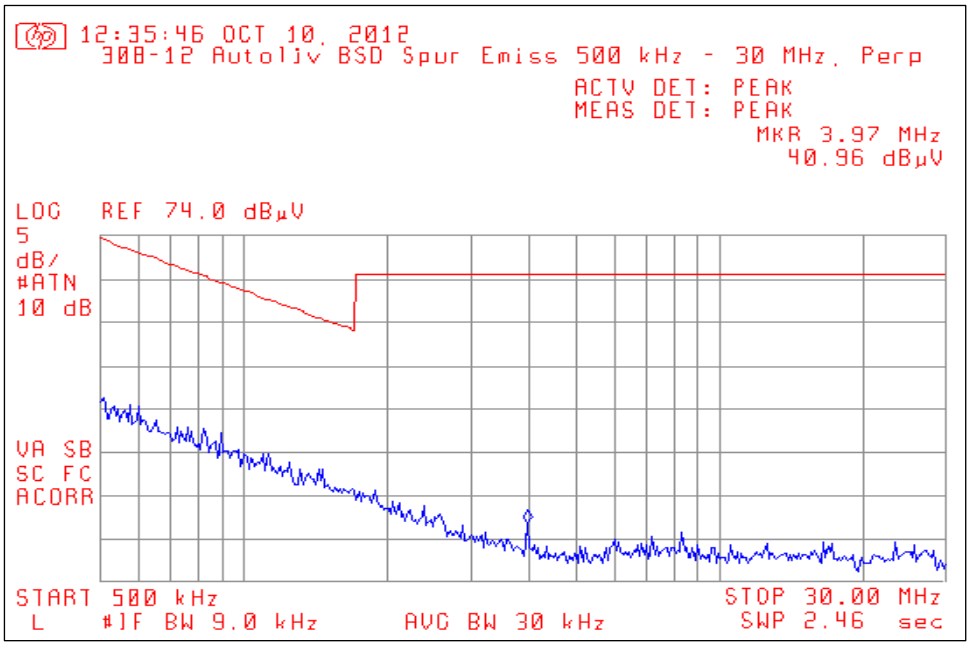
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.9. Test Results, 500 kHz to 30 MHz

6.5.9.1. Parallel Orientation (BSD)



6.5.9.2. Perpendicular Orientation (BSD)



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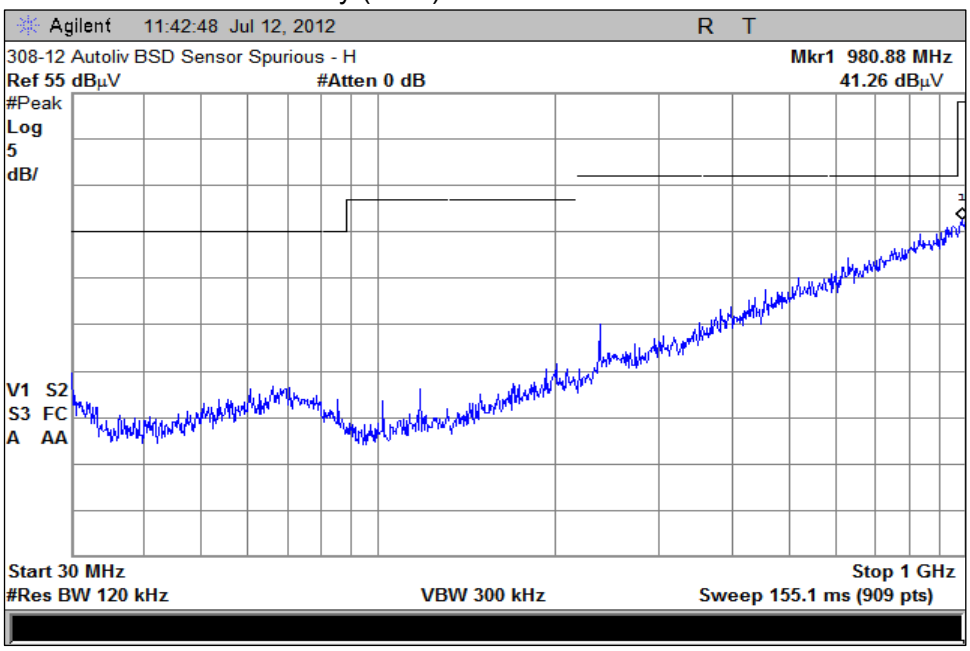
6. Measurement Data (continued)

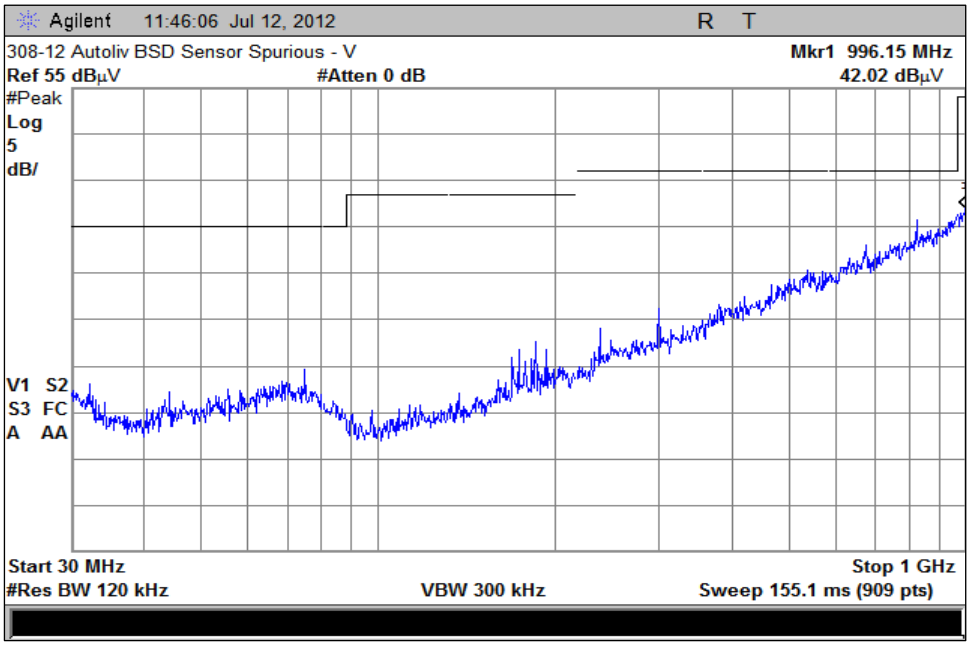
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.10. Test Results, 30 MHz to 1 GHz

6.5.10.1. Horizontal Polarity (BSD)



6.5.10.2. Vertical Polarity (BSD)



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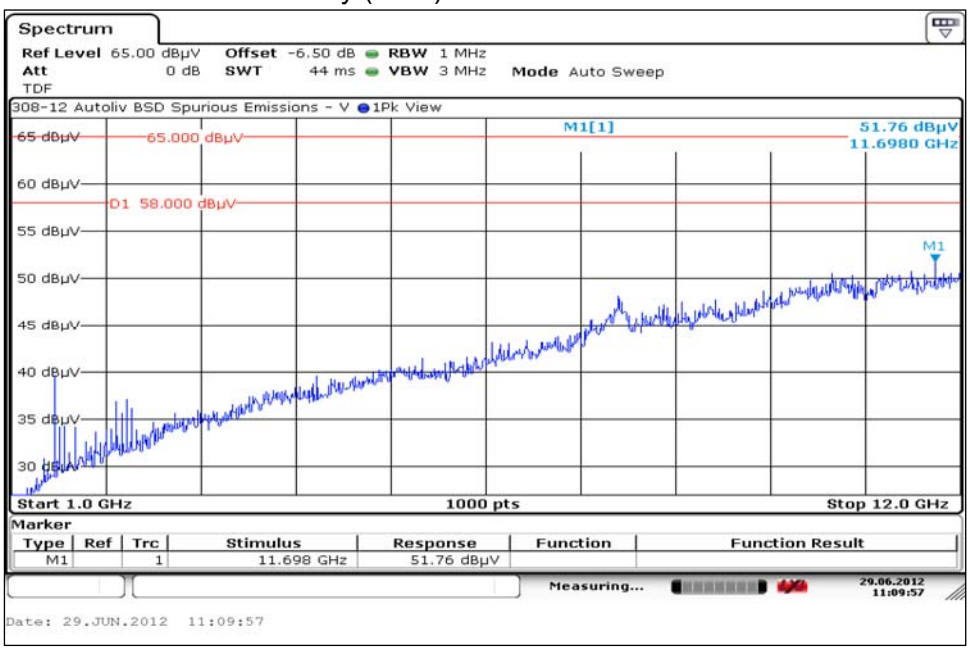
6. Measurement Data (continued)

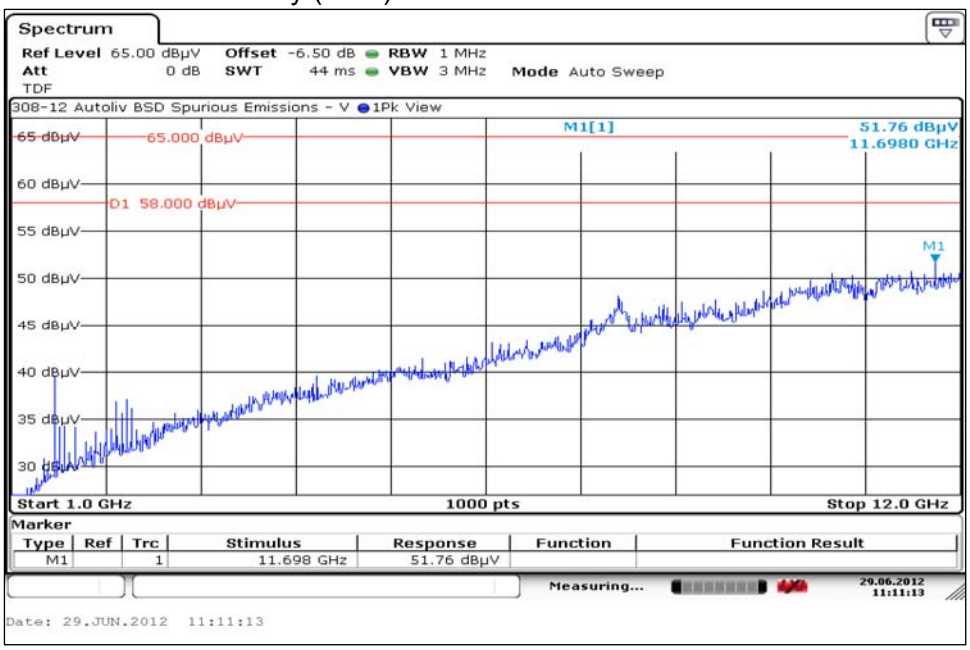
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.11. Test Results, 1 GHz to 12 GHz

6.5.11.1. Horizontal Polarity (BSD)



6.5.1.2. Vertical Polarity (BSD)



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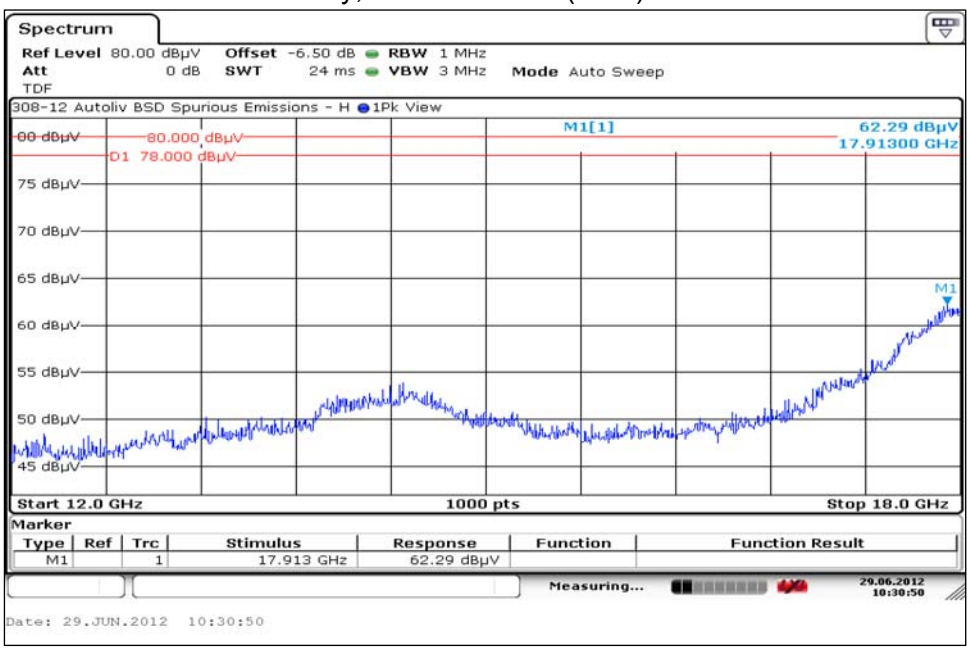
6. Measurement Data (continued)

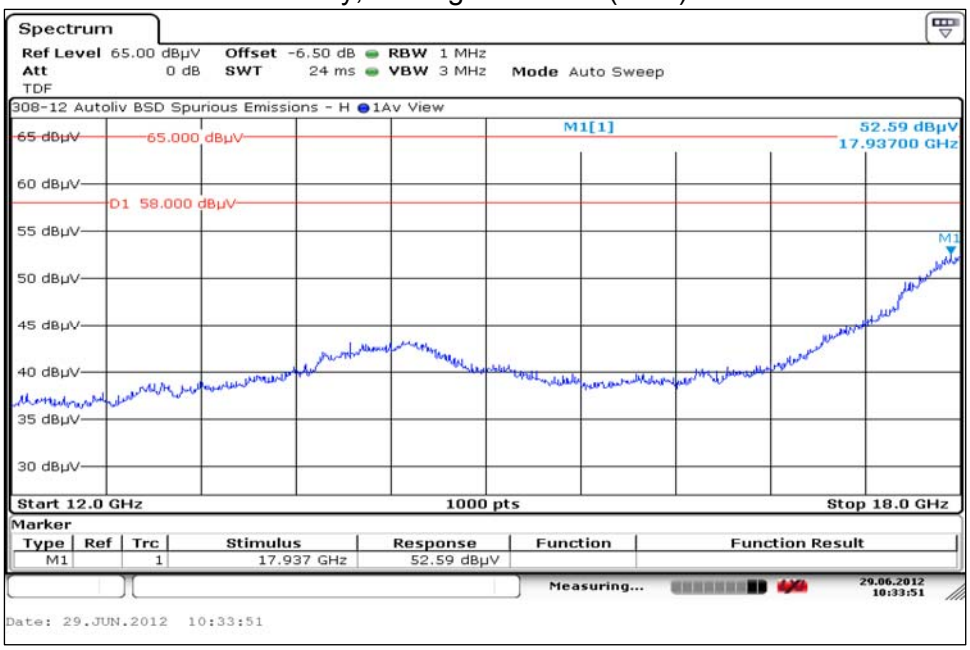
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.12. Test Results, 12 GHz to 18 GHz

6.5.12.1. Horizontal Polarity, Peak Detector (BSD)



6.5.12.2. Horizontal Polarity, Average Detector (BSD)



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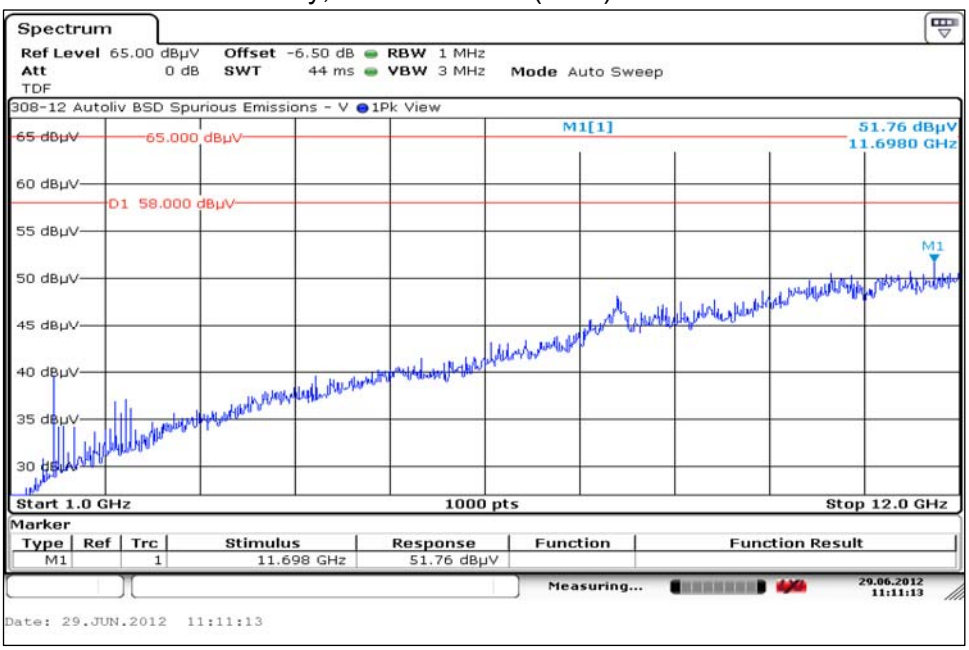
6. Measurement Data (continued)

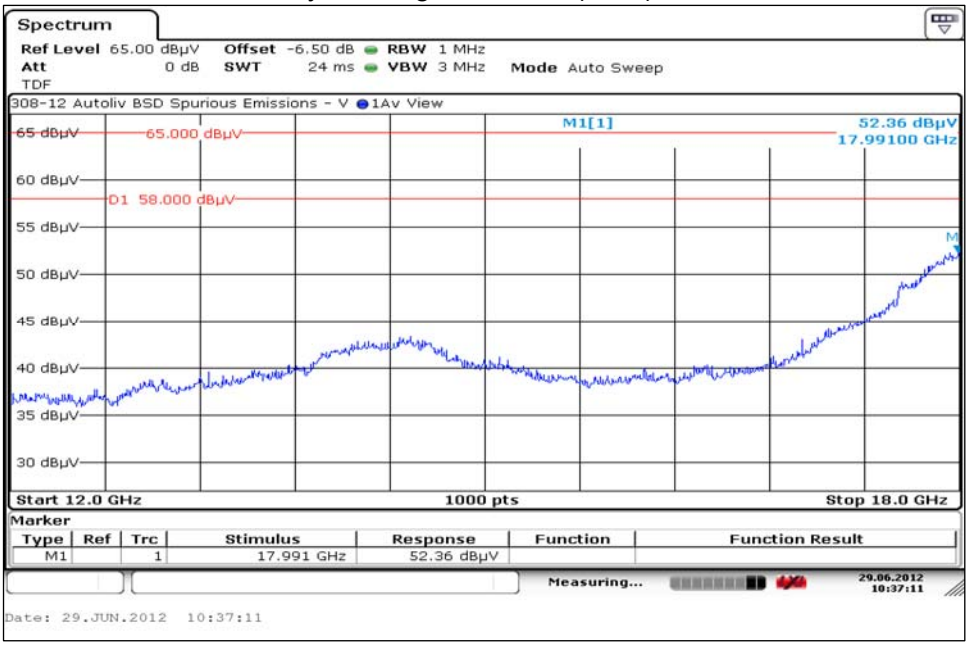
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.12. Test Results, 12 GHz to 18 GHz

6.5.12.3. Vertical Polarity, Peak Detector (BSD)



6.5.12.4. Vertical Polarity, Average Detector (BSD)



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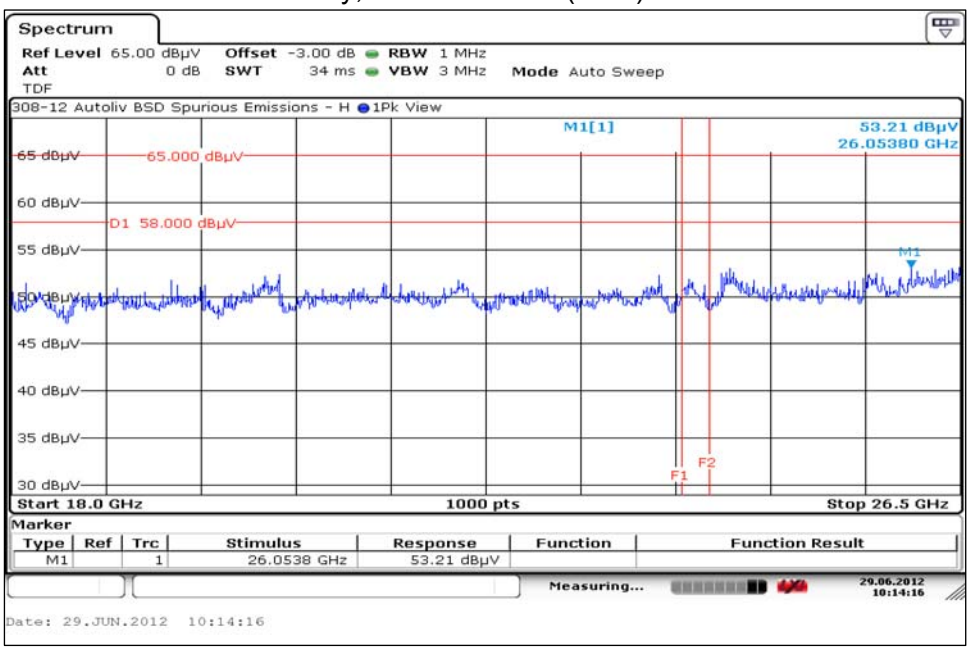
6. Measurement Data (continued)

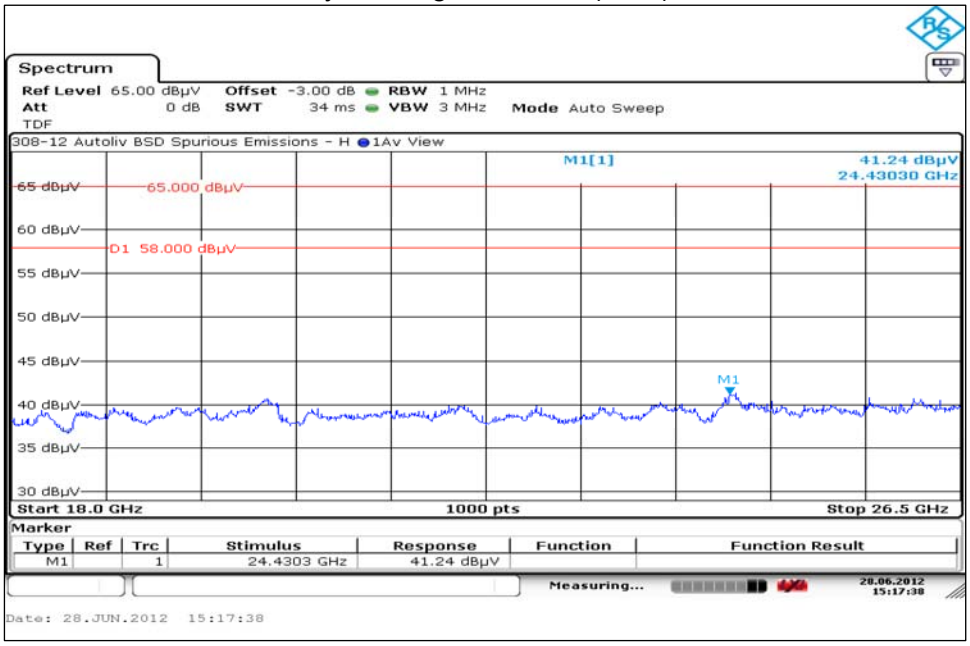
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.13. Test Results, 18 GHz to 26.5 GHz

6.5.13.1. Horizontal Polarity, Peak Detector (BSD)



6.5.5.2. Horizontal Polarity, Average Detector (BSD)



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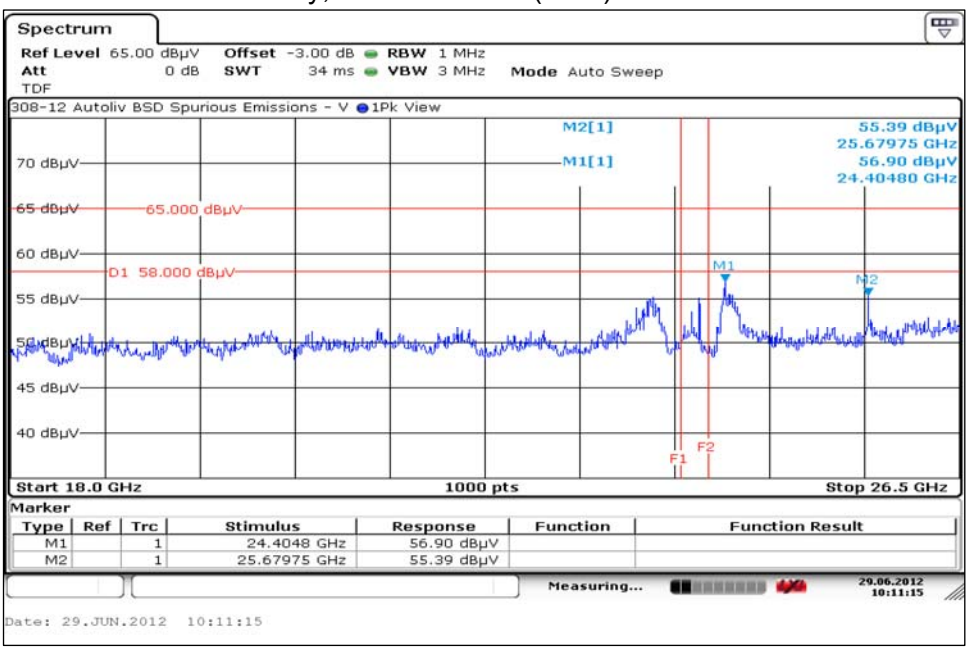
6. Measurement Data (continued)

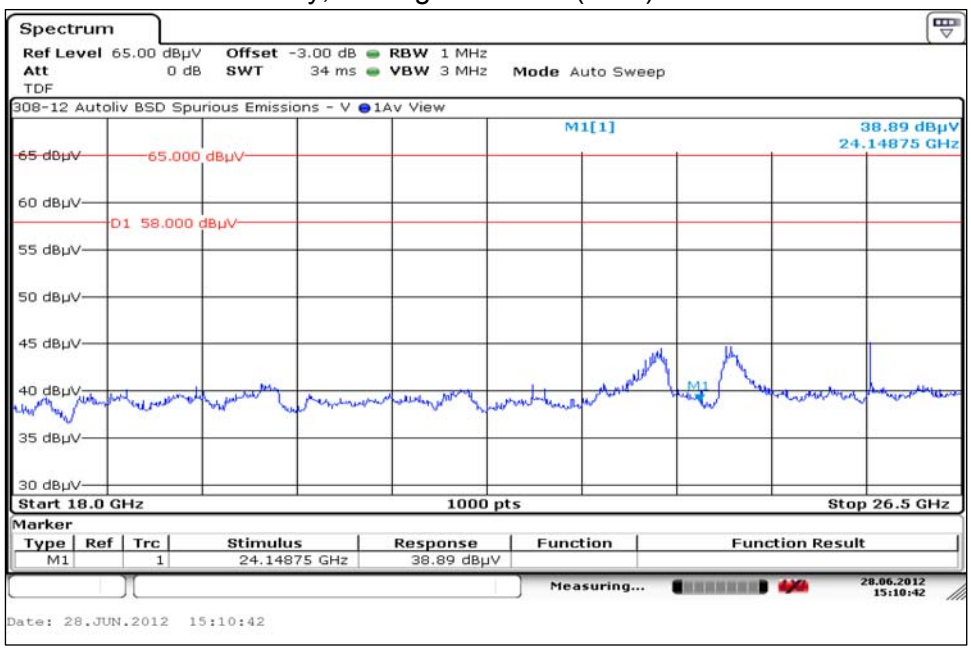
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.13. Test Results, 18 GHz to 26.5 GHz

6.5.13.3. Vertical Polarity, Peak Detector (BSD)



6.5.13.4. Vertical Polarity, Average Detector (BSD)



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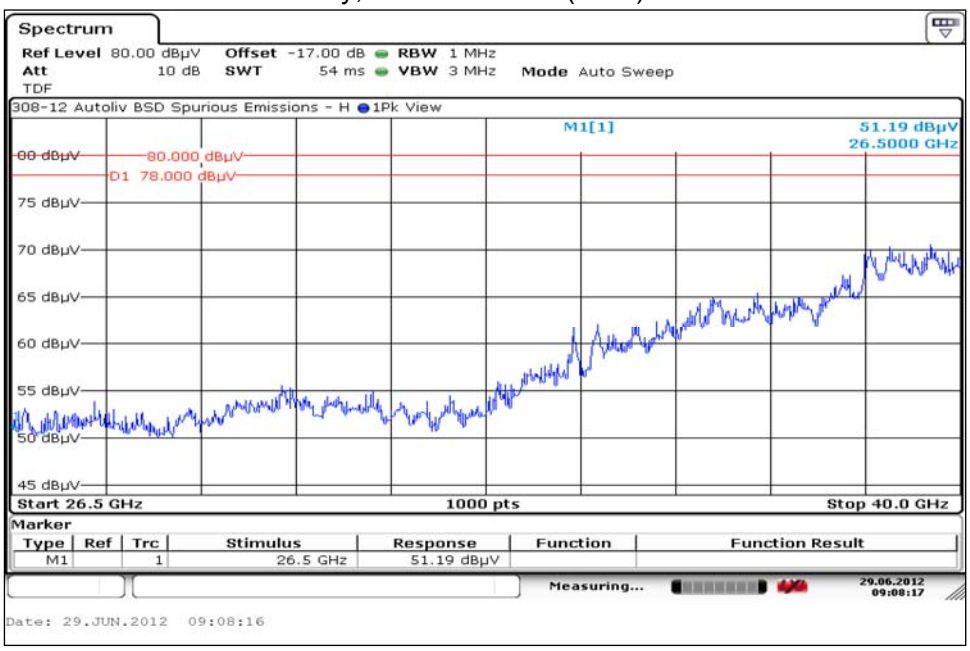
6. Measurement Data (continued)

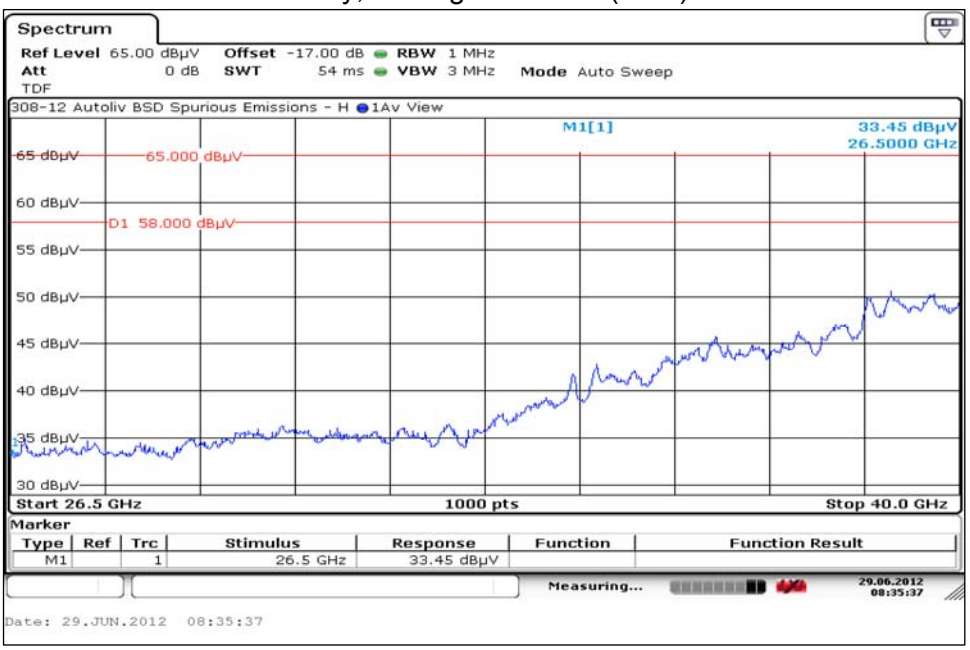
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.14. Test Results, 26.5 GHz to 40 GHz

6.5.14.1. Horizontal Polarity, Peak Detector (BSD)



6.5.14.2. Horizontal Polarity, Average Detector (BSD)



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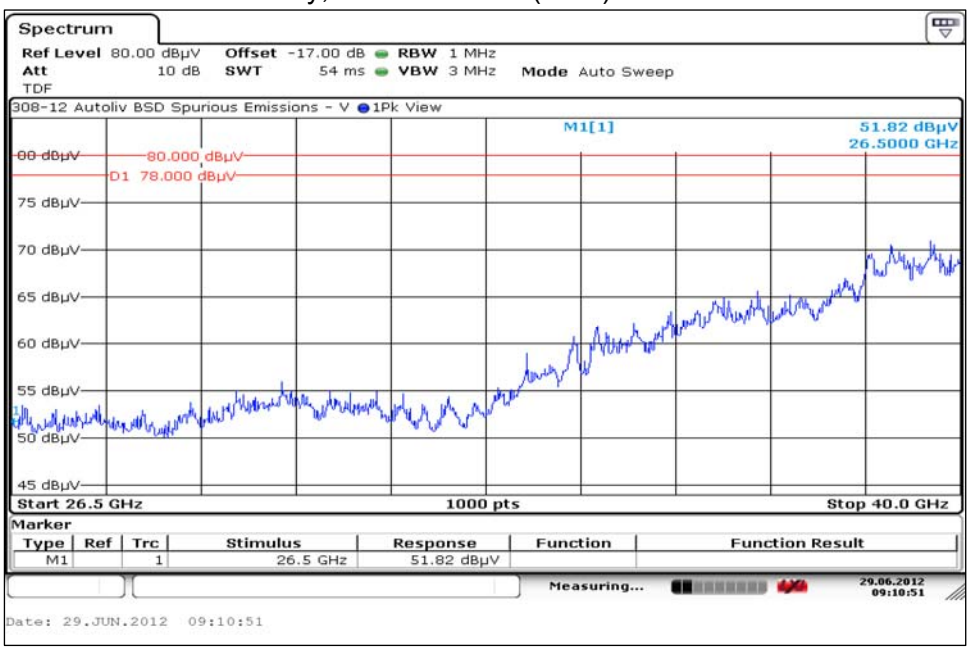
6. Measurement Data (continued)

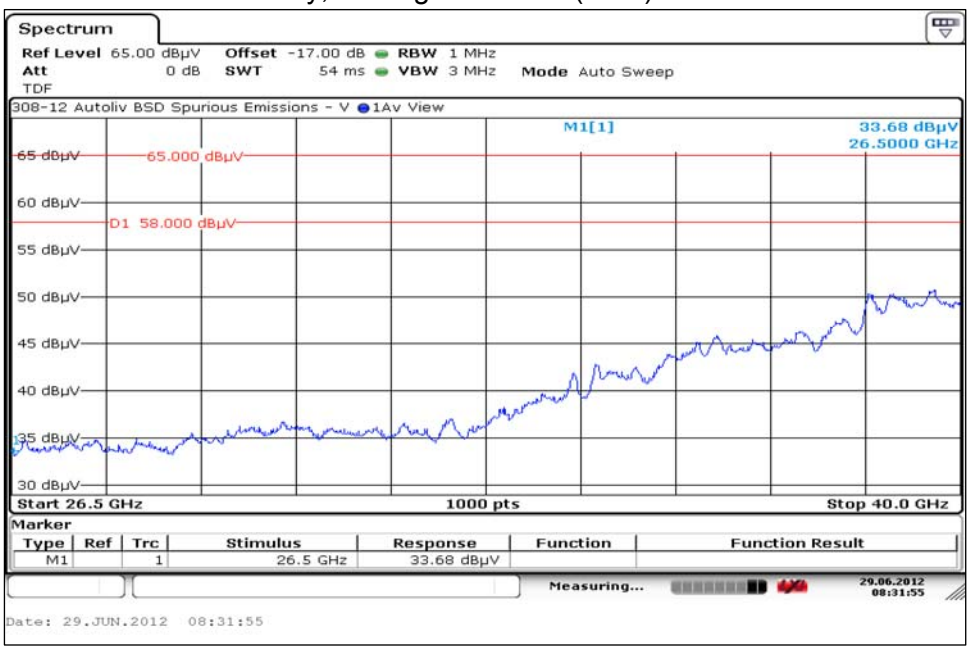
6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.14. Test Results, 26.5 GHz to 40 GHz

6.5.14.3. Vertical Polarity, Peak Detector (BSD)



6.5.14.4. Vertical Polarity, Average Detector (BSD)



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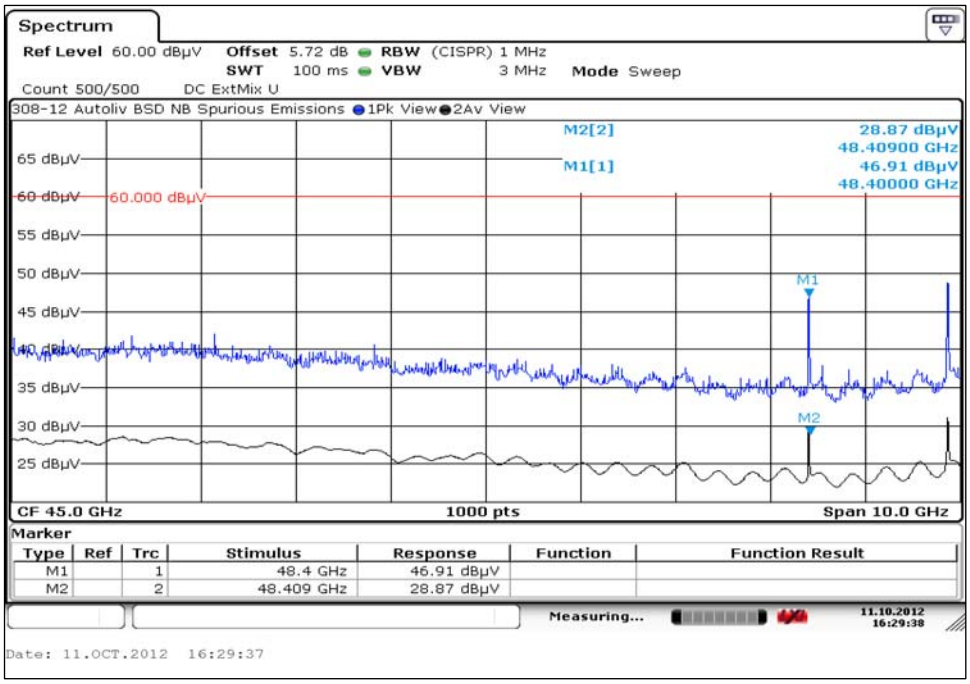
6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 500 kHz to 100 GHz (15.249, Section (d)), IC RSS-GEN

6.5.15. Test Results, 40 GHz to 50 GHz

6.5.15.1. Vertical Polarity, Peak and Average Detectors (BSD)



Notes: 1. Peaks to the right of the marked peaks were ghost images.
2. No emissions were found when the horizontal polarity was investigated.

6.5.16. There were no measurable emissions above 50 GHz.

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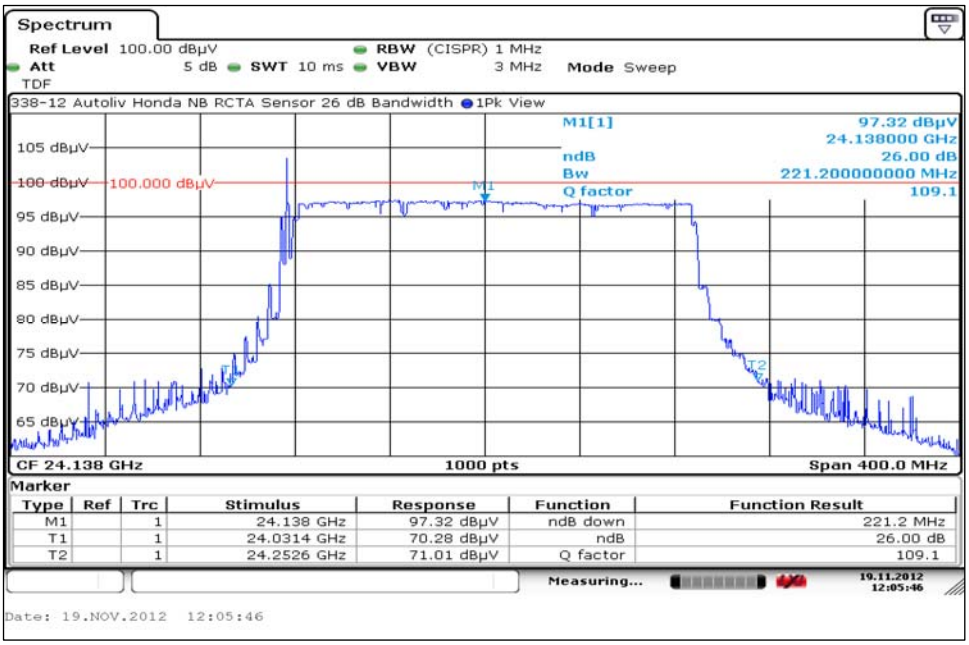
6. Measurement Data (continued)

6.6 26 dB Bandwidth (ANSI C63.4, Section 13.7)

Requirement: The occupied bandwidth measurements on an intentional radiator shall be made in accordance with the requirements outlined in ANSI C63.4-2009, Section 13.7. If no bandwidth requirement is specified by the procuring or regulatory agency, measure the bandwidth at –26 dB with respect to the reference level. The resolution bandwidth was set according to Table 5 in Section 13.7 of ANSI C63.4-2009.

Channel GHz	Center Frequency	26 dB Bandwidth	Result
	GHz	MHz	
24.054850	24.138	221.2	**Compliant**

6.6.1. Measurement Plot - 26 dB Bandwidth (RCTA)



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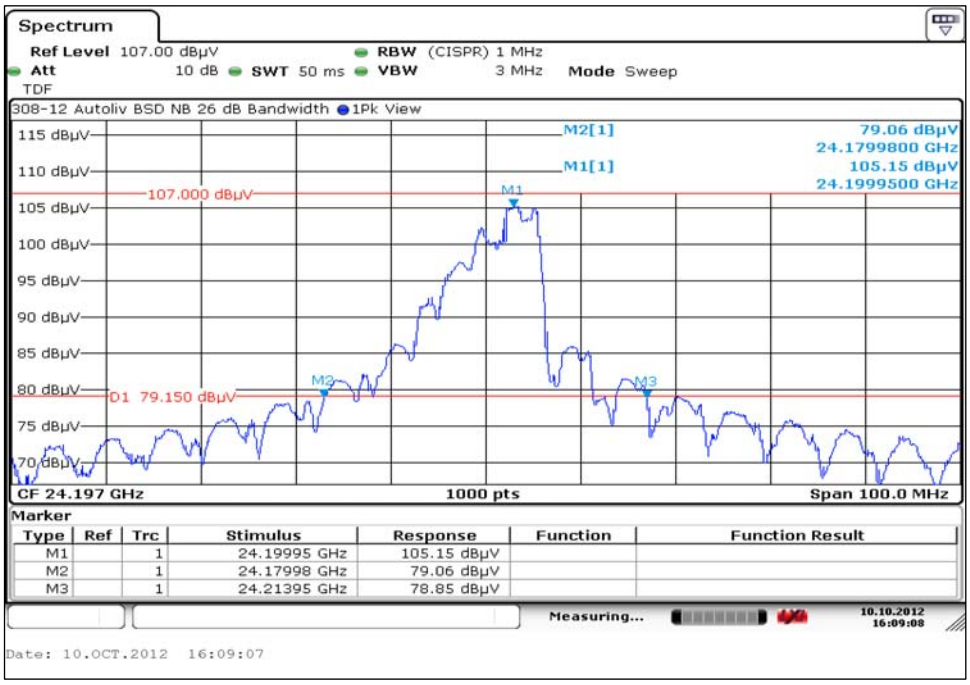
6. Measurement Data (continued)

6.6. 26 dB Bandwidth (ANSI C63.4, Section 13.7)

Requirement: The occupied bandwidth measurements on an intentional radiator shall be made in accordance with the requirements outlined in ANSI C63.4-2009, Section 13.7. If no bandwidth requirement is specified by the procuring or regulatory agency, measure the bandwidth at –26 dB with respect to the reference level. The resolution bandwidth was set according to Table 5 in Section 13.7 of ANSI C63.4-2009.

Channel	Channel Frequency	26 dB Bandwidth	Result
	GHz	MHz	
N/A	24.2	33.97	**Compliant**

6.6.2. 26 dB Bandwidth Plot (BSD)



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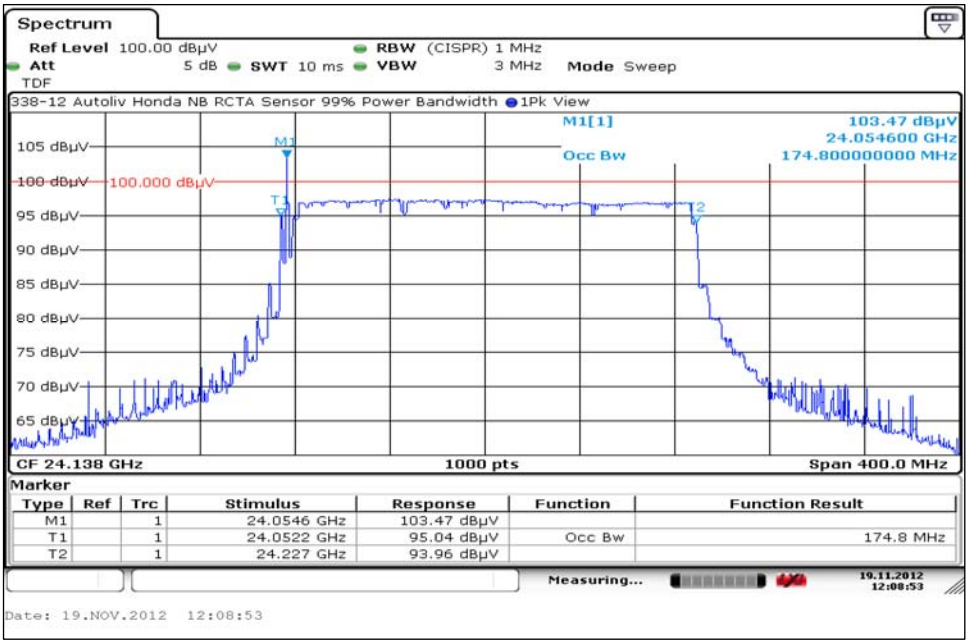
6. Measurement Data (continued)

6.7. 99% Power Bandwidth (RSS GEN 4.6.1)

Requirement: When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

Channel (GHz)	Centerl Frequency	99% Power Bandwidth
	GHz	MHz
24.0546	24.138	174.8

6.7.1. 99% Bandwidth Plot (RCTA)



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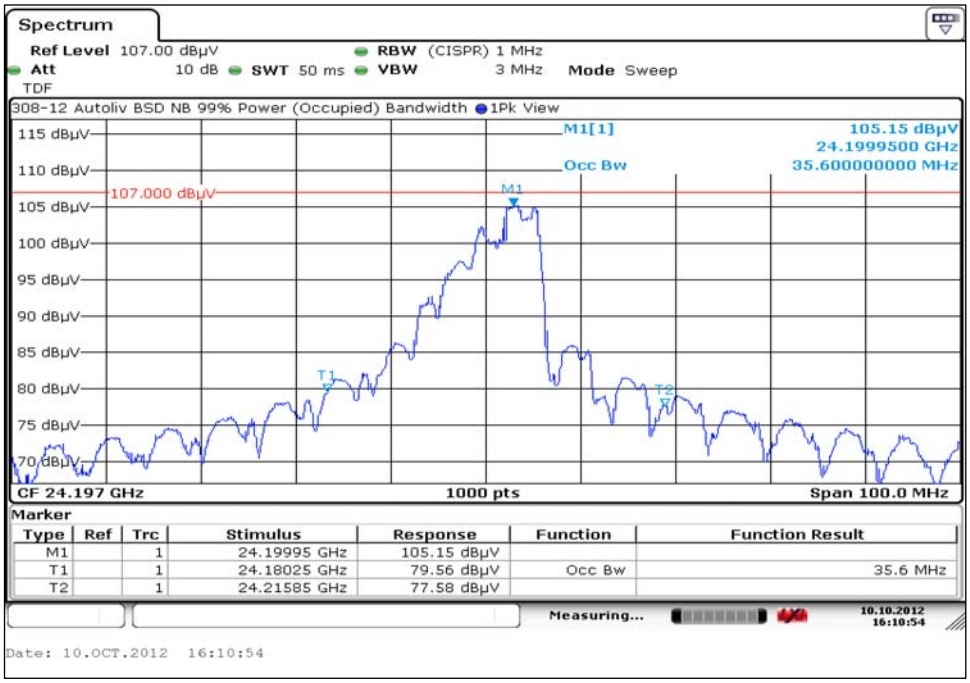
6. Measurement Data (continued)

6.7. 99% Power Bandwidth (RSS GEN 4.6.1)

Requirement: When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. The measurement bandwidth used shall be 1 to 3 % of the measurement span.

Center Frequency	99% Power Bandwidth	Result
GHz	MHz	
24.2	35.6	Compliant

6.7.2. 99% Bandwidth Plot (BSD)



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6. Measurement Data (continued)

6.8. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

6.9.1. Note: The following equation is used to determine the output power from the measured worst case field strength:

$$P = \frac{(E \times d)^2}{(30 \times G)}$$

P = the power in Watts.
E = the measured maximum field in V/m
G = the numeric gain of the transmitting antenna over an isotropic radiator.
d = the distance in meters of the field strength measurement.

Channel	Frequency	Peak Field Strength	Distance	Antenna Gain[1]	Measured Output Power
	(GHz)	(dBµV/m)	(m)	(dBi)	(mW)
RCTA	24.05485	101.09	3.0	12.200	0.23
BSD	24.19985	105.31	3.0	12.200	0.61

Channel	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm²)	Result
				(mW/cm^2)	(W/m^2)		
	(1)	(2)	(3)	(4)		(5)	
RCTA	20	-6.34	12.20	0.0007671	0.0076710	1	Compliant
BSD	20	8.08	12.20	0.0212252	0.2122518	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

PD = Power Density (mW/cm2)
OP = DUT Output Power (dBm)
AG = DUT Antenna Gain (dBi)
d = MPE Distance (cm)

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.
2. Sections 6.2 of this test report.
3. Antenna gain data provided by the client.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

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7. Test Images

7.1. Spurious and Harmonic Emissions – Front

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7. Test Images

7.2 Spurious and Harmonic Emissions Below 30 MHz – Rear

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7. Test Images

7.3. Spurious and Harmonic Emissions – Rear – 30 MHz to 1 GHz

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7. Test Images

7.4. Spurious and Harmonic Emissions – Rear - 1 to 18 GHz

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

7. Test Images

7.5. Spurious and Harmonic Emissions – Rear - 18 to 40 GHz

Compliance Worldwide, Inc. - 357 Main Street - Sandown, NH 03873
(603) 887 3903 Fax 887 6445
http://www.cw-inc.com

7. Test Images

7.3. Spurious and Harmonic Emissions – Front - 48 GHz

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8. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC) and Industry Canada standards. A description of the test sites is on file with the FCC (registration number **96392**) and Industry Canada (file number **IC 3023A-1)**.

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meter W x 1.5 meter L x 2.0 meter H, floor standing or table top.

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