166 South Carter, Genoa City, WI 53128

Company:	GE Medical Systems, LLC
Model Tested:	5390144 rev3
Report Number:	16995
Project Number:	4678

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart F – Ultra-Wideband Operation
Section 15.519
Technical Requirements for hand held UWB systems

Class II Permissive Change

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name:	WUSB Host Radio
Kind of Equipment:	UWB Radio
FCC ID Number:	YYJ-5390144
Frequency Range:	3168 - 4752 MHz, 6336 – 7920 MHz
Test Configuration:	Hand-held transceiver tested table-top in worst case configuration of three orthogonal planes.
Model Number(s):	5390144 rev4, 5390144-2 rev 1, 5390144 rev 3
Model(s) Tested:	5390144 rev 3
Serial Number(s):	11V00084
Date of Tests:	May 23 – 27, 2011
Test Conducted For:	GE Medical Systems, LLC 3000 N. Grandview Blvd Mailstop W622 Waukesha, WI 53188

NOTICE: "This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Description of Test Sample" page listed inside of this report.

166 South Carter, Genoa City, WI 53128

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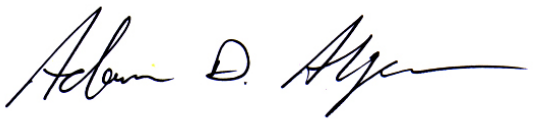
SIGNATURE PAGE

Report By:



Adam Alger
Test Engineer
June 20, 2011

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2010-10-01 through 2011-09-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

1.0 Summary of Test Report

It was determined that the GE Medical Systems, LLC WUSB Host Radio, Model 5390144 rev 3, complies with the requirements of CFR 47 Part 15 Subpart F Section 15.519.

Subpart F Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
15.519 (b)	Fundamental Emission Bandwidth – 10dB	ANSI C63.4-2009 & ANSI C63.10-2009	1	Yes
15.519 (c) / 15.209	Radiated Spurious Emissions below 960 MHz	ANSI C63.4-2009 & ANSI C63.10-2009	1	Yes
15.519 (c)	Radiated / RF Conducted Spurious Emissions above 960 MHz	ANSI C63.4-2009 & ANSI C63.10-2009	1,2	Yes
15.519 (c) & (e)	Radiated Fundamental Emissions in band 3100 to 10600 MHz	ANSI C63.4-2009 & ANSI C63.10-2009	1	Yes
15.519 (d)	Radiated Spurious Emissions in GPS band	ANSI C63.4-2009 & ANSI C63.10-2009	1	Yes

Note 1: Radiated emission measurement tested in 3 orthogonal planes.
Note 2: RF antenna port conducted emissions.

2.0 Introduction

On May 23 – 27, 2011 the WUSB Host Radio, Model 5390144 rev 3, as provided from GE Medical Systems, LLC was tested to the requirements of CFR 47 Part 15 Subpart C Section 15.519. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.

3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Wisconsin Test Facility:
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

4.0 Description of Test Sample

Description:

WUSB Host Radio is a USB peripheral device which acts like a Wireless USB Host using the UWB protocol. The device is used to transfer large medical images.

Type of Equipment / Frequency Range:

Handheld / MHz

Band Group	Band ID	Lower Frequency	Center Frequency	Upper Frequency
1	1	3168	3432	3696
	2	3696	3960	4224
	3	4224	4488	4752
3	7	6336	6600	6864
	8	6864	7128	7392
	9	7392	7656	7920

Physical Dimensions of Equipment Under Test:

Length: 156 mm x Width: 38 mm x Height:11 mm

Power Source:

USB powered (5 VDC)

Internal Frequencies:

66, 12 MHz

Type of Modulation(s) / Antenna Type:

Multiband OFDM with QPSK, Dual Carrier Modulation, Modified DCM / Magnetic Dipole

Description of Circuit Board(s) / Part Number:

WUSB Host Radio	5390144 rev 3
WUSB Host Radio	5390144 rev 4
WUSB Host Radio	5390144-2 rev 1
WUSB Host Radio	5390144-3 rev 1

5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

D.L.S. Wisconsin –Site 3 / G1

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
G1 Emissions 30-1000 MHz						
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/10	7/11
Preamplifier	Rohde & Schwarz	TS-PR10	032001/003	9 kHz – 1 GHz	1/11	1/12
Antenna	EMCO	3104C	9810-4849	20 MHz – 200 MHz	2/10	2/12
Antenna	EMCO	3146	1604	200 MHz – 1 GHz	8/10	8/12
Site 3 Emissions – 1-40 GHz						
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/10	7/11
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	1/11	1/12
Horn Antenna	EMCO	3115	9903-5731	1-18GHz	6/09	6/11
Signal Generator	Rhode & Schwarz	SMR40	100092	1-40 GHz	1/11	1/12
Horn Antenna	EMCO	3115	9502-4451	1-18GHz	4/11	4/13
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18GHz-26GHz	8/10	8/11
Horn Antenna	EMCO	3116	2549	18 – 40GHz	8/10	8/11
Preamp	R&S	TS-PR40	052002/025	26GHz-40GHz	8/10	8/11
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/10	7/11
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	1/11	1/12
Horn Antenna	EMCO	3115	9903-5731	1-18GHz	6/09	6/11

6.0 Test Arrangements

Emissions Measurement Arrangement:

All emissions measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.4-2009 and ANSI C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

7.0 Test Conditions

Test Conditions recorded during test:

Temperature and Humidity:

65°F at 25% RH

8.0 Modifications Made To EUT For Compliance

None noted at time of test.

9.0 Additional Descriptions

The client has been informed of the operational limits defined in FCC 47 CFR Section 15.519 (a).

AC Mains Line conducted was not performed because the the UWB radio is powered by a PC USB port.

Using a PC with proprietary software, the UWB radio was connected through a USB cable and configured for continuos transmit. The software allowed the user to configure the radio settings to achieve compliant levels and determine worst case data rate settings.

TX Rate: 53
TX Payload: 4095
TX IFS: 10 us

Final Transmitter Power Settings:

Band Group 1			
	TFC 5	TFC 6	TFC 7
TPC	2		
C1	21		
C2	00		

Band Group 3			
	TFC 5	TFC 6	TFC 7
TPC	9	8	9
D1	01		
D2	06	07	04

10.0 Results

Measurements were performed in accordance with ANSI C63.4-2009 and ANSI C63.10-2009. Graphical and tabular data can be found in Appendix B at the end of this report.

11.0 Conclusion

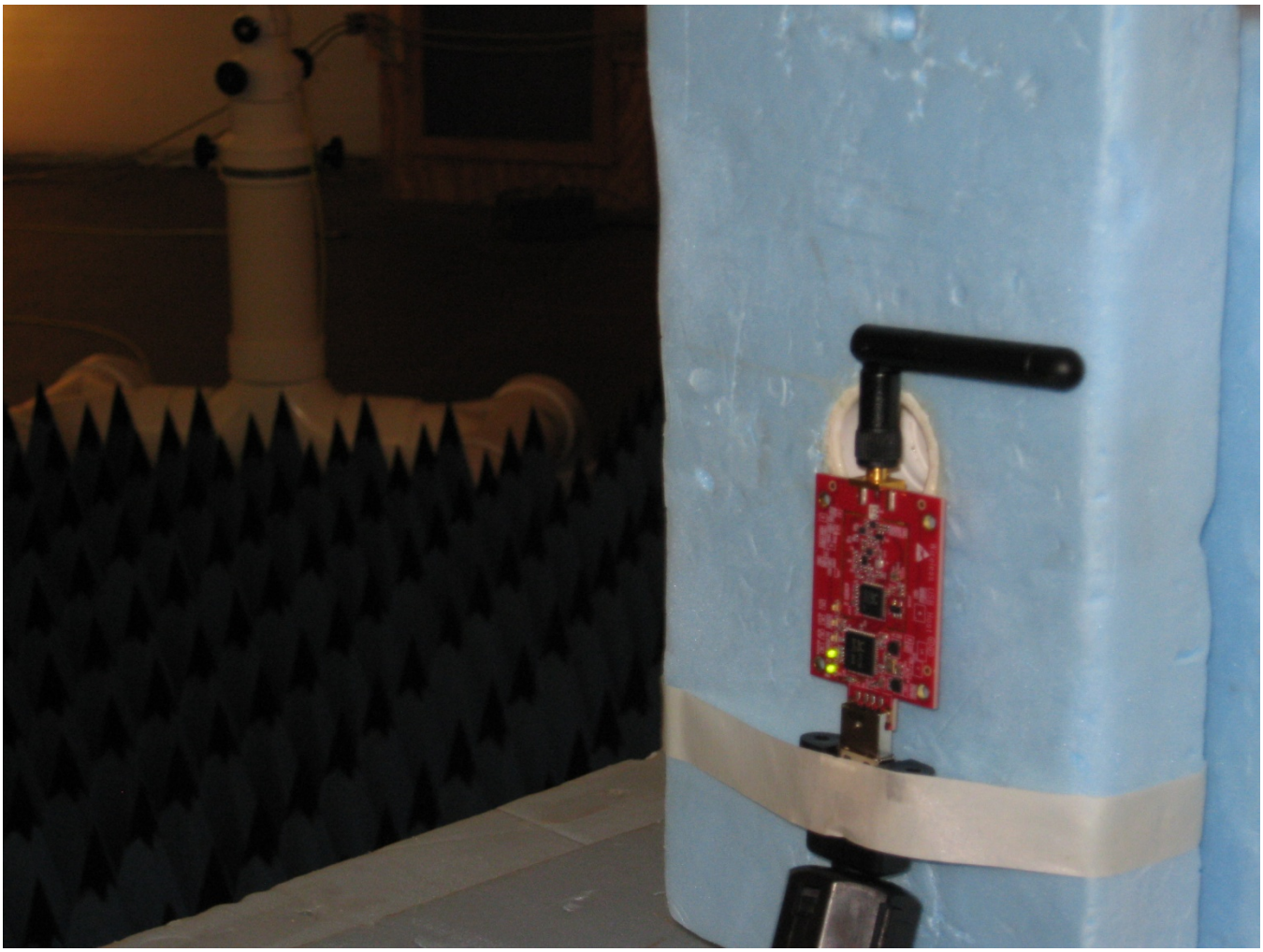
The WUSB Host Radio, Model 5390144 rev 3, as provided from GE Medical Systems, LLC tested on May 23 - 27, 2011 **meets** the requirements of CFR 47 Part 15 Subpart F Section 15.519.

Appendix A – Test Photos

Photo Information and Test Setup:

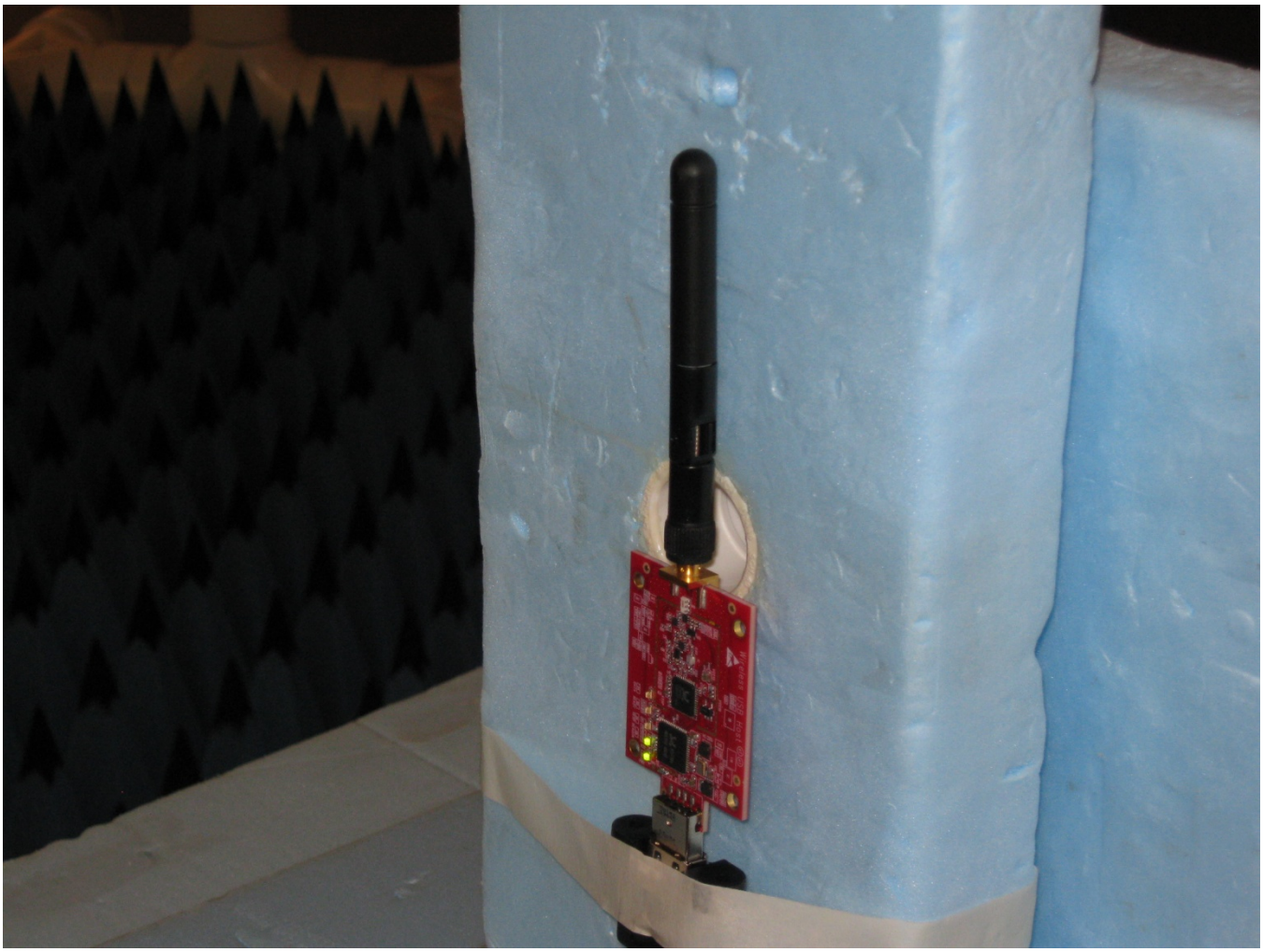
Items: WUSB Host Radio 5390144 rev 3
Antenna: ACON P/N ADM3S-100010
20 meter USB cable with ferrites

Radiated Emissions – Y – Worst Case Position



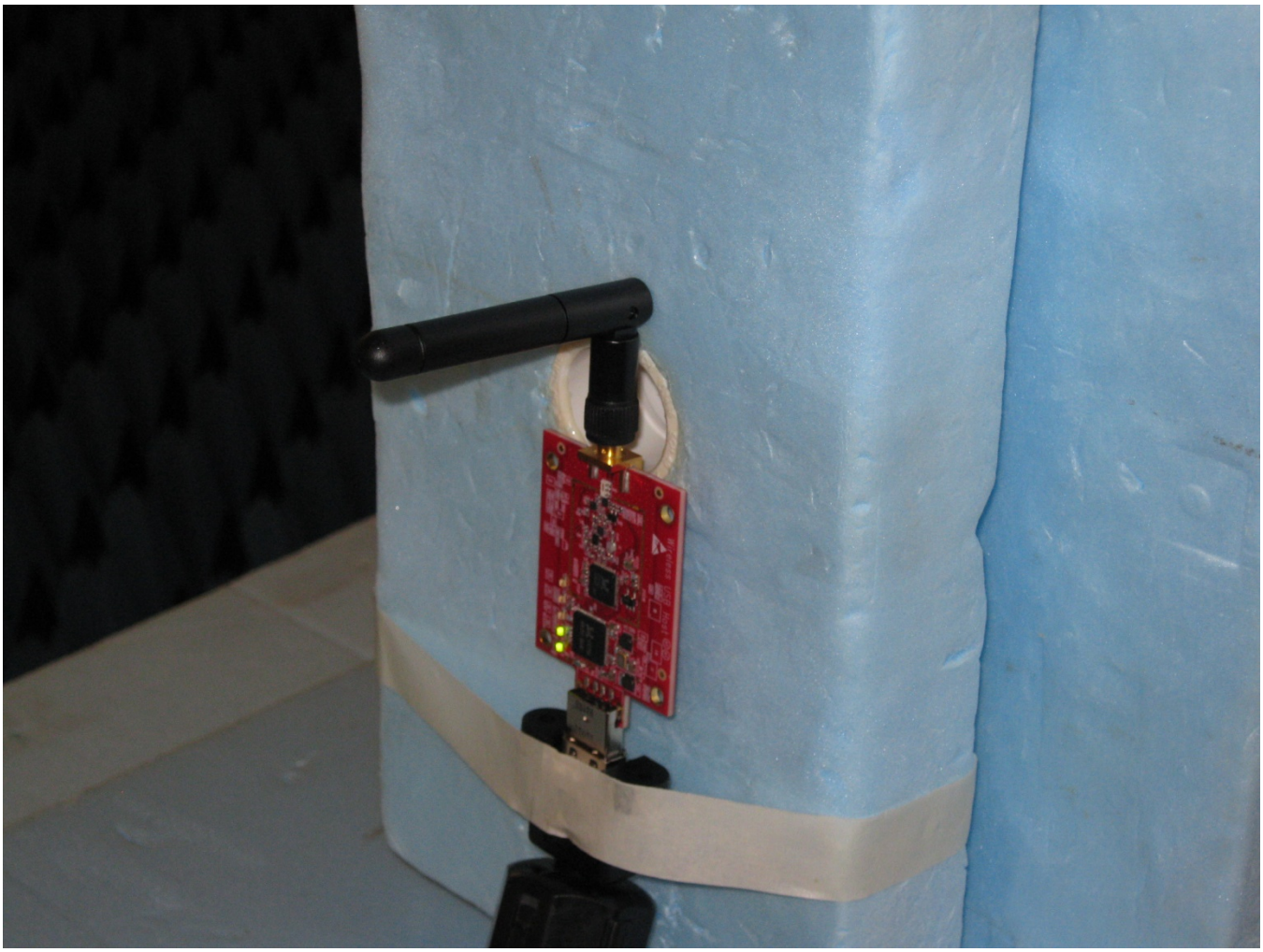
Appendix A

Radiated Emissions – Y Position



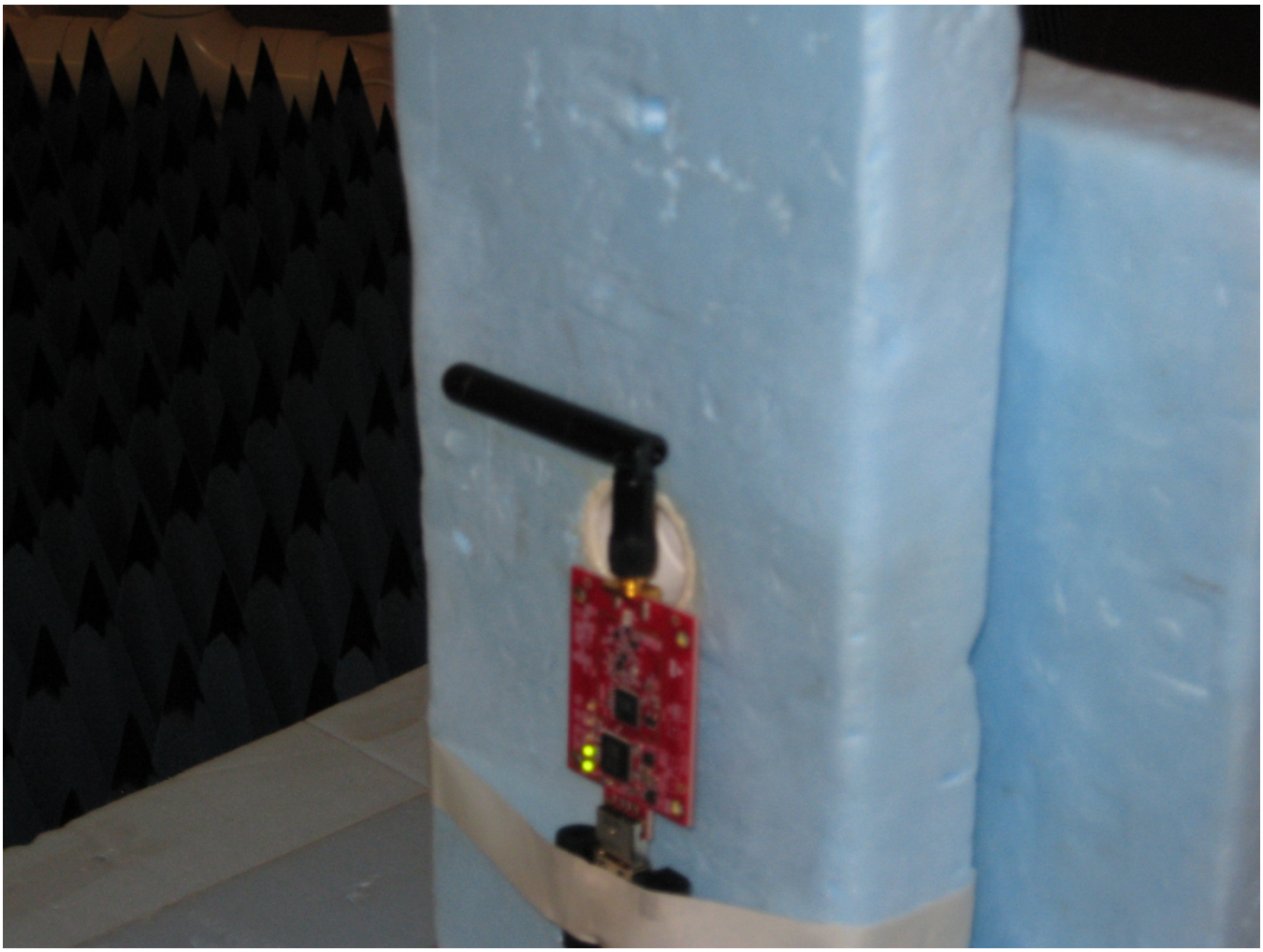
Appendix A

Radiated Emissions – Y Position



Appendix A

Radiated Emissions – Y Position



Appendix A

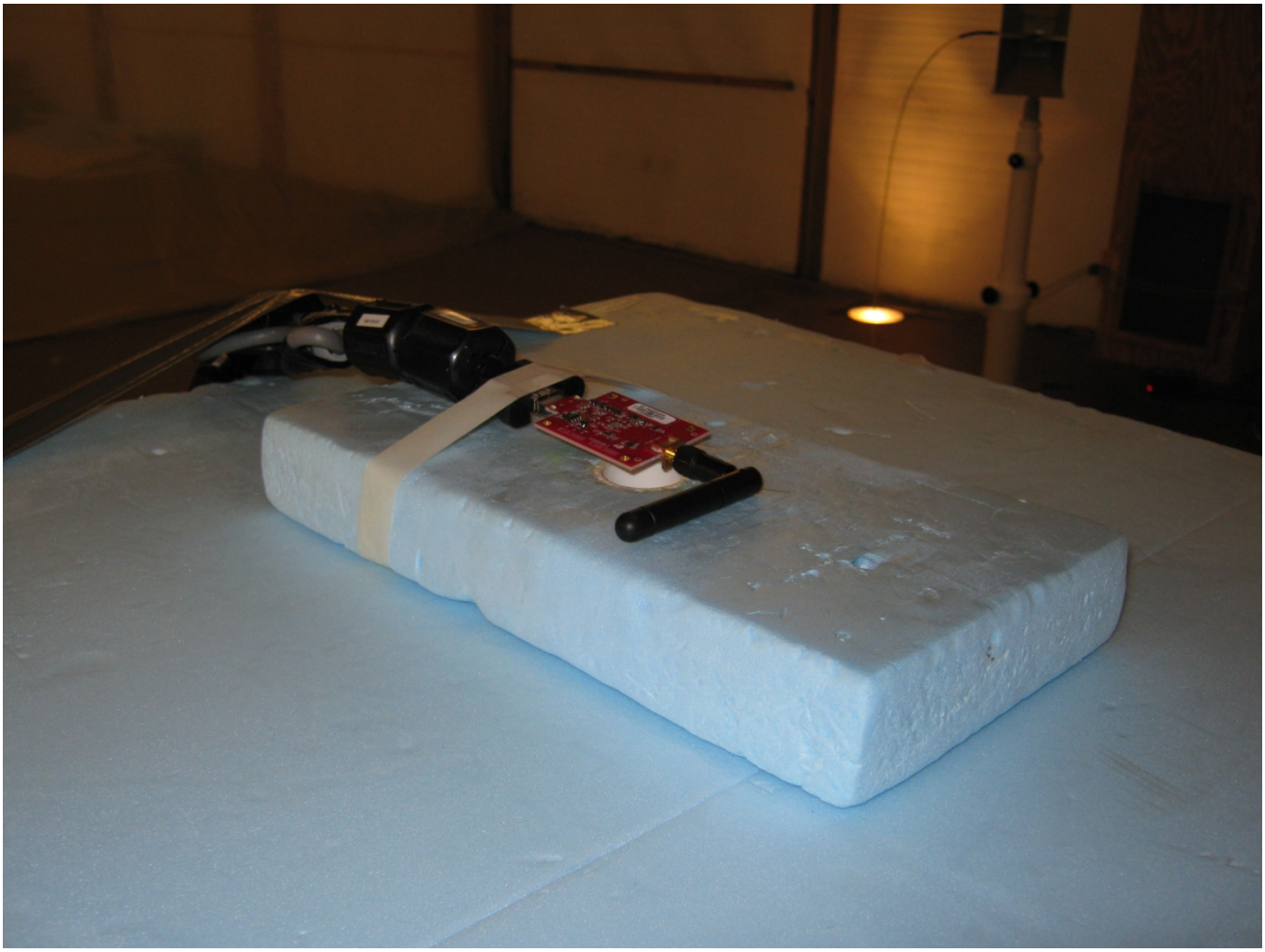
Radiated Emissions – Y Position

Appendix A

Radiated Emissions – Z Position

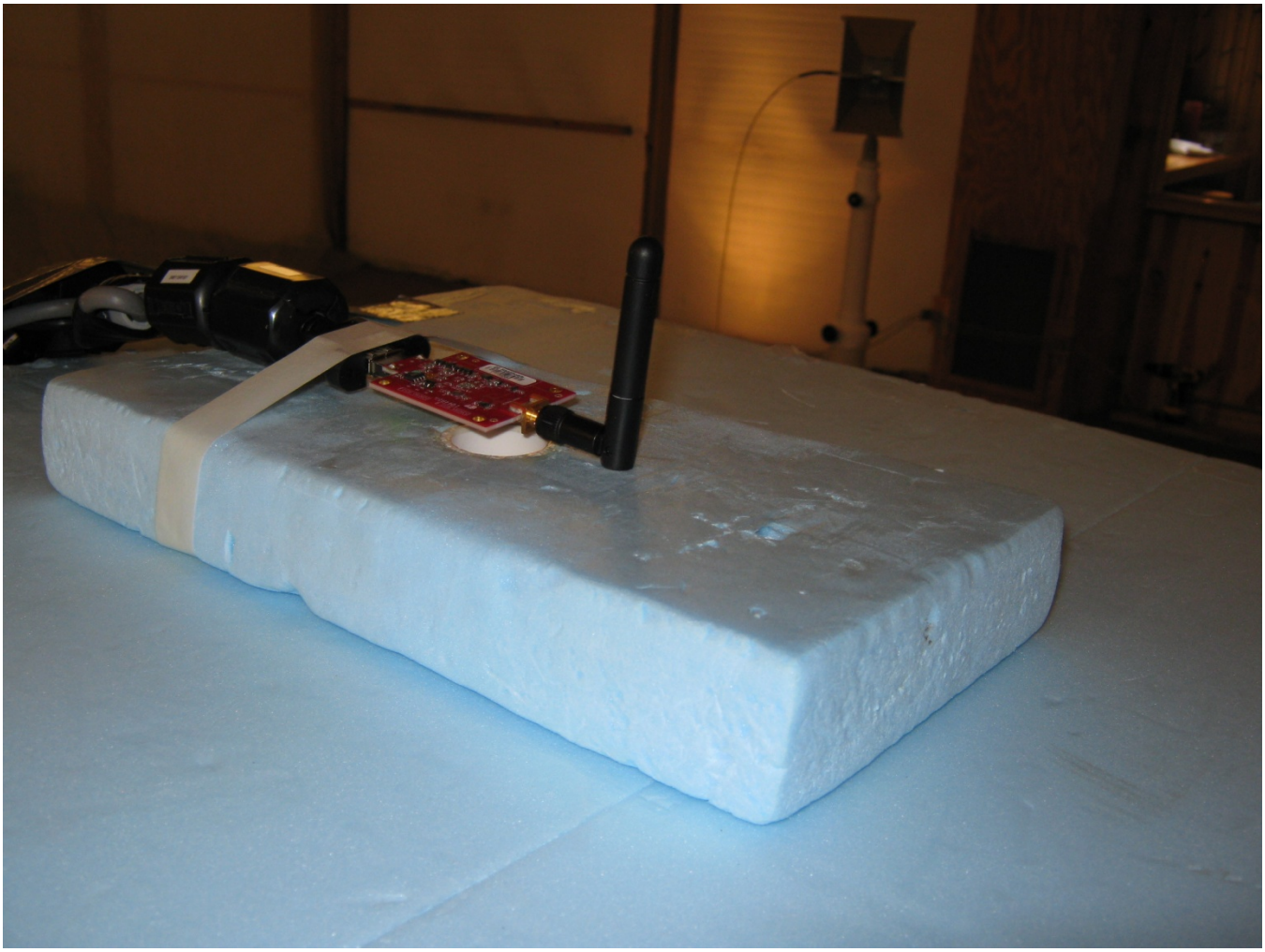
Appendix A

Radiated Emissions – Z Position



Appendix A

Radiated Emissions – Z Position



Appendix A

Radiated Emissions – Z Position

Appendix B – Measurement Data

1.0 Fundamental Emission Bandwidth – 10 dB

Rule Part:

Section 15.519 (b)

Test Procedure:

ANSI C63.4-2009 and ANSI C63.10-2009

Limit:

Contained between 3100 MHz and 10,600 MHz

Results:

Compliant:

Band ID	10 dB bandwidth
1	509.2 MHz
2	510.3 MHz
3	509.2 MHz
7	510.3 MHz
8	511.4 MHz
9	509.2 MHz

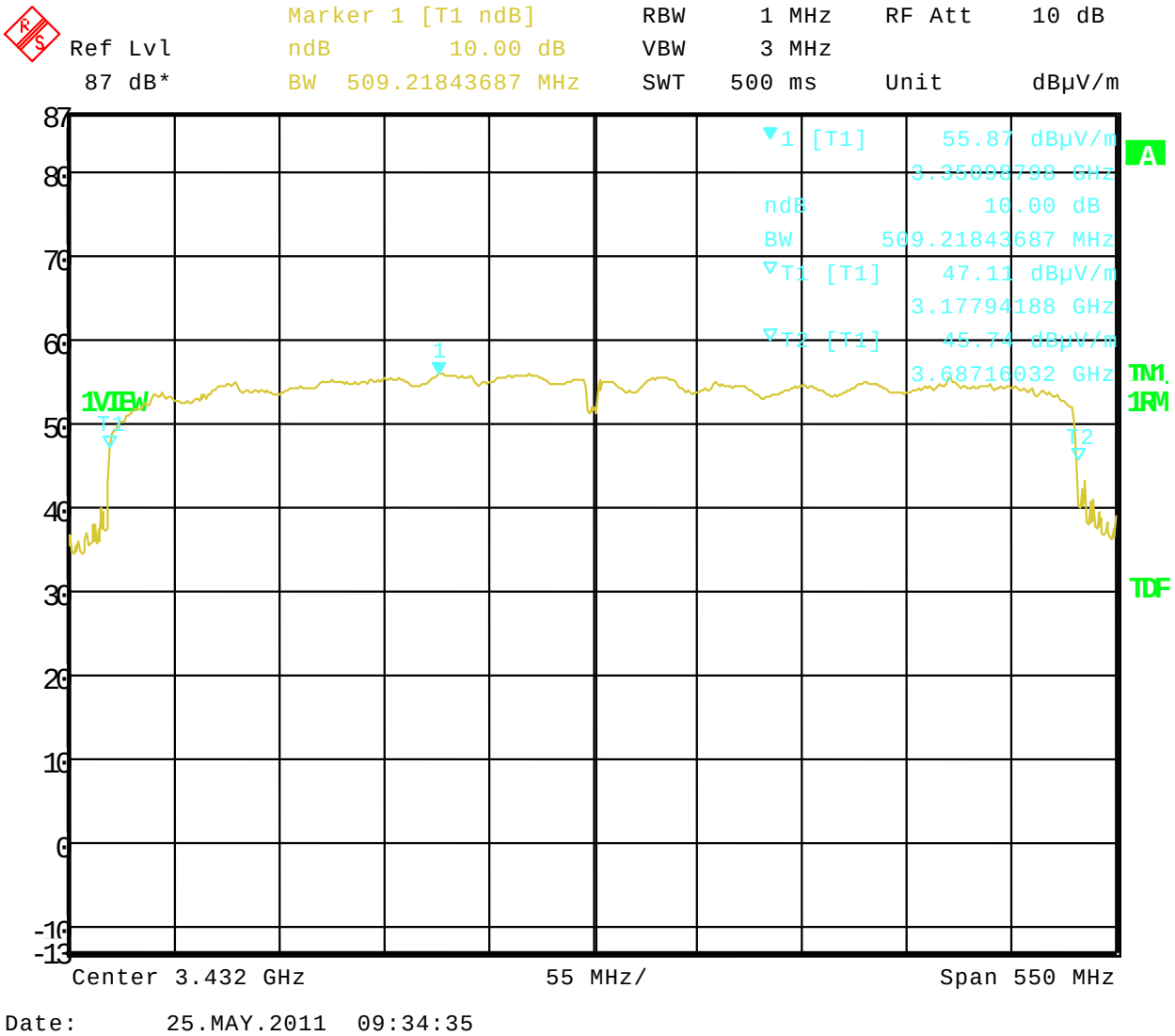
Sample Equation(s):

None

Notes:

This was a radiated emissions measurement. The maximum field strength of the emission was determined and the bandwidth was measured from the points at 10 dB down from the highest radiated emission, as based on the complete transmission system including the antenna.

Band Group 1
Band # 1



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Model Tested:	5390144 rev3
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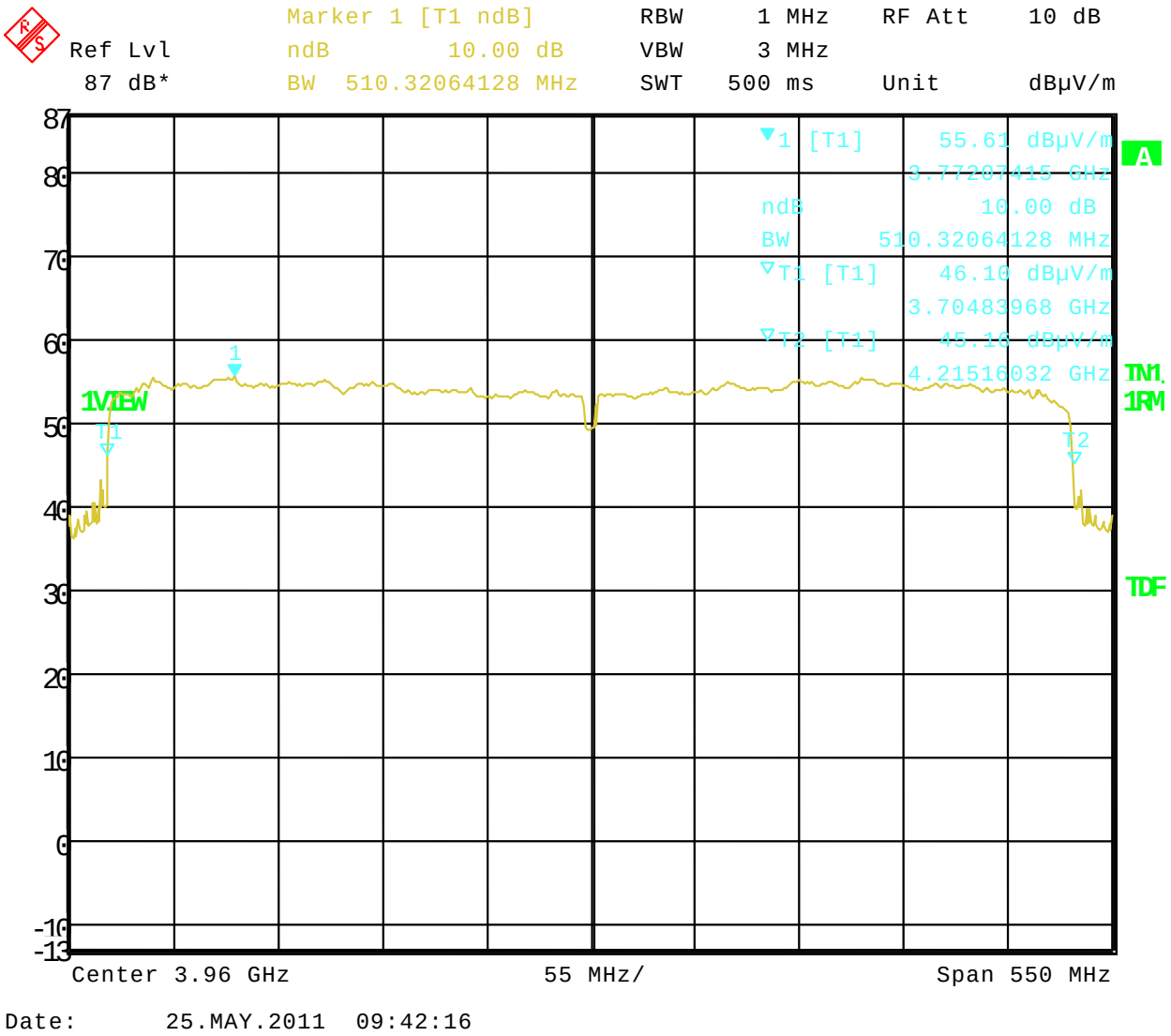
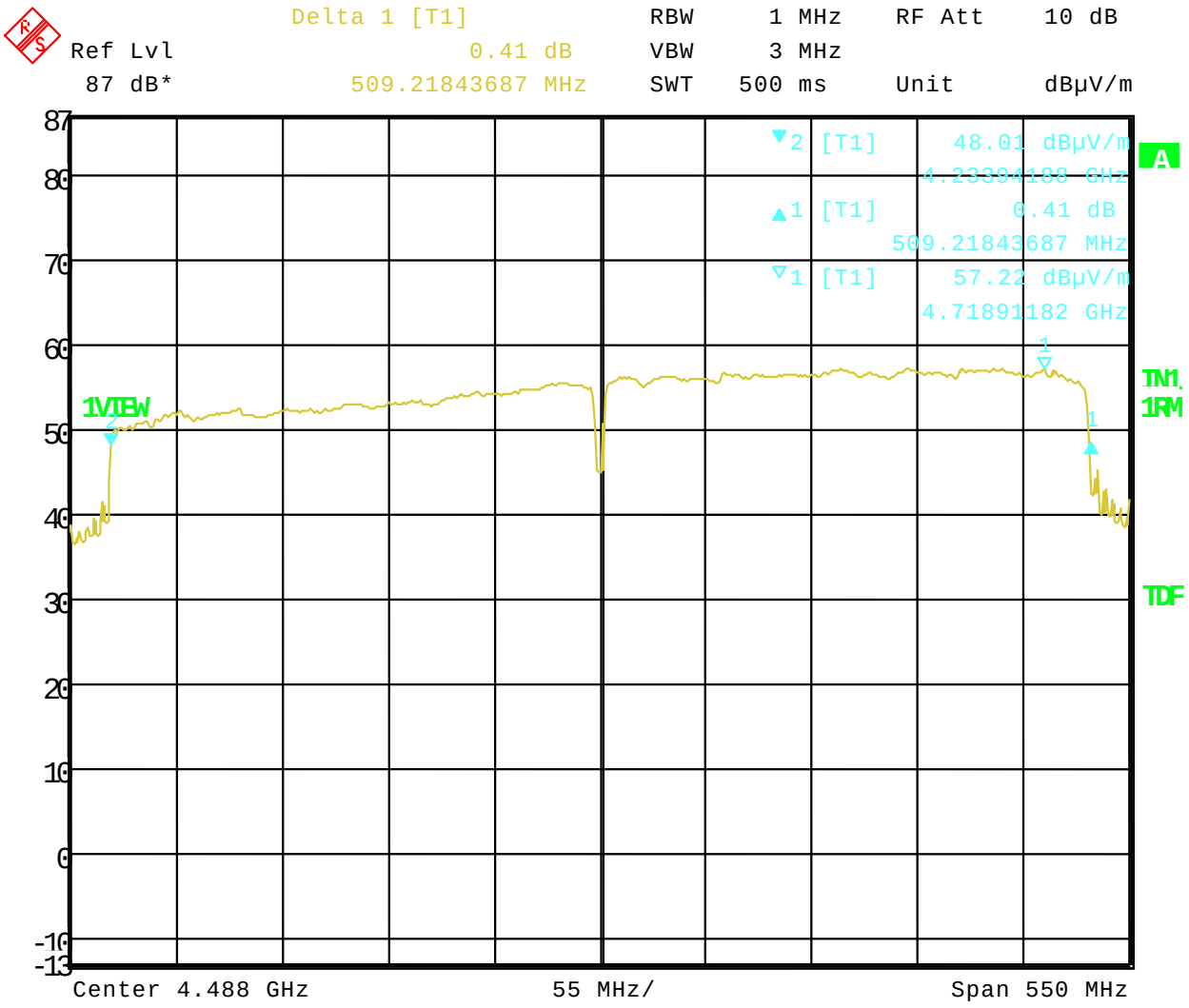
Band Group 1
Band # 2

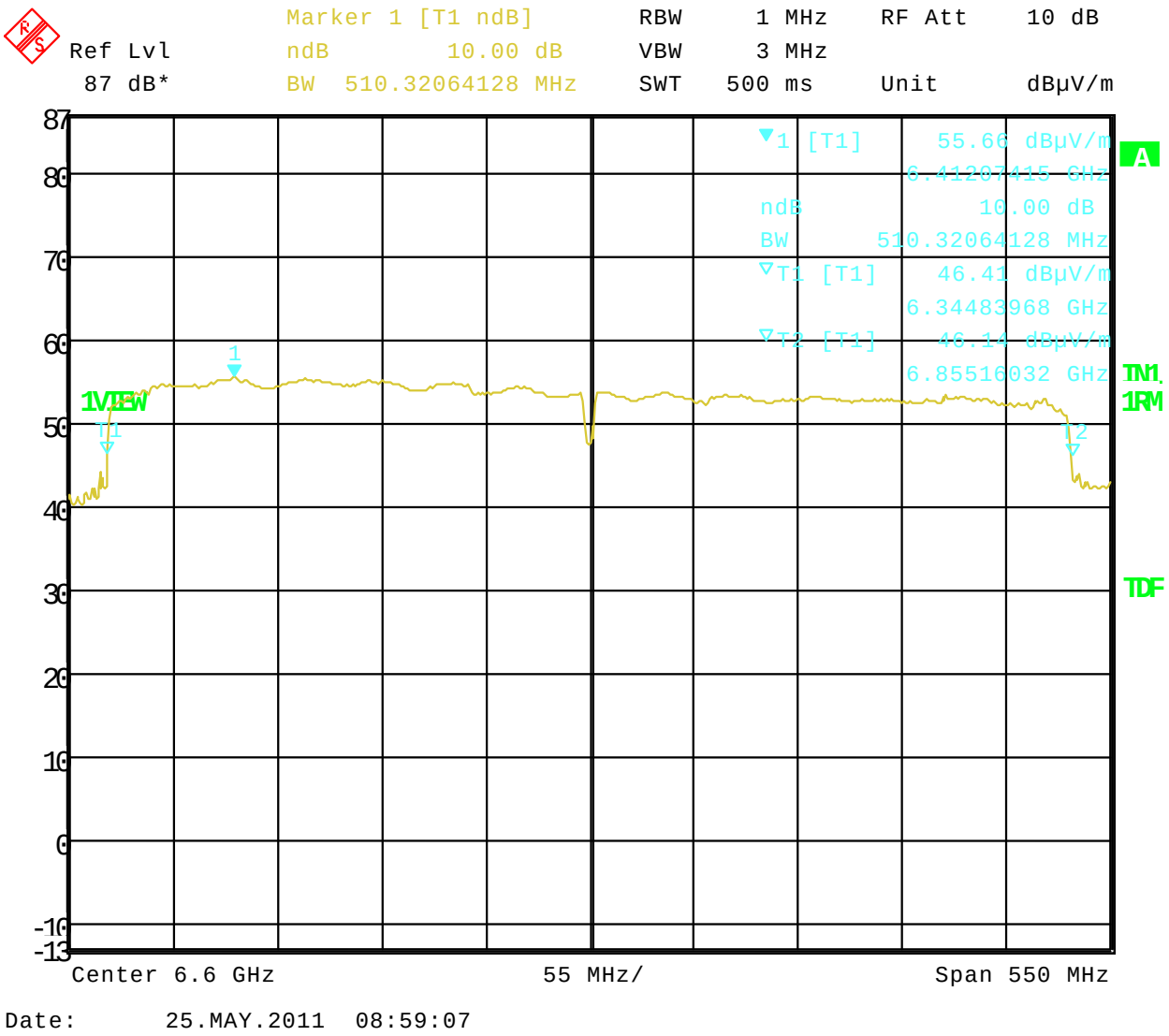


Band Group 1
Band # 3

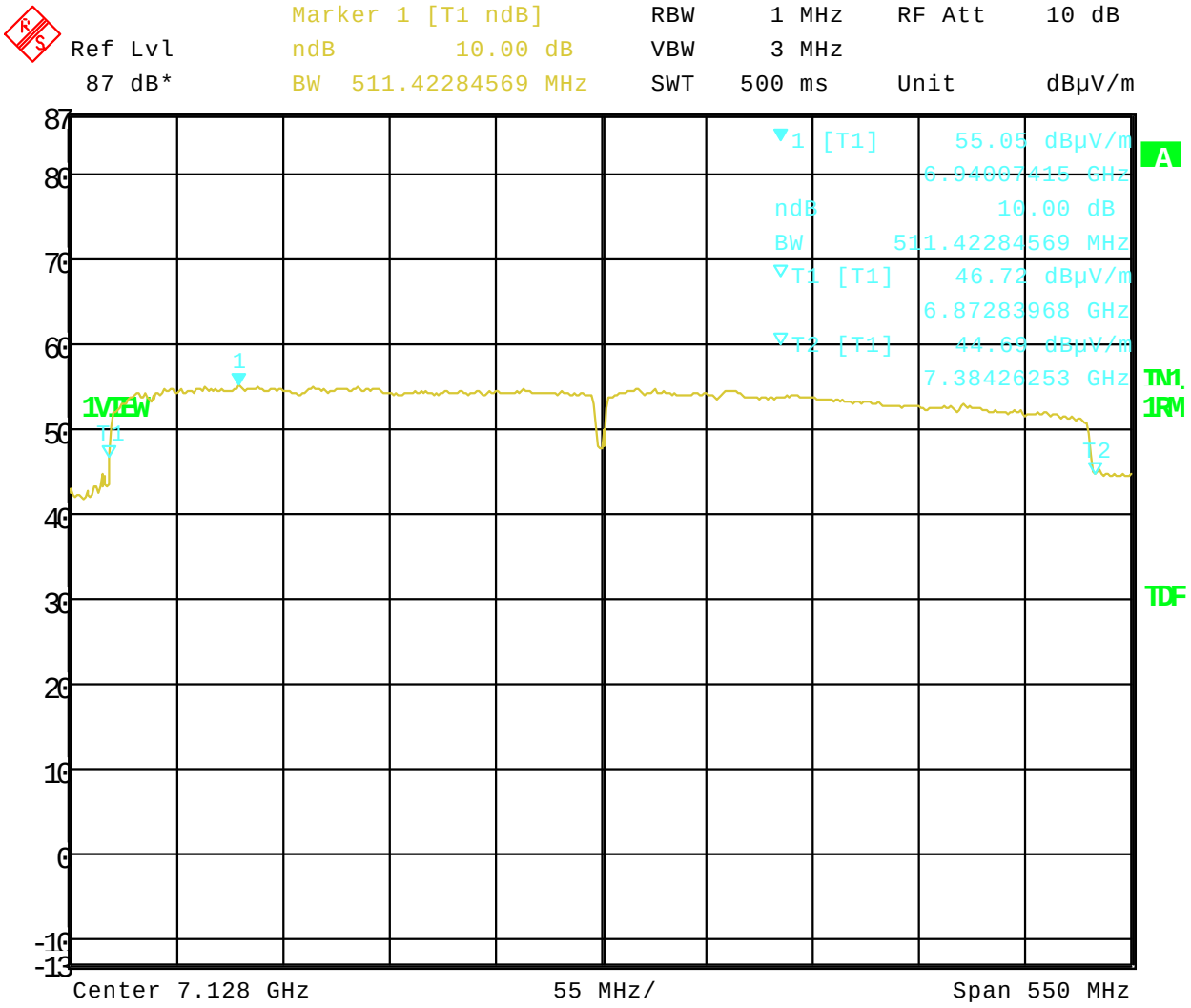


Date: 25.MAY.2011 09:54:09

Band Group 3
Band # 7

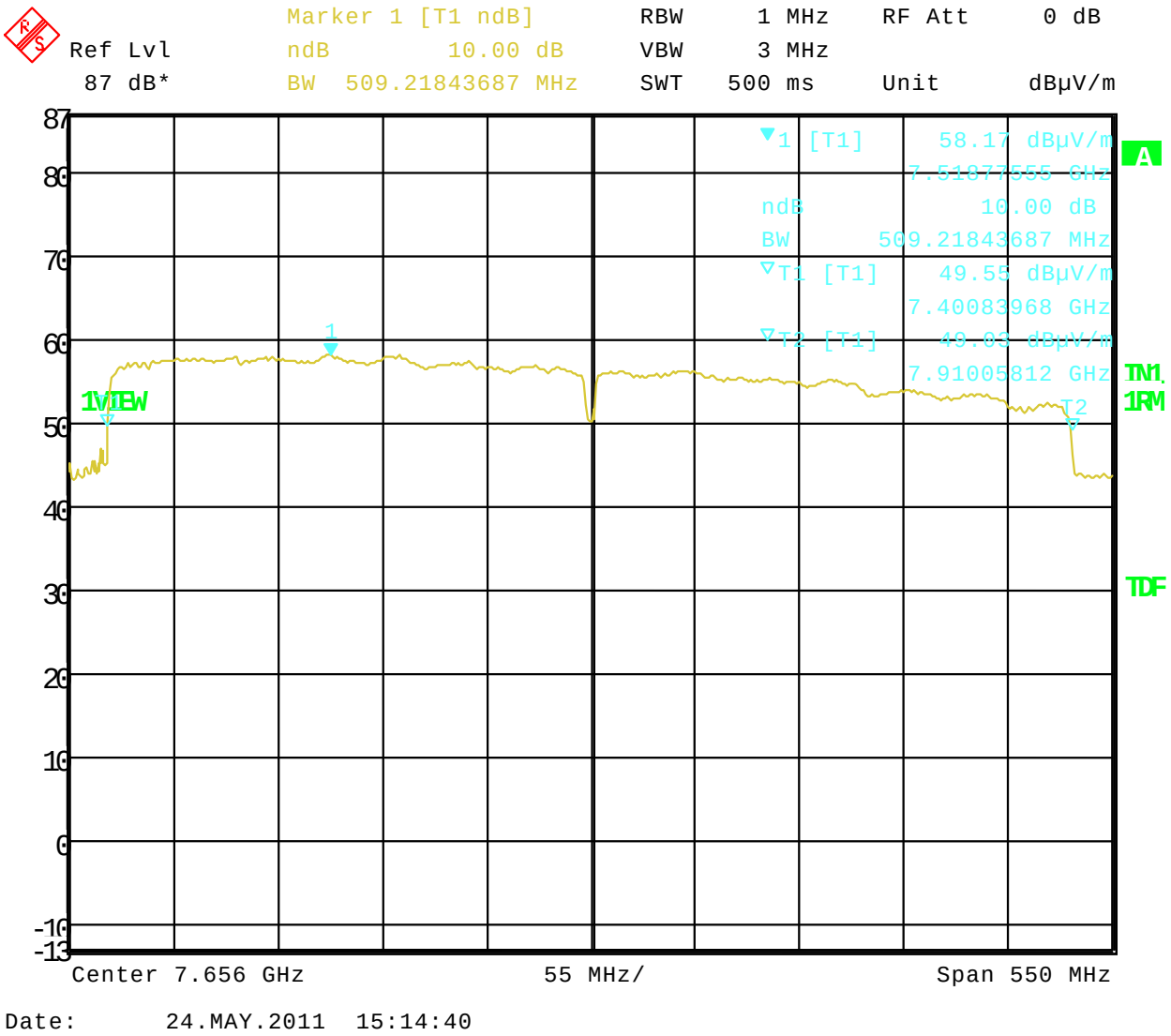


Band Group 3
Band # 8



Date: 25.MAY.2011 09:06:50

Band Group 3
Band # 9



Date: 24.MAY.2011 15:14:40

Appendix B

2.0 Radiated Spurious Emissions below 960 MHz

Rule Part:

15.519 (c)

Test Procedure:

ANSI C63.4-2009and ANSI C63.10-2009

Limit:

15.209

Results:

Compliant

Sample Equation(s):

None

Notes:

Test distance 3 meter. No emissions detected within 20 dB of limit associated with UWB transmission.

Appendix B

3.0 Radiated / RF Conducted Spurious Emissions above 960 MHz

Rule Part:

15.519 (c)

Test Procedure:

ANSI C63.4-2009and ANSI C63.10-2009

Limit:

Average limit with resolution bandwidth of 1 MHz

Frequency (MHz)	EIRP in dBm
960 – 1610	-75.3
1610 – 1990	-63.3
1990 – 3100	-61.3
3100 – 10600	-41.3
Above 10600	-61.3

Results:

Compliant

Sample Equation(s):

See data

Notes:

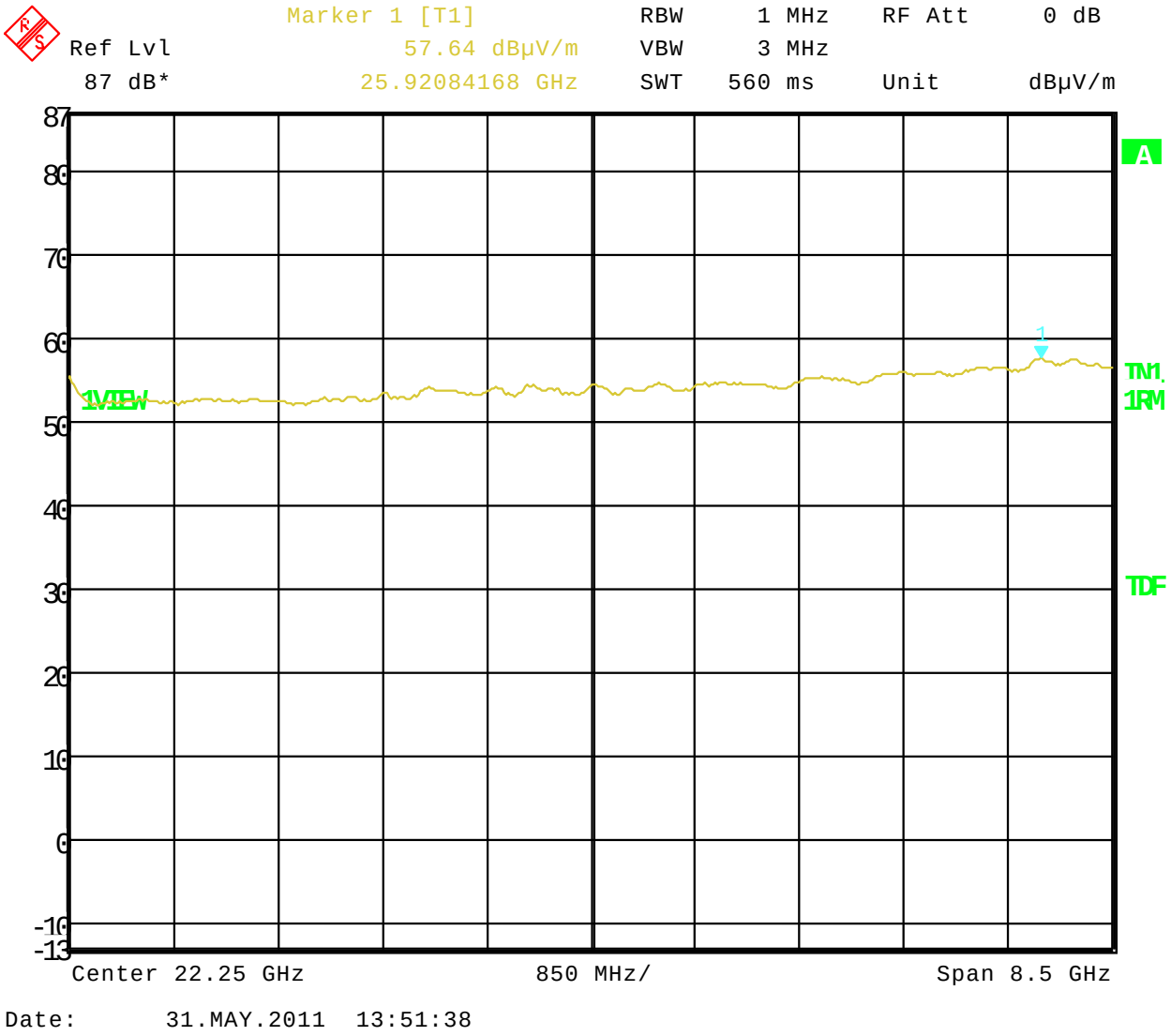
Radiated emissions tested at 3 meter distance 1-10 GHz, 1 meter distance 10-18 GHz and 0.5 meter distance 18-40 GHz maximized in vertical and horizontal polarizations.
No spurious radiated emissions were found associated with UWB transmission.
The antenna port was connected directly to the analyzer through appropriate adapter and investigated for spurious emissions. No spurious conducted emissions were detected.

Radiated Spurious

10 – 18 GHz @ 1 meter – Maximized in vertical and horizontal polarizations – no emissions found

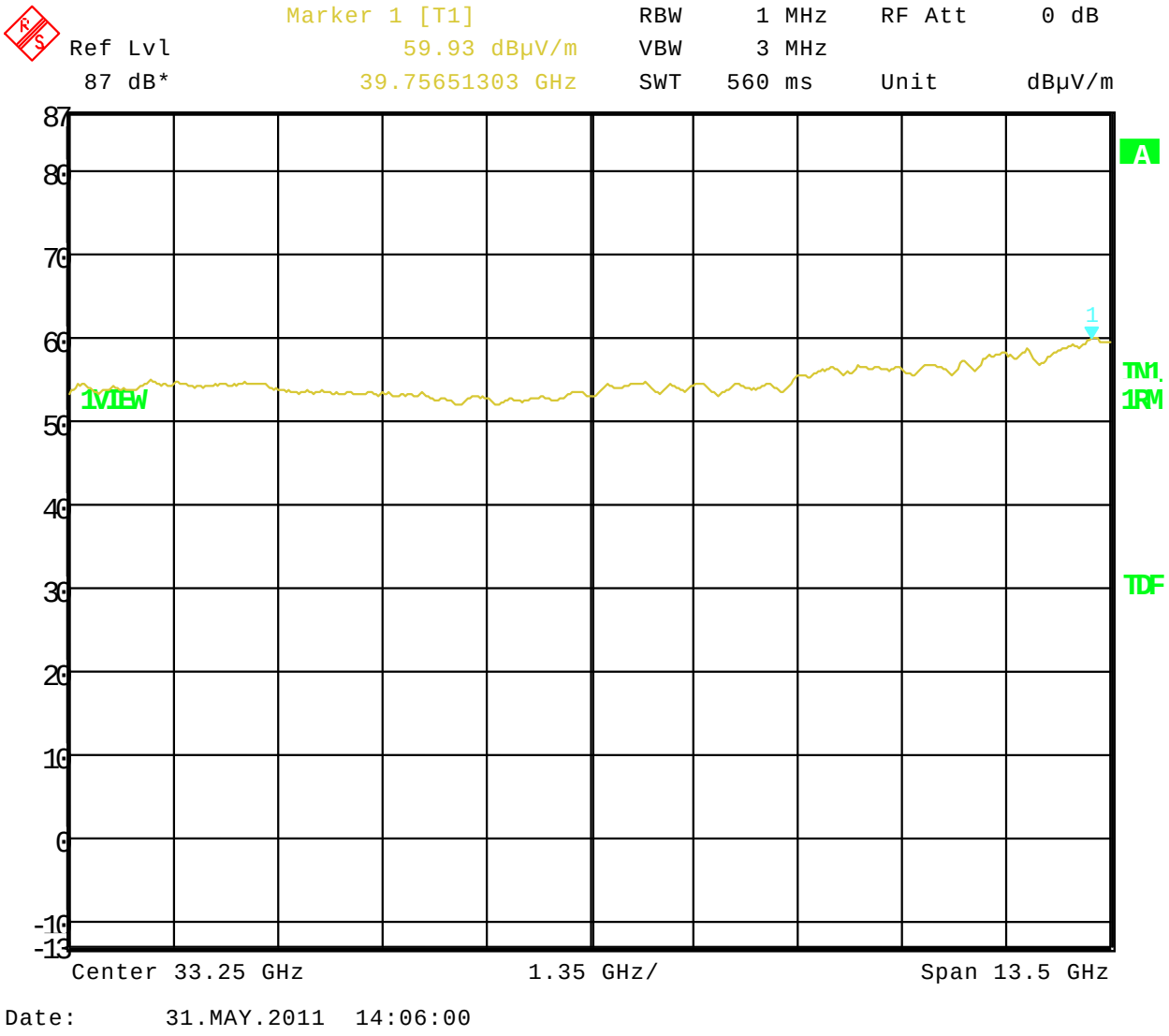
Radiated Spurious

18 – 26.5 GHz @ 0.5 meter – Maximized in vertical and horizontal polarizations – no emissions found



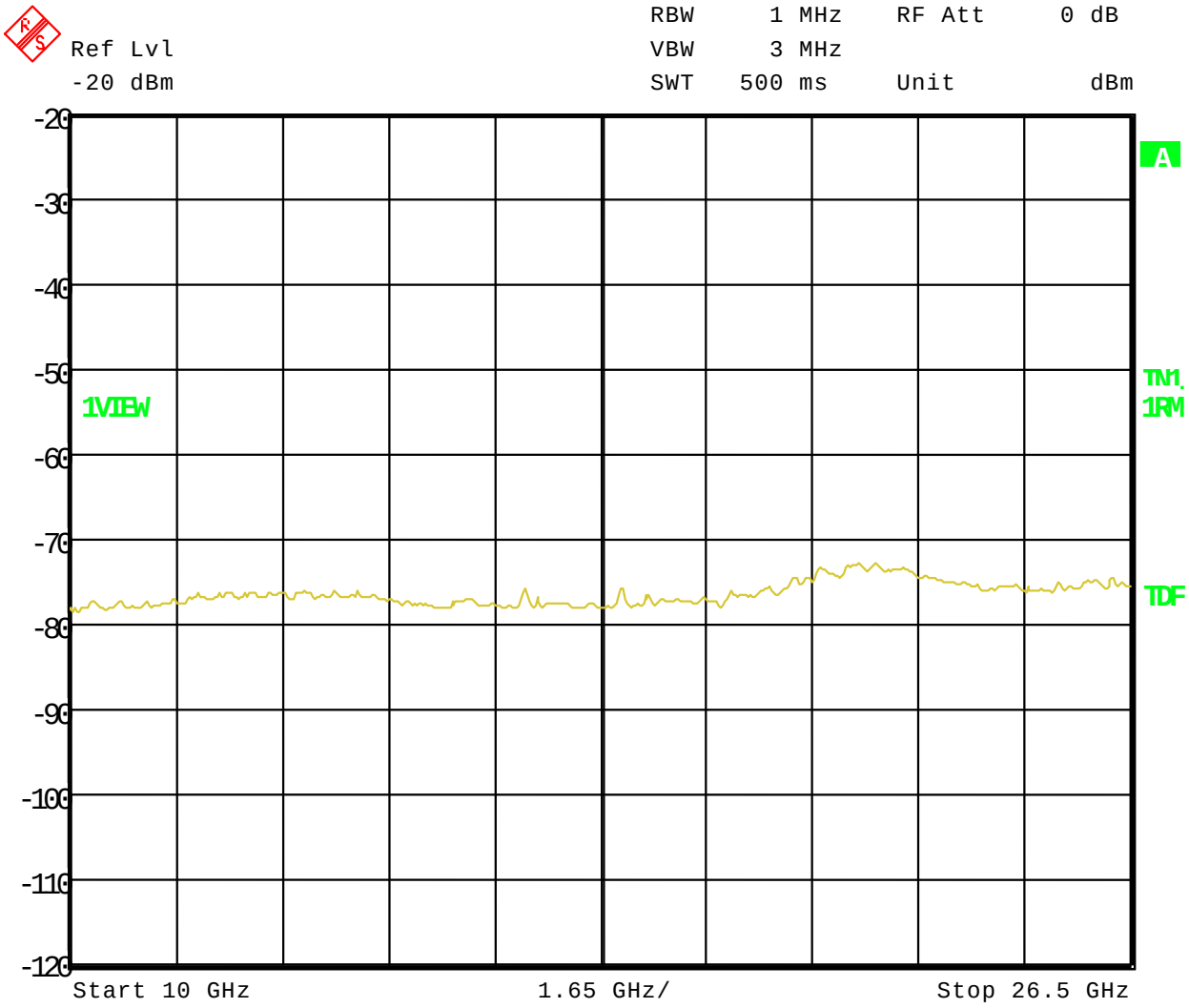
Radiated Spurious

26.5 – 40 GHz @ 0.5 meter – Maximized in vertical and horizontal polarizations – no emissions found



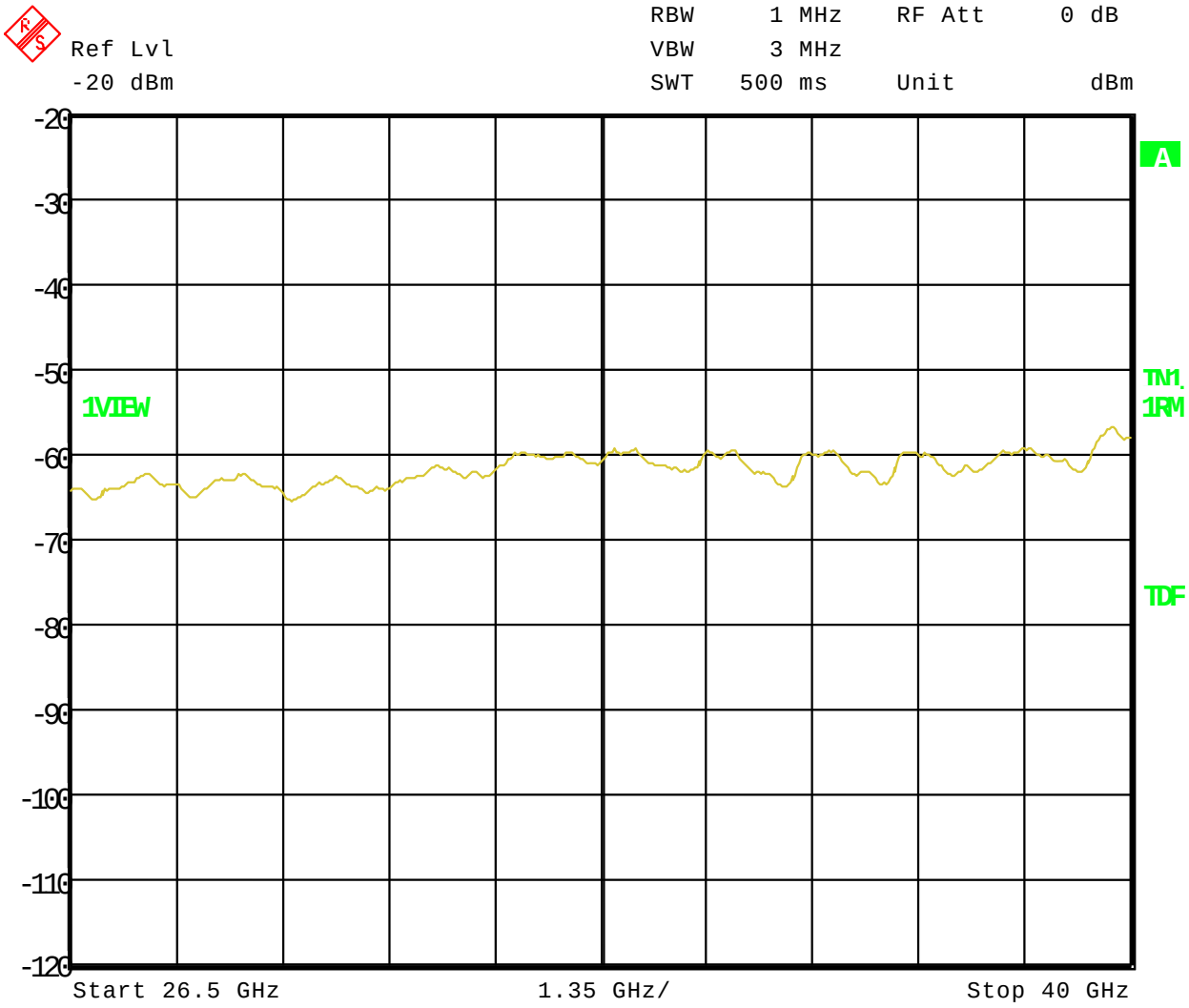
Conducted Spurious

10 – 26.5 GHz



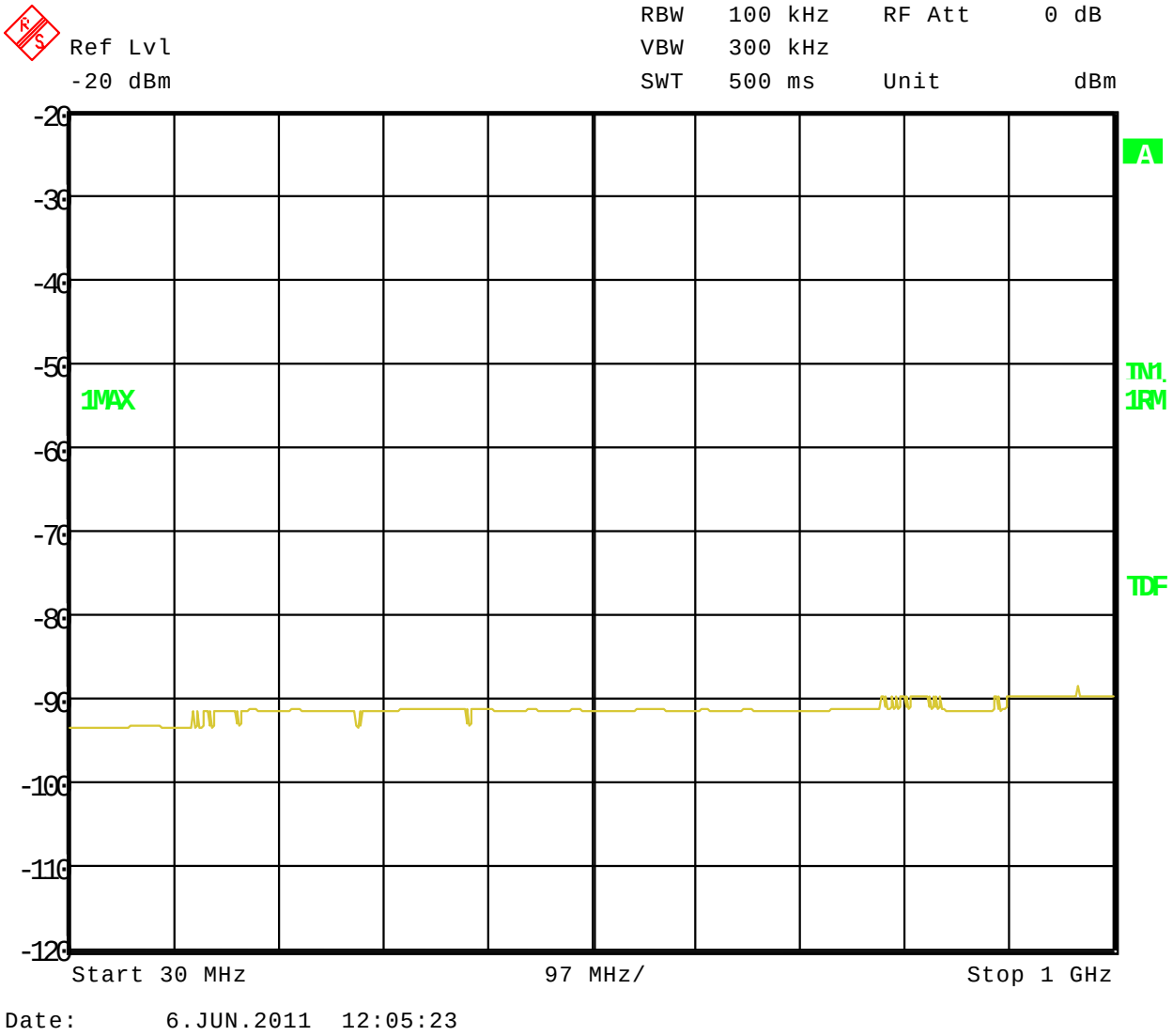
Conducted Spurious

26.5 – 40GHz



Conducted Spurious

30 – 1000 MHz



Appendix B

4.0 Radiated Fundamental Emissions in band 3100 to 10600 MHz

Rule Part:

15.519 (c) & (e)

Test Procedure:

ANSI C63.4-2009 and ANSI C63.10-2009

Limit:

EIRP in dBm
Average: -41.3
Peak: -24.4*

Results:

Compliant

Sample Equation(s):

See data

Notes:

*As per 15.521(g), limit adjusted by 20log (RBW/50) dBm where RBW is the resolution bandwidth in MHz that is employed.

EUT investigated for worst case orientation and maximized in vertical and horizontal polarization. The maximum emission was then recorded. The EUT was replaced by an antenna connected to a signal generator. The level of the signal generator was set to match the maximum emission recorded from the EUT. Once corrected for antenna gain and cable loss the EIRP was compared to the limit.

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Company: GE Medical Systems, LLC
Model Tested: 5390144 rev3
Report Number: 16995
Project Number: 4678

Band Group 1

DLS Electronic Systems, Inc.												
Company: GE Healthcare												
Operator: Adam A												
Date of test: 5-23-2011												
Temperature: 70 deg. F												
Humidity: 61% R.H.												
	Average	**Peak**										
Detector	RMS (linear)	Peak						Antenna to EUT Distance:			3 m	
RBW	1 MHz	3 MHz						Floor to EUT Height:			80 cm	
VBW	3 MHz	3MHz						Antenna Scan Height*:			1 - 4 m	
Sweep	500 ms (1 ms per point)							* EUT to remain in antenna 3dB beamwidth				
Span	550 MHz							RF Absorber lined floor				
EIRP = Signal generator output + cable loss + antenna gain												
Model: Host 84 (Band Group 1)												

Band #	Frequency (GHz)	Measurement Antenna Polarization	Limit Type	Field Strength of EUT (dBµV/m)	Antenna Height (m)	Table Azimuth (deg)	Level of Gen. when field strength equals that of EUT (dBm)	Cable loss between Gen. and Subst. Antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)
1	3.35	Horizontal	Average	55.87	1.3	180	-50.4	-2.21	9.91	-42.70	-41.3	1.4
			Peak	67.24			-39.8			-32.10	-24.4	7.7
2	3.772	Horizontal	Average	55.61	1.2	215	-50.8	-2.36	10.39	-42.77	-41.3	1.5
			Peak	66.47			-40.8			-32.77	-24.4	8.4
3	4.718	Horizontal	Average	56.35	1.1	230	-50.7	-2.48	10.85	-42.33	-41.3	1.0
			Peak	67.21			-41.1			-32.73	-24.4	8.3

166 South Carter, Genoa City, WI 53128

Company: GE Medical Systems, LLC
Model Tested: 5390144 rev3
Report Number: 16995
Project Number: 4678

Band Group 3

DLS Electronic Systems, Inc.												
Company: GE Healthcare												
Operator: Adam A												
Date of test: 5-23-2011												
Temperature: 70 deg. F												
Humidity: 61% R.H.												
	Average	**Peak**										
Detector	RMS (linear)	Peak						Antenna to EUT Distance:			3 m	
RBW	1 MHz	3 MHz						Floor to EUT Height:			80 cm	
VBW	3 MHz	3MHz						Antenna Scan Height*:			1 - 4 m	
Sweep	500 ms (1 ms per point)							* EUT to remain in antenna 3dB beamwidth				
Span	550 MHz							RF Absorber lined floor				
EIRP = Signal generator output + cable loss + antenna gain												
Model: Host 84 (Band Group 3)												

Band #	Frequency (GHz)	Measurement Antenna Polarization	Limit Type	Field Strength of EUT (dBµV/m)	Antenna Height (m)	Table Azimuth (deg)	Level of Gen. when field strength equals that of EUT (dBm)	Cable loss between Gen. and Subst. Antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)
7	6.412	Horizontal	Average	55.66	1.1	240	-52.2	-3.10	12.06	-43.24	-41.3	1.9
			Peak	67.53			-42.3			-33.34	-24.4	8.9
8	6.94	Horizontal	Average	55.49	1.2	345	-51.5	-3.30	12.00	-42.80	-41.3	1.5
			Peak	67.22			-42.1			-33.40	-24.4	9.0
9	7.513	Horizontal	Average	57.33	1.3	350	-50.3	-3.34	11.23	-42.41	-41.3	1.1
			Peak	68.59			-41.8			-33.91	-24.4	9.5

Appendix B

5.0 Radiated Spurious Emissions in GPS Band

Rule Part:

15.519 (d)

Test Procedure:

ANSI C63.4-2009and ANSI C63.10-2009

Limit:

Average limit with resolution bandwidth of no less than 1 kHz

Frequency (MHz)	EIRP in dBm
1164 – 1240	-85.3
1559 – 1610	-85.3

Results:

Compliant

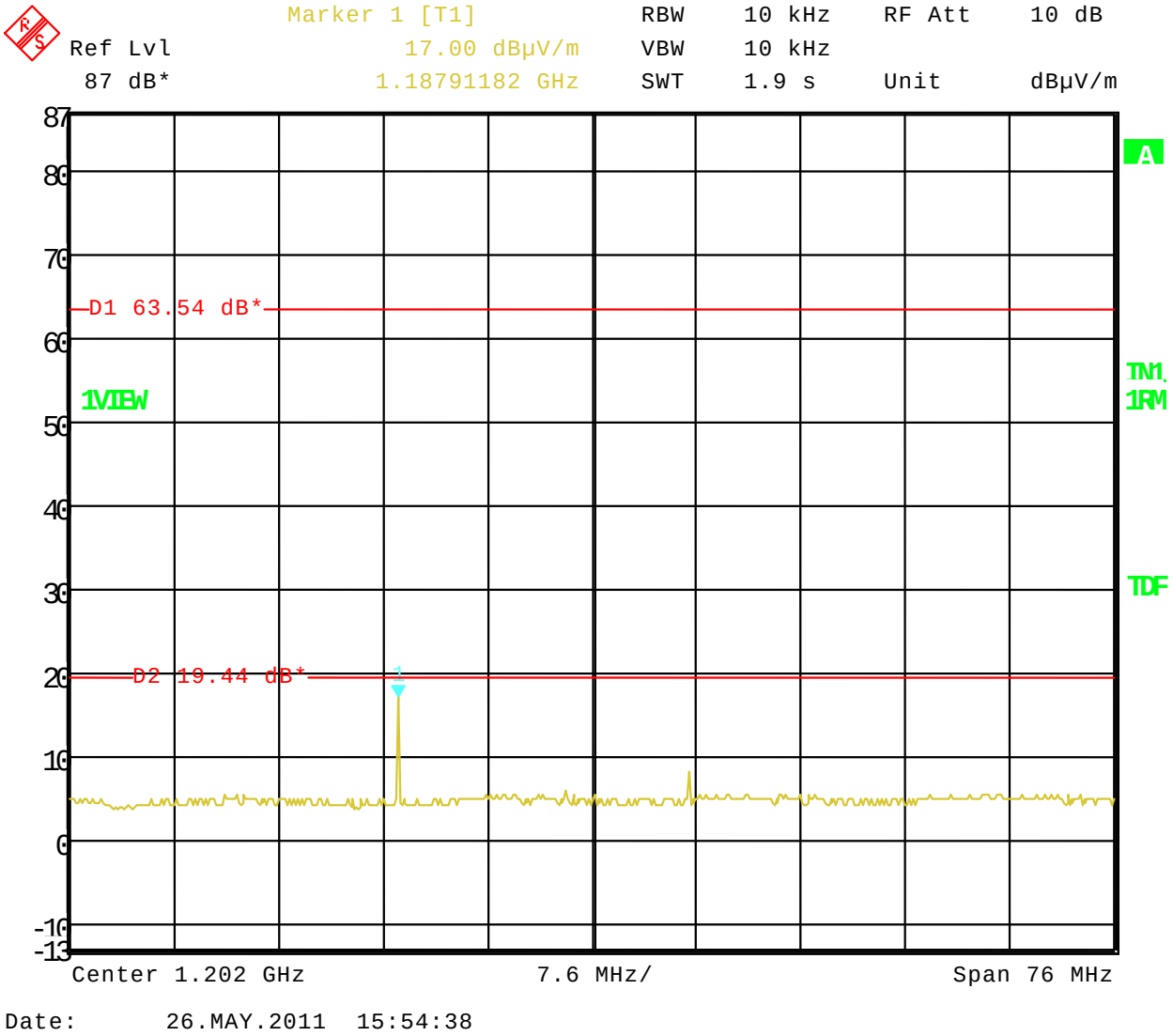
Sample Equation(s):

15.519 (e) limit @ 1 meter: -85.3 + 95.2 + 20log (3/1)
15.209 limit @ 1 meter: 63.54 dBµV/m

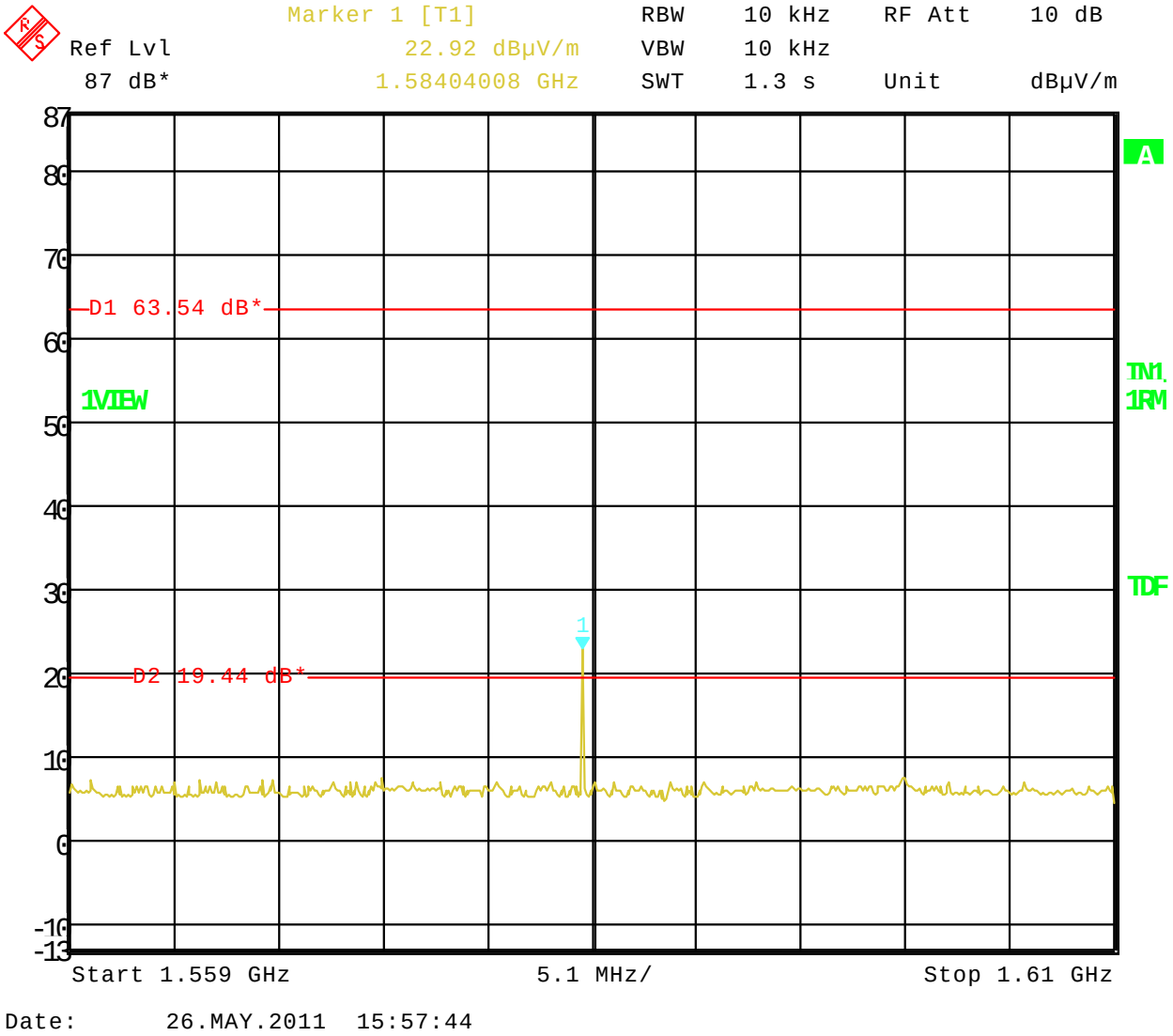
Notes:

EUT tested at 1 meter distance.
EUT was set in standby mode with no UWB transmission. The EUT was the place in transmit mode and no emissions were observed. (Emission from associated equipment not related to the function of the UWB transmission.)

GPS BAND 1.164 – 1.240 GHz



GPS BAND 1.559 – 1.61 GHz



Date: 26.MAY.2011 15:57:44

END OF REPORT

Revision #	Date	Comments	By
1.0	6-20-2011	Preliminary Release	AA
1.1	6-21-2011	Minor typo fixes	AA