

**FCC
Electromagnetic Compatibility
Test Report**

For

Wireless Mouse

Models EM550GPS and EM550GPL

**FCC ID: DGFOSDEM550GP
IC: 458A-OSDEM550GP**

3M™ OSD Division

St. Paul, MN

September 15, 2010

Report Number: F0210002

**Prepared By:
3M Regulatory Engineering and Quality
EMC Laboratory
410 Fillmore Avenue, Building 76
St. Paul, Minnesota 55144-1000**

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 2 of 40

CERTIFICATE OF COMPLIANCE

MANUFACTURER'S NAME:	3M™ Company
NAME OF EQUIPMENT:	Wireless Mouse
MODEL NUMBER(S):	EM550GPS, EM550GPL
FCC ID	DGFOSDEM550GP
IC	IC: 458A-OSDEM550GP
TEST REPORT NUMBER:	F021002
DATE OF ISSUE:	September 15, 2010

USA (FCC) - Title 47, Code of Federal Regulations (2007)
Industry Canada (IC) – ICES, RSS

EMISSIONS:

Radiated / Conducted (FCC Part 15, Subpart C)
(IC, RSS-210, RSS-GEN)

RF Exposure (FCC - Exempt)
(IC - Complies with RSS-102)

As the responsible EMC Project Engineer, I hereby declare that the equipment tested, as specified in the test report, at the 3M Product Safety EMC Laboratory is in compliance with 47 CFR, Part 15, Subpart C and Industry Canada RSS & ICES Standards. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Robert E. Heller
Senior EMC Engineer



NVLAP Lab Code 200033

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 3 of 40

TABLE OF CONTENTS

Title Page
Certificate of Compliance
Table of Contents

- 1.0 Test Summary
- 2.0 Introduction
 - 2.1 Scope
 - 2.2 EUT Description and Operation
 - 2.3 Modifications to EUT
 - 2.4 Measurement Uncertainty
- 3.0 Applicable Documents
- 4.0 Radiated Emissions
 - 4.1 Band Edge and 99% Occupied Bandwidth Measurements
 - 4.1.1 Test Criteria
 - 4.1.2 Test Results
 - 4.1.3 Occupied Bandwidth (99%)
 - 4.1.4 Test Setup Photo
 - 4.2 Spurious Emissions (30 MHz to 40 GHz)
 - 4.2.1 Test Criteria
 - 4.2.2 Test Results
 - 4.2.3 Test Setup Photo
 - 4.3 Digital Radiated Emissions (30 MHz to 40 GHz)
 - 4.3.1 Test Criteria
 - 4.3.2 Test Results
 - 4.3.3 Test Setup Photo
 - 4.4 Channel Field Strength Measurements
 - 4.4.1 Test Criteria
 - 4.4.2 Test Results
 - 4.4.3 Test Setup Photo
 - 4.5 Duty Cycle Measurement
 - 4.5.1 Duty Cycle Calculation

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 4 of 40

4.6 Human Exposure (EMF)

4.6.1 Test Criteria

4.6.2 Test Results

4.6.3 Test Setup Photo

5.0 List of Test Equipment

6.0 Labeling Information

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 5 of 40

1.0 TEST SUMMARY

Test Report Number:	F0210002
Requester:	Pam Wolf
Company:	3M Company OSD Division St. Paul, MN 55144
Telephone Number:	651-736-9907
Test Dates:	July 26, 27 and August 4, 2010
Equipment Under Test:	Wireless Mouse Models EM550GPS and EM550GPL
Date Of Receipt:	July 24, 2010
Condition upon receipt	Device was in good working condition
Test Environment:	See individual test sheets.
Test Results:	Passed the following tests: Conducted Emissions: FCC Part 15 Subpart C, IC RSS-210, RSS-Gen Radiated Emissions: FCC Part 15 Subpart C, IC RSS-210, RSS-Gen IC RSS-102
Modifications:	No modifications were required.
Test Location:	3M Product Safety EMC Laboratory Building 76-1-01 410 Fillmore Ave. St. Paul, MN 55144-1000

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 6 of 40

2.0 INTRODUCTION

2.1 Scope

This report contains results describing the conformance of the Equipment Under Test (EUT) to FCC Part 15, Subpart C and IC RSS rules for intentional radiators.

This report is the confidential property of the client and applies only to the specific item tested under the stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. This report shall not be reproduced except in full without the written approval of the testing laboratory. The appropriate testing standards and references that were used are contained in Section 3.0. Worst case test data, test configuration, and photographs (worst case configuration) are provided in Sections 4.0 and 5.0. Equipment information is contained in Section 6.0. Documentation labeling information is contained in Section 7.0.

Subsequent tests are necessary from time to time on equipment taken at random from production. Retesting of the EUT is also required when the EMC profile has been changed or is suspected of being changed.

The 3M Regulatory Engineering and Quality EMC Laboratory is recognized under the United States Department of Commerce National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of test results. Accreditation by the National Voluntary Laboratory Accreditation Program is awarded for specific services, listed on the Scope of Accreditation for: Electromagnetic Compatibility and Telecommunications FCC under Lab Code 200033. A complete copy of the Scope of Accreditation is available upon request.

The FCC Site Registration Number is 93334. The Industry Canada (IC) Site Registration Number is 458A-1.

The NVLAP accreditation or this test report does not in any way constitute or imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 7 of 40

2.2 EUT Description and Operation

The Equipment Under Test (EUT) was the 3M™ Wireless Mouse Models EM550GPS and EM550GPL. The wireless mouse is a computer peripheral used to control computer operations activated from the display. This report covers two models, EM550GPS and EM550GPL, whose only difference is size (to accommodate different hand sizes). The size difference is:

EM550GPS – 126.3mm(L), 79.4mm(W), 104.4mm(H)

EM550GPL – 127.9mm(L), 79.4mm(W), 111.9mm(H)

The RF mouse transmitter obtains new data when the motion of the mouse is detected. This data is transmitted to the computer and the cursor on the screen tracks the linear motion of the mouse. The mouse uses a 16 channel fixed frequency scheme. The mouse fixes on one channel and will switch to another channel only after encountering interference. Before the mouse switches to the next predefined channel, the mouse will send a message to the computer to inform the computer to switch to the next channel as well. The predefined channel sequence is: Ch1 2402, Ch2 2439, Ch3 2462, Ch4 2405, Ch6 2465, Ch7 2408, Ch8 2432, Ch9 2468, Ch10 2411, Ch11 2447, Ch12 2471, Ch13 2425, Ch14 2470, Ch15 2450, Ch16 2472.

The EUT has 1 antenna consisting of circuit board etching and located on the circuit board at the base of the mouse. The highest channel power output (CH16) has a measured power output level of 479 microwatts (4.0 dBm). The power out was measured by the antenna substitution method and the power out of Channels 1, 8 and 16 are shown below. The EUT is powered by two AAA batteries.

Transmit Channel	Power Out (mW)
1	0.282
8	0.275
16	0.479

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 8 of 40



Wireless Mouse

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 9 of 40

2.3 Modifications to EUT

No modifications were required.

2.4 Measurement Uncertainty

The data and test results referenced in this report are true and accurate. However, there may be deviations within the calibration limits of the test equipment and facilities that can account for deviations. The following table lists the measurement uncertainty for the emissions testing. Furthermore, EUT component and manufacturing process variables may result in additional deviation.

Emission test	Confidence (95%)	Measurement Uncertainty	CISPR Limit
Radiated Emissions (30 MHz – 5 GHz)	k=2.0	4.11 dB	5.20 dB
Conducted Emissions (150 kHz – 30 MHz)	k=2.0	3.29 dB	3.60 dB

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 10 of 40

3.0 APPLICABLE DOCUMENTS

The following documents were used as references. The dates that are referenced are the dates of the latest amendments. All 3M Test Procedures can be found in the Document Center of the SEMS QDS System.

CFR 47: 2007	Part 15 Radio Frequency Devices, Subpart B Unintentional Radiators and Subpart C, Intentional Radiators.	
CISPR 16-1	Specification for radio disturbance and immunity measuring apparatus and methods	
	-1 Measuring Apparatus	2003
	-2 Ancillary Equipment – Conducted Disturbance	2004
	-3 Ancillary Equipment – Disturbance Power	2004
	-4 Ancillary Equipment – Radiated Disturbance	2004
CISPR 16-2	Specification for radio disturbance and immunity measuring apparatus and methods	
	-1 Conducted Disturbance Measurements	2003
	-2 Measurements of Disturbance Power	2004
	-3 Radiated Disturbance Measurements	2003
CISPR 16-4	-1 Uncertainties in Standardized EMC Tests	2005
ANSI C63.4:2003	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.	
ICES-003	Industry Canada, Interference-Causing Equipment Standard, 2004 Issue 4	
RSS-GEN	Industry Canada, Radio Standards Specification Issue 2 2007	
RSS-210	Industry Canada, Radio Standards Specification Issue 7 2007	
RSS-102	Industry Canada, Radio Frequency Exposure Compliance, Issue 2 2005	
3M Test Procedure: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2		
3M Test Procedure: Radiated Emissions Test (1 GHz – 18 GHz), PBLI-6SNHFY		
3M Test Procedure: Conducted Emissions Test (150 kHz – 30 MHz), PBLI6S8LR2		
3M Test Procedure: 99% Power Bandwidth Test, PBLI-7C9JVN		

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 11 of 40

4.0 Radiated Emissions Testing

4.1 Band Edge and 99% Occupied Bandwidth Measurement

The EUT was placed in a semi-anechoic chamber and the band edge measurements were made to determine the level of electromagnetic energy radiated at the lower and upper edges of the permitted frequency band in accordance with FCC 15.249, C63.4, and C63.10.

4.1.1 Test Criteria

FCC Part 15 Subpart C, Paragraph 15.249(d) – Emissions radiated outside of the specific 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.

FCC Part 15 Subpart C, Paragraph 15.209 radiated limits at 3 meters are:

Frequency (MHz)	Distance (Meters)	QP/Avg (dB μ V/m)	Peak (dB μ V/m)
30 - 88	10	40.00	-
88 - 216	10	43.52	-
216 - 960	10	46.02	-
Above 960	10	53.98	73.98

4.1.2 Test Results

The EUT met the Band Edge requirements.

Frequency (MHz)	Average Reading	Average Limit	Peak Reading	Peak Limit
2400.0	47.64	53.98	71.89	73.98
2483.5	26.92	53.98	61.46	73.98

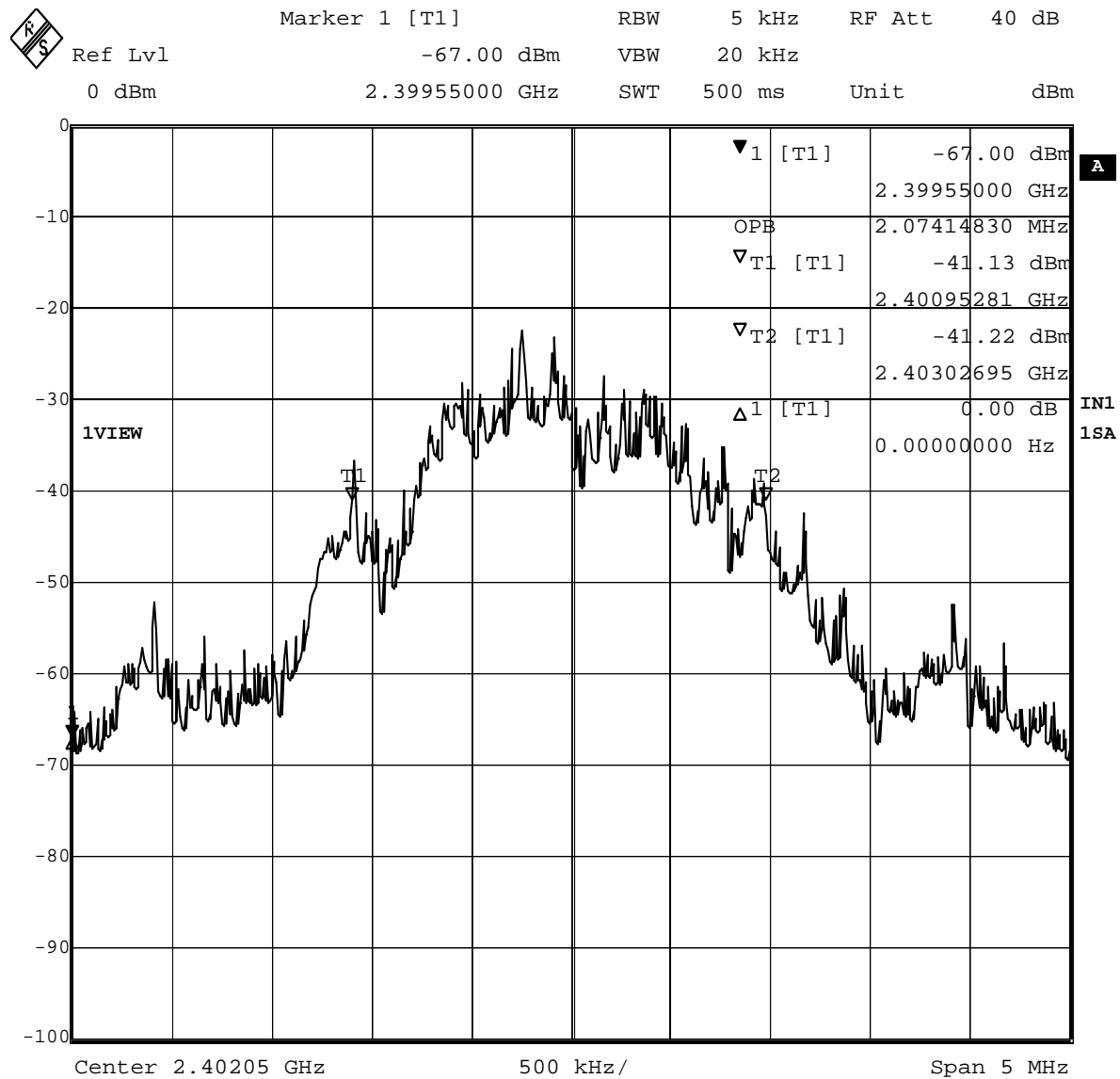
Band edges measured with a receiver bandwidth setting of 1 KHz. per ANSI C63.4 Paragraph 13.1.7.

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 14 of 40

4.1.3 Occupied Bandwidth (99%)

The Occupied Bandwidth was measured by radiated fields as the EUT had no means of connecting directly to the receiver. Channels 1, 8, and 16 were measured (2402.05 MHz, 2432.01 MHz, and 2472.01 MHz). The transmitter was operated at its maximum carrier output with modulation applied under normal test conditions. The receiver's span and bandwidths were set in accordance with Industry Canada RSS-GEN (section 4.6.1). The receiver has an internal function that can be selected for the measurement of the 99% Bandwidth, and automatic placement of the markers.

The Channel 1 had a measured occupied bandwidth of: **2.074 MHz**

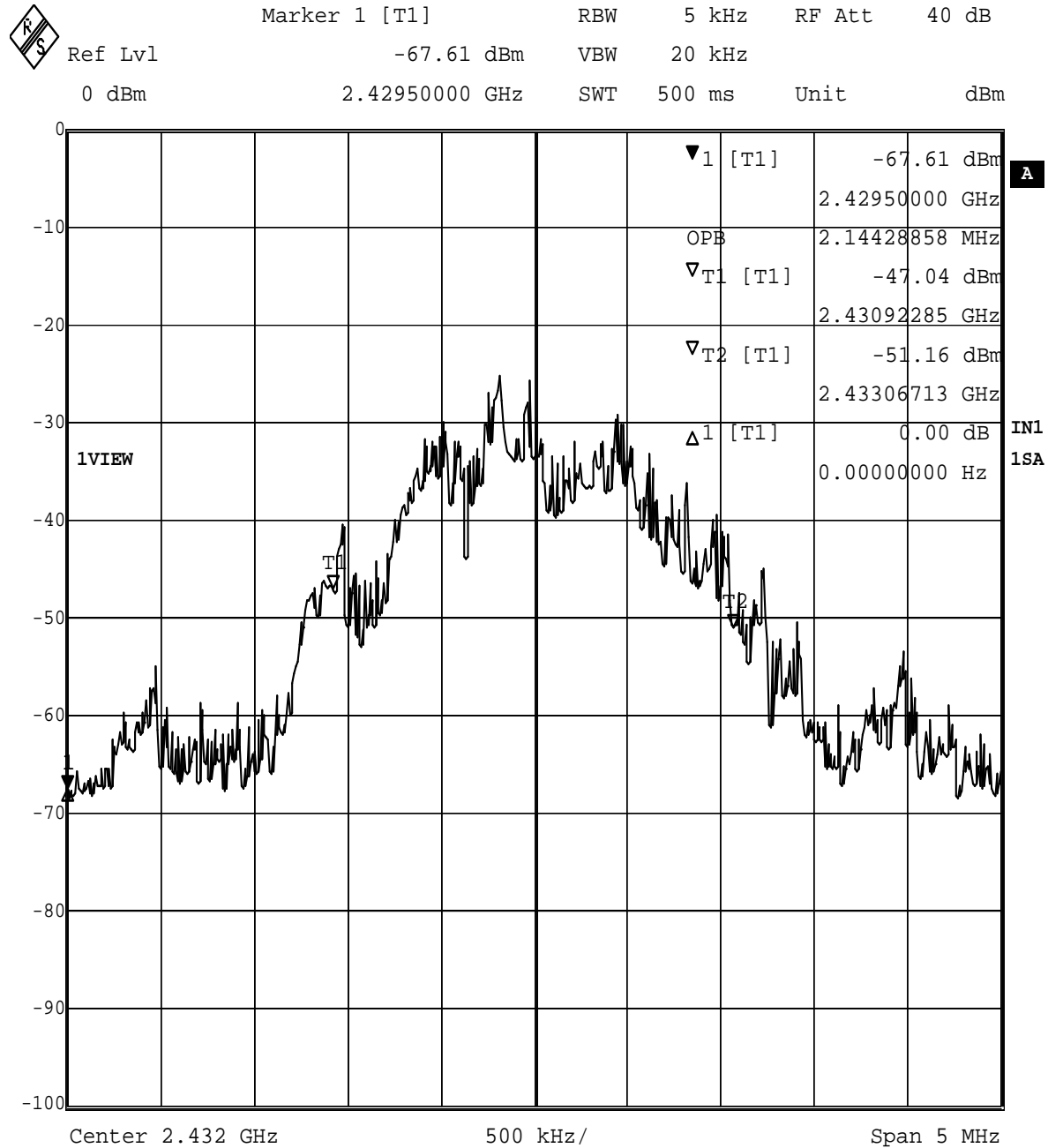


Date: 4.AUG.2010 12:25:32

Channel 1 (2402.05 MHz)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 15 of 40

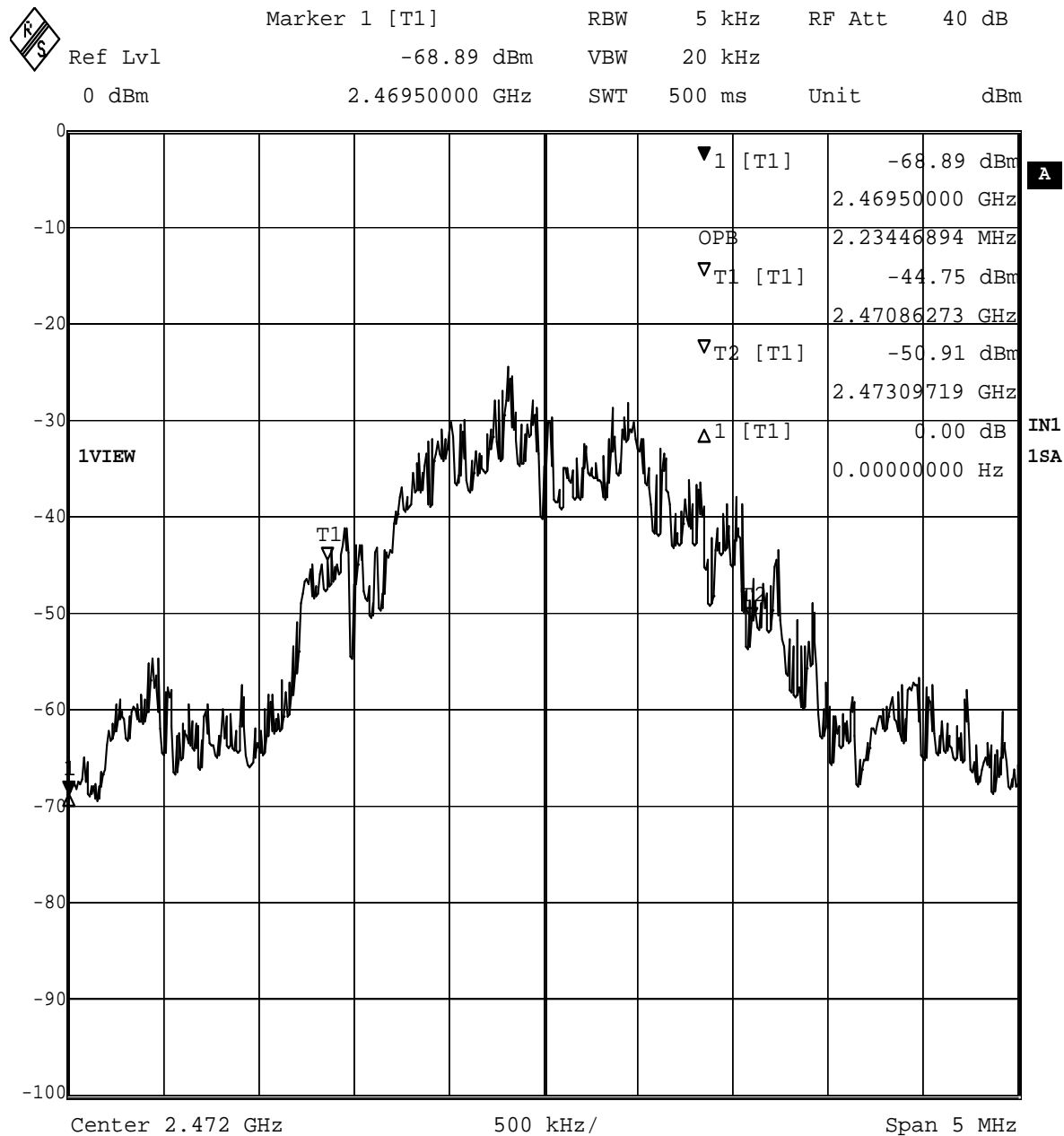
Channel 8 had a measured occupied bandwidth of: **2.144 MHz**



Date: 4.AUG.2010 12:29:40

Channel 8 (2432.01 MHz)

Channel 16 had a measured occupied bandwidth of: **2.234 MHz**



Date: 4.AUG.2010 12:34:34

Channel 16 (2472.01 MHz)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 17 of 40

4.1.4 Test Setup Photo



Band Edge and 99% Occupied Bandwidth Measurements

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 18 of 40

4.2 Spurious Emissions (30 MHz to 40 GHz.)

The EUT was placed in a semi-anechoic chamber for spurious emissions testing in accordance with ANSI C63.4, FCC Part 15, Subpart C and 3M Test Procedure: Radiated Emissions Test (30 MHz to 40 GHz), PBLI-6SHLK2. The Spurious Emission measurements were made to determine the level of spurious electromagnetic energy radiated from the EUT while in the transmit mode.

4.2.1 Test Criteria

The FCC Part 15, Subpart C radiated limits are given below.

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
30 - 88	10	29.54
88 - 216	10	33.06
216 - 960	10	35.56
960 and higher	10	43.52/63.52

4.2.2 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (30 MHz to 40 GHz.) requirements. No spurious emissions were detected above 8 GHz.

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 19 of 40

Report Number	F0210002	Date	7/27/10
EUT Name	3M Ergonomic Mouse	EUT Power	Battery
EUT Model	EM550GPS, EM550GPL	Test Std	FCC 15.249
EUT Serial #	05182010	Temperature (°C)	23 C
EUT Description	2.4GHz wireless mouse with USB receiver.	Humidity (%)	47%
Spurious Emissions 30 MHz to 1000 MHz		Air Pressure (kPa)	99.0

FREQ. (MHz)	MAXIMIZED QP SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED POSITION		REMARKS
	H/V	dBµV	dBµV	dBµV	TURNTABLE (°)	ANTENNA (M)	
550 7/26/10 sc2 V-H SE LO Channel 2402 MHz							
528.00	V	27.00	35.56	8.56	0	1.0	
588.00	V	25.00	35.56	10.56	0	1.0	
612.00	V	23.50	35.56	12.06	0	1.0	
550 7/27/10 sc3 V-H SE MID Channel 2432 MHz							
528.00	V	28.50	35.56	7.06	0	1.0	
540.00	V	25.00	35.56	10.56	0	1.0	
588.00	V	24.50	35.56	11.06	0	1.0	
550 7/27/10 sc4 V-H SE HI Channel 2472 MHz							
528.00	V	28.50	35.56	7.06	0	1.0	
588.00	V	25.00	35.56	10.56	0	1.0	
612.00	V	23.50	35.56	12.06	0	1.0	

* - All readings have the correction factors applied.

Test Engineer: Mike Schultz	Date: 27 July 2010
-----------------------------	--------------------

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 20 of 40

Report Number	F0210002	Date	8/4/10
EUT Name	3M Ergonomic Mouse	EUT Power	Battery
EUT Model	EM550GPS, EM550GPL	Test Std	FCC 15.249
EUT Serial #	05182010	Temperature (°C)	23 C
EUT Description	2.4GHz wireless mouse with USB receiver.	Humidity (%)	47%
Spurious Emissions 1 to 18 GHz		Air Pressure (kPa)	99.0

MAXIMIZED FILES: 550 8/4/10 sc1 (Channel 1 - 2.402 GHz)

FREQ. (GHz)	MAXIMIZED AVG SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	MAXIMIZED PEAK SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	TURN TABLE (degrees)	ANTENNA HEIGHT (m)
	H/V	(dBµV/ m)			H/V	(dBµV/m)				
1.201	H	31.17	43.52	12.35	H	49.21	63.52	14.31	276	1.0
2.258	H	37.36	43.52	6.16	H	58.24	63.52	5.28	48	1.0
2.545	H	34.71	43.52	9.35	H	55.02	63.52	8.50	60	1.1
4.803	H	32.29	43.52	11.23	H	51.57	63.52	11.95	207	1.1
7.205	H	35.38	43.52	8.14	H	50.33	63.52	13.19	36	1.2

MAXIMIZED FILES: 550 8/4/10 sc2 (Channel 8 - 2.432 GHz)

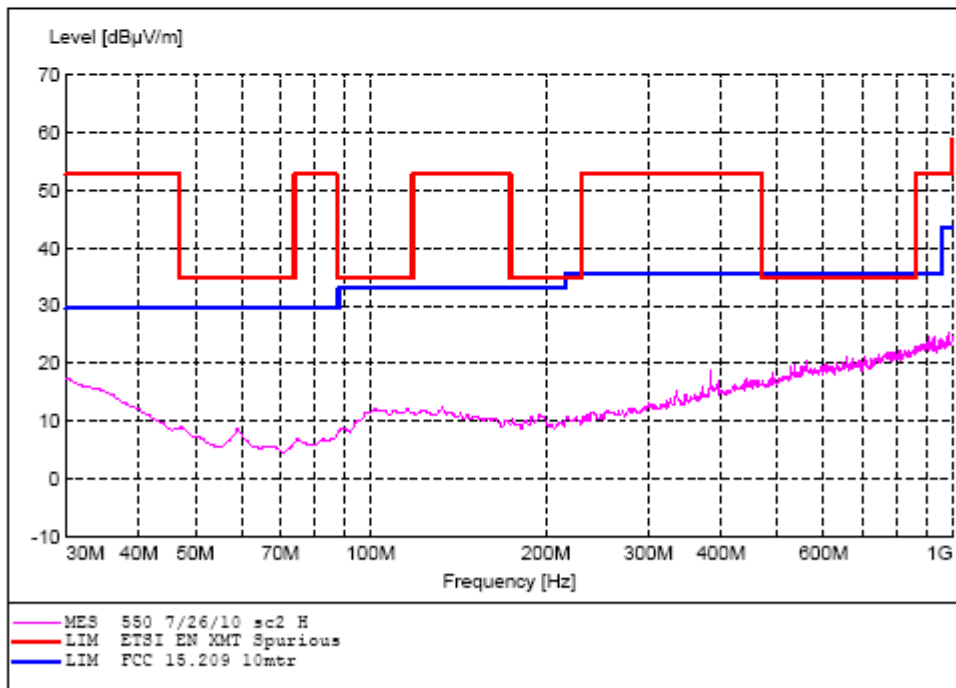
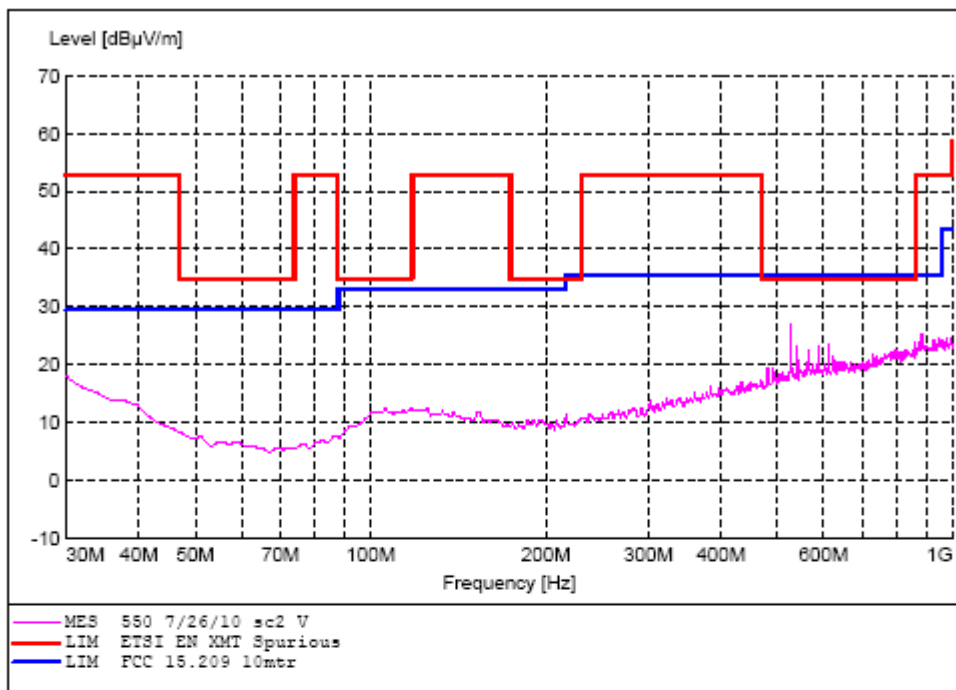
FREQ. (GHz)	MAXIMIZED AVG SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	MAXIMIZED PEAK SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	TURN TABLE (degrees)	ANTENNA HEIGHT (m)
	H/V	(dBµV/ m)			H/V	(dBµV/m)				
1.216	H	30.41	43.52	13.11	H	48.40	63.52	15.12	280	1.0
2.288	H	36.76	43.52	6.76	H	57.40	63.52	6.12	50	1.0
2.576	H	33.90	43.52	9.62	H	54.16	63.52	9.36	65	2.0
4.864	H	31.47	43.52	12.05	H	49.09	63.52	14.43	35	1.5

MAXIMIZED FILES: 550 8/4/10 sc3 (Channel 16 - 2.472 GHz)

FREQ. (GHz)	MAXIMIZED AVG SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	MAXIMIZED PEAK SIGNAL		LIMIT LINE (dBµV/m)	PASSING MARGIN (dB)	TURN TABLE (degrees)	ANTENNA HEIGHT (m)
	H/V	(dBµV/ m)			H/V	(dBµV/m)				
1.236	H	29.04	43.52	14.48	H	46.74	63.52	16.78	278	1.0
2.327	H	30.20	43.52	13.32	H	53.84	63.52	9.68	51	2.5
2.616	H	32.80	43.52	10.72	H	50.62	63.52	12.90	216	1.4
4.943	H	32.70	43.52	10.82	H	52.68	63.52	10.84	63	1.1

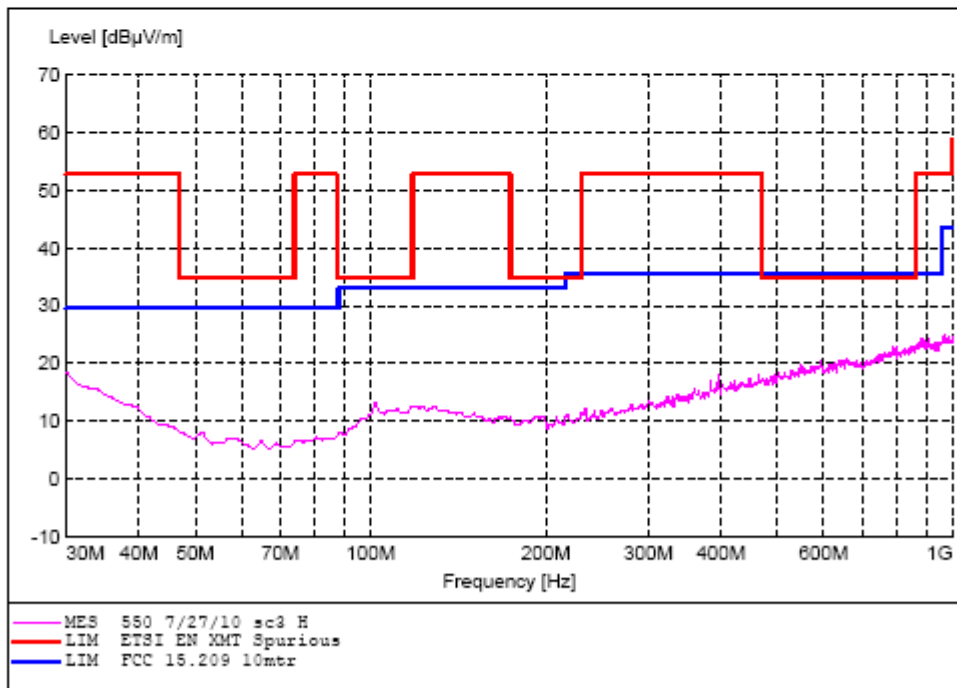
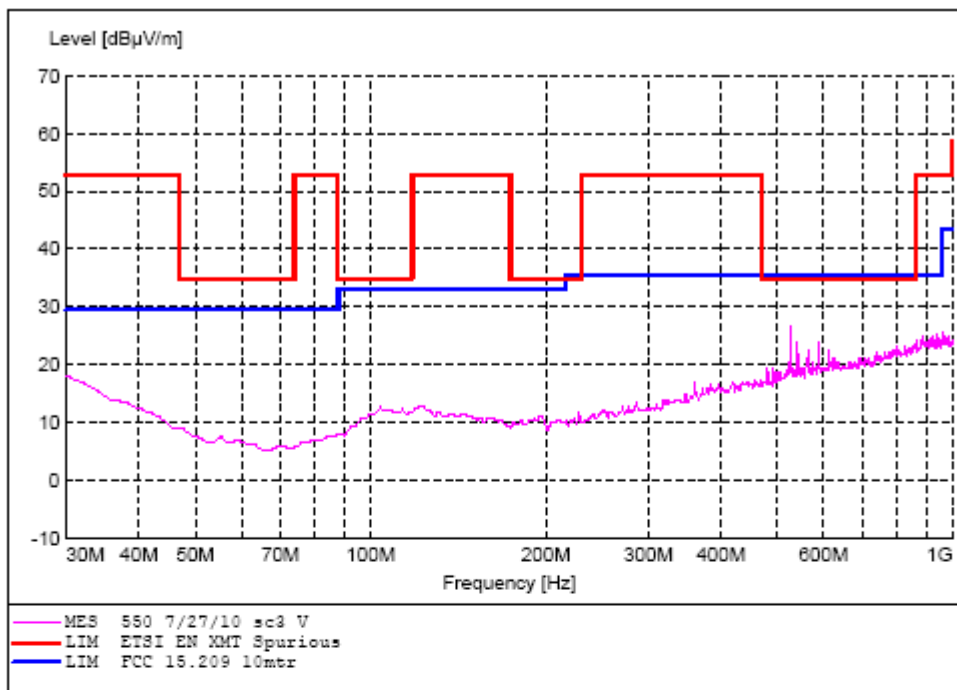
Test Engineer: Bruce Jungwirth	Date: 8/4/10
--------------------------------	--------------

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 21 of 40



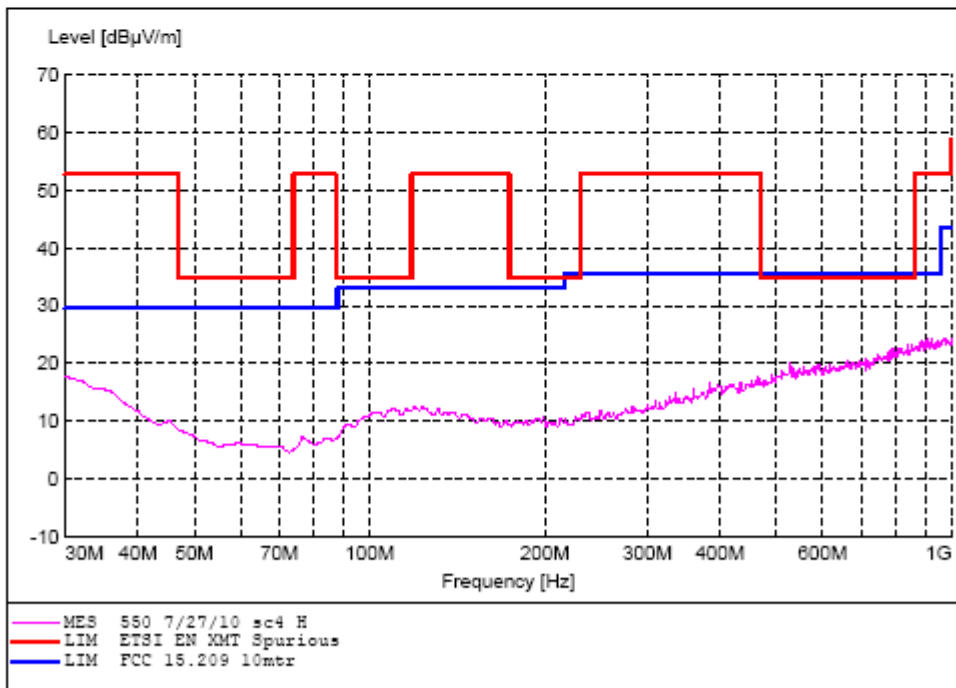
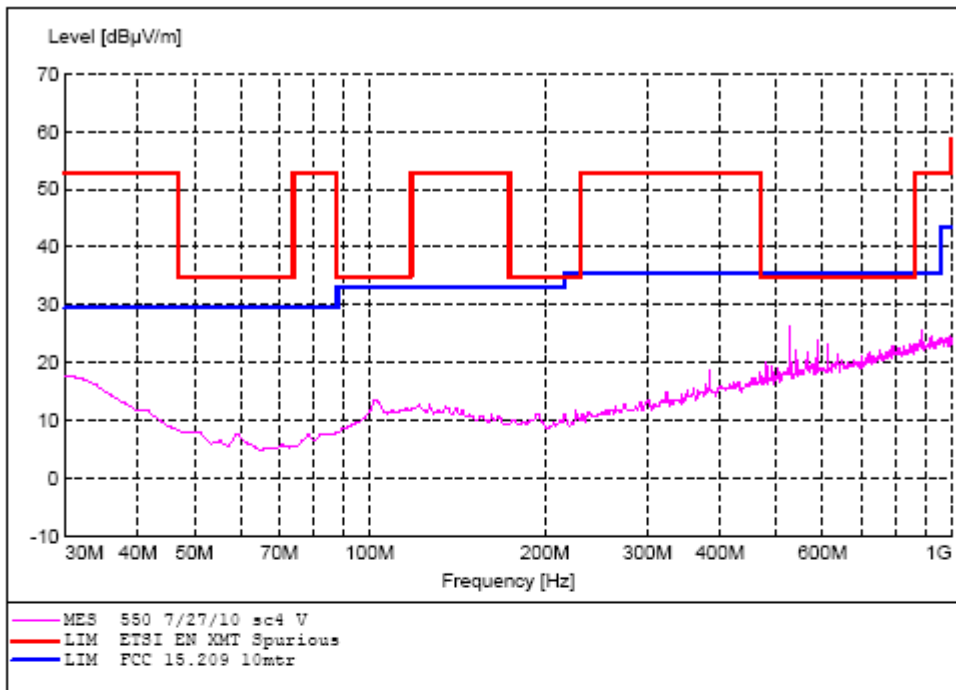
Spurious Emissions 30 to 1000 (Channel 1)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 22 of 40



Spurious Emissions 30 to 1000 (Channel 8)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 23 of 40



Spurious Emissions 30 to 1000 (Channel 16)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 24 of 40

4.2.3 Test Setup Photo



Spurious Emissions 30 MHz – 1000 MHz



Spurious Emissions 1 – 18 GHz

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 25 of 40

4.3 Digital Radiated Emissions (30 MHz – 40 GHz)

The EUT was placed in an anechoic chamber and radiated emissions testing was performed in accordance with ANSI C63.4, FCC Part 15 and 3M Test Procedures: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2, and Radiated Emissions Test (1 GHz – 5 GHz), PBLI-6SNHFY. Radiated emissions measurements were made to determine the level of electromagnetic energy radiating from the EUT.

4.3.1 Test Criteria

The FCC Class 'B' radiated limits are given below. The lower limit shall apply at the transition frequency.

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
30 - 88	10	29.54
88 - 216	10	33.06
216 - 960	10	35.56
960 - 1000	10	43.52
1000 – 40000	10	43.52 AVG 63.52 PEAK

4.3.2 Test Results

The EUT met the FCC Class 'B' radiated emission requirements. All maximized quasi-peak measurements for the EUT were below the quasi-peak limit.

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 26 of 40

Report Number	F0210002	Date	26 July 2010
EUT Name	3M Ergonomic Mouse	EUT Power	Battery
EUT Model	EM550GPS, EM550GPL	Test Std	FCC B
EUT Serial #	05182010	Temperature (°C)	23
EUT Description	2.4GHz wireless mouse with USB receiver.	Humidity (%)	43
	Digital Emissions (not transmitting)	Air Pressure (kPa)	993

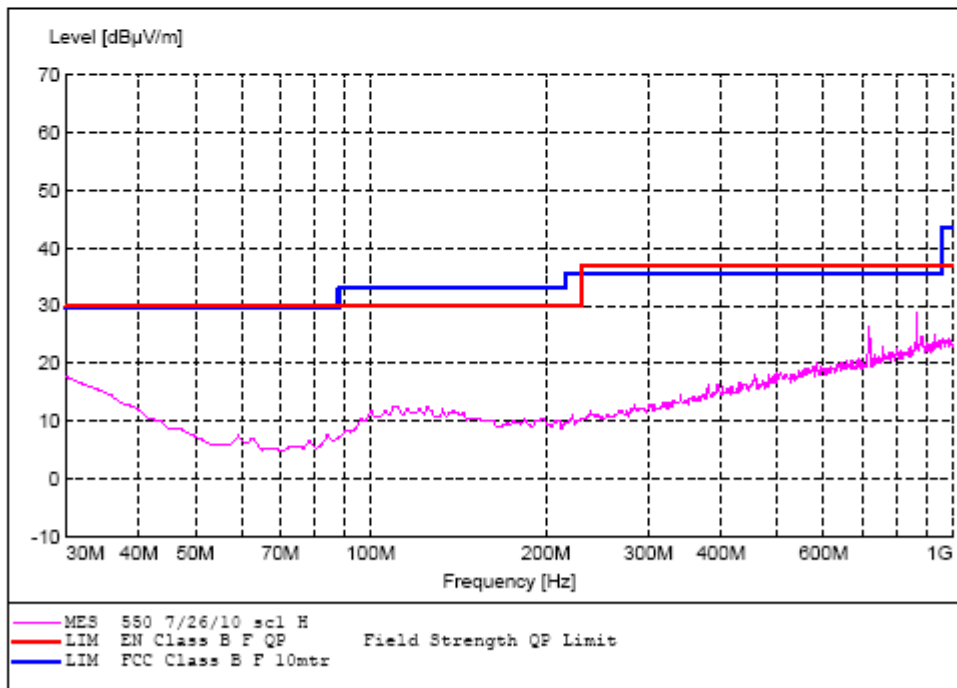
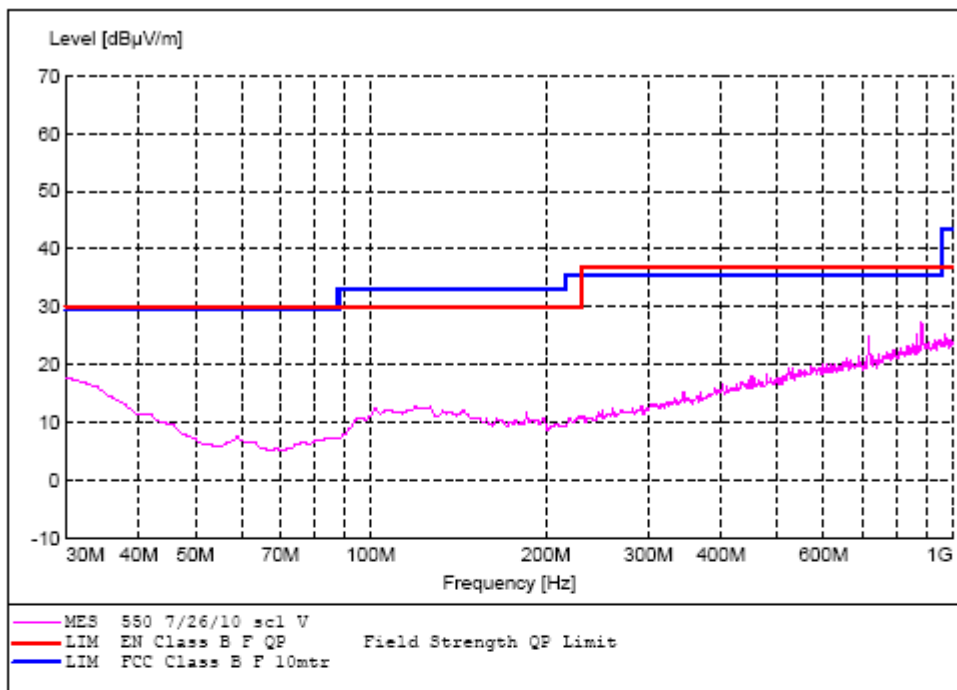
MAXIMIZED FILES 550 7/26/10 sc1 V-H

FREQ. (MHz)	MAXIMIZED QP SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED POSITION		REMARKS
	H/V	dBµV	dBµV	dBµV	TURNTABLE (°)	ANTENNA (M)	
34.00	V	13.50	29.54	16.04	0	1.0	
96.00	V	7.50	33.06	25.56	0	1.0	
110.00	V	9.00	33.06	24.06	0	1.0	
170.00	V	8.00	33.06	25.06	0	1.0	
550.00	V	16.50	35.56	19.06	0	1.0	
717.00	V	28.50	35.56	7.06	0	1.0	

* - All readings have the correction factors applied.

Test Engineer: Mike Schultz	Date: 26 July 2010
-----------------------------	--------------------

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 27 of 40



Digital Emissions (30 MHz to 1000 MHz)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 28 of 40

4.3.3 Test Setup Photo



Digital Radiated Emissions 30 to 1000 MHz

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 29 of 40

4.4 Channel Field Strength Measurement

The EUT was placed in a semi-anechoic chamber and the field strength of the fundamental of the transmit channels was measured in accordance with FCC 15.249, C63.4, and C63.10.

4.4.1 Test Criteria

FCC Part 15 Subpart C, Paragraph 15.249(a) – the field strength of the fundamental from intentional radiators shall comply with the following:

Frequency (MHz)	Distance (Meters)	Average (dB μ V/m)	Peak (dB μ V/m)
2400 – 2483.5	3	93.98	113.98

4.4.2 Test Results

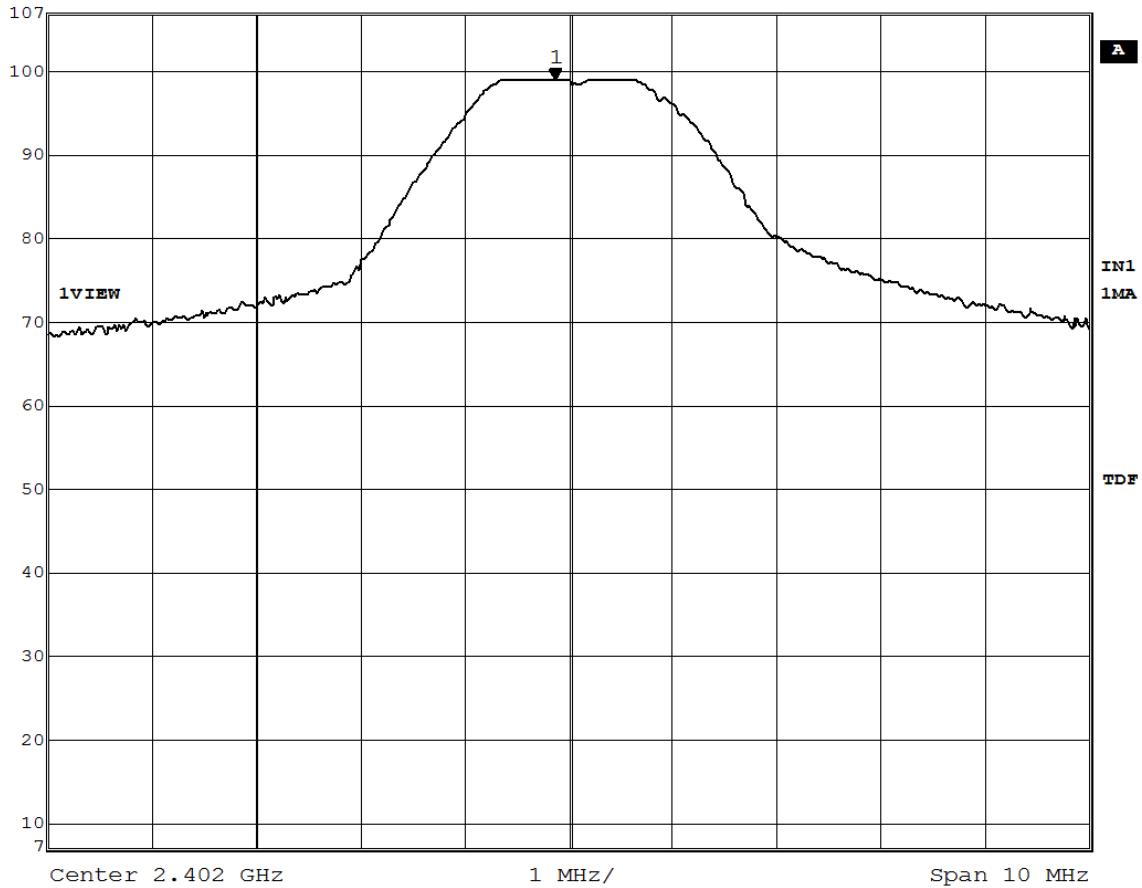
The EUT met the fundamental field strength requirements.

Frequency (MHz)	Average Reading	Average Limit	Peak Reading	Peak Limit
2402.05 (CH1)	77.73	93.98	98.55	113.98
2432.01 (CH8)	76.18	93.98	97.22	113.98
2472.01 (CH16)	76.69	93.98	98.02	113.98

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 30 of 40



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
107 dB*	98.94 dB μ V/m	VBW	3 MHz		
	2.40186974 GHz	SWT	5 ms	Unit	dB μ V/m



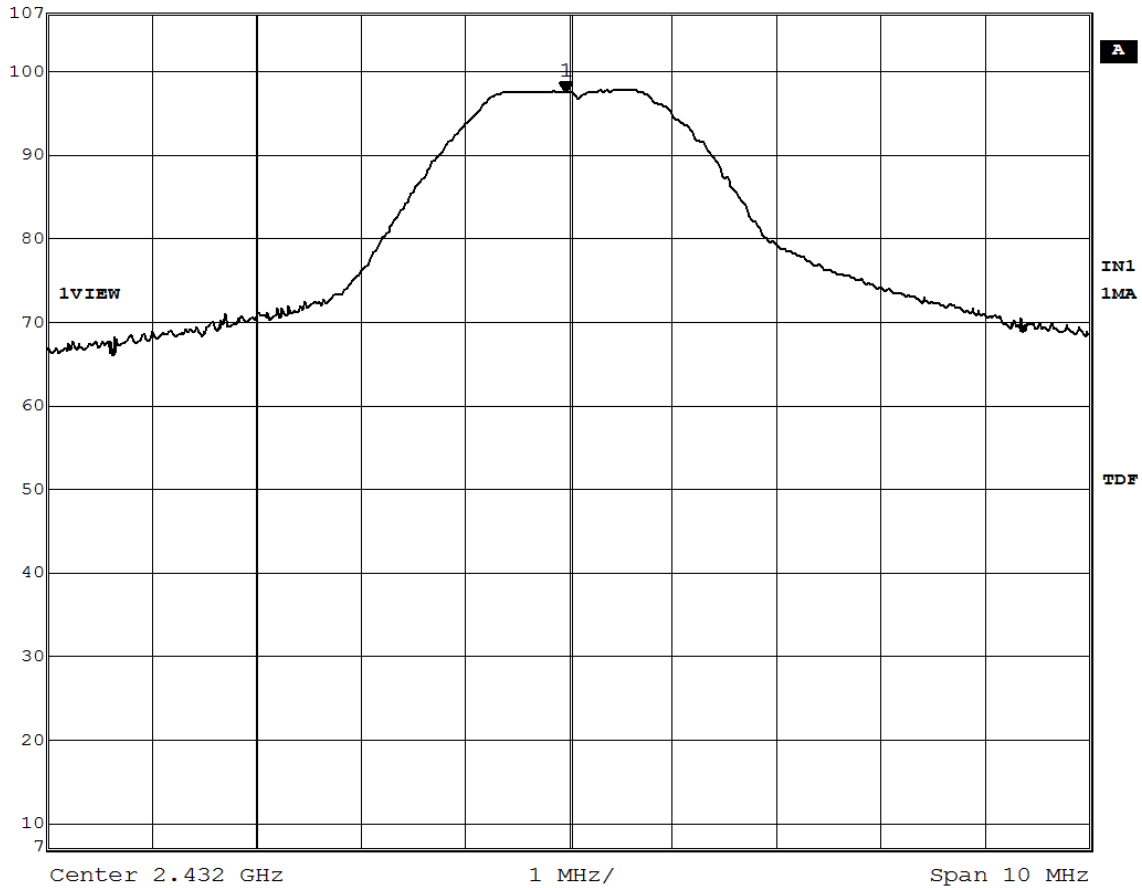
Date: 4.AUG.2010 08:09:29

Channel 1 (Peak)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 31 of 40



Marker 1 [T1] RBW 1 MHz RF Att 40 dB
 Ref Lvl 97.47 dB μ V/m VBW 3 MHz
 107 dB* 2.43196994 GHz SWT 5 ms Unit dB μ V/m



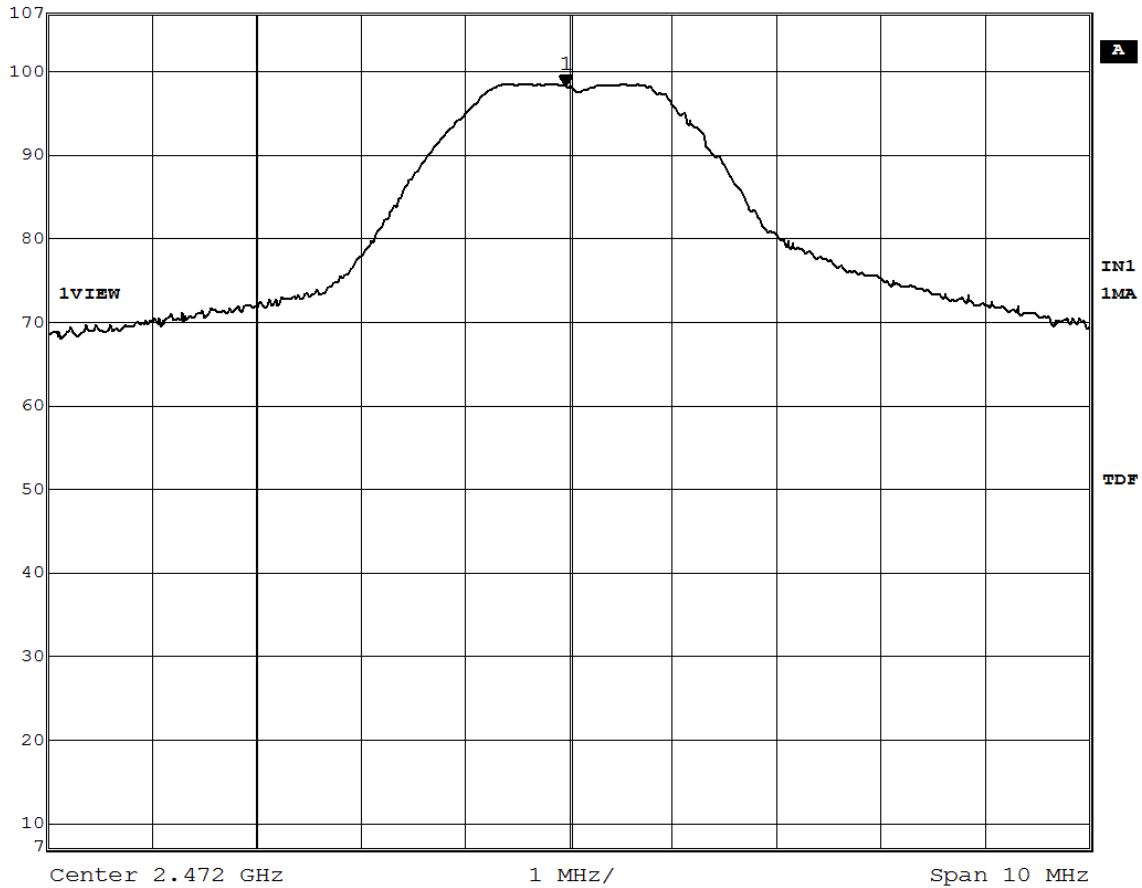
Date: 4.AUG.2010 08:28:48

Channel 8 (Peak)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 32 of 40



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
107 dB*	98.02 dB μ V/m	VBW	3 MHz		
	2.47196994 GHz	SWT	5 ms	Unit	dB μ V/m



Date: 4.AUG.2010 09:38:08

Channel 16 (Peak)

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 33 of 40

4.4.3 Test Setup Photo



Channel Field Strength Measurements

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 34 of 40

4.5 Transmit Duty Cycle Measurement

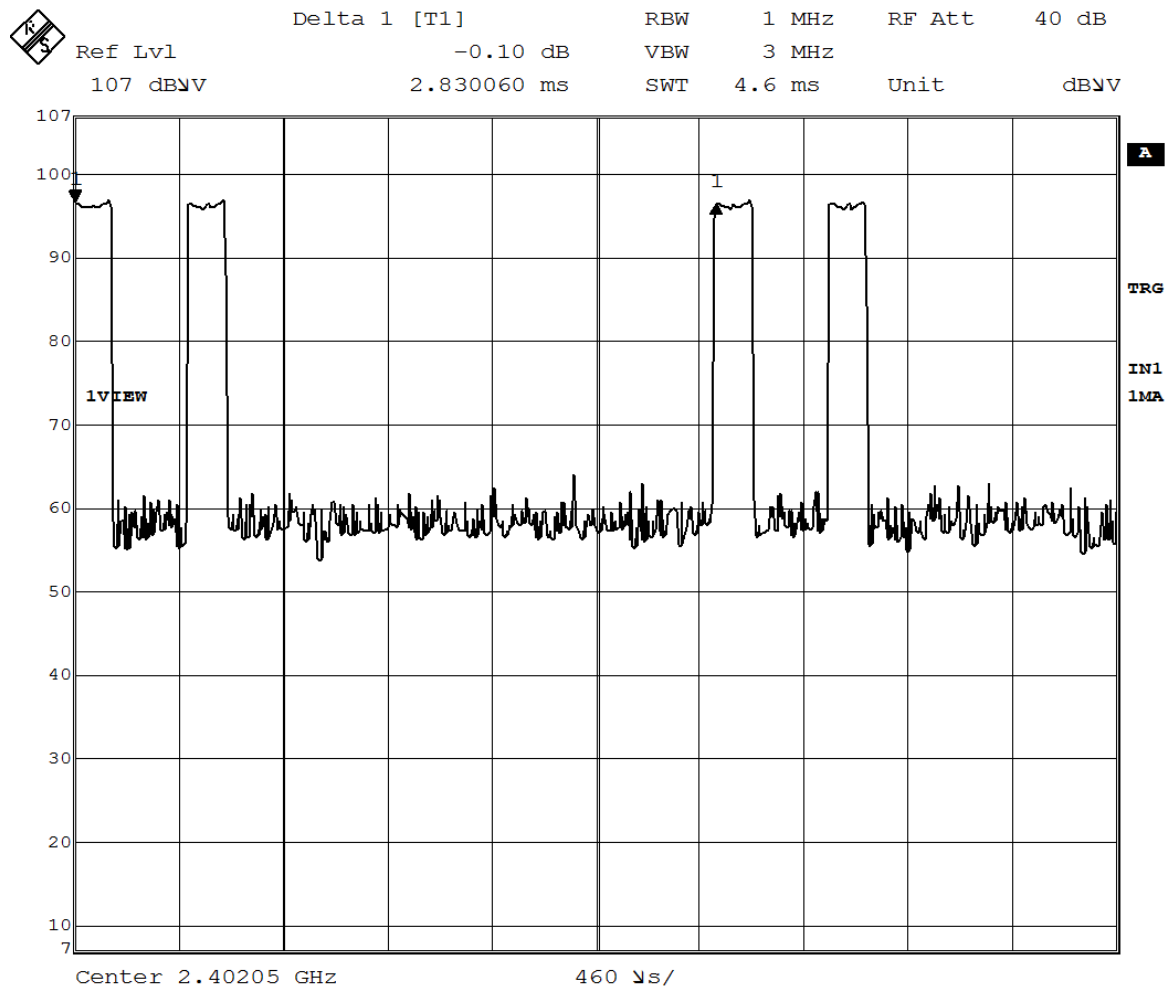
The EUT was placed in a semi-anechoic chamber and the duty cycle of transmit Channel 8 was measured in accordance with C63.4, and C63.10.

4.5.1 Duty Cycle Calculation

The formula for duty cycle is:

$$\frac{\text{Total Transmit Time}}{\text{Cycle Time}} \times 100 = \text{Duty Cycle}$$

$$\frac{0.35}{2.83} \times 100 = 12.4\%$$



Date: 4.AUG.2010 12:07:57

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 35 of 40

4.6 Human Exposure (EMF)

This procedure is for the evaluation of human exposure to electromagnetic fields (EMF) from devices containing RFID. The testing is in accordance with RSS-102 and 3M Test Procedure: EMF Test w/EMR-300, PBLI-7FAM2G.

The EUT was setup in a shielded room and measurements were made of both the electric and magnetic fields at 2.4 GHz at a distance of 10 cm around the equipment using EMF exposure meters.

4.6.1 Performance Criteria

For general public exposure, the results shall be compared with the exposure limits of paragraph 4.2 of RSS-102. For 2400 MHz, the limits are as follows:

Freq Range	V/m	A/m	W/m ²	EUT Power
2400 MHz	61.4	0.163	10	0.479 mw

4.6.2 Test Results

The EUT met the general public exposure criteria for both the electric field and the magnetic field (Channel 16 transmitting).

Test Position	Frequency	Distance	Measurement	Limit	Margin
Rear of EUT	2400 MHz	10 CM	1.14 V/m	61.4 V/m	60.26 V/m

Test Engineer: Bruce Jungwirth	Date: 10 August 2010
--------------------------------	----------------------

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 36 of 40

4.6.3 Test Setup Photo



E-Field Measurement

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 37 of 40

6.0 LIST OF TEST EQUIPMENT

The following test equipment was used to perform the indicated tests. All test equipment was calibrated by an accredited calibration laboratory or by the manufacturer. All calibration intervals are one year. All equipment calibrations, test procedures, and test facility are traceable to the standards of the National Institute of Standards and Technology (NIST). The test facility site attenuation verification results fall within the normalized site attenuation (NSA) criteria for open area test sites using volumetric measurements.

RADIATED EMISSIONS/ BAND EDGES / POWER OUTPUT

Schaffner Biconilog Antenna, Model CBL6112B, Serial No. 27491 (cal due date: 21 Oct 10)
A. H Systems Horn Antenna, Model SAS_200/571 Serial No: 234 (cal due date: 22 Oct 10)
HP Pre-Amplifier, Model 8447D, Serial No. 1937A03090 (cal due date: 21 Oct 10)
HP Pre-Amplifier, Model 83017A, Serial No. 3123A00259 (cal due date: 20 Oct 10)
Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 23 Oct 10)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

OCCUPIED BANDWIDTH

Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 23 Oct 10)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

EMF MEASUREMENT

Narda EMR 300 Exposure Meter, Model 2244/31 (cal due date: 15 Jan 11)
Narda Type 8.3 E-Probe, p/n 2244/90.21 (cal due date: 15 Jan 11)

TEST FACILITY

Lindgren Semi-Anechoic Chamber, (verification due date: 30 Nov 10)
FCC Site Registration Number: 93334
Canadian Site Registration Number: 458A-1

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 38 of 40

7.0 LABELING INFORMATION

The following labeling information is required by the FCC (Federal Communications Commission) and IC (Industry Canada) for Class A digital devices. Since the equipment contains both intentional and unintentional radiators, it must be labeled as a digital device and as an intentional radiator.

Labels on the Product

The following statements shall be placed in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**FCC ID: DGFOSDEM550GP
IC ID: 458A-OSDEM550GP**

"This Class A digital apparatus complies with Canadian ICES-003."

"Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada."

Statements in the Manuals

The following statement shall be placed in a prominent location in the text of the user manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

FCC ID: DGFOSDEM550GP

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 39 of 40

NO MODIFICATIONS. Modifications to this device shall not be made without the written consent of 3M, Company. Unauthorized modifications may void the authority granted under Federal Communications Commission and Industry Canada Rules permitting the operation of this device.

"This Class A digital apparatus complies with Canadian ICES-003."

"Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada."

IC ID: 458A-OSDEM550GP

3M	Wireless Mouse EM550GP	Report # F0210002	3M
EMC Laboratory	Reg. Eng. And Quality	September 15, 2010	Page 40 of 40

This is the last page of the Test Report