

**FCC and IC
Electromagnetic Compatibility
Test Report**

For

**3M™ RTE8000HS and RTE8450HS
Full Page Reader**

**FCC ID: DGF-SSDRTE8000
IC: 458A-SSDRTE8000**

3M™ Security Systems Division

St. Paul, MN

May 25, 2010

Report Number: F0410001

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

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 2 of 52

CERTIFICATE OF COMPLIANCE

MANUFACTURER'S NAME:	3M™ Company
NAME OF EQUIPMENT:	Full Page Reader
MODEL NUMBER(S):	RTE8000HS and RTE8450HS
FCC ID	DGF-SSDRTE8000
IC ID	458A-SSDRTE8000
TEST REPORT NUMBER:	F0410001
DATE OF ISSUE:	May 26, 2010

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

EMISSIONS:

Radiated / Conducted (FCC Part 15, Subpart B, Class A)
(IC, ICES-003)

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 B and 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	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 3 of 52

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	Frequency Stability
4.1.1	Test Procedure
4.1.2	Test Criteria
4.1.3	Test Results
4.1.4	Test Setup Photo
4.2	Emissions Bandwidth
4.2.1	Test Procedure
4.2.2	Test Criteria
4.2.3	Test Results
4.2.4	Test Setup Photo
4.2.5	99% Occupied Bandwidth Test Procedure and Test Results
4.3	Spurious Emissions (9KHz to 30 MHz)
4.3.1	Test Procedure
4.3.2	Test Criteria
4.3.3	Test Results
4.3.4	Test Setup Photo
4.4	Spurious Emissions (30 MHz to 1000 MHz)
4.4.1	Test Procedure
4.4.2	Test Criteria
4.4.3	Test Results
4.4.4	Test Setup Photo

	RTE8000HS RTE8450HS	Report # F0410001	
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 4 of 52

- 4.5 Radiated Emissions (30 MHz - 40 GHz)
 - 4.5.1 Test Procedure
 - 4.5.2 Test Criteria
 - 4.5.3 Test Results
 - 4.5.4 Test Setup photo

- 4.6 Human Exposure (EMF)
 - 4.6.1 Test Procedure
 - 4.6.2 Test Criteria
 - 4.6.3 Test Results
 - 4.6.4 Test Setup Photo

- 5.0 Conducted Emissions
 - 5.0.1 Test Procedure
 - 5.0.2 Test Criteria
 - 5.0.3 Test Results
 - 5.0.4 Test Setup Photo



- 6.0 List of Test Equipment

- 7.0 Labeling Information

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 5 of 52

1.0 TEST SUMMARY

Test Report Number:	F0410001
Requester:	Parfes Mohammed
Company:	3M Company Security Systems Division St. Paul, MN 55144
Telephone Number:	*8 011-44-1635-264112
Test Dates:	April 26, 27, 28, 29, 30, 2010
Equipment Under Test:	Full Page Reader Models RTE8000HS and RTE8450HS
Date Of Receipt:	Dec 21, 2010
Condition upon receipt	Device was in good working condition
Test Environment:	See individual test sheets.
Test Results:	Passed the following tests: Radiated Emissions: FCC Part 15 Subpart B, ICES-003 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

	RTE8000HS RTE8450HS	Report # F0410001	
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 6 of 52

2.0 INTRODUCTION

2.1 Scope

This report contains results describing the conformance of the Equipment Under Test (EUT) to FCC Part 15, Subpart B and IC ICES-003 rules for unintentional radiators and 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. Equipment information is contained in Section 5.0. Documentation labeling information is contained in Section 6.0.

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	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 7 of 52

2.2 EUT Description and Operation

The Equipment Under Test (EUT) was the 3M™ Full Page Reader, Models RTE8000HS and RTE8450HS. The Full Page Reader is used to read passport and other security documents. The scanner has several modes of reading including IR, UV, visible light, and RFID. In RFID mode, the reader has a transmit frequency of 13.5602 MHz. The EUT has two integral antennas. Both antennas are etched onto a board located just under the glass with the front antenna having dimensions of 4" x 9" (36 square inches) and the back antenna being 8" x 9" (72 square inches). The antennas are integral and are connected to the reader via PC board etchings. The EUT was tested while exercising all functions and at an input power of 120 VAC, 60 Hz.

Two models were tested, the RTE8000HS and the RTE8450HS. Both models use the same RFID reader and antennas. The difference between the two is that the RTE8000HS uses red, green, and blue LEDs for visible light while the RTE8450HS uses white LEDs.



Model 8000 Full Page Reader

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 8 of 52



Model 8450 Full Page Reader

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 9 of 52

2.3 Modifications to EUT

No modifications were required on the EUT. However, the USB cable supplied with the EUT had an attached ferrite.

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	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 10 of 52

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	2006
	-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
	-2 Uncertainty in EMC Measurements	2003
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.	
ICES-003	Industry Canada, Interference-Causing Equipment Standard, Issue 4, 2004	
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 4, 2010	
3M Test Procedure: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2		
3M Test Procedure: Radiated Emissions Test (1 GHz – 5 GHz), PBLI-6SNHFY		
3M Test Procedure: Conducted Emissions Test (0.15 MHz – 30 MHz), PBLI-6S8LR2		
3M Test Procedure: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM		
3M Test Procedure: 99% Power Bandwidth Test, PBLI-7C9JVN		
3M Test Procedure: Frequency Stability Test, PBLI-7REHQV		
3M Test Procedure: EMF Test w/EMR-300, PBLI-7FAM2G		

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 11 of 52

4.0 Radiated Emissions Testing

The EUT was placed in an anechoic chamber and radiated emissions testing was performed in accordance with FCC Part 15, ICES-003, and 3M Test Procedures: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2, Radiated Emissions Test (1 GHz – 5 GHz), PBLI-6SNHFY, and 13.56 MHz RFID Emissions Test, PBLI-6WHLEM. Radiated emissions measurements were made to determine the level of electromagnetic energy radiating from the EUT.

4.1 Frequency Stability

The Frequency Stability testing was performed in accordance with RSS-210, ANSI C63.4, FCC Part 15.225(e), and 3M Test Procedure PBLI-7REHQV to insure that the intentional radiator carrier frequency stability was within the allowable limits for input power and temperature variations.

4.1.1 Test Procedure

The frequency stability was measured using the radiated signals from the EUT so that the measurement equipment would not load the radio frequency circuits. A frequency counter was used for the frequency stability measurements. A close field probe was attached to the counter and placed near the antenna of the reader for measurement. The frequency was measured while the input voltage was varied over the required voltage range and the ambient air temperature was varied over the required ambient temperature range. Measurements were taken at startup and at 2, 5, and 10 minutes after startup at each test condition.

4.1.2 Test Criteria

The IC/FCC Part 15, Subpart C for Frequency Stability Limits versus Supply Voltage are given as:

Carrier Frequency (MHz)	Voltage Range % of Nominal Supply (85 % and 115 %)	Max. Frequency Change (%)
13.56	102 and 138 VAC	+/- 0.01 %

The IC/FCC Part 15, Subpart C for Frequency Stability Limits versus Temperature is given as:

Carrier Frequency (MHz)	Temperature Range (degrees C)	Max. Frequency Change (%)
13.5602	-20 to +50	+/- 0.01 %

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 12 of 52

4.1.3 Test Results

The EUT met all FCC Part 15, Subpart C frequency stability requirements.

Frequency Stability Data Sheet

Folder: 0410001
Model: RTE 8450HS
Date: 3 June 2010

Measurement	Startup	2 Minutes	5 Minutes	10 Minutes
120 V (+20°C)	13.5602	13.5602	13.5602	13.5602
102 V (+20°C)	13.5602	13.5602	13.5602	13.5602
138 V (+20°C)	13.5602	13.5602	13.5602	13.5602
+50°C (120 V)	13.5601	13.5601	13.5602	13.5602
-20°C (120 V)	13.5602	13.5602	13.5602	13.5602

Note: For 13.56 MHz RFID transmitters, the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency (± 135.6 kHz).

Engineer: Mike Schultz & Bruce Jungwirth

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 13 of 52

4.1.3 Test Setup Photos



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 14 of 52

4.2 Emission Bandwidth

The EUT was placed in a semi-anechoic chamber and the Emission Bandwidth testing was performed in accordance with ANSI C63.4, FCC Part 15.225 and 3M Test Procedure: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM. The Emission Bandwidth measurements were made to determine the intentional radiator frequency and determine the level of electromagnetic energy radiated at that frequency and at the band edges from the EUT.

4.2.1 Test Procedure

A loop measurement antenna was positioned at a distance of 5 meters from the center of the EUT (to insure far field measurements). An EMI receiver was used for the emissions measurements. Initial sweep measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. The intentional radiator frequency and band edge frequencies utilizing quasi-peak detection were then maximized. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling at least every 4 degrees). Then the antenna, which was fixed at 1 meter height, was rotated until the highest emissions levels found. Measurement results were automatically calculated via software running the EMI receiver. The final quasi-peak measurements recorded were determined by the following formula: Result (dB μ V/m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

4.2.2 Test Criteria



The FCC Part 15 Subpart C, Paragraph 15.225 Carrier Frequency Limits are given as:

Lower Band Edge: 13.553 MHz
Upper Band Edge: 13.567 MHz

The FCC Part 15, Subpart C radiated limits are given as:

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
1.705 to 13.110	10	48.62
13.110 to 13.410	10	59.58
13.410 to 13.553	10	69.55
13.553 to 13.567	10	103.00
13.567 to 13.710	10	69.55
13.710 to 14.010	10	59.58
14.010 to 30.000	10	48.62

Note: 40 dB/decade extrapolation factor was used per 15.31.

	RTE8000HS RTE8450HS	Report # F0410001	
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 15 of 52

4.2.3 Test Results

The EUT met the FCC Part 15, Subpart C Emission Bandwidth requirements. The intentional radiator frequencies were within the allowed band and all maximized quasi-peak measurements for the EUT were below the quasi-peak limits.

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 16 of 52

Product Model: **RTE 8450HS Front Antenna**

Report Number: **0410001**

Report Number	F0410001	Date	30 April 2010
EUT Name	Passport Scanner	EUT Power	120 VAC / 60 Hz
EUT Model	RTE8450 HS	Test Std	FCC
EUT Serial #	5RH11138	Temperature (°C)	23
EUT Description	Passport Scanner	Humidity (%)	30
Front Antenna		Air Pressure (kPa)	98.7

Carrier Frequency 13.5602 Turntable Degrees 95°
Output Power _____ Loop Angle Y + 3° CW

PLOTS

Frequency Range	B/W	Type	Filename
13.00 - 14.10 MHz	9 kHz	Modulation Sweep	8450 4/30/10 sc1 Y
13.55 - 13.57 MHz	9 kHz	QP Modulation Scan	
13.55 - 13.57 MHz	1 kHz	QP Modulation Scan	
12.00 - 30.00 MHz	9 kHz	Spurious Below 30 MHz	8450 4/30/10 sc2 Y
9.00 kHz - 30.00 MHz	Multiple		
30 - 1000 MHz	120 kHz	with RFID	
30 - 1000 MHz	120 kHz	without RFID	
1.00 - ?? GHz	1 MHz	with RFID	
1.00 - ?? GHz	1 MHz	without RFID	
150 kHz - 30 MHz	9 kHz	AC line, with RFID	

MODULATION SPECTRUM MASK

Frequency	B/W	QP H-Field FCC and EU Limits @ 10 m		QP Level
13.5603 MHz	9 kHz	FCC 103 dBµV/m	EU 60 dBµA/m or 111.5 dBµV/m	67.08
13.553 MHz	1 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	15.83
13.567 MHz	1 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	16.20
13.5485 MHz	9 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	41.83
13.5715 MHz	9 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	42.69
13.41 MHz	1 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	1.68
13.71 MHz	1 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	3.82
13.4055 MHz	9 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	21.27
13.7141 MHz	9 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	21.82
13.11 MHz	1 kHz	FCC 48.6 dBµV/m		1.18
14.01 MHz	1 kHz	FCC 48.6 dBµV/m		0.61
13.1055 MHz	9 kHz	FCC 48.6 dBµV/m		14.72
14.0145 MHz	9 kHz	FCC 48.6 dBµV/m		14.73

HARMONICS

	Measured Frequency	Limit	QP Level
2 nd	27.12 MHz	27.1202	EU -3.5 dBµA/m or 48 dBµV/m
3 rd	40.68 MHz		250 nW or 52.8 dBµV/m
4 th	52.24 MHz		4 nW or 34.8 dBµV/m
5 th	67.80 MHz		4 nW or 34.8 dBµV/m
7 th	94.92 MHz		4 nW or 34.8 dBµV/m
8 th	108.48 MHz		4 nW or 34.8 dBµV/m
9 th	122.04 MHz		250 nW or 52.8 dBµV/m
10 th	135.60 MHz		250 nW or 52.8 dBµV/m

OTHER SPURIOUS EMISSIONS

Frequency	Limit	QP Level
13.774 MHz	48 dBµV/m	23.36 dBµV/m

Test Engineer: Mike Schultz

Date: 3 May 2010

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 17 of 52

Report Number	F0410001	Date	3 May 2010
EUT Name	Passport Scanner	EUT Power	120 VAC / 60 Hz
EUT Model	RTE8450 HS	Test Std	FCC
EUT Serial #	5RH11138	Temperature (°C)	23
EUT Description	Passport Scanner	Humidity (%)	30
	Rear Antenna	Air Pressure (kPa)	98.7

Product Model: **RTE 8450HS** Rear Antenna Report Number: **0410001**
Carrier Frequency 13.5601 Turntable Degrees 106°
Output Power _____ Loop Angle Y + 3° CW

PLOTS

Frequency Range	B/W	Type	Filename
13.00 - 14.10 MHz	9 kHz	Modulation Sweep	8450 5/3/10 sc1 Y
13.55 - 13.57 MHz	9 kHz	QP Modulation Scan	
13.55 - 13.57 MHz	1 kHz	QP Modulation Scan	
12.00 - 30.00 MHz	9 kHz	Spurious Below 30 MHz	8450 4/30/10 sc3 Y
9.00 kHz - 30.00 MHz	Multiple		
30 - 1000 MHz	120 kHz	with RFID	
30 - 1000 MHz	120 kHz	without RFID	
1.00 - ?? GHz	1 MHz	with RFID	
1.00 - ?? GHz	1 MHz	without RFID	
150 kHz - 30 MHz	9 kHz	AC line, with RFID	

MODULATION SPECTRUM MASK

Frequency	B/W	QP H-Field FCC and EU Limits @ 10 m		QP Level
13.5603 MHz	9 kHz	FCC 103 dBµV/m	EU 60 dBµA/m or 111.5 dBµV/m	67.70
13.553 MHz	1 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	14.12
13.567 MHz	1 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	14.27
13.5485 MHz	9 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	42.12
13.5715 MHz	9 kHz	FCC 69.6 dBµV/m	EU 9 dBµA/m or 60.5 dBµV/m	42.88
13.41 MHz	1 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	2.92
13.71 MHz	1 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	3.29
13.4055 MHz	9 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	26.97
13.7141 MHz	9 kHz	FCC 59.6 dBµV/m	EU -3.5 dBµA/m or 48 dBµV/m	26.96
13.11 MHz	1 kHz	FCC 48.6 dBµV/m		1.18
14.01 MHz	1 kHz	FCC 48.6 dBµV/m		0.61
13.1055 MHz	9 kHz	FCC 48.6 dBµV/m		14.56
14.0145 MHz	9 kHz	FCC 48.6 dBµV/m		15.01

HARMONICS

	Measured Frequency	Limit	QP Level
2 nd	27.12 MHz	27.1202	EU -3.5 dBµA/m or 48 dBµV/m
3 rd	40.68 MHz		250 nW or 52.8 dBµV/m
4 th	52.24 MHz		4 nW or 34.8 dBµV/m
5 th	67.80 MHz		4 nW or 34.8 dBµV/m
7 th	94.92 MHz		4 nW or 34.8 dBµV/m
8 th	108.48 MHz		4 nW or 34.8 dBµV/m
9 th	122.04 MHz		250 nW or 52.8 dBµV/m
10 th	135.60 MHz		250 nW or 52.8 dBµV/m

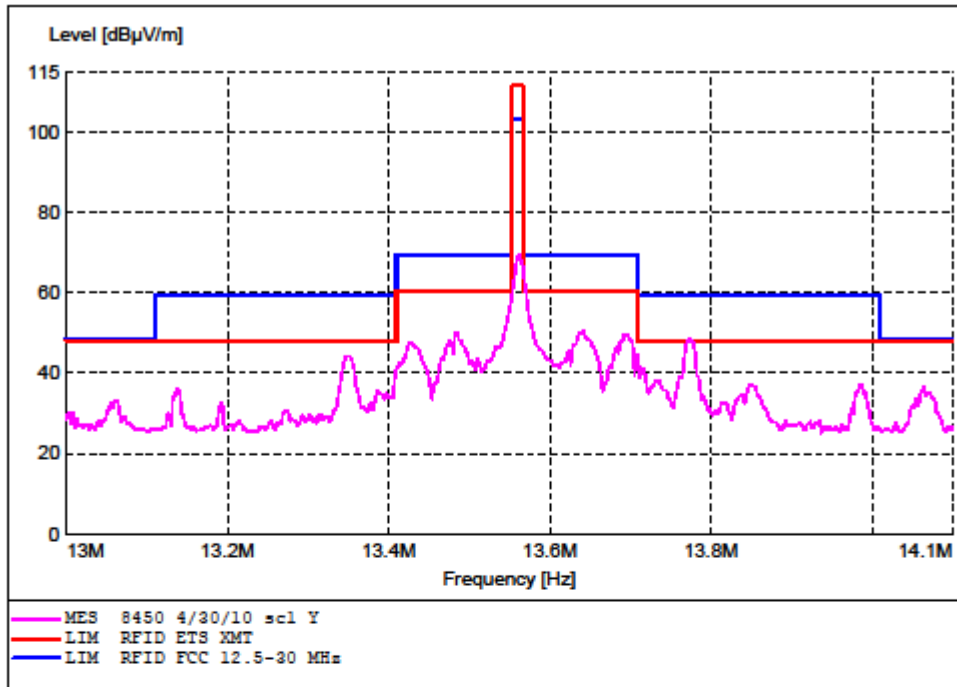
OTHER SPURIOUS EMISSIONS

Frequency	Limit	QP Level

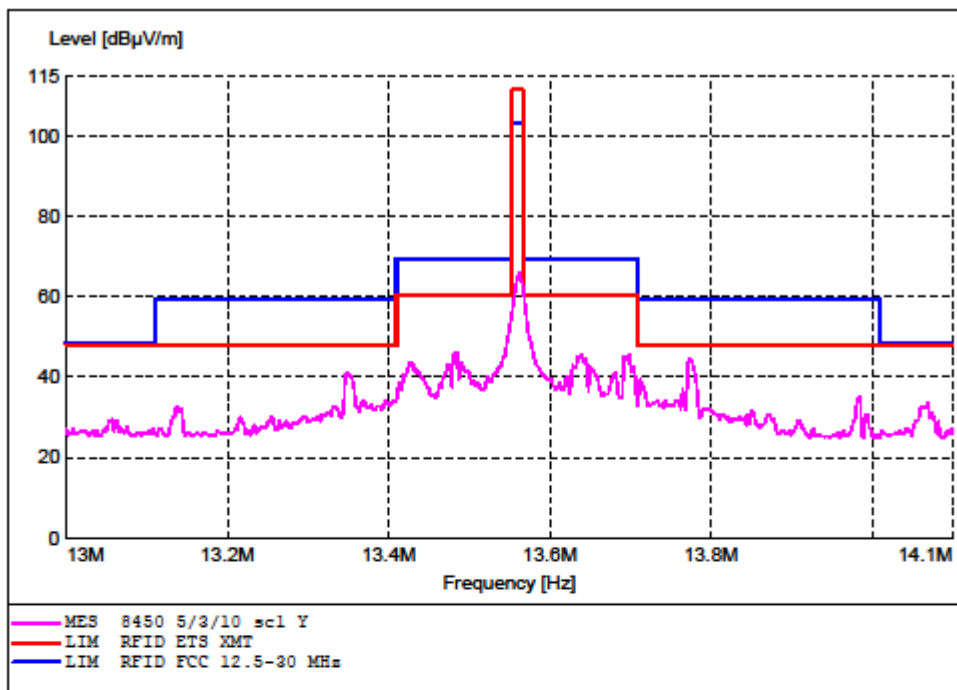
Test Engineer: Mike Schultz

Date: 3 May 2010

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 18 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 19 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 20 of 52

4.2.4 Test Setup Photo



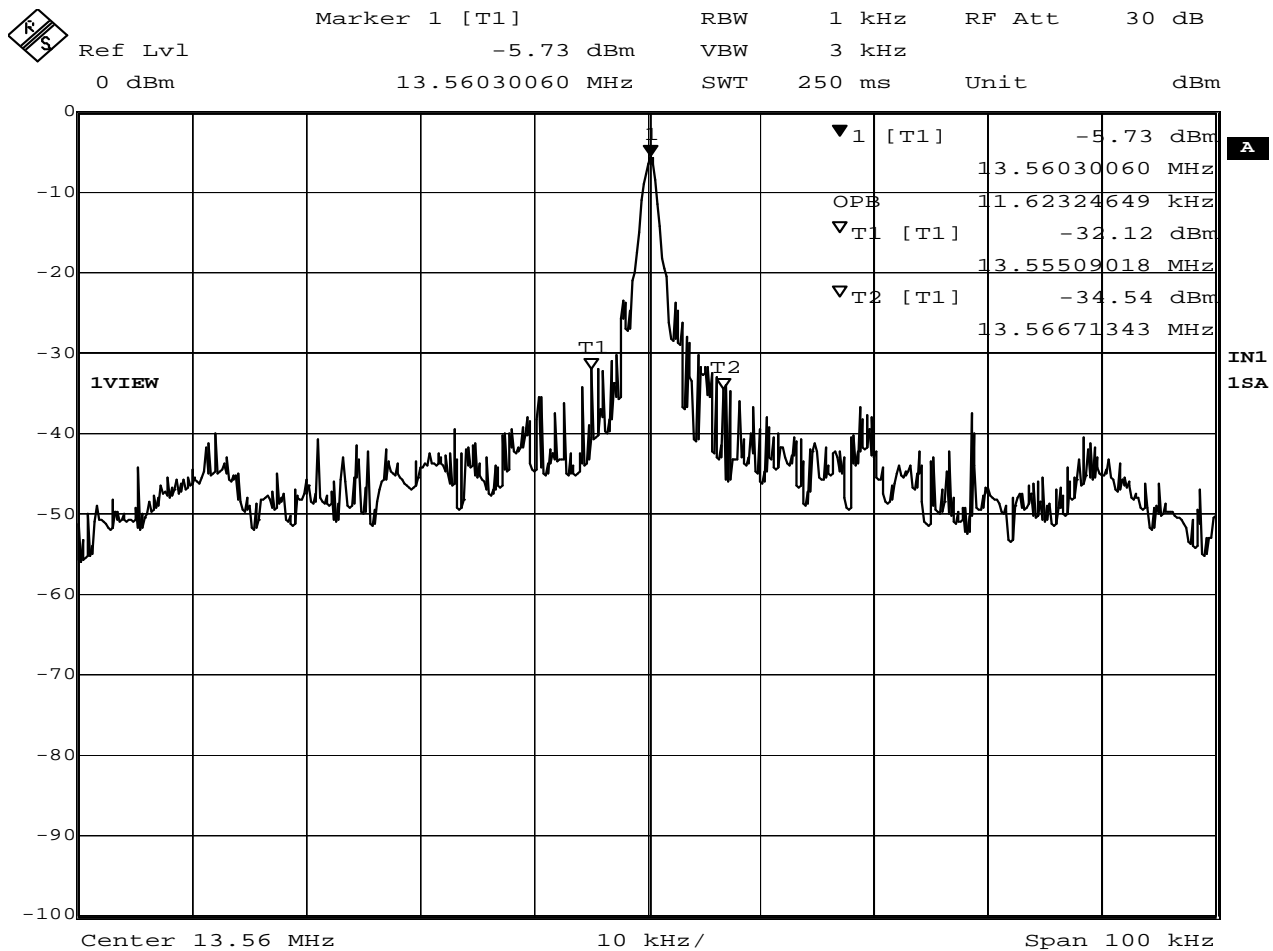
Carrier Frequency / Emissions Bandwidth / Spurious Emissions 9KHz to 30 MHz

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 21 of 52

4.2.5 Power Bandwidth Test Procedure (99%)

The EUT was placed in a shielded room and connected to the input of an EMI Receiver. The receiver was operated in the analyzer mode with a center frequency of 13.56 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. 3M Test Procedure: 99% Bandwidth Test, PBLI-7C9JVN contains the procedure for selecting the bandwidth function and output of the resultant plot.

The EUT has a measured occupied bandwidth of: **11.6232 kHz.**



Date: 3.JUN.2010 08:34:03

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 22 of 52

4.3 Spurious Emissions (9 kHz to 30 MHz.)

The EUT was placed in a semi-anechoic chamber and the Spurious Emissions testing was performed in accordance with ANSI C63.4, FCC Part 15, Subpart C, and 3M Test Procedure: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM. The Spurious Emission measurements were made to determine the level of spurious electromagnetic energy radiated from the EUT.

4.3.1 Test Procedure

A measurement antenna (loop) was positioned at a distance of 5 meters from the center of the EUT (to insure far field measurements). An EMI receiver was used for the emissions measurements. Initial sweep measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Acceptance analysis of these sweeps was used to determine which discrete frequencies, other than the intentional radiator frequency and band edge frequencies were to be maximized. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling at least every 4 degrees). Then the antenna, which was fixed at 1 meter height, was rotated until the highest emissions levels found. Final measurements were taken utilizing quasi-peak detection. Measurement results were automatically calculated via software running the EMI receiver. The final measurements recorded were determined by the following formula:

Result (dB μ V/m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

4.3.2 Test Criteria

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

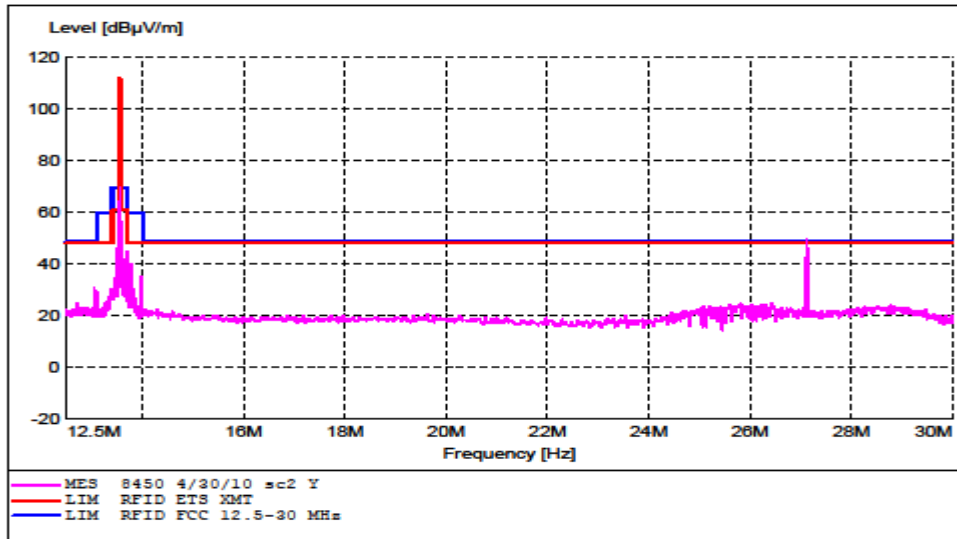
Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
12.000 to 13.110	10	48.62
13.110 to 13.410	10	59.58
13.410 to 13.553	10	69.55
13.553 to 13.567	10	103.00
13.567 to 13.710	10	69.55
13.710 to 14.010	10	59.58
14.010 to 30.000	10	48.62

Note: A 40 dB/decade extrapolation factor was used per 15.31.

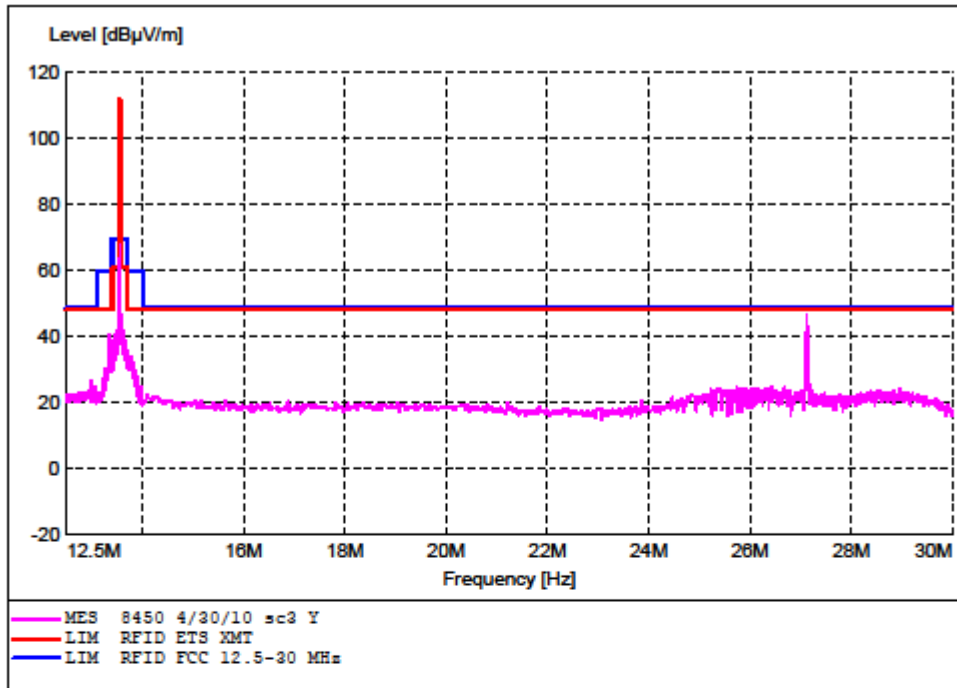
3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 23 of 52

4.3.3 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (12 kHz to 30 MHz.) requirements. No measurable spurious emissions were detected below 12.5MHz.



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 25 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 27 of 52

5.3.4 Test Setup Photo



Spurious emissions below 30 MHz

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 28 of 52

4.4 Spurious Emissions (30 to 1000 MHz.)

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 Procedures: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM and Radiated Emissions Test (30 MHz – 1 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.

4.4.1 Test Procedure

The EUT was placed in the center of a turntable. An EMI receiver was used for the emissions measurements in the range of 30MHz to 1000MHz. Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Peak results were maximized at discrete frequencies utilizing quasi-peak detection. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling every 4 degrees) and varying the antenna height between 1 and 4 meters at the angles of the highest emissions levels found. Measurements were taken in both vertical and horizontal antenna polarization. The final measurements recorded were determined by the following formula:

Result (dB μ V /m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB)

4.4.2 Test Criteria

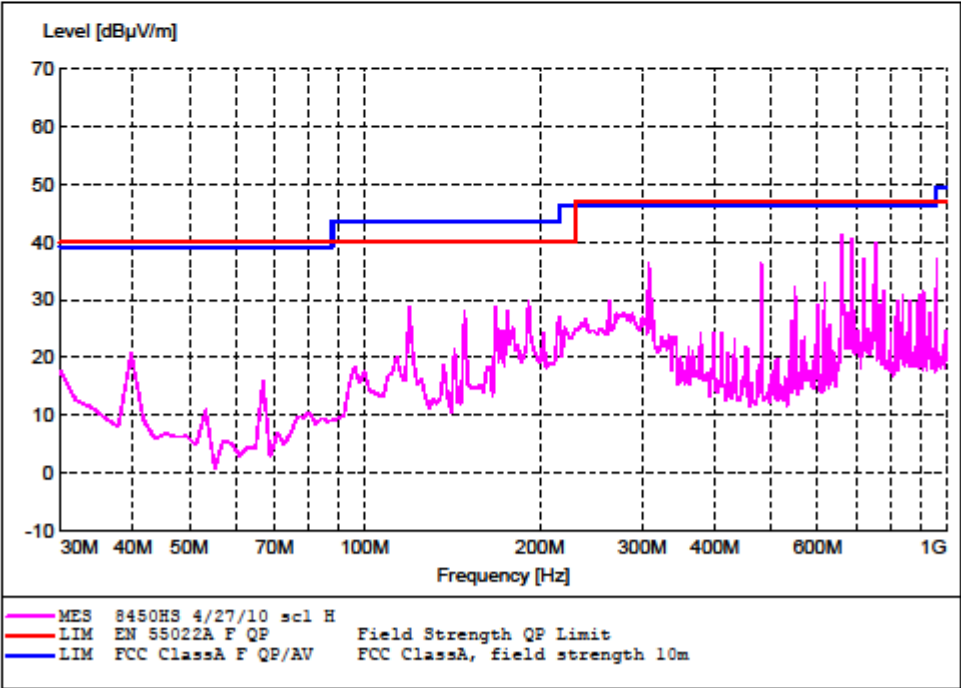
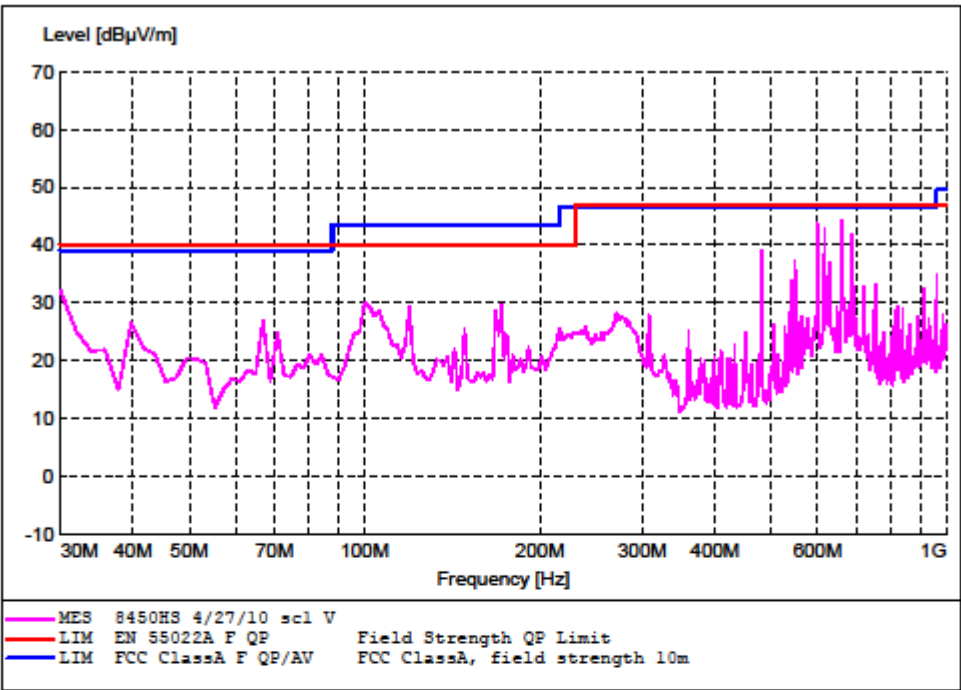
The FCC Part 15, Subpart C radiated limits are given below.

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

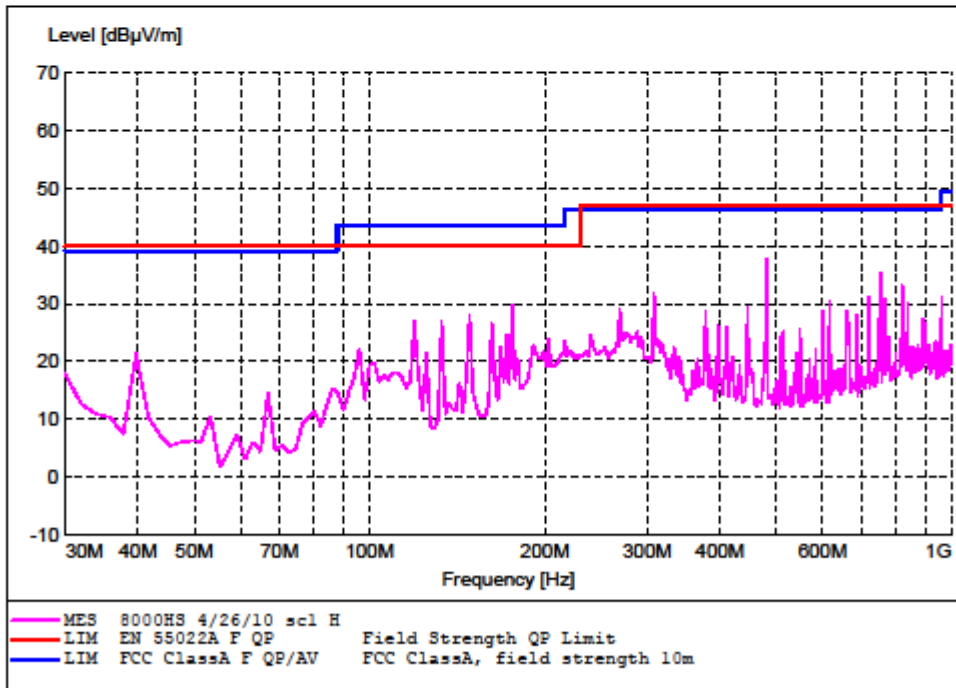
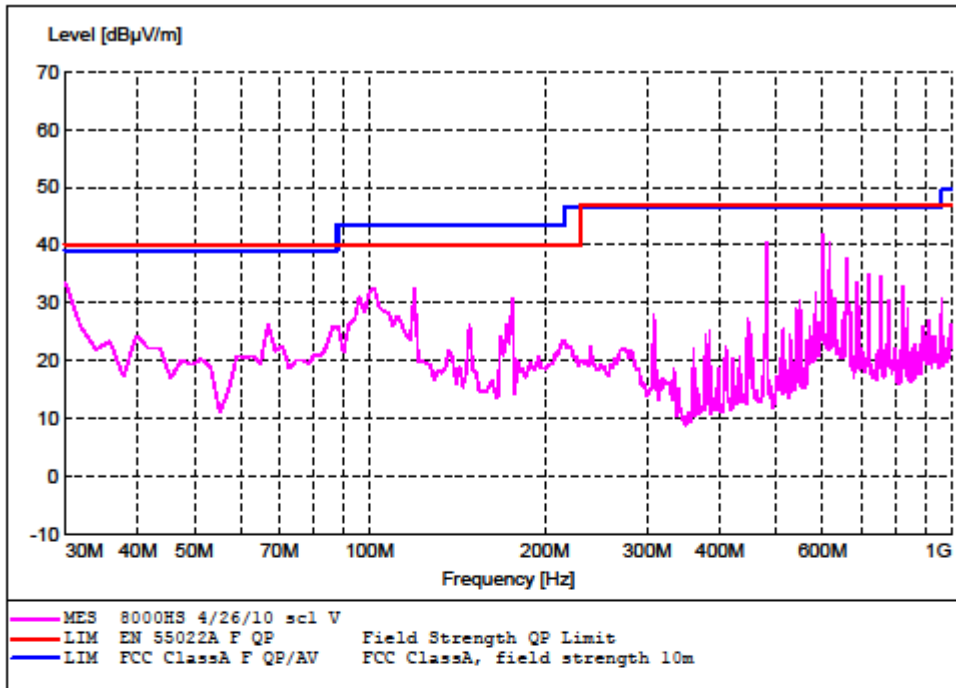
4.4.3 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (30 to 1000 MHz.) requirements.

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 30 of 52

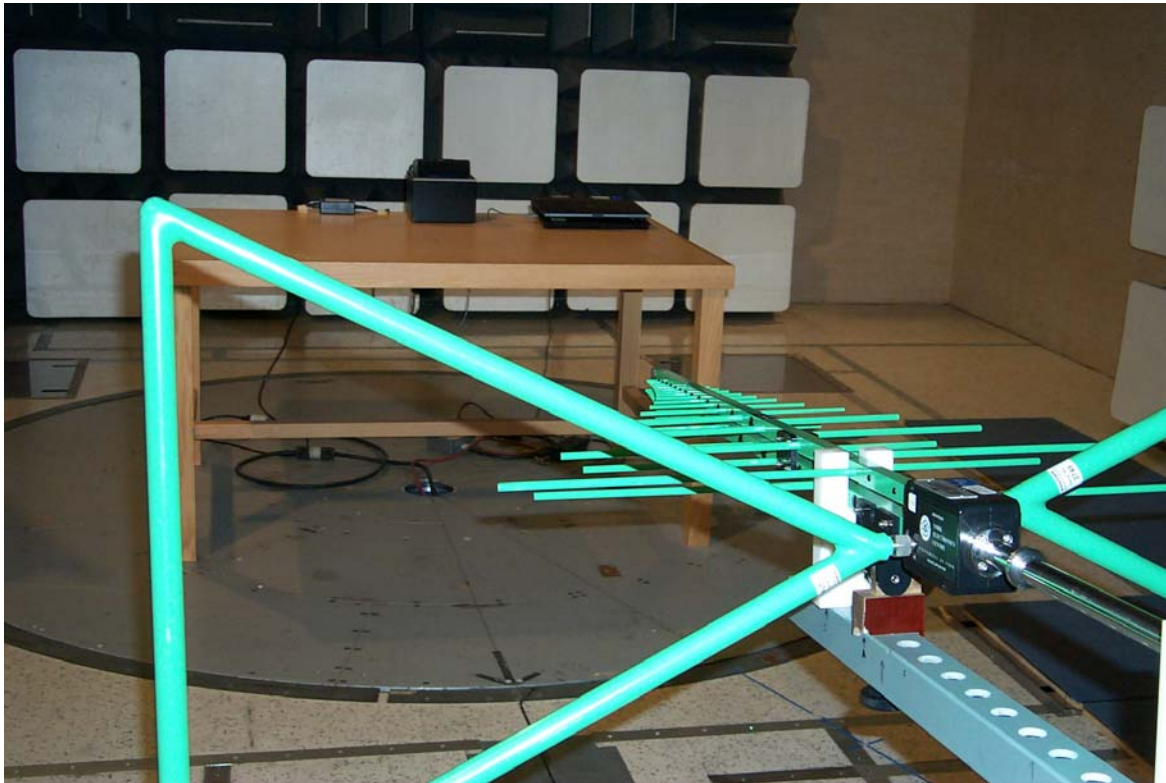


3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 32 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 33 of 52

4.4.4 Test Setup Photo



Spurious Emissions 30 - 1000 MHz

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 34 of 52

4.5 Digital Radiated Emissions (30 MHz - 18000 MHz)

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.

4.5.1 Test Procedure

The EUT was placed in the center of a turntable. An EMI receiver was used for the emissions measurements in the range of 30MHz to 40GHz (the upper limit of measurement is determined by the 5th harmonic of the highest frequency generated in the device or 40 GHz whichever is lower). Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Peak results were maximized at discrete frequencies utilizing quasi-peak detection. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling every 4 degrees) and varying the antenna height between 1 and 4 meters at the angles of the highest emissions levels found. Measurements were taken in both vertical and horizontal antenna polarization. The final quasi-peak measurements recorded were determined by the following (the detector used above 1000 MHz is both average and peak): Result (dB μ V /m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

4.5.2 Test Criteria

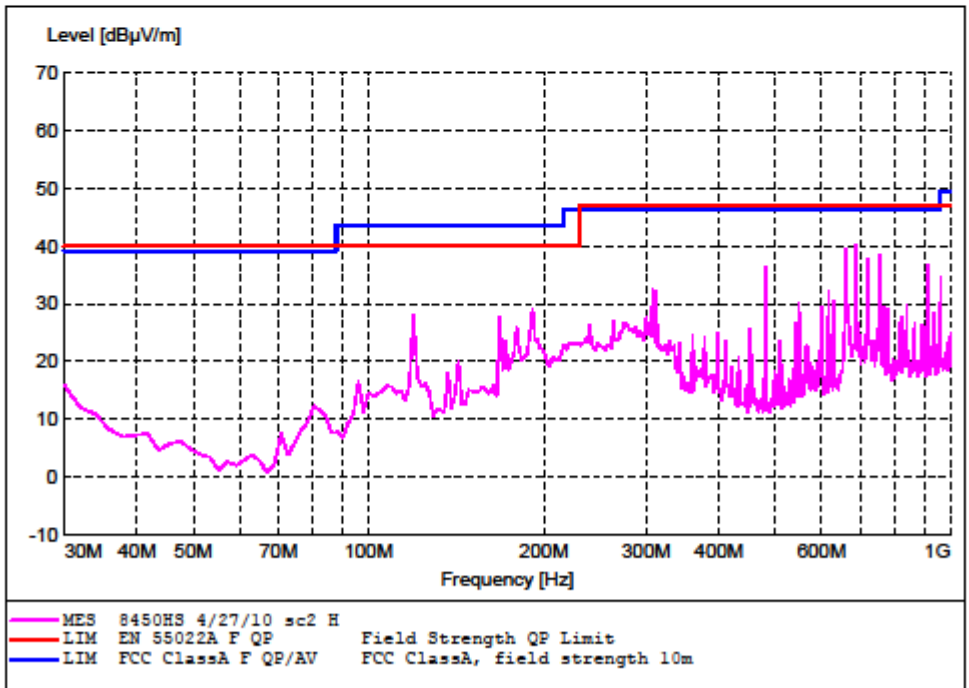
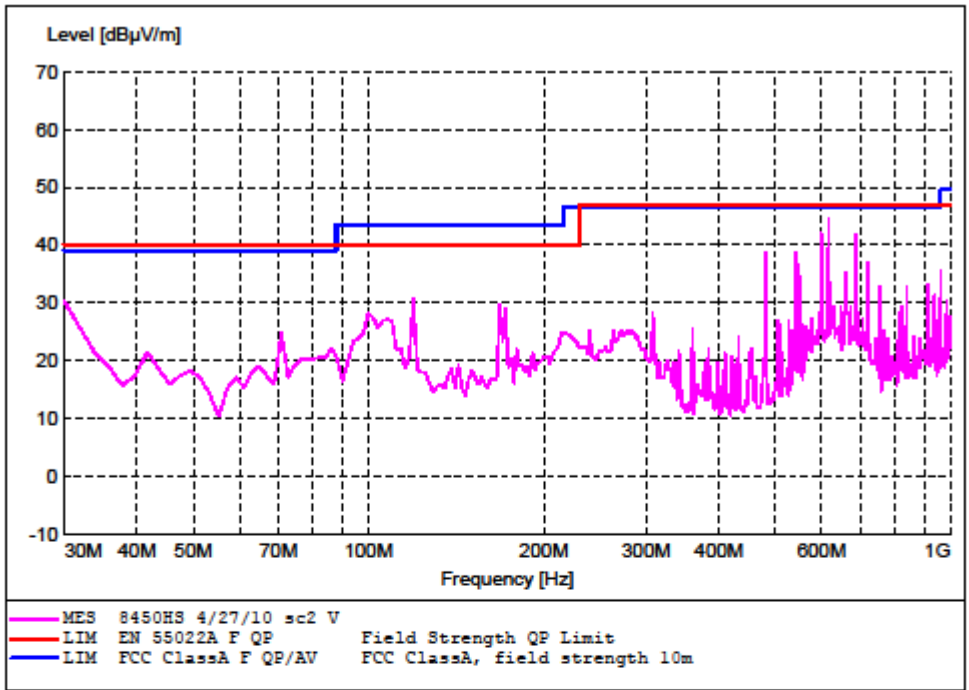
The FCC Class 'A' radiated limits are given below. The lower limit shall apply at the transition frequency.

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
30 - 88	10	39.08
88 - 216	10	43.52
216 - 960	10	46.44
960 - 1000	10	49.50
1000 – 40000	10	49.50 AVG 69.50 PEAK

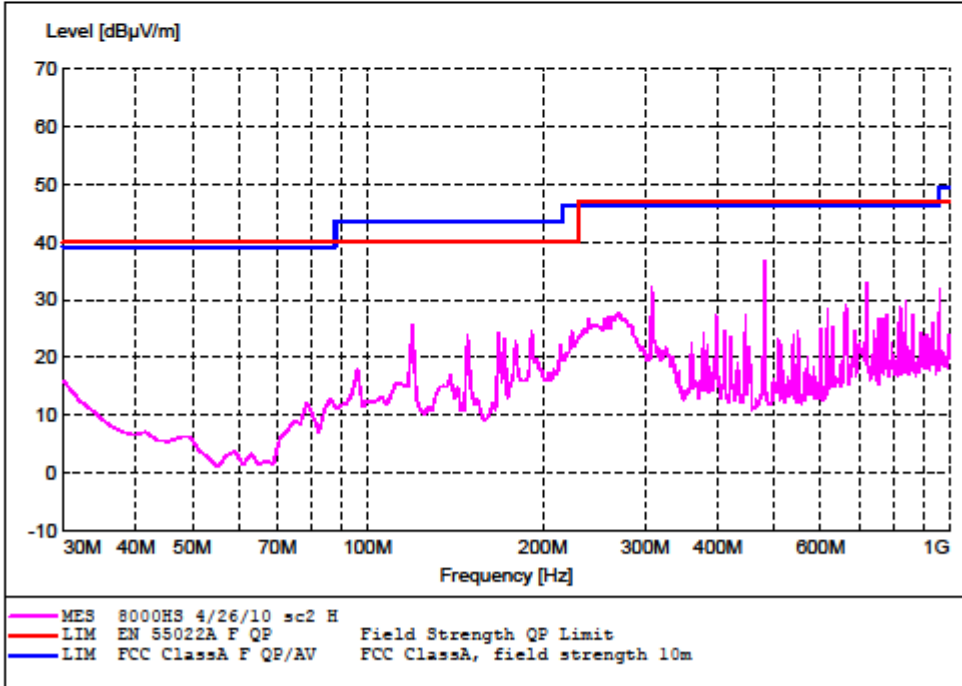
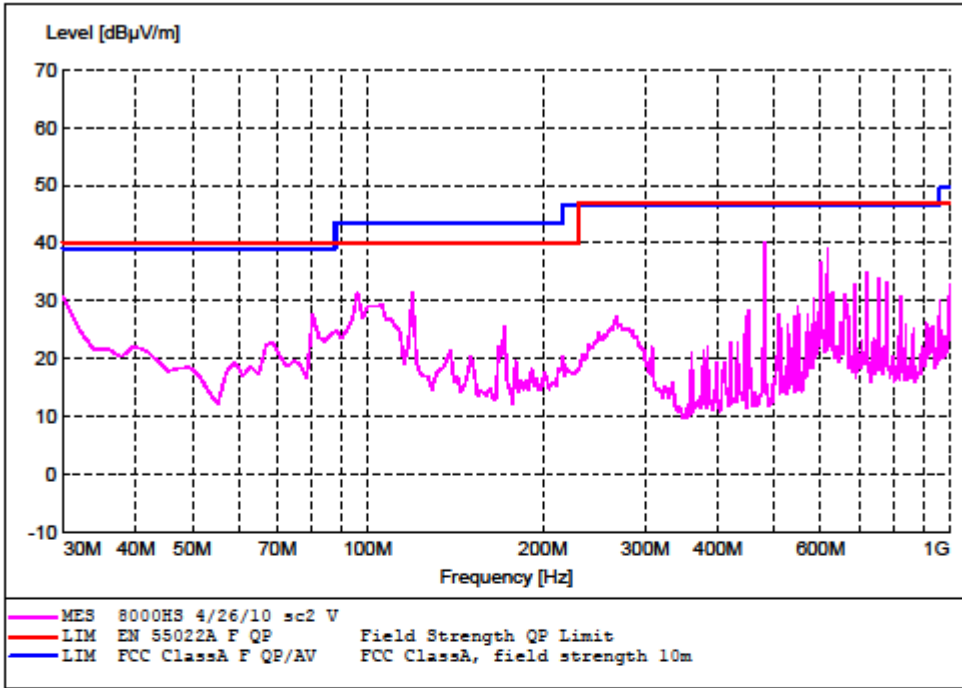
4.5.3 Test Results

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

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 36 of 52

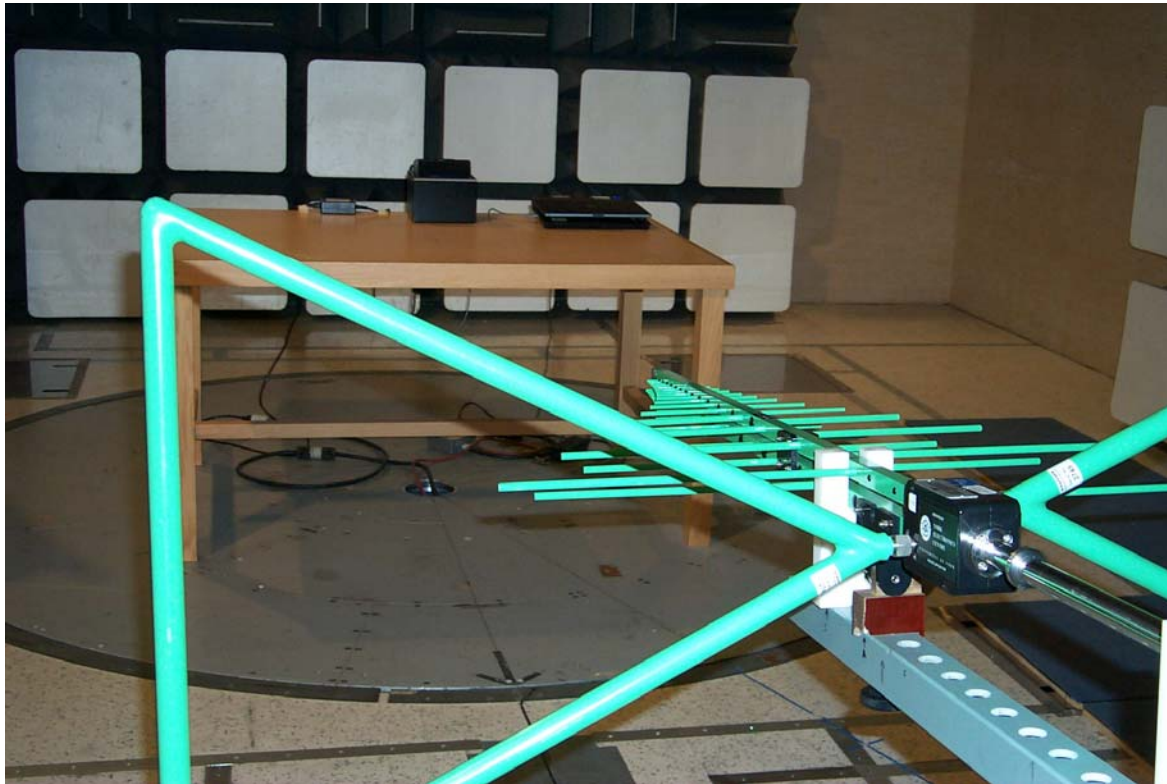


3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 38 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 39 of 52

4.5.4 Test Setup Photo



Radiated Emissions 30 to 1000 MHz

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 40 of 52

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.

4.6.1 Test Procedure

The EUT was setup in a shielded room and measurements were made of both the electric and magnetic fields at 13.56 MHz at a distance of 20 cm around the equipment using EMF exposure meters.

4.6.2 Performance Criteria

For general public exposure, the results shall be compared with the exposure limits 4.2 of RSS-102. For 13.56 MHz, the limits are as follows:

Freq Range	V/m	A/m	W/m ²	Avg Time
10-30 MHz	28.0	0.162	-	6 min

4.6.3 Test Results

The EUT met the general public exposure criteria for both the electric field and the magnetic field.

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 41 of 52

Report Number	F0410001	Date	7 May 2010
EUT Name	Passport Scanner	EUT Power	230 VAC / 50 Hz
EUT Model	RTE8000 HS, RTE8450 HS	Test Std	RSS-102 / 50364
EUT Serial #	5RH11138	Temperature (°C)	23
EUT Description	Passport Scanner	Humidity (%)	31
		Air Pressure (kPa)	98.7

Test Position	Frequency	Distance	Measurement	Limit	Margin
Top H-Field	13.56 MHz	20 cm	0.072 A/m	EUR 0.073 A/m	0.001 A/m
Top H-Field	13.56 MHz	20 cm	0.072 A/m	IC 0.162 A/m	0.09 A/m
Rear E-Field	13.56 MHz	20 cm	1.85 V/m	EUR 28 V/m	26.15 V/m
Rear E-Field	13.56 MHz	20 cm	1.85 V/m	IC 28 V/m	26.15 V/m

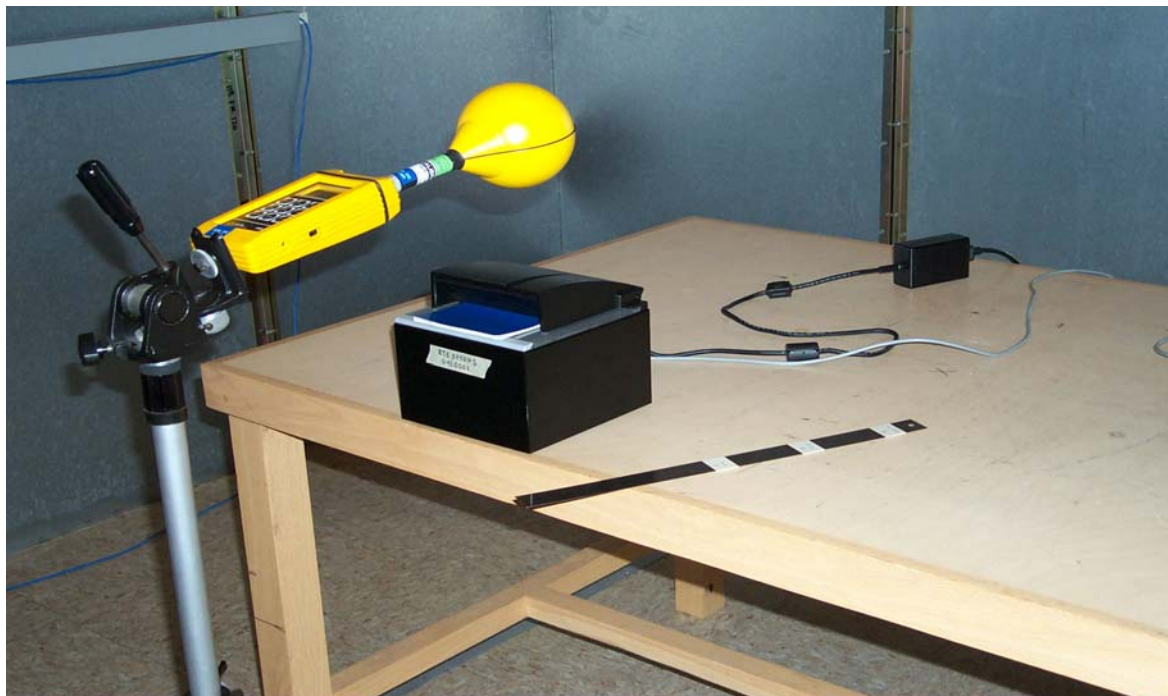
Test Engineer: Mike Schultz	Date: 7 May 2010
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3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 42 of 52

4.6.4 Test Setup Photo



E-Field Measurement



H-Field Measurement

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 43 of 52

5.0 CONDUCTED EMISSIONS TESTING

Conducted emissions testing was performed in accordance with ANSI C63.4 and FCC Part 15 and 3M Test Procedure: Conducted Emissions Test (150 kHz – 30 MHz), PBLI-6S8LR2. Conducted emissions tests were made to determine the level of electromagnetic noise that is conducted onto the power mains from the EUT.

5.0.1 Test Procedure:

A Line Impedance Stabilization Network (LISN) with 50Ω / 50μH characteristic was used to isolate the EUT and give accurate and repeatable readings. An EMI test receiver was used for the emissions measurements in the range from 150 KHz to 30 MHz. Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Initial results were measured at discrete frequencies utilizing quasi-peak detection. Measurement results were automatically calculated via software running the EMI receiver. The final quasi-peak and average measurements recorded were determined by the following:

Result (dBμV) = receiver reading (μV) + LISN (dB) + cable loss (dB)

5.0.2 Test Criteria:

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

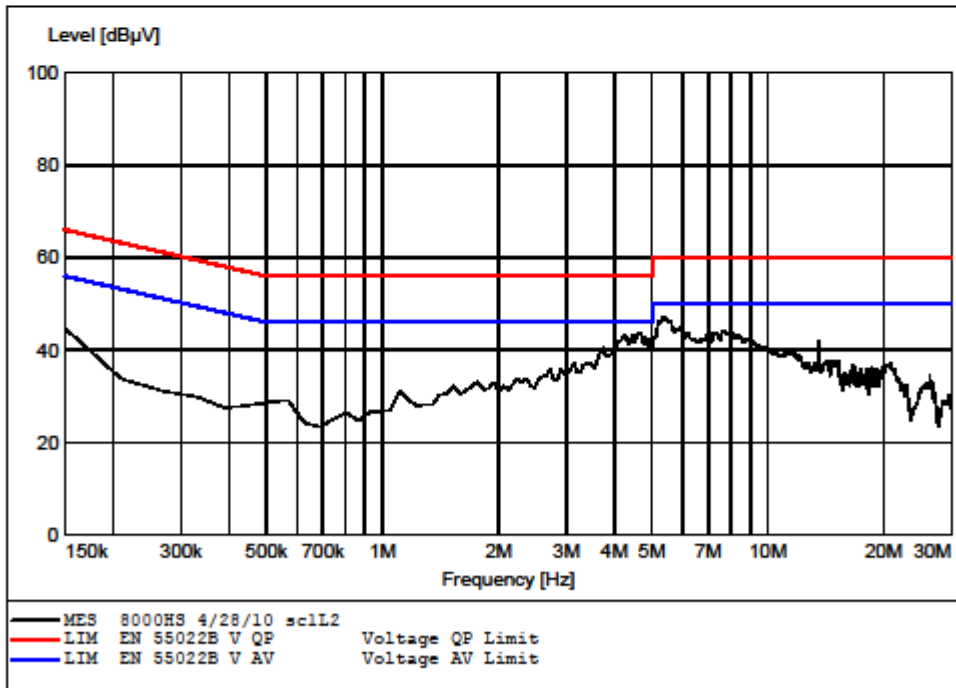
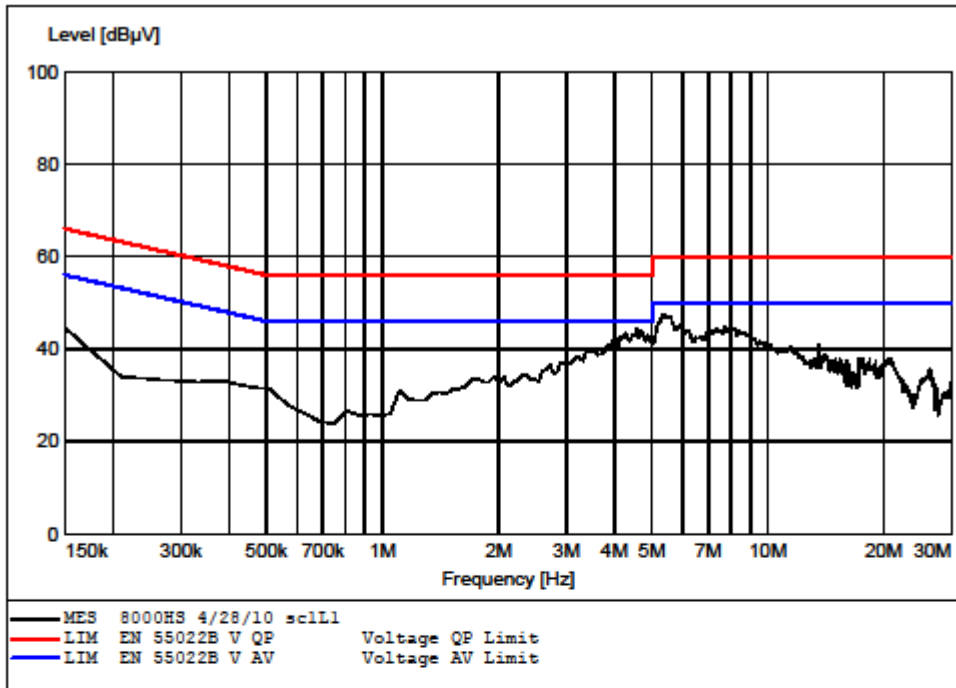
Mains Terminal Disturbance Limits		
Frequency (MHz)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.50	66 to 56 * ¹	56 to 46 * ¹
0.50 to 5.0	56	46
5.0 to 30.0	60	50

*1 – decreasing with the log of the frequency

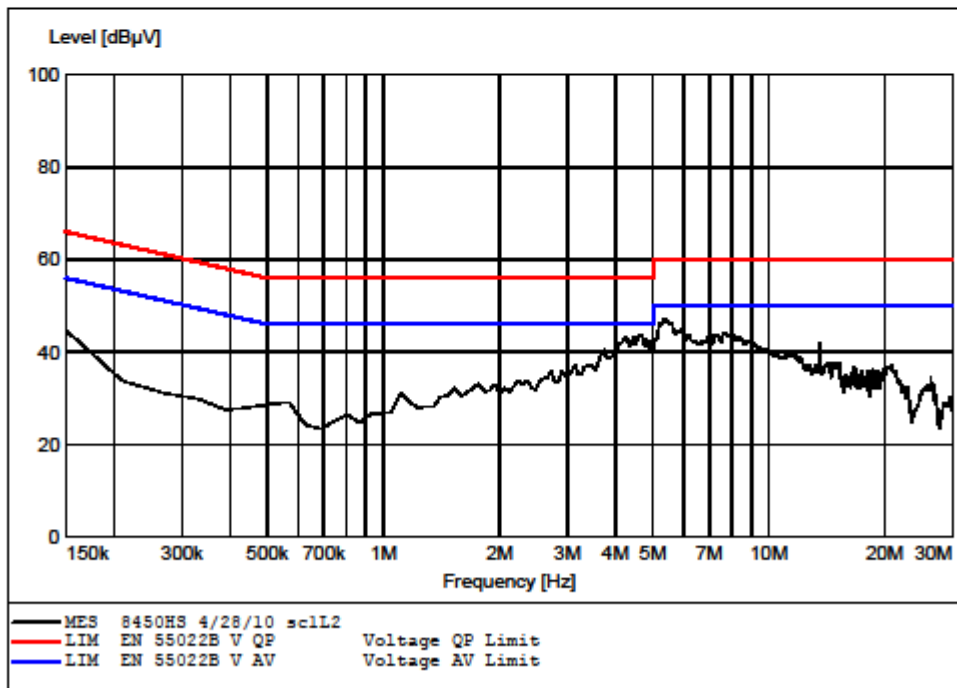
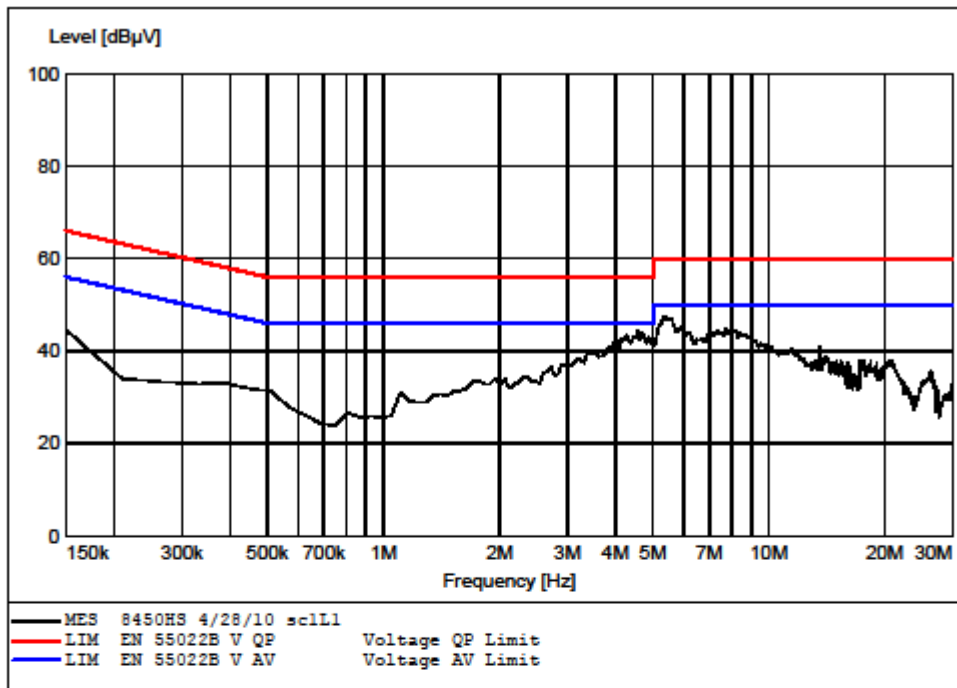
5.0.3 Test Results

The EUT met the conducted emission and discontinuous requirements.

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 45 of 52



3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 47 of 52



RTE8450

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 48 of 52

5.0.4 Test Setup Photograph



Conducted Emissions Test Setup (RTE8000)



Conducted Emissions Test Setup (RTE8450)

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 49 of 52

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

Electro Metrics Large Loop Antenna, Model ALR25M, Serial No. 603 (cal due date: 20 Oct 10)
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

CONDUCTED EMISSIONS

EMCO LISN, Model 3825-2, Serial No. 1039 (cal due date: 20 Oct 10)
Solar High Pass Filter, Model 8131 - 5.0 (cal due date: 30 Aug 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

FREQUENCY STABILITY / POWER OUTPUT

Agilent Freq. Counter Model 53131A, Serial No. MY40012264 (cal due date: 12 Oct 10)
Envirotronics Environ. Chamber, EH16-1-1.5AC, SN:10066639 (cal due date: 30 Mar 10)

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 E-Probe, s/n BG0030 (cal due date: 13 Jan 11)
Narda Type 12 H-Probe, s/n AE0020 (cal due date: 13 Jan 11)

TEST FACILITY

Lindgren Semi-Anechoic Chamber, (verification due date: 2 Dec 10)
FCC Site Registration Number: 93334
Canadian Site Registration Number: 458A-1

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 50 of 52

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: DGF-SSDRTE8000
IC ID: 458A-SSDRTE8000**

"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: DGF-SSDRTE8000

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 51 of 52

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-SSDRTE8000

3M	RTE8000HS RTE8450HS	Report # F0410001	3M
EMC Laboratory	Reg. Eng. And Quality	May 26, 2010	Page 52 of 52

This is the last page of the Test Report