FCC
Electromagnetic Compatibility
Test Report

For

Mini RFID Pad
Model 210

FCC ID: DGFTTS210

IC: 458A-TTS210

3M™ Track & Trace Solutions Division

St. Paul, MN

8 December 2008

Report Number: F0808002

Prepared By:
3M Regulatory Engineering and Quality
EMC Laboratory
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CERTIFICATE OF COMPLIANCE

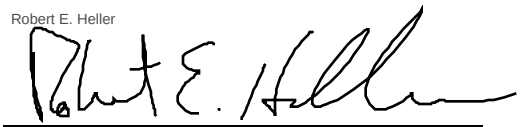
MANUFACTURER'S NAME:	3M™ Company
NAME OF EQUIPMENT:	Mini RFID Pad
MODEL NUMBER:	210
FCC ID	DGFTTS210
IC	IC:458A-TTS210
TEST REPORT NUMBER:	F0808002
DATE OF ISSUE:	8 December 2008

USA STANDARD 47, CODE OF FEDERAL REGULATIONS (2007)
Industry Canada RSS-210, RSS-GEN, and ICES-003

Radiated Emissions	**(FCC Part 15, Subpart B, Class A)** **(IC, ICES-003)**
Radiated Emissions	**(FCC Part 15, Subpart C)** **(IC, RSS-210, RSS-GEN)**

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



Robert E. Heller
Senior EMC Engineer

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1.0 TEST SUMMARY

Test Report Number:	F0808002
Requester:	Tom Mercer
Company:	3M™ Company Track and Trace Solutions Building 209 St. Paul, MN 55144
Telephone Number:	(651) 736-1174
Test Dates:	Oct 30, 31, 2008
Equipment Under Test:	Mini RFID Pad, Model 210
Date Of Receipt:	Oct 30, 2008
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, ICES-003 Radiated Emissions: FCC Part 15 Subpart C, IC RSS-210, RSS-Gen
Modifications:	See paragraph 2.3
Test Location:	3M Product Safety EMC Laboratory Building 76-1-01 410 Fillmore Ave. St. Paul, MN 55144-1000

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, IC ICES-003 rules for unintentional radiators and FCC Part 15, Subpart C, 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. Worse 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 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.

2.2 EUT Description and Operation

The Equipment Under Test (EUT) was the 3M Mini RFID Pad, Model 210. The Mini RFID Pad is designed for use with other equipment and software to read and/or program 3M RFID tags. These tags are used to identify files, folders, and other items such as books. When used in conjunction with software, the unit can track, monitor, and assist in locating various items equipped with RFID tags. The EUT has not been evaluated for other uses. The EUT is powered by 5 VDC from a computer USB port.

The transmitter output RF power (set at the factory) is 145 mW. The antenna used is located on the outer perimeter of the circuit board located in the RFID Pad and has the dimensions 15.24cm by 15.24cm.

2.3 Modifications to EUT

The following modifications were required for this device:

1 Ferrite – Steward #28A03920A0 (or equivalent) – 1 turn, on USB cable at the reader pad end of the cord.

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 – 5000 MHz)	k=2.0	4.11 dB	5.20 dB
Conducted Emissions (150 kHz – 30 MHz)	k=2.0	3.29 dB	3.60 dB

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-210	Industry Canada, Radio Standards Specification Issue 7 2007	
RSS-GEN	Industry Canada, Radio Standards Specification Issue 2 2007	

3M Test Procedure: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2: Issue 1 – Released Effective – 08/09/2006
3M Test Procedure: Radiated Emissions Test (1 GHz – 5 GHz), PBLI-6SNHFY: Issue 1 – Released Effective – 08/14/2006
3M Test Procedure: Conducted Emissions Test (150 kHz – 30 MHz), PBLI-6S8LR2: Issue 1 – Released Effective – 07/31/2006
3M Test Procedure: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM: Issue 1 Released Effective 12/18/2006
3M Test Procedure: 99% Power Bandwidth Test, PBLI-7C9JVN: Issue 1 Released Effective 03/04/2008

4.0 Radiated Emissions Testing

The EUT was placed in an anechoic chamber and radiated emissions testing was performed in accordance with FCC Part 15.225 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 preformed in accordance with ANSI C63.4 and FCC Part 15.225 (e) to insure that the intentional radiator 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 Reader was put into a continuous output mode through instructions from the host computer (test mode of operation). 1) The frequency was measured while the input DC power to the Intentional Radiator (RFID Reader) was varied over the required input voltage range. 2) The frequency was also measured while the ambient air temperature was varied over the required ambient temperature range (measurements are taken within 1 minute of startup, and after 10 minutes of operation at each test condition).

4.1.2 Test Criteria

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

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

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

Carrier Frequency (MHz)	Temperature Range (degrees C)	Max. Frequency Change (%)
13.56	-20 to +50	+/- 0.01 %

4.1.3 Test Results

The EUT met all FCC Part 15, Subpart C Frequency Stability requirements.

Carrier Frequency Stability versus Supply Voltage			
Carrier Frequency (MHz)	Lowest Frequency (MHz)	Highest Frequency (MHz)	Max. Frequency Change (%)
13.5603	13.5603	13.5603	+/- 0.0

Carrier Frequency Stability versus Temperature			
Carrier Frequency (MHz)	Lowest Frequency (MHz)	Highest Frequency (MHz)	Max. Frequency Change (%)
13.5603	13.560204	13.560393	±0.0007

Carrier Frequency (MHz) vs. Supply Voltage at 20° C

Voltage	Freq. at Startup	Freq. after 10 Min.
102 VAC	13.56030	13.56030
120 VAC	13.56030	13.56030
138 VAC	13.56030	13.56030

Carrier Frequency (MHz) vs. Temperature at nominal supply voltage

Temp. ° C	Freq. at Startup	Freq. after 10 min.
-20°	13.560300	13.560393
0°	13.560300	13.560371
20°	13.560300	13.560289
50°	13.560300	13.560204

4.1.4 Test Setup Photo

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 measurement antenna (loop) was positioned at a distance of 5 meters (to insure far field measurements) from the center of the EUT. 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 (dBµV/m) = receiver level (µV) + 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 (dBµV/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

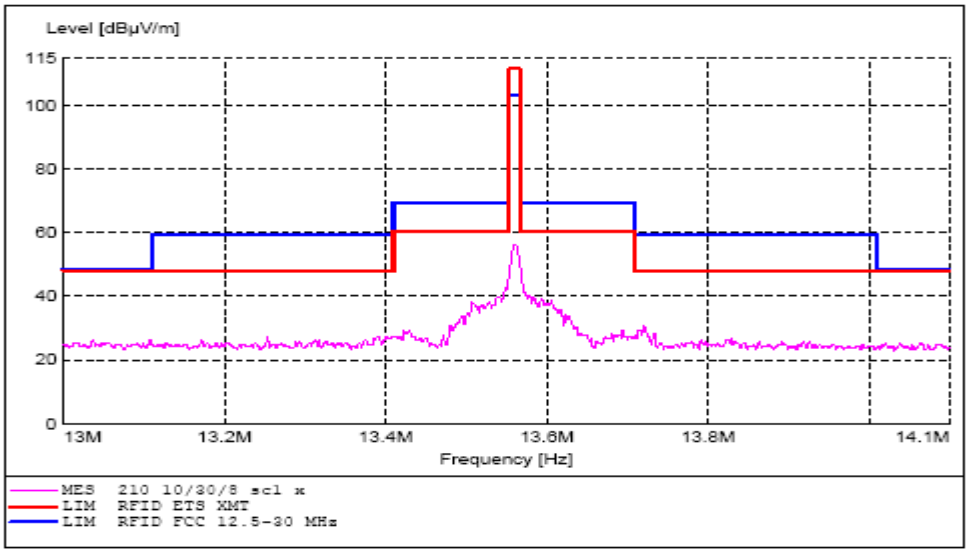
Note: 40 dB/decade extrapolation factor was used per 15.31.

4.2.3 Test Results

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

3M™ Mini RFID Pad Model 210						
Freq. (MHz)	BW (kHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	Passing Margin (dB)	Turntable (degrees)	Antenna Orientation/Angle (Polarity/degrees)
13.5603[1]	9	56.02	103.00	46.98	172	X ±0º
13.553[2]	1	13.40	69.60	56.20	172	X ±0º
13.567[2]	1	12.27	69.60	57.33	172	X ±0º
13.5485	9	30.17	69.60	39.43	172	X ±0º
13.5715	9	30.30	69.60	39.30	172	X ±0º
13.41[2]	1	1.82	59.60	57.78	172	X ±0º
13.71[2]	1	1.71	59.60	57.89	172	X ±0º
13.4055	9	16.89	59.60	42.71	172	X ±0º
13.7141	9	17.14	59.60	42.46	172	X ±0º
13.11[2]	1	0.83	48.60	47.77	172	X ±0º
14.01	1	0.24	48.60	48.36	172	X ±0º
13.1055	9	14.99	48.60	33.61	172	X ±0º
14.0145	9	14.23	48.60	34.37	172	X ±0º

1 - Intentional Radiator Frequency
2 - Band edges measured with a receiver bandwidth setting of 1 KHz. Per ANSI C63.4 Paragraph 13.1.7.



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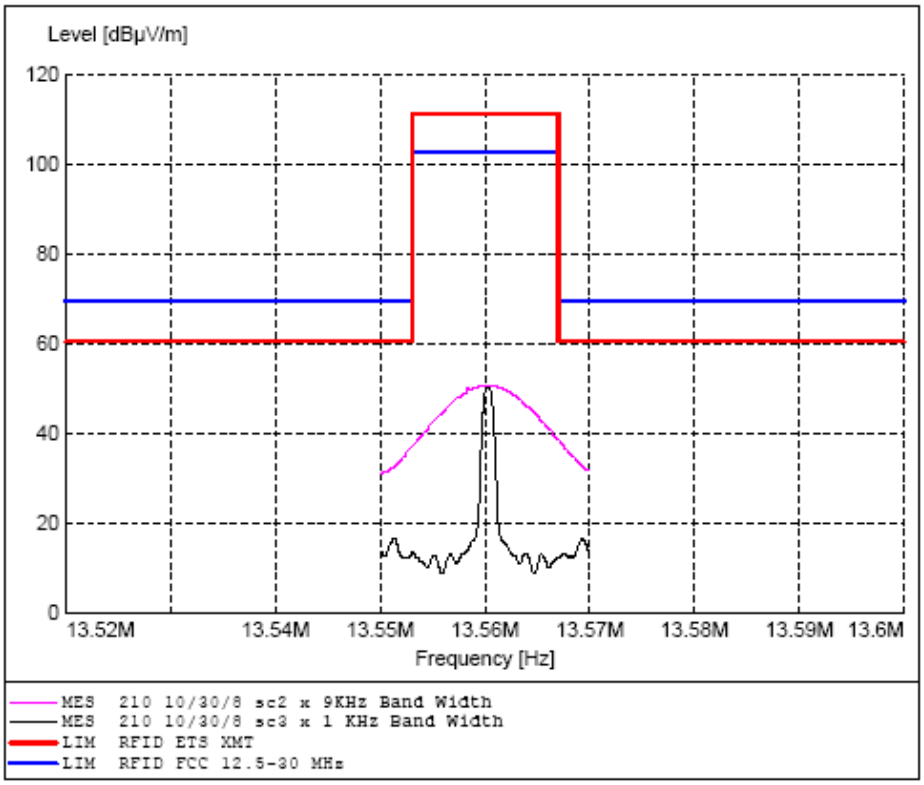
RF Carrier Output



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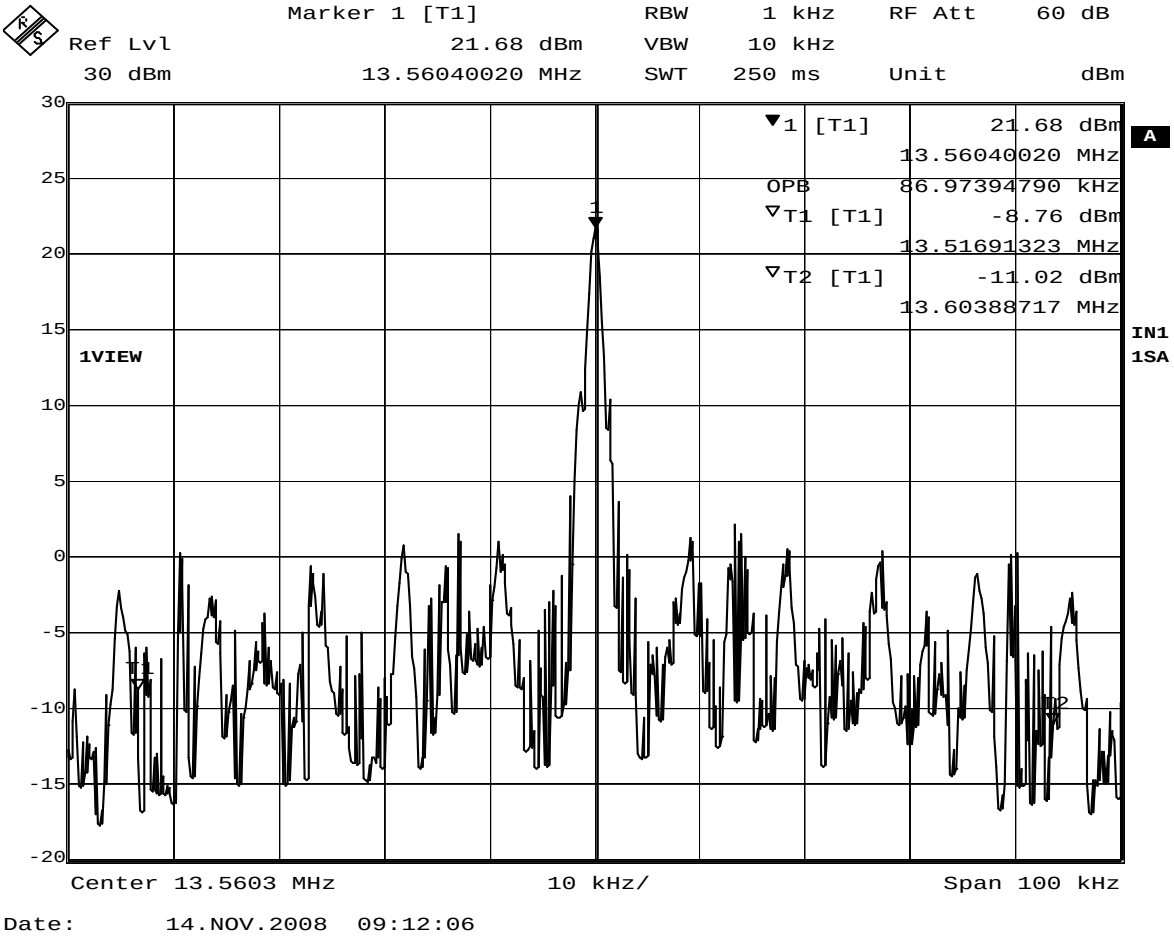
Violet 9 KHz BW QP Scan
Black 1 KHz BW QP Scan

4.2.4 Occupied Bandwidth (99%) (Canada)

The EUT was placed in a shielded room and connected directly 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: 13.56 MHz RFID Emissions Test, PBLI-6WHLEM contains the procedure for selecting the Bandwidth function and output of the result plot.

The EUT had a measured bandwidth of **86.974 KHz.**



4.2.5 Test Setup Photo

Model 210
Carrier Frequency / Emissions Bandwidth / Spurious Emissions 9KHz to 30 MHz

4.3 Spurious Emissions (9 KHz to 30 MHz.)

The EUT was placed in a semi-anechoic chamber and the Spurious Emissions testing was preformed 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 (to insure far field measurements) from the center of the EUT. 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 (dBμV/m) = receiver level (μV) + 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 (dBμV/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

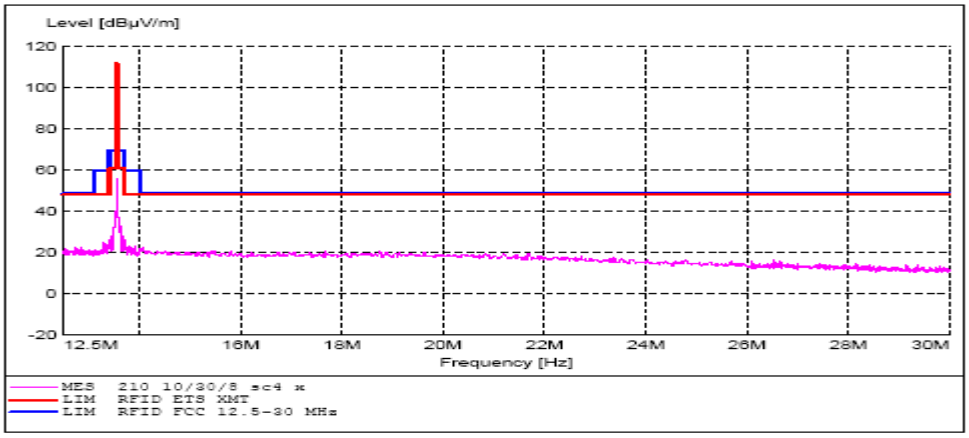
Note: A 40 dB/decade extrapolation factor was used per 15.31.

4.3.3 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (9 KHz to 30 MHz.) requirements. No measurable spurious emissions were detected below 12.5MHz. The worst-case emission was as follows:

Model 210			
Frequency (MHz)	Limit (dBμV)	Maximized QP Signal (dBμV)	Passing Margin (dB)
27.1198[1]	48.00	8.49	39.51

1. 2nd Harmonic of Intentional Radiator



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4.3.4 Test Setup Photo

Spurious Emissions (9 kHz – 30 MHz)

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 on a 0.80 meter high wooden table 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 (dBμV /m) = receiver level (μV) + 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 (dBμV/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.

Report Number	F0808002	**Date**	31 Oct 2008
EUT Name	RFID Reader Pad, Model 210	**EUT Power**	120 / 60
EUT Model	210 Reader Pad	**Test Std**	FCC Part C
EUT Serial #	Prototype 1	**Temperature (°C)**	23
EUT Description	RFID Tag reader	**Humidity (%)**	31
		Air Pressure (kPa)	998

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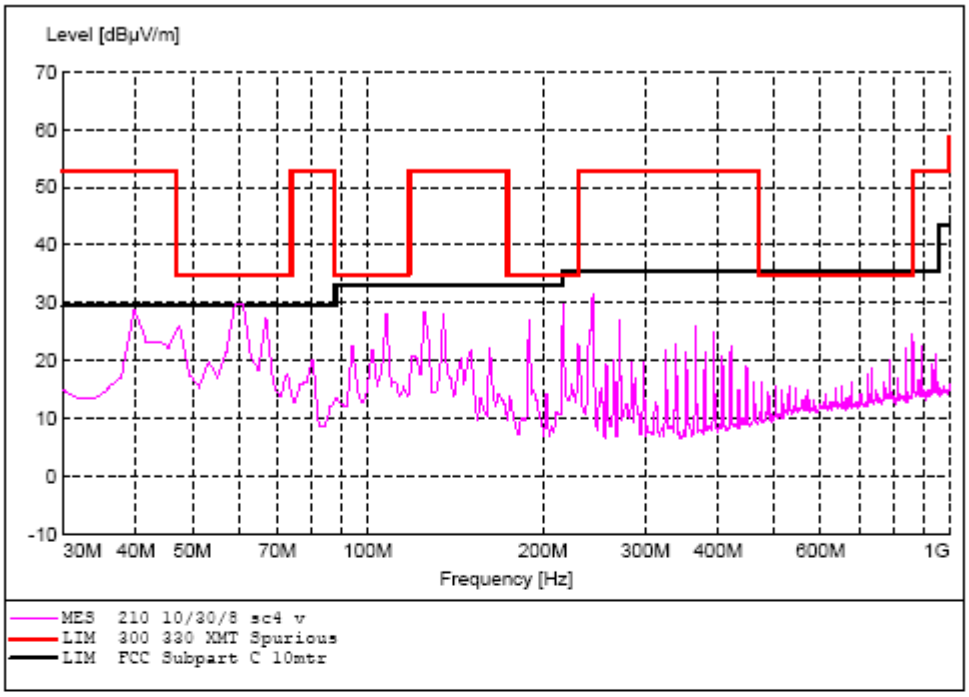
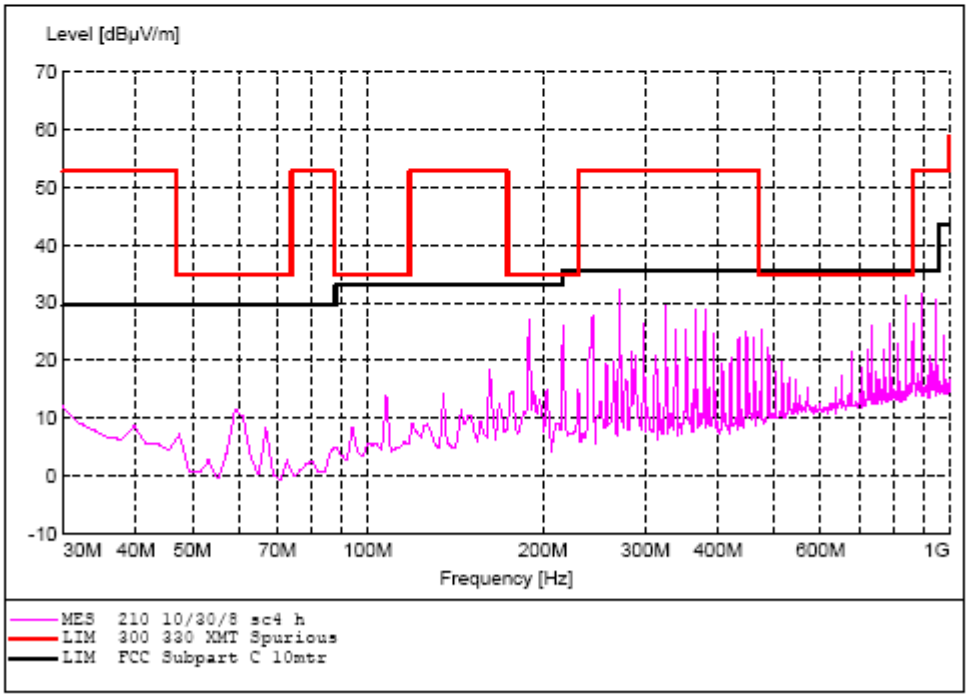
FREQ. (MHz)	MAXIMIZED QP SIGNAL H/V	MAXIMIZED QP SIGNAL dBµV	LIMIT LINE dBµV	PASSING MARGIN dBµV	MAXIMIZED POSITION TURNTABLE (°)	MAXIMIZED POSITION ANTENNA (M)	REMARKS
40.685	V	27.33	29.54	2.21	80	1.0	
60.492	V	23.37	29.54	6.17	0	1.0	
67.815	V	25.48	29.54	4.06	147	1.4	
108.485	V	27.57	33.06	5.49	180	1.0	
135.605	V	26.99	33.06	6.07	90	1.0	
189.849	H	28.33	33.06	4.73	90	1.8	
216.974	V	30.56	35.56	5.00	310	1.0	
244.094	V	29.42	35.56	6.14	242	1.0	
271.212	H	30.30	35.56	5.26	275	1.0	
840.721	H	31.28	35.56	4.28	90	1.0	
894.967	H	30.95	35.56	4.61	90	1.0	

* - All readings have the correction factors applied.

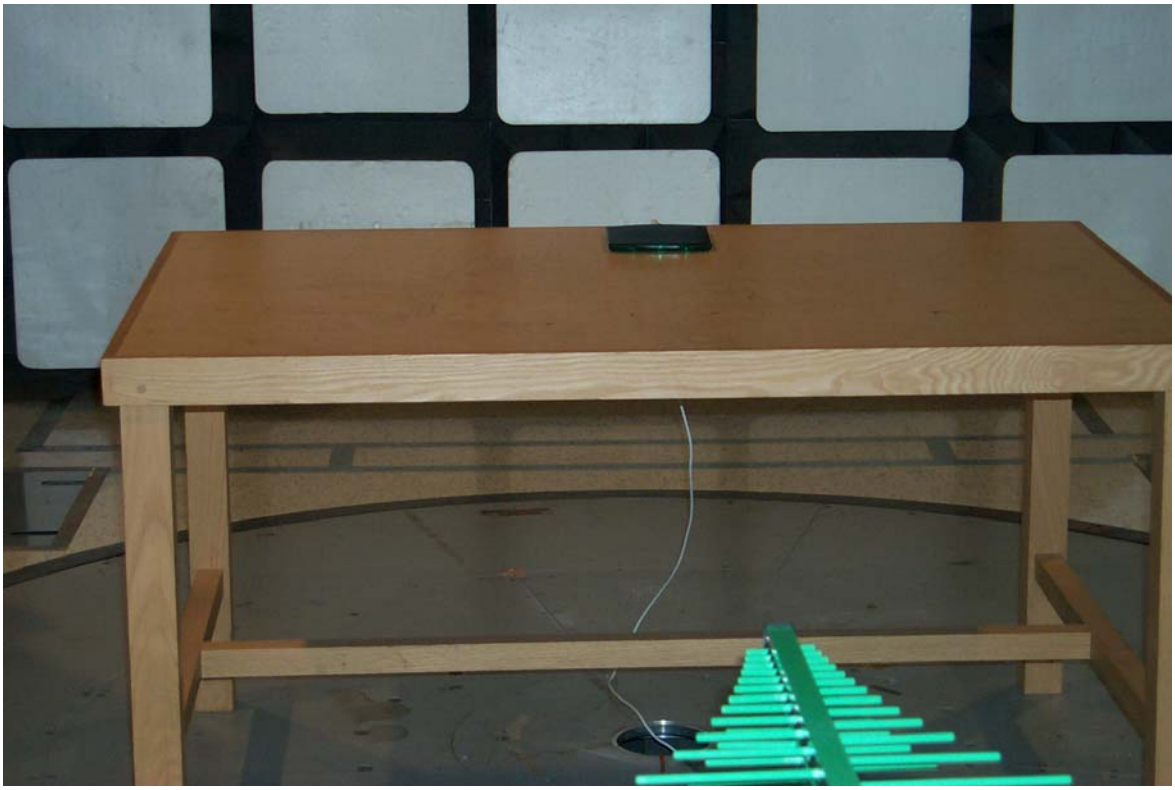
Test Engineer: Bruce Jungwirth	Date: 31 Oct 2008





210 Spurious Emissions (RFID on)

4.4.4 Test Setup Photo



Spurious Emissions above 30 MHz

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 on a 0.80 meter high wooden table 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 5^{th} 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 (dBμV /m) = receiver level (μV) + 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 (dBμV/m)
30 - 88	10	39.08
88 - 216	10	43.52
216 - 960	10	46.44
960 - 1000	10	49.54
1000 – 40000	10	49.54 AVG 69.54 PEAK

4.5.3 Test Results

The EUT met the FCC Class 'A' radiated emission requirements. The upper Limit of testing was 18000 MHz. All maximized quasi-peak measurements for the EUT were below the quasi-peak limit. The worst-case quasi-peak emissions were as follows:

Model 210					
Frequency (MHz)	Level (dBμV /m)	Limit (dBμV /m)	Passing Margin (dB)	Turntable (degrees)	Antenna (m/polarity)
48.242	20.81	39.08	18.27	0	1.0/vertical

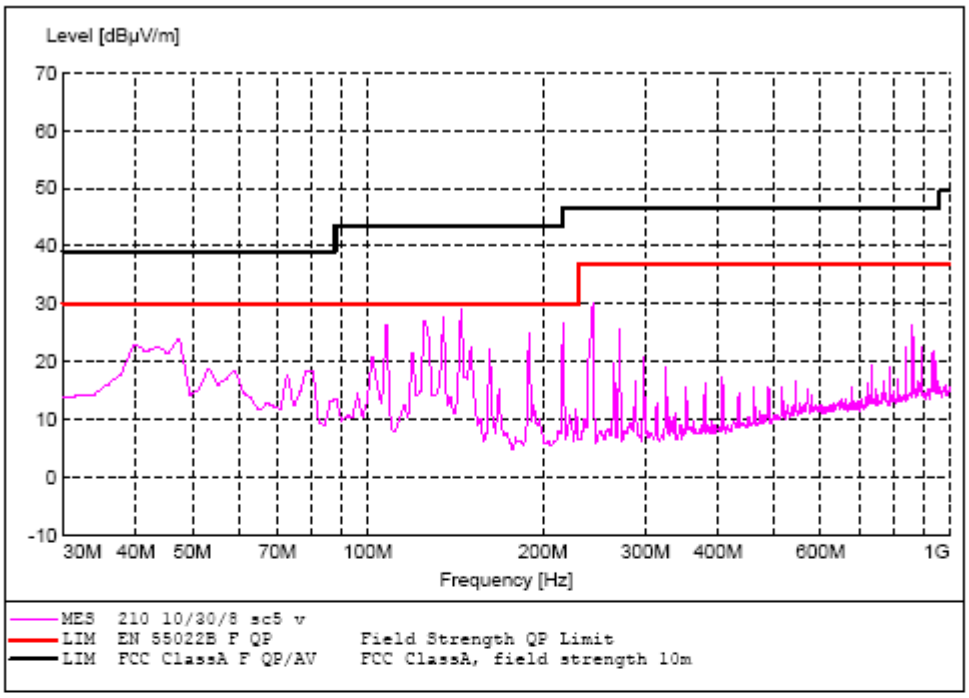
Report Number	F0808002	**Date**	31 Oct 2008
EUT Name	RFID Reader Pad, Model 210	**EUT Power**	120 / 60
EUT Model	210 Reader Pad	**Test Std**	FCC Part B
EUT Serial #	Prototype 1	**Temperature (°C)**	23
EUT Description	RFID Tag reader	**Humidity (%)**	31
		Air Pressure (kPa)	998

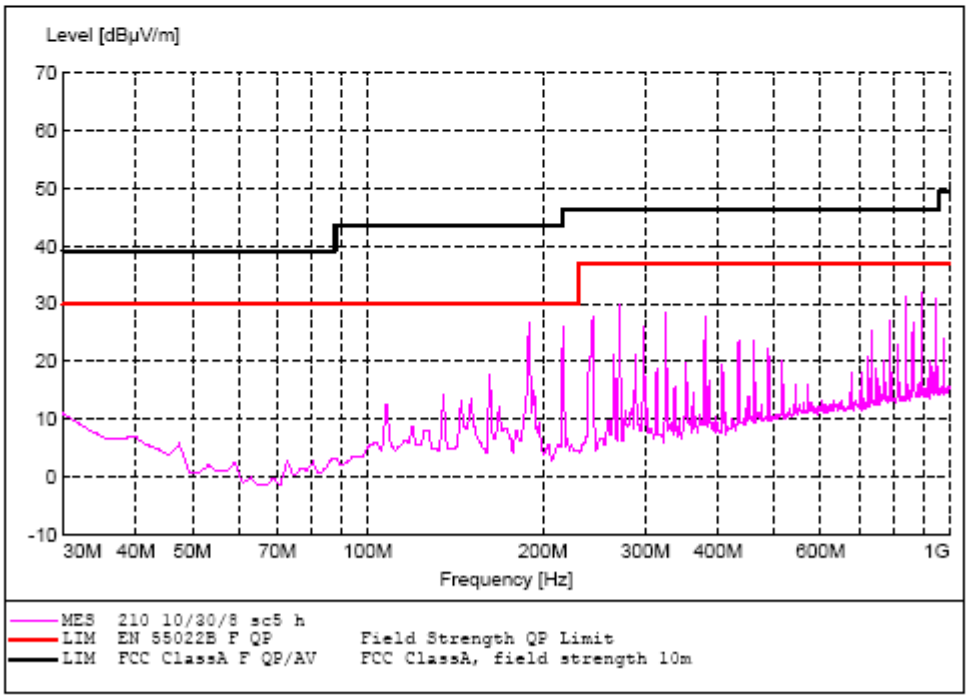
MAXIMIZED FILES 210 10/30/8 sc5 V&H

	MAXIMIZED QP SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED POSITION		
FREQ. (MHz)	H/V	dBµV	dBµV	dBµV	TURNTABLE (°)	ANTENNA (M)	REMARKS
30.1	V	8.48	39.08	30.60	80	1.0	
43.0	V	17.91	39.08	21.17	0	1.0	
48.242	V	20.81	39.08	18.27	0	1.0	
102.515	V	12.72	43.52	30.80	150	1.0	
126.527	V	16.66	43.52	26.86	317	1.0	
144.707	V	19.48	43.52	24.04	72	1.0	

* - All readings have the correction factors applied.

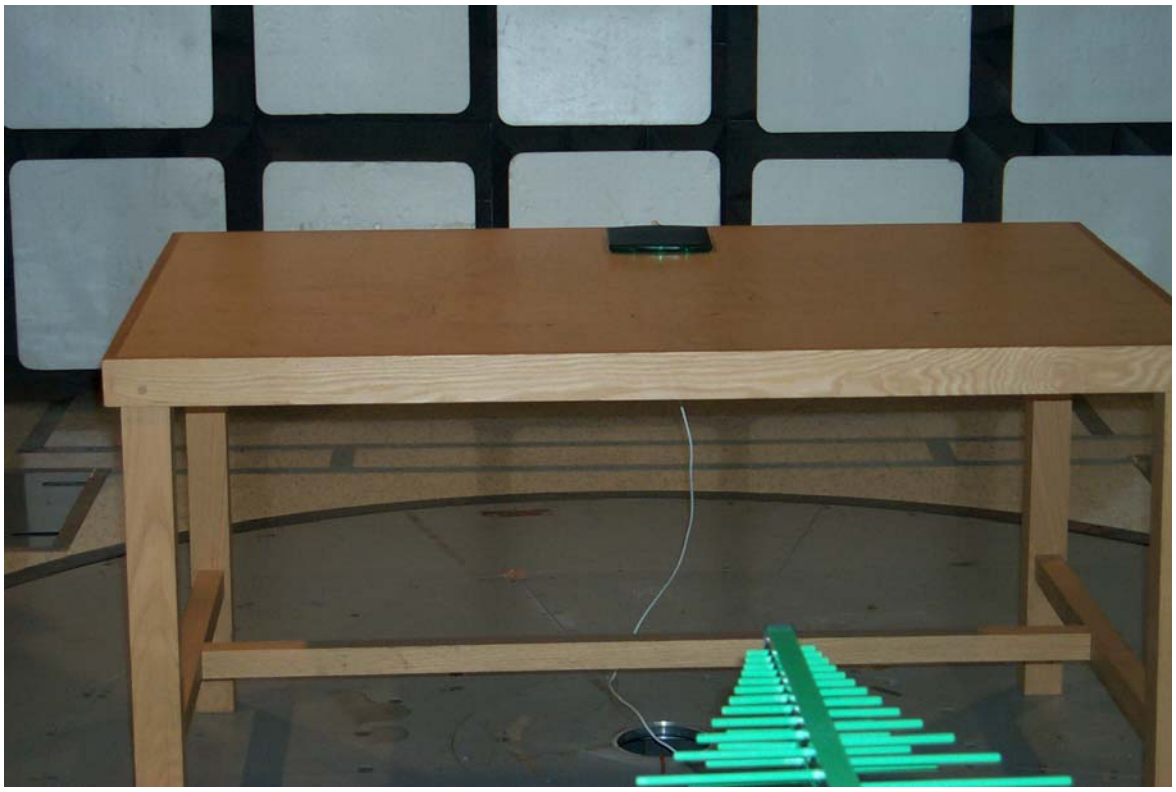
Test Engineer: Bruce Jungwirth	Date: 31 Oct 2008





210 Radiated Emissions (Digital) (RFID off)

4.5.4 Test Setup Photo



Radiated Emissions above 30 MHz

5.0 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 09)
Schaffner Biconilog Antenna, Model CBL6112B, Serial No. 27491 (cal due date: 21 Oct 09)
A. H Systems Horn Antenna, Model SAS_200/571 Serial No: 234 (cal due date: 22 Oct 09)
HP Pre-Amplifier, Model 8447D, Serial No. 1937A03090 (cal due date: 21Oct 09)
HP Pre-Amplifier, Model 83017A, Serial No. 3123A00259 (cal due date: 20 Oct 09)
Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 23 Oct 09)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

FREQUENCY STABILITY / POWER OUTPUT

Agilent Frequency Counter Model 53131A, Serial No. MY40012264 (cal due date: 21 Oct 09)
HP Spectrum Analyzer Model 8591A, Serial No. 3108A02041 (cal due date: 20 Oct 09)
Envirotronics Environ. Chamber, Model EH16-1-1.5AC, SN:10066639 (cal due date: 10 Jan 09)

OCCUPIED BANDWIDTH

Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 23 Oct 09)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

TEST FACILITY

Lindgren Semi-Anechoic Chamber, (verification due date: 30 Aug 09)
FCC Site Registration Number: 93334
Canadian Site Registration Number: 458A-1

6.0 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: DGFTTS210**
> **IC ID: 458A-TTS210**
>
> > **"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: DGFTTS210**

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: 458A-TTS210

7.0 REPORT SIGNATURES

This page contains the secured digital signatures of the parties responsible for reviewing and approving the contents of this report:

Robert E. Heller

APPROVER: _____ DATE: 8 Dec 2008

Robert E. Heller

Bruce R. Jungwirth

TEST ENGINEER: _____ DATE: 8 Dec 2008

Bruce Jungwirth

This is the last page of the Test Report