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Job Number:	963170
Project Number:	08CA18774
File Number:	MC15927
FCC ID:	VJS-M402TX
Date:	08 May 08
Model:	M402

## Electromagnetic Compatibility Test Report

For

### Altec Lansing Technologies

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Underwriters Laboratories Inc.  
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Tel: (631) 271-6200 Fax: (631)439-6095

Job Number: 963170 File Number: MC15927 Page 2 of 40  
Model Number: M402 FCC ID: VJS-M402TX  
Client Name: Altec Lansing Technologies

## Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.  
1285 Walt Whitman Rd.  
Melville, NY 11747**

Tests Performed For: **Altec Lansing Technologies  
P. O. Box 277  
Milford, PA 18337**

Applicant Contact: **STEVE BACHO**  
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Test Report Date: **08 May 08**

Product Type: **RF Remote for M402 Speaker System**

Product standards **FCC Part 15, Subpart C, 15.231**

Model Number: **M402**

Sample Serial Number: **Prototype**

EUT Category: **Periodic Low Power Transmitter**

Testing Start Date: **01 May 08**

Date Testing Complete: **06 May 08**

**Overall Results: Compliant**

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, A2LA, or any agency of the US government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA websites referenced at the end of this report.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	-	-

## 1.0 GENERAL - Product Description

### 1.1 Equipment Description

The system is designed to work as an RF remote control. The Encoder TX PCB includes all buttons, battery terminals and microcontroller for the encoding. The buttons get encoded and the data is sent to the RF TX PCB. The RF TX PCB includes the RF transmit IC and antenna. The Power, GND and data are sent to the RF TX PCB over a 3 pin header. The antenna is a copper trace on the PCB. The RF transmission is ASK 433.92MHz.

The main speaker portion of the system (AC powered) contains the receiver only portion. The transmit portion is only located in the battery operated remote snooze button. Therefore, only FCC Subpart C portion of the rules were applied to the remote.

### 1.2 Equipment Marking Plate



**1.3 Device Configuration During Test**

**1.3.1 Equipment Used During Test:**

Use	Product Type	Manufacturer	Model	Comments
EUT	RF Remote	Altec Lansing Technologies	M402	None
AE	Speaker System	Altec Lansing Technologies	M402	None

Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)

**1.3.2 Input/Output Ports:**

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	Remote & Speaker System
1	Mains	AC	N	N	Speaker System Only
2	Aux In	I/O	N	N	Speaker System Only
3	Snooze Receiver	I/O	N	N	Speaker System Only
4	AM/FM Antenna Connector	I/O	N	N	Speaker System Only

Note:  
 AC = AC Power Port      DC = DC Power Port      N/E = Non-Electrical  
 I/O = Signal Input or Output Port (Not Involved in Process Control)  
 TP = Telecommunication Ports

**1.3.3 EUT Internal Operating Frequencies:**

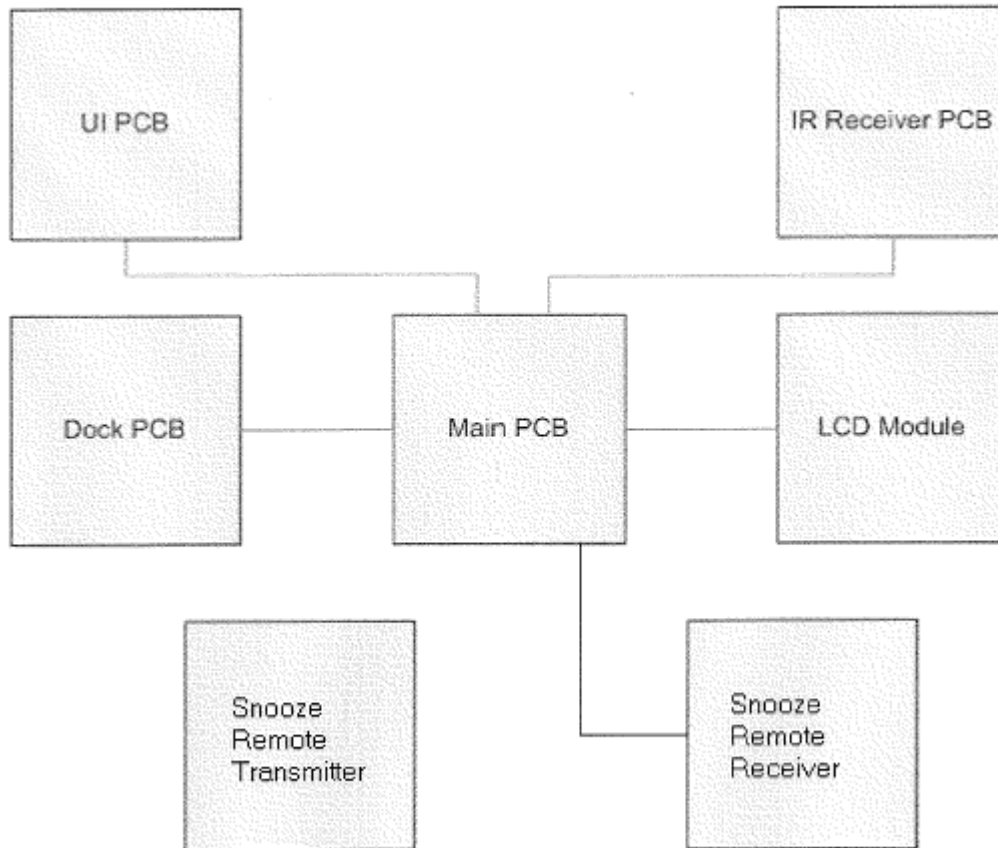
Frequency (MHz)	Description
433	Fundamental
9.84375	LO of Transmit Module
13.52127	LO of Receiver Module

**1.3.4 Power Interface:**

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	Battery	-	-	DC	-	Remote Control (3V Lithium Battery)
2	120	-	-	AC-60Hz	Single Phase	Speaker System Only

**1.4 Block Diagram:**

The diagram below illustrates the configuration of the equipment above.



### 1.5 EUT Configurations

Mode #	Description
1	Main speaker system portion of the EUT powered from a 120Vac, 60Hz source. The transmitter module is battery powered. The base was configured to either constantly transmit or operate as intended depending on what test is being performed.

### 1.6 EUT Operation Modes

Mode #	Description
1	Transmit Mode – Battery powered remote constantly transmitting. AC mains powered base unit operating as intended
2	Receive Mode – Battery powered remote powered, but not transmitting. AC mains powered base unit operating as intended.



## 2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

### 2.1 Deviations from standard test methods

None

### 2.2 Device Modifications Necessary for Compliance

None

**2.3 Reference Standards**

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007

**2.4 Results Summary**

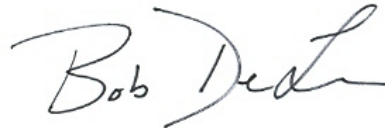
This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
15.231 Cease Operation	Compliant
15.231 Fundamental Radiated Emissions	Compliant
15.207 General Conducted Emissions	Not Applicable*
15.209 General Radiated Emissions	Compliant
15.231 Occupied Bandwidth	Compliant
15.35 Pulse Train - Averaging Factor	Compliant
15.31 Pulse Train Measurement	Compliant
15.231 Spurious Radiated Emissions	Compliant

\* - Transmitter module is battery powered.

Test Engineer:

Reviewer:

Mike Antola (Ext.23053)  
 Senior Project Engineer  
 International EMC Services  
 Conformity Assessment Services-

Bob DeLisi (Ext.22452)  
 Senior Staff Engineer  
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 Conformity Assessment Services

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### 3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

### 4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- United States -----

Code of Federal Regulations Title 47	Part 15, Subpart C, Radio Frequency Devices
--------------------------------------	---------------------------------------------

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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**4.1 Test Conditions and Results – Occupied Bandwidth**

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	CFR 47, Part 15, Subpart C
<b>Occupied Bandwidth Limits</b>	
0.25% of the Fundamental (1.08MHz)	

**Table 4 Occupied Bandwidth Configuration Settings**

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

**Table 5 Occupied Bandwidth Spectrum Analyzer Settings**

Resolution Bandwidth (MHz)	Occupied Bandwidth Requirements
	dBc
0.01	-20
Supplementary information: None	

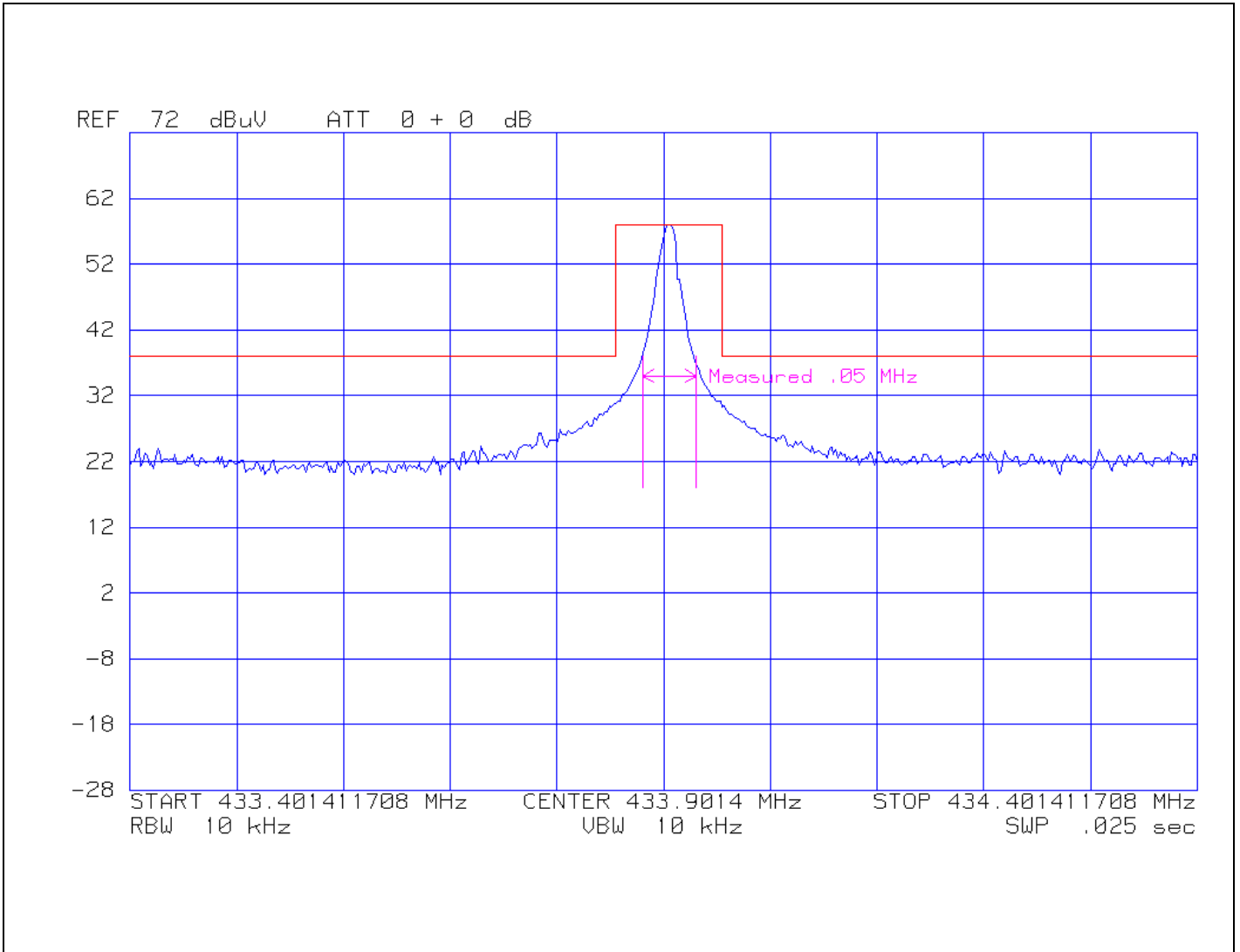
**Table 6 Occupied Bandwidth Test Equipment**

<b>Test Equipment Used</b>			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

Figure 3 Test Setup for Occupied Bandwidth



Figure 4 Occupied Bandwidth Graph



**4.2 Test Conditions and Results – Cease Operation**

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	CFR 47, Subpart C, Part 15.231
<b>Cease Operation Limits</b>	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

**Table 7 Cease Operation Configuration Settings**

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

**Table 8 Cease Operation Test Equipment**

<b>Test Equipment Used</b>			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

Figure 5 Test Setup for Cease Operation

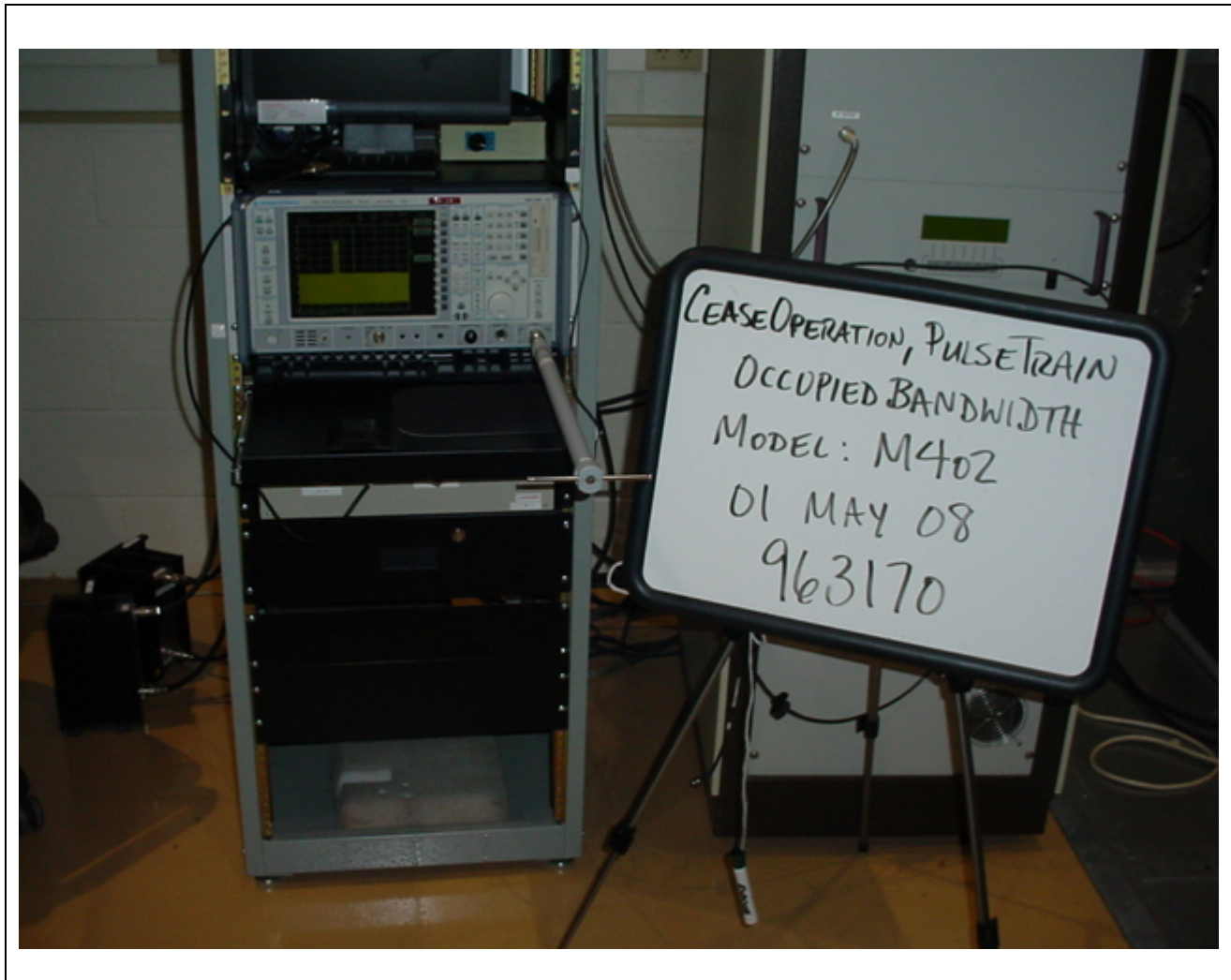
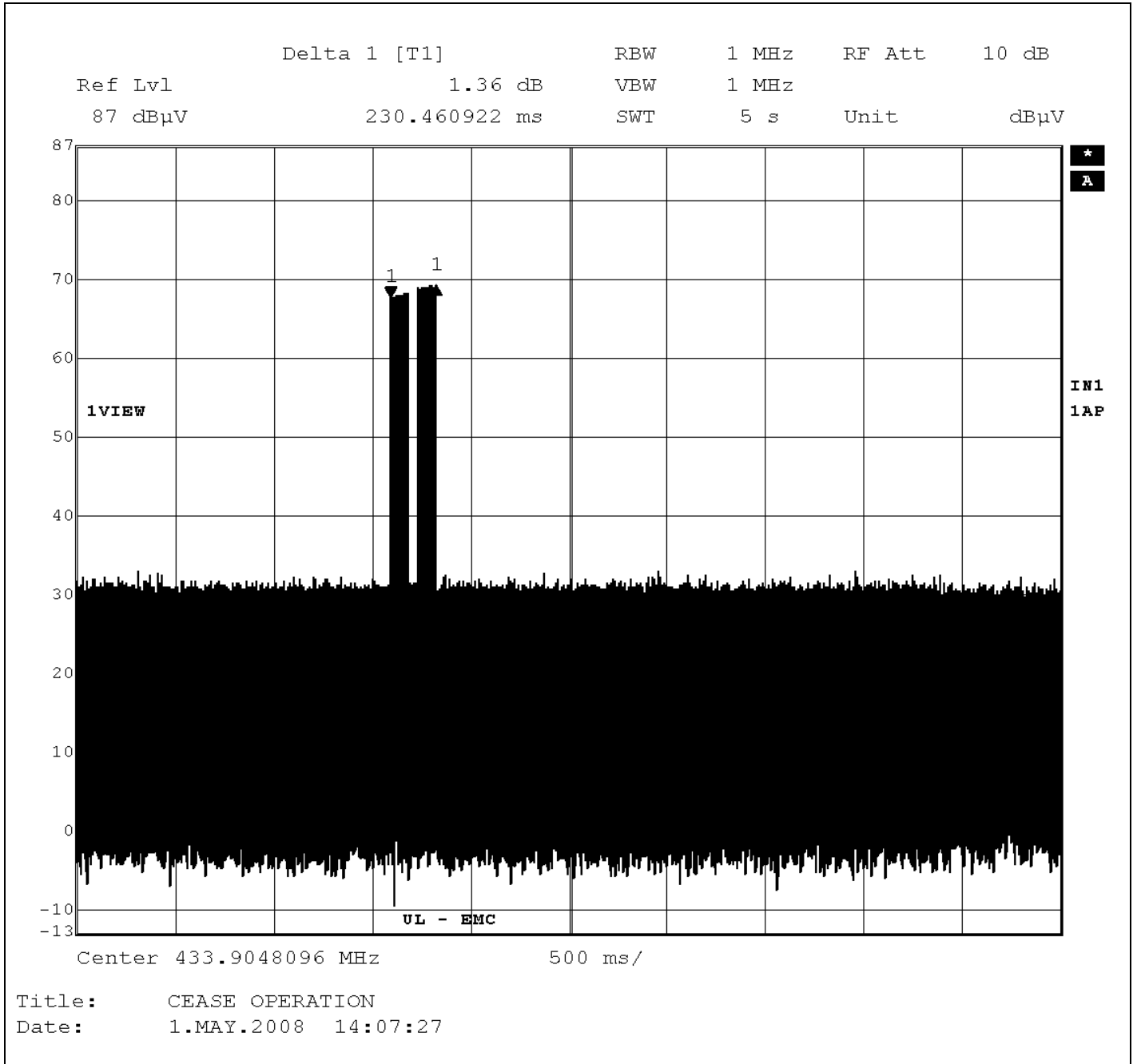




Figure 6 Cease Operation Graph



**4.3 Test Conditions and Results – Pulse Train**

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A, 15.35
<b>Pulse Train Limits</b>	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

**Table 9 Pulse Train Configuration Settings**

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

**Table 10 Pulse Train Calculation**

Pulse Width (mS)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB)
		$20 \log \left( \frac{PulseWidth}{TotalTransmissionTime} \right)$
94	45.25	6.35

Referring to the following plots, it is determined that:

There are 44 Total 400µs pulses (17.6ms)

There are 35 Total 790µs pulses (27.65ms)

Total Transmission Time = 17.6ms + 27.65ms = 45.25ms

**Table 11 Pulse Train Test Equipment**

<b>Test Equipment Used</b>			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Oscilloscope	Tektronix	TDS680B	5-975
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Figure 7 Test Setup for Pulse Train

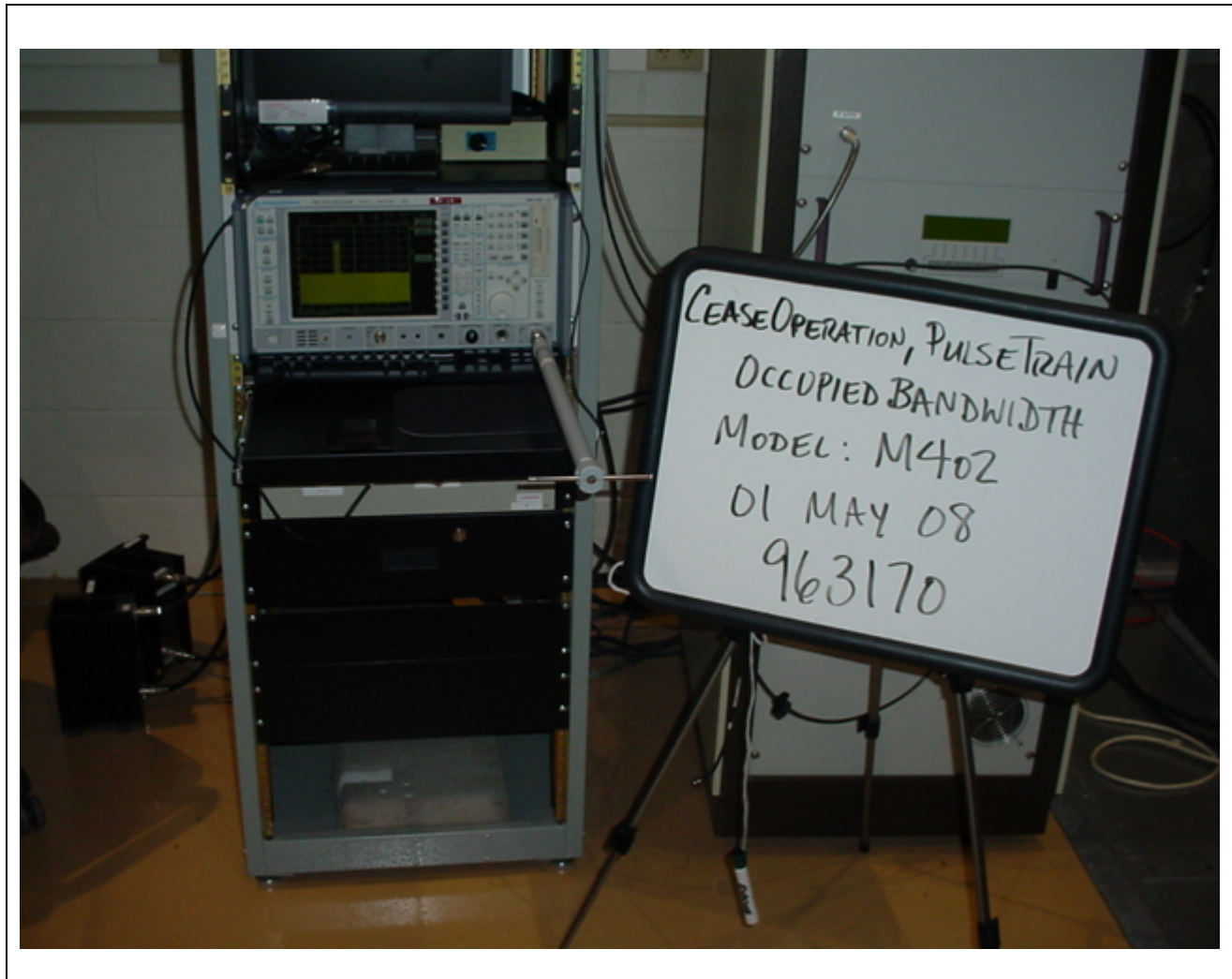


Figure 8 Pulse Train Graph

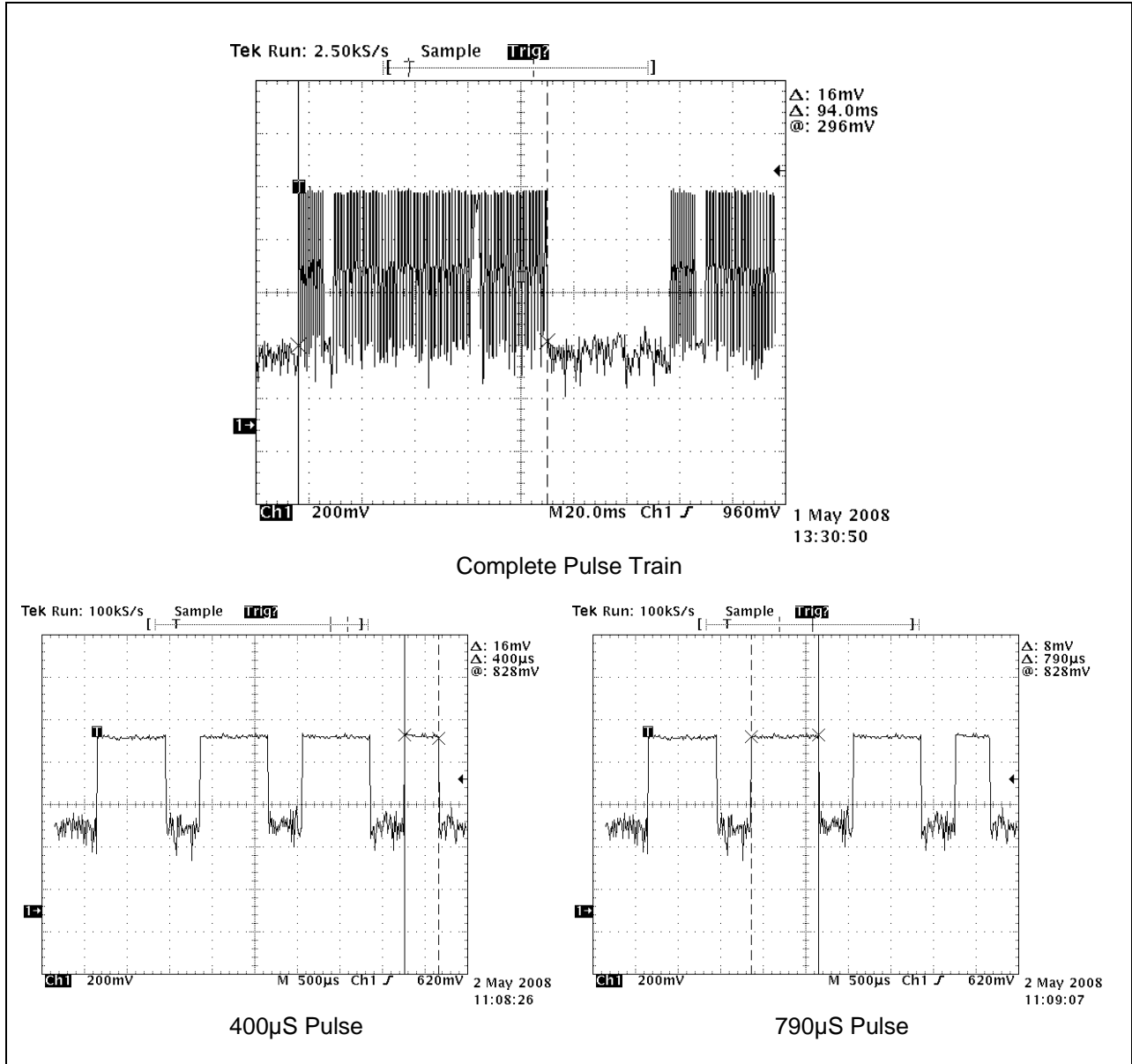
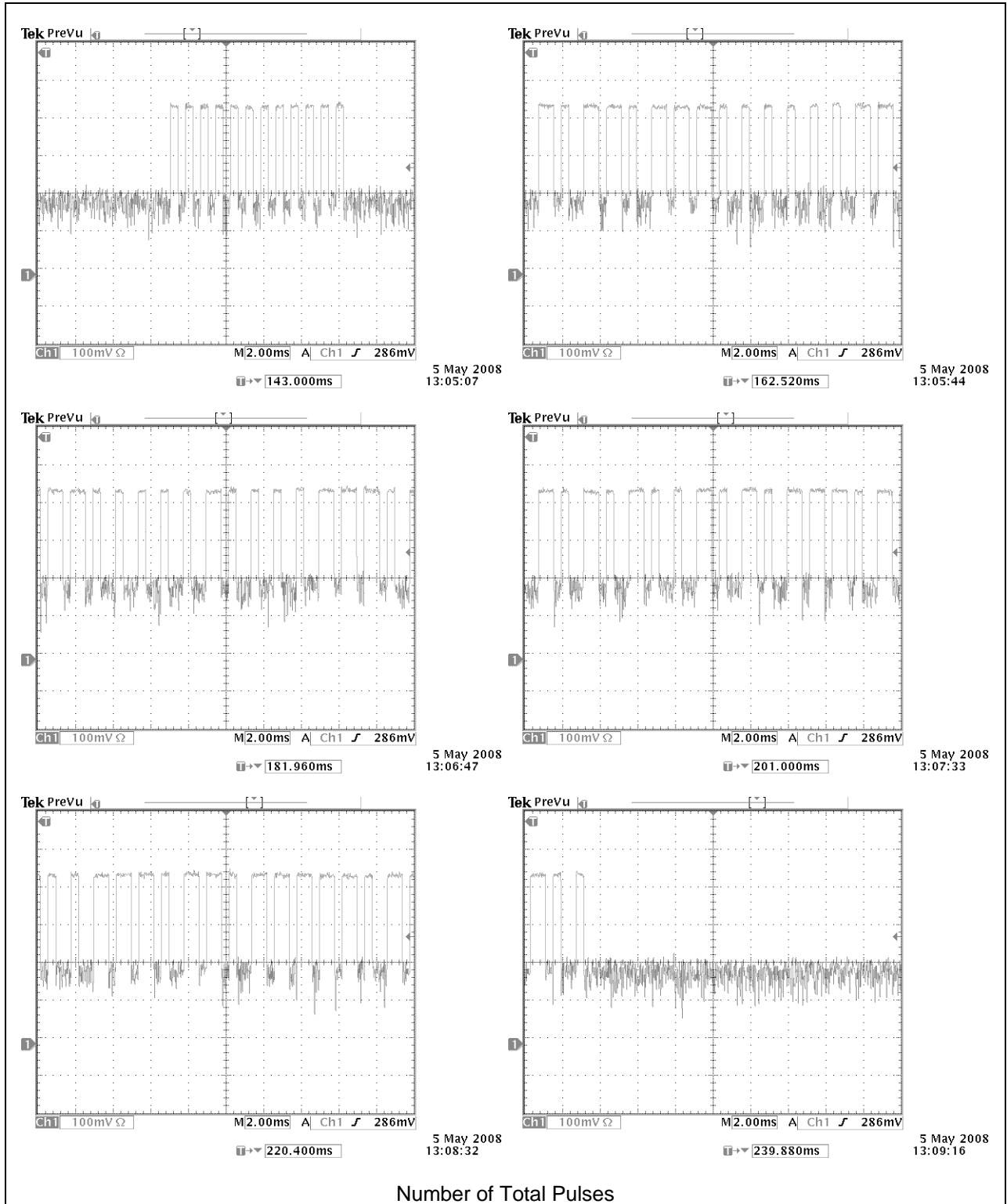


Figure 9 Pulse Train Graphs



**4.4 Test Conditions and Results – Radiated Emissions**

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard	CFR 47, Part 15, Subpart C, 15.209		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30MHz – 5GHz	(3 meter measurement distance)	
<b>Limits</b>			
Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	-
960-1000	54		
1000-5000	-	-	54
433	-	80.79	-
867,1301,1735,2169,2603,3037,3470,4339	-	-	60.79
Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits. Testing below 30MHz was not performed since the fundamental frequency does not reside in this range.			

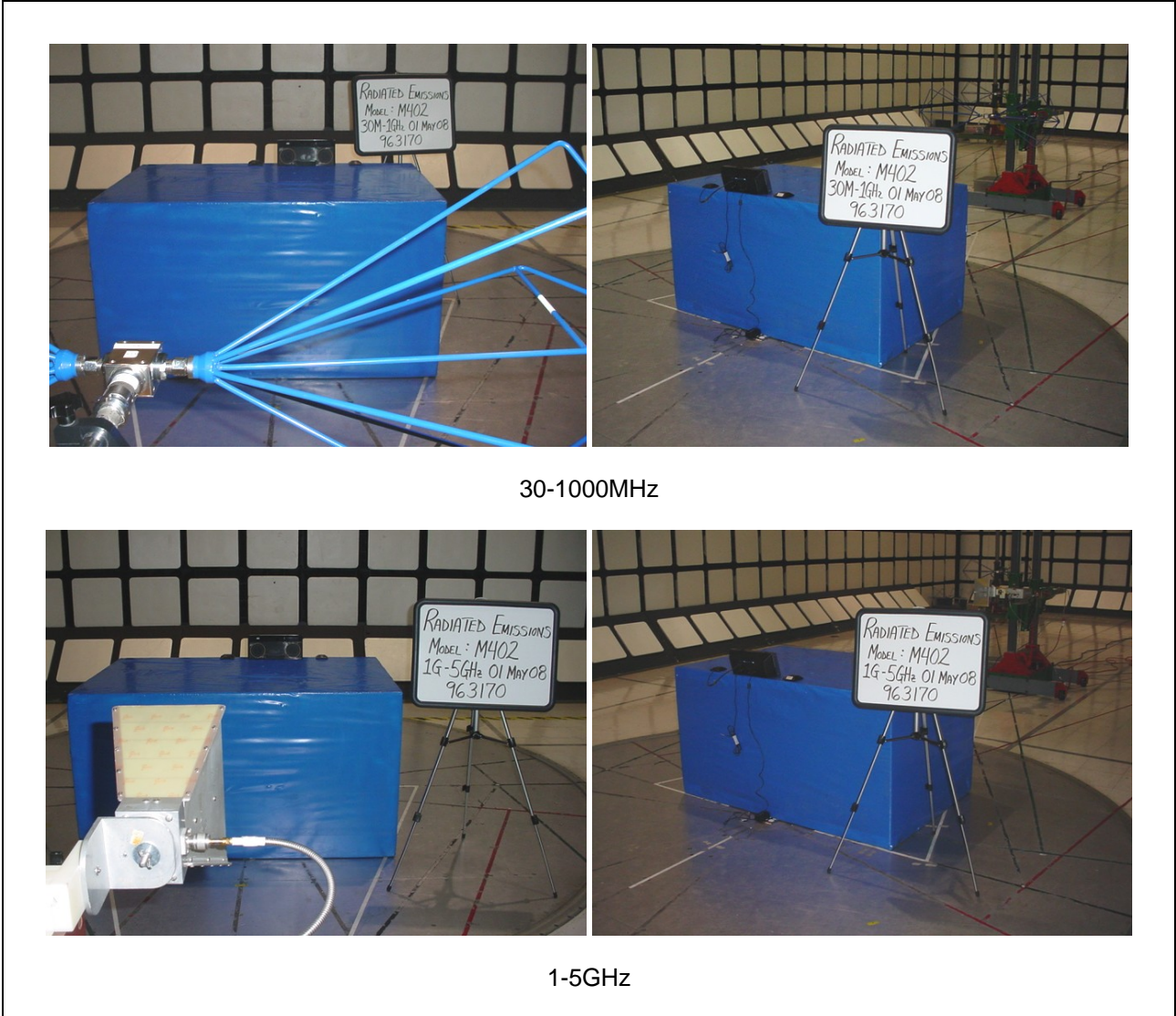
**Table 12 Radiated Emissions EUT Configuration Settings**

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1,2	1	1,2
Supplementary information: None		

**Table 13 Radiated Emissions Test Equipment**

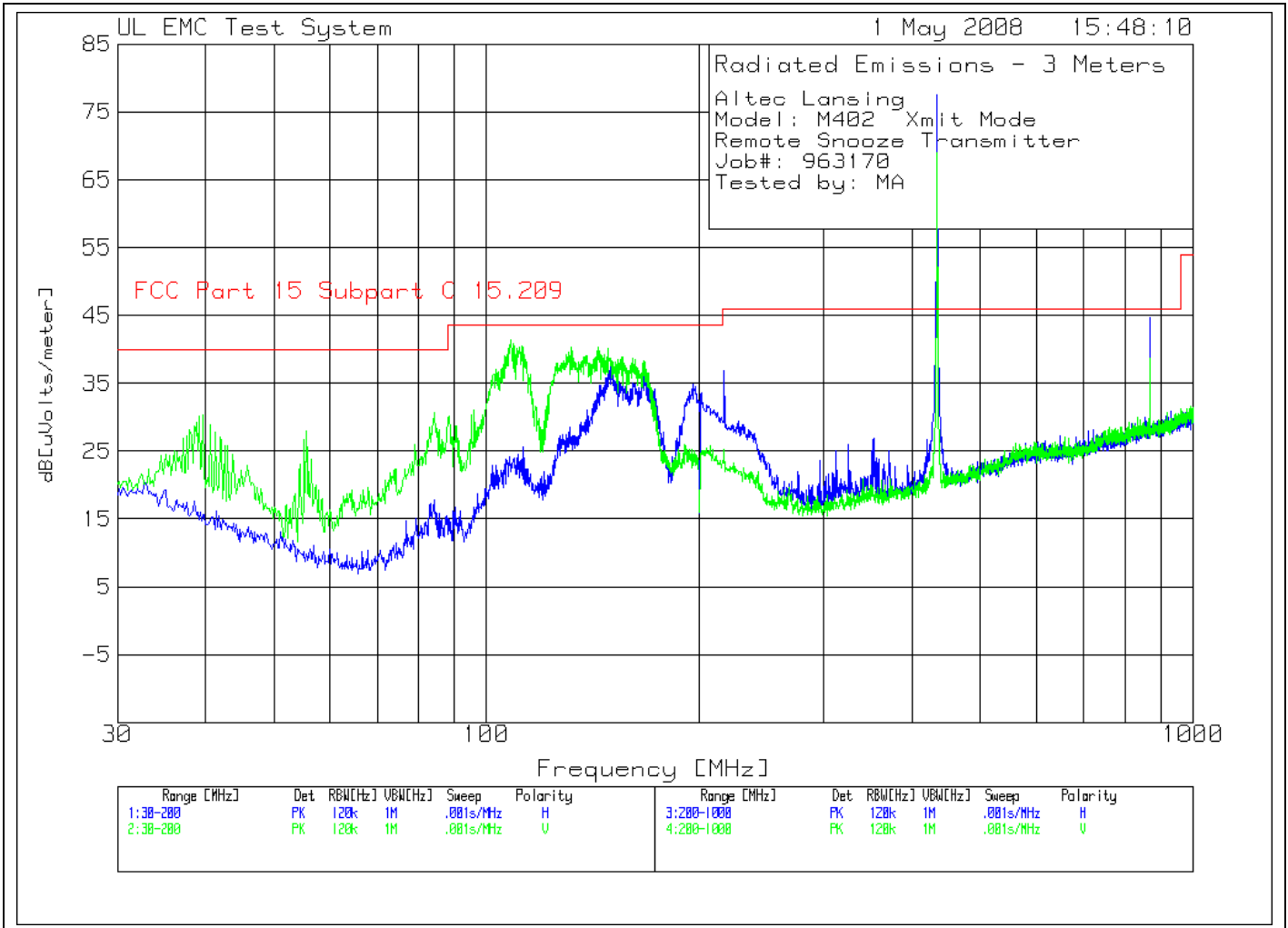
<b>Test Equipment Used</b>			
Description	Manufacturer	Model	Identifier
<b>30-1000MHz</b>			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	54
Log-P Antenna	Schaffner	UPA6109	44067
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	83III	ME5B-305
<b>Above 1GHz</b>			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Horn Antenna	EMCO	3115	ME5A-766
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	83III	ME5B-305

Figure 10 Test setup for Radiated Emissions





**Figure 11 Radiated Emissions Graph – Transmit Mode (30-1000MHz)**



**Table 14 Radiated Emissions Data Points**

Altec Lansing  
 Model: M402  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz -----											
1	149.7998	21.87 pk	.7	14.4	36.97	43.5	-	-	-	-	-
	Azimuth:17	Height:250	Horz	Margin [dB]		-6.53	-	-	-	-	-
6	167.1572	20.66 pk	.8	14.8	36.26	43.5	-	-	-	-	-
	Azimuth:17	Height:250	Horz	Margin [dB]		-7.24	-	-	-	-	-
7	197.2773	17.54 pk	.9	15.7	34.14	43.5	-	-	-	-	-
	Azimuth:343	Height:100	Horz	Margin [dB]		-9.36	-	-	-	-	-
Vertical 30 - 200MHz -----											
2	108.4484	27.89 pk	.7	12.6	41.19	43.5	-	-	-	-	-
	Azimuth:88	Height:100	Vert	Margin [dB]		-2.31	-	-	-	-	-
3	131.5916	26.23 pk	.7	14.1	41.03	43.5	-	-	-	-	-
	Azimuth:88	Height:100	Vert	Margin [dB]		-2.47	-	-	-	-	-
4	144.5245	24.15 pk	.8	15.2	40.15	43.5	-	-	-	-	-
	Azimuth:127	Height:100	Vert	Margin [dB]		-3.35	-	-	-	-	-
5	161.7117	22.22 pk	.8	15.6	38.62	43.5	-	-	-	-	-
	Azimuth:127	Height:100	Vert	Margin [dB]		-4.88	-	-	-	-	-
Horizontal 200 - 1000MHz -----											
1	433.7169	59.25 pk	1.3	16.7	77.25	46	-	-	-	-	-
	Azimuth:131	Height:100	Horz	Margin [dB]		31.25	-	-	-	-	-
2	216.8084	22.08 pk	.9	11.5	34.48	46	-	-	-	-	-
	Azimuth:347	Height:100	Horz	Margin [dB]		-11.52	-	-	-	-	-
3	867.934	19.24 pk	1.7	22.9	43.84	46	-	-	-	-	-
	Azimuth:261	Height:100	Horz	Margin [dB]		-2.16	-	-	-	-	-
4	325.2626	10.26 pk	1.2	14.4	25.86	46	-	-	-	-	-
	Azimuth:133	Height:100	Horz	Margin [dB]		-20.14	-	-	-	-	-
Vertical 200 - 1000MHz -----											
5	433.7169	48.32 pk	1.3	16.4	66.02	46	-	-	-	-	-
	Azimuth:137	Height:200	Vert	Margin [dB]		20.02	-	-	-	-	-
6	867.934	12.58 pk	1.7	23.2	37.48	46	-	-	-	-	-
	Azimuth:164	Height:300	Vert	Margin [dB]		-8.52	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

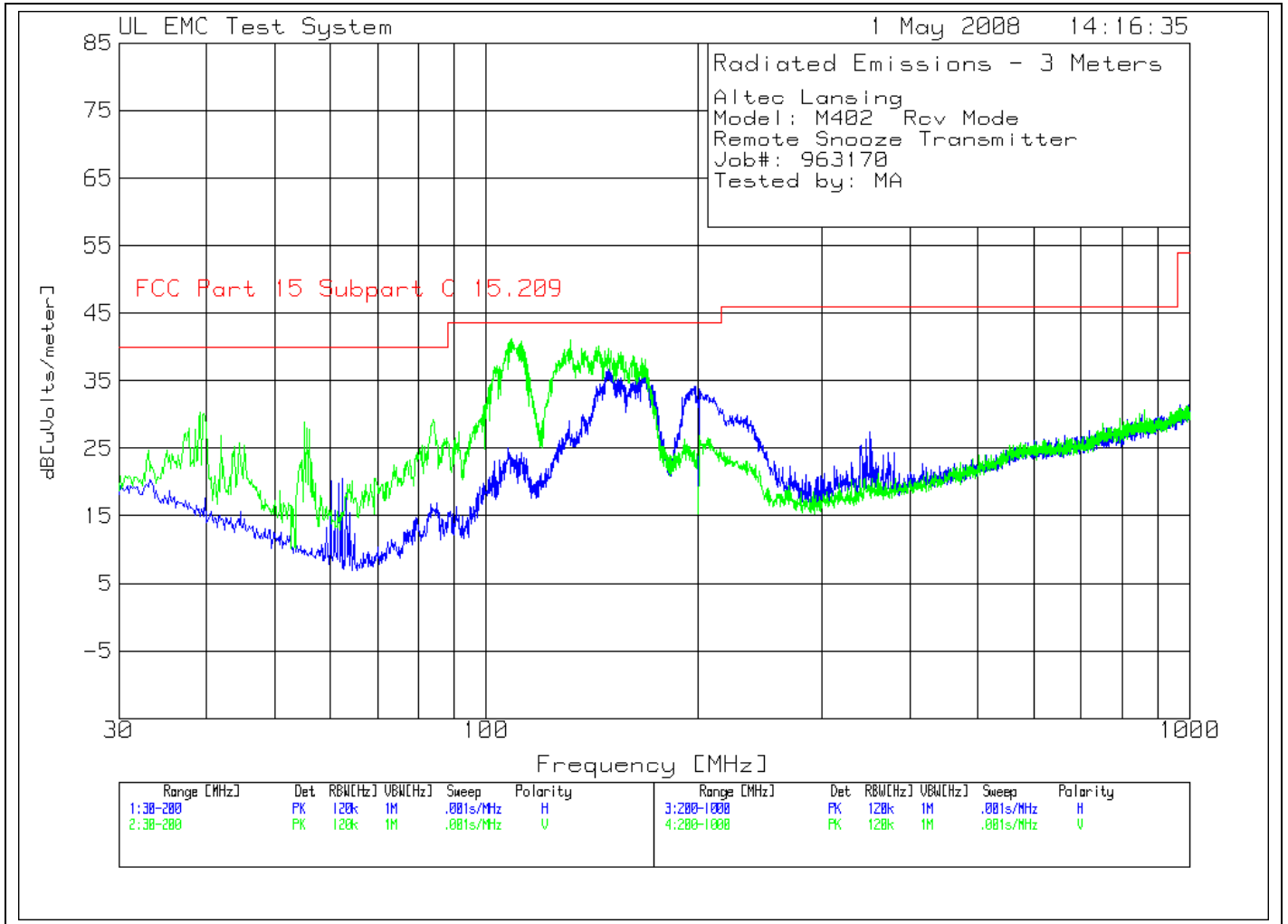
Altec Lansing  
 Model: M402  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Vertical 30 - 200MHz										
108.5696	27.17 qp	.7	12.6	40.47	43.5	-	-	-	-	-
Azimuth: 50 Height:104 Vert					Margin [dB]:	-3.03	-	-	-	-
131.5922	24.43 qp	.7	14.1	39.23	43.5	-	-	-	-	-
Azimuth: 101 Height:105 Vert					Margin [dB]:	-4.27	-	-	-	-
144.0251	20.34 qp	.8	15.2	36.34	43.5	-	-	-	-	-
Azimuth: 111 Height:112 Vert					Margin [dB]:	-7.16	-	-	-	-
161.8868	23.32 qp	.8	15.6	39.72	43.5	-	-	-	-	-
Azimuth: 104 Height:102 Vert					Margin [dB]:	-3.78	-	-	-	-
Horizontal 200 - 1000MHz										
433.8936	58.73 qp	1.3	16.8	76.83	-	80.79	-	-	-	-
Azimuth: 142 Height:280 Horz					Margin [dB]:	-3.96	-	-	-	-
867.8072	19.54 qp	1.7	22.9	44.14	-	60.79	-	-	-	-
Azimuth: 22 Height:156 Horz					Margin [dB]:	-16.65	-	-	-	-
Vertical 200 - 1000MHz										
433.8959	47.61 qp	1.3	16.4	65.31	-	80.79	-	-	-	-
Azimuth: 135 Height:138 Vert					Margin [dB]:	-15.48	-	-	-	-
867.7943	20.28 qp	1.7	23.2	45.18	-	60.79	-	-	-	-
Azimuth: 108 Height:143 Vert					Margin [dB]:	-15.61	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: FCC Part 15 Subpart C 15.231  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

**Figure 12 Radiated Emissions Graph – Receive Mode (30-1000MHz)**



**Table 15 Radiated Emissions Data Points**

Altec Lansing  
 Model: M402  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz -----											
1	149.7998	21.87 pk	.7	14.4	36.97	43.5	-	-	-	-	-
	Azimuth:17	Height:250	Horz	Margin [dB]		-6.53	-	-	-	-	-
6	167.1572	20.66 pk	.8	14.8	36.26	43.5	-	-	-	-	-
	Azimuth:17	Height:250	Horz	Margin [dB]		-7.24	-	-	-	-	-
7	197.2773	17.54 pk	.9	15.7	34.14	43.5	-	-	-	-	-
	Azimuth:343	Height:100	Horz	Margin [dB]		-9.36	-	-	-	-	-
Vertical 30 - 200MHz -----											
2	108.4484	27.89 pk	.7	12.6	41.19	43.5	-	-	-	-	-
	Azimuth:88	Height:100	Vert	Margin [dB]		-2.31	-	-	-	-	-
3	131.5916	26.23 pk	.7	14.1	41.03	43.5	-	-	-	-	-
	Azimuth:88	Height:100	Vert	Margin [dB]		-2.47	-	-	-	-	-
4	144.5245	24.15 pk	.8	15.2	40.15	43.5	-	-	-	-	-
	Azimuth:127	Height:100	Vert	Margin [dB]		-3.35	-	-	-	-	-
5	161.7117	22.22 pk	.8	15.6	38.62	43.5	-	-	-	-	-
	Azimuth:127	Height:100	Vert	Margin [dB]		-4.88	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

Job Number: 963170 File Number: MC15927 Page 30 of 40  
 Model Number: M402 FCC ID: VJS-M402TX  
 Client Name: Altec Lansing Technologies

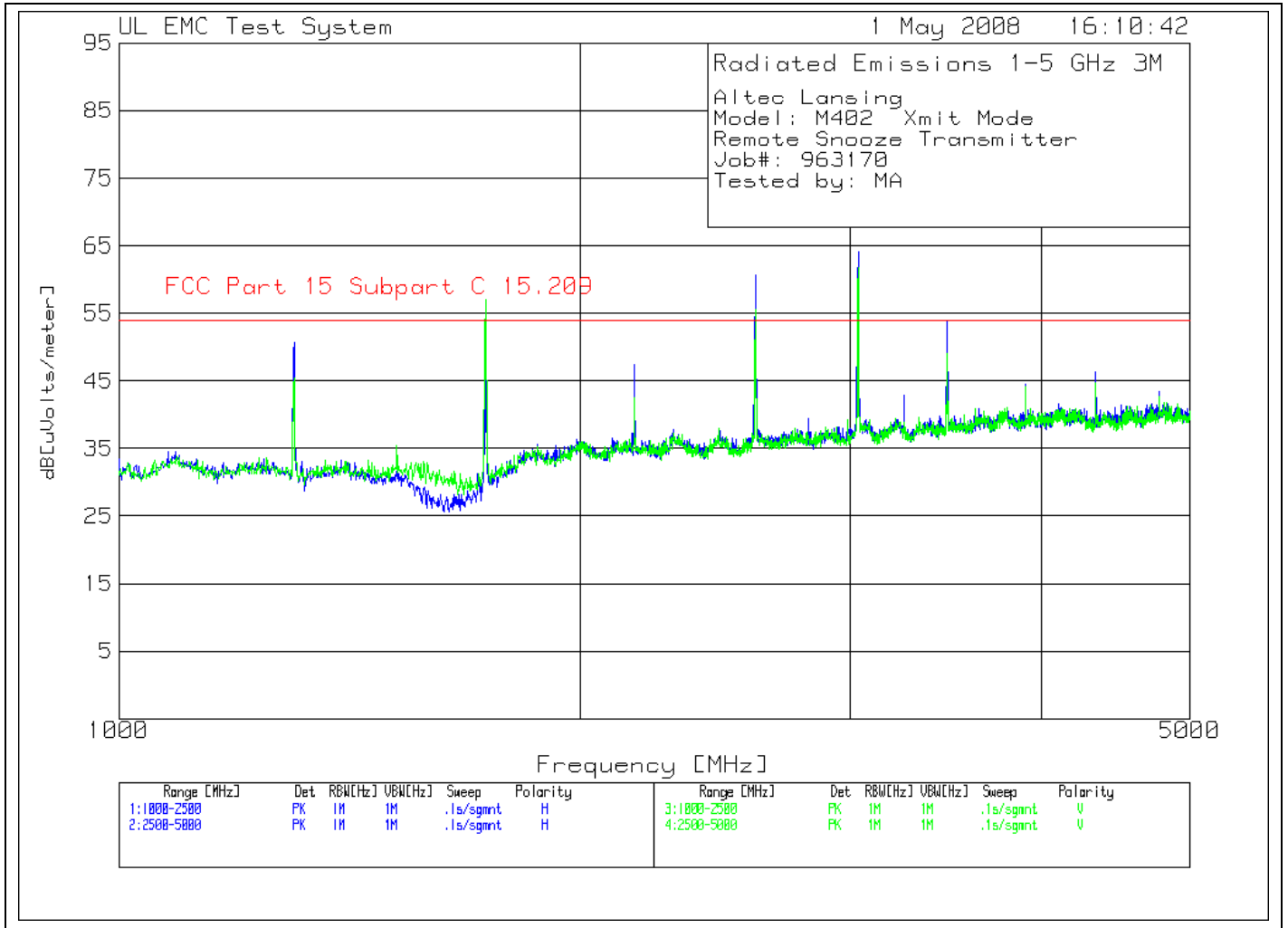
Altec Lansing  
 Model: M402  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Vertical 30 - 200MHz										
108.5696	27.17 qp	.7	12.6	40.47	43.5	-	-	-	-	-
Azimuth: 50	Height:104	Vert		Margin [dB]:	-3.03	-	-	-	-	-
131.5922	24.43 qp	.7	14.1	39.23	43.5	-	-	-	-	-
Azimuth: 101	Height:105	Vert		Margin [dB]:	-4.27	-	-	-	-	-
144.0251	20.34 qp	.8	15.2	36.34	43.5	-	-	-	-	-
Azimuth: 111	Height:112	Vert		Margin [dB]:	-7.16	-	-	-	-	-
161.8868	23.32 qp	.8	15.6	39.72	43.5	-	-	-	-	-
Azimuth: 104	Height:102	Vert		Margin [dB]:	-3.78	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

Figure 13 Radiated Emissions Graph – Transmit Mode (1-5GHz)



**Table 16 Radiated Emissions Data Points**

Altec Lansing  
 Model: M402 Xmit Mode  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2500MHz -----											
1	1301.802	57.12 pk	-31.6	25.1	50.62	54	-	-	-	-	-
	Azimuth:192	Height:100	Horz	Margin [dB]		-3.38	-	-	-	-	-
2	1735.736	55.69 pk	-30.5	26.3	51.49	54	-	-	-	-	-
	Azimuth:164	Height:200	Horz	Margin [dB]		-2.51	-	-	-	-	-
3	2169.67	48.8 pk	-29.5	28.1	47.4	54	-	-	-	-	-
	Azimuth:353	Height:200	Horz	Margin [dB]		-6.6	-	-	-	-	-
Horizontal 2500 - 5000MHz -----											
4	2603.402	60.61 pk	-29	29.1	60.71	54	-	-	-	-	-
	Azimuth:136	Height:100	Horz	Margin [dB]		6.71	-	-	-	-	-
5	3037.025	61.13 pk	-27.5	30.4	64.03	54	-	-	-	-	-
	Azimuth:219	Height:199	Horz	Margin [dB]		10.03	-	-	-	-	-
6	3470.647	49.59 pk	-27	31.1	53.69	54	-	-	-	-	-
	Azimuth:34	Height:199	Horz	Margin [dB]		-1.31	-	-	-	-	-
7	4339.56	39.39 pk	-25.5	32.5	46.39	54	-	-	-	-	-
	Azimuth:136	Height:100	Horz	Margin [dB]		-7.61	-	-	-	-	-
Vertical 1000 - 2500MHz -----											
8	1301.802	51.91 pk	-31.6	25.1	45.41	54	-	-	-	-	-
	Azimuth:7	Height:200	Vert	Margin [dB]		-8.59	-	-	-	-	-
9	1735.736	61.18 pk	-30.5	26.4	57.08	54	-	-	-	-	-
	Azimuth:81	Height:200	Vert	Margin [dB]		3.08	-	-	-	-	-
10	2169.67	43.92 pk	-29.5	28.1	42.52	54	-	-	-	-	-
	Azimuth:220	Height:200	Vert	Margin [dB]		-11.48	-	-	-	-	-
Vertical 2500 - 5000MHz -----											
11	2601.734	55.76 pk	-29	28.9	55.66	54	-	-	-	-	-
	Azimuth:191	Height:200	Vert	Margin [dB]		1.66	-	-	-	-	-
12	3037.025	58.99 pk	-27.5	30.3	61.79	54	-	-	-	-	-
	Azimuth:247	Height:200	Vert	Margin [dB]		7.79	-	-	-	-	-
13	3470.647	45.02 pk	-27	31.1	49.12	54	-	-	-	-	-
	Azimuth:306	Height:100	Vert	Margin [dB]		-4.88	-	-	-	-	-
14	3905.937	37.59 pk	-25.8	32.3	44.09	54	-	-	-	-	-
	Azimuth:358	Height:100	Vert	Margin [dB]		-9.91	-	-	-	-	-
15	4339.56	37.74 pk	-25.5	32.4	44.64	54	-	-	-	-	-
	Azimuth:52	Height:200	Vert	Margin [dB]		-9.36	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE



Altec Lansing  
 Model: M402 Xmit Mode  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2500MHz										
1301.8341	51.46 ave	-31.6	25.1	44.96	54	-	-	-	-	-
Azimuth: 12		Height:109	Horz	Margin [dB]:	-9.04	-	-	-	-	-
1301.8341	59.05 pk	-31.6	25.1	52.55	54	-	-	-	-	-
Azimuth: 12		Height:109	Horz	Margin [dB]:	-1.45	-	-	-	-	-
1735.6737	52.22 ave	-30.5	26.3	48.02	54	-	-	-	-	-
Azimuth: 219		Height:126	Horz	Margin [dB]:	-5.98	-	-	-	-	-
1735.6737	58.03 pk	-30.5	26.3	53.83	54	-	-	-	-	-
Azimuth: 219		Height:126	Horz	Margin [dB]:	-.17	-	-	-	-	-
Horizontal 2500 - 5000MHz										
2603.2142	53.2 ave	-29	29.1	53.3	54	-	-	-	-	-
Azimuth: 222		Height:198	Horz	Margin [dB]:	-.7	-	-	-	-	-
2603.2142	62.25 pk	-29	29.1	62.35	54	-	-	-	-	-
Azimuth: 222		Height:198	Horz	Margin [dB]:	8.35	-	-	-	-	-
3037.3407	55.73 ave	-27.5	30.4	58.63	54	-	-	-	-	-
Azimuth: 270		Height:189	Horz	Margin [dB]:	4.63	-	-	-	-	-
3037.3407	62.21 pk	-27.5	30.4	65.11	54	-	-	-	-	-
Azimuth: 270		Height:189	Horz	Margin [dB]:	11.11	-	-	-	-	-
3471.483	39.35 ave	-27	31.1	43.45	54	-	-	-	-	-
Azimuth: 49		Height:153	Horz	Margin [dB]:	-10.55	-	-	-	-	-
3471.483	55.14 pk	-27	31.1	59.24	54	-	-	-	-	-
Azimuth: 49		Height:153	Horz	Margin [dB]:	5.24	-	-	-	-	-
Vertical 1000 - 2500MHz										
1735.5284	58.09 ave	-30.5	26.4	53.99	54	-	-	-	-	-
Azimuth: 159		Height:101	Vert	Margin [dB]:	-.01	-	-	-	-	-
1735.5284	63.41 pk	-30.5	26.4	59.31	54	-	-	-	-	-
Azimuth: 159		Height:101	Vert	Margin [dB]:	5.31	-	-	-	-	-
Vertical 2500 - 5000MHz										
2603.2946	52.93 ave	-29	28.9	52.83	54	-	-	-	-	-
Azimuth: 256		Height:192	Vert	Margin [dB]:	-1.17	-	-	-	-	-
2603.2946	59.54 pk	-29	28.9	59.44	54	-	-	-	-	-
Azimuth: 256		Height:192	Vert	Margin [dB]:	5.44	-	-	-	-	-
3037.4208	37.89 ave	-27.5	30.3	40.69	54	-	-	-	-	-
Azimuth: 148		Height:144	Vert	Margin [dB]:	-13.31	-	-	-	-	-
3037.4208	61.51 pk	-27.5	30.3	64.31	54	-	-	-	-	-
Azimuth: 148		Height:144	Vert	Margin [dB]:	10.31	-	-	-	-	-
3471.4228	29.6 ave	-27	31.1	33.7	54	-	-	-	-	-
Azimuth: 126		Height:150	Vert	Margin [dB]:	-20.3	-	-	-	-	-

Job Number: 963170      File Number: MC15927      Page 34 of 40  
 Model Number: M402      FCC ID: VJS-M402TX  
 Client Name: Altec Lansing Technologies

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
3471.4228	49.01 pk	-27	31.1	53.11	54	-	-	-	-	-
Azimuth: 126    Height:150    Vert					Margin [dB]:	-0.89	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

Job Number: 963170      File Number: MC15927      Page 35 of 40  
 Model Number: M402      FCC ID: VJS-M402TX  
 Client Name: Altec Lansing Technologies

Altec Lansing  
 Model: M402 Xmit Mode  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

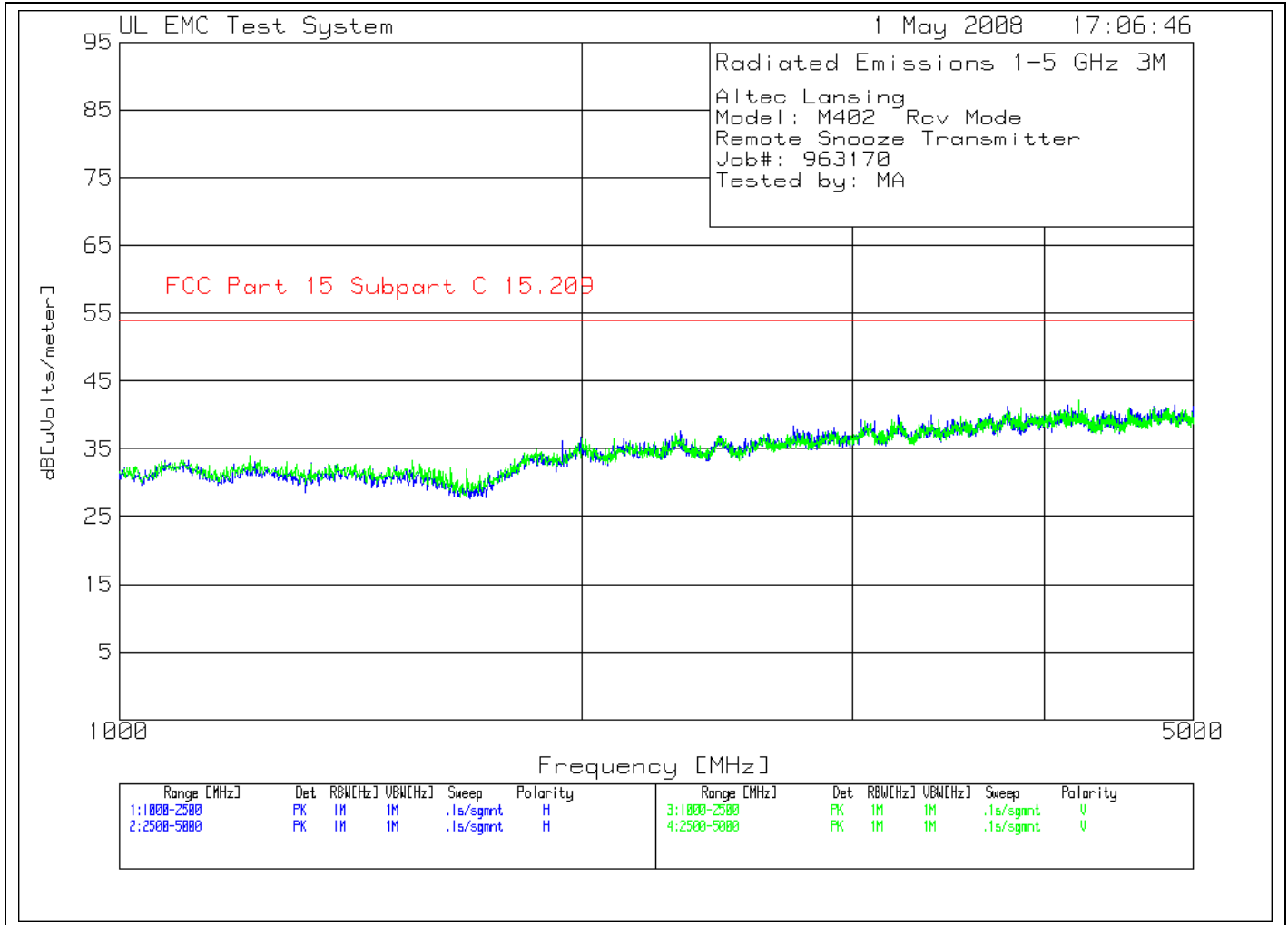
Test	Meter	Gain/Loss	Transducer	Correction	Level	Limit:1	2	3	4
Frequency	Reading	Factor	Factor	Factor	dB[uVolts/meter]				
[MHz]	[dB(uV)]	[dB]	[dB]	[dB]					
=====									
Horizontal 2500 - 5000MHz									
2603.2142	62.25 pk	-29	29.1	-6.35	56	60.79	-	-	-
Azimuth: 222		Height:198	Horz	Margin [dB]:		-4.79	-	-	-
3037.3407	62.21 pk	-27.5	30.4	-6.35	58.64	60.79	-	-	-
Azimuth: 270		Height:189	Horz	Margin [dB]:		-2.03	-	-	-
3471.483	55.14 pk	-27	31.1	-6.35	52.89	60.79	-	-	-
Azimuth: 49		Height:153	Horz	Margin [dB]:		-7.9	-	-	-
Vertical 1000 - 2500MHz									
1735.5284	63.41 pk	-30.5	26.4	-6.35	52.96	60.79	-	-	-
Azimuth: 159		Height:101	Vert	Margin [dB]:		-7.83	-	-	-
Vertical 2500 - 5000MHz									
2603.2946	59.54 pk	-29	28.9	-6.35	53.09	60.79	-	-	-
Azimuth: 256		Height:192	Vert	Margin [dB]:		-7.7	-	-	-
3037.4208	61.51 pk	-27.5	30.3	-6.35	57.96	60.79	-	-	-
Azimuth: 148		Height:144	Vert	Margin [dB]:		-2.83	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.231  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

Note: The values above represent maximized peak measurements. Correction factor obtained from Pulse Train section of the test report.

**Figure 14 Radiated Emissions Graph – Receive Mode (1-5GHz)**



**Table 17 Radiated Emissions Data Points**

Altec Lansing  
 Model: M402 Rcv Mode  
 Remote Snooze Transmitter  
 Job#: 963170  
 Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2500MHz -----											
1	1109.61	40.22 pk	-32.2	25.2	33.22	54	-	-	-	-	-
	Azimuth:303	Height:200	Horz	Margin [dB]		-20.78	-	-	-	-	-
2	1942.943	38.51 pk	-29.9	27.5	36.11	54	-	-	-	-	-
	Azimuth:220	Height:101	Horz	Margin [dB]		-17.89	-	-	-	-	-
Horizontal 2500 - 5000MHz -----											
3	3213.809	36.66 pk	-27.4	30.7	39.96	54	-	-	-	-	-
	Azimuth:358	Height:100	Horz	Margin [dB]		-14.04	-	-	-	-	-
4	3782.522	34.8 pk	-25.4	31.9	41.3	54	-	-	-	-	-
	Azimuth:34	Height:200	Horz	Margin [dB]		-12.7	-	-	-	-	-
Vertical 1000 - 2500MHz -----											
5	1216.216	40.9 pk	-31.9	25	34	54	-	-	-	-	-
	Azimuth:84	Height:200	Vert	Margin [dB]		-20	-	-	-	-	-
6	2001.502	38.52 pk	-29.8	27.8	36.52	54	-	-	-	-	-
	Azimuth:84	Height:200	Vert	Margin [dB]		-17.48	-	-	-	-	-
Vertical 2500 - 5000MHz -----											
7	3527.352	35.37 pk	-26.8	31.3	39.87	54	-	-	-	-	-
	Azimuth:336	Height:100	Vert	Margin [dB]		-14.13	-	-	-	-	-
8	4209.473	34.95 pk	-25.2	32.4	42.15	54	-	-	-	-	-
	Azimuth:359	Height:100	Vert	Margin [dB]		-11.85	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209  
 LIMIT 2: NONE  
 LIMIT 3: NONE  
 LIMIT 4: NONE  
 LIMIT 5: NONE  
 LIMIT 6: NONE

Job Number: 963170 File Number: MC15927 Page 38 of 40  
Model Number: M402 FCC ID: VJS-M402TX  
Client Name: Altec Lansing Technologies

## 5.0 IMMUNITY TEST RESULTS

Not Applicable

## Appendix A

### Accreditations and Authorizations



NVLAP Lab code: 100255-0

NVLAP: Recognized under the 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 EN17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91040).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2181



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: (Radiated Emissions) R-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-160.



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6