Underwriters Laboratories Inc.
1285 Walt Whitman Rd.
Melville, NY 11747

www.ul.com/emc
(631) 271-6200

Job Number:	1001139483
Project Number:	09CA34808
File Number:	NC9394
Date:	02 October 2009
Model:	Radioband/TBX
FCC ID:	U5Z-RADIOBAND-TBX
IC Number:	8572A-RADIOBANDTX

Electromagnetic Compatibility Test Report

For

JCM TECHNOLOGIES S A

Test Report Details

Tests Performed By:	**Underwriters Laboratories Inc. 1285 Walt Whitman Rd. Melville, NY 11747**
Tests Performed For:	**JCM TECHNOLOGIES S A BISBE MORGADES, 46 BAIXOS VIC, 08500**
Applicant Contact:	**GEMMA REVERTER**
Phone:	**93.883.32.31**
Fax:	**93.883.32.33**
E-mail:	**GREVERTER@JCM-TECH.COM**
Test Report Date:	**02 October 2009**
Product Type:	**Transmitter**
Product standards	**FCC Part 15, Subpart C, 15.231**
Model Number:	**Radioband/TBX**
Sample Serial Number:	**Non-serialized production unit**
EUT Category:	**Periodic Low Power Transmitter**
Testing Start Date:	**26 August 2009**
Date Testing Complete:	**02 October 2009**
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, NIST, 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.

Report Directory

Report Revision History

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

1.0 G E N E R A L - Product Description

1.1 Equipment Description

The Radioband/TBX is designed for installation with a safety edge in garage door installations. This system allows for wireless safety edge – control panel connection.

1.2 Equipment Marking Plate

Not Available

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Transmitter	JCM TECHNOLOGIES S A	Radioband/TBX	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	—	—	None
1	Mains	Batt	—	—	Device uses 2 AA batteries

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) Batt = Battery Power
TP = Telecommunication Ports

1.3.3 EUT Internal Operating Frequencies:

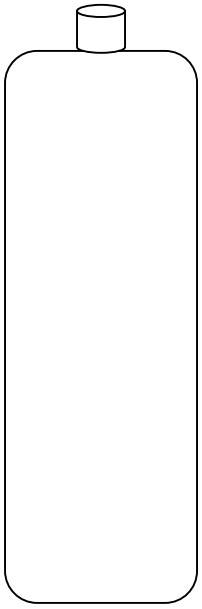
Frequency (MHz)	Description
4	Microcontroller
26	Oscillator
868.90	Fundamental Frequency

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	3	-	-	DC	-	Devices uses 2 AA batteries
1	3	-	-	DC	-	Devices uses 2 AA batteries

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 EUT Configurations

Mode #	Description
1	Stand-alone

1.6 EUT Operation Modes

Mode #	Description
1	Continuously transmitting with modulation
2	Periodically transmitting with modulation

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	2009
FCC Part 15, Subpart B	Code of Federal Regulations, Part 15, Radio Frequency Devices	2009
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radiocommunication Equipment	2007
RSS-210, Issue 7	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	2007
ICES-003, Issue 4	Digital Apparatus	2004

2.4 Results Summary

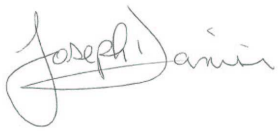
This product is considered Periodic Transmitter

Requirement – Test	Result (Compliant / Non-Compliant)*
Fundamental Radiated Emissions	Compliant
Spurious Radiated Emissions	Compliant
Occupied Bandwidth	Compliant
Pulse Train - Averaging Factor	Compliant
Cease Operation	Compliant

Test Engineer:

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

Reviewer:



Joe Danisi(Ext.23055)
Lead Engineering Associate
International EMC Services
Conformity Assessment Services

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:

---------- North America ----------

Code of Federal Regulations Title 47	Part 15, Subpart B and C, Radio Frequency Devices
Industry Canada	RSS-GEN, RSS-210 and ICES-003

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, ℃	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150

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	FCC Part 15, Subpart C 15.231
Occupied Bandwidth Limits	
0.25% Fo	

Table 1 Occupied Bandwidth Configuration Settings

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

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth (kHz)	Occupied Bandwidth Requirements	
	dBc	%
10	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Equipment

Test Equipment Used			
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 1 Test Setup for Occupied Bandwidth

Table 4 Occupied Bandwidth Data

Frequency (MHz)	20dB OBW	99% OBW	Limit (MHz)	Result
868.7	404.8kHz	388.8kHz	2.17	Pass

Figure 2 Occupied Bandwidth Graph – 20dB Occupied Bandwidth

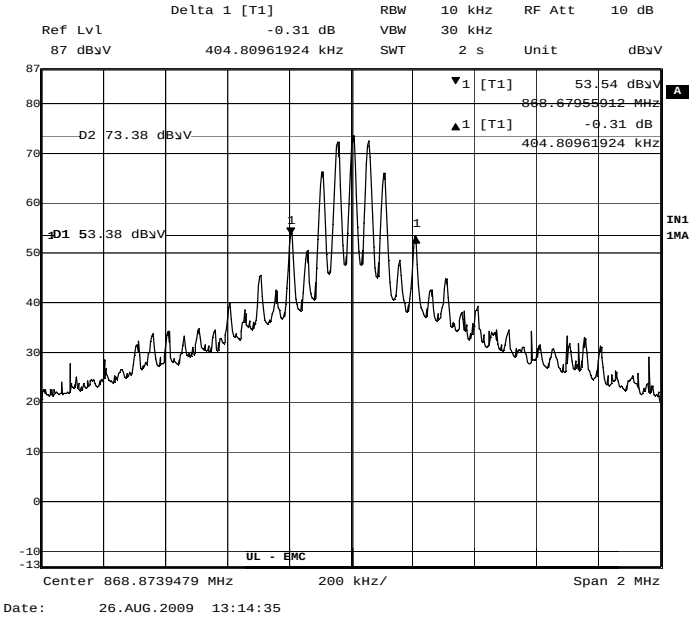
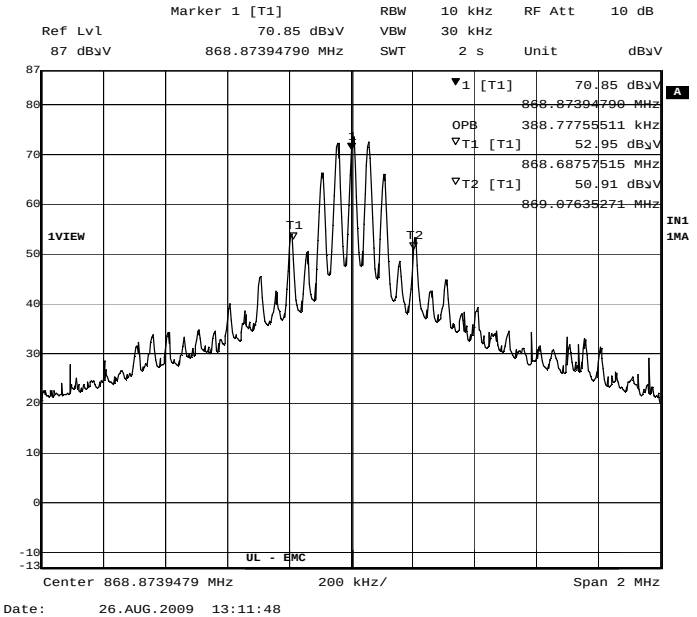


Figure 3 Occupied Bandwidth Graph – 99% Power Occupied Bandwidth



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	FCC Part 15, Subpart C 15.231
Cease Operation Limits	
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 5 Cease Operation Configuration Settings

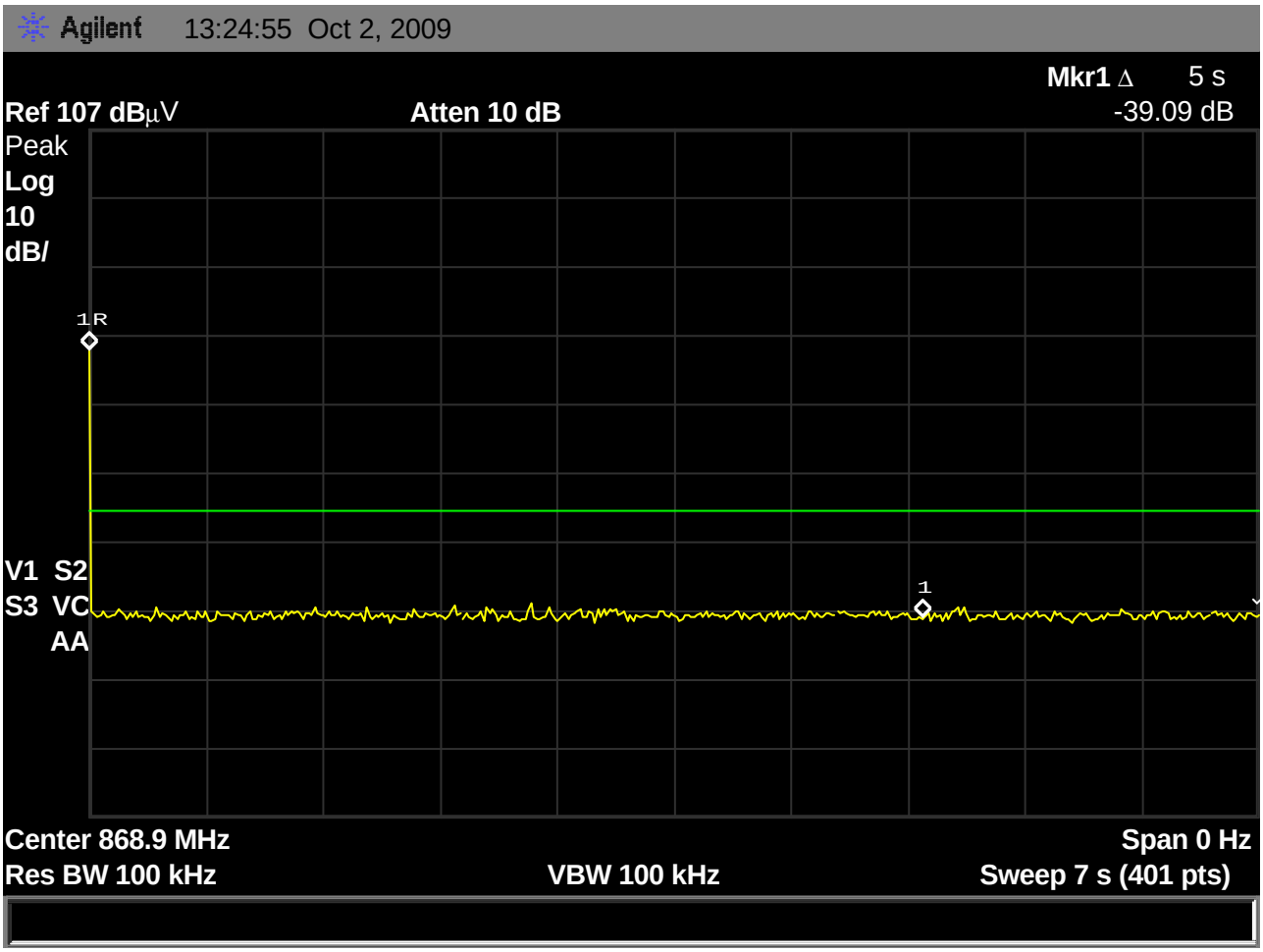
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	2
Supplementary information: None		

Table 6 Cease Operation Test Equipment

Test Equipment Used			
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 4 Test Setup for Cease Operation

Figure 5 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
Pulse Train Limits	
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 7 Pulse Train Configuration Settings

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

Table 8 Pulse Train Calculation

Pulse Width (mS)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB) $20\log\left(\frac{PulseWidth}{TotalTransmissionTime}\right)$
3	100	-30.5 (see note)
Note: 20db correction factor used.		

Table 9 Pulse Train Test Equipment

Test Equipment Used			
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 6 Test Setup for Pulse Train

Figure 7 Pulse Train Graph

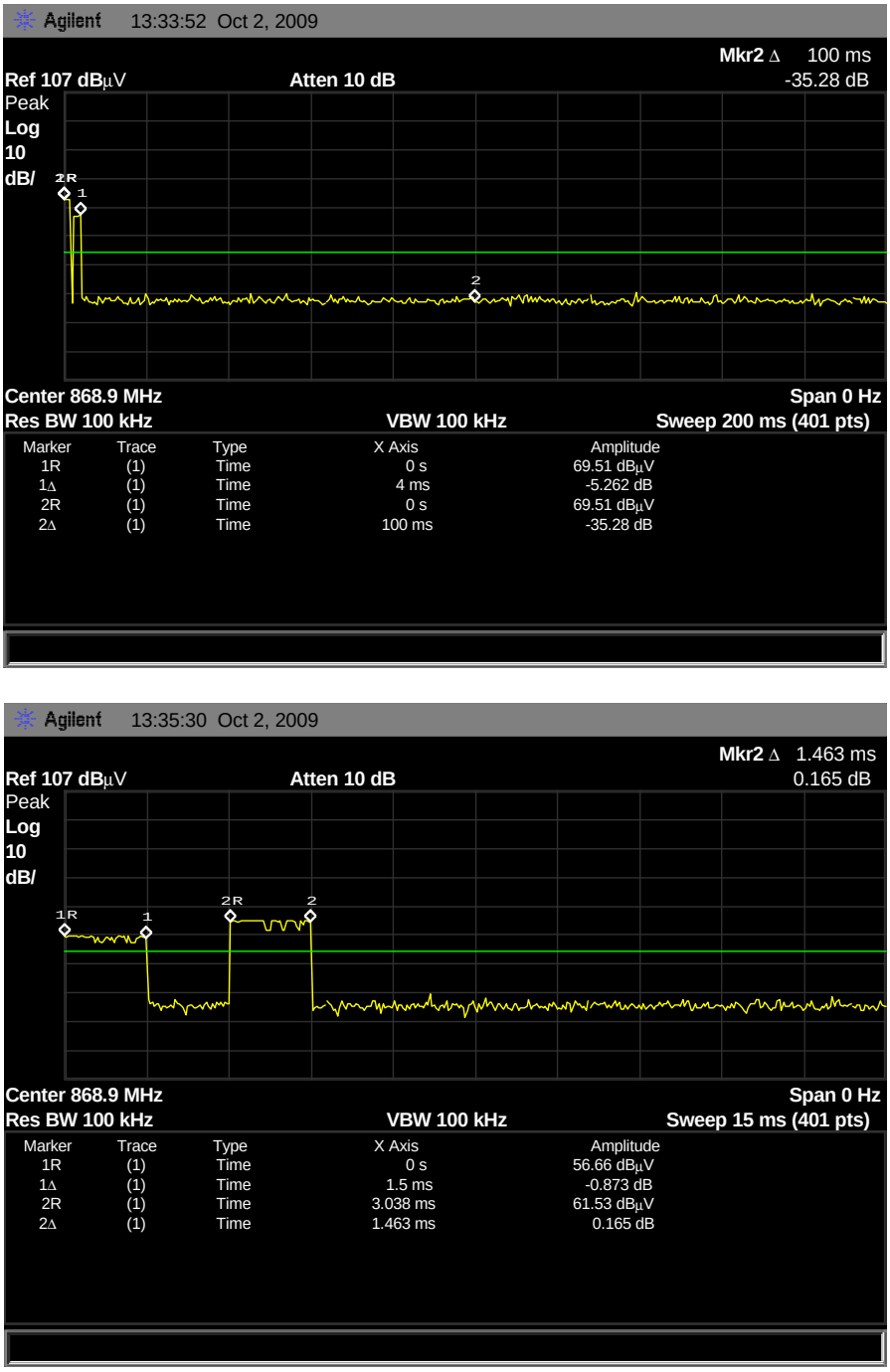
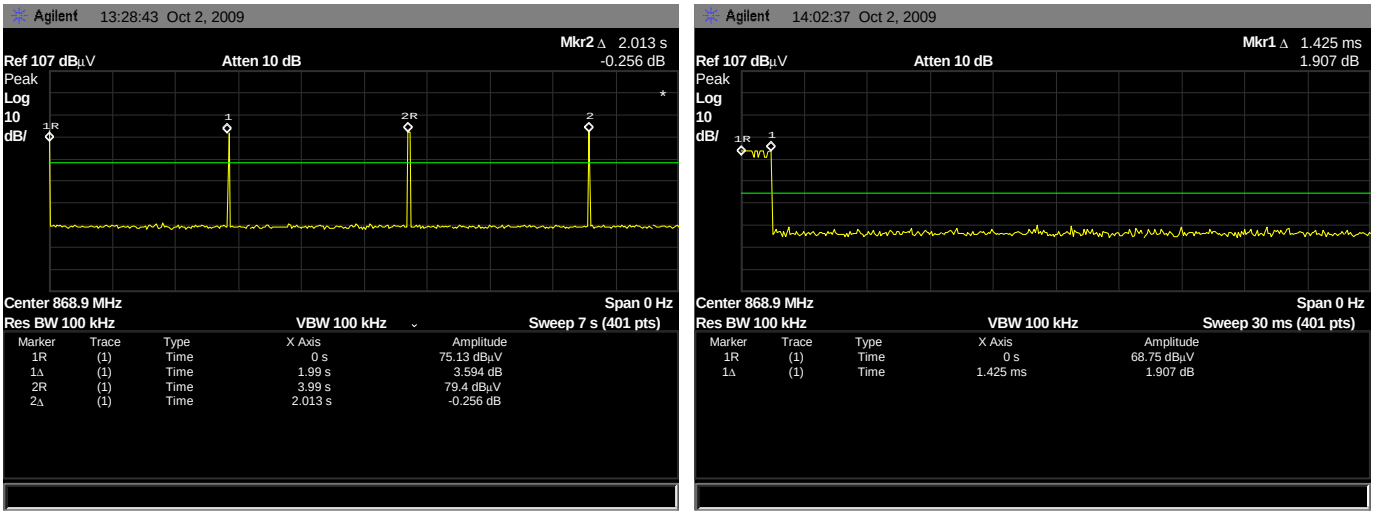


Figure 8 Polling Transmissions



Transmission Time (mS)	Total Transmissions in 1 Hour	Total Transmission Time (mS) in 1 Hour	Requirement
1.425	180	256.5	Total Transmission time is to be less than 2 seconds in a 1-hr period.

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 for measurements above 30MHz, adjusting th e receive antenna height from 1 to 4-meters. Below 30MHz, the loop antenna was maximized about its azimuth. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

Basic Standard	FCC Part 15, Subpart C, 15.209 and 15.231	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	9kHz – 1GHz	(3 meter measurement distance)
Fully configured sample scanned over the following frequency range	1GHz – 10GHz	(3 meter measurement distance)

Limits

Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
0.009 – 0.490	128.5 – 93.8	-	-
0.490 – 1.705	73.8 – 63	-	-
1.705 – 30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	
1000-10000	54	-	-
Fundamental		81.9	
Spurious			61.9

Supplementary information: Spurious limits are only applied against products of the transmitter. The transmitter was checked in 3 orientations and the worst case emissions are reported.

Unintentional radiations from circuits not related to the transmitter are considered in the emissions data in this section since all circuits are active.

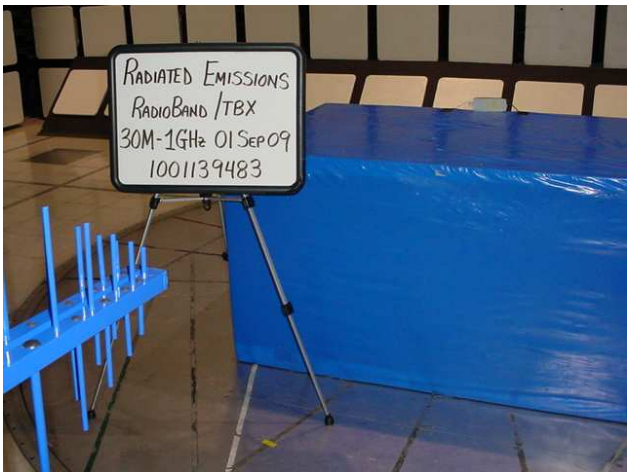
Table 10 Radiated Emissions EUT Configuration Settings

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

Table 11 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
9kHz-30MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Active Loop Antenna	EMCO	6507	ME5A-288
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
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Log-P Antenna	Schaffner	UPA6109	44068
Bicon Antenna	Schaffner	VBA6106A	54
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
Above 1GHz (Band Optimized System)			
Spectrum Analyzer	Agilent	E7405A	19695
Horn Antenna (1-2 GHz)	ETS	3161-01	51442
Horn Antenna (2-4 GHz)	ETS	3161-02	48107
Horn Antenna (4-8 GHz)	ETS	3161-03	48106
Horn Antenna (8-12 GHz)	ETS	3160-07	8933
Signal Path Controller	HP	11713A	50250
Gain Controller	HP	11713A	50251
RF Switch / Preamp Fixture	UL	BOMS1	50249
System Controller	UL	BOMS2	50252
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

Figure 9 Test setup for Radiated Emissions



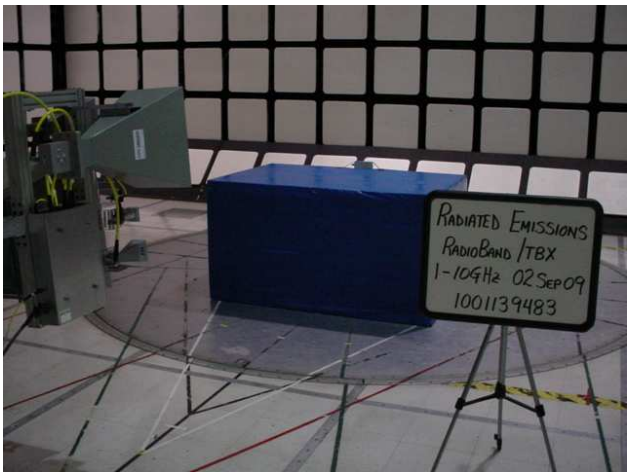


Figure 10 Radiated Emissions Graph (Horizontal)

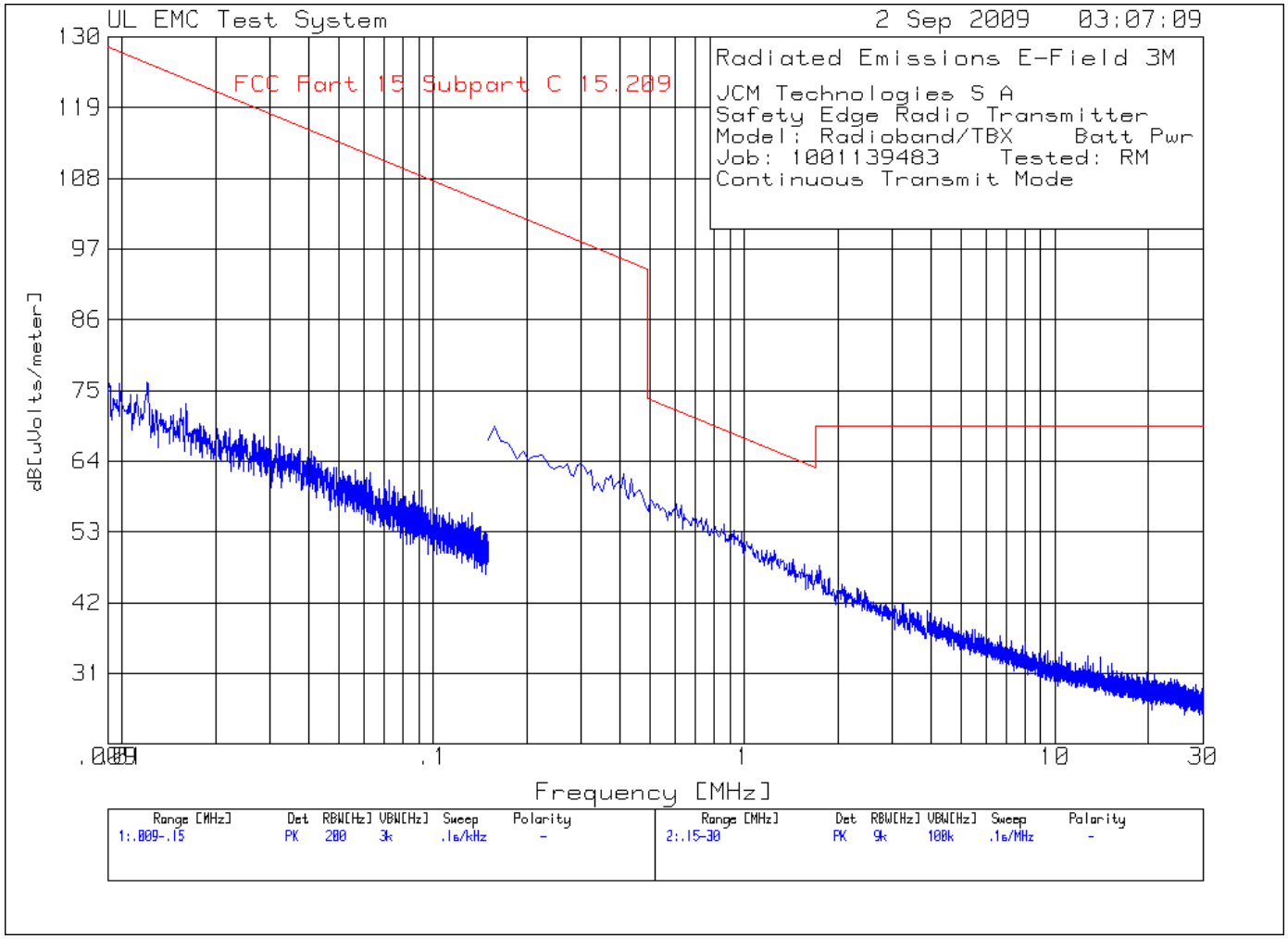


Table 12 Radiated Emissions Data Points

JCM Technologies S A
Safety Edge Radio Transmitter
Model: Radioband/TBX Batt Pwr
Job: 1001139483 Tested: RM
Continuous Transmit Mode

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
Range 1 .009 - .15MHz											
1	.0121	46.22 pk	.1	30	76.32	125.9	-	-	-	-	-
	Azimuth:302			Margin [dB]		-49.58	-	-	-	-	-
2	.01611	45.16 pk	.1	27.8	73.06	123.4	-	-	-	-	-
	Azimuth:302			Margin [dB]		-50.34	-	-	-	-	-
3	.06266	42.51 pk	0	19.7	62.21	111.7	-	-	-	-	-
	Azimuth:58			Margin [dB]		-49.49	-	-	-	-	-
Range 2 .15 - 30MHz											
4	.60533	40.2 pk	0	17.1	57.3	72	-	-	-	-	-
	Azimuth:62			Margin [dB]		-14.7	-	-	-	-	-
5	.98601	36.13 pk	0	16.7	52.83	67.7	-	-	-	-	-
	Azimuth:184			Margin [dB]		-14.87	-	-	-	-	-
6	1.73991	31.03 pk	.1	16.7	47.83	69.5	-	-	-	-	-
	Azimuth:354			Margin [dB]		-21.67	-	-	-	-	-
7	3.24025	25.08 pk	.1	16.8	41.98	69.5	-	-	-	-	-
	Azimuth:337			Margin [dB]		-27.52	-	-	-	-	-
8	14.00386	15.81 pk	.2	17.6	33.61	69.5	-	-	-	-	-
	Azimuth:226			Margin [dB]		-35.89	-	-	-	-	-

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 - denotes average log detection

Figure 11 Radiated Emissions Graph (Vertical)

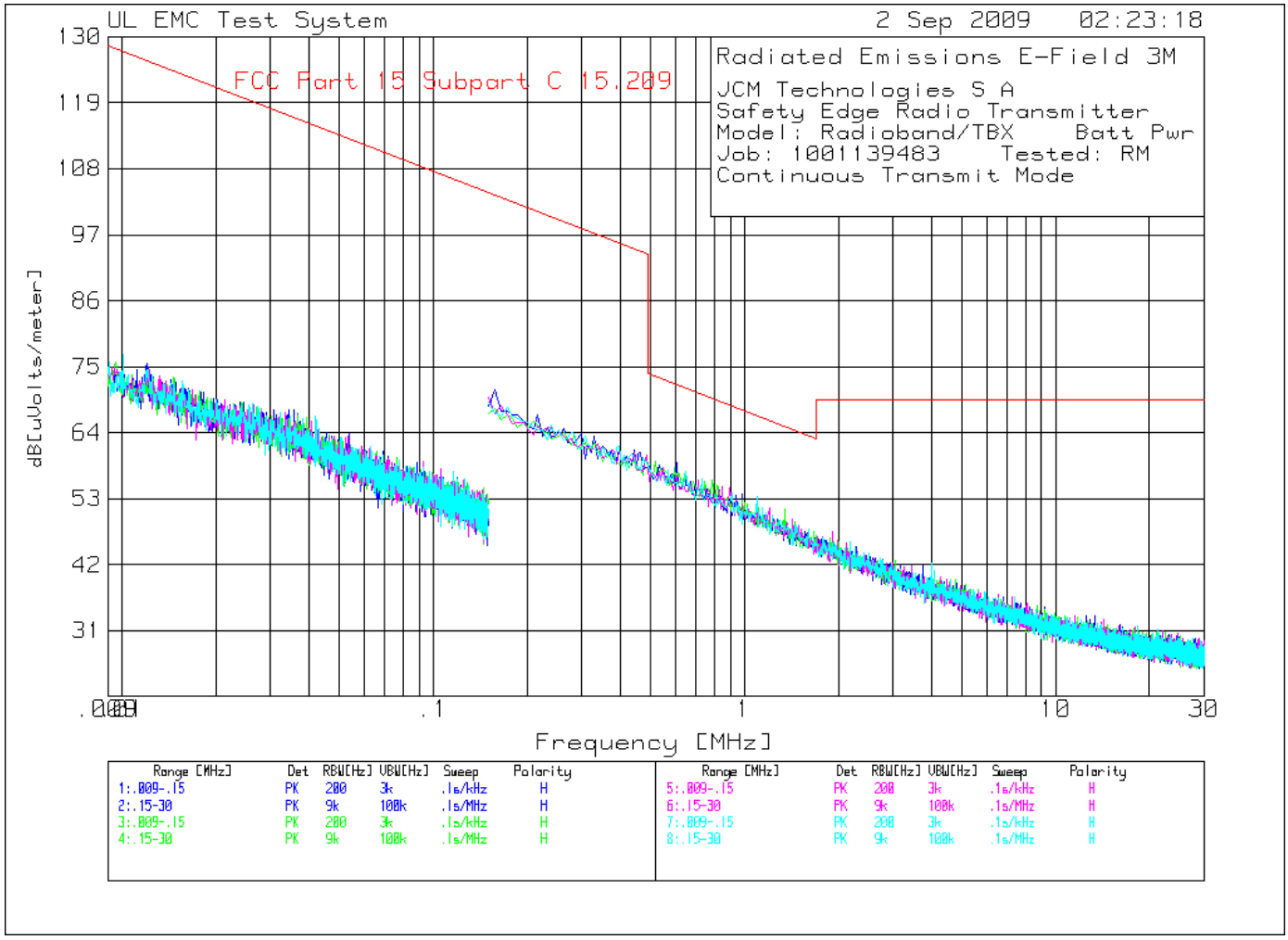


Table 13 Radiated Emissions Data Points

JCM Technologies S A
Safety Edge Radio Transmitter
Model: Radioband/TBX Batt Pwr
Job: 1001139483 Tested: RM
Continuous Transmit Mode

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
0° .009 - .15MHz											
1	.0121	45.43 pk	.1	30	75.53	125.9	-	-	-	-	-
	Azimuth:227	Height:100 Horz		Margin [dB]		-50.37	-	-	-	-	-
0° .15 - 30MHz											
2	.60533	41.93 pk	0	17.1	59.03	72	-	-	-	-	-
	Azimuth:215	Height:100 Horz		Margin [dB]		-12.97	-	-	-	-	-
3	2.28481	28.29 pk	.1	16.7	45.09	69.5	-	-	-	-	-
	Azimuth:32	Height:100 Horz		Margin [dB]		-24.41	-	-	-	-	-
4	3.7329	25.06 pk	.1	16.8	41.96	69.5	-	-	-	-	-
	Azimuth:337	Height:100 Horz		Margin [dB]		-27.54	-	-	-	-	-
45° .009 - .15MHz											
5	.03907	44.05 pk	0	22.5	66.55	115.8	-	-	-	-	-
	Azimuth:2	Height:120 Horz		Margin [dB]		-49.25	-	-	-	-	-
45° .15 - 30MHz											
6	1.35176	34.54 pk	.1	16.7	51.34	65	-	-	-	-	-
	Azimuth:23	Height:120 Horz		Margin [dB]		-13.66	-	-	-	-	-
7	4.77791	22.45 pk	.1	17	39.55	69.5	-	-	-	-	-
	Azimuth:6	Height:120 Horz		Margin [dB]		-29.95	-	-	-	-	-
8	22.40128	12.77 pk	.3	17.7	30.77	69.5	-	-	-	-	-
	Azimuth:6	Height:120 Horz		Margin [dB]		-38.73	-	-	-	-	-
90° .009 - .15MHz											
9	.03354	44.07 pk	0	23.4	67.47	117.1	-	-	-	-	-
	Azimuth:151	Height:140 Horz		Margin [dB]		-49.63	-	-	-	-	-

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

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
90° .15 - 30MHz											
10	.89644	37.91 pk	0	16.9	54.81	68.6	-	-	-	-	-
	Azimuth:32	Height:140 Horz		Margin [dB]		-13.79	-	-	-	-	-
11	1.92652	30.77 pk	.1	16.7	47.57	69.5	-	-	-	-	-
	Azimuth:32	Height:140 Horz		Margin [dB]		-21.93	-	-	-	-	-
12	14.3099	15.03 pk	.2	17.6	32.83	69.5	-	-	-	-	-
	Azimuth:353	Height:140 Horz		Margin [dB]		-36.67	-	-	-	-	-
135° .009 - .15MHz											
13	.01007	45.73 pk	.2	31.1	77.03	127.5	-	-	-	-	-
	Azimuth:359	Height:160 Horz		Margin [dB]		-50.47	-	-	-	-	-
14	.04201	44.68 pk	0	22	66.68	115.1	-	-	-	-	-
	Azimuth:6	Height:160 Horz		Margin [dB]		-48.42	-	-	-	-	-
135° .15 - 30MHz											
15	1.09797	36.69 pk	0	16.7	53.39	66.8	-	-	-	-	-
	Azimuth:267	Height:160 Horz		Margin [dB]		-13.41	-	-	-	-	-
16	3.97922	25.29 pk	.1	16.8	42.19	69.5	-	-	-	-	-
	Azimuth:6	Height:160 Horz		Margin [dB]		-27.31	-	-	-	-	-

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 12 Radiated Emissions Graph

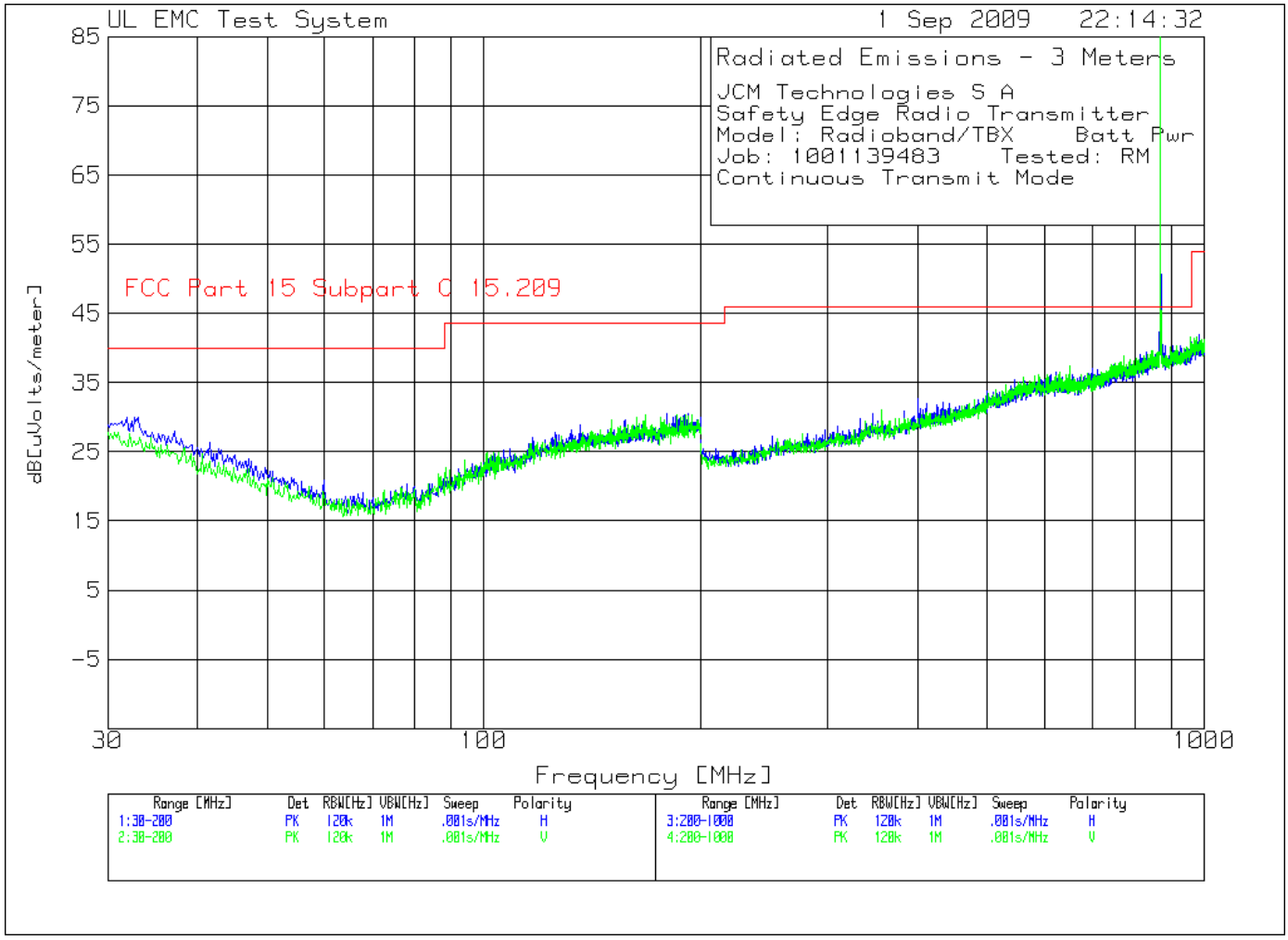


Table 14 Radiated Emissions Data Points

JCM Technologies S A
Safety Edge Radio Transmitter
Model: Radioband/TBX Batt Pwr
Job: 1001139483 Tested: RM
Continuous Transmit Mode

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	31.8719	11.8 pk	.4	17.8	30	40	-	-	-	-	-
	Azimuth:142	Height:400 Horz		Margin [dB]		-10	-	-	-	-	-
2	179.4094	14.43 pk	.8	15.2	30.43	43.5	-	-	-	-	-
	Azimuth:359	Height:100 Horz		Margin [dB]		-13.07	-	-	-	-	-
Vertical 30 - 200MHz											
3	94.1542	12.51 pk	.6	10.6	23.71	43.5	-	-	-	-	-
	Azimuth:286	Height:100 Vert		Margin [dB]		-19.79	-	-	-	-	-
4	150.1401	13.73 pk	.7	15.2	29.63	43.5	-	-	-	-	-
	Azimuth:71	Height:100 Vert		Margin [dB]		-13.87	-	-	-	-	-
Horizontal 200 - 1000MHz											
5	869.1346	73.28 pk	1.7	22.9	97.88	46	-	-	-	-	-
	Azimuth:185	Height:100 Horz		Margin [dB]		51.88	-	-	-	-	-
6	958.3792	15.08 pk	1.9	23.8	40.78	46	-	-	-	-	-
	Azimuth:16	Height:200 Horz		Margin [dB]		-5.22	-	-	-	-	-
Vertical 200 - 1000MHz											
7	869.1346	65.11 pk	1.7	23.1	89.91	46	-	-	-	-	-
	Azimuth:97	Height:200 Vert		Margin [dB]		43.91	-	-	-	-	-
8	957.1786	15.42 pk	1.9	24.3	41.62	46	-	-	-	-	-
	Azimuth:141	Height:100 Vert		Margin [dB]		-4.38	-	-	-	-	-

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

JCM Technologies S A
Safety Edge Radio Transmitter
Model: Radioband/TBX Batt Pwr
Job: 1001139483 Tested: RM
Continuous Transmit Mode

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 200 - 1000MHz										
868.8292	73.16 pk	1.7	22.9	77.76*	-	81.9	-	-	-	-
Azimuth: 170	Height:100 Horz		Margin [dB]:		-	-4.14	-	-	-	-
958.3792	9.3 qp	1.9	23.8	35	46	-	-	-	-	-
Azimuth: 173	Height:148 Horz		Margin [dB]:		-11	-	-	-	-	-
Vertical 200 - 1000MHz										
868.8236	63.92 pk	1.7	23.1	68.72*	-	81.9	-	-	-	-
Azimuth: 135	Height:194 Vert		Margin [dB]:		-	-13.18	-	-	-	-
957.1786	9.15 qp	1.9	24.3	35.35	46	-	-	-	-	-
Azimuth: 139	Height:163 Vert		Margin [dB]:		-10.65	-	-	-	-	-

Duty Cycle Correction Factor of 20dB applied (See Section 4.4 for calculation)

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 (Maximized)
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
ave - Average detector

Figure 13 Radiated Emissions Graph

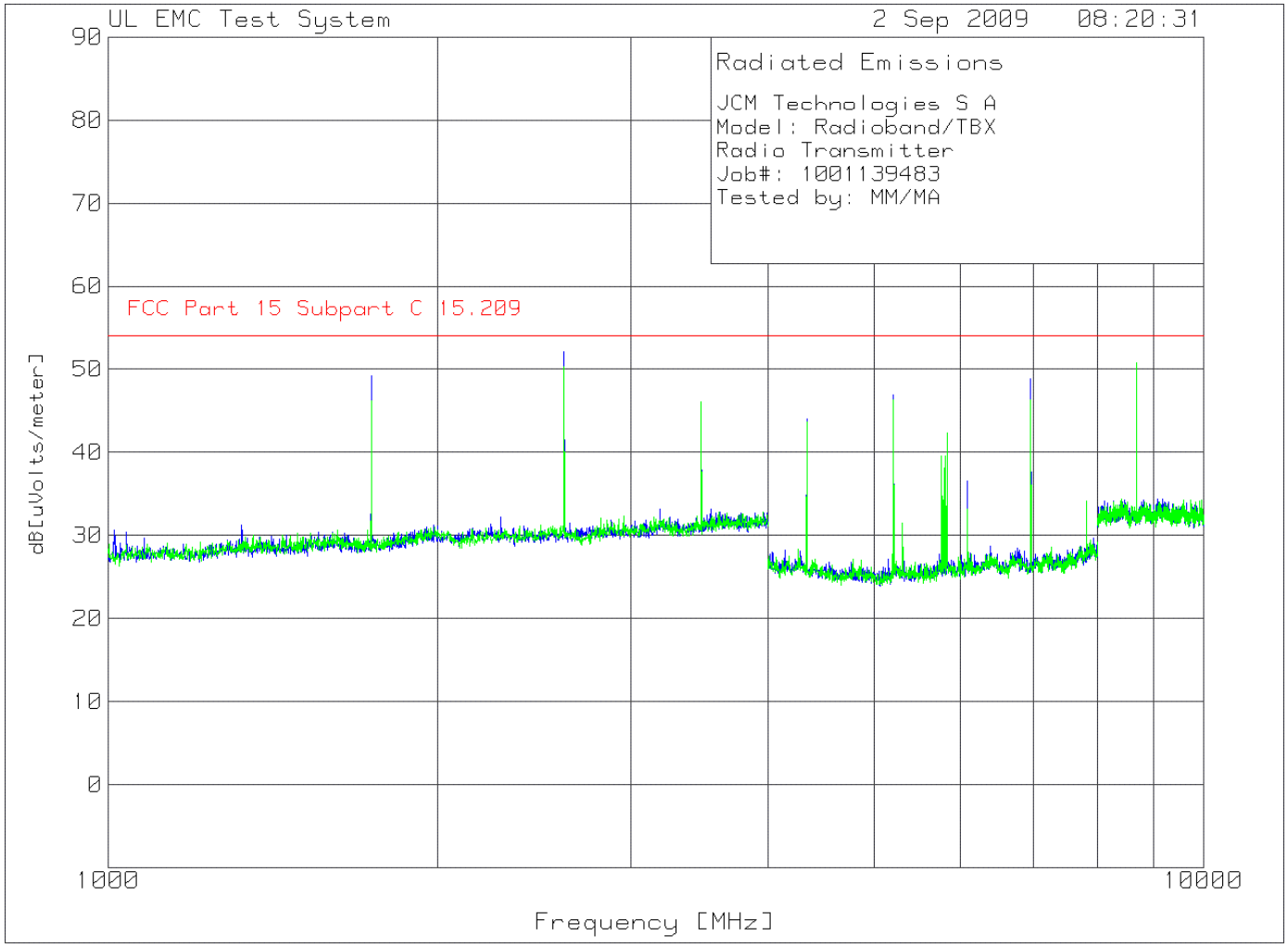


Table 15 Radiated Emissions Data Points

JCM Technologies S A
Model: Radioband/TBX
Radio Transmitter
Job#: 1001139483
Tested by: MM/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 - 2000MHz											
1	1739.076	73.5 pk	-45.12	20.8	49.18	54	-	-	-	-	-
		Height:100 Horz		Margin [dB]		-4.82	-	-	-	-	-
Horizontal 2000 - 4000MHz											
2	2606.742	74.14 pk	-43.37	21.3	52.07	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-1.93	-	-	-	-	-
3	3475.655	66.56 pk	-42.94	22.2	45.82	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-8.18	-	-	-	-	-
Horizontal 4000 - 8000MHz											
4	4342.762	69.83 pk	-53.55	27.7	43.98	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-10.02	-	-	-	-	-
5	5211.314	73.83 pk	-54.2	27.3	46.93	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-7.07	-	-	-	-	-
6	6083.195	61.82 pk	-52.8	27.5	36.52	54	-	-	-	-	-
		Height:101 Horz		Margin [dB]		-17.48	-	-	-	-	-
7	6951.747	74.08 pk	-53.1	27.9	48.88	54	-	-	-	-	-
		Height:200 Horz		Margin [dB]		-5.12	-	-	-	-	-
Horizontal 8000 - 10000MHz											
8	8688.852	69.41 pk	-52.22	33.1	50.29	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-3.71	-	-	-	-	-
Vertical 1000 - 2000MHz											
9	1739.076	70.51 pk	-45.12	20.8	46.19	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-7.81	-	-	-	-	-

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 - Linear average detector
avlg - Average log detector
AV - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection

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
Vertical 2000 - 4000MHz											
10	2606.742	72.19 pk	-43.37	21.5	50.32	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-3.68	-	-	-	-	-
11	3475.655	66.71 pk	-42.94	22.3	46.07	54	-	-	-	-	-
		Height:199 Vert		Margin [dB]		-7.93	-	-	-	-	-
Vertical 4000 - 8000MHz											
12	4342.762	69.44 pk	-53.55	27.8	43.69	54	-	-	-	-	-
		Height:200 Vert		Margin [dB]		-10.31	-	-	-	-	-
13	5211.314	73.17 pk	-54.2	27.3	46.27	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-7.73	-	-	-	-	-
14	5833.611	68.02 pk	-53.39	27.7	42.33	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-11.67	-	-	-	-	-
15	6083.195	58.56 pk	-52.8	27.4	33.16	54	-	-	-	-	-
		Height:200 Vert		Margin [dB]		-20.84	-	-	-	-	-
16	6951.747	71.55 pk	-53.1	27.9	46.35	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-7.65	-	-	-	-	-
Vertical 8000 - 10000MHz											
17	8688.852	69.75 pk	-52.22	33.2	50.73	54	-	-	-	-	-
		Height:200 Vert		Margin [dB]		-3.27	-	-	-	-	-

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 - Linear average detector
avlg - Average log detector
AV - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection

JCM Technologies S A
Model: Radioband/TBX
Radio Transmitter
Job#: 1001139483
Tested by: MM/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 - 2000MHz										
1737.67	74.72 PK	-45.08	20.8	50.44	54	-	-	-	-	-
Azimuth: 42	Height:255 Horz		Margin [dB]:	-3.56		-	-	-	-	-
Horizontal 2000 - 4000MHz										
2606.803	75.41 PK	-43.37	21.3	53.34	54	-	-	-	-	-
Azimuth: 1	Height:397 Horz		Margin [dB]:	-.66		-	-	-	-	-
3475.755	66.97 PK	-42.94	22.2	46.23	54	-	-	-	-	-
Azimuth: 316	Height:398 Horz		Margin [dB]:	-7.77		-	-	-	-	-
Horizontal 4000 - 8000MHz										
4344.14	69.09 PK	-53.56	27.7	43.23	54	-	-	-	-	-
Azimuth: 255	Height:400 Horz		Margin [dB]:	-10.77		-	-	-	-	-
5212.97	73.99 PK	-54.19	27.3	47.1	54	-	-	-	-	-
Azimuth: 359	Height:399 Horz		Margin [dB]:	-6.9		-	-	-	-	-
6081.8	62.71 PK	-52.84	27.5	37.37	54	-	-	-	-	-
Azimuth: 339	Height:351 Horz		Margin [dB]:	-16.63		-	-	-	-	-
6950.6375	74.97 PK	-53.09	27.9	49.78	54	-	-	-	-	-
Azimuth: 9	Height:364 Horz		Margin [dB]:	-4.22		-	-	-	-	-
Horizontal 8000 - 10000MHz										
8689.35	69.5 PK	-52.21	33.1	50.39	54	-	-	-	-	-
Azimuth: 284	Height:366 Horz		Margin [dB]:	-3.61		-	-	-	-	-
Vertical 1000 - 2000MHz										
1737.86	70.71 PK	-45.09	20.8	46.42	54	-	-	-	-	-
Azimuth: 84	Height:366 Vert		Margin [dB]:	-7.58		-	-	-	-	-

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 (Maximized)
QP - Quasi-Peak detector
av - Linear average detector
avlg - Average log detector
AV - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection

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
Vertical 2000 - 4000MHz										
2606.4925	68.1 PK	-43.38	21.5	46.22	54	-	-	-	-	-
Azimuth: 121	Height:361 Vert		Margin [dB]:	-7.78	-	-	-	-	-	
3475.32	68.9 PK	-42.94	22.3	48.26	54	-	-	-	-	-
Azimuth: 92	Height:300 Vert		Margin [dB]:	-5.74	-	-	-	-	-	
Vertical 4000 - 8000MHz										
4344.155	70.21 PK	-53.56	27.8	44.45	54	-	-	-	-	-
Azimuth: 284	Height:387 Vert		Margin [dB]:	-9.55	-	-	-	-	-	
5212.965	74.07 PK	-54.19	27.3	47.18	54	-	-	-	-	-
Azimuth: 285	Height:382 Vert		Margin [dB]:	-6.82	-	-	-	-	-	
5833.6113	46.07 PK	-53.39	27.7	20.38	54	-	-	-	-	-
Azimuth: 240	Height:193 Vert		Margin [dB]:	-33.62	-	-	-	-	-	
6082.55	58.68 PK	-52.81	27.4	33.27	54	-	-	-	-	-
Azimuth: 99	Height:130 Vert		Margin [dB]:	-20.73	-	-	-	-	-	
6950.64	73.72 PK	-53.09	27.9	48.53	54	-	-	-	-	-
Azimuth: 280	Height:353 Vert		Margin [dB]:	-5.47	-	-	-	-	-	
Vertical 8000 - 10000MHz										
8688.275	70.21 PK	-52.23	33.2	51.18	54	-	-	-	-	-
Azimuth: 265	Height:295 Vert		Margin [dB]:	-2.82	-	-	-	-	-	

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 (Maximized)
QP - Quasi-Peak detector
av - Linear average detector
avlg - Average log detector
AV - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection

Appendix A

Accreditations and Authorizations

NVLAP Lab code: 100255-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. 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-83400, and C-81879 and (Conducted Emissions - Telecommunications Ports) T-1582 and T-1583.

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