



Underwriters Laboratories Inc.
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Job Number: 581226
File Number: NC9394
Date: 20 March 2007
Model: Radioband/T
FCC ID: UZ5-Radioband-T

Electromagnetic Compatibility Test Report

For

JCM TECHNOLOGIES S A

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

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Tel: (631) 271-6200 Fax: (631)439-6095

Job Number: 581226
Model Number: Radioband/T
Client Name: JCM TECHNOLOGIES S A
FCC ID: UZ5-Radioband-T

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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**
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Test Report Date: **20 March 2007**

Product Type: **Transceiver**

Product standards **FCC Part 15, Subpart C 15.209, 15.231, 15.31
FCC Part 15, Subpart B, 15.109**

Model Number: **RADIOBAND/T**

Sample Serial Number: **Not provided**

EUT Category: **RF Remote Control Transmitter/Receiver – 868.35MHz**

Testing Start Date: **12 March 2007**

Date Testing Complete: **14 March 2007**

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
20 March 07	Original	-	-

1.0 GENERAL - Product Description

1.1 Equipment Description

The Radioband/T is part of the Radioband system. It is an radio communication system for safety edges that offers a two-way 868 MHz link. With self-test between the transmitter and receiver parts. The Radioband system is made up of a transmitter unit and a receiver unit. The transmitter part is connected to the safety edge and the receiver part is connected to the control panel. Communication between the transmitter and receiver is established by radio.

1.2 Equipment Marking Plate

Not Applicable

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1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	Transceiver	JCM TECHNOLOGIES S A	Radioband/T	None
SIM	Resistor/switch	-	8k2	Simulation of switch activation
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	Battery	NA	NA	3Vdc Battery
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					

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1.3.3 EUT Internal Operating Frequencies:

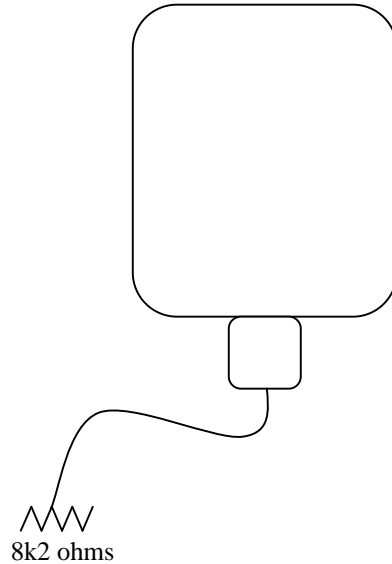
Frequency (MHz)	Description	Frequency (MHz)	Description
868.35	Transmit Frequency	4	Microcontroller

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	3	-	-	DC	-	Powered by 3Vdc Battery
1	3	-	-	DC	-	None

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 EUT Operation Modes

Mode #	Description
1	Continuously transmitting.
2	Periodically transmitting
3	Receiving

1.6 EUT Configurations

Mode #	Description
1	Stand Alone Device

2.0 Results 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 Reference Standards

Standard Number	Standard Name	Standard Date
Part 15, Subpart C 15.35, 15.209, 15.231	Part 15 - Radio Frequency Devices	2006
Part 15, Subpart B 15.109	Part 15 - Radio Frequency Devices	2006

2.2 Results Summary

Requirement – Test	Result (C/NC)*
15.35 Pulse Train	C
15.109 Radiated Emissions – Unintentional	C
15.209 Radiated Emissions Restricted Bands	C
15.231 Radiated Emissions – Fundamental and Spurious Emissions	C

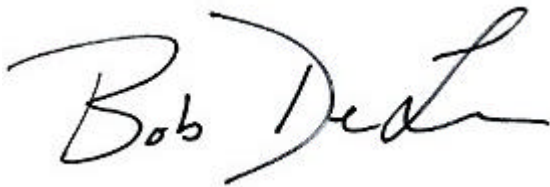
Note: C-Compliant, NC-Non-Compliant

2.3 Deviations from standard test methods

None

2.4 Device Modifications Necessary for Compliance

None



Bob DeLisi (Ext.22452)
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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

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 – PULSE TRAIN

Test Description	Measurements were made in the laboratory environment. A Dipole 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		

Table 1 Pulse Train Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	2
Supplementary information: None		

Table 2 Pulse Train Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Oscilloscope	Tektronix	TDS680B	ME5A-258
Dipole Antenna	EMCO	3121C - B4	ME5A-751
Temp/Humidity/ Pressure Meter	Cole Parmer	99760-00	4848

Figure 1 Test Setup for Pulse Train

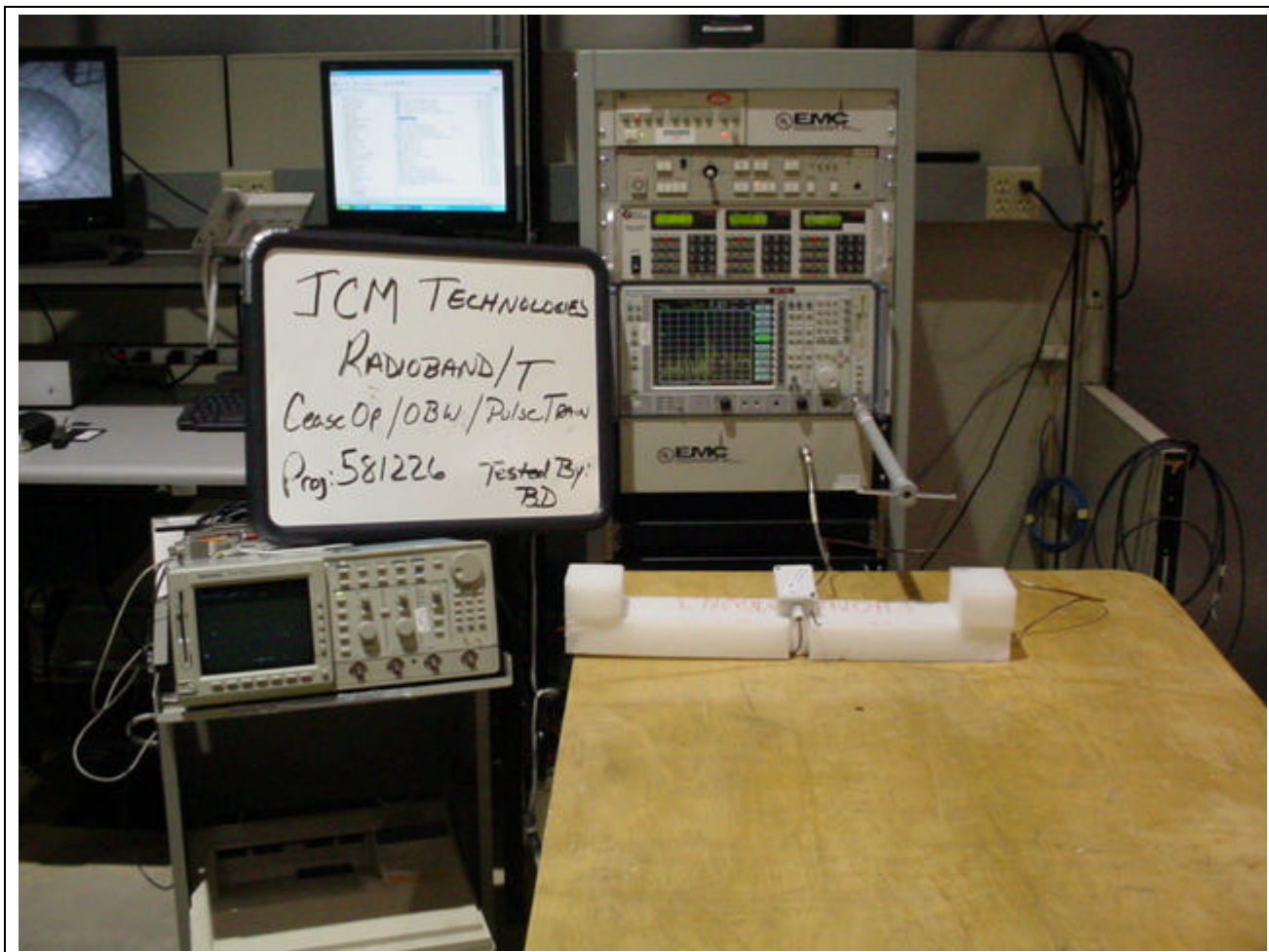


Figure 2 Pulse Train Graph

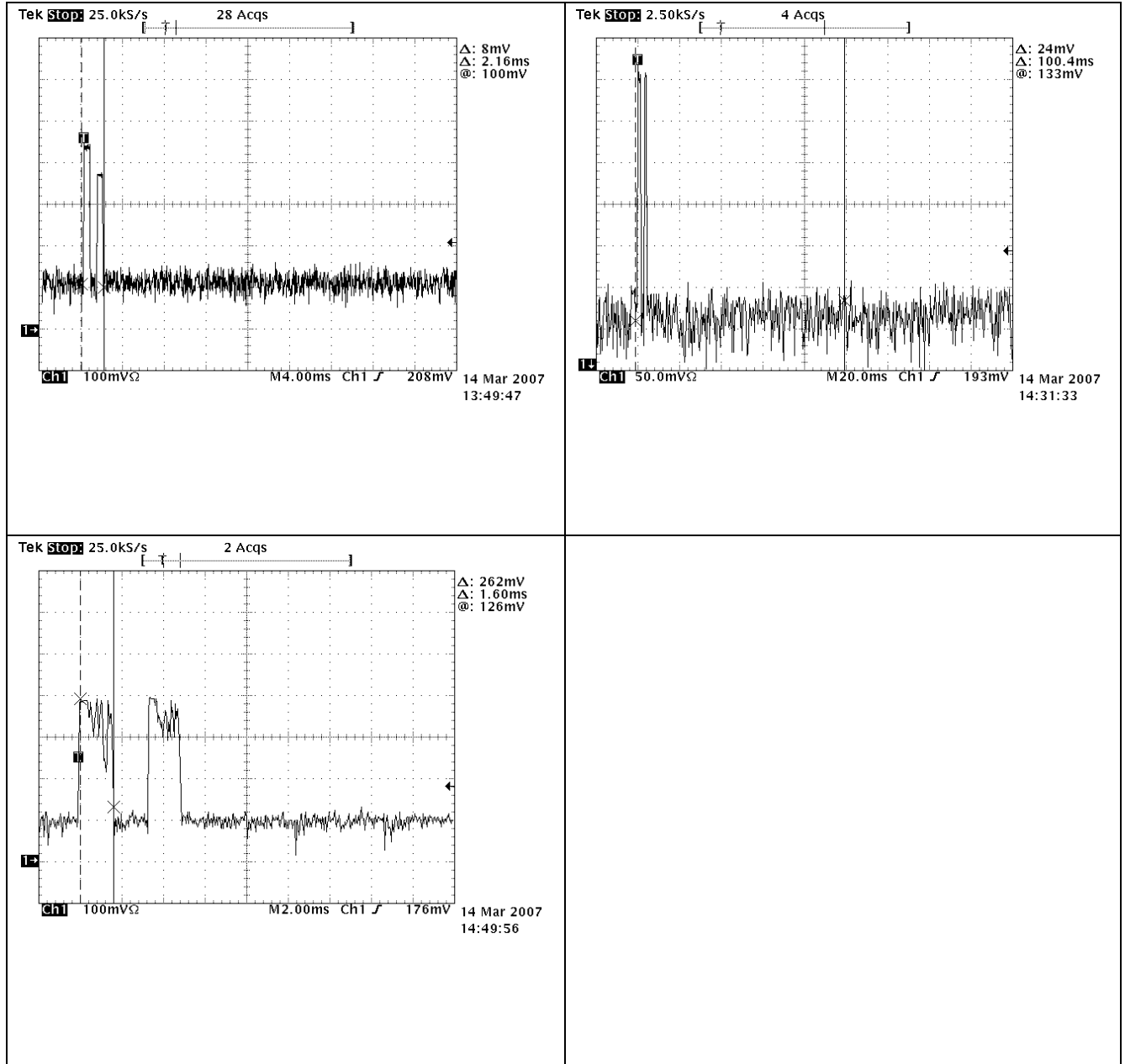
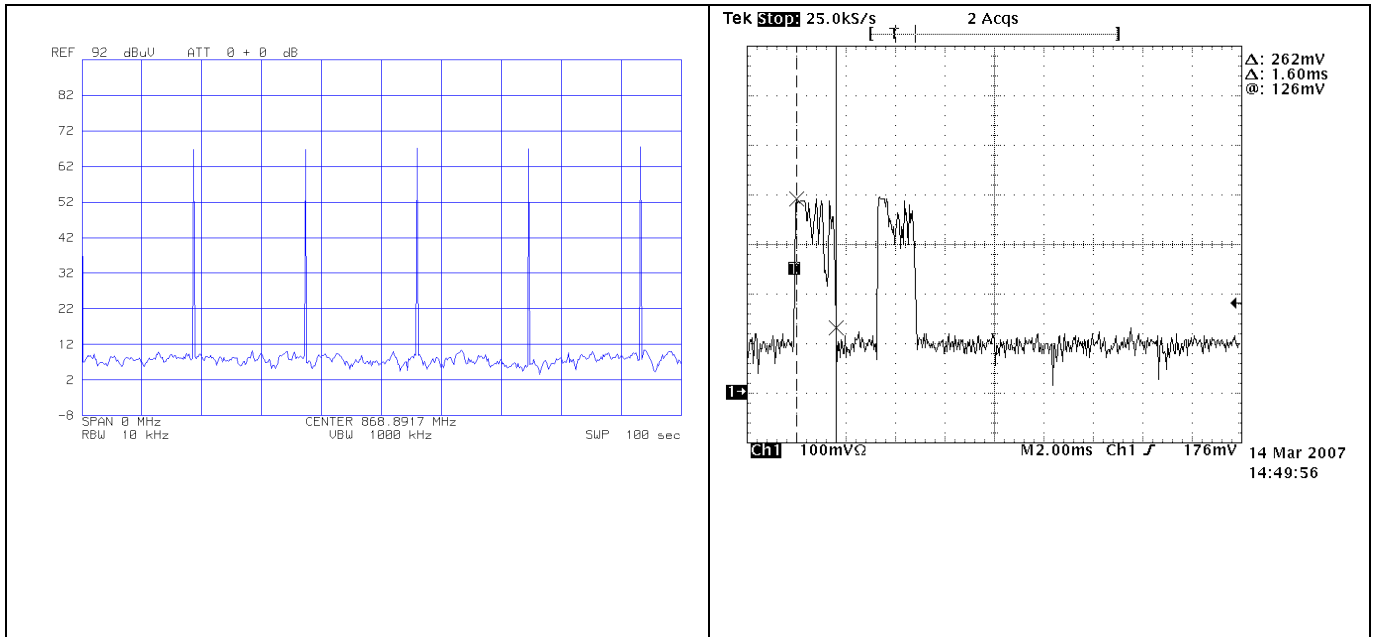


Figure 3 Polling Transmissions



Transmission Time (mS)	Total Transmissions in 1 Hour	Total Transmission Time (mS) in 1 Hour	Requirement
3.2	180	576	Total Transmission time is to be less than 2 seconds in a 1-hr period.

4.2 Test Conditions and Results – OCCUPIED BANDWIDTH

Test Description	Measurements were made in the laboratory environment. A Dipole 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
Occupied Bandwidth Limits	
0.25% of Fundamental Frequency	

Table 3 Occupied Bandwidth Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	2
Supplementary information: None		

Table 4 Occupied Bandwidth Spectrum Analyzer Settings

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

Table 5 Occupied Bandwidth Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C - B4	ME5A-751
Temp/Humidity/ Pressure Meter	Cole Parmer	99760-00	4848

Figure 4 Test Setup for Occupied Bandwidth

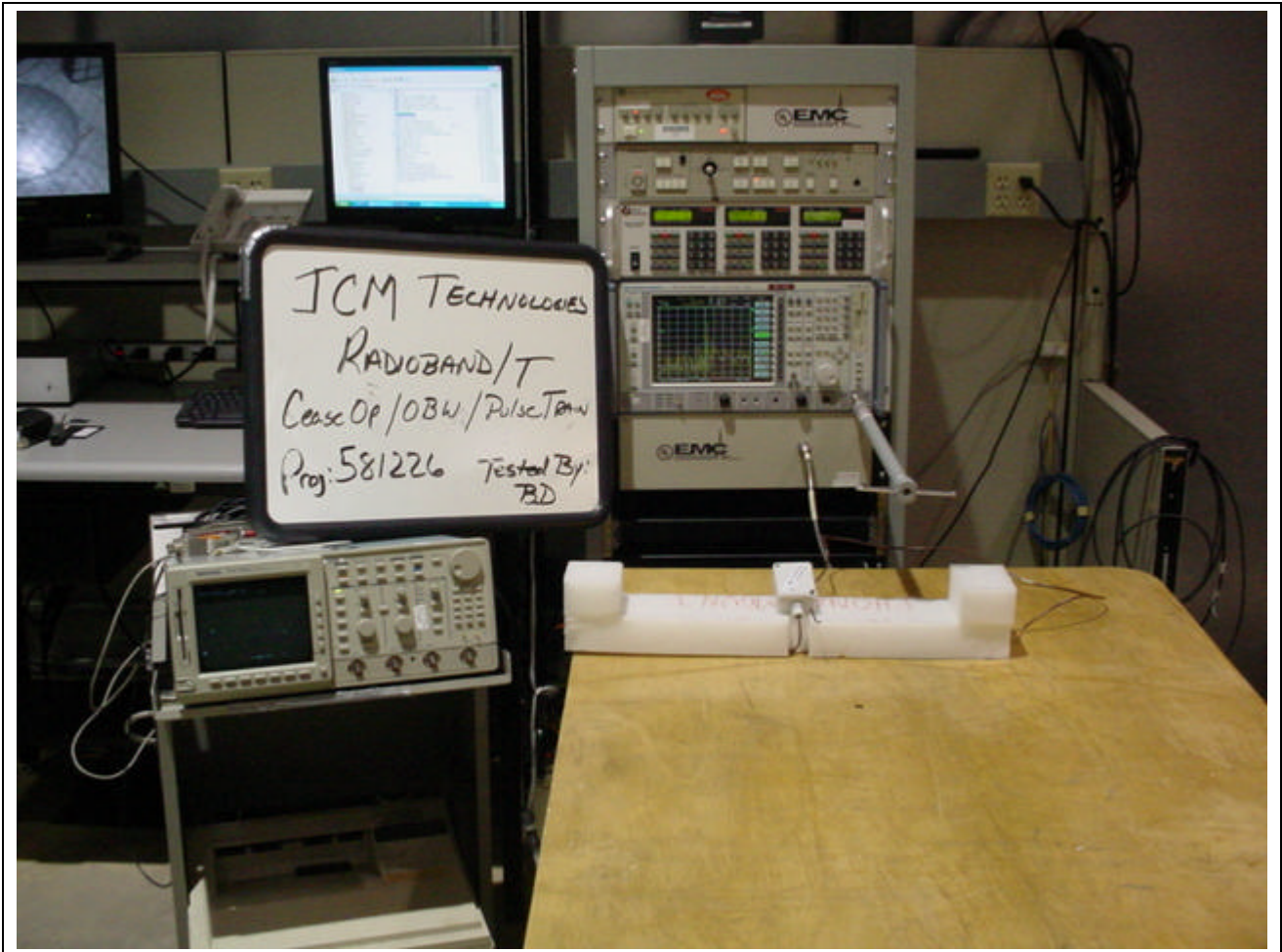
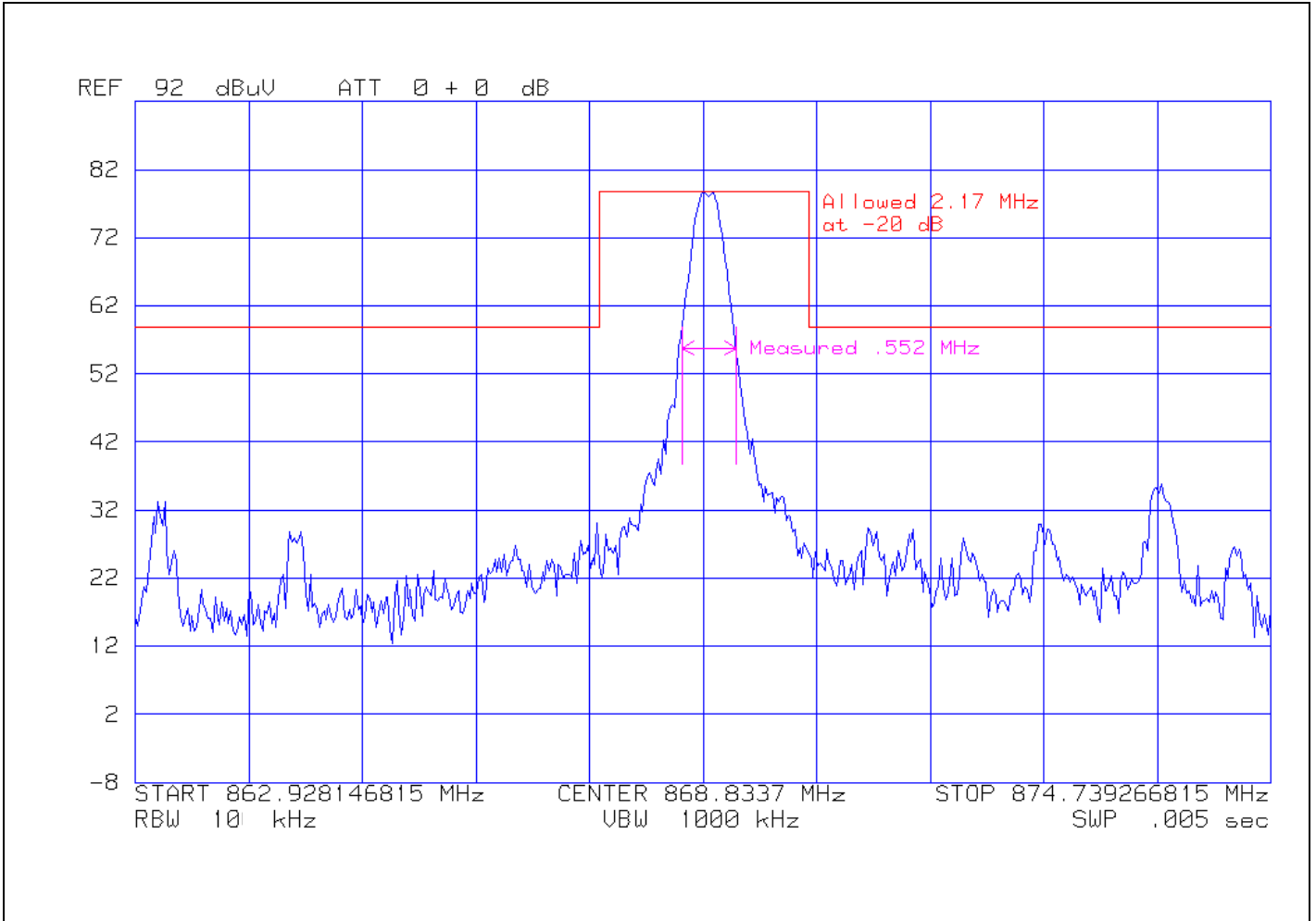


Figure 5 Occupied Bandwidth Graph



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4.3 Test Conditions and Results – CEASE OPERATION

Test Description	Measurements were made in the laboratory environment. A Dipole 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

Table 6 Cease Operation Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	2
Supplementary information: None		

Table 7 Cease Operation Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Oscilloscope	Tektronix	TDS3054	ME5B-173
Dipole Antenna	EMCO	3121C - B4	ME5A-751
Temp/Humidity/ Pressure Meter	Cole Parmer	99760-00	4848

Figure 6 Test Setup for Cease Operation

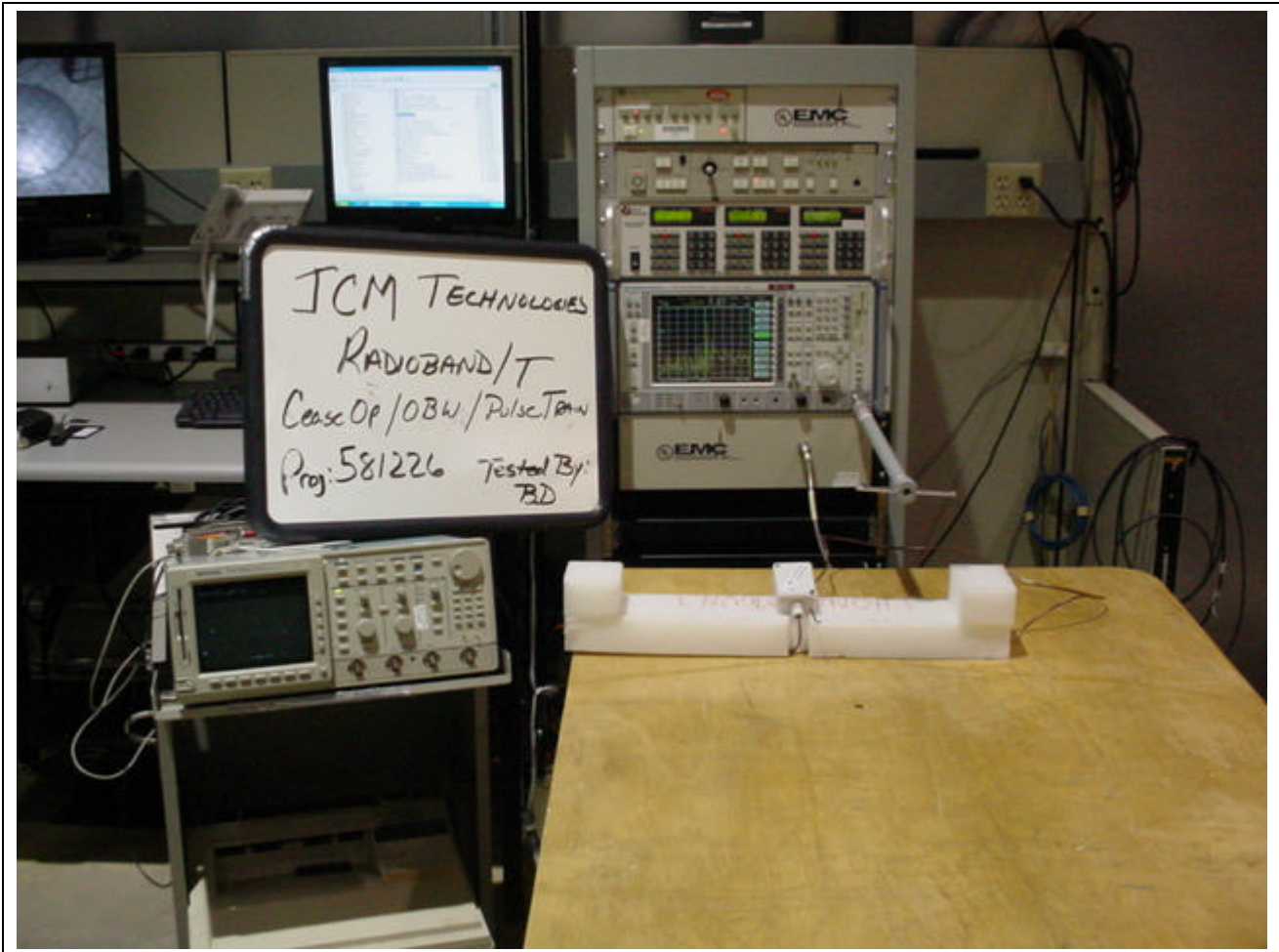
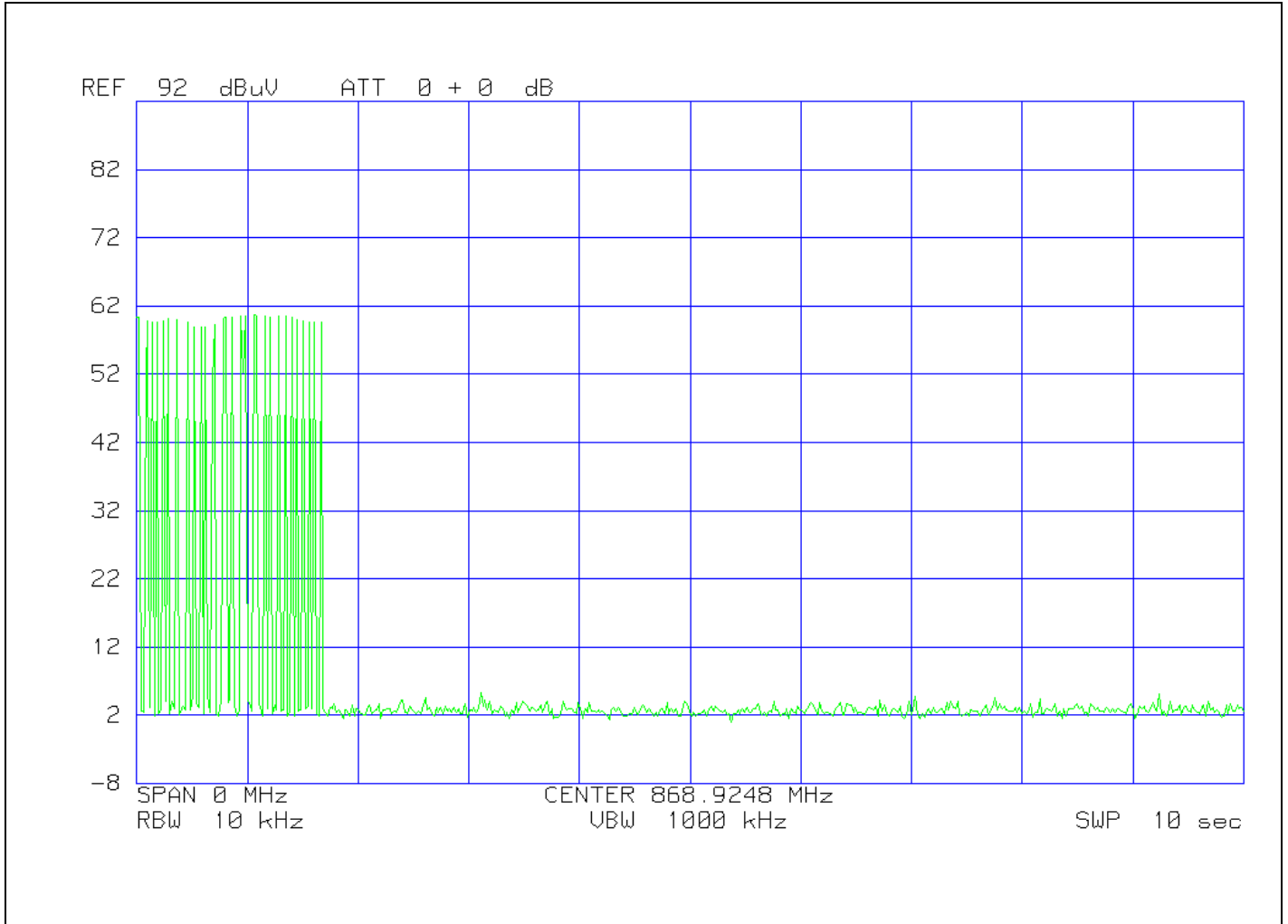


Figure 7 Cease Operation Graph



Transmission Time	Requirement
1.85 seconds	Cease Operation within 5 seconds

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-meters. 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.		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	(3 meter measurement distance)	
Fully configured sample scanned over the following frequency range	1GHz – 10GHz	(3 meter measurement distance)	
Limits – 15.109 Class B / 15.209			
Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
4-30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	
1000-5000	54		61.94
868.9MHz		81.94	
Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits.			

Table 8 Radiated Emissions EUT Configuration Settings

Power Interface Mode # (See Section 1.3.4)	EUT Configurations Mode # (See Section 1.6)	EUT Operation Mode # (See 1.5)
1	1	1
1	1	3
Supplementary information: None		

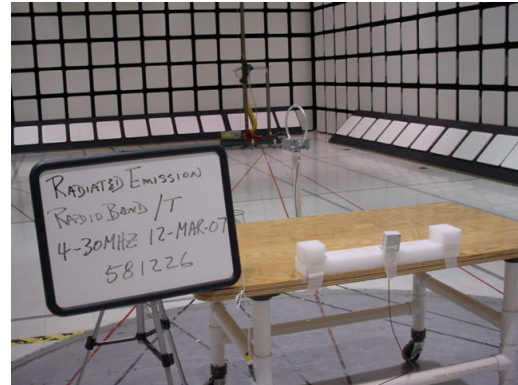
Table 9 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Bicon Antenna	Schaffner	VBA6106A	SN: 22681
Log-P Antenna	Schaffner	UPA6109	SN: 22987
Horn Antenna	Electro-Metrics	RGA-180	ME5-565
Active Loop Antenna	EMCO	6507	ME5A-288
Preamp (1 - 26GHz)	HP	8449B	ME5-914

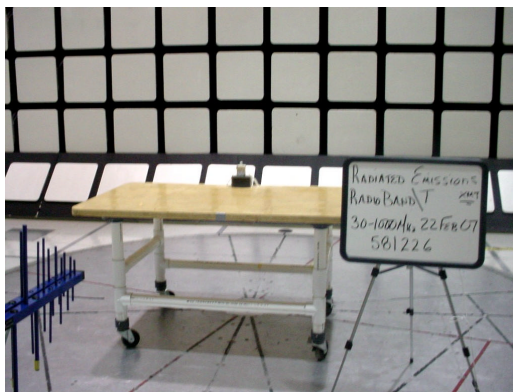
Figure 8 Test setup for Radiated Emissions – Transmit Mode



Radiated Emissions Setup 4-30MHz XMT Mode



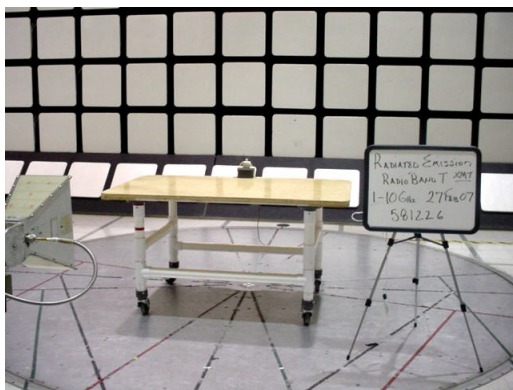
Radiated Emissions Setup 4-30MHz XMT Mode



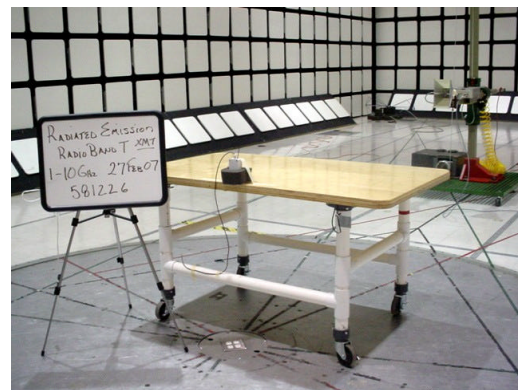
Radiated Emissions Setup 30-1000MHz XMT MODE



Radiated Emissions Setup 30-1000MHz XMT MODE

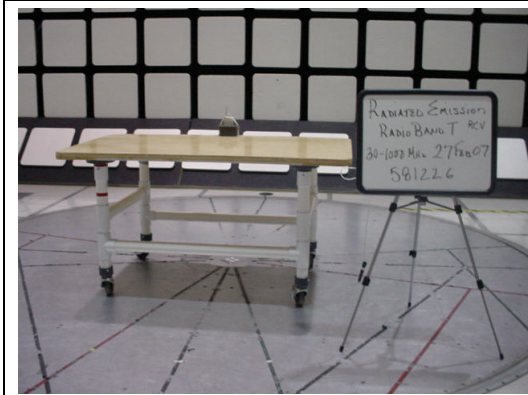


Radiated Emissions Setup 1-10GHz XMT MODE

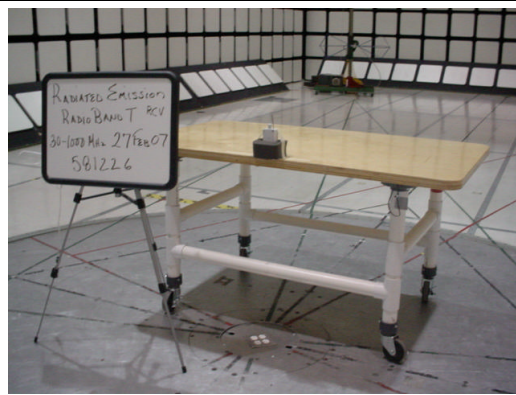


Radiated Emissions Setup 1-10GHz XMT MODE

Figure 9 Test setup for Radiated Emissions – Receive Mode



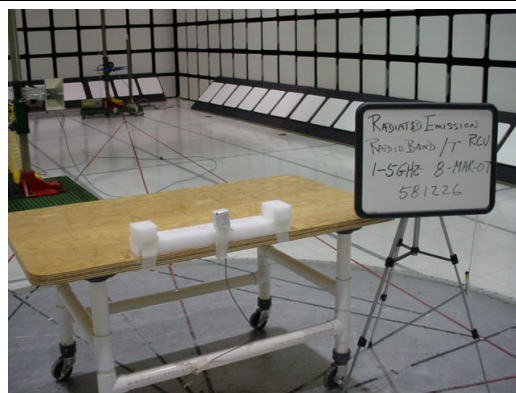
Radiated Emissions Setup 30-1000MHz RCV Mode



Radiated Emissions Setup 30-1000MHz RCV Mode

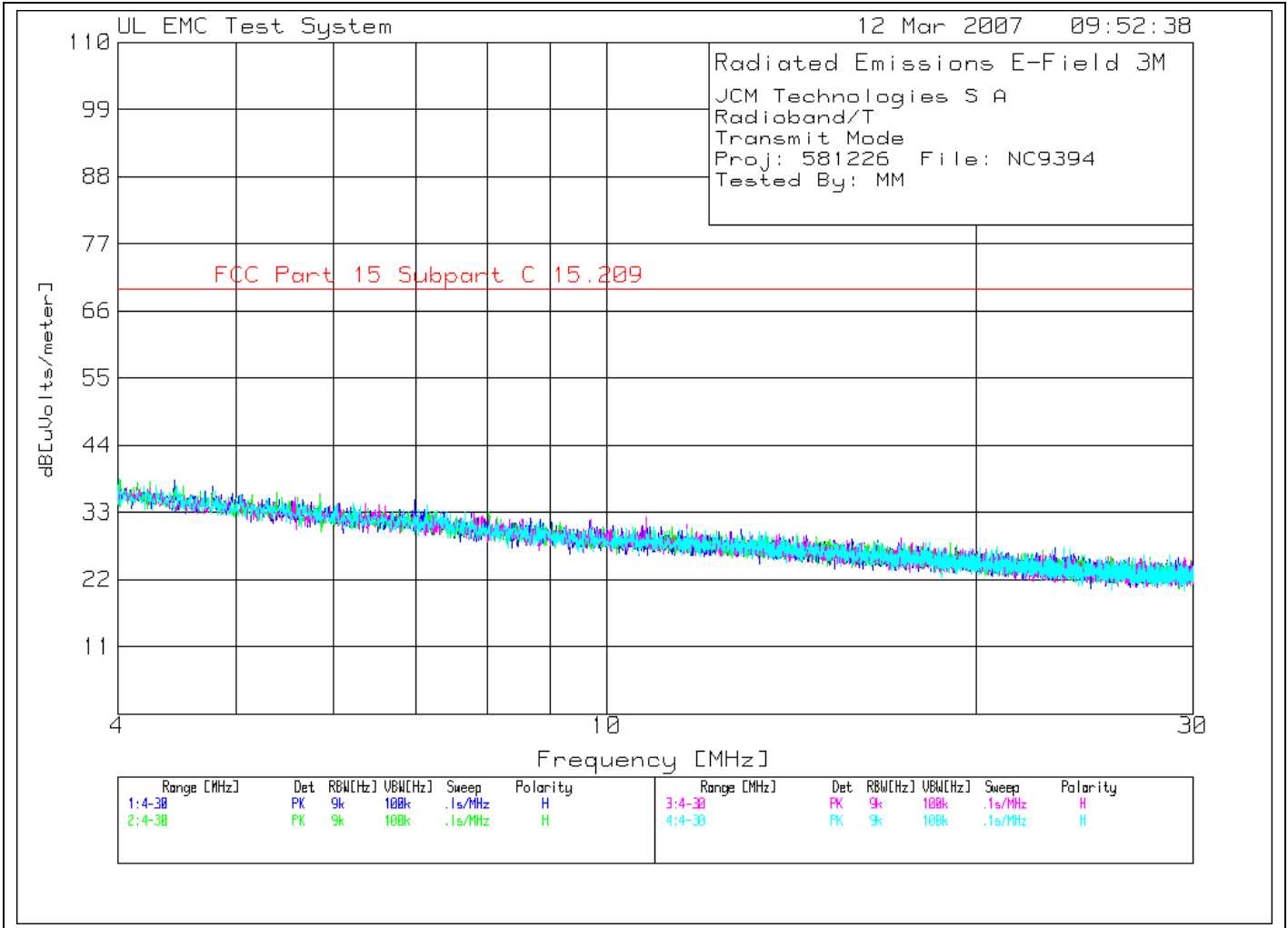


Radiated Emissions Setup 1-5GHz RCV MODE



Radiated Emissions Setup 1-5GHz RCV MODE

Figure 10 Radiated Emissions Graph



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Table 10 Radiated Emissions Data Points

JCM Technologies S A
 Radioband/T
 Transmit Mode
 Proj: 581226 File: NC9394
 Tested By: MM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1

0°	4 - 30MHz	-----				
1	4.44861	22.83 pk	.2	15.3	38.33	69.5
	Azimuth:208	Height:100	Horz	Margin [dB]		-31.17

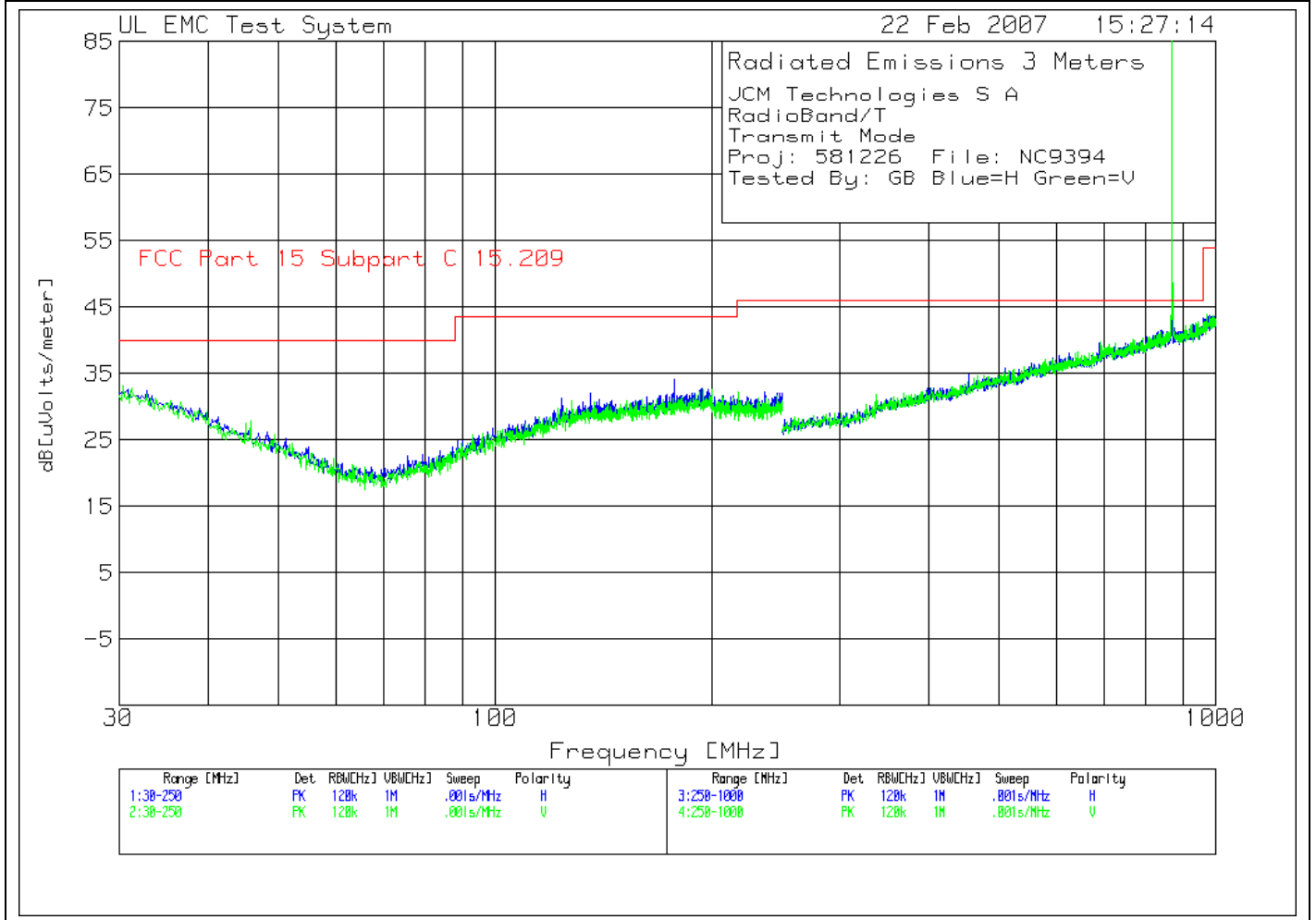
45°	4 - 30MHz	-----				
2	5.83996	20.57 pk	.2	15.2	35.97	69.5
	Azimuth:43	Height:120	Horz	Margin [dB]		-33.53
3	7.17279	17.37 pk	.2	15.4	32.97	69.5
	Azimuth:330	Height:120	Horz	Margin [dB]		-36.53

90°	4 - 30MHz	-----				
4	9.71493	16.13 pk	.2	15.5	31.83	69.5
	Azimuth:343	Height:140	Horz	Margin [dB]		-37.67
5	10.76169	16.33 pk	.2	15.6	32.13	69.5
	Azimuth:138	Height:140	Horz	Margin [dB]		-37.37
6	14.46762	12.65 pk	.3	16.1	29.05	69.5
	Azimuth:235	Height:140	Horz	Margin [dB]		-40.45

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 11 Radiated Emissions Graph



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Table 11 Radiated Emissions Data Points

JCM Technologies S A
 RadioBand/T
 Transmit Mode
 Proj: 581226 File: NC9394
 Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	Average Correction Factor[dB]	Average Level [dBuV/m]

Horizontal 30 - 250MHz								
1	30.8806	14.76 pk	-.4	18.2	32.56	40		
	Azimuth:79	Height:102	Horz	Margin [dB]			-7.44	
2	123.3422	17.96 pk	0	13.4	31.36	43.5		
	Azimuth:14	Height:102	Horz	Margin [dB]			-12.14	
3	177.2048	18.8 pk	.1	15.3	34.2	43.5		
	Azimuth:197	Height:250	Horz	Margin [dB]			-9.3	

Vertical 30 - 250MHz								
4	127.7452	17.16 pk	0	13.8	30.96	43.5		
	Azimuth:270	Height:101	Vert	Margin [dB]			-12.54	

Horizontal 250 - 1000MHz								
5	868.9126	61.84 pk	1.5	22.8	86.14	46		
	Azimuth:344	Height:400	Horz	Margin [dB]			40.14	

Vertical 250 - 1000MHz								
6	868.9126	70.95 pk	1.5	22.8	95.25	46		
	Azimuth:45	Height:101	Vert	Margin [dB]			49.25	

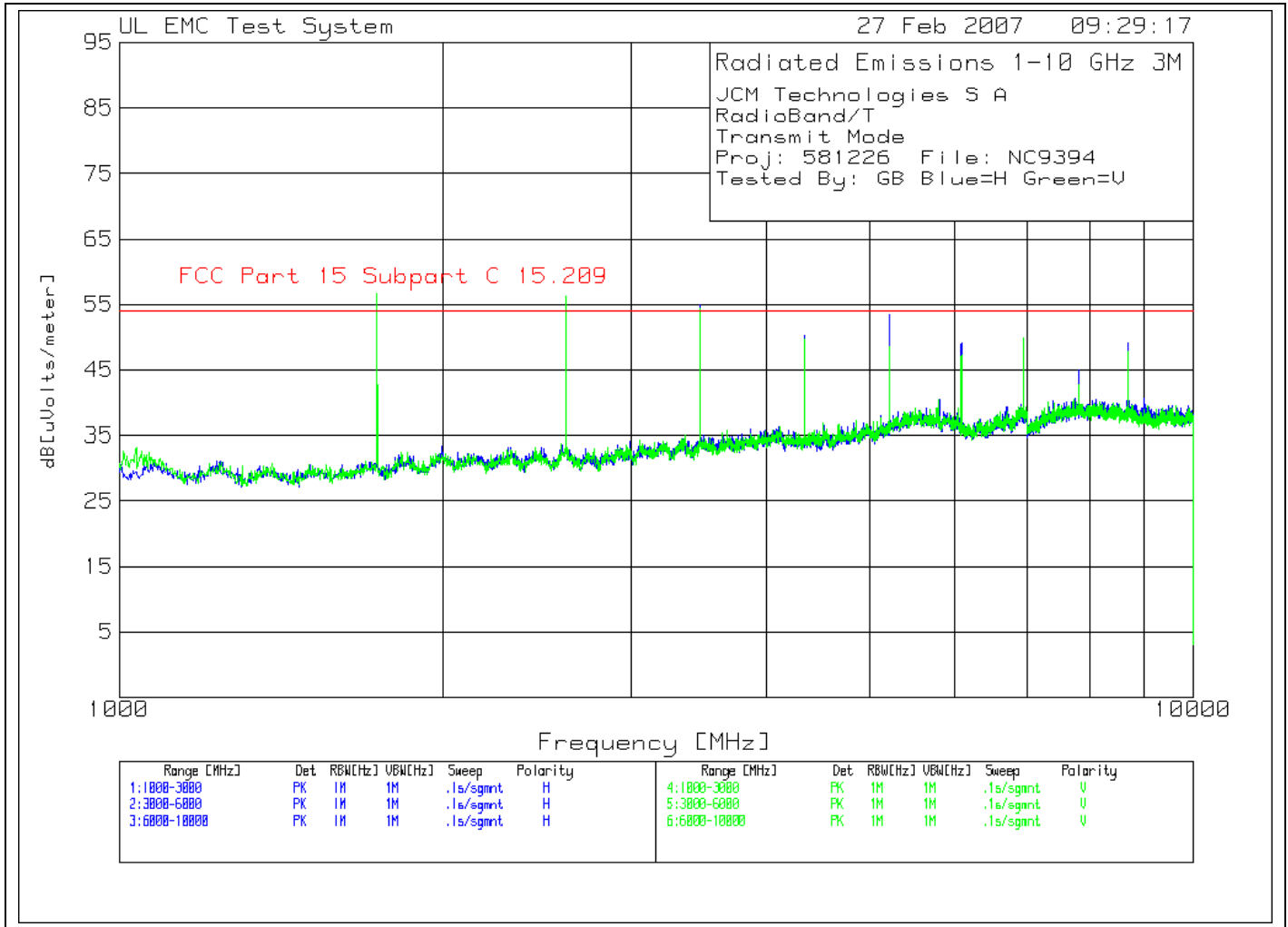
Horizontal 250 - 1000MHz								
	868.8877	60.51 qp	1.5	22.8	84.81	81.94	-20	64.81
	Azimuth: 30	Height:248	Horz			Margin [dB]:	-17.13	

Vertical 250 - 1000MHz								
	868.8877	70.51 qp	1.5	22.8	94.81	81.94	-20	74.81
	Azimuth: 327	Height:115	Vert			Margin [dB]:	-7.13	

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 12 Radiated Emissions Graph



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Table 12 Radiated Emissions Data Points

JCM Technologies S A
 RadioBand/T
 Transmit Mode
 Proj: 581226 File: NC9394
 Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	Average Correction Factor [dB]	Average Level [dBuV/m]

Horizontal 1000 - 3000MHz								
1	1736.737	56.76 pk	-33.8	26.5	49.46	61.94		
	Azimuth:196	Height:101	Horz	Margin [dB]		-12.48		
4	2607.608	57.51 pk	-32.7	29.2	54.01	61.94		
	Azimuth:169	Height:101	Horz	Margin [dB]		-7.93		

Horizontal 3000 - 6000MHz								
5	3474.316	54.74 pk	-31.3	31.5	54.94	61.94		
	Azimuth:169	Height:101	Horz	Margin [dB]		-7.00		
8	4344.897	48.52 pk	-30.7	32.4	50.22	61.94		
	Azimuth:326	Height:101	Horz	Margin [dB]		-11.72		
9	5213.476	49.24 pk	-29.5	33.7	53.44	61.94		
	Azimuth:305	Height:101	Horz	Margin [dB]		-8.5		

Horizontal 6000 - 10000MHz								
11	6082.041	43.57 pk	-28.8	34.4	49.17	61.94		
	Azimuth:224	Height:101	Horz	Margin [dB]		-12.77		
13	8689.345	39.19 pk	-27.8	37.8	49.19	61.94		
	Azimuth:325	Height:101	Horz	Margin [dB]		-12.75		

Vertical 1000 - 3000MHz								
2	1736.737	63.92 pk	-33.8	26.5	56.62	61.94	-20	36.62
	Azimuth:142	Height:101	Vert	Margin [dB]		-25.32		
3	2607.608	59.93 pk	-32.7	29	56.23	61.94	-20	36.23
	Azimuth:169	Height:101	Vert	Margin [dB]		-25.71		

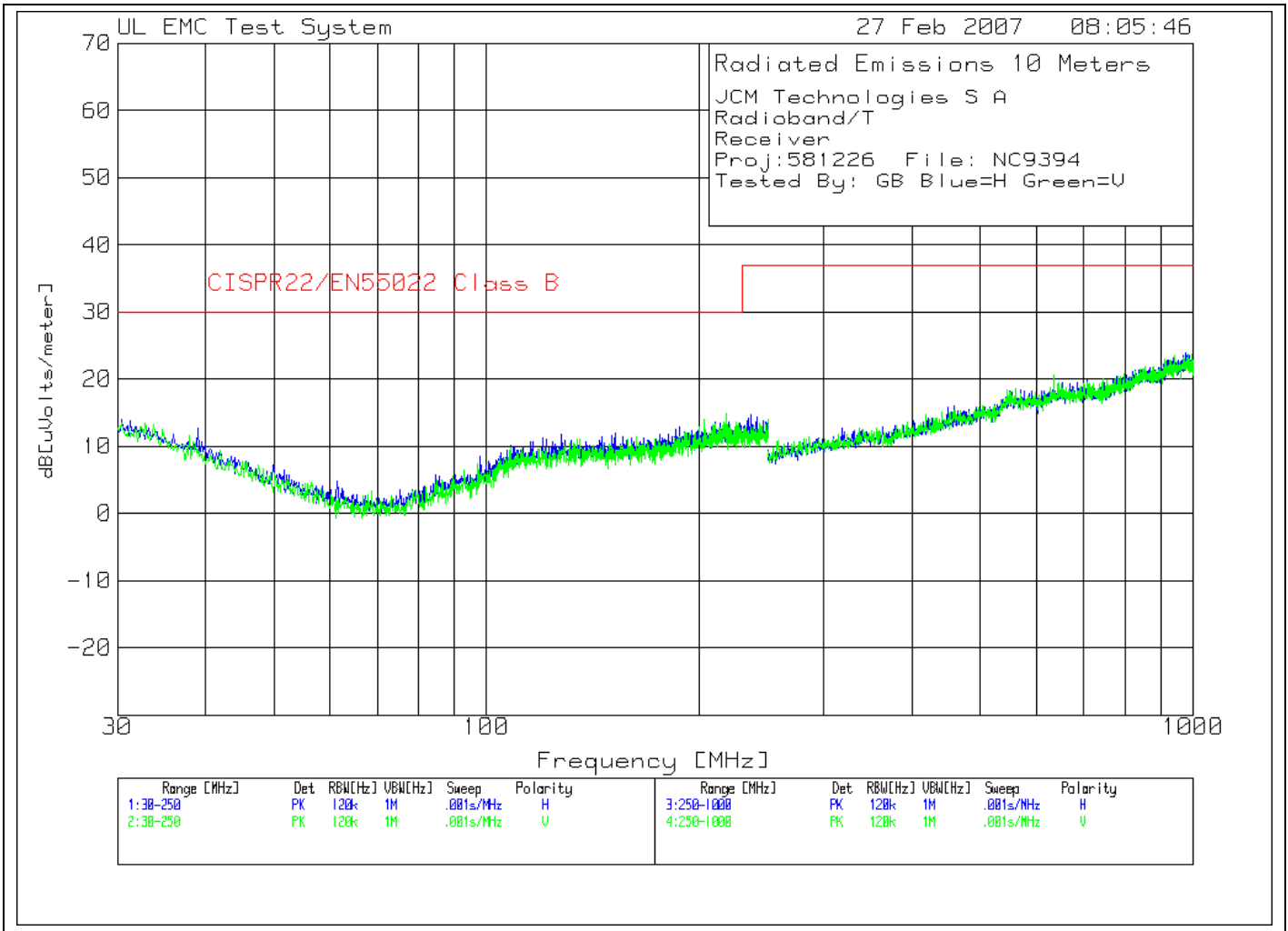
Vertical 3000 - 6000MHz								
6	3474.316	54.58 pk	-31.3	31.2	54.48	61.94		
	Azimuth:169	Height:101	Vert	Margin [dB]		-7.36		
7	4344.897	47.86 pk	-30.7	32.6	49.76	61.94		
	Azimuth:26	Height:101	Vert	Margin [dB]		-12.18		
10	5213.476	44.23 pk	-29.5	33.8	48.53	61.94		
	Azimuth:278	Height:101	Vert	Margin [dB]		-13.41		

Vertical 6000 - 10000MHz								
12	6950.475	42.39 pk	-28	35.4	49.79	61.94		
	Azimuth:333	Height:101	Vert	Margin [dB]		-12.15		
14	8689.345	38.13 pk	-27.8	37.4	47.73	61.94		
	Azimuth:357	Height:101	Vert	Margin [dB]		-14.21		

LIMIT 1: FCC Part 15 Subpart C 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 13 Radiated Emissions Graph



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Table 13 Radiated Emissions Data Points

JCM Technologies S A
 Radioband/T
 Receiver

Proj:581226 File: NC9394

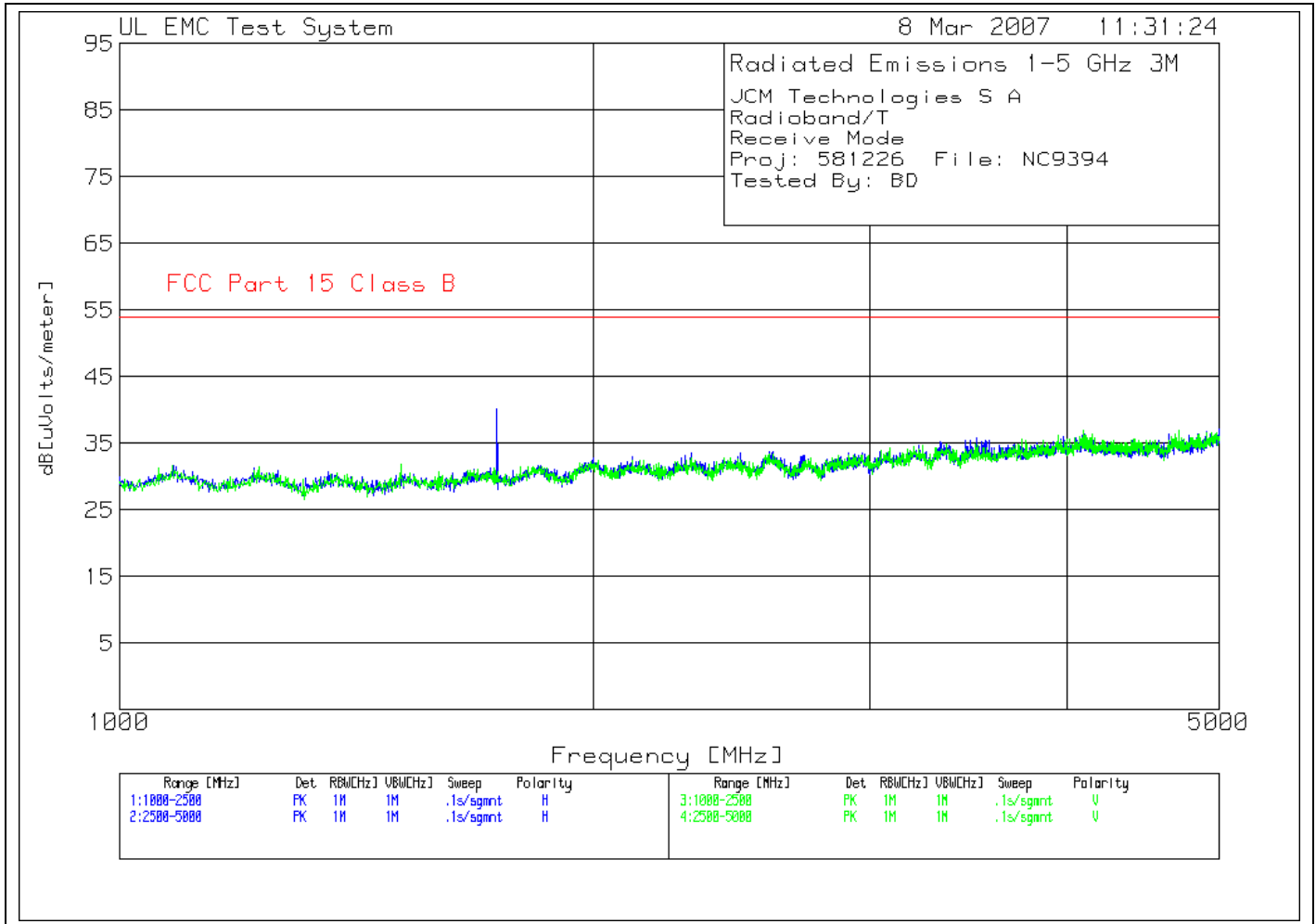
Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
Horizontal 30 - 250MHz -----						
1	38.9526	33.58 pk	-35.6	14.7	12.68	30
	Azimuth:79	Height:101	Horz	Margin [dB]		-17.32
2	61.4076	34.16 pk	-35.6	6.3	4.86	30
	Azimuth:357	Height:101	Horz	Margin [dB]		-25.14
3	97.952	33.55 pk	-35.7	10.7	8.55	30
	Azimuth:158	Height:250	Horz	Margin [dB]		-21.45
4	127.5984	33.73 pk	-35.7	13.7	11.73	30
	Azimuth:83	Height:101	Horz	Margin [dB]		-18.27
Vertical 30 - 250MHz -----						
5	218.1521	34.38 pk	-35.1	15.7	14.98	30
	Azimuth:201	Height:101	Vert	Margin [dB]		-15.02
Vertical 250 - 1000MHz -----						
6	635.2568	31.37 pk	-31.3	20.5	20.57	37
	Azimuth:44	Height:100	Vert	Margin [dB]		-16.43

LIMIT 1: CISPR22/EN55022 Class B

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Figure 14 Radiated Emissions Graph



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Table 14 Radiated Emissions Data Points

JCM Technologies S A
 Radioband/T
 Receive Mode
 Proj: 581226 File: NC9394
 Tested By: BD

No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit
Horizontal 1000 - 2500MHz -----						
1	1737.237	47.41 pk	-33.8	26.5	40.11	
	Azimuth:250	Height:101	Horz	Margin [dB]		-13.89
2	2307.808	37.9 pk	-32.8	28.5	33.6	54
	Azimuth:114	Height:200	Horz	Margin [dB]		-20.4
6	1082.583	41.1 pk	-34.9	25.4	31.6	54
	Azimuth:196	Height:200	Horz	Margin [dB]		-22.4
Horizontal 2500 - 5000MHz -----						
3	3320.547	35.82 pk	-31.7	31.1	35.22	54
	Azimuth:32	Height:200	Horz	Margin [dB]		-18.78
4	3507.338	35.71 pk	-31.5	31.6	35.81	54
	Azimuth:356	Height:200	Horz	Margin [dB]		-18.19
5	3550.7	35.34 pk	-31.5	31.7	35.54	54
	Azimuth:164	Height:200	Horz	Margin [dB]		-18.46
Vertical 1000 - 2500MHz -----						
7	1081.081	41.24 pk	-34.9	25.3	31.64	54
	Azimuth:141	Height:101	Vert	Margin [dB]		-22.36
8	1226.727	40.82 pk	-34.6	25.3	31.52	54
	Azimuth:87	Height:101	Vert	Margin [dB]		-22.48
9	2015.015	37.72 pk	-33	27.7	32.42	54
	Azimuth:87	Height:200	Vert	Margin [dB]		-21.58
Vertical 2500 - 5000MHz -----						
10	3088.726	36.2 pk	-32.3	30.5	34.4	54
	Azimuth:87	Height:100	Vert	Margin [dB]		-19.6
11	4101.067	34.78 pk	-30.4	32.5	36.88	54
	Azimuth:28	Height:200	Vert	Margin [dB]		-17.12
12	4711.474	34.12 pk	-30.1	32.9	36.92	54
	Azimuth:141	Height:200	Vert	Margin [dB]		-17.08

LIMIT 1: FCC Part 15 Class B

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

4.5 Fundamental Frequency and Spurious Emissions Measurement Limit Calculations

Limit Calculation

Fundamental Frequency is MHz

$$\text{Limit} = 20 \cdot \log (\text{mV/m})$$

$$\text{Limit} = 20 \cdot \log (12500)$$

$$\text{Limit} = 81.94\text{dBuV/m}$$

Spurious Emissions Limit

Fundamental Frequency is above 470MHz

$$\text{Limit} = 20 \cdot \log (\text{uV/m})$$

$$\text{Limit} = 20 \cdot \log (1250)$$

$$\text{Limit} = 61.94\text{dBuV}$$

Radiated Emissions Limit conversion from mV/m to dBmV/m (accordance with paragraph 15.209)

$$\text{Radiated Emissions Limit (dB}\mu\text{V/m)} = 20 \cdot \log (\mu\text{V/m})$$

$$\text{Radiated Emissions Limit (dB}\mu\text{V/m)} = 20 \cdot \log (90)$$

$$\text{Radiated Emissions Limit (dB}\mu\text{V/m)} = 39.1$$

Radiated Emissions test data obtained during measurements.

Field Strength (dB μ V/m) = Measured field strength (dB μ V/m) + Antenna Factor (dB) + Cable Factor (dB)

$$\text{Field Strength (dB}\mu\text{V/m)} = 57.9\text{dB}\mu\text{V/m} + 22.8\text{dB} + 1.5\text{dB}$$

$$\text{Field Strength (dB}\mu\text{V/m)} = 82.2$$

Duty Cycle Correction Factor calculation.

Total number of pulses counted in 100ms.

Total time on = 2.16mS

$$\text{Duty cycle correction factor} = 20 \log (2.16\text{mS} / 100\text{ms})$$

$$= 20 \log (0.0216)$$

$$= \mathbf{-33.3\text{dB so } -20\text{dB used}}$$

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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.

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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