



**FCC CFR47 PART 15 SUBPART C
CERTIFICATION TEST REPORT
FOR
RFID Reader**

MODEL NUMBER: FREE15R

REPORT NUMBER: 1001433020

FCC ID: U5Z-FREE15R

**ISSUE DATE: 2012-03-22
REVISION DATE: 2012-03-30**

Prepared for
**JCM TECHNOLOGIES S A
BISBE MORGADES, 46 BAIXOS
VIC
08500, SPAIN**

Prepared by
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NVLAP LAB CODE 100255-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2012-03-22	Initial Issue	B. DeLisi
--	2012-03-30	Added AC adapter information in section 5.5	B. DeLisi

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: JCM TECHNOLOGIES S A
BISBE MORGADES, 46 BAIXOS
VIC, 08500, SPAIN

EUT DESCRIPTION: RFID Reader

MODEL: FREE15R

SERIAL NUMBER: Non-serialized production unit.

DATE TESTED: 2012-03-12 through 2012-03-15

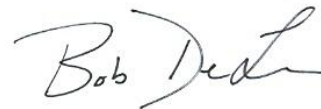
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation, as described by the referenced documents. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL By:

Tested By:



Joseph Danisi
Lead Engineering Associate
UL LLC

Bob DeLisi
Sr. Staff Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.3 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.00 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a RFID Reader intended for security purposes.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral loop antenna.

5.3. WORST-CASE CONFIGURATION AND MODE

The worst-case configuration was the Y-axis. All radiated emissions testing was conducted in this configuration. The device only has one mode of operation.

5.4. MODIFICATIONS

No modifications were made during testing.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adpater	Leader Electronics Inc.	MU12-G128100-A1	N/A	N/A

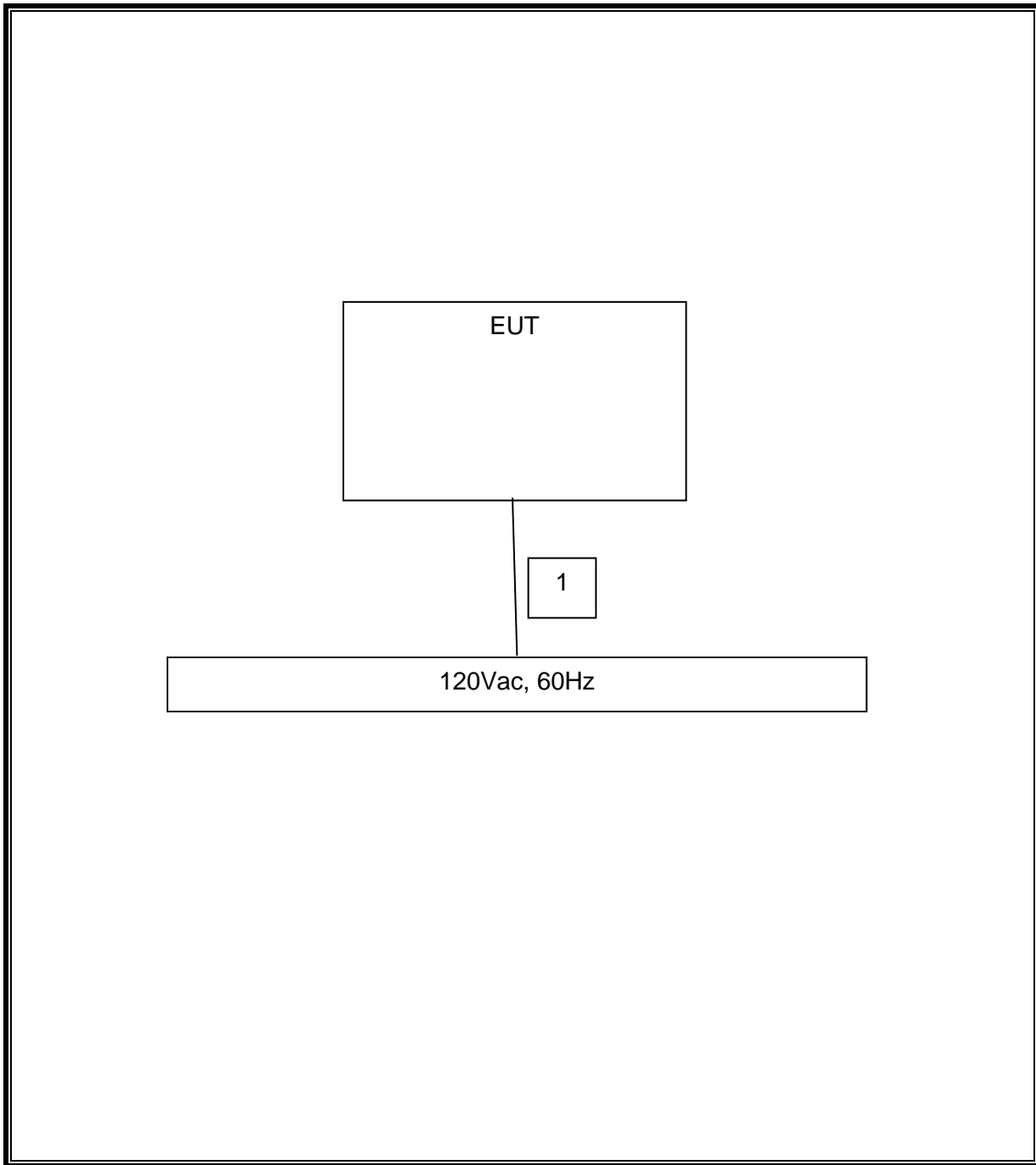
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC/DC	1	Wire	Unshielded	1.8	Powered by AC/DC converter

TEST SETUP

The EUT is a stand-alone device and was tested as such.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
60Hz-30MHz					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2012-01-30	2013-01-30
Active Loop Antenna	EMCO	6507	ME5A-288	2011-10-26	2012-10-26
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2012-01-30	2013-01-30
Bicon Antenna	Schaffner	VBA6106A	43441	2010-09-09	2011-09-09
Log-P Antenna	Schaffner	UPA6109	44067	2011-04-05	2012-04-05
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
External Preamp (9k-1GHz)	Schaffner	CPA9231A	31613	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Conducted Emissions – Shield Room					
Spectrum Analyzer	Agilent	E7402A	ME5B-123	2012-02-01	2013-02-28
LISN	Solar	9252-50-R-24-BNC	47367	2012-02-03	2013-02-28
Switch Driver	HP	11713A	44403	N/A	N/A
RF Switch Box	UL	2	44400	N/A	N/A
Measurement Software	UL	Version 9.3	44743	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43736	2010-12-07	2012-12-07
Multimeter	Fluke	87V	64386	2012-02-01	2013-02-28

7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.209 (a)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (m)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960 MHz	500	3
Note: The lower limit shall apply at the transition frequency.		

Limits were extrapolated to 3-meters by adding 80dB/decade below 0.490MHz and 40dB/decade from 0.490MHz to 30MHz. Above 30MHz measurements were made at the specified measurement distance.

TEST PROCEDURE

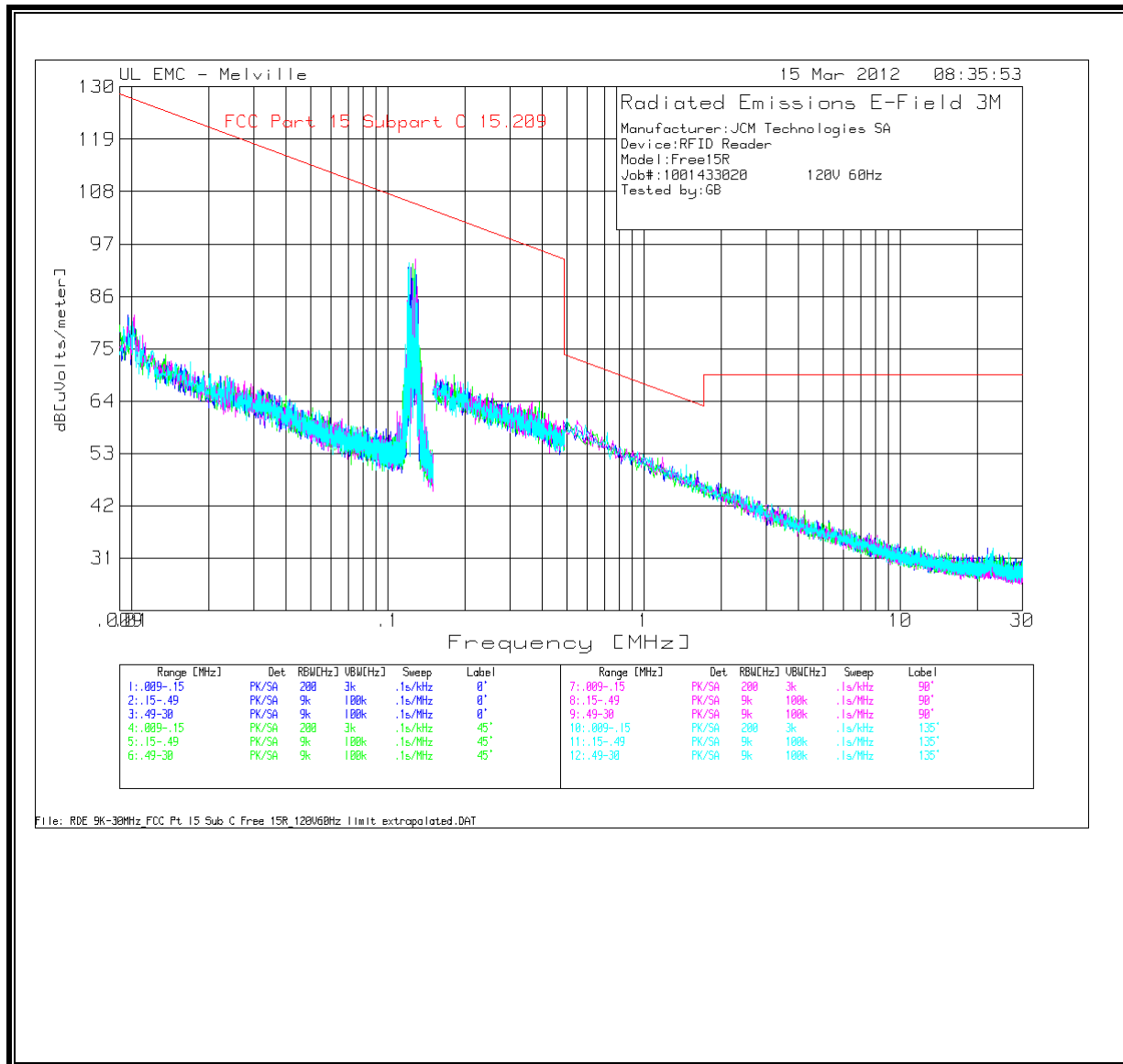
ANSI C63.4

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 0.125 MHz, while the highest frequency generated or used in the device is 4 MHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000 MHz).

RESULTS

No non-compliance noted:

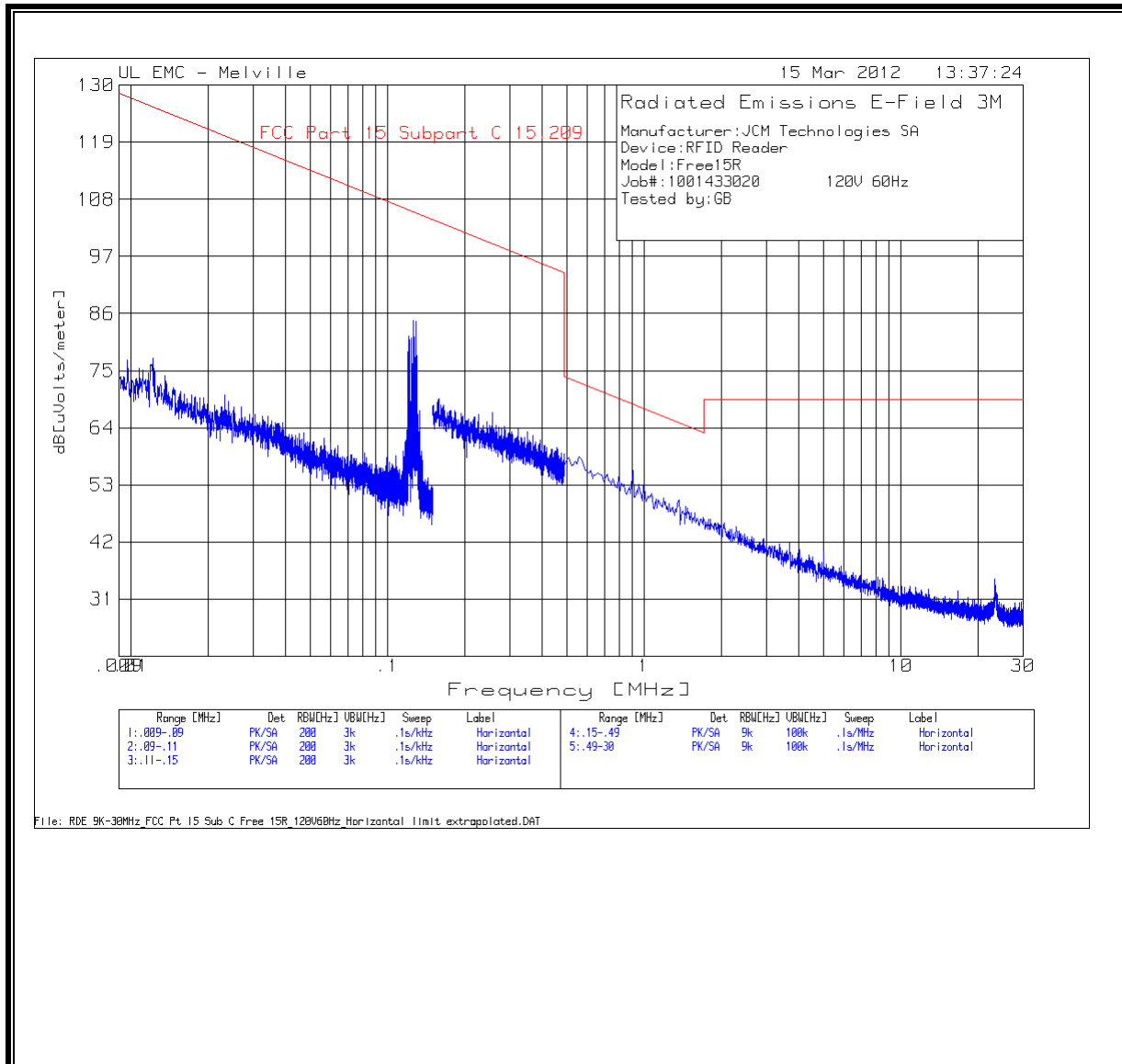
7.2. TX SPURIOUS EMISSIONS 0.009 TO 30 MHz - Vertical



Limits are extropolated as follows: Below 490kHz – add 80dB/decade; Above 490kHz – add 40dB/decade

Manufacturer:JCM Technologies SA										
Device:RFID Reader										
Model:Free15R										
Job#:1001433020 120V 60Hz										
Tested by:GB										
Test	Meter	Detector	MESA-288 6507 EFlid 19Oct11 [dB]	3MLoc 9kHz- 30MHz 03Feb12 [dB]	dB[uVolts /meter]	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
0° .009 - .15MHz										
0.010298	51.08	PK	30.6	0.3	81.98	127.3	-45.32	1	100	Horz
45° .009 - .15MHz										
0.125456	75.34	PK	17.5	0.1	92.94	105.6	-12.66	354	120	Horz
90° .009 - .15MHz										
0.127939	76.15	PK	17.5	0.1	93.75	105.5	-11.75	275	139	Horz
90° .49 - 30MHz										
0.54904	42.83	PK	16.9	0.1	59.83	72.8	-12.97	36	139	Horz
1.1788	35.15	PK	16.9	0.2	52.25	66.2	-13.95	115	139	Horz
135° .009 - .15MHz										
0.121055	75.5	PK	17.5	0.1	93.1	105.9	-12.8	206	160	Horz
0° .009 - .15MHz										
0.0103	34.25	Av	30.6	0.3	65.15	127.3	-62.15	209	245	Horz
0.121	38.26	Av	17.5	0.1	55.86	105.9	-50.04	179	264	Horz
0.126	45.45	Av	17.5	0.1	63.05	105.6	-42.55	202	101	Horz
0.127	46.55	Av	17.5	0.1	64.15	105.5	-41.35	4	149	Horz
0° .49 - 30MHz										
0.549	36.66	QP	16.9	0.1	53.66	72.8	-19.14	162	107	Horz
1.178	29.11	QP	16.9	0.2	46.21	66.2	-19.99	332	220	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

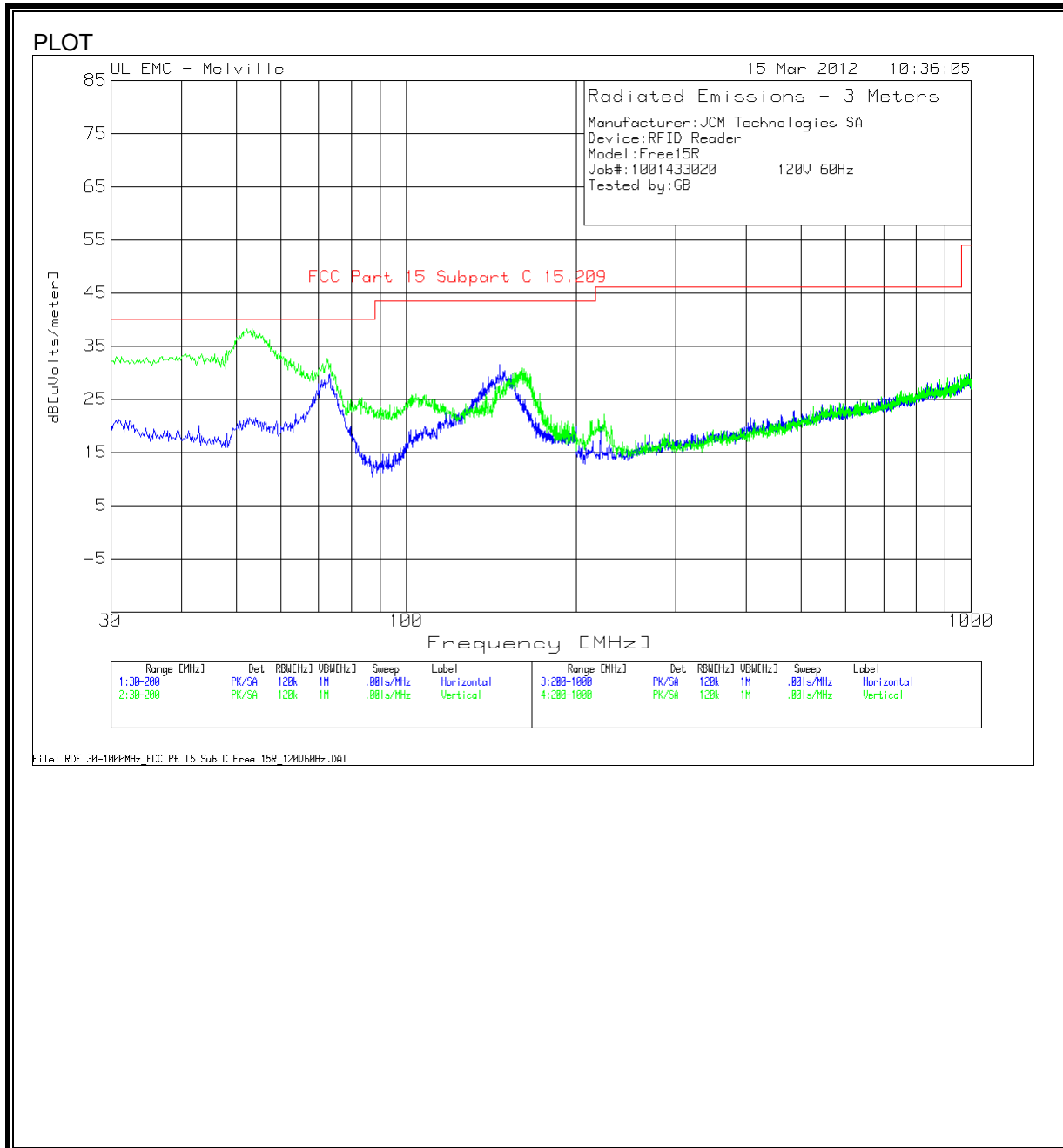
7.3. TX SPURIOUS EMISSIONS 0.009 TO 30 MHz - Horizontal



Limits are extropolated as follows: Below 490kHz – add 80dB/decade; Above 490kHz – add 40dB/decade

Manufacturer:JCM Technologies SA										
Device:RFID Reader										
Model:Free15R										
Job#:1001433020 120V 60Hz										
Tested by:GB										
Test	Meter	Detector	ME5A-288 6507 EFlid 19Oct11 [dB]	3MLoc 9kHz- 30MHz 03Feb12 [dB]	dB[uVolts/ meter]	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]		
Horizontal .009 - .09MHz										
0.012161	47.6	PK	29.5	0.3	77.4	125.9	-48.5	2	100	Horz
Horizontal .11 - .15MHz										
0.120834	62.97	PK	17.5	0.1	80.57	106	-25.43	354	100	Horz
0.12621	67.1	PK	17.5	0.1	84.7	105.6	-20.9	89	100	Horz
0.128839	66.93	PK	17.5	0.1	84.53	105.4	-20.87	89	100	Horz
Horizontal .49 - 30MHz										
0.55888	41.37	PK	16.9	0.1	58.37	72.7	-14.33	1	100	Horz
0.90328	38.92	PK	16.8	0.1	55.82	68.5	-12.68	255	100	Horz
Horizontal .009 - .09MHz										
0.01255	34.04	Av	29.3	0.3	63.64	125.6	-61.96	88	100	Horz
Horizontal .11 - .15MHz										
0.1262	38.46	Av	17.5	0.1	56.06	105.6	-49.54	250	100	Horz
0.12871	41.31	Av	17.5	0.1	58.91	105.4	-46.49	77	100	Horz
0.1208	40.53	Av	17.5	0.1	58.13	106	-47.87	121	100	Horz
Horizontal .49 - 30MHz										
0.558	36.86	QP	16.9	0.1	53.86	72.7	-18.84	161	100	Horz
0.903	31.96	QP	16.8	0.1	48.86	68.5	-19.64	152	100	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

7.4. TX SPURIOUS EMISSION 30 TO 1000 MHz



DATA

Manufacturer:JCM Technologies SA										
Device:RFID Reader										
Model:Free15R										
Job#:1001433020 120V 60Hz										
Tested by:GB										
FCC Part 15										
Test	Meter		AF-43441	GL-3M	dB[uVolts/	Subpart C		Azimuth	Height	
Frequency	Reading	Detector	[dB]	[dB]	meter]	15.209	Margin	[Degs]	[cm]	Polarity
Horizontal 30 - 200MHz										
73.2	43.4	QP	6.5	-23.8	26.1	40	-13.9	178	242	Horz
146.4	33.94	QP	14.7	-23.4	25.24	43.5	-18.26	182	102	Horz
Vertical 30 - 200MHz										
53	50.32	QP	8.8	-23.8	35.32	40	-4.68	4	100	Vert
34.5	37.57	QP	16.3	-24.1	29.77	40	-10.23	68	102	Vert
43	40.59	QP	12.9	-23.9	29.59	40	-10.41	45	107	Vert
72.8	46.42	QP	6.5	-23.7	29.22	40	-10.78	21	109	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207 (a)

Frequency of emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

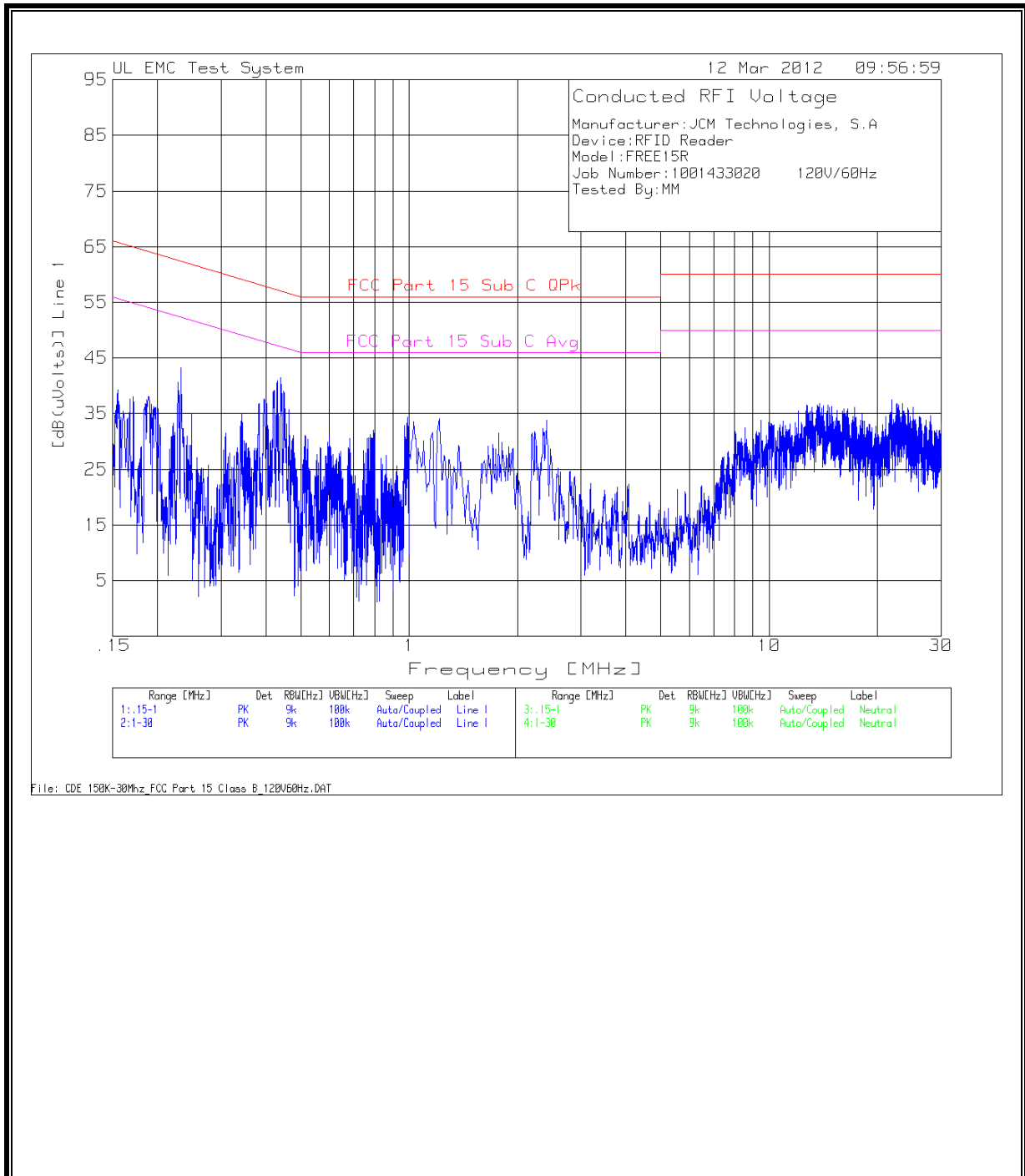
RESULTS

No non-compliance noted:

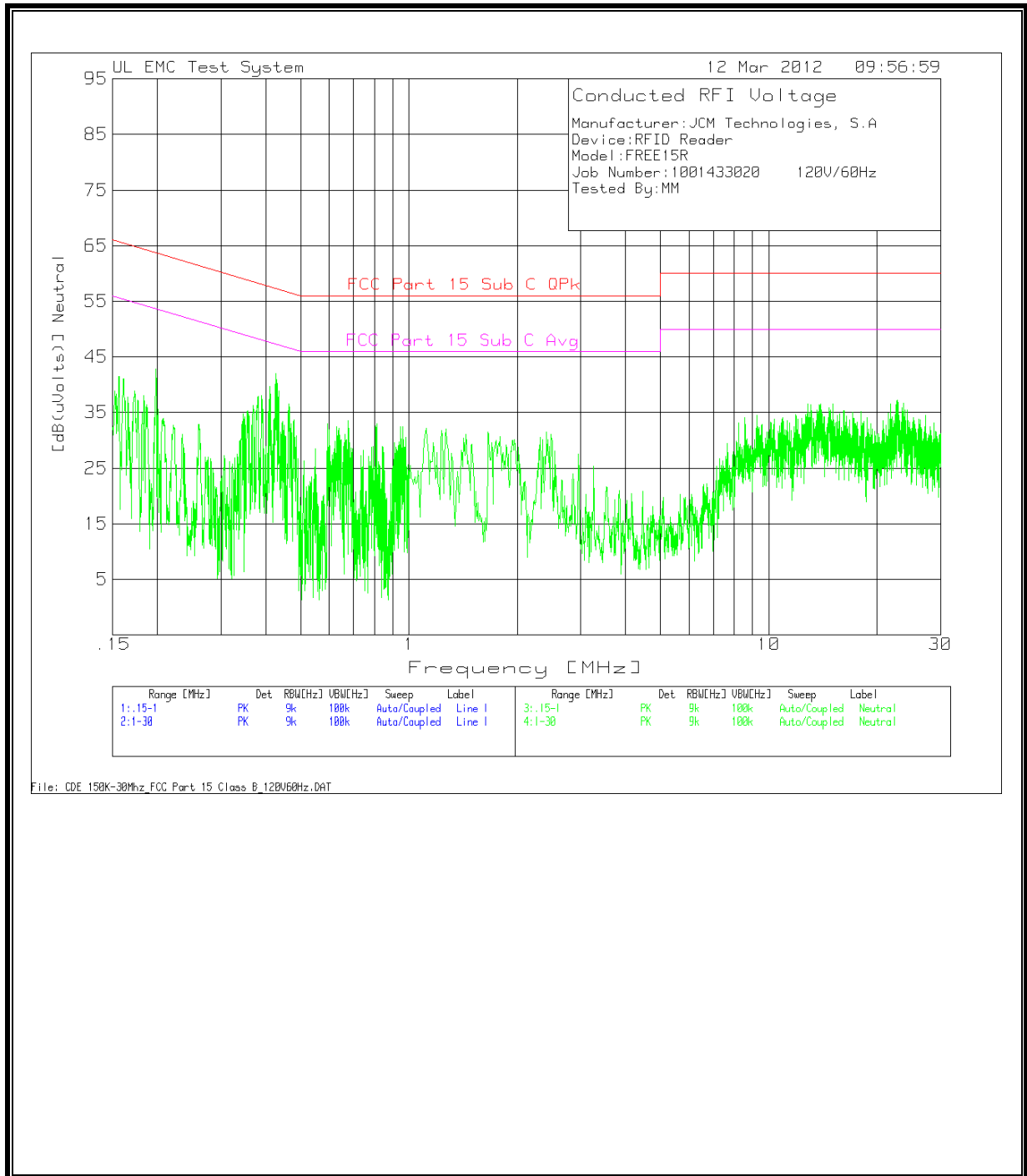
6 WORST EMISSIONS

Manufacturer:JCM Technologies, S.A									
Device:RFID Reader									
Model:FREE15R									
Job Number:1001433020 120V/60Hz									
Tested By:MM									
Test	Meter	Detector	47367 L1 9k-30MHz with Preamp [dB]	[dB(uVolts)]	FCC Part 15 Sub C QPk	Margin	FCC Part 15 Sub C Avg	Margin	
Line 1 .15 - 1MHz									
0.23205	61.09	PK	-17.9	43.19	62.4	-19.21	52.4	-9.21	
0.43878	59.59	PK	-18.1	41.49	57.1	-15.61	47.1	-5.61	
0.90968	38.18	PK	-18.2	19.98	56	-36.02	46	-26.02	
Line 1 1 - 30MHz									
1.20978	52.3	PK	-18.2	34.1	56	-21.9	46	-11.9	
2.40334	51.99	PK	-18.2	33.79	56	-22.21	46	-12.21	
13.68795	53.8	PK	-17.5	36.3	60	-23.7	50	-13.7	
Neutral .15 - 1MHz									
0.19771	60.2	PK	-17.3	42.9	63.7	-20.8	53.7	-10.8	
0.4269	60.04	PK	-18	42.04	57.3	-15.26	47.3	-5.26	
Neutral 1 - 30MHz									
1.26765	50.25	PK	-18.2	32.05	56	-23.95	46	-13.95	
2.41058	49.66	PK	-18.1	31.56	56	-24.44	46	-14.44	
12.76204	52.33	PK	-17.6	34.73	60	-25.27	50	-15.27	
22.56373	53.07	PK	-16.7	36.37	60	-23.63	50	-13.63	
Line 1 .15 - 1MHz									
0.23255	48.06	Av	-17.9	30.16	62.36	-32.2	52.36	-22.2	
0.43782	52.05	Av	-18.1	33.95	57.1	-23.15	47.1	-13.15	
0.90881	47.48	Av	-18.2	29.28	56	-26.72	46	-16.72	
Line 1 1 - 30MHz									
1.18451	47.48	Av	-18.2	29.28	56	-26.72	46	-16.72	
2.38704	47.53	Av	-18.2	29.33	56	-26.67	46	-16.67	
13.7004	48.19	Av	-17.5	30.69	60	-29.31	50	-19.31	
Neutral .15 - 1MHz									
0.19825	50.4	Av	-17.3	33.1	63.68	-30.58	53.68	-20.58	
0.42533	52.26	Av	-18	34.26	57.34	-23.08	47.34	-13.08	
Neutral 1 - 30MHz									
1.28544	47.06	Av	-18.2	28.86	56	-27.14	46	-17.14	
2.39727	47.39	Av	-18.1	29.29	56	-26.71	46	-16.71	
12.7715	48.02	Av	-17.6	30.42	60	-29.58	50	-19.58	
22.5595	47.85	Av	-16.7	31.15	60	-28.85	50	-18.85	
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

LINE 1 RESULTS

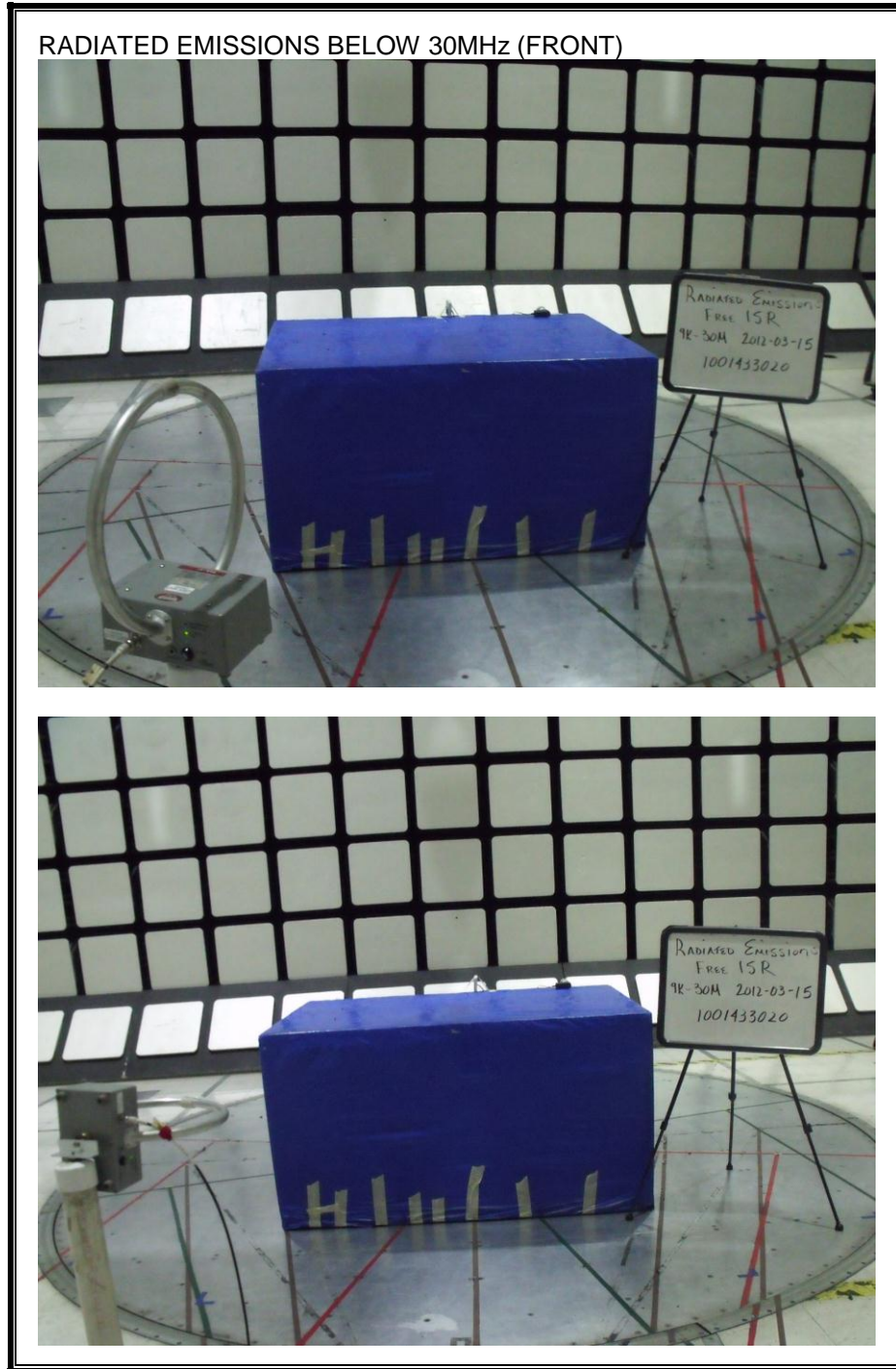


LINE 2 RESULTS

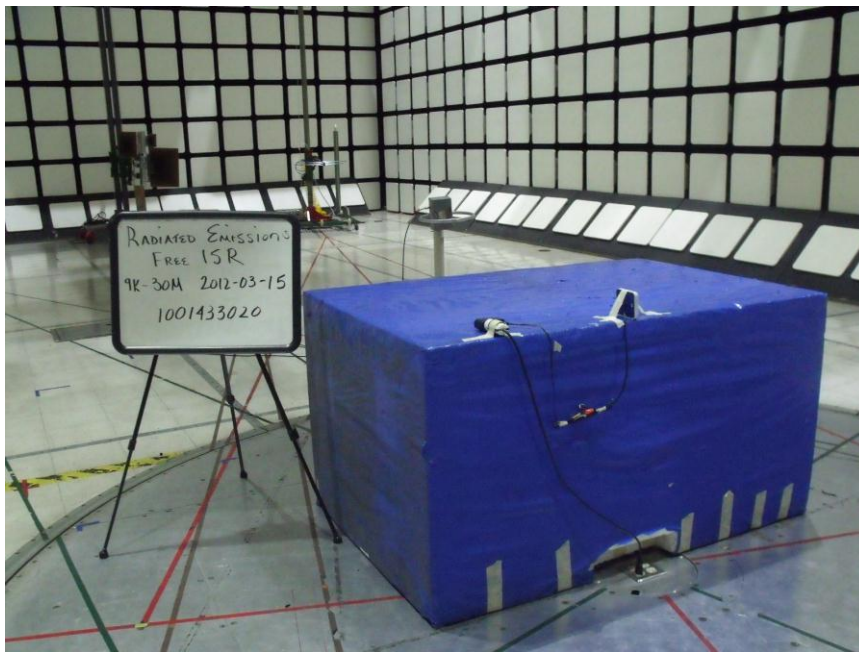
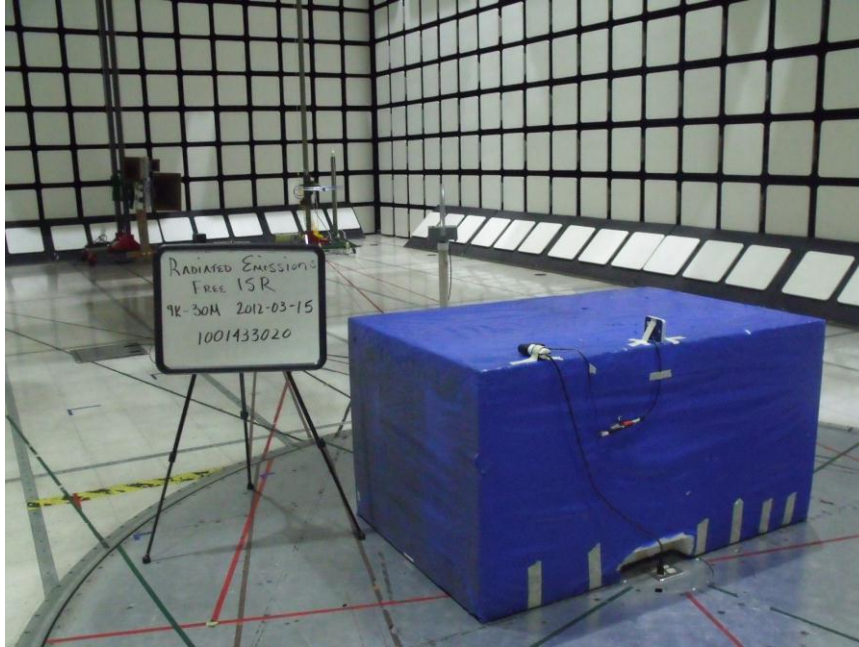


9. SETUP PHOTOS

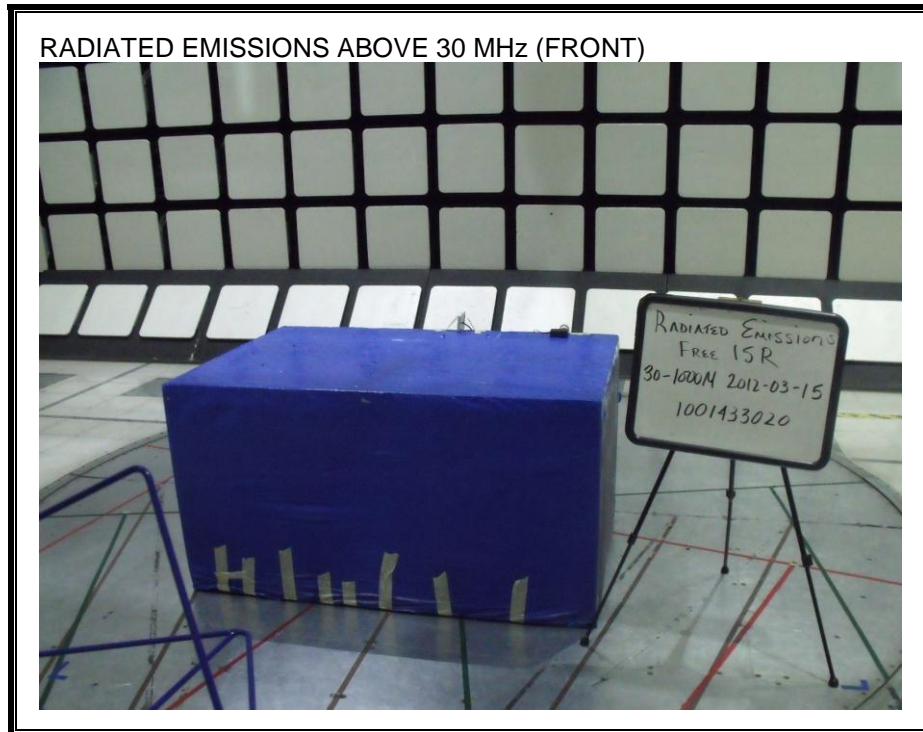
RADIATED EMISSION BELOW 30 MHz

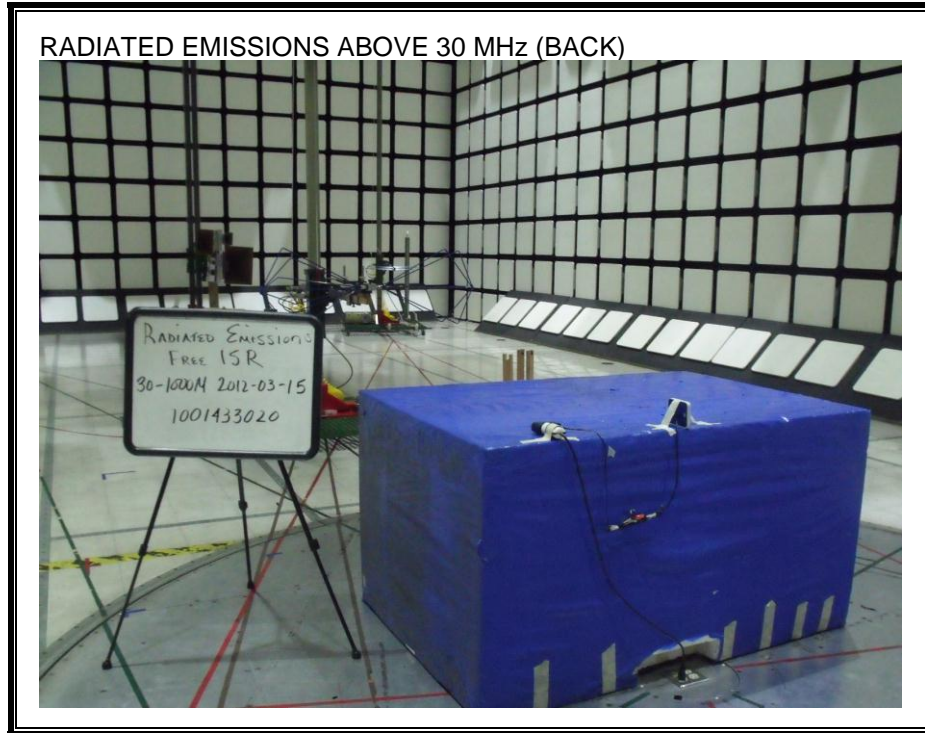


RADIATED EMISSIONS BELOW 30MHz (BACK)

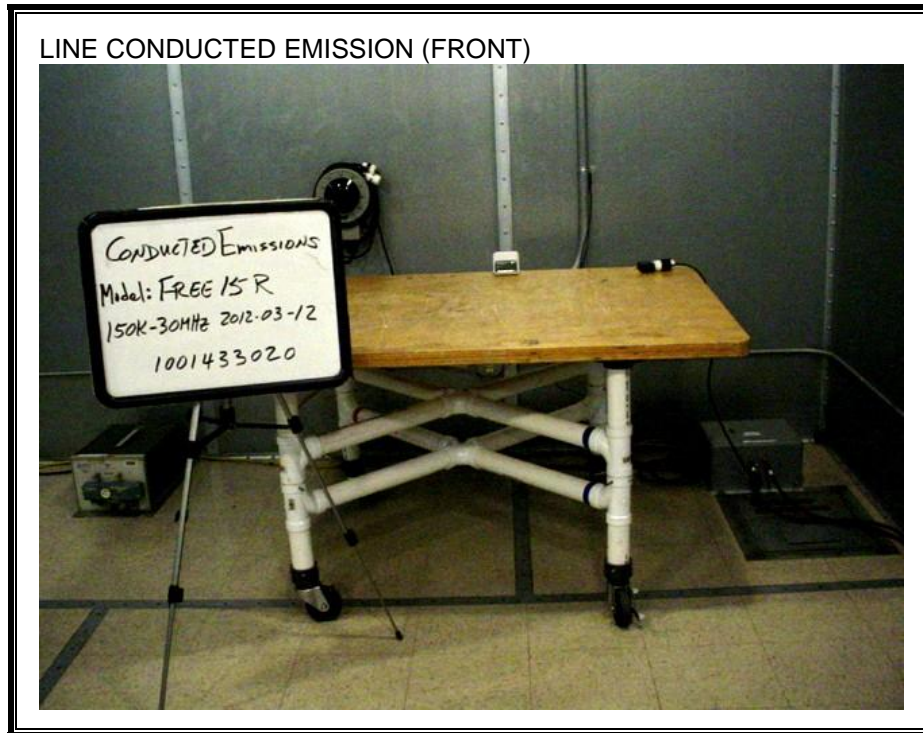


RADIATED EMISSION ABOVE 30 MHz





AC MAINS LINE CONDUCTED EMISSION





END OF REPORT