FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

EAS DETECTION SYSTEM MODULE

MODEL NUMBER: TR7240

FCC ID: DO4TR7240
IC: 3356B-TR7240

REPORT NUMBER: 10072468

ISSUE DATE: 2013-11-13

Prepared for
CHECKPOINT SYSTEMS
101 WOLF DRIVE
THOROFARE
NJ, 08086, USA

Prepared by
UL LLC
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NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/13/13	Initial Issue	M. Antola

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CHECKPOINT SYSTEMS
101 WOLF DRIVE
THOROFARE, NJ, 08086, USA

EUT DESCRIPTION: EAS DETECTION SYSTEM MODULE

MODEL: TR7240

SERIAL NUMBER: NON-SERIALIZED PRODUCTION UNIT

DATE TESTED: 9/23/13 – 10/9/13

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 3	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:

Bob DeLisi
WiSE Principal Engineer
UL

Tested By:

Mike Antola
WiSE Project Lead
UL

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.3-2003, 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a transmitter board, Model: TR7240, designed for use in Electronic Article Surveillance Systems. The EUT was tested for full Modular Approval.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

For this investigation, the radio utilized an inductive loop antenna, Model: EVOLVE P10 PABS, with dimensions of 19.68" (W) x 4.55" (D) x 67.28" (H). This is representative of the worse-case antenna type that would be used with this module.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 5.00-EnggBuild20130904.

The EUT driver software installed during testing was DMS version 1.08.078.

The test utility software used during testing was DMS version 1.08.078.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was initially investigated in each of the three orthogonal axes to determine its worst-case orientation. It was determined that the X-axis yielded the highest reading, thus all testing was performed in this axis (see Setup Photos for details). Testing was performed on the min and max channels. Because the EUT was tested as a module, the normally floor standing antenna was placed on a table due to the need for the typical short cable to be connected in order for the unit to function properly

5.5. MODIFICATIONS

1. R2, R3, R7, R8
Change from 0 Ohm to 10 Ohm.

2. R178, R179, R174, R175
Change from 560 Ohm to 330 Ohm.

3. C130, C131
Change from 1000pF to 470pF.

4. Added Fair-rite P/N: 0443806406 with 3 turns to DC cable near TR7240

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Loop Antenna	Checkpoint	P10 Pedestal	7356748C0D10740034	N/A
Power Supply	Globetek	GT-2S5024D-R-ES	ROHS002938151/07	N/A

I/O CABLES

I/O CABLE LIST					
Cable No.	**Port**	**# of Identical Ports**	**Cable Type**	**Cable Length**	**Remarks**
1	RF Interface	1	Shielded	15'	None
2	DC	1	Shielded	14'	None
3	AC	1	Unshielded	7'	None

TEST SETUP

The EUT is evaluated as a stand-alone device during the tests. Test software exercised the radio module.

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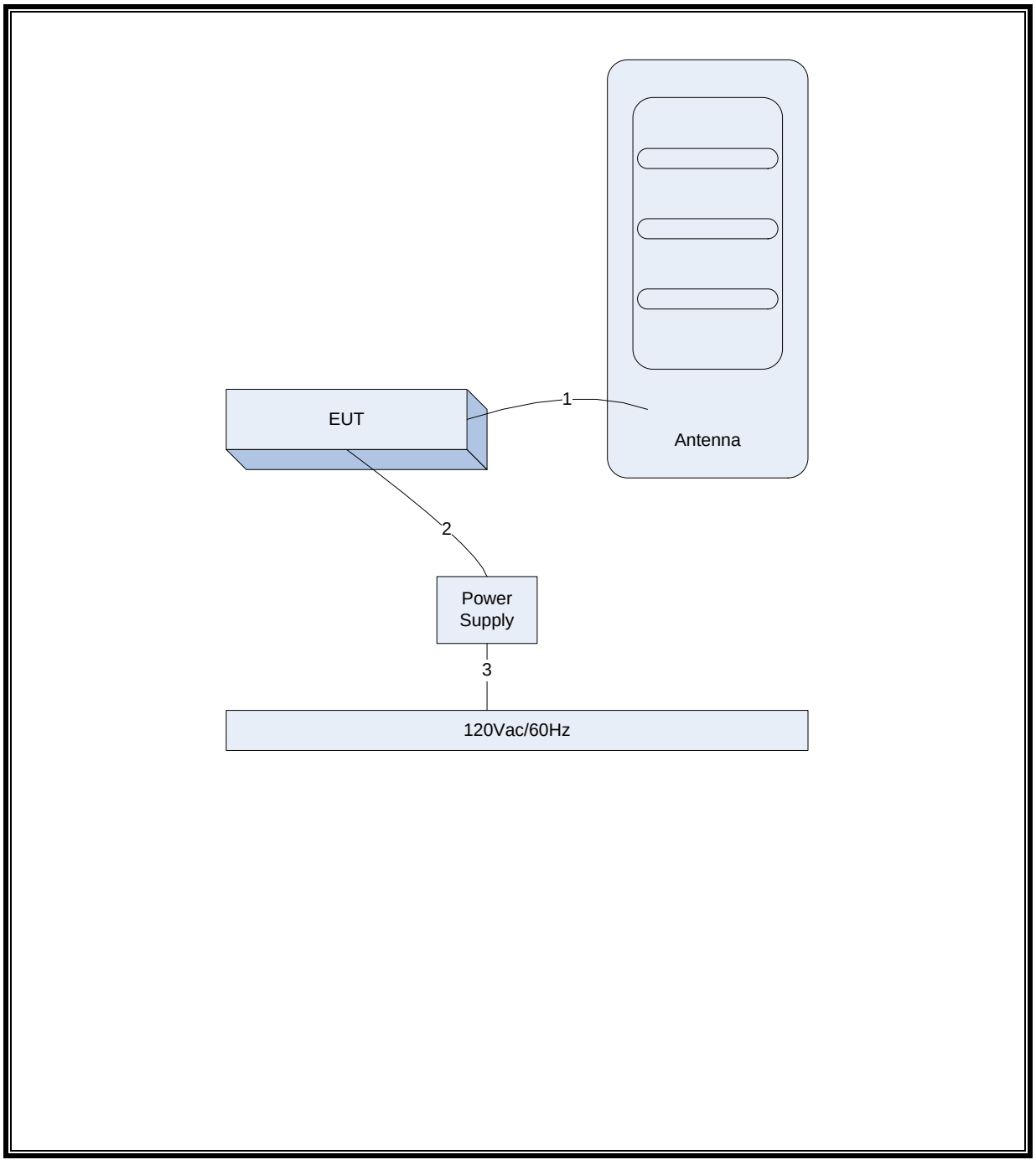
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

Radiated Emissions / 6dB Bandwidth / Duty Cycle					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Below 30MHz					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2013-01-30	2014-01-31
Loop Antenna	EMCO		5A-288	2012-11-13	2013-11-13
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 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2013-01-29	2014-01-31
Oscilloscope	Tektronix	TDS680B	5A-258	2013-01-31	2014-01-31
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2013-01-30	2014-01-31
Log-P Antenna	Schaffner	UPA6109	68	2013-04-03	2014-04-03
Bicon Antenna	Schaffner	VBA6106A	67	2013-11-12	2014-11-12
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 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2013-01-29	2014-01-31
Above 1GHz (Band Optimized System)					
Spectrum Analyzer	Agilent	E4446A	72823	2013-01-29	2014-01-31
Horn Antenna (1-2 GHz)	ETS	3161-01 (26°)**	51442	2008-03-28	See * below
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2013-01-29	2014-01-31

* - Note: As allowed by the calibration standard ANSI C63.4 Section 4.4.2, standard gain horns need only a one-time calibration. Only if physical damage occurs will the horn antenna require re-calibration.

Gain standard horn antennas (sometimes called standard gain horn antennas) need not be calibrated beyond that which is provided by the manufacturer unless they are damaged or deterioration is suspected, or they are used at a distance closer than $2D^2/\lambda$. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.

** - Number in parentheses denotes antenna beam width.

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Conducted Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Ground Plane 1					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2013-01-29	2014-01-31
LISN	Solar	9252-50-R-24-BNC	ME5A-636	2013-02-01	2014-02-28
Switch Driver	HP	11713A	44397	NA	NA
RF Switch Box	UL	4	44404	NA	NA
Measurement Software	UL	Version 9.5	44736	NA	NA
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734	2012-03-13	2014-03-13
Multimeter	Fluke	87V	44547	2013-01-28	2014-01-31

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7. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

Due to the short response time, an oscilloscope was used to in order to accurately measure the signal.

CALCULATION

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
1.98	0.005	32	0.00	0	0.081	-21.85

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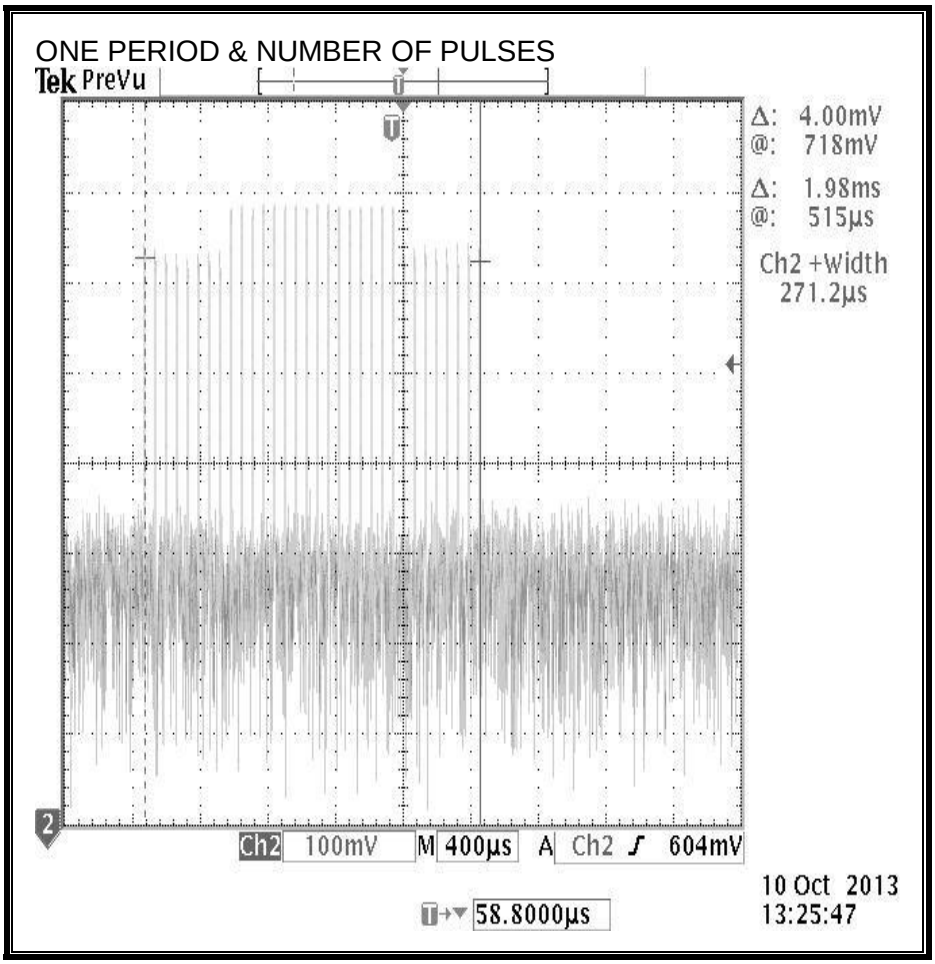
ONE PERIOD & NUMBER OF PULSES



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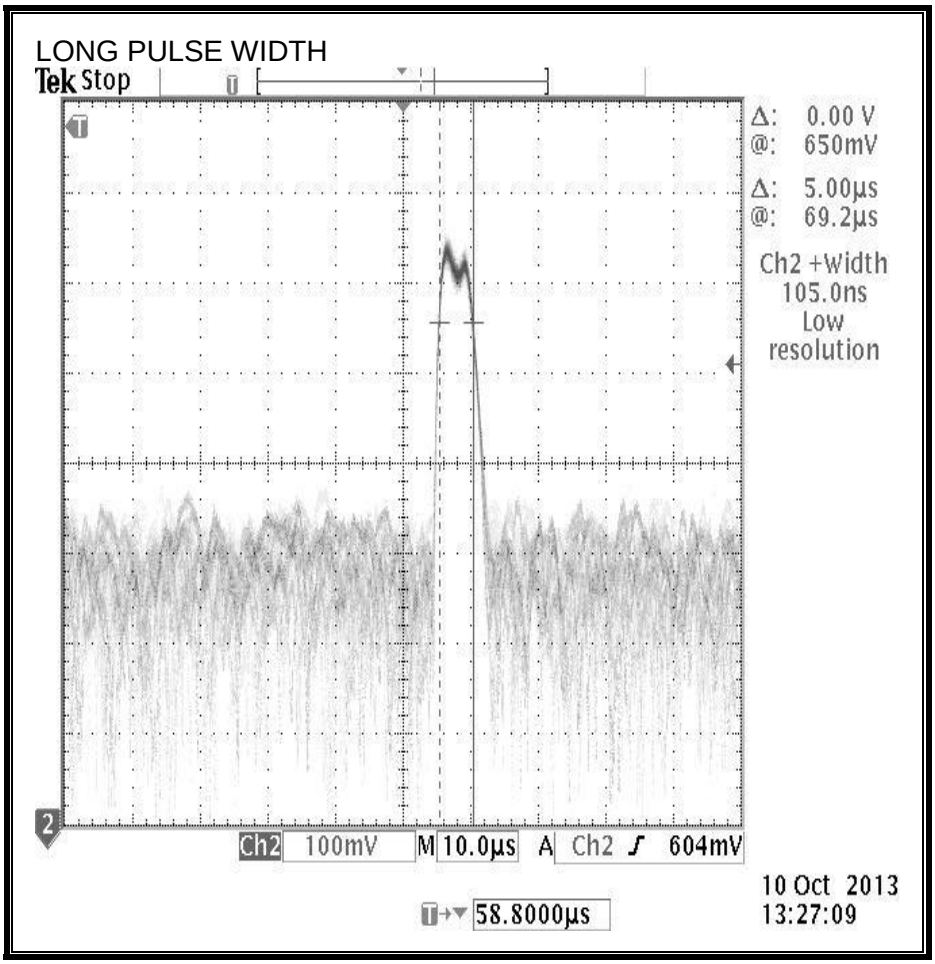
LONG PULSE WIDTH



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8. 6dB BANDWIDTH

LIMITS

FCC §15.223 (a) / IC RSS-210 A2.3
Measurement is for reference only. If the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level.

TEST PROCEDURE

ANSI C63.4

The transmitter output is connected to the spectrum analyzer.

6dB Bandwidth: The RBW is set to 10 KHz. The VBW is set to 100 KHz. The sweep time is coupled. Bandwidth is determined at the points 6 dB down from the modulated carrier.

RESULTS

Frequency (MHz)	6dB Bandwidth (KHz)
7.4	704.5
9.5	860.5

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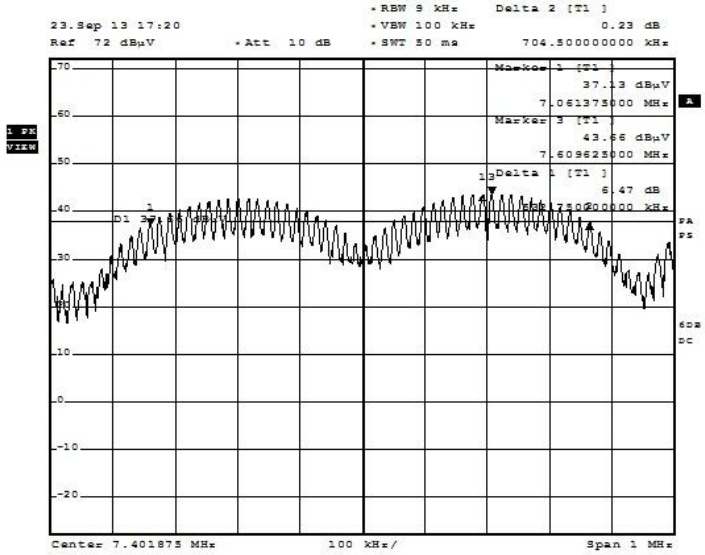
6dB BANDWIDTH

LOW CHANNEL



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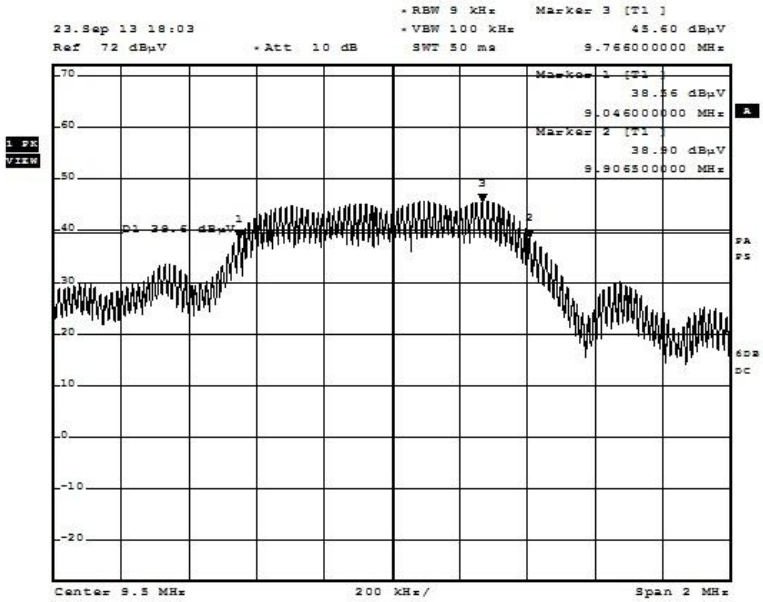
HIGH CHANNEL



Date: 23.SEP.2013 18:03:58

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9. RADIATED EMISSION TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMIT

§15.223
IC RSS-210, Section 2.6 (Transmitter)
IC RSS-GEN, Section 6 (Receiver)

(a) The field strength of any emissions within the band 1.705–10 MHz shall not exceed 100 microvolts/ meter at 30 meters. However, if the bandwidth of the emissions is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purpose of this Section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in Section 15.35(b) for limiting peak emissions apply.

(b) The field strength of any emissions appearing outside of the 1.705– 10 MHz shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	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 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.
§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

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In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

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 9.5 MHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency, or 2000 MHz.

RESULTS

No non-compliance noted:

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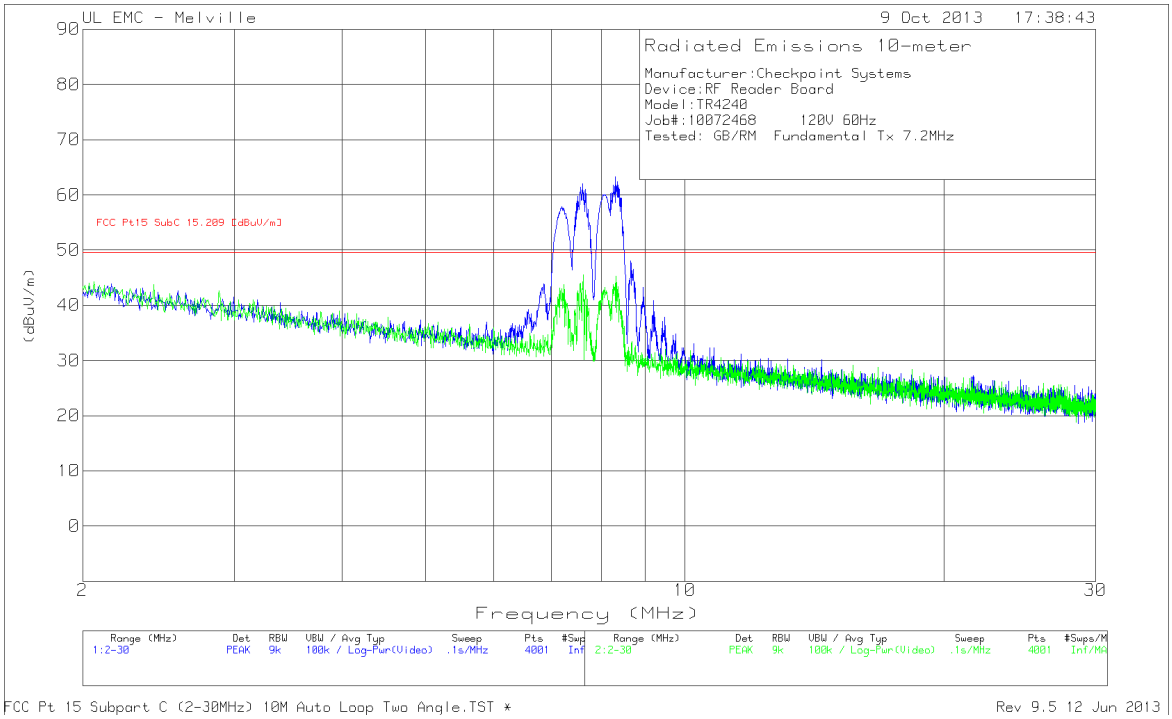
9.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 – 30 MHz)

LOW CHANNEL (7.4MHz)



NOTE: No emissions detected above the system noise floor below 2MHz

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LOW CHANNEL (7.4MHz)

Manufacturer:Checkpoint Systems									
Device:RF Reader Board									
Model:TR4240									
Job#:10072468 120V 60Hz									
Tested: GB/RM Fundamental Tx 7.2MHz									
Radiated Emission Data									
0 Degrees 2 - 30MHz									
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	AF-5A288 [dB/m]	GL-3M [dB]	DCF [dB]	Corrected Reading (dBuV/m)	FCC Pt15 SubC 15.223 [dBuV/m]	Margin (dB)	Azimuth [Degs]
7.21138	40.67	PK	16.5	0.4	-21.9	35.67	58.67	-23	218
7.60463	44.13	PK	16.4	0.4	-21.9	39.03	58.67	-19.64	109
8.0705	43.41	PK	16.4	0.4	-21.9	38.31	58.67	-20.36	3
8.341	44.31	PK	16.5	0.4	-21.9	39.31	58.67	-19.36	63
6.844	28.12	PK	16.5	0.4	-21.9	23.12	58.67	-35.55	146
8.704	31.02	PK	16.5	0.4	-21.9	26.02	58.67	-32.65	283
90 Degrees 2 - 30MHz									
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	AF-5A288 [dB/m]	GL-3M [dB]	DCF [dB]	Corrected Reading (dBuV/m)	FCC Pt15 SubC 15.223 [dBuV/m]	Margin (dB)	Azimuth [Degs]
7.209	29.59	PK	16.5	0.4	-21.9	24.59	58.67	-34.08	274
7.6185	29.9	PK	16.4	0.4	-21.9	24.8	58.67	-33.87	279
PK - Peak detector (Maximized)									

NOTE: Since the emissions bandwidth is less than 10% of the center frequency, the limit of the fundamental is derived in the following way per 15.223:

6dB BW = 704.5 kHz

[BW in kHz] / [Center Frequency in MHz] = 704.5 / 7.4 = 95.2uV/m at 30-meters

95.2uV/m at 30-meters = 58.67dBuV/m at 10-meters

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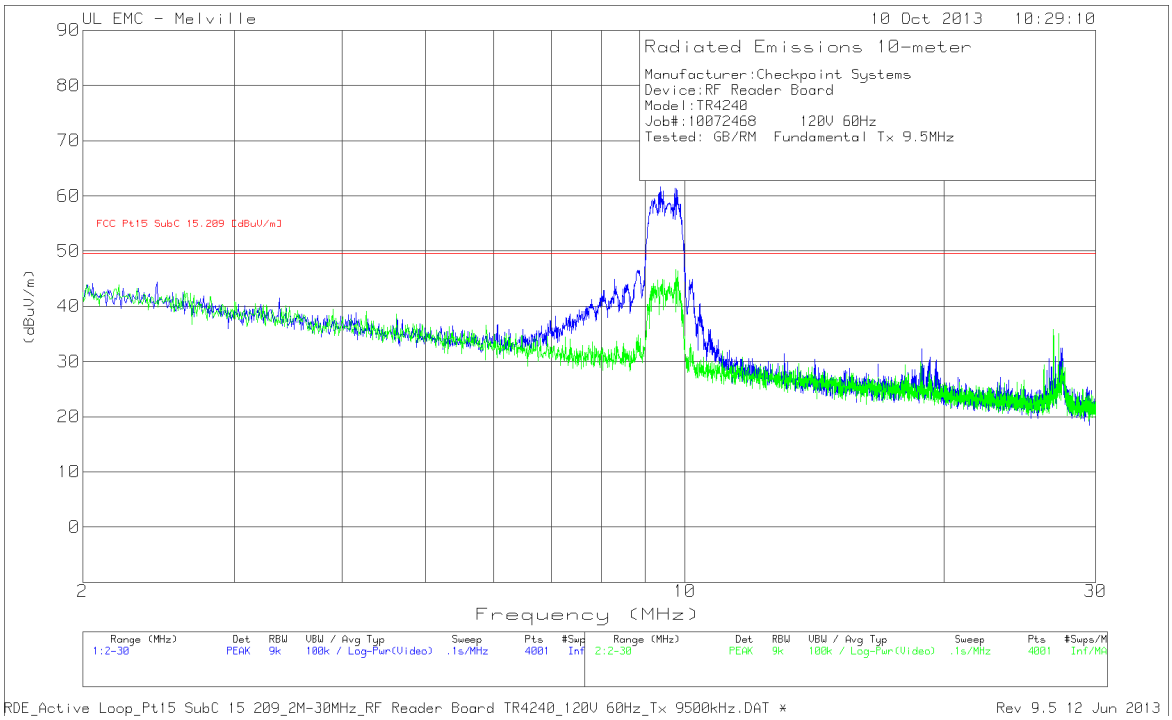
HIGH CHANNEL (9.5MHz)



NOTE: No emissions detected above the system noise floor below 2MHz

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HIGH CHANNEL (9.5MHz)

Manufacturer:Checkpoint Systems
Device:RF Reader Board
Model:TR4240
Job#:10072468 120V 60Hz
Tested: GB/RM Fundamental Tx 9.5MHz

Radiated Emission Data

0 Degrees 2 - 30MHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	AF-5A288 [dB/m]	GL-3M [dB]	DCF [dB]	Corrected Reading (dBuV/m)	FCC Pt15 SubC 15.223 [dBuV/m]	Margin (dB)	Azimuth [Degs]
9.40656	46.01	PK	16.6	0.5	-21.9	41.21	58.24	-17.03	347
9.79721	45.42	PK	16.6	0.5	-21.9	40.62	58.24	-17.62	339

90 Degrees 2 - 30MHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	AF-5A288 [dB/m]	GL-3M [dB]	DCF [dB]	Corrected Reading (dBuV/m)	FCC Pt15 SubC 15.223 [dBuV/m]	Margin (dB)	Azimuth [Degs]
9.798	24.43	PK	16.6	0.5	-21.9	19.63	58.24	-38.61	0
9.4	39.51	PK	16.6	0.5	-21.9	34.71	58.24	-23.53	291

PK - Peak detector (Maximized)

NOTE: Since the emissions bandwidth is less than 10% of the center frequency, the limit of the fundamental is derived in the following way per 15.223:

6dB BW = 860.5 kHz

[BW in kHz] / [Center Frequency in MHz] = 860.5 / 9.5 = 90.57uV/m at 30-meters

90.57uV/m at 30-meters = 58.24dBuV/m at 10-meters

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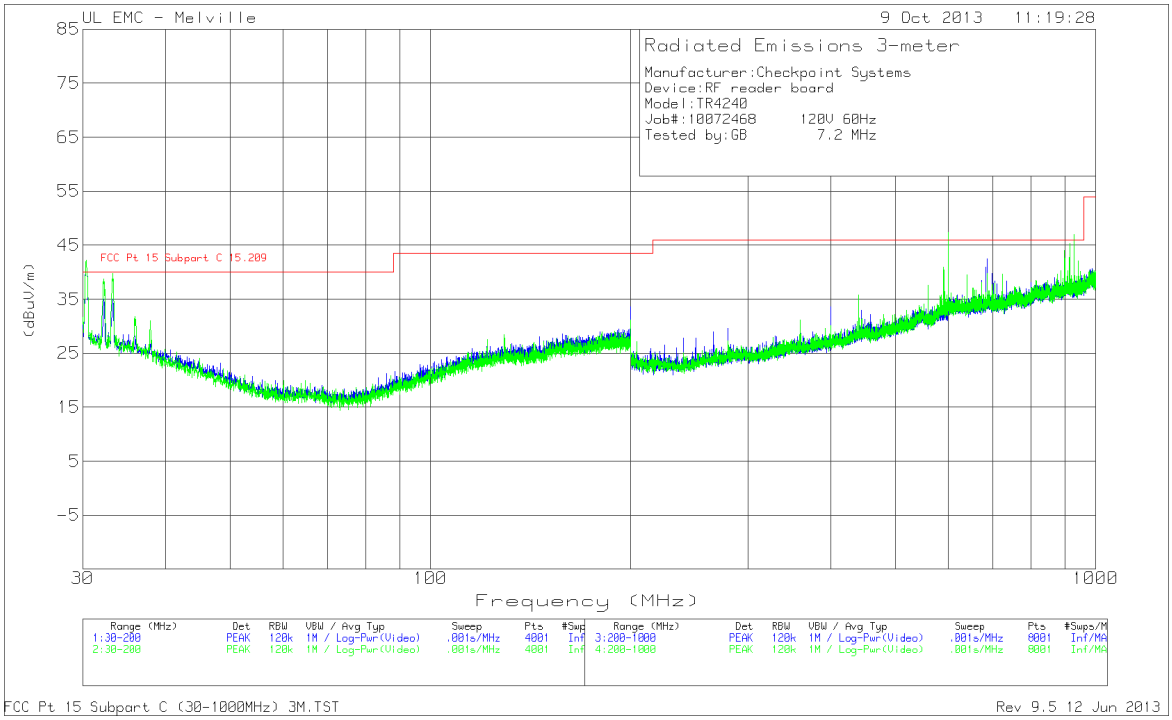
9.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz

LOW CHANNEL

HORIZONTAL & VERTICAL PLOT



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HORIZONTAL & VERTICAL DATA

Frequency (MHz)	Meter Reading (dBuV)	Det	AF-54 [dB/m]	GL-3M [dB]	Corrected Reading (dBuV/m)	FCC Pt 15 Subpart C 15.209	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
30.3	16.03	QP	17.6	0	33.63	40	-6.37	357	294	H
30.3	16.09	QP	17.6	0	33.69	40	-6.31	357	294	H
32.3	14.67	QP	16.8	0	31.47	40	-8.53	350	324	H
33.3	9.92	QP	16.5	.1	26.52	40	-13.48	350	324	H
33.3	11.38	QP	16.5	.1	27.98	40	-12.02	350	324	H
30.38	19.9	QP	17.6	0	37.5	40	-2.5	5	292	V
32.2163	7.67	QP	16.8	0	24.47	40	-15.53	121	292	V
32.3	15.28	QP	16.8	0	32.08	40	-7.92	344	325	V
686.3894	9.17	QP	20.3	1.7	31.17	46	-14.83	3	259	H
683.9986	8.28	QP	20.1	1.9	30.28	46	-15.72	194	101	H
698.5	12.26	QP	20.1	1.8	34.16	46	-11.84	51	119	H
900.1	8.24	QP	22.8	2.1	33.14	46	-12.86	101	326	H
914.45	8.32	QP	22.6	2.1	33.02	46	-12.98	243	358	H
600.0148	23.16	QP	19.7	1.7	44.56	46	-1.44	24	102	V
928.5	8.07	QP	22.8	2.1	32.97	46	-13.03	335	389	V
914.5	17.17	QP	22.6	2.1	41.87	46	-4.13	64	180	V
589.2035	7.78	QP	19.4	1.7	28.88	46	-17.12	66	229	V
591.555	8.66	QP	19.4	1.7	29.76	46	-16.24	25	290	V
896.4	17.61	QP	22.6	2.1	42.31	46	-3.69	75	188	V
900.0263	18.58	QP	22.8	2.1	43.48	46	-2.52	71	192	V
912	8.16	QP	22.7	2.1	32.96	46	-13.04	62	136	V
941	8.5	QP	22.6	2.2	33.3	46	-12.7	56	132	V

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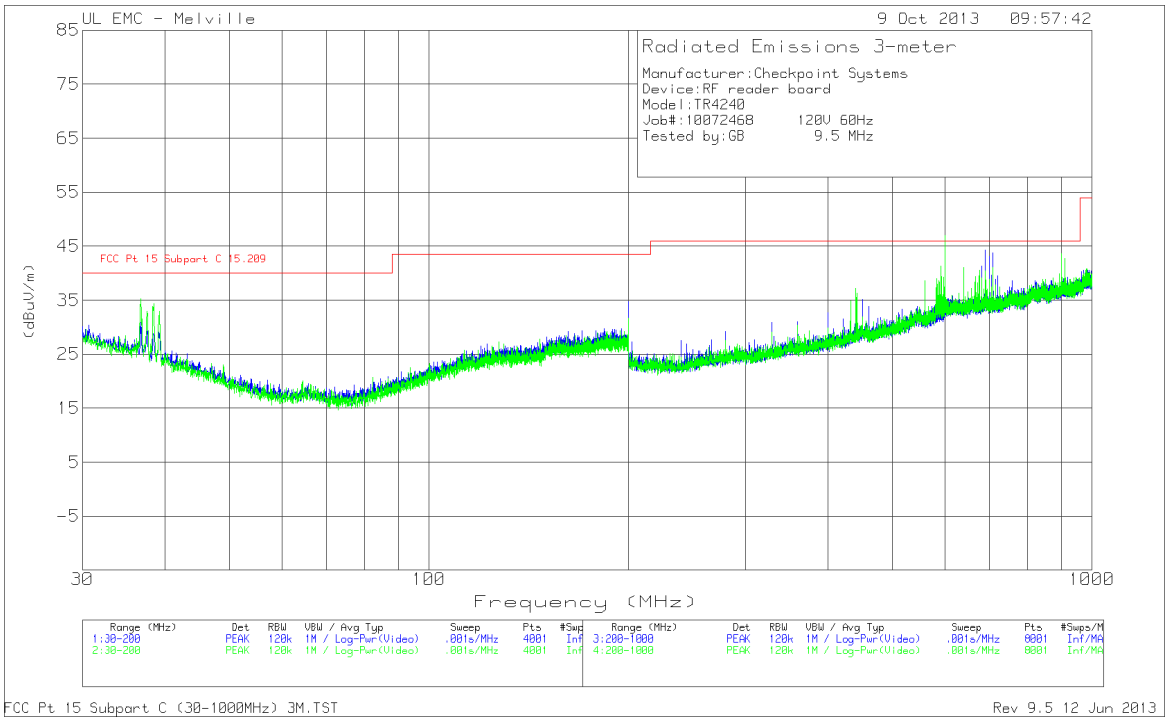
HIGH CHANNEL

HORIZONTAL & VERTICAL PLOT



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HORIZONTAL & VERTICAL DATA

Frequency (MHz)	Meter Reading (dBuV)	Det	AF-54 [dB/m]	GL-3M [dB]	Corrected Reading (dBuV/m)	FCC Pt 15 Subpart C 15.209	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
36.7486	12.86	QP	15.1	0	27.96	40	-12.04	35	138	V
38.3427	12.81	QP	14.5	.2	27.51	40	-12.49	335	116	V
701	3.78	QP	20	1.9	25.68	46	-20.32	243	299	H
708.5	10.86	QP	20.1	1.8	32.76	46	-13.24	204	121	H
910.9407	11.87	QP	22.8	2.1	36.77	46	-9.23	360	163	H
681.7	13.3	QP	20	1.7	35	46	-11	79	127	H
690.2	8.66	QP	20.7	1.8	31.16	46	-14.84	99	175	H
600.0238	16.05	QP	19.7	1.7	37.45	46	-8.55	111	101	V
900.0151	18.14	QP	22.8	2.1	43.04	46	-2.96	72	199	V
911	8.14	QP	22.8	2.1	33.04	46	-12.96	304	233	V
708	8.2	QP	20.1	1.8	30.1	46	-15.9	99	175	V

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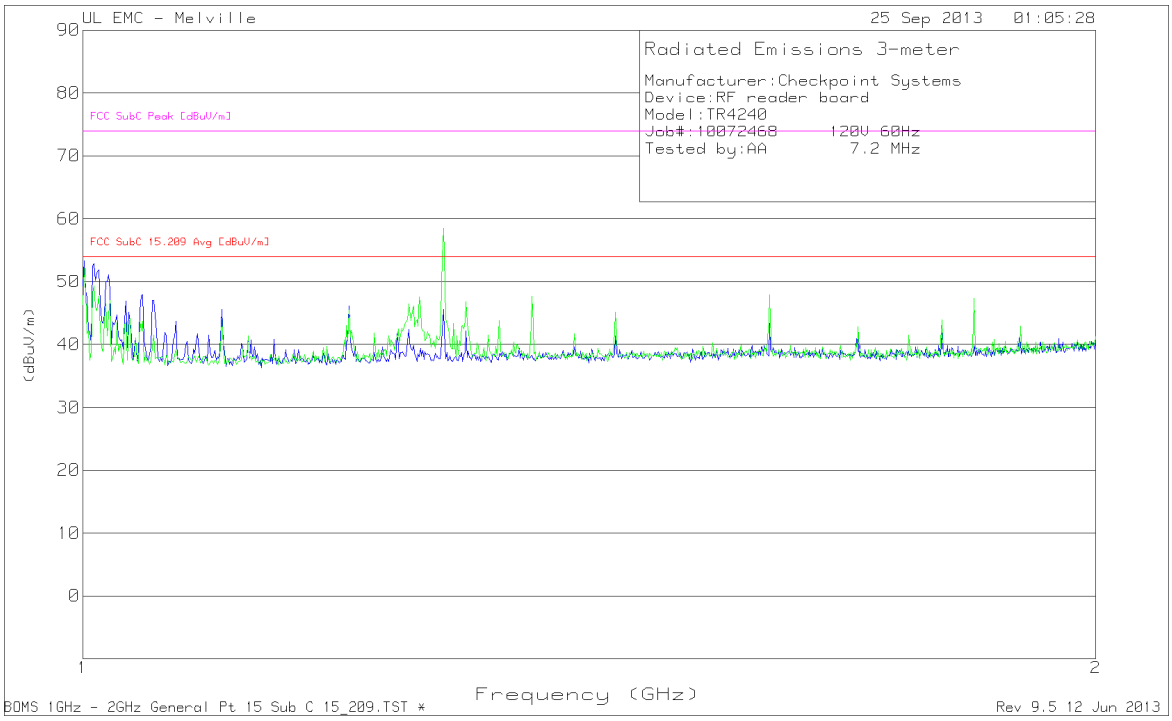
9.1.3. TX SPURIOUS EMISSIONS ABOVE 1 GHz

LOW CHANNEL PLOT



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LOW CHANNEL DATA

Radiated Emission Data												
Horizontal 1 - 2GHz												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	AF-51442 [dB/m]	BOMS Factor [dB]	Corrected Reading (dBuV/m)	FCC SubC 15.209 Avg [dBuV/m]	Margin (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.001	78.34	PK	19.3	-44.67	52.97	-	-	74	-21.03	0-360	200	H
1.008	77.65	PK	19.4	-44.58	52.47	-	-	74	-21.53	0-360	200	H
1.018	75.98	PK	19.4	-44.58	50.8	-	-	74	-23.2	0-360	200	H
1.001	49.42	Av	19.3	-44.67	24.05	54	-29.95	-	-	61	206	H
1.0075	49.21	Av	19.4	-44.58	24.03	54	-29.97	-	-	8	379	H
1.0177	49	Av	19.4	-44.58	23.82	54	-30.18	-	-	15	150	H
Vertical 1 - 2GHz												
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	AF-51442 [dB/m]	BOMS Factor [dB]	Corrected Reading (dBuV/m)	FCC SubC 15.209 Avg [dBuV/m]	Margin (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.001	77.08	PK	19.3	-44.67	51.71	-	-	74	-22.29	0-360	200	V
1.008	74.15	PK	19.4	-44.58	48.97	-	-	74	-25.03	0-360	200	V
1.28	82.21	PK	20.4	-44.37	58.24	-	-	74	-15.76	0-360	99	V
1.001	49.42	Av	19.3	-44.67	24.05	54	-29.95	-	-	344	148	V
1.0075	49.3	Av	19.4	-44.58	24.12	54	-29.88	-	-	358	318	V
1.28	61.49	Av	20.4	-44.37	37.52	54	-16.48	-	-	181	118	V
Pk - Peak detector												
Av - Average detector												

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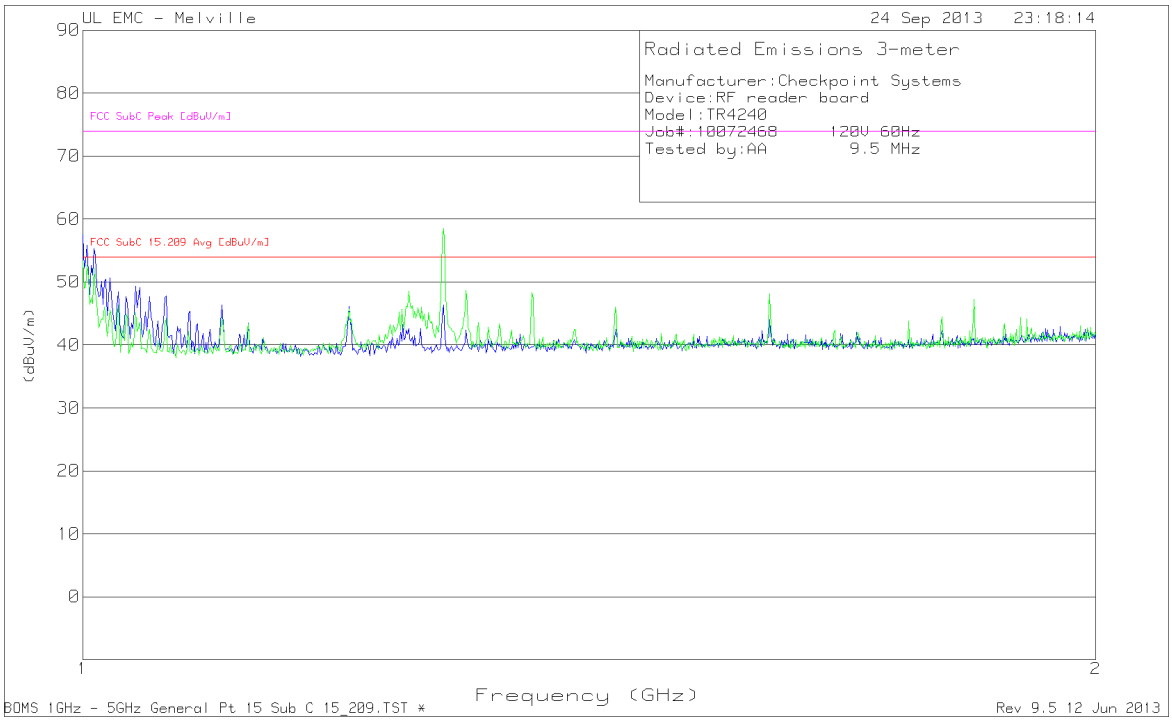
HIGH CHANNEL PLOT



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HIGH CHANNEL DATA

Radiated Emission Data

Horizontal 1 - 2GHz

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	AF-51442 [dB/m]	BOMS Factor [dB]	Corrected Reading (dBuV/m)	FCC SubC 15.209 Avg [dBuV/m]	Margin (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	82.42	PK	19.3	-44.77	56.95	-	-	74	-17.05	0-360	200	H
1.003	80.94	PK	19.3	-44.71	55.53	-	-	74	-18.47	0-360	200	H
1.008	80.13	PK	19.4	-44.58	54.95	-	-	74	-19.05	0-360	200	H
1.016	75.18	PK	19.4	-44.56	50.02	-	-	74	-23.98	0-360	200	H
1.019	75.36	PK	19.4	-44.57	50.19	-	-	74	-23.81	0-360	200	H
1.037	73.96	PK	19.6	-44.59	48.97	-	-	74	-25.03	0-360	200	H
1	57.48	Av	19.3	-44.77	32.01	54	-21.99	-	-	59	206	H
1.0029	49.28	Av	19.3	-44.71	23.87	54	-30.13	-	-	8	386	H
1.0082	49.15	Av	19.4	-44.59	23.96	54	-30.04	-	-	11	367	H
1.0154	48.94	Av	19.4	-44.55	23.79	54	-30.21	-	-	10	365	H
1.02	49.4	Av	19.4	-44.55	24.25	54	-29.75	-	-	9	147	H
1.037	48.91	Av	19.6	-44.59	23.92	54	-30.08	-	-	6	351	H

Vertical 1 - 2GHz

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	AF-51442 [dB/m]	BOMS Factor [dB]	Corrected Reading (dBuV/m)	FCC SubC 15.209 Avg [dBuV/m]	Margin (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	78.21	PK	19.3	-44.77	52.74	-	-	74	-21.26	0-360	200	V
1.003	77.7	PK	19.3	-44.71	52.29	-	-	74	-21.71	0-360	200	V
1.008	77.02	PK	19.4	-44.58	51.84	-	-	74	-22.16	0-360	200	V
1.25	72.55	PK	20.2	-44.41	48.34	-	-	74	-25.66	0-360	200	V
1.28	82.19	PK	20.4	-44.37	58.22	-	-	74	-15.78	0-360	99	V
1.3	72.42	PK	20.5	-44.37	48.55	-	-	74	-25.45	0-360	99	V
1.36	71.87	PK	20.6	-44.38	48.09	-	-	74	-25.91	0-360	99	V
1.2486	54	Av	20.1	-44.43	29.67	54	-24.33	-	-	64	359	V
1.28	60.61	Av	20.4	-44.37	36.64	54	-17.36	-	-	166	111	V
1.3	66.26	Av	20.5	-44.37	42.39	54	-11.61	-	-	65	108	V
1.36	57.78	Av	20.6	-44.38	34	54	-20	-	-	0	102	V
1	57	Av	19.3	-44.77	31.53	54	-22.47	-	-	41	159	V
1.003	49.32	Av	19.3	-44.71	23.91	54	-30.09	-	-	347	150	V
1.0082	49.03	Av	19.4	-44.59	23.84	54	-30.16	-	-	97	163	V

PK - Peak detector

Av - Average detector

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10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 7.2.2

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (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
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.4

Testing was performed on low and high channels. The test was performed on each channel twice – once with the antenna connected and again with the antenna replaced with a termination.

RESULTS

No non-compliance noted:

UL LLC FORM NO: CCSUP4701D
1285 WALT WHITMAN RD, MELVILLE, NY 11747, USA TEL: (631) 271-6200 FAX: (877) 854-3577
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6 WORST EMISSIONS – LOW CHANNEL W/O TERMINATION

Manufacturer:Checkpoint System								
Device:RF Reader Board, 7.2 MHz								
Model:TR4240								
Job:10072468 120V/60Hz								
Tested by:MM								
Line - L1 .15 - 30MHz								
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
6.22633	35.8	QP	10.3	46.1	60	-13.9	-	-
6.868093	51.99	QP	10.3	62.29	60	2.29	-	-
7.158175	69.42	QP	10.3	79.72	60	19.72	-	-
7.626653	68.77	QP	10.4	79.17	60	19.17	-	-
8.356415	68.65	QP	10.4	79.05	60	19.05	-	-
8.932478	47.05	QP	10.5	57.55	60	-2.45	-	-
9.972905	37.7	QP	10.6	48.3	60	-11.7	-	-
10.40645	30.63	QP	10.7	41.33	60	-18.67	-	-
6.2264	27.62	Av	10.3	37.92	-	-	50	-12.08
6.86796	39.57	Av	10.3	49.87	-	-	50	-0.13
7.15739	45.1	Av	10.3	55.4	-	-	50	5.4
7.62667	45.82	Av	10.4	56.22	-	-	50	6.22
8.353	51.3	Av	10.4	61.7	-	-	50	11.7
8.92994	36.33	Av	10.5	46.83	-	-	50	-3.17
9.97134	26.62	Av	10.6	37.22	-	-	50	-12.78
10.4045	20.14	Av	10.7	30.84	-	-	50	-19.16
Neutral .15 - 30MHz								
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
6.17229	34.53	QP	10.3	44.83	60	-15.17	-	-
6.774363	49.32	QP	10.3	59.62	60	-0.38	-	-
7.12379	68.16	QP	10.4	78.56	60	18.56	-	-
7.55269	69.61	QP	10.4	80.01	60	20.01	-	-
8.356075	68.77	QP	10.5	79.27	60	19.27	-	-
9.221823	45.08	QP	10.5	55.58	60	-4.42	-	-
9.909073	35.66	QP	10.6	46.26	60	-13.74	-	-
10.76465	30.88	QP	10.8	41.68	60	-18.32	-	-
6.17525	26.76	Av	10.3	37.06	-	-	50	-12.94
6.77476	39.3	Av	10.3	49.6	-	-	50	-0.4
7.12372	53.6	Av	10.4	64	-	-	50	14
7.5525	55.45	Av	10.4	65.85	-	-	50	15.85
8.35733	52.64	Av	10.5	63.14	-	-	50	13.14
9.22101	34.9	Av	10.5	45.4	-	-	50	-4.6
9.9088	25.38	Av	10.6	35.98	-	-	50	-14.02
10.7639	21.12	Av	10.8	31.92	-	-	50	-18.08
QP - Quasi-Peak detector								
Av - Average detector								

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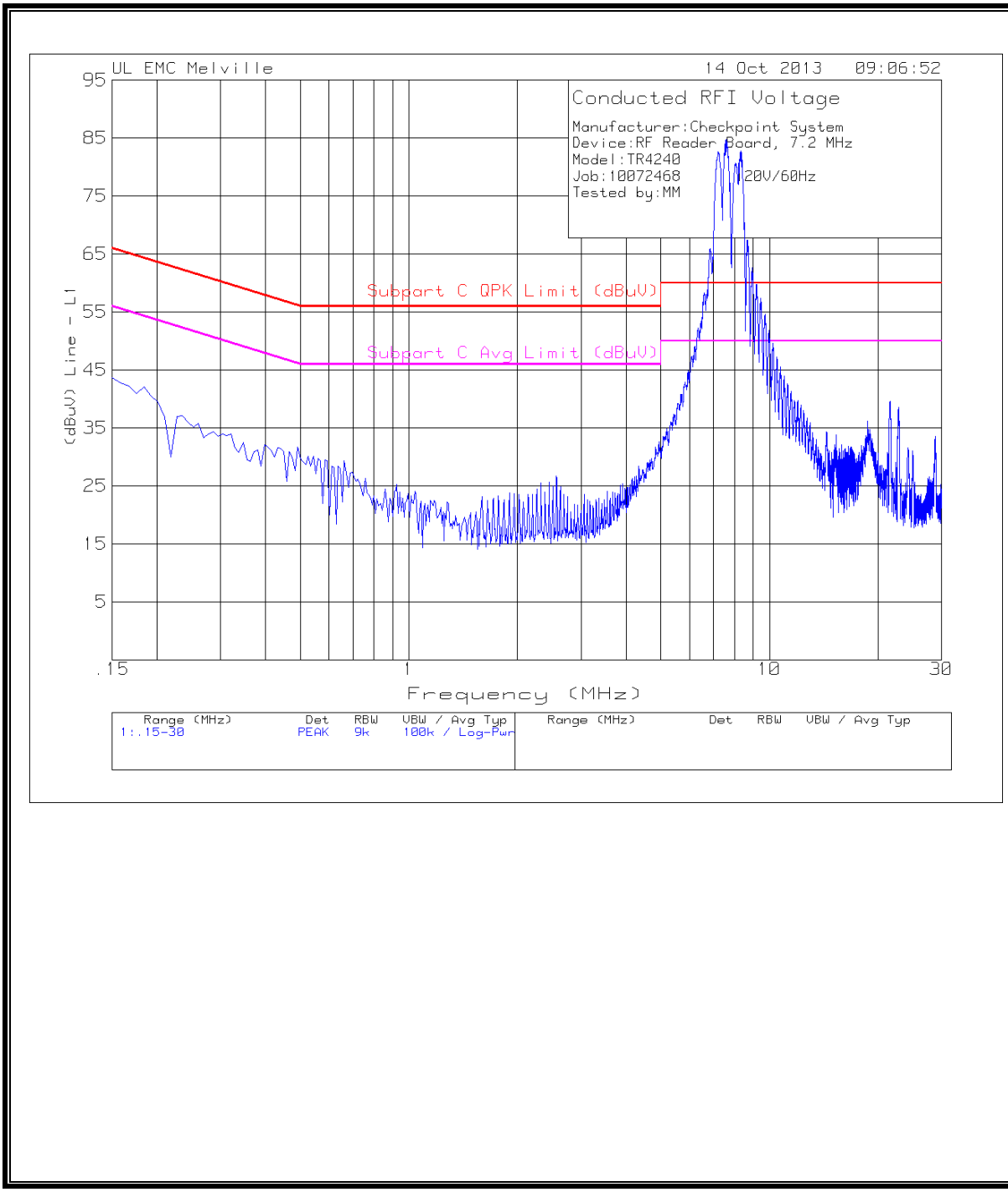
LINE 1 RESULTS – LOW CHANNEL W/O TERMINATION



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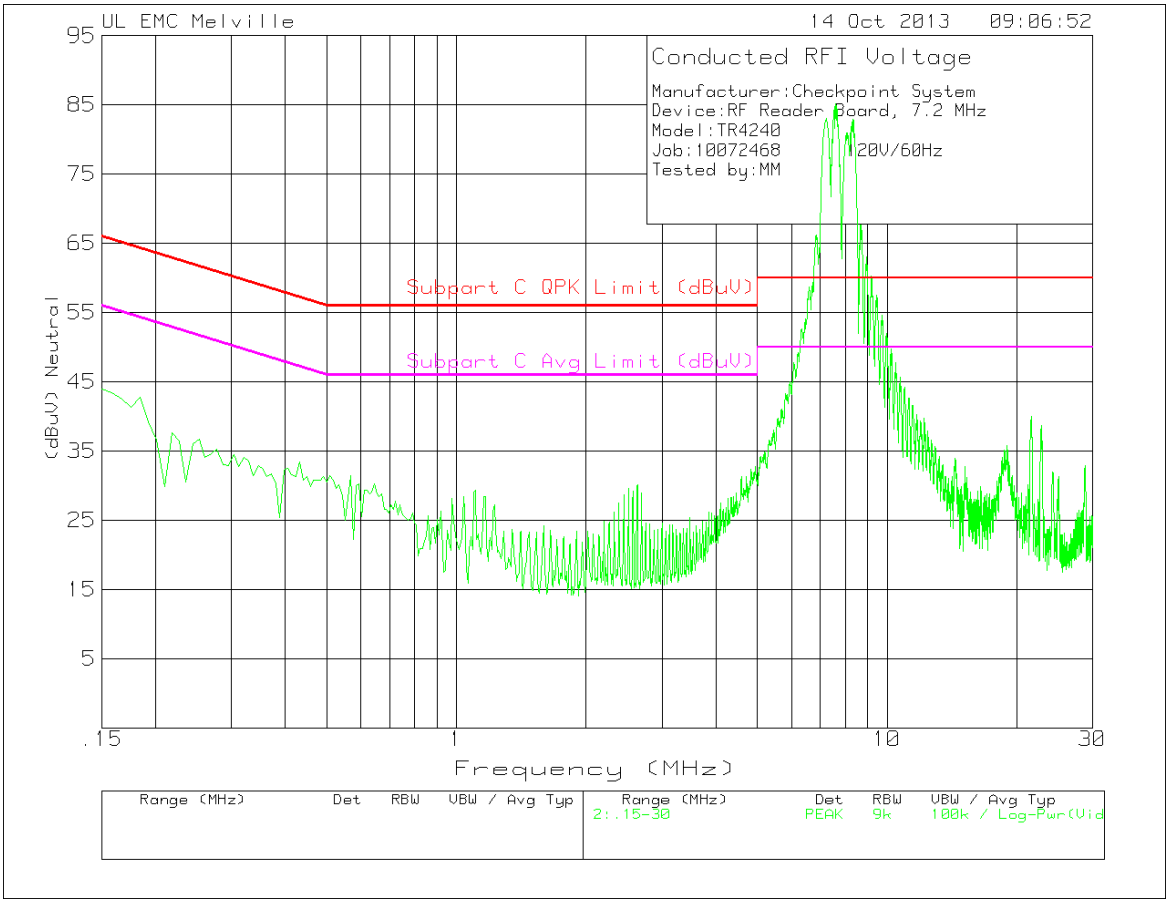
LINE 2 RESULTS – LOW CHANNEL W/O TERMINATION



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6 WORST EMISSIONS – LOW CHANNEL W/ TERMINATION

Manufacturer:Checkpoint System								
Device:RF Reader Board, 7.2 MHz								
Model:TR4240 With Termination								
Job:10072468 120V/60Hz								
Tested by:MM								
Line - L1 .15 - 30MHz								
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.3067	43.59	QP	10	53.59	60.06	-6.47	-	-
0.342553	38.87	QP	10	48.87	59.14	-10.27	-	-
7.03925	20.01	QP	10.3	30.31	60	-29.69	-	-
7.162275	26.39	QP	10.3	36.69	60	-23.31	-	-
7.642023	31.8	QP	10.4	42.2	60	-17.8	-	-
8.392305	38.15	QP	10.4	48.55	60	-11.45	-	-
8.751893	24.43	QP	10.4	34.83	60	-25.17	-	-
10.2048	17.48	QP	10.6	28.08	60	-31.92	-	-
0.30625	17.9	Av	10	27.9	-	-	50.07	-22.17
0.32528	15.03	Av	10	25.03	-	-	49.57	-24.54
7.04021	9.08	Av	10.3	19.38	-	-	50	-30.62
7.15612	13.43	Av	10.3	23.73	-	-	50	-26.27
7.64091	17.61	Av	10.4	28.01	-	-	50	-21.99
8.39342	22.54	Av	10.4	32.94	-	-	50	-17.06
8.75259	13.66	Av	10.4	24.06	-	-	50	-25.94
10.2077	8.63	Av	10.6	19.23	-	-	50	-30.77
Neutral .15 - 30MHz								
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.305433	37.88	QP	10	47.88	60.09	-12.21	-	-
0.30811	37.82	QP	10	47.82	60.02	-12.2	-	-
7.040148	20.58	QP	10.4	30.98	60	-29.02	-	-
7.226653	28.17	QP	10.4	38.57	60	-21.43	-	-
7.59483	30.93	QP	10.4	41.33	60	-18.67	-	-
8.348365	37.05	QP	10.5	47.55	60	-12.45	-	-
8.691988	26.19	QP	10.5	36.69	60	-23.31	-	-
9.42637	20.58	QP	10.6	31.18	60	-28.82	-	-
10.893275	16.02	QP	10.8	26.82	60	-33.18	-	-
0.30231	17.77	Av	10	27.77	-	-	50.18	-22.41
0.30833	23.57	Av	10	33.57	-	-	50.02	-16.45
7.04015	8.26	Av	10.4	18.66	-	-	50	-31.34
7.22671	15.24	Av	10.4	25.64	-	-	50	-24.36
7.59426	17.16	Av	10.4	27.56	-	-	50	-22.44
8.33478	21.42	Av	10.5	31.92	-	-	50	-18.08
8.69329	15.23	Av	10.5	25.73	-	-	50	-24.27
9.42663	11.54	Av	10.6	22.14	-	-	50	-27.86
10.8941	7.91	Av	10.8	18.71	-	-	50	-31.29
QP - Quasi-Peak detector								
Av - Average detector								

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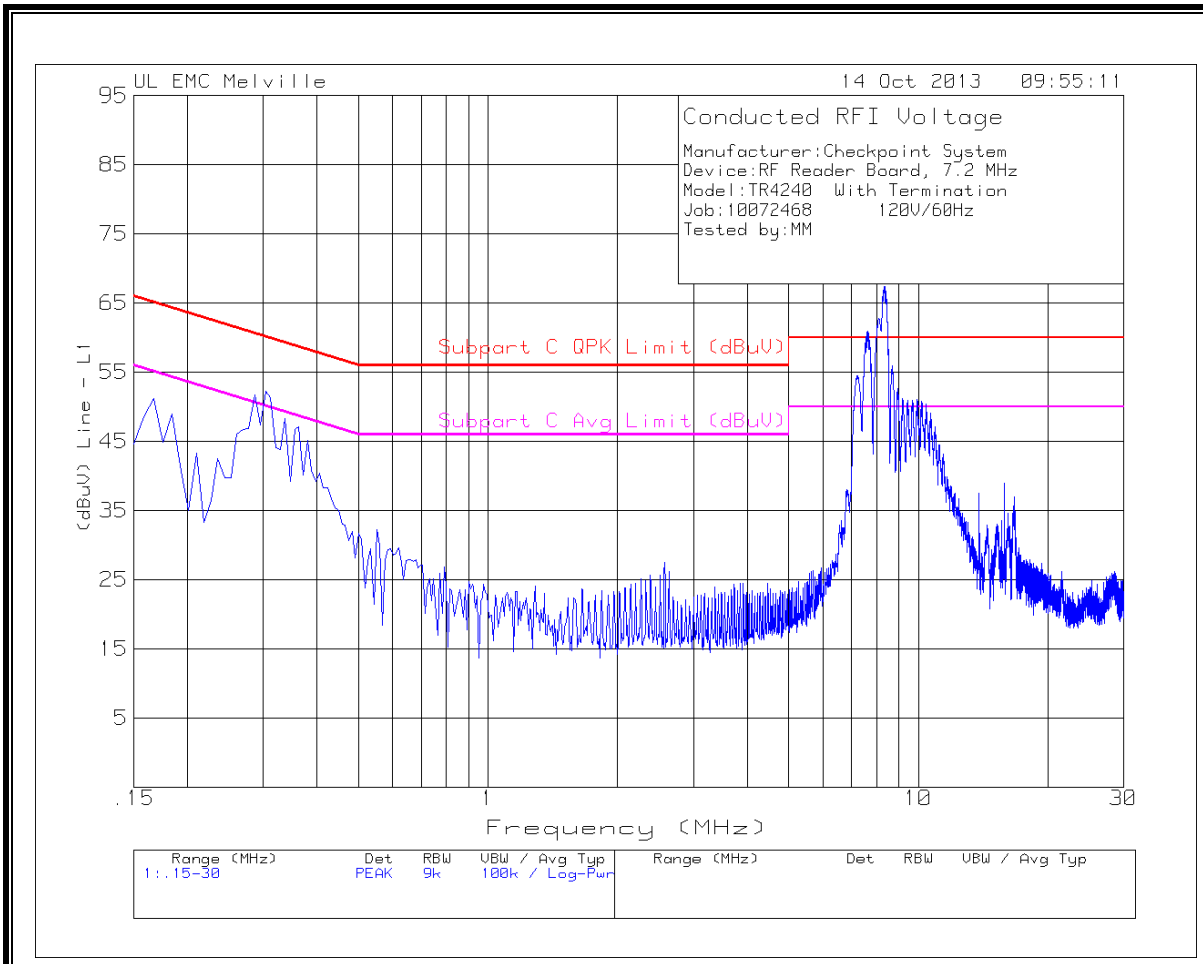
LINE 1 RESULTS – LOW CHANNEL W/ TERMINATION



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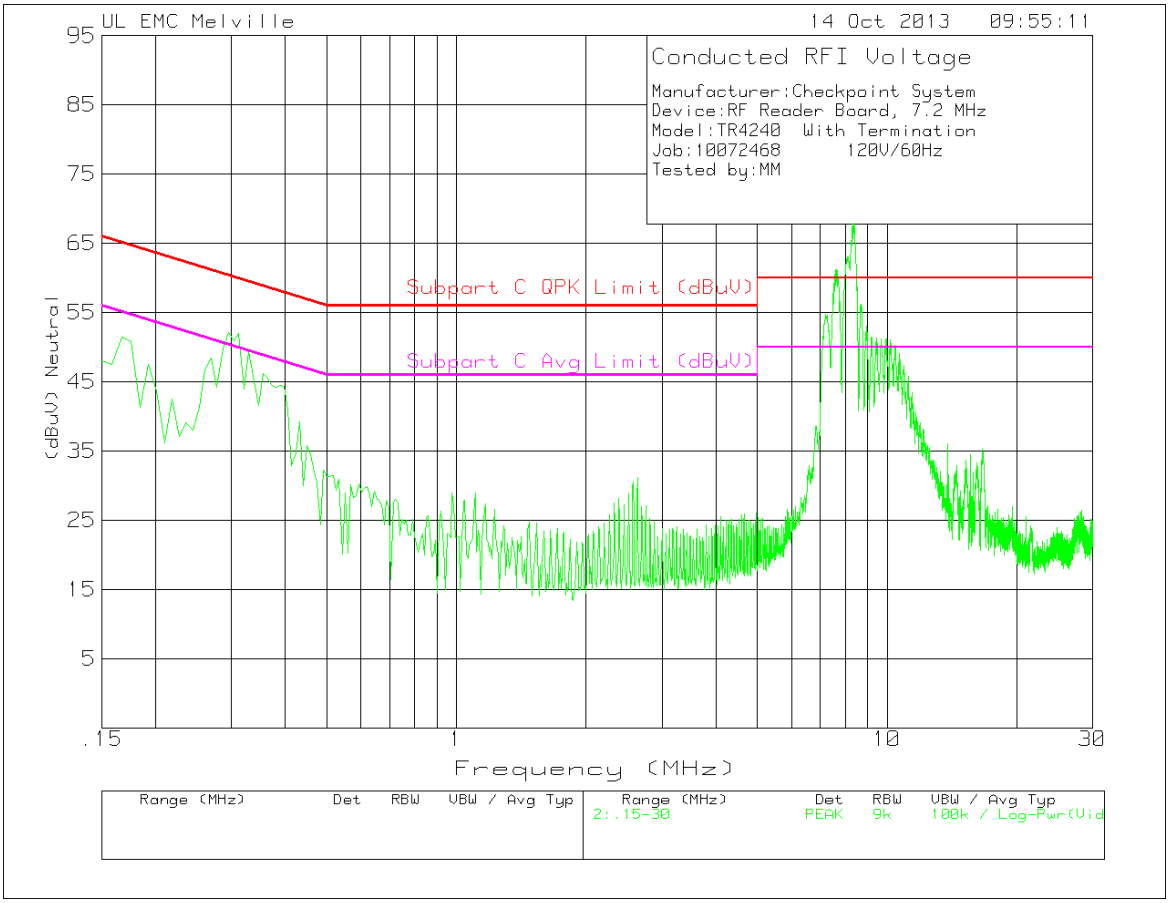
LINE 2 RESULTS – LOW CHANNEL W/ TERMINATION



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6 WORST EMISSIONS – HIGH CHANNEL W/O TERMINATION

Manufacturer:Checkpoint System								
Device:RF Reader Board, 9.5 MHz								
Model:TR4240								
Job:10072468	120V/60Hz							
Tested by:MM								
Line - L1 .15 - 30MHz								
Test Frequency (MHz)	Meter Reading	Detector	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.182945	41.76	QP	10	51.76	64.35	-12.59	-	-
0.306443	43.6	QP	10	53.6	60.07	-6.47	-	-
0.367488	36.52	QP	10	46.52	58.56	-12.04	-	-
6.332893	33.8	QP	10.3	44.1	60	-15.9	-	-
7.49952	48.92	QP	10.4	59.32	60	-0.68	-	-
8.846348	54.85	QP	10.5	65.35	60	5.35	-	-
9.41096	69.81	QP	10.5	80.31	60	20.31	-	-
9.777975	68.21	QP	10.6	78.81	60	18.81	-	-
10.1908	54.12	QP	10.6	64.72	60	4.72	-	-
10.71815	44.6	QP	10.8	55.4	60	-4.6	-	-
12.3458	30.34	QP	10.8	41.14	60	-18.86	-	-
18.808375	31.15	QP	11.1	42.25	60	-17.75	-	-
0.18291	23.88	Av	10	33.88	-	-	54.35	-20.47
0.30574	23.63	Av	10	33.63	-	-	50.09	-16.46
0.36796	18.97	Av	10	28.97	-	-	48.55	-19.58
6.33287	24.36	Av	10.3	34.66	-	-	50	-15.34
7.49911	41.04	Av	10.4	51.44	-	-	50	1.44
8.84659	43.8	Av	10.5	54.3	-	-	50	4.3
9.41101	57.28	Av	10.5	67.78	-	-	50	17.78
9.77775	45.45	Av	10.6	56.05	-	-	50	6.05
10.1909	41.18	Av	10.6	51.78	-	-	50	1.78
10.7193	33.37	Av	10.8	44.17	-	-	50	-5.83
12.346	23.79	Av	10.8	34.59	-	-	50	-15.41
18.8083	18.73	Av	11.1	29.83	-	-	50	-20.17
Neutral .15 - 30MHz								
Test Frequency (MHz)	Meter Reading	Detector	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.30722	43.53	QP	10	53.53	60.05	-6.52	-	-
0.306458	43.6	QP	10	53.6	60.07	-6.47	-	-
0.367565	36.43	QP	10	46.43	58.56	-12.13	-	-
6.332978	34.08	QP	10.3	44.38	60	-15.62	-	-
7.433545	46.76	QP	10.4	57.16	60	-2.84	-	-
8.77386	53.53	QP	10.5	64.03	60	4.03	-	-
9.370515	67.62	QP	10.6	78.22	60	18.22	-	-
9.763803	69.43	QP	10.6	80.03	60	20.03	-	-
10.155975	55.1	QP	10.7	65.8	60	5.8	-	-
10.666925	43.57	QP	10.8	54.37	60	-5.63	-	-
12.1977	31.41	QP	10.8	42.21	60	-17.79	-	-
18.8591	31.67	QP	11.2	42.87	60	-17.13	-	-
0.30563	18.13	Av	10	28.13	-	-	50.09	-21.96
0.30608	17.93	Av	10	27.93	-	-	50.08	-22.15
0.36691	15.86	Av	10	25.86	-	-	48.57	-22.71
6.33278	24.95	Av	10.3	35.25	-	-	50	-14.75
7.42966	39.41	Av	10.4	49.81	-	-	50	-0.19
8.77358	43.52	Av	10.5	54.02	-	-	50	4.02
9.37068	56	Av	10.6	66.6	-	-	50	16.6
9.76385	56.54	Av	10.6	67.14	-	-	50	17.14
10.1561	41.53	Av	10.7	52.23	-	-	50	2.23
10.6708	32.31	Av	10.8	43.11	-	-	50	-6.89
12.1985	23	Av	10.8	33.8	-	-	50	-16.2
18.8604	18.9	Av	11.2	30.1	-	-	50	-19.9
QP - Quasi-Peak detector								
Av - Average detector								

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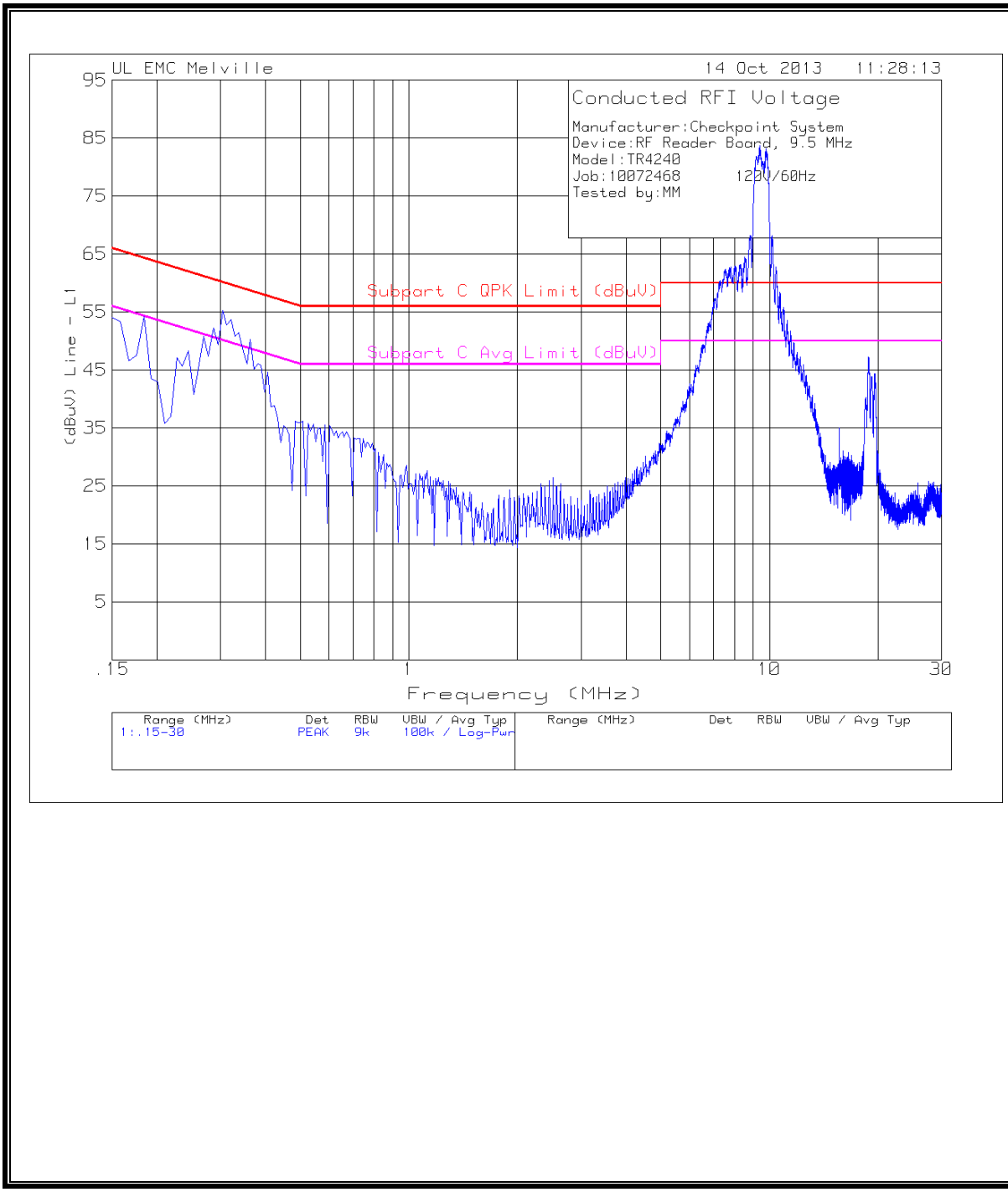
LINE 1 RESULTS – HIGH CHANNEL W/O TERMINATION



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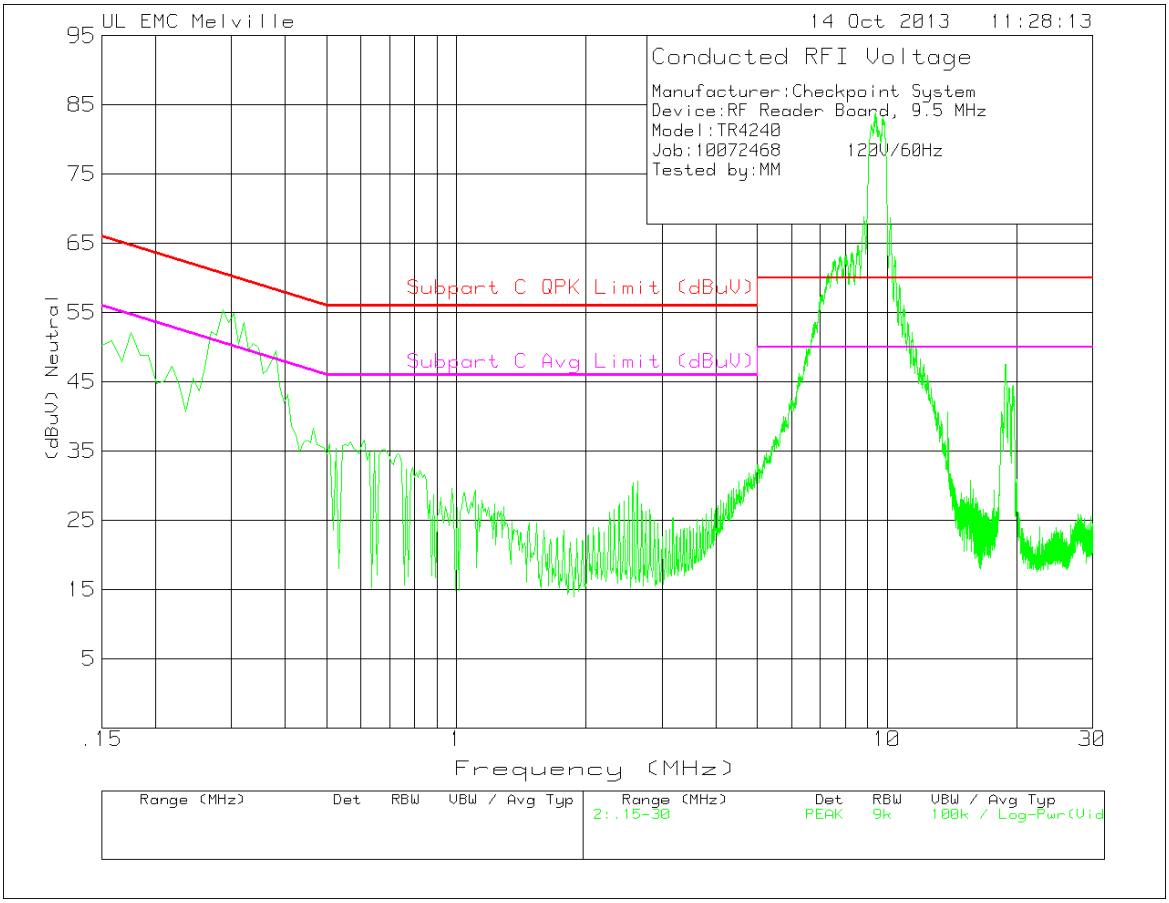
LINE 2 RESULTS – HIGH CHANNEL W/O TERMINATION



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6 WORST EMISSIONS – HIGH CHANNEL W/ TERMINATION

Manufacturer:Checkpoint System
Device:RF Reader Board, 9.5 MHz
Model:TR4240 With Termination
Job:10072468 120V/60Hz
Tested by:MM

Line - L1 .15 - 30MHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.182515	41.61	QP	10	51.61	64.37	-12.76	-	-
0.306575	43.6	QP	10	53.6	60.06	-6.46	-	-
0.367083	36.63	QP	10	46.63	58.57	-11.94	-	-
9.12273	36.77	QP	10.5	47.27	60	-12.73	-	-
9.410833	41.42	QP	10.5	51.92	60	-8.08	-	-
9.863495	41.88	QP	10.6	52.48	60	-7.52	-	-
10.222725	26.82	QP	10.6	37.42	60	-22.58	-	-
0.18192	23.78	Av	10	33.78	-	-	54.4	-20.62
0.30594	23.42	Av	10	33.42	-	-	50.08	-16.66
0.36672	15.46	Av	10	25.46	-	-	48.57	-23.11
9.12266	23.26	Av	10.5	33.76	-	-	50	-16.24
9.41066	28.55	Av	10.5	39.05	-	-	50	-10.95
9.8595	27.66	Av	10.6	38.26	-	-	50	-11.74
10.2188	19.26	Av	10.6	29.86	-	-	50	-20.14

Neutral .15 - 30MHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
0.181848	41.76	QP	10	51.76	64.4	-12.64	-	-
0.305753	43.51	QP	10	53.51	60.09	-6.58	-	-
0.366403	36.28	QP	10	46.28	58.58	-12.3	-	-
9.122655	37	QP	10.5	47.5	60	-12.5	-	-
9.41107	41.64	QP	10.6	52.24	60	-7.76	-	-
9.794608	43.7	QP	10.6	54.3	60	-5.7	-	-
10.1571	31.35	QP	10.7	42.05	60	-17.95	-	-
0.18303	23.93	Av	10	33.93	-	-	54.35	-20.42
0.30543	23.58	Av	10	33.58	-	-	50.09	-16.51
0.36674	19.2	Av	10	29.2	-	-	48.57	-19.37
9.12286	23.77	Av	10.5	34.27	-	-	50	-15.73
9.41083	29.02	Av	10.6	39.62	-	-	50	-10.38
9.79454	29.88	Av	10.6	40.48	-	-	50	-9.52
10.1687	18.45	Av	10.7	29.15	-	-	50	-20.85

QP - Quasi-Peak detector
Av - Average detector

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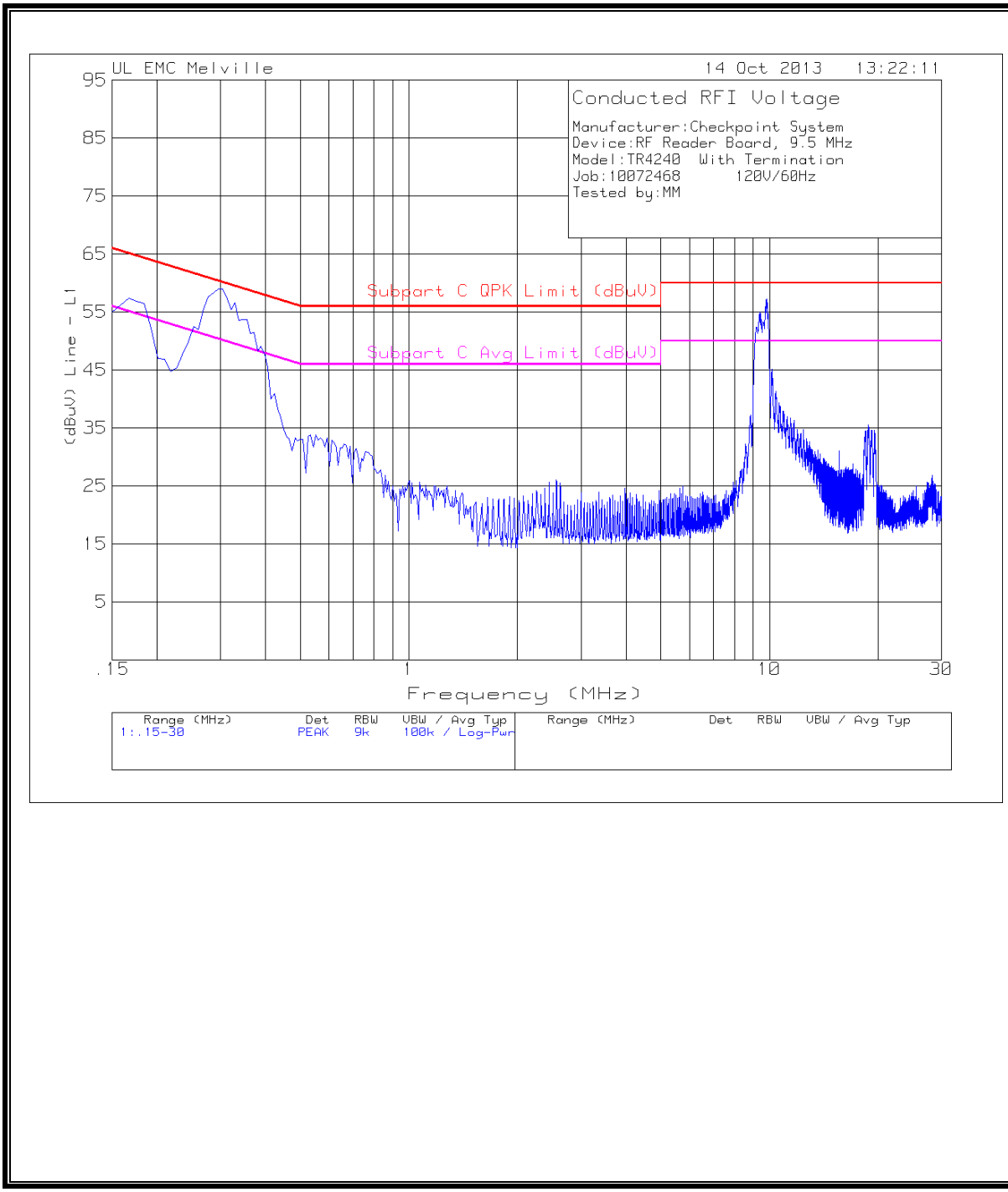
LINE 1 RESULTS – HIGH CHANNEL W/ TERMINATION



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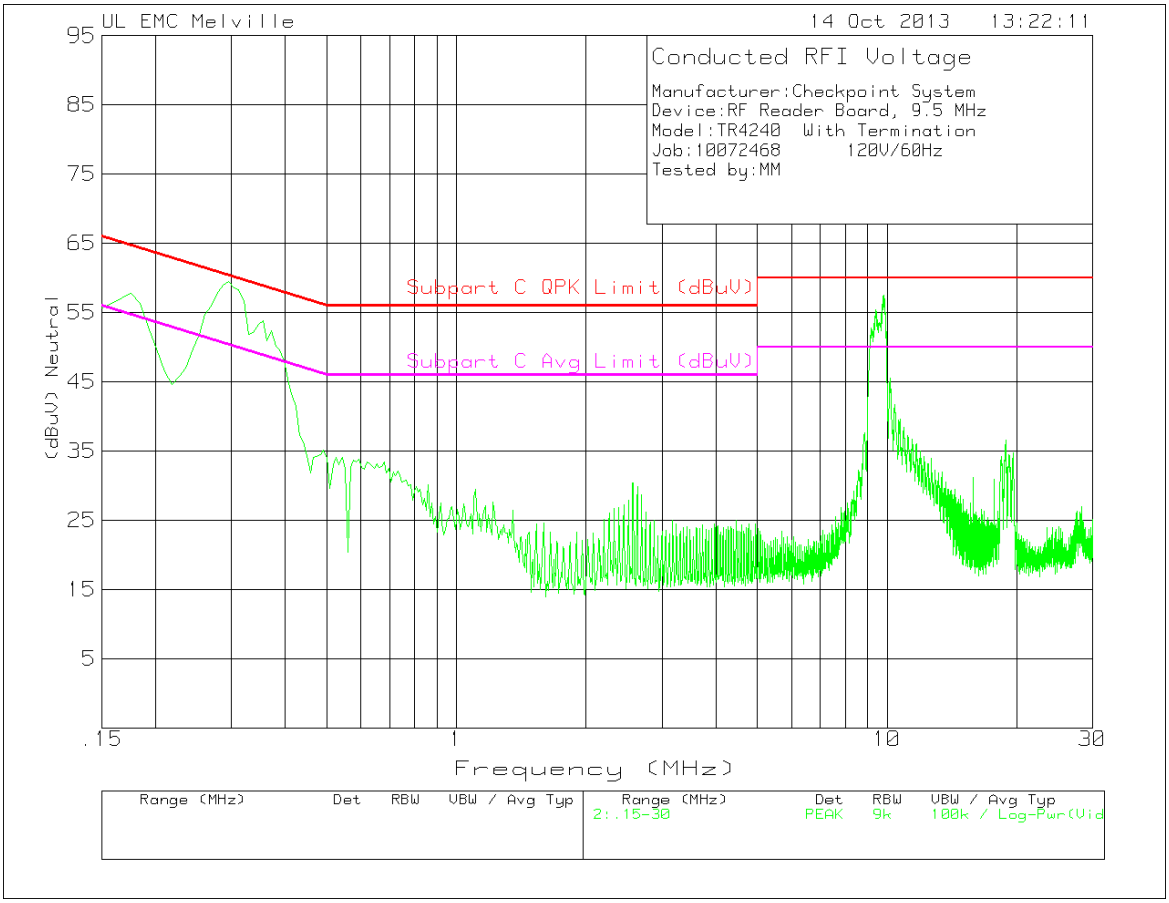
LINE 2 RESULTS – HIGH CHANNEL W/ TERMINATION



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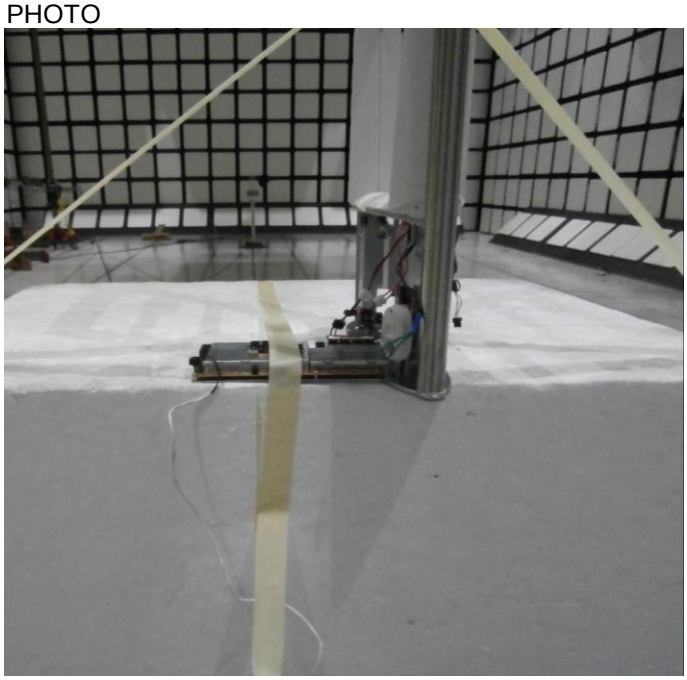
11. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

X-AXIS PHOTO



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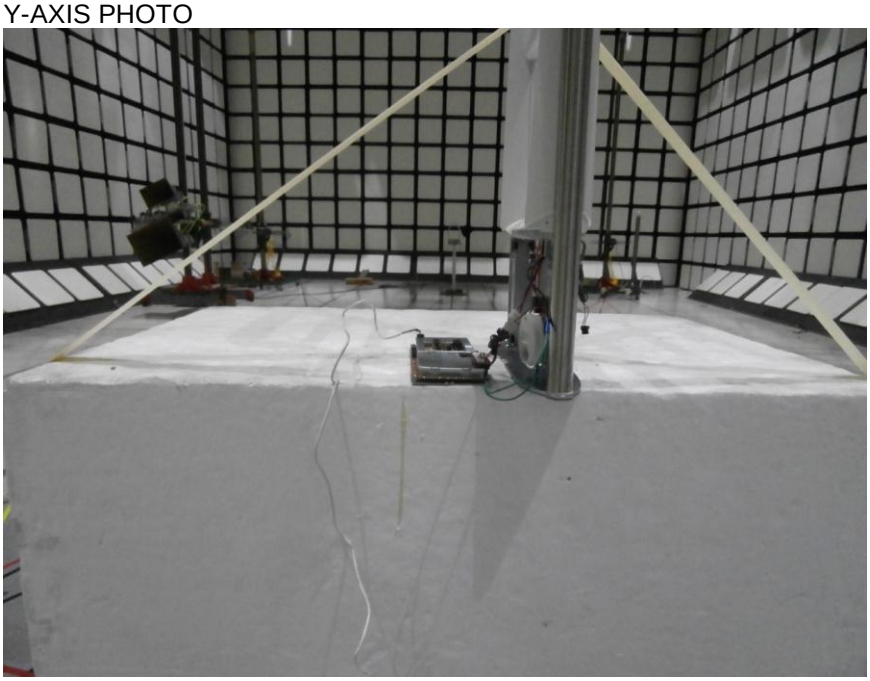
Y-AXIS PHOTO



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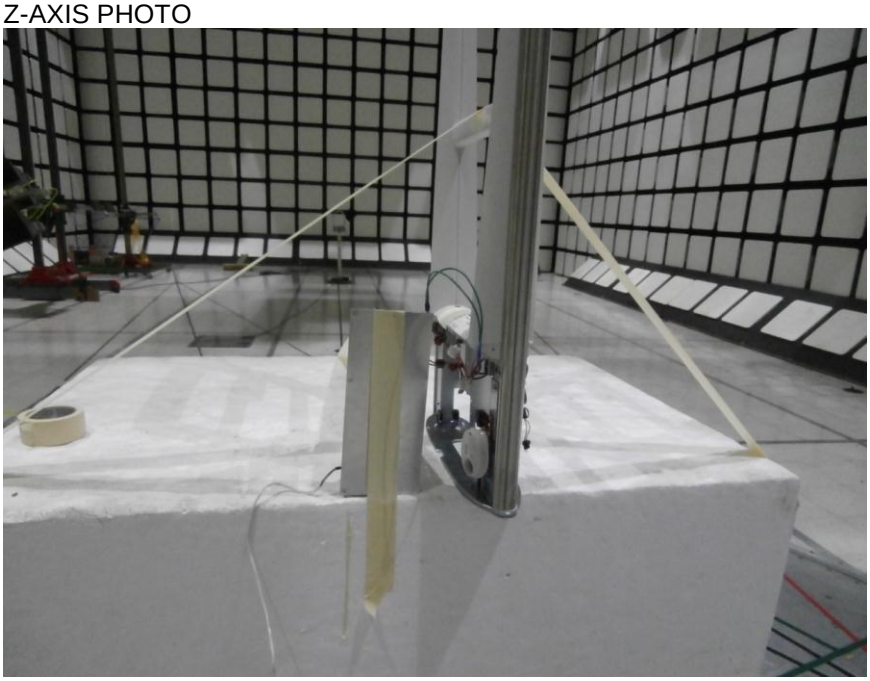
Z-AXIS PHOTO



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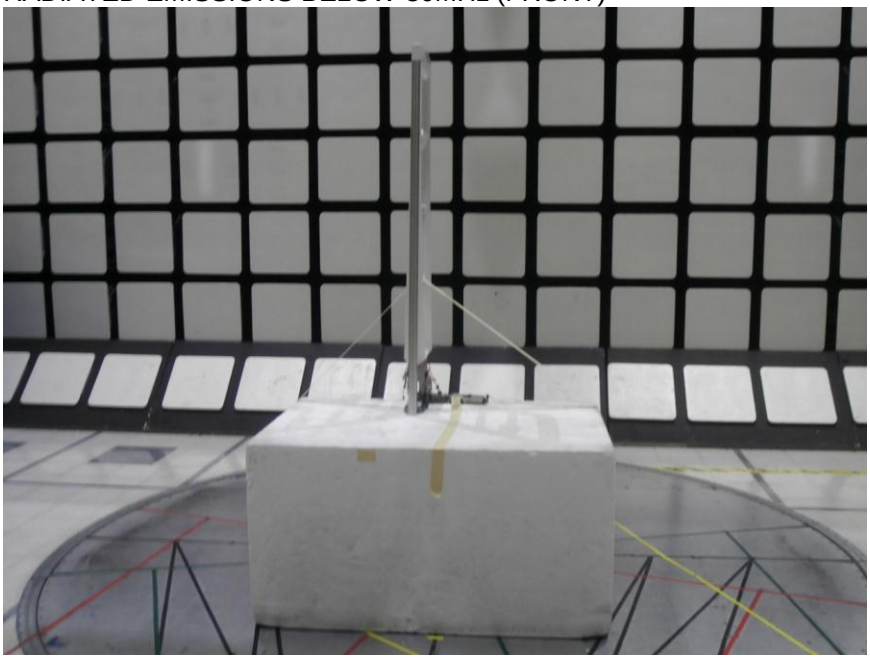
RADIATED EMISSION BELOW 30 MHz

RADIATED EMISSIONS BELOW 30MHz (FRONT)



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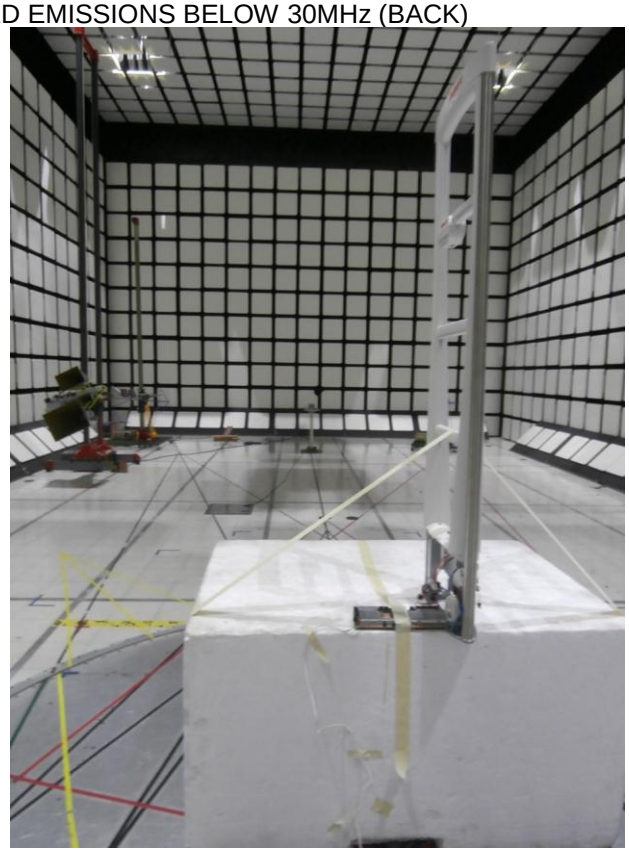
RADIATED EMISSIONS BELOW 30MHz (BACK)



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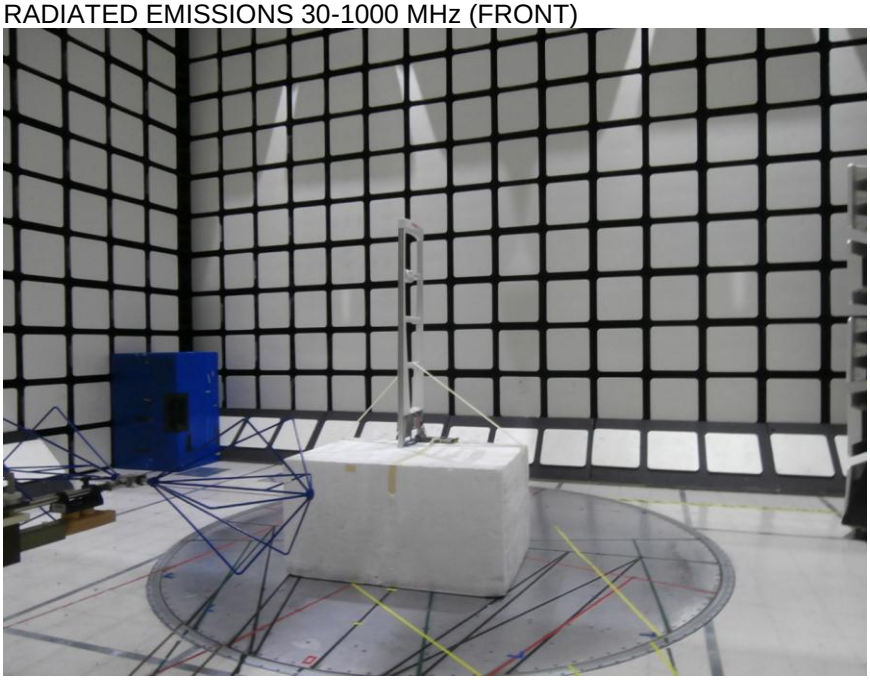
RADIATED EMISSION 30-1000 MHz

RADIATED EMISSIONS 30-1000 MHz (FRONT)



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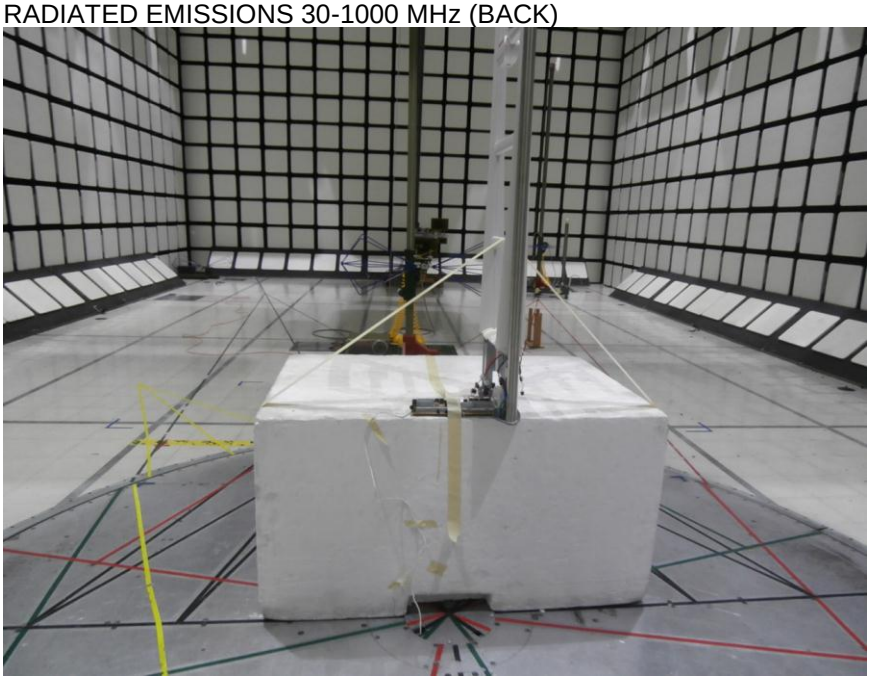
RADIATED EMISSIONS 30-1000 MHz (BACK)



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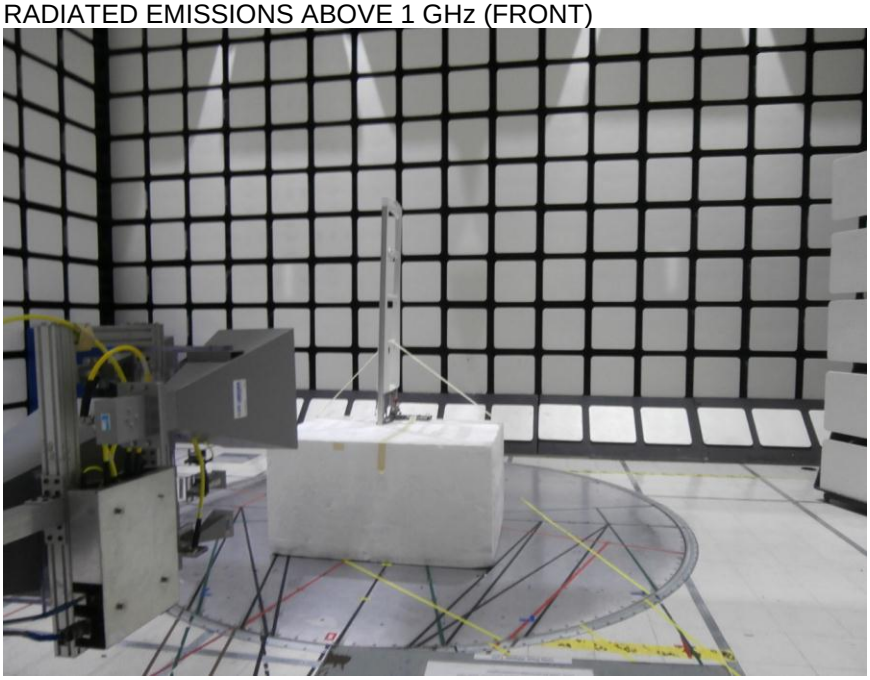
RADIATED EMISSION ABOVE 1 GHz

RADIATED EMISSIONS ABOVE 1 GHz (FRONT)



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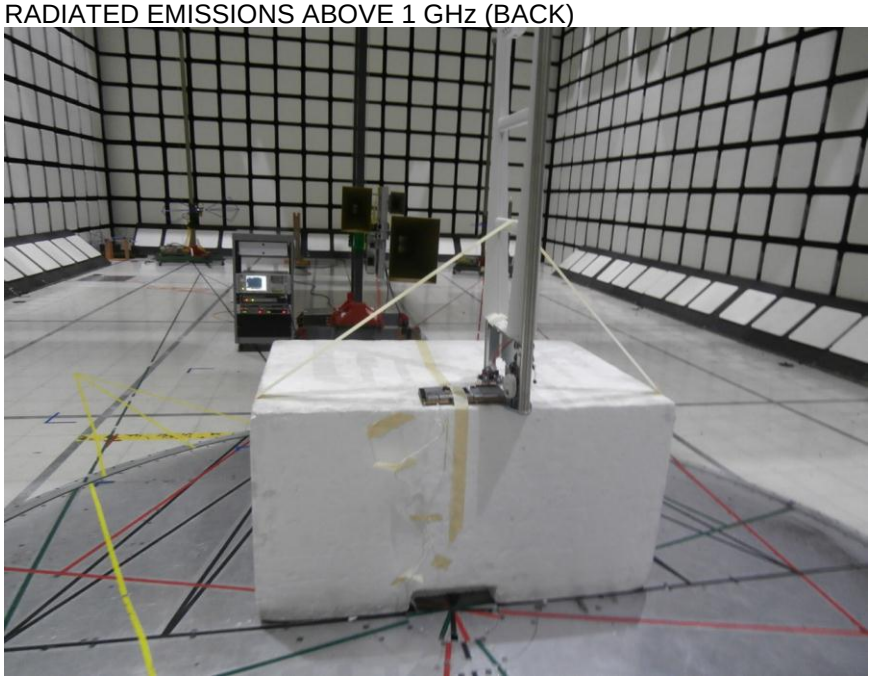
RADIATED EMISSIONS ABOVE 1 GHz (BACK)



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AC MAINS LINE CONDUCTED EMISSION

LINE CONDUCTED EMISSION (FRONT – WITH ANTENNA)

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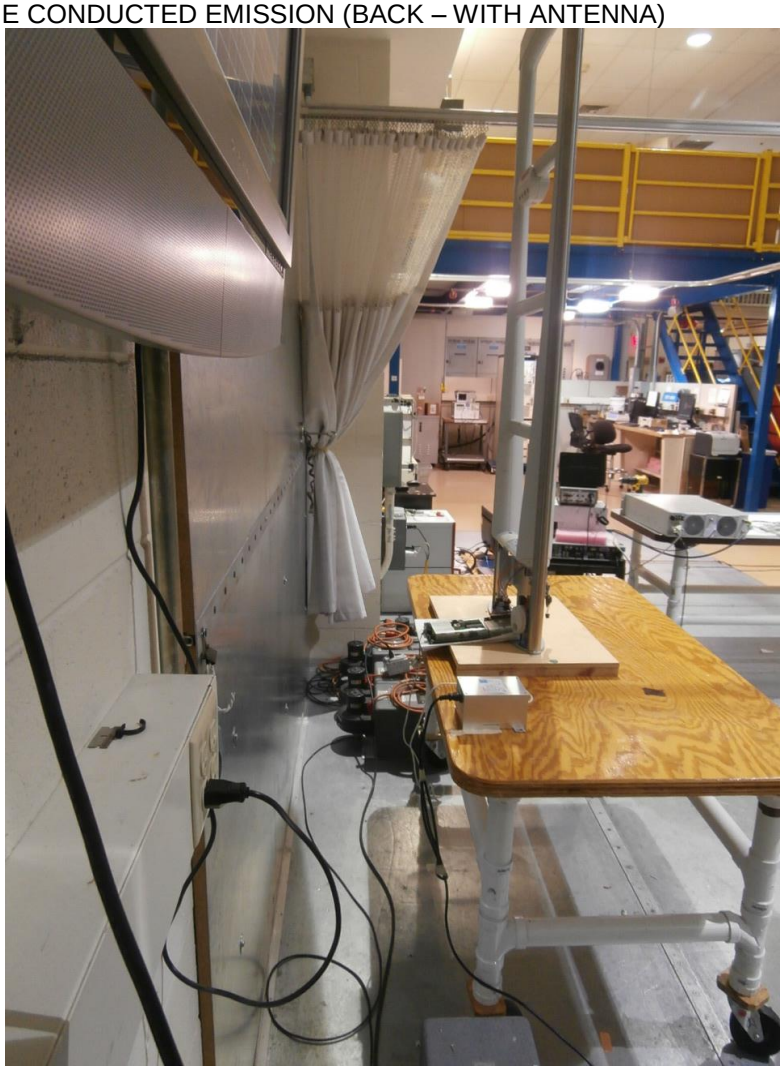
LINE CONDUCTED EMISSION (BACK – WITH ANTENNA)



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LINE CONDUCTED EMISSION (FRONT – WITH TERMINATION)

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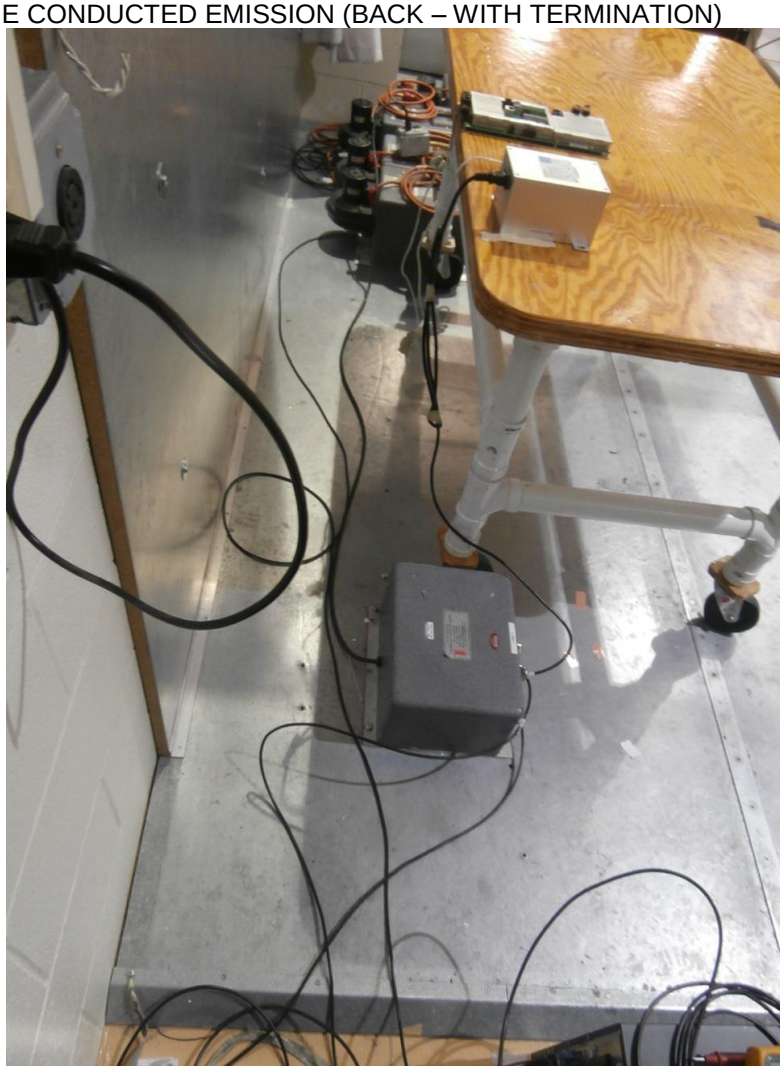
LINE CONDUCTED EMISSION (BACK – WITH TERMINATION)



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