



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

CERTIFICATION TEST REPORT

FOR

Remote Control

MODEL NUMBER: R300TAD, R300TAT, R300TAW

FCC ID: UX5-R300A

IC: 4943B-R300A

REPORT NUMBER: 11U13965

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Prepared for
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NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/20/14	Initial Issue	M.Ferrer
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Maxitrol Company
23555 Telegraph Rd.
Southfield, MI 48037

EUT DESCRIPTION: Remote Control

MODEL: R300TAD, R300TAT, R300TAW (See 5.1)

SERIAL NUMBER: Prototype

DATE TESTED: January 11, 2013, February 11, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	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. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested 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 herein. 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:



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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, 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 333 Pfingsten Road, Northbrook, IL 60193, USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0

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

Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

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	+/- 0.9 dB (k=2)
Radiated Disturbance, 30 to 1000 MHz	+/- 3.17 dB (k=2)

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Remote Control operating at 915MHz. The difference in models is software only and does not affect RF circuitry or testing results.

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)
914.87	TX	76.63

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB trace antenna.

5.4. SOFTWARE AND FIRMWARE

Sample programmed by manufacturer

5.5. WORST-CASE CONFIGURATION AND MODE

The worst case was found to be at X-Axis. See photos for setup information and axis description.

5.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

None

I/O CABLES

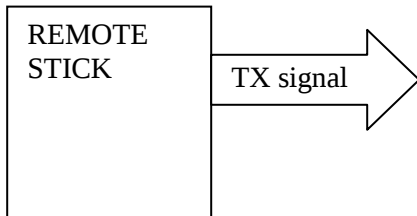
None

TEST SETUP

The EUT is configured to transmit continuously when button is held down. It is battery powered and stands alone

SETUP DIAGRAM FOR TESTS

The diagram below illustrates the configuration of the equipment above.



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List						
Description	Manufacturer	Model	Asset	Cal Date	Cal Due	Test
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20121227	20131231	RE
Bicon Antenna	Chase	VBA6106A	EMC4078	20120117	20130131	RE
Log-P Antenna	Chase	UPA6109	EMC4013	20120807	20130831	RE
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20121226	20131231	RE
Antenna Array	UL	BOMS	EMC4276	20111227	20131231	RE
EMI Test Receiver	Agilent	N9030A	EMC4360	20131221	20141221	OBW
Antenna	EMCO	-	-	-	-	OBW

7. TEST RESULTS

7.1.1. 99% , 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

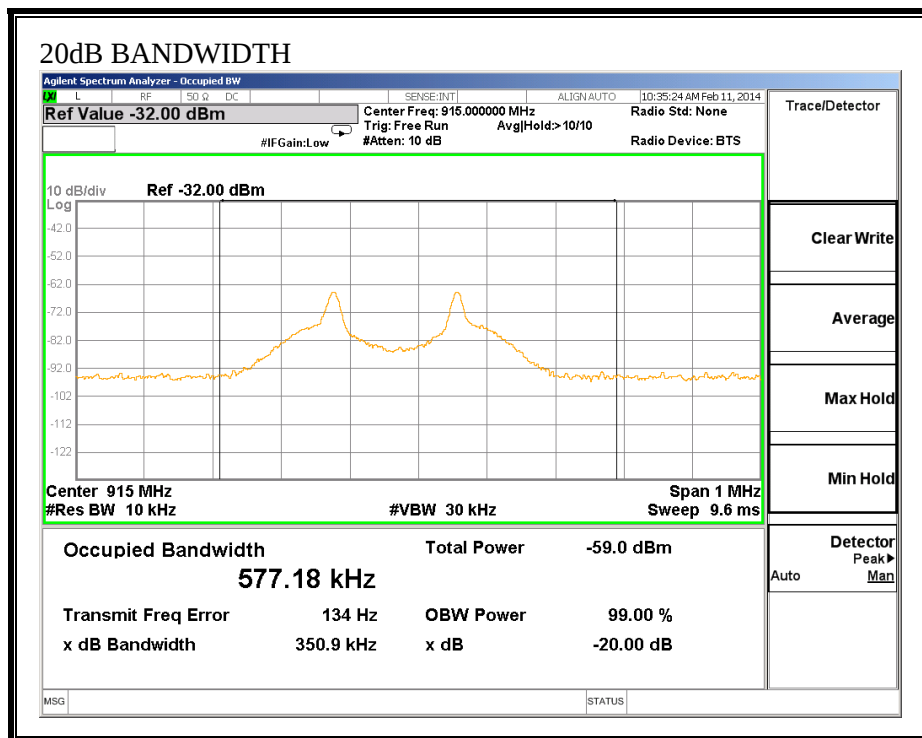
TEST PROCEDURE

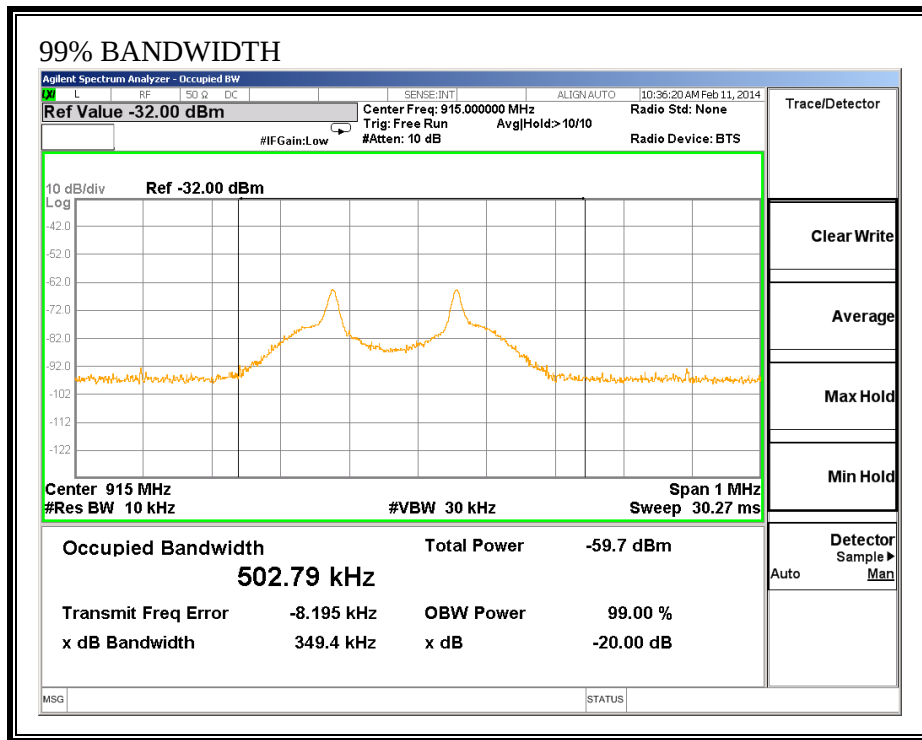
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth and 20dB function is utilized.

RESULTS

	BW (kHz)
20dB	350.9
99%	502.79

20dB BANDWIDTH





7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4 2003

LIMIT

IC RSS-210, A2.9
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

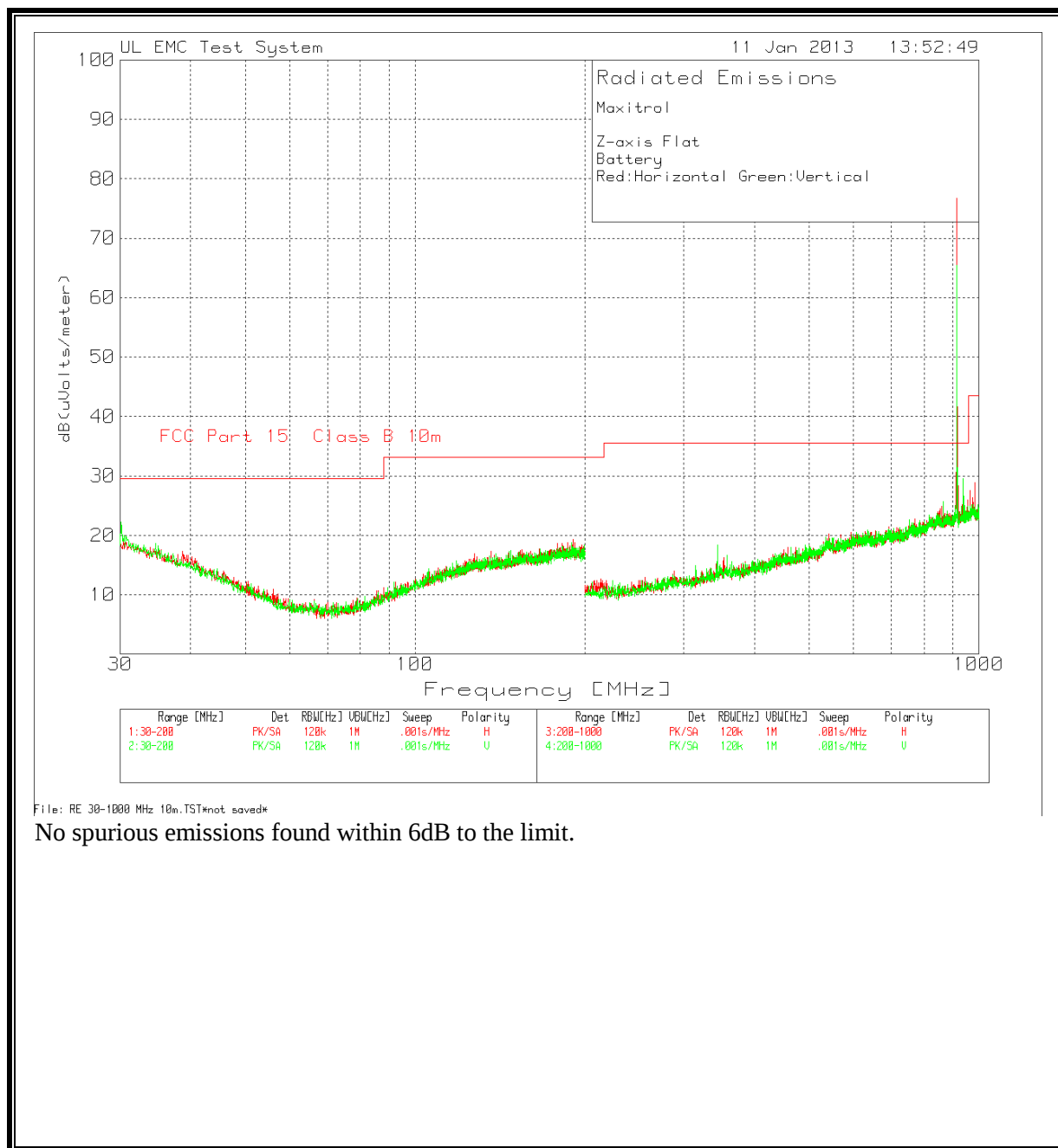
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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.

RESULTS

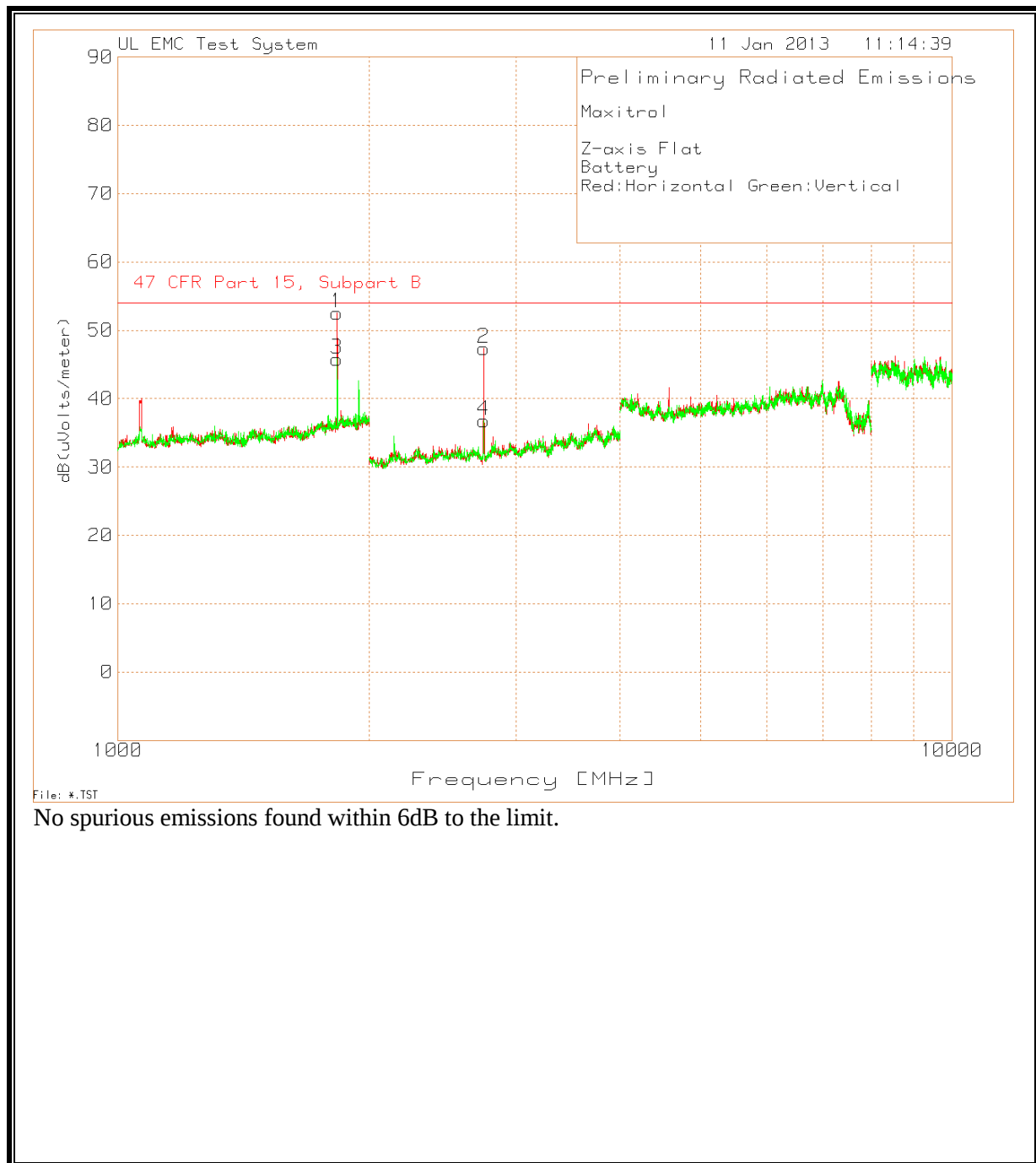
7.1.1. FUNDAMENTAL FREQUENCY/Spurious RADIATED EMISSION



Maxitrol												
Battery												
Red:Horizontal Green:Vertical												
Test	Meter		UPA6109	East 25-								
Frequency	Reading	Detector	SN24423	1000MHz		FCC Part						
			EMC4313	with		15 Class						
			10M [dB]	Miteq	dB(uV	B 10m	Margin	Azimuth	Height	Polarity	Axis	
				[dB]	s/meter)			[Degs]	[cm]			
914.8752	81.76	QP	22.9	-30	74.66	83.51	-8.85	7	100	Horz	Y	
914.8752	81.85	PK	22.9	-30	74.75	83.51	-8.76	7	100	Horz	Y	
914.8752	77.17	QP	22.9	-30	70.07	83.51	-13.44	107	343	Vert	Y	
914.8752	77.3	PK	22.9	-30	70.2	83.51	-13.31	107	343	Vert	Y	
914.8752	83.64	QP	22.9	-30	76.54	83.51	-6.97	115	178	Vert	X	
914.8752	83.73	PK	22.9	-30	76.63	83.51	-6.88	115	178	Vert	X	
914.8752	74.51	QP	22.9	-30	67.41	83.51	-16.1	13	108	Horz	X	
914.8752	74.7	PK	22.9	-30	67.6	83.51	-15.91	13	108	Horz	X	
914.8752	83.5	QP	22.9	-30	76.4	83.51	-7.11	147	272	Horz	Z	
914.8752	83.61	PK	22.9	-30	76.51	83.51	-7	147	272	Horz	Z	
914.8752	72.92	QP	22.9	-30	65.82	83.51	-17.69	79	276	Vert	Z	
914.8752	73.13	PK	22.9	-30	66.03	83.51	-17.48	79	276	Vert	Z	
914.8752	83.55	QP	22.9	-30	76.45	83.51	-7.06	143	269	Horz	Z	
PK - Peak detector												
QP - Quasi-Peak detector												

Measurements were made at 10m. The limit was converted to a 10m limit.

7.1.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz



DATA

Test Frequency	Meter Reading	Detector	ENCO 3115 S/N 2638 [dB]	BOMS Factor [dB]	dB(uV s/meter)	47 CFR Part 15, Subpart B	Margin	Azimuth [Degr]	Height [cm]	Polarity	Axis
1830.0952	81.19	PK	26.9	-55	53.09	74	-20.91	352	120	Horz	Z
1829.9549	79.49	LnAv	26.9	-55.01	51.38	54	-2.62	352	120	Horz	Z
1829.7896	76.7	PK	26.9	-55.01	48.59	74	-25.41	279	143	Vert	Z
1829.9499	74.41	LnAv	26.9	-55.01	46.3	54	-7.7	279	143	Vert	Z
1830.2305	77.39	PK	26.9	-55	49.29	74	-24.71	155	134	Vert	X
1829.9599	75.02	LnAv	26.9	-55.01	46.91	54	-7.09	155	134	Vert	X
1829.7395	80.16	PK	26.9	-55.02	52.04	74	-21.96	311	112	Horz	X
1829.9599	78.28	LnAv	26.9	-55.01	50.17	54	-3.83	311	112	Horz	X
1830.0902	79.47	PK	26.9	-55	51.37	74	-22.63	7	122	Horz	Y
1829.9499	77.58	LnAv	26.9	-55.01	49.47	54	-4.53	7	122	Horz	Y
1830.1503	76.67	PK	26.9	-55	48.57	74	-25.43	66	126	Vert	Y
1829.9599	74.32	LnAv	26.9	-55.01	46.21	54	-7.79	66	126	Vert	Y
PK - Peak detector											
LnAv - Linear Average detector											