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FCC PART 15.249 TEST REPORT

UNLICENSED INTENTIONAL RADIATOR

Applicant	E-ZONE GUARDIAN	
Address	P.O. BOX 774	
	CEDAR HILL TX 75106-0774	
FCC ID	O4UEZ12031	
Model Number	EZR12001	
Product Description	TRANSMITTER	
Date Sample Received	6/7/2012	
Date Tested	6/11/2012	
Tested By	Nam Nguyen	
Approved By	Mario R. de Aranzeta	
Report Number	1234ZUT12TestReport.doc	
Test Results	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



Testing Certificate #0955-01



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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.



Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669



Authorized Signatory Name:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: July 17, 2012

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GENERAL INFORMATION

DUT Specification

The test results relate only to the items tested.		
Applicable Standard	Part 15.249	
DUT Description	TRANSMITTER	
FCC ID	O4UEZ12031	
Operating Frequency	TX: 2405 – 2475 MHz	RX: Same
DUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz	
	<input type="checkbox"/> DC Power	
	<input checked="" type="checkbox"/> Battery Operated Exclusively	
Test Item	<input type="checkbox"/> Prototype	<input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Production
Type of Equipment	<input type="checkbox"/> Fixed	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable
Antenna Connector	FCC Rules require that the antenna connector be unique.	
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.	
Test Conditions	Temperature: 26°C Relative humidity: 50%	
Test Exercise	The DUT was placed in continuous transmit mode of operation.	
Modifications	None	

Test Supporting Equipment

Supporting Device	Manufacturer	Model / FCC ID	Serial Number
N/A			

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EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
3-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	12/31/13
Analyzer Open-Frame Tower Preamplifier	HP	8449B	3008A01075	07/22/09	09/15/13
Analyzer Open-Frame Tower Quasi-Peak Adapter	HP	85650A	2043A00305	10/26/09	09/15/13
Analyzer Open-Frame Tower RF Preselector	HP	85685A	3107A01282	07/22/09	09/15/13
Analyzer Open-Frame Tower Spectrum Analyzer	HP	8566B/85662A	2627A03154/2648A14276	07/22/09	09/15/13
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	11/21/09	10/28/13
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	11/22/09	10/28/13
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	11/21/09	10/28/13
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	11/24/09	10/28/13
Antenna: Biconical	Eaton	94455-1	1057	05/31/11	05/31/13
Antenna: Biconical	Eaton	94455-1	1096	05/04/11	05/04/13
Antenna: Double-Ridged Horn	ETS Lindgren	3117	35923	12/7/2011	12/7/2013
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/04/11	05/04/13
Power Line Coupling/Decoupling Network	Fischer Custom Communications	FCC-801-M2-16A	01048	01/04/11	01/04/13
Power Line Coupling/Decoupling Network	Fischer Custom Communications	FCC-801-M3-16A	01060	01/04/11	01/04/13

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TEST PROCEDURES

Radiation Interference: ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

$$\begin{array}{llll}
 \text{Freq (MHz)} & \text{Meter Reading} & + \text{ACF} & + \text{CL} = \text{FS} \\
 33 & 20 \text{ dB}\mu\text{V} & + 10.36 \text{ dB} & + 0.5 = 30.86 \text{ dB}\mu\text{V/m} @ 3\text{m}
 \end{array}$$

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

ANSI C63.4-2003 10.1 Measurement Procedures: The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. Emissions attenuated more than 20 dB below the permissible value are not reported.

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RADIATION INTERFERENCE

Rules Part No.: 15.249, 15.209

Requirements:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dB μ V/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	94.0 dB μ V/m @ 3 meters
Harmonics	54.0 dB μ V/m @ 3 meters

Test Data: Measurements were made from 9 kHz or the lowest frequency generated to the tenth harmonic of the desired.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Pol	Coax Loss dB	Correction Factor dB	Field Strength dB μ V/m	Margin dB
2,405.0	2,405.00	55.7	V	3.18	32.49	91.37	2.63
2,405.0	2,405.00	57.6	H	3.18	32.49	93.27	0.73
2,405.0	4,810.00*	18.9P	V	4.91	33.96	57.77	16.23
2,405.0	4,810.00*	20.5P	H	4.91	33.96	59.37	14.63
2,405.0	4,810.10*	5.8A	V	4.91	33.96	44.67	9.33
2,405.0	4,810.10*	6.7A	H	4.91	33.96	45.57	8.43
2,405.0	7,215.00	13.4P	V	5.73	35.66	54.79	19.21
2,405.0	7,215.00	16.2P	H	5.73	35.66	57.59	16.41
2,405.0	7,215.10	0.0A	V	5.73	35.66	41.39	12.61
2,405.0	7,215.10	1.6A	H	5.73	35.66	42.99	11.01
2,405.0	9,620.00	11.9P	H	6.79	36.82	55.51	18.49
2,405.0	9,620.00	14.5P	V	6.79	36.82	58.11	15.89
2,405.0	9,620.10	0.2A	H	6.79	36.82	43.81	10.19
2,405.0	9,620.10	1.7A	V	6.79	36.82	45.31	8.69
2,425.0	2,425.00	53.2	V	3.20	32.51	88.91	5.09
2,425.0	2,425.00	55.9	H	3.20	32.51	91.61	2.39

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TEST DATA CONT'D.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Pol	Coax Loss dB	Correction Factor dB	Field Strength dBμV/m	Margin dB
2,425.0	4,850.00*	18.3P	H	4.93	33.97	57.20	16.8
2,425.0	4,850.00*	21.6P	V	4.93	33.97	60.50	13.5
2,425.0	4,850.10*	4.4A	H	4.93	33.97	43.30	10.7
2,425.0	4,850.10*	8.1A	V	4.93	33.97	47.00	7
2,425.0	7,275.00*	12.5P	V	5.77	35.65	53.92	20.08
2,425.0	7,275.00*	14.7P	H	5.77	35.65	56.12	17.88
2,425.0	7,275.10*	0.3A	V	5.77	35.64	41.71	12.29
2,425.0	7,275.10*	0.5A	H	5.77	35.64	41.91	12.09
2,425.0	9,700.00	12.0P	H	6.81	36.90	55.71	18.29
2,425.0	9,700.00	14.6P	V	6.81	36.90	58.31	15.69
2,425.0	9,700.10	0.1A	H	6.81	36.90	43.81	10.19
2,425.0	9,700.10	2.7A	V	6.81	36.90	46.41	7.59
2,475.0	2,475.00	54.0	H	3.23	32.57	89.80	4.2
2,475.0	2,475.00	54.2	V	3.23	32.57	90.00	4
2,475.0	4,950.00*	18.5P	H	4.98	33.99	57.47	16.53
2,475.0	4,950.00*	20.5P	V	4.98	33.99	59.47	14.53
2,475.0	4,950.10*	7.8A	V	4.98	33.99	46.77	7.23
2,475.0	4,950.10*	8.2A	H	4.98	33.99	47.17	6.83
2,475.0	7,425.00*	13.3P	V	5.86	35.62	54.78	19.22
2,475.0	7,425.00*	14.4P	H	5.86	35.62	55.88	18.12
2,475.0	7,425.10*	1.5A	V	5.86	35.61	42.97	11.03
2,475.0	7,425.10*	2.3A	H	5.86	35.61	43.77	10.23
2,475.0	9,900.00	11.6P	V	6.87	37.10	55.57	18.43
2,475.0	9,900.00	11.9P	H	6.87	37.10	55.87	18.13
2,475.0	9,900.10	0.1A	V	6.87	37.10	44.07	9.93
2,475.0	9,900.10	0.7A	H	6.87	37.10	44.67	9.33

P = Peak

A = Average

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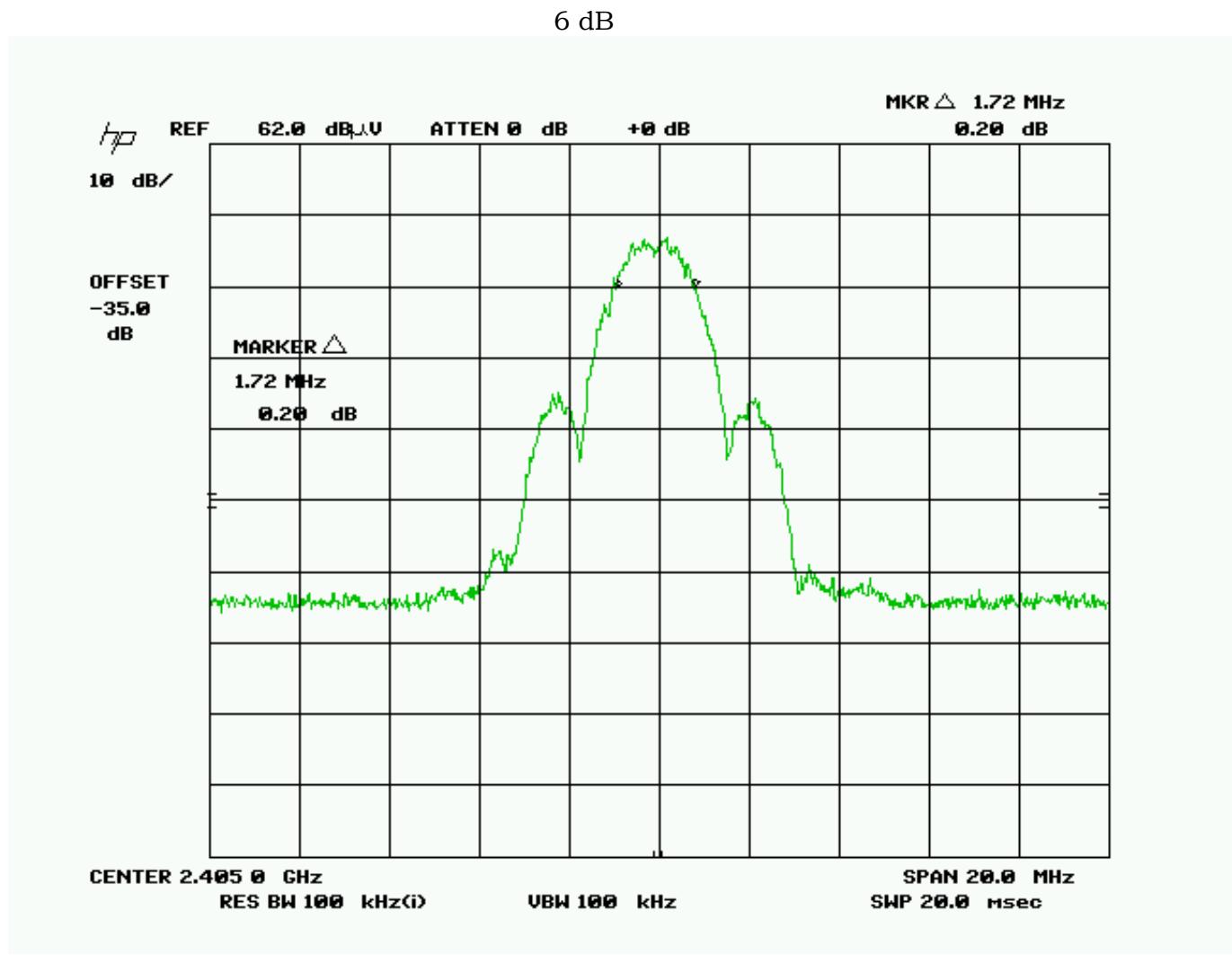
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OCCUPIED BANDWIDTH

Rules Part No.: 15.249 (d)

Requirements: The field strength of any emissions appearing outside the bandedges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

Test Data:



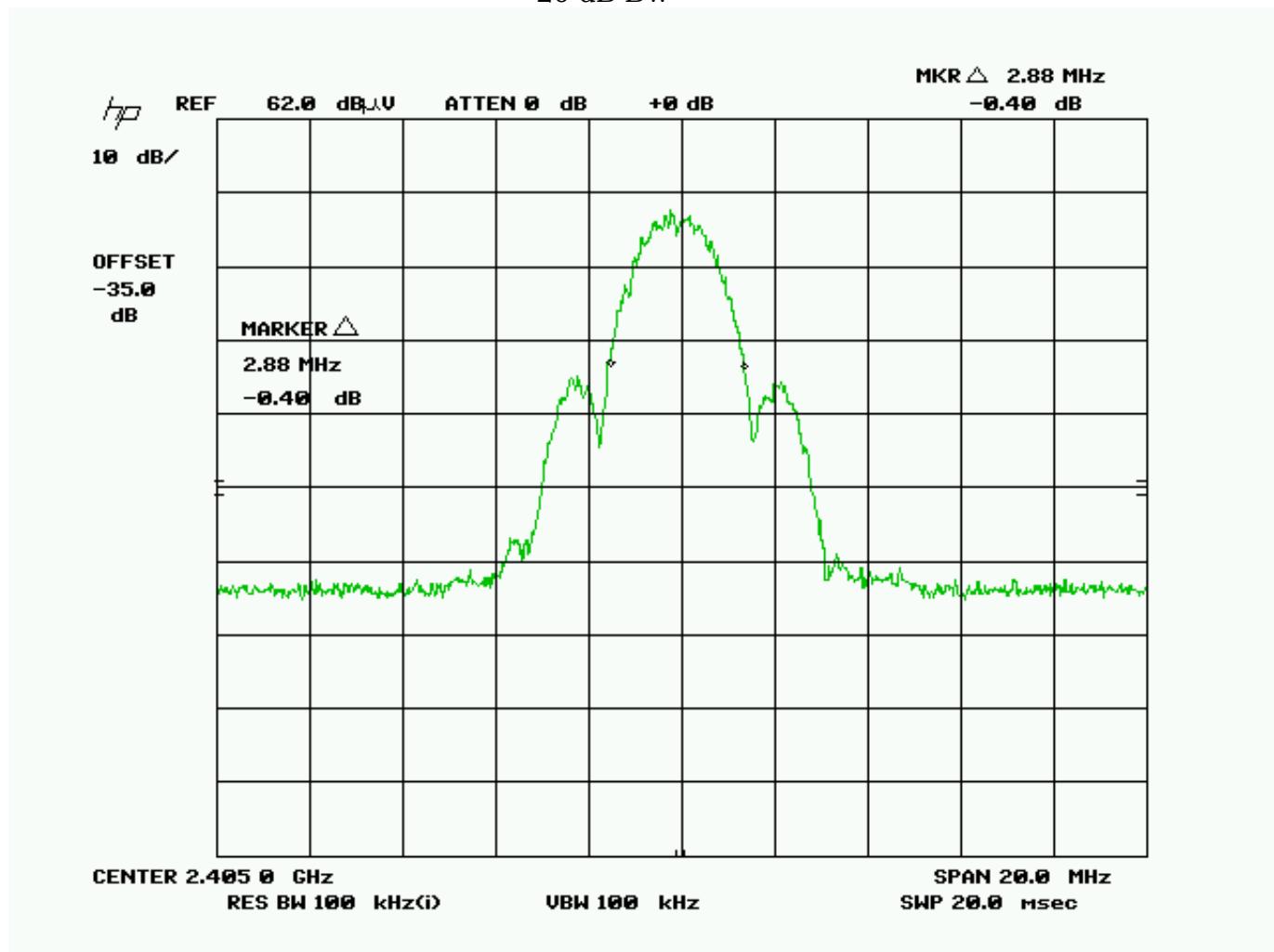
Three places in the band were measured and the worst case reported.

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20 dB BW



Three places in the band were measured and the worst case reported.

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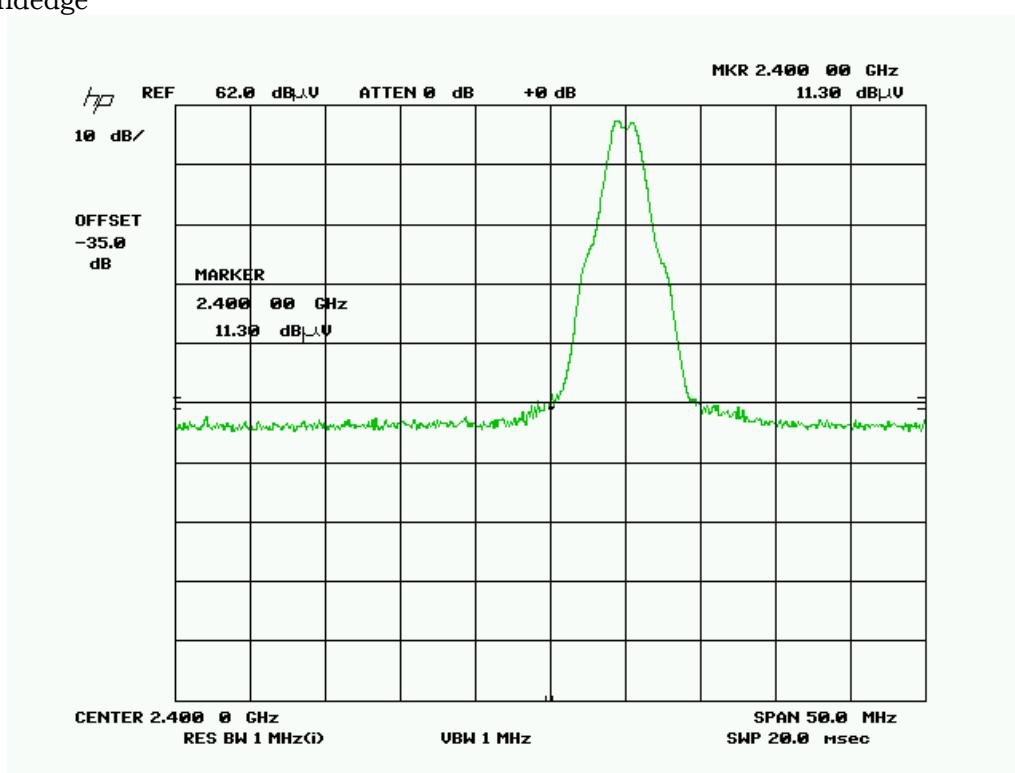
BAND EDGE COMPLIANCE

Rules Part No.: 15.249 (d)

Requirements: 40 dBc or in the case of restricted bands 54 dB μ V/m.

Test Data:

Lower bandedge



Peak Plot

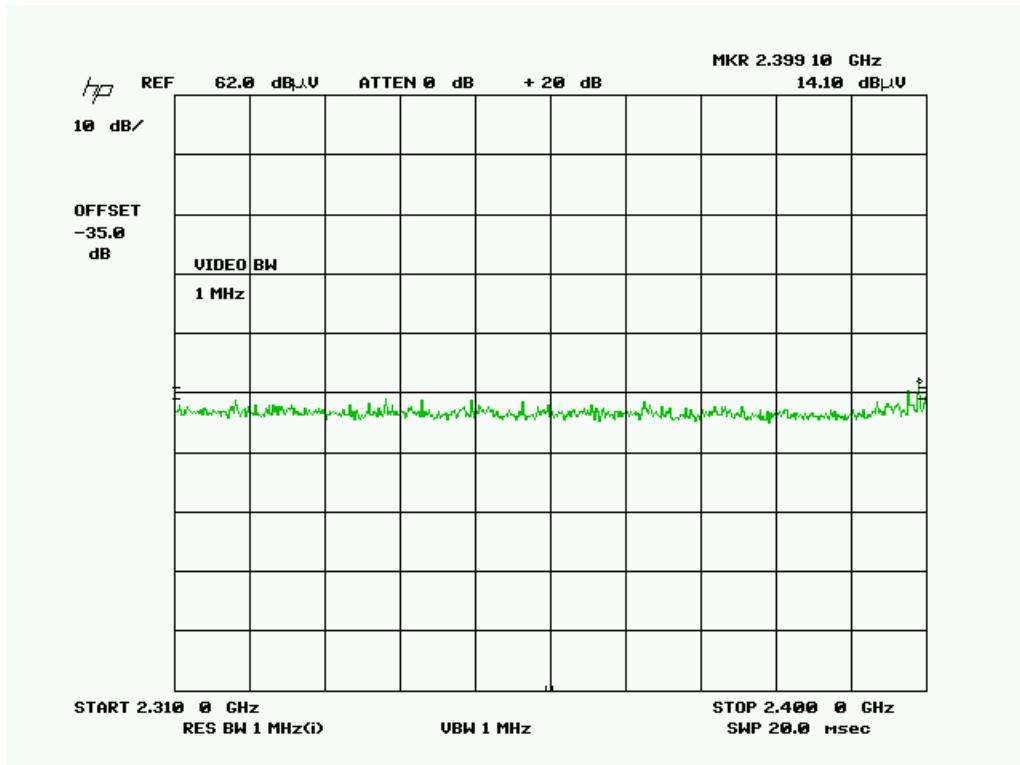
Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m	Margin dB
2405	2400.00	11.3	V	3.18	32.4	46.88	7.12

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Lower non-adjacent restricted band



Peak Plot

Average Plot

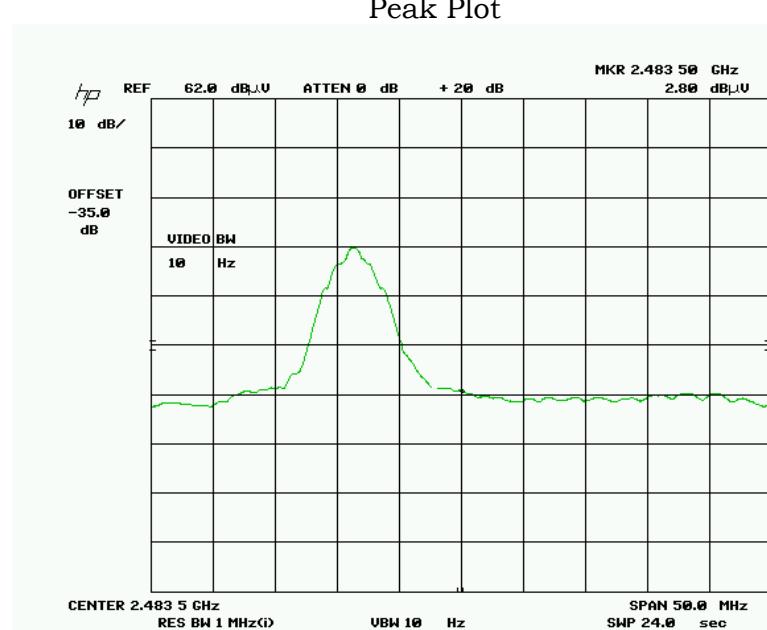
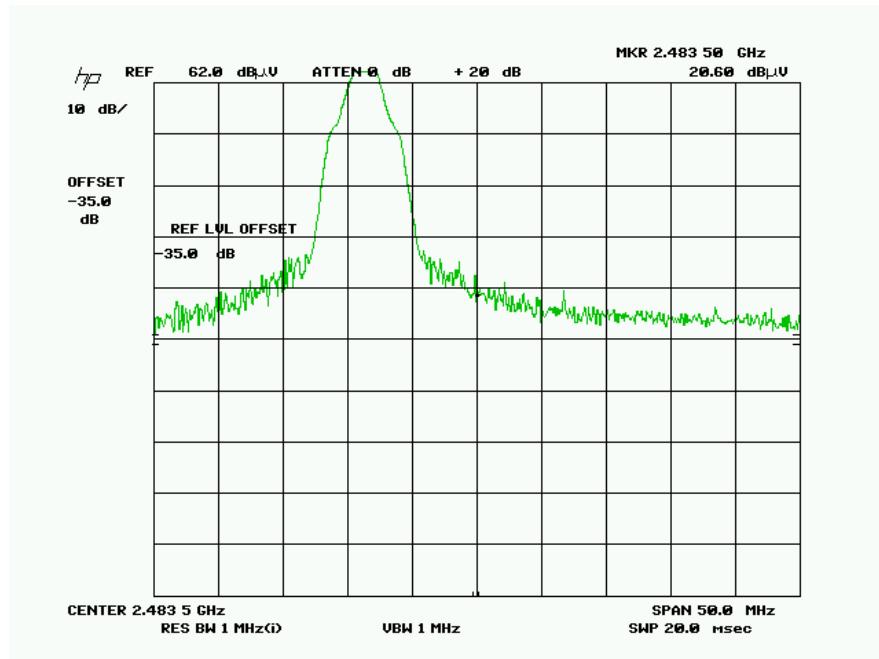
Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m	Margin dB
2405	2350	11.5	V	3.15	32.4	47.05	6.95

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Upper bandedge



Average Plot

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB μ V	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dB μ V/m	Margin dB
2475	2483.5	20.60	V	3.24	32.58	56.42	17.58
2475	2483.5	2.8	V	3.24	32.58	38.62	15.38

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POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dB μ V)	Average Limits (dB μ V)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: The attached graphs represent the emissions read for power line conducted for this device. Both lines were observed.

N/A
Battery or vehicle powered DUT.

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