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FCC PART 15.249 TEST REPORT

UNLICENSED INTENTIONAL RADIATOR

Applicant	GOTENNA
Address	102 S 6TH STREET BROOKLYN NY 11249 USA
FCC ID	2ABVK02629
Model Number	02629
Product Description	MURS RADIO WITH BT
FCC Standard Applied	47 CFR §15.249
Date Sample Received	7/21/2014
Date Tested	7/24/2014 & 9/30/2014
Tested By	Cory Leverett
Approved By	Sid Sanders
Report Number	1267CUT14TestReport.docx
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.

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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: 2005 requirements.

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: Cory Leverett

Engineering Project Manager

Date: 8/7/2014



GENERAL INFORMATION

EUT Specification

The test results relate only to the items tested.			
Applicable Standard	Part 15.249		
EUT Description	MURS RADIO WITH BT		
FCC ID	2ABVK02629		
Model Number	02629		
Operating Frequency	TX: 2402 -2479 MHz	RX: Same	
No. of Channels	39	Modulations BTLE	
EUT 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.		
Conditions in the Test laboratory	Temperature: 26°C Relative humidity: 50%		
Test Exercise	The EUT was placed in continuous transmit mode of operation.		
Revision History of EUT	NA		

Test Supporting Equipment

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

TEST RESULTS SUMMARY

Specification – Rules Part No.	RESULTS – Pass/Fail/NA
FCC Rule 15.249 Fundamental	Pass
FCC Rule 15.249 Harmonics & Spurious	Pass
Occupied Bandwidth	Pass
Bandedge	Pass
Power Line Emissions 15.207	Pass

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 worst 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 dBuV) 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:

Freq (MHz)	Meter Reading	+ ACF	+ CL	= FS
33	20 dBuV	+ 10.36 dB	+ 0.5	= 30.86 dBuV/m @ 3m

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 EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT 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) $\mu\text{V/m}$ @ 300 meters
490 to 1705 kHz	24000/F (kHz) $\mu\text{V/m}$ @ 30 meters
1705 kHz to 30 MHz	29.54 dB $\mu\text{V/m}$ @ 30 meters
30 – 88	40.0 dB $\mu\text{V/m}$ @ 3 meters
80 – 216	43.5 dB $\mu\text{V/m}$ @ 3 meters
216 – 960	46.0 dB $\mu\text{V/m}$ @ 3 meters
Above 960	54.0 dB $\mu\text{V/m}$ @ 3 meters
Part 15.249	
Fundamental 902 – 928 MHz	94.0 dB $\mu\text{V/m}$ @ 3 meters
Fundamental 2.4 – 2.4835 GHz	94.0 dB $\mu\text{V/m}$ @ 3 meters
Harmonics	54.0 dB $\mu\text{V/m}$ @ 3 meters

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Corection Factor dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
2,401.90	2,401.90	47.5	V	20	35.66	63.16	30.84
2,401.90	2,401.90	47.7	H	20	35.66	63.36	30.64
2,401.90	4,804.00	18	V	20	39	37	17
2,401.90	4,804.00	19.5	H	20	39	38.5	15.5
2,401.90	7,206.00	1.6	H	20	41.54	23.14	30.86
2,401.90	7,206.00	1.9	V	20	41.54	23.44	30.56
2,401.90	9,608.00	1.7	H	20	43.53	25.23	28.77
2,401.90	9,608.00	1.8	V	20	43.53	25.33	28.67
2,440.00	2,440.00	46	V	20	35.78	61.78	32.22
2,440.00	2,440.00	48.2	H	20	35.78	63.98	30.02
2,440.00	4,880.00	16.3	V	20	39.04	35.34	18.66
2,440.00	4,880.00	18.9	H	20	39.04	37.94	16.06
2,440.00	7,320.00	1.8	V	20	41.56	23.36	30.64
2,440.00	7,320.00	2.9	H	20	41.56	24.46	29.54
2,440.00	9,760.00	2.3	V	20	43.79	26.09	27.91
2,440.00	9,760.00	2.6	H	20	43.79	26.39	27.61
2,479.90	2,479.90	43.8	V	20	35.9	59.7	34.3
2,479.90	2,479.90	44.7	H	20	35.9	60.6	33.4
2,479.90	4,960.00	15.1	V	20	39.08	34.18	19.82
2,479.90	4,960.00	18.5	H	20	39.08	37.58	16.42
2,479.90	7,439.00	2.2	H	20	41.58	23.78	30.22
2,479.90	7,439.00	2.5	V	20	41.58	24.08	29.92
2,479.90	9,919.00	2.6	H	20	44.07	26.67	27.33
2,479.90	9,919.00	2.9	V	20	44.07	26.97	27.03

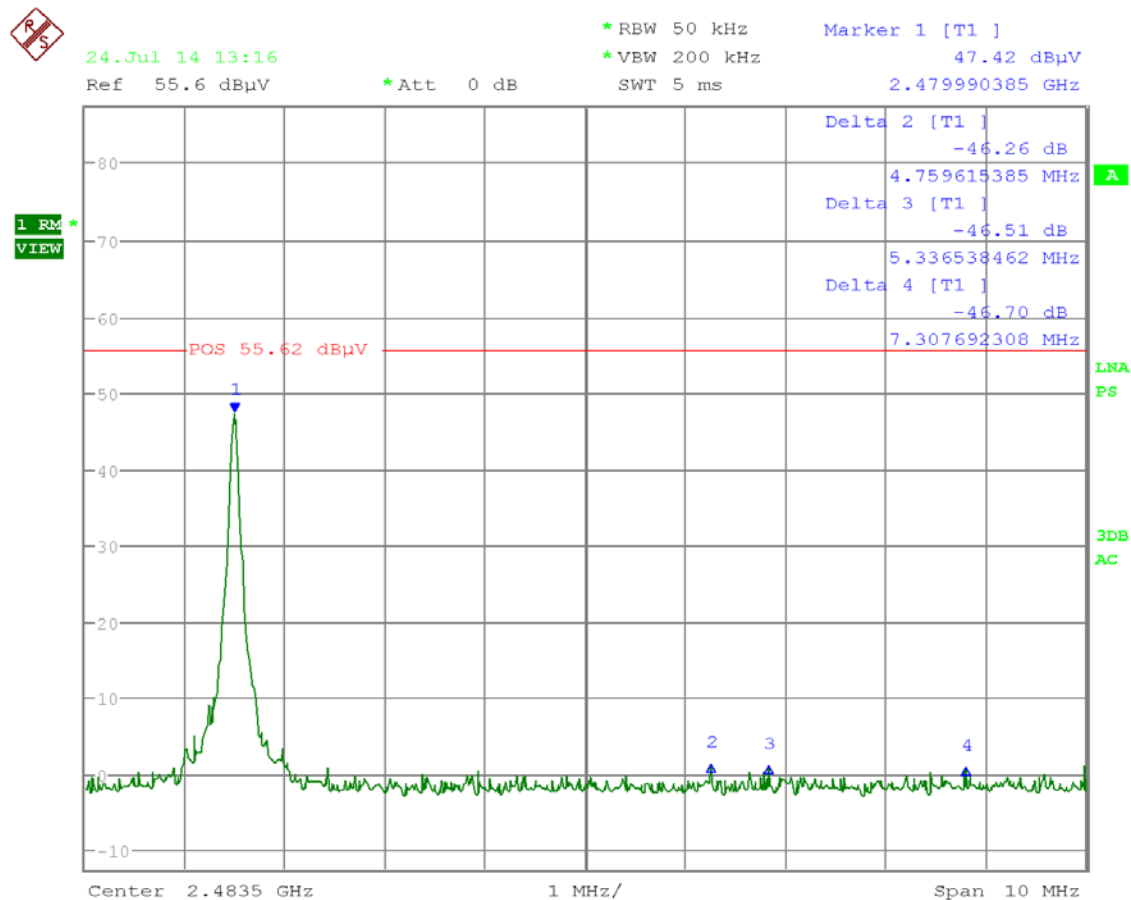
BANDEDGE

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:

Upper Band Edge Hopping off



Date: 24.JUL.2014 13:16:05

FS reading at highest tuned frequency – difference to band edge = level at band edge.
 $80.61 - 46.26 = 34.35$

Results: Meets Requirement

APPLICANT: GOTENNA

FCC ID: 2ABVK02629

REPORT: G\GOTENNA\1267CUT14\1267CUT14TestReport.docx

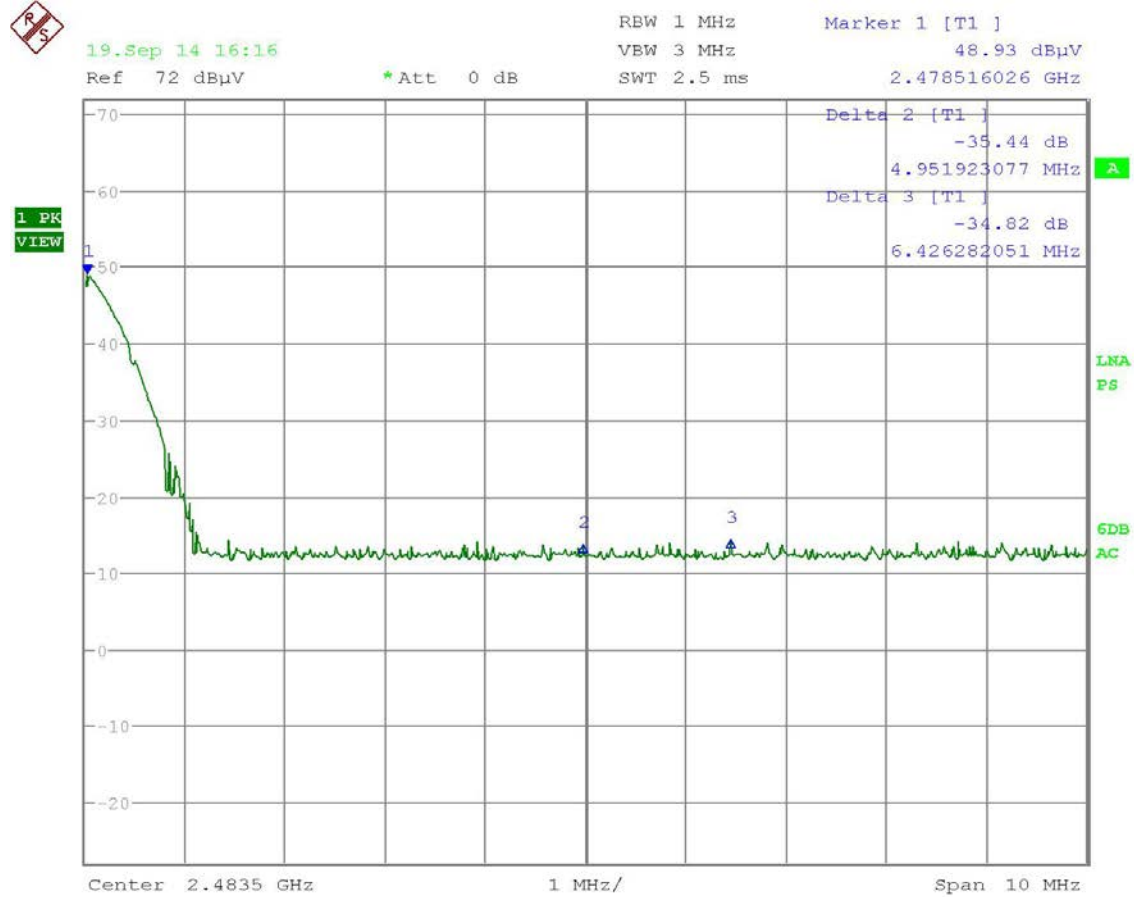
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BANDEDGE

Test Data:

Upper Band Edge Hopping On



Date: 19.SEP.2014 16:16:34

BANDEDGE

Test Data:

Lower Band Edge Hopping off



24.Jul 14 13:10

Ref 55.6 dBμV

*Att 0 dB

*RBW 50 kHz

*VBW 200 kHz

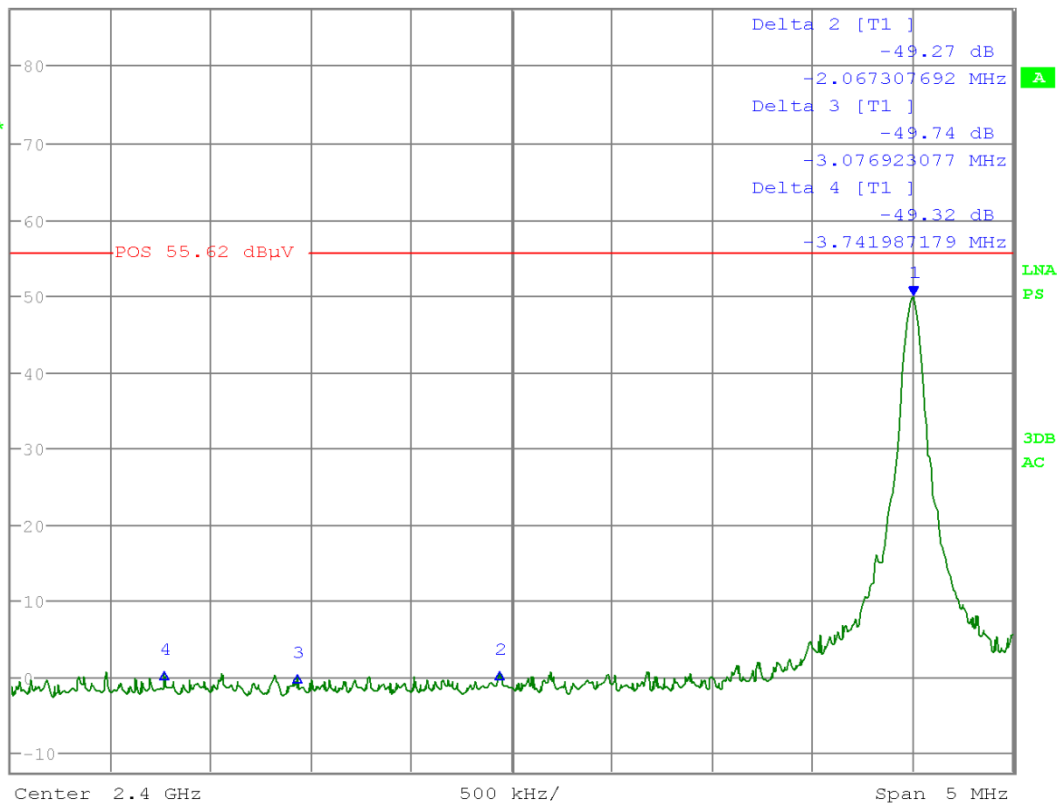
SWT 2.5 ms

Marker 1 [T1]

49.91 dBμV

2.402003205 GHz

1 RM
VIEW



Date: 24.JUL.2014 13:10:51

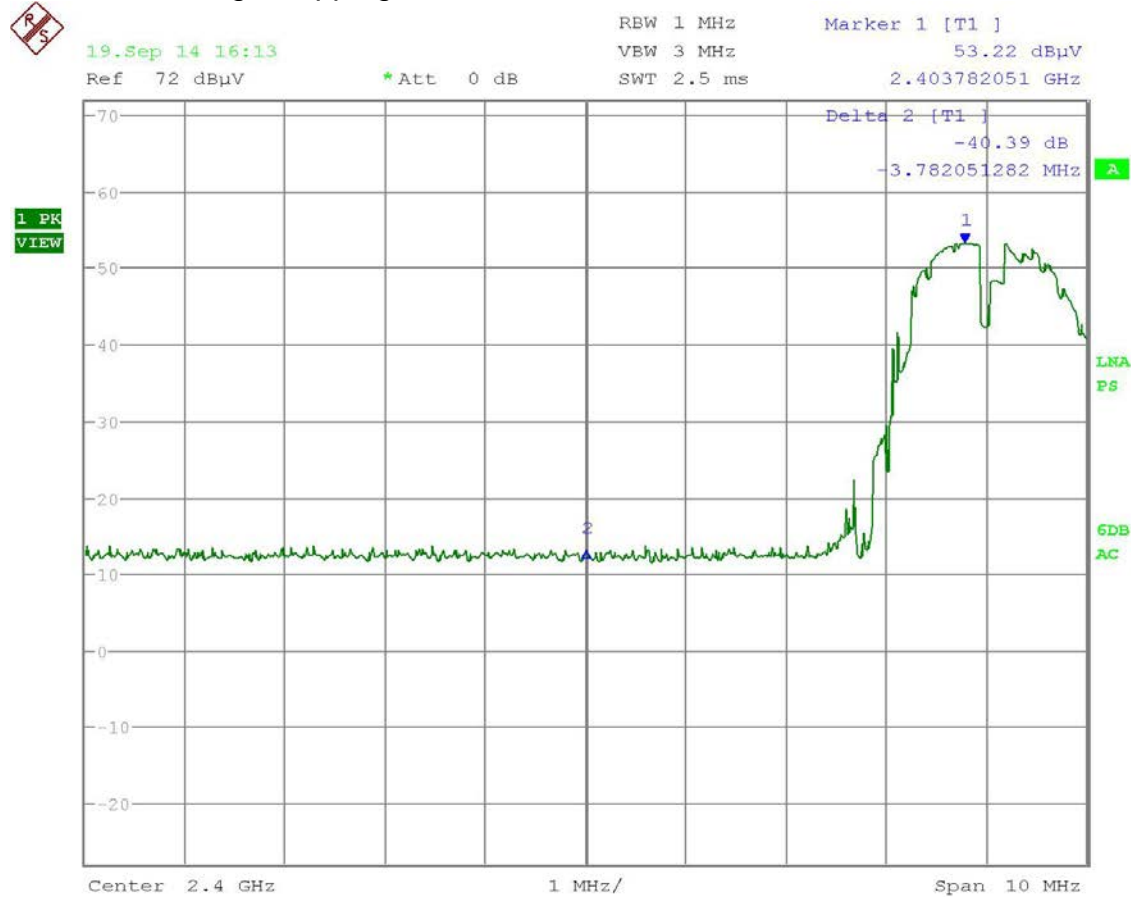
FS reading at lowest tuned frequency – difference to band edge = level at band edge.
 $83.33 - 49.27 = 34.06$

Results: Meets all requirements

BANDEDGE

Test Data:

Lower Band Edge Hopping On



Date: 19.SEP.2014 16:13:24

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207

Requirements:

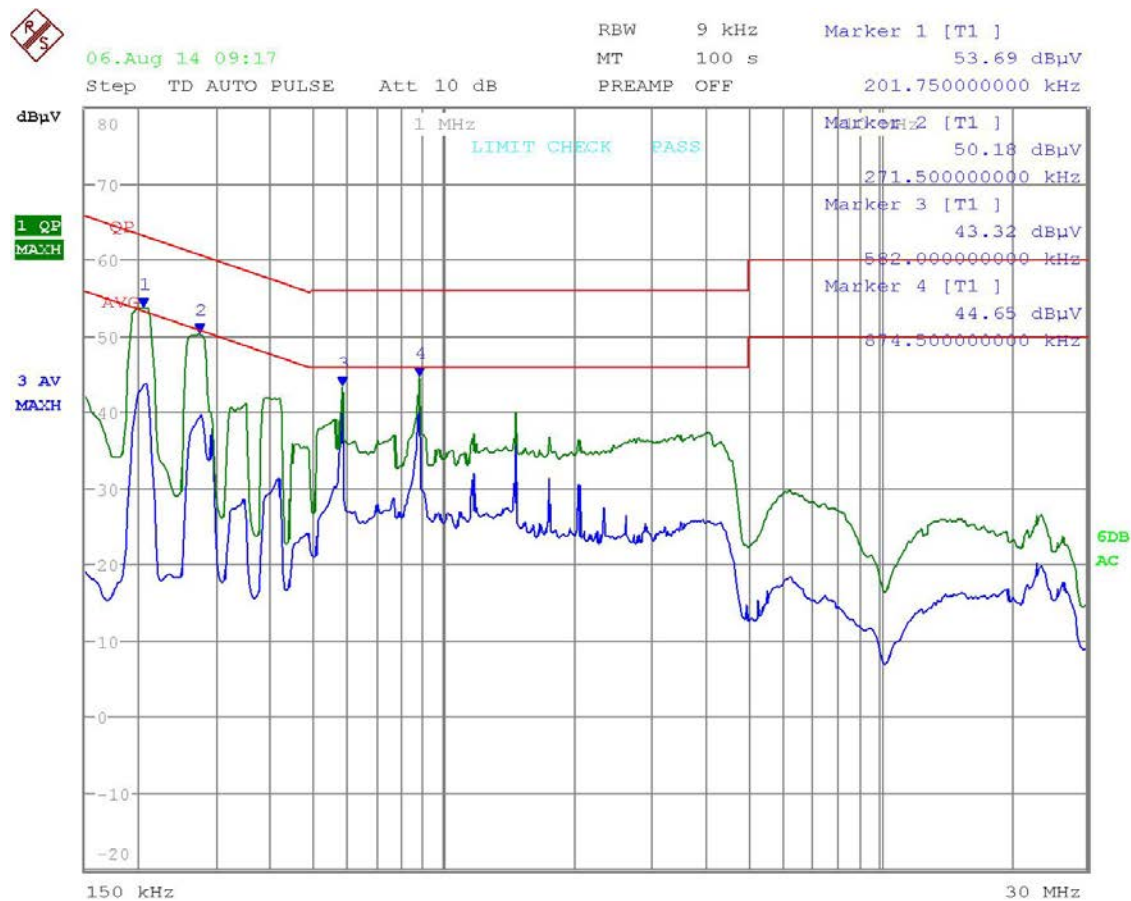
Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

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

POWER LINE CONDUCTED INTERFERENCE

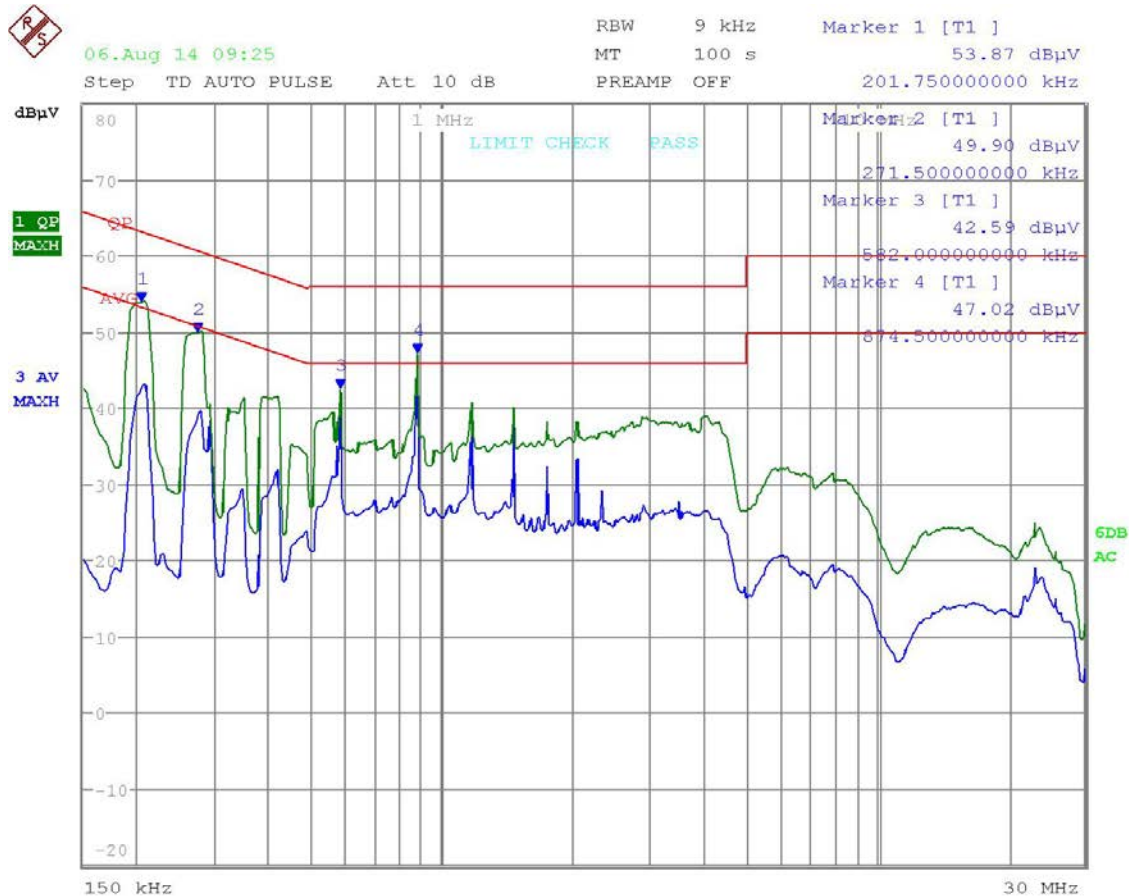
Test Results:

Line 1 Quasi Peak and Average



Date: 6.AUG.2014 09:17:25

Line 2 Quasi Peak and Average



Date: 6.AUG.2014 09:25:32

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/13	12/31/15
Antenna: Biconnical	Eaton	94455-1	1057	06/14/13	06/14/15
Antenna: Log-Periodic	Eaton	96005	1243	05/31/13	05/31/15
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/09/13	05/09/15
LISN	Electro-Metrics	EM-7820	2682	02/26/13	02/26/15
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	10/05/12	10/05/14
*EMI Test Receiver R & S ESU 40	Rhode & Schwarz	ESU 40	100320	03/11/2014	03/11/2015

*EMI RECEIVER SOFTWARE VERSION

Firmware: 4.43 SP3; BIOS Ver: V5.1-24-3