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FCC PART 15.247 TEST REPORT

UNLICENSED INTENTIONAL RADIATOR

Applicant	Cleveland Medical Devices, Inc	
Address	4415 Euclid Ave 4th Floor Cleveland Ohio 44103 USA	
FCC ID	N9Y0091	
Model Number	100-0091	
Product Description	ISM Device	
Date Sample Received	December 12, 2007	
Date Tested	January 12, 2008	
Tested By	Nam Nguyen	
Approved By	Mario de Aranzeta	
Report Number	2324DUT7TestReport.pdf	
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.**



Certificate # 0955-01



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ATTESTATIONS



Test certificate # 0955-01

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report. No modifications were made to the equipment during testing in order to demonstrate compliance with these standards.

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

I attest that the necessary measurements were made, under my supervision, at one or more of the test sites of:

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



Authorized Signatory Name:

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

APPLICANT: CLEVELAND MEDICAL DEVICES, INC

FCC ID: N9Y0091

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REPORT SUMMARY

Purpose of Test:	To demonstrate compliance with FCC Pt 15.247 for wireless medical telemetry radio.
Applicable Standards:	Pt 15.247, ANSI C63.4: 2003
Related Reports:	2324BUT7 TestReport.pdf

TEST ENVIRONMENT AND TEST SETUP

Test Facilities:	All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.
Laboratory Test Conditions:	Temperature: 26°C, Humidity: 55%
Test Exercise:	The DUT was set in continuous transmit mode of operation.
Deviation to the Standards:	There was no deviation from the standard.
Modification to the DUT:	No modification was made.
Supporting Accessories:	Laptop: Dell Inspiron 1100

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DUT Specification

Applicable Standard	Part 15.247
DUT Description	ISM Device
FCC ID	N9Y0091
Model Number	100-0091
Serial Number	N/A
Operating Frequency	TX: 902.5 – 927 MHz RX: same as TX
Modulation	GFSK
DUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz <input checked="" type="checkbox"/> DC Power 3Vdc (USB powered) <input 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	Vertical dipole
Antenna Connector	Reverse SMA

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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	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 1/15/08	1/15/10
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 7/18/07	7/18/09
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 5/17/07	5/17/09
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 5/17/07	5/17/09
Analyzer Blue Tower Spectrum Analyzer	HP	8566B	2928A04729 2848A18049	CAL 5/17/07	5/17/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 7/23/07	7/23/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/13/07	12/13/09

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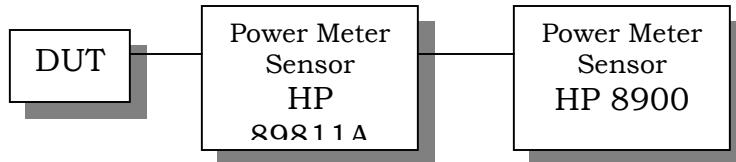
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TEST PROCEDURE

Radiation Interference: ANSI C63.4-2003 using an Agilent model 8566B spectrum analyzer, an Agilent model 85685A preselector, a Agilent model 85650A 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.

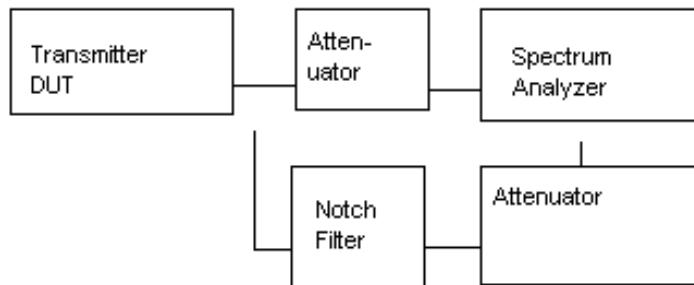
RF Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Output Power Test Setup Diagram



Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz. Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a peak power meter. The antenna is non-directional and doesn't exceed 6 dBi gain. The power output was measured at three places in the band highest is reported below.

Spurious Emissions at
Antenna Terminals





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:

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

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 10 kHz 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 Standard C63.4-2003 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.



POWER OUTPUT

Rules Part No.: 15.247(b)

Requirement: 1 Watt conducted, 4W ERP

Test Results:

Frequency MHz	Po dBm	Po Watts
902.5	7	0.005
915	8	0.006
927	7.5	0.0056

Harmonics were checked through the 10th harmonic



SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Requirements: Emissions must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

Test Data:

Tuned freq. MHz	Emission freq. MHz	dBc
902	2706	59
	4513	47
	6314	56
915	2746	59
	4576	47
	6409	59
927	2783	57
	4638	44.7

Harmonics were checked through the 10th. Frequencies not listed were not seen.



RADIATED INTERFERENCE

Rules Part No.: 15.247, 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 15.247	
Fundamental 902 – 928 MHz	127.37 dB μ V/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	127.37 dB μ V/m @ 3 meters
Harmonics	20 dBc or 54.0 dB μ V/m @ 3 meters

Test Data:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
902.5	902.50	76.4	V	1.95	22.68	101.03	26.34
902.5	1,806.00	16.8	V	2.74	29.96	49.50	4.5
902.5	2,710.00	12.7	V	3.40	32.54	48.64	5.36
902.5	3,610.00	10.0	V	4.15	32.98	47.13	6.87
902.5	4,515.00	14.0	V	4.76	34.10	52.86	1.14
902.5	5,415.00	9.1	V	5.12	34.60	48.82	5.18
902.5	6,318.00	11.1	V	5.40	35.65	52.15	1.85
915.0	915.00	78.2	V	1.97	22.60	102.77	24.6
915.0	2,746.00	13.0	V	3.42	32.55	48.97	5.03
915.0	3,660.00	10.0	V	4.19	33.06	47.25	6.75
915.0	4,576.00	9.0	V	4.79	34.10	47.89	6.11
915.0	4,576.00	15.0	V	4.79	34.10	53.89	0.11
915.0	5,490.00	9.9	V	5.15	34.69	49.74	4.26
915.0	6,405.00	8.5	V	5.42	35.72	49.64	4.36

[Continued]

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Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
927.0	927.00	79.5	V	1.99	22.67	104.16	23.21
927.0	1,854.00	16.0	V	2.78	30.27	49.05	4.95
927.0	2,781.00	13.0	V	3.45	32.56	49.01	4.99
927.0	3,708.00	11.0	V	4.24	33.13	48.37	5.63
927.0	4,635.00	14.0	V	4.82	34.10	52.92	1.08
927.0	5,562.00	10.0	V	5.17	34.79	49.96	4.04
927.0	6,489.00	8.0	V	5.45	35.79	49.24	4.76

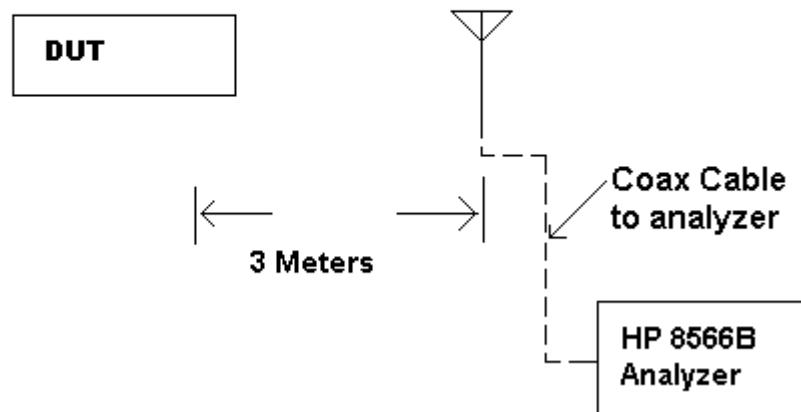
Harmonics were checked through the 10th.

Both polarities of the antenna were checked and the worst case reported.

All values are peak unless noted otherwise.

TEST PROCEDURE

Antenna is Calibrated
and appropriate one.
Raised from 1 to 4 M.



METHOD OF MEASUREMENT: The procedure used was ANSI C63.4-2003 & the FCC/OET Guidance on Measurements for Direct Sequence Spread Spectrum Systems – Public Notice 54797 Dated July 12, 1995.

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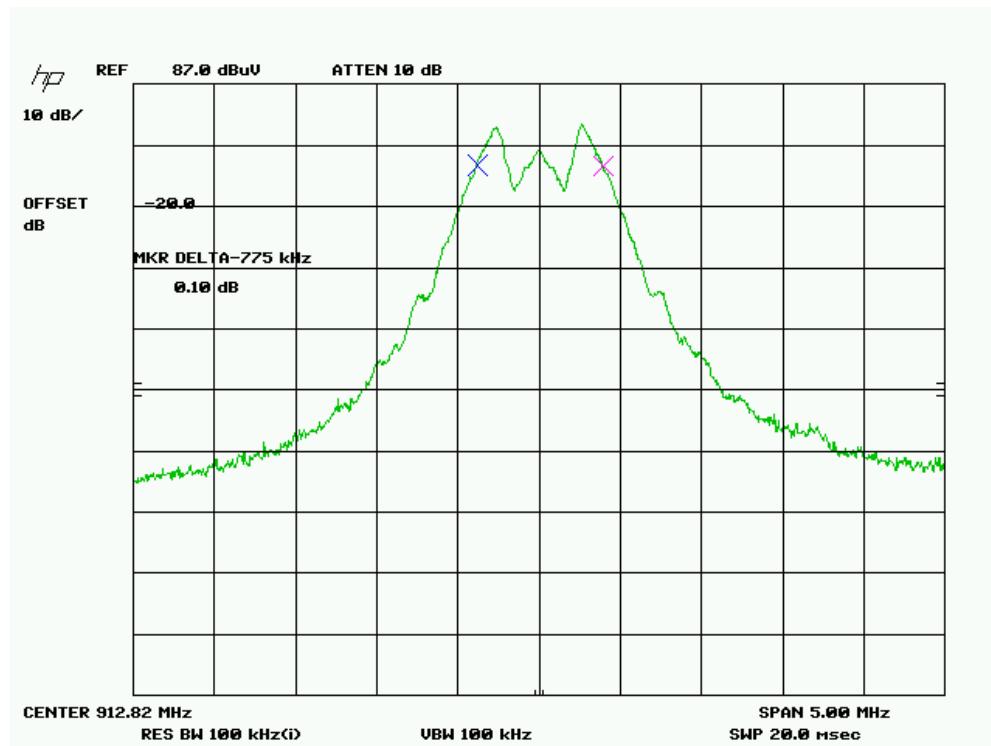
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6 dB OCCUPIED BANDWIDTH

Rules Part No.: 15.247

Requirements: Must be at least 500 kHz

Test Data: Three places in the band were measured and the worst case presented.
Result: 912.82 MHz; Occupied Bandwidth = 775 kHz.



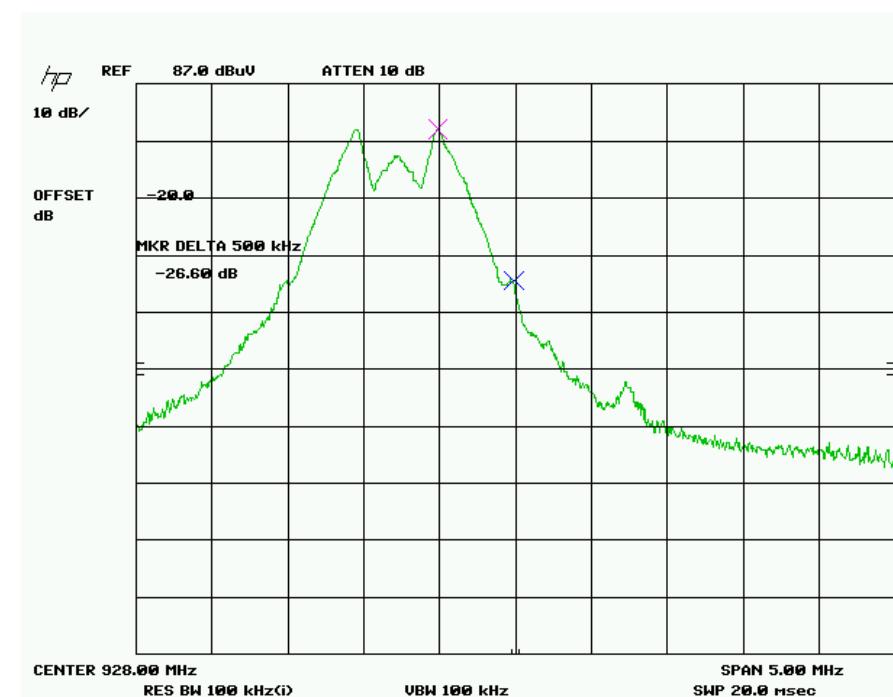
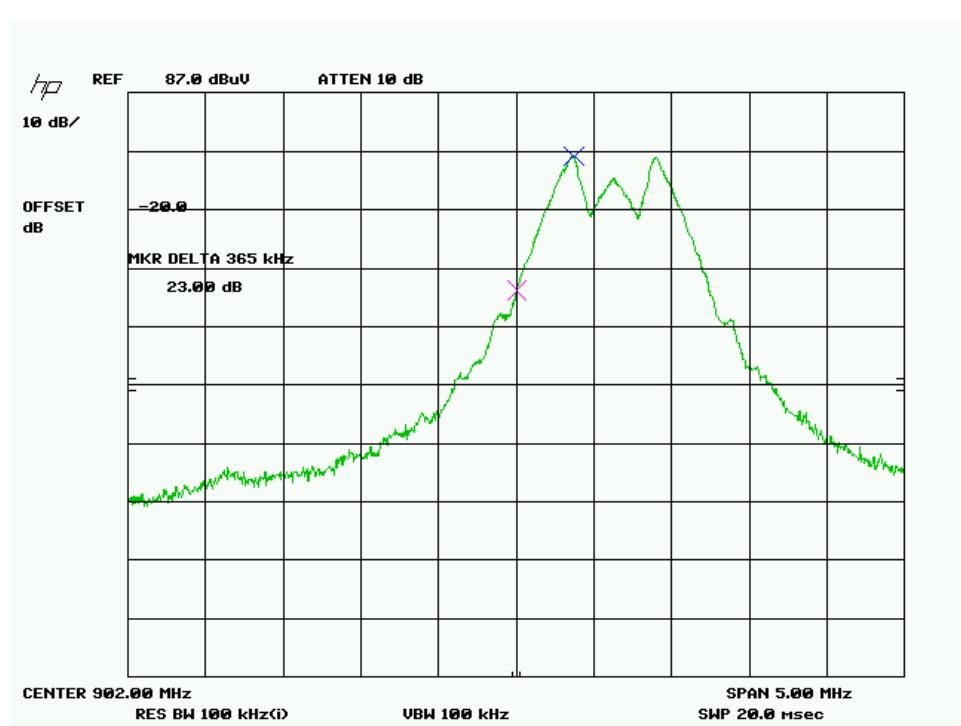
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BANDEDGE COMPLIANCE

Requirements: The field strength of any emissions appearing outside the band edges shall be attenuated at least 20 dB below the level of the carrier or to the general limits of 15.209. Results: PASS



APPLICANT: CLEVELAND MEDICAL DEVICES, INC

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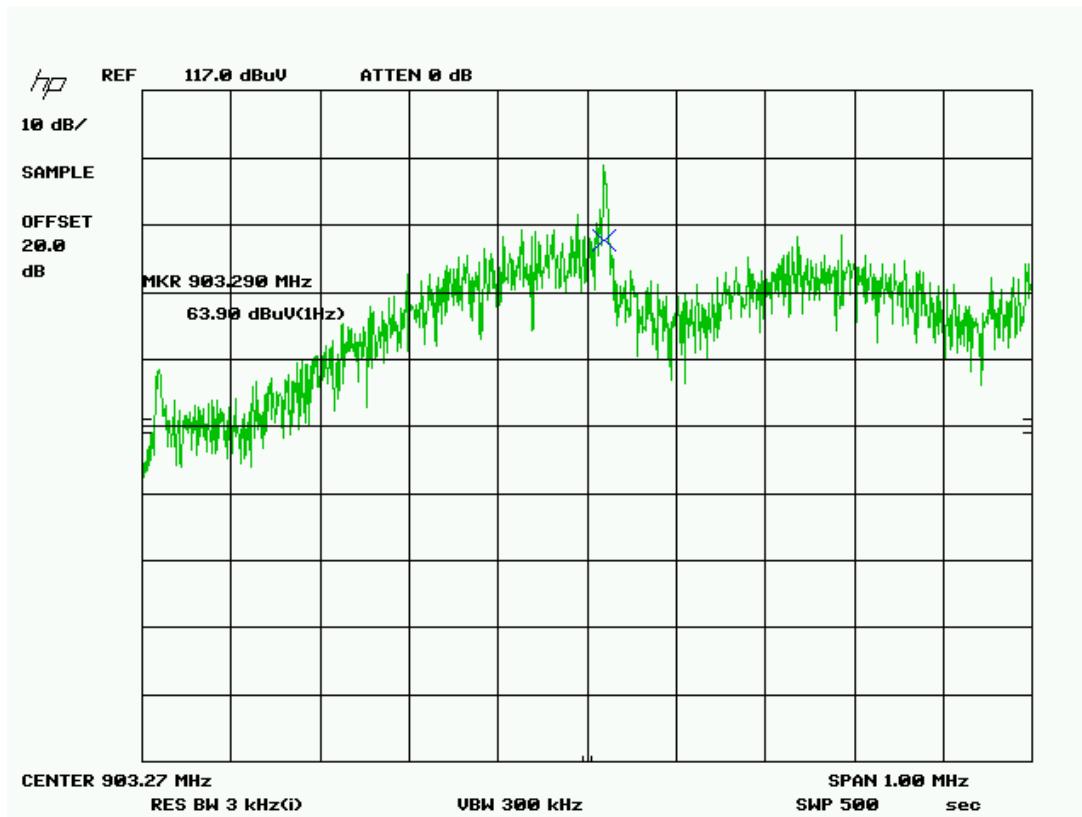
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POWER SPECTRAL DENSITY

Rules Part No.: 15.247(d)

Requirements: The peak level measured must be less than +8.0 dBm.

Test Data: SEE THE FOLLOWING PLOT – RESULT: PASS



63.9 dBuV

35.0 dB CF to 3 kHz

98.9 dBuV

-107

-8.1 dBm

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

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: 15.207

Requirements:

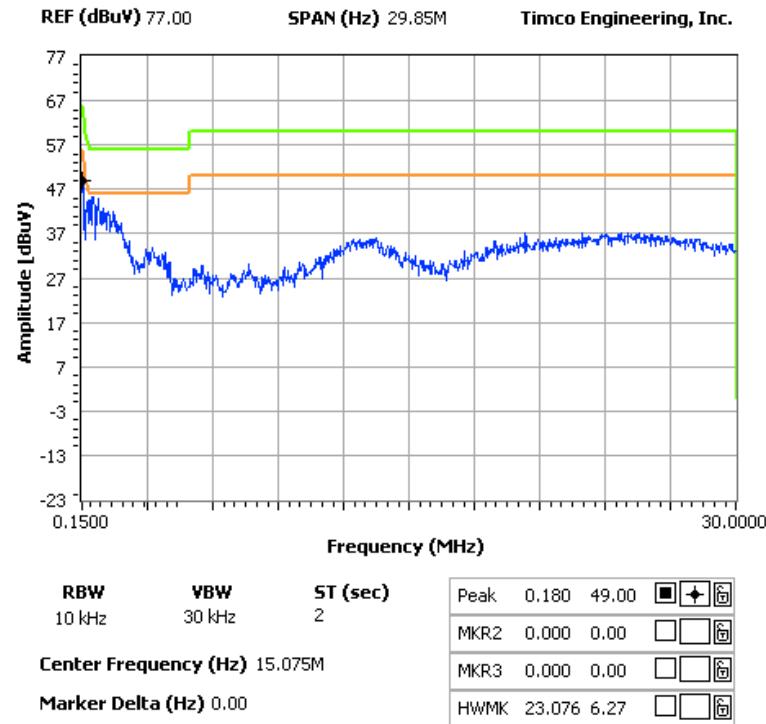
Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: The attached plots represent the emissions for power line conducted. Both lines were observed.

NOTES:

CLEVELAND MEDICAL DEVICES, INC - ISM DEVICE
 POWER LINE CONDUCTED - LINE 1

FCC 15.107 Mask Class B



APPLICANT: CLEVELAND MEDICAL DEVICES, INC

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NOTES:

 CLEVELAND MEDICAL DEVICES, INC - ISM DEVICE
 POWER LINE CONDUCTED - LINE 2

FCC 15.107 Mask Class B
