EMT
ELECTRO MAGNETIC TEST, INC.
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

FCC PART 18
TEST REPORT

for

the

CRADLE

MODEL:MN001938

Prepared for

Dosime, Inc.
3000 Executive Pkwy #222
San Ramon, CA 94583

Prepared by: George Hsu
GEORGE HSU

Approved by: Kevin Bothmann
KEVIN BOTHMANN

ELECTRO MAGNETIC TEST, INC.
1547 PLYMOUTH STREET
MOUNTAIN VIEW, CALIFORNIA 94043
(650) 965-4000

DATE: February 9, 2017

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	A-0118
	Open Field Test Site "A"	-
	Mains Conducted Emissions Test Site "D"	-
	Telecom Conducted Emissions Test Site "D"	-
	3 Meter Semi-Anechoic Chamber Site "E"	-
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	-
	Mains Conducted Emissions Test Site "E"	-
	Telecom Conducted Emissions Test Site "E"	-
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

*These agencies do not issue an identifying number to test labs.

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GENERAL REPORT SUMMARY (CONTINUED)

Device Tested: CRADLE
Model:MN001938
S/N: N/A

Product Description: The EUT is a cradle that wirelessly charges a battery powered dosimeter

Modifications: The EUT was not modified during the testing.

Manufacturer: Dosime, Inc.
3000 Executive Pkwy #222
San Ramon, CA 94583

Test Date(s): November 4, 25, and December 5, 2016

Test Specifications: EMI requirements
Limits: FCC Title 47, Part 18
Test Procedure: ANSI C63.10.2013, FCC MP-5 1986

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	FCC STANDARD	REMARKS	RESULTS
7.1	Radiated Emissions	18.305	Radiated	**PASS**
7.2	Conducted Emissions	18.307	Conducted/ Over Powerline	**N/A**
7.3	Occupied Bandwidth	N/A	Radiated	**N/A**

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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the CRADLE Model: MN001938. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10: 2013. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined in FCC Title 47, Part 18.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Electro Magnetic Test, Inc., 1547 Plymouth Street, Mountain View, California, 94043.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The measurement results in this report and the calibration of the test equipment are traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Dosime, Inc.

Cindy Meyrath	Vice President

Electro Magnetic Test, Inc.

David Flores	Test Technician
David Vivanco	Test Technician
George Hsu	Test Technician
Simeet Gandhi	Test Technician
Manan Modi	Test Technician
Sagar Bombaywala	Test Technician
Kevin Bothmann	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on November 4, 2016.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Dosime, Inc..

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2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
CISPR	International Special Committee On Radio Interference
FCC	Federal Communications Commission

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3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 18	Industrial, Scientific and Medical Equipment
FCC MP-5 1986	FCC Methods of Measurments of Radio Noise Emissions from Industrial, Scientific, and Medical Equipment
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

During testing the cradle was charging the dosimeter wirelessly.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix B.

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4.1.1 Cable Construction and Termination

The EUT does not have any cables

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4.2 Device Technical Description

Operation frequency:	6.67 MHz +/- 10%
Occupied Bandwidth (99%)	1.474 MHz
Channel Number:	1
Equipment Classification:	Miscellaneous, Non ISM Frequency
Power Output:	33.0 dBµV/m @ 3M
Description:	The cradle is a wireless power transfer device deisgned to transfer power to the accompanying dosimeter (FCC ID: 2AKMV-DOSIME). The cradle is not designed to charge more than one device at one time and does not transfer any data through its wireless power transfer frequency. Any power transfer related data is controleed through its 2.4 GHz BLE Radio.

Operating Frequencies (MHz)			
6.67			

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5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
CRADLE(EUT)	DOSIME, INC.	MN001938	N/A	2AKMV-CRADLE
THE FOLLOWING WERE LOCATED OUTSIDE THE TEST SITE:				
REMOTE LAPTOP	DELL	LATTITUDE D630	FZFDLJ1	N/A
REMOTE LAPTOP POWER SUPPLY	DELL	PA-1900-02D	CN-09T215-71615-42I-6608	DoC

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5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3024A20115	September 30, 2016	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	September 30, 2016	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00451	September 30, 2016	1 Year
Conducted EMI Software	ETS-Lindgren	Tile!	Rev. 7.0.12.697	N/A	N/A
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 11, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150701	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150702	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150703	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150704	August 3, 2016	1 Year
EMI Receiver	Rohde & Schwarz	ESU40	100127	March 11, 2016	1 Year
EMI Test Software	Rohde & Schwarz	EMC32	V8.40.0	N/A	N/A
Active Loop Antenna (9 KHz – 30 MHz)	ETS-Lindgren	6502	00206773	May 10, 2016	2 Years
BiConiLog Antenna (30 MHz – 1 GHz)	ETS-Lindgren	3142D	00109337	July 8, 2016	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Dell, Inc.	OPTIPLEX 745	4T50WC1	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A

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6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to the table below and section 7 of this report for the details of which sites were used for testing. All sites are located at 1547 Plymouth Street, Mountain View, California 94043.

Site Used For Test	Site Description
	Open Field Test Site "A"
X	Mains Conducted Emissions Test Site "D"
	Telecom Conducted Emissions Test Site "D"
X	3 Meter Semi-Anechoic Chamber Site "E"
	Mains Conducted Emissions Test Site "E"
	Telecom Conducted Emissions Test Site "E"

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

All tests were performed in a climate controlled building. The temperature was 22° C, humidity 45%, and barometric pressure 102.6 kPa.

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7. TEST PROCEDURES

7.1 Radiated Emissions

7.1.1 Limit (FCC PART 18 Section 18.305(b))

b.) The field strength levels of emissions which lie outside the bands specfied in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 ([2])	1,600 ([2])
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT(power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]3

[1]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

[2]Reduced to the greatest extent possible.

[3]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

[4]Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment

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7.1 Radiated Emissions (Continued)

7.1.2 Test Procedure

The Rohde & Schwarz ESU40 EMI receiver was used as a measuring meter while under software control by the Rohde & Schwarz EMC32 software. To increase the sensitivity of the instrument, the built in preamplifier was used from 9 KHz to 1 GHz. The EMI receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI receiver records the highest measured reading over all the sweeps. The built in quasi-peak or average detector was used only for those readings which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was 300 Hz below 150 kHz 10 kHz from 150 kHz to 30 Mhz and 100 kHz from 30 MHz to 1000 MHz. .

The Loop Antenna, Broadband BiConiLog and horn antennas were used as transducers during the measurement. The Loop antenna was used from 9 KHz to 30 MHz, the BiConiLog antenna was used from 30 MHz to 1000 MHz. The frequency spans were wide (9 kHz to 150 kHz, 150 kHz to 30 MHz, 30 MHz to 88 MHz, 88 MHz to 216 MHz, 216 to 300 MHz, 300 MHz to 1 GHz) during preliminary investigations. The final data was taken with a frequency span of 1 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The 5 meter semi-anechoic chamber of Electro Magnetic Test, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.10: 2013. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. The EUT was rotated 360 degrees and the antenna height was set at 1 meter for the Loop antenna and varied from 1 to 4 meters for any other antennas.

The presence of non EUT signals was verified by turning the EUT off. In case a non EUT signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the other signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 9 kHz to 1 GHz. to obtain final test data and the appropriate correction was added to the limit to convert to a 3 meter equivalent limit.

Calculation Of Radiated Emission Test Data:

Amplitude - Gain + Antenna Factor + Cable Loss = Corrected Amplitude

Corrected Amplitude - Limit = Margin

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7.2 Conducted Emissions Test – Mains Ports

7.2.1 Limit (FCC PART 18 Section 18.307(a))

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Note: Decreases with the logarithm of the frequency

7.2.2 Test Procedure

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the HP 8566B spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 120 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.10: 2013. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable and peripheral placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 85869PC software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.

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8. CONCLUSIONS / COMPLIANCE STATEMENT

Based upon the results contained in this report, Electro Magnetic Test, Inc. has determined that the CRADLE, Model:MN001938 meets all of the specification limits defined in FCC Title 47, Part 18.

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APPENDIX A

RADIATED AND CONDUCTED EMISSION DATA SHEETS

EMT ELECTRO MAGNETIC TEST, INC.
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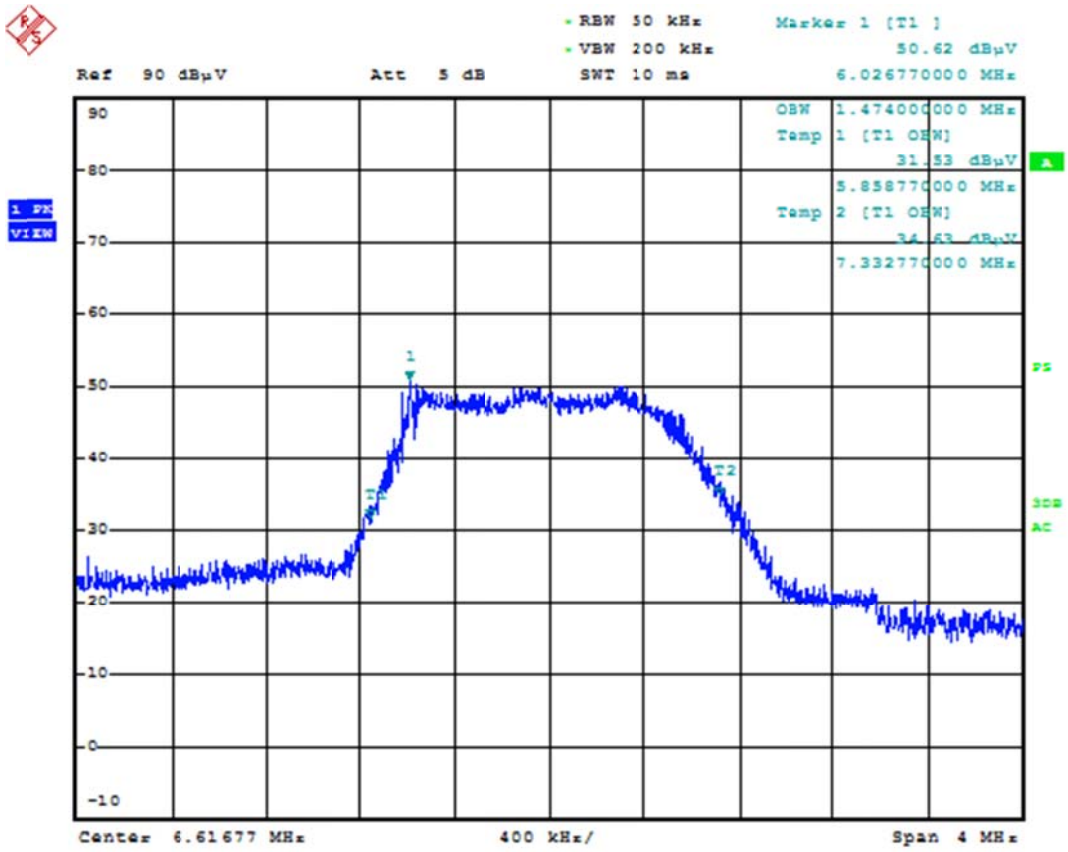
Occupied Bandwidth

EUT:	CRADLE	Model Name:	MN001938
Test Mode:	Wireless Charging	Test Date:	11/25/2016
Test Engineer:	George Hsu	Measurement:	9 KHz to 30 MHz



Occupied Bandwidth
1.474 MHz

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Radiated Emissions

EUT:	CRADLE	Model Name:	MN001938
Test Mode:	Wireless Charging	Test Date:	11/25/2016
Test Engineer:	George Hsu	Measurement:	9 KHz to 30 MHz

Frequency (MHz)	Peak (dBµV/m) @3m	Peak (dBµV/m) @300m	Height (cm)	Azimuth (deg)	Corr (dB)	Margin (dB) @3m	Limit (dBµV/m) @3m	Limit (dBµV/m) @300m
6.132 (Fundamental Measurement)	33.0	-7.0	100.0	0	10.9	30.50	63.50	23.50

Please note there are no other emissions outside of the fundmental that are less than 20dB within the limit.

Limit Calculation:
Limit for Non-ISM Frequency below 500W = (15µV/m @ 300m) (15µV/m @ 300m) = (23.5 dBµV/m @ 300m) (23.5 dBµV/m @ 300m) + $20log_{10}$(300/3) = 63.5 dBµV/m @ 3m

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Radiated Emissions

EUT:	CRADLE	Model Name:	MN001938
Test Mode:	Wireless Charging	Test Date:	11/25/2016
Test Engineer:	George Hsu	Measurement:	30 MHz to 1 GHz

Peak Measurement:

Frequency (MHz)	Peak (dBµV/m) @3m	Peak (dBµV/m) @300m	Height (cm)	Polarization	Azimuth (deg)	Corr (dB)	Margin (dB) @3m	Limit (dBµV/m) @3m	Limit (dBµV/m) @300m
37.38	31.4	-8.6	100.0	V	44.0	12.1	32.1	63.50	23.50
43.26	31.5	-8.5	100.0	V	323.0	9.6	32	63.50	23.50
55.68	42.7	2.7	100.0	V	355.0	7.4	20.8	63.50	23.50
55.86	41.7	1.7	126.0	V	16.0	7.4	21.8	63.50	23.50
56.10	40.0	0	100.0	V	0.0	7.4	23.5	63.50	23.50
56.64	41.8	1.8	100.0	V	16.0	7.4	21.7	63.50	23.50
57.09	45.0	5	120.0	V	325.0	7.4	18.5	63.50	23.50
57.24	42.4	2.4	114.0	V	322.0	7.4	21.1	63.50	23.50
57.57	43.7	3.7	119.0	V	314.0	7.4	19.8	63.50	23.50
57.78	42.2	2.2	195.0	V	0.0	7.4	21.3	63.50	23.50
60.12	37.4	-2.6	142.0	V	354.0	7.3	26.1	63.50	23.50
132.51	33.8	-6.2	150.0	H	256.0	9.0	29.7	63.50	23.50
272.73	31.3	-8.7	120.0	H	113.0	14.4	32.2	63.50	23.50

Please note that the emissions recorded were from sources other than the intentional radiator, the EUT was tested with the 6.78 MHz transmitter both on and off. The results on both scans were similar with differences falling within the measurement uncertainty.

Limit Calculation:
Limit for Non-ISM Frequency below 500W = (15µV/m @ 300m) (15µV/m @ 300m) = (23.5 dBµV/m @ 300m) (23.5 dBµV/m @ 300m) + $20log_{10}(300/3)$ = 63.5 dBµV/m @ 3m

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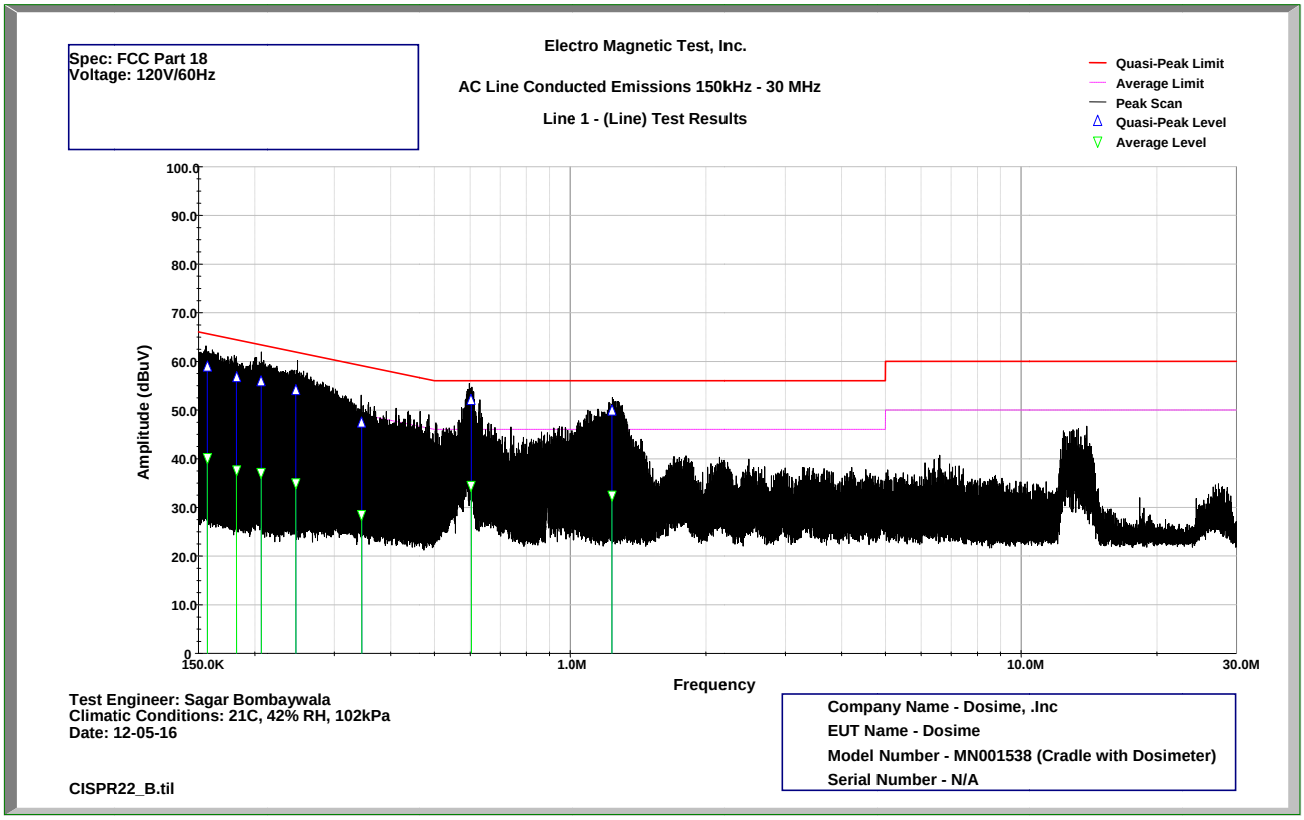
AC Line Conducted Emissions Test Data



Line 1 - (Line) Test Results

Frequency (MHz)	Peak (dBuV)	Quasi-Peak (dBuV)	Average (dBuV)	Corr. Factor (dB)	Quasi-Peak Limit	QP Margin	Average Limit	Average Margin
0.157	63.065	58.765	40.225	11.465	65.803	7.038	55.803	15.578
0.182	60.931	56.681	37.718	11.231	65.087	8.406	55.087	17.369
0.207	60.429	55.899	37.209	11.029	64.384	8.485	54.384	17.175
0.246	58.744	54.024	35.041	10.844	63.244	9.220	53.244	18.203
0.345	52.244	47.304	28.484	10.744	60.427	13.123	50.427	21.943
0.604	56.856	52.006	34.416	10.556	56.000	3.994	46.000	11.584
1.238	53.651	49.751	32.468	10.451	56.000	6.249	46.000	13.532

Sample Calculation (for 0.345 Mhz)

(Attenuation of attenuator) + (Cable Loss) + (Line LISN Insertion Loss)

10.019 + 0.107 + 0.618 = 10.744

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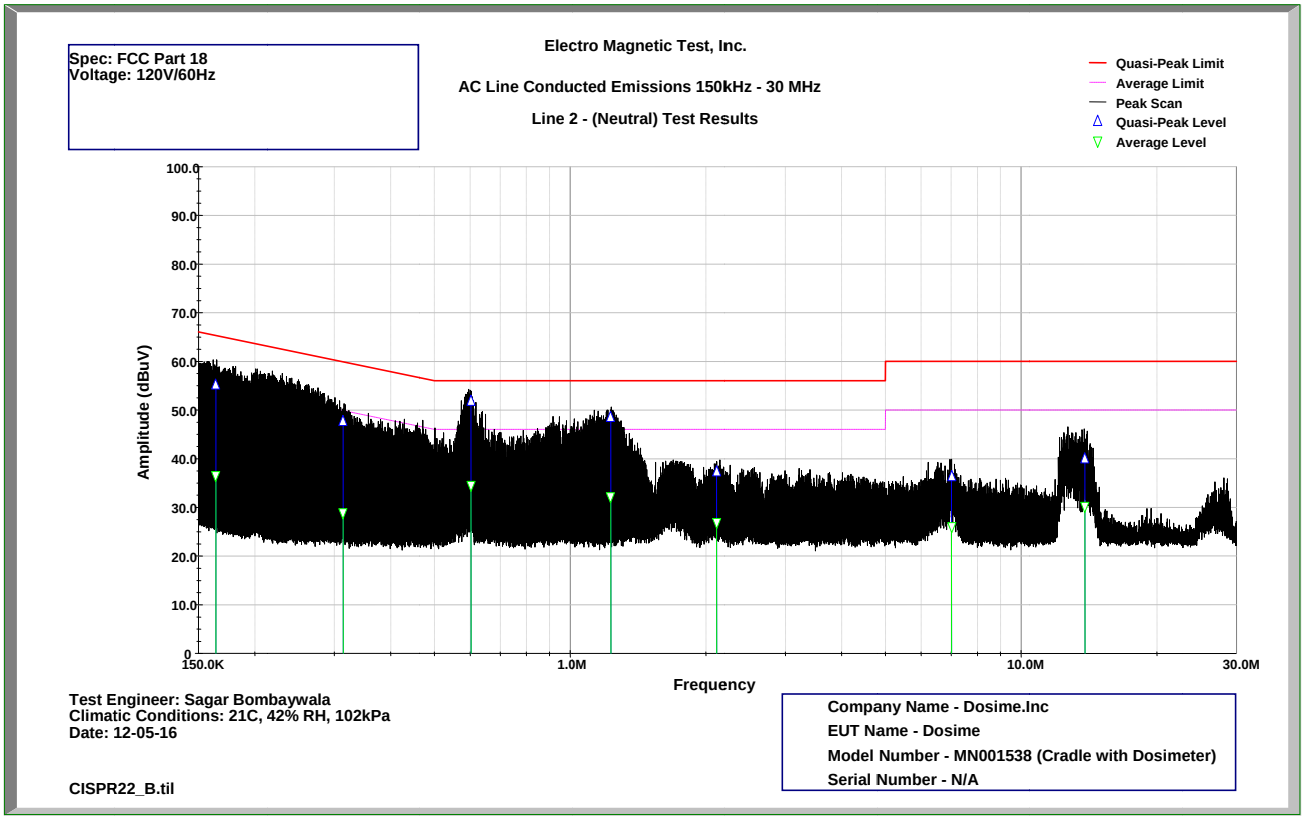
AC Line Conducted Emissions Test Data



Line 2 - (Neutral) Test Results

Frequency (MHz)	Peak (dBuV)	Quasi-Peak (dBuV)	Average (dBuV)	Corr. Factor (dB)	Quasi-Peak Limit	QP Margin	Average Limit	Average Margin
0.164	60.807	55.227	36.475	11.407	65.605	10.378	55.605	19.130
0.314	52.185	47.625	28.852	10.785	61.319	13.694	51.319	22.467
0.603	56.163	51.783	34.575	10.563	56.000	4.217	46.000	11.425
1.231	51.760	48.510	32.205	10.460	56.000	7.490	46.000	13.795
2.111	41.935	37.315	26.725	10.635	56.000	18.685	46.000	19.275
7.006	46.441	36.321	26.031	10.741	60.000	23.679	50.000	23.969
13.857	48.682	40.032	30.117	10.982	60.000	19.968	50.000	19.883

Sample Calculation (for 0.314 Mhz)

(Attenuation of attenuator) + (Cable Loss) + (Line LISN Insertion Loss)

10.030 + 0.100 + 0.655 = 10.785

EMT ELECTRO MAGNETIC TEST, INC.
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APPENDIX B

TEST SETUP DIAGRAMS

EMT ELECTRO MAGNETIC TEST, INC.
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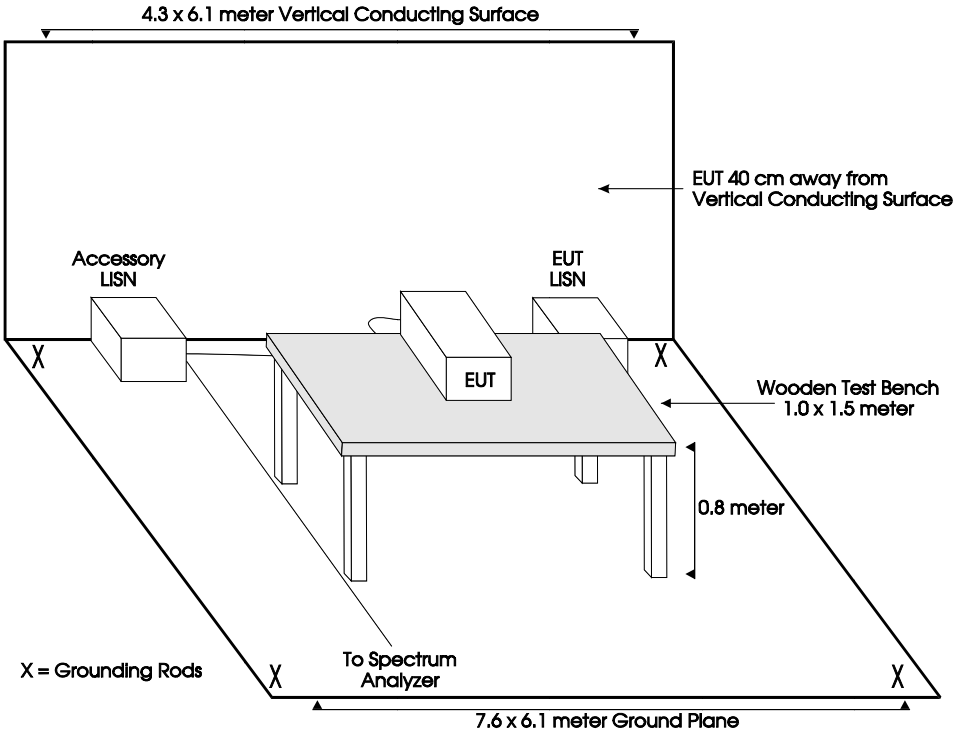

FIGURE 1 – TABLETOP CONDUCTED EMISSIONS TEST SETUP – SITE "A"

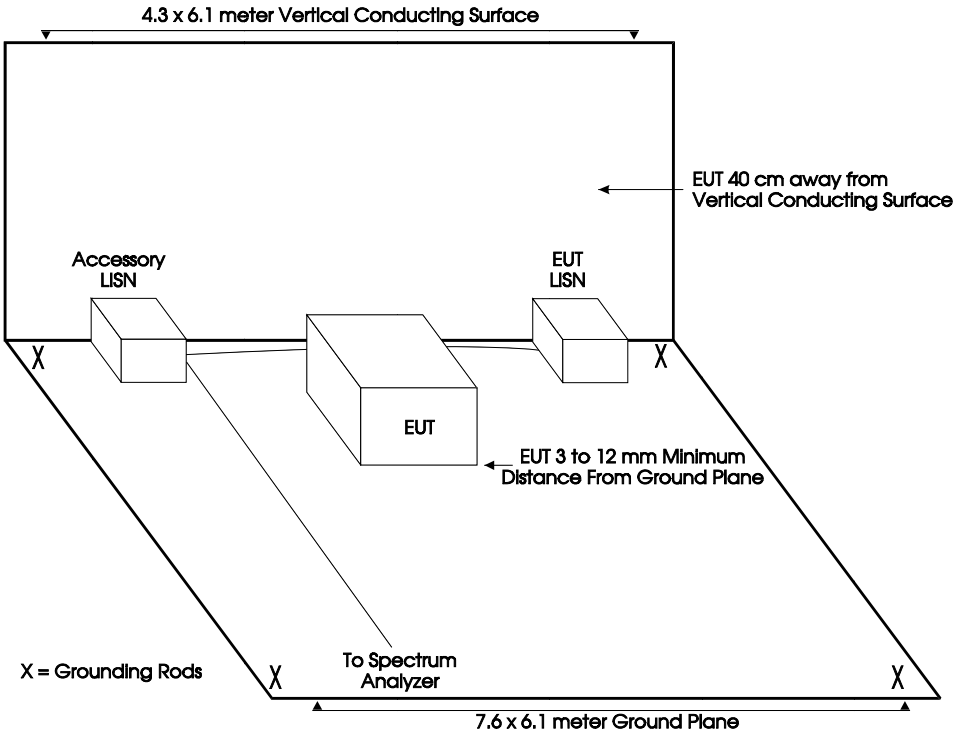

FIGURE 1a – FLOORSTANDING CONDUCTED EMISSIONS TEST SETUP – SITE "A"

EMT ELECTRO MAGNETIC TEST, INC.
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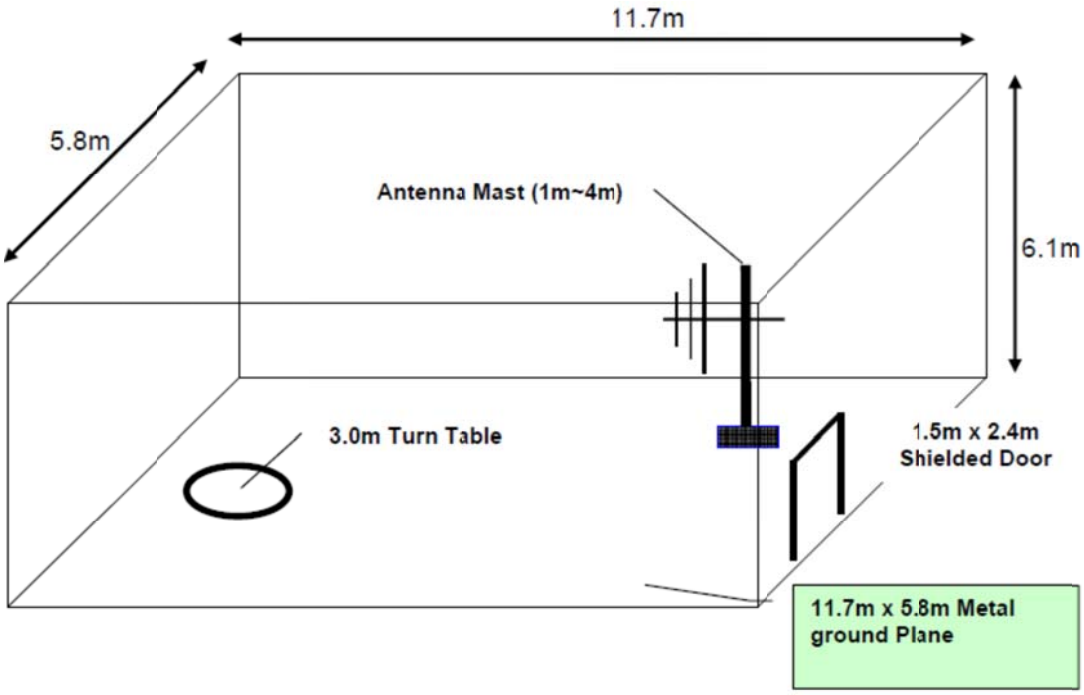

FIGURE 3 - LAYOUT OF 5 METER SEMI-ANECHOIC CHAMBER

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APPENDIX C

MODIFICATIONS TO THE EUT

EMT ELECTRO MAGNETIC TEST, INC.
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

MODIFICATIONS TO THE EUT

No modifications were made to the EUT by Electro Magnetic Test, Inc. personnel during the testing.

EMT ELECTRO MAGNETIC TEST, INC.
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APPENDIX D

ADDITIONAL MODELS COVERED UNDER THIS REPORT

EMT ELECTRO MAGNETIC TEST, INC.
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ADDITIONAL MODELS COVERED UNDER THIS REPORT

There are no additional models to be covered under this report.