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

FCC PART 15.247, SUBPART C
IC RSS 210, ISSUE 8
TEST REPORT

for

the

BLE MODULE

MODEL: ILUMIBLEH

Prepared for

Ilumi Solutions, Inc.
1800 Preston Park Blvd., Suite 220, Plano
Plano, TX, 75093

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: March 24, 2015

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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.

The measurement data and conclusions contained in this test report are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003, Issue 5, August 2012.

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 "A"	-
	Telecom Conducted Emissions Test Site "A"	-
	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: BLE Module
Model: ILUMIBLEH
S/N: N/A

Product Description: BLE modules from Ilumi make it easy to add single-mode Bluetooth Low Energy (Ble), or Bluetooth Smart, to small, power conscious devices, including those powered by AAA or coin cell batteries. The fully approved, programmable modules feature Ilumi innovative, event-driven Smart BASIC programming interface, which. Significantly simplifies BLE module integration. The DUT consist of two ceramic antennas out of which one can be used at a time in the product, the assembly is BOM dependent

Modifications: The EUT was not modified during the testing.

Manufacturer: Ilumi Solutions, Inc.
1800 Preston Park Blvd., Suite 220
Plano, TX 75093

Test Date(s): March 12, 16, and 24, 2015

Test Specifications: EMI requirements
Limits: FCC Title 47, Part 15 Subpart C
Test Procedure: ANSI C63.4: 2009

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

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	FCC STANDARD	IC STANDARD	REMARKS	RESULTS
7.1	Radiated Emissions (General Requirements and Emissions in Restricted Freqeuency Bands)	15.209, 15.247	RSS-GEN Issue 4, [6.1] RSS 210 Issue 8[A2.6]	Radiated	**PASS**
7.2	Conducted Emissions	15.207(a)	IC RSS-GEN Issue 4 [7.2.4]	Conducted	**PASS**
7.3	Occupied Bandwidth	15.247(a)(2)	RSS 210 Issue 8, [A8.2] IC RSS-GEN Issue 4 [4.6]	Conducted	**PASS**
7.4	Maximum Peak Output Power	15.247 (b)	RSS 210 Issue 8, [A8.4]	Conducted	**PASS**
7.5	Maximum Peak Power Spectral Density	15.247(e)	RSS 210 Issue 8, [A8.2]	Conducted	**PASS**
7.6	Emissions in Non-Restricted Frequency Bands	15.247(d)	RSS 210 Issue 8, [A8.5]	Conducted	**PASS**
7.7	Bandedge	15.247(d)	RSS 210 Issue 8, [A8.5]	Conducted	**PASS**
7.8	Antenna Requirement	15.203,15.247(b)(4))	IC RSS-GEN Issue 4 [7.1.2]	N/A	**PASS**

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TECHNICAL DESCRIPTION OF THE EUT

Manufacturer:	Ilumi Solutions, Inc.
Manufacturer Address:	298 S. Sunnyvale Ave, Ste 205, Sunnyvale, CA 94086
EUT Name:	BLE Module
Model No:	ILUMIBLEH
Operation frequency:	2400 MHz to 2480 MHz
Channel Number:	81
Modulation Technology:	DSSS
Antenna Type:	Internal Antenna
Antenna Gain:	0 dB
Maximum Output Power:	15.904 dBm

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Description of Channel:							
Bluetooth LE							
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
2	2402	22	2422	42	2442	62	2462
3	2403	23	2423	43	2443	63	2463
4	2404	24	2424	44	2444	64	2464
5	2405	25	2425	45	2445	65	2465
6	2406	26	2426	46	2446	66	2466
7	2407	27	2427	47	2447	67	2467
8	2408	28	2428	48	2448	68	2468
9	2409	29	2429	49	2449	69	2469
10	2410	30	2430	50	2450	70	2470
11	2411	31	2431	51	2451	71	2471
12	2412	32	2432	52	2452	72	2472
13	2413	33	2433	53	2453	73	2473
14	2414	34	2434	54	2454	74	2474
15	2415	35	2435	55	2455	75	2475
16	2416	36	2436	56	2456	76	2476
17	2417	37	2437	57	2457	77	2477
18	2418	38	2438	58	2458	78	2478
19	2419	39	2439	59	2459	79	2479
20	2420	40	2440	60	2460	80	2480
21	2421	41	2441	61	2461		

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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the BLE Module Model: ILUMIBLEH. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2009. 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 15, Subpart C.

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

Ilumi Solutions, Inc.

Swapnil Bora	Co-Founder

Electro Magnetic Test, Inc.

David Vivanco	Test Technician
George Hsu	Test Technician
Kevin Bothmann	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on March 16, 2015.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Ilumi Solutions, 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 15, Subpart C	FCC Rules - Radio frequency devices (including digital devices).
RSS 210, Issue 8, December 2010	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment
RSS-Gen Issue 4, November 2014	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
FCC Publication KDB558074	Guidance for Performing Compliance Measurments on Digital Transmissions Systems (DTS) Operating Under 15.247, June 5, 2014

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4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

The BLE Module was connected to the power supply through its power port. During testing the Bluetooth radio was continuously transmitting and the BLE Module was testing in its worst case orientation.

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

Cable #1

This is a 3.5 ft. unshielded power cable connecting the EUT to its AC power supply. It has a 1/8 inch round power connector on the EUT end and is hardwired into the AC power supply.

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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
BLE MODULE (EUT)	ILUMI SOLUTIONS, INC.	ILUMIBLEH	N/A	N/A
AC ADAPTER	N/A	SJ-0510-U	N/A	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	3013A07296	August 21, 2014	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	August 21, 2014	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00451	August 21, 2014	1 Year
Radiated EMI Software	Sector Design	N/A	Ver.1.4.6	N/A	N/A
Conducted EMI Software	Hewlett Packard	85869PC	Ver. A.02.03	N/A	N/A
Preamplifier	Com Power	PA-102	1482	March 4, 2015	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 11, 2014	1 Year
LISN	Com Power	LI-200	12012	October 1, 2014	1 Year
LISN	Com Power	LI-200	12214	October 1, 2014	1 Year
LISN	Com Power	LI-200	1767	October 1, 2014	1 Year
LISN	Com Power	LI-200	1768	October 1, 2014	1 Year
Biconical Antenna	Com Power	AB-100	01557	July 9, 2014	1 Year
Log Periodic Antenna	Com Power	AL-100	16001	July 9, 2014	1 Year
Horn Antenna	Com Power	AHA-118	711054	N/A	N/A
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39A220ZD	N/A	N/A

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5.2 EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	January 16, 2015	1 Year
EMI Test Software	Rohde & Schwarz	EMC32	V8.40.0	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY53420778	July 1, 2014	1 Year
Passive Loop Antenna (9 KHz – 30 MHz)	ETS-Lindgren	6512	00128210	October, 28, 2014	4 Years
BiConiLog Antenna (30 MHz – 1 GHz)	ETS-Lindgren	3142D	00109337	July 24, 2014	1 Year
Horn Antenna (1 GHz – 18 GHz)	ETS-Lindgren	3117	00109294	July 24, 2014	1 Year
Preamplifier (1 GHz – 18 GHz)	Rohde & Schwarz	TS-PR18	100056	December 20, 2014	1 Year
Horn Antenna (18 GHz – 26.5 GHz)	ETS-Lindgren	3160-09	102646	June 17, 2014	1 Year
Preamplifier (18 GHz – 26.5 GHz)	Rohde & Schwarz	TS-PR26	100034	June 17, 2014	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

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 "A"
	Telecom Conducted Emissions Test Site "A"
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.

7. TEST PROCEDURES

7.1 Radiated Emissions Test – Semi-Anechoic Chamber

7.1.1 General Requirements Limit (FCC PART 15 Section 15.209(a)(1), IC-RSS-GEN Issue 4, [6.1])

Frequency of Emission (MHz)	Field Strength		Measurement Distance (Meters)
	µV/m	dBµV/m	
0.009-0.49	2400/F(kHz)		300
0.49-1.705	24000/F(kHz)		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

7.1.2 Emissions in Restricted Bands Limit (FCC PART 15 Section 15.247(d), RSS 210 Issue 8[A2.6])

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Limit
See General Limits Requirement In Above Chart

7.1.3 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 and an external

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preamplifier was used from 1 GHz to 26.5 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 100 kHz from 9 kHz to to 26.5 GHz.

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 and horn antennas were used from 1GHz – 26.5 GHz. 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, 1 GHz to 18 GHz and 18 GHz to 26.5 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 C63.4: 2009. 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 varied from 1 to 4 meters (for E field radiated field strength).

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 26.5 GHz. to obtain final test data.

Calculation Of Radiated Emission Test Data:

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

Corrected Amplitude - Limit = Margin

7.2 Conducted Emissions Test – Mains Ports

7.2.1 Limit (FCC PART 15 Section 15.207(a), IC RSS-GEN Issue 4 [7.2.4])

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 9 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 C63.4: 2009. 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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7.3 Occupied Bandwidth

7.3.1 Limit (FCC PART 15 Section 15.247(a)(2), IC-RSS 210 Issue 8, [A8.2], IC RSS-GEN Issue 4 [4.6])

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

Limit
6 dB Bandwidth ≥ 500 kHz

7.3.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator, set the Spectrum Analyzer as below:

RBW: 100 kHz
VBW: ≥ 3 X RBW
Detector: Peak
Trace Mode: Max Hold

(1) When the trace is completed, mark the peak value

(2) Measure the 6db bandwidth using Xdb down function, If this does not encompass the full bandwidth, then "Measure the maximum width of the emission that is constraiended by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission"

7.3.3 Test Result

The EUT meets the requirements. Please see the datasheets in Appendix A for the measurement results.

7.4 Maximum Peak Output Power

7.4.1 Limit (FCC PART 15 Section 15.247(b)(3), IC-RSS 210 Issue 8, [A8.4])

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

Limit
Maximum Peak Output Power (Digital Modulation) ≤ 1Watt or 30 dBm

7.4.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator and set the Spectrum Analyzer as below:

RBW > DTS Bandwidth
VBW ≥ 3 x RBW
Span ≥ 3 * RBW
Detector: Peak
Trace Mode: Max Hold

(1) When the trace is completed, mark the peak value

7.4.3 Test Result

The EUT meets the requirements. Please see the datasheets in Appendix A for the measurement results.

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7.5 Maximum Peak Power Spectral Density

7.5.1 Limit (FCC PART 15 Section 15.247(e), IC-RSS 210 Issue 8, [A8.2])

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density

Limit
8 dBm

7.5.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator and set the Spectrum Analyzer as below:

3 kHz ≤ RBW ≤ 100 kHz
VBW ≥ 3 x RBW
Span ≥ 1.5 * DTS Bandwidth
Detector: Peak
Sweep Time auto

(1) Use Peak Marker Function

(2) If value Exceeds limit, reduce RBW (no less than 3 kHz)

7.5.3 Test Result

The EUT meets the requirements. Please see the datasheets in Appendix A for the measurement results.

7.6 Emissions in Non-Restricted Frequency Bands

7.6.1 Limit (FCC PART 15 Section 15.247(d), IC-RSS 210 Issue 8, [A8.5])

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Limit
20db Below Peak Power Spectral Density
30db Below Average Power Spectral Density

7.6.2 Test Procedure

(1) Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator, set the Spectrum Analyzer as below:

RBW: 100 KHz
VBW: ≥ 3 x RBW
Detector: Peak
Trace Mode: Max Hold
Span ≥ 1.5 DTS Bandwidth

(2) Set Frequency Span to DTS Channel Center Frequency

(3) Use Peak Marker Function, This is your reference PSD

RBW: 100 KHz
VBW: ≥ 3 x RBW
Detector: Peak
Trace Mode: Max Hold

(4) Set Span to encompass frequency range

(5) Report 3 highest emissions

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1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.6.3 Test Result

The EUT meets the requirements. Please see the datasheets in Appendix A for the measurement results.

7.7 Bandedge

7.7.1 Limit (FCC PART 15 Section 15.247(d), IC-RSS 210 Issue 8, [A8.5])

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Limit
20db Below Peak Power Spectral Density
30db Below Average Power Spectral Density

7.7.2 Test Procedure

(1) Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator, set the Spectrum Analyzer as below:

RBW: 100 KHz
VBW: ≥ 3 x RBW
Detector: Peak
Trace Mode: Max Hold
Span ≥ 1.5 DTS Bandwidth

(2)Set Frequency Span to DTS Channel Center Frequency

(3)Use Peak Marker Function, This is your reference PSD

RBW: 100 KHz
VBW: ≥ 3 x RBW
Detector: Peak
Trace Mode: Max Hold

(4) Set Span to encomapass the bandedge

(5) Report 3 highest emissions

EMT ELECTRO MAGNETIC TEST, INC.
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7.7.3 Test Result

The EUT meets the requirements. Please see the datasheets in Appendix A for the measurement results.

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7.8 Antenna Requirement

7.8.1 Requirement (FCC PART 15 SECTION 15.203,15.247(b)(4), IC RSS-GEN Issue 4 [7.1.2])

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.8.2 Test Result

The antenna is integrated on the main PCB with no consideration for replacement on the BLE Module.

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8. CONCLUSIONS / COMPLIANCE STATEMENT

Based upon the results contained in this report, Electro Magnetic Test, Inc. has determined that the BLE Module, Model: ILUMIBLEHmeets all of the specification limits defined in FCC Title 47, Part 15, Subpart C.

EMT
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APPENDIX A

RADIATED AND CONDUCTED DATA SHEETS

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

Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE	Test Date:	3/16/15
Test Engineer:	George Hsu	Measurement:	9 KHz to 30 MHz

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators were attenuated more than 20 dB below the permissible value

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

Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE Channel 80	Test Date:	3/25/15
Test Engineer:	George Hsu	Measurement:	30 MHz to 1 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.140000	37.9	211.0	V	179.0	16.9	2.10	40.00
41.880000	35.4	188.0	V	238.0	12.3	4.60	40.00
66.330000	33.5	270.0	V	323.0	8.2	6.50	40.00
72.840000	32.4	100.0	V	129.0	8.3	7.60	40.00
139.980000	33.1	217.0	V	193.0	11.4	10.40	43.50
145.890000	28.8	138.0	H	221.0	11.4	14.70	43.50
176.850000	29.9	211.0	V	172.0	12.1	13.60	43.50
812.490000	34.3	123.0	V	100.0	25.3	11.70	46.00

Quasipeak Measurement:

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.140000	27.4	211.0	V	179.0	16.9	12.60	40.00
41.880000	25.7	188.0	V	238.0	12.3	14.30	40.00
66.330000	27.7	270.0	V	323.0	8.2	12.30	40.00
72.840000	28.4	100.0	V	129.0	8.3	11.60	40.00
139.980000	24.5	217.0	V	193.0	11.4	19.00	43.50
145.890000	21.2	138.0	H	221.0	11.4	22.30	43.50
176.850000	23.7	211.0	V	172.0	12.1	19.80	43.50
812.490000	30.3	123.0	V	100.0	25.3	15.70	46.00

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

Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE, Channel 2	Test Date:	3/24/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 18 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
4800.250000	51.8	207.0	H	236.0	4.9	22.2	74.00
4800.250000	49.7	156.0	V	150.0	4.9	24.3	74.00
11999.250000	54.1	100.0	V	91.0	16.9	19.9	74.00
12001.250000	54.6	143.0	H	207.0	16.9	19.4	74.00
13773.500000	49.9	338.0	V	239.0	17.9	24.1	74.00

Average Measurement:

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
4800.250000	46.5	207.0	H	236.0	4.9	7.50	54.00
4800.250000	43.8	156.0	V	150.0	4.9	10.20	54.00
11999.250000	43.1	100.0	V	91.0	16.9	10.90	54.00
12001.250000	42.1	143.0	H	207.0	16.9	11.90	54.00
13773.500000	37.0	338.0	V	239.0	17.9	17.00	54.00

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

Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE, Channel 40	Test Date:	3/24/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 18 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
3659.813333	42.6	250.0	V	60.0	3.3	31.4	74.0
3659.813333	43.9	200.0	H	1.0	3.3	30.1	74.0
4879.360000	47.6	200.0	V	218.0	4.6	26.4	74.0
4879.866667	53.0	200.0	H	218.0	4.6	21.0	74.0
7319.973333	52.8	100.0	V	150.0	9.1	21.2	74.0
7320.480000	52.6	100.0	H	225.0	9.1	21.4	74.0

Average Measurement:

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
3659.813333	32.4	250.0	V	60.0	3.3	21.60	54.0
3659.813333	35.8	200.0	H	1.0	3.3	18.20	54.0
4879.360000	38.1	200.0	V	218.0	4.6	15.90	54.0
4879.866667	49.1	200.0	H	218.0	4.6	4.90	54.0
7319.973333	45.6	100.0	V	150.0	9.1	8.40	54.0
7320.480000	43.6	100.0	H	225.0	9.1	10.40	54.0

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1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE, Channel 80	Test Date:	3/24/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 18 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
4960.426667	47.5	200.0	V	149.0	4.7	26.5	74.0
4960.426667	52.4	200.0	H	221.0	4.7	21.6	74.0
7439.040000	52.9	150.0	H	226.0	8.8	21.1	74.0
7440.560000	54.1	100.0	V	198.0	8.8	19.9	74.0
12400.320000	60.2	150.0	H	328.0	16.2	13.8	74.0
12400.826667	57.9	150.0	V	1.0	16.2	16.1	74.0
15761.546667	53.4	200.0	V	324.0	21.8	20.6	74.0
15762.053333	53.2	150.0	H	136.0	21.8	20.8	74.0

Average Measurement:

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
4960.426667	38.9	200.0	V	149.0	4.7	15.10	54.0
4960.426667	45.9	200.0	H	221.0	4.7	8.10	54.0
7439.040000	42.0	150.0	H	226.0	8.8	12.00	54.0
7440.560000	45.7	100.0	V	198.0	8.8	8.30	54.0
12400.320000	51.3	150.0	H	328.0	16.2	2.70	54.0
12400.826667	48.4	150.0	V	1.0	16.2	5.60	54.0
15761.546667	40.0	200.0	V	324.0	21.8	14.00	54.0
15762.053333	40.1	150.0	H	136.0	21.8	13.90	54.0

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Radiated Emissions

EUT:	BLE Module	Model Name:	ILUMIBLEH
Test Mode:	Bluetooth LE	Test Date:	3/16/15
Test Engineer:	George Hsu	Measurement:	18 GHz to 26.5 GHz

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators were attenuated more than 20 dB below the permissible value

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

6dB Bandwidth Test Data and 99% Occupied Bandiwdth(Conducted)

Company:	Ilumi Solutions, Inc.	Test Date	3/12/15
EUT Name	BLE Module	Test Engineer	George Hsu
Model:	ILUMIBLEH	Test Result	PASS
Operating Mode	TX Mode		

Mode	Test CH	Frequency (MHz)	6 dB Bandwidth (KHz)	Limit (KHz)	Conclusion
Bluetooth LE	2	2402	505.2	≥ 500	PASS
	40	2440	515.0	≥ 500	PASS
	80	2480	513.3	≥ 500	PASS
	Test CH	Frequency (MHz)	99% Bandwidth (KHz)	Limit (KHz)	Conclusion
Bluetooth LE	2	2402	844.19	≥ 500	PASS
	40	2440	666.24	≥ 500	PASS
	80	2480	656.45	≥ 500	PASS

Test Equipment: Please refer to section 5.2

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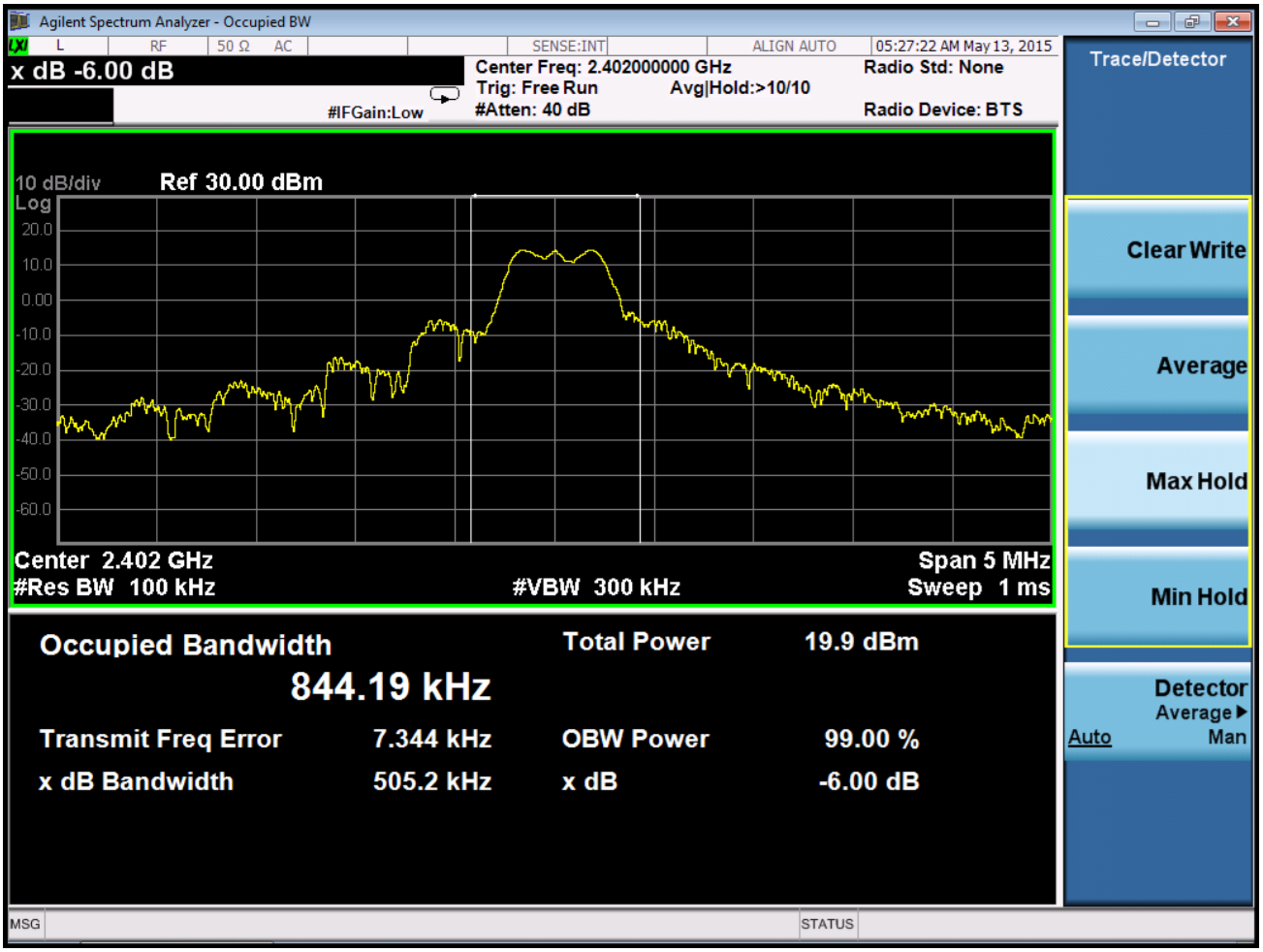
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

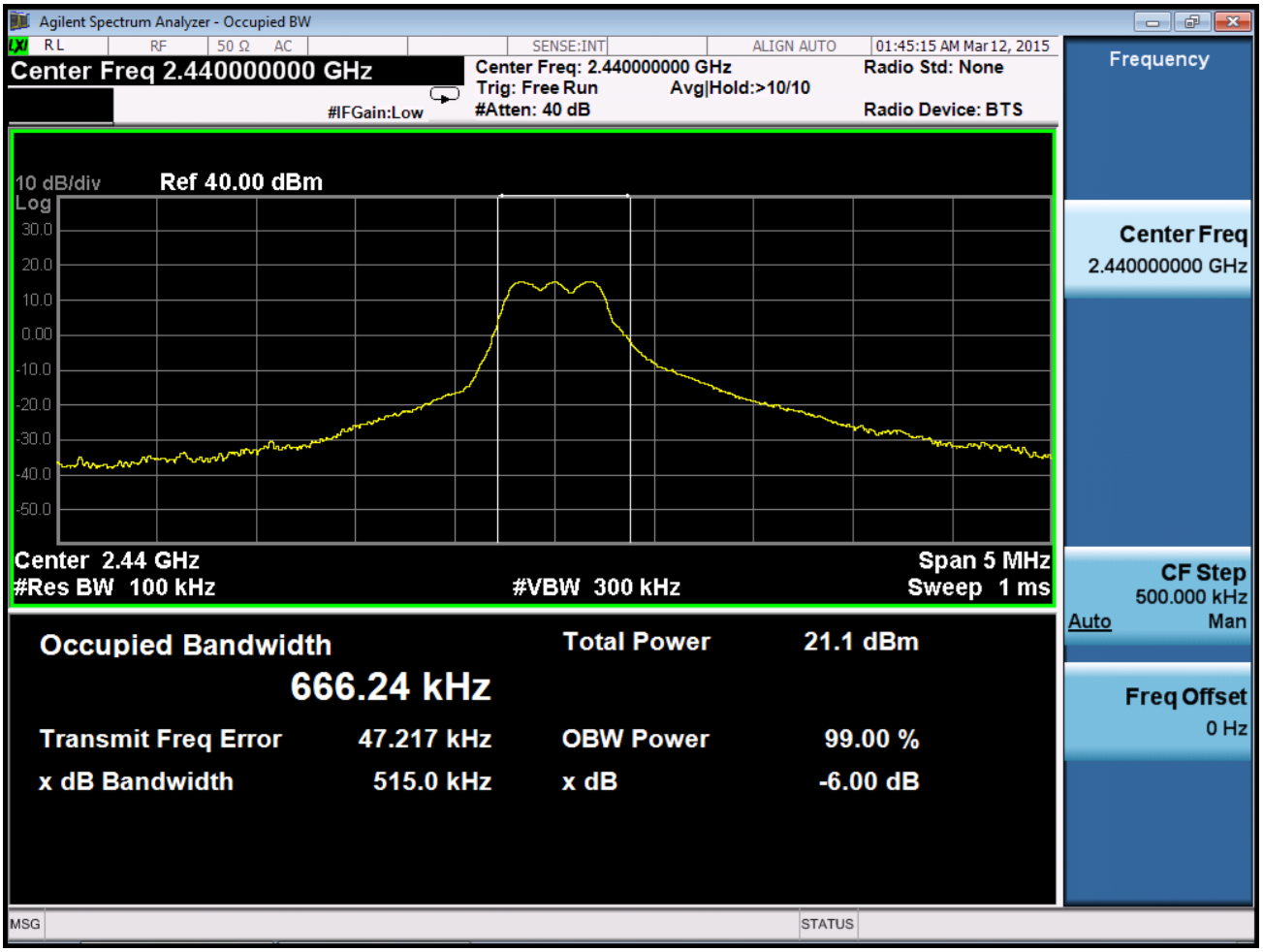
6dB Bandwidth Test Data and 99% Occupied Bandiwdth(Conducted)



Channel 2

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

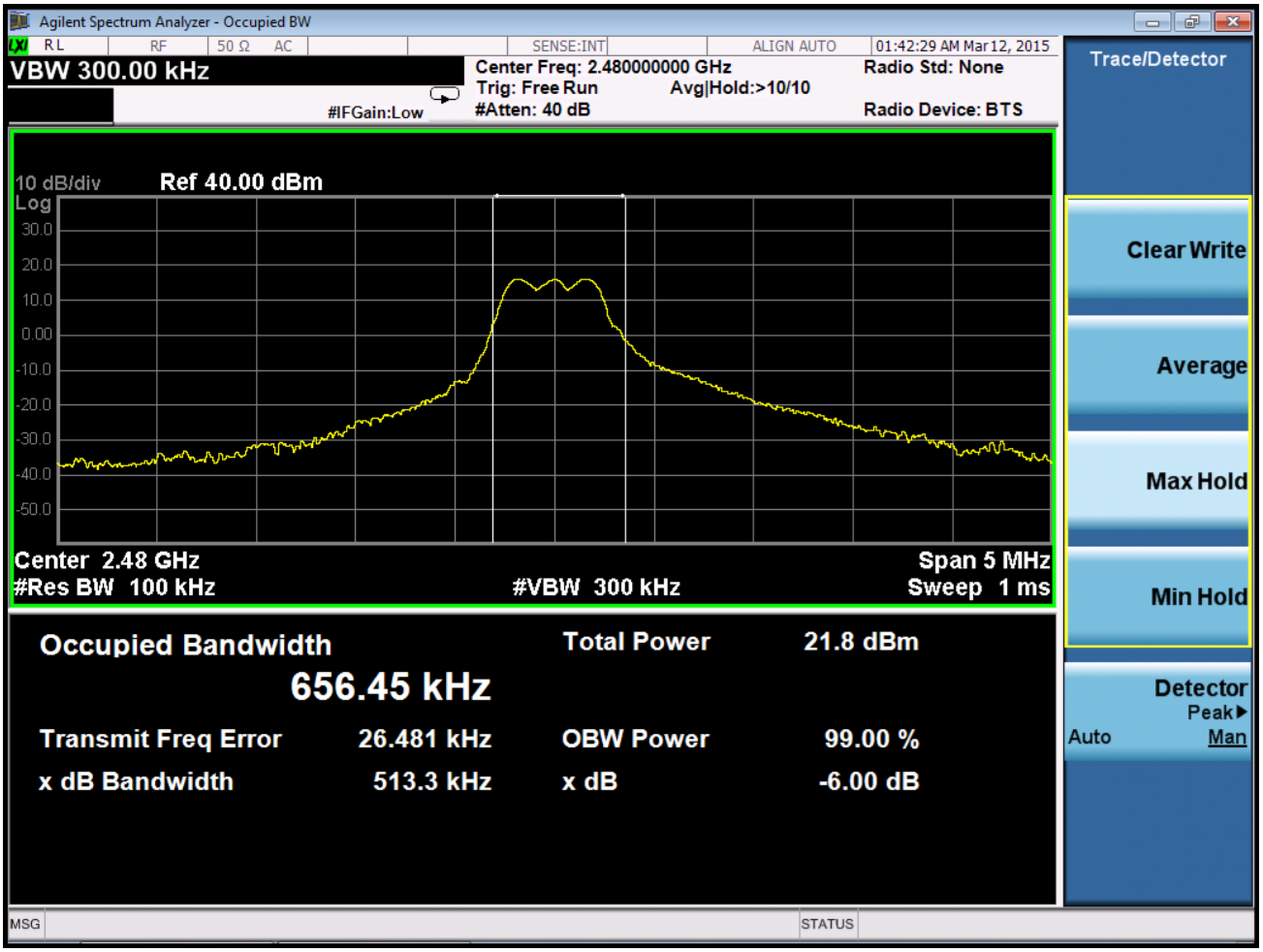
6dB Bandwidth Test Data and 99% Occupied Bandiwdth(Conducted)



Channel 40

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

6dB Bandwidth Test Data and 99% Occupied Bandiwdth(Conducted)



Channel 80

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

Maximum Peak Output Power Test Data (Conducted)

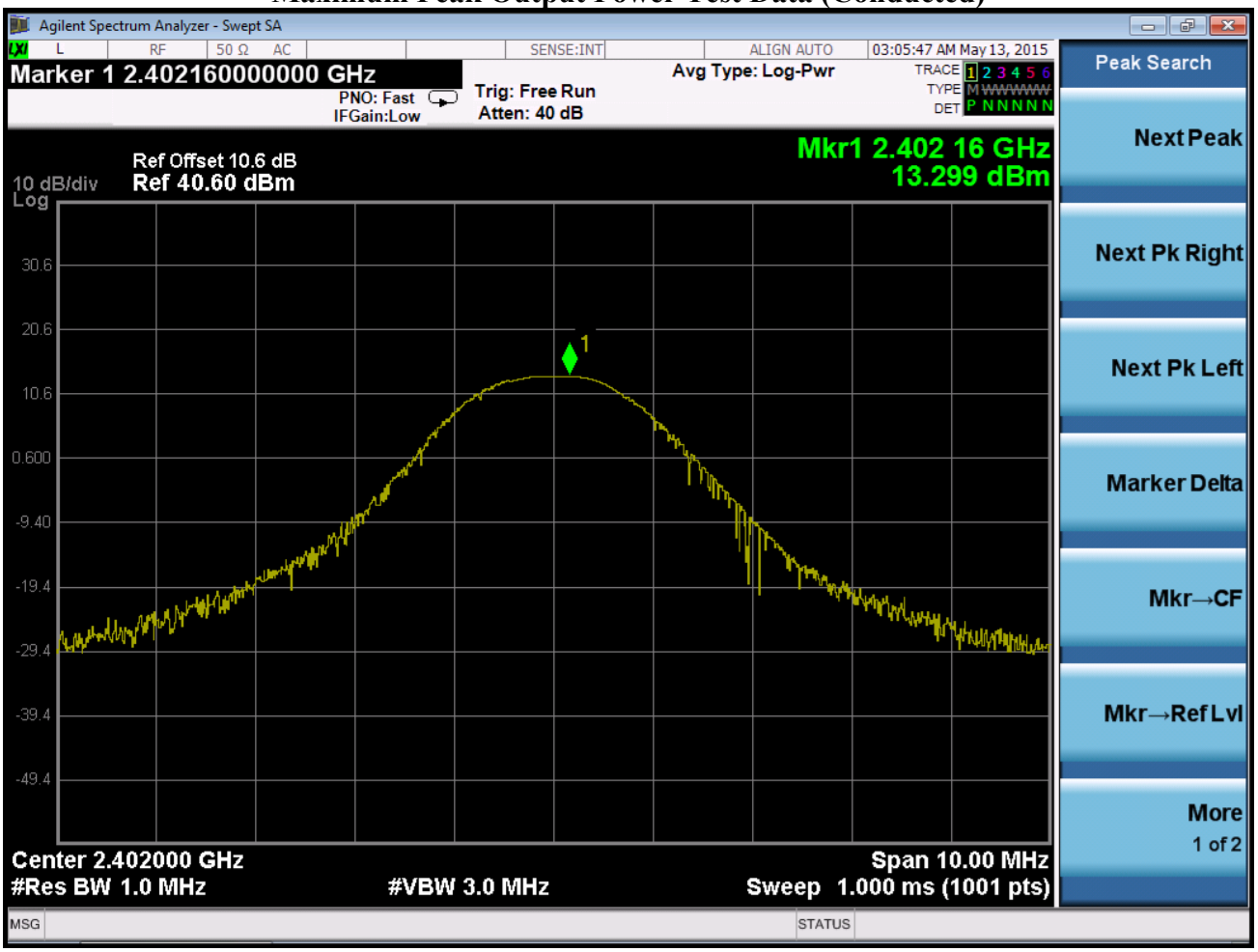
Company:	Ilumi Solutions, Inc.	Test Date	3/12/15
EUT Name	BLE Module	Test Engineer	George Hsu
Model:	ILUMIBLEH	Test Result	PASS
Operating Mode	TX Mode		

Mode	Test CH	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Conclusion
Bluetooth LE	2	2402	13.299	≤ 30	Pass
	40	2440	15.178	≤ 30	Pass
	80	2480	15.904	≤ 30	Pass

Test Equipment: Please refer to section 5.2

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

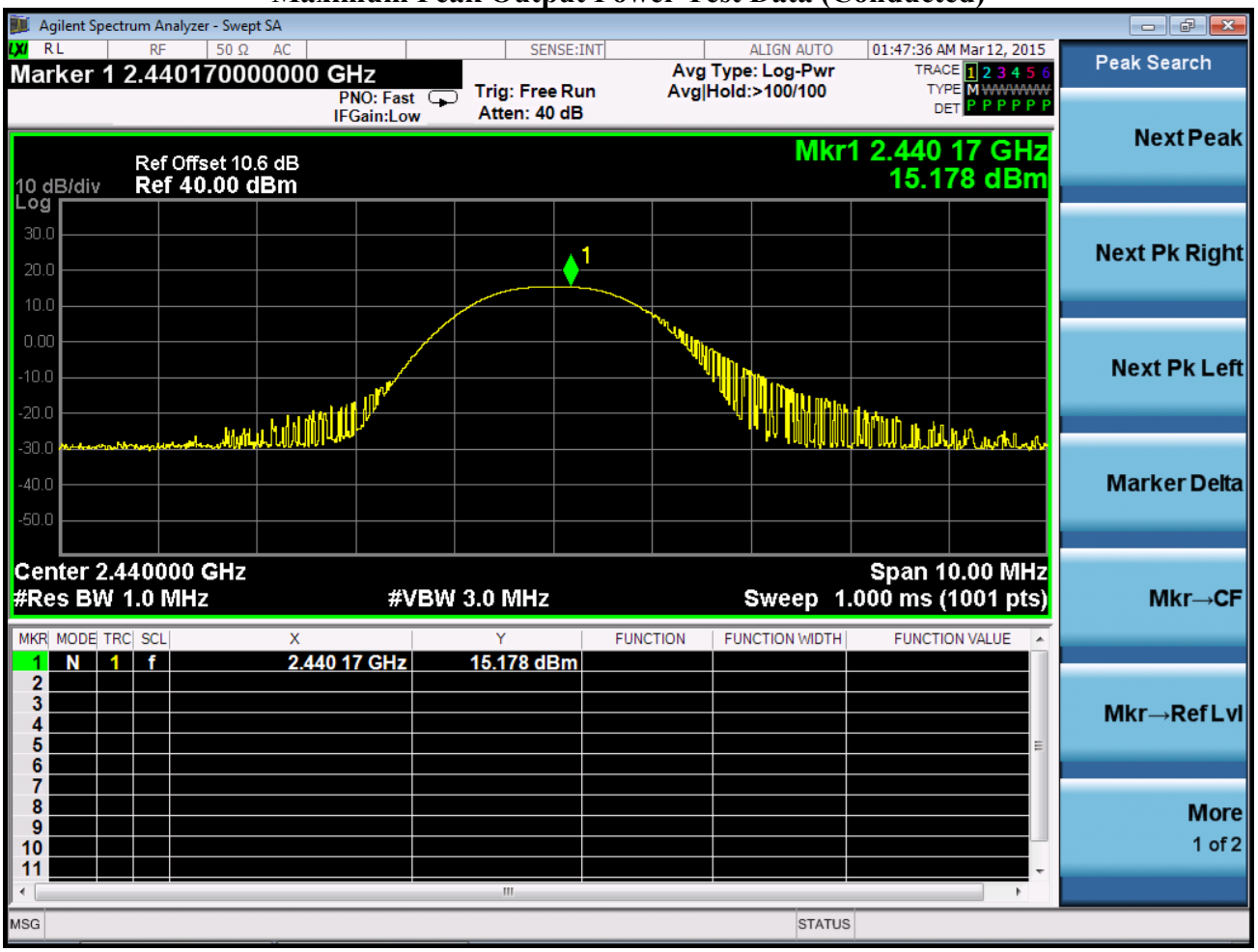
Maximum Peak Output Power Test Data (Conducted)



Channel 0

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

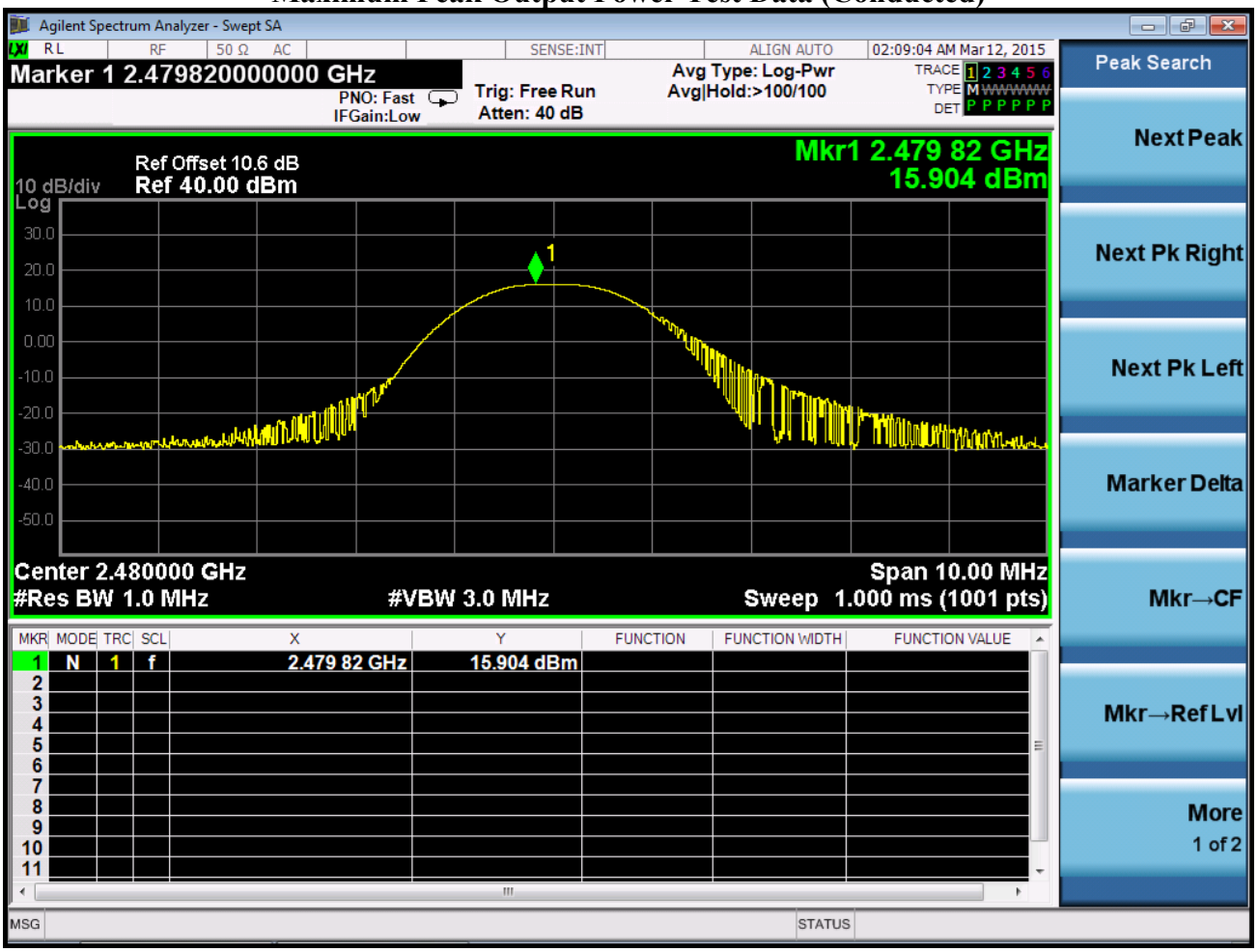
Maximum Peak Output Power Test Data (Conducted)



Channel 40

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

Maximum Peak Output Power Test Data (Conducted)



Channel 80

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

Maximum Power Spectral Density Test Data (Conducted)

Company:	Ilumi Solutions, Inc.	Test Date	3/12/15
EUT Name	BLE Module	Test Engineer	George Hsu
Model:	ILUMIBLEH	Test Result	PASS
Operating Mode	TX Mode		

Mode	Test CH	Frequency (MHz)	Peak (dBm)	Limit (dBm)	Conclusion
Bluetooth LE	2	2400	5.742	≤ 8	Pass
	40	2440	6.740	≤ 8	Pass
	80	2480	7.911	≤ 8	Pass

Test Equipment: Please refer to 5.2

EMT
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1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Maximum Peak Power Spectral Density Test Data (Conducted)

Low Channel, Channel 2

EMT
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1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Maximum Peak Power Spectral Density Test Data (Conducted)

Middle Channel, Channel 40

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

Maximum Peak Power Spectral Density Test Data (Conducted)

High Channel, Channel 80

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

Emissions in Non-Restricted Frequency Bands (Conducted)

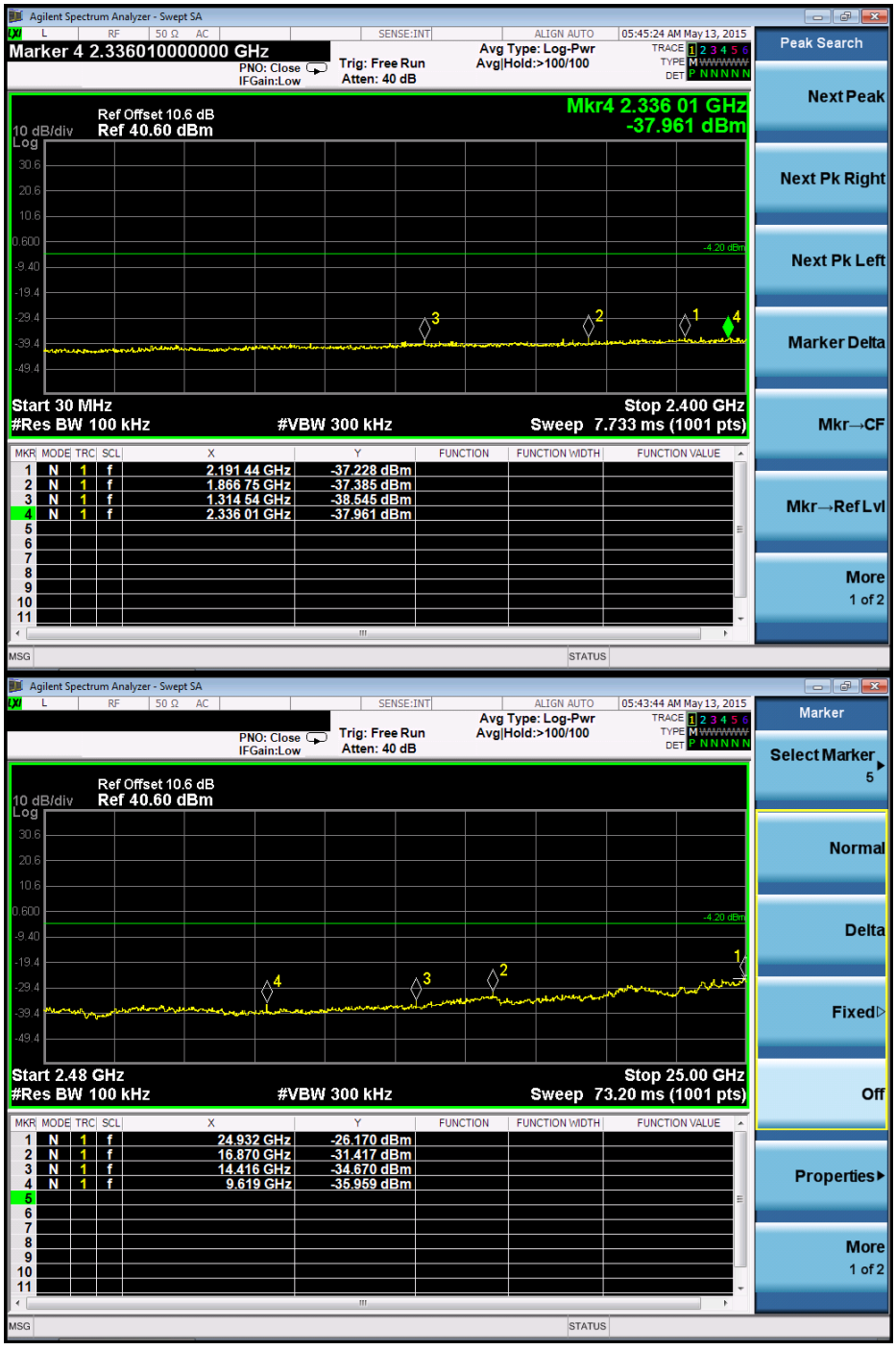
Company:	Ilumi Solutions, Inc.	Test Date	3/12/15
EUT Name	BLE Module	Test Engineer	George Hsu
Model:	ILUMIBLEH	Test Result	PASS
Operating Mode	TX Mode		

Mode	Test CH	Frequency (MHz)	Peak (dBm)	Limit (dBm)	Conclusion
Bluetooth LE	2	2191	-37.228	≤ -4.20	Pass
	2	9619	-35.959	≤ -4.20	Pass
	2	16870	-31.417	≤ -4.20	Pass
	40	1973	-38.919	≤ -4.20	Pass
	40	21667	-28.429	≤ -4.20	Pass
	40	23559	-27.894	≤ -4.20	Pass
	80	1985	-37.567	≤ -4.20	Pass
	80	2400	-37.305	≤ -4.20	Pass
	80	23559	-27.591	≤ -4.20	Pass

Test Equipment: Please refer to 5.2

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

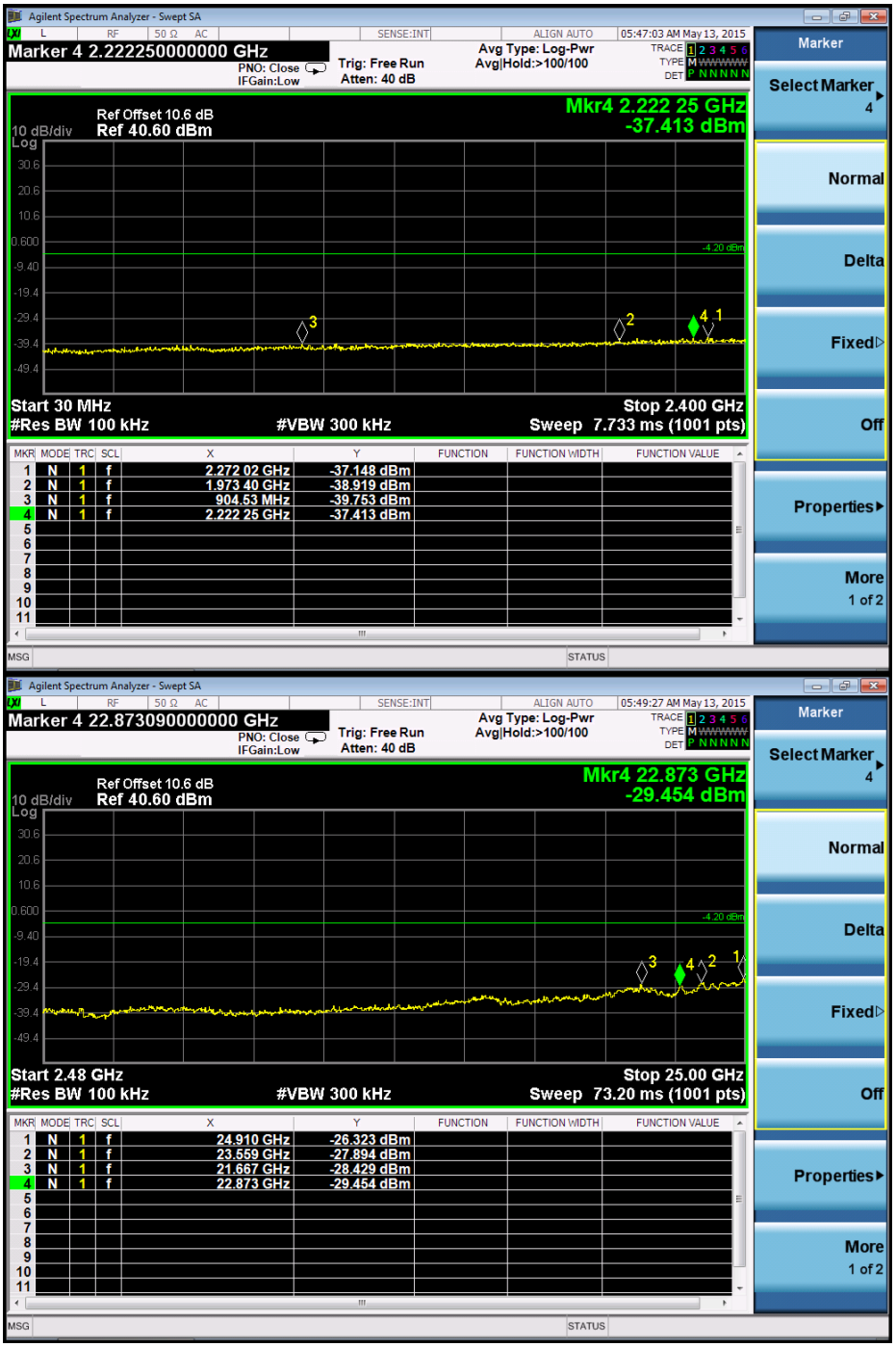
Emissions in Non-Restricted Frequency Bands (Conducted)



Low Channel, Channel 2

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

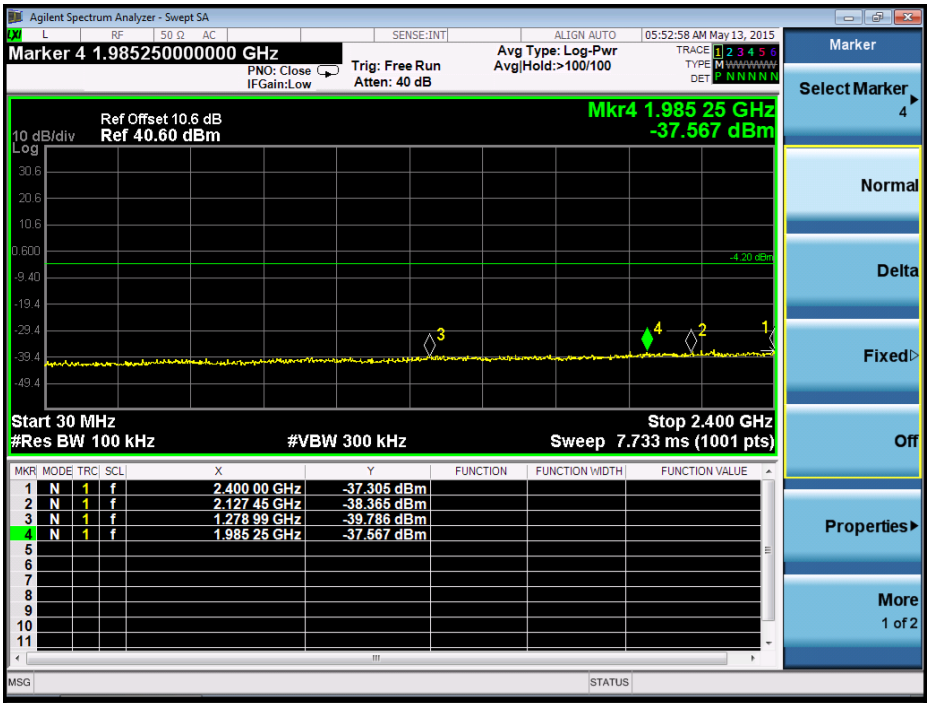
Emissions in Non-Restricted Frequency Bands (Conducted)



Low Channel, Channel 40

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

Emissions in Non-Restricted Frequency Bands (Conducted)



Low Channel, Channel 80

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

Bandedge Test Data (Conducted)

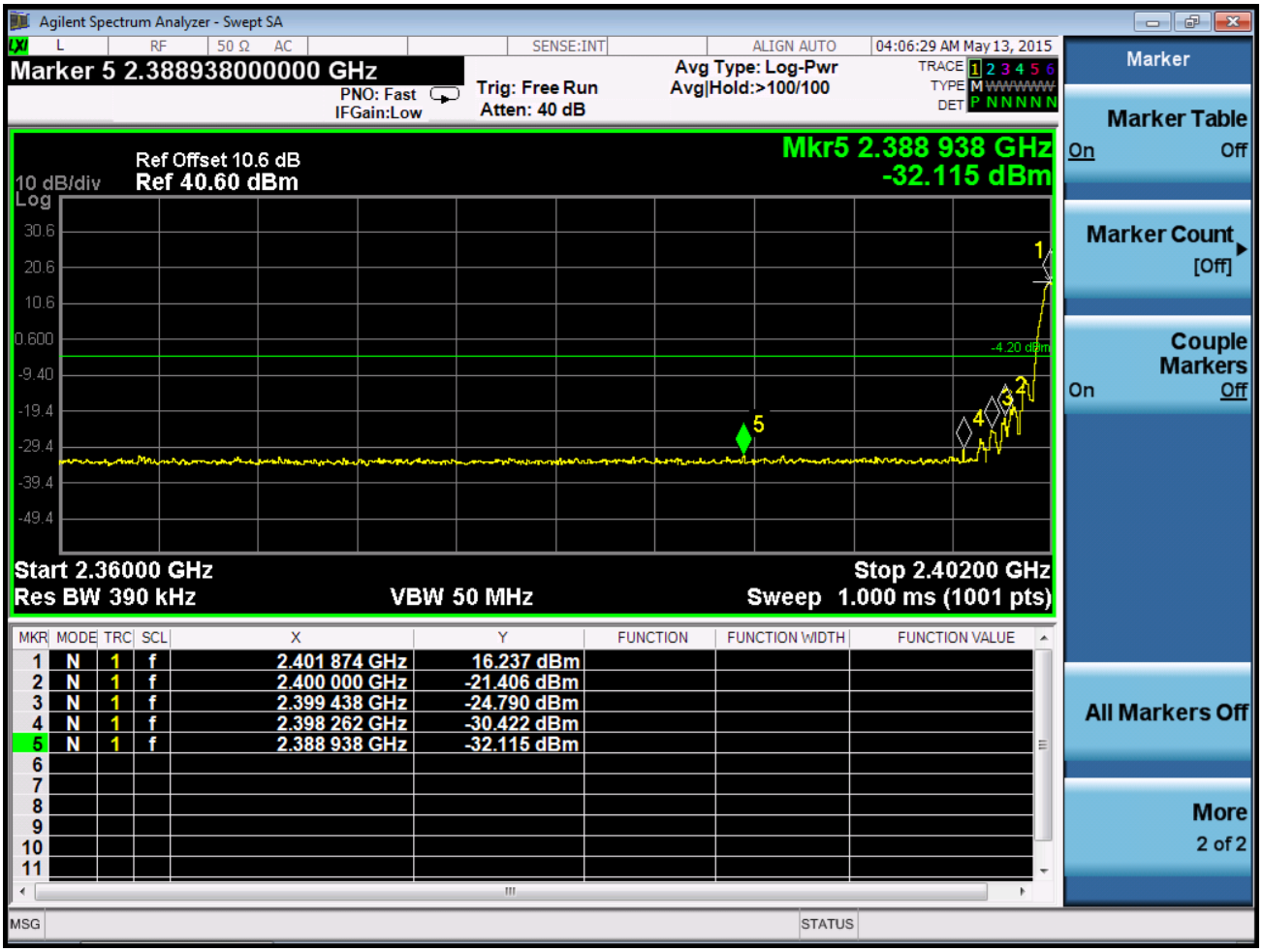
Company:	Ilumi Solutions, Inc.	Test Date	3/12/15
EUT Name	BLE Module	Test Engineer	George Hsu
Model:	ILUMIBLEH	Test Result	PASS
Operating Mode	TX Mode		

Mode	Test CH	Frequency (MHz)	Peak (dBm)	Limit (dBm)	Conclusion
Bluetooth LE	2	2399.43	-24.790	≤ -4.20	Pass
	2	2400.00	-21.406	≤ -4.20	Pass
	80	2483.5	-38.561	≤ -4.20	Pass
	80	2505.2	-38.102	≤ -4.20	Pass

Test Equipment: Please refer to 5.2

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

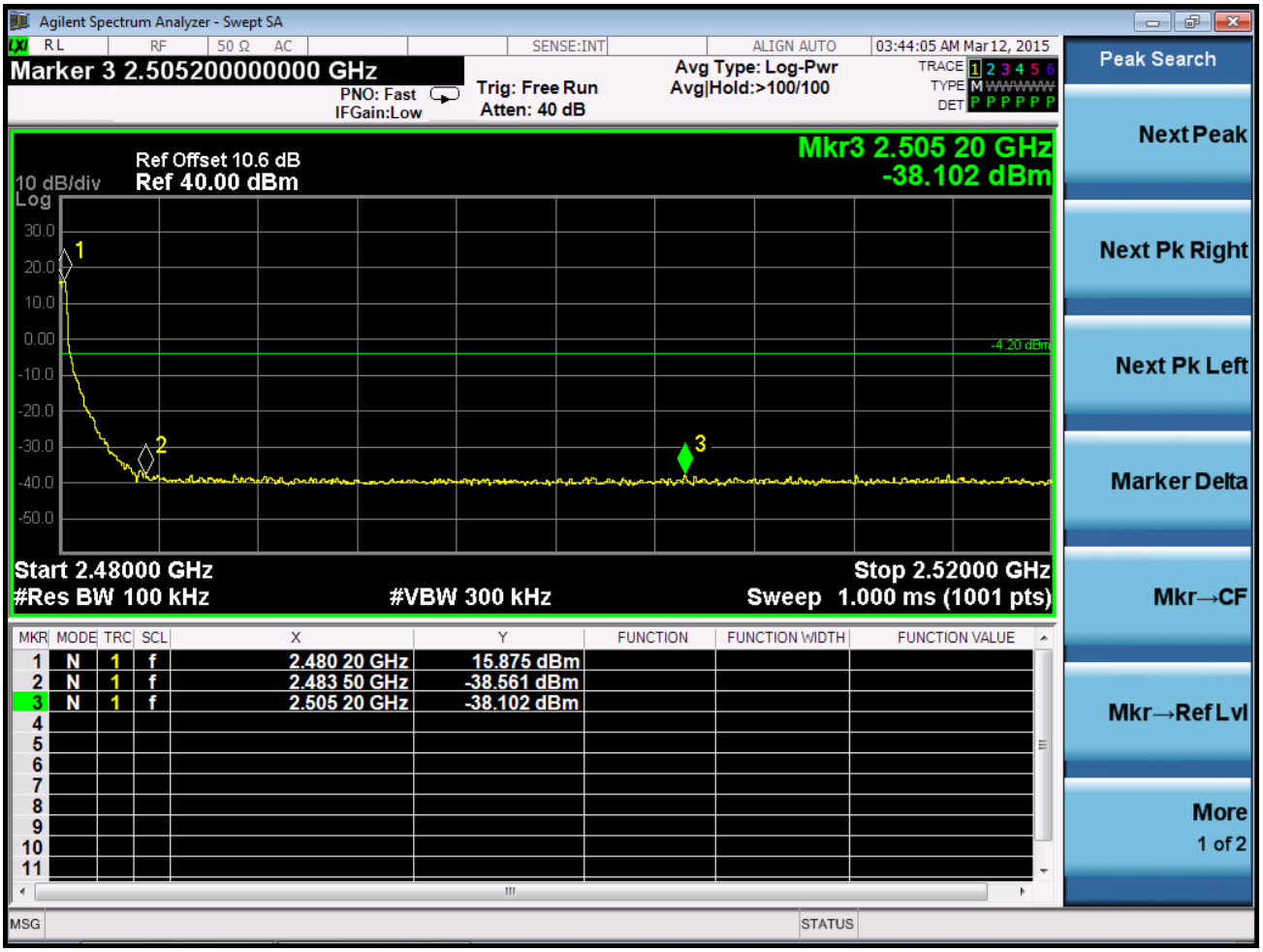
Bandedge Test Data (Conducted)



Low Channel, Channel 2

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

Bandedge Test Data (Conducted)



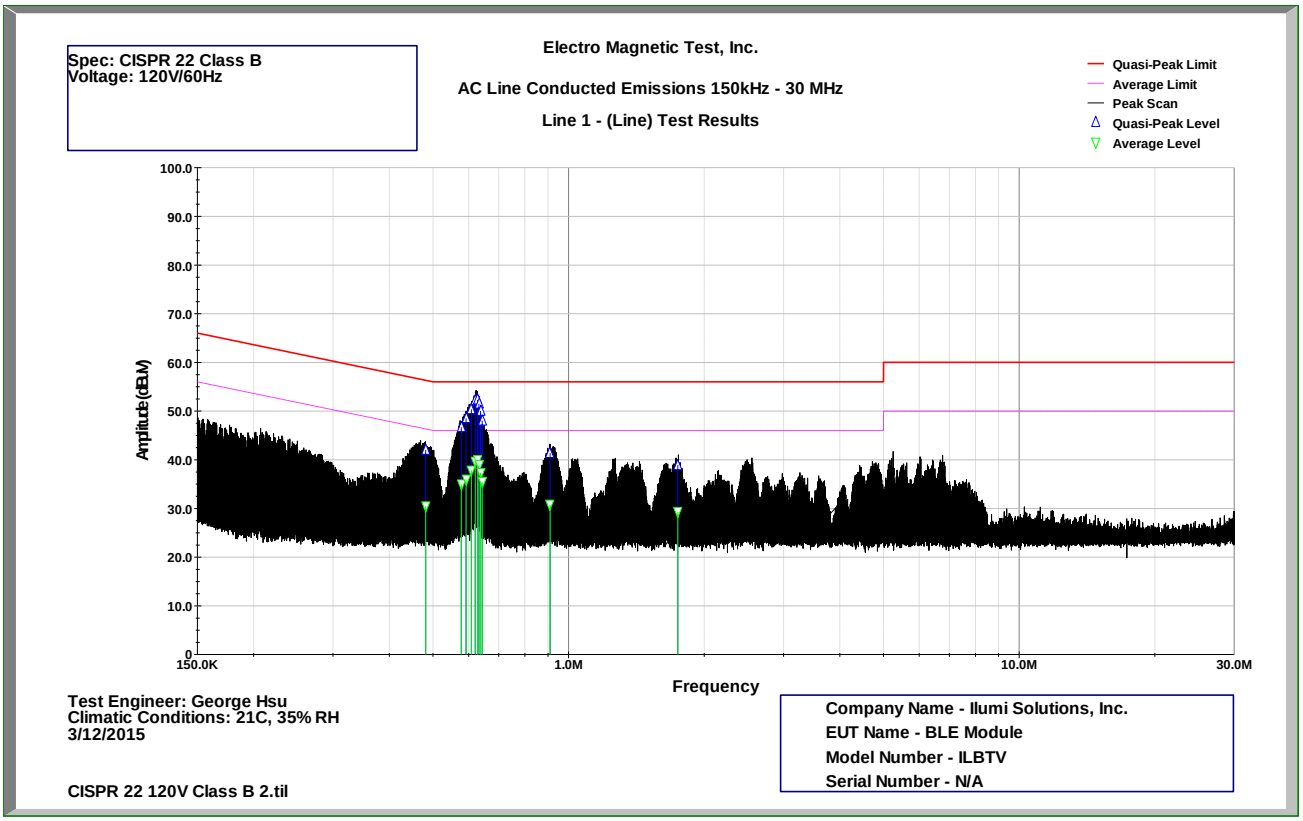
High Channel, Channel 80

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

Conducted Emissions Data (AC Powerline)

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

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
0.482	45.525	42.015	30.530	10.425	56.520	-14.505	46.520	-15.990
0.578	49.708	46.658	34.923	10.508	56.000	-9.342	46.000	-11.077
0.592	50.764	48.464	35.941	10.464	56.000	-7.536	46.000	-10.059
0.608	52.857	50.357	37.812	10.457	56.000	-5.643	46.000	-8.188
0.621	55.065	52.085	39.705	10.465	56.000	-3.915	46.000	-6.295
0.628	54.787	52.297	39.999	10.487	56.000	-3.703	46.000	-6.001
0.633	54.499	51.469	38.914	10.499	56.000	-4.531	46.000	-7.086
0.638	52.414	50.024	37.324	10.514	56.000	-5.976	46.000	-8.676
0.643	50.430	48.000	35.430	10.530	56.000	-8.000	46.000	-10.570
0.910	44.614	41.354	30.757	10.514	56.000	-14.646	46.000	-15.243
1.748	42.970	38.890	29.330	10.470	56.000	-17.110	46.000	-16.670

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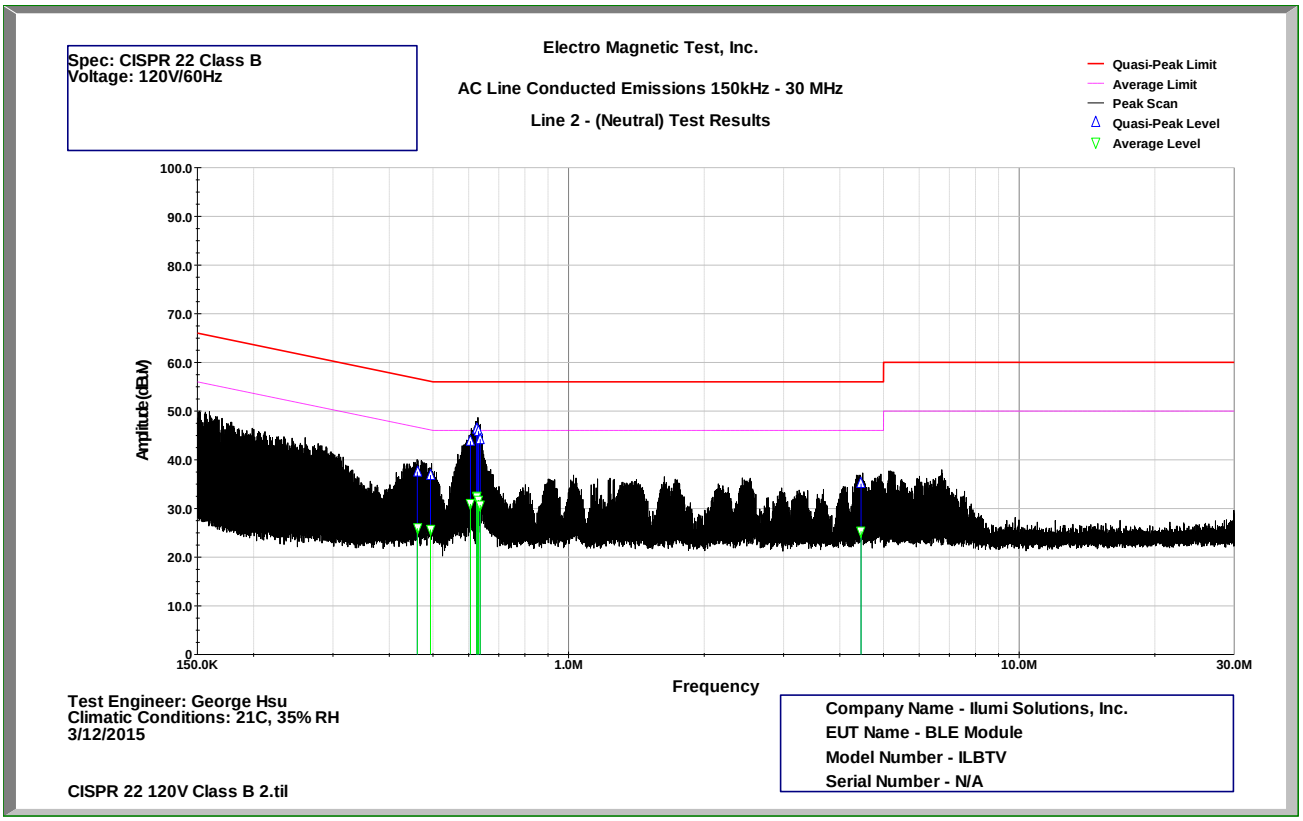
AC Line Conducted Emissions Test Data



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
0.462	42.128	37.538	25.918	10.528	57.094	-19.555	47.094	-21.175
0.494	41.296	36.846	25.671	10.496	56.179	-19.333	46.179	-20.508
0.606	47.428	43.808	30.925	10.528	56.000	-12.192	46.000	-15.075
0.625	49.945	46.375	32.435	10.545	56.000	-9.625	46.000	-13.565
0.627	49.850	46.400	32.375	10.550	56.000	-9.600	46.000	-13.625
0.631	49.262	45.852	31.719	10.562	56.000	-10.148	46.000	-14.281
0.637	47.477	44.217	30.722	10.577	56.000	-11.783	46.000	-15.278
4.457	40.751	35.081	25.301	10.551	56.000	-20.919	46.000	-20.699

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APPENDIX B

TEST SETUP DIAGRAMS

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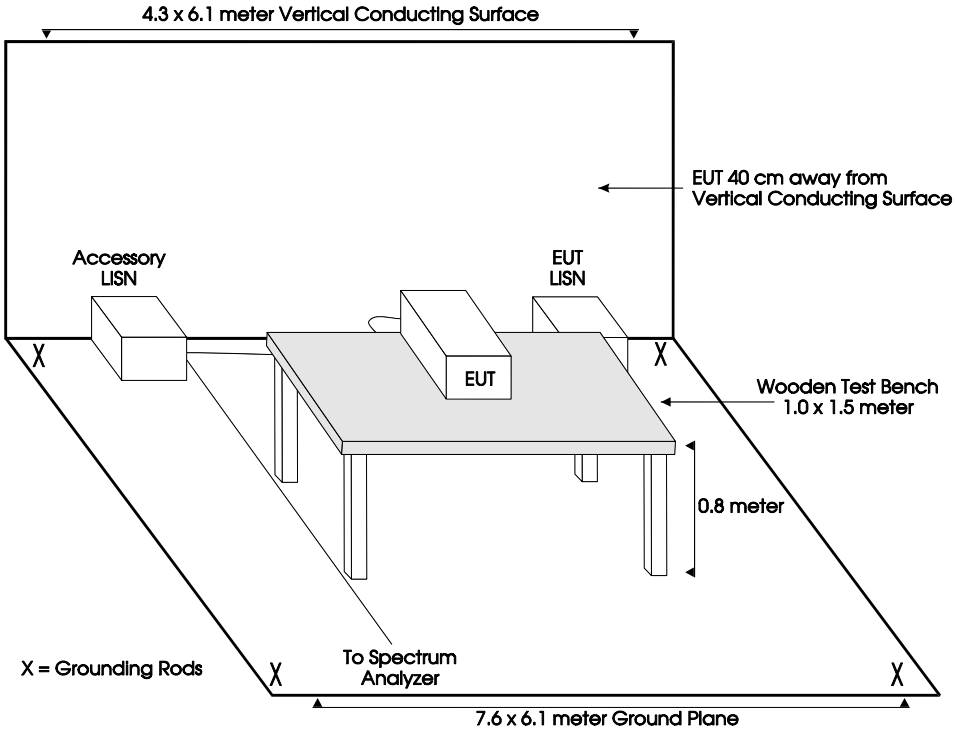

FIGURE 1 – TABLETOP CONDUCTED EMISSIONS TEST SETUP – SITE "A"

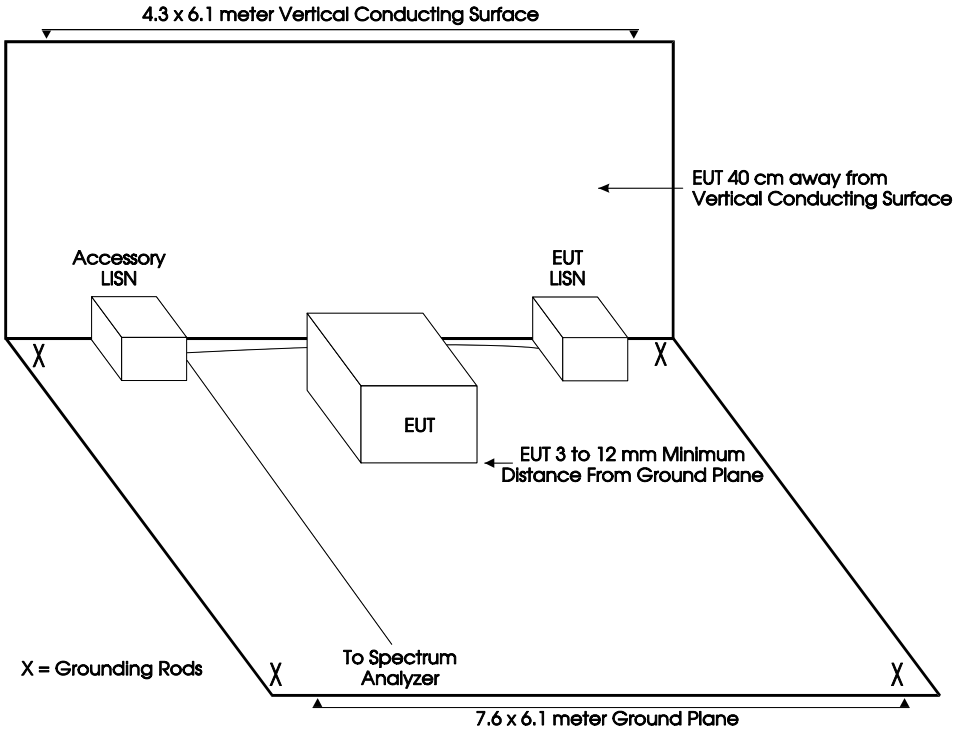

FIGURE 1a – FLOORSTANDING CONDUCTED EMISSIONS TEST SETUP – SITE "A"

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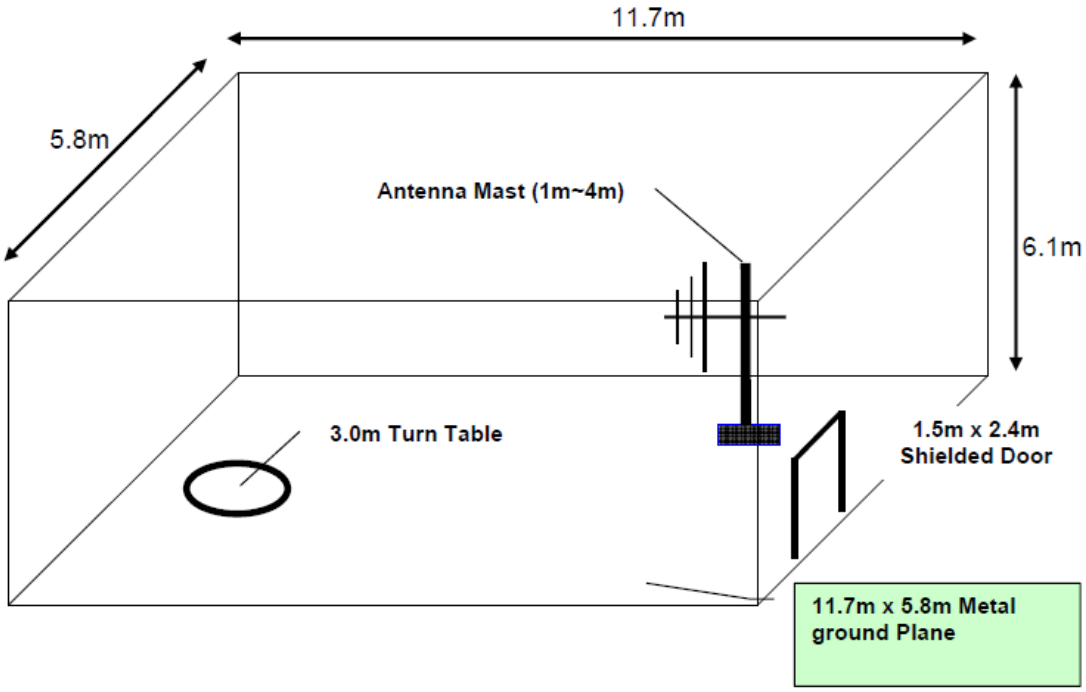

FIGURE 3 - LAYOUT OF 5 METER SEMI-ANECHOIC CHAMBER

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APPENDIX C

MODIFICATIONS TO THE EUT

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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

USED FOR THE PRIMARY TEST

BLE Module
Model: ILUMIBLEH
S/N: N/A

ALSO APPROVED UNDER THIS REPORT:

Model: ILUMIBLEV

The only difference between the two model numbers is that the antenna orientation on the PCB is different