FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2009 TEST REPORT

For

LED Meter

Model : MK350D

Trade Name : UPRtek

Issued for

United Power Research Technology Corp.

No.38, Keyi St., Zhunan Township, Miaoli County 35059, Taiwan,R.O.C

Issued by

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Issued Date: June 10, 2014

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	06/10/2014	Initial Issue	All Page 49	Michelle Chiu

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1. TEST REPORT CERTIFICATION

Applicant	:	United Power Research Technology Corp.
Address	:	No.38, Keyi St., Zhunan Township, Miaoli County 35059, Taiwan,R.O.C
Equipment Under Test	:	LED Meter
Model	:	MK350D
Trade Name	:	UPRtek
Tested Date	:	April 29 ~ June 05, 2014

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.4:2009	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb. Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer

2. EUT DESCRIPTION

Product Name	LED Meter
Model Number	MK350D
Identify Number	T140429S04
Received Date	April 29, 2014
Frequency Range	2402MHz to 2480MHz
Transmit Power	0.49 dBm (0.0011W)
Channel Spacing	2MHz
Channel Number	40 Channels
Transmit Data Rate	GFSK (1Mbps)
Type of Modulation	Frequency Hopping Spread Spectrum
Frequency Selection	by software / firmware
Antenna Type	Chip Antenna × 1, Antenna Gain : 2.1 dBi
Power Rating	5Vdc (For Charging) 3.7Vdc, 2.8Wh (For Battery)
Test Voltage	120Vac, 60Hz
DC Power Cable Type	Shielded USB cable 1.0m × 1 (Detachable)
I/O Port	Mini USB Port × 1, Micro SD card Port × 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	E-TEK.	ZDC050100US	100-240Vac, 50/60Hz, 0.2A	5.0Vdc, 1000mA

Remark :

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: P7SMK350D filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3. DESCRIPTION OF TEST MODE

The EUT (LED Meter) had been tested under operating condition.

Conducted Emission / Radiated Emission Test (Below 1 GHz)

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	Normal Operating / Single Mode
2	Normal Operating / USB PC Charge Mode
3	Normal Operating / Adapter Charge Mode

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Radiated Emission	Normal Operating / Adapter Charge Mode
	Conducted Emission	Normal Operating / Adapter Charge Mode

Remark : *Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.*

Conducted / Radiated Emission Test (Above 1 GHz)

Bluetooth 4.0 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2402
Middle	2442
High	2480

Remark : *The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X, Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.*

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47, 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	INDUSTRY CANADA
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_A) / Radiated Emission, 30 to 1000 MHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_A) / Radiated Emission, 1 to 18GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_A) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_A) / Radiated Emission, 26 to 40 GHz	+/- 3.82
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	Notebook PC	IBM (Lenovo)	ThinkPad T61 7663-AS6	L3F3864
2	Micro SD Card	Kingston	SD-C02G	---

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF Mode:

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run BlueTool Test software: IBDK_svn183
3. Select COM port:COM1
4 .Select HCI --> OK
5. Key in F5 , and Key in Conmmend
6. TX Mode

   TX command:

   (BT4.0-TX2402)

   CMD LTT 0x000100

   (BT4.0-TX2442)

   CMD LTT 0x000114

   (BT4.0-TX2480)

   CMD LTT 0x000127
7. All of the functions are under run.
8. Start test.

Normal Mode

All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Turn on the power of all equipments.
3. EUT link notebook PC.
4. (1) USB link PC: Run the program "uSpectrum.
   (2) BT link: run the program "WifiNet".
5. All of the functions are under run.
6. Start test.

7. FCC PART 15.247 REQUIREMENTS

7.1 6dB BANDWIDTH

LIMITS

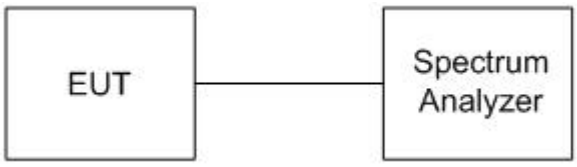
§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

1. The transmitter output was connected to a spectrum analyzer.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW) ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

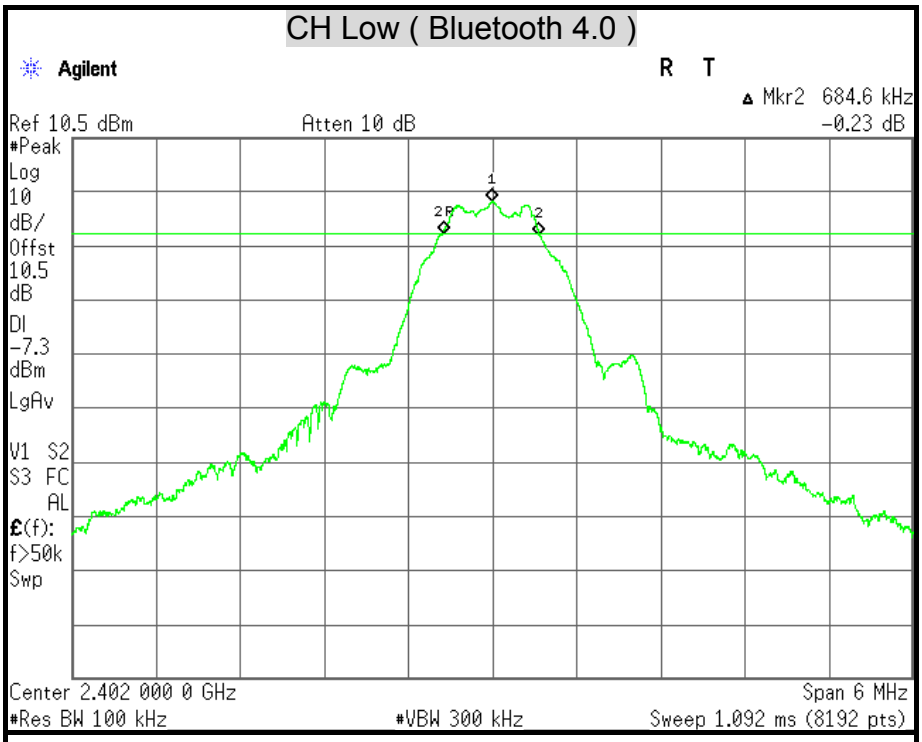
TEST RESULTS

Bluetooth 4.0 Mode

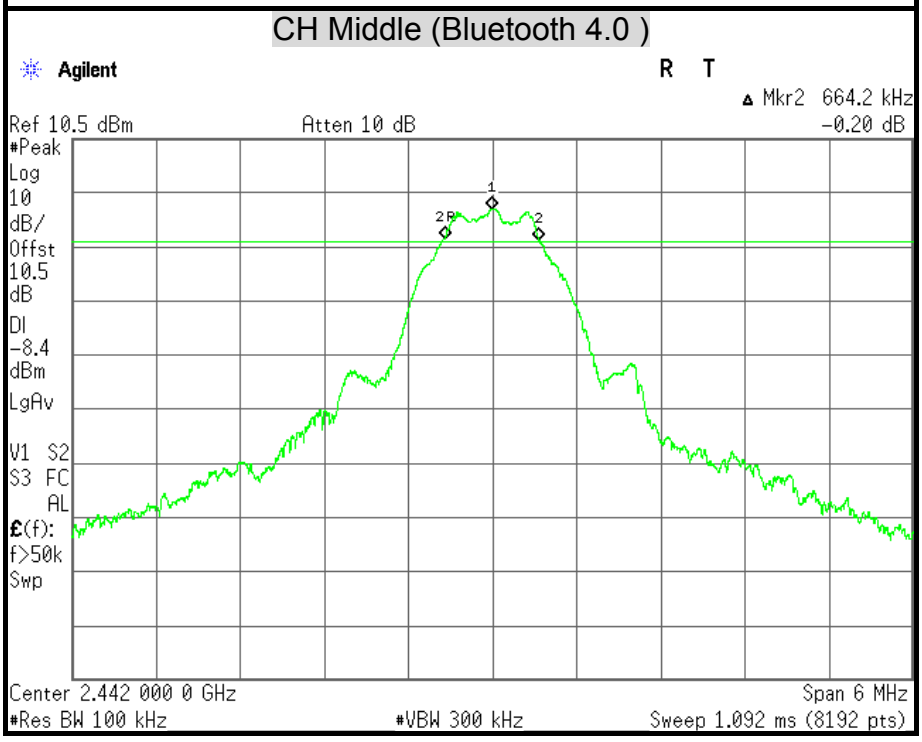
Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2402	684.6	500	PASS
Middle	2442	664.2	500	PASS
High	2480	674.4	500	PASS

6dB BANDWIDTH

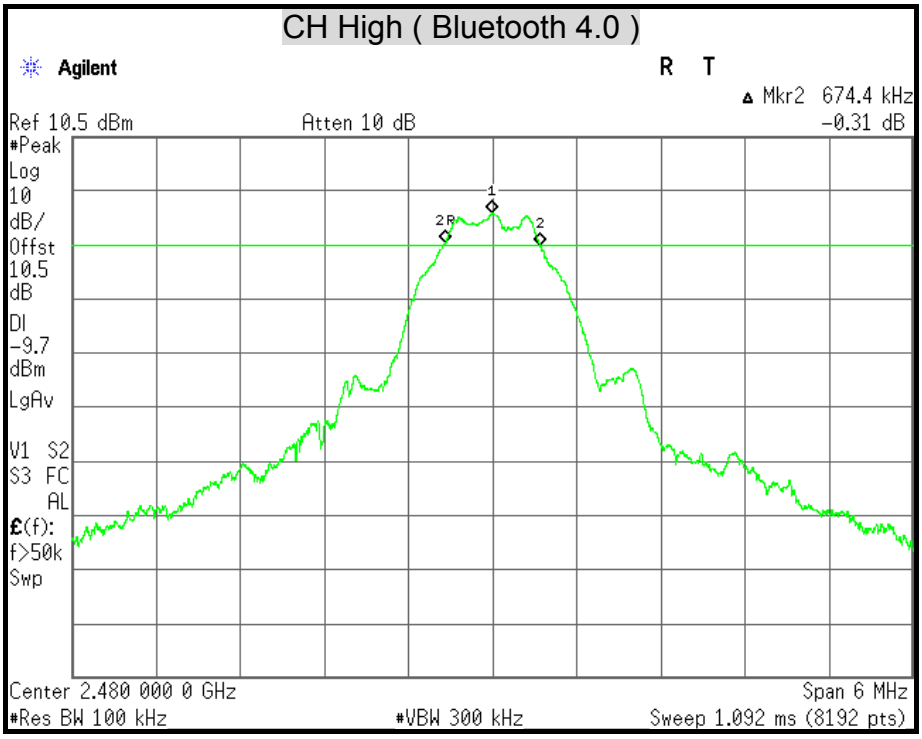
CH Low (Bluetooth 4.0)



CH Middle (Bluetooth 4.0)



CH High (Bluetooth 4.0)



7.2 MAXIMUM PEAK OUTPUT POWER

LIMITS

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (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.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1149001	12/06/2014
Power Sensor	Anritsu	MA2411B	1126148	12/06/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the peak power detection.

TEST RESULTS

Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2402	0.49	0.0011	30	1	PASS
Middle	2442	-0.56	0.0009	30	1	PASS
High	2480	-1.88	0.0006	30	1	PASS

Remark: *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*

7.3 AVERAGE POWER

LIMITS

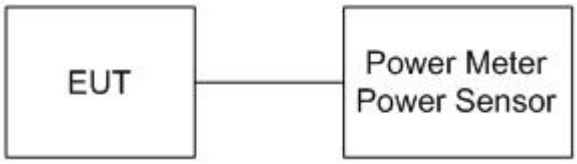
None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/06/2014
Power Sensor	ANRITSU	MA2411B	1126148	12/06/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the average power detection.

TEST RESULTS

Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	-3.14
Middle	2442	-4.31
High	2480	-5.82

Remark: *The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*

7.4 POWER SPECTRAL DENSITY

LIMITS

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
5. Set the VBW ≥ 3 x RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level within the RBW.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

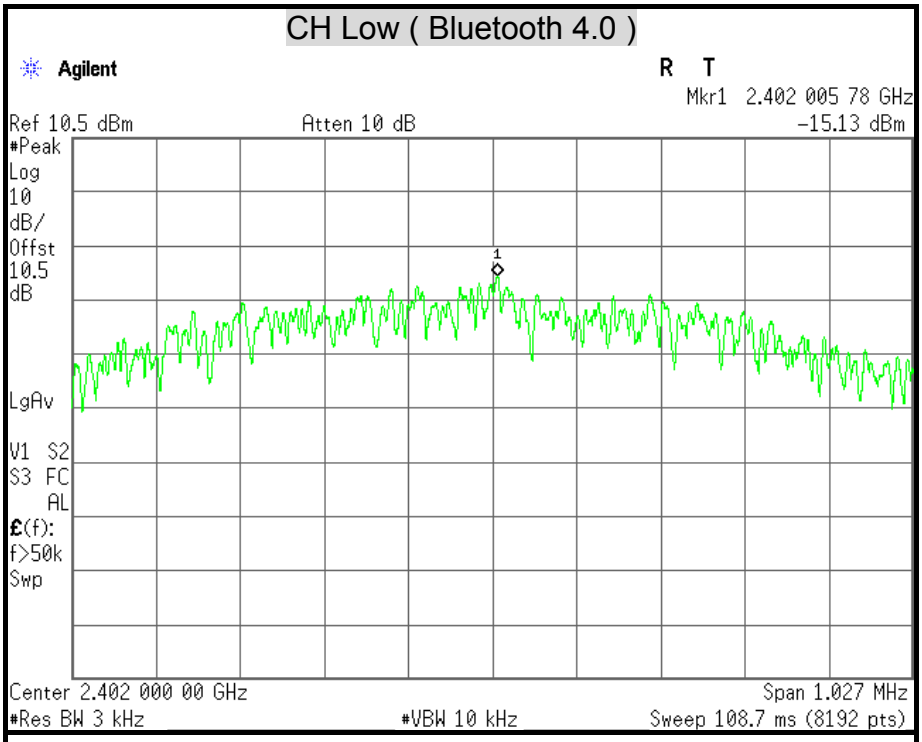
Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2402	-15.13	8	PASS
Middle	2442	-16.47	8	PASS
High	2480	-17.75	8	PASS

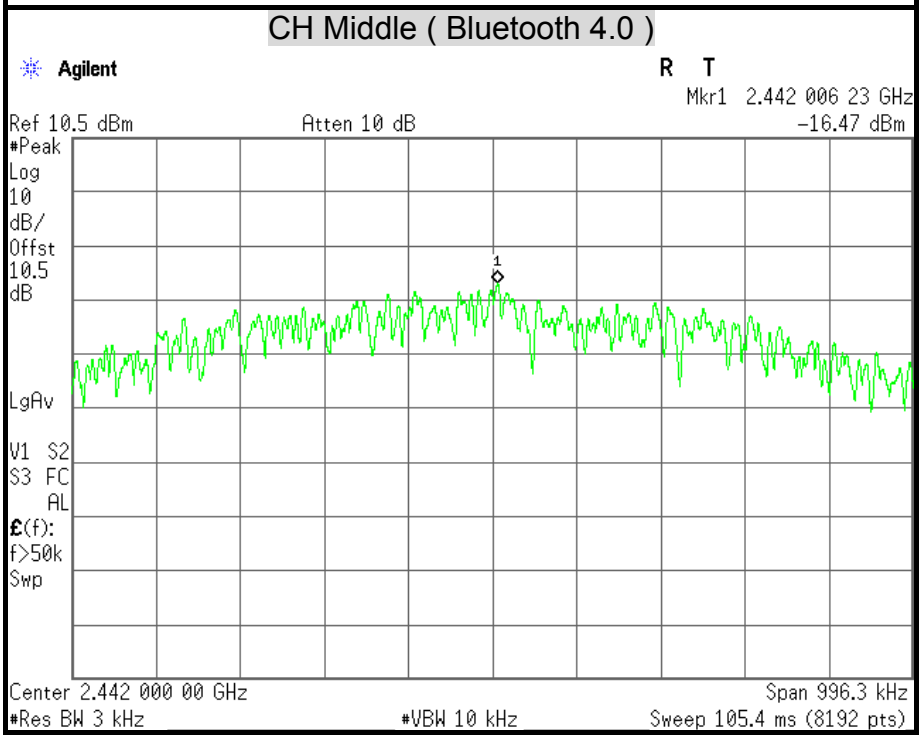
Remark: *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

POWER SPECTRAL DENSITY

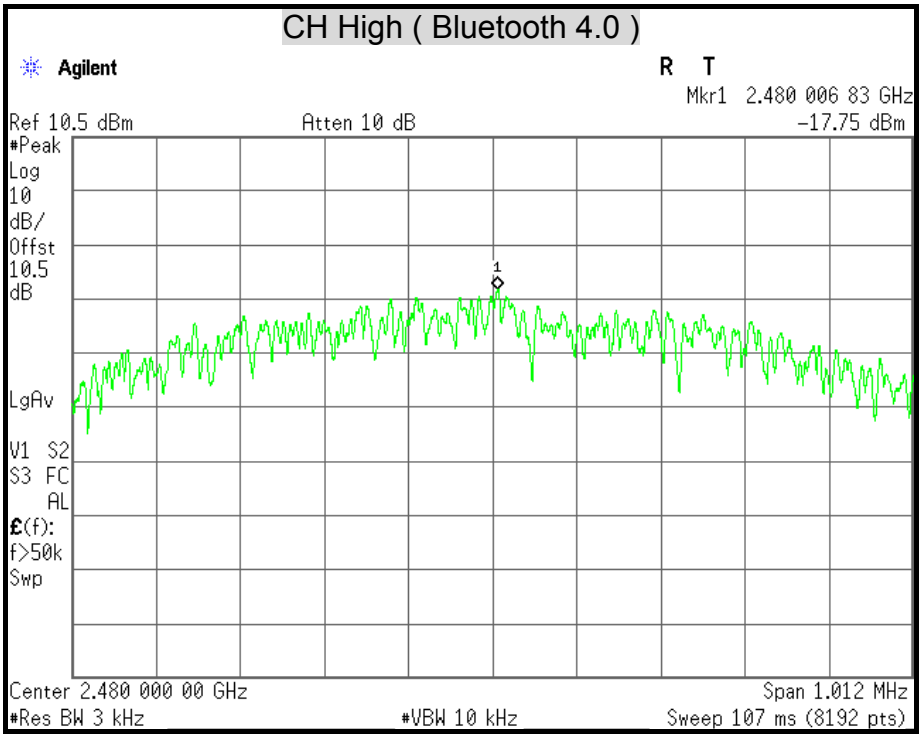
CH Low (Bluetooth 4.0)



CH Middle (Bluetooth 4.0)



CH High (Bluetooth 4.0)



7.5 CONDUCTED SPURIOUS EMISSION

LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

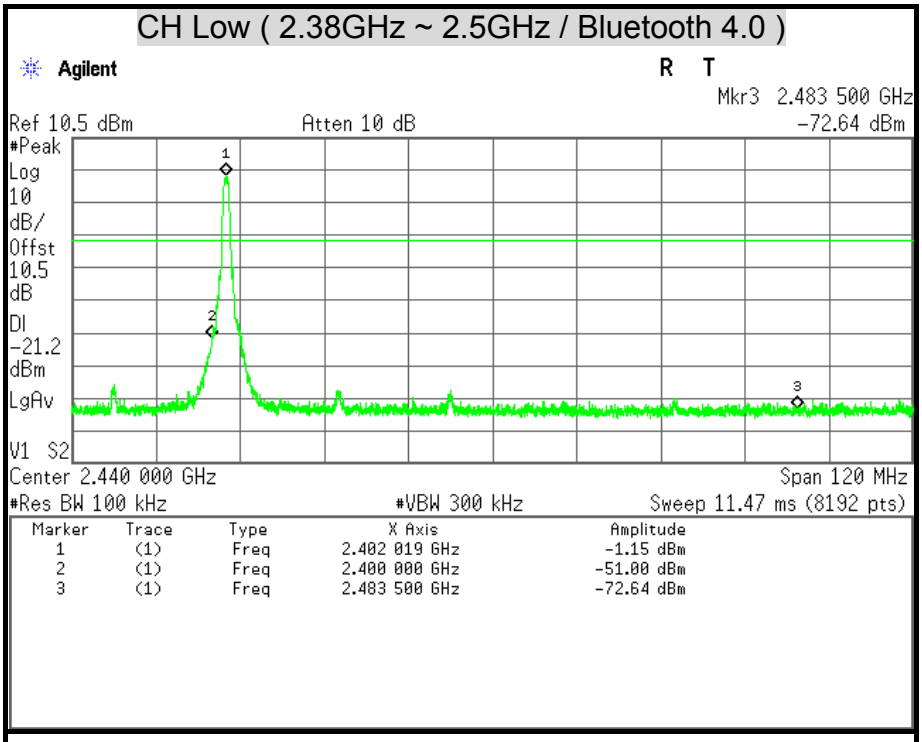
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

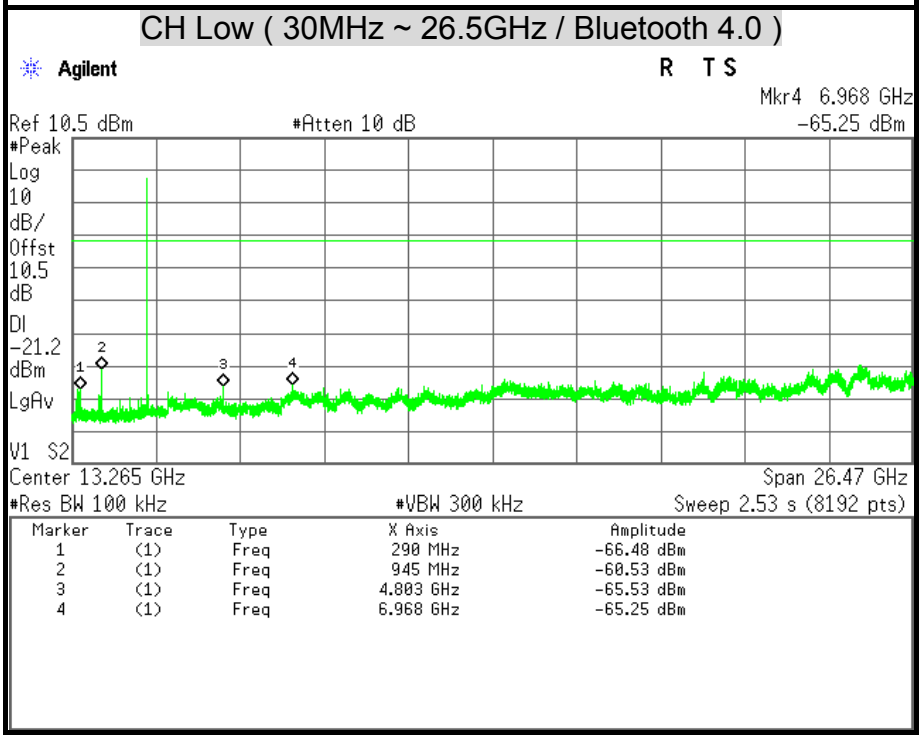
TEST RESULTS

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

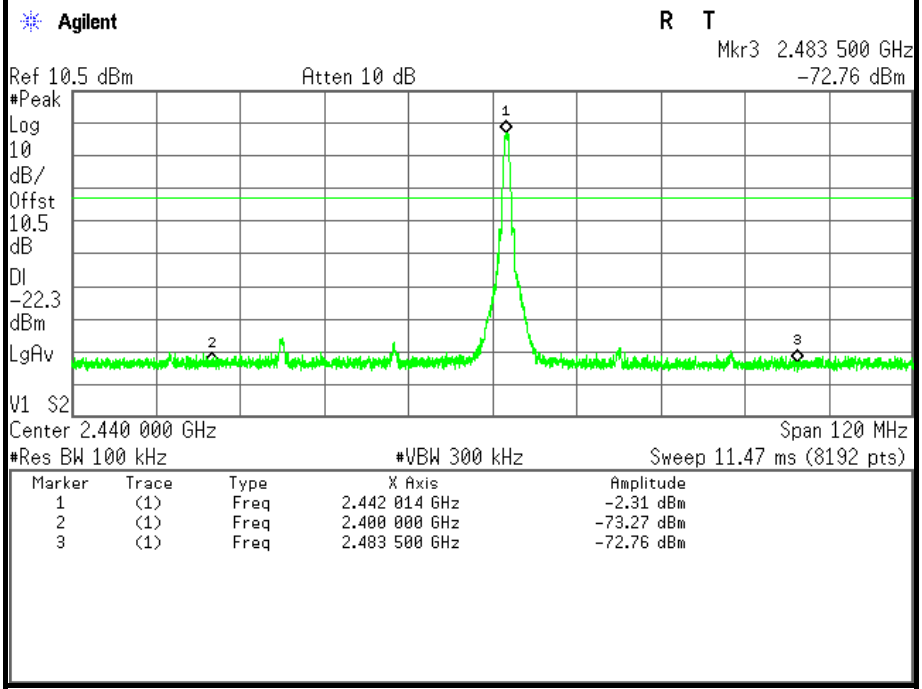
CH Low (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



CH Low (30MHz ~ 26.5GHz / Bluetooth 4.0)

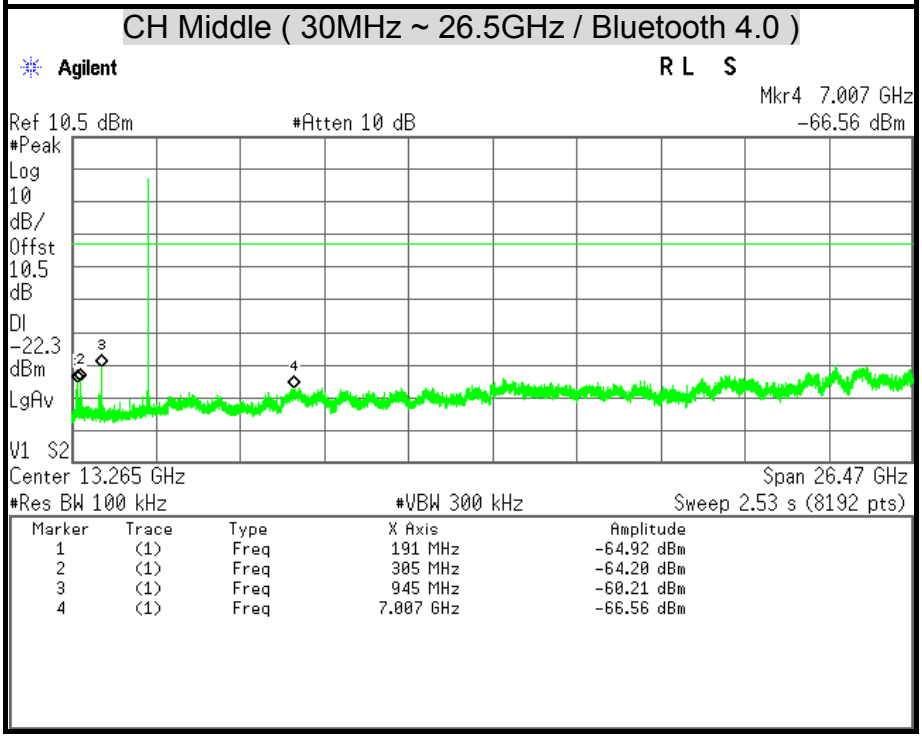


CH Middle (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



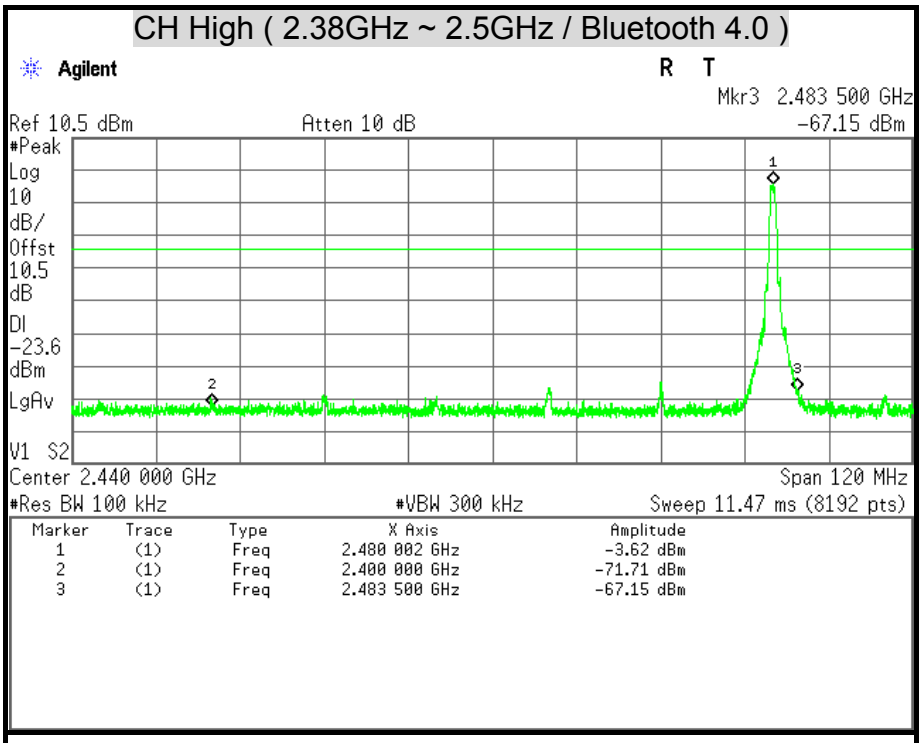
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.442 014 GHz	-2.31 dBm
2	(1)	Freq	2.400 000 GHz	-73.27 dBm
3	(1)	Freq	2.483 500 GHz	-72.76 dBm

CH Middle (30MHz ~ 26.5GHz / Bluetooth 4.0)



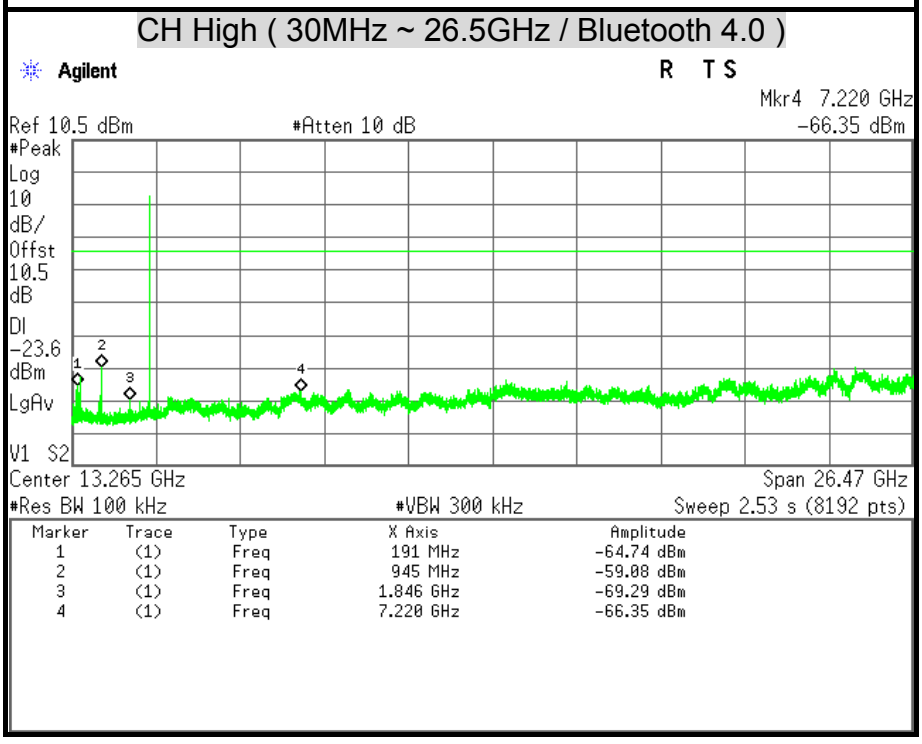
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	191 MHz	-64.92 dBm
2	(1)	Freq	305 MHz	-64.20 dBm
3	(1)	Freq	945 MHz	-60.21 dBm
4	(1)	Freq	7.007 GHz	-66.56 dBm

CH High (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.480 002 GHz	-3.62 dBm
2	(1)	Freq	2.400 000 GHz	-71.71 dBm
3	(1)	Freq	2.483 500 GHz	-67.15 dBm

CH High (30MHz ~ 26.5GHz / Bluetooth 4.0)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	191 MHz	-64.74 dBm
2	(1)	Freq	945 MHz	-59.08 dBm
3	(1)	Freq	1.846 GHz	-69.29 dBm
4	(1)	Freq	7.220 GHz	-66.35 dBm

7.6 RADIATED EMISSION

LIMITS

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

Remark:
1. [1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. [2] Above 38.6

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

Remark: ***Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

Radiated Emission / 966Chamber_A

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2014
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	04/28/2015
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-249	09/12/2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	09/12/2014
Pre-Amplifier	Agilent	8449B	3008A01471	07/16/2014
Pre-Amplifier	HP	8447F	2944A03748	07/16/2014
Band Reject Notch Filter	Micro-Tronics	BRM05702-01	009	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

Radiated Emission / 966Chamber_B

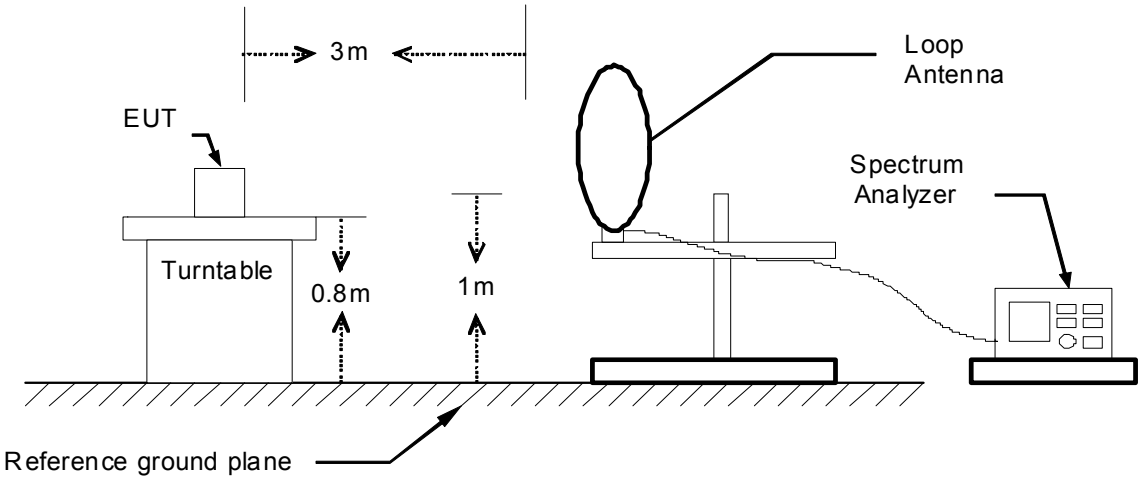
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/16/2014
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	09/12/2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	09/12/2014
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/05/2014
Horn Antenna	COM-POWER	AH-840	03077	12/18/2014
Pre-Amplifier	Agilent	8447D	2944A10052	07/16/2014
Pre-Amplifier	Agilent	8449B	3008A01916	07/16/2014
LOOP Antenna	EMCO	6502	8905-2356	08/20/2014
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

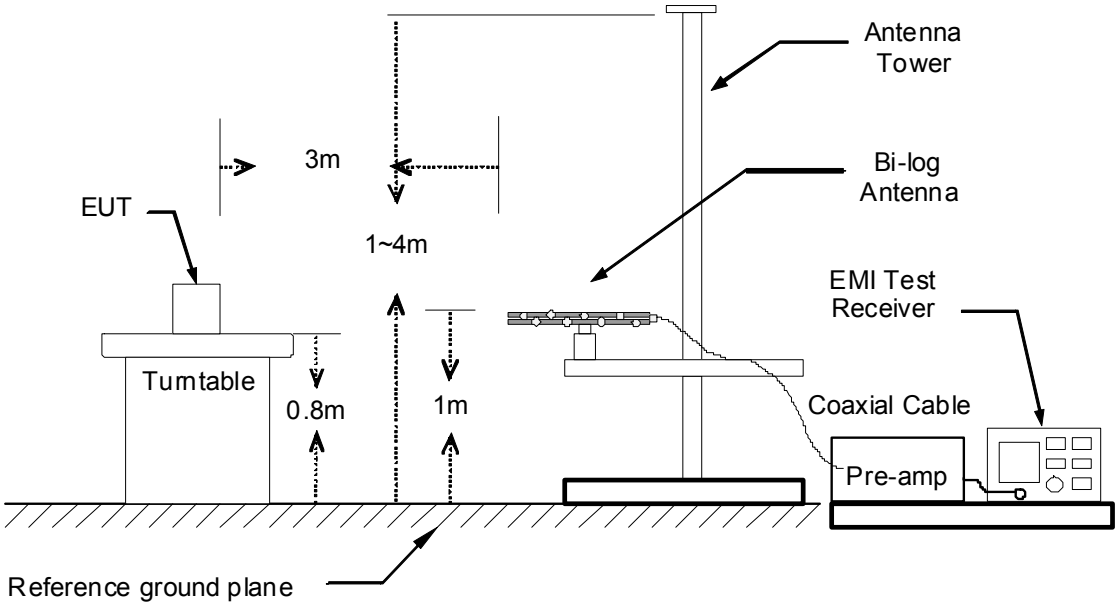
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.

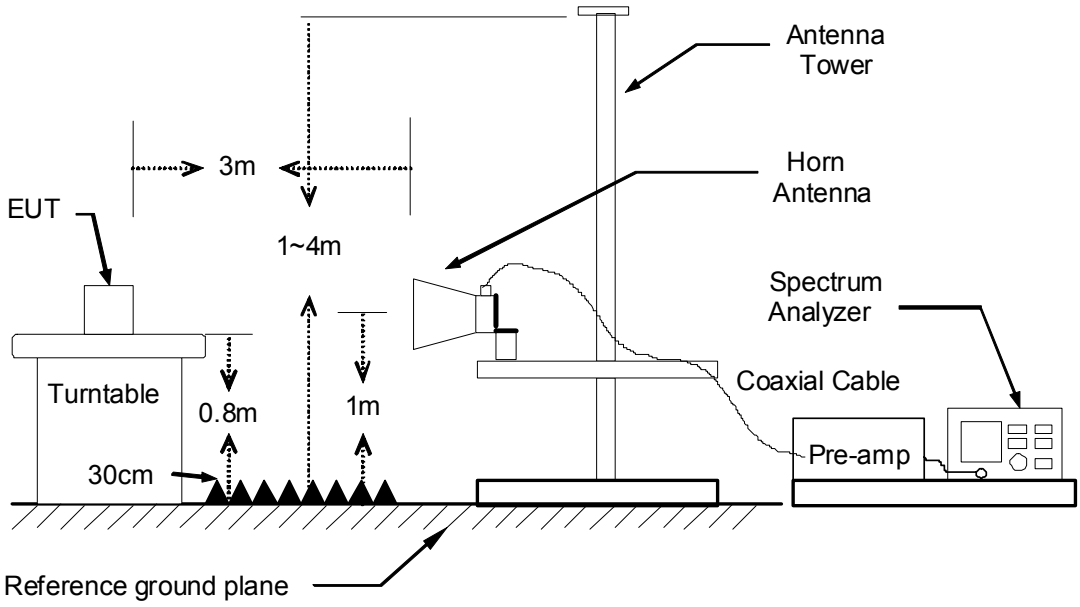
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark：

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/08
Test Mode	Normal Operating / Adapter Charge Mode	Temp. & Humidity	24°C, 60%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
95.96	42.37	-15.37	27.00	43.50	-16.50	Peak
204.60	43.90	-12.55	31.35	43.50	-12.15	Peak
288.02	41.10	-9.17	31.92	46.00	-14.08	Peak
383.08	44.18	-6.78	37.40	46.00	-8.60	Peak
392.78	43.76	-6.53	37.23	46.00	-8.77	Peak
416.06	41.57	-5.85	35.72	46.00	-10.28	Peak
666.32	37.70	-0.90	36.80	46.00	-9.20	Peak
864.20	30.39	2.57	32.96	46.00	-13.04	Peak

966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
35.82	46.30	-10.74	35.56	40.00	-4.44	QP
64.92	46.44	-11.16	35.27	40.00	-4.73	Peak
148.34	44.07	-10.08	33.99	43.50	-9.51	Peak
194.90	46.23	-12.26	33.98	43.50	-9.52	Peak
288.02	40.81	-9.17	31.63	46.00	-14.37	Peak
352.04	39.05	-7.56	31.49	46.00	-14.51	Peak
433.52	39.20	-5.30	33.90	46.00	-12.10	Peak
664.38	37.80	-0.93	36.87	46.00	-9.13	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Above 1 GHz

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/08
Test Mode	Bluetooth 4.0 / TX Mode / CH Low	Temp. & Humidity	24°C, 60%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1376.00	49.20	---	-2.90	46.31	---	74.00	54.00	-7.69	Peak
1598.00	50.58	---	-1.97	48.61	---	74.00	54.00	-5.39	Peak
1804.00	49.03	---	-0.03	49.00	---	74.00	54.00	-5.00	Peak
3630.00	41.51	---	4.85	46.36	---	74.00	54.00	-7.64	Peak
4110.00	40.33	---	6.20	46.53	---	74.00	54.00	-7.47	Peak
4800.00	41.90	---	8.03	49.93	---	74.00	54.00	-4.07	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1084.00	53.23	---	-2.88	50.35	---	74.00	54.00	-3.65	Peak
1792.00	48.38	---	-0.14	48.23	---	74.00	54.00	-5.77	Peak
1956.00	48.16	---	1.40	49.56	---	74.00	54.00	-4.44	Peak
3075.00	43.47	---	4.14	47.61	---	74.00	54.00	-6.39	Peak
4380.00	40.72	---	7.04	47.76	---	74.00	54.00	-6.24	Peak
5040.00	40.34	---	8.51	48.85	---	74.00	54.00	-5.15	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/08
Test Mode	Bluetooth 4.0 / TX Mode / CH Middle	Temp. & Humidity	24°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1230.00	50.95	---	-2.89	48.06	---	74.00	54.00	-5.94	Peak
1498.00	50.00	---	-2.90	47.10	---	74.00	54.00	-6.90	Peak
1602.00	51.44	---	-1.94	49.51	---	74.00	54.00	-4.49	Peak
3270.00	42.18	---	4.30	46.49	---	74.00	54.00	-7.51	Peak
4410.00	40.05	---	7.13	47.18	---	74.00	54.00	-6.82	Peak
4890.00	41.34	---	8.21	49.55	---	74.00	54.00	-4.45	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1532.00	49.57	---	-2.60	46.97	---	74.00	54.00	-7.03	Peak
1716.00	49.40	---	-0.86	48.54	---	74.00	54.00	-5.46	Peak
1978.00	48.65	---	1.61	50.26	---	74.00	54.00	-3.74	Peak
3150.00	45.05	---	4.20	49.26	---	74.00	54.00	-4.74	Peak
4350.00	40.32	---	6.94	47.26	---	74.00	54.00	-6.74	Peak
4905.00	40.18	---	8.24	48.42	---	74.00	54.00	-5.58	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/08
Test Mode	Bluetooth 4.0 / TX Mode / CH High	Temp. & Humidity	24°C, 60%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1150.00	49.57	---	-2.89	46.68	---	74.00	54.00	-7.32	Peak
1598.00	50.03	---	-1.97	48.05	---	74.00	54.00	-5.95	Peak
2010.00	48.40	---	1.84	50.24	---	74.00	54.00	-3.76	Peak
3180.00	41.80	---	4.23	46.03	---	74.00	54.00	-7.97	Peak
4290.00	40.97	---	6.76	47.73	---	74.00	54.00	-6.27	Peak
4965.00	40.40	---	8.37	48.77	---	74.00	54.00	-5.23	Peak

966 Chamber_B at 3Meter / Vertical

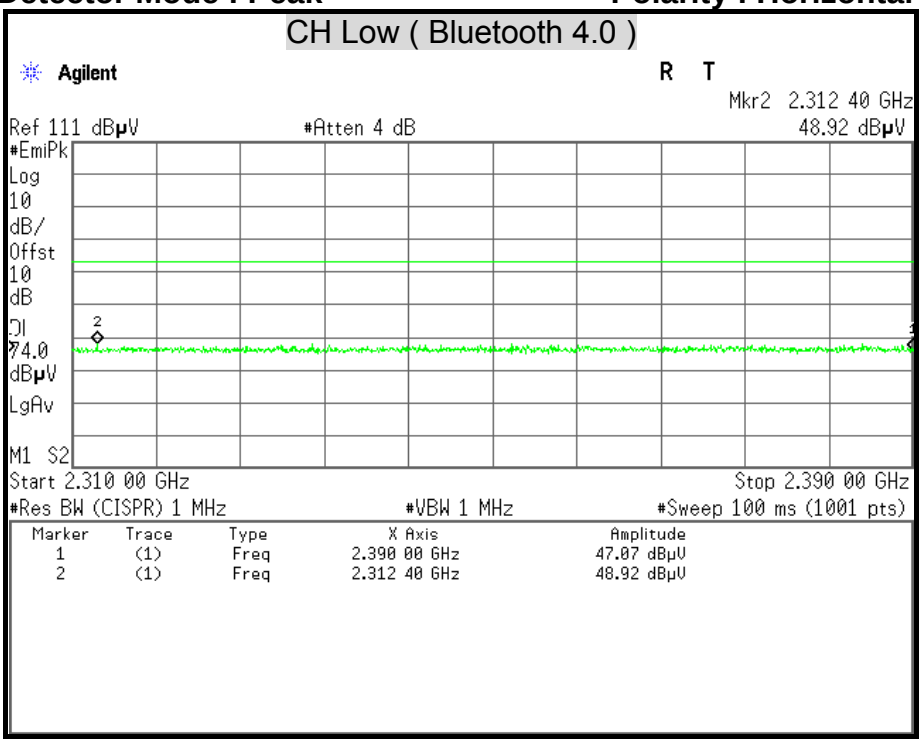
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1156.00	49.87	---	-2.89	46.99	---	74.00	54.00	-7.01	Peak
1310.00	49.56	---	-2.89	46.67	---	74.00	54.00	-7.33	Peak
1598.00	49.03	---	-1.97	47.06	---	74.00	54.00	-6.94	Peak
3075.00	44.90	---	4.14	49.04	---	74.00	54.00	-4.96	Peak
3960.00	41.06	---	5.75	46.81	---	74.00	54.00	-7.19	Peak
5070.00	40.17	---	8.56	48.73	---	74.00	54.00	-5.27	Peak

Remark:

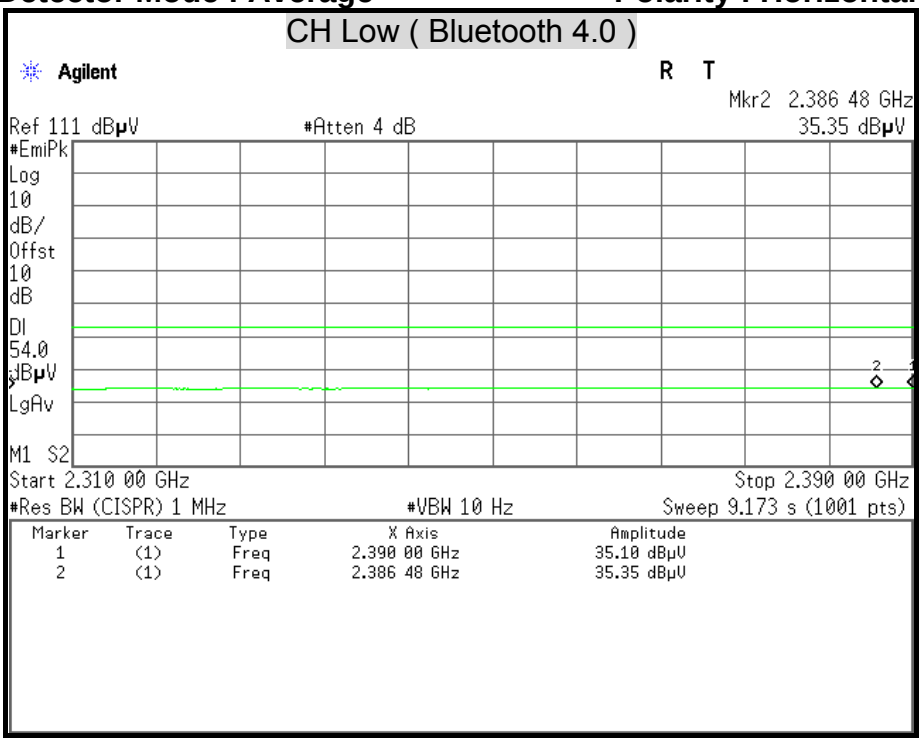
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Restricted Band Edges

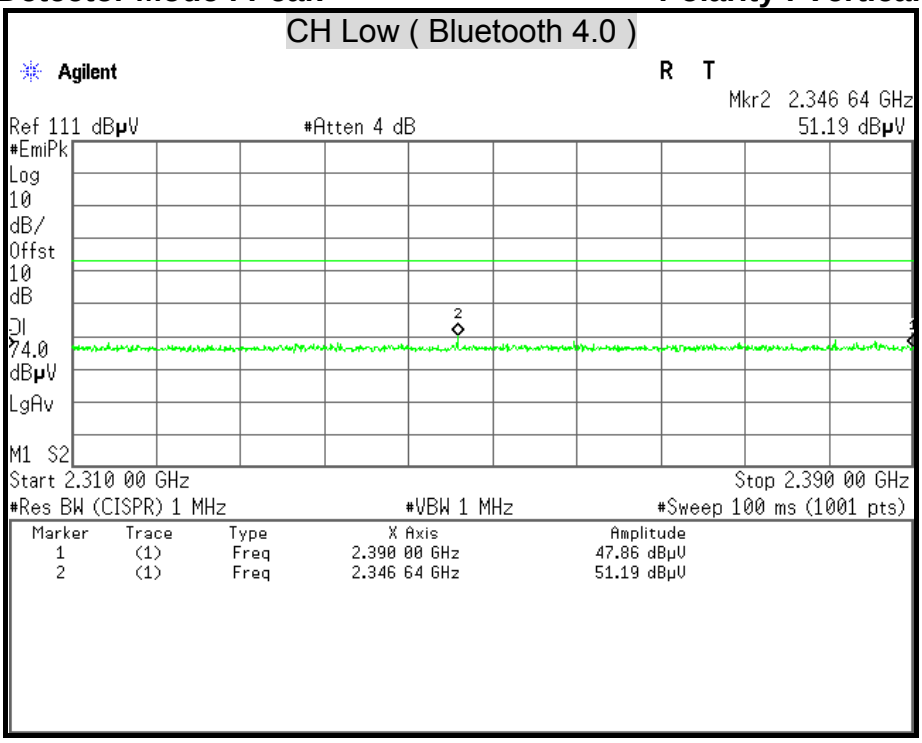
Detector Mode : Peak **Polarity : Horizontal**



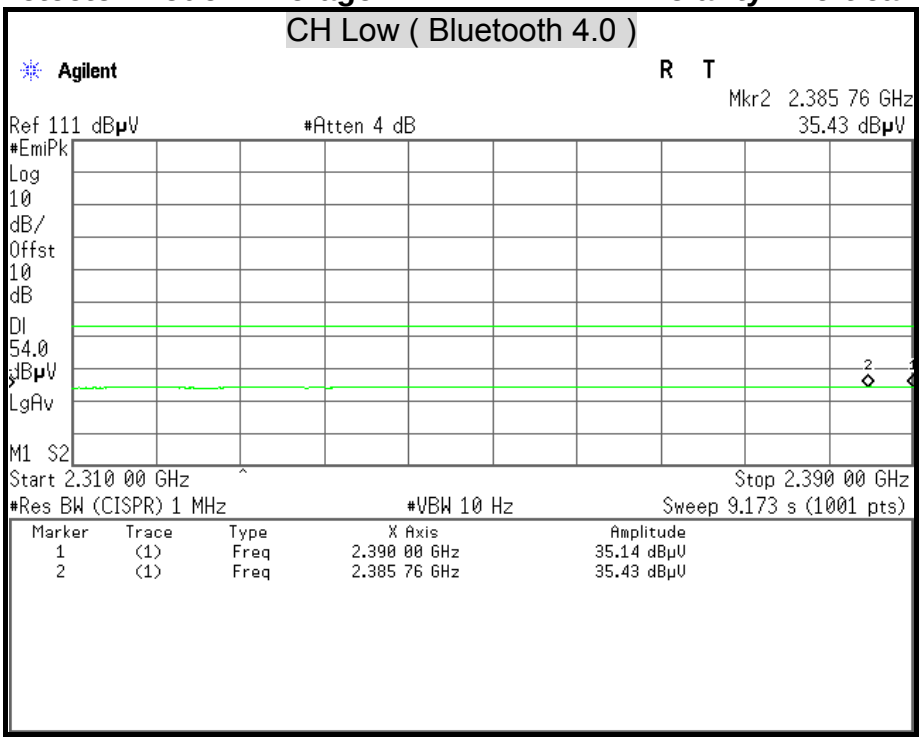
Detector Mode : Average **Polarity : Horizontal**



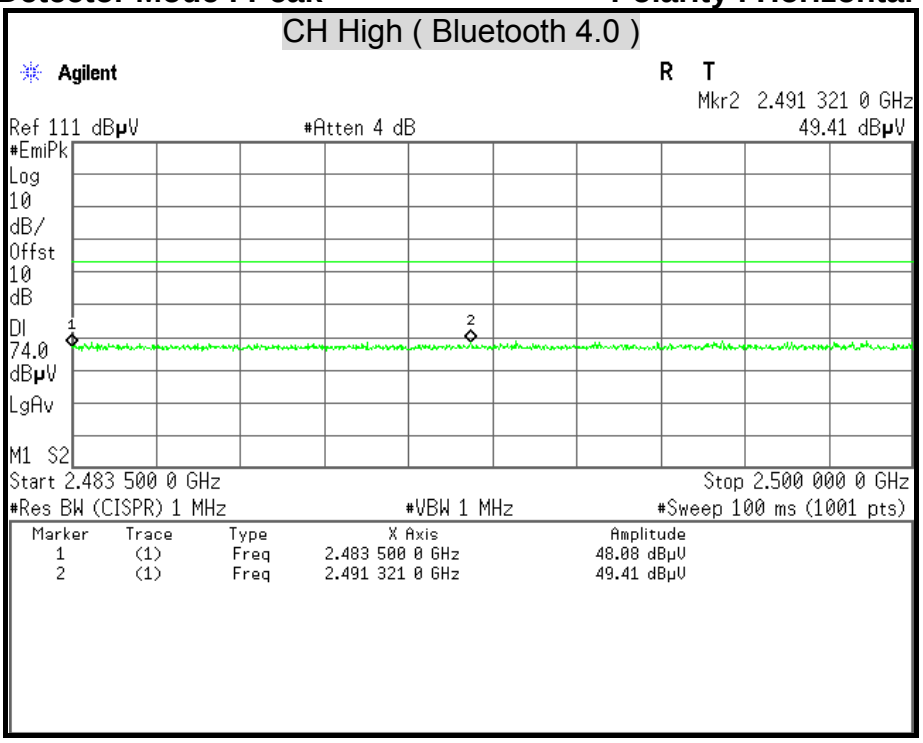
Detector Mode : Peak **Polarity : Vertical**



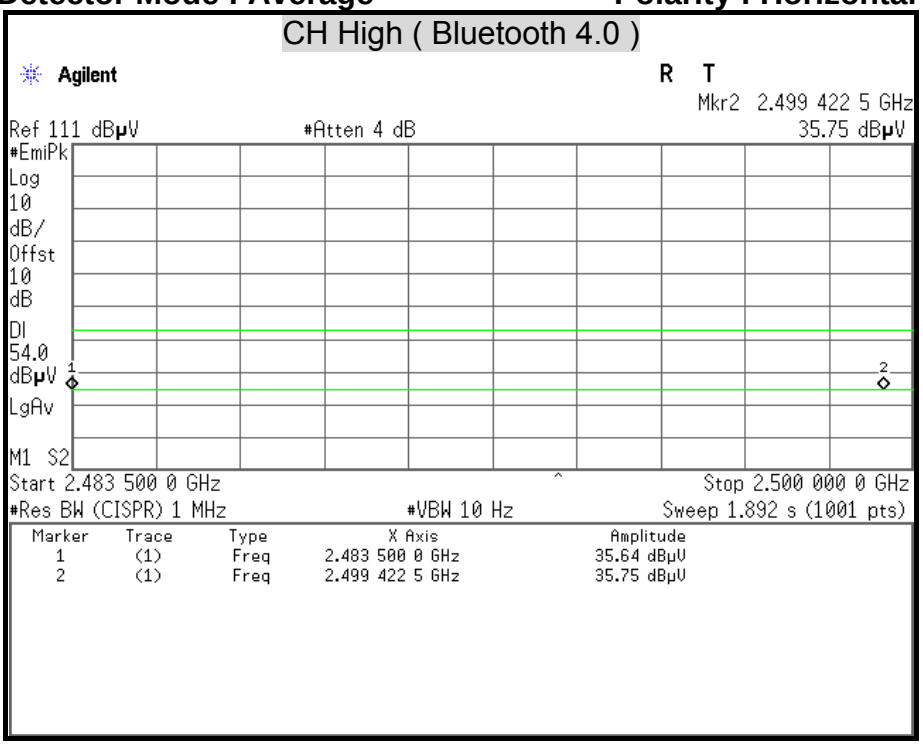
Detector Mode : Average **Polarity : Vertical**



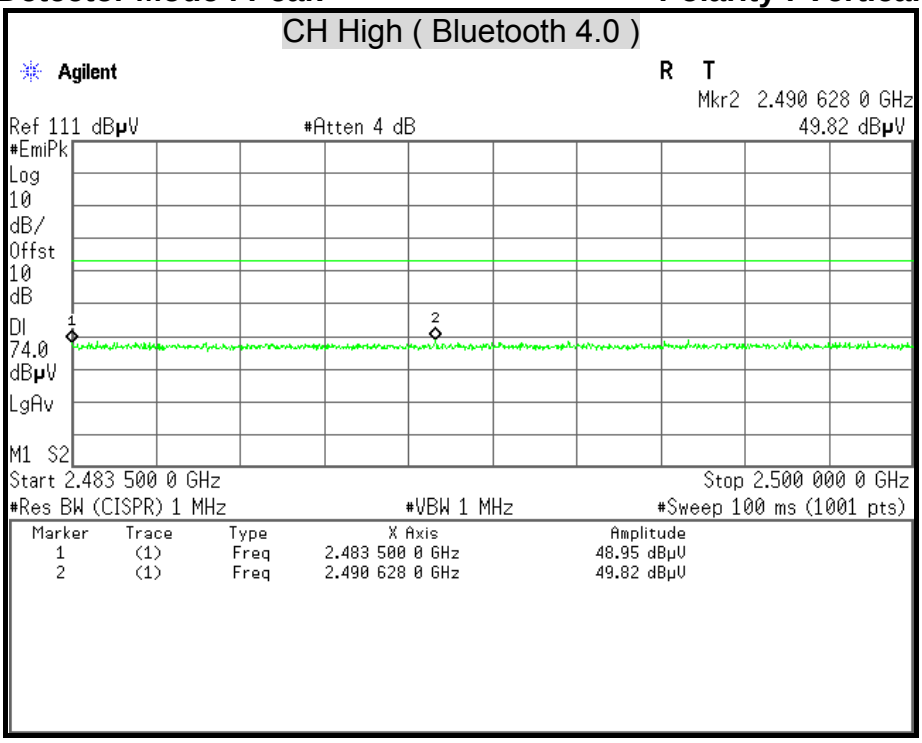
Detector Mode : Peak **Polarity : Horizontal**



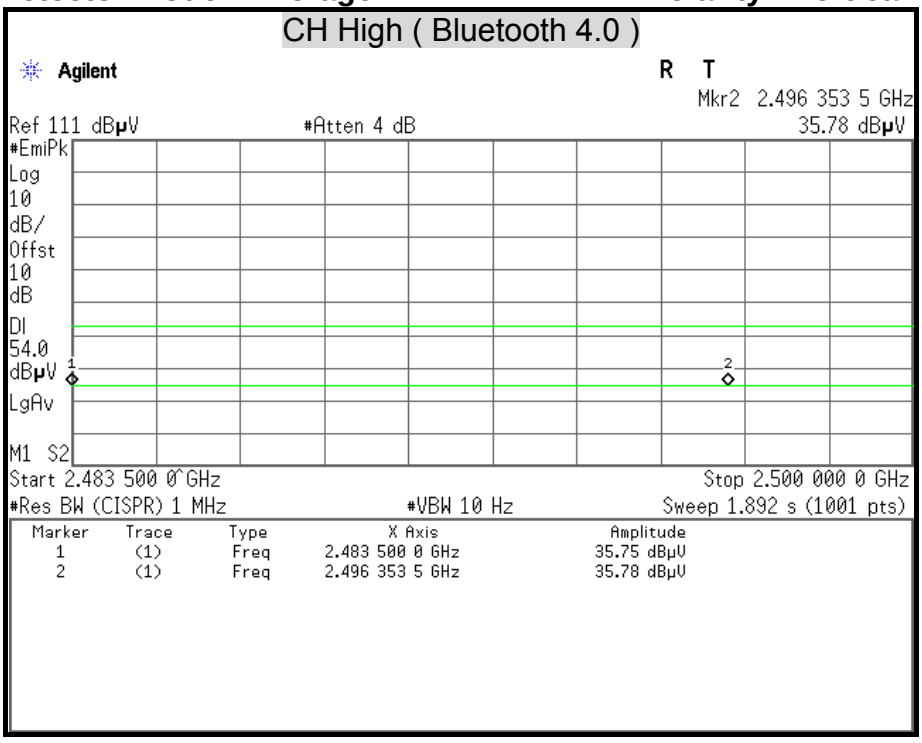
Detector Mode : Average **Polarity : Horizontal**



Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



7.7 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

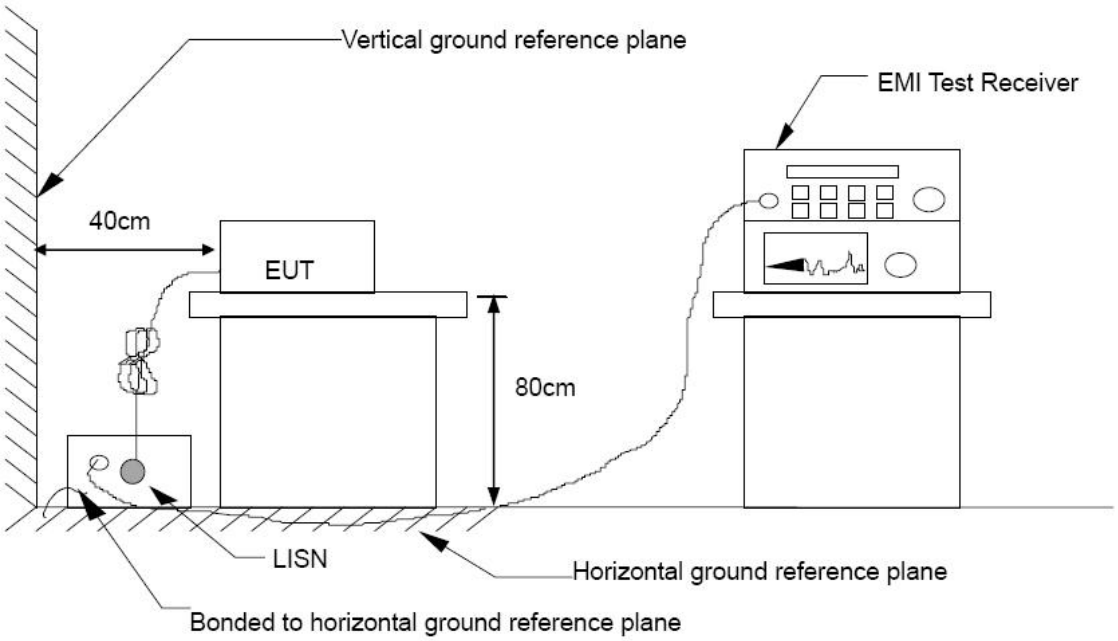
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

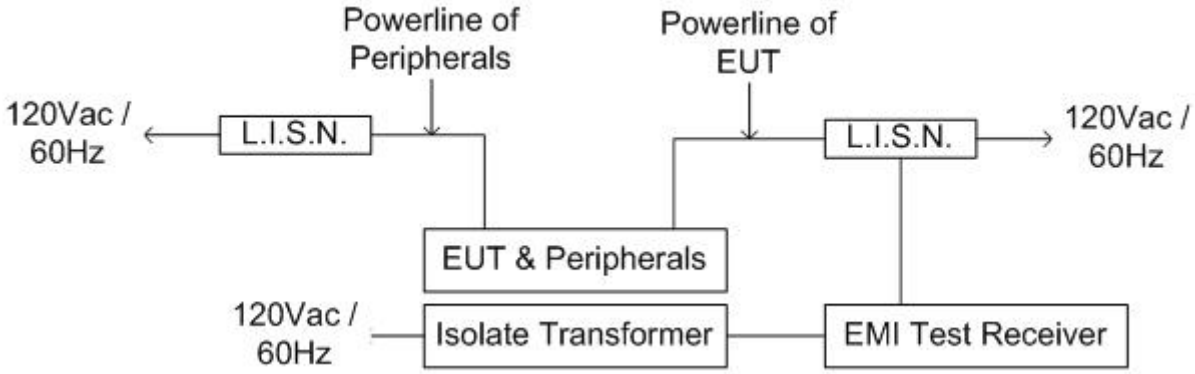
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/11/2014
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/10/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESHS 30	838550/003	11/07/2014
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100117	07/01/2014

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

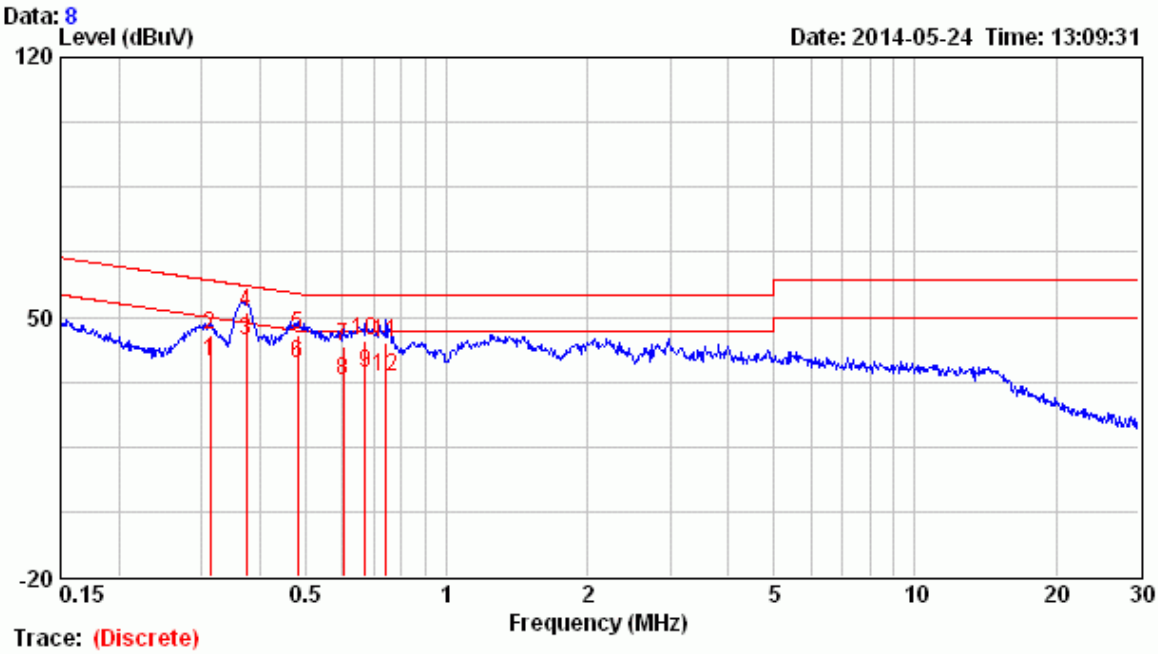
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/24
Test Mode	Normal Operating / Adapter Charge Mode	Temp. & Humidity	26°C, 63%

LINE



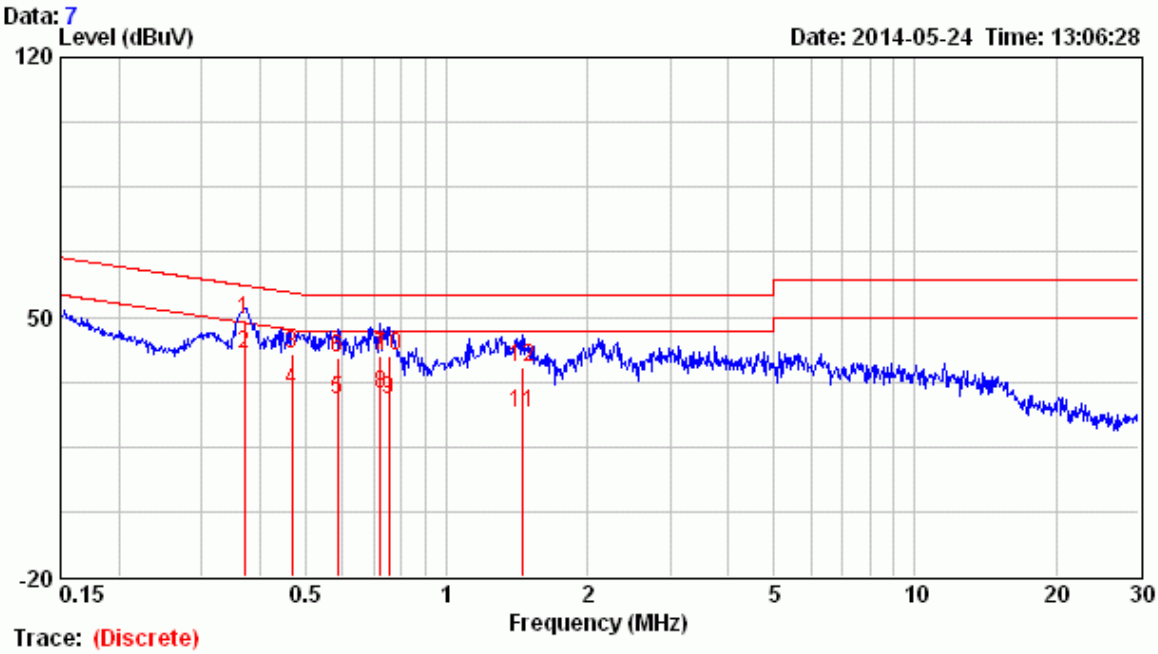
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.313	0.42	44.62	37.61	45.04	38.03	59.88	49.88	-14.84	-11.85
0.373	0.53	50.72	43.30	51.25	43.83	58.43	48.43	-7.18	-4.60
0.481	0.54	44.72	36.89	45.26	37.43	56.32	46.32	-11.06	-8.89
0.601	0.50	41.45	32.15	41.95	32.65	56.00	46.00	-14.05	-13.35
0.672	0.48	42.95	34.26	43.43	34.74	56.00	46.00	-12.57	-11.26
0.743	0.46	42.52	33.18	42.98	33.64	56.00	46.00	-13.02	-12.36

Remark:

1. *Correction Factor = Insertion loss + Cable loss*
2. *Emission level = Reading Value + Correction factor*
3. *Margin value = Emission level – Limit value*

Product Name	LED Meter	Test By	Waternil Guan
Test Model	MK350D	Test Date	2014/05/24
Test Mode	Normal Operating / Adapter Charge Mode	Temp. & Humidity	26°C, 63%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.370	0.08	49.39	39.73	49.47	39.81	58.51	48.51	-9.04	-8.70
0.469	0.09	39.90	30.17	39.99	30.26	56.54	46.54	-16.55	-16.28
0.585	0.10	38.76	27.67	38.86	27.77	56.00	46.00	-17.14	-18.23
0.724	0.11	39.44	28.89	39.55	29.00	56.00	46.00	-16.45	-17.00
0.755	0.11	39.27	27.49	39.38	27.60	56.00	46.00	-16.62	-18.40
1.456	0.13	36.53	23.89	36.66	24.02	56.00	46.00	-19.34	-21.98

Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value