

RF TEST REPORT



Report No.: 16020287-FCC-R1

Supersede Report No.: N/A

Applicant	Beijing WatchSmart Technologies Co.LTD.	
Product Name	WatchKeyOCL MB	
Main Model	WatchKeyOCL MB	
Test Standard	FCC Part 15.247: 2015, ANSI C63.10: 2013	
Test Date	March 31 to April 15, 2016	
Issue Date	April 25, 2016	
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Equipment complied with the specification	<input checked="" type="checkbox"/>	
Equipment did not comply with the specification	<input type="checkbox"/>	
<i>Amos Xia</i>	<i>Herve Idoko</i>	
Amos Xia Test Engineer	Herve Idoko Checked By	
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Issued by:
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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
16020287-FCC-R1	NONE	Original	April 25, 2016

2. Customer information

Applicant Name	Beijing WatchSmart Technologies Co.LTD.
Applicant Add	F7 Qi Ming International Mansion, No.101 Li Ze Zhong Yuan Beijing,China
Manufacturer	Beijing WatchSmart Technologies Co.LTD.
Manufacturer Add	F7 Qi Ming International Mansion, No.101 Li Ze Zhong Yuan Beijing,China

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0

4. Equipment under Test (EUT) Information

Description of EUT:	WatchKeyOCL MB
Main Model:	WatchKeyOCL MB
Serial Model:	N/A
Date EUT received:	March 29, 2016
Test Date(s):	March 31 to April 15, 2016
Output Max power	-5.838 dBm
Antenna Gain:	BLE: 0 dBi
Type of Modulation:	BLE: GFSK
RF Operating Frequency (ies):	BLE: 2402-2480 MHz
Number of Channels:	BLE: 40CH
Port:	USB Port
Input Power:	3.7V 90mAh
Trade Name :	OCL
FCC ID:	AMGWATCHKEYOCLMB

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.247 (a)(2)	DTS (6 dB) CHANNEL BANDWIDTH	Compliance
§15.247(b)(3)	Conducted Maximum Output Power	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands	Compliance
§15.207 (a),	AC Power Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Test Item	Description	Uncertainty
Radiated Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	3.952dB

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6. Measurements, Examination And Derived Results

6.1 RF Exposure

The EUT is a portable device, thus requires RF exposure evaluation;
Please refer to SIEMIC RF Exposure Report: 16020287-FCC-H1.

6.2 Antenna Requirement

Applicable Standard

According to § 15.203, 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules.

§15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

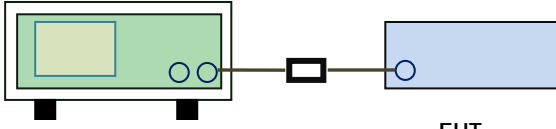
The EUT has 1 antenna:

A PIFA antenna for BLE, the gain is 0 dBi for BLE.

Result: Compliance.

6.3 DTS (6 dB) Channel Bandwidth

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 05, 2016
Tested By :	Amos Xia

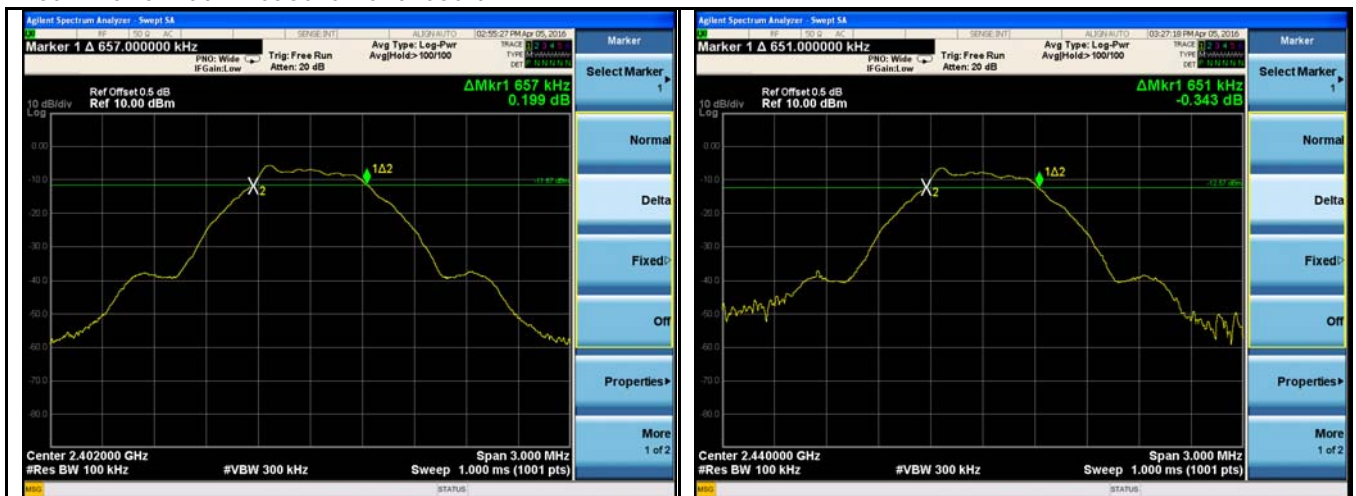
Spec	Item	Requirement	Applicable
§ 15.247(a)(2) RSSGen (4.6.1)	a)	6dB BW≥500kHz;	<input checked="" type="checkbox"/>
	b)	20dB BW: For FCC reference only; required by IC.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<p>558074 D01 DTS Meas Guidance v03r05, 8.1 DTS bandwidth</p> <p><u>6dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 3 x RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. <p>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.</p>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		
Test Data	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A		
Test Plot	<input checked="" type="checkbox"/> Yes (See below) <input type="checkbox"/> N/A		

6dB Bandwidth measurement result

Type	Test mode	CH	Freq (MHz)	Result (MHz)	Limit (MHz)	Result
6dB BW	BLE	Low	2402	0.657	≥ 0.5	Pass
		Mid	2440	0.651	≥ 0.5	Pass
		High	2480	0.654	≥ 0.5	Pass

Test Plots

6dB Bandwidth measurement result



6dB Bandwidth - Low CH 2402

6dB Bandwidth - Mid CH 2440



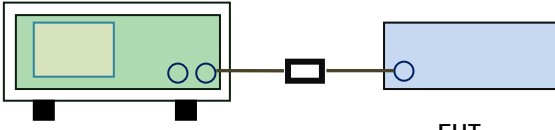
6dB Bandwidth - High CH 2480

6.4 Maximum Output Power

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 05, 2016
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(b) (2),RSS210 (A8.4)	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤ 1 Watt	<input type="checkbox"/>
	b)	FHSS in 5725-5850MHz: ≤ 1 Watt	<input type="checkbox"/>
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤ 0.125 Watt.	<input type="checkbox"/>
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤ 1 Watt	<input type="checkbox"/>
	e)	FHSS in 902-928MHz with ≥ 25 & < 50 channels: ≤ 0.25 Watt	<input type="checkbox"/>
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤ 1 Watt	<input checked="" type="checkbox"/>

Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
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Test Procedure	<p>558074 D01 DTS Meas Guidance v03r05, 9.1.2 Integrated band power method Maximum output power measurement procedure</p> <p>a) Set the RBW \geq DTS bandwidth. b) Set VBW $\geq 3 \times$ RBW. c) Set span $\geq 3 \times$ RBW d) Sweep time = auto couple. e) Detector = peak. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use peak marker function to determine the peak amplitude level.</p>
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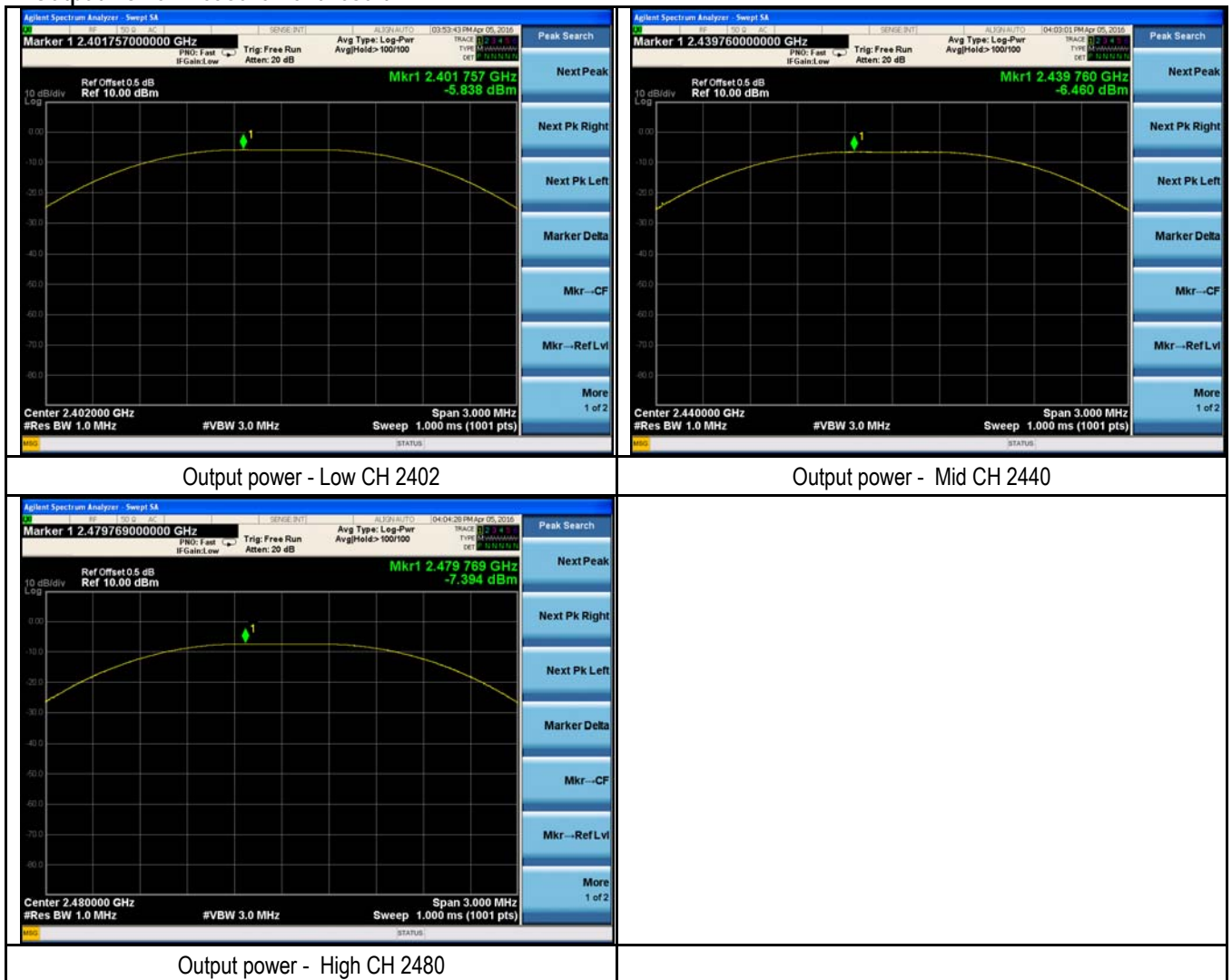
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Test Data	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
Test Plot	<input checked="" type="checkbox"/> Yes (See below) <input type="checkbox"/> N/A

Output Power measurement result

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Limit (dBm)	Result
Output power	BLE	Low	2402	-5.838	30	Pass
		Mid	2440	-6.460	30	Pass
		High	2480	-7.394	30	Pass

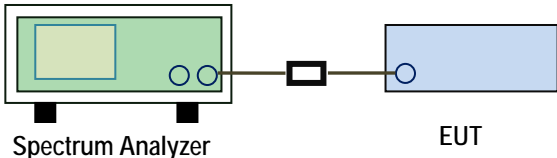
Test Plots

Output Power measurement result



6.5 Power Spectral Density

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 05, 2016
Tested By :	Amos Xia

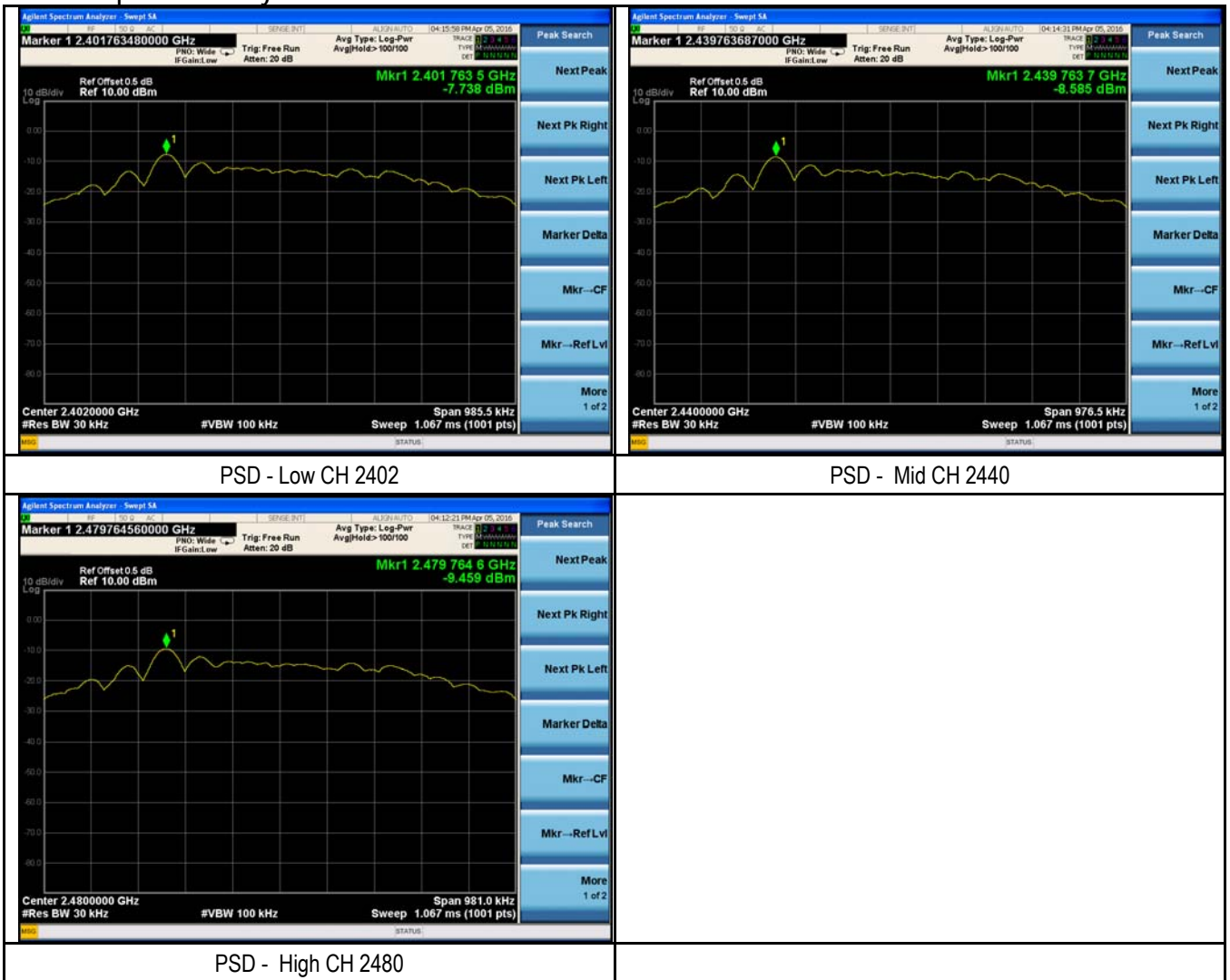
Spec	Item	Requirement	Applicable
§15.247(e)	a)	The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<p>558074 D01 DTS MEAS Guidance v03r05, 10.2 power spectral density method power spectral density measurement procedure</p> <p>a) Set analyzer center frequency to DTS channel center frequency.</p> <p>b) Set the span to 1.5 times the DTS bandwidth.</p> <p>c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.</p> <p>d) Set the VBW $\geq 3 \times \text{RBW}$.</p> <p>e) Detector = peak.</p> <p>f) Sweep time = auto couple.</p> <p>g) Trace mode = max hold.</p> <p>h) Allow trace to fully stabilize.</p> <p>i) Use the peak marker function to determine the maximum amplitude level within the RBW.</p> <p>j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.</p>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		
Test Data	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A		

Power Spectral Density measurement result

Type	Test mode	CH	Freq (MHz)	PSD (dBm)	Limit (dBm)	Result
PSD	BLE	Low	2402	-7.738	8	Pass
		Mid	2440	-8.585	8	Pass
		High	2480	-9.459	8	Pass

Test Plots

Power Spectral Density measurement result

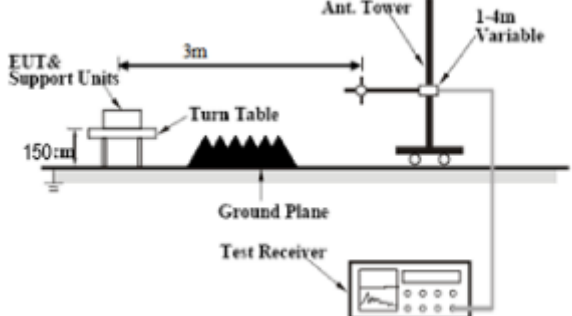


6.6 Band-Edge & Unwanted Emissions into Non-Restricted Frequency Bands

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 15, 2016
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(d)	a)	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.	<input checked="" type="checkbox"/>

Test Setup	
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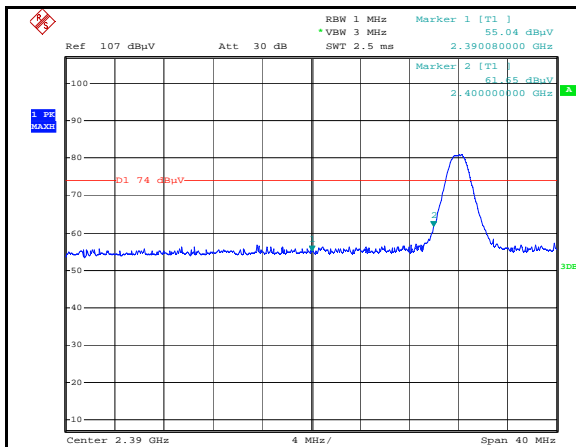
Test Procedure	<p>Radiated Method Only</p> <ul style="list-style-type: none"> 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: <ul style="list-style-type: none"> a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth for Average detection (AV) as below at frequency above 1GHz. <ul style="list-style-type: none"> ■ 1/T kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. 5. Repeat above procedures until all measured frequencies were complete.
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Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Test Data	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
Test Plot	<input checked="" type="checkbox"/> Yes (See below) <input type="checkbox"/> N/A

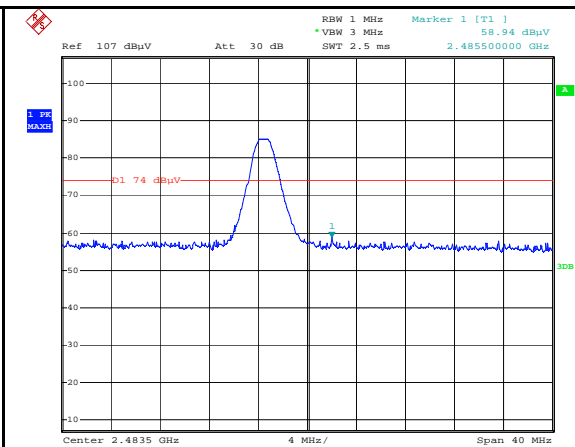
Test Plots

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Band Edge measurement result



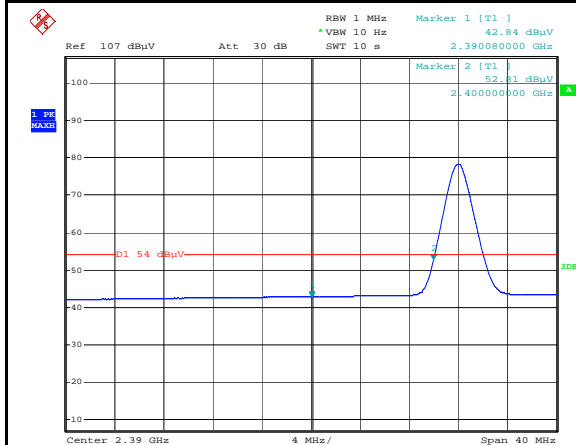
Date: 15.APR.2016 11:55:06



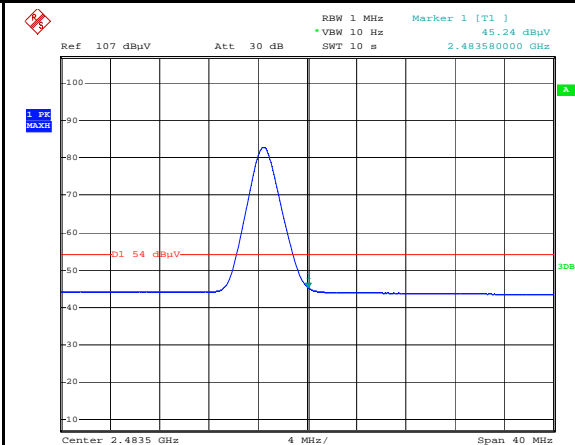
Date: 15.APR.2016 11:57:01

Band Edge, Left Side (Peak)
Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz

Band Edge, Right Side (Peak)
Note: F1 is frequency 2483.5MHz



Date: 15.APR.2016 11:53:29



Date: 15.APR.2016 11:58:26

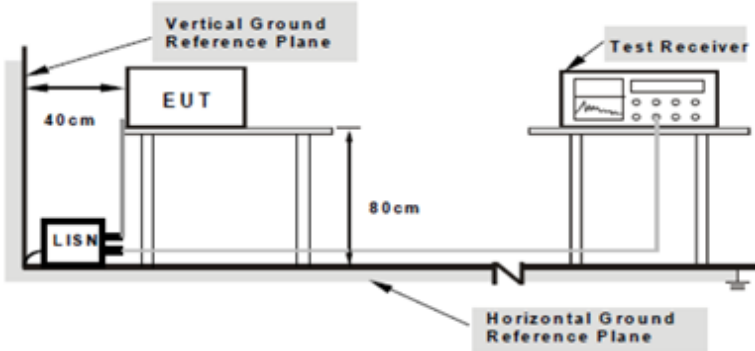
Band Edge, Left Side (Average)

Band Edge, Right Side (Average)

6.7 AC Power Line Conducted Emissions

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	April 01, 2016
Tested By :	Amos Xia

Requirement(s):

Spec	Item	Requirement	Applicable														
47CFR§15.207, RSS210 (A8.1)	a)	For Low-power radio-frequency devices 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 [μ]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.	<div><input checked="" type="checkbox"/></div>														
		<table><tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>QP</th><th>Average</th></tr><tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr><tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr><tr><td>5 ~ 30</td><td>60</td><td>50</td></tr></table>		Frequency ranges (MHz)	Limit (dBμV)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50
		Frequency ranges (MHz)			Limit (dBμV)												
				QP	Average												
		0.15 ~ 0.5		66 – 56	56 – 46												
		0.5 ~ 5		56	46												
5 ~ 30	60	50															
Test Setup	<div><p>Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</p></div>																
Procedure	<div><ol style="list-style-type: none">The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.All other supporting equipment were powered separately from another main supply.The EUT was switched on and allowed to warm up to its normal operating condition.A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz.Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</div>																
Remark																	
Result	<div><input checked="" type="checkbox"/> Pass</div>	<div><input type="checkbox"/> Fail</div>															
Test Data	<div><input checked="" type="checkbox"/> Yes</div>	<div><input type="checkbox"/> N/A</div>															
Test Plot	<div><input checked="" type="checkbox"/> Yes (See below)</div>	<div><input type="checkbox"/> N/A</div>															

Data sample

Frequency (MHz)	Quasi-Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
xxx	56.21	66.00	-9.79	39.20	56.00	-16.80	12.22

Frequency (MHz) = Emission frequency in MHz

Quais-Peak/Average (dBμV)=Receiver Reading(dBμV)+ Factor(dB)

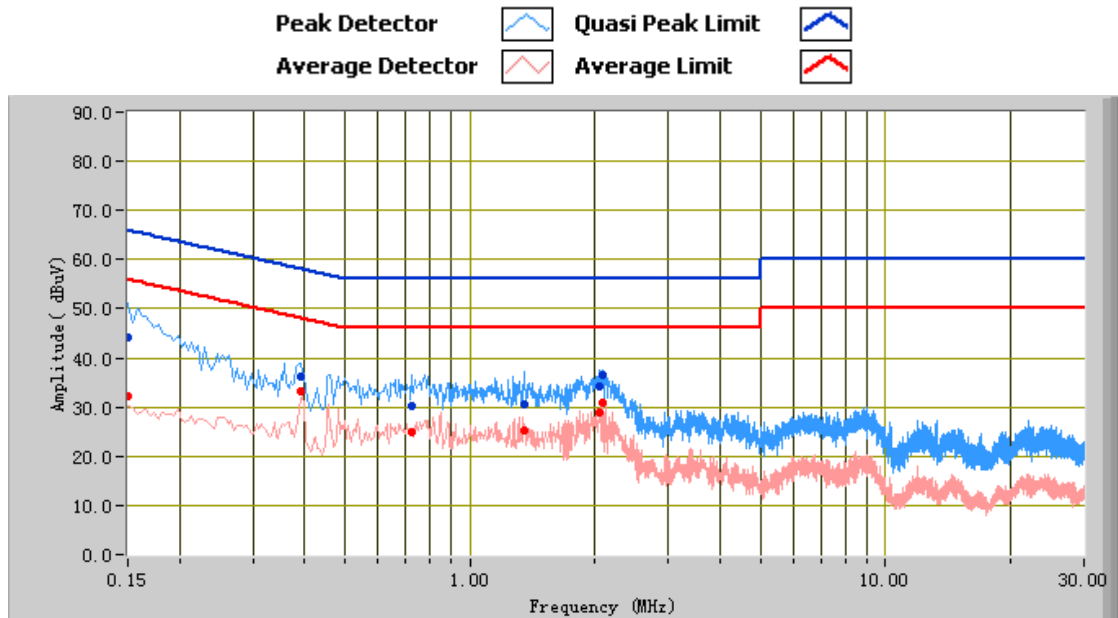
Limit(dBμV)=Limit stated in standard

Factor (dB)= cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Calculation Formula:

Margin (dB)=Quasi Peak / Average (dBμV) – limit (dBμV)

Test Mode : Normal Working Mode

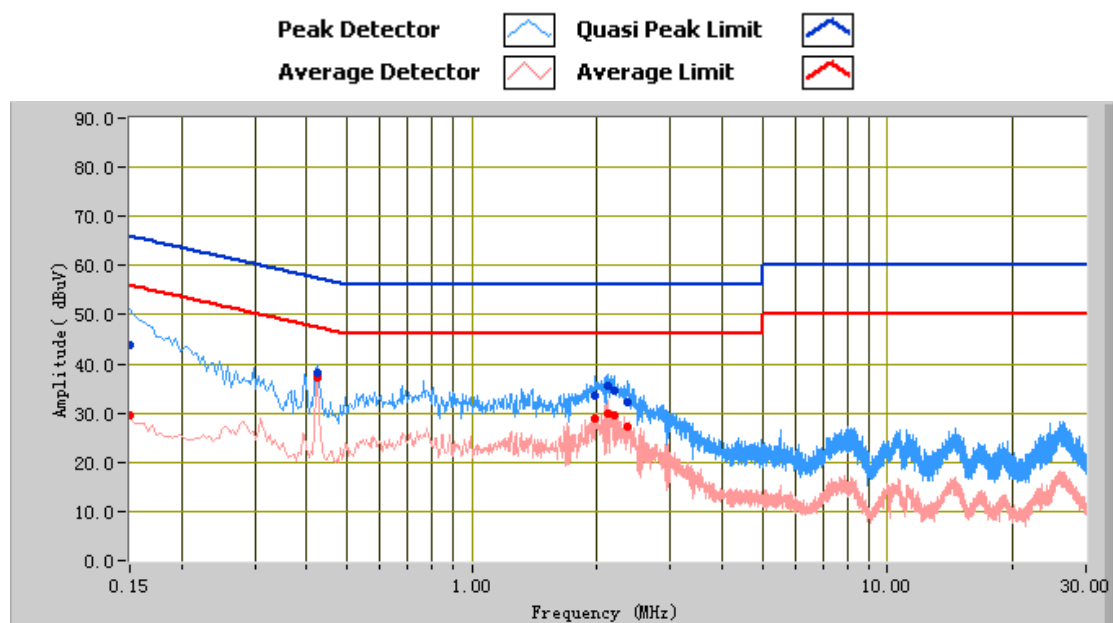


Test Data

Phase Line Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
0.15	44.01	66.00	-21.99	32.07	56.00	-23.93	12.22
2.05	34.31	56.00	-21.69	28.74	46.00	-17.26	10.88
2.09	36.48	56.00	-19.52	30.83	46.00	-15.17	10.88
1.35	30.58	56.00	-25.42	25.29	46.00	-20.71	10.75
0.39	36.22	58.06	-21.85	33.11	48.06	-14.96	11.25
0.72	30.12	56.00	-25.88	25.07	46.00	-20.93	10.91

Test Mode : Normal Working Mode

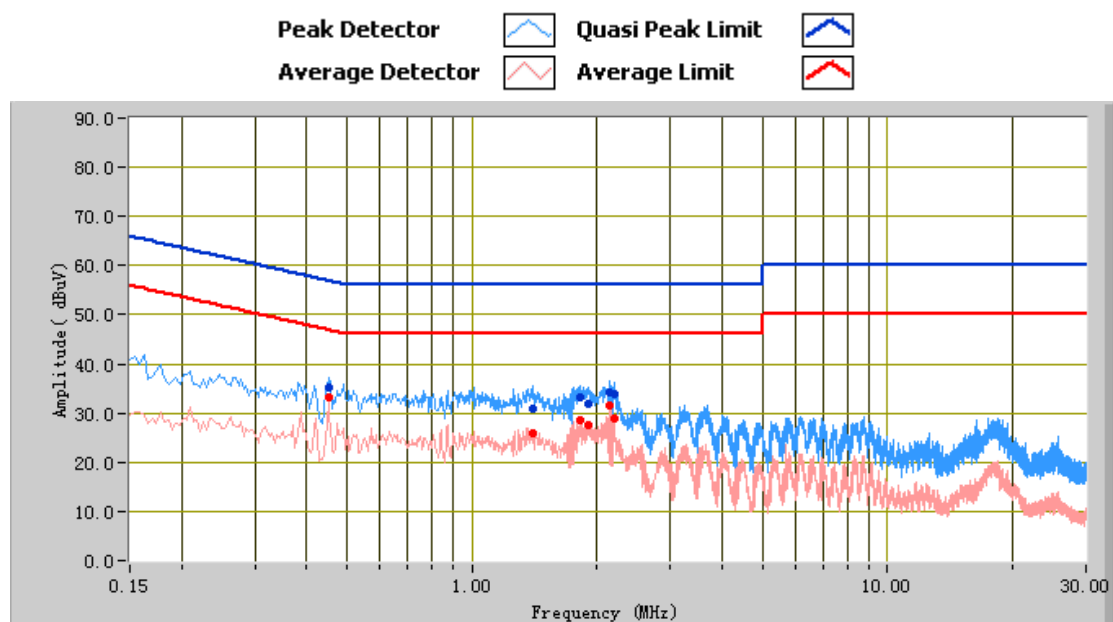


Test Data

Phase Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
0.15	43.90	66.00	-22.10	29.71	56.00	-26.29	12.21
0.43	38.35	57.33	-18.98	37.33	47.33	-10.00	11.18
2.12	35.60	56.00	-20.40	30.00	46.00	-16.00	10.92
2.20	34.54	56.00	-21.46	29.63	46.00	-16.37	10.92
1.97	33.58	56.00	-22.42	29.02	46.00	-16.98	10.91
2.35	32.20	56.00	-23.80	27.26	46.00	-18.74	10.92

Test Mode : Normal Working Mode

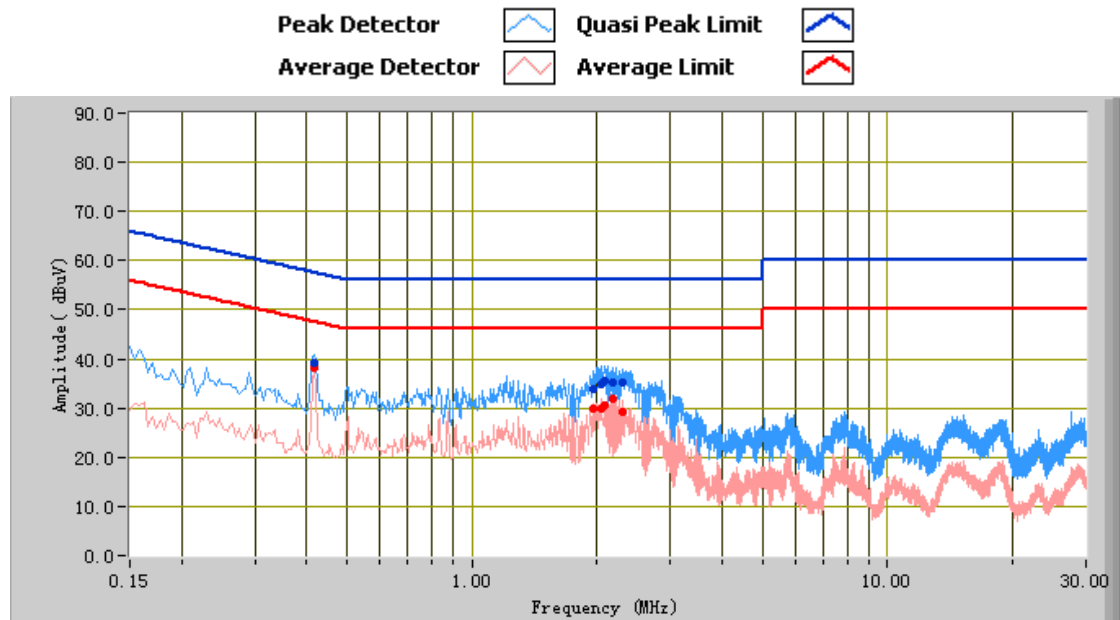


Test Data

Phase Line Plot at 240Vac, 50Hz

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
2.14	34.09	56.00	-21.91	31.42	46.00	-14.58	10.88
0.45	35.13	56.87	-21.74	33.17	46.87	-13.71	11.16
2.21	33.82	56.00	-22.18	28.96	46.00	-17.04	10.88
1.39	31.00	56.00	-25.00	25.94	46.00	-20.06	10.76
1.82	33.13	56.00	-22.87	28.59	46.00	-17.41	10.84
1.90	31.92	56.00	-24.08	27.65	46.00	-18.35	10.86

Test Mode : Normal Working Mode



Test Data

Phase Neutral Plot at 240Vac, 50Hz

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Factors (dB)
0.42	39.24	57.49	-18.25	38.32	47.49	-9.17	11.19
2.09	35.70	56.00	-20.30	30.51	46.00	-15.49	10.92
2.05	34.77	56.00	-21.23	29.81	46.00	-16.19	10.92
2.17	35.16	56.00	-20.84	31.73	46.00	-14.27	10.92
2.30	35.20	56.00	-20.80	29.17	46.00	-16.83	10.92
1.96	33.99	56.00	-22.01	29.96	46.00	-16.04	10.91

6.8 Radiated Spurious Emissions

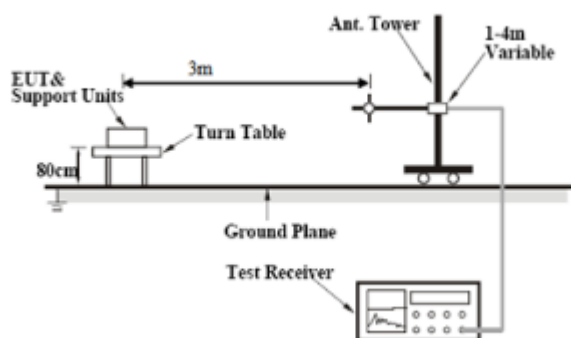
Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar
Test date :	March 31, 2016
Tested By :	Amos Xia

Requirement(s):

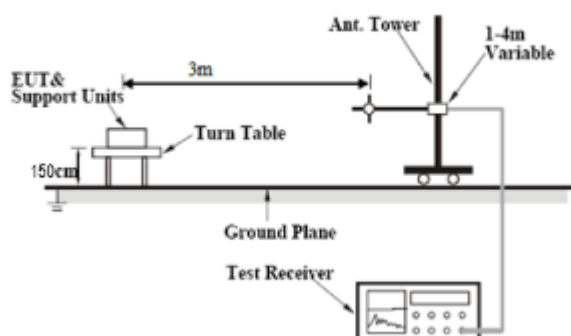
Spec	Item	Requirement	Applicable										
47CFR§15.24 7(d), RSS210 (A8.5)	a)	<div>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</div> <table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>	Frequency range (MHz)	Field Strength (µV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	<div><input checked="" type="checkbox"/></div>
	Frequency range (MHz)	Field Strength (µV/m)											
	30 – 88	100											
88 – 216	150												
216 960	200												
Above 960	500												
b)	<div>For non-restricted band, 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 or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required</div> <div><input checked="" type="checkbox"/> 20 dB down <input type="checkbox"/> 30 dB down</div>	<div><input checked="" type="checkbox"/></div>											
c)	<div>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</div>	<div><input checked="" type="checkbox"/></div>											

Test Setup

A: Frequency Below 1000MHz:



B: Frequency Above 1000MHz:



Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi Peak detection at frequency below 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz. ■ 1/T kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Test Data	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
Test Plot	<input checked="" type="checkbox"/> Yes (See below) <input type="checkbox"/> N/A

Data sample

Frequency (MHz)	Quasi Peak (dBμV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBμV/m)	Margin (dB)
xxx	32.23	181.00	H	350.00	-38.23	40.00	-7.77

Frequency (MHz) = Emission frequency in MHz

Quais-Peak (dBμV/m)= Receiver Reading(dBμV/m)+ Factor(dB)

Azimuth=Position of turn table

Polarity=Polarity of Receiver antenna

Height(cm)= Height of Receiver antenna

Factor (dB)=Antenna factor + cable loss- antenna gain



Limit (dBμV/m)=Limit stated in standard

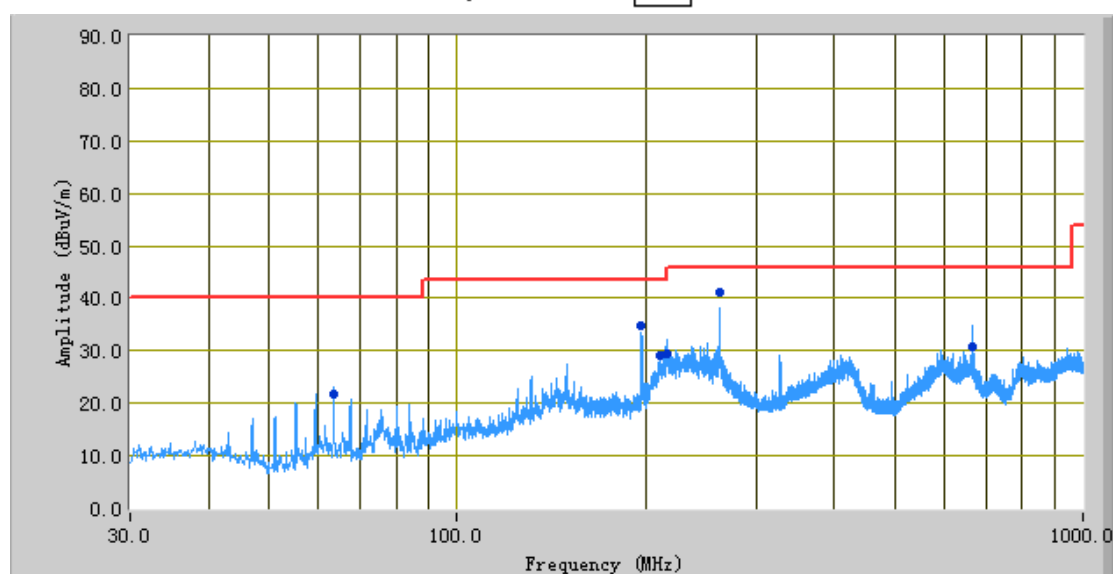
Calculation Formula:

Margin (dB)=Quasi Peak (dBμV/m) – limit (dBμV/m)

Test Mode:	Normal Working Mode
------------	---------------------

(Below 1GHz)

Peak Detector 
Quasi Peak Limit 



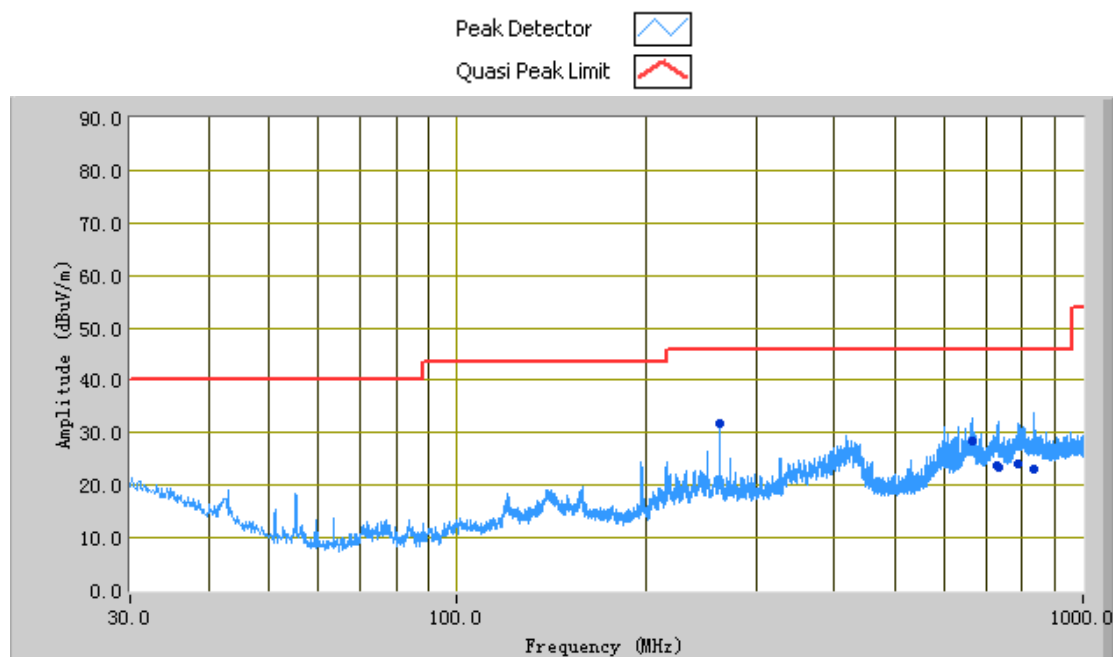
Test Data

Horizontal Polarity Plot @3m

Frequency (MHz)	Quasi Peak (dBμV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBμV/m)	Margin (dB)
262.81	41.03	251.00	H	102.00	-28.74	46.00	-4.97
197.20	34.73	262.00	H	194.00	-31.54	43.50	-8.77
663.91	30.86	2.00	H	175.00	-21.41	46.00	-15.14
216.05	29.44	268.00	H	123.00	-30.32	43.50	-14.06
211.05	28.97	248.00	H	114.00	-30.71	43.50	-14.53
63.46	21.91	136.00	H	280.00	-37.78	40.00	-18.09

Test Mode:	Normal Working Mode
------------	---------------------

(Below 1GHz)



Test Data

Vertical Polarity Plot @3m

Frequency (MHz)	Quasi Peak (dBμV/m)	Azimuth	Polarity (H/V)	Height (cm)	Factors (dB)	Limit (dBμV/m)	Margin (dB)
836.56	23.24	290.00	V	150.00	-17.62	46.00	-22.76
666.38	28.56	8.00	V	110.00	-20.66	46.00	-17.44
731.40	23.41	55.00	V	193.00	-19.34	46.00	-22.59
789.16	24.21	44.00	V	243.00	-17.79	46.00	-21.79
727.97	23.67	353.00	V	217.00	-19.38	46.00	-22.33
262.48	31.81	4.00	V	290.00	-29.80	46.00	-14.19

Test Mode:	Transmitting Mode
------------	-------------------

Low Channel (2402 MHz)

Frequency (MHz)	Substituted level (dBμV/m)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.00	77.73	AV	V	11.2	12.83	55	46.76	54	-7.24
4804.00	73.25	AV	H	11.2	12.83	55	42.28	54	-11.72
4804.00	84.76	PK	V	11.2	12.83	55	53.79	74	-20.21
4804.00	81.33	PK	H	11.2	12.83	55	50.36	74	-23.64

Middle Channel (2440 MHz)

Frequency (MHz)	Substituted level (dBμV/m)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4882.00	75.44	AV	V	11.2	12.5	55	44.14	54	-9.86
4882.00	74.41	AV	H	11.2	12.5	55	43.11	54	-10.89
4882.00	84.89	PK	V	11.2	12.5	55	53.59	74	-20.41
4882.00	81.13	PK	H	11.2	12.5	55	49.83	74	-24.17

High Channel (2480 MHz)

Frequency (MHz)	Substituted level (dBμV/m)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.00	75.38	AV	V	11.2	12.5	55	44.08	54	-9.92
4960.00	73.12	AV	H	11.2	12.5	55	41.82	54	-12.18
4960.00	82.31	PK	V	11.2	12.5	55	51.01	74	-22.99
4960.00	81.41	PK	H	11.2	12.5	55	50.11	74	-23.89

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
R&S EMI Test Receiver	ESPI3	101216	11/03/2015	11/02/2016	<input checked="" type="checkbox"/>
V-LISN	ESH3-Z5	838979/005	09/27/2015	09/26/2016	<input checked="" type="checkbox"/>
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/08/2015	10/07/2016	<input checked="" type="checkbox"/>
SIEMIC Labview Conducted Emissions software	V1.0	N/A	N/A	N/A	<input checked="" type="checkbox"/>
RF conducted test					
R&S EMI Receiver	ESPI3	101216	11/03/2015	11/02/2016	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	02/02/2016	02/01/2017	<input checked="" type="checkbox"/>
Spectrum Analyzer	N9010A	MY47191130	10/09/2015	10/08/2016	<input checked="" type="checkbox"/>
Temperature/Humidity Chamber	1007H	N/A	01/07/2016	01/06/2017	<input checked="" type="checkbox"/>
Radiated Emissions					
Spectrum Analyzer	N9010A	MY47191130	10/09/2015	10/08/2016	<input checked="" type="checkbox"/>
R&S EMI Receiver	ESPI3	101216	11/04/2015	11/03/2016	<input checked="" type="checkbox"/>
Antenna (30MHz~6GHz)	JB6	A121411	04/14/2015	04/13/2016	<input checked="" type="checkbox"/>
EMCO Horn Antenna (1 ~18GHz)	3115	N/A	11/15/2015	11/14/2016	<input checked="" type="checkbox"/>
INFOMW Antenna (1 ~18GHz)	JXTXLB-10180	J2031081120092	10/09/2015	10/08/2016	<input checked="" type="checkbox"/>
Horn Antenna (18~40GHz)	AH-840	101013	04/22/2015	04/21/2016	N/A
Microwave Pre-Amp (18~40GHz)	PA-840	181250	05/29/2015	05/28/2016	N/A
Hp Agilent Pre-Amplifier	8447F	1937A01160	10/27/2015	10/26/2016	<input checked="" type="checkbox"/>
MITEQ Pre-Amplifier (0.1 ~ 18GHz)	AMF-7D-00101800-	1451709	10/27/2015	10/26/2016	<input checked="" type="checkbox"/>
SIEMIC Labview Radiated Emissions software	V1.0	N/A	N/A	N/A	<input checked="" type="checkbox"/>

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

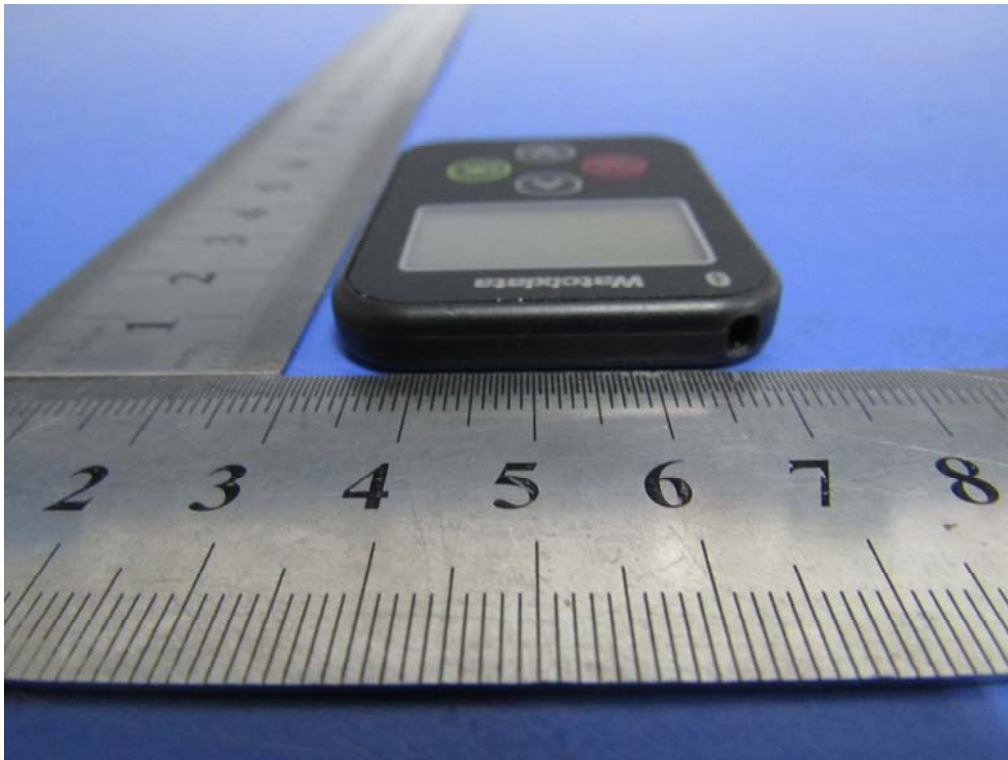


EUT - Front View



EUT - Rear View

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EUT - Top View



EUT - Bottom View



EUT – Left View

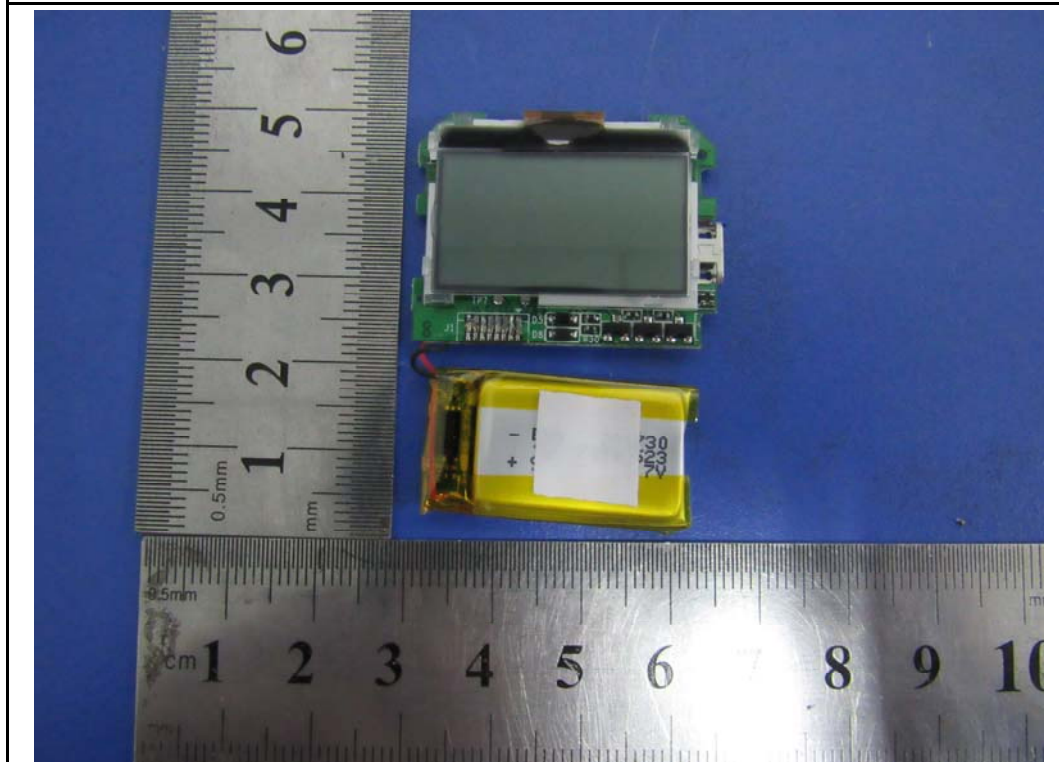


EUT – Right View

Annex B.ii. Photograph: EUT Internal Photo

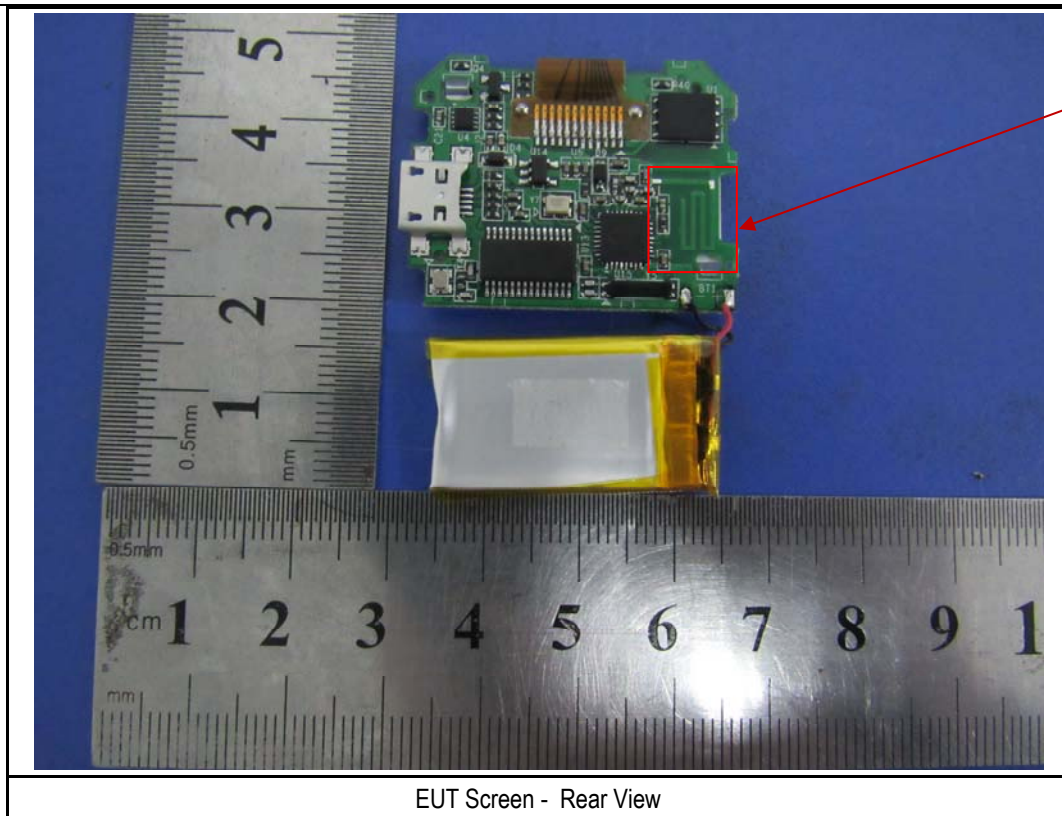


EUT – Uncover Front View



EUT Screen - Front View

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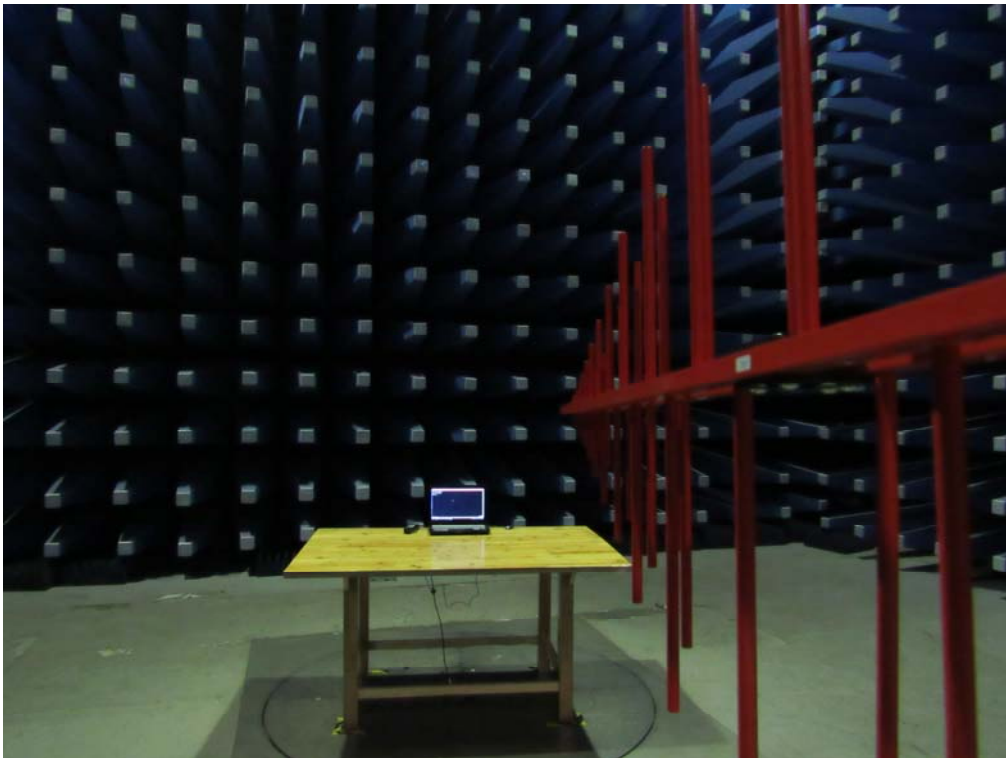
Annex B.iii. Photograph: Test Setup Photo



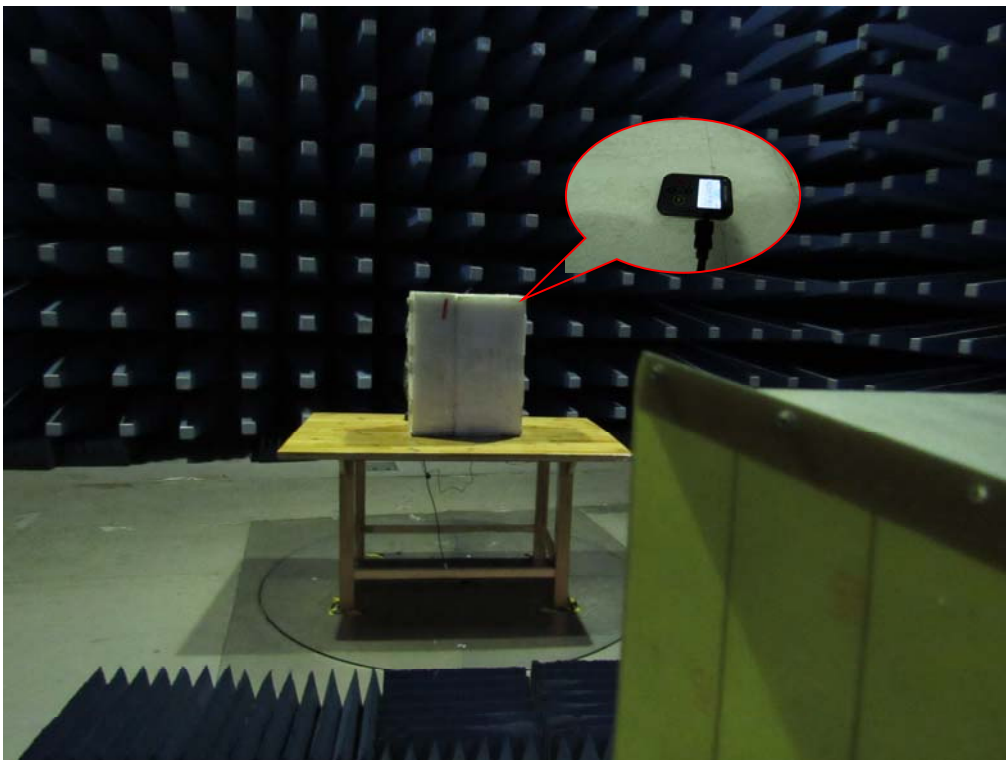
Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Spurious Emissions Test Setup Below 1GHz

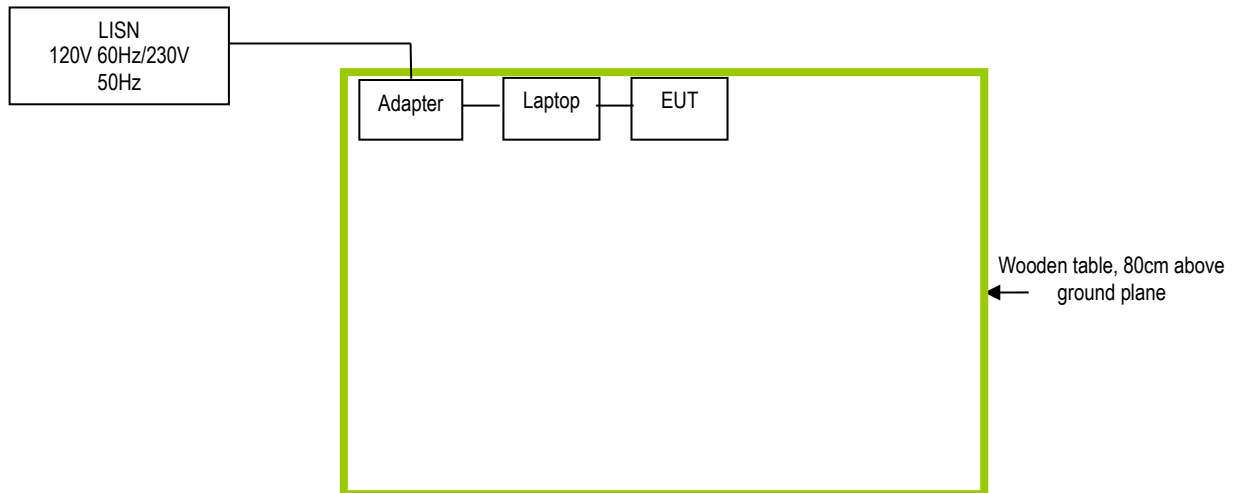


Radiated Spurious Emissions Test Setup Above 1GHz

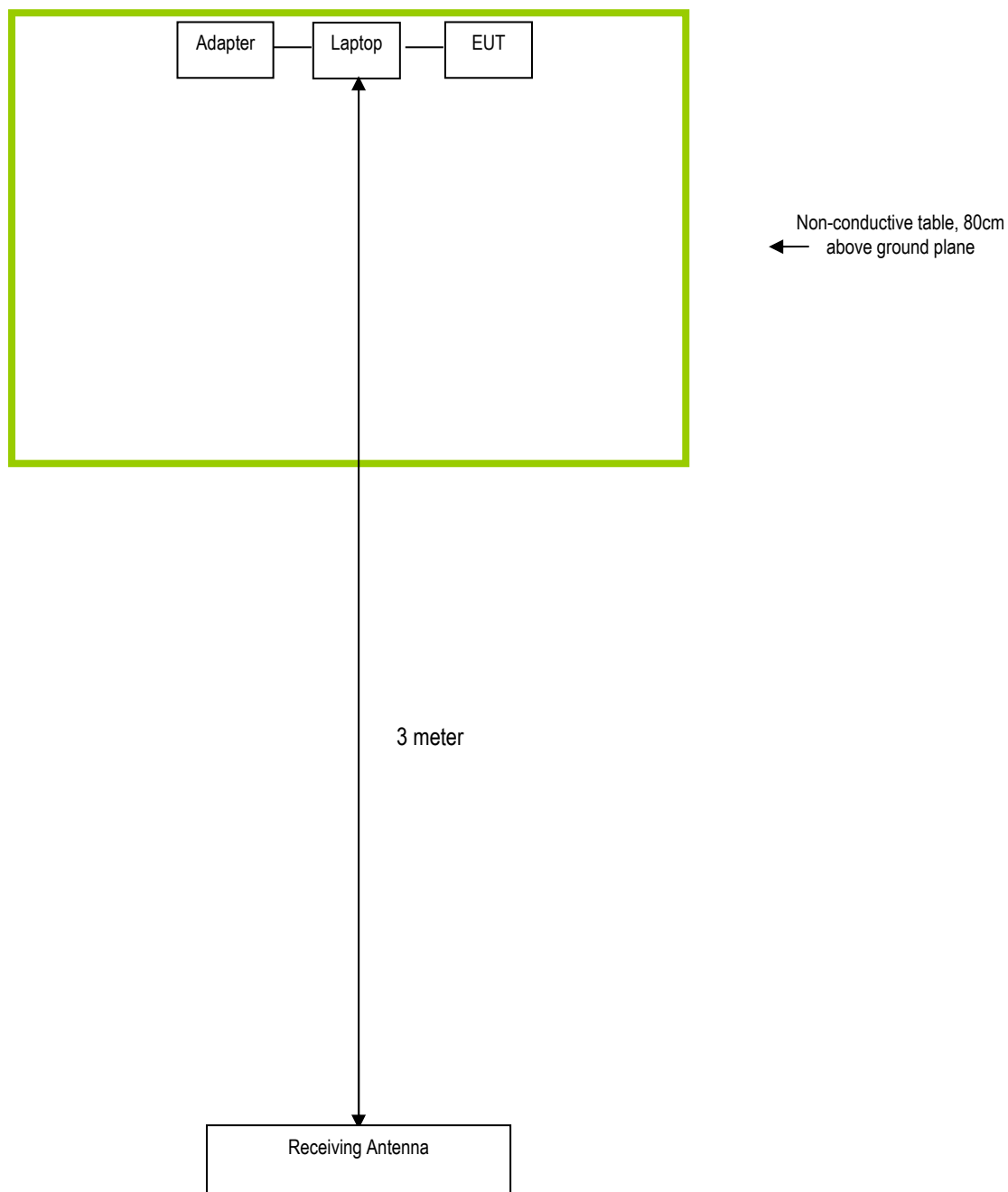
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.i. TEST SET UP BLOCK

Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions



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Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
N/A	N/A	N/A	N/A	N/A

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Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

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Annex E. DECLARATION OF SIMILARITY

N/A