

RF TEST REPORT



Report No.: 15070620-FCC-R

Supersede Report No.: N/A

| | | |
|--|--|-------------------------------------|
| Applicant | Shenzhen Creative Industry Co., Ltd. | |
| Product Name | Oximeter | |
| Model No. | PC-68A | |
| Serial Model . | N/A | |
| Test Standard | FCC 15.231:2014, ANSI C63.4:2009 | |
| Test Date | September 03 to November 11, 2015 | |
| Issue Date | December 22, 2015 | |
| 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>Winnie Zhang</i> | <i>David Huang</i> | |
| Winnie Zhang Test Engineer | David Huang Checked By | |
| This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only | | |

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

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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 |
|----------------|----------------|-------------|--------------------|
| 15070620-FCC-R | NONE | Original | September 09, 2015 |
| 15070620-FCC-R | V1 | Update date | December 22, 2015 |
| | | | |
| | | | |
| | | | |
| | | | |

2. Customer information

| | |
|------------------|---|
| Applicant Name | Shenzhen Creative Industry Co., Ltd. |
| Applicant Add | 2/F, Block 3, Nanyou Tian'an Industry Town, Guangd, Shenzhen, China, 518054 |
| Manufacturer | Shenzhen Creative Industry Co., Ltd. |
| Manufacturer Add | 2/F, Block 3, Nanyou Tian'an Industry Town, Guangd, Shenzhen, China, 518054 |

3. Test site information

| | |
|----------------------|--|
| Lab performing tests | SIEMIC (Shenzhen-China) LABORATORIES |
| Lab Address | Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108 |
| FCC Test Site No. | 718246 |
| IC Test Site No. | 4842E-1 |
| Test Software | Radiated Emission Program-To Shenzhen v2.0 |

4. Equipment under Test (EUT) Information

| | |
|-------------------------------|-----------------------------------|
| Description of EUT: | Oximeter |
| Main Model: | PC-68A |
| Serial Model: | N/A |
| Date EUT received: | September 02, 2015 |
| Test Date(s): | September 03 to November 11, 2015 |
| RF Operating Frequency (ies): | Tx: 434.4 MHz |
| Number of Channels : | 1 CH |
| Equipment Category: | DSC |
| Antenna Gain: | 0 dBi |
| Input Power: | N/A |
| Trade Name : | N/A |
| FCC ID: | A49PC-68A |
| Port: | N/A |
| Type of Modulation: | FSK |

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

Test Results Summary

| Test Standard | Description | Pass / Fail |
|---|---|-------------|
| CFR 47 Part 15.231: 2014 | | |
| 15.203 | Antenna Requirement | Pass |
| 15.207 | Conducted Emissions Voltage | N/A |
| 15.231(e) | Fundamental & Radiated Spurious Emission | Pass |
| 15.231(c) | 20dB Bandwidth | Pass |
| 15.231(e) | Deactivation | Pass |
| ANSI C63.4: 2009 | | |
| PS: All measurement uncertainties are not taken into consideration for all presented test result. | | |

6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

6.1 Antenna Requirement

Requirement(s): 47 CFR §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.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

Test result: Pass

The antenna is permanently attached to the device which meets the requirement.

6.2 Conducted Emissions Voltage

| | |
|----------------------|--------------|
| Temperature | 24°C |
| Relative Humidity | 62% |
| Atmospheric Pressure | 1012mbar |
| Test date : | ----- |
| Tested By : | Winnie Zhang |

Requirement:

| Frequency of emission (MHz) | Conducted limit (dBμ V) | |
|-----------------------------|-------------------------|-----------|
| | Quasi-peak | Average |
| 0.15– 0.5 | 66 to 56* | 56 to 46* |
| 0.5– 5 | 56 | 46 |
| 5– 30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

Procedures:

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.

Test result: N/A (Batteries operated)

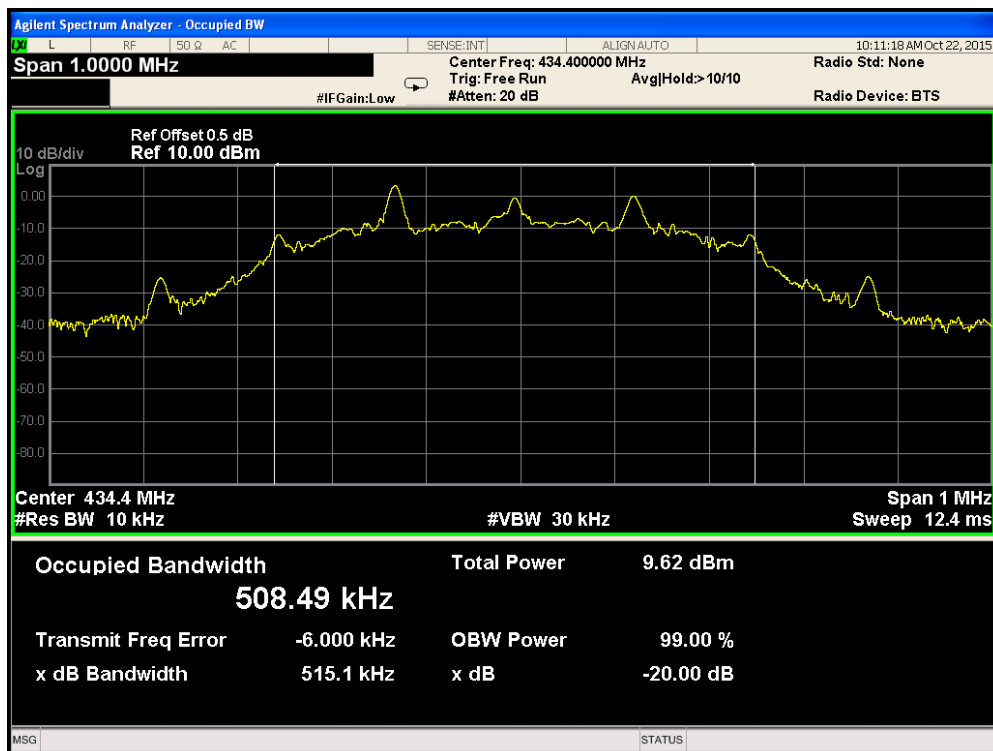
6.3 20dB Occupied Bandwidth

| | |
|----------------------|------------------|
| Temperature | 23 °C |
| Relative Humidity | 55% |
| Atmospheric Pressure | 1022mbar |
| Test date : | October 22, 2015 |
| Tested By : | Winnie Zhang |

20dB bandwidth was measured by conducted method using a spectrum analyzer.

Test Result:

| Fundamental Frequency (MHz) | Measured 20dB Bandwidth (kHz) | FCC 15.231 Limit (kHz) | Result |
|-----------------------------|-------------------------------|------------------------|--------|
| 434.4 | 515.1 | 1084.80 | Pass |



6.4 Radiated Fundamental and Spurious Emission

| | |
|----------------------|---------------|
| Temperature | 22 °C |
| Relative Humidity | 54% |
| Atmospheric Pressure | 1021mbar |
| Test date : | July 21, 2015 |
| Tested By : | Winnie Zhang |

- Radiated emissions were measured according to ANSI C63.4. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1meter above the ground from the center of the loop. The measuring bandwidth was set to 10kHz. All possible modes of operation were investigated. Only the worst case emissions measured, All other emissions were relatively insignificant.
- A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- Sample Calculation: Corrected Amplitude=Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor.
Sample Calculation:
1) Corrected Amplitude= Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor
2) Average = peak reading + 20log(duty cycle)
- Radiated Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz(QP only3m & 10m) is +5.6/-4.5dB(for EUTs<0.5m×0.5m×0.5m).In range of 1-40GHz) is ±3.6dB.

Standard Requirement:

| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emissions (microvolts/meter) |
|-----------------------------|--|---|
| 40.66-40.70 | 1000 | 100 |
| 70-130 | 500 | 50 |
| 130-174 | 500 to 1,500 | 50 to 150 |
| 174-260 | 1,500 | 150 |
| 260-470 | 1,500-5,000 | 150-500 |
| Above 470 | 5,000 | 500 |

Test Result : Pass

| Frequency (MHz) | Average Factor (dB) | Field Strength(PK) (dBuV/m) | Field Strength(AV) (dBuV/m) | Limit(PK) (dBuV/m) | Limit(AV) (dBuV/m) |
|--------------------|------------------------|--------------------------------|--------------------------------|-----------------------|-----------------------|
| 434.3 | -1.28 | 68.62 | 67.34 | 92.88 | 72.88 |
| 868.6 | -1.28 | 32.17 | 29.99 | 72.88 | 52.88 |
| 2536.1 | -1.28 | 48.34 | 47.06 | 74.00 | 54.00 |
| 3629.5 | -1.28 | 50.21 | 48.93 | 74.00 | 54.00 |
| 4765.8 | -1.28 | 51.86 | 50.58 | 74.00 | 54.00 |

Notes:

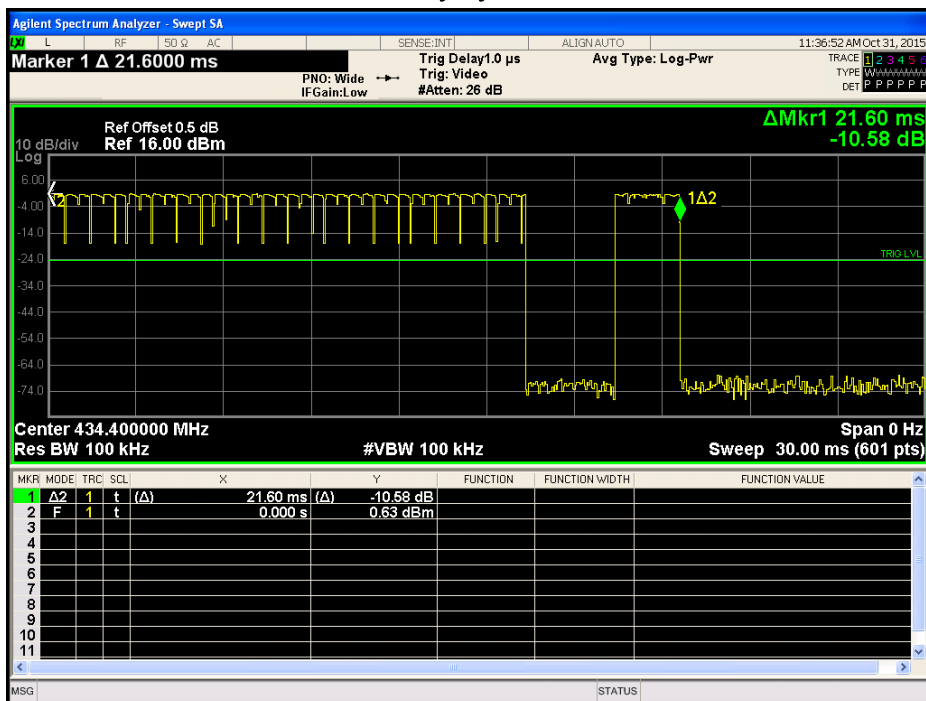
- Duty cycle is 86.34%, $20\log(\text{duty cycle}) = -1.28\text{dB}$ correction was used to determine the average level from the peak
- reading. Average = peak reading + $20\log(\text{duty cycle})$, Final Average= peak reading -1.28
- All the data measurement of peak values.
- FCC Limit for Average Measurement= $1,500+(5,000-1,500)/(470-260)*(434.4-260) \mu \text{ V/m}$
= $4406.66 \mu \text{ V/m}=72.88\text{dB} \mu \text{ V/m}$
- Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms
- Maximum average in 100 ms
- Calculate duty cycle for pulse train or 100 ms
- Duty cycle = $(t_1 + t_2 + t_3 + \dots t_n)/T$ where t_n = pulse width, T = pulse train length or 100 ms
- Pulse width (PW) = 21.60ms
 $2/PW = 2/21.60\text{ms} = 0.09259 \text{ kHz}$
 $RBW > 2/PW (0.09259 \text{ kHz})$
Therefore PDCF is not needed.

Pulse Duty Cycle:

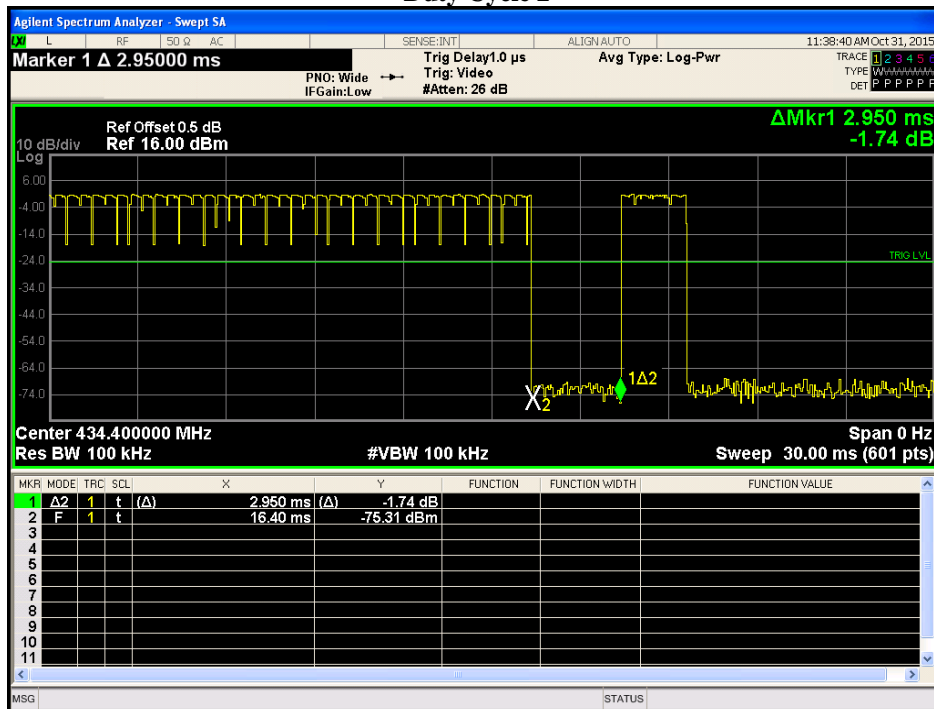
Duty cycle= (21.60-2.950)/21.60 =86.34%

Average Duty Factor: 20*log (Duty Cycle) = -1.28 dB

Duty Cycle 1

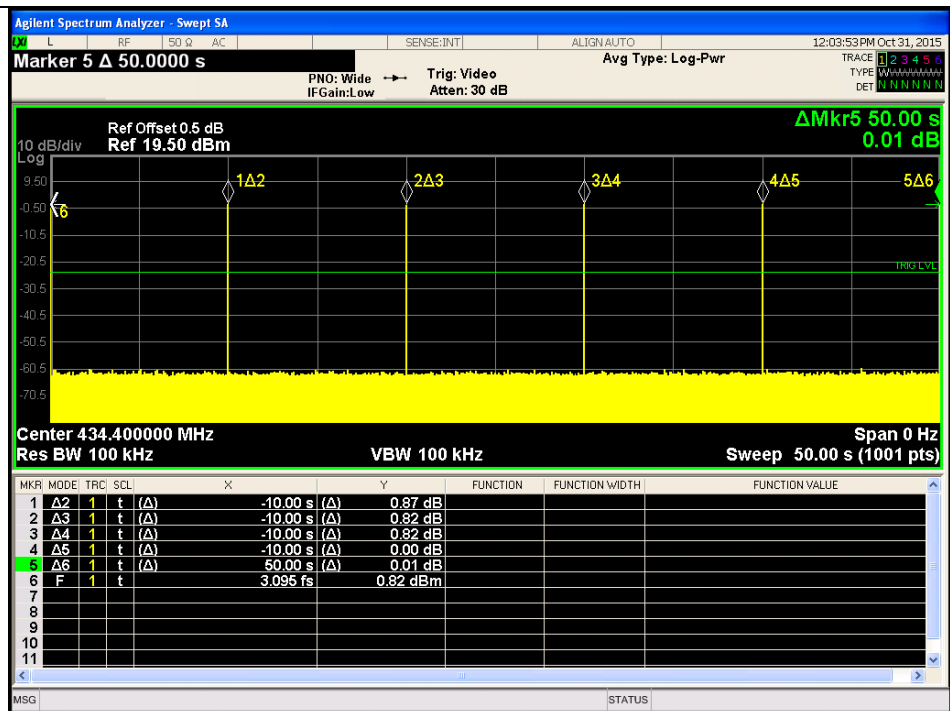


Duty Cycle 2



Duty Cycle 2

| | |
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6.5 Deactivation

| | |
|----------------------|--------------|
| Temperature | 25°C |
| Relative Humidity | 59% |
| Atmospheric Pressure | 1010 mbar |
| Test date : | May 13, 2015 |
| Tested By : | Winnie Zhang |

Deactivation was measured by conducted method using a spectrum analyzer.

Standard requirement: 47 CFR §15.231 (e)

devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds

Test Result: Pass

| Frequency (MHz) | Transmission time | Silent time | Silent time / Transmission time | Limit(Transmission time) | Limit(Silent time) |
|-----------------|-------------------|-------------|---------------------------------|--------------------------|--|
| 434.4 | 21.60(ms) | 10(s) | 462.96 | $\leq 1s$ | Silent time ≥ 10 s and Silent time / Transmission time ≥ 30 |

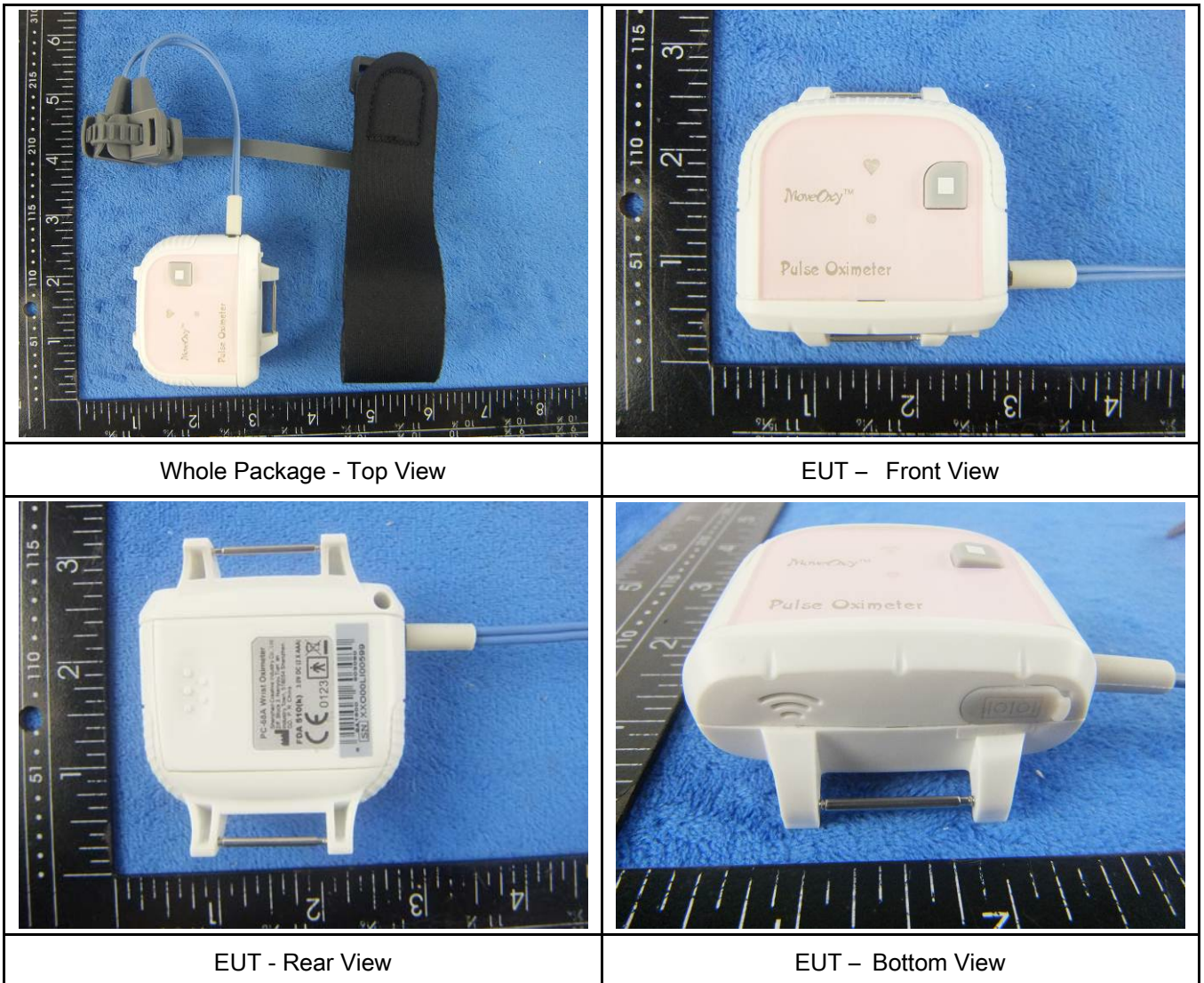
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Annex A. TEST INSTRUMENT

| Instrument | Model | Serial # | Cal Date | Cal Due | In use |
|--------------------------------------|----------|-------------|------------|------------|-------------------------------------|
| AC Line Conducted | | | | | |
| EMI test receiver | ESCS30 | 8471241027 | 09/17/2015 | 09/16/2016 | <input checked="" type="checkbox"/> |
| Line Impedance | LI-125A | 191106 | 09/25/2015 | 09/24/2016 | <input checked="" type="checkbox"/> |
| Line Impedance | LI-125A | 191107 | 09/25/2015 | 09/24/2016 | <input checked="" type="checkbox"/> |
| LISN | ISN T800 | 34373 | 09/25/2015 | 09/24/2016 | <input checked="" type="checkbox"/> |
| Double Ridge Horn Antenna (1 ~18GHz) | AH-118 | 71283 | 09/24/2015 | 09/23/2016 | <input checked="" type="checkbox"/> |
| Transient Limiter | LIT-153 | 531118 | 09/01/2015 | 08/31/2016 | <input checked="" type="checkbox"/> |
| RF conducted test | | | | | |
| Agilent ESA-E SERIES | E4407B | MY45108319 | 09/17/2015 | 09/16/2016 | <input checked="" type="checkbox"/> |
| Power Splitter | 1# | 1# | 09/01/2015 | 08/31/2016 | <input checked="" type="checkbox"/> |
| DC Power Supply | E3640A | MY40004013 | 09/17/2015 | 09/16/2016 | <input checked="" type="checkbox"/> |
| Radiated Emissions | | | | | |
| EMI test receiver | ESL6 | 100262 | 09/17/2015 | 09/16/2016 | <input checked="" type="checkbox"/> |
| Positioning Controller | UC3000 | MF780208282 | 11/20/2014 | 11/19/2015 | <input checked="" type="checkbox"/> |
| OPT 010 AMPLIFIER (0.1-1300MHz) | 8447E | 2727A02430 | 09/01/2015 | 08/31/2016 | <input checked="" type="checkbox"/> |
| Microwave Preamplifier (1 ~ 26.5GHz) | 8449B | 3008A02402 | 03/25/2015 | 03/24/2016 | <input checked="" type="checkbox"/> |
| Bilog Antenna (30MHz~6GHz) | JB6 | A110712 | 09/21/2015 | 09/20/2016 | <input checked="" type="checkbox"/> |
| Double Ridge Horn Antenna (1 ~18GHz) | AH-118 | 71283 | 09/24/2015 | 09/23/2016 | <input checked="" type="checkbox"/> |
| Universal Radio Communication Tester | CMU200 | 121393 | 09/25/2015 | 09/24/2016 | <input checked="" type="checkbox"/> |

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo



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EUT - Top View

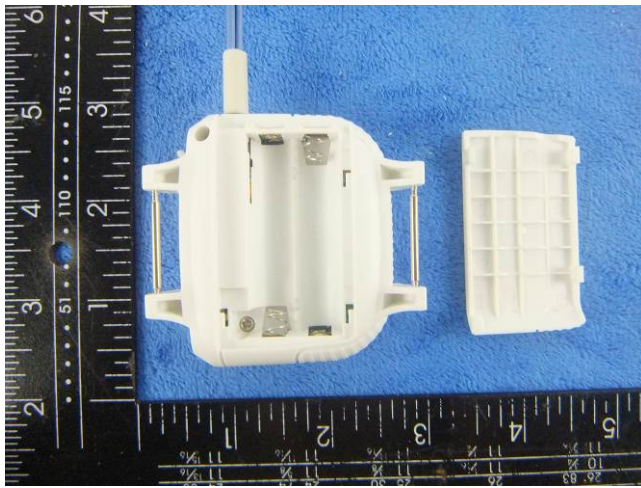


EUT – Left View



EUT – Right View

Annex B.ii. Photograph: EUT Internal Photo



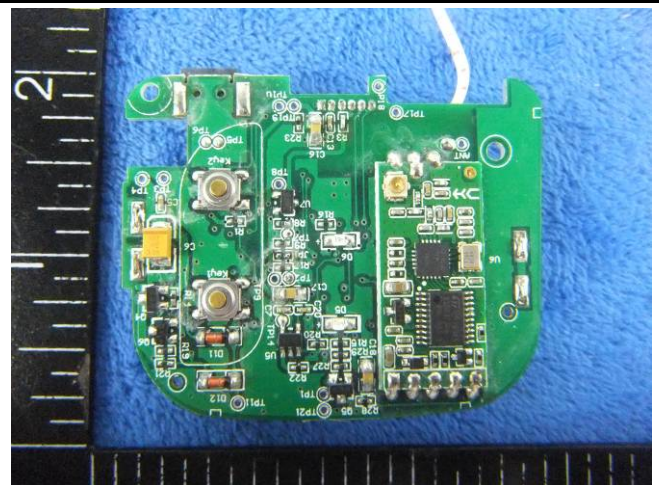
Cover Off - Top View 1



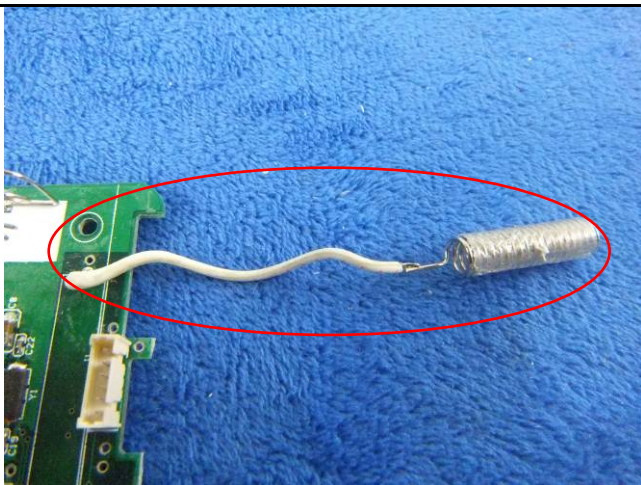
Cover Off - Top View 2



Battery - Front View

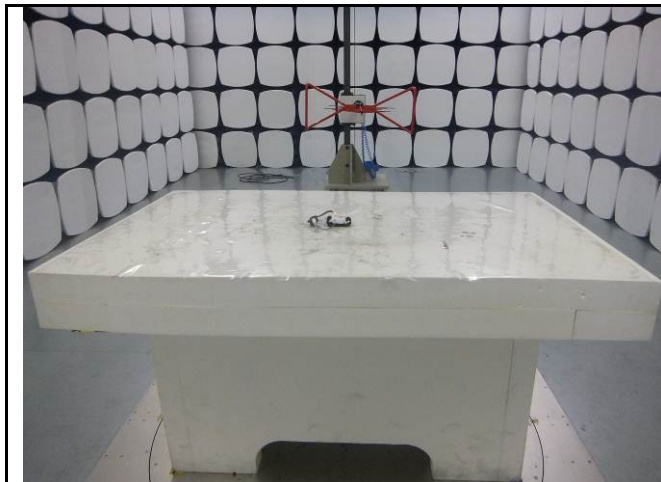


Mainboard - Rear View



434.4Mhz-Antenna View

Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz

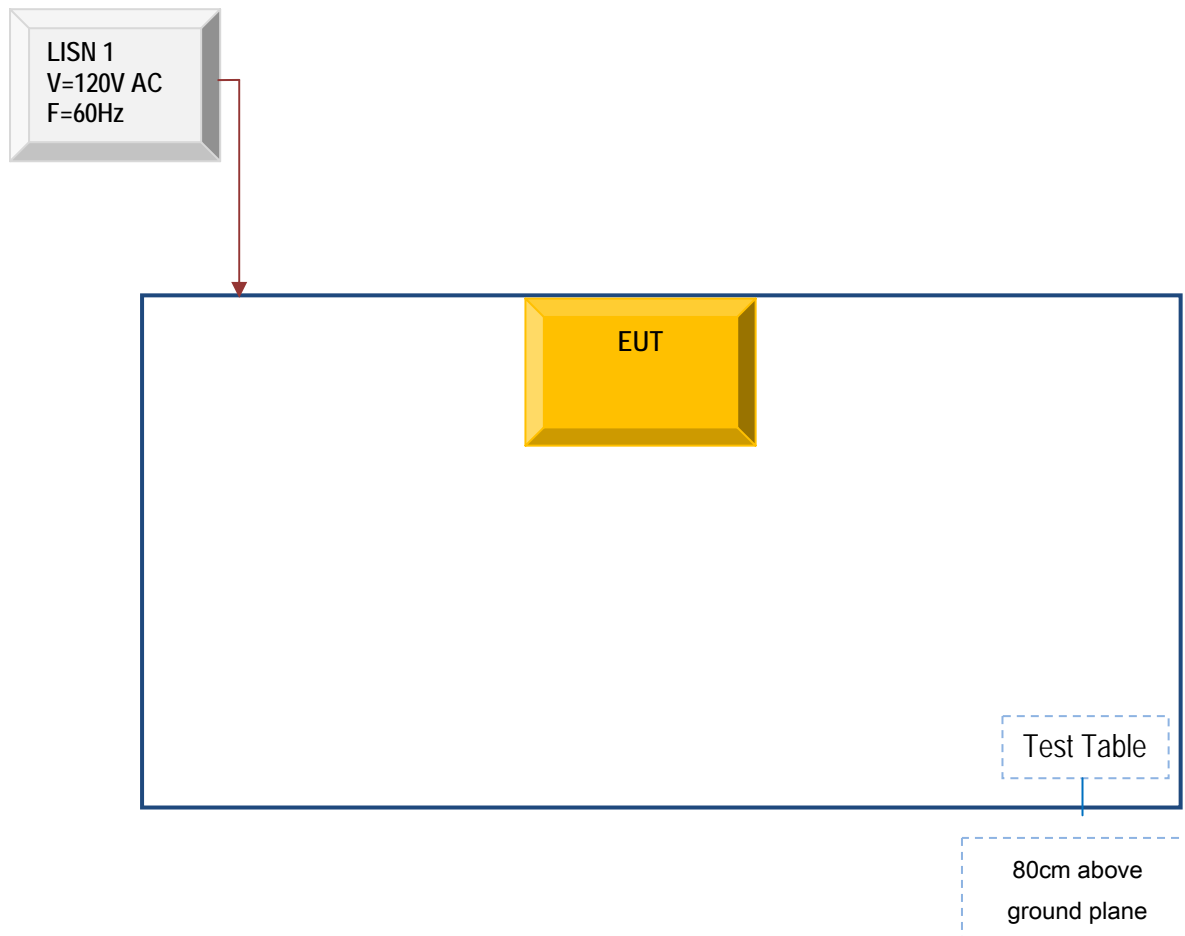


Radiated Spurious Emissions Test Setup Above
1GHz

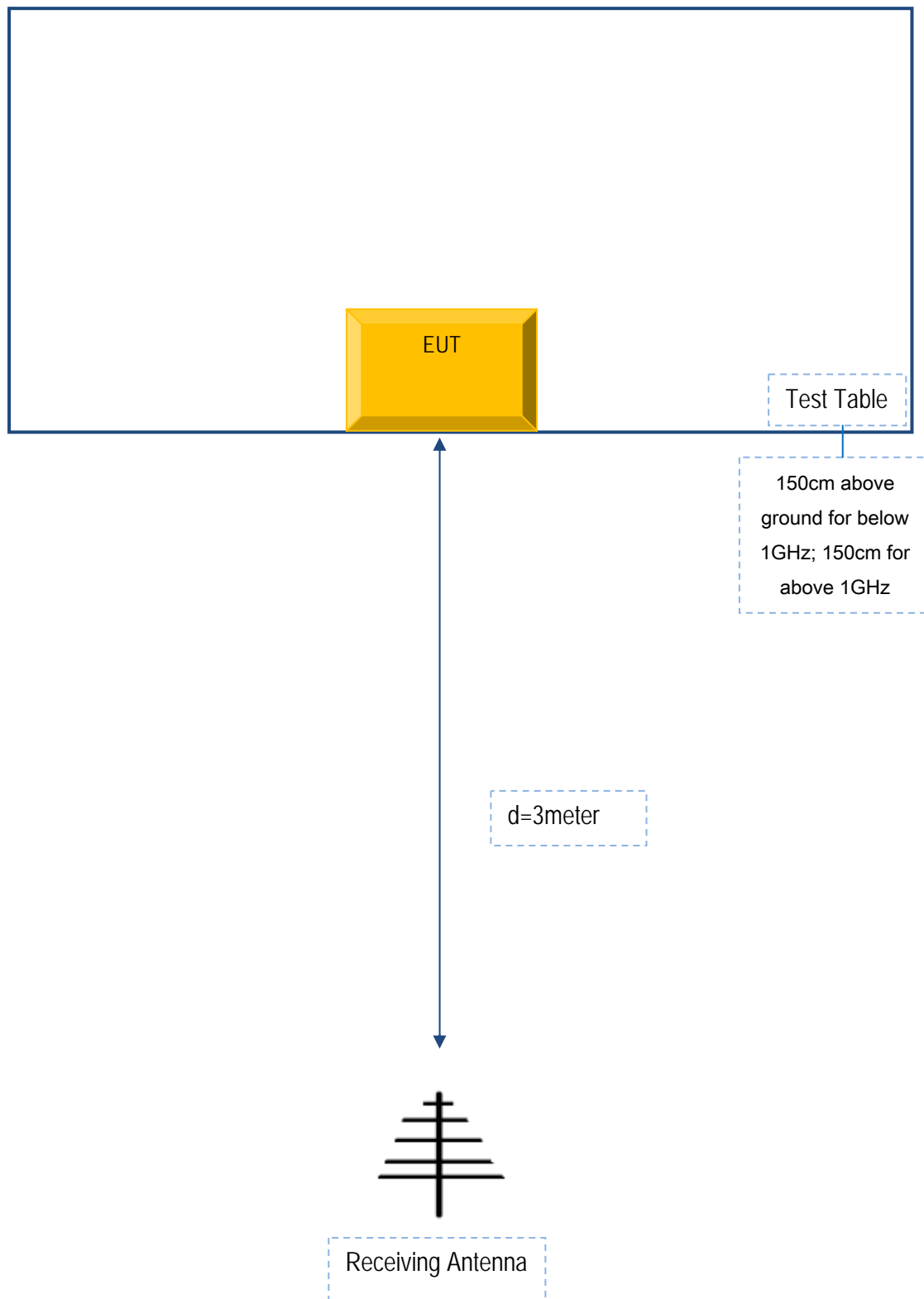
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. 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