




# EMC TEST REPORT



Report No.: 14021051-FCC-E

Supersede Report No.: N/A

|  |   |   |  |
|--|---|---|--|
| Applicant  | Watchdata Technologies Pte. Ltd.  |   |  |
| Product Name   | WatchKey ProX USB Token   |   |  |
| Main Model   | K8  |   |  |
| Test Standard  | FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2009                                |   |  |
| Test Date  | February 06, 2015   |   |  |
| Issue Date   | February 06, 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"/>  |   |  |
|   |  |  |  |
| Deon Dai<br>Test Engineer  | Alex Liu<br>Checked By  |   |  |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |   |   |  |

Issued by:

**SIEMIC (Nanjing-China) Laboratories**

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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        |
|----------------|----------------|-------------|-------------------|
| 14021051-FCC-E | NONE           | Original    | February 06, 2015 |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |
|                |                |             |                   |

## 2. Customer information

|                  |   |
|------------------|---|
| Applicant Name   | Watchdata Technologies Pte. Ltd.                          |
| Applicant Add    | 84 Genting Lane, #02-01 Cityneon Design Centre, Singapore |
| Manufacturer     | Watchdata Technologies Pte. Ltd.                          |
| Manufacturer Add | 84 Genting Lane, #02-01 Cityneon Design Centre, Singapore |

## 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  |

|                 |                |
|-----------------|----------------|
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#### 4. Equipment under Test (EUT) Information

Description of EUT: WatchKey ProX USB Token

Main Model: K8

Serial Model: N/A

Date EUT received: January 30, 2015

Test Date(s): February 06, 2015

Input Power: Power Supply By USB

Trade Name : N/A

Port USB Port

FCC ID: Y97-PROXKEY001

|                 |                |
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## 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     |
|---------------------------|-----------------------------------|------------|
| §15.107; ANSI C63.4: 2009 | AC Power Line Conducted Emissions | Compliance |
| §15.109; ANSI C63.4: 2009 | Radiated Emissions                | 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     |

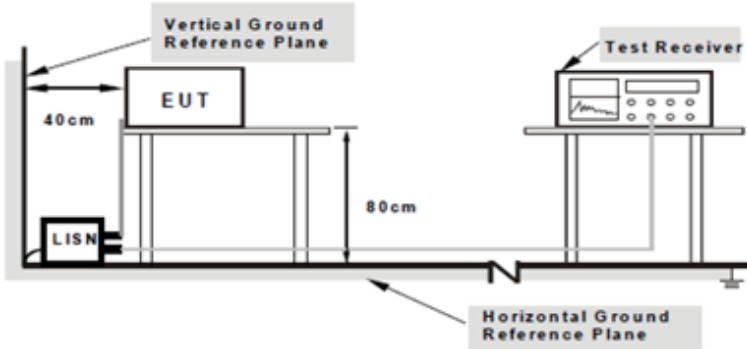
## 6. Measurements, Examination And Derived Results

### 6.1 AC Power Line Conducted Emissions

|                      |                   |
|----------------------|-------------------|
| Temperature          | 20°C              |
| Relative Humidity    | 50%               |
| Atmospheric Pressure | 1019mbar          |
| Test date :          | February 06, 2015 |
| Tested By :          | Deon Dai          |

#### Requirement(s):

| Spec         | Item | Requirement  | Applicable  |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|--------------|------|--|---|------------------------|--------------|--|----|---------|------------|---------|---------|---------|----|----|--------|----|----|
| 47CFR§15.107 | a)   | 1. 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 [mu]H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges. |  |                        |              |  |    |         |            |         |         |         |    |    |        |    |    |
|              |      | <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 |  <p>Note: 1. Support units were connected to second LISN.<br/>2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</p> |
|------------|---|

|           |   |
|-----------|---|
| Procedure | <ol style="list-style-type: none"> <li>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.</li> <li>The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</li> <li>The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>All other supporting equipment were powered separately from another main supply.</li> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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.</li> <li>High peaks, relative to the limit line, were then selected, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz.</li> <li>Steps 6-7 were repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol> |
|-----------|---|



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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 <input type="checkbox"/> N/A   |

#### Data sample

| Frequency (MHz) | Quasi-Peak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Average (dBμV/m) | Limit (dBμV/m) | 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/m)=Receiver Reading(dBμV/m)+ Factor(dB)

Limit(dBμV/m)=Limit stated in standard

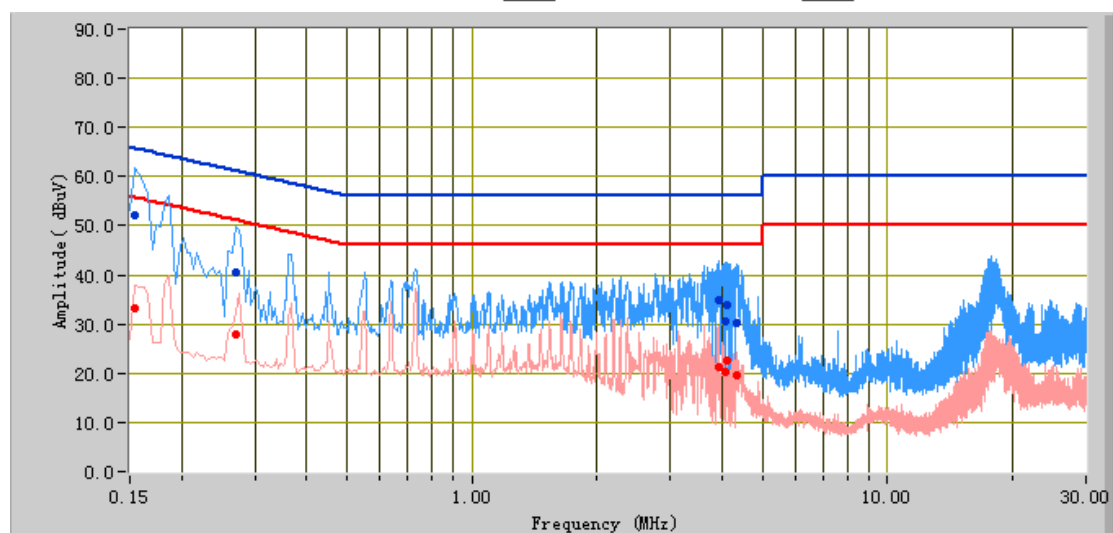
Factor (dB)= cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

#### Calculation Formula:

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

Test Mode: Normal Working

Peak Detector      Quasi Peak Limit  
Average Detector      Average Limit

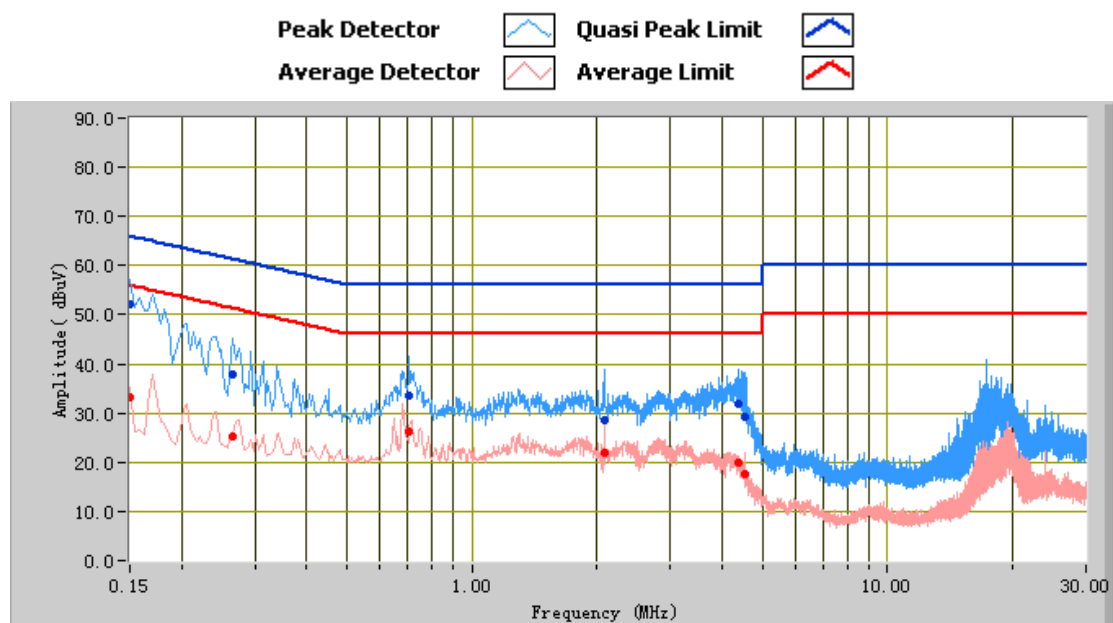


### Test Data

#### Phase Line Plot 120V

| Frequency (MHz) | Quasi Peak (dBμV) | Limit (dBμV) | Margin (dB) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Factors (dB) |
|-----------------|-------------------|--------------|-------------|----------------|--------------|-------------|--------------|
| 0.15            | 52.30             | 65.78        | -13.48      | 33.19          | 55.78        | -22.59      | 12.16        |
| 0.27            | 40.45             | 61.12        | -20.67      | 27.85          | 51.12        | -23.27      | 11.42        |
| 3.91            | 34.75             | 56.00        | -21.25      | 21.30          | 46.00        | -24.70      | 10.89        |
| 4.07            | 30.42             | 56.00        | -25.58      | 20.41          | 46.00        | -25.59      | 10.89        |
| 4.10            | 33.80             | 56.00        | -22.20      | 22.66          | 46.00        | -23.34      | 10.89        |
| 4.31            | 30.33             | 56.00        | -25.67      | 19.66          | 46.00        | -26.34      | 10.89        |

Test Mode: Normal Working



### Test Data


#### Phase Neutral Plot 120V

| Frequency (MHz) | Quasi Peak (dBμV) | Limit (dBμV) | Margin (dB) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Factors (dB) |
|-----------------|-------------------|--------------|-------------|----------------|--------------|-------------|--------------|
| 0.15            | 52.16             | 66.00        | -13.84      | 33.12          | 56.00        | -22.88      | 12.21        |
| 0.71            | 33.51             | 56.00        | -22.49      | 26.22          | 46.00        | -19.78      | 10.91        |
| 0.27            | 37.99             | 61.24        | -23.25      | 25.31          | 51.24        | -25.93      | 11.43        |
| 4.39            | 31.83             | 56.00        | -24.17      | 20.04          | 46.00        | -25.96      | 10.94        |
| 2.07            | 28.48             | 56.00        | -27.52      | 22.08          | 46.00        | -23.92      | 10.92        |
| 4.54            | 29.16             | 56.00        | -26.84      | 17.71          | 46.00        | -28.29      | 10.95        |

## 6.2 Radiated Emissions

|                      |                   |
|----------------------|-------------------|
| Temperature          | 20°C              |
| Relative Humidity    | 50%               |
| Atmospheric Pressure | 1019mbar          |
| Test date :          | February 06, 2015 |
| Tested By :          | Deon Dai          |

### Requirement(s):

| Spec            | Item | Requirement   | Applicable  |                       |
|-----------------|------|---|---|-----------------------|
| 47CFR§15.107(d) | a)   | 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 |  |                       |
|                 |      | Frequency range (MHz)   |   | Field Strength (µV/m) |
|                 |      | 30 – 88   |   | 100                   |
|                 |      | 88 – 216  |   | 150                   |
|                 |      | 216 960   |   | 200                   |
|                 |      | Above 960   |   | 500                   |

|            |  |
|------------|--|
| Test Setup |  |
|------------|--|

|           |   |
|-----------|---|
| Procedure | <ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. 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"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and 1MHz resolution bandwidth respectively for each frequency measured.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol> |
|-----------|---|

|        |  |
|--------|--|
| Remark |  |
|--------|--|

|        |  |
|--------|--|
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
|--------|--|

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

### Data sample

| Frequency (MHz) | Quasi Peak (dB $\mu$ V/m) | Azimuth | Polarity (H/V) | Height (cm) | Factors (dB) | Limit (dB $\mu$ V/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 (dB $\mu$ V/m)= Receiver Reading(dB $\mu$ V/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

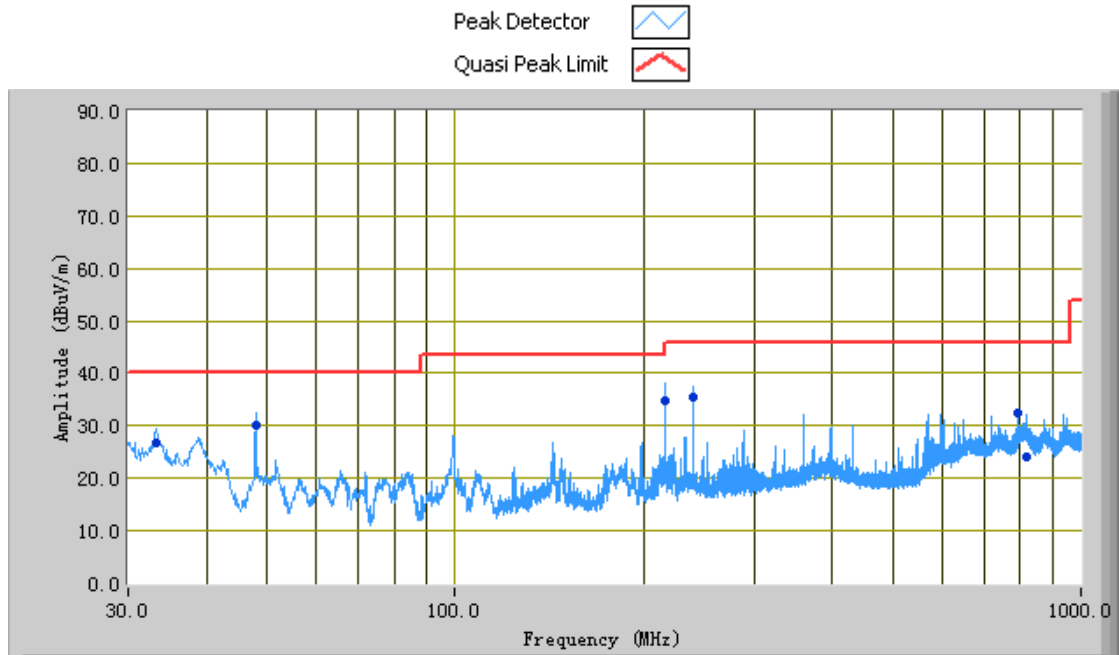
Limit (dB $\mu$ V/m)=Limit stated in standard

### Calculation Formula:

Margin (dB)=Quasi Peak (dB $\mu$ V/m) – limit (dB $\mu$ V/m)

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

(Below 1GHz)



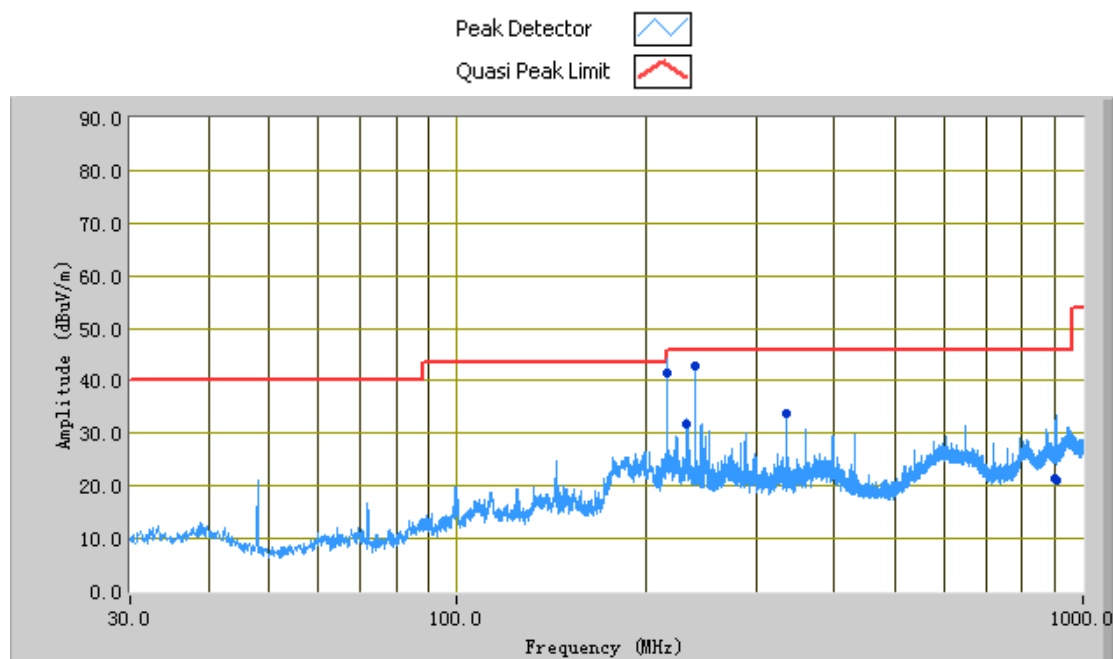
### Test Data

#### Vertical Polarity Plot @3m

| Frequency (MHz) | Quasi Peak (dBμV/m) | Azimuth | Polarity (H/V) | Height (cm) | Factors (dB) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------|----------------|-------------|--------------|----------------|-------------|
| 48.00           | 30.11               | 44.00   | V              | 106.00      | -33.43       | 40.00          | -9.89       |
| 216.43          | 34.89               | 21.00   | V              | 140.00      | -31.16       | 46.00          | -11.11      |
| 240.00          | 35.62               | 220.00  | V              | 191.00      | -29.90       | 46.00          | -10.38      |
| 33.26           | 26.66               | 167.00  | V              | 106.00      | -25.86       | 40.00          | -13.34      |
| 793.55          | 32.36               | 16.00   | V              | 104.00      | -17.66       | 46.00          | -13.64      |
| 820.59          | 24.17               | 143.00  | V              | 150.00      | -17.55       | 46.00          | -21.83      |

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

(Below 1GHz)



### 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) |
|-----------------|---------------------|---------|----------------|-------------|--------------|----------------|-------------|
| 216.42          | 41.40               | 274.00  | H              | 155.00      | -30.30       | 46.00          | -4.60       |
| 240.00          | 42.70               | 285.00  | H              | 122.00      | -28.50       | 46.00          | -3.30       |
| 905.02          | 21.23               | 285.00  | H              | 258.00      | -19.04       | 46.00          | -24.77      |
| 336.00          | 33.67               | 318.00  | H              | 100.00      | -29.96       | 46.00          | -12.33      |
| 233.19          | 31.76               | 275.00  | H              | 128.00      | -29.02       | 46.00          | -14.24      |
| 900.15          | 21.31               | 282.00  | H              | 354.00      | -19.36       | 46.00          | -24.69      |

Note: The highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement shall only be made up to 1GHz.

|                 |                |
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## Annex A. TEST INSTRUMENT

| Instrument                                  | Model   | Serial #   | Cal Date   | Cal Due    | In use                              |
|---|---------|------------|------------|------------|-------------------------------------|
| <b>AC Line Conducted Emissions</b>          |         |            |            |            |                                     |
| R&S EMI Test Receiver                       | ESPI3   | 101216     | 11/04/2014 | 11/03/2015 | <input checked="" type="checkbox"/> |
| V-LISN                                      | ESH3-Z5 | 838979/005 | 09/27/2014 | 09/26/2015 | <input checked="" type="checkbox"/> |
| SIEMIC Labview Conducted Emissions software | V1.0    | N/A        | N/A        | N/A        | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>                   |         |            |            |            |                                     |
| Hp Spectrum Analyzer                        | 8563E   | 3821A09023 | 10/09/2014 | 10/08/2015 | <input checked="" type="checkbox"/> |
| R&S EMI Receiver                            | ESPI3   | 101216     | 11/04/2014 | 11/03/2015 | <input checked="" type="checkbox"/> |
| Antenna (30MHz~6GHz)                        | JB6     | A121411    | 04/15/2014 | 04/14/2015 | <input checked="" type="checkbox"/> |
| Hp Agilent Pre-Amplifier                    | 8447F   | 1937A01160 | 10/27/2014 | 10/26/2015 | <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 Internal Photo



Front View of EUT

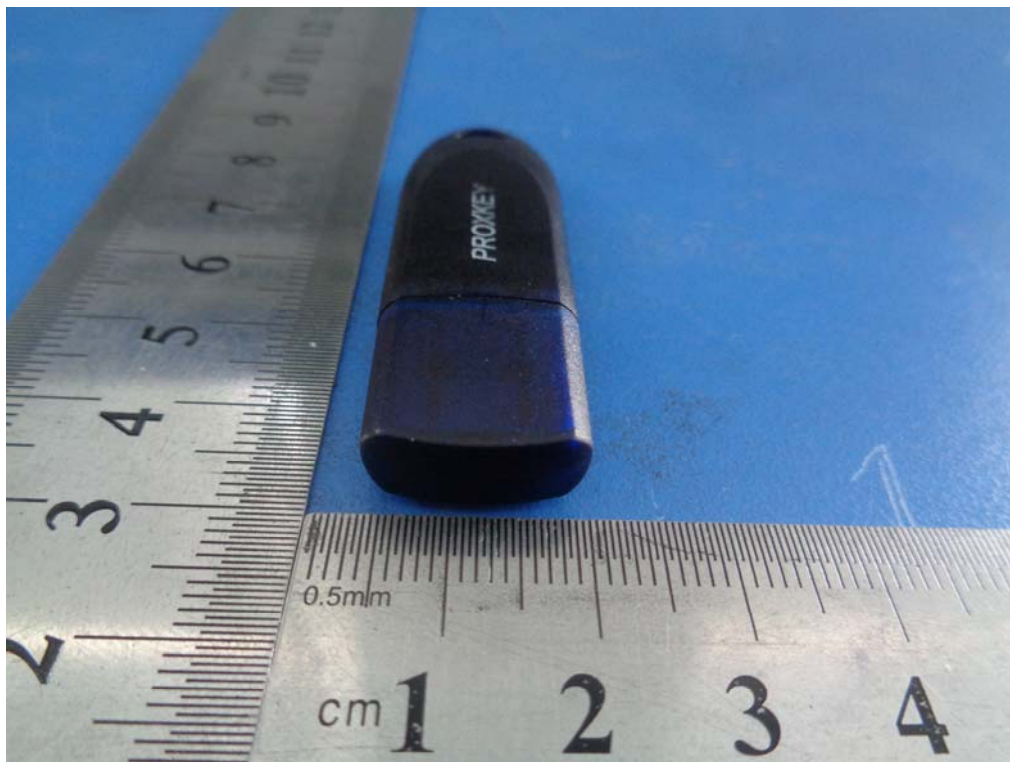


Rear View of EUT

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Top View of EUT



Bottom View of EUT

|                 |                |
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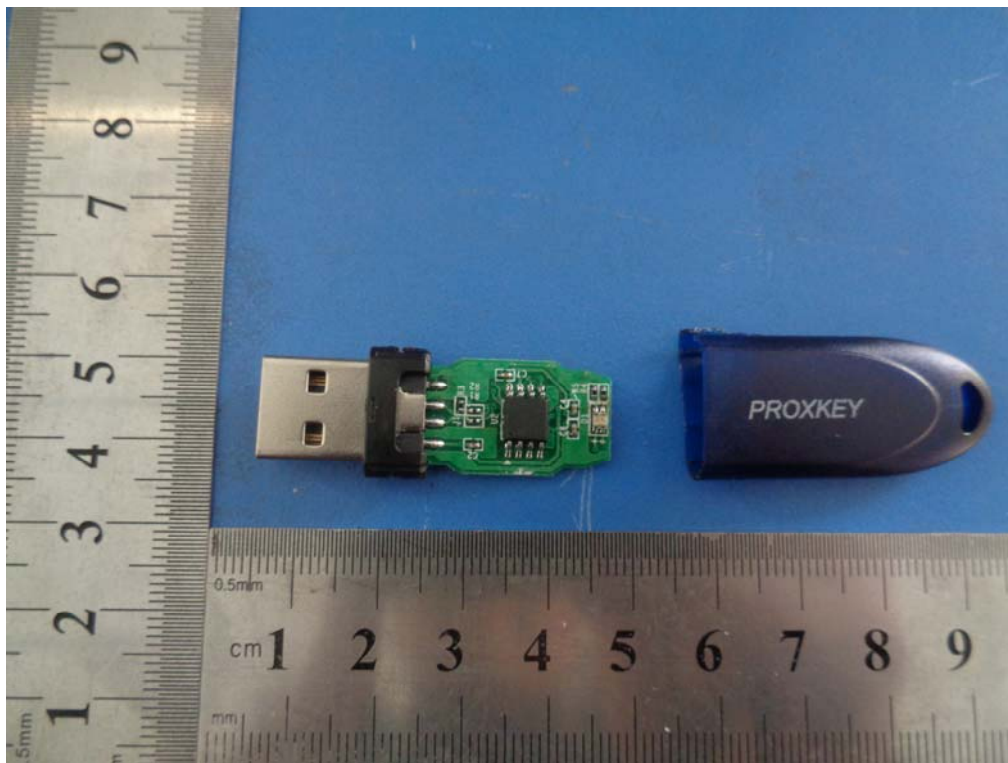
Left View of EUT



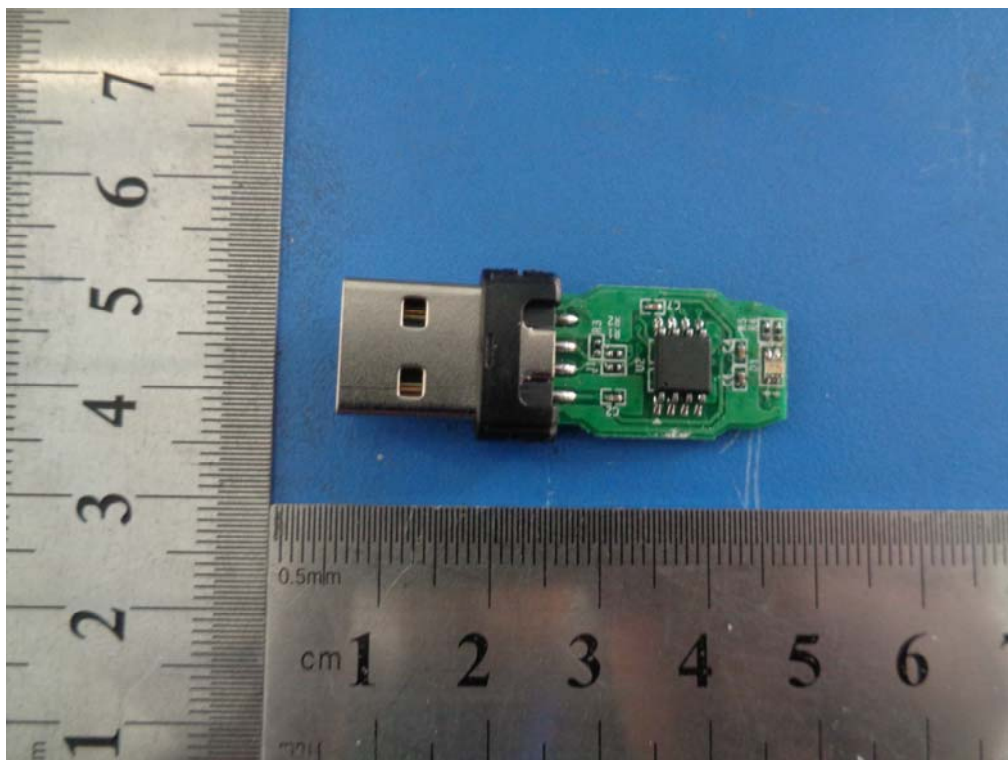
Right View of EUT



Annex B.ii. Photograph EUT Internal Photo

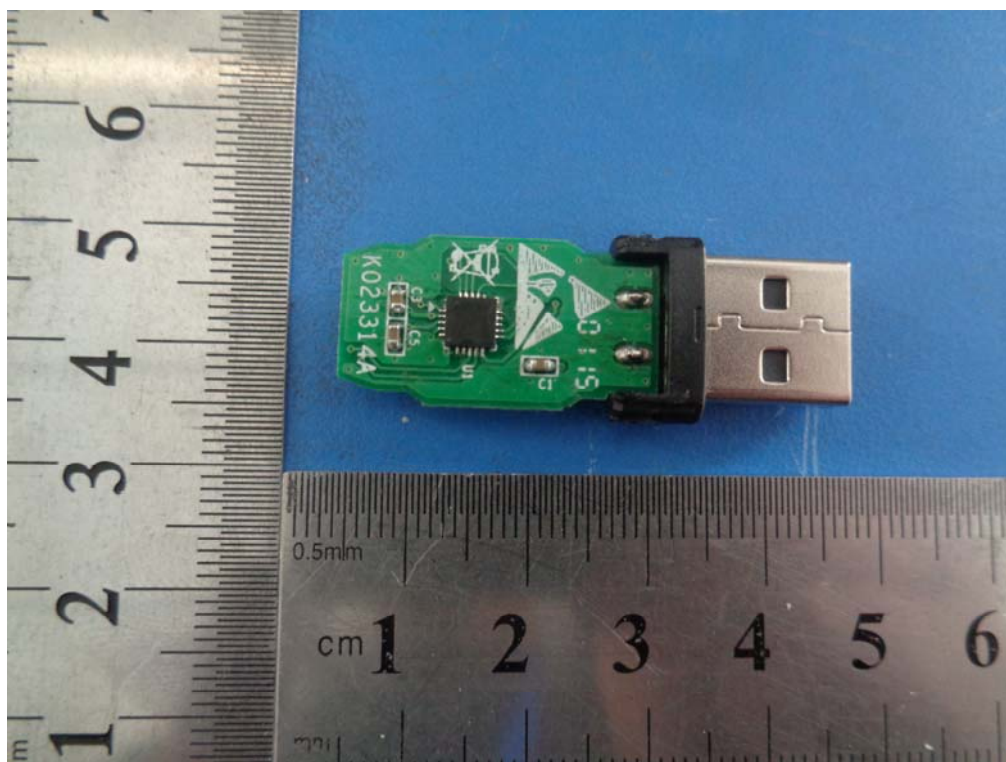


Uncover- Front View



EUT PCBA – Front View

|                 |                |
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EUT PCBA – Rear View

**Annex B.iii. Photograph: Test Setup Photo**

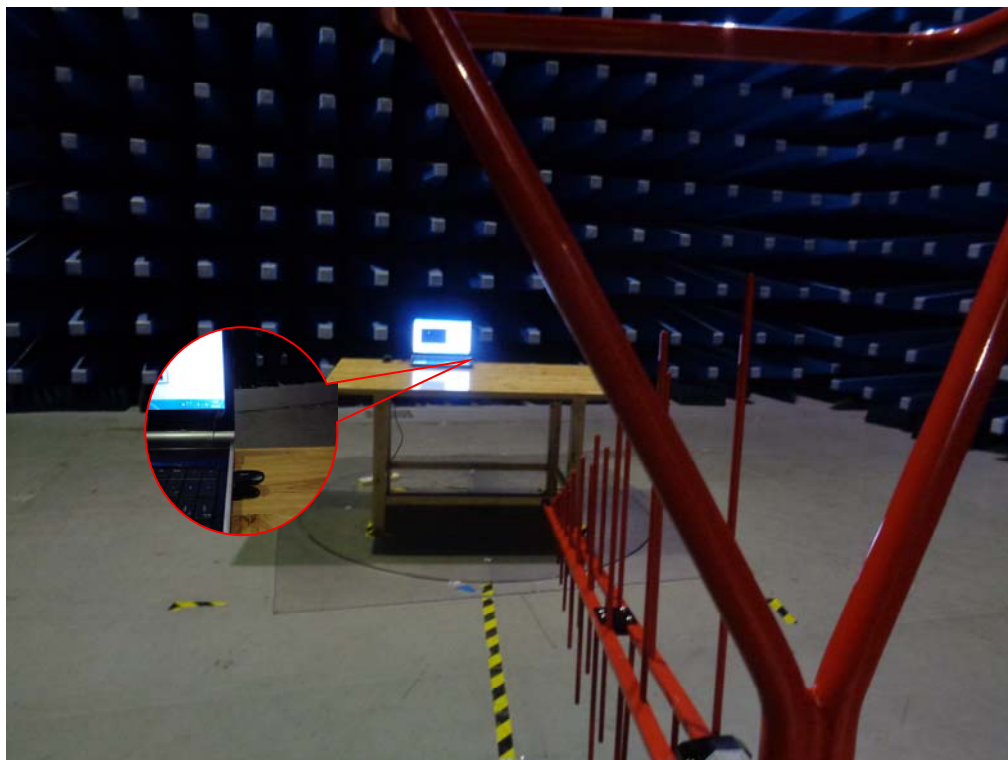


Conducted Emissions Setup Front View



Conducted Emissions Setup Side View

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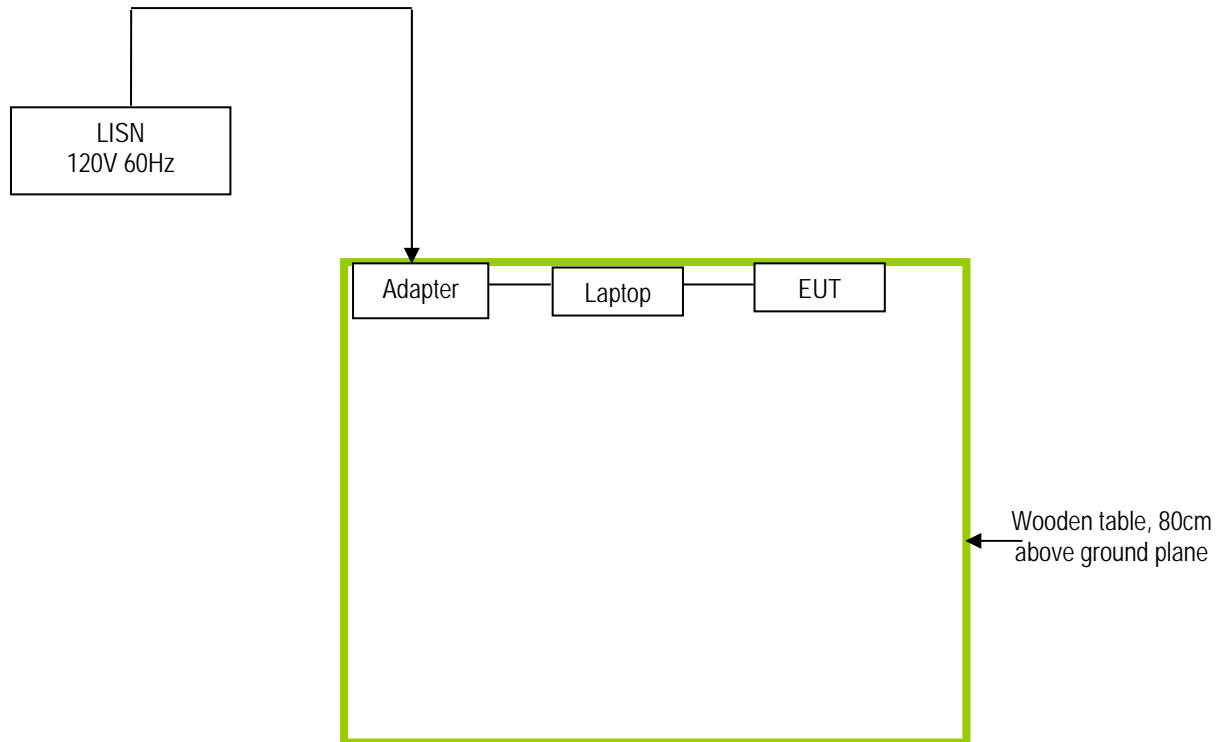


Radiated Emissions Setup Below 1GHz Front View

## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

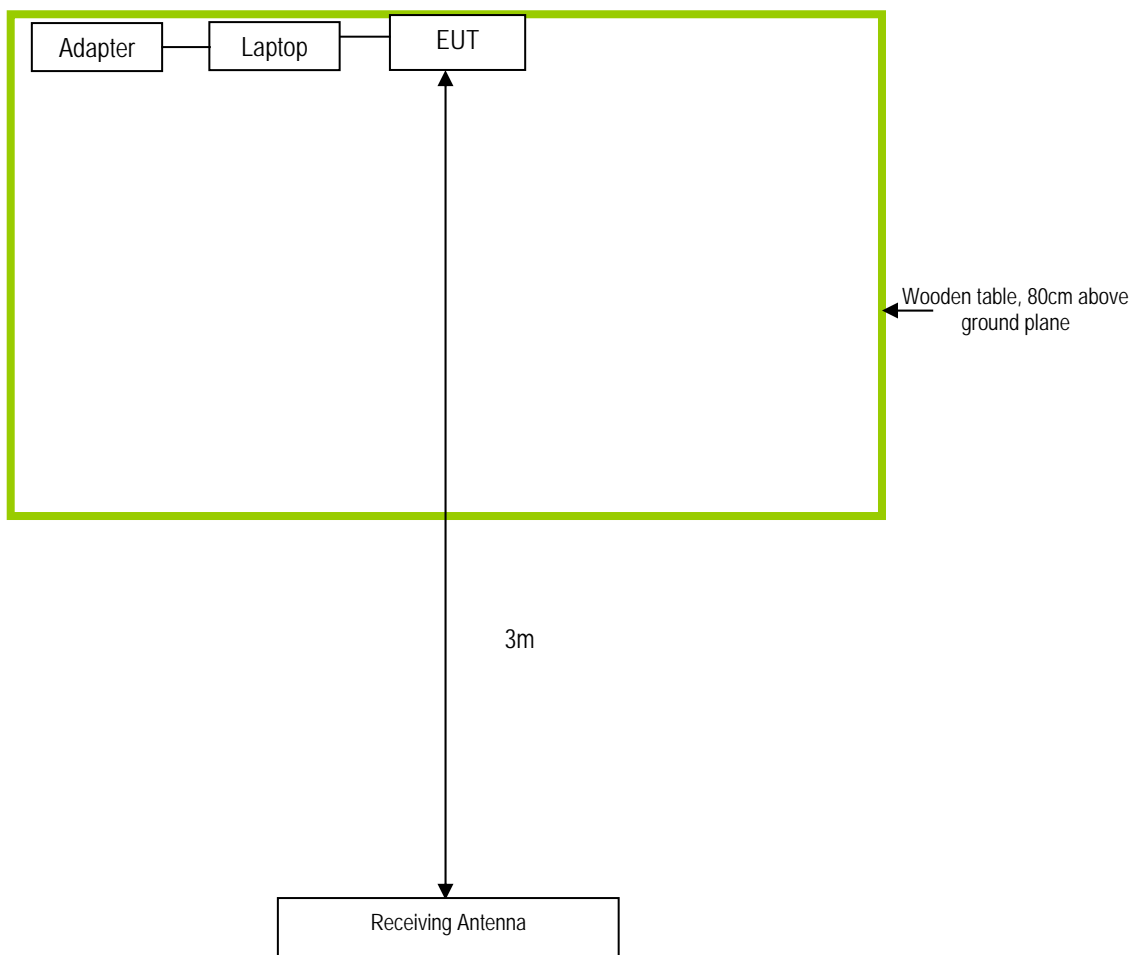
### Annex C.i. TEST SET UP BLOCK

#### Block Configuration Diagram for 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 |
|--------------|-----------------------|------------------------------------|------------------|
| Gateway      | Gateway Laptop        | MS2288 &<br>LXWHF02013951C3CA92200 | 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