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# FCC REPORT

| Applicant:              | PHILIPS CONSUMER LIFESTYLE                                 |
|-------------------------|--|
| Address of Applicant:   | High Tech Campus Building HTC 37 - Parterre Eindhoven 5656 |
|                         | AE Netherlands   |
| Equipment Under Test (E | UT)  |
| Product Name:           | SKIN MOISTURE TESTER                                       |
| Brand Name:             | Philips  |
| Model No.:              | ST-01  |
| FCC ID:                 | 2AEFK-BSC711   |
| Applicable standards:   | FCC CFR Title 47 Part 15 Subpart C Section 15.249:2017     |
| Date of sample receipt: | July 3, 2017   |
| Date of Test:           | July 3, 2017 to July 13, 2017                              |
| Date of report issued:  | July 13, 2017  |
| Test Result :           | PASS *   |

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Kevin Yu Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the EBO product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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#### 2 Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | July 13, 2017 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

Prepared by:

Date:

July 13, 2017

Project Engineer

Reviewed by:

Date:

July 13, 2017

Reviewer



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# 4 Test Summary

| Test Item                                | Section in CFR 47     | Result |
|--|-----------------------|--------|
| Antenna requirement                      | 15.203                | Pass   |
| AC Power Line Conducted Emission         | 15.207                | N/A    |
| Field strength of the fundamental signal | 15.249 (a)            | Pass   |
| Spurious emissions                       | 15.249 (a) (d)/15.209 | Pass   |
| Band edge                                | 15.249 (d)/15.205     | Pass   |
| 20dB Occupied Bandwidth                  | 15.215 (c)            | Pass   |

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.4 2014 and ANSI C63.10 2013.

#### 4.1 Measurement Uncertainty

| Test Item                           | Frequency Range                     | Measurement Uncertainty           | Notes |
|-------------------------------------|-------------------------------------|-----------------------------------|-------|
| Radiated Emission                   |                                     |                                   | (1)   |
| Radiated Emission                   |                                     |                                   | (1)   |
| Radiated Emission                   | 1GHz ~ 26.5GHz                      | ± 4.68dB                          | (1)   |
| AC Power Line Conducted<br>Emission | $() 15MH7 \sim 30MH7 = + 3.450H8$   |                                   | (1)   |
| Note (1): The measurement unce      | rtainty is for coverage factor of k | =2 and a level of confidence of 9 | 95%.  |



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## 5 General Information

#### 5.1 Client Information

| Applicant:                          | PHILIPS CONSUMER LIFESTYLE   |
|-------------------------------------|--|
| Address of Applicant:               | High Tech Campus Building HTC 37 - Parterre Eindhoven 5656 AE<br>Netherlands                         |
| Manufacturer/Factory:               | SHENZHEN VANILLA ELECTRONICS CO., LTD.   |
| Address of<br>Manufacturer/Factory: | 2/F, Building B, Shangxingxibu Industrial Zone, Xihuan Road, Shajing, Bao'an, Shenzhen 518109, China |

#### 5.2 General Description of EUT

| -                                      |                             |
|--|-----------------------------|
| Product Name:                          | SKIN MOISTURE TESTER        |
| Brand Name:                            | Philips                     |
| Model No.:                             | ST-01                       |
| Operation Frequency:                   | 2402MHz~2480MHz             |
| Channel Numbers:                       | 40                          |
| Channel Separation:                    | 2MHz                        |
| Modulation Type:                       | GFSK                        |
| Antenna Type:                          | PCB Antenna                 |
| Antenna gain:                          | 0dBi (declare by Applicant) |
| Power supply: DC 3.0V (CR2050 Battery) |                             |



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| Operation F | Operation Frequency each of channel |         |           |         |           |         |           |
|-------------|-------------------------------------|---------|-----------|---------|-----------|---------|-----------|
| Channel     | Frequency                           | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1           | 2402MHz                             | 11      | 2422MHz   | 21      | 2442MHz   | 31      | 2462MHz   |
| 2           | 2404MHz                             | 12      | 2424MHz   | 22      | 2444MHz   | 32      | 2464MHz   |
|             | •                                   |         | •         | •       | •         |         | •         |
| 9           | 2418MHz                             | 19      | 2438MHz   | 29      | 2458MHz   | 39      | 2478MHz   |
| 10          | 2420MHz                             | 20      | 2440MHz   | 30      | 2460MHz   | 40      | 2480MHz   |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2402MHz   |
| The middle channel  | 2440MHz   |
| The Highest channel | 2480MHz   |

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#### 5.3 Test mode

| Transmitting mode Keep the EUT in continuously transmitting mode |                      |  |  |
|--|----------------------|--|--|
| Remark: New battery is   | used during all test |  |  |

#### Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

| Axis                   | Х     | Y     | Z     |
|------------------------|-------|-------|-------|
| Field Strength(dBuV/m) | 86.42 | 89.93 | 87.31 |

#### 5.4 Description of Support Units

None

#### 5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### • FCC — Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

#### • Industry Canada (IC) — Registration No.: 9079A-2

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

#### 5.6 Test Location

All tests were performed at: Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China



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# 6 Test Instruments list

| Radiated Emission:     |   |                                    |                             |                  |                                 |                            |
|------------------------|---|------------------------------------|-----------------------------|------------------|---------------------------------|----------------------------|
| Item Test Equipment Ma |   | Manufacturer                       | Model No.                   | Inventory<br>No. | Cal.Date<br>(mm-dd-yy)          | Cal.Due date<br>(mm-dd-yy) |
| 1                      | 1 3m Semi- Anechoic<br>Chamber ZhongYu Electron |                                    | 9.2(L)*6.2(W)*<br>6.4(H)    | 250              | July. 03 2015                   | July. 02 2020              |
| 2                      | Control Room                                    | ZhongYu Electron                   | 6.2(L)*2.5(W)*<br>2.4(H)    | 251              | N/A                             | N/A                        |
| 3                      | EMI Test Receiver                               | Rohde & Schwarz                    | ESU26                       | 203              | June. 29 2017                   | June. 28 2018              |
| 4                      | BiConiLog Antenna                               | SCHWARZBECK<br>MESS-<br>ELEKTRONIK | VULB9163                    | 214              | June. 29 2017                   | June. 28 2018              |
| 5                      | Double -ridged<br>waveguide horn                | SCHWARZBECK<br>MESS-<br>ELEKTRONIK | 9120D-829                   | 208              | June. 29 2017                   | June. 28 2018              |
| 6                      | Horn Antenna                                    | ETS-LINDGREN                       | 3160                        | 217              | June. 29 2017                   | June. 28 2018              |
| 7                      | EMI Test Software                               | AUDIX                              | E3                          | N/A              | N/A                             | N/A                        |
| 8                      | Coaxial Cable                                   | GTS                                | N/A                         | 213              | June. 29 2017                   | June. 28 2018              |
| 9                      | Coaxial Cable                                   | GTS                                | N/A                         | 211              | June. 29 2017                   | June. 28 2018              |
| 10                     | Coaxial cable                                   | GTS                                | N/A                         | 210              | June. 29 2017                   | June. 28 2018              |
| 11                     | Coaxial Cable                                   | GTS                                | N/A                         | 212              | June. 29 2017                   | June. 28 2018              |
| 12                     | Amplifier(100kHz-<br>3GHz)                      | HP                                 | 8347A                       | 204              | June. 29 2017                   | June. 28 2018              |
| 13                     | Amplifier(2GHz-<br>20GHz)                       | HP                                 | 8349B                       | 206              | June. 29 2017                   | June. 28 2018              |
| 14                     | Amplifier (18-26GHz)                            | Rohde & Schwarz                    | AFS33-18002<br>650-30-8P-44 | 218              | June. 29 2017                   | June. 28 2018              |
| 15                     | Band filter                                     | Amindeon                           | 82346                       | 219              | June. 29 2017                   | June. 28 2018              |
| 16                     | Constant temperature and humidity box           | Oregon Scientific                  | BA-888                      | 248              | June. 29 2017                   | June. 28 2018              |
| 17                     | D.C. Power Supply                               | Instek                             | PS-3030                     | 232              | 232 June. 29 2017 June. 28 2018 |                            |
| 18                     | Wideband Radio<br>Communication Tester          | Rohde & Schwarz                    | CMW500                      | 588              | June. 29 2017                   | June. 28 2018              |
| 19                     | Splitter  | Agilent                            | 11636B                      | 237              | June. 29 2017                   | June. 28 2018              |



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#### 7 Test results and Measurement Data

#### 7.1 Antenna requirement

| Standard requirement:  | FCC Part15 C Section 15.203 /247(c)  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
| 15.203 requirement:  |  |  |  |  |  |  |  |  |  |
| responsible party shall be us<br>antenna that uses a unique<br>so that a broken antenna ca | 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. |  |  |  |  |  |  |  |  |
| 15.247(c) (1)(i) requiremen  | t:   |  |  |  |  |  |  |  |  |
| operations may employ trans<br>maximum conducted output                                    | <ul> <li>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</li> </ul>  |  |  |  |  |  |  |  |  |
| EUT Antenna:   |  |  |  |  |  |  |  |  |  |
| The antenna is PCB antenna   | a, the best case gain of the antenna is 0dBi   |  |  |  |  |  |  |  |  |



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#### 7.2 Radiated Emission Method

|  | Method  |   |                                  |             |   |  |  |  |
|--|---|---|----------------------------------|-------------|---|--|--|--|
| Test Requirement:                          | FCC Part15 C S                                    | Section 15.209  | 9                                |             |   |  |  |  |
| Test Method:                               | ANSI C63.10:20                                    | 013   |                                  |             |   |  |  |  |
| Test Frequency Range:                      | 30MHz to 25GH                                     | lz  |                                  |             |   |  |  |  |
| Test site:                                 | Measurement D                                     | Distance: 3m  |                                  |             |   |  |  |  |
| Receiver setup:                            | Frequency   | Detector  | RBW                              | VBW         | Remark  |  |  |  |
|  | 30MHz-<br>1GHz                                    | Quasi-peak  | 120KHz                           | 300KHz      | Quasi-peak Value  |  |  |  |
|  | Above 1GHz  | Peak  | 1MHz                             | 3MHz        | Peak Value  |  |  |  |
|  | Above IGHZ  | Peak  | 1MHz                             | 10Hz        | Average Value   |  |  |  |
| Limit:                                     | Freque  | ency  | Limit (dBuV                      | /m @3m)     | Remark  |  |  |  |
| (Field strength of the fundamental signal) | 2400MHz-24  | 183.5MHz  | 94.0                             | 0           | Average Value   |  |  |  |
| Limit:                                     | Freque  | ency  | Limit (dBuV                      | /m @3m)     | Remark  |  |  |  |
| (Spurious Emissions)                       | 30MHz-8   |   | 40.0                             |             | Quasi-peak Value  |  |  |  |
|  | 88MHz-2   |   | 43.5                             |             | Quasi-peak Value  |  |  |  |
|  | 216MHz-9  |   | 46.0                             |             | Quasi-peak Value  |  |  |  |
|  | 960MHz-   | IGHZ  | <u> </u>                         |             | Quasi-peak Value  |  |  |  |
|  | Above 1   | GHz   |                                  |             | Average Value<br>Peak Value                                   |  |  |  |
| Limit:<br>(band edge)                      | harmonics, shal                                   | II be attenuate<br>to the genera                            | ed by at least<br>I radiated emi | 50 dB belov | bands, except for<br>w the level of the<br>in Section 15.209, |  |  |  |
| Test setup:                                | Below 1GHz  | 3m «  |                                  | Sea         |   |  |  |  |
|  | EUT<br>Tum<br>Table<br>Ground Plane<br>Above 1GHz | 4m<br>RF T est<br>Receiver<br>Turm<br>Table<br>Ground Plane |                                  |             |   |  |  |  |



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|                   | EUT<br>Turn<br>Table<br>1.5m<br>Antenna<br>Horn Antenna<br>Spectrum<br>Analyzer<br>Amplifier   |
|-------------------|--|
| Test Procedure:   | <ol> <li>The EUT was placed on the top of a rotating table 0.8m above the<br/>ground at a 3 meter camber. The table was rotated 360 degrees to<br/>determine the position of the highest radiation.</li> </ol>   |
|                   | 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.   |
|                   | 3. The antenna 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 polarizations of the antenna are set to make the measurement.  |
|                   | 4. For each suspected emission, the EUT was arranged to its worst case<br>and then the antenna was tuned to heights from 1 meter to 4 meters<br>and the rota table was turned from 0 degrees to 360 degrees to find the<br>maximum reading.  |
|                   | 5. The test-receiver system was set to Peak Detect Function and<br>Specified Bandwidth with Maximum Hold Mode.   |
|                   | 6. If the emission level of the EUT in peak mode was 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.3 for details   |
| Test results:     | Pass   |

#### Measurement data:



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#### 7.2.1 Field Strength of The Fundamental Signal

Peak value:

| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| 2402.00            | 90.74                   | 27.58                       | 5.39                  | 34.01                    | 89.70             | 114.00                 | -24.30                | Vertical     |
| 2402.00            | 85.53                   | 27.58                       | 5.39                  | 34.01                    | 84.49             | 114.00                 | -29.51                | Horizontal   |
| 2440.00            | 90.98                   | 27.48                       | 5.43                  | 33.96                    | 89.93             | 114.00                 | -24.07                | Vertical     |
| 2440.00            | 85.05                   | 27.48                       | 5.43                  | 33.96                    | 84.00             | 114.00                 | -30.00                | Horizontal   |
| 2480.00            | 89.97                   | 27.52                       | 5.47                  | 33.92                    | 89.04             | 114.00                 | -24.96                | Vertical     |
| 2480.00            | 84.18                   | 27.52                       | 5.47                  | 33.92                    | 83.25             | 114.00                 | -30.75                | Horizontal   |

#### Average value:

|                    |                         |                             |                       | _                        |                   |                        | -                     |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 2402.00            | 80.96                   | 27.58                       | 5.39                  | 34.01                    | 79.92             | 94.00                  | -14.08                | Vertical     |
| 2402.00            | 75.89                   | 27.58                       | 5.39                  | 34.01                    | 74.85             | 94.00                  | -19.15                | Horizontal   |
| 2440.00            | 81.05                   | 27.48                       | 5.43                  | 33.96                    | 80.00             | 94.00                  | -14.00                | Vertical     |
| 2440.00            | 74.46                   | 27.48                       | 5.43                  | 33.96                    | 73.41             | 94.00                  | -20.59                | Horizontal   |
| 2480.00            | 80.09                   | 27.52                       | 5.47                  | 33.92                    | 79.16             | 94.00                  | -14.84                | Vertical     |
| 2480.00            | 74.66                   | 27.52                       | 5.47                  | 33.92                    | 73.73             | 94.00                  | -20.27                | Horizontal   |

#### Note: RBW 3MHz VBW 3MHz Peak detector is for PK value ,RMS detector is for AV value



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#### 7.2.2 Spurious emissions

Below 1GHz

| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| 95.762             | 30.97                   | 11.35                       | 1.16                  | 29.82                    | 13.66             | 43.5                   | -27.81                | Vertical     |
| 103.08             | 30.81                   | 11.8                        | 1.22                  | 29.79                    | 14.04             | 43.5                   | -28.6                 | Vertical     |
| 210.048            | 26.99                   | 10.59                       | 1.9                   | 29.47                    | 10.01             | 43.5                   | -34.27                | Vertical     |
| 315.481            | 26.59                   | 13.79                       | 2.44                  | 30.11                    | 12.71             | 46                     | -34.25                | Vertical     |
| 552.883            | 24.56                   | 18.45                       | 3.53                  | 29.45                    | 17.09             | 46                     | -29.06                | Vertical     |
| 925.756            | 24.94                   | 22.36                       | 4.95                  | 29.28                    | 22.97             | 46                     | -20.93                | Vertical     |
| 49.187             | 24.68                   | 12.23                       | 0.76                  | 30.1                     | 7.57              | 40                     | -32.43                | Horizontal   |
| 119.856            | 26.58                   | 9.4                         | 1.36                  | 29.72                    | 7.62              | 43.5                   | -35.88                | Horizontal   |
| 192.419            | 26                      | 9.87                        | 1.8                   | 29.44                    | 8.23              | 43.5                   | -35.27                | Horizontal   |
| 326.74             | 26.06                   | 14.03                       | 2.5                   | 30.04                    | 12.55             | 46                     | -33.45                | Horizontal   |
| 504.706            | 25.29                   | 17.61                       | 3.33                  | 29.5                     | 16.73             | 46                     | -29.27                | Horizontal   |
| 836.244            | 24.83                   | 21.62                       | 4.6                   | 29.17                    | 21.88             | 46                     | -24.12                | Horizontal   |



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| Above 1            | GHz                     |                             |                       |                          |                   |                        |                       |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Test channel       | :                       |                             |                       | Low                      | est channel       |                        |                       |              |
| Peak value:        |                         |                             |                       | I.                       |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4804.00            | 37.41                   | 31.78                       | 8.60                  | 32.09                    | 45.70             | 74.00                  | -28.30                | Vertical     |
| 7206.00            | 31.90                   | 36.15                       | 11.65                 | 32.00                    | 47.70             | 74.00                  | -26.30                | Vertical     |
| 9608.00            | 31.53                   | 37.95                       | 14.14                 | 31.62                    | 52.00             | 74.00                  | -22.00                | Vertical     |
| 12010.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 14412.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 4804.00            | 41.72                   | 31.78                       | 8.60                  | 32.09                    | 50.01             | 74.00                  | -23.99                | Horizontal   |
| 7206.00            | 33.66                   | 36.15                       | 11.65                 | 32.00                    | 49.46             | 74.00                  | -24.54                | Horizontal   |
| 9608.00            | 30.96                   | 37.95                       | 14.14                 | 31.62                    | 51.43             | 74.00                  | -22.57                | Horizontal   |
| 12010.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| 14412.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| Average val        |                         |                             |                       |                          |                   |                        | -                     |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4804.00            | 26.20                   | 31.78                       | 8.60                  | 32.09                    | 34.49             | 54.00                  | -19.51                | Vertical     |
| 7206.00            | 20.57                   | 36.15                       | 11.65                 | 32.00                    | 36.37             | 54.00                  | -17.63                | Vertical     |
| 9608.00            | 19.64                   | 37.95                       | 14.14                 | 31.62                    | 40.11             | 54.00                  | -13.89                | Vertical     |
| 12010.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 14412.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 4804.00            | 30.44                   | 31.78                       | 8.60                  | 32.09                    | 38.73             | 54.00                  | -15.27                | Horizontal   |
| 7206.00            | 22.75                   | 36.15                       | 11.65                 | 32.00                    | 38.55             | 54.00                  | -15.45                | Horizontal   |
| 9608.00            | 19.38                   | 37.95                       | 14.14                 | 31.62                    | 39.85             | 54.00                  | -14.15                | Horizontal   |
| 12010.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |
| 14412.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |

#### Above 1GHz

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor

2. "\*", means this data is the too weak instrument of signal is unable to test.



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| Test channel       | :                       |                             |                       | Mic                      | ldle              |                        |                       |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Peak value:        |                         |                             |                       |                          |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4880.00            | 36.95                   | 31.85                       | 8.67                  | 32.12                    | 45.35             | 74.00                  | -28.65                | Vertical     |
| 7320.00            | 31.59                   | 36.37                       | 11.72                 | 31.89                    | 47.79             | 74.00                  | -26.21                | Vertical     |
| 9760.00            | 31.26                   | 38.35                       | 14.25                 | 31.62                    | 52.24             | 74.00                  | -21.76                | Vertical     |
| 12200.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 14640.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 4880.00            | 41.16                   | 31.85                       | 8.67                  | 32.12                    | 49.56             | 74.00                  | -24.44                | Horizontal   |
| 7320.00            | 33.32                   | 36.37                       | 11.72                 | 31.89                    | 49.52             | 74.00                  | -24.48                | Horizontal   |
| 9760.00            | 30.65                   | 38.35                       | 14.25                 | 31.62                    | 51.63             | 74.00                  | -22.37                | Horizontal   |
| 12200.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| 14640.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| Average val        | ue:                     |                             |                       |                          |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4880.00            | 25.84                   | 31.85                       | 8.67                  | 32.12                    | 34.24             | 54.00                  | -19.76                | Vertical     |
| 7320.00            | 20.33                   | 36.37                       | 11.72                 | 31.89                    | 36.53             | 54.00                  | -17.47                | Vertical     |
| 9760.00            | 19.43                   | 38.35                       | 14.25                 | 31.62                    | 40.41             | 54.00                  | -13.59                | Vertical     |
| 12200.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 14640.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 4880.00            | 30.03                   | 31.85                       | 8.67                  | 32.12                    | 38.43             | 54.00                  | -15.57                | Horizontal   |
| 7320.00            | 22.48                   | 36.37                       | 11.72                 | 31.89                    | 38.68             | 54.00                  | -15.32                | Horizontal   |
| 9760.00            | 19.13                   | 38.35                       | 14.25                 | 31.62                    | 40.11             | 54.00                  | -13.89                | Horizontal   |
| 12200.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |
| 14640.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. "\*", means this data is the too weak instrument of signal is unable to test.



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| Test channel       | :                       |                             |                       | Hig                      | hest              |                        |                       |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Peak value:        |                         |                             |                       |                          |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4960.00            | 35.66                   | 31.93                       | 8.73                  | 32.16                    | 44.16             | 74.00                  | -29.84                | Vertical     |
| 7440.00            | 30.74                   | 36.59                       | 11.79                 | 31.78                    | 47.34             | 74.00                  | -26.66                | Vertical     |
| 9920.00            | 30.49                   | 38.81                       | 14.38                 | 31.88                    | 51.80             | 74.00                  | -22.20                | Vertical     |
| 12400.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 14880.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Vertical     |
| 4960.00            | 39.60                   | 31.93                       | 8.73                  | 32.16                    | 48.10             | 74.00                  | -25.90                | Horizontal   |
| 7440.00            | 32.35                   | 36.59                       | 11.79                 | 31.78                    | 48.95             | 74.00                  | -25.05                | Horizontal   |
| 9920.00            | 29.76                   | 38.81                       | 14.38                 | 31.88                    | 51.07             | 74.00                  | -22.93                | Horizontal   |
| 12400.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| 14880.00           | *                       |                             |                       |                          |                   | 74.00                  |                       | Horizontal   |
| Average val        | ue:                     | •                           |                       |                          | •                 |                        |                       | •            |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | polarization |
| 4960.00            | 24.82                   | 31.93                       | 8.73                  | 32.16                    | 33.32             | 54.00                  | -20.68                | Vertical     |
| 7440.00            | 19.63                   | 36.59                       | 11.79                 | 31.78                    | 36.23             | 54.00                  | -17.77                | Vertical     |
| 9920.00            | 18.81                   | 38.81                       | 14.38                 | 31.88                    | 40.12             | 54.00                  | -13.88                | Vertical     |
| 12400.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 14880.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Vertical     |
| 4960.00            | 28.87                   | 31.93                       | 8.73                  | 32.16                    | 37.37             | 54.00                  | -16.63                | Horizontal   |
| 7440.00            | 21.70                   | 36.59                       | 11.79                 | 31.78                    | 38.30             | 54.00                  | -15.70                | Horizontal   |
| 9920.00            | 18.41                   | 38.81                       | 14.38                 | 31.88                    | 39.72             | 54.00                  | -14.28                | Horizontal   |
| 12400.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |
| 14880.00           | *                       |                             |                       |                          |                   | 54.00                  |                       | Horizontal   |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor

2. "\*", means this data is the too weak instrument of signal is unable to test.

3. The emission levels of other frequencies are very lower than the limit and not show in test report.



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#### 7.2.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

| Test channe        | el:                     |                             |                       | Lov                      | west channe       |                        |                       |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Peak value:        |                         |                             |                       |                          |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Polarization |
| 2390.00            | 41.26                   | 27.59                       | 5.38                  | 30.18                    | 44.05             | 74.00                  | -29.95                | Horizontal   |
| 2400.00            | 43.82                   | 27.58                       | 5.39                  | 30.18                    | 46.61             | 74.00                  | -27.39                | Horizontal   |
| 2390.00            | 41.66                   | 27.59                       | 5.38                  | 30.18                    | 44.45             | 74.00                  | -29.55                | Vertical     |
| 2400.00            | 45.68                   | 27.58                       | 5.39                  | 30.18                    | 48.47             | 74.00                  | -25.53                | Vertical     |
| Average va         | lue:                    |                             |                       |                          |                   |                        |                       |              |
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Polarization |
| 2390.00            | 32.18                   | 27.59                       | 5.38                  | 30.18                    | 34.97             | 54.00                  | -19.03                | Horizontal   |
| 2400.00            | 33.32                   | 27.58                       | 5.39                  | 30.18                    | 36.11             | 54.00                  | -17.89                | Horizontal   |
| 2390.00            | 32.01                   | 27.59                       | 5.38                  | 30.18                    | 34.80             | 54.00                  | -19.20                | Vertical     |
| 2400.00            | 34.81                   | 27.58                       | 5.39                  | 30.18                    | 37.60             | 54.00                  | -16.40                | Vertical     |

# Test channel:

#### Highest channel

| Peak value:        |                         |                             |                       |                          |                   |                        |                       |              |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------------|--------------|
| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Polarization |
| 2483.50            | 43.17                   | 27.53                       | 5.47                  | 29.93                    | 46.24             | 74.00                  | -27.76                | Horizontal   |
| 2500.00            | 42.65                   | 27.55                       | 5.49                  | 29.93                    | 45.76             | 74.00                  | -28.24                | Horizontal   |
| 2483.50            | 43.74                   | 27.53                       | 5.47                  | 29.93                    | 46.81             | 74.00                  | -27.19                | Vertical     |
| 2500.00            | 43.50                   | 27.55                       | 5.49                  | 29.93                    | 46.61             | 74.00                  | -27.39                | Vertical     |

Average value:

| Frequency<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit (dB) | Polarization |
|--------------------|-------------------------|-----------------------------|-----------------------|--------------------------|-------------------|------------------------|--------------------|--------------|
| 2483.50            | 34.98                   | 27.53                       | 5.47                  | 29.93                    | 38.05             | 54.00                  | -15.95             | Horizontal   |
| 2500.00            | 33.22                   | 27.55                       | 5.49                  | 29.93                    | 36.33             | 54.00                  | -17.67             | Horizontal   |
| 2483.50            | 36.06                   | 27.53                       | 5.47                  | 29.93                    | 39.13             | 54.00                  | -14.87             | Vertical     |
| 2500.00            | 33.00                   | 27.55                       | 5.49                  | 29.93                    | 36.11             | 54.00                  | -17.89             | Vertical     |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor



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#### 7.3 20dB Occupy Bandwidth

| Test Requirement: | FCC Part15 C Section 15.249/15.215  |  |  |
|-------------------|---|--|--|
| Test Method:      | ANSI C63.10:2013  |  |  |
| Limit:            | Operation Frequency range 2400MHz~2483.5MHz                                 |  |  |
| Test setup:       | Spectrum Analyzer<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane |  |  |
| Test Instruments: | Refer to section 6.0 for details  |  |  |
| Test mode:        | Refer to section 5.3 for details  |  |  |
| Test results:     | Pass  |  |  |

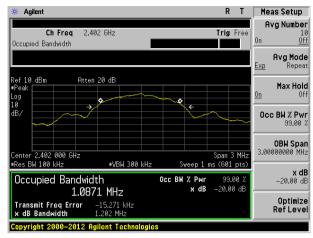
#### **Measurement Data**

| Test channel | 20dB bandwidth(MHz) | Result |
|--------------|---------------------|--------|
| Lowest       | 1.202               | Pass   |
| Middle       | 1.194               | Pass   |
| Highest      | 1.202               | Pass   |



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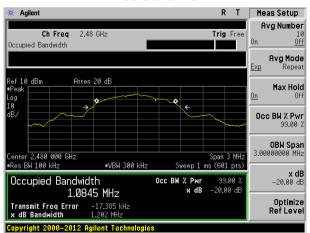
#### Test plot as follows:



Lowest channel

| * Agilent R T  | Meas Setup                        |
|--|-----------------------------------|
| Ch Freq 2.44 GHz Trig Free<br>Occupied Bandwidth   | Avg Number<br>10<br>On <u>Off</u> |
| -  | Avg Mode<br>Exp Repeat            |
| Ref 10 dBm Atten 20 dB<br>●Peak<br>Log<br>10 → ◆ ◆ ◆ ◆ ◆   | Max Hold<br>On Off                |
| dB/  | Occ BW % Pwr<br>99.00 %           |
| Center 2.440 000 GHz   | <b>OBW Span</b><br>3.00000000 MHz |
| Cocupied Bandwidth         Occ BM 2 Sweep 1 ms (oor prs)           1.0831         MHz         × 48         -20.00 dB | <b>x dB</b><br>-20.00 dB          |
| Transmit Freq Error -15.819 kHz<br>× dB Bandwidth 1.194 MHz<br>Copyright 2000-2012 Agilent Technologies              | Optimize<br>RefLevel              |

Middle channel



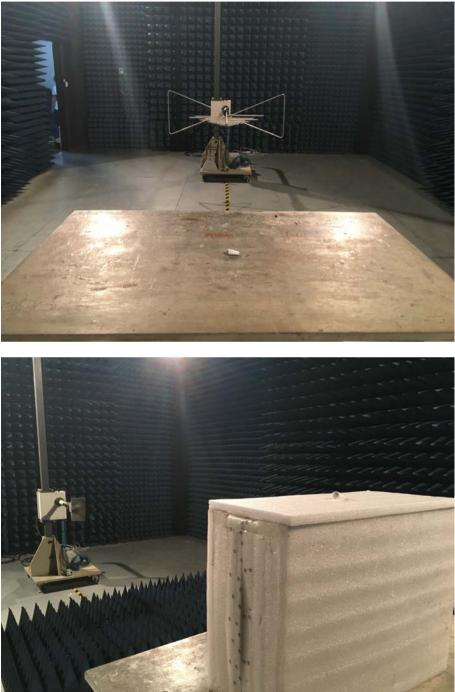
Highest channel



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8 Test Setup Photo

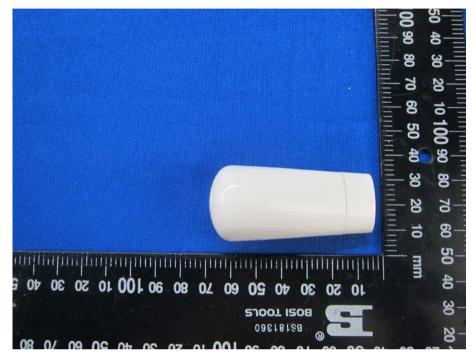


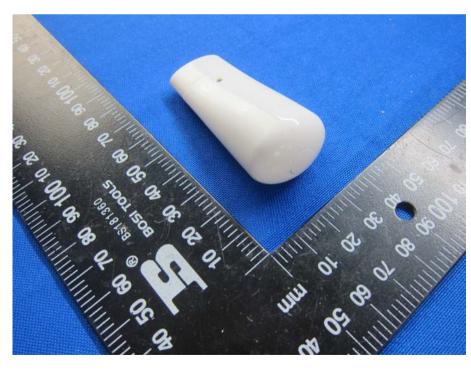




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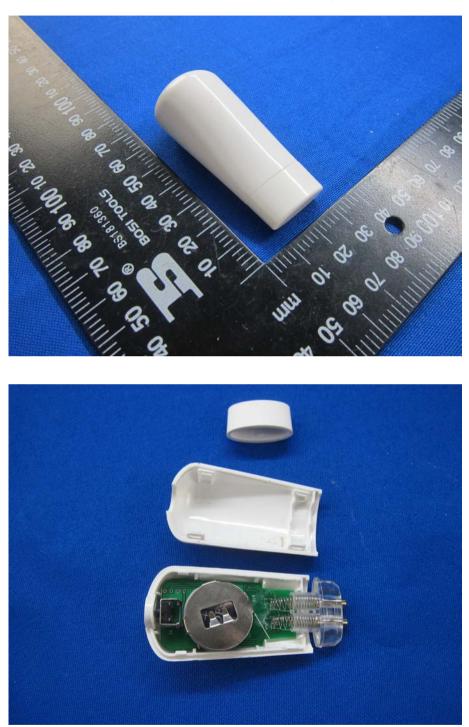
#### 9 EUT Constructional Details





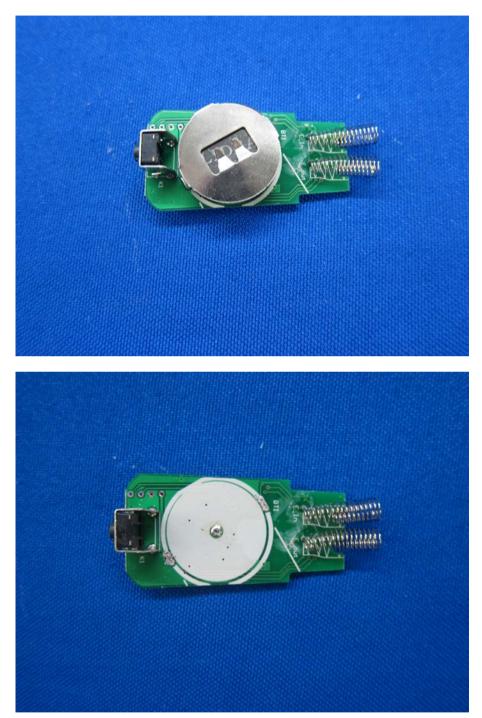


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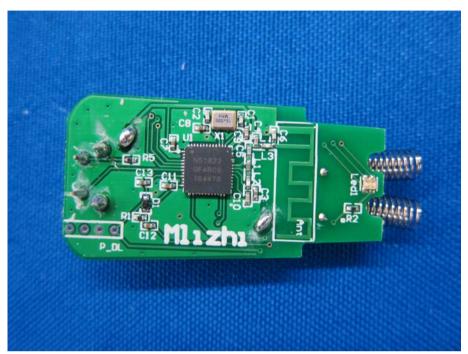


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