

RF Exposure Measurement and Test Report

For

ShenZhen HaiLingKe Electronic co., Ltd.

3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District,

Shenzhen, Guangdong, China

Test Standard: EN 62311:2008

Product Description: WIFI module

Tested Model: HLK-RM80S

Report No.: STR17058329E-2

Tested Date: 2017-06-12 to 2017-07-04

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Manufacturer: ShenZhen HaiLingKe Electronic co., Ltd.
Address of manufacturer: 3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District,
Shenzhen, Guangdong, China

General Description of EUT

| | |
|--|-------------------------|
| Product Name: | WIFI module |
| Brand Name: | HI-LINK |
| Model No.: | HLK-RM80S |
| Adding Model(s): | / |
| Rated Voltage: | 3.3V by DC power supply |
| Software Version: | / |
| Hardware Version: | / |
| <i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i> | |

Technical Characteristics of EUT

| | |
|----------------------|--|
| Support Standards: | 802.11b, 802.11g, 802.11n-HT20/40 |
| Frequency Range: | 2412-2472MHz for 802.11b/g/n(HT20) 2422-2462MHz for 802.11n(HT40) |
| Max.RF Output Power: | 18.94dBm (EIRP) |
| Type of Modulation: | CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM |
| Data Rate: | 1-11Mbps, 6-54Mbps, up to 150Mbps |
| Quantity of Channels | 13 for 802.11b/g/n(HT20), 9 for 802.11n(HT40) |
| Channel Separation: | 5MHz |
| Type of Antenna: | Integral Antenna |
| Antenna Gain: | 2.94dBi |

1.2 Compliance Standards

The following report is prepared on behalf of the ShenZhen HaiLingKe Electronic co., Ltd. in accordance with EN 62311:2008, Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz).

The objective of the manufacturer is to determine compliance with EN 62311:2008, Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz).

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained

2. RF EXPOSURE REFERENCE LEVELS

2.1 Standard Applicable

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies. The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic and electromagnetic fields and induced and contact current.

Normative reference

EN 62311:2008, Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz).

Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to the electromagnetic fields (0Hz to 300GHz) (Official Journal L 197 of 30 July 1999).

2.2 Reference Levels Limit

According to the EN 62311:2008, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/519/EC.

Reference levels of electric, magnetic, and electromagnetic fields
(0MHz to 300GHz, imperturbed rms values)

| Frequency range | E-field strength (V/m) | H-field strength (\wedge /m) | B-field (nT) | Equivalent plane wave power density S_{Eq} (W/m ²) |
|-----------------|------------------------|---------------------------------|-----------------------|--|
| 0-1Hz | — | 3.2×10^4 | 4×10^4 | — |
| 1-8Hz | 10000 | $3.2 \times 10^4 / f^2$ | $4 \times 10^4 / f^2$ | — |
| 8-25Hz | 10000 | $4000 / f$ | $5000 / f$ | — |
| 0.025-0.8kHz | $250 / f$ | $4 / f$ | $5 / f$ | — |
| 0.8-3kHz | $250 / f$ | 5 | 6.25 | — |
| 3-150kHz | 87 | 5 | 6.25 | — |
| 0.15-1MHz | 87 | $0.73 / f$ | $0.92 / f$ | — |
| 1-10MHz | $87 / f^{1/2}$ | $0.73 / f$ | $0.92 / f$ | — |
| 10-400MHz | 28 | 0.073 | 0.092 | 2 |
| 400-2000MHz | $1,375 f^{1/2}$ | $0.0037 f^{1/2}$ | $0.0046 f^{1/2}$ | $f / 200$ |
| 2-300GHz | 61 | 0.16 | 0.20 | 10 |

Note:

1. f as indicated in the frequency range column
2. For frequencies between 100 kHz and 10 GHz, S_{Eq} , E^2 , H^2 , and B^2 are to be averaged over any sixty-minute period.
3. For frequencies exceeding 10GHz, S_{Eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{0.05}$ -minute period (f in GHz).

4. No E-field value is provided for frequencies <1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m, Spark discharges causing stress or annoyance should be avoided.

2.3 Evaluation Methods

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user to keeping at least 20 cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \eta_0 H = \frac{\sqrt{30 P G(\theta, \phi)}}{r}$$

G=antenna gain relative to an isotropic antenna

θ, ϕ =elevation and azimuth angles to point of investigation

r=distance from observation point to the antenna

η_0 =Characteristic impedance of free space


2.4 Evaluation Results

| Channel | Frequency (MHz) | EIRP (dBm) | E-field Strength (V/m) | E-field Strength Limit (V/m) | Result Pass/Fail |
|--------------|-----------------|------------|------------------------|------------------------------|------------------|
| 802.11b | | | | | |
| 1 | 2412 | 17.31 | 6.35 | 61 | Pass |
| 7 | 2442 | 17.71 | 6.65 | 61 | Pass |
| 13 | 2472 | 18.94 | 7.67 | 61 | Pass |
| 802.11g | | | | | |
| 1 | 2412 | 15.56 | 5.19 | 61 | Pass |
| 7 | 2442 | 15.43 | 5.12 | 61 | Pass |
| 13 | 2472 | 15.33 | 5.06 | 61 | Pass |
| 802.11n-HT20 | | | | | |
| 1 | 2412 | 15.72 | 5.29 | 61 | Pass |
| 7 | 2442 | 15.99 | 5.46 | 61 | Pass |
| 13 | 2472 | 16.98 | 6.12 | 61 | Pass |
| 802.11n-HT40 | | | | | |
| 3 | 2422 | 14.6 | 4.65 | 61 | Pass |
| 7 | 2442 | 14.93 | 4.83 | 61 | Pass |
| 11 | 2462 | 15.45 | 5.13 | 61 | Pass |

Since the maximum E-field strength of this device based on 20cm separation distance cannot exceed the E-field strength of reference levels limit. It is deemed to full fit the requirement of RF exposure basic restriction specified in EC Council Recommendation (1999/519/EC).

EXHIBIT 1 - PRODUCT LABELING

Proposed CE Label Format

| | |
|---|--|
| WIFI module | |
| Model: HLK-RM80S | |
| Brand: HI-LINK | |
| Importer Name: XXX | CE |
| Importer Address: XXX |  |
| ShenZhen HaiLingKe Electronic co., Ltd. | |
| 3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District, Shenzhen, Guangdong, China | |

Specifications: Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The 'CE' marking must be affixed to the EUT or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents. The 'CE' marking is allowed less than 5 mm but must clear. If the 'CE' marking is reduced or enlarged the proportions given in the above graduated drawing must be respected. The Importer name, address and Manufacturer name and address should indicate on marking label or packaging or in a document accompanying

Proposed Label Location on EUT

CE Label Location

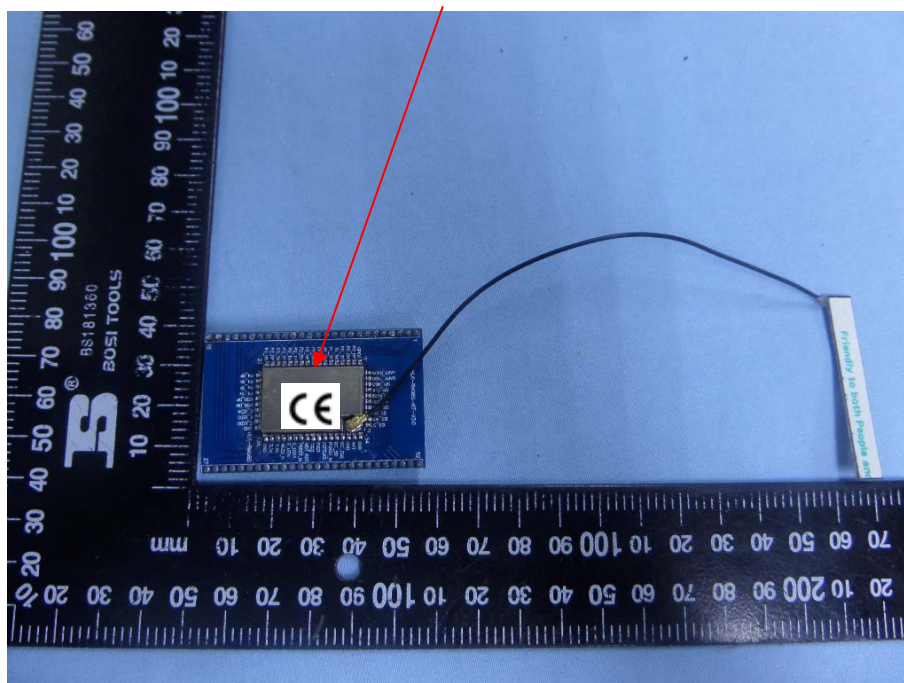
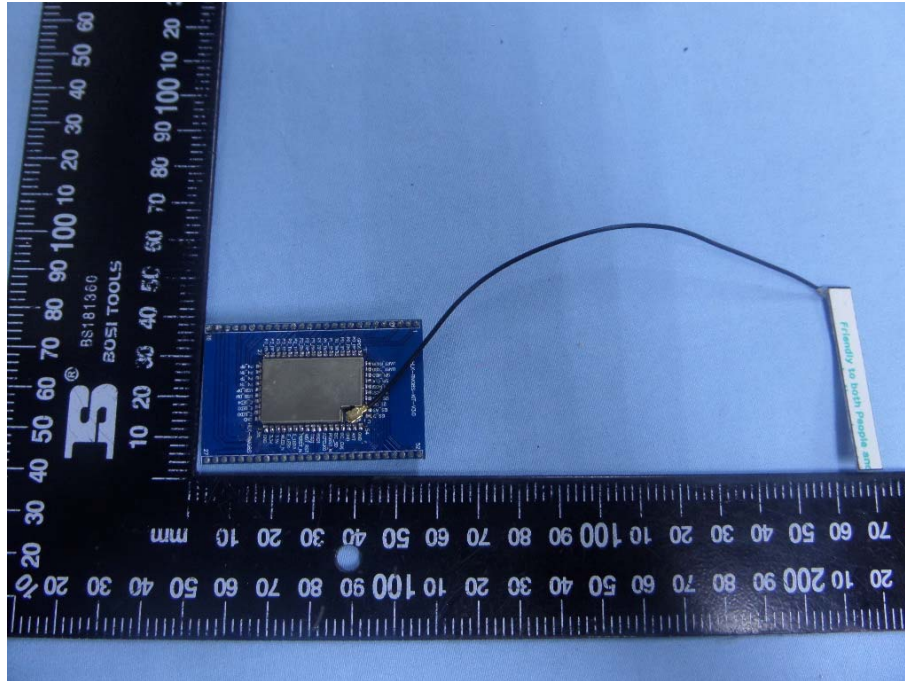
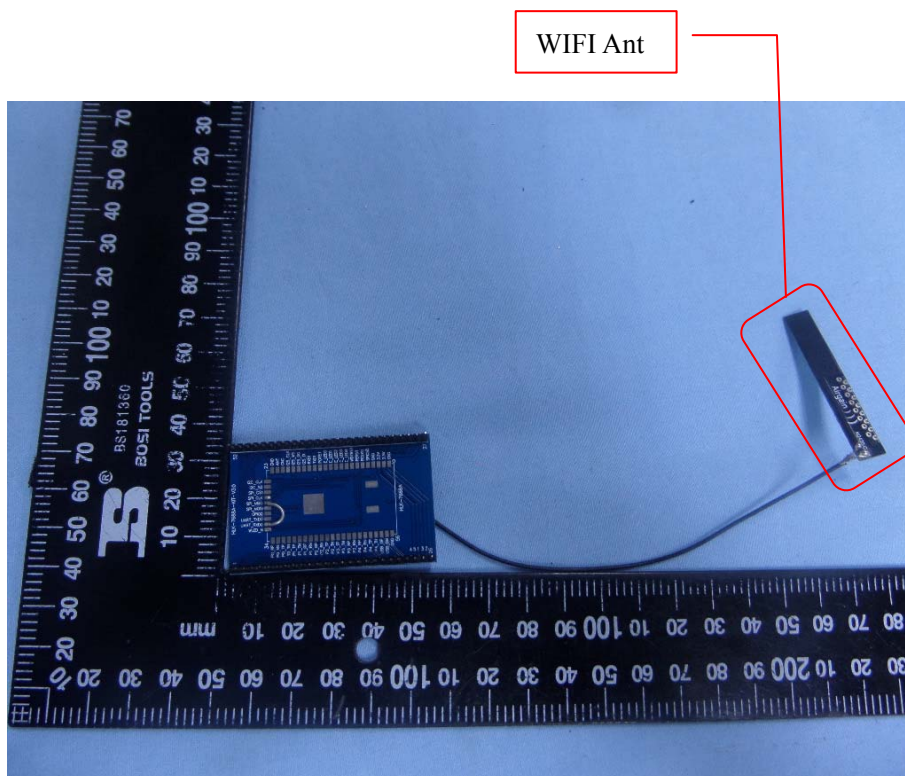


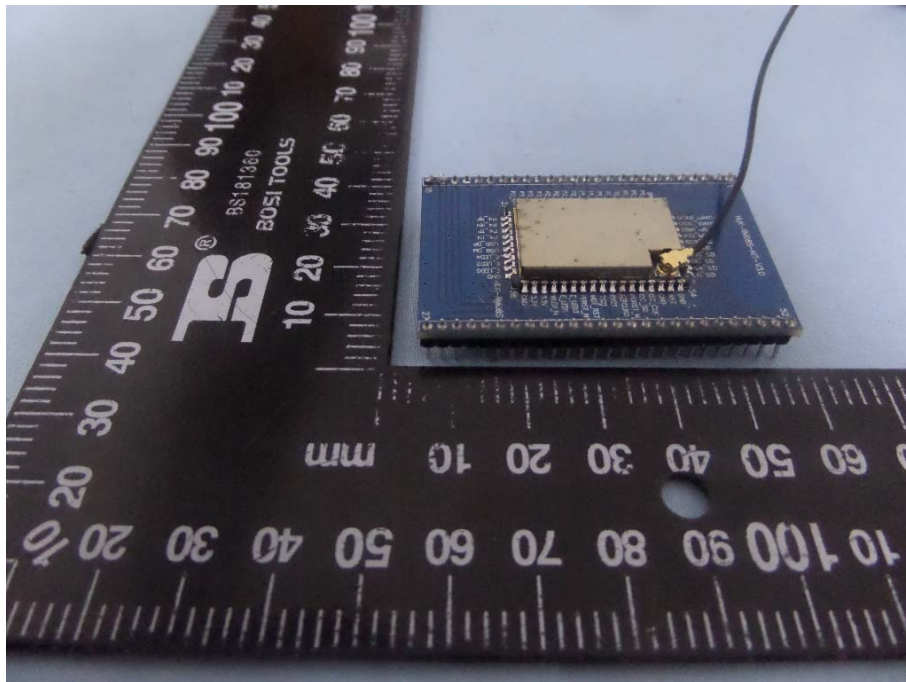
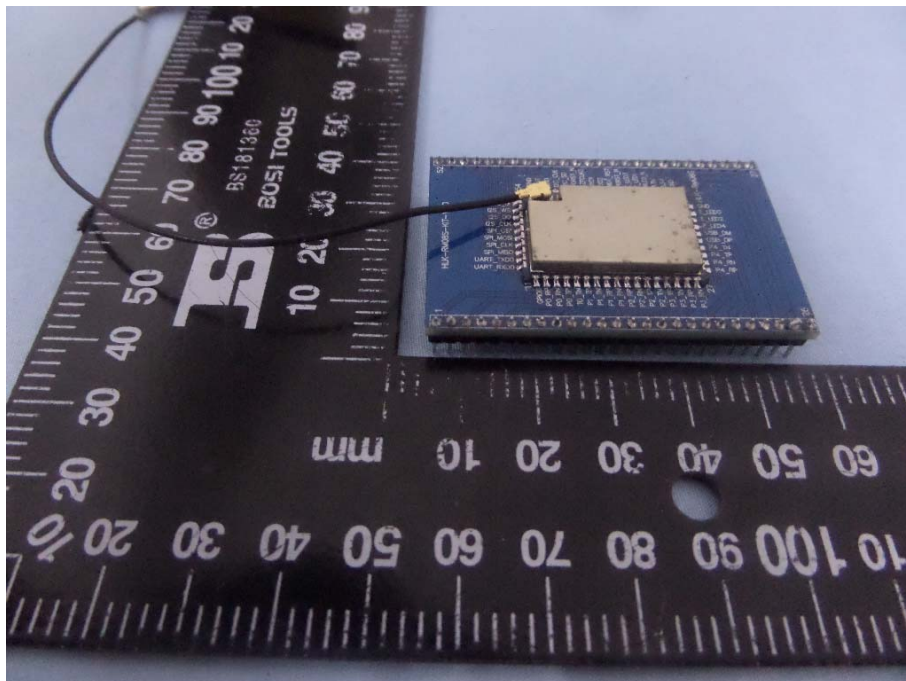
EXHIBIT 2 - EUT PHOTOGRAPHS

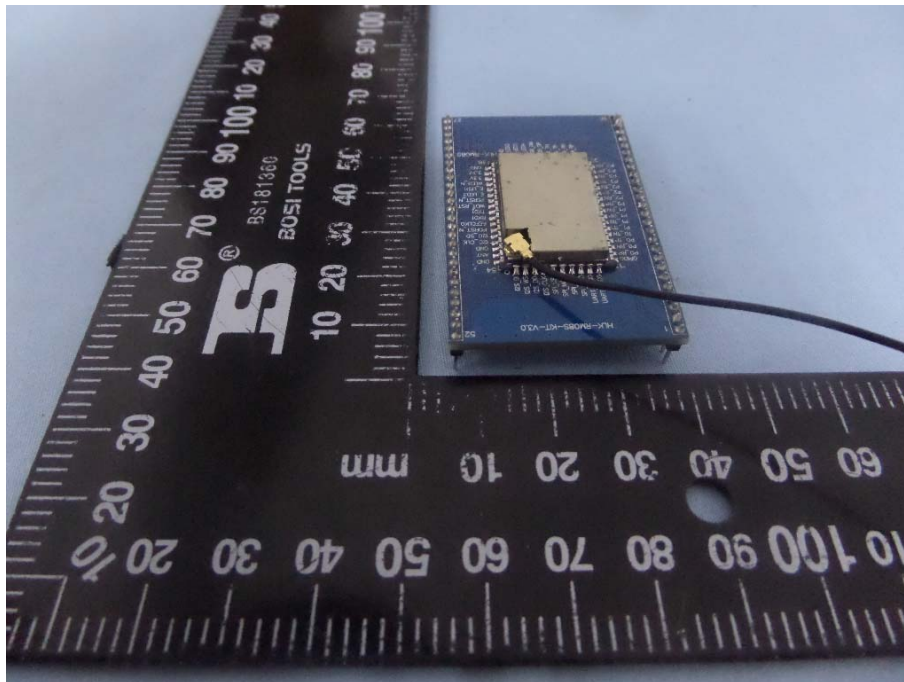
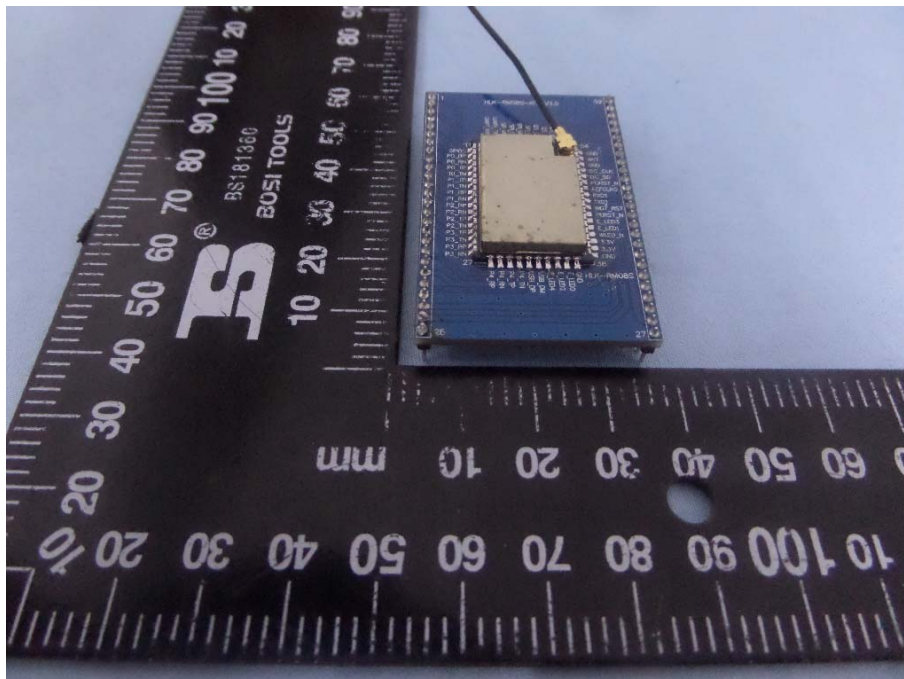
EUT View 1

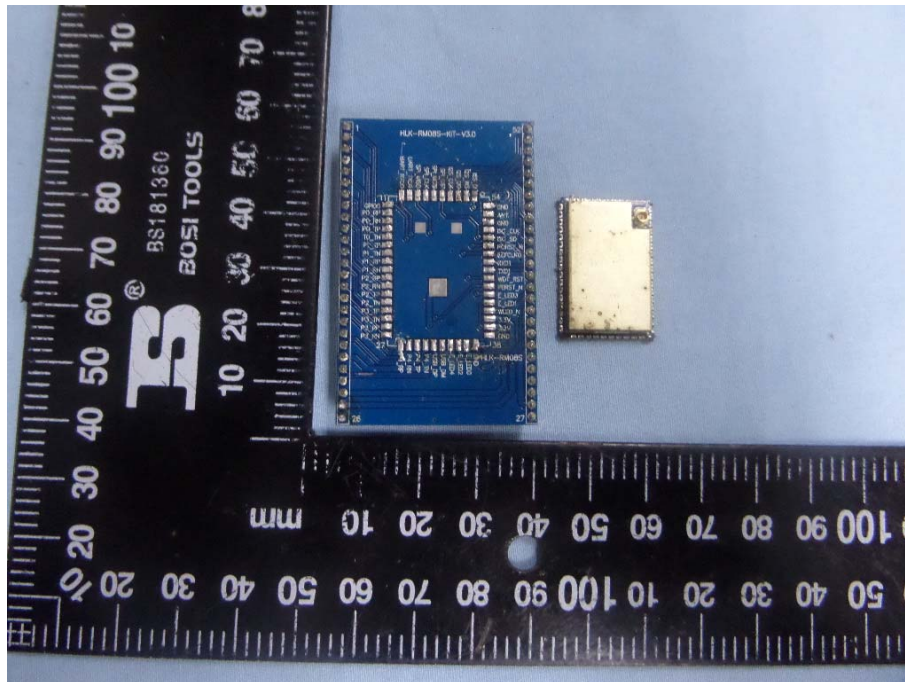
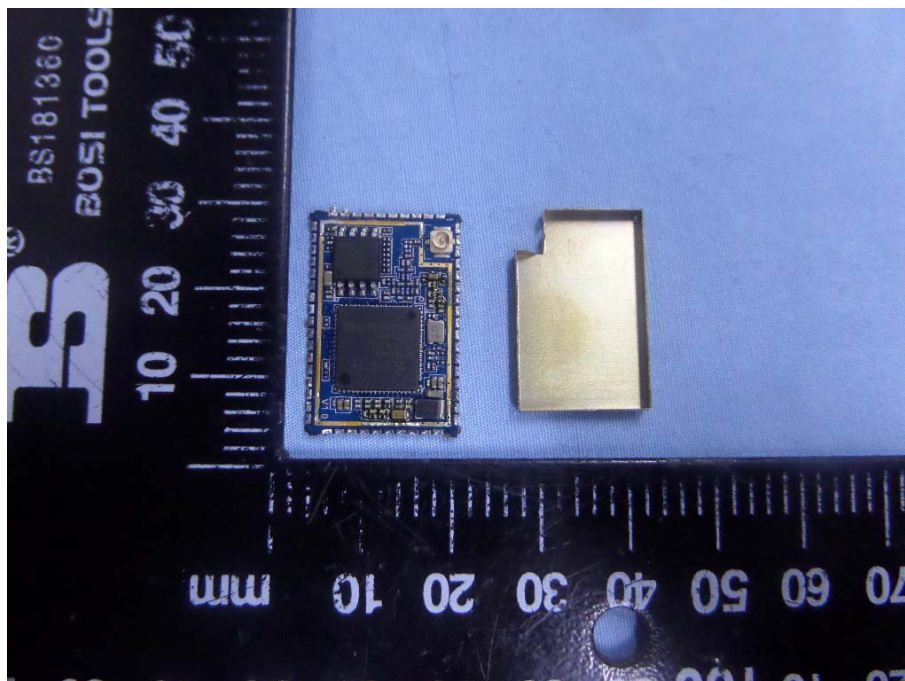


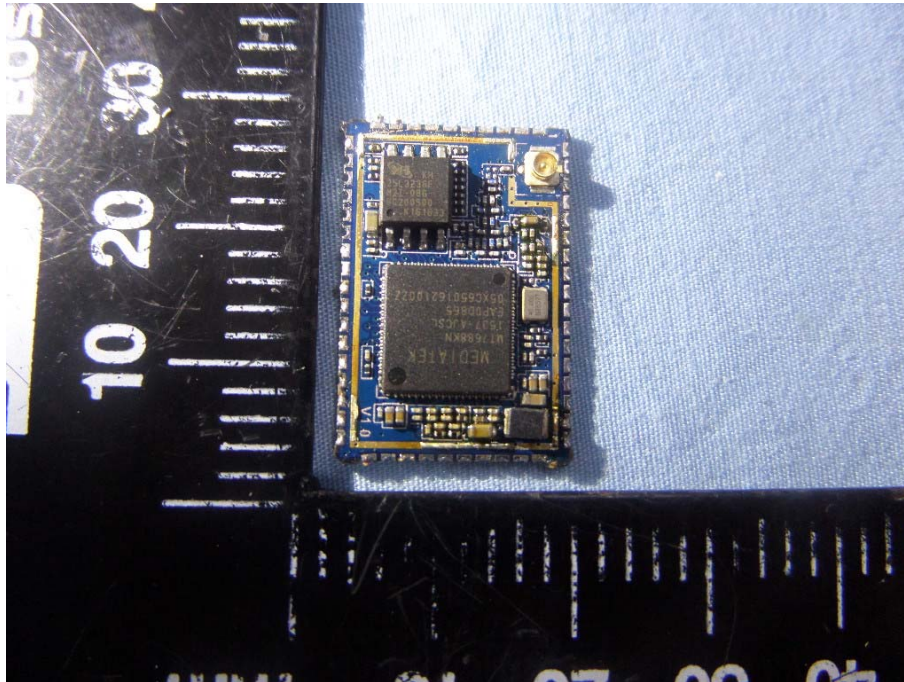
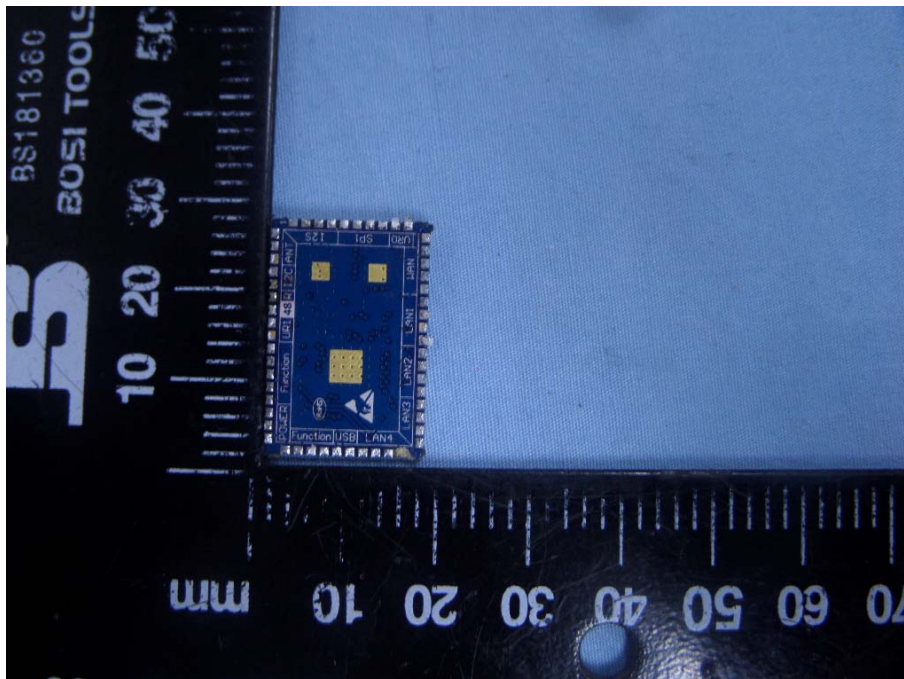
EUT View 2



EUT View 3**EUT View 4**

EUT View 5**EUT View 6**

EUT Housing and Board View 1**EUT Housing and Board View 2**

Solder Board-Component View 1**Solder Board-Component View 2**

***** END OF REPORT *****