



# FCC RF Test Report

**APPLICANT** : ASUSTeK COMPUTER INC.  
**EQUIPMENT** : ASUS Phone (Mobile Phone)  
**BRAND NAME** : ASUS  
**MODEL NAME** : ASUS\_X018D  
**FCC ID** : MSQX018D  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DSS) Spread Spectrum Transmitter

The product was received on Nov. 23, 2017 and testing was completed on Dec. 11, 2017. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

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Approved by: James Huang / Manager



***Sporton International (Kunshan) Inc.***

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China***



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## REVISION HISTORY

| REPORT NO.   | VERSION | DESCRIPTION             | ISSUED DATE   |
|--------------|---------|-------------------------|---------------|
| FR783105-03A | Rev. 01 | Initial issue of report | Dec. 29, 2017 |
|              |         |                         |               |
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## SUMMARY OF TEST RESULT

| Report Section | FCC Rule           | Description                                        | Limit                                  | Result       | Remark                                  |
|----------------|--------------------|----------------------------------------------------|----------------------------------------|--------------|-----------------------------------------|
| -              | 15.247(a)(1)       | Number of Channels                                 | $\geq 15\text{Chs}$                    | Not Required | -                                       |
| -              | 15.247(a)(1)       | Hopping Channel Separation                         | $\geq 2/3$ of 20dB BW                  | Not Required | -                                       |
| -              | 15.247(a)(1)       | Dwell Time of Each Channel                         | $\leq 0.4\text{sec}$ in 31.6sec period | Not Required | -                                       |
| -              | 15.247(a)(1)       | 20dB Bandwidth                                     | NA                                     | Not Required | -                                       |
| -              | -                  | 99% Bandwidth                                      | -                                      | Not Required | -                                       |
| -              | 15.247(b)(1)       | Peak Output Power                                  | $\leq 125\text{ mW}$                   | Not Required | -                                       |
| -              | 15.247(d)          | Conducted Band Edges                               | $\leq 20\text{dBc}$                    | Not Required | -                                       |
| -              | 15.247(d)          | Conducted Spurious Emission                        | $\leq 20\text{dBc}$                    | Not Required | -                                       |
| 3.1            | 15.247(d)          | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d)                  | Pass         | Under limit<br>10.71 dB at<br>36.79 MHz |
| -              | 15.207             | AC Conducted Emission                              | 15.207(a)                              | Not Required | -                                       |
| -              | 15.203 & 15.247(b) | Antenna Requirement                                | N/A                                    | Not Required | -                                       |

Remark: Not Required means the changes dose not affected the test result.

# 1 General Description

## 1.1 Applicant

ASUSTeK COMPUTER INC.

4F, No. 150, LI-TE RD., PEITOU, TAIPEI, TAIWAN

## 1.2 Manufacturer

ASUSTeK COMPUTER INC.

4F, No. 150, LI-TE RD., PEITOU, TAIPEI, TAIWAN

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | ASUS Phone (Mobile Phone)                                                                                                  |
| Brand Name                      | ASUS                                                                                                                       |
| Model Name                      | ASUS_X018D                                                                                                                 |
| FCC ID                          | MSQX018D                                                                                                                   |
| EUT supports Radios application | GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+/DC-HSDPA/LTE<br>WLAN 2.4GHz 802.11b/g/n HT20/HT40<br>Bluetooth v3.0+EDR/ Bluetooth v4.0 LE |
| HW Version                      | WIUMA1A2-2                                                                                                                 |
| SW Version                      | WW_14.02.1709.8_20170930                                                                                                   |
| EUT Stage                       | Identical Prototype                                                                                                        |

### Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report for ASUS\_X018D. The product equality declaration could be referred to Appendix C. Based on the similarity between two models, only the worst cases of Radiated Spurious Emission from original test report (Sporton Report Number FR783105A) were verified for the differences.



## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification  |                                                                                                         |
|------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Tx/Rx Frequency Range</b>             | 2402 MHz ~ 2480 MHz                                                                                     |
| <b>Number of Channels</b>                | 79                                                                                                      |
| <b>Carrier Frequency of Each Channel</b> | 2402+n*1 MHz; n=0~78                                                                                    |
| <b>Antenna Type / Gain</b>               | LDS Antenna with gain 1.00 dBi                                                                          |
| <b>Type of Modulation</b>                | Bluetooth BR (1Mbps) : GFSK<br>Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK<br>Bluetooth EDR (3Mbps) : 8-DPSK |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No is CN5013.

|                           |                                                                                                                                               |                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Test Site</b>          | Sporton International (Kunshan) Inc.                                                                                                          |                                       |
| <b>Test Site Location</b> | No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China<br>TEL : +86-512-57900158<br>FAX : +86-512-57900958 |                                       |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                       | <b>FCC Test Firm Registration No.</b> |
|                           | 03CH03-KS                                                                                                                                     | 630927                                |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



## 2 Test Configuration of Equipment Under Test

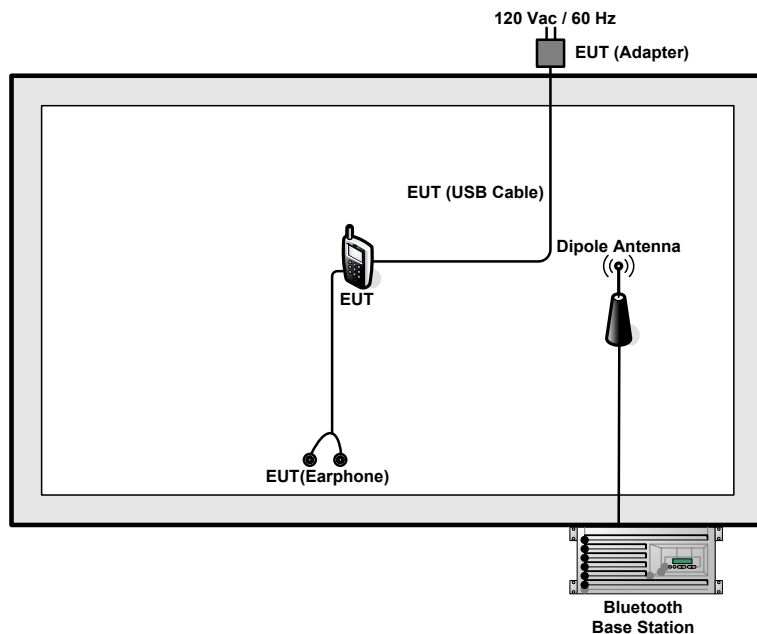
### 2.1 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

| Summary table of Test Cases                                                                            |                            |
|--------------------------------------------------------------------------------------------------------|----------------------------|
| Radiated<br>Test Cases                                                                                 | Bluetooth EDR 3Mbps 8-DPSK |
|                                                                                                        | Mode 1: CH39_2441 MHz      |
| <b>Remark:</b> For Radiated Test Cases, The tests were performed with Adapter, Earphone and USB Cable. |                            |

## 2.2 Connection Diagram of Test System

<Bluetooth Tx Mode>



## 2.3 Support Unit used in test configuration and system

| Item | Equipment       | Trade Name | Model Name | FCC ID | Data Cable | Power Cord        |
|------|-----------------|------------|------------|--------|------------|-------------------|
| 1.   | BT Base Station | R&S        | CBT        | N/A    | N/A        | Unshielded, 1.8 m |

## 2.4 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.

### 3 Test Result

#### 3.1 Radiated Band Edges and Spurious Emission Measurement

##### 3.1.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 0.009 – 0.490      | 2400/F(kHz)                          | 300                              |
| 0.490 – 1.705      | 24000/F(kHz)                         | 30                               |
| 1.705 – 30.0       | 30                                   | 30                               |
| 30 – 88            | 100                                  | 3                                |
| 88 – 216           | 150                                  | 3                                |
| 216 - 960          | 200                                  | 3                                |
| Above 960          | 500                                  | 3                                |

##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



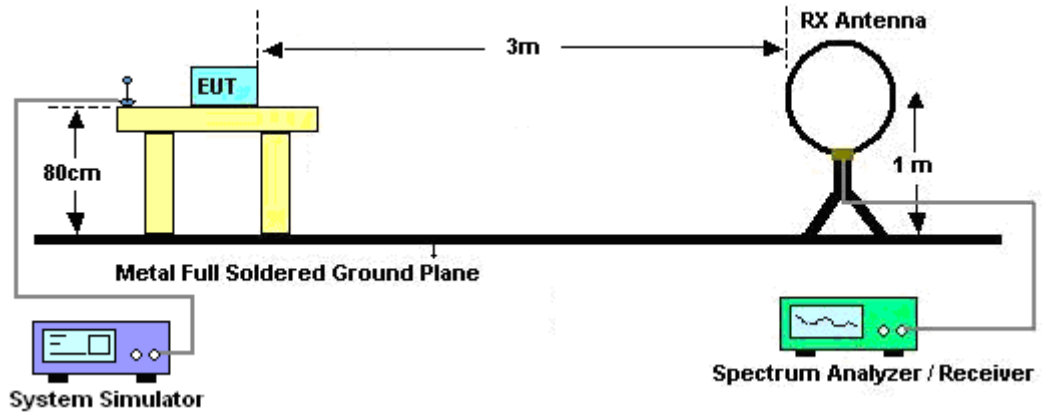
### 3.1.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz, RBW=1MHz for  $f > 1$ GHz ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

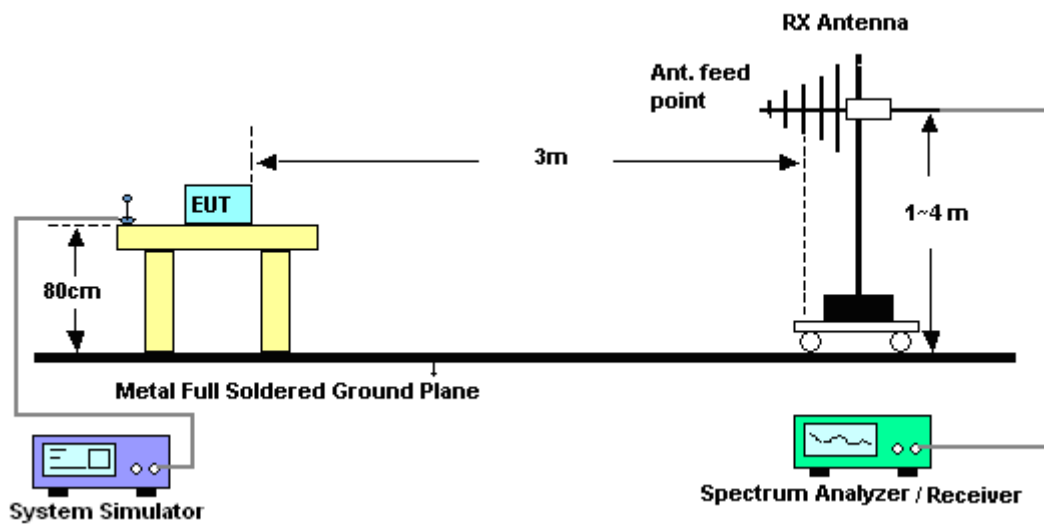
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.82dB) derived from  $20 \log(\text{dwell time}/100\text{ms})$ . This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

### 3.1.4 Test Setup

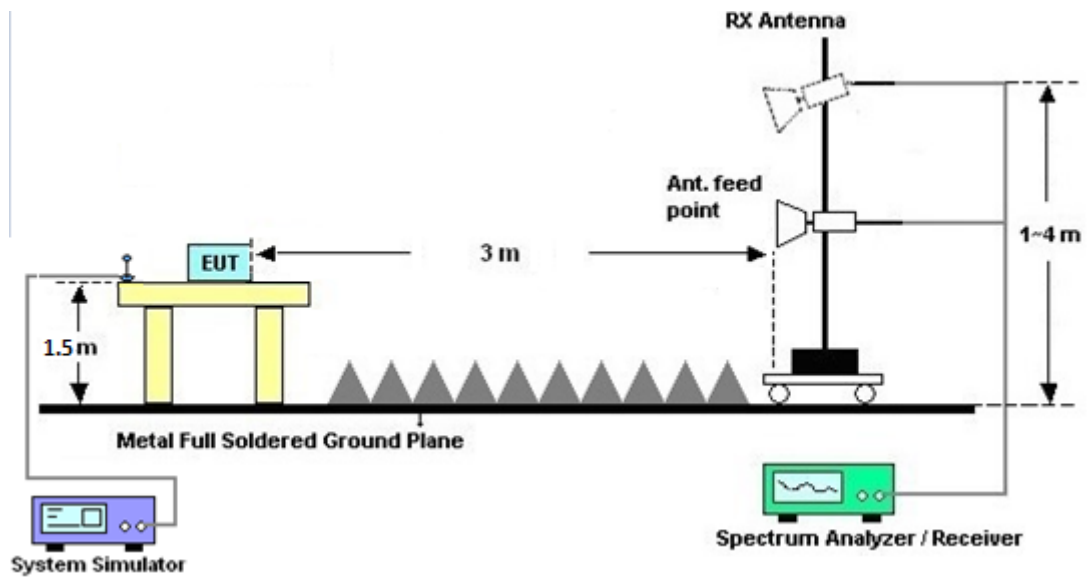
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



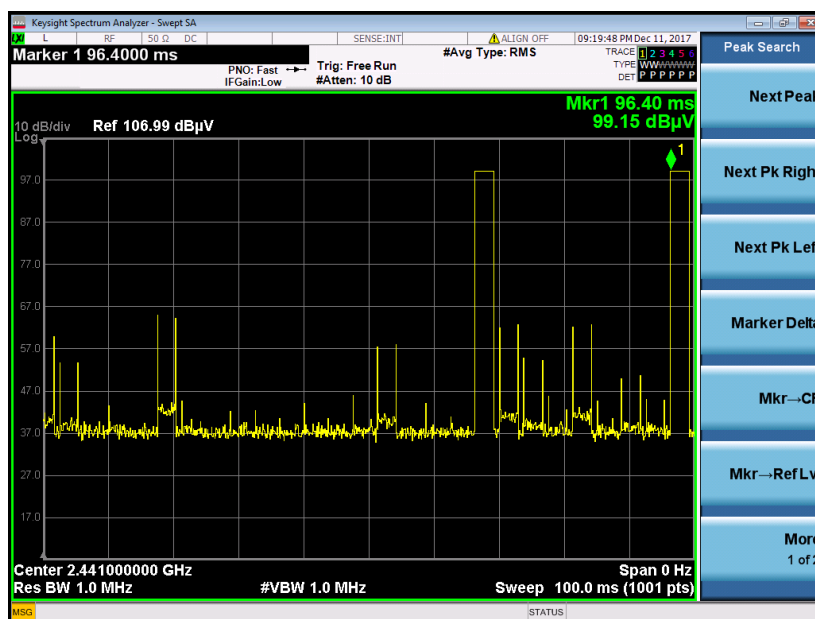
### 3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

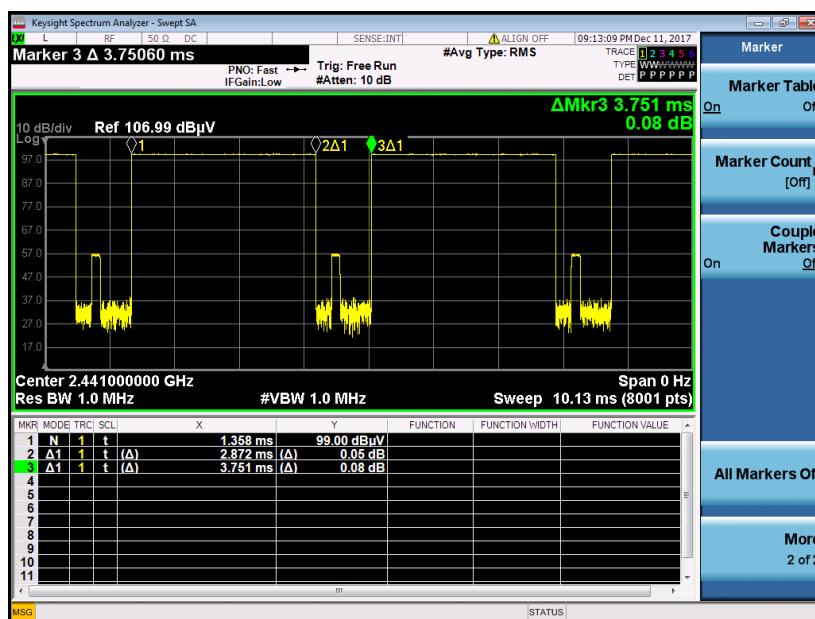


### 3.1.6 Duty cycle correction factor for average measurement

DH5 on time (One Pulse) Plot on Channel 39



DH5 on time (Count Pulses) Plot on Channel 39



**Note:**

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.87 / 100 = 5.74 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.82 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

$$2.87 \text{ ms} \times 20 \text{ channels} = 57.4 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100\text{ms} / 57.4\text{ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.87 \text{ ms} \times 2 = 5.74 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.74 \text{ ms}/100\text{ms}) = -24.82 \text{ dB}$$

**3.1.7 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix A.

**3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)**

Please refer to Appendix A.



## **3.2 Antenna Requirements**

### **3.2.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.2.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.2.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

| Instrument            | Manufacturer | Model No.                  | Serial No.     | Characteristics          | Calibration Date | Test Date     | Due Date      | Remark                   |
|-----------------------|--------------|----------------------------|----------------|--------------------------|------------------|---------------|---------------|--------------------------|
| EMI Test Receiver     | Keysight     | N9038A                     | MY564000<br>04 | 3Hz~8.5GHz;<br>Max 30dBm | Oct. 19, 2017    | Dec. 11, 2017 | Oct. 18, 2018 | Radiation<br>(03CH03-KS) |
| EXA Spectrum Analyzer | Keysight     | N9010A                     | MY551502<br>44 | 10Hz~44GHz               | Apr. 18, 2017    | Dec. 11, 2017 | Apr. 17, 2018 | Radiation<br>(03CH03-KS) |
| Loop Antenna          | R&S          | HFH2-Z2                    | 100321         | 9kHz~30MHz               | Oct. 22, 2017    | Dec. 11, 2017 | Oct.21, 2018  | Radiation<br>(03CH03-KS) |
| Bilog Antenna         | TeseQ        | CBL6112D                   | 35406          | 25MHz~2GHz               | Apr. 22, 2017    | Dec. 11, 2017 | Apr. 21, 2018 | Radiation<br>(03CH03-KS) |
| Horn Antenna          | Schwarzbeck  | BBHA9120D                  | 9120D-135<br>6 | 1GHz~18GHz               | Apr. 22, 2017    | Dec. 11, 2017 | Apr. 21, 2018 | Radiation<br>(03CH03-KS) |
| SHF-EHF Horn          | Schwarzbeck  | BBHA 9170                  | BBHA1702<br>49 | 15GHz~40GHz              | Feb. 15, 2017    | Dec. 11, 2017 | Feb. 14, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier             | com-power    | PA-103A                    | 161069         | 1MHz~1000MH<br>z / 32 dB | Apr. 18, 2017    | Dec. 11, 2017 | Apr. 17, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier             | MITEQ        | TTA1840-35-<br>HG          | 1887435        | 18GHz~40GHz              | Oct. 12, 2017    | Dec. 11, 2017 | Oct. 11, 2018 | Radiation<br>(03CH03-KS) |
| high gain Amplifier   | MITEQ        | AMF-7D-0010<br>1800-30-10P | 2025788        | 1GHz~18GHz               | Apr. 18, 2017    | Dec. 11, 2017 | Apr. 17, 2018 | Radiation<br>(03CH03-KS) |
| Amplifier             | Agilent      | 8449B                      | 3008A023<br>70 | 1GHz~26.5GHz             | Oct. 12, 2017    | Dec. 11, 2017 | Oct. 11, 2018 | Radiation<br>(03CH03-KS) |
| AC Power Source       | Chroma       | 61601                      | F1040900<br>04 | N/A                      | NCR              | Dec. 11, 2017 | NCR           | Radiation<br>(03CH03-KS) |
| Turn Table            | ChamPro      | EM 1000-T                  | 060762-T       | 0~360 degree             | NCR              | Dec. 11, 2017 | NCR           | Radiation<br>(03CH03-KS) |
| Antenna Mast          | ChamPro      | EM 1000-A                  | 060762-A       | 1 m~4 m                  | NCR              | Dec. 11, 2017 | NCR           | Radiation<br>(03CH03-KS) |

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.6dB |
|----------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.5dB |
|----------------------------------------------------------------------------|-------|

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.7dB |
|----------------------------------------------------------------------------|-------|



## Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

| BT                     | Note                                                                                        | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol.    |
|------------------------|---------------------------------------------------------------------------------------------|-----------|------------|------------|------------|------------|----------------|------------|---------------|---------|-----------|-----------|---------|
|                        |                                                                                             | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )     | ( dB )        | ( cm )  | ( deg )   | ( P/A )   | ( H/V ) |
| BT<br>CH 39<br>2441MHz |                                                                                             | 2353.16   | 40.12      | -33.88     | 74         | 41.48      | 25.29          | 5.61       | 32.26         | 105     | 144       | P         | H       |
|                        |                                                                                             | 2353.16   | 15.30      | -38.70     | 54         | -          | -              | -          | -             | -       | -         | A         | H       |
|                        | *                                                                                           | 2442      | 97.83      | -          | -          | 98.63      | 25.83          | 5.71       | 32.34         | 105     | 144       | P         | H       |
|                        | *                                                                                           | 2442      | 73.01      | -          | -          | -          | -              | -          | -             | -       | -         | A         | H       |
|                        |                                                                                             | 2486.35   | 40.76      | -33.24     | 74         | 41.27      | 26.11          | 5.75       | 32.37         | 105     | 144       | P         | H       |
|                        |                                                                                             | 2486.35   | 15.94      | -38.06     | 54         | -          | -              | -          | -             | -       | -         | A         | H       |
|                        |                                                                                             | 2321.44   | 40.3       | -33.70     | 74         | 41.78      | 25.18          | 5.57       | 32.23         | 267     | 84        | P         | V       |
|                        |                                                                                             | 2321.44   | 15.48      | -38.52     | 54         | -          | -              | -          | -             | -       | -         | A         | V       |
|                        | *                                                                                           | 2442      | 98.96      | -          | -          | 99.76      | 25.83          | 5.71       | 32.34         | 267     | 84        | P         | V       |
|                        | *                                                                                           | 2442      | 74.14      | -          | -          | -          | -              | -          | -             | -       | -         | A         | V       |
|                        |                                                                                             | 2498.04   | 41.42      | -32.58     | 74         | 41.78      | 26.26          | 5.77       | 32.39         | 267     | 84        | P         | V       |
|                        |                                                                                             | 2498.04   | 16.60      | -37.40     | 54         | -          | -              | -          | -             | -       | -         | A         | V       |
| Remark                 | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |            |            |            |                |            |               |         |           |           |         |

**2.4GHz 2400~2483.5MHz****BT (Harmonic @ 3m)**

| BT                              | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>(P/A) | Pol.<br>(H/V) |
|---------------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|-------------------------|----------------------------|----------------------|-------------------------|-----------------------|---------------|
| <b>BT<br/>CH 39<br/>2441MHz</b> |                                                                                             | 4884                 | 38.86               | -35.14                  | 74                          | 61.15                     | 31.01                         | 7.9                     | 61.2                       | 100                  | 360                     | P                     | H             |
|                                 |                                                                                             | 7320                 | 40.80               | -33.20                  | 74                          | 59.01                     | 35.39                         | 9.51                    | 63.11                      | 100                  | 360                     | P                     | H             |
|                                 |                                                                                             | 4884                 | 38.05               | -35.95                  | 74                          | 60.34                     | 31.01                         | 7.9                     | 61.2                       | 100                  | 360                     | P                     | V             |
|                                 |                                                                                             | 7320                 | 40.03               | -33.97                  | 74                          | 58.24                     | 35.39                         | 9.51                    | 63.11                      | 100                  | 360                     | P                     | V             |
| <b>Remark</b>                   | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                         |                             |                           |                               |                         |                            |                      |                         |                       |               |



## Emission below 1GHz

## 2.4GHz BT (LF)

| BT                 | Note                                                                       | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Cable  | Preamp | Ant    | Table   | Peak  | Pol.  |
|--------------------|----------------------------------------------------------------------------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
|                    |                                                                            |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
|                    |                                                                            | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 2.4GHz<br>BT<br>LF |                                                                            | 30        | 24.79      | -15.21 | 40         | 29.5   | 26.3     | 0.09   | 31.1   | 100    | 269     | P     | H     |
|                    |                                                                            | 148.34    | 20.80      | -22.70 | 43.5       | 33.38  | 17.32    | 0.99   | 30.89  | -      | -       | P     | H     |
|                    |                                                                            | 223.03    | 24.43      | -21.57 | 46         | 37.25  | 16.72    | 1.61   | 31.15  | -      | -       | P     | H     |
|                    |                                                                            | 455.83    | 25.66      | -20.34 | 46         | 31.18  | 23.39    | 2.69   | 31.6   | -      | -       | P     | H     |
|                    |                                                                            | 707.06    | 30.49      | -15.51 | 46         | 32.11  | 26.87    | 2.4    | 30.89  | -      | -       | P     | H     |
|                    |                                                                            | 796.3     | 30.71      | -15.29 | 46         | 30.96  | 27.76    | 2.7    | 30.71  | -      | -       | P     | H     |
|                    |                                                                            | 36.79     | 29.29      | -10.71 | 40         | 38.11  | 22.14    | 0.12   | 31.08  | 100    | 269     | P     | V     |
|                    |                                                                            | 56.19     | 22.05      | -17.95 | 40         | 39.25  | 13.52    | 0.8    | 31.52  | -      | -       | P     | V     |
|                    |                                                                            | 148.34    | 23.17      | -20.33 | 43.5       | 35.75  | 17.32    | 0.99   | 30.89  | -      | -       | P     | V     |
|                    |                                                                            | 369.5     | 24.40      | -21.60 | 46         | 32.05  | 21.75    | 2.1    | 31.5   | -      | -       | P     | V     |
|                    |                                                                            | 639.16    | 26.51      | -19.49 | 46         | 28.16  | 26.13    | 3.01   | 30.79  | -      | -       | P     | V     |
|                    |                                                                            | 704.15    | 27.97      | -18.03 | 46         | 29.65  | 26.84    | 2.37   | 30.89  | -      | -       | P     | V     |
| Remark             | 1. No other spurious found.<br>2. All results are PASS against limit line. |           |            |        |            |        |          |        |        |        |         |       |       |



**Note symbol**

|     |                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| *   | <b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| !   | Test result is <b>over limit</b> line.                                                                                                                   |
| P/A | <b>P</b> eak or <b>A</b> verage                                                                                                                          |
| H/V | <b>H</b> orizontal or <b>V</b> ertical                                                                                                                   |



A calculation example for radiated spurious emission is shown as below:

| WIFI    | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.    |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1+2     |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11b |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
| CH 01   |      |           |            |        |            |          |          |        |        |        |         |         |         |
| 2412MHz |      | 2390      | 43.54      | -10.46 | 54         | 42.6     | 32.22    | 4.58   | 35.86  | 103    | 308     | A       | H       |

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

**Both peak and average measured complies with the limit line, so test result is “PASS”.**



## **Appendix C. Product Equality Declaration**

**ASUSTeK COMPUTER INC.**

Add: 4F, No. 150, LI-TE RD., PEITOU, TAIPEI, TAIWAN

Date: December 29, 2017

**Product Equality Declaration**

We, ASUSTeK COMPUTER INC., declare on our sole responsibility for the product of ASUS\_X018D as below:

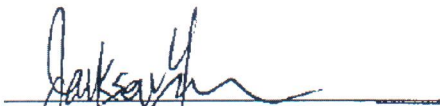
The differences between ASUS\_X018D US SR and ASUS\_X018D US ER are as below:

1. The antenna supply vendor is different
2. The antenna pattern is different
3. EMCP changes to Samsung32+3
4. Front camera changes to holitech 8M
5. Rear camera changes to holitech 16M

Except listings above, the others are all the same as previous version.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,



**Contact Person:** Jackson Yen

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