



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 47 CFR Part 2, 22(H), 24(E), 27(L)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Nov. 23, 2017 and testing was completed on Dec. 14, 2017. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI/TIA-603-E 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.



Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335
China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG783105-03A	Rev. 01	Initial issue of report	Dec. 29, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power	< 1 Watts	PASS	-
4.4	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 21.85 dB at 2510.000 MHz



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/DC-HSDPA/HSPA+/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth v3.0+EDR/Bluetooth v4.0 LE
IMEI Code	N/A
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 D. According to the differences between previous and current project, only the worse cases of Radiated Spurious Emission/ERP/EIRP, Conducted Power from original test report (Sporton Report Number FG783105A) were verified for the differences.
3. The worst case of 850/1900MHz bands are GSM 850/ WCDMA 1900 for Radiated Spurious Emission from original test report. The 1700MHz band of worst case for RSE is located on LTE band which can be referred to report number "FG783105-03B"

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM/GPRS/EDGE: 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4 MHz ~ 1752.6 MHz
Rx Frequency	GSM/GPRS/EDGE: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz WCDMA: Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4 MHz ~ 2152.6 MHz
Maximum Output Power to Antenna	GSM/GPRS/EDGE: 850: 32.60 dBm 1900: 29.25 dBm WCDMA: Band V: 22.53 dBm Band II: 22.88 dBm Band IV: 23.01 dBm
Antenna Type	LDS Antenna
Antenna Gain	Cellular Band: -0.80 dBi PCS Band: 0.80 dBi AWS Band: 0.80 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM DC-HSDPA : 64QAM

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22H	GSM850 GSM	GMSK	0.9226	-	-
Part 22H	GSM850 EDGE class 8	8PSK	-	-	-
Part 22H	WCDMA Band V RMC 12.2Kbps	BPSK	-	-	-
Part 24E	GSM1900 GSM	GMSK	1.0116	-	-
Part 24E	GSM1900 EDGE class 8	8PSK	-	-	-
Part 24E	WCDMA Band II RMC 12.2Kbps	BPSK	-	-	-
Part 27L	WCDMA Band IV RMC 12.2Kbps	BPSK	0.2404	-	-



1.7 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.

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

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

1.8 Applicable Standards

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

- 47 CFR Part 2, 22(H), 24(E), 27(L)
- ANSI/TIA-603-E
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850
2. 30 MHz to 10th harmonic for WCDMA Band II.

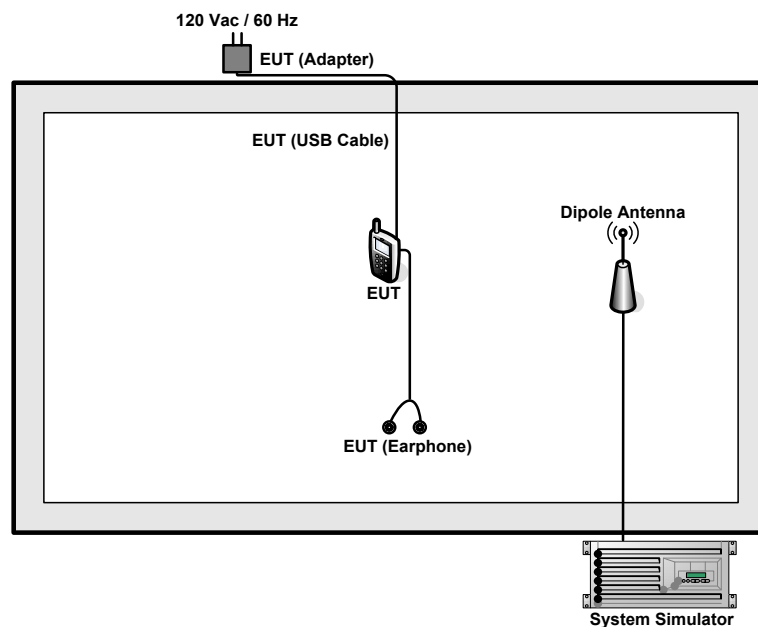
All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GSM Link	■ GSM Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band IV	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System

For Part22H, 24E



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m

3 Conducted Test Result

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power and ERP/EIRP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850

The EIRP of mobile transmitters must not exceed 2 Watts for GSM1900

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

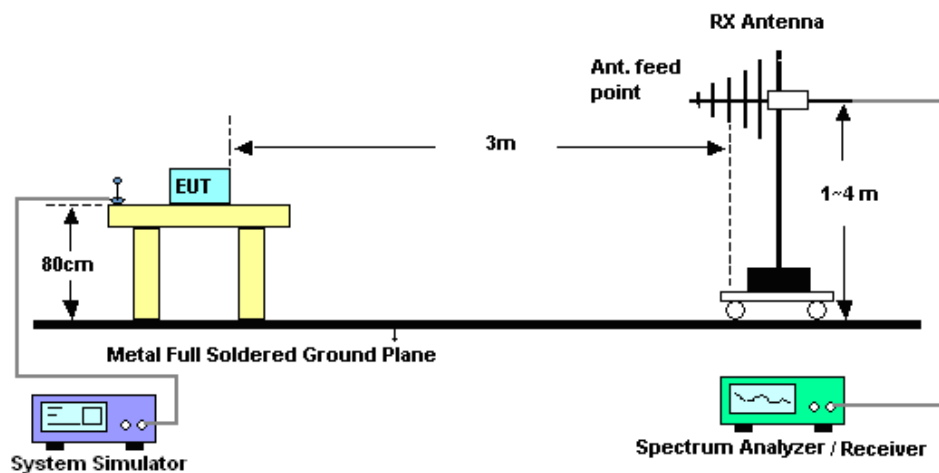
4 Radiated Test Items

4.1 Measuring Instruments

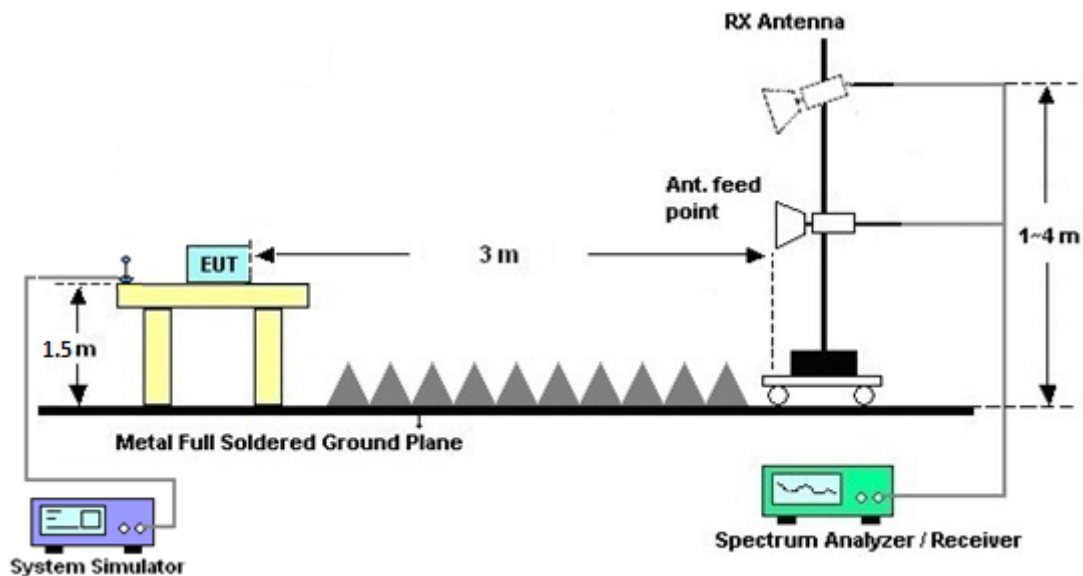
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix A.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03 Section 5.8 and ANSI/TIA-603-E Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Dec. 14, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Dec. 14, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120 D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Dec. 14, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Dec. 14, 2017	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Dec. 14, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-	2025788	1GHz~18GHz	Apr. 18, 2017	Dec. 14, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Dec. 14, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 14, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 14, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 14, 2017	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.8dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.3dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

Conducted Power (*Unit: dBm)						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM	32.52	32.60	32.59	29.25	29.22	29.17
GPRS class 8	32.5	32.58	32.58	29.24	29.22	29.15
GPRS class 10	31.67	31.76	31.79	28.48	28.45	28.41
GPRS class 11	29.84	29.93	29.97	26.68	26.65	26.6
GPRS class 12	28.67	28.83	28.88	25.63	25.58	25.54
EGPRS class 8	26.72	26.71	26.77	25.88	25.92	25.64
EGPRS class 10	25.76	25.81	25.85	24.84	24.78	24.53
EGPRS class 11	23.9	23.92	24.01	22.72	22.71	22.42
EGPRS class 12	22.81	22.83	22.89	21.58	21.49	21.31

Conducted Power (*Unit: dBm)									
Band	WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel	4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency	826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
AMR 12.2K	22.35	22.45	22.51	22.68	22.76	22.86	22.96	23.00	23.00
RMC 12.2K	22.37	22.44	22.53	22.69	22.78	22.88	22.98	23.00	23.01
HSDPA Subtest-1	21.67	21.76	21.84	21.78	22.08	22.02	22.31	22.36	22.48
HSDPA Subtest-2	21.68	21.74	21.82	21.78	22.05	22.02	22.32	22.21	22.47
HSDPA Subtest-3	21.22	21.24	21.3	21.29	21.58	21.55	21.92	21.95	21.95
HSDPA Subtest-4	21.15	21.25	21.39	21.29	21.55	21.54	21.85	21.91	21.99
DC-HSDPA Subtest-1	21.58	21.62	21.671	21.15	21.33	21.36	21.97	21.98	22.01
DC-HSDPA Subtest-2	21.62	21.62	21.64	21.08	21.22	21.24	21.94	21.97	21.85
DC-HSDPA Subtest-3	21.29	21.41	21.46	20.61	20.74	20.74	21.54	21.58	21.63
DC-HSDPA Subtest-4	21.27	21.42	21.34	20.59	20.79	20.81	21.58	21.52	21.63
HSUPA Subtest-1	20.22	19.75	19.76	19.74	20.01	20.04	20.33	20.36	20.3
HSUPA Subtest-2	19.66	19.76	19.85	19.85	20.12	20.04	20.32	20.41	20.46
HSUPA Subtest-3	20.63	20.77	20.8	20.75	21.04	21.04	21.27	21.39	21.47
HSUPA Subtest-4	19.18	19.28	19.28	19.37	19.54	19.58	19.85	19.88	19.87
HSUPA Subtest-5	20.68	20.7	20.73	20.76	21.07	21.01	21.19	21.42	21.51
HSPA+ (16QAM) Subtest-1	20.1	20.2	20.29	20.17	20.34	20.31	20.49	20.52	20.61

**ERP/EIRP**

GSM850 ($G_T - L_C = -0.80\text{dB}$)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency	824.2	836.4	848.8
(MHz)			
Conducted Power (dBm)	32.52	32.60	32.59
Conducted Power (Watts)	1.7865	1.8197	1.8155
ERP(dBm)	29.57	29.65	29.64
ERP(Watts)	0.9057	0.9226	0.9204

GSM1900 ($G_T - L_C = 0.80\text{dB}$)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency	1850.2	1880	1909.8
(MHz)			
Conducted Power (dBm)	29.25	29.22	29.17
Conducted Power (Watts)	0.8414	0.8356	0.8260
EIRP(dBm)	30.05	30.02	29.97
EIRP(Watts)	1.0116	1.0046	0.9931

WCDMA Band IV ($G_T - L_C = 0.80\text{dB}$)			
Channel	1312	1413	1513
	(Low)	(Mid)	(High)
Frequency	1712.4	1732.6	1752.6
(MHz)			
Conducted Power (dBm)	22.98	23.00	23.01
Conducted Power (Watts)	0.1986	0.1995	0.2000
EIRP(dBm)	23.78	23.80	23.81
EIRP(Watts)	0.2388	0.2399	0.2404



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

GSM850 (GSM)									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-40.13	-13	-27.13	-46.61	-42.45	1.33	5.80	H
	2510	-34.85	-13	-21.85	-47.79	-38.02	1.58	6.90	H
	3345	-57.27	-13	-44.27	-66.48	-60.77	1.85	7.50	H
	4182	-56.98	-13	-43.98	-66.90	-60.02	2.11	7.30	H
	1674	-37.43	-13	-24.43	-43.99	-39.75	1.33	5.80	V
	2510	-37.79	-13	-24.79	-49.71	-40.96	1.58	6.90	V
	3345	-58.34	-13	-45.34	-67.36	-61.84	1.85	7.50	V
	4182	-57.77	-13	-44.77	-66.30	-60.81	2.11	7.30	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band II (RMC 12.2Kbps)									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3759	-45.36	-13	-32.36	-59.60	-47.07	5.08	6.80	H
	5640	-55.65	-13	-42.65	-72.45	-57.32	8.03	9.70	H
	7521	-51.16	-13	-38.16	-72.46	-53.54	9.43	11.81	H
	3762	-45.27	-13	-32.27	-58.92	-46.99	5.08	6.80	V
	5640	-55.34	-13	-42.34	-72.43	-57.01	8.03	9.70	V
	7521	-50.73	-13	-37.73	-71.87	-53.11	9.43	11.81	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



Appendix C. Test Setup Photographs



Appendix D. 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:

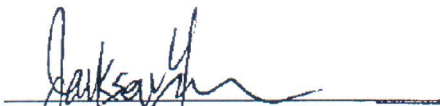
The differences between ASUS_X018D US SR and ASUS_X018D US ER are as below:

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,



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E-mail: jackson_yen@asus.com