



FCC RF Test Report

APPLICANT : ASUSTeK COMPUTER INC.
EQUIPMENT : ASUS Phone (Mobile Phone)
BRAND NAME : ASUS
MODEL NAME : ASUS_X00HD
FCC ID : MSQX00HD
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(H)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Aug. 14, 2017 and completely tested on Sep. 13, 2017. We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-D-2010 and the testing has shown the tested sample to be 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.

Approved by: Eric Shih / Manager



Sporton International (Shenzhen) Inc.

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Guangdong Province 518055 China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG752406-01B	Rev. 01	Initial issue of report	Nov. 13, 2017

**SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7)	EIRP < 2Watt	PASS	-
4.4	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	$< 55 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 28.98 dB at 10001.400 MHz



1 General Description

1.1 Applicant

ASUSTeK COMPUTER INC.

4F, No.150, Li-Te Rd., Peitou, Taipei 112, Taiwan

1.2 Manufacturer

ASUSTeK COMPUTER INC.

4F, No.150, Li-Te Rd., Peitou, Taipei 112, Taiwan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	ASUS Phone (Mobile Phone)
Brand Name	ASUS
Model Name	ASUS_X00HD
FCC ID	MSQX00HD
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 v 4.0 LE/ Bluetooth v4.1 LE/ Bluetooth v4.2 LE
IMEI Code	Radiation: 358410080040289/358410080040297
HW Version	QL1526_MB_PCB_v2.0
SW Version	NMF26F.WW_Phone-14.2016.1705.135
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_X00HD, there are two types of EUT sample 1 and sample 2, the product equality declaration could be referred to Appendix D. Based on the similarity between current and previous project, only the conducted power, EIRP and the worst cases of radiated spurious emission from original test report (Sporton Report Number FG752406B) were verified for the differences. According to the difference, we choose sample 1 to perform RF test.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz LTE Band 26 : 824.7MHz ~ 848.3 MHz LTE Band 38 : 2572.5MHz ~ 2617.5MHz LTE Band 41 : 2547.5 MHz ~ 2652.5 MHz
Rx Frequency	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz LTE Band 26 : 869.7MHz ~ 893.3MHz LTE Band 38 : 2572.5MHz ~ 2617.5MHz LTE Band 41 : 2547.5 MHz ~ 2652.5 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz LTE Band 26 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz LTE Band 38 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 7 : 22.23 dBm
Antenna Gain	LTE Band 7 : -0.91 dBi
Type of Modulation	QPSK / 16QAM



1.5 Modification of EUT

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

1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

LTE Band 7		QPSK	16QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
5	2502.5 ~ 2567.5	0.1297	0.1033
10	2505.0 ~ 2565.0	0.1340	0.1079
15	2507.5 ~ 2562.5	0.1265	0.1062
20	2510.0 ~ 2560.0	0.1355	0.0993

1.7 Testing Location

Sporton Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No. is CN5019.

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	Sporton Site No.	FCC Test Firm Registration No.
	03CH03-SZ	577730

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), 27(M), 27(H)
- ♦ ANSI / TIA / EIA-603-D-2010
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- ♦ 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

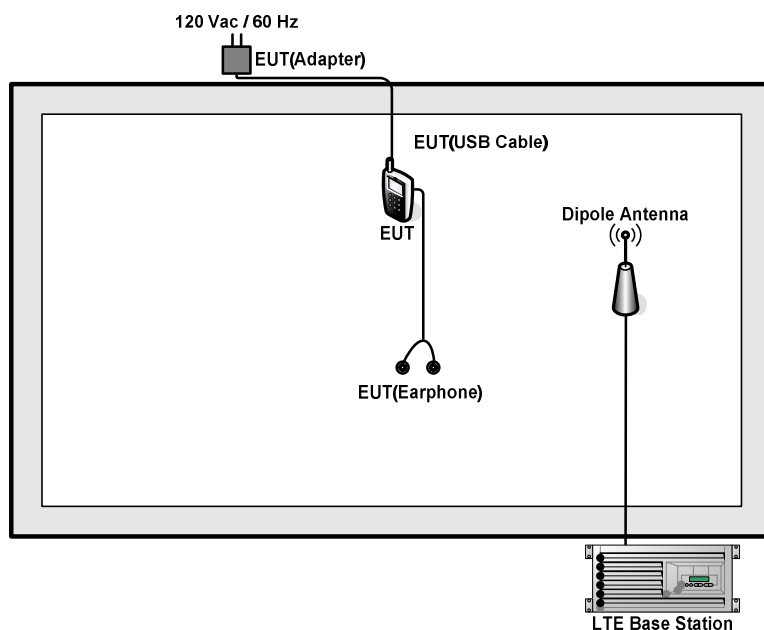
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

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

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	7	-	-	v	v	v	v	v	v	v	v	v	v	v	v
E.I.R.P.	7	-	-	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	7	-	-	v	v	v	v	v		v			v		
Note	- The mark "v" means that this configuration is chosen for testing - The mark "-" means that this bandwidth is not supported. - The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
15	Channel	20825	21100	21375
	Frequency	2507.5	2535	2562.5
10	Channel	20800	21100	21400
	Frequency	2505	2535	2565
5	Channel	20775	21100	21425
	Frequency	2502.5	2535	2567.5

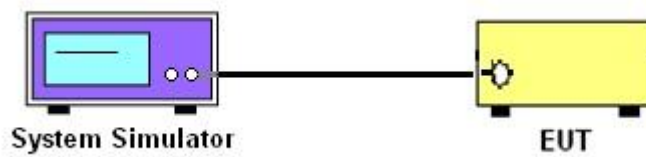
3 Conducted Test Items

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 EIRP

3.4.1 Description of the Conducted Output Power Measurement and EIRP Measurement

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

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 7.

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 the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

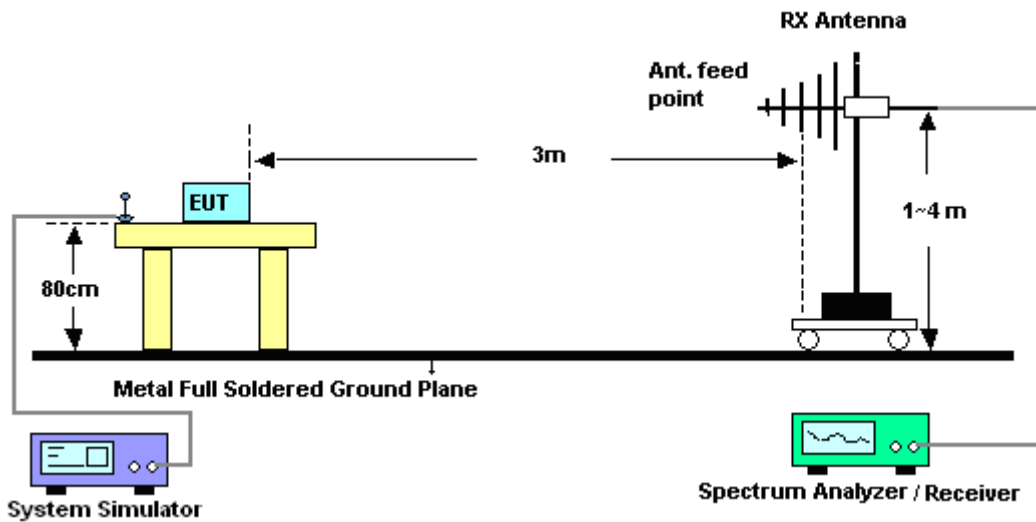
4 Radiated Test Items

4.1 Measuring Instruments

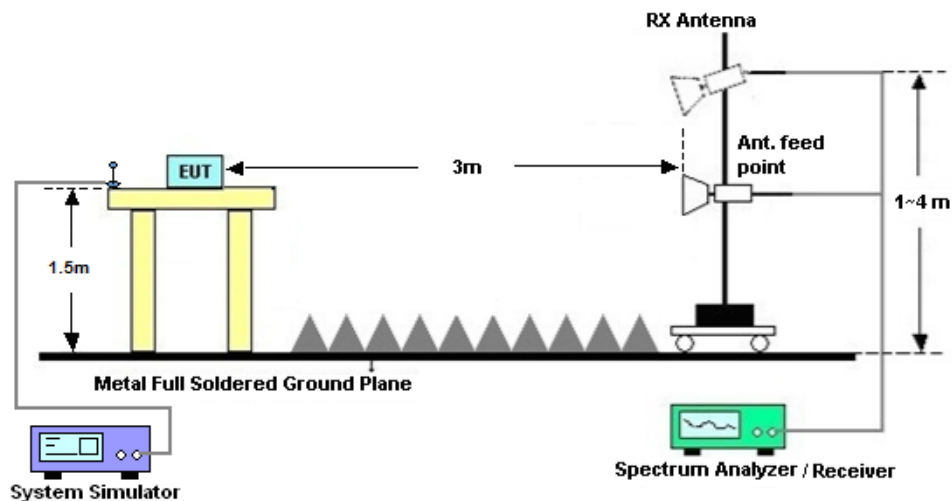
See list of measuring instruments of this test report.

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 B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-D-2010. 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.

For Band 7

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 $55 + 10 \log (P)$ dB.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna 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 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

13. For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
 $ERP \text{ (dBm)} = EIRP - 2.15$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 20, 2017	Sep. 13, 2017	Apr. 19, 2018	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	May 14, 2017	Sep. 13, 2017	May 13, 2018	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Jul. 09, 2017	Sep. 13, 2017	Jul. 08, 2018	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 11, 2016	Sep. 13, 2017	Oct. 10, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21, 2017	Sep. 13, 2017	Jul. 20, 2018	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Jun. 16, 2017	Sep. 13, 2017	Jun. 15, 2018	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 06, 2017	Sep. 13, 2017	Jan. 05, 2018	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Sep. 13, 2017	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Sep. 13, 2017	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Sep. 13, 2017	NCR	Radiation (03CH03-SZ)

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% ($U = 2U_c(y)$)	3.0dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.6dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.8dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	21.63	21.25	21.36
20	1	49		22.09	22.15	22.23
20	1	99		21.51	21.28	21.75
20	50	0		20.60	20.72	20.74
20	50	24		20.55	20.76	20.93
20	50	50		20.70	20.86	21.04
20	100	0		20.63	20.79	20.94
20	1	0	16-QAM	20.07	20.13	20.27
20	1	49		20.20	20.28	20.88
20	1	99		20.01	19.98	20.53
20	50	0		19.39	19.77	19.72
20	50	24		19.39	19.81	19.81
20	50	50		19.36	19.82	19.94
20	100	0		19.66	19.75	19.74
15	1	0	QPSK	21.87	21.40	21.57
15	1	37		21.89	21.93	21.88
15	1	74		21.71	21.58	21.73
15	36	0		20.74	20.74	20.93
15	36	20		20.82	20.79	20.87
15	36	39		20.78	20.75	21.00
15	75	0		20.77	20.81	20.94
15	1	0	16-QAM	20.40	20.43	20.51
15	1	37		20.41	21.10	21.17
15	1	74		20.25	20.54	20.82
15	36	0		19.81	19.62	19.90
15	36	20		19.67	19.77	19.64
15	36	39		19.85	19.61	20.00
15	75	0		19.84	19.87	19.84



LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	21.77	21.57	21.38
10	1	25		21.92	21.62	22.18
10	1	49		21.43	21.40	21.73
10	25	0		20.88	20.75	20.86
10	25	12		20.88	20.85	21.07
10	25	25		20.82	20.71	21.07
10	50	0		20.81	20.79	20.93
10	1	0	16-QAM	20.48	20.30	20.28
10	1	25		20.55	20.57	21.24
10	1	49		20.25	20.25	20.60
10	25	0		19.77	19.63	19.85
10	25	12		19.87	19.74	20.15
10	25	25		19.79	19.49	20.07
10	50	0		19.88	19.66	20.01
5	1	0	QPSK	21.80	21.58	21.82
5	1	12		22.04	21.93	22.04
5	1	24		21.68	21.64	21.69
5	12	0		20.86	20.71	21.08
5	12	7		20.95	20.74	21.08
5	12	13		20.80	20.77	20.94
5	25	0		20.85	20.72	20.98
5	1	0	16-QAM	20.86	20.79	20.48
5	1	12		21.05	20.42	20.73
5	1	24		20.44	20.69	20.49
5	12	0		19.97	19.79	20.00
5	12	7		20.03	19.82	20.09
5	12	13		19.88	19.65	19.98
5	25	0		19.84	19.61	19.99

EIRP

LTE Band 7 ($G_T - L_C = -0.91$ dB) QPSK			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency	2502.5	2535	2567.5
(MHz)			
Conducted Power (dBm)	22.04	21.93	22.04
Conducted Power (Watts)	0.1600	0.1560	0.1600
EIRP(dBm)	21.13	21.02	21.13
EIRP(Watts)	0.1297	0.1265	0.1297

LTE Band 7 ($G_T - L_C = -0.91$ dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(Mid)
Frequency	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
(MHz)									
Conducted Power (dBm)	21.92	21.62	22.18	21.89	21.93	21.88	22.09	22.15	22.23
Conducted Power (Watts)	0.1556	0.1452	0.1652	0.1545	0.1560	0.1542	0.1618	0.1641	0.1671
EIRP(dBm)	21.01	20.71	21.27	20.98	21.02	20.97	21.18	21.24	21.32
EIRP(Watts)	0.1262	0.1178	0.1340	0.1253	0.1265	0.1250	0.1312	0.1330	0.1355



LTE Band 7 ($G_T - L_C = -0.91$ dB) 16QAM			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency	2502.5	2535	2567.5
(MHz)			
Conducted Power (dBm)	21.05	20.42	20.73
Conducted Power (Watts)	0.1274	0.1102	0.1183
EIRP(dBm)	20.14	19.51	19.82
EIRP(Watts)	0.1033	0.0893	0.0959

LTE Band 7 ($G_T - L_C = -0.91$ dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(Mid)
Frequency	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
(MHz)									
Conducted Power (dBm)	20.55	20.57	21.24	20.41	21.10	21.17	20.20	20.28	20.88
Conducted Power (Watts)	0.1135	0.1140	0.1330	0.1099	0.1288	0.1309	0.1047	0.1067	0.1225
EIRP(dBm)	19.64	19.66	20.33	19.50	20.19	20.26	19.29	19.37	19.97
EIRP(Watts)	0.0920	0.0925	0.1079	0.0891	0.1045	0.1062	0.0849	0.0865	0.0993



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 7 / 5MHz / QPSK									
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)
Lowest	5000.7	-57.65	-25	-32.65	-74.72	-64.50	6.25	13.10	H
	7501.0	-56.45	-25	-31.45	-77.32	-60.02	7.73	11.30	H
	10001.4	-53.98	-25	-28.98	-80.08	-57.64	8.44	12.10	H
	5000.7	-60.61	-25	-35.61	-77.35	-67.46	6.25	13.10	V
	7501.0	-58.01	-25	-33.01	-78.55	-61.58	7.73	11.30	V
	10001.4	-55.23	-25	-30.23	-79.52	-58.89	8.44	12.10	V

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



Appendix D. Product Equality Declaration

HUAQIN TELECOM HONG KONG LIMITED

FLAT/RM 510 5/F LINCOLN CENTRE 20 YIP FUNG STREET FANLING NT

Date: November 13, 2017

Product Equality Declaration

We, HUAQIN TELECOM HONG KONG LIMITED, declare on our sole responsibility for the product of ASUS_X00HD as below:

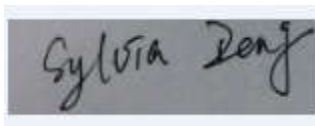
The differences between ASUS_X00HD and previous model, ASUS_X00HD are as below:

1. Add 2nd & 3rd 16+2 Memory: Hynix(D21) /HYNIX 16GNAND+16GLPD3 FBGA221 FWA5, MICRO /16G+16GLPD3 FBGA221 0X54
2. Add 2nd LCD: Holitech
3. Add 2nd rear camera(5M): Chicony/CBFH51120005800LH
4. Add 2nd front camera(8M): Chicony / CBFH81720005800LH
5. Add 2nd rear camera(13M): Chicony / CBAHC1020005800LH
6. Antenna optimizing for WCDMA Band 1
7. Add WCDMA Band 4 through SW

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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