

## FCC Test Report (Part 22)

### (Spot Check)

**Report No.:** RF190507C02-5

**FCC ID:** MSQI01WDX

**Original FCC ID:** MSQI01WD

**Test Model:** ASUS\_I01WDX

**Received Date:** May 07, 2019

**Test Date:** May 11 ~ May 20, 2019

**Issued Date:** May 29, 2019

**Applicant:** ASUSTek COMPUTER INC.

**Address:** 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /** 788550 / TW0003

**Designation Number:**



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### Release Control Record

Issue No.	Description	Date Issued
RF190507C02-5	Original release	May 29, 2019

## 1 Certificate of Conformity

**Product:** ASUS Phone

**Brand:** ASUS

**Test Model:** ASUS\_I01WDX

**Sample Status:** Identical Prototype

**Applicant:** ASUSTek COMPUTER INC.

**Test Date:** May 11 ~ May 20, 2019

**Standards:** FCC Part 22, Subpart H

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen , **Date:** May 29, 2019  
Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen , **Date:** May 29, 2019  
Bruce Chen / Project Engineer

## 2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -23.50dB at 2509.20MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

## 2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Jan. 03, 2019	Jan. 02, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 24, 2019
MXG Vector signal generator Agilent	N5182B	MY53050162	Jan. 16, 2019	Jan. 15, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Nov. 20, 2018	Nov. 19, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2018	Aug. 07, 2019
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jul. 02, 2018	Jul. 01, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2018	Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2018	Aug. 07, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	May 22, 2018	May 21, 2019

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 4.

### 3 General Information

#### 3.1 General Description of EUT

Product	ASUS Phone	
Brand	ASUS	
Test Model	ASUS_I01WDX	
Sample Status	Identical Prototype	
Power Supply Rating	3.85 Vdc (Battery) 5 or 9 Vdc (Adapter) 5 Vdc (Host equipment)	
Modulation Type	GSM, GPRS: GMSK EDGE: 8PSK WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM, 64QAM	
Operating Frequency	GSM/GPRS/EDGE	824.2~848.8MHz
	WCDMA Band 5	826.4~846.6MHz
	LTE Band 5 (Channel Bandwidth 1.4MHz)	824.7~848.3MHz
	LTE Band 5 (Channel Bandwidth 3MHz)	825.5~847.5MHz
	LTE Band 5 (Channel Bandwidth 5MHz)	826.5~846.5MHz
	LTE Band 5 (Channel Bandwidth 10MHz)	829.0~844.0MHz
	LTE Band 26 (Channel Bandwidth 1.4MHz)	824.7~848.3MHz
	LTE Band 26 (Channel Bandwidth 3MHz)	825.5~847.5MHz
	LTE Band 26 (Channel Bandwidth 5MHz)	826.5~846.5MHz
	LTE Band 26 (Channel Bandwidth 10MHz)	829.0~844.0MHz
LTE Band 26 (Channel Bandwidth 15MHz)	831.5~841.5MHz	

Max. ERP Power	GSM	204.174mW (23.10dBm)		
	WCDMA Band 5	23.988mW (13.80dBm)		
		QPSK	16QAM	64QAM
	LTE Band 5 (Channel Bandwidth 1.4MHz)	30.903mW (14.90dBm)	26.303mW (14.20dBm)	13.300mW (13.30dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	30.200mW (14.80dBm)	26.303mW (14.20dBm)	21.878mW (13.40dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	30.200mW (14.80dBm)	26.915mW (14.30dBm)	20.893mW (13.20dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	30.200mW (14.80dBm)	27.542mW (14.40dBm)	21.878mW (13.40dBm)
	LTE Band 26 (Channel Bandwidth 1.4MHz)	14.454mW (11.60dBm)	12.589mW (11.00dBm)	10.965mW (10.40dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	14.125mW (11.50dBm)	12.303mW (10.90dBm)	11.749mW (10.70dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	14.454mW (11.60dBm)	12.589mW (11.00dBm)	10.715mW (10.30dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	14.791mW (11.70dBm)	12.882mW (11.10dBm)	10.715mW (10.30dBm)
	LTE Band 26 (Channel Bandwidth 15MHz)	14.454mW (11.60dBm)	12.882mW (11.10dBm)	10.965mW (10.40dBm)
	Emission Designator	GSM/GPRS	240KGXW	
EDGE		240KG7W		
WCDMA Band 5		4M15F9W		
		QPSK	16QAM	64QAM
LTE Band 5 (Channel Bandwidth 1.4MHz)		1M09G7D	1M09D7W	1M09D7W
LTE Band 5 (Channel Bandwidth 3MHz)		2M70G7D	2M70D7W	2M70D7W
LTE Band 5 (Channel Bandwidth 5MHz)		4M49G7D	4M50D7W	4M49D7W
LTE Band 5 (Channel Bandwidth 10MHz)		9M00G7D	8M97D7W	8M97D7W
LTE Band 26 (Channel Bandwidth 1.4MHz)		1M09G7D	1M09D7W	1M09D7W
LTE Band 26 (Channel Bandwidth 3MHz)		2M70G7D	2M70D7W	2M70D7W
LTE Band 26 (Channel Bandwidth 5MHz)		4M49G7D	4M49D7W	4M49D7W
LTE Band 26 (Channel Bandwidth 10MHz)		8M98G7D	8M98D7W	8M97D7W
LTE Band 26 (Channel Bandwidth 15MHz)		13M5G7D	13M4D7W	13M4D7W
Antenna Type	Refer to Note as below			
Antenna Connector	Refer to Note as below			
Accessory Device	Refer to Note as below			
Cable Supplied	Refer to Note as below			

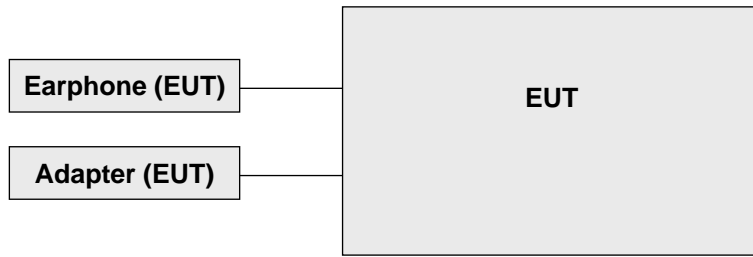
Note:

1. This report is a supplementary report to the original BV CPS report no.: RF190114C07-6. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Radiated emission and output power (GSM, WCDMA) verification worst test refer to original report.
2. The EUT accessories list refers to EUT Photo.pdf.
3. The following antennas were provided to the EUT.

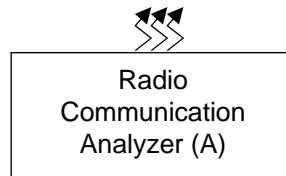
Ant. No.	Type	Connector	Gain (dBi)											
			GSM 850	GSM 1900	WCDMA B2	WCDMA B4	WCDMA B5	LTE B2	LTE B4	LTE B5	LTE B7	LTE B26	LTE B38	LTE B41
WWAN Antenna-0	PIFA	NA	-4.5	-2.6	-2.6	-1.9	-4.5	-2.5	-1.9	-4.5	-1.3	-4.4	-1.0	-1.0
WWAN Antenna-1	PIFA	NA	-3.4	-3.2	-3.2	-5.3	-3.4	-3.2	-5.3	-3.3	-4.7	-3.3	-5.7	-5.7



### 3.2 Configuration of System under Test



Remote site



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8860C	1702001	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Z-plane. Following channel(s) was (were) selected for the final test as listed below.

#### GSM Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	Conducted Output Power	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GSM
-	Radiated Emission Above 1GHz	128 to 251	189(836.4MHz)	GSM

#### WCDMA Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	Conducted Output Power	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA

#### LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Conducted Output Power	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset

#### LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Conducted Output Power	26797 to 27033	26797 (824.7MHz), 26915 (836.5MHz), 27033 (848.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		26805 to 27025	26805 (825.5MHz), 26915 (836.5MHz), 27025 (847.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		26815 to 27015	26815 (826.5MHz), 26915 (836.5MHz), 27015 (846.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		26840 to 26990	26840 (829MHz), 26915 (836.5MHz), 26990 (844MHz)	10MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
		26865 to 26965	26865 (831.5MHz), 26915 (836.5MHz), 26965 (841.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	26797 to 27033	26797 (824.7MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
Conducted Output Power	25deg. C, 70%RH	120Vac, 60Hz	Han Wu
Radiated Emission Below 1GHz	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
Radiated Emission Above 1GHz	24deg. C, 66%RH	120Vac, 60Hz	Greg Lin

### 3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-E 2016**

**ANSI 63.26-2015**

All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

#### 4.1.2 Test Procedures

##### EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, 5MHz for WCDMA mode, 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ . E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi}$ .

Where:

$$ERP/EIRP = P_{Meas} + G_T - L_C$$

$P_{Meas}$  : Measure transmitter output power.

$G_T$  : Gain of the transmitting antenna.

$L_C$  : signal attenuation in the connecting cable between the transmitter and antenna.

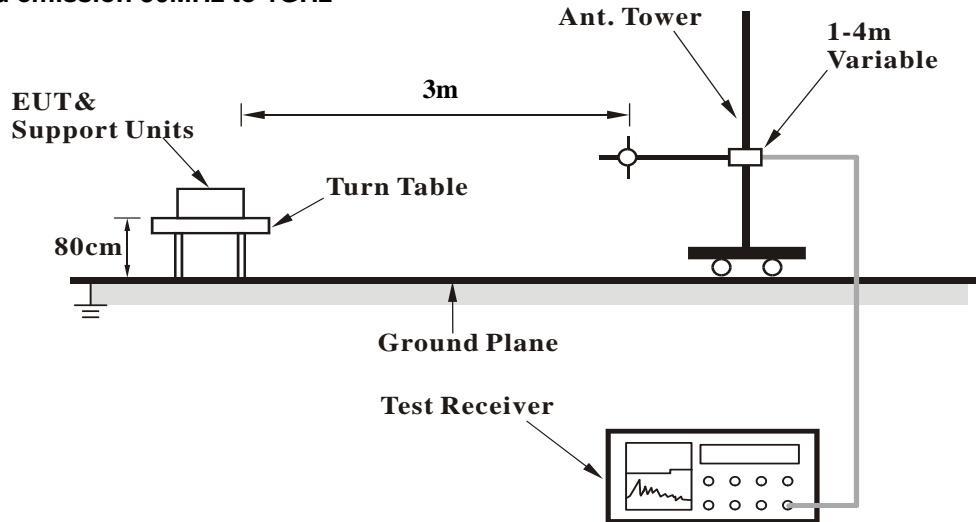
##### Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, WCDMA, LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

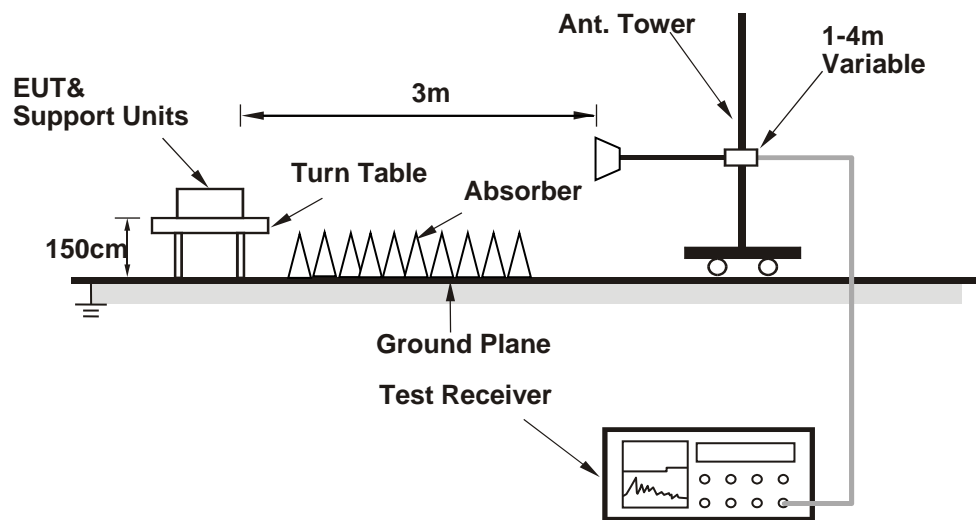
### 4.1.3 Test Setup

EIRP / ERP Measurement:

**For radiated emission 30MHz to 1GHz**



**For radiated emission above 1GHz**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

Band	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GSM	32.50	32.76	32.81

Band	WCDMA V		
TX Channel	4132	4182	4233
Rx Channel	4357	4407	4458
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.11	23.21	23.17

LTE Band 5							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20407	20525	20643	
		Frequency (MHz)		824.7	836.5	848.3	
1.4M	QPSK	1	0	21.66	21.73	21.64	0
		1	2	21.60	21.66	21.59	0
		1	5	21.55	21.60	21.53	0
		3	0	21.46	21.50	21.44	0
		3	1	21.42	21.48	21.39	0
		3	3	21.40	21.46	21.38	0
	16QAM	6	0	20.56	20.69	20.55	1
		1	0	20.65	20.80	20.71	1
		1	2	20.57	20.74	20.58	1
		1	5	20.54	20.64	20.58	1
		3	0	20.44	20.69	20.43	1
		3	1	20.47	20.48	20.53	1
	64QAM	3	3	20.49	20.43	20.49	1
		6	0	20.03	19.73	19.86	2
		1	0	19.90	19.92	19.71	2
		1	2	19.65	19.72	19.75	2
		1	5	19.86	19.55	19.61	2
		3	0	19.71	19.65	19.63	3
		3	1	19.54	19.73	19.50	3
		3	3	19.42	19.74	19.52	3
	6	0	18.84	18.77	18.68	3	

LTE Band 5							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20415	20525	20635	
		Frequency (MHz)		825.5	836.5	847.5	
3M	QPSK	1	0	21.68	<b>21.74</b>	21.66	0
		1	7	21.62	21.69	21.60	0
		1	14	21.55	21.63	21.54	0
		8	0	20.67	20.70	20.66	1
		8	3	20.60	20.68	20.61	1
		8	7	20.58	20.66	20.50	1
		15	0	20.53	20.65	20.49	1
	16QAM	1	0	20.92	<b>20.93</b>	20.90	1
		1	7	20.86	20.84	20.88	1
		1	14	20.79	20.71	20.86	1
		8	0	19.90	19.81	19.92	2
		8	3	19.87	19.85	19.61	2
		8	7	19.78	19.86	19.58	2
		15	0	19.83	19.90	19.86	2
	64QAM	1	0	19.87	19.91	19.87	2
		1	7	19.67	19.74	19.70	2
		1	14	19.64	19.67	19.66	2
		8	0	18.66	18.87	18.82	3
		8	3	18.83	19.06	18.69	3
		8	7	18.79	18.87	18.93	3
		15	0	18.88	18.81	18.80	3



LTE Band 5							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20425	20525	20625	
		Frequency (MHz)		826.5	836.5	846.5	
5M	QPSK	1	0	21.70	<b>21.76</b>	21.69	0
		1	12	21.66	21.72	21.64	0
		1	24	21.60	21.65	21.58	0
		12	0	20.71	20.77	20.67	1
		12	6	20.66	20.71	20.63	1
		12	13	20.63	20.70	20.61	1
		25	0	20.62	20.69	20.58	1
	16QAM	1	0	21.04	<b>21.05</b>	20.93	1
		1	12	21.00	20.96	21.00	1
		1	24	20.85	20.76	20.71	1
		12	0	19.82	19.79	19.97	2
		12	6	19.88	19.92	19.98	2
		12	13	19.87	19.87	19.92	2
		25	0	19.71	19.75	19.65	2
	64QAM	1	0	19.83	19.99	19.97	2
		1	12	19.83	19.87	19.84	2
		1	24	19.79	19.84	19.86	2
		12	0	18.87	18.82	18.79	3
		12	6	18.73	18.71	18.75	3
		12	13	18.88	18.96	18.71	3
		25	0	18.82	18.92	18.96	3

LTE Band 5							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600	
		Frequency (MHz)		829	836.5	844	
10M	QPSK	1	0	21.75	<b>21.81</b>	21.74	0
		1	24	21.71	21.77	21.69	0
		1	49	21.66	21.72	21.64	0
		25	0	20.80	20.91	20.77	1
		25	12	20.78	20.84	20.73	1
		25	25	20.70	20.77	20.68	1
		50	0	20.66	20.75	20.67	1
	16QAM	1	0	20.94	<b>20.96</b>	20.93	1
		1	24	20.79	20.83	20.86	1
		1	49	20.73	20.80	20.73	1
		25	0	19.72	19.87	19.82	2
		25	12	19.78	19.88	19.74	2
		25	25	19.96	19.81	19.94	2
		50	0	20.05	20.11	19.93	2
	64QAM	1	0	19.91	19.98	19.95	2
		1	24	19.83	19.88	19.95	2
		1	49	19.80	19.83	19.77	2
		25	0	18.78	18.85	18.79	3
		25	12	18.85	18.84	18.72	3
		25	25	18.80	19.02	18.87	3
		50	0	18.96	19.06	18.89	3

LTE Band 26							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26797	26915	27033	
		Frequency (MHz)		824.7	836.5	848.3	
1.4M	QPSK	1	0	21.70	21.81	21.75	0
		1	2	21.60	21.69	21.74	0
		1	5	21.75	21.66	21.70	0
		3	0	21.66	21.86	21.66	0
		3	1	21.77	21.85	21.65	0
		3	3	21.85	21.84	21.60	0
	16QAM	6	0	20.80	20.85	20.80	1
		1	0	20.75	20.93	20.90	1
		1	2	20.71	20.87	20.85	1
		1	5	20.77	20.91	20.82	1
		3	0	21.17	20.88	20.71	1
		3	1	20.68	20.95	20.75	1
	64QAM	3	3	20.70	20.91	20.82	1
		6	0	20.08	20.18	20.05	2
		1	0	19.89	19.99	20.09	2
		1	2	19.90	19.97	20.03	2
		1	5	19.99	20.04	20.05	2
		3	0	20.01	20.15	20.08	3
		3	1	20.14	20.23	20.07	3
	3	3	20.01	20.05	19.99	3	
	6	0	18.91	19.06	19.02	3	

LTE Band 26							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26805	26915	27025	
		Frequency (MHz)		825.5	836.5	847.5	
3M	QPSK	1	0	21.65	21.70	21.75	0
		1	7	21.63	21.68	21.72	0
		1	14	21.68	21.73	21.70	0
		8	0	20.73	20.90	20.88	1
		8	3	20.77	20.81	20.84	1
		8	7	20.73	20.75	20.80	1
		15	0	20.85	20.74	20.81	1
	16QAM	1	0	20.75	20.85	20.92	1
		1	7	20.88	21.03	20.93	1
		1	14	20.86	21.01	20.99	1
		8	0	20.19	20.04	20.14	2
		8	3	19.86	20.11	20.12	2
		8	7	19.99	20.08	20.06	2
		15	0	20.09	20.14	20.12	2
	64QAM	1	0	20.01	19.97	20.05	2
		1	7	19.98	20.09	20.08	2
		1	14	20.02	20.00	20.01	2
		8	0	19.01	19.03	19.12	3
		8	3	19.08	19.06	19.10	3
		8	7	18.96	19.15	19.06	3
		15	0	18.91	18.91	19.05	3

LTE Band 26							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26815	26915	27015	
		Frequency (MHz)		826.5	836.5	846.5	
5M	QPSK	1	0	21.70	21.72	21.80	0
		1	12	21.70	21.69	21.76	0
		1	24	21.68	21.63	21.75	0
		12	0	20.77	20.69	20.91	1
		12	6	20.75	20.80	20.88	1
		12	13	20.81	20.77	20.85	1
		25	0	20.77	20.86	20.87	1
	16QAM	1	0	20.93	20.78	21.07	1
		1	12	20.97	20.96	21.06	1
		1	24	20.92	20.85	21.02	1
		12	0	20.06	20.18	20.18	2
		12	6	19.94	19.90	20.13	2
		12	13	19.96	19.98	20.16	2
		25	0	19.87	19.89	20.17	2
	64QAM	1	0	19.80	19.89	20.05	2
		1	12	19.96	19.83	20.03	2
		1	24	19.95	19.91	20.01	2
		12	0	19.06	19.03	19.14	3
		12	6	18.97	19.11	19.16	3
		12	13	18.89	18.99	19.03	3
		25	0	19.10	9.03	19.18	3

LTE Band 26							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26840	26915	26990	
		Frequency (MHz)		829	836.5	844	
10M	QPSK	1	0	21.77	21.83	21.84	0
		1	24	21.80	21.77	21.79	0
		1	49	21.80	21.77	21.77	0
		25	0	20.88	20.93	20.95	1
		25	12	20.85	20.90	20.91	1
		25	25	21.00	20.88	20.92	1
		50	0	20.85	20.87	20.88	1
	16QAM	1	0	21.08	20.90	21.09	1
		1	24	21.00	20.98	21.04	1
		1	49	21.03	21.00	21.05	1
		25	0	20.11	20.16	20.25	2
		25	12	20.10	20.03	20.19	2
		25	25	20.16	20.06	20.13	2
		50	0	20.06	20.03	20.14	2
	64QAM	1	0	19.99	19.98	20.07	2
		1	24	20.00	19.96	20.03	2
		1	49	19.95	19.97	20.05	2
		25	0	19.19	19.00	19.13	3
		25	12	19.04	19.17	19.19	3
		25	25	19.07	18.98	19.18	3
		50	0	19.09	18.99	19.12	3

LTE Band 26							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26865	26915	26965	
		Frequency (MHz)		831.5	836.5	841.5	
15M	QPSK	1	0	21.88	21.82	21.93	0
		1	37	21.87	21.82	21.88	0
		1	74	21.85	21.80	21.87	0
		36	0	20.99	20.93	21.00	1
		36	19	20.96	20.92	20.99	1
		36	39	20.93	20.90	20.96	1
		75	0	20.92	20.91	20.97	1
	16QAM	1	0	21.17	21.03	21.21	1
		1	37	21.11	21.05	21.20	1
		1	74	21.00	21.04	21.14	1
		36	0	20.18	20.17	20.21	2
		36	19	20.18	20.19	20.29	2
		36	39	20.19	20.16	20.21	2
		75	0	20.21	20.14	20.28	2
	64QAM	1	0	20.16	20.14	20.22	2
		1	37	20.09	20.04	20.15	2
		1	74	20.14	20.04	20.07	2
		36	0	19.23	19.19	19.24	3
		36	19	19.16	19.20	19.28	3
		36	39	19.15	19.12	19.20	3
		75	0	19.11	19.10	19.15	3

## 4.2 Radiated Emission Measurement

### 4.2.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13\text{dBm}$ .

### 4.2.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$ .

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

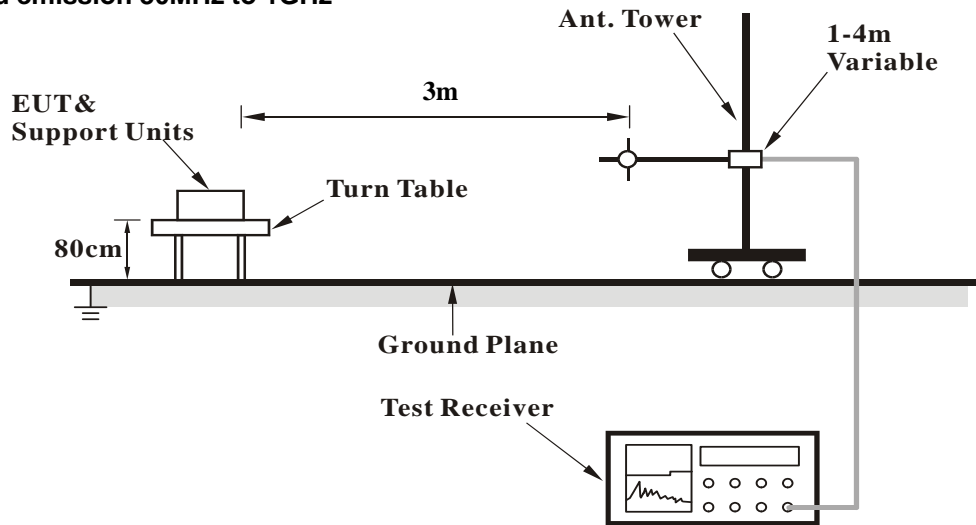
### 4.2.3 Deviation from Test Standard

No deviation.

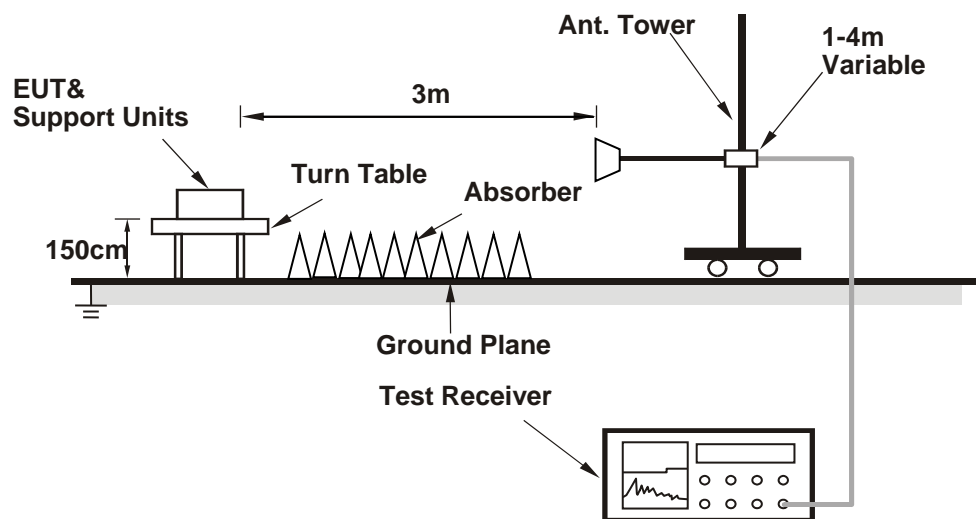


#### 4.2.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.2.5 Test Results

Below 1GHz

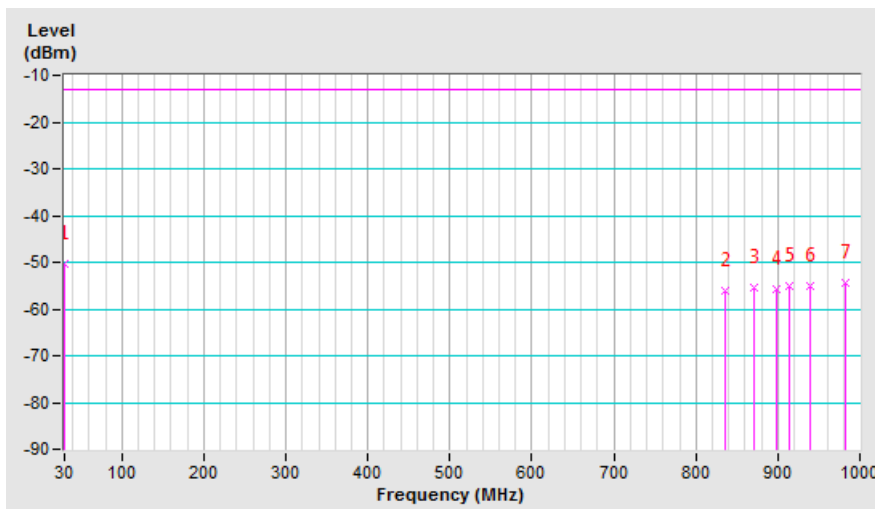
LTE Band 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26797 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 64%RH	Input Power	120Vac, 60Hz
Tested By	Match Tsui		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.97	-52.01	-49.63	-0.84	-50.47	-13.00	-37.47
2	836.07	-60.67	-52.52	-3.44	-55.96	-13.00	-42.96
3	870.99	-60.69	-51.94	-3.59	-55.53	-13.00	-42.53
4	899.12	-61.09	-51.96	-3.72	-55.68	-13.00	-42.68
5	913.67	-60.54	-51.27	-3.70	-54.97	-13.00	-41.97
6	939.86	-61.18	-51.35	-3.69	-55.04	-13.00	-42.04
7	981.57	-61.08	-50.54	-3.90	-54.44	-13.00	-41.44

Remarks:

- ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
- Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

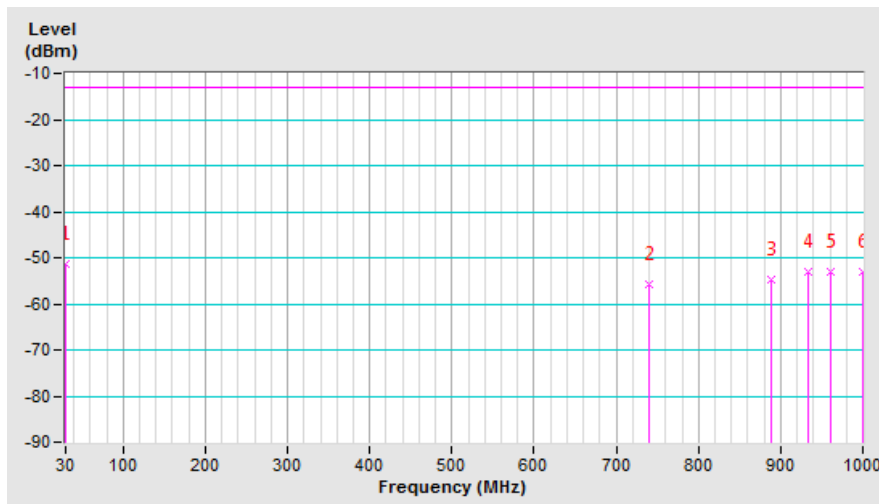


Mode	TX channel 26797 (824.7MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 64%RH	Input Power	120Vac, 60Hz
Tested By	Match Tsui		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-39.45	-50.65	-0.82	-51.47	-13.00	-38.47
2	740.04	-60.55	-52.49	-3.40	-55.89	-13.00	-42.89
3	889.42	-60.80	-51.07	-3.69	-54.76	-13.00	-41.76
4	933.07	-59.85	-49.45	-3.70	-53.15	-13.00	-40.15
5	961.20	-60.12	-49.30	-3.77	-53.07	-13.00	-40.07
6	1000.00	-61.04	-49.07	-4.01	-53.08	-13.00	-40.08

Remarks:

- ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
- Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz  
GSM Mode

Mode	TX channel 189 (836.4MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	25deg. C, 70%RH	Input Power	120Vac, 60Hz
Tested By	Noah Chang		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-59.00	-51.40	0.80	-50.60	-13.00	-37.60
2	2509.20	-44.00	-37.70	0.20	-37.50	-13.00	-24.50
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-59.40	-52.10	0.80	-51.30	-13.00	-38.30
<b>2</b>	<b>2509.20</b>	<b>-40.60</b>	<b>-36.70</b>	<b>0.20</b>	<b>-36.50</b>	<b>-13.00</b>	<b>-23.50</b>

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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