Partial FCC Test Report

(PART 22)

Report No.:	RFBFLF-WTW-P21123600A
Test Model:	B2402CB/B2402CBA/P2452CB/PX460CB/BW460CB/B2402FB/ B2402FBA/P2452FB/PX460FB/BW460FB (refer to item 3.1 for more details)
Received Date:	Dec. 20, 2021
Test Date:	Jun. 28 ~ Jul. 02, 2022
Issued Date:	Jul. 06, 2022
Applicant:	ASUSTeK COMPUTER INC.
Address:	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBFLF-WTW-P21123600A	Original Release	Jul. 06, 2022

1 Certificate of Conformity

Product:	Notebook PC/ExpertBook
Brand:	ASUS
Test Model:	B2402CB/B2402CBA/P2452CB/PX460CB/BW460CB/B2402FB/ B2402FBA/P2452FB/PX460FB/BW460FB (refer to item 3.1 for more details)
Sample Status:	Engineering Sample
Applicant:	ASUSTeK COMPUTER INC.
Test Date:	Jun. 28 ~ Jul. 02, 2022
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 : Polly Chien , **Date:** Jul. 06, 2022

Polly Chien / Specialist

Approved by : Jeremy Lin , **Date:** Jul. 06, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 22.913 (a)	Effective Radiated Power	N/A	Refer to Note
2.1047	Modulation Characteristics	N/A	Refer to Note
22.913 (d)	Peak to Average Ratio	N/A	Refer to Note
2.1055 22.355	Frequency Stability	N/A	Refer to Note
2.1049	Occupied Bandwidth	N/A	Refer to Note
22.917	Band Edge Measurements	N/A	Refer to Note
2.1051 22.917	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -25.66 dB at 66.86 MHz.

Note:

1. This report is a partial report, only test items of Radiated Spurious Emissions tests was performed for this report. Other testing data please refer to Sporton report no.: FG051802A_R01, FG051802B_R01, FG051802G_R01, FG051802H_R01 for module (Brand: Fibocom, Model: FM350-GL).
2. 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) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 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.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 27, 2022	Apr. 26, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 15, 2021	Sep. 14, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	May 14, 2022	May 13, 2023
Preamplifier Agilent (Above 1GHz)	8449B	3008A01962	Oct. 05, 2021	Oct. 04, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable Woken	8D-FB	Cable-CH9-01	May 14, 2022	May 13, 2023
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2021	Sep. 09, 2022
Radio Communication Test Station Anritsu	MT8000A	6262135011	Nov. 18, 2021	Nov. 17, 2022
Radio Communication Test Station Anritsu	MT8821C	6261806803	Feb. 16, 2022	Feb. 15, 2023

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 9.

3 General Information

3.1 General Description of EUT

Product	Notebook PC/ExpertBook	
Brand	ASUS	
Test Model	B2402CB/B2402CBA/P2452CB/PX460CB/BW460CB/B2402FB/B2402FBA/ P2452FB/PX460FB/BW460FB	
Model Difference	Refer to Note as below	
Status of EUT	Engineering Sample	
Power Supply Rating	11.4 Vdc (Battery) 5Vdc/9Vdc/15Vdc/20Vdc (Adapter)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM, 256QAM
	5GNR	π/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
Frequency Range	WCDMA	826.4 ~ 846.6 MHz
	LTE 5 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 5 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 5 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 5 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 26 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 26 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 26 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 15 MHz)	831.5 ~ 841.5 MHz
	n5 (Channel Bandwidth 5MHz)	826.5MHz ~ 846.5MHz
	n5 (Channel Bandwidth 10MHz)	829.0MHz ~ 844.0MHz
	n5 (Channel Bandwidth 15MHz)	831.5MHz ~ 841.5MHz
	n5 (Channel Bandwidth 20MHz)	834.0MHz ~ 839.0MHz
Antenna Type	Refer to Note as below	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	
Tx / Rx Function	1Tx/4Rx	

Note:

1. All models are listed as below.

Brand	Model	Difference
ASUS	B2402CB	All models are electrically identical, different model names are for marketing purpose.
	B2402CBA	
	P2452CB	
	PX460CB	
	BW460CB	
	B2402FB	
	B2402FBA	
	P2452FB	
	PX460FB	
	BW460FB	

2. The EUT contains the following accessories.

Accessories information		
Main Board	**Brand**	ASUS
	Model	B2402FBA MB
LCD Panel 1	**Brand**	INNOLUX
	Model	N140BGA-EA4
	spec	14" HD TN
LCD Panel 2	**Brand**	AUO
	Model	B140XTN07.2
	spec	14" HD TN
LCD Panel 3	**Brand**	INNOLUX
	Model	N140HGA-EA1
	spec	14" FHD TN
LCD Panel 4	**Brand**	BOE
	Model	NT140FHM-N44
	spec	14" FHD TN
LCD Panel 5	**Brand**	INNOLUX
	Model	N140HCA-EAC
	spec	14" FHD value IPS
LCD Panel 6	**Brand**	AUO
	Model	B140HAN04.0
	spec	14" FHD value IPS
LCD Panel 7	**Brand**	INNOLUX
	Model	N140HCE-EN2
	spec	14"FHD IPS, 400nits
Camera 1	**Brand**	AZWAVE
	Model	AM-9BF56EB-D
	spec	CAMERA HD RGB/IR ARRAY MIC CR
Camera 2	**Brand**	SUPREME
	Model	AHDFN050
	spec	CAMERA HD FIX 3.3V ARRAYMIC CL
Camera 3	**Brand**	AZWAVE
	Model	AM-6SF56A2-J
	spec	CAMERA HD FIX 3.3V ARRAYMIC CL
Camera 4	**Brand**	SUPREME
	Model	AHDFN171
	spec	CAMERA HD FIX 3.3V ARRAYMIC CL
CPU 1	**Brand**	Intel/BGA1744
	Model	I7-1260P 12C
	spec	2.1G
CPU 2	**Brand**	Intel/BGA1744
	Model	I5-1240P 12C
	spec	1.7G

Accessories information		
CPU 3	Brand	Intel/BGA1744
	Model	I3-1215U 6C
	spec	1.2GHz
V-Pro CPU 1	Brand	Intel/BGA1744
	Model	I5-1250P
	spec	1.7GHz
V-Pro CPU 2	Brand	Intel/BGA1744
	Model	I7-1270P
	spec	2.2GHz
M.2 SSD 1	Brand	WD
	Model	SDBPNPZ-256G-1002
	spec	256GB M2 2280 NVME
M.2 SSD 2	Brand	KST
	Model	OM8PDP3256B-AB1
	spec	256GB M2 2280 NVME
M.2 SSD 3	Brand	INT
	Model	SSDPEKNU512GZ
	spec	512GB M2 2280 NVME
M.2 SSD 4	Brand	MICRON
	Model	MTFDHBA512QFD
	spec	512G M2 2280 NVME
M.2 SSD 5	Brand	INT
	Model	SSDPEKNU010TZ
	spec	1TB M2 2280 NVME
M.2 SSD 6	Brand	MICRON
	Model	MTFDHBA1T0QFD
	spec	1TB M2 2280 NVME
M.2 SSD 7	Brand	SAMSUNG
	Model	MZVL2512HCJQ
	spec	512GB M2 2280 NVME
M.2 SSD 8	Brand	MICRON
	Model	MTFDKBA512TFH
	spec	512GB M2 2280 NVME
M.2 SSD 9	Brand	SAMSUNG
	Model	MZVL21T0HCLR
	spec	1TB M2 2280 NVME
M.2 SSD 10	Brand	MICRON
	Model	MTFDKBA1T0TFH
	spec	1TB M2 2280 NVME
M.2 SSD 11	Brand	SAMSUNG
	Model	MZVL22T0HBLB
	spec	2TB M2 2280 NVME
M.2 SSD 12	Brand	MICRON
	Model	MTFDKBA2T0TFH
	spec	2TB M2 2280 NVME
HDD 1	Brand	TOSHIBA
	Model	MQ04ABF100
	spec	1 TB-5400rpm
HDD 2	Brand	SEAGATE
	Model	ST1000LM035
	spec	1 TB-5400rpm
HDD 3	Brand	SEAGATE
	Model	ST1000LM049
	spec	1 TB-7200rpm
HDD 4	Brand	SEAGATE
	Model	ST2000LM007
	spec	2 TB-5400rpm
BT/WLAN Module	Brand	INTEL
	Model	AX201D2W

Accessories information		
Battery 1	Brand	ASUS
	Model	B31N1909
	Power Rating	CPT/GLP606080R/3S1P/11.4V/48WH
	Manufacturer	CPT
SO-DIMM	SPEC	DDR4, 3200 MHz (4G/8G/16G/32G)
AC Adapter 1	Brand	ASUS
	Model	AD10380
	AC Input	100 - 240 Vac; 50 - 60 Hz; 1.5 A
	DC Output	5Vdc; 3A / 9Vdc; 3A / 15Vdc; 3A / 20Vdc; 3.25A
	DC Output Cable	1.5m / 0 core shielding
	Manufacturer	PI
AC Adapter 2	Brand	ASUS
	Model	A19-065N3A
	AC Input	100 - 240 Vac; 50 - 60 Hz; 1.5 A
	DC Output	5Vdc; 3A / 9Vdc; 3A / 15Vdc; 3A / 20Vdc; 3.25A
	DC Output Cable	1.5m / 0 core shielding
	Manufacturer	CHICONY
AC power cable	Signal Line	0.8 meter / no shielding / 0 core
AC Adapter 3	Brand	ASUS
	Model	ADP-65TW A
	AC Input	100 - 240 Vac; 50 - 60 Hz; 1.5 A
	DC Output	5Vdc; 3A / 9Vdc; 3A / 15Vdc; 3A / 20Vdc; 3.25A
	Manufacturer	DELTA
Type C to Type C USB Cable 1	Brand	MECIMEX
	Model	USB2.0 TYPE C TO C CABLE
	Signal Line	1.5 meter
Stylus Pen	Brand	Shenzhen qianfenyi intelligent technology co., LTD.
	Model	Active Stylus SA201H
	Manufacturer	MAXEYE

**After pretesting, Adapter 1 was the worst case and chosen for final test.

3. The antenna information is listed as below.

Ant. Type	Brand	Model
PIFA	PULSE	Ant. 0: TZ21101 (1415-090R0A9) Ant. 1: TZ21104 (1415-08YX0A9) Ant. 2: TZ21108 (1415-08YW0A9) Ant. 3: TZ21109 (1415-090U0A9)

Band			WCDMA			LTE															
			II	IV	V	2	4	5	7	12	13	14	17	25	26	30	38	41	48	66	71
Peak Gain (dBi)	NB	Ant. 0	3.1	2.9	-1.32	3.1	2.9	-1.32	1.7	3.29	1.59	1.07	3.24	3.1	-0.49	1.79	2.42	2.68	1.85	2.9	3.36
		Ant. 1	1.92	1.9	-0.59	1.92	1.9	-0.59	2.72	-	-0.21	-0.86	-	1.92	-0.54	3.36	3.13	3.22	5.38	1.9	-
		Ant. 2	3.07	-	-	3.07	-	-	4.24	-	-	-	-	3.07	-	3.64	3.59	4.93	5.52	-	-
		Ant. 3	2.27	2.58	-	2.27	2.58	-	2.31	-	-	-	-	2.27	-	2.62	1.93	2.31	2.26	2.58	-
	TB	Ant. 0	0	0.18	-2.59	0	0.18	-2.59	0.73	-3.98	-2.38	-2.1	-3.98	0	-2.05	0.98	0.98	2.18	5.83	0.18	-4.53
		Ant. 1	1.35	0.65	-1.55	1.35	0.65	-1.55	3.92	-	-1.93	-1.62	-	1.35	-1.55	0.93	3.92	3.96	4.23	2.33	-
		Ant. 2	0.62	-	-	0.62	-	-	2.36	-	-	-	-	0.62	-	1.82	2.25	2.86	5.5	-	-
		Ant. 3	0.93	-1.39	-	0.93	-1.39	-	0.18	-	-	-	-	0.93	-	1.95	-0.64	0.28	2.35	-0.27	-

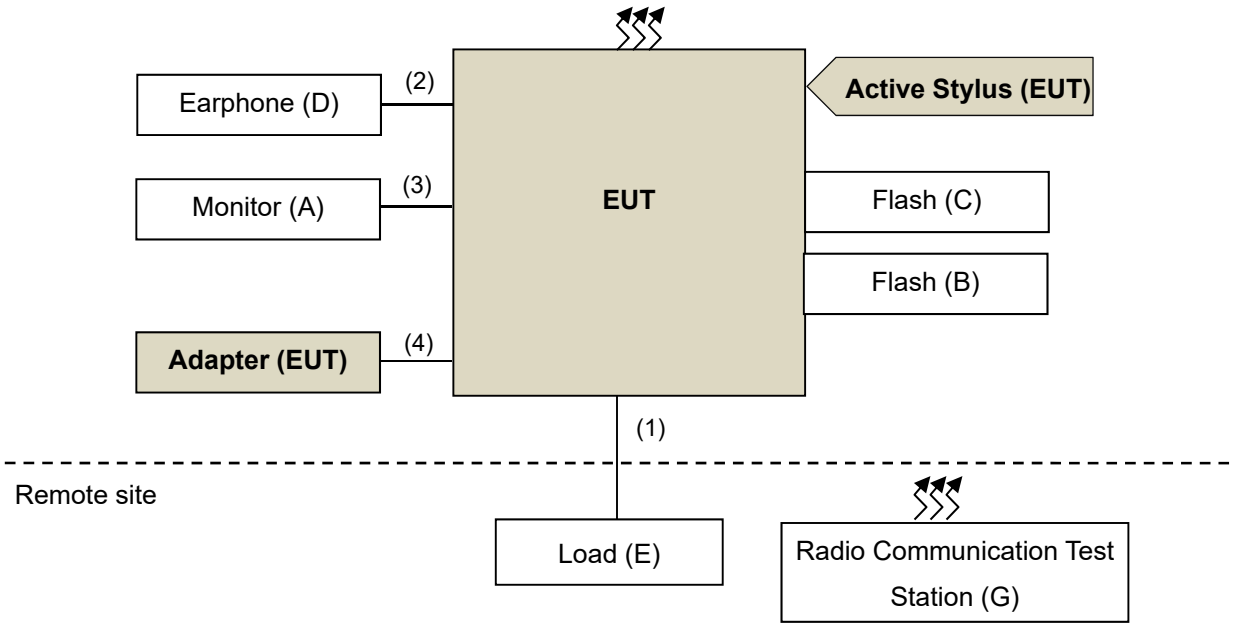
Band			5GNR										
			2	5	7	25	30	38	41	66	71	77	78
Peak Gain (dBi)	NB	Ant. 0	3.1	-1.32	1.7	3.1	1.79	2.42	2.68	2.9	3.36	1.3	1.3
		Ant. 1	1.92	-0.59	2.72	1.92	3.36	3.13	3.22	1.9	-	4.11	4.11
		Ant. 2	3.07	-	4.24	3.07	3.64	3.59	4.93	-	-	5.51	5.51
		Ant. 3	2.27	-	2.31	2.27	2.62	1.93	2.31	2.58	-	2.74	2.74
	TB	Ant. 0	0	-2.59	0.73	0	0.98	0.98	2.18	0.18	-4.53	5.83	5.83
		Ant. 1	1.35	-1.55	3.92	1.35	0.93	3.92	3.96	2.33	-	4.66	4.66
		Ant. 2	0.62	-	2.36	0.62	1.82	2.25	2.86	-	-	4.4	4.4
		Ant. 3	0.93	-	0.18	0.93	1.95	-0.64	0.28	-0.27	-	3.38	3.38

4. The above Antenna information refers to the manufacturer's antenna specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
6. The EUT contains certified WWAN module with FCC ID: MSQFM350GL.

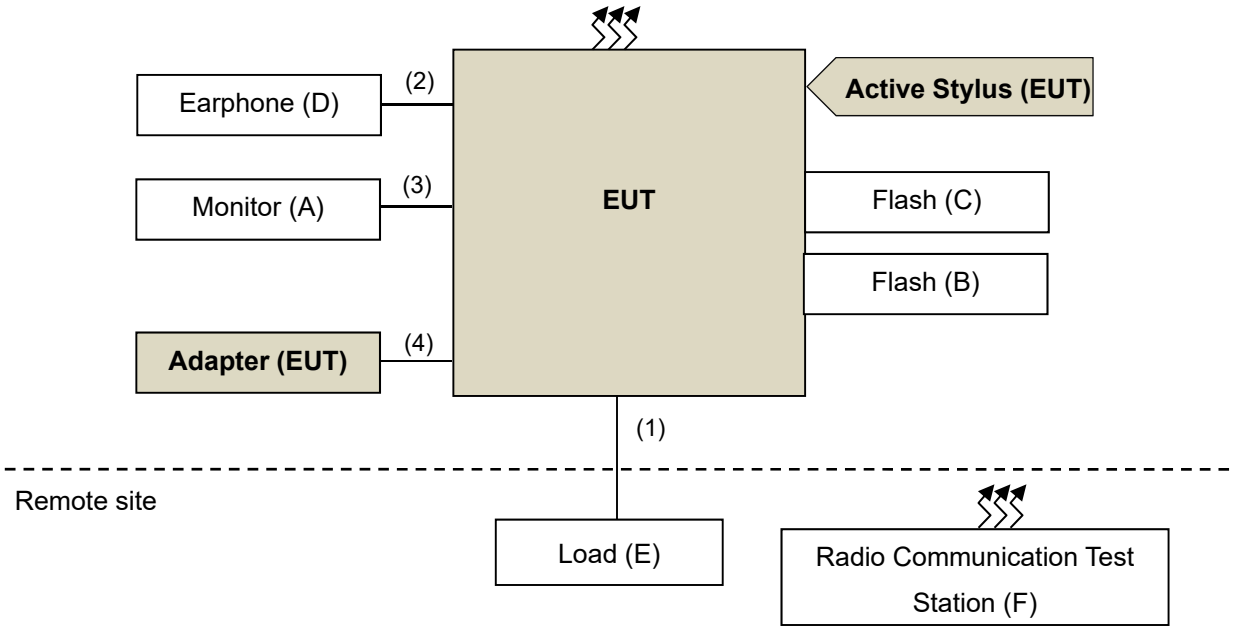
3.2 Configuration of System under Test

<Radiated Emission Test>

WCDMA & LTE



5GNR



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	Monitor	DELL	U2410	CN-0J257M-72872-0A6-02NL	FCC DoC Approved	-
B	Flash	SanDisk	SDDDC3-032G	NA	NA	Type-C
C	Flash	SanDisk	SDDDC3-032G	NA	NA	Type-C
D	Earphone	APPLE	MB770FEB	NA	NA	-
E	Load	NA	NA	NA	NA	-
F	Radio Communication Test Station	Anritsu	MT8000A	6262135011	NA	-
G	Radio Communication Test Station	Anritsu	MT8821C	6261806803	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items F-G acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	RJ45, Cat.5e
2.	Audio cable	1	1.2	N	0	-
3.	HDMI cable	1	2.0	Y	0	Provided by Lab. (Brand: Amber, Model: HDMI-AA120)
4.	DC cable	1	1.55	N	0	Provided by client

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 X-plane. Following channel(s) was (were) selected for the final test as listed below:

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	Radiated Emission	4132 to 4233	4132	WCDMA

LTE Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission	20450 to 20600	20525	10 MHz	QPSK	1 RB / 0 RB Offset

LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission	26865 to 26965	26965	15 MHz	QPSK	1 RB / 0 RB Offset

5GNR Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission	166800 to 167800	167300	20MHz	QPSK	1 RB / 1 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Radiated Emission	22 deg. C, 69 % RH	120 Vac, 60 Hz	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 and references

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

Test Standard:
FCC 47 CFR Part 2
FCC 47 CFR Part 22
ANSI 63.26-2015

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

References Test Guidance:
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 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 is equal to -13 dBm.

4.1.2 Test Procedure

a. 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.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7
   EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

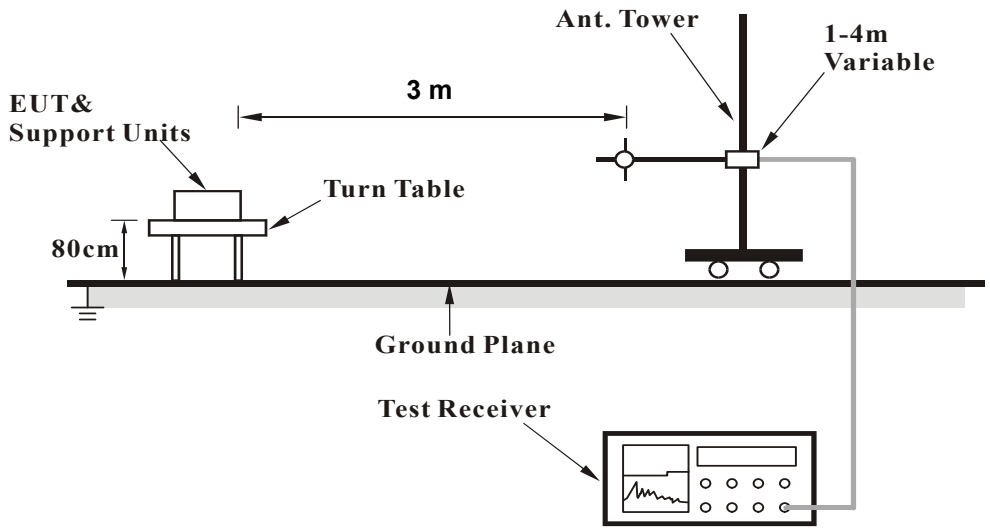
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.1.3 Deviation from Test Standard

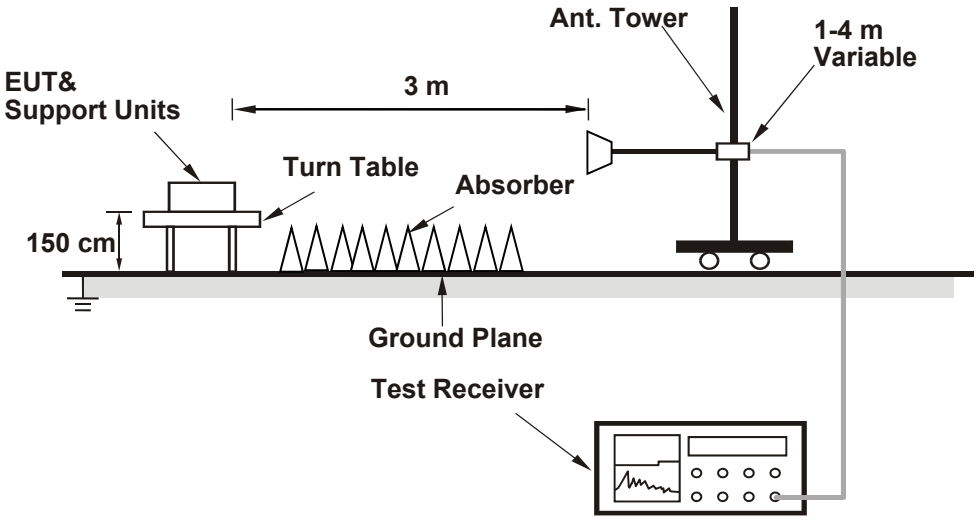
No deviation.

4.1.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.5 Test Results

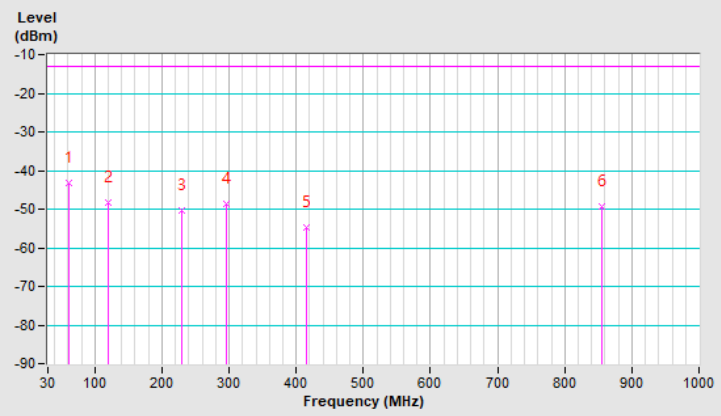
Below 1GHz
WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	61.04	-43.34	-13.00	-30.34	1.00 H	17	63.43	-106.77
2	119.24	-48.22	-13.00	-35.22	1.00 H	6	60.39	-108.61
3	229.82	-50.41	-13.00	-37.41	1.50 H	182	58.31	-108.72
4	295.78	-48.51	-13.00	-35.51	1.25 H	176	56.59	-105.10
5	416.06	-54.78	-13.00	-41.78	1.00 H	355	48.25	-103.03
6	854.50	-49.40	-13.00	-36.40	1.25 H	53	44.33	-93.73

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

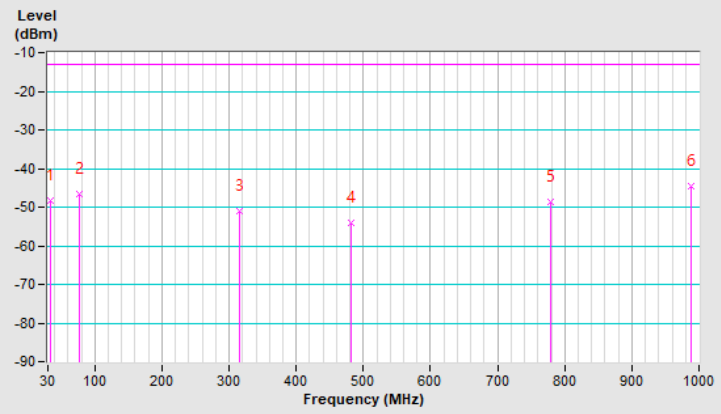


Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	-48.29	-13.00	-35.29	1.00 V	164	59.26	-107.55
2	76.56	-46.46	-13.00	-33.46	1.25 V	149	63.08	-109.54
3	315.18	-51.08	-13.00	-38.08	1.50 V	222	53.55	-104.63
4	482.02	-54.06	-13.00	-41.06	1.00 V	174	47.73	-101.79
5	778.84	-48.56	-13.00	-35.56	1.25 V	250	46.46	-95.02
6	988.36	-44.64	-13.00	-31.64	1.00 V	31	46.64	-91.28

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



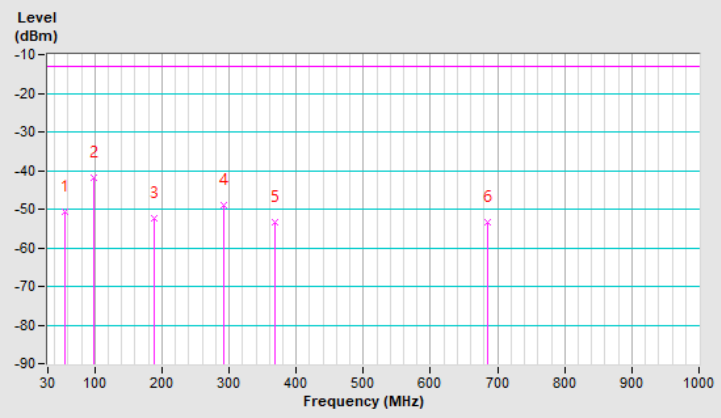
LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	55.22	-50.65	-13.00	-37.65	1.25 H	246	55.55	-106.20
2	97.90	-41.89	-13.00	-28.89	1.25 H	170	69.22	-111.11
3	189.08	-52.47	-13.00	-39.47	1.00 H	109	56.15	-108.62
4	291.90	-48.89	-13.00	-35.89	1.50 H	170	56.30	-105.19
5	367.56	-53.46	-13.00	-40.46	1.00 H	176	50.35	-103.81
6	685.72	-53.30	-13.00	-40.30	1.00 H	66	44.61	-97.91

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

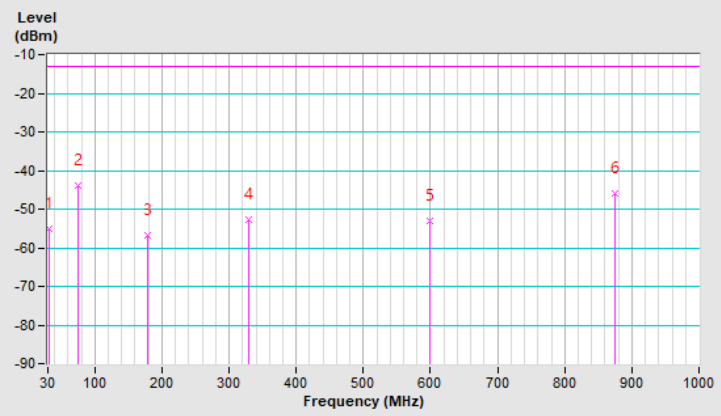


Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	-55.00	-13.00	-42.00	1.00 V	313	52.69	-107.69
2	74.62	-43.78	-13.00	-30.78	1.50 V	153	65.11	-108.89
3	179.38	-56.70	-13.00	-43.70	1.25 V	122	50.92	-107.62
4	328.76	-52.86	-13.00	-39.86	1.25 V	10	51.37	-104.23
5	598.42	-52.91	-13.00	-39.91	1.00 V	254	46.62	-99.53
6	873.90	-45.91	-13.00	-32.91	1.50 V	318	47.48	-93.39

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



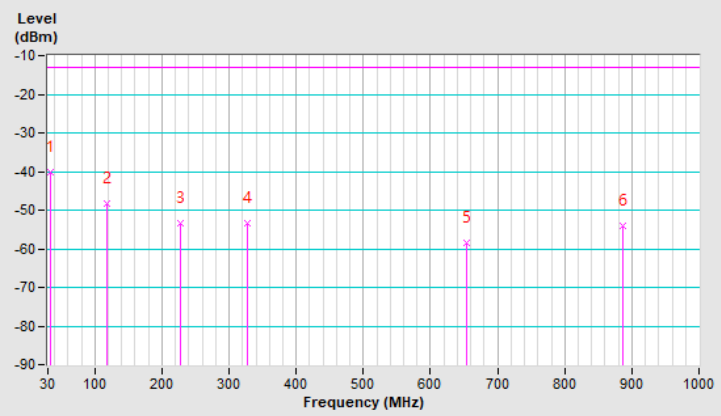
LTE Band 26, Channel Bandwidth: 15MHz

Mode	TX channel 26965 (841.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	-40.08	-13.00	-27.08	1.50 H	351	67.47	-107.55
2	117.30	-48.17	-13.00	-35.17	1.25 H	345	60.58	-108.75
3	227.88	-53.29	-13.00	-40.29	1.00 H	6	55.52	-108.81
4	326.82	-53.48	-13.00	-40.48	1.25 H	164	50.80	-104.28
5	654.68	-58.37	-13.00	-45.37	1.00 H	163	39.85	-98.22
6	887.48	-54.13	-13.00	-41.13	1.00 H	213	39.16	-93.29

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

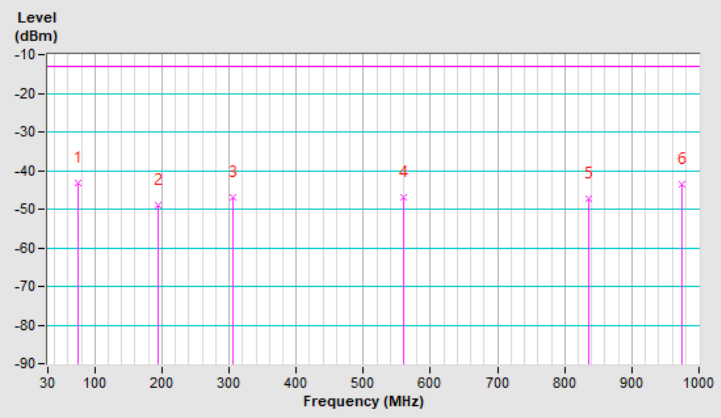


Mode	TX channel 26965 (841.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	74.62	-43.25	-13.00	-30.25	1.00 V	89	65.64	-108.89
2	194.90	-49.08	-13.00	-36.08	1.25 V	100	59.91	-108.99
3	305.48	-46.87	-13.00	-33.87	1.00 V	100	57.93	-104.80
4	559.62	-46.95	-13.00	-33.95	1.50 V	99	53.69	-100.64
5	835.10	-47.29	-13.00	-34.29	1.25 V	20	46.77	-94.06
6	974.78	-43.70	-13.00	-30.70	1.00 V	213	47.60	-91.30

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



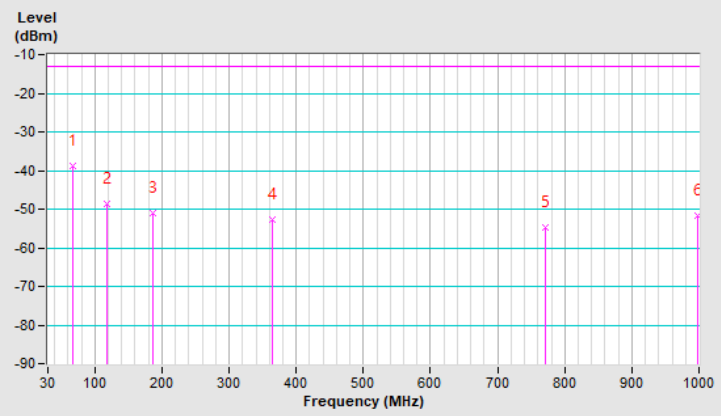
n5, Channel Bandwidth 20MHz

Mode	TX channel 167300 (836.5 MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**66.86**	**-38.66**	**-13.00**	**-25.66**	**1.25 H**	**189**	**68.72**	**-107.38**
2	117.30	-48.75	-13.00	-35.75	1.50 H	355	60.00	-108.75
3	187.14	-51.00	-13.00	-38.00	1.00 H	19	57.42	-108.42
4	363.68	-52.63	-13.00	-39.63	1.25 H	1	51.27	-103.90
5	771.08	-54.86	-13.00	-41.86	1.00 H	275	40.47	-95.33
6	998.06	-51.84	-13.00	-38.84	1.25 H	200	38.99	-90.83

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

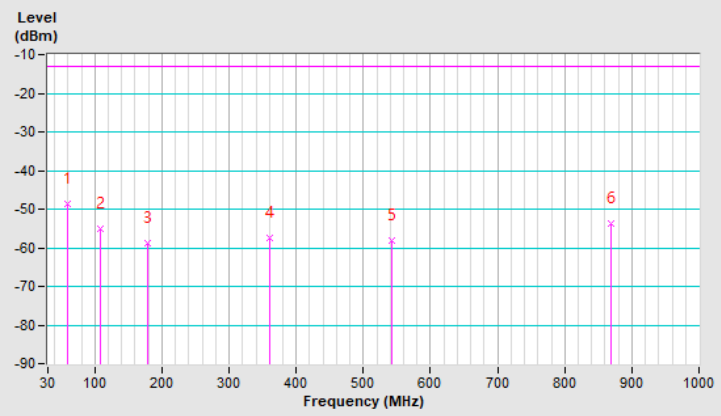


Mode	TX channel 167300 (836.5 MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	59.10	-48.69	-13.00	-35.69	1.00 V	63	57.68	-106.37
2	107.60	-54.97	-13.00	-41.97	1.00 V	100	54.67	-109.64
3	179.38	-58.72	-13.00	-45.72	1.25 V	199	48.90	-107.62
4	359.80	-57.47	-13.00	-44.47	1.50 V	191	46.51	-103.98
5	542.16	-58.11	-13.00	-45.11	1.00 V	10	42.70	-100.81
6	868.08	-53.64	-13.00	-40.64	1.25 V	251	39.86	-93.50

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz
WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1652.80	-54.38	-13.00	-41.38	2.67 H	151	45.12	-99.50
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1652.80	-54.87	-13.00	-41.87	2.27 V	58	44.63	-99.50

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-52.59	-13.00	-39.59	2.93 H	112	46.85	-99.44
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-53.20	-13.00	-40.20	2.81 V	42	46.24	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 26, Channel Bandwidth: 15MHz

Mode	TX channel 26965 (841.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1683.00	-51.17	-13.00	-38.17	3.18 H	117	48.23	-99.40
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1683.00	-52.26	-13.00	-39.26	2.82 V	38	47.14	-99.40

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

n5, Channel Bandwidth 20MHz

Mode	TX channel 167300 (836.5 MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 69%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-52.71	-13.00	-39.71	2.56 H	158	46.73	-99.44
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-53.77	-13.00	-40.77	3.02 V	347	45.67	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

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 according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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