FCC Test Report
(Part 24)

Report No.:	RFBBGM-WTW-P21116011-1
FCC ID:	WIYLE910C1NF
Test Model:	LE910C1-NF
Received Date:	Dec. 01, 2021
Test Date:	Dec. 02 ~ Dec. 07, 2021
Issued Date:	Jan. 04, 2022
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Address:	6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, TAIWAN (R. O. C.)
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 (1):	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number(1):	788550 / TW0003
Test Location(2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan
FCC Registration / Designation Number(2):	281270 / TW0032

Testing Laboratory
2021

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P21116011-1	Original release	Jan. 04, 2022

1 Certificate of Conformity

Product:	WCDMA and LTE cellular wireless module
Brand:	CASTLES TECHNOLOGY
Test Model:	LE910C1-NF
Sample Status:	Identical Prototype
Applicant:	CASTLES TECHNOLOGY CO., LTD.
Test Date:	Dec. 02 ~ Dec. 07, 2021
Standards:	FCC Part 24, Subpart E

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:** Jan. 04, 2022

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Jan. 04, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note
24.232(d)	Peak to Average Ratio	N/A	Refer to Note
2.1055 24.235	Frequency Stability	N/A	Refer to Note
2.1049	Occupied Bandwidth	N/A	Refer to Note
24.238	Band Edge Measurements	N/A	Refer to Note
2.1051 24.238	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.62dB at 822.87MHz.

Note:

1. This report is a partial report. Therefore, only test item of Equivalent Isotropic Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to DEKRA report no.: 1980255R-HPUSP17V00-B & 1980255R-HPUSP17V00-C (LTE Module, Brand: Telit, Model: LE910C4-NF, FCC ID: RI7LE910CXNF).
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	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	ESR3	102782	Dec. 21, 2020	Dec. 20, 2021
Spectrum Analyzer Rohde & Schwarz	FSW43	101582	Apr. 01, 2021	Mar. 31, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-1213	Oct. 27, 2021	Oct. 26, 2022
HORN Antenna RF SPIN	DRH18-E	210103A18E	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-1048	Nov. 14, 2021	Nov. 13, 2022
Preamplifier EMCI	EMC330N	980782	Jan. 19, 2021	Jan. 18, 2022
Preamplifier EMCI	EMC118A45SE	980808	Jan. 03, 2021	Jan. 02, 2022
Preamplifier EMCI	EMC184045SE	980788	Jan. 18, 2021	Jan. 17, 2022
RF signal cable EMCI	EMC104-SM-SM-(9000+2000+1000)	201243+ 201231+ 210102	Jan. 18, 2021	Jan. 17, 2022
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+300+500)	201236+ 201235+ 201233	Jan. 18, 2021	Jan. 17, 2022
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201260+201257+201254	Jan. 18, 2021	Jan. 17, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 12, 2021	Jul. 11, 2022

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 WM Chamber 8.

3 General Information

3.1 General Description of EUT

Product	WCDMA and LTE cellular wireless module		
Brand	CASTLES TECHNOLOGY		
Test Model	LE910C1-NF		
Sample Status	Identical Prototype		
Power Supply Rating	5.0 Vdc (host equipment) 3.8 Vdc		
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM		
Operating Frequency	WCDMA Band 2	1852.4~1907.6MHz	
	LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7~1909.3MHz	
	LTE Band 2 (Channel Bandwidth 3MHz)	1851.5~1908.5MHz	
	LTE Band 2 (Channel Bandwidth 5MHz)	1852.5~1907.5MHz	
	LTE Band 2 (Channel Bandwidth 10MHz)	1855.0~1905.0MHz	
	LTE Band 2 (Channel Bandwidth 15MHz)	1857.5~1902.5MHz	
	LTE Band 2 (Channel Bandwidth 20MHz)	1860.0~1900.0MHz	
Max. EIRP Power	WCDMA Band 2	192.309mW (22.84dBm)	
		QPSK	16QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	197.697mW (22.96dBm)	164.816mW (22.17dBm)
	LTE Band 2 (Channel Bandwidth 3MHz)	197.242mW (22.95dBm)	155.597mW (21.92dBm)
	LTE Band 2 (Channel Bandwidth 5MHz)	188.799mW (22.76dBm)	147.231mW (21.68dBm)
	LTE Band 2 (Channel Bandwidth 10MHz)	202.768mW (23.07dBm)	162.930mW (22.12dBm)
	LTE Band 2 (Channel Bandwidth 15MHz)	201.837mW (23.05dBm)	161.436mW (22.08dBm)
	LTE Band 2 (Channel Bandwidth 20MHz)	201.372mW (23.04dBm)	159.221mW (22.02dBm)
Antenna Type	Refer to Note		
Accessory Device	NA		
Cable Supplied	NA		

Note:

1. The EUT was installed in POS Terminal (Brand: CASTLES TECHNOLOGY, Model: UPT1000F).
2. The antenna information of POS Terminal is listed as below.

Antenna Type	Dipole	Brand	Aristotle
Antenna Connector	SMA R/A PLUG	Model	RFA-US-T1000G-2M-A5
Antenna Gain (dBi)	WCDMA Band 2	0.7	
	LTE Band 2	0.7	

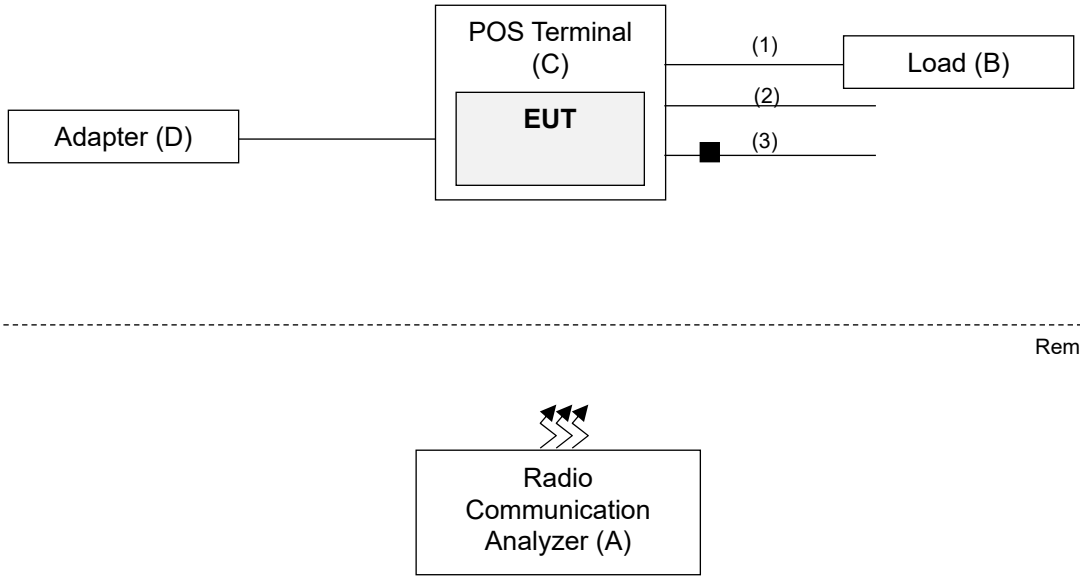
*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3. The adapter information of POS Terminal is listed as below.

Adapter (Support unit)	
Brand	CASTLES TECHNOLOGY
Model	FSP040-DRAN2
Input Power	100-240 Vac, 50-60 Hz, 1.4 A
Output Power	9.0 Vdc, 4.44 A MAX
Power Line	1.45m cable without core

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test



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	MT8821C	6261806803	NA	-
B.	Load	NA	NA	NA	NA	-
C.	POS Terminal	CASTLES TECHNOLOGY	UPT1000F	NA	NA	-
D.	Adapter	CASTLES TECHNOLOGY	FSP040-DRAN2	NA	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.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	RJ45
2.	Audio cable	1	1.5	Y	0	Provided by client
3.	USB cable	1	1.5	Y	1	Provided by lab

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

WCDMA Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA
-	Radiated Emission Below 1GHz	9262 to 9538	9400 (1880.0MHz)	WCDMA
-	Radiated Emission Above 1GHz	9262 to 9538	9400 (1880.0MHz)	WCDMA

LTE Band 2

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607 (1850.70MHz), 18900 (1880.00MHz), 19193 (1909.30MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.50MHz), 18900 (1880.00MHz), 19185 (1908.50MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.50MHz), 18900 (1880.00MHz), 19175 (1907.50MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.00MHz), 18900 (1880.00MHz), 19150 (1905.00MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.50MHz), 18900 (1880.00MHz), 19125 (1902.50MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.00MHz), 18900 (1880.00MHz), 19100 (1900.00MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	18615 to 19185	18900 (1880.00MHz)	3MHz	QPSK	1 RB / 7 RB Offset
-	Radiated Emission Above 1GHz	18615 to 19185	18900 (1880.00MHz)	3MHz	QPSK	1 RB / 7 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
EIRP	23deg. C, 70%RH	120Vac, 60Hz	Rui Chan
Radiated Emission	23deg. C, 68%RH	120Vac, 60Hz	Edison Lee

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 24
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

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

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 2 watts e.r.p.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with WCDMA and 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.

EIRP / ERP Measurement:

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA Band 2		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1888	1907.6
RMC 12.2K	22.14	22.10	22.07

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	21.87	21.93	21.76
		1	50	**22.34**	22.13	21.71
		1	99	21.70	21.75	21.31
		50	0	20.82	20.76	20.48
		50	25	20.70	20.66	20.47
		50	50	20.61	20.73	20.22
		100	0	20.64	20.61	20.49
20M	16QAM	1	0	20.78	20.86	20.63
		1	50	**21.32**	21.03	20.79
		1	99	20.67	20.67	20.57
		50	0	19.93	19.86	19.53
		50	25	19.77	19.78	19.37
		50	50	19.62	19.61	19.44
		100	0	19.63	19.59	19.32

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	21.82	21.95	21.76
		1	37	22.30	22.28	**22.35**
		1	74	21.93	21.98	21.64
		36	0	20.72	20.84	20.44
		36	19	20.75	20.76	20.46
		36	39	20.73	20.78	20.33
		75	0	20.77	20.78	20.36
15M	16QAM	1	0	20.79	20.75	20.81
		1	37	21.23	21.06	**21.38**
		1	74	20.90	20.78	20.66
		36	0	19.68	19.67	19.41
		36	19	19.77	19.58	19.56
		36	39	19.59	19.45	19.47
		75	0	19.61	19.56	19.39

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	21.98	22.07	21.96
		1	24	21.93	**22.37**	21.94
		1	49	21.77	22.08	21.86
		25	0	20.68	20.90	20.60
		25	12	20.79	20.86	20.63
		25	25	20.58	20.84	20.62
		50	0	20.65	20.87	20.45
10M	16QAM	1	0	20.72	20.98	20.73
		1	24	20.76	**21.42**	20.68
		1	49	20.61	20.88	20.66
		25	0	19.38	19.67	19.33
		25	12	19.46	19.63	19.43
		25	25	19.51	19.73	19.42
		50	0	19.44	19.71	19.22

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	21.73	21.76	21.93
		1	12	22.02	21.92	**22.06**
		1	24	21.82	21.88	21.86
		12	0	20.79	20.97	20.81
		12	6	20.79	21.06	20.81
		12	13	20.81	21.03	20.73
		25	0	20.75	21.00	20.76
5M	16QAM	1	0	20.84	20.70	20.87
		1	12	20.75	20.44	**20.98**
		1	24	20.82	20.63	20.56
		12	0	19.76	20.02	19.57
		12	6	19.72	19.91	19.71
		12	13	19.75	20.04	19.86
		25	0	19.88	20.07	19.81

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	21.70	22.17	21.84
		1	7	22.06	**22.25**	21.94
		1	14	21.85	22.07	21.74
		8	0	20.74	20.86	20.54
		8	3	20.75	20.87	20.63
		8	7	20.74	21.03	20.62
		15	0	20.69	20.88	20.59
3M	16QAM	1	0	20.39	20.72	20.77
		1	7	20.77	20.81	20.58
		1	14	20.82	**21.22**	20.54
		8	0	19.61	19.93	19.60
		8	3	19.80	20.34	19.66
		8	7	19.87	20.25	19.78
		15	0	19.91	19.94	19.68

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	21.89	22.12	22.02
		1	2	21.94	**22.26**	21.93
		1	5	21.88	22.11	21.98
		3	0	21.74	22.02	21.82
		3	1	21.76	22.14	21.78
		3	3	21.73	22.03	21.83
		6	0	20.74	20.97	20.68
1.4M	16QAM	1	0	20.71	21.28	20.77
		1	2	20.91	**21.47**	20.58
		1	5	21.02	21.29	21.17
		3	0	20.69	20.71	20.83
		3	1	20.82	21.15	21.03
		3	3	20.84	21.25	20.94
		6	0	19.79	19.77	19.39

EIRP Power (dBm)

Band	WCDMA Band 2		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1888	1907.6
RMC 12.2K	22.84	22.80	22.77

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	22.57	22.63	22.46
		1	50	**23.04**	22.83	22.41
		1	99	22.40	22.45	22.01
		50	0	21.52	21.46	21.18
		50	25	21.40	21.36	21.17
		50	50	21.31	21.43	20.92
		100	0	21.34	21.31	21.19
20M	16QAM	1	0	21.48	21.56	21.33
		1	50	**22.02**	21.73	21.49
		1	99	21.37	21.37	21.27
		50	0	20.63	20.56	20.23
		50	25	20.47	20.48	20.07
		50	50	20.32	20.31	20.14
		100	0	20.33	20.29	20.02

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	22.52	22.65	22.46
		1	37	23.00	22.98	**23.05**
		1	74	22.63	22.68	22.34
		36	0	21.42	21.54	21.14
		36	19	21.45	21.46	21.16
		36	39	21.43	21.48	21.03
		75	0	21.47	21.48	21.06
15M	16QAM	1	0	21.49	21.45	21.51
		1	37	21.93	21.76	**22.08**
		1	74	21.60	21.48	21.36
		36	0	20.38	20.37	20.11
		36	19	20.47	20.28	20.26
		36	39	20.29	20.15	20.17
		75	0	20.31	20.26	20.09

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	22.68	22.77	22.66
		1	24	22.63	**23.07**	22.64
		1	49	22.47	22.78	22.56
		25	0	21.38	21.60	21.30
		25	12	21.49	21.56	21.33
		25	25	21.28	21.54	21.32
		50	0	21.35	21.57	21.15
10M	16QAM	1	0	21.42	21.68	21.43
		1	24	21.46	**22.12**	21.38
		1	49	21.31	21.58	21.36
		25	0	20.08	20.37	20.03
		25	12	20.16	20.33	20.13
		25	25	20.21	20.43	20.12
		50	0	20.14	20.41	19.92

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	22.43	22.46	22.63
		1	12	22.72	22.62	**22.76**
		1	24	22.52	22.58	22.56
		12	0	21.49	21.67	21.51
		12	6	21.49	21.76	21.51
		12	13	21.51	21.73	21.43
		25	0	21.45	21.70	21.46
5M	16QAM	1	0	21.54	21.40	21.57
		1	12	21.45	21.14	**21.68**
		1	24	21.52	21.33	21.26
		12	0	20.46	20.72	20.27
		12	6	20.42	20.61	20.41
		12	13	20.45	20.74	20.56
		25	0	20.58	20.77	20.51

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	22.40	22.87	22.54
		1	7	22.76	**22.95**	22.64
		1	14	22.55	22.77	22.44
		8	0	21.44	21.56	21.24
		8	3	21.45	21.57	21.33
		8	7	21.44	21.73	21.32
		15	0	21.39	21.58	21.29
3M	16QAM	1	0	21.09	21.42	21.47
		1	7	21.47	21.51	21.28
		1	14	21.52	**21.92**	21.24
		8	0	20.31	20.63	20.30
		8	3	20.50	21.04	20.36
		8	7	20.57	20.95	20.48
		15	0	20.61	20.64	20.38

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	22.59	22.82	22.72
		1	2	22.64	**22.96**	22.63
		1	5	22.58	22.81	22.68
		3	0	22.44	22.72	22.52
		3	1	22.46	22.84	22.48
		3	3	22.43	22.73	22.53
		6	0	21.44	21.67	21.38
1.4M	16QAM	1	0	21.41	21.98	21.47
		1	2	21.61	**22.17**	21.28
		1	5	21.72	21.99	21.87
		3	0	21.39	21.41	21.53
		3	1	21.52	21.85	21.73
		3	3	21.54	21.95	21.64
		6	0	20.49	20.47	20.09

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 –13dBm.

4.2.2 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.

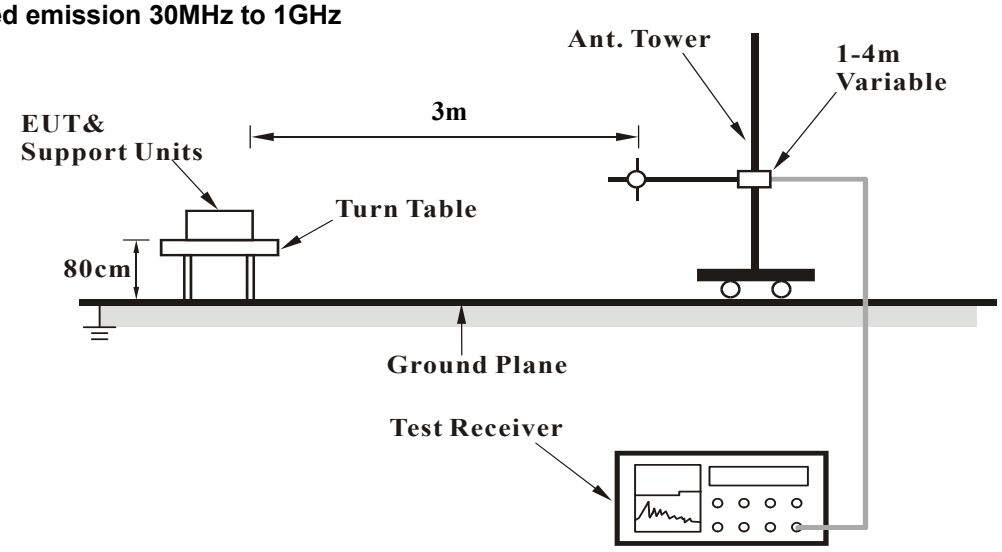
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.2.3 Deviation from Test Standard

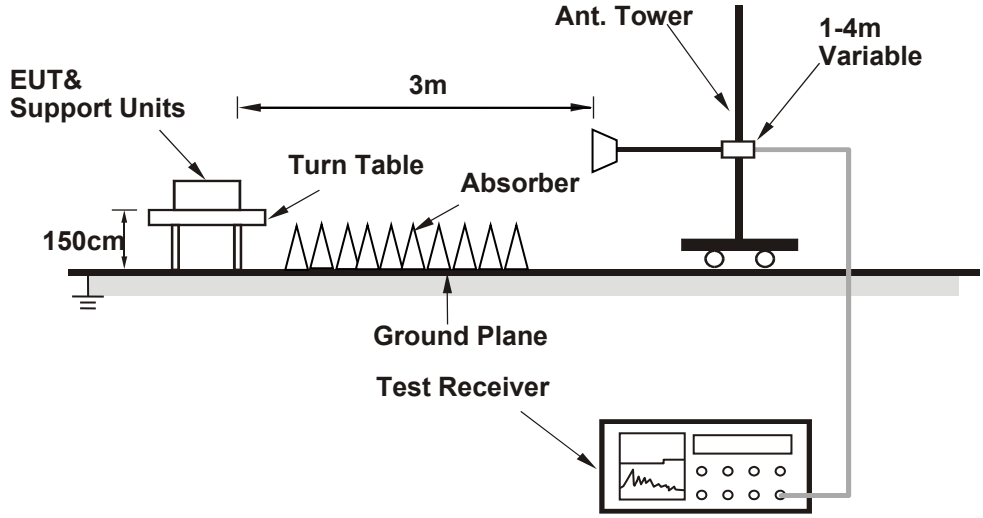
No deviation.

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

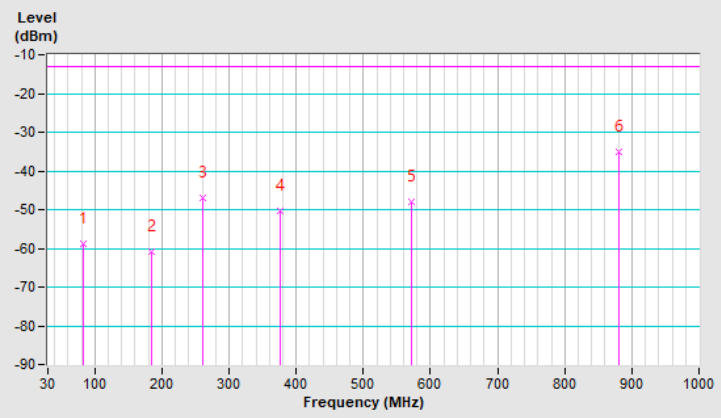
Below 1GHz
WCDMA Band 2

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	82.01	-58.83	-13.00	-45.83	1.50 H	2	60.38	-119.21
2	184.64	-60.96	-13.00	-47.96	1.50 H	150	54.49	-115.45
3	260.55	-46.87	-13.00	-33.87	1.50 H	286	67.43	-114.30
4	375.83	-50.35	-13.00	-37.35	1.01 H	68	60.65	-111.00
5	572.64	-47.81	-13.00	-34.81	1.01 H	134	58.77	-106.58
6	880.51	-35.18	-13.00	-22.18	1.50 H	297	66.72	-101.90

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

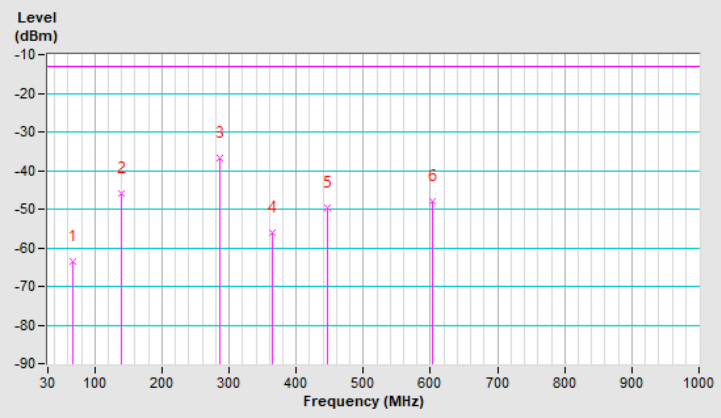


Mode	TX channel 9400 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.55	-63.41	-13.00	-50.41	1.99 V	215	52.05	-115.46
2	139.65	-45.82	-13.00	-32.82	1.50 V	322	68.04	-113.86
3	285.86	-36.71	-13.00	-23.71	1.50 V	242	76.43	-113.14
4	364.58	-56.16	-13.00	-43.16	1.50 V	320	55.22	-111.38
5	447.52	-49.51	-13.00	-36.51	1.50 V	322	59.34	-108.85
6	602.16	-47.84	-13.00	-34.84	1.50 V	299	57.60	-105.44

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



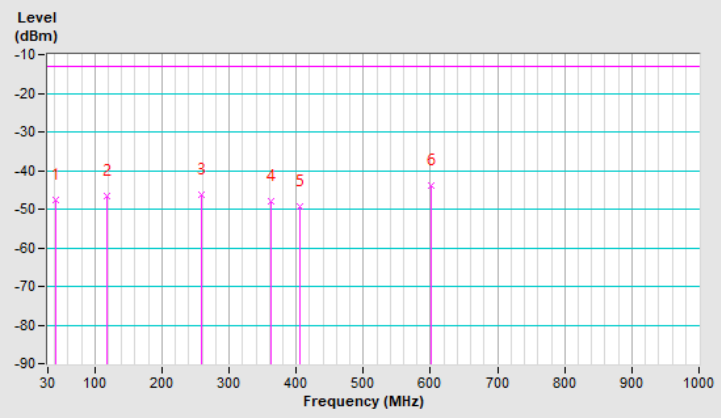
LTE Band 2, Channel Bandwidth: 5MHz

Mode	TX channel 18625 (1852.50MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.65	-47.69	-13.00	-34.69	1.01 H	297	66.24	-113.93
2	117.16	-46.57	-13.00	-33.57	1.01 H	325	69.30	-115.87
3	259.14	-46.37	-13.00	-33.37	1.01 H	269	67.99	-114.36
4	363.17	-47.80	-13.00	-34.80	1.01 H	49	63.63	-111.43
5	405.35	-49.38	-13.00	-36.38	1.01 H	261	60.92	-110.30
6	600.75	-44.03	-13.00	-31.03	1.50 H	134	61.44	-105.47

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

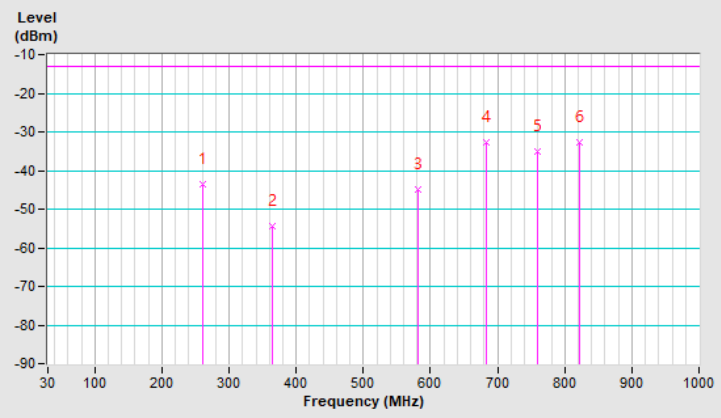


Mode	TX channel 18625 (1852.50MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Vertical at 3 M								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	260.55	-43.65	-13.00	-30.65	2.00 V	129	70.65	-114.30
2	364.58	-54.27	-13.00	-41.27	1.51 V	132	57.11	-111.38
3	581.07	-44.95	-13.00	-31.95	1.51 V	131	61.31	-106.26
4	682.29	-32.81	-13.00	-19.81	1.51 V	324	71.96	-104.77
5	759.61	-35.08	-13.00	-22.08	2.00 V	305	68.20	-103.28
6	**822.87**	**-32.62**	**-13.00**	**-19.62**	**1.51 V**	**131**	**69.90**	**-102.52**

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



Above 1GHz
WCDMA Band 2

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.66	-13.00	-35.66	3.23 H	215	47.20	-95.86
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.66	-13.00	-35.66	1.36 V	66	47.20	-95.86

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2, Channel Bandwidth 3MHz

Mode	TX channel 18900 (1880.00MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	23deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Edison Lee		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.36	-13.00	-35.36	3.17 H	211	47.50	-95.86
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-48.86	-13.00	-35.86	1.25 V	51	47.00	-95.86

Remarks:

1. EIRP(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
3. Margin value = EIRP – Limit value
4. The other EIRP 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 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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