

Variant FCC Test Report (Part 22)

Report No.: RFBEEKK-WTW-P20080111A-1

FCC ID: 2AARN-DLWPH-8M

Test Model: DLWPH-8M-RW

Series Model: DLWPH-8M

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**FCC Registration /
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Release Control Record

Issue No.	Description	Date Issued
RFBEKK-WTW-P20080111A-1	Original Release	Mar. 24, 2022

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	Pass	Meet the requirement of limit.
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	Pass	Meet the requirement of limit.
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 -27.9 dB at 128.94 MHz.

Note:

1. This report is a partial report, only test item of Effective Radiated Power, Frequency Stability and Radiated Spurious Emissions test was performed for this report. Other testing data please refer to original report.
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) (\pm)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 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 ROHDE & SCHWARZ	ESCI	100424	Dec. 30, 2021	Dec. 29, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 15, 2021	Sep. 14, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 01, 2021	Oct. 31, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Jun. 05, 2021	Jun. 04, 2022
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 05, 2021	Jun. 04, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH4-01	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Jun. 05, 2021	Jun. 04, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

- 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	EV charging system module 4G with WI-FI		
Brand	Phihong Technology Co., Ltd.		
Test Model	DLWPH-8M-RW		
Series Model	DLWPH-8M		
Model Difference	Refer to Note as below		
Sample Status	Engineering Sample		
Power Supply Rating	5Vdc (for DC power supply or host equipment)		
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM		
Operating Frequency	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	
Max. ERP Power	WCDMA Band 5	108.643mW (20.36dBm)	
		QPSK	16QAM
	LTE Band 5 (Channel Bandwidth 1.4MHz)	120.5041mW (20.81dBm)	94.624mW (19.76dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	114.025mW (20.57dBm)	91.622mW (19.62dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	118.032mW (20.72dBm)	95.060mW (19.78dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	120.781mW (20.82dBm)	95.280mW (19.79dBm)
Antenna Type	Refer to Note as below		
Antenna Connector	Refer to Note as below		
Accessory Device	NA		
Cable Supplied	NA		

Note:

- This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. RFBEEK-WTW-P20080111-1. The difference compared with original report is changing the motherboard design and adding external antenna, therefore only Effective Radiated Power, Frequency Stability and Radiated Spurious Emissions tests had been performed and recorded in this report.
- All models are listed as below.

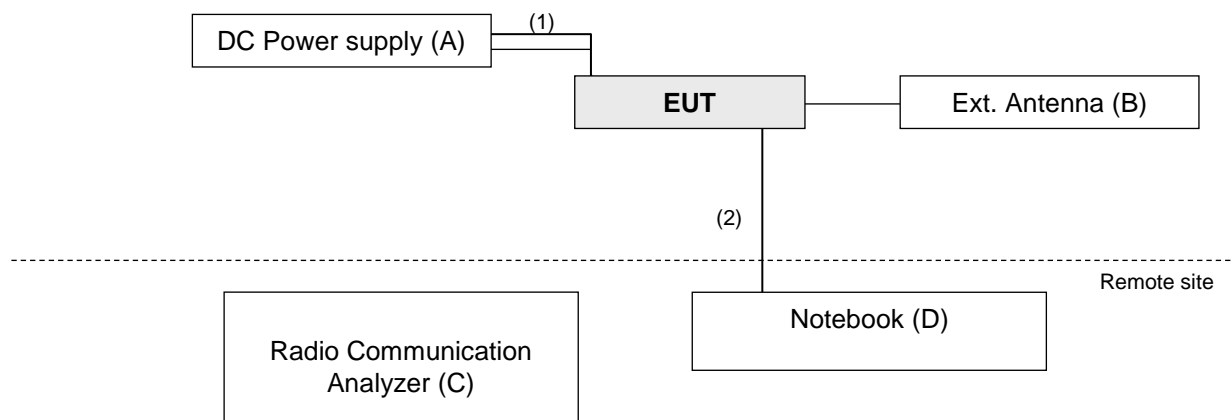
Brand	Model	Difference of WLAN Antenna type
Phihong Technology Co., Ltd.	DLWPH-8M	internal antenna
	DLWPH-8M-RW	external antenna

- The following antennas were provided to the EUT. (New antenna is marked in gray)

Brand	Model	Antenna Gain(dBi)	Antenna Type	Connector Type
Gortec	DR0727-4201BSM	-0.37	PCB	SMA Male
Aristotle	RFA-LTE-JP187-79B300	2.28	PCB	SMA PLUG

4. 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.
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.

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.	DC Power Supply	JIN YIH TECHNOLOGY CO., LTD.	ODP3033	ODP30332027416	NA	-
B.	Ext. Antenna	Aristotle	RFA-LTE-JP187-79B300	NA	NA	Provided by client
C.	Notebook	DELL	E5430	2RL3YW1	NA	-
D.	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Power cable	1	2	N	0	-
2.	LAN Cable	1	5	Y	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 Z-plane. Following channel(s) was (were) selected for the final test as listed below.

WCDMA Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA, HSDPA, HSUPA
-	Frequency Stability	4132 to 4233	4132 (826.4MHz), 4233 (846.6MHz)	WCDMA
-	Radiated Emission Below 1GHz	4132 to 4233	4233 (846.6MHz)	WCDMA
-	Radiated Emission Above 1GHz	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA

Note:

1. This device was tested under all modulations. The worst case of conducted output power was found in WCDMA modulation. Therefore, only ERP had been tested under WCDMA, HSDPA and HSUPA mode, the other items were performed under WCDMA mode only.
2. For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.

LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM	3 RB / 1 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM	1 RB / 7 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM	1 RB / 12 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
-	Frequency Stability	20407 to 20643	20407(824.7MHz), 20643(848.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		20415 to 20635	20415(825.5MHz), 20635(847.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20625(846.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20600(844.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	20407 to 20643	20407(824.7MHz)	1.4MHz	QPSK	3 RB / 1 RB Offset
-	Radiated Emission Above 1GHz	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	3 RB / 1 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 12 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

- For radiated emission below 1GHz, select the worst radiated emission (above 1GHz) channel for final testing.
- For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
- The conducted output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only ERP had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
ERP	22deg. C, 69%RH	120Vac, 60Hz	Rex Wang
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Radiated Emission	23deg. C, 66%RH	120Vac, 60Hz	Titan Hsu

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 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

Conducted Power Measurement:

The EUT was set up for the maximum power with 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.

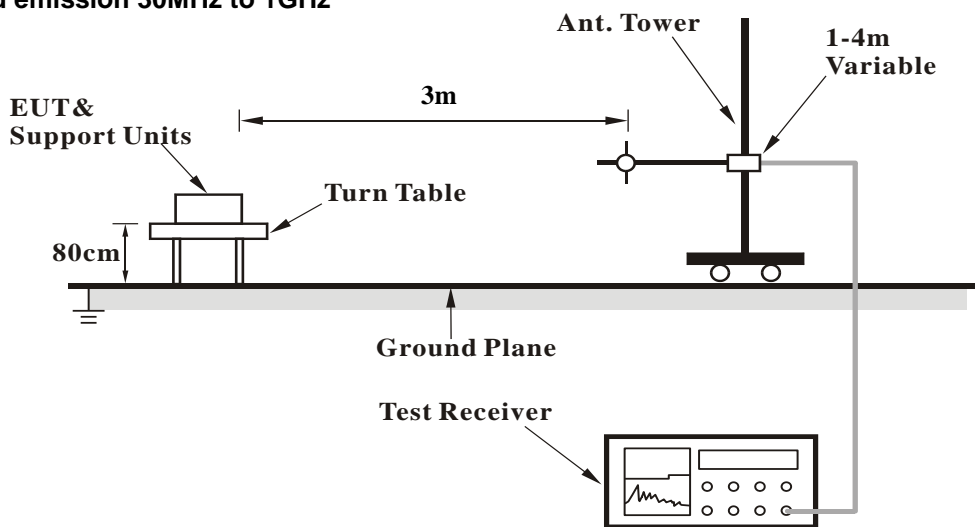
EIRP / ERP Measurement:

- 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
 - $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
 - $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

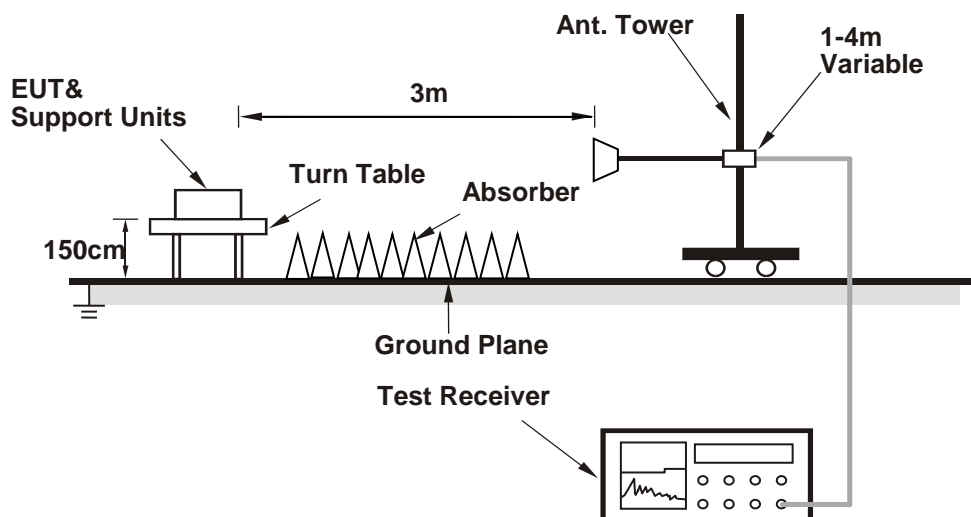
4.1.3 Test Setup

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

ERP Power (dBm)

WCDMA Band 5, Channel Bandwidth 1.4MHz

Mode		TX channel 4132, 4182, 4233						
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	826.40	18.77	38.45	-19.68	2.36 H	169	84.25	-65.48
2	836.40	18.78	38.45	-19.67	2.34 H	165	84.19	-65.41
3	846.60	18.65	38.45	-19.80	2.33 H	172	83.96	-65.31
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	826.40	20.33	38.45	-18.12	1.55 V	38	85.81	-65.48
2	836.40	20.35	38.45	-18.10	1.54 V	38	85.76	-65.41
3	846.60	20.36	38.45	-18.09	1.50 V	32	85.67	-65.31

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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

Modulation Type: QPSK

LTE Band 5, Channel Bandwidth 1.4MHz

Mode		TX channel 20407, 20525, 20643						
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	824.70	18.53	38.45	-19.92	2.27 H	125	84.02	-65.49
2	836.50	18.09	38.45	-20.36	2.24 H	128	83.49	-65.40
3	848.30	17.89	38.45	-20.56	2.32 H	122	83.14	-65.25
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	824.70	20.81	38.45	-17.64	1.80 V	139	86.30	-65.49
2	836.50	20.62	38.45	-17.83	1.71 V	139	86.02	-65.40
3	848.30	20.62	38.45	-17.83	1.80 V	132	85.87	-65.25

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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 3MHz

Mode		TX channel 20415, 20525, 20635						
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	825.50	18.62	38.45	-19.83	2.32 H	121	84.10	-65.48
2	836.50	18.28	38.45	-20.17	2.26 H	128	83.68	-65.40
3	847.50	18.31	38.45	-20.14	2.31 H	132	83.59	-65.28
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	825.50	20.45	38.45	-18.00	1.78 V	139	85.93	-65.48
2	836.50	20.33	38.45	-18.12	1.73 V	133	85.73	-65.40
3	847.50	20.57	38.45	-17.88	1.72 V	135	85.85	-65.28

Remarks:

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

LTE Band 5, Channel Bandwidth 5MHz

Mode		TX channel 20425, 20525, 20625						
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	826.50	18.02	38.45	-20.43	2.29 H	123	83.50	-65.48
2	836.50	17.76	38.45	-20.69	2.27 H	127	83.16	-65.40
3	846.50	18.28	38.45	-20.17	2.31 H	132	83.59	-65.31
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	826.50	20.72	38.45	-17.73	1.73 V	136	86.20	-65.48
2	836.50	20.34	38.45	-18.11	1.78 V	139	85.74	-65.40
3	846.50	20.71	38.45	-17.74	1.82 V	137	86.02	-65.31

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
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 20450, 20525, 20600						
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	829.00	18.33	38.45	-20.12	2.30 H	124	83.80	-65.47
2	836.50	18.24	38.45	-20.21	2.22 H	123	83.64	-65.40
3	844.00	18.02	38.45	-20.43	2.28 H	134	83.40	-65.38
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	829.00	20.49	38.45	-17.96	1.78 V	136	85.96	-65.47
2	836.50	20.82	38.45	-17.63	1.71 V	137	86.22	-65.40
3	844.00	20.41	38.45	-18.04	1.78 V	134	85.79	-65.38

Remarks:

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

Modulation Type: 16QAM

LTE Band 5, Channel Bandwidth 1.4MHz

Mode		TX channel 20407, 20525, 20643						
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	824.70	17.64	38.45	-20.81	2.32 H	128	83.13	-65.49
2	836.50	16.91	38.45	-21.54	2.25 H	125	82.31	-65.40
3	848.30	16.92	38.45	-21.53	2.24 H	128	82.17	-65.25
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	824.70	19.76	38.45	-18.69	1.76 V	138	85.25	-65.49
2	836.50	19.71	38.45	-18.74	1.72 V	134	85.11	-65.40
3	848.30	19.73	38.45	-18.72	1.79 V	142	84.98	-65.25

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$

LTE Band 5, Channel Bandwidth 3MHz

Mode		TX channel 20415, 20525, 20635						
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	825.50	17.71	38.45	-20.74	2.28 H	127	83.19	-65.48
2	836.50	17.12	38.45	-21.33	2.23 H	121	82.52	-65.40
3	847.50	17.24	38.45	-21.21	2.21 H	131	82.52	-65.28
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	825.50	19.53	38.45	-18.92	1.80 V	139	85.01	-65.48
2	836.50	19.35	38.45	-19.10	1.79 V	134	84.75	-65.40
3	847.50	19.62	38.45	-18.83	1.74 V	131	84.90	-65.28

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$

LTE Band 5, Channel Bandwidth 5MHz

Mode		TX channel 20425, 20525, 20625						
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	826.50	16.88	38.45	-21.57	2.22 H	121	82.36	-65.48
2	836.50	16.30	38.45	-22.15	2.30 H	126	81.70	-65.40
3	846.50	17.09	38.45	-21.36	2.31 H	123	82.40	-65.31
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	826.50	19.73	38.45	-18.72	1.73 V	136	85.21	-65.48
2	836.50	19.41	38.45	-19.04	1.77 V	133	84.81	-65.40
3	846.50	19.78	38.45	-18.67	1.73 V	129	85.09	-65.31

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
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 20450, 20525, 20600						
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	829.00	17.29	38.45	-21.16	2.24 H	124	82.76	-65.47
2	836.50	17.27	38.45	-21.18	2.31 H	127	82.67	-65.40
3	844.00	17.21	38.45	-21.24	2.31 H	128	82.59	-65.38
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	829.00	19.29	38.45	-19.16	1.74 V	133	84.76	-65.47
2	836.50	19.79	38.45	-18.66	1.71 V	134	85.19	-65.40
3	844.00	19.23	38.45	-19.22	1.77 V	129	84.61	-65.38

Remarks:

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

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

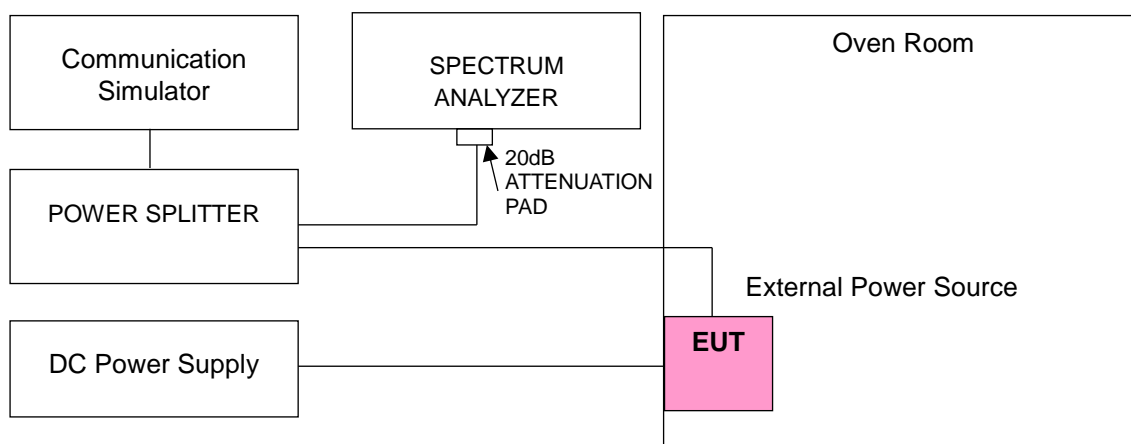
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA Band 5			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
5	826.400002	0.003	846.600003	0.003
4.25	826.400003	0.003	846.600003	0.004
5.75	826.400002	0.002	846.600001	0.002

Note: The applicant defined the normal working voltage is from 5Vdc to 5.75Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA Band 5			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	826.400003	0.004	846.600004	0.005
-30	826.400002	0.002	846.600002	0.003
-20	826.400002	0.002	846.600003	0.004
-10	826.400004	0.004	846.600002	0.003
0	826.400002	0.002	846.600002	0.003
10	826.400003	0.003	846.600003	0.003
20	826.399997	-0.004	846.599996	-0.004
30	826.399999	-0.002	846.599996	-0.005
40	826.399999	-0.002	846.599999	-0.002
50	826.399998	-0.003	846.599997	-0.004
60	826.399997	-0.004	846.599996	-0.005
70	826.399998	-0.002	846.599998	-0.003
80	826.399998	-0.002	846.599996	-0.005
85	826.399997	-0.003	846.599997	-0.004

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
5	824.700003	0.004	848.300002	0.002
4.3	824.700001	0.002	848.300003	0.004
5.75	824.700002	0.003	848.300002	0.002

Note: The applicant defined the normal working voltage is from 5Vdc to 5.75Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	824.700003	0.003	848.300001	0.001
-30	824.700001	0.002	848.300003	0.003
-20	824.700003	0.004	848.300004	0.005
-10	824.700002	0.003	848.300002	0.002
0	824.700003	0.004	848.300003	0.003
10	824.700003	0.004	848.300003	0.004
20	824.699999	-0.001	848.299997	-0.003
30	824.699996	-0.004	848.299998	-0.002
40	824.699997	-0.003	848.299998	-0.003
50	824.699998	-0.003	848.299997	-0.004
60	824.699996	-0.005	848.299999	-0.001
70	824.699998	-0.003	848.299996	-0.004
80	824.699998	-0.002	848.299997	-0.003
85	824.699996	-0.004	848.299997	-0.004

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
5	825.500001	0.002	847.500002	0.002
4.25	825.500002	0.003	847.500003	0.004
5.75	825.500003	0.004	847.500001	0.001

Note: The applicant defined the normal working voltage is from 5Vdc to 5.75Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	825.500004	0.005	847.500002	0.003
-30	825.500003	0.004	847.500003	0.003
-20	825.500003	0.004	847.500003	0.004
-10	825.500003	0.004	847.500003	0.004
0	825.500002	0.002	847.500002	0.003
10	825.500004	0.005	847.500003	0.003
20	825.499999	-0.002	847.499996	-0.004
30	825.499997	-0.004	847.499999	-0.002
40	825.499997	-0.004	847.499997	-0.004
50	825.499999	-0.002	847.499998	-0.002
50	825.499997	-0.003	847.499996	-0.004
50	825.499997	-0.004	847.499998	-0.002
50	825.499998	-0.003	847.499998	-0.002
85	825.499999	-0.002	847.499999	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
5	826.500004	0.005	846.500003	0.003
4.25	826.500003	0.004	846.500002	0.002
5.75	826.500002	0.002	846.500004	0.005

Note: The applicant defined the normal working voltage is from 5Vdc to 5.75Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	826.500002	0.002	846.500003	0.003
-30	826.500002	0.002	846.500002	0.002
-20	826.500002	0.002	846.500002	0.002
-10	826.500004	0.005	846.500004	0.004
0	826.500003	0.004	846.500002	0.002
10	826.500002	0.003	846.500001	0.001
20	826.499999	-0.002	846.499997	-0.004
30	826.499997	-0.004	846.499997	-0.003
40	826.499997	-0.004	846.499997	-0.004
50	826.499997	-0.003	846.499998	-0.002
50	826.499998	-0.002	846.499997	-0.003
50	826.499999	-0.002	846.499997	-0.004
50	826.499996	-0.004	846.499998	-0.002
85	826.499998	-0.002	846.499998	-0.003

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 5			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
5	829.000003	0.003	844.000003	0.003
4.25	829.000002	0.002	844.000001	0.001
5.75	829.000002	0.003	844.000001	0.002

Note: The applicant defined the normal working voltage is from 5Vdc to 5.75Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 5			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	829.000003	0.004	844.000002	0.002
-30	829.000003	0.004	844.000004	0.005
-20	829.000004	0.004	844.000002	0.002
-10	829.000002	0.002	844.000002	0.002
0	829.000002	0.002	844.000004	0.004
10	829.000003	0.004	844.000004	0.004
20	828.999999	-0.002	843.999997	-0.004
30	828.999997	-0.004	843.999998	-0.003
40	828.999999	-0.001	843.999999	-0.001
50	828.999999	-0.002	843.999996	-0.005
50	828.999998	-0.003	843.999999	-0.001
50	828.999998	-0.003	843.999997	-0.004
50	828.999998	-0.003	843.999997	-0.003
85	828.999998	-0.003	843.999996	-0.005

4.3 Radiated Emission Measurement

4.3.1 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 .

4.3.2 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) = $E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
ERP (dBm) = $E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8 - 2.15$; 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:

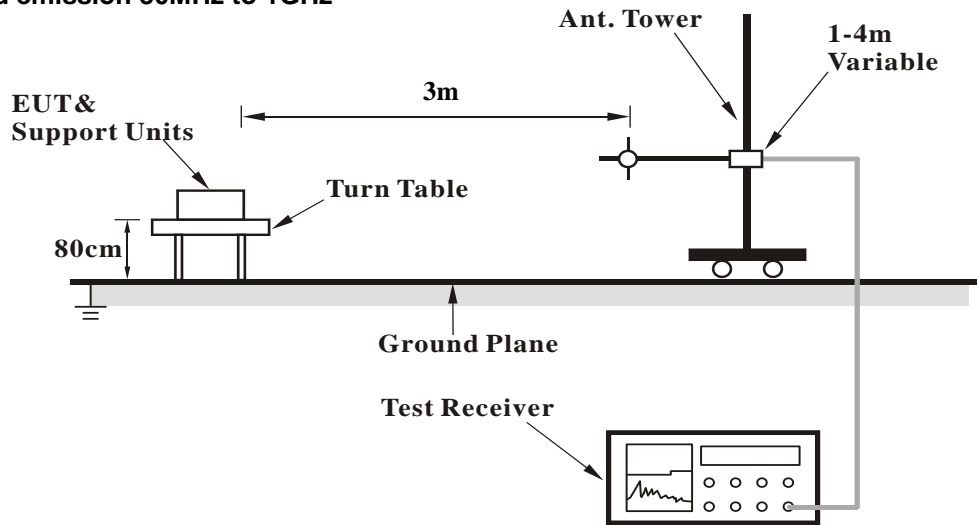
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.3.3 Deviation from Test Standard

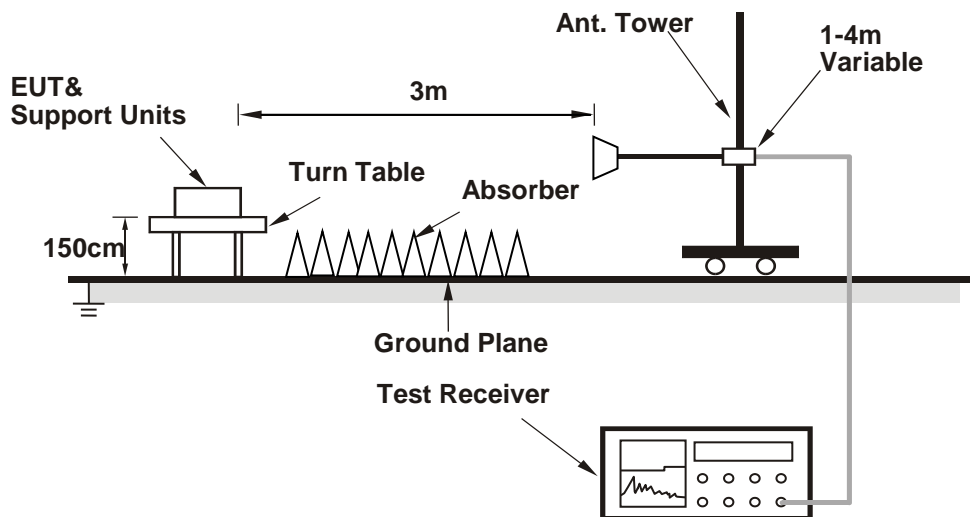
No deviation.

4.3.4 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).

4.3.5 Test Results

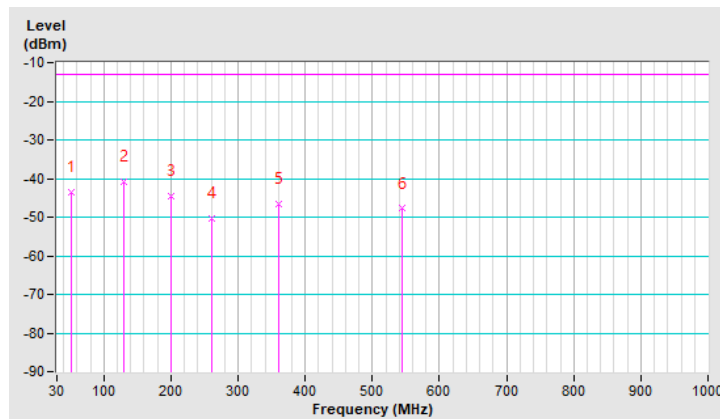
Below 1GHz
WCDMA Band 5

RF Mode	TX WCDMA Band V	Channel	CH 4233 : 846.6 MHz
Frequency Range	30MHz ~ 1GHz		

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	51.34	-43.7	-13.0	-30.7	1.50 H	74	62.2	-106.0
2	128.94	-40.9	-13.0	-27.9	1.50 H	323	66.8	-107.8
3	200.72	-44.6	-13.0	-31.6	1.50 H	323	64.6	-109.2
4	260.86	-50.2	-13.0	-37.2	1.50 H	169	56.2	-106.4
5	359.80	-46.7	-13.0	-33.7	1.50 H	316	57.2	-104.0
6	544.10	-47.8	-13.0	-34.8	1.50 H	169	53.2	-101.0

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

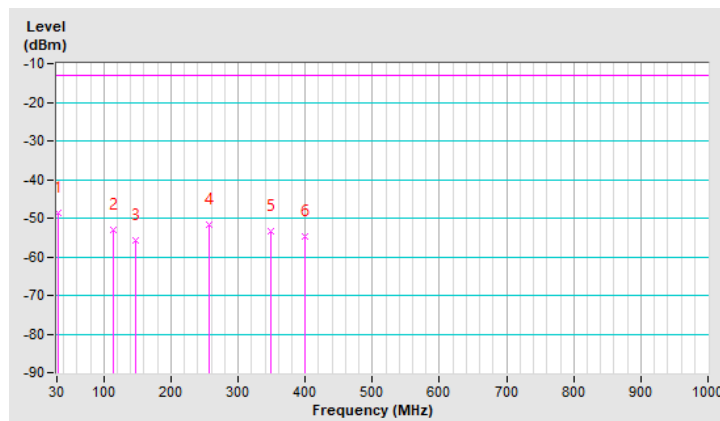


RF Mode	TX WCDMA Band V	Channel	CH 4233 : 846.6 MHz
Frequency Range	30MHz ~ 1GHz		

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	-48.8	-13.0	-35.8	1.00 V	327	59.0	-107.8
2	113.42	-52.9	-13.0	-39.9	1.50 V	115	56.3	-109.2
3	146.40	-55.7	-13.0	-42.7	1.50 V	201	50.6	-106.3
4	256.98	-51.7	-13.0	-38.7	1.50 V	174	55.0	-106.7
5	348.16	-53.5	-13.0	-40.5	1.50 V	175	50.8	-104.2
6	400.54	-54.6	-13.0	-41.6	1.00 V	140	48.9	-103.5

Remarks:

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



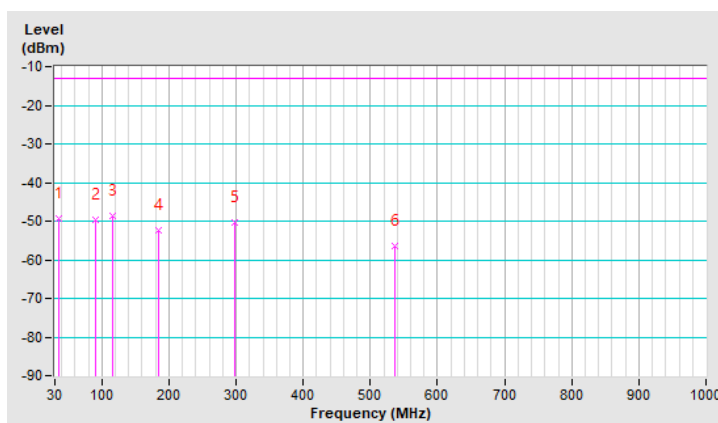
LTE Band 5, Channel Bandwidth: 1.4MHz

RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20407 : 824.7 MHz
Frequency Range	30MHz ~ 1GHz		

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	35.82	-49.2	-13.0	-36.2	1.01 H	291	58.2	-107.5
2	90.14	-49.7	-13.0	-36.7	1.01 H	240	62.0	-111.8
3	115.36	-48.6	-13.0	-35.6	1.01 H	291	60.5	-109.1
4	185.20	-52.5	-13.0	-39.5	1.01 H	298	55.8	-108.2
5	297.72	-50.2	-13.0	-37.2	1.01 H	331	54.8	-105.0
6	536.34	-56.6	-13.0	-43.6	1.50 H	218	44.4	-101.0

Remarks:

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

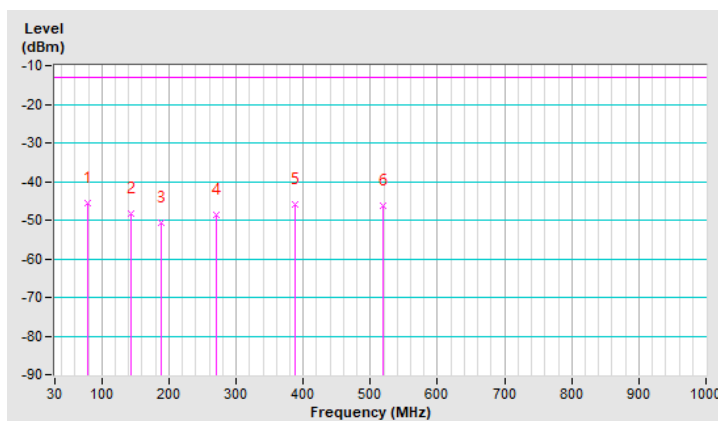


RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20407 : 824.7 MHz
Frequency Range	30MHz ~ 1GHz		

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	78.50	-45.5	-13.0	-32.5	1.00 V	51	64.6	-110.1
2	142.52	-48.2	-13.0	-35.2	1.00 V	51	58.2	-106.5
3	189.08	-50.7	-13.0	-37.7	1.50 V	48	57.9	-108.6
4	270.56	-48.7	-13.0	-35.7	1.50 V	165	57.2	-105.9
5	386.96	-45.9	-13.0	-32.9	1.00 V	184	57.6	-103.5
6	518.88	-46.4	-13.0	-33.4	1.00 V	250	54.6	-101.0

Remarks:

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



Above 1GHz
WCDMA Band 5

RF Mode	TX WCDMA Band V	Channel	CH 4132 : 826.4 MHz
Frequency Range	1GMHz ~ 18GHz		

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	-49.39	-13.00	-36.39	1.55 H	357	50.11	-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	-47.65	-13.00	-34.65	3.02 V	295	51.85	-99.50

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX WCDMA Band V	Channel	CH 4182 : 836.4 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1672.80	-49.33	-13.00	-36.33	1.44 H	8	50.11	-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	1672.80	-47.55	-13.00	-34.55	3.21 V	285	51.89	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX WCDMA Band V	Channel	CH 4233 : 846.6 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1693.20	-49.34	-13.00	-36.34	1.45 H	2	50.02	-99.36
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	1693.20	-47.34	-13.00	-34.34	3.22 V	295	52.02	-99.36

Remarks:

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

LTE Band 5

RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20407 : 824.7 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1649.40	-49.32	-13.00	-36.32	1.50 H	360	50.20	-99.52
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	1649.40	-47.42	-13.00	-34.42	3.23 V	292	52.10	-99.52

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	1GMHz ~ 18GHz		

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	-48.82	-13.00	-35.82	1.53 H	360	50.62	-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	-48.18	-13.00	-35.18	3.25 V	291	51.26	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20643 : 848.3 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1696.60	-48.93	-13.00	-35.93	1.54 H	17	50.42	-99.35
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	1696.60	-47.80	-13.00	-34.80	3.29 V	289	51.55	-99.35

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-5MHz	Channel	CH 20425 : 826.5 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1653.00	-48.84	-13.00	-35.84	1.52 H	360	50.66	-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	1653.00	-48.05	-13.00	-35.05	3.22 V	287	51.45	-99.50

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-5MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	1GMHz ~ 18GHz		

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	-48.66	-13.00	-35.66	1.48 H	13	50.78	-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	-48.29	-13.00	-35.29	3.21 V	291	51.15	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-5MHz	Channel	CH 20625 : 846.5 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1693.00	-49.10	-13.00	-36.10	1.45 H	360	50.26	-99.36
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	1693.00	-47.54	-13.00	-34.54	3.29 V	286	51.82	-99.36

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-10MHz	Channel	CH 20450 : 829 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1658.00	-48.95	-13.00	-35.95	1.49 H	15	50.54	-99.49
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	1658.00	-48.52	-13.00	-35.52	3.30 V	287	50.97	-99.49

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-10MHz	Channel	CH 20525 : 836.5 MHz
Frequency Range	1GMHz ~ 18GHz		

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	-48.88	-13.00	-35.88	1.49 H	360	50.56	-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	-48.28	-13.00	-35.28	3.25 V	291	51.16	-99.44

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + 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.

RF Mode	TX LTE Band V-10MHz	Channel	CH 20600 : 844 MHz
Frequency Range	1GMHz ~ 18GHz		

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	1688.00	-48.81	-13.00	-35.81	1.47 H	360	50.57	-99.38

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	1688.00	-47.52	-13.00	-34.52	3.26 V	291	51.86	-99.38

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
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 and approved according to ISO/IEC 17025.

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

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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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