

Partial FCC Test Report

(PART 22)

Report No.: RFBHDI-WTW-P21120081-7

FCC ID: 2ATM8EG25G

Test Model: EG25-G MINIPCIE

Received Date: Dec. 24, 2021

Test Date: Jan. 19 ~ Mar. 29, 2022

Issued Date: Apr. 22, 2022

Applicant: Hawkeye Tech Co., Ltd.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBHDI-WTW-P21120081-7	Original Release	Apr. 22, 2022

1 Certificate of Conformity

Product: LTE Module

Brand: Hawkeye Tech Co., Ltd.

Test Model: EG25-G MINIPCIE

Sample Status: Engineering Sample

Applicant: Hawkeye Tech Co., Ltd.

Test Date: Jan. 19 ~ Mar. 29, 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 : Lena Wang , Date: Apr. 22, 2022
Lena Wang / Specialist

Approved by : Jeremy Lin , Date: Apr. 22, 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	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note
2.1046 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 -30.80 dB at 30.97 MHz.

Note:

1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to SGS report no.: HR/2019/1001601 for module (Brand: Quectel, Model: EG25-G MINIPCIE)
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	9 kHz ~ 30 MHz	3.0400 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Analyzer Agilent	N9010A	MY52220207	Jan. 06, 2022	Jan. 05, 2023
Test Receiver Agilent	N9038A	MY51210203	Sep. 22, 2021	Sep. 21, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 14, 2021	Nov. 13, 2022
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Oct. 28, 2021	Oct. 27, 2022
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2021	Nov. 24, 2022
Preamplifier EMCI	EMC 012645	980115	Oct. 05, 2021	Oct. 04, 2022
Preamplifier EMCI	EMC 330H	980112	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable EMCI	EMC104-SM-SM- 8000	171005	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 05, 2021	Oct. 04, 2022
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 24, 2021	Dec. 23, 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 HwaYa Chamber 10.

3 General Information

3.1 General Description of EUT

Product	LTE Module		
Brand	Hawkeye Tech Co., Ltd.		
Test Model	EG25-G MINIPCIE		
Status of EUT	Engineering Sample		
Power Supply Rating	48Vdc (Adapter and PoE)		
Modulation Type	GSM/GPRS	GMSK	
	EDGE	GMSK, 8PSK	
	WCDMA	QPSK	
	LTE	QPSK, 16QAM	
Frequency Range	GSM/GPRS/EDGE	824.2 ~ 848.8 MHz	
	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	
Max. ERP Power	GSM/GPRS	1188.502 mW (30.75dBm)	
	WCDMA	152.405 mW (21.83dBm)	
		QPSK	16QAM
	LTE 5 (Channel Bandwidth: 1.4 MHz)	143.219 mW (21.56dBm)	98.855 mW (19.95dBm)
	LTE 5 (Channel Bandwidth: 3 MHz)	140.281 mW (21.47dBm)	101.859 mW (20.08dBm)
	LTE 5 (Channel Bandwidth: 5 MHz)	140.281 mW (21.47dBm)	99.541 mW (19.98dBm)
	LTE 5 (Channel Bandwidth: 10 MHz)	142.233 mW (21.53dBm)	106.660 mW (20.28dBm)
	LTE 26 (Channel Bandwidth: 1.4 MHz)	121.339 mW (20.84dBm)	94.406 mW (19.75dBm)
	LTE 26 (Channel Bandwidth: 3 MHz)	127.057 mW (21.04dBm)	96.828 mW (19.86dBm)
	LTE 26 (Channel Bandwidth: 5 MHz)	130.617 mW (21.16dBm)	95.940 mW (19.82dBm)
	LTE 26 (Channel Bandwidth: 10 MHz)	132.739 mW (21.23dBm)	98.175 mW (19.92dBm)
	LTE 26 (Channel Bandwidth: 15 MHz)	133.968 mW (21.27dBm)	95.719 mW (19.81dBm)

Antenna Type	Dipole Antenna with 0.3 dBi gain
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT was installed in a specific End-product.

Product	Brand	Model	FCC ID
veeaHub	veeaHub	VHH09-4GL	2ARXKVHE09-4GL

2. The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	EDAC Power Electronics Co., Ltd.	EA1062SGR-480	I/P: 100-240 Vac, 50/60 Hz, 2.5A O/P: 48 Vdc, 1.35 A 1.2m DC cable with 1 core

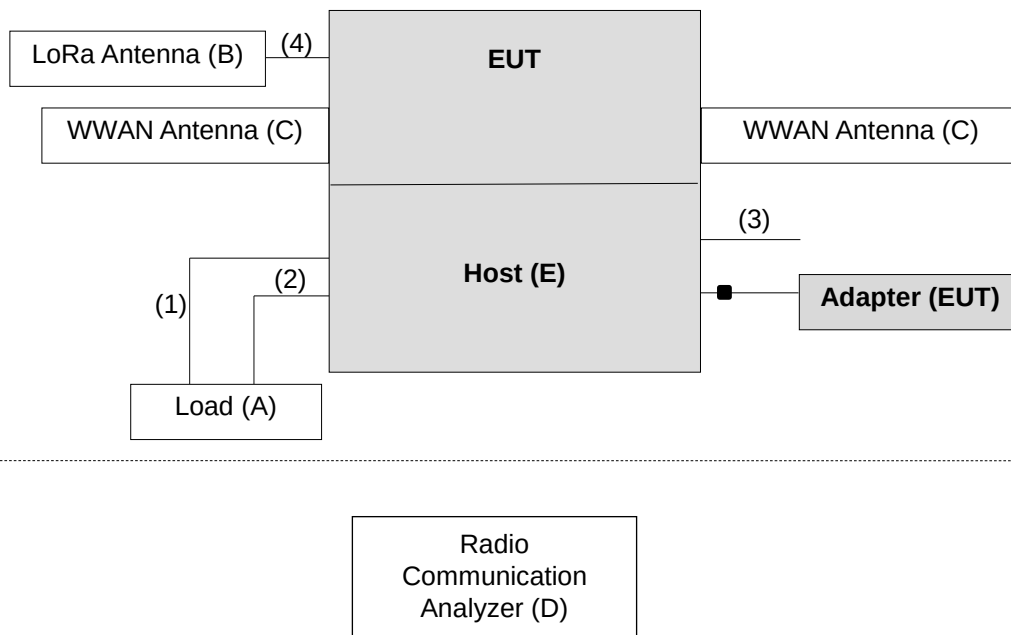
3. The End-product use following devices (Support unit).

Product	Brand	Model	Description
PoE	N/A	APOE02-WM	O/P: 48 Vdc

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

<Radiated Emission Test> & <E.R.P. 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.	Load	NA	NA	NA	NA	-
B.	LoRa Antenna	PCTEL	MFB9155NF	NA	NA	Provided by manufacturer
C.	WWAN Antenna	2J	2J2124W -C315N	NA	NA	Provided by manufacturer
D.	Radio Communication Analyzer	Anritsu	MT8820C	6201010284	NA	-
E.	veeaHub		VHE09XXXXX (X=A-Z, 0-9, blank or "-")	NA	2ARXKVHE09-4GL	Provided by manufacturer

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	0.4	N	0	RJ45, Cat5e
2.	LAN cable	1	0.4	N	0	RJ45, Cat5e
3.	RS232 cable	1	0.4	Y	0	-
4.	Coaxial cable	1	1.5	Y	0	-

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, antenna degree 90° and 180°, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	Radiated Emission
GSM	X-axis
WCDMA	X-axis
LTE Band 5	X-axis

GSM

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128, 189, 251	GSM, EDGE
-	Radiated Emission	128 to 251	128	GSM, EDGE

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
-	Radiated Emission	4132 to 4233	4132	WCDMA

LTE Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407, 20525, 20643	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20425 to 20625	20425, 20525, 20625	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20450 to 20600	20450, 20525, 20600	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Radiated Emission	20407 to 20643	20407	1.4 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation and RB configurations according to Module report worst maximum output power.
2. For radiated emission, select the worst radiated emission channel for final testing.

LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	26797 to 27033	26797, 26915, 27033	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26805 to 27025	26805, 26915, 27025	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26815 to 27015	26815, 26915, 27015	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26840 to 26990	26840, 26915, 26990	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		26865 to 26965	26865, 26915, 26965	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	120 Vac, 60 Hz	Vincent Chen
Radiated Emission	23 deg. C, 65 % RH	120 Vac, 60 Hz	Vincent Chen

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:

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 GSM, 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.

Maximum EIRP / ERP

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

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

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

where

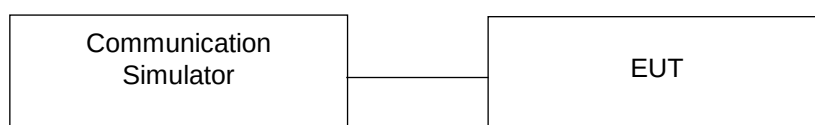
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	32.60	32.44	32.58
EDGE (8PSK, 1Tx-slot)	28.27	28.12	28.30

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.68	23.62	23.61
HSDPA Subtest-1	22.69	22.76	22.75
HSUPA Subtest-1	22.18	22.24	22.24

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	23.03	22.58	22.98
		1	2	23.41	22.72	23.13
		1	5	23.09	22.64	22.99
		3	0	22.86	22.51	22.95
		3	1	22.85	22.56	22.96
		3	3	22.82	22.52	22.82
		6	0	21.80	21.53	21.84
	16QAM	1	0	21.76	21.66	21.73
		1	2	21.80	21.67	21.78
		1	5	21.61	21.51	21.55
		3	0	21.62	21.54	21.51
		3	1	21.41	21.44	21.33
		3	3	21.40	21.49	21.32
		6	0	20.25	20.42	20.34
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	23.17	22.55	23.04
		1	7	23.32	22.94	23.30
		1	14	23.29	22.86	23.28
		8	0	22.09	21.61	22.17
		8	3	22.14	21.69	22.27
		8	7	22.03	21.64	22.22
		15	0	22.02	21.64	22.32
	16QAM	1	0	21.89	21.44	21.71
		1	7	21.93	21.23	21.83
		1	14	21.64	21.18	21.64
		8	0	21.11	20.64	21.16
		8	3	21.28	20.84	21.27
		8	7	21.13	20.75	21.23
		15	0	21.08	20.80	21.25

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	22.92	22.33	22.86
		1	12	23.32	22.76	23.25
		1	24	23.24	22.67	23.19
		12	0	22.14	21.56	22.03
		12	6	22.18	21.61	22.18
		12	13	22.09	21.63	22.22
		25	0	22.01	21.59	22.13
	16QAM	1	0	21.80	21.42	21.78
		1	12	21.83	21.47	21.75
		1	24	21.15	20.87	21.25
		12	0	20.76	20.43	20.71
		12	6	20.77	20.49	20.71
		12	13	21.03	20.80	21.05
		25	0	20.59	20.48	20.82
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	23.03	22.43	22.72
		1	24	23.38	22.74	23.04
		1	49	23.31	22.86	23.06
		25	0	21.98	21.45	21.70
		25	12	22.16	21.59	21.86
		25	25	22.09	21.64	22.01
		50	0	21.81	21.47	21.86
	16QAM	1	0	21.87	21.37	21.68
		1	24	22.13	21.47	21.78
		1	49	21.80	21.73	22.06
		25	0	20.71	20.46	20.92
		25	12	20.97	20.79	21.32
		25	25	20.88	20.72	21.28
		50	0	20.70	20.64	21.24

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26797	26915	27033
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	22.52	22.27	22.58
		1	2	22.69	22.35	22.52
		1	5	22.40	22.24	22.68
		3	0	22.22	22.18	22.52
		3	1	22.23	22.30	22.56
		3	3	22.13	22.23	22.40
		6	0	21.01	21.20	21.33
	16QAM	1	0	21.48	21.27	21.43
		1	2	21.60	21.38	21.54
		1	5	21.37	21.20	21.26
		3	0	21.31	21.15	21.18
		3	1	21.29	21.25	21.29
		3	3	21.18	21.23	21.25
		6	0	20.26	20.26	20.20
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26805	26915	27025
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	22.63	22.40	22.65
		1	7	22.89	22.61	22.73
		1	14	22.49	22.42	22.67
		8	0	21.35	21.39	21.70
		8	3	21.32	21.48	21.83
		8	7	21.23	21.42	21.86
		15	0	21.02	21.30	21.82
	16QAM	1	0	21.52	21.04	21.37
		1	7	21.71	21.23	21.53
		1	14	21.36	21.08	21.67
		8	0	20.55	20.36	20.86
		8	3	20.57	20.35	20.81
		8	7	20.67	20.43	20.91
		15	0	20.61	20.37	20.81

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26815	26915	27015
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	22.53	22.22	22.50
		1	12	23.01	22.77	22.97
		1	24	22.77	22.48	22.74
		12	0	21.45	21.20	21.50
		12	6	21.54	21.36	21.75
		12	13	21.57	21.40	21.83
		25	0	21.52	21.35	21.72
	16QAM	1	0	21.43	21.08	21.40
		1	12	21.67	21.48	21.63
		1	24	21.50	21.16	21.43
		12	0	20.62	20.23	20.54
		12	6	20.51	20.16	20.39
		12	13	20.35	20.12	20.39
		25	0	20.55	20.31	20.49
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26840	26915	26990
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	22.65	22.36	22.52
		1	24	23.08	22.79	23.05
		1	49	22.92	22.68	22.91
		25	0	21.41	21.29	21.56
		25	12	21.50	21.46	21.64
		25	25	21.50	21.41	21.51
		50	0	21.45	21.35	21.38
	16QAM	1	0	21.46	21.31	21.47
		1	24	21.77	21.51	21.56
		1	49	21.17	21.22	21.36
		25	0	20.31	20.31	20.46
		25	12	20.37	20.36	20.49
		25	25	20.34	20.40	20.43
		50	0	20.19	20.33	20.45

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26865	26915	26965
		Frequency (MHz)		831.5	836.5	841.5
15M	QPSK	1	0	22.49	22.29	22.32
		1	37	23.12	22.88	22.82
		1	74	22.86	22.66	22.53
		36	0	21.38	21.29	21.12
		36	19	21.45	21.37	21.10
		36	39	21.30	21.32	21.15
		75	0	21.12	21.25	21.07
	16QAM	1	0	21.43	21.36	21.38
		1	37	21.66	21.49	21.49
		1	74	21.16	21.24	21.19
		36	0	20.17	20.28	20.14
		36	19	20.18	20.32	20.28
		36	39	20.05	20.26	20.28
		75	0	20.23	20.42	20.37

ERP Power (dBm)

Band	GSM850		
Channel	128	189	251
Frequency (MHz)	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	30.75	30.59	30.73
EDGE (8PSK, 1Tx-slot)	26.42	26.27	26.45

*ERP = Conducted + antenna gain (0.3dBi)-2.15

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	21.83	21.77	21.76
HSDPA Subtest-1	20.84	20.91	20.90
HSUPA Subtest-1	20.33	20.39	20.39

*ERP = Conducted + antenna gain (0.3dBi)-2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	21.18	20.73	21.13
		1	2	21.56	20.87	21.28
		1	5	21.24	20.79	21.14
		3	0	21.01	20.66	21.10
		3	1	21.00	20.71	21.11
		3	3	20.97	20.67	20.97
		6	0	19.95	19.68	19.99
	16QAM	1	0	19.91	19.81	19.88
		1	2	19.95	19.82	19.93
		1	5	19.76	19.66	19.70
		3	0	19.77	19.69	19.66
		3	1	19.56	19.59	19.48
		3	3	19.55	19.64	19.47
		6	0	18.40	18.57	18.49
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	21.32	20.70	21.19
		1	7	21.47	21.09	21.45
		1	14	21.44	21.01	21.43
		8	0	20.24	19.76	20.32
		8	3	20.29	19.84	20.42
		8	7	20.18	19.79	20.37
		15	0	20.17	19.79	20.47
	16QAM	1	0	20.04	19.59	19.86
		1	7	20.08	19.38	19.98
		1	14	19.79	19.33	19.79
		8	0	19.26	18.79	19.31
		8	3	19.43	18.99	19.42
		8	7	19.28	18.90	19.38
		15	0	19.23	18.95	19.40

*ERP = Conducted + antenna gain (0.3dBi)-2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	21.07	20.48	21.01
		1	12	21.47	20.91	21.40
		1	24	21.39	20.82	21.34
		12	0	20.29	19.71	20.18
		12	6	20.33	19.76	20.33
		12	13	20.24	19.78	20.37
		25	0	20.16	19.74	20.28
	16QAM	1	0	19.95	19.57	19.93
		1	12	19.98	19.62	19.90
		1	24	19.30	19.02	19.40
		12	0	18.91	18.58	18.86
		12	6	18.92	18.64	18.86
		12	13	19.18	18.95	19.20
		25	0	18.74	18.63	18.97
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	21.18	20.58	20.87
		1	24	21.53	20.89	21.19
		1	49	21.46	21.01	21.21
		25	0	20.13	19.60	19.85
		25	12	20.31	19.74	20.01
		25	25	20.24	19.79	20.16
		50	0	19.96	19.62	20.01
	16QAM	1	0	20.02	19.52	19.83
		1	24	20.28	19.62	19.93
		1	49	19.95	19.88	20.21
		25	0	18.86	18.61	19.07
		25	12	19.12	18.94	19.47
		25	25	19.03	18.87	19.43
		50	0	18.85	18.79	19.39

*ERP = Conducted + antenna gain (0.3dBi)-2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26797	26915	27033
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	20.67	20.42	20.73
		1	2	20.84	20.50	20.67
		1	5	20.55	20.39	20.83
		3	0	20.37	20.33	20.67
		3	1	20.38	20.45	20.71
		3	3	20.28	20.38	20.55
		6	0	19.16	19.35	19.48
	16QAM	1	0	19.63	19.42	19.58
		1	2	19.75	19.53	19.69
		1	5	19.52	19.35	19.41
		3	0	19.46	19.30	19.33
		3	1	19.44	19.40	19.44
		3	3	19.33	19.38	19.40
		6	0	18.41	18.41	18.35
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26805	26915	27025
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	20.78	20.55	20.80
		1	7	21.04	20.76	20.88
		1	14	20.64	20.57	20.82
		8	0	19.50	19.54	19.85
		8	3	19.47	19.63	19.98
		8	7	19.38	19.57	20.01
		15	0	19.17	19.45	19.97
	16QAM	1	0	19.67	19.19	19.52
		1	7	19.86	19.38	19.68
		1	14	19.51	19.23	19.82
		8	0	18.70	18.51	19.01
		8	3	18.72	18.50	18.96
		8	7	18.82	18.58	19.06
		15	0	18.76	18.52	18.96

*ERP = Conducted + antenna gain (0.3dBi)-2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26815	26915	27015
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	20.68	20.37	20.65
		1	12	21.16	20.92	21.12
		1	24	20.92	20.63	20.89
		12	0	19.60	19.35	19.65
		12	6	19.69	19.51	19.90
		12	13	19.72	19.55	19.98
		25	0	19.67	19.50	19.87
	16QAM	1	0	19.58	19.23	19.55
		1	12	19.82	19.63	19.78
		1	24	19.65	19.31	19.58
		12	0	18.77	18.38	18.69
		12	6	18.66	18.31	18.54
		12	13	18.50	18.27	18.54
		25	0	18.70	18.46	18.64
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26840	26915	26990
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	20.80	20.51	20.67
		1	24	21.23	20.94	21.20
		1	49	21.07	20.83	21.06
		25	0	19.56	19.44	19.71
		25	12	19.65	19.61	19.79
		25	25	19.65	19.56	19.66
		50	0	19.60	19.50	19.53
	16QAM	1	0	19.61	19.46	19.62
		1	24	19.92	19.66	19.71
		1	49	19.32	19.37	19.51
		25	0	18.46	18.46	18.61
		25	12	18.52	18.51	18.64
		25	25	18.49	18.55	18.58
		50	0	18.34	18.48	18.60

*ERP = Conducted + antenna gain (0.3dBi)-2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26865	26915	26965
		Frequency (MHz)		831.5	836.5	841.5
15M	QPSK	1	0	20.64	20.44	20.47
		1	37	21.27	21.03	20.97
		1	74	21.01	20.81	20.68
		36	0	19.53	19.44	19.27
		36	19	19.60	19.52	19.25
		36	39	19.45	19.47	19.30
		75	0	19.27	19.40	19.22
	16QAM	1	0	19.58	19.51	19.53
		1	37	19.81	19.64	19.64
		1	74	19.31	19.39	19.34
		36	0	18.32	18.43	18.29
		36	19	18.33	18.47	18.43
		36	39	18.20	18.41	18.43
		75	0	18.38	18.57	18.52

*ERP = Conducted + antenna gain (0.3dBi)-2.15

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 is equal to -13 dBm.

4.2.2 Test Procedure

- a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. 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.
- c. 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.

NOTE:

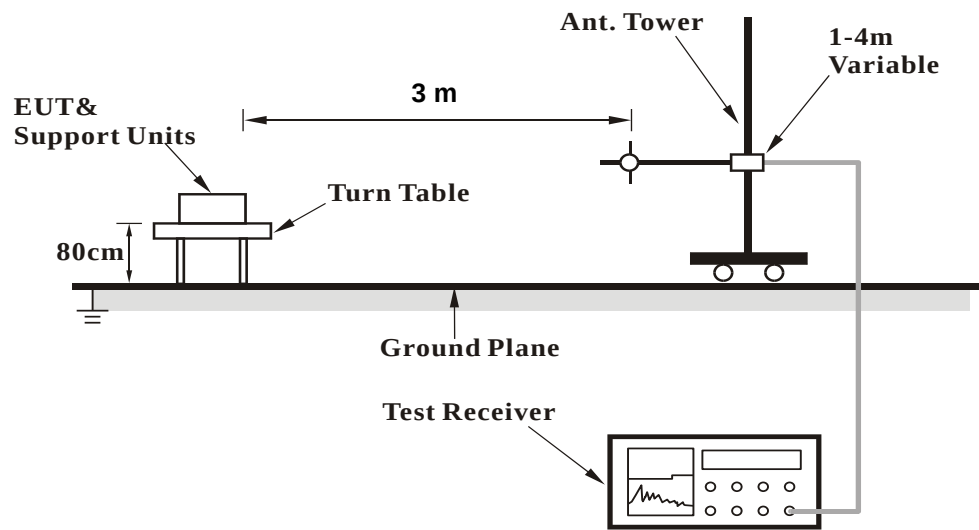
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. 9 kHz ~ 30 MHz Data:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.2.3 Deviation from Test Standard

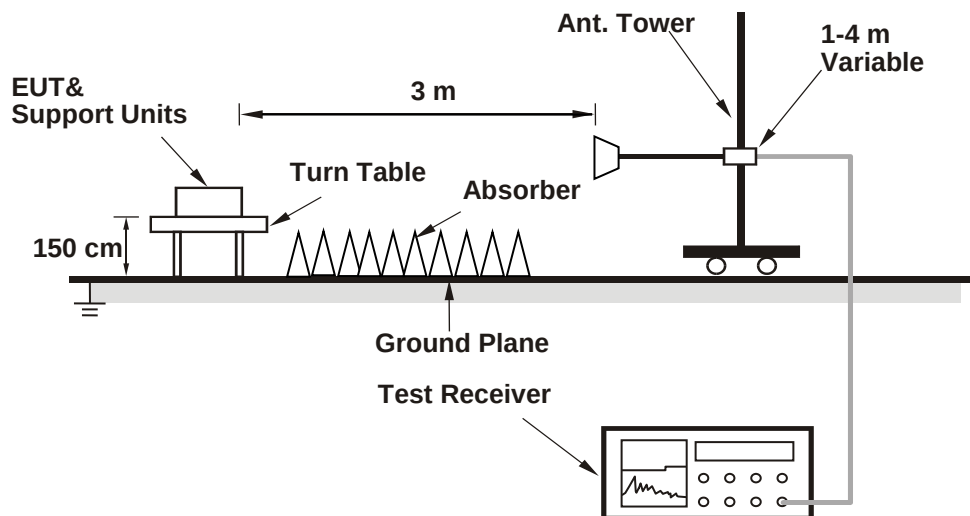
No deviation.

4.2.4 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).

4.2.5 Test Results

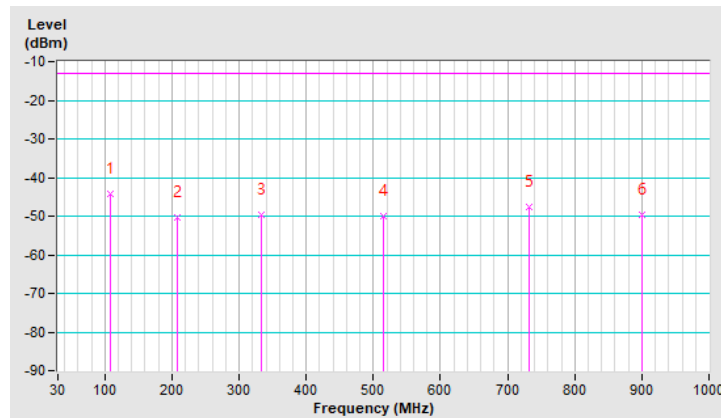
Below 1GHz

RF Mode	TX GSM 850	Channel	CH 128 : 824.2 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	107.60	-44.28	-13.00	-31.28	1.98 H	229	68.52	-112.80
2	207.51	-50.29	-13.00	-37.29	2.20 H	76	63.34	-113.63
3	332.64	-49.75	-13.00	-36.75	1.78 H	233	58.45	-108.20
4	515.97	-50.05	-13.00	-37.05	3.23 H	93	53.18	-103.23
5	732.28	-47.51	-13.00	-34.51	1.52 H	264	51.03	-98.54
6	901.06	-49.67	-13.00	-36.67	1.44 H	74	46.18	-95.85

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.

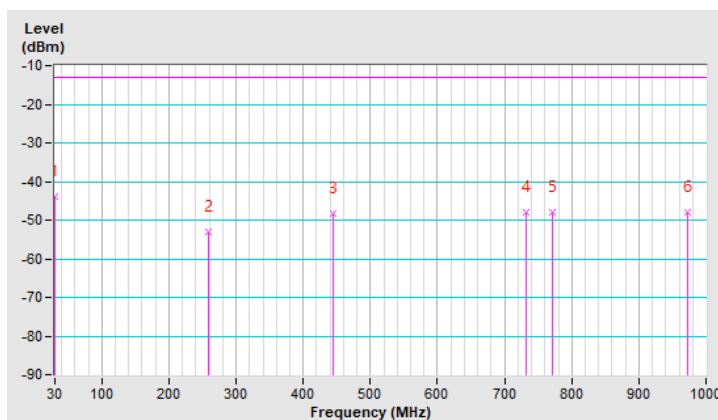


RF Mode	TX GSM 850	Channel	CH 128 : 824.2 MHz
Frequency Range	30MHz ~ 1GHz		

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	30.97	-43.80	-13.00	-30.80	2.00 V	305	67.93	-111.73
2	258.92	-53.18	-13.00	-40.18	2.00 V	331	58.47	-111.65
3	444.19	-48.20	-13.00	-35.20	2.00 V	18	56.65	-104.85
4	731.31	-47.81	-13.00	-34.81	2.00 V	284	50.76	-98.57
5	771.08	-48.12	-13.00	-35.12	2.00 V	179	49.40	-97.52
6	971.87	-47.94	-13.00	-34.94	2.00 V	179	46.45	-94.39

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.

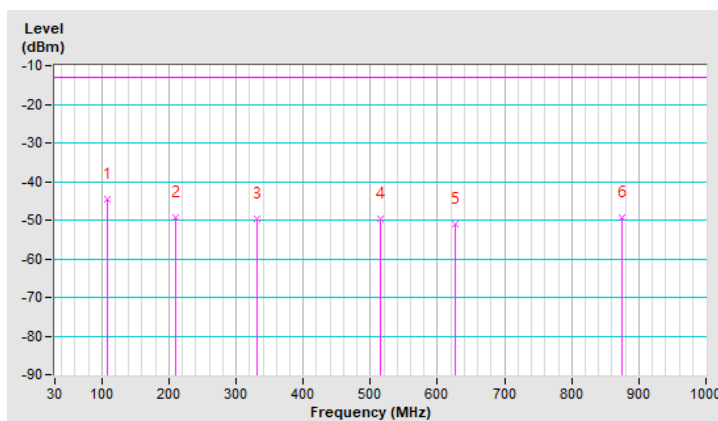


RF Mode	TX WCDMA Band V	Channel	CH 4132 : 826.4 MHz
Frequency Range	30MHz ~ 1GHz		

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	107.60	-44.45	-13.00	-31.45	1.44 H	228	68.35	-112.80
2	209.45	-49.28	-13.00	-36.28	1.77 H	88	64.37	-113.65
3	330.70	-49.54	-13.00	-36.54	2.23 H	237	58.73	-108.27
4	515.00	-49.82	-13.00	-36.82	1.09 H	107	53.44	-103.26
5	625.58	-51.04	-13.00	-38.04	2.00 H	247	49.20	-100.24
6	874.87	-49.21	-13.00	-36.21	2.22 H	66	46.81	-96.02

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.

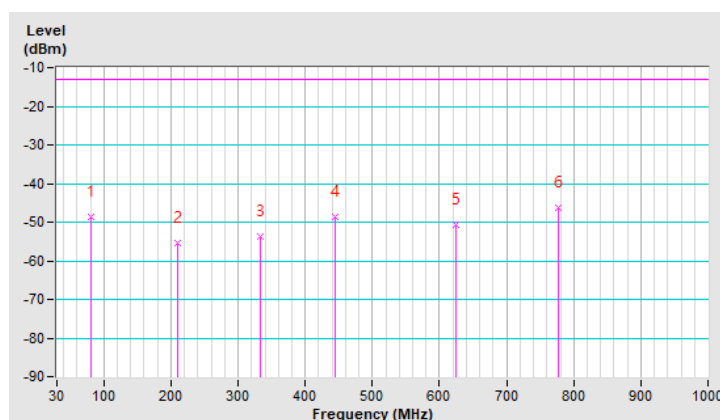


RF Mode	TX WCDMA Band V	Channel	CH 4132 : 826.4 MHz
Frequency Range	30MHz ~ 1GHz		

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	81.41	-48.60	-13.00	-35.60	1.87 V	333	66.73	-115.33
2	210.42	-55.26	-13.00	-42.26	1.63 V	327	58.40	-113.66
3	333.61	-53.63	-13.00	-40.63	1.74 V	106	54.54	-108.17
4	444.19	-48.73	-13.00	-35.73	2.22 V	17	56.12	-104.85
5	624.61	-50.58	-13.00	-37.58	1.36 V	272	49.69	-100.27
6	776.90	-46.30	-13.00	-33.30	2.02 V	180	51.16	-97.46

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.

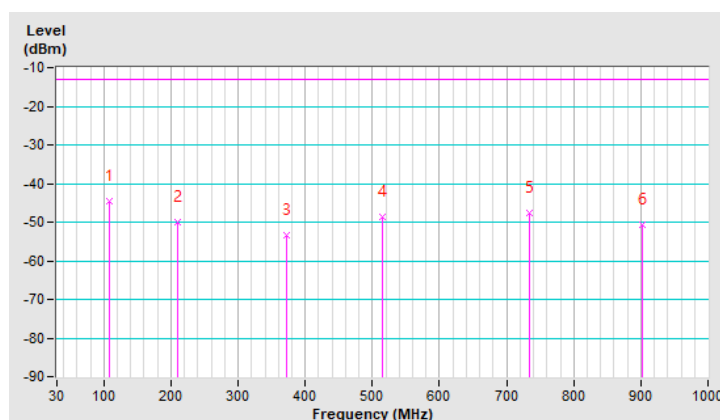


RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20407 : 824.7 MHz
Frequency Range	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : 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	107.60	-44.68	-13.00	-31.68	1.78 H	236	68.12	-112.80
2	209.45	-50.03	-13.00	-37.03	2.06 H	82	63.62	-113.65
3	372.41	-53.24	-13.00	-40.24	1.88 H	152	53.94	-107.18
4	515.00	-48.67	-13.00	-35.67	1.69 H	107	54.59	-103.26
5	734.22	-47.54	-13.00	-34.54	2.32 H	270	50.91	-98.45
6	902.03	-50.78	-13.00	-37.78	1.27 H	79	45.02	-95.80

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.

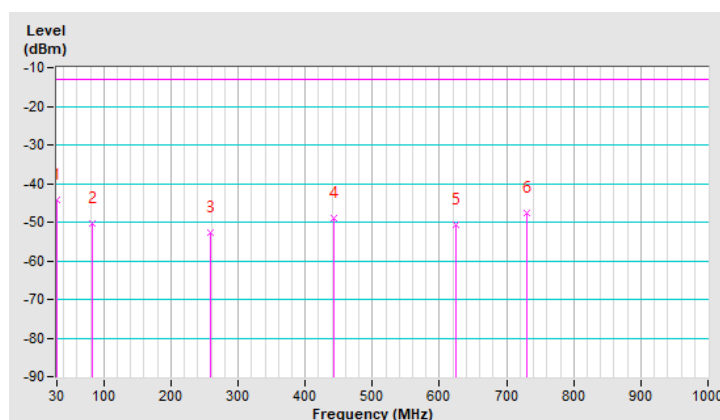


RF Mode	TX LTE Band V-1.4MHz	Channel	CH 20407 : 824.7 MHz
Frequency Range	30MHz ~ 1GHz		

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	30.00	-44.25	-13.00	-31.25	1.98 V	302	67.14	-111.39
2	82.38	-50.19	-13.00	-37.19	2.40 V	330	65.24	-115.43
3	258.92	-52.77	-13.00	-39.77	1.32 V	333	58.88	-111.65
4	442.25	-48.82	-13.00	-35.82	2.24 V	7	56.03	-104.85
5	624.61	-50.72	-13.00	-37.72	1.08 V	278	49.55	-100.27
6	730.34	-47.47	-13.00	-34.47	1.96 V	279	51.15	-98.62

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

RF Mode	TX GSM 850	Channel	CH 128 : 824.2 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	1648.40	-53.00	-13.00	-40.00	2.00 H	294	69.20	-122.20
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1648.40	-49.91	-13.00	-36.91	1.97 V	78	72.29	-122.20

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 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	-49.77	-13.00	-36.77	1.23 H	123	72.43	-122.20
Antenna Polarity & Test Distance : Vertical at 3m								
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	-48.97	-13.00	-35.97	1.56 V	243	73.23	-122.20

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	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	-49.68	-13.00	-36.68	1.00 H	62	72.52	-122.20
Antenna Polarity & Test Distance : Vertical at 3m								
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	-48.38	-13.00	-35.38	1.80 V	283	73.82	-122.20

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 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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