

Partial FCC Test Report

(Part 27: LTE Band 7, 38, 41)

Report No.: RFBHDI-WTW-P22040138-2

FCC ID: 2ATM8EG25G

Test Model: EG25-G MINIPCIE

Received Date: Apr. 15, 2022

Test Date: Apr. 15 ~ Apr. 18, 2022

Issued Date: Sep. 07, 2022

Applicant: Hawkeye Tech Co., Ltd.

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

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Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
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FCC Registration /

Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBHDI-WTW-P22040138-2	Original Release	Sep. 07, 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: Apr. 15 ~ Apr. 18, 2022
Standards: FCC Part 27, Subpart C, M

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 : _____, **Date:** Sep. 07, 2022
Pettie Chen / Senior Specialist



Approved by : _____, **Date:** Sep. 07, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(h)(2)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note
2.1055 27.54	Frequency Stability	N/A	Refer to Note
2.1049	Occupied Bandwidth	N/A	Refer to Note
--	Peak to Average Ratio	N/A	Refer to Note
27.53(m)(4)(6)	Out-of-Band Emissions Measurements	N/A	Refer to Note
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	N/A	Refer to Note
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.93 dB at 35.82 MHz.

Note:

1. This report is a partial report. Therefore, only test item of Equivalent Isotropic Radiated Power / Effective Isotropic Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch 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	3.04 dB
	30 MHz ~ 200 MHz	3.59 dB
	200 MHz ~ 1000 MHz	3.60 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	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	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 16, 2022	Feb. 15, 2023
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM- SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 12, 2021	Jul. 11, 2022
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2021	May 31, 2022
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	376	43860087WS	Feb. 20, 2022	Feb. 19, 2023
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 9.

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	3.8Vdc (Host equipment)		
Modulation Type	QPSK, 16QAM		
Frequency Range	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz	
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz	
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz	
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz	
	LTE Band 38 (Channel Bandwidth: 5 MHz)	2572.5 ~ 2617.5 MHz	
	LTE Band 38 (Channel Bandwidth: 10 MHz)	2575.0 ~ 2615.0 MHz	
	LTE Band 38 (Channel Bandwidth: 15 MHz)	2577.5 ~ 2612.5 MHz	
	LTE Band 38 (Channel Bandwidth: 20 MHz)	2580.0 ~ 2610.0 MHz	
	LTE Band 41 (Channel Bandwidth: 5 MHz)	2498.5 ~ 2687.5 MHz	
	LTE Band 41 (Channel Bandwidth: 10 MHz)	2501.0 ~ 2685.0 MHz	
	LTE Band 41 (Channel Bandwidth: 15 MHz)	2503.5 ~ 2682.5 MHz	
	LTE Band 41 (Channel Bandwidth: 20 MHz)	2506.0 ~ 2680.0 MHz	
	Max. EIRP Power		QPSK
LTE Band 7 (Channel Bandwidth: 5 MHz)		308.319mW (24.89dBm)	237.684mW (23.76dBm)
LTE Band 7 (Channel Bandwidth: 10 MHz)		318.420mW (25.03dBm)	250.611mW (23.99dBm)
LTE Band 7 (Channel Bandwidth: 15 MHz)		358.922mW (25.55dBm)	276.058mW (24.41dBm)
LTE Band 7 (Channel Bandwidth: 20 MHz)		315.500mW (24.99dBm)	248.313mW (23.95dBm)
LTE Band 38 (Channel Bandwidth: 5 MHz)		297.852mW (24.74dBm)	236.592mW (23.74dBm)
LTE Band 38 (Channel Bandwidth: 10 MHz)		301.301mW (24.79dBm)	233.346mW (23.68dBm)
LTE Band 38 (Channel Bandwidth: 15 MHz)		304.089mW (24.83dBm)	231.206mW (23.64dBm)
LTE Band 38 (Channel Bandwidth: 20 MHz)		303.389mW (24.82dBm)	239.332mW (23.79dBm)
LTE Band 41 (Channel Bandwidth: 5 MHz)		316.228mW (25.00dBm)	241.546mW (23.83dBm)
LTE Band 41 (Channel Bandwidth: 10 MHz)		311.889mW (24.94dBm)	243.220mW (23.86dBm)
LTE Band 41 (Channel Bandwidth: 15 MHz)		314.051mW (24.97dBm)	247.742mW (23.94dBm)
LTE Band 41 (Channel Bandwidth: 20 MHz)		313.329mW (24.96dBm)	247.172mW (23.93dBm)
Antenna Type		Dipole Antenna with 2.3 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	VHH10XXX (X=A-Z, 0-9, blank or "-")	2ARXKVHH10

2. The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	EDACPOWER ELEC.	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).

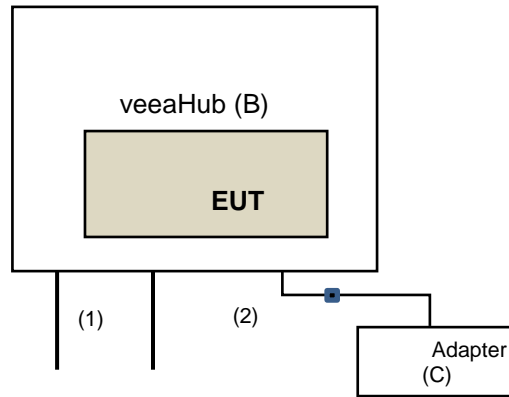
Product	Brand	Model	Description
PoE	OPEN-MESH	APOE02-WM	O/P: 48 Vdc

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.

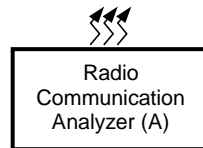
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

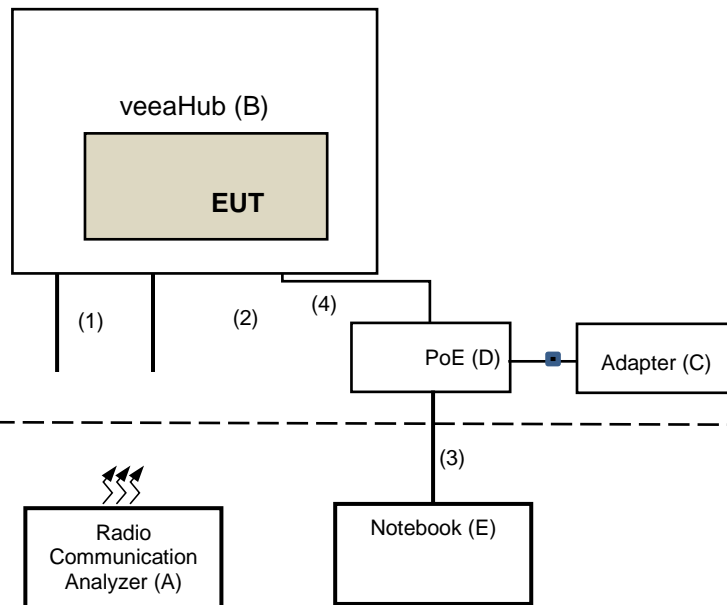
Test Mode A



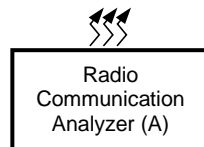
Under Table



Test Mode B



Under Table



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	MT8820C	6201240432	NA	-
B.	veeaHub		VHH10	NA	NA	-
C.	Adapter	EDACPOWER ELEC.	EA1062SGR-480	NA	NA	Supplied by applicant
D.	PoE	OPEN-MESH	APOE02-WM	NA	NA	Supplied by applicant
E.	Notebook	DELL	Inspiron 14R	NA	NA	

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.	RS232 Cable	1	0.5	N	0	Supplied by applicant
2.	LAN Cable	2	0.5	N	0	Supplied by applicant
3.	LAN Cable	1	10	N	0	Provided by Lab
4.	LAN Cable	1	0.5	N	0	Supplied by applicant

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

EUT Configure Mode	Description
A	Power from adapter
B	Power from PoE

Band	Radiated Emission
LTE Band 41	Z-axis

LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	EIRP	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5 MHz	QPSK, 16QAM	1 Half Full
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10 MHz	QPSK, 16QAM	1 Half Full
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15 MHz	QPSK, 16QAM	1 Half Full
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20 MHz	QPSK, 16QAM	1 Half Full

LTE Band 38

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	EIRP	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5 MHz	QPSK, 16QAM	1 Half Full
		37800 to 38200	37800 (2575.0MHz), 38000 (2595.0MHz), 38200 (2615.0MHz)	10 MHz	QPSK, 16QAM	1 Half Full
		37825 to 38175	37825 (2577.5MHz), 38000 (2595.0MHz), 38175 (2612.5MHz)	15 MHz	QPSK, 16QAM	1 Half Full
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20 MHz	QPSK, 16QAM	1 Half Full

LTE Band 41

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	EIRP	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5 MHz	QPSK, 16QAM	1 Half Full
		39700 to 41540	39700 (2501.0MHz), 40620 (2593.0MHz), 41540 (2685.0MHz)	10 MHz	QPSK, 16QAM	1 Half Full
		39725 to 41515	39725 (2503.5MHz), 40620 (2593.0MHz), 41515 (2682.5MHz)	15 MHz	QPSK, 16QAM	1 Half Full
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20 MHz	QPSK, 16QAM	1 Half Full
A, B	Radiated Emission Below 1GHz	39675 to 41565	40620 (2593.0MHz)	5 MHz	QPSK	1
A	Radiated Emission Above 1GHz	39675 to 41565	40620 (2593.0MHz)	5 MHz	QPSK	1

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25 deg. C, 65 % RH	3.8 Vdc	Charles Hsiao
Radiated Emission	22 deg. C, 70 % RH	120 Vac, 60 Hz	Greg Lin Rex Wang

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

3.1 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 27

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

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2 watts transmitter output power” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

Conducted Power Measurement:

- The EUT was set up for the maximum power with 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:

$$\text{EIRP} = P_{\text{Meas}} + G_{\text{T}}$$

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

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)

LTE Band 7						
BW	MCS Index	Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	22.33	22.26	22.23
		1	12	22.57	22.59	22.47
		1	24	22.15	22.01	21.92
		12	0	21.26	21.12	21.17
		12	6	21.36	21.30	21.17
		12	13	21.17	21.19	21.14
		25	0	21.21	21.19	21.16
	16QAM	1	0	21.16	21.16	21.22
		1	12	21.43	21.46	21.45
		1	24	21.02	20.81	20.78
		12	0	20.08	20.06	20.02
		12	6	20.31	20.25	20.05
		12	13	19.99	20.10	20.07
		25	0	20.20	20.15	20.04
BW	MCS Index	Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	22.42	22.37	22.34
		1	24	22.69	22.67	22.73
		1	49	22.04	22.09	22.13
		25	0	21.11	21.23	21.35
		25	12	21.41	21.32	21.28
		25	25	21.04	21.12	21.19
		50	0	21.32	21.17	21.24
	16QAM	1	0	21.33	21.23	21.25
		1	24	21.59	21.48	21.69
		1	49	20.90	21.08	21.05
		25	0	19.94	20.07	20.15
		25	12	20.36	20.24	20.17
		25	25	19.98	20.06	20.10
		50	0	20.26	19.97	20.09

LTE Band 7						
BW	MCS Index	Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	22.26	22.24	22.20
		1	37	23.15	23.13	23.25
		1	74	22.27	22.13	22.06
		36	0	21.29	21.23	21.22
		36	19	21.22	21.29	21.29
		36	39	21.08	21.12	21.21
		75	0	21.36	21.23	21.14
	16QAM	1	0	21.18	21.04	21.04
		1	37	22.11	21.99	22.07
		1	74	21.07	21.12	20.97
		36	0	20.22	20.08	20.04
		36	19	20.22	20.13	20.14
		36	39	20.08	20.00	20.01
		75	0	20.29	20.22	20.08
BW	MCS Index	Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	22.24	22.25	22.16
		1	50	22.64	22.69	22.65
		1	99	22.10	22.15	22.25
		50	0	21.20	21.31	21.41
		50	25	21.16	21.25	21.14
		50	50	21.23	21.11	21.00
		100	0	21.16	21.16	21.26
	16QAM	1	0	21.08	21.12	21.13
		1	50	21.46	21.65	21.58
		1	99	20.90	20.99	21.13
		50	0	20.11	20.26	20.24
		50	25	20.12	20.12	20.12
		50	50	20.22	20.10	19.89
		100	0	20.01	20.07	20.15

LTE Band 38						
BW	MCS Index	Channel		37775	38000	38225
		Frequency (MHz)		2572.5	2595	2617.5
5M	QPSK	1	0	21.94	22.07	22.17
		1	12	22.44	22.44	22.34
		1	24	22.21	22.30	22.29
		12	0	21.30	21.26	21.28
		12	6	21.35	21.31	21.29
		12	13	21.19	21.22	21.25
		25	0	21.20	21.20	21.14
	16QAM	1	0	20.88	21.07	21.14
		1	12	21.44	21.32	21.18
		1	24	21.02	21.10	21.23
		12	0	20.11	20.18	20.22
		12	6	20.22	20.26	20.15
		12	13	20.04	20.15	20.15
		25	0	20.05	20.16	20.11
BW	MCS Index	Channel		37800	38000	38200
		Frequency (MHz)		2575	2595	2615
10M	QPSK	1	0	22.30	22.22	22.17
		1	24	22.49	22.42	22.30
		1	49	22.24	22.23	22.14
		25	0	21.24	21.26	21.14
		25	12	21.42	21.35	21.48
		25	25	21.38	21.25	21.17
		50	0	21.32	21.30	21.40
	16QAM	1	0	21.16	21.19	21.14
		1	24	21.38	21.25	21.19
		1	49	21.14	21.10	20.95
		25	0	20.23	20.16	19.98
		25	12	20.36	20.20	20.31
		25	25	20.22	20.20	20.04
		50	0	20.13	20.14	20.34

LTE Band 38						
BW	MCS Index	Channel		37825	38000	38175
		Frequency (MHz)		2577.5	2595	2612.5
15M	QPSK	1	0	22.24	22.21	22.13
		1	37	22.36	22.44	22.53
		1	74	22.24	22.28	22.31
		36	0	21.23	21.26	21.28
		36	19	21.47	21.38	21.41
		36	39	21.11	21.25	21.36
		75	0	21.32	21.25	21.29
	16QAM	1	0	21.09	21.19	21.01
		1	37	21.32	21.28	21.34
		1	74	21.08	21.25	21.30
		36	0	20.16	20.25	20.18
		36	19	20.34	20.34	20.41
		36	39	19.96	20.14	20.16
		75	0	20.20	20.22	20.11
BW	MCS Index	Channel		37850	38000	38150
		Frequency (MHz)		2580	2595	2610
20M	QPSK	1	0	22.23	22.24	22.14
		1	50	22.52	22.42	22.48
		1	99	22.11	22.23	22.13
		50	0	21.22	21.29	21.26
		50	25	21.33	21.32	21.17
		50	50	21.29	21.32	21.42
		100	0	21.35	21.28	21.25
	16QAM	1	0	21.22	21.13	21.03
		1	50	21.49	21.25	21.48
		1	99	21.09	21.12	21.08
		50	0	20.15	20.16	20.17
		50	25	20.21	20.22	20.00
		50	50	20.21	20.23	20.22
		100	0	20.34	20.18	20.24

LTE Band 41						
BW	MCS Index	Channel		39675	40620	41565
		Frequency (MHz)		2498.5	2593	2687.5
5M	QPSK	1	0	22.41	22.42	22.28
		1	12	22.56	22.65	22.70
		1	24	22.56	22.45	22.36
		12	0	21.45	21.53	21.55
		12	6	21.59	21.53	21.61
		12	13	21.28	21.38	21.47
		25	0	21.52	21.58	21.48
	16QAM	1	0	21.34	21.22	21.19
		1	12	21.53	21.48	21.53
		1	24	21.52	21.27	21.32
		12	0	20.45	20.45	20.45
		12	6	20.54	20.53	20.44
		12	13	20.19	20.27	20.44
		25	0	20.50	20.48	20.33
BW	MCS Index	Channel		39700	40620	41540
		Frequency (MHz)		2501	2593	2685
10M	QPSK	1	0	22.34	22.48	22.55
		1	24	22.64	22.59	22.56
		1	49	22.47	22.42	22.36
		25	0	21.60	21.56	21.45
		25	12	21.64	21.59	21.73
		25	25	21.48	21.48	21.56
		50	0	21.50	21.50	21.42
	16QAM	1	0	21.23	21.35	21.54
		1	24	21.55	21.43	21.56
		1	49	21.30	21.37	21.32
		25	0	20.48	20.39	20.39
		25	12	20.52	20.59	20.55
		25	25	20.48	20.31	20.45
		50	0	20.37	20.44	20.26

LTE Band 41						
BW	MCS Index	Channel		39725	40620	41515
		Frequency (MHz)		2503.5	2593	2682.5
15M	QPSK	1	0	22.08	22.22	22.19
		1	37	22.67	22.53	22.64
		1	74	22.36	22.46	22.53
		36	0	21.39	21.36	21.47
		36	19	21.68	21.60	21.70
		36	39	21.54	21.42	21.44
		75	0	21.51	21.53	21.56
	16QAM	1	0	20.96	21.22	21.00
		1	37	21.64	21.48	21.58
		1	74	21.20	21.32	21.33
		36	0	20.38	20.29	20.33
		36	19	20.51	20.50	20.64
		36	39	20.50	20.29	20.32
		75	0	20.36	20.47	20.51
BW	MCS Index	Channel		39750	40620	41490
		Frequency (MHz)		2506	2593	2680
20M	QPSK	1	0	22.14	22.27	22.35
		1	50	22.61	22.66	22.66
		1	99	22.45	22.45	22.34
		50	0	21.50	21.44	21.43
		50	25	21.49	21.56	21.43
		50	50	21.33	21.47	21.44
		100	0	21.60	21.56	21.46
	16QAM	1	0	21.07	21.12	21.29
		1	50	21.58	21.58	21.63
		1	99	21.40	21.43	21.25
		50	0	20.43	20.33	20.38
		50	25	20.45	20.44	20.39
		50	50	20.30	20.37	20.37
		100	0	20.41	20.46	20.32

EIRP Power (dBm)

LTE Band 7						
BW	MCS Index	Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	24.63	24.56	24.53
		1	12	24.87	24.89	24.77
		1	24	24.45	24.31	24.22
		12	0	23.56	23.42	23.47
		12	6	23.66	23.60	23.47
		12	13	23.47	23.49	23.44
		25	0	23.51	23.49	23.46
	16QAM	1	0	23.46	23.46	23.52
		1	12	23.73	23.76	23.75
		1	24	23.32	23.11	23.08
		12	0	22.38	22.36	22.32
		12	6	22.61	22.55	22.35
		12	13	22.29	22.40	22.37
		25	0	22.50	22.45	22.34
BW	MCS Index	Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	24.72	24.67	24.64
		1	24	24.99	24.97	25.03
		1	49	24.34	24.39	24.43
		25	0	23.41	23.53	23.65
		25	12	23.71	23.62	23.58
		25	25	23.34	23.42	23.49
		50	0	23.62	23.47	23.54
	16QAM	1	0	23.63	23.53	23.55
		1	24	23.89	23.78	23.99
		1	49	23.20	23.38	23.35
		25	0	22.24	22.37	22.45
		25	12	22.66	22.54	22.47
		25	25	22.28	22.36	22.40
		50	0	22.56	22.27	22.39

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 7						
BW	MCS Index	Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	24.56	24.54	24.50
		1	37	25.45	25.43	25.55
		1	74	24.57	24.43	24.36
		36	0	23.59	23.53	23.52
		36	19	23.52	23.59	23.59
		36	39	23.38	23.42	23.51
		75	0	23.66	23.53	23.44
	16QAM	1	0	23.48	23.34	23.34
		1	37	24.41	24.29	24.37
		1	74	23.37	23.42	23.27
		36	0	22.52	22.38	22.34
		36	19	22.52	22.43	22.44
		36	39	22.38	22.30	22.31
		75	0	22.59	22.52	22.38
BW	MCS Index	Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	24.54	24.55	24.46
		1	50	24.94	24.99	24.95
		1	99	24.40	24.45	24.55
		50	0	23.50	23.61	23.71
		50	25	23.46	23.55	23.44
		50	50	23.53	23.41	23.30
		100	0	23.46	23.46	23.56
	16QAM	1	0	23.38	23.42	23.43
		1	50	23.76	23.95	23.88
		1	99	23.20	23.29	23.43
		50	0	22.41	22.56	22.54
		50	25	22.42	22.42	22.42
		50	50	22.52	22.40	22.19
		100	0	22.31	22.37	22.45

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 38						
BW	MCS Index	Channel		37775	38000	38225
		Frequency (MHz)		2572.5	2595	2617.5
5M	QPSK	1	0	24.24	24.37	24.47
		1	12	24.74	24.74	24.64
		1	24	24.51	24.60	24.59
		12	0	23.60	23.56	23.58
		12	6	23.65	23.61	23.59
		12	13	23.49	23.52	23.55
		25	0	23.50	23.50	23.44
	16QAM	1	0	23.18	23.37	23.44
		1	12	23.74	23.62	23.48
		1	24	23.32	23.40	23.53
		12	0	22.41	22.48	22.52
		12	6	22.52	22.56	22.45
		12	13	22.34	22.45	22.45
		25	0	22.35	22.46	22.41
BW	MCS Index	Channel		37800	38000	38200
		Frequency (MHz)		2575	2595	2615
10M	QPSK	1	0	24.60	24.52	24.47
		1	24	24.79	24.72	24.60
		1	49	24.54	24.53	24.44
		25	0	23.54	23.56	23.44
		25	12	23.72	23.65	23.78
		25	25	23.68	23.55	23.47
		50	0	23.62	23.60	23.70
	16QAM	1	0	23.46	23.49	23.44
		1	24	23.68	23.55	23.49
		1	49	23.44	23.40	23.25
		25	0	22.53	22.46	22.28
		25	12	22.66	22.50	22.61
		25	25	22.52	22.50	22.34
		50	0	22.43	22.44	22.64

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 38						
BW	MCS Index	Channel		37825	38000	38175
		Frequency (MHz)		2577.5	2595	2612.5
15M	QPSK	1	0	24.54	24.51	24.43
		1	37	24.66	24.74	24.83
		1	74	24.54	24.58	24.61
		36	0	23.53	23.56	23.58
		36	19	23.77	23.68	23.71
		36	39	23.41	23.55	23.66
		75	0	23.62	23.55	23.59
	16QAM	1	0	23.39	23.49	23.31
		1	37	23.62	23.58	23.64
		1	74	23.38	23.55	23.60
		36	0	22.46	22.55	22.48
		36	19	22.64	22.64	22.71
		36	39	22.26	22.44	22.46
		75	0	22.50	22.52	22.41
BW	MCS Index	Channel		37850	38000	38150
		Frequency (MHz)		2580	2595	2610
20M	QPSK	1	0	24.53	24.54	24.44
		1	50	24.82	24.72	24.78
		1	99	24.41	24.53	24.43
		50	0	23.52	23.59	23.56
		50	25	23.63	23.62	23.47
		50	50	23.59	23.62	23.72
		100	0	23.65	23.58	23.55
	16QAM	1	0	23.52	23.43	23.33
		1	50	23.79	23.55	23.78
		1	99	23.39	23.42	23.38
		50	0	22.45	22.46	22.47
		50	25	22.51	22.52	22.30
		50	50	22.51	22.53	22.52
		100	0	22.64	22.48	22.54

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 41						
BW	MCS Index	Channel		39675	40620	41565
		Frequency (MHz)		2498.5	2593	2687.5
5M	QPSK	1	0	24.71	24.72	24.58
		1	12	24.86	24.95	25.00
		1	24	24.86	24.75	24.66
		12	0	23.75	23.83	23.85
		12	6	23.89	23.83	23.91
		12	13	23.58	23.68	23.77
		25	0	23.82	23.88	23.78
	16QAM	1	0	23.64	23.52	23.49
		1	12	23.83	23.78	23.83
		1	24	23.82	23.57	23.62
		12	0	22.75	22.75	22.75
		12	6	22.84	22.83	22.74
		12	13	22.49	22.57	22.74
		25	0	22.80	22.78	22.63
BW	MCS Index	Channel		39700	40620	41540
		Frequency (MHz)		2501	2593	2685
10M	QPSK	1	0	24.64	24.78	24.85
		1	24	24.94	24.89	24.86
		1	49	24.77	24.72	24.66
		25	0	23.90	23.86	23.75
		25	12	23.94	23.89	24.03
		25	25	23.78	23.78	23.86
		50	0	23.80	23.80	23.72
	16QAM	1	0	23.53	23.65	23.84
		1	24	23.85	23.73	23.86
		1	49	23.60	23.67	23.62
		25	0	22.78	22.69	22.69
		25	12	22.82	22.89	22.85
		25	25	22.78	22.61	22.75
		50	0	22.67	22.74	22.56

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 41						
BW	MCS Index	Channel		39725	40620	41515
		Frequency (MHz)		2503.5	2593	2682.5
15M	QPSK	1	0	24.38	24.52	24.49
		1	37	24.97	24.83	24.94
		1	74	24.66	24.76	24.83
		36	0	23.69	23.66	23.77
		36	19	23.98	23.90	24.00
		36	39	23.84	23.72	23.74
		75	0	23.81	23.83	23.86
	16QAM	1	0	23.26	23.52	23.30
		1	37	23.94	23.78	23.88
		1	74	23.50	23.62	23.63
		36	0	22.68	22.59	22.63
		36	19	22.81	22.80	22.94
		36	39	22.80	22.59	22.62
		75	0	22.66	22.77	22.81
BW	MCS Index	Channel		39750	40620	41490
		Frequency (MHz)		2506	2593	2680
20M	QPSK	1	0	24.44	24.57	24.65
		1	50	24.91	24.96	24.96
		1	99	24.75	24.75	24.64
		50	0	23.80	23.74	23.73
		50	25	23.79	23.86	23.73
		50	50	23.63	23.77	23.74
		100	0	23.90	23.86	23.76
	16QAM	1	0	23.37	23.42	23.59
		1	50	23.88	23.88	23.93
		1	99	23.70	23.73	23.55
		50	0	22.73	22.63	22.68
		50	25	22.75	22.74	22.69
		50	50	22.60	22.67	22.67
		100	0	22.71	22.76	22.62

*EIRP = Conducted + antenna gain (2.3dBi)

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The limit of emission is equal to -25 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 μ V/m) + 20log (D) - 104.8; where D is the measurement distance (in the far field region) in m.
ERP (dBm) = E (dB μ V/m) + 20log (D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

NOTE:

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

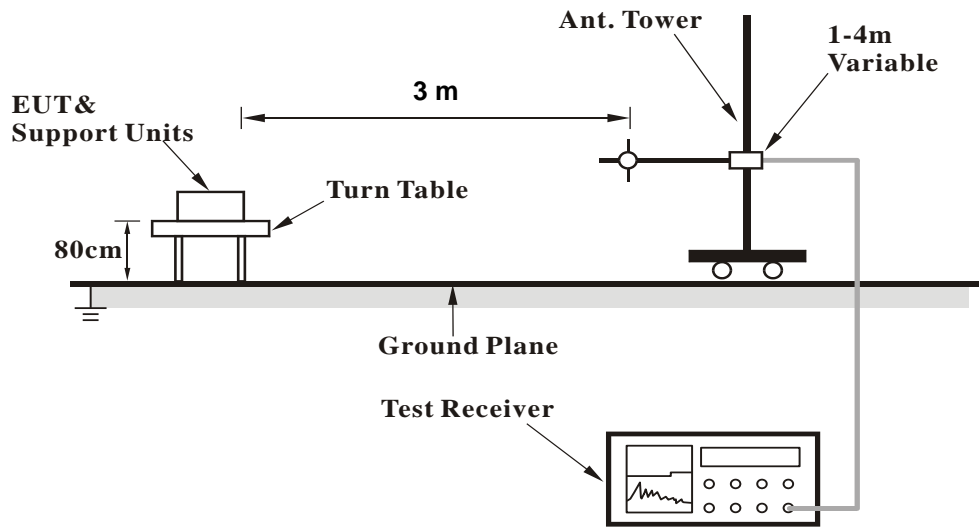
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.2.3 Deviation from Test Standard

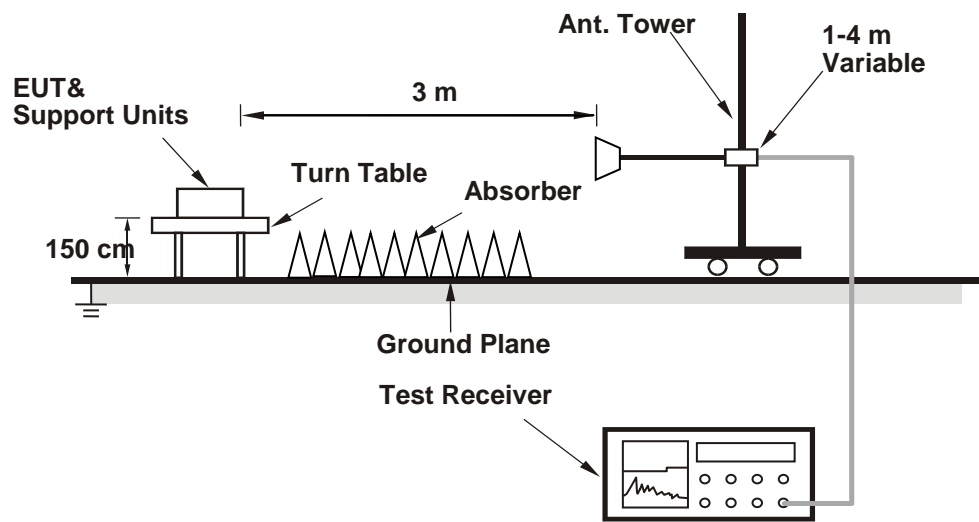
No deviation.

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

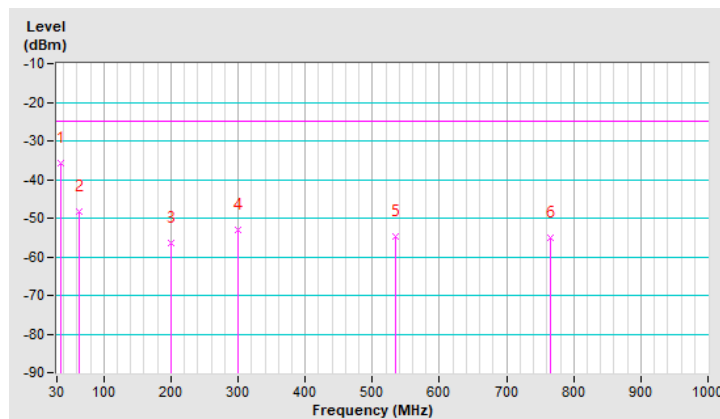
Below 1GHz

RF Mode	TX LTE Band 41-5MHz	Channel	CH 40620: 2593.0MHz
Frequency Range	30MHz ~ 1GHz	Test Mode	A

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	35.82	-35.93	-25.00	-10.93	1.50 H	174	69.53	-105.46
2	63.95	-48.36	-25.00	-23.36	1.25 H	269	56.93	-105.29
3	199.75	-56.60	-25.00	-31.60	1.00 H	224	50.24	-106.84
4	299.66	-52.94	-25.00	-27.94	1.25 H	27	49.24	-102.18
5	534.40	-54.75	-25.00	-29.75	1.00 H	59	42.42	-97.17
6	766.23	-55.01	-25.00	-30.01	1.50 H	189	37.40	-92.41

Remarks:

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

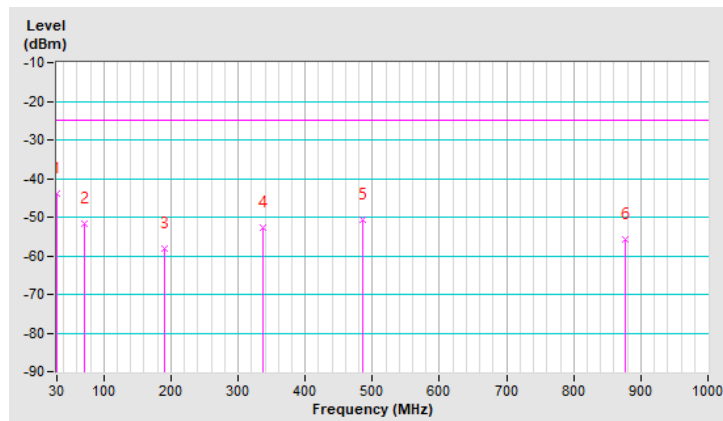


RF Mode	TX LTE Band 41-5MHz	Channel	CH 40620: 2593.0MHz
Frequency Range	30MHz ~ 1GHz	Test Mode	A

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	30.00	-43.95	-25.00	-18.95	1.00 V	93	61.48	-105.43
2	70.74	-51.70	-25.00	-26.70	1.25 V	28	54.80	-106.50
3	190.05	-58.11	-25.00	-33.11	1.50 V	28	48.49	-106.60
4	337.49	-52.83	-25.00	-27.83	1.25 V	75	48.48	-101.31
5	485.90	-50.65	-25.00	-25.65	1.00 V	28	47.47	-98.12
6	876.81	-55.75	-25.00	-30.75	1.50 V	173	34.97	-90.72

Remarks:

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

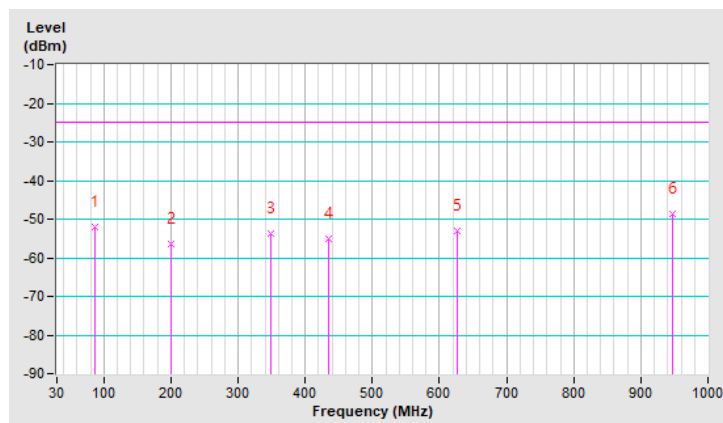


RF Mode	TX LTE Band 41-5MHz	Channel	CH 40620: 2593.0MHz
Frequency Range	30MHz ~ 1GHz	Test Mode	B

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	87.23	-52.08	-25.00	-27.08	1.00 H	96	57.83	-109.91
2	199.75	-56.28	-25.00	-31.28	1.25 H	168	50.56	-106.84
3	348.16	-53.72	-25.00	-28.72	1.00 H	6	47.65	-101.37
4	435.46	-55.07	-25.00	-30.07	1.50 H	107	43.95	-99.02
5	625.58	-52.92	-25.00	-27.92	1.00 H	65	42.28	-95.20
6	946.65	-48.72	-25.00	-23.72	1.50 H	99	40.42	-89.14

Remarks:

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

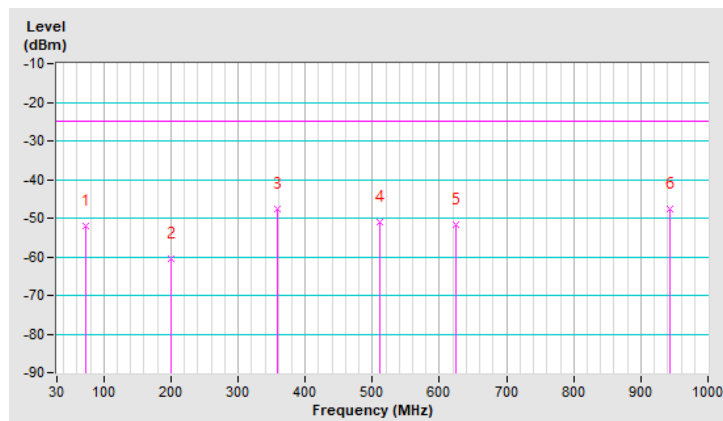


RF Mode	TX LTE Band 41-5MHz	Channel	CH 40620: 2593.0MHz
Frequency Range	30MHz ~ 1GHz	Test Mode	B

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	73.65	-51.97	-25.00	-26.97	1.50 V	81	55.30	-107.27
2	199.75	-60.56	-25.00	-35.56	1.25 V	168	46.28	-106.84
3	358.83	-47.61	-25.00	-22.61	1.00 V	123	53.52	-101.13
4	511.12	-51.02	-25.00	-26.02	1.25 V	325	46.50	-97.52
5	624.61	-51.54	-25.00	-26.54	1.00 V	343	43.67	-95.21
6	942.77	-47.77	-25.00	-22.77	1.00 V	298	41.31	-89.08

Remarks:

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



Above 1GHz

RF Mode	TX LTE Band 41-5MHz	Channel	CH 40620: 2593.0MHz
Frequency Range	1GHz ~ 27GHz	Test Mode	A

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	5186.00	-43.38	-25.00	-18.38	1.98 H	19	46.27	-89.65

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	5186.00	-40.93	-25.00	-15.93	3.43 V	78	48.72	-89.65

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
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 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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