

FCC Test Report (Part 90S/R) (Spot Check)

Report No.: RF180321E03Y-3

FCC ID: MCLT77W968C9

Original FCC ID: MCLT77W968

Test Model: T77W968C9

Received Date: Dec. 26, 2019

Test Date: Jan. 08 to 17, 2020

Issued Date: Feb. 03, 2020

Applicant: HON HAI PRECISION IND. CO., LTD.

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R.O.C.

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan.

**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180321E03Y-3	Original release	Feb. 03, 2020

1 Certificate of Conformity

Product: LTE M.2 Module

Brand: FOXCONN

Test Model: T77W968C9

Sample Status: ENGINEERING SAMPLE

Applicant: HON HAI PRECISION IND. CO., LTD.

Test Date: Jan. 08 to 17, 2020

Standards: FCC Part 90, Subpart S / R

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 EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Feb. 03, 2020
Claire Kuan / Specialist

Approved by :  , **Date:** Feb. 03, 2020
Clark Lin / Technical Manager

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 90.635 (b) 90.542(a)(7)	Radiated Power	PASS	Meet the requirement of limit.
2.1053 90.691 90.543	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -13.56dB at 1586MHz.

Note: 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	3.0 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Test Site and Instruments

For radiated spurious emissions below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	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 966 Chamber No. 3.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Jan. 17, 2020

For radiated spurious emissions above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMC	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMC	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	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 966 Chamber No. 3.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Jan. 08 to 09, 2020

For other test items

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Spectrum Analyzer Agilent	E4446A	MY48250253	July 24, 2019	July 23, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
AC Power Source Extech Electronics	6205	1440452	NA	NA
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020
ESG Vector signal generator Agilent	E4438C	MY45094468/005 506 602 UK6 UNJ	Nov. 14, 2019	Nov. 13, 2020
Mech Switch Absorptive Mini-Circuits	MSP4TA-18+	0140	Feb. 11, 2019	Feb. 10, 2020
FXD ATTEN Mini-Circuits	BW-S3W2+	MN71981	Feb. 11, 2019	Feb. 10, 2020
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Jan. 14, 2020

3 General Information

3.1 General Description of EUT

Product	LTE M.2 Module		
Brand	FOXCONN		
Test Model	T77W968C9		
Status of EUT	ENGINEERING SAMPLE		
Power Supply Rating	DC 3.3V from host equipment		
Modulation Type	QPSK, 16QAM, 64QAM		
Operating Frequency	LTE Band 14	790.5MHz ~ 795.5MHz	
	LTE Band 26	814.7MHz ~ 823.3MHz	
Max. ERP Power	LTE Band 14 (Channel Bandwidth 5MHz)		24.49 dBm
	LTE Band 14 (Channel Bandwidth 10MHz)		24.50 dBm
	LTE Band 26 (Channel Bandwidth 1.4MHz)		24.33 dBm
	LTE Band 26 (Channel Bandwidth 3MHz)		24.57 dBm
	LTE Band 26 (Channel Bandwidth 5MHz)		24.36 dBm
	LTE Band 26 (Channel Bandwidth 10MHz)		24.45 dBm
Emission Designator	LTE Band 14	Channel Bandwidth 5MHz	QPSK: 4M49G7D 16QAM: 4M49D7W 64QAW: 4M50D7W
		Channel Bandwidth 10MHz	QPSK: 8M97G7D 16QAM: 8M97D7W 64QAW: 8M99D7W
	LTE Band 26	Channel Bandwidth 1.4MHz	QPSK: 1M09G7D 16QAM: 1M09D7W 64QAW: 1M09D7W
		Channel Bandwidth 3MHz	QPSK: 2M70G7D 16QAM: 2M70D7W 64QAW: 2M70D7W
		Channel Bandwidth 5MHz	QPSK: 4M49G7D 16QAM: 4M49D7W 64QAW: 4M49D7W
		Channel Bandwidth 10MHz	QPSK: 8M95G7D 16QAM: 8M96D7W 64QAW: 8M96D7W
Antenna Type	Refer to note as below		
Antenna Connector	Refer to note as below		
Accessory Device	NA		
Data Cable Supplied	NA		

Note:

1. Exhibit prepared for FCC Spot Check Verification Report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. (Original FCC ID: MCLT77W968)

2. The antennas provided to the EUT, please refer to the following table:

Antenna No.	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type	Cable Length
1	Please refer to below table	699~803	PIFA	i-pex(MHF)	100mm
2	Please refer to below table	791~960 1447.9~1606	PIFA	i-pex(MHF)	100mm
3	Please refer to below table	1710~2170 2500~2690	PIFA	i-pex(MHF)	100mm
4	Please refer to below table	2305~2315	Dipole	i-pex(MHF)	80mm

Antenna gain list			
Antenna No.	Band	Freq. Range (MHz)	Gain (dBi)
3	WCDMA II (B2)	1850~1910	4.92
3	WCDMA IV (B4)	1710~1755	5.99
2	WCDMA V (B5)	824~849	2.68
3	LTE Band (2)	1850~1910	4.92
3	LTE Band (4)	1710~1755	5.99
2	LTE Band (5)	824~849	2.68
3	LTE Band (7)	2500~2570	5.2
1	LTE Band (12)	698~716	4.17
1	LTE Band (13)	777~787	3.05
1	LTE Band (17)	704~716	4.17
3	LTE Band (25)	1850~1915	4.92
2	LTE Band (26)	814~849	2.92
4	LTE Band (30)	2305~2315	3.02
3	LTE Band (38)	2570~2620	4.82
3	LTE Band (41)	2496~2690	5.38
3	LTE Band (66)	1710~1780	5.99

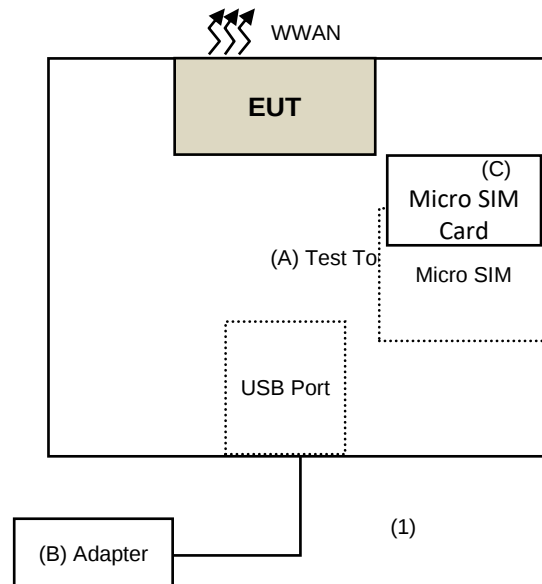
3. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Without e-SIM
Mode B	With e-SIM

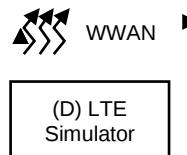
Note: From the above modes, radiated emission the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.

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

3.2 Configuration of System under Test



Remote Site



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.	Test Tool	Foxconn	T77W968	NA	NA	Supplied by client
B.	Adapter	ASUS	EXA1205UA	NA	NA	Provided by Lab
C.	Micro SIM Card	NA	NA	NA	NA	Provided by Lab
D.	Simulator	Keysight	E7515A	MY56030229	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1	Yes	0	Provided by Lab

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

In the original test report, the worst case was found when positioned on X-plane. Following channel(s) was (were) selected for the final test as listed below:

LTE Band 14

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
	23330	23330	10MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
Radiated Emission	23330	23330	10MHz	QPSK	1RB / 0 RB offset

LTE Band 26

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	26697 to 26783	26697, 26740, 26783	1.4MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
	26705 to 26775	26705, 26740, 26775	3MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
	26715 to 26765	26715, 26740, 26765	5MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
	26740	26740	10MHz	QPSK/16QAM/64QAM	1RB / 0 RB offset
Radiated Emission	26705 to 26775	26775	3MHz	QPSK	1RB / 0 RB offset

NOTE:

All supported modulation types were evaluated. The Worst case of QPSK was selected.

Test Condition:

Test Item	Environmental Conditions	Input Power (System)	Tested By
ERP	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin
Radiated Emission	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

3.4 EUT Operating Conditions and References

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

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 90, Subpart S / R

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement and Antenna Height

According to 90.635 (b), Maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). According to 90.542(a)(7), Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

4.1.2 Test Procedures

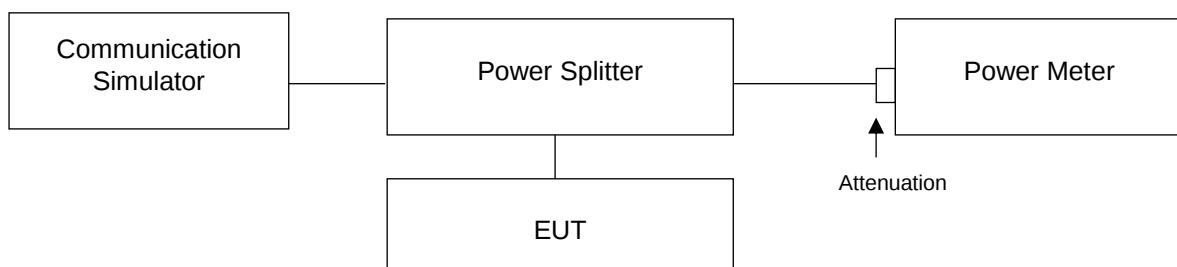
Conducted Power Measurement:

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 difference RB size/ RB offset for difference bandwidth record the power level shown on power meter.

EIRP / ERP Measurement:

- EIRP = Conducted Output power level + Antenna gain.
- ERP power can be calculated form EIRP power by subtracting the gain of dipole, ERP power = EIPR power - 2.15dBi.
- ERP = Conducted Output power level + Antenna gain (dBi) - Isotropically Factor (2.15dB).

4.1.3 Test Setup



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

4.1.4 Test Results

CONDUCTED OUTPUT POWER

LTE Band 14

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23305	23330	23335		23305	23330	23335		23305	23330	23335	
			790.5 MHz	793 MHz	795.5 MHz		790.5 MHz	793 MHz	795.5 MHz		790.5 MHz	793 MHz	795.5 MHz	
14 / 5M	1	0	23.75	23.77	23.69	0	22.57	22.61	22.68	1	21.69	21.54	21.54	2
	1	12	23.65	23.70	23.68	0	22.53	22.60	22.63	1	21.60	21.50	21.51	2
	1	24	23.74	23.53	23.63	0	22.48	22.58	22.56	1	21.64	21.50	21.50	2
	12	0	22.72	22.56	22.80	1	21.43	21.56	21.62	2	20.43	20.47	20.37	3
	12	6	22.56	22.55	22.63	1	21.71	21.71	21.72	2	20.60	20.49	20.37	3
	12	13	22.82	22.61	22.49	1	21.69	21.77	21.52	2	20.45	20.44	20.49	3
	25	0	22.69	22.78	23.50	1	21.58	21.63	21.73	2	20.64	20.37	20.32	3

Band / BW	RB Size	RB Offset	QPSK	3GPP MPR (dB)	16QAM	3GPP MPR (dB)	64QAM	3GPP MPR (dB)
			Mid CH		Mid CH		Mid CH	
			23330		23330		23330	
			793		793		793	
			MHz		MHz		MHz	
14 / 10M	1	0	23.78	0	22.80	1	21.66	2
	1	24	23.49	0	22.51	1	21.58	2
	1	49	23.46	0	22.56	1	21.65	2
	25	0	22.73	1	21.79	2	20.74	3
	25	12	22.78	1	21.80	2	20.61	3
	25	25	22.66	1	21.69	2	20.59	3
	50	0	22.73	1	21.71	2	20.68	3

LTE Band 26

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26697	26740	26783		26697	26740	26783		26697	26740	26783	
			814.7	819	823.3		814.7	819	823.3		814.7	819	823.3	
			MHz	MHz	MHz		MHz	MHz	MHz		MHz	MHz	MHz	
26 / 1.4M	1	0	23.55	23.56	23.39	0	22.32	22.41	22.21	1	21.38	21.26	21.36	2
	1	2	23.42	23.50	23.30	0	22.30	22.40	22.20	1	21.22	21.34	21.33	2
	1	5	23.36	23.25	23.31	0	22.16	22.33	22.06	1	21.20	21.33	21.19	2
	3	0	23.35	23.45	23.38	0	22.29	22.29	22.20	1	21.33	21.05	21.28	2
	3	1	23.51	23.47	23.23	0	22.30	22.29	22.10	1	21.30	21.20	21.34	2
	3	3	23.26	23.51	22.31	0	22.30	22.39	22.11	1	21.27	21.30	21.38	2
	6	0	22.34	22.39	22.40	1	21.31	21.37	21.14	2	20.26	20.27	20.33	3

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26705	26740	26775		26705	26740	26775		26705	26740	26775	
			815.50	819.00	822.50		815.50	819.00	822.50		815.50	819.00	822.50	
			MHz	MHz	MHz		MHz	MHz	MHz		MHz	MHz	MHz	
26 / 3M	1	0	23.60	23.57	23.80	0	22.66	22.53	22.59	1	21.37	21.49	21.55	2
	1	7	23.60	23.56	23.49	0	22.53	22.36	22.52	1	21.29	21.24	21.52	2
	1	14	23.43	23.54	23.42	0	22.65	22.33	22.48	1	21.21	21.48	21.37	2
	8	0	22.32	22.55	22.39	1	21.49	21.52	21.33	2	20.26	20.18	20.42	3
	8	3	22.38	22.51	22.36	1	21.41	21.41	21.35	2	20.24	20.37	20.41	3
	8	7	22.44	22.58	22.37	1	21.43	21.29	21.39	2	20.25	20.27	20.45	3
	15	0	22.43	22.42	22.37	1	21.57	21.49	21.56	2	20.25	20.19	20.51	3

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26715	26740	26765		26715	26740	26765		26715	26740	26765	
			816.50	819.00	821.50		816.50	819.00	821.50		816.50	819.00	821.50	
			MHz	MHz	MHz		MHz	MHz	MHz		MHz	MHz	MHz	
26 / 5M	1	0	23.56	23.56	23.59	0	22.44	22.57	22.35	1	21.31	21.33	21.37	2
	1	12	23.45	23.54	23.30	0	22.43	22.40	22.27	1	21.09	21.21	21.36	2
	1	24	23.45	23.38	23.44	0	22.34	22.45	22.31	1	21.15	21.38	21.23	2
	12	0	22.35	22.42	22.55	1	21.41	21.50	20.83	2	20.28	20.50	20.24	3
	12	6	22.44	22.50	23.45	1	21.50	21.26	21.53	2	20.16	20.39	20.43	3
	12	13	22.42	22.50	22.29	1	21.29	21.31	21.55	2	20.35	20.36	20.43	3
	25	0	22.41	22.37	22.38	1	21.39	21.45	21.45	2	20.30	20.39	20.37	3

Band / BW	RB Size	RB Offset	QPSK	3GPP MPR (dB)	16QAM	3GPP MPR (dB)	64QAM	3GPP MPR (dB)
			Mid CH		Mid CH		Mid CH	
			26740		26740		26740	
			819		819		819	
			MHz		MHz		MHz	
26/ 10M	1	0	23.68	0	22.42	1	21.50	2
	1	24	23.56	0	22.41	1	21.48	2
	1	49	23.31	0	22.31	1	21.49	2
	25	0	22.39	1	21.32	2	20.22	3
	25	12	22.35	1	21.41	2	20.42	3
	25	25	22.50	1	21.32	2	20.46	3
	50	0	22.33	1	21.34	2	20.26	3

ERP POWER

LTE Band 14

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			23305	23330	23335		23305	23330	23335		23305	23330	23335	
			790.5	793	795.5		790.5	793	795.5		790.5	793	795.5	
			MHz	MHz	MHz		MHz	MHz	MHz		MHz	MHz	MHz	
14 / 5M	1	0	23.75	23.77	23.69	0	22.57	22.61	22.68	1	21.69	21.54	21.54	2
Gain (dBi)			2.87	2.87	2.87		2.87	2.87	2.87		2.87	2.87	2.87	
Isotropically Factor (dB)			2.15	2.15	2.15		2.15	2.15	2.15		2.15	2.15	2.15	
Max ERP Power (dBm)			24.47	24.49	24.41		23.29	23.33	23.40		22.41	22.26	22.26	

Band / BW	RB Size	RB Offset	QPSK	3GP P MPR (dB)	16QAM	3GP P MPR (dB)	64QAM	3GP P MPR (dB)
			Mid CH		Mid CH		Mid CH	
			23330		23330		23330	
			793		793		793	
			MHz		MHz		MHz	
14 / 10M	1	0	23.78	0	22.80	1	21.66	2
Gain (dBi)		2.87	2.87		2.87			
Isotropically Factor (dB)		2.15	2.15		2.15			
Max ERP Power (dBm)		24.50	23.52		22.38			

LTE Band 26

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26697	26740	26783		26697	26740	26783		26697	26740	26783	
			814.7	819	823.3		814.7	819	823.3		814.7	819	823.3	
26 / 1.4M	1	0	23.55	23.56	23.39	0	22.32	22.41	22.21	1	21.38	21.26	21.36	2
Gain (dBi)			2.92	2.92	2.92		2.92	2.92	2.92		2.92	2.92	2.92	
Isotropically Factor (dB)			2.15	2.15	2.15		2.15	2.15	2.15		2.15	2.15	2.15	
Max ERP Power (dBm)			24.32	24.33	24.16		23.09	23.18	22.98		22.15	22.03	22.13	

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26705	26740	26775		26705	26740	26775		26705	26740	26775	
			815.50	819.00	822.50		815.50	819.00	822.50		815.50	819.00	822.50	
26 / 3M	1	0	23.60	23.57	23.80	0	22.66	22.53	22.59	1	21.37	21.49	21.55	2
Gain (dBi)			2.92	2.92	2.92		2.92	2.92	2.92		2.92	2.92	2.92	
Isotropically Factor (dB)			2.15	2.15	2.15		2.15	2.15	2.15		2.15	2.15	2.15	
Max ERP Power (dBm)			24.37	24.34	24.57		23.43	23.30	23.36		22.14	22.26	22.32	

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH	Mid CH	High CH		Low CH	Mid CH	High CH		Low CH	Mid CH	High CH	
			26715	26740	26765		26715	26740	26765		26715	26740	26765	
			816.50	819.00	821.50		816.50	819.00	821.50		816.50	819.00	821.50	
26 / 5M	1	0	23.56	23.56	23.59	0	22.44	22.57	22.35	1	21.31	21.33	21.37	2
Gain (dBi)			2.92	2.92	2.92		2.92	2.92	2.92		2.92	2.92	2.92	
Isotropically Factor (dB)			2.15	2.15	2.15		2.15	2.15	2.15		2.15	2.15	2.15	
Max ERP Power (dBm)			24.33	24.33	24.36		23.21	23.34	23.12		22.08	22.10	22.14	

Band / BW	RB Size	RB Offset	QPSK	3GPP MPR (dB)	16QAM	3GPP MPR (dB)	64QAM	3GPP MPR (dB)
			Mid CH		Mid CH		Mid CH	
			26740		26740		26740	
			819		819		819	
			MHz		MHz		MHz	
26/ 10M	1	0	23.68	0	22.42	1	21.50	2
Gain (dBi)		2.92	2.92		2.92			
Isotropically Factor (dB)		2.15	2.15		2.15			
Max ERP Power (dBm)		24.45	23.19		22.27			

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 $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13 dBm

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals.

4.2.2 Test Procedure

- Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8m/1.5m 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.
- Follow ANSI 63.26 section 5.2.7 d), $\text{EIRP Value (dBm)} = \text{Read Value (dB}\mu\text{V/m)} - \text{Correction Factor @ 3m}$
- Correction Factor (dB) @ 3m = $20\log(D) - 104.8$; where D is the measurement distance @3m = -95.26 dB
- ERP power can be calculated from EIRP power by subtracting the gain of dipole, $\text{ERP power} = \text{EIRP power} - 2.15$ dBi.

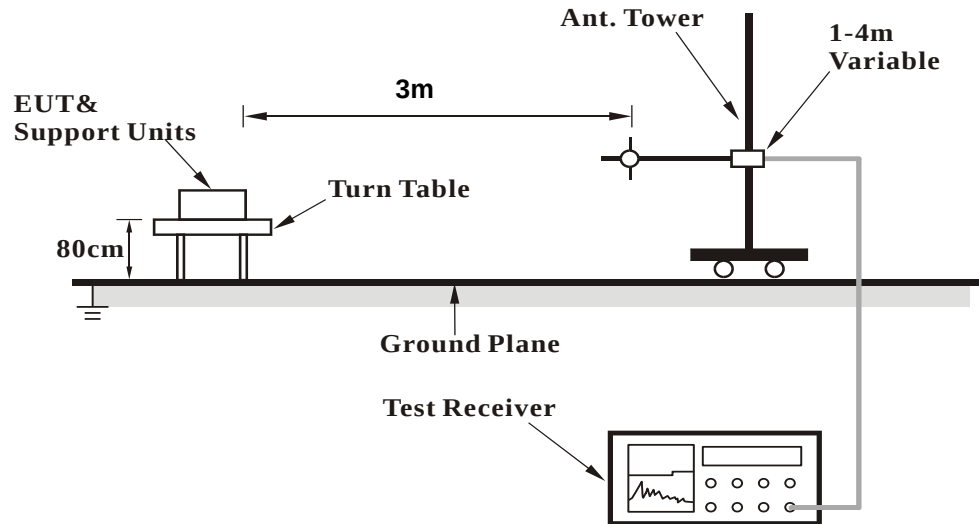
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.2.3 Deviation from Test Standard

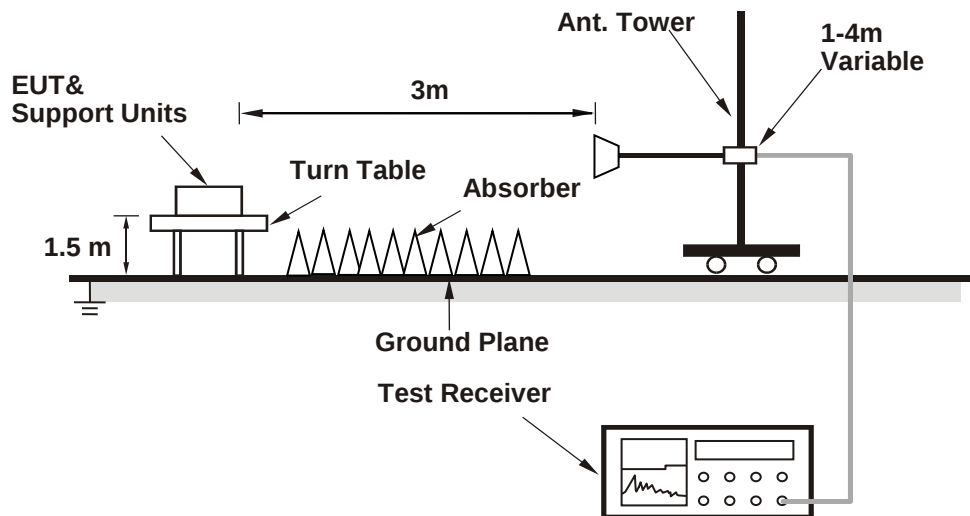
No deviation.

4.2.4 Test Setup

For Below 1GHz



For Above 1GHz:



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

4.2.5 Test Results

Below 1GHz

LTE Band 14: 10MHz

Mode	TX channel 23330	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	83.82	32.16	-95.26	-63.10	-13	-50.10
2	134.89	30.28	-95.26	-64.98	-13	-51.98
3	290.71	28.82	-95.26	-66.44	-13	-53.44
4	347.05	29.02	-95.26	-66.24	-13	-53.24
5	470.91	31.28	-95.26	-63.98	-13	-50.98
6	736.19	28.18	-95.26	-67.08	-13	-54.08
Antenna Polarity & Test Distance: Vertical at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	66.86	26.39	-95.26	-68.87	-13	-55.87
2	92.67	27.99	-95.26	-67.27	-13	-54.27
3	130.59	27.08	-95.26	-68.18	-13	-55.18
4	239.59	27.53	-95.26	-67.73	-13	-54.73
5	509.8	27.93	-95.26	-67.33	-13	-54.33
6	607.54	28.94	-95.26	-66.32	-13	-53.32

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), EIRP Value (dBm) = E (dB μ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance @3m.

LTE Band 26: 3MHz

Mode	TX channel 26775	Frequency Range	Below 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	83.63	33.87	-95.26	-61.39	-13	-48.39
2	135.78	30.01	-95.26	-65.25	-13	-52.25
3	291.63	28.34	-95.26	-66.92	-13	-53.92
4	346.63	31.26	-95.26	-64.00	-13	-51.00
5	471.01	31.18	-95.26	-64.08	-13	-51.08
6	736.81	27.19	-95.26	-68.07	-13	-55.07
Antenna Polarity & Test Distance: Vertical at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	64.49	27.21	-95.26	-68.05	-13	-55.05
2	93.07	29.46	-95.26	-65.80	-13	-52.80
3	130.14	27.48	-95.26	-67.78	-13	-54.78
4	238.8	27.79	-95.26	-67.47	-13	-54.47
5	509.59	29.91	-95.26	-65.35	-13	-52.35
6	607.66	29.11	-95.26	-66.15	-13	-53.15

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), EIRP Value (dBm) = E (dB μ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) - 104.8; where D is the measurement distance @3m.

Above 1GHz

LTE Band 14: 10MHz

Mode	TX channel 23330	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1586	41.7	-95.26	-53.56	-40	-13.56
2	2379	46.44	-95.26	-48.82	-13	-35.82
3	3172	47.28	-95.26	-47.98	-13	-34.98
4	3965	49	-95.26	-46.26	-13	-33.26
Antenna Polarity & Test Distance: Vertical at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1586	30.21	-95.26	-65.05	-40	-25.05
2	2379	46.77	-95.26	-48.49	-13	-35.49
3	3172	54.07	-95.26	-41.19	-13	-28.19
4	3965	54.87	-95.26	-40.39	-13	-27.39

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), EIRP Value (dBm) = E (dB μ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance @3m.

LTE Band 26: 3MHz

Mode	TX channel 26775	Frequency Range	Above 1000 MHz
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Antenna Polarity & Test Distance: Horizontal at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1645	33.33	-95.26	-61.93	-13	-48.93
2	2467.5	36.83	-95.26	-58.43	-13	-45.43
3	3290	37.84	-95.26	-57.42	-13	-44.42
4	4112.5	40.67	-95.26	-54.59	-13	-41.59
Antenna Polarity & Test Distance: Vertical at 3 M						
No.	Freq. (MHz)	Reading (dB μ V/m)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	1645	32.01	-95.26	-63.25	-13	-50.25
2	2467.5	43.95	-95.26	-51.31	-13	-38.31
3	3290	44.22	-95.26	-51.04	-13	-38.04
4	4112.5	50.15	-95.26	-45.11	-13	-32.11

Remarks:

1. Follow ANSI 63.26 section 5.2.7 d), EIRP Value (dBm) = E (dB μ V/m) - Correction Factor @ 3m.
2. Correction Factor (dB) = 20log(D) – 104.8; where D is the measurement distance @3m.

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 accredited and approved according to ISO/IEC 17025.

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

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