FCC Test Report

(PART 90S)

Report No.:	RFBHAA-WTW-P20090611-3
FCC ID:	JOYDA39
Test Model:	AL-T51A2-2
Series Model:	AL-T52V1, AL-T51A2-1 (refer to item 3.1 for more details)
Received Date:	Sep. 26, 2020
Test Date:	Sep. 29 ~ Oct. 06, 2020
Issued Date:	Oct. 15, 2020
Applicant:	Kyocera Corporation
Address:	2-1-1 Kagahara,Tsuzuki-ku Yokohama-city Kanagawa 224-8502 Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBHAA-WTW-P20090611-3	Original Release	Oct. 15, 2020

1 Certificate of Conformity

Product:	Telematics Module
Brand:	Kyocera
Test Model:	AL-T51A2-2
Series Model:	AL-T52V1, AL-T51A2-1 (refer to item 3.1 for more details)
Sample Status:	Engineering Sample
Applicant:	Kyocera Corporation
Test Date:	Sep. 29 ~ Oct. 06, 2020
Standards:	FCC Part 90, Subpart I, S FCC Part 2

This report is issued as a supplementary report of RFBHAA-WTW-P20070391-3. This report shall be used combined together with its original report.

Prepared by : Pettie Chen , **Date:** Oct. 15, 2020

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 15, 2020

Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2 (LTE 26)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 90.635 (b)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	N/A	Refer to Note 1
2.1055 90.213	Frequency Stability	N/A	Refer to Note 1
2.1049 90.209	Occupied Bandwidth	N/A	Refer to Note 1
90.210	Emission Masks	N/A	Refer to Note 1
2.1051 90.691	Conducted Spurious Emissions	N/A	Refer to Note 1
2.1053 90.691	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -34.4 dB at 97.90 MHz.

N/A: Not Applicable

Note:

1. The equivalent radiated power and radiated spurious emissions test items are performed for the addendum, according to the worst case of the original report. Refer to original report for the other test data.
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	3.63 dB
	200 MHz ~ 1000 MHz	3.64 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. 31, 2019	Dec. 30, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Jun. 08, 2020	Jun. 07, 2021
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 08, 2020	Jun. 07, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH4-01	Aug. 16, 2020	Aug. 15, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Aug. 16, 2020	Aug. 15, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Jun. 08, 2020	Jun. 07, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Jun. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.

3 General Information

3.1 General Description of EUT

Product	Telematics Module	
Brand	Kyocera	
Test Model	AL-T51A2-2	
Series Model	AL-T52V1, AL-T51A2-1	
Status of EUT	Engineering Sample	
Power Supply Rating	5Vdc	
Modulation Type	LTE	QPSK, 16QAM
Frequency Range	LTE Band 26 (Channel Bandwidth: 1.4 MHz)	814.7 ~ 823.3 MHz
	LTE Band 26 (Channel Bandwidth: 3 MHz)	815.5 ~ 822.5 MHz
	LTE Band 26 (Channel Bandwidth: 5 MHz)	816.5 ~ 821.5 MHz
	LTE Band 26 (Channel Bandwidth: 10 MHz)	819 MHz
Max. ERP Power	LTE Band 26 (Channel Bandwidth: 1.4 MHz)	204.174 mW (23.10dBm)
	LTE Band 26 (Channel Bandwidth: 3 MHz)	181.970 mW (22.60dBm)
	LTE Band 26 (Channel Bandwidth: 5 MHz)	169.824 mW (22.30dBm)
	LTE Band 26 (Channel Bandwidth: 10 MHz)	162.181 mW (22.10dBm)
Antenna Type	Refer to Note as below	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. This report is prepared for FCC class II permissive change. The differences compared with the original report (BV CPS report no.: RFBHAA-WTW-P20070391-3) are adding a model and changing software & memory capacity. The effective radiated power and radiated spurious emissions test items are performed for the addendum, according to the worst case of the original report. Refer to original report for the other test data.
2. All models are listed as below. (New model is marked in boldface.)

Brand	Model	Difference
Kyocera	AL-T52V1	Support WCDMA Band 2, 4, 5 and LTE Band 2, 4, 5, 12, 13
	AL-T51A2-1	Support WCDMA Band 2, 4, 5 and LTE Band 2, 4, 5, 12
	AL-T51A2-2	Support band same with AL-T51A2-1, just different memory and driver software

3. The EUT uses following antennas (support units).

Antenna 1					
Antenna Type	AUX		**Connecter Type**	SMA	
Manufacturer	YOKOWO		**Part Number**	86769-459B1	
Band	**B12**	**B13**	**B5 / B26**	**B4**	**B2**
Frequency (MHz)	**704**	**782**	**832**	**1730**	**1880**
Gain (dBi)	3.1	3.2	3.8	2.6	2.0

Antenna 2				
Antenna Type	AUX	**Connecter Type**	SMA	
Manufacturer	taoglas	**Part Number**	TG.30.8113	
Band	**B12**	**B5 / B26**	**B4**	**B2**
Frequency (MHz)	**700-800**	**824-960**	**1710-1880**	**1850-1990**
Free Space Straight Gain (dBi)	1.1	0.3	1.9	2.7
Free Space Bent Gain (dBi)	2.6	1.5	2.7	3.1

Antenna 3				
Antenna Type	AUX	**Connecter Type**	Inverted-F	
Manufacturer	MinebeaMitsumi	**Part Number**	DN4E 66T30	
Band	**B12 / B13**	**B5 / B26**	**B4**	**B2**
Frequency (MHz)	**700-800**	**824-960**	**1710-1880**	**1850-1990**
Gain (dBd)	-0.3	-0.3	0.4	0.4
Gain (dBi)	1.85	1.85	2.55	2.55

dBi = dBd + 2.15

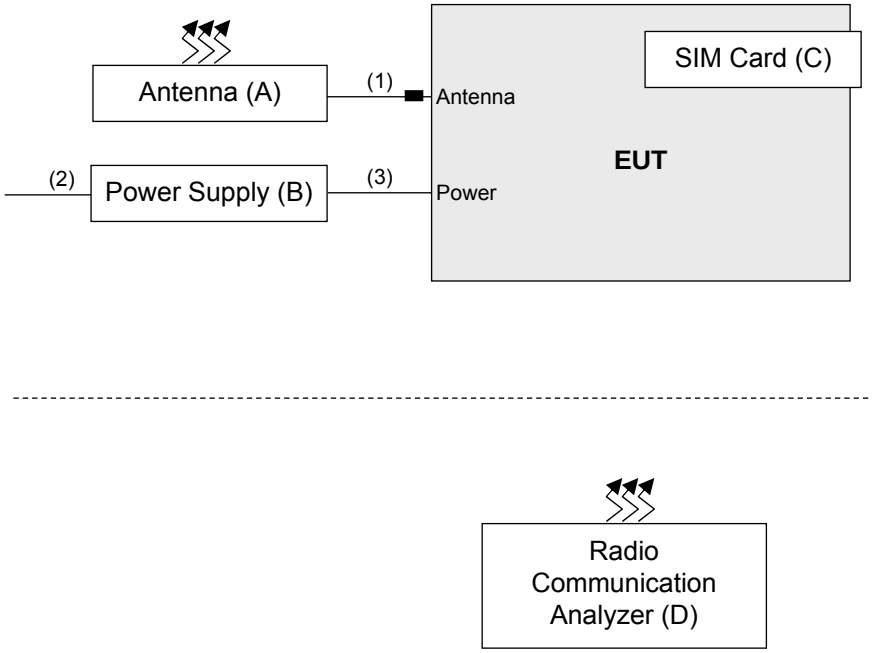
Antenna 4				
Antenna Type	External	**Connecter Type**	Inverted-F	
Manufacturer	Mitsumi Electric	**Part Number**	KJK966 T30	
Band	**B12 / B13**	**B5 / B26**	**B4**	**B2**
Frequency (MHz)	**700-800**	**824-960**	**1710-1880**	**1850-1990**
Gain (dBi)	1.0	1.0	0.4	0.4

Antenna 5				
Antenna Type	External	**Connecter Type**	Inverted-F	
Manufacturer	HARADA INDUSTRY	**Part Number**	TD2K 66 T30	
Band	**B12 / B13**	**B5 / B26**	**B4**	**B2**
Frequency (MHz)	**700-800**	**824-960**	**1710-1880**	**1850-1990**
Gain (dBi)	-2.1	-2.1	-1.2	-1.2

For WCDMA Band 2 and LTE Band 2: Antenna 2 was chosen for final test according to manufacturer's requirement.
For WCDMA Band 4, 5 and LTE Band 4, 5, 12, 13, 26: Antenna 1 was chosen for final test according to manufacturer's requirement.

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

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Antenna	taoglas	TG.30.8113	NA	NA	Provided by manufacturer
B.	Power Supply	Inspower	DC400-20D	212004	FCC DoC Approved	Provided by manufacturer Input:100-240Vac, 0.4A, 50-60Hz Output: 5Vdc, 3A
C.	SIM Card	NA	NA	NA	NA	Provided by manufacturer
D.	Radio Communication Analyzer	Anritsu	MT8820C	6201300640	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna	1	3	N	1	Provided by manufacturer
2.	Power	1	1.75	N	0	Provided by manufacturer
3.	Module cable	2	0.08	N	0	Attached on EUT

Note: The core(s) is(are) originally attached to the cable(s).

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Z-plane. Following channel(s) was (were) selected for the final test as listed below.

LTE Band 26

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		26740	26740 (819.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	26697 to 26783	26740 (819MHz)	1.4 MHz	QPSK	1 RB / 0 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25deg. C, 70%RH	120Vac, 60Hz	Luis Lee
Radiated Emission	25deg. C, 70%RH	120Vac, 60Hz	Noah Chang

3.4 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 90
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
KDB 971168 D02 Misc Rev Approv License Devices v02r01
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 maximum output power of the transmitter for mobile stations is 100 watts (20 dBw) ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. 10 MHz for LTE mode, and VBW ≥ 3 x RBW.

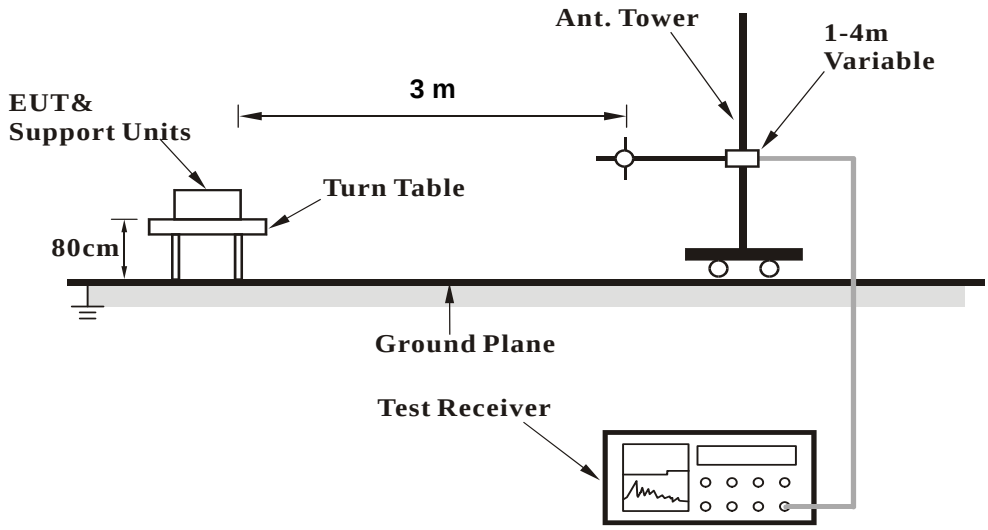
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical 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.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.

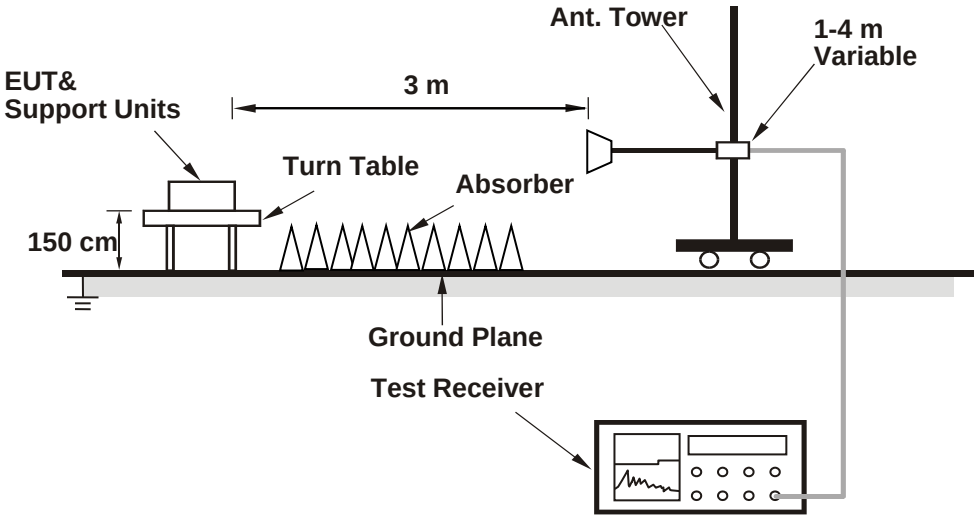
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

4.1.3 Test Setup

EIRP / ERP Measurement:
<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).

4.1.4 Test Results

ERP Power (dBm)

QPSK

LTE Band 26, Channel Bandwidth 1.4MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26697	814.70	-8.8	22.6	-0.3	22.3	50.0	-27.7
26740	819.00	-8.0	23.3	-0.2	23.1	50.0	-26.9
26783	823.30	-9.1	22.2	-0.1	22.1	50.0	-27.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26697	814.70	-18.7	13.5	-0.3	13.2	50.0	-36.8
26740	819.00	-17.0	15.1	-0.2	14.9	50.0	-35.1
26783	823.30	-17.9	14.2	-0.1	14.1	50.0	-35.9

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 3MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26705	815.50	-9.1	22.3	-0.3	22.0	50.0	-28.0
26740	819.00	-8.5	22.8	-0.2	22.6	50.0	-27.4
26775	822.50	-8.9	22.5	-0.1	22.4	50.0	-27.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26705	815.50	-18.7	13.5	-0.3	13.2	50.0	-36.8
26740	819.00	-17.9	14.2	-0.2	14.0	50.0	-36.0
26775	822.50	-18.0	14.0	-0.1	13.9	50.0	-36.1

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 5MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26715	816.50	-9.0	22.3	-0.2	22.1	50.0	-27.9
26740	819.00	-8.9	22.4	-0.2	22.2	50.0	-27.8
26765	821.50	-8.9	22.4	-0.1	22.3	50.0	-27.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26715	816.50	-18.9	13.2	-0.2	13.0	50.0	-37.0
26740	819.00	-18.4	13.7	-0.2	13.5	50.0	-36.5
26765	821.50	-17.5	14.5	-0.1	14.4	50.0	-35.6

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 10MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26740	819.00	-9.0	22.3	-0.2	22.1	50.0	-27.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26740	819.00	-18.8	13.3	-0.2	13.1	50.0	-36.9

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

16QAM

LTE Band 26, Channel Bandwidth 1.4MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26697	814.70	-9.8	21.6	-0.3	21.3	50.0	-28.7
26740	819.00	-9.0	22.3	-0.2	22.1	50.0	-27.9
26783	823.30	-10.1	21.2	-0.1	21.1	50.0	-28.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26697	814.70	-19.7	12.5	-0.3	12.2	50.0	-37.8
26740	819.00	-18.0	14.1	-0.2	13.9	50.0	-36.1
26783	823.30	-18.9	13.2	-0.1	13.1	50.0	-36.9

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 3MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26705	815.50	-10.1	21.3	-0.3	21.0	50.0	-29.0
26740	819.00	-9.5	21.8	-0.2	21.6	50.0	-28.4
26775	822.50	-9.9	21.5	-0.1	21.4	50.0	-28.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26705	815.50	-19.7	12.5	-0.3	12.2	50.0	-37.8
26740	819.00	-18.9	13.2	-0.2	13.0	50.0	-37.0
26775	822.50	-19.0	13.0	-0.1	12.9	50.0	-37.1

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 5MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26715	816.50	-10.0	21.3	-0.2	21.1	50.0	-28.9
26740	819.00	-9.9	21.4	-0.2	21.2	50.0	-28.8
26765	821.50	-9.9	21.4	-0.1	21.3	50.0	-28.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26715	816.50	-19.9	12.2	-0.2	12.0	50.0	-38.0
26740	819.00	-19.4	12.7	-0.2	12.5	50.0	-37.5
26765	821.50	-18.5	13.5	-0.1	13.4	50.0	-36.6

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

LTE Band 26, Channel Bandwidth 10MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26740	819.00	-10.0	21.3	-0.2	21.1	50.0	-28.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
Channel	FREQ. (MHz)	READING (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	ERP (dBm)	LIMIT (dBm)	MARGIN (dB)
26740	819.00	-19.8	12.3	-0.2	12.1	50.0	-37.9

NOTE: Power Value(dBm) = S.G Power Value(dBm) + Correction Factor(dB)

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

(1) 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 (P) dB. The limit of emission is equal to -13 dBm.

4.2.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. 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. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

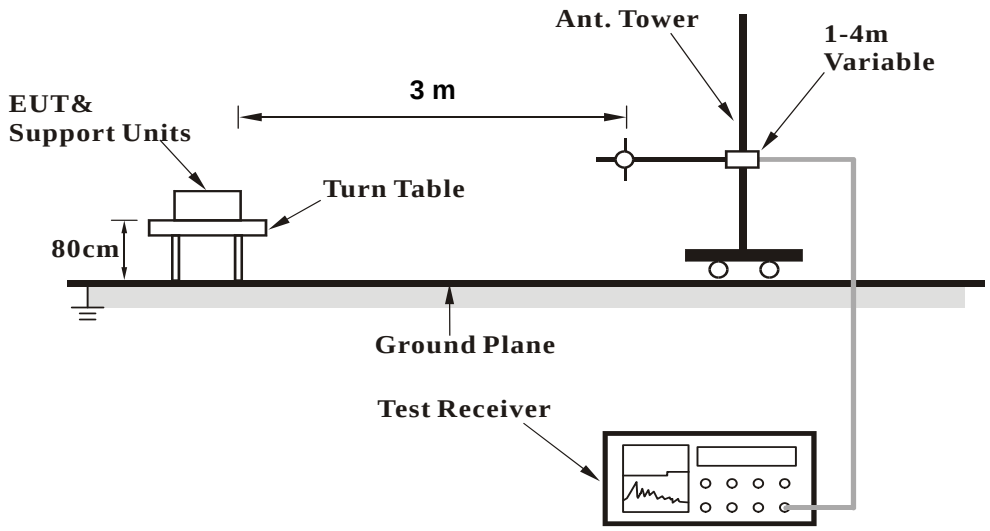
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.2.3 Deviation from Test Standard

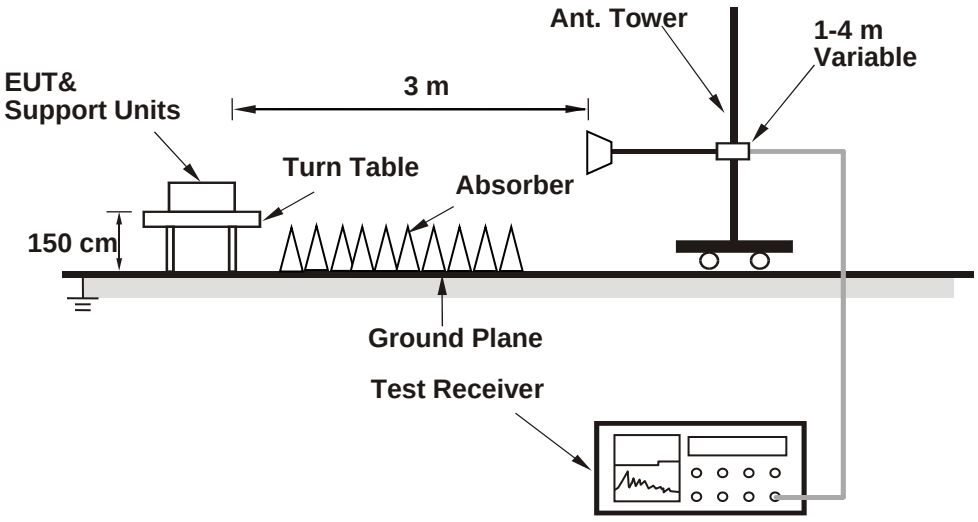
No deviation.

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).

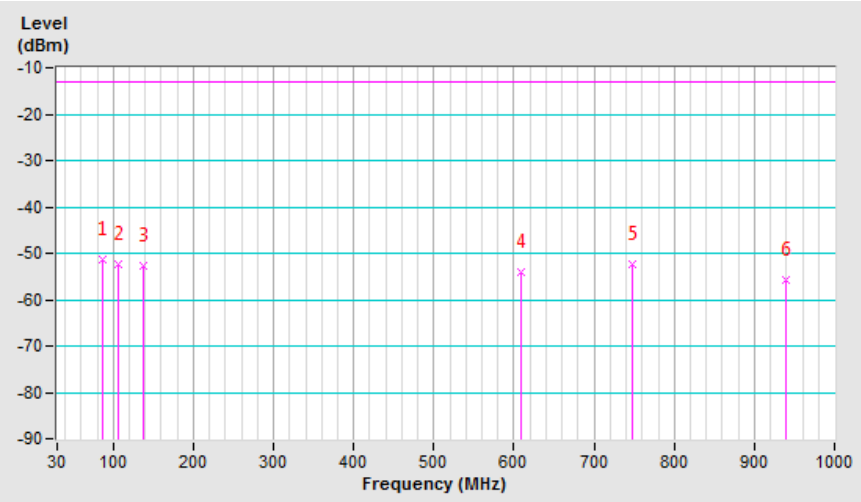
4.2.5 Test Results

LTE BAND 26, CHANNEL BANDWIDTH: 1.4MHz

Mode	TX channel 26740 (819MHz)	**Frequency Range**	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	**Input Power**	120Vac, 60Hz
Tested By	Noah Chang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	**FREQ. (MHz)**	**READING (dBm)**	**S.G POWER VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**ERP (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
1	86.26	-42.4	-51.4	0.1	-51.3	-13.0	-38.3
2	105.66	-42.4	-52.9	0.6	-52.3	-13.0	-39.3
3	136.70	-44.2	-52.3	-0.3	-52.6	-13.0	-39.6
4	608.12	-52.5	-58.5	4.5	-54.0	-13.0	-41.0
5	747.80	-53.9	-57.1	4.7	-52.4	-13.0	-39.4
6	939.86	-60.8	-59.8	3.9	-55.9	-13.0	-42.9

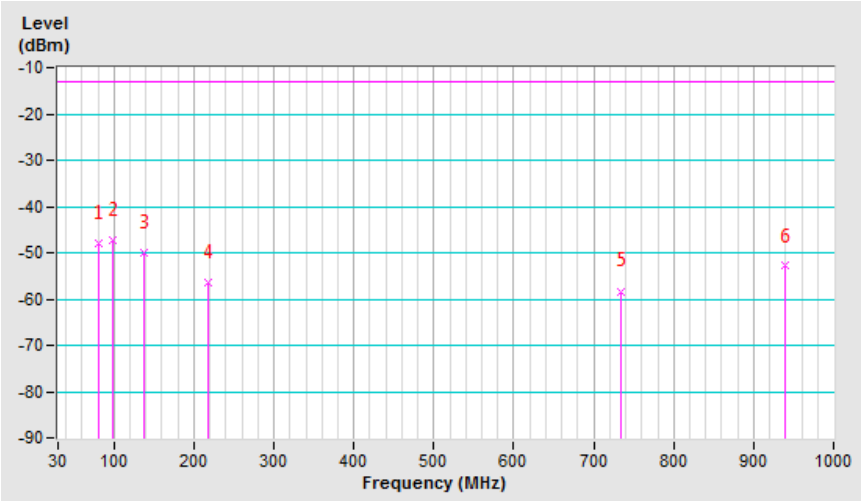
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 26740 (819MHz)	**Frequency Range**	Below 1000 MHz
Environmental Conditions	25deg. C, 70%RH	**Input Power**	120Vac, 60Hz
Tested By	Noah Chang		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	**FREQ. (MHz)**	**READING (dBm)**	**S.G POWER VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**ERP (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
1	80.44	-42.2	-46.4	-1.6	-48.0	-13.0	-35.0
2	**97.90**	**-39.6**	**-48.4**	**1.0**	**-47.4**	**-13.0**	**-34.4**
3	136.70	-43.8	-49.8	-0.3	-50.1	-13.0	-37.1
4	218.18	-53.4	-61.8	5.4	-56.4	-13.0	-43.4
5	734.22	-61.8	-63.1	4.8	-58.3	-13.0	-45.3
6	939.86	-59.5	-56.8	3.9	-52.9	-13.0	-39.9

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz

LTE Band 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26740 (819MHz)	**Frequency Range**	1GHz-18GHz
Environmental Conditions	25deg. C, 70%RH	**Input Power**	120Vac, 60Hz
Tested By	Noah Chang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	**FREQ. (MHz)**	**READING (dBm)**	**S.G POWER VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**ERP (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
1	1638.00 (PK)	-59.2	-60.4	5.5	-54.9	-13.0	-41.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
NO.	**FREQ. (MHz)**	**READING (dBm)**	**S.G POWER VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**ERP (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
1	1638.00 (PK)	-62.0	-61.1	5.5	-55.6	-13.0	-42.6

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

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.

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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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