

FCC CERTIFICATION TEST REPORT

REPORT NO.: FC140630C01

MODEL NO.: F-02G

FCC ID: VQK-F02G

RECEIVED: Aug. 05, 2014

TESTED: Aug. 13~ Aug. 15, 2014

ISSUED: Aug. 29, 2014

APPLICANT: FUJITSU LIMITED

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Table of Contents

RELEASE CONTROL RECORD	3
1 CERTIFICATION	4
2 SUMMARY OF TEST RESULTS	5
2.1 MEASUREMENT UNCERTAINTY	5
3 GENERAL INFORMATION	6
3.1 GENERAL DESCRIPTION OF EUT	6
3.2 DESCRIPTION OF TEST MODES	7
3.3 DESCRIPTION OF SUPPORT UNITS	8
3.4 CONFIGURATION OF SYSTEM UNDER TEST	9
4 TEST TYPES AND RESULTS	10
4.1 CONDUCTED EMISSION MEASUREMENT	10
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	10
4.1.2 TEST INSTRUMENTS	10
4.1.3 TEST PROCEDURES	11
4.1.4 DEVIATION FROM TEST STANDARD	11
4.1.5 TEST SETUP	12
4.1.6 EUT OPERATING CONDITIONS	12
4.1.7 TEST RESULTS	13
4.2 RADIATED EMISSION MEASUREMENT	17
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	17
4.2.2 TEST INSTRUMENTS	19
4.2.3 TEST PROCEDURES	21
4.2.4 DEVIATION FROM TEST STANDARD	22
4.2.5 TEST SETUP	23
4.2.6 EUT OPERATING CONDITIONS	24
4.2.7 TEST RESULTS	25
5 PHOTOGRAPHS OF THE TEST CONFIGURATION	31
6 INFORMATION ON THE TESTING LABORATORIES	32
7 APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	33



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC140630C01	Original release	Aug. 29, 2014

1 CERTIFICATION

PRODUCT: Smart Phone
MODEL: F-02G
BRAND: FUJITSU
APPLICANT: FUJITSU LIMITED
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Aug. 13~ Aug. 15, 2014
STANDARD: **FCC Part 15, Subpart B, Class B**
ICES-003:2012 Issue 5, Class B
ANSI C63.4:2009

The above equipment (Model: F-02G) 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 : Celine Chou , **DATE** : Aug. 29, 2014
Celine Chou / Specialist

APPROVED BY : Ken Liu , **DATE** : Aug. 29, 2014
Ken Liu / Senior Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications.

EMISSION			
Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B, Class B	Conducted emissions test	PASS	Meet the requirement of limit. Minimum passing margin is -3.06dB at 0.56591MHz.
ICES-003:2012 Issue 5, Class B	Radiated emissions test (30MHz~40GHz)	PASS	Meet the requirement of limit. Minimum passing margin is -4.71dB at 42.80MHz.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Frequency	Uncertainty
Conducted emissions	150kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 1GHz	4.70 dB
	Above 1GHz	2.26 dB

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Smart Phone
MODEL NO.	F-02G
POWER SUPPLY	3.8Vdc (Battery) 5Vdc (Adapter or cradle when normal charging) 9Vdc (Adapter or cradle when quick charging)
OPERATING SOFTWARE	Android 4.4.4
I/O PORTS	Refer to users' manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

- The EUT contains the following accessories.

PRODUCT	BRAND	MODEL	DESCRIPTION
Battery	NTT docomo	NA	3.8Vdc, 3500mA, 13.3Wh
Cradle	Fujitsu Limited	F47	Input: 5.0Vdc, 1.5A 9.0Vdc, 1.5A Output: 5.0Vdc, 1.5A 9.0Vdc, 1.5A

- The following adapter is support unit only.

PRODUCT	BRAND	MODEL	DESCRIPTION
Adapter	NTT docomo	AC Adaptor 05	Input: 100-240Vac, 0.12A, 50-60Hz, 0.4A Output: 5.0Vdc, 1.5A 9.0Vdc, 1.5A Power line: 1.25m cable with two cores attached on adapter

- SW version is R15Ae.
- HW version is V2.1.0.
- IMEI Code: 354014060011312.
- The EUT's highest operating frequency is 5GHz. Therefore the radiated emissions tests are tested up to 40GHz.
- 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 DESCRIPTION OF TEST MODES

The EUT consumes power from adapter or cradle, which is designed with AC power supply of 100-240Vac, 50-60Hz.

For radiated emissions below 1GHz test, the EUT has been pre-tested under the following test modes, and **test mode 4** was found to be the worst case for final test.

Test Mode	Test Condition
1	GSM 850 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + MP4 (SD Card) + Adapter
2	GSM 1900 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + MP4 (SD Card) + Adapter + Earphone
3	WCDMA Band 5 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + Camera (Front) + Adapter + Earphone
4	LTE Band 17 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + Camera (Back) + Adapter + Earphone
5	GSM 850 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + RFID Idle + USB R/W
6	EUT charging + adapter + Cradle

Test results are presented in the report as below.

Test Result	Test Condition
Conducted emissions test	
A	LTE Band 17 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + Camera (Back) + Adapter + Earphone
B	EUT charging + adapter + Cradle
Radiated emissions test	
-	LTE Band 17 Idle + WIFI Idle + BT Idle + GPS RX + ANT plus Idle + Camera (Back) + Adapter + Earphone

3.3 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.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A.	Earphone	Apple	N/A	N/A	N/A	-
B.	Adapter	NTT docomo	AC Adaptor 05	N/A	N/A	Provided by the manufacturer
C.	Bluetooth Earphone	ELECOM	LBT-MPHS400	N/A	N/A	-
D.	GPS simulator	SPECTRACOM	GSG-54	200055	N/A	-
E.	Universal Radio Communication Tester	Anritsu	MT8820C	6201010284	N/A	-
F.	Wireless N Dual band Router	D-LINK	DIR-815	PVK21B5000399	KA21R815A1	-
G.	Ant.	Adidas	Q00145	N/A	N/A	-
H.	SIM Card	R&S	CMW-Z04	N/A	N/A	-
I.	SD Card	SanDisk	8GB	N/A	N/A	-

NOTE:

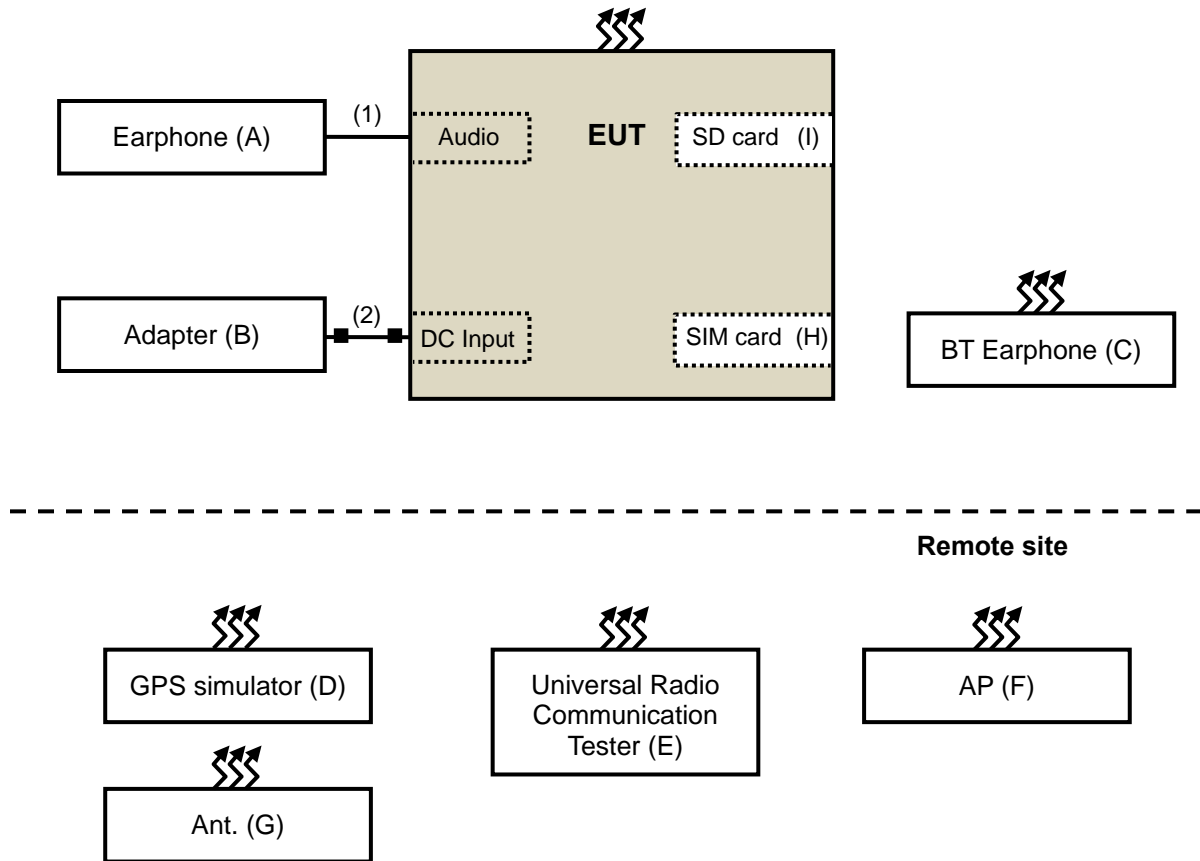
1. All power cords of the above support units are non-shielded (1.8 m).
2. Item C-G acted as a communication partner to transfer data.

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	Earphone cable	1	1.2	Y	0	-
2.	Power cable	1	1.25	N	2	Attached on adapter

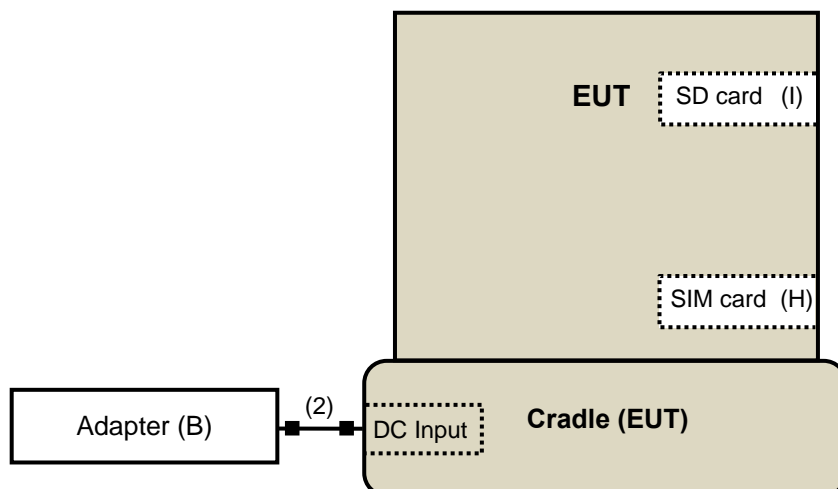
Note: The core(s) is(are) originally attached to the cable(s).

3.4 CONFIGURATION OF SYSTEM UNDER TEST

TEST MODE A



TEST MODE B



4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSIONS MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

TEST STANDARD:

FCC Part 15, Subpart B (section: 15.107)

ICES-003:2012 Issue 5 (section: 6.1)

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	79	66	66-56	56-46
0.5-5	73	60	56	46
5-30	73	60	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	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 Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

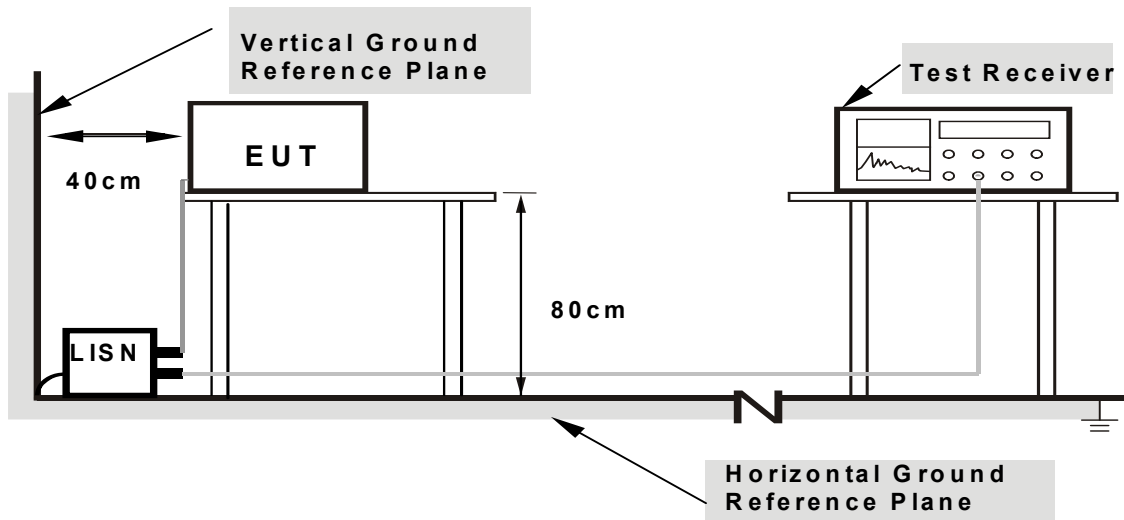
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under Limit - 20dB was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

TEST MODE A

- Placed the EUT on the test table.
- The EUT linked with the Bluetooth Earphone, GPS simulator, Universal Radio Communication Tester, Wireless N Dual band Router and Ant., which acted as a communication partner, and then set the LTE, WIFI, Bluetooth and ANT plus function in idle condition, GPS function in RX condition.
- Camera function of EUT was enabled during testing.
- The EUT played audio signals and sent audio signals to the earphone.

TEST MODE B

- Placed the EUT on the cradle and located it on the test table, the EUT was powered by cradle at charging mode.

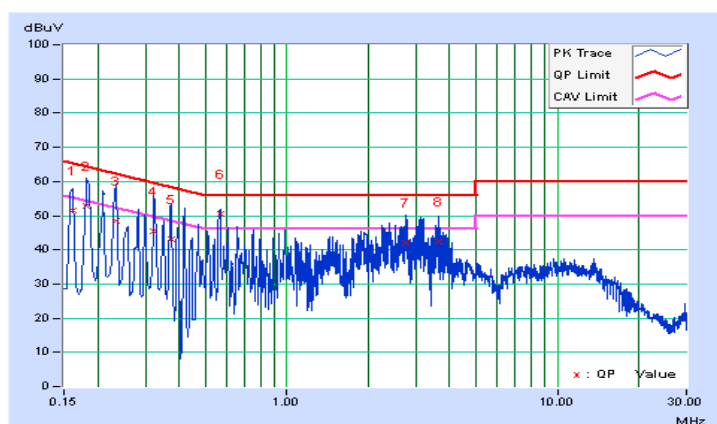
4.1.7 TEST RESULTS

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	25°C, 62%RH
Tested by	Daniel Lin	Test Date	2014/8/13
Test Mode	Mode A		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16105	0.11	51.48	30.48	51.59	30.59	65.41	55.41	-13.82	-24.82
2	0.18228	0.10	52.63	31.41	52.73	31.51	64.38	54.38	-11.65	-22.87
3	0.23400	0.09	48.40	30.47	48.49	30.56	62.31	52.31	-13.81	-21.74
4	0.32203	0.10	45.21	28.86	45.31	28.96	59.65	49.65	-14.34	-20.69
5	0.37322	0.11	42.91	24.56	43.02	24.67	58.43	48.43	-15.41	-23.76
6	0.56591	0.14	50.44	42.80	50.58	42.94	56.00	46.00	-5.42	-3.06
7	2.73800	0.25	41.74	30.11	41.99	30.36	56.00	46.00	-14.01	-15.64
8	3.64600	0.26	42.03	25.40	42.29	25.66	56.00	46.00	-13.71	-20.34

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

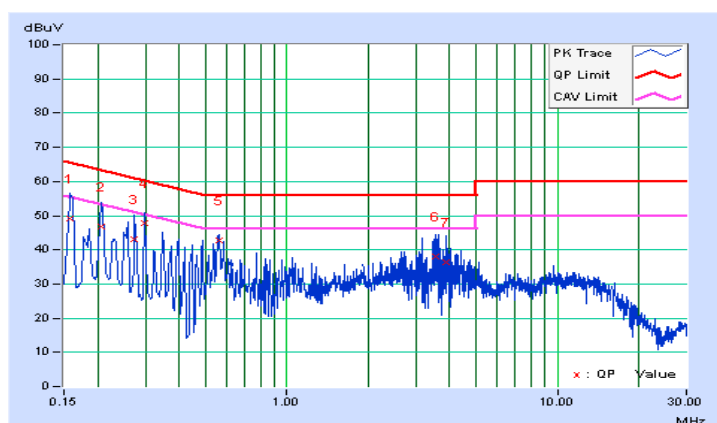


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	25°C, 62%RH
Tested by	Daniel Lin	Test Date	2014/8/13
Test Mode	Mode A		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15811	0.06	49.26	28.46	49.32	28.52	65.56	55.56	-16.25	-27.05
2	0.20600	0.09	46.82	30.47	46.91	30.56	63.37	53.37	-16.45	-22.80
3	0.27422	0.12	43.13	26.47	43.25	26.59	60.99	50.99	-17.74	-24.40
4	0.29800	0.13	47.84	26.17	47.97	26.30	60.30	50.30	-12.33	-24.00
5	0.56146	0.18	42.66	36.64	42.84	36.82	56.00	46.00	-13.16	-9.18
6	3.56200	0.25	37.71	23.04	37.96	23.29	56.00	46.00	-18.04	-22.71
7	3.89000	0.26	36.09	23.00	36.35	23.26	56.00	46.00	-19.65	-22.74

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

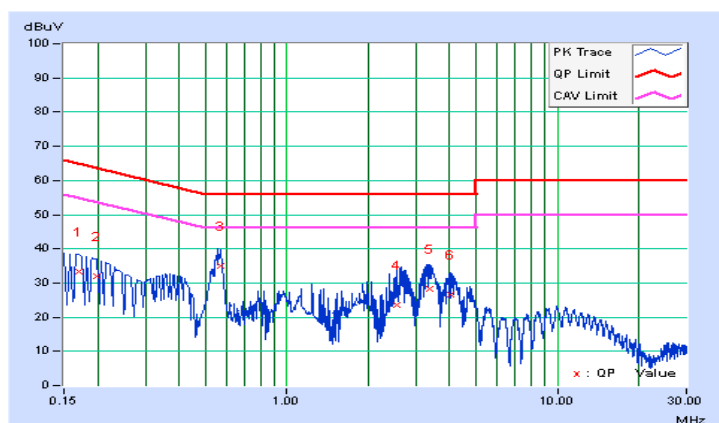


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	25°C, 62%RH
Tested by	Daniel Lin	Test Date	2014/8/13
Test Mode	Mode B		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	0.10	33.32	18.73	33.42	18.83	64.96	54.96	-31.54	-36.13
2	0.19800	0.09	31.90	17.95	31.99	18.04	63.69	53.69	-31.70	-35.65
3	0.56600	0.14	34.84	26.83	34.98	26.97	56.00	46.00	-21.02	-19.03
4	2.55800	0.25	23.36	13.30	23.61	13.55	56.00	46.00	-32.39	-32.45
5	3.35400	0.26	28.16	13.99	28.42	14.25	56.00	46.00	-27.58	-31.75
6	4.00753	0.26	26.25	12.76	26.51	13.02	56.00	46.00	-29.49	-32.98

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

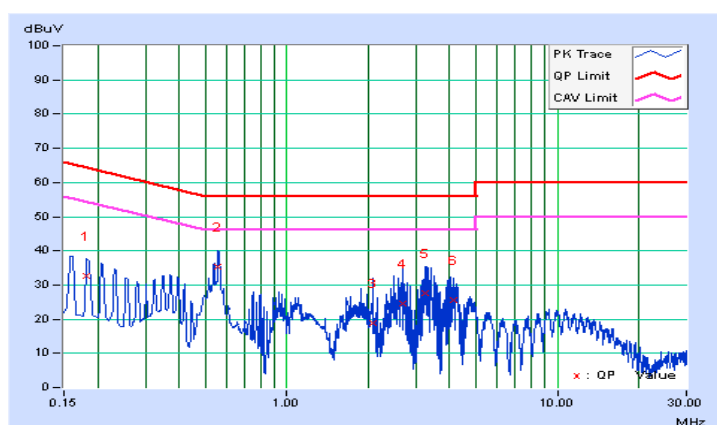


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	25°C, 62%RH
Tested by	Daniel Lin	Test Date	2014/8/13
Test Mode	Mode B		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18228	0.08	32.72	14.66	32.80	14.74	64.38	54.38	-31.59	-39.65
2	0.55851	0.18	35.32	23.40	35.50	23.58	56.00	46.00	-20.50	-22.42
3	2.07400	0.22	18.57	7.21	18.79	7.43	56.00	46.00	-37.21	-38.57
4	2.68200	0.23	24.21	9.30	24.44	9.53	56.00	46.00	-31.56	-36.47
5	3.25800	0.25	27.41	10.14	27.66	10.39	56.00	46.00	-28.34	-35.61
6	4.13000	0.27	25.35	9.55	25.62	9.82	56.00	46.00	-30.38	-36.18

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.2 RADIATED EMISSIONS MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSIONS MEASUREMENT

TEST STANDARD:

FCC Part 15, Subpart B (section: 15.109)

ICES-003:2012 Issue 5 (section: 6.2)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960				
960-1000	49.5	43.5	47	37
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960				
960-1000	60	54	57.5	47.5
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000			Avg: 60 Peak: 80	Avg: 54 Peak: 74

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (uV/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 4. QP detector shall be applied if not specified.

Radiated Emissions Limits at 1.5 meter (dBμV/m)		
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B
18000-40000	Avg: 66 Peak: 86	Avg: 60 Peak: 80

Note: Limit@1.5m = Limit@3m + 20log(3/1.5)

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 TEST INSTRUMENTS

Frequency range 30MHz~1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ (V)	ESR-7	101240	Sep. 23, 2013	Sep. 22, 2014
Test Receiver ROHDE & SCHWARZ (H)	ESR-7	101264	Nov. 29, 2013	Nov. 28, 2014
BILOG Antenna SCHWARZBECK (V)	VULB9168	9168-148	Feb. 25, 2014	Feb. 24, 2015
BILOG Antenna SCHWARZBECK (H)	VULB9168	9168-149	Feb. 25, 2014	Feb. 24, 2015
Preamplifier Agilent (V)	8447D	2944A10636	Oct. 18, 2013	Oct. 17, 2014
Preamplifier Agilent (H)	8447D	2944A10637	Oct. 18, 2013	Oct. 17, 2014
Preamplifier Agilent	8449B	3008A01959	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Woken (V)	8D-FB	Cable-Hych1-01	Oct. 26, 2013	Oct. 25, 2014
RF signal cable Woken (H)	8D-FB	Cable-Hych1-02	Oct. 26, 2013	Oct. 25, 2014
Software BV ADT	BV ADT_Radiated_ V 8.7.07	NA	NA	NA
Antenna Tower (V)	MFA-440	9707	NA	NA
Antenna Tower (H)	MFA-440	970705	NA	NA
Turn Table	DS430	50303	NA	NA
Controller (V)	MF7802	074	NA	NA
Controller (H)	MF7802	08093	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 1.
3. The FCC Site Registration No. is 477732.
4. The IC Site Registration No. is IC 7450F-1.
5. The VCCI Site Registration No. is R-1893.

Frequency range above 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Oct. 24, 2013	Oct. 23, 2014
Spectrum Analyzer Agilent	E4446A	MY44360124	Feb. 12, 2014	Feb. 11, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Feb. 26, 2014	Feb. 25, 2015
RF signal cable Woken	8D-FB	NA	Mar. 21, 2014	Mar. 20, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Jan. 05, 2014	Jan. 04, 2015
Preamplifier Agilent (Below 1GHz)	8447D	2944A10629	Oct. 18, 2013	Oct. 17, 2014
Preamplifier Agilent (Above 1GHz)	8449B	3008A01959	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MWX322+MW X2211308S029 5	Sep. 09, 2013	Sep. 08, 2014
Software BV ADT	BV ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Controller BV ADT	SC100	SC93021702	NA	NA
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 09, 2014	Jan. 08, 2015
RF signal cable HUBER+SUHNER	SUCOFLEX 102	38218/2+ 37433/2	Oct. 26, 2013	Oct. 25, 2014
Fix tool for Boresight antenna tower	BAF-01	2	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 2.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 686814.
 5. The IC Site Registration No. is IC 7450F-2.
 6. The VCCI Site Registration No. is G-18.

4.2.3 TEST PROCEDURES

Frequency range 30MHz~1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-Peak (QP) detection at frequency below 1GHz.

Frequency range above 1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For frequency range 1GHz ~ 18GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. For frequency range 18GHz ~ 40GHz, the EUT was set 1.5 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna can be varied from 1 meter to 4 meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

NOTE:

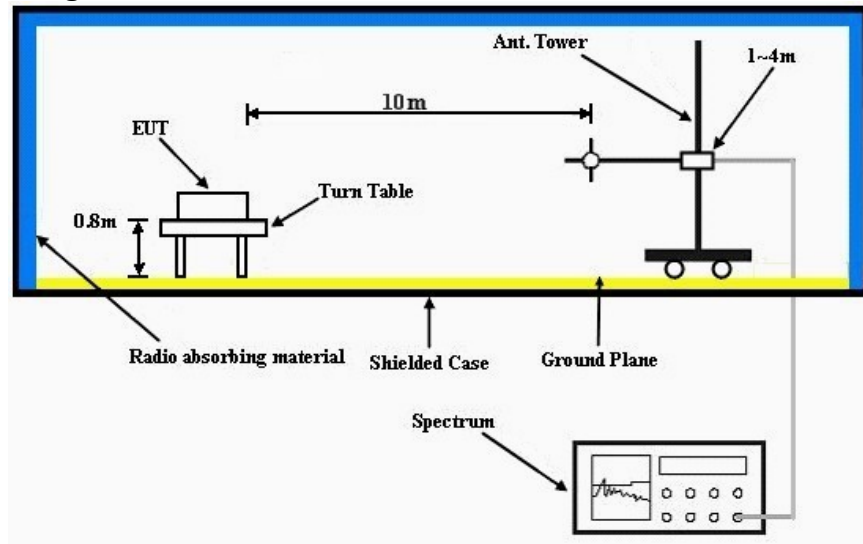
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak (PK) detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz for Average (AV) detection at frequency above 1GHz.
2. For measurement of frequency above 1000MHz, the EUT was set 3 meters away from the receiver antenna.

4.2.4 DEVIATION FROM TEST STANDARD

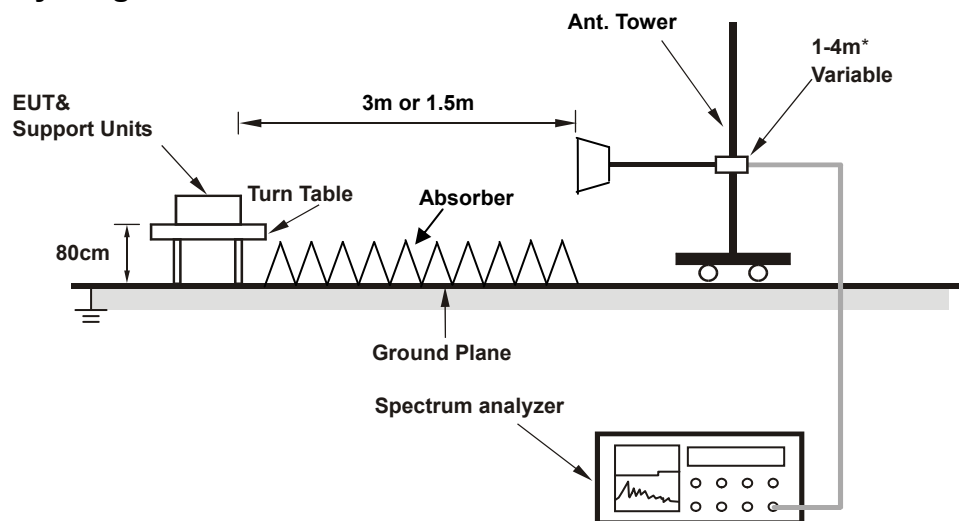
No deviation.

4.2.5 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



* : depends on the EUT height and the antenna 3dB beamwidth both.

For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the test table.
- b. The EUT linked with the Bluetooth Earphone, GPS simulator, Universal Radio Communication Tester, Wireless N Dual band Router and Ant., which acted as a communication partner, and then set the LTE, WIFI, Bluetooth and ANT plus function in idle condition, GPS function in RX condition.
- c. Camera function of EUT was enabled during testing.
- d. The EUT played audio signals and sent audio signals to the earphone.

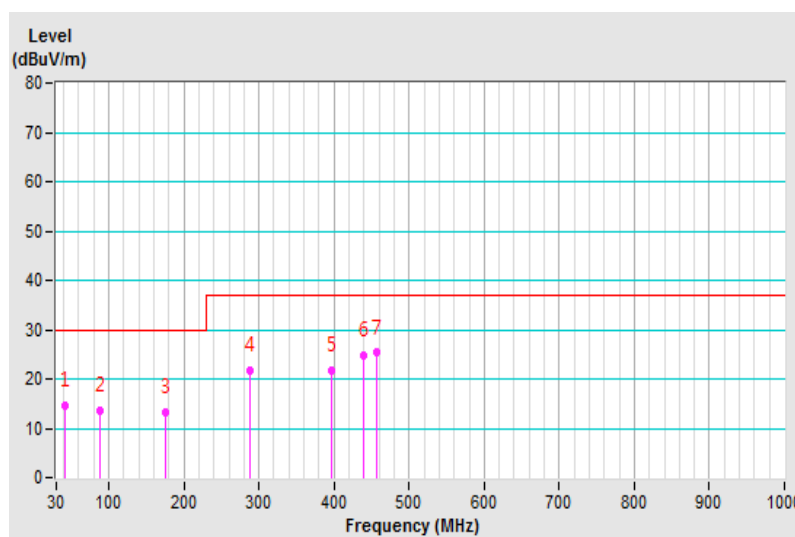
4.2.7 TEST RESULTS

Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	23°C, 63%RH
Tested by	Rolan Zheng	Test Date	2014/8/14

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.32	14.72 QP	30.00	-15.28	2.50 H	305	29.74	-15.02
2	87.72	13.57 QP	30.00	-16.43	3.00 H	122	33.62	-20.05
3	175.99	13.23 QP	30.00	-16.77	3.50 H	174	28.07	-14.84
4	287.98	21.71 QP	37.00	-15.29	3.00 H	257	34.12	-12.41
5	396.78	21.69 QP	37.00	-15.31	3.00 H	183	31.27	-9.58
6	438.39	24.83 QP	37.00	-12.17	2.00 H	168	33.32	-8.49
7	457.60	25.30 QP	37.00	-11.70	2.00 H	179	33.51	-8.21

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

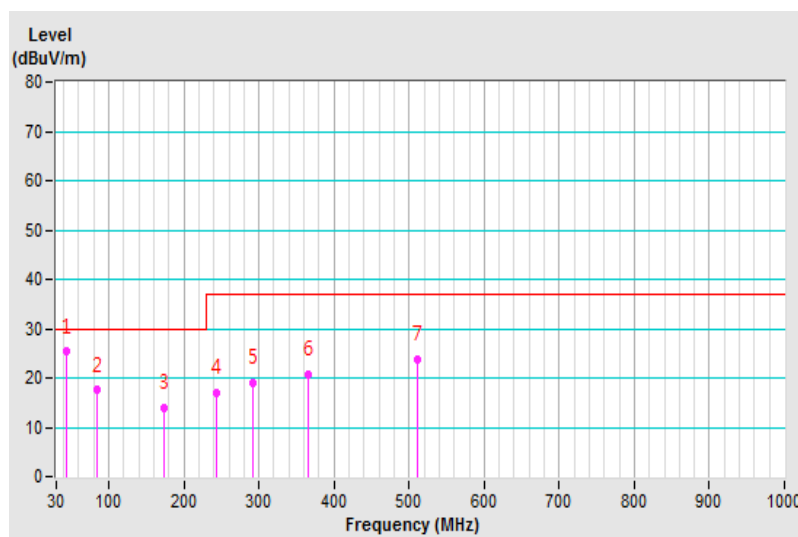


Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	23°C, 63%RH
Tested by	Rolan Zheng	Test Date	2014/8/14

Antenna Polarity & Test Distance : Vertical at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.80	25.29 QP	30.00	-4.71	3.00 V	342	39.57	-14.28
2	83.84	17.50 QP	30.00	-12.50	2.00 V	106	36.73	-19.23
3	173.71	13.93 QP	30.00	-16.07	4.00 V	343	27.83	-13.90
4	243.17	16.97 QP	37.00	-20.03	1.00 V	273	30.70	-13.73
5	291.19	19.03 QP	37.00	-17.97	3.50 V	316	30.45	-11.42
6	364.76	20.82 QP	37.00	-16.18	1.00 V	358	30.43	-9.61
7	512.02	23.88 QP	37.00	-13.12	3.50 V	345	30.70	-6.82

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

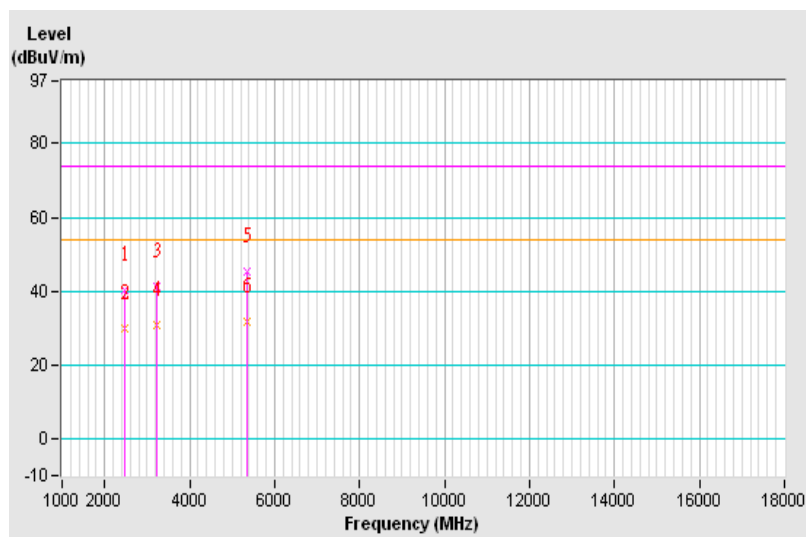


Frequency Range	1GHz ~ 18GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	22°C, 63%RH
Tested by	Pon Tsai	Test Date	2014/8/15

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2473.33	40.52 PK	74.00	-33.48	1.00 H	11	44.16	-3.64
2	2473.33	29.88 AV	54.00	-24.12	1.00 H	11	33.52	-3.64
3	3238.22	41.21 PK	74.00	-32.79	1.00 H	110	43.06	-1.85
4	3238.22	30.60 AV	54.00	-23.40	1.00 H	110	32.45	-1.85
5	5363.20	45.22 PK	74.00	-28.78	1.00 H	149	41.36	3.86
6	5363.20	31.89 AV	54.00	-22.11	1.00 H	149	28.03	3.86

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

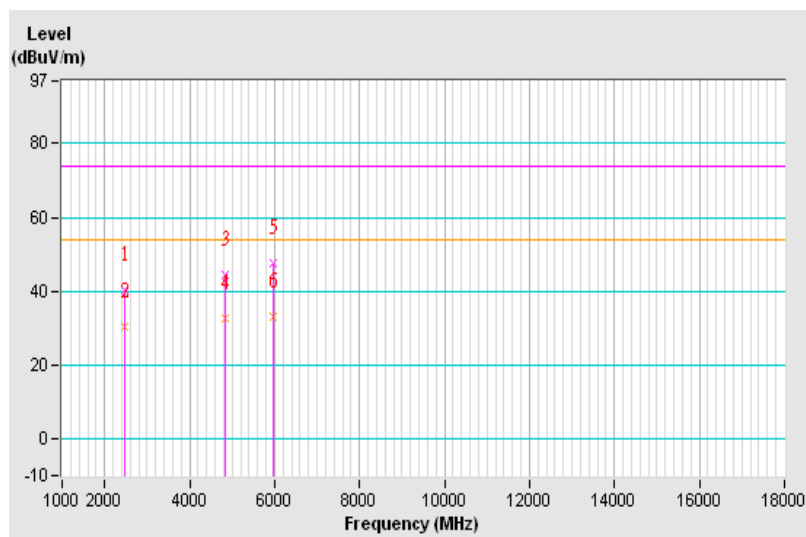


Frequency Range	1GHz ~ 18GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	22°C, 63%RH
Tested by	Pon Tsai	Test Date	2014/8/15

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2473.90	40.13 PK	74.00	-33.87	1.00 V	115	43.76	-3.63
2	2473.90	30.25 AV	54.00	-23.75	1.00 V	115	33.88	-3.63
3	4825.01	44.21 PK	74.00	-29.79	1.00 V	162	41.72	2.49
4	4825.01	32.56 AV	54.00	-21.44	1.00 V	162	30.07	2.49
5	5986.67	47.38 PK	74.00	-26.62	1.00 V	277	42.05	5.33
6	5986.67	33.12 AV	54.00	-20.88	1.00 V	277	27.79	5.33

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

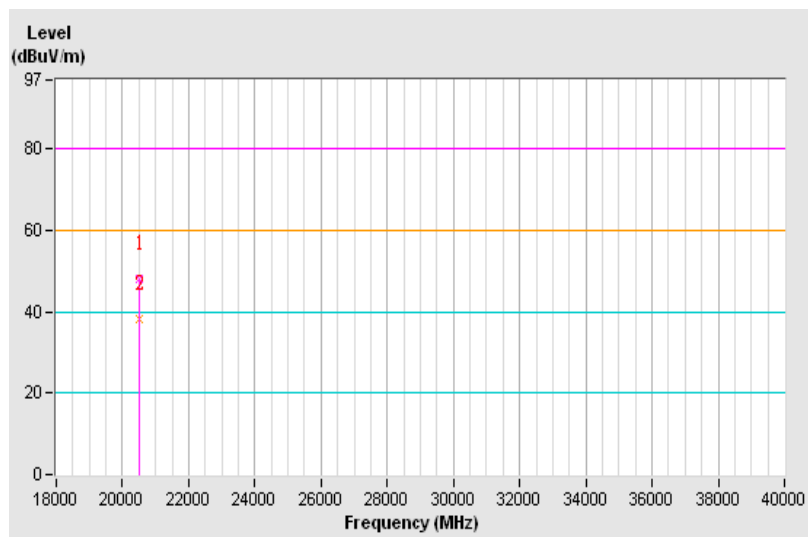


Frequency Range	18GHz ~ 40GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	22°C, 63%RH
Tested by	Pon Tsai	Test Date	2014/8/15

Antenna Polarity & Test Distance : Horizontal at 1.5 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	20490.12	48.21 PK	80.00	-31.79	1.00 H	35	52.24	-4.03
2	20490.12	38.21 AV	60.00	-21.79	1.00 H	35	42.24	-4.03

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

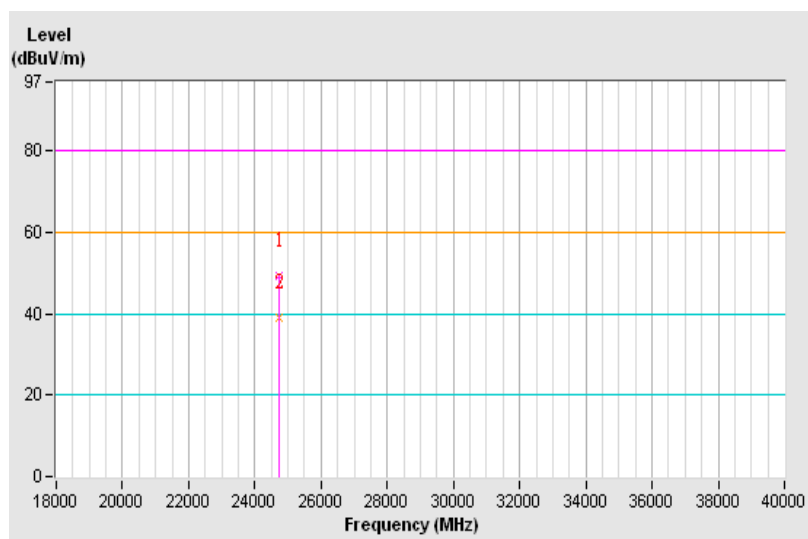


Frequency Range	18GHz ~ 40GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz (System)	Environmental Conditions	22°C, 63%RH
Tested by	Pon Tsai	Test Date	2014/8/15

Antenna Polarity & Test Distance : Vertical at 1.5 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	24751.22	49.31 PK	80.00	-30.69	1.00 V	18	50.18	-0.87
2	24751.22	39.22 AV	60.00	-20.78	1.00 V	18	40.09	-0.87

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 INFORMATION ON 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.

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.

7 APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

--- END ---