

FCC Test Report

Report No.: RF160831C13-4

FCC ID: HFS-M99

Test Model: QTAXU1

Received Date: Aug. 31, 2016

Test Date: Sep. 05, 2016 ~ Sep. 14, 2016

Issued Date: Sep. 21, 2016

Applicant: Quanta Computer Inc.

Address: No.188, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C)

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan, R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results.....	5
2.1 Measurement Uncertainty.....	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes.....	7
3.2.1 Test Mode Applicability and Tested Channel Detail.....	7
3.3 Description of Support Units	8
3.3.1 Configuration of System under Test	8
3.4 General Description of Applied Standards.....	8
4 Test Types and Results	9
4.1 Radiated Emission Measurement.....	9
4.1.1 Limits of Radiated Emission Measurement.....	9
4.1.2 Test Instruments	10
4.1.3 Test Procedures.....	11
4.1.4 Deviation from Test Standard	11
4.1.5 Test Set Up	12
4.1.6 EUT Operating Conditions.....	12
4.1.7 Test Results	13
4.2 Frequency Stability	19
4.2.1 Limits of Frequency Stability Measurement	19
4.2.2 Test Setup.....	19
4.2.3 Test Instruments	19
4.2.4 Test Procedure	19
4.2.5 Deviation from Test Standard	19
4.2.6 EUT Operating Conditions.....	19
4.2.7 Test Result	20
4.3 20 dB Bandwidth.....	21
4.3.1 Limits of 20 dB Bandwidth Measurement.....	21
4.3.2 Test Setup.....	21
4.3.3 Test Instruments	21
4.3.4 Test Procedures.....	21
4.3.5 Deviation from Test Standard	21
4.3.6 EUT Operating Conditions.....	21
4.3.7 Test Results	22
5 Pictures of Test Arrangements.....	23
Appendix – Information on the Testing Laboratories	24

Release Control Record

Issue No.	Description	Date Issued
RF160831C13-4	Original Release	Sep. 21, 2016

1 Certificate of Conformity

Product: Wearable device

Test Model: QTAXU1

Sample Status: Engineering Sample

Applicant: Quanta Computer Inc.

Test Date: Sep. 05, 2016 ~ Sep. 14, 2016

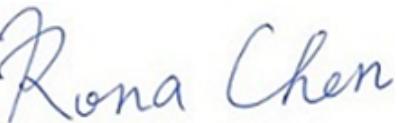
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.225)

47 CFR FCC Part 15, Subpart C (Section 15.215)

ANSI C63.10:2013

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 :

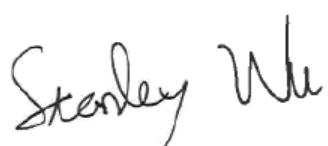


Rona Chen / Specialist

, **Date:**

Sep. 21, 2016

Approved by :



Stanley Wu / Assistant Manager

, **Date:**

Sep. 21, 2016

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	Test Item	Result	Remarks
15.207	Conducted emission test	N/A	Without AC power port of the EUT EUT consumes DC power
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -62.64 dB at 13.561 MHz.
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	Pass	Meet the requirement of limit.
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	Pass	Meet the requirement of limit.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass	Meet the requirement of limit. Minimum passing margin is -15.9 dB at 31.94 MHz.
15.225 (e)	The frequency tolerance	Pass	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wearable device
Test Model	QTAXU1
Status of EUT	Engineering Sample
Power Supply Rating	3.85 Vdc (Li-ion battery)
Modulation Type	ASK
Operating Frequency	13.56 MHz
Antenna Type	Loop Antenna
Accessory Device	Refer to Note
Data Cable Supplied	Refer to Note

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery	WELLTECH ENERGY INC.	EXGU111K2003	3.85 Vdc, 450 mAh
Wireless Charger	N/A	QXU1	--
LTE Chip	Qualcomm	WTR2965	--
WLAN Chip	Qualcomm	WCN3620	--
NFC Chip	NXP	PN5482D2EV	--

2. 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

One channel was provided to this EUT:

Channel	Frequency (MHz)
1	13.56

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE	PLC	FS	EB	
-	√	-	√	√	-

Where RE: Radiated Emission

PLC: Power Line Conducted Emission

FS: Frequency Stability

EB: 20 dB Bandwidth measurement

NOTE: “-”means no effect.

Radiated Emission Test:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

Frequency Stability:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

20 dB Bandwidth:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Y

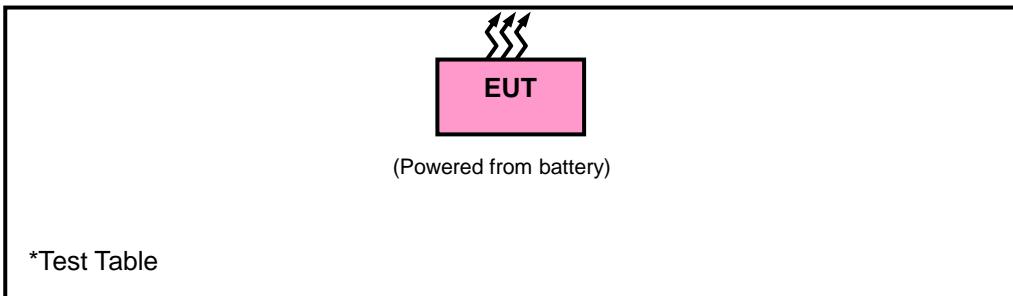
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE	25 deg. C, 65 % RH	3.85 Vdc	Getaz Yang
FS	25 deg. C, 65 % RH	3.85 Vdc	Anson Lin
EB	25 deg. C, 68 % RH	3.85 Vdc	Anson Lin

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



3.4 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:

FCC Part 15, Subpart C (15.225)

FCC Part 15, Subpart C (15.215)

ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).

The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_BV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2015	Jan. 21, 2016
Spectrum Analyzer Agilent	N9010A	MY52220314	Oct. 23, 2015	Oct. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. 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. Height of receiving antenna is varied from one meter to four 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

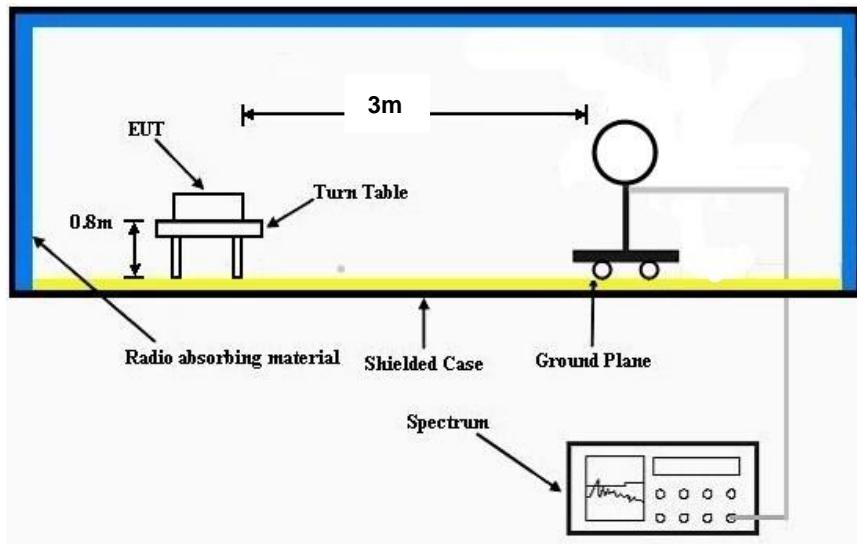
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $> 98\%$) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

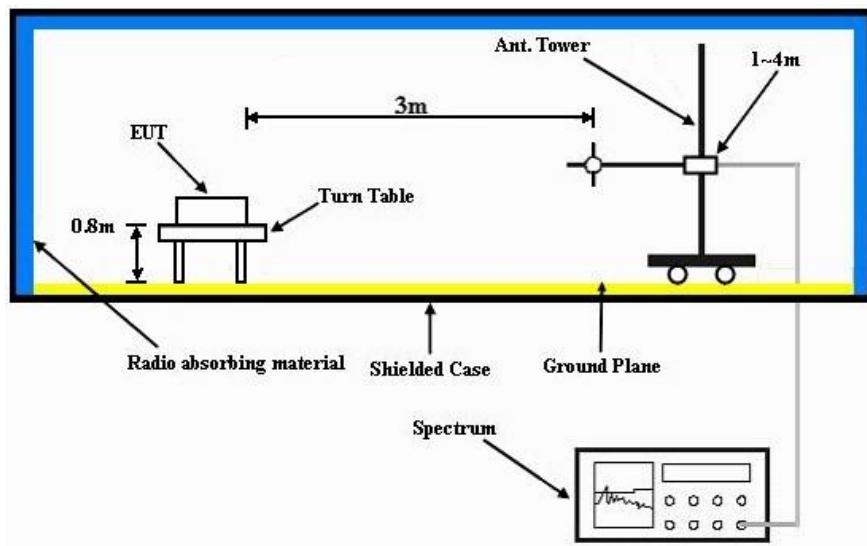
No deviation.

4.1.5 Test Set Up

Frequency range 9k~30MHz:



Frequency range 30~1000MHz:



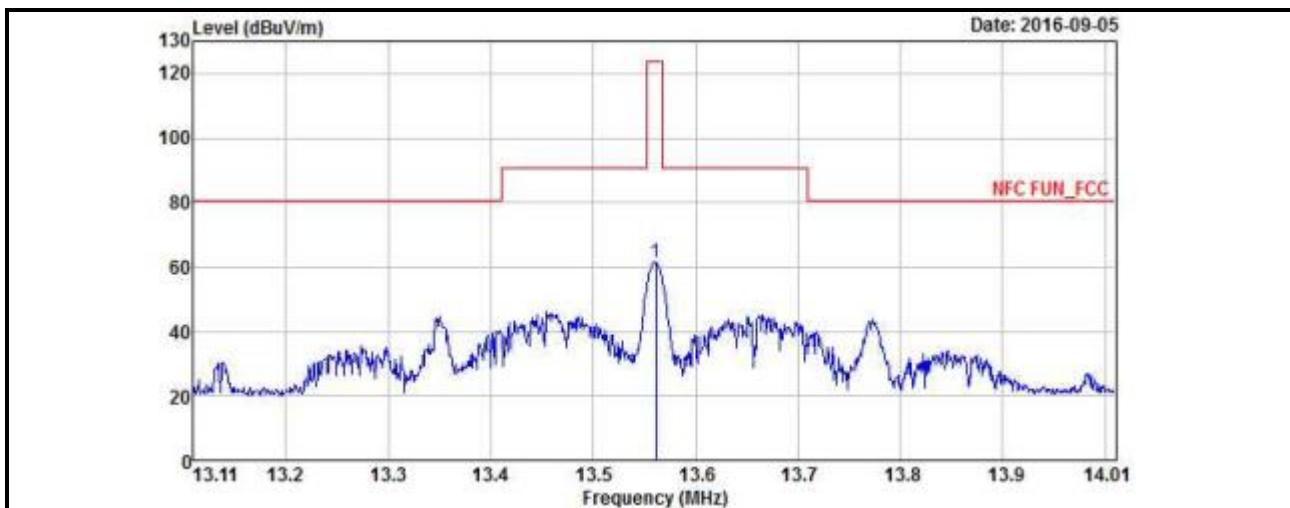
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang



Antenna Polarity & Test Distance: Loop Antenna Open at 3M										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
13.561	61.36	64.74	124	-62.64	37.67	0.31	41.36	100	0	Peak

REMARKS:

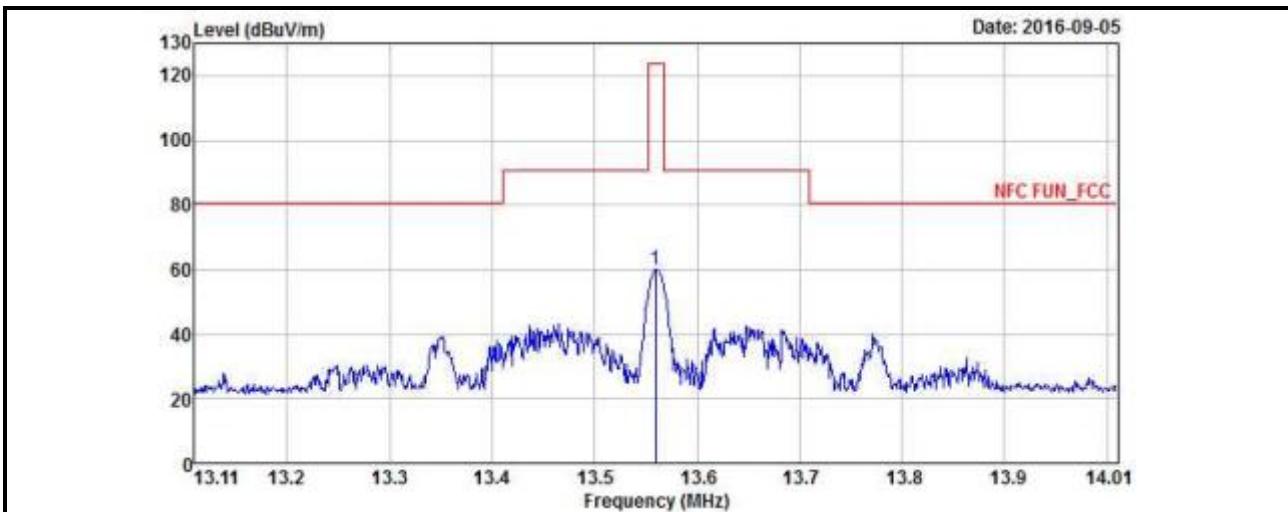
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits have been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

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56 \text{ MHz} &= 15848 \text{ uV/m} & 30\text{m} \\
 &= 84 \text{ dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124 \text{ dBuV/m}
 \end{aligned}$$

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567 MHz
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang



Antenna Polarity & Test Distance: Loop Antenna Close at 3M											
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark	
13.56	59.92	63.3	124	-64.08	37.67	0.31	41.36	100	360	Peak	

REMARKS:

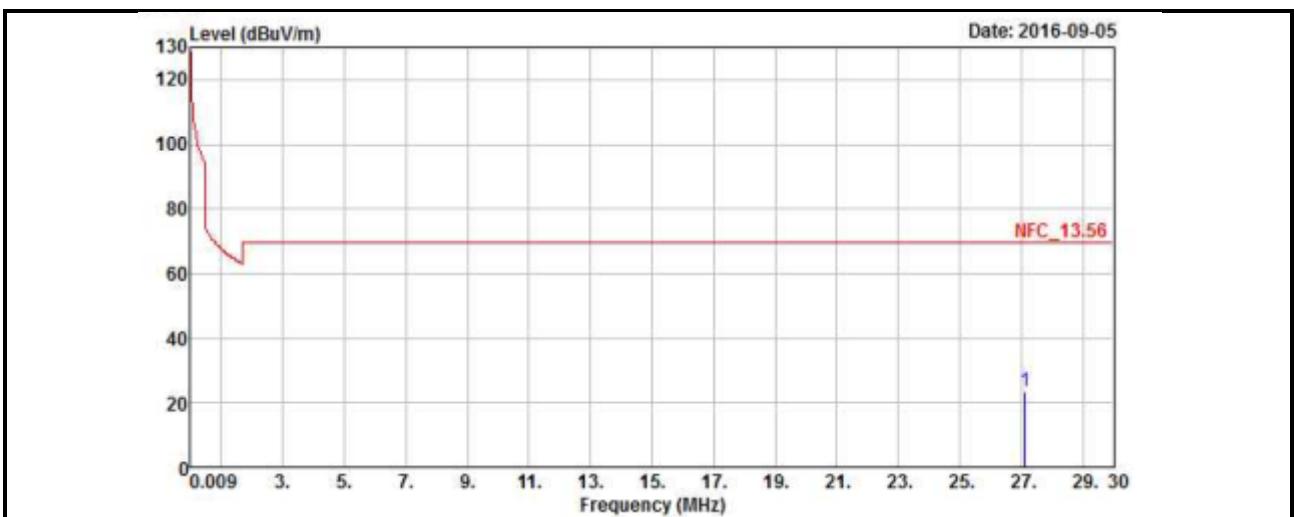
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits have been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

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56 \text{ MHz} &= 15848 \text{ uV/m} & 30 \text{ m} \\
 &= 84 \text{ dBuV/m} & 30 \text{ m} \\
 &= 84 + 20\log(30/3)^2 & 3 \text{ m} \\
 &= 124 \text{ dBuV/m}
 \end{aligned}$$

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30 MHz
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

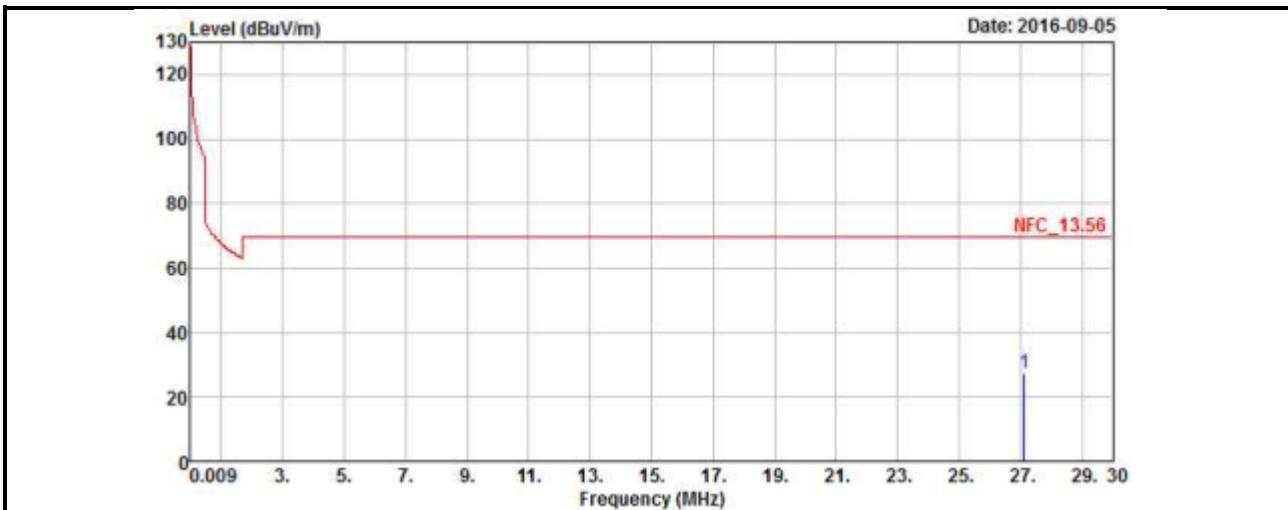


Antenna Polarity & Test Distance: Loop Antenna Open at 3M										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
27.12	23.7	29.1	69.54	-45.84	35.55	0.38	41.33	100	0	Peak

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

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30 MHz
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang



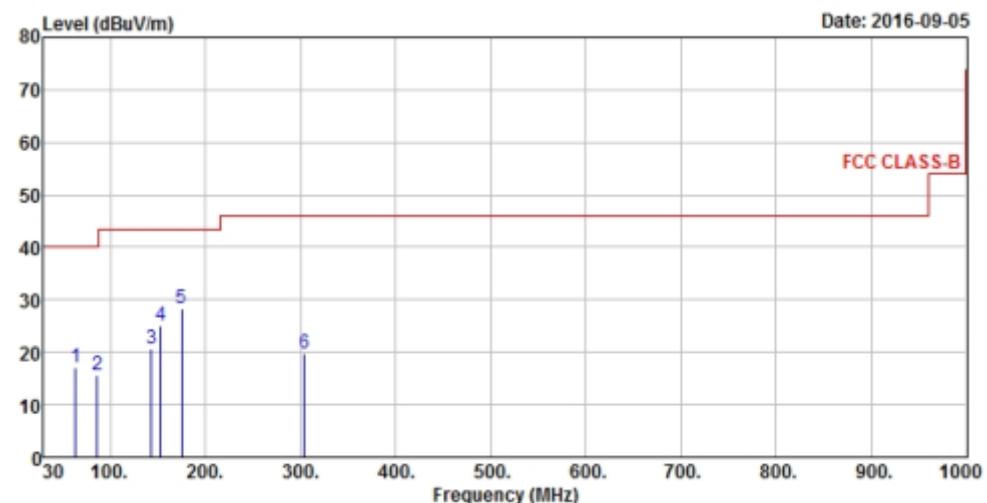
Antenna Polarity & Test Distance: Loop Antenna Close at 3M										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
27.12	27.56	32.96	69.54	-41.98	35.55	0.38	41.33	100	360	Peak

REMARKS:

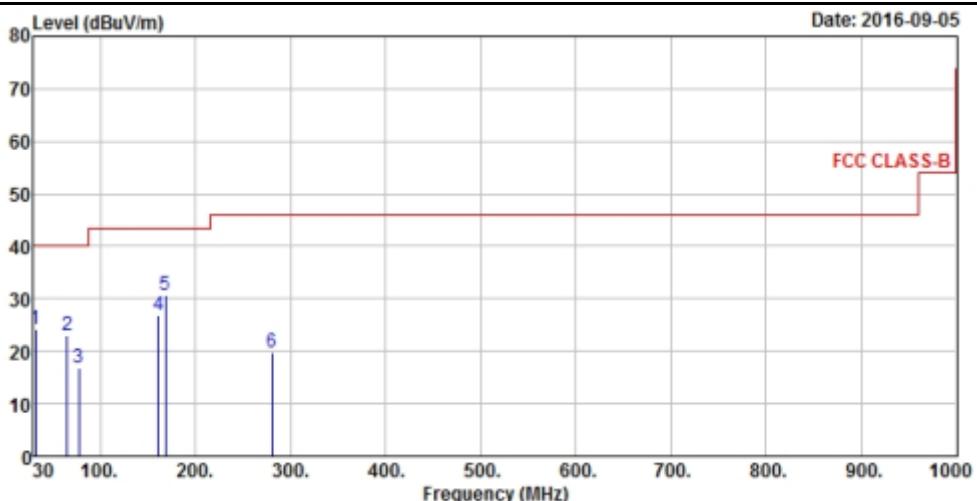
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000 MHz
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

HORIZONTAL



VERTICAL



Antenna Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emissino Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
63.95	17.03	36.26	40	-22.97	11.47	0.84	31.54	103	339	Peak
86.26	15.59	38.2	40	-24.41	8.23	0.94	31.78	136	322	Peak
143.49	20.6	38.6	43.5	-22.9	12.47	1.16	31.63	120	12	Peak
153.19	25.06	42.92	43.5	-18.44	12.72	1.11	31.69	104	273	Peak
174.53	28.39	47.73	43.5	-15.11	11.28	1.16	31.78	120	204	Peak
304.51	19.8	36.98	46	-26.2	13.06	1.65	31.89	127	77	Peak

Antenna Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emissino Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
31.94	24.1	42.32	40	-15.9	12.3	0.59	31.11	132	189	Peak
64.92	22.9	42.3	40	-17.1	11.35	0.84	31.59	120	189	Peak
77.53	16.88	38.75	40	-23.12	8.85	0.87	31.59	140	290	Peak
160.95	26.76	44.84	43.5	-16.74	12.63	1.15	31.86	123	96	Peak
168.71	30.71	49.43	43.5	-12.79	11.86	1.16	31.74	102	138	Peak
280.26	19.81	37.68	46	-26.19	12.37	1.58	31.82	138	13	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

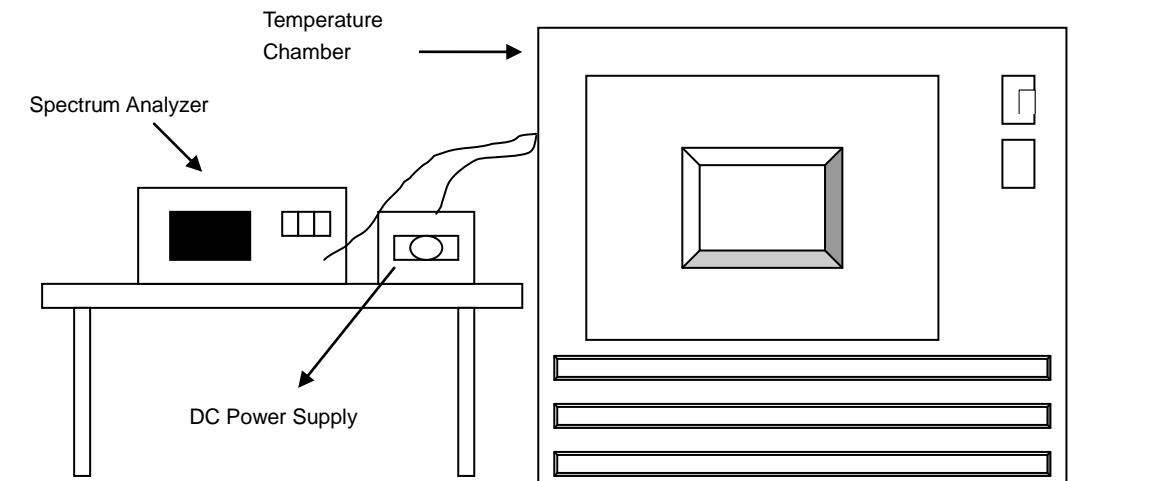
Margin value = Emission level – Limit value.

4.2 Frequency Stability

4.2.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01 % of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turned the EUT on and coupled its output to a spectrum analyzer.
- Turned the EUT off and set the chamber to the highest temperature specified.
- Allowed sufficient time (approximately 30 min) for the temperature of the chamber to stabilize then turned the EUT on and measured the operating frequency after 2, 5, and 10 minutes.
- Repeated step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85 % to 115 % and the frequency record.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Result

Frequency Stability Versus Temperature										
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute		
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%	
50	3.85	13.559969	-0.00023	13.559959	-0.00030	13.559953	-0.00035	13.559971	-0.00021	
40	3.85	13.559939	-0.00045	13.559928	-0.00053	13.559941	-0.00044	13.559936	-0.00047	
30	3.85	13.560006	0.00004	13.560015	0.00011	13.560011	0.00008	13.560014	0.00010	
20	3.85	13.559934	-0.00049	13.559949	-0.00038	13.559954	-0.00034	13.559932	-0.00050	
10	3.85	13.559962	-0.00028	13.559966	-0.00025	13.559955	-0.00033	13.559960	-0.00029	
0	3.85	13.559936	-0.00047	13.559929	-0.00052	13.559924	-0.00056	13.559949	-0.00038	
-10	3.85	13.560019	0.00014	13.560037	0.00027	13.560021	0.00015	13.560032	0.00024	
-20	3.85	13.559939	-0.00045	13.559942	-0.00043	13.559951	-0.00036	13.559961	-0.00029	
-30	3.85	13.559958	-0.00031	13.559953	-0.00035	13.559964	-0.00027	13.559969	-0.00023	

Frequency Stability Versus Voltage										
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute		
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%	
20	4.2	13.559932	-0.00050	13.559949	-0.00038	13.559951	-0.00036	13.559932	-0.00050	
	3.85	13.559934	-0.00049	13.559949	-0.00038	13.559954	-0.00034	13.559932	-0.00050	
	3.4	13.55993	-0.00052	13.559948	-0.00038	13.559952	-0.00035	13.559932	-0.00050	

4.3 20 dB Bandwidth

4.3.1 Limits of 20 dB Bandwidth Measurement

The 20 dB bandwidth shall be specified in operating frequency band.

4.3.2 Test Setup

Refer to section 4.1.5.

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1 kHz RBW and 3 kHz VBW. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

4.3.5 Deviation from Test Standard

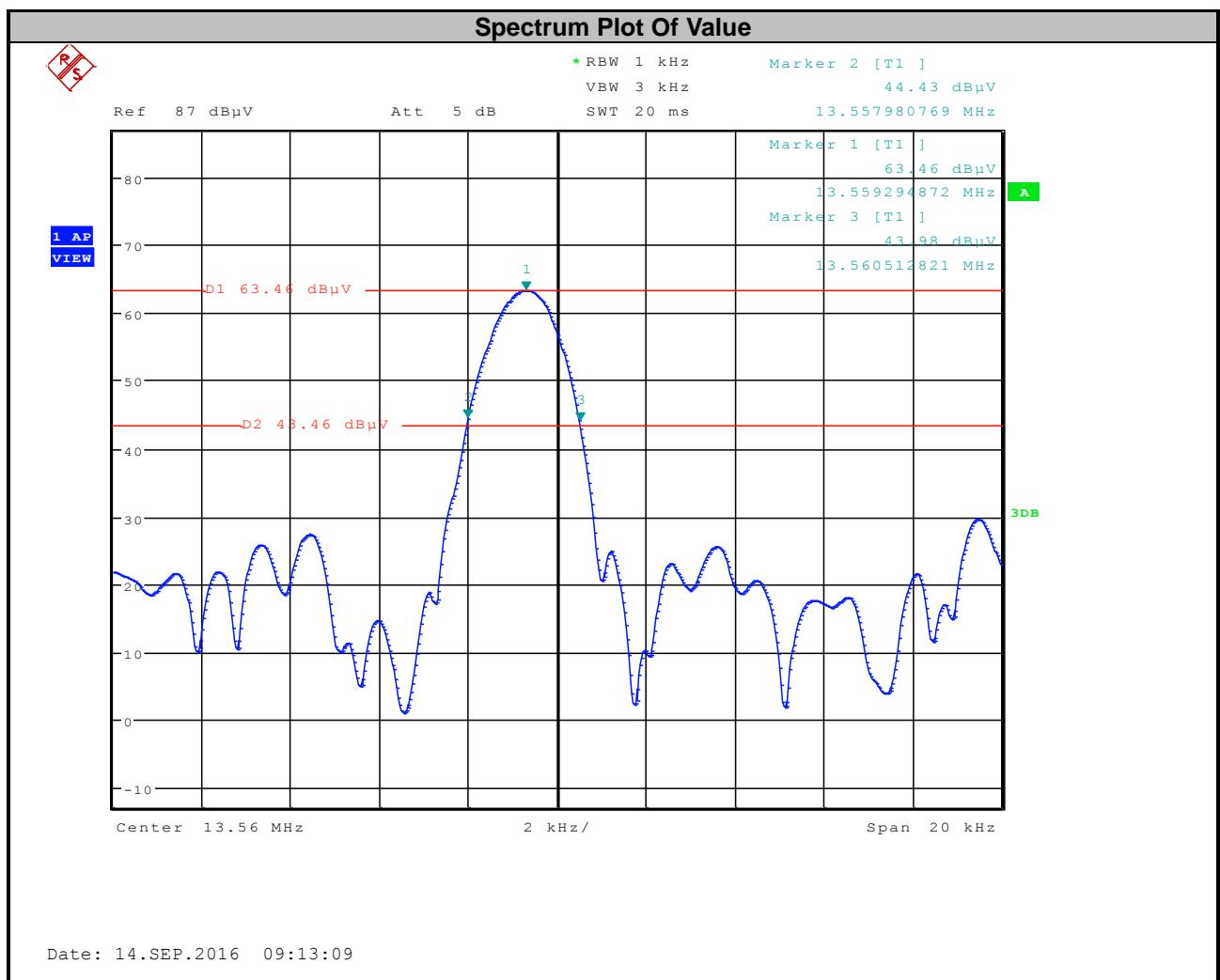
No deviation.

4.3.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Set the EUT under transmission condition continuously at specific channel frequency.

4.3.7 Test Results

20 dBc Point (Low)	20 dBc Point (High)	Operating Frequency Band (MHz)	Pass / Fail
13.559294872 MHz	13.560512821 MHz	13.553~13.567	Pass



5 Pictures of Test Arrangements

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

Appendix – 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:

Linko EMC/RF Lab

Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---