

FCC Test Report (RFID)

Report No.: RF160727E11-3

FCC ID: MQT-PRESTOA3

Test Model: PRESTO A3

Received Date: July 27, 2016

Test Date: Aug. 01 to Oct. 03, 2016

Issued Date: Oct. 25, 2016

Applicant: XAC AUTOMATION CORP.

Address: 4F, No. 30, INDUSTRY E. RD. IX, SCIENCE-BASED INDUSTRIAL
PARK,HSINCHU,TAIWAN

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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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 (RFID)	6
3.2 Description of Test Modes.....	7
3.2.1 Test Mode Applicability and Tested Channel Detail.....	8
3.3 Description of Support Units	10
3.3.1 Configuration of System under Test	10
3.4 General Description of Applied Standards	11
4 Test Types and Results	12
4.1 Radiated Emission Measurement	12
4.1.1 Limits of Radiated Emission Measurement.....	12
4.1.2 Test Instruments	13
4.1.3 Test Procedures.....	14
4.1.4 Deviation from Test Standard	14
4.1.5 Test Setup.....	15
4.1.6 EUT Operating Conditions.....	15
4.1.7 Test Results	16
4.2 Frequency Stability.....	20
4.2.1 Limits of Frequency Stability Measurement	20
4.2.2 Test Setup.....	20
4.2.3 Test Instruments	20
4.2.4 Test Procedure	21
4.2.5 Deviation from Test Standard	21
4.2.6 EUT Operating Conditions.....	21
4.2.7 Test Result.....	22
4.3 20dB bandwidth	23
4.3.1 Limits of 20dB Bandwidth Measurement.....	23
4.3.2 Test Setup.....	23
4.3.3 Test Instruments	23
4.3.4 Test Procedures.....	23
4.3.5 Deviation from Test Standard	23
4.3.6 EUT Operating Conditions.....	23
4.3.7 Test Results	24
5 Pictures of Test Arrangements	25
Appendix – Information on the Testing Laboratories	26

Release Control Record

Issue No.	Description	Date Issued
RF160727E11-3	Original release.	Oct. 25, 2016

1 Certificate of Conformity

Product: Terminal

Brand: ElaCarte

Test Model: PRESTO A3

Sample Status: ENGINEERING SAMPLE

Applicant: XAC AUTOMATION CORP.

Test Date: Aug. 01 to Oct. 03, 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 : Midoli Peng , **Date:** Oct. 25, 2016
Midoli Peng / Specialist

Approved by : May Chen , **Date:** Oct. 25, 2016
May Chen / Manager

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	NA	Power supply is 3.7Vdc from battery
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 -52.3dB at 13.56MHz.
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 -13.2dB at 61.67MHz.
15.225 (e)	The frequency tolerance	PASS	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.

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	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (RFID)

Product	Terminal
Brand	ElaCarte
Test Model	PRESTO A3
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.7V from battery
Modulation Type	ASK
Operating Frequency	13.56MHz
Number of Channel	1
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Battery x1(option)
Data Cable Supplied	NA

Note:

1. The EUT could be supplied with 3.7V battery(option) as the following table:

Brand	Model No.	Spec.
Ela Carte	A2 Battery	DC 3.7V, 10800mA

2. There are WLAN, Bluetooth and RFID technology used for the EUT.

3. Simultaneously transmission condition.

Condition	Technology		
1	WLAN (2.4GHz)	Bluetooth	RFID
2	WLAN (5GHz)	Bluetooth	RFID

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

WiFi/BT Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	
INPAQ	WA-P-LB-02-368	PCB	HRS U.FL-LP(V)-040	2.4GHz:4.23	5GHz:4.02
RFID Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
INPAQ	NF-C-F10-R0-083	PCB	ZIF	13	13.56

5. 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	FREQ. (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 \geq 1G**: Radiated Emission above 1GHz **PLC**: Power Line Conducted Emission
FS: Frequency Stability **EB**: 20dB Bandwidth measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

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.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

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.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

20dB 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.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	24deg. C, 67%RH	DC 3.7V	Andy Ho
FS	25deg. C, 60%RH	DC 3.7V	Tim Ho
EB	25deg. C, 60%RH	DC 3.7V	Tim Ho

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.

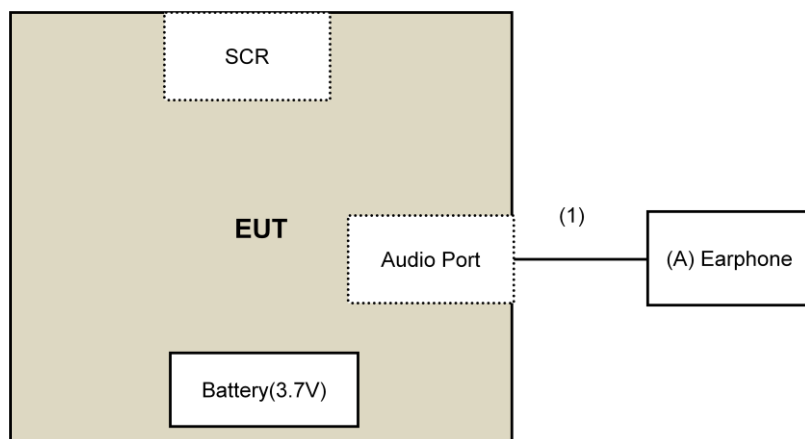
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Earphone	Hawk	HKC920	H003	FCC DoC	Provided by Lab

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.	Audio Cable	1	2.2	No	0	Provided by Lab

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.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

The field strength of any emission shall not exceed the following limits:

- (a) 15.848 millivolts/m (84 dB μ V/m) at 30 m, within the band 13.553-13.567 MHz.
- (b) 334 microvolts/m (50.5 dB μ V/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.
- (c) 106 microvolts/m (40.5 dB μ V/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz.

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 (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Software	ADT_Radiated _V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 4.
5. The FCC Site Registration No. is 292998
6. The CANADA Site Registration No. is 20331-2
- 7 Tested Date: Sep. 05 to Oct. 03, 2016

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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. The height of 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Note:

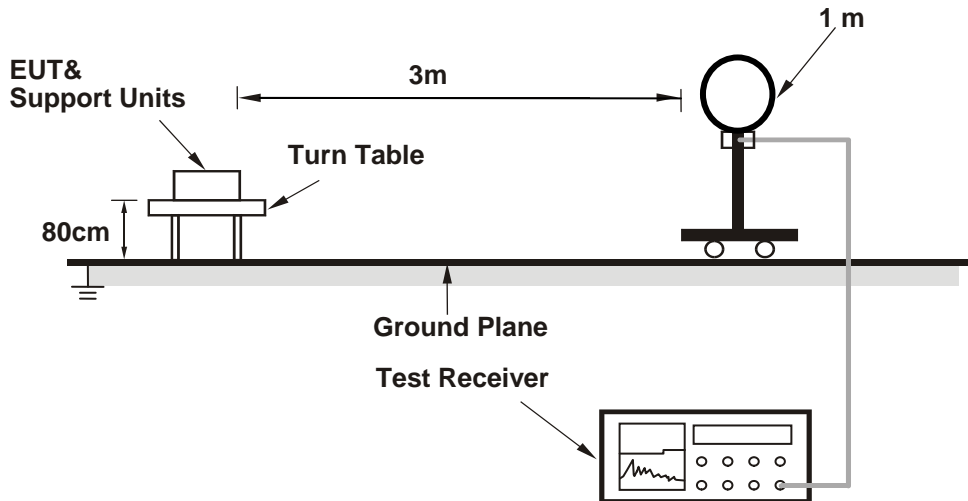
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency 30MHz ~ 1GHz.

4.1.4 Deviation from Test Standard

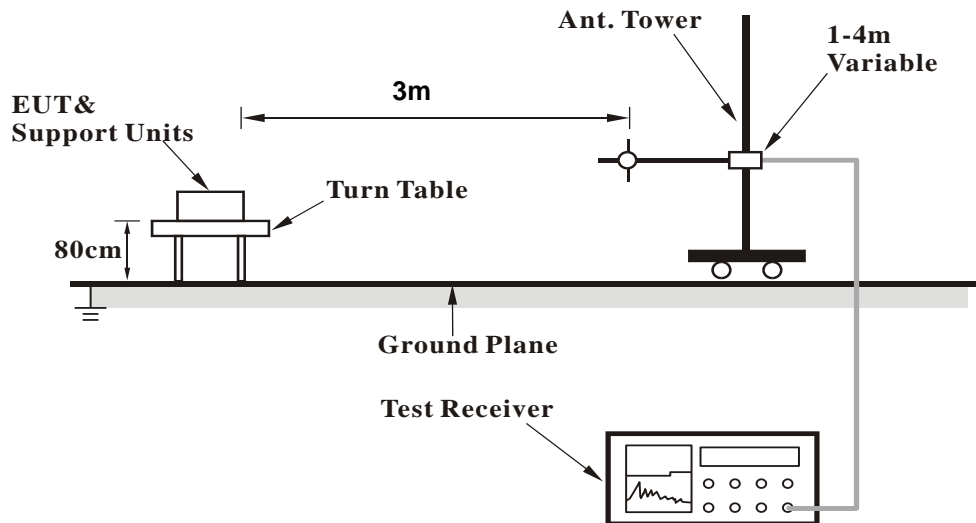
No deviation.

4.1.5 Test Setup

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



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

4.1.6 EUT Operating Conditions

- a. The communication partner run test program "p-test.exe" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak
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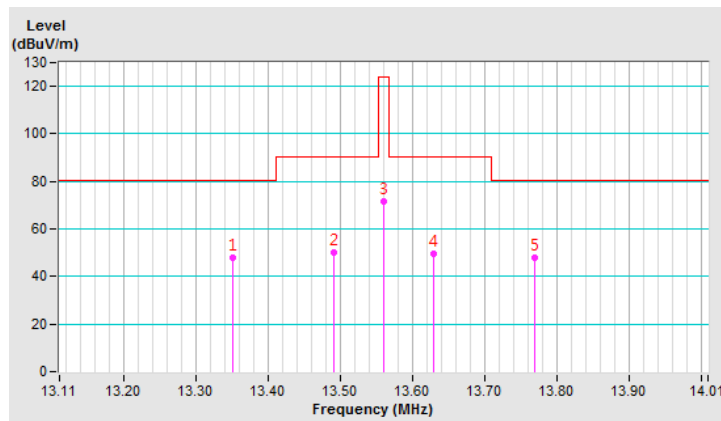
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.35	48.1 QP	80.5	-32.4	1.00 H	163	51.4	-3.3
2	13.49	50.2 QP	90.5	-40.3	1.00 H	163	53.5	-3.3
3	13.56	71.7 QP	124.0	-52.3	1.00 H	163	75.0	-3.3
4	13.63	49.6 QP	90.5	-40.9	1.00 H	163	52.9	-3.3
5	13.77	47.8 QP	80.5	-32.7	1.00 H	163	51.1	-3.3

- 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
 6. " * " : Fundamental frequency.

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:

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



Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak
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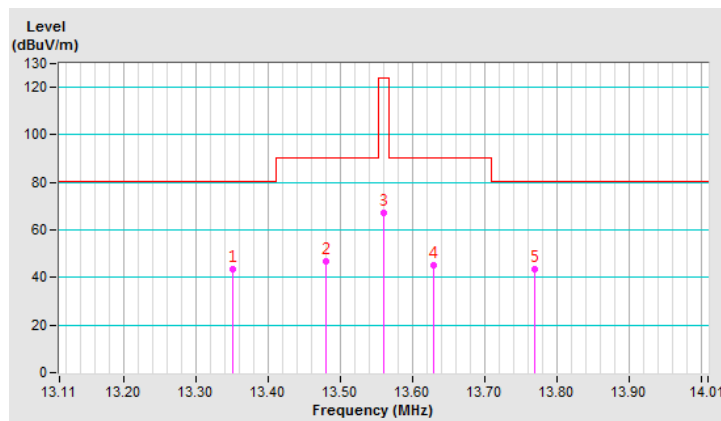
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.35	43.6 QP	80.5	-36.9	1.00 V	82	46.9	-3.3
2	13.48	46.6 QP	90.5	-43.9	1.00 V	82	49.9	-3.3
3	13.56	67.0 QP	124.0	-57.0	1.00 V	82	70.3	-3.3
4	13.63	45.1 QP	90.5	-45.4	1.00 V	82	48.4	-3.3
5	13.77	43.3 QP	80.5	-37.2	1.00 V	82	46.6	-3.3

- 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
 6. " * ": Fundamental frequency.

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:

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



Frequency Range	Below 30MHz	Detector Function	Quasi-Peak
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ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	0.15	50.3 QP	104.2	-53.9	1.05 H	8	35.3	15.0
2	4.03	33.9 QP	69.5	-35.6	1.05 H	360	36.7	-2.8
3	7.29	30.7 QP	69.5	-38.8	1.05 H	341	33.6	-2.9
4	18.24	28.3 QP	69.5	-41.2	1.05 H	295	32.4	-4.1
5	25.69	46.0 QP	69.5	-23.5	1.05 H	255	49.2	-3.2
6	26.61	45.9 QP	69.5	-23.6	1.05 H	228	48.8	-2.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	0.14	48.0 QP	104.9	-56.9	1.05 V	92	32.4	15.6
2	4.07	36.4 QP	69.5	-33.1	1.05 V	176	39.2	-2.8
3	7.31	32.7 QP	69.5	-36.8	1.05 V	246	35.6	-2.9
4	12.75	40.6 QP	69.5	-28.9	1.05 V	10	43.8	-3.2
5	24.90	46.0 QP	69.5	-23.5	1.05 V	332	49.4	-3.4
6	26.61	46.5 QP	69.5	-23.0	1.05 V	39	49.4	-2.9

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 ~ 1000MHz	Detector Function	Quasi-Peak
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ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	61.67	26.8 QP	40.0	-13.2	1.50 H	140	36.3	-9.5
2	186.17	21.8 QP	43.5	-21.7	2.00 H	260	32.9	-11.1
3	432.04	26.8 QP	46.0	-19.2	2.00 H	244	31.0	-4.2
4	644.42	28.3 QP	46.0	-17.7	2.00 H	242	28.2	0.1
5	727.04	28.4 QP	46.0	-17.6	2.00 H	0	27.0	1.4
6	912.68	31.0 QP	46.0	-15.0	2.00 H	15	27.0	4.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	60.48	24.7 QP	40.0	-15.3	1.50 V	157	33.8	-9.1
2	432.04	27.3 QP	46.0	-18.7	1.50 V	34	31.5	-4.2
3	615.69	29.3 QP	46.0	-16.7	2.00 V	184	29.5	-0.2
4	644.35	30.2 QP	46.0	-15.8	1.00 V	202	30.1	0.1
5	787.33	29.3 QP	46.0	-16.7	1.50 V	283	26.9	2.4
6	930.72	31.2 QP	46.0	-14.8	1.00 V	357	26.9	4.3

REMARKS:

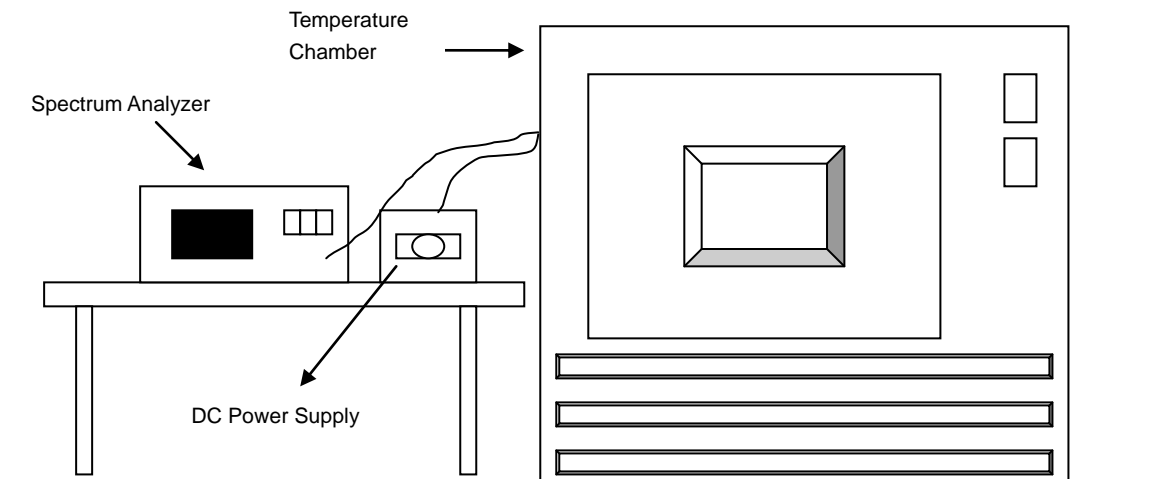
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Frequency Stability

4.2.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 27, 2016	Jan. 26, 2017
Temperature & Humidity Chamber TERCHY	MHU-225AU	911033	Dec. 03, 2015	Dec. 02, 2016
DC Power Supply GOOD WILL INSTRUMENT CO., LTD.	GPC - 3030D	7700087	NA	NA
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2015	Nov. 09, 2016

- NOTE:**
1. The test was performed in Oven room 1.
 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: Aug. 01, 2016

4.2.4 Test Procedure

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turned the EUT on and coupled its output to a spectrum analyzer.
- c. Turned the EUT off and set the chamber to the highest temperature specified.
- d. 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.
- e. Repeated step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. 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

Same as Item 4.1.6.

4.2.7 Test Result

Frequency Stability Versus Temp.									
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	3.7	13.55994	-0.00044	13.55994	-0.00044	13.55995	-0.00037	13.55994	-0.00044
40	3.7	13.56001	0.00007	13.56001	0.00007	13.56	0.00000	13.56	0.00000
30	3.7	13.55998	-0.00015	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022
20	3.7	13.56005	0.00037	13.56004	0.00029	13.56004	0.00029	13.56005	0.00037
10	3.7	13.55996	-0.00029	13.55995	-0.00037	13.55997	-0.00022	13.55995	-0.00037
0	3.7	13.55996	-0.00029	13.55997	-0.00022	13.55998	-0.00015	13.55998	-0.00015
-10	3.7	13.55996	-0.00029	13.55995	-0.00037	13.55994	-0.00044	13.55996	-0.00029
-20	3.7	13.55995	-0.00037	13.55994	-0.00044	13.55995	-0.00037	13.55994	-0.00044

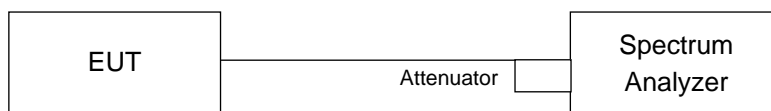
Frequency Stability Versus Voltage									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	3.7	13.56005	0.00037	13.56004	0.00029	13.56004	0.00029	13.56005	0.00037
	3.7	13.56005	0.00037	13.56004	0.00029	13.56004	0.00029	13.56005	0.00037
	3.7	13.56005	0.00037	13.56004	0.00029	13.56004	0.00029	13.56005	0.00037

4.3 20dB bandwidth

4.3.1 Limits of 20dB Bandwidth Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 27, 2016	Jan. 26, 2017

- NOTE:**
1. The test was performed in Oven room 1.
 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: Aug. 01, 2016

4.3.4 Test Procedures

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

4.3.5 Deviation from Test Standard

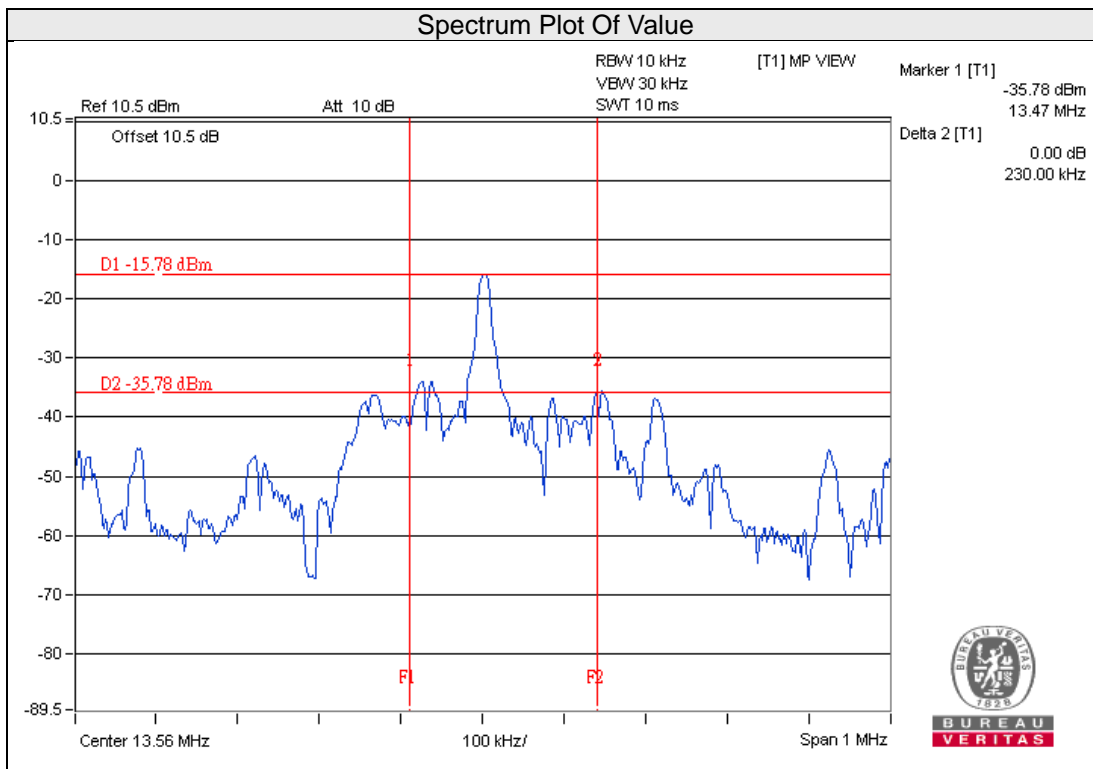
No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.1.6.

4.3.7 Test Results

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass/Fail
13.47	13.7	13.11-14.01	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:

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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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