

# **Radio Test Report**

# FCC ID: XHM-K75RFID

This report concerns (check one) : 🖂 Original Grant 🗌 Class II Change

	: Jun. 26, 2014 : 1406051 : PPC K750 Series Device Box : K750 Device Box
Applicant	<ul> <li>FLYTECH Technology Co., Ltd.</li> <li>1F, No. 168, Sing-Ai Rd., NeiHu District</li></ul>
Address	11494, Taipei, Taiwan

**Tested by:** Neutron Engineering Inc. EMC Laboratory **Date of Receipt:** Jun. 09, 2014 **Date of Test:** Jun. 09, 2014 ~ Jun. 24, 2014

Testing Engineer: (Josh Lin) Technical Manager: Authorized Signatory (Andy Chiu)

**Neutron Engineering Inc.** B1, No. 37, Lane 365, YangGuang St., NeiHu District 114, Taipei, Taiwan. TEL: +886-2-2657-3299 FAX: +886-2-2657-3331





#### Declaration

**Neutron** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (NML) of R.O.C., or National Institute of Standards and Technology (NIST) of U.S.A.

**Neutron**'s reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **Neutron** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **Neutron** issued reports.

**Neutron**'s reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **Neutron-self**, extracts from the test report shall not be reproduced except in full with **Neutron**'s authorized written approval.

**Neutron**'s laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

#### Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



# **Table of Contents**

REPOR	T ISSUED HISTORY	4
1	CERTIFICATION	5
2	SUMMARY OF TEST RESULTS	6
2.1	TEST FACILITY	7
2.2	MEASUREMENT UNCERTAINTY	7
3	GENERAL INFORMATION	8
3.1	GENERAL DESCRIPTION OF EUT	8
3.2	DESCRIPTION OF TEST MODES	9
3.3	BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
3.4	DESCRIPTION OF SUPPORT UNITS	11
4	CONDUCTED EMISSION	12
4.1	LIMITS	12
4.2	MEASUREMENT INSTRUMENTS LIST	12
4.3	TEST PROCEDURES	13
4.4	TEST SETUP LAYOUT	13
4.5	DEVIATION FROM TEST STANDARD	13
4.6	EUT OPERATING CONDITIONS	13
4.7	TEST RESULTS	14
5	RADIATED EMISSION	16
5.1	LIMITS	16
5.2	MEASUREMENT INSTRUMENTS LIST	17
5.3	TEST PROCEDURE	17
5.4	DEVIATION FROM TEST STANDARD	18
5.5	TEST SETUP	18
5.6	EUT OPERATING CONDITIONS	19
5.7	TEST RESULTS- FCC PART 15.209	20
5.8	TEST RESULTS- FCC PART 15.225	22
6	FREQUENCY STABILITY	24
6.1	LIMITS	24
6.2	MEASUREMENT INSTRUMENTS LIST	24
6.3	TEST PROCEDURE	24
6.4	DEVIATION FROM TEST STANDARD	24
6.5	EUT OPERATING CONDITIONS	24
6.6	TEST RESULTS	25
7	EUT TEST PHOTO	26



# **REPORT ISSUED HISTORY**

Issue No. NEI-FCCP-1-1406051	Issue No.DescriptionIssued DateCCP-1-1406051Original Issue.Jun. 26, 2014					
NEI-FCCP-1-1406051	Original Issue.	Jun. 26, 2014				



## **1 CERTIFICATION**

Equipment	: PPC K750 Series Device Box	
Brand Name	: FLYTECH	
Model Name	: K750 Device Box	
Applicant	: FLYTECH Technology Co., Ltc	J.
Date of Test	: Jun. 09, 2014 ~ Jun. 24, 2014	
Standards	: FCC Part 15, Subpart C: 2013	
	ANSI C63.4-2009	

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1406051) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).



# **2 SUMMARY OF TEST RESULTS**

Test procedures according to the technical standards:

Standard Section	Test Item	Result
15.207	Conducted emission	PASS
15.35 / 15.205 / 15.209 / 15.225	Radiated emission	PASS
15.225(e)	Frequency Stability	PASS
15.203	15.203 Antenna Requirement	

NOTE:

1. N/A: denotes test is not applicable in this Test Report



### 2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

Conducted emission Test:

**C02:** (VCCI RN: C-3477; FCC RN: 614388; FCC DN: TW1054)

1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

#### **Radiated emission Test:**

**CB08:** (FCC RN: 614388; FCC DN: TW1054; IC Assigned Code: 4428C-1)

1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

### 2.2 MEASUREMENT UNCERTAINTY

# The measurement uncertainty is not specified by FCC/Industry Canada rules and for reference only.

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

A. Conducted emission test:

Test Site	Test Site Measurement Frequency Range		NOTE
C02	150 kHz ~ 30 MHz	2.59	

#### B. Radiated emission test:

	Test Site	Item	Measurement	Frequency Range	Uncertainty	NOTE		
						30 - 200MHz	3.35 dB	
			Horizontal	200 - 1000MHz	3.11 dB			
		CB08 Radiated emission at 3m Vertical Polarization	Polarization	Polarization	1 - 18GHz	3.97 dB		
	CB08 emission at					18 - 40GHz	4.01 dB	
				30 - 200MHz	3.22 dB			
			Vertical	200 - 1000MHz	3.24 dB			
			1 - 18GHz	4.05 dB				
				18 - 40GHz	4.04 dB			

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our  $U_{lab}$  values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U<sub>CISPR</sub>, as follows:

Conducted Disturbance (mains port) - 150 kHz - 30 MHz : 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our  $U_{\text{lab}}$  values are smaller than  $U_{\text{CISPR}}.$ 

# **3 GENERAL INFORMATION**

# 3.1 GENERAL DESCRIPTION OF EUT

Equipment	PPC K750 Series Device Box		
Brand Name	FLYTECH		
Model Name	K750 Device Box		
OEM Brand/Model Name	N/A		
Model Difference	N/A		
Product Description	Operation Frequency         13.56 MHz           Antenna Designation         LOOP Antenna           More details of EUT technical specification please refer to the User's Manual.		
Power Source	DC Voltage supplied from PC USB Port.		
Power Rating	I/P: DC 5V		
Connecting I/O Port(s)	Please refer to the User's Manual		
Products Covered	N/A		
EUT Modification(s)	N/A		

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Test Mode	Description		
Mode 1	13.56MHz Transmit		
	Conducted emission test		
Final Test Mode	Description		
Mode 1	13.56MHz Transmit		
Radiated emission test			
Final Test Mode	Description		
Mode 1	13.56MHz Transmit		
Frequency Stability test			
Final Test Mode	Description		
Mode 1	13.56MHz Transmit		

Antenna Requirement test			
Final Test Mode Description			
Mode 1	13.56MHz Transmit		

Neutron Engineering Ind	C. <u> </u>
-------------------------	-------------

# 3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

E-1 EUT		



### 3.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	PPC K750 Series Device Box	FLYTECH	K750 Device Box	XHM-K75RFID	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

(1) The support equipment was authorized by Declaration of Conformity (DOC).

# **4 CONDUCTED EMISSION**

### 4.1 LIMITS

FREQUENCY	Class A	(dBuV)	Class B (dBuV)		
(MHz)	Quasi-peak	Average	Quasi-peak	Average	
0.15 - 0.5	79.00	66.00	66 - 56 *	56 - 46 *	
0.50 - 5.0	73.00	60.00	56.00	46.00	
5.0 - 30.0	73.00	60.00	60.00	50.00	

NOTE:

- 1. The tighter limit applies at the band edges.
- 2. The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- The test result calculated as following: Measurement Value = Reading Level + Correct Factor Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use) Margin Level = Measurement Value – Limit Value

### 4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	Schwarzbeck	NSLK 8127	8127685	Jan. 08, 2015
2	Test Cable	TIMES	CFD300-NL	C01	Jun. 15, 2015
3	EMI Test Receiver	Agilent	N9038A	MY51210215	Apr. 21,2015
4	Measurement Software	EZ	EZ_EMC (Version NB-02A)	N/A	N/A

NOTE: N/A: denotes No Model Name, No Serial No. or No Calibration specified.



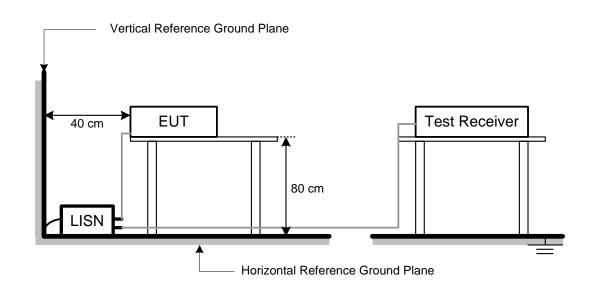
### 4.3 TEST PROCEDURES

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos. **NOTE:** 

- a. Reading in which marked as Peak, QP or AVG means measurements by using are Quasi-Peak or Average Mode with Detector BW=9 kHz (6 dB Bandwidth).
- b. All readings are Peak Mode value unless otherwise stated QP or AVG in column of Note. If the Peak or QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only Peak or QP Mode was measured, but AVG Mode didn't perform.

# 4.4 TEST SETUP LAYOUT



### 4.5 DEVIATION FROM TEST STANDARD

No deviation

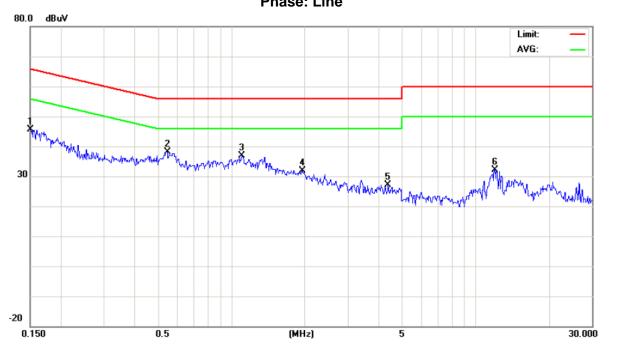
### 4.6 EUT OPERATING CONDITIONS

The EUT used during radiated and/or conducted emission measurement was designed to exercise in a manner similar to a typical use.

# Neutron Engineering Inc.

# 4.7 TEST RESULTS

EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	24°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		

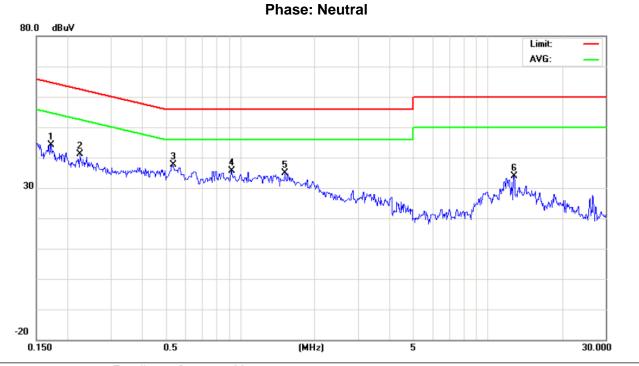


No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	37.07	8.68	45.75	66.00	-20.25	peak	
2 *	0.5450	29.53	8.63	38.16	56.00	-17.84	peak	
3	1.1029	27.14	9.66	36.80	56.00	-19.20	peak	
4	1.9399	22.52	9.36	31.88	56.00	-24.12	peak	
5	4.3699	17.64	9.48	27.12	56.00	-28.88	peak	
6	11.9498	22.74	9.35	32.09	60.00	-27.91	peak	

# Phase: Line



EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	24°C	Relative Humidity	46%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1714	34.59	9.46	44.05	64.89	-20.84	peak	
2		0.2248	31.26	9.84	41.10	62.64	-21.54	peak	
3	*	0.5360	29.15	8.60	37.75	56.00	-18.25	peak	
4		0.9229	26.14	9.51	35.65	56.00	-20.35	peak	
5		1.5168	25.26	9.50	34.76	56.00	-21.24	peak	
6		12.7500	24.55	9.39	33.94	60.00	-26.06	peak	

# Neutron Engineering Inc.\_\_\_\_\_

# **5 RADIATED EMISSION**

### 5.1 LIMITS

	FCC Part 15.209							
Frequency	Field Streng Limitation		Field Strength Limitation at 3m Measurement Dist					
(MHz)	(uV/m)	Dist	(uV/m)	(dBuV/m)				
0.009 - 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80				
0.490 - 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40				
1.705 - 30.00	30	30m	100* 30	20log 30 + 40				
30.0 - 88.0	100	3m	100	20log 100				
88.0 - 216.0	150	3m	150	20log 150				
216.0 - 960.0	200	3m	200	20log 200				
Above 960.0	500	3m	500	20log 500				
		FCC Pa	art 15.225(a)/(b)/(c)					
Frequency	Field Streng Limitation		Field Strength Limitation at 3m Measurement Dist					
(MHz)	(uV/m)	Dist	(uV/m)	(dBuV/m)				
13.553 – 13.567	15,848	30 m	15,848*100	124				
13.567 – 13.710	334	30 m	334*100	90.5				
13.110 – 13.410 13.710 – 14.010	106	30 m	106*100	80.5				

NOTE:

(1) The tighter limit shall apply at the boundary between two frequency range.

(2) Limitation expressed in dBuV/m is calculated by 20log Emission Level (uV/m).

(3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of  $L_{d1} = L_{d2} * (d_2/d_1)^2$ .

Example:

F.S Limit at 30m distance is 30uV/m , then F.S Limitation at 3m distance is adjusted as  $L_{d1}$  =  $L_1$  = 30uV/m  $^*$  (10)  $^2$  = 100  $^*$  30 uV/m

(4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use) Margin Level = Measurement Value – Limit Value

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-30	100854	Sep. 08, 2014
2	Microflex Cable	Harbour industries	27478LL142	1m	May. 12, 2015
3	Test Cable	LMR	LMR-400	12m	May. 13, 2015
4	Test Cable	LMR	LMR-400	3m	May. 13, 2015
5	Pre-Amplifier	Anritsu	MH648A	M92649	Jun. 17, 2015
6	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 10, 2015
7	Loop Ant.	EMCO	6502	00042960	Sep. 29. 2014

# 5.2 MEASUREMENT INSTRUMENTS LIST

Remark: "N/A" denotes No Model Name, No Serial No. or No Calibration specified.

### 5.3 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### NOTE: (FCC PART 15.209)

- a. Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode with Detector BW=120 kHz.
- b. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

# NOTE: (FCC PART 15.225)

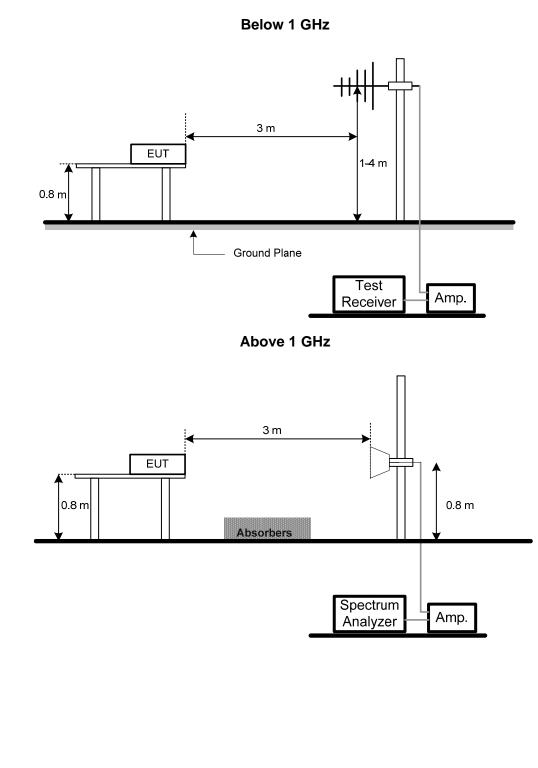
- a. Spectrum Setting: 9 KHz – 150 KHz, RBW= 200Hz, VBW=200Hz, Sweep time = 200 ms.
  150 K Hz – 30 MHz, RBW= 10 KHz, VBW=10 KHz, Sweep time = 200 ms.
  30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
- b. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- c. The Log-Bicon Antenna will use to test frequency range from 30MHz to 1000MHz and the Loop Antenna will use to test frequency below 30MHz.



# 5.4 DEVIATION FROM TEST STANDARD

No deviation

## 5.5 TEST SETUP





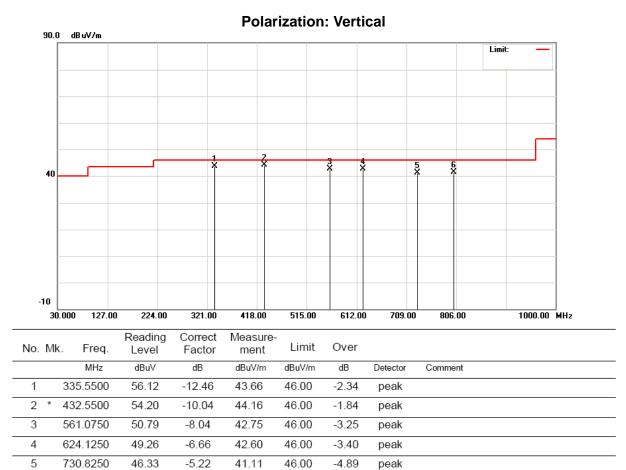
### 5.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

# Neutron Engineering Inc.\_

# 5.7 TEST RESULTS- FCC PART 15.209

EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	20°C	Relative Humidity	61%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		



-4.51

peak

46.00

801.1499

6

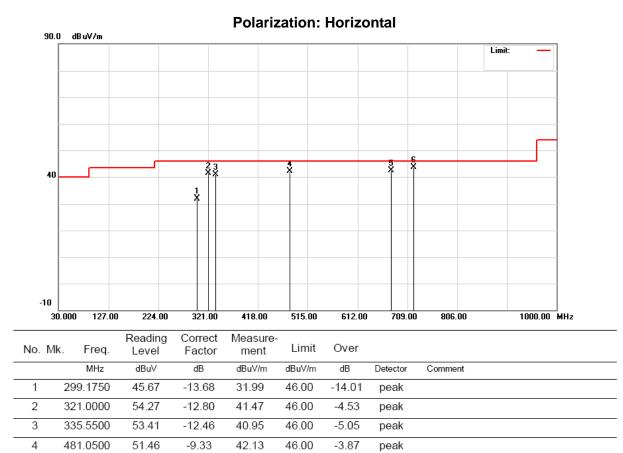
45.86

-4.37

41.49



EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	20°C	Relative Humidity	61%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		



677.4750

721.1250

5

6 \*

48.46

49.03

-6.18

-5.37

42.28

43.66

46.00

46.00

-3.72

-2.34

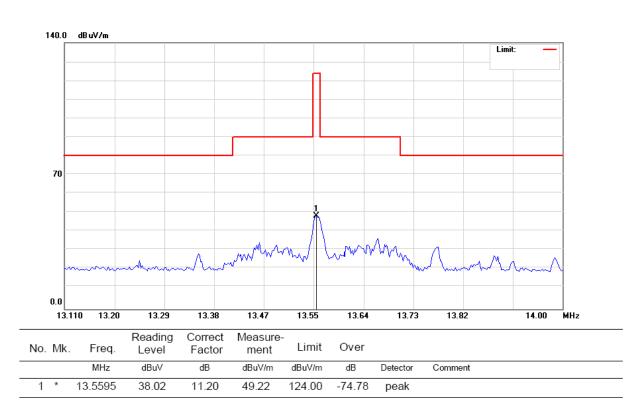
peak

peak

# Neutron Engineering Inc.\_

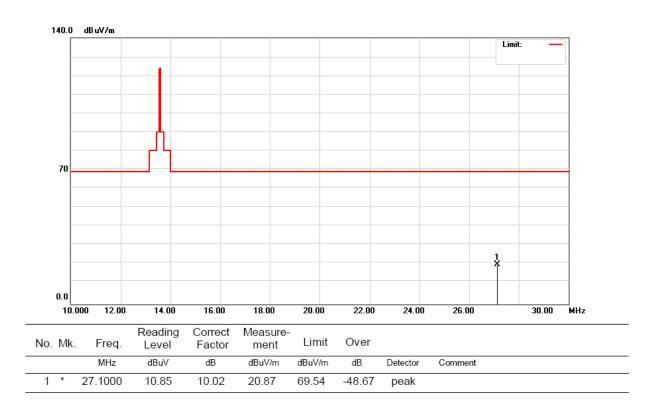
## 5.8 TEST RESULTS- FCC PART 15.225

EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	20°C	Relative Humidity	61%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		





EUT	PPC K750 Series Device Box	Model Name	K750 Device Box
Temperature	20°C	Relative Humidity	61%
Test Voltage	AC 120V/60Hz		
Test Mode	13.56MHz Transmit		





# **6 FREQUENCY STABILITY**

### 6.1 LIMITS

### FCC Part 15.225(e)

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. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 6.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Oct. 06, 2012

Remark: "N/A" denotes No Model Name, No Serial No. or No Calibration specified.

### 6.3 TEST PROCEDURE

a. The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

b. At room temperature (25±5°C), an external variable AC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

### 6.4 DEVIATION FROM TEST STANDARD

No deviation

### 6.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.



# 6.6 TEST RESULTS

EUT	產品名稱	Model Name	型號
Temperature	26°C	Relative Humidity	60%
Test Voltage	DC 48 V		
Test Mode	測試模式一		

	Frequency Stability Versus Environmental Temperature								
	Temperature (°C)	Voltage (AC)	Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)	Result			
	20	120V	13.56020						
0 min	50	120V	13.56020	0.000	+/- 1.356	PASS			
	-20	120V	13.55980	-0.400	+/- 1.356	PASS			
2 min	50	120V	13.56020	0.000	+/- 1.356	PASS			
	-20	120V	13.55980	-0.400	+/- 1.356	PASS			
5 min	50	120V	13.56020	0.000	+/- 1.356	PASS			
	-20	120V	13.55980	-0.400	+/- 1.356	PASS			
10 min	50	120V	13.56040	0.200	+/- 1.356	PASS			
	-20	120V	13.55960	-0.600	+/- 1.356	PASS			

Fuequency Stability Versus Input Voltage								
Temperature (°C)	Voltage (AC)		Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)	Result		
20	V-nom	120	13.56020					
20	V-min	102	13.56000	-0.2	+/- 1.356	PASS		
20	V-max	138	13.56040	0.2	+/- 1.356	PASS		



# 7 EUT TEST PHOTO

# Conducted emission test photos

13.56MHz Transmit





Report No.: NEI-FCCP-1-1406051



Radiated emission test photos

13.56MHz Transmit



