

FCC TEST REPORT

FCC ID : YOIN3-015RX

Applicant : PEGA HK LIMITED

Address of Applicant : Unit 10A,12/F,Tower2,China HongKong City,No.33 Canton Road, Tsim Sha Tsui,HongKong

Equipment Under Test (EUT) :

Product description : Raven (Alternate Version)

Model No. : N3-015 (83081)

Frequency Range : 2410MHz to 2470MHz

Standards : FCC Part 15 Subpart B

Date of Test : August 2~12,2010

Test Engineer : Zero Zhou

Reviewed By : 

Test Result :	PASS *
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* The sample detailed above has been tested to the requirements of FCC Part15 SubpartB rules. The test results have been reviewed against the rules above and found to meet their essential requirements.

PREPARED BY:

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1 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 1GHz)	FCC PART 15, SUBPART B: 2008	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15, SUBPART B: 2008	ANSI C63.4: 2003	Class B	PASS

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3 General Information

3.1 Client Information

Applicant: PEGA HK LIMITED
Address of Applicant: Unit 10A,12/F,Tower2,China HongKong City,No.33 Canton Road,Tsim Sha Tsui,HongKong

Manufacturer: SHENZHEN PEGA ELECTRONICS TECHNOLOGY CO.,LTD
Address of Manufacturer: 7Floor, Building A, PEGA Industrial Zone, Xingye Road, the 65th Block, Xixiang Town, Bao'an District, Shenzhen City, China

3.2 General Description of E.U.T.

Product description: Raven (Alternate Version)
Model No.: N3-015 (83081)

3.3 Details of E.U.T.

Power Supply: Receiver:USB 5VDC

3.4 Description of Support Units

The EUT has been tested as an independent unit.

3.5 Standards Applicable for Testing

The customer requested FCC tests for a Raven (Alternate Version) . The standards used were FCC Part 15 Subpart B.

3.6 Test Facility

The test facility has a test site registered with the following organizations:

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581.June 24,2008.

- **IC – Registration No.:7760A**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration No.:7760A, August 3,2010.

3.7 Test Location

All Emission tests were performed at:-

1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen 518105,China

4 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY451149 43	W2008001	9k-26.5GHz	Aug-10	Aug-11	Wws200 81596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZB ECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug-10	Aug-11		±1dB
Broad-band Horn Antenna	SCHWARZB ECK MESS-ELEKTROM / VULB9163	667	W2008003	1-18GHz	Aug-10	Aug-11		f<10 GHz: ±1dB 10GHz<f< 18 GHz: ±1.5dB
Broadband Preamplifier	SCHWARZB ECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug-10	Aug-11		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 25GHz,	SCHWARZB ECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug-10	Aug-11		-
10m 50 Ohm Coaxial Cable with N-plug, individual length,usable up to 3(5)GHz, Connector	SCHWARZB ECK MESS-ELEKTROM / AK 9513				Aug-10	Aug-11		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSPO/ SP-14C				N/A	N/A		
Test Receiver	ROHDE&SC HWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug-10	Aug-11	Wws200 80942	±1dB
EMI Receiver	Beijingkehuan	KH3931		9k-1GHz	Aug-10	Aug-11		
Two-Line V-Network	ROHDE&SC HWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug-10	Aug-11	Wws200 80941	±10%
Absorbing Clamp	ROHDE&SC HWARZ/ MDS-21	100205	W2005003	impandance 50 Ω loss : 17 dB	Aug-10	Aug-11	Wws200 80943	±1dB

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
10m 50 Ohm Coaxial Cable with N-plug, individual length,usable up to 3(5)GHz, Connectors	SCHWARZB ECK MESS-ELEKTROM / AK 9514				Aug-10	Aug-11		
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V07451 03095	W2008012	Power: 2000VA Vol-range: 0-300V Freq_range: 10-80Hz	Aug-10	Aug-11	Wwd200 81185	Voltage distinguish:0 .025% Power_freq distinguish:0 .02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V07451 03096	W2008013	Vol-range: 0-300V Power_freq: 10-80Hz				
Electrostatic Discharge Simulator	Em Test AG/Switzerland/DITO	V07451 03094	W2008005	Contact discharge: 500V-10KV Air diacharge: 500V-16.5KV	Aug-10	Aug-11	Wwc200 82400	7.5A current will be changed in V _m =1.5V
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range: 9K-1GHz RF voltage: -60 dBm-+10dBm	Aug-10	Aug-11	Wws200 81890	Power_freq distinguish:0.1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug-10	Aug-11	Wwc200 82396	150K-80MHz: ±1dB 80-230MHz:-2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range: 0.15-1000 MHz	Aug-10	Aug-11	Wwc200 82397	0.3-400 MHz: ±4dB Other freq: ±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365			Aug-10	Aug-11	Wws200 81597	
All Modules Generator	SCHAFFNER/6150	34579	W2008006	voltage:200V-4.4KV Pulse current: 100A-2.2KA	Aug-10	Aug-11	Wwc200 82401	voltage: ±10% Pulse current: ±10%

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Capacitive Coupling Clamp	SCHAFFNER R/ CDN 8014	25311			Aug-10	Aug-11	Wwc200 82398	-
Signal and Data Line Coupling Network	SCHAFFNER R/ CDN 117	25627	W2008011	1.2/50μS	Aug-10	Aug-11	Wwc200 82399	-
AC Power Supply	TONGYUN/ DTDGC-4				Aug-10	Aug-11	Wws200 80944	-
Exposure Level Tester ELT-400	Narda Safety TEST Solutions/230 4/03	M-0155	w2008022	Test freq range: 1—400kHz	Aug-10	Aug-11	Wwd200 81191	Test uncertainly: 1—120kHz:±1.83%, 120 kHz-400 kHz:±4.06%
Magnetic Field Probe 100cm ²	Narda Safety TEST Solutions/230 0/90.10		w2008021	Test freq range: 1—400kHz				Test uncertainly: 1Hz-10Hz:±16.2%, 10Hz - 120kHz:±2.2%, 120 kHz-400 kHz: ±4.7%
Active Loop Antenna Charger 10kHz-30MHz	Beijing Dazhi / ZN30900A	-	-	10kHz-30MHz	Aug-10	Aug-11		±1dB
PC	ACER	AG1720	PTSAF0C0 02813C05C 89001		Aug-10	Aug-11		±1dB
PC	IBM	X31	99-8D3W4		Aug-10	Aug-11		±1dB

5 Emissions Test Results

5.1 Conducted Emission Data

Test Requirement:	FCC Part15.107 Class B
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

5.1.1 E.U.T. Operation

Operating Environment:	
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	1012 mbar

EUT Operation :

The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.1.2 EUT Setup

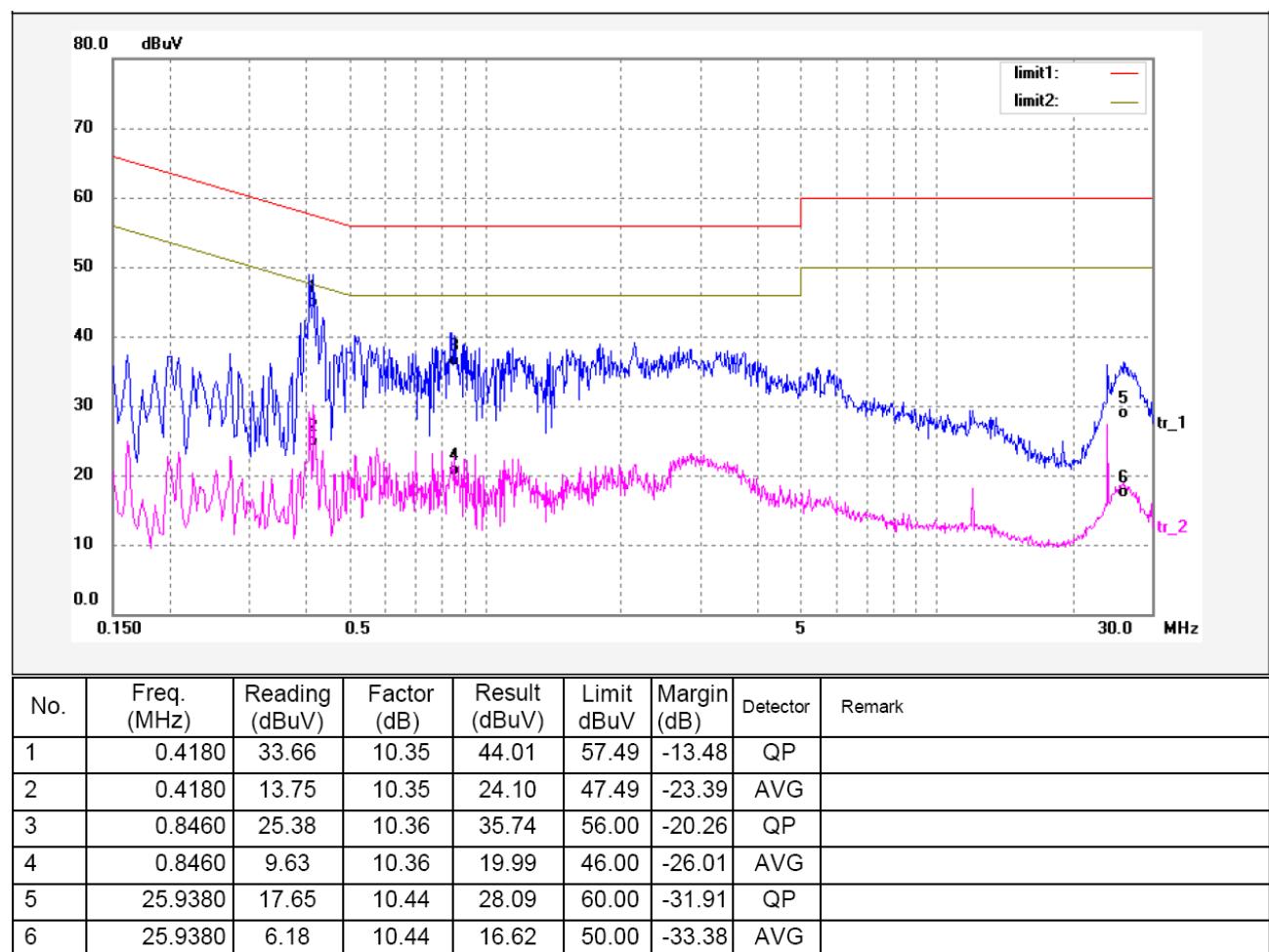
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15.107 Class B limits. The EUT was placed on the test table in working mode. The EUT has been tested the PC mode, and the data as follow:

5.1.3 Conducted Emission Test Data

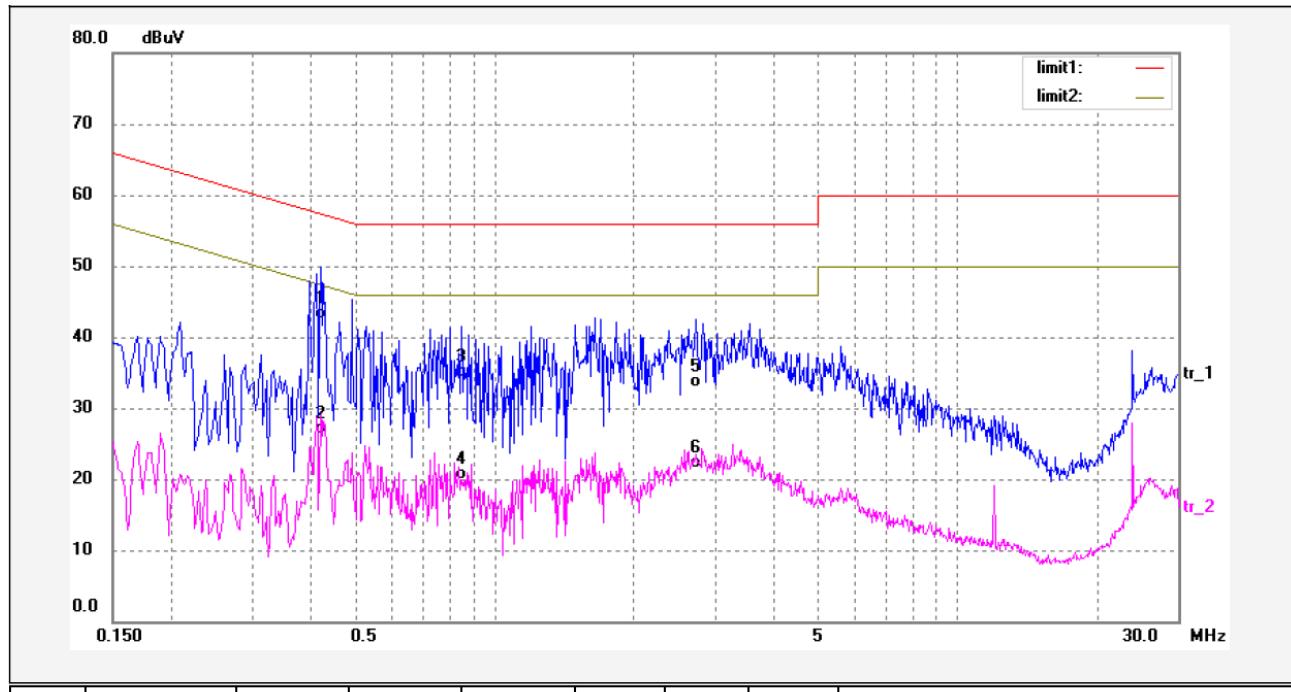
The conducted test data as below :

Mode : PC mode

Live Line



Neutral Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4220	32.18	10.35	42.53	57.41	-14.88	QP	
2	0.4220	16.05	10.35	26.40	47.41	-21.01	AVG	
3	0.8500	23.87	10.36	34.23	56.00	-21.77	QP	
4	0.8500	9.62	10.36	19.98	46.00	-26.02	AVG	
5	2.7300	22.57	10.38	32.95	56.00	-23.05	QP	
6	2.7300	11.14	10.38	21.52	46.00	-24.48	AVG	

5.1.4 Photograph – Conducted Emission Test Setup



5.2 Radiation Emission Data

Test Requirement:	FCC Part15 B
Test Method:	Based on ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Class:	Class B
Limit:	40.0 dB μ V/m between 30MHz & 88MHz 43.5 dB μ V/m between 88MHz & 216MHz 46.0 dB μ V/m between 216MHz & 960MHz 54.0 dB μ V/m above 960MHz
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

5.2.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC lab is ± 5.03 dB.

5.2.2 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 B limits. The EUT was placed on the test table in working mode. a typical signal or an unmodulated CW signal at the operating frequency of the EUT shall be supplied to the EUT for all measurements.

5.2.3 Spectrum Analyzer Setup

According to FCC Part15 B Rules, the system was tested from 30 to 1000MHz.

Below 1G

Start Frequency.....	30 MHz
Stop Frequency	1000 MHz
Sweep Speed Auto	
IF Bandwidth	120 kHz
Video Bandwidth.....	100KHz
Quasi-Peak Adapter Bandwidth.....	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	100KHz

5.2.4 Test Procedure

The radiated emissions test.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB μ V of specification limits), and are distinguished with a "Qp" in the data table.

The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

The EUT was working in normal link of read/write mode. for more details of the test result,please refer to the test setup view in the report.

5.2.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

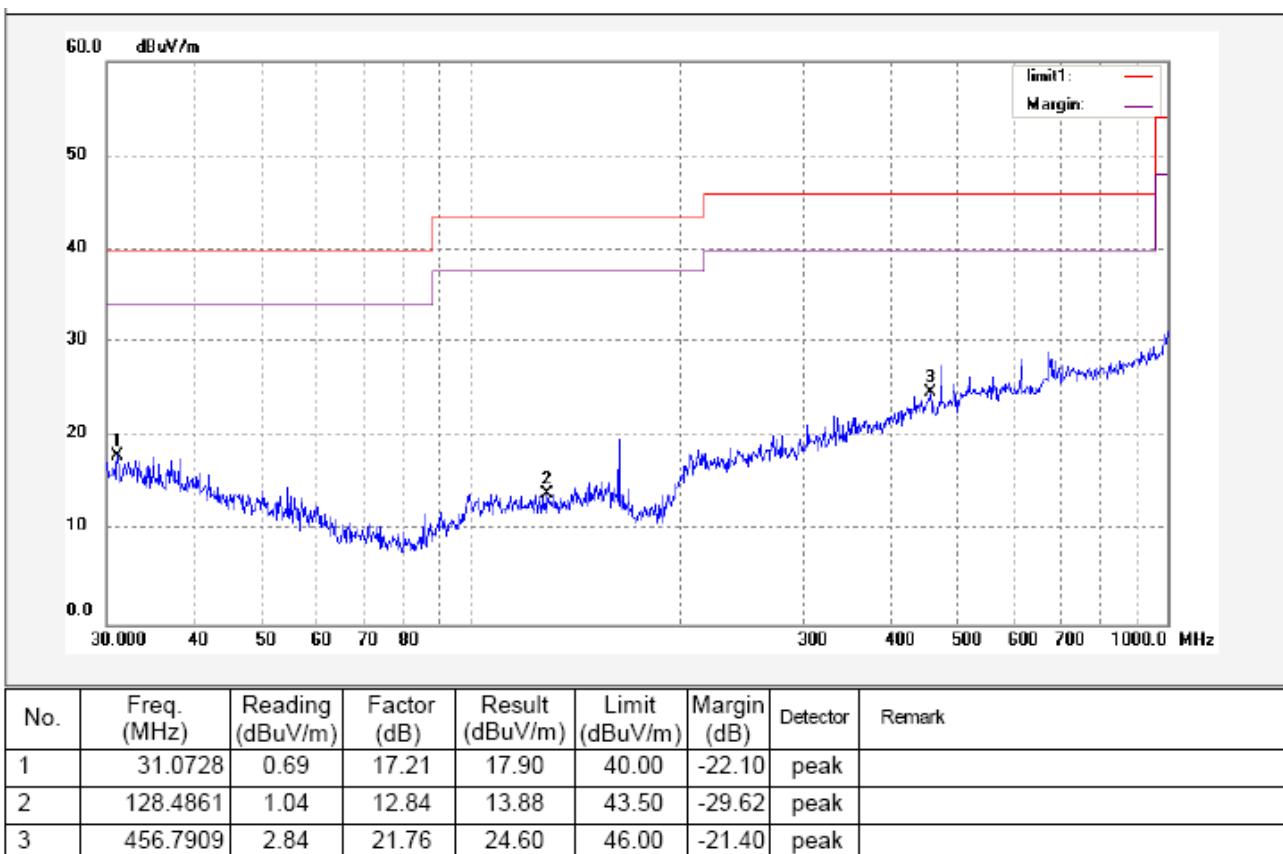
5.2.6 Summary of Test Results

According to the data in this section, the EUT complied with the FCC Part15 B standards.

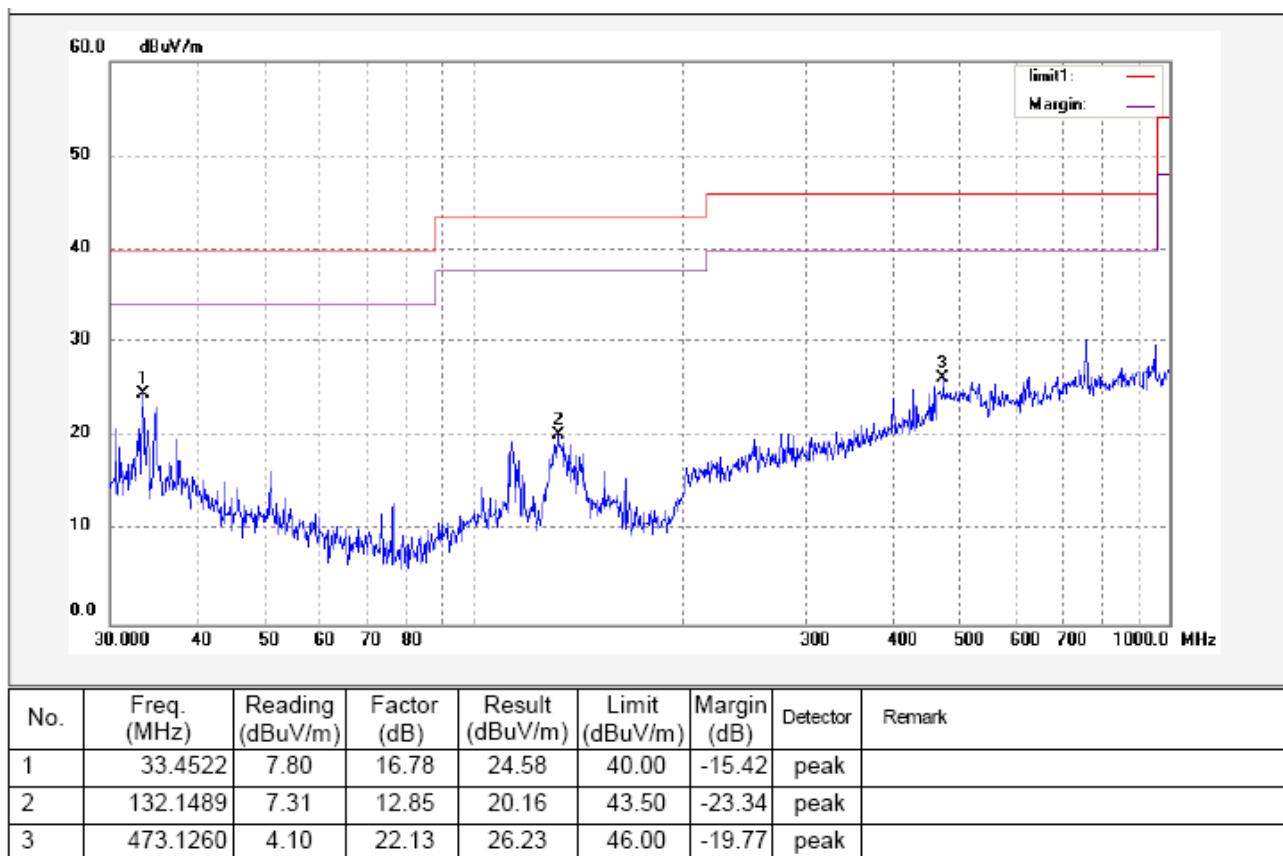
The EUT was pretested in two modes:PC mode and AV/OUT mode, and the worse case was the PC mode, so the data show was the PC mode only.

Test Mode:PC mode

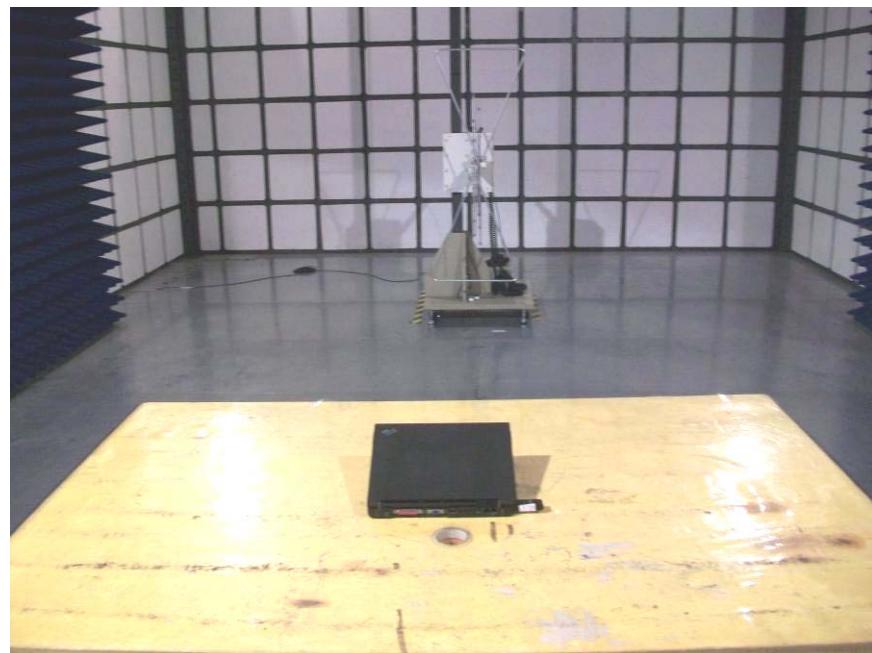
Test Polarization : Horizontal



Test Polarization : Vertical



5.2.7 Photograph–Radiation Emission Test Setup View



6 Photographs - Constructional Details

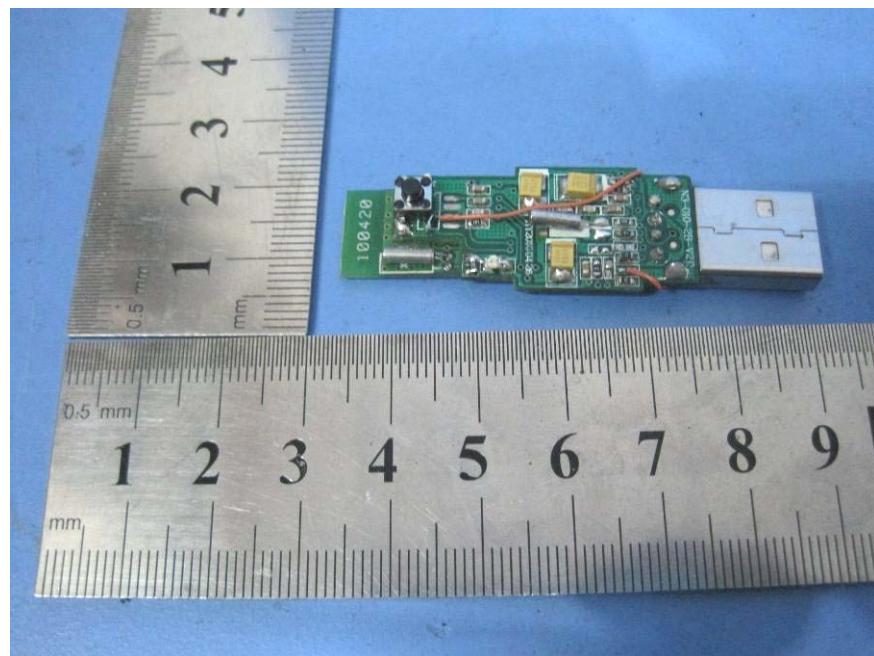
6.1 EUT - Front View



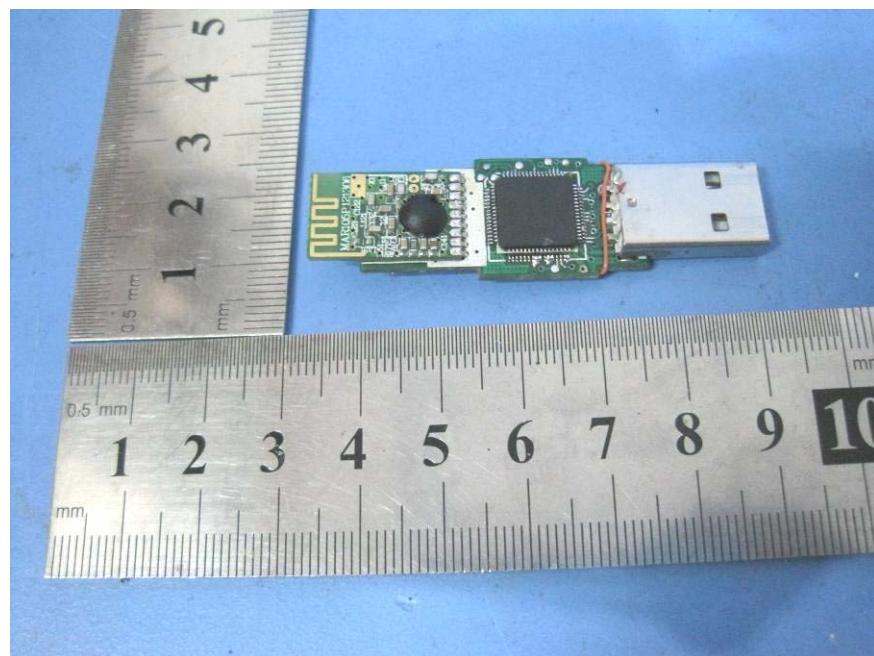
6.2 EUT - Back View



6.3 PCB -Front View



6.4 PCB - Back View



7 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Top View/ proposed FCC Label Location

