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## FCC PART 15 SUBPART B TEST REPORT

### FCC Part 15B

**Report Reference No.**.....: **CTL130116086-WF**

Compiled by

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*Tracy Qi*

Date of issue.....: Jan. 31, 2013

**Representative Laboratory Name.** : **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

Address.....: Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China.

**Test Firm**.....: **Bontek Compliance Testing Laboratory Ltd**

Address.....: 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

**Applicant's name**.....: **Nordic Games GmbH**

Address.....: Landstrasser Hauptstrasse 1/Top 18, A-1030 Vienna, Austria

#### Test specification:

Standard.....: FCC Part 15B: Unintentional Radiators

TRF Originator.....: Shenzhen CTL Electromagnetic Technology Co., Ltd.

Master TRF.....: Dated 2011-01

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**Test item description**.....: **USB Hub 4 ports**

**FCC ID**.....: **R7IKT-UH406**

Trade Mark.....: /

Model/Type reference.....: KT-UH406, KT-UH402, KT-UH412, KT-UH417, KT-UH419

Result.....: **Positive**

**TEST REPORT**

<b>Test Report No. :</b>	<b>CTL130116086-WF</b>	Jan. 31, 2013
		Date of issue

**Equipment under Test** : USB Hub 4 ports

**Model /Type** : KT-UH406(under test in the report)

**Listed Models** : KT-UH402, KT-UH412, KT-UH417, KT-UH419

**Different Description** : All the models(KT-UH406, KT-UH402, KT-UH412, KT-UH417, KT-UH419) have same electrical, PCB and BOM, only the model' s name is different for marketing requirements.

**Applicant** : **Nordic Games GmbH**

**Address** : Landstrasser Hauptstrasse 1/Top 18, A-1030 Vienna, Austria

**Manufacturer** **Keeptech Electronics(HK) Ltd.**

**Address** Rm.2302, 23/F. Seaview Comm. Building, 21-24 Connaught Rd. West, Sheung Wan, Hong Kong

**Test Result** according to the standards on page 4:

**Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[FCC Part 15B: Unintentional Radiators](#)

[ANCI C63.4: 2003](#)



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample : Jan. 16, 2013

Testing commenced on : Jan. 17, 2013

Testing concluded on : Jan. 22, 2013

### 2.2. Equipment Under Test

#### Power supply system utilised

Power supply voltage : ☐ 120V / 60 Hz ☐ 115V / 60Hz  
☐ 12 V DC ☐ 24 V DC  
☒ Other (specified in blank below)

DC 5V from USB port

### 2.3. Short description of the Equipment under Test (EUT)

The device is a USB Hub 4 ports. The main IC work frequency speed is 12MHz and CPU Speed 25MHz.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

### 2.4. EUT operation mode

Test Mode(TM)	Description	Remark
TM1	Downloading	Connect to Notebook PC

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of X axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

The worst case of AC Conducted Emission is mode 1; the test data of this mode was reported.

### 2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

#### Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	0.12	Unshielded	Without Core



- - supplied by the manufacturer
- - supplied by the lab

● U-Disk	Manufacturer : KINGSTON Model No. : 4047412
● U-Disk	Manufacturer : KINGSTON Model No. : DTIG3
● U-Disk	Manufacturer : Netac Model No. : U235
● Notebook PC	Manufacturer : DELL Model No. : PP26L
● Notebook PC	Manufacturer : SONY Corporation Model No. : PCG-41426W
● USB Keyboard	Manufacturer : DELL Model No. : KB2521
● USB Mouse	Manufacturer : DELL Model No. : MS111-L

## 2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **R7IKT-UH406** filing to comply with of the FCC Part 15B Rules.

## 2.7. Modifications

No modifications were implemented to meet testing criteria.

### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Bontek Compliance Testing Laboratory Ltd  
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

#### **3.2. Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

##### **IC Registration No.: 7631A**

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

##### **FCC-Registration No.: 338263**

Bontek Compliance Testing Laboratory 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 338263, March 24, 2008.

#### **3.3. Environmental conditions**

During the measurement the environmental conditions were within the listed ranges:

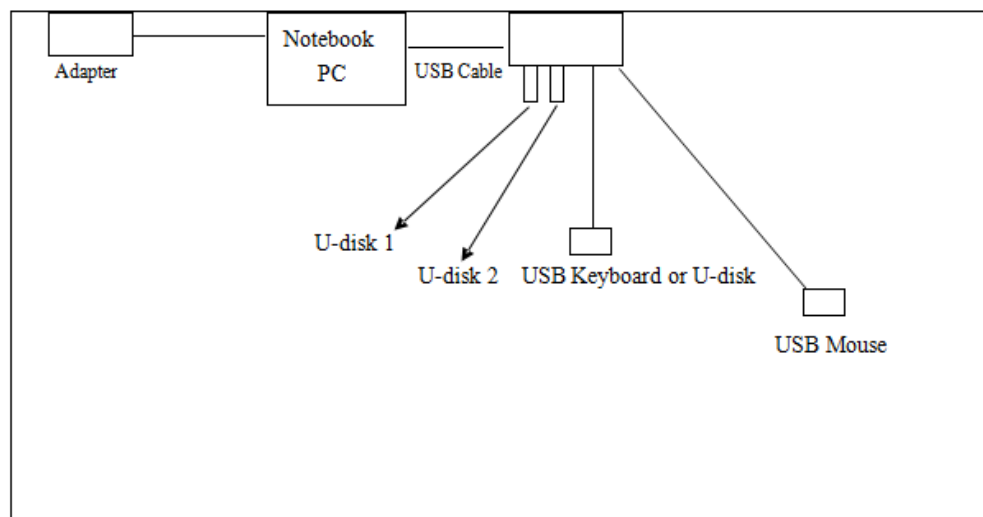
Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

#### **3.4. Configuration of Tested System**

**Fig. 2-1 Configuration of Tested System**



### 3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~26.5GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

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

### 3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2012/04/14	2013/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2012/04/14	2013/04/13
3	Dual Directional Coupler	Agilent	778D	2012/04/14	2013/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2012/04/14	2013/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2012/04/14	2013/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2012/04/14	2013/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2012/04/14	2013/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2012/04/14	2013/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2012/04/14	2013/04/13
10	AC Power Supply	IDRC	CF-500TP	2012/04/14	2013/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2012/04/14	2013/04/13
12	RF Current Probe	FCC	F-33-4	2012/04/14	2013/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2012/04/14	2013/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2012/04/14	2013/04/13
15	Amplifier	HP	8447D	2012/04/14	2013/04/13
16	SIGNAL GENERATOR	HP	8647A	2012/04/14	2013/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2012/04/14	2013/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2012/04/14	2013/04/13
19	EMI Test Receiver	R&S	ESPI	2012/04/14	2013/04/13
20	Loop Antenna	ZHINAN	ZN30900A	2012/04/14	2013/04/13
21	Horn Antenna	Schwarzbeck	BBHA9120D	2012/04/14	2013/04/13
22	Horn Antenna	Schwarzbeck	BBHA9170	2012/04/14	2013/04/13



### 3.7. Summary of Test Result

No deviations from the test standards

Test Item	Test Requirement	Standard Paragraph	Result
Radiated Emission	FCC PART 15	Section 15.109	PASS
Conducted Emission	FCC PART 15	Section 15.107	PASS

### 3.8. Test Software

The following programs installed in the EUT were programmed during the test.

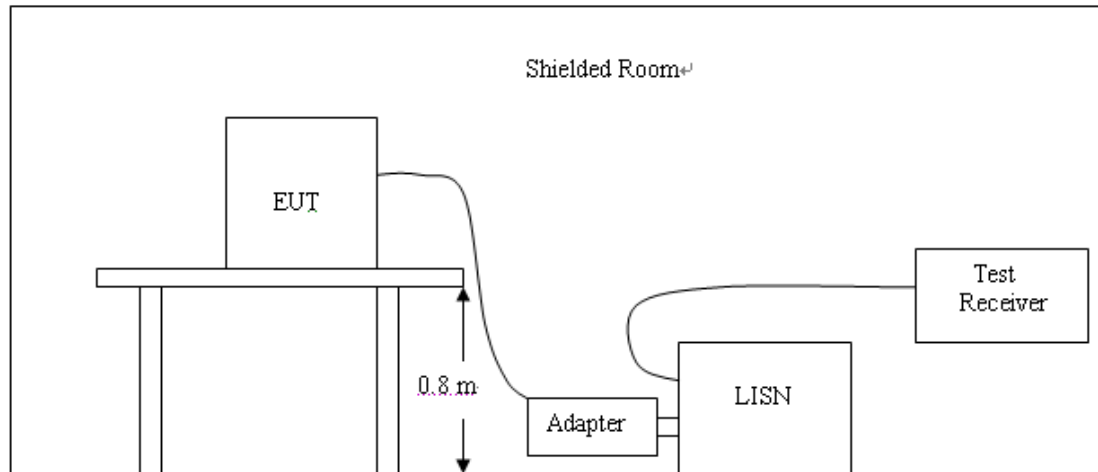
1. Execute the program, “Winthrax” , installed in PC for files transfer with EUT via USB cable.
2. Turn on camera to capture images.



## 4. TEST CONDITIONS AND RESULTS

### 4.1. Conducted Emissions Test

#### TEST CONFIGURATION



#### TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

\* Decreasing linearly with the logarithm of the frequency

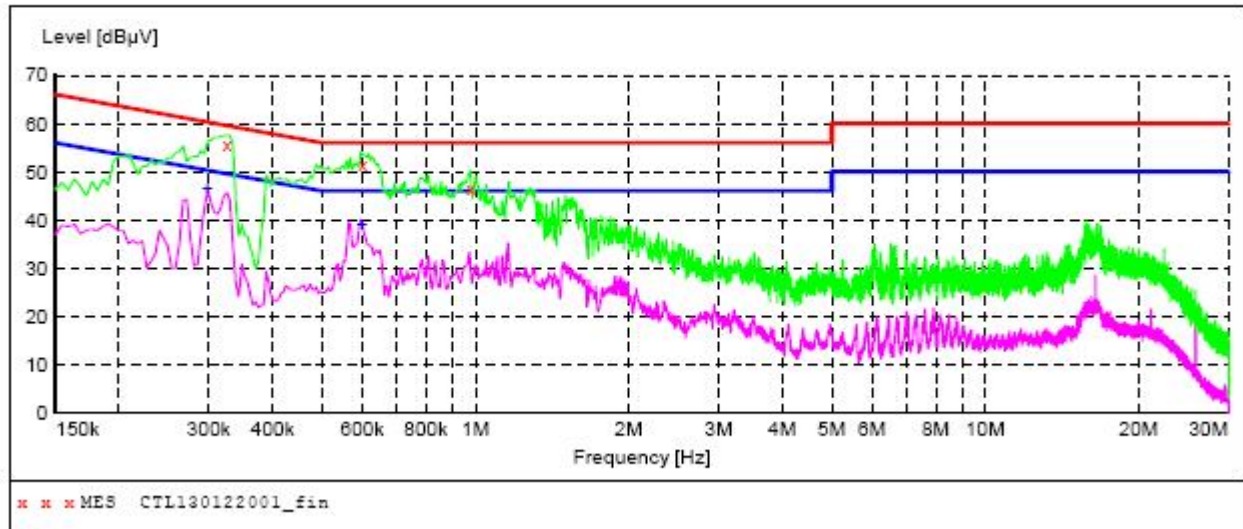
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

**The RBW/VBW for 150KHz to 30MHz: 9KHz**

**TEST RESULTS****SCAN TABLE: "Voltage (9K-30M) FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL130122001\_fin"**

1/22/2013 8:55AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.325500	55.80	10.2	60	3.8	QP	L1	GND
0.600000	51.60	10.2	56	4.4	QP	L1	GND
0.978000	46.40	10.3	56	9.6	QP	L1	GND

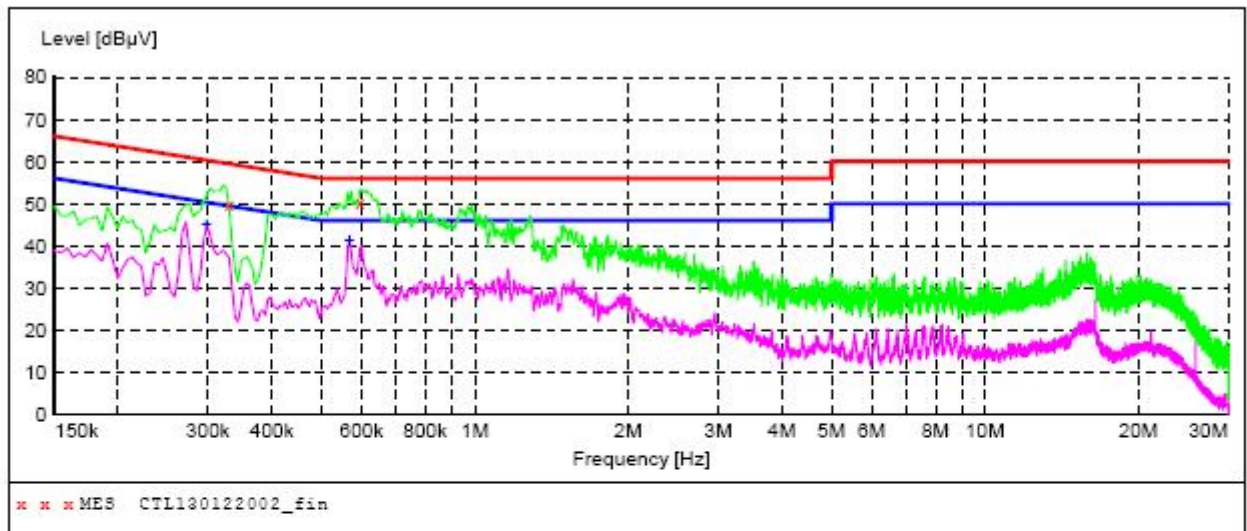
**MEASUREMENT RESULT: "CTL130122001\_fin2"**

1/22/2013 8:55AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.298500	46.40	10.2	50	3.9	AV	L1	GND
0.600000	39.00	10.2	46	7.0	AV	L1	GND

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL130122002\_fin"**

1/22/2013 8:58AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.330000	50.00	10.2	60	9.5	QP	N	GND
0.595500	50.40	10.2	56	5.6	QP	N	GND

**MEASUREMENT RESULT: "CTL130122002\_fin2"**

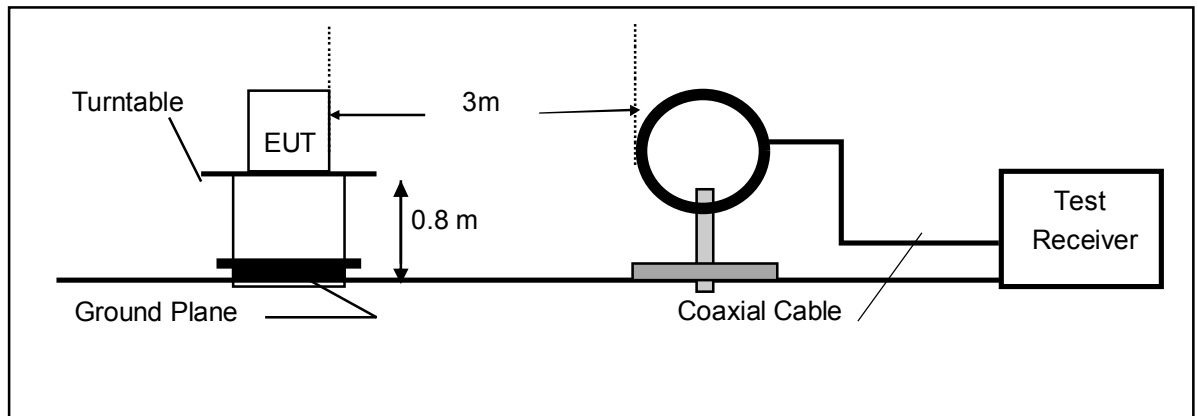
1/22/2013 8:58AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.298500	45.20	10.2	50	5.1	AV	N	GND
0.568500	41.40	10.2	46	4.6	AV	N	GND

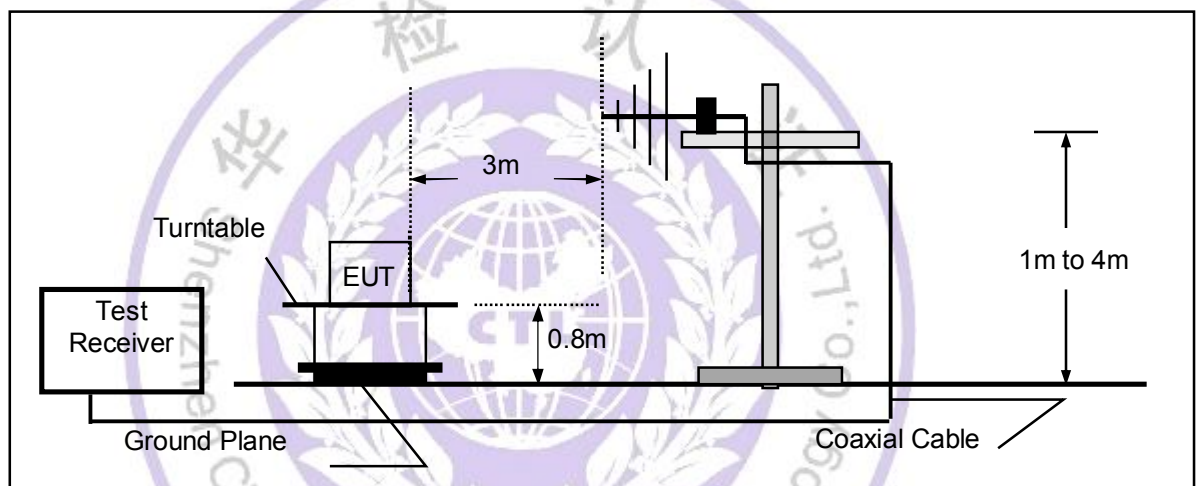
## 4.2. Radiated Emissions Test

### TEST CONFIGURATION

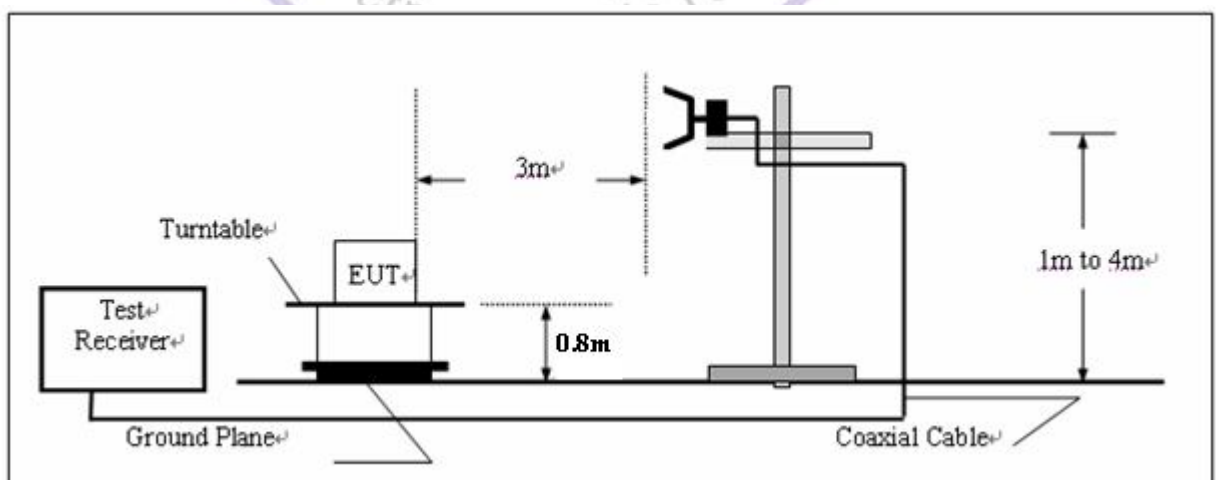
#### (A) Radiated Emission Test Set-Up, Frequency Below 30MHz



#### (B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



#### (C) Radiated Emission Test Set-Up, Frequency above 1000MHz





**LIMIT**

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (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

**FIELD STRENGTH CALCULATION**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

**TEST PROCEDURE**

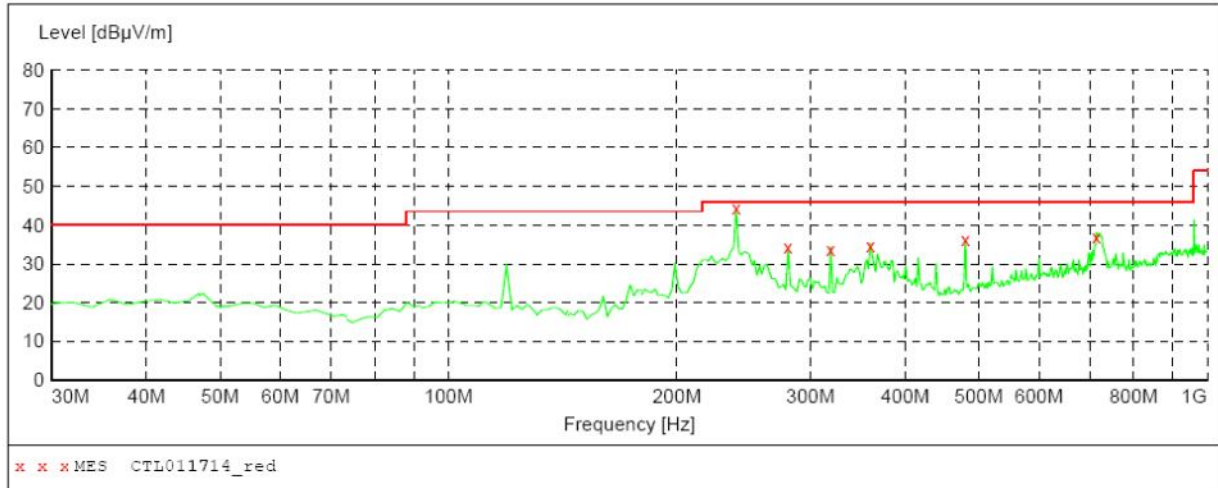
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measurements have been completed.
6. Based on the Frequency Generator in the device include 12MHz, the speed of CPU is 25MHz, the test frequency range from 9KHz to 1GHz per FCC PART 15.33(a) and (b).

**TEST RESULTS**

TM1 completed for test. The worst case of Radiated Emission is mode 1; the test data of this mode was reported.

**TM 1:*****SWEEP TABLE: "test (30M-1G)"***

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW

***MEASUREMENT RESULT: "CTL011714\_red"***

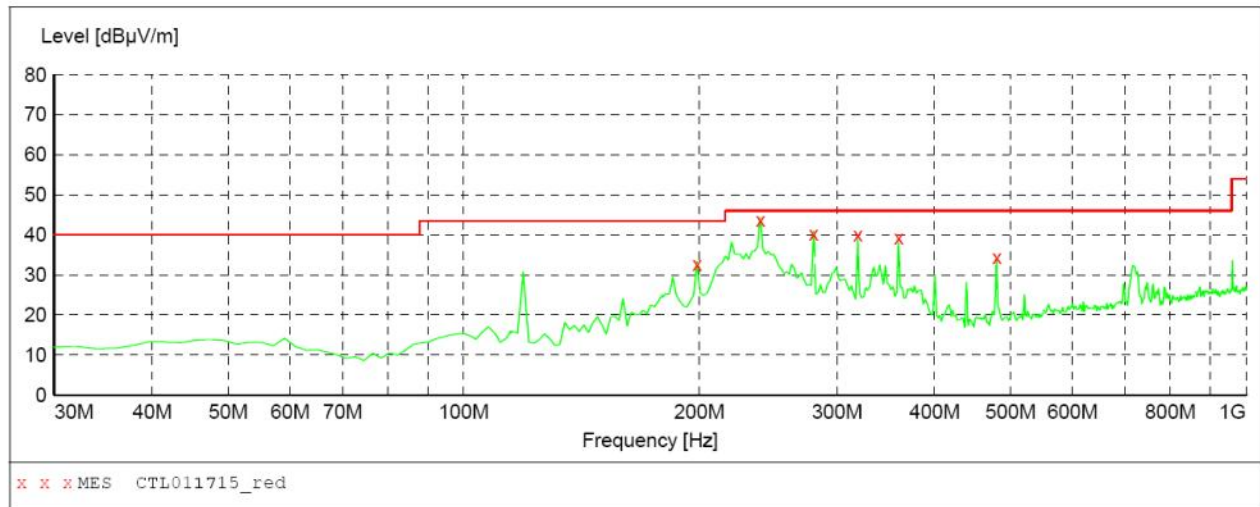
1/17/2013 3:28PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
239.520000	44.60	16.9	46.0	1.4	---	100.0	0.00	VERTICAL
280.260000	33.60	18.2	46.0	12.4	---	100.0	0.00	VERTICAL
319.060000	32.00	19.2	46.0	14.0	---	100.0	0.00	VERTICAL
359.800000	34.90	20.6	46.0	11.1	---	100.0	0.00	VERTICAL
480.080000	36.50	23.1	46.0	9.5	---	100.0	0.00	VERTICAL
714.820000	37.10	26.7	46.0	8.5	---	100.0	0.00	VERTICAL



***SWEEP TABLE: "test (30M-1G)"***

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 30.0 MHz	Frequency 1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW

***MEASUREMENT RESULT: "CTL011715\_red"***

1/17/2013 3:30PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
198.780000	32.20	14.9	43.5	11.3	---	100.0	0.00	HORIZONTAL
239.520000	43.10	16.9	46.0	2.9	---	100.0	0.00	HORIZONTAL
280.260000	40.10	18.2	46.0	5.9	---	100.0	0.00	HORIZONTAL
319.060000	39.50	19.2	46.0	6.5	---	100.0	0.00	HORIZONTAL
359.800000	38.60	20.6	46.0	7.4	---	100.0	0.00	HORIZONTAL
480.080000	33.80	23.1	46.0	12.2	---	100.0	0.00	HORIZONTAL

**Remark:**

- (1) Measuring frequencies from 9 KHz to the 1GHz, Loop Antenna used below 30MHz. See Section 3.6 table item 20. Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The test results from 9KHz to 30MHz are not reported because the emissions levels that are 20dB below the official limit.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 100KHz. Below 30MHz was 10KHz, above 1GHz was 1MHz.

## 5. Test Setup Photos of the EUT



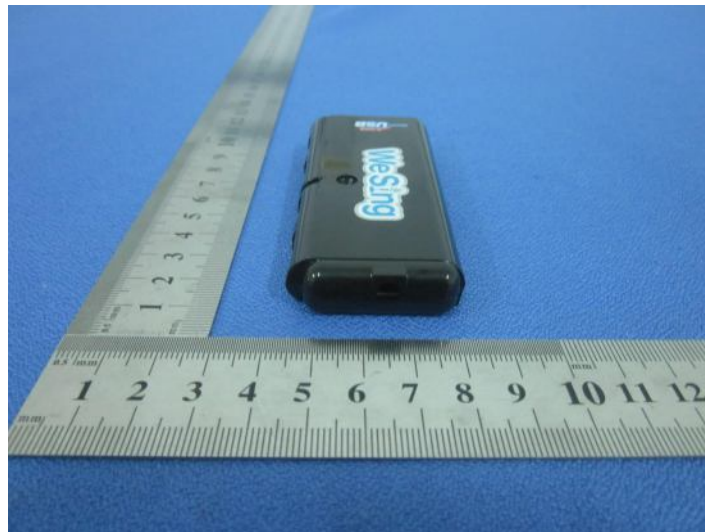


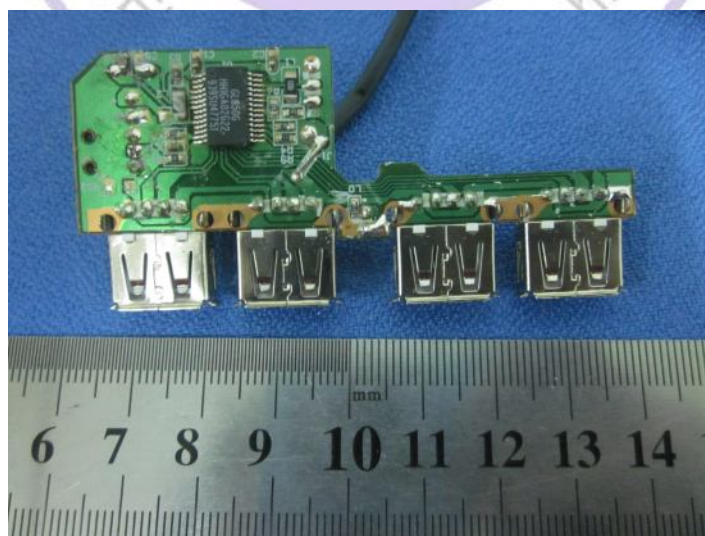
## 6. External and Internal Photos of the EUT

### External Photos of EUT







Internal Photos of EUT

.....End of Report.....