

APPLICATION CERTIFICATION FCC Part 15B  
On Behalf of  
Hanshin International Limited

Instructor Response System - Receiver  
Model No.: HSTNX-0002

FCC ID: WT4HSTNX-0002

Prepared for : Hanshin International Limited  
Address : 1/F., Block 3, No. 5 Zhuji Road, Tianhe District, Guangzhou  
China

Prepared by : ACCURATE TECHNOLOGY CO. LTD  
Address : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.  
Science & Industry Park, Nanshan, Shenzhen, Guangdong  
P.R. China

Tel: (0755) 26503290  
Fax: (0755) 26503396

Report Number : ATE20091164  
Date of Test : June 29-30, 2009  
Date of Report : July 2, 2009

# **TABLE OF CONTENTS**

Description	Page
Test Report Certification	
<b>1. GENERAL INFORMATION .....</b>	<b>4</b>
1.1. Description of Device (EUT).....	4
1.2. Description of Test Facility .....	5
1.3. Measurement Uncertainty .....	5
<b>2. MEASURING DEVICE AND TEST EQUIPMENT .....</b>	<b>6</b>
<b>3. OPERATION OF EUT DURING TESTING .....</b>	<b>7</b>
3.1. Operating Mode .....	7
3.2. Configuration and peripherals .....	7
<b>4. TEST PROCEDURES AND RESULTS .....</b>	<b>8</b>
<b>5. CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.107(A) .....</b>	<b>9</b>
5.1. Block Diagram of Test Setup.....	9
5.2. The Emission Limit .....	9
5.3. Configuration of EUT on Measurement .....	10
5.4. Operating Condition of EUT .....	10
5.5. Test Procedure .....	10
5.6. Power Line Conducted Emission Measurement Results .....	11
<b>6. RADIATED EMISSION FOR FCC PART 15 SECTION 15.109(A).....</b>	<b>14</b>
6.1. Block Diagram of Test Setup.....	14
6.2. The Emission Limit For Section 15.109 (a) .....	15
6.3. EUT Configuration on Measurement .....	15
6.4. Operating Condition of EUT .....	15
6.5. Test Procedure .....	16
6.6. The Emission Measurement Result .....	17

## Test Report Certification

Applicant : Hanshin International Limited  
Manufacturer : Hanshin International Limited  
EUT Description : Instructor Response System - Receiver  
(A) MODEL NO.: HSTNX-0002  
(B) SERIAL NO.: N/A  
(C) POWER SUPPLY: DC 5V (Connect to PC use USB terminal)

Measurement Procedure Used:

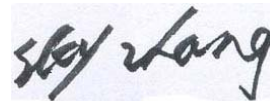
### **FCC Rules and Regulations Part 15 Subpart B ANSI C63.4: 2003**

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

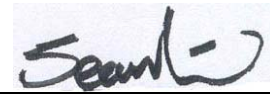
Date of Test : June 29-30, 2009

Prepared by :



(Engineer)

Approved & Authorized Signer :



(Manager)

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

EUT	:	Instructor Response System - Receiver
Model Number	:	HSTNX-0002
Frequency Band	:	2410.3-2470.3MH
Power Supply	:	DC 5V (Connect to PC use USB terminal)
PC System	:	Manufacturer: DELL M/N: DCNE Serial No.: 6CQSC2X
Printer	:	Manufacturer: Canon Model No.: BJC-1000SP
Applicant	:	Hanshin International Limited
Address	:	1/F., Block 3, No. 5 Zhuji Road, Tianhe District, Guangzhou, China
Manufacturer	:	Hanshin International Limited
Address	:	1/F., Block 3, No. 5 Zhuji Road, Tianhe District, Guangzhou, China
Date of sample received	:	June 26, 2009
Date of Test	:	June 29-30, 2009

## 1.2. Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC  
The Registration Number is 752051

Listed by Industry Canada  
The Registration Number is 5077A-2

Accredited by China National Accreditation Committee  
for Laboratories  
The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.  
Science & Industry Park, Nanshan, Shenzhen, Guangdong  
P.R. China

## 1.3. Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2  
(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2  
(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2  
(Above 1GHz)

## 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment**

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	03.28.2010
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	03.28.2010
Spectrum Analyzer	Agilent	E7405A	MY45115511	03.28.2010
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	03.30.2010
Loop Antenna	Schwarzbeck	FMZB1516	1516131	03.28.2010
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	03.28.2010
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	12.19.2009
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	10.09.2009
LISN	Rohde&Schwarz	ESH3-Z5	100305	03.28.2010
LISN	Schwarzbeck	NSLK8126	8126431	03.28.2010

### 3. OPERATION OF EUT DURING TESTING

#### 3.1.Operating Mode

The mode is used: Connect to PC

#### 3.2.Configuration and peripherals

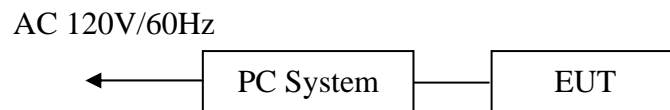


Figure 1 Setup: Connect to PC

(EUT: Instructor Response System - Receiver)

#### 4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.107	Conducted Emission Test	Compliant
Section 15.109	Radiated Emission Test	Compliant

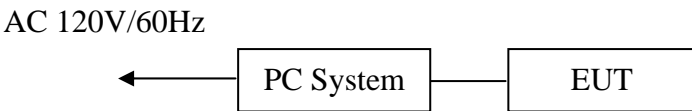


## 5. CONDUCTED EMISSION FOR FCC PART 15 SECTION

### 15.107(A)

#### 5.1. Block Diagram of Test Setup

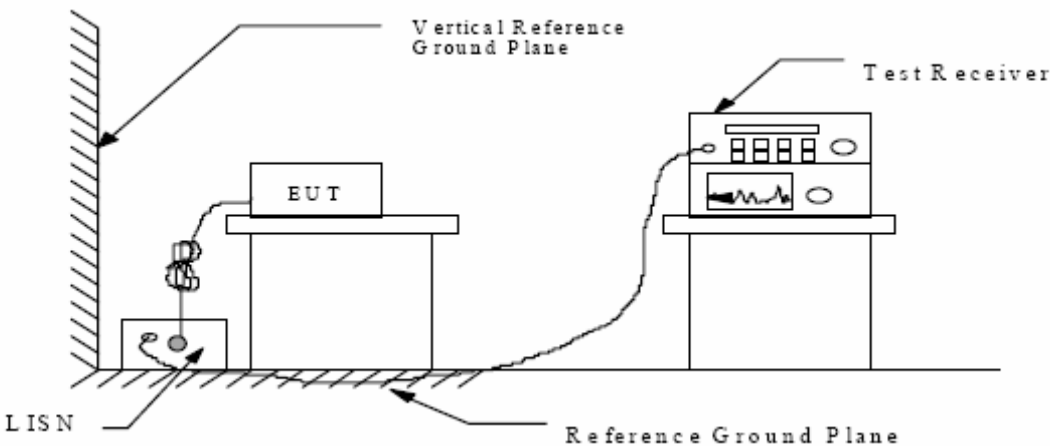
##### 5.1.1. Block diagram of connection between the EUT and simulators



Setup: Connect to PC

(EUT: Instructor Response System - Receiver)

##### 5.1.2. Shielding Room Test Setup Diagram



(EUT: Instructor Response System - Receiver)

#### 5.2. The Emission Limit

##### 5.2.1. Conducted Emission Measurement Limits According to Section 15.107(a)

Frequency (MHz)	Limit dB( $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 - 56.0 *	56.0 - 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

\* Decreases with the logarithm of the frequency.

### 5.3.Configuration of EUT on Measurement

The following equipment are installed on the Conducted Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

#### 5.3.1.Instructor Response System - Receiver (EUT)

Model Number	:	HSTNX-0002
Serial Number	:	N/A
Manufacturer	:	Hanshin International Limited

### 5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in Connect to PC mode measure it.

### 5.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2003 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

## 5.6. Power Line Conducted Emission Measurement Results

**PASS.**

The frequency range from 150kHz to 30MHz is checked.

Date of Test:	June 29, 2009	Temperature:	25°C
EUT:	Instructor Response System - Receiver	Humidity:	50%
Model No.:	HSTNX-0002	Power Supply:	Connect to PC use USB terminal PC power: AC 120V/60Hz
Test Mode:	Connect to PC	Test Engineer:	Joe

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.591000	31.90	12.0	56	24.1	QP	N	GND
2.976000	28.00	11.6	56	28.0	QP	N	GND
16.728000	39.90	11.1	60	20.1	QP	N	GND
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.991500	28.90	11.8	46	17.1	AV	N	GND
2.116500	28.10	11.6	46	17.9	AV	N	GND
11.508000	34.40	11.2	50	15.6	AV	N	GND
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.595500	32.90	12.0	56	23.1	QP	N	GND
2.382000	30.20	11.6	56	25.8	QP	N	GND
11.917500	37.30	11.2	60	22.7	QP	N	GND
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	36.80	11.2	54	16.8	AV	N	GND
0.595500	28.30	12.0	46	17.7	AV	N	GND
1.257000	28.80	11.8	46	17.2	AV	N	GND

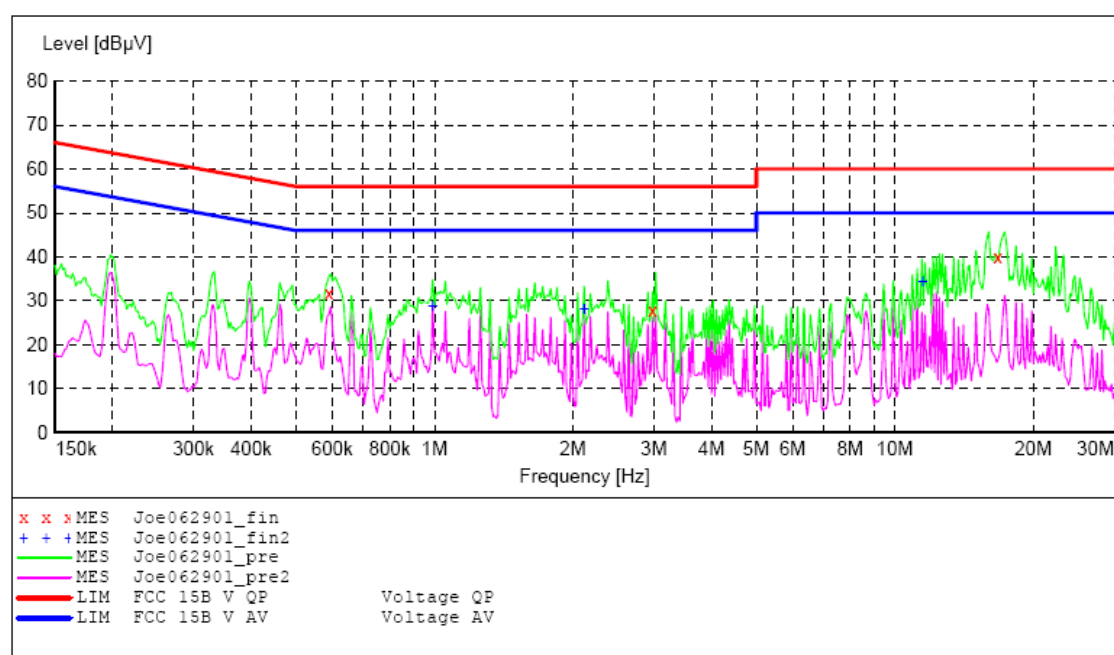
Emissions attenuated more than 20 dB below the permissible value are not reported.  
The spectral diagrams are attached as below.

**ACCURATE TECHNOLOGY CO., LTD**
**CONDUCTED EMISSION STANDARD FCC PART 15B**

EUT: Instructor Response System-Receiver M/N:HSTNX-0002  
 Manufacturer: Hanshin International Limited  
 Operating Condition: Connect to PC  
 Test Site: 1#Shielding Room  
 Operator: Joe  
 Test Specification: Va 120V/60Hz  
 Comment: Sample No.:091361 Report No.:ATE20091164  
 Start of Test: 6/29/2009 / 6:25:00PM

**SCAN TABLE: "V 150K-30MHz fin"**

Short Description: \_SUB\_STD\_VTERM2 1.70  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 0.8 % QuasiPeak 1.0 s 9 kHz NSLK8126 2008  
 Average


**MEASUREMENT RESULT: "Joe062901\_fin"**

6/29/2009 6:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.591000	31.90	12.0	56	24.1	QP	N	GND
2.976000	28.00	11.6	56	28.0	QP	N	GND
16.728000	39.90	11.1	60	20.1	QP	N	GND

**MEASUREMENT RESULT: "Joe062901\_fin2"**

6/29/2009 6:30PM

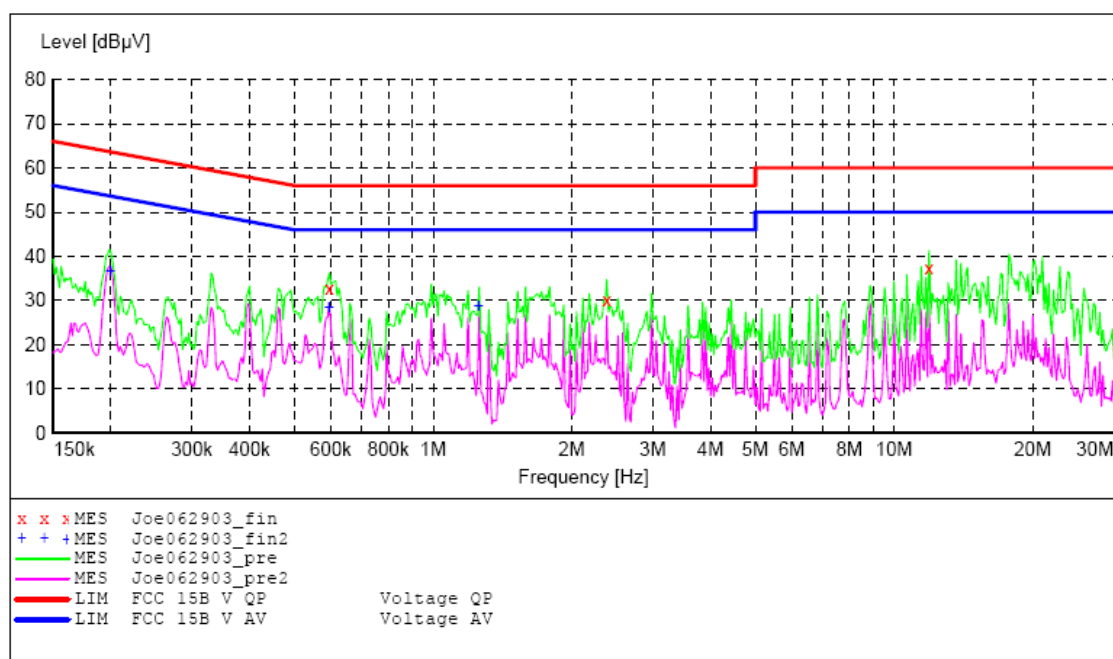
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.991500	28.90	11.8	46	17.1	AV	N	GND
2.116500	28.10	11.6	46	17.9	AV	N	GND
11.508000	34.40	11.2	50	15.6	AV	N	GND

**ACCURATE TECHNOLOGY CO., LTD****CONDUCTED EMISSION STANDARD FCC PART 15B**

EUT: Instructor Response System-Receiver M/N:HSTNX-0002  
 Manufacturer: Hanshin International Limited  
 Operating Condition: Connect to PC  
 Test Site: 1#Shielding Room  
 Operator: Joe  
 Test Specification: Vb 120V/60Hz  
 Comment: Sample No.:091361 Report No.:ATE20091164  
 Start of Test: 6/29/2009 / 6:35:38PM

**SCAN TABLE: "V 150K-30MHz fin"**

Short Description: \_SUB\_STD\_VTERM2 1.70  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 0.8 % QuasiPeak 1.0 s 9 kHz NSLK8126 2008  
 Average

**MEASUREMENT RESULT: "Joe062903\_fin"**

6/29/2009 6:38PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.595500	32.90	12.0	56	23.1	QP	L	GND
2.382000	30.20	11.6	56	25.8	QP	L	GND
11.917500	37.30	11.2	60	22.7	QP	L	GND

**MEASUREMENT RESULT: "Joe062903\_fin2"**

6/29/2009 6:38PM

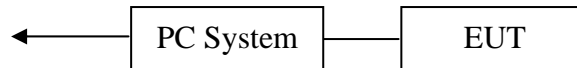
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.199500	36.80	11.2	54	16.8	AV	L	GND
0.595500	28.30	12.0	46	17.7	AV	L	GND
1.257000	28.80	11.8	46	17.2	AV	L	GND

## 6. RADIATED EMISSION FOR FCC PART 15 SECTION 15.109(A)

### 6.1. Block Diagram of Test Setup

#### 6.1.1. Block diagram of connection between the EUT and simulators

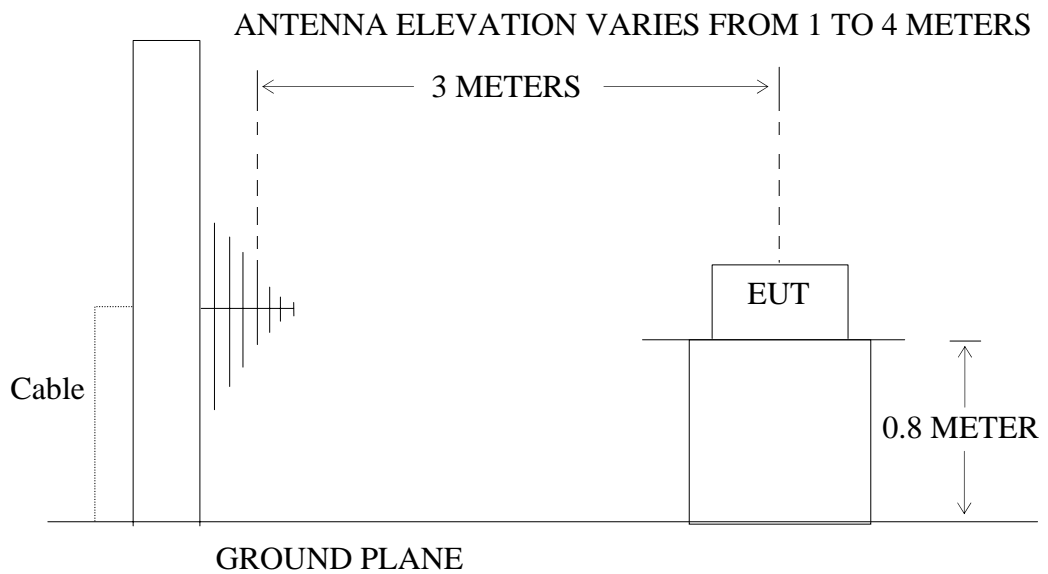
AC 120V/60Hz



Setup: Connect to PC

(EUT: Instructor Response System - Receiver)

#### 6.1.2. Semi-Anechoic Chamber Test Setup Diagram



(EUT: Instructor Response System - Receiver)

## 6.2.The Emission Limit For Section 15.109 (a)

### 6.2.1.Radiation Emission Measurement Limits According to Section 15.109 (a).

Frequency (MHz)	Limit	
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBμV/m)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

## 6.3.EUT Configuration on Measurement

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 6.3.1.Instructor Response System - Receiver (EUT)

Model Number : HSTNX-0002  
 Serial Number : N/A  
 Manufacturer : Hanshin International Limited

## 6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3. Let the EUT work in Connect to PC mode measure it.

## 6.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver is set at 120kHz in 30-1000MHz.

The frequency range from 30MHz to 1000MHz is checked.

The final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.



## 6.6.The Emission Measurement Result

**PASS.**

Date of Test:	June 30, 2009	Temperature:	25°C
EUT:	Instructor Response System - Receiver	Humidity:	50%
Model No.:	HSTNX-0002	Power Supply:	Connect to PC use USB terminal PC power: AC 120V/60Hz
Test Mode:	Connect to PC	Test Engineer:	Joe

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
119.1430	25.16	14.60	39.76	43.50	-3.74	Vertical
131.0590	26.08	14.86	40.94	43.50	-2.56	Vertical
142.9711	26.15	14.48	40.63	43.50	-2.87	Vertical
119.1430	26.00	14.60	40.60	43.50	-2.90	Horizontal
131.0590	26.31	14.86	41.17	43.50	-2.33	Horizontal
142.9711	26.49	14.48	40.97	43.50	-2.53	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

3. The spectral diagrams are attached as below display the measurement of peak values.


**ACCURATE TECHNOLOGY CO., LTD.**

 F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
 Science & Industry Park,Nanshan Shenzhen,P.R.China

 Site: 966 chamber  
 Tel:+86-0755-26503290  
 Fax:+86-0755-26503396

Job No.: RTTE #2038

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 %

EUT: Instructor Response System - Recei

Mode: Connect to PC

Model: HSTNX-0002

Manufacturer: Hanshin International Limited

Polarization: Vertical

Power Source: DC 5V

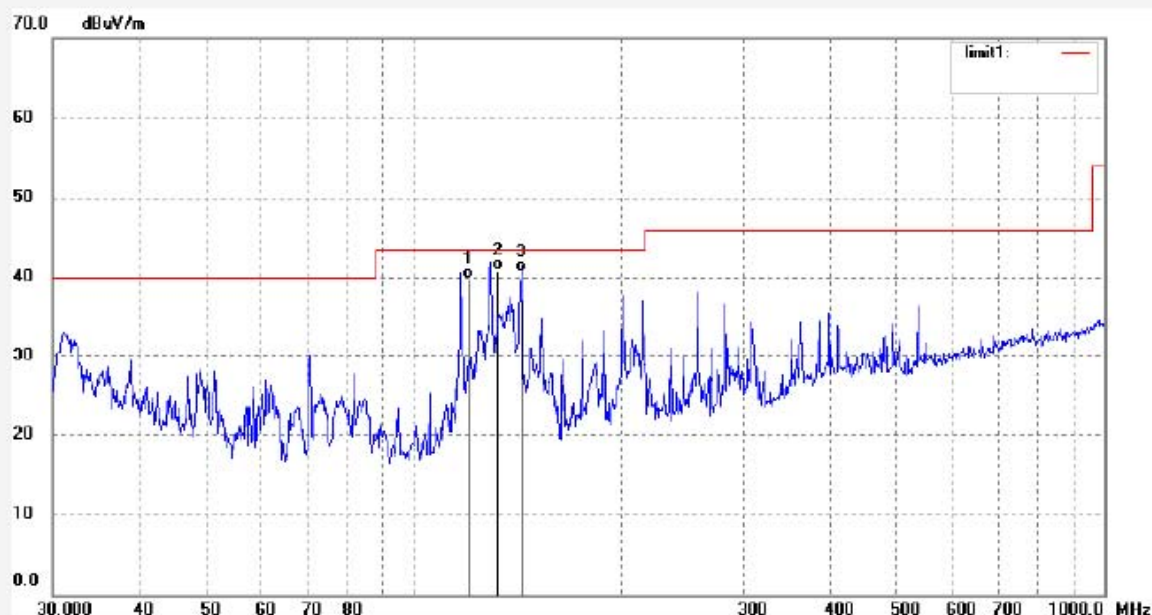
Date: 09/06/30/

Time: 8/56/39

Engineer Signature: Joe

Distance: 3m

Note: Sample No.:091361 Report No.:ATE20091164



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	119.1430	25.16	14.60	39.76	43.50	-3.74	QP			
2	131.0590	26.08	14.86	40.94	43.50	-2.56	QP			
3	142.9711	26.15	14.48	40.63	43.50	-2.87	QP			


**ACCURATE TECHNOLOGY CO., LTD.**

 F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
 Science & Industry Park,Nanshan Shenzhen,P.R.China

 Site: 966 chamber  
 Tel:+86-0755-26503290  
 Fax:+86-0755-26503396

Job No.: RTTE #2037

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 %

EUT: Instructor Response System - Recei

Mode: Connect to PC

Model: HSTNX-0002

Manufacturer: Hanshin International Limited

Polarization: Horizontal

Power Source: DC 5V

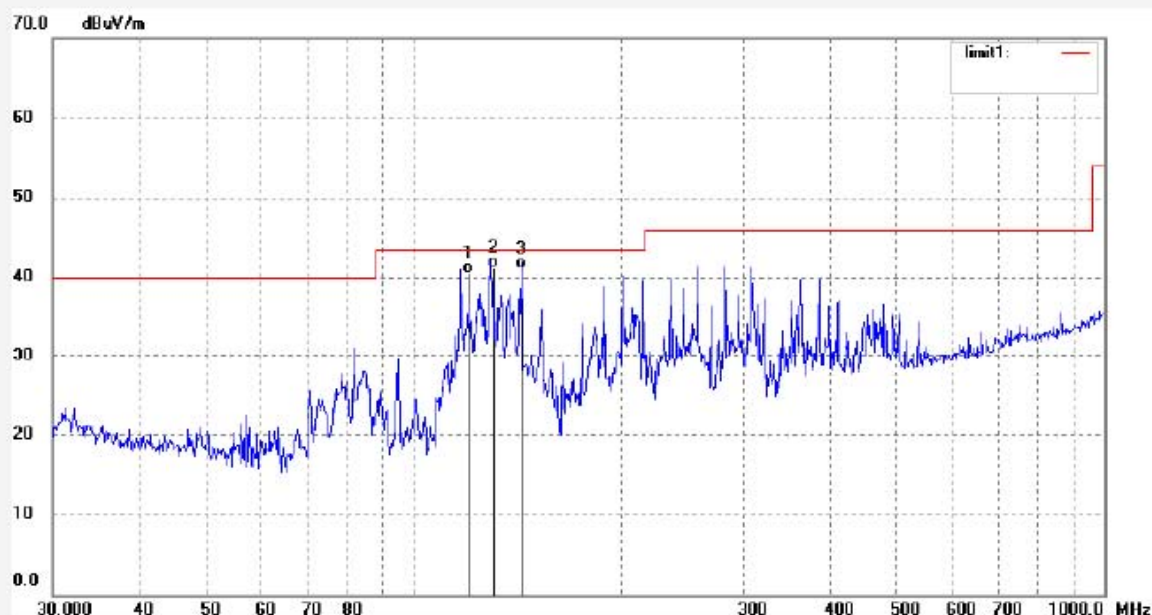
Date: 09/06/30/

Time: 8/54/07

Engineer Signature: Joe

Distance: 3m

Note: Sample No.:091361 Report No.:ATE20091164



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	119.1430	26.00	14.60	40.60	43.50	-2.90	QP			
2	131.0590	26.31	14.86	41.17	43.50	-2.33	QP			
3	142.9711	26.49	14.48	40.97	43.50	-2.53	QP			