




# FCC Test Report

FCC EVALUATION REPORT FOR VERIFICATION	
Project Reference No.	150934
Product	Classroom Response System
Brand Name	<b>SMART.</b>
Model	SMART Response XE 03-00181 (Receiver / Base Station)
Alternate Model	N/A
Tested according to	FCC Rules and Regulations Part 15 Subpart B Class B 2008, ANSI C63.4-2009

Tested in period	2010-07-09 to 2010-08-01
Issued date	2010-08-02
Name and address of the Test House	 Nemko Shanghai Ltd. 9A No. 528 Ruiqing Road, PuDong New Area, Shanghai, China P.C. Phone : +86 21 5072 0988 Fax : +86 21 5072 0950
Tested by	 _____ <b>Susan Zhou</b>
	2010-08-02 <b>date</b>
Verified by	 _____ <b>Daria Liu</b>
	2010-08-02 <b>date</b>

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## 1. Client Information

### 1.1 Applicant

Company Name: **SMART Technologies ULC**  
Company Address: **3636 Research Road NW Calgary, Alberta, Canada**

### 1.2 Manufacturer

Company Name: **Qingdao Haier Intelligent Electronics Co., Ltd.**  
Company Address: **No.99 Chongqing south Road, Qingdao, China**

### 1.3 Scope

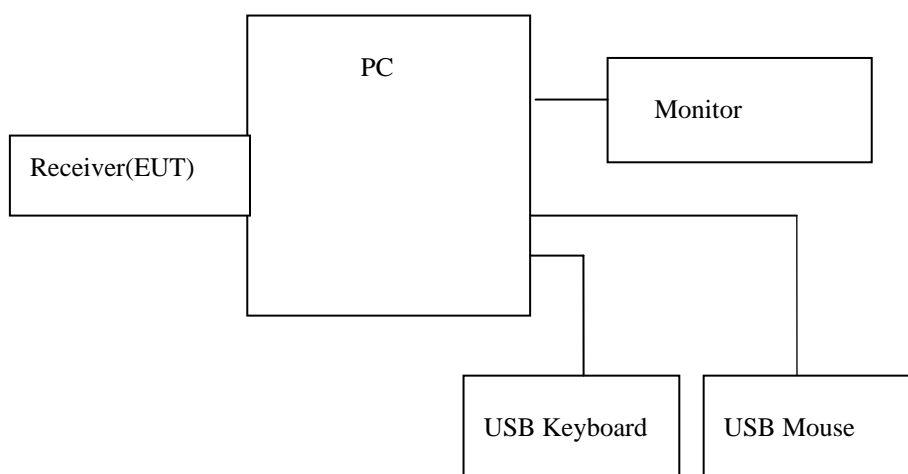
- Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.

## 2. Equipment under Test (EUT)

### 2.1 Identification of EUT

Category: **Classroom Response System**  
Model Name: **SMART Response XE**  
**03-00181 (Receiver / Base Station)**  
Alternate model: **N/A**  
Brand name: **Smart**  
Technical data (Rating, etc.): **Input: DC 5V from PC USB**

### 2.2 Setup drawing



### 2.3 Additional Information Related to Testing

#### Test mode

**TM1 DC 5V from PC USB Receive mode and communicate with PC**

Remark: only list worse result in the report

## 3. General Test Conditions

### 3.1 Location

These measurement tests were conducted at Audix Technology (Shenzhen) Co., Ltd.  
No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China

3m Anechoic Chamber : Jun. 13, 2006 File on Federal Communication Commission

Registration Number: 90454

Note: all test are witnessed by NEMKO engineer

### 3.2 Operating Environment

All tests and measurements were performed in a shielded enclosure or a controlled environment suitable for the tests conducted. The climatic conditions in the test area are automatically controlled and recorded continuously.

Parameters	Recording during test	Accepted deviation
Ambient temperature	20-25°C	15 – 35 °C
Relative humidity	45-55%	30 - 60%
Atmospheric pressure	101.2 kPa -101.3kPa	86-106kPa

### 3.3 Operating During Test

- The EUT is operated at DC 5V from PC USB during all tests.AC120V 60Hz for PC.
- EUT connect to PC, receive mode and communicate with PC.

### 3.4 Test Equipment

The test equipments used in testing are calibrated on a regular basis. For most of the testing equipments accredited calibration is conducted once a year. For certain equipment the calibration interval is longer. Between the calibrations all test equipment are controlled and verified on a regular basis. The test equipments used are defined in each test section of this report.

#### AE Equipment:

VGA Cable : Shielded, Detachable, 1.8m(Bonded two ferrite cores)

DVI Cable : Shielded, Detachable, 1.8m(Bonded two ferrite cores)

Power Cord : Unshielded, Detachable, 1.8m (3pins)

#### 1. PERSONAL COMPUTER

EMC CODE : Test PC G

M/N : AG017PA#AB2

S/N : CN5470G18

Manufacturer : HP

Power cord : Unshielded, Detachable, 1.8m

FCC ID : By DoC

BSMI ID : R33001

#### 2. MONITOR

EMC CODE : Test Monitor B

M/N : E772F

S/N : CN-02W486-64180-3CE-00LA

Manufacturer : Dell

Data Cable : Shielded, Undetachabled, 1.8m

FCC ID : By DoC

BSMI ID : N/A

#### 3. MOUSE

EMC CODE : ACS-EMC-M04R

M/N : M056UO

S/N : 512024282

Manufacturer : Dell

Data Cable : Shielded, Undetachabled, 1.8m

FCC ID : By DoC

BSMI ID : R41108

#### 4. KEYBOARD

EMC CODE : ACS-EMC-K01R

M/N : SK-8125

Manufacturer : Dell

Data Cable : Shielded, Undetachable, 2.0m

Add core

FCC ID : By DoC

BSMI ID : R31302

#### 4. Measurement Uncertainty

The Measurement Uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 with the confidence level of 95 %.

No.	Item	Uncertainty	Remark
1	Conducted Emission Test	1.22dB	
2	Radiated Emission Test	3.14dB	3m chamber

## 5. Conducted Emission (150 KHz to 30 MHz)

### 5.1 Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network. This provided a 50-ohm coupling impedance for the EUT (Please refer to the test setup photographs). The other peripheral devices power cord connected to the power mains through another line impedance stabilization network.

Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2009 on conducted Emission test.

The bandwidth of test receiver is set at 9kHz. The frequency range from 150kHz to 30MHz is checked. The test result are reported as below.

### 5.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	2010.05.07	ESHS10	844077/020	R&S
<input checked="" type="checkbox"/>	LISN	2010.05.10	ESH2-Z5	834066/011	R&S
<input checked="" type="checkbox"/>	LISN	2010.05.10	3825/2	9006-1660	EMCO
<input checked="" type="checkbox"/>	Terminator	2010.05.10	50Ω	No.1	Hubersuhner
<input checked="" type="checkbox"/>	RF cable	2010.07.08	3D-2W	LISN Cable1#	Fujikura
<input checked="" type="checkbox"/>	Coaxial switch	2010.07.08	MP59B	M55367	Anritsu
<input checked="" type="checkbox"/>	Pulse Limiter	2010.07.08	ESH3-Z2	100340	R&S

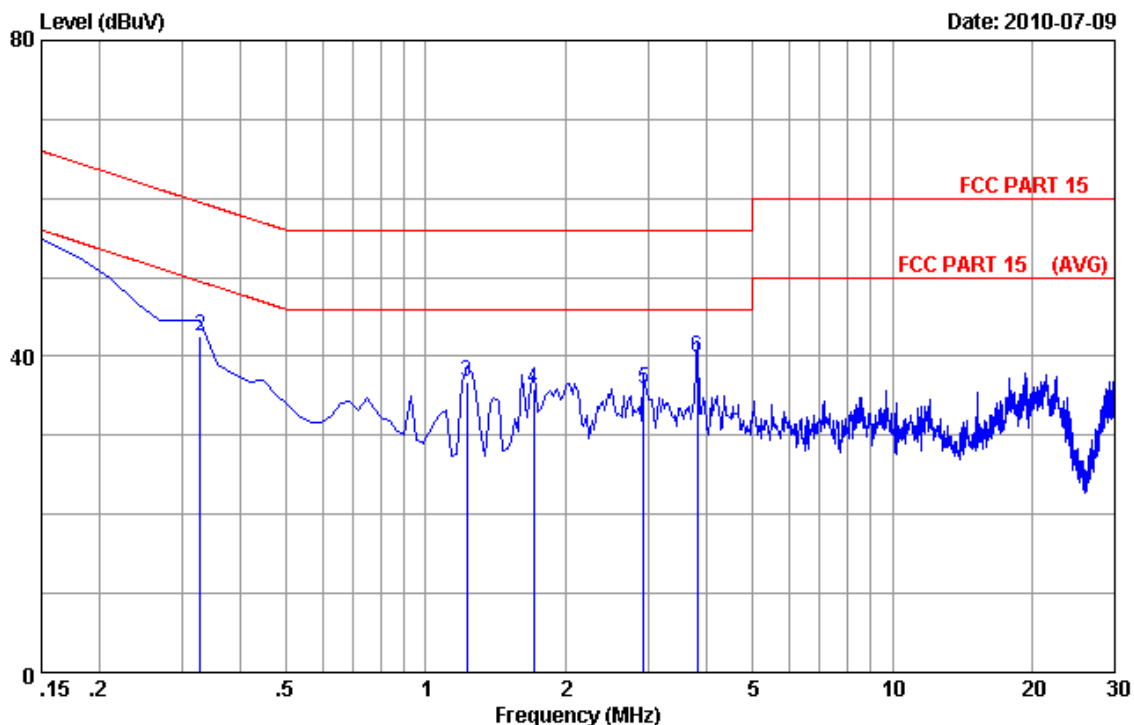
### 5.3 Test Result

Connect mode	Power Line	Test Data	Test Result
TM1	Line	Diagram 001	<b>Pass</b>
	Neutral	Diagram 002	<b>Pass</b>

#### NOTES:

1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission are reported. See attached Plots.
3. The limit for Class B device is on the FCC Part section 15.107(a).
- 4: If PK value is lower than AV limit then AV value deem to comply with the AV limit .If QP value is Lower than AV limit ,then AV value deem to comply with the AV limit.

5.3.1 Diagram 001



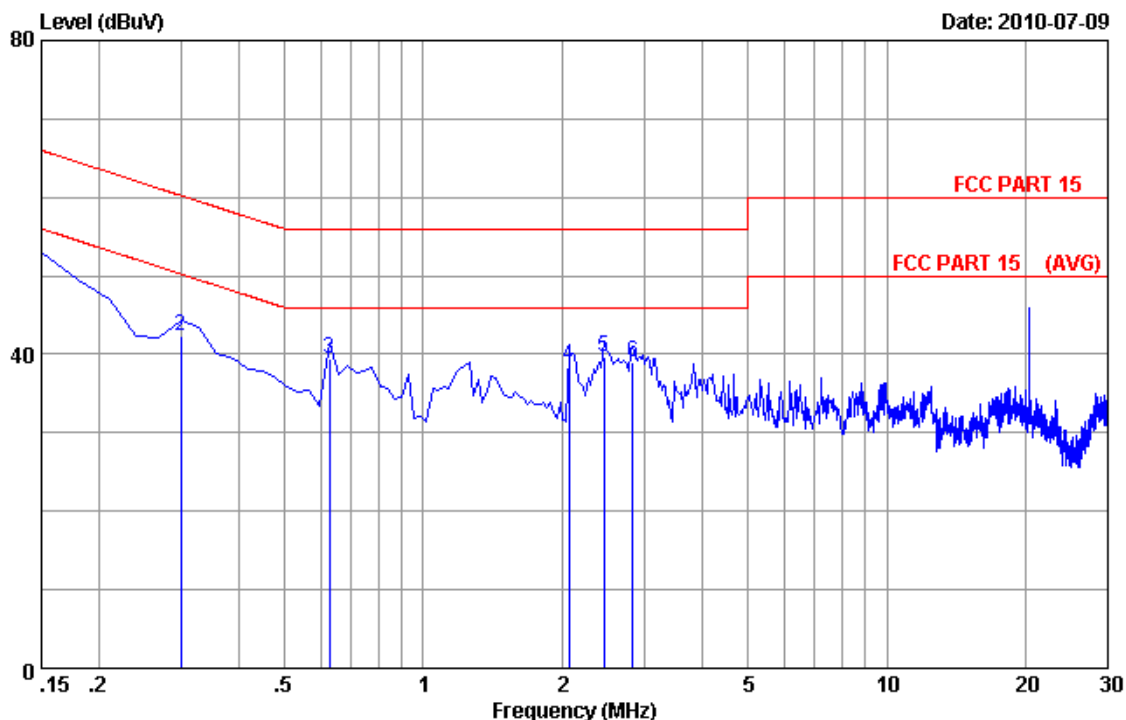
Site no :Audix No.1 Conduction Data no :2  
 Dis./Ant. \*\*: 2010 ESH2-25 LINE  
 Limit :FCC PART 15  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Leo-Li  
 EUT :Receiver M/N:03-00181  
 Power Rating :DC 5V From PC Input AC 120V/60Hz

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.23	9.88	40.65	50.76	66.00	15.24	QP
2	0.32910	0.23	9.88	32.47	42.58	59.47	16.89	QP
3	1.225	0.23	9.89	26.73	36.85	56.00	19.15	QP
4	1.702	0.25	9.90	25.64	35.79	56.00	20.21	QP
5	2.926	0.26	9.93	25.65	35.84	56.00	20.16	QP
6	3.822	0.27	9.94	29.73	39.94	56.00	16.06	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Cable loss+pulse limiter)+Reading  
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



5.3.2 Diagram 002



Site no :Audix No.1 Conduction Data no :1  
 Dis./Ant. \*\*: 2010 ESH2-25 NEUTRAL  
 Limit :FCC PART 15  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Leo-Li  
 EUT :Receiver M/N:03-00181  
 Power Rating :DC 5V From PC Input AC 120V/60Hz

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV)	Limits (dBUV)	Margin (dB)	Remark
1	0.15000	0.21	9.88	40.85	50.94	66.00	15.06	QP
2	0.29925	0.21	9.88	32.24	42.33	60.26	17.93	QP
3	0.62760	0.23	9.88	29.25	39.36	56.00	16.64	QP
4	2.060	0.26	9.91	28.38	38.55	56.00	17.45	QP
5	2.448	0.26	9.92	29.54	39.72	56.00	16.28	QP
6	2.837	0.27	9.93	28.77	38.97	56.00	17.03	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Cable loss+pulse limiter)+Reading  
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

## 6. Radiated Electromagnetic Disturbances

### 6.1 Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast.

The EUT were rotated 0 to 360 degree and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. The test result are reported as below.

For below 1GHz

RBW=120 kHz; VBW=300KHz.QP detector.The frequency range from 30MHz to 1000MHz is checked.

For above 1GHz

RBW=1MHz ; VBW=1MHz,PK detector for peak emissions measurement above 1GHz

RBW=1MHz ; VBW=10Hz, PK detector for average emissions measure above 1GHz

### 6.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	3m Chamber	Dec.05,2009	N/A	N/A	AUDIX
<input checked="" type="checkbox"/>	EMC Spectrum	May.08,2010	E7405A	MY42000131	Agilent
<input checked="" type="checkbox"/>	EMC Spectrum	Oct.24,2009	E7405A	MY45116588	Agilent
<input checked="" type="checkbox"/>	Test Receiver	Oct 24,2009	ESCI	100842	R & S
<input checked="" type="checkbox"/>	Pre-Amplifier	May.08,2010	8447D	2944A10684	Agilent
<input checked="" type="checkbox"/>	Pre-Amplifier	May.08,2010	8447D	2944A07794	Agilent
<input checked="" type="checkbox"/>	Bilog Antenna	Feb.12,2010	CBL6112D	25238	Schaffner
<input checked="" type="checkbox"/>	Bilog Antenna	Feb.12,2010	CBL6112D	25237	Schaffner
<input checked="" type="checkbox"/>	RF Cable	May.08,2010	8D-FB	3m Chamber No.1	MIYAZAKI
<input checked="" type="checkbox"/>	RF Cable	May.08,2010	8D-FB	3m Chamber No.2	MIYAZAKI
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,2010	MP59B	6200766906	Anritsu
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,2010	MP59B	6200766907	Anritsu
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,2010	MP59B	M74389	Anritsu
<input checked="" type="checkbox"/>	Horn Antenna	May.08,2010	3115	9607-4877	EMCO
<input checked="" type="checkbox"/>	Horn Antenna	May.08,2010	3115	9510-4580	EMCO
<input checked="" type="checkbox"/>	Amp	May.08,2010	8449B	3008A00863	HP
<input checked="" type="checkbox"/>	Signal Generator	May.08,2010	83732B	6K00003262	HP

### 6.3 Test Result

Connect mode	Remark	Antenna Polarity	Test Data	Test Result
TM1	Below 1GHz, 3m test distance	Horizontal	Diagram 003	Pass
		Vertical	Diagram 004	Pass
TM1	Above 1GHz 3m test distance	Horizontal	Diagram 005	Pass
		Vertical	Diagram 006	Pass

NOTES:

- 1.All modes were measured and the worst case emission was reported.
- 2.The limit for Class B device is on the FCC Part section 15.109(a).
- 3.If Pk value lower than AV limit then AV value deem to comply with the AV limit .











## Appendix A Sample Label

### Labelling Requirements

The sample label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

\*\*\* The following paragraph specified in the user manual.

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.

\*\*\*\*\*END OF REPORT\*\*\*\*\*