EMC TEST REPORT

No. JSH0409341-001

Applicant	:Bestest Electric Instrument Co., Ltd. No. 58 Wenzhou Road, Wenzhou, Zhejiang 325011, P.R.China
Manufacturer	: Bestest Electric Instrument Co., Ltd. No. 58 Wenzhou Road, Wenzhou, Zhejiang 325011, P.R.China
Equipment	:Remote control doorbell
Type/Model	:ST-60

Summary

The test report is to certify that the tested equipment properly complies with the requirements of:

FCC Rules and Regulations: 47CFR Part 15: Radio Frequency Devices: 2004
ANSIC63.4 (2001): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Description

The appliances were tested by Quitek Corp. and found compliance with relevant requirements described in FCC Part 15: Radio Frequency Devices.

Test results are contained in this test report and Intertek Testing Services ETL SEMKO Shanghai Limited is assumed full responsibility for the accuracy and completeness of these measurements.

Date of issue: Dec. 18, 2004

Prepared by: Daniel . Zhao

Daniel Zhao(*Project engineer*)

Approved by:

Steve Li (*Reviewer*)

Description of Test Facility

Name of Firm : Quitek Corp.

Site Location : 716 Yishan Road Shanghai, P.R. China

FCC Registration Number: 142171

NVLAP Lab Code: 200632-0

Name of contact : Kevin Wang

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E-mail address : Kevin@quietek.com

Content

1.Applicant Information

Applicant :Bestest Electric Instrument Co., Ltd.
No. 58 Wenzhou Road, Wenzhou, Zhejiang 325011, P.R.China

Manufacture : Bestest Electric Instrument Co., Ltd.
No. 58 Wenzhou Road, Wenzhou, Zhejiang 325011, P.R.China

Country of origin : P.R. China
Name of contact : Mr. Cheng Di Sun
Telephone : 86 577 8653666 ext.8006
Telefax : 86 577 8653666 ext.8004

2.Information of Equipment Under Test (EUT)

2.1 Identification of the EUT

Equipment : Remote control doorbell
Type/model : ST-60
FCC ID : SO9ST-60
Date of sample receipt : Dec. 1, 2004
Date of test : Dec. 1, 2004 to Dec. 18, 2004

2.2 Technical specification

Operation Frequency : 315 MHz
Modulation : Pulse Modulation(PM)
Antenna Designation : Non-User Replaceable(Fixed)
Transmitting Time : A manually operated transmitter employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
Rating : DC 12V, Battery Operated.
Description of EUT : none.

2.3 Mode of operation during the test / Test peripherals used

The compliance tests were performed under the following operation mode.
The EUT (Transmitter) was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.4 Related Grant and test Standard

This product is complying with section 15.231 of FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a DOC Procedure.

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2001). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.5 Instrument list

Equipment	Type	Manu.	Serials number	Cal. Date	Cal. Interval
Test receiver	ESCS 30	R&S	835418/003	2004-3-14	1 Year
Passive voltage probe	ESH2-Z3	R&S	100009	2004-3-14	2 Years
Artificial mains network	ESH3-Z5	R&S	835239/008	2004-3-14	1 Year
Absorbing Clamp	MDS 21	R&S	831676/016	2004-3-15	1 Year
Oscilloscope	TDS430A	TEK	B061847	2004-11-20	1 Year
Harmonic & Flicker test system	500lix-CTS-400	California Instruments	HK53885	2004-3-15	1 Year
Signal generator	SML03	R & S	838503/018	2004-3-14	1 Year
Log-periodic Antenna	HL046	R & S	100001	2004-10-10	1 Year
Horn Antenna	AT4002A	AR	302196	2004-10-10	1 Year
Power Amplifier	500W1000A	AR	302108	2004-8-16	1 Year
Power Amplifier	30S1G3	AR	302240	2004-9-6	1 Year
Field Monitor Mainframe 4 slors	FM5004	AR	300546	2004-8-2	1 Year
Isotropic “E” field probe	FP6001	AR	300540	2004-9-4	1 Year
RF generator with amplifier	NSG-2070	SCHAFFNER	1013	2004-8-2	2 Years
CDN	CDN M216	SCHAFFNER	15609	2004-8-2	2 Years
CDN	CDN M316	SCHAFFNER	15128	2004-8-2	2 Years
Attenuator	INA2070-1	SCHAFFNER	2013	2004-8-2	2 Years

EMC immunity system	BEST EMC	SCHAFFNER	200024-001SC	2004-8-2	1 Year
EMI test receiver	ESI 26	R&S	838687/011	2004-8-13	1 Year
Broadband antenna	HL562	R&S	100019	2004-10-10	1 Year
Horn antenna	HF906	R&S	100023	2004-6-24	1 Year
10m anechoic chamber	-	Franconia	-	2004-9-6	Half year

3. Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	RESULT	NOTE
Conducted Emission	NA	
Radiation Emission	Pass	
Emission Bandwidth	Pass	

Notes: 1: NA =Not Applicable

4. Conducted Emissions Test (Not applicable in this report)

4.1 Limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.2 Test Procedure:

1. The EUT was placed on a table that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT Compliance.
3. Repeat above procedures until all frequency measured was complete.

4.3 Test SET-UP (Block Diagram of Configuration)

N/A

4.4 Test Result:

N/A

5. Radiated Emission Test

5.1 Limits

According to 15.231(b), the field strength of emissions from Intentional Radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	Field Strength of Fundamental (uV/m)	Field Strength of Spurious (dBuV/m)	Field Strength of Spurious (uV/m)
40.66 - 40.70	67.04	2,250	47.04	225
70 - 130	61.94	1,250	41.94	125
130 - 174	* 61.94 - 71.48	* 1,250 -3,750	* 41.94 - 51.48	* 125 - 375
174 - 260	71.48	3,750	51.48	375
260 - 470	* 71.48 - 81.94	* 3,750 - 12,500	* 51.48 - 61.94	* 375 - 1,250
above 470	81.94	12,500	61.94	1,250

* Linear Interpolations.

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.
3. Field strength of fundamental(limit = 20log(56.81818 x (F) - 6136.3636) ;
F: Fundamental Frequency (130-174MHz)
4. Field strength of fundamental limit = 20log(41.6667 x (F) – 7083.3333) ;
F: Fundamental Frequency (260-470MHz)
5. Field strength of spurious emission limit = The Limit of Fundamental Frequency – 20dB
6. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
7. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205, then the general radiated emission limits in ξ 15.209 apply.

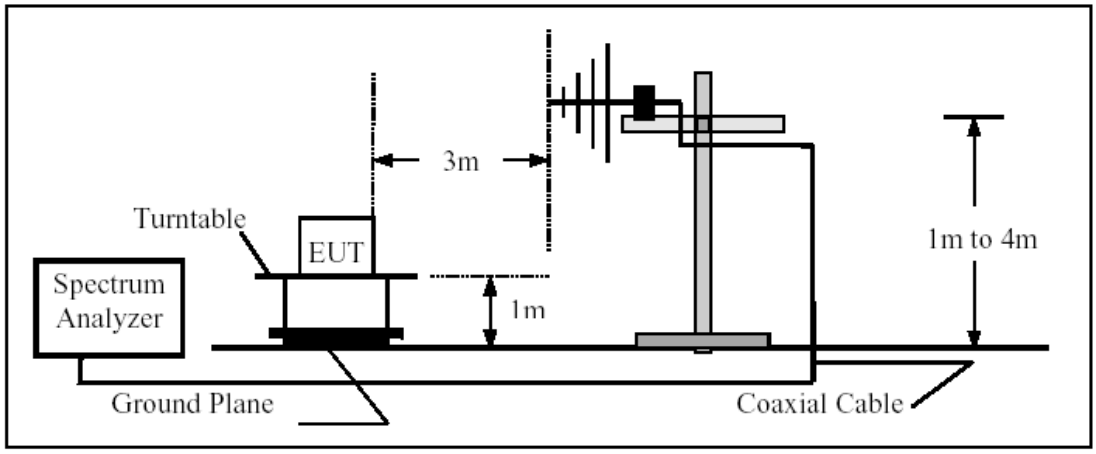
5.2 Test Procedure:

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in ANSI C63.4-2001.

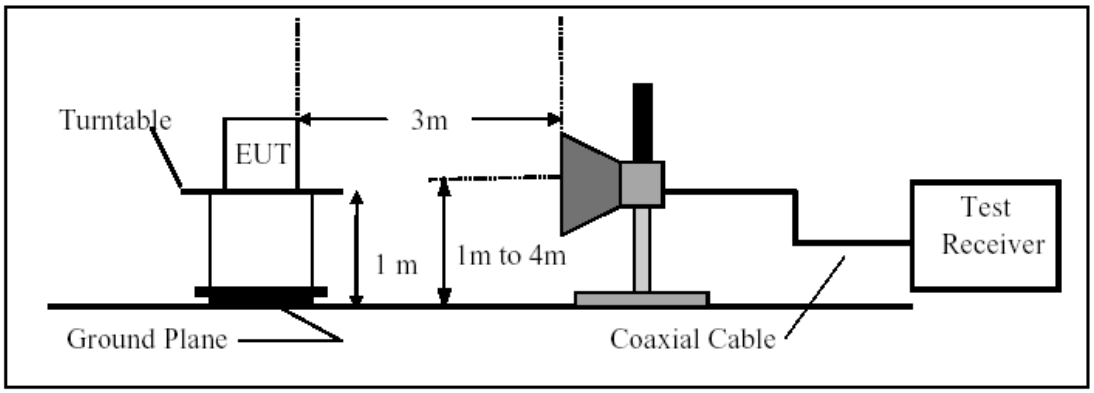
The EUT was placed on a turntable which is 0.8m above ground plane. .
The turntable shall rotate 360 degrees to determine the position of maximum emission level.
EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

5.3 Test SET-UP (Block Diagram of Configuration)

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



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



5.4 Test result.

Temperature: 22 °C

Humidity: 40%

EUT Axis: X

Frequency (MHz)	Ant. Pol. (H/V)	Factor (dB)	Duty cycle (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV	PK	AV	PK	AV
315.00	H	17.06	-14.98	82.69	67.71	95.56	75.56	-12.87	-7.85
945.00	H	24.79	-14.98	67.32	52.34	75.56	55.56	-8.24	-3.22
1260.00	H	-7.68	-14.98	60.67	45.69	75.56	55.56	-14.89	-9.87
1575.00	V	-5.45	-14.98	54.45	39.47	75.56	55.56	-21.11	-16.09
1890.00	H	-3.70	-14.98	48.36	33.38	75.56	55.56	-27.20	-22.18

EUT Axis: Y

Frequency (MHz)	Ant. Pol. (H/V)	Factor (dB)	Duty cycle (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV	PK	AV	PK	AV
315.00	V	17.06	-14.98	77.59	62.61	95.56	75.56	-17.97	-12.95
945.00	V	24.79	-14.98	65.68	50.70	75.56	55.56	-9.88	-4.86
1260.00	V	-7.68	-14.98	61.49	46.51	75.56	55.56	-14.07	-9.05
1575.00	V	-5.45	-14.98	55.60	40.62	75.56	55.56	-19.96	-14.94
1890.00	V	-3.70	-14.98	44.40	29.42	75.56	55.56	-31.16	-26.14
2520.00	V	-0.60	-14.98	41.33	26.35	75.56	55.56	-34.23	-29.21

EUT Axis: Z

Frequency (MHz)	Ant. Pol. (H/V)	Factor (dB)	Duty cycle (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV	PK	AV	PK	AV
315.00	H	17.06	-14.98	80.47	65.49	95.56	75.56	-15.09	-10.07
945.00	V	24.79	-14.98	64.21	49.23	75.56	55.56	-11.35	-6.33
1260.00	V	-7.68	-14.98	61.29	46.31	75.56	55.56	-14.27	-9.25
1575.00	V	-5.45	-14.98	53.96	38.98	75.56	55.56	-21.60	-16.58
1890.00	V	-3.70	-14.98	46.25	31.27	75.56	55.56	-29.31	-24.29

Note:

(1) Emission level PK (dBuV/m) has already included the Factor(dB)
Emission level AV (dBuV/m)= Emission level PK (dBuV/m) + Duty cycle(dB)

(2) Measuring frequencies from 30 MHz to the 10th harmonic of fundamental frequency of 315MHz.

(3) * Denotes spurious frequency which falls within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.

6. Emission Bandwidth

6.1 Limits

According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

FREQUENCY (MHz)	BANDWIDTH LIMIT(kHz)
Above 70-900	0.25%×Center Frequency(MHz)
Above 900	0.5% ×Center Frequency(MHz)

6.2 Test Procedure

The Occupied bandwidth is measured with a spectrum analyzer connected to the transmitter output while EUT is operating in transmit mode with modulation at the appropriate frequency. The spectrum analyzer was set to: RBW = 10 kHz, VBW = 10 kHz, span = 500 kHz

6.3 Test Configuration

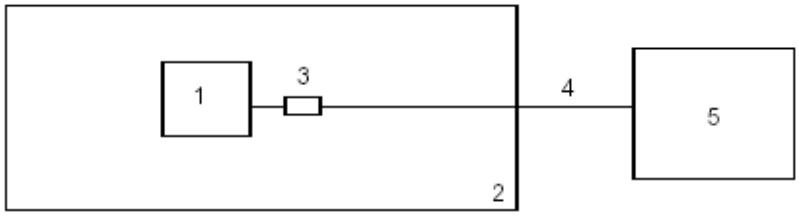


Figure 3: Measurement setup for operating bandwidth test

1 Transmitter (EUT)
2 Wooden table
3 DC-block
4 Test cable
5 Spectrum analyzer

6.4 Test Results

Ref Level (dBm)	Center Frequency (MHz)	20dB down Bandwidth (kHz)	Authorized Bandwidth (kHz)
-10.19	314.9093	41.3	787.6

7. Duty Cycle Measurement

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency , RBW,VBW= 100KHz, Span =0 Hz. Adjacent sweep.
4. Set SPA View. Mark delta.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 5.3 Radiated Emission Measurements.

7.3 Test results

Total Time (ms)	Total on Time (ms)	Duty Cycle	Duty Cycle (%)	Duty cycle Fact (dB)
36.072	6.4328	0.178	17.8%	-14.98

Note: 1. Total on Time (ms)= 0.2305(ms) × 6(number of on time-1) + 0.7214 × 7(number of on time-2)=1.3830+5.0498=6.4328ms

2.Duty cycle= Total on time/Total Time (on + off time)=0.178

3.Duty cycle(%)=Duty cycle × 100%=17.8%

4.Duty cycle factor=20 log (Duty cycle)= -14.98dB