


FCC PART 15.249  
EMI MEASUREMENT AND TEST REPORT  
For  
JUSTLISTEN TECHNOLOGY LIMITED  
2, Independence Square, Valletta VLT 1520, Malta

**FCC ID:ZF4WS823T**

April 12, 2011

This Report Concerns: Original Report		Equipment Type: Wireless Guide Transmitter	
Test Engineer:		Eric Li <i>Eric Li</i>	
Report No.:		BST BST11040001Y-1ER-3	
Receive EUT Date/Test Date:		April 1, 2011/ April 1, 2011-April 11, 2011	
Reviewed By:		Christina Deng <i>Christina Deng</i>	
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# 1. GENERAL INFORMATION

## 1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BST, unless the applicant has authorized BST in writing to do so.

### Test Facility -

The test site used to collect the radiated data is located on the address of emitel (Shenzhen) Limited

(FCC Registered Test Site Number: 746887) on

Building 2, 171 Meihua Road, Futian District, Shenzhen, 518049 China

The Test Site is constructed and calibrated to meet the FCC requirements.

## 1.2. Measurement Uncertainty

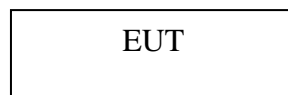
Available upon request.

## 2. GENERAL INFORMATION

### 2.1.Description of Device (EUT)

EUT	:	Wireless Guide Transmitter
Model Number	:	WS823T
Trade Name	:	Whisper
Power Supply	:	4.2V DC
Operate Frequency	:	915.025 - 916.975MHz
Channel Number	:	79 Channels
Applicant	:	JUSTLISTEN TECHNOLOGY LIMITED
Address	:	2, Independence Square, Valletta VLT 1520, Malta
Manufacturer	:	Shenzhen Freetalker Industry Co., Ltd.
Address	:	3 <sup>rd</sup> Floor, 6 <sup>th</sup> level standard workshop, NO.10 North of Linyuan East Rd, Futian, Shenzhen, China

### 2.2.Block Diagram of EUT Configuration



### 2.3.Support Equipment List

1.	--	-----
2.	--	-----
3.	--	-----

### 2.4.Test Conditions

Temperature: 23~25°C

Relative Humidity: 49~63 %

### 3. FCC ID LABEL

**FCC ID: ZF4WS823T**

**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.**

#### **Label Location on EUT**

#### **EUT Bottom View/ FCC ID Label Location**



## 4. MEASURING DEVICE AND TEST EQUIPMENT

Equipment/Facilities	Manufacturer	Model#	Serial no.	Date of Cal.	Cal. Interval
Cable	Resenberger	N/A	NO.1	Mar 10 , 2011	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10 , 2011	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10 , 2011	1 Year
LISN	Rohde & Schwarz	ESH3-Z5	100305	Mar 10 , 2011	1 Year
50 $\Omega$ Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10 , 2011	1 Year
EMI Test Receiver	Rohde & Schwarz	ESP13	100180	Oct.11,2010	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.10,2010	1 Year
3m Semi-Anechoic Chamber	Albatross Projects	9mx6mx6m	N/A	Feb.20,2011	1 Year
Signal Generator	FLUKE	PM5418+ Y/C	LO747012	Feb.20,2011	1 Year
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2011	1 Year
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2011	1 Year
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2010	1 Year
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2010	1 Year
Ultra Broadband Antenna	Rohde & Schwarz	HL-562	100110	June.15,2010	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct.11,2010	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct.11,2010	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.20,2011	1 Year
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb.20,2011	1 Year
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2010	1 Year
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.20,2011	1 Year
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2011	1 Year
Absorbing clamp	Rohde & Schwarz	MDS-21	N/A	Oct.11,2010	1 Year

## 5. SUMMARY OF TEST RESULTS

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
Section 15.207	Conducted Emission	Compliant
Section 15.249(a)	Fundamental and Harmonics Radiated Emission	Compliant
Section 15.249(d)	Spurious Radiated Emission	Compliant
Section 15.249(d)	Band Edge	Compliant
Section 15.203	Antenna Requirement	Compliant

Remark: “N/A” means “Not applicable”.

## 6. FUNDAMENTAL AND HARMONICS RADIATED EMISSION FOR SECTION 15.249(A)

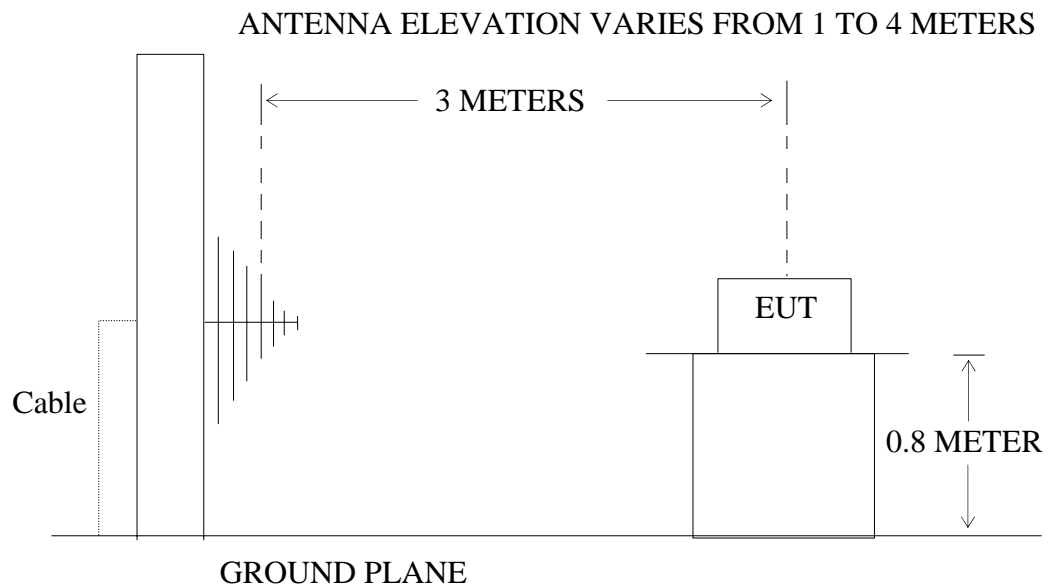
### 6.1. Block Diagram of Test Setup

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

EUT

(EUT: Wireless Guide Transmitter)

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



(EUT: Wireless Guide Transmitter)



## 6.2.The Emission Limit

6.2.1.For intentional radiators, According to section 15.249(a), Operation within the frequency band of 902 to 928MHz, The fundamental field strength shall not exceed 94 dB $\mu$ V/m and the harmonics shall not exceed 54 dB $\mu$ V/m.

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of harmonics (microvolts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

6.2.2.According to section 15.249(e), as shown in section 15.35(b), the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

## 6.3.Configuration of EUT on Measurement

The following equipment are installed on Radiated 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. Wireless Guide Transmitter (EUT)

Model Number : WS823T  
 Serial Number : N/A  
 Manufacturer : Shenzhen Freetalker Industry Co., Ltd.

## 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 TX modes measure it. The transmit frequency are 915.025MHz, 916.00MHz, 916.975MHz.

## 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. Through three orthogonal axes to determine which attitude and equipment arrangement produces the highest emission relative to the limit.

The bandwidth of test receiver is set at 120kHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 10000MHz is checked.

## 6.6.The Field Strength of Radiation Emission Measurement Results

### PASS.

Date of Test:	April 11, 2011	Temperature:	25°C
EUT:	Wireless Guide Transmitter	Humidity:	50%
Model No.:	WS823T	Power Supply:	4.2V DC
Test Mode:	TX Channel Low: 915.025MHz	Test Engineer:	Eric Li

#### Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
915.025	60.04	62.66	28.82	88.86	91.48	94	114	-5.14	-22.52	Vertical
915.025	41.56	44.08	28.82	70.38	72.90	94	114	-23.62	-41.10	Horizontal

#### Harmonics Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
1830.049	59.06	61.67	-9.84	49.22	51.83	54	74	-4.78	-22.17	Vertical
2745.073	47.72	50.26	-6.20	41.52	44.06	54	74	-12.48	-29.94	Vertical
2745.073	47.00	49.56	-6.20	40.80	43.36	54	74	-13.20	-30.64	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

Date of Test:	April 11, 2011	Temperature:	25°C
EUT:	Wireless Guide Transmitter	Humidity:	50%
Model No.:	WS823T	Power Supply:	4.2V DC
Test Mode:	TX Channel Middle: 916.000MHz	Test Engineer:	Eric Li

### Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
916.000	59.64	62.29	28.92	88.56	91.21	94	114	-5.44	-22.79	Vertical
916.000	41.35	43.97	28.92	70.27	72.89	94	114	-23.73	-41.11	Horizontal

### Harmonics Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
1831.996	59.70	62.21	-9.73	49.97	52.48	54	74	-4.03	-21.52	Vertical
2747.992	48.02	50.64	-6.12	41.90	44.52	54	74	-12.10	-29.48	Vertical
2747.992	46.82	49.39	-6.12	40.70	43.27	54	74	-13.30	-30.73	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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

Date of Test:	April 11, 2011	Temperature:	25°C
EUT:	Wireless Guide Transmitter	Humidity:	50%
Model No.:	WS823T	Power Supply:	4.2V DC
Test Mode:	TX Channel High: 916.975MHz	Test Engineer:	Eric Li

### Fundamental Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
916.975	59.67	62.73	29.03	88.70	91.76	94	114	-5.30	-22.24	Vertical
916.975	41.97	44.51	29.03	71.00	73.54	94	114	-23.00	-40.46	Horizontal

### Harmonics Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
1833.948	57.63	60.24	-9.63	48.00	50.61	54	74	-6.00	-23.39	Vertical
2750.923	47.56	50.18	-6.09	41.47	44.09	54	74	-12.53	-29.91	Vertical
2750.923	48.58	51.13	-6.09	42.49	45.04	54	74	-11.51	-28.96	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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

## 7. SPURIOUS RADIATED EMISSION FOR SECTION 15.249(D)

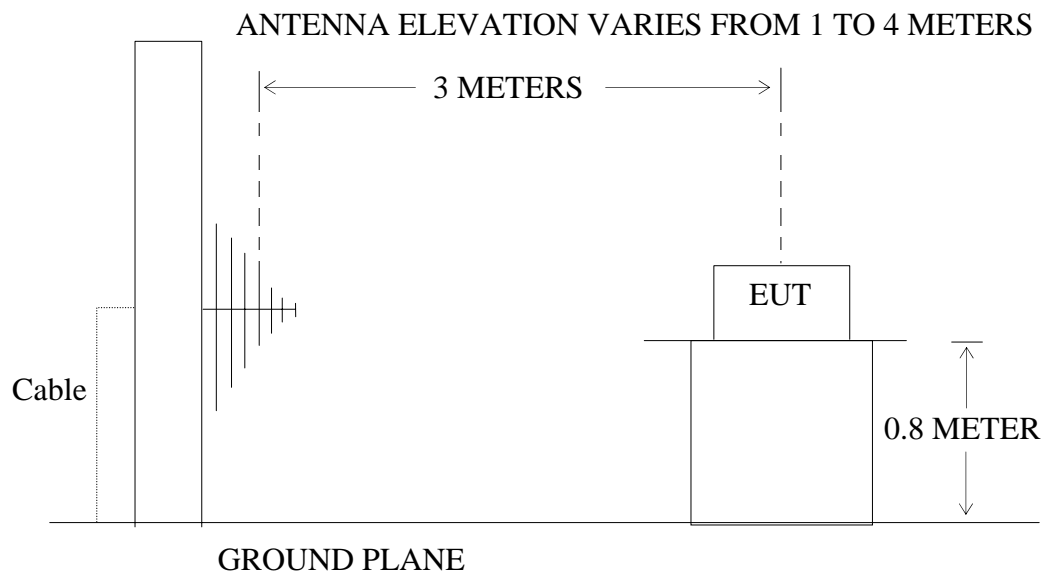
### 7.1. Block Diagram of Test Setup

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



(EUT: Wireless Guide Transmitter)

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



(EUT: Wireless Guide Transmitter)

## 7.2.The Emission Limit For Section 15.249(d)

7.2.1.Emission radiated outside of the specified frequency bands, except for harmonics, shall be comply with the general radiated emission limits in Section 15.209.

### Radiation Emission Measurement Limits According to Section 15.209

Frequency (MHz)	Limit		The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dB $\mu$ V/m)	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	

## 7.3.EUT Configuration on Measurement

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

### 7.3.1. Wireless Guide Transmitter (EUT)

Model Number : WS823T  
 Serial Number : N/A  
 Manufacturer : Shenzhen Freetalker Industry Co., Ltd.

## 7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 915.025MHz, 916.00MHz, 916.975MHz.

## 7.5. 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. Through three orthogonal axes to determine which attitude and equipment arrangement produces the highest emission relative to the limit.

The bandwidth of test receiver is set at 120kHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 10000MHz is checked.

The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.



## 7.6.The Emission Measurement Result

**PASS.**

Date of Test:	<u>April 11, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Guide Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>WS823T</u>	Power Supply:	<u>4.2V DC</u>
Test Mode:	<u>TX Channel Low: 915.025MHz</u>	Test Engineer:	<u>Eric Li</u>

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	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

Date of Test:	<u>April 11, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Guide Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>WS823T</u>	Power Supply:	<u>4.2V DC</u>
Test Mode:	<u>TX Channel Middle: 916.000MHz</u>	Test Engineer:	<u>Eric Li</u>

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

Date of Test:	<u>April 11, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Guide Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>WS823T</u>	Power Supply:	<u>4.2V DC</u>
Test Mode:	<u>TX Channel High: 916.975MHz</u>	Test Engineer:	<u>Eric Li</u>

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

## 8. BAND EDGES

### 8.1.The Requirement

8.1.1.Band Edge from 902MHz to 928MHz. Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

### 8.2.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.

#### 8.2.1. Wireless Guide Transmitter (EUT)

Model Number : WS823T  
Serial Number : N/A  
Manufacturer : Shenzhen Freetalker Industry Co., Ltd.

### 8.3.Operating Condition of EUT

8.3.1.Setup the EUT and simulator as shown as Section 8.1.

8.3.2.Turn on the power of all equipment.

8.3.3.Let the EUT work in TX modes measure it. The transmit frequency are 915.025MHz, 916.975MHz.

### 8.4.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. and set at 1MHz in above 1000MHz.

## 8.5.The Measurement Result

**Pass.**

Date of Test:	<u>April 11, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Guide Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>WS823T</u>	Power Supply:	<u>4.2V DC</u>
Test Mode:	<u>TX Channel Low: 915.025MHz</u>	Test Engineer:	<u>Eric Li</u>

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
902.000	5.21	28.78	33.99	46.00	-12.01	Vertical
902.000	3.46	28.78	32.24	46.00	-13.76	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:  

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$
3. The spectral diagrams in appendix I display the measurement of peak values.

Date of Test:	<u>April 11, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Guide Transmitter</u>	Humidity:	<u>50%</u>
Model No.:	<u>WS823T</u>	Power Supply:	<u>4.2V DC</u>
Test Mode:	<u>TX Channel High: 916.975MHz</u>	Test Engineer:	<u>Eric Li</u>

Frequency (MHz)	Reading (dBμV/m)	Factor(dB) Corr.	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
928.000	4.34	29.22	33.56	46.00	-12.44	Vertical
928.000	2.51	29.22	31.73	46.00	-14.27	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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

$$\text{Where Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

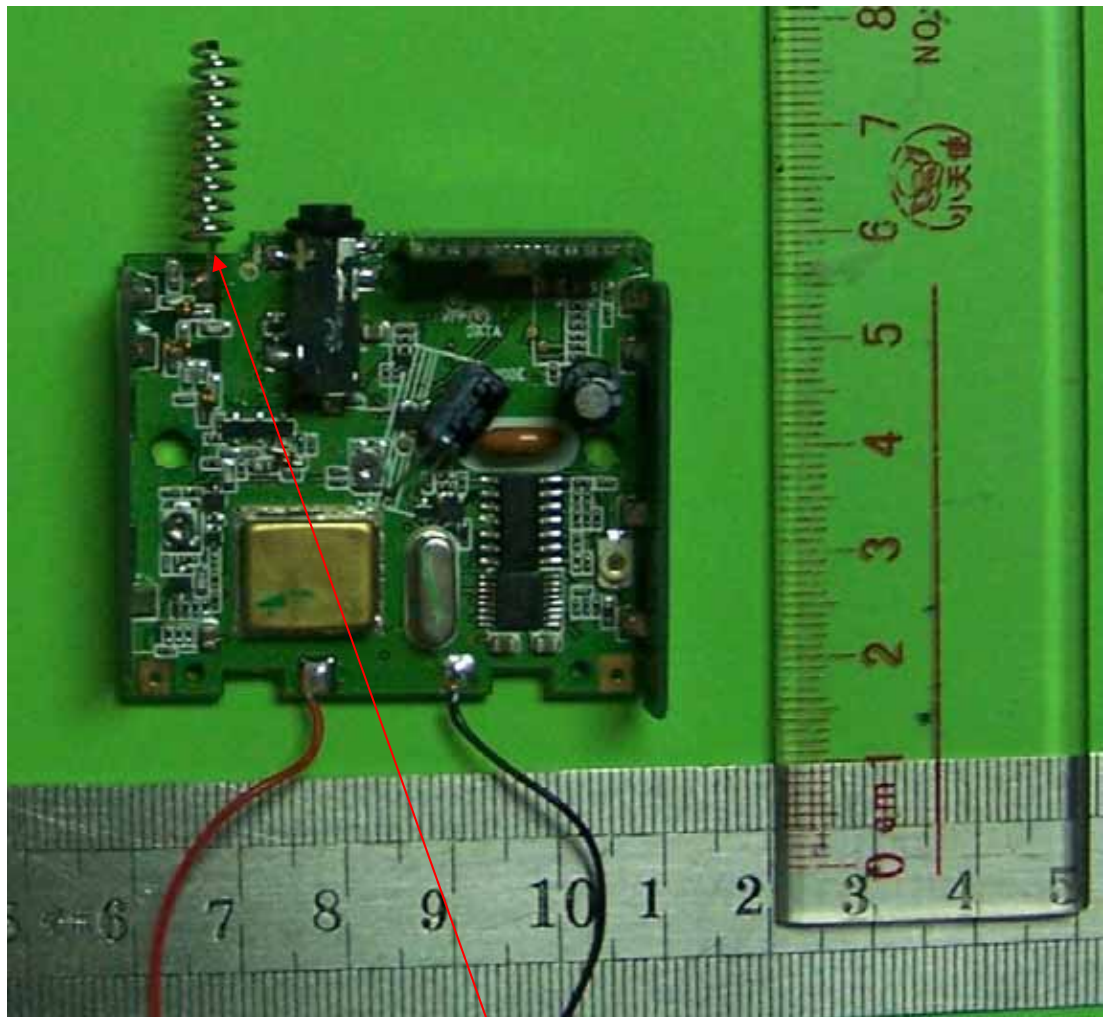
## 9. ANTENNA REQUIREMENT

### 9.1.The Requirement

9.1.1.According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 9.2.Antenna Construction

Antenna is formed by a short metal wire soldered on the PCB, no consideration of replacement.



Antenna

## 10. CONDUCTED POWER LINE TEST

### 10.1. Test Equipment

Test Equipment: Charger.

The battery for this EUT is charged by the charger that is attached to the AC mains.

### 10.2. Test Procedure

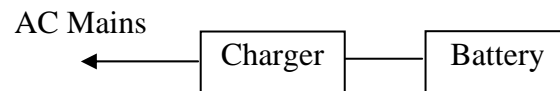
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uh coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uh coupling impedance with 50ohm termination.

Both sides of A.C. Line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ASIN C63.4:2003 on conducted measurement. Conducted emissions were measured over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

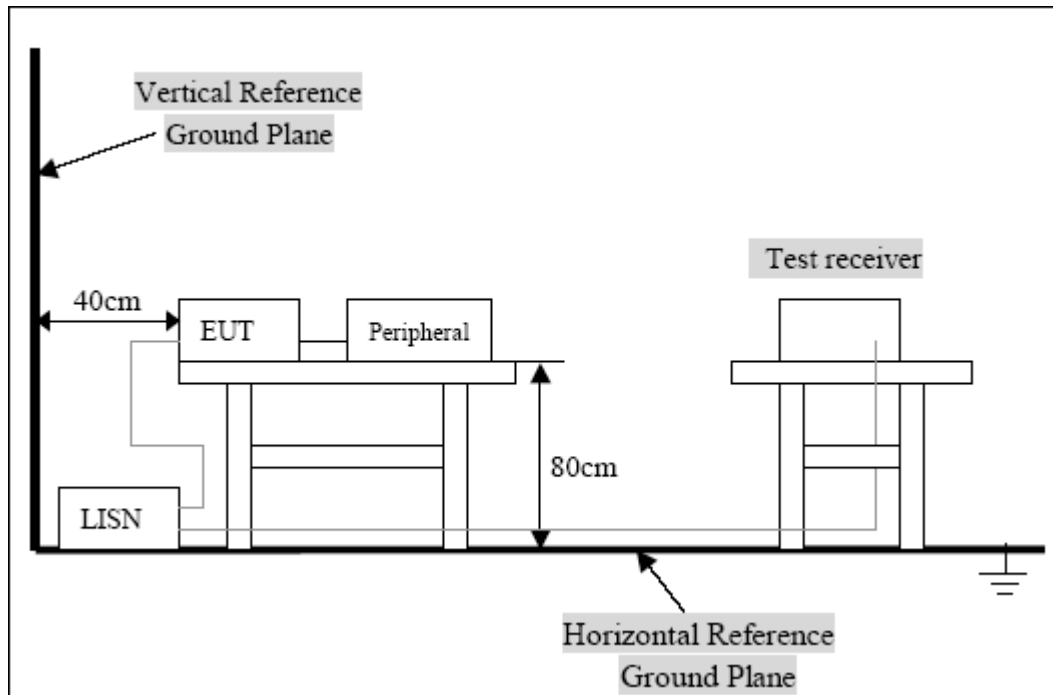


### 10.3.Test Setup

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



#### 10.3.2.Test Setup Diagram



For the actual test configuration, Please refer to the related items-Photos of testing

### 10.4.Configuring of the EUT

The EUT was configured according to ASIN C63.4:2003. Enable the signal transmitted from the external antenna from EUT to receiver. All interface ports were connected to the appropriate peripherals.

### 10.5.EUT Operating Condition

Operating condition is according to ANSI C63.4-2003.  
 Setup the EUT and simulators as shown on follow.  
 Enable RF signal and confirm EUT active.  
 Modulate output capacity of EUT up to specification.

## 10.6. Conducted Power line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuv)		
Frequency Range (MHZ)	Class A QP/AV	Class B QP/AV
0.15-0.5	79/66	65-56/56-46
0.5-5.0	73/60	56/46
5.0-30	73/60	60/50

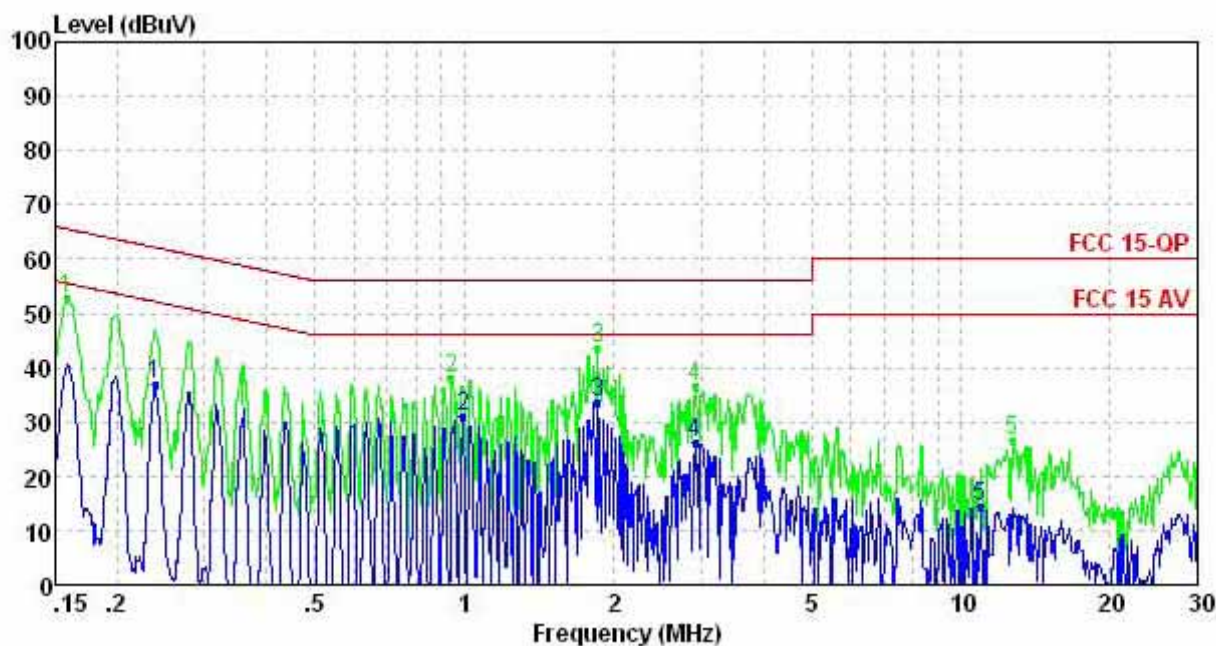
**Note:** In the above table, the tighter limit applies at the band edges.

## 10.7. Conducted Power Line Test Result

Temperature: 25°C

Humidity: 56%RH

Test Result: PASS



Condition:

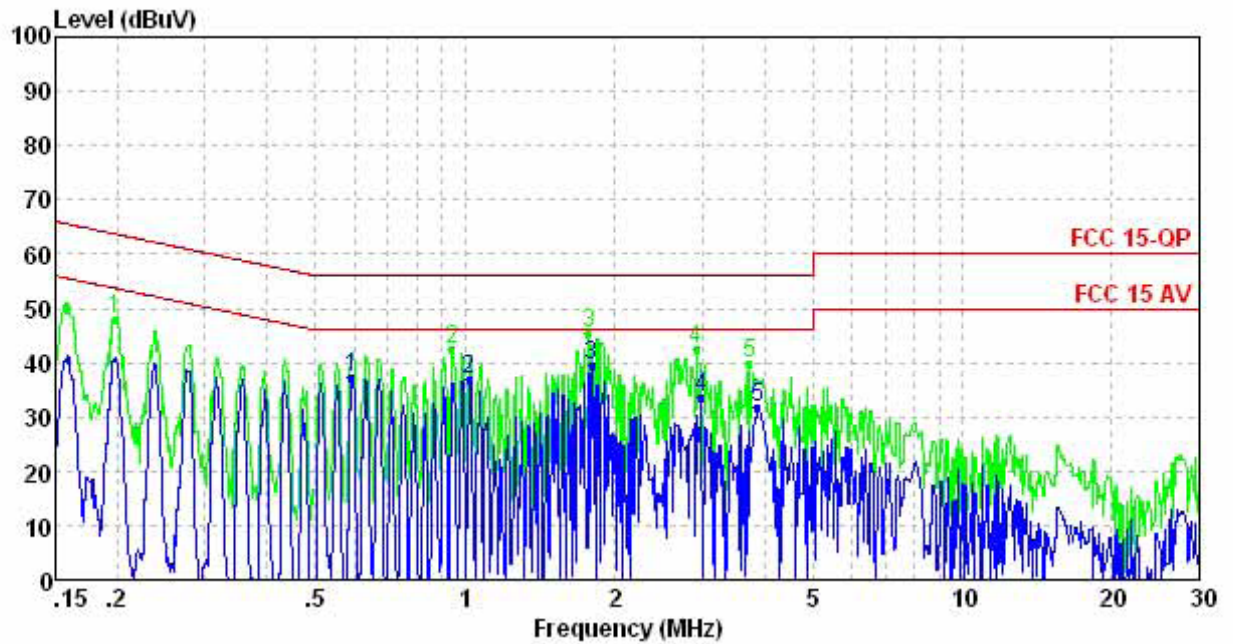
: RBW:9.000KHz VBW:30.000KHz

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	Line	Limit	dB	
1	0.24	36.98	52.17	-15.19	Average	LINE
2	0.99	30.97	46.00	-15.03	Average	LINE
3 Max	1.86	33.72	46.00	-12.28	Average	LINE
4	2.92	26.05	46.00	-19.95	Average	LINE
5	10.96	14.52	50.00	-35.48	Average	LINE

Condition:

: RBW:9.000KHz VBW:30.000KHz

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	Line	Limit	dB	
1	0.16	52.80	65.56	-12.76	Peak	LINE
2	0.94	37.90	56.00	-18.10	Peak	LINE
3 Max	1.86	43.68	56.00	-12.32	Peak	LINE
4	2.92	36.71	56.00	-19.29	Peak	LINE
5	12.72	26.43	60.00	-33.57	Peak	LINE



Condition:

: RBW:9.000KHz VBW:30.000KHz

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	Line	Limit	dB	
1	0.59	37.28	46.00	-8.72	Average	NEUTRAL
2	1.02	36.98	46.00	-9.02	Average	NEUTRAL
3 Max	1.80	39.32	46.00	-6.68	Average	NEUTRAL
4	2.99	33.52	46.00	-12.48	Average	NEUTRAL
5	3.88	31.74	46.00	-14.26	Average	NEUTRAL

Condition:

: RBW:9.000KHz VBW:30.000KHz

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	Line	Limit	dB	
1	0.20	48.11	63.71	-15.60	Peak	NEUTRAL
2	0.94	42.58	56.00	-13.42	Peak	NEUTRAL
3 Max	1.77	45.52	56.00	-10.48	Peak	NEUTRAL
4	2.92	42.43	56.00	-13.57	Peak	NEUTRAL
5	3.74	39.99	56.00	-16.01	Peak	NEUTRAL