FCC CERTIFICATION On Behalf of La Crosse Technology

Wind Sensor Model No.: TX56U-IT

FCC ID: OMO-M-04

Prepared for		La Crosse Technology
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Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
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Report Number	:	ATE20091796
Date of Test	:	October 14-15, 2009
Date of Report	:	October 30, 2009

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#### APPENDIX I (TEST CURVES) (6 pages)

#### **Test Report Certification**

Applicant	:	La Crosse Technology
Manufacturer	:	Golden ESL Instrument (S.Z.) Co. Ltd.
EUT Description	:	Wind Sensor
		(A) MODEL NO.: TX56U-IT
		(B) SERIAL NO.: N/A
		(C) POWER SUPPLY: 3V DC ("AAA" batteries $2 \times$ )

Measurement Procedure Used:

#### FCC Rules and Regulations Part 15 Subpart C Section 15.249 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 C Section15.249 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 :

October 14-15, 2009

Prepared by :

(Engineer)

Approved & Authorized Signer :

(Manager)

## **1. GENERAL INFORMATION**

## 1.1.Description of Device (EUT)

EUT	:	Wind Sensor
Model Number	:	TX56U-IT
Power Supply	:	3V DC ("AAA" batteries $2 \times$ )
Transmitting Frequency	:	924MHz
Applicant Address	:	La Crosse Technology 2809 Losey Blvd. So. La Crosse WI 54601, USA
Manufacturer Address	:	Golden ESL Instrument (S.Z.) Co. Ltd. Fu Yuan #2 Manufactory Building, 45 Area of Baoan District, ShenZhen, China
Date of sample received	:	October 13, 2009
Date of Test	:	October 14-15, 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 Site Location	:	ACCURATE TECHNOLOGY CO. LTD F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

## 2. MEASURING DEVICE AND TEST EQUIPMENT

Kind of equipment	Manufacturer	Туре	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	10.09.2010
LISN	Rohde&Schwarz	ESH3-Z5	100305	03.28.2010
LISN	Schwarzbeck	NSLK8126	8126431	03.28.2010

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

## 3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission	N/A
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".

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

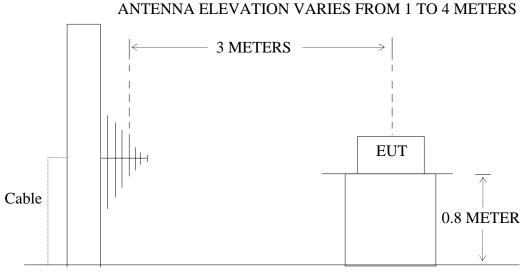
4.1.Block Diagram of Test Setup

4.1.1.Block diagram of connection between the EUT and simulators



(EUT: Wind Sensor)

4.1.2.Semi-Anechoic Chamber Test Setup Diagram



GROUND PLANE

(EUT: Wind Sensor)

#### 4.2. The Emission Limit

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

4.2.2.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.

#### 4.3.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.

4.3.1.Wind Sensor (EUT)

Model Number	:	TX56U-IT
Serial Number	:	N/A
Manufacturer	:	Golden ESL Instrument (S.Z.) Co. Ltd.

#### 4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

4.4.3. Let the EUT work in TX mode measure it. The transmit frequency is 924MHz.

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

# 4.6.The Field Strength of Radiation Emission Measurement Results **PASS.**

Date of Test:	October 14-15, 2009	Temperature:	25°C
EUT:	Wind Sensor	Humidity:	50%
Model No.:	TX56U-IT	Power Supply:	3V DC ("AAA" batteries $2 \times$ )
Test Mode:	TX 924MHz	Test Engineer:	Joe

#### **Fundamental Radiated Emissions**

Frequency	Reading(c	ng(dBµV/m) Factor(		Result(dBµV/m)		Limit(dBµV/m)		Margin(dB)		Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
923.9858	44.02	45.68	29.12	73.14	74.80	94	114	-20.86	-39.20	Vertical
923.9858	51.69	53.31	29.12	80.81	82.43	94	114	-13.19	-31.57	Horizontal

#### **Harmonics Radiated Emissions**

Frequency	Reading(c	dBµV/m)	Factor(dB)	Result(dBµV/m)		Limit(dBµV/m)		Margin(dB)		Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
1847.989	48.66	50.27	-9.55	39.11	40.72	54	74	-14.89	-33.28	Vertical
3695.967	42.72	44.29	-2.41	40.31	41.88	54	74	-13.69	-32.12	Vertical
1847.989	50.25	51.88	-9.55	40.70	42.33	54	74	-13.30	-31.67	Horizontal
3695.967	43.32	44.91	-2.41	40.91	42.50	54	74	-13.09	-31.50	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 in appendix I display the measurement of peak values.

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

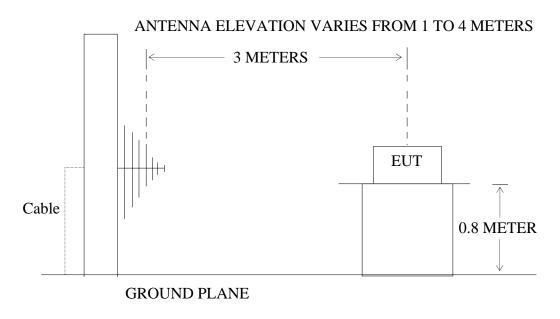
5.1.Block Diagram of Test Setup

5.1.1.Block diagram of connection between the EUT and simulators



(EUT: Wind Sensor)

5.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Wind Sensor)

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

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

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

Radiation Emission Measurement Limits According to Section 15.209

#### 5.3.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.

5.3.1.Wind Sensor (EUT)

Model Number	:	TX56U-IT
Serial Number	:	N/A
Manufacturer	:	Golden ESL Instrument (S.Z.) Co. Ltd.

#### 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 TX mode measure it. The transmit frequency is 924MHz.

#### 5.5.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. 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.

#### 5.6. The Emission Measurement Result

#### PASS.

Date of Test:	October 14-15, 2009	Temperature:	25°C
EUT:	Wind Sensor	Humidity:	50%
Model No.:	TX56U-IT	Power Supply:	3V DC ("AAA" batteries $2 \times$ )
Test Mode:	TX 924MHz	Test Engineer:	Joe

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

3. The spectral diagrams in appendix I display the measurement of peak values.

### 6. BAND EDGES

#### 6.1. The Requirement

6.1.1.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.

#### 6.2.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.

6.2.1.Wind Sensor (EUT)

Model Number	:	TX56U-IT
Serial Number	:	N/A
Manufacturer	:	Golden ESL Instrument (S.Z.) Co. Ltd.

#### 6.3. Operating Condition of EUT

6.3.1.Setup the EUT and simulator as shown as Section 4.1.

6.3.2.Turn on the power of all equipment.

6.3.3. Let the EUT work in TX mode measure it. The transmit frequency is 924MHz.

#### 6.4.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.

#### 6.5. The Measurement Result

#### Pass.

Date of Test:	October 15, 2009	Temperature:	25°C
EUT:	Wind Sensor	Humidity:	50%
Model No.:	TX56U-IT	Power Supply:	3V DC ("AAA" batteries $2 \times$ )
Test Mode:	TX 924MHz	Test Engineer:	Joe

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

3. The spectral diagrams in appendix I display the measurement of peak values.

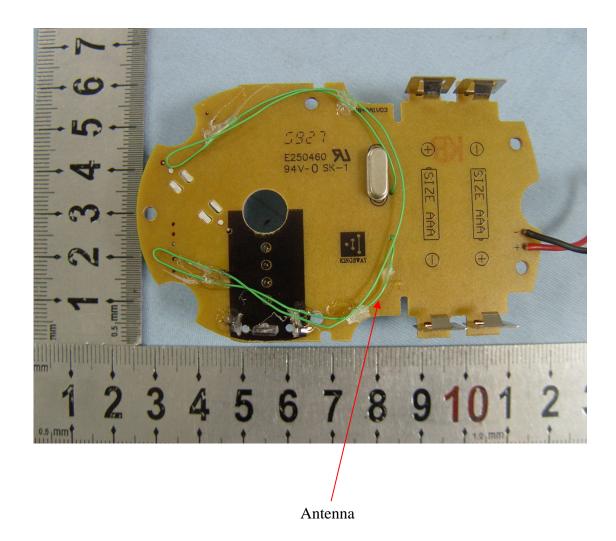
## 7. ANTENNA REQUIREMENT

#### 7.1. The Requirement

7.1.1.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.

#### 7.2. Antenna Construction

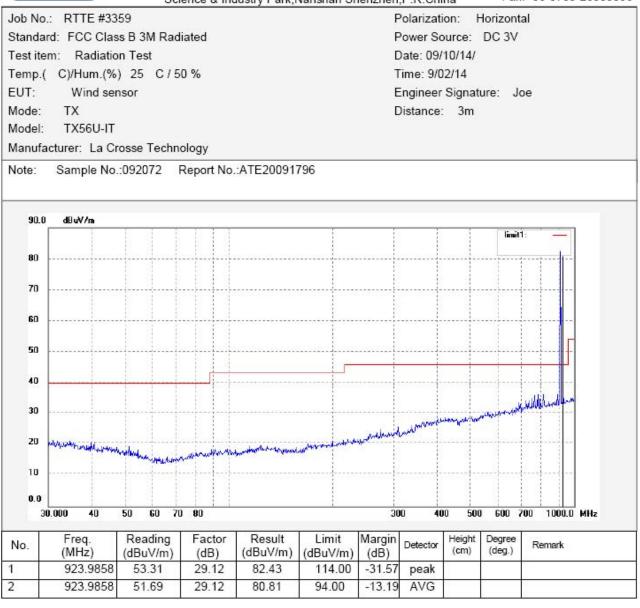
Antenna is formed by a short copper wire soldered on the PCB, no consideration of replacement.



# APPENDIX I (Test Curves)

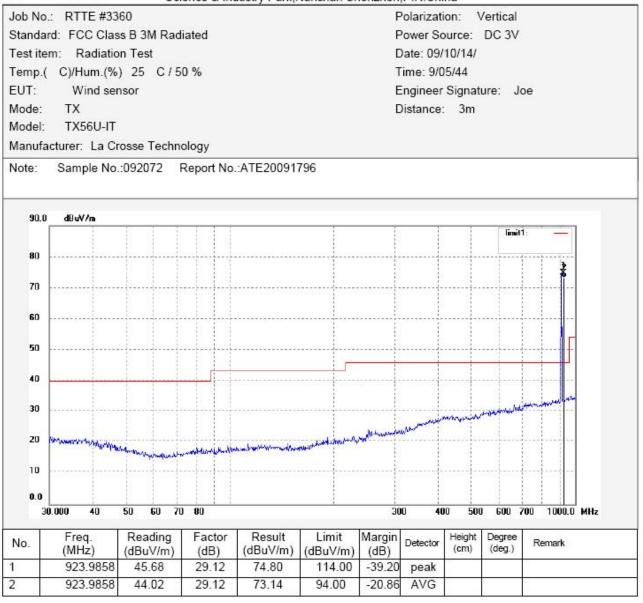


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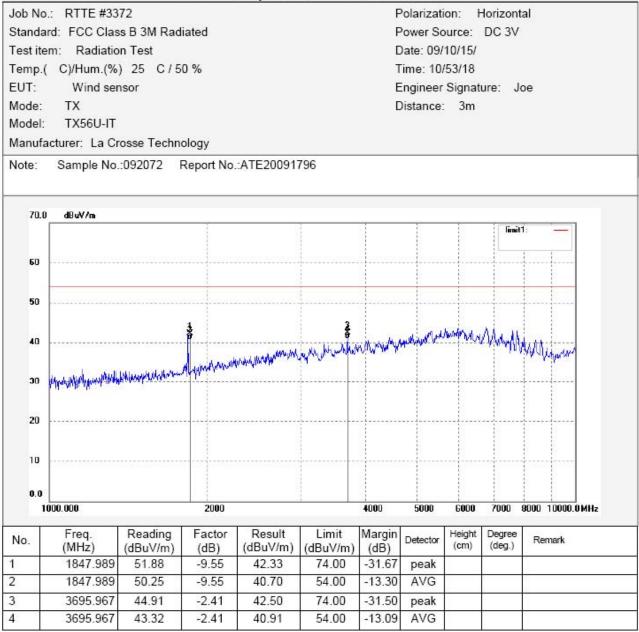


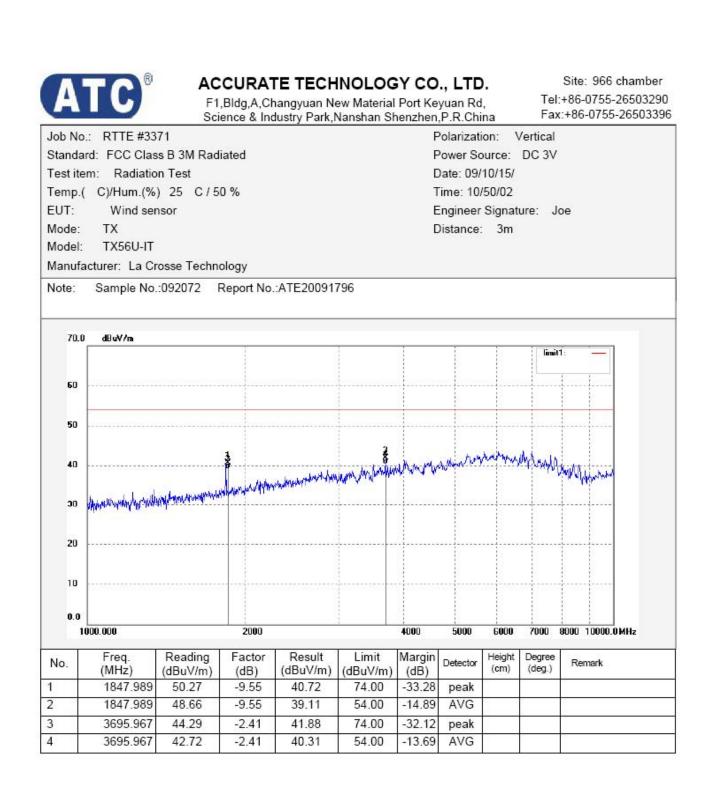
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