

## FCC ID TEST REPORT

for

JY-2410 Transceiver

Model: JY-2410-C1

## FCC ID: PZFJY2410C1

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Date of Test:	September 10~14, 2012

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Date of Report: September 14, 2012



#### **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

#### FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

#### IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-01.



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#### 1.0 General Details

1.1 Test Lab Details

Name :	Shenzhen TCT Testing Technology Co.,Ltd							
Address:	1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town, Baoan Distric							
	Shenzhen, Guangdong, Ch	ina						
Telephone:	+86-0755-27363466	Fax:	+86-0755-276	73332				

Shenzhen Timeway Technology Consulting Co., Ltd. Site on File with the Federal Communications Commission – United Sates Registration Number: 899988 For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada Registration Number: IC: 5205A-01 For 3m & 10 m OATS

1.2 Applicant Details

Applicant:	SHENZHEN JUEYING TECHNOLOGY CO.,LTD								
Address:	5th Floor, No. 4 Building, Baokun Technology Park, Dalang South Road, Dalang Street, Baoan,								
	Shenzhen, China								
Telephone:	15986789261	Fax:	0755-28774730						

#### 1.3 Description of EUT

-	
Product:	JY-2410 Transceiver
Manufacturer:	SHENZHEN JUEYING TECHNOLOGY CO.,LTD
Brand Name:	VILTROX
Model No.:	JY-2410-C1
Additional Model No.	JY-2410-C3、JY-2410-N1、JY-2410-N2、JY-2410-N3、JY-2410-P1、JY-2410-E2、
	JY-2410-S1
Additional Trade Name	N/A
Rating:	DC3V (1.5*2AA/LR6 batteries)
Modulation Type:	FSK
Channel number:	4
Channel spacing	N/A
<b>Operation Frequency</b>	2.4268GHz、2.4420GHz、2.4510GHz、2.4540GHz
Antenna Designation	A PCB printed antenna and the maximum gain is 2.5 dBi

Differences Statement: All modes above are different in the camera connect cable port only.



- 1.4 Submitted Sample 2 Samples
- 1.5 Test Duration 2012-09-14 to 2012-09-18
- 1.6 Test Uncertainty Conducted Emissions Uncertainty =3.7dB Radiated Emissions Uncertainty =4.5dB
- 1.7 Test Engineer

The sample tested by

Jack barg

#### Printed name: Jack Kang

2.0	) Test Equipments							
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date			
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2011-12-04	2012-12-03			
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2011-12-04	2012-12-03			
System Controller	СТ	SC100	-	2012-02-17	2013-02-16			
Spectrum Analyzer	ROHDE&SCHWARZ	FSU	-	2012-02-17	2013-02-16			
Pre-amplifier	Agilent	8447D	83153007374	2012-02-17	2013-02-16			
Pre-amplifier	Agilent	8449B	3008A01738	2012-02-17	2013-02-16			
Triple-loop antenna	ROHDE&SCHWARZ	HM020	843885/002	2012-02-17	2013-02-16			
Horn Antenna	ETS LINDGREN	3117		2012-02-17	2013-02-16			



#### 3.0 Technical Details

#### 3.1 Summary of test results

The EUT has been tested according to the following specifications:						
Standard	Test Type	Result	Notes			
FCC Part 15:2011, Paragraph 15.207	Conducted Emission Test	PASS	N/A			
FCC Part 15; 2011 Subpart C Paragraph 15.249(a)	Radiated Emission Test	PASS	Complies			
FCC Part 15:2011 Subpart C Paragraph 15.249(d) Limit	Band Edge Test	PASS	Complies			
FCC Part 15:2011 Subpart C Paragraph 15.215(c)	20 dB Bandwidth	PASS	Complies			

## 3.2 Test Standards FCC Part 15:2011 Subpart C, Paragraph 15.249

## 4.0 EUT Modification No modification by Shenzhen TCT Testing Technology Co., Ltd

Note: N/A=Not Applicable



#### 5. Power Line Conducted Emission Test

5.1 Schematics of the test





5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

- A Setup the EUT and simulators as shown on the following
- B Enable AF signal and confirm EUT active to normal condition
- 5.4 Test Equipment Please refer to the Section 2



Eraguanay (MUz)	Class A Lir	nits (dB µ V)	Class B Limits (dB µ V)		
Frequency(MHZ)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level	
$0.15~\sim~0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*	
$0.50~\sim~5.00$	73.0	60.0	56.0	46.0	
$5.00 \sim 30.00$	73.0	60.0	60.0	50.0	

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

- 5.6 Photo documentation of the test set-up Please refer to the Section 11
- 5.7 Test specification:

Environmental conditions: Temperature: 24° C Humidity: 51% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- Normal wireless communication

5.8 Test result

Min. limit margin

The requirements are FULFILLED

Remarks: The EUT is powered by batteries, so the test item is not applicable.



## A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT Description:
Operation Mode:
Tested By:
Test date:

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Fraguanay		Reading	Limit			
(MHz)	Line		Neutral		(dB µ V)	
(IVITIZ)	Quasi-peak	Average	Quasi-peak Average		Quasi-peak	Average



## B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description: Operation Mode: Tested By: Test Data:

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

Reading(dB µ V)					Limit	
(MHz)	Live		Neutral		(dB µ V)	
(IVITIZ)	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average



#### 6 Radiated Emission Test

#### 6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10 –2009. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) The antenna polarization: Vertical polarization and Horizontal polarization.



#### Block diagram of Test setup



#### Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



## 6.2 EUT Operating Condition Operating condition is according to ANSI C63.10 -2009



#### 6.3 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

#### A FCC Part 15:2011 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency	Field Stre	eld Strength of Fundamental (3m)			trength of Harmo	onics (3m)
(MHz)	mV/m	dBuV/m		uV/m	dBu	V/m
2400-2483.5	50	94 (Average)	114 (Peak)	500	54 (Average)	74 (Peak)

#### Note: 1. RF Field Strength $(dBuV) = 20 \log RF$ Voltage (uV)

2.Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

#### B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

-	-	
Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage  $(dBuV) = 20 \log RF$  Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.
5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK and AV detector.
6. If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 \* (d2/d1)

- 6.4 Photo documentation of the test set-up Please refer to the Section 11
- 6.5 Test Equipment: Please refer to the Section 2

6.6 Test specification:

Environmental conditions:	Temperature	24° C	Humidity:	51%	Atmospheric pressure:	103kPa
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6.7 Test result

#### A Radiated Emission (9 kHz----30 MHz)

Note: 1) Emission Level=Reading+ Cable loss-Antenna factor-Amp factor
2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

#### Result: Pass

Frequency (MHz)	Level@3m (dB µ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
		V	
		Н	
		V	
		Н	



# B. General Radiated Emissions Data Radiated Emission In Horizontal (30MHz----1000MHz)

Please refer to following diagram for individual Low channel: 2426.8 MHz



Frequency (MHz)	Level@3m (dB µ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
30.6390	23.46	Н	40.00
99.0690	14.95	Н	43.50
274.9297	18.73	Н	46.00
356.5731	20.57	Н	46.00
593.7273	26.83	Н	46.00
931.9637	31.68	Н	46.00



#### Radiated Emission In Vertical (30MHz----1000MHz)

Please refer to following diagram for individual



Note: Measurements were conducted in all four channels (high, middle1 middle2, low), and the worst case (low channel) was submitted only.



Low channel: 2426.8 MHz				
Frequency	Emission PK/AV	Horizontal /	Limits PK/AV	Margin
(MHz)	(dBuV/m)	Vertical	(dBuV/m)	( <b>dB</b> )
2426.8	85.32(PK)	Н	114/94	28.68
2426.8	90.18(PK)	V	114/94	23.82
4853.6	43.65(PK)	Н	74/54	30.35
4853.6	47.14(PK)	V	74/54	26.86
7280.4		Н	74/54	
7280.4		V	74/54	
9707.2		H/V	74/54	
12134		H/V	74/54	
14560.8		H/V	74/54	
16987.6		H/V	74/54	
19414.4		H/V	74/54	
2426.8		H/V	74/54	
24268		H/V	74/54	

## C Fundamental & Harmonics Radiated Emission Data (1000MHz-25000MHz)

Middle1 channel: 2442 MHz				
Frequency	Emission PK/AV	Horizontal /	Limits PK/AV	Margin
(MHz)	(dBuV/m)	Vertical	(dBuV/m)	( <b>dB</b> )
2442	84.84 (PK)	Н	114/94	29.16
2442	88.96 (PK)	V	114/94	25.04
4884	42.78 (PK)	Н	74/54	31.22
4884	45.41 (PK)	V	74/54	28.59
7326		Н	74/54	
7326		V	74/54	
9768		H/V	74/54	
12210		H/V	74/54	
14652		H/V	74/54	
17094		H/V	74/54	
19536		H/V	74/54	
21978		H/V	74/54	
24420		H/V	74/54	



Middle2 channel: 2451 MHz				
Frequency	Emission PK/AV	Horizontal /	Limits PK/AV	Margin
(MHz)	(dBuV/m)	Vertical	(dBuV/m)	( <b>dB</b> )
2451	85.93 (PK)	Н	114/94	28.07
2451	90.14 (PK)	V	114/94	23.86
4902	43.25 (PK)	Н	74/54	30.75
4902	46.72 (PK)	V	74/54	27.28
7353		Н	74/54	
7353		V	74/54	
9804		H/V	74/54	
12255		H/V	74/54	
14706		H/V	74/54	
17157		H/V	74/54	
19608		H/V	74/54	
22059		H/V	74/54	
24510		H/V	74/54	

High channel: 2454 MHz					
Frequency	Emission PK/AV	Horizontal /	Limits PK/AV	Margin	
(MHz)	(dBuV/m)	Vertical	(dBuV/m)	( <b>dB</b> )	
2454	86.22 (PK)	Н	114/94	27.78	
2454	89.54 (PK)	V	114/94	24.46	
4908	43.14 (PK)	Н	74/54	30.86	
4908	46.83 (PK)	V	74/54	27.17	
7362		H/V	74/54		
9816		H/V	74/54		
12270		H/V	74/54		
14724		H/V	74/54		
17178		H/V	74/54		
19632		H/V	74/54		
22086		H/V	74/54		
24540		H/V	74/54		

Note: 1) PK= Peak, AV= Average

2) Emission Level = Reading Level + Antenna Factor + Cable Loss.

- 3) Margin= Limit Emission Level
- 4) According to section 15.35(b), the peak limit is 20dB higher than the average limit
- 5) If the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

6) It is the floor noise from 18-25GHz, which is deemed to comply with the requirement of the rule.



Please refer to the following diagram for individual Low Channel: 2426.8 MHz





Please refer to following diagram for individual Middle1 Channel: 2442 MHz





Please refer to following diagram for individual Middle2 Channel: 2451 MHz





Please refer to following diagram for individual High Channel: 2454 MHz





#### 7. Band Edge

#### 7.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10 –2009. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) Set Spectrum as RBW=VBW=1MHz and Peak detector used
- (3) The antenna height is varied from 1 m to 4 m to find the maximum emission for the frequency measured.
- (4) The antenna polarization: Vertical polarization and Horizontal polarization.

#### 7.2 Radiated Test Setup



For the actual test configuration , please refer to the related items - Photos of Testing

#### 7.3 Band Edge Limit

Emissions 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.

#### 7.4 Test Equipment

Please refer to the Section 2

#### 7.5 Test Produce

1) The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

2) The turntable was rotated for 360 degrees to determine the position of maximum emission level.

3) EUT is set 3m away from the antenna, which is varied from 1m to 4m to find out the highest emission.

4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

(a) PEAK: RBW=VBW=1MHz, PK detector, Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / PK detector Sweep=AUTO



#### 7.6 Test Result

#### Low channel in Horizontal polarization



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Detector	Limit@3m (dB µ V/m)
2387.816	41.35	Peak	74.00
2390.000	41.92	Peak	74.00
2426.650	85.24	Peak	114.00

Note: 1. Emission Level = Reading Level + Antenna Factor + Cable Loss.

- 2. Margin= Limit Emission Level
- 3. According to section 15.35(b), the peak limit is 20dB higher than the average limit



#### Low channel in Vertical polarization



Frequency (MHz)	Level@3m (dB µ V/m)	Detector	Limit@3m (dB µ V/m)
2382.305	44.41	Peak	74.00
2390.000	46.47	Peak	74.00
2426.348	89.41	Peak	114.00

Note: 1. Emission Level = Reading Level + Antenna Factor + Cable Loss.

- 2. Margin= Limit Emission Level
- 3. According to section 15.35(b), the peak limit is 20dB higher than the average limit



#### High channel in Horizontal polarization



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Detector	Limit@3m (dB µ V/m)
2454.208	85.26	peak	114.00
2483.500	42.86	peak	74.00
2499.198	50.42	peak	74.00

Note: 1. Emission Level = Reading Level + Antenna Factor + Cable Loss.

2. Margin= Limit – Emission Level

3. According to section 15.35(b), the peak limit is 20dB higher than the average limit



#### High channel in Vertical polarization



Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Detector	Limit@3m (dB µ V/m)
2454.309	89.76	peak	114.00
2483.500	45.86	peak	74.00
2499.185	52.93	peak	74.00

Note: 1. Emission Level = Reading Level + Antenna Factor + Cable Loss.

2. Margin= Limit – Emission Level

3. According to section 15.35(b), the peak limit is 20dB higher than the average limit



#### 8.0 Antenna Requirement

#### **Applicable Standard**

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

A PCB printed antenna was used and the maximum Gain of the antenna is 2.5dBi. Test Result: Pass



#### 9.0 20dB Bandwidth Measurement

9.1 Test Equipment Please refer to the Section 2

#### 9.2 Test specification:

Environmental conditions:	Temperature	23° C	Humidity:	50%	Atmospheric pressure:	103kPa
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#### 9.3 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### 9.4 Test Result:

Channel number	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
(Low)	384.77		PASS
(Middle)	402.81		PASS
(High)	426.85		PASS









#### 10.0 FCC ID Label

## FCC ID: PZFJY2410C1

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.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.



#### Mark Location:



#### 11.0 Photos of testing

11.1 Conducted test View--

N/A

11.2 Radiated emission test view





#### 12 Photos for the EUT

Outside View of the EUT







Inside View of the EUT



Inside View of the EUT





Inside View of the EUT





Inside View of the EUT



--End of the report--