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MPE Test Report

FCC Per 47 CFR 2.1091(b)

Report Reference No.....:	**CTL120503385-WM**
Compiled by (position+printed name+signature)..:	File administrators Andy Zhang
Name of the organization performing the tests (position+printed name+signature)..:	Test Engineer Nie Quan
Approved by (position+printed name+signature)..:	Manager Tracy Qi
Date of issue.....:	June 01, 2012
Testing Laboratory Name .....:	**Shenzhen CTL Electromagnetic Technology Co., Ltd.**
Address.....:	Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China
Applicant's name.....:	**Shenzhen Friendcom Technology Development Co., Ltd.**
Address.....:	6/F,17 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan District, Shenzhen City, China
Test specification:	
Standard .....:	**FCC Per 47 CFR 2.1091(b)** **OET Bulletin 65 Supplement C[June 2001]**
TRF Originator.....:	Shenzhen CTL Electromagnetic Technology Co., Ltd.
Master TRF.....:	Dated 2011-01

Test item description ..... :	Data Radio
Trade Mark .....:	Friendcom
Model/Type reference.....:	FC-301/D
Modulation……:	GMSK
Emission Type……:	7K60FXD
Channel Separation.....	12.5KHz
Power Supply……:	DC 12.5V
Rated Power……:	5W
Operating Frequency Range…..……:	From 400 MHz to 470 MHz
Result.....:	**Positive**

TEST REPORT

Test Report No. :	CTL120503385-WM	June 01, 2012 Date of issue

Equipment under Test	:	Data Radio
Model /Type	:	FC-301/D
Listed Models	:	/
Applicant	:	Shenzhen Friendcom Technology Development Co., Ltd.
Address	:	6/F,17 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan District, Shenzhen City, China
Manufacture	:	Shenzhen Friendcom Technology Development Co., Ltd.
Address	:	6/F,17 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan District, Shenzhen City, China

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

1.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC12.5V

1.3. Short description of the Equipment under Test (EUT)

The Friendcom's Model: FC-301/D or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Data Radio	
Model Number	FC-301/D	
FCC ID	UU3FC301DU1	
Rated Output Power	5 Watts(36.99dBm)	
Support data rate	9.6kbps	
Modilation Type	GMSK for Digital Data	
	Digital	7K60FXD for Digital Data only
Channel Separation	Digital Data	12.5KHz
Antenna Type	External	
Frequency Range	400MHz-470MHz	
Maximum Output Power	Digital	5.96 W for 12.5 KHz Channel Separation

Test frequency list

Frequency Range (MHz)	Modulation Type	Channel Separation (KHz)	Test Channel	Test Frequency (MHz)	
				TX	RX
400-470	Digital/GMSK	12.5	Low	406.5000	406.5000
			Middle	435.0000	435.0000
			High	469.5000	469.5000

1.4. Note

The EUT is is a U frequency band (400-470MHz) Data Radio, The functions of the EUT listed as below:

	Test Standards	Reference Report
Radio	FCC Part 90	CTL120503385-WF
MPE	OET 65	CTL120503385-WM

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

2.2. Test Facility

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

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd 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 338263, March 24, 2008.

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Bontek laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.30 dB	(1)
Transmitter power Radiated	2.20 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Method of measurement

3.1. Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §RSS-102, Devices that have a radiating element normally operating at separation distances greater than 20 cm between the user and the device shall undergo an RF exposure evaluation. SAR evaluation may be performed in lieu of an RF exposure evaluation for devices operating below 6 GHz with a separation distance of greater than 20 cm between the user and the device.

According to §1.1310 and §2.1091 RF exposure is calculated.

OET Bulletin 65 Supplement C [June 2001]: Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz
*=Plane-wave equivalent power density

3.3. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the center of radiation of the antenna

From the peak EUT RF output power, the minimum mobile separation distance, R=35 cm, as well as the maximum gain of the used antenna is 3.0 dBi, the RF power density can be obtained.

TEST RESULTS

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm^2)	Power Density At 35 cm (mW/cm^2)	Test Results
406.5000	35.00	37.75	5956.60	1.9953	1.3350	0.7721	Compliance
435.0000	35.00	37.75	5956.60	1.9953	1.4500	0.7721	Compliance
469.5000	35.00	37.69	5874.90	1.9953	1.5650	0.7615	Compliance

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 (b) for the controlled RF Exposure.

.....End of Report.....