



## Test Report

Product Name	U-NET Series
Model No.	SR801-2
FCC ID.	FU5SR801-2

Applicant	EVERSPRING INDUSTRY CO., LTD
Address	7th fl. No. 609 Wan Shou Road Sec.1, Kweishan, Taoyuan Hsien 333, Taiwan, R.O.C.

Date of Receipt	Dec. 26, 2008
Issued Date	Feb. 03, 2009
Report No.	091027R-RFUSP07V01
Version	V1.0

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.


This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

# Test Report Certification

Issued Date: Feb. 03, 2009

Report No. : 091027R-RFUSP07V01



Product Name	U-NET Series	
Applicant	EVERSPRING INDUSTRY CO., LTD	
Address	7th fl. No. 609 Wan Shou Road Sec.1, Kweishan, Taoyuan Hsien 333,Taiwan, R.O.C.	
Manufacturer	Dong-Guan Li Yuan Electronics Co., Ltd	
Model No.	SR801-2	
FCC ID.	FU5SR801-2	
Rated Voltage	DC 3V (Power by battery)	
Working Voltage	DC 3V (Power by battery)	
Trade Name	EVERSPRING	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003	 <small>NVLAP Lab Code: 200533-0</small>
Test Result	Complied	

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( Engineer / Dino Chen )

Approved By : Vincent Lin  
( Manager / Vincent Lin )



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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	U-NET Series
Trade Name	EVERSPRING
FCC ID.	FU5SR801-2
Model No.	SR801-2
Frequency Range	923MHz
Type of Modulation	FSK
Number of Channels	1
Channel Control	Auto
Antenna Type	Monopole
Antenna Gain	Refer to the table "Antenna List"

#### Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	EVERSPRING	N/A	-5.37dBi for 923MHz

Center Frequency of Each Channel:

Channel	Frequency
Channel 1	923 MHz

Note:

1. The EUT is a U-NET Series with a built-in transceiver module.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmitter
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## 1.2. Operation Description

The EUT is a U-NET Series with a built-in transceiver module. The EUT operation frequency is 923MHz. The signals modulated by FSK are transmitted from the Monopole Antenna of the EUT.

Together with the patented U-NET Protocol the U-NET Module delivers a complete highly reliable RF communication solution. The U-NET Protocol uses Flood Detector, Temperature/Humidity Detector, illumination Sensor and sophisticated Routing to assure reliable full home coverage.

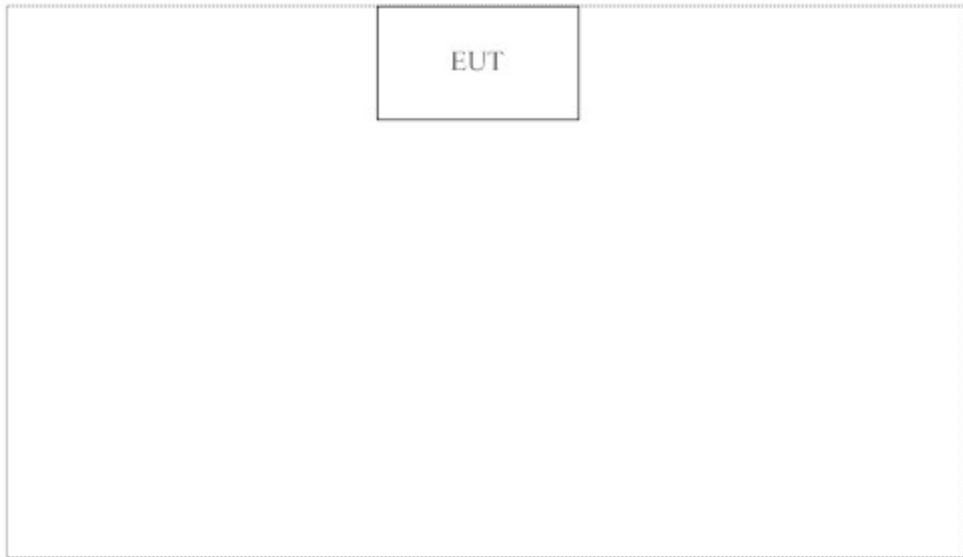
**1.3. Tested System Details**

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
N/A				

Signal Cable Type	Signal cable Description
N/A	

**1.4. Configuration of Test System**



**1.5. EUT Exercise Software**

- (1) Setup the EUT as shown in section 1.4.
- (2) Open the EUT power.
- (3) Start the continuous transmit.
- (4) Verify that the EUT works correctly.

**1.6. Test Facility**

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation’s Web Site: <http://tw.quietek.com/modules/myalbum/>  
 The address and introduction of Quietek Corporation’s laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
 Federal Communications Commission  
 FCC Engineering Laboratory  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 92195



Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,  
 Lin-Kou Shiang, Taipei,  
 Taiwan, R.O.C.  
 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789  
 E-Mail : [service@quietek.com](mailto:service@quietek.com)

FCC Accreditation Number: TW1014



## 2. Conducted Emission

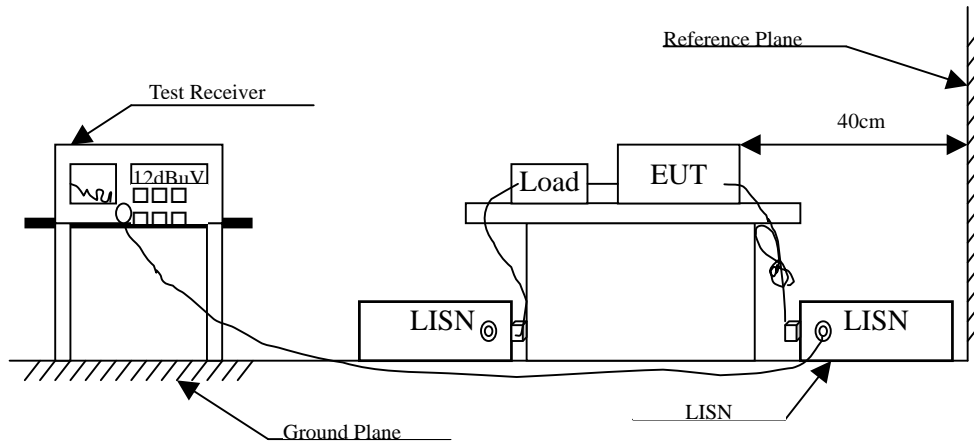
### 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2008	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2008	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2008	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2008	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

### 2.2. Test Setup



### 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

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



## 2.4. 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 50 ohm /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. (Please refers to the block diagram of the test setup and photographs.)

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 ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

## 2.5. Uncertainty

± 2.26 dB

## 2.6. Test Result of Conducted Emission

The EUT is powered by batteries. This test item is not performed.

### 3. Radiated Emission

#### 3.1. Test Equipment

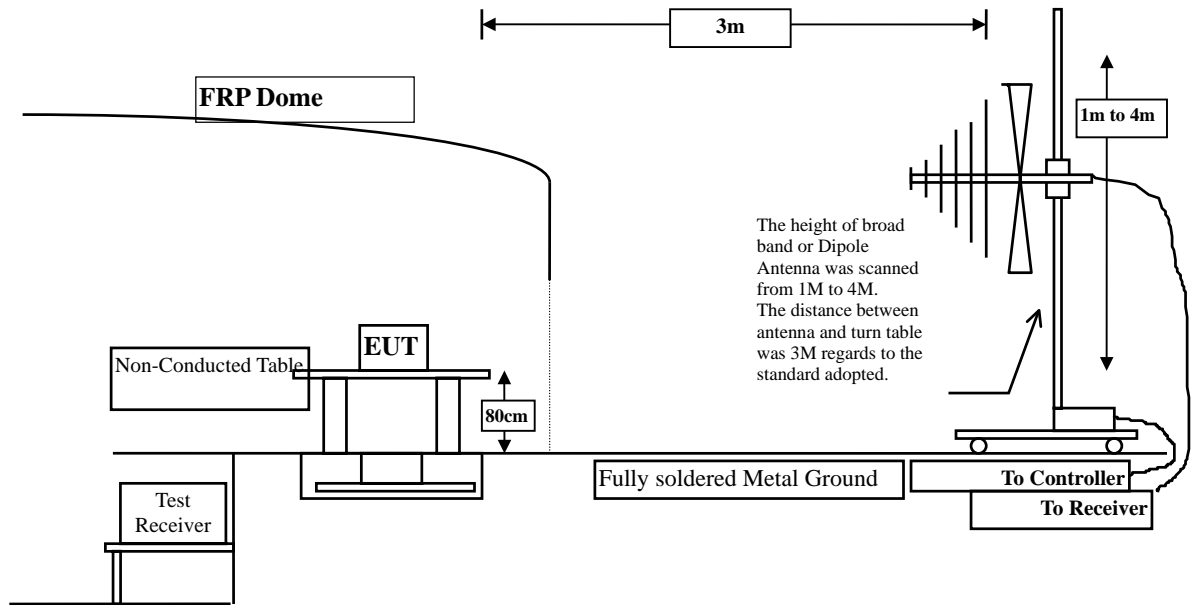
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1		Test Receiver	R & S	ESVS 10 / 834468/003	May, 2008
		Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2008
		Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2008
		Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2008
<input type="checkbox"/> Site # 2		Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2008
		Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2008
		Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2008
		Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2008
		Horn Antenna	ETS	3115 / 0005-6160	Sep., 2008
		Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2008
<input checked="" type="checkbox"/> Site # 3	X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2008
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2008
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2008
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2008

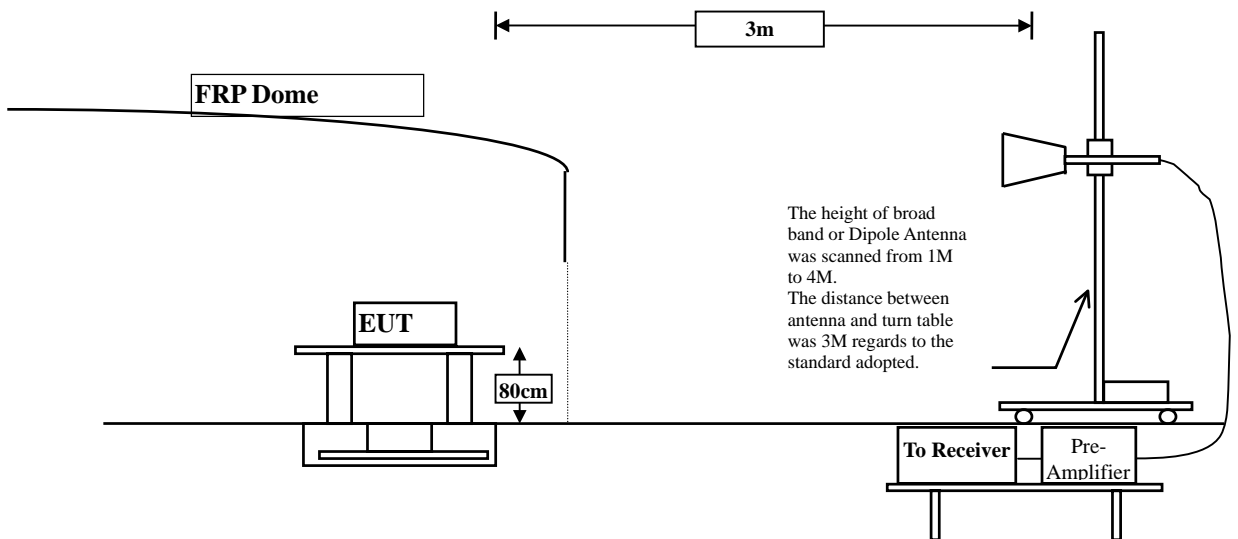
- Note:
1. All equipments are calibrated every one year.
  2. Test equipments marked by "X" are used to measure the final test results.

### 3.2. Test Setup

Below 1GHz



Above 1GHz



### 3.3. Limits

#### ➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
  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.

#### ➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
  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 closed point of any part of the device or system.

### 3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The frequency range from 30MHz to 10th harmonics is checked.

### 3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

### 3.6. Test Result of Radiated Emission

Product : U-NET Series  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
923.000	27.403	68.320	95.723	-18.277	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Average Detector:</b>					
923.000	95.723	-16.772	78.951	-15.049	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle
2. The Duty Cycle is refer to section 5.
3. If Duty Cycle is smaller than -20dB,based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

Product : U-NET Series  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Vertical</b>					
<b>Peak Detector:</b>					
923.000	5.053	90.620	95.673	-18.327	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Frequency MHz	Peak Measurement dBuV/m	Duty Cycle dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Vertical</b>					
<b>Average Detector:</b>					
923.000	95.673	-16.772	78.901	-15.099	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle
2. The Duty Cycle is refer to section 5.
3. If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.



Product : U-NET Series  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
1846.000	-4.994	35.610	30.616	-43.354	74.000
2769.000	-1.370	26.610	25.241	-48.729	74.000
3692.000	0.335	35.780	36.116	-37.854	74.000
4615.000	3.070	31.580	34.651	-39.319	74.000
5538.000	4.560	31.400	35.959	-38.011	74.000
6461.000	6.716	31.620	38.336	-35.634	74.000

**Average Detector:**

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : U-NET Series  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		
<b>Vertical</b>					
<b>Peak Detector:</b>					
1846.000	-4.994	37.580	32.586	-41.384	74.000
2769.000	-1.370	25.940	24.571	-49.399	74.000
3692.000	0.335	35.410	35.746	-38.224	74.000
4615.000	3.070	31.430	34.501	-39.469	74.000
5538.000	4.560	30.680	35.239	-38.731	74.000
6461.000	6.716	30.330	37.046	-36.924	74.000

**Average Detector:**

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : U-NET Series  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		
<b>Horizontal</b>					
652.740	1.666	27.918	29.584	-16.416	46.000
707.060	2.458	29.482	31.940	-14.060	46.000
761.380	3.850	30.842	34.691	-11.309	46.000
815.700	4.975	32.972	37.947	-8.053	46.000
870.020	4.798	26.106	30.904	-15.096	46.000
978.660	6.253	18.915	25.168	-28.832	54.000
<b>Vertical</b>					
518.880	-1.057	26.567	25.510	-20.490	46.000
652.740	-5.094	27.296	22.202	-23.798	46.000
707.060	-0.372	26.098	25.726	-20.274	46.000
761.380	1.840	26.341	28.180	-17.820	46.000
815.700	2.925	31.834	34.759	-11.241	46.000
842.860	2.683	24.205	26.888	-19.112	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “■” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

## 4. Band Edge

### 4.1. Test Equipment

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2008
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2008
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2008
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2008

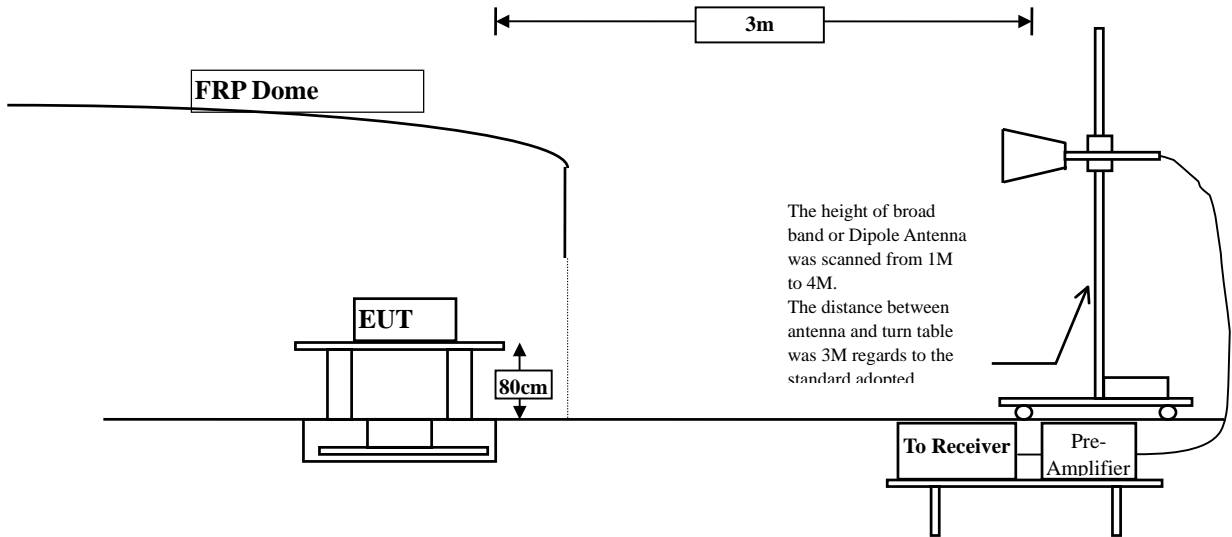
OATS No.3

- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by “X” are used to measure the final test results.

**4.2. Test Setup**

**RF Radiated Measurement:**

Above 1GHz



**4.3. Limit**

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### 4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30 )is 120 kHz, above 1GHz are 1 MHz.

#### 4.5. Uncertainty

Conducted is  $\pm 1.27$  dB

Radiated is  $\pm 3.9$  dB.

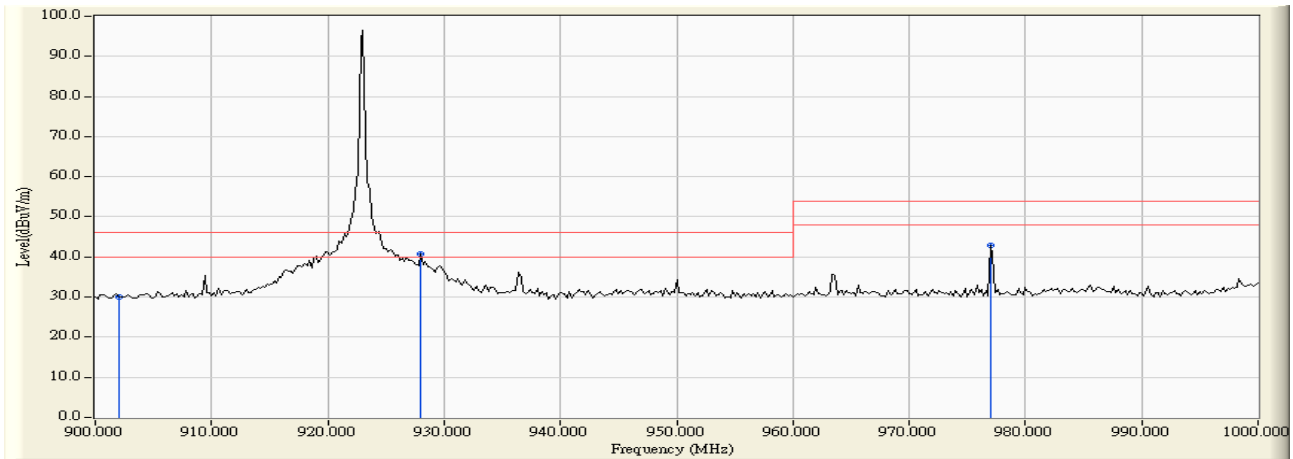
**4.6. Test Result of Band Edge**

Product : U-NET Series  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

**RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	977.000	6.164	36.659	42.824	54.000	Pass

**Figure Channel 01: Horizontal (Quasi-Peak)**



Note:

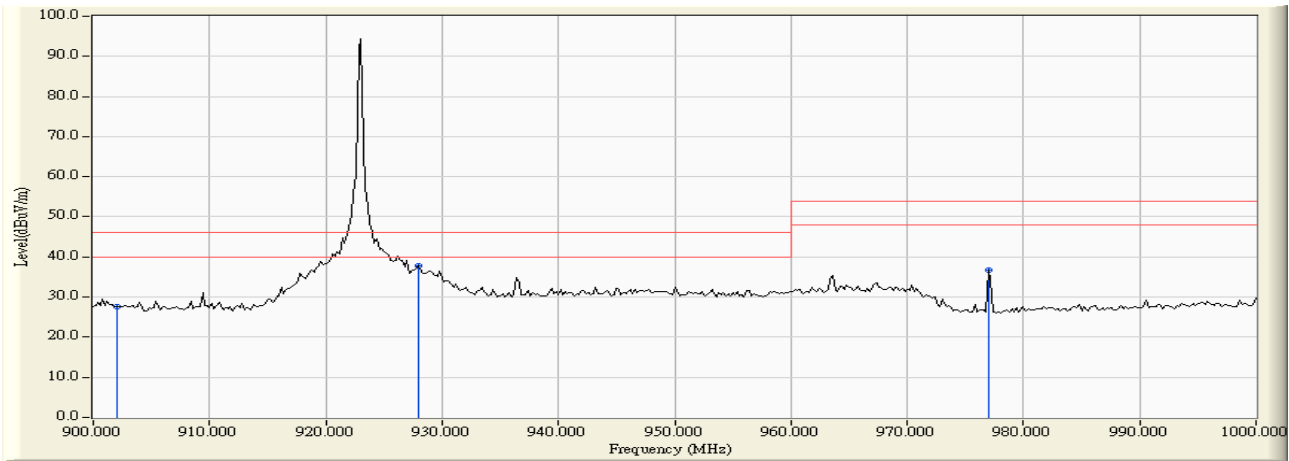
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : U-NET Series  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923MHz)

**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	977.000	1.913	34.910	36.823	54.000	Pass

**Figure Channel 01: Vertical (Quasi-Peak)**



**Note:**

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.



## 5. Duty Cycle

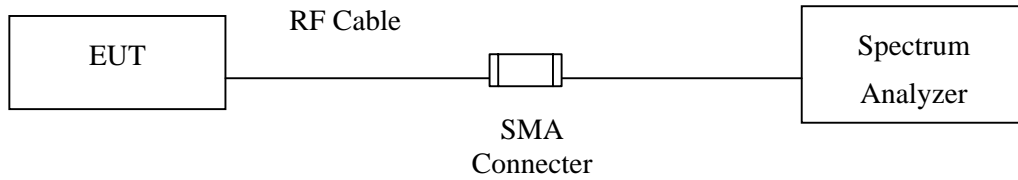
### 5.1. Test Equipment

The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2008

- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by "X" are used to measure the final test results.

### 5.2. Test Setup

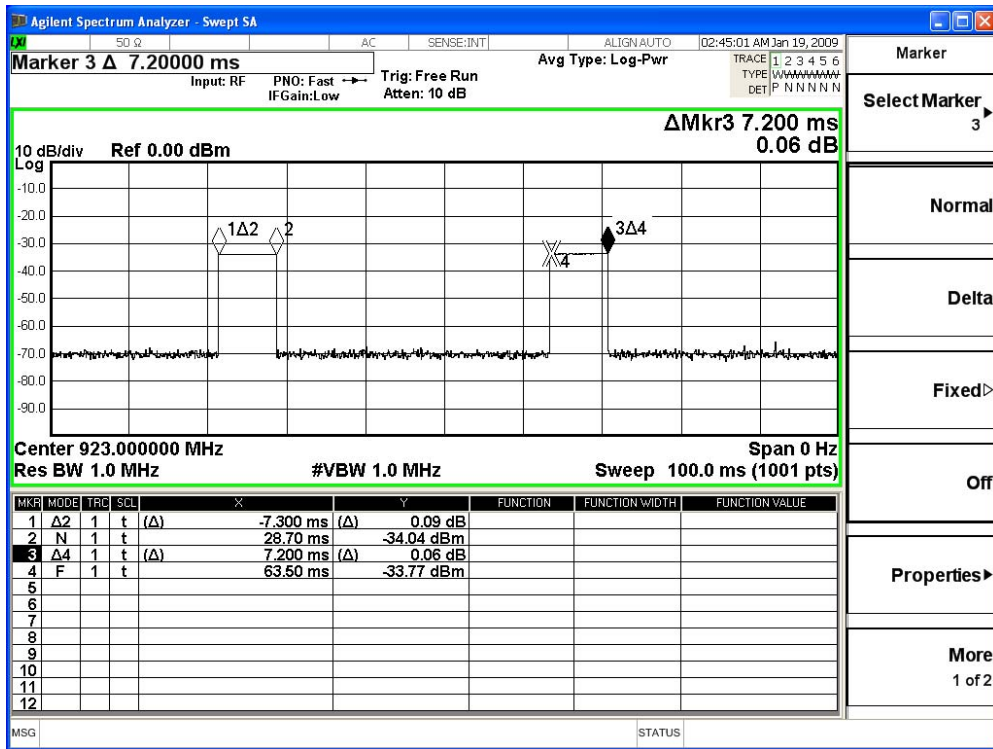


### 5.3. Uncertainty

± 150Hz

### 5.4. Test Result of Duty Cycle

Product : U-NET Series  
 Test Item : Duty Cycle Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter (923MHz)



Time on of 100ms= 7.3msec+7.2msec=14.5msec

Duty Cycle= 14.5 / 100msec= 0.145

Duty Cycle correction factor= 20 LOG 0.145 = -16.772 dB

Remark: If Duty Cycle is smaller than -20dB,based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

## **6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.