



# FCC TEST REPORT

**CATEGORY** : Mobile Module  
**PRODUCT NAME** : Wrist Walkie Talkie  
**FCC ID.** : SDOFRSRD018  
**FILING TYPE** : Certification  
**MODEL NAME** : RD-018  
**BRAND NAME** : freetalker

**APPLICANT** : **SHENZHEN RUIDIAN COMMUNICATION CO., LTD.**  
3/F, No.1 Yijian Industrial, Linyuan East Rd., Shangmeilin,  
518049, Shenzhen, China  
**MANUFACTURER** : Same as Applicant

**ISSUED BY** : **SPORTON INTERNATIONAL INC.**  
6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien,  
Taiwan, R.O.C.

## Statements:

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA, NVLAP or any agency of U.S. government.

The test equipment used to perform the test are calibrated and traceable to NML/ROC or NIST/USA.



**Dr. Alan Lane**  
Vice General Manager  
Sporton International Inc.



Lab Code: 200079-0



## Table of Contents

<b>History of this test report.....</b>	<b>ii</b>
<b>1. General Description of Equipment under Test.....</b>	<b>1</b>
1.1. Applicant.....	1
1.2. Manufacturer .....	1
1.3. Basic Description of Equipment under Test .....	1
1.4. Features of Equipment under Test.....	1
1.5. Table for Carrier Frequencies .....	2
1.6. Type of Emission.....	3
<b>2. Test Configuration of the Equipment under Test.....</b>	<b>4</b>
2.1. Description of the Test .....	4
2.2. Frequency Range Investigated .....	4
2.3. Description of Test Supporting Units.....	4
2.4. Connection Diagram of Test System .....	4
2.5. Test Software .....	4
<b>3. Test Location and Standards .....</b>	<b>5</b>
3.1. Test Location.....	5
3.2. Test Conditions .....	5
3.3. Standards for Methods of Measurement.....	5
3.4. DoC Statement.....	5
<b>4. List of Measurements.....</b>	<b>6</b>
4.1. Summary of the Test Results.....	6
<b>5. Test Result .....</b>	<b>7</b>
5.1. Test of Modulation Characteristics.....	7
5.2. Test of Frequency Stability.....	11
5.3. Test of RF Power Output .....	14
5.4. Test of Occupied Bandwidth .....	17
5.5. Test of Radiated Spurious Emission .....	20
5.6. Test of Spurious Conducted Emission .....	33
<b>6. List of Measuring Equipments Used .....</b>	<b>38</b>
<b>Appendix A. Photographs of EUT.....</b>	<b>A1 ~ A10</b>



## History of this test report

No additional attachment.

Additional attachment were issued as following record:



## 1. General Description of Equipment under Test

### 1.1. Applicant

**SHENZHEN RUIDIAN COMMUNICATION CO., LTD.**

3/F, No.1 Yijian Industrial, Linyuan East Rd., Shangmeilin, 518049, Shenzhen, China

### 1.2. Manufacturer

Same as 1.1

### 1.3. Basic Description of Equipment under Test

This product is a Walkie-Talkie which can be worn on the wrist. 22 FRS/GMRS channels are available. The used modulation technique is FM. For other technique information, please reference section " Features of Equipment under Test ".

### 1.4. Features of Equipment under Test

#### **FRS**

ITEMS	DESCRIPTION
Type of Modulation	FM (F3E)
Number of Channels	14
Frequency Band	462.5625 ~ 467.7125 MHz
Carrier Frequencies	Please reference section 1.5
Authorized Bandwidth	12.5kHz
Output Power	21.10dBm Conducted 11.03dBm ERP
Antenna Type / Gain	Dipole / -14dBi
Function Type	Transceiver
Type of emission	Please reference section 1.6
Power Rating (DC/AC, Voltage)	3.7 VDC
Consumption	0.5A
Duty Cycle	>50% (Max)
Temperature Range (Operating)	-30 ~ 50



FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

### GMRS

ITEMS	DESCRIPTION
Type of Modulation	FM (F3E)
Number of Channels	8
Frequency Band	462.5500 ~ 462.7250 MHz
Carrier Frequencies	Please reference section 1.5
Authorized Bandwidth	20kHz
Output Power	21.00dBm Conducted 10.58dBm ERP
Antenna Type / Gain	Dipole / -14dBi
Function Type	Transceiver
Type of emission	Please reference section 1.6
Power Rating (DC/AC, Voltage)	3.7 VDC
Consumption	0.5A
Duty Cycle	>50% (Max)
Temperature Range (Operating)	-30 ~ 50

### 1.5. Table for Carrier Frequencies

#### FRS

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	462.5625 MHz	5	462.6625 MHz	9	467.5875 MHz	13	467.6875 MHz
2	462.5875 MHz	6	462.6875 MHz	10	467.6125 MHz	14	467.7125 MHz
3	462.6125 MHz	7	462.7125 MHz	11	467.6375 MHz		
4	462.6375 MHz	8	467.5625 MHz	12	467.6625 MHz		

#### GMRS

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	462.5500 MHz	2	462.5750 MHz	3	462.6000 MHz	4	462.6250 MHz
5	462.6500 MHz	6	462.6750 MHz	7	462.7000 MHz	8	462.7250 MHz



**FCC ID: SDOFRSRD018**  
Issued on Aug. 31, 2004

Report No.: F472806

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#### 1.6. Type of Emission

##### ***FRS and GMRS***

$$Bn = 2M + 2DK$$

$$M = 3000$$

$$D = 2400$$

$$Bn = 2(3000) + 2(2400) = 10800$$

10K80F3E



## 2. Test Configuration of the Equipment under Test

### 2.1. Description of the Test

- a. During testing, the equipment was placed on a non-conducting support.
- b. The following test modes were performed:
  - Mode 1: CH 01 (462.5625MHz)-FRS
  - Mode 2: CH 15 (462.5500MHz)-GMRS.
- c. The EUT has been programmed to continuously transmit or receive during testing. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2001.
- d. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- e. 3 meters measurement distance of semi-fully chamber and fully chamber was used in this test.

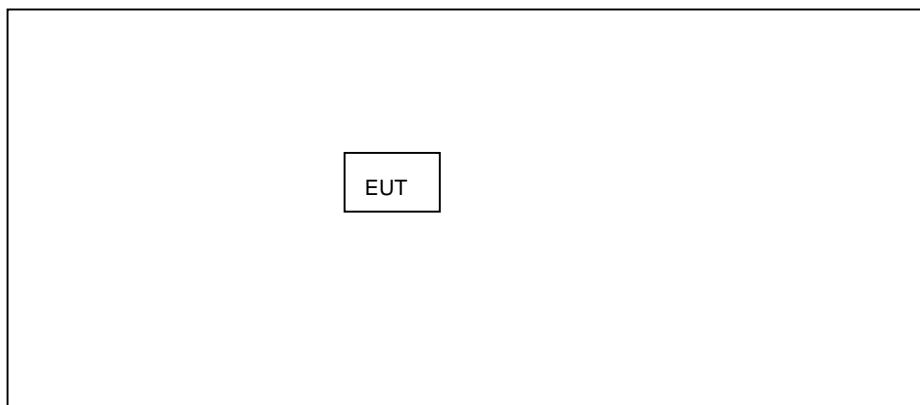
### 2.2. Frequency Range Investigated

- a. Conducted power line test: from 150 kHz to 30 MHz
- b. Radiated emission test: from 30 MHz to 10<sup>th</sup> harmonic of the highest operating frequency or 40GHz, whichever is lower

### 2.3. Description of Test Supporting Units

During the test, no supporting unit is required.

### 2.4. Connection Diagram of Test System



### 2.5. Test Software

No test software is required.



### 3. Test Location and Standards

#### 3.1. Test Location

**Test Site Location** : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,  
Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.  
TEL : 886-3-327-3456  
FAX : 886-3-318-0055

**Test Site No** : 03CH03-HY

#### 3.2. Test Conditions

Normal Voltage : 3.7VDC from battery  
Extreme Voltage : NA  
Normal Temperature : 20  
Extreme Temperature : -30 and 50

#### 3.3. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

**ANSI C63.4-2001**

**TIA/EIA-603-A**

**47 CFR Part 95**

#### 3.4. DoC Statement

This EUT is also able to act as a receiver. So, Class B of DoC has to be followed. It has been verified according to the rule of 47 CFR part 15 Subpart B, and found that all the requirements has been fulfilled.



## 4. List of Measurements

### 4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 95 and Part 2			
Paragraph	FCC Rule	Description of Test	Result
5.1	2.1047(a)(b)	Modulation Characteristics	Pass
5.2	2.1055 / 95.627 / 95.621	Frequency Stability	Pass
5.3	2.1046 / 95.639	RF Power Output	Pass
5.4	2.1049 / 95.635	Occupied Bandwidth	Pass
5.5	2.1053 / 95.635	Radiated Spurious Emission	Pass
5.6	2.1053 / 95.635	Conducted Spurious Emission	Pass

## 5. Test Result

### 5.1. Test of Modulation Characteristics

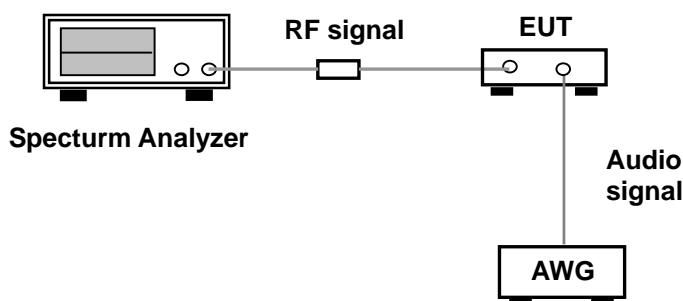
#### 5.1.1. Measuring Instruments

Item 20 of the table on section 6.

#### 5.1.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer, which has FM demodulation and deviation measurement function, through an attenuator.
2. According to the TIA-603, 95.637(a) and 95.637(b) requirement and test procedure measure the audio frequency response, modulating limiting and audio frequency low pass filtering.
3. The audio frequency response was measured in accordance with TIA/EIA Specification 603.
4. The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are curves are provided for audio input frequencies of 300, 500, 1000 and 3000 Hz.
5. The Audio Frequency Response testing is the output audio strength of frequency range 0.1 ~ 5 kHz relative to that of 1 kHz tone.
6. The Modulating Limiting is the deviation of demodulated audio signal v.s. the strength of input audio.
7. The Audio Frequency Low Pass Filtering is the strength of demodulated audio signal v.s. the input audio frequency. .

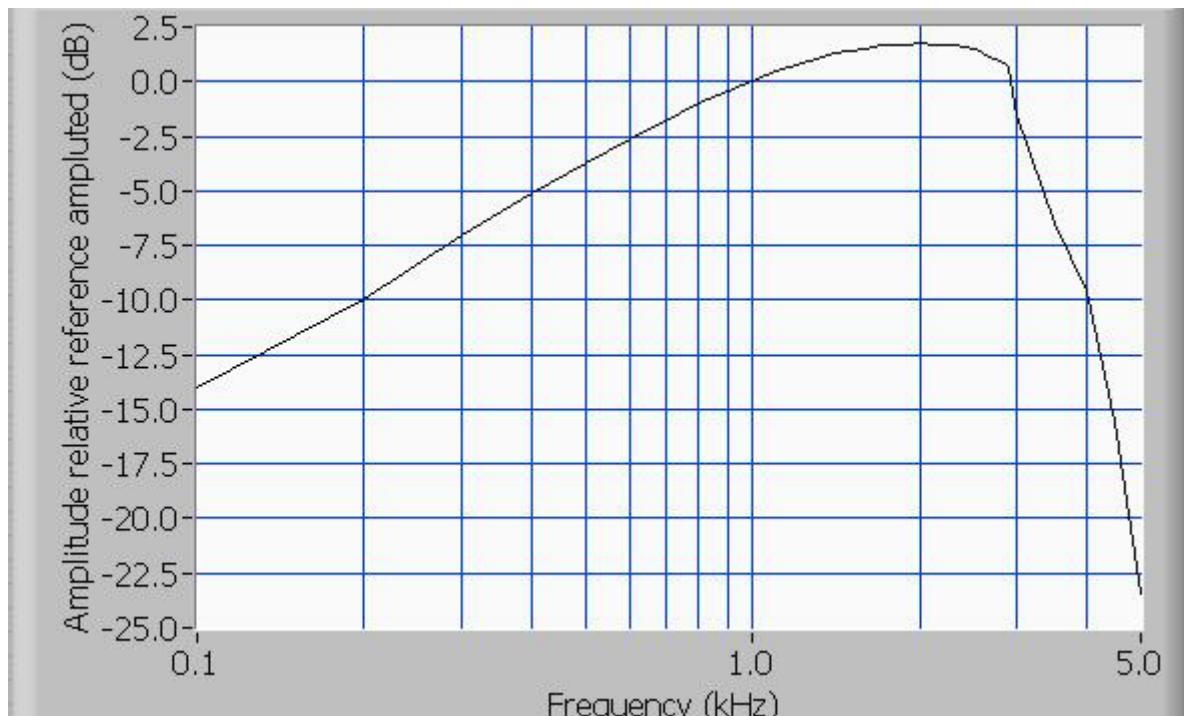
#### 5.1.3. Test Setup Layout





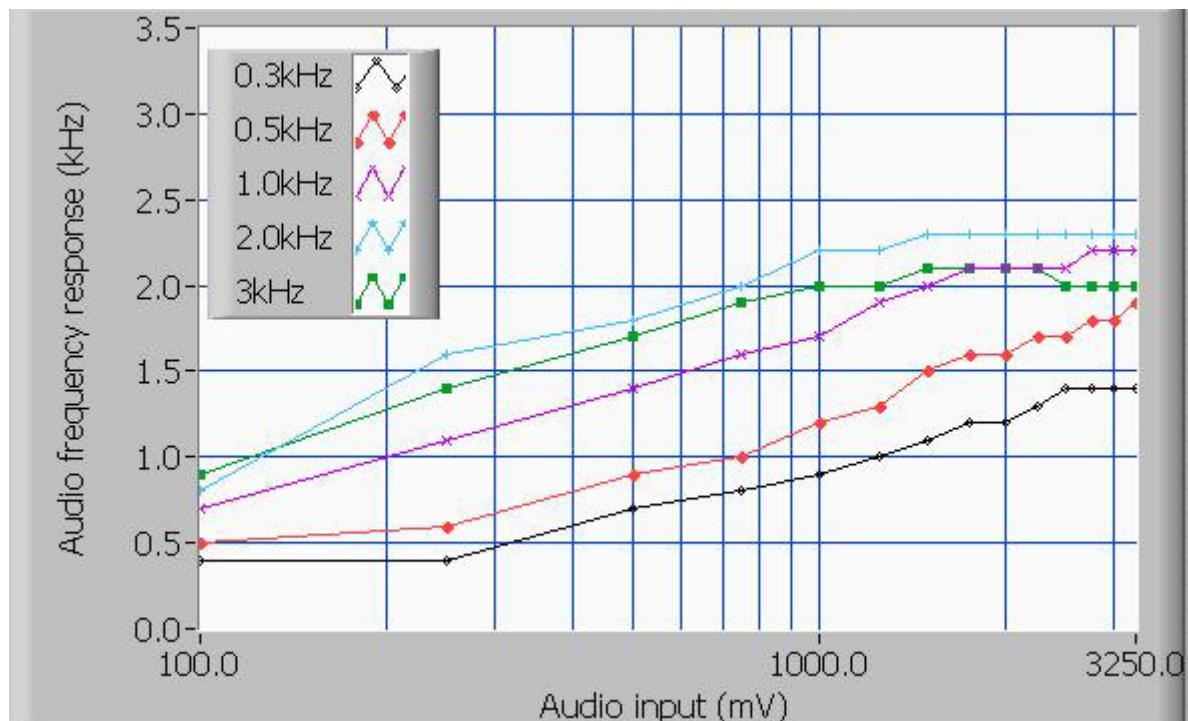
#### 5.1.4. Test Result for Audio Frequency Response

- Modulation Type: FM
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test : 100%



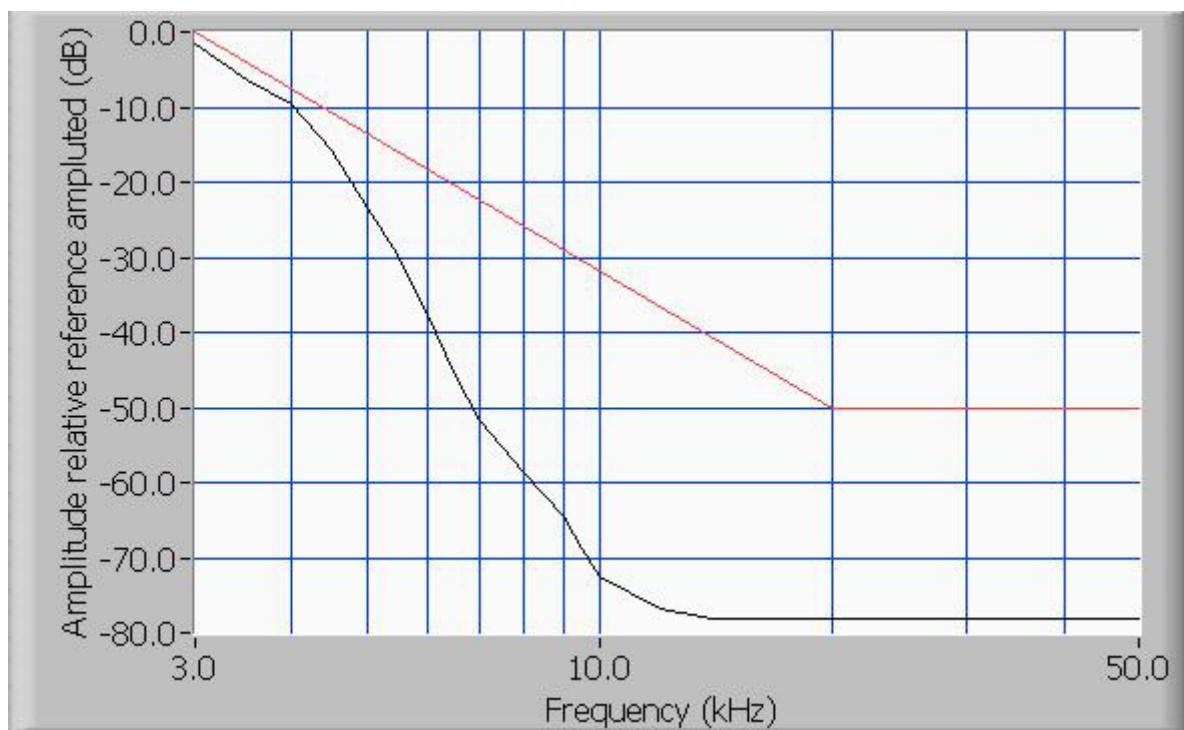
### 5.1.5. Test Result for Modulating Limiting

- Modulation Type: FM
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test : 100%



### 5.1.6. Audio Frequency Low Pass Filtering

- Modulation Type: FM
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test : 100%



## 5.2. Test of Frequency Stability

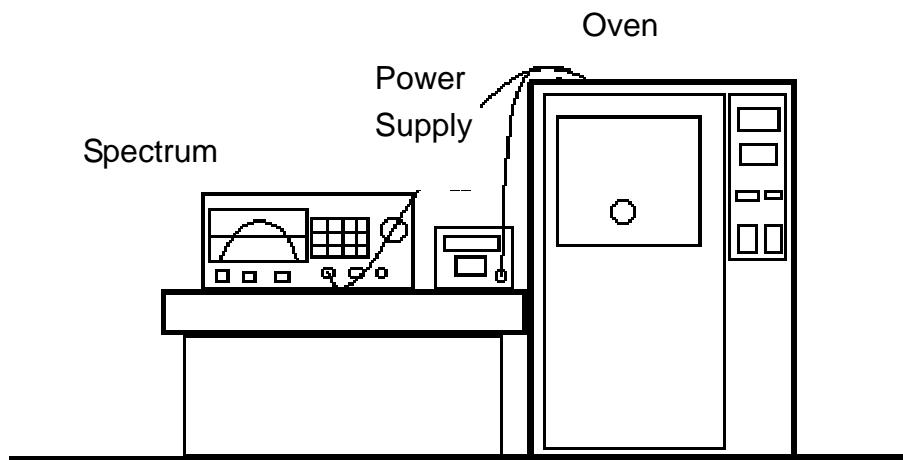
### 5.2.1. Measuring Instruments

Item 9 of the table on section 6.

### 5.2.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1kHz and VBW to 1kHz.
3. Use peak detector mode, Max-hold and search the peak of trace 1.
4. According to the part 2.1055(d)(1), the supply voltage has to be changed from 85 to 115 percent of the nominal value.
5. According to the part 2.1055(a)(1), extreme temperature has to be changed from -30 to 50 .
6. Read the frequency of the carrier and calculate the deviation.

### 5.2.3. Test Setup Layout





#### 5.2.4. Test Result

- Modulation Type: Un-Modulated Carrier (CW)
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test: 100%

Frequency (MHz)	Deviation (MHz)	Frequency Error ppm	Limits ppm	Temperature
462.5629	0.0004	0.86	2.5	-30
462.5628	0.0003	0.65	2.5	-20
462.5631	0.0006	1.30	2.5	-10
462.5629	0.0004	0.86	2.5	0
462.5630	0.0005	1.08	2.5	10
462.5620	-0.0005	-1.08	2.5	30
462.5623	-0.0002	-0.43	2.5	40
462.5621	-0.0004	-0.86	2.5	50

Frequency (MHz)	Deviation (MHz)	Frequency Error ppm	Limits ppm	Voltage V
462.5626	0.00010	0.2162	2.5	4.255
462.5629	0.00040	0.8647	2.5	3.700
462.5628	0.00030	0.6486	2.5	3.145



FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

Frequency (MHZ)	Deviation (MHz)	Frequency Error ppm	Limits ppm	Temperature
462.5507	0.0007	1.51	5.0	-30
462.5511	0.0011	2.38	5.0	-20
462.5513	0.0013	2.81	5.0	-10
462.5509	0.0009	1.95	5.0	0
462.5512	0.0012	2.59	5.0	10
462.5494	-0.0006	-1.30	5.0	30
462.5492	-0.0008	-1.73	5.0	40
462.5489	-0.0011	-2.38	5.0	50

Frequency (MHZ)	Deviation (MHz)	Frequency Error ppm	Limits ppm	Voltage V
462.5506	0.00060	1.2972	5.0	4.255
462.5501	0.00010	0.2462	5.0	3.700
462.5503	0.00030	0.6486	5.0	3.145



### 5.3. Test of RF Power Output

#### 5.3.1. Measuring Instruments

Item 20 of the table on section 6.

#### 5.3.2. Test Procedures

##### Conducted Test

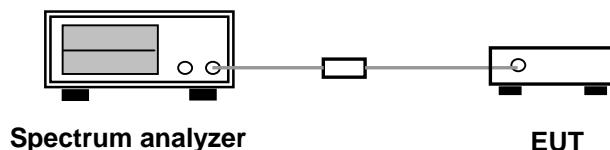
1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum
4. Set the span to 5MHz and the sweep time to Auto.

##### Radiated Test

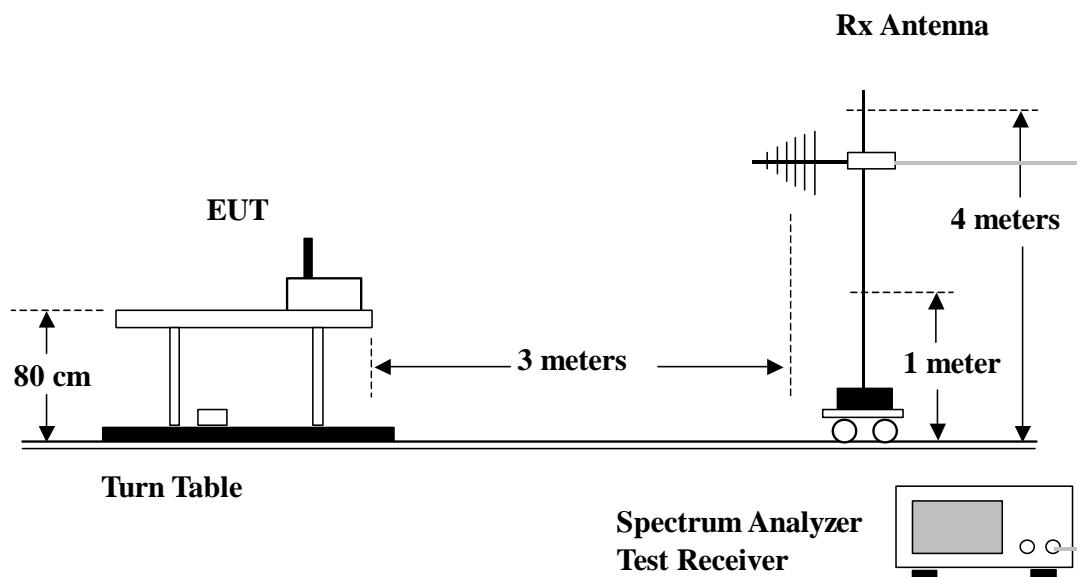
1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. Record the maximum value
7. Remove the transmitter and replace it with a broadband substitution antenna.
8. With the substitution antennas at maximum polarized and with the signal generator tuned to a particular fundamental frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading (item 6) . This should be done carefully repeating the adjustment of the test antenna and generator output.
9.  $P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ .  $P_d$  is the dipole equivalent power and  $P_g$  is the generator output power into the substitution antenna.
10.  $\text{ERP} = \text{Conducted Output Power} + \text{Antenna Gain} - 2.14\text{dB}$

### 5.3.3. Test Setup Layout

#### Conducted Test



#### Radiated Test





#### 5.3.4. Test Result

- Modulation Type: FM
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test : 100%

Channel	Frequency	Conducted Output Power	ERP Output Power	Limits
	(MHz)	(dBm)	(dBm)	(dBm)
01	462.6525	21.10	11.03	27
15	462.5500	21.00	10.58	47



## 5.4. Test of Occupied Bandwidth

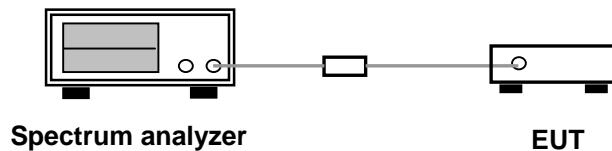
### 5.4.1. Measuring Instruments

Item 9 of the table on section 6.

### 5.4.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 300Hz and VBW to 100kHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum
4. Set the span to 80kHz and the sweep time to Auto.
5. Record the power spectral and compare to the Mask.

### 5.4.3. Test Setup Layout



### 5.4.4. Test Result : See spectrum analyzer plots below

- Modulation Type: FM
- Temperature: 25°C
- Relative Humidity: 62 %
- Duty cycle of the equipment during the test: 100%

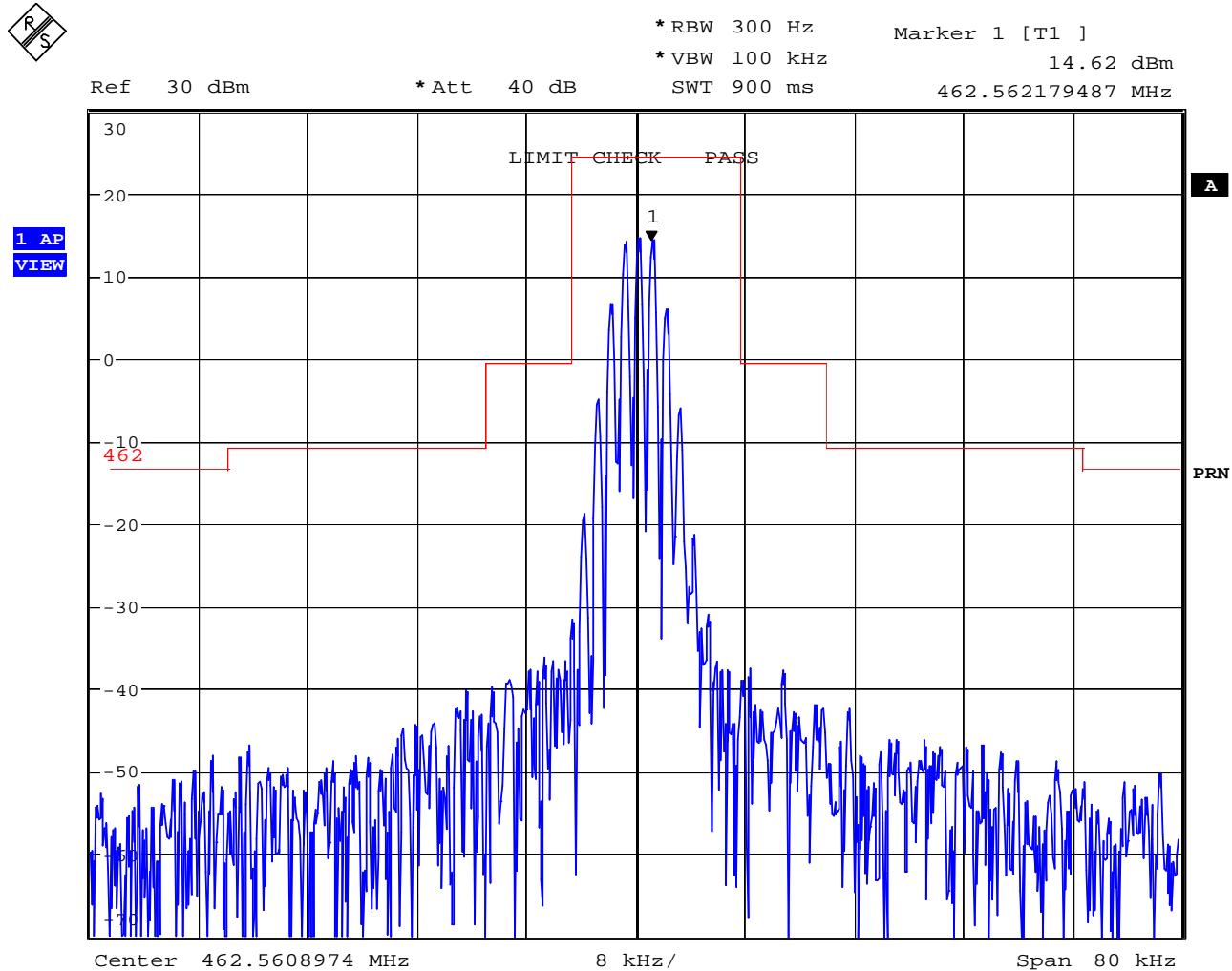
Channel	Frequency (MHz)	Result
01	462.5625	Pass
15	462.5500	Pass



FCC ID: SDOFRSRD018  
Issued on Aug. 31, 2004

Report No.: F472806

FM (Channel 01) :



Date: 13.AUG.2004 20:25:30

**Sportun International Inc.**

TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

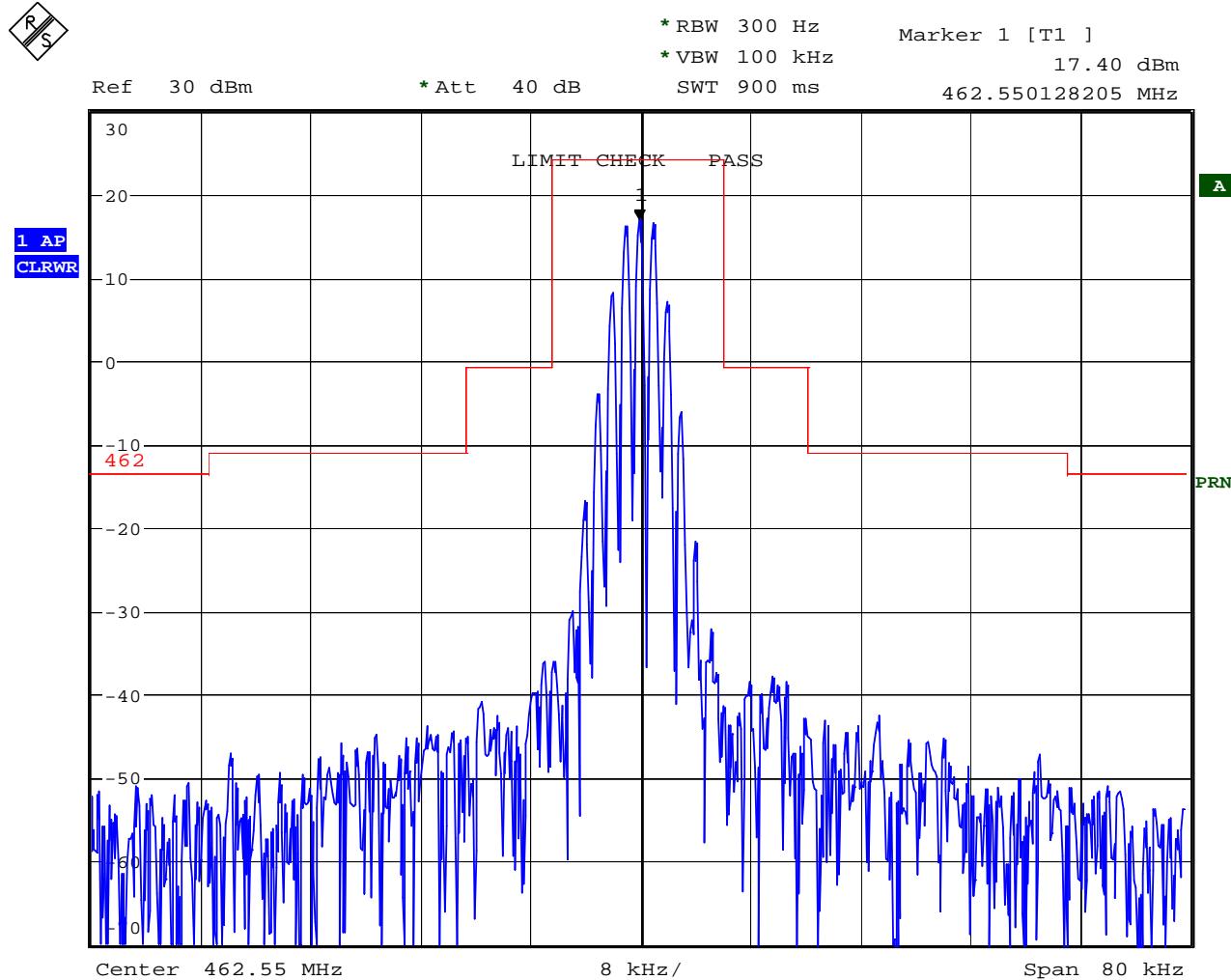
Page No. : 18 of 39  
Issued Date : Aug. 31, 2004



FCC ID: SDOFRSRD018  
Issued on Aug. 31, 2004

Report No.: F472806

FM (Channel 15) :



Date: 13.AUG.2004 20:41:46

**Sportun International Inc.**

TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

Page No. : 19 of 39  
Issued Date : Aug. 31, 2004



## 5.5. Test of Radiated Spurious Emission

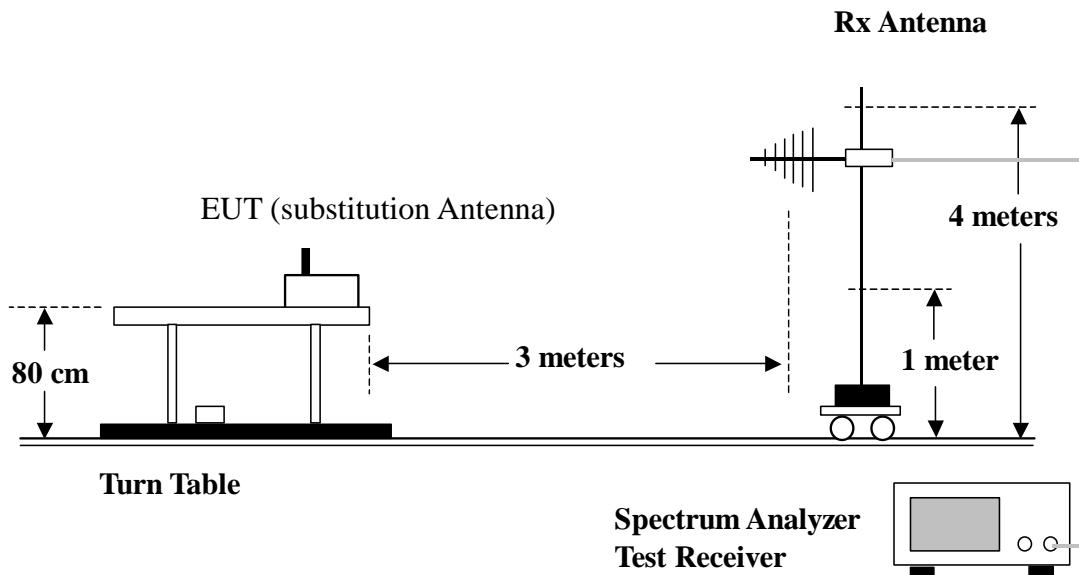
### 5.5.1. Measuring Instruments

Please reference item 8~19 in chapter 6 for the instruments used for testing.

### 5.5.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz and 1 MHz for spurious emissions above 1GHz.
  - 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
  - 3) Sweep Speed slow enough to maintain measurement calibration.
  - 4) Detector Mode = Positive Peak.
9. Remove the transmitter and replace it with a broadband substitution antenna.
10. With the substitution antennas at horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading (item 7) . This should be done carefully repeating the adjustment of the test antenna and generator output.
11.  $P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ .  $P_d$  is the dipole equivalent power and  $P_g$  is the generator output power into the substitution antenna.
12. Radiated spurious emissions in dB =  $43 + 10 \log_{10}$  (power out in Watts) or an equivalent absolute level of -13 dBm
13. or Radiated spurious emissions (dB) =  $10 \log_{10}(\text{Tx power mW}) - P_d < [43 + 10 \log_{10} (\text{power out in Watts})]$

### 5.5.3. Test Setup Layout





FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

#### 5.5.4. Test Results and Limit

##### Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	Mode 1	Temperature	29.6 deg. C	Tested By	Steve Chen
Freq. Range	Below 1GHz	Humidity	52%		

##### (A) X axis :

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.120	H	-44.4	-13.0	-31.4
925.120	V	-47.4	-13.0	-34.4
Measurement uncertainty		6dB		

##### (B) Y axis :

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.120	H	-48.0	-13.0	-35.0
925.120	V	-43.2	-13.0	-30.2
Measurement uncertainty		6dB		

##### (B) Z axis :

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.120	H	-46.9	-13.0	-33.9
925.120	V	-42.6	-13.0	-29.6
Measurement uncertainty		6dB		



FCC ID: SDOFRSRD018  
Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 2	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	Below 1GHz	<b>Humidity</b>	52%		

**(A) X axis :**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.090	H	-44.5	-13.0	-31.5
925.100	V	-43.9	-13.0	-30.9
Measurement uncertainty	6dB			

**(B) Y axis :**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.100	H	-48.4	-13.0	-35.4
925.100	V	-40.9	-13.0	-27.9
Measurement uncertainty	6dB			

**(B) Z axis :**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
925.100	H	-45.6	-13.0	-32.6
925.090	V	-42.6	-13.0	-29.6
Measurement uncertainty	6dB			



FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 1 (X axis)	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	1GHz~5GHz	<b>Humidity</b>	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-53.6	-13.0	-40.6
1852.000	H	-46.4	-13.0	-33.4
2310.000	H	-49.1	-13.0	-36.1
2774.000	H	-51.4	-13.0	-38.4
3236.000	H	-45.5	-13.0	-32.5
3700.000	H	-46.7	-13.0	-33.7
4164.000	H	-44.9	-13.0	-31.9
4628.000	H	-39.3	-13.0	-26.3
Measurement uncertainty	6dB			

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-52.9	-13.0	-39.9
1852.000	V	-45.9	-13.0	-32.9
2310.000	V	-40.9	-13.0	-27.9
2774.000	V	-52.3	-13.0	-39.3
3236.000	V	-49.9	-13.0	-36.9
3700.000	V	-47.6	-13.0	-34.6
4164.000	V	-44.1	-13.0	-31.1
4628.000	V	-59.6	-13.0	-46.6
Measurement uncertainty	6dB			



FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 1 (Y axis)	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	1GHz~5GHz	<b>Humidity</b>	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-51.9	-13.0	-38.9
1852.000	H	-46.5	-13.0	-33.5
2310.000	H	-42.9	-13.0	-29.9
2774.000	H	-49.0	-13.0	-36.0
3236.000	H	-46.2	-13.0	-33.2
3700.000	H	-45.6	-13.0	-32.6
4164.000	H	-42.3	-13.0	-29.3
4628.000	H	-42.2	-13.0	-29.2
Measurement uncertainty	6dB			

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-53.2	-13.0	-40.2
1852.000	V	-46.5	-13.0	-33.5
2310.000	V	-53.8	-13.0	-40.8
2774.000	V	-52.5	-13.0	-39.5
3236.000	V	-49.4	-13.0	-36.4
3700.000	V	-51.5	-13.0	-38.5
4164.000	V	-45.4	-13.0	-32.4
4628.000	V	-43.8	-13.0	-30.8
Measurement uncertainty	6dB			



FCC ID: SDOFRSRD018

Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 1 (Z axis)	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	1GHz~5GHz	<b>Humidity</b>	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-52.6	-13.0	-39.6
1852.000	H	-48.5	-13.0	-35.5
2310.000	H	-46.5	-13.0	-33.5
2774.000	H	-51.3	-13.0	-38.3
3236.000	H	-49.0	-13.0	-36.0
3700.000	H	-53.5	-13.0	-40.5
4164.000	H	-44.9	-13.0	-31.9
4628.000	H	-43.0	-13.0	-30.0
Measurement uncertainty	6dB			

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-53.7	-13.0	-40.7
1852.000	V	-51.8	-13.0	-38.8
2310.000	V	-50.3	-13.0	-37.3
2774.000	V	-52.7	-13.0	-39.7
3236.000	V	-49.7	-13.0	-36.7
3700.000	V	-47.9	-13.0	-34.9
4164.000	V	-46.2	-13.0	-33.2
4628.000	V	-43.7	-13.0	-30.7
Measurement uncertainty	6dB			



FCC ID: SDOFRSRD018  
Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 2 (X axis)	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	1GHz~5GHz	<b>Humidity</b>	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-53.8	-13.0	-40.8
1852.000	H	-46.4	-13.0	-33.4
2310.000	H	-48.8	-13.0	-35.8
2774.000	H	-50.4	-13.0	-37.4
3236.000	H	-48.1	-13.0	-35.1
3700.000	H	-46.8	-13.0	-33.8
4164.000	H	-45.5	-13.0	-32.5
4628.000	H	-39.9	-13.0	-26.9
Measurement uncertainty	6dB			

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-53.7	-13.0	-40.7
1852.000	V	-47.4	-13.0	-34.4
2310.000	V	-42.8	-13.0	-29.8
2774.000	V	-56.0	-13.0	-43.0
3236.000	V	-50.9	-13.0	-37.9
3700.000	V	-49.2	-13.0	-36.2
4164.000	V	-45.5	-13.0	-32.5
4628.000	V	-42.2	-13.0	-29.2
Measurement uncertainty	6dB			



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Issued on Aug. 31, 2004

Report No.: F472806

<b>Test Mode</b>	Mode 2 (Y axis)	<b>Temperature</b>	29.6 deg. C	<b>Tested By</b>	Steve Chen
<b>Freq. Range</b>	1GHz~5GHz	<b>Humidity</b>	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-55.8	-13.0	-42.8
1852.000	H	-48.4	-13.0	-35.4
2310.000	H	-44.8	-13.0	-31.8
2774.000	H	-47.9	-13.0	-34.9
3236.000	H	-48.3	-13.0	-35.3
3700.000	H	-45.7	-13.0	-32.7
4164.000	H	-43.1	-13.0	-30.1
4628.000	H	-42.8	-13.0	-29.8
Measurement uncertainty	6dB			

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-54.8	-13.0	-41.8
1852.000	V	-47.1	-13.0	-34.1
2310.000	V	-53.2	-13.0	-40.2
2774.000	V	-52.5	-13.0	-39.5
3236.000	V	-50.5	-13.0	-37.5
3700.000	V	-52.5	-13.0	-39.5
4164.000	V	-45.6	-13.0	-32.6
4628.000	V	-44.6	-13.0	-31.6
Measurement uncertainty	6dB			



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Issued on Aug. 31, 2004

Report No.: F472806

Test Mode	Mode 2 (Z axis)	Temperature	29.6 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~5GHz	Humidity	52%		

**(A) Polarization: Horizontal**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	H	-58.0	-13.0	-45.0
1852.000	H	-49.5	-13.0	-36.5
2310.000	H	-46.2	-13.0	-33.2
2774.000	H	-49.5	-13.0	-36.5
3236.000	H	-51.5	-13.0	-38.5
3700.000	H	-48.3	-13.0	-35.3
4164.000	H	-47.4	-13.0	-34.4
4628.000	H	-45.1	-13.0	-32.1
Measurement uncertainty		6dB		

**(B) Polarization: Vertical**

Frequency (MHz)	Antenna Polarization	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)
1388.000	V	-61.5	-13.0	-48.5
1852.000	V	-54.4	-13.0	-41.4
2310.000	V	-46.7	-13.0	-33.7
2774.000	V	-46.3	-13.0	-33.3
3236.000	V	-53.2	-13.0	-40.2
3700.000	V	-44.4	-13.0	-31.4
4164.000	V	-47.8	-13.0	-34.8
4628.000	V	-41.5	-13.0	-28.5
Measurement uncertainty		6dB		



**FCC ID: SDOFRSRD018**  
Issued on Aug. 31, 2004

Report No.: F472806

#### 5.5.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

**X axis**

FRONT VIEW



REAR VIEW





**FCC ID: SDOFRSRD018**  
Issued on Aug. 31, 2004

Report No.: F472806

**Y axis**

FRONT VIEW



REAR VIEW





**FCC ID: SDOFRSRD018**  
Issued on Aug. 31, 2004

Report No.: F472806

**Z axis**

FRONT VIEW



REAR VIEW



---

***SPORTON International Inc.***

TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

Page No. : 32 of 39  
Issued Date : Aug. 31, 2004



## 5.6. Test of Spurious Conducted Emission

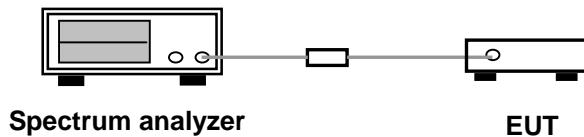
### 5.6.1. Measuring Instruments

Please reference item 9 in chapter 6 for the instruments used for testing.

### 5.6.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator
2. Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
  - 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
  - 3) Sweep Speed slow enough to maintain measurement calibration.
  - 4) Detector Mode = Positive Peak.
3. Limits = -13dBm

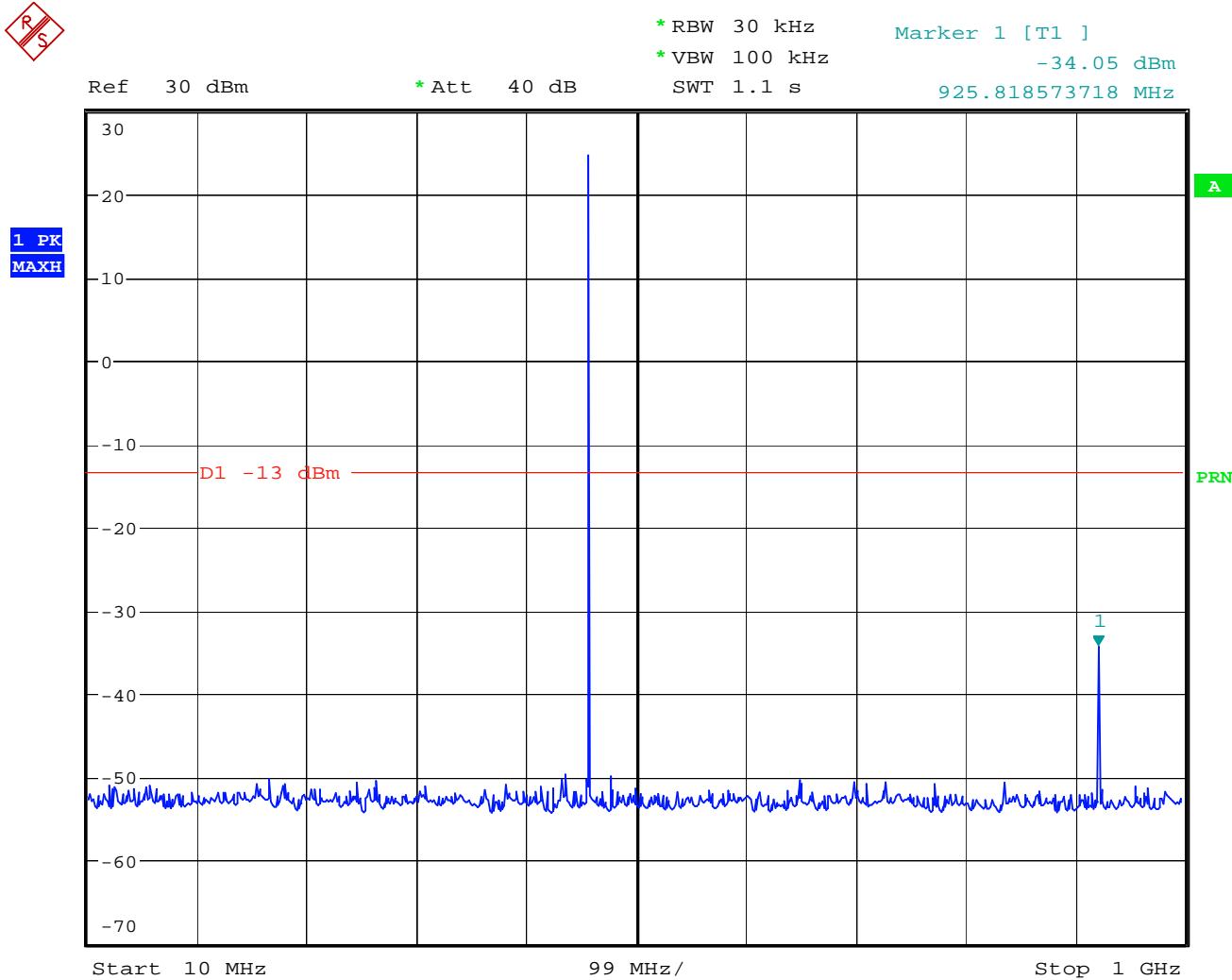
### 5.6.3. Test Setup Layout





#### 5.6.4. Test Results and Limit

CH 01 (Below 1GHz)



Date: 13.AUG.2004 20:07:46

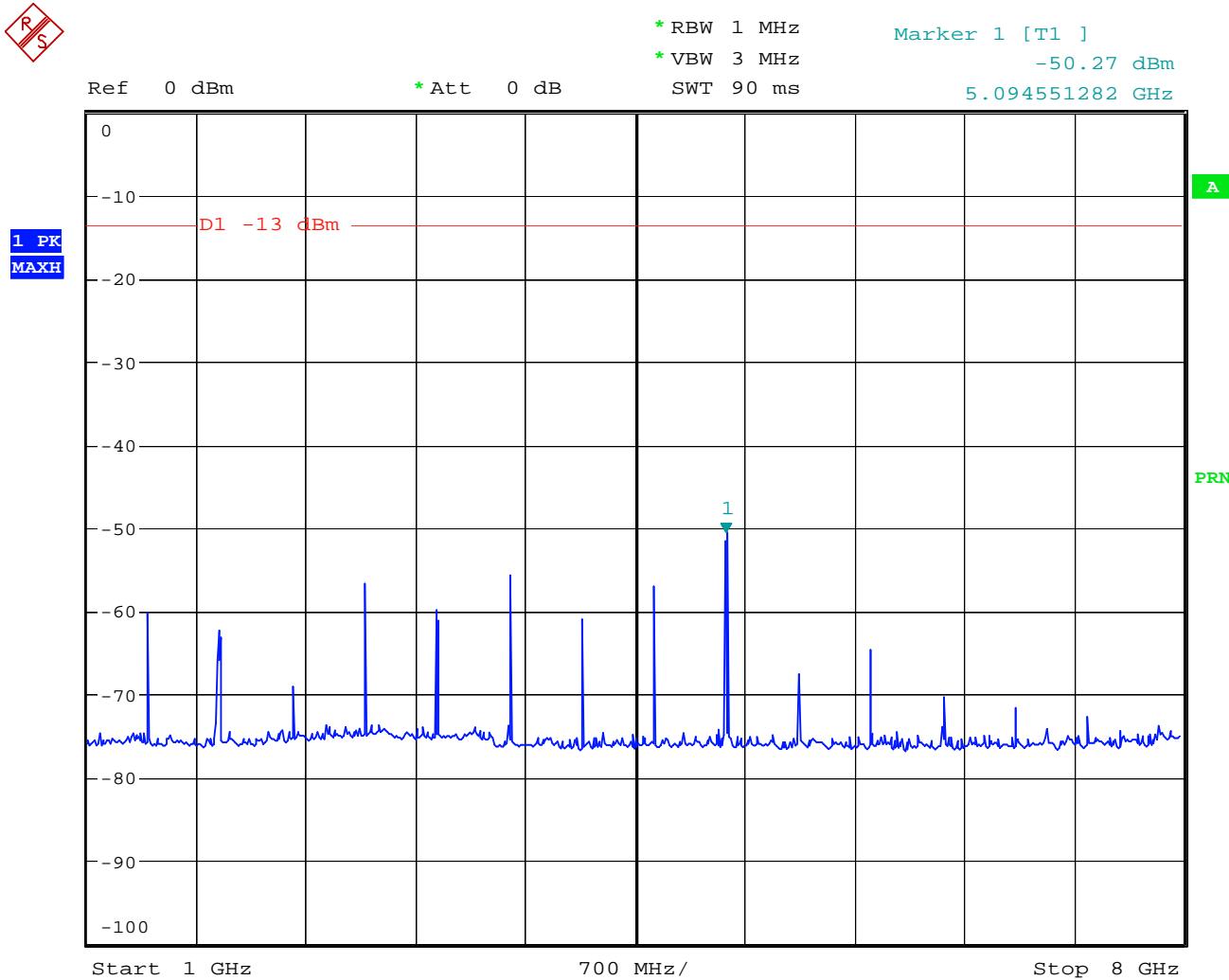
Remark: The peak one is the carrier frequency.



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Report No.: F472806

CH 01 (Above 1GHz)



Date: 13.AUG.2004 20:10:44

**Sportun International Inc.**

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FAX : 886-2-2696-2255

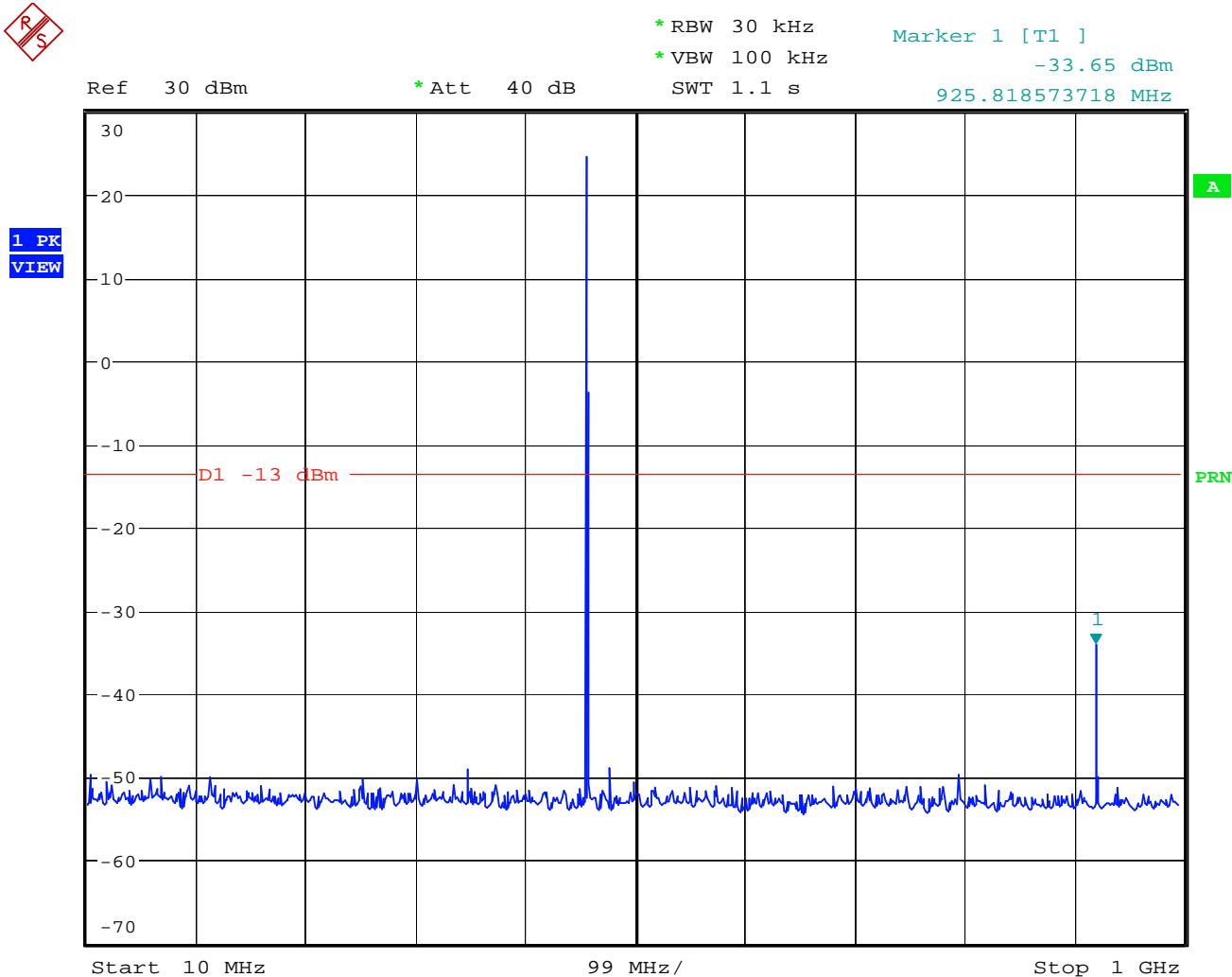
Page No. : 35 of 39  
Issued Date : Aug. 31, 2004



FCC ID: SDOFRSRD018  
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Report No.: F472806

CH 15 (Below 1GHz)



Date: 13.AUG.2004 20:06:47

Remark: The peak one is the carrier frequency.

**Sportun International Inc.**

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FAX : 886-2-2696-2255

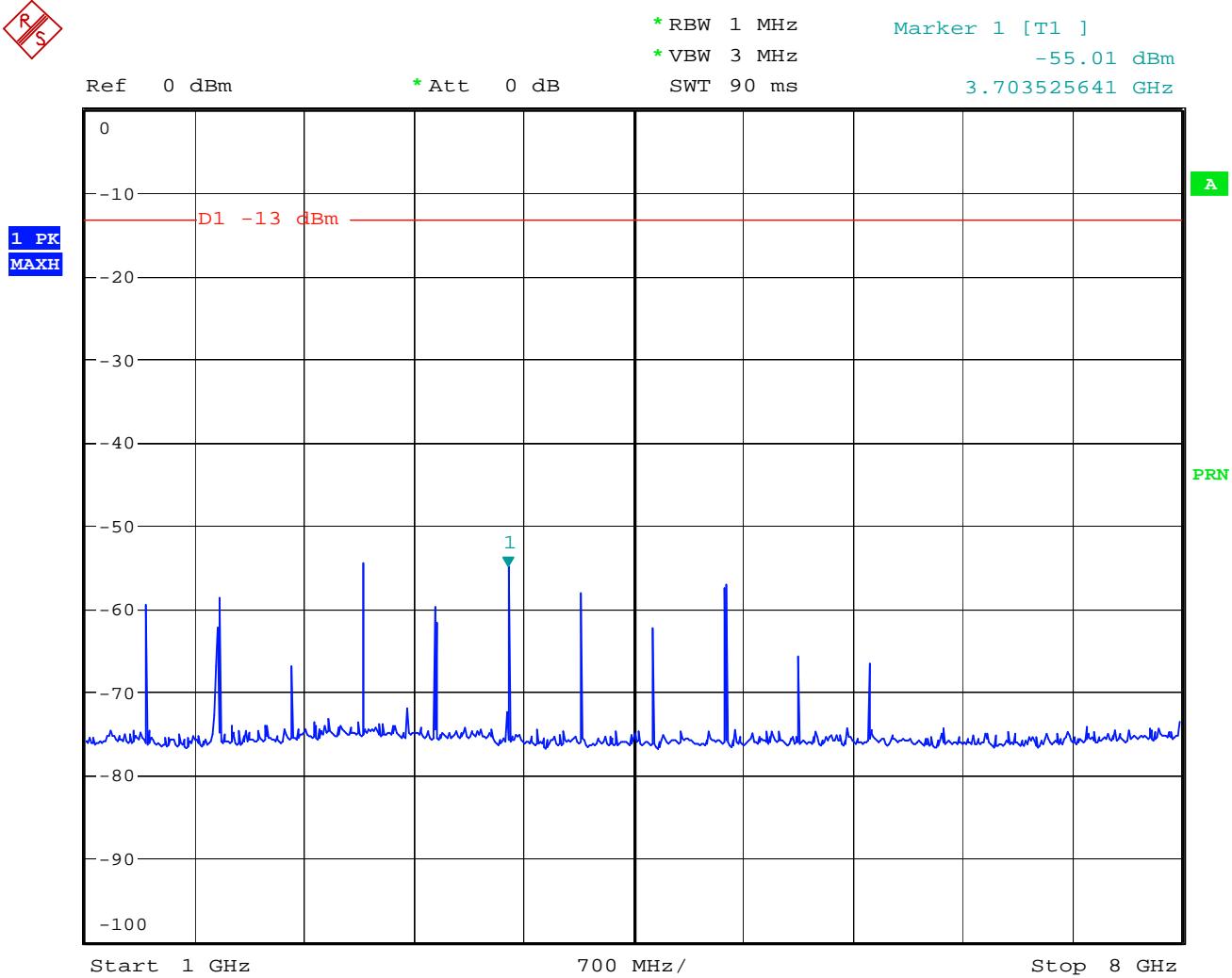
Page No. : 36 of 39  
Issued Date : Aug. 31, 2004



FCC ID: SDOFRSRD018  
Issued on Aug. 31, 2004

Report No.: F472806

CH 15 (Above 1GHz)



Date: 13.AUG.2004 20:12:20

Remark: According to FCC 2.1051, there is no need to keep record for emission with power strength lower than limit by more than 20dB. The limit of conducted spurious emission is -13dBm.

**Sportun International Inc.**

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Page No. : 37 of 39  
Issued Date : Aug. 31, 2004



## 6. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 28, 2004	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 28, 2004	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	849984	100MHz~26.5GHz	Mar. 26, 2004	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

Calibration Interval of instruments listed above is one year.



**FCC ID: SDOFRSRD018**

Issued on Aug. 31, 2004

Report No.: F472806

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSP7	838858/014	9KHZ~7GHZ	Sep. 03, 2003	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	Jun. 15, 2004	Conducted (TH01-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	Jun. 16, 2004	Conducted (TH01-HY)
AC power source	G.W.	GPC-6030D	C671845	DC 1V~60V	Nov. 06, 2003	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2003	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2004	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2004	Conducted (TH01-HY)

Calibration Interval of instruments listed above is one year.