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FCC RADIO TEST REPORT

Applicant's company	**Everspring Industry Co., Ltd.**
Applicant Address	7F, No. 609 Wan Shou Road Sec. 1, Kweishan, Taoyuan Hsien 333, Taiwan, R.O.C.
FCC ID	**FU5SM101**
Manufacturer's company	**Everspring Industry Co., Ltd.**
Manufacturer Address	7F, No. 609 Wan Shou Road Sec. 1, Kweishan, Taoyuan Hsien 333, Taiwan, R.O.C.

Product Name	Simple wireless alarm system
Brand Name	EVERSPRING
Model Name	SM101
Test Freq. Range	**315MHz**
Test Rule Part(s)	**47 CFR FCC Part 15 Subpart C**
Receive Date	June 30, 2005
Test Date	Aug. 18, 2005
File Type	New Applicant
Multiple Listing	NA

Statement

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.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Wayne Hsu / Supervisor
Sporton International Inc.

Lab Code: 200079-0

Table of Contents

History of This Test Report

Original Issue Date: Aug. 24, 2005

Report No.: FR563004

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. INTRODUCTION

The EUT is a pair of media player with wireless solution. Only the test results for transmitter portion are shown in this test report.

Test results and procedures were in compliance and were performed in accordance with Federal Communications Commission (FCC) 47 CFR FCC Part 15 Subpart C standards/regulations:

Sections/Parts	Description
Section 15.203	Antenna Requirements
Section 15.204	External RF Power Amplifiers and Antenna Modifications
Section 15.205	Restricted Bands of Operation
Section 15.207	AC Power Line Conducted Emissions
Section 15.209	Radiated Emissions (General Requirements)
Section 15.215	General Radiated Emissions Limitation
Section 15.231	Periodic Operation Intentional Radiators
Section 15.231(c)	20dB Spectrum Bandwidth
Section 15.231(b)/(e)	Field Strength of Fundamental EmissionS
Section 15.231(b)/(e)	Out of Band Emissions
Section 15.231(a)/(e)	Dwell Time of Periodic Operation

2. GENERAL INFORMATION

2.1. Product Details

Items	Description
Product Type	Simple wireless alarm system
Radio Type	Intentional Transmitter
Power Type	TX-Battery
Interface Type	TX-None

2.2. Accessories

Adaptor	
AC Adaptor Brand	Without AC Adapter (Not Applicable)
AC Adapter Model	Without AC Adapter (Not Applicable)

2.3. Antenna Information

Ant.	Antenna Type	Connector	Gain (dBi)
1	Helical Antenna	No Connector	-

2.4. Technical Specifications

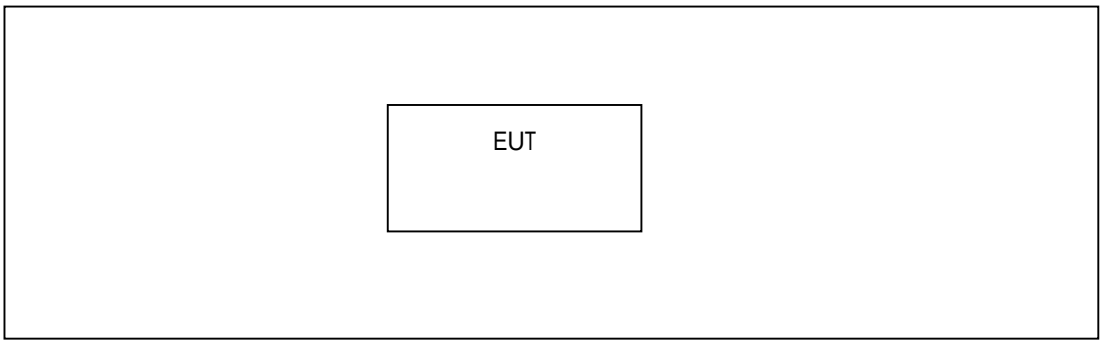
Items	Description
Modulation Type	ASK
Frequency Range	315MHz
Number of Channels	1
Max. Field Strength	70.74dBuV/m at 3m (Average)
Channel Space	Not-applicable
Power Supply	TX - 3.0 Vdc from battery

Frequency Allocation

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
315MHz	1	315MHz	-	-

2.5. Test Configuration

Radiation Emissions Test Configuration



2.6. Support Equipment

Radiation Emissions Test Configuration

There is no supporting equipment for the test.

2.7. Test Software

During testing, there is not any test software to support contiuous transmission (CTX). CTX is controlled by hardware.

2.8. Test Procedure

Emissions measurements were performed in accordance with the procedures of ANSI C63.4-2003, Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz .

3. GENERAL INFORMATION OF FACILITY

3.1. Test Location

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 7 for Test Site Address.

3.2. Test Equipment Calibration

All measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent CNLA registered laboratory such as Electronics Testing Center, Taiwan (ETC) or the National Measurement Laboratory (NML). All equipment calibration is traceable to Chinese national standards at the National Measurements Laboratory. The reference antenna calibration was performed by NML and the working antennas (biconical, log-periodic and horn) was calibrated by the CNLA approved procedures. The complete list of test equipment used for the measurements, including calibration dates and traceability is contained in section 6 of this report.

4. SUMMARY OF THE TEST RESULTS

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Part	**Rule Section**	**Description of Test**	**Result**
-	15.207	AC Power Line Conducted Emissions	Not Applicable
5.1	15.231(b)/(e)	Field Strength of Fundamental EmissionS	Complies
5.2	15.209	Radiated Emissions (General Requirements)	Complies
5.2	15.231(b)/(e)	Out of Band Emissions	Complies
5.3	15.231(c)	20dB Spectrum Bandwidth	Complies
5.4	15.231(a)/(e)	Dwell Time of Periodic Operation	Complies
5.5	15.203	Antenna Requirements	Complies

Note:

The EUT is powered by battery. So AC power line conducted emissions was not implemented.

5. TEST RESULT

5.1. Field Strength of Fundamental Emissions Measurement

5.1.1. Applicable Standard

47 CFR FCC Part 15 Subpart C, section 15.231(b)/(e):

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(a). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Fundamental Emissions Limit (uV/m) at 3m
40.66-40.70	2250
70-130	1250
130-174	1250-3750(**)
174-260	3750
260-470	3750-12500(**)
Above 470	12500

**1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz, μV/m at 3 meters = 56.81818×(operating frequency, MHz) - 6136.3636;

(2) for the band 260 - 470 MHz, μV/m at 3 meters = 41.6667×(operating frequency, MHz) - 7083.3333.

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(e). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Fundamental Emissions Limit (uV/m) at 3m
40.66-40.70	1000
70-130	500
130-174	500-1500(**)
174-260	1500
260-470	1500-5000(**)
Above 470	5000

** 1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz, μV/m at 3 meters = 22.72727×(operating frequency, MHz) – 2454.545;

(2) for the band 260 - 470 MHz, μV/m at 3 meters = 16.6667×(operating frequency, MHz) – 2833.3333.

5.1.2. Measuring Instruments

Refer to section 6 in this report.

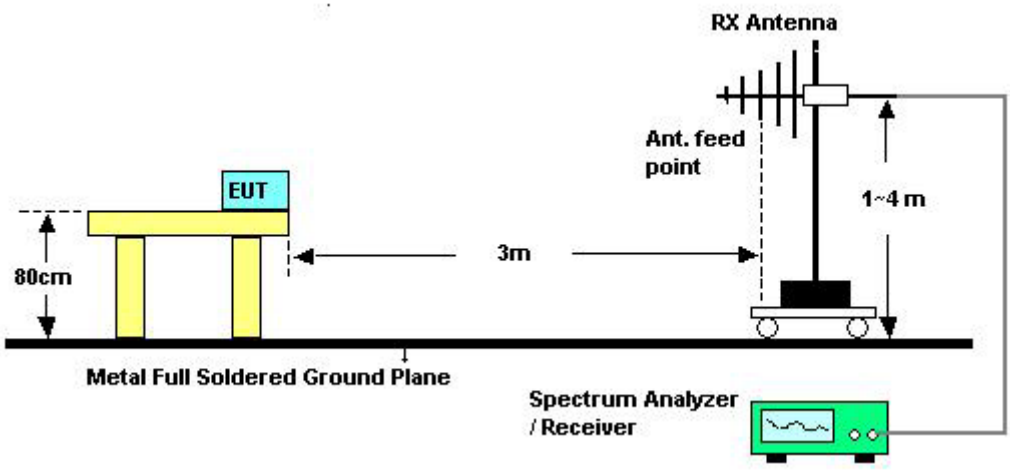
5.1.3. Major Test Instruments Setting

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RB	120 KHz
Detector	Peak / Average

5.1.4. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. Set the test-receiver system to Peak and Average Detect Function with specified bandwidth under Maximum Hold Mode.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

5.1.5. Test Setup Layout



5.1.6. Test Deviation

The measurement uncertainty is 2.54dB. Test methods have no deviation with original standard.

5.1.7. Test Mode(s)

EUT is CTX mode (Continuous Transmission). Measurements have been done on channel 1, 315MHz. X, Y and Z axes should be test, but only x axis, the worst case, was shown in the tets report.

5.1.8. Calculation of Voltage Levels

Measurements are reported in units of dB relative to one microvolt per metre (dBµV/m).

The field strength was calculated automatically by the software using all the pre-stored calibration data. The method of calculation is shown below:

E = V + AF - G + L Where:

E = Radiated Field Strength in dBµV/m.

V = EMI Receiver Voltage in dBµV. (measured value)

AF = Antenna Factor in dB(m^{-1}). (stored as a data array)

G = Preamplifier Gain in dB. (stored as a data array)

L = Cable insertion loss in dB. (stored as a data array of Insertion Loss versus frequency)

Level = Read Level + Factor.

Factor = AF - G + L.

When pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. So duty factor is show below:

duty factor = 20 x $\log_{10}$(duty cycle) = -6.9dB

Average value = Peak value + duty factor

The devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(a) or 15.231(e). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Carrier Frequency (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
315MHz	75.62 (Average)
315MHz	95.62 (Peak)

5.1.9. Test Result

Test Site	03CH03-HY
Temperature	20℃
Humidity	65%
Test Engineer	Ted Chiu

315MHz / Maximum Polarization : Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	315.020	87.64	-7.98	102.23	95.62	1.72	14.27	30.58	Peak	---	---
2 @	315.020	70.74	-4.88	85.33	75.62	1.72	14.27	30.58	Average	---	---

5.2. Radiated Emissions Measurement

5.2.1. Applicable Standard

47 CFR FCC Part 15 Subpart C, section 15.231(b)/(e):

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(a). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Spurious Emissions Limit (uV/m) at 3m
40.66-40.70	225
70-130	125
130-174	125-375(**)
174-260	375
260-470	375-1250(**)
Above 470	1250

**1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz, μV/m at 3 meters = 56.81818×(operating frequency, MHz) - 6136.3636;

(2) for the band 260 - 470 MHz, μV/m at 3 meters = 41.6667×(operating frequency, MHz) - 7083.3333.

(3)The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear outside of this band shall not exceed the general radiated emissions limits in Section 15.209.

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(e). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Frequency Band (MHz)	Spurious Emissions Limit (uV/m) at 3m
40.66-40.70	100
70-130	50
130-174	50-150(**)
174-260	150
260-470	150-500(**)
Above 470	500

** 1. Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130 - 174 MHz, μV/m at 3 meters = 22.72727×(operating frequency, MHz) – 2454.545;

(2) for the band 260 - 470 MHz, μV/m at 3 meters = 16.6667×(operating frequency, MHz) –

2833.3333.

(3)The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear outside of this band shall not exceed the general radiated emissions limits in Section 15.209.

47 CFR FCC Part 15 Subpart C, section 15.215: In most cases, unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emissions limits shown in Section 15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emissions.

Outside Frequency Band Edge (MHz)	Limit (dBuV/m) at 3m
315MHz	46

5.2.2. Measuring Instruments

Please refer to section 6 in this report.

5.2.3. Major Test Instruments Setting

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB	1 MHz / 1MHz for Peak
RB / VB	1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.2.4. Test Procedures

For radiated emissions below 30MHz

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.

4. Set the test-receiver system to QP Detect Function with specified bandwidth under Maximum Hold Mode.

For radiated emissions above 30MHz

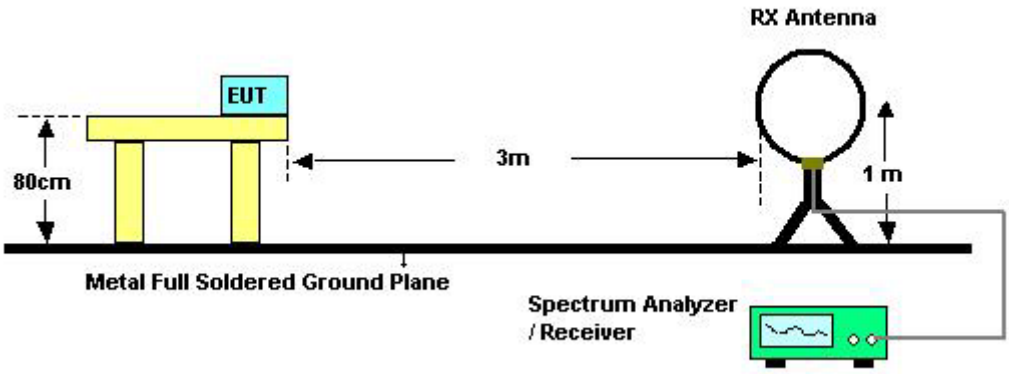
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.2.5. Test Mode(s)

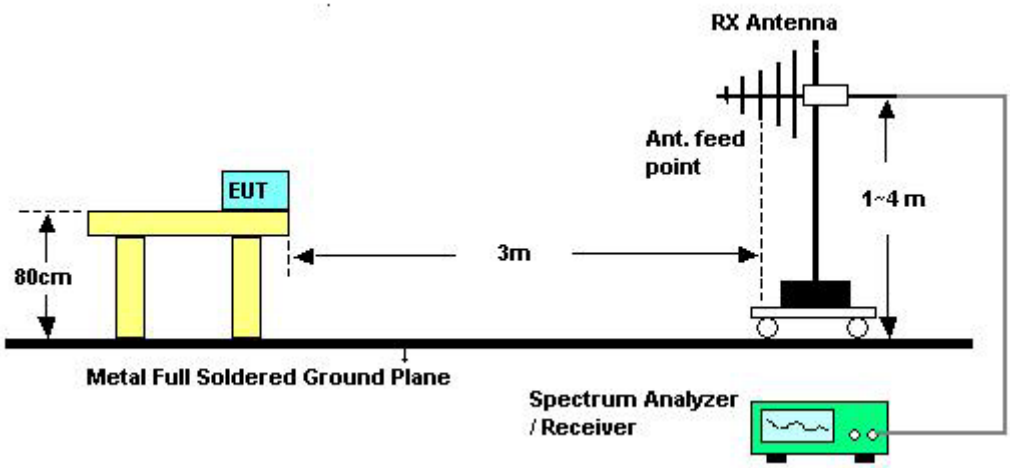
EUT is CTX mode (Continuous Transmission). Measurements have been done on channel 1, 315 MHz. X, Y and Z axes should be test, but only x axis, the worst case, was shown in the tets report.

5.2.6. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



5.2.7. Test Deviation

The measurement uncertainty is 2.26dB. Test methods have no deviations with original standard.

5.2.8. Calculation of Voltage Levels

Measurements are reported in units of dB relative to one microvolt per metre (dBµV/m).

The field strength was calculated automatically by the software using all the pre-stored calibration data. The method of calculation is shown below:

E = V + AF - G + L Where:

E = Radiated Field Strength in dBµV/m.

V = EMI Receiver Voltage in dBµV. (measured value)

AF = Antenna Factor in dB(m^{-1}). (stored as a data array)

G = Preamplifier Gain in dB. (stored as a data array)

L = Cable insertion loss in dB. (stored as a data array of Insertion Loss versus frequency)

Level = Read Level + Factor.

Factor = AF - G + L.

When measurement frequency was below 30MHz, the results shall be extrapolated to the specified distance using an extrapolation factor of 40 dB/decade. If measurement frequency was above 30MHz, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade.

When pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. So duty factor is show below:

duty factor = 20 x $\log_{10}$(duty cycle) = -16.9dB

Average value = Peak value + duty factor

5.2.9. Test Data Requirement

Test data records were performed in accordance with the following ANSI C63.4-2003. For intentional radiators, for each of the frequencies to which the device is tuned, the frequency and amplitude of the highest fundamental emissions, the frequency and amplitude of the three highest harmonic or spurious emissions relative to the limit, and the frequency and amplitude of the three highest restricted band emissions relative to the limit shall be reported.

5.2.10. Results of Bandedge Emissions

Please refer to section 5.2 of test result.

5.2.11. Results of Radiated Emissions

Test Site	03CH03-HY
Temperature	20℃
Humidity	65%
Test Engineer	Ted Chiu

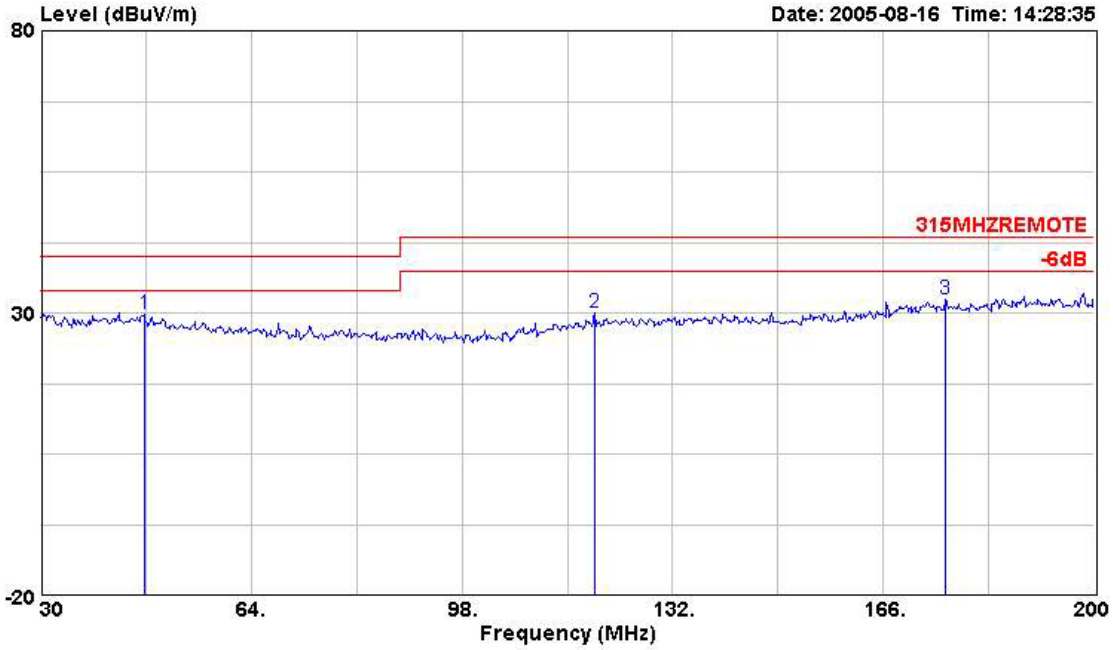
Note:

Results for the radiated measurement below 30MHz, no emissions found and caused by the EUT.

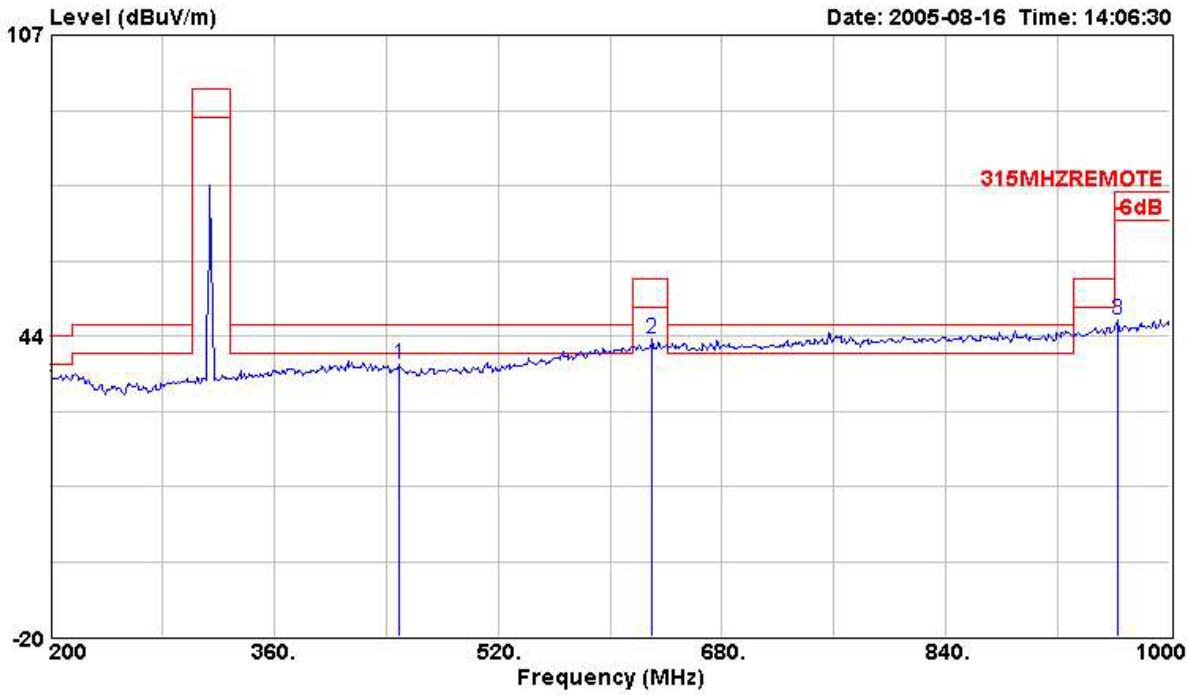
If any spurious emissions are in non-restriction bands, these emissions comply with 20dB down of fundamental emissions. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

315MHz (Below 1GHz)

Vertical Polarization

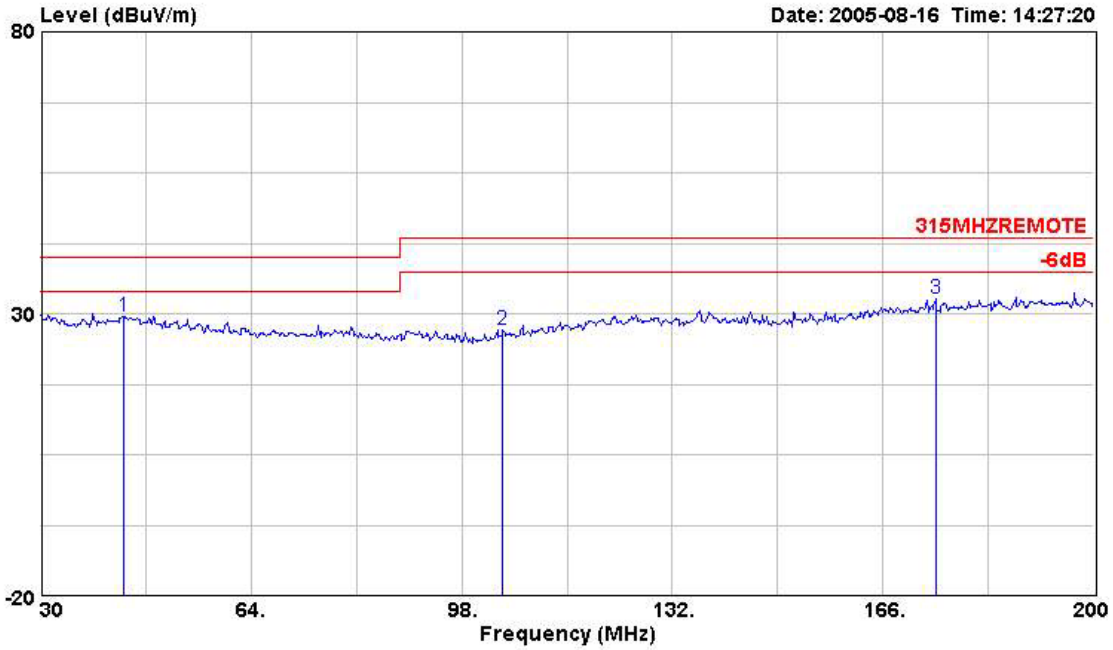


	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	46.660	29.73	-10.27	47.24	40.00	0.66	12.06	30.23	Peak	---	---
2 @	119.420	30.08	-13.42	47.46	43.50	1.08	11.82	30.28	Peak	---	---
3 @	176.030	32.37	-11.13	46.87	43.50	1.27	14.20	29.97	Peak	---	---

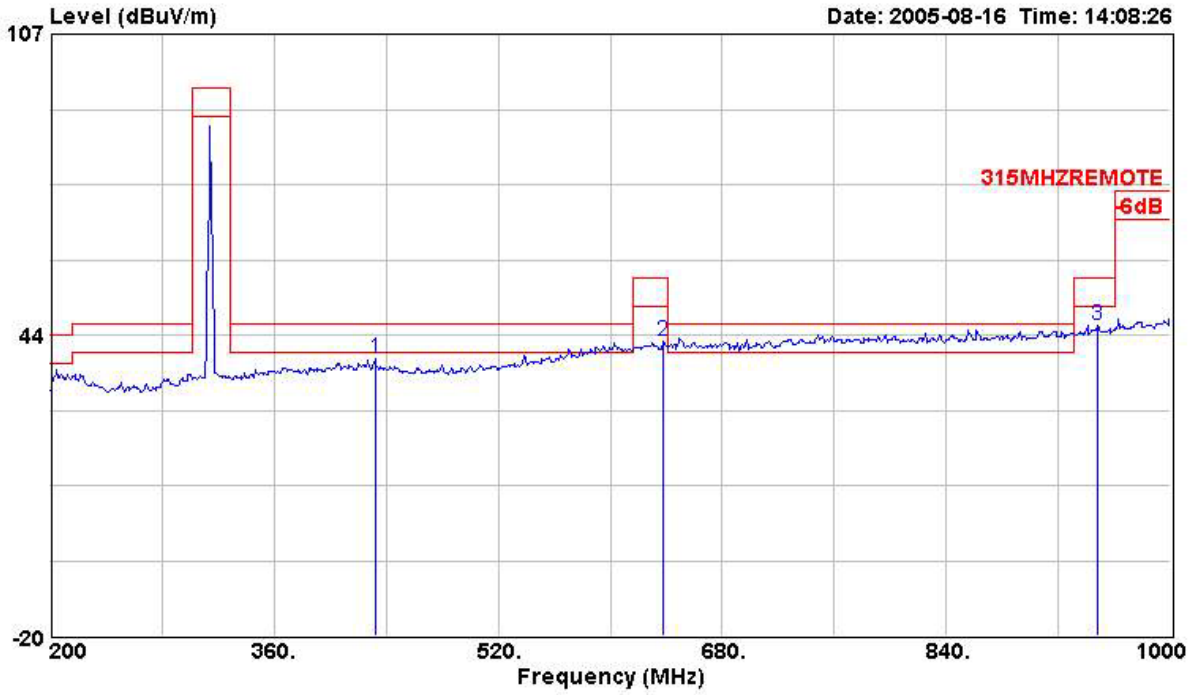


	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	448.800	37.35	-8.65	49.79	46.00	2.12	16.41	30.97	Peak	---	---
2 @	630.400	42.78	-12.84	50.56	55.62	2.45	20.49	30.73	Peak	---	---
3 @	963.200	46.93	-27.07	50.08	74.00	3.04	23.09	29.27	Peak	---	---

Horizontal Polarization



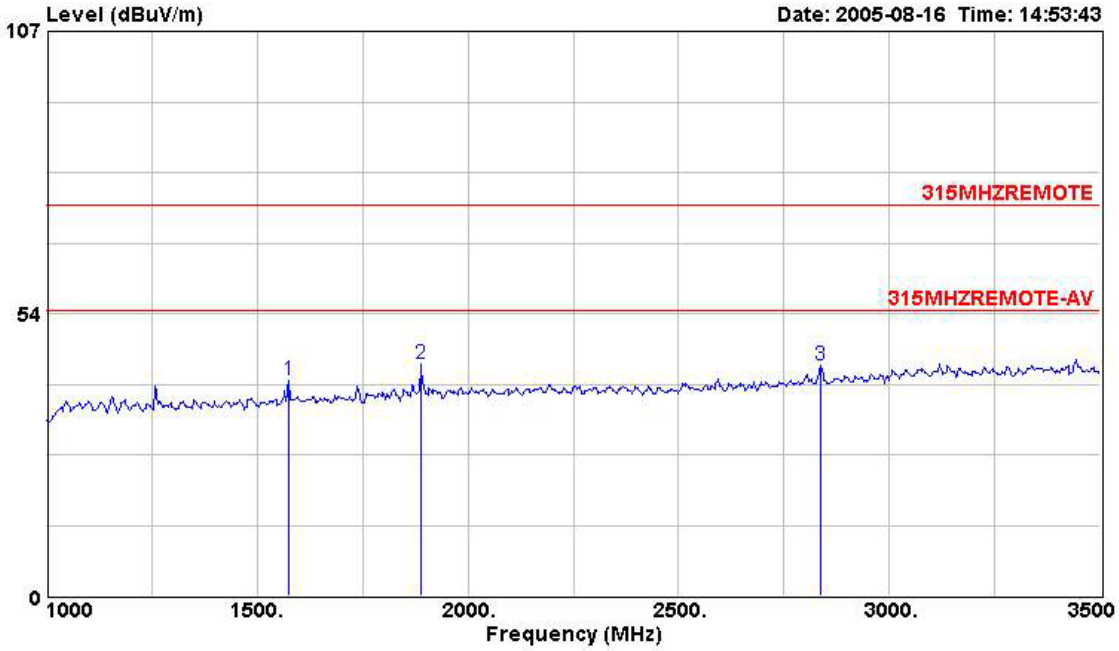
	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	43.430	29.61	-10.39	46.84	40.00	0.65	12.46	30.34	Peak	---	---
2 @	104.630	27.18	-16.32	47.00	43.50	0.99	9.66	30.47	Peak	---	---
3 @	174.500	32.62	-10.88	47.15	43.50	1.28	14.14	29.95	Peak	---	---



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	432.000	38.50	-7.50	50.58	46.00	2.04	16.54	30.66	Peak	---	---
2 @	637.600	42.16	-13.46	49.82	55.62	2.47	20.51	30.64	Peak	---	---
3 @	948.000	45.44	-10.18	49.06	55.62	2.97	22.76	29.35	Peak	---	---

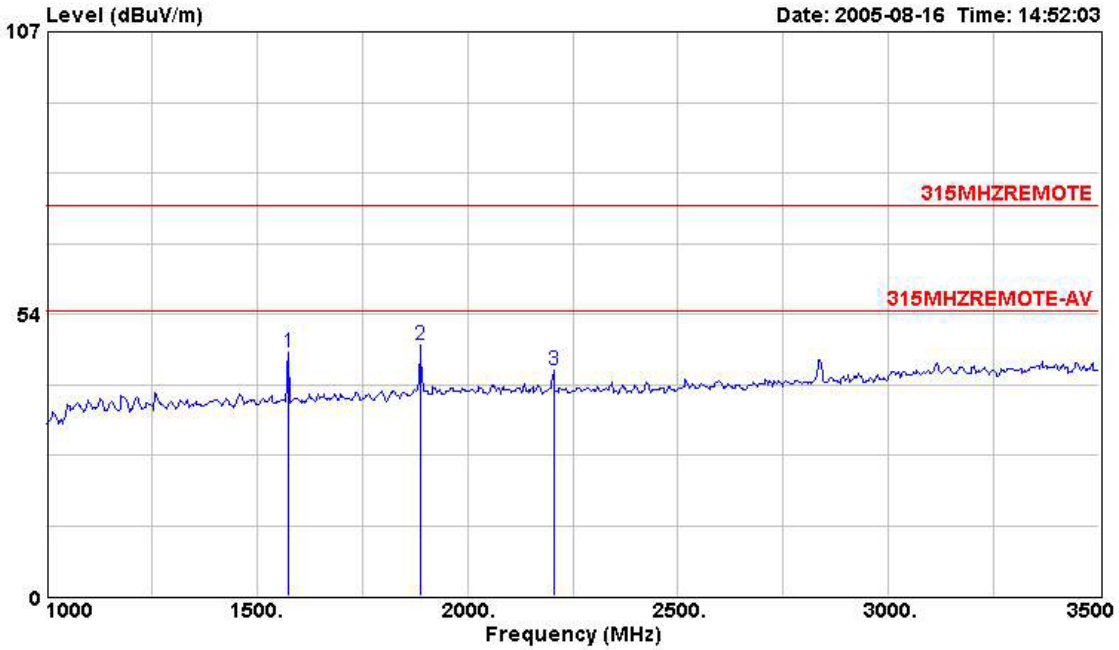
315MHz (Above 1GHz)

Vertical Polarization



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	1575.000	40.80	-33.20	46.61	74.00	1.51	25.67	32.98	Peak	---	---
2	1887.500	44.04	-29.96	48.15	74.00	1.66	26.99	32.76	Peak	---	---
3	2837.500	43.60	-30.40	44.79	74.00	2.13	29.53	32.85	Peak	---	---

Horizontal Polarization

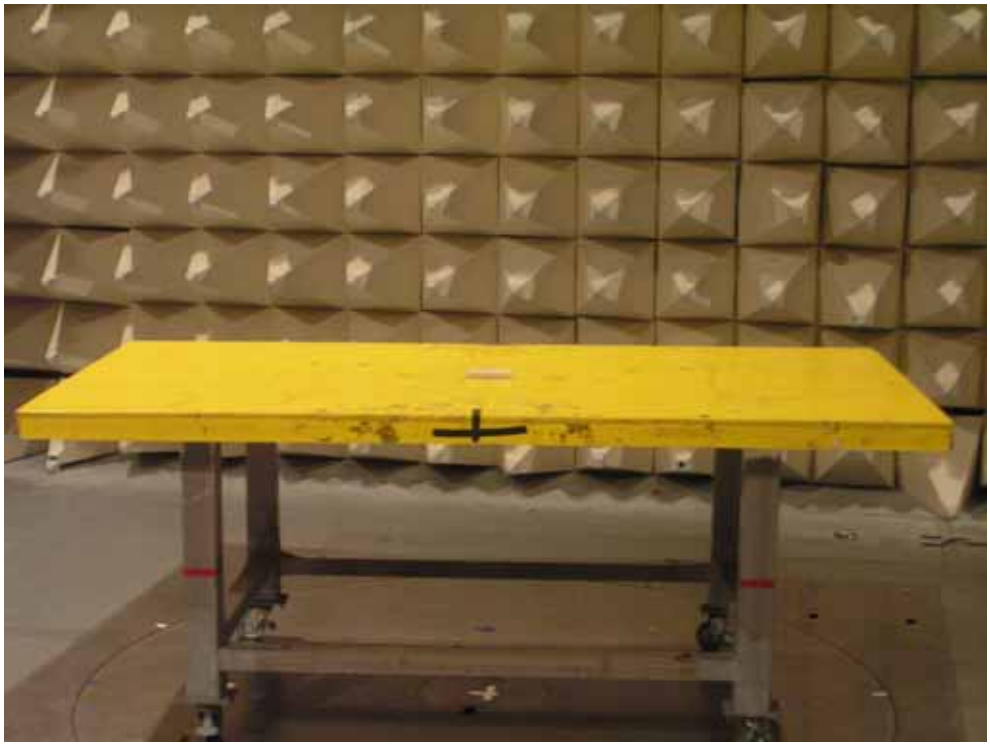


	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1 @	1575.000	46.25	-27.75	52.06	74.00	1.51	25.67	32.98	Peak	---	---
2 @	1887.500	47.68	-26.32	51.79	74.00	1.66	26.99	32.76	Peak	---	---
3	2205.000	42.93	-31.07	46.14	74.00	1.81	27.87	32.89	Peak	---	---

5.2.12. Photographs of Radiated Emissions Test Configuration

FRONT VIEW

REAR VIEW



5.3. 20dB Spectrum Bandwidth Measurement

5.3.1. Applicable Standard

47 CFR FCC Part 15 Subpart C, section 15.231(c): The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emissions shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Fundamental Freq. (MHz)	20dB Bandwidth (MHz)
315	0.7875

Section 15.215: Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (433.05~434.79MHz).

In ANSI C63.4-2003, the resolution bandwidth of the measuring instrument shall be set to a value greater than 5% of the bandwidth requirements. When no bandwidth requirements are specified, the minimum resolution band-width of the measuring instrument is given in the following:

Fundamental Freq.	Minimum Resolution Bandwidth
9 kHz to 30 MHz	1 kHz
30 to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

5.3.2. Measuring Instruments

Please refer to section 6 in this report.

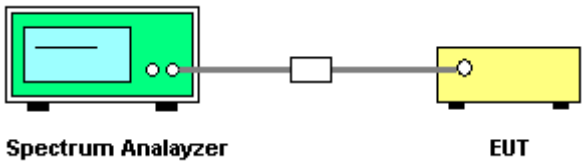
5.3.3. Major Test Instruments Setting

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth
RB	10 kHz (20dB Bandwidth)
VB	10 kHz (20dB Bandwidth)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3.4. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 10 kHz and the video bandwidth of 10 kHz were utilised for 20 dB bandwidth measurement.

5.3.5. Test Setup Layout



5.3.6. Test Deviation

The measurement uncertainty is 10^{-7}. Test methods have no deviations with original standard.

5.3.7. Test Mode(s)

EUT is CTX mode (Continuous Transmission). Measurements have been done on channel, 315 MHz.

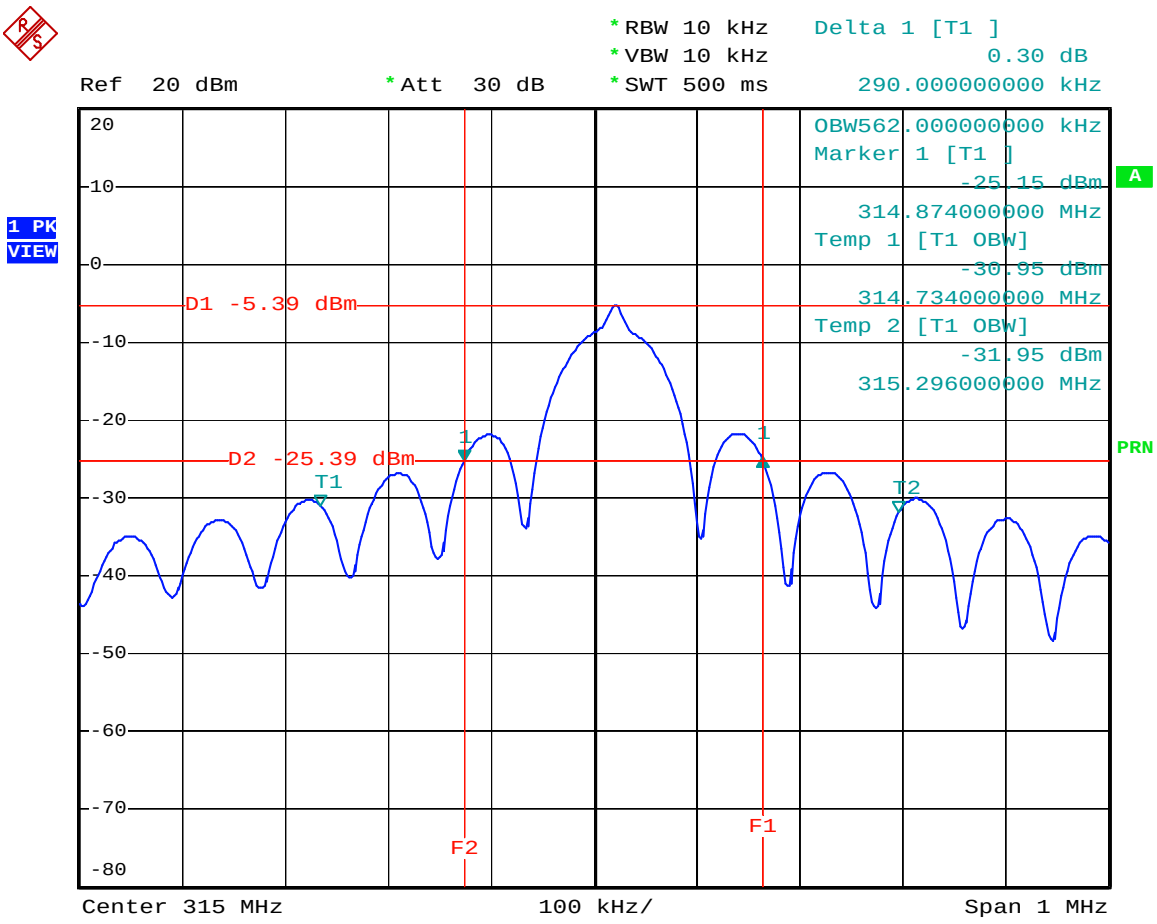
5.3.8. Test Result

Test Site	TH01-HY
Temperature	20℃
Humidity	65%
Test Engineer	Eason Lu

Frequency	20dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Limits (MHz)	Result
315 MHz	290.00	562.00	0.79	**Complies**

5.3.9. 20 dB Bandwidth Plots

20 dB Bandwidth Plot on 315 MHz



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5.4. Dwell Time of Periodic Operation Measurement

5.4.1. Applicable Standard

47 CFR FCC Part 15 Subpart C, section 15.231(a)/(e):

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(a).

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs 15.231(a) of this section, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

If devices complying with 47 CFR FCC Part 15 Subpart C, section 15.231(e)

Intentional radiators may operate at a periodic rate exceeding that specified in section 15.231(a) and may be employed for any type of operation, including operation prohibited section 15.231(a).

5.4.2. Measuring Instruments

Refer to section 6 in this report.

5.4.3. Major Test Instruments Setting

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1000 kHz
VB	1000 kHz
Detector	Peak
Trace	Single Trigger

5.4.4. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.
3. Use a video trigger with the trigger level set to enable triggering only on full pulses.
4. Sweep Time is more than once pulse time.
5. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
6. Measure the maximum time duration of one single pulse.

5.4.5. Test Setup Layout

5.4.6. Test Deviation

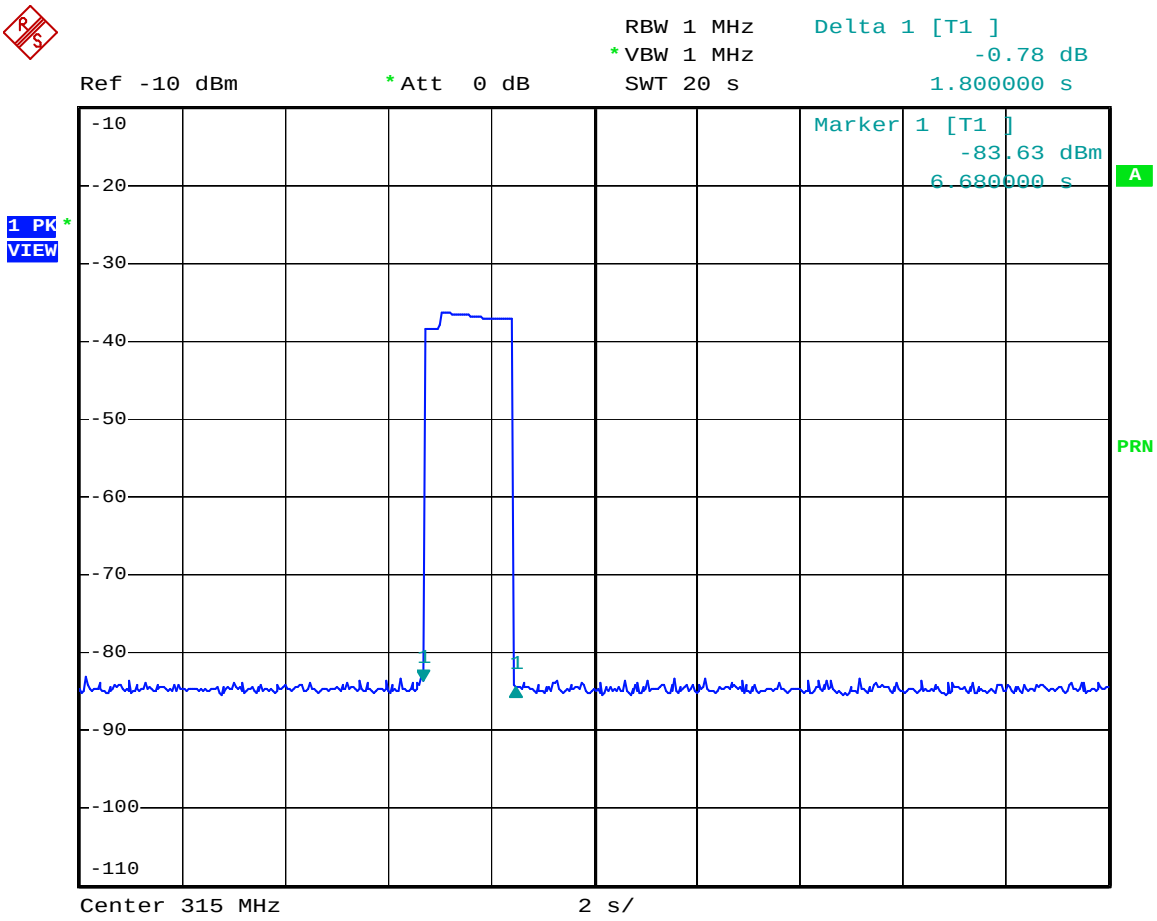
The measurement uncertainty is 10^{-7}. Test methods have no deviations with original standard.

5.4.7. Test Mode(s)

EUT is normal use mode (Periodic Continuous Transmission). Measurements have been done on channel 1

5.4.8. Test Result

Dwell Time of Periodic Operation



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5.5. Antenna Requirements

5.5.1. Applicable Standard

47 CFR FCC Part 15 Subpart C, section 15.203: The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the power limits in 47 CFR FCC Part 15 Subpart C, section 15.231.

5.5.2. Antenna Connector Construction

Please refer to section 2.3 in this test report, all antenna connectors comply with 47 CFR FCC Part 15 Subpart C, section 15.203 requirements.

6. List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Jun. 16, 2005	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	18667	9KHz ~ 2GHz	Jan. 10, 2005	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	May 31, 2005	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz ~ 200MHz	Jul. 22, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz ~ 1GHz	Jul. 22, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 22, 2005	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 22, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec.01, 2004	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)
Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 31, 2004	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Apr. 28, 2005	Conducted (TH01-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Apr. 21, 2005	Conducted (TH01-HY)
DC power source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Nov. 28, 2004	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2004	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Jan. 01, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Jan. 01, 2005	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Apr. 15, 2005	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 31, 2004	Conducted (TH01-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 02, 2005	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	923364	26.5GHz ~ 40GHz	Jan. 05, 2004*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9kHz ~ 30MHz	May 24, 2004*	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jun. 09, 2004*	Radiation (03CH03-HY)

Note: Calibration Interval of instruments listed above is two year.

7. SPORTON COMPANY PROFILE

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test familial apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

7.1. Test Location

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 02-2696-2468 FAX : 02-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 03-327-3456 FAX : 03-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 02-2601-1640 FAX : 02-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 02-2631-4739 FAX : 02-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 02-8227-2020 FAX : 02-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 02-2794-8886 FAX : 02-2794-9777
JHUBEI	ADD : No.8, Lane 728, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C. TEL : 03-656-9065 FAX : 03-656-9085

8. Certificate of NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

SPORTON INTERNATIONAL, INC.
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is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2005
Effective through

For the National Institute of Standards and Technology

NVLAP Lab Code: 200079-0

NVLAP-01C (06-01)