

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

for

INTENTIONAL RADIATOR

WIRELESS WHEEL & BALL MOUSE

MODEL NO: UNC-800T

BRAND NAME: SPACEBALL

FCC ID NO: QLKUNC-800T

REPORT NO: 02I1483-1

ISSUE DATE: SEPTEMBER 24, 2002

Prepared for
YUSUNG C&C CO., LTD.
865-13, BANG BAE-DONG
SEO CHO-KU, SEOUL 137-060 KOREA

Prepared by
COMPLIANCE ENGINEERING SERVICES, INC.
d.b.a.
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD
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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: YUSUNG C&C CO., LTD.
 865-13, BANG BAE-DONG
 SEO CHO-KU, SEOUL 137-060 KOREA

EUT DESCRIPTION: WIRELESS WHEEL & BALL MOUSE

MODEL NAME/NUMBER: UNC-800T

BRAND NAME: SPACEBALL

FCC ID: QLKUNC-800T

DATE TESTED: SEPTEMBER 24, 2002

REPORT NUMBER: 02I1483-1

TYPE OF EQUIPMENT	RADIO CONTROL
EQUIPMENT TYPE	27 MHz TRANSMITTER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15.227

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in CFR 47, PART 15. This said equipment in the configuration described in this report shows that maximum emission levels emanating from equipment are within the compliance requirements. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Tested By:



THU CHAN
 SENIOR EMC ENGINEER
 COMPLIANCE CERTIFICATION SERVICES

Approved & Released For CCS By:



MICHAEL HECKROTTE
 CHIEF ENGINEER
 COMPLIANCE CERTIFICATION SERVICES

2. PRODUCT DESCRIPTION

CHASSIS TYPE	PLASTIC
Fundamental Frequency	26.985 MHz – 27.260Mhz
Operating Frequency	26.985, 27.010, 27.035, 27.060, 27.085, 27.110 27.135, 27.16, 27.185, 27.210, 27.235, 27.260MHz
Power Source	3 VOLT (2 X AAA BATTERY)
Transmitting Time	CONTINUOUS
Type of antenna	PERMANENTLY ATTACHED
Local Osc.	10.245MHz

3. TEST FACILITY

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27,1994.

4. MEASUREMENT STANDARDS

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

5. TEST METHODOLOGY

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

6. MEASUREMENT EQUIPMENT USED

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Spectrum Analyzer	HP 0.1K - 1.5GHz	8568B	2732A03661	5/16/03
Spectrum Display	HP	85662A	2816A16696	5/16/03
Quasi Peak Adapter	HP9K - 1GHz	85650A	2811A01155	5/16/03
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P5)	2944A06550	8/28/03
Antenna, Bicon	Eaton30 - 200MHz	94455-1	1214	8/22/03
Antenna, LP	EMCO200 - 2000MHz	3146	9107-3163	8/22/03
Active Loop Antenna, (10K - 30MHz)	EMCO	6502	9202-2722	4/20/03

7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 KHz TO 30MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NOT REQUIRED.

8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
OPERATION WITHIN THE BAND 26.96 - 27.28 MHZ	SECTION 15.227

9. SYSTEM TEST CONFIGURATION

The EUT was configured for testing in a typical fashion (as a customer would normally use it).



X-Position



Y-Position



Z-Position

10. EQUIPMENT MODIFICATION

To achieve compliance to FCC Section 15.227 technical limits, the following change(s) were made during compliance testing:

No changes were required in order to achieve compliance to FCC Section 15.227.

11. TEST PROCEDURE AND RESULT

Powerline RFI Limits	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	x
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	x
BATTERY POWER	X	SECTION 15.227	X

11.1 Radiated Emission Test Procedure and Result

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 meter from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The readings so obtained are recorded in the data listed below.

Fundamental @ Low (Lower Band Edge), Mid, & High (Upper Band Edge) Channels:

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 02I1483-1
Report #: 020923C1
Date & Time: 09/24/02 10:35 AM
Test Engr: Van & Thu

Company: Yusung C&C Co., Ltd.
EUT Description: Wireless Wheel & Ball Mouse
Test Configuration: EUT only
Type of Test: FCC 15.227
Mode of Operation: Transmitting Continuously



Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
Loop Antenna were using to measure the readings below:											
Fundamental, Low Channel, High Power:											
X-Position (Standup):											
26.99	50.30	5.85	0.87	0.00	57.02	80.00	-22.98	3mV	0.00	1.00	P
26.99	41.80	5.85	0.87	0.00	48.52	80.00	-31.48	3mH	0.00	1.00	P
Y-Position (Side Lay Down):											
26.99	45.30	5.85	0.87	0.00	52.02	80.00	-27.98	3mV	0.00	1.00	P
26.99	43.30	5.85	0.87	0.00	50.02	80.00	-29.98	3mH	0.00	1.00	P
Z-Position (Back Lay Down):											
26.99	45.30	5.85	0.87	0.00	52.02	80.00	-27.98	3mV	0.00	1.00	P
26.99	43.80	5.85	0.87	0.00	50.52	80.00	-29.48	3mH	0.00	1.00	P
Worst Lower Band Edge @ X-Position:											
26.99	28.30	5.85	0.87	0.00	35.02	69.50	-34.48	3mV	0.00	1.00	P
26.99	20.10	5.85	0.87	0.00	26.82	69.50	-42.68	3mH	0.00	1.00	P
Fundamental, Mid Channel, High Power @ X-Position:											
27.14	50.80	5.85	0.87	0.00	57.52	80.00	-22.48	3mV	0.00	1.00	P
27.14	44.30	5.85	0.87	0.00	51.02	80.00	-28.98	3mH	0.00	1.00	P
Fundamental, High Channel, High Power @ X-Position:											
27.26	50.30	5.85	0.87	0.00	57.02	80.00	-22.98	3mV	0.00	1.00	P
27.26	44.60	5.85	0.87	0.00	51.32	80.00	-28.68	3mH	0.00	1.00	P
Worst Upper Band Edge @ X-Position:											
27.28	41.20	5.85	0.87	0.00	47.92	69.50	-21.58	3mV	0.00	1.00	P
27.28	36.30	5.85	0.87	0.00	43.02	69.50	-26.48	3mH	0.00	1.00	P

Spurious & Harmonic Emissions @ Worst Position, Mid Channel:

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

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Test Engr: Van & Thu

Company: Yusung C&C Co., Ltd.

EUT Description: Wireless Wheel & Ball Mouse

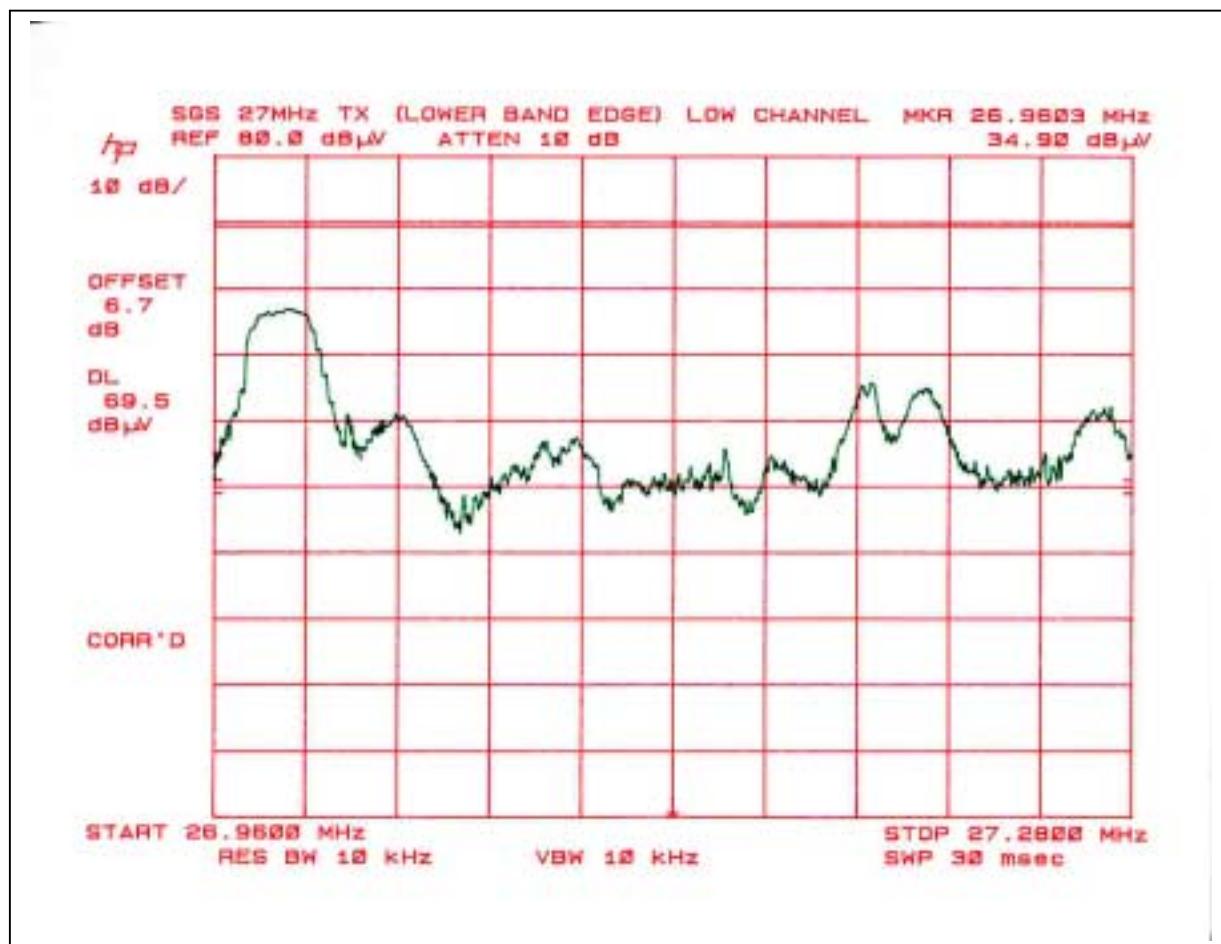
Test Configuration : EUT only

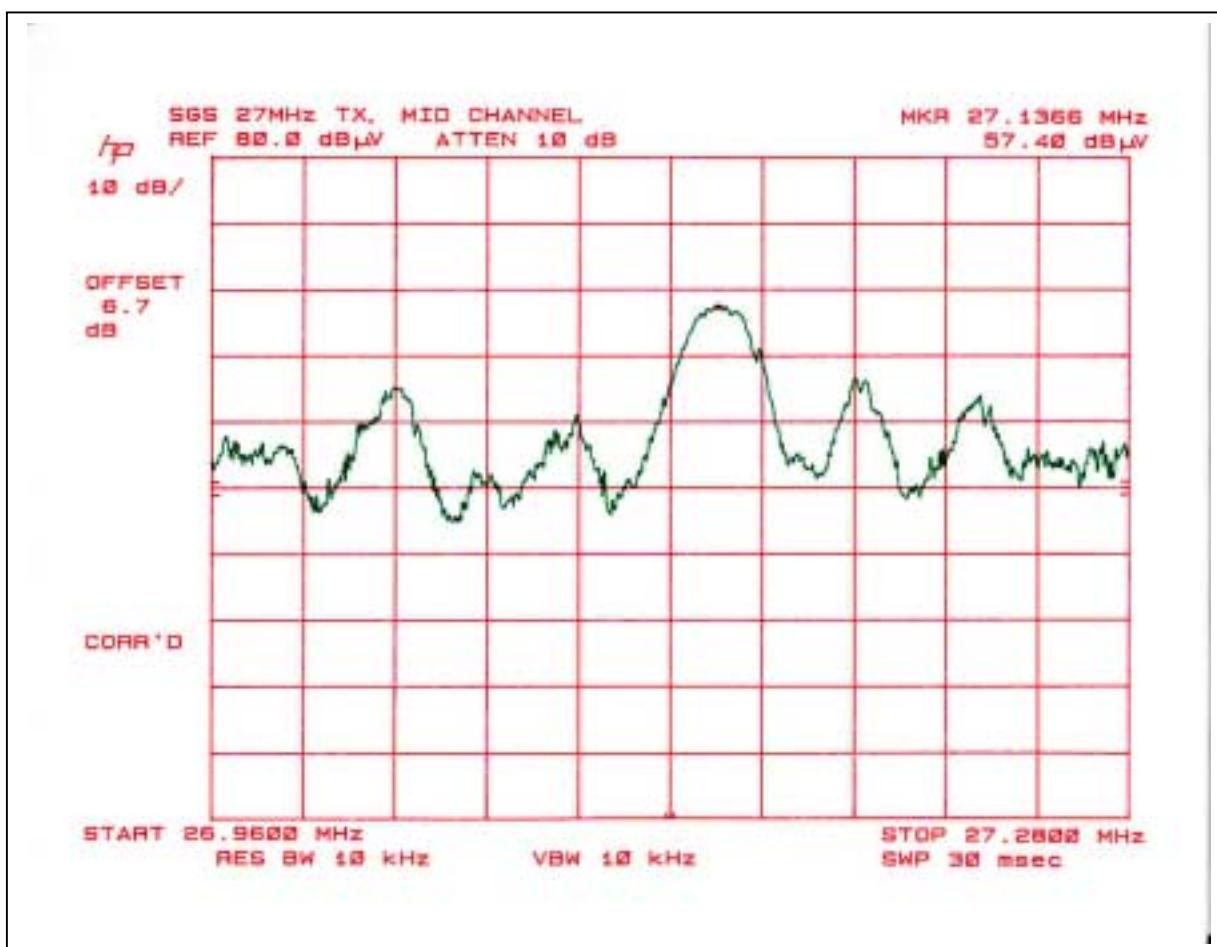
Type of Test: FCC 15.227

Mode of Operation: Transmitting Continuously @ Mid Channel X-Worst Position

[<< Main Sheet](#)

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
54.27	55.60	9.45	1.15	27.17	39.03	40.00	-0.97	3mV	0.00	1.00	P
325.62	53.40	14.87	3.14	26.58	44.84	46.00	-1.16	3mH	0.00	1.00	P
189.95	50.00	15.51	2.36	26.67	41.20	43.50	-2.30	3mH	0.00	1.00	P
352.76	52.00	15.09	3.30	26.78	43.61	46.00	-2.39	3mV	0.00	1.00	P
271.35	53.70	13.20	2.83	26.41	43.33	46.00	-2.67	3mH	0.00	1.00	P
352.75	51.60	15.09	3.30	26.78	43.21	46.00	-2.79	3mH	0.00	1.00	P
6 Worst Data											

Lower Band Edge, Low Channel, High Power @ Worst Case:

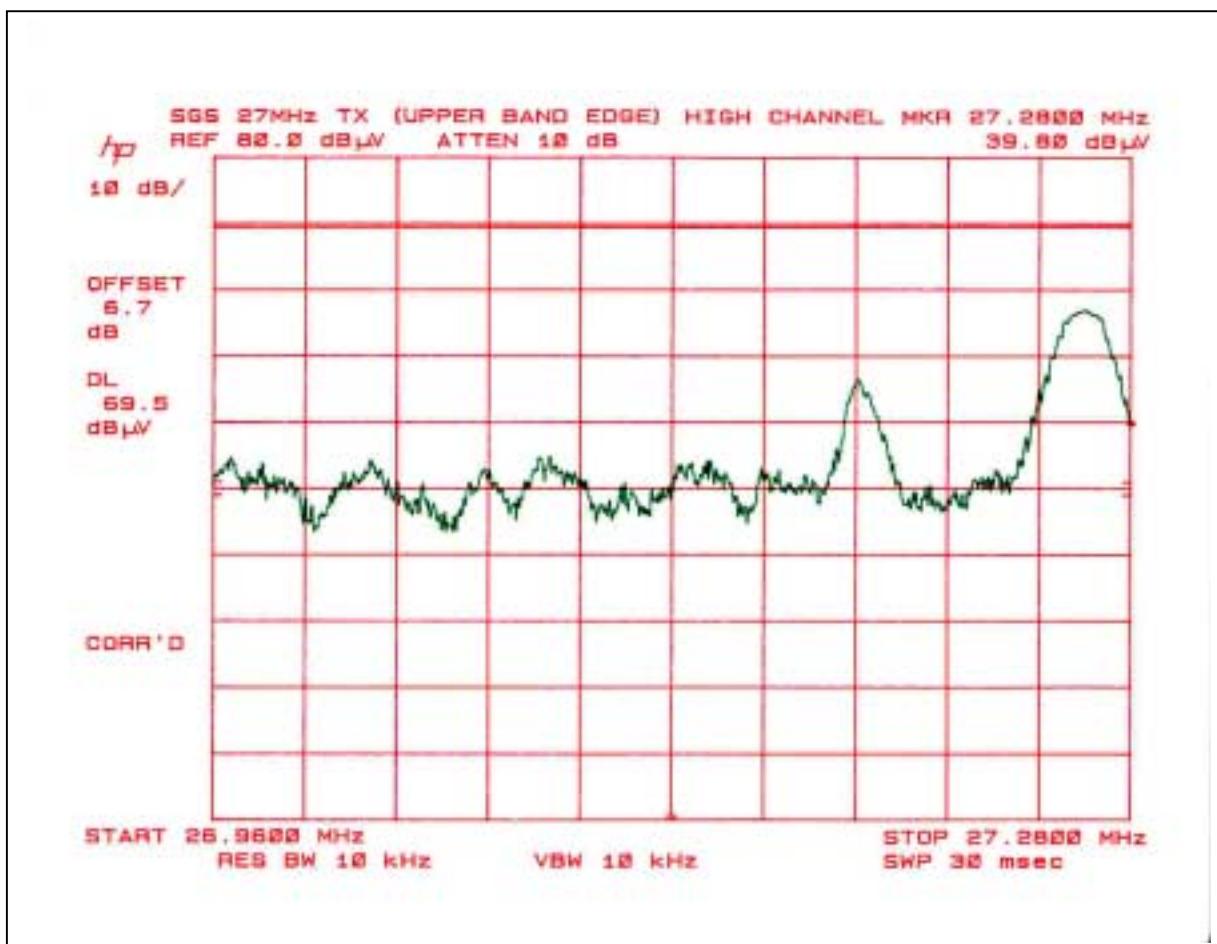
Mid Channel @ Worst Case:

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Upper Band Edge, High Channel, High Power @ Worst Case:

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12. Appendix

External & Internal Photos



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Schematics

Please refer to attached sheets.

Block Diagram

Please refer to attached sheets.

User Manual

Please refer to attached sheets.

END OF REPORT

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