



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

For

INTENTIONAL RADIATOR

HANDY TRACKBALL (27MHZ WIRELESS CONNECTION)

MODEL NO: TB2

FCC ID NO: PRDTB0010615

PROJECT NO: 01T0857-5

ISSUE DATE: JULY 11, 2001

Prepared for

**ACROX TECHNOLOGIES CO., LTD.
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TAIPEI, TAIWAN 114 ROC**

Prepared by

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NVLAP[®]
LAB CODE:200065-0

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: ACROX TECHNOLOGIES, CO., LTD.
437, 8F, RUI GUANG ROAD, NEI HU DISTRICT
TAIPEI, TAIWAN 114 ROC

CONTACT PERSON: ALLEN SHYU, RD MANAGER

TELEPHONE NO.: (2) 8797-8696

EUT DESCRIPTION: HANDY TRACKBALL
(27MHZ WIRELESS CONNECTION)

MODEL NAME / NO.: TB2

FCC ID: PRDTB0010615

DATE TESTED: JULY 11, 2001


TYPE OF EQUIPMENT	REMOTE CONTROL
EQUIPMENT TYPE	27MHZ WIRELESS HANDY TRACKBALL
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:



Approved and Released By:



HUE VANG
ASSOCIATE EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

STEVE CHEANG
EMC ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES

2. PRODUCT DESCRIPTION

CHASSIS TYPE	Plastic
FUNDAMENTAL FREQUENCY	27.045MHz
POWER SOURCE	3 V dc Battery
CHIPSET BRAND / NAME	EM78P156EM
TRANSMITTING TIME	Continues
LOCAL OSCILLATORS	1.84MHz

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), in accordance with ANSI C63.4 Section 13.1.4.1 preliminary testing was conducted rotating the EUT through three orthogonal axes in order to determine the attitude and configuration producing the highest emissions.

6. MEASUREMENT EQUIPMENT USED

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P5)	2944A06550	9/19/2001
Antenna, Bicon	Eaton30 - 200MHz	94455-1	1214	8/10/2001
Antenna, LP	EMCO200 - 2000MHz	3146	9107-3163	8/10/2001
Spectrum Analyzer	HP100Hz - 22GHz	8566B	3014A06685	6/28/2002
Spectrum Display	HP	85662A	3026A19146	6/28/2002
Quasi-Peak Detector	HP9K - 1GHz	85650A	3145A01654	6/28/2002
Antenna, Loop	EMCO	6502	9202-2722	2/18/2002

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).

Radiated Open Site Test Set-up



10. EQUIPMENT MODIFICATIONS

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

Not applicable.

11. TEST PROCEDURE AND RESULT

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. 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.

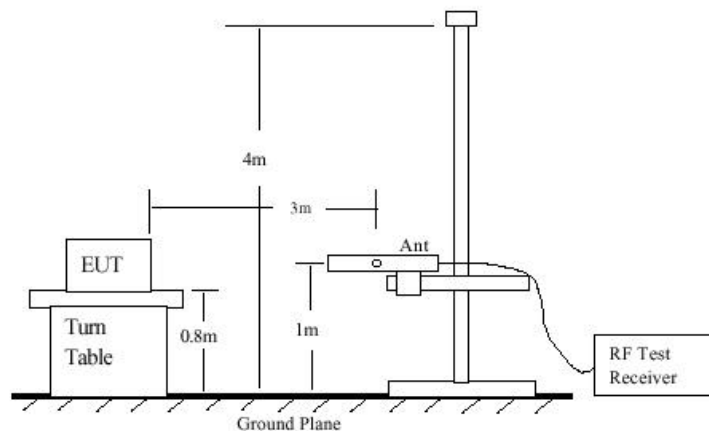



Fig 1: Radiated Emission Measurement 30 to 1000 MHz

11.2 ADIATED EMISSION CFR PART §15.227 OPERATION WITHIN THE BAND 26.96-27.28MHz.

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meter. The emission limit is base on employing an average detector.

The mximum output power from the EUT is 65.51dBuV. This confirms that the EUT is within limit of 80dBuV.

FCC 15.227 SCAN

											
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 #: <u>01T0857-2</u> Report #: <u>10627</u> Date & Time: <u>06/27/01 11:25 AM</u> Test Engr: <u>Hue Vang</u>					
Company: <u>Acrox Technologies Co. Ltd.</u> EUT Description: <u>Handy Trackball (27MHz Wireless Connection)</u> Test Configuration: <u>EUT only</u> Type of Test: <u>FCC 15.227</u> Mode of Operation: <u>transmitting continuously</u>											
<input type="radio"/> A-Site		<input checked="" type="radio"/> B-Site		<input type="radio"/> C-Site		<input type="radio"/> F-Site		<input type="text" value="6 Worst Data"/>		<input type="text" value="Descending"/>	
Freq (MHz)	Reading (dBuV)	AF (dB)	Class (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
Horizontal / Lay Down Position:											
27.05	42.70	8.00	1.21	0.00	51.91	80.00	-28.09	3m H	360.00	1.00	P
27.05	45.20	8.00	1.21	0.00	54.41	80.00	-25.59	3m V	270.00	1.00	P
Z / Side Lie Down Position:											
27.05	43.10	8.00	1.21	0.00	52.31	80.00	-27.69	3m V	290.00	1.00	P
27.05	44.70	8.00	1.21	0.00	53.91	80.00	-26.09	3m H	10.00	1.00	P
Vertical / Stand Up Position:											
27.05	42.20	8.00	1.21	0.00	51.41	80.00	-28.59	3m H	360.00	1.00	P
27.05	56.30	8.00	1.21	0.00	65.51	80.00	-14.49	3m V	180.00	1.00	P
Above data were taken by Loop Antenna.											
54.10	45.40	8.72	1.66	29.48	26.29	40.00	-13.71	3m V	180.00	1.00	P
81.15	42.80	7.12	2.01	29.42	22.51	40.00	-17.49	3m V	0.00	1.00	P
108.20	44.40	11.03	2.32	29.32	28.43	43.50	-15.07	3m V	0.00	1.00	P
54.10	41.20	8.72	1.66	29.48	22.09	40.00	-17.91	3m H	0.00	3.50	P
81.15	38.10	7.12	2.01	29.42	17.81	40.00	-22.19	3m H	0.00	3.50	P
108.20	37.90	11.03	2.32	29.32	21.93	43.50	-21.57	3m H	0.00	1.00	P
No other emissions were found within 20dB under the limits up to 1Ghz.											
Total data #: 12											
V.2b											

C.F.(Correction Factor) = Antenna Factor + Cable Loss - Amplifier Gain

Corrected Reading = Metering Reading + C.F.

Margin = Corrected Reading - Limits

P = Peak Reading

H = Horizontal Polarization/Antenna

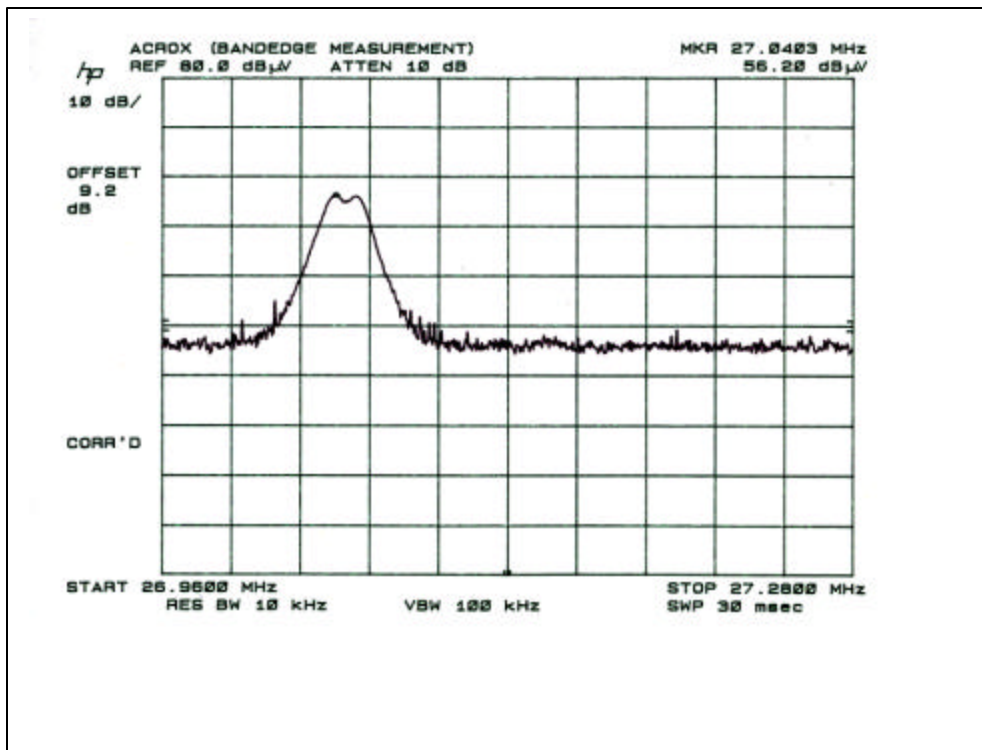
Q = Quasi-peak

V = Vertical Polarization/Antenna

A = Average Reading

Comments: N/A

Bandedge of the fundamental frequency is show below.



11.3 RADIATED EMISSION CFR PART §15.205 RESTRICTED BANDS OF OPERATION.

(a)Only spurious emissions are permitted in any of the frequency bands listed below:
 Note: The restricted bands bellow lists only those that the EUT’s harmonic frequency may fall in.

FROM (MHz)	TO (MHz)
37.5	38.25
73	74.6
108	121.94
123	138
149.9	150.5

Test results show no harmonic within these bands .

11.4 RADIATED EMISSION CFR PART §15.209 RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS.

(a)Expect as provided elsewhere in this subpart, the emission from an intentional radiator shall not exceed the fields strength levels specified in the following table.

Frequency(MHz)	Field Strength (uV/meter)	dBuV
30-88	30	30
88-216	100	40
216-960	150	44
Above 960	500	54

Test results shows no emission exceeded the given limits above..

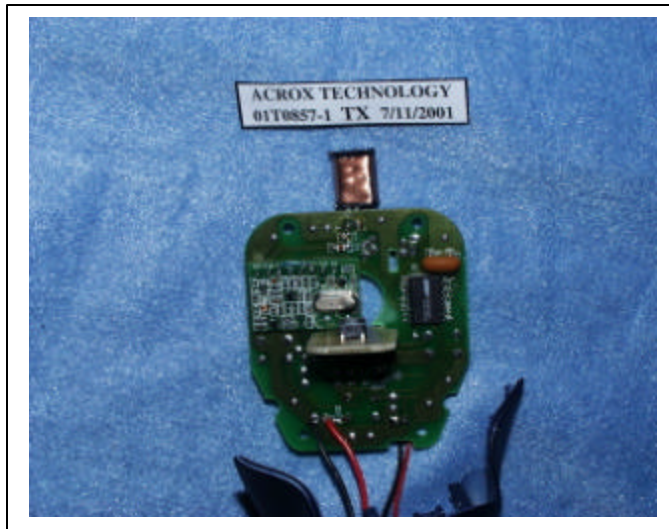
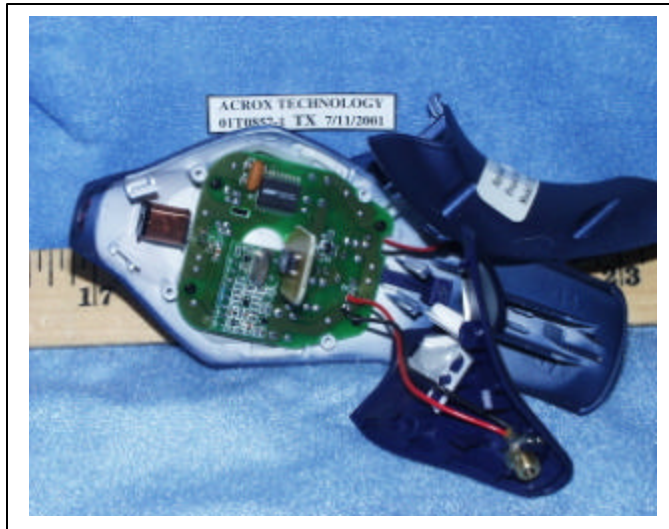
FCC 15.209 SCAN

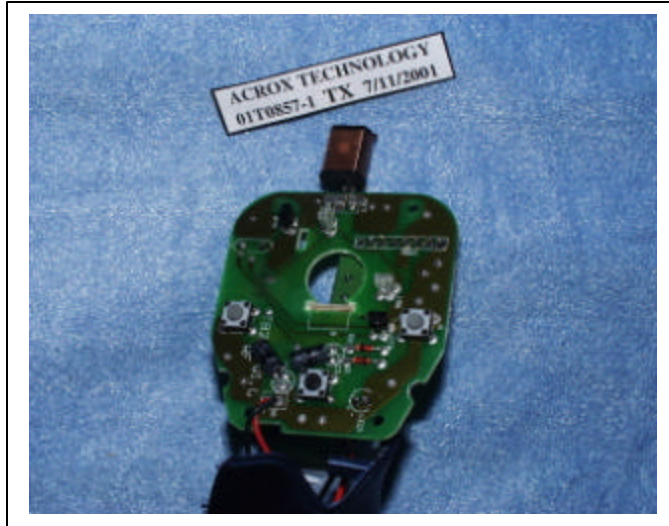
Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
56.00	45.00	9.03	1.03	27.25	27.81	30.00	-2.19	10mV	180.00	1.00	P
80.00	44.50	9.04	1.21	27.23	27.52	30.00	-2.48	10mV	180.00	1.00	P
48.00	42.00	11.15	0.96	27.27	26.84	30.00	-3.16	10mV	180.00	1.00	P
52.00	41.50	10.18	1.00	27.26	25.42	30.00	-4.58	10mV	180.00	1.00	P
60.00	42.00	7.88	1.07	27.25	23.70	30.00	-6.30	10mV	180.00	1.00	P
76.00	41.00	7.80	1.19	27.24	22.75	30.00	-7.25	10mV	180.00	1.00	P
6 Worst Data											

12. APPENDIX

External & Internal Photos







Schematics

Please refer to attached sheets.

Block Diagram

Please refer to attached sheets.

User Manual

Please refer to attached sheets.