

Date: 2003-02-11  
No.: HM109557

## **TEST REPORT**

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### **FCC PART 15 SUBPART C CERTIFICATION REPORT FOR LOW POWER TRANSMITTER**

#### **TEST REPORT No.: HM109557**

Equipment Under Test [EUT]:	ImmediateCare
Model Number:	NRM-180
Applicant:	Excel Engineering (HK) Co., Ltd.
FCC ID :	OWGNRM180

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### **Appendix A**

List of Measurement Equipment

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### CONCLUSION

The submitted product was deemed to have COMPLIED after modification by customer with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

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Verify by

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Patrick Wong  
for Chief Executive

**1.0 General Details**

**1.1 Test Laboratory**

The Hong Kong Standards and Testing Centre Ltd.  
EMC Laboratory  
10 Dai Wang Street, Taipo Industrial Estate  
New Territories, Hong Kong

Telephone: 852 2666 1888  
Fax: 852 2664 4353

**1.2 Applicant Details**

**Applicant**

EXCEL ENGINEERING (HK) CO., LTD.  
Unit 1101, 11<sup>th</sup> Fl., Lippo Sun Plaza,  
28 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong.

Telephone: 852 2736 3632  
Fax: 852 2314 4424

**HKSTC Code Number for Applicant**

**EXE001**

**Manufacturer**

KWOK' S WINTY INDUSTRIES CORPORATION (SHEN ZHEN) CO., LTD.  
San Lian Industry Zone, Shi Yan Town,  
Baoan District, Shen Zhen, China

Telephone: N/A  
Fax: N/A

**1.3 Equipment Under Test [EUT]**  
**Description of Sample**

Product: ImmediateCare  
Manufacturer: Kwok's Winty Industries Corporation (Shen Zhen) Co., Ltd.  
Brand Name: Excel  
Model Number: NRM-180  
Input Voltage: 3Vd.c. (Rechargeable Battery) and 6Vd.c. (AC-DC Adaptor)  
The AC/DC Adapter used for the tests was provided by the  
applicant with the following details: Model Number: EX-6100, Input:  
120Va.c. 60Hz, Output: 6Vd.c. 100mA  
Additional Model Number: NRM-320

**1.3.1 Description of EUT Operation**

The Equipment Under Test(EUT) is an Excel Engineering (HK) Co., Ltd., ImmediateCare. The transmitter is a 2 button transmitter. The EUT continues to transmit while button is being pressed. It is voice transmission, Modulation by Mic. and tape is frequency modulation.

**1.4 Date of Order**

2002-12-31

**1.5 Submitted Sample(s):**

1 Sample per model

**1.6 Test Duration**

2003-01-13

**1.7 Country of Origin**

China

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### 1.8 Additional Information of EUT

	Submitted	Not Available
User Manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Part List	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Circuit Diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Printed Circuit Board [PCB] Layout	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Block diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC ID Label	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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### **2.0 Technical Details**

#### **2.1 Investigations Requested**

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4:2000 for FCC Certification.

#### **2.2 Test Standards and Results Summary Tables**

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.235	ANSI C63.4:2000	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2000	Class B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2000	Class B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

**3.0 Test Results**

**3.1 Emission**

**3.1.1 Radiated Emissions**

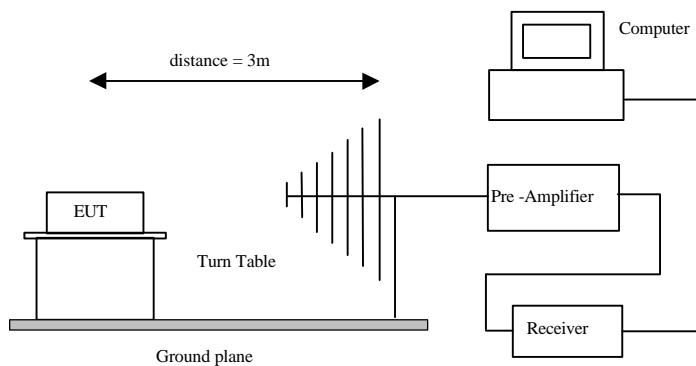
Test Requirement: FCC 47CFR 15.235  
Test Method: ANSI C63.4:2000  
Test Date: 2003-01-13  
Mode of Operation: On mode

**Test Method:**

The sample was placed 0.8m above the ground plane on the OATS \*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigate all operating modes, rotated about all 3 axis (X, Y & Z) to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*: OATS [Open Area Test Site] located at HKSTC with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90657.

**Test Setup:**



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### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.235]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [ $\mu$ V/m]	Field Strength of Fundamental Emission [Average] [ $\mu$ V/m]
49.82-49.90	100,000	10,000

### Results: Channel A

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
49.84	56.8	10.0	66.8	2,187.8	100,000	Vertical

Field Strength of Fundamental Emissions Average						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
49.84	56.4	10.0	66.4	2,089.3	100,00	Vertical

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

\*: Linear interpolations

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz  $\pm$ 3.7dB  
300MHz to 1GHz +3.0dB / -2.7dB

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Limited for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ V/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results : Channel A

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
99.68	16.7	10.8	27.5	23.7	150	Vertical
149.52	< 1.0	9.8	< 10.8	< 3.5	150	Vertical
199.36	< 1.0	11.5	< 12.5	< 4.2	150	Vertical
249.20	< 1.0	15.9	< 16.9	< 7.0	200	Vertical
299.04	< 1.0	17.4	< 18.4	< 8.3	200	Vertical
348.88	< 1.0	17.2	< 18.2	< 8.1	200	Vertical
398.72	< 1.0	18.8	< 19.8	< 9.8	200	Vertical
448.56	< 1.0	19.7	< 20.7	< 10.8	200	Vertical
498.40	< 1.0	20.6	< 21.6	< 12.0	200	Vertical

Remarks:

\*: Linear interpolations

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz  $\pm$ 3.7dB  
300MHz to 1GHz +3.0dB / -2.7dB

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### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.235]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [ $\mu$ V/m]	Field Strength of Fundamental Emission [Average] [ $\mu$ V/m]
49.82-49.90	100,000	10,000

### Results: Channel B

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
49.87	55.6	10.0	65.6	1,905.5	100,000	Vertical

Field Strength of Fundamental Emissions Average						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
49.87	55.3	10.0	65.3	1,840.8	100,00	Vertical

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

\*: Linear interpolations

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz  $\pm$ 3.7dB  
300MHz to 1GHz +3.0dB / -2.7dB

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Limited for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ V/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results : Channel B

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dB $\mu$ V/m	Correction Factor dB $\mu$ V/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit @3m $\mu$ V/m	Antenna Polarity
99.75	14.5	10.8	25.3	18.4	150	Vertical
149.62	< 1.0	9.8	< 10.8	< 3.5	150	Vertical
199.50	< 1.0	11.5	< 12.5	< 4.2	150	Vertical
249.37	< 1.0	15.9	< 16.9	< 7.0	200	Vertical
299.24	< 1.0	17.4	< 18.4	< 8.3	200	Vertical
349.12	< 1.0	17.2	< 18.2	< 8.1	200	Vertical
398.99	< 1.0	18.8	< 19.8	< 9.8	200	Vertical
448.87	< 1.0	19.7	< 20.7	< 10.8	200	Vertical
498.74	< 1.0	20.6	< 21.6	< 12.0	200	Vertical

Remarks:

\*: Linear interpolations

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz  $\pm 3.7\text{dB}$   
300MHz to 1GHz  $+3.0\text{dB} / -2.7\text{dB}$

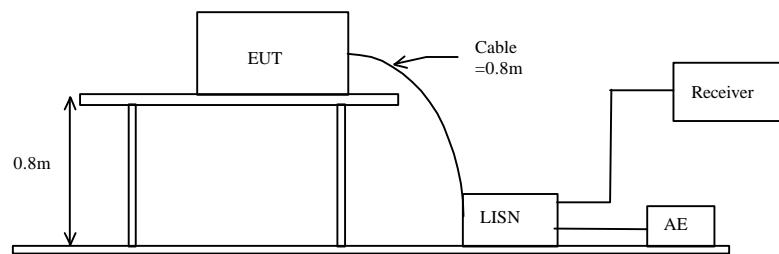
**3.1.1 Conducted Emissions (0.15MHz to 30MHz)**

Test Requirement: FCC 47CFR 15.207  
Test Method: ANSI C63.4:2000  
Test Date: 2003-01-13  
Mode of Operation: On mode

**Test Method:**

The test was performed in accordance with ANSI C63.4:2000, with the following: an initial measurement was performed in peak and average detection mode on the live line. Any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

**Test Setup:**



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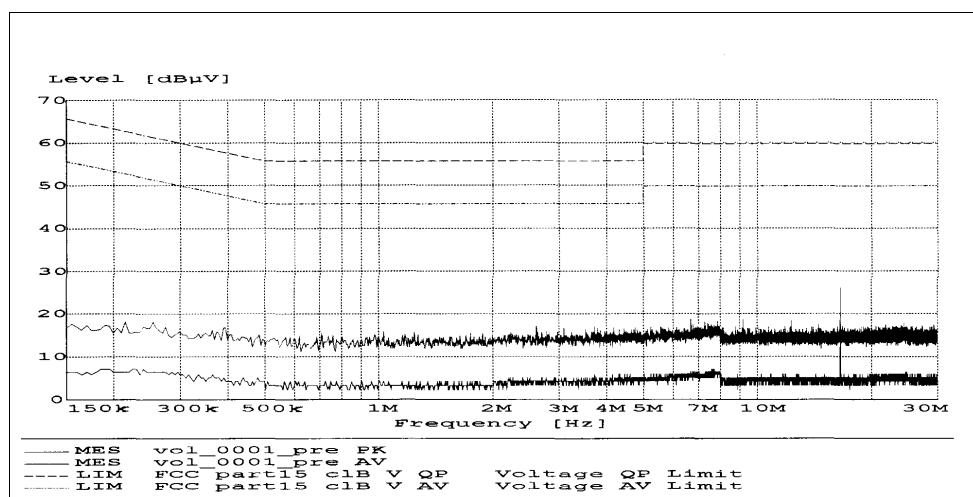
### Limit for Conducted Emissions (FCC 47 CFR 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dB $\mu$ V]	Average [dB $\mu$ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

\* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram labelled as (QP and AV).

### Results: Channel A



Conductor	Frequency	Quasi-peak			
		Level dBmVh	Limit dBmVh	Level mVh	Limit mVh
NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS					

Remarks:

Calculated measurement uncertainty =  $\pm 2.3$ dB  
-\*- Emission greater than 30dB below limit line

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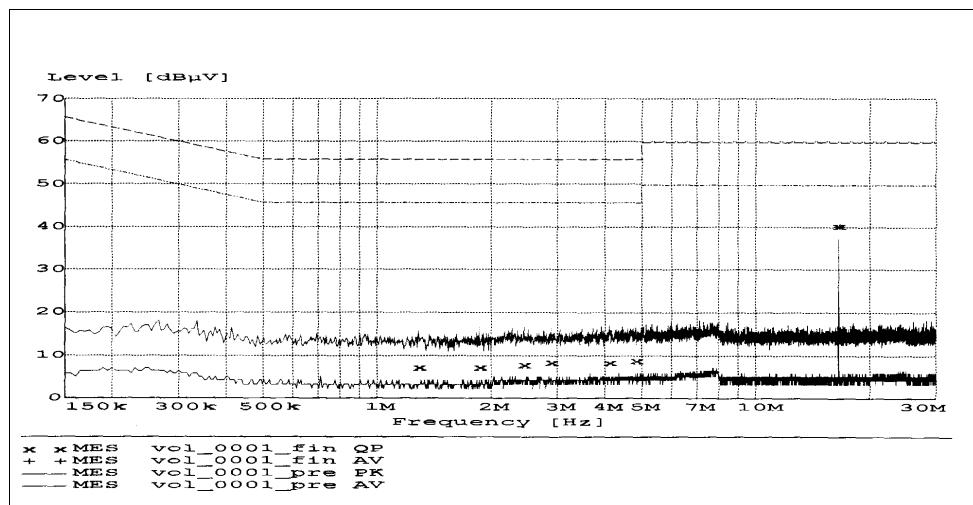
### Limit for Conducted Emissions (FCC 47 CFR 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dB $\mu$ V]	Average [dB $\mu$ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

\* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram labelled as (QP and AV).

### Results: Channel B



Conductor	Frequency	Quasi-peak			
		Level dBmVh	Limit dBmVh	Level mVh	Limit mVh
Neutral	16.61	40.5	60	109	1000

Remarks:

Calculated measurement uncertainty =  $\pm 2.3$ dB

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-\*- Emission greater than 30dB below limit line

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### **3.2 26dB Bandwidth of Fundamental Emission**

Test Requirement:	FCC 47 CFR 15.235
Test Method:	ANSI C63.4:2000 (Section 13.1.7)
Test Date:	2003-01-13
Mode of Operation:	On mode

#### **Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

#### **Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

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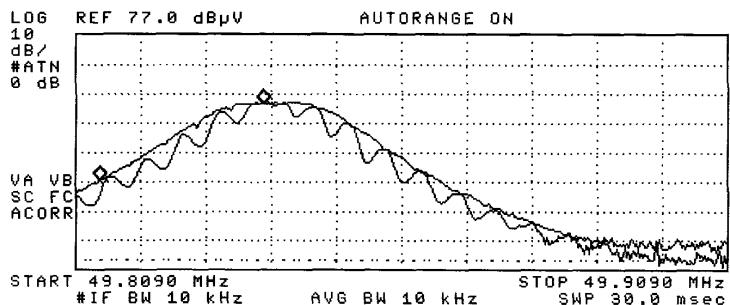
### Limits for 26 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	26dB Bandwidth [KHz]	FCC Limits * [KHz]
49.84	46.6	within 49.82-49.90

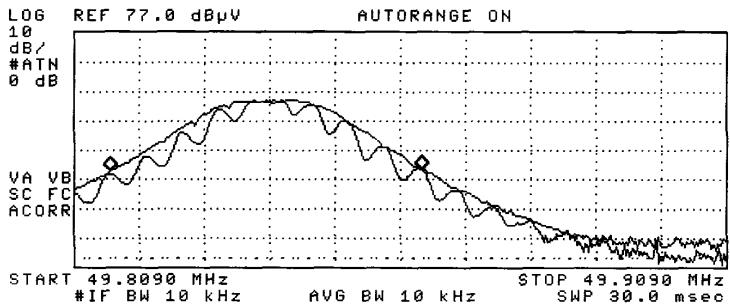
### Channel A

#### 26dB Bandwidth of Fundamental Emission

09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997  
MARKER A ACTV DET: PEAK  
-25.0 kHz MEAS DET: PEAK QP AVG  
-26.08 dB MKRA -25.0 kHz  
-26.08 dB



09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997  
MARKER A ACTV DET: PEAK  
-47.8 kHz MEAS DET: PEAK QP AVG  
-1.04 dB MKRA -47.8 kHz  
-1.04 dB



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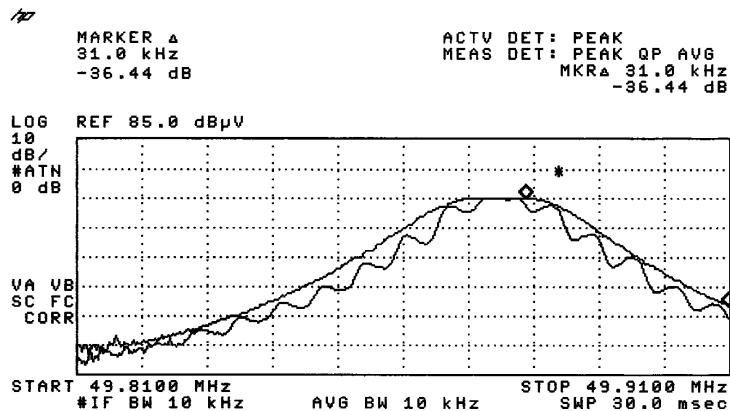
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### Limits for 26 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	26dB Bandwidth [KHz]	FCC Limits * [KHz]
49.874	45.2	within 49.82-49.90

Channel A

### 26dB Bandwidth of Fundamental Emission



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## Appendix A

### Test Equipment Audit

#### Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	07/09/01
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	07/09/01
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	07/09/01
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	07/09/01
EM011	ATTENNUATOR/SWITCH	HEWLETT PACKARD	HP1713A	2508A10595	07/09/01
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	07/09/01
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM020	HORN ANTENNA	EMCO	3115	4032	19/07/00
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	04/08/00
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	14/02/02
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	18/12/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	22/07/02
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	14/05/02
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A

#### Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	04/10/01
EM119	LISN	R & S	ESH3-Z5	0831.5518.5 2	31/08/00
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	CM
EM142	PULES LIMITER	R & S	ESH3Z2	357.8810.52	04/07/01
EM181	EMI TEST RECEIVER	R & S	ESIB7	100072	28/11/01
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	02/01/02
EM197	LISN	EMCO	4825/2	1193	28/03/02

Remarks:

CM      Corrective Maintenance  
N/A     Not Applicable or Not Available  
TBD    To Be Determined

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### Appendix B

#### Photographs of EUT

Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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### Photographs of EUT

Measurement of Radiated Emission Test Set Up



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