

**MEASUREMENT AND TECHNICAL REPORT**

**HM ELECTRONICS**  
**6675 Mesa Ridge Road**  
**San Diego, CA 92121-2937**

**DATE: 14 July 2000**

<b>This Report Concerns:</b>	<input checked="" type="checkbox"/> Original Grant: X	<input type="checkbox"/> Class II Change:
<b>Equipment Type:</b>	COM 900 BP (Belt Pack), Model K23870, S/N 24B01970/	
<b>Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?</b>	<input type="checkbox"/> Yes: <b>Defer until:</b>	<input checked="" type="checkbox"/> No: X
<i>Company Name agrees to notify the Commission by:</i> <input type="checkbox"/> N/A of the intended date of announcement of the product so that the grant can be issued on that date.		
<b>Transition Rules Request per 15.37?</b>	<input type="checkbox"/> Yes:	<input type="checkbox"/> *No:
<i>(*) FCC Part 15, Paragraphs 15.107(a), 15.109(a), 15.209, and 15.249</i>		
<i>Report Prepared by:</i> <b>TÜV PRODUCT SERVICE</b> <b>10040 Mesa Rim Road</b> <b>San Diego, CA 92121-2912</b> <b>Phone: 619 546 3999</b> <b>Fax: 619 546 0364</b>		

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## 1 GENERAL INFORMATION

### 1.1 Product Description

**COM 900BP (Belt Pack), Model K23870, S/N 24B01970**

Components of EUT							
Description		Model Number	Serial Number	FCC ID Number			
Communicator (Transceiver) COM 900 BP		K23870		24B01970			
OPERATING MODE(S):		Normal					
EUT SOFTWARE		Version 1.1, Operating Firmware HME P/N 680093					
FREQUENCY/AC/DC VOLTAGE:		Battery, 4.8 Vdc					
PHASES ( )/CURRENT (amps):		Maximum Current: Less than 70 mA, Nominal Current: 45 mA					
POWER SUPPLY:		N/A Battery					
POWERLINE FILTER: MODEL #:		N/A Battery					
CRITICAL EMI COMPONENTS:		One shield over main PCB, Manufacturer, HME					
SUPPORT EQUIPMENT:		None					
Name of Line	Type of Line	Length (Inches)	Connector Type	Port Termination	Kind of Transmission		
Headset Connection	Unshielded 3-wire 2 for speaker 1 for shielded mic; removable	1	5-pin DIN	Audio	Analog		
Oscillator Frequencies							
Frequency	Derived Frequency	Component #/Location			Description of Use		
4 MHz	Synth	--			MCU Clock		
16 MHz	Xtal	--			TCXO, Reference Osc.		
44.545 MHz	Synth	--			VCO, 2 <sup>nd</sup> LO		
858 MHz	Synth	--			VCO, 1 <sup>st</sup> LO		
300 kHz	--	Oscillator internal to SW Regulator IC			Switching Regulator		

## **1 GENERAL INFORMATION (continued)**

### **1.2 Related Submittal/Grant**

**None**

### **1.3 Tested System Details**

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

### **1.4 Test Methodology**

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

Test Performed: \* 1. Conducted Emissions, FCC Part 15, Paragraph 15.107(a)  
x 2. Radiated Emissions, FCC Part 15, Paragraph 15.109(a), 30 - 1,000 MHz, 3 meters  
x 3. Radiated Emission per FCC Part 15, Paragraphs 15.209 and 15.249  
4. Engineering evaluations

(\*) EUT battery operated.

### **1.5 Test Facility**

The open area test site and conducted measurement data were tested by:

TÜV PRODUCT SERVICE  
10040 Mesa Rim Road  
San Diego, CA 92121-2912  
Phone: 619 546 3999  
Fax: 619 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

## **2. SYSTEM TEST CONFIGURATION**

### **2.1 Justification**

The COM 900BP (Belt Pack), Model K23870 was initially tested for FCC emission in the following configuration:

See Block Diagram.

### **2.2 EUT Exercise Software**

None

### **2.3 Special Accessories**

None

### **2.4 Modification**

None

## 5 CONDUCTED EMISSIONS

**Not performed - EUT is battery operated.**

## **8 RADIATED EMISSION DATA**

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

REPORT No: s0275 TESTED BY: David Gray SPEC: *FCC PART 15, Para 15.209 + 15.249*

CUSTOMER: HM Electronics TEST DIST: 3 Meters

EUT: COM 900BP TEST SITE: 3

EUT MODE: Transmit BICONICAL: N/A

DATE: 5-Jul-00 LOG: 244

NOTES: Duty Cycle= 100% OTHER: 251

### Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The **RADIATED EMISSIONS** measurements were performed at the following test location :

- **Test not applicable**

■ - Roof (Small Open Area Test Site)

Testing was performed at a test distance of:

■ - 3 meters

#### Test Equipment Used :

Model No.	Manufacturer	Description	Serial No.	Prop. No.	Cal Due Date
■ - 8566B	Hewlett Packard	Spectrum Analyzer	2311A02209	407	10/00
■ - 85662B	Hewlett Packard	Spectrum Analyzer Display	2309A04682	406	10/00
■ - 3115	EMCO	Antenna, Double Ridge Guide	2495	251	10/00
■ - AFD3-0208-40-ST	Miteq, Inc.	Pre-Amplifier (30 dB gain), 2 to 8 GHz	155382	367	*
■ - 3146	EMCO	Antenna, LPA	--	244	10/00

Remarks: (\*) Verified internally.

**Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)**

The **RADIATED EMISSIONS (ELECTRIC FIELD)** measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

- Test not applicable

- - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego (Calibration Due Date: May 2001)

**Testing was performed at a test distance of :**

- - 3 meters

**Test Equipment Used :**

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
LPB 2520/A	739	Antenna, Bilog	Antenna Research	1169	05/01
ESVS 30	427	EMI Test Receiver	Rohde & Schwarz	830350/006	03/01

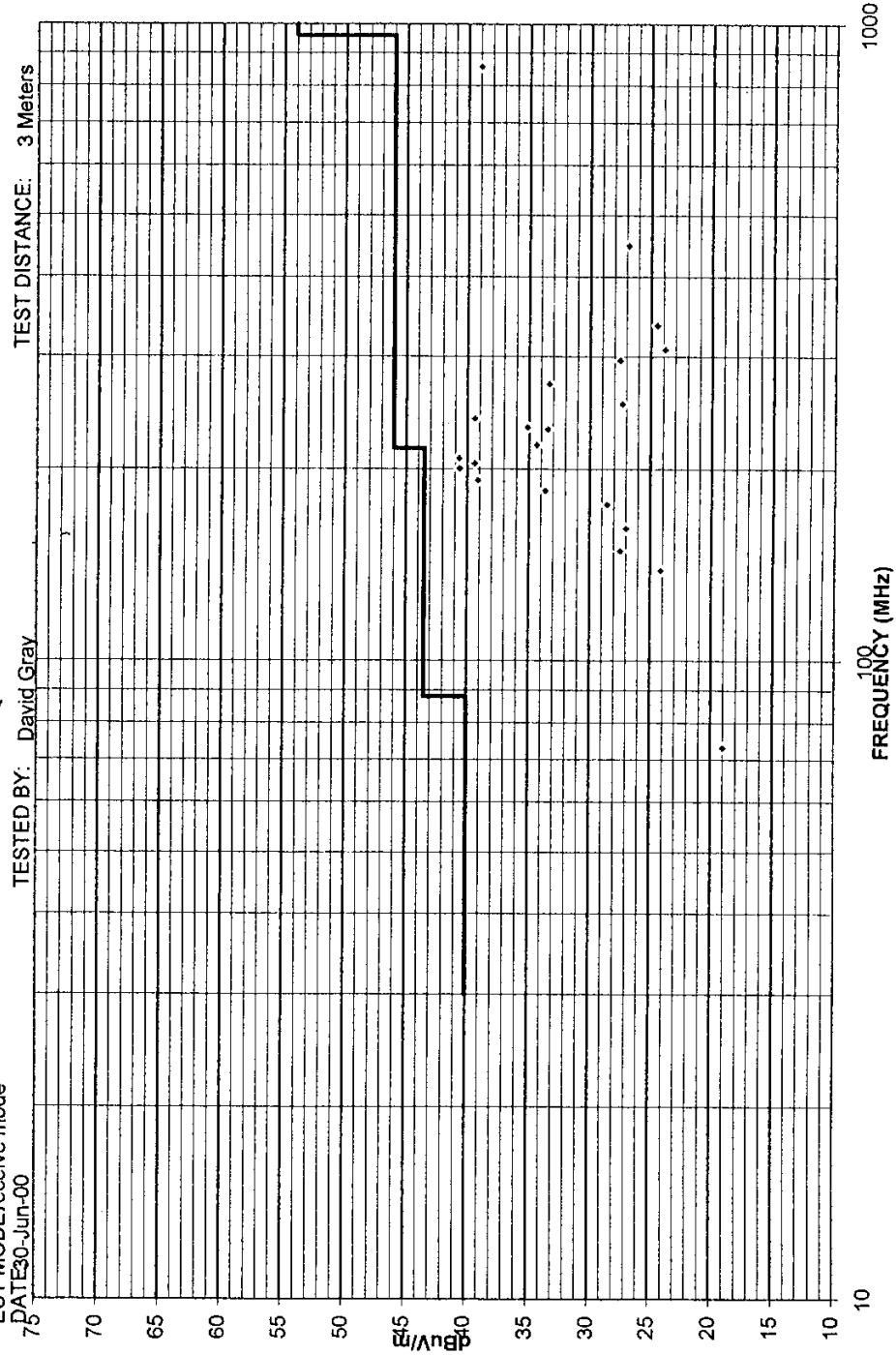
Remarks: One year calibration cycle for all test equipment and sites.

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REPORT NO:0275  
COMPANY:HM Electronics  
EUT Model Com 900 BP transceiver  
EUT MODE:Receive mode  
DATE:0-Jun-00  
75

SPEC: FCC Part 15 para 15.109(a)



REPORT No: s0275

SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: HM Electronics

TEST DIST: 3 Meters

← E U T: Model Com 900 BP transceiver

TEST SITE: 2

EUT MODE: receive mode

BICONICAL 739

DATE: 30-Jun-00 TESTED BY: David Gray

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.

RCVR: 427

## 8.2 Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna , cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} = 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

This result is well below the FCC and CSA Class A limit of 29.5 dbuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

**9 SUMMARY:**

All tests according to the regulations cited on page 1 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements cited on page 1.

- **Does not** fulfill the general approval requirements cited on page 1.

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- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Mary Washington  
(EMC Engineer)

Responsible Technician:



David Gray  
(EMC Senior Technician)