CARL T. JONES
CORPORATION

April 18, 1994

Mr. Herbert Van Dyk
Hewlett Packard GmbH
Boeblingen Medical Division
Schickardstr. 4
71034 Boeblingen
Germany

Dear Herbert:

Enclosed is the final "corrected" copy of the Application for Type Acceptance prepared for the Hewlett Packard Model 1310A Biomedical Telemetry Transmitter (FCC ID: IPZBMDM1310A). Your equipment has been shipped today via Federal Express.

I apologize for the confusion. I enjoyed working with you, and I hope to work with you again.

Sincerely,

Jon Bondanella

Jon Bondanella
EMC Engineer

JB/law

Enclosure

Carl T. Jones Corporation
7901 Yarnwood Court, Springfield, Virginia 22153-2899 (703) 569-7704 Fax: (703) 569-6417

CARL T. JONES
CORPORATION

APPLICATION FOR TYPE ACCEPTANCE
Hewlett-Packard Company
Model 1310A Biomedical Telemetry Transmitter

FCC ID: IPZBMDM1310A

December, 1993

Carl T. Jones Corporation
7901 Yarnwood Court, Springfield, Virginia 22153-2899 (703) 569-7704 Fax: (703) 569-6417

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STATEMENT OF JON BONDANELLA
In Connection with
APPLICATION FOR TYPE ACCEPTANCE
Hewlett-Packard Company
Model 1310A Biomedical Telemetry Transmitter

FCC ID: IPZBMDM1310A

I am an Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia.

My education and experience are a matter of record with the Federal Communications Commission.

All of the tests contained in this report were prepared by me or under my supervision, and I attest to the accuracy of each. I submit that, to the best of my knowledge, the information contained in this report is complete and that the test sample meets the technical standards set forth in the Commission's Rules and Regulations.

DATED: December 1, 1993

Jon Bondanella
EMC Engineer

I. INTRODUCTION

The following data have been taken in support of an Application for Type Acceptance for the Hewlett-Packard Model M1310A Biomedical Telemetry Transmitter (FCC ID: IPZBMDM1310A), in accordance with Part 2, Subpart J and Part 90, Subpart I of the Federal Communications Commission's Rules and Regulations.

The equipment under test (EUT) is a biomedical telemetry transmitter which is used for the transmission of patient electrocardiograms (ECG's) within hospital buildings. It is powered by three small batteries and operates in the 406 - 470 MHz frequency range. The transmitter output power is 4 milliwatts. The patient cable leads are used for the antenna.

II. INFORMATION REQUIRED FOR TYPE ACCEPTANCE UNDER PART 2

Paragraphs

2.983 — A completed FCC Form 731 is included with this application.

2.983(a) — The applicant is both the vendor and manufacturer of the equipment in question. The company's full name and address are as follows:

Hewlett-Packard
Medical Products Group (Europe)
P.O. Box 1427
71004 Boeblingen, Germany

2.983(b) — The equipment is identified as the Hewlett-Packard Model M1310A Biomedical Telemetry Transmitter, FCC ID: IPZBMDM1310A.

2.983(c) — Quantity production is planned.

2.983(d)(1) — Emission designator: 7K80F9D

2.983(d)(2) — The frequency range is 406 MHz to 470 MHz.

2.983(d)(3) The rated maximum power of the transmitter is 4.0 milliwatts. It is internally adjustable ±1.0 dB by a potentiometer in the RF module; however, this unit is advertised as a fixed power device. This adjustment is not accessible to the user.

2.983(d)(4) The final amplifier stage of the M1310A produces a maximum output of 4.0 milliwatts. This is less than the maximum power of 350 Watts allowed for transmitters operating in the 220 to 470 MHz band as per Paragraph 90.205(b).

2.983(d)(5) The transmitter's final amplifier stage consumes a DC current of 1.0 milliamps with a DC voltage of 2.2 Volts on the collector.

2.983(d)(6) The function of each active device is described in Section 2 of the technical manual included with this report as Exhibit 13.

2.983(d)(7) Complete circuit schematics are included in the exhibits section.

2.983(d)(8) The user's manual containing complete operating instructions is provided as Exhibit 14.

2.983(d)(9) The tune-up procedure is given in Section 3 of the technical manual.

2.983(d)(10) A description of the circuits for determining and stabilizing the frequency is given in Section 4 of the technical manual.

2.983(d)(11) A description of the circuits employed for suppression of spurious emissions, limiting modulation, and limiting power are given in Section 5 of the technical manual.

2.983(d)(12) A detailed description of the modulation system is given in Section 6 of the technical manual.

2.983(d)(13) The data required by Paragraph 2.985 through 2.995 are included with this report.

III. MEASUREMENT REQUIREMENTS (Paragraphs 2.985 et. seq.)

2.985(a) RF Power Output

The transmitter was connected to a test adapter which provided impedance matching between the transmitter's RF output and the input of the measuring equipment. The test adapter had a measured insertion loss

of approximately 8.0 dB. The output of the transmitter was terminated into a Boonton microwattmeter which has an input impedance of 50 ohms. The maximum measured power level (including correction for losses) was 4.47 milliwatts which is less than the 350 Watts allowed under Paragraph 90.205(b) for a transmitter operating in the 220 - 470 MHz range. The measured maximum output power of 4.47 milliwatts (6.5 dBm) is well within the ±20% variation from the manufacturer's rating of 4.0 milliwatts as allowed under Paragraph 90.205(c).

2.987 Modulation Characteristics

Investigations showed that the analog transmission of the heart rate signals (US doppler-LF or filtered ECG) and a digital transmission of the TOCO and status (battery, ID-codes, marker, nurse call, fetal movement..) signals by an additional FSK modulated subcarrier gives the best overall performance. Based on this investigation, the modulation will be done in the following way:

The heart rate signals, which may be fetal ECG or ultrasound doppler signal, are pre-processed with standard technologies known from fetal monitors. These signals are band limited by filters: ECG: 15 Hz....100 Hz; US doppler LF: 100 Hz....450 Hz. The signals are then fed into a programmable gain amplifier controlled by an automatic gain control circuitry. The dynamic range of the signals is

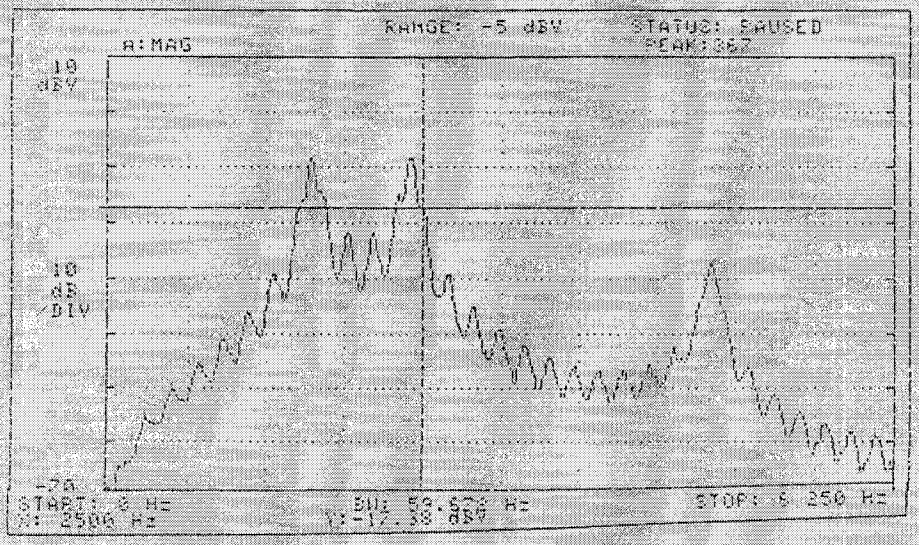
compressed from about 70 dB to about 30 dB. The signals are also amplitude limited and filtered again to ensure a modulation limitation of the RF carrier.

To this signal is added the FSK subcarrier, which is a sinoid signal with a frequency of 1.6 kHz or 2.4 kHz and a well-defined amplitude. A digital zero is represented by the 1.6 kHz subcarrier while a digital one is represented by the 2.4 kHz signal. The bit rate is 200 bits/second, thus the duration of the bit is 5 msec.

The composite signal modulates the RF carrier frequency in the 406...470 MHz band with an FM modulation. The RF deviation is 5 kHz peak to peak; required RF bandwidth is 14 kHz.

The modulation characteristics of the transmitter were measured using the configuration described in the occupied bandwidth section of this report. Their responses are shown on the following pages. The plots found on the following pages demonstrate that the overall system deviation is limited to less than the maximum +/- 5 kHz allowed under Paragraph 90.209(b).

M13 10 A: modulation signal, no traducer plugged (FSK signal only)



M12.10 Pa: modulation signal, US mode, US signal before clipping