TEST PROCEDURE CONTROL # 12-01	
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ASSY. PART # 404452

TELEPAK PCBA TEST PROCEDURE

I. Purpose

This document supports and details of the alignment, and subassembly testing of the Medical Data Electronics part 404452 Telepak Transmitter.

II. Scope

All tests are to be performed by persons trained by Medical Data Electronics employees or authorized trained sub-contractor personnel.

III. Test Equipment Required *

Power meter Agilent E4418B
Power sensor Agilent E9301A
Frequency counter Agilent 53181A with opt 001,015
50Ω BNC coax cable
Male BNC to female N adapter
TF1213 Angel test fixture
Red tuning tool MDE part # 268
Black modified tuning tool MDE part # 263
PC with Windows 98 and Data Logger latest software version
Straight DB-9 serial cable
Bar Code Scanner Intermec Scanplus 1800 ST (optional)
GPIB card for PC with drivers (optional)
GPIB cables (optional)

* **Note: Equivalent test equipment may be substituted if necessary**

IV. Applicable Documents

404452 Schematic

V. Procedure

1.0 FIXTURE SETUP

1.1 Plug the AC cord into the fixture, set to Auto mode.

1.2 Connect the PC's serial connector with the DB-9 cable to the serial connector on the fixture. Connect the optional GPIB cables from the PC GPIB card to the freq. counter and power meter.

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1.3 Turn on all test equipment and fixture and allow them to warm up for 30 minutes.

1.4 Calibrate the Power meter and power sensor according to the Setup Appendix.

1.5 Press the Recall button on the Frequency counter till Recall 1 appears. Then press the Enter button by the Channel 2 connector. The settings should be set to those given in the Setup appendix. If there is no longer a Recall 1 in the saved setups, see the Setup Appendix to setup the Counter and save the setup.

1.6 Connect power sensor to the test fixture's TX output connector with the N to BNC adapter.

1.7 Use the BNC coax cable to connect channel 2 of the frequency counter to the –15 dB connector on the fixture marked Freq. Counter.

1.8 Power up the PC and get to the Windows desktop.

1.9 Double click the Smdata.exe Test icon on the PC to start the Data Logger.

1.10 The Stickman Test Fixture window will pop up. Click the INITZ GPIB button if using the GPIB option, otherwise go to step 1.11.

1.11 Click the port control button. The Portclt Class Properties popup window will appear. From the Port: pull down, select the Com port being used to connect to the fixture. The default is Com 2. Click OK when done.

1.12 Click the Open Port button. On the dialog window "Port opened –Com2 – Baud Rate =19200" will appear, if you are using Com2.

1.13 Enter the Test Tech name or Number in the Test Tech box.

2.0 UUT INSTALLATION AND TESTING

2.1 Enter the serial number of the UUT in the serial number box of the Data Logger using a keyboard or a bar code scanner.

2.2 Unlatch the test head door and install the UUT aligning it with the 2 alignment pins.

2.3 Close and latch the door. Then press the green Start button to begin the test. The fixture will begin testing the ECG portion of the PCBA. The Data Logger will display in the dialog window "Fixture state Rx'd", if not try a different Com Port selection. If there are any failures the fixture will stop at that test and deflate the head removing power from the PCBA. Retry testing the UUT again and if it fails again on the same test remove the UUT and document the failure and route the board for rework or disposal, then skip to Section 2.13.

2.4 If the UUT completes the ECG portion of the test it will stop at the RF Adjust menu.

2.5 Adjust the power output with VR4 so the current on the display does not exceed 15 ma, but the power meter reads 5.0 dBm minus the loss of the fixture ± 1 dBm. If the limits are turned on, the display will show "Undr Lmt" if the reading is low, "Over Lmt" if it is high, or just the reading if it is in spec. **Note:** Max power of the Angel PCBA is 5dBm ± 1 dBm. Example: the power meter reads 0.4 dBm + loss of the fixture is 5.1 dBm. The total power of the Telepak PCBA is 0.4 dBm + 5.1 dBm = 5.5 dBm.

2.6 Adjust VR3 for the minimum value read on the fixture display for Bias. The final reading after completing steps 2.7 and 2.8 should be ≤ 20, typical value is 11.

2.7 Adjust VR2 for the frequency of the test fixture shown in the upper left corner of the fixture display + 0.000,500/-0 MHz (i.e. if RF @610.6 The Freq Counter should read the frequency 610.600,000 + 0.000,500/-0 MHz).
Note: Turning VR2 clockwise the frequency goes up.

2.8 Adjust VR1 so the Dev reading on the fixture display reads 515 ± 5.
Note: Turning VR1 clockwise the Dev value goes down.

2.9 Repeat the adjustments for steps 2.6 to 2.8 as required. If any portion of the RF adjustment does not pass its final value, press the red Stop button and document the failure and route the board for rework or disposal, then skip to Section 2.13

2.10 Press the green Start button when done tuning to advance the test.

2.11 Verify on the power meter that the TX power output is < –20dBm. Press the green Start button after verifying the value to continue.

2.12 The fixture will complete testing the UUT and then deflate ending testing of the UUT. The fixture display will read UUT passed. The Data Logger will acknowledge the UUT passed and will display "Test record Rx'd" in the dialog window followed by "file opened" and "file closed".

2.13 To test the next board, go to Step 2.1. If the Board S/N box is highlighted, the Data Logger is ready for another serial number. If it is not highlighted click on the Clear Test Results button, click "OK" for the popup window that appears and the Board S/N will be highlighted to add the new serial number.

2.14 When done testing the job batch or for the shift, all test data will be saved electronically with the ability to be accessed on demand by Medical Data Electronics. (See Appendix for process procedure.)

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SETUP APPENDIX

1.0 AGILENT E4418B POWER METER

1.1 Connect the RF power sensor to the power meter.
1.2 To calibrate the power meter, connect the power sensor to the RF REF connector on the power meter after removing the BNC to N adapter.
1.3 Press the Zero/Cal button on the power meter.
1.4 Press the Cal selection on the meter display.
1.5 The meter will show a Wait message as it calibrates the meter.
1.6 To Zero the power meter,
1.7 Press the Zero selection on the meter display.
1.8 The power meter will again display a Wait message as it zeros the meter.
1.9 Press the dBm/W button and select the dBm unit of measurement. The power meter is now ready to test.

Note: All Setups beyond this point are to be performed by an engineer or qualified technician trained for these operations. The instruments normally remember the settings below, so the following steps are needed only if the instruments or PC are new, or if the settings are lost or changed.

If the power meter limits need to be set, press the Meas Setup button. Press the Limits selection on the meter display. Press the Limits OFF/ON selection till ON is highlighted. Press the Max selection on the meter display, and then use the arrow keys to set the desired value (i.e. 6db minus the loss of the fixture). Press the dBm meter selection to save. Press the Min selection on the meter display, and then use the arrow keys to set the desired value (i.e. 4dB minus the loss of the fixture). Next select dBm as the measurement units being used.

2.0 AGILENT 53181A FREQUENCY COUNTER

2.1 If the Recall no longer has the saved setup.
2.2 Press the Ch. 2 button.
2.3 Press the Gate button. Use the Arrow buttons to get to Time and press Enter. Use the Arrow buttons to get 1 sec and press Enter.
2.4 Press the Gate button. Use the Arrow buttons to get to Digits and press Enter. Use the Arrow buttons to set 10 digits and press Enter.
2.5 Press the Fewer Digits button once to eliminate one digit.
2.6 Press the Save button. Use the Arrow buttons to get to 1 and press Enter. This will save the setting in Recall 1. The frequency counter is ready for testing.

3.0 TELEPAK DATA LOGGER

Note: The data logger is an application that stores and shows test data results, displays logger events, provides port control, GPIB interface and accepts operator information. The data logger will accept test data from the Angel test fixture via a serial port, add operator information and output this data to a file.

3.1 Load the Data Logger software into \telepak directory. The following files need to be in the directory: Smdata.exe, Commx.ocx and gpib-32.dll. The data log output file name is "Smresults.txt" and is created in the \Telepak directory. There is NO file size limit. It should be renamed periodically to avoid huge files. Each test record is approx. 570 bytes. When a new test record is received and 'smresults.txt' does not exist, it will be created. The fixture will ONLY output a test data packet if ALL tests pass.

3.2 Configurations

3.2.1. Minimum configuration is the fixture working stand alone. Any RF adjustments are acknowledged to be CORRECT by pressing the 'go' button. They are not checked.

3.2.2. Mid configuration is the fixture and Data logger application. In this configuration the fixture is working stand alone. Any RF adjustments are acknowledged to be CORRECT by pressing the 'go' button. They are not checked. When all tests pass, a test record of the results is sent to the application. Acknowledge is displayed in the dialog window "Test record Rx'd". The test record will show NO Data for the frequency/power readings.

3.2.3. Max configuration is the fixture, Data logger application and GPIB interface. The PC will interface the test equipment to the fixture via the GPIB bus. The fixture verifies RF adjustments measured by the test equipment. When all tests pass, a test record of the results is sent to the application. Acknowledge is displayed in the dialog window "Test record Rx'd".
The 'Recycle Mode" is used in the Max configuration to speed retest time of already adjusted boards. In this mode, the RF adjustment test timeouts are reduced to 5 sec each. This is enough time for the equipment to capture a reading and sent the results to the fixture for comparison. No operator acknowledgement is needed.

3.2.4. The fixture serial port is fixed at 19.2kbaud no parity, 8,1.

3.3 Bar Code Scanner (Mid and Max configuration options) — Formatted: Bullets and Numbering

3.3.1. Setup the bar code scanner for Keyboard Wedge configuration and to read barcodes as symbology "Code 128".

3.4 GPIB (Max configuration option) — Formatted: Bullets and Numbering

3.4.1. Set the Frequency counter to address 3 and set the power meter to address 13.

3.4.2. Install the GPIB card into the PC and software per card manufacturer instructions.

3.4.3. Connect the GPIB cables between the GPIB card and the power meter and frequency counter.

NOTE"CLEAR TEST RESULT" is not necessary after every result. It is only a convenience or for clearing test results from failed units.

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