4 T838/839 Fault Finding

Caution: **This equipment contains CMOS devices which are susceptible to damage from static charges. Refer to Section 1.2 in Part A for more information on anti-static procedures when handling these devices.**

The following test procedures and fault finding flow charts may be used to help locate a hardware problem, however they are by no means a complete fault finding procedure. If you still cannot trace the fault after progressing through them in a logical manner, contact your nearest Tait Dealer or Customer Service Organisation. If necessary, you can get additional technical help from Customer Support, Tait Electronics Ltd, Christchurch, New Zealand (full contact details are on page 2).

Refer to Section 5 where the parts lists, grid reference index and diagrams will provide detailed information on identifying and locating components.

The following topics are covered in this section.

4.1 Visual Checks

Remove the side cover from the T838/839 and inspect the PCB for damaged or broken components, paying particular attention to the surface mounted devices (SMDs). Also check for defective solder joints.

Refer to Section 4.5, Section 4.6 and Section 3 of Part A for more details on repair and replacement of components.

4.2 DC Checks

Check that +13.8V is present on pin 3 of *#IC202 and/or #IC201. Make this measurement when the transmitter is not keyed.

Key the transmitter and check that approximately 6-13V is present on pin 2 of *#IC202 and/or #IC201 (the level is dependent on the setting of RV109).

Check that +13.8V is present at pin 4 of IC103.

Check that approximately +12V is present at pin 8 of IC105 (the level is dependent on the setting of RV109).

Check that +7.0V is present at the output of regulator IC109.

4.3 RF Checks

The PA Fault Finding Charts (Section 4.4.1 & Section 4.4.2) provide a systematic approach for locating a fault in the RF circuitry. Use these charts in conjunction with Figure 4.1, which shows the locations of the 50Ω input and output test points for RF power modules #IC201 and *#IC202.

Note 1: Use good quality 50Ω coax for the "flying" test leads.

Note 2: Ensure each output is terminated in a 50Ω load of the correct power rating.

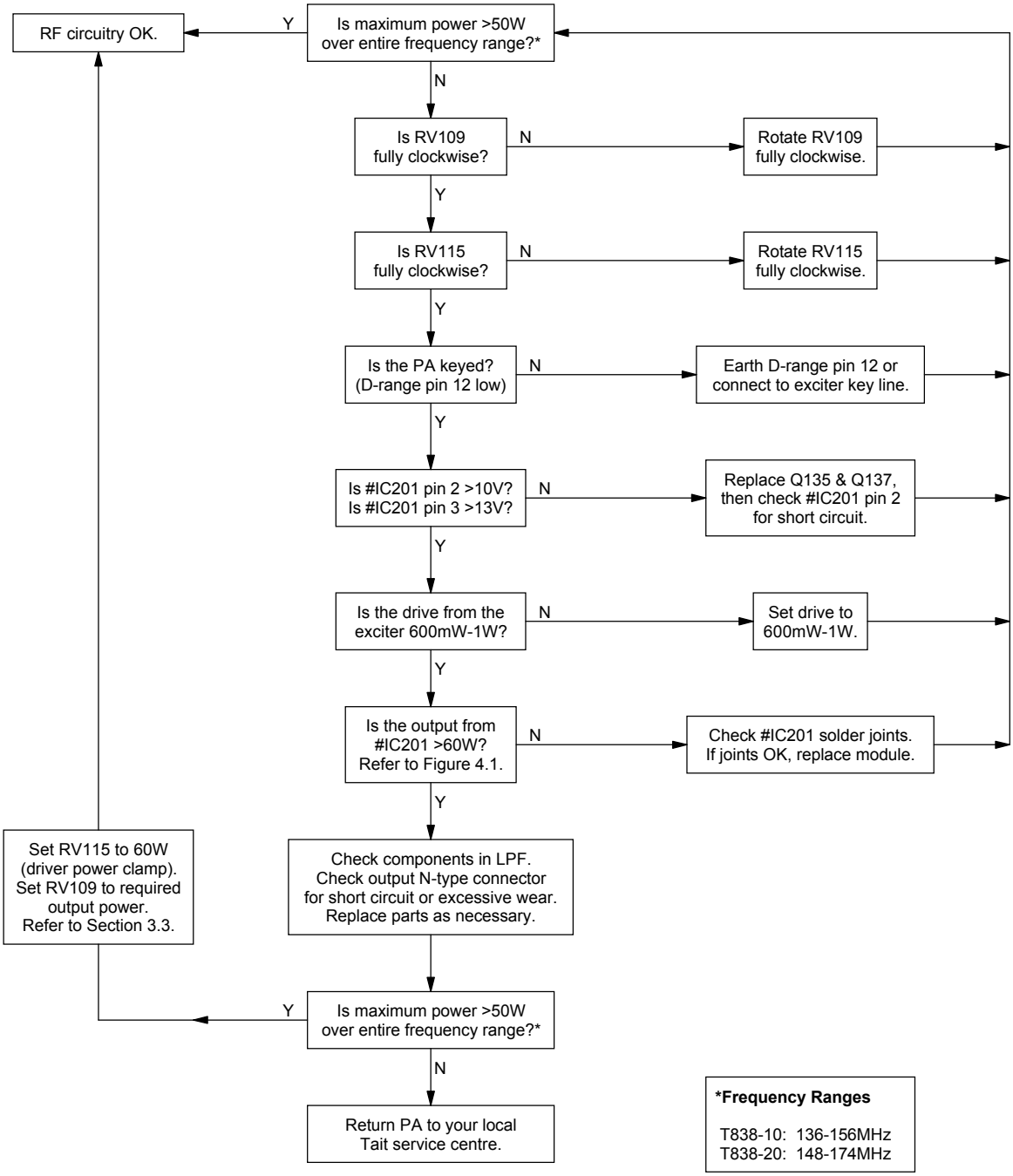
For problems with the power control circuitry, refer to the Power Control Fault Finding Chart (Section 4.4.3).

replace A4 pages D4.5/D4.6 with A3 pages D4.5/D4.6

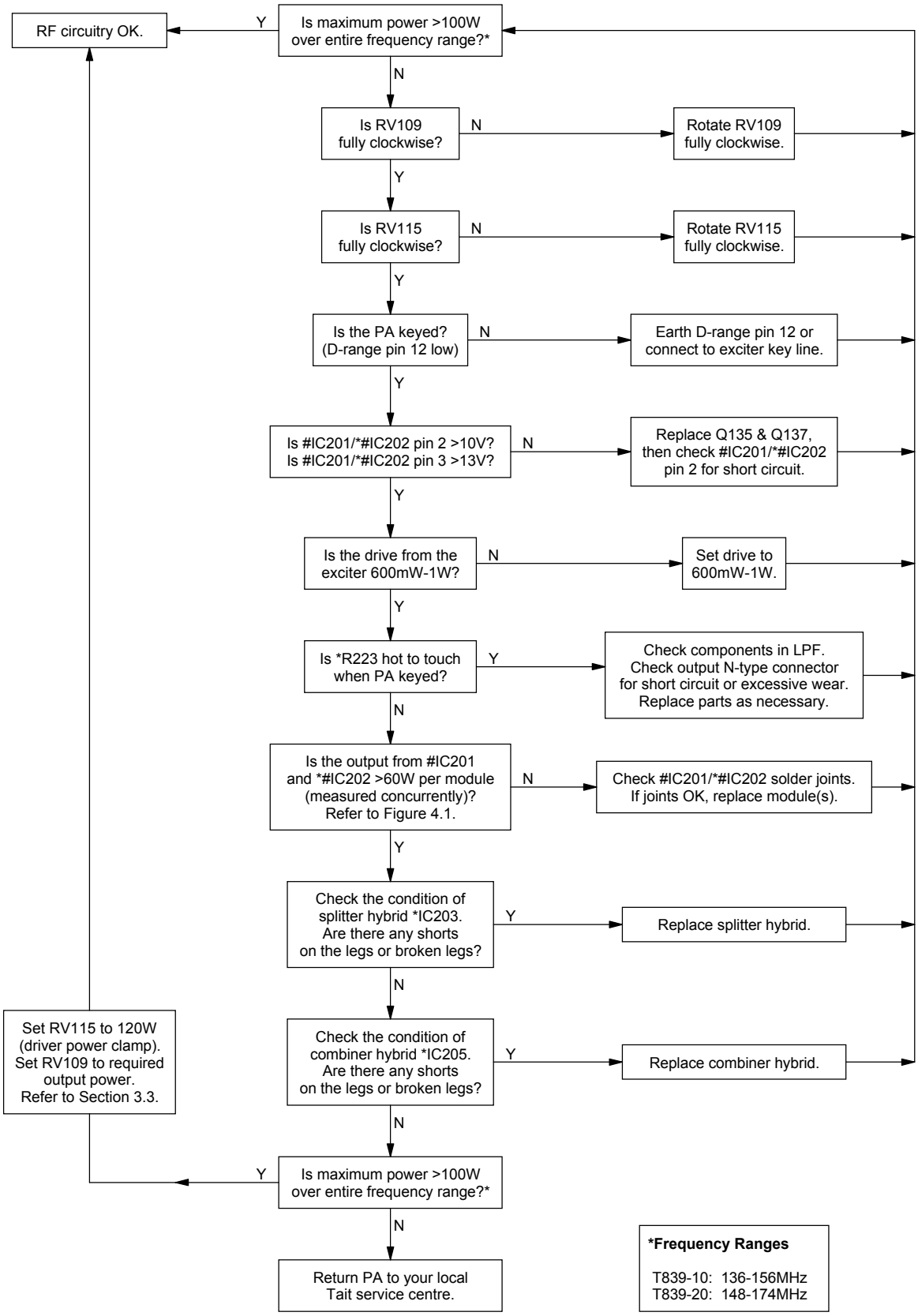
replace A4 pages D4.5/D4.6 with A3 pages D4.5/D4.6

4.4 Fault Finding Charts

4.4.1 T838 PA



4.4.2 T839 PA



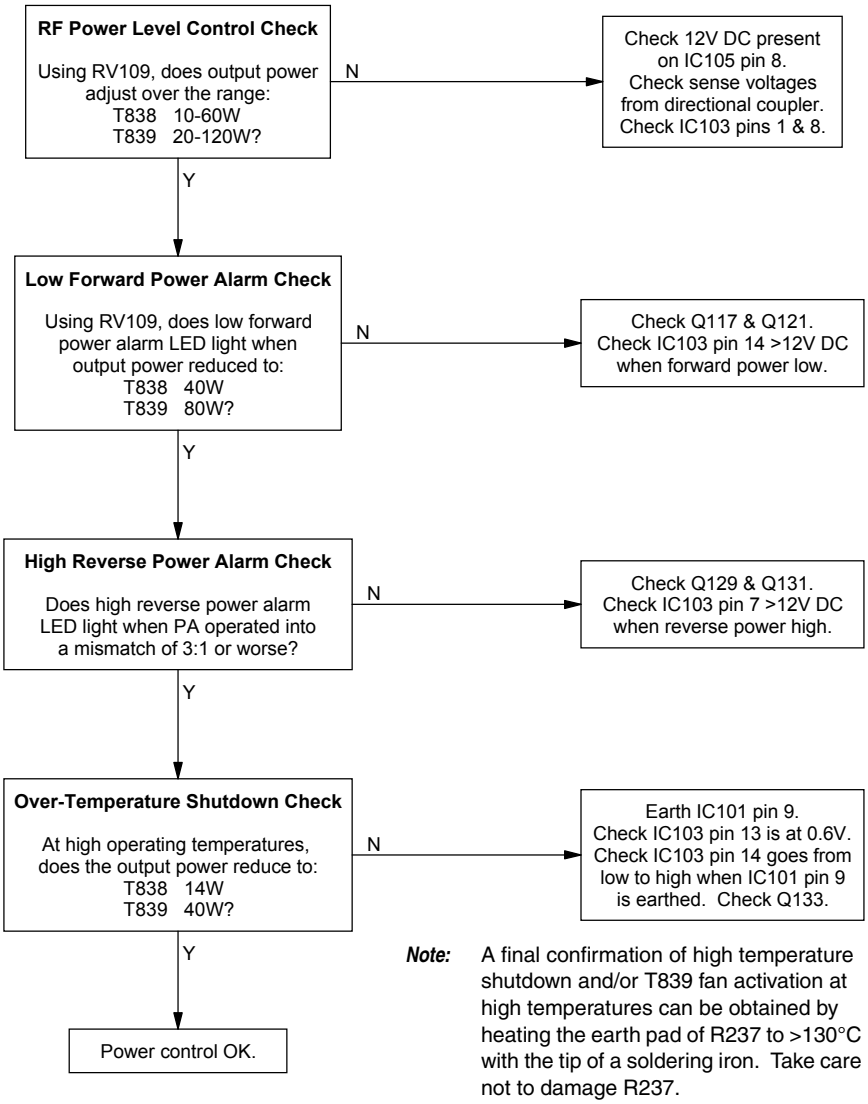
4.4.3 Power Control

Approximate voltages (@ 174MHz) under normal operating conditions:

Forward & Reverse Power Measurement	Output Power	
	50W	100W
forward power at IC103 pin 1	2.3V	3.3V
forward power at C261	4.1V	6.0V
reverse power at IC103 pin 8	0.6V	0.6V
reverse power at C295	0.3V	0.6V

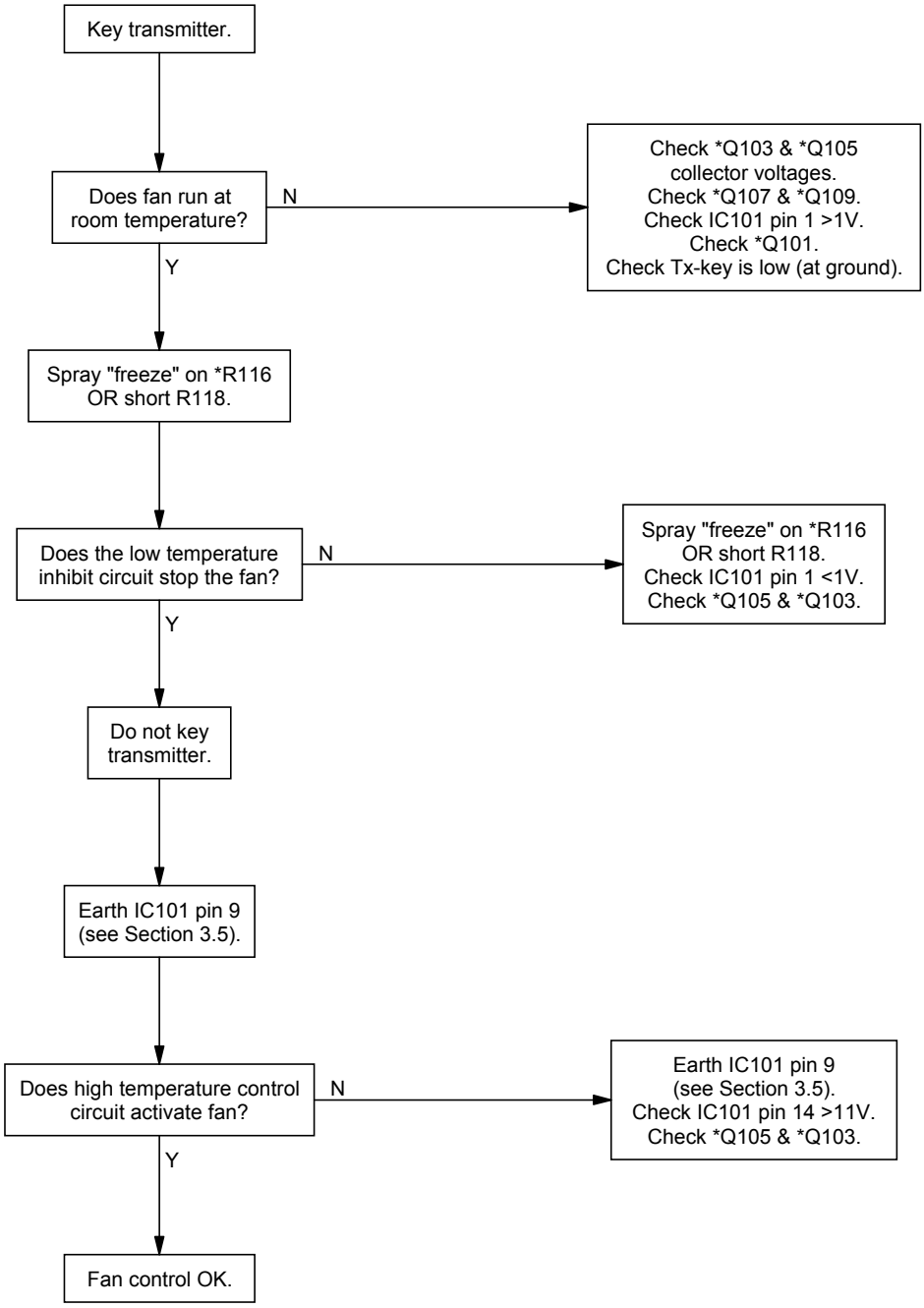
Caution

The following voltage checks are all done with RV115 (driver power clamp) set to maximum. When these tests are finished, reset RV115 to 60W (T838) or 120W (T839).



Note: A final confirmation of high temperature shutdown and/or T839 fan activation at high temperatures can be obtained by heating the earth pad of R237 to >130°C with the tip of a soldering iron. Take care not to damage R237.

4.4.4 T839 Fan Control Circuitry



4.5 Replacing RF Power Modules

Caution: **Follow these instructions carefully, otherwise the module can fail because of poor heatsinking or cracked substrates.**

Caution: **Do not apply too much heat to the original type of thermistor assembly as the epoxy used may give off fumes that will cause eye irritation. If necessary, replace this device as a complete assembly (see note 1 below).**

Desolder the module and thermistor[1] legs by heating with a soldering iron and lifting away from the PCB with a screwdriver or thin stainless steel spike.

Undo the module screws and remove the thermistor assembly.

Desolder and remove both earth tags.

Gently lift the module away from the heatsink.

Note: The module may be stuck down quite firmly with heatsink compound. You may need to carefully prise it away from the heatsink with a small screwdriver. Keep the heatsink compound clean while the module is detached.

Apply a small amount of heatsink compound (Dow-Corning 340 or equivalent) to the replacement module mounting surface. Use enough compound to ensure an even film over the entire mounting surface.

Reposition the module in the correct orientation and ensure it is well pasted to the heatsink.

Replace the earth tags and thermistor[1] assembly in their original positions and hand-tighten the screws, ensuring the tags and thermistor remain in place. Alternately tighten each screw evenly, finally torquing them down to 56N.cm/5in.lbf. with an accurate torque driver.

Caution: **It is essential that you apply the correct torque to these screws to allow the module flange to expand and contract under temperature cycling. Also, do not solder any module legs before torquing down otherwise the device may be broken.**

Solder all module legs to the PCB.

Carefully solder the thermistor leg to the PCB[1].

1. Later production PAs are fitted with a different type of thermistor which you do not need to desolder from the PCB before removing a power module. Refer to the top side PCB layout diagrams in Sections 5.2 and 5.3 for further details.

4.6 Removing The PCB From The Heatsink

Note: This is a lengthy procedure and should be considered only after all other checks have been carried out. There are no components on the bottom of the PCB.

Remove the harmonic filter shield lid.

T839 Only: Desolder the power feed to the fan from the PCB.

Remove the output 50 ohm coaxial connector by unscrewing it from the heatsink casting and desoldering it from the PCB and harmonic filter shield wall.

Unplug the input 50 ohm coaxial cable from the PCB, unscrew the BNC connector from the heatsink, and remove the connector and cable.

Desolder the positive and negative power feed wires from the D-range PCB.

Disconnect the ribbon cable from the D-range PCB.

Remove the 2 screws securing the D-range connector and PCB to the heatsink and withdraw the assembly from the heatsink.

Remove the mounting screws for the TO-220 device(s): Q137 (and *R223 in the T839).

Remove the screws securing the RF power module(s): #IC201 (and *#IC202 in the T839).

T839 Only: Remove the four hex nuts and washers from the splitter/combiner hybrids (*IC203 and *IC205).

Remove the 11 PCB retaining screws.

Push the three LEDs out of their front panel grommets.

Lift the PCB gently from the heatsink to gain access to the underside of the board.

Note: #IC201, *#IC202 and *R223 may be stuck down with heatsink compound. You may need to carefully prise them away from the heatsink with a small screwdriver.

Caution: **Keep the heatsink compound clean while the PCB is detached. Any objects caught in the heatsink compound underneath the module which prevent effective earthing and/or heatsinking will cause catastrophic failure.**

Caution: **Do not operate the PA with the PCB detached as the heatsink is used for earthing and heat dissipation.**

To replace the PCB, reverse the order of removal, taking care that the wiring is correctly positioned and not 'pinched'.

Make sure that the heatsink compound has stayed clean, and that the insulating pad for Q137 is not damaged.

If you have difficulty refitting the LEDs, try pushing the body of the LED back into the grommet with a thin screwdriver or spike.

Caution: **Tighten the splitter/combiner hybrid hex nuts to a torque of 22N.cm/2in.lbf. Any greater force will damage the devices.**

Tighten the RF power module screws to a torque of 56N.cm/5in.lbf. with an accurate torque driver. Deviating from this figure can cause the device to fail (refer to Section 4.5).

