AV-15 Calibration

Note: There are no adjustable components in the AV-15 design. The calibration is done yearly to insure that the unit is still functioning within specifications. The following is performed during factory calibration;

Connect AV-15 output to a HP8568B (or equiv) spectrum analyzer using aprox 3 ft RG58 coax. The analyzer must have a precision frequency standard that is accurate to +/- 1x10^-7 Hz or better and 30Hz or less resolution BW.

General info:
Sideband to carrier db for double sideband AM = 20 LOG(%AM/200)
DDM=((Large % - Small %)/100)

ILS Localizer;
Set the HP8568B center freq to 108.1 and span to 2KHz. Select ILS localizer 108.1 and DDM=0 (CENTER) on the AV-15. Check that;
Frequency=108.1MHz (+/- 2.5PPM +/- 1PPM aging per year) and that the power is -10dbm (+/- 3db).
With the center selected, check that the 90Hz and 150Hz sidebands are equal (+/- 1db) and -20db (+/- 1db) from carrier.
Set 1/2 right on AV-15. Side bands -18.5 (+/- 1) db and -21.9 (+/- 1) db
Set Full right on AV-15 Side bands -17.2 (+/- 1) db and -24.2 (+/- 1) db
Set 150 Hz OFF and see that sideband gone.
Set 90 Hz OFF and see that sideband gone.

ILS Glide slope;
Change the HP8568b to 334.7MHz 2Khz scan and check the AV-15 glide slope signal for frequency accuracy +/- 2.5PPM +/- aging, power=-17dbm +/- 3db, 90Hz and 150Hz AM mod sidebands -14dbm +/- 2db from carrier and +/- 1db of equal magnitude for center.
For 1/2 the sidebands should be -13.1(+/- 1) and -15(+/- 1) db down.
For FULL the sidebands should be -12.25(+/- 1) and -16.125(+/- 1) db down.
Set 150 Hz OFF and see that sideband gone.
Set 90 Hz OFF and see that sideband gone.

ILS Marker;
Check for 75MHz +/- 5ppm carrier with -15dbm +/- 3db power out. check on/off AM mod as;
outer marker 400Hz +/- 5%
middle marker 1300Hz +/- 5%
inner marker 3000Hz +/- 5%

VOR;
Select VOR mode and 108 MHz freq on AV-15. Measure the center frequency and power.
108MHz +/- 2.5PPM aging and -10dbm +/- 3dbm in 10KHz analyzer BW.
Using a modulation analyzer check that the 30Hz AM and 9960Hz subcarrier provide about 30% AM and that the on/off 1024Hz tone is giving about 10% AM mod. Check the Phase between the two 30Hz signals to insure they are within +/- 1 degree of expected phase.
Check the other VOR frequencies and their power.
DME;
Use a 1GHz bandwidth Tek-7104 scope (or equiv). View the AV-15 output signal. The output will be pulse pairs spaced 12uS +/- .1uS for the 108.0 X mode and 36uS +/- .1uS for the 108.05 Y mode. The output power =-12dbm +/- 3db. Check the AV-15 with a known good DME for proper lock.

ADF;
Use the spectrum analyzer to check the ADF am signals. Freq within +/- 5ppm and output power -12dbm +/- 3db. On/off AM modulation.

Transponder;
Using the 1GHz bandwidth above, scope view the AV-15 output and check power for -12dbm +/-3db. The HP85688B analyzer can be used to check the carrier frequency by selecting the AV-15 MODE-A squawk mode and using the appropriate analyzer scan rate to determine the aprox output frequency.

COMM;
Using an accurate digital frequency counter, measure the communications output frequencies.
Using an accurate frequency source at 0dbm power, measure its frequency with the AV15 to check for +/- 2PPM +/- generator accuracy when the difference frequency is 1000Hz.

Finally all the transponder modes are checked using a known good mode-a/c/s-ES transponder.
If any of the above tests fail the factory should be contacted for repair.