

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 approx 3 ft RG58 coax. The analyzer must have a precision frequency standard that is accurate to +/- 1×10^{-7} Hz or better and 30Hz or less resolution BW.

General info;

Sideband to carrier db for double sideband AM=20 $\text{LOG}(\%AM/200)$
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 HP8568B 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.