*TB 9-6625-2094-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR SIGNAL GENERATOR SG-1170/U (WAVETEK, MODEL 3001)

Headquarters, Department of the Army, Washington, DC
18 December 2008

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our FAX number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use: https://amcom2028.redstone.army.mil.

*This technical bulletin supersedes TB 9-6625-2094-35, 6 August 2003, including all changes.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Signal Generator SG-1170/U (Wavetek, Model 3001). The manufacturer's manual was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations

(1) Wavetek, Model 3001 (unmodified) frequency range is from 1 MHz to 520 MHz.

(2) The SG-1170/U (modified) instruments have a frequency range from 1 kHz to 520 MHz.

(3) SG-1170/U (unmodified) instruments have a frequency range from 450 kHz to 520 MHz.

(4) Frequency ranges for a particular instrument are shown on the front panel, located above the **FREQUENCY** indicator switches.

b. Time and Technique. The time required for this calibration is approximately 4 hours, using the dc and low frequency and microwave techniques.

2. Forms, Records, and Reports.

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications, which pertain to this calibration, are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Frequency	Range: 0.001 to 520 MHz Accuracy: ± 0.1%, 1 to 100 kHz[1] ± 0.001%, 0.1 to 520 MHz (± 0.001% ± 10 kHz FREQUENCY VENIER in UNCAL position) Stability: <0.38 ppm/hr in CAL position ± 500 Hz/10 min in UNCAL position

See footnote at end of table.

Table 1. Calibration Description - Continued

Test instrument parameters	Performance specifications
RF output	Range: -137 to +13 dBm Accuracy: ± 1.25 dB, -7 to 13 dBm ± 1.95 dB, -7 to -77 dBm ± 2.75 dB, -77 to -137 dBm
Flatness	Range: -7 to 13 dBm Accuracy: ± 0.75 dB ref 50 MHz
Meter	Range: 10 dBm Accuracy: ± 0.5 dB at 50 MHz
Attenuators	Range: -130 to +10 dBm Accuracy: ± 0.5 dB to 70 dBm (± 0.2 dB cal error) ± l dB to 130 dBm (± 0.5 dB cal error)
Amplitude modulation	Range: 0 to 90% Accuracy: ± (5% +5% of Full Scale) at 1 kHz
Internal frequency	Range: 400 Hz and 1 kHz Accuracy: ± 5%
Distortion	Accuracy: <3% to 70% <5% to 90%
Frequency modulation:	
Frequency	Range: 400 Hz and 1 kHz Accuracy: ± 5%
Deviation	Range: 0 to 10 kHz and 0 to 100 kHz Accuracy: ± 500 Hz on X1 range ± 5 kHz on X10 range
Distortion	Accuracy: <2%, 10 kHz to 100 kHz deviation at 1 kHz <4%, 3 kHz to 10 kHz deviation at 1 kHz

[1]Specification change authorized.

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286, AN/GSM-287, or AN/GSM-705. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment is shown in parenthesis.

5. Accessories Required. The accessories required for this calibration are common usage accessories, issued as indicated in paragraph **4** above, and are not listed in this calibration procedure.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUDIO ANALYZER	Frequency measurement: Range: 380 to 1050 Hz Accuracy: ±1.25% Distortion capability: <0.5% at 1 kHz	Boonton, Model 1121 (1121)
FREQUENCY COUNTER	Range: 1 kHz to 520 MHz Accuracy: ±0.00025%	Fluke, Model PM6681/656 (PM6681/656)
MEASURING RECEIVER Frequency RF Power Flatness Amplitude modulation Frequency modulation	 Range: 500 kHz to 520 MHz Accuracy: <1 x E-9/day Stability: ±0.05 ppm/hr Range: 520 MHz (0 dBm to -110 dBm) Accuracy: ±0.1875 dBm Range: 10 MHz to 500 MHz Accuracy: ±0.125 dBm Range: 10% to 90% mod at 520 MHz Accuracy: ±2.65% Range: 50 MHz at 400 Hz and 1 kHz mod Accuracy: <1.25% from 10 kHz to 100 kHz frequency deviation	Measuring receiver system N5530S consisting of: Spectrum Analyzer, Agilent Model E4440A (E4440A), Power meter, Agilent Model E4419B (E4419B), and Sensor module, Agilent Model 504 (504)
MULTIMETER	Range: 20 V dc Accuracy: ±0.05%	Hewlett-Packard, Model 3458A (3458A)

SECTION III
CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs **6** and **7** are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name as listed in table 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in TM 11-6625-3029-14 for this TI.

d. When indications specified in paragraphs **8** through **16** are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs **8** through **16**. Do not perform power supply check if all other parameters are within tolerance.

e. Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions. REDUCE OUTPUT(S) to minimum after each step within the performance check where applicable.

a. Remove protective cover from TI only when necessary to make adjustments. Replace cover upon completion of adjustments.

b. Connect TI to a 115 V ac source.

c. If **OUTPUT** meter needle does not bisect the dot at the left end of the scale, adjust zero adjust, located below meter face, until meter needle bisects dot.

d. Set **POWER** switch to **ON** and allow at least 2 hours for TI to warm-up and stabilize.

NOTE

Verify that the proper CAL FACTORS are loaded for the measuring receiver sensor module.

8. Frequency Accuracy

a. Performance Check

NOTE

Perform only the frequency checks pertaining to the model being calibrated. See paragraph **1 a** (1) through (4) for identification of models.

(1) Connect TI **RF OUTPUT** to frequency counter input **A**. Set counter to 50 Ω input and gate time to 10 seconds.

(2) Position TI controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) **MODULATION MODE** switch to **CW**.
(c) **OUTPUT** step attenuator control for **0 dBm**.
(d) **OUTPUT VERNIER** control fully cw.
(e) **FREQUENCY** switches to indicate **000.001 MHz**.

(3) If counter does not indicate within limits specified in first row of table 3, perform **b** (1) through (3) below.

(4) Repeat technique of (2) (e) above for **FREQUENCY** switch settings listed in table 3. If frequency counter does not indicate within limits specified, perform **b** (1) through (3) below.

Table 3. Frequency

Test instrument **FREQUENCY** switch settings (MHz)	Frequency counter indications (Hz)	
	Min	Max
000.001	0999	1001
000.005	4995	5005
000.009	8991	9009
000.010	9990	10,010
000.050	49,950	50,050
000.090	89,910	90,090
000.100	99,999	100,001
000.500	499,995	500,005
000.900	899,991	900,009
001.000	999,990	1,000,010
005.000	4,999,950	5,000,050
009.000	8,999,910	9,000,090
010.000	9,999,900	10,000,100
050.000	49,999,500	50,000,500
090.000	89,999,100	90,000,900
100.000	99,999,000	100,001,000
500.000	499,995,000	500,005,000

(5) Position TI controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **0 kHz**.
(b) **FREQUENCY** switches to indicate **001.000 MHz**.
(c) **MODULATION MODE** switch to **FMx1**.
(d) **MODULATION FREQ** switch to **DC**.
(e) **MODULATION FM/AM** switch to **10 kHz**.

(6) If frequency counter does not indicate between 999.99 and 1020.01 kHz, perform **b** (4) through (11) below.

(7) Set **MODULATION MODE** switch to **FMx10**.

(8) Frequency counter will indicate between 1089.99 and 1110.01 kHz.

(9) Set **MODE** switch to **CW**, **FREQUENCY** switches to **002.000 MHz**, and **FREQUENCY VENIER** control to **+3 kHz**. After 1 minute, record frequency counter indication.

(10) Set **FREQUENCY VERNIER** control to **0 kHz**. After 1 minute, record frequency counter indication. Subtract from indication recorded in (9) above. Difference will be between 2500 and 3500 Hz.

(11) Set **FREQUENCY VERNIER** control to **-3 kHz**. After 1 minute, record frequency counter indication. Subtract from indication recorded in (10) above. Difference will be between 2500 and 3500 Hz.

b. Adjustments

(1) Position TI controls as listed in (a) through (d) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) **MODULATION MODE** switch to **CW**.
(c) **OUTPUT** step attenuator control for **0 dBm**.
(d) **OUTPUT VERNIER** control fully cw.

(2) Set **FREQUENCY** switches to indicate **500.000 MHz**.

(3) Adjust FREQ ADJ M30-1(UNMODIFIED) (fig. 1) trimmer ccw for minimum frequency indication on frequency counter, then adjust trimmer cw until frequency counter indicates 500.000 MHz (R).

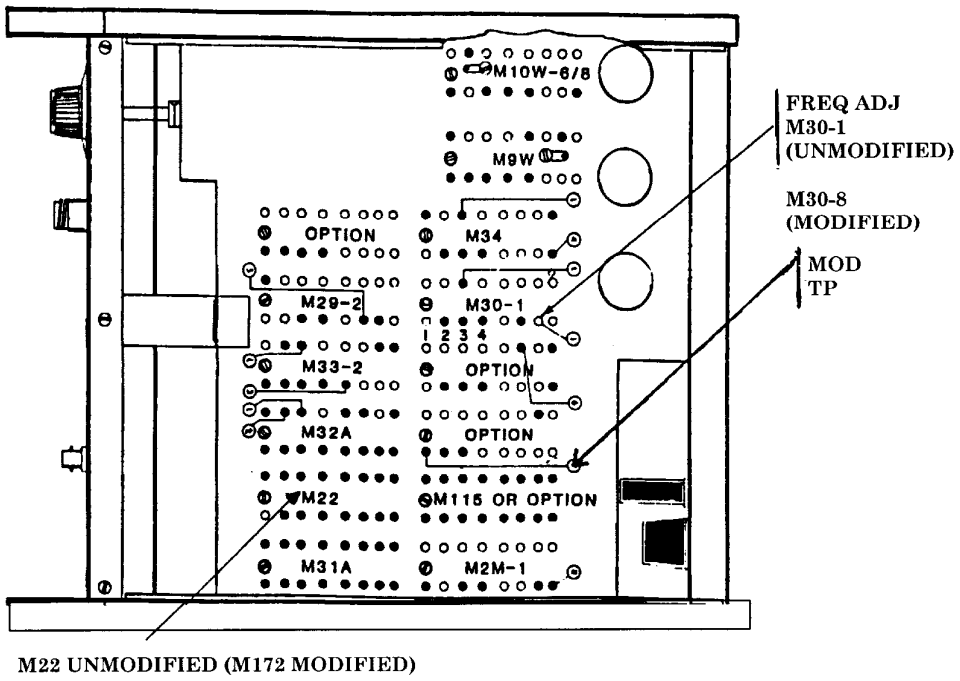

Figure 1. Test instrument - bottom view.

(4) Position controls as listed in (a) through (g) below:

(a) **FREQUENCY VERNIER** control to **0 kHz**.
(b) **FREQUENCY** switches to **002.000 MHz**.
(c) **MODULATION MODE** switches to **FMx10**.
(d) **MODULATION FREQ** to **DC**.
(e) **MODULATION FM/AM** slide control to full up position.
(f) **OUTPUT** step attenuator control **for +10 dBm**.
(g) **OUTPUT VERNIER** control fully cw.

NOTE

Modulation board C316-6 contains a size ADJ (C) and a balance ADJ (D), which are factory adjustments. DO NOT change the settings of these two controls.

(5) Connect multimeter to MOD TP (fig. 1) and ground.

(6) Adjust MODULATION BOARD POT A (fig. 2) for a +5.00 ±01 V dc indication on the multimeter (R).

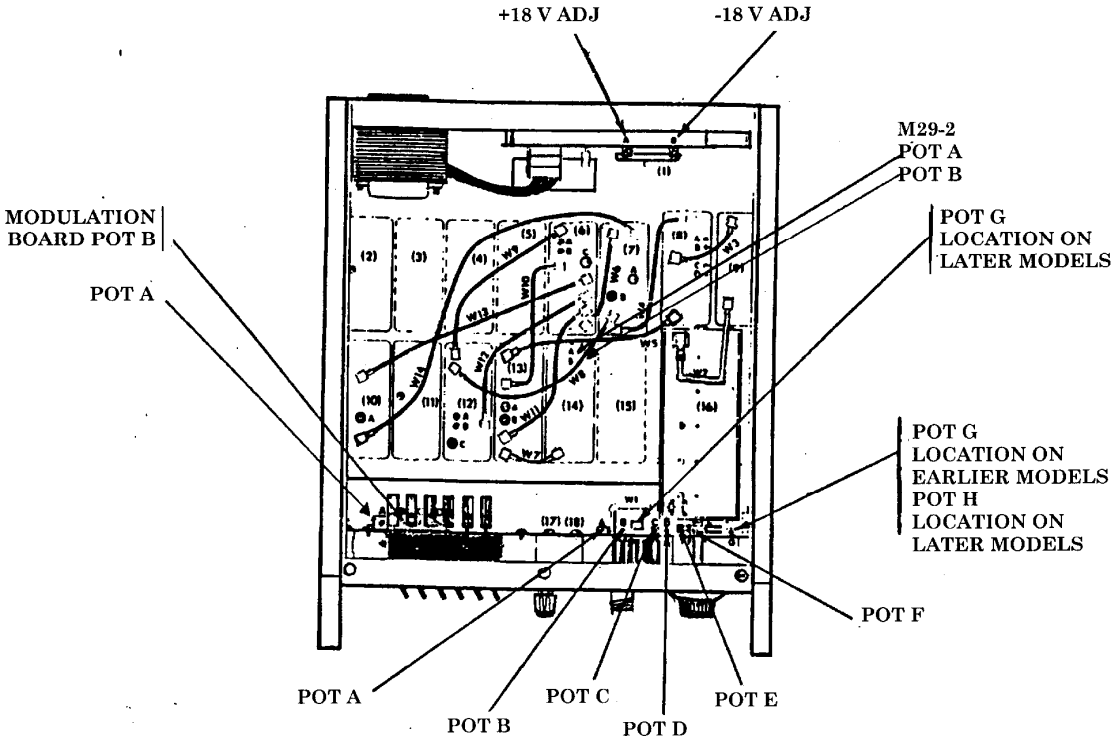

Figure 2. Test instrument - top view.

(7) Set **MODULATION FM/AM** slide control to **0**. The multimeter should indicate 0 V ±20 mV dc.

(8) Disconnect the multimeter from MOD TP (fig. 1) and ground.

(9) Adjust M29-2 POT B (fig. 2) to produce an indication of 2.000 MHz 100 Hz on frequency counter (R).

(10) Set **MODULATION FM/AM** slide control to full up position and adjust M29-2 POT A (fig. 2) to produce an indication of 2.100 MHz 100 Hz (R) on frequency counter.

(11) Set **MODULATION MODE** switch to **FMx1** and adjust MODULATION BOARD POT B on left side of board (fig. 2) to produce an indication of 2.010 MHz 100 Hz on frequency counter (R).

9. Frequency Stability

a. Performance Check

(1) Position controls as listed (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) **MODULATION MODE** switch to **CW**.
(c) **OUTPUT** step attenuator control for **0 dBm**.
(d) **OUTPUT VERNIER** control fully cw.
(e) Set **FREQUENCY** switches to indicate **500.000 MHz.**

(2) After frequency counter indication stabilizes, record frequency indication.

(3) Monitor frequency counter indication for 1 hour. The frequency will not drift more than 200 Hz from the value recorded in 2 above.

(4) Position controls as listed in (a) through (c) below:

(a) **FREQUENCY VERNIER** control to **0 kHz**.
(b) **MODULATION MODE** switch to **FMx1**.
(c) **MODULATION FM/AM** slide control to **10 kHz**.

(5) After 1 minute stabilization period, record frequency counter indication.

(6) Monitor frequency counter indication for 10 minutes. The frequency will not drift more than 500 Hz from the value recorded in 5 above.

(7) Disconnect frequency counter input **A** from **TI RF OUTPUT**.

b. Adjustments. No adjustments can be made.

10. Output Meter Accuracy

a. Performance Check

NOTE

ZERO and CALIBRATE the measuring receiver and sensor module.

(1) Connect measuring receiver sensor module to TI **RF OUTPUT**.

(2) Configure measuring receiver to measure RF power in LOG mode.

(3) Position controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) Set **FREQUENCY** switches to indicate **050.000 MHz**.
(c) **MODULATION MODE** switch to **CW**.
(d) **OUTPUT VERNIER** control for a **-1 dB** indication on **OUTPUT** meter.
(e) **OUTPUT** step attenuator control to **+10 dBm**.

(4) If measuring receiver does not indicate within limits specified in first row of table 4, perform **b** below.

(5) Repeat technique of (3) (d) and (e) above for TI settings and indications listed in table 4. If measuring receiver does not indicate within specified limits, perform **b** below.

Table 4. Output Meter

Test instrument		Power meter (dBm)	
OUTPUT step attenuator settings (dBm)	**OUTPUT** meter settings	Min	Max
+10	-1	+8.5	+9.5
0	+3	+2.5	+3.5
0	0	-0.5	+0.5
0	-3	-2.5	-3.5
0	-5	-4.5	-5.5
0	-7	-6.5	-7.5
-10	+3	-6.5	-7.5

b. Adjustments

(1) Temporarily disconnect measuring receiver sensor module from TI.

(2) Set **OUTPUT VERNIER** control fully ccw and adjust meter board POT B (fig. 2) until meter needle bisects dot at left end of meter scale (R).

(3) Adjust **OUTPUT VERNIER** control fully cw and adjust meter board POT A (fig. 2) for a +3-dBm **OUTPUT** meter reading (R).

(4) Set **OUTPUT** step attenuator to **+10 dBm**.

(5) Connect measuring receiver sensor module to TI **RF OUTPUT**.

(6) Alternately adjust **OUTPUT VERNIER** control for a **0** and **-7 dBm** reading on TI **OUTPUT** meter while adjusting meter board POT F (fig. 2) for +10 dBm and POT E (fig. 2) for +3 dBm indications on the measuring receiver. Repeat the above until no further adjustments are required (R).

(7) Adjust **OUTPUT** step attenuator to **0 dBm**.

(8) Alternately adjust **OUTPUT VERNIER** control for a **+3** and **-6 dBm** reading on TI **OUTPUT** meter while adjusting meter board POT C (fig. 2) for +3 dBm and POT D for -6 dBm indications on the measuring receiver. Repeat the above until no further adjustments are required (R).

11. Output Level Flatness

a. Performance Check

(1) Position controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) **Set FREQUENCY** switches to indicate **050.000 MHz**.
(c) **MODULATION MODE** switch to **CW**.
(d) **OUTPUT** step attenuator control to **-10 dBm**.
(e) **OUTPUT VERNIER** control for a **-7 dB** indication on measuring receiver.

NOTE

Do not change **OUTPUT VERNIER** control setting after this point.

(2) Set measuring receiver to ratio mode and adjust TI **FREQUENCY** switches from 010.000 MHz to 500.000 MHz. Measuring receiver indication will stay between -.75 and +.75 dB over the entire range.

(3) Take measuring receiver out of ratio mode.

(4) Position controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) Set **FREQUENCY** switches to indicate **050.000 MHz**.
(c) **MODULATION MODE** switch to **CW**.
(d) **OUTPUT** step attenuator control to **0 dBm**.
(e) **OUTPUT VERNIER** control for a **-1 dB** indication on measuring receiver.

NOTE

Do not change **OUTPUT VERNIER** control setting after this point.

(5) Set measurement receiver to ratio mode and adjust TI **FREQUENCY** switches from **010.00 MHz** to **500.00 MHz**. Measuring receiver indication will stay between -.75 to +.75 dB over the entire range.

(6) Take measuring receiver out of ratio mode.

(7) Position controls as listed in (a) through (e) below:

(a) **FREQUENCY VERNIER** control to **CAL**.
(b) Set **FREQUENCY** switches to indicate **050.000 MHz**.
(c) **MODULATION MODE** switch to **CW**.
(d) **OUTPUT** step attenuator control to **10 dBm**.
(e) **OUTPUT VERNIER** control for a **+9 dB** indication on measuring receiver.

NOTE

Do not change **OUTPUT VERNIER** control setting after this point.

(8) Set measurement receiver to ratio mode and adjust TI **FREQUENCY** switches from **010.00 MHz to 500.00 MHz**. Measuring receiver indication will stay between -.75 to +.75 dB over the entire range.

(9) Take measuring receiver out of ratio mode.

b. Adjustments. No adjustments can be made.

12. Attenuator Accuracy

a. Performance Check

NOTE

If necessary, ZERO and CALIBRATE measuring receiver and sensor module.

(1) Position controls as listed in (a) through (c) below.

(a) **FREQUENCY** switches to indicate **520.000 MHz**.
(b) **OUTPUT** step attenuator switch to **0 dBm**.
(c) **OUTPUT VERNIER** control for **0 dBm** on TI **OUTPUT** meter.

(2) Configure measuring receiver to measure frequency and wait for an indication.

(3) Configure measuring receiver to measure tuned RF level. Set measuring receiver to ratio mode.

(4) Set **TI OUTPUT** attenuator switch to **-10 dBm**. Measuring receiver will indicate within limits specified in first row of table 5.

(5) Repeat technique of (4) above for **TI OUTPUT** step attenuator settings listed in table 5. Measuring receiver will indicate within limits specified.

Table 5. Attenuator Accuracy

Test instrument step attenuator settings	Receiver system indications (dB)	
	Min	Max
-10	-9.3	-10.7
-20	-19.3	-20.7
-30[1]	-29.3	-30.7
-40	-39.3	-40.7
-50	-49.3	-50.7
-60	-59.3	-60.7
-70[1]	-68.5	-71.5
-80	-78.5	-81.5
-90	-88.5	-91.5
-100	-98.5	-101.5
-110	-108.5	-111.5

[1]If **RCAL** annunciator is illuminated, press the **CAL** key on the measuring receiver.

b. Adjustments. No adjustments can be made.

13. Amplitude Modulation Accuracy

a. Performance Check

NOTE

If necessary, ZERO and CALIBRATE measuring receiver and sensor module.

(1) Connect measuring receiver sensor module to TI **RF OUTPUT**.

(2) Set measuring receiver to measure modulation rate.

(3) Position controls as listed in (a) through (f) below:

(a) **FREQUENCY** switches to indicate **520.000 MHz**.
(b) **MODULATION MODE** switch to **AM**.
(c) **MODULATION FREQ** switch to **400 Hz**.
(d) **MODULATION FM/AM** slide control to **90** percent.
(e) **OUTPUT** step attenuator switch for **0 dBm**.
(f) **OUTPUT VERNIER** control for **-3 dB**.

(4) The measuring receiver will indicate between 380 and 420 Hz modulation.

(5) Set **MODULATION FREQ** switch to **1 kHz**.

(6) The measuring receiver will indicate between 950 and 1050 Hz modulation.

(7) Set measuring receiver to measure AM. If measuring receiver does not indicate within limits specified in first row of table 6, perform **b** below.

(8) Repeat technique of (3) (d) above for TI **OUTPUT** percent settings listed in table 6. Measuring receiver will indicate within limits specified.

Table 6. Amplitude Modulation

Test instrument (**MODULATION FM/AM**) percent slide settings	Measuring receiver percent modulation (AM)	
	Min	Max
90%	81.0	99.0
80%	71.5	88.5
70%	62.0	78.0
60%	52.5	67.5
50%	43.0	57.0
40%	33.5	46.5
30%	24.0	36.0
20%	14.5	25.5
10%	5.00	15.0

b. Adjustments

(1) Position controls as listed in (a) through (e) below:

(a) **FREQUENCY** switches to **520.000 MHz**.
(b) **MODULATION MODE** switch to **AM**.
(c) **MODULATION FREQ** switch to **DC**.
(d) **OUTPUT** step attenuator switch for **0 dBm**.
(e) **OUTPUT VERNIER** control for **+3 dB**.

(2) Connect audio analyzer **INPUT HI** to **MOD TP** (fig. 1) and chassis ground.

NOTE
Set audio analyzer to read V dc.

(3) Adjust **MODULATION FM/AM** slide control until audio analyzer indicates 4.5 V dc.

(4) Set **MOD FREQ** to **1000 Hz**.

(5) Connect measuring receiver sensor module to **TI RF OUTPUT**.

(6) Adjust meter board **POT G** (fig. 2) for 90 percent AM indication on the measuring receiver modulation display (R).

(7) Set **OUTPUT VERNIER** control for **-7 dBm** indication on **OUTPUT** meter.

(8) Adjust meter board POT H (fig. 2) for 90 percent AM indication on the measuring receiver modulation display (R).

(9) Repeat technique above until no further adjustment is required.

(10) Disconnect audio analyzer **INPUT HI** from MOD TP (fig. 1) and chassis ground.

14. AM Distortion

a. Performance Check

(1) Position controls as listed in (a) through (f) below:

(a) **FREQUENCY** switches to indicate **520.000 MHz**.
(b) **MODULATION MODE** switch to **AM**.
(c) **MODULATION FREQ** switch to **1 KHz**.
(d) **MODULATION FM/AM** slide control to **0** percent.
(e) **OUTPUT** step attenuator switch for **0 dBm**.
(f) **OUTPUT VERNIER** control for **-7 dB**.

(2) Set measuring receiver to measure AM.

(3) Adjust TI **MODULATION FM/AM** slide control to indicate 70 percent AM on measuring receiver.

(4) Set measuring receiver to measure modulation distortion.

(5) The measuring receiver will indicate less than 3 percent AM distortion.

(6) Set measuring receiver to measure AM.

(7) Adjust TI **MODULATION FM/AM** slide control to indicate 90 percent AM on measuring receiver.

(8) Set measuring receiver to measure modulation distortion.

(9) The measuring receiver will indicate less than 5 percent AM distortion.

b. Adjustments. No adjustments can be made.

15. Frequency Modulation Accuracy

a. Performance Check

NOTE

If necessary, ZERO and CALIBRATE measuring receiver and sensor module.

(1) Connect measuring receiver sensor module to the TI **RF OUTPUT**.

(2) Position controls as listed in (a) through (g) below:

(a) **FREQUENCY VERNIER** control to **0 kHz**.
(b) **FREQUENCY** switches to indicate **050.000 MHz**.

(c) **MODULATION MODE** switch to **FMx1**.
(d) **MODULATION FREQ** switch to **400 Hz**.
(e) **MODULATION FM/AM** switch to **10 kHz FM**.
(f) **OUTPUT** step attenuator switch to **+10 dBm**.
(g) **OUTPUT VERNIER** control fully cw.

(3) Set measuring receiver to measure FM with 50 Hz high-pass filter 15 kHz low-pass filter. Measuring receiver will indicate within limits specified in first row of table 7.

(4) Repeat technique of (2) (e) above for TI **OUTPUT FM KHz** settings listed in table 7. Measuring receiver will indicate within limits specified.

Table 7. Frequency Modulation FMx1

Test instrument (**MODULATION FM/AM**) **FM kHz** slide settings	Measuring receiver indication (kHz)	
	Min	Max
10 kHz FM	9.5	10.5
5 kHz FM	4.5	5.5

(5) Set **MODULATION MODE** switch to **FMx10** and **MODULATION FM/AM** slide control to **2 kHz FM**. Measuring receiver will indicate within limits specified in first row of table 8.

(6) Repeat technique of (2) (e) above for TI **OUTPUT FM KHz** settings listed in table 8. Measuring receiver will indicate within limits specified.

Table 8. Frequency Modulation FMx10

Test instrument (**MODULATION FM/AM**) **FM kHz** slide settings	Measuring receiver indication (kHz)	
	Min	Max
2 kHz FM	15.0	25.0
4 kHz FM	35.0	45.0
6 kHz FM	55.0	65.0
8 kHz FM	75.0	85.0
10 kHz FM	95.0	105.0

b. Adjustments. No adjustments can be made.

16. FM Distortion

a. Performance Check

(1) Connect measuring receiver sensor module to the TI **RF OUTPUT**.

(2) Position controls as listed in (a) through (g) below:

(a) **FREQUENCY VERNIER** control to **0 kHz**.
(b) **FREQUENCY** switches to indicate **050.000 MHz**.
(c) **MODULATION MODE** switch to **FMx1**.

(d) **MODULATION FREQ** switch to **1 kHz**.
(e) **MODULATION FM/AM** slide control to **3 kHz FM**.
(f) **OUTPUT** step attenuator switch for **+10 dBm.**
(g) **OUTPUT VERNIER** control fully cw.

(3) Set measuring receiver to measure FM with 50 Hz high-pass filter 15 kHz low-pass filter.

(4) Set measuring receiver to measure modulation distortion. Measuring receiver will indicate within limit specified in first row of table 9.

(5) Set **TI MODULATION MODE** switch to **FMx10**. Measuring receiver will indicate within limit specified in table 9.

Table 9. FM Distortion

Test instrument **MODULATION MODE** setting	Measuring receiver indication (%)
	Limit
FMx1	<4
FMx10	<2

b. Adjustments. No adjustments can be made.

17. Power Supply

a. Performance Check

NOTE

Do not perform power supply check if all other parameters are within tolerance.

(1) Connect multimeter to pin 3 of M30-1 (fig. 1) and chassis ground. If multimeter does not indicate +18.00 V dc, perform b (**1**) below.

(2) Move multimeter connection to pin 4 of M30-1 (fig. 1). If multimeter does not indicate -18.00 V dc, perform b (**2**) below.

b. Adjustments.

(1) Adjust +18 V ADJ (fig. 2) for +18.00 V dc indication on multimeter (R).

(2) Adjust -18 V ADJ (fig. 2) for -18.00 V dc indication on multimeter (R).

18. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA label/form in accordance with TB 750-25.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

0829702

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342229, requirements for calibration procedure TB 9-6625-2094-24.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.mil
To: <2028@redstone.army.mil

Subject: DA Form 2028

1. **From**: Joe Smith
2. Unit: home
3. **Address**: 4300 Park
4. **City**: Hometown
5. **St**: MO
6. **Zip**: 77777
7. **Date Sent**: 19-OCT –93
8. **Pub no:** 55-2840-229-23
9. **Pub Title**: TM
10. **Publication Date**: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter FName**: Joe
14. Submitter MName: T
15. **Submitter LName**: Smith
16. **Submitter Phone**: 123-123-1234
17. **Problem**: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text**

This is the text for the problem below line 27

PIN: 085181-000