

*TB 9-6695-273-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MICROWAVE COMB GENERATOR, TEKTRONIX, TYPE 067-0885-00

Headquarters, Department of the Army, Washington, DC
23 May 2008

Distribution Statement A: Approved for public release; distribution is unlimited.

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, U.S. 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 send in your comments electronically to our E-mail address: 2028@redstone.army.mil or by fax 256-842-6546/DSN 788-6546. For the World Wide Web use: <https://amcom2028.redstone.army.mil>. Instructions for sending an electronic 2028 can be found at the back of this manual.

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*This bulletin supersedes TB 9-6695-273-35, dated 23 April 2004, including all changes.

**SECTION I
IDENTIFICATION AND DESCRIPTION**

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Microwave Comb Generator, Tektronix, Type 067-0885-00. 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. None.

b. Time and Technique. The time required for this calibration is approximately 2 hours, using the microwave technique.

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 (signal source)	Range: 500 MHz Accuracy: ±0.01%	
Output power (signal source)	Range: +30 dBm Accuracy: ±2 dB	
Output power (comb generator module)	Frequency (GHz)	Power (dBm)
	0.5	5
	1	3
	2	1
	4	-4
	6	-9
	8	-13
	10	-17
	12	-20
	14	-23
	16	-26
	18	-28
	Accuracy: ±10 dB	

**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 selected 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. The following peculiar accessory is also required for this calibration: Power Module, Tektronix, Type TM5006A or equivalent.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
ATTENUATOR (FIXED)	Frequency: 500 MHz Range: 30 dB Accuracy: Certified before use within ± 0.2 dB	Weinschel Model 9918-30dB (9918-30dB)
FREQUENCY COUNTER	Range: 499.95 to 500.05 MHz Accuracy: +0.0025%	Fluke, Model PM6681/656 (PM6681/656)
POWER METER	Range: 0 to +5 dB Frequency: 500 MHz Accuracy: +6%	Hewlett Packard, Model 437B (13440045) w/power sensor Hewlett Packard, Model 8482A (13440043)
SPECTRUM ANALYZER	Range: 500 MHz to 18 GHz Accuracy: +2.5 dB	(AN/USM-677)

**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 tables 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 the manufacturer's manual for this TI.

d. 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. Install microwave comb generator signal source (p/o of TI) into power module.
- b. Press microwave comb generator signal source **STANDBY** pushbutton to **STANDBY**.
- c. Energize power module and allow at least 30 minutes for equipment to stabilize.

8. Signal Source Output Power

a. Performance Check

CAUTION

Do not connect 500 MHz +30 dB output directly to power meter. Damage to power meter may result.

- (1) Connect **500 MHz +30 dBm** output of microwave comb generator signal source to power meter using adapter and (30 dB) attenuator.
- (2) Record value of attenuator.
- (3) Press **STANDBY** pushbutton to **ON**.
- (4) Measure power using power meter and record value.
- (5) Add values recorded in (2) and (4) above. If sum of values is not between 28 and 32 dB, perform **b** below.
- (6) Press **STANDBY** pushbutton to **STANDBY**.

b. Adjustments

- (1) Connect spectrum analyzer to **500 MHz +30 dBm** output using cable and 3 dB attenuator (p/o TI).
- (2) Adjust spectrum analyzer to display 500 MHz as center frequency.
- (3) Adjust C3029 (fig. 1) for maximum signal amplitude while keeping the frequency between 499.95 and 500.05 MHz (R).

NOTE

C3029 is frequency and amplitude responsive.

(4) Perform adjustments in order as listed in (a) through (f) below, adjusting for maximum amplitude on spectrum analyzer.

- (a) C3035 (R) (fig. 1).
- (b) C3042 (R) (fig. 1).
- (c) C3045 (R) (fig. 1).
- (d) C3056 (R) (fig. 1).
- (e) C3059 (R) (fig. 1).
- (f) C3060 (R) (fig. 1).

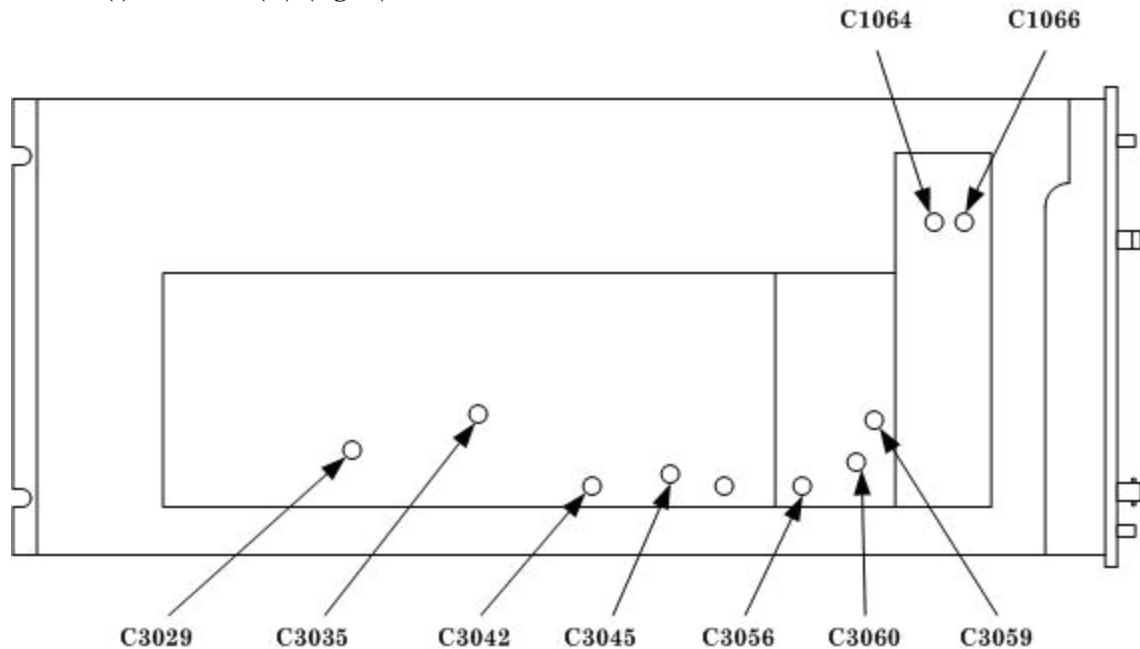


Figure 1. Test instrument - left view.

(5) Repeat a (1) through (5) and if required adjust C1064 and C1066 (fig. 1) for best in-tolerance condition (R).

(6) Repeat a (1) through (5) above as required due to interaction.

9. Signal Source Frequency

a. Performance Check

CAUTION

Do not connect TI directly to frequency counter. Damage to frequency counter may result.

(1) Connect **500 MHz +30 dBm** output to frequency counter input **C** using (30 db) attenuator.

- (2) Press **STANDBY** pushbutton to **ON**.
- (3) Measure frequency. If frequency counter does not indicate between 499.95 and 500.05 MHz, perform **b** below.
- (4) Press **STANDBY** pushbutton to **STANDBY**.

b. Adjustments

- (1) Adjust C3029 (fig. 1) for 500.00 MHz indication on frequency counter (R).
- (2) Repeat paragraph 8 a.

10. Output Power (Comb Generator Module)

a. Performance Check

- (1) Connect equipment as shown in figure 2.
- (2) Press **STANDBY** pushbutton to **ON**.
- (3) Adjust spectrum analyzer to display the comb line frequencies listed in table 3. Comb lines will be within limits specified.

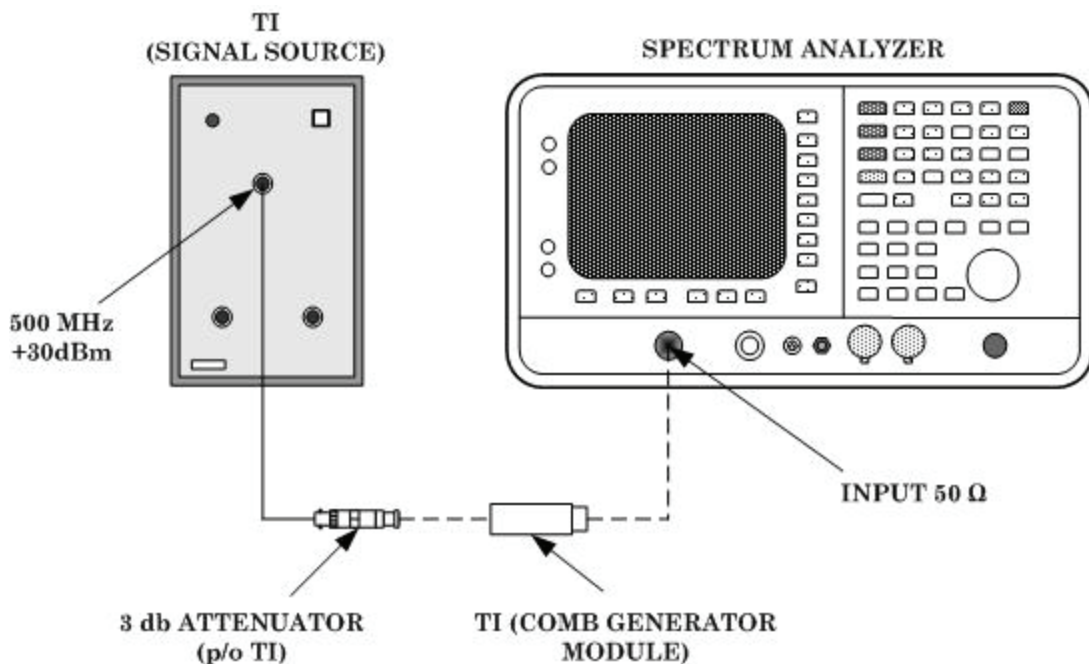


Figure 2. Output power - equipment setup.

Table 3. Comb Lines

Comb lines (GHz)	Amplitude (dB) ¹	
	Min	Max
1	-7	+13
2	-9	+11
4	-14	+6
6	-19	+1
8	-23	-3
10	-27	-7
12	-30	-10
14	-33	-13
16	-36	-16
18	-38	-18

¹The tolerances listed are typical values. TI may not meet the listed values and still be in tolerance so long as any two adjacent comb lines are not more than 10 dB different in amplitude.

b. Adjustments. No adjustments can be made.

11. 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:

Official:



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*Administrative Assistant to the
Secretary of the Army*

0808807

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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342315, requirements for calibration procedure TB 9-6695-273-24.

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.

