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| DWG NO. 10475-4584 | SH. 1 | REV. - |
| APPLICATION | | |
| NEXT ASSEMBLY | USED ON | |
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| | | |
| SIMILAR TO: | | |

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FILENAME: J:\DOCUMENT\104754584.DOC

REVISIONS


| LTR | DESCRIPTION | DATE | CLASS | T/E | ENG |
|-----|-----------------|--------|-------|-----|-----|
| - | Initial Release | 1/5/00 | I | SFE | |
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|---|------------|----------------------|----------|------|
| Unit Under Test (UUT): LAAS PA&PS Transmitter | Procedure | Date(s) Performed | Pass | Fail |
| Serial Number: PA s/n #125, PS s/n #124 | N/A | 5-19-00 | X | |
| Top Level Assembly Number: --- | | | | |

Abstract: **THIS TEST WAS CONDUCTED TO PROVE COMPLIANCE TO THE FCC, TITLE 47, PART 2, § 2.1055 FREQUENCY STABILITY REQUIREMENT. THE LAAS SYSTEM SUCCESSFULLY PASSED ALL THE REQUIREMENTS STATED HEREIN.**

PROPRIETARY DATA: THE DATA DISCLOSED IN THIS DOCUMENT WAS ORIGINATED BY HARRIS CORP., RF COMMUNICATIONS DIVISION AND IS TO BE UTILIZED ONLY FOR THE SPECIFIC PURPOSES FOR WHICH IT WAS INTENDED. IT IS NOT TO BE DISCLOSED TO OTHERS OR REPRODUCED WITHOUT THE PRIOR WRITTEN CONSENT OF RF COMMUNICATIONS.

**QUALIFICATION TEST PROCEDURE AND REPORT
USE BLACK INK ONLY**

| | | | |
|--------------------------------------|--|----------------------------------|------------------|
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| DESIGN ENG. Joseph Stoltz | | | |
| Quality Assurance William Jackson | | | |
| REPORT NO. 0002 | TITLE: LAAS - FCC TITLE 47, PART 2, § 2.1055 FREQUENCY STABILITY | | |
| CONTRACT NO. | PROC RLSE DATE May 20, 2000 | | |
| SIZE: A | CAGE CODE: 14304 | DRAWING NO. 10475-4584 | REV. - |
| SCALE: NONE | TOTAL NO. OF PAGES | SHEET. 1 OF 11 | |

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1. SCOPE

- 1.1 This Harris/RF generated document contains a procedure, equipment list, and data sheet(s) for the Frequency Stability Requirement detailed in FCC Part 2, § 2.1055 over the units expected operating temperature range.

2. ATE REQUIREMENTS

- 2.1 This test procedure has been written on the basis of manual test methods.

3. APPLICABLE DOCUMENTATION

- 3.1 Harris Product Specification for the VGS VHF Data Radio Subsystem Document Number 7004064.

Code of Federal Regulations, Title 47, Part 2 § 2.1055 - Frequency Stability.

4. TEST EQUIPMENT

- 4.1 The procedure listed in paragraph 6. contains a list of test equipment required to perform that procedure.

- 4.2 Calibration of the test equipment and test fixtures if required shall be verified prior to performing the applicable qualification test procedure specified within this document. Equipment requiring calibration is indicated by an asterisk (*).

5. STANDARD TEST CONDITIONS

- 5.1 Unless stated otherwise, the tests described in this procedure shall be performed under the following conditions:

| | | |
|----------------------|---------------------------|---|
| Temperature | 25°C ± 10°C | <i>SFE 616100</i> <i>77°F 50°F</i> <i>(73°F ± 18°F)</i> |
| Relative Humidity | Uncontrolled Room Ambient | |
| Atmospheric Pressure | Site Pressure | |

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6. TEST PROCEDURE METHODS

6.1 FREQUENCY STABILITY

6.1.1 This test is to be performed in accordance with the Code of Federal Regulations, Title 47, Part 2 - § 2.1055 over the units expected operating temperature range of the LAAS system. All test events which include UUT failures, environmental test equipment failures, UUT inspections, troubleshooting, etc. may be documented in the Comment Sheet. The Comment Sheet will serve as a test log. Note: It may be necessary to make multiple copies of the applicable Comment Sheet prior to starting the test.

6.1.2 Note additional special test instructions, deviations, or explanations necessary to complete this test or enter N/A if not applicable:

~~N/A~~

6.1.3 Failure Criteria

6.1.3.1 Electrical requirements and failure criteria are detailed in the following procedural instructions.

6.1.3.2 Note additional failure criteria or enter N/A if not applicable:

~~N/A~~

6.1.4 Pre-test UUT Identification Data

6.1.4.1 List the UUT with all appropriate Model Number(s), Serial Number(s), and Top Level Assembly Number(s):

LAAS Transmitter Power Amp, VLR441PA-001 s/n#125
 LAAS Transmitter Power Supply, VLR441PS-001 s/n#124

6.1.4.2 Prior Test History

~~N/A~~

6.1.5 Environmental Test Equipment List

| Required Test Equipment | | | | | | |
|-------------------------|---------------------|--------------|----------|----------------------------|----------------------|------------|
| Item # | Description | Manufacturer | Model # | Harris/RF ID # or Serial # | Calibration Due Date | Comments |
| 1 | Temperature Chamber | Thermotron | 4800 | 26527 | 10-18-00 | Chamber #2 |
| 2 | DATA Bucket | Fluke | 2635A | 29894 | 5-31-01 | |
| 3 | PC | GATEWAY | P5-133 | 011401 | N/A | |
| 4 | 30dB Attenuator | TEMSLINE | 8327-300 | 24971 | 6-23-01 | |
| 5 | Frequency Counter | HP | 53131A | 31158 | 2-4-01 | |
| 6 | Power Supply DC | Sorrenson | DC40-70B | 22391 | N/A | |
| 7 | Power Supply AC | Chromq | 6520 | 2061 | N/A | Rental |
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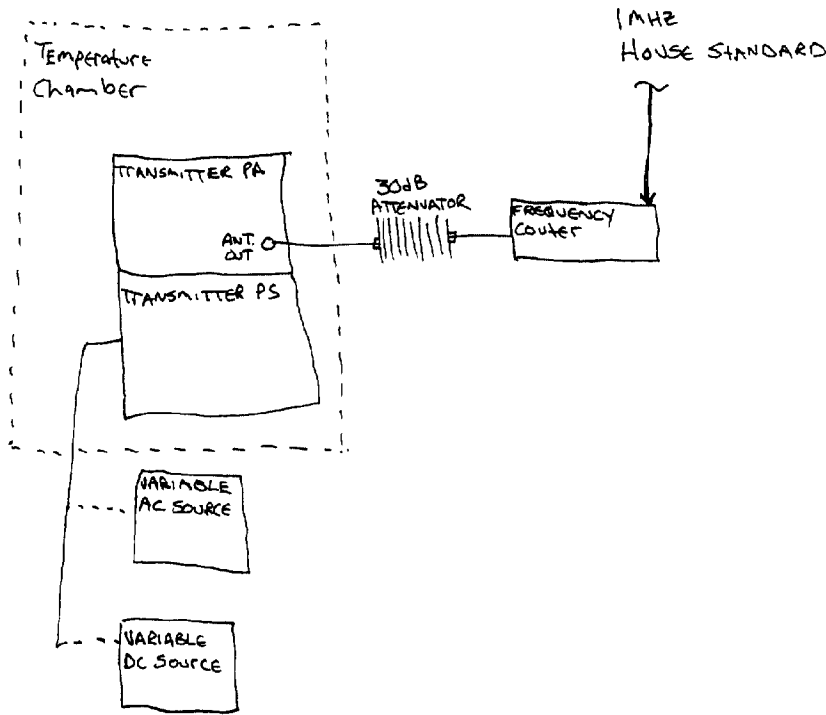
Note: An asterisk (*) in the "Description" column indicates that calibration is required per QA-541 or QA-552

6.1.6 Electrical Test Setup:

Thermocouple locations

| <u>TC#</u> | <u>Description</u> |
|------------|--------------------|
| 1 | TCXO 1 |
| 2 | Chamber Air |

* REFERENCE TEMPERATURE DATA ON LAST PAGE OF THIS REPORT.



EQUIPMENT SETUP

| | | | |
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6.1.6 Environmental Test Setup (continued)

Attach actual photographs of test setup:



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- 6.1.7 Record the High and Low Temperature extremes below.
- High Operational Temperature +55°C
- Low Operational Temperature -30°C
- 6.1.8 Install a temperature sensor(s) inside of the UUT in contact with the operating part of the UUT considered to have the longest thermal lag. Document the location of the temperature sensor(s) on the Environmental Test Setup Diagram (paragraph 6.1.6) including the assembly part number and/or the reference designator. This sensor(s) will determine the UUT temperature.
- 6.1.9 Place UUT into the temperature chamber a minimum of 15 cm from any chamber surface. Note any exceptions in paragraph 6.1.6.
- 6.1.10 Install, sign, and date a new chart of actual environmental conditions. Throughout the test replace, sign, and date the chart as needed.
- 6.1.11 Turn ON UUT power, and adjust the chamber temperature to -30°C at a rate not exceeding -3°C per minute. Maintain the chamber temperature until the temperature of the temperature sensor(s) stabilizes.
- 6.1.12 Configure the UUT to transmit at 113MHz. Measure and record the frequency stability of the UUT in Table I below.
- 6.1.13 Adjust the chamber air temperature at a rate not exceeding 3°C to next temperature indicated in Table I. Allow the temperature sensor(s) to stabilize and measure and record the frequency stability of the UUT.
- 6.1.14 Repeat 6.1.13 for the remaining temperatures listed in Table I.

TABLE I - Temperature vs Frequency Stability Data

| Temperature (°C) | Lower Limit (MHz) | Measurement (MHz) | Upper Limit (MHz) |
|------------------|-------------------|------------------------|-------------------|
| -30 | 112,999,887 | 112,999,979 (1:00 PM) | 113,000,113 |
| -20 | 112,999,887 | 112,999,975 (1:55 PM) | 113,000,113 |
| -10 | 112,999,887 | 112,999,936 (2:45 PM) | 113,000,113 |
| 0 | 112,999,887 | 112,999,915 (3:45 PM) | 113,000,113 |
| 10 | 112,999,887 | 112,999,930 (4:30 PM) | 113,000,113 |
| 20 | 112,999,887 | 112,999,979 (8:50 AM) | 113,000,113 |
| 30 | 112,999,887 | 112,999,993 (9:20 AM) | 113,000,113 |
| 40 | 112,999,887 | 112,999,983 (10:03 AM) | 113,000,113 |
| 50 | 112,999,887 | 112,999,956 (10:56 AM) | 113,000,113 |
| 55 | 112,999,887 | 112,999,962 (11:15 AM) | 113,000,113 |

- 6.1.15 Adjust the chamber air temperature at a rate not exceeding 3°C to standard ambient and maintain until the UUT temperature has stabilized.
- 6.1.16 Using a variable power supply adjust the AC voltage to 85% of its rated AC input voltage. Configure the UUT to transmit at 113MHz. Measure and record the frequency stability of the UUT in Table II.
- 6.1.17 Repeat 6.1.16 for the remaining voltage variations listed in Table II.

TABLE II - Voltage Variation vs Frequency Stability Data

| Voltage (VAC/VDC) | Input Voltage (%) | Lower Limit (MHz) | Measurement (MHz) | Upper Limit (MHz) |
|-------------------|-------------------|-------------------|-------------------|-------------------|
| 97.75 VAC | 85 | 112,999,887 | 112,999,998 | 113,000,113 |
| 115 VAC | 100 | 112,999,887 | 112,999,998 | 113,000,113 |
| 132.25 VAC | 115 | 112,999,887 | 112,999,998 | 113,000,113 |
| 195.5 VAC | 85 | 112,999,887 | 113,000,000 | 113,000,113 |
| 230 VAC | 100 | 112,999,887 | 112,999,998 | 113,000,113 |
| 264.5 VAC | 115 | 112,999,887 | 112,999,998 | 113,000,113 |
| 23.8 VDC | 85 | 112,999,887 | 112,999,997 | 113,000,113 |
| 28 VDC | 100 | 112,999,887 | 112,999,997 | 113,000,113 |
| 32.2 VDC | 115 | 112,999,887 | 112,999,998 | 113,000,113 |

6.1.18 Frequency Stability - Comment Sheet

| ITEM # | COMMENTS SIGN and DATE |
|--------|--|
| 1 | Installed Thermocouples TC# 1 ONTCXO CAN 2 Chamber Air @ 5-18-00 |
| 2 | UUT Powered ON and chamber sent to -30°C. @ 5-18-00 |
| 3 | Data taken at -30°C after UUT stabilization. @ 5-18-00 |
| 4 | Chamber temp increased by 10°C increments to +55°C and Data taken at each increment. @ 5-18-00 |
| 5 | Chamber temp sent back to Ambient 25°C for Voltage variation part of test. @ 5-19-00 |
| 6 | AC + DC Voltage variation test performed. @ 5/19/00 |
| 7 | TEST complete - TEST PASSED. @ 5/19/00 |

6.1.19 Date(s) of test: 5-19-00

Test conducted by: Signature [Signature]

Name/EMP# Jack m D. Polito 7913

Title Engineering Aide
 Harris RF Communications
 1680 University Ave.
 Rochester, NY 14610

Test Witnessed by:

| | | | |
|-----------|--------------------|-----------|--|
| Signature | <u>[Signature]</u> | Signature | <u>St. Edll</u> |
| Name | <u>[Signature]</u> | Name/EMP# | <u>STEPHEN ERDLE 8013</u> |
| Title | <u>[Signature]</u> | Title | <u>LEAD TEST ENGINEER</u> |
| Company | <u>N/A</u> | | Harris Communications 1680 University Ave. Rochester, NY 14610 |
| Address | <u>[Signature]</u> | | |

Data Reviewed by
~~William L. Jackson~~
 WILLIAM L. JACKSON, CQE
 QUALITY ASSURANCE

John Lundberg
 Project Engineer
 6/12/2000

REPORT No. 0002

LAAS FCC Title 47, Part 2, 2.1055 - Frequency Stability

