AFRL-IF-WP-TR-1999-1528

RAPID AVIONICS TEST MODIFICATION CAPABILITY

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OCTOBER 1999

FINAL REPORT FOR PERIOD 04 JANUARY 1996 – 04 JANUARY 1999

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 074-0188*

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	OCTOBER 1999	Final, 01/04/1996 - 01/04/1999

4. TITLE AND SUBTITLE

RAPID AVIONICS TEST MODIFICATION CAPABILITY

5. FUNDING NUMBERS

C: F33615-92-D-1052
PE: 69199
PN: OAFI
TN: FT
WU: 02

6. AUTHOR(S)

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

PR-8290-FINAL

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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10. SPONSORING / MONITORING AGENCY REPORT NUMBER

AFRL-IF-WP-TR-1999-1528

11. SUPPLEMENTARY NOTES:

12a. DISTRIBUTION / AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
Approved for public release; distribution unlimited.	

13. ABSTRACT *(Maximum 200 Words)*

This effort involves the research of identifying the Special Operation Forces (SOF) software/system support capabilities and requirements for the future support of SOF weapon systems. In addition, the development of a RATEMC Software Support and Test Program Set (TPS) development plan which provides a cost-effective approach for I-level maintenance for the SOF.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Software Support, Test Program Set, Special Operation Forces I-level maintenance	70
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	SAR

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

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1. INTRODUCTION

TASC completed its work on test program set development, automatic test equipment, field maturation testing, sustaining engineering, program support, and special studies for Special Operations Forces (SOF) requirements for intermediate and depot level maintenance support to the AC-130U, AC-130H, MC-130H, MH-53J, MH-60K, and CV-22 aircraft. Support was provided to the Integrated Product Development Teams as required for Automatic Test Equipment (ATE) and Test Program Sets (TPSs) development, testing, and sustaining engineering support. TASC provided primary support to the Integration Program Office (ASC/LUN) and secondary support to Combat Talon II, MC-130H (ASC/LUM), Gunship, AC-130U (ASC/LUU), and Helicopter/CV-22 (ASC/LUH) Program Offices.

1.1 BACKGROUND

Special Operations Forces weapon systems are constantly undergoing revisions due to rapidly changing mission requirements and availability of new technologies to maintain system superiority. The rapid changes to the weapon systems and the operational requirements to make changes and support the new systems in the field severely tax the capabilities of traditional depot, intermediate, or organizational level Test Program Set (TPS) support assets for SOF. Research and development of new technology is required to leverage or enhance the TPS development capabilities of traditional standard test sets to meet the SOF needs for rapid TPS maintenance.

1.2 OBJECTIVE

The objective of the effort is to support the government in implementing a Rapid Avionics Test Modification Capability. These tasks are required to support avionics platform Program Managers (PM) with unique frequently changing avionics testing requirements.

2. WORK PERFORMED

2.1 AN/ALQ-184 ELECTRONIC COUNTERMEASURES (ECM) POD CABLE TEST

Purpose — The Technical Information Memorandum (TIM) documented the development effort, development environment, and tool used to create the ALQ-184 electronic countermeasures (ECM) pod phase matched cable test capability for WR-ALC. This TIM describes the test interfaces and the interactions required by the test operator to perform calibration and test activities. These include: references to the power-up and power-down procedures for the host test station, pre-test calibration activities, calibration validation procedures, cable testing by selected part number, and printing and storing of cable test results. See Appendix A for further information about this TIM.

2.2 RADIO FREQUENCY MOBILE ELECTRONIC TEST SET (RFMETS)/DOWN SIZE TESTER (DST) COST/BENEFIT ANALYSIS (CBA) AUTOMATIC TEST STATION COMPARISON STUDY

Purpose — The CBA was designed to aid in determining if United States Special Operations Command (USSOCOM) should continue to use the Radio Frequency Mobile Electronic Test Set (RFMETS) as the common deployable intermediate level avionics tester or if the proposed F-15 Down Sized Tester (DST) should replace the RFMETS.

Scope — The study was limited to a CBA of the RFMETS and the DST because these were the only candidate test systems that could meet Special Operations Forces (SOF) requirements.

Introduction — The study compared the use of the DST and the RFMETS in fulfilling the Air Force Special Operations Command (AFSOC) intermediate level avionics maintenance requirements. To assure that the CBA remained unbiased, actual data was used when available. Assumptions and statements of fact were reviewed and agreed to prior to the analysis. The measures of effectiveness included DoD acquision, operation and support costs, ability to meet AFSOC workload demands, test system availability schedules, and SOF deployability needs. The most representative common set of units under test (UUTs) was selected from among existing avionics subsystems that both test sets were supporting or that they have been designed to support. Actual information for each of the subsystems was used where available. An agreed upon model and factors were used to consolidate measures of effectiveness for each of the testers when actual information did not exist.

Methodology

Requirement Definition — During this phase, the comparison groundrules and assumptions were established. The objective was to conduct an unbiased comparison of the RFMETS and the DST by evaluating each of the test systems ability to test a common selection of LRUs. A common or derivative avionics subsystem that both test systems had been designed to support is the common LRUs of the APG-70 and APQ-180 radars. These radar subsystems offered an opportunity to exercise a large portion of the capabilities of each of the test systems using common test requirements. The DST is designed to support the APG-70 radar subsystem and the RFMETS supports the APQ-180 radar subsystem. Since the APQ-180 radar is used on the AC-130U aircraft and is a derivative of the APG-70 radar used on the F-15 weapon system, there are similarities in test requirements. Differences in test requirements between the two radar subsystems were noted and the impact of the differences highlighted. Using a single major subsystem as the basis of comparison was expected to yield a cost-effective result in a realistic timeframe. Other avionics subsystems that may have test requirements in common between the test systems were considered for incorporation in the comparison. A listing of all subsystems supported by each test system was provided to show the range and variety of the avionics subsystems supported.

Data Gathering — Data for each of the test systems was gathered to satisfy the comparison requirements. The complete list of avionics LRUs tested by each of the testers was collected for comparison (atch.1). The operational/deployment impact of each of the test systems was determined. The comparison of the selected LRU Test Program Sets (TPSs) was done in detail and included the setup and run time requirements, transportation and deployment footprint, size and weight, recurring and non-recurring cost and schedules, deployed operational requirements, and the test coverage for each of the LRUs.

Data Evaluation — The data collected for each test system was provided as information to the USSOCOM, AFSOC, San Antonio Air Logistic Center, DST and RFMETS Program

Offices. The DST and RFMETS data was validated by the DST and RFMETS Program Offices respectively to assure that it was complete and would contribute to an unbiased comparison.

Analysis — Actual data for each test system was used in the analysis. Differences in the data were evaluated and modeling was used where no actual data was available. The operation and support costs were evaluated using the Joint Advanced Strike Technology (JAST) Operating and Support Technology Evaluation (JOSTE) model. JOSTE is the latest evolution of the TASC family of LCC models that use the same computation algorithms as life cycle cost analyzer (LCCA) and standardization evaluation program (STEP). JOSTE was proposed for use in this study because it offers a flexible means of evaluating alternatives for life cycle cost impacts using a readily available personal computer (PC) environment. The JOSTE model is a Microsoft Windows hosted, PC based operating and supports cost and technology assessment program.

Study Recommendation — The analysis/study findings showed that the most cost effective test system to support the continued and new SOF requirements was the RFMETS based on the JOSTE model analysis. The rehost/development costs of TPSs to a new tester was cost prohibitive and the support structure in place could easily be expanded versus establishing a new support structure.

2.3 CV-22 SUPPORTABILITY STUDY

Purpose — The purpose of this study was to understand and analyze the common and unique maintenance requirements of the V-22, CV-22, and the MV-22 weapon systems. Particular emphasis was placed on understanding the needs and requirements of the Special Operations Forces (SOF) as the CV-22 weapon system is deployed.

Scope — The V-22 development program is managed by the Naval Air Systems Command at Crystal City, while the SOF peculiar equipment is funded by the Air Force through the Air Force Special Operations Command (AFSOC), Hurlburt Field, Florida. The study included the available CV-22 avionics suite information in a database used to develop input files for alternative cost analysis using the JAST Operating and Support Technology Model (JOSTE), a Life Cycle Cost (LCC) model developed by TASC for the Joint Advanced Strike Technology Program.

Methodology — The study began with a review of the available documentation describing the requirements for the V-22 weapon system and the specific requirements for the CV-22 weapon system built to comply with the needs of the SOF community. Discussions were held with Program Office personnel at Crystal City to gain a clearer understanding of the avionics requirements described in the Operational Requirements Document for the weapon system. An information-gathering trip was made to Hurlburt Field, Florida to gain further insight into the avionics needs in the SOF environment. The avionics subsystem descriptions were compiled in a database used for entry into the JOSTE Model. The information was then used for what-if analyses of alternative support techniques and avionics configurations.

Study Assumptions/Guidelines — The Engineering, Manufacturing, and Development (EMD) phase of the V-22 is funded by the Navy, while production funding of the common MV-22 features will be assumed by the Air Force and funding for the unique hardware in the CV-22 will be assumed by the US Special Operations Command (USSOCOM).

Analysis Concept — JOSTE has been employed in this study because it offers a flexible means of evaluating alternatives for life cycle cost impacts using a readily available personal computer (PC) environment. The JOSTE model is a Microsoft Windows hosted, PC based operating and supports cost and technology assessment program. It was developed to evaluate the combined cost of acquiring and supporting next generation avionics systems. It assesses the costs associated with the supportability and sustainability of systems over their operational life. Cost comparisons can facilitate selection of avionics alternatives at the system and the subsystem levels. The model will also support technology cost forecasting using technology maturity levels and technology scaling factors. Since avionics alternative evaluations will be needed over an on-going basis in the future, the data was structured to permit the analyst to rapidly re-configure the model to run the analysis. The data has been compiled and maintained in a FileMaker Pro database designed to be readily expanded as data becomes available or changes as the program matures.

Study Recommendation — The study showed that the CV-22 aircraft possessed systems that could be supported with the METS/RFMETS automatic test stations. Existing TPSs could be modified to provide the additional repair capability for common systems, while new TPSs would have to be developed for CV-22 SOF unique systems.

2.4 CALIBRATION AND MEASUREMENT REQUIREMENTS SUMMARY STUDY

Background — The Calibration and Measurement Requirements Summary (CMRS) is a three-category, contractor prepared summary of measurement parameters. The CMRS identifies all measurement requirements within a specific system or item of equipment (including Support equipment (SE) items) which must be measured or tested to ensure the system's operation is maintained within its specified limits. The CMRS further indicates the contractors proposed solutions to maintain the system parameters within stated limits. These data are provided to the Air Force, ensuring calibration supportability and planning.

The CMRS is made a contract deliverable by referencing the required language in the contract. Calibration is a necessary element of logistics support for Air Force weapon systems, subsystems, and Support Equipment (SE). For adequate calibration support to be available at the time and place it is needed, it must be considered early in the Acquisition process. Measurement parameters of new systems and equipment can generate requirements for Air Force or national standards. Developing such standards and the means to transfer their value can be a lengthy and costly process.

Acquisition agencies are required to ensure calibration support is considered during the planning for logistics support of their equipment. Most test measurement and diagnostic equipment (TMDE) acquired in support of new systems or subsystems is identified by the contractor through Logistics Support Analysis and CMRS. Because of a lack of funding or oversight during system acquisition, CMRSs are not always developed and/or provided.

Purpose — TASC was asked to investigate/study the possibility of developing software that could be used to develop a CMRS product after a system had already been acquired or to find out if software already existed. TASC approach was first to determine if there were any commercially available tools that would expedite data extract for expediting the manpower intensive task of manually extracting the TYPE I CMRS data and the components needed to develop the TYPE 3 data. TASC and the project officer reviewed two potential tools. The first was a modified version of Galactic's Test Program Set (TPS) Instrument Command Extraction Tool (TICET). The tool was able to automatically extract absolute values but not tolerance data. Galactic's estimate for modifying their tool to extract variable data was not cost effective for this effort. The second tool reviewed was a GTT's (General Telephone & Telegraph) tool. Their design was sound but it was neither cost nor time effective for this effort. In both cases, neither product could be used to meet the Air Force requirements without major investment of time and money. A total development effort was also found not to be cost effective, compared to original cost estimates provided by the system developers. Another option that was looked at was extracting the data from electronic files using a database and associated software which could be developed within the cost and time constraints of this study. The program office provided all available files to TASC for review and started development of the database prototype. This process included a three-week effort to determine what portions of the effort could be hosted in MS Access database and what portions could not. The design and building of the database prototypes for this effort were completed. Review of the available MS Access functions revealed that it would be more cost effective to use MS Basic program because of the repetitive, multiple database quires, extraction, and mathematical operations required. During an interim briefing, government personnel directed that no further effort should be expended on the investigation/study, as no possible alternatives would be cost effective. In addition, much of the data required for generation of a CMRS was proprietary or not purchased during the acquisition phase of the program.

2.5 AIRCRAFT MODERNIZATION PROGRAM (AMP)/COMMON AVIONICS ARCHITECTURE FOR PENETRATION (CAAP) ACQUISITION STRATEGY

Introduction — This tasking was concerned with defining a roadmap of activities that were required in order to arrive at a Milestone I decision for CAAP. Other tasking covered an independent assessment of the CAAP Acquisition Strategy. As a result of activities occurring at high levels in the Air Force and DoD the possibility of the Avionics Modernization Program (AMP) and CAAP being conducted together and at Wright-Patterson AFB surfaced. New tasking provided by ASC/LUN consisted of assessing the effort already being done on AMP and the acquisition strategy to be pursued by the AMP/CAAP combination. A particular activity covered during the tasking consisted of reviewing the CAAP Conceptual Design developed by

ASC/LUN. The Integrated Weapon System Support Program (IWSSP) contract awarded by ASC/LU was made to the Boeing Company with a support approach to build on the successful ongoing AC-130U Interim Contractor Support (ICS) organization by adding team members from industry and government. The industry team mates include: TRW, Manufacturing Technologies Inc., Ball Aerospace, MacAuley Brown, California Microwave Inc., Systems & Electronics, Inc., and Crestview Aerospace Corporation. Also, a business understanding has been signed with Warner Robins Air Logistics Center that provides Boeing-Air Force software systematic development (LY), C-130 core competencies partnering (LB), and defensive avionics integration support (LN). The understanding with WR-ALC also provides for cooperative usage of the Air Force Special Operations Forces Extendable Integrated Support Environment (EISE) facility at WR-ALC and the Boeing Software Integration Laboratory (SIL) at Fort Walton Beach, Florida. This contract will be used to support all SOF sustainment requirements.

Assessment of CAAP Acquisition Strategy — A roadmap of the activities defining an Acquisition Strategy for the CAAP program was under development during the time of this tasking. Due to the activities of higher authorities, discussed above, the CAAP acquisition was never completed. As a result of this effort, some useful ideas were developed which are discussed in subsequent sub-paragraphs.

Conceptual Design — A draft copy of the CAAP Conceptual Design developed by ASC/LUN team was reviewed during this period. The design was not reviewed in detail but several observations were noted. Overall the effort appears to be a sound technical treatment of integration of CAAP on SOF aircraft. There were portions that were not complete at the time of its review.

The material on the C-130U was incomplete and needs further effort. It was interesting to note that the C-130U does not consider the integration of the Low Probability of Intercept TF/TA. This was because the USSOCOM ORD does not list the TF/TA as a threshold requirement, only as an objective requirement for the C-130U. It would seem that this should be a threshold requirement on all SOF aircraft. It is suggested that this be considered in follow-on activities.

During this design investigation, the replacement of the AP-102A was not investigated. This processor has marginal growth capability and will become a key factor in any integration of AMP/CAAP capability on SOF aircraft. The most challenging replacement of the AP-102A will be on the AC-130U. This replacement leads to the question of how do you develop software to work on the new processor(s) and maintain all the current capability? The use of an Open System Architecture has been proposed but it is not clear from material reviewed as what programs have any experience in this area. The concept seems worthy of pursuit but this area needs to be considered high risk.

The CAAP Conceptual Design needs to be continued with the goal of developing a set of well-defined requirements, which can be used in either a combined AMP/CAAP program or a CAAP program alone. The surest and quickest way to create problems in any program is to start with poorly defined requirements and continue to make changes in requirements during development. ASC/LUN has a plan for the follow on effort and this should be pursued with the intent of establishing well defined requirements, replacement of the AP-102A, and identification of all interfaces with the AMP program. In addition, a through Risk Management analysis needs to be applied to this task.

Handbook Development — Using the material contained in the Defense Acquisition Deskbook (DAD) Version 2.4, a handbook for Risk Management and Acquisition Strategy were developed. These handbooks contain information from the DAD containing topical descriptions, procedures, mandatory and discretionary references, applicable training courses and discretionary practices in DoD and the Air Force. Each handbook has a table of contents indicating the topics covered in each section. In addition to the Risk Management and Acquisition Strategy volume, there is a volume, which contains DoDD 5000.1, and DoDD 5000.2-R. A large amount of the regulatory requirements pertaining to the acquisition process is contained in these two DoD Directives.

To indicate how the handbook can be used, an example follows. In the Table of Contents of Part I of the "ACQUISITION STRATEGY" volume under Tab 1 can be found the topic "Process Information." The following information is found under this tab: An outline, which establishes a general model for managing a Major Defense Acquisition Program (MDAP); a listing of recommended Program Management Courses; Mandatory references dealing with the acquisition process, discretionary references, which can be accessed from the computer exactly just like the mandatory references; and a discussion of the "General Acquisition Process."

The reason that the "Process Information" topic was selected as an example was to point out information contained in the article "General Acquisition Process." In this article, a table titled "Program Documentation for Milestone Reviews" lists the mandatory documentation required at each milestone review, source of the requirements (Statutory or Regulatory), who prepares the document, who approves/considers the document, and if the document has a mandatory format. This table is invaluable in the preparation of any acquisition strategy program and its required documentation.

Efforts are underway to see that all ASC/LUN personnel have accessed to the latest version of the DAD through their computers. If this is successful, then the information contained in the handbooks can be access directly through the computer and displayed on the monitor. Members of ASC/LUN will have the option to find information either by reading the handbook or viewing the material on the monitor.

Training — ASC/SYG PreAward Support Office (PASO) is an office at Wright-Patterson, with a multi-functional team of government and contractor personnel, dedicated to assisting ASC acquisition teams through the preaward process (Acquisition Strategy, Request for Proposal (RFP) Development and Source Selection). Training is offered by the PASO and it is tailored to the specific needs of each program team. The Acquisition Strategy Process Training consists of courses such as; An Overview of the Preaward Process, Statement of Objectives (SOO) Overview, Acquisition Strategy Planning Process, Test and Evaluation in the Preaward Process, Source Selection Planning Overview, and Cost as an Independent Variable (CAIV). In addition, they offer Competitive Program Workshops and Request for Proposal Training. One of the more important Workshops is the Initial Program Risk Assessment Workshop. The documents developed during this workshop are the Initial Draft Statement of Objectives, Evaluation Criteria Outline, and Instructions to Offerors, Outline and Program Risk Matrix. A course syllabus is located in the "ACQUISITION STRATEGY" Part II handbook.

Contact with the PASO office needs to occur as soon as the AMP/CAAP programs are assigned to ASC and the Working Level Integrated Product Team (WIPT) has been selected. The WIPT should be scheduled for all the Acquisition Strategy Process Training, Competitive Program Workshops, and Request for Proposal Training. The training should start as early as possible so that it is not delayed by the magnitude of the workload limiting the availability of team members. Contacts in the PASO office are Lt. Col. Kevin Rankin (937) 255-2763 and Mr. Robert Andrews (937) 255-2763. Mr. Andrews is the ASC/LU point of contact in PASO.

The PASO has developed a generic schedule program for both competitive and sole source procurements. These schedules run on Microsoft Project 4.0 and can be used, as a model by the acquisition team, in planning the activity needed to get to a given Milestone. The team can add or delete activities and change the amount of time to accomplish an activity based on the characteristic of the particular program. All the statutory and regulatory activities are included in the generic schedule. The program should be aware that the PASO is required at ASC to approve the RFP before it can be released to industry.

2.6 PROGRAM SUPPORT

Primary program support was provided to the Integration Program Office ASC/LUN in support to the following programs: Mobile Electronic Test Set (METS) and Radio Frequency Mobile Electronic Test Set (RFMETS) intermediate/depot level tester acquisition and modification programs, along with the acquisition of three additional RF sections. The Aircraft Radar Avionics Test Station (ARATS) intermediate level tester acquisition, Test Program Set (TPS) development involving several developers (Lockheed Martin Federal Systems, Systems and Electronics, Inc., TAMSCO, and DME Corp.). In addition, the AP-102A Mission Computer Depot repairs acquisition, MC-130H aircraft APQ-170 radar modification to the -423E/425 configurations, and the APQ-170 radar depot repair acquisition.

The intermediate level maintenance capability is comprised of the ARATS APQ-170 radar hot mock-up, METS and RFMETS test sets, Test Program Sets (consisting of Test Programs, Interface Test Adapters, and engineering/technical data) for selected groups of LRUs, ancillary equipment to augment test set capabilities, and engineering/technical data. The Intermediate-level (I-level) capability detects failures of the LRUs, isolates them to failed Shop

Replaceable Units (SRU), removes and replaces the failed SRU, and certifies the operational suitable of the LRU. The I-level capability supports LRUs from the AC-130U Gunship All Light Level Television (ALLTV), APQ-180 radar, displays, weapons control systems, and AIC-40 communications system; AC-130H, AIC-38 communications, displays, and weapons control systems; and the MC-130H APQ-170 radar system. The I-level capability is a mobile and, except for the ARTS, deployable on two pallets on support aircraft. While deployed, it operates in a double-wide NAVAIR shelter.

The Depot-level capability consists of TPSs, ancillary equipment, tools, and engineering/technical data foe use with several existing depot test sets at WR-ALC along with software maintenance capabilities. The depot capability maintains selected SRUs and some LRUs that cannot be repaired in the field. The depot includes a set of the I-level capabilities. The depot capability detects failures in SRUs, isolates the failed components, removes and replaces the failed components, and certifies operational suitability of the SRU. The depot supports the majority of the systems identified at the I-level. The Automatic Test Equipment will be managed by SA-ALC and the aircraft UUTs will be managed by WR-ALC.

One of the major development effects accomplished for support to ASC/LUN was the identification of all LRUs and SRUs being supported by the METS/RFMETS testers. This was accomplished by developing and maintaining a database that tracked all required information and part number rolls. This Excel spreadsheet example (Attachment 1) was developed/maintained by TASC and used by the MAJCOM, Program Offices, and supporting Air Logistics Centers to insure total subsystem support. In addition, a scheduling notebook (Attachment 2) was developed/maintained showing all the subsystems being supported, Government Furnished Equipment requirements, status, and location. The notebook also included schedules for each system being supported, funding information, listing of key personnel and other information required for successful completion of the program. This notebook became a value asset and key management tool for the program and over 80 individuals on distribution. TASC performed trade-off analysis, schedule analysis, and recommendations on contractor submitted schedules and prepared briefings as required.

Another area that was constantly under evaluation was that of rehosting the METS/RFMETS TPSs to other candidate automatic test stations. In fact, a separate study was conducted against the F-15 Down Size Tester as explained earlier in this report. In all cases, the rehosting of TPSs was too costly, as no software existed that would allow the conversion in a cost-effective manner, thus requiring full TPS development.

These are only some of the major areas that were supported by TASC during the period covered by this contract. This report can not be totally inclusive but provides the most important areas of study or support to ASC/LU.

3. CONCLUSION

During the period of this delivery order, many of the specific tasks and the extent of the support required was to implement a capability to baseline the many different development programs required to support the Special Operation Forces intermediate and depot level avionics testing requirements. Once this was accomplished, much of the effort was concentrated on supporting studies as outlined in the Statement of Work (SOW) paragraphs 3.1.1 through 3.1.4 and direct program management support.

The studies and support provided by this delivery order allowed ASC/LUN to accomplish the critical tasks necessary to support their customer in a timely and cost efficient manner. TASC helped solve many of the day-to-day and long-term problems facing ACS/LUN by recommending alternative solutions; identifying potential problem areas while providing recommended solutions, providing experience in program management, operations, and support cost benefit analysis; and providing comparison studies.

APPENDIX A

TECHNICAL INFORMATION MEMORANDUM

Litton
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Technical Information Memorandum

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TASC

To: Commander Warner Robins Air Logistics Center Robins AFB, GA 31098 Attention: Mr. Mark Leslein	*TIM No.* *Date:* June 1998 *Contract No.* F33615 -92-D- 1052 *From:* Michael H. Nichols
Program: Rapid Avionics Test Modification Capability (RATEMC)	*Approval:* C.J. Debeljak
Subject: AN/ALQ-184 ELECTRONIC COUNTERMEASURES (ECM) POD CABLE TEST	

ABSTRACT

This Technical Information Memorandum (TIM) documents the development effort, development environment, and tools used to create the ALQ-184 electronic countermeasures (ECM) pod phase matched cable test capability for WR-ALC/LNXEJ. This capability was developed under the Rapid Avionics Test Modification Capability (RATEMC) deliver order of the Avionics Software Technology Support (ASTS) contract (F33615-92-D-1052) with Wright Laboratories Hardware and Software division. Additionally, this TIM describes the test interfaces and the interactions required by the test operator to perform calibration and test activities. These include: references to the power-up and power-down procedures for the host test station, pre-test calibration activities, calibration validation procedure, cable testing by selected part number, and printing and storing of cable test results.

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1. BACKGROUND

The modification of test specifications or the addition of new test requirements into an existing automated test system (ATS) requires a software development effort that is time consuming and expensive. TASC developed re-configurable software during the Traveling Wave Tube (TWT) Automated Test Station (TATS II) Version II development program for WR-ALC/LN. This software suite, the Microwave Component Analysis and Test Software (MiCATS™), includes several tools that enable rapid modification of the software and the data files used to define the operation of the software. Combined with a robust set of test editors, MiCATS™ enables the software maintainer to rapidly prototype new test and measurement capabilities. Utilizing generalized test algorithms as templates for developing new tests or the editors to modify or create new test requirements, WR-ALC/LN selected the MiCATS™ as the development system of choice to acquire a test capability for the ALQ-184 ECM Pod phased-matched cables.

2. SCOPE

WR-ALC/LN needed the ALQ-184 ECM pod phased-matched cable test capability developed rapidly to meet program milestones and desired a cost-effective solution that would also provide growth for future requirements. This test capability included Voltage Standing Wave Ratio (VSWR) testing, insertion loss testing, electrical length or phase testing, and the ability to track phase for sets of cables. TASC was to develop this capability within 30 to 60 days and be able to test several different cable lengths, each with its own VSWR, phase, and insertion loss requirements. Utilizing the MiCATS™ test develop suite, TASC would build prototype tests to meet these requirements by modifying exiting tests and using the editors to create the various test limits files for the cable specifications.

3. DESIGN AND DEVELOPMENT OF CABLE TESTS

Using specification data provided by WR-ALC/LN in the Times Microwave Systems Acceptance Test Plan (ATP) for cable assemblies, manufactured by Times Microwave Systems per Raytheon drawing 1038372 and 1038373, dated 29 March 1996, TASC developed the required tests and associated test limit files using the MiCATS™ development suite. The development effort spanned five weeks and this included software re-configuration, calibration procedures development, test limit files creation, verification and validation, integration testing, sell off to the WR-ALC/LN customer, test of approximately 100 cables, and development of cable test procedures and reports. The process for developing Test Program Sets (TPSs) for the various cables, four different cable types, is delineated in the following paragraphs.

3.1 Software Reconfiguration

While the MiCATS™ development suite included several of the test programs required to support this effort, the VSWR and phase matching programs had to be developed. By utilizing software components within the MiCATS™ development library, TASC was able to prototype these new programs within two weeks. Once they were developed, associated test editors were fabricated using legacy components within the MiCATS™ software assets library. Once the basic programs and editors were developed, the MiCATS™ editing environment was used extensively to create specific TPSs for the various cables. The cable testing required that we have the ability to perform phase, VSWR, and insertion loss testing. To maximize the utility of the test programs and minimize the impact on the TATS II, TASC hosted the entire set of cable tests on the Vector Network Analyzer, which is currently used to test ALQ-184 TWT phase only. Therefore, we gained more utility from this instrument and allowed testing to be conducted on the VNA without interfering with other testing activities, if desired. The four primary tests are discussed in the following paragraphs.

The Voltage Standing Wave Ratio (VSWR) Test performs a forward and reverse measurement of reflected input signal and compares the measured amount to the maximum allowable amount for each cable. Refer to Figure 3-1 for discussions concerning the operation of the VSWR Test.

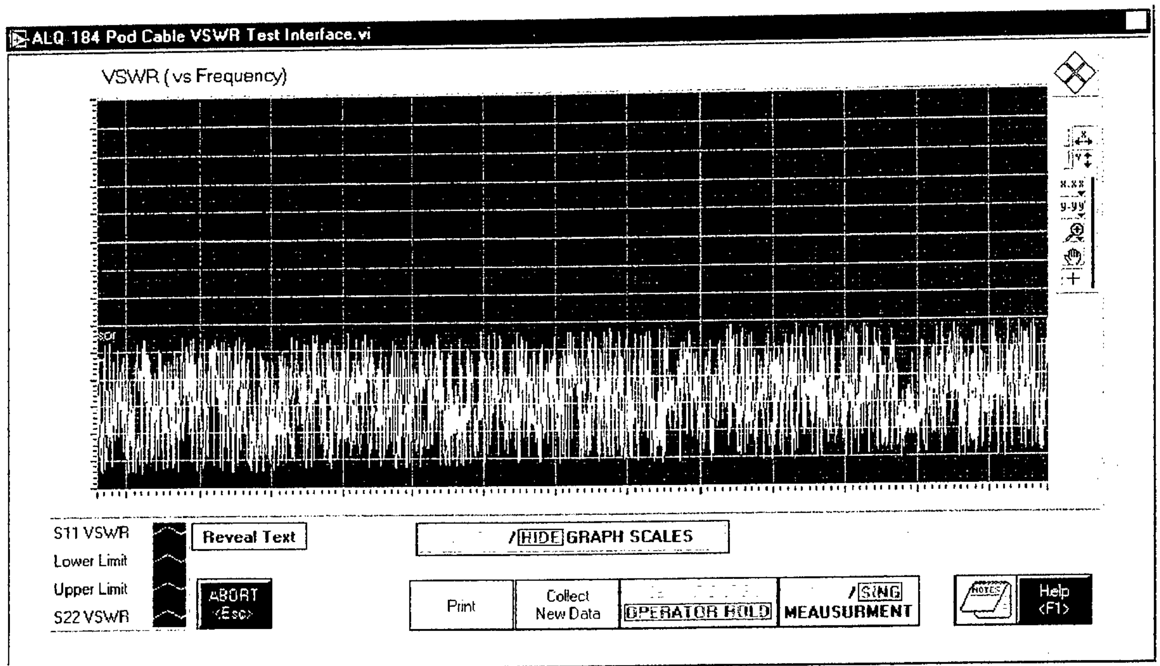

Figure 3-1 VSWR Test Interface

The VSWR Interface Panel has a large graph that depicts the measured forward and reverse VSWR for the cable under test (CUT). The yellow plot represents forward VSWR and the purple plot represents reverse VSWR. The VSWR Interface Panel has several user controls located on it. Since many of these controls are standardized, they will be labeled and function exactly the same on other interface panels. For this reason, they will be discussed once in this section and not repeated in other sections. To the top right side of the graph are the graph controls. These controls are used to manipulate the graph display and include: X and Y manual and auto scale controls, magnifying glass, pointer, and paging (+) capability. The graph legend in the lower left corner provides a color-coded display of the various plots used on the VSWR Graph. Across the bottom of the interface panel are the test interface operator options. The first is the ABORT option, which activates the global test abort. If in a driven sequence the next test in the sequence will automatically execute. The SHOW/HIDE GRAPH SCALES option allows the operator turn on and off the graph scales for the currently displayed graph. This option is useful if the values for the test are classified. The REVEAL/HIDE TEXT option allows the operator to toggle between a graphical display or a textual-based test report. The PRINT option allows the operator to send the graph of the test results to the default system printer. The COLLECT NEW DATA option allows the operator to force the test to collect new test data. The TEST PROCEED/OPERATOR HOLD option allows the operator to toggle between automatic test proceed after collecting and displaying results or operator hold mode which allows the operator to interact with the test interface panel. The CONT/SING MEASUREMENT option allows the operator to set the test to collect a single set of data (default) or continuously collect and display new data. The NOTES option allows the operator to launch the interactive NOTE TOOL for entering data into test specific, test sequence peculiar, or personal files. The HELP option allows the operator to enable/disable the on-line help capability that explains the various controls and indicators located on the test interface panel. All of these controls are standard controls that appear throughout the interfaces within the ALQ-184 Cable Test software.

The Phase Test measures the electrical length of the CUT and compares it to the expected electrical length and displays the results in phase relative to the desired length. The Phase Test uses the actual electrical length of the individual cables to test each of the cables. Since the electrical length difference desired between the CUT and the electrical length standard is zero, the tolerance is applied around a zero level. Therefore, an upper and lower maximum allowable phase is displayed as solid red lines at the minimum and maximum levels. Reference the Phase Test interface panel during discussions that follow. The graph displays the measured phase value referenced to zero or the desired electrical length. The graph controls are standard and control the display as described in the VSWR Test.

In Figure 3-2, the user controls on the Phase Test Interface Panel are the same as the VSWR test.

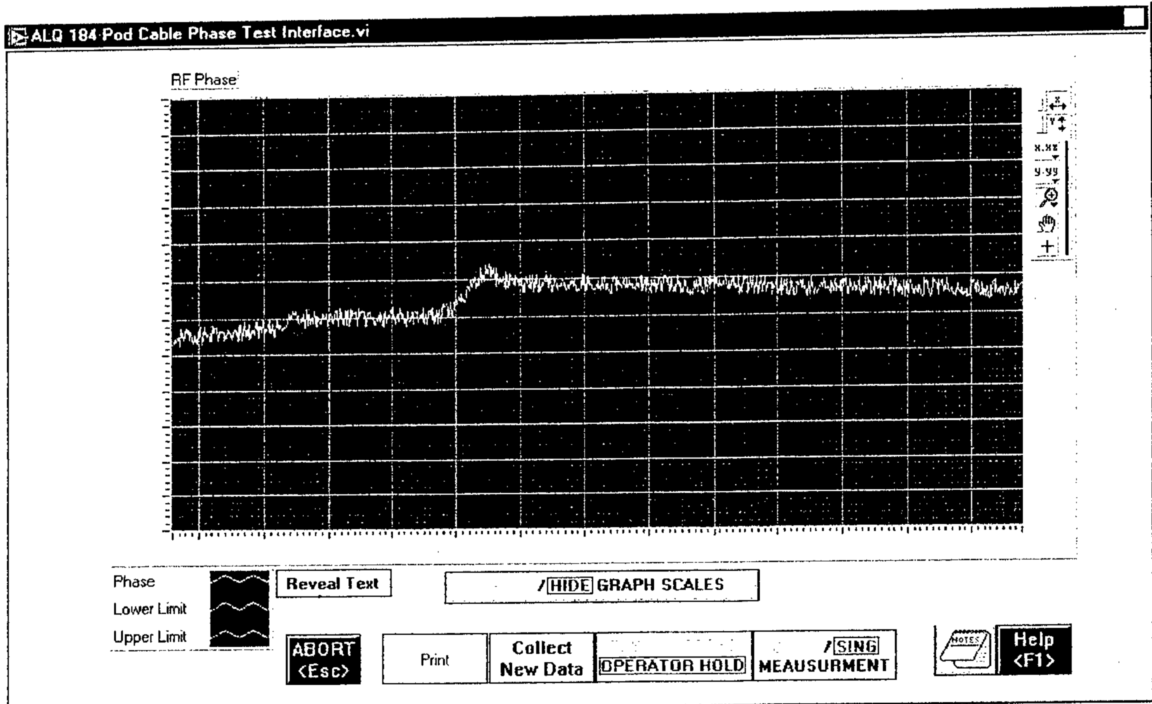

Figure 3-2 Phase Test Interface Panel

The Insertion Loss Test is designed to measure the loss of the CUT over the designated frequency range and compare it to the maximum allowable loss for the cable. Since the cable loss is only a maximum amount of negative loss, the test displays only one parameter line, which represent the maximum loss at each of the corresponding frequency within the applicable frequency band. The Insertion Loss Test takes a reading of the path loss with no CUT installed during the calibration and then takes an identical reading with the CUT installed and determines the loss associated with only the CUT. The Insertion Loss Test Interface Panel is displayed in Figure 3–3. The controls are the same as for the VSWR Test Interface Panel.

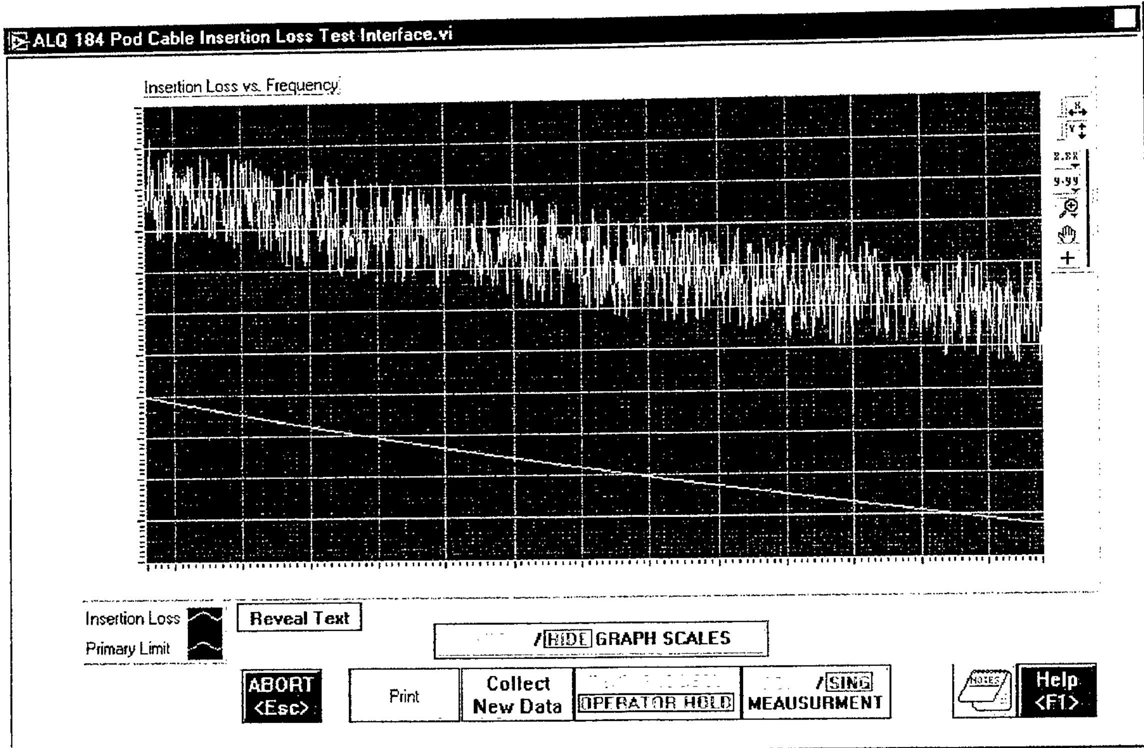

Figure 3-3 Insertion Loss Test Interface Panel

The ALQ-184 Cable Test Post Run Interface Panel represents a collection of all three test types displayed on a single interface panel. This allows the operator and opportunity to view entire cable performance from a single interface. The three graphs represent the VSWR, Phase, and Insertion Loss plot for the current CUT. Additionally, this panel enables some higher level functions to be performed. The first is the PRINT option. The PRINT option enables a selection interface that provides the operator printing options. The operator may print all plots, the default, or select to print only those plots of choice. This panel is also used to invoke the Phase Tracking Test, which is another display option included as part of the post-run activities. The remaining options presented on the post-run interface panel are standard controls and indicators that have been discussed previously. To activate the Phase Tracking Test, select the PHASE TRACKING option on the interface panel and the Phase Tracking Interface Panel will appear. This interface panel is discussed in the following paragraphs.

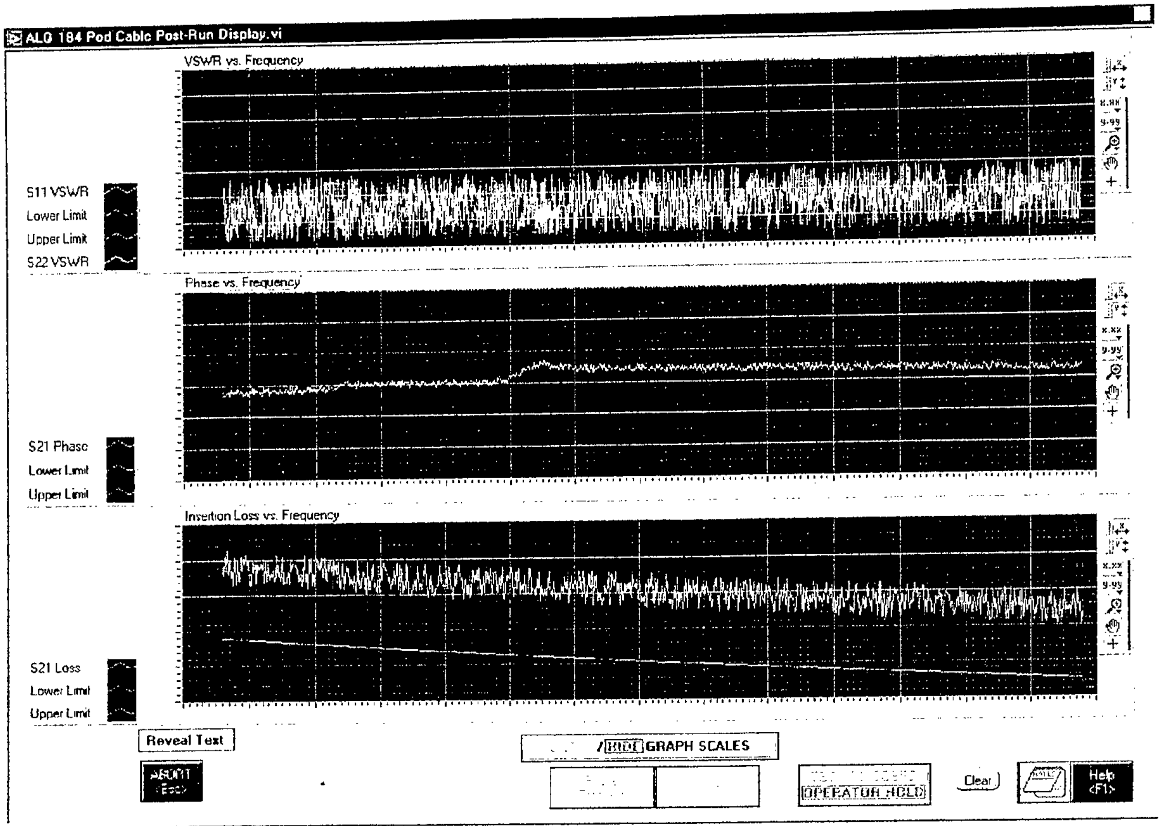

Figure 3-4 Post-Run Interface Panel

The Phase Tracking Test collects phase plots from the current group of cables. Each plot is assigned a plot number which corresponds to the order in which the plots where collected. Additionally, the maximum phase difference is displayed in the phase tracking plot at the top. The Phase Tracking Test compares the phase values of the individual cable plots at all frequencies across the desired frequency band and finds the single frequency point at which the greatest phase difference for all cable plots occurs. This is represented on the Phase Tracking Plot as a relative difference value. Since the only tolerance for the Phase Tracking Test is a not-to-exceed value, the plot displays a maximum difference limit line only. If the electrical or phase length of the cable is shorter than the desired length, this is interpreted as a negative phase value which is relatively more distant from the most positive or longest electrical length cable then all other positive length cables. Therefore, all tracking measurements are displayed as a relative phase difference, depicted as a positive value.

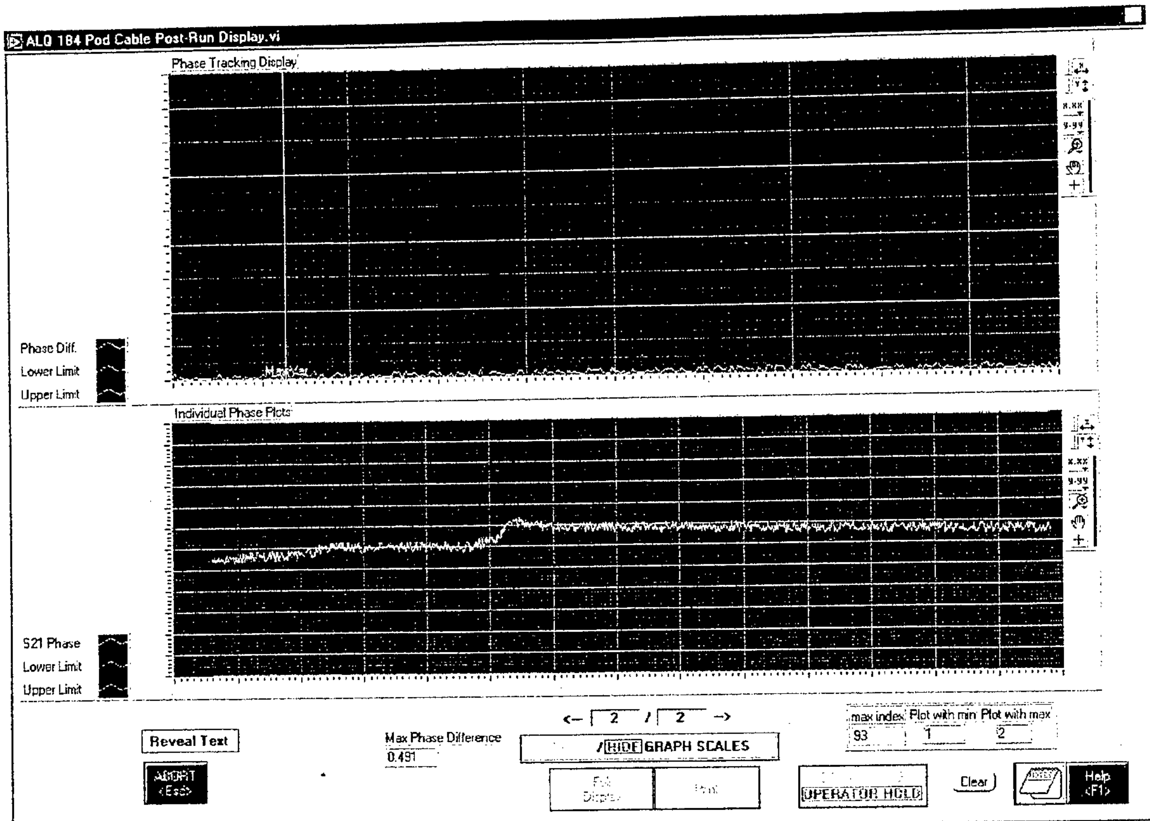

Figure 3-5 Phase Tracking Test Interface Panel

The Phase Tracking Test Interface Panel has numerous test specific user controls. The Max Phase Difference indicator displays the relative value representing the maximum phase difference of all cables current included in the Phase Tracking Test array. Above the SHOW/HIDE GRAPH SCALES option is plot selected/number of available plots indicator. The operator intuitively knows how many plots are stored within the current Phase Tracking Test array by the number of plots listed on the right. The number on the left indicates the currently displayed phase plot number. Remember this plot number is assigned by the order in which the phase plot data was collected. To sequence through the available phase plots and view the plot graphically, select the left arrow (←) to sequence down in the array and the right arrow (→) to sequence up. The on-panel textual display, blue text, lets the operator know when the first or last plot is reached within the Phase Tracking Test array. The box located above the TEST PROCEED/OPERATOR HOLD option contains information pertinent to the Phase Tracking Test array. The Max Index indicator contains the number of indices within the current Phase Tracking Test array. The plot with MIN and plot with MAX values indicate the position within the array of the plots that have the greatest phase difference or those two plots currently defining the maximum and minimum for the Phase Tracking measurement. By viewing these two plots, the operator can verify the minimum and maximum phase values for the Phase Tracking Test. Finally, the CLEAR option is used to clear the plots currently stored within the Phase Tracking Test array. The operator should ensure all current phase tracking plots are saved or no longer required before selecting this option. Once this option is selected, all of the plot data for the applicable cable testing will be lost and is not recoverable.

The cable test data, including the phase tracking data, can be saved by using the applicable TEST EXECUTIVE AND RESULTS TOOL options prior to executing the CLEAR option from the Phase Tracking Test Interface Panel. To print the current cable's Test Sequence Report, select the Print option from the Test Executive Interface Panel before starting the next cable sequence. To print an entire set of cable test report, select the Results Tool option from the Test Executive Interface Panel. Then select the Print option from the Results Tool Interface Panel. To save the current Results File, select the Save option from the File window area on the Results Tool Interface Panel. Then save the file as whatever file name and file extension is desired.

To test additional cables after the cable test sequence is complete, select the TEST UUT option of the Test Executive Interface Panel. To ensure the cable is connected properly prior to executing the test, view the Vector Network Analyzer display and tighten, torque, or loosen the cable connects as required to achieve the flattest display results as near the center graticule as possible prior to executing the tests following the connection instructions. This process is repeated for each cable within the set.

To ensure the most accurate results, the input / output cables should be re-calibrated periodically. This can be accomplished between cable sets or about every two hours of test to ensure the best possible test results.

3.2 TPS File Development From System Specifications

The MiCATS™ editing environment is the heart of the RATEMC. It allows the developer to create operator instructions, device specific limit files, link these limits to generalized test programs, correlate the various files associated with the tests types, and perform validation of test parametric data using the graphical editing tools. This consists of a set of editing tools tied to the LabVIEW/ MiCATS™ Test Executive via the Test Sequence Editor. By selecting the EDIT option from the LabVIEW/MiCATS Test Executive Interface, the Test Sequence Editor is launched. Within the Test Sequence Editor is an option to edit the test VI. This option launches the various MiCATS™ Test Editors. Each test type has associated editors depending on the types of data required for the test type. For example, a Gain Test may require wide-band curve data to specify such requirements as drive level, upper gain limit, lower gain limit, operator instruction and various other test requirements. By selecting the EDIT TEST option from the LabVIEW/ MiCATS™ Test Sequence Editor, the edit options menu is presented as illustrated in Figure 3-6. By selecting the various options from the Test Edit Menu, the developer can open the test VI or the various editors associated with a particular test type.

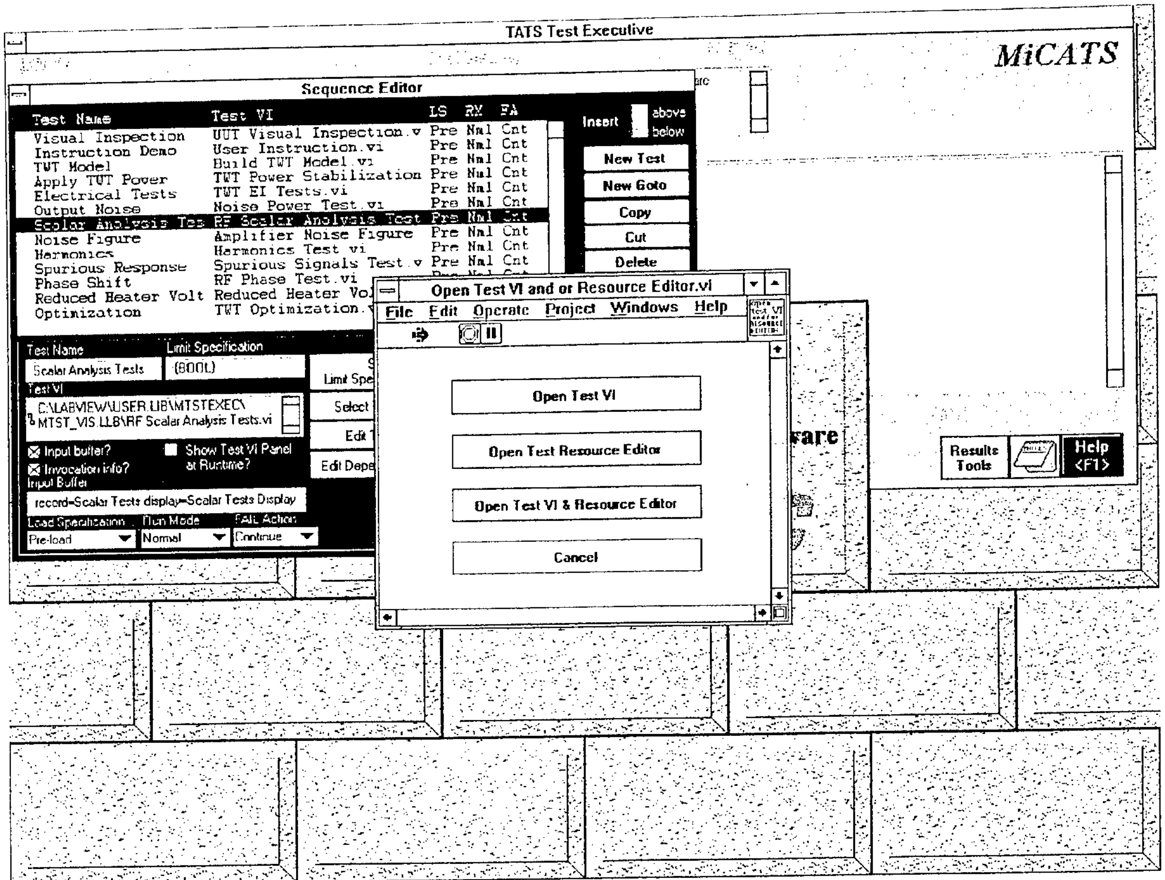

Figure 3-6 Test Sequence Editor's Test Edit Menu

After selecting the desired editing option, the individual editors will be opened allowing the software maintainer to create or edit test data. The test data editors consist of many editors that are linked to the various tests by the MiCATS™ Test Editor. This linking allows the individual tests to use numerous editors of varying types.

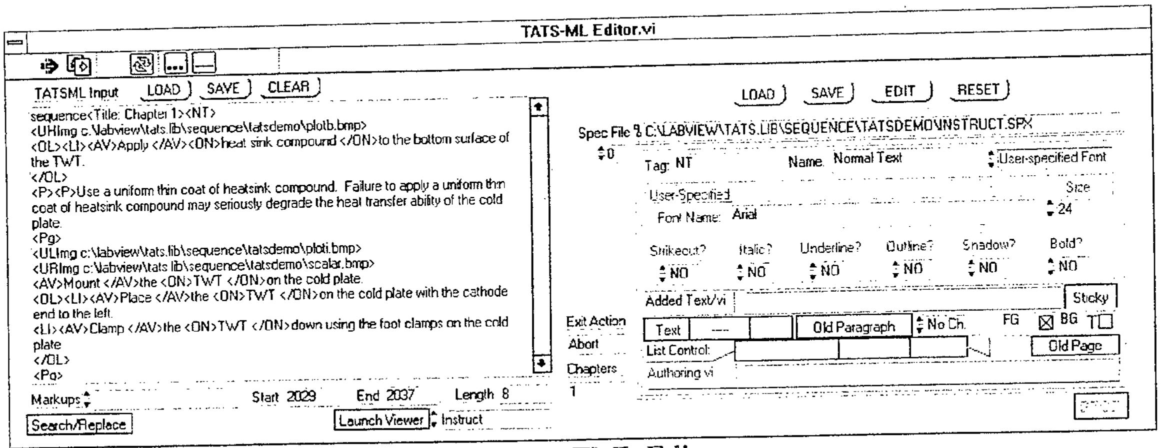

Figure 3-7 TML Editor

3.3 Developing A TPS Using The MiCATS™ Development Environment

First, the developer would use the Test Sequence Editor and the MiCATS™ Test Editor to define the tests needed within the device specific Test Sequence. Once the test sequence is developed, the required general test programs or VIs would be linked to the tests within the sequence using the Test Sequence Editor. An input buffer would be defined to indicate the location of the resource files to be used for each test within the sequence. The MiCATS™, Test Executive uses the input buffers to load the required resources during Test Executive initialization. Then, the individual test requirements identified by the user and the specific device specification would be developed using the applicable test editors.

Since the test may require the end user to perform certain set-up functions, the Textual Mark-up Language (TML) Editor would be used to develop standardized instruction sets for executing the test. Refer to Figure 3-7. The TML Editor uses standard textual input files, for example, Microsoft Word, to create test set up and execution instructions. These instructions are displayed in a standard format, using limited color coding to effectively convey operator interactions during test execution. Each unique test sequence has an associated instruction "book" file. Within the "book" files are chapters that relate to the individual tests within the sequence that use instructions. Within each chapter are pages that relate directly to instruction pages. These instruction pages contain the actual color-coded instructions that the operator will view and pointers to any graphics that may be required to convey complex or highly interactive test set-ups. The graphics displays are presented as either upper half, upper right, or upper left bitmap images. The desired TML specification is loaded into the TML Editor from previously created files, allowing the developer to use unique mark-up specifications depending on user specific requirements. Once the TML files and the bitmap inks are embedded, the sequence specific TML file is saved in the desired sequence directory structure.

The remaining data within a Test Program Set (TPS) will consist of all the files required for the MiCATS™ test sequence to perform the desired test functions. Device specific specifications are used to create the various test limits files for the required tests. For example, a gain test would require input and output specification files to define the limits to which a generic Gain Test would perform within the required TPS. This can consist of many different requirements depending on the device to be tested, the device test requirements, and the user's test requirements. Therefore, a general description of gain test requirements are presented to provide an idea of the complexity of the interaction of the various components that are used to construct a gain test for a specific device. The Gain Test Editor would be launched from the Sequence Editor's Test Edit menu. Figure 3-8 shows a simplistic set of limit curves associated with a gain test. Each curve represents an input or output test requirement and the individual curves specify the test limits for each of these requirements. The ability to tie together all of these complex interactions into a uniform editing tool significantly simplifies the development process for a truly complex set of tests that have numerous dependencies and myriad data associated with them. The Gain Test Editor identifies for the developer all of the tests that must be performed, the interactions between these tests, and the ability to develop or edit the data associated with these requirements in a controlled environment. This makes the editor concept a very valuable tool for the developer and maintainer, but the editing environment does not end here.

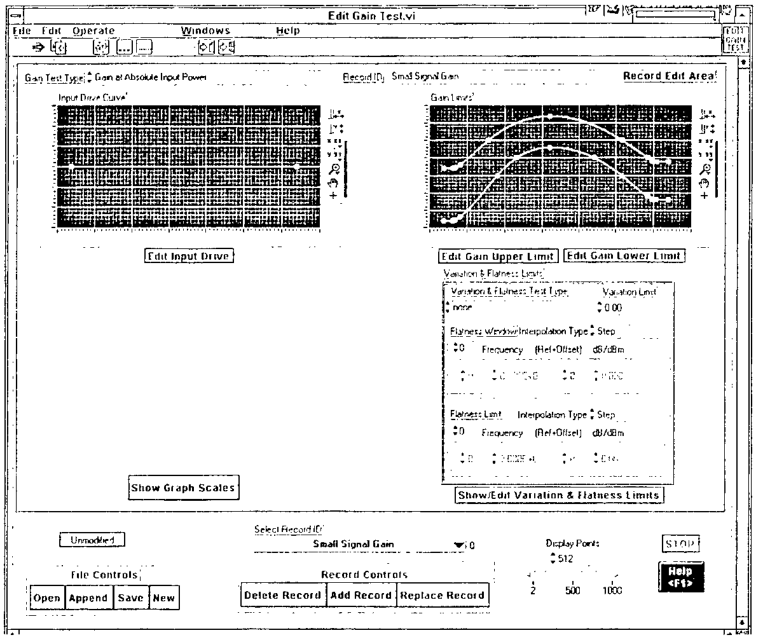

Figure 3-8 Gain Test Editor

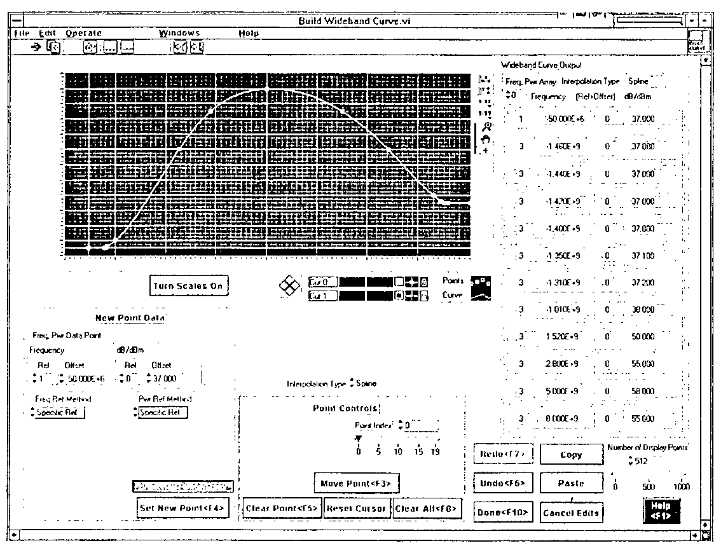

Figure 3-9 Wide Band Curve Editor

Robust correlation tools are integrated into the editing environment. The correlation tools automatically perform data integrity checks and look for the natural relationships that should be present in this complex series of tests. If items are reversed, missing, or corrupted, the correlation tools will identify these errors to the developer. As each of the test specific requirements is entered, they use a standard graphical or data structure editor. The data structure can be used if numerical specification data is to be entered directly. However, if the requirements are flexible and a more intuitive method of creating the specification files are desired, we have included a "drag and drop" type of graphical editor, the Wide-Band Curve Editor in Figure 3-9. By minimizing the variation of editor types, we are able to lessen the software maintainer's burden while improving the editing environment. This minimizes the amount of software required to support development of individual test requirements while supporting maximum reuse of test development assets.

Finally, the instrumentation used to perform testing varies from user to user and test station to test station. Therefore, the MiCATS™ software utilizes a Data Driven Driver that eliminates the need to develop driver software when the instrumentation changes. By managing the instrument specific data with the Data Driven Driver Resource Editor, the need to develop new driver software, typically encountered with other development strategies, is eliminated in the MiCATS™ development environment. This enabled us to rapidly adapt to and use additional capabilities from the Vector Network Analyzer without the requirement to build additional driver software.

4. ALQ-184 CABLE TEST REPORTS

During execution of the ALQ-184 Cable Test software for WR-ALC/LNXEJ we collected cable test data and numerous cable sets containing 8 to 16 cables per set. The report data for each of these cables is included in Appendix 1. These reports are generated by the test sequence reporting method and the Result Tool method. Additionally, all cable test data has been saved and provided in electronic form with the ALQ-184 Cable Test software.

5. CONCLUSION

By employing a more flexible design concept, component-based algorithm development practices, and sound software development principles, a once insurmountable problem has been solved. TASC and their Air Force partners, WR-ALC/LN and the Wright Laboratories Hardware and Software Division, have solved the scaleable microwave test challenge and created RATEMC compatible applications using the development tools. The time and cost reductions associated with applications development utilizing scaleable MiCATS™ software technology is very significant and sets the precedence for all future software development activities.

6. ALQ-184 Cable Test Results

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence	C:\LABVIEW\SEQUENCE\TWT\CableTWT\CalVal.seq					
	Description:						
	Date:	7/1/98					
	Time:	7 23 AM					
	Operator:	mike					
	Operating Level:	Developer					
....							
UUT Information							
	Part Number:	Cal Verification					
	Vendor:	None					
	NSN:						
	Item Description:	Morning Pre-run Cal Validation					
	System:						
	WUC:						
	.						
	Serial Number:						
	JCN:						
	Type Maint:						
	SRD						
	When Disc.:						
	HOW MAL:						
	Tag No.:						
	Removed From:						
	Inspection Activity						
	Condition Code						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:36.672
	S11 VSWR Maximum w/limit	PASS	1.000000	LE	1.100000		
	S11 VSWR Maximum w/limit Frequency GHz	NONE	0.000000	LOG			
	S22 VSWR Maximum w/limit	PASS	1.053000	LE	1.100000		
	S22 VSWR Maximum w/limit Frequency GHz	NONE	5.000000	LOG			
Phase Test		PASS		BOOL			00:00:35.565
	Cal Validation Phase Minimum w/limit	PASS	0.040000	GELE	0.500000	0.100000	
	Cal Validation Phase Minimum w/limit Frequency GHz	NONE	1.125000	LOG			
	Cal Validation Phase Maximum w/limit	PASS	0.160000	GELE	0.500000	0.500000	
	Cal Validation Phase Maximum w/limit Frequency GHz	NONE	18.510000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:24.321
	Cal Validation Insertion Loss Minimum w/limit	PASS	0.000000	GE	0.000000		
	Cal Validation Insertion Loss Minimum w/limit Frequency GHz	NONE	0.000000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00:01:39
	Total Test Execution Time:						00:02:15
	Total UUT Execution Time:						00:01:24
	Overhead:	00:00:00.163	0.030680%				00:00:18

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\184Cable\184Cable.seq					
	Description:						
	Date:	7/1/98					
	Time:	8:29 AM					
	Operator:	mike					
	Operating Level	developer					
....							
UUT Information							
	Part Number:	1030372-1					
	Vendor:	[illegible]					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ [illegible]					
	RUC:						
	Serial Number	0221					
	JCN:						
	Type Maint.						
	SRD						
	When Disc						
	HOW MAL.						
	Tag No.						
	Removed From:						
	Inspection Activity						
	Condition Code:						
	Discrepancy:						
TEST RESULT		UUT FAILED	FAIL				
TEST RESULTS							
WEC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			10:05:38.266
	S11 VSWR Maximum w/ limit	PASS	1.320000	LE	1.400000		
	S11 VSWR Maximum w/ limit Frequency XFS	NONE	96.802401	LOG			
	S12 VSWR Maximum w/ limit	PASS	1.210000	LE	1.100000		
	S12 VSWR Maximum w/ limit Frequency XFS	NONE	37.243100	LOG			
Phase Test		FAIL		BOOL			10:05:51.3[illegible]
	1030372-1 Phase Minimum w/ limit	PASS	0.772030	GELE	6.010000	6.000000	
	1030372-1 Phase Minimum w/ limit Frequency XFS	NONE	1.250001	LOG			
	1030372-1 Phase Maximum w/ limit	FAIL	1.200003	GELE	-6.010000	6.000000	
	1030372-1 Phase Maximum w/ limit Frequency XFS	NONE	95.000050	LOG			
Insertion Loss Test		FAIL		BOOL			00:00:26.073
	1030372-1 Insertion Loss Minimum w/ limit	FAIL	-1.770100	GE	1.010000		
	1030372-1 Insertion Loss Maximum w/ limit Frequency XFS	NONE	67.833052	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time.						
	PostRun Execution Time.						00:03.22
	Total Test Execution Time:						00:00:03.810
	Total UUT Execution Time:						00:01:54
	Overhead:	00:03:50.711	0.078359%				00:05:20

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TATS-

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\TT\Cable\TT\Cable.seq					
	Description:						
	Date:	7/1/98					
	Time:	9:31 AM					
	Operator:	mike					
	Operating Level	Developer					
....							
UUT Information							
	Part Number:	1030372-1					
	Vendor:	Litton					
	NSN						
	Item Description:	Cable Assembly					
	System	ALQ 134					
	WUC:						
	Serial Number:	0031					
	JCN						
	Type Maint.						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No.						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:	re-collect data					
TEST RESULT		UUT FAILED	FAIL				
TEST RESULTS							
WEC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:13.864
	S11 VSWR Maximum w/limit	PASS	1.320000	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency GHz	NONE	95.862111	LOG			
	S22 VSWR Maximum w/limit	PASS	1.210000	LE	1.165000		
	S22 VSWR Maximum w/limit Frequency GHz	NONE	17.213108	LOG			
Phase Test		FAIL		BOOL			00:00:21.116
	1030372-1 Phase Minimum w/limit	PASS	0.610000	GELE	6.000000	1.060300	
	1030372-1 Phase Minimum w/limit Frequency GHz	NONE	1.350000	LOG			
	1030372-1 Phase Maximum w/limit	FAIL	7.660000	GELE	6.000000	6.000000	
	1030372-1 Phase Maximum w/limit Frequency GHz	NONE	96.600000	LOG			
Insertion Loss Test		FAIL		BOOL			00:00:20.310
	1030372-1 Insertion Loss Minimum w/limit	FAIL	-1.270000	GE	1.010310		
	1030372-1 Insertion Loss Minimum w/limit Frequency GHz	NONE	61.871550	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00:00:05.705
	PostRun Execution Time:						00:00:03.312
	Total Test Execution Time:						00:01:16
	Total UUT Execution Time						00:01:25
	Overhead	00:00:00.170	0.2004328				

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A-25

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence	C:\LABVIEW\SEQUENCE\18\Cable\18\Cable.seq					
	Description:						
	Date:	[illegible]					
	Time:	8 36 AM					
	Operator:	mike					
	Operating Level:	developer					
....							
UUT Information							
	Part Number	1038372-1					
	Vendor	Times					
	NSN:						
	Item Description	Cable Assembly					
	System	ALQ 184					
	WUC:						
	Serial Number:	0025					
	JCN						
	Type Maint:						
	SRD:						
	When Disc						
	HOW MAL						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
W2C Editor		SKIP					
VHA OSL 12 Term Cal		SKIP					
VSWR Test		PASS		BOOL			00 00 35 971
	S11 VSWR Maximum w/ limit	PASS	1.130100	LE	1.105000		
	S11 VSWR Maximum w/ limit Frequency XFS	NONE	10.121465	LOG			
	S22 VSWR Maximum w/ limit	PASS	1.160000	LE	1.400000		
	S22 VSWR Maximum w/ limit Frequency XFS	NONE	67.019711	LOG			
Phase Test		PASS		BOOL			00 00.10 976
	1038372-1 Phase Minimum w/ limit	PASS	-1.780000	GELE	6.000000	6.000000	
	1038372-1 Phase Minimum w/ limit Frequency XFS	NONE	13.155000	LOG			
	1038372-1 Phase Maximum w/ limit	PASS	0.160000	GELE	6.000000	6.000000	
	1038372-1 Phase Maximum w/ limit Frequency XFS	NONE	81.250050	LOG			
Insertion Loss Test		PASS		BOOL			00 00 27 070
	1038372-1 Insertion Loss Minimum w/ limit	PASS	1.210000	GE	-1.210000		
	1038372-1 Insertion Loss Maximum w/ limit Frequency XFS	NONE	35.625000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00.00 16 151
	PostRun Execution Time:						00 03 01 181
	Total Test Execution Time:						00 01 11
	Total UUT Execution Time:						00 01 11
	Overhead	00 00.00 246	0.277037K				

TATo-..

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCES\TE\Cable\TE\Cable.seq					
	Description:						
	Date:	7/1/98					
	Time	9:37 AM					
	Operator:	mike					
	Operating Level:	developer					
....							
UUT Information							
	Part Number:	1038372-1					
	Vendor:	Lmes					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	:						
	Serial Number	0020					
	JCN:						
	Type Maint						
	SRD:						
	When Disc:						
	HOW MAL						
	Tag No:						
	Removed From:						
	Inspection Activity						
	Condition Code						
	Discrepancy:						
TEST RESULT:		UUT PASSED					
TEST RESULTS			PASS				
WSC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00 00 31 430
	S11 VSWR Maximum w/Limit	PASS	1 250000	LE	1 400000		
	S11 VSWR Maximum w/Limit Frequency XFS	NONE	10 245614	LOG			
	S22 VSWR Maximum w/Limit	PASS	1 166000	LE	1.400000		
	S22 VSWR Maximum w/Limit Frequency XFS	NONE	10 725817	LOG			
Phase Test		PASS		BOOL			00 00.19 886
	1038372-1 Phase Minimum w/Limit	PASS	0 011000	GELE	6 000000	6 000000	
	1038372-1 Phase Minimum w/Limit Frequency XFS	NONE	1 250000	LOG			
	1038372-1 Phase Maximum w/Limit	PASS	1 420000	GELE	6 000000	6 000000	
	1038372-1 Phase Maximum w/Limit Frequency XFS	NONE	14 425000	LOG			
Insertion Loss Test		PASS		BOOL			00 00 13 111
	1038372-1 Insertion Loss Minimum w/Limit	PASS	1 150000	GE	-1 250000		
	1038372-1 Insertion Loss Minimum w/Limit Frequency XFS	NONE	11 250000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00 00 05 435
	PostRun Execution Time:						00 00 05 812
	Total Test Execution Time:						00 01 19
	Total UUT Execution Time:						00 01.28
	Overhead:	00 00.00 207	0 231701%				

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Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\1\[illegible]\Cable.seq					
	Description:						
	Date:	1/1/10					
	Time:	0:41 AM					
	Operator	mike					
	Operating Level:	Testlayer					
....							
UUT Information							
	Part Number:	1031372-1					
	Vendor:	Times					
	NSN:						
	Item Description	Cable Assembly					
	System:	ALQ 184					
	WUC						
	:						
	Serial Number:	1026					
	JCN:						
	Type Maint.						
	SRD						
	When Disc.						
	HOW MAL.						
	Tag No.						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT							
TEST RESULTS		UUT PASSED	PASS				
WBC Editor		SKIP					
VNA OSL 12-Term. Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:36.722
	S11 VSWR Maximum w/limit	PASS	1.260000	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency XFS	NONE	95.715614	LOG			
	S22 VSWR Maximum w/limit	PASS	1.280033	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency XFS	NONE	100.000000	LOG			
Phase Test		PASS		BOOL			00:00:19.476
	1031372-1 Phase Minimum w/limit	PASS	1.160000	GELE	6.000000	8.000000	
	1031372-1 Phase Minimum w/limit Frequency XFS	NONE	6.375000	LOG			
	1031372-1 Phase Maximum w/limit	PASS	1.216000	GELE	6.000000	6.000000	
	1031372-1 Phase Maximum w/limit Frequency XFS	NONE	76.001000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:22.469
	1031372-1 Insertion Loss Minimum w/limit	PASS	-1.166900	GE	1.216100		
	1031372-1 Insertion Loss Minimum w/limit Frequency XFS	NONE	95.750000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00:00:05.107
	Total Test Execution Time:						00:00:03.313
	Total UUT Execution Time:						00:01.26
	Overhead:	00:00:00.189	0.214011%				33.11.33

TMS ??

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\TE\Cable\TE\Cable.seq					
	Description:						
	Date:	7/1/66					
	Time:	1 47 AM					
	Operator:	nite					
	Operating Level:	Developer					
....							
UUT Information							
	Part Number:	1031312-1					
	Vendor:	Times					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number:	0022					
	JCN:						
	Type Maint:						
	SRD						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy						
TEST RESULT		UUT PASSED	PASS				
TEST RESULTS							
WBC Error		SKIP					
VNA OSL 12-Term Ca		SKIP					
VSWR Test		PASS		BOOL			00 00:36 186
	S11 VSWR Maximum w/ limit	PASS	1.206160	LE	1.400000		
	S11 VSWR Maximum w/ limit Frequency XFS	NONE	57.380152	LOG			
	S22 VSWR Maximum w/ limit	PASS	1.200000	LE	1.400000		
	S22 VSWR Maximum w/ limit Frequency XFS	NONE	52.380051	LOG			
Phase Test		PASS		BOOL			00 00:19 138
	1031312-1 Phase Minimum w/ limit	PASS	0.460000	GELE	-6.000000	6.000000	
	1031312-1 Phase Minimum w/ limit Frequency XFS	NONE	1.250000	LOG			
	1031312-1 Phase Maximum w/ limit	PASS	3.130000	GELE	6.000000	6.000100	
	1031312-1 Phase Maximum w/ limit Frequency XFS	NONE	94.625000	LOG			
Insertion Loss Test		PASS		BOOL			00 00 21 400
	1031312-1 Insertion Loss Minimum w/ limit	PASS	0.540000	GE	0.670000		
	1031312-1 Insertion Loss Minimum w/ limit Frequency XFS	NONE	6.505000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00 00 01 111
	PostRun Execution Time:						00 00 01 717
	Total Test Execution Time:						00 01 18
	Total UUT Execution Time:						00 01 29
	Overhead	00 00 00 307	0.356688%				

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Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
	[illegible]	[illegible]					
UUT Information							
	Part Number:	1031372 1					
	Vendor:	Unes					
	NSN						
	Item Description	Cable Assembly					
	System:	ALQ 1[illegible]					
	WUC						
	Serial Number:	0017					
	JCN:						
	Type Maint:						
	SRD:						
	When Disc						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WEC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:55.431
	S11 VSWR Maximum w/t limit	PASS	1.270000	LE	1.450000		
	S11 VSWR Maximum w/t limit Frequency KFS	NONE	67.019111	LOG			
	S22 VSWR Maximum w/t limit	PASS	1.260000	LE	1.400000		
	S22 VSWR Maximum w/t limit Frequency KFS	NONE	17.243101	LOG			
Phase Test		PASS		BOOL			00:00:12.437
	1031372-1 Phase Minimum w/t limit	PASS	1.310000	GELE	6.000000	6.000000	
	1031372-1 Phase Minimum w/t limit Frequency KFS	NONE	6.315010	LOG			
	1031372-1 Phase Maximum w/t limit	PASS	0.700000	GELE	-6.000000	6.000000	
	1031372-1 Phase Maximum w/t limit Frequency KFS	NONE	24.350000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:21.978
	1031372-1 Insertion Loss Minimum w/t limit	PASS	1.230000	GE	1.240000		
	1031372-1 Insertion Loss Minimum w/t limit Frequency KFS	NONE	17.600000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00:00:46.163
	PostRun Execution Time:						00:00:04.210
	Total Test Execution Time:						00:01:17
	Total UUT Execution Time:						00:01:18
	Overhead:	00.00.00 205	0.231424%				

Traveling Wave Tube ...

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST THE POINT							
	Test Requested	[illegible]					
	Description						
	Date:	[illegible]					
	Time	[illegible] AM					
	Operator:	[illegible]					
	Operating Level	[illegible]					
UUT Information							
	Part Number	1038372-1					
	Vendor:	[illegible]					
	NSN						
	Item Description.	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number:	3028					
	JCN:						
	Type Maint						
	SRD:						
	When Disc.						
	HOW MAL.						
	Tag No.						
	Removed From:						
	Inspection Activity.						
	Condition Code:						
	Discrepancy:						
TEST RESULT.		UUT PASSED	PASS				
TEST RESULTS							
WBC Editor		SKIP					
VIA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00 00 37 430
	S11 VSWR Maximum wil limit	PASS	1.220000	LE	1.600000		
	S11 VSWR Maximum wil limit Frequency NFS	NONE	70.175439	LOG			
	S22 VSWR Maximum wil limit	PASS	1.266000	LE	1.600000		
	S22 VSWR Maximum wil limit Frequency NFS	NONE	103.000010	LOG			
Phase Test		PASS		BOOL			00 01.89
	1038372-1 Phase Minimum wil limit	PASS	0.320000	GELE	6.000000	6.000000	
	1038372-1 Phase Minimum wil limit Frequency NFS	NONE	1.250000	LOG			
	1038372-1 Phase Maximum wil limit	PASS	5.260000	GELE	6.000000	6.000000	
	1038372-1 Phase Maximum wil limit Frequency NFS	NONE	84.625000	LOG			
Insertion Loss Test		PASS		BOOL			00 00 13.671
	1038372-1 Insertion Loss Minimum wil limit	PASS	-1.100000	GE	-1.260000		
	1038372-1 Insertion Loss Minimum wil limit Frequency NFS	NONE	39.375000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00 00 05.665
	Total Test Execution Time:						00 00 03.913
	Total UUT Execution Time						00 03.20
	Overhead:	10 03 00.161	0.080169%				00 03.20

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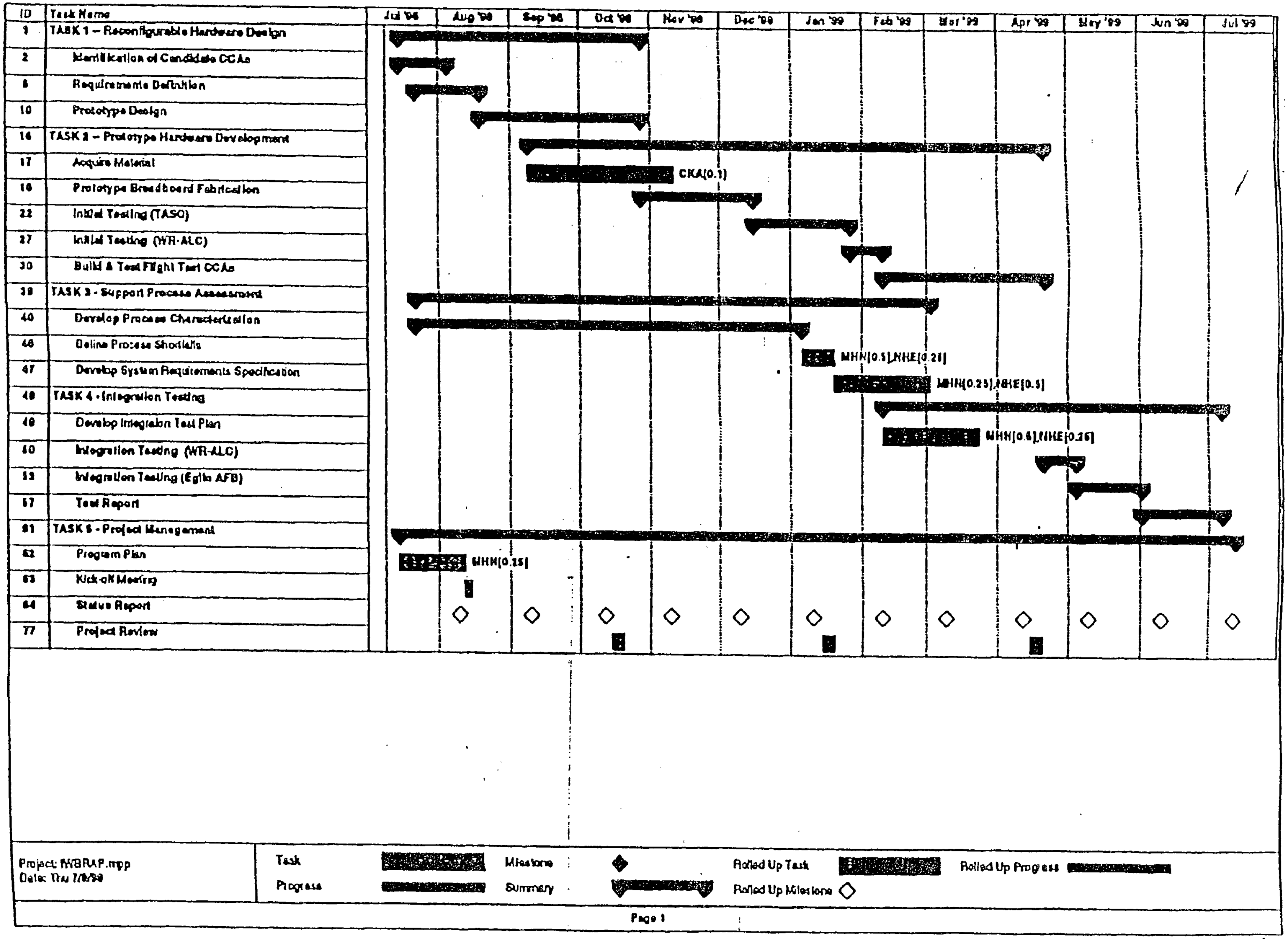
Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible]Cable\[illegible]Cable.seq					
	Description:						
	Date	[illegible]					
	Time:	8:50 AM					
	Operator:	mike					
	Operating Level:	developer					
************************							
UUT Information							
	Part Number:	1018322-1					
	Vendor:	lines					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number	1024					
	JCN:						
	Type Maint:						
	3RD						
	When Disc:						
	HOW MAL:						
	Tag No						
	Removed From						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:34.831
	S11 VSWR Maximum w/i limit	PASS	1.374000	LE	1.400000		
	S11 VSWR Maximum w/i limit Frequency %FS	NONE	10.216614	LOG			
	S22 VSWR Maximum w/i limit	PASS	1.366000	LE	1.450000		
	S22 VSWR Maximum w/i limit Frequency %FS	NONE	51.211611	LOG			
Phase Test		PASS		BOOL			00:00:10.581
	1018322-1 Phase Minimum w/i limit	PASS	-1.110126	GELE	-6.000000	6.000000	
	1018322-1 Phase Minimum w/i limit Frequency %FS	NONE	6.375000	LOG			
	1018322-1 Phase Maximum w/i limit	PASS	0.830000	GELE	-6.000000	6.000000	
	1018322-1 Phase Maximum w/i limit Frequency %FS	NONE	15.875000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:20.651
	1018322-1 Insertion Loss Minimum w/i limit	PASS	-1.110000	GE	-1.250000		
	1018322-1 Insertion Loss Minimum w/i limit Frequency %FS	NONE	99.250000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00:00:06.280
	PostRun Execution Time:						00:00:03.380
	Total Test Execution Time:						00:01:16
	Total UUT Execution Time						00:01:26
	Overhead:	00:00:00.166	0.333664%				


ID
Task Name
1 TASK 1 – Reconfigurable Hardware Design
2 Identification of Candidate CCAs
6 Requirements Definition
10 Prototype Design
14 TASK 2 – Prototype Hardware Development
17 Acquire Material
18 Prototype Breadboard Fabrication
22 Initial Testing (TASO)
27 Initial Testing (WR-ALC)
30 Build & Test Flight Test CCAs
39 TASK 3 - Support Process Assessment
40 Develop Process Characterization
46 Define Process Shortfalls
47 Develop System Requirements Specification
48 TASK 4 - Integration Testing
49 Develop Integration Test Plan
50 Integration Testing (WR-ALC)
53 Integration Testing (Eglin AFB)
57 Test Report
61 TASK 5 - Project Management
62 Program Plan
63 Kick-off Meeting
64 Status Report
77 Project Review
Jul '98
Aug '98
Sep '98
Oct '98
Nov '98
Dec '98
Jan '99
Feb '99
Mar '99
Apr '99
May '99
Jun '99
Jul '99
CKA(0.1)
MHH[0.5],NHE[0.25]
MHH[0.25],NHE[0.5]
MHH[0.5],NHE[0.25]
MHH[0.25]
Project: IWBRAP.mpp
Date: Thu 7/9/98
Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
Page 1

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible]\Cable[illegible]					
	Description:						
	Date:	7/1/98					
	Time:	8:58 AM					
	Operator:	mike					
	Operating Level:	developer					
....							
UUT Information							
	Part Number:	1038372-1					
	Vendor:	Times					
	NSN:						
	Item Description	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number:	0021					
	JCN:						
	Type Maint.						
	SRD.						
	When Disc.						
	HOW MAL:						
	Tag No:						
	Removed From						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:	Re-run at end of cable set testing					
TEST RESULT:		UUT FAILED	FAIL				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:03:33.716
	S11 VSWR Maximum w/l limit	PASS	1.300000	LE	1.400000		
	S11 VSWR Maximum w/l limit Frequency XFS	NONE	18.245614	LOG			
	S22 VSWR Maximum w/l limit	PASS	1.111000	LE	1.400000		
	S22 VSWR Maximum w/l limit Frequency XFS	NONE	15.631015	LOG			
Phase Test		FAIL		BOOL			00:00:20.823
	1038372-1 Phase Minimum w/l limit	PASS	0.740000	GELE	6.000000	6.000000	
	1038372-1 Phase Minimum w/l limit Frequency XFS	NONE	1.155000	LOG			
	1038372-1 Phase Maximum w/l limit	FAIL	1.320000	GELE	6.000000	6.000000	
	1038372-1 Phase Maximum w/l limit Frequency XFS	NONE	64.625000	LOG			
Insertion Loss Test		FAIL		BOOL			00:00:13.070
	1038372-1 Insertion Loss Minimum w/l limit	FAIL	1.360000	GE	1.240000		
	1038372-1 Insertion Loss Minimum w/l limit Frequency XFS	NONE	85.625000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution time.						
	PostRun Execution time.						00:00:36.551
	Total Test Execution time:						00:00:22.165
	Total UUT Execution Time:						01:01.10
	Overhead.	00:00:00.354	0.330148%				00:01.63

TAT

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\184\Cable\184Cable.seq					
	Description:						
	Date:	7/1/98					
	Time:	4:18 PM					
	Operator:	JONES					
	Operating Level	Technician					
UUT Information							
	Part Number	1038372-1					
	Vendor	Times					
	NSN						
	Item Description	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number	C021					
	JCN:						
	Type Maint.						
	SRD						
	When Disc:						
	HOW MAL						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy						
TEST RESULT		UUT FAILED	FAIL				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12-Term Ca'		SKIP					
VSWR Test		PASS		BOOL			00 00 34.245
	S11 VSWR Maximum w/limit	PASS	1.230000	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency XFS	NONE	13.233083	LOG			
	S22 VSWR Maximum w/limit	PASS	1.210000	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency XFS	NONE	16.611111	LOG			
Phase Test		FAIL		BOOL			00 00 25.421
	1038372-1 Phase Minimum w/limit	PASS	0.840000	GELE	6.000000	6.000000	
	1038372-1 Phase Minimum w/limit Frequency XFS	NONE	0.000000	LOG			
	1038372-1 Phase Maximum w/limit	FAIL	9.540000	GELE	6.000000	6.000000	
	1038372-1 Phase Maximum w/limit Frequency XFS	NONE	10.625000	LOG			
Insertion Loss Test		FAIL		BOOL			00 00 21.331
	1038372-1 Insertion Loss Minimum w/limit	FAIL	-1.320000	GE	1.011000		
	1038372-1 Insertion Loss Minimum w/limit Frequency XFS	NONE	67.750000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time						
	PostRun Execution Time						00 00 04.949
	Total Test Execution Time						00 00 08.039
	Total UUT Execution Time:						00 01 52
	Overhead:	00 01 00.285	0.344110%				00 02 01

7A1

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible]					
	Description:						
	Date	7/7/61					
	Time:	3.46 PM					
	Operator:	JONES					
	Operating Level:	Technician					
....							
UUT Information							
	Part Number	Cal Validation					
	Vendor:	None					
	NSN:						
	Item Description:	Afternoon Pre run cal validation					
	System						
	WUC						
	:						
	Serial Number:						
	JCN:						
	Type Maint						
	SRD						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WRC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00 00 11 101
	S11 VSWR Maximum w/l limit	PASS	1.610000	LE	1.100000		
	S11 VSWR Maximum w/l limit Frequency %FS	NONE	17.[illegible]	LOG			
	S22 VSWR Maximum w/l limit	PASS	1.010[illegible]	LE	1.100000		
	S22 VSWR Maximum w/l limit Frequency %FS	NONE	86.[illegible]	LOG			
Phase Test		PASS		BOOL			00 00 22 [illegible]
	Cal Validation Phase Minimum w/l limit	PASS	0.060000	GELE	0.[illegible]00	[illegible]100000	
	Cal Validation Phase Minimum w/l limit Frequency %FS	NONE	0.400000	LOG			
	Cal Validation Phase Maximum w/l limit	PASS	0.323000	GELE	-0.[illegible]	0.[illegible]	
	Cal Validation Phase Maximum w/l limit Frequency %FS	NONE	13.590000	LOG			
Insertion Loss Test		PASS		BOOL			00 00 20 [illegible]
	Cal Validation Insertion Loss Minimum w/l limit	PASS	0.00[illegible]00	GE	0.250000		
	Cal Validation Insertion Loss Minimum w/l limit Frequency %FS	NONE	1.[illegible]	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00 01 38
	Total Test Execution Time:						00 00 07 [illegible]
	Total UUT Execution Time:						00 01 21
	Overhead:	00.00 00.213	[illegible]%				00 05 11

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TAT

Travelling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\18\Cable\18\Cable.seq					
	Description:						
	Date:	7/1/18					
	Time:	3:55 PM					
	Operator:	JONES					
	Operating Level:	technician					
....							
UUT Information							
	Part Number:	1038371-1					
	Vendor:	Times					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	:						
	Serial Number:	0020					
	JCN:						
	Type Maint:						
	SRD						
	When Disc.						
	HOW MAL.						
	Tag No:						
	Removed From						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:34.612
	S11 VSWR Maximum w/limit	PASS	1.250010	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency/KFS	NONE	80.788117	LOG			
	S22 VSWR Maximum w/limit	PASS	1.300006	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency/KFS	NONE	36.992111	LOG			
Phase Test		PASS		BOOL			00:21.1E
	1038371-1 Phase Minimum w/limit	PASS	0.140000	GELE	6.000000	6.000000	
	1038371-1 Phase Minimum w/limit Frequency KFS	NONE	1.210000	LOG			
	1038371-1 Phase Maximum w/limit	PASS	5.100000	GELE	6.000000	6.000000	
	1038371-1 Phase Maximum w/limit Frequency KFS	NONE	94.625000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:22.171
	1038371-1 Insertion Loss Minimum w/limit	PASS	-1.190000	GE	1.230000		
	1038371-1 Insertion Loss Minimum w/limit Frequency KFS	NONE	14.250000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time						
	PostRun Execution Time:						00:00:06.30E
	Total Test Execution Time.						00:00:01.153
	Total UUT Execution Time.						00:02:45
	Overhead:	00:00:00.357	0.146211%				00:02:58

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Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible]\Cable seq					
	Description						
	Date:	[illegible]					
	Time:	3:51 PM					
	Operator:	JONES					
	Operating Level	[illegible]					
....							
UUT Information							
	Part Number:	1033372-1					
	Vendor:	Times					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 126					
	WUC:						
	Serial Number:	0025					
	JCN:						
	Type Maint:						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT FAILED	FAIL				
TEST RESULTS							
HBC Editor		SKIP					
VNA OSL 12 Term Cal		SKIP					
VSWR Test		PASS		BOOL			00.00 33 712
	S11 VSWR Maximum wrt limit	PASS	1.200000	LE	1.440000		
	S11 VSWR Maximum wrt limit Frequency NFS	NONE	92.210516	LOG			
	S22 VSWR Maximum wrt limit	PASS	1.740000	LE	1.400000		
	S22 VSWR Maximum wrt limit Frequency NFS	NONE	95.731310	LOG			
Phase Test		PASS		BOOL			[illegible]
	1038372-1 Phase Minimum wrt limit	PASS	1.610000	GELE	6.000000	6.010000	
	1038372-1 Phase Minimum wrt limit Frequency NFS	NONE	6.115000	LOG			
	1038372-1 Phase Maximum wrt limit	PASS	0.160000	GELE	6.010000	6.000000	
	1038372-1 Phase Maximum wrt limit Frequency NFS	NONE	14.675000	LOG			
Insertion Loss Test		FAIL		BOOL			00 01.43
	1038372-1 Insertion Loss Minimum wrt limit	FAIL	-1.331000	GE	-1.230010		
	1038372-1 Insertion Loss Minimum wrt limit Frequency NFS	NONE	94.250002	LOG			
Phase Tracking		SKIP					
EXECUTION LINE							
	PreRun Execution Time:						00 00 05 024
	PostRun Execution Time						00 00:05.420
	Total Test Execution Time						00.02:30
	Total UUT Execution Time:						00 02 49
	Overhead	00.00.40 268	0.150771%				

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TATS

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test Sequence:	C:\LABVIEW\SEQUENCE\1[illegible]Cable\[illegible]Cable seq					
	Description:						
	Date:	7/1/10					
	Time:	1:01 PM					
	Operator:	JONES					
	Operating Level	technician					
....							
UUT Information							
	Part Number:	1033372-1					
	Vendor:	lines					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 15[illegible]					
	WUC:						
	:						
	Serial Number:	0017					
	JCN:						
	Type Maint						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WBC Edits		SKIP					
VNA OSL 12 Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:28 547
	S11 VSWR Maximum w/l limit	PASS	1.270000	LE	1.[illegible]00		
	S11 VSWR Maximum w/l limit Frequency XFS	NONE	18.748313	LOG			
	S22 VSWR Maximum w/l limit	PASS	1.310000	LE	1.400000		
	S22 VSWR Maximum w/l limit Frequency XFS	NONE	16.812481	LOG			
Phase Test		PASS		BOOL			00:00:10 383
	1033372-1 Phase Minimum w/l limit	PASS	0.980000	GELE	6.000000	6.0[illegible]000	
	1033372-1 Phase Minimum w/l limit Frequency XFS	NONE	1.250000	LOG			
	1033372-1 Phase Maximum w/l limit	PASS	3.210000	GELE	6.010000	6.00[illegible]00	
	1033372-1 Phase Maximum w/l limit Frequency XFS	NONE	11.750000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:12 131
	1033372-1 Insertion Loss Minimum w/l limit	PASS	-1.100000	GE	-1.210000		
	1033372-1 Insertion Loss Minimum w/l limit Frequency XFS	NONE	11.11[illegible]000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00:00:06 320
	Total Test Execution Time:						00:00:10 540
	Total UUT Execution Time:						00:01:16
	Overhead	03 08 00.317	0.402755%				00:01:24

TA

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible] seq					
	Description						
	Date:	7/1/11					
	Time:	1:19 PM					
	Operator:	JONES					
	Operating Level:	Technician					
....							
UUT Information							
	Part Number:	1038372-1					
	Vendor	Jones					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 106					
	WUC:						
	:						
	Serial Number:	0026					
	JCN:						
	Type Maint:						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No						
	Removed From:						
	Inspection Activity:						
	Condition Code						
	Discrepancy:						
TEST RESULT		UUT PASSED					
TEST RESULTS			PASS				
WBC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:24.723
	S11 VSWR Maximum wit limit	PASS	1.180000	LE	1.400000		
	S11 VSWR Maximum wit limit Frequency XFS	NONE	66.736842	LOG			
	S22 VSWR Maximum wit limit	PASS	1.320000	LE	1.400000		
	S22 VSWR Maximum wit limit Frequency XFS	NONE	85.735311	LOG			
Phase Test		PASS		BOOL			00:00:19.417
	1038372-1 Phase Minimum wit limit	PASS	1.010000	GELE	1.000000	6.000000	
	1038372-1 Phase Minimum wit limit Frequency XFS	NONE	1.250100	LOG			
	1038372-1 Phase Maximum wit limit	PASS	1.310000	GELE	1.000000	6.000000	
	1038372-1 Phase Maximum wit limit Frequency XFS	NONE	56.000000	LOG			
Insertion Loss Test		PASS		BOOL			00:00:26.972
	1038372-1 Insertion Loss Minimum wit limit	PASS	-1.230000	GE	1.230000		
	1038372-1 Insertion Loss Maximum wit limit Frequency XFS	NONE	14.335000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00:00:01.171
	Total Test Execution Time:						00:00:01.533
	Total UUT Execution Time						00:01:21
	Overhead:	00:00:00.200	0.230156%				00:01:31

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TS

Travelling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\184Cable\1E1Cable.seq					
	Description:						
	Date:	7/1/11					
	Time:	1:07 PM					
	Operator	JONES					
	Operating Level:	technician					
....							
UUT Information							
	Part Number:	1031372-1					
	Vendor:	Ilmes					
	NSN:						
	Item Description:	Cable Assembly					
	System	ALQ 184					
	NUC:						
	:						
	Serial Number:	0024					
	ICN:						
	Type Maint.						
	SRO						
	When Disc.						
	HOW MAL						
	Tag No.						
	Removed From						
	Inspection Activity						
	Condition Code:						
	Discrepancy:						
TEST RESULT:		UUT PASSED	PASS				
TEST RESULTS							
WDC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00 03.35.356
	S11 VSWR Maximum wit limit	PASS	1.250000	LE	1.400000		
	S11 VSWR Maximum wit limit Frequency XFS	NONE	11.715E14	LOG			
	S22 VSWR Maximum wit limit	PASS	1.310100	LE	1.400000		
	S22 VSWR Maximum wit limit Frequency XFS	NONE	96.749153	LOG			
Phase Test		PASS		BOOL			00 00.18.933
	1031372-1 Phase Minimum wit limit	PASS	0.170310	GELE	6.000000	6.000000	
	1031372-1 Phase Minimum wit limit Frequency XFS	NONE	1.750000	LOG			
	1031372-1 Phase Maximum wit limit	PASS	1.160000	GELE	6.000000	1.000000	
	1031372-1 Phase Maximum wit limit Frequency XFS	NONE	91.625000	LOG			
Insertion Loss Test		PASS		BOOL			00.00.21.385
	1031372-1 Insertion Loss Minimum wit limit	PASS	-1.110000	GE	1.230000		
	1031372-1 Insertion Loss Minimum wit limit Frequency XFS	NONE	91.250000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PrePun Execution Time						
	PostRun Execution Time:						00 03 14.418
	Total Test Execution Time:						00.04.01.338
	Total UUT Execution Time.						00 01 16
	Overhead:	00 03 00.780	0.303316%				00 01 36

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Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\\\Cable\\\Cable.seq					
	Description:						
	Date:	7/1/98					
	Time:	1:06 PM					
	Operator:	JONES					
	Operating Level:	technician					
....							
UUT Information							
	Part Number	1038372-1					
	Vendor	litton					
	NSN:						
	Item Description	Cable Assembly					
	System	ALQ 188					
	WUC:						
	Serial Number	0022					
	JCN:						
	Type Maint:						
	SRD						
	When Disc						
	HOW MAL						
	Tag No						
	Removed From:						
	Inspection Activity						
	Condition Code						
	Discrepancy:						
TEST RESULT		UUT PASSED					
TEST RESULTS			PASS				
WEC Editor							
VNA OSL 12 Term Cal		SKIP					
VSWR Test		SKIP					
		PASS		BOOL			00 00 32 084
	S11 VSWR Maximum w/limit	PASS	1.180000	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency XFS	NONE	19.774811	LOG			
	S22 VSWR Maximum w/limit	PASS	1.250020	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency XFS	NONE	69.074137	LOG			
Phase Test		PASS		BOOL			00 00 21 091
	1038372-1 Phase Minimum w/limit	PASS	0.610000	GELE	-6.000010	6.000010	
	1038372-1 Phase Minimum w/limit Frequency XFS	NONE	1.250000	LOG			
	1038372-1 Phase Maximum w/limit	PASS	5.970010	GELE	6.000000	1.000000	
	1038372-1 Phase Maximum w/limit Frequency XFS	NONE	11.625000	LOG			
Insertion Loss Test		PASS		BOOL			00 00 21 691
	1038372-1 Insertion Loss Minimum w/limit	PASS	0.500000	GE	0.610000		
	1038372-1 Insertion Loss Minimum w/limit Frequency XFS	NONE	1.625000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time						00 00 03 321
	Total Test Execution Time						00 00 03 450
	Total UUT Execution Time:						00 01 16
	Overhead	00 00 00 423	0.484010%				00 01 25

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Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test Sequence:	C:\LABVIEW\SEQUENCES\TECU\TECU.seq					
	Description:						
	Date:	7/1/98					
	Time:	1:15 PM					
	Operator:	JONES					
	Operating Level:	technician					
******************************							
UUT Information							
	Part Number:	1038372-1					
	Vendor:	Times					
	NSN						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC:						
	Serial Number:	3023					
	JCN:						
	Type Maint:						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity						
	Condition Code						
	Discrepancy:						
TEST RESULT		UUT PASSED	PASS				
TEST RESULTS							
WBC Editor		SKIP					
VNA OSL 12 Term Cal		SKIP					
VSWR Test		PASS		BOOL			00:00:34.112
	S11 VSWR Maximum w/limit	PASS	1.230650	LE	1.400000		
	S11 VSWR Maximum w/limit Frequency XFS	NONE	61.911125	LOG			
	S21 VSWR Minimum w/limit	PASS	1.300005	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency XFS	NONE	10.215611	LOG			
Phase Test		PASS		BOOL			00:03.27
	1038372-1 Phase Minimum w/limit	PASS	1.110002	GELE	1.016000	6.000000	
	1038372-1 Phase Minimum w/limit Frequency XFS	NONE	10.102100	LOG			
	1038372-1 Phase Maximum w/limit	PASS	4.510010	GELE	6.000000	6.000000	
	1038372-1 Phase Maximum w/limit Frequency XFS	NONE	91.625010	LOG			
Insertion Loss Test		PASS		BOOL			00:00.55.276
	1038372-1 Insertion Loss Minimum w/limit	PASS	1.170000	GE	1.230000		
	1038372-1 Insertion Loss Minimum w/limit Frequency XFS	NONE	91.375000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						
	PostRun Execution Time:						00:00:07.574
	Total Test Execution Time:						00:00:01.188
	Total UUT Execution Time:						00:06.57
	Overhead:	00:00:00.228	0.073580%				00:05.08

Traveling Wave Tube Test Results

Test Name	Subtest Name	Result/Comments	Measured Value	Comparison	Lower Limit	Upper Limit	Execution Time
TEST REPORT							
	Test sequence:	C:\LABVIEW\SEQUENCE\[illegible]\Cable.seq					
	Description:						
	Date:	7/1/98					
	Time:	4:24 PM					
	Operator:	JONES					
	Operating Level:	technician					
....							
UUT Information							
	Part Number:	1038372-1					
	Vendor:	Times					
	NSN:						
	Item Description:	Cable Assembly					
	System:	ALQ 184					
	WUC						
	Serial Number:	1026					
	JCN:						
	Type Maint:						
	SRD:						
	When Disc:						
	HOW MAL:						
	Tag No:						
	Removed From:						
	Inspection Activity:						
	Condition Code:						
	Discrepancy	REPEAT AFTER CLEANING					
TEST RESULT		UUT PASSED	PASS				
TEST RESULTS							
WRC Editor		SKIP					
VNA OSL 12-Term Cal		SKIP					
VSWR Test		PASS		BOOL			00.00 33 310
	S11 VSWR Maximum w/limit	PASS	1.180000	LE	1.401000		
	S11 VSWR Maximum w/limit Frequency XFS	NONE	72.629173	LOG			
	S22 VSWR Maximum w/limit	PASS	1.230160	LE	1.400000		
	S22 VSWR Maximum w/limit Frequency XFS	NONE	56.097111	LOG			
Phase Test		PASS		BOOL			33 51 20 420
	1038372-1 Phase Minimum w/limit	PASS	-2.010005	GELE	-6.000000	6.000000	
	1038372-1 Phase Minimum w/limit Frequency XFS	NONE	18.125000	LOG			
	1038372-1 Phase Maximum w/limit	PASS	0.460000	GELE	-6.000000	6.000000	
	1038372-1 Phase Maximum w/limit Frequency XFS	NONE	91.621010	LOG			
Insertion Loss Test		PASS		BOOL			00 02 37
	1038372-1 Insertion Loss Minimum w/limit	PASS	1.150649	GE	1.230000		
	1038372-1 Insertion Loss Minimum w/limit Frequency XFS	NONE	94.250000	LOG			
Phase Tracking		SKIP					
EXECUTION TIME							
	PreRun Execution Time:						00 00 05 301
	PostRun Execution Time:						00 00 12 930
	Total Test Execution Time:						03 03 76
	Total UUT Execution Time:						00.03 16
	Overhead	00.00.08 230	0.101657%				

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** TOTAL PAGE.24 **

LRU/SRU NOMENCLATURE	P/N	VENDOR	NSN	QPA	WUC	SMR CODE	MTBF/ MTBM	# OF SPARES PROVISION	2 VS. 3 LEVEL	WEIGHT	C INC
-							/43.09				
APQ-180 Radar											
Transmitter, Radar	3173111-105	Hughes	5841-01-294-7946	1	72VAE		1521/229.6	0	3	188	
Circuit Card Assembly	5003252-10	•	5998-01-310-7478	1				?			
Transmitter Subassy	3249015-5	•	5841-01-107-2137	1				?			
Radar Modulator	3334045-10	•	5841-01-224-7835	1				?			
Radar Data Processor	5002060-10	•	5841-01-299-3515	1				?			
Radar Set Subassembly	5061302-15	•	5841-01-303-0403	1				?			
Detector Assembly	3334220-10	•	N/A	1		AFFDDT		?			
Power Supply	5001940	•	6130-01-226-1154	1				?			
Solenoid Power Supply	3334270-2	•	5841-01-407-5880	1				?			
Radar Rcvr/Exciter	3173025-115	•	5841-01-319-0846	1	72VBO		2487/250.65	0	3	63	
Filter Assembly	5002880	•	5841-61-224-7751	1				?			
RF Electronics	5002440-5	•	5841-01-328-8234	1				?			
IF Electronics	5002490	•	5841-01-226-1171	1				?			
Volt Reg./Fmr Calib	5002580	•	5841-01-226-5530	1				?			
Trans. Driver Gen.	5002810-10	•	5895-01-302-2076	1				?			
Trans. Driver Offset	5002660-1	•	5841-01-267-8662	1				?			
Local Oscil Gen.	5002710-1	•	5841-01-297-8078	1				?			
Ref Oscil Gen.	5002780-1	•	5841-01-267-7708	1				?			
Unit Control	5002860-1	•	5841-01-267-8737	1				?			
Intra-Radar Mux Bus	5002890	•	5841-01-231-9895	1				?			
Signal Processor	3173044-115	•	5841-01-284-3965	1	72VAA		600/416.56	0	3	60	
Display Interface	5042380-5	•	5999-01-281-8661	1				?			
Input Data Processor	5042370-5	•	5998-01-285-1282	1				?			
IRE/ASC	5042390	•	5841-01-227-4735	1				?			
Array Control Aux.	5042360-5	•	5999-01-279-7171	1				?			
Cent Proc Unit (CPU)	3562119-10	•	5998-01-299-8666	1				?			
Processor Pipeline	5042330-5	•	5999-01-279-3555	1				?			
Data Memory Struct	5042320-1	Hughes	5999-01-279-7172	1				?			
Inst Sequence Logic	5042310	•	5841-01-226-5538	1				?			
Global Bulk Mem Cont	5042350-3	•	5998-01-226-5535	1				?			
Global Bulk Memory	5042140	•	5998-01-296-1434	1				?			
Linear Regulator	5002942	•	6110-01-224-4330	1				?			
AC/DC Converter	5002902	•	6130-01-226-1155	1				?			

e:

* ECP 2488 created 3173044-115

** ECP 2506 created 3173082-110

*** ECP 2325 created 3173111-110

(P) SOF Peculiar

UBIC CH/FT	UNIT COST	FCA/PCA DATE	DATA AVAIL	COST TO REPAIR	TPS COMPLEXITY	TPS DATE AVAIL	TPS DEV.	"I" LVL SE	"D" LVL SE	EQUIP. AVAIL	COMMENTS	F-15 P/N ECP/CCP
	$1,201,111	Feb-93	Jun-93		Very Complex	Mar-97	DME	EEETS	ARTS/MTTS		GFE	3173111-110, 115
	$55,487											
	$6,490											
	$83,099											
	$648,121											
	$300,014										APG-63	
	$84,550											
	$101,614										APG-63	
	$888,775	Feb-93	Jun-93		Complex	Mar-95	DME	EEETS	ARTS/MMTS	Jan-96	GFE	2249/M252
	$22,955											
	$166,680											
	$231,767											
	$153,779											
	$212,455											-5/-7
	$71,900											-10
	$215,304											
	$74,485											
	$61,005											
	$102,839											
	$695,312	Feb-93	Jun-93		Very Complex	Jan-96	DME	EEETS	ARTS/MMTS	Jan-96	GFE	3173044-100, 105, 107, 115
	$26,562											
	$65,574											
	$51,676											
	$62,553											
	$21,068											
	$53,575											
	$30,928											
	$67,732											
	$61,701											-4/-5/-10
	$71,079											
	$11,099											
	$30,349											

LRU/SRU NOMENCLATURE	P/N	VENDOR	NSN	QPA	WUC	SMR CODE	MTBF/ MTBM	# OF SPARES PROVISION	2 VS. 3 LEVEL	WEIGHT	
Analog/Digital Convert.	3173037-100	*	5895-01-310-0160	1	72VAF	PAODDT	195.48	5	3	70	1F
Chassis	5091575	*									
High Prf	5043220-15	*	5998-01-299-8047	1		PAFDD		?			
(P) (A2) Gain Cont Amp	5091580-5	*	5998-01-328-4716	1		PAFLDT		2		48	2
11 Bit A/D	5039960-7	*	5998-01-356-4392	1		PAFDD		?			
VFO	5065490	*	5998-01-285-7495	1		PAFDD		?			
(P) (A5) 6 Bit A/D-Interface	5091590-10	*	5998-01-328-4725	1		PAFLDT		2		48	2
(P) (A6) Priority Buffer	5091600	*	5998-01-328-4728	1		PAFDDT		2		48	2
I/O Log/Tim Cont.	5065480	*	5998-01-268-6188	1		PAFDD		?			
Dagc/Micro Processor (A8)	5065420-65	*	5998-01-310-2196	1		PAFDAT		3		48	2
Linear Regulator	5002300-5	*	5841-01-311-2851	1		PAFDD		?			
Power Supply	5002210-15	*	6130-01-282-8769	1		PAFDD		?			
Cable Assy	5091577	*		1		PAFFFP		?			
Cable Assy	5091578	*		1		PAFFFP		?			
Data Processor	3173082-105	*	5841-01-290-5864	1	72VAB		718/453.25	0	3	53	
Inter Nav Set (INS)	3562124-5	*	5998-01-279-6050	1				?			
AIO/DO	3562114-10	*	5998-01-279-6048	1				?			
RSP Wall Clock	3562120-15	*	5998-01-293-1546	1				?			
Cen Comp/Dig Input	3562121-15	*	5998-01-318-0303	1				?			
I/O Bus Controller	3562122-10	*	5999-01-268-6186	1				?			
Cent Proc Unit (CPU)	3562119-10	*	5998-01-299-8666	1				?			
Memory Controller	3562191	*	5998-01-292-2801	1				?			
Working Memory	3562113-15	*	5998-01-312-6075	1		PAFDDT		?			
Firm Memory	3562185	*	5998-01-297-7764	1		PAFDDT		?			
Linear Regulator	5002230	*	5999-01-217-6746	1		PADDDT		?			
Antenna	3173032-100	Hughes	5985-01-309-4085	1	72VAC	PAODDT	147.87	14	3	131	
Antenna Assy	50855566	*		1		PAFDDT	*	1			
Disk Brake Assy	6239153	*		1		PAFDDT		2			
Valve Assy Hyd	6239152	*		1		PAFFFP		?			
Gimbal Assy	6239140	*		1		PADDDT		2			
Inst. Assy Read	6239209	*		1		PAFDDT		1			
Inst. Assy REA	6239210	*		1		PAFDDT		1			
Hyd Manifold	6239201	*		1		PADDDT		1			
Cable Wrap	6239187	*		1		PAFFFP		1			
Wiring Harness	6239192	*		1		PAFDDT		3			
LV Power Supply	3173615-100	*	6130-01-309-3092	1	72VAH	PAODDT	5374/1198.31	6	3	42	1
(A 1) Circuit Card Assembly	3569820	*	5998-01-158-5207	1		PAFLD		?			
(P) (A2) LV Dir Current	5085628	*	5998-01-328-8779	1		PAFLDT		2			
(A3) Voltage Regulator	3569970-20	*	6110-01-123-0868	1		PAFLD		?			
(P) (A4) Control Amp	6237440	*	5998-01-329-0760	1		PAFLDT		2			
(P) (A5) A/E Elect. Control	6237450	*	5998-01-328-8820	1		PAFLDT		2			
(P) (A6) LV Power Sub Ass	5091590-10	*	6130-01-328-4680	1		PAFDDT		2			
Chassis	5058625	*		1		XB		?			
Bonded Assembly	3556300	*	5841-01-122-6664	1		XB		?			
Indicator Assy Faul	5085685	*		1		PAFFFP		?			

ECP 2488 created 3173044-115
ECP 2506 created 3173082-110
** ECP 2325 created 3173111-110
P) SOF Peculiar

JPPORT DATA

:UBIC CH/FT	UNIT COST	FCA/PCA DATE	DATA AVAIL	COST TO REPAIR	TPS COMPLEXITY	TPS DATE AVAIL	TPS DEV.	"I" LVL SE	"D" LVL SE	EQUIP. AVAIL	COMMENTS	F-15 P/N ECP/CCP
x26x16	$1,079,459	Feb-93	Jun-93		Average	Feb-95	DME	EEETS	RMTS	Jan-96		2192/M228
									TBD			
									ARTS/MMTS			-5/10
	$51,221											
									TBD			
x32x8	$71,600								ARTS/MMTS			-3/-5/-7
	$68,000								ARTS/MMTS			-5/-10/-15
	$72,150								TBD			/276
x32x8	$217,825								TBD			
x32x8	$63,889								ARTS/MMTS			
	$62,278											
x32x8	$97,815											
	$2,921											-10/-12
	$107,990											
	$440,373	Feb-93	Jun-93		Complex	Jan-95	DME	EEETS	ARTS/MMTS	Jan-96	GFE	3173082-110, 115
	$40,389								ARTS/MMTS			
	$29,229								ARTS/MMTS			-7/-10
	$35,877								ARTS/MMTS			-5/-6/-10
	$54,820								ARTS/MMTS			-5/-7/-20
	$26,996								ARTS/MMTS			
	$21,068								ARTS/MMTS			
	$21,740								ARTS/MMTS			-5/-10
	$44,388								ARTS/MMTS			
	$40,144								ARTS/MMTS			
	$20,838								ARTS/MMTS			
	$1,858,082	Feb-93	Jun-93		Very Complex	Mar-97	DME					
26x16	$428,016	Feb-93	Jun-93		Average	Apr-95	DME	EETS	AADTS			
	$29,450								ARTS/MMTS			
	$38,553								TBD			
	$20,443								ARTS/MMTS			
	$79,310								TBD			
	$79,310								TBD			
	$11,127								TBD			Throw away
									TBD			
	$5,617								TBD			