



MIL-C-55427A

## STANDARDS

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
- MIL-STD-454 - Standard General Requirements for Electronic Equipment.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

## 3. REQUIREMENTS

3.1 Specification sheets. The individual cable assembly requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Cable assemblies furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.5 and 6.3).

3.3 Materials and processes. Materials and processes shall be as specified herein or in the individual specification sheet. However, when a definite material or process is not specified, a material or process shall be used which will enable the cable assembly to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished cable assembly.

3.3.1 Solder and soldering. When used, solder and soldering shall be in accordance with MIL-STD-454, Requirement 5, except the solder shall have a minimum solidus temperature of +450°F for 200°C cable.

3.3.2 Dissimilar metals. Dissimilar metals between which an electromotive couple may exist shall not be placed in contact with each other. Refer to MIL-STD-454, Requirement 16, for a definition of dissimilar metals.

3.4 Design and construction. Cable assemblies shall be of the design, construction, and physical dimensions specified (see 3.1).

3.4.1 Cable. Unless otherwise specified (see 3.1), cable shall have been tested to and shall have met the requirements of MIL-C-17.

3.4.2 Connectors. Unless otherwise specified (see 3.1), connectors shall have been tested to and shall have met the requirements of MIL-C-39012.

3.4.3 Protective cap or cover. Each connector interface shall be protected with a disposable cap or cover during shipping and storage.

3.4.4 Marker bands and strain reliefs. Marker bands and strain reliefs shall be of a material and applied in a manner that will enable them to meet the requirements of this specification.

3.5 Performance.

3.5.1 Moisture resistance. When cable assemblies are tested as specified in 4.7.2, there shall be no evidence of visual or mechanical damage.

3.5.2 Dielectric withstanding voltage. When tested as specified in 4.7.3, cable assemblies shall withstand the specified voltage (see 3.1) with no evidence of breakdown.

3.5.3 Thermal shock. When cable assemblies are tested as specified in 4.7.4, there shall be no evidence of damage.

3.5.4 Flexure. When cable assemblies are tested as specified in 4.7.5, there shall be no evidence of separation at the cable-to-connector junction.

3.5.5 Cable retention. When tested as specified in 4.7.6, the cable assemblies shall withstand the specified force (see 3.1).

3.5.6 Voltage standing wave ratio (VSWR). When cable assemblies are tested as specified in 4.7.7, the VSWR over the specified frequency range (see 3.1) shall not exceed the values specified (see 3.1).

3.5.7 Insertion loss. When cable assemblies are tested as specified in 4.7.8, the insertion loss over the specified frequency range (see 3.1) shall not exceed the values specified (see 3.1).

3.6 Marking. Unless otherwise specified (see 3.1), each cable assembly shall be marked to include the military part number, manufacturer's name or trademark, and year of manufacture, as specified in 3.6.1 or 3.6.2. Lettering shall be "Futura" or "Gothic" capitals, and numerals shall be arabic.

3.6.1 Marking the insulation. Marking shall be on the outermost insulation surface or visible through it. Marking shall be at intervals of every 2 meters and at both ends. Marking shall remain legible after subjection to the tests herein. Impressed marking shall not be used.

3.6.2 Marking bands. Unless otherwise specified (see 3.1), heat shrinkable insulation tubing in accordance with MIL-I-23053 which is marked with the identification of product may be used in lieu of marking the insulation of the cable assembly. Impressed marking may be used to mark the bands. The marking bands shall be snug fitting and not loose and unless otherwise specified (see 3.1), shall be placed at intervals of every 2 meters and at both ends.

3.7 Workmanship. Cable assemblies shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, serviceability or appearance. Interfaces shall be free of sharp edges, burrs, damages, and contaminants. The outer surface of the assembly shall be free of cuts, dents, nicks, and frayed or burred spots that might affect the performance of the assembly.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-C-45662.

4.2 Classification of inspections. The inspections specified herein are classified as follows:

- a. Component materials inspection (see 4.3).
- b. Qualification inspection (see 4.5).
- c. Quality conformance inspection (see 4.6).

4.3 Component materials inspection. Component materials inspection shall consist of certification supported by verifying inspection and test data that the components listed in table I, used in fabricating the cable assembly, are in accordance with the applicable referenced specifications prior to such fabrication.

TABLE I. Component materials inspection.

Component	Requirement paragraph	Applicable specification
Cable - - - - -	3.4.1	MIL-C-17
Connectors - - -	3.4.2	MIL-C-39012

4.4 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

MIL-C-55427A

4.5 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

4.5.1 Sample size. Two cable assemblies per qualification group (see 3.1), 1 meter (maximum) in length, shall be subjected to qualification inspection.

4.5.2 Inspection routine. The sample shall be subjected to the inspections specified in table II, in the order shown.

4.5.3 Failures. One or more failures shall be cause for refusal to grant qualification approval.

TABLE II. Qualification inspection.

Inspection	Requirement paragraph	Test paragraph
Visual inspection - - - -	3.1, 3.3, 3.4, 3.6, and 3.7	4.7.1
Moisture resistance - - -	3.5.1	4.7.2
Dielectric withstanding voltage - - - - -	3.5.2	4.7.3
Thermal shock - - - - -	3.5.3	4.7.4
Flexure - - - - -	3.5.4	4.7.5
Cable retention - - - - -	3.5.5	4.7.6
VSWR - - - - -	3.5.6	4.7.7
Insertion loss - - - - -	3.5.7	4.7.8

4.5.4 Group qualification. Qualification of any one termination within a qualification group (see 3.1) will qualify all the terminations within that group. When terminations from different qualification groups are qualified, they may be used in any combination. Each cable assembly shall be made of qualified terminations.

4.5.5 Retention of qualification. To retain qualification, the contractor shall forward a report 12 months after notification of qualification and thereafter at 36-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

- a. A summary of the results of the tests performed for inspection of product for delivery, groups A and B, indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.
- b. The results of tests performed for periodic inspection, group C, including the number and mode of failures. The test report shall include results of all periodic inspection tests performed and completed during the 12- or 36-month period, as applicable. If the test results indicate nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 60 days after the end of each 12- or 36-month period, as applicable, may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the 12- or 36-month period, as applicable, that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during three consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit a representative product of each specification sheet to testing in accordance with the qualification inspection requirements.

#### 4.6 Quality conformance inspection.

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections.

4.6.1.1 Inspection lot. An inspection lot shall consist of all cable assemblies of the same part number offered for inspection at one time. All of the units of product in the inspection lot submitted shall have been produced during the sample production period with the same materials and processes.

4.6.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table III, in the order shown.

TABLE III. Group A inspection.

Inspection	Requirement paragraph	Test paragraph	AQL (percent defective)	
			Major	Minor
Visual inspection - - -	3.1, 3.3, 3.4, 3.6, and 3.7	4.7.1	---	1.5
Dielectric withstanding voltage - - - - -	3.5.2	4.7.3	} .65	} 2.5
Insertion loss - - - -	3.5.7	4.7.8		
VSWR - - - - -	3.5.6	4.7.7		

4.6.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table III. Major and minor defects shall be as defined in MIL-STD-105.

4.6.1.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection, and shall not thereafter be tendered for acceptance unless the former rejection or requirement of correction is disclosed. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3 Group B inspection. Group B inspection shall consist of the inspections specified in table IV, in the order shown, and shall be made on sample units which have been subjected to and have passed group A inspection.

4.6.1.3.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-3. The sample size shall be based on the inspection lot size from which the sample was selected for group A inspection. The AQL shall be 2.5 percent defective.

4.6.1.3.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection, and shall not thereafter be tendered for acceptance unless the former rejection or requirement of correction is disclosed. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

TABLE IV. Group B inspection.

Inspection	Requirement paragraph	Test paragraph
Moisture resistance - - -	3.5.1	4.7.2
Dielectric withstanding voltage - - - - -	3.5.2	4.7.3

4.6.1.3.3 Disposition of sample units. Sample units which have passed all group B inspection may be delivered on the contract, if the lot is accepted.

4.6.2 Periodic inspection. Periodic inspection shall consist of group C. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.6.2.1.4), delivery of products which have passed groups A and B inspection shall not be delayed pending the results of these periodic inspections.

MIL-C-55427A

4.6.2.1 Group C inspection. Group C inspection shall consist of the inspections specified in table V, in the order shown. Group C inspection shall be made on sample units selected from inspection lots which have passed groups A and B inspection.

4.6.2.1.1 Sampling plan. The number of sample units specified (see 3.1) shall be selected from those covered by a single specification sheet, 12 months after the date of notification of qualification, and after each subsequent 36-month period.

4.6.2.1.2 Failures. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed.

4.6.2.1.3 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract.

TABLE V. Group C inspection.

Inspection	Requirement paragraph	Test paragraph
Thermal shock - - -	3.5.3	4.7.4
Flexure - - - - -	3.5.4	4.7.5
Cable retention - -	3.5.5	4.7.6
VSWR - - - - -	3.5.6	4.7.7
Insertion loss - -	3.5.7	4.7.8

4.6.2.1.4 Noncompliance. If a sample fails to pass group C inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the qualifying activity). Groups A and B inspection may be reinstated; however, final acceptance and shipment shall be withheld until the group C inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6.3 Packaging inspection. The sampling and inspection of the preservation-packaging, packing and container marking shall be in accordance with the requirements of MIL-C-55442.

#### 4.7 Methods of inspection.

4.7.1 Visual inspection. The cable assembly shall be examined to verify that the design, construction, length, dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3, 3.4, 3.6, and 3.7).

4.7.1.1 Length. The length of the assembly shall be measured with a longitudinal pull applied to the connectors sufficient to straighten without stretching the cable. The length of the assembly shall be measured against a rigid surface marked off in length increments suitable to the length to be measured, with an accuracy of  $\pm 1$  millimeter. The length of the assembly shall be measured to the following reference points:

- a. The end of the body of the connector.
- b. The centerline on right angle connectors.

4.7.1.2 Interface dimensions. The dimensions of the center contact and dielectric surfaces shall be measured to the reference plane of each connector interface using an appropriate pin depth gage with an accuracy of  $\pm 0.0005$  inch.

4.7.2 Moisture resistance (see 3.5.1). The cable assembly shall be tested in accordance with method 106 of MIL-STD-202. The following details and exceptions shall apply:

- a. Mating connector - Cabled connector per MIL-C-39012.
- b. Initial measurements - Not applicable.
- c. Loading voltage - Not applicable.
- d. Number of cycles - 10 continuous cycles except step 7b (vibration) shall be omitted.
- e. Final measurements - After the final cycle and within 5 minutes after removal from high humidity, the cable assemblies shall be visually inspected for evidence of damage.

4.7.3 Dielectric withstanding voltage (see 3.5.2). The cable assembly shall be tested in accordance with method 301 of MIL-STD-202. The following details shall apply:

- a. Magnitude of test voltage - As specified (see 3.1). The voltage shall be instantaneously applied and shall be metered on the high side of the transformer.
- b. Nature of potential - AC.
- c. Points of application of test voltage - Between the center contact and body.

4.7.4 Thermal shock (see 3.5.3). The cable assembly shall be tested in accordance with method 107 of MIL-STD-202. The test condition shall be as specified (see 3.1). The cable assembly shall be placed in the chamber with the connectors not mated or otherwise protected. After completing the specified test cycles (see 3.1), the cable assembly shall be allowed to return to ambient room temperature.

4.7.5 Flexure (see 3.5.4). The cable assembly shall be suspended vertically, supported by the connector at one end with the specified force (see 3.1) applied to the cable in the downward vertical direction. The connector shall be rotated 90 degrees from the vertical in one direction and then 90 degrees from the vertical in the opposite direction. This shall be done four times. The procedure is then to be repeated with the cable assembly turned end for end.

4.7.6 Cable retention (see 3.5.5). The cable assembly shall be tested as specified in 4.7.6.1 and 4.7.6.2.

4.7.6.1 Longitudinal pull. A longitudinal force (see 3.1) shall be applied to the connector at each end of the cable assembly for 30 seconds. In the case of long assemblies the force may be applied to each end in turn with the cable wrapped four times or more around a stationary mandrel whose outside diameter is at least 20 times the cable outer diameter. There must be at least 300 centimeters of cable between the mandrel and the connector to which the force is applied.

4.7.6.2 Torque. After the longitudinal pull, a 10-pound force shall be applied to the longitudinal axis of the cable, and the specified torque (see 3.1) shall be applied to the connector in both directions.

4.7.7 VSWR (see 3.5.6). The VSWR of the cable assembly shall be measured over a frequency range as specified (see 3.1). A swept frequency technique capable of measuring a VSWR of 1.04 decibels (dB) or less shall be used. The measuring system (see figure 1) shall have a directivity of at least 30 dB. One of the calibration lines shall contain frequency marker pips and a calibrated narrow band spike which is 1 percent wide at 10 megahertz (MHz) to 2 gigahertz (GHz) and 20 MHz wide above 2 GHz.

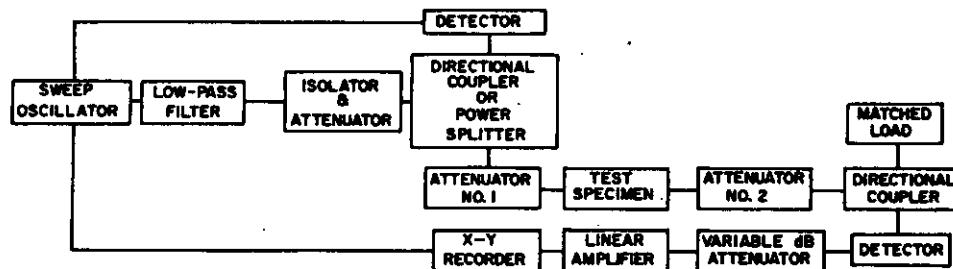


FIGURE 1. Block diagram of VSWR equipment.

MIL-C-55427A

4.7.8 Insertion loss (see 3.5.7). The swept frequency insertion loss shall be measured in accordance with the following procedure or a method acceptable to the Government. In the event of dispute, the method outlined herein shall be used. Diagrams for the swept frequency insertion loss system checkout and measurement procedures are shown on figure 2. Included in the insertion loss of the cable assembly are the reflective and dissipative losses of two standard precision adapters - one for each connector interface of the cable assembly under test.

Before performing the measurement of the cable assembly under test, the following three-step checkout and calibration procedure should be performed:

- Step 1 - The insertion loss of items 10 and 11 of figure 2 shall be measured.  
 Step 2 - The insertion loss of items 12 and 13 shall be measured.  
 Step 3 - The insertion loss of item 14 shall be measured for several attenuation settings to establish calibration lines for item 7. The settings should include 0 dB and extend over the anticipated insertion loss range for the cable assembly to be tested. One of the calibration lines shall contain frequency marker pips and a calibrated narrow band spike which is 1 percent wide at 10 MHz to 2 GHz and 20 MHz wide above 2 GHz.

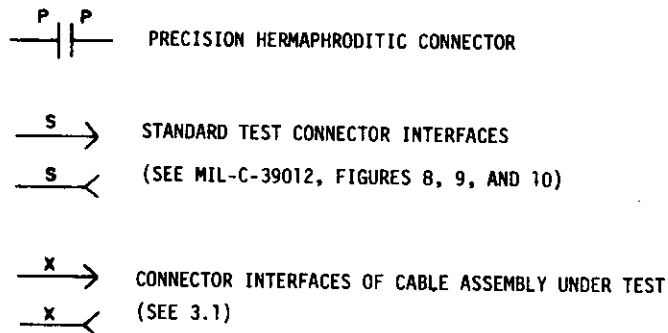
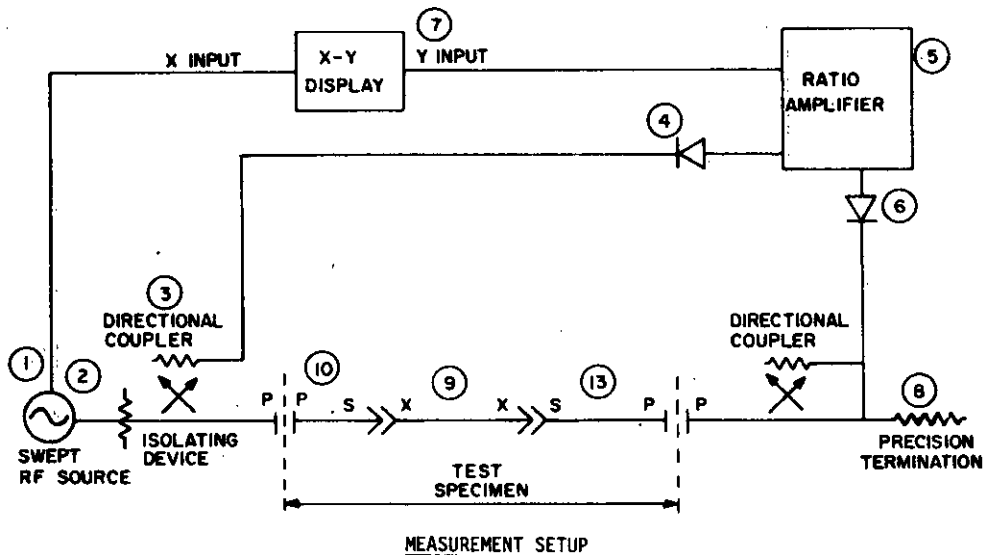
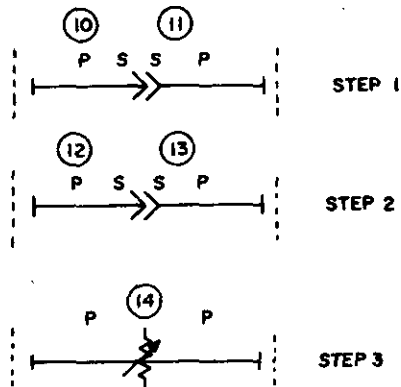


FIGURE 2. Swept frequency insertion loss.





1. Swept RF source.
2. Isolating device.
3. Directional coupler.
4. Detector No. 1 (incident signal).
5. Ratio amplifier.
6. Detector No. 2 (transmitted signal).
7. X-Y display.
8. Precision hermaphroditic termination, VSWR less than  $1.009 + .002F$  (F in GHz).
9. Cable assembly under test.
10. Standard precision adapter having standard test connector interface (see MIL-C-39012, figures 8, 9, and 10) compatible with input connector interface of cable assembly under test.
11. Standard precision adapter having standard test connector interface compatible with 10.
12. Standard precision adapter having standard test connector interface compatible with output connector interface of cable assembly under test.
13. Standard precision adapter having standard test connector interface compatible with 12.
14. Variable precision attenuator. Accuracy  $\pm 0.03$  dB.

FIGURE 2. Swept frequency insertion loss - Continued.

MIL-C-55427A

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-C-55442.

## 6. NOTES

6.1 Intended use. Cable assemblies covered by this specification are intended for noncritical, general purpose use in electronic communications. Where high reliability is required, or high performance, the use of specifications specifically addressing the particular installation is recommended. They are not recommended for installations where they will encounter extreme abuse.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Title, number, and date of the applicable specification sheet.
- c. The complete part number of the cable assembly ordered.
- d. Levels of preservation-packaging and packing required (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts for the products covered by this specification. The activity responsible for the qualified products list is the Electronics Command, Department of the Army, Fort Monmouth, New Jersey 07703; however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E), Dayton, Ohio 45444.

6.4 Expected operational life. Cable assemblies manufactured to this specification have a finite life expectancy. Present information indicates that a maximum use life of 5 years can be expected. If properly packaged, up to 3 years of storage will not affect the expected operational life.

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

## Custodians:

Army - EL  
Navy - EC  
Air Force - 85

## Review activities:

Army - EL, AR, MI  
Navy - SH, AS, OS  
Air Force - II, 17, 99  
DLA - ES

## User activities:

Army - ME, AT, AV  
Navy - MC  
Air Force - 14, 19

## Preparing activity:

Army - EL

## Agent:

DLA - ES

(Project 5995-0090)

FOLD

---

POSTAGE AND FEES PAID



**OFFICIAL BUSINESS**  
PENALTY FOR PRIVATE USE \$300

Commander  
US Army Electronics Command  
ATTN: DRSEL-RD-TS  
Fort Monmouth, NJ 07703

---

FOLD

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL	
<p><b>INSTRUCTIONS:</b> This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.</p> <p><b>NOTE:</b> This form shall not be used to submit requests for waivers, deviations or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.</p>	
DOCUMENT IDENTIFIER (Number) AND TITLE <b>MIL-C-55427A CABLE ASSEMBLIES, RADIO FREQUENCY, GENERAL SPECIFICATION FOR</b>	
NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER	
<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER	
1. <input type="checkbox"/> HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? <input type="checkbox"/> IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.	
A. GIVE PARAGRAPH NUMBER AND WORDING	
B. RECOMMENDED WORDING CHANGE	
C. REASON FOR RECOMMENDED CHANGE(S)	
2. REMARKS	
SUBMITTED BY (Printed or typed name and address - Optional)	TELEPHONE NO.
	DATE

DD FORM 1426  
1 OCT 76

EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.