DATA ITEM DESCRIPTION

Form Approved
OMB No 0704 0188

2. TITLE	1. IDENTIFICATION NUMBER
Calibration and Measurement Requirements Summary (CMRS)	DI-QCIC-80278A

3. DESCRIPTION / PURPOSE

3.1 This Data Item Description (DID) defines the content and format requirements covered by the task to develop data as specified in 5. of MIL-STD-1839.

3.2 The CMRS details the measurement requirements of the system, subsystem, or equipment; the test, measurement, and diagnostic equipment (TMDE); and the calibration standards and equipment required to assure traceability of all measurements (Continued on Page 2)

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a. DTIC REQUIRED	6b. GIDEP REQUIRED
881028	30		

7. APPLICATION / INTERRELATIONSHIP

7.1 This DID satisfies requirements of DOD Directive 4155.1, paragraphs C.1.2 and E.2.b as implemented by AFR 74-2, AR 750-25, NAVELEX 4355.2, and MCO 4733.1.

7.2 This DID contains the format and content preparation instructions for that data generated under work task as specified in 5. of MIL-STD-1839.

7.3 This DID is applicable to the acquisition of all military systems, subsystems, and equipment. (Continued on Page 2)

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
		F4563

10. PREPARATION INSTRUCTIONS

10.1 Reference documents. The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments, notices, and revisions, shall be as specified in the contract.

10.2 General. The Calibration and Measurement Requirements Summary (CMRS) shall document in detail the measurement requirements of the system, subsystem, or equipment; the test, measurement, and diagnostic equipment (TMDE); and the calibration standards and equipment required to assure traceability of all measurements to approved national standards. It shall ensure that:

a. All operational system, subsystem, and equipment calibration and measurement requirements are identified and traceable to the National Institute of Standards and Technology (NIST), or other DOD-approved measurement sources.

b. All supporting TMDE identified are adequate to support the operational system, subsystem, and equipment measurement requirements.

c. All supporting TMDE that require calibration are calibrated with calibration and measurement equipment of higher known accuracy.

10.3 Administrative information.

a. Classified information shall not be listed in the CMRS. (Continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

3. DESCRIPTION/PURPOSE (Continued)

through the individual military department metrology and calibration programs to approved national standards. The summary identifies and validates the adequacy of TMDE and the need for calibration standards and equipment.

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7. APPLICATION/INTERRELATIONSHIP (Continued)

7.4 The data requires periodic updating to include changes in design, engineering change proposals (ECPs), etc., which affect system measurement requirements or TMDE.

7.5 This DID supersedes DI-QCIC-80278.

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10. PREPARATION INSTRUCTIONS (Continued)

Classified parameters and information shall be addressed in a classified supplement or appendix and that document shall be appropriately controlled.

b. Black and white copy, equivalent 20 pound sulphite bond, minimum size 8 1/2" X 11" shall be used. Final submission shall be typed or machine printed. Electronic media, e.g. magnetic tape or disk, is acceptable when approved by the cognizant contracting officer.

10.4 Content requirements. The CMRS shall be structured as follows:

a. Cover page
b. Revision status
c. Introduction
d. Table of contents
e. List of abbreviations, symbols, and acronyms
f. Table of category II TMDE
g. Table of category III calibration equipment and standards
h. List of manufacturers' code to name
i. Summary data table of contents
j. Summary data

10.4.1 Cover page. The cover page (see Figure 1) shall include descriptive information such as system or program name, contract number, contractor's company name, current CMRS revision, date of submittal, Contract Data Requirements List (CDRL) Number, etc.

10.4.2 Revision status. This section shall be included in the CMRS (see Figure 2). The initial CMRS submittal shall specify "original" on the revision status pages. Subsequent revisions shall be recorded on the cover page, in the revision status section, and on the pages affected by the revision. Other CMRS pages which are not affected by a revision shall not be resubmitted.

10.4.3 Introduction. This section (see Figure 3) contains general information, remarks or other information about the system, equipment or the CMRS which the preparer feels would be beneficial.

10.4.4 Table of contents. This table (see Figure 4) shall reflect the contents and page location numbers of each structural part of the CMRS identified in 10.4 above.

10.4.5 List of abbreviations, symbols, and acronyms. This list (see Figure 5) shall include all abbreviations, symbols, and acronyms used in the CMRS with their meanings. Abbreviations shall be in accordance with MIL-STD-12 where applicable.

10. PREPARATION INSTRUCTIONS (Continued)

10.4.6 Table of category II TMDE. This table shall include an alphanumerical listing of equipment identified in the category II column of the summary data section. Items of TMDE that are component parts of test stations or other TMDE shall be shown as an indenture under the overall test station or TMDE. Calibration intervals shall be recommended if they are not already established or if a different interval is recommended other than those established in Air Force TO 33K-1-100, Army TB 43-180, NAVAIR 17-35MTL-1 or Marine Corp TM-10510. The Table (see Figure 6) shall include the following:

a. TMDE model, type or part number.
b. Nomenclature.
c. Commercial and Government Entity (CAGE) (five digits).
d. National Stock Number (NSN), if assigned.
e. Calibration interval in months.
f. Calibration procedure applicable to contracting Military Department.
g. Support Equipment Recommendation Data (SERD) number, if assigned.
h. Maintenance document applicable to contracting Military Department.

10.4.7 Table of category III calibration equipment and standards. This table shall include an alphanumerical listing of equipment identified in the category III column of the summary data section. The table shall include the same type of information described in 10.4.6a through h above.

10.4.8 List of manufacturers code to name. This list (see Figure 7) shall contain the DOD-assigned, five-digit CAGE code (reference DLA Cataloging Handbook H4/H8) and manufacturer's name for each equipment item identified in the CMRS.

10.4.9 Summary data table of contents. This table shall immediately precede the summary data section and shall reference the content number and hardware item for each system, subsystem, and equipment entry shown in the summary data category I column (see Figure 8).

10.4.10 Summary data. This section is an in-line presentation of system, subsystem, and equipment; TMDE; and calibration equipment and standards parameters which require measurement or calibration support (see Figure 9). The summary data are prepared as follows:

a. Category I operational equipment. These columns are for displaying the description, function, operational range or value and accuracy and test interval of the operational system, subsystem, equipment, assembly, module or component that has parameters that require measurement as specified in 5.1.1.3 of MIL-STD-1839.

b. Content number. Each category I hardware entry shall be identified by a sequential locater reference number. Sequential alphanumeric or decimal reference numbers shall be used. When Logistic Support Analysis Record (LSAR) are a contractual requirement the LSA control number shall be used.

c. Function. The category I function which must be measured, tested, verified, checked, adjusted or supplied shall be shown in the description of item column in a logical sequence.

10. PREPARATION INSTRUCTIONS (Continued)

d. In-line presentation. As each category I function and measurement parameter is listed, complete the category II and the category III summary data before proceeding to the next category I hardware measurement parameter. The parameters and tolerances in each line shall be expressed in consistent units of voltage, frequency, power, current, etc., or percentages. Where this is not the case, explain the inconsistency in an appropriate footnote.

e. Category II TMDE. This summary data represents the support TMDE used to measure, test, verify, check, or adjust the category I equipment as specified in 5.3 of MIL-STD-1839. The summary data category II columns shall list the nomenclature and part or model number of the TMDE and its specifications.

f. Peculiar TMDE. Items of TMDE developed specifically to support category I measurement requirements. The first time an item of category II peculiar TMDE is listed in support of a category I measurement parameter, the complete measuring, generating and accuracy capabilities of the peculiar TMDE shall be listed. For subsequent requirements for the same item of category II peculiar TMDE, only those capabilities required to satisfy the category I measurement parameters shall be listed. Complete category III requirements in 10.4.10i below before proceeding to the next category II entry. First time entries for category II peculiar TMDE may be listed in contractor elected format in a separate section of the CMRS.

g. ATE. The first time an item of category II ATE is listed in support of category I measurement requirements, all minimum use specifications of the replaceable TMDE in the ATE shall be listed. First time entries for category II ATE may be listed in contractor elected format in a separate section of the CMRS. For subsequent requirements for the same ATE, only the most stringent of minimum use requirement and the specific replaceable TMDE need be listed in the in-line presentation. Complete category III requirements in 10.4.10i below before proceeding to the next category II entry. Integral items of the ATE used for self testing or ATE calibration shall be identified.

h. Common TMDE. Items of category II common TMDE that do not have DOD approved calibration procedures, technical orders or maintenance technical orders shall be handled like the peculiar TMDE in 10.4.10f above.

i. Category III calibration equipment and standards. This summary data represents the common and peculiar calibration equipment, standards and TMDE used for calibration, testing, troubleshooting or maintenance of category II TMDE as specified in 5.3.2 of MIL-STD-1839. The summary data category III columns shall list the description of the calibration equipment, standards and TMDE, and its specifications or the DOD approved calibration procedure, technical order or maintenance technical order for the category II TMDE. Where no approved method of support exists for the category II TMDE, list all the equipment and parameters required to show measurement traceability in the category III column. For subsequent entries, reference notes may be used where the requirements are duplicated. Where multiple items of calibration equipment and standards are required to accomplish measurement traceability, the overall systematic error shall also be shown.

j. DOD approved calibration procedures. For items of category II TMDE that have an approved method of support, list the applicable military department approved calibration procedure, technical order, or maintenance technical order in the category III column opposite the category II TMDE.

10. PREPARATION INSTRUCTIONS (Continued)

k. Category III peculiar calibration equipment and standards. Items developed specifically to support category II TMDE measurement requirements. This equipment shall first appear in the category III coulum opposite the category II TMDE it is designed to support. It shall also be listed in the category II column so method of support and traceability can be established in the category III column.

10.4.11 Additional information.

a. When two or more identical items of TMDE are required for a specific measurement, it shall be so noted in the applicable category II or III item description column and the Tables of TMDE.

b. Transistor Transistor Logic (TTL) level test requirements shall not be listed in the category I or category II summary data.

c. When category I input torque calibration requirements are listed, the test accuracy ratio (TAR) of the category II torque tool shall not be less than 1:1 and need not be greater than 1:1. The TAR of the category III torque calibration standard shall be 4:1 or better.

d. When category I input stimuli requirements are listed and being supplied by category II TMDE, the test accuracy ratio shall not be less than 1:1 and need not be greater than 1:1, unless conducting pass, fail or fault tolerance test.

10. PREPARATION INSTRUCTIONS (Continued)

Doc. no. _____

Revision _____

Rev. Date _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

for the

X Y Z SYSTEM

Contract No. _____

Date _____

Prepared by: _____

(title)

Approved by: _____

(title)

C O M P A N Y N A M E

(address)

FIGURE 1. Cover page sample format

10. PREPARATION INSTRUCTIONS (Continued)

Date: _____
Revision: _____

CMRS Revision Status

Page	Revision	Page	Revision	Page	Revision	Page	Revision
i	B						
ii	Original						
iii	Original						
iv	Original						
v	Original						
vi	Original						
vii	Original						
viii	Original						
ix	Original						
1	Original						
2	Original						
3	Original						
4	Original						
5	A						
6	A						
7	A						
8	A						
9	A						
10	B						
11	B						
12	B						
13	B						
14	B						
15	A						
16	A						
17	A						
18	Original						
19	Original						
20	Original						
21	B						
22	A						
23	Original						
24	Original						

FIGURE 2. Revision status sample format

10. PREPARATION INSTRUCTIONS (Continued)

Date: _____ Page ___

Revision: _____

I N T R O D U C T I O N

for the

X Y Z SYSTEM

CALIBRATION & MEASUREMENTS REQUIREMENTS SUMMARY

(Company Name) submits a Calibration & Measurements Requirements Summary (CMRS) in accordance with the XYZ System contract statement of work and contract data requirements list (CDRL) Item No. AOXXX for data item description for CMRS.

This CMRS identifies the XYZ SYSTEM stimuli and measurement parameters; the common and peculiar Test, Measurement, and Diagnostics Equipment parameters and the measurement parameters of the supporting TMDE. These data are required to assure measurement traceability through the Services base or depot measurement laboratories to the National Institue of Standards and Technology (NIST).

FIGURE 3. Introduction sample format

10. PREPARATION INSTRUCTIONS (Continued)

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

TABLE OF CONTENTS

FIGURE 4. Table of contents sample format

10. PREPARATION INSTRUCTIONS (Continued)

LIST of ABBREVIATIONS, SYMBOLS, and ACRONYMS

AMP	Ampere
A/D	analog to digital
AC	alternating current
ATE	automatic test equipment
BITE	built-in test equipment
CAGE	Commercial and Government Entity
CAL	calibrate
CMRS	Calibration & Measurement Requirements Summary
Co	company
Cont	continued
CPU	central processing unit
CW	continuous wave
dB or DB	decibel
DC	direct current
DEG or Deg	degree
DMM	digital multimeter
DTS	Digital Test Station
GHz	gigahertz
Hz	Hertz
KHz	kilohertz
kV	kilovolts
kW	kilowatts
MAX or max	maximum
MHz	megahertz
MIN or min	minimum
mVDC	millivolts direct current
ns	nanosecond
NO	number
ppm	parts per million
SQ CM	square centimeter
TMDE	Test, Measurement, and Diagnostic Equipment
V	volt
VAC	alternating current volts
VDC	volt direct current
W	watt

FIGURE 5. List of abbreviations, symbols, and acronyms sample format

Date: _____
Revision: _____

Table of Category II TMDE

Model, Type or Part No.	Nomenclature	CAGE	National Stock Number	Cal Int	Calibration Procedure *	SERD NO	Maintenance Document **

* Applicable Military Department calibration procedure number
** Applicable Military Department maintenance TO, manual, etc.

FIGURE 6. Table of category II TMDE sample format

10. PREPARATION INSTRUCTIONS (Continued)

LIST OF MANUFACTURERS CODE TO NAME

Code	Name
324XX	Company Manufacturing Inc.
387XX	Manufacturing Company Inc.
432XX	TMDE Experts Inc.
498XX	Digital Voltmeters Express
523XX	Phase Analysis Corporation
526XX	Ohms All Right Inc.
633XX	Ultra Violight Inc.
678XX	Test Systems Associates
719XX	Diagnostics Inc.
754XX	Power Supplies Unlimited
786XX	C-Systems Corp.
813XX	Jay Electronics Inc.
869XX	Mega Watts Ltd.
999XX	High Power Designs

FIGURE 7. List of Manufacturers Code to Name Sample Format

10. PREPARATION INSTRUCTIONS (Continued)

SUMMARY DATA TABLE OF CONTENT

FIGURE 6. Summary data table of content sample format

Date: _____
Revision: _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

Sheet ____ of ____
Page _____

SUMMARY DATA

Category I Operational/System Equipment					Category II Test/Meas & Diagnostic Equipment			Category III Calib Equipment/Standards		
Con-tent No	Description of Item	Operation Range or Value	Opera-tional Tol	Inter-val	Description of Item	Specific Range or Value	Specific Toler-ance	Description of Item	Range or Value	Toler-ance
1.0	Radar System AN/FPS-XXX									
1.1	Transmitter Assembly PN 5XX6X			06						
	Output Power (kilowatts)	1 kW	+/-25%		Power Meter Model XXXX with Power Sensor PN XXXX	0 to 3 watts	+/-4%	33K4-4-XX-1 (Air Force Procedure)		
					Directional Coupler Model XX	30 dB (decibel)	+/-2% (0.1 dB)	33K4-4-X-1 (Air Force Procedure)		
					Dummy Load Model XXX (overall accuracy +/- 6.25%)	50 ohm	+/-1 ohm	NCR***		
	Pulse Width (microseconds)	1 uS	+/-0.1 uS		Oscilloscope PN XX-XX	0.2 uS per/div*	+/-3% (.006uS)	17-20WW-222 (Navy Procedure)		
	Spectrum Sidelobes	10 dB down from carrier (minimum)			Spectrum Analyzer PN 2XXX (with coupler and load listed above) (overall accuracy +/-1.2 dB)	+20 dBm to -100 dBm**	+/-1 dB (see note)	17-20GW-19 (Navy Procedure)		

note: Spectrum Analyzer accuracy determined adequate for measurement of operational minimum
* per/division ** decibel milliwatt *** No Calibration Required

FIGURE 9. Summary data sample format

Date: _____
Revision: _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

Sheet ____ of ____
Page _____

SUMMARY DATA

Category I Operational/System Equipment					Category II Test/Meas & Diagnostic Equipment			Category III Calib Equipment/Standards		
Content No	Description of Item	Operation Range or Value	Operational Tol	Interval	Description of Item	Specific Range or Value	Specific Tolerance	Description of Item	Range or Value	Tolerance
1.1	(Continued) Frequency (megahertz)	8400 to 9400 MHz	+/-2 MHz		Electronic Counter PN X-XXX	8000 to 9500 MHz	+/-10 Hz	TB9-6625-137-XX (Army Procedure)		
1.2	Transmitter High Voltage Power Supply Assembly PN 5XX7X			12						
	DC Voltage (kilovolts)	10 kV	+/-10%		Digital Voltmeter (volt direct current) PN 0000 with	0-10 VDC	+/-.01%	TB9-6625-1429-XX (Army Procedure)		
					HV Prove HV-X (overall accuracy +/-2.02%)	10,000:1	+/-2%	*		
	DC Current Limit Level	5 Amp	+/- 0.1A							
		5 VDC**	+/-0.1 VDC		Digital Voltmeter PN 0000	0-10 VDC	+/-.02 VDC	33K3-4-XXX-1 (Air Force Procedure)		
1.3	Receiver Assembly PN 5XX8X			12						
	Frequency	8400 to 9400 MHz	+/-2 MHz		Electronic Counter PN X-XXX	8300 to 9500 MHz	+/-10 Hz	33K3-4-XXXX-1 (Air Force Procedure)		

* Military Department authorized source ** Voltage drop measured across 1 ohm resistor

FIGURE 9. Summary data sample format - Continued

Date: _____
Revision: _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

Sheet ____ of ____
Page _____

S U M M A R Y D A T A

Category I Operational/System Equipment					Category II Test/Meas & Diagnostic Equipment			Category III Calib Equipment/Standards		
Con-tent No	Description of Item	Operation Range or Value	Opera-tional Tol	Inter-val	Description of Item	Specific Range or Value	Specific Toler-ance	Description of Item	Range or Value	Toler-ance
1.3	(Continued) Sensitivity	-80 dBm @8.5 GHz* minimum			Signal Generator Model YXX	0 to -100 dBm	+/-1 dB @8.5 GHz (see note)	17-20ACG-11-00XD (Navy Procedure)		
1.4	Power Supply Assembly PN 5XX9X			12						
	AC Volts	6 VAC**	+/-8%		AC Voltmeter Model X-X	10 VAC	+/-2%	17-20VQ-0X (Navy Procedure)		
	Output VDC	-440 VDC -80 VDC 5 VDC	+/-4% +/-2% +/-2%		Digital Multimeter PN ZZZZ	500 VDC 100 VDC 10 VDC	+/-1% +/-0.5% +/-0.5%	33K8-4-X-1 (Air Force Procedure)		
2.0	C-XXX Test System									
2.1	Attitude Director PN CX1			12	Automatic Test Station (ATS) AN/USM-5XX					
	Output Regulated Volts AC	340 mVAC	+/-1%		Digital Multimeter PN 9XXX	1 VAC	+/-0.25%	Meter Calibrator PN XOOO Part of PATEC***	2 VAC	+/-0.06%

note: Signal Generator accuracy determined adequate for support of minimum operational requirement
* Gigahertz
** Volts Alternating Current
*** Part of Air Force Portable Automatic Test Equipment Calibrator

Date: _____
Revision: _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

Sheet ____ of ____
Page _____

SUMMARY DATA

	Category I Operational/System Equipment				Category II Test/Meas & Diagnostic Equipment			Category III Calib Equipment/Standards		
Con-tent No	Description of Item	Operation Range or Value	Opera-tional Tol	Inter-val	Description of Item	Specific Range or Value	Specific Toler-ance	Description of Item	Range or Value	Toler-ance
2.1	(Continued)									
	Resistance	98 ohms	+/-4%		Digital Multimeter PN 9XXX Part of ATS*	0 to 200 ohms	+/-1% of reading	Meter Calibrator PN XOOO Part of PATEC	100 ohms	+/- 0.25%
	Synchro Phase Angle Input 28V, 400 Hz Reference	0 DEG**	+/- 0.08 DEG		Synchro Simulator PN SSXX	0 to 360 DEG	+/-0.02 DEG	Angle Position Indicator PN APIX	0 to 359.9 DEG	+/- 0.005 DEG
	AC Voltage Input Power	115 VAC	+/-4% ***		Power Supply PN PSX Part of ATS*	115 VAC	+/-4%	Digital Multimeter Part of ATS*	200 VAC	+/-1%
		5 VAC (stimuli)	+/-10%		Phase Ref Power Supply PN PRPSX Ratio Transformer Part of ATS*	0 to 10 VAC	+/-2.5%	Meter Calibrator PN XOOO and Phase Angle Voltmeter PN PAVX Part of PATEC	20 VAC	+/- 0.6%
	DC Voltage	-15 to +2.2 VDC (stimuli)	+/-80 mVDC		DC Power Supply PN PSOC Part of ATS*	-16 to +16 VDC	+/-20 mVDC	Digital Multimeter PN 9XXX Part of ATS*	100 VDC	+/-5 mVDC

* Automatic Test Station ** Degrees *** Non-test, TAR= 1:1

FIGURE 9. Summary data sample format - Continued

Date: _____
Revision: _____

CALIBRATION & MEASUREMENT REQUIREMENTS SUMMARY

Sheet ____ of ____
Page _____

S U M M A R Y D A T A

Category I Operational/System Equipment					Category II Test/Meas & Diagnostic Equipment			Category III Calib Equipment/Standards		
Con-tent No	Description of Item	Operation Range or Value	Opera-tional Tol	Inter-val	Description of Item	Specific Range or Value	Specific Toler-ance	Description of Item	Range or Value	Toler-ance
3.0	Diagnostic Module PN CXX-3			12	Digital Test Station (DTS) PN ABC					
	DC Reference	1.378 VDC	+/- 0.1%		Digital Multimeter PN ZXZX Part of DTS	0-10 VDC	+/-0.025% of reading	TB9-4935-365-XX (Army Procedure)		
	Precision Resistor	1.00 ohm	+/- 0.1%		Digital Multimeter PN ZXZX Part of DTS	0-10 ohm	+/-0.025% of reading	Same as above		
4.0	Laser Range Finder RT* PN LRFX			06						
	Receiver Sensitivity (Nano Watts per Square Centimeter) (nW/cm2)	60 nW/cm2 minimum			Laser RT* Test Source PN LRIU	50 nW/cm2	+/-10 nW (see note)	Laser Receiver PN PECULIAR	10 to 100 nW/cm2	+/- 5 nW of read-ing **
					Laser Reciever PN PECULIAR (Peculiar Category III)	10 TO 100 nW/cm2	+/-5 nW of reading	APD Detector PN APDX with Low Level Laser Sys PN LLLSX with Neutral Density Filter PN X	5 to 100 nW/cm2	+/- 2.5 nW of read-ing **

note: Accuracy determined adequate to support minimum operational requirement
* Receiver/Transmitter ** Overall Accuracy, TAR = 2:1 = state-of-art

FIGURE 9. Summary data ba[illegible]ormat - Continued