DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY
REFER TO Networks and Transport Division (JTE) **5 Apr 04**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: MIL-STD-188-182 Conformance Certification of the AN/USC-42A(V)2(C) Miniaturized Demand Assigned Multiple Access (Mini-DAMA) Terminal (Certification 370.283)

References:
(a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 Jan 2002

(b) CJCSI 6212.01C, "Interoperability and Supportability of Information Technology and National Security Systems," 20 November 2003

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.

2. JITC has completed a technical analysis of the Titan Corporation White Paper, "Software Changes to the AN/USC-42A(V)2(C) Mini-DAMA Terminal," 29 September 2003, and has determined that the software modifications implemented in the terminal affect only the message service requirements of 5-kHz Ultrahigh Frequency (UHF) Demand Assigned Multiple Access (DAMA) Satellite Communications (SATCOM) functionality. Military standard (MIL-STD)-188-182 conformance testing and certification was previously completed on the AN/USC-42(V)1(C), AN/USC-42(V)2(C), and AN/USC-42A(V)2(C) Mini-DAMA terminals on 29 September 2003 (Certification 338.283). Subsequent to this certification, software changes documented in the Titan Corporation White Paper were implemented only in the AN/USC-42A(V)2(C) terminal version to provide automatic message processing during MIL-STD-188-182 operation for a user who has a specialized requirement related to message processing. Automatic message processing, as well as all MIL-STD message service functions, were tested for this certification.

3. The AN/USC-42A(V)2(C) Mini-DAMA Terminal is certified as conforming to the requirements of MIL-STD-188-182 (reference (c)) to the extent detailed in the Conformance Certification Testing Summary (enclosure 2). The certified terminal components and associated software versions are:

Miniaturized Demand Assigned Multiple Access Terminal ..... AN/USC-42A(V)2(C)
- Modem ..... MD-1293A(V)2(C)(P)/USC-42(V)
  - System Software Build Version 8.35d
  - Red Communications Signal Processor (CSP) Version 8.36
  - Black Communications Signal Processor (CSP) Version 8.07
  - Black Input/Output (I/O) Version 8.18
  - Transmission Security (TRANSEC) Version 5.05
  - Digital Signal Processor (DSP) Version 8.35
- High Power Amplifier ..... AM-7543/USC-42(V)

4. Testing was conducted at the JITC UHF SATCOM test facility using the JITC procedures contained in "MIL-STD-188-182/MIL-STD-188-182A Conformance Test Procedure," March 2001. A summary of the test results is provided in enclosure 2.

5. Although the terminal is being certified compliant to MIL-STD-188-182, an operational problem can exist if the transmit power is too high. The operator must ensure the transmit Effective Isotropically Radiated Power (EIRP) level does not exceed the previously certified level of 23.9 decibels referenced to 1 watt, relative to isotropically radiated power (dBWi), including cable loss and antenna gain, at a data rate of 2400 bits per second (bps) and a burst rate of 3000 symbols per second (sps). Higher transmit EIRP levels will result in out-of-band emissions that exceed the limits set by the MIL-STD, and may cause friendly jamming in adjacent channels.

6. In accordance with reference (d), users are required to have terminals certified compliant to MIL-STD-188-181 series, -182 series, and -183 series. Technical analysis and Standards Conformance testing was performed to ensure that the terminal was in compliance to the MIL-STD. This certification memorandum declares the MIL-STD-188-182 portion of the overall Joint Chiefs of Staff-mandated requirement has been met for the AN/USC-42A(V)2(C) Mini-DAMA Terminal.

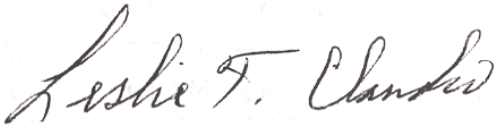
7. Previous testing has demonstrated that even though a product conforms to standards, there is still a potential for incompatibility between UHF terminals that implement operational requirements differently. Therefore, prior to an initial operational capability assessment, terminal users must define the specific terminal operational requirements. Additionally, the terminals must be tested and certified for interoperability by JITC in accordance with reference (b).

JITC Memo, Networks and Transport Division (JTE), MIL-STD-188-182 Conformance Certification of the AN/USC-42A(V)2(C) Miniaturized Demand Assigned Multiple Access (Mini-DAMA) Terminal (Certification 370.283)

8. JITC distributes test documentation via the JITC Electronic Report Distribution (ERD) system which uses unclassified (NIPRNET) e-mail. More comprehensive information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/.gov users on the NIPRNET at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET) or http://199.208.204.125 (SIPRNET). JITC also provides a DAMA Certification Register on the JITC public website under "Product Registers." The DAMA Certification Register can be reached directly at http://jitc.fhu.disa.mil/reg/dama1.html. The UHF SATCOM DAMA Test Facility homepage can be reached directly at http://jitc.fhu.disa.mil/reg/uhfdama.htm.

8. The testing agent point of contact is Norma Vega, DSN 879-1741, Commercial (520) 538-1741, e-mail vegan@fhu.disa.mil.

FOR THE COMMANDER:



2 Enclosures:
1 Additional References
2 Conformance Certification Testing Summary

LESLIE CLAUDIO
Chief
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ADDITIONAL REFERENCES

(c) MIL-STD-188-182, "Interoperability Standard for 5-kHz UHF DAMA Terminal Waveform," 2 December 1996

(d) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6251.01A, "Ultrahigh Frequency (UHF) Satellite Communications Demand Assigned Multiple Access Requirements," 21 April 2003

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CONFORMANCE CERTIFICATION TESTING SUMMARY
(Certification 370.283)

1. CERTIFICATION TITLE. MIL-STD-188-182 Conformance Certification of the AN/USC-42A(V)2(C) Miniaturized Demand Assigned Multiple Access (Mini-DAMA) Terminal.

2. PROPONENT. Commanding Officer
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4. TESTERS. Joint Interoperability Test Command (JITC):
Mr. Larry Metz, (520) 538-5215
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Ms. Norma Vega, (520) 538-1741

5. SYSTEM DESCRIPTION. The AN/USC-42A(V)2(C) Mini-DAMA Terminal provides full-duplex capabilities in both dedicated and DAMA modes of operation. The terminal has eight input/output (I/O) ports which can be independently configured and can be selected for half or full-duplex operations. The terminal provides internal transmission security (TRANSEC) for orderwire encryption in the DAMA mode, and optional embedded Communications Security (COMSEC) for user communications encryption in all modes. The terminal uses an external 100-Watt amplifier, and has one audio Input/Output port that is used for Frequency Shift Keying (FSK) operation in the Dedicated SATCOM mode. There are three versions of the Mini-DAMA Terminal. All are identical in size and appearance, and the software and hardware components are interchangeable between them. The AN/USC-42(V)1(C) is a single Radio Frequency (RF) channel version that uses a modem power supply that differs slightly from the others. The AN/USC-42(V)2(C) and AN/USC-42A(V)2(C) terminals are dual and single RF channel versions respectively. All three configurations specifically address ship, shore, submarine and aircraft Ultrahigh Frequency (UHF) Dedicated and DAMA SATCOM requirements for the United States Navy.

6. TEST NETWORK DESCRIPTION. The test networks varied for each military standard (MIL-STD) requirement being verified. Testers used various configurations of the 5-kHz/25-kHz DAMA Channel Controller, which is the Resource Controller (RC) subsystem of the Joint UHF Military Satellite Communications (MILSATCOM) Network Integrated (JMINI) Control System, and commercial-off-the-shelf (COTS) test equipment to verify each MIL-STD requirement. Detailed test configurations and data collection information are in the appropriate sections of the JITC test procedure, “MIL-STD-188-

182/MIL-STD-188-182A Conformance Test Procedure," 19 March 2001. Figure 1 shows the configuration of the previously certified system.

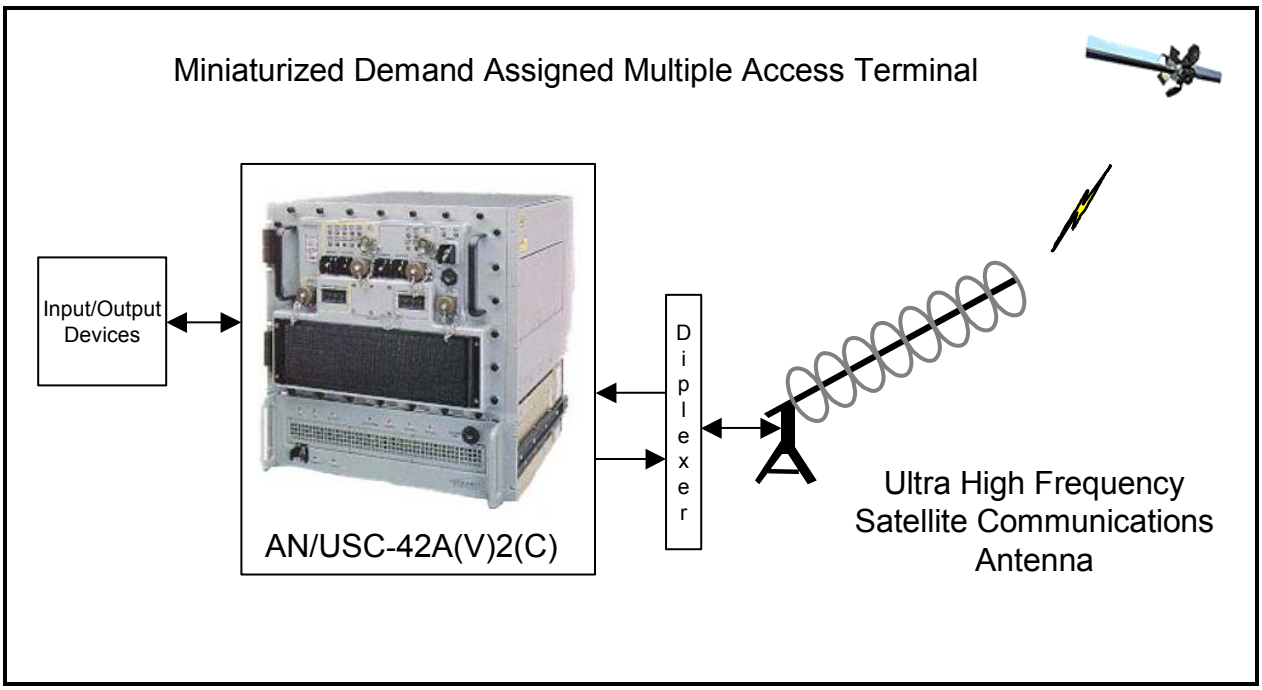

Figure 1. Tested System Configuration

7. SYSTEM CONFIGURATION. Terminal components and software versions include:

Miniaturized Demand Assigned Multiple Access Terminal ..... AN/USC-42A(V)2(C)
Modem..... MD-1293A(V)2(C)(P)/USC-42(V)
System Software Build Version..... 8.35d
Red Communications Signal Processor (CSP) Version..... 8.36
Black Communications Signal Processor (CSP) Version..... 8.07
Black Input/Output (I/O) Version 8.18
Transmission Security (TRANSEC) Version 5.05
Digital Signal Processor (DSP) Version 8.35
High Power Amplifier ..... AM-7543/USC-42(V)

8. MODES OF OPERATION. All mandatory and implemented optional modes of operation specified in MIL-STD-188-182 have been verified. No optional capabilities are implemented in the terminal.

9. TESTING LIMITATIONS. Details of the specific requirement that could not be verified are listed below.

a. Requirement 231, paragraph 5.4.4.1 (2), "The modulation used shall have spectral containment equal to or better than constant envelope SOQPSK."

(1) Not Tested. The pass/fail criteria for this requirement are not well defined. This is a spectral containment requirement, which is indirectly verified by meeting the MIL-STD Adjacent Channel Emission (ACE) requirements.

(2) Impact. The ACE requirements have been met. Therefore, no adverse operational impact is anticipated resulting from not directly testing this requirement. This requirement has been deleted from MIL-STD-188-182A.

b. Requirement 232, paragraph 5.4.4.1c, "The spectral shaping used during modulation, including additive noise, shall introduce no greater than a 1.0 dB degradation in a receiver's performance, if the receiver uses matched-filter demodulation and expects the incoming signal to have 50 percent sinusoidal shaped modulation, as illustrated in figure 11 [of the MIL-STD]."

(1) Not Tested. A characterized, matched-filter demodulator that expects and is optimally tuned to receive a 50 percent sinusoidal shaped, modulated signal was not available to perform this test.

(2) Impact. Test results for the other MIL-STD performance requirements (ACE and decoder gain) indicate the likelihood of the terminal also meeting this requirement, even though it was not directly tested. Since no performance problems were discovered while testing the other requirements, there is a high probability that this requirement is met, as well.

10. REQUIRED STANDARDS and CONFORMANCE. The required standard is MIL-STD-188-182, "Interoperability Standard for 5-kHz UHF DAMA Terminal Waveform," 2 December 1996. Table 1 delineates all the MIL-STD requirements and indicates the status as "Met," "Previously Met," "Not Met," "Not Tested," or "Not Applicable." The requirements marked "Previously Met" are requirements determined not to have been affected by the software modifications implemented in the terminal. Sufficient analysis of the Titan Corporation White Paper and message service testing have been performed to determine that the AN/USC-42A(V)2(C) Mini-DAMA Terminal, has met the mandatory requirements set forth in MIL-STD-188-182. The following provides details and impacts to some of the noted requirements.

a. Requirement 234, paragraph 5.4.4.3, "In a nominal 5-kHz bandwidth whose center frequency is displaced by Δf from a terminal transmitter's carrier frequency, the EIRP shall be as specified in table XVIII [of the MIL-STD]."

(1) Met with Comment. As tested, the maximum Effective Isotropically Radiated Power (EIRP) level allowable to stay within the high-power ACE requirement is 23.9 decibels referenced to 1 watt, relative to isotropically radiated power (dBWi) for a

data rate of 2400 bits per second (bps) and modulation rate of 3000 signals per second (sps).

(2) Impact. If the terminal is operated at EIRP levels greater than 23.9 dBWi for a data rate of 2400 bps and a modulation rate of 3000 sps, ACE will potentially cause friendly jamming and transmission disruption. An EIRP level of 23.9 dBWi, including cable losses and antenna gain, is normally enough power to maintain adequate link quality.

b. Requirement 237, paragraph 5.5.1(3), "Hardware implementation of the terminal shall include provisions for future implementation of Over the Air Rekeying (OTAR) for the orderwire."

(1) Not Tested. Testing could not be performed because OTAR of the Transmission Security (TRANSEC) Key for Forward Orderwire (FOW) messages has not been implemented in the Channel Controller.

(2) Impact. None. Since the Channel Controller will not support OTAR of the TRANSEC Key for FOW messages, OTAR is not being used in this mode of operation.

11. TEST AND ANALYSIS REPORT. JITC distributes test documentation via the JITC Electronic Report Distribution (ERD) system which uses unclassified (NIPRNET) e-mail. More comprehensive information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/.gov users on the NIPRNET at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET) or http://199.208.204.125 (SIPRNET). JITC also provides a DAMA Certification Register on the JITC public website under "Product Registers." The DAMA Certification Register can be reached directly at http://jitc.fhu.disa.mil/reg/dama1.html. The UHF SATCOM DAMA Test Facility homepage can be reached directly at http://jitc.fhu.disa.mil/reg/uhfdama.htm. The testing agent point of contact is Norma Vega, DSN 879-1741, Commercial (520) 538-1741, e-mail vegan@fhu.disa.mil.

Table 1. MIL-STD-188-182 Requirements Matrix for the AN/USC-42A(V)2(C) Miniaturized Demand Assigned Multiple Access (Mini-DAMA) Terminal

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
1	4.2.2.2	The decoder performance gain shall be at least equal to that of the Viterbi decoder.	**Previously Met**
2	4.2.3.2	The modulation rates shall be 600, 800, 1200, 2400 and 3000 symbols per second (sps), as specified in table III [of the MIL-STD].	**Previously Met**
3	4.3(1)	The transmit terminal power received at the satellite shall be at least -169 decibels relative to 1 watt (dBW).	**Not Testable (Note)**
Note: This requirement is not directly testable.			
4	4.3(2)	The terminal receiver system shall be designed to provide error-free reception of the FOW burst for at least 99 of 100 FOW bursts, with a confidence of 98 percent.	**Previously Met**
5	4.3(3)	It shall be assumed that FOWs have an average length of 1400-bits, where bit length is the value indicated in the FOW field called *Length of this FOW* and that the controller power received at the satellite is at least -169 dBW.	**Not Applicable (Note)**
Note: Controller requirement, not applicable to terminal.			
6	4.3(4)	Terminal specifications shall define the parameters that must be met for them to comply with the requirements of this paragraph.	**Not Testable (Note)**
Note: This requirement is not directly testable.			
7	4.3.1(1)	The uplink carrier frequency, as received at the satellite, shall be within 400-Hz of the allocated channel frequency.	**Previously Met**
8	4.3.1(2)	The terminal receiver system shall accommodate these amounts of uplink frequency offset in the terminal uplink frequency offset budget.	**Previously Met**
9	4.3.2(1)	If a terminal has the capability to transmit and receive concurrently, then in the ROW:Login message and in the ROW:Status Report message the terminal shall identify itself as full-duplex.	**Previously Met**
10	4.3.2(2)	If a terminal cannot concurrently receive and transmit, then the terminal shall identify itself as half-duplex.	**Not Applicable (Note)**
Note: These are full duplex terminals at RF.			
11	4.4(1)	Communications options available for circuit services shall be as specified in table IV [of the MIL-STD].	**Previously Met**
12	4.4(2)	Communications options available for message services shall be as specified in table V [of the MIL-STD].	**Met**
13	5.1c	Transmissions shall only occur during authorized timeslots.	**Previously Met**
14	5.1.1	The fields and the number of bits for each field of a FOW shall be as illustrated in figure 2 [of the MIL-STD] and described below.	**Not Applicable (Note)**
Note: Controller requirement, not applicable to terminal.			
15	5.1.1a(1)	A preamble shall be transmitted as the initial part of each orderwire and communications burst.	**Previously Met**
16	5.1.1a(2)	The preamble format shall be a continuous wave (CW) carrier followed by a dot pattern.	**Previously Met**
17	5.1.1a(3)	Using shaped offset quadrature phase shift keying (SOQPSK) modulation, the preamble during the CW portion shall be generated with constant data on both the I and Q channels (I=1, Q=1).	**Previously Met**
18	5.1.1a(4)	During the dot pattern portion, the preamble shall consist of alternating data on the I channel (I=0101...) and a constant phase (Q=1111...) on the Q channel.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
19	5.1.1a(5)	The length of the preamble and the length of the CW carrier portion of each preamble shall be as defined in table IV [of the MIL-STD].	**Previously Met**
20	5.1.1b	The preamble shall be immediately followed by the 42-bit SOM sequence defined in table VII [of the MIL-STD].	**Previously Met**
21	5.1.1c(1)	The burst type field shall be as defined in table VIII [of the MIL-STD], and immediately follows the SOM sequence in each orderwire and communications burst.	**Previously Met**
22	5.1.1c(2)	Since this field is not coded, the terminal shall be able to identify the transmit burst type when the burst type is received with up to 3-bit errors in the 12-bits.	**Previously Met**
23	5.1.1c(3)	The start-of-frame burst type is used on the FOW burst only, and it shall not be transmitted by a terminal.	**Not Applicable (Note)**
Note: Controller requirement, not applicable to terminal.			
24	5.1.1c(4)	The end-of-service burst type shall be used on any communications burst assignment for which the terminal is attempting to tear down the service, as described in 5.4.2.5.6.	**Previously Met**
25	5.1.1c(5)	The start-of-slot burst type shall be used on all other bursts.	**Previously Met**
26	5.1.1f	With the Length of next FOW field information in the FOW bursts, and information in the directed message, the terminal shall determine the position of the timeslots in the next frame.	**Previously Met**
27	5.1.1g	The terminals that use active ranging shall use contention ranging slots in accordance with 5.2.2.1.1.	**Previously Met**
28	5.1.1h	The terminal shall interpret all system messages, comply with all applicable system messages, and ignore all system messages which were undefined at the time of terminal construction.	**Previously Met**
29	5.1.1j(1)	All FOW requests, notifications, and assignments shall take effect during the frame following the one in which they are received.	**Previously Met**
30	5.1.1j(2)	Terminals shall not fault on reception of any directed FOW message type that was not completely defined at the terminals' time of construction.	**Previously Met**
31	5.1.2.1c	The Burst Type field for a ranging timeslot shall be Start-of-Slot.	**Previously Met**
32	5.1.2.2c	The Burst Type field shall always be Start-of-Slot for ROW message timeslots.	**Previously Met**
33	5.1.3	Network communications shall be conducted in an assigned timeslot within the frame's communications segment.	**Previously Met**
34	5.1.4(1)	Data fields shall be transmitted in the sequence defined by figures 3, 4, 5, 6, and 7 [of the MIL-STD].	**Previously Met**
35	5.1.4(2)	For each field, the MSB (the leftmost bit) shall be transmitted first.	**Previously Met**
36	5.1.5	Each terminal shall ensure that its transmissions always fall within its allocated timeslots, as depicted in figure 7 [of the MIL-STD].	**Previously Met**
37	5.1.5b(1)	Terminal design shall prohibit the use of the Contention Ranging timeslots except when: (1) performing initial ranging (prior to login), or (2) its uplink timing error becomes excessive.	**Previously Met**
38	5.1.5b(2)	If active ranging is used, the terminal design shall allow the terminal to maintain sufficient uplink timing (that is, within 12.604-ms) for a period of at least 4.6 hours following a successful range.	**Previously Met**
39	5.2(1)	Terminal timing shall be aligned with the PCC timing.	**Previously Met**
40	5.2(2)	Prior to logging into the network, each terminal shall perform downlink and uplink acquisition to align its frame timing with that of the PCC.	**Previously Met**
41	5.2(3)	Thereafter, each terminal shall track the downlink and perform ranging (active or passive) to maintain uplink timing.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
42	5.2.1	Prior to initiation of any network transmission, the terminal shall perform downlink acquisition.	**Previously Met**
43	5.2.1a	Initial frame acquisition shall involve: (1) acquisition of downlink symbol timing by acquiring the FOW slot preamble, (2) acquisition of downlink slot timing by detecting the FOW slot SOM sequence, and (3) acquisition of frame timing by detecting the unique start-of-frame burst type indicator.	**Previously Met**
44	5.2.1b	If the terminal achieves initial frame acquisition, the terminal shall attempt to interpret the FOW by proceeding with error correction decoding, decryption, and CRC validation.	**Previously Met**
45	5.2.1c(1)	The terminal shall terminate uplink transmission upon loss of the downlink synchronization (loss of the FOW).	**Previously Met**
46	5.2.1c(2)	If no FOW burst is received for 200 consecutive frames, the terminal shall assume that login and service request information at the PCC is lost.	**Previously Met**
47	5.2.1c(3)	If downlink acquisition is recovered within 200 frames, the terminal shall not log in or retransmit service requests which have been previously acknowledged by the PCC.	**Previously Met**
48	5.2.2(1)	Prior to network log in, a terminal shall perform uplink acquisition.	**Previously Met**
49	5.2.2(2)	Terminals that use active ranging shall range in the Contention Ranging timeslots of the ROW.	**Previously Met**
50	5.2.2.1(1)	The terminal that performs active ranging shall set the Ranging Type field of the ROW:Login message to zero (0).	**Previously Met**
51	5.2.2.1(2)	To perform active ranging, a terminal shall transmit a short burst in accordance with 5.1.2.1 and figure 3 [of the MIL-STD] and shall measure the roundtrip propagation time to the satellite.	**Previously Met**
52	5.2.2.1.1	If initial ranging is unsuccessful, subsequent ranging attempts shall occur in the Contention Ranging timeslots during frames determined by the algorithm defined in 5.2.2.1.2.	**Previously Met**
53	5.2.2.1.2(1)	Following an unsuccessful attempt to range in a contention ranging timeslot, the terminal shall select a frame and slot for further contention ranging attempts.	**Previously Met**
54	5.2.2.1.2(2)	The contention ranging ROW slot in which to retransmit the ROW ranging message shall be selected using an algorithm that uses two levels of randomization.	**Previously Met**
55	5.2.2.1.2(3)	The contention ranging ROW timeslot selection process shall be as follows:	**Previously Met**
56	5.2.2.1.2a(1)	To determine the frame in which to retransmit the contention ranging ROW message, the terminal shall use the acquisition back-off number.	**Previously Met**
57	5.2.2.1.2a(2)	The terminal shall derive a uniformly distributed random number (U1) between 1 and the acquisition back-off number, inclusive.	**Previously Met**
58	5.2.2.1.2a(3)	Starting at the next frame, the terminal shall determine the accumulated number of contention ranging slots.	**Previously Met**
59	5.2.2.1.2a(4)	The frame in which the accumulated number equals or exceeds U1 shall be the frame for retransmission of the contention ROW ranging message.	**Previously Met**
60	5.2.2.1.2b(1)	To determine the contention ranging slot in which to retransmit the contention ROW ranging message, the terminal shall derive a uniformly distributed random number (U2) between 1 and the number of contention ranging slots inclusive, in the frame determined in a, above.	**Previously Met**
61	5.2.2.1.2b(2)	The terminal shall use the contention ranging ROW slot U2 for retransmission of the contention ROW ranging message.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
62	5.2.2.1.3	If active ranging is used, the terminal shall range using the timeslot defined by the FOW:Ranging Assignment message.	**Previously Met**
63	5.2.2.1.3a(1)	If a terminal performs active ranging and does not receive a FOW:Ranging Assignment message within 4.5 hours since the time it most recently ranged successfully, or if the ranging in an assigned ROW timeslot is unsuccessful, the terminal shall request an assignment to range.	**Previously Met**
64	5.2.2.1.3a(2)	The request shall be sent in the contention portion of the ROW, using an ROW:Assign Ranging message.	**Previously Met**
65	5.2.2.1.3b(1)	If a terminal performs active ranging and does not successfully range prior to its uplink timing error being greater than ±12.604-ms, the terminal shall inhibit transmissions (other than ranging) until ranging is successful.	**Previously Met**
66	5.2.2.1.3b(2)	If a terminal performs active ranging and its uplink timing error becomes excessive (that is, no longer within ±12.604-ms), the terminal shall range in the contention ranging timeslot as defined in 5.2.2.1.2.	**Previously Met**
67	5.2.2.2(1)	Terminals that passively range shall report this to the PCC in the ROW:Login Message by setting the Ranging Type field to 1.	**Previously Met**
68	5.2.2.2(2)	The terminal shall then transmit a ROW ranging burst in accordance with 5.1.2.1 in the assigned ROW timeslot.	**Not Applicable (Note)**
Note: The terminal, when logged in as a passive ranging terminal, cannot request an active ranging slot. In order to actively range, the operator must log out and log in as an active ranging terminal.			
69	5.3(1)	The terminal shall report the carrier-power-to-noise-spectral-density ratio (C/N_o) of received FOW within 1 dB.	**Previously Met**
70	5.3(2)	The terminal shall report link quality to the PCC at login using a ROW:Login message or when requested using a ROW:Status Report message.	**Previously Met**
71	5.4.1.1.1	The terminal shall provide circuit service at data I/O rates of 75-, 300-, 600-, 1200-, and 2400-bps and at the digital voice rate of 2400-bps, as indicated in table XIII [of the MIL-STD].	**Previously Met**
72	5.4.1.1.2(1)	Messages shall be less than or equal to 114,688 bits which is equivalent to 512 blocks of 224 bits each.	**Met**
73	5.4.1.1.2(2)	Cryptographic equipment preambles and pad bits, and any I/O equipment overhead bits such as start, stop, and parity, shall be included in the 114,688-bit maximum.	**Met**
74	5.4.1.2	Voice and data communications on dedicated channels shall be in accordance with MIL-STD-188-181.	**Previously Met (Note)**
Note: Testing was limited to establishing communications on the dedicated channel. Complete compliance to MIL-STD-188-181 is addressed during separate MIL-STD-188-181 conformance testing.			
75	5.4.1.3	Communication on the assigned 25-kHz TDMA channel shall be in accordance with MIL-STD-188-183.	**Previously Met (Note)**
Note: Testing was limited to achieving downlink and uplink synchronization on a 25-kHz channel, and establishing communications. Compliance to MIL-STD-188-183 is addressed during separate certification testing.			
76	5.4.2.1.1d(1)	A terminal shall respond to normal FOW requests and commands while participating on a pre-assigned circuit.	**Previously Met**
77	5.4.2.1.1d(2)	Terminals shall not request a tear-down for pre-assigned circuits.	**Previously Met**
78	5.4.2.1.2	Terminals shall originate each service request at one of five levels of precedence.	**Previously Met**
79	5.4.2.1.3.1	No service request whose precedence exceeds the terminal access restriction shall be transmitted by the terminal, unless the destination address is zero (numeric value). See 5.4.2.5.1.2.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
80	5.4.2.1.3.2	A terminal shall not transmit a service request if the precedence is less than the system access restriction.	**Previously Met**
81	5.4.2.1.3.3	When the FOW system service restriction is specified as being on, a terminal shall not originate requests for 2400-bps multiple access channel circuit services.	**Previously Met**
82	5.4.2.1.4	A terminal shall not transmit except as permitted in this MIL STD and authorized by the PCC.	**Previously Met**
83	5.4.2.1.5.1(1)	A terminal shall prohibit any type of transmission other than ranging and login until it receives a positive login acknowledgment.	**Previously Met**
84	5.4.2.1.5.1(2)	A terminal shall select a random time to transmit a ROW:Login message in the contention portion of the ROW.	**Previously Met**
85	5.4.2.1.5.1(3)	The random time shall be selected in accordance with 5.4.2.1.7.4.1.	**Previously Met**
86	5.4.2.1.5.1(4)	If the terminal does not receive a Login response in the FOW, within the time specified in 5.4.2.1.7.4.2, it shall retransmit the message using the ROW acknowledgment/ retry protocol defined in 5.4.2.1.7.4.2.	**Previously Met**
87	5.4.2.1.5.2.1	ROW messages responding to these FOW messages shall be transmitted within assigned ROW timeslots.	**Previously Met**
88	5.4.2.1.5.2.2(1)	If no acknowledgment is received within four frames, the terminal shall use the acknowledgment/retry protocol specified in 5.4.2.1.7.4.2 for retransmission of the ROW message.	**Previously Met**
89	5.4.2.1.5.2.2(2)	If no acknowledgment is received within four frames after retransmission, the terminal shall terminate the orderwire message retransmission attempt.	**Previously Met**
90	5.4.2.1.6.1(1)	Whenever possible, a terminal shall logout by transmitting a ROW:Logout message in a contention ROW timeslot.	**Previously Met**
91	5.4.2.1.6.1(2)	The terminal shall follow the protocol specified in 5.4.2.1.7.4.	**Previously Met**
92	5.4.2.1.6.1(3)	If a logout response is not received, the terminal shall terminate the logout protocol and consider itself logged out of the network.	**Previously Met**
93	5.4.2.1.6.4 b	On receipt of the tear-down, the terminal shall inform the operator that the service has been torn down by the PCC.	**Previously Met**
94	5.4.2.1.7.2	The position of a timeslot shall be determined from the ordering of assignments in the FOW burst.	**Previously Met**
95	5.4.2.1.7.3	The terminal receiving the first ROW assignment in the FOW shall transmit during the first assigned ROW timeslot (following the contention ranging timeslots), the second in the next, and so on.	**Previously Met**
96	5.4.2.1.7.4(1)	A terminal shall identify the beginning of the contention ROW timeslots by analyzing the Length of Next FOW field and FOW directed messages that assign ROW capacity.	**Previously Met**
97	5.4.2.1.7.4(2)	These contention ROW message timeslots shall immediately follow the assigned ROW timeslots.	**Previously Met**
98	5.4.2.1.7.4.1	The contention ROW timeslot within the frame shall be selected at random, based on a uniform distribution over the contention ROW timeslots within the frame.	**Previously Met**
99	5.4.2.1.7.4.2(1)	Further retries shall not be automatic (will require operator intervention).	**Previously Met**
100	5.4.2.1.7.4.2(2)	Terminals transmitting a contention ROW message shall expect to receive a FOW response.	**Previously Met**
101	5.4.2.1.7.4.2(3)	Terminals that do not receive a response shall assume that the contention ROW message was not received by the PCC.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
102	5.4.2.1.7.4.2(4)	The contention ROW slot in which to retransmit the contention ROW message shall be selected using an algorithm that uses two levels of randomization.	**Previously Met**
103	5.4.2.1.7.4.2(5)	The contention ROW timeslot selection process shall be as follows:	**Previously Met**
104	5.4.2.1.7.4.2a(1)	To determine the frame in which to retransmit the contention ROW message, the terminal shall use the contention back-off number most recently transmitted by the PCC (in a FOW system message).	**Previously Met**
105	5.4.2.1.7.4.2a(2)	The terminal shall derive a uniformly distributed random number (U1) between 1 and the contention back-off number, inclusive.	**Previously Met**
106	5.4.2.1.7.4.2a(3)	Starting at the next frame, the terminal shall determine the accumulated number of contention ROW slots.	**Previously Met**
107	5.4.2.1.7.4.2a(4)	The frame in which the accumulated number equals of exceeds U1 shall be the frame for retransmission of the contention ROW message.	**Previously Met**
108	5.4.2.1.7.4.2b(1)	To determine the contention ROW slot in which to retransmit the contention ROW message, the terminal shall derive a uniformly distributed random number (U2) between 1 and the number of contention ROW slots, inclusive, in the frame determined in a, above.	**Previously Met**
109	5.4.2.1.7.4.2b(2)	The terminal shall use the contention ROW slot U2 for retransmission of the contention ROW message.	**Previously Met**
110	5.4.2.1.7.5a	Within a contention ROW message, the terminal shall use the Retry Flag to indicate if the transmission is a first attempt or a retry.	**Previously Met**
111	5.4.2.1.7.5b	Within an assigned ROW message, the terminal shall use the Retransmission Flag to indicate if the last contention ROW transmission was successful.	**Previously Met**
112	5.4.2.1.7.5(1)	The terminal shall remember if the contention ROW message most recently transmitted was acknowledged.	**Previously Met**
113	5.4.2.1.7.5(2)	The terminal shall set the Retransmission Flag if a response to a retransmitted contention ROW is not received within four frames.	**Previously Met**
114	5.4.2.1.7.5(3)	The terminal shall reset the Retransmission Flag if (1) it receives a response to a contention ROW, (2) it detects a change in the ROW back-off number received in the FOW, or (3) 30 minutes has elapsed since the Retransmission Flag was set.	**Previously Met**
115	5.4.2.2.1(1)	To originate a circuit service, the terminal shall transmit a ROW:Circuit Setup message.	**Previously Met**
116	5.4.2.2.1(2)	If a response is received, the terminal shall abort the ROW acknowledgment/retry protocol.	**Previously Met**
117	5.4.2.2.3(1)	If the receiving terminal transfers data to the input/output device at a fixed rate based on the terminal's or input/ output device's internal clock, then a receive buffer shall be required.	**Previously Met**
118	5.4.2.2.3(2)	If the transmitting terminal transfers data from the input/output device at a fixed rate based on the terminal's or input/output device's internal clock, then a transmit buffer shall be required.	**Previously Met**
119	5.4.2.2.3(3)	Sufficient buffering in the terminal shall be provided to accommodate at least 24 hours of continuous operation at a I/O device rate of 2400-bps.	**Previously Met**
120	5.4.2.2.3(4)	The terminal clock accuracy shall be 1 X 10^{6} or better.	**Previously Met**
121	5.4.2.2.4(1)	With the possible exception of the last two bursts of a transmission, the same number of data bits shall be transmitted within each burst.	**Previously Met**
122	5.4.2.2.4(2)	The size shall be N = (User I/O Rate) (8.96 seconds) where N is the nominal number of data bits sent in each burst.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
123	5.4.2.2.4(3)	The receiving terminal shall correctly interpret the CBK if no more than 2-bit positions of the 8-bit CBK are received in error.	**Previously Met**
124	5.4.2.2.4a(1)	Unless an entire transmission has N or fewer data bits, the first burst for a voice circuit service shall use the first burst CBK format.	**Previously Met**
125	5.4.2.2.4a(2)	The CBK field for the first burst shall be 11111000.	**Previously Met**
126	5.4.2.2.4a(3)	All voice circuit service bursts, except the first and last of a transmission, shall use the nominal CBK format.	**Previously Met**
127	5.4.2.2.4a(4)	The CBK field for the nominal burst shall be 00000000.	**Previously Met**
128	5.4.2.2.4a(5)	All bursts for voice circuit service shall use the same burst format except that the CBK shall be set appropriately.	**Previously Met**
129	5.4.2.2.4a(6)	Unused bits in the data sub-field shall be filled with the repeating 4-bit sequence 1001.	**Previously Met**
130	5.4.2.2.4a(7)	When the service is voice and the entire transmission has no more than N data bits, then the last burst CBK format shall be used in the first and only burst of the transmission.	**Previously Met**
131	5.4.2.2.4a(8)	The CBK field for the last burst shall be 10101111.	**Previously Met**
132	5.4.2.2.4b(1)	Unused bits in the data sub-field for data circuit service shall be filled with the repeating 4-bit sequence 1001.	**Previously Met**
133	5.4.2.2.4b(2)	The Last Burst Count sub-field shall contain a count of the number of non-fill data bits in the burst.	**Previously Met**
134	5.4.2.2.4b(3)	The count shall consist of a 16-bit binary number repeated 5 times to fill the 80-bit Last Burst Count sub-field.	**Previously Met**
135	5.4.2.2.4b(4)	Each time the 16-bit number is repeated, the most significant bit shall be transmitted first.	**Previously Met**
136	5.4.2.2.4b(5)	The receiving terminal shall correctly interpret the Last Burst Count sub-field if no more than 2 of the 16-bit binary numbers are received in error.	**Previously Met**
137	5.4.2.2.4b(6)	For the second from last burst, the CBK field shall be 01010111.	**Previously Met**
138	5.4.2.2.4b(7)	The 80-bit Last Burst Count sub-field shall be filled with the repeating 4-bit sequence 1001, and the data sub-field shall contain N80 bits.	**Previously Met**
139	5.4.2.2.4b(8)	When the service is data and the entire transmission has no more than N80 data bits, then the last burst CBK format shall be used in the first and only burst of the transmission.	**Previously Met**
140	5.4.2.2.4b(9)	When the service is data and the entire transmission has N or fewer data bits but more than N80 data bits, then the second from last burst CBK format shall be used for the first burst of the transmission and the last burst CBK format shall be used in the second and last burst of the transmission.	**Previously Met**
141	5.4.2.2.5(1)	For interfacing with asynchronous I/O equipment, the transmitting terminal shall strip start and stop bits, and the receiving terminal shall put these bits back onto the data stream.	**Previously Met**
142	5.4.2.2.5(2)	The CBK field shall be 11111000 for the first burst of the transmission, shall be 00000000 for all but the first and last burst of the transmission, and shall be 10101111 for the last burst.	**Previously Met**
143	5.4.2.2.5(3)	The receiving terminal shall correctly interpret the CBK if no more than 2-bit positions of the 8-bit CBK are received in error.	**Previously Met**
144	5.4.2.2.5(4)	When the entire transmission has no more than N80 data bits, the last burst CBK format shall be used in the first and only burst of the transmission.	**Previously Met**
145	5.4.2.2.5(5)	Unused bits in the data sub-field shall be filled with the repeating 4-bit sequence 1001.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
146	5.4.2.2.5(6)	The Burst Count sub-field shall contain a count of the number of non-fill data bits in the burst.	**Previously Met**
147	5.4.2.2.5(7)	The count shall consist of a 16-bit binary number repeated 5 times to fill the 80-bit Burst Count sub-field.	**Previously Met**
148	5.4.2.2.5(8)	Each time the 16-bit number is repeated, the most significant bit shall be transmitted first.	**Previously Met**
149	5.4.2.2.5(9)	The receiving terminal shall correctly interpret the Burst Count sub-field if no more than 2 of the 16-bit binary numbers are received in error.	**Previously Met**
150	5.4.2.2.6	When the PCC tear-down command is received, terminals shall cease transmission pertaining to that service.	**Previously Met**
151	5.4.2.3.1(1)	To originate a message service, the terminal shall transmit a ROW:Message Setup message.	**Met**
152	5.4.2.3.1(2)	If the terminal receives a response, the terminal shall abort the ROW acknowledgment/retry protocol.	**Met**
153	5.4.2.3.2(1)	Message information transmitted over the channel shall be arranged into packets.	**Met**
154	5.4.2.3.2(2)	A data block containing 224 message bits shall be the minimum packet size.	**Met**
155	5.4.2.3.2b	The terminal shall determine the timeslot size (number of building blocks required) for a message service from this information, as shown in table V [of the MIL-STD].	**Met**
156	5.4.2.3.2.1	When polled, the destination terminal shall respond in a ROW:Blocks Acknowledgment message.	**Met**
157	5.4.2.3.2.2(1)	The ROW:Blocks Acknowledgment message is used with point-to-point message services and shall contain information to acknowledge the block up to which all blocks have been received correctly.	**Met**
158	5.4.2.3.2.2(2)	This procedure shall continue until all message data has been transmitted and acknowledged, or until the service is torn down.	**Met**
159	5.4.2.3.2.5	The last packet shall use the unused-byte counter to identify the number of fill bytes that follow valid data bytes in the packet.	**Met**
160	5.4.2.3.2.6b(1)	The receiving terminal shall send a ROW:Message Acknowledgment only after the terminal has successfully delivered the message to the terminal I/O device.	**Met**
161	5.4.2.3.2.6b(2)	The terminal specification shall define if the message should be delivered to the I/0 device after the message has been completely and correctly received, or incrementally as continuous blocks are correctly received.	**Met**
162	5.4.2.4.1(1)	Only terminals that are Automatic Frequency Change capable (ROW:Login message) shall respond to a FOW:Channel Assignment message by changing to the new channel.	**Previously Met**
163	5.4.2.4.1(2)	Only terminals that are Automatic Frequency Change capable shall request an assignment of a dedicated channel.	**Previously Met**
164	5.4.2.4.2(1)	When a FOW:Terminal Channel Assignment message is sent, a slot for an assigned ROW message is reserved and the terminal guarding that node address shall respond with a ROW:Terminal Channel Assignment Response message before switching to the dedicated channel.	**Previously Met**
165	5.4.2.4.2(2)	The terminal shall reject any terminal channel assignment which it does not accept (as when it is participating in a higher precedence sub-net service, for example), using the ROW:Terminal Channel Assignment Response message.	**Previously Met (Note)**

Note: The terminal always accepts the channel assignment. Since precedence is not indicated in the dedicated channel assignment, the parenthetical portion of the requirement is not applicable, and has been deleted from MIL-STD-188-182A.

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
166	5.4.2.4.2(3)	The terminal shall return to the initial TDMA channel prior to, or immediately after the allotted time assigned.	**Previously Met**
167	5.4.2.4.2(4)	The terminal shall achieve downlink and uplink synchronization upon return to the initial TDMA channel.	**Previously Met**
168	5.4.2.4.2(5)	The terminal shall send a ROW:Terminal Channel Return message in the contention ROW message timeslots for early reentry into the TDMA network if the selected contention ROW message slot occurs before the end of the allocated dedicated channel time assigned.	**Previously Met**
169	5.4.2.5.1(1)	Sixteen-bit addresses shall be used for identifying network nodes and sub-nets.	**Previously Met**
170	5.4.2.5.1(2)	Each terminal shall receive the FOW messages and process those messages directed to its terminal node address or to any other address on its guard list.	**Previously Met**
171	5.4.2.5.1(3)	Each terminal shall maintain an address guard list.	**Previously Met**
172	5.4.2.5.1(4)	This guard list shall contain the node and sub-net addresses for which the terminal receives services.	**Previously Met**
173	5.4.2.5.1.1	A terminal shall always use its unique terminal node address to identify itself in orderwire messages, that is, when logging into the network, requesting services, and in other orderwire messages.	**Previously Met**
174	5.4.2.5.1.2	Terminals shall not use address zero for a Login address or maintain address zero on their guard lists.	**Previously Met**
175	5.4.2.5.1.3	A sub-net address shall not be used for a terminal node address.	**Previously Met**
176	5.4.2.5.2(1)	A terminal shall report the number of addresses on its guard list and a guard list cyclic redundancy check (CRC) in the ROW:Login message.	**Previously Met**
177	5.4.2.5.2(2)	Only node and sub-net addresses shall be counted for the number of addresses in the Login message.	**Previously Met**
178	5.4.2.5.2a	When requested by the PCC in one or more FOW:Report Terminal Address messages, the terminal shall report its guard list of node and sub-net addresses in ROW:Terminal Address Report messages.	**Previously Met**
179	5.4.2.5.2b	When reporting guard list addresses in the ROW:Terminal Address Report message, the terminal shall fill with zeros any fields corresponding to empty locations on the terminal address guard list.	**Previously Met**
180	5.4.2.5.2c(1)	The terminal shall update its address guard list, when requested by the PCC in a FOW:Terminal Address Add or Delete message.	**Previously Met**
181	5.4.2.5.2c(2)	The terminal shall respond to the FOW request with a ROW:Terminal Address Add or Delete Response message.	**Previously Met**
182	5.4.2.5.2c(3)	The terminal shall report a failure to delete an address only if the address is not on its guard list.	**Previously Met**
183	5.4.2.5.2c(4)	The terminal shall report a failure to add an address only if the address is already on its guard list or the guard list already contains fifteen addresses in addition to the terminal node address.	**Previously Met**
184	5.4.2.5.2c(5)	If the terminal is involved in a receive service directed to a deleted address, the terminal shall ignore any further communications associated with the service.	**Previously Met**
185	5.4.2.5.3(1)	Each service request shall be identified by a unique service identification number (04) known as the terminal virtual port number.	**Previously Met**
186	5.4.2.5.3(2)	The terminal shall not reuse a virtual port number until the initial request with the virtual port number is no longer valid (such as is the case with a rejected request, a received tear-down, or a timeout).	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
187	5.4.2.5.3(3)	The terminal shall not use virtual port numbers greater than those permitted.	**Previously Met**
188	5.4.2.5.3a(1)	The terminal shall be capable of processing any assigned services in the sequence established by the PCC, independent of the services requested by the terminal.	**Previously Met**
189	5.4.2.5.3a(2)	Before transmission of a service request, the terminal shall validate the service request against terminal access restrictions, system access restrictions, and system service restrictions.	**Previously Met**
190	5.4.2.5.3b(1)	The terminal shall be capable of processing at least two active sub-net message services as the service destination during a single frame while participating in one other active service of any type (as either the source or the destination).	**Previously Met**
191	5.4.2.5.3b(2)	The terminal shall process multiple assignments in the following manner:	**Previously Met**
192	5.4.2.5.3b(3)	If the terminal is assigned multiple services that it cannot process simultaneously (example being, both a point-to-point service and a sub-net circuit service), it shall process the service with the highest precedence.	**Previously Met**
193	5.4.2.5.3b(4)	If the terminal is assigned multiple services at the same precedence level, it shall process the first service assigned and continue to process the service until the service is preempted, completed, or if the operator intervenes.	**Previously Met**
194	5.4.2.5.3c	The terminal shall automatically request tear down of any point-to-point service it will not process.	**Previously Met**
195	5.4.2.5.3d	The terminal shall automatically request tear-down of any sub-net service (for which it is identified as the source) that it will not process.	**Previously Met**
196	5.4.2.5.3e	The terminal shall not request tear down of a sub-net service (for which it is identified as a destination) that it will not process.	**Previously Met**
197	5.4.2.5.3f	The terminal shall automatically request tear-down of any service that falsely identifies it as the originator.	**Previously Met**
198	5.4.2.5.4.1(1)	If the message is not received, the terminal shall consider that it is logged out and the terminal specification should define what action the terminal and the operator should take.	**Previously Met**
199	5.4.2.5.4.1(2)	If a FOW:Participant Status Data Base message that reports the terminal's status is received, and the number of indicated services (either active or queued) does not agree with the number in the terminal's data base, the terminal shall send a service request message to the PCC for each service that should be active or queued.	**Previously Met**
200	5.4.2.5.4.2(1)	When a FOW system message indicates a dedicated channel mode countdown is in progress, the terminal shall follow the FOW system message countdown...	**Previously Met**
201	5.4.2.5.4.2(2)	...and shall cease DAMA operations in the frame identified by the countdown message.	**Previously Met**
202	5.4.2.5.4.2(3)	The terminal specifications shall define the detail requirements of the operator notification.	**Previously Met**
203	5.4.2.5.5	Terminals shall respond to a FOW:Report Status message from the PCC by transmitting a ROW:Status Report message in the assigned ROW timeslot.	**Previously Met**
204	5.4.2.5.6.1.1.1	The terminal shall not request tear-down of an active sub-net circuit service that it did not originate.	**Previously Met**
205	5.4.2.5.6.1.1.2	The terminal shall not request tear-down of a queued circuit service that it did not originate.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
206	5.4.2.5.6.1.2.1	The terminal shall not request tear-down of an active sub-net message service that it did not originate.	**Met**
207	5.4.2.5.6.1.2.2	The terminal shall not request tear-down of a queued message service that it did not originate.	**Met**
208	5.4.2.5.6.2.1.1(1)	The terminal (either source or destination) requesting the service tear-down shall transmit a preamble, an SOM sequence, and an end-of-service burst type in each assigned communications timeslot.	**Previously Met**
209	5.4.2.5.6.2.1.1(2)	The terminal shall transmit a ROW:Circuit Tear-down message in the contention portion of the ROW if, after the fourth frame following the time the tear-down request is originated, the response has not been received.	**Previously Met**
210	5.4.2.5.6.2.1.1(3)	The terminal shall continue to transmit the preamble, SOM sequence, and end-of-service burst type field in each assigned communications timeslot until a FOW:Circuit Tear-down message is received.	**Previously Met**
211	5.4.2.5.6.2.1.2(1)	The source terminal requesting tear-down shall transmit a ROW:Circuit Tear-down message.	**Previously Met**
212	5.4.2.5.6.2.1.2(2)	The terminal shall assume the service has been torn down if it receives no response to the request.	**Previously Met**
213	5.4.2.5.6.2.2.1(1)	The source terminal shall transmit a preamble, a SOM sequence, and an end-of-service burst type in each assigned communications timeslot.	**Met**
214	5.4.2.5.6.2.2.1(2)	The terminal shall transmit a ROW:Message Tear-down message in the contention portion of the ROW if, after the fourth frame following the time the tear-down request is originated, the response has not been received.	**Met**
215	5.4.2.5.6.2.2.1(3)	The terminal shall continue to transmit the preamble, SOM sequence, and end-of-service burst type field in each assigned communications timeslot until a FOW:Message Tear-down message is received.	**Met**
216	5.4.2.5.6.2.2.2(1)	The source terminal requesting tear-down shall transmit a ROW:Message Tear-down message.	**Met**
217	5.4.2.5.6.2.2.2(2)	The terminal shall assume service has been torn down if it receives no response to the request.	**Met**
218	5.4.3.1(1)	Two CRC code lengths shall be used for error detection.	**Previously Met**
219	5.4.3.1(2)	A long code (16-bits) shall be used on the FOW transmissions, on message service data blocks, and as a check of guard-list consistency.	**Previously Met**
220	5.4.3.1(3)	A short code (8-bits) shall be used on the ROW message and ROW ranging transmissions.	**Previously Met**
221	5.4.3.1(4)	Only bursts received correctly, as determined by the CRC, shall be used by the terminal for FOW transmissions and ROW ranging transmissions.	**Previously Met**
222	5.4.3.1(5)	The generator polynomials for the long and short codes, respectively, shall be as given below (see Page 70).	**Previously Met**
223	5.4.3.1b(1)	All address fields of the 15 address guard list for which there is no guarded address shall be zero filled for the CRC calculation, and the CRC is computed over a 256-bit data field.	**Previously Met**
224	5.4.3.1b(2)	All zero fill shall occur at the end of the valid guard list addresses.	**Previously Met**
225	5.4.3.2	Forward error correction (FEC) encoding shall be performed using a rate 1/2, constraint length seven convolutional code (figure 10 [of the MIL-STD]).	**Previously Met**
226	5.4.3.3(1)	The block interleaving structure shall consist of two independently constructed blocks of 112 code bits used in sequence.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
227	5.4.3.3(2)	The interleaving process shall be equivalent to writing input bits into the 112-bit blocks sequentially and read out in the sequence dictated by the tables [of the MIL-STD].	**Previously Met**
228	5.4.3.3(3)	De-interleaving shall reverse this operation.	**Previously Met**
229	5.4.3.3(4)	Interleaver boundaries shall start at the beginning of the data field within each burst for circuit services (see figure 5 [of the MIL-STD]); they shall start at the beginning of the data block within each packet for message service (see figure 6 [of the MIL-STD]); with the first interleaved bit of the burst in the first position defined by the block of table XVI [of the MIL-STD].	**Previously Met**
230	5.4.4.1(1)	The modulation for all transmissions shall be interoperable with shaped offset quadrature phase shift keying (SOQPSK).	**Previously Met**
231	5.4.4.1(2)	The modulation used shall have spectral containment equal to or better than constant envelope SOQPSK.	**Not Tested (Note)**
Note: This is a spectral containment requirement for which a pass/fail criterion could not be determined.			
232	5.4.4.1c	The spectral shaping used during modulation, including additive noise, shall introduce no greater than a 1.0 dB degradation in a receiver's performance, if the receiver uses matched filter demodulation and expects the incoming signal to have 50 percent sinusoidally shaped modulation, as illustrated in figure 11 [of the MIL-STD].	**Not Tested (Note)**
Note: Due to the lack of a characterized, matched filter demodulator, this requirement could not be tested.			
233	5.4.4.2	The modulation rates shall be 600, 800, 1200, 2400, and 3000 sps, as specified in table III [of the MIL-STD].	**Previously Met**
234	5.4.4.3	In a nominal 5-kHz bandwidth whose center frequency is displaced by Δf from a terminal transmitter's carrier frequency, the EIRP shall be as specified in table XVIII [of the MIL-STD].	**Previously Met (Note)**
Note: The maximum terminal EIRP level allowable, from the previous certification, to meet the high power Adjacent Channel Emissions (ACE) requirement is 23.9 dBWi for a data rate of 2400-bps and a modulation rate of 3000 sps.			
235	5.5.1(1)	All orderwires shall be encrypted for normal transmission, however an orderwire encryption/decryption bypass shall be provided.	**Previously Met**
236	5.5.1(2)	Orderwire encryption/decryption shall be performed using the COMSEC/TRANSEC Integrated Circuit (CTIC) or an alternate NSA-approved device that is cryptographically and functionally compatible with the CTIC implementing KGV11 as specified in NSA specifications 884A and 871.	**Previously Met**
237	5.5.1(3)	Hardware implementation of the terminal shall include provisions for future implementation of Over the Air Re-keying (OTAR) for the orderwire.	**Not Tested (Note)**
Note: Forward Channel Control Orderwire (FOW) messages for OTAR have not been implemented in the Channel Controller; therefore testing could not be performed.			
238	5.5.1(4)	Inputs to the TRANSEC encryption/decryption process shall be a cryptographic key and an initialization vector called the Time Slot Number (TSN).	**Not Testable (Note)**
Note: General statement/definition.			
239	5.5.1.1(1)	The terminal shall have storage for up to eight TRANSEC keys.	**Previously Met**
240	5.5.1.1(2)	Each TRANSEC key shall be loaded into a specific location in the terminal's key storage memory, numbered from 0 to 7.	**Previously Met**
241	5.5.1.1(3)	When a terminal enters the network, it shall try all loaded TRANSEC keys until it correctly decrypts the FOW (determined by a correct CRC).	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
242	5.5.1.1(4)	If the terminal enters the network during the Time Slot Countdown, it will have missed the Next Key Indicator and shall determine the next key using the trial process for all stored TRANSEC keys (until obtaining the correct CRC).	**Previously Met**
243	5.5.1.2(1)	A 39-bit TSN shall be used as the cryptographic initialization vector for the CTIC.	**Previously Met**
244	5.5.1.2(2)	This TSN shall have four fields, as shown in figure 12 [of the MIL-STD] and as described below.	**Previously Met**
245	5.5.1.2a	The Net number shall be 127 (1111111).	**Previously Met**
246	5.5.1.2c(1)	It shall be coded from 0 through 1023 for the first through one thousand twenty fourth building block in the frame.	**Previously Met**
247	5.5.1.2c(2)	The Frame Offset field shall be zero for the FOW.	**Not Applicable (Note)**
Note: Controller requirement not applicable to the terminal.			
248	5.5.1.2d(1)	This field shall start at a value of zero for all encryptions and decryptions.	**Previously Met**
249	5.5.1.2d(2)	The TSN for encryption of the orderwire shall be generated using the Frame Number and Frame Offset of the time slot within which the orderwire is transmitted.	**Previously Met**
250	5.5.1.2d(3)	The TSN for decryption of the orderwires shall be generated using the Frame Number and Frame Offset of the time slot within which the orderwire was received.	**Previously Met**
251	5.5.1.3b	The generation of the CRC is now completed and the CRC shall be added to the end of the already built FOW.	**Not Applicable (Note)**
Note: Controller requirement not applicable to the terminal.			
252	5.5.1.4b	The remaining FOW data shall be error correction decoded.	**Previously Met**
253	5.5.1.4d	The CTIC shall be initialized to operate in Mode B Decrypt Common Synchronization, using the TSN as defined in 5.5.1.	**Previously Met**
254	5.5.1.4e	The FOW shall be decrypted beginning with the MSB of the PCC address and ending with the LSB of the CRC.	**Previously Met**
255	5.5.1.4f	A CRC shall be computed on the decrypted data and compared with the CRC Field (see 5.4.3.1).	**Previously Met**
256	5.5.1.5b	The generation of the CRC shall now be completed and the CRC shall be added to the end of the already built ROW.	**Previously Met**
257	5.5.1.5c	The CTIC shall be initialized to operate in Mode B Encrypt Common Initialization, using the TSN as defined in 5.5.1.	**Previously Met**
258	5.5.1.5d	The ROW shall be encrypted beginning with the MSB of the Node Address and ending with the LSB of the CRC.	**Previously Met**
259	5.5.1.5e	The resulting ROW shall now be error correction encoded (see 5.4.3.2).	**Previously Met**
260	5.5.1.5f	The preamble, Start-of-message indicator, and Burst Type fields shall be added to the beginning of the ROW.	**Previously Met**
261	5.5.2(1)	The terminal originating a service request shall indicate whether or not the user data is to be encrypted.	**Previously Met**
262	5.5.2(2)	Terminals shall transmit user data in plain text only if authorized by the terminal operator.	**Previously Met**
263	5.5.2.1	For joint operations, secure voice at 2400-bps shall be interoperable with the digitization and encryption techniques used in the Advanced Narrowband Digital Voice Terminal (ANDVT), application 3 (see MILC28883A).	**Previously Met (Note)**
Note: This requirement was previously met with external COMSEC.			

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
264	5.5.2.2(1)	For joint operations, data encryption shall be interoperable with KYV5 and KG84A encryption devices.	**Previously Met (Note)**
Note: This requirement was previously met with external COMSEC.			
265	5.5.2.2(2)	Terminals that embed COMSEC devices shall support all data rates specified in this MIL-STD for communication over the DAMA channel.	**Not Applicable (Note)**
Note: This terminal configuration does not embed COMSEC.			
266	5.6(1)	Multiple channel network operations shall take place on the channels listed in Appendix D.	**Previously Met**
267	5.6(2)	Those terminals that are not “automatic frequency change” capable shall indicate this in the ROW:Login message when they log into a network, and will not be commanded to change channels via the FOW:Terminal Channel Assignment message.	**Previously Met**
268	5.6.1(1)	While operating on a TDMA channel, the terminal shall change to a new channel only when directed to by the PCC.	**Previously Met**
269	5.6.1(2)	The direction to change channels shall be by the FOW:Terminal Channel Assignment message.	**Previously Met**
270	5.6.1(3)	The terminal shall change to the channel identified in the message.	**Previously Met**
271	5.6.1(4)	The terminal shall determine, based on the Channel field and Appendix D, whether the assigned channel is 5- or 25-kHz.	**Previously Met**
272	5.6.1(5)	If the channel is a 5-kHz, the DAMA waveform shall be in accordance with MIL-STD-188-182.	**Previously Met**
273	5.6.1(6)	If the assigned channel is 25-kHz, the DAMA waveform shall be in accordance with MIL-STD-188-183.	**Previously Met (Note)**
Note: Testing was limited to achieving downlink and uplink synchronization on a 25-kHz channel, and establishing communications. Compliance to MIL-STD-188-183 is addressed during separate certification testing.			
274	5.6.1(7)	The terminal shall achieve downlink and uplink synchronization in the new channel.	**Previously Met**
275	5.6.1(8)	If the terminal cannot achieve downlink and uplink synchronization on the assigned channel within 90 seconds, the terminal shall return to the previous channel of operation.	**Previously Met**
276	5.6.1(9)	If the terminal is switching from a 5-kHz DAMA channel to another 5-kHz DAMA channel, then the terminal shall retain all pending service requests it held in queue and shall not send a ROW:Login message on the new channel.	**Previously Met**
277	5.6.1(10)	If the terminal is switching form a 5-kHz DAMA channel to a 25-kHz DAMA channel, then the terminal shall clear (i.e. delete) all pending service requests it previously held in queue.	**Previously Met**
278	5.6.1(11)	After a terminal is reassigned to a new TDMA channel (5- or 25-kHz), it shall not return to the previous channel or change to any other channel unless directed to by the PCC.	**Previously Met**
279	5.6.2(1)	While operating on a TDMA channel, the terminal shall change to a new channel only when directed to by the PCC.	**Previously Met**
280	5.6.2(2)	The direction to change channels shall be by the FOW:Terminal Channel Assignment message.	**Previously Met**
281	5.6.2(3)	The terminal shall change to the channel identified in the message.	**Previously Met**
282	5.6.2(4)	If the Channel Type field is a one, the channel operates in the dedicated mode.	**Previously Met**
283	5.6.2(5)	The terminal shall determine, based on the Channel field and Appendix D, whether the assigned channel is 5- or 25-kHz.	**Previously Met**

JITC Req #	MIL-STD Paragraph	REQUIREMENT DESCRIPTION	STATUS
284	5.6.2(6)	The channel shall be in accordance with MIL-STD-188-181.	**Previously Met (Note)**
Note: Testing was limited to establishing communications on the dedicated channel. Complete compliance to MIL-STD-188-181 is addressed during separate conformance testing.			
285	5.6.2(7)	The use of this channel shall be in accordance with 5.4.2.4.2.	**Previously Met**

Legend:
A – Signal Amplitude
ACC – Alternate Channel Controller
AFB – Air Force Base
AFSATCOM – Air Force Satellite Communications
$a_i(t)$ – In-phase Data Modulation Signal
$a_q(t)$ – Quadrature Data Modulation Signal
$a_m, \ldots, a_0$ – Data Bits, 0 or 1
ANDVT – Advanced Narrowband Digital Voice Terminal
ASCII – American Standard Code of Information Interchange

BER – Bit Error Ratio
bps – Bit Per Second

CBK – Circuit Burst Kind
CC – Channel Controller
C/N_0 – Carrier-Power To Noise-Spectral-Density Ratio
COM – Communications
COMSEC – Communications Security
CRC – Cyclic Redundancy Check
CRS – Contention Ranging Slots
CTIC – COMSEC/TRANSEC Integrated Circuit
CW – Continuous Wave

DAMA – Demand Assigned Multiple Access
dB – Decibel
dB-Hz – Decibel-Hertz
DBW – Decibels Relative to 1 Watt
DCS – Defense Communications System
DISA – Defense Information Systems Agency
D(x) – Data for which CRC is Generated
DO – Design Objective
DoD – Department of Defense
DoDD – DoD Directive
DoDISS – DoD Index of Specifications and Standards

E_b/N_o – Energy Per Bit to Noise Power Spectral Density Ratio

FEC – Forward Error Correction
FED-STD – Federal Standard
FIFO – First In, First Out
FOW – Forward Orderwire

G/T – Antenna Gain-to-Noise Temperature In dB/K
G(x) – Generating Polynomial for CRC

Hz – Hertz

I – In-Phase
I/O – Input/Output

JCS – Joint Chiefs Of Staff
JITC – Joint Interoperability Test Command

k – Constraint Length
kHz – Kilohertz

LSB – Least Significant Bit

m – index
MIL-STD – Military Standard
MJCS – JCS Memorandum
ms – Millisecond
MSB – Most Significant Bit

N – Integer Number
NCS – Network Control Station
NMCS – National Military Command System

OTAR – Over-the-Air Rekeying

PCC – Primary Channel Controller

Q – Quadrature

Req – Requirement
RF – Radio Frequency
ROW – Return Orderwire

SATCOM – Satellite Communications
SOM – Start-of-Message
SOQPSK – Shaped Offset Quadrature Phase-Shift Keying
s(t) – Transmit Signal
sps – Symbols Per Second

T – Symbol Period
TBD – To Be Determined
TDMA – Time-Division Multiple Access
TRANSEC – Transmission Security
TSN – Time Slot Number

UHF – Ultrahigh Frequency
USTS – UHF Satellite Terminal System (Air Force)

W – Watt

ω_0 – Radian Frequency, 2π x Frequency in Hertz
x – Unit Delay
$\Phi(t)$ – Phase

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