



MD-1324 and MD-1324A 5kHz Modem Overview, Issues and Status

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DMR, MD-1324
1 Mar 2011



"Sustaining the Tactical Edge through reliable C4ISR UHF SATCOM Support"

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 01 MAR 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE MD-1324 and MD-1324A 5kHz Modem Overview, Issues and Status				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) SPAWAR Systems Center Pacific, 53560 Hull Street, San Diego, CA, 92152				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES The 32nd Annual USN-USMC Spectrum Management Conference 7-11 March 2011, San Diego, CA					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 12	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

MD-1324 (C)/U Variants

- ▼ Two fielded MD-1324 modem variants - one with (the MD-1324A C/U) and one without a dedicated single RF Channel receiver front end. Both modems use an external HPA/UpConverter to transmit.
- ▼ MD-1324 “straight” is without the RF Front End, and it must rely on 70MHz RCV IF from a WSC-3 to not only Transmit but to also Receive from the satellite.
- ▼ A third MD-1324A + IW modem version soon to be fielded which will support 183B IW waveforms



Fielding: where is it installed ?

- ▼ Installed in 100+ shore sites and almost all USN, USNS, SSN, SSGN ships/ subs
- ▼ 600+ modems fielded
- ▼ Critical to Tomahawk Blk IV TSN
 - Missile comms in flight
 - CG, DDG, CV/CVN shooters
- ▼ Also Supports dedicated 5kHz Voice comms for most Amphibs
 - LHA, LHD, LPD, LSD
 - ESG, MEU, LFOC comms
- ▼ FMS: UK, AU, other Coalition forces



MD-1324 Overview

- ▼ Uses shipboard UHF SATCOM Antenna and an External HPA / Up Converter (like a UHF SATCOM AN/WSC-3, ARC-210, or DMR RFS).
- ▼ Supports 5kHz and 25kHz DAMA and Non-DAMA UHF SATCOM voice and data capability across a broad UHF satellite footprint covering almost ½ the globe per RF Channel up/downlink frequency pair.
- ▼ Low cost light weight comms to manpac radio users and low data rate reliable comms to disadvantaged users.
- ▼ Simultaneously supports two Digital I/O ports in 25kHz DAMA mode for CUDIXS, SAT TADIL-J, and ANDVT Voice or combo of both. Supports SAT TADIL-A Link-11, and DAMA BCST Reception.



What's it used for

▼ GENSER Message Systems:

- CUDIXS/ NAVMACS. NOW TTY, BCST

▼ Air Tracks

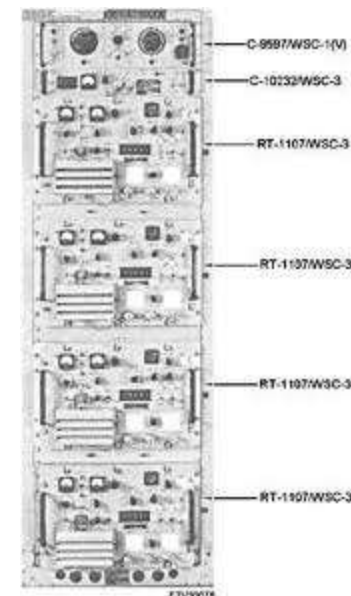
- SAT-TADIL-J, SAT TADIL-A

▼ Secure Voice-

- ANDVT Covered SATHICOM, CSG/ESG CMD

▼ TSN

- TACTICAL Tomahawk COMMS in flight



What's the Problem?

▼ Tactical UHF LOS stepping on UHF SATCOM Downlinks

- UHF SATCOM is in the 243.8 to 270+ MHz range
- SATCOM: -50dBm to -120dBm downlink signals are typical
- NO filtering possible in-band within the SATCOM Antenna System
- Limited deconflict effort seen in some AORs

▼ UHF LOS Interference

- Co-site coupling and preamp applies up to +30dBm at Radios
- SATCOM Receivers see it as noise swamping SATCOM signals and jacking up their AGC (reducing their sensitivity)
- Local EMI, but caused by Shore Training Freq assignments, and shore sites nearby

▼ SEMCIP Involvement

- Problem verified during EMC Certifications
- Reports 40% of MD-1324As degraded or INOP.

What's the Solution?

▼ Mitigate Modem Hardware Degradation & RF Burnout

- 22 of 62 with Bad Receivers in the modems turned in last year
- Improved Screening and Q/A
- IW modem: new EC-2 Receiver Front End tolerates +30dBm

▼ Better Spectrum Management

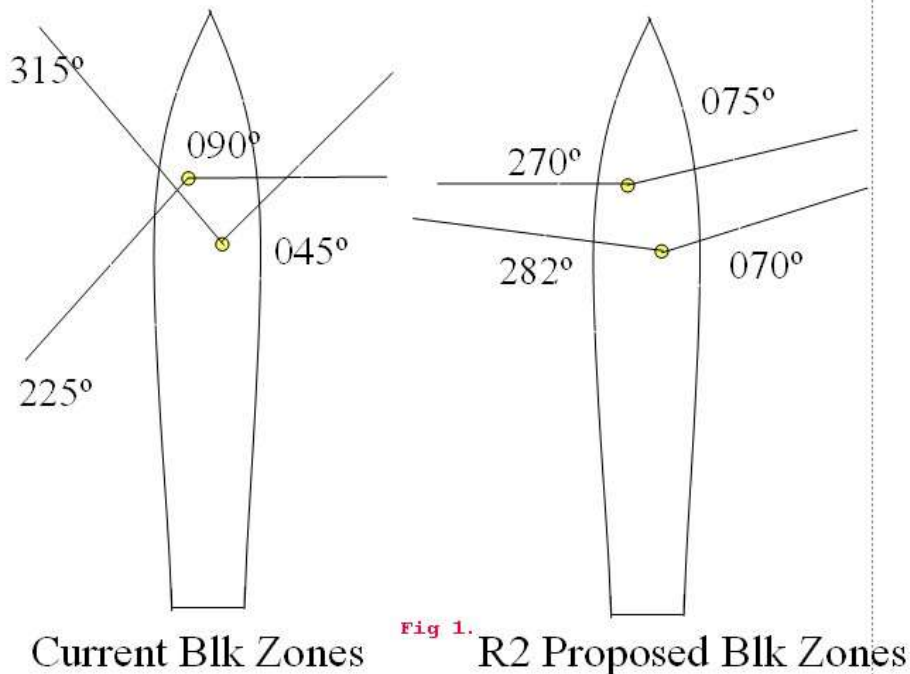
- CONUS OPTASK COMMS have been cleared of offending freqs
- Limit Primary assignments in lower half of band (243 to 260)
- Secondary assignments only in upper half to 277MHz and only as-required low duty cycle ckts.

Table 7-11. AFSATCOM wideband channel frequency assignments (MHz).

PLAN A & X		PLAN B & Y		PLAN C & Z		PLAN W	
UPLINK	DOWNLINK	UPLINK	DOWNLINK	UPLINK	DOWNLINK	UPLINK	DOWNLINK
263.950	266.350	265.950	261.450	265.950	262.850	267.150	263.350
263.975	266.375	265.975	261.475	265.975	262.875	267.175	263.375
264.000	266.400	265.100	261.500	265.100	262.900	267.200	263.400
264.025	266.425	265.125	261.525	265.125	262.925	267.225	263.425
264.050	266.450	265.150	261.550	265.150	262.950	267.250	263.450
264.075	266.475	265.175	261.575	265.175	262.975	267.275	263.475
264.100	266.500	265.200	261.600	265.200	262.100	267.300	263.500
264.125	266.525	265.225	261.625	265.225	262.125	267.325	263.525
264.150	266.550	265.250	261.650	265.250	262.150	267.350	263.550
264.175	266.575	265.275	261.675	265.275	262.175	267.375	263.575
264.200	266.600	265.300	261.700	265.300	262.200	267.400	263.600
264.225	266.625	265.325	261.725	265.325	262.225	267.425	263.625
264.250	266.650	265.350	261.750	265.350	262.250	267.450	263.650
264.275	266.675	265.375	261.775	265.375	262.275	267.475	263.675
264.300	266.700	265.400	261.800	265.400	262.300	267.500	263.700
264.325	266.725	265.425	261.825	265.425	262.325	267.525	263.725
264.350	266.750	265.450	261.850	265.450	262.350	267.550	263.750
264.375	266.775	265.475	261.875	265.475	262.375	267.575	263.775
264.400	266.800	265.500	261.900	265.500	262.400	267.600	263.800
264.425	266.825	265.525	261.925	265.525	262.425	267.625	263.825
264.450	266.850	265.550	261.950	265.550	262.450	267.650	263.850

What's the Solution (contd.)?

- ▼ Ref SECRET Message sent in 2007 and re-sent as:
 - NAVSURFWARCENDIV DAHLGREN/Q54 171913Z DEC 09
- ▼ Shipboard Antenna RF Block Zone Optimization



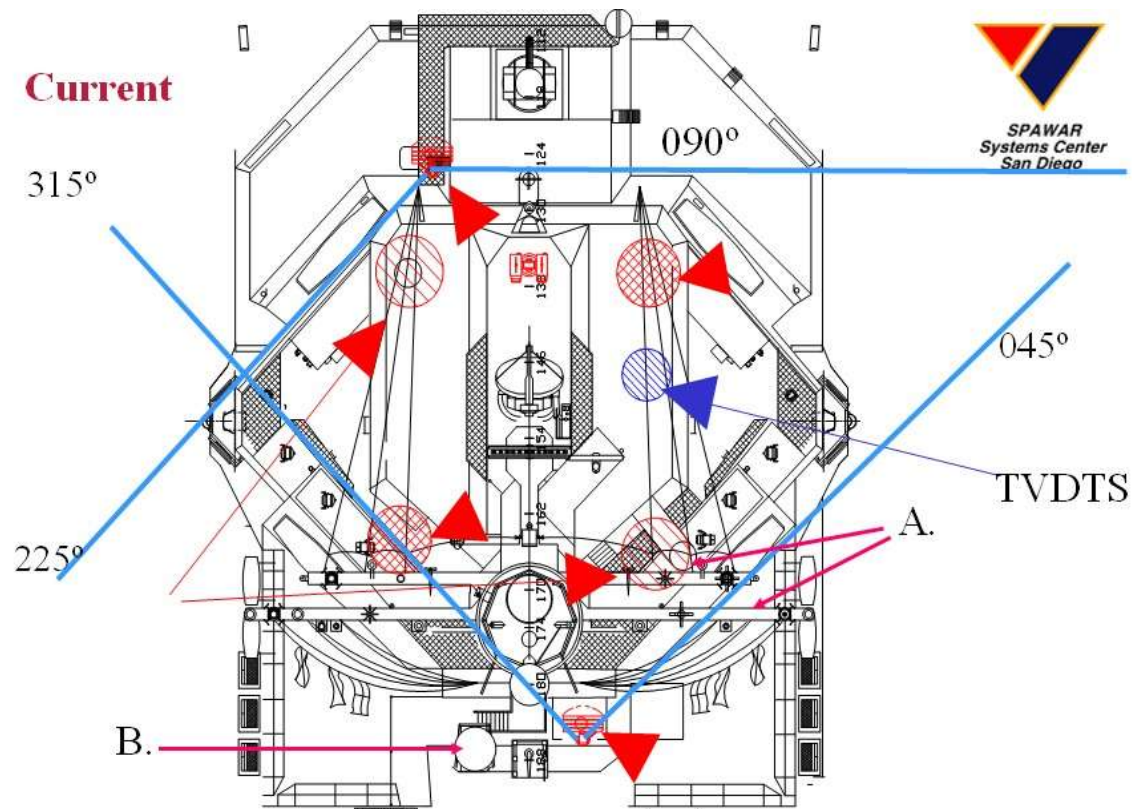
Backup Slides

- ▼ Pop Up notices added to DMR HMI s/w
 - Warn User of potential neg-impact on SATCOM as he sets a UHF LOS freq in the SATCOM band



What's the Solution (contd.)?

▼ Shipboard Antenna RF Block Zone Optimization



Who Wins?

