



**31st Annual  
USN-USMC Spectrum Management Conference  
1- 5 March 2010  
San Diego, CA**

---



# **Spectrum Certification**

**DISTRIBUTION A: Approved for public release**

**Mrs. Thu Luu  
NMSC Engineering Team Manager  
Alexandria, VA**

# Report Documentation Page

Form Approved  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>MAR 2010</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2010 to 00-00-2010</b>	
4. TITLE AND SUBTITLE <b>Spectrum Certification</b>				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) <b>Navy Cyber Forces, Navy and Marine Corps Spectrum Center, Norfolk, VA, 23511</b>				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 <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# Agenda



- **Spectrum Certification Myth**
- **Spectrum Certification Process**
- **Spectrum Certification Requests**
- **Spectrum Certification Data**
- **Spectrum Certification Issues**
- **Host Nation Coordination Requests**
- **Japan Spectrum Re-Allocation Update**
- **Spectrum Management Tools Update**
- **Spectrum Certification System (SCS) Database Update**



# Spectrum Certification Myth

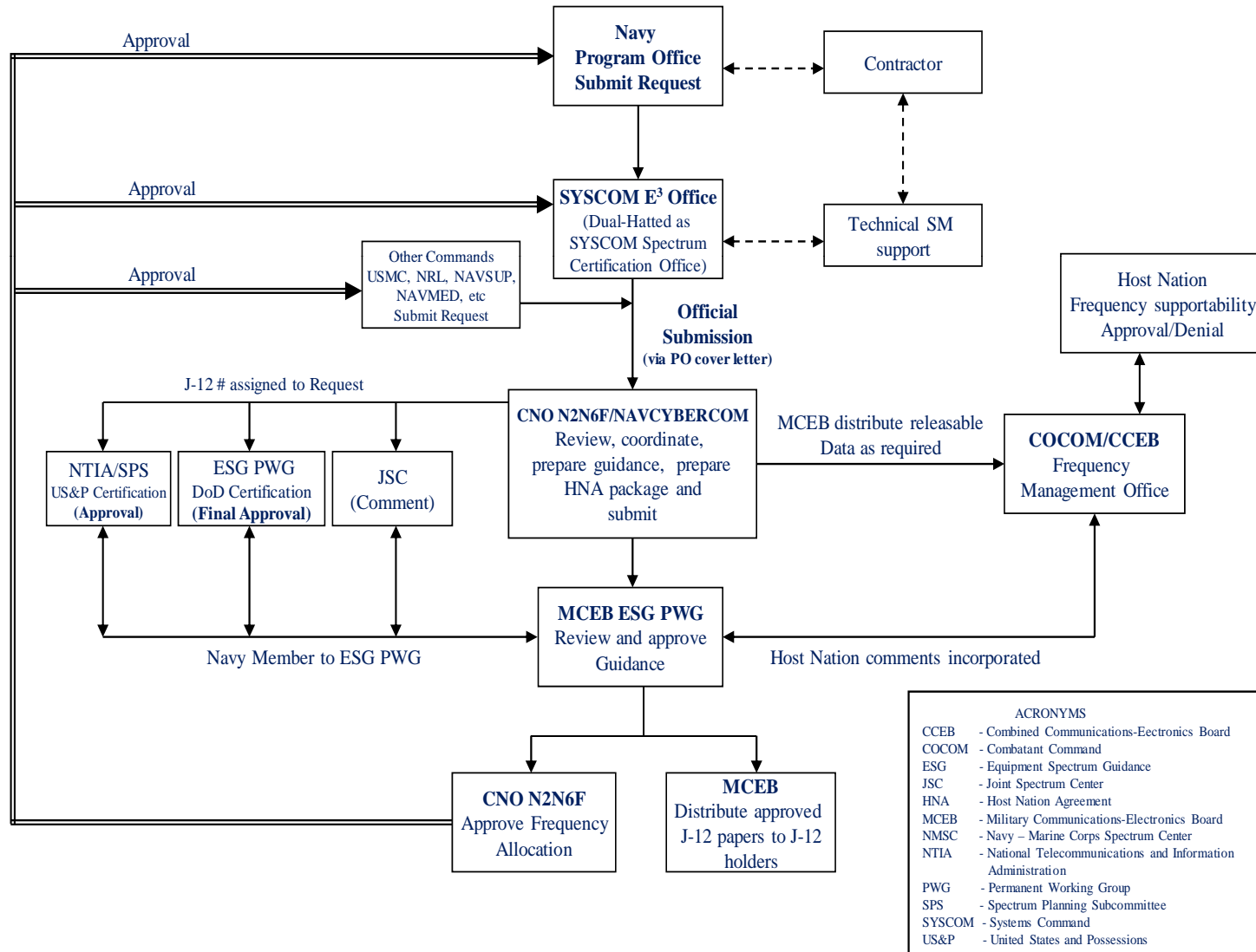


- One Application for Equipment Frequency Allocation is required for all RF components on a platform, especially for an Unmanned Aerial System (UAS)
- Note-To-Holders (NTH) is easier to go through the spectrum certification process than a new system
- Program Manager don't have to submit and update the Application for Equipment Frequency Allocation
- Approved frequency bands, emission designators and operating locations for a system are on DoD or NTIA page of the J-12
- Testing at Atlantic Undersea Test and Evaluation Center (AUTECE), or deploy a system to OUS&P is just a NTH adding operating location



# Navy Spectrum Certification Process

## OPNAVINST 2400.20F, 19 July 2007



ACRONYMS	
CCEB	- Combined Communications-Electronics Board
COCOM	- Combatant Command
ESG	- Equipment Spectrum Guidance
JSC	- Joint Spectrum Center
HNA	- Host Nation Agreement
MCEB	- Military Communications-Electronics Board
NMSC	- Navy - Marine Corps Spectrum Center
NTIA	- National Telecommunications and Information Administration
PWG	- Permanent Working Group
SPS	- Spectrum Planning Subcommittee
SYSCOM	- Systems Command
US&P	- United States and Possessions



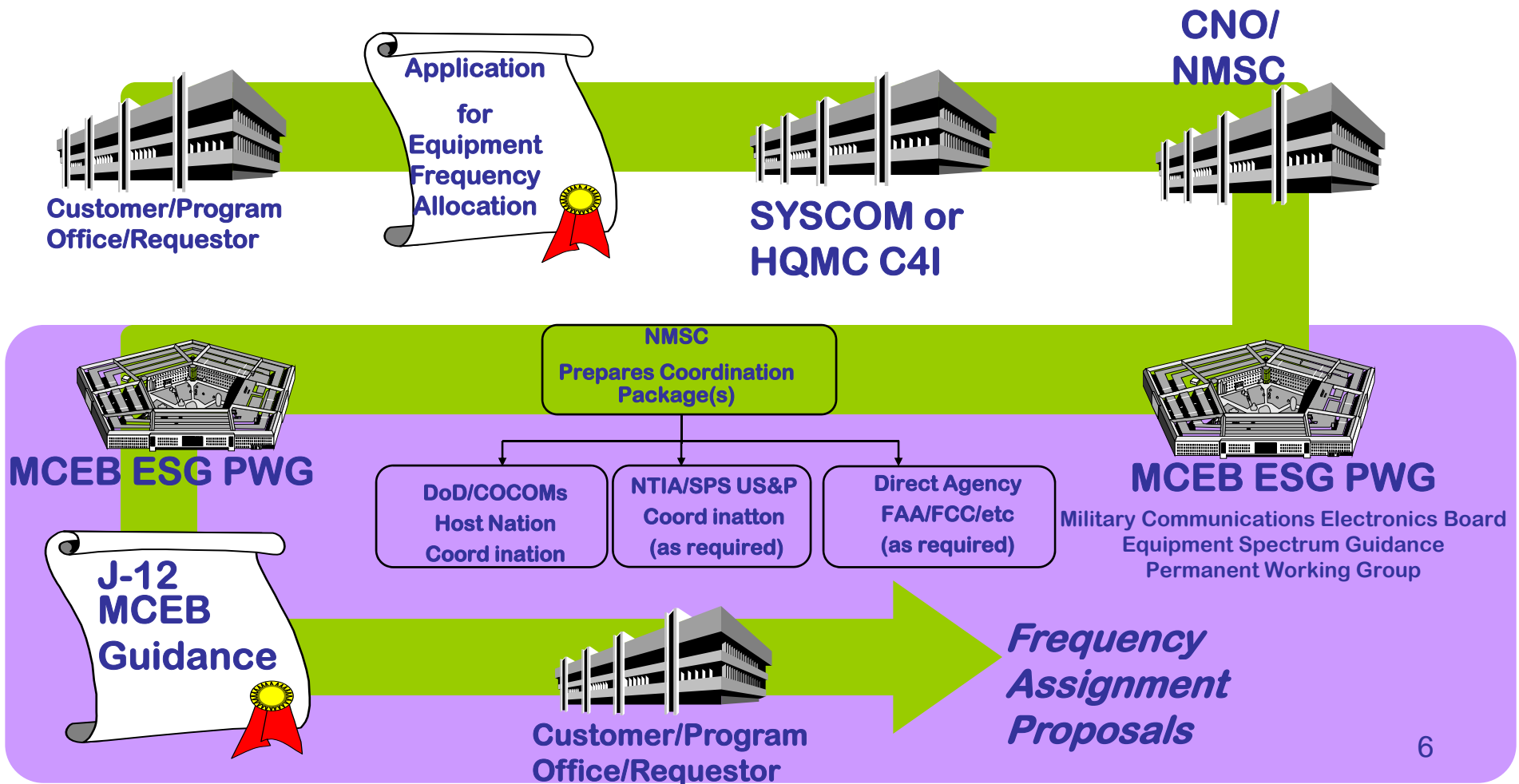
# Application for Equipment Frequency Allocation Submission Lead Time Guidelines



Acquisition Stage	Lead Times	
	Space Systems	Other Systems
<b>Planning or Conceptual (Stage 1)</b> <b>(Radiation not permitted)</b>	Not earlier than seven years before satellite launch	As part of any Capability based AoA and/or pre-MS A activity
<b>Experimental (Stage 2)</b>	No later than four years before satellite launch	Not less than one year before procuring pre-systems acquisition equipment, or MS B
<b>Developmental (Stage 3)</b>	No later than three years before satellite launch	Not less than one year before LRIP, or award of a developmental contract, or MS C
<b>Operational (Stage 4)</b>	No later than two years before satellite launch	At least six months before IOC for all equipment if there are only minor changes from previous stage submissions; one year prior for all other equipment with significant changes, or was not filed previously



# Spectrum Certification Process







# Interim Guidance for Spectrum Certification & Frequency Proposal Submission



- NTIA enforces NTIA Manual Section 10.5.3, frequency assignments are not granted until system is certified by SPS
- While NMSC is negotiating with NTIA until further notice, frequency proposals could only be submitted to NTIA
  - When spectrum certification request has been submitted to NTIA SPS for
    - ♦ A new system
    - ♦ A revised request to a SPS certified system
  - With a referenced SPS submission document number
- Special Temporary Authorization (STA) is only for a 30-day test and any longer duration test is considered as a long term frequency proposal which requires 5 and 9 working days, respectively, for voting by all Federal agencies





# MCEB Equipment Frequency Allocation Guidance Page



- **Section 2 - Approved Operating Characteristics**
  - Frequency bands, Emission designator, Power, Service Type, Operating Location (foreign nations are not added until spectrum supportability (SS) comments are received prior JAN 09; effective FEB 09, SS comments are documented in HNSWDO)
- **Section 3 – MCEB Guidance**
  - Non-compliance w/ NTIA Standards (Chapter 5 of NTIA Manual) need to be addressed for subsequent system review (i.e. next stage, or revised request to add operating location/TX/RX/antenna)
  - Frequency assignments should be IAW National Telecommunications Information Administration (NTIA) or MCEB Channel Plan; might be difficult to obtain frequency assignments
  - NTIA Spectrum Planning Subcommittee (SPS) recommendations
- **Referenced NTIA Spectrum Cert, IRAC/SPS Document Number**
  - Not listed if it was not coordinated with NTIA SPS



# What System Requires Spectrum Certification?



- Communications equipment
- Radars
- Transmitters
- Receivers
- Electronic Warfare Systems, e. g., Counter IED jammers
- Simulators
- Equipment using civilian bands
- Off-the-shelf systems
- Equipment bought from foreign nations
- New systems in a band already used for similar systems
- Classified systems
- Modified versions of previously approved equipment
- Systems already used by the Army or Air Force
- Systems not planned for operational use
- Systems to be used at sea only
- Existing systems without spectrum certification
- Leased equipment
- Low Power (NTIA Manual Annex K/ FCC Part 15 equipment)



# Spectrum Certification Requests



- **Radio Frequency (RF) equipment**
  - Stage 1 - Conceptual
  - Stage 2 - Experimental : Calculated data
  - Stage 3 - Developmental: MEASURED data
  - Stage 4 - Operational: MEASURED data
- **Note To Holders: Modification to an existing certified system**
  - Adding operating locations, transmitter(s), receiver(s), antenna(s)
  - Need to address any previous National Telecommunications Information Administration (NTIA) Spectrum Planning Subcommittee (SPS) certification issues
- **Spectrum certification requests (new systems, new transmitter/receiver/antenna) shall be submitted in Equipment Location-Certification Information Database (EL-CID) format**



# EL-CID



- NTIA mandated use of EL-CID V5.1 Rev. 81 as of 1 Nov 2009
- EL-CID Software is available from
  - NTIA website, <http://www.ntia.doc.gov/osmhome/elcid/>
  - NMCI “Push-down” POC
    - ◆ Mr. Deems Wiggs, NNWC, [deems.wiggs@navy.mil](mailto:deems.wiggs@navy.mil), 757-417-7924
    - ◆ Mr. Paulo Perini, [pperini@deltaresources.com](mailto:pperini@deltaresources.com), 540-287-5465
- Before submitting to SYSCOM/HQMC C4I, Program Office is responsible for
  - System specifications accuracy obtained from manufacturer
  - Running Compliance Checks
  - Resolving Technical Compliance Check failures
    - ◆ Refer to specific standard in NTIA Manual
    - ◆ Identify related data fields which caused compliance check failures
    - ◆ Ensure accuracy of related data fields (i.e. measured units)
    - ◆ Verify data with manufacturer again



# Operating Frequency Bands



- Table of Frequency Allocation
  - NTIA Manual, Chapter 4, Section 4.1  
<http://www.ntia.doc.gov/osmhome/redbook/redbook.html>
    - ◆ National
      - Federal vs. Non-Federal
      - Gov't , Non-Gov't and US Footnotes
        - US58 footnote
    - ◆ International
      - Military vs. Commercial
      - Footnotes
  - Provide Technical Out-Of-Band Justification if not in compliance with Table of Frequency Allocation



# Frequency Channel Plans



- **NTIA Frequency Plans**
  - **NTIA Manual, Chapter 4, Section 4.3**
- **Military Communications Electronics Board (MCEB)**
  - **UHF (225-399.9 MHz), MCEB-M-001-04, dated 1 April 2004**
    - 12.5 /25 KHz channels
    - Wideband emission up to 1.2 MHz bandwidth
      - Only available in 230-395 MHz band with some sub-bands are reserved for primary use to support Data Link 4A requirements
      - Very difficult to obtain frequency assignments
      - MCEB Equipment Spectrum Guidance Permanent Working Group (ESG PWG) might require Program Office provide electromagnetic compatibility (EMC) analysis due to UHF band congestion





# Additional Data Requirements for Specific Systems



- Commercial SATCOM Lease: USN/USMC owned Earth Terminals need Application for Equipment Frequency Allocation
- **Identification Friend or Foe (IFF)/Traffic Collision Avoidance System (TCAS): Program Office is responsible to obtain DoD AIMS Certification in a timely manner with the program milestone**
  - **Box Level: Stage 3**
  - **Platform: Stage 4**
- JTIDS/MIDS: DoD 4650.1-R1 Link 16 EMC Features Certification Process & Requirements
- Satellite: Attachment 2, Power Flux Density Analysis, ITU Registration
- Trunking System: Signal Coverage Plot





# Processing Delay



- **NMSC technical queries**
  - Piece-meal response
  - If NMSC does not receive response in 90 days, request will be rejected
- **Data consistency**
- **Project Manager/Engineer (only gov't POC)**
  - Sometimes can't answer questions directly
  - Need to provide manufacturer technical POC on cover letter
- **Manufacturer**
  - Program Office should use "Purchase Power"
  - Is not obligated to provide data to NMSC
  - Application for Equipment Frequency Allocation is not a requirement in procurement contract
  - Unable to support due to funding issue after system has been operational for a while
  - Foreign manufacturer



# Inadequate Data for System Review



- **Common missing data**
  - **Transmitter Occupy Bandwidth and Harmonic Level**
  - **Receiver IF Selectivity and IF Frequency**
  - **Line Diagram describing a point-to-point concept of operation**
  - **System Purpose, Operational and System Concepts**
  - **System Estimated Initial Cost - important for spectrum migration/auction**
  - **Target Date for Application Approval, System Activation, System Termination**
  - **System Relationship and Essentiality**
  - **Type of Service and Station Class**
    - ◆ **Source: Chapter 6 of NTIA Manual**



# Data Classification



- **Ambiguous Classification Markings**
  - Inconsistent classification markings on Transmitter, Receiver, and Antenna data items
  - Items are not properly marked or not marked at all
- **Downgrading Instructions need to be filled completely:**
  - Classified By:
  - Declassify On:
  - Derived From:
  - Reason:
- **Security Classification Guide (SCG) update**
  - Presidential Executive Order signed in 2003
    - ♦ Every 5 years or as necessary
- **Need to update Downgrading Instructions for numerous old J-12s**
  - Affect frequency assignment renewal



# Identification Friend or Foe (IFF) and Radars



- **NTIA Manual Chapter 8, Section 8.3.16, Procedures for Field Level Coordination**
  - **1030 MHz: Interrogators**
    - ♦ Shipboard Interrogators--Operational agreements with applicable FAA Regional Coordinator are required when operations are within 100 nm (185 km) of U.S. Coast or its possessions or as modified by local agreement
  - **1090 MHz: Ground Transponders**
  - **1215-1400 MHz, 2700-2900 MHz, 9000-9200 MHz: Radars**
    - ♦ NMSC need to pre-coordinate w/ FAA prior to SPS submission
    - ♦ Shipboard Radars--Operational agreements with applicable FAA Regional Coordinator are required when operations are within 100 nm of U.S. Coast or its possessions or as modified by local agreement



# IFF



- Early coordination with NMSC on system design
  - Interrogation Scheme
  - Antenna Side Lobe Suppression
  - Transmit Power
  - Platform Integration and Interrogation Controls
  - Pulse Repetition Rate (PRR)
    - ◆ Issue with PRR is controlled by antenna rotation speed
- Within 100 nm of US&P Coast
  - Mode 4
    - ◆ No 360 degrees
    - ◆ Requires sectoring toward FAA to be determined “hot zones”



# Unmanned Aerial System (UAS)



- Application for Equipment Frequency Allocation is required for each RF component, i.e. command and control (C2) link, video link
- Spectrum is not supportable if
  - Operating frequency bands are not allocated for Federal use
  - Wide emission bandwidth in UHF band
- Scan Eagle only has C2 link approved, no video link was approved
- New development , Digital Data Link for Small UAS
  - Transmitter/Antenna modules
    - ◆ US&P (1750-1850 MHz), Iraq (1625-1725 MHz)
  - Change channel center frequency in 1 MHz increments
  - Change bandwidth of each channel from 2 MHz to 5 MHz
  - Change radiated power level to a value below max of 1W



# Common Data Link (CDL)



- X-band Operation
  - MCEB Guidance page: Recommendation to protect Navy system
- CDL Executive Agent approved new series of CDL waveforms
  - Advanced CDL (A-CDL)
  - Bandwidth Efficient CDL (BE-CDL)
  - Discovery CDL (D-CDL)
  - Network CDL (N-CDL)





# GPS Re-radiators



- **NTIA Manual Chapter 8**
  - Section 8.3.28 - Fixed devices: EIRP not greater than -140 dBm/24 MHz at 100 ft (30 m) based on free-space propagation
  - Section 8.3.29 - Mobile devices: EIRP not greater than -144 dBm/24 MHz at 10 meters as received by an isotropic antenna
  - Section 8.3.29 – Airborne devices are not authorized
- **V22 Airborne GPS Re-radiator**
  - **US & P: Diligent coordination with**
    - ◆ NTIA and HQ FAA: Low Power Testing at Patuxent River, MD
    - ◆ Radio Navigation Satellite Service (RNSS) Experts Group (REG): AF, FAA, NASA and Navy
      - Requirements to support future training
      - Test Plan
      - Working on change to NTIA Manual Section 8.3.29
  - **OUS& P: CENTCOM supported**



# Commercial Off-The-Shelf (COTS)



- FCC Part 15 devices: non-licensed
  - Application for Equipment Frequency Allocation
    - ◆ US&P:
      - NTIA: Spectrum Certification is not required
      - Military Communications Electronics Board (MCEB) Equipment Spectrum Guidance Permanent Working Group (ESG PWG): Noted for Information & File
    - ◆ OUS&P: required for host nation coordination requests
- FCC Type Acceptance Verification
  - ◆ <http://www.fcc.gov/oet/fccid/>
- FCC Part 90 devices: licensed
  - Application for Equipment Frequency Allocation is required for spectrum certification with NTIA and MCEB ESG PWG



# ECM, Jammer, RCIED, CREW



- **Electronic Countermeasure, Jammer, Counter-Radio Controlled Improvised Explosive Device (RCIED), CREW**
  - **Application for Equipment Frequency Allocation**
    - ◆ Noted for Information & File
    - ◆ Only submitted to Military Communications Electronics Board (MCEB) Equipment Spectrum Guidance Permanent Working Group (ESG PWG)
  - **CJCSM 3212.2B– Submit GPS EA and other EA frequency request 65 and 60 days, respectively, prior to testing**
    - ◆ Coordination with FAA and FCC at national and/or local level is depending upon operating frequency bands, Appendix D



# Host Nation Coordination Requests (HNCRs)



- Deploy a system outside of US&P
  - NMSC Engineering Team coordinate with Combatant Commanders (COCOMs) to gain spectrum supportability (SS) from hosting countries via Host Nation Spectrum Worldwide Database Online (HNSWDO)
  - Status and SS comments are available in HNSWDO
  - NMCSO (Bahrain, Far East, Naples) submit frequency proposals to COCOMs or hosting country
- Application for Equipment Frequency Allocation with Foreign Coordination Information page in SCS format (DD1494)
- Foreign Disclosure Letter
  - Release all of data or only specified data fields in DD1494
  - Specify every intended hosting country
  - Intended deployment in any one of 6 Gulf Cooperative Countries (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates
    - Data should be releasable to all 6 GCC countries
  - Japan & Korea: specify base/training facilities



# Host Nation Worldwide Database Online (HNSWDO)



- **Unclassified and Classified Online web-based tool for host nation coordination as GEMSIS Increment 1**
  - **AFRICOM, CENTCOM, EUCOM, PACOM, SOUTHCOM**
    - ◆ ACP-190, SUP-1 list countries for each COCOM
  - **MCEB Number (J-12), Nomenclature, Emission designator, Emission Bandwidth, Power, Service Type, Station Class, etc.**
  - **COCOM Host Nation Coordination package as attachment in Adobe Acrobat**
    - ◆ Military Communications Electronics Board (MCEB) Cover letter
    - ◆ Foreign Disclosure Letter
    - ◆ Application for Equipment Frequency Allocation in SCS format
- **HNSWDO Program Change Requests are prioritized by GEMSIS Configuration Control Board (CCB)**



# HNSWDO

## Contact Information



- **Access Request:**
  - <http://www.disa.mil/jsc/hnswdo.html>
    - SAAR DD Form 2875, APR 2005
    - Fax to HNSWDO Help Desk, (410) 293-9913
  - Register for an unclassified user account at <https://HNSWDO.jsc.mil>
- **HNSWDO Help Desk**  
(410) 293-9760, DSN 281-9760  
NIPRNET: [HNSWDO@disa.mil](mailto:HNSWDO@disa.mil)  
SIPRNET: [HNSWDO@jsc.js.smil.mil](mailto:HNSWDO@jsc.js.smil.mil)





# Japan Spectrum Re-Allocation Update



- In FY05, Gov't of Japan (GOJ) requested US DoD vacate 4.4 - 5.0 GHz band in preparation for Mobile and Fixed Wireless Access Service as part of Int'l Mobile Telecommunication (IMT) Advanced System, beyond 3<sup>rd</sup> Generation IMT-2000
- USPACOM J613 and USFJ notified Joint Staff and MILDEP(s) to vacate 4.4 -5.0 GHz band through official message and various conferences
- FY07/09, USPACOM J613 requested extensions to remain in this band and GOJ approved one final extension to Nov 2012
- GOJ recommended US DoD relocate to 7 GHz
  - Army identified replacement equipment for fixed microwave system
  - III MEF has no replacement for AN/TRC-170, or a near/long term plan to procure a new system





# Spectrum Management Tools Update



- EL-CID Program Change Request
  - Fill out a PCR form from NTIA website and submit to Navy SPS WG-5 representative, [thu.a.luu@navy.mil](mailto:thu.a.luu@navy.mil)
- EL-CID Version 6.0
  - Release in Nov 2009 for Federal agencies completing network certification & accreditation
- EL-CID Version 7.0
  - Release in Sept 2010
  - Continue to discuss w/ NTIA to allow DoD
    - ♦ Insert MCEB Guidance page to NTIA locked-down records after NTIA SPS certified the system application and release approved EL-CID records
    - ♦ Maintain MCEB locked-down records (w/ MCEB Guidance page) after ESG PWG approved records similar to Spectrum Certification System (SCS) Database



# Spectrum Management Tools Update (cont'd)



- **Army Spectrum Management Office tools**
  - **Stepstone**
    - ◆ Collect equipment technical data in XML
    - ◆ Print DD1494 for host nation coordination requests
    - ◆ MCEB Pub 8 Compliant
    - ◆ Can not convert data into EL-CID format
    - ◆ Provide demo to NTIA for collaboration w/ NTIA development of Federal Spectrum Management System (FSMS)
  - **Spectrum Management Office Business Process Module Online via AKO/DKO**
    - ◆ Army started in Nov 2009
    - ◆ Air Force and Navy are in development
    - ◆ Tracking submission and status for spectrum certification requests and host nation coordination requests in real time



# SCS Database Update



- SCS Database
  - Was not successfully mapped into EL-CID format by the Joint Spectrum Center (JSC)
  - JSC will not distribute CD via mail effective March 2010
  - Posted on DKO-S website, SIPRNET link
    - ♦ <http://www.us.army.smil.mil/suite/folder/1416407>
  - Requires DKO-S User Account
    - ♦ Register at <http://www.us.army.smil.mil>
  - Send your DKO-S account name via a NIPRNET email to [JSC\\_Spectrum\\_Certification\\_Team@jsc.mil](mailto:JSC_Spectrum_Certification_Team@jsc.mil) to gain access to SCS database folder
  - JSC POC:
    - ♦ Mr. Jose Blanco, [Jose.Blanco@disa.mil](mailto:Jose.Blanco@disa.mil), 410-293-9260
    - ♦ Mr. Carey Beall, [Carey.Beall@disa.mil](mailto:Carey.Beall@disa.mil), 410-293-5252



# Spectrum Certification Statistics



<u>Requests</u>	<u>FY10</u>	<u>FY09</u>	<u>FY08</u>
Received	81	250	144
Completed	0	36	57
Working	72	161	52
Returned	8	39	29
Tracking	1	14	6

Both NMSC and NTIA have a big back log  
of spectrum certification requests



# NMSC Engineering Team POINT OF CONTACTS



NMSC NIPR E-Mail: [Navyspectrum.fct@navy.mil](mailto:Navyspectrum.fct@navy.mil)

NMSC SIPR E-Mail: [Navy.Spectrum@navy.smil.mil](mailto:Navy.Spectrum@navy.smil.mil)

Manager: Thu Luu, 703-325-2838, [thu.a.luu@navy.mil](mailto:thu.a.luu@navy.mil)

Gov't Staff:

Adam Burak, 703-325-2833, [adam.burak@navy.mil](mailto:adam.burak@navy.mil)

Mike Kelley, 703-325-2817, [mike.j.kelley@navy.mil](mailto:mike.j.kelley@navy.mil)

Mohammed Rahman, 703-325-2834, [mohammed.rahman@navy.mil](mailto:mohammed.rahman@navy.mil)

Contractor Staff:

Eric Batteiger, 703-325-2802, [eric.batteiger.ctr@navy.mil](mailto:eric.batteiger.ctr@navy.mil)

Warren Edmonds, 703-325-2785, [warren.edmonds.ctr@navy.mil](mailto:warren.edmonds.ctr@navy.mil)

Wilfredo Lopez-Morales, 703-325-2815, [wilfredo.lopezmorale.ctr@navy.mil](mailto:wilfredo.lopezmorale.ctr@navy.mil)

Mark Miller, 703-325-2862, [mark.miller.ctr@navy.mil](mailto:mark.miller.ctr@navy.mil)

Wilbert Wells, 703-325-2831, [wilbert.wells.ctr@navy.mil](mailto:wilbert.wells.ctr@navy.mil)



**31st Annual  
USN-USMC Spectrum Management Conference  
1- 5 March 2010  
San Diego, CA**

---



**QUESTIONS ?**

**Mrs. Thu Luu  
NMSC Engineering Team Manager  
(703) 325 -2838  
[thu.a.luu@navy.mil](mailto:thu.a.luu@navy.mil)**