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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient)

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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient) - Freq-Geo Transition Timeline

Serial Number	System Name	Center Lower Frequency (MHz)	Upper Frequency (MHz)	Emission Bandwidth (MHz)	Receiver Bandwidth (MHz)	System Use Type Name	Operation Area	Transmitter State	Transmitter Latitude	Transmitter Longitude

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Serial Number	Receiver State	Receiver Latitude	Receiver Longitude	Frequency Remarks	Geographic Location associated with Timeline (AAO in this column indicates the timeline is associated with the geographic location defined by the Authorized Area of Operation in the frequency)	Sharing Type (Indefinite, Temporary i.e. Coordinated, or None)	Temporary Sharing Timeline (Months After 1/14/2022)	Indefinite Sharing Timeline (Months After 1/14/2022)

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Serial Number	Vacate Assignment Timeline (Months After 1/14/2022)

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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient) - Funds

System Name	Total Pre-Auction Cost (\$M)	Funds Requested Prior to Auction (\$M)	Transition Implementation Cost (\$M)	Total Cost (\$M)	Begin Expenditure Timeline (Months after Receipt of Funds)	End Expenditure Timeline (Months after Receipt of Funds)	Expanded Capability Cost (\$M)
DoD Commercial Industry Deployment Coordination (DOD-3450-1)	4.1300	4.1300	13.5800	17.7100	1	126	
EW Spectrum Sharing Range and Engineering Study (DOD-3450-7)	3.0000	3.0000	0.0000	3.0000	1	72	
Multiband EW Simulator (DOD-3450-6)	1.5000	1.5000	111.7500	113.2500	1	72	
Propagation Model Study (DOD-3450-2)	1.7300	1.7300	19.0900	20.8200	1	66	
Secure Laboratory (DOD-3450-4)	2.9500	2.9500	43.3500	46.3000	1	78	
Spectrum Management Modernization (DOD-3450-5)	0.5000	0.5000	61.0000	61.5000	1	66	
Threat Representations Operations and Development (DOD-3450-3)	3.5000	3.5000	36.1000	39.6000	1	78	
<b>Total</b>	17.3100	17.3100	284.8700	302.1800			0.0000

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System Name	Expanded Capability Description	Expanded Capability Justification
DoD Commercial Industry Deployment Coordination (DOD-3450-1)		
EW Spectrum Sharing Range and Engineering Study (DOD-3450-7)		
Multiband EW Simulator (DOD-3450-6)		
Propagation Model Study (DOD-3450-2)		
Secure Laboratory (DOD-3450-4)		
Spectrum Management Modernization (DOD-3450-5)		
Threat Representations Operations and Development (DOD-3450-3)		
<b>Total</b>		

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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient) - Interactions

Interaction Name	Interaction Description
Development of Coordination Guidelines For Federal Agencies and Industry	Given the fact that most federal operations will still be in the band upon the award of licenses by the FCC and some federal operations will continue indefinitely in the band, specific coordination guidelines must be developed and published by NTIA (for federal agencies) and the FCC (for non-federal licensees).

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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient) - Impact Factors

Factor Name	Factor Description
Incumbent Support	Incumbents will support interference testing to determine feasibility of co-existence and necessary equipment alterations, and they will support as necessary to address interference issues.

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Note Name	Note Text
3450-3550 MHz CPA and PUA	<p>Cooperative Planning Areas (CPA): Geographic locations in which non-federal operations shall coordinate with federal systems in the band to deploy non-federal operations, in a manner that shall not cause harmful interference to federal systems operating in the band and to protect non-federal operations from potential harm caused by high powered federal operations.</p> <p>Periodic Use Areas (PUA): Geographic locations where non-federal operations in the band may not cause harmful interference to federal systems operating in the band for episodic periods. During such episodic time periods, non-federal users in PUAs must alter their operations to enable federal systems' temporary use of the band, and during such times, non-federal users may not claim interference protection from federal systems outside of coordination procedures.</p>
5G Assumptions	<p>DoD was required to plan protection to and from 5G. An agreed standard was not available. Special subgroup that included the White House Office of Science and Technology (OSTP), DoD, the Federal Communications Commission (FCC), National Telecommunications and Information Administration (NTIA), and National Science Foundation (NSF) provided 5G assumptions for development of the initial plan. It was concluded that DoD would continue to work towards the topline goals in the Transition Plan by refining the assumptions with industry.</p> <p>(1) 5G Base Station Transmitter Power Output as Effective Isotropic Radiated Power (EIRP): (a) Urban: 1640 watts per megahertz (W/MHz); (b) Non-Urban: 3280 W/MHz</p> <p>(2) 5G Base Station Receiver Characteristics: Interference Power Input Density -35 dBm per meter squared (dBm/m<sup>2</sup>) or 0.01 Volts per meter (V/m)</p> <p>(3) Maximum Power Input: +35 dBm/m<sup>2</sup></p> <p>(4) 1 dB Compression (P1dB): -25 dBm for continuous wave signals referenced at antenna port</p> <p>(5) 20 MHz channels</p> <p>(6) Tower Height of 100 meters: Adjusted due to FCC requirement for an interference reporting declaration boundary</p>

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Note Name	Note Text
<p>AMBIT Risks and Mitigation to DoD</p>	<p>In achieving the AMBIT Top Line goals, the DoD is accepting some risks and making assumptions that require further definition. The full operating electromagnetic environment is unknown and the definition of it is based on assumptions of 5G characteristics. The network laydowns are not yet available; as such, industry can be engaged to define a network laydown and engineering analysis to define CPAs and PUAs. The impact of ducting, particularly evaporation ducts for the Navy ships, are a known issue. An extensive detailed engineering analysis of the 5G environment and associated ducting can help address this issue. Out-of-band emissions are also a significant risk, in addition to unknown noise levels. Another definable problem includes a need for increased coordination between federal and non-federal entities for AMBIT to be successful. Spectrum compression due to increased number of systems in the lower band needs to be defined. In addition, DoD is incurring cost impacts as a result of increased testing, training, operational and acquisition timelines. This has a direct impact on critical electromagnetic warfare (EW) testing, training and exercise. Conducting analysis, research, and development and equipment modification or replacement to maintain comparable capability can help alleviate some of the unknowns. Potential solutions include but are not limited to:</p> <ul style="list-style-type: none"> <li>a. Backlobe/sidelobe suppression</li> <li>b. Sparse signal processing</li> <li>c. Receiver noise reduction</li> </ul> <p>As the network deploys, verification and validation of the electromagnetic environment can help provide a better picture of the new environment. Development of tools to reduce spectrum dependence from open-air testing and training as well as those to improve the efficiency of spectrum utilization can be utilized to mitigate some of the aforementioned issues. This in turn would assist in maintaining comparable capability and readiness in a shared spectrum environment. With adequate management, oversight and guidance of the transition, the overall transition plans will stand to see more viable success.</p>
<p>Checkpoints</p>	<p>It is recognized that a number of the identified solutions require further analysis and study. The final solutions will be compliant with allowable relocation or sharing costs and comparable capability of systems 47 USC 923(g)(3). Upon completion of each analysis and study effort, DOD will provide OMB with the results, and describe compliance with 47 USC 923(g)(3) so OMB can address its statutory oversight requirements. If requested, DOD will provide OMB status updates on analysis and study efforts via the SRF Resources Oversight Group (ROG). If required by OMB, DoD CIO will update its transition plan as specified in OMB's "Information for Eligible Federal Entities Related to Spectrum Transition Plan Updates (17-01)" to revise the cost estimate, funds expenditure timelines, or technical approach. No funds will be transferred until OMB has determined the appropriateness of the costs and the timeline for relocation or sharing in accordance with 47 USC 928(d)(2)(B).</p>

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Note Name	Note Text
CPA and PUA Sites	<p>List of approved CPA and PUA Sites: Yuma Proving Grounds AZ (CPA &amp; PUA); Camp Pendleton CA (CPA - only); Naval Air Weapons Station, China Lake CA (CPA &amp; PUA); Point Mugu CA (CPA &amp; PUA), San Diego* CA (CPA only) - Includes Point Loma SESEF range *; Twentynine Palms CA (CPA only); Mayport* FL (CPA only) - Includes Mayport SESEF range*; Pensacola FL (CPA &amp; PUA); Chesapeake Beach MD (CPA &amp; PUA); Naval Air Station, Patuxent River MD (CPA &amp; PUA); St. Inigoes MD (CPA &amp; PUA); Bath ME (CPA &amp; PUA); Pascagoula MS (CPA &amp; PUA); Camp Lejeune NC (CPA - only); Cherry Point NC (CPA - only); Portsmouth NH (CPA &amp; PUA); Moorestown NJ (CPA &amp; PUA); White Sands Missile Range NM (CPA &amp; PUA); Dahlgren VA (CPA &amp; PUA); Newport News VA (CPA &amp; PUA); Norfolk* VA (CPA - only) Includes Fort Story SESEF range*; Wallops Island VA (CPA &amp; PUA); Bremerton WA (CPA &amp; PUA); and Everett* WA (CPA - only) Includes Ediz Hook SESEF range*; Edwards Air Force Base CA (CPA &amp; PUA); National Training Center CA (CPA &amp; PUA); Eglin Air Force Base FL (CPA &amp; PUA) Includes Cape Sand Blas site; Joint Readiness Training Center LA (CPA &amp; PUA); Fort Bragg NC (CPA &amp; PUA); Nevada Test and Training Range NV (CPA &amp; PUA); Fort Sill OK (CPA &amp; PUA); and Tobyhanna Army Depot PA (CPA/PUA)</p>
DOD-3450-1	<p>DOD-3450-1: DoD Commercial Industry Deployment Coordination                      Objective(s): Provide management, oversight, and guidance for the MILDEPs and DSO Transition Plans in accordance with the overall DoD sharing strategy for 3450 – 3550 MHz, to include risk management and external reporting. Represent DoD at joint working groups with FCC, NTIA, and/or industry                      System or Sites: All systems and sites operating in 3450 – 3550 MHz                      Readiness/Capability Impact:                      Single point of contact for DoD 3.45 GHz transition activities                      Inability to administrate sharing plans and effectively comply with federal business processes while supporting 5G requirements and protecting critical national security capabilities                      Benefit: DoD leadership oversight and guidance for DoD 3450 – 3550 MHz transition activities</p>
DOD-3450-2	<p>DOD-3450-2: 3.5 GHz Propagation Model;                      Objective(s): Develop a propagation model for the 3.5 GHz band to better inform spectrum sharing and utilization of the 2.9 – 4.2 GHz band;                      System or Sites: All systems and sites operating in mid-band spectrum;                      Readiness/Capability Impact:                      Lack of agreed standard for S-band propagation                      Reduced efficiency of spectrum use;                      Benefit: Accurate propagation modeling improves protection of incumbent systems operating at mid-band frequencies while also facilitating spectrum sharing decision making</p>

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Note Name	Note Text
DOD-3450-3	<p>DOD-3450-3: Test Range Transmission Mitigations – Threat Representations Operations and Development (Test);</p> <p>Objective(s):</p> <p>Assess range electromagnetic environments impacting the Open Air Range (OAR) test capabilities.</p> <p>Adjust CONOPS and TTP changes for threat representations operations.</p> <p>Develop and deploy hardware and software agile spectrum access capabilities to reconfigure OAR systems that enable operation at other frequencies and retain comparable capabilities.</p> <p>Conduct OAR testing with real world effects (atmosphere, scattering, etc.) in order to provide confirmation of results;</p> <p>Sites: Pt Mugu, CA; China Lake, CA; NTTR Nellis AFB, NV; Eglin AFB, FL;</p> <p>System: Advanced Reprogrammable Radars, Range Signal Density Enhancement (RSDE), RSE, Unmanned Threat Emitter (UMTE), and Joint Threat Emitter (JTE);</p> <p>Readiness/Capability Impact: Blue and red system interactions critical for effectiveness testing and control of frequency emissions;</p> <p>Benefit: Preserves critical EW Red/Blue test interactions while implementing restrictions and required coordination of operations</p>
DOD-3450-4	<p>DOD-3450-4: Integrated, Secure Laboratory EW Red / Blue System Threat Representation Interactions (Test);</p> <p>Objective(s):</p> <p>Reduce dependency on electronic attack open air testing requirements by developing and implementing threat representation testing in laboratory environments.</p> <p>System will integrate environments for Red/Blue interactions on frequencies for multiple scenarios;</p> <p>System or Sites: EW Laboratories at Pt Mugu, CA; Patuxent River, MD; Edwards AFB, CA; Eglin AFB, FL;</p> <p>Readiness/Capability Impact:</p> <p>Increased system development timelines</p> <p>Increased operational test timelines;</p> <p>Benefit:</p> <p>Reduces spectrum demand in open air use which impacts broad areas of geography</p> <p>Enables DoD to maintain system development and acquisition timelines by reducing spectrum access bottle necks</p>

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Note Name	Note Text
DOD-3450-5	<p>DOD-3450-5: Spectrum Management Modernization (Test and Training);</p> <p>Objective(s):</p> <p>Develop an environmentally informed range spectrum management system that enable rapid reuse of frequencies to effect greater spectrum efficiency</p> <p>Optimize frequency assignments, reduce spectrum footprint, and ensure regulatory compliance</p> <p>Instrument twelve ranges for spectrum situational awareness, efficiency, governance, and command and control;</p> <p>System or Sites: Nevada Test &amp; Training Range, Camp Pendleton, Twenty-nine Palms, Joint Pacific Alaska Range Complex, Fallon Training Range Complex, Fort Huachuca, Utah Test &amp; Training Range, NAS PAX River, VA Capes / Oceana, Eglin Test &amp; Training Range, Yuma Training Range;</p> <p>Readiness/Capability Impact: Provides situational awareness, increases automation in spectrum access management and policy dissemination (governance);</p> <p>Benefits:</p> <p>Minimized and optimized open-air spectrum utilization</p> <p>More automated frequency assignment and management</p> <p>Enhance spectrum SA, reporting, and governance</p>

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DOD-3450-6	<p>DOD-3450-6: Multiband Constructive EW Simulator (Training);</p> <p>Objective(s):</p> <ul style="list-style-type: none"> <li>Develop tools to reduce spectrum dependence by improving use of live, virtual and constructive (LVC) training</li> <li>Enable EW in all training environments and incorporate electromagnetic spectrum (EMS) as a warfighting maneuver space</li> <li>Build simulation capability to enable synthetic EW training in multiple bands</li> <li>Inject constructive EW effects into LVC training scenarios</li> </ul> <p>System or Sites: All DoD EW training locations;</p> <p>Readiness/Capability Impact:</p> <ul style="list-style-type: none"> <li>Increased training timelines</li> <li>Reduced proficiency due to reduced target flexibility;</li> </ul> <p>Benefits:</p> <ul style="list-style-type: none"> <li>Reduced reliance on open-air EW training spectrum requirements</li> <li>Training on demand</li> <li>Reproducible proficiency</li> <li>Improves overall commercial spectrum environment</li> </ul>
DOD-3450-7	<p>DOD-3450-7: Electromagnetic Warfare Spectrum Sharing Range and Engineering Study;</p> <p>Objective(s):</p> <ul style="list-style-type: none"> <li>Conduct detailed engineering and range analysis of DoD EW capabilities impact due to compression and congestion in a shared 5G environment</li> <li>Provide recommendations on how to optimize EW training ranges (locations and regulatory) and incorporation of live, virtual and constructive training into existing architectures with a view to decrease spectrum footprints</li> </ul> <p>System or Sites: DoD wide EW capabilities;</p> <p>Readiness/Capability Impact: Reduction in testing of communications equipment, counter-UAS, counter-fire systems, and live EW systems (jammers, etc);</p> <p>Benefits:</p> <ul style="list-style-type: none"> <li>Mitigate reduction of available spectrum for EW training and testing sites</li> <li>Targeted range definition for future investment</li> <li>Maintain readiness and reduce spectrum footprint</li> </ul>

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EW Impacts	As a part of the transition efforts, DoD may need to revise the existing CJCSM 3212 coordination process ('Performing Electronic Attack in the United States and Canada for Test, Training and Exercises') to incorporate new coordination procedures with the commercial licensees to facilitate continued DoD EW and EA operations in the 3450-3550 MHz band. Any modifications will need to be codified in the NTIA Manual in paragraph 7.14, PERFORMANCE OF ELECTRONIC ATTACK TEST, TRAINING, AND EXERCISE OPERATIONS.
Modification of Assignments	Upon conclusion of the transition, frequency assignments which authorize use in geographical areas that fall outside of CPAs and PUAs listed in US Footnote 431B will be modified to reflect operations shall not cause harmful interference to non-Federal operations in areas outside of the identified CPAs and PUAs.
Project Background	As agreed during the AMBIT effort, DoD will implement sharing via modifications to standard operating procedures (SOPs), tactics, techniques, and procedures (TTPs) or other operational-related means. Modifications to or replacement of some DoD equipment are required to restore comparable capability.
Timing of Funding Both Pre- and Post-Auction	DoD's timelines are based on the assumption that DoD will receive one year of pre-auction funding in FY21, with initial payment no later than April 2021 and post auction funding in FY23Q1 based on December 2021 auction start. If the auction date is accelerated to August 2021, DoD assumes that post-auction funding will be received in FY22Q3. Additionally, DoD's costs and timelines assume that annual SRF disbursements will be received in Q1 of each FY. Should any receipt of funds be delayed, timelines and costs may need to be adjusted accordingly.
Transition Plan Includes Sensitive Information Not Releasable to the Public	Withholding the sensitive information has no impact on fulfillment of this transition plan as the protection areas already identified are inclusive.

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DOD\OCIO 3450-3550 (Rev. 1) (Sufficient) - Excluded Info

Table	Row	Column	CUI Category	Safeguarding and/or Dissemination Authority
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