

QUESTIONS AND ANSWERS REGARDING DOD'S 3.45 GHZ OPERATIONS

Questions Received During the 3.45 GHz Information Session

Q1: Asking again - will today's slides be made available?

A: Yes. The slides have been posted on the NTIA 3.45 GHz website at <https://www.ntia.doc.gov/page/07122021-dod-workshop-information>.

Q2: Will the recording be made available to attendees after the workshop?

A: DoD is aiming to provide the recording pending quality and approval. Due to technical difficulties a transcript will not be provided.

Q3: What is the process to get CUI from an industry association?

A: Companies should contact their appropriate Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Industry Partner industry association for information regarding their specific process.

Q4: Please confirm that the analysis was done with 100 foot 5G towers. The Navy transition plan referenced 100 meter towers, which are way too high and not realistic and would constrain 5G operations. Thank you

A: As stated in the June 2, 2021 [Joint Public Notice on Coordination Procedures in the 3.45-3.55 GHz Band](#) “the Cooperative Planning Areas and Periodic Use Areas are based on 100-meter commercial towers.” Furthermore, paragraph 29 of the 2nd R&O states “we reiterate that the Cooperative Planning and Periodic Use Areas are not exclusion zones, because licensees will be permitted to operate in these areas subject to the coordination requirements, and these zones were developed based on the Commission’s proposed power limits and assuming relatively high antenna heights. In practice, we expect that the areas in which flexible-use licensees may need to adjust their networks will be smaller than the areas encompassed by the Cooperative Planning and Periodic Use Area boundaries we are adopting. First, actual flexible-use operations are likely to use lower towers and lower power than the maximum tower heights and power levels permitted under our rules, which NTIA and the DoD used in their analyses to generate the Cooperative Planning Areas and Periodic Use Areas.”

Q5: Unlike AWS-3, which was a commercial mobile uplink band, the 3450 band involves both commercial uplink and downlink. It is unclear from the DoD Workbook whether the coordination areas are defined with reference to Commercial interference into DoD or DoD interference into Commercial. Can you please clarify.

A: As stated in the February 19, 2021 letter from NTIA to FCC, “The CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness requirements. ... Depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.” Footnote US431B denotes sites with high power radar operations with an asterisks. The boundary of these CPAs/PUAs are based upon anticipated harmful interference from DoD radars to 5G operations. For all other CPAs/PUAs (no asterisks), the boundaries are calculated based on anticipated harmful

interference to incumbent DoD operations from commercial operations. The February 19, 2021 letter from NTIA to FCC can be found at https://www.ntia.gov/files/ntia/publications/ntia_letter_to_fcc_re_3450-3550_mhz.pdf.

Q6: Can you expand on DoD efforts to minimize impacts to 3.45GHz?

A: As stated in paragraph 6 of the 2nd R&O “under the agreement that was reached as part of the AMBIT process, the DoD expected to enable commercial 5G systems to operate at full power throughout almost all the contiguous United States by: (1) adjusting its concept of operations within the band; (2) coordinating network planning with new commercial operators in certain areas near the DoD’s operations; (3) periodically coordinating with new commercial operators for use of the spectrum during certain discrete time periods in specific areas; (4) relocating certain airborne systems out of the band; and (5) developing and deploying a supplemental radar capacity that operates outside the band.”

Q7: Why a 100 meter tower height?

A: As noted in paragraph 29 of the 2nd R&O “these zones were developed based on the Commission’s proposed power limits and assuming relatively high antenna heights. In practice, we expect that the areas in which flexible-use licensees may need to adjust their networks will be smaller than the areas encompassed by the Cooperative Planning and Periodic Use Area boundaries we are adopting. First, actual flexible-use operations are likely to use lower towers and lower power than the maximum tower heights and power levels permitted under our rules, which NTIA and the DoD used in their analyses to generate the Cooperative Planning Areas and Periodic Use Areas.”

Q8: Can you verify the DTED used? You stated SRTM Level 2 which has known void issues. That was corrected with SRTMf Level 2

A: DoD analysis software uses Irregular Terrain Model (ITM) with SRTMv2.

Q9: Can DoD please update the workbook to indicate where (a) DoD systems might suffer interference from commercial users vs. (b) where commercial users would suffer interference. Scenario (a) seems like it would be appropriate for a coordination process. Scenario (b) seems more like a “caveat emptor” situation where auction bidders should know they are buying licenses that are at risk of interference but should not be required to coordinate with DoD to take that interference.

A: As stated in the February 19, 2021 [letter from NTIA to FCC](#), “The CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness requirements. ... Depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.” Footnote US431B denotes sites with high power radar operations with an asterisks. The boundary of these CPAs/PUAs are based upon anticipated harmful interference from DoD radars to 5G operations. For all other CPAs/PUAs (no asterisks), the boundaries are calculated based on anticipated harmful interference to incumbent DoD operations from commercial operations.

Q10: Are you going to address the ASCS?

A: The Automated Spectrum Coordination System (ASCS) is a Defense Information Systems Agency (DISA) Defense Spectrum Organization (DSO) transition support program to develop and operate the coordination portal. As noted in the Joint Public Notice on Coordination Procedures for the 3.45-3.55 GHz band “ASCS could be used to provide notification of the activation of Periodic Use Areas by DoD incumbents. All use of these capabilities is dependent upon the operator-to-operator agreements.”

Q11: In the DoD workbook for the upper five channels (3500-3550) there is a discrepancy between the CPA/PUA data and the Total Encumbrances data for the White Sands Missile Range CPA, both 100ft and 100m designs. Reading one data says the five channels are clear. Reading the other says they are encumbered. Which is correct? See GEOID 35005001102 for an example tract.

A: NTIA will be posting a revised Workbook correcting this discrepancy. The revised Workbook will be located at <https://www.ntia.doc.gov/other-publication/2021/transition-plans-and-transition-data-3450-3550-mhz-band>.

Q12: Are there any foreseeable impacts to 3.45-3.55 GHz DoD equipment used in the Freely Associated States, more specifically the Republic of the Marshall Islands? Or are all the coordination and interference concerns strictly located within the 48 states previously mentioned?

A: As stated in the February 19, 2021 letter from NTIA to FCC, this auction “specifically exclude[s] Hawaii, Alaska, the Gulf of Mexico, and other areas and U.S. possessions that have not been subject to technical evaluation by federal incumbent users.” Furthermore, footnote 57 of the 2nd R&O states “At this time, however, we only make licenses available in the contiguous United States, due to lack of DoD analysis at this time of the adjustments that may be necessary to its operations outside of the contiguous United States.”

Q13: Will you respond to these questions in the chat?

A: Questions provided via the chat are included in this document.

Q14:



A: This question is CUI and has been redacted.

Q15: Will OOBE characteristics of the systems that create encumbrances in the first 5 blocks of the band shared, is it possible that they’ll cause interference to 5G systems in the unencumbered blocks or is that covered by the analysis?

A: High-power radar OOBE characteristics have been provided to the Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications

(NCC) Trusted Industry Partners. As stated in paragraph 68 and 69 of the 2nd R&O “we find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band. . . . We find that these rules will encourage efficient use of spectrum resources and promote investment in the band, while protecting incumbent operations in the band and in adjacent bands.”

Q16: Also, on the coordination slide, non-federal entities cannot cause interference nor claim interference from fed entities. Given that, what will the parties be coordinating within the CPA/PUAs?

A: As stated in the February 19, 2021 letter from NTIA to FCC, “The CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness requirements.” Per paragraph 23 of the 2nd R&O “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.” In these areas, ‘operators of non-Federal stations may be required to modify their operations (e.g., reduce power, add filters adjust antenna pointing angles, install shielding, etc.) to protect Federal operations against harmful interference and to avoid, where possible, interference and potential damage to the non-Federal operators’ systems.’”

Q17: How soon can unencumbered areas be used after the auction?

A: Per the Joint Public Notice on Coordination Procedures for the 3.45-3.55 GHz Band “3.45 GHz Service licensees must successfully coordinate their operations with federal incumbent(s) before commencing operation in any Cooperative Planning Area or Periodic Use Area.” DoD defers questions regarding the timing of availability of areas outside of Cooperative Planning Areas and Periodic Use Areas to FCC.

Q18: In addition to the Air Force Airborne radar, do we know when other DoD systems will be vacating (if at all)?

A: As noted in paragraph 6 of the 2nd R&O and the DoD transition plans posted on NTIA’s 3.45 GHz website, DoD is only relocating certain airborne systems out of the band and it will complete its transition 138 months after the conclusion of the auction.

Q19: Will continuous wave radar waveforms be differentiated from pulse radar waveforms for interference analysis?

A: Yes, DoD will use the appropriate technical characteristics per individual radar system for interference analysis during the coordination process.

Q20: For each encumbered census tract, can the main cause of encumbrance be provided? Information like whether the main encumbrance cause was interference from 5G to radar, or radar to 5G, or both.

A: As stated in the February 19, 2021 letter from NTIA to FCC, “the CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness

requirements. ... Depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.” Footnote US431B denotes sites with high power radar operations with an asterisks. The boundary of these CPAs/PUAs are based upon anticipated harmful interference from DoD radars to 5G operations. For all other CPAs/PUAs (no asterisks), the boundaries are calculated based on anticipated harmful interference to incumbent DoD operations from commercial operations. The February 19, 2021 letter from NTIA to FCC can be found at https://www.ntia.gov/files/ntia/publications/ntia_letter_to_fcc_re_3450-3550_mhz.pdf.

Q21: Adjacent band (3.1-3.45 GHz) high power radars could overload and/or desensitize the 3.45 GHz band 5G receivers due to high power and high OOB respectively. Has the impact of these radars been factored in determination of 3.45 GHz band encumbrances?

A: High-power radar OOB characteristics have been provided to the Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Trusted Industry Partners as part of the DoD supplemental information. As stated in paragraph 68 of the 2nd R&O “we find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band.”

Q22: Seems that there will be a need for coordination with adjacent band radars. Will that be part of the overall coordination?

A: As stated in paragraph 68 and 69 of the 2nd R&O “we find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band. ... We find that these rules will encourage efficient use of spectrum resources and promote investment in the band, while protecting incumbent operations in the band and in adjacent bands.”

Q23: Will our questions submitted (CTIA collected questions) be presented in the same document as our questions posed today?

A: Additional questions previously received from CTIA are included in this document.

Q24: The FACT site where radars are tested by public companies and are not included in the CPAs and PUAs. How will these locations be provided to auction participants?

A: The FACT sites are listed in the Aerospace Industry Association’s (AIA) Petition for Reconsideration. Per AIA’s submission, the FACT site locations outside of CPAs are—

- St. Louis, MO (The Boeing Company)
- Liverpool, NY (Lockheed Martin)
- Cazenovia, NY (Lockheed Martin)
- Portsmouth, RI (Raytheon Technologies)
- McKinney, TX (Raytheon Technologies)

Per paragraph 34 of the 2nd R&O “We recognize that the DoD has expended significant time and resources to craft limited Cooperative Planning Areas or Periodic Use Areas that maximize new commercial operations while still allowing effective mission-critical DoD uses. While the DoD’s calculations and assessments do not consider future operations by non-federal radiolocation experimental licensees within or outside these areas, we agree that these contractor

facilities have needs to access the spectrum for testing and experimentation as the Commission has recognized in authorizing various part 5 experimental authorizations. Protection of such operations by rule is outside the scope of the AMBIT efforts. Further, expanding protection to future non-federal operations at FACT facilities would create uncertainty for potential bidders considering commercial deployments in the band. We note, however, that non-federal entities will continue to be able to obtain experimental licenses for such testing under our part 5 rules, which limit experimental use to operations on a non-interference basis and generally require licensees to notify or coordinate with incumbent spectrum users to avoid causing harmful interference.¹ Accordingly, we do not extend coordination obligations on commercial licensees for existing or future non-federal radiolocation operations authorized under part 5 of the rules regardless of whether they are located either inside or outside of Cooperative Planning Areas or Periodic Use Areas.² We expect all future commercial licensees to cooperate with part 5 licensees when presented with requests for experimentation and testing in the 3.45 GHz band to enable continued development and upgrades of essential DoD systems.³ Moreover, we encourage all stakeholders to work with the National Defense Industrial Association Spectrum Working Group to develop mutually agreeable practices regarding experimental use of the band for defense radar testing and development.⁴ The Commission will monitor the results of this approach, and may revisit it as necessary based on the experience of experimental and 3.45 GHz Service licensees. To that end, we encourage parties to provide the Commission with information on this approach if needed.”

¹ See 47 CFR § 15.5 “General conditions of operation” for experimental licenses.

² See T-Mobile Reply at 19 (opposing extension of coordination requirement for FACT facilities outside of Cooperative Planning Areas); AT&T Reply at 14; Letter from Kara Graves, Assistant Vice President, Regulator Affairs, CTIA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 19-348, at 2 (filed Mar. 10, 2021) (CTIA Mar. 10, 2021 *Ex Parte* Letter).

³ See Letter from Steve B. Sharkey, Vice President, Government Affairs, T-Mobile, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 19-348, at 5 (filed Mar. 5, 2021) (T-Mobile Mar. 3, 2021 *Ex Parte* Letter) (noting that “T-Mobile is generally open to working cooperatively with entities to accommodate reasonable needs” but “experimental operations should not completely upend the existing regulatory structure and diminish use of the band for commercial services”).

⁴ See AIA Comments at 5 (noting that radar manufacturers, 5G carriers and 5G OEMs are participating in the National Defense Industrial Association Spectrum Working Group to “explore the potential for [a] consensus approach on the use of the band by priority flexible use licensees and aerospace and defense industry contractors for testing and other experimental operations); AIA Reply at 3; Letter from Karina Perez Molina, Manager, Unmanned and Emerging Aviation Technologies, AIA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 19-348, at 2-3 (filed Feb. 18, 2021). As the Working Group’s deliberations are ongoing, we see no need at this time to impose a deadline as requested by AIA.

Questions Received from CTIA

Impairments

Q1: Could DoD/NTIA potentially allow for sharing (structured as necessary to address national security interests) more information on how the protected areas were determined?

- a) **Specifically, it would be helpful to understand what signal levels from DoD were used to calculate the contours (was it the -35 dBm per meter squared value for interference power density for 5G base station receivers or was it some other value) and what propagation, clutter, and terrain models were used in the analysis.**

A: Per Enclosure 5 of the September 8, 2020, NTIA Letter to FCC, DoD analysis used -35 dBm per meter squared for interference power density for 5G base station receivers. Analysis used Irregular Terrain Model (ITM) with SRTMv2 30-meter terrain data in a standard, well-mixed atmosphere with no clutter loss for foliage or buildings.

- b) **DoD 3.45 GHz explanation letter provides assumptions on 5G Base Station receiver characteristics. Can you explain how 5G BS receivers were used for coordination distance calculations in the workbook? Are the coordination distances derived to ensure protection to both 5G and DoD receivers? If so, can coordination distances for incumbent and 5G systems protections be provided separately?**

A: As stated in the February 19, 2021 letter from NTIA to FCC, “The CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness requirements. ... Depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.” Footnote US431B denotes sites with high power radar operations with an asterisks. The boundary of these CPAs/PUAs are based upon anticipated harmful interference from DoD radars to 5G operations. For all other CPAs/PUAs (no asterisks), the boundaries are calculated based on anticipated harmful interference to incumbent DoD operations from commercial operations.

- c) **What is the power level threshold from the 5G system(s) for which DoD systems are considered to experience harmful interference for each CPA?**

A: Per NSDD 298, this is operation security information, is restricted and controlled and cannot be shared.

- d) **In addition to access to the signal levels and terrain/propagation models as discussed above, can NTIA/DoD provide additional insight regarding the information that was redacted from the publicly released transition plans and workbooks? [*See list below of information that was redacted from the public releases.]**

A: Unredacted CUI Transition Plans have been distributed to Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Industry Partners.

Q2: We recognize that there will be ongoing DoD operations in the 3.1-3.45 GHz band, but our industry has not been provided information on what operations will occur immediately below/adjacent to the 3.45 GHz band edge. Can DoD elaborate on the operations that will remain in the band below 3.45 GHz? What are the out of band emission characteristics we can expect from DoD systems? Will DoD operations below 3.45 GHz utilize a guard band to protect commercial operations? If so, what size (e.g., 10 megahertz?).

A: High-power radar OOB characteristics have been provided to the Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Trusted Industry Partners. As stated in paragraph 68 and 69 of the 2nd R&O “As the Commission noted in the FNPRM, the creation of guard bands is one option for protecting adjacent systems, but such a use of valuable spectrum is inefficient and could be avoided using other technical solutions. As discussed below, we find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band. No commenters support the use of guard bands in this band and we decline to create guard bands here. ... We find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band. ... We find that these rules will encourage efficient use of spectrum resources and promote investment in the band, while protecting incumbent operations in the band and in adjacent bands.”

Q3: Is there any information DoD can share on the relocation bands and/or content of the transition plans? The limited information in the workbooks only provides some timelines and costs, but it would be helpful to understand the transition process more fully. We’re particularly interested in information on:

- a) Navy: AN/SPN-43 Air Traffic Control Radar; AN/SPY-1/SPY-6 Air and Surface Search Radar
- b) Army: AN/TPQ-53 Radiolocation Radar
- c) Air Force: AWACS AN/APY-1 and APY-2; 3DELRR
- d) Marines: AN/TPS-80 G/ATOR

A: Unredacted Transition Plans have been distributed to Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Industry Partners.

Q4: Are there any time of day variances for any CPA encumbrances? E.g. for ship borne radar continuing to operate in the 3.45-3.55 band, are they typically only operated at night for testing purposes while in port or is the impairment expected on a continuous/unplanned basis?

A: Per the February 19, 2021, letter from NTIA to FCC “depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.

Modeling

Q5: Were the 5G technical parameters provided by the industry in September 2019 used for sharing studies?

A: Per the February 19, 2021, letter from NTIA to FCC "the technical assumptions used by DoD for 5G equipment to generate the geographic parameters were provided in NTIA's September 2020 letter, on which the FNPRM sought comment. There were no responses to the FNPRM proposing different 5G equipment assumptions."

Q6: Were there any 5G technical parameters used other than max EIRP and base station receiver characteristics used to model the commercial wireless operations (as these were the only parameters listed in the workbook release)?

A: Per paragraph 27 of the 2nd R&O, "In defining each area, the DoD's analysis employed certain assumptions and parameters, including: (1) 5G networks operating at a maximum power of 1640watts/MHz in urban environments and 3280 watts/MHz in non-urban environments; (2) an EMI threshold of -35dBm/m²peak power density from the nearby radar; and (3) damage to 5G networks calculated at a threshold of +35dBm/m²peak power density from the nearby radar".

Q7: How were pico, micro, and macro power levels and corresponding antenna heights considered in the study and in the Early Access portal?

A: Per paragraph 27 of the 2nd R&O, "In defining each area, the DoD's analysis employed certain assumptions and parameters, including: (1) 5G networks operating at a maximum power of 1640watts/MHz in urban environments and 3280 watts/MHz in non-urban environments; (2) an EMI threshold of -35dBm/m²peak power density from the nearby radar; and (3) damage to 5G networks calculated at a threshold of +35dBm/m²peak power density from the nearby radar."

Per the Joint Public Notice on Coordination Procedures for the 3.45-355 GHz Band "to submit a formal coordination request, the 3.45 GHz Service licensee must include information about the technical characteristics for its base stations and associated mobile units relevant to operation within the Cooperative Planning Area or Periodic Use Area. This information should be provided in accordance with the instructions provided in the DoD's online portal user's guide. The types of specific information, including the likely data fields in the portal, include basic technical operating parameters (e.g., system technology, mobile effective isotropic radiated power (EIRP), frequency block, channel bandwidth, site name, latitude, and longitude)."

Q8: Did NTIA/DoD assume FDD in the band or TDD? How would modeling 5G systems with TDD as opposed to FDD affect the size of CPAs and the coordination required? How are active antenna systems modeled in the study and in the Early Access portal?

A: Enclosure 5 of the September 8, 2020, letter from NTIA to FCC states the parameters used during the analysis.

Per the Joint Public Notice on Coordination Procedures for the 3.45-355 GHz Band “to submit a formal coordination request, the 3.45 GHz Service licensee must include information about the technical characteristics for its base stations and associated mobile units relevant to operation within the Cooperative Planning Area or Periodic Use Area. This information should be provided in accordance with the instructions provided in the DoD’s online portal user’s guide. The types of specific information, including the likely data fields in the portal, include basic technical operating parameters (e.g., system technology, mobile effective isotropic radiated power (EIRP), frequency block, channel bandwidth, site name, latitude, and longitude).”

Q9: Were all commercial base stations modeled at maximum power levels (1640 W/MHz or 3280 W/MHz depending on location)? Or was all modeling looking solely at interference from DoD operations to commercial systems? How does the interference assessment tool account for interference margin appropriation among multiple licensees?

A: Per paragraph 27 of the 2nd R&O, “In defining each area, the DoD’s analysis employed certain assumptions and parameters, including: (1) 5G networks operating at a maximum power of 1640watts/MHz in urban environments and 3280 watts/MHz in non-urban environments; (2) an EMI threshold of -35dBm/m²peak power density from the nearby radar; and (3) damage to 5G networks calculated at a threshold of +35dBm/m²peak power density from the nearby radar.”

As stated in the February 19, 2021 letter from NTIA to FCC, “The CPAs and PUAs proposed by DoD and NTIA are not exclusion zones, but are areas where military systems require protection from harmful interference from new non-federal operations, either indefinitely (in CPAs) or episodically (in PUAs), in support of national security missions and to meet readiness requirements. ... Depending on the types of military systems used at these locations, the scope and purpose of each CPA and PUA differ in certain respects.” Footnote US431B denotes sites with high power radar operations with an asterisks. The boundary of these CPAs/PUAs are based upon anticipated harmful interference from DoD radars to 5G operations. For all other CPAs/PUAs (no asterisks), the boundaries are calculated based on anticipated harmful interference to incumbent DoD operations from commercial operations.

Q10: We understand that DoD may have been told by the FCC to re-run its analysis with some new inputs regarding the height of antennas (100 meters instead of 100 feet) and higher power levels. Can you elaborate on the assumptions DoD made, and how they compare to realistic deployment scenarios? If the industry were able to provide more relevant tower height and/or base station EIRP information (based on a cumulative distribution function of actual values used in the real-world), would there be an opportunity to rerun the sharing analysis based on these modified parameters?

A: Paragraph 29 of the 2nd R&O states “these zones were developed based on the Commission’s proposed power limits and assuming relatively high antenna heights. In practice, we expect that the areas in which flexible-use licensees may need to adjust their networks will be smaller than the areas encompassed by the Cooperative Planning and Periodic Use Area boundaries we are adopting. First, actual flexible-use operations are likely to use lower towers and lower power than the maximum tower heights and power levels permitted under our rules, which NTIA and

the DoD used in their analyses to generate the Cooperative Planning Areas and Periodic Use Areas.”

Furthermore, paragraphs 94 and 95 of the 2nd R&O state “Consistent with the proposal in the FNPRM, we will not restrict antenna heights for 3.45 GHz band operations beyond the requirements necessary to ensure physical obstructions do not impact air navigation safety. This approach is consistent with part 27 AWS rules, which generally do not impose antenna height limits on antenna structures, and is supported by the record. Rather than using antenna height limits to reduce interference between mobile service licensees, as has been done in the past, the Commission more recently has used field strength limits at service boundaries to provide licensees more flexibility to design their systems while still ensuring harmful interference protection between systems. As this has proven successful in other services, we adopt that same approach in the 3.45 GHz Service. Further, we believe that such limits would have limited practical effect because we expect that licensees generally will deploy systems predicated on lower tower heights and increased cell density, in order to achieve maximum 5G data throughput to as many consumers as possible. In rural areas where higher antennas may be used to provide longer range to serve sparse populations, the field strength limit at service area boundaries we adopt here will ensure that adjacent area licensees are protected from harmful interference.”

Q11: In the DoD Workbook the census tracts flagged as impacted for the 100 meter and 100 ft 5G Base Station analyses are almost the same. Why is that? How would coordination be different for a 5G network with 30 ft rad center sites versus 60 ft sites versus 90 ft sites?

A: Per the Joint Public Notice on Coordination Procedures for the 3.45-355 GHz Band “to submit a formal coordination request, the 3.45 GHz Service licensee must include information about the technical characteristics for its base stations and associated mobile units relevant to operation within the Cooperative Planning Area or Periodic Use Area. This information should be provided in accordance with the instructions provided in the DoD’s online portal user’s guide. The types of specific information, including the likely data fields in the portal, include basic technical operating parameters (e.g., system technology, mobile EIRP, frequency block, channel bandwidth, site name, latitude, and longitude).”

Q12: Can you provide details on which methodologies and parameters are according to the NTIA published Details - ITS (bldrdoc.gov)?

A: Details on methodologies and parameters are provided in the NTIA report, Technical Feasibility of Sharing Federal Spectrum with Future Commercial Operations in the 3450-3550 MHz Band. The NITA report can be found at <https://www.its.bldrdoc.gov/DownloadPublications.ashx?id=TR-20-546.pdf>.

Protection Regime

Q13: If we’re recalling correctly, NTIA indicated previously that the contours will show the difference between zones where there is a potential for damage to the licensee’s hardware (catastrophic interference) vs. packet error rate interference, which can vary dramatically. If that’s true, can you elaborate on this statement? How many pops are

impacted by these various levels of impairment? And what assumptions were made regarding a device's tolerance for interference?

A: Further information about DoD's high powered radar operations have been distributed to Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Industry Partners.

Per paragraph 27 of the 2nd R&O "In defining each area, the DoD's analysis employed certain assumptions and parameters, including: ... (3) damage to 5G networks calculated at a threshold of +35dBm/m² peak power density from the nearby radar."

Q14: The notice references I/N -6 dB used as the receiver protection threshold. Can you share the thresholds in PSD or PFD format for ground-based radars, ship-based radars, and other incumbents' systems?

A: Per NSDD 298, this is operation security information, is restricted and controlled and cannot be shared.

Q15: In terms of the potential for hardware damage, NTIA had indicated previously their belief that certain mitigation steps could be taken on the part of the licensee—e.g., antennas could be positioned so as not to point directly toward the ship. Are other mitigations envisioned, and did DoD/NTIA consider the impacts on the licensee of these measures (e.g., changing the orientation of the antenna impacts the ability to use the antenna for adjacent services like C-Band).

A: Per paragraph 29 on the 2nd R&O "we expect that the areas in which flexible-use licensees may need to adjust their networks will be smaller than the areas encompassed by the Cooperative Planning and Periodic Use Area boundaries we are adopting. First, actual flexible-use operations are likely to use lower towers and lower power than the maximum tower heights and power levels permitted under our rules, which NTIA and the DoD used in their analyses to generate the Cooperative Planning Areas and Periodic Use Areas."

Q16: The Coordination procedure notice, June 2 2021, references additional information on anticipated power density levels curves for the high power radar location. Is this input considered for coordination distances analysis, along with 5G receiver characteristics? When will this information be made available?

A: Anticipated received power level curves for DoD's high power radar locations have been provided to Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Trusted Industry Partners. Per the Joint Public Notice on Coordination for the 3.45-3.55 GHz band, "an optional streamlined framework is available to meet the coordination requirement associated with some of the high-power radar facilities identified with an asterisk (*) in footnote US431B."

Q17: OOBE from radars below 3.45 GHz would seem to be a bigger problem than we had previously understood. Is there any possibility that OOBE limits from DoD operations could be provided to potential auction participants?

A: High-power radar OOBE characteristics have been provided to the Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Trusted Industry Partners. As stated in paragraph 68 and 69 of the 2nd R&O “we find that adoption of the technical rules we proposed in the FNPRM as modified herein will sufficiently protect adjacent operations at both edges of the band. ... We find that these rules will encourage efficient use of spectrum resources and promote investment in the band, while protecting incumbent operations in the band and in adjacent bands.”

Logistics

Q18: Although the FCC stated that formal coordination requests cannot be submitted until 9 months after the auction closes, has DoD given any thought as to: (1) how auction parties can at least informally work to obtain rapid access; (2) how they will prioritize coordination requests; and (3) timing for development and deployment of the early entry portal for the 3.45 GHz band?

A: As outlined in Section B of the Joint Public Notice on Coordination Procedures for the 3.45-355 GHz Band, “3.45 GHz Service licensees may discuss their proposed deployments and seek guidance from the federal incumbent(s)” via voluntary, informal, and non-binding discussions. DoD will offer informal coordination after the close of the auction and prior to the opening of the early entry portal 9 months after the completion of the auction.

Per the Joint Public Notice on Coordination Procedures for the 3.45-355 GHz Band Section C, “3.45 GHz Service licensees must prioritize their deployments in the Cooperative Planning Area or Periodic Use Area for each federal incumbent when submitting a formal coordination request.³³ If a licensee seeks to coordinate with multiple systems or multiple locations of operation controlled by one federal incumbent, it must specify the order in which it prefers the federal incumbent process the request (i.e., the order of systems or geographic locations).”

DoD is planning on holding a meeting for winning licensees post auction to discuss the coordination process and logistics.

Q19: Post-auction, can the licensees participate in the development of functional requirements and methodology of the early entry portal?

A: DoD is planning on holding a meeting for winning licensees post auction to discuss the coordination process and logistics.

Q20: Are there any insights you can share on the process for sharing sensitive information with stakeholders? Will there be opportunities for access pre-auction?

A: DoD supplemental information has been provided via the Cybersecurity and Infrastructure Security Agency (CISA) National Coordinating Center for Communications (NCC) Trusted Industry Partners.

Q21: Does a CPA always correspond to a single DoD location? Newport News CPA likely corresponds to the Navy location, but there are also Army and Air Force locations nearby; which Department's transition timeline applies for that CPA? Are there any other CPAs for which the transition timeline could be unclear?

A: Slides 18 and 19 of the DoD 3.45 GHz Information Session briefing indicate which DoD systems are located within each CPA/PUA. This briefing can be found on the NTIA 3.45 GHz website at <https://www.ntia.doc.gov/page/07122021-dod-workshop-information>.

Q22: The Jan 14th NTIA letter gives the transition timelines within CPAs for the Departments of the Army and Navy as 9 months and for the Department of the Air Force as 12, 138 months. The footnotes, especially footnote 2, describing the various dates are unclear. Will you step through the various start and end dates of transition timelines by Department and CPA as appropriate?

A: As indicated in the DoD transition plans, the majority of DoD systems will begin indefinite sharing 9 months after the conclusion of the auction. Per the Joint Public Notice on Coordination Procedures for the 3.45-3.55 GHz band “no formal coordination requests may be submitted until nine (9) months after the date of the auction closing Public Notice.” As noted in paragraph 6 of the 2nd R&O and the DoD transition plans posted on NTIA’s 3.45 GHz website, DoD is only relocating certain airborne systems out of the band and it will complete its transition 138 months after the conclusion of the auction. Additionally, as stated in paragraph 31 of the 2nd R&O “the Little Rock, Arkansas Cooperative Planning Area, for approximately the first 12 months following the close of the auction for this band, licensees will have to coordinate with the DoD across all 100 megahertz of the spectrum within those areas.¹⁰⁹ After this time period, however, licensees will only need to coordinate in the lower 40 megahertz of the band, as the DoD states that it will vacate the upper 60 megahertz, i.e., between 3490-3550 MHz, by that time.”