Department of Defense Workbook Information File

In Support of the 3450-3550 MHz Band

Rev. 07/23/2021

The Department of Defense (DoD) has prepared the DoD 3450-3550 MHz Workbook (hereafter referred to as the Workbook) to provide potential bidders in the upcoming auction for commercial flexible use licensees with information about potential impacts to frequency blocks and market areas from DoD incumbent users. The Workbook allows the sharing of Cooperative Planning Areas (CPA) and Periodic Use Areas (PUA) for coordination with incumbent DoD operations. This adjunct information file is provided to help in the understanding and use of the Workbook.

Many aspects of the incumbent spectrum uses involve sensitive, non-public information that is redacted for public use. For example, almost all DoD frequency assignments have restrictions on distribution which prevents their public release. The presentation of this information in the Workbook excludes critical RF parameters and usage characteristics such that distribution limitations can be honored. At the same time, the information is presented at a high level of resolution (e.g., at the census tract level) in order to provide bidders additional information about the DoD incumbent use and coordination obligations to plan for the auction.

CPA and/or PUA for sites listed in NTIA Letter to FCC re 3450-3550 MHz[1] were determined and mapped into a Geographic Information System (GIS) application. As stated in the letter, "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.

Figure 1 below shows an example CPA/PUA (not an actual CPA/PUA) overlayed on a map with state borders. Files containing US census tract boundaries determined in 2010 were also mapped into the GIS tool – approximately 75,000 census tracts. The use of census tracts was chosen to provide a high degree of fidelity in representing the impact of DoD operations on geographic areas. Figure 2 below shows a selection of 2010 census tracts in the region of the example CPA/PUA. The GIS tool was used to determine the overlap of CPA/PUA and census tracts for each of the ten 10 MHz segments within the 3450-3550 MHz band. Figure 3 shows a map of the impacted census tracts from the single, overlaying Example CPA/PUA. Any one census tract may be impacted by more than one CPA/PUA if regions overlap. The encumbered census tracts and CPA/PUA data was then exported into Microsoft Excel.

[1] Charles Cooper, NTIA Letter to FCC re 3450-3550 MHz, 19 Feb. 2021, available at https://www.ntia.gov/files/ntia/publications/ntia_letter_to_fcc_re_3450-3550_mhz.pdf

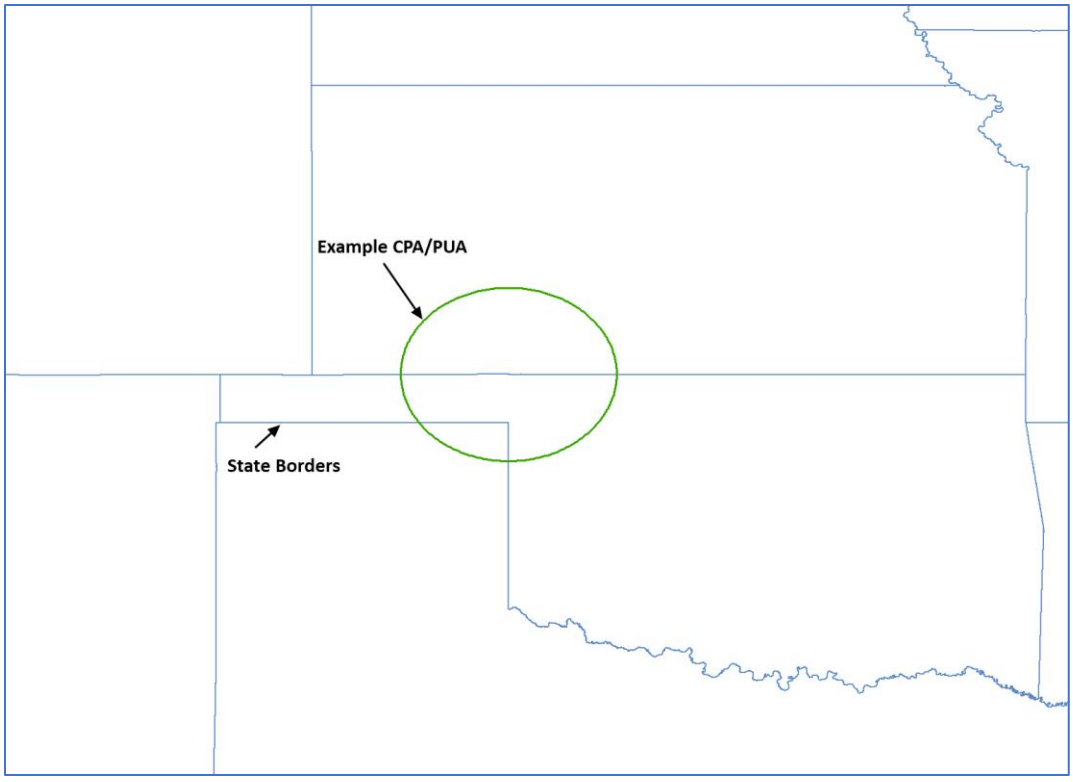

Figure 1:Map of Example CPA/PUA

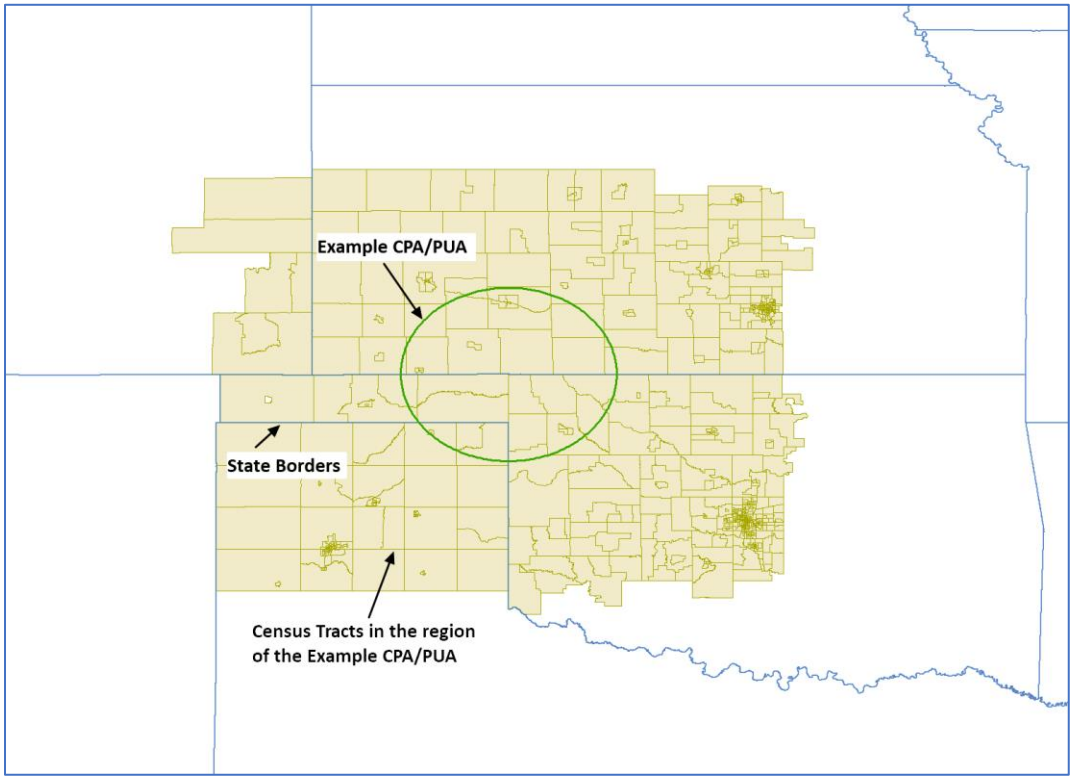

Figure 2:Map of Example CPA/PUA with local Census Tracts

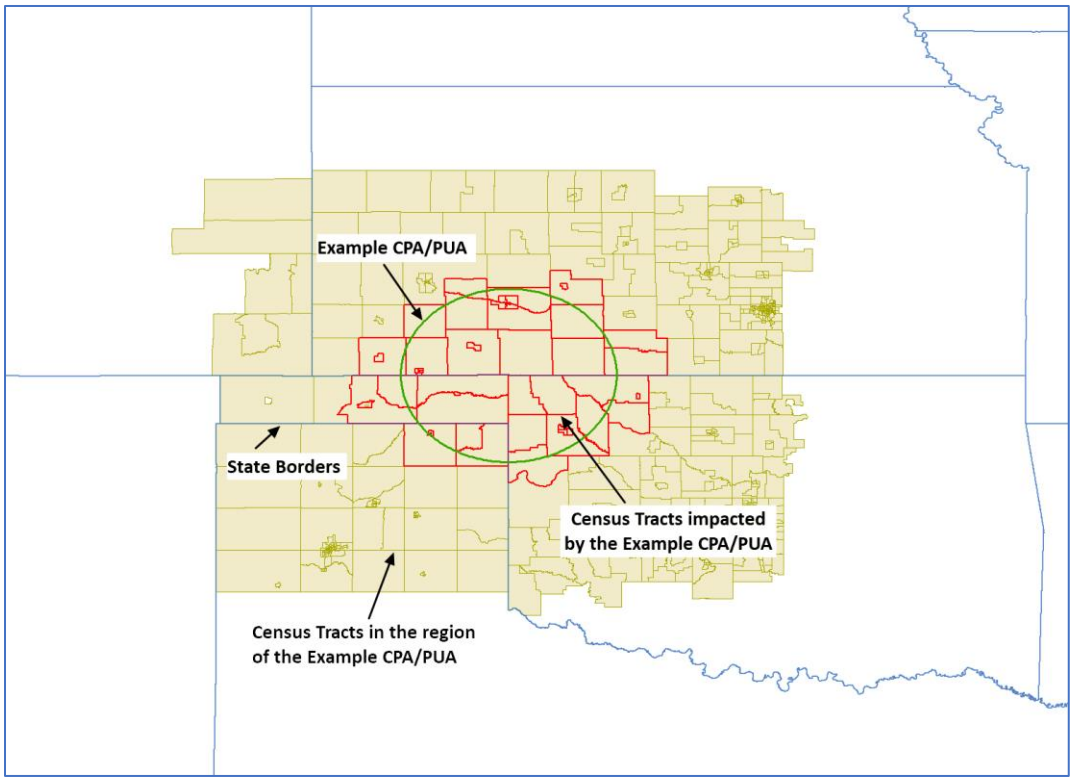

Figure 3:Map of Example CPA/PUA with impacted Census Tracts

The Workbook is a Microsoft Excel file containing the GIS data for each of the ten 10 MHz segments within the 3450-3550 MHz band. Each 10MHz band is listed on a separate tab within the file. Each tab contains a list of impacted census tracts denoted by its GEOID, the state associated with the census tract and the latitude/longitude coordinate of the center of the census tract. Two different CPA/PUA groups are calculated based on 5G equipment assumptions provided below from the Letter to FCC re Facilitating Shared Use in the 3450-3550 MHz Band[2]. Group 1 is calculated for 100 meter tall commercial use antenna towers and is highlighted in orange. Group 2 is calculated for 100 feet tall commercial use antenna towers and is highlighted in blue. The total number of encumbrances from each antenna height is listed as well as the encumbrances from each individual CPA/PUA. Each tab contains an identical list of census tracts, therefore some census tracts may have zero encumbrances for a selected frequency band tab. See Table 1 for an example of a selection of the Workbook using fictionalized data. Table 2 contains a description of the workbook column headings.

The Workbook and the underlying data draws directly from the approved DoD transition plans and Government Master File records. However, it was prepared and processed by DoD and has not been verified or validated by NTIA or the FCC. Additionally, this information release does not supersede any rights and obligations specified by law, rule, or other NTIA or FCC action.

[2] Charles Cooper, Letter to FCC re Facilitating Shared Use in the 3450-3550 MHz Band, 09 Sept. 2020 available at https://www.ntia.gov/fcc-filing/2020/letter-fcc-re-facilitating-shared-use-3450-3550-mhz-band

The following are assumptions used by the for 5G equipment to calculate CPA/PUA:

5G Base Station Transmitter Power Output as Effective Isotropic Radiated Power (EIRP)

- Urban: 1640 Watts per Megahertz (W/MHz)
- Non-Urban: 3280 W/MHz

5G Base Station Receiver Characteristics

- Interference Power Input Density
  - -35 dBm per meter squared (dBm/m_2) or 0.01 Volts per meter (V/m)
- Maximum Power Input
  - +35 dBm/m^2
- 1 dB Compression (P1dB)
  - -25 dBm for continuous wave signals referenced at antenna port

GEOID	State	Latitude	Longitude	Total Encumbrances 100m	Total Encumbrances 100ft	Location 1 CPA	Location 2 CPA	Location 1 CPA -100ft	Location 2 CPA -100ft
1003010100	AL	31.1104762	-87.7868713	1	1	1	0	1	0
1003010200	AL	30.9478929	-87.6787306	1	1	0	1	0	1
1003010300	AL	30.8244356	-87.8710563	2	0	1	1	0	0
1003010400	AL	30.7200267	-87.6245437	2	2	1	1	1	1
1003010500	AL	30.8969612	-87.7737368	0	0	0	0	0	0
1003010600	AL	30.8531544	-87.7701913	1	1	1	0	1	0
1003010701	AL	30.7174494	-87.9529225	2	0	1	1	0	0

Table 1: Example Workbook Table

Column Heading	Description
GEOID	Census Tract GEOID Value
State	State Census Tract is located
Latitude	Latitude coordination of census tract center
Longitude	Latitude coordination of census tract center
Total Encumbrances 100m	Total number of encumbrances affecting specified census tract from CPA/PUA for 100m antenna height
Total Encumbrances 100ft	Total number of encumbrances affecting specified census tract from CPA/PUA for 100m antenna height
100 m CPA/PUA Data	Encumbered census tracts from listed CPA/PUA for 100m antenna height
	Blank column to help with distinguishing 100m and 100 feet antenna height data
100 ft CPA/PUA Data	Encumbered census tracts from listed CPA/PUA for 100 feet antenna height

Table 2: Workbook Column Headings