

## DaneCom Outreach Update 8/30/2018

This edition of the DaneCom Outreach Update talks about the trunked radio subsystem of the DaneCom (this is the most-used subsystem of the entire DaneCom radio system).

As time goes on, usage of the Trunked Radio Subsystem will only increase. This radio subsystem can handle a total of nine simultaneous conversations at any given time. Should the system encounter an issue that removes a radio channel from service – even temporarily – the system can then only handle eight conversations at the same time (or 88% of full capacity).

Finding new radio frequencies, especially in our area, is very difficult. Finding a frequency is only half of the battle. The other half of that battle is to ensure that the new frequency “plays nicely” with all the other radio frequencies at every DaneCom tower location. It’s very possible to find an available frequency for us to use only to find out that the new frequency causes interference to the rest of the system – or one of our neighbors in another community or county many miles away.

The Trunked Radio Subsystem currently uses P25 Phase 1 technology. Should we begin utilizing P25 Phase 2 technology, the number of simultaneous conversations the system can handle will double – from nine to 18! DaneCom is “Phase 2” capable already, but at this point there are many radios using the system that are not yet capable of using “Phase 2”, which is OK at this time.

**Beginning January 1<sup>st</sup>, 2019, any new radio purchased or otherwise newly introduced into DaneCom will be required to be enabled to utilize P25 Phase 2 technology. Any radios already in use and purchased / acquired prior to this date can continue to be used on the system as they are today and into the foreseeable future. Once a “Phase 1” radio has reached the end of its service life, its replacement must be “Phase 2” enabled / ready.**

**This process will allow you to continue using radios that have already been purchased prior to January 1<sup>st</sup> 2019 that may not be phase 2 capable until they reach the end of their service life. As time goes on, existing “Phase 1” radios will be replaced or upgraded by your community’s normal radio life cycle process.**

Once all of the radios on any given talk group (or “channel”) are capable of “Phase 2”, the entire talk group will begin to use the much more efficient Phase 2 technology. Should a “Phase 1” radio tune to that particular talk group, the entire talk group will revert to Phase 1 for the benefit of that single radio. Your current “Phase 1” radios will continue to work as they do today until they reach the end of their service life, but as the previous sentence indicates, we are eager to get to an all Phase 2 scenario.

With all that said, I encourage you to upgrade your “Phase 1” radios whenever possible (some radios cannot be simply upgraded) so we may begin to enjoy the enhanced capacity that the DaneCom Trunked Radio Subsystem is already able to provide!

If you have any questions, please reach out to me.

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## DANECOM Subscriber Radio Requirements Revised August 2018

The following characteristics are a minimum set of specifications that are being considered as necessary for subscriber units (mobile and portable radios) to operate on the DaneCom VHF Project 25 trunked radio system. Generally, if a radio is certified to operate on the WISCOM radio system, it is certified to operate on DaneCom. **The main difference being any radio purchased and placed into service on the DaneCom Trunked Radio System on or after January 1, 2019 must be capable of operating in the Phase 2 Project 25 trunked mode.**

- Subscriber units intended to operate on the DANECOM network **must** be certified under the Project 25 Compliance Assessment Program (CAP) and have been issued a Standard Declaration of Compliance (SDOC) that is posted on the Responder Knowledge Base ([www.rkb.us](http://www.rkb.us)) website, consistent with SAFECOM FY 2010 grant guidelines. The SDOC documents the results of testing associated with subscriber performance and interoperability requirements, in conformance to the Project 25 standard<sup>1</sup>.
- Subscriber units must operate throughout the 138-174 MHz VHF High band
  - VHF/700/800 capability is strongly recommended for any agencies likely to operate within 10 miles of Madison, and encouraged for everyone else.
  - Subscriber units must be equipped with the proper (wideband) antenna for the radio in question
- Subscriber units must have the following radio performance specifications<sup>2</sup>:
  - Mobile radios should have a minimum receiver sensitivity (analog reference, 12dB SINAD) of 0.2 microvolts
  - Portable radios should have a minimum receiver sensitivity (analog reference, 12dB SINAD) of 0.16 microvolts
- Subscriber units must have the following radio performance :
  - Mobile and portable radios must have a minimum receiver sensitivity (analog reference, 12dB SINAD) of 0.28 microvolts
- Subscriber units must have the following radio performance specifications
  - Mobile radios must have a maximum transmitter power of 50 watts
  - Portable radios must have a transmitter power of 5 watts
- Subscriber radios purchased and placed into service after January 1, 2019 must be capable of operating in the Phase 2 Project 25 Trunked Mode
  - Phase 1 – only radios already in use on DaneCom can continue to be used into the foreseeable future, however, once a Phase 1 radio reaches the end of its service life, it cannot be re-used on DaneCom

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<sup>1</sup>The CAP Baseline Common Air Interface Testing Requirements (current edition: July 2017) summarize performance and interoperability requirements for P25 equipment and are available at [https://www.dhs.gov/sites/default/files/publications/P25-CAB-CAI\\_TEST\\_REQ-TDMA\\_170720-508.pdf](https://www.dhs.gov/sites/default/files/publications/P25-CAB-CAI_TEST_REQ-TDMA_170720-508.pdf)

<sup>2</sup>The coverage of the DANECOM radio infrastructure was designed based on these subscriber parameters – mobile or portable radios that do not meet these requirements may not receive the same coverage performance.

- Subscriber radios must contain a minimum capacity for 128 control channels
  - Subscriber radios should be able to scan for Control Channels, including adjacent site Control Channels, across the full range of the VHF High Band spectrum radio (138-174 MHz).
- Subscriber radios must contain a minimum capacity for 512 channels/modes
- Subscriber radios must be capable of having a “preferred” system site list established for specific radios operating within defined areas: this is necessary to manage system capacity
  - Subscriber radios should have a roaming algorithm that takes into consideration Receive Signal Strength Indicator (RSSI) and Adjacent Site System Information.
- Subscriber radios must utilize a programming security key or other technology that facilitates only authorized programming of radios
  - Software or hardware based programming security keys may be used
- Subscriber radios must support channel spacing of 12.5kHz
  - Subscriber radios must support the following synthesizer tuning steps: 2.5, 5.0, 6.25, 7.5, and 12.5kHz
- Subscriber radios must be capable of Advanced Project 25 Control Channel functionality that enables *explicit* trunking<sup>3</sup>
- **Subscriber radios must be capable of supporting multiple Project 25 system Ids (to allow for the possibility of roaming to other Project 25 systems such as WISCOM).**

If you have any questions on the DANECOM Subscriber Radio Requirements listed above, contact the DaneCom Radio System Administrator at 608-283-2912 or [danecom@countyofdane.com](mailto:danecom@countyofdane.com).

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<sup>3</sup> Due to the lack of standardized channel pairings in the public safety VHF High Band spectrum allocation, a more flexible Project 25 control channel functionality is required in subscriber devices on the DANECOM system. The required method, known as explicit trunking, allows the infrastructure to grant radio channels to subscriber radios by providing them with exact transmit and receive frequency values. This is an improvement over implicit trunking, in which the infrastructure assigns radio channels based on pre-programmed identifiers (which does not allow for the subscribers to be assigned to channels for which they are not pre-programmed).