UAT-WP-7-11

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Assessment of the European DME/TACAN Environment

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Introduction

- Objective
  - To assess the European DME/TACAN interference environment for 978/979 MHz

- Approach
  - Fly an aircraft over Europe at different altitudes
  - Plot contours for received power levels from every DME and TACAN
  - Evaluate regions where multiple contours intersect to determine worst cast scenario

- Assumptions
  - Adjacent channel rejection (ACR) of DME
    - 20 dB for 1.2 MHz filter
    - 40 dB for 0.8 MHz filter.
  - All ground antenna patterns are isotropic
  - EIRPs are as listed in supplied database of DMEs and TACANs in Europe
  - DME/TACAN ground station height is 10 meters

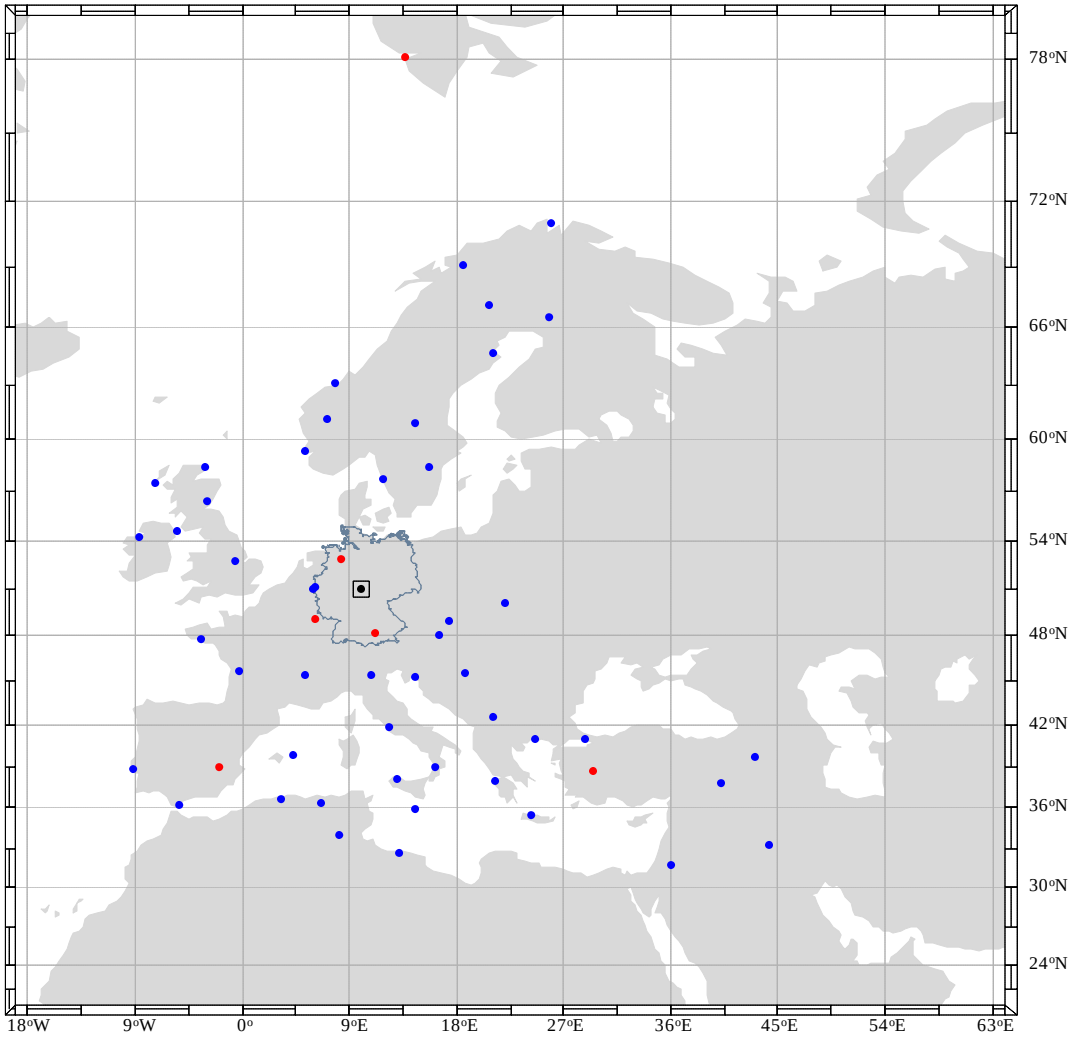
European DME Environment

legend

- DME/TACAN - 978 MHz
- DME/TACAN - 979 MHz

- Germany TACAN - 979 MHz

  This is a mobile DME station, and although we place it in the center of Germany, it can be located anywhere within the the highlighted borders of Germany.



European DME Environment (Closer Look)

legend

- DME/TACAN - 978 MHz
- DME/TACAN - 979 MHz

- Germany TACAN - 979 MHz

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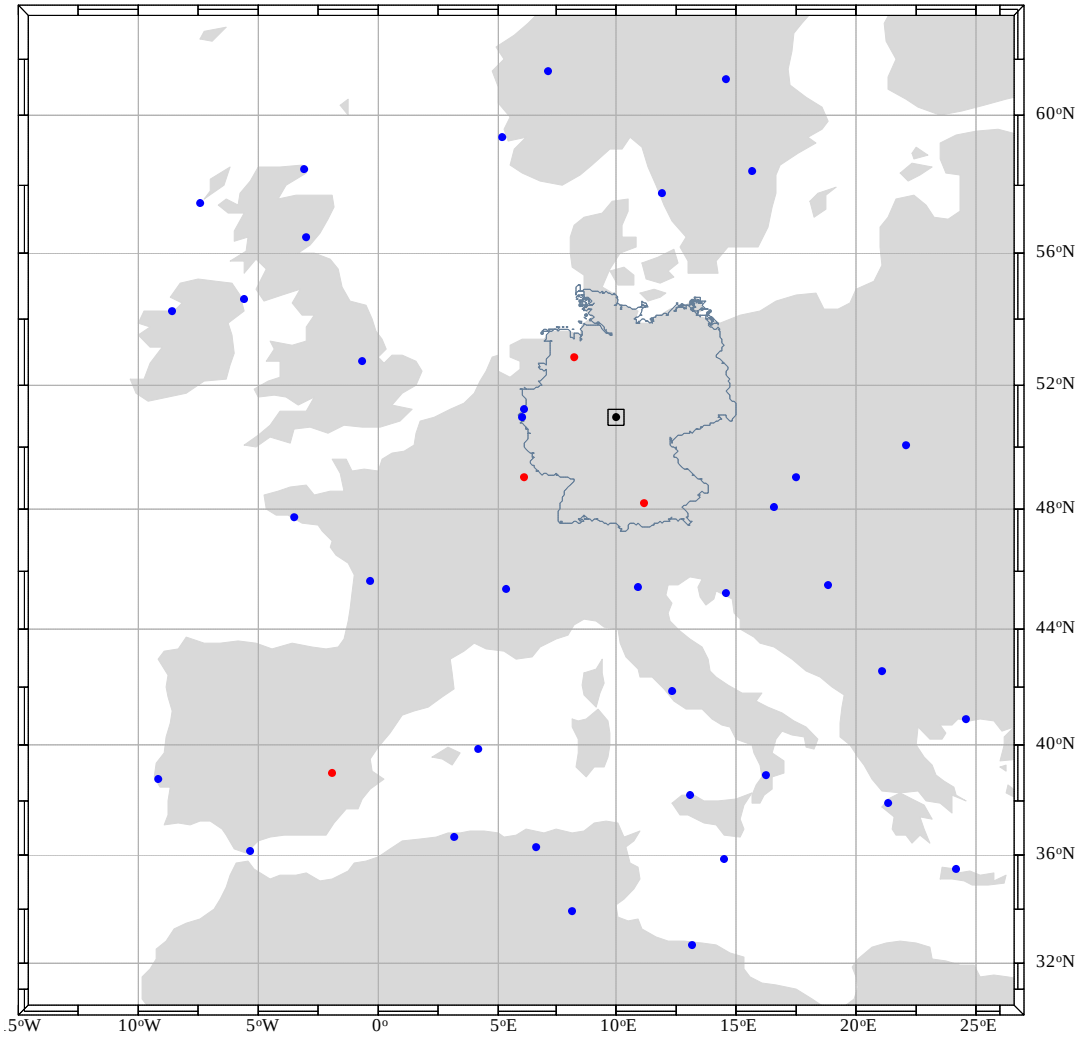
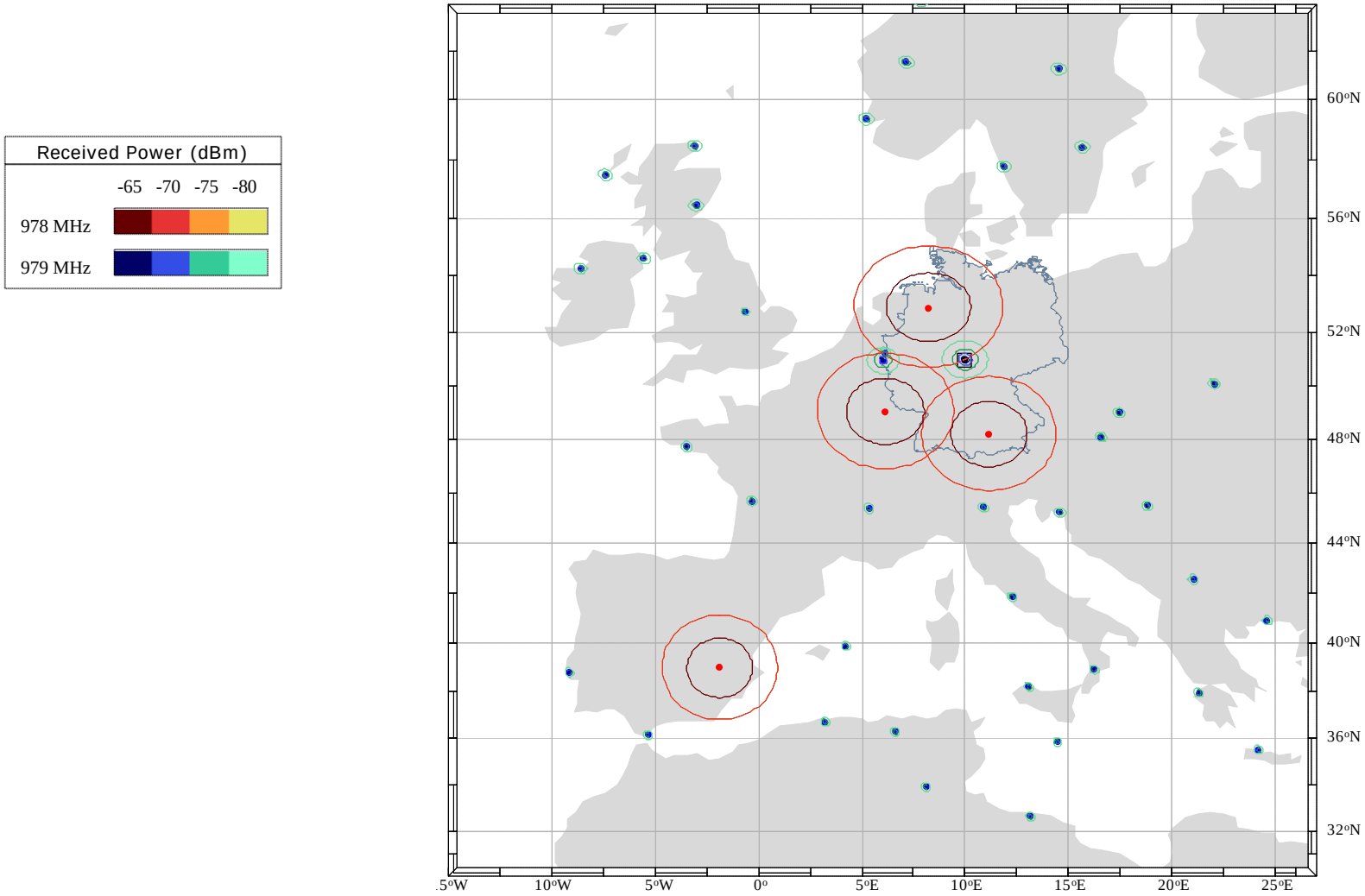
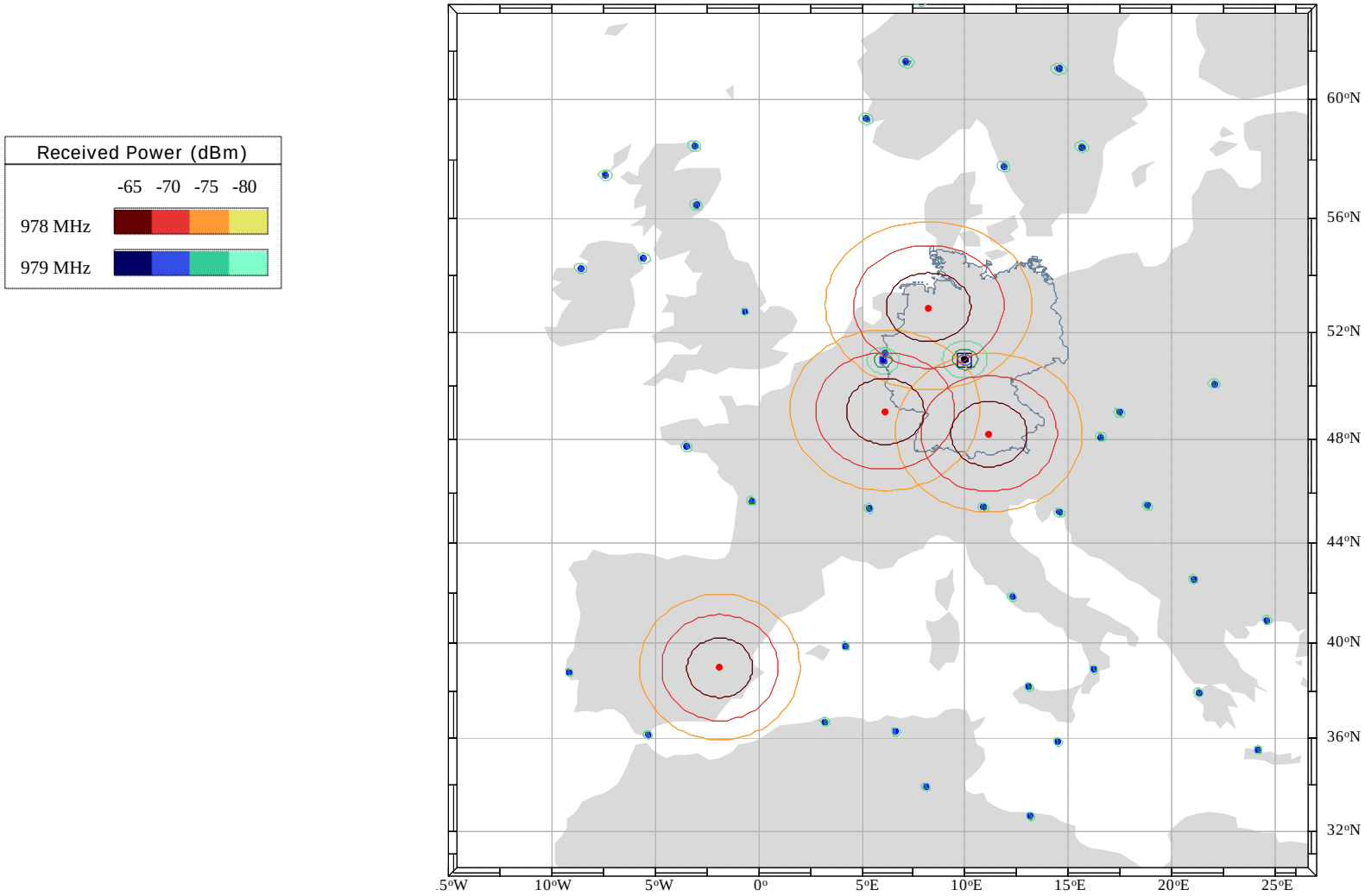


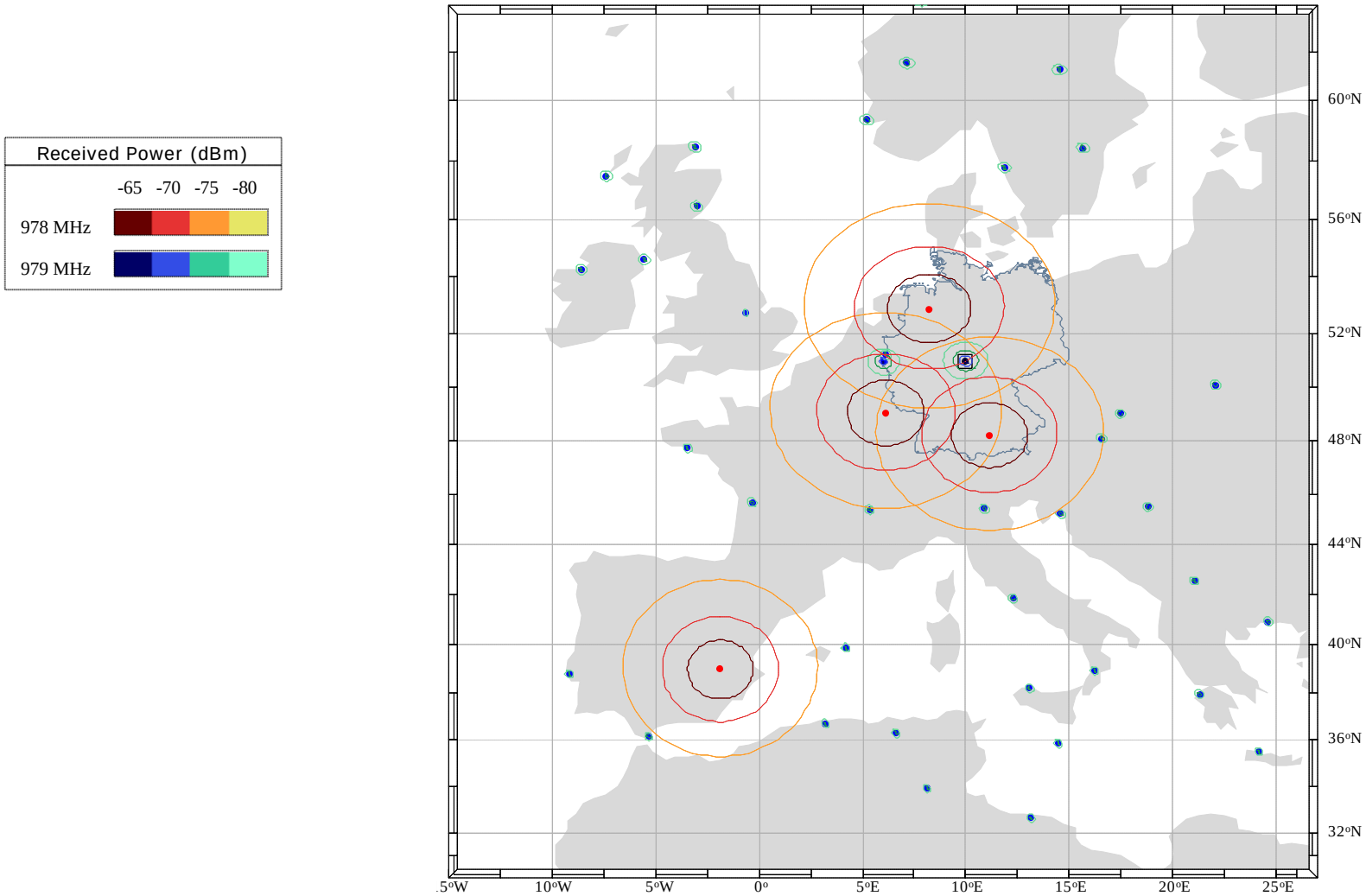
Altitude = 10,000 ft, Filter BW = 1.2 MHz



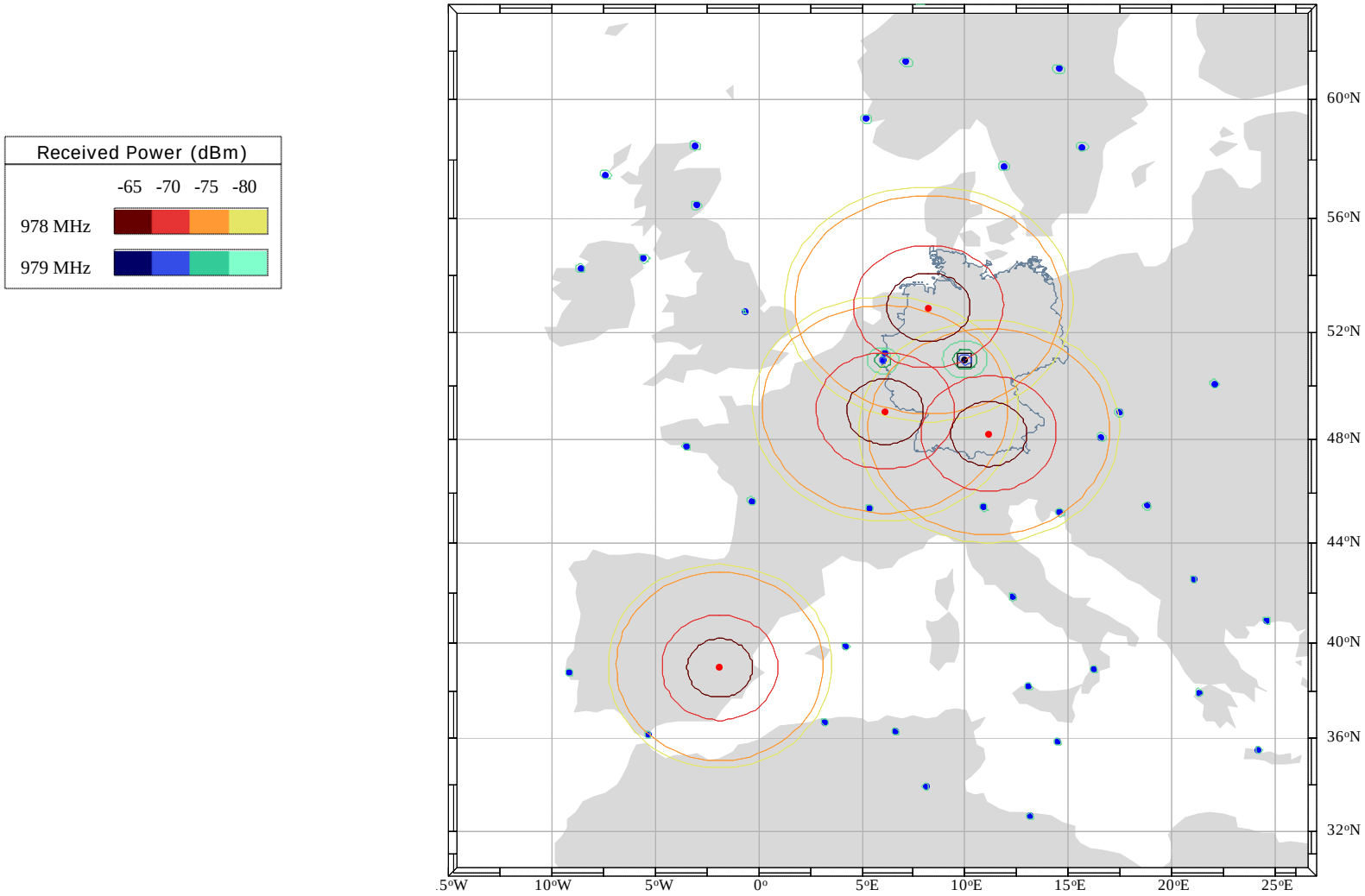
Altitude = 20,000 ft, Filter BW = 1.2 MHz



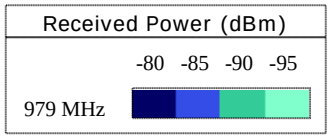
Altitude = 30,000 ft, Filter BW = 1.2 MHz



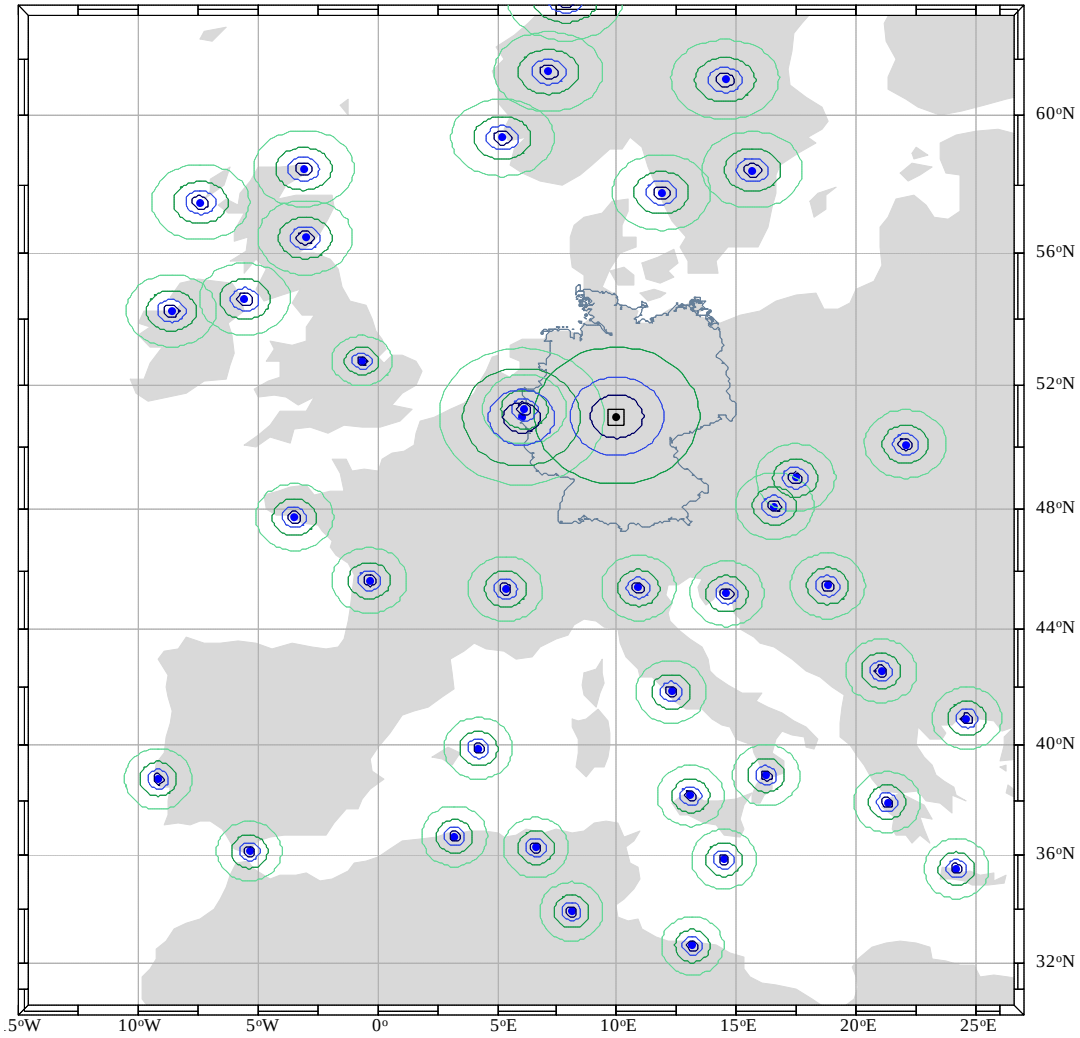
Altitude = 40,000 ft, Filter BW = 1.2 MHz



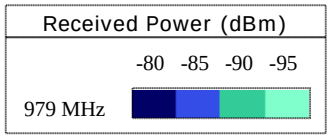
Altitude = 10,000 ft, Filter BW = 1.2 MHz



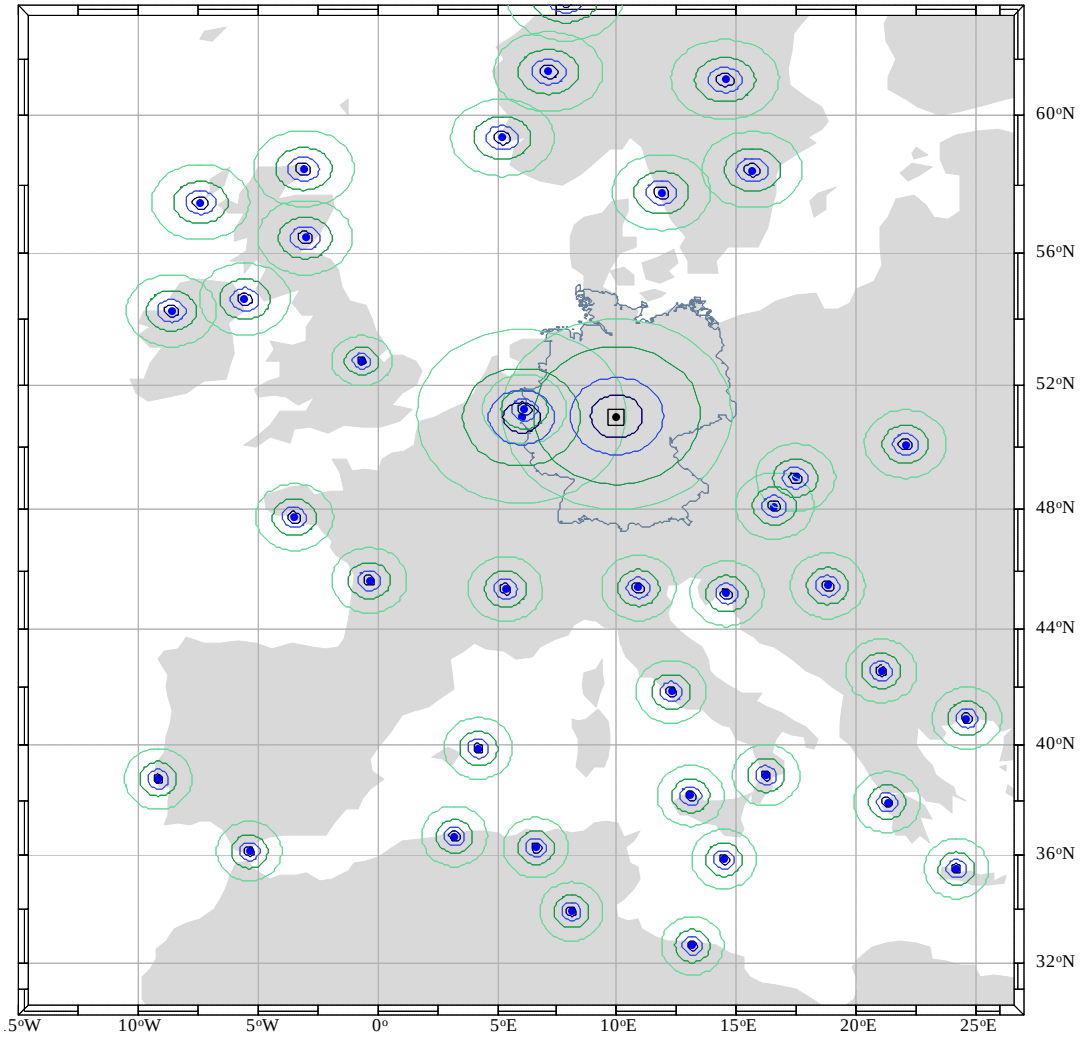
978-MHz DMEs
not shown



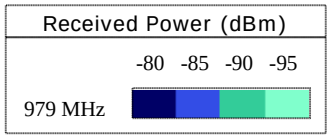
Altitude = 20,000 ft, Filter BW = 1.2 MHz



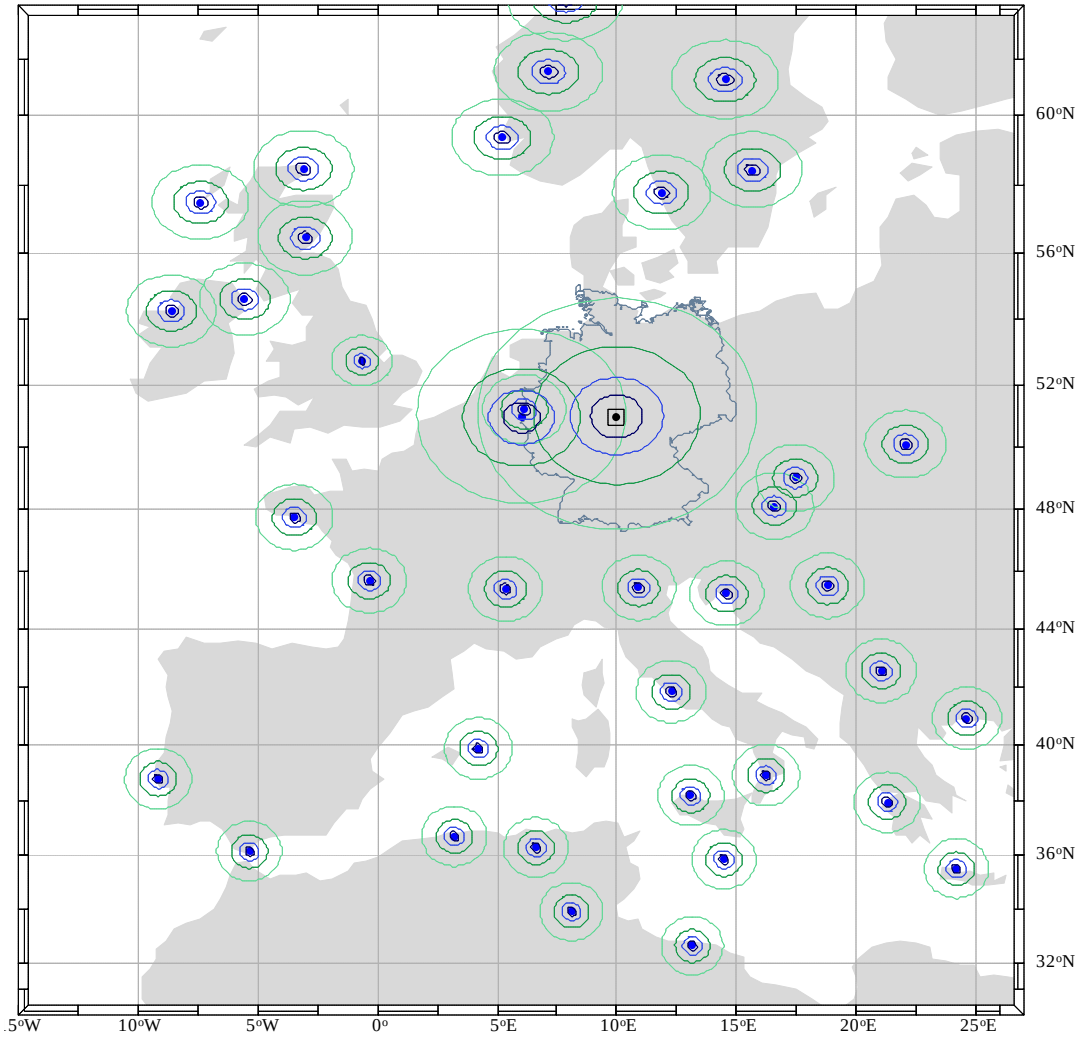
978-MHz DMEs
not shown



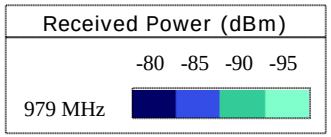
Altitude = 30,000 ft, Filter BW = 1.2 MHz



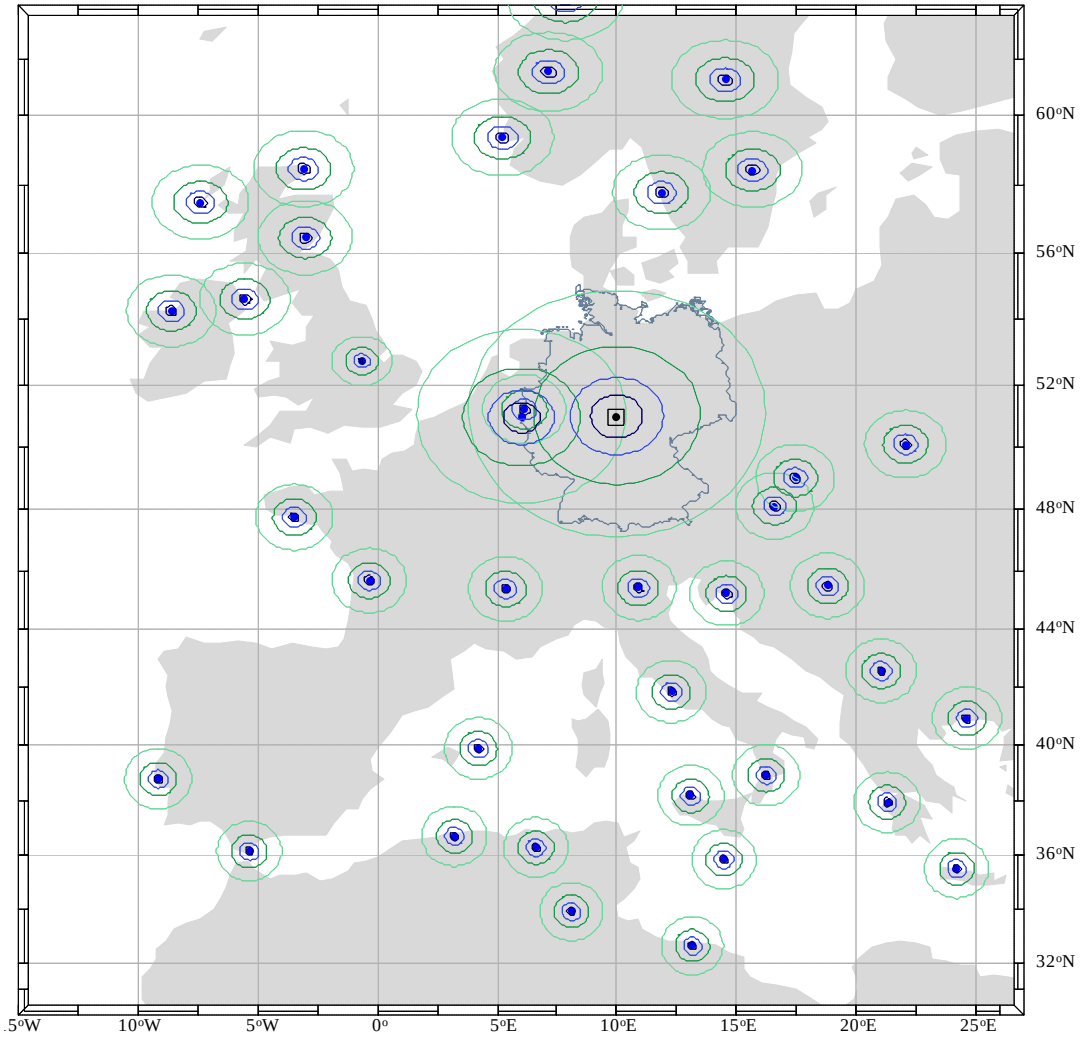
978-MHz DMEs
not shown



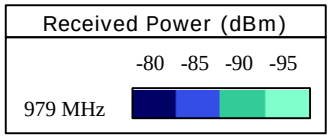
Altitude = 40,000 ft, Filter BW = 1.2 MHz



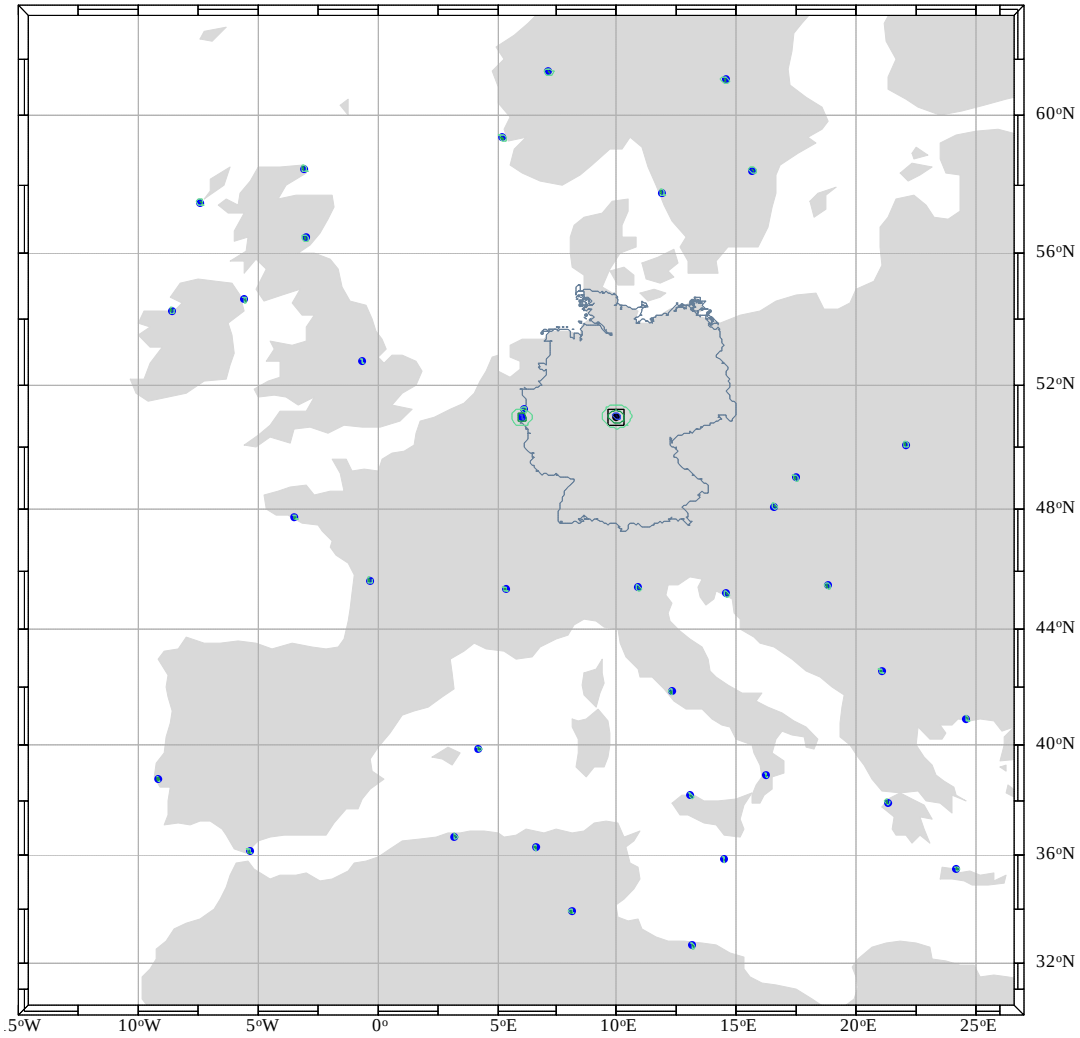
978-MHz DMEs
not shown



Altitude = 20,000 ft, Filter BW = 0.8 MHz



978-MHz DMEs
not shown



Conclusions

- Worst case scenario (all 978 MHz DMEs cleared)
  - (1.2 MHz) 2 at -80 dBm, 1 at -90 dBm
  - (0.8 MHz) 2 at -100 dBm, 1 at -110 dBm

- Worst case scenario (Ahlhorn and Furstenfeldbruck cleared)
  - (1.2 MHz) 1 at -70 dBm, 2 at -80 dBm, 1 at -90 dBm
  - (0.8 MHz) 1 at -70 dBm, 2 at -100 dBm, 1 at -110 dBm

- Worst case scenario (no DMEs cleared)
  - (1.2 MHz) 2 at -70 dBm, 3 at -80 dBm, 1 at -90 dBm
  - (0.8 MHz) 2 at -70 dBm, 1 at -80 dBm, 2 at -100 dBm, 1 at -110 dBm

    - or -
  - (1.2 MHz) 1 at -65 dBm, 2 at -70 dBm, 1 at -75 dBm
  - (0.8 MHz) 2 at -70 dBm, 1 at -75 dBm, 1 at -85 dBm