

Applicant: University of Massachusetts Lowell
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Below are the answers to questions requested by Behnam Ghaffari:

- a) Satellite antenna gain and beamwidth
 - 8300-8400 MHz band (4x4 patch antenna array):
 - Antenna gain: 15 dB
 - Beamwidth: 25° (FWHM)
 - 435-438 MHz band (tape dipole antenna):
 - Antenna gain: 2 dB
 - Beamwidth: 180° (FWHM)
- b) Satellite transmitter antenna: Narrow Beam (NB) or Earth Coverage (EC)
 - 8300-8400 MHz band (4x4 patch antenna array):
 - Narrow Beam (NB)
 - 435-438 MHz band (tape dipole antenna):
 - Earth Coverage (EC)
- c) Earth Station receiver:
 - i. Antenna gain:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - 59 dB
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - 15 dB
 - ii. Beamwidth:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - 0.2°
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - 42°
 - iii. Azimuth Range:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - 360°
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - 360°
 - iv. Site elevation above mean sea level in meters:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - 99 meters
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - 50 meters (to roof from mean sea level)
 - v. Antenna height above terrain in meters:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - 25 meters
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - 3 meters
- d) Earth station receiver antenna azimuth, the minimum angle of elevation:
 - 8300-8400 MHz band (18 meters dish at MIT Haystack, Westford MA):
 - Azimuth: 360°
 - Minimum angle of elevation: 5° (above horizon)
 - 435-438 MHz band (M2 436CP16 at UMass Lowell, Lowell MA):
 - Azimuth: 360°
 - Minimum angle of elevation: 5° (above horizon)