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EJSM Radar instruments: Natural radio noise from Jupiter

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Radar instruments are part of the core payload of the Europa Jupiter System Mission (EJSM) spacecraft: NASA-led JEO (Jupiter Europa Orbiter) and ESA-led JGO (Jupiter Ganymede Orbiter). At this point of the project, several frequency bands are foreseen for radar studies between 5MHz and 50MHz. While the high frequencies (40 to 50 MHz) are clean bands since natural jovian radio emissions show a high frequency cutoff at about 40 MHz, lower frequencies are right in the middle of the intense decametric (DAM) radio emissions. We present a review of spectral intensity, variability and sources of these radio emissions. As the radio emission are beamed, it is possible to model the visibility of the radio emissions, as seen from the vicinity of Europa or Ganymede. We have investigated Io-related radio emissions as well as radio emissions related to the auroral oval. One result from these simulations is that some portion of the orbit of Europa is clean from Non-Io DAM emissions above 22 MHz. We also review the radiation belts synchrotron emission characteristics. This study clearly shows that a deep understanding of the natural radio emissions at Jupiter is necessary to prepare the future EJSM radar instrumentation.