**REACH antenna specs**

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| **Specs** | **Value** | **Note** | **Priority** |
| *S11* | <-15 dB | In order to reduce reflections in the matching with the LNA. | High |
| *Beam patterns* | Residuals after low order model fitting < 10 mK | See eq 8 of Christo’s paper. Ultimately we need to evaluate our ability to model the whole instrument response and we will assess that using Dominic’s pipeline. | High |
| *Bandwidth* | ~<50 MHz  -  ~>180 MHz  (ideally up to 200 MHz) | This is a very demanding bandwidth. Based on the expected signal and priorities, the low part of the band from ~< 50 MHz up to as much as possible but at least 120 MHz. The final bandwidth will determine the total number of subsystems needed to cover the entire band. | High |
| *Physical dimensions* | TBD | There is no a fundamental constrain on the antenna dimensions or weight , within reason. | Medium |
| *Radiation efficiency* | >98% | This parameter is strongly linked to the beam patterns, since low losses are not strictly necessary as long as they can be modeled well enough, however, as for the beams and S11, high values of radiation efficiency will ensure a smoother system and easier data analysis. | High |
| *Effective length* | TBD | The ultimate goal is to assess our ability to separate the cosmic signal from the foregrounds using the data analysis tools at hand, thus we will include any antenna models in Dominic’s pipeline to assess its goodness for REACH. | Highest |
| *Number of orthogonal polarizations* | 2 (1) | TBD, based on the ability to meet the highest priority requirements. | Medium |
| *Field of View (3dB beam-width)* | > 10 deg2 in the sky | Provided that the FoV is larger than ~ 10 degrees squared in the sky in order to observe the monopole emission, the FoV could be as wide as required. Narrower beams will be less affected by foregrounds and are preferred though. Furthermore, gain values <- 20 dB at the horizon (Within at least 10 degrees from the horizon) in all directions will reduce the effect of environmental factors and terrestrial RFI. The beam does not need to be looking at zenith necessarily. | Medium-high |

Table 1. Antenna specs for REACH