

## SKA1 Telescope Expected Performance – Imaging Design Baseline (AA4)

| Nominal Frequency                                              | 110 MHz    | 300 MHz    | 770 MHz   | 1.4 GHz   | 6.7 GHz | 12.5 GHz |
|----------------------------------------------------------------|------------|------------|-----------|-----------|---------|----------|
| Range [GHz]                                                    | 0.05-0.35  | 0.05-0.35  | 0.35-1.05 | 0.95-1.76 | 4.6-8.5 | 8.3-15.3 |
| Telescope                                                      | Low        | Low        | Mid       | Mid       | Mid     | Mid      |
| FoV [arcmin]                                                   | 327        | 120        | 109       | 60        | 12.5    | 6.7      |
| Max. Resolution (arcsec)                                       | 11         | 4          | 0.7       | 0.4       | 0.08    | 0.04     |
| Max. Bandwidth [MHz]                                           | 300        | 300        | 700       | 810       | 3900    | 2 X 2500 |
| Cont. rms, 1 hr ( $\mu\text{Jy}/\text{beam}$ ) <sup>a</sup>    | 26         | 11         | 4.4       | 2         | 1.3     | 1.2      |
| Line rms, 1 hr ( $\mu\text{Jy}/\text{beam}$ ) <sup>b</sup>     | 1840       | 800        | 300       | 140       | 90      | 85       |
| Resolution Range for Cont. and Line rms [arcsec] <sup>c</sup>  | 10-870     | 4–330      | 1.3–184   | 0.6–99    | 0.15–21 | 0.08–11  |
| Channel width (uniform resolution across max. bandwidth) [kHz] | 5.4        | 5.4        | 13.4      | 13.4      | 53.8    | 80.6     |
| Spectral zoom windows X narrowest bandwidth [MHz] <sup>d</sup> | 64 X 0.025 | 64 X 0.025 | 4 X 3.1   | 4 X 3.1   | 4 X 3.1 | 4 X 3.1  |
| Finest zoom channel width [Hz]                                 | 14         | 14         | 210       | 210       | 210     | 210      |

a. Continuum sensitivity at Nominal Frequency, assuming fractional bandwidth of  $\Delta\nu/\nu = 0.3$

b. Line sensitivity at Nominal Frequency, assuming fractional bandwidth per channel of  $\Delta\nu/\nu = 10^{-4}$  ( $>10^{-6}$  will be possible)

c. The sensitivity numbers apply to the range of beam sizes listed

d. This lists the maximum number of zoom windows allowed. Zoom windows that are 2x, 4x, 8x, ... the narrowest bandwidth are possible, with decreased spectral resolution (128x for Low; 64x for Mid).

Source: SKA System Requirements Specification, Revision 13

For more details refer to the document “Anticipated SKA1 Science Performance” (SKA-TEL-SKO-0000818: Mid – Table 3. Low – Table 1).