Main Technical Specifications for the uGMRT Phase-II release of 15th Sep 2015

The uGMRT Phase-II system for internal release to NCRA users, which is a subset of the full uGMRT system that is planned, is targeted to have the following configuration and specifications for the end user :

1. Front-End (FE) + Optical Fibre (OF) systems :

1.1. All 30 antennas with Lband FE system (1000-1450 full-band & 4 sub-bands)

(note : refined versions of full band & sub band filters will continue to be installed in a phased manner, as and when a FE unit comes down for repair)

1.2. Minimum of 16 antennas with 250-500 MHz wideband FE system :
- 1.2.1. 250-500 MHz feed + matching LNA & full-band BPF + TV notch filters
- 1.2.2. Following 18 antennas with system installed will be available :
  C00, C04, C06, C08, C10, C11, C12, C13,
  E02, E04, E06,
  S02, S04, S06,
  W01, W04, W05 & W06.

(note : not all of these antennas have final FE box with sub-band filters, noise injection, temperature and total power monitoring facilities, which will continue to be installed in a phased manner, as per the overall plan)

1.3. All 30 antennas with wideband OF system, delivering the full wideband signals to the analog backend system.

2. Back-end (BE) systems :

2.1. Analog section : GMRT Analog Backend (GAB) for all 30 antennas :

- 2.1.1. Convert any of the RF bands to baseband, with final BW of 100/200/400 MHz.
- 2.1.2. Common LO settings for all antennas, both polarisations in steps of 1 Hz, from 10 to 1500 MHz.
- 2.1.3. Variable attenuation control for power equalisation

(note : small improvements and additions will continue to be made to this released system, as per the overall plan)

2.2. Digital section : GMRT Wideband Backend (GWB) for 16 antennas, dual polarisation :

(note : any 16 antennas can be connected to the digital back-end by rearranging the input cables to the correlator room, on the wall panel)

2.2.1. Interferometric modes :
(a) Total intensity and full polar modes for 100/200/400 MHz BW choices.
(b) Total intensity narrow bandwidth spectral line modes (details to be specified in the SOP for the GWB)

2.2.2. Beam modes (can be in parallel with the interferometric mode 2.2.1.a) :
(a) Total intensity mode for one IA and one PA beam for 100/200/400 MHz BW.
(b) Full polar mode for one PA beam for 100/200/400 MHz BW.
(c) Range of choices for integration time (and number of channels) -- details specified separately in a table in the SOP for the GWB.

2.2.3. Common features :
(a) Upto 16 k spectral channels for most of the above modes (for extreme combinations of number of channels and integration times, may not work reliably for lack of i/o or recording capabilities).
(b) Phasing of the antennas using standard procedure (additional mode called "wideband phasing" likely to be available -- to be specified separately).

(c) Standard power equalisation scheme for balancing the power levels for all working antennas, using the GAB attenuators.
(d) Recommended settings of GAB LO for some "standard modes" of observing for L-band (full band and sub-bands) and 250-500 systems.

NOTE : It is to be understood that not all the modes and combinations specified above have been tested thoroughly, and there may be undiscovered issues in some of these. Part of the aim of the uGMRT phase-II internal release is to allow users to exercise the system for a thorough shake-down of the system.

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