32T Test Plan –
FFT Imaging (4a)

Original Author: Stephen Ord
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1 Introduction

FFT imaging is the basic task of inverting the gridded visibilties into a representation of the sky brightness distribution via the application of a Fast Fourier Transform. This plan is responsive to requirement #4a contained in the memo "MWA 32-T Objectives and Quality Assurance Evaluation Criteria", dated 4 September 2009 (46-03001.99).

2 References

This task is unconstrained by elements outside the RTS. The imaging task for 32T is similar to that of 512T. However we *do not* have to apply a wide field polarimetric calibration to the same degree as required by 512T. The 32T imaging pipeline will be outlined in a publication currently in preparation.

3 Measurement Description

The task required is to *demonstrate basic imaging performance at 3 different frequencies.* Basic imaging performance is viewed as an instantaneous imaging capability for an 8 second cadence, of 16 channels per RTS node, in instrument polarization without wide-field correction.

3.1 Frequency Resolution

Each RTS node will image the frequency range allocated to it. This may be as large as 192, 40kHz channels. It is unlikely that all 192 channels will be independently imaged as this is a task well in excess of the computational task required of the full system (nearer 16 channels). As a result we will consider that the imaging of 16 channels, either spread throughout the 192 channels – or formed by integrating over some fraction of the input frequency allocation will be sufficient.

3.2 Time Resolution

As this is a demonstration of basic imaging capability no integration in time will be attempted and a single 8 second cadence will be generated.

3.3 Instrumental Polarization

The basic imaging task will not convert the image from instrumental polarisation.

3.4 Wide-field Correction

As no integration of images is implied no wide field correction will be performed.

4 Resources Required

4.1 Staffing

Imaging is an entirely automated task within the Real-time system. This system is intended to operate without intervention. In reality it is reasonable to assume that the RTS will have to be managed initially by one or more of the RTS development team

4.2 Hardware

To demonstrate the RTS imaging capabilities we depend upon the successful operation of the complete array

- Operational tiles and beamformers, receivers
- Operational correlator
- Operational Real-time computer with sufficient capability to perform the task (task 14).
- Monitor and Control system – must at least provide RTS with pointing parameters.

4.3 Software

Operational RTS.

4.4 Execution Time and Constraints

After initial convergence of the calibration system 8 seconds of observing time is required to meet this goal, for each frequency band observed.

5 Success Criteria

Lack of obvious image artifacts and a noise floor consistent with the array and the system temperature.

Revision History

Rev Ltr	Date	Author	Description
01	2008-09-18	SMO	First draft at 4a.
02	2009-09-28	SMO	Some corrections
03	2010-01-04	RFG	Formatting