Integration Test Report

Document number E1200-XXX-XXXX
Revision 1
Classification . . . . Commercial in Confidence
Prepared by . . . . Unknown
Date . . . . 08 December 2021

Organisation	:	NRF (National Research Foundation)
Facility	:	SARAO (South African Radio Astronomy Observatory)
Project	:	MeerKAT Extension
Document Type	:	Integration Test Report
Function/Discipline	:	Engineering / Digital Signal Processing

Document Approval

Function	Name	Designation	Affiliation	Date	Signature
Submitted by	J.N. Smith	Digital Engineer	SARAO		
Approved by	T. van Balla	Functional Manager: DSP	SARAO		
Accepted by	S. Celliers	MeerKAT Extention System Engineer	SARAO		
Accepted by	T. Abbott	MeerKAT Programme Manager	SARAO		

Document History

Revision	Date of Issue	ECN Number	Comments
A	01 Apr 2021	N/A	First release for internal review.

Document Distribution

Publish in eB and Distribute to all signatories on the document and the relevant line managers.

Document Software

Task	Package	Version
Stylesheet	katdoc	1.1.2-dirty
Text processor	pdfLATEX	3.14159265-2.6-1.40.20 (TeX Live 2019/Debian)

Company Details

Name	SARAO, Johannesburg	SARAO, Cape Town	SARAO, HartRAO	SARAO, Karoo Astronomy Reserve
Physical / Postal Address	???	Black River Park North 2 Fir Street, Observatory, Cape Town, 7925, South Africa	P.O. Box 443, Krugersdorp, 1740, South Africa	Posbus 69, Carnarvon, 8925, South Africa
Tel.	+27 11 268 3400	+27 21 506 7300	+27 12 301 3100	+27 21 506 7300
Fax	+27 11 442 2454	+27 21 506 7375	+27 12 301 3300	+27 86 538 6836
Website	www.ska.ac.za	www.ska.ac.za	www.hartrao.ac.za	www.ska.ac.za

Contents

List of Figures

List of Tables

Glossary

B-Engine	The DSP software or bitstream responsible for beamforming.
F-Engine	The DSP software or bitstream responsible for channelisation.
F-X Correlator	A correlator architecture where digitiser data is first channelised (F) per-receptor, and then cross-correlation (X) is calculated per-frequency-channel.
X-Engine	The DSP software or bitstream responsible for correlation.

1 Result Summary

Channelisation	passed	4.014 s
Delay Tracking	failed	5.013 s
Baselines	failed	2.007 s

Total test duration: 11.035 s

2 Detailed Test Results
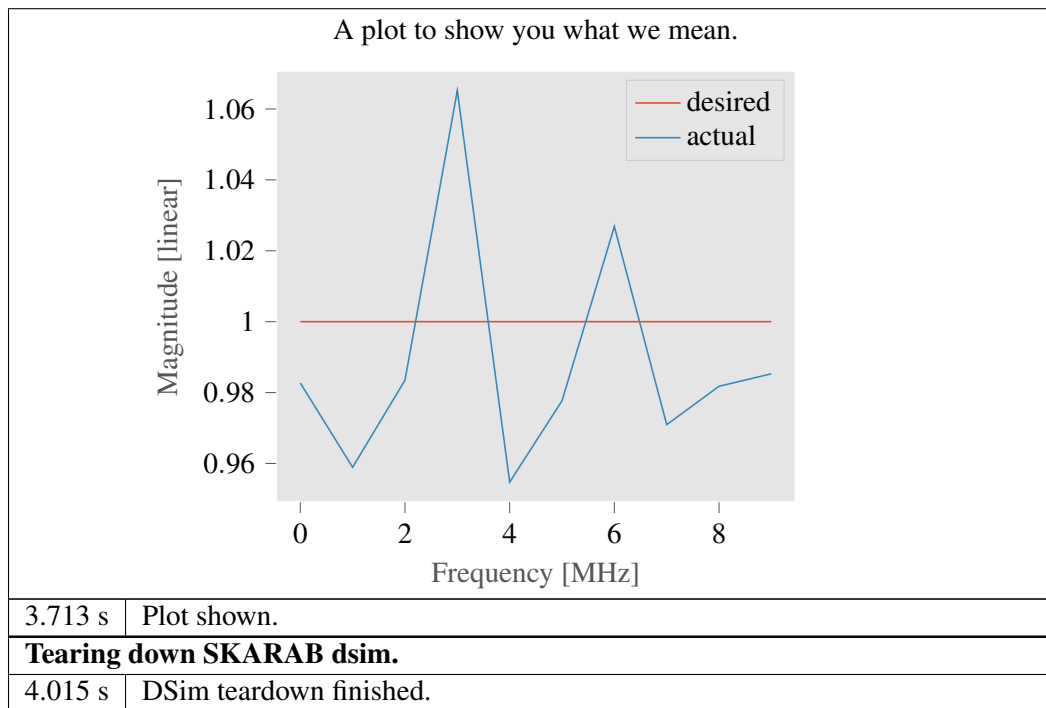
2.1 Channelisation

Channelisation Test.

Fulfils requirement ABC.

Outcome: PASSED   Test start time: 11:25:09   Duration: 4.014 s seconds

Test Configuration	
Channels	4096
Antennas	13
Bandwidth	1712000000.0

2.1.1 Procedure

Setting up SKARAB Dsim	
0.701 s	skarab020406, firmware 0.1
Select a random channel.	
0.704 s	Random channel selected: 42
Sweep frequencies across that channel and capture heaps.	
0.704 s	Setting Dsim frequency to 1
1.706 s	Heap captured.
1.706 s	Setting Dsim frequency to 2
2.707 s	Heap captured.
2.707 s	Setting Dsim frequency to 3
3.708 s	Heap captured.
Draw a plot to illustrate some of the data.	
3.708 s	Making up some numners.

A plot to show you what we mean.

3.713 s	Plot shown.
Tearing down SKARAB dsim.	
4.015 s	DSim teardown finished.

2.2 Delay Tracking

Delay tracking test.

Fulfils requirement FGD.

Outcome: FAILED   Test start time: 11:25:13   Duration: 5.013 s seconds

Test Configuration	
Channels	4096
Antennas	13
Bandwidth	1712000000.0
Enthusiasm	Low

2.2.1 Procedure

Setting up SKARAB Dsim	
0.701 s	skarab020406, firmware 0.1
Set delay model on Antenna 1	
0.705 s	Setting delay model on antenna 1
1.706 s	Antenna 1 delay model confirmed as 345.
Capture 3 heaps, compare the phase, check for within spec.	
2.708 s	Captured heap 1
3.709 s	Captured heap 2
4.711 s	Captured heap 3
Tearing down SKARAB dsim.	

| 5.033 s | DSim teardown finished. |

AssertionError: Phase not within spec!
assert 2 < 1

2.3   Baselines

Baseline test.

Blurb.

Fulfils another requirement.

Outcome: FAILED   Test start time: 11:25:18   Duration: 2.007 s seconds

Test Configuration	
Setup	Arbitrary

2.3.1   Procedure

Setting up SKARAB Dsim	
0.701 s	skarab020406, firmware 0.1
Set something.	
1.705 s	Checking that something is set.
1.705 s	Confirmed, something is set properly.
Tearing down SKARAB dsim.	
2.015 s	DSim teardown finished.

assert 9 < 8