

SMOS L1 Processor Prototype Test Data Set 5.5.0 description

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Page : i

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Table of Contents

Document Information ii

Document Status Log iii

1. INTRODUCTION 1

1.1. Purpose and Scope 1

1.2. Acronyms and Abbreviations 1

1.3. Applicable and Reference Documents..... 2

2. Test Data Set V5.5.0 contents..... 3

List of Tables

Table 1: Table of Acronyms..... 2

Table 2: Applicable Documents. 2

Table 3: List of tests proposed for TDS 5.5.0..... 3

1. INTRODUCTION

1.1. Purpose and Scope

This short note lists the contents of the Test Data Set for the L1PP v5.5.0. It is intended as a high level description, leaving a full description of the tests to the Validation Report document.

1.2. Acronyms and Abbreviations

| | |
|-------|---|
| APID | Application program identifier |
| CFI | Customer Furnished Item |
| DPM | Data Processing Model |
| EE | Earth Explorer |
| EEFH | Earth Explorer File Handling CFI (ASCII XML library) |
| GUI | Graphical User Interface |
| HKTM | HouseKeeping Telemetry |
| HTML | HyperText Markup Language |
| L1PP | Level 1 processor prototype |
| LCF | LiCeF (Lightweight and Cost-Effective Front-end) |
| LO | Local Oscillator |
| MIRAS | Microwave Imaging Radiometer with Aperture Synthesis |
| NIR | Noise Injection Radiometer |
| OBET | On Board Elapsed Time |
| PLM | PayLoad Module |
| PMS | Power Measurement Signal |
| SEPS | SMOS End-to-end Performance Simulator |
| SMOS | Soil Moisture and Ocean Salinity |
| SVP | Software Validation Plan |
| TBW | To Be Written |
| UPC | <i>Universitat Politècnica de Catalunya</i> (Technical University of Catalonia) |
| XML | Extended Markup Language |

Table 1: Table of Acronyms.

1.3. Applicable and Reference Documents

| Ref. | Code | Title | Issue |
|------|---------------------|--|------------------------|
| AD.1 | SO-TR-DME-L1PP-0263 | SMOS L1 Processor v5.5.0 System Validation Report / Acceptance Test Report | 1.0 29/11/11 |

Table 2: Applicable Documents.

2. TEST DATA SET V5.5.0 CONTENTS

For this release of the Test Data Set, the scenarios were chosen in order to keep the dimension of the TDS reasonable and of a manageable complexity, while still exemplifying all the relevant cases. The TDS contents are exactly the same as for TDS 5.0.0, in order to be able to make direct comparisons, with the exception of specific tests designed to demonstrate the impact of new implementations.

Data was selected from the data base available from dpgs-l0 ftp servers at ESAC, covering the period between 13th-Jan-2010 until 31st-Jan-2010.

All scientific scenarios were processed with L1PP v5.5.0 using:

- Offset correction on baselines sharing the same LO;
- Reference temperature set to be the average of the NIRs (Tref v2);
- Gibbs 1 reconstruction algorithm;
- Applying all the Foreign Sources corrections **except** Sun Glint;

For each (segment of an) orbit in measurement mode to be processed, L1PP v5.5.0 shall ingest:

- a) the closest long and external calibration events prior to the orbit and;
- b) the PMS short sequences to update PMS offset values and;
- c) the LO calibration relative to the orbit to be processed.

The orbits have been cut in smaller portions to improve the performance of the system testing. The list of tests performed, which covers the previous functionalities, is presented in the table below. For more information on the test contents and results, please refer to [AD.1].

Table 3: List of tests proposed for TDS 5.5.0

| Type | Description | Internal Code |
|---|---|---------------|
| System Tests / Calibration Processing and Consolidation Tests | Test processing from L0 to L1a using external calibration and NIR Calibration. | genANIR |
| | Test processing from L0 to L1b using external calibration data and external target manoeuvre, including FTR in Dual polarisation. | genFTTD |
| | Test processing from L0 to L1b using external calibration data and external target manoeuvre, including FTR in Full polarisation. | genFTTF |
| | Test Generation of G and J Matrices from L0 data | genMatr |
| | Test processing from L0 to L1a using long calibration sequences | genLongCal |

| Type | Description | Internal Code |
|-----------------------------|---|----------------------------|
| Scientific Validation Tests | Test processing from L0 to L1c data acquired in measurement mode in Dual polarisation with LO injection every 6 minutes. Segment of 500 scenes in an ascending orbit over Australia. | austD |
| | Test processing from L0 to L1c data acquired data in measurement mode in Dual polarisation with LO injection every 6 minutes. Segment of 600 scenes in an ascending orbit over Europe. | euroD |
| | Test processing from L0 to L1c data acquired data in measurement mode in Dual polarisation with LO injection every 6 minutes. Segment of 600 scenes in an ascending orbit over the Pacific Ocean. | pacfD |
| | Test processing from L0 to L1c data acquired in measurement mode in Full polarisation with LO injection every 6 minutes. Segment of 749 scenes in an ascending orbit over Australia. | austF |
| | Test processing from L0 to L1c data acquired data in measurement mode in Full polarisation with LO injection every 6 minutes. Segment of 748 scenes in an ascending orbit over Europe. | euroF |
| | Test processing from L0 to L1c data acquired data in measurement mode in Full polarisation with LO injection every 6 minutes. Segment of 747 scenes in an ascending orbit over the Pacific Ocean. | pacfF |
| Specific Validation Tests | Test Generation of Hexagonally Expanded G-Matrix from In-Orbit Data with Long Calibration sequence. | genHexagonalMatr |
| | Test processing from L0 to L1c data acquired in measurement mode in Full polarisation with LO injection every 6 minutes. Segment of 500 scenes in an ascending orbit over Australia. This test is executed with the "Earth_Contribution_Correction_Type" set to 2 (CNF file), "Use Expanded Hexagonal Domain G-Matrix" set to true (configuration file) and using the G-matrix from genHexagonalMatr test. | austF-Gibbs2 |
| | Test processing from L0 to L1c data acquired in measurement mode in Dual polarisation with LO injection every 6 minutes. Segment of 500 scenes in an ascending orbit over Australia using a Circular Apodisation Window, provided by ESA. | austD-Circular-Apodisation |
| | Test the processing of the Long Calibration Sequences after the separation between long and short term parameters. | genLongCal-Split |
| Reference tests | Test processing from L0 to L1c data acquired data in measurement mode in Full polarisation with LO injection every 10 minutes. Two ascending orbits with 3211 scenes over the Pacific Ocean. | pacfF-OS |

As for the delivery of TDS, it is proposed to deliver a single TDS to all users, with the following contents:

| TDS | Scenarios | Contents |
|-----------------|--|--|
| TDS-L1PP V5.5.0 | genANIR, genFTTD, genFTTF, genMatr, genMatr, genLongCalib, austD, euroD, pacfD, austF, euroF, pacfF, austF-Gibbs2, austD-Circular-Apodisation, genLongCal-Split and pacfF-OS | Products, breakpoints (when applicable) and logs |

The scenarios will be provided, packed separately, through the SMOS L1PP webpage¹.

¹ http://www.smos.com.pt/project_data_products.html