



**Dataset Description Document
for RPW Low Latency CDF Files**

Ref: ROC-OPS-LLD-NTT-00028-LES
Issue: 01
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Date: 06/03/2017

SOLAR ORBITER



RPW Ground Segment

Dataset Description Document for RPW Low Latency CDF Files

ROC-OPS-LLD-NTT-00028-LES
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Change Record

Issue	Rev.	Date	Authors	Modifications
0	0	16/01/2016	X.Bonnin	First draft
1	0	16/06/2016	X.Bonnin	First release
1	1	06/03/2017	X.Bonnin	<ul style="list-style-type: none"> - Rename Potential, Electrical, and Magnetical zVars of RPW-BIA dataset to V, E and B respectively - Rename SBM1/2_QUALITY_FACTOR zVars to SBM1/2_QF - SBM1/2_QF CDF data type is now CDF_REAL4 to provide the engineering value - Add COARSE_TIME zVar in the RPW-TNR dataset - Update the filename naming for each data set - Fix the ACQUISITION_TIME_UNITS value for fine part (s / 65536) - Update data volume information

Acronym List

Acronym	Definition
CCSDS	Consultative Committee for Space Data Systems
CDF	Common Data Format
CLI	Command Line Interface
CUC	CCSDS Unsegmented time Code
ESA	European Space Agency
ESAC	European Space Astronomy Centre



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EUI	Extreme Ultraviolet Imager
HF	High Frequency
HK	Housekeeping
ICD	Interface Control Document
ISO	International Organization for Standardization
LESIA	Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique
LF	Low Frequency
LL	Low Latency
LLDP	Low Latency Data Pipeline
LLDPDD	Low Latency Data Product Definition Document
LLVM	Low Latency Virtual Machine
MD5	Message Digest 5
OBT	On-Board Time
OS	Operating System
RLLP	RPW Low Latency data Pipeline
ROC	RPW Operation Centre
RPW	Radio and Plasma Waves instrument
S/C	Spacecraft
SCET	Spacecraft Elapsed Time
SCM	Search Coil Magnetometer
SEGU	Solar Orbiter Engineering Guidelines for External Users
SOAR	Solar Orbiter Science Archive
SFTP	SSH File Transfer Protocol
SGS	Science Ground Segment
SGSE	Software Ground Support Equipment
SOC	Science Operation Centre
SSH	Secure Shell
SVN	SubVersion
S/W	Software
TDS	Time Domain Sampler
SUM	Software User Manual
UTC	Universal Time Coordinated



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VM	Virtual Machine
XML	eXtended Markup Language



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1 GENERAL

1.1 Scope of the Document

This Low Latency Data Product Definition Document (LLDPDD) describes the format and content of the Radio and Plasma Waves instrument (RPW) Low Latency (LL) data. It includes descriptions of the data products and associated metadata, including the data format, content, and generation pipeline, in accordance with the Low Latency CDF ICD [AD1]. These products will be stored and distributed from the Solar Orbiter Science Archive [RD5] of the SOC.

The specifications described in this LLDPDD apply to all RPW Low Latency products generated by the instrument-provided pipeline running at the Solar Orbiter SOC, specified as LL01 data. A similar document will be provided by the SOC, describing the RPW LL02 data that were generated at SOC after processing the LL01 data.

This document only includes descriptions of Low Latency products generated at SOC. It does not address the Science data delivered by the Science pipelines run at the RPW Team premises, as these data products shall be described in [RD2].

1.1 Applicable Documents

This document responds to the requirements of the documents listed in the following table:

Mark	Reference/Iss/Rev	Title of the document	Authors	Date
AD1	SOL-SGS-ICD-0004/1/1	Solar Orbiter Interface Control Document for Low Latency Data CDF Files	A. Walsh	21/07/2015
AD2				
AD3				
AD4				
AD5				

1.2 Reference Documents

This document is based on the documents listed in the following table:

Mark	Reference/Iss/Rev	Title of the document	Authors	Date
RD1	http://cdf.gsfc.nasa.gov	CDF User's Guide v3.5	NASA CDF team	
RD2	SOL-SGS-OTH-004-TPL_DPDD	Solar Orbiter RPW Data Product Description Document, template	X. Bonnin	
RD3	SOL-SGS-TN-0009/2/2	Metadata definition for Solar Orbiter Science Data	Solar Orbiter MADA WG	23/07/2015



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RD4	SOL-SGS-TN-0006/1/0	SOC Engineering Guidelines for External Users	Richard Carr	04/03/2015
RD5	SOL-SGS-PL-0009/0/2	Solar Orbiter Archive Plan	Pedro Osuna	01/07/2015
RD6				
RD7				
RD8				



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2 RPW INSTRUMENT DESCRIPTION

2.1 Science Objective

RPW will make key measurements in support of the first three, out of four top-level scientific questions, which drive Solar Orbiter overall science objectives:

1. How and where do the solar wind plasma and magnetic field originate in the corona?
2. How do solar transients drive heliospheric variability?
3. How do solar eruptions produce energetic particle radiation that fills the heliosphere?
4. How does the solar dynamo work and drive connections between the Sun and the heliosphere?

Here is the summary of the specific RPW Science Objectives.

Solar & Interplanetary Radio Burst

5. What is the role of shocks and flares in accelerating particles near the Sun?
6. How is the Sun connected magnetically to the interplanetary medium?
7. What are the sources and the global dynamics of eruptive events?
8. What is the role of ambient medium conditions on particle acceleration and propagation?
9. How do variations and structure in the solar wind affect low frequency radio wave propagation?

Electron density & temperature measurements with the Quasi-Thermal Noise spectroscopy

10. Precise measurement of both the electron density and temperature, with accuracies respectively of a few % and around 10 %, at perihelion.
11. Study the non-thermal character of the electron distributions at perihelion.

Radio emission processes from electron beams: Langmuir waves and electromagnetic mode conversion

12. Measurements for the first time in the Solar Wind of both the electric and magnetic field waveforms at high time resolution (up to 500 kSs).
13. Study of the mode conversion from Langmuir to electromagnetic waves.
14. Study of the energy balance between electron beams, Langmuir waves and e.m. radio waves at several radial distances

Solar wind microphysics and turbulence

15. Measure of the waves associated with the plasma instabilities that are generated by temperature anisotropies in the solar wind.
16. First DC/LF electric field measurements in the inner heliosphere and over a large radial distance in the solar.



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Shocks, Reconnection, Current Sheets, and Magnetic Holes

17. Identification & study of the reconnection process in current sheets with thickness down to the ion scales and smaller.
18. Determination of the interplanetary shock structure down to the spatial and temporal scales comparable and smaller than the typical ion scales.
19. Determination of different particle energisation mechanisms within shocks and reconnection regions.
20. Distinguish different radio burst generation mechanisms.

Interplanetary Dust

21. Determination, in combination with the EPD instrument, the spatial distribution, mass and dynamics of dust particles in the near-Sun heliosphere, in and out of the ecliptic.

To cover its specific Science Objectives, RPW will measure magnetic and electric fields at high time resolution using a number of sensors, to determine the characteristics of electromagnetic and electrostatic waves in the solar wind. More precisely, RPW will:

22. Make the first-ever high accuracy, high-sensitivity and low noise measurements of electric fields at low frequencies (below ~1 kHz) in the inner Heliosphere.
23. Measure the magnetic and electric fields of the solar wind turbulence with high sensitivity and dynamic range along the spacecraft trajectory.
24. Store high-resolution data from scientifically interesting regions such as in-situ shock crossings, in-situ Type III events and others.
25. Measure the satellite potential with high temporal resolution permitting to estimate the density fluctuations in the solar wind and allowing higher accuracy particle instrument measurements.
26. Measure the quasi thermal noise and Langmuir waves around the local plasma frequency
27. Measure for the first time the high frequency magnetic counterpart of Langmuir waves associated with in-situ Type III bursts
28. Observe the solar and interplanetary radio burst
29. Observe the radio counterpart of dust particle impacts
30. Detect on-board in-situ shock crossings and store the corresponding data
31. Detect on-board in-situ Type III events and store the corresponding data

2.2 Operational Modes producing LL data

The RPW software modes are managed by the Data Processing Unit (DPU) Software. For their part, the RPW analyzers shall manage the following modes:

32. A STANDBY mode: a mode where no scientific measurements are performed.
33. A SCIENCE mode: a mode itself decomposed in four sub-modes: NORMAL mode, BURST mode, SBM1 mode, SBM2 mode.



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In SCIENCE mode, RPW will have capability to run into basically three different types of modes, a "normal" mode or "SURVEY_NORMAL" mode, a "commanded burst" mode or "SURVEY_BURST" mode, and a "selected-burst" mode divided into two sub-modes "SBM1" and "SBM2".

The "normal" mode is a low cadence mode that will basically run all the time along the orbit except during time when the "commanded burst" mode will operate. The "normal" mode is intended to provide all the data for synoptic survey of the plasma conditions in the heliosphere.

The "commanded burst" mode is a high cadence mode that will be operated by command.

The "selected-burst" modes will run simultaneously with the "normal" mode, and fill internal (circular or no) buffers in order to enable the RPW DPU to perform the selection of specific events. The existence of "selected-burst" modes involves therefore that two data flows, one at "normal" (low) cadence, the other one at higher cadence, are continuously recorded by the sub-systems and transmitted to the DPU.

The RPW Low Latency (LL) science telemetry (TM) packets are produced only when RPW is operated in the SCIENCE mode, with an average rate of 33 bps.

At the S/C SSMM level, one packet store is dedicated for storing the RPW LL data: PS LL. The size of the packet store PS LL shall allow to store up to 60 days of RPW low latency science; this corresponds to a size of about: 0.17 Gbits.

The RPW LL data stream will be generated by taking the Automatic Gain Value (AGC) as well as the median of the radio flux in the top five frequency bins in band D of the thermal noise receiver (TNR), covering ~850-1024 kHz, and the plasma frequency index measured on-board.

Once a week, calibration data from the regular BIAS sweeping campaign will be added to the LL data stream.

3 DATA GENERATION PROCESS

The RPW LL01 products are produced by the pipeline delivered by the RPW Instrument Team and running at SOC. The data generation is described in this section.

The procedure for delivery of the LL data pipelines from the RPW Instrument Team to the SOC must be fully compliant with the SOC Engineering Guidelines for External Users [RD4].

SOC will host the instrument pipelines and retrieve the low latency data from MOC after downlink, passing it as input to the instrument pipelines. SOC will also post process the output of the pipelines, applying operations that will include, but not necessarily be limited to, time conversion from on-board time (OBT) to UTC and transformation of FOV parameters from instrument coordinates to an appropriate scientific coordinate system. SOC will not apply calibrations to the output of the instrument pipelines. SOC will also provide a simple web-based visualisation tool for the low latency. SOC will also distribute the low latency data files via the SOAR, hosted at ESAC, following the policies described in the Archive Plan [RD5].



3.1 Scientific Measurements

To meet the science objectives defined above, the RPW instrument has to consist of a sophisticated plasma/radio wave receiver system connected to high sensitivity electric and magnetic sensors. Since the receiver system covers a very wide frequency range (quasi-DC to 20 MHz for electric, and 0.1 Hz to 500 kHz for magnetic), different kinds of sensors are used for the measurements.

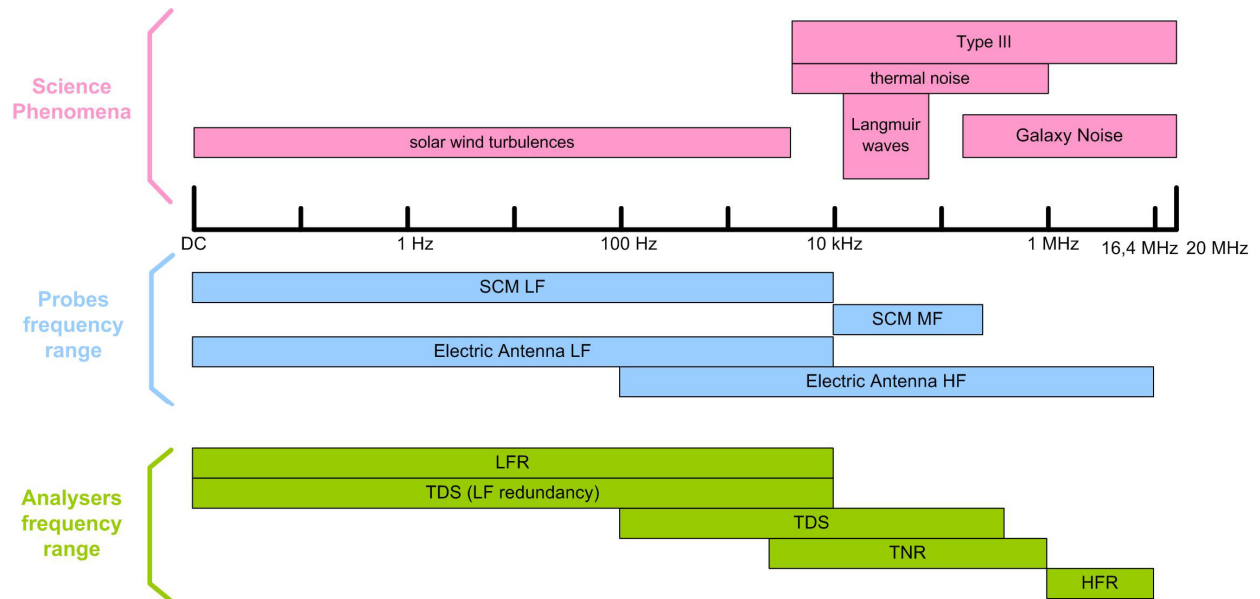


Figure 1. RPW frequency allocation.

The electric antenna (ANT), consisting on a set of three monopoles and the magnetic search coil unit (SCM) are designed to perform correctly for quasi-DC as well as for high frequency measurements. In particular, ANT design is optimised to satisfy the goal of measuring both the quasi-DC/low frequency electric fields and higher frequency radio and thermal noise emissions.

A biasing unit (BIAS) will allow DC electric measurements. The three TDS, LFR and TNR-HFR sub-systems correspond to the core of the receiver system by covering both waveform data and power spectral densities. TDS, LFR and TNR-HFR are connected to a common Data Processing Unit (DPU) that will handle commands, data and communication with S/C.

The science objective of LFR is the study of the electromagnetic wave activity in the extended corona and the solar wind, from a fraction of a Hertz to about 10 kHz, which should cover the electron gyrofrequency and most of the Doppler-shifted frequencies of the low frequency plasma waves. The main waves to be observed in this frequency range are thus kinetic or inertial Alfvén waves, ion cyclotron waves, ion acoustic waves, and magnetosonic or whistler mode waves. Their characterization and the determination of their respective role in heating and accelerating the solar wind during its expansion is the main scientific issue addressed by LFR. Another important subject for LFR is the study of the low frequency plasma waves associated to solar wind disturbances, as for instance interplanetary shocks.

Characterizing the low frequency waves in the solar wind involves the capability of the LFR to distinguish solitary waves from broadband wave activity, to cover turbulence and plasma instabilities, to identify the wave modes at work. Performing a multi-component analysis of



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the data is thus mandatory, using either a classical Fourier analysis or another treatment of the waveforms more appropriate to turbulence analysis.

Given the limitations in the telemetry, it is necessary to implement specific techniques to take the maximum advantage of the data. The LFR is tailored to optimize the scientific return of the data. The LFR design gives the possibility of mixing different types of output data, from low-level processed data (**waveform data**) to high-level processed data (**averaged spectral matrices and their derived parameters**), with various data rate possibilities (continuous or cyclic transmission, adaptable frequency bandwidth as well as adaptable frequency and time resolutions). A number of predefined working modes will be defined, but it will also be possible to define other working modes in flight.

The main scientific objective of TDS is the study of high frequency plasma waves and electric fields oscillations in the solar wind. The most important phenomenon observed in this frequency range are Langmuir waves associated with solar bursts, interplanetary shocks and other solar wind disturbances. These waves play a significant role in solar wind physics, being the source process of the solar radio emissions. The TDS is designed to study the detailed structure and dynamics of the waves and primarily the poorly understood process of conversion of electron beam energy to electromagnetic radiation via Langmuir waves. The target waves appear close (within 20%) to the local plasma frequency and the conversion to electromagnetic waves can occur both at the plasma frequency and at its first harmonic ($2 \cdot f_p$). The waves are typically narrow-band, strongly modulated and appear in bursts lasting from several milliseconds to about one second. Experience from previous experiments (e.g. Cluster, WIND and STEREO) has shown that due to short duration and rich structure, the waves are best studied using broadband waveform data. In particular:

- Multiple field components are required to study wave polarization
- Magnetic field measurements are needed to properly identify the EM radiation process
- Waveform snapshots need to be sufficiently long to capture an entire wave burst.

TDS will be designed to perform **waveform measurements** fulfilling these requirements, offering a range of configurable parameters to tune the instrument to a present region of solar wind and target process. Since the data volume associated with these measurements is enormous and Langmuir wave bursts are relatively rare and short, the on-board logic will attempt to identify snapshots containing potentially interesting measurements and only select these for downlink. Second science objective of the TDS instrument is the study of interplanetary dust by registering voltage spikes measured by spacecraft antenna in response to an impact of a dust particle on the spacecraft. Recent studies have shown that the amplitude and shape of the dust impact can be used to gather information about the size and energy of the impacting particle. Full waveform measurements are in general not necessary for this process. TDS on-board software will scan the data for dust impact signatures and collect **statistics of their parameters**.

TNR-HFR is of prime importance for the RPW science objectives since it provides **electric power spectral densities** from 4 kHz up to 16MHz **and magnetic power spectral densities** from 10 kHz up to 500 kHz. Below is a brief overview of the TNR-HFR science objectives:

The TNR-HFR measures the Quasi-thermal Noise due to the motion of solar wind electrons around the electric antennas. The spectroscopy of this noise will provide electron properties



such as their density and temperature. The TNR-HFR measures Langmuir-like waves that are frequently observed in the solar wind in association with supra-thermal electron beams produced by either solar flares or accelerated by interplanetary shocks.

The TNR-HFR measures and tracks the solar radio bursts due to particle acceleration and shock waves in the corona and inner heliosphere. By processing **cross-correlations** between two channels connected to different antennas, the TNR- HFR has direction-finding capabilities for tracking the solar radio bursts. Finally, TNR-HFR is also sensitive to dust impacts via the corresponding plasma cloud and pickup signal on the electric field antennas. Actually, TNR-HFR measures, in the spectral domain, the voltage induced when a dust grain impacting the S/C at high velocity is vaporized and ionized, producing a plasma cloud, which is partially recollected by the target.

3.2 Data flow overview

The RPW LL data processing is ensured by the RPW Low Latency data Pipeline (RLLP), which must be delivered to the SOC following the requirements in [RD4].

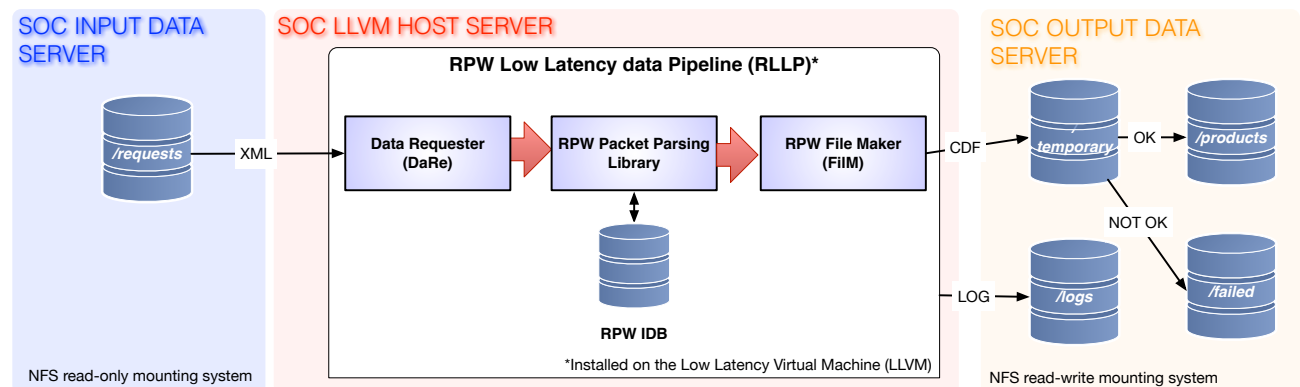


Figure 2. RPW Low Latency Data Pipeline Design.

The RLLP is divided into three main modules that permit to fully process the RPW LL data:

- The RPW Data Requester (DaRe) is in charge of fetching new telemetry data files in the “requests” directory of the SOC input data server.
- The RPW Packet parsing Library (RPL) then parses the input data files, and returns the RPW packet data after de-commutation/decompression processes. The packet analysis is performed using the RPW instrument database (IDB), which contains a description of all of the TM/TC packet
- The RPW File Maker (FiLM) finally produces the output LL data files as defined in the current document. Generated files are first written in a corresponding request folder in the “temporary” directory, and then moved to the “products” or “failed” directory, depending of the success of the processing.

4 DATA PRODUCT DESCRIPTIONS

RPW LL01 data products are formatted in accordance with the rules outlined in [AD1]. This section provides details on the filenames, formats and metadata for each of the products included in the RPW LL01 data.



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4.1 General Data Format

The RPW LL01 data are formatted in CDF files.

The following sections provide for each type of file produced by the LL pipeline a detailed description of the content and format. Each section, named for the logical source of that file type, should contain the following information, in this order:

1. A brief description of the data product. In the LL02 Document, this text will be copied from the relevant LL01 section.
2. Product filename
3. Expected dataset volume per day and time resolution.
4. The Global Attributes in the file, in attribute number order, and their values.
5. The Variable scope Attributes in the file, in attribute number order.
6. The Variables in the file, in variable number order.
7. The variable scope attributes that have an entry for that variable, and their values.

Note that the required (meta)data to produce the dataset description document can be extracted from a CDF file of the correct structure using the SkeletonTable utility provided as part of the CDF distribution (see [RD1]). Equivalently, a correctly formatted ASCII skeleton table can be used to create a CDF of the correct structure using the SkeletonCDF utility.

4.2 SOLO_LL01_RPW-TNR data product

The “SOLO_LL01_RPW-TNR” data product concerns the LL data returned in the RPW TNR spectral power TM packets (i.e., “TM_THR_SCIENCE_SPECTRAL_POWER”). It contains the coarse part of the CUC measurement time, the AGC and the median of the radio flux in the top five frequency bins in band D of the receiver, around 1 MHz, as well as the plasma frequency index measured on-board.

4.2.1 Filename

solo_LL01_RPW-TNR_[timefield]_V[version].cdf

4.2.2 Expected data volume and time resolution

The data product will be 64 bits in length with a cadence of between 1 and 15 seconds. Including a 2% overhead for packet headers, this is a data volume of between 48 kB and 718.9 kB per day.

4.2.3 Global Attributes

Name	Entry	Value	
Project entry	1	“Solar Orbiter”	#When adding a 2 nd
Project name.	2	“Cosmic Visions”	#repeat the attribute
Source_name	1	“SOLO>Solar Orbiter”	
Discipline	1	“Space Physics>Interplanetary Studies”	
Data_type	1	“LL01”	



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Descriptor	1	"RPW-TNR>Radio and Plasma Waves instrument - Thermal Noise Receiver"
Data_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
Software_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
PI_name	1	"M.Maksimovic"
PI_affiliation	1	"LESIA, Observatoire de Paris - CNRS"
Text	1	"This file contains RPW level 1 Low latency TNR spectral power data, produced by the RPW Low Latency data Pipeline (RLLP.)"
Instrument_type	1	"Radio and Plasma Waves (space)"
Mission_group	1	"Solar Orbiter"
Logical_source	1	"source_level_instrument_data-product"
Logical_file_id	1	"solo_LL01_rpw-tnr_0000000000-0000000000_V01"
Logical_source_description	1	"Solar Orbiter Radio/Plasma Wave, LL01 parameters"
Rules_of_use	1	"Not For Publication"
Generated_by	1	"Solar Orbiter SOC, ESAC"
Generation_date	1	"YYYY-MM-DDTHH:MN:SS"
Mods	1	"V01 First Version"
Data_Product	1	"LL-TNR-DATA>Low Latency TNR Data"
Level	1	"LL01>Level 1 Low Latency Data"
Instrument	1	"RPW>Radio and Plasma Waves"
Provider	1	"SOC"
Software_name	1	"RLLP"
Skeleton_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
IDB_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
Parents	1	#This attribute is not fixed. It will depend on the parent files used to generate the CDF data file.
Validate	1	#This attribute is not fixed. It will depend on the RLLP validation test results.
REFERENCE	1	#This attribute is not fixed. It should be the current document.
SKELETON_PARENT	1	"SOLO_LL01_RPW-TNR_V01.skt"
ACCESS_FORMAT	1	"CDF"
SCET_MIN	1	#This attribute is not fixed. It will depend on the SCET minimal value in the CDF data file.
SCET_MAX	1	#This attribute is not fixed. It will depend on the SCET maximal value in the CDF data file.



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FILE_UUID	1	#This attribute is not fixed. It will generate by the RLLP during the CDF data file creation.
DATASET_ID	1	"SOLO_LL01_RPW-TNR" #This is the dataset id in the RPW database system.
PACKET_SRDB_ID	1	"YIW00265"

4.2.4 Variables

Note that SCET must always be the first variable in a LL01 file.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	1	T	F

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Spacecraft Elapsed Time"
CATDESC	CDF_CHAR	"Elapsed time of the onboard clock"
DISPLAY_TYPE	CDF_CHAR	"time_series"
FILLVAL	CDF_REAL8	-1.0e31
FORMAT	CDF_CHAR	"f14.3"
LABLAXIS	CDF_CHAR	"Spacecraft Elapsed Time (Ticks)"
UNITS	CDF_CHAR	"Ticks"
VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	4294967295.999
SCALEMIN	CDF_REAL8	TBC #This will depend on the UTC of zero SCET
SCALEMAX	CDF_REAL8	TBC #and when end of mission is.
VAR_TYPE	CDF_CHAR	"support_data"
SCALETYP	CDF_CHAR	"linear"
TIME_BASE	CDF_CHAR	"Spacecraft onboard clock"
TIME_SCALE	CDF_CHAR	"Spacecraft onboard clock"
REFERENCE_POSITION	CDF_CHAR	"Spacecraft barycentre"
VAR_NOTES	CDF_CHAR	"Primary time used a reference in the file"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
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ACQUISITION_TIME CDF_UINT4 1 2 T T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"ACQUISITION_TIME"
CATDESC	CDF_CHAR	"RPW THR acquisition time"
DEPEND_0	CDF_CHAR	"SCET" #DEPEND_o must always point to a time variable
DISPLAY_TYPE	CDF_CHAR	"time_series"
FILLVAL	CDF_REAL8	4294967295
FORMAT	CDF_CHAR	"I10.0"
LABL_PTR_1	CDF_CHAR	"ACQUISITION_TIME_LABEL"
UNIT_PTR	CDF_CHAR	"ACQUISITION_TIME_UNITS"
VALIDMIN	CDF_REAL8	0
VALIDMAX	CDF_REAL8	4294967295
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_REAL8	0
SCALEMAX	CDF_REAL8	4294967295
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
TIME_BASE	CDF_CHAR	"RPW THR onboard clock"
TIME_SCALE	CDF_CHAR	"RPW THR onboard clock"
VAR_NOTES	CDF_CHAR	"Acquisition time of the data packet sample in CUC format. It corresponds to the PA_THR_ACQUISITION_TIME packet parameter."
PARAM_SRDB_ID	CDF_CHAR	NIW01430

Variable_Name Data_type DIMS SIZES R_VARY D_VARY

TIME_SYNCHRO_FLAG CDF_UINT1 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"TIME_SYNCHRO_FLAG"
CATDESC	CDF_CHAR	"Receiver time synchronisation

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		flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"i1.0"
LABLAXIS	CDF_CHAR	"Time sync. flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
VAR_TYPE	CDF_CHAR	"data"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Flag to indicate if the receiver clock is synchronized (=0) or not (=1) with the RPW DPU clock.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
POST_GAP_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"POST_GAP_FLAG"
CATDESC	CDF_CHAR	"Post gap flag for missing data"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Post gap flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	255 #Possible values of POST_GAP_FLAG are not yet defined.
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	255



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VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Flag to indicate the reason why there is gap in the data preceding the current record. If no gap then POST_GAP_FLAG=0.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"QUALITY_FLAG"
CATDESC	CDF_CHAR	"Quality data flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Quality flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	2
VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	3
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Flag to indicate the quality of the data. It should be always 2 for the LL01 data.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_UINT1	0		T	

ATTRIBUTES



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Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"QUALITY_BITMASK"
CATDESC	CDF_CHAR	"Quality bitmask flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Quality bitmask flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	255 #Possible values of QUALITY_BITMASK are not yet defined.
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	255
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Flag to indicate any context information or status at the receiver or experiment level.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SURVEY_MODE	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SURVEY_MODE"
CATDESC	CDF_CHAR	"TNR-HFR receiver survey mode"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"TNR-HFR survey mode"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1



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SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Flag to indicate if the TNR-HFR receiver is in the SURVEY_BURST (=1) or SURVEY_NORMAL (=0) science mode.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
COARSE_TIME	CDF_UINT4	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"COARSE_TIME"
CATDESC	CDF_CHAR	"CUC COARSE TIME "
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	4294967295
FORMAT	CDF_CHAR	"I10.0"
LABLAXIS	CDF_CHAR	"Coarse Time"
UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	4294967295
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	4294967295
VAR_TYPE	CDF_CHAR	"support_data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	CUC Coarse part time of the TNR measurement.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
AGC_BAND_D	CDF_UINT2	0		T	



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ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"AGC_BAND_D"
CATDESC	CDF_CHAR	"TNR D band AGC value"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65535
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"TNR-D AGC"
UNITS	CDF_CHAR	"Count"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65534
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65534
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Automatic Gain Control value of the TNR D Band.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
AUTO_MEDIAN_1MHZ	CDF_UINT2	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"AUTO_MEDIAN_1MHZ"
CATDESC	CDF_CHAR	"Median value of the 5 top frequency channels of the TNR D band auto-correlations"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65535
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"TNR-D auto median@1MHz"
UNITS	CDF_CHAR	"Count"



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VALIDMIN	CDF_UINT1	0			
VALIDMAX	CDF_UINT1	65534			
SCALETYP	CDF_CHAR	"linear"			
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	65534			
VAR_TYPE	CDF_CHAR	"data"			
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"			
VAR_NOTES	CDF_CHAR	Median value of the 5 top frequency channels of the TNR D band auto-correlations.			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
PLASMA_FREQ_INDEX	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"PLASMA_FREQ_INDEX"
CATDESC	CDF_CHAR	"Index of the plasma frequency"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Plasma freq. index"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	254
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	254
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"TNR>Thermal Noise Receiver"
VAR_NOTES	CDF_CHAR	Index of the plasma frequency

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACQUISITION_TIME_LABEL	CDF_CHAR	1	2	F	T



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ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"ACQUISITION_TIME_LABEL"
CATDESC	CDF_CHAR	"Label for ACQUISITION_TIME"
FORMAT	CDF_CHAR	"A32"
VAR_TYPE	CDF_CHAR	"metadata"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACQUISITION_TIME_UNITS	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"ACQUISITION_TIME_UNITS"
CATDESC	CDF_CHAR	"Units for ACQUISITION_TIME"
FORMAT	CDF_CHAR	"A16"
VAR_TYPE	CDF_CHAR	"metadata"

"ACQUISITION_TIME_LABEL" and "ACQUISITION_TIME_UNITS" are non-record-variant (NRV) zVariables., which are directly defined in the CDF skeleton with the following values:

Variable Name	Index	Value
ACQUISITION_TIME_LABEL	1	CUC coarse part time
ACQUISITION_TIME_LABEL	2	CUC fine part time
ACQUISTION_TIME_UNITS	1	s
ACQUISTION TIME UNITS	2	s / 65536

Table 1. Non-Record Variables of SOLO_LL01_RPW-TNR.

4.3 SOLO_LL01_RPW-BIA data product

The "SOLO_LL01_RPW-BIA" data product contains the BIAS sweeping calibration parameters transmitted by the RPW DPU in science BIAS calibration TM packets (i.e., "TM_DPU_SCIENCE_BIAS_CALIB, TM_DPU_SCIENCE_BIAS_CALIB_LONG, TM_DPU_SCIENCE_BIAS_CALIB_C and TM_DPU_SCIENCE_BIAS_CALIB_LONG_C").



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4.3.1 Filename

solo_LL01_RPW-BIA_[timefield]_V[version].cdf

4.3.2 Expected data volume and time resolution

The regular BIAS sweeping campaign (40 kB) will be added to the LL data stream once a week.

4.3.3 Global attributes

Name	Entry	Value
Project entry	1	"Solar Orbiter" #When adding a 2 nd
Project name.	2	"Cosmic Visions" #repeat the attribute
Source_name	1	"SOLO>Solar Orbiter"
Discipline	1	"Space Physics>Interplanetary Studies"
Data_type	1	"LL01"
Descriptor instrument - Bias"	1	"RPW-BIA>Radio and Plasma Waves
Data_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
Software_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
PI_name	1	"M.Maksimovic"
PI_affiliation	1	"LESIA, Observatoire de Paris - CNRS"
Text	1	"This file contains RPW level 1 Low latency Bias sweeping calibration data, produced by the RPW Low Latency data Pipeline (RLLP.)"
Instrument_type	1	"Radio and Plasma Waves (space)"
Mission_group	1	"Solar Orbiter"
Logical_source	1	"source_level_instrument_data-product"
Logical_file_id	1	"solo_LL01_rpw-bia_0000000000-0000000000_V01"
Logical_source_description	1	"Solar Orbiter Radio/Plasma Wave, LL01 parameters"
Rules_of_use	1	"Not For Publication"
Generated_by	1	"Solar Orbiter SOC, ESAC"
Generation_date	1	"YYYY-MM-DDTHH:MN:SS"
Mods	1	"V01 First Version"
Data_Product	1	"LL-BIA-DATA>Low Latency Bias Data"
Level	1	"LL01>Level 1 Low Latency Data"
Instrument	1	"RPW>Radio and Plasma Waves"
Provider	1	"SOC"



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Software_name	1	"RLLP"
Skeleton_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
IDB_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
Parents	1	#This attribute is not fixed. It will depend on the parent files used to generate the CDF data file.
Validate RLLP validation test results.	1	#This attribute is not fixed. It will depend on the RLLP validation test results.
REFERENCE document.	1	#This attribute is not fixed. It should be the current document.
SKELETON_PARENT	1	"SOLO_LL01_RPW-BIA_V01.skt"
ACCESS_FORMAT	1	"CDF"
SCET_MIN minimal value in the CDF data file.	1	#This attribute is not fixed. It will depend on the SCET minimal value in the CDF data file.
SCET_MAX maximal value in the CDF data file.	1	#This attribute is not fixed. It will depend on the SCET maximal value in the CDF data file.
FILE_UUID RLLP during the CDF data file creation.	1	#This attribute is not fixed. It will generate by the RLLP during the CDF data file creation.
DATASET_ID the RPW database system.	1	"SOLO_LL01_RPW-BIA" #This is the dataset id in the RPW database system.
PACKET_SRDB_ID	1	#This attribute is not fixed. It will depend on the TM packet used to fill the CDF data file. It can have between 1 and 4 entries.

4.3.4 Variables

Note that SCET must always be the first variable in a LL01 file.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	1	T	F

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Spacecraft Elapsed Time"
CATDESC	CDF_CHAR	"Elapsed time of the onboard clock"
DISPLAY_TYPE	CDF_CHAR	"time_series"
FILLVAL	CDF_REAL8	-1.0e31
FORMAT	CDF_CHAR	"f14.3"
LABLAXIS	CDF_CHAR	"Spacecraft Elapsed Time (Ticks)"
UNITS	CDF_CHAR	"Ticks"



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VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	4294967295.999
SCALEMIN	CDF_REAL8	TBC #This will depend on the UTC of zero SCET
SCALEMAX	CDF_REAL8	TBC #and when end of mission is.
VAR_TYPE	CDF_CHAR	"support_data"
SCALETYP	CDF_CHAR	"linear"
TIME_BASE	CDF_CHAR	"Spacecraft onboard clock"
TIME_SCALE	CDF_CHAR	"Spacecraft onboard clock"
REFERENCE_POSITION	CDF_CHAR	"Spacecraft barycentre"
VAR_NOTES	CDF_CHAR	"Primary time used a reference in the file"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACQUISITION_TIME	CDF_UINT4	1	2	T	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	ACQUISITION_TIME
CATDESC	CDF_CHAR	RPW LFR acquisition time
DEPEND_0	CDF_CHAR	SCET #DEPEND_o must always point to a time variable
DISPLAY_TYPE	CDF_CHAR	time_series
FILLVAL	CDF_REAL8	4294967295
FORMAT	CDF_CHAR	I10.0
LABL_PTR_1	CDF_CHAR	ACQUISITION_TIME_LABEL
UNIT_PTR	CDF_CHAR	ACQUISITION_TIME_UNITS
VALIDMIN	CDF_REAL8	0
VALIDMAX	CDF_REAL8	4294967295
SCALETYP	CDF_CHAR	linear
VAR_TYPE	CDF_CHAR	support_data
SCALEMIN	CDF_REAL8	0
SCALEMAX	CDF_REAL8	4294967295
DETECTOR	CDF_CHAR	LFR>LFR
TIME_BASE	CDF_CHAR	RPW LFR onboard clock
TIME_SCALE	CDF_CHAR	RPW LFR onboard clock
VAR_NOTES	CDF_CHAR	Acquisition time of the BIAS



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sweep in CUC format. It corresponds to the PA_LFR_ACQUISITION_TIME packet parameter.

PARAM_SRDB_ID CDF_CHAR NIW00874

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
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TIME_SYNCHRO_FLAG	CDF_UINT1	0		T	
-------------------	-----------	---	--	---	--

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	TIME_SYNCHRO_FLAG
CATDESC	CDF_CHAR	"Receiver time synchronisation flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	I1.0
LABLAXIS	CDF_CHAR	Time sync. flag
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	linear
VAR_TYPE	CDF_CHAR	data
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
DETECTOR	CDF_CHAR	"BIA>BIAS"
VAR_NOTES	CDF_CHAR	"Flag to indicate if the receiver clock is synchronized (=0) or not (=1) with the RPW DPU clock."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
---------------	-----------	------	-------	--------	--------

POST_GAP_FLAG	CDF_UINT1	0		T	
---------------	-----------	---	--	---	--

ATTRIBUTES

Attribute_Name	Data_type	Value
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FIELDNAM	CDF_CHAR	"POST_GAP_FLAG"
CATDESC	CDF_CHAR	"Post gap flag for missing data"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Post gap flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	255 #Possible values of POST_GAP_FLAG are not yet defined.
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	255
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"BIA>BIAS"
VAR_NOTES	CDF_CHAR	"Flag to indicate the reason why there is gap in the data preceding the current record. If no gap then POST_GAP_FLAG=0."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"QUALITY_FLAG"
CATDESC	CDF_CHAR	"Quality data flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Quality flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	2



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VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	3
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"BIA>BIAS"
VAR_NOTES	CDF_CHAR	"Flag to indicate the quality of the data. It should be always 2 for the LL01 data."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
QUALITY_BITMASK	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"QUALITY_BITMASK"
CATDESC	CDF_CHAR	"Quality bitmask flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Quality bitmask flag"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	255 #Possible values of QUALITY_BITMASK are not yet defined.
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	255
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"BIA>BIAS"
VAR_NOTES	CDF_CHAR	"Flag to indicate any context information or status at the receiver or experiment level."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
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TYPE CDF_UINT1 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"TYPE"
CATDESC	CDF_CHAR	"Type of calibration (short or long)"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"Cal. type"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
DETECTOR	CDF_CHAR	"BIA>BIAS"
VAR_NOTES	CDF_CHAR	"Flag to indicate if it is a short calibration (only potential and electrical values) or a long calibration (potential, electrical and magnetical values)."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_MODE_MUX_SET	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS multiplexer setting
CATDESC	CDF_CHAR	Copy of multiplexer setting.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	7



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SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	7			
FILLVAL	CDF_UINT1	255			
DISPLAY_TYPE	CDF_CHAR	time_series			
FORMAT	CDF_CHAR	I3.0			
LABLAXIS	CDF_CHAR	BIAS mux set			
UNITS	CDF_CHAR	" "			
VAR_TYPE	CDF_CHAR	data			
SCALETYP	CDF_CHAR	linear			
					Indicates the mode of BIAS multiplexer for a full snapshot ([PA_LFR_PKT_CNT] number of packets). Possible values are 0 : Standard operation. 1 : Probe 1 fails. 2 : Probe 2 fails. 3 : Probe 3 fails. 4 : Calibration mode 0. 5 : Calibration mode 1. 6 : Calibration mode 2. 7 : Calibration mode 3. This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
VAR_NOTES	CDF_CHAR				
PARAM_SRDB_ID	CDF_CHAR	NIWD0556			

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_MODE_HV_ENABLED	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS high voltage status
CATDESC	CDF_CHAR	Copy of enable/disable HV (+- 100V).
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1



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FILLVAL	CDF_UINT1	255	
DISPLAY_TYPE	CDF_CHAR	time_series	
FORMAT	CDF_CHAR	I3.0	
LABLAXIS	CDF_CHAR	BIAS mode hv enabled	
UNITS	CDF_CHAR	" "	
VAR_TYPE	CDF_CHAR	data	
SCALETYP	CDF_CHAR	linear	
			Indicates the status of BIAS HV. Possible values are DISABLED = 0. ENABLED = 1. This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
VAR_NOTES	CDF_CHAR		
PARAM_SRDB_ID	CDF_CHAR	NIWD0557	

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_MODE_BIAS1_ENABLED	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS probe 1 status
CATDESC	CDF_CHAR	Copy of enable/disable BIAS 1.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	BIAS1 status
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	Indicates the status of BIAS probe



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1. Possible values are
 DISABLED = 0.
 ENABLED = 1.
 This variable should be filled
 once for each [PA_LFR_PKT_CNT]
 number of packets i.e. full
 snapshot because LFR FSW copy
 the same value for all sub
 packets.

PARAM_SRDB_ID CDF_CHAR NIWD0558

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_MODE_BIAS2_ENABLED	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS probe 2 status
CATDESC	CDF_CHAR	Copy of enable/disable BIAS 2.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	BIAS2 status
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
		Indicates the status of BIAS probe 2. Possible values are DISABLED = 0. ENABLED = 1. This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
VAR_NOTES	CDF_CHAR	
PARAM_SRDB_ID	CDF_CHAR	NIWD0559



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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_MODE_BIAS3_ENABLED	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS probe 3 status
CATDESC	CDF_CHAR	Copy of enable/disable BIAS 3.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	BIAS3 status
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	Indicates the status of BIAS probe 3. Possible values are DISABLED = 0. ENABLED = 1. This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
PARAM_SRDB_ID	CDF_CHAR	NIWD0560

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BIA_ON_OFF	CDF_UINT1	0		T	



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ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS status
CATDESC	CDF_CHAR	Copy of BIAS status.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	Indicates the status of BIAS. Possible values are OFF = 0 - Power line off. ON = 1 - Power line on. This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
PARAM_SRDB_ID	CDF_CHAR	NIWD0561

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
BW	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	BIAS Works/BIAS Fails



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CATDESC	CDF_CHAR	configuration.
DEPEND_0	CDF_CHAR	BIAS Works/BIAS Fails configuration.
VALIDMIN	CDF_UINT1	SCET
VALIDMAX	CDF_UINT1	0
SCALEMIN	CDF_UINT1	1
SCALEMAX	CDF_UINT1	0
FILLVAL	CDF_UINT1	1
DISPLAY_TYPE	CDF_UINT1	255
FORMAT	CDF_CHAR	time_series
LABLAXIS	CDF_CHAR	I3.0
UNITS	CDF_CHAR	BIAS Work/Fails config.
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
PARAM_SRDB_ID	CDF_CHAR	NIWD0176

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SP0	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Shaping of electrical data parameter 0.
CATDESC	CDF_CHAR	Shaping of electrical data.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0



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SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	SP0
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.

PARAM_SRDB_ID	CDF_CHAR	NIWD0177
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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SP1	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Shaping of electrical data parameter 1.
CATDESC	CDF_CHAR	Shaping of electrical data.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	SP1
UNITS	CDF_CHAR	



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VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.

PARAM_SRDB_ID	CDF_CHAR	NIWD0178
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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
R0	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Rooting of electrical data for F0.
CATDESC	CDF_CHAR	Rooting of electrical data.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	R0
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear



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VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.
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PARAM_SRDB_ID	CDF_CHAR	NIWD0179
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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
R1	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Rooting of electrical data for F1.
CATDESC	CDF_CHAR	Rooting of electrical data.
DEPEND_0	CDF_CHAR	SCET1
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	R1
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.



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PARAM_SRDB_ID CDF_CHAR NIWD0180

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
R2	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Rooting of electrical data for F2.
CATDESC	CDF_CHAR	Rooting of electrical data.
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
FILLVAL	CDF_UINT1	255
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I3.0
LABLAXIS	CDF_CHAR	R2
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	support_data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	This variable should be filled once for each [PA_LFR_PKT_CNT] number of packets i.e. full snapshot because LFR FSW copy the same value for all sub packets.

PARAM_SRDB_ID CDF_CHAR NIWD0656



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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
V	CDF_INT2	1	672	T	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Potential
CATDESC	CDF_CHAR	Potential value (V)
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_INT2	-32767
VALIDMAX	CDF_INT2	32767
SCALEMIN	CDF_INT2	-32767
SCALEMAX	CDF_INT2	32767
FILLVAL	CDF_INT2	-32768
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I6.5
LABLAXIS	CDF_CHAR	V
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	Potential value

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
E	CDF_INT2	2	[672,2]	T	[T,T]

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Electric field
CATDESC	CDF_CHAR	Electrical field values (E1 and E2)
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_INT2	-32767



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VALIDMAX	CDF_INT2	32767
SCALEMIN	CDF_INT2	-32767
SCALEMAX	CDF_INT2	32767
FILLVAL	CDF_INT2	-32768
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I6.5
LABLAXIS	CDF_CHAR	E
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear
VAR_NOTES	CDF_CHAR	2 entry array with electrical field values (E1 and E2)

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
B	CDF_INT2	2	[672,3]	T	[T,T]

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	Magnetic field
CATDESC	CDF_CHAR	Magnetic field values (B1, B2 and B3)
DEPEND_0	CDF_CHAR	SCET
VALIDMIN	CDF_INT2	-32767
VALIDMAX	CDF_INT2	32767
SCALEMIN	CDF_INT2	-32767
SCALEMAX	CDF_INT2	32767
FILLVAL	CDF_INT2	-32768
DISPLAY_TYPE	CDF_CHAR	time_series
FORMAT	CDF_CHAR	I6.5
LABLAXIS	CDF_CHAR	B
UNITS	CDF_CHAR	
VAR_TYPE	CDF_CHAR	data
SCALETYP	CDF_CHAR	linear



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VAR_NOTES CDF_CHAR 3 entry array with magnetic field values (B1,B2 and B3)

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACQUISITION_TIME_LABEL	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"ACQUISITION_TIME_LABEL"
CATDESC	CDF_CHAR	"Label for ACQUISITION_TIME"
FORMAT	CDF_CHAR	"A32"
VAR_TYPE	CDF_CHAR	"metadata"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
ACQUISITION_TIME_UNITS	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"ACQUISITION_TIME_UNITS"
CATDESC	CDF_CHAR	"Units for ACQUISITION_TIME"
FORMAT	CDF_CHAR	"A16"
VAR_TYPE	CDF_CHAR	"metadata"

ACQUISITION_TIME_LABEL" and "ACQUISITION_TIME_UNITS" are non-record-variant (NRV) zVariables., which are directly defined in the CDF skeleton with the following values:

Variable Name	Index	Value
ACQUISITION_TIME_LABEL	1	CUC coarse part time



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ACQUISITION_TIME_LABEL	2	CUC fine part time
ACQUISITION_TIME_UNITS	1	s
ACQUISITION_TIME_UNITS	2	s / 65536

Table 2. Non-record variables fo SOLO_LL01_RPW-BIA.

4.4 SOLO_LL01_RPW-SBM1 data product

The “SOLO_LL01_RPW-SBM1” data product contains the SBM1 algorithm detection parameters transmitted by the RPW DPU in Event progress TM packets (i.e., “TM_DPU_EVENT_PR_DPU_SBM1”). Thus, they are not strictly speaking transferred through the LL data stream, since the TM packets are not stored in the PS LL on-board.

4.4.1 Filename

solo_LL01_RPW-SBM1_[timefield]_V[version].cdf

4.4.2 Expected data volume and time resolution

The size of a TM_DPU_EVENT_PR_DPU_SBM1 packet is 34 B. Assuming the detection of 50 events over 60 days, this gives a data rate of 29 B per day.

4.4.3 Global attributes

Name	Entry	Value	
Project entry	1	“Solar Orbiter”	#When adding a 2 nd
Project name.	2	“Cosmic Visions”	#repeat the attribute
Source_name	1	“SOLO>Solar Orbiter”	
Discipline	1	“Space Physics>Interplanetary Studies”	
Data_type	1	“LL01”	
Descriptor instrument - SBM1 parameters”	1	“RPW-SBM1>Radio and Plasma Waves	
Data_version	1	#This attribute is not fixed (format is I2.2, e.g., “01”)	
Software_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., “01.00.00”, X, Y and Z are respectively integer corresponding to major, minor and revision changes)	
PI_name	1	“M.Maksimovic”	
PI_affiliation	1	“LESIA, Observatoire de Paris - CNRS”	
Text	1	“This file contains RPW level 1 Low latency SBM1 algorithm detection parameters, produced by the RPW Low Latency data Pipeline (RLLP.)”	
Instrument_type	1	“Radio and Plasma Waves (space)”	
Mission_group	1	“Solar Orbiter”	
Logical_source	1	“source_level_instrument_data-product”	
Logical_file_id	1	“solo_LL01_rpw-sbm1_0000000000-0000000000_v01”	



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Logical_source_description	1	"Solar Orbiter Radio/Plasma Wave, LL01 parameters"
Rules_of_use	1	"Not For Publication"
Generated_by	1	"Solar Orbiter SOC, ESAC"
Generation_date	1	"YYYY-MM-DDTHH:MN:SS"
Mods	1	"V01 First Version"
Data_Product	1	"LL-SBM1-DATA>Low Latency SBM1 Data"
Level	1	"LL01>Level 1 Low Latency Data"
Instrument	1	"RPW>Radio and Plasma Waves"
Provider	1	"SOC"
Software_name	1	"RLLP"
Skeleton_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
IDB_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
Parents	1	#This attribute is not fixed. It will depend on the parent files used to generate the CDF data file.
Validate	1	#This attribute is not fixed. It will depend on the RLLP validation test results.
REFERENCE	1	#This attribute is not fixed. It should be the current document.
SKELETON_PARENT	1	"SOLO_LL01_RPW-SBM1_V01.skt"
ACCESS_FORMAT	1	"CDF"
SCET_MIN	1	#This attribute is not fixed. It will depend on the SCET minimal value in the CDF data file.
SCET_MAX	1	#This attribute is not fixed. It will depend on the SCET maximal value in the CDF data file.
FILE_UUID	1	#This attribute is not fixed. It will generate by the RLLP during the CDF data file creation.
DATASET_ID	1	"SOLO_LL01_RPW-SBM1" #This is the dataset id in the RPW database system.
PACKET_SRDB_ID	1	"YIW00304"

4.4.4 Variables

Note that SCET must always be the first variable in a LL01 file.

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	1	T	F

ATTRIBUTES



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Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Spacecraft Elapsed Time"
CATDESC	CDF_CHAR	"Elapsed time of the onboard clock"
DISPLAY_TYPE	CDF_CHAR	"time_series"
FILLVAL	CDF_REAL8	-1.0e31
FORMAT	CDF_CHAR	"f14.3"
LABLAXIS	CDF_CHAR	"Spacecraft Elapsed Time (Ticks)"
UNITS	CDF_CHAR	"Ticks"
VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	4294967295.999
SCALEMIN	CDF_REAL8	TBC #This will depend on the UTC of zero SCET
SCALEMAX	CDF_REAL8	TBC #and when end of mission is.
VAR_TYPE	CDF_CHAR	"support_data"
SCALETYP	CDF_CHAR	"linear"
TIME_BASE	CDF_CHAR	"Spacecraft onboard clock"
TIME_SCALE	CDF_CHAR	"Spacecraft onboard clock"
REFERENCE_POSITION	CDF_CHAR	"Spacecraft barycentre"
VAR_NOTES	CDF_CHAR	"Primary time used a reference in the file"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM1_TIME	CDF_UINT4	1	2	T	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	SBM1_TIME
CATDESC	CDF_CHAR	SBM1 event absolute time
DEPEND_0	CDF_CHAR	SCET #DEPEND_0 must always point to a time variable
DISPLAY_TYPE	CDF_CHAR	time_series
FILLVAL	CDF_REAL8	4294967295
FORMAT	CDF_CHAR	I10.0
LABL_PTR_1	CDF_CHAR	SBM1_TIME_LABEL
UNIT_PTR	CDF_CHAR	SBM1_TIME_UNITS



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VALIDMIN	CDF_REAL8	0
VALIDMAX	CDF_REAL8	4294967295
SCALETYP	CDF_CHAR	linear
VAR_TYPE	CDF_CHAR	support_data
SCALEMIN	CDF_REAL8	0
SCALEMAX	CDF_REAL8	4294967295
TIME_BASE	CDF_CHAR	RPW DPU onboard clock
TIME_SCALE	CDF_CHAR	RPW DPU onboard clock
VAR_NOTES	CDF_CHAR	Time of the SBM1 event detection in CUC format. It corresponds to the HK_RPW_S20_SBM1_TIME packet parameter.
PARAM_SRDB_ID	CDF_CHAR	NIW01732

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
TIME_SYNCHRO_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	TIME_SYNCHRO_FLAG
CATDESC	CDF_CHAR	"Time synchronisation flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	I1.0
LABLAXIS	CDF_CHAR	Time sync. flag
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	linear
VAR_TYPE	CDF_CHAR	data
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1
DETECTOR	CDF_CHAR	"DPU>RPW DPU"
VAR_NOTES	CDF_CHAR	"Flag to indicate if the RPW DPU clock is synchronized (=0) or



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not (=1) with the on-board spacecraft clock."

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM1_ALGO_STATUS	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM1 detection progress code"
CATDESC	CDF_CHAR	"SBM1 detection progress code"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM1 algo status"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"SBM1 detection progress code. Possible values: SBM1_NONE = 0, SBM1_RPW = 1, SBM1_MAG = 2"
PARAM_SRDB_ID	CDF_CHAR	NIWD0733

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM1_QF	CDF_REAL4	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM1_QF"
CATDESC	CDF_CHAR	"SBM1 event quality factor"



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DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	-1.0e31
FORMAT	CDF_CHAR	"f5.5"
LABLAXIS	CDF_CHAR	"SBM1 event Qf"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1.0e31
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1.0e31
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"SBM1 event quality factor (engineering value)."
PARAM_SRDB_ID	CDF_CHAR	NIW01731
PARAM_TF_ID	CDF_CHAR	TF_PA_DPU_0038

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
DT1_SBM1	CDF_UINT2	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"DT1_SBM1 parameter"
CATDESC	CDF_CHAR	"DT1_SBM1 parameter"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65355
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"DT1_SBM1"
UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65355
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65355
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Value of the SBM1 DT1_SBM1 parameter. "



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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
DT2_SBM1	CDF_UINT2	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"DT2_SBM1 parameter"
CATDESC	CDF_CHAR	"DT2_SBM1 parameter"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65355
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"DT2_SBM1"
UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65355
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65355
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Value of the SBM1 DT2_SBM1 parameter. "
PARAM_SRDB_ID	CDF_CHAR	NIW01933

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
DT3_SBM1	CDF_UINT2	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"DT3_SBM1 parameter"
CATDESC	CDF_CHAR	"DT3_SBM1 parameter"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"



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FILLVAL	CDF_CHAR	65355
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"DT3_SBM1"
UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65355
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65355
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Value of the SBM1 DT3_SBM1 parameter. "
PARAM_SRDB_ID	CDF_CHAR	NIW01934

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM1_TIME_LABEL	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM1_TIME_LABEL"
CATDESC	CDF_CHAR	"Label for SBM1_TIME"
FORMAT	CDF_CHAR	"A32"
VAR_TYPE	CDF_CHAR	"metadata"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM1_TIME_UNITS	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM1_TIME_UNITS"
CATDESC	CDF_CHAR	"Units for SBM1_TIME"
FORMAT	CDF_CHAR	"A16"
VAR_TYPE	CDF_CHAR	"metadata"



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“SBM1_TIME_LABEL” and “SBM1_TIME_UNITS” are non-record-variant (NRV) zVariables., which are directly defined in the CDF skeleton with the following values:

Variable Name	Index	Value
SBM1_TIME_LABEL	1	CUC coarse part time
SBM1_TIME_LABEL	2	CUC fine part time
SBM1_TIME_UNITS	1	s
SBM2_TIME_UNITS	2	s / 65536

Table 3. Non-record variables of SOLO_LL01_RPW-SBM1.

4.5 SOLO_LL01_RPW-SBM2 data product

The “SOLO_LL01_RPW-SBM2” data product contains the SBM2 algorithm detection parameters transmitted by the RPW DPU in Event progress TM packets (i.e., “TM_DPU_EVENT_PR_DPU_SBM2”). Thus, they are not strictly speaking transferred through the LL data stream, since the TM packets are not stored in the PS LL on-board.

4.5.1 Filename

solo_LL01_RPW-SBM2_[timefield]_V[version].cdf

4.5.2 Expected data volume and time resolution

The size of a TM_DPU_EVENT_PR_DPU_SBM2 packet is 32 B. Assuming the detection of 4 events over 60 days, this gives a data rate of 2.2 B per day.

4.5.3 Global attributes

Name	Entry	Value	
Project entry	1	“Solar Orbiter”	#When adding a 2 nd
Project name.	2	“Cosmic Visions”	#repeat the attribute
Source_name	1	“SOLO>Solar Orbiter”	
Discipline	1	“Space Physics>Interplanetary Studies”	
Data_type	1	“LL01”	
Descriptor instrument - SBM2 parameters”	1	“RPW-SBM2>Radio and Plasma Waves	
Data_version	1	#This attribute is not fixed (format is I2.2, e.g., “01”)	
Software_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., “01.00.00”, X, Y and Z are respectively integer corresponding to major, minor and revision changes)	
PI_name	1	“M.Maksimovic”	
PI_affiliation	1	“LESIA, Observatoire de Paris - CNRS”	



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Text	1	"This file contains RPW level 1 Low latency SBM2 algorithm detection parameters, produced by the RPW Low Latency data Pipeline (RLLP.)"
Instrument_type	1	"Radio and Plasma Waves (space)"
Mission_group	1	"Solar Orbiter"
Logical_source	1	"source_level_instrument_data-product"
Logical_file_id	1	"solo_LL01_rpw-sbm2_0000000000-0000000000_V01"
Logical_source_description	1	"Solar Orbiter Radio/Plasma Wave, LL01 parameters"
Rules_of_use	1	"Not For Publication"
Generated_by	1	"Solar Orbiter SOC, ESAC"
Generation_date	1	"YYYY-MM-DDTHH:MN:SS"
Mods	1	"V01 First Version"
Data_Product	1	"LL-SBM2-DATA>Low Latency SBM2 Data"
Level	1	"LL01>Level 1 Low Latency Data"
Instrument	1	"RPW>Radio and Plasma Waves"
Provider	1	"SOC"
Software_name	1	"RLLP"
Skeleton_version	1	#This attribute is not fixed (format is I2.2, e.g., "01")
IDB_version	1	#This attribute is not fixed (format is X.Y.Z, e.g., "01.00.00", X, Y and Z are respectively integer corresponding to major, minor and revision changes)
Parents	1	#This attribute is not fixed. It will depend on the parent files used to generate the CDF data file.
Validate	1	#This attribute is not fixed. It will depend on the RLLP validation test results.
REFERENCE	1	#This attribute is not fixed. It should be the current document.
SKELETON_PARENT	1	"SOLO_LL01_RPW-SBM2_V01.skt"
ACCESS_FORMAT	1	"CDF"
SCET_MIN	1	#This attribute is not fixed. It will depend on the SCET minimal value in the CDF data file.
SCET_MAX	1	#This attribute is not fixed. It will depend on the SCET maximal value in the CDF data file.
FILE_UUID	1	#This attribute is not fixed. It will generate by the RLLP during the CDF data file creation.
DATASET_ID	1	"SOLO_LL01_RPW-SBM2" #This is the dataset id in the RPW database system.
PACKET_SRDB_ID	1	"YIW00305"

4.5.4 Variables

Note that SCET must always be the first variable in a LL01 file.



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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SCET	CDF_REAL8	1	1	T	F

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Spacecraft Elapsed Time"
CATDESC	CDF_CHAR	"Elapsed time of the onboard clock"
DISPLAY_TYPE	CDF_CHAR	"time_series"
FILLVAL	CDF_REAL8	-1.0e31
FORMAT	CDF_CHAR	"f14.3"
LABLAXIS	CDF_CHAR	"Spacecraft Elapsed Time (Ticks)"
UNITS	CDF_CHAR	"Ticks"
VALIDMIN	CDF_REAL8	0.0
VALIDMAX	CDF_REAL8	4294967295.999
SCALEMIN	CDF_REAL8	TBC #This will depend on the UTC of zero SCET
SCALEMAX	CDF_REAL8	TBC #and when end of mission is.
VAR_TYPE	CDF_CHAR	"support_data"
SCALETYP	CDF_CHAR	"linear"
TIME_BASE	CDF_CHAR	"Spacecraft onboard clock"
TIME_SCALE	CDF_CHAR	"Spacecraft onboard clock"
REFERENCE_POSITION	CDF_CHAR	"Spacecraft barycentre"
VAR_NOTES	CDF_CHAR	"Primary time used a reference in the file"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM2_TIME	CDF_UINT4	1	2	T	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	SBM2_TIME
CATDESC	CDF_CHAR	SBM2 event absolute time



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DEPEND_0	CDF_CHAR	SCET	#DEPEND_0 must always point to a time variable
DISPLAY_TYPE	CDF_CHAR	time_series	
FILLVAL	CDF_REAL8	4294967295	
FORMAT	CDF_CHAR	I10.0	
LABL_PTR_1	CDF_CHAR	SBM2_TIME_LABEL	
UNIT_PTR	CDF_CHAR	SBM2_TIME_UNITS	
VALIDMIN	CDF_REAL8	0	
VALIDMAX	CDF_REAL8	4294967295	
SCALETYP	CDF_CHAR	linear	
VAR_TYPE	CDF_CHAR	support_data	
SCALEMIN	CDF_REAL8	0	
SCALEMAX	CDF_REAL8	4294967295	
TIME_BASE	CDF_CHAR	RPW DPU onboard clock	
TIME_SCALE	CDF_CHAR	RPW DPU onboard clock	
VAR_NOTES	CDF_CHAR	Time of the SBM2 event detection in CUC format. It corresponds to the HK_RPW_S20_SBM2_TIME packet parameter.	
PARAM_SRDB_ID	CDF_CHAR	NIW01734	

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
TIME_SYNCHRO_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	TIME_SYNCHRO_FLAG
CATDESC	CDF_CHAR	"Time synchronisation flag"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	I1.0
LABLAXIS	CDF_CHAR	Time sync. flag
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0



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VALIDMAX	CDF_UINT1	1			
SCALETYP	CDF_CHAR		linear		
VAR_TYPE	CDF_CHAR		data		
SCALEMIN	CDF_UINT1	0			
SCALEMAX	CDF_UINT1	1			
DETECTOR	CDF_CHAR		"DPU>RPW DPU"		
VAR_NOTES	CDF_CHAR		"Flag to indicate if the RPW DPU clock is synchronized (=0) or not (=1) with the on-board spacecraft clock."		

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM2_ALGO_STATUS	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM2 detection progress code"
CATDESC	CDF_CHAR	"SBM2 detection progress code"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 algo status"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"SBM2 detection progress code. Possible values: SBM2_NONE = 0, SBM2_RPW = 1, SBM2_EPD = 2"
PARAM_SRDB_ID	CDF_CHAR	NIWD0734

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
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SBM2_QF CDF_REAL4 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM2 event quality factor"
CATDESC	CDF_CHAR	"SBM2 event quality factor"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_REAL4	-1.0e31
FORMAT	CDF_CHAR	"f5.5"
LABLAXIS	CDF_CHAR	"SBM2 Q factor"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_REAL4	0
VALIDMAX	CDF_REAL4	1.0e31
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	1.0e31
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"SBM2 event quality factor (engineering value)."
SRDB_ID	CDF_CHAR	NIW01733
TRANSFER_FUNC	CDF_CHAR	TF_PA_DPU_0039

Variable_Name Data_type DIMS SIZES R_VARY D_VARY

DT_SBM2 CDF_UINT2 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"DT_SBM2 parameter"
CATDESC	CDF_CHAR	"DT_SBM2 parameter"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65355
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"DT_SBM2"



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UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65355
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65355
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Value of the SBM2 DT_SBM2 or DT_SBM2_F parameter. "
SRDB_ID	CDF_CHAR	NIW02078

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
DT_LW	CDF_UINT2	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM2 DT_LW parameter"
CATDESC	CDF_CHAR	"SBM2 DT_LW parameter"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	65355
FORMAT	CDF_CHAR	"I5.0"
LABLAXIS	CDF_CHAR	"DT_LW"
UNITS	CDF_CHAR	"s"
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	65355
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	65355
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Value of the SBM2_DT_LW or SBM2_DT_LW_F parameter. "
SRDB_ID	CDF_CHAR	NIW02079

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_ESW_FLAG	CDF_UINT1	0		T	



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ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Electron flux from EPD instrument in sunward direction"
CATDESC	CDF_CHAR	"Electron flux from EPD instrument in sunward direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD SW e. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	2
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Electron flux from EPD instrument in sunward direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0744

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_EASW_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Electron flux from EPD instrument in anti-sunward direction"
CATDESC	CDF_CHAR	"Electron flux from EPD instrument in anti-sunward direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"



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LABLAXIS	CDF_CHAR	"SBM2 EPD ASW e. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Electron flux from EPD instrument in anti-sunward direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0745

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_EN_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Electron flux from EPD instrument in north direction"
CATDESC	CDF_CHAR	"Electron flux from EPD instrument in north direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD N e. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Electron flux from EPD instrument in north direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0746

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
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EPD_S20_ES_FLAG CDF_UINT1 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Electron flux from EPD instrument in south direction"
CATDESC	CDF_CHAR	"Electron flux from EPD instrument in south direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD S e. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Electron flux from EPD instrument in south direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0747

Variable_Name Data_type DIMS SIZES R_VARY D_VARY

EPD_S20_PSW_FLAG CDF_UINT1 0 T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Proton flux from EPD instrument in sunward direction"
CATDESC	CDF_CHAR	"Proton flux from EPD instrument in sunward direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"



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FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD SW p. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Proton flux from EPD instrument in sunward direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0748

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_PASW_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Proton flux from EPD instrument in anti-sunward direction"
CATDESC	CDF_CHAR	"Proton flux from EPD instrument in anti-sunward direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD ASW p. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Proton flux from EPD instrument in anti-sunward direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0749



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Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_PN_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Proton flux from EPD instrument in north direction"
CATDESC	CDF_CHAR	"Proton flux from EPD instrument in north direction"
DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD N p. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Proton flux from EPD instrument in north direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0750

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
EPD_S20_PS_FLAG	CDF_UINT1	0		T	

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"Proton flux from EPD instrument in south direction"
CATDESC	CDF_CHAR	"Proton flux from EPD instrument in south direction"



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DISPLAY_TYPE	CDF_CHAR	"time_series"
DEPEND_0	CDF_CHAR	"SCET"
FILLVAL	CDF_CHAR	255
FORMAT	CDF_CHAR	"I3.0"
LABLAXIS	CDF_CHAR	"SBM2 EPD S p. flux"
UNITS	CDF_CHAR	" "
VALIDMIN	CDF_UINT1	0
VALIDMAX	CDF_UINT1	1
SCALETYP	CDF_CHAR	"linear"
SCALEMIN	CDF_UINT1	0
SCALEMAX	CDF_UINT1	2
VAR_TYPE	CDF_CHAR	"data"
VAR_NOTES	CDF_CHAR	"Proton flux from EPD instrument in south direction"
PARAM_SRDB_ID	CDF_CHAR	NIWD0751

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM2_TIME_LABEL	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM2_TIME_LABEL"
CATDESC	CDF_CHAR	"Label for SBM2_TIME"
FORMAT	CDF_CHAR	"A32"
VAR_TYPE	CDF_CHAR	"metadata"

Variable_Name	Data_type	DIMS	SIZES	R_VARY	D_VARY
SBM2_TIME_UNITS	CDF_CHAR	1	2	F	T

ATTRIBUTES

Attribute_Name	Data_type	Value
FIELDNAM	CDF_CHAR	"SBM2_TIME_UNITS"
CATDESC	CDF_CHAR	"Units for SBM2_TIME"
FORMAT	CDF_CHAR	"A16"



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VAR_TYPE CDF_CHAR "metadata"

"SBM2_TIME_LABEL" and "SBM2_TIME_UNITS" are non-record-variant (NRV) zVariables., which are directly defined in the CDF skeleton with the following values:

Variable Name	Index	Value
SBM2_TIME_LABEL	1	CUC coarse part time
SBM2_TIME_LABEL	2	CUC fine part time
SBM2_TIME_UNITS	1	s
SBM2_TIME_UNITS	2	s / 65536

Table 4. Non-record variables of SOLO_LL01_RPW-SBM2.

5 APPENDIX

5.1 RPW LL01 data product matrix

The following table gives the summary of the data products names and description.

Data Product	Description	Descriptor	Time resolution	Expected Daily Vol
SOLO_LL01_RPW-TNR	RPW Low Latency TNR spectral power data at level LL01	RPW-TNR	1 to 15 sec.	Between 48 kB and 718.9 kB per day
SOLO_LL01_RPW-BIA	RPW Low Latency BIAS sweeping calibration data at level LL01	RPW-BIA	Once a week	approx. 5.7 kB per day
SOLO_LL01_RPW-SBM1	RPW Low Latency SBM1 event detection parameters at level LL01	RPW-SBM1	1 packet per SBM1 event detected on-board	29 B per day, assuming 50 events detected over 60 days
SOLO_LL01_RPW-SBM2	RPW Low Latency SBM2 event detection parameters at level LL01	RPW-SBM2	1 packet per SBM2 event detected on-board	2.2 B per day, assuming 4 events detected over 60 days

Table 5. RPW LL01 data product summary list.

6 LIST OF TBC/TBD/TBWS

TBC/TBD/TBW			
Reference/Page/Location	Description	Type	Status



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7 DISTRIBUTION LIST

<p style="text-align: center;">LISTS</p> <p>See Contents lists in “Baghera Web”: Project’s informations / Project’s actors / RPW_actors.xls and tab with the name of the list or NAMES below</p>	Tech_LESIA
	Tech_MEB
	Tech_RPW
	[Lead-]Cols
	Science-Cols

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LESIA CNRS		

LESIA CNRS		

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