

EUMETSAT - Copernicus Sentinel-3 SLSTR L2 NRT FRP Product Data Format Specification

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**EUMETSAT - Copernicus Sentinel-3 SLSTR L2 NRT FRP Product Data
Format Specification**

Change Record

Version	Date	DCR* No. if applicable	Description of Changes
V1.0	18/03/2020		Initial
V1.A	30/03/2020		Modification report / file name IPF Code version non indicated anymore (for internal document management tool convenience). Acronym list updated. Updated product size, and FRP data content.
V1.B	28/09/2020		Update format table, and removal common parts to all product structure / manifest (available in other common documents).
V1.D	29/04/2021		Update product format following Release of Processing Baseline (PB) FRP_NR.001.02

***DCR = Document Change Request**

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1 INTRODUCTION

1.1 Scope

This document describes the format of the Near Real Time (NRT) Level 2 (L2) Fire Radiative Power (FRP) product generated from the Copernicus Sentinel-3 (S3) Sea and Land Surface Temperature Radiometer (SLSTR) by EUMETSAT.

1.2 Applicable Documents

	Document Title	Reference
AD-1	Sentinel 3 PDGS File Naming Convention	EUM/LEO-SEN3/SPE/10/0070 GMES-S3GS-EOPG-TN-09-0009, Issue 1.3, 07/11/2012
AD-2	Product Data Format Specification - Product Structures	S3IPF.PDS.002, Issue 1.6, 10/02/2015
AD-3	XML Schemas.zip – Zip file containing all the schemas used to represent the metadata	S3IPF.PDS.009, i2r5 – 26/03/2015
AD-4	EUMETSAT - Copernicus Sentinel-3 SLSTR L2 NRT FRP Auxiliary Data Format Specification	EUM/SEN3/DOC/20/1169484, v1.B, 28/09/2020.

1.3 Reference Documents

	Document Title	Reference
RD-1	Product Data Format Specification - Level 0	S3IPF PDS 001 - Product Data Format Specification - Level 0
RD-2	Product Data Format Specification – SLSTR Level 1 and 2	S3IPF PDS 005 - Product Data Format Specification - SLSTR
RD-3	Active Fire : Fire Detection And Fire Radiative Power Assessment – S3 SLSTR L2 FRP ATBD	S3-L2-SD-03-T04-KCL-ATBD_FIREPRODUCT, v4.3, 31/10/2019.

1.4 Terminology

AD	Applicable Document
ADF	Auxiliary Data File
ATBD	Algorithm Theoretical Basis Document

BT	Brightness Temperature
CFI	Customer Furnished Items
ESA	European Space Agency
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FRP	Fire Radiative Power
IPF	Instrument Processing Facility
L1	Level 1
L2	Level 2
MWIR	Medium Wave InfraRed
NRT	Near Real Time
PDGS	Payload Data Ground Segment
RSP	Remote Sensing and Products division
RD	Reference Document
S3	Sentinel-3
SLSTR	Sea and Land Surface Temperature Radiometer
SWIR	Short Wave-InfraRed
TIR	Thermal InfraRed

1.5 Document Structure

This document is structured as follow:

- NRT S3 SLSTR L2 FRP product description in Section 2;
- Manifest file description in Section **Error! Reference source not found.**;
- XML schema in Section 3;
- NRT S3 SLSTR L2 FRP product size in Section 4.

2 NRT S3 SLSTR L2 FRP PRODUCT DESCRIPTION

2.1 General product structure

The format of all Sentinel 3 products is described in [AD-2]. The Product Package is illustrated in Figure 1.

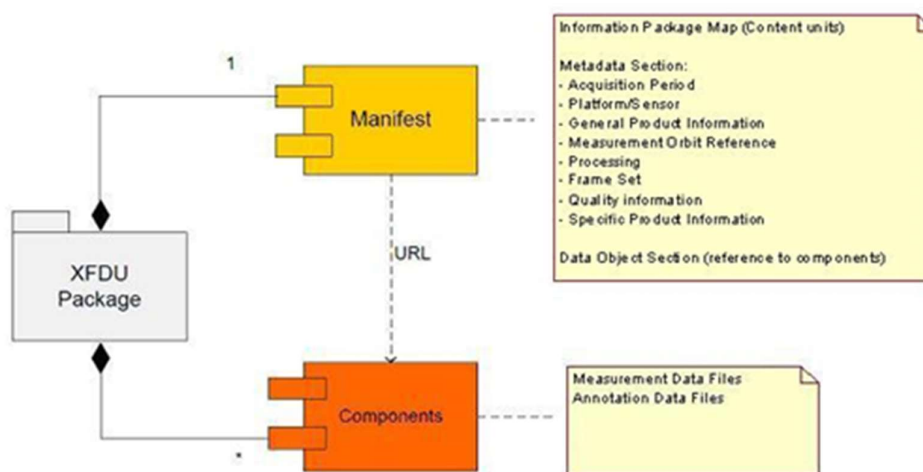


Figure 1: S3 Product package

2.2 NRT S3 SLSTR L2 FRP product: SL_2_FRP__

This product contains the list of parameters for each detected hot-spot, including its FRP value Medium Wave InfraRed (MWIR) and/or Short-Wave InfraRed (SWIR).

2.2.1 Product summary

The NRT S3 SLSTR L2 FRP product contains one measurement and three annotation data files.

Table 1: NRT SLSTR L2 FRP product composition

Product Package Type SL_2_FRP		Description Fire Detection and Fire Radiative Power Parameters			
Product Level	Diss. Timeliness	Product Category	Application Domain	Spatial Resolution	
2	NRT	Available to the user	LND	1 Km	
Product Dissemination Unit Stripe		Number of Package components	Number of Measurement Data Files	Number of Annotation Data Files	Number of Representation Information Files
		14 ¹	1	13	0
Product Package Structure					

¹ Number of Package components includes the manifest and the OLQC Report.

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Manifest file	
File name	Composition
xfdmanifest.xml	XML fields
Measurement Data files (see section Error! Reference source not found. for more details)	
File name	Composition
FRP_in.nc	i, j, time, latitude, longitude, FRP_SWIR, FRP_MWIR, FLAG_SWIR_SAA, FRP_uncertainty_SWIR, FRP_uncertainty_MWIR, TCWV, transmittance_SWIR, transmittance_MWIR, transmittance_SWIR, IFOV_area, glint_angle,, confidence, classification, window_size, flags, S7_Fire_pixel_radiance, F1_Fire_pixel_radiance, used_channel, Radiance_window, n_window, n_water, n_cloud, n_SWIR_fire.
Annotation Data files	
File name	Composition
flags_in.nc	cloud_in, bayes_in, pointing_in, confidence_in, cloud_orphan_in, bayes_orphan_in, pointing_orphan_in, confidence_orphan_in
geodetic_in.nc	latitude_in, longitude_in, elevation_in, latitude_orphan_in, longitude_orphan_in, elevation_orphan_in

2.2.2 Manifest file

The structure of the manifest file is described in [AD-2].

2.2.3 Measurement data file – FRP_in.nc

The measurement data file contains all key scientific result associated with the NRT FRP processor, especially FRP (from MWIR and/SWIR), FRP uncertainty FRP (from MWIR and/SWIR) and other supporting fields associated with each individual detected hot-spot reported at 1 km resolution on the SLSTR S7 image grid. Furthermore, for each original pixel in the S7 image grid, a series of flags is provided associated with each detection test result (see ATBD in [RD-3]). This allows further analyses related to potential omitted fires or false alarms and identify the reason (*i.e.* the detection test responsible of this phenomenon).

Table 2: NRT SLSTR L2 FRP – FRP_in.nc description

Element name	Description	Range or value	T	D
fires	Fire list array size - Only associated with Standard FRP MWIR & FRP SWIR (1 km).			
fires_MWIR_alternative	Fire list array size - Only associated with Alternative FRP MWIR			
fires_SWIR_500m	Fire list array size - Only associated with FRP SWIR (500 m)			
rows	Along track grid size			
columns	Across track grid size			
<common global attributes>	Common global attributes			
i	Fire pixel across-track image grid index		i32	fires
j	Fire pixel along-track image grid index		i16	fires
time	Time		i64	fires
standard_name	CF standard name	time		1

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Element name	Description	Range or value	T	D
units	UDUNITS unit name	Microseconds since 2000-01-01T00:00:00		
latitude	Latitude	[-90; 90]	f64	fires
standard_name	CF standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
longitude	Longitude	[-180; 180]	f64	fires
standard_name	CF standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
latitude_alternative	Latitude_alternative	[-90; 90]	f64	fires_MWIR_alternative
standard_name	CF standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
longitude_alternative	Longitude_alternative	[-180; 180]	f64	fires_MWIR_alternative
standard_name	CF standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
latitude_SWIR_500m	Latitude_alternative	[-90; 90]	f64	fires_SWIR_500m
standard_name	CF standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
longitude_SWIR_500m	Longitude_alternative	[-180; 180]	f64	fires_SWIR_500m
standard_name	CF standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
FRP_MWIR	Fire radiative power computed from Standard MWIR channels (S7 and F1)		f64	fires
units	UDUNITS unit name	MW		1
FRP_uncertainty_MWIR	Fire radiative power total uncertainty computed from Standard MWIR channels (S7 and F1)		f64	fires
units	UDUNITS unit name	MW		1
FRP_MWIR_alternative	Fire radiative power computed from Alternative MWIR channels (S7 and F1)		f64	fires_MWIR_alternative
units	UDUNITS unit name	MW		1
FRP_uncertainty_MWIR_alternative	Fire radiative power total uncertainty computed from Alternative MWIR channels (S7 and F1)		f64	fires_MWIR_alternative
units	UDUNITS unit name	MW		1
transmittance_MWIR	Transmittance of path to fire computed from MWIR channels (S7 and F1)	[0;1]	f64	fires
transmittance_MWIR_alternative	Transmittance of path to fire computed from MWIR channels (S7 and F1)	[0;1]	f64	fires_alternative
FRP_SWIR	Fire radiative power computed from SWIR (1 km) channels (S5 and S6)		f64	fires
units	UDUNITS unit name	MW		1

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Element name	Description	Range or value	T	D
FRP_SWIR_500m	Fire radiative power computed from SWIR (1 km) channels (S5 and S6)		f64	fires_SWIR_500m
units	UDUNITS unit name	MW		1
FRP_uncertainty_SWIR	Fire radiative power total uncertainty computed from SWIR channels (S5 and S6)		f64	fires
units	UDUNITS unit name	MW		1
confidence_SWIR_SAA	Probabilistic Confidence South Atlantic Anomaly (SAA) suspected from SWIR (1 km) channels (S5 and S6) & a & b stripes	[0 ; 100]	i32	fires
confidence_SWIR_SAA_500m	Probabilistic Confidence South Atlantic Anomaly (SAA) suspected from SWIR (500 m) channels (S5 and S6)	[0 ; 100]	i32	Fires_SWIR_500m
transmittance_SWIR	Transmittance of path to fire computed from SWIR channels (S5 and S6)	[0;1]	f64	fires
confidence_MWIR	Overall Fire detection confidence – Standard FRP MWIR	[0 ; 100]	f64	fires
confidence_Abs_BT_NWIR	Fire detection confidence – Standard FRP MWIR – Absolute S7 BT	[0 ; 100]	f64	fires
confidence_Rel_BT_MWIR_spatial	Fire detection confidence – Standard FRP MWIR – Relative S& BT between fire pixel & background	[0 ; 100]	f64	fires
confidence_Rel_BT_MWIR_spectral	Fire detection confidence – Standard FRP MWIR – Relative S7 BT to S7-S8 spectral BT	[0 ; 100]	f64	fires
confidence_ncloud_vicinity	Fire detection confidence – Standard FRP MWIR - w.r.t. near-neighbouring cloud pixels	[0 ; 100]	f64	fires
confidence_nwater_vicinity	Fire detection confidence – Standard FRP MWIR – w.r.t. near-neighbouring water pixels	[0 ; 100]	f64	fires
confidence_clear_sky_freezing	Fire detection confidence – Standard FRP MWIR – clear-sky freezing test	[0 ; 100]	f64	fires
confidence_clear_sky_split_window	Fire detection confidence – Standard FRP MWIR – clear-sky split-window test	[0 ; 100]	f64	fires
classification	Hotspot classification code – Standard FRP MWIR or FRP SWIR (1 km)	See Table 4	u8	fires
flag_values	Flag values	See Table 4		1
flag_masks	Flag masks	See Table 4		1
flag_meanings	Flag descriptions	See Table 4		1
classification_alternative	Hotspot classification code – Alternative FRP MWIR	See Table 4	u8	Fires_MWIR_alternative
flag_values	Flag values	See Table 4		1
flag_masks	Flag masks	See Table 4		1
flag_meanings	Flag descriptions	See Table 4		1
S7_Fire_pixel_radiance	Fire pixel radiance computed from S7 brightness Temperature	[-32767, 32767]	i16	fires
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1

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Element name	Description	Range or value	T	D
F1_Fire_pixel_radiance	Fire pixel radiance computed from F1 brightness Temperature	[-32767, 32767]	i16	fires
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
S7_Fire_pixel_BT	Fire pixel radiance computed from S7 brightness Temperature	[-32767, 32767]	i16	fires
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	K		1
S8_Fire_pixel_BT	Fire pixel radiance computed from S8 brightness Temperature	[-32767, 32767]	i16	fires
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	K		1
used_channel	Boolean flag indicating which channel was used in the FRP calculation, with 0 referring to S7 channel and 1 to F1 channel – Standard FRP MWIR	[0,1]		fires
used_channel_alternative	Boolean flag indicating which channel was used in the FRP calculation, with 0 referring to S7 channel and 1 to F1 channel – Alternative FRP MWIR	[0,1]		fires_MWIR_alternative
Radiance_window	Average background window radiance used in the FRP equation. This radiance is associated with the channel defined by the used_channel parameter – Standard FRP MWIR	[-32767, 32767]	i16	fires
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
Radiance_window_alternative	Average background window radiance used in the FRP equation. This radiance is associated with the channel defined by the used_channel parameter – Alternative FRP MWIR	[-32767, 32767]	i16	fires_MWIR_alternative
standard_name	CF standard name	toa_radiance		1
scale_factor	Scaling factor used in decoding packed data	0.01		1
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
Glint_angle	Angle between SLSTR viewing direction and the direction of the sun rays specifically reflected from the horizontal surface		f64	fires
units	UDUNITS unit name	degrees		1
IFOV_area	Projected area of detector IFOV on surface – Standard FRP MWIR or FRP SWIR (1 km)		f64	fires

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Element name	Description	Range or value	T	D
units	UDUNITS unit name	m2		1
IFOV_area_alternative	Projected area of detector IFOV on surface – Alternative FRP MWIR		f64	fires_MWIR_alternative
units	UDUNITS unit name	m2		1
IFOV_area_500m	Projected area of detector IFOV on surface – FRPS WIR (500 m)		f64	fires_SWIR_500m
units	UDUNITS unit name	m2		1
TCWV	Total column water vapour above fire		f64	fires
standard_name	CF standard name	atmosphere_water_vapor_content		1
source	Data source	ECMWF files		1
units	UDUNITS unit name	kg m-2		1
n_window	Background window size		i16	fires
n_water	Number of water pixels in background window		i16	fires
n_cloud	Number of cloudy pixels in background window		i16	fires
n_SWIR_fire	Number of fires detected on the 500m grid using the S6 absolute test. This number is only relevant for oceanic or daytime land detected fires. The others cases are associated with a “-1” value	[0,4]	u16	fires
_FillValue	Value indicating missing data	-1		
flags	Fire test summary flags	See Table 3	i16	rows columns
flag_values	Flag values	See Table 3		1
flag_meanings	Flag descriptions	See Table 3		1
flag_maskss	Flag masks	See Table 3		1
solar_zenith	Solar Zenith Angle – Standard FRP MWIR or FRP SWIR (1 km)	[0-180]	f64	fires
units	UDUNITS unit name	deg		1
solar_azimuth	Solar Azimuth Angle – Standard FRP MWIR or FRP SWIR (1 km)	[0-180]	f64	fires
units	UDUNITS unit name	deg		1
sat_zenith	Viewing Zenith Angle – Standard FRP MWIR or FRP SWIR (1 km)	[0-180]	f64	fires
units	UDUNITS unit name	deg		1
sat_azimuth	Viewing Azimuth Angle – Standard FRP MWIR or FRP SWIR (1 km)	[0-180]	f64	fires
units	UDUNITS unit name	deg		1
solar_zenith_alternative	Solar Zenith Angle – Alternative FRP MWIR	[0-180]	f64	fires_MWIR_alternative
units	UDUNITS unit name	deg		1

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Element name	Description	Range or value	T	D
solar_azimuth_alternative	Solar Azimuth Angle – Alternative FRP MWIR	[0-180]	f64	fires_MWIR_alternative
units	UDUNITS unit name	deg		1
sat_zenith_alternative	Viewing Zenith Angle – Alternative FRP MWIR	[0-180]	f64	fires_MWIR_alternative
units	UDUNITS unit name	deg		1
sat_azimuth_alternative	Viewing Azimuth Angle – Alternative FRP MWIR	[0-180]	f64	fires_MWIR_alternative
units	UDUNITS unit name	deg		1

Table 3: FRP summary flag word values

Bit number	Value	Text Code	Description
0	1	exception	L1b pixel radiance exception
1	1	l1b_water	L1b water surface classification
2	1	frp_water	Water detected by FRP tests
3	1	l1b_cloud	Cloud detected by L1b tests
4	1	bayesian_cloud	Cloud detected by Bayesian tests
5	1	frp_cloud	Cloud detected by FRP tests
6	0	night	Pixel is in day or night
	1	day	
7	1	sun_glint	Sun glint
8	1	spectral_filter	Potential fire identified by spectral test
9	1	spatial_filter	Potential fire identified by spatial test
10	1	absolute_threshold	Fire identified by absolute threshold test
11	1	background_characterisation	Potential fire successful background characterisation
12	1	contextual_threshold	Potential fire confirmed by contextual threshold test
13	1	desert_boundary	Potential fire rejected by desert boundary test
14	0	No Fire	Normal fire have BT <500K
	1	Saturated fire	Saturation fire have BT >500K
15	0	Low confidence fire	Low confidence (0-50%)
	1	High confidence fire	High confidence (50-100%)
16	1	abs_bckg_invalid	if raised, Fire detected by absolute test but associated with unvalid background
17	1	saturated_area	if raised, pixel in located on a saturated area (i.e the percentage of S7-saturated pixel are higher than a certain threshold) and “classic” FRP detection cannot be processed over this pixel
18	1	cloud_edge	if raised, this potential fire pixel has been discarded due to neighboring cloudy pixels
19	1	land-water_edge	if raised, this potential fire pixel has been discarded due to too many neighbors with inconsistent surface classification.
20	1	F1_overshooting_risk	If raised, this S7 pixel is considered to be located in an area of risk w.r.t. F1 overshooting measurement behavior. Hence, it cannot be processed within the Alternative FRP MWIR module.

Table 4FRP classification byte values

Bit number	Text Code	Description
0	vegetation_fire	If raised, suspected vegetation fire
1	onshore_gas_flare	if raised, suspected onshore gas flare
2	offshore_gas_flare	if raised, Suspected offshore gas flare
3	volcanic	if raised, Suspected volcanic hotspot
4	industrial	if raised, Suspected industrial hotspot
5	spare	spare

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6	spare	spare
7	spare	spare

2.2.4 Annotation data files

2.2.4.1 Global flags data file - flags_in.nc

The global flags annotation data file contains the product quality flags that are applicable across all measurement datasets sharing the same view and detector geometry. In the SLSTR FRP product, the global flags are applicable to the 1 km nadir view thermal channels.

Table 5: Global flags flag_in.nc description

Element name	Description	Range or value	T	D
rows	Along track grid size			
columns	Across track grid size			
orphan_pixels	Maximum Number of un-regridded (orphaned) pixels on each image line			
<common global attributes>	Common global attributes			
Probability_cloud_single_i<v>	Probability of cloud in pixel (single view)	[-100, 100]	i16	rows columns
_FillValue	Value indicating missing data	-32768		1
scale_factor	Scaling factor used in decoding packed data	0.005		1
add_offset	Offset used to in decoding packed data	0.5		1
comment	comment	Probability of cloud in pixel as estimated by Bayesian Cloud detection on a single view		1
Probability_cloud_dual_i<v>	Probability of cloud in pixel (dual view)	[-100, 100]	i16	rows columns
_FillValue	Value indicating missing data	-32768		1
scale_factor	Scaling factor used in decoding packed data	0.005		1
add_offset	Offset used to in decoding packed data	0.5		1
comment	comment	Probability of cloud in pixel as estimated by Bayesian Cloud detection on both views		1
cloud_<g><v>	Global cloud flags (basic SLSTR cloud tests)		u16	rows columns
flag_masks	Masks for each flag bit	See Table 6		1
flag_meanings	Text descriptions for each flag bit	See Table 6		1
bayes_<g><v>	Bayesian cloud flags	[0b; 100b]	u8	rows columns
flag_masks	Masks for each flag bit	See Table 7		1

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Element name	Description	Range or value	T	D
flag_meanings	Text descriptions for each flag bit	See Table 7		1
pointing_<g><v>	Global pointing flags		u8	rows columns
flag_masks	Masks for each flag bit	See Table 8		1
flag_meanings	Text descriptions for each flag bit	See Table 8		1
confidence_<g><v>	Global confidence flags		u16	rows columns
flag_masks	Masks for each flag bit	See Table 9		1
flag_meanings	Text descriptions for each flag bit	See Table 9		1
cloud_orphan_<g><v>	Orphan pixel global cloud flags		u16	rows orphan_pixels
flag_masks	Masks for each flag bit	See Table 6		1
flag_meanings	Text descriptions for each flag bit	See Table 6		1
bayes_orphan_<g><v>	Orphan pixel Bayesian cloud flags		u8	rows orphan_pixels
flag_masks	Masks for each flag bit	See Table 7		1
flag_meanings	Text descriptions for each flag bit	See Table 7		1
pointing_orphan_<g><v>	Orphan pixel global pointing flags		u8	rows orphan_pixels
flag_masks	Masks for each flag bit	See Table 8		1
flag_meanings	Text descriptions for each flag bit	See Table 8		1
confidence_orphan_<g><v>	Orphan pixel global confidence flags		u16	rows orphan_pixels
flag_masks	Masks for each flag bit	See Table 9		1
flag_meanings	Text descriptions for each flag bit	See Table 9		1

Table 6: Cloud word definitions

Bit	Text code	Meaning if set	Comment
0		Visible channels cloud test	Day time only
1		1.37µm threshold test	Day time only
2		1.6µm small-scale histogram test	Day time only
3		1.6µm large-scale histogram test	Day time only
4		2.25µm small-scale histogram test	Day time only
5		2.25µm large-scale histogram test	Day time only
6		11µm spatial coherence test	
7		12µm gross cloud test	
8	thin_cirrus	11µm/12µm thin cirrus test	
9		3.7µm/12µm medium/high level test	
10	fog_low_stratus	11µm/3.7µm fog/low stratus test	
11		11µm/12µm view difference test	Uses both views
12		3.7µm/11µm view difference test	Uses both views
13	thermal_histogram	11µm/12µm thermal histogram test	
14		spare	
15		spare	

Table 7: Bayesian cloud word definitions

Bit	Text code	Meaning if set	Comment
0		Single view low probability threshold	Climate-quality clearing

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Bit	Text code	Meaning if set	Comment
1		Single view moderate probability threshold	Operational-quality clearing
2		Dual view low probability threshold	Climate-quality clearing
3		Dual view moderate probability threshold	Operational-quality clearing
4		spare	
5		spare	
6		spare	
7		spare	

Table 8: Pointing word definitions

0	FlipMirrorAbsoluteError	flip mirror absolute error exceeds threshold	
1	FlipMirrorIntegratedError	flip mirror integrated error exceeds threshold	
2	FlipMirrorRMSError	flip mirror RMS error exceeds threshold	
3	ScanMirrorAbsoluteError	scan mirror absolute error exceeds threshold	
4	ScanMirrorIntegratedError	scan mirror integrated error exceeds threshold	
5	ScanMirrorRMSError	scan mirror RMS error exceeds threshold	
6	ScanTimeError	Scan time is inconsistent with scan count sequence	
7	Platform_Mode	platform mode	0 if nominal, else 1

Table 9: Confidence word definitions

Bit	Text code	Meaning if set	Comment
0	coastline	coastline in field of view	
1	ocean	ocean in field of view	
2	tidal	tidal zone in field of view	
3	land	land in field of view	
4	inland_water	inland water in field of view	
5	unfilled	unfilled pixel (1 if this pixel is never tested or filled)	
6		(spare)	
7		(spare)	
8	cosmetic	cosmetic fill pixel	
9	duplicate	Pixel has a duplicate	
10	day	pixel in daylight	
11	twilight	pixel in twilight	
12	sun_glint	sun glint in pixel	
13	snow	snow	
14	summary_cloud	summary cloud test	
15	summary_pointing	summary pointing	

2.2.4.2 Full resolution geodetic coordinate annotation data file - geodetic_in.nc

The geodetic coordinates dataset contains the ortho-geolocated geodetic coordinates, in latitude and longitude, and the surface elevation of the centre of each field of view on the earth's surface, determined from a digital elevation model. The dataset is generated in the image frame. The dataset is encoded in NetCDF 4. In the NRT SLSTR L2 FRP product, the given file is the one dedicated to the 1 km nadir view S7 thermal channel.

Table 10: Full resolution geodetic coordinate annotation data file description

**EUMETSAT - Copernicus Sentinel-3 SLSTR L2 NRT FRP Product Data
Format Specification**

Element name	Description	Range or value	T	D
rows	Along track grid size			
columns	Across track grid size			
orphan_pixels	Maximum number of un-regridded (orphaned) pixels on each image line			
<common global attributes>	Common global attributes			
latitude_<g><v>	Latitude of detector FOV centre on the earth's surface	[-90; 90]	i32	rows columns
standard_name	CF standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
scale_factor	Scaling factor used in decoding packed data	1e-6		1
add_offset	Offset used in decoding packed data	0		1
_FillValue	Value indicating missing data	-2147483648		1
longitude_<g><v>	Longitude of detector FOV centre on the earth's surface	[-180; 180]	i32	rows columns
standard_name	CF standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
scale_factor	Scaling factor used in decoding packed data	1e-6		1
add_offset	Offset used in decoding packed data	0		1
_FillValue	Value indicating missing data	-2147483648		1
elevation_<g><v>	Surface elevation of detector FOV centre above reference ellipsoid	[-450; 9000]	i16	rows columns
standard_name	CF standard name	surface_altitude		1
units	UDUNITS unit name	m		1
scale_factor	Scaling factor used in decoding packed data	0.1		1
add_offset	Offset used in decoding packed data	0		1
_FillValue	Value indicating missing data	-32768		1
latitude_orphan_<g><v>	Latitude of detector FOV centre on the earth's surface associated with un-regridded pixels	[-90; 90]	i32	rows orphan_pixels
standard_name	CF standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
scale_factor	Scaling factor used in decoding packed data	1e-6		1
add_offset	Offset used in decoding packed data	0		1
_FillValue	Value indicating missing data	-2147483648		1
longitude_orphan_<g><v>	Longitude of detector FOV centre on the earth's surface associated with un-regridded pixels	[-180; 180]	i32	rows orphan_pixels
standard_name	CF standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
scale_factor	Scaling factor used in decoding packed data	1e-6		1
add_offset	Offset used in decoding packed data	0		1
_FillValue	Value indicating missing data	-2147483648		1
elevation_orphan_<g><v>	Surface elevation of detector FOV centre above reference ellipsoid associated with un-regridded pixels	[-450; 9000]	i16	rows orphan_pixels

**EUMETSAT - Copernicus Sentinel-3 SLSTR L2 NRT FRP Product Data
Format Specification**

Element name	Description	Range or value	T	D
standard_name	CF standard name	surface_altitude		1
units	UDUNITS unit name	m		1
scale_factor	Scaling factor used in decoding packed data	0.1		1
add_offset	Offset used to in decoding packed data	0		1
_FillValue	Value indicating missing data	-32768		1

3 XML SCHEMA

The xml schemas used to generate the product manifest are provided as separate files [AD-4].

4 NRT S3 SLSTR L2 FRP PRODUCT SIZE

Table 11 lists the size computation per product file produced over a 5-min granule. A file compression is applied (ratio of 4) on FRP_in.nc.

The overall product size over 1 full day (24h) is about 24 Gbytes. Note that the number of detected files has a very minor impact on product size as the largest part is due to annotations files. Only the size and the content of FRP_in.nc file is impacted by the number of fires. The size of annotations files remains constant as they are associated with the whole SLSTR image and not only the detected fires.

Table 11: NRT SLSTR L2 FRP product size per 5-min granule

Element name	Description	Size in Mbytes
xfdumanifest.xml	Sentinel-SAFE product manifest	
FRP_in.nc	1km fire radiative power measurement dataset	~0.8
flags_in.nc	Nadir 1km global flags dataset	31
geodetic_in.nc	Nadir 1km geodetic coordinates dataset	40
Total		~62