

AIST ALOS/PALSAR InSAR Product Format Description

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National Institute of Advanced Industrial Science and Technology

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AIST ALOS/PALSAR InSAR Product Format Description

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1. Overview

This document describes the format of the National Institute of Advanced Industrial Science and Technology (AIST) Advanced Land Observing Satellite (ALOS)/Phased Array type L-band Synthetic Aperture Radar (PALSAR) Interferometric Synthetic Aperture Radar (InSAR) product created from ALOS/PALSAR level 1.0 of the AIST.

Abbreviations used in this document are as follows.

AIST	National Institute of Advanced Industrial Science and Technology
ALOS	Advanced Land Observing Satellite
CEOS	Committee on Earth Observation Satellites
CF	Calibration Factor
DEM	Digital Elevation Model
DN	Digital Number
InSAR	Interferometric Synthetic Aperture Radar
JAXA	Japan Aerospace Exploration Agency
PALSAR	Phased Array type L-band Synthetic Aperture Radar
SLC	Single Look Complex

2. Product specifications

2.1. Outline of the product

The AIST ALOS/PALSAR InSAR products are the data processed by SAR imaging, precise co-registration for all scenes in the same frame, InSAR analysis, and unwrapping regarding ALOS/PALSAR L1.0 whose polarizations are single (HH) and dual (HH, HV). The following software was utilized for each process:

- Sigma-SAR SAR Imaging, Precise Co-registration, InSAR analysis
- SNAPHU Unwrapping

The AIST ALOS/PALSAR InSAR product comprises 1) GeoTIFF files of SLC and InSAR images, 2) text files containing metadata, and 3) SLC CEOS files conforming to the Japan Aerospace Exploration Agency (JAXA) ALOS/PALSAR CEOS Level 1.1 format. Most GeoTIFF files are in the Cloud Optimized GeoTIFF format.

Table 2-1 shows the main specifications of ALOS/PALSAR used in this InSAR analysis. The product outline and the product type in each processing level are presented in Table 2-2 and Table 2-3, respectively. Also, Table 2-4 presents the pixel spacing of the products.

Table 2-1 ALOS/PALSAR specifications

	Fine mode (single-pol., dual-pol.)	
Center frequency (wavelength)	1.27 GHz (0.2360571 m)	
Bandwidth	28 MHz	14 MHz
Polarization	HH	HH+HV

Table 2-2 Outline of the InSAR product

Processing level	Processing abbreviation	Outline of the product
1.3	RSLC	<p>These data are complex data compressed in range direction and azimuth direction with zero doppler frequency. The magnitude and phase information in slant range coordinates are contained.</p> <p>In the case of dual-polarization, the data are oversampled at the range direction sampling frequency of single-polarization.</p> <p>Also, the data are co-registered pixel by pixel to a single prime scene, a center scene regarding spatial and temporal in the frame. Both orbital and topographic fringes have been removed.</p>
2.3	GUNW	<p>These data are processed from level 1.3 product by InSAR analysis, unwrapping, and orthorectified with a digital elevation model.</p>

Table 2-3 File type of the product

Processing level	Filename	Description
1.3	<i>SCENEID</i> _RSLC_HH.tif	Resampled SLC(GeoTIFF)
	<i>SCENEID</i> _RSLC.txt	Metadata
	VOL-ALPSRP <i>MMMMMMNNNN</i> -H1.3_ <i>O</i> LED-ALPSRP <i>MMMMMMNNNN</i> -H1.3_ <i>O</i> IMG-HH-ALPSRP <i>MMMMMMNNNN</i> -H1.3_ <i>O</i> TRL-ALPSRP <i>MMMMMMNNNN</i> -H1.3_ <i>O</i>	Resampled SLC(CEOS) MMMMM: Orbit accumulation number of a scene center NNNN: Frame number O: Orbit direction
2.3	<i>PAIRID</i> _GUNW_dif.tif <i>PAIRID</i> _GUNW_dif_filt.tif <i>PAIRID</i> _GUNW_unw.tif	Interferograms
	<i>PAIRID</i> _GUNW_coh.tif	Coherence
	<i>PAIRID</i> _GUNW_mask.tif	Mask
	<i>PAIRID</i> _GUNW_hgt.tif <i>PAIRID</i> _GUNW_losN.tif <i>PAIRID</i> _GUNW_losE.tif <i>PAIRID</i> _GUNW_losU.tif	Elevation and Line-of-Sight
	<i>SCENEID</i> _GUNW_amp.tif	Backscatter amplitude
	<i>PAIRID</i> _GUNW.txt	Metadata
	<i>PPP_FFFF_OOO</i> _GUNW.baselines	Perpendicular baseline PPP: Path number FFFF: Frame number OOO: Off-nadir angle

※The definition of PAIRID and SCENEID are shown in Section 2.3.

Table 2-4 Pixel spacing of the product

Processing level	Pixel spacing
2.3	0.0003 degree ※ Azimuth: 8 looks, Range: 4 looks

※Since level 1.3 is the product in slant range coordinates, the pixel spacing is not defined in ground range coordinates.

2.2. Differences from JAXA standard product

The differences between the AIST ALOS/PALSAR InSAR product (Level 1.3) and ALOS/PALSAR product (JAXA standard product Level 1.1) are listed below.

- i) Chirp replica signals before and after observations were not stored in ALOS/PALSAR level 1.0 of AIST. However, the following paper reports that the chirp rate is stable. The processing was performed using the average value of the chirp rates.

PALSAR Radiometric and Geometric Calibration, M. Shimada, O. Isoguchi, T. Tadono, K. Isono, IEEE Transactions on Geoscience and Remote Sensing, Vol. 47, No.12, pp.3915-3932, Dec. 2009.

- ii) Satellite positions and velocities in the inertial coordinates are stored in ALOS/PALSAR level 1.0 of AIST. Then, the data converted to the fixed earth coordinates by taking into account only the rotation of the Earth were utilized.
- iii) Since the cut-out position of the scene of the AIST product is not defined according to the JAXA standard product, the imaging ranges of the AIST product and the JAXA standard product in the scene unit may be different.
- iv) The AIST product consists of a dataset that is imaged at zero doppler frequency. In the case of dual-polarization, the data are oversampled at the range direction sampling frequency of single-polarization.
- v) The AIST product is co-registered to a single prime scene, a center scene regarding spatial and temporal in the frame. Both orbital and topographic fringes for the single prime are removed.

2.3. Filename

The filename of the AIST ALOS/PALSAR InSAR product follows the format shown below. Table 2-5 and Table 2-6 list scene ID and pair ID definitions, respectively. The processing abbreviation and image type definitions are listed in Table 2-7, Table 2-8, and Table 2-9.

➤ GeoTIFF file

PairID_ProcessingAbbreviation_ImageType.tif	Interferograms, Coherence, Mask, Elevation, and Line-of-Sight
SceneID_ProcessingAbbreviation_ImageType.tif	Backscatter amplitude, Resampled SLC

➤ Text file

PairID_ProcessingAbbreviation.txt	Metadata of level 2.3
PathNumber_FrameNumber_OffnadirAngle_ProcessingAbbreviation.baselines	Perpendicular baseline of level 2.3
SceneID_ProcessingAbbreviation.txt	Metadata of level 1.3

➤ CEOS file

VOL-JAXA SceneAndProductID	Volume directory file of RSLC
LED-JAXA SceneAndProductID	Leader file of RSLC
TRL-JAXA SceneAndProductID	Trailer file of RSLC
IMG-HH-JAXA SceneAndProductID	Image file of RSLC

The GeoTIFF filename and the metadata filename definitions are listed in Table 2-7 and Table 2-8, respectively. Furthermore, Table 2-9 presents the CEOS filename definition.

Table 2-5 Scene ID definition

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D

Characters	Item name	Description
AAAA	Latitude of Scene Center	N900 – S900 (North latitude 90.0°– South latitude 90.0°) ※The equator is N000. ※Truncate the second decimal place.
BBBBB	Longitude of Scene Center	W1800 – E1800 (West longitude 180.0°– East longitude 180.0°) ※The 0° meridian is E0000, and the 180° meridian is E1800. ※Truncate the second decimal place.
CCC	Observation Mode	FBS: Fine mode (single-pol.) FBD: Fine mode (dual-pol.)
D	Observation Direction	R: Right looking
E	Orbit Direction	A: Ascending, D: Descending
YYYYMMDD	Observation date of Scene Center	YYYY: Year, MM: Month, DD: day

Table 2-6 Pair ID definition

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D
27	28	29	30	31	32	33	34	35																	
_	y	y	y	y	m	m	d	d																	

Characters	Item name	Description
AAAA	Latitude of Scene Center	N900 – S900 (North latitude 90.0°– South latitude 90.0°) ※The equator is N000. ※Truncate the second decimal place.
BBBBB	Longitude of Scene Center	W1800 – E1800 (West longitude 180.0°– East longitude 180.0°) ※The 0° meridian is E0000, and the 180° meridian is E1800. ※Truncate the second decimal place.
CCC	Observation Mode	FB_: Fine mode
D	Observation Direction	R: Right looking
E	Orbit Direction	A: Ascending, D: Descending
YYYYMMDD	Observation date of Scene Center in Primary Scene	YYYY: Year, MM: Month, DD: day
yyyymmdd	Observation date of Scene Center in Secondary Scene	yyyy: Year, mm: Month, dd: day

Table 2-7(1/3) GeoTIFF filename definitions
(interferogram, coherence, mask, elevation, and line-of-sight)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D	
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	...									
_	y	y	y	y	m	m	d	d	_	F	F	F	F	_	G	G	G	.	t	i	f				

Characters	Item name	Description
P01AAAABBBBBB CCCDE_YYYYMMDD _yyyymmdd	Pair ID	Table 2-6
FFFFF	Processing Abbreviation	GUNW: Level 2.3
GGG	Image type	dif: Wrapped interferogram before spatial filtering dif_filt: Wrapped interferogram after spatial filtering unw: Unwrapped interferogram coh: Coherence mask: Mask hgt: Elevation losN: Line-of-Sight (North-south direction. North is positive.) losE: Line-of-Sight (East-west direction. East is positive.) losU: Line-of-Sight (Vertical direction. Top is positive.)

<Examples of filename>

P01N420E1410FB_RA_20061221_20070808_GUNW_unw.tif

Observation Mode: Fine mode

Orbit Direction: Ascending

Processing Level: 2.3

Image type: Unwrapped interferogram

P01N420E1410FB_RA_20061221_20070808_GUNW_mask.tif

Observation Mode: Fine mode

Orbit Direction: Ascending

Processing Level: 2.3

Image type: Mask

Table 2-7(2/3) GeoTIFF filename definitions (backscatter amplitude)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D	
27	28	29	30	31	32	33	34	35	36	37	38	39													
_	F	F	F	F	_	G	G	G	.	t	i	f													

Characters	Item name	Description
P01AAAABBBBB CCCDE_YYYYMMDD	Scene ID	Table 2-5
FFFF	Processing Abbreviation	GUNW: Level 2.3
GGG	Image type	amp: Backscatter amplitude

<Examples of filename>

P01N420E1410FBSRA_20061221_GUNW_amp.tif

Observation Mode: Fine mode (single-pol.) Orbit Direction: Ascending

Processing Level: 2.3 Image type: Backscatter amplitude

Table 2-7(3/3) GeoTIFF filename definitions (resampled SLC)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D	
27	28	29	30	31	32	33	34	35	36	37	38														
_	F	F	F	F	_	G	G	.	t	i	f														

Characters	Item name	Description
P01AAAABBBBB CCCDE_YYYYMMDD	Scene ID	Table 2-5
FFFF	Processing Abbreviation	RSLC: level 1.3
GG	Image type	HH: Horizontally polarized wave transmission / horizontally polarized wave receiving

<Examples of filename>

P01N420E1410FBDRA_20061221_RSLC_HH.tif

Observation Mode: Fine mode (dual-pol.) Orbit Direction: Ascending

Processing Level: 1.3

Image type: Horizontally polarized wave transmission/horizontally polarized wave receiving

Table 2-8(1/3) Text filename definitions (metadata of Level 2.3)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44								
_	y	y	y	y	m	m	d	d	_	F	F	F	F	.	t	x	t								

Characters	Item name	Description
P01AAAABBBBB CCCDE_YYYYMMDD _yyyymmdd	Pair ID	Table 2-6
FFFF	Processing Abbreviation	GUNW: Level 2.3

Table 2-8(2/3) Text filename definitions (perpendicular baseline of Level 2.3)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
A	A	A	_	B	B	B	B	_	C	C	C	_	D	D	D	D	.	b	a	s	e	l	i	n	e	s

Characters	Item name	Description
AAA	Path Number	
BBBB	Frame Number	
CCC	Off-nadir Angle	Ten times the off-nadir angle (e.g., 343 if the off-nadir angle is 34.3 degrees)
DDDD	Processing Abbreviation	GUNW: Level 2.3

Table 2-8(3/3) Text filename definitions (metadata of Level 1.3)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	0	1	A	A	A	A	B	B	B	B	B	C	C	C	D	E	_	Y	Y	Y	Y	M	M	D	D
27	28	29	30	31	32	33	34	35																	
_	F	F	F	F	.	t	x	t																	

Characters	Item name	Description
P01AAAABBBBB CCCDE_YYYYMMDD	Scene ID	Table 2-5
FFFF	Processing Abbreviation	RSLC: Level 1.3

Table 2-9 CEOS filename definitions

File type	Filename definitions
Volume directory file	VOL-JAXA SceneAndProductID
Leader file	LED-JAXA SceneAndProductID
Trailer file	TRL-JAXA SceneAndProductID
Image file	IMG-HH-JAXA SceneAndProductID

<JAXA SceneAndProductID>

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
A	A	B	B	B	C	D	D	D	D	D	E	E	E	E	-	F	G	G	G	G	_	_	H

Characters	Item name	Description
AA	Satellite type	AL : ALOS
BBB	Sensor type	PSR : PALSAR
C	Sensor subtype	P: Other than Scan SAR mode
DDDDD	Orbit accumulation number of Scene Center	
EEEE	Frame number of Scene Center	
F	Observation Mode	H: Fine mode
GGG	Processing Level	1.3: Level 1.3
H	Orbit Direction	A: Ascending, D: Descending

<Examples of filename>

VOL-ALPSRP028660700-H1.3__A

LED-ALPSRP028660700-H1.3__A

TRL-ALPSRP028660700-H1.3__A

IMG-HH-ALPSRP028660700-H1.3__A

Observation Mode: Fine mode

Orbit Direction: Ascending

Processing Level: 1.3

Image type: Horizontally polarized wave transmission/horizontally polarized wave receiving

2.4. Pixel value of GeoTIFF

Backscatter complex data I, Q (floating number) are stored in the resampled SLC. The formula below calculates the backscattering coefficient (unit: dB).

$$\sigma^0 = 10 \times \log_{10}(I^2 + Q^2) + CF - 32.0$$

In the backscatter amplitude image, digital number DN (i.e., integer number) is stored. The valid pixels have a value between 1 and 65535. Invalid pixels, such as that indicating an out-of-image range, have 0. The backscattering coefficient (unit: dB) is calculated below.

$$\sigma^0 = 10 \times \log_{10}(DN^2) + CF$$

These values are obtained with the ensemble average $\langle \rangle$. The CF is a calibration factor included in the metadata file.

The coherence image stores values from 0 to 255 and can be divided by 255 to make it coherence (0.0 to 1.0).

The images of the wrapped interferogram, unwrapped interferogram, elevation, and line-of-sight contain real values, indicating the relevant numbers and whose units are radians for interferogram and meters for elevation. The line-of-sight is the vector from the satellite to the Earth's surface.

Table 2-10 lists the pixel values of the mask product.

Table 2-10 Mask definition

Pixel value	Contents
0	Within the imaging range
1	Out of imaging range
3	Sea
150	Radar shadow
255	Layover

3. Product formats

3.1. GeoTIFF file

The GeoTIFF file of the AIST ALOS/PALSAR InSAR product is a GeoTIFF format file. The byte order of the image data is little-endian. Note that the TIFF and GeoTIFF tags conform to TIFF Revision 6.0 and GeoTIFF Revision 1.0. The GeoTIFF files in level 2.3 are Cloud Optimized GeoTIFF format GeoTIFF files.

Table 3-1 presents the items for the TIFF tag. Table 3-2 and Table 3-3 present items for the GeoTIFF tag. The latitude mentioned in the table indicates the geodetic latitude.

Table 3-1 TIFF tags of the product

No.	Tag Name	Tag Type	Description	Remark
1	ImageLength	LONG	Number of lines	
2	ImageWidth	LONG	Number of pixels in each line	
3	SampleFormat	SHORT	Data type of pixel L1.3 : 3 L2.3 : coh,mask,amp = 1 other = 3	1 = unsigned integer data 3 = IEEE floating point data
4	BitsPerSample	SHORT	Number of bits in each sample L1.3 : 32 L2.3 : coh,mask = 8 amp = 16 other = 32	
5	Compression	SHORT	Compression type = 8 (Fixed)	8 = COMPRESSION_ADOBE_DEFLATE
6	PhotometricInterpretation	SHORT	Colorspace type of pixel = 1 (Fixed)	1 = Black is zero (Pixel value: Black = 0, White = (2 ^{BitsPerSample} -1))
7	SamplesPerPixel	SHORT	Number of samples in each pixel L1.3 = 2 Other = 1	
8	TileWidth	SHORT	Number of columns in each tile = 256 (Fixed)	
9	TileLength	SHORT	Number of rows in each tile = 256 (Fixed)	
10	PlanarConfiguration	SHORT	Storing order of the data = 1 (Fixed)	1 = Values for each pixel are stored contiguously (Example: RGBRGBRGB...)

Table 3-2 GeoTIFF tags of the product (Level 1.3)

No.	Tag Name	Tag Type	Description	Remark
1	ModelTiePointTag	DOUBLE	The correspondence between image coordinates and map coordinates of four corners In an image (N: number of pixels, M: number of lines) = (0.5, 0.5, 0.0, Longitude, Latitude, 0.0, 0.5, M-0.5, 0.0, Longitude, Latitude, 0.0, N-0.5, 0.5, 0.0, Longitude, Latitude, 0.0, N-0.5, M-0.5, 0.0, Longitude, Latitude, 0.0) ※Pixel No, Line No, 0.0, Longitude, Latitude, 0.0	

Table 3-3 GeoTIFF tags of the product (Level 2.3)

No.	Tag Name	Tag Type	Description	Remark
1	ModelPixelScaleTag	DOUBLE	(scale_x, scale_y, 0) scale_x: Horizontal spacing of the image (pixel direction) scale_y: Vertical spacing of the image (line direction)	
2	ModelTiePointTag	DOUBLE	The correspondence between image coordinates and map coordinates of the upper left corner (0.0, 0.0, 0, x, y, 0) ※Pixel No, Line No, 0.0, Map Coordinate(X), Map Coordinate(Y), 0.0	
3	GTModelTypeGeoKey	SHORT	Coordinate system type = 2 (Fixed)	2 = ModelTypeGeographic(Geographic latitude-longitude System)
4	GTRasterTypeGeoKey	SHORT	Area occupied by pixel value = 1 (Fixed)	1 = PixelIsArea The first pixel value occupies the area enclosed by (0,0), (0,1), (1,0), (1,1). The center of pixel is (0.5,0.5). (0,0) (1,0) ↓ ↓ +---+---+---+ * * +---+---+---+ ↑ ↑ (0,1) (1,1)
5	GeographicTypeGeoKey	SHORT	Map coordinate code = 4326 (Fixed)	4326 = GCS WGS 84
6	GeogCitationGeoKey	ASCII	"WGS 84" (Fixed)	
7	GeogAngularUnitsGeoKey	SHORT	Coordinate unit (angle) = 9102 (Fixed)	9102 = Angular Degree[deg]
8	GeogSemiMajorAxisGeoKey	DOUBLE	Elliptical major radius = 6378137.0 (Fixed)	Unit[m]
9	GeogInvFlatteningGeoKey	DOUBLE	Reciprocal of flattening = 298.257223563 (Fixed)	

3.2. Metadata file

The metadata file of the AIST ALOS/PALSAR InSAR product is a plain text file described in the format “keyword = value.”

Table 3-4 and Table 3-5 present items stored in the metadata file.

The string value is enclosed within the double quotation symbol (“”), whereas the numerical value is not enclosed. The latitude mentioned in the table indicates the geodetic latitude.

Table 3-4 Metadata information (Level 1.3)

No.	Section	Item Name	Keyword	Format	Remark
1	Scene	Scene ID	SceneID	%s	
2		Date and Time of Scene Start (UTC)	SceneStartTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
3		Date and Time of Scene End (UTC)	SceneEndTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
4		Date and Time of Scene Center (UTC)	SceneCenterTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
5		Latitude of Scene Start Near Range (degree)	SceneStartNearRangeLatitudeDegree	%.6f	-90≤latitude≤90
6		Longitude of Scene Start Near Range (degree)	SceneStartNearRangeLongitudeDegree	%.6f	-180<longitude≤180
7		Latitude of Scene Start Far Range (degree)	SceneStartFarRangeLatitudeDegree	%.6f	-90≤latitude≤90
8		Longitude of Scene Start Far Range (degree)	SceneStartFarRangeLongitudeDegree	%.6f	-180<longitude≤180
9		Latitude of Scene End Near Range (degree)	SceneEndNearRangeLatitudeDegree	%.6f	-90≤latitude≤90
10		Longitude of Scene End Near Range (degree)	SceneEndNearRangeLongitudeDegree	%.6f	-180<longitude≤180
11		Latitude of Scene End Far Range (degree)	SceneEndFarRangeLatitudeDegree	%.6f	-90≤latitude≤90
12		Longitude of Scene End Far Range (degree)	SceneEndFarRangeLongitudeDegree	%.6f	-180<longitude≤180
13		Latitude of Scene Center (degree)	SceneCenterLatitudeDegree	%.6f	-90≤latitude≤90
14		Longitude of Scene Center (degree)	SceneCenterLongitudeDegree	%.6f	-180<longitude≤180
15		Off-nadir Angle (degree)	OffNadirAngleDegree	%.6f	Copy from level 1.0
16		Orbit Accumulation Number	OrbitNumber	%d	Copy from level 1.0
17		Path No	PathNo	%d	Copy from level 1.0
18		Row No	RowNo	%.2f	Copy from level 1.0
19		Orbit Direction	OrbitDirection	%s	Copy from level 1.0("Ascending" / "Descending")
20		Orbit Data Type	OrbitDataType	%s	Copy from level 1.0 ("High Accurate Orbit" / "Determined Orbit")
21		Observation Mode	ObservationMode	%s	"FBS" / "FBD"
22		Observation Direction	ObservationDirection	%s	"Right" (Fixed)
23		Polarimetry	Polarimetry	%s	"HH" / "HH+HV"
24	Product	Processing Level	ProcessingLevel	%s	"1.3"(Fixed)
25		Reference Frame	ReferenceFrame	%s	"ITRF97" (Fixed)
26		Reference Ellipsoid	ReferenceEllipsoid	%s	"GRS80" (Fixed)
27		Calibration Factor (dB)	CalibrationFactorDecibel	%.2f	"-83.00" (Fixed)
28	Image	Image File Name	ImageFileName	%s	
29		Number of Lines	ImageLines	%d	
30		Number of Samples	ImageSamples	%d	
31		Data Type	DataType	%s	"32FL"
32	Product Information	Producer Organization	ProducerID	%s	"National Institute of Advanced Industrial Science and Technology" (Fixed)
33		Satellite Name	SatelliteName	%s	"ALOS" (Fixed)
34		Sensor Name	SensorName	%s	"PALSAR" (Fixed)
35		Level1.0 GranuleID	Level1.0GranuleID	%s	Copy from level 1.0
36		Level1.0 Quality	Level1.0Quality	%s	Copy from level 1.0 ("good" / "poor")
37		Processing Time	ProcessingTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)

Table 3-5(1/2) Metadata information (Level 2.3)

No.	Section	Item Name	Keyword	Format	Remark
1	Pair	Pair ID	PairID	%s	
2		Perpendicular Baseline (m)	PerpendicularBaselineMeter	%.6f	
3		Latitude of Scene Start Near Range (degree)	SceneStartNearRangeLatitudeDegree	%.6f	-90≤latitude≤90
4		Longitude of Scene Start Near Range (degree)	SceneStartNearRangeLongitudeDegree	%.6f	-180<longitude≤180
5		Latitude of Scene Start Far Range (degree)	SceneStartFarRangeLatitudeDegree	%.6f	-90≤latitude≤90
6		Longitude of Scene Start Far Range (degree)	SceneStartFarRangeLongitudeDegree	%.6f	-180<longitude≤180
7		Latitude of Scene End Near Range (degree)	SceneEndNearRangeLatitudeDegree	%.6f	-90≤latitude≤90
8		Longitude of Scene End Near Range (degree)	SceneEndNearRangeLongitudeDegree	%.6f	-180<longitude≤180
9		Latitude of Scene End Far Range (degree)	SceneEndFarRangeLatitudeDegree	%.6f	-90≤latitude≤90
10		Longitude of Scene End Far Range (degree)	SceneEndFarRangeLongitudeDegree	%.6f	-180<longitude≤180
11		Latitude of Scene Center (degree)	SceneCenterLatitudeDegree	%.6f	-90≤latitude≤90
12		Longitude of Scene Center (degree)	SceneCenterLongitudeDegree	%.6f	-180<longitude≤180
13		Off-nadir Angle (degree)	OffNadirAngleDegree	%.6f	Copy from level 1.0
14		Path No	PathNo	%d	Copy from level 1.0
15		Row No	RowNo	%.2f	Copy from level 1.0
16		Orbit Direction	OrbitDirection	%s	Copy from level 1.0("Ascending" / "Descending")
17		Observation Direction	ObservationDirection	%s	"Right" (Fixed)
18	Scene	Primary Scene ID	PrimarySceneID	%s	
19		Secondary Scene ID	SecondarySceneID	%s	
20		Date and Time of Primary Scene Start (UTC)	PrimarySceneStartTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
21		Date and Time of Primary Scene End (UTC)	PrimarySceneEndTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
22		Date and Time of Primary Scene Center (UTC)	PrimarySceneCenterTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
23		Date and Time of Secondary Scene Start (UTC)	SecondarySceneStartTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
24		Date and Time of Secondary Scene End (UTC)	SecondarySceneEndTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
25		Date and Time of Secondary Scene Center (UTC)	SecondarySceneCenterTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)
26		Orbit Accumulation Number of Primary Scene	PrimaryOrbitNumber	%d	Copy from level 1.0
27		Orbit Accumulation Number of Secondary Scene	SecondaryOrbitNumber	%d	Copy from level 1.0
28		Orbit Data Type of Primary Scene	PrimaryOrbitDataType	%s	Copy from level 1.0 ("High Accurate Orbit" / "Determined Orbit")
29		Orbit Data Type of Secondary Scene	SecondaryOrbitDataType	%s	Copy from level 1.0 ("High Accurate Orbit" / "Determined Orbit")
30		Observation Mode of Primary Scene	PrimaryObservationMode	%s	"FBS" / "FBD"
31		Observation Mode of Secondary Scene	SecondaryObservationMode	%s	"FBS" / "FBD"
32		Polarimetry of Primary Scene	PrimaryPolarimetry	%s	"HH" / "HH+HV"
33		Polarimetry of Secondary Scene	SecondaryPolarimetry	%s	"HH" / "HH+HV"

Table 3-5(2/2) Metadata information (Level 2.3)

No.	Section	Item Name	Keyword	Format	Remark
34	Product	Processing Level	ProcessingLevel	%s	"2.3"(Fixed)
35		Reference Frame	ReferenceFrame	%s	"WGS84" (Fixed)
36		Reference Ellipsoid	ReferenceEllipsoid	%s	"WGS84" (Fixed)
37		Digital Elevation Model	DigitalElevationModel	%s	"ASTER GDEM V2" (Fixed)
38		Map Projection	MapProjection	%s	"LATLON"(Fixed)
39		Pixel Spacing (degree/pixel)	PixelSpacingDegree	%.4f	
40		Latitude of Map: Upper Left Corner (degree)	MapUpperLeftLatitudeDegree	%.6f	-90≤latitude≤90
41		Longitude of Map: Upper Left Corner (degree)	MapUpperLeftLongitudeDegree	%.6f	-180<longitude≤180
42		Latitude of Map: Upper Right Corner (degree)	MapUpperRightLatitudeDegree	%.6f	-90≤latitude≤90
43		Longitude of Map: Upper Right Corner (degree)	MapUpperRightLongitudeDegree	%.6f	-180<longitude≤180
44		Latitude of Map: Lower Left Corner (degree)	MapLowerLeftLatitudeDegree	%.6f	-90≤latitude≤90
45		Longitude of Map: Lower Left Corner (degree)	MapLowerLeftLongitudeDegree	%.6f	-180<longitude≤180
46		Latitude of Map: Lower Right Corner (degree)	MapLowerRightLatitudeDegree	%.6f	-90≤latitude≤90
47		Longitude of Map: Lower Right Corner (degree)	MapLowerRightLongitudeDegree	%.6f	-180<longitude≤180
48	Calibration Factor (dB)	CalibrationFactorDecibel	%.2f	"-83.00" (Fixed)	
49	Image	Image File Name	ImageFileName[1-N]	%s	N=11
50		Number of Lines	ImageLines	%d	
51		Number of Samples	ImageSamples	%d	
52		Data Type	DataType[1-N]	%s	N=11."32FL" / "16UI" / "16SI" / "8UI"
53	Product	Producer Organization	ProducerID	%s	"National Institute of Advanced Industrial Science and Technology" (Fixed)
54	Information	Satellite Name	SatelliteName	%s	"ALOS" (Fixed)
55		Sensor Name	SensorName	%s	"PALSAR" (Fixed)
56		Level1.0 GranuleID of Primary Scene	PrimaryLevel1.0GranuleID	%s	Copy from level 1.0
57		Level1.0 GranuleID of Secondary Scene	SecondaryLevel1.0GranuleID	%s	Copy from level 1.0
58		Level1.0 Quality of Primary Scene	PrimaryLevel1.0Quality	%s	Copy from level 1.0 ("good" / "poor")
59		Level1.0 Quality of Secondary Scene	SecondaryLevel1.0Quality	%s	Copy from level 1.0 ("good" / "poor")
60		Processing Time	ProcessingTime	%s	ISO 8601 format (YYYY-MM-DDThh:mm:ssZ)

3.3. Perpendicular baseline file

The perpendicular baseline file of the AIST ALOS/PALSAR InSAR product is a plain text file with each item separated by a space.

Table 3-6 lists items stored in the perpendicular baseline file.

Table 3-6 Items of the perpendicular baseline file

No.	Item name	Remarks
1	Sequential number	
2	Date of primary scene center	
3	Date of secondary scene center	
4	Perpendicular baseline of the secondary scene relative to the primary scene	=No.9 – No.8
5	Day difference of the secondary scene relative to the primary scene	=No.7 – No.6
6	Day difference of the primary scene relative to the single prime scene	
7	Day difference of the secondary scene relative to the single prime scene	
8	Perpendicular baseline of the primary scene relative to the single prime scene	
9	Perpendicular baseline of the secondary scene relative to the single prime scene	

3.4. CEOS file

The AIST ALOS/PALSAR InSAR CEOS file is a binary file conforming to the JAXA ALOS/PALSAR CEOS Level 1.1 format.

The record structure of the CEOS file is shown in Table 3-7, and the format is presented in Table 3-9 through Table 3-21. The items whose definition differs from the JAXA CEOS format are marked with an X in the “Different from JAXA definition” column. Simultaneously, the orange hatching identifies the repeated items.

As explained in section 2.2, because this product is co-registered to a single prime scene in the frame, the orbit data of the single prime scene is stored in the CEOS file. In addition, both orbital and topographic fringes for the single prime scene are removed in SAR images. Even though these two points need to be noted, users can obtain the interferogram by taking only the phase difference without major modifications to their existing SAR processing software since this product is a CEOS file compliant with the JAXA format.

Table 3-7 CEOS file composition

File/Record name	Record length	Record number
a) Volume Directory File		
1) Volume descriptor record	360	1
2) File pointer record	360	Number of SAR Image Files + 2
3) Text record	360	1
b) SAR Leader File		
1) File descriptor record	720	1
2) Dataset summary record	4096	1
3) Map projection data record	1620	0
4) Platform position data record	4680	1
5) Attitude data record	8192	1
6) Radiometric data record	9860	1
7) Data quality summary record	1620	1
8) Calibration data record	13212	0
9) Facility related record	Variable	11
c) SAR Image File		
1) File descriptor record	720	1
2) Signal data record	Variable	Variable
3) Processed data record	Variable	0
d) Trailer File		
1) File descriptor record	720	1
2) Low-resolution image data record	Variable	0

Table 3-8 Data type in CEOS file

Type	Description
CH	Character (left fill if not specified)
Im	ASCII that represents an integer (right fill)
Fm.n	Real type data (right fill)
Em.n	Real type data (exponential notation, right fill)
B	Binary number representation (The first byte is the most significant, big-endian)

m: Number of digits, n: Number of decimal places

Table 3-9(1/2) CEOS volume directory file – volume descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 1		
2	5	B	1st record subtype code = 192 (0xC0)		
3	6	B	Record type code = 192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 360 (0x0168)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Blanks		
9	17-28	CH	Superstructure format control document ID = 'CEOS-SAR-CCT'		
10	29-30	CH	Superstructure format control document revision level = 'bA'		
11	31-32	CH	Superstructure record format revision level = 'bA'		
12	33-44	CH	Software release and revision level = 'b1.00bbbbbb'		
13	45-60	CH	Physical volume ID = 'AIST-bbbbbbbbbb'		X
14	61-76	CH	Logical volume ID = 'MMNSSSYYYYMMDDbb' MM : Mission ID (ALOS='AL') N : Mission number (ALOS='1') SSS : Sensor ID (PALSAR='PSR') YYYY : Product generation year MM : Product generation month DD : Product generation day		
15	77-92	CH	Volume set ID = 'MMMMMMbSSSSSbbb' MMMMMM : Mission name ('ALOSbb') SSSSSS : Sensor name (PALSAR = 'PALSAR')		
16	93-94	I2	Total number of physical volumes in the logical volume = 'b1'		
17	95-96	I2	Physical volume sequence number of the first tape = 'b1'		
18	97-98	I2	Physical volume sequence number of the last tape = 'b1'		
19	99-100	I2	Physical volume sequence number of the current tape = 'b1'		
20	101-104	I4	File number in the logical volume follows volume directory file = 'bbb3' ~ 'bbb6':N + 2 (N is number of polarization)		
21	105-108	I4	Logical volume within a volume set = 'bbb1'		
22	109-112	I4	Logical volume number within physical volume = 'bbb1'		
23	113-120	CH	Logical volume creation data = 'YYYYMMDD' (Without zero suppression) YYYY : Year MM : Month DD : Day		

Table 3-9(2/2) CEOS volume directory file – volume descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
24	121-128	CH	Logical volume creation time = 'HHMMSSXX' (Without zero suppression) HH : Hour MM : Minute SS : Second XX : 10mili-second		
25	129-140	CH	Logical volume generation country (JAPAN) = 'JAPANbbbbbb'		
26	141-148	CH	Logical volume generating agency (National Institute of Advanced Industrial Science and Technology) = 'AISTbbbb'		X
27	149-160	CH	Logical volume generating facility (Geoinformation Service Research Team in Digital Architecture Research Center) = 'DigiARC-GSRT'		X
28	161-164	I4	Number of file pointer records in volume directory = 'bbb3' ~ 'bbb6':N + 2 (N is number of polarization)		
29	165-168	I4	Number of text records in volume directory = 'bbb1'		
30	169-260	CH	Volume descriptor spare = Blanks		
31	261-360	CH	Local use segment = Blanks		

Table 3-10(1/2) CEOS volume directory file – file pointer record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number Leader file = 2 Image file = 3 Trailer file = 4		
2	5	B	1st record subtype code = 219 (0xDB)		
3	6	B	record type code = 192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 360 (0x0168)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Blanks		
9	17-20	I4	Referenced file number Leader file = 'bbb1' Image file = 'bbb2' Trailer file = 'bbb3'		
10	21-36	CH	Referenced file ID = 'MMNbSSSTFFFFbbb' MM : Mission ID (ALOS = 'AL') N : Mission number (= '1') SSS : Sensor ID (PALSAR = 'PSR') T : Processing level code (= 'B') FFFF : File type 'SARL' = Leader file 'IMOP' = Image file 'SART' = Trailer file		
11	37-64	CH	Referenced file class Leader file = 'SARLEADERbFILEbbbbbbbbbbbb' Image file = 'IMAGERYbOPTIONSbFILEbbbbbbbb' Trailer file = 'SARTRAILERbFILEbbbbbbbbbbbb'		
12	65-68	CH	Referenced file class code Leader file = 'SARL' Image file = 'IMOP' Trailer file = 'SART'		
13	69-96	CH	Referenced file data type = 'MIXEDbBINARYbANDBASCIIbbbbbb'		
14	97-100	CH	Referenced file data type code = 'MBAA'		

Table 3-10(2/2) CEOS volume directory file – file pointer record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
15	101-108	I8	Number of records in referenced file Leader file = 'bbbbbb17' (Level 1.3) Image file = N + 1 (N is the number of image data records) Trailer file = N + 1 (N is the number of low-resolution image data records)		
16	109-116	I8	Length of the first record in referenced file = 'bbbbbb720'		
17	117-124	I8	Maximum record length in referenced file Leader file = 'b4370000' Image file = Record length of image data records Trailer file = 'bbbbbb720'		
18	125-136	CH	Referenced file record length type Leader file = 'VARIABLEbLEN' Image file = 'VARIABLEbLEN' Trailer file = 'VARIABLEbLEN'		
19	137-140	CH	Referenced file record length type code Leader file = 'VARE' Image file = 'VARE' Trailer file = 'VARE'		
20	141-142	I2	Number of the physical volume set containing the first record of the file = 'b1'		
21	143-144	I2	Number of the physical volume set containing the last record of the file = 'b1'		
22	145-152	I8	Record number of the first record appearing on this physical volume = 'bbbbbbb1'		
23	153-160	I8	Record number of the last record appearing on this physical volume Leader file = 'bbbbbb17' (Level 1.3) Image file = N + 1 (N is the number of image data records) Trailer file = N + 1 (N is the number of low-resolution image data records)		
24	161-360	CH	Blanks		

Table 3-11 CEOS volume directory file – text record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = N + 4 (N is number of polarization)		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code=192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 360 (0x0168)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Continuation flag = 'bb'		
9	17-56	CH	Product ID = 'PRODUCT:FGGGHIJb~b' F = Observation mode H: Fine mode, W: ScanSAR mode D: Direct Downlink mode, P: Polarimetry mode GGG = Process level 1.3: Level 1.3 H = Processing option _: Not specified I = Map projection _: Not specified J = Orbit direction A: Ascending, D: Descending		
10	57-116	CH	Location and date/time of product creation = 'PROCESS:PROCESS:JAPAN-AIST-DigiARC- GSRTbbYYYYMMDDbHHMMSSb~b' YYYYMMDD : Creation date(UT) HHMMSS : Creation time(UT)		X
11	117-156	CH	Blanks		X
12	157-196	CH	Scene ID = 'ORBITb:AABBBCDDDDDEEEEb~b' AA : Satellite ID BBB : Sensor ID C : Sensor Sub-ID DDDDD : Orbit accumulation number of a scene center EEEE : Scene frame number of a scene center		
13	197-236	CH	Scene location ID Level 1.3 = 'FRAMEbCENTRE:b~b'		
14	237-360	CH	Blanks		

Table 3-12(1/3) CEOS SAR leader file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 1		
2	5	B	1st record subtype code = 11 (0x0B)		
3	6	B	Record type code = 192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 720 (0x02D0)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Continuation flag = 'bb'		
9	17-28	CH	Format control document ID = 'CEOS-SAR-CCT'		
10	29-30	CH	Format control document revision level = 'bA'		
11	31-32	CH	File design descriptor revision letter = 'bA'		
12	33-44	CH	Software release and revision level = 'b1.00bbbbbb'		
13	45-48	I4	Number of files = 'bbb1'		
14	49-64	CH	File ID = 'MMNbSSSTFFFFbbb' MM : Mission ID (ALOS = 'AL') N : Mission number (= '1') SSS : Sensor ID (PALSAR = 'PSR') T : Processing level code (= 'B') FFFF : File type Leader File = 'SARL'		
15	65-68	CH	Record sequence and location type flag = 'FSEQ'		
16	69-76	I8	Sequence number location = 'bbbbbb1'		
17	77-80	I4	Sequence number field length = 'bbb4'		
18	81-84	CH	Record code and location type flag = 'FTYP'		
19	85-92	I8	Record code location = 'bbbbbb5'		
20	93-96	I4	Record code field length = 'bbb4'		
21	97-100	CH	Record length and location type flag = 'FLGT'		
22	101-108	I8	Record length location = 'bbbbbb9'		
23	109-112	I4	Record length field length = 'bbb4'		
24	113-180	CH	Blanks		
25	181-186	I6	Number of data set summary records = 'bbbb1'		
26	187-192	I6	Data set summary record length = 'bb4096'		
27	193-198	I6	Number of map projection data records = 'bbbb0' (Level 1.3)		
28	199-204	I6	Map projection record length = 'bbbb0' (Level 1.3)		
29	205-210	I6	Number of platform position data records = 'bbbb1'		

Table 3-12(2/3) CEOS SAR leader file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
30	211-216	I6	Platform position record length = 'bb4680'		
31	217-222	I6	Number of attitude data records = 'bbbbb1'		
32	223-228	I6	Attitude data record length = 'bb8192'		
33	229-234	I6	Number of radiometric data records = 'bbbbb1' (Level 1.3)		
34	235-240	I6	Radiometric data record length = 'bb9860' (Level 1.3)		
35	241-246	I6	Number of radiometric compensation records = 'bbbbb0'		
36	247-252	I6	Radiometric compensation record length = 'bbbbb0'		
37	253-258	I6	Number of data quality summary records = 'bbbbb1' (Level 1.3)		
38	259-264	I6	Data quality summary record length = 'bb1620' (Level 1.3)		
39	265-270	I6	Number of data histogram records = 'bbbbb0'		
40	271-276	I6	Data histogram record length = 'bbbbb0'		
41	277-282	I6	Number of range spectral records = 'bbbbb0'		
42	283-288	I6	Range spectral record length = 'bbbbb0'		
43	289-294	I6	Number of DEM descriptor records = 'bbbbb0'		
44	295-300	I6	DEM descriptor record length = 'bbbbb0'		
45	301-306	I6	Number of radar parameter update records = 'bbbbb0'		
46	307-312	I6	Radar parameter update record length = 'bbbbb0'		
47	313-318	I6	Number of annotation data records = 'bbbbb0'		
48	319-324	I6	Annotation data record length = 'bbbbb0'		
49	325-330	I6	Number of detail processing records = 'bbbbb0'		
50	331-336	I6	Detail processing record length = 'bbbbb0'		
51	337-342	I6	Number of calibration records = 'bbbbb0' (Level 1.3)		
52	343-348	I6	Calibration record length = 'bbbbb0' (Level 1.3)		
53	349-354	I6	Number of GCP records = 'bbbbb0'		
54	355-360	I6	GCP record length = 'bbbbb0'		
55	361-420	CH	Blanks		
56	421-426	I6	Number of facility data(1) records = 'bbbbb1'		
57	427-434	I8	Facility data(1) record length = 'b1540000'		
58	435-440	I6	Number of facility data(2) records = 'bbbbb1'		
59	441-448	I8	Facility data(2) record length = 'b4314000'		
60	449-454	I6	Number of facility data(3) records = 'bbbbb1'		
61	455-462	I8	Facility data(3) record length = 'bb345000'		
62	463-468	I6	Number of facility data(4) records = 'bbbbb1'		
63	469-476	I8	Facility data(4) record length = 'bb325000'		
64	477-482	I6	Number of facility data(5) records = 'bbbbb1'		

Table 3-12(3/3) CEOS SAR leader file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
65	483-490	I8	Facility data(5) record length = 'bb325000'		
66	491-496	I6	Number of facility data(6) records = 'bbbbbb1'		
67	497-504	I8	Facility data(6) record length = 'bbbb3072'		
68	505-510	I6	Number of facility data(7) records = 'bbbbbb1'		
69	511-518	I8	Facility data(7) record length = 'bb511000'		
70	519-524	I6	Number of facility data(8) records = 'bbbbbb1'		
71	525-532	I8	Facility data(8) record length = 'b4370000'		
72	533-538	I6	Number of facility data(9) records = 'bbbbbb1'		
73	539-546	I8	Facility data(9) record length = 'bb728000'		
74	547-552	I6	Number of facility data(10) records = 'bbbbbb1'		
75	553-560	I8	Facility data(10) record length = 'bbb15000'		
76	561-566	I6	Number of facility data(11) records = 'bbbbbb1'		
77	567-574	I8	Facility data(11) record length = 'bbbb5000'		
78	575-720	CH	Blanks		

Table 3-13(1/6) CEOS SAR leader file—dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 2		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 10 (0x0A)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length = 4096 (0x1000)		
7	13-16	I4	Data set summary record sequence number = 'bbb1'		
8	17-20	I4	SAR channel ID = Blank		
9	21-52	CH	Scene ID = 'AABBBCDDDDDEEEeb~b' AA : Satellite ID BBB : Sensor ID C : Sensor Sub-ID DDDDD : Orbit accumulation number of a scene center EEEE : Scene frame number of a scene center		
10	53-68	CH	Number of scene reference = 'bbbbbbbbbbbbbb'		
11	69-100	CH	Scene center time = 'YYYYMMDDHHMMSSTTTbbbbbbbbbbbbbb' YYYY : year MM : month DD : day HH : hours (00 to 23) MM : minutes (00 to 59) SS : seconds (00 to 59) TTT : milliseconds (000 to 999)		
12	101-116	CH	Blanks		
13	117-132	F16.7	Geodetic latitude of processed scene center (degree) Level 1.3 = 'b~b'		
14	133-148	F16.7	Geodetic longitude of processed scene center (degree) Level 1.3 = 'b~b'		
15	149-164	F16.7	Processed scene center true heading (degree) Level 1.3 = 'b~b'		
16	165-180	CH	Ellipsoid designator = 'GRS80b~b'		
17	181-196	F16.7	Ellipsoid semi major axis (km) = 6378.1370000		
18	197-212	F16.7	Ellipsoid semi minor axis (km) = 6356.7523141		
19	213-228	F16.7	Earth mass (10 ²⁴ kg) = 5.9740000		
20	229-244	F16.7	Gravitational constant (10 ¹⁴ m ³ /s ² kg) = 3.9860050		
21	245-260	F16.7	Ellipsoid J2 parameter (10 ⁻²) = 0.1082629		

Table 3-13(2/6) CEOS SAR leader file—dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
22	261-276	F16.7	Ellipsoid J3 parameter (10 ⁻¹) = -0.0000254		
23	277-292	F16.7	Ellipsoid J4 parameter (10 ⁻¹) = -0.0000162		
24	293-308	CH	Blanks		
25	309-324	F16.7	Average terrain height above Ellipsoid at scene center = Blank		
26	325-332	I8	Scene center line number (Including zero fill)	N/2 (N: number of lines)	
27	333-340	I8	Scene center pixel number (Including zero fill)	M/2 (M: number of pixels)	
28	341-356	F16.7	Processing scene length (km) = Blank		
29	357-372	F16.7	Processing scene width (km) = Blank		
30	373-388	CH	Blanks		
31	389-392	I4	Number of SAR channels 1 : Fine mode (Single-Polarization), Direct Downlink mode, ScanSAR mode 2 : Fine mode (Dual-Polarization) 4 : Polarimetry mode		
32	393-396	CH	Blanks		
33	397-412	CH	Sensor platform mission ID = 'ALOSbbbbbbbbbbb'		
34	413-444	CH	Sensor ID and operation mode = 'AAAAAA-BB-CCDE-bbbbbbbbbbbbbbb' AAAAAA : Mission name (ALOS : 'ALOSbb') BB : SAR band (ALOS : 'Lb') CC : Code for resolution mode('Hb', 'Lb') (Except ScanSAR mode : 'Hb', ScanSAR mode : 'Lb') DE : Code for imaging mode D : PALSAR mode (Observation mode : 6) E : PALSAR Sub-mode Fine mode = 0, ScanSAR mode = 1, Polarimetry mode = 2, Direct Downlink mode = 3		
35	445-452	I8	Orbit number or flight line indicator		
36	453-460	F8.3	Sensor platform geodetic latitude at nadir corresponding to scene center (degree) Level 1.3 = 'b~b'		
37	461-468	F8.3	Sensor platform geodetic longitude at nadir corresponding to scene center (degree) Level 1.3 = 'b~b'		
38	469-476	F8.3	Sensor platform heading at nadir corresponding to scene center (degree) Level 1.3 = 'b~b'		
39	477-484	F8.3	Sensor clock angle as measured relative to sensor platform flight direction (degree) = 'bb90.000' (Left : -90.0, Right : 90.0)		
40	485-492	F8.3	Incidence angle at scene center (degree)		
41	493-500	CH	Blanks		
42	501-516	F16.7	Radar wavelength (m) = Nominal value		

Table 3-13(3/6) CEOS SAR leader file—dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
43	517-518	CH	Motion compensation indicator = '00'		
44	519-534	CH	Range pulse code = 'LINEARbFMbCHIRPb'		
45	535-550	E16.7	Range pulse amplitude coefficient #1 = Nominal value Center frequency ξ_1 for pulse width τ of linear FM modulation chirp (Constant term)		
46	551-566	E16.7	Range pulse amplitude coefficient #2 = Nominal value Center frequency ξ_2 for pulse width τ of linear FM modulation chirp (Linear coefficient terms)		
47	567-582	E16.7	Range pulse amplitude coefficient #3 = 0.0 Center frequency ξ_3 for pulse width τ of linear FM modulation chirp (Quadratic coefficient terms)		
48	583-598	E16.7	Range pulse amplitude coefficient #4 = 0.0 Center frequency ξ_4 for pulse width τ of linear FM modulation chirp (Cubic coefficient terms)		
49	599-614	E16.7	Range pulse amplitude coefficient #5 = 0.0 Center frequency ξ_5 for pulse width τ of linear FM modulation chirp (Fourth coefficient terms)		
50	615-630	E16.7	Range pulse phase coefficient #1 (Constant term) = 0.0		
51	631-646	E16.7	Range pulse phase coefficient #2 (Linear coefficient terms) = 0.0		
52	647-662	E16.7	Range pulse phase coefficient #3 (Quadratic coefficient terms) = 0.0		
53	663-678	E16.7	Range pulse phase coefficient #4 (Cubic coefficient terms) = 0.0		
54	679-694	E16.7	Range pulse phase coefficient #5 (Fourth coefficient terms) = 0.0		
55	695-702	I8	Downlinked data chirp extraction index = 'bbbbbb0' linear-down chirp = 'bbbbbb1' linear-up chirp = 'bbbbbb0'		X
56	703-710	CH	Blanks		
57	711-726	F16.7	Sampling rate (MHz)		
58	727-742	F16.7	Range gate (early edge (in time) at the start of the image) (μ sec)		
59	743-758	F16.7	Range pulse length (μ sec)		
60	759-762	CH	Base band conversion flag = 'YESb'		
61	763-766	CH	Range compressed flag = 'YESb' (range compressed)		
62	767-782	F16.7	Receiver gain for like polarized at early edge at the start of the image = Blank		
63	783-798	F16.7	Receiver gain for cross polarized at early edge at the start of the image = Blank		
64	799-806	I8	Quantization in bits per channel = 'bbbbbb3', 'bbbbbb5'		
65	807-818	CH	Quantizer descriptor = 'UNIFORMI,Qb'		
66	819-834	F16.7	DC Bias for I-component = Nominal value		
67	835-850	F16.7	DC Bias for Q-component = Nominal value		

Table 3-13(4/6) CEOS SAR leader file – dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
68	851-866	F16.7	Gain imbalance for I & Q = Nominal value		
69	867-898	CH	Blanks		
70	899-914	F16.7	Electronic boresight (degree)		
71	915-930	F16.7	Mechanical boresight (degree)		
72	931-934	CH	Echo tracker-on/off = Blank		
73	935-950	F16.7	PRF (mHz)		
74	951-966	F16.7	Two way antenna beam width (Elevation, Effective value) (degree) = Blank		
75	967-982	F16.7	Two way antenna beam width (Azimuth, Effective value) (degree) = Blank		
76	983-998	I16	Satellite encoded binary time code = Blank		
77	999-1030	CH	Satellite clock time = Blank		
78	1031-1046	I16	Satellite clock increment = Blank		
79	1047-1062	CH	Processing facility ID = 'DigiARC-GSRTb~b'		X
80	1063-1070	CH	Processing system ID = 'GSRTb~b'		X
81	1071-1078	CH	Processing version ID = 'b1 .00bbbbbb'		
82	1079-1094	CH	Processing code of processing facility = 'bbbbbbbbbbbbbb'		
83	1095-1110	CH	Product level code Level 1.3 = '1.1bbbbbbbbbb'		X
84	1111-1142	CH	Product type specifier Level 1.3 = 'BASICbIMAGEbb~b'		
85	1143-1174	CH	Processing algorithm ID = Blank		
86	1175-1190	F16.7	Number of looks in azimuth = 1.0		
87	1191-1206	F16.7	Number of looks in range = 1.0		
88	1207-1222	F16.7	Bandwidth per look in azimuth (Hz)		
89	1223-1238	F16.7	Bandwidth per look in range (Hz) (3dB down width of the power spectrum of the reference function for a sub aperture look)		
90	1239-1254	F16.7	Bandwidth in azimuth (Hz) (3dB down width of the power spectrum of the reference function for full aperture)		
91	1255-1270	F16.7	Bandwidth in range (kHz)		
92	1271-1302	CH	Window function in azimuth = 1 : RECTANGLE		
93	1303-1334	CH	Window function in range = 1 : RECTANGLE		
94	1335-1350	CH	Data input source (e.g.: HDDT identifier) Online = 'ONLINEb~b'		
95	1351-1366	F16.7	Resolution in ground range (m) = Blank		
96	1367-1382	F16.7	Resolution in azimuth (m) = Blank		
97	1383-1398	F16.7	Radiometric parameter (Bias) = Blank		
98	1399-1414	F16.7	Radiometric parameter (Gain) = Blank		
99	1415-1430	F16.7	Along track doppler frequency constant term at early edge of the image (Hz)		

Table 3-13(5/6) CEOS SAR leader file – dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
100	1431-1446	F16.7	Along track doppler frequency linear term at early edge of the image (Hz/pixel) = 0.0		
101	1447-1462	F16.7	Along track doppler frequency quadratic term at early edge of the image (Hz/pixel/pixel) = 0.0		
102	1463-1478	CH	Blanks		
103	1479-1494	F16.7	Cross track doppler frequency constant term at near edge of the image (Hz)		
104	1495-1510	F16.7	Cross track doppler frequency linear term at near edge of the image (Hz/pixel)		
105	1511-1526	F16.7	Cross track doppler frequency quadratic term at near edge of the image (Hz/pixel/pixel) = 0.0		
106	1527-1534	CH	Time direction indicator along pixel direction		
107	1535-1542	CH	Time direction indicator along line direction Ascending = 'ASCENDbb' Descending = 'DESCENDb'		
108	1543-1558	F16.7	Along track doppler frequency rate constant term at early edge of the image (Hz/sec)		
109	1559-1574	F16.7	Along track doppler frequency rate linear term at early edge of the image (Hz/sec/pixel) = 0.0		
110	1575-1590	F16.7	Along track doppler frequency rate quadratic term at early edge of the image (Hz/sec/pixel/pixel) = 0.0		
111	1591-1606	CH	Blanks		
112	1607-1622	F16.7	Cross track doppler frequency rate constant term at near edge of the image (Hz/sec)		
113	1623-1638	F16.7	Cross track doppler frequency rate linear term relative to near edge of the image (Hz/sec/pixel)		
114	1639-1654	F16.7	Cross track doppler frequency rate quadratic term relative to near edge of the image (Hz/sec/pixel/pixel)		
115	1655-1670	CH	Blanks		
116	1671-1678	CH	Line content indicator Level 1.3 = 'RANGEbbb'		
117	1679-1682	CH	Clutter lock applied flag Level 1.3 = 'NOTb'		X
118	1683-1686	CH	Auto-focusing applied flag Level 1.3 = 'NOTb'		
119	1687-1702	F16.7	Line spacing (m) Level 1.3 = Calculated azimuth spacing		
120	1703-1718	F16.7	Pixel spacing (m) Level 1.3 = Calculated range spacing		
121	1719-1734	CH	Processor range compression designator Level 1.3 = 'EXTRACTEDbCHIRPb'		

Table 3-13(6/6) CEOS SAR leader file—dataset summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
122	1735-1750	F16.7	Doppler center frequency constant term (a)	$fd = a + b \cdot R$	
123	1751-1766	F16.7	Doppler center frequency linear term (b)	fd : Doppler center frequency (Hz) R : Slant range (km)	
SENSOR SPECIFIC LOCAL USE SEGMENT					
124	1767-1770	I4	Calibration data indicator No calibration data = 'bbb0'		
125	1771-1778	I8	Start line number of calibration at upper image = 'bbbbbbb0'		
126	1779-1786	I8	Stop line number of calibration at upper image = 'bbbbbbb0'		
127	1787-1794	I8	Start line number of calibration at bottom image = 'bbbbbbb0'		
128	1795-1802	I8	Stop line number of calibration at bottom image = 'bbbbbbb0'		
129	1803-1806	I4	PRF switching indicator A fixed PRF = 'bbb0'		
130	1807-1814	I8	Line locator of PRF switching = 'bbbbbbb1'		
131	1815-1830	F16.7	Direction of a beam center in a scene center (degree)		
132	1831-1834	I4	Yaw steering mode flag = Blank		X
133	1835-1838	I4	Parameter table number of automatically setting = Blank		X
134	1839-1854	F16.7	Nominal offnadir angle		
135	1855-1858	I4	Antenna beam number = Blank		X
136	1859-1886	CH	Spare		
137	1887-1906	E20.13	Incidence angle constant term (a0)	$\theta = a0 + a1 \cdot R + a2 \cdot R^2 + a3 \cdot R^3 + a4 \cdot R^4 + a5 \cdot R^5$ θ : Incidence angle (rad) R : Slant range (km)	
138	1907-1926	E20.13	Incidence angle linear term (a1)		
139	1927-1946	E20.13	Incidence angle quadratic term (a2)		
140	1947-1966	E20.13	Incidence angle cubic term (a3)		
141	1967-1986	E20.13	Incidence angle fourth term (a4)		
142	1987-2006	E20.13	Incidence angle fifth term (a5)		
IMAGE ANNOTATION FIELDS					
143	2007-2014	I8	Number of annotation points (up to 64) = 'bbbbbbb0'		
144	2015-2022	CH	Blanks		
145	2023-2030	I8	Line number of 1st annotation start = Blank		
146	2031-2038	I8	Pixel number of 1st annotation start = Blank		
147	2039-2054	CH	1st annotation text = Blank		
	2055-4070	(I8*2,CH)*63	Repeat 64th annotation point		
148	4071-4072	CH	Blanks		
149	4073-4096	CH	System reserve		

Table 3-14(1/2) CEOS SAR leader file—platform position data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 3		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 30 (0x1E)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length = 4680 (0x1248)		
7	13-44	CH	Orbital elements designator ALOS High precision orbit information = '2bbbbbbbbbbbbbbbbbbbbbbbb'		
8	45-60	F16.7	1st orbital element Position vector in the earth fixed coordinate system of the scene center (x) (m)		
9	61-76	F16.7	2nd orbital element Position vector in the earth fixed coordinate system of the scene center (y) (m)		
10	77-92	F16.7	3rd orbital element Position vector in the earth fixed coordinate system of the scene center (z) (m)		
11	93-108	F16.7	4th orbital element Velocity vector in the earth fixed coordinate system of the scene center (x') (m/sec)		
12	109-124	F16.7	5th orbital element Velocity vector in the earth fixed coordinate system of the scene center (y') (m/sec)		
13	125-140	F16.7	6th orbital element Velocity vector in the earth fixed coordinate system of the scene center (z') (m/sec)		
14	141-144	I4	Number of data points = 15		X
15	145-148	I4	Year of 1st point = 'YYYY'		
16	149-152	I4	Month of 1st point = 'bbMM'		
17	153-156	I4	Day of 1st point = 'bbDD'		
18	157-160	I4	Day in the year of 1st point (e.g.: 2nd February = 'bb33')		
19	161-182	E22.15	Seconds of day of 1st point (e.g.: 0: 51: 30.23 = 3090.23)		
20	183-204	E22.15	Time interval between data points (second) = 60		
21	205-268	CH	Reference coordinate system (ECI,ECR) = 'ECRbb-b'		
22	269-290	E22.15	Greenwich mean hour angle (degree) = Blank		
23	291-306	F16.7	Along track position error (m) = Blank		X
24	307-322	F16.7	Across track position error (m) = Blank		X
25	323-338	F16.7	Radial position error (m) = Blank		X
26	339-354	F16.7	Along track velocity error (m/sec) = Blank		X
27	355-370	F16.7	Across track velocity error (m/sec) = Blank		X
28	371-386	F16.7	Radial velocity error (m/sec) = Blank		X

Table 3-14(2/2) CEOS SAR leader file—platform position data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
			FIRST POSITIONAL DATA POINT		
29	387-452	3E22.15	1st data point position vector (x,y,z) (m)		
30	453-518	3E22.15	1st data point velocity vector (x',y',z') (m/sec)		
	519-4082	28*6E22.15	Repeat 2nd - 28th data point same as 387-518 bytes		
31	4083-4100	CH	Blanks		
32	4101-4101	I1	Occurrence flag of a leap second = 0 No leap second = 0 Occurrence of a leap second = 1		
33	4102-4680	CH	Blanks		

Table 3-15 CEOS SAR leader file – attitude data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 4		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 40 (0x28)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length = 8192 (0x2000)		
7	13-16	I4	Number of points = 0		X
8	17-20	I4	Day of the year = Blank		X
9	21-28	I8	Milli-second of the day = Blank		X
10	29-32	I4	Pitch data quality flag = Blank		X
11	33-36	I4	Roll data quality flag = Blank		X
12	37-40	I4	Yaw data quality flag = Blank		X
13	41-54	E14.6	Pitch (degree) = Blank		X
14	55-68	E14.6	Roll (degree) = Blank		X
15	69-82	E14.6	Yaw (degree) = Blank		X
16	83-86	I4	Pitch rate quality flag = Blank		X
17	87-90	I4	Roll rate quality flag = Blank		X
18	91-94	I4	Yaw rate quality flag = Blank		X
19	95-108	E14.6	Pitch rate = Blank		X
20	109-122	E14.6	Roll rate = Blank		X
21	123-136	E14.6	Yaw rate = Blank		X
	137-2658	I4/I8/E14.6	Repeat bytes 17-136 for the number of points		
22	2659-8192	CH	Blanks		

Table 3-16 CEOS SAR leader file – radiometric data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 5		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 50 (0x32)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length = 9860 (0x2684)		
7	13-16	I4	Radiometric data records number = 'bbb1'		
8	17-20	I4	Number of radiometric fields = 'bbb1'		
9	21-36	F16.7	Calibration factor(CF) Level 1.3 : $\sigma_0 = 10 * \log_{10} \langle I^2 + Q^2 \rangle + CF - 32.0$ This means that the sigma-naught of the pixel can be obtained by the ensemble averaging ($\langle \rangle$) of the pixel values, in reality, the spatial averaging of the pixel values around the target. Here, I and Q in $\langle \rangle$ of the above formulas are the pixel values in Level 1.3.		
10	37-52	F16.7	Transmission distortion matrix for Full (Quad.) pol. Level 1.3 (DT) Real part of DT(1,1) = Blank		X
11	53-68	F16.7	Imaginary part of DT(1,1) = Blank		X
12	69-84	F16.7	Real part of DT(1,2) = Blank		X
13	85-100	F16.7	Imaginary part of DT(1,2) = Blank		X
14	101-116	F16.7	Real part of DT(2,1) = Blank		X
15	117-132	F16.7	Imaginary part of DT(2,1) = Blank		X
16	133-148	F16.7	Real part of DT(2,2) = Blank		X
17	149-164	F16.7	Imaginary part of DT(2,2) = Blank		X
18	165-180	F16.7	Reception distortion matrix for Full (Quad.) pol. Level 1.3 (DR) Real part of DR(1,1) = Blank		X
19	181-196	F16.7	Imaginary part of DR(1,1) = Blank		X
20	197-212	F16.7	Real part of DR(1,2) = Blank		X
21	213-228	F16.7	Imaginary part of DR(1,2) = Blank		X
22	229-244	F16.7	Real part of DR(2,1) = Blank		X
23	245-260	F16.7	Imaginary part of DR(2,1) = Blank		X
24	261-276	F16.7	Real part of DR(2,2) = Blank		X
25	277-292	F16.7	Imaginary part of DR(2,2) = Blank		X
26	293-9860	CH	Reserve (blanks)		

Table 3-17(1/2) CEOS SAR leader file—data quality summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 6		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 60 (0x3C)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length = 1620 (0x0654)		
7	13-16	I4	Data quality summary record number = 'bbb1'		
8	17-20	CH	SAR channel ID = Blank		X
9	21-26	CH	Date of the last calibration update = Blank		X
10	27-30	I4	Number of channels (up to 16) = 0		X
ABSOLUTE RADIOMETRIC DATA QUALITY					
11	31-46	F16.7	ISLR(nominal value) (dB) = Blank		X
12	47-62	F16.7	PSLR(nominal value) (dB) = Blank		X
13	63-78	F16.7	Azimuth ambiguity rate (AAR) (nominal value) = Blank		X
14	79-94	F16.7	Range ambiguity rate (RAR) (nominal value) = Blank		X
15	95-110	F16.7	Estimate of SNR (dB) = Blank		X
16	111-126	F16.7	BER (Effective value) = Blank		X
17	127-142	F16.7	Slant range resolution (nominal value) (m) = Blank		X
18	143-158	F16.7	Azimuth resolution (nominal value) (m) = Blank		X
19	159-174	F16.7	Radiometric resolution (nominal value) (dB) = Blank		X
20	175-190	F16.7	Instantaneous dynamic range (dB) = Blank		X
21	191-206	F16.7	Nominal absolute radiometric calibration magnitude uncertainty of SAR channel indicated in bytes 17-20 (dB) = Blank		X
22	207-222	F16.7	Nominal absolute radiometric calibration phase uncertainty of SAR channel indicated in bytes 17-20 (degree) = Blank		X
RELATIVE RADIOMETRIC DATA QUALITY					
23	223-238	F16.7	Nominal relative radiometric calibration magnitude uncertainty of SAR channel indicated in bytes 17-20 (dB) = Blank		X
24	239-254	F16.7	Nominal relative radiometric calibration phase uncertainty of SAR channel indicated in bytes 17-20 (degree) = Blank		X
	255-734	15*2F16.7	Repetition of bytes 223 - 254 for the remaining channels		X
ABSOLUTE GEOMETRIC DATA QUALITY					
25	735-750	F16.7	Absolute location error along track (nominal value) (m) = Blank		X
26	751-766	F16.7	Absolute location error cross track (nominal value) (m) = Blank		X
27	767-782	F16.7	Geometric distortion scale in line direction (nominal value) = Blank		X
28	783-798	F16.7	Geometric distortion scale in pixel direction (nominal value) = Blank		X

Table 3-17(2/2) CEOS SAR leader file—data quality summary record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
29	799-814	F16.7	Geometric distortion skew = Blank		X
30	815-830	F16.7	Scene orientation error = Blank		X
			RELATIVE GEOMETRIC DATA QUALITY		
31	831-846	F16.7	Along track relative misregistration error of SAR channel (bytes 17-20) versus other channels (m) = Blank		X
32	847-862	F16.7	Cross track relative misregistration error of SAR channel (bytes 17-20) versus other channels (m) = Blank		X
	863-1102	15*2F16.7	Repetition of bytes 831 - 862 for the other channels		X
33	1103-1620	CH	Blanks		

Table 3-18(1/3) CEOS SAR leader file— facility related data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number TT&C system telemetry data = 7 Attitude determination 3 and GPSR raw data = 8 PALSAR mission telemetry data = 9 ALOS Orbit Information (Preliminary) (ECR) = 10 ALOS Orbit Information (Decision) (ECR) = 11 Time difference information = 12 ALOS High Precision Orbit Information = 13 High Precision Attitude Information = 14 Coordinates Conversion Information = 15 Workorder & Workreport for level 1.0 processing = 16		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code = 200 (0xC8)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 00 (0x00)		X
6	9-12	B	Record length TT&C system telemetry data = 1540000 Attitude determination 3 and GPSR raw data = 4314000 PALSAR mission telemetry data = 345000 ALOS Orbit Information (Preliminary) (ECR) = 325000 ALOS Orbit Information (Decision) (ECR) = 325000 Time difference information = 3072 ALOS High Precision Orbit Information = 511000 High Precision Attitude Information = 4370000 Coordinates Conversion Information = 728000 Workorder & Workreport for level 1.0 processing = 15000		
7	13-16	I4	Facility related data record sequence number = 'bbb1' ~ 'bb10'		
8	17-	CH	Blanks		X

Table 3-18(2/3) CEOS SAR leader file— facility related data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 17		
2	5	B	1st record subtype code = 18 (0x12)		
3	6	B	Record type code= 200 (0xC8)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 00 (0x00)		X
6	9-12	B	Record length = 5000		
7	13-16	I4	Facility related data record number = 'bb11'		
8	17-416	20E20.10	Twenty coefficients to convert from the map projection (E, N) to line(L) and pixel (P) position in the image = Blanks		
9	417-420	I4	Calibration data indicator = Blank		X
10	421-428	I8	Start line number of calibration at upper image = Blank		X
11	429-436	I8	Stop line number of calibration at upper image = Blank		X
12	437-444	I8	Start line number of calibration at bottom image = Blank		X
13	445-452	I8	Stop line number of calibration at bottom image = Blank		X
14	453-456	I4	PRF switching indicator = Blank		X
15	457-464	I8	Start line number of PRF switching = Blank		X
16	465-472	I8	SIGMA-SAR processing start line number = Blank		X
17	473-480	I8	Number of loss lines (Level 1.0) = Blank		X
18	481-488	I8	Number of loss lines (range for processing in Level 1.3) = Blank		X
19	489-800	CH	Blanks		
20	801-1024	CH	System reserve		
21	1025-2024	50E20.10	<p>Coefficients of the 8th polynomial expression to convert from pixel (P) and line (L) to latitude (ϕ) and longitude (λ)</p> $\phi = a_0L^4P^4 + a_1L^3P^4 + a_2L^2P^4 + a_3L^1P^4 + a_4L^0P^4$ $+ a_5L^4P^3 + a_6L^3P^3 + a_7L^2P^3 + a_8L^1P^3 + a_9L^0P^3$ $+ a_{10}L^4P^2 + a_{11}L^3P^2 + a_{12}L^2P^2 + a_{13}L^1P^2 + a_{14}L^0P^2$ $+ a_{15}L^4P^1 + a_{16}L^3P^1 + a_{17}L^2P^1 + a_{18}L^1P^1 + a_{19}L^0P^1$ $+ a_{20}L^4P^0 + a_{21}L^3P^0 + a_{22}L^2P^0 + a_{23}L^1P^0 + a_{24}L^0P^0$ $\lambda = b_0L^4P^4 + b_1L^3P^4 + b_2L^2P^4 + b_3L^1P^4 + b_4L^0P^4$ $+ b_5L^4P^3 + b_6L^3P^3 + b_7L^2P^3 + b_8L^1P^3 + b_9L^0P^3$ $+ b_{10}L^4P^2 + b_{11}L^3P^2 + b_{12}L^2P^2 + b_{13}L^1P^2 + b_{14}L^0P^2$ $+ b_{15}L^4P^1 + b_{16}L^3P^1 + b_{17}L^2P^1 + b_{18}L^1P^1 + b_{19}L^0P^1$ $+ b_{20}L^4P^0 + b_{21}L^3P^0 + b_{22}L^2P^0 + b_{23}L^1P^0 + b_{24}L^0P^0$ <p>(The order of storing: $a_0, a_1, a_2, \dots, a_{24}, b_0, b_1, b_2, \dots, b_{24}$)</p>	<p>(P, L) are substituted by the following expressions as P=p-Po L=l-Lo where (p, l) is an arbitrary coordinate address in the image.</p> <p>For the expressions above, the position defined as (p, l)=(0, 0) corresponds to the central point of the pixel at the upper left corner and (ϕ, λ) is measured in "degree".</p>	

Table 3-18(3/3) CEOS SAR leader file—facility related data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
22	2025-2044	E20.10	Origin pixel (Po)		
23	2045-2064	E20.10	Origin line (Lo)		
24	2065-3064	50E20.10	<p>Coefficients of the 8th polynomial expression to convert from latitude (Φ) and longitude (Λ) to pixel (p) and line (l)</p> $p = c_0\Lambda^4\Phi^4 + c_1\Lambda^3\Phi^4 + c_2\Lambda^2\Phi^4 + c_3\Lambda^1\Phi^4 + c_4\Lambda^0\Phi^4$ $+ c_5\Lambda^4\Phi^3 + c_6\Lambda^3\Phi^3 + c_7\Lambda^2\Phi^3 + c_8\Lambda^1\Phi^3 + c_9\Lambda^0\Phi^3$ $+ c_{10}\Lambda^4\Phi^2 + c_{11}\Lambda^3\Phi^2 + c_{12}\Lambda^2\Phi^2 + c_{13}\Lambda^1\Phi^2 + c_{14}\Lambda^0\Phi^2$ $+ c_{15}\Lambda^4\Phi^1 + c_{16}\Lambda^3\Phi^1 + c_{17}\Lambda^2\Phi^1 + c_{18}\Lambda^1\Phi^1 + c_{19}\Lambda^0\Phi^1$ $+ c_{20}\Lambda^4\Phi^0 + c_{21}\Lambda^3\Phi^0 + c_{22}\Lambda^2\Phi^0 + c_{23}\Lambda^1\Phi^0 + c_{24}\Lambda^0\Phi^0$ $l = d_0\Lambda^4\Phi^4 + d_1\Lambda^3\Phi^4 + d_2\Lambda^2\Phi^4 + d_3\Lambda^1\Phi^4 + d_4\Lambda^0\Phi^4$ $+ d_5\Lambda^4\Phi^3 + d_6\Lambda^3\Phi^3 + d_7\Lambda^2\Phi^3 + d_8\Lambda^1\Phi^3 + d_9\Lambda^0\Phi^3$ $+ d_{10}\Lambda^4\Phi^2 + d_{11}\Lambda^3\Phi^2 + d_{12}\Lambda^2\Phi^2 + d_{13}\Lambda^1\Phi^2 + d_{14}\Lambda^0\Phi^2$ $+ d_{15}\Lambda^4\Phi^1 + d_{16}\Lambda^3\Phi^1 + d_{17}\Lambda^2\Phi^1 + d_{18}\Lambda^1\Phi^1 + d_{19}\Lambda^0\Phi^1$ $+ d_{20}\Lambda^4\Phi^0 + d_{21}\Lambda^3\Phi^0 + d_{22}\Lambda^2\Phi^0 + d_{23}\Lambda^1\Phi^0 + d_{24}\Lambda^0\Phi^0$ <p>(The order of storing: $c_0, c_1, c_2, \dots, c_{24}, d_0, d_1, d_2, \dots, d_{24}$)</p>	<p>(Φ, Λ) are substituted by the following expressions as $\Phi = \varphi - \Phi_0$ (degrees) $\Lambda = \lambda - \Lambda_0$ (degrees) where (φ, λ) is an arbitrary position in the image.</p> <p>For the expressions, the position defined as (p, l)=(0, 0) corresponds to the central point of the pixel at the upper left corner.</p>	
25	3065-3084	E20.10	Origin latitude (Φ_0) (degree)		
26	3085-3104	E20.10	Origin longitude (Λ_0) (degree)		
27	3105-5000	CH	Blanks		

Table 3-19(1/3) CEOS SAR image file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 1		
2	5	B	1st record subtype code = 50 (0x32)		
3	6	B	Record type code=192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 720 (0x02D0)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Blanks		
9	17-28	CH	Format control document ID = 'CEOS-SAR-CCT'		
10	29-30	CH	Format control document revision level = 'bA'		
11	31-32	CH	File design descriptor revision letter = 'bA'		
12	33-44	CH	Software release and revision level = 'b1 .00bbbbbb'		
13	45-48	I4	Number of files = 'bbb1'		
14	49-64	CH	File ID = 'MMNbsSSTFFFFbbb' MM : Mission ID (ALOS = 'AL') N : Mission number (= '1') SSS : Sensor ID (PALSAR = 'PSR') T : Processing level code (= 'B') FFFF : File type Image file = 'IMOP'		
15	65-68	CH	Record sequence and location type flag = 'FSEQ'		
16	69-76	I8	Location sequence number = 'bbbbbb1'		
17	77-80	I4	Field length of sequence number = 'bbb4'		
18	81-84	CH	Record code and location type flag = 'FTYP'		
19	85-92	I8	Record code location = 'bbbbbb5'		
20	93-96	I4	Record code field length = 'bbb4'		
21	97-100	CH	Record length and location type flag = 'FLGT'		
22	101-108	I8	Record length location = 'bbbbbb9'		
23	109-112	I4	Record length field length = 'bbb4'		
24	113-180	CH	Blanks		
25	181-186	I6	Number of SAR data records		
26	187-192	I6	SAR data record length		
27	193-216	CH	Blanks		
SAMPLE GROUP DATA					
28	217-220	I4	Number of bits per sample Level 1.3 = 'bb32'		

Table 3-19(2/3) CEOS SAR image file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
29	221-224	I4	Number of samples per data group Level 1.3 = 'bbb2'		
30	225-228	I4	Number of bytes per data group Level 1.3 = 'bbb8'		
31	229-232	CH	Justification and order of samples within data group = Blank		
SAR RELATED DATA IN THE RECORD					
32	233-236	I4	Number of SAR channels = 'bbb1'		
33	237-244	I8	Number of lines per data set (one channel) (Excluding border lines)		
34	245-248	I4	Number of left border pixels per line = 'bbb0'		
35	249-256	I8	Number of data groups (pixels) per line	For level 1.3 products, each data record corresponds to 1 image range line. Each range line begins at the nearest range pixel and ends at the farthest range pixel.	
36	257-260	I4	Number of right border pixels per line = 'bbb0'		
37	261-264	I4	Number of top border lines = 'bbb0'		
38	265-268	I4	Number of bottom border lines = 'bbb0'		
39	269-272	CH	Interleaving ID = 'BSQb'		
RECORD DATA IN THE FILE					
40	273-274	I2	Number of physical records per line = 'b1'		
41	275-276	I2	Number of physical records per multi-channel line = 'b1'		
42	277-280	I4	Number of bytes of prefix data per record Level 1.3 = 'b412'		
43	281-288	I8	Number of bytes of SAR data per record	For Level 1.3 products, each data record corresponds to 1 image range line. Each range line begins at the nearest range pixel and ends at the farthest range pixel.	
44	289-292	I4	Number of bytes of suffix data per record = 'bbb0'		
45	293-296	CH	Prefix/suffix repeat flag = 'bbb'		
PREFIX/SUFFIX DATA LOCATORS					
46	297-304	CH	Sample data line number locator = 'bb13b4PB'		
47	305-312	CH	SAR channel number locator = 'bb49b2PB'		
48	313-320	CH	Time of SAR data line locator = 'bb45b4PB'		
49	321-328	CH	Left-fill count locator = 'bb21b4PB'		
50	329-336	CH	Right-fill count locator = 'bb29b4PB'		
51	337-340	CH	Pad pixels present indicator = 'bbb'		
52	341-368	CH	Blanks		

Table 3-19(3/3) CEOS SAR image file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
53	369-376	CH	SAR data line quality code locator = 'bb97b4PB'		
54	377-384	CH	Calibration information field locator = 'bbbbbb'		
55	385-392	CH	Gain values field locator = 'bbbbbb'		
56	393-400	CH	Bias values field locator = 'bbbbbb'		
57	401-428	CH	SAR data format type Level 1.3 = 'COMPLEX*8bbbbbbbbbbbb'	The front half of the 8 bytes field (4 bytes) is 2's complement notations. Including the real value of floating point type, rear half of that is complex representation including imaginary part.	
58	429-432	CH	SAR data format type code Level 1.3 = 'C*8b'		
59	433-436	I4	Number of left fill bits within a pixel Level 1.3 = 'bbb0'		
60	437-440	I4	Number of right fill bits within a pixel Level 1.3 = 'bbb0'		
61	441-448	I8	Maximum data range of pixel (starting form 0) Level 1.3 = Blank		
62	449-720	CH	Blanks		

Table 3-20(1/3) CEOS SAR image file—signal data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 2, 3, ...		
2	5	B	1st record subtype code = 50 (0x32)		
3	6	B	Record type code = 10 (0x0A)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 20 (0x14)		
6	9-12	B	Record length		
PREFIX DATA-GENERAL INFORMATION					
7	13-16	B	SAR image data line number = 1, 2, ...		
8	17-20	B	SAR image data record index = 1 (fixed value) (indicates the record sequence number in the image line)		
9	21-24	B	Actual count of left-fill pixels = 0		
10	25-28	B	Actual count of data pixels	For level 1.3 products, actual count of data pixels corresponds to the number of 1 image range pixels. Each range line begins at the nearest range pixel and ends at the farthest range pixel.	
11	29-32	B	Actual count of right-fill pixels = 0		
PREFIX DATA-SENSOR PARAMETERS					
12	33-36	B	Sensor parameters update flag = 0		
13	37-40	B	Sensor acquisition year (UT) Scene start line year		
14	41-44	B	Sensor acquisition day of the year (UT) Scene start line day of the year		
15	45-48	B	Sensor acquisition milliseconds of the day (UT)		
16	49-50	B	SAR channel ID Single polarization = 1 Dual polarization = 2 Polarimetry mode = 4		
17	51-52	B	SAR channel code = 0 (0=L, 1=S, 2=C, 3=X, 4=KU, 5=KA channel)		
18	53-54	B	Transmitted polarization (0=H, 1=V)		
19	55-56	B	Received polarization (0=H, 1=V)		
20	57-60	B	PRF (mHz)		
21	61-64	B	Scan ID ScanSAR mode = 1~5 Except ScanSAR = 0		
22	65-66	B	Onboard range compressed flag = 0 (0 = no, 1 = yes)		

Table 3-20(2/3) CEOS SAR image file—signal data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
23	67-68	B	Chirp type designator = 0 LINEAR FM CHIRP = 0 PHASE MODULATORS = 1		
24	69-72	B	Chirp length (nanoseconds)		
25	73-76	B	Chirp constant coefficient (Hz) = 0		X
26	77-80	B	Chirp linear coefficient (Hz/micro-sec)		
27	81-84	B	Chirp quadratic coefficient (Hz/micro-sec ²) = 0		X
28	85-92	B	Blanks		
29	93-96	B	Receiver gain (dB) = 0		X
30	97-100	B	Nought line flag = 0 Effective line = 0 Invalid line (loss line) = 1		
31	101-104	B	Electronic antenna squint angle (1/1,000,000 degree) = 0		X
32	105-108	B	Antenna mechanical elevation angle from nadir (1/1,000,000 degree) = 0		X
33	109-112	B	Electronic antenna squint angle (1/1,000,000 degree) = 0		X
34	113-116	B	Mechanical antenna squint angle (1/1,000,000 degree) = 0		X
35	117-120	B	Slant range to 1st data sample (meter)		
36	121-124	B	Data record window position (SAMPLE DELAY (nanoseconds)) Level 1.3 = 0		
37	125-128	B	Blanks		
PREFIX DATA-PLATFORM REFERENCE INFORMATION					
38	129-132	B	Platform position parameters update flag = 0 Update = 1 Repeat = 0		
39	133-136	B	Platform latitude (1/1,000,000 degree) = 0		
40	137-140	B	Platform longitude (1/1,000,000 degree) = 0		
41	141-144	B	Platform altitude (meter) = 0		
42	145-148	B	Platform ground speed (cm/sec) = 0		
43	149-160	3B4	Platform velocity X',Y',Z' (cm/sec) = 0		
44	161-172	3B4	Platform acceleration X'',Y'',Z'' (cm/sec ²) = 0		
45	173-176	B	Platform track angle (1/1,000,000 degree) = 0		
46	177-180	B	Platform true track angle (1/1,000,000 degree) = 0		
47	181-184	B	Platform pitch angle (1/1,000,000 degree) = 0		
48	185-188	B	Platform roll angle (1/1,000,000 degree) = 0		
49	189-192	B	Platform yaw angle (1/1,000,000 degree) = 0		
PREFIX DATA-SENSOR/FACILITY SPECIFIC AUXILIARY DATA					
50	193-196	B	Latitude of 1st pixel (1/1,000,000 degree)		

Table 3-20(3/3) CEOS SAR image file—signal data record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
51	197-200	B	Latitude of center-pixel (1/1,000,000 degree)		
52	201-204	B	Latitude of last pixel (1/1,000,000 degree)		
53	205-208	B	Longitude of 1st pixel (1/1,000,000 degree)		
54	209-212	B	Longitude of center-pixel (1/1,000,000 degree)		
55	213-216	B	Longitude of last pixel (1/1,000,000 degree)		
56	217-284	B	Blanks		
57	285-288	B	PALSAR frame number = 0		
58	289-388	B	PALSAR auxiliary data = 0		
59	389-412	B	Blanks		
			SAR RAW SIGNAL DATA		
	413-i	jBk	SAR signal data i : number of bytes of data + 412 j : number of pixels on this record k : size of a pixel in bytes	Repeat by the number of pixels	

Table 3-21(1/3) CEOS trailer file – file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
1	1-4	B	Record sequence number = 1		
2	5	B	1st record subtype code = 63 (0x3F)		
3	6	B	Record type code =192 (0xC0)		
4	7	B	2nd subtype code = 18 (0x12)		
5	8	B	3rd subtype code = 18 (0x12)		
6	9-12	B	Record length = 720 (0x02D0)		
7	13-14	CH	ASCII/EBCDIC flag = 'Ab' : ASCII		
8	15-16	CH	Continuation flag = 'bb'		
9	17-28	CH	Format control document ID = 'CEOS-SAR-CCT'		
10	29-30	CH	Format control document revision level = 'bA'		
11	31-32	CH	File design descriptor revision letter = 'bA'		
12	33-44	CH	Software release and revision level = 'b1 .00bbbbbb'		
13	45-48	I4	Number of files = 'bbb1'		
14	49-64	CH	File ID = 'MMNbsSSTFFFFbbb' MM : Mission ID (ALOS = 'AL') N : Mission number (= '1') SSS : Sensor ID (PALSAR = 'PSR') T : Processing level code (= 'B') FFFF : File type Trailer File = 'SART'		
15	65-68	CH	Record sequence and location type flag = 'FSEQ'		
16	69-76	I8	Sequence number location = 'bbbbbb1'		
17	77-80	I4	Sequence number field length = 'bbb4'		
18	81-84	CH	Record code and location type flag = 'FTYP'		
19	85-92	I8	Record code location = 'bbbbbb5'		
20	93-96	I4	Record code field length = 'bbb4'		
21	97-100	CH	Record length and location type flag = 'FLGT'		
22	101-108	I8	Record length location = 'bbbbbb9'		
23	109-112	I4	Record length field length = 'bbb4'		
24	113-180	CH	Blanks		
25	181-186	I6	Number of data set summary records = 'bbbbbb0'		
26	187-192	I6	Data set summary record length = 'bbbbbb0'		
27	193-198	I6	Number of map projection data records = 'bbbbbb0'		
28	199-204	I6	Map projection record length = 'bbbbbb0'		
29	205-210	I6	Number of platform position data records = 'bbbbbb0'		
30	211-216	I6	Platform position record length = 'bbbbbb0'		

Table 3-21(2/3) CEOS trailer file – file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
31	217-222	I6	Number of attitude data records = 'bbbbb0'		
32	223-228	I6	Attitude data record length = 'bbbbb0'		
33	229-234	I6	Number of radiometric data records = 'bbbbb0'		
34	235-240	I6	Radiometric data record length = 'bbbbb0'		
35	241-246	I6	Number of radiometric compensation records = 'bbbbb0'		
36	247-252	I6	Radiometric compensation record length = 'bbbbb0'		
37	253-258	I6	Number of data quality summary records = 'bbbbb0'		
38	259-264	I6	Data quality summary record length = 'bbbbb0'		
39	265-270	I6	Number of data histogram records = 'bbbbb0'		
40	271-276	I6	Data histogram record length = 'bbbbb0'		
41	277-282	I6	Number of range spectral records = 'bbbbb0'		
42	283-288	I6	Range spectral record length = 'bbbbb0'		
43	289-294	I6	Number of DEM descriptor records = 'bbbbb0'		
44	295-300	I6	DEM descriptor record length = 'bbbbb0'		
45	301-306	I6	Number of radar parameter update records = 'bbbbb0'		
46	307-312	I6	Radar parameter update record length = 'bbbbb0'		
47	313-318	I6	Number of annotation data records = 'bbbbb0'		
48	319-324	I6	Annotation data record length = 'bbbbb0'		
49	325-330	I6	Number of detail processing records = 'bbbbb0'		
50	331-336	I6	Detail processing record length = 'bbbbb0'		
51	337-342	I6	Number of calibration records = 'bbbbb0'		
52	343-348	I6	Calibration record length = 'bbbbb0'		
53	349-354	I6	Number of GCP records = 'bbbbb0'		
54	355-360	I6	GCP record length = 'bbbbb0'		
55	361-420	CH	Blanks		
56	421-426	I6	Number of facility data (1) records = 'bbbbb0'		
57	427-434	I8	Facility data (1) record length = 'bbbbbbb0'		
58	435-440	I6	Number of facility data (2) records = 'bbbbb0'		
59	441-448	I8	Facility data (2) record length = 'bbbbbbb0'		
60	449-454	I6	Number of facility data (3) records = 'bbbbb0'		
61	455-462	I8	Facility data (3) record length = 'bbbbbbb0'		
62	463-468	I6	Number of facility data (4) records = 'bbbbb0'		
63	469-476	I8	Facility data (4) record length = 'bbbbbbb0'		
64	477-482	I6	Number of facility data (5) records = 'bbbbb0'		
65	483-490	I8	Facility data (5) record length = 'bbbbbbb0'		
66	491-496	I6	Number of facility data (6) records = 'bbbbb0'		

Table 3-21(3/3) CEOS trailer file—file descriptor record

Field No.	Byte No.	Type	Description	Remarks	Different from JAXA definition
67	497-504	I8	Facility data (6) record length = 'bbbbbbb0'		
68	505-510	I6	Number of facility data (7) records = 'bbbbbb0'		
69	511-518	I8	Facility data (7) record length = 'bbbbbbb0'		
70	519-524	I6	Number of facility data (8) records = 'bbbbbb0'		
71	525-532	I8	Facility data (8) record length = 'bbbbbbb0'		
72	533-538	I6	Number of facility data (9) records = 'bbbbbb0'		
73	539-546	I8	Facility data (9) record length = 'bbbbbbb0'		
74	547-552	I6	Number of facility data (10) records = 'bbbbbb0'		
75	553-560	I8	Facility data (10) record length = 'bbbbbbb0'		
76	561-566	I6	Number of facility data (11) records = 'bbbbbb0'		
77	567-574	I8	Facility data (11) record length = 'bbbbbbb0'		
78	575-580	I6	Number of low-resolution image data records = 0		X
79	581-586	I6	Low-resolution image data record length = 0		X
80	587-592	I6	Number of pixels of low-resolution image data = 0		X
81	593-598	I6	Number of lines of low-resolution image data = 0		X
82	599-604	I6	Number of bytes per one sample of low-resolution image data = 0		X
83	605-720	CH	Blanks		