

NEB-070062B

**ALOS/PALSAR**  
**Level 1.1/1.5 product**  
**Format description**  
**<English Version>**

## Revision History(1/1)

NEB Revision	Revision	Date	Revision Contents
NEB-01006	First edition	2002.2.5	
	Rev.A	2003.2.28	Chapter 3 : revision of the items in the Table-I
	Rev.B	2003.7.4	Chapter 1 and 2 : revision of 2-byte fonts Chapter 4 : revision of the summary information
	Rev.C	2004.3.1	Chapter 1 : P1-4 Table1-7(a) : revision of the off-nadir angles of polarimetry mode (18.1deg. -> 17.9deg, 19.3 -> 19.2deg) Chapter 3 : revision of the items in the Table-II
	Rev.D	2004.6.22	Chapter 2 : addition of "2.5 Low Resolution Image Data" and "2.6 PALSAR Browse Data"
	Rev.E	2005.2.28	Chapter 1 : P1-4 Table1-5 : revision of the level 1.1 azimuth length Chapter 1 : P1-5 deletion of the remark on polarimetry mode Chapter 1 : P1-6 addition of the remark 3 Chapter 1 : P1-9 addition of the remark (*3) Chapter 3 : revision of the items in the Table-III Chapter 4 : revision of the summary information
	Rev.F	2005.5.20	Chapter 1 : P1-6 revision of the remark 3 Chapter 3 : revision of the items in the Table-IV
	Rev.G	2005.10.28	Chapter 1 : P1-2 Table 1-2 : addition of the level 1.5 of Polarimetry mode Chapter 1 : P1-3 Table 1-3 : deletion of the remark of the level 1.5, Table 1-4 : addition of the pixel spacing and look number of Polarimetry mode Chapter 1 : P1-4 Table 1-5 : deletion of the remark of the level 1.5 Chapter 1 : P1-5 Table 1-6 : addition of the remark about Polarimetry mode Chapter 1 : P1-8~9 addition of Table 1-7 (e) and (f) Chapter 2 : P2-5 Table 2-4 : addition of the level 1.5 of Polarimetry mode Chapter 2 : P2-6 Table 2-6 addition of the level 1.5 of Polarimetry mode Chapter 3 : P3-1 revision of page numbers and the items in the Table-V
	Rev.H	2006.5.24	Chapter 3 : P3-32 : addition of the description about "Stand-by 4" in Leaderfile Datasetssummary Record 413 - 444 bytes
	Rev.I	2006.10.20	Chapter 1 : P1-1 Table 1-1 : addition of the description about latitudes and longitudes in level 1.5 products. Chapter 1 : P1-5 Table 1-6 : revision of the remark about Polarimetry mode Chapter 1 : P1-10 Table 1-8 : addition of "97" to "ITRF" Chapter 3 : revision of the items in the Table-VI
NEB-070062	Rev.J	2007.11.29	Chapter 3 : revision of the items in the Table-VII Appendix 1 : This appendix is added.
NEB-070062 Rev.A	Rev.K	2008.1.17	Chapter 2 : P2-3 Table 2-2 : The comment on the low resolution image data record (*1) in the trailer file was removed. Chapter 2 : P2-4 Table 2-3 : The comment on the low resolution image data record (*3) in the trailer file was removed. Chapter 2 : P2-5 : The description about pixel spacing of Scan SAR mode was added. Chapter 2 : P2-5 Table 2-4 : The description about the level 1.5 of Scan SAR mode was added. Chapter 2 : P2-5 Table 2-5 : The description about pixel spacing of Scan SAR mode was added. Chapter 2 : P2-6 : The description about pixel spacing of Scan SAR mode was added. Chapter 2 : P2-6 Table 2-6 : The description about the level 1.5 of Scan SAR mode was added. Chapter 2 : P2-6 Table 2-7 : The description about pixel spacing of Scan SAR mode was added. Chapter 3: revision of the items in the Table-VIII
NEB-070062 Rev.B	Rev.L	2009.7.21	Chapter 3: P3-1 revision of page numbers Chapter 3: revision of the items in the Table-IX

Table-I ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from the first edition(1/1)

Record	Bytes	Format	Description	Contents
VolumeDescriptorRecord	<b>33-44</b>	<b>CH</b>	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
TextRecord	<b>17-56</b>	<b>CH</b>	Product type specifier = 'PRODUCT:FGGGHIJbbbbbbbbbbbbbbbbbbbb' where: F = Observation mode H: Fine mode, W: Scan SAR mode, D: Direct Downlink mode P: Polarimetry mode, C: Calibration mode GGG = Process level 1.0: Level 1.0, 1.1: Level 1.1, 1.5: Level 1.5 H = Processing option parameter G: Geo-code, : not specific I = Map projection U: UTM, P: PS, M: MER, L: LCC, _: not specified J = Ascending Node (Planning) A: Ascending, D: Descending	The addition of the contents
SARLeaderFileDescriptorRecord	<b>33-44</b>	<b>CH</b>	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
	<b>441-448</b>	<b>I8</b>	Facility data(2) record length = 'b4314000'	Change of a storing value
	<b>519-524</b>	<b>I6</b>	Number of facility data(8) records = 'bbbb1'	Change of a storing value
DataSetSummaryRecord	<b>477-484</b>	<b>F8.3</b>	Sensor clock angle as measured relative to sensor platform flight direction (degrees) (i.e.: -90:0=left pointing, and +90:0=right pointing) = always 'bb90.000'	Change of a storing value
	<b>759-762</b>	<b>CH</b>	Base band conversion flag (YESb/NOTb) (YES = base band converted)	Deletion of TBD
	<b>899-914</b>	<b>F16.7</b>	Antenna electronic boresight relative to platform vertical axis at the start of the image (degrees)	Deletion of TBD
	<b>915-930</b>	<b>F16.7</b>	Antenna mechanical boresight relative to platform vertical axis at the start of the image, positive to the right, negative to the left (degrees)	Deletion of TBD
	<b>931-934</b>	<b>CH</b>	Echo tracker-on/off designator ('Onbb', or 'OFFb')	Deletion of TBD
	<b>1071-1078</b>	<b>CH</b>	Processing version identifier Note: This is the same as software release and revision level	The value of Level 1.0 is copied
FacilityRelatedDataRecord1-10	<b>9-12</b>	<b>B</b>	Length of this record Attitude determination 3 and GPSR raw data = 4314000 High Precision Attitude Information = 4370000	Determination and change of a storing value
FacilityRelatedDataRecord11	<b>489-800</b>	<b>CH</b>	Always blank filled	Change of a byte position
	<b>801-1024</b>	<b>CH</b>	system reserve	The addition of an item
ImageFileDescriptorRecord	<b>33-44</b>	<b>CH</b>	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
TrailerFileDescriptorRecord	<b>33-44</b>	<b>CH</b>	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied

Table-I | ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. B to Rev. C(1/1)

Record	Bytes	Format	Description	Contents
VolumeDescriptorRecord	<b>141-148</b>	<b>CH</b>	Logical volume generating agency (Japan Aerospace Exploration Agency) = 'JAXAbbbb'	Agency name
Text Record	<b>57-116</b>	<b>CH</b>	Location and date/time of product creation = 'PROCESS:JAPAN-JAXA-EOC-ALOS-DPSbbYYYYMMDDbHHMMSSb - bb' YYYYMMDD : Creation date(UT) HHMMSS : Creation time(UT)	Agency name
Dataset Summary Record	<b>1751-1766</b>	<b>F16.7</b>	Doppler center frequency linear term (b)  $fd = a + b R$ where $fd$ : Doppler center frequency (Hz) $R$ : Slant range ( <u>km</u> )	unit of slant range

Table-111 ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. D to Rev. H(1/1)

Record	Bytes	Format	Description	Contents
Facility Related Data Record 1-10	<b>8</b>	<b>B</b>	3rd record sub-type code	change NASDA to JAXA
Image File Descriptor Record	<b>249-256</b>	<b>18</b>	Total number of data groups (or pixels) per line per SAR channel	addition of the description for level 1.1 products
	<b>281-288</b>	<b>18</b>	Number of bytes of SAR data (or pixels) per line per SAR channel	ditto
Signal Data Record	<b>25-28</b>	<b>B</b>	Actual count of data pixels	ditto

Table-IV ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. E to Rev. F(1/1)

Record	Bytes	Format	Description	Contents
DataSetSummaryRecord	413-444	CH	Sensor ID: and mode of operation for this channel = 'AAAAAA-BB-CCDE-bbbbbbbbbbbbbbbb'  DE : Code for imaging mode	correction of a clerical error
	1671-1678	CH	Line content indicator (e.g.: 'RANGEbbb', 'AZIMUTHb' or 'OTHERbbb') Level 1.1 = 'RANGEbbb' Level 1.5 = 'OTHERbbb'	correction of a clerical error
	1987-2006	E20.13	Incidence angle fifth term (a5)  $\theta = a_0 + a_1 R + a_2 R^2 + a_3 R^3 + a_4 R^4 + a_5 R^5$ where theta : Incidence angle (rad) R : Slant range (km)	change unit of Slant range
PlatformPositionDataRecord	45-60	F16.7	1st orbital element (x) (m)	addition of units
	61-76	F16.7	2nd orbital element (y) (m)	
	77-92	F16.7	3rd orbital element (z) (m)	
	93-108	F16.7	4th orbital element (x') (m/sec)	
	109-124	F16.7	5th orbital element (y') (m/sec)	
	125-140	F16.7	6th orbital element (z') (m/sec)	
RadiometricDataRecord	21-36	F16.7	Calibration factor (CF)	correction of the equation
Facility Related Data Record 11	8	B	3rd record sub-type code	change NASDA to JAXA
	465-472	I8	SIGMA-SAR processing start line number	correction of a clerical error
Image File Descriptor Record	249-256	I8	Total number of data groups (or pixels) per line per SAR channel	addition of the description for level 1.1 products
	281-288	I8	Number of bytes of SAR data (or pixels) per line per SAR channel	ditto
Signal Data Record	25-28	B	Actual count of data pixels	ditto
	45-48	B	Sensor acquisition milliseconds of day (UT)	Deletion of '=0'
	117-120	B	Slant range to 1st data sample (meters)	ditto

Table-V ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. F to Rev. G(1/1)

Record	Bytes	Format	Description	Contents
DataSetSummaryRecord	1175-1190	F16.7	Nominal effective number of looks processed in Azimuth Level 1.1 = 1.0 Level 1.5, High resolution mode (Single-Polarization), Pixel spacing 6.25 meter = 1.0->2.0 Pixel spacing 12.5 meter = 2.0,4.0->4.0 Polarimetry Mode, Pixel spacing 12.5 meter = 4.0	correction of a clerical error correction of a clerical error addition
MapProjectionDataRecord	445-476 477-480 481-496 497-512  513-528 529-544 545-560 561-576 577-592  593-624 625-640 641-656 657-672  673-704  705-720 721-736 737-752 753-768 769-784  785-800	CH CH F16.5 F16.5  F16.7 F16.7 CH CH F16.7  CH F16.7 F16.7 F16.7  CH F16.7 F16.7 F16.7  F16.7	UTM descriptor = 'UNIVERSAL TRANSVERSE MERCATORb - b' Signature of the UTM zone Map origin (false easting) (meters) = 500000.00000 Map origin (false northing) (meters) Northern Hemisphere = 0.00000 Southern Hemisphere = 10000000.00000 Centre of projection longitude (deg) Centre of projection latitude (deg) 1st standard parallel (deg) = blanks 2nd standard parallel (deg) = blanks Scale factor = 0.9996000  UPS descriptor = 'UNIVERSAL POLAR STEREOGRAPHICb - b' Centre of projection longitude (deg) Centre of projection latitude (deg) Scale factor  Projection descriptor MER-PROJECTION = 'MERCATORb - b' LCC-PROJECTION = 'LAMBERT-CONFORMAL CONICb - b' Map origin (false easting) (meters) = blanks Map origin (false northing) (meters) = blanks Centre of projection longitude (deg) Centre of projection latitude (deg) Standard parallels (deg) MER-PROJECTION = blanks LCC-PROJECTION = Standard parallels fai-1 Standard parallels (deg) MER-PROJECTION = blanks LCC-PROJECTION = Standard parallels fai-2	addition of remark except UTM  addition of remark except UPS  addition of remark except MER. LCC
RadiometricDataRecord	21-36  37-292  293-9860	F16.7  F16.7  CH	Calibration factor (CF)  Transmission and reception distortion matrices for polarimetry mode  reserve (blanks)	change of description  addition of description and notes change of byte number of blanks

Table-VI ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. H to Rev. I(1/1)

Record	Bytes	Format	Description	Contents
DataSetSummaryRecord	<b>1207-1222</b>	<b>F16.7</b>	Bandwidth per look in Azimuth (Hz) B <sub>A</sub>	revision of the description
	<b>1239-1254</b>	<b>F16.7</b>	Total processor bandwidth in Azimuth (Hz)	addition of the description
	<b>1687-1702</b>	<b>F16.7</b>	Line spacing (meter)	} revision of the description for level 1.1
	<b>1703-1718</b>	<b>F16.7</b>	Pixel spacing (meter)	
MapProjectionDataRecord	<b>945-960</b>	<b>F16.7</b>	Top left corner northing (kilometers)	} addition of the description of setting values
	<b>961-976</b>	<b>F16.7</b>	Top left corner easting (kilometers)	
	<b>977-992</b>	<b>F16.7</b>	Top right corner northing (kilometers)	
	<b>993-1008</b>	<b>F16.7</b>	Top right corner easting (kilometers)	
	<b>1009-1024</b>	<b>F16.7</b>	Bottom right corner northing (kilometers)	
	<b>1025-1040</b>	<b>F16.7</b>	Bottom right corner easting (kilometers)	
	<b>1041-1056</b>	<b>F16.7</b>	Bottom left corner northing (kilometers)	
	<b>1057-1072</b>	<b>F16.7</b>	Bottom left corner easting (kilometers)	
RadiometricDataRecord	<b>21-36</b>	<b>F16.7</b>	Calibration factor (CF)	revision of the value for the expression of level 1.1
			Notes	revision of the description
DataQualitySummaryRecord	<b>95-110</b>	<b>F16.7</b>	Estimate of SNR (from range spectra) (dB)	addition of the unit
ImageFileDescriptorRecord	<b>441-448</b>	<b>I8</b>	Maximum data range of pixel (starting form 0)	correction of the description for level 1.5
ProcessedDataRecord	<b>57-60</b>	<b>B</b>	PRF (mHz)	addition of the notes



Table-VII ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. I to Rev. J (1/1)

Record	Bytes	Format	Description	Contents
SARLeaderFileDescriptorRecord	567-574	I8	Facility data(11) record length	The length of the record was changed from 1024 to 5000
DataSetSummaryRecord	325-332 333-340 1175-1190 1687-1702 1703-1718	I8 I8 F16.7 F16.7 F16.7	Scene center line number (the line no. at the scene center including zero fill) Scene center line number (the line no. at the scene center including zero fill) Nominal effective number of looks processed in Azimuth Line spacing (meter) Pixel spacing (meter)	The description about the values was added. The description about the pixel spacing was added. The description about the values was added.
MapProjectionDataRecord	1-4 93-108 109-124 1073-1088 1089-1104 1105-1120 1121-1136 1137-1152 1153-1168 1169-1184 1185-1200 1265-1424 1425-1584	B F16.7 F16.7 F16.7 F16.7 F16.7 F16.7 F16.7 F16.7 F16.7 F16.7 8E20.10 8E20.10	Record sequence number = 3 Nominal inter-line distance in output scene (meters) = 6.25 / 12.5 / 100.0 Nominal inter-pixel distance in output scene (meters) = 6.25 / 12.5 / 100.0 Top left corner latitude (deg) Top left corner longitude (deg) Top right corner latitude (deg) Top right corner longitude (deg) Bottom right corner latitude (deg) Bottom right corner longitude (deg) Bottom left corner latitude (deg) Bottom left corner longitude (deg) Eight coefficients (A11, A12, ..., A24) to convert a line (L) and pixel (P) position to the map projection frame of reference Eight coefficients (B11, B12, ..., B24) to convert from the map projection (E, N) to line (L) and pixel (P) position in the image	The description about the processing level was added. The description about the values was added. "line" & "pixel" were replaced The description about the values was added. The description about the values was added.
FacilityRelatedDataRecord	9-12 17-416 1025-2024 2025-2044 2045-2064 2065-3064 3065-3084 3085-3104 3105-5000	B 20E20.10 50E20.10 E20.10 E20.10 50E20.10 E20.10 E20.10 CH	Length of this record twenty coefficients (a0, a1, ..., a9 & b0, b1, ..., b9) to convert from the map projection (E, N) to line (L) and pixel (P) position in the image Coefficients of the 8th polynomial expression to convert from pixel (P) and line (L) to latitude ( $\phi$ ) and longitude ( $\lambda$ ) Origin Pixel (Po) Origin Line (Lo) Coefficients of the 8th polynomial expression to convert from latitude ( $\Phi$ ) and longitude ( $\Lambda$ ) to pixel (p) and line (l) Origin Latitude ( $\Phi_0$ ) (degrees) Origin Longitude ( $\Lambda_0$ ) (degrees) blanks	The length of the record was changed from 1024 to 5000 The description about the values was added. The items were added.
SignalDataRecord	1-4	B	Record sequence number = 2, 3, ...	The description about the processing level is added.
ProcessedDataRecord	1-4 133-136 137-140 141-144 145-148 149-152 153-156	B B B B B B	Record sequence number = 2, 3, ... Latitude of 1st pixel (millionths of degrees) Latitude of middle-pixel (millionths of degrees) Latitude of last pixel (millionths of degrees) Longitude of 1st pixel (millionths of degrees) Longitude of middle-pixel (millionths of degrees) Longitude of last pixel (millionths of degrees)	The description about the processing level is added. The description of "=0" was deleted. (Valid values are set from revision J)

Table-VIII ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. J to Rev. K (1/1)

Record	Bytes	Format	Description	Contents
FilePointerRecoed	<b>101-108</b>	<b>I8</b>	Number of records in referenced file	} The description about the trailer file was revised.
	<b>125-136</b>	<b>CH</b>	Referenced file record length type	
	<b>137-140</b>	<b>CH</b>	Referenced file record length type code	
	<b>153-160</b>	<b>I8</b>	Referenced file portion end, last record number for this physical volume	
SARTrailerFileDescriptorRecord	<b>575-580</b>	<b>I6</b>	Number of low resolution image data records (Level 1.1, 1.5)	} The description about the values was revised because the low resolution image data record of Scan SAR mode was added.
	<b>581-586</b>	<b>I6</b>	Low resolution image data record length (Level 1.1, 1.5)	
	<b>587-592</b>	<b>I6</b>	Number of pixels of low resolution image data (Level 1.1, 1.5)	
	<b>593-598</b>	<b>I6</b>	Number of lines of low resolution image data (Level 1.1, 1.5)	
	<b>599-604</b>	<b>I6</b>	Number of bytes per one sample of low resolution image data (Level 1.1, 1.5)	
LowResolutionImageDataRecord	<b>1-i</b>	<b>jBk</b>	Low resolution image data for 16 bit.	The comment on Scan SAR mode was deleted.

Table-IX ALOS PALSAR DATA (Level 1.1/1.5) DATA FORMAT, Revision history from Rev. K to Rev. L (1/1)

Record	Bytes	Format	Description	Contents
SignalDataRecord	<b>193-196</b>	<b>B</b>	Latitude of 1st pixel (millionths of degrees)	The addition of the new items
	<b>197-200</b>	<b>B</b>	Latitude of middle-pixel (millionths of degrees) (*)	
	<b>201-204</b>	<b>B</b>	Latitude of last pixel (millionths of degrees)	
	<b>205-208</b>	<b>B</b>	Longitude of 1st pixel (millionths of degrees)	
	<b>209-212</b>	<b>B</b>	Longitude of middle-pixel (millionths of degrees) (*)	
	<b>213-216</b>	<b>B</b>	Longitude of last pixel (millionths of degrees)	
	<b>217-284</b>	<b>B68</b>	Always blank (0) filled	

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1 Abstract

This document describes the products specifications for ALOS PALSAR data. The product specification formats are based on the CEOS (Committee on Earth Observation Satellites) revised standardized formats.

1.1 PALSAR Data Product Definitions

The definitions of PALSAR data products for processing levels are shown in Table 1-1 and the processing levels of observational modes are given in Table 1-2.

**Table 1-1 Processing Levels and Their Definitions**

Processing Level	Definition
1.0	The data of 1 scene area is extracted from received data. Data type is 8 bit. The number of SAR data files is the same as the number of polarizations in the case of dual polarization and polarimetry modes. The data in SCAN SAR mode is not divided into individual scans.
1.1	Range compression and 1 look azimuth compression are performed. Data is complex data on the slant range coordinate. The phase history is included.
1.5	After range and multi-look azimuth compression are performed, radiometric and geometric corrections are performed according to the map projection. Pixel spacing can be selected for the Fine mode. Latitudes and longitudes in the product are calculated without considering the altitude.

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**Table 1-2 Processing Levels of Observational Modes**

Observation Mode		Processing Level			Remarks
		1.0	1.1	1.5	
Fine mode	Single polarization	O	O	O	18 beams
	Dual polarization	O	O	O	18 beams
Scan SAR mode	Burst mode 1	O	-	O	3 scans, 4 scans, 5 scans
	Burst mode 2	O	-	O	3 scans, 4 scans, 5 scans
Direct Downlink mode		O	O	O	18 beams
Polarimetry mode		O	O	<u>O</u>	12 beams

Remark : Level 1.0 data sometimes includes calibration data as well as observation data.

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1.2 Processing Level and Data Type

The data type for each processing level is shown in Table 1-3.

**Table 1-3 Processing Levels and Their Data Types**

Processing level	DATA Formats	Data coordinate	Data meanings	Remarks
1.0	8 bit(I) + 8 bit(Q)	-	-	
1.1	32 bit(I) + 32 bit(Q) (*1)	Slant range coordinate	-	except SCAN SAR mode
1.5	16 bit unsigned integer (*2)	Map coordinate	Amplitude	

(\*1) I and Q are real data based on IEEE. Byte order is Big Endian.

(\*2) Byte order is Big Endian

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1.3 Pixel Spacing

Table 1-4 shows the pixel spacing of level 1.5 products for each observational mode.

**Table 1-4 Pixel Spacing of Level 1.5 Products**

Processing Level	Fine mode		SCAN SAR mode		Direct Downlink mode	Polarimetry mode
	Single polarization	Dual polarization	Burst mode 1	Burst mode 2		
1.5	6.25m(2look) 12.5m(4look)	12.5m(4look)	100m	100m	12.5m(4look)	<u>12.5m(4look)</u>

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1.4 Products Size

The definitions of the scene size are summarized in Table 1-5, the image frame sizes of level 1.5 are shown in Table 1-6.

And Table 1-7 shows sample numbers for each observational mode, off-nadir angle and others.

**Table 1-5 Definitions of Scene Size**

Processing level	Scene Size Range direction	Scene Size Azimuth direction	Remarks
1.0	Input signal data length [corresponds to signal gate width]	The size corresponds to the following length (includes synthetic aperture length) •Except SCAN SAR mode : 16.4 sec (corresponding to 110km) •Scan SAR mode : 57.0 sec (corresponding to 385km)	In the case of SCAN SAR mode, data is extracted at burst boundaries
1.1	Valid signal data length [corresponds to signal gate width - pulse width]	<u>Fine/Direct Downlink modes:</u> 51 to 79 km <u>Polarimetry mode: 62 to 83km</u>	Except Scan SAR mode
1.5	(refer to table 1-6)	(refer to table 1-6)	

Remark : For level 1.0, the number of records and the record length are fixed according to observational modes and off-nadir angles.

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**Table 1-6 Image Sizes of Level 1.5 Data**

Observation mode		Image Size Range direction	Image Size Azimuth direction
Fine/Direct Downlink modes	off-nadir angle 9.9 deg. - 43.4 deg.	70 km	(*)
	off-nadir angle 45.2 deg. - 50.0 deg.	50 km	
	off-nadir angle 50.8 deg.	40 km	
Polarimetry mode	off-nadir angle 9.7 deg. - 26.2 deg.	(*)	(*)
SCAN SAR mode	5 scan	350 km	350 km
	4 scan	300 km	
	3 scan	250 km	

\*: Image size of azimuth direction is variable according to PRF and off-nadir angle.

- Fine mode and Direct Downlink mode: 51 – 79 km (Azimuth)
- Polarimetry mode: 20 – 65 km (Range), 62 – 83 km (Azimuth)

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**Table 1-7 (a) Image Size of PALSAR Level 1.1 Products (typical values)**

Fine and Direct downlink modes				Polarimetry mode		
Off-nadir angle (deg)	Range Samples		Azimuth samples	Off-nadir angle (deg)	Range Samples	Azimuth samples
	Single	Dual, Direct Downlink mode				
9.9	3,936	1,824	18,432	9.7	1,344	18,432
14.0	5,088	2,400	18,432	13.8	1,472	18,432
18.0	6,144	2,944	18,432	16.2	736	18,432
21.5	7,168	3,456	18,432	17.3	768	18,432
25.8	8,288	4,000	18,432	17.9	800	18,432
28.8	9,056	4,384	18,432	19.2	832	18,432
30.8	9,568	4,640	18,432	20.5	1,312	18,432
34.3	10,400	5,088	18,432	21.5	1,344	18,432
36.9	10,816	5,376	18,432	23.1	1,216	18,432
38.8	11,296	5,600	18,432	24.2	1,024	18,432
41.5	11,680	5,792	18,432	25.2	1,056	18,432
43.4	12,256	6,080	18,432	26.2	1,120	18,432
45.2	9,248	4,576	18,432			
46.6	9,472	4,704	18,432			
47.5	9,664	4,800	18,432			
49.0	9,824	4,864	18,432			
50.0	9,952	4,928	18,432			
50.8	8,224	4,064	18,432			

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Remark 1: The output size for one processing segment in the azimuth direction is 9216 samples. The number of output azimuth samples is 18,432, corresponding to a size of two segments.

Remark 2: The Sampling Window Start Time (SWST) may vary slightly which can result in the number of output range samples changing by approximately 256 samples during processing.

Remark 3: For level 1.1 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. Also, the first image record contains the earliest range line, and the last record contains the latest line.

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**Table 1-7(b) Image Frame Size and Data Capacity of Level 1.5 Products (rough estimation)**

**Fine and Direct downlink modes (Geo-reference)**

Image Size Range x Azimuth	Frame Size (Pixels) and Data Capacity (Megabytes)					
	Pixel Spacing : 6.25m			Pixel Spacing : 12.5m		
	Range	Azimuth	Data Capacity	Range	Azimuth	Data Capacity
70 x 52 - 78km	11,200	8,900 - 13,100	280	5,600	4,500 - 6,600	71
50 x 64 - 79km	8,000	10,300 - 13,100	200	4,000	5,200 - 6,600	50
40 x 75 - 79km	6,400	12,000 - 13,100	160	3,200	6,000 - 6,600	40

• 1 Megabyte = 2<sup>20</sup> Bytes

• Above table shows maximum capacities without considering data capacity increase due to methods of map projection and processing scene latitude.

• In PS (Polar Stereographic) projection, maximum capacity (at scene latitude of +/- 25deg.) may be twice as large as the values in the table.

**Table 1- 7(c) Image Frame Size and Data Capacity of Level 1.5 Products (rough estimation)**

**Fine and Direct downlink modes (Geo-code)**

Pixel Spacing	Image Size Range x Azimuth	Frame Size (Pixels) and Data Capacity (Megabytes)		
		East - West	South - North	Data Capacity
6.25m	70 x 52 ~ 78km	8,300 ~ 17,200	11,200 ~ 17,200	558
	50 x 64 ~ 79km	10,300 ~ 15,300	8,000 ~ 15,300	400
	40 x 75 ~ 79km	12,000 ~ 14,600	6,400 ~ 14,600	320
12.5m	70 x 52 ~ 78km	4,200 ~ 8,600	5,600 ~ 8,600	140
	50 x 64 ~ 79km	5,200 ~ 7,700	4,000 ~ 7,700	101
	40 x 75 ~ 79km	6,000 ~ 7,300	3,200 ~ 7,300	81

• 1 Megabyte = 2<sup>20</sup> Bytes

• Above table shows maximum capacities without considering data capacity increase due to methods of map projection and processing scene latitude.

• In PS (Polar Stereographic) projection, maximum capacity (at scene latitude of +/- 25deg.) may be twice as large as the values in the table.

**Table 1-7(d) Image Frame Size and Data Capacity of Level 1.5 Products (rough estimation)**

**SCAN SAR mode**

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Image Size Range x Azimuth	Frame Size (Pixels) and Data Capacity (Megabytes)					
	Geo-reference			Geo-code		
	Range	Azimuth	Data Capacity	East - West	South - North	Data Capacity
250km x 350km	2,500	3,500	17	4,300	4,300	36
300km x 350km	3,000	3,500	21	4,600	4,600	41
350km x 350km	3,500	3,500	24	5,000	5,000	48

• 1 Megabyte = 2<sup>20</sup> Bytes

• Above table shows maximum capacities without considering data capacity increase due to methods of map projection and processing scene latitude.

• The maximum capacity in PS (Polar Stereographic) projection (at scene latitude of 0deg.) may be 4 times, that in MER (Mercator) projection (at latitude of +/- 73deg.) 11.7 times and that in LCC (Lambert-Conformal Conic) projection (at scene latitude of -52deg. in the case of the standard parallels  $\phi_1=50deg.$  and  $\phi_2=20deg.$ ) 12.1 times as large as the values in the table.

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**Table 1-7(e) Image Frame Size and Data Capacity of Level 1.5 Products (rough estimation)**

**Polarimetry mode (Geo-reference)**

Image Size Range x Azimuth	Frame Size (Pixels) and Data Capacity (Megabytes)		
	Pixel Spacing : 12.5m		
	Range	Azimuth	Data Capacity
65 x 63 ~ 68 km	5,200	5,100 ~ 5,800	230
50 x 64 ~ 69 km	4,000	5,200 ~ 5,800	177
20 x 63 ~ 83 km	1,600	5,100 ~ 6,800	83
30 x 64 ~ 72 km	2,400	5,200 ~ 5,900	108
25 x 68 ~ 73 km	2,000	5,500 ~ 6,000	92

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- 1 Megabyte =  $2^{20}$  Bytes
- Above table shows maximum capacities for full-polarization without considering data capacity increase due to methods of map projection and processing scene latitude.
- In PS (Polar Stereographic) projection, maximum capacity (at scene latitude of +/- 25deg.) may be twice as large as the values in the table.

**Table 1-7(f) Image Frame Size and Data Capacity of Level 1.5 Products (rough estimation)  
Polarimetry mode (Geo-code)**

Pixel Spacing	Image Size Range x Azimuth	Frame Size (Pixels) and Data Capacity (Megabytes)		
		East – West	South - North	Data Capacity
12.5m	65 x 63 ~ 68 km	5,100 ~ 7,700	5,200 ~ 7,800	458
	50 x 64 ~ 69 km	5,200 ~ 6,600	4,000 ~ 7,000	352
	20 x 63 ~ 83 km	3,100 ~ 6,700	1,600 ~ 7,000	358
	30 x 64 ~ 72 km	4,400 ~ 5,800	2,400 ~ 6,400	283
	25 x 68 ~ 73 km	3,800 ~ 5,900	2,000 ~ 6,300	284

- 1 Megabyte =  $2^{20}$  Bytes
- Above table shows maximum capacities for full-polarization without considering data capacity increase due to methods of map projection and processing scene latitude.
- In PS (Polar Stereographic) projection, maximum capacity (at scene latitude of +/- 25deg.) may be twice as large as the values in the table.

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## 1.5 Processing Parameters

The processing parameters of each level are given in Table 1-8.

**Table 1-8 Summary of Processing Parameters**

Items	Processing level		
	1.0	1.1	1.5
Map projection	-	-	UTM,PS MER, LCC(*3)
Framing (*1)	-	-	GR,GC
Image direction (*2)	-	-	Map
Resampling	-	-	NN,BL,CC
Geodetic coordinate (Earth model)	-	-	ITRF97(GRS80)
Scene Shift	-5 to 4	-5 to 4	-5 to 4
Window Function	-	rectangle	rectangle
Multi-look Number	-	1	depending on observational mode
Pixel Spacing	-	-	depending on observational mode and multi-look number

(\*1)GR: Geo-reference, GC: Geo-code

(\*2)valid in the case of Geo-coded

(\*3)UTM, PS, MER or LCC can be chosen in the case of SCAN SAR mode and UTM or PS can be chosen in other cases.

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2 Product Formats

PALSAR product formats are based on the CEOS (Committee on Earth Observation Satellites) revised standardized formats.

2.1 Logical Volume

The image volume exists as a logical volume.

2.2 Order of Image Data

The order of image data is BSQ format.

2.3 File Composition

An image volume consists of 4 kinds of files. The file names and their contents are shown in Table 2-1 and Figure 2-1, the records composing those files are shown in Table 2-2.

**Table 2-1 File Composition and Definitions of File Names**

File Name	Definition of File Name	Contents
Volume Directory File	VOL-Scene ID-Product ID	This file is located at the beginning of the image volume and stores the volume and file management information.
Leader File	LED-Scene ID-Product ID	This file is located before image file and stores annotation data, ancillary data and other types of data related to the image data in the succeeding image file.
Image File	IMG-XX-Scene ID-Product ID	This file is located after the leader file and stores the image data.
Trailer File	TRL-Scene ID-Product ID	This file is located after the image file and stores the final information related to the image data.

XX: polarization (HH, HV, VH, VV) (order of transmitting, receiving)

Volume directory file

SAR leader file

SAR Image file

SAR image files repeat according to the number of polarizations in the case of dual polarization and polarimetric modes.

Trailer file

**Figure 2-1 File Composition of Product Format**



**Table 2-2 Record Composition of Each File**

File / Record name	Processing Level		
	1.0	1.1	1.5
a) Volume directory file			
1) Volume descriptor	0	0	0
2) File pointer	0	0	0
3) Text	0	0	0
b) SAR leader file			
1) File descriptor	0	0	0
2) Data set summary	0	0	0
3) Map projection data	-	-	0
4) Platform position data	0	0	0
5) Attitude data	0	0	0
6) Radiometric data	-	0	0
7) Data quality summary	-	0	0
8) Calibration data	0	-	-
9) Facility related data	0	0	0
c) SAR Image file			
1) File descriptor	0	0	0
2) Signal data	0	0	-
3) Processed data	-	-	0
d) Trailer file			
1) File descriptor	0	0	0
2) Low resolution image data	-	0	0

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2.4 Record Length and Record Number

Table 2-3 shows the record lengths and the number of records of each file.

**Table 2-3 Record Lengths and The Number of Records of Each File**

File/Record Name	Record length	Record number
<b>a) Volume Directory File</b>		
1) Volume descriptor	360	1
2) File pointer	360	Number of SAR Image Files + 2 (*1)
3) Text	360	1
<b>b) SAR Leader File</b>		
1) File descriptor	720	1
2) Data set summary	4096	1
3) Map projection data	1620	1
4) Platform position data	4680	1
5) Attitude data	8192	1
6) Radiometric data	9860	1
7) Data quality summary	1620	1
8) Calibration data	13212	1
9) Facility related	Variable	10 (for level 1.0) 11 (for level 1.1/1.5)
<b>c) SAR Image File(s)</b>		
1) File descriptor	720	1
2) Signal data	(*2)	(*2)
3) Processed data	(*2)	(*2)
<b>d) Trailer File</b>		
1) File descriptor	720	1
2) Low resolution image data	Variable	1

(\*1) There is one file pointer for each SAR Image File (according to the number of polarizations) plus one for the SAR leader file and one for the trailer file.

(\*2) Refer to table 1-7

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## 2.5 Low Resolution Image Data

Low resolution image data which is contained in a trailer file is 16 bit per pixel data which is created by equalizing a processed image so that pixel spacing is set to 100m (500 m for Scan SAR mode). The conditions for creation of low resolution image data, the format, etc. are summarized in Table 2-4 and Table 2-5. In the cases of the fine mode (dual polarization) and polarimetry mode, low resolution image data in HH or VV polarization is produced.

**Table 2-4 Conditions for creation of low resolution image data**

Observation Mode	Processing Level	
	1.1	1.5
Fine mode and Direct Downlink mode	Create geo-referenced image.	Create low resolution image with the same frame as product image.
Scan SAR mode	-	Create low resolution image with the same frame as product image.
Polarimetry mode	Create geo-referenced image.	Create low resolution image with the same frame as product image.

**Table 2-5 Format of low resolution image data**

Format Factor	Specification
Data type	16 bit integer
Record length	Variable (multiples of 100)
The Number of Records	Variable (multiples of 100)
Pixel spacing	100 m (except Scan SAR mode) 500 m (Scan SAR mode)
Map projection	- S 84 deg. $\leq$ phi $\leq$ N 84 deg. : UTM - S 90 deg. $\leq$ phi < S 84 deg. or N 84 deg. < phi $\leq$ N 90 deg. : PS phi : scene center latitude (deg.)

2.6 PALSAR Browse Data (for reference)

Based on the conditions in Table 2-6, PALSAR browse data is normalized to 8 bit processed images, and is created by equalizing such that pixel spacing is set to 100m (500 m for Scan SAR mode). The format, pixel spacing, map projection etc. are summarized in Table 2-7. In the cases of the fine mode (dual polarization) and polarimetry mode, browse data in HH or VV polarization is produced.

The browse data for processed scenes is specified in inventory information as image catalog data with JPEG compression.

**Table 2-6 Conditions for creation of PALSAR browse data**

Observation Mode	Processing Level	
	1.1	1.5
Fine mode and Direct Downlink mode	Create geo-referenced image when PALSAR browse data creation flag is "YES".	
Scan SAR mode	-	Create geo-referenced image when PALSAR browse data creation flag is "YES".
Polarimetry mode	Create geo-referenced image when PALSAR browse data creation flag is "YES".	

**Table 2-7 Format of PALSAR browse data**

Format Factor	Specification
File name	Emergency/Normal flag (1 character) + scene ID.BRS
Data type	8 bit integer
Record length	Variable (multiples of 100)
The Number of Records	Variable (multiples of 100)
Image frame	Geo-referenced
Pixel spacing	100 m (except Scan SAR mode) 500 m (Scan SAR mode)
Map projection	- S 84 deg. <= phi <= N 84 deg. : UTM - S 90 deg. <= phi < S 84 deg. or N 84 deg. < phi <= N 90 deg. : PS phi : scene center latitude (deg.)

### 3 Record Formats

#### 3.1 Volume Directory File

The record formats for the volume directory file describe as follows.

p. 3-2 - 3-6	Volume Descriptor Record
p. 3-7 - 3-12	File Pointer Record
p. 3-13 - 3-15	Text Record

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#### 3.2 SAR Leader File

The record formats for the SAR leader file for level 1.1 and 1.5 describes as follows.

p. 3-16 - 3-27	File Descriptor Record
p. 3-28 - 3-48	Data set Summary Record
p. 3-49 - 3-60	Map Projection Data Record
p. 3-61 - 3-64	Platform Position Data Record
p. 3-65 - 3-67	Attitude Data Record
p. 3-68 - 3-70	Radiometric Data Record
p. 3-71 - 3-75	Data Quality Summary Record
p. 3-76 - 3-84	Facility Related Data Record

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#### 3.3 SAR Image File

The following tables show the record formats for the SAR data file(s).

p. 3-85 - 3-98	File Descriptor Record
p. 3-99 - 3-106	Signal Data Record
p. 3-107 - 3-113	Processed Data Record

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#### 3.4 SAR Trailer File

The following tables show the record formats for the SAR trailer file.

p. 3-114 - 3-123	File Descriptor Record
p. 3-124 - 3-124	Low Resolution Image Data Record

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VolumeDescriptorRecord ( 1 / 5 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 1	The value of Level 1.0 is copied
<b>5</b>	<b>B</b>	1st record subtype code = 192	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 192	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd subtype code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd subtype code = 18	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 360	The value of Level 1.0 is copied
<b>13-14</b>	<b>CH</b>	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
<b>15-16</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied
<b>17-28</b>	<b>CH</b>	Superstructure format control document ID. (the ID of the CCB document) = 'CEOS-SAR-CCT'	The value of Level 1.0 is copied
<b>29-30</b>	<b>CH</b>	Superstructure format control document revision level = 'bA' - 'bZ'	The value of Level 1.0 is copied

VolumeDescriptorRecord ( 2 / 5 )

Bytes	Format	Description	Contents
31-32	CH	Superstructure record format revision level = 'bA' - 'bZ'	The value of Level 1.0 is copied
33-44	CH	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
45-60	CH	ID of physical volume containing this volume descriptor (tape ID) = 'EOC-bbbbbbbbbbbb'	The value of Level 1.0 is copied

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VolumeDescriptorRecord ( 3 / 5 )

Bytes	Format	Description	Contents
<b>61-76</b>	<b>CH</b>	Logical volume ID (scene related information uniquely identifying this logical volume) = 'MMNSSSYYYYMMDDbb' MM : Mission ID (ALOS='AL') (*1) N : Mission number (ALOS='1') (*1) SSS : Sensor ID (PALSAR='PSR') (*1) YYYY : Product generation year MM : Product generation month DD : Product generation day	(*1)The value of Level 1.0 is copied
<b>77-92</b>	<b>CH</b>	Volume set ID (16 character string assigned to uniquely identify a multiple physical volume data set.) = 'MMMMMMbSSSSSbbb' MMMMMM : Mission name ('ALOSbb') SSSSSS : Sensor name (PALSAR='PALSAR')	The value of Level 1.0 is copied
<b>93-94</b>	<b>I2</b>	Total number of physical volumes in the logical volume = 'b1'	The value of Level 1.0 is copied
<b>95-96</b>	<b>I2</b>	Physical volume sequence number of the first tape within the logical volume = 'b1'	The value of Level 1.0 is copied
<b>97-98</b>	<b>I2</b>	Physical volume sequence number of the last tape within the logical volume = 'b1'	The value of Level 1.0 is copied
<b>99-100</b>	<b>I2</b>	Physical volume sequence number of the current tape within the logical volume = 'b1'	The value of Level 1.0 is copied



VolumeDescriptorRecord ( 4 / 5 )

Bytes	Format	Description	Contents
<b>101-104</b>	<b>I4</b>	First referenced file number in this physical volume within the logical volume, i.e.: the first file which follows this volume directory = 'bbb3' - 'bbb6' : N+2 (N is number of polarization)	The value of Level 1.0 is copied
<b>105-108</b>	<b>I4</b>	Logical volume within a volume set = 'bbb1'	The value of Level 1.0 is copied
<b>109-112</b>	<b>I4</b>	Logical volume number within physical volume (if a logical volume spans physical volumes, the portion of the logical volume on this tape is counted as an entire logical volume) = 'bbb1'	The value of Level 1.0 is copied
<b>113-120</b>	<b>CH</b>	Logical volume creation data = 'YYYYMMDD' where YYYY : Year MM : Month DD : Day	
<b>121-128</b>	<b>CH</b>	Logical volume creation time = 'HHMMSSXX' where HH : Hour MM : Minute SS : Second XX : 10mili-second	
<b>129-140</b>	<b>CH</b>	Logical volume generation country (JAPAN) = 'JAPANbbbbbbb'	The value of Level 1.0 is copied
<b>141-148</b>	<b>CH</b>	Logical volume generating agency (Japan Aerospace Exploration Agency) = 'JAXAbbbb'	The value of Level 1.0 is copied

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VolumeDescriptorRecord ( 5 / 5 )

Bytes	Format	Description	Contents
<b>149-160</b>	<b>CH</b>	Logical volume generating facility (ALOS Data Processing Sub-system at Earth Observation Center) = 'EOC-ALOS-DPS'	The value of Level 1.0 is copied
<b>161-164</b>	<b>I4</b>	Number of file pointer records in volume directory = 'bbb3' - 'bbb6': N+2 (N is number of polarization)	The value of Level 1.0 is copied
<b>165-168</b>	<b>I4</b>	Number of records in volume directory = 'bbb1'	The value of Level 1.0 is copied
<b>169-260</b>	<b>CH</b>	Volume descriptor spare segment (always blank filled)	The value of Level 1.0 is copied
<b>261-360</b>	<b>CH</b>	Local use segment	The value of Level 1.0 is copied

**FilePointerRecoed ( 1 / 6 )**

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number In case of High Resolution Mode(Single-Polarization), Direct Down link Mode and Wide Observation Mode : SAR Leader File = 2 SAR Data File = 3 SAR Trailer File = 4 In case of High Resolution Mode(Dual-Polarization) : SAR Leader File = 2 SAR Data File = 3, 4 SAR Trailer File = 5 In case of Polarimetry Mode : SAR Leader File = 2 SAR Data File = 3, 4, 5, 6 SAR Trailer File = 7	The value of Level 1.0 is copied
5	<b>B</b>	1st record subtype code = 219	The value of Level 1.0 is copied
6	<b>B</b>	record type code = 192	The value of Level 1.0 is copied
7	<b>B</b>	2nd subtype code = 18	The value of Level 1.0 is copied
8	<b>B</b>	3rd record sub-type code = 18	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 360	The value of Level 1.0 is copied

FilePointerRecoed ( 2 / 6 )

Bytes	Format	Description	Contents
13-14	CH	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
15-16	CH	blanks	The value of Level 1.0 is copied
17-20	I4	Referenced file number SAR Leader File = 'bbb1' SAR Data File = 'bbb2' SAR Trailer File = 'bbb3'	The value of Level 1.0 is copied
21-36	CH	Referenced file name (16 characters indicating nature of the data, i.e. header, annotation, SAR product type, etc.) = 'MMNbSSSTFFFFbbbb' MM : Mission ID (ALOS='AL') (*2) N : Mission number (ALOS='1') (*2) SSS : Sensor ID (PALSAR='PSR') (*2) T : Processing Level Code (*1) FFFF : File Type Code (*2) SAR Leader File = 'SARL' SAR Data File = 'IMOP' SAR Trailer File = 'SART'	(*1) 'B' : Level 1.1 'C' : Level 1.5  (*2)The value of Level 1.0 is copied

FilePointerRecoed ( 3 / 6 )

Bytes	Format	Description	Contents
37-64	CH	Referenced file class SAR Leader File = 'SARLEADERbFILEbbbbbbbbbbbbbb' SAR Data File = 'IMAGERYbOPTIONSbFILEbbbbbbbb' SAR Trailer File = 'SARTRAILERbFILEbbbbbbbbbbbbbb'	The value of Level 1.0 is copied
65-68	CH	Referenced file class code SAR Leader File = 'SARL' SAR Data File = 'IMOP' SAR Trailer File = 'SART'	The value of Level 1.0 is copied
69-96	CH	Referenced file data type = 'MIXEDbBINARYbANDBASCIIbbbbbb'	The value of Level 1.0 is copied
97-100	CH	Referenced file data type code = 'MBAA'	The value of Level 1.0 is copied

**FilePointerRecoed ( 4 / 6 )**

Bytes	Format	Description	Contents
<b>101-108</b>	<b>I8</b>	Number of records in referenced file SAR Leader File = 'bbbbbb17' (Level 1.1) = 'bbbbbb18' (Level 1.5) SAR Data File = N+1 (N is the number of SAR DATA records) SAR Trailer File = N+1 (N is the number of low resolution image data records)	
<b>109-116</b>	<b>I8</b>	Referenced file 1-st record length (length of the first record in the file) = 'bbbbbb720'	The value of Level 1.0 is copied

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**FilePointerRecoed ( 5 / 6 )**

Bytes	Format	Description	Contents
<b>117-124</b>	<b>I8</b>	Referenced file maximum record length (length of largest record in the file)	
<b>125-136</b>	<b>CH</b>	Referenced file record length type SAR Leader File = 'VARIABLEbLEN' SAR Data File = 'VARIABLEbLEN' SAR Trailer File = 'VARIABLEbLEN'	In except SAR Trailer File the value of Level 1.0 is copied
<b>137-140</b>	<b>CH</b>	Referenced file record length type code SAR Leader File = 'VARE' SAR Data File = 'VARE' SAR Trailer File = 'VARE'	In except SAR Trailer File the value of Level 1.0 is copied

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**FilePointerRecoed ( 6 / 6 )**

Bytes	Format	Description	Contents
<b>141-142</b>	<b>I2</b>	Referenced file physical volume start number (the number of the physical volume set containing the first record of the file) = 'b1'	The value of Level 1.0 is copied
<b>143-144</b>	<b>I2</b>	Referenced file physical volume end number (the number of the physical volume set containing the last record of the file) = 'b1'	The value of Level 1.0 is copied
<b>145-152</b>	<b>I8</b>	Referenced file portion start, 1-st record number for this physical volume (record number of the first record appearing on this physical volume) = bbbbbbb1'	The value of Level 1.0 is copied
<b>153-160</b>	<b>I8</b>	Referenced file portion end, last record number for this physical volume (record number of the last record appearing on this physical volume) SAR Leader File = 'bbbbbb17' (Level 1.1) = 'bbbbbb18' (Level 1.5) SAR Data File = N+1 (N is the number of SAR DATA records) SAR Trailer File = N+1 (N is the number of low resolution image data records)	
<b>161-360</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied

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TextRecoed ( 1 / 3 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = N+4 where N = 'Number of polarization'	The value of Level 1.0 is copied
<b>5</b>	<b>B</b>	1st record sub-type code = 18	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 192	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 18	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 360	The value of Level 1.0 is copied
<b>13-14</b>	<b>CH</b>	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
<b>15-16</b>	<b>CH</b>	Continuation flag ('Cb' if information is continued on the next text record, else 'bb' for no continuation) = 'bb'	The value of Level 1.0 is copied

TextRecoed ( 2 / 3 )

Bytes	Format	Description	Contents
17-56	CH	Product type specifier = 'PRODUCT:FGGGHIJbbbbbbbbbbbbbbbbbbbb' where: F = Observation mode H: Fine mode, W: Scan SAR mode, D: Direct Downlink mode P: Polarimetry mode, C: Calibration mode GGG = Process level 1.0: Level 1.0, 1.1: Level 1.1, 1.5: Level 1.5 H = Processing option parameter G: Geo-code, _: not specified I = Map projection U: UTM, P: PS, M: MER, L: LCC, _: not specified J = Ascending Node (Planning) A: Ascending, D: Descending	
57-116	CH	Location and date/time of product creation = 'PROCESS:JAPAN-JAXA-EOC-ALOS-DPSbbYYYYMMDDbHHMMSSb - bb' YYYYMMDD : Creation date(UT) HHMMSS : Creation time(UT)	
117-156	CH	Physical volumes identification = 'TAPEbID:bbbbbbbbbbbbbbbbbbbb'	The value of Level 1.0 is copied

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TextRecoed ( 3 / 3 )

Bytes	Format	Description	Contents
157-196	CH	Scene identification = 'ORBITb:AABBBCDDDDDEEEEbbbbbbbbbbbbbbbb' where : AA = Satellite ID ('AL') BBB = Sensor ID ('PSR') C = Sensor Sub-ID DDDDD = Orbit accumulation number of a scene center EEEE = Scene frame number of a scene center	The value of Level 1.0 is copied
197-236	CH	Scene location Level 1.1 = 'FRAMEbCENTRE:bbbbbbbbbbbbbbbb' Level 1.5 = 'FRAMEbCENTRE:bN+(or -)nnn.nnbE+(or -)nnn.nnb' where : N+(or -)nnn.nn = latitude of a scene center (deg) E+(or -)nnn.nn = longitude of a scene center (deg)	In Level 1.1, the value of Level 1.0 is copied
237-360	CH	blanks	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 1 / 12 )

Bytes	Format	Description	Contents
1-4	B	Record sequence number = 1	The value of Level 1.0 is copied
5	B	1st record subtype code = 11	The value of Level 1.0 is copied
6	B	Record type code = 192	The value of Level 1.0 is copied
7	B	2nd subtype code = 18	The value of Level 1.0 is copied
8	B	3rd subtype code = 18	The value of Level 1.0 is copied
9-12	B	Length of this record = 720	The value of Level 1.0 is copied
13-14	CH	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
15-16	CH	Continuation flag ('Cb' if information is continued on the next text record, else 'bb' for no continuation) = 'bb'	The value of Level 1.0 is copied
17-28	CH	Format control document ID for this data file format (the ID of this document) = 'CEOS-SAR-CCT'	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 2 / 12 )

Bytes	Format	Description	Contents
29-30	CH	Format control document revision level = 'bA'	The value of Level 1.0 is copied
31-32	CH	File design descriptor revision letter = 'bA'	The value of Level 1.0 is copied
33-44	CH	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
45-48	I4	File number = 'bbb1'	The value of Level 1.0 is copied

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SARLeaderFileDescriptorRecord ( 3 / 12 )

Bytes	Format	Description	Contents
<b>49-64</b>	<b>CH</b>	Referenced file name (16 characters indicating nature of the data, i.e. header, annotation, SAR product type, etc.) = 'MMNbSSSTFFFFbbbb' MM : Mission ID (ALOS='AL') (*2) N : Mission number (ALOS='1') (*2) SSS : Sensor ID (PALSAR='PSR') (*2) T : Processing Level Code (*1) FFFF : File Type Code (*2) SAR Leader File = 'SARL'	(*1) 'B' : Level 1.1 'C' : Level 1.5  (*2)The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 4 / 12 )

Bytes	Format	Description	Contents
<b>65-68</b>	<b>CH</b>	Record sequence and location type flag = 'FSEQ'	The value of Level 1.0 is copied
<b>69-76</b>	<b>I8</b>	Sequence number location = 'bbbbbb1'	The value of Level 1.0 is copied
<b>77-80</b>	<b>I4</b>	Sequence number field length = 'bbb4'	The value of Level 1.0 is copied
<b>81-84</b>	<b>CH</b>	Record code and location type flag = 'FTYP'	The value of Level 1.0 is copied
<b>85-92</b>	<b>I8</b>	Record code location = 'bbbbbb5'	The value of Level 1.0 is copied
<b>93-96</b>	<b>I4</b>	Record code field length = 'bbb4'	The value of Level 1.0 is copied
<b>97-100</b>	<b>CH</b>	Record length and location type flag = 'FLGT'	The value of Level 1.0 is copied
<b>101-108</b>	<b>I8</b>	Record length location = 'bbbbbb9'	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 5 / 12 )

Bytes	Format	Description	Contents
<b>109-112</b>	<b>I4</b>	Record length field length = 'bbb4'	The value of Level 1.0 is copied
<b>113-180</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied



SARLeaderFileDescriptorRecord ( 6 / 12 )

Bytes	Format	Description	Contents
<b>181-186</b>	<b>I6</b>	Number of data set summary records = 'bbbbb1'	The value of Level 1.0 is copied
<b>187-192</b>	<b>I6</b>	Data set summary record length = 'bb4096'	The value of Level 1.0 is copied
<b>193-198</b>	<b>I6</b>	Number of map projection data records Level 1.1 = 'bbbbb0' Level 1.5 = 'bbbbb1'	
<b>199-204</b>	<b>I6</b>	Map projection record length Level 1.1 = 'bbbbb0' Level 1.5 = 'bb1620'	
<b>205-210</b>	<b>I6</b>	Number of platform pos. data records = 'bbbbb1'	The value of Level 1.0 is copied
<b>211-216</b>	<b>I6</b>	Platform position record length = 'bb4680'	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 7 / 12 )

Bytes	Format	Description	Contents
217-222	I6	Number of attitude data records = 'bbbb1'	The value of Level 1.0 is copied
223-228	I6	Attitude data record length = 8192	The value of Level 1.0 is copied
229-234	I6	Number of radiometric data records Level 1.1, 1.5 = 'bbbb1'	
235-240	I6	Radiometric record length Level 1.1, 1.5 = 'bb9860'	
241-246	I6	Number of radiometric compensation records = 'bbbb0'	The value of Level 1.0 is copied
247-252	I6	Radiometric compensation rec. length = 'bbbb0'	The value of Level 1.0 is copied
253-258	I6	Number of data quality summary records Level 1.1, 1.5 = 'bbbb1'	

SARLeaderFileDescriptorRecord ( 8 / 12 )

Bytes	Format	Description	Contents
<b>259-264</b>	<b>I6</b>	Data quality summary record length Level 1.1, 1.5 = 'bb1620'	
<b>265-270</b>	<b>I6</b>	Number of data histograms records = 'bbbb0'	The value of Level 1.0 is copied
<b>271-276</b>	<b>I6</b>	Data histogram record length = 'bbbb0'	The value of Level 1.0 is copied
<b>277-282</b>	<b>I6</b>	Number of range spectra records = 'bbbb0'	The value of Level 1.0 is copied
<b>283-288</b>	<b>I6</b>	Range spectra record length = 'bbbb0'	The value of Level 1.0 is copied
<b>289-294</b>	<b>I6</b>	Number of DEM descriptor records = 'bbbb0'	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 9 / 12 )

Bytes	Format	Description	Contents
<b>295-300</b>	<b>I6</b>	DEM descriptor record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>301-306</b>	<b>I6</b>	Number of Radar par. update records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>307-312</b>	<b>I6</b>	Radar par. update record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>313-318</b>	<b>I6</b>	Number of Annotation data records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>319-324</b>	<b>I6</b>	Annotation data record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>325-330</b>	<b>I6</b>	Number of Det. processing records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>331-336</b>	<b>I6</b>	Det. processing record length = 'bbbbbb0'	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 10 / 12 )

Bytes	Format	Description	Contents
<b>337-342</b>	<b>I6</b>	Number of Calibration records Level 1.1, 1.5 = 'bbbbbb0'	
<b>343-348</b>	<b>I6</b>	Calibration record length Level 1.1, 1.5 = 'bbbbbb0'	
<b>349-354</b>	<b>I6</b>	Number of GCP records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>355-360</b>	<b>I6</b>	GCP record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>361-420</b>	<b>10I6</b>	blanks	The value of Level 1.0 is copied

SARLeaderFileDescriptorRecord ( 11 / 12 )

Bytes	Format	Description	Contents
421-426	I6	Number of facility data(1) records = 'bbbb1'	The value of Level 1.0 is copied
427-434	I8	Facility data(1) record length = 'b1540000'	The value of Level 1.0 is copied
435-440	I6	Number of facility data(2) records = 'bbbb1'	The value of Level 1.0 is copied
441-448	I8	Facility data(2) record length = 'b4314000'	The value of Level 1.0 is copied
449-454	I6	Number of facility data(3) records = 'bbbb1'	The value of Level 1.0 is copied
455-462	I8	Facility data(3) record length = 'bb345000'	The value of Level 1.0 is copied
463-468	I6	Number of facility data(4) records = 'bbbb1'	The value of Level 1.0 is copied
469-476	I8	Facility data(4) record length = 'bb325000'	The value of Level 1.0 is copied
477-482	I6	Number of facility data(5) records = 'bbbb1'	The value of Level 1.0 is copied
483-490	I8	Facility data(5) record length = 'bb325000'	The value of Level 1.0 is copied
491-496	I6	Number of facility data(6) records = 'bbbb1'	The value of Level 1.0 is copied
497-504	I8	Facility data(6) record length = 'bbbb3072'	The value of Level 1.0 is copied

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SARLeaderFileDescriptorRecord ( 12 / 12 )

Bytes	Format	Description	Contents
<b>505-510</b>	<b>I6</b>	Number of facility data(7) records = 'bbbb1'	The value of Level 1.0 is copied
<b>511-518</b>	<b>I8</b>	Facility data(7) record length = 'bb511000'	The value of Level 1.0 is copied
<b>519-524</b>	<b>I6</b>	Number of facility data(8) records = 'bbbb1'	The value of Level 1.0 is copied
<b>525-532</b>	<b>I8</b>	Facility data(8) record length = 'b4370000'	The value of Level 1.0 is copied
<b>533-538</b>	<b>I6</b>	Number of facility data(9) records = 'bbbb1'	The value of Level 1.0 is copied
<b>539-546</b>	<b>I8</b>	Facility data(9) record length = 'bb728000'	The value of Level 1.0 is copied
<b>547-552</b>	<b>I6</b>	Number of facility data(10) records = 'bbbb1'	The value of Level 1.0 is copied
<b>553-560</b>	<b>I8</b>	Facility data(10) record length = 'bbb15000'	The value of Level 1.0 is copied
<b>561-566</b>	<b>I6</b>	Number of facility data(11) records = 'bbbb1'	
<b>567-574</b>	<b>I8</b>	Facility data(11) record length = 'bbbb5000'	
<b>575-720</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 1 / 21 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 2	The value of Level 1.0 is copied
<b>5</b>	<b>B</b>	1st record sub-type code = 18	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 10	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 4096	The value of Level 1.0 is copied
<b>13-16</b>	<b>I4</b>	Data set Summary Record sequence number (starts at 1) = 'bbb1'	The value of Level 1.0 is copied
<b>17-20</b>	<b>I4</b>	SAR channel indicator Always blank filled	The value of Level 1.0 is copied



DataSetSummaryRecord ( 2 / 21 )

Bytes	Format	Description	Contents
21-52	CH	Scene identifier = 'AABBBCDDDDDEEEEEbbbbbbbbbbbbbbbb' where : AA = Satellite ID ('AL') BBB = Sensor ID ('PSR') C = Sensor Sub-ID DDDDD = Orbit accumulation number of a scene center EEEE = Scene frame number of a scene center	The value of Level 1.0 is copied
53-68	CH	Scene designator (Always blank filled)	The value of Level 1.0 is copied
69-100	CH	Input scene center time = 'YYYYMMDDHHMMSSTTTbbbbbbbbbbbbbb' where : 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)	In Level 1.1, the value of Level 1.0 is copied
101-116	CH	spare (Always blank filled)	The value of Level 1.0 is copied
117-132	F16.7	Processed scene center geodetic latitude defined as positive to the north of the equator and negative to the south (deg.) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied
133-148	F16.7	Processed scene center geodetic longitude defined as positive to the east of the prime meridian and negative to the west. (deg.) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied

DataSetSummaryRecord ( 3 / 21 )

Bytes	Format	Description	Contents
149-164	F16.7	Processed Scene Center true heading as calculated relative to true North (deg.) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied
165-180	CH	Ellipsoid designator = 'GRS80bbbbbbbbbbb'	The value of Level 1.0 is copied
181-196	F16.7	Ellipsoid semi-major axis (km) -(R) = 6378.1370000	The value of Level 1.0 is copied
197-212	F16.7	Ellipsoid semi-minor axis (km) = 6356.7523141	The value of Level 1.0 is copied
213-228	F16.7	Earth's mass -(M) ( $10^{24}$ kg) = 5.9740000	The value of Level 1.0 is copied
229-244	F16.7	Gravitational constant -(G) ( $10^{14}$ m <sup>3</sup> /s <sup>2</sup> kg)= 3.9860050	The value of Level 1.0 is copied
245-260	F16.7	Ellipsoid J2 parameter ( $10^{-2}$ ) = 0.1082629	The value of Level 1.0 is copied
261-276	F16.7	Ellipsoid J3 parameter ( $10^{-1}$ )= -0.0000254	The value of Level 1.0 is copied
277-292	F16.7	Ellipsoid J4 parameter ( $10^{-1}$ ) = -0.0000162	The value of Level 1.0 is copied
293-308	CH	spare (Always blank filled)	The value of Level 1.0 is copied

DataSetSummaryRecord ( 4 / 21 )

Bytes	Format	Description	Contents
309-324	F16.7	Average terrain height above Ellipsoid at scene center (km) (Always blank filled)	The value of Level 1.0 is copied
325-332	I8	Scene center line number (the line no. at the scene center including zero fill)	N/2 (N: number of lines)
333-340	I8	Scene center pixel number (the pixel number at the scene center including zero fill)	M/2 (M: number of pixels)
341-356	F16.7	Processed scene length (km) including zero fill (Always blank filled)	The value of Level 1.0 is copied
357-372	F16.7	Processed scene width (km) including zero fill (Always blank filled)	The value of Level 1.0 is copied
373-388	CH	spare (Always blank filled)	The value of Level 1.0 is copied
389-392	I4	Number of SAR channels 1: In case of High Resolution Mode(Single-Polarization), Direct Down link Mode and Wide Observation Mode 2: In case of High Resolution Mode(Dual-Polarization) 4: In case of Polarimetry Mode	The value of Level 1.0 is copied
393-396	CH	spare (Always blank filled)	The value of Level 1.0 is copied
397-412	CH	Sensor platform mission identifier ALOS : 'ALOSbbbbbbbbbbbb'	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 5 / 21 )

Bytes	Format	Description	Contents
<b>413-444</b>	<b>CH</b>	Sensor ID: and mode of operation for this channel = 'AAAAAA-BB-CCDE-bbbbbbbbbbbbbbb' where AAAAAA = Mission name (ALOS : 'ALOSbb') BB = SAR band (ALOS : 'Lb') CC = Code for resolution mode ('Hb', 'Lb') (Except Wide Observation Mode = 'Hb', Wide Observation Mode = 'Lb') DE : Code for imaging mode D : PALSAR mode (Stand-by 4 = '3', Calibration mode = '4', Standby for observation='5', Observation mode = '6') Extracted from Auxiliary data of first PALSAR frame E : PALSAR Sub-mode In case of D = PALSAR mode is '4'or '5' Noise3 = '0', Monitor of Tx Power = '1', Monitor of Tx wave = '2', REV of Rx = '3', Special characteristic for total Rx = '4', REV of Tx = '5', Special characteristic for total Tx = '6', IN/OUT for Rx = '7', Special characteristic for ATT of Rx = '8', Special characteristic for frequency of Rx = '9', Noise1 = '10',Noise2 = '11' In case of D = PALSAR mode is '6' High resolution mode = '0',Wide observation = '1', Polarimetry mode = '2', Direct downlink mode = '3' Extracted from Auxiliary data of first PALSAR frame	The value of Level 1.0 is copied
<b>445-452</b>	<b>I8</b>	Orbit number or flight line indicator	The value of Level 1.0 is copied
<b>453-460</b>	<b>F8.3</b>	Sensor Platform geodetic Latitude at nadir corresponding to Scene Center (degrees) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied
<b>461-468</b>	<b>F8.3</b>	Sensor Platform geodetic Longitude at nadir corresponding to Scene Center (degrees) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied

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DataSetSummaryRecord ( 6 / 21 )

Bytes	Format	Description	Contents
469-476	F8.3	Sensor Platform Heading at nadir corresponding to Scene Center (degrees) (Level 1.5)	In Level 1.1, the value of Level 1.0 is copied
477-484	F8.3	Sensor clock angle as measured relative to sensor platform flight direction (degrees) (i.e.: -90:0=left pointing, and +90:0=right pointing) = always 'bb90.000'	The value of Level 1.0 is copied
485-492	F8.3	Incidence angle at scene center as derived from sensor platform orientation, electronic boresight and Earth's geometry (Level1.1, Level1.5 Geo-reference)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
493-500	CH	spare (Always blank filled)	The value of Level 1.0 is copied
501-516	F16.7	Radar wavelength (meters) = Nominal value	The value of Level 1.0 is copied
517-518	CH	Motion compensation indicator = Always '00' 00 : no compensation 01 : on board compensation 10 : in processor compensation 11 : both on board and in processor	The value of Level 1.0 is copied
519-534	CH	Range pulse code specifier = 'LINEARbFMbCHIRPb' (e.g.: 'LINEARbFMbCHIRPb', 'PHASEbMODULATORb', etc.)	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 7 / 21 )

Bytes	Format	Description	Contents
<b>535-550</b>	<b>E16.7</b>	Range pulse amplitude coefficient #1 = Nominal value (Chirp range chirp constant term (offset from DC) (Hz))	The value of Level 1.0 is copied
<b>551-566</b>	<b>E16.7</b>	Range pulse amplitude coefficient #2 = Nominal value (Chirp = range chirp linear term (Hz/sec))	The value of Level 1.0 is copied
<b>567-582</b>	<b>E16.7</b>	Range pulse amplitude coefficient #3 = Nominal value (quadratic term)	The value of Level 1.0 is copied
<b>583-598</b>	<b>E16.7</b>	Range pulse amplitude coefficient #4 = Nominal value (cubic term)	The value of Level 1.0 is copied
<b>599-614</b>	<b>E16.7</b>	Range pulse amplitude coefficient #5 = Nominal value (fourth term)	The value of Level 1.0 is copied

DataSetSummaryRecord ( 8 / 21 )

Bytes	Format	Description	Contents
<b>615-630</b>	<b>E16.7</b>	Range pulse phase coefficient #1 (offset in radians) (Always blank filled)	The value of Level 1.0 is copied
<b>631-646</b>	<b>E16.7</b>	Range pulse phase coefficient #2 (linear term in rads./sec) (Always blank filled)	The value of Level 1.0 is copied
<b>647-662</b>	<b>E16.7</b>	Range pulse phase coefficient #3 (quadratic term in rads./sec') (Always blank filled)	The value of Level 1.0 is copied
<b>663-678</b>	<b>E16.7</b>	Range pulse phase coefficient #4 (cubic term) (Always blank filled)	The value of Level 1.0 is copied
<b>679-694</b>	<b>E16.7</b>	Range pulse phase coefficient #5 (quadratic term) (Always blank filled)	The value of Level 1.0 is copied
<b>695-702</b>	<b>I8</b>	Down linked data chirp extraction index (in samples) = 'bbbbbbb1' linear-down chirp = 'bbbbbbb1' linear-up chirp = 'bbbbbbb0'	
<b>703-710</b>	<b>CH</b>	spare (Always blank filled)	The value of Level 1.0 is copied
<b>711-726</b>	<b>F16.7</b>	Sampling rate (MHz) Extracted from Auxiliary data of first PALSAR frame.	The value of Level 1.0 is copied
<b>727-742</b>	<b>F16.7</b>	Range gate at early edge (in time) at the start of the image (micro-sec) Extracted from Auxiliary data of first PALSAR frame.	The value of Level 1.0 is copied
<b>743-758</b>	<b>F16.7</b>	Range pulse length (micro-sec) Extracted from Auxiliary data of first PALSAR frame.	The value of Level 1.0 is copied
<b>759-762</b>	<b>CH</b>	Base band conversion flag (YESb/NOTb) (YES = base band converted)	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 9 / 21 )

Bytes	Format	Description	Contents
<b>763-766</b>	<b>CH</b>	Range compressed flag (YESb/NOTb) (YES = range compressed) Level 1.1, 1.5 = 'YESb'	
<b>767-782</b>	<b>F16.7</b>	Receiver gain for like polarized at early edge at the start of the image (dB) = Nominal value	The value of Level 1.0 is copied
<b>783-798</b>	<b>F16.7</b>	Receiver gain for cross polarized at early edge at the start of the image (dB) = Nominal value	The value of Level 1.0 is copied
<b>799-806</b>	<b>I8</b>	Quantization in bits per channel = 'bbbbbbb3', 'bbbbbbb5'	The value of Level 1.0 is copied
<b>807-818</b>	<b>CH</b>	Quantizer descriptor (e.g.: 'UNIFORMbI,Qb') = 'UNIFORMbI,Qb'	The value of Level 1.0 is copied
<b>819-834</b>	<b>F16.7</b>	DC Bias for I-component = Nominal value	The value of Level 1.0 is copied
<b>835-850</b>	<b>F16.7</b>	DC Bias for Q-component = Nominal value	The value of Level 1.0 is copied
<b>851-866</b>	<b>F16.7</b>	Gain imbalance for I & Q = Nominal value	The value of Level 1.0 is copied
<b>867-898</b>	<b>2F16.7</b>	spare (Always blank filled)	The value of Level 1.0 is copied



DataSetSummaryRecord ( 10 / 21 )

Bytes	Format	Description	Contents
<b>899-914</b>	<b>F16.7</b>	Antenna electronic boresight relative to platform vertical axis at the start of the image (degrees)	The value of Level 1.0 is copied
<b>915-930</b>	<b>F16.7</b>	Antenna mechanical boresight relative to platform vertical axis at the start of the image, positive to the right, negative to the left (degrees)	The value of Level 1.0 is copied
<b>931-934</b>	<b>CH</b>	Echo tracker-on/off designator ('Onbb', or 'OFFb')	The value of Level 1.0 is copied
<b>935-950</b>	<b>F16.7</b>	Nominal PRF (mHz) Inverse of PRT extracted from Auxiliary data of first PALSAR frame.	The value of Level 1.0 is copied
<b>951-966</b>	<b>F16.7</b>	Effective two-way antenna elevation 3dB beam width at boresight (degrees) (Nominal value)	The value of Level 1.0 is copied
<b>967-982</b>	<b>F16.7</b>	Effective two-way antenna azimuth 3dB beam width at electronic boresight (degrees) (Nominal value)	The value of Level 1.0 is copied
<b>983-998</b>	<b>I16</b>	Satellite encoded binary time code	The value of Level 1.0 is copied
<b>999-1030</b>	<b>CH</b>	Satellite clock time	The value of Level 1.0 is copied
<b>1031-1046</b>	<b>I16</b>	Satellite clock increment (nsec)	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 11 / 21 )

Bytes	Format	Description	Contents
1047-1062	CH	Processing facility identifier = 'EOC-ALOS-DPSbbbb'	The value of Level 1.0 is copied
1063-1070	CH	Processing system identifier = 'ALOS-DPS'	The value of Level 1.0 is copied
1071-1078	CH	Processing version identifier Note: This is the same as software release and revision level	The value of Level 1.0 is copied
1079-1094	CH	Processing facility process code = 'bbbbbbbbbbbbbbbb'	The value of Level 1.0 is copied
1095-1110	CH	Product level code Level 1.1 = '1.1bbbbbbbbbbbbbb' Level 1.5 = '1.5bbbbbbbbbbbbbb'	
1111-1142	CH	Product type specifier Level 1.1 = 'BASICbIMAGEbbbbbbbbbbbbbbbbbb' Level 1.5 = 'STANDARDbGEOCODEDbIMAGEbbbbbbbbbb'	
1143-1174	CH	Processing algorithm identifier = 'bbbbbbbbbbbbbbbb'	The value of Level 1.0 is copied

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DataSetSummaryRecord ( 12 / 21 )

Bytes	Format	Description	Contents
1175-1190	F16.7	Nominal effective number of looks processed in Azimuth Level 1.1 = 1.0 Level 1.5, High resolution mode (Single-Polarization), Pixel spacing 6.25 meters = 2.0 Pixel spacing 12.5 meters = 4.0 (Dual-Polarization), Pixel spacing 12.5 meters = 4.0 Direct Down link Mode, Pixel spacing 12.5 meters = 4.0 Wide Observation Mode, Pixel spacing 100 meters = 8.0 Polarimetry Mode, Pixel spacing 12.5 meters = 4.0	For level 1.5, the pixel spacing measured not on the reference ellipsoid but on map coordinates. applied.
1191-1206	F16.7	Nominal effective number of looks processed in Range = 1.0	
1207-1222	F16.7	Bandwidth per look in Azimuth (Hz) $B_A$ Same value as 1239-1254 bytes	
1223-1238	F16.7	Bandwidth per look in Range (Hz)	
1239-1254	F16.7	Total processor bandwidth in Azimuth (Hz) Wide Observation Mode : blank	
1255-1270	F16.7	Total processor bandwidth in Range (kHz)	

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DataSetSummaryRecord ( 13 / 21 )

Bytes	Format	Description	Contents
1271-1302	CH	Weighing function designator in Azimuth = 1 (*1)	(*1) 1:RECTANGLE
1303-1334	CH	Weighing function designator in Range = 1 (*1)	
1335-1350	CH	Data input source (e.g.: HDDT identifier) Online = 'ONLINEbbbbbbbbbb'	The value of Level 1.0 is copied
1351-1366	F16.7	Nominal resolution equal to 3dB points in ground range (meter)	In Level 1.1, the value of Level 1.0 is copied
1367-1382	F16.7	Nominal resolution in Azimuth (meter)	In Level 1.1, the value of Level 1.0 is copied
1383-1398	F16.7	Constant radiometric parameter (Bias) = Always blank filled	The value of Level 1.0 is copied
1399-1414	F16.7	Linear radiometric parameter (Gain) = Always blank filled	The value of Level 1.0 is copied
1415-1430	F16.7	Along track Doppler frequency constant term at early edge of image (Hz)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
1431-1446	F16.7	Along track Doppler frequency linear term at early edge of the image (Hz/pixel)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied

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DataSetSummaryRecord ( 14 / 21 )

Bytes	Format	Description	Contents
1447-1462	F16.7	Along track Doppler frequency quadratic term at early edge of the image (Hz/pixel/pixel)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
1463-1478	CH	spare (Always blank filled)	The value of Level 1.0 is copied
1479-1494	F16.7	Cross track Doppler frequency constant term at early edge of the image (Hz)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
1495-1510	F16.7	Cross track Doppler frequency linear term at early edge of the image (Hz/pixel)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
1511-1526	F16.7	Cross track Doppler frequency quadratic term at early edge of the image (Hz/pixel/pixel) = 0.0	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
1527-1534	CH	Time direction indicator along pixel direction = Always blank filled (i.e. 'INCREASE' -ing or 'DECREASE'-ing)	The value of Level 1.0 is copied
1535-1542	CH	Time direction indicator along line direction Ascending node = 'ASCENDbb' Descending node = 'DESCENDb'	The value of Level 1.0 is copied
1543-1558	F16.7	Along track Doppler frequency rate constant term at early edge of the image (Hz/sec)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied

DataSetSummaryRecord ( 15 / 21 )

Bytes	Format	Description	Contents
<b>1559-1574</b>	<b>F16.7</b>	Along track Doppler frequency rate 1 linear term at early edge of the image (Hz/sec/pixel)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1575-1590</b>	<b>F16.7</b>	Along track Doppler frequency rate quadratic term at early edge of the image (Hz/sec/pixel/pixel) = 0.0	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1591-1606</b>	<b>CH</b>	spare (Always blank filled)	The value of Level 1.0 is copied
<b>1607-1622</b>	<b>F16.7</b>	Cross track Doppler frequency rate constant term at near edge of the image (Hz/sec)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1623-1638</b>	<b>F16.7</b>	Cross track Doppler frequency rate linear term relative to near edge of the image (Hz/sec/pixel)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1639-1654</b>	<b>F16.7</b>	Cross track Doppler frequency rate quadratic term relative to near edge of the image (Hz/sec/pixel/pixel) = 0.0	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1655-1670</b>	<b>CH</b>	spare (Always blank filled)	The value of Level 1.0 is copied

DataSetSummaryRecord ( 16 / 21 )

Bytes	Format	Description	Contents
1671-1678	CH	Line content indicator (e.g.: 'RANGEbbb', 'AZIMUTHb' or 'OTHERbbb') Level 1.1 = 'RANGEbbb' Level 1.5 = 'OTHERbbb'	<p>For level 1.5, the line/pixel spacing measured not on the reference ellipsoid but on map coordinates applied.</p>
1679-1682	CH	Clutter lock applied flag ('YESb' / 'NOTb') Level 1.1, Level 1.5 = 'YESb'	
1683-1686	CH	Auto-focusing applied flag ('YESb' / 'NOTb') Level 1.1, Level 1.5 = 'NOTb'	
1687-1702	F16.7	Line spacing (meter) Level 1.5 = 6.25 / 12.5 / 100.0 Level 1.1 = Calculated azimuth spacing	
1703-1718	F16.7	Pixel spacing (meter) Level 1.5 = 6.25 / 12.5 / 100.0 Level 1.1 = Calculated range spacing	
1719-1734	CH	Processor range compression designator ('SYNTHETICbCHIRPb' or 'EXTRACTEDbCHIRPb') Level 1.1, Level 1.5 = 'EXTRACTEDbCHIRPb'	

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DataSetSummaryRecord ( 17 / 21 )

Bytes	Format	Description	Contents
<b>1735-1750</b>	<b>F16.7</b>	Doppler center frequency constant term (a)	
<b>1751-1766</b>	<b>F16.7</b>	Doppler center frequency linear term (b)  $f_d = a + b R$ where $f_d$ : Doppler center frequency (Hz) $R$ : Slant range ( <u>km</u> )	

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DataSetSummaryRecord ( 18 / 21 )

Bytes	Format	Description	Contents
		SENSOR SPECIFIC LOCAL USE SEGMENT	
<b>1767-1770</b>	<b>I4</b>	Calibration data indicator no calibration data = 'bbb0' including calibration data at the edge of upper image = 'bbb1' including calibration data at the edge of lower image = 'bbb2' including calibration data at the edges of upper and lower image = 'bbb3'	The value of Level 1.0 is copied Set at the facility related (11) data record
<b>1771-1778</b>	<b>I8</b>	Start line number of calibration at upper image In case of no calibration data, always = bbbbbb0'	
<b>1779-1786</b>	<b>I8</b>	Stop line number of calibration at upper image In case of no calibration data, always = bbbbbb0'	
<b>1787-1794</b>	<b>I8</b>	Start line number of calibration at bottom image In case of no calibration data, always = bbbbbb0'	
<b>1795-1802</b>	<b>I8</b>	Stop line number of calibration at bottom image In case of no calibration data, always = bbbbbb0'	

DataSetSummaryRecord ( 19 / 21 )

Bytes	Format	Description	Contents
<b>1803-1806</b>	<b>I4</b>	PRF switching indicator a fixed PRF = 'bbb0' variable PRFs except Wide observation mode = 'bbb1' Wide observation mode = 'bbb1'	The value of Level 1.0 is copied Set at the facility related (11) data record
<b>1807-1814</b>	<b>I8</b>	Line locator of PRF switching a fixed PRF = 'bbbbbbb1' Wide observation mode = 'bbbbbbb0'	
<b>1815-1830</b>	<b>F16.7</b>	The direction of a beam center in a scene center (degree)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1831-1834</b>	<b>I4</b>	Yew Steering mode flag No yew Steering mode = 'bbb1' Yew Steering mode = 'bbb0'	The value of Level 1.0 is copied
<b>1835-1838</b>	<b>I4</b>	Parameter table number of automatically setting = 'bbb0' - 'b191'	The value of Level 1.0 is copied
<b>1839-1854</b>	<b>F16.7</b>	Nominal offnadir angle	The value of Level 1.0 is copied
<b>1855-1858</b>	<b>I4</b>	Antenna beam number = 'bbb0' - 'bb22'	The value of Level 1.0 is copied
<b>1859-1886</b>	<b>CH</b>	spare (Always blank filled)	The value of Level 1.0 is copied

DataSetSummaryRecord ( 20 / 21 )

Bytes	Format	Description	Contents
<b>1887-1906</b>	<b>E20.13</b>	Incidence angle constant term (a0)	In Level 1.5 and Geo-coded, the value of Level 1.0 is copied
<b>1907-1926</b>	<b>E20.13</b>	Incidence angle linear term (a1)	
<b>1927-1946</b>	<b>E20.13</b>	Incidence angle quadratic term (a2)	
<b>1947-1966</b>	<b>E20.13</b>	Incidence angle cubic term (a3)	
<b>1967-1986</b>	<b>E20.13</b>	Incidence angle fourth term (a4)	
<b>1987-2006</b>	<b>E20.13</b>	Incidence angle fifth term (a5)	
		$\theta = a_0 + a_1 R + a_2 R^2 + a_3 R^3 + a_4 R^4 + a_5 R^5$ <p>where theta : Incidence angle (rad)  R : Slant range (<u>km</u>)</p>	

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DataSetSummaryRecord ( 21 / 21 )

Bytes	Format	Description	Contents
		IMAGE ANNOTATION FIELDS	
2007-2014	I8	Number of Annotation Points (up to 64) = 'bbbbbb0'	The value of Level 1.0 is copied
2015-2022	CH	spare (Always blank filled)	The value of Level 1.0 is copied
2023-2030	I8	Line Number of 1st Annotation start = Always blank filled	The value of Level 1.0 is copied
2031-2038	I8	Pixel Number of 1st Annotation start = Always blank filled	The value of Level 1.0 is copied
2039-2054	CH	1st Annotation Text (e.g.: lat., long. as 'Nnn.nn, W-nnn.nnb') = Always blank filled	The value of Level 1.0 is copied
2055-4070	(I8*2, CH)*63	2nd - 64th Annotation = Always blank filled	The value of Level 1.0 is copied
4071-4072	CH	spare (Always blank filled)	The value of Level 1.0 is copied
4073-4096	CH	system reserve	

MapProjectionDataRecord ( 1 / 12 )

Bytes	Format	Description	Contents
1-4	B	Record sequence number = 3	Only level 1.5 products have this record.
5	B	1st record sub-type code = 18	
6	B	Record type code = 20	
7	B	2nd record sub-type code = 18	
8	B	3rd record sub-type code = 20	
9-12	B	Length of this record = 1620	
13-28	CH	blanks	

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MapProjectionDataRecord ( 2 / 12 )

Bytes	Format	Description	Contents		
<p><b>29-60</b></p>	<p><b>CH</b></p>	<p>MAP PROJECTION GENERAL INFORMATION</p>			
		<p><b>61-76</b></p>		<p><b>I16</b></p>	<p>Map projection descriptor (e.g.: slant range, ground range, geocoded) = 'GEOCODEDb - bb'</p>
		<p><b>77-92</b></p>		<p><b>I16</b></p>	<p>Number of pixels per line of image</p>
		<p>Number of lines</p>			

MapProjectionDataRecord ( 3 / 12 )

Bytes	Format	Description	Contents
<b>93-108</b>	<b>F16.7</b>	Nominal inter- <u>line</u> distance in output scene (meters) = 6.25 / 12.5 / 100.0	} The inter-line/pixel distances measured not on the reference ellipsoid but on map coordinates applied.
<b>109-124</b>	<b>F16.7</b>	Nominal inter- <u>pixel</u> distance in output scene (meters) = 6.25 / 12.5 / 100.0	
<b>125-140</b>	<b>F16.7</b>	Orientation at output scene centre, for geocoded products this is simply the convergence of the meridians, i.e.: the angle between geographic north and map grid north (degrees) (Angle of projection axis from true North)	
<b>141-156</b>	<b>F16.7</b>	Actual platform orbital inclination (degrees) = 0.0000000	
<b>157-172</b>	<b>F16.7</b>	Actual ascending node (longitude at equator) (degrees) = 0.0000000	
<b>173-188</b>	<b>F16.7</b>	Distance of platform at input scene centre from the geocentre (meters)	
<b>189-204</b>	<b>F16.7</b>	Geodetic altitude of the platform relative to the ellipsoid (meters)	
<b>205-220</b>	<b>F16.7</b>	Actual ground speed at nadir at input scene centre time (meters/sec)	
<b>221-236</b>	<b>F16.7</b>	Platform heading (degrees): effective subplatform track direction angle relative to true north, including the effects of orbital inclination and skew due to earth rotation	

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MapProjectionDataRecord ( 4 / 12 )

Bytes	Format	Description	Contents
		PROJECTION ELLIPSOID PARAMETERS	
237-268	CH	Name of reference ellipsoid = 'GRS80b - bb'	
269-284	F16.7	Semimajor axis of ref. ellipsoid (meters) = 6378137.0000000	
285-300	F16.7	Semiminor axis of ref. ellipsoid (meters) = 6356752.3141000	
301-316	F16.7	Datum shift parameter referenced to Greenwich: dx (meters) = 0.0000000	
317-332	F16.7	Datum shift parameter perpendicular to Greenwich: dy (meters) = 0.0000000	
333-348	F16.7	Datum shift parameter direction of the rotation: dz (meters) = 0.0000000	
349-364	F16.7	Additional datum shift parameter 1st rotation angle = 0.0000000	
365-380	F16.7	Additional datum shift parameter 2nd rotation angle = 0.0000000	
381-396	F16.7	Additional datum shift parameter 3rd rotation angle = 0.0000000	
397-412	F16.7	Scale factor of reference ellipsoid = 0.0000000	



MapProjectionDataRecord ( 5 / 12 )

Bytes	Format	Description	Contents
413-444	CH	<p>MAP PROJECTION DESIGNATOR</p> <p>Alphanumeric description of Map projection                      'UTM-PROJECTION' or 'UPS-PROJECTION',                      'MER-PROJECTION', 'LCC-PROJECTION'</p>	

MapProjectionDataRecord ( 6 / 12 )

Bytes	Format	Description	Contents
		UTM-PROJECTION (1st default)	blanks except UTM
<b>445-476</b>	<b>CH</b>	UTM descriptor = 'UNIVERSAL TRANSVERSE MERCATORb - b'	
<b>477-480</b>	<b>CH</b>	Signature of the UTM zone	
<b>481-496</b>	<b>F16.5</b>	Map origin (false easting) (meters) = 500000.00000	
<b>497-512</b>	<b>F16.5</b>	Map origin (false northing) (meters) Northern Hemisphere = 0.00000 Southern Hemisphere = 10000000.00000	
<b>513-528</b>	<b>F16.7</b>	Centre of projection longitude (deg)	
<b>529-544</b>	<b>F16.7</b>	Centre of projection latitude (deg)	
<b>545-560</b>	<b>CH</b>	1st standard parallel (deg) = blanks	
<b>561-576</b>	<b>CH</b>	2nd standard parallel (deg) = blanks	
<b>577-592</b>	<b>F16.7</b>	Scale factor = 0.9996000	

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MapProjectionDataRecord ( 7 / 12 )

Bytes	Format	Description	Contents
		UPS-PROJECTION (2nd default)	
<b>593-624</b>	<b>CH</b>	UPS descriptor = 'UNIVERSAL POLAR STEREOGRAPHICb - b'	
<b>625-640</b>	<b>F16.7</b>	Centre of projection longitude (deg)	
<b>641-656</b>	<b>F16.7</b>	Centre of projection latitude (deg)	
<b>657-672</b>	<b>F16.7</b>	Scale factor	blanks except UPS

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MapProjectionDataRecord ( 8 / 12 )

Bytes	Format	Description	Contents
<b>673-704</b>	<b>CH</b>	NATIONAL SYSTEMS PROJECTION (any other) Projection descriptor MER-PROJECTION = 'MERCATORb - b' LCC-PROJECTION = 'LAMBERT-CONFORMAL CONICb - b'	Set up map origin (latitude, longitude)  blanks except MER, LCC
<b>705-720</b>	<b>F16.7</b>	Map origin (false easting) (meters) = blanks	
<b>721-736</b>	<b>F16.7</b>	Map origin (false northing) (meters) = blanks	
<b>737-752</b>	<b>F16.7</b>	Centre of projection longitude (deg)	
<b>753-768</b>	<b>F16.7</b>	Centre of projection latitude (deg)	
<b>769-784</b>	<b>F16.7</b>	Standard parallels (deg) MER-PROJECTION = blanks LCC-PROJECTION = Standard parallels fai-1	
<b>785-800</b>	<b>F16.7</b>	Standard parallels (deg) MER-PROJECTION = blanks LCC-PROJECTION = Standard parallels fai-2	

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MapProjectionDataRecord ( 9 / 12 )

Bytes	Format	Description	Contents
<b>801-816</b>	<b>F16.7</b>	Standard parallels (deg) = blanks	
<b>817-832</b>	<b>F16.7</b>	Standard parallels (deg) = blanks	
<b>833-848</b>	<b>F16.7</b>	Central meridian (deg) = blanks	
<b>849-864</b>	<b>F16.7</b>	Central meridian (deg) = blanks	
<b>865-880</b>	<b>F16.7</b>	Central meridian (deg) = blanks	
<b>881-944</b>	<b>CH</b>	blanks	

MapProjectionDataRecord ( 10 / 12 )

Bytes	Format	Description	Contents
		COORDINATES OF FOUR CORNER POINTS	
<b>945-960</b>	<b>F16.7</b>	Top left corner northing (*) (kilometers)	* set the X coordinate value
<b>961-976</b>	<b>F16.7</b>	Top left corner easting (*) (kilometers)	* set the Y coordinate value
<b>977-992</b>	<b>F16.7</b>	Top right corner northing (*) (kilometers)	* set the X coordinate value
<b>993-1008</b>	<b>F16.7</b>	Top right corner easting (*) (kilometers)	* set the Y coordinate value
<b>1009-1024</b>	<b>F16.7</b>	Bottom right corner northing (*) (kilometers)	* set the X coordinate value
<b>1025-1040</b>	<b>F16.7</b>	Bottom right corner easting (*) (kilometers)	* set the Y coordinate value
<b>1041-1056</b>	<b>F16.7</b>	Bottom left corner northing (*) (kilometers)	* set the X coordinate value
<b>1057-1072</b>	<b>F16.7</b>	Bottom left corner easting (*) (kilometers)	* set the Y coordinate value
<b>1073-1088</b>	<b>F16.7</b>	Top left corner latitude (**) (deg)	** latitude at the central point of the pixel at the top left corner
<b>1089-1104</b>	<b>F16.7</b>	Top left corner longitude (**) (deg)	** longitude at the central point of the pixel at the top left corner
<b>1105-1120</b>	<b>F16.7</b>	Top right corner latitude (**) (deg)	** latitude at the central point of the pixel at the top right corner

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MapProjectionDataRecord ( 11 / 12 )

Bytes	Format	Description	Contents
1121-1136	F16.7	Top right corner longitude (**) (deg)	** longitude at the central point of the pixel at the top right corner
1137-1152	F16.7	Bottom right corner latitude (**) (deg)	** latitude at the central point of the pixel at the bottom right corner
1153-1168	F16.7	Bottom right corner longitude (**) (deg)	** longitude at the central point of the pixel at the bottom right corner
1169-1184	F16.7	Bottom left corner latitude (**) (deg)	** latitude at the central point of the pixel at the bottom left corner
1185-1200	F16.7	Bottom left corner longitude (**) (deg)	** longitude at the central point of the pixel at the bottom left corner
1201-1216	CH	Top left corner terrain height relative to ellipsoid (meters) = blanks	
1217-1232	CH	Top right corner terrain height (meters) = blanks	
1233-1248	CH	Bottom right corner terrain height = blanks	
1249-1264	CH	Bottom left corner terrain height = blanks	

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MapProjectionDataRecord ( 12 / 12 )

Bytes	Format	Description	Contents
1265-1424	8E20.10	<p>Eight coefficients (A11, A12, ..., A24) to convert a line (L) and pixel (P) position to the map projection frame of reference, say (E, N) where:</p> $E = A11 + A12*L + A13*P + A14*L*P$ $N = A21 + A22*L + A23*P + A24*L*P$ <p>(The order of storing: A11, A12, A13, ..., A24)</p> <p>(Using the coefficients of 1025-2024 bytes in Facility Related DataRecord 11 are recommended.)</p>	<p>For the expressions referred in the left, the position defined as (P, L)=(1, 1). corresponds to the central point of the pixel at the upper left corner and (E, N) show a longitude (deg.) and a latitude (deg.).</p>
1425-1584	8E20.10	<p>Eight coefficients (B11, B12, ..., B24) to convert from the map projection (E, N) to line (L) and pixel (P) position in the image, say (L, P) where:</p> $L = B11 + B12*E + B13*N + B14*E*N$ $P = B21 + B22*E + B23*N + B24*E*N$ <p>(The order of storing: B11, B12, B13, ..., B24)</p> <p>(Using the coefficients of 2065-3064 bytes in Facility Related Data Record 11 are recommended.)</p>	
1585-1620	CH	blanks	

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PlatformPositionDataRecord ( 1 / 4 )

Bytes	Format	Description	Contents
1-4	B	Record sequence number Level 1.1 = 3 Level 1.5 = 4	
5	B	1st record sub-type code = 18	The value of Level 1.0 is copied
6	B	Record type code = 30	The value of Level 1.0 is copied
7	B	2nd record sub-type code = 18	The value of Level 1.0 is copied
8	B	3rd record sub-type code = 20	The value of Level 1.0 is copied
9-12	B	Length of this record = 4680	The value of Level 1.0 is copied
13-44	CH	Orbital elements designator ALOS Orbit Information(Preliminary) : '0bbbbbbbbbbbbbbbbbbbbbbbbbbbbbb' ALOS Orbit Information(Decision) : '1bbbbbbbbbbbbbbbbbbbbbbbbbbbbbb' ALOS High Precision Orbit Information : '2bbbbbbbbbbbbbbbbbbbbbbbbbbbbbb'	The value of Level 1.0 is copied

PlatformPositionDataRecord ( 2 / 4 )

Bytes	Format	Description	Contents
<b>45-60</b>	<b>F16.7</b>	1st orbital element (x) (m)	
<b>61-76</b>	<b>F16.7</b>	2nd orbital element (y) (m)	
<b>77-92</b>	<b>F16.7</b>	3rd orbital element (z) (m)	
<b>93-108</b>	<b>F16.7</b>	4th orbital element (x') (m/sec)	
<b>109-124</b>	<b>F16.7</b>	5th orbital element (y') (m/sec)	
<b>125-140</b>	<b>F16.7</b>	6th orbital element (z') (m/sec)	
<b>141-144</b>	<b>I4</b>	Number of data points ALOS Orbit Information(Preliminary) : 'bb28' ALOS Orbit Information(Decision) : 'bb28' ALOS High Precision Orbit Information : 'bb28'	The value of Level 1.0 is copied
<b>145-148</b>	<b>I4</b>	Year of data point. = 'YYYY'	The value of Level 1.0 is copied
<b>149-152</b>	<b>I4</b>	Month of data point. = 'bbMM'	The value of Level 1.0 is copied
<b>153-156</b>	<b>I4</b>	Day of data point. = 'bbDD'	The value of Level 1.0 is copied

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**PlatformPositionDataRecord ( 3 / 4 )**

Bytes	Format	Description	Contents
<b>157-160</b>	<b>I4</b>	Day in the year (UT) ( Ex: 2nd February ='bb33')	The value of Level 1.0 is copied
<b>161-182</b>	<b>E22.15</b>	Seconds of day (UT) of data (Ex: 0: 51: 30.23 = 3090.23)	The value of Level 1.0 is copied
<b>183-204</b>	<b>E22.15</b>	Time interval between DATA points (sec) = 60	The value of Level 1.0 is copied
<b>205-268</b>	<b>CH</b>	Reference co-ordinate system(ECI,ECR) = 'ECRbb - bb'	The value of Level 1.0 is copied
<b>269-290</b>	<b>E22.15</b>	Greenwich mean hour angle = always blank filled	The value of Level 1.0 is copied
<b>291-306</b>	<b>F16.7</b>	Along track position error (meter) = Nominal value	The value of Level 1.0 is copied
<b>307-322</b>	<b>F16.7</b>	Across track position error (meter) = Nominal value	The value of Level 1.0 is copied
<b>323-338</b>	<b>F16.7</b>	Radial position error (m/sec) = Nominal value	The value of Level 1.0 is copied
<b>339-354</b>	<b>F16.7</b>	Along track velocity error (m/sec) = Nominal value	The value of Level 1.0 is copied
<b>355-370</b>	<b>F16.7</b>	Across track velocity error (m/sec) = Nominal value	The value of Level 1.0 is copied
<b>371-386</b>	<b>F16.7</b>	Radial velocity error (m/sec) = Nominal value	The value of Level 1.0 is copied

**PlatformPositionDataRecord ( 4 / 4 )**

Bytes	Format	Description	Contents
		<b>FIRST POSITIONAL DATA POINT</b>	
<b>387-452</b>	<b>3E22.15</b>	1st data point position vector as (X, Y, Z) co-ordinates for spaceborne sensor platform in a reference system (x, y, z) (meters)	The value of Level 1.0 is copied
<b>453-518</b>	<b>3E22.15</b>	1st data point velocity vector (X', Y', Z') in a reference system (x', y', z') (meter/sec)	The value of Level 1.0 is copied
<b>519-4082</b>	<b>28*6*E22.15</b>	2nd, 3rd, ... data point position & velocity vectors (repetition of fields 29-34 as specified by the number of points in fields 141-144)	The value of Level 1.0 is copied
<b>4083-4100</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied
<b>4101-4101</b>	<b>I1</b>	Occurrence flag of a leap second No leap second = '0' Occurrence of a leap second = '1'	The value of Level 1.0 is copied
<b>4102-4680</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied

AttitudeDataRecord ( 1 / 3 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number Level 1.1 = 4 Level 1.5 = 5	
<b>5</b>	<b>B</b>	1st record sub-type code = 18	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 40	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 8192	The value of Level 1.0 is copied
<b>13-16</b>	<b>I4</b>	Number of attitude data points = 'bb22', 'bb62'	The value of Level 1.0 is copied

AttitudeDataRecord ( 2 / 3 )

Bytes	Format	Description	Contents
<b>17-20</b>	<b>I4</b>	Day of the year	The value of Level 1.0 is copied
<b>21-28</b>	<b>I8</b>	Millisecond of day ('bbbbbbb0' - '86399999')	The value of Level 1.0 is copied
<b>29-32</b>	<b>I4</b>	Pitch data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>33-36</b>	<b>I4</b>	Roll data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>37-40</b>	<b>I4</b>	Yaw data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>41-54</b>	<b>E14.6</b>	Pitch (degrees)	The value of Level 1.0 is copied
<b>55-68</b>	<b>E14.6</b>	Roll (degrees)	The value of Level 1.0 is copied
<b>69-82</b>	<b>E14.6</b>	Yaw (degrees)	The value of Level 1.0 is copied

AttitudeDataRecord ( 3 / 3 )

Bytes	Format	Description	Contents
<b>83-86</b>	<b>I4</b>	Pitch rate data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>87-90</b>	<b>I4</b>	Roll rate data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>91-94</b>	<b>I4</b>	Yaw rate data quality flag Good : 'bbb0' NG : 'bbb1'	The value of Level 1.0 is copied
<b>95-108</b>	<b>E14.6</b>	Pitch rate (degrees/sec)	The value of Level 1.0 is copied
<b>109-122</b>	<b>E14.6</b>	Roll rate (degrees/sec)	The value of Level 1.0 is copied
<b>123-136</b>	<b>E14.6</b>	Yaw rate (degrees/sec)	The value of Level 1.0 is copied
<b>137- 2658 or 7458</b>	<b>I4/I8/E14.6</b>	2nd, 3rd, ... attitude data points (repetition of byets 17-136 as specified in bytes 13-16)	The value of Level 1.0 is copied
<b>2659 or 7459 -8192</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied

**RadiometricDataRecord ( 1 / 3 )**

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number Level 1.1 = 5 Level 1.5 = 6	
<b>5</b>	<b>B</b>	1st record sub-type code = 18	
<b>6</b>	<b>B</b>	Record type code = 50	
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	
<b>9-12</b>	<b>B</b>	Length of this record = 9860	
<b>13-16</b>	<b>I4</b>	Radiometric Data Record sequence number ( starts at 1 ) = 'bbb1'	
<b>17-20</b>	<b>I4</b>	Number of Radiometric Data Record fields = 'bbb1'	
		Radiometric Data Set	
<b>21-36</b>	<b>F16.7</b>	Calibration factor (CF) Level 1.1 : $s^0 = 10 * \log_{10}\langle I^2+Q^2 \rangle + CF - \underline{32.0}$ Level 1.5 : $s^0 = 10*\log_{10}\langle DN^2 \rangle + CF$ This means that the sigma-naught of the pixel can be obtained by the ensemble averaging (<>) of the pixel values, in reality, the spatial averaging of the pixel values around the target. Here, I, Q, and DN in <> of the above formulas are the pixel values in levels 1.1, and 1.5, respectively.	

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RadiometricDataRecord ( 2 / 3 )

Bytes	Format	Description	Contents
37-52	F16.7	Transmission and reception distortion matrices applied for polarimetric data (level 1.1, *) Real part of transmission distortion matrix (DT)(1,1)	
53-68	F16.7	Imaginary part of DT (1,1)	
69-84	F16.7	Real part of DT (1,2)	
85-100	F16.7	Imaginary part of DT (1,2)	
101-116	F16.7	Real part of DT (2, 1)	
117-132	F16.7	Imaginary part of DT(2, 1)	
133-148	F16.7	Real part of DT (2, 2)	
149-164	F16.7	Imaginary part of DT (2, 2)	
165-180	F16.7	Real part of reception distortion matrix (DR)(1,1)	
181-196	F16.7	Imaginary part of DR (1,1)	
197-212	F16.7	Real part of DR (1,2)	

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RadiometricDataRecord ( 3 / 3 )

Bytes	Format	Description	Contents
213-228	F16.7	Imaginary part of DR (1,2)	
229-244	F16.7	Real part of DR (2, 1)	
245-260	F16.7	Imaginary part of DR (2, 1)	
261-276	F16.7	Real part of DR(2, 2)	
277-292	F16.7	Imaginary part of DR (2, 2)	
293-9860	CH	Reserve (blanks)	

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(\*) Notes:

The measured scattering matrix can be expressed by

$$\begin{pmatrix} Z_{hh} & Z_{hv} \\ Z_{vh} & Z_{vv} \end{pmatrix} = A \frac{1}{r} e^{\frac{-j^4 \pi r}{\lambda}} \begin{pmatrix} 1 & \delta_3 \\ \delta_4 & f_2 \end{pmatrix} \begin{pmatrix} S_{hh} & S_{hv} \\ S_{vh} & S_{vv} \end{pmatrix} \begin{pmatrix} 1 & \delta_1 \\ \delta_2 & f_1 \end{pmatrix} + \begin{pmatrix} N_{hh} & N_{hv} \\ N_{vh} & N_{vv} \end{pmatrix} \quad (1)$$

where  $Z_{ij}$  is the measurement matrix of the target,  $j$  is the transmission polarization,  $i$  is the reception polarization,  $A$  is the amplitude,  $r$  is the slant range,  $S_{ij}$  is the true scattering matrix of the target,  $f_1$  is the channel imbalance of the transmission distortion matrix,  $f_2$  is that for the reception matrix,  $\delta_1$  and  $\delta_2$  are the cross talks of transmission, and  $\delta_3$  and  $\delta_4$  are the those for the reception,  $N_{ij}$  are the noise component. Here,  $N_{ij}$  is assumed to be zero. It should be noted that polarization notation of the pduct is different from the above, i.e., IMG-HV-ALPSR..., means the data acquitred at H transmission and V reception.

Complex transmission distortion matrix (1,  $\delta_1$ ,  $\delta_2$ ,  $f_1$ ) are stored from 37 to 164 bytes, and reception distortion matrix (1,  $\delta_3$ ,  $\delta_4$ , and  $f_2$ ) are stored from 165 to 292 bytes.

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DataQualitySummaryRecord ( 1 / 5 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number Level 1.1 = 6 Level 1.5 = 7	
<b>5</b>	<b>B</b>	1st record sub-type code = 18	
<b>6</b>	<b>B</b>	Record type code = 60	
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	
<b>9-12</b>	<b>B</b>	Length of this record = 1620	
<b>13-16</b>	<b>I4</b>	Data summary quality record sequence number (starts at 1) = 'bbb1'	
<b>17-20</b>	<b>CH</b>	SAR channel indicator	
<b>21-26</b>	<b>CH</b>	Date of the last calibration update = 'YYMMDD' where 'YY' : last two digits of year 'MM' : month of the year 'DD' : day of the month	
<b>27-30</b>	<b>I4</b>	Number of channels (up to 16)	

DataQualitySummaryRecord ( 2 / 5 )

Bytes	Format	Description	Contents
		ABSOLUTE RADIOMETRIC DATA QUALITY	
<b>31-46</b>	<b>F16.7</b>	Nominal Integrated Side Lobe Ratio (ISLR) (dB)	
<b>47-62</b>	<b>F16.7</b>	Nominal Peak Side Lobe to main lobe Ratio (PSLR) (dB)	
<b>63-78</b>	<b>F16.7</b>	Nominal azimuth ambiguity (AAR)	
<b>79-94</b>	<b>F16.7</b>	Nominal range ambiguity (RAR)	
<b>95-110</b>	<b>F16.7</b>	Estimate of SNR (from range spectra) <u>(dB)</u>	
<b>111-126</b>	<b>F16.7</b>	Actual Bit Error Rate (BER)	
<b>127-142</b>	<b>F16.7</b>	Nominal slant range resolution (meters)	
<b>143-158</b>	<b>F16.7</b>	Nominal azimuth resolution (meters)	
<b>159-174</b>	<b>F16.7</b>	Nominal radiometric resolution (dB)	
<b>175-190</b>	<b>F16.7</b>	Instantaneous dynamic range (dB)	

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DataQualitySummaryRecord ( 3 / 5 )

Bytes	Format	Description	Contents
<b>191-206</b>	<b>F16.7</b>	Nominal absolute radiometric calibration magnitude of uncertainty of SAR channel indicated in bytes 17-20 (dB)	
<b>207-222</b>	<b>F16.7</b>	Nominal absolute radiometric calibration magnitude uncertainty of SAR channel indicated in bytes 17-20 (deg)	
		RELATIVE RADIOMETRIC DATA QUALITY	
<b>223-238</b>	<b>F16.7</b>	Nominal relative radiometric calibration magnitude uncertainty of SAR channel (bytes 17-20) versus first of the other channels on a multi-channel volume (dB)	
<b>239-254</b>	<b>F16.7</b>	Nominal relative radiometric calibration phase uncertainty of SAR channel (bytes 17-20) versus first of the other channels on a multi-channel volume (deg)	
<b>255-734</b>	<b>15*2F16.7</b>	Repetition of bytes 223 - 254 for the remaining channels (up to 16 channels)	

DataQualitySummaryRecord ( 4 / 5 )

Bytes	Format	Description	Contents
		ABSOLUTE GEOMETRIC DATA QUALITY	
<b>735-750</b>	<b>F16.7</b>	Nominal absolute location error along track (meters)	
<b>751-766</b>	<b>F16.7</b>	Nominal absolute location error cross track (meters)	
<b>767-782</b>	<b>F16.7</b>	Nominal geometric distortion scale in line direction	
<b>783-798</b>	<b>F16.7</b>	Nominal geometric distortion scale in pixel direction	
<b>799-814</b>	<b>F16.7</b>	Nominal geometric distortion skew	
<b>815-830</b>	<b>F16.7</b>	Scene orientation error	

DataQualitySummaryRecord ( 5 / 5 )

Bytes	Format	Description	Contents
		RELATIVE GEOMETRIC DATA QUALITY	
<b>831-846</b>	<b>F16.7</b>	Along track relative misregistration error of SAR channel (bytes 17-20) versus first of the other channels (meters)	
<b>847-862</b>	<b>F16.7</b>	Cross track relative misregistration error of SAR channel (bytes 17-20) versus first of the other channels (meters)	
<b>863-1102</b>	<b>15*2F16.7</b>	Repetition of bytes 831 - 862 for the other channels (up to 16 channels)	
<b>1103-1620</b>	<b>CH</b>	blanks	

FacilityRelatedDataRecord1-10 ( 1 / 3 )

Bytes	Format	Description	Contents
1-4	B	<p>Record sequence number</p> <p>Level 1.1 :</p> <ul style="list-style-type: none"> <li>TT&amp;C system telemetry data = 7</li> <li>Attitude determination 3 and GPSR raw data = 8</li> <li>PALSAR mission telemetry data = 9</li> <li>ALOS Orbit Information(Preliminary)(ECR) = 10</li> <li>ALOS Orbit Information(Decision)(ECR) = 11</li> <li>Time difference information = 12</li> <li>ALOS High Precision Orbit Information = 13</li> <li>High Precision Attitude Information = 14</li> <li>Coordinates Conversion Information = 15</li> <li>Workorder &amp; Workreport for level 1.0 processing = 16</li> </ul> <p>Level 1.5 :</p> <ul style="list-style-type: none"> <li>TT&amp;C system telemetry data = 8</li> <li>Attitude determination 3 and GPSR raw data = 9</li> <li>PALSAR mission telemetry data = 10</li> <li>ALOS Orbit Information(Preliminary)(ECR) = 11</li> <li>ALOS Orbit Information(Decision)(ECR) = 12</li> <li>Time difference information = 13</li> <li>ALOS High Precision Orbit Information = 14</li> <li>High Precision Attitude Information = 15</li> <li>Coordinates Conversion Information = 16</li> <li>Workorder &amp; Workreport for level 1.0 processing = 17</li> </ul>	



FacilityRelatedDataRecord1-10 ( 2 / 3 )

Bytes	Format	Description	Contents
5	B	1st record sub-type code = 18	The value of Level 1.0 is copied
6	B	Record type code = 200	The value of Level 1.0 is copied
7	B	2nd record sub-type code = 18	The value of Level 1.0 is copied
8	B	3rd record sub-type code = 106) <sub>8</sub> CEOS = 10, CCRS = 36, ESA = 50, NASA = 60, JPL = 61, <u>JAXA</u> = 70, DFVLR = 80, RAE = 90, TELESPAZIO = 100, UNSPECIFIED = 18 etc.	The value of Level 1.0 is copied
9-12	B	Length of this record 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	The value of Level 1.0 is copied

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FacilityRelatedDataRecord1-10 ( 3 / 3 )

Bytes	Format	Description	Contents
13-16	I4	Facility Related Data Record sequence number = 'bbb1' - 'bb10'	The value of Level 1.0 is copied
17-66	CH	Always blank filled	The value of Level 1.0 is copied
67-	---	set the original data used for processing level 1.0 TT&C system telemetry data Attitude determination 3 and GPSR raw data PALSAR mission telemetry data ALOS Orbit Information(Preliminary)(ECR) ALOS Orbit Information(Decision)(ECR) Time difference information ALOS High Precision Orbit Information High Precision Attitude Information Coordinates Conversion Information Workorder & Workreport for level 1.0 processing	The value of Level 1.0 is copied

FacilityRelatedDataRecord11 ( 1 / 6 )

Bytes	Format	Description	Contents
1-4	B	Record sequence number Level 1.1 = 17 Level 1.5 = 18	
5	B	1st record sub-type code = 18	
6	B	Record type code = 200	
7	B	2nd record sub-type code = 18	
8	B	3rd record sub-type code = 70 CEOS = 10, CCRS = 36, ESA = 50, NASA = 60, JPL = 61, JAXA = 70, DFVLR = 80, RAE = 90, TELESPAZIO = 100, UNSPECIFIED = 18 etc.	
9-12	B	Length of this record = <u>5000</u>	
13-16	I4	Facility Related Data Record sequence number = 'bb11'	

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FacilityRelatedDataRecord11 ( 2 / 6 )

Bytes	Format	Description	Contents
17-416	20E20.10	<p>twenty coefficients (<math>a_0, a_1, \dots, a_9</math> &amp; <math>b_0, b_1, \dots, b_9</math>) to convert from the map projection (E, N) to line (L) and pixel (P) position in the image, say (P, L) where:</p> $P = a_0 + a_1 * N + a_2 * E + a_3 * N * E + a_4 * N^2 + a_5 * E^2 + a_6 * N^2 * E + a_7 * N * E^2 + a_8 * N^3 + a_9 * E^3$ $L = b_0 + b_1 * N + b_2 * E + b_3 * N * E + b_4 * N^2 + b_5 * E^2 + b_6 * N^2 * E + b_7 * N * E^2 + b_8 * N^3 + b_9 * E^3$ <p>(The order of storing: <math>a_0, a_1, \dots, a_9</math> &amp; <math>b_0, b_1, \dots, b_9</math>)                      (Using the coefficients of 2065-3064 bytes are recommended.)                      Level 1.1 = blank filled</p>	<p>For the expressions referred in the left, the position defined as (P, L)=(1, 1). corresponds to the central point of the pixel at the upper left corner and (E, N) show a longitude (deg.) and a latitude (deg.).</p>

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FacilityRelatedDataRecord11 ( 3 / 6 )

Bytes	Format	Description	Contents
417-420	I4	Calibration data indicator no calibration data = 'bbb0' including calibration data at the edge of upper image = 'bbb1' including calibration data at the edge of lower image = 'bbb2' including calibration data at the edges of upper and lower image = 'bbb3'	
421-428	I8	Start line number of calibration at upper image In case of no calibration data, always = bbbbbb0'	
429-436	I8	Stop line number of calibration at upper image In case of no calibration data, always = bbbbbb0'	
437-444	I8	Start line number of calibration at bottom image In case of no calibration data, always = bbbbbb0'	
445-452	I8	Stop line number of calibration at bottom image In case of no calibration data, always = bbbbbb0'	

FacilityRelatedDataRecord11 ( 4 / 6 )

Bytes	Format	Description	Contents
453-456	I4	PRF switching indicator a fixed PRF = 'bbb0' variable PRFs except Wide observation mode = 'bbb1' Wide observation mode = 'bbb1'	
457-464	I8	Line locator of PRF switching a fixed PRF = 'bbbbbbb1' Wide observation mode = 'bbbbbbb0'	
465-472	I8	SIGMA- SAR processing start line number	
473-480	I8	Number of loss lines (Level 1.0)	
481-488	I8	Number of loss lines (range for processing in Level 1.1, Level 1.5)	
489-800	CH	Always blank filled	
801-1024	CH	system reserve	

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FacilityRelatedDataRecord11 ( 5 / 6 )

Bytes	Format	Description	Contents
1025-2024	50E20.10	<p>Coefficients of the 8th polynomial expression to convert from pixel (P) and line (L) to latitude (<math>\phi</math>) and longitude (<math>\lambda</math>), say (<math>\phi</math>, <math>\lambda</math>) where:</p> $\begin{aligned} \phi = & a_0L^4P^4 + a_1L^3P^4 + a_2L^2P^4 + a_3LP^4 + a_4P^4 \\ & + a_5L^4P^3 + a_6L^3P^3 + a_7L^2P^3 + a_8LP^3 + a_9P^3 \\ & + a_{10}L^4P^2 + a_{11}L^3P^2 + a_{12}L^2P^2 + a_{13}LP^2 + a_{14}P^2 \\ & + a_{15}L^4P + a_{16}L^3P + a_{17}L^2P + a_{18}LP + a_{19}P \\ & + a_{20}L^4 + a_{21}L^3 + a_{22}L^2 + a_{23}L + a_{24} \end{aligned}$ $\begin{aligned} \lambda = & b_0L^4P^4 + b_1L^3P^4 + b_2L^2P^4 + b_3LP^4 + b_4P^4 \\ & + b_5L^4P^3 + b_6L^3P^3 + b_7L^2P^3 + b_8LP^3 + b_9P^3 \\ & + b_{10}L^4P^2 + b_{11}L^3P^2 + b_{12}L^2P^2 + b_{13}LP^2 + b_{14}P^2 \\ & + b_{15}L^4P + b_{16}L^3P + b_{17}L^2P + b_{18}LP + b_{19}P \\ & + b_{20}L^4 + b_{21}L^3 + b_{22}L^2 + b_{23}L + b_{24} \end{aligned}$ <p>(The order of storing: <math>a_0, a_1, a_2, \dots, a_{24}</math> &amp; <math>b_0, b_1, b_2, \dots, b_{24}</math>)</p>	<p>(P, L) referred in the left are substituted by the following expressions as</p> $P = p - P_0,$ $L = l - L_0,$ <p>where (p, l) is an arbitrary coordinate address on the image. 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 (<math>\phi</math>, <math>\lambda</math>) is measured in "degrees".</p>
2025-2044	E20.10	Origin Pixel (Po)	
2045-2064	E20.10	Origin Line (Lo)	

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FacilityRelatedDataRecord11 ( 6 / 6 )

Bytes	Format	Description	Contents
<b>2065-3064</b>	<b>50E20.10</b>	<p>Coefficients of the 8th polynomial expression to convert from latitude (<math>\Phi</math>) and longitude (<math>\Lambda</math>) to pixel (p) and line (l), say (p, l) where:</p> $p = c_0\Lambda^4\Phi^4 + c_1\Lambda^3\Phi^4 + c_2\Lambda^2\Phi^4 + c_3\Lambda\Phi^4 + c_4\Phi^4$ $+ c_5\Lambda^4\Phi^3 + c_6\Lambda^3\Phi^3 + c_7\Lambda^2\Phi^3 + c_8\Lambda\Phi^3 + c_9\Phi^3$ $+ c_{10}\Lambda^4\Phi^2 + c_{11}\Lambda^3\Phi^2 + c_{12}\Lambda^2\Phi^2 + c_{13}\Lambda\Phi^2 + c_{14}\Phi^2$ $+ c_{15}\Lambda^4\Phi + c_{16}\Lambda^3\Phi + c_{17}\Lambda^2\Phi + c_{18}\Lambda\Phi + c_{19}\Phi$ $+ c_{20}\Lambda^4 + c_{21}\Lambda^3 + c_{22}\Lambda^2 + c_{23}\Lambda + c_{24}$ $l = d_0\Lambda^4\Phi^4 + d_1\Lambda^3\Phi^4 + d_2\Lambda^2\Phi^4 + d_3\Lambda\Phi^4 + d_4\Phi^4$ $+ d_5\Lambda^4\Phi^3 + d_6\Lambda^3\Phi^3 + d_7\Lambda^2\Phi^3 + d_8\Lambda\Phi^3 + d_9\Phi^3$ $+ d_{10}\Lambda^4\Phi^2 + d_{11}\Lambda^3\Phi^2 + d_{12}\Lambda^2\Phi^2 + d_{13}\Lambda\Phi^2 + d_{14}\Phi^2$ $+ d_{15}\Lambda^4\Phi + d_{16}\Lambda^3\Phi + d_{17}\Lambda^2\Phi + d_{18}\Lambda\Phi + d_{19}\Phi$ $+ d_{20}\Lambda^4 + d_{21}\Lambda^3 + d_{22}\Lambda^2 + d_{23}\Lambda + d_{24}$ <p>(The order of storing: <math>c_0, c_1, c_2, \dots, c_{24}</math> &amp; <math>d_0, d_1, d_2, \dots, d_{24}</math>)</p>	<p>(<math>\Phi, \Lambda</math>) referred in the left are substituted by the following expressions as</p> <p><math>\Phi = \phi - \Phi_0</math> (degrees),</p> <p><math>\Lambda = \lambda - \Lambda_0</math> (degrees),</p> <p>where (<math>\phi, \lambda</math>) is an arbitrary position on the image.</p> <p>For the expressions, the position defined as (<math>p, l</math>)=(0, 0) corresponds to the central point of the pixel at the upper left corner.</p>
<b>3065-3084</b>	<b>E20.10</b>	Origin Latitude ( $\Phi_0$ ) (degrees)	
<b>3085-3104</b>	<b>E20.10</b>	Origin Longitude ( $\Lambda_0$ ) (degrees)	
<b>3105-5000</b>	<b>CH</b>	blanks	

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**ImageFileDescriptorRecord ( 1 / 14 )**

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 1	The value of Level 1.0 is copied
<b>5</b>	<b>B</b>	1st record sub-type code = 50	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 192	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 18	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 720	The value of Level 1.0 is copied
<b>13-14</b>	<b>CH</b>	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
<b>15-16</b>	<b>CH</b>	Always blank filled	The value of Level 1.0 is copied
<b>17-28</b>	<b>CH</b>	Superstructure format control document ID. (the ID of the CCB document) = 'CEOS-SAR-CCT'	The value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 2 / 14 )**

Bytes	Format	Description	Contents
<b>29-30</b>	<b>CH</b>	Format control document revision level = 'bA'	The value of Level 1.0 is copied
<b>31-32</b>	<b>CH</b>	File design descriptor revision letter = 'bA'	The value of Level 1.0 is copied
<b>33-44</b>	<b>CH</b>	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
<b>45-48</b>	<b>I4</b>	File number = 'bbb1'	The value of Level 1.0 is copied

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**ImageFileDescriptorRecord ( 3 / 14 )**

Bytes	Format	Description	Contents
<p align="center"><b>49-64</b></p>	<p align="center"><b>CH</b></p>	<p>Referenced file name (16 characters indicating nature of the data, i.e. header, annotation, SAR product type, etc.) = 'MMNbSSSTFFFFbbbb'</p> <p>MM : Mission ID (ALOS='AL') (*2)</p> <p>N : Mission number (ALOS='1') (*2)</p> <p>SSS : Sensor ID (PALSAR='PSR') (*2)</p> <p>T : Processing Level Code (*1)</p> <p>FFFF : File Type Code (*2)</p> <p>SAR Data File = 'IMOP'</p>	<p>(*1)</p> <p>'B' : Level 1.1</p> <p>'C' : Level 1.5</p> <p>(*2)The value of Level 1.0 is copied</p>

**ImageFileDescriptorRecord ( 4 / 14 )**

Bytes	Format	Description	Contents
<b>65-68</b>	<b>CH</b>	Record sequence and location type flag = 'FSEQ'	The value of Level 1.0 is copied
<b>69-76</b>	<b>I8</b>	Record sequence and location type flag = 'bbbbbb1'	The value of Level 1.0 is copied
<b>77-80</b>	<b>I4</b>	Sequence number location = 'bbb4'	The value of Level 1.0 is copied
<b>81-84</b>	<b>CH</b>	Record code and location type flag = 'FTYP'	The value of Level 1.0 is copied
<b>85-92</b>	<b>I8</b>	Record code location = 'bbbbbb5'	The value of Level 1.0 is copied
<b>93-96</b>	<b>I4</b>	Record code field length = 'bbb4'	The value of Level 1.0 is copied
<b>97-100</b>	<b>CH</b>	Record length and location type flag = 'FLGT'	The value of Level 1.0 is copied
<b>101-108</b>	<b>I8</b>	Record length location = 'bbbbbb9'	The value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 5 / 14 )**

Bytes	Format	Description	Contents
<b>109-112</b>	<b>I4</b>	Record length field length = 'bbb4'	The value of Level 1.0 is copied
<b>113-180</b>	<b>CH</b>	Reserved = Always blank filled	The value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 6 / 14 )**

Bytes	Format	Description	Contents
<b>181-186</b>	<b>I6</b>	Number of SAR DATA records	
<b>187-192</b>	<b>I6</b>	SAR DATA record length (bytes)	
<b>193-216</b>	<b>CH</b>	Reserved = Always blank filled	The value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 7 / 14 )**

Bytes	Format	Description	Contents
<b>217-220</b>	<b>I4</b>	<b>SAMPLE GROUP DATA</b>  Number of bits per sample Level 1.1 = 'bb32' Level 1.5 = 'bb16'	
<b>221-224</b>	<b>I4</b>	Number of samples per data group (or pixel) Level 1.1 = 'bbb2' Level 1.5 = 'bbb1'	
<b>225-228</b>	<b>I4</b>	Number of bytes per data group (or pixel) Level 1.1 = 'bbb8' Level 1.5 = 'bbb2'	
<b>229-232</b>	<b>CH</b>	Justification and order of samples within data group (or pixel) = Always blank filled	The value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 8 / 14 )**

Bytes	Format	Description	Contents
		SAR RELATED DATA IN THE RECORD	
<b>233-236</b>	<b>I4</b>	Number of SAR channels in this tile = 'bbb1'	The value of Level 1.0 is copied
<b>237-244</b>	<b>I8</b>	Number of lines per data set (one channel) in this file (excluding border lines)	
<b>245-248</b>	<b>I4</b>	Number of left border pixels per line = 'bbb0'	
<b>249-256</b>	<b>I8</b>	Total number of data groups (or pixels) per line per SAR channel For level 1.1 products, each data record corresponds to 1 image range line. Each range line begins at the <u>nearest</u> -range pixel and ends at the <u>farthest</u> -range pixel.	
<b>257-260</b>	<b>I4</b>	Number of right border pixels per line = 'bbb0'	

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**ImageFileDescriptorRecord ( 9 / 14 )**

Bytes	Format	Description	Contents
<b>261-264</b>	<b>I4</b>	Number of top border lines = 'bbb0'	The value of Level 1.0 is copied
<b>265-268</b>	<b>I4</b>	Number of bottom border lines = 'bbb0'	The value of Level 1.0 is copied
<b>269-272</b>	<b>CH</b>	Interleaving indicator = 'BSQb'	The value of Level 1.0 is copied
		RECORD DATA IN THE FILE	
<b>273-274</b>	<b>I2</b>	Number of physical records per line = 'b1'	

**ImageFileDescriptorRecord ( 10 / 14 )**

Bytes	Format	Description	Contents
<b>275-276</b>	<b>I2</b>	Number of physical records per multi-channel line in this file = 'b1'	
<b>277-280</b>	<b>I4</b>	Number of bytes of prefix data per record Level 1.1 = 'b412' Level 1.5 = 'b192'	In Level 1.1, the value of Level 1.0 is copied

**ImageFileDescriptorRecord ( 11 / 14 )**

Bytes	Format	Description	Contents
<b>281-288</b>	<b>I8</b>	Number of bytes of SAR data (or pixel data) data per record For level 1.1 products, each data record corresponds to 1 image range line. Each range line begins at the <u>nearest</u> -range pixel and ends at the <u>farthest</u> -range pixel.	
<b>289-292</b>	<b>I4</b>	Number of bytes of suffix data per record = 'bbb0'	The value of Level 1.0 is copied
<b>293-296</b>	<b>CH</b>	Prefix/suffix repeat flag = 'bbbb'	The value of Level 1.0 is copied

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**ImageFileDescriptorRecord ( 12 / 14 )**

Bytes	Format	Description	Contents								
		<b>PREFIX/SUFFIX DATA LOCATORS</b>									
<b>297-304</b>	<b>CH</b>	Sample data line number locator = 'bb13b4PB'	The value of Level 1.0 is copied  The contents of locator : <table border="1"> <tr> <td>1-4</td> <td>Start byte number of the field with PREFIX/SUFFIX</td> </tr> <tr> <td>5-6</td> <td>Length in bytes</td> </tr> <tr> <td>7</td> <td>PREFIX/SUFFIX</td> </tr> <tr> <td>8</td> <td>Type of data format</td> </tr> </table> PREFIX/SUFFIX 'P' : PREFIX 'S' : SUFFIX Type of data format : 'A' : ASCII 'B' : Binary 'N' : Numeric	1-4	Start byte number of the field with PREFIX/SUFFIX	5-6	Length in bytes	7	PREFIX/SUFFIX	8	Type of data format
1-4	Start byte number of the field with PREFIX/SUFFIX										
5-6	Length in bytes										
7	PREFIX/SUFFIX										
8	Type of data format										
<b>305-312</b>	<b>CH</b>	SAR channel number locator = 'bb49b2PB'									
<b>313-320</b>	<b>CH</b>	Time of SAR data line locator = 'bb45b4PB'									
<b>321-328</b>	<b>CH</b>	Left-fill count locator = 'bb21b4PB'									
<b>329-336</b>	<b>CH</b>	Right-fill count locator = 'bb29b4PB'									
<b>337-340</b>	<b>CH</b>	Pad pixels present indicator 'YESb' or 'NObb' = 'bbbb'									
<b>341-368</b>	<b>CH</b>	Always blank filled									
<b>369-376</b>	<b>CH</b>	SAR data line quality code locator = 'bb97b4PB'									
<b>377-384</b>	<b>CH</b>	Calibration information field locator = 'bbbbbbbb'	The value of Level 1.0 is copied								
<b>385-392</b>	<b>CH</b>	Gain values field locator = 'bbbbbbbb'	The value of Level 1.0 is copied								
<b>393-400</b>	<b>CH</b>	Bias values filed locator = 'bbbbbbbb'	The value of Level 1.0 is copied								

**ImageFileDescriptorRecord ( 13 / 14 )**

Bytes	Format	Description	Contents
<b>401-428</b>	<b>CH</b>	SAR Data format type Level 1.1 = 'COMPLEX*8bbbbbbbbbbbbbbbb' Level 1.5 = 'UNSIGNEDbINTEGER*2bbbbbbbb'	
<b>429-432</b>	<b>CH</b>	SAR Data format type code Level 1.1 = 'C*8b' Level 1.5 = 'IU2b'	

**ImageFileDescriptorRecord ( 14 / 14 )**

Bytes	Format	Description	Contents
433-436	<b>I4</b>	Number of left fill bits within pixel Level 1.1 = 'bbb0' Level 1.5 = 'bbb0'	
437-440	<b>I4</b>	Number of right fill bits within pixel Level 1.1 = 'bbb0' Level 1.5 = 'bbb0'	
441-448	<b>I8</b>	Maximum data range of pixel (starting form 0) Level 1.1 = blank Level 1.5 = 'bbb65535'	
449-720	<b>CH</b>	Always blank filled	The value of Level 1.0 is copied

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**SignalDataRecord ( 1 / 8 )**

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 2, 3, ...	Level 1.1 products have this record.
<b>5</b>	<b>B</b>	1st record sub-type code = 50	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 10	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record	

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SignalDataRecord ( 2 / 8 )

Bytes	Format	Description	Contents
		PREFIX DATA-GENERAL INFORMATION	
13-16	B	SAR image data line number = 1, 2, ...	
17-20	B	SAR image data record index = 1 (indicates the record sequence number in the image line)	
21-24	B	Actual count of left-fill pixels = 0	
25-28	B	Actual count of data pixels For level 1.1 products, actual count of data pixels corresponds to the number of 1 image range pixels. Each range line begins at the <u>nearest</u> -range pixel and ends at the <u>farthest</u> -range pixel.	
29-32	B	Actual count of right-fill pixels = 0	

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**SignalDataRecord ( 3 / 8 )**

Bytes	Format	Description	Contents
		<b>PREFIX DATA-SENSOR PARAMETERS</b>	
<b>33-36</b>	<b>B</b>	Sensor parameters update flag = 0 (1=data in this section is an update, 0=data is a repeat)	
<b>37-40</b>	<b>B</b>	Sensor acquisition year (UT) Scene start year	
<b>41-44</b>	<b>B</b>	Sensor acquisition day of year (UT) Scene start day of year	
<b>45-48</b>	<b>B</b>	Sensor acquisition milliseconds of day (UT)	
<b>49-50</b>	<b>B</b>	SAR channel indicator (sequence number in multi-channel SAR data) where : single polarization = 1 dual polarization = 2 Polarimetry mode = 4	The value of Level 1.0 is copied
<b>51-52</b>	<b>B</b>	SAR channel code = 0 (0=L, 1=5, 2=C, 3=X, 4=KU and 5=KA channel)	The value of Level 1.0 is copied
<b>53-54</b>	<b>B</b>	Transmitted polarization (0=H, 1=V)	The value of Level 1.0 is copied
<b>55-56</b>	<b>B</b>	Received polarization (0=H, 1=V)	The value of Level 1.0 is copied

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SignalDataRecord ( 4 / 8 )

Bytes	Format	Description	Contents
<b>57-60</b>	<b>B</b>	PRF (mHz)	
<b>61-64</b>	<b>B</b>	Scan ID for SCAN SAR mode ( 1 - 5 ) except Wide Observation mode = 0	
<b>65-66</b>	<b>B</b>	Onboard Range compressed flag = 0 (0=no/1=yes)	The value of Level 1.0 is copied
<b>67-68</b>	<b>B</b>	Pulse (chirp) type designator = 0 0 : LINEAR FM CHIRP 1 : PHASE MODULATORS	The value of Level 1.0 is copied
<b>69-72</b>	<b>B</b>	Chirp length (nanoseconds)	The value of Level 1.0 is copied
<b>73-76</b>	<b>B</b>	Chirp constant coefficient (Hz) (nominal value)	The value of Level 1.0 is copied
<b>77-80</b>	<b>B</b>	Chirp linear coefficient (Hz/micro-sec) (nominal value)	The value of Level 1.0 is copied
<b>81-84</b>	<b>B</b>	Chirp quadratic coefficient (Hz/micro-sec <sup>2</sup> ) (nominal value)	The value of Level 1.0 is copied
<b>85-92</b>	<b>B</b>	spare = 0	The value of Level 1.0 is copied

SignalDataRecord ( 5 / 8 )

Bytes	Format	Description	Contents
93-96	B	Receiver gain (dB) (nominal value)	The value of Level 1.0 is copied
97-100	B	Nought line flag Effective line = 0 Invalid line (loss line) = 1	
101-104	B	Electronic antenna squint angle (millionths of degrees)	
105-108	B	Antenna mechanical elevation angle from nadir (millionths of degrees)	
109-112	B	Electronic antenna squint angle (millionths of degrees)	
113-116	B	Mechanical antenna squint angle (millionths of degrees)	
117-120	B	Slant range to 1st data sample (meters)	
121-124	B	Data record window position (i.e. sample delay) (nanoseconds) Level 1.1 = 0	
125-128	B	spare = 0	

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**SignalDataRecord ( 6 / 8 )**

Bytes	Format	Description	Contents
		PREFIX DATA-PLATFORM REFERENCE INFORMATION	
<b>129-132</b>	<b>B</b>	Platform pos. parameters update flag = 0 (1=data in this section is an update, 0=data is a repeat)	
<b>133-136</b>	<b>B</b>	Platform latitude (millionths deg.) = 0	The value of Level 1.0 is copied
<b>137-140</b>	<b>B</b>	Platform longitude (millionths deg.) = 0	The value of Level 1.0 is copied
<b>141-144</b>	<b>B</b>	Platform altitude (m) = 0	The value of Level 1.0 is copied
<b>145-148</b>	<b>B</b>	Platform ground speed (cm/sec) = 0	The value of Level 1.0 is copied
<b>149-160</b>	<b>3B4</b>	Platform velocity X', Y', Z' (cm/sec) = 0	The value of Level 1.0 is copied
<b>161-172</b>	<b>3B4</b>	Platform acceleration X', Y', Z' (cm/sec <sup>2</sup> ) = 0	The value of Level 1.0 is copied
<b>173-176</b>	<b>B</b>	Platform track angle (millionths deg.) = 0	The value of Level 1.0 is copied
<b>177-180</b>	<b>B</b>	Platform track angle (millionths deg.) = 0	The value of Level 1.0 is copied

SignalDataRecord ( 7 / 8 )

Bytes	Format	Description	Contents
181-184	B	Platform Pitch angle (millionths deg.) = 0	The value of Level 1.0 is copied
185-188	B	Platform Roll angle (millionths deg.) = 0	The value of Level 1.0 is copied
189-192	B	Platform Yaw angle (millionths deg.) = 0	The value of Level 1.0 is copied
		PREFIX DATA-SENSOR/FACILITY SPECIFIC AUXILIARY DATA	
193-196	B	Latitude of 1st pixel (millionths of degrees)	
197-200	B	Latitude of middle-pixel (millionths of degrees) (*)	* the latitude at M/2th pixel is set. (M: number of pixels)
201-204	B	Latitude of last pixel (millionths of degrees)	
205-208	B	Longitude of 1st pixel (millionths of degrees)	
209-212	B	Longitude of middle-pixel (millionths of degrees) (*)	* the longitude at M/2th pixel is set. (M: number of pixels)
213-216	B	Longitude of last pixel (millionths of degrees)	
217-284	B68	Always blank (0) filled	
285-288	B4	Counter of PALSAR frame = 0	
289-388	B100	PALSAR auxiliary data = 0	

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**SignalDataRecord ( 8 / 8 )**

Bytes	Format	Description	Contents
<p><b>389-412</b></p>	<p><b>B24</b></p>	<p>Always blank (0) filled</p> <p>SAR RAW SIGNAL DATA</p>	<p>The value of Level 1.0 is copied</p>
<p><b>413-i</b></p>	<p><b>jBk</b></p>	<p>SAR Signal data consisting of Noise and Echo data. Where:</p> <p>(i) -number of bytes of data + 412</p> <p>(j) -number of pixels on this record</p> <p>(k) -size of pixel in bytes</p>	

ProcessedDataRecord ( 1 / 7 )

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 2, 3, ...	Only level 1.5 products have this record.
<b>5</b>	<b>B</b>	1st record sub-type code = 50	
<b>6</b>	<b>B</b>	Record type code = 11	
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	
<b>8</b>	<b>B</b>	3rd record sub-type code = 20	
<b>9-12</b>	<b>B</b>	Length of this record	

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ProcessedDataRecord ( 2 / 7 )

Bytes	Format	Description	Contents
		<p>PREFIX DATA-GENERAL INFORMATION</p>	
13-16	B	SAR image data line number = 1, 2, ...	
17-20	B	SAR image data record index = 1 (indicates the record sequence number in the image line)	
21-24	B	Actual count of left-fill pixels = 0	
25-28	B	Actual count of data pixels	
29-32	B	Actual count of right-fill pixels = 0	



ProcessedDataRecord ( 3 / 7 )

Bytes	Format	Description	Contents
		PREFIX DATA-SENSOR/PROCESSING PARAMETERS	
33-36	B	Sensor parameters update flag = 0 (1=data in this section is an update, 0=data is a repeat)	
37-40	B	Sensor acquisition year (UT) Scene start year	
41-44	B	Sensor acquisition day of year (UT) Scene start day of year	
45-48	B	Sensor acquisition milliseconds of day (UT) = 0	
49-50	B	SAR channel indicator (sequence number in multi-channel SAR data) where : single polarization = 1 dual polarization = 2 Polarimetry mode = 4	
51-52	B	SAR channel code = 0 (0=L, 1=5, 2=C, 3=X, 4=KU and 5=KA channel)	
53-54	B	Transmitted polarization (0=H, 1=V)	
55-56	B	Received polarization (0=H, 1=V)	

ProcessedDataRecord ( 4 / 7 )

Bytes	Format	Description	Contents
<b>57-60</b>	<b>B</b>	PRF (mHz)	ScanSAR = 0
<b>61-64</b>	<b>B</b>	Scan ID for SCAN SAR mode = 0	In Geo-coded, set blank
<b>65-68</b>	<b>B</b>	Slant Range to 1st pixel (m)	
<b>69-72</b>	<b>B</b>	Slant Range to mid-pixel (m)	
<b>73-76</b>	<b>B</b>	Slant Range to last-pixel (m)	
<b>77-80</b>	<b>B</b>	Doppler centroid value at 1st pixel (1/1,000 Hz)	
<b>81-84</b>	<b>B</b>	Doppler centroid value at mid-pixel (1/1,000 Hz)	
<b>85-88</b>	<b>B</b>	Doppler centroid value at last pixel (1/1,000 Hz)	
<b>89-92</b>	<b>B</b>	Azimuth FM rate of 1st pixel (Hz/msec)	
<b>93-96</b>	<b>B</b>	Azimuth FM rate of mid-pixel (Hz/msec)	
<b>97-100</b>	<b>B</b>	Azimuth FM rate of last pixel (Hz/msec)	
<b>101-104</b>	<b>B</b>	Look angle of nadir (millionths of degrees) = 0	

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ProcessedDataRecord ( 5 / 7 )

Bytes	Format	Description	Contents
105-108	B	Azimuth squint angle (millionths of degrees) = 0	
109-128	B	spare = 0	
		PREFIX DATA-GEOGRAPHIC REFERENCE INFO.	
129-132	B	Geographic ref. Parameter update flag = 0 (1 = data in this section is an update, 0 = data is a repeat)	
133-136	B	Latitude of 1st pixel (millionths of degrees)	
137-140	B	Latitude of middle-pixel (millionths of degrees) (*)	* the latitude at M/2th pixel is set. (M: number of pixels)
141-144	B	Latitude of last pixel (millionths of degrees)	
145-148	B	Longitude of 1st pixel (millionths of degrees)	
149-152	B	Longitude of middle-pixel (millionths of degrees) (*)	* the longitude at M/2th pixel is set. (M: number of pixels)
153-156	B	Longitude of last pixel (millionths of degrees)	
157-160	B	Northing of 1st pixel (m) = 0	

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ProcessedDataRecord ( 6 / 7 )

Bytes	Format	Description	Contents
161-164	B	spare = 0	
165-168	B	Northing of last pixel (m) = 0	
169-172	B	Easting of 1st pixel (m) = 0	
173-176	B	spare = 0	
177-180	B	Easting of last pixel (m) = 0	
181-184	B	Line heading (orientation of the perpendicular to the data line centre relative to true north) (millionths of degrees) = 0	
185-192	B	spare = 0	
		SAR PROCESSED DATA	
193-i	jBk	SAR processed data. Where : (i) -number of bytes of data + 412 (j) -number of pixels on this record (k) -size of pixel in bytes	

ProcessedDataRecord ( 7 / 7 )

Bytes	Format	Description	Contents
	<b>0*B</b>	SUFFIX DATA  Processing Facility specific details	

**TrailerFileDescriptorRecord ( 1 / 10 )**

Bytes	Format	Description	Contents
<b>1-4</b>	<b>B</b>	Record sequence number = 1	The value of Level 1.0 is copied
<b>5</b>	<b>B</b>	1st record sub-type code = 63	The value of Level 1.0 is copied
<b>6</b>	<b>B</b>	Record type code = 192	The value of Level 1.0 is copied
<b>7</b>	<b>B</b>	2nd record sub-type code = 18	The value of Level 1.0 is copied
<b>8</b>	<b>B</b>	3rd record sub-type code = 18	The value of Level 1.0 is copied
<b>9-12</b>	<b>B</b>	Length of this record = 720	The value of Level 1.0 is copied
<b>13-14</b>	<b>CH</b>	ASCII/EBCDIC flag = 'Ab' for ASCII	The value of Level 1.0 is copied
<b>15-16</b>	<b>CH</b>	Continuation flag ('Cb' if information is continued on the next text record, else 'bb' for no continuation) = 'bb'	The value of Level 1.0 is copied
<b>17-28</b>	<b>CH</b>	Format control document ID for this data file format (the ID of this document) = 'CEOS-SAR-CCT'	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 2 / 10 )**

Bytes	Format	Description	Contents
29-30	CH	Format control document revision level = 'bA'	The value of Level 1.0 is copied
31-32	CH	File design descriptor revision letter = 'bA'	The value of Level 1.0 is copied
33-44	CH	Logical volume generating facility software release and revision level (i.e. name and version left justified) = 'NN.NNbbbbbb' 1.00, 1.01, ..., 1.10, ..., 2.00	The value of Level 1.0 is copied
45-48	I4	File number = 'bbb1'	The value of Level 1.0 is copied

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**TrailerFileDescriptorRecord ( 3 / 10 )**

Bytes	Format	Description	Contents
<p align="center"><b>49-64</b></p>	<p align="center"><b>CH</b></p>	<p>Referenced file name (16 characters indicating nature of the data, i.e. header, annotation, SAR product type, etc.) = 'MMNbSSSTFFFFbbbb'</p> <p>MM : Mission ID (ALOS='AL') (*2)</p> <p>N : Mission number (ALOS='1') (*2)</p> <p>SSS : Sensor ID (PALSAR='PSR') (*2)</p> <p>T : Processing Level Code (*1)</p> <p>FFFF : File Type Code (*2)</p> <p>SAR Trailer File = 'SART'</p>	<p>(*1)</p> <p>'B' : Level 1.1</p> <p>'C' : Level 1.5</p> <p>(*2)The value of Level 1.0 is copied</p>



**TrailerFileDescriptorRecord ( 4 / 10 )**

Bytes	Format	Description	Contents
<b>65-68</b>	<b>CH</b>	Record sequence and location type flag = 'FSEQ'	The value of Level 1.0 is copied
<b>69-76</b>	<b>I8</b>	Sequence number location = 'bbbbbb1'	The value of Level 1.0 is copied
<b>77-80</b>	<b>I4</b>	Sequence number field length = 'bbb4'	The value of Level 1.0 is copied
<b>81-84</b>	<b>CH</b>	Record code and location type flag = 'FTYP'	The value of Level 1.0 is copied
<b>85-92</b>	<b>I8</b>	Record code location = 'bbbbbb5'	The value of Level 1.0 is copied
<b>93-96</b>	<b>I4</b>	Record code field length = 'bbb4'	The value of Level 1.0 is copied
<b>97-100</b>	<b>CH</b>	Record length and location type flag = 'FLGT'	The value of Level 1.0 is copied
<b>101-108</b>	<b>I8</b>	Record length location = 'bbbbbb9'	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 5 / 10 )**

Bytes	Format	Description	Contents
<b>109-112</b>	<b>I4</b>	Record length field length = 'bbb4'	The value of Level 1.0 is copied
<b>113-180</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied
<b>181-186</b>	<b>I6</b>	Number of data set summary records = 'bbbb0'	The value of Level 1.0 is copied
<b>187-192</b>	<b>I6</b>	Data set summary record length = 'bbbb0'	The value of Level 1.0 is copied
<b>193-198</b>	<b>I6</b>	Number of map projection data records = 'bbbb0'	The value of Level 1.0 is copied
<b>199-204</b>	<b>I6</b>	Map projection record length = 'bbbb0'	The value of Level 1.0 is copied
<b>205-210</b>	<b>I6</b>	Number of platform pos. data records = 'bbbb0'	The value of Level 1.0 is copied
<b>211-216</b>	<b>I6</b>	Platform position record length = 'bbbb0'	The value of Level 1.0 is copied
<b>217-222</b>	<b>I6</b>	Number of attitude data records = 'bbbb0'	The value of Level 1.0 is copied
<b>223-228</b>	<b>I6</b>	Attitude data record length = 'bbbb0'	The value of Level 1.0 is copied
<b>229-234</b>	<b>I6</b>	Number of radiometric data records = 'bbbb0'	The value of Level 1.0 is copied
<b>235-240</b>	<b>I6</b>	Radiometric record length = 'bbbb0'	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 6 / 10 )**

Bytes	Format	Description	Contents
<b>241-246</b>	<b>I6</b>	Number of radiometric compensation records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>247-252</b>	<b>I6</b>	Radiometric compensation rec. length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>253-258</b>	<b>I6</b>	Number of data quality summary records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>259-264</b>	<b>I6</b>	Data quality summary record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>265-270</b>	<b>I6</b>	Number of data histograms records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>271-276</b>	<b>I6</b>	Data histogram record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>277-282</b>	<b>I6</b>	Number of range spectra records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>283-288</b>	<b>I6</b>	Range spectra record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>289-294</b>	<b>I6</b>	Number of DEM descriptor records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>295-300</b>	<b>I6</b>	DEM descriptor record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>301-306</b>	<b>I6</b>	Number of Radar par. update records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>307-312</b>	<b>I6</b>	Radar par. update record length = 'bbbbbb0'	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 7 / 10 )**

Bytes	Format	Description	Contents
<b>313-318</b>	<b>I6</b>	Number of Annotation data records = 'bbbbb0'	The value of Level 1.0 is copied
<b>319-324</b>	<b>I6</b>	Annotation data record length = 'bbbbb0'	The value of Level 1.0 is copied
<b>325-330</b>	<b>I6</b>	Number of Det. processing records = 'bbbbb0'	The value of Level 1.0 is copied
<b>331-336</b>	<b>I6</b>	Det. processing record length = 'bbbbb0'	The value of Level 1.0 is copied
<b>337-342</b>	<b>I6</b>	Number of Calibration records = 'bbbbb0'	The value of Level 1.0 is copied
<b>343-348</b>	<b>I6</b>	Calibration record length = 'bbbbb0'	The value of Level 1.0 is copied
<b>349-354</b>	<b>I6</b>	Number of GCP records = 'bbbbb0'	The value of Level 1.0 is copied
<b>355-360</b>	<b>I6</b>	GCP record length = 'bbbbb0'	The value of Level 1.0 is copied
<b>361-420</b>	<b>I6</b>	blanks	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 8 / 10 )**

Bytes	Format	Description	Contents
<b>421-426</b>	<b>I6</b>	Number of facility data (1) records = 'bbbb0'	The value of Level 1.0 is copied
<b>427-432</b>	<b>I8</b>	Facility data (1) record length = 'bbbb0'	The value of Level 1.0 is copied
<b>435-440</b>	<b>I6</b>	Number of facility data (2) records = 'bbbb0'	The value of Level 1.0 is copied
<b>441-448</b>	<b>I8</b>	Facility data (2) record length = 'bbbb0'	The value of Level 1.0 is copied
<b>449-454</b>	<b>I6</b>	Number of facility data (3) records = 'bbbb0'	The value of Level 1.0 is copied
<b>455-462</b>	<b>I8</b>	Facility data (3) record length = 'bbbb0'	The value of Level 1.0 is copied
<b>463-468</b>	<b>I6</b>	Number of facility data (4) records = 'bbbb0'	The value of Level 1.0 is copied
<b>469-476</b>	<b>I8</b>	Facility data (4) record length = 'bbbb0'	The value of Level 1.0 is copied
<b>477-482</b>	<b>I6</b>	Number of facility data (5) records = 'bbbb0'	The value of Level 1.0 is copied
<b>483-490</b>	<b>I8</b>	Facility data (5) record length = 'bbbb0'	The value of Level 1.0 is copied
<b>491-496</b>	<b>I6</b>	Number of facility data (6) records = 'bbbb0'	The value of Level 1.0 is copied
<b>497-504</b>	<b>I8</b>	Facility data (6) record length = 'bbbb0'	The value of Level 1.0 is copied

**TrailerFileDescriptorRecord ( 9 / 10 )**

Bytes	Format	Description	Contents
<b>505-510</b>	<b>I6</b>	Number of facility data (7) records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>511-518</b>	<b>I8</b>	Facility data (7) record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>519-524</b>	<b>I6</b>	Number of facility data (8) records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>525-532</b>	<b>I8</b>	Facility data (8) record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>533-538</b>	<b>I6</b>	Number of facility data (9) records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>539-546</b>	<b>I8</b>	Facility data (9) record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>547-552</b>	<b>I6</b>	Number of facility data (10) records = 'bbbbbb0'	The value of Level 1.0 is copied
<b>553-560</b>	<b>I8</b>	Facility data (10) record length = 'bbbbbb0'	The value of Level 1.0 is copied
<b>561-566</b>	<b>I6</b>	Number of facility data (11) records = 'bbbbbb0'	
<b>567-574</b>	<b>I8</b>	Facility data (11) record length = 'bbbbbb0'	

**TrailerFileDescriptorRecord ( 10 / 10 )**

Bytes	Format	Description	Contents
<b>575-580</b>	<b>I6</b>	Number of low resolution image data records (Level 1.1, 1.5) = variable	
<b>581-586</b>	<b>I6</b>	Low resolution image data record length (Level 1.1, 1.5) = variable	
<b>587-592</b>	<b>I6</b>	Number of pixels of low resolution image data (Level 1.1, 1.5) = variable	
<b>593-598</b>	<b>I6</b>	Number of lines of low resolution image data (Level 1.1, 1.5) = variable	
<b>599-604</b>	<b>I6</b>	Number of bytes per one sample of low resolution image data (Level 1.1, 1.5) = 'bbbb2'	
<b>605-720</b>	<b>CH</b>	blanks	The value of Level 1.0 is copied

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LowResolutionImageDataRecord ( 1 / 1 )

Bytes	Format	Description	Contents
<p><b>1-i</b></p>	<p><b>jBk</b></p>	<p>Low resolution image data for 16bit. Where :</p> <ul style="list-style-type: none"> <li>(i) -number of bytes of data</li> <li>(j) -number of pixels on this record</li> <li>(k) -size of pixel in bytes = 2</li> </ul>	

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4 Summary Information

The following pages show the record formats for the Summary Information.

Summary Information (PALSAR Level 1.1/1.5) (1/4)

No.	Section	Name of Items	Keyword	Contents
1	Ordered Information (Odi)	Number of Product Management	Odi_ProductManagementNo	XYNNNNNN X: Code distinguished the inquiry office YY: The year of receipted orders (Last two digits of A.D.year) NNNNN: Running numbers(00001 - 99999) (Refer to NCX-000048)
2		Sub-number of product management	Odi_ProductManagementBranchNo	XXX XXX: 001 - 999 (Refer to NCX-000048)
3	Appointed Scene (Scs)	Scene ID	Scs_SceneID	AABBBCDDDDDEEEEE AA: Mission type BBB : Sensor type C: Supplemental remarks of sensor type (S:Wide observation mode, P:Except wide observation mode) DDDDD: Total calculated orbit number of the scene center EEEE : Frame number of the scene center
4		Amount of scene shift	Scs_SceneShift	-5 - 4 (No sign in case of zero and plus)
5	Appointed Product (Pds)	Product ID	Pds_ProductID	ABBBCDE A: Observation mode BBB: Processing level C: Processing option D : Map projection E: Ascending Node
6		Resampling method	Pds_ResamplingMethod	NN/BL/CC (only case of Level 1.5) Nearest neighbor/Bi-linear/Cubic convolution
7		Number of UTM zone	Pds_UTM_ZoneNo	1 - 60 (only case of Level 1.5 and UTM in map projection)
8		PS Reference Latitude	Pds_PS_ReferenceLatitude	In case of except wide observation mode; The Northern Hemisphere: 25.000<=Reference Latitude<=90.000 The Southern Hemisphere: -90.000<=Reference Latitude<=-25.000 In case of wide observation mode; -90.000<=Reference Latitude<=90.000 (only case of Level 1.5 and PS in map projection)
9		PS Reference Longitude	Pds_PS_ReferenceLongitude	-179.999<=Reference Longitude<=180.000 (only case of Level 1.5 and PS in map projection)
10		LCC Reference Latitudinal Line 1 Latitude	Pds_LCC_ReferenceLatitudinalLine1	-90.000<Reference Longitude<90.000 (only case of Level 1.5 and LCC in map projection)
11		LCC Reference Latitudinal Line 2 Latitude	Pds_LCC_ReferenceLatitudinalLine2	-90.000<Reference Longitude<90.000 (only case of Level 1.5 and LCC in map projection)
12		Direction of Map	Pds_MapDirection	MapNorth (only case of Level 1.5/Geo-coded)
13		LCC Origin Latitude	Pds_LCC_OriginLatitude	-90.000<=Origin Latitude<=90.000 (only case of Level 1.5 and LCC in map projection)
14		LCC Origin Longitude	Pds_LCC_OriginLongitude	-179.999<=Origin Longitude<=180.000 (only case of Level 1.5 and LCC in map projection)
15		Pixel Spacing	Pds_PixelSpacing	6.25/12.5/100 (Unit: m) (only case of Level 1.5)

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Summary Information (PALSAR Level 1.1/1.5) (2/4)

No.	Section	Name of Items	Keyword	Contents
16	Appointed Product (Pds) (continued)	Accuracy of used orbit data	Pds_OrbitDataPrecision	Precision/RARR_Determine/RARR_Predict Precision: ALOS High Precision Orbit Information RARR_Determine: ALOS Orbit Information (Decision) RARR_Predict: ALOS Orbit Information (Preliminary)
17		Accuracy of used attitude data	Pds_AttitudeDataPrecision	Standard Standard: Standard attitude determination system (Onboard)
18	Image Information (Img)	Scene center date and time	Img_SceneCenterDateTime	YYYYMMDDbHH:MM:SS.TTT(UT) YYYY:A.D. year MM:Month(01- 12) DD:Day(01 - 31) HH:Hour(00 - 23) MM:Minute(00 - 59) SS:Second(00 - 60) TTT:Milisecond(000 - 999) (ss=60 is only case of a leap second)
19		Scene start date and time	Img_SceneStartDateTime	YYYYMMDDbHH:MM:SS.TTT(UT) YYYY:A.D. year MM:Month(01- 12) DD:Day(01 - 31) HH:Hour(00 - 23) MM:Minute(00 - 59) SS:Second(00 - 60) TTT:Milisecond(000 - 999) (ss=60 is only case of a leap second)
20		Scene end date and time	Img_SceneEndDateTime	YYYYMMDDbHH:MM:SS.TTT(UT) YYYY:A.D. year MM:Month(01- 12) DD:Day(01 - 31) HH:Hour(00 - 23) MM:Minute(00 - 59) SS:Second(00 - 60) TTT:Milisecond(000 - 999) (ss=60 is only case of a leap second)
21		Latitude of image scene center	Img_ImageSceneCenterLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
22		Longitude of image scene center	Img_ImageSceneCenterLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
23		Latitude of image scene left upper corner	Img_ImageSceneLeftTopLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
24		Longitude of image scene left upper corner	Img_ImageSceneLeftTopLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
25		Latitude of image scene right upper corner	Img_ImageSceneRightTopLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
26		Longitude of image scene right upper corner	Img_ImageSceneRightTopLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
27		Latitude of image scene left lower corner	Img_ImageSceneLeftBottomLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
28	Longitude of image scene left lower corner	Img_ImageSceneLeftBottomLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus	
29	Latitude of image scene right lower corner	Img_ImageSceneRightBottomLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus	
30	Longitude of frame scene right lower corner	Img_ImageSceneRightBottomLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus	

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Summary Information (PALSAR Level 1.1/1.5) (3/4)

No.	Section	Name of Items	Keyword	Contents
31	Image Information (Img) (continued)	Latitude of frame scene center	Img_FrameSceneCenterLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
32		Longitude of frame scene center	Img_FrameSceneCenterLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
33		Latitude of frame scene left upper corner	Img_FrameSceneLeftTopLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
34		Longitude of frame scene left upper corner	Img_FrameSceneLeftTopLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
35		Latitude of frame scene right upper corner	Img_FrameSceneRightTopLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
36		Longitude of frame scene right upper corner	Img_FrameSceneRightTopLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
37		Latitude of frame scene left lower corner	Img_FrameSceneLeftBottomLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
38		Longitude of frame scene left lower corner	Img_FrameSceneLeftBottomLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
39		Latitude of frame scene right lower corner	Img_FrameSceneRightBottomLatitude	-90.000 - 90.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
40		Longitude of frame scene right lower corner	Img_FrameSceneRightBottomLongitude	-179.999 - 180.000 (degree) (case of Level 1.5 processing) No abbreviation down to three decimals/ No sign in case of zero and plus
41			Off Nadir Angle	Img_OffNadirAngle
42	Product Information (Pdi)	Size of product data	Pdi_ProductDataSize	0.0 - 9999.9 (Unit: Mbytes=1024Kbyte)
43		Number of Level 1.1/1.5 product files	Pdi_CntOfL15ProductFileName	High resolution mode (single polarization): 4 files High resolution mode (dual polarization): 5 files Direct down link mode: 4 files Wide observation mode: 4 files Polarimetry mode: 7 files
44		Name of product file created Level 1.1/1.5 processing (This item will be prepared of number of product files.)	Pdi_Pdi_L15ProductFileNamenn nn: 01 ~ 99	Volume Directory File VOL-SSSSSSSSSSSSSS-PPPPPPP Leader File LED-SSSSSSSSSSSSSS-PPPPPPP Image File IMG-XX-SSSSSSSSSSSSSS-PPPPPPP Trailer File TRL-SSSSSSSSSSSSSS-PPPPPPP SSSSSSSSSSSSSS: Scene ID PPPPPPP: ProductID XX: Polarization (HH,HV,VH,VV) (First is transmitter, second is receiving)
45		Bit / Pixel	Pdi_BitPixel	NN "16": Level 1.5 (only case of Level 1.5)
46		Number of pixels	Pdi_NoOfPixels	0 - 99999
47		Number of lines	Pdi_NoOfLines	0 - 99999
48		Product format	Pdi_ProductFormat	CEOS: Fixed

c

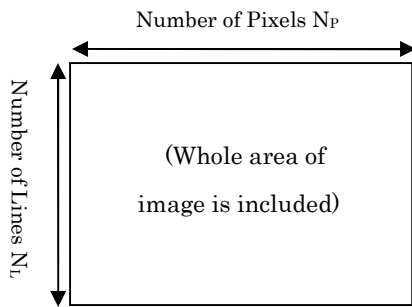
Summary Information (PALSAR Level 1.1/1.5) (4/4)

No.	Section	Name of Items	Keyword	Contents
49	Result of automatic check (Ach)	Time system data status	Ach_TimeCheck	OK/NG OK: GSP time system, NG:DMS time system
50		Attitude determination system data status	Ach_AttitudeCheck	OK/NG OK: Precision attitude determination system, NG: Standard attitude determination system
51		Absolute navigation status	Ach_AbsoluteNavigationStatus	OK/NG
52		House keeping data status	Ach_HouseKeepingDataCheck	OK/NG NG: NG is checked out in check items
53		Orbit data status	Ach_OrbitCheck	OK/NG Result of onboard limit check
54		Onboard PCD attitude status	Ach_OnBoardAttitudeCheck	OK/NG
55		Loss lines status	Ach_LossLines	OK/NG NG: Rate of loss lines is over threshold
56		PRF change status	Ach_PRF_Check	OK/FAIR/NG OK : PRF does not change in a scene. FAIR : PRF changes in a scene. Operator does not need to inspect the image. NG : PRF changes in a scene. Operator needs to inspect the image.
57		Calibration data including status	Ach_CalibrationDataCheck	OK/FAIR/NG OK : Calibration data are not included in a scene. FAIR : Calibration data are included in a scene. Operator does not need to inspect the image. NG : Calibration data are included in a scene. Operator needs to inspect the
58	Version (Ver)	OS (Linux)	Ver_OS_VersionInDataProcessingUnit	XX----XX Version of operating system in the Data Processing Unit
59	Result Information (Rad)	Practice result code	Rad_PracticeResultCode	00: Passing 01: Passing for this time by operator inspection 02: Conditional passing ( with passed automatic check) 03: Conditional passing ( with failed automatic check)
60		Processed host name	Rad_ProcessedHostName	XXXXXXXXX (Host name used for data processing)
61		Number of CDR	Rad_NoOfCDR	N: 1 - 9 (Number of CDR made case of output appointment is "CD-R")
62	Label Information (Lbi)	Satellite name	Lbi_Satellite	ALOS (Fixed)
63		Sensor name	Lbi_Sensor	PALSAR (Fixed)
64		Processing Level	Lbi_ProcessLevel	xxx
65		Processed facility name	Lbi_ProcessFacility	HEOC (Fixed)
66		Observation date	Lbi_ObservationDate	YYYYMMDD

C

E

Appendix 1 Definition of Level 1.5 Image

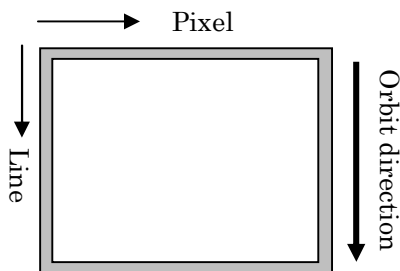


$N_P$  and  $N_L$  are always multiples of 100:  
 The number of pixels ( $N_P$ ) is  
 $N_P = 100 * n$  ( $n$ : integer)  
 And the number of lines ( $N_L$ ) is  
 $N_L = 100 * m$  ( $m$ : integer)  
 for level 1.5 images including geo-reference  
 and geo-code.

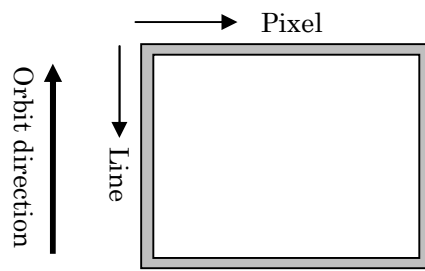
The georeferenced and geocoded images are defined as follows.

<Georeference>

A Georeferenced image is an image oriented in parallel with orbit direction.



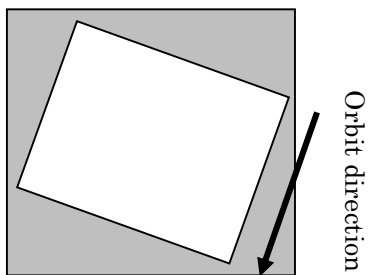
Descending: The start of the scene is at the top of the image and the end of the scene is at the bottom of the image.



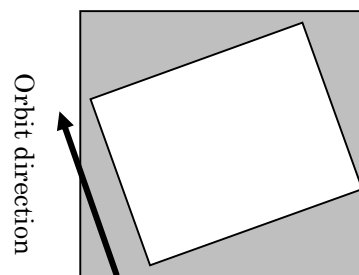
Ascending: The end of the scene is at the top of the image and the beginning of the scene is at the bottom of the image.

<Geocode>

A geocoded image is an image projected on a map which is oriented in a map north-south direction.



Descending



Ascending