NEC/TOSHIBA
NEC TOSHIBA Space Systems, Ltd.

ALOS

Product Format Description

(AVNIR-2)

Product Format Description (AVNIR-2)
Change Record (1/1)

Rev.	Date	Changed place	Changed contents
	2003/07/28		The first revision was released.
A	2003/09/05	P2-8 P2-10	Explanation about DEM correction option was added.
		Appendix	"DEM correction result (Ach_DEM_Correction)" was added in auto-inspection result. "04: OK under the conditions (There is NG at the DEM correction result) was added in the work result code.
B	2004/01/30	Table 3.3-1	"NASDA" in "Logical volume preparing agent" of Volume Descriptor Record was changed to "JAXA".
		Table 3.3-3	"NASDA" in "Facility for preparing product and preparation" of Text Record was changed to "JAXA".
		Table 3.3-6	"NASDA" in "Identification of competent agent and project" of Scene Header Record was changed to "JAXA".
		Table 3.3-7	Supplemental explanation was added to the remarks column of "(pixel, line), (latitude, longitude) transformation coefficients" of Ancillary 1 (Map Projection) Record.
		Appendix	"No zero-suppress" was deleted from "the number of pixels" and "the number of lines" in product information.
C	2004/01/05	Table 3.3-22	Byte position and record length are corrected.
D	2004/03/24	Table 3.3-6	Remarks column of "Off-Nadir Mirror Pointing Angle" in the scene header was corrected.
E	2004/12/16	P2-8, P2-10	Note for Rough DEM correction was added.
		Table 3.1-1	The content of Ancillary 3 record and trailer record was corrected.
		Table 3.2-2 Table 3.3-14	Record length of Ancillary 11 record was corrected.
		Appendix	"Absolute navigation time" was added in Auto-verification result.
F	2005/06/20	Appendix	"DVD-R" was added to "Number of CDRs" in Result Information.
G	2005/07/15		Revised only for PALSAR description, nothing changed in AVNIR-2.
H	2005/11/30	Appendix	Supplemental explanation was added to the scene ID and the product ID of summary information.
		Appendix	Supplemental explanation was added to the number of pixels and lines of summary information.
I	2006/05/19		Revised only for PALSAR description, nothing changed in AVNIR-2.
J	2006/10/06	Table 3.3-7	Supplemental explanation of scene center position was added.
		Appendix	Appendix about the ancillary information was added.
		Table 3.3-15 ～23	Reference in the remarks was changed to the renewed appendix.

Product Format Description (AVNIR-2)

Table of contents

List of figures

List of tables

Appendix

1. Outline

This document describes a format of the AVNIR-2 (Advanced Visible Near-Infrared Radiometer) products generated by the ALOS Data Processing Subsystem.
The AVNIR-2 Processing Software accepts Level 0 data, performs radiometric and geometric corrections, and generates Level 1A, Level 1B1, and level LB2 products.

2. Specification of Product

2.1 Scene Definitions

AVNIR-2 scene is defined by RSP (Reference System for Planning) number (Path, Frame) and scene shift distance. Each path is separated into 7200 frames on the basis of the argument of latitude of satellite. Frame number is allocated every 10 frame (approximately 56 km) in AVNIR-2. Scene shift can be carried out in the processed data, and the distance of scene shift is specified by distance of the scene shift is specified by the number of frames.
In the ALOS Data Processing Subsystem, the scene of a Raw product (geometrically uncorrected) and a Geo-reference product (map-projected based on the flight direction) are defined by determining image position and image range using input data according to the RSP. And the scene of a Geo-coded product (projected based on the direction on the map) is defined by rotating the same range of the Geo-reference image to map-north.

Table 2.1-1 describes the scene definitions and scene size of AVNIR-2.

Table 2.1-1 Scene Size and Scene Definition (AVNIR-2) (1/2)

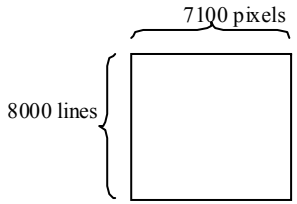
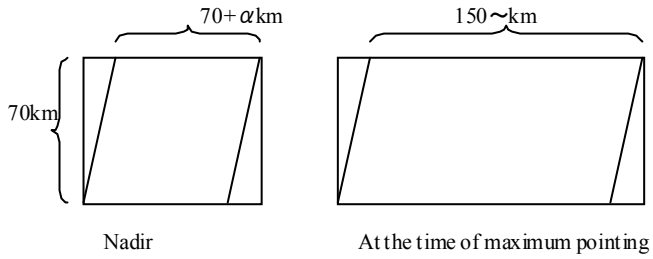
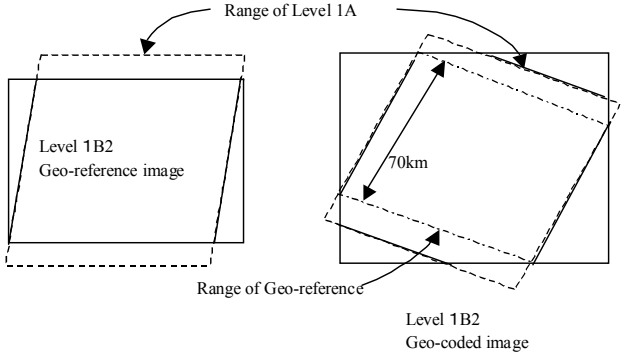
Processing Level	Scene Size	Scene Definitions and Extraction method
1A, 1B1	Approximately 70 km x 70 km (Nadir) (7100 pxls x 8000 lines x 4 bands = 217 Mbyte)  	Scene position is defined by satellite RSP No. (Path and Frame) and scene shift distance. Calculate the scene center time corresponding to the frame number, and extract equidistant lines above and below from the calculated time. When scene shift is specified, the center time corresponding to the shifted frame number is calculated. The image file is composed of the data for each band, and these files are not divided by odd and even number pixel. Simple stagger liner correction is not performed in level 1B1.
1B2R (Geo-reference)	70 km x 70 km (Nadir) (Size of cross-struck direction is increased at pointing) ((7100+α) x 7000 lines x 4 bands = 190 Mbyte : Default: Pixel Spacing 10m) ((4730+α) x 4667l ines x 4 bands = 84 Mbyte : Pixel Spacing 15m) ((3550+α) x 3500 lines x 4 bands = 47 Mbyte : Pixel Spacing 20m)  	Scene position is defined by satellite RSP No. (Path and Frame) and scene shift distance. Calculate the scene center time corresponding to the frame number, and extract equidistant lines above and below from the calculated time. When scene shift is specified, the center time corresponding to the shifted frame number is calculated. The image file is composed of the data for each band.

Table 2.1-1 Scene Size and Scene Definition (AVNIR-2) (2/2)

Processing Level	Scene Size	Scene Definitions and Extraction method
1B2G (Geo-coded)	Variable size (Rotated Geo-reference)  	Scene position is Map north. Geo-coded is an image that rotated a Geo-reference. Each corner of the Geo-reference image touches each side of Geo-coded image. The image size will be variable and double at the maximum. The image file is composed of the data for each band.

2.2 Definition of Scene Related Information

This section describes the definitions of the scene related information for AVNIR-2 products.

(1) Uncorrected image

AVNIR-2 has four bands, and each band has 7100-pixel CCD. The odd number pixels and the even number pixels are arrayed by stagger alignment, where both pixels are approximately 5 pixels away from each other. The odd number pixels come first and are located below (satellite direction). Since there is a registration error between bands, the imaging position of each band is not the same exactly. In this section, band three is described as an example.

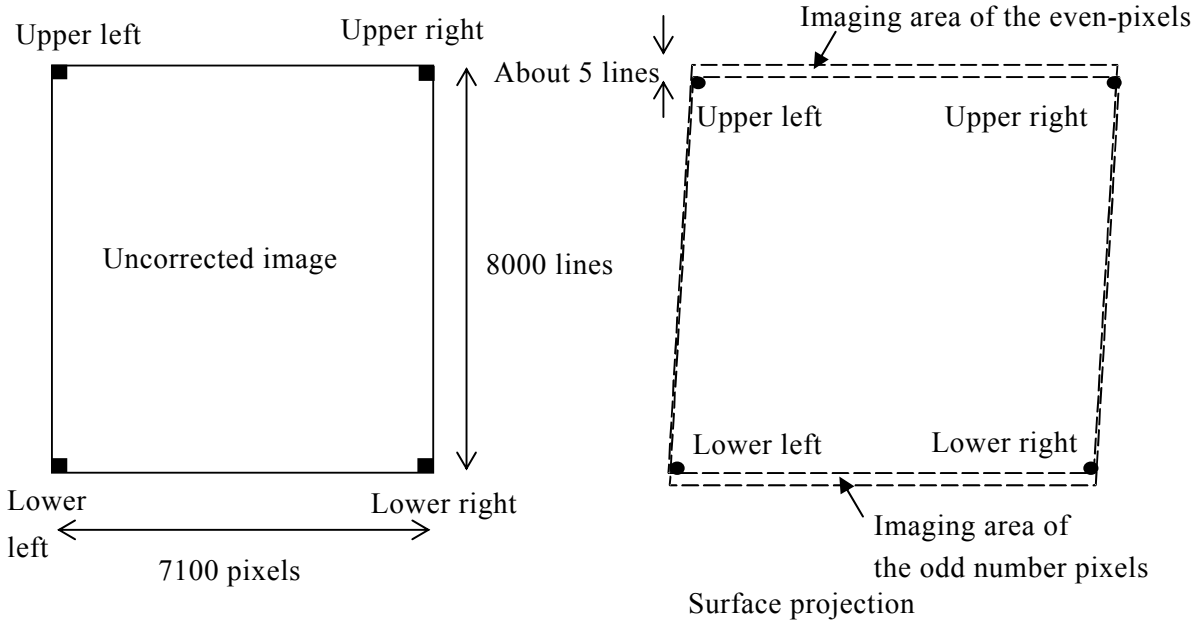


Figure 2.2-1 Concept of the Scene Related Information of AVNIR-2 Uncorrected Image

Latitude and longitude at each corner of scene:

Upper left : Latitude and longitude of the first pixel (odd pixel) at the first line

Upper right : Latitude and longitude of the position corresponding to odd number pixel of the 7100th pixel at the first line. (Even number pixel is actually placed in this position, but it is assumed that odd number pixel exists there.)

Lower left : Latitude and longitude of the position corresponding to even number pixel of the first pixel at the last line (8000th line). (Odd number pixel is actually placed in this position, but it is assumed that even number pixel exists there.)

Lower right : Latitude and longitude of the 7100th pixel (even pixel) at the last line (8000th line)

Pixel number of scene center and line number:

Pixel number: middle point between 7100 pixels (3550.5)

Line number: middle point between 8000 lines (4000.5)

Latitude and longitude at the scene center:

Latitude and longitude of the middle point between the imaging point corresponding to the odd number pixel and the imaging point corresponding to the even number pixel. Each imaging point corresponds to the above address.

(2) Level 1B2 Geo-referenced image

Level 1B2 Geo-reference image is framed based on the centerline of an uncorrected image and is a map-projected image with 70 km x 7000 lines (when pixel spacing is 10 m). Column direction of the Geo-reference image is framed to fit inside the effective area of the uncorrected image in the Geo-referenced image (variable length). Band three is used for framing. For the ascending image, image direction is flipped to make nearly north of the image upward. (Satellite direction will be upward.)

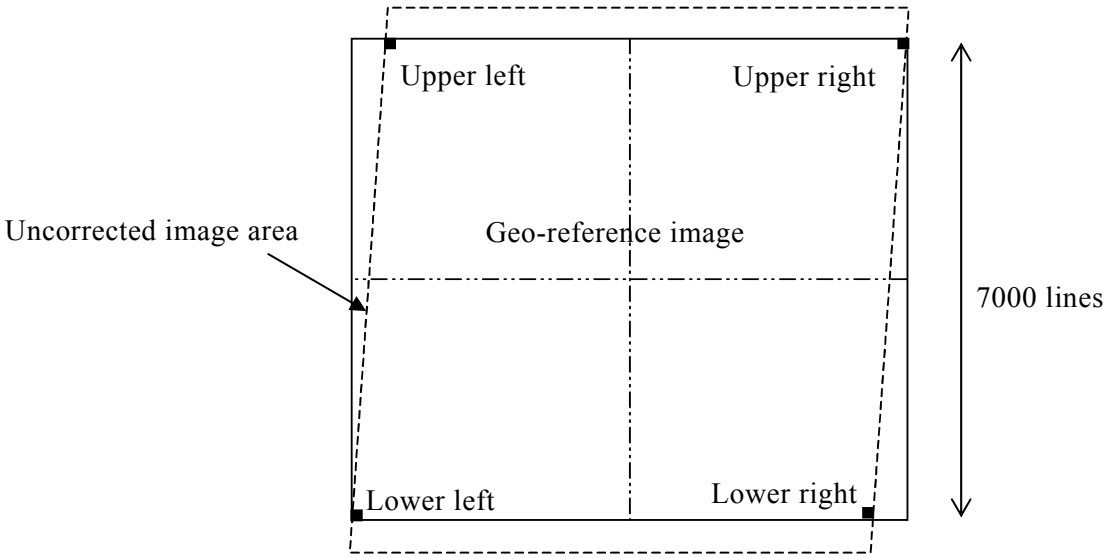


Figure 2.2-2 Concept of the Scene Related Information of AVNIR-2 1B2 Geo-referenced Image

Latitude and longitude at each corner of scene:

Upper left : Latitude and longitude of the intersection point of the first line and the first pixel of the uncorrected image (it is the line connecting the upper left and lower left of the uncorrected image).

Upper right : Latitude and longitude of the intersection point of the first line and the end pixel of the uncorrected image (it is the line connecting the upper right and lower right of the uncorrected image).

Lower left : Latitude and longitude of the intersection point of the last line and the first pixel of the uncorrected image.

Lower right : Latitude and longitude of the intersection point of the last line and the last pixel of the uncorrected image.

For ascending image, since the image has been flipped, the first pixel of the uncorrected image is started from the right side and the last pixel of the uncorrected image is located in the left side. From this reason, the calculation of the intersection point is opposite in both sides.

Pixel number of scene center and line number:

Pixel number: It is (s+1)/2 when size of the column direction is defined as s (variable).

Line number: Center line number of the image. Pixel spacing value, the number of lines, and the center line number are described as follows:

Pixel spacing	Number of lines	Cneter line number
10 m	7000 lines	3500.5
12.5 m	5600 lines	2800.5
15 m	4667 lines	2334
20 m	3500 lines	1750.5

Latitude and longitude at the scene center:

Latitude and longitude which correspond to the above address.

(3) Level 1B2 Geo-coded image

Level 1B2 Geo-coded image is made by framing to make map-north upward. In this case, framing is done by making the four corner points of the Geo-reference image touch the Geo-coded image sides.

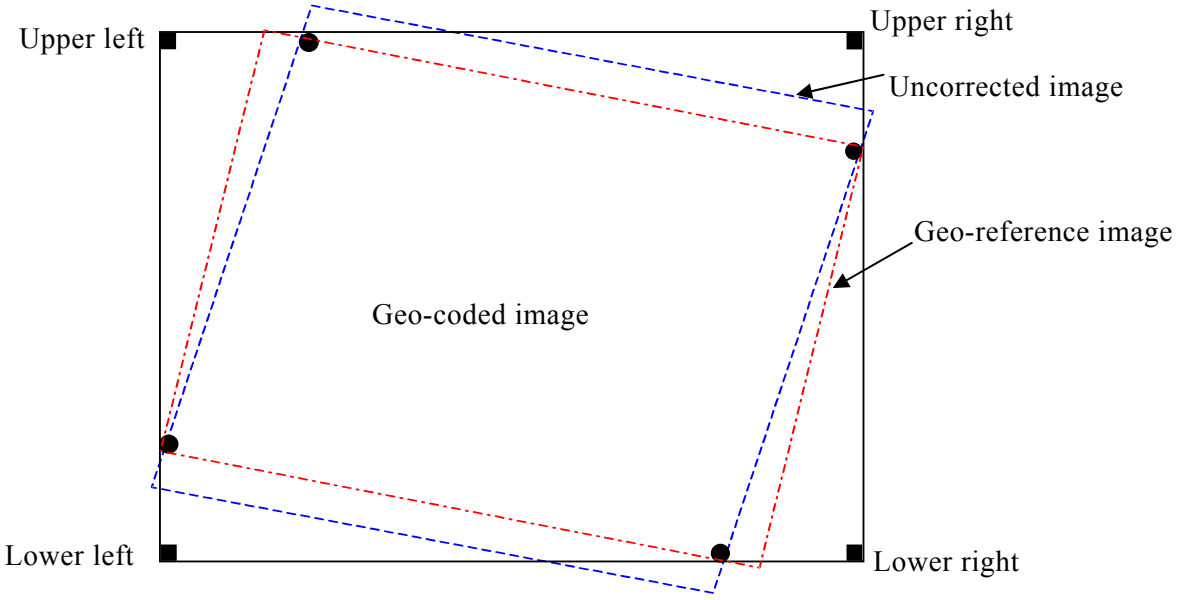


Figure 2.2-3 Concept of the Scene Related Information of AVNIR-2 1B2 Geo-coded Image

Latitude and longitude at each corner of scene:

Upper left : Latitude and longitude at the corner of the upper left pixel in the whole image including dummy area

Upper right : Latitude and longitude at the corner of the upper right pixel in the whole image including dummy area

Lower left : Latitude and longitude at the corner of the lower left pixel in the whole image including dummy area

Lower right : Latitude and longitude at the corner of the lower right pixel in the whole image including dummy area

Pixel number of scene center and line number:

Pixel number: It is (s+1)/2 when size of the column direction is defined as s (variable).

Line number: It is (l+1)/2 when the number of lines of the image is defined as l (variable).

Latitude and longitude at the scene center:

Latitude and longitude which correspond to the above address.

2.3 Definition of Processing Level

This section describes the definition of processing level of AVNIR-2 products.

(1) Level 0 (generated in the ALOS Data Recording Subsystem)

This is an AVNIR-2 raw data generated by every downlink segment and every band.
This product is divided into an equivalent size to one scene.

(2) Level 1A

This is an AVNIR-2 raw data extracted from the Level 0 data, expanded and generated lines. Ancillary information such as radiometric information and etc. required for the processing, superior to the Level 1B is added.

(3) Level 1B1

This is the data that performed radiometric correction to Level 1A data, and added the absolute calibration coefficient.
Ancillary information such as radiometric information and etc. required for the processing, superior to the Level 1B2 is added.

(4) Level 1B2

This is the data that performed geometric correction to Level 1B1 data.
The following correction options are available.
R: Geo-reference data
G: Geo-corded data
D: Rough DEM (Digital Elevation Model) correction: this option corrects the topographical influence to the areas where DEM was covered.
DEM correction is effective only in Japanese region. There is a possibility that DEM correction error will occur when pointing angle is large. In this case, accuracy is not guaranteed because interpolation is carried out in the error area.
If specifying this option outside the Japanese region, D option becomes effective, however, DEM applied product is not generated. That is; the product, which is defined as altitude = 0m, will be generated.

2.4 Format

The AVNIR-2 product is CEOS format (BSQ: Band Sequential).

2.5 Processing Parameters

This section describes the processing parameters that can specify to AVNIR-2 products.

(1) 1B2 option

This option can apply to the geometric correction for Level 1B2.

It is specified by product ID.

It is mandatory that operator choose G or R.

R: Geo-reference

G: Geo-corded

D: Rough DEM (Digital Elevation Model) correction

(Effective only in Japanese region. When DEM correction error occurred, accuracy is not guaranteed because interpolation is carried out in the error area.)

If specifying this option outside the Japanese region, D option becomes effective, however, DEM applied product is not generated. That is; the product, which is defined as altitude = 0m, will be generated.

(2) Map projection

Operator chooses UTM (Universal Transcerse Mercator) or PS (Polar Stereographic).

It is specified by product ID.

(3) Resampling

Operator chooses NN (Nearest Neighbor), CC (Cubic Convolution) or BL (Bi-Linear).

(4) UTM zone number

This is a zone number where UTM was chosen in the map projection method.

The default is the zone number corresponding to the latitude and longitude of the scene center.

(5) PS Projection parameter

This is a projection parameter where PS was chosen in the map projection method.

The default is the projection parameter corresponding to the latitude and longitude of the scene center.

(6) Map direction

This is an imagery direction on map projection.

True north or Map north. (It is valid for Geo-coded only)

(7) Accuracy of the used orbit data

It is mandatory that operator choose the precision orbit determination value only or the most accurate value from all available data.

(8) Accuracy of the used orbit attitude data

It is mandatory that operator choose the precision attitude determination value or the most accurate value from all available data.

(9) Reference ellipsoid

This is a reference ellipsoid for map projection. Geodetic coordinates system ITRF97, Ellipsoid model GRS80. (fixed)

(10) Scene shift (along track)

This is a scene shift in the along-track direction, and it is specified by frame number. There are 10 steps from –5 to +4.

(11) Pixel spacing

Operator chooses the pixel spacing from 10m, 12.5m, 15m, 20m.

Default of the pixel spacing depends on the pointing angle.

Pointing angle	0 to 31.6 degrees	31.6 to 40.3 degrees	More than 40.3 degrees
Pixel spacing	10m	15m	20m

2.6 Product Explanation

(1) Product Types

Table 2.6-1 describes the products of AVNIR-2.

(2) Production Unit

In the ALOS Data Processing Subsystem, products are processed per scene unit according to the processing work order from the ALOS Central Information System. Table 2.6-1 describes scene unit. (It corresponds to one record of processing work order and processing work result.)

Table 2.6-1AVNIR-2 Products

Level	Scene Specification	The number of files/ Contents	Unit	Size
1A	RSP (Path, frame) + Shift (Frame No.)	8/B1 to B4	Geo-reference	1*7100*8000*4 = 217M
1B1		8/B1 to B4	Geo-reference	1*7100*8000*4 = 217M
1B2R (D)		7/B1 to B4	Geo-reference	1*7100*7000*4= 190M (Standard) max.: about 450M Pixel spacing 10-15-20m: max 1*8876*7000*4 = 273M Pixel spacing 10m (Fixed): max 1*16679*7000*4 = 445.4M
1B2G (D)		7/B1 to B4	Geo-coded	Variable Twice as large as Geo-reference at the maximum = 891M

* Size = (byte) x (pixel) x (line) x (band)

(3) Production Types

Table 2.6-2 describes the production type of AVNIR-2.

Table 2.6-2 Production types of AVNIR-2

	Input	Output
Emergency processing	Level 0	Level 1A, Level 1B1, Level 1B2(Geo-reference/Geo-coded)
Near-real time processing	Level 0	Level 1A, Level 1B1, Level 1B2(Geo-reference/Geo-coded)
Routine processing (Fixed request)	Level 0	Level 1A, Level 1B1, Level 1B2(Geo-reference/Geo-coded)
Routine processing (Order processing)	Level 0	Level 1A, Level 1B1, Level 1B2(Geo-reference/Geo-coded)

All processing of AVNIR-2, emergency, near-real time, routine (fixed request) and routine (order processing) are based on the work order from the ALOS Central Information System. In the emergency processing and the near-real time processing, GPSR data is used as orbit data, and on-board data is used as attitude data.

As a general rule, in case of both the routine processing of fixed request and order processing, the precision orbit determination value and the precision attitude determination value are used.

3. Product Format

3.1 Whole Structure of Product Format

AVNIR-2 product is composed of five different files as shown below, and each file consists of multiple records.
In the geometrically uncorrected image of AVNIR-2, image file is not separated into odd number pixels and even number pixels, and simple correction for stagger-linear between odd and even number pixel is not performed. That is, the data on the same line consist of the same observation time.
Figure 3.1-1 shows the file structure of the AVNIR-2 products, and Figure 3.1-2 shows the record structure of products.
Table 3.1-1 describes the file name and record name that compose products and their contents, and Table 3.1-2 describes the naming rule of each file.

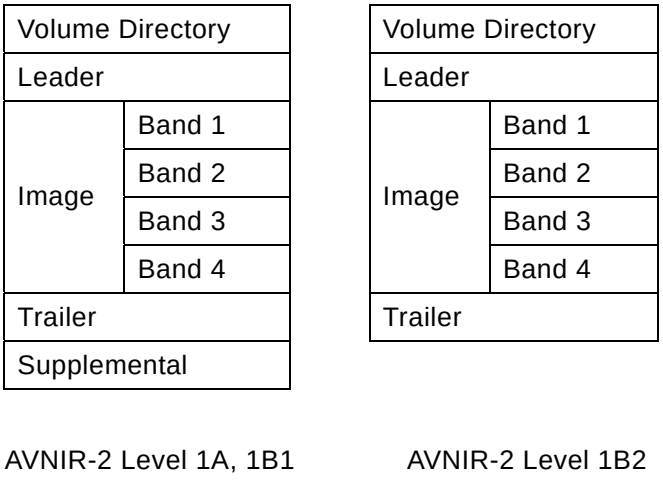


Figure 3.1-1 File Structure of AVNIR-2 Products

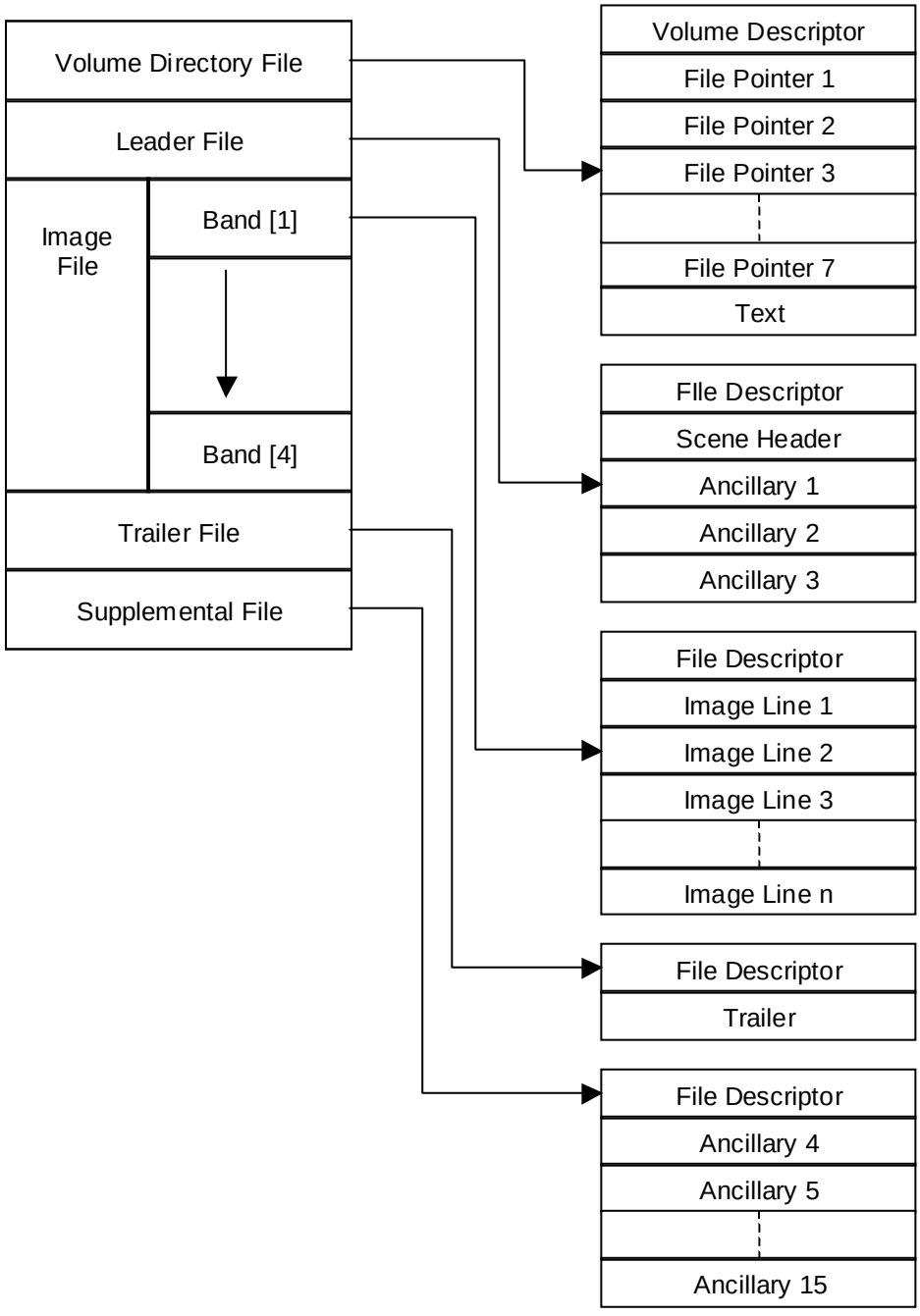


Figure 3.1-2 Record Structure of the AVNIR-2 Products

Table 3.1-1 List of AVNIR-2 File Structure

File	Record	Contents
Volume Directory	Volume descriptor	Record includes the information for identifying the logical/physical volume.
	File pointer	Record includes the information for identifying each file on each volume.
	Text	Record includes the comment for identifying products.
Leader	File descriptor	Record includes the information related to the configuration of the leader file.
	Scene header	Record includes the information related to the scene identification.
	Ancillary 1 (Map protection)	Record includes the geometric information related to the scene.
	Ancillary 2 (Radiometric collection)	Record includes the information related to radiometric feature such as gain and etc. and absolute calibration coefficient.
	Ancillary 3 (Platform position data)	The most accurate information from all available offline orbit data (ECR) is stored.
Image	File descriptor	Record includes the information related to the configuration of the image file.
	Image	Record includes the image data of each line. AUX data is added in case of Level 1A and 1B1.
Trailer	File descriptor	Record includes the information related to the configuration of the trailer file.
	Trailer	Histogram data is stored.
Supplemental	File descriptor	Record includes the information related to the configuration of the supplemental file.
	Ancillary 4 (Telemetry 1)	Record includes the PCD data.
	Ancillary 5 (Telemetry 2)	Record includes the TT&C system telemetry data.
	Ancillary 6 (Telemetry 3)	Record includes the AOCS attitude data (attitude determination 3).
	Ancillary 7 (Telemetry 4)	Record includes the GPSR data.
	Ancillary 8 (ALOS Precession orbit data)	Record includes the ALOS precision orbit data.
	Ancillary 9 (ALOS conventional orbit data)	Record includes the ALOS conventional orbit information (RARR data).
	Ancillary 10 (ALOS coordination conversion matrix)	Record includes the ALOS coordination conversion matrix.
	Ancillary 11 (ALOS time difference information)	Record includes the ALOS time difference information.
	Ancillary 12 (ALOS precision attitude determination value)	Record includes the ALOS precision attitude determination value.
	Ancillary 13 (Geometric parameter)	Record includes the geometric model parameter of AVNIR-2.
	Ancillary 14 (Dummy data)	Record includes the dummy pixel of AVNIR-2 and quality information.
	Ancillary 15 (Internal use data)	Record includes the product order parameter.

Table 3.1-2 Naming Rule of AVNIR-2 File

	Level 1A, 1B1	Level 1B2
Volume Directory File	VOL-ssssssssssssss-ppppppp	VOL-ssssssssssssss-ppppppp
Leader File	LED-ssssssssssssss-ppppppp	LED-ssssssssssssss-ppppppp
Image File	IMG-XX-ssssssssssssss-ppppppp	IMG-XX-ssssssssssssss-ppppppp
Trailer File	TRL-ssssssssssssss-ppppppp	TRL-ssssssssssssss-ppppppp
Supplemental File	SUP-ssssssssssssss-ppppppp	—

ssssssssssssss: Scene ID

ppppppp: Product ID

XX: Band number (01-04)

3.2 Description of Product Records

This section describes the format of the following eight record types.

(1) Volume Descriptor

(2) File Pointer

(3) Text

(4) File Descriptor

(5) Scene Header

(6) Ancillary

(7) Image

(8) Trailer

3.2.1 Record Data Types

Table 3.2-1 describes the definition of the data type used for record explanation.

Table 3.2-1 Data Types

Type (Abbrev.)	Description
Am	Character display (left justified unless otherwise specified).
Im	ASCII character string representing an integer (right justified).
Fm.n	Real type data display (right justified).
Gm.nEp	Real type data display (exponential – right justified).
Bm	Binary display (most significant byte first).

m….The number of digits displayed

n…..The number of digits after the decimal point

p…..The power of the exponent

3.2.2 Record Type Codes and Record Subtype Codes

Each record contains a record type code and a record subtype code (hereinafter referred to as the "subtype code") to distinguish it from other records.
Table 3.2-2 describes the type codes for each record.

Table 3.2-2 Record Types

Record Name	First Record Subtype	Record Type	Second Record Subtype	Third Record Subtype	Record Length (bytes)
Volume Descriptor	$300\|_8$	$300\|_8$	$022\|_8$	$022\|_8$	$360\|_{10}$
File Pointer	$333\|_8$	$300\|_8$	$022\|_8$	$022\|_8$	$360\|_{10}$
Text	$022\|_8$	$077\|_8$	$022\|_8$	$022\|_8$	$360\|_{10}$
File Descriptor	$077\|_8$	$300\|_8$	$022\|_8$	$022\|_8$	Variable
Scene Header	$022\|_8$	$022\|_8$	$022\|_8$	$011\|_8$	$4680\|_{10}$
Ancillary 1 (Map projection)	$044\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$4680\|_{10}$
Ancillary 2 (Radiometric)	$077\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$4680\|_{10}$
Ancillary 3 (Platform position data)	$022\|_8$	$030\|_{10}$	$022\|_8$	$024\|_8$	$9360\|_{10}$
Ancillary 4 (Telemetry 1)	$055\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$151000\|_{10}$
Ancillary 5 (Telemetry 2)	$055\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$1537000\|_{10}$
Ancillary 6 (Telemetry 3)	$055\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$1099000\|_{10}$
Ancillary 7 (Telemetry 4)	$055\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$3217000\|_{10}$
Ancillary 8 (Precision orbit data)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$529000\|_{10}$
Ancillary 9 (ALOS orbit information)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$1183000\|_{10}$
Ancillary 10 (Coordinate conversion information)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$698000\|_{10}$
Ancillary 11 (Time difference information)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$50000\|_{10}$
Ancillary 12 (Precision attitude data)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$4370000\|_{10}$
Ancillary 13 (Geometric parameter)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$12000\|_{10}$
Ancillary 14 (Dummy data)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$1904000\|_{10}$
Ancillary 15 (Internal use data)	$066\|_8$	$044\|_8$	$022\|_8$	$011\|_8$	$67000\|_{10}$
Image Data	$355\|_8$	$355\|_8$	$222\|_8$	$022\|_8$	Variable
Trailer	$022\|_8$	$366\|_8$	$022\|_8$	$011\|_8$	$4680\|_{10}$

3.3 Product Format

Detailed format of each record is given in Table 3.3-1 through Table 3.3-26.

Note: “B” in each table represents blank.

Table 3.3-1 Volume Descriptor Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record No. = $1)_{10}$	
2	5 - 5	B1	The first record subtype = $300)_8$	
3	6 - 6	B1	Record type code = $300)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $022)_8$	
6	9 - 12	B4	Record length =360 $)_{10}$	
7	13 - 14	A2	ASCII code character = ‘Ab’	
8	15 - 16	A2	Blank	
9	17 - 28	A12	Specification No. =‘ CEOS-AV2-CCT’	
10	29 - 30	A2	Revision number of specification =‘ NN’ NN : ‘Ab’ to ‘Zb’	
11	31 - 32	A2	Record format revision number = ‘NN’ NN : ‘Ab’ to ‘Zb’	
12	33 - 44	A12	Software version number = ‘AAABBBCCCDDD’ AAABBB: version and revision of the whole data processing software CCCDDD: version and revision of the whole parameter for correction	
13	45 - 60	A16	Blank	
14	61 - 76	A16	Logical volume ID = ‘MMNSSSYYYYMMDDbb’ MM : Mission name (ALOS = ’AL’) N : Mission number. (ALOS = ’1’) SSS : Sensor name (AVNIR-2 = ’AV2’) YYYY : Product preparation year (A.D.year) MM : Product preparation month DD : Product preparation day	
15	77 - 92	A16	Volume set ID = ‘MMMMMMbSSSSSSbbb’ MMMMMM : Mission name (’ALOSbb’) SSSSSS : Sensor name (AVNIR-2 = ’AVNIR2’)	
16	93 - 98	A6	Blank	

Table 3.3-1 Volume Descriptor Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
17	99 - 100	I2	Volume number of this volume descriptor record =‘b1’	
18	101 - 104	I4	Number of the first file following the volume directory file = ‘bbb1’	
19	105 - 108	I4	Logical volume number in the volume set = ‘bbb1’	
20	109 - 112	A4	Blank	
21	113 - 120	A8	Logical Volume preparation date (UT) =‘YYYYMMDD’ YYYY : A.D. year MM : Month DD : Day	
22	121 - 128	A8	Logical Volume preparation time (UT) = ‘HHMMSSbb’ HH : Hour MM : Minute SS : Second	
23	129 - 140	A12	Logical Volume preparation country = ‘JAPANbbbbbbb’	
24	141 - 148	A8	Logical Volume preparing agent = ‘JAXAbbbb’	
25	149 - 160	A12	Facility for preparing logical volume = ‘EOC-ALOS-DPS’	
26	161 - 164	I4	Number of file pointer records in the volume directory file = ‘bbb6’ to ‘bbb7’	
27	165 - 168	I4	Number of records in the volume directory file = ‘bbb8’ to ‘bbb9’	
28	169 - 360	A192	Blank	

Table 3.3-2 File Pointer Record (1/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $02)_{10}$ to $8)_{10}$	
2	5 - 5	B1	The first record subtype = $333)_8$	
3	6 - 6	B1	Record type code = $300)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $022)_8$	
6	9 - 12	B4	Record length = $360)_{10}$	
7	13 - 14	A2	ASCII code character = 'Ab'	
8	15 - 16	A2	Blank	
9	17 - 20	I4	File number of this file pointer record = 'bbb1' to 'bbb7'	
10	21 - 36	A16	File ID indicated by this file pointer = 'LLbSSSCTFFFFXXXB' LL : Satellite code = 'AL'(ALOS) SSS : Sensor type = 'AV2'(AVNIR-2) C : Sensor type = 'A'(Fixed) T : Data type (='0' to '2': Correction level) = '0' : Level 1A = '1' : Level 1B1 = '2 ': Level 1B2 FFFF : File type = 'LEAD' : Leader file = 'IMGY ': Image file = 'TRAI' : Trailer file = 'SPPL' : Supplemental XXX : Image format = 'BSQ' B : Band number = '1' to '4' (*1)	(*1) In case of the leader file, the trailer file, and the supplemental file, it will be left blank.

Table 3.3-2 File Pointer Record (2/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
11	37 - 64	A28	File class indicated by this file pointer Leader file = ‘LEADERbbbbbbbbbbbbbbbbbbbb’ Image file = ‘IMAGERYbbbbbbbbbbbbbbbbbbbb’ Trailer file = ‘TRAILERbbbbbbbbbbbbbbbbbbbb’ Supplemental file = ‘SUPPLEMENTALbbbbbbbbbbbbbbbb’	
12	65 - 68	A4	File class code indicated by this file pointer Leader file = ‘LEAD’ Image file = ‘IMGY’ Trailer file = ‘TRAI’ Supplemental file = ‘SPPL’	
13	69 - 96	A28	File data type shown in this file pointer record = ‘MIXEDbBINARYbANDbASCIIbbbbbb’ For the Image file = ‘BINARYbONLYbbbbbbbbbbbbbbbb’	
14	97 - 100	A4	File data type code shown in this file pointer record = ‘MBAA’ For the Image File = ‘BINO’	
15	101 - 108	I8	Number of records in the file shown in this file pointer record 1A, 1B1: Record # 2 → Number of records 5; Record # 3,4,5,6 → Number of records n+1; Record # 7 → Number of records 2; Record # 8 → Number of records 13 1B2: Record # 2 → Number of records 5; Record # 3,4,5,6 → Number of records n+1; Record # 7 → Number of records 2 n: Number of lines	
16	109 - 116	I8	The first record length of the file shown in this file pointer record = ’bbbb4680’ : Leader file, Trailer file ’bbbb4680’ : Supplemental file Image file : variable	

Table 3.3-2 File Pointer Record (3/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
17	117 - 124	I8	The maximum record length in the file shown in this file pointer record = ’bbbb4680’ : Leader file, Trailer file ’b4370000’ : Supplemental file Image file : variable	
18	125 - 136	A12	‘FIXEDbLENGTH’	
19	137 - 140	A4	Record length type code in the file shown in this file pointer record =‘FIXD’	
20	141 - 142	I2	Volume number containing the first record in the file shown in this file pointer record =‘b1’	
21	143 - 144	I2	Volume number containing the final record in the file shown in this file pointer record =‘b1’	
22	145 - 152	I8	The first record number of the referenced file within the volume containing this record = ‘bbbbbbb1’	
23	153 - 360	A208	Blank	

Table 3.3-3 Text Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $8)_{10}$ to $9)_{10}$	
2	5 - 5	B1	The first record subtype = $022)_8$	
3	6 - 6	B1	Record type code = $077)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $022)_8$	
6	9 - 12	B4	Record length = $360)_{10}$	
7	13 - 14	A2	ASCII code character = 'Ab'	
8	15 - 16	A2	Blank	
9	17 - 56	A40	Product ID ='PRODUCT:ABBBCCDbbbbbbbbbbbbbbbbbbbbbbbb' A : Observation mode O: Observation, C: Inner light calibration BBB : Processing level 1A_, 1B1, 1B2 CC : 1B2 option _ _: Not specified (Except level 1B2), R_: Geo-reference, G_: Geo-coded RD: Geo-reference and DEM correction GD: Geo-coded and DEM correction D : Map projection U: UTM, P: PS, _: Not specified	Product ID of work order
10	57 - 116	A60	Facility for preparing product and preparation date = 'PROCESS:JAPAN-JAXA-EOC-ALOS-DPSbbYYYYMMDDHHNNSSbbbbbbbbbbbb'	Same as the description of the logical volume in the volume descriptor.
11	117 - 156	A40	Scene ID ='ORBIT:AABBBCDDDDDEEEEbbbbbbbbbbbbbbbbbb' AA : Mission type (ALOS) BBB : Sensor type (AVNIR-2) C : Supplemental remarks of sensor type ("A" Fixed) DDDDD : Total calculated orbit number of the scene center EEEE : Frame number of the scene center	Scene ID of work order
12	157 - 160	A4	Image format = 'BSQb'	
13	161 - 360	A200	Blank	

Table 3.3-4 File Descriptor Record (Common for each file) (1/2)

Filed No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $1)_{10}$	
2	5 - 5	B1	The first record subtype = $077)_8$	
3	6 - 6	B1	Record type code = $300)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $022)_8$	
6	9 - 12	B4	Record length Leader file = $4680)_{10}$ Image file = variable Trailer file = $4680)_{10}$ Supplemental file = $4680)_{10}$	
7	13 - 14	A2	ASCII code character = 'Ab'	
8	15 - 16	A2	Blank	
9	17 - 28	A12	Manual number for logical volume format (File document number)	
10	29 - 30	A2	Revision number of manual for logical volume format	
11	31 - 32	A2	Revision number of logical volume layout (File design revision letter)	
12	33 - 44	A12	Logical volume preparation system release number	
13	45 - 48	I4	File Number Leader file 1 Imgae file 2, 3, 4, 5 (band 1, band 2, band 3, band 4) Trailer file 6 Supplemental file 7	Except the volume directory file
14	49 - 64	A16	File ID Same as for field No.10 in the file pointer record.	
15	65 - 68	A4	Record composition flag = 'FSEQ'	
16	69 - 76	I8	Record number position of each file = 'bbbbbbb1'	
17	77 - 80	I4	Field length (byte) for record data = 'bbb4'	
18	81 - 84	A4	Specified flag of record type code = 'FTYP'	
19	85 - 92	I8	Byte position of record type code = 'bbbbbbb5'	

Table 3.3-4 File Descriptor Record (Common for each file) (2/2)

Filed No.	Byte No.	Type	Description (Definition and Value)	Remarks
20	93 - 96	I4	Field length of record type code = ‘bbb4’	
21	97 - 100	A4	Specified flag of record length = ‘FLGT’	
22	101 - 108	I8	Byte position of record length = ‘bbbbbbb9’	
23	109 - 112	I4	Number of bytes of record length = ‘bbb4’	
24	113 - 113	A1	Flag for data conversion information in the file descriptor record = ‘N’	
25	114 - 114	A1	Flag for data conversion information in records other than the file descriptor record =‘N’(i.e., not included)	
26	115 - 115	A1	Flag for data display information in the file descriptor record = ‘N’(i.e., not included)	
27	116 - 116	A1	Flag for data display information in records other than the file descriptor record = ‘N’(i.e., not included)	
28	117 - 180	A64	Blank	
29	181 -		Continuation area of the specific file descriptor. Refer to the tables for respective file descriptor.	

Table 3.3-5 Leader File Descriptor Record (1/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 180		Common file descriptor	
2	181 - 186	I6	Number of scene header records = ‘bbbbb1’	
3	187 - 192	I6	Length of scene headaer record = ‘bb4680’	
4	193 - 198	I6	Number of ancillary records = ‘bbbbb3’	
5	199 - 204	I6	Length of ancillary record = ‘bb4680’	
6	205 - 210	A6	Blank	
7	211 - 216	A6	Blank	
8			Scene ID field locator	
8.1	217 - 222	I6	Record number = ‘bbbbb2’	
8.2	223 - 228	I6	Data start byte number = ‘bbbb37’: Level 1A, 1B1 ‘bbb197’: Level 1B2	
8.3	229 - 231	I3	Number of bytes = ‘b16’	
8.4	232 - 232	A1	Data type = ‘A’	
9			RSP ID locator	
9.1	233 - 238	I6	Record number = ‘bbbbb2’	
9.2	239 - 244	I6	Data start byte number = ‘bbb165’	
9.3	245 - 247	I3	Number of bytes = ‘b16’	
9.4	248 - 248	A1	Data type = ‘A’	
10			Mission ID locator	
10.1	249 - 254	I6	Record number = ‘bbbbb2’	
10.2	255 - 260	I6	Data start byte number = ‘bbb309’	
10.3	261 - 263	I3	Number of bytes = ‘b16’	
10.4	264 - 264	A1	Data type = ‘A’	
11			Sensor ID locator	
11.1	265 - 270	I6	Record number = ‘bbbbb2’	
11.2	271 - 276	I6	Data start byte number = ‘bbb325’	
11.3	277 - 279	I3	Number of bytes = ‘b16’	
11.4	280 - 280	A1	Data type = ‘A’	

Table 3.3-5 Leader File Descriptor Record (2/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
12			Scene center time locator	
12.1	281 - 286	I6	Record number = ‘bbbbb2’	
12.2	287 - 292	I6	Data start byte number = ‘bbb117’	
12.3	293 - 295	I3	Number of bytes = ‘b32’	
12.4	296 - 296	A1	Data type = ‘A’	
13			Scene center latitude/longitude locator	
13.1	297 - 302	I6	Record number = ‘bbbbb2’	
13.2	303 - 308	I6	Data start byte number = ‘bbbb53’: Level 1A, 1B1 ‘bbb213’: Level 1B2	
13.3	309 - 311	I3	Number of bytes = ‘b32’	
13.4	312 - 312	A1	Data type = ‘N’	
14			Processing level locator	
14.1	313 - 318	I6	Record number = ‘bbbbb2’	
14.2	319 - 324	I6	Data start byte number = ‘bb1573’	
14.3	325 - 327	I3	Number of bytes = ‘b16’	
14.4	328 - 328	A1	Data type = ‘A’	
15			Image format locator	
15.1	329 - 334	I6	Record number = ‘bbbbb2’	
15.2	335 - 340	I6	Data start byte number = ‘bb1717’	
15.3	341 - 343	I3	Number of bytes = ‘b16’	
15.4	344 - 344	A1	Data type = ‘A’	
16			Effective band locator	
16.1	345 - 350	I6	Record number = ‘bbbbb2’	
16.2	351 - 356	I6	Data start byte number = ‘bb1653’	
16.3	357 - 359	I3	Number of bytes = ‘b64’	
16.4	360 - 360	A1	Data type = ‘A’	
17	361 - 376	A16	Blank	
18			Nominal pixel size locator	
18.1	377 - 382	I6	Record number = ‘bbbbb3’	

Table 3.3-5 Leader File Descriptor Record (3/3)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
18.2	383 - 388	I6	Data start byte number = ‘bbb541’	
18.3	389 - 391	I3	Number of bytes = ‘b32’	
18.4	392 - 392	A1	Data type = ‘N’	
19	393 - 408	A16	Blank	
20	409 - 424	A16	Blank	
21	425 - 4680	A4256	Blank	

Table 3.3-6 Scene Header Record (1/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $2)_{10}$	
2	5 - 5	B1	The first record subtype = $022)_8$	
3	6 - 6	B1	Record type code = $022)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $4680)_{10}$	
7	13 - 16	I4	Header record number = 'bbb1'	
8	17 - 20	A4	Blank	
9	21 - 36	A16	Product ID ='ABBBCCDbbbbbbbbb' A : Observation mode O: Observation, C: Internal lamp calibration BBB: Processing level 1A_, 1B1, 1B2 CC : 1B2 option _ _: Not specified (Except Level 1B2)、R_: Geo-reference、G_: Geo-coded、 RD: Geo-reference and DEM correction GD: Geo-coded and DEM correction D : Map projection U: UTM, P: PS, : Not specified	Product ID of work order
10	37 - 52	A16	Uncorrected scene ID = 'AABBBCDDDDDEEEEb' AA : Mission type (ALOS) BBB : Sensor type (AVNIR-2) C : Supplemental remarks of sensor type("A" Fixed) DDDDD : Total calculated orbit number of the scene center EEEE : Frame number of the scene center	Data for fields No.10 to No.16 are as follows: - Effective for Level 1A and 1B1 only. - For Level 1B2: Field No.10, No.15 will be left blank. Field No.16 will be 0. Field No.11 to No14 will be bbbbbbb0.0000000.

Table 3.3-6 Scene Header Record (2/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
11	53 - 68	F16.7	Level 1A and 1B1 scene center latitude (degree) (*1) = 'bbbbbLNN.NNNNNNN' L: North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (-90.0000000 to 90.0000000)	
12	69 - 84	F16.7	Level 1A and level 1B1 scene center longitude (degree) (*1) = 'bbbbWNNN.NNNNNNN' W: East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-179.9999999 to 180.0000000)	
13	85 - 100	F16.7	Line number for level 1A and level 1B1 of the scene center	
14	101 - 116	F16.7	Pixel number for level 1A and level 1B1 of the scene center	
15	117 - 148	A32	Scene center time = 'YYYYMMDDHHMMSSXXXZZZbbbbbbbbbbb' YYYY : Year (Four digits of A.D. year) MM : Month DD : Day HH : Hour MM : Minute SS : Second XXX : Millisecond ZZZ : microsecond	
16	149 - 164	I16	Time offset from nominal RSP center (millisecond - zero for any time less than a millisecond)	
17	165 - 180	A16	RSP ID = 'MPPPFFFFSNbbbbbb' M : Ascending / Descending node ('A' or 'D') PPP : RSP Path number FFFF : RSP Frame number SN : RSP Scene shift (-5 to b4)	When the scene shift is at a value other than 0, the value of RSP frame number will be the RSP frame number where scene shift value is 0.
18	181 - 196	I16	Orbits per cycle	

Table 3.3-6 Scene Header Record (3/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
19	197 - 212	A16	Level 1B2 scene ID =‘AABBBCDDDDDEEEEb’ AA : Mission type (ALOS) BBB : Sensor type (AVNIR-2) C : Supplemental remaks of sensor type ("A" Fixed) DDDDD : Total calculated orbit number of the scene center EEEE : Frame number of the scene center	Data for fields No.19 to No.23 are as follows: - Effective for Level 1B2 only - For Level 1A and 1B1: Field No.19 will be left blank, and All data for field No.20 to No.23 will be bbbbbbb0.0000000.
20	213 - 228	F16.7	Level 1B2 scene center latitude (degree) (*1) = ‘bbbbbLNN.NNNNNNN’ L : Noth latitude (’b’) or South latitude (’-’) NN.NNNNNNN : Latitude (-90.0000000 to 90.0000000)	
21	229 - 244	F16.7	Level 1B2 scene center longitude (degree) (*1) = ‘bbbbWNNN.NNNNNNN’ W : East longitude (’b’) or West longitude (’-’) NNN.NNNNNNN : Longitude (-179.9999999 to 180.0000000)	
22	245 - 260	F16.7	Line number for Level 1B2 scene center	
23	261 - 276	F16.7	Pixel number for Level 1B2 scene center	
24	277 - 292	A16	Orientation Angle = ‘bbbbbbbbbbbNNN.N’ NNN.N = degrees	
25	293 - 308	A16	Incident angle = ‘SNN.Nbbbbbbbbbbb’ S = ‘R’ or ‘L’	
26	309 - 324	A16	Mission ID = ‘ALOSbbbbbbbbbbb’	
27	325 - 340	A16	Sensor ID = ‘AVNIR-2Mbbbbbbbb’	
28	341 - 356	I16	Calculated orbit number (cummulative - i.e., number of orbits since launch)	
29	357 - 372	A16	Orbit direction = ‘Dbbbbbbbbbbbbbb’ or ‘Abbbbbbbbbbbbbb’	
30	373 - 388	A16	Off-Nadir Mirror Pointing Angle = ‘bbbbbbbbSNN.NNN’ (*1) SNN.NNN = degrees (-44.000 to b44.000) (For observation mode)	For calibration mode, pointing angle will be >44.0 degree.

Table 3.3-6 Scene Header Record (4/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
31	389 - 389	A1	Blank	
32	390 - 400	A11	Blank	
33	401 - 408	A8	Date image was taken =‘DDMMMYYb’ DD : Day (‘01’ to ‘31’) MMM : Month (‘Jan’ to ‘Dec’) YY : Year (Last two digits)	
34	409 - 425	A17	Latitude and longitude of scene center (degree, minute) = ‘CbLDD-MM/WDDD-MMb’ L : North latitude (‘N’) or South latitude (‘S’) DD,DDD : Degree MM : Minute (discard the number under the unit of minute) W: East longitude (‘E’) or West longitude (‘W’)	In Level 1A and Level 1B1, latitude and longitude of field No.11 and No.12 are converted into degrees and minutes. In Level 1B2, latitude and longitude of field No.20 and No.21 are converted into degrees and minutes.
35	426 - 442	A17	Blank	
36	443 - 452	A10	Type of sensor and spectrum band identification = ‘XXXbBBBBbb’ XXX : Sensor type = ‘AV2’(AVNIR-2) BBBB : Band = ‘1234’	
37	453 - 466	A14	Sun angle at product scene center =‘SUNbELGGGbAHHH’ GGG : Elevation of the sun (degree - value will be " - " (negative) when the sun is below the horizon. (-90 to 90) HHH : Azimuth of the sun (degree - value measured clockwise from north) (0 to 359)	

Table 3.3-6 Scene Header Record (5/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
38	467 - 478	A12	Processing code = ‘GGP-R-XXXbbb’ GG : Type of correction: ‘1A’ : Level 1A ‘B1’ : Level 1B1 ‘B2’ : Level 1B2 P : Map projection method: ‘b’ : Level 1A, Level 1B1 ‘U’ : UTM ‘P’ : PS R : Resampling method: ‘B’ : Bi-linear ‘C’ : Cubic convolution ‘N’ : Nearest neighbor ‘b’ : Uncorrected XXXbbb : Processing option = ‘RGD’ Options are left justified and reported in the following order: ‘R’ : Geo-reference ‘G’ : Geo-coded ‘D’ : Rough DEM correction	
39	479 - 490	A12	Identification of competent agent and project =‘JAXAALOSbbbb’	
40	491 - 506	A16	Scene ID =‘AABBBCDDDDDEEEEb’ AA : Mission type (ALOS) BBB : Sensor type (AVNIR-2) C : Supplemental remarks of sensor type ("A" Fixed) DDDDD : Total calculated orbit number of the scene center EEEE : Frame number of the scene center	Scene ID of work order.
41	507 - 516	A10	Blank	
42	517 - 1396	A880	Blank	
43	1397 - 1412	A16	Blank	

Table 3.3-6 Scene Header Record (6/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
44	1413 - 1428	I16	Number of effective bands in image = Number of effective bands shown by field No.58 If there is no effective band, it should always be ‘bbbbbbbbbbbbbb4’	
45	1429 - 1444	I16	Number of pixels per line in image	
46	1445 - 1460	I16	Number of scene lines in image	
47	1461 - 1476	A16	Blank	
48	1477 - 1492	A16	Blank	
49	1493 - 1508	I16	Radiometric resolution = ‘bbbbbbbbbbbbbb8’	
50	1509 - 1524	A16	Blank	
51	1525 - 1540	A16	Level 1B2 option = ‘RGDbbbbbbbbbbbbb’ ‘R’ : Geo-reference ‘G’ : Geo-coded ‘D’ : Rough DEM correction	
52	1541 - 1556	A16	Resampling method = ‘NNNNNbbbbbbbbbb’: Raw (L1A, L1B1) ‘YNNNNbbbbbbbbbb’: Nearest neighbor ‘NNYNNbbbbbbbbbb’: Cubic convolution ‘NYNNNbbbbbbbbbb’: Bi-linear	
53	1557 - 1572	A16	Map projection method = ‘NNNNNbbbbbbbbbb’: Raw (L1A, L1B1) ‘YNNNNbbbbbbbbbb’: UTM ‘NNNNYbbbbbbbbbb’: PS	
54	1573 - 1588	A16	Correction level = ‘Tbbbbbbbbbbbbbb’ T=‘0’: Raw (Level 1A) ‘1’: radiometrically corrected and geometrically raw (Level 1B1) ‘2’: radiometrically corrected and geometrically corrected (Level 1B2)	
55	1589 - 1604	I16	Number of map projection ancillary records = ‘bbbbbbbbbbbbbb1’	
56	1605 - 1620	I16	Number of radiometric ancillary records = ‘bbbbbbbbbbbbbb1’	
57	1621 - 1652	A32	Blank	

Table 3.3-6 Scene Header Record (7/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
58	1653 - 1716	64I1	Effective band (CCD) = '1234bbbbbbbbbbbbbbbbbbbbbbbb bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb' Use 'b' in place of band number if band is not effective, for example, '12bbbb to b'	
59	1717 - 1732	A16	Image format = 'BSQbbbbbbbbbbbbb'(fixed)	
60	1733 - 1748	F16.7	Latitude of scene left upper corner (degree) (*1) = 'bbbbbLNN.NNNNNNN' L : North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (-90.0000000 to 90.0000000)	As to the definition of field No.60 to No.67, refer to Section 2.2. Filed No.60 to No.67, at the internal light calibration, the value calculated as the pointing angle is zero degree will be stored
61	1749 - 1764	F16.7	Longitude of scene left upper corner (degree) (*1) = 'bbbbWNNN.NNNNNNN' W : East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-179.9999999 to 180.0000000)	
62	1765 - 1780	F16.7	Latitude of scene right upper corner (degree) (*1) = 'bbbbbLNN.NNNNNNN' L : North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (-90.0000000 to 90.0000000)	
63	1781 - 1796	F16.7	Longitude of scene right upper corner (degree) (*1) = 'bbbbWNNN.NNNNNNN' W : East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-179.9999999 to 180.0000000)	
64	1797 - 1812	F16.7	Latitude of scene left lower corner (degree) (*1) = 'bbbbbLNN.NNNNNNN' L : North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (-90.0000000 to 90.0000000)	

Table 3.3-6 Scene Header Record (8/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
65	1813 - 1828	F16.7	Longitude of scene left lower corner (degree) (*1) = 'bbbbWNNN.NNNNNNN' W : East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-179.9999999 to 180.0000000)	
66	1829 - 1844	F16.7	Latitude of scene right lower corner (degree) (*1) = 'bbbbbLNN.NNNNNNN' L : North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (-90.0000000 to 90.0000000)	
67	1845 - 1860	F16.7	Longitude of scene right lower corner (degree) (*1) = 'bbbbWNNN.NNNNNNN' W : East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-179.9999999 to 180.0000000)	
68	1861 - 1862	I2	Time system status '00': GPS time system '01': DMS time system	
69	1863 - 1864	I2	Absolute navigation status '00' : Kalman filter convergence '01' : Kalman filter navigation (not convergence) '02' : AG filter navigation '03' : No navigation '99' : Invalid	When offline orbit data is used, '99' (Invalid) is stored.
70	1865 - 1866	I2	Attitude determination flag '00' : Precision attitude determination system '01' : Standard attitude determination system '99' : Invalid	

Table 3.3-6 Scene Header Record (9/9)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
71	1867 - 1868	I2	Accuracy of used orbit data ‘10’: Precision (accuracy index A) ‘11’: Precision (accuracy index B) ‘12’: Precision (accuracy index C) ‘13’: Precision (accuracy index D) ‘14’: Precision (accuracy index E) ‘15’: Precision (accuracy index unknown) ‘20’: RARR_Determine ‘30’: RARR_Predict ‘40’: GPSR_Raw ‘50’: GPSR_PCD	
72	1869 - 1870	I2	Accuracy of used attitude data ‘20’: OnSitePrecision ‘30’: AOCS_Precision ‘40’: PCD_Precision ‘50’: Standard	
73	1871 - 1872	I2	Yaw steering flag ‘b0’: NOT_EXE ‘b1’: START ‘b2’: WAIT ‘b3’: EXE ‘b4’: END ‘99’: Unknown	
74	1873 - 4680	2808A	Blank	

(*1) For latitude and longitude, there is no blank between symbol (-) and numeric value. Sample) -1.0 → bbbbbb-1.0000000

Table 3.3-7 Ancillary 1 (Map Projection) Record (1/5)

Field No.	Byte No.	Type	Description (Definition and Value)	Remaks
1	1 - 4	B4	Record number = $3)_{10}$	
2	5 - 5	B1	The first record subtype = $044)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $4680)_{10}$	
7	13 - 28	I16	Number of nominal pixels per line	Field No.7 to No.11 are valid for Level 1A and 1B1 only. For Level 1B2, these fields will be left blank.
8	29 - 44	I16	Number of nominal lines per scene	
9	45 - 60	F16.7	Nominal inter-pixel distance of the scene center (meter)	
10	61 - 76	F16.7	Nominal inter-line distance of the scene center (meter)	
11	77 - 92	F16.7	Image skew (milliradian) of the scene center	
12	93 - 96	I4	Hemisphere = 'bbb0': North Hemisphere 'bbb1': South Hemisphere	Field No.12 to No.20 are valid for Level 1B2 UTM projection products only. For other products, these fields will be left blank.
13	97 - 108	I12	UTM zone number (1 to 60: left justified)	
14	109 - 124	A16	Blank	
15	125 - 140	A16	Blank	
16	141 - 156	F16.7	Scene center position (Northing - km)	This is a value that the latitude and longitude of the scene center are converted into UTM coordinates. The following offset is included. False Northing = 10,000km (case of the south hemisphere)
17	157 - 172	F16.7	Scene center position (Easting - km)	False Easting = 500km
18	173 - 188	A16	Blank	

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Table 3.3-7 Ancillary 1 (Map Projection) Record (2/5)

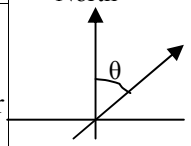
Field No.	Byte No.	Type	Description (Definition and Value)	Remaks
19	189 - 204	A16	Blank	North  Map projection vertical axis θ
20	205 - 220	F16.7	Angle between the map projection vertical axis and the true north at scene center (radian)	
21	221 - 332	A112	Blank	
22	333 - 348	F16.7	Latitude of map projection origin (degree) = 'bbbbbLNN.NNNNNNN' (*1) L: North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude	Field No.22 to No.32 are valid for Level 1B2 polarstereographic projection products only. For other products, these fields will be left blank.
23	349 - 364	F16.7	Longitude of map projection origin (degree) = 'bbbbWNNN.NNNNNNN' (*1) W: East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude	
24	365 - 380	F16.7	Reference latitude (degree) = 'bbbbbLNN.NNNNNNN' (*1) L: North latitude ('b') or South latitude ('-') NN.NNNNNNN: Latitude (30.0000000 < Reference latitude <= 90.0000000) : North Hemisphere -90.0000000 <= Reference latitude < -30.0000000) : South Hemisphere)	
25	381 - 396	F16.7	Reference longitude(degree) = 'bbbbWNNN.NNNNNNN' (*1) W: East longitude ('b') or West longitude ('-') NNN.NNNNNNN: Longitude (-180.0000000 < Reference longitude <= 180.0000000)	
26	397 - 412	A16	Blank	
27	413 - 428	A16	Blank	
28	429 - 444	F16.7	X coordinates of the scene center (km)	This is a value that the latitude and longitude of the scene center are converted into PS coordinates.
29	445 - 460	F16.7	Y coordinates of the scene center (km)	
30	461 - 476	A16	Blank	
31	477 - 492	A16	Blank	
32	493 - 508	F16.7	Angle between the map projection axis and the true north at scene center (radian). See field No.20 for definition.	

Table 3.3-7 Ancillary 1 (Map Projection) Record (3/5)

Field No.	Byte No.	Type	Description (Definition and Value)	Remaks
33	509 - 524	F16.7	Number of nominal pixels per line	Field No.33 to No.48 are the data related to corrected scene and are valid for Level 1B2 only. For level 1A and 1B1, these fields will be left blank.
34	525 - 540	F16.7	Number of nominal lines per scene	
35	541 - 556	F16.7	Nominal output inter-pixel distance (pixel spacing)	
36	557 - 572	F16.7	Nominal output inter-line distance (pixel spacing)	
37	573 - 588	A16	Blank	
38	589 - 604	A16	Blank	
39	605 - 620	A16	Blank	
40	621 - 636	F16.7	Angle between the map projection axis and the true north of scene center (radian)	UTM: Same as field No.20. PS: Same as field No.32.
41	637 - 652	F16.7	Nominal satellite orbit inclination (degree)	
42	653 - 668	F16.7	Longitude of nominal ascending node (radian)	
43	669 - 684	F16.7	Nominal satellite altitude (km)	
44	685 - 700	F16.7	Nominal ground speed (km/sec)	
45	701 - 716	F16.7	Satellite heading angle (radian) including earth rotation of the scene center	
46	717 - 732	F16.7	= bbbbbbb0.0000000	
47	733 - 748	F16.7	Swath angle (nominal - degree)	
48	749 - 764	F16.7	Nominal scan rate (scan/sec)	
49	765 - 780	A16	Name of reference ellipsoid = ’GRS80bbbbbbbbbbb’	Field No.49 to No.52 store the reference ellipsoid data.
50	781 - 796	F16.7	Semimajor axis of reference ellipsoid (meter)	
51	797 - 812	F16.7	Semiminor axis of reference ellipsoid (meter)	
52	813 - 828	A16	Geodetic coordinate name = ’ITRF97bbbbbbbbbb’	
53	829 - 956	A128	Blank	

Table 3.3-7 Ancillary 1 (Map Projection) Record (4/5)

Field No.	Byte No.	Type	Description (Definition and Value)	Remaks
54	957 - 1196	10G24.16E	Level 1B2 (pixel, line), (latitude, longitude) transformation coefficients: $\phi = \phi_0 + \phi_1 I + \phi_2 J + \phi_3 IJ + \phi_4 I^2 + \phi_5 J^2 + \phi_6 I^2 J + \phi_7 IJ^2 + \phi_8 I^3 + \phi_9 J^3$ $\lambda = \lambda_0 + \lambda_1 I + \lambda_2 J + \lambda_3 IJ + \lambda_4 I^2 + \lambda_5 J^2 + \lambda_6 I^2 J + \lambda_7 IJ^2 + \lambda_8 I^3 + \lambda_9 J^3$ $I = I_0 + I_1 \phi + I_2 \lambda + I_3 \phi\lambda + I_4 \phi^2 + I_5 \lambda^2 + I_6 \phi^2\lambda + I_7 \phi\lambda^2 + I_8 \phi^3 + I_9 \lambda^3$ $J = J_0 + J_1 \phi + J_2 \lambda + J_3 \phi\lambda + J_4 \phi^2 + J_5 \lambda^2 + J_6 \phi^2\lambda + J_7 \phi\lambda^2 + J_8 \phi^3 + J_9 \lambda^3$ Where: (I, J) are pixel and line of corrected image. (ϕ, λ) are degrees of latitude and longitude. Storage format = SN.NNNNNNNNNNNNNNNNESNN S: Sign (G24.16E3) Stores ten coefficients from ϕ_0 to ϕ_9	Field No.54 to No.57 are valid for LevelB2 product. For Level 1A and 1B1 products, these fileds will be left blank. Image address is started at 1. There is a possibility that an error could occur to the conversion result depending on the imaging and processing conditions. It does not cover scenes that go over 180 degrees.
55	1197 - 1436	10G24.16E	Stores ten coefficients from λ_0 to λ_9	
56	1437 - 1676	10G24.16E	Stores ten coefficients from I_0 to I_9	
57	1677 - 1916	10G24.16E	Stores ten coefficients from J_0 to J_9	
58	1917 - 1964	6B8	Coefficient of F4 function (a, b, c, d, e, f) $\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} e \\ f \end{pmatrix}$ (x,y): Map coordinate (x',y'): Corrected Image address	Field No.58 is valid for Level 1B2 product only. For Level 1A and 1B1 products, this field will be left blank. Map projection origin = (0,0). In case of UTM, map coordinate at an intersection of the equator and UTM zone refelence circles of longitude = (0,0)

Table 3.3-7 Ancillary 1 (Map Projection) Record (5/5)

Field No.	Byte No.	Type	Description (Definition and Value)	Remaks
59	1965 - 2044	10B8	Level 1B1(pixel, line), (latitude, longitude) transformation coefficients Band 1 Stores ten coefficients from ϕ 0 to ϕ 9	Field No.59 to No.74 are valid for Level 1A and 1B1 products. For Level 1B2 products, these fileds will be left blank. Image address is started at 1. Coefficient is only for the even pixels. There is a possibility that an error could occur to the conversion result depending on the imaging and processing conditions. It does not cover scenes that go over 180 degrees.
60	2045 - 2124	10B8	Stores ten coefficients from λ 0 to λ 9	
61	2125 - 2204	10B8	Stores ten coefficients from I0 to I9	
62	2205 - 2284	10B8	Stores ten coefficients from J0 to J9	
63	2285 - 2364	10B8	Level 1B1(pixel, line), (latitude, longitude) transformation coefficients Band 2 Stores ten coefficients from ϕ 0 to ϕ 9	
64	2365 - 2444	10B8	Stores ten coefficients from λ 0 to λ 9	
65	2445 - 2524	10B8	Stores ten coefficients from I0 to I9	
66	2525 - 2604	10B8	Stores ten coefficients from J0 to J9	
67	2605 - 2684	10B8	Level 1B1(pixel, line), (latitude, longitude) transformation coefficients Band 3 Stores ten coefficients from ϕ 0 to ϕ 9	
68	2685 - 2764	10B8	Stores ten coefficients from λ 0 to λ 9	
69	2765 - 2844	10B8	Stores ten coefficients from I0 to I9	
70	2845 - 2924	10B8	Stores ten coefficients from J0 to J9	
71	2925 - 3004	10B8	Level 1B1(pixel, line), (latitude, longitude) transformation coefficients Band 4 Stores ten coefficients from ϕ 0 to ϕ 9	
72	3005 - 3084	10B8	Stores ten coefficients from λ 0 to λ 9	
73	3085 - 3164	10B8	Stores ten coefficients from I0 to I9	
74	3165 - 3244	10B8	Stores ten coefficients from J0 to J9	
75	3245 - 4680	1436A	Blank	

(*1) For latitude and longitude, there is no blank between symbol (-) and numeric value. Sample) -1.0 → bbbbbb-1.0000000

Table 3.3-8 Ancillary 2 (Radiometric Calibration) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $4)_{10}$	
2	5 - 5	B1	The first record subtype = $077)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $4680)_{10}$	
7	13 - 16	A4	Sensor operation mode = 'xxxb' XXX = 'OBS' : Observation 'CA1' : Calibration using internal lamp A 'CA2' : Calibration using internal lamp B 'CA3' : Calibration using both internal lamp A and B 'CA4' : Calibration using both internal lamp A and B, after Calibration using internal lamp A 'CA5' : Calibration using both internal lamp A and B, after Calibration using internal lamp B	
8	17 - 20	I4	Lower limit of strength after correction = 'bbb0'	
9	21 - 24	I4	Upper limit of strength after correction = 'b255'	
10	25 - 29	I5	Exposure coefficient - Band 1	The values in Field No.10 to No.13 can be converted into the corresponding real values between 0 and 1 by multiplying by 10^{-4}.
11	30 - 34	I5	Exposure coefficient - Band 2	
12	35 - 39	I5	Exposure coefficient - Band 3	
13	40 - 44	I5	Exposure coefficient - Band 4	
14	45 - 54	A10	Blank	
15	55 - 55	A1	Blank	
16	56 - 56	A1	Blank	
17	57 - 62	A4	Sensor gains ='ABCD' (A: Band 1, B: Band 2, C: Band 3, D: Band 4) '1': Gain 1 '2': Gain 2 '3': Gain 3 '4': Gain 4	This field stores a typical gain of one scene for every band.
18	63 - 63	A1	Blank	

Table 3.3-8 Ancillary 2 (Radiometric Calibration) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
19	64 - 66	A3	Blank	
20	67 - 78	A12	Blank	
21	79 - 86	F8.3	Detector temperature Band 1 (degree) = 'NNNN.NNN'	
22	87 - 94	F8.3	Detector temperature Band 2 (degree) = 'NNNN.NNN'	
23	95 - 102	F8.3	Detector temperature Band 3 (degree) = 'NNNN.NNN'	
24	103 - 110	F8.3	Detector temperature Band 4 (degree) = 'NNNN.NNN'	
25	111 - 118	F8.3	Temperature of detector assembly band 1 (degree) = 'NNNN.NNN'	The content of field No.25 to No.28 is common to those of No.21 to No.24.
26	119 - 126	F8.3	Temperature of detector assembly band 2 (degree) = 'NNNN.NNN'	
27	127 - 134	F8.3	Temperature of detector assembly band 3 (degree) = 'NNNN.NNN'	
28	135 - 142	F8.3	Temperature of detector assembly band 4 (degree) = 'NNNN.NNN'	
29	143 - 150	F8.3	Temperature of signal processing unit (degree) = 'NNNN.NNN'	
30	151 - 2686	A2536	Blank	
31	2687 - 2694	A8	Blank	
32	2695 - 2702	A8	Blank	
33	2703 - 2718	2F8.4	Absolute calibration coefficient (Gain and Offset) The following gains and offsets are for conversion from calibrated digital numbers to radiances. L=O*a+b L:radiances(W/m2/sr/μm) O:calibrated digital numbers(count) a:Gain b:Offset	
34	2719 - 2734	2F8.4	Band 2 gain, offset	
35	2735 - 2750	2F8.4	Band 3 gain, offset	
36	2751 - 2766	2F8.4	Band 4 gain, offset	
37	2767 - 4680	A1914	Blank	

Table 3.3-9 Ancillary 3 (Platform Position Data) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $5)_{10}$	
2	5 - 5	B1	The first record subtype = $022)_8$	
3	6 - 6	B1	Record type code = $036)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $024)_8$	
6	9 - 12	B4	Record length = $4680)_{10}$	
7	13 - 44	A32	Type of orbital elements = 'Abbbbbbbbbbbbbbbbbbbbbbbbbbbbbb' A: 0: ALOS conventional orbit data (predictive orbit data: ECR) 1: ALOS conventional orbit data (definitive orbit data: ECR) 2: ALOS precision orbit data (ECR)	
8	45 - 60	F16.7	Orbital element 1 Positional vector on earth fixed coordinates of the scene center (x) Blank	
9	61 - 76	F16.7	Orbital element 2 Positional vector on earth fixed coordinates of the scene center (y) Blank	
10	77 - 92	F16.7	Orbital element 3 Positional vector on earth fixed coordinates of the scene center (z) Blank	
11	93 - 108	F16.7	Orbital element 4 Velocity vector on earth fixed coordinates of the scene center (x') Blank	
12	109 - 124	F16.7	Orbital element 5 Velocity vector on earth fixed coordinates of the scene center (y') Blank	
13	125 - 140	F16.7	Orbital element 6 Velocity vector on earth fixed coordinates of the scene center (z') Blank	
14	141 - 144	I4	Number of effective data points (= n)	
15	145 - 148	I4	Year of the first point = 'YYYY'	
16	149 - 152	I4	Month of the first point = 'bbMM'	
17	153 - 156	I4	Day of the first point = 'bbDD'	
18	157 - 160	I4	Total days of the first point (For example: February 2nd: 33 days)	
19	161 - 182	E22,15	Total seconds of the first point (For example: 0 o'clock 51minutes 30.23 seconds: 3090.23 seconds)	
20	183 - 204	E22.15	Interval time between points（second） = 60	

Table 3.3-9 Ancillary 3 (Platform Position Data) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
21	205 - 268	A64	Reference coordinate system (ECI, ECR) = 'ECRb to b'	
22	269 - 290	E22,15	Greenwich mean hour angle = Blank	
23	291 - 306	F16.7	Positional error in flight direction [m] Nominal value	
24	307 - 322	F16.7	Positional error in flight vertical direction [m] Nominal value	
25	323 - 338	F16.7	Positional error in radius direction [m/sec] Nominal value	
26	339 - 354	F16.7	Velocity error in flight direction [m/sec] Nominal value	
27	355 - 370	F16.7	Velocity error in flight vertical direction [m/sec] Nominal value	
28	371 - 386	F16.7	Velocity error in radius direction [deg/sec] Nominal value	
29	387 - 452	3*E22.15	Positional vector at the first data point (x, y, z)	For field No.29 to No.31, if data point number are not reached to 28 points, 0.0 is stored to fill the differences.
30	453 - 518	3*E22.15	Velocity vector at the first data point (x', y', z')	
31	519 - 4082		Repeat from the second data point to the n-th point data point with the same format of 387 to 518 bytes.	
32	4083 - 4100	A18	Blank	
33	4101 - 4101	I1	Leap second flag 0: No leap, 1: Leap	
34	4102 - 4680	A579	Blank	

Table 3.3-10 Image File Descriptor Record (1/2)

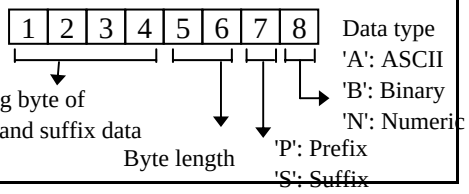
Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 180		Common file descriptor (Refer to Table 3.3-4)	
2	181 - 186	I6	Number of image records = ‘N’ N: Number of lines per band	
3	187 - 192	I6	Image record length	
4	193 - 216	A24	Blank	
5	217 - 220	I4	Number of bits per pixel = ‘bbb8’	
6	221 - 224	I4	Number of pixels per data = ‘bbb1’	
7	225 - 228	I4	Number of bytes per data = ‘bbb1’	
8	229 - 232	A4	Bit list of pixel = ‘RJLR’ for right justified ‘LJLR’ for left justified	
9	233 - 236	I4	Number of bands per file = ‘bbb1’	
10	237 - 244	I8	Number of lines per band	
11	245 - 248	I4	Number of left border pixels per line = ‘bbb0’	
12	249 - 256	I8	Number of image pixels per line	
13	257 - 260	I4	Number of right border pixels per line = ‘bbb0’	
14	261 - 264	I4	Number of top border lines = ‘bbb0’	
15	265 - 268	I4	Number of bottom border lines = ‘bbb0’	
16	269 - 272	A4	Image format ID = ‘BSQb’	
17	273 - 276	I4	Number of records per line (single band) = ‘bbb1’	
18	277 - 280	I4	Number of records per line = ‘bbb1’	
19	281 - 284	I4	Number of bytes which cover both record identifier (12) per record and record header (22) per prefix data = ‘bb34’	
20	285 - 292	I8	Number of image data bytes per record including dummy pixels	
21	293 - 296	I4	Number of bytes of suffix data per record = ‘bb66’	
22	297 - 300	A4	Prefix data repeat flag = ‘bbbb’	
23	301 - 308	A8	Line number locator = ’bbb1b4PB’	Field No.23 to 33, details for prefix and suffix data. 
24	309 - 316	A8	Band number locator = ’bbb5b4PB’	
25	317 - 324	A8	Scan start time locator = ’bbb9b6PB’	
26	325 - 332	A8	Left dummy pixel locator = ’bb15b4PB’	
27	333 - 340	A8	Right dummy pixel locator = ’bb19b4PB’	
28	341 - 348	A8	Dummy pixel locator = ’bbb112SB’	

Table 3.3-10 Image File Descriptor Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
29	349 - 356	A8	Optical black locator = ’bb13b8SB’	
30	357 - 364	A8	Optical white locator = ’bb2116SB’	
31	365 - 372	A8	Electrical calibration locator = ’bb3716SB’	
32	373 - 380	A8	Image auxiliary data locator = ’bb5312SB’	
33	381 - 388	A8	Quality information locator = ’bb65b2SB’	
34	389 - 392	A4	Blank	
35	393 - 428	A36	Data format type ID = ‘INTEGER*1bbbbbbbbbbbbbbbbbbbbbbbbbb’	
36	429 - 432	A4	Data format type ID code = ‘I*1b’	
37	433 - 436	I4	Number of left unused bits in pixel data = ‘bbb0’	
38	437 - 440	I4	Number of right unused bits in pixel data = ‘bbb0’	
39	441 - 444	I4	The maximum value of pixel data = ‘b255’	
40	445 - 448	A4	Blank	
41	449 - 456	A8	Blank	
42	457 - 464	A8	Blank	
43	465-Same number as the byte of the image record	A	Blank	

Table 3.3-11 Image Record (1/2)

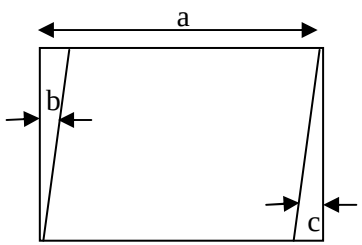
Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $2)_{10}$ to number of lines +1	
2	5 - 5	B1	The first record type = $355)_8$	
3	6 - 6	B1	Record type code = $355)_8$	
4	7 - 7	B1	The second record subtype = $222)_8$	
5	8 - 8	B1	The third record subtype = $022)_8$	
6	9 - 12	B4	Record length	
7	13 - 16	B4	Prefix data Line number (to be counted from the first line of the full scene regarded as 1)	
8	17 - 20	B4	Band number	
9	21 - 24	B4	Scan start time (Total milliseconds in a day)	Field No.9 and No.10 are only valid for Level 1A and Level 1B1 products. For Level 1B2, these fields will be "0x00."
10	25 26	B2	Scan start time (Microseconds smaller than milliseconds)	
11	27 - 30	B4	Number of left dummy pixels (= b)	Record No.11 and 12 
12	31 - 34	B4	Number of right dummy pixels (= c)	
13	35 - (NPIX+34)	B	Image data	
14	SF1	B12	Suffix data Dummy pixel	Field No.14 to No.19 are only valid for Level 1A and 1B1 products. For Level 1B2, these fields will be "0x00." Byte number of Suffix data: SF1 = 1+(NPIX+34)
15	SF1+12	B8	Optical black	
16	SF1+20	B16	Optical white	
17	SF1+36	B16	Electrical calibration	
18	SF1+52	B12	Image auxiliary data	

Table 3.3-11 Image Record (2/2)

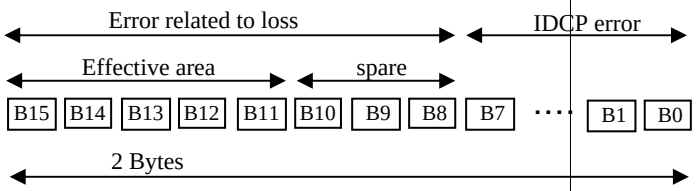
Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
19	SF1+64	B2	Quality information - VCDU frame loss - JPEG frame loss - Block loss - Huffman decoded error - EOI not detected - IDCP error 	

Table 3.3-12 Trailer File Descriptor Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 180		Common file descriptor	
2	181 - 186	I6	Number of trailer records = ‘bbbbb1’	
3	187 - 192	I6	Trailer record length = ‘bb4680’	
4	193 - 216	A24	Blank	
5	217 - 4680	A4464	Blank	

Table 3.3-13 Trailer Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $2)_{10}$	
2	5 - 5	B1	The first record subtype = $022)_8$	
3	6 - 6	B1	Record type code = $366)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $4680)_{10}$	
7	13 - 16	I4	Number of trailer records = ‘bbb1’	
8	17 - 20	I4	Number of trailer records in one CCD unit = ‘bbb1’	
9	21 - 1044	256B4	Histogram (Band 1)	
10	1045 - 2068	256B4	Histogram (Band 2)	
11	2069 - 3092	256B4	Histogram (Band 3)	
12	3093 - 4116	256B4	Histogram (Band 4)	
13	4117 - 4680	A564	Blank	

Table 3.3-14 Supplemental File Descriptor Record (1/1)

Filed No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 180		Common file descriptor	
2	181 - 186	I6	Ancillary 4 (PCD data) number of records = ‘bbbbb1’	
3	187 - 194	I8	Ancillary 4 (PCD data) record length = ‘bb151000’	
4	195 - 200	I6	Ancillary 5 (TT&C system telemetry) number of records = ‘bbbbb1’	
5	201 - 208	I8	Ancillary 5 (TT&C system telemetry) record length = ‘b1537000’	
6	209 - 214	I6	Ancillary 6 (AOCS attitude data 3) number of records = ‘bbbbb1’	
7	215 - 222	I8	Ancillary 6 (AOCS attitude data 3) record length = ‘b1099000’	
8	223 - 228	I6	Ancillary 7 (GPSR raw data) number of records =‘bbbbb1’	
9	229 - 236	I8	Ancillary 7 (GPSR raw data) record length = ‘b3217000’	
10	237 - 242	I6	Ancillary 8 (Precision orbit data) number of records = ‘bbbbb1’	
11	243 - 250	I8	Ancillary 8 (Precision orbit data) record length = ‘bb529000’	
12	251 - 256	I6	Ancillary 9 (ALOS conventional orbit data) number of records =‘bbbbb1’	
13	257 - 264	I8	Ancillary 9 (ALOS conventional orbit data) record length = ‘b1183000’	
14	265 - 270	I6	Ancillary 10 (Coordination conversion matrix) number of records = ‘bbbbb1’	
15	271 - 278	I8	Ancillary 10 (Coordination conversion matrix) record length = ‘bb698000’	
16	279 - 284	I6	Ancillary 11(Time difference information) number of records = ‘bbbbb1’	
17	285 - 292	I8	Ancillary 11(Time difference information) record length = ‘bbbb50000’	
18	293 - 298	I6	Ancillary 12 (Precision attitude data) number of records = ‘bbbbb1’	
19	299 - 306	I8	Ancillary 12 (Precision attitude data) record length = ‘b4370000’	
20	307 - 312	I6	Ancillary 13 (Geometric parameter) number of records = ‘bbbbb1’	
21	313 - 320	I8	Ancillary 13 (Geometric parameter) record length =‘ 12000’	
22	321 - 326	I6	Ancillary 14 (Dummy data) number of records = ‘bbbbb1’	
23	327 - 334	I8	Ancillary 14 (Dummy data) record length = ‘b1904000’	
24	335 - 340	I6	Ancillary 15 (Internal use data) number of records = ‘bbbbb1’	
25	341 - 348	I8	Ancillary 15 (Internal use data) record length = ‘bbb67000’	
26	349 - 4680	A4332	Blank	

Table 3.3-15 Ancillary 4 (Telemetry 1) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $2)_{10}$	
2	5 - 5	B1	The first record subtype = $055)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $151000)_{10}$	
7	13 - 16	I4	Number of bytes of PCD data = 50	
8	17 - 24	A8	Blank	
9	25 - 30	B6	PCD data 1 Primary header	PCD data stores one downlink segment worth of data set. Regarding the format of PCD data, refer to Appendix 1. Filed No.9 to No.13 are downloaded one time per a second.
10	31 - 30	B4	GPS absolute navigation time	
11	31 - 30	B3	Absolute navigation position data X	
12	31 - 30	B3	Absolute navigation position data Y	
13	31 - 30	B3	Absolute navigation position data Z	
14	31 - 30	B3	Absolute navigation position data X'	
15	31 - 30	B3	Absolute navigation position data Y'	
16	31 - 30	B3	Absolute navigation position data Z'	
17	31 - 30	B2	Estimated attitude angle ϕ	
18	31 - 30	B2	Estimated attitude angle θ	
19	31 - 30	B2	Estimated attitude angle ϕ	
20	31 - 30	B2	Estimated attitude angle speed ϕ '	
21	31 - 30	B2	Estimated attitude angle speed θ '	
22	31 - 30	B2	Estimated attitude angle speed ϕ '	
23	31 - 30	B4	Latitude argument	
24	31 - 30	B4	Absolute navigation status	
25	31 - 30	B1	Attitude determination time data	
26	31 - 30	B1	Attitude determination system flag	
27	31 - 30	B50	PCD data 2	
			…	

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Table 3.3-15 Ancillary 4 (Telemetry 1) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
28		B50	PCD data n	
29	151000	A	Blank	

Table 3.3-16 Ancillary 5 (Telemetry 2) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $3)_{10}$	
2	5 - 5	B1	The first record subtype = $055)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $1537000)_{10}$	
7	13 - 16	I4	Number of bytes of system telemetry data = 512	
8	17 - 24	A8	Blank	
9	25 - 30	B6	System telemetry data 1 Primary header	TT&C system telemetry data stores one downlink segment worth of data set. Regarding the format of TT&C system telemetry data, refer to Appendix 1, 4.System Telemetry Data. Filed No.9 to No.13 are downloaded one time per second.
10	31 - 36	B6	Secondary header	
11	37 - 536	B500	User data	
12	537 - 1048	B512	System telemetry data 2	
			…	
13		B512	System telemetry data n	
14	1537000	A	Blank	

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Table 3.3-17 Ancillary 6 (Telemetry 3) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $4)_{10}$	
2	5 - 5	B1	The first record subtype = $055)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $1099000)_{10}$	
7	13 - 16	I4	Number of bytes of attitude determination 3 data = 366	
8	17 - 24	A8	Blank	
9	25 - 30	B6	Attitude determination 3 data 1 Primary header	Attitude determination 3 data stores one downlink segment worth of data set. Regarding the format of attitude determination 3 data, refer to Appendix 1, 3.AOCS Related Data. Filed No.9 to No.13 are downloaded one time per a second. J
10	31 - 36	B6	Secondary header	
11	37 - 38	B2	ID	
12	39 - 388	B350	Attitude determination 3	
13	389 - 390	B2	CW	
14	391 - 756	B366	Attitude determination 3 data 2	
			…	
		B366	Attitude determination 3 data n	
15	1099000	A	Blank	

Table 3.3-18 Ancillary 7 (Telemetry 4) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $5)_{10}$	
2	5 - 5	B1	The first record subtype = $055)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $3217000)_{10}$	
7	13 - 16	I4	Number of bytes of GPS data = 1072	
8	17 - 24	B8	Blank	
9	25 - 30	B6	GPS data 1 Primary header	GPSR data stores one downlink segment worth of data set. Regarding the format of the data set for GPSR data, refer toAppendix 1, 2.PCD (Payload Correction Data). Filed No.9 to No.23 are downloaded one time per a second.
10	31 - 36	B6	Secondary header	
11	37 - 38	B2	ID	
12	39 - 534	B496	GPSR data (1/3)	
13	535 - 536	B2	CW	
14	537 - 542	B6	Primary header	
15	543 - 548	B6	Secondary header	
16	549 - 550	B2	ID	
17	551 - 1046	B496	GPSR data (2/3)	
18	1047 - 1048	B2	CW	
19	1049 - 1054	B6	Primary header	
20	1055 - 1060	B6	Secondary header	
21	1061 - 1062	B2	ID	
22	1063 - 1094	B32	GPSR data (3/3)	
23	1095 - 1096	B2	CW	
24	1097 - 2186	B1072	GPS data 2	
			…	
25		B1072	GPS data n	
26	3217000	A	Blank	

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Table 3.3-19 Ancillary 8 (ALOS Precision Orbit Data) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $6)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $529000)_{10}$	
7	13 - 24	A12	Blank	
			ALOS precision orbit data (ECI)	Precision orbit data stores one day (25-hours) worth of data set of ECI and ECR. Field No.8 to No.16 are ECI data. Field No.17 is ECR data and is repeated with the same format of Field No.8 to No.16. Regarding the detailed format of field No.8 to No.16, refer to Appendix 2, 2.ALOS Precision Orbit Data File. Field No.8 will be the header section of the ALOS precision orbit data. J
8	25 - 152	A128	ALOS precision orbit data Header section	
9	153 - 322	A170	ALOS precision orbit data Common control information record (1/3)	Field No.9 to No.11 will be the common control section of the ALOS precision orbit data.
10	323 - 492	A170	ALOS precision orbit data Common control information record (2/3)	
11	493 - 662	A170	ALOS precision orbit data Common control information record (3/3)	
12	663 - 832	A170	ALOS precision orbit data Individual control information record	Field No.12 will be the individual control section of the ALOS precision orbit data.
13	833 - 1002	A170	ALOS precision orbit data TAI-UTC data record #1	Field No.13 to No.14 will the leap second data section of the ALOS precision orbit data.
			…	
14		A170	ALOS precision orbit data TAI-UTC data record #n	
15		A170	ALOS precision orbit data Orbit ephemeris data record #1	Field No.15 to No.16 will be the orbit ephemeris data section of the ALOS precision orbit data.
			…	
16		A170	ALOS precision orbit data Orbit ephemeris data record #m	

Table 3.3-19 Ancillary 8 (ALOS Precision Orbit Data) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
17	264500	A	Blank	
18	264501	A	ALOS precision orbit data (ECR)	
19	529000	A	Blank	

Table 3.3-20 Ancillary 9 (ALOS ConventionaOrbit Information) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $7)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $1183000)_{10}$	
7	13 - 24	A12	Blank	
			ALOS conventional orbit data (Predictive ECI) 1	ALOS Conventional orbit data stores 1day or 2 day worth of data, as defining RARR data for one-day is 1 set. Field No.8 to No.14 are predictive ECI 1 data. Field No.15 to No.21 is predictive ECI2, predictive ECR 1, 2, definitive ECI 1, 2, definitive ECR 1, 2 respectively, and each field is repeated with the same format as No.8 to No.14 Regarding the detailed format of field No.8 to No.14, refer to Appendix 2, 1.ALOS Conventional Orbit Data File. J Field No.8 will be the header section of the ALOS conventional orbit data.
8	25 - 152	A128	ALOS conventional orbit data Header section	
9	153 - 280	A128	ALOS conventional orbit data Control Information record	Field No.9 will be the control information record of the ALOS conventional orbit data.
10	281 - 408	A128	ALOS conventional orbit data Epoch record	Field No.10 will be the epoch record of the ALSO conventional orbit data.
11	409 - 536	A128	ALOS conventional orbit data Event record 1	Field No.11 to No.12 will be the event record of the ALOS conventional orbit data.
			…	
12		A128	ALOS conventional orbit data Event record n	
13		A97	ALOS conventional orbit data Orbital data 1	Field No.13 to No.14 will be the orbit data

Table 3.3-20 Ancillary 9 (ALOS ConventionaOrbit Information) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
			…	record of the ALOS conventional orbit data.
14		A97	ALOS conventional orbit data Orbital data m	
15			Blank	
16	147876	A	ALOS conventional orbit data (Predictive ECI) 2	
17		A	Blank	
18	295751	A	ALOS conventional orbit data (Predictive ECR) 1	
19		A	Blank	
20	443626	A	ALOS conventional orbit data (Predictive ECR) 2	
21		A	Blank	
22	591501	A	ALOS conventional orbit data (Definitive ECI) 1	
23		A	Blank	
24	739376	A	ALOS conventional orbit data (Definitive ECI) 2	
25		A	Blank	
26	887251	A	ALOS conventional orbit data (Definitive ECR) 1	
27		A	Blank	
28	1035126	A	ALOS conventional orbit data (Definitive ECR) 2	
29	1183000	A	Blank	

Table 3.3-21 Ancillary 10 (Coordinates Conversion Matrix) Record (1/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $8)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $698000)_{10}$	
7	13 - 24	A12	Blank	
8	25 - 152	A128	ALOS coordinates conversion matrix Header section	ALOS coordinates conversion matrix stores one day (25-hours) worth of data set. Regarding the detailed format of field No.8 to No.23, refer to Appendix 2, 3.ALOS Coordinates Transformation Matrix File. Field No.8 will be the header section of the ALSO coordinates conversion matrix. J
9	153 - 215	A63	ALOS coordinates conversion matrix Common control information record (1/3)	Field No.9 to No.11 will be the common control section of the ALOS coordinates conversion matrix.
10	216 - 276	A61	ALOS coordinates conversion matrix Common control information record	
11	277 - 327	A51	ALOS coordinates conversion matrix Common control information record	
12	328 - 401	A74	ALOS coordinates conversion matrix Sidereal time record	Field No.12 will be the sidereal time data section of the ALOS coordinates conversion
13	402 - 422	A21	ALOS coordinates conversion matrix TAI-UTC data record #1	Field No.13 to No.14 will the leap second data section of the ALOS coordinates conversion matrix.
			…	
14		A21	ALOS coordinates conversion matrix TAI-UTC data record #n	
15		A26	ALOS coordinates conversion matrix data 1 Data record (1/2)	Field No.15 to No.23 will the matrix data section of the ALOS coordinates conversion matrix.
16		A73	Data record (2/2) #1	
17		A73	Data record (2/2) #2	
18		A73	Data record (2/2) #3	
19		A73	Data record (2/2) #4	
20		A73	Data record (2/2) #5	
21		A73	Data record (2/2) #6	

Table 3.3-21 Ancillary 10 (Coordinates Conversion Matrix) Record (2/2)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
22		A464	ALOS coordinates conversion matrix data 2	
			…	
23		A464	ALOS coordinates conversion matrix data m	
24	698000	A	Blank	

Table 3.3-22 Ancillary 11 (ALOS Time Difference Information) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $9)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $50000)_{10}$	
7	13 - 24	A12	Blank	
8	25 - 152	A128	ALOS time difference information 1 ALOS time information Header section	Time difference information stores 1 day or 2 day worth of data set, as defining data for 1 day is 1 set. Field No.8 to No.10 are the time difference information 1 data. Field No.12 is the time difference information 2 data and is repeated with the same format as Field No.8 to No.10. If the time difference information is one file, No12 will be left blank. Regarding the detailed format of field No.8-No.10, refer to Appendix 2, 4.ALOS Time Difference Information File. Field No.8 will be the header section of the ALOS time difference information.
9	153 - 270	A118	ALOS time difference information 1	No.9 to No.10 will be the data section of the ALOS time difference information.
			…	
10		A118	ALOS time difference information n	
11	25000	A	Blank	
12	25001	A	ALOS time difference information 2	
13	50000	A	Blank	

J

Table 3.3-23 Ancillary 12 (ALOSPrecision Attitude Determination Value) Record (1/1)

Filed No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $10)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type cod = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $4370000)_{10}$	
7	13 - 24	A12	Blank	
8	25 -	A	ALOS precision attitude determination value	Precision attitude data stores one cycle + about one minute worth of data set. Regarding the format of the ALOS precision attitude determinatin value data set, refer to Appendix 3, 1.ALOS Precision Attitude Determination Value. J
9				
10	4370000	A	Blank	

Table 3.3-24 Ancillary 13 (Geometric Parameter) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $11)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_8$	
3	6 - 6	B1	Record type code = $044)_8$	
4	7 - 7	B1	The second record subtype = $022)_8$	
5	8 - 8	B1	The third record subtype = $011)_8$	
6	9 - 12	B4	Record length = $12000)_{10}$	
7	13 - 24	A12	Blank	
8	25 -	A	Geometric parameter	
9	12000			
10		A	Blank	

Table 3.3-25 Ancillary 14 (Dummy Data) Record (1/1)

Field No.	Byte No.	Type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number =12)$_{10}$	
2	5 - 5	B1	The first record subtype = 066)$_{8}$	
3	6 - 6	B1	Record type code = 044)$_{8}$	
4	7 - 7	B1	The second record subtype = 022)$_{8}$	
5	8 - 8	B1	The third record subtype = 011)$_{8}$	
6	9 - 12	B4	Record length = 1904000)$_{10}$	
7	13 - 24	A12	Blank	
8	25 - 280	B256	Band 1: Header section	
9	281 - 282	B2	The first line: Quality information	
10	283 - 294	B12	Dummy data	
11	295 - 302	B8	Optical black	
12	303 - 318	B16	Optical white	
13	319 - 334	B16	Electrical calibration	
			…	
14		B2	The n-th line: Quality information	
15		B12	Dummy data	
16		B8	Optical black	
17		B16	Optical white	
18		B16	Electrical calibration	
19		A	Blank	
20	476001	B	Band 2: Header section, Data section	In the field from No. 20 to No.25, the same content in Band 1 is repeated.
			…	
21		A	Blank	
22	952001	B	Band 3: Header section, Data section	
			…	
23		A	Blank	
24	1428001	B	Band 4: Header section, Data section	
			…	
25	1904000	A	Blank	

Table 3.3-26 Ancillary 15 (Internal Use Data) Record (1/1)

Field No.	Byte No.	type	Description (Definition and Value)	Remarks
1	1 - 4	B4	Record number = $13)_{10}$	
2	5 - 5	B1	The first record subtype = $066)_{8}$	
3	6 - 6	B1	Record type code = $044)_{8}$	
4	7 - 7	B1	The second record subtype = $022)_{8}$	
5	8 - 8	B1	The third record subtype = $011)_{8}$	
6	9 - 12	B4	Record length = $67000)_{10}$	
7	13 - 24	A12	Blank	
8	25 -	A	Internal use data	Product order parameter
9	67000	A	Blank	

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Appendix

Summary Information

(AVNIR-2)

This appendix describes the format of the AVNIR-2 summary information file.

1. Outline of the Summary Information

The summary information file includes the information for creating processed data created in the ALOS Data Processing Subsystem, and it is always made in a pair with its processed data.

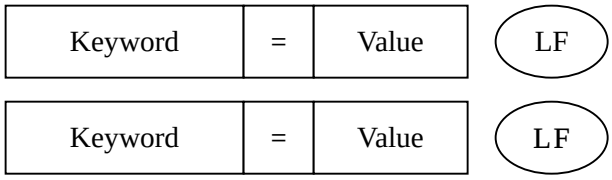
2. Name of File

Name of the summary information file is fixed as follows.

summary.txt

3. File Format

The file does not include header information, footer information, and etc., and consists of keyword and value and LF. Outline of the file format is shown as follows.



Outline of the file format

3.1 Keyword Setting form

(1) The first character of Keyword is set to the first column.
(2) Equal mark (=) is set after the last character of Keyword.
(3) Blank is not included between Keyword and Equal mark (=) as a general rule.

3.2 Value Setting form

(1) Double quotation (“) is set to before and after of the Value.
(2) Alphanumeric characters and diacritics (except Double quotation (“)) are used in the Value, and a string of characters is stored in the enclosed place with Double quotation (“).
(3) Blank is not included between Equal mark (=) and the first Double quotation (“) as a general rule.

3.3 Setting Items

The setting items of the AVNIR-2 summary information are described in the following table.

Summary Information（AVNIR-2）(1/7)

No.	Group	Item	Keyword	Stored Value (Range)
1	Order Information Odi	Product management number	Odi_ProductManagementNo	XYYNNNNN X: Window class YY: Fiscal year of accepted order (last two digits of A.D. year) NNNNN: Sequence number (00001 to 99999)（Refer to NCX-000048）
2		Product management branch number	Odi_ProductManagementBranchNo	XXX XXX: 001 to 999（Refer to NCX-000048）
3	Scene Specification Scs	Scene ID	Scs_SceneID	AABBBCDDDDDEEEE AA: Mission type （=AL) BBB: Sensor type (=AV2) C: Supplemental remarks of sensor type ("A" Fixed) DDDDD: Total calculated orbit number of the scene center EEEE: Frame number of the scene center
4		Scene Shift Distance	Scs_SceneShift	-5 to 4 Sign will not be added in case of zero and positive numbers.
5	Product Specification Pds	Product ID	Pds_ProductID	ABBBCCD A: Observation mode (O: Observation、C: Lamp Calibration) BBB: Processing level (1A_, 1B1, 1B2) CC: 1B2 option (__: Not specified (Except Level 1B2, R_: Geo-reference, G_: Geo-coded, RD: Geo-reference and DEM correction, GD：Geo-coded and DEM correction) D: Map projection (U: UTM, P: PS, _: Not specified)
6		Resampling Method	Pds_ResamplingMethod	NN / BL / CC Nearest neighbor / Bi-linear / Cubic convolution Resampling method is set only in case of level 1B2.
7		UTM Zone Number	Pds_UTM_ZoneNo	1 to 60 This item is set only in case of level 1B2 and UTM.
8		PS Reference Latitude	Pds_PS_ReferenceLatitude	30.000 < reference latitude <= 90.000 This item is set only in case of level 1B2 and PS. It is set by absolute value also in case of South hemisphere.
9		PS Reference Longitude	Pds_PS_ReferenceLongitude	-179.999 <= reference longitude <= 180.000 This item is set only in case of level 1B2 and PS.
10		Map Direction	Pds_MapDirection	True North/Map North Geo-coded: Stored only in case of level 1B2.

Summary Information（AVNIR-2）(2/7)

No.	Group	Item	Keyword	Stored Value (Range)
11	Product Specification (continued) Pds	Pixel Spacing	Pds_PixelSpacing	10 / 12.5 / 15 / 20 (Unit: meter)
12		Accuracy of used orbit data	Pds_OrbitDataPrecision	Precision/GPSR_Raw/GPSR_PCD/RARR_Determine/RARR_Predict Precision: ALOS precision orbit data GPSR_Raw: Onboard GPSR raw data GPSR_PCD: Onboard PCD GPSR data RARR_Determine: ALOS conventional orbit data (definitive) RARR_Predict: ALOS conventional orbit data (predictive)
13		Accuracy of used attitude data	Pds_AttitudeDataPrecision	OnSitePrecision/AOCS_Precision/PCD_Precision/Standard OnSitePrecision: Precision attitude data (ground) AOCS_Precision: AOCS precision attitude determination system (onboard) PCD_Precision: PCD precision attitude determination system (onboard) Standard: PCD standard attitude determination system (onboard)
14	Image Information Img	Scene Center Time	Img_SceneCenterDateTime	YYYYMMDD hh:mm:ss.ttt (UT) (This item is stored in case of level 1A and 1B1.) YYYY: A.D. year MM: Month (01 to 12) DD: Day (01 to 31) hh: Hour (00 to 23) mm: Minute (00 to 59) ss: second (00 to 60) ttt: Millisecond (000 to 999) (ss = 60 is only for leap second)
15		Scene center latitude（image）	Img_ImageSceneCenterLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
16		Scene center longitude (image)	Img_ImageSceneCenterLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
17		Latitude of upper left of scene (image)	Img_ImageSceneLeftTopLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
18		Longitude of left upper of scene (image)	Img_ImageSceneLeftTopLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.

Summary Information（AVNIR-2）(3/7)

No.	Group	Item	Keyword	Stored Value (Range)
19	Image Information (continued) Img	Latitude of upper right of scene (image)	Img_ImageSceneRightTopLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
20		Longitude of upper right of scene (image)	Img_ImageSceneRightTopLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
21		Latitude of lower left of scene (image)	Img_ImageSceneLeftBottomLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
22		Longitude of lower left of scene (image)	Img_ImageSceneLeftBottomLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
23		Latitude of lower right of scene (image)	Img_ImageSceneRightBottomLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
24		Longitude of lower right of scene (image)	Img_ImageSceneRightBottomLongitude	-179.999 to 180.000（degree）' (This item is stored in case of level 1A, 1B1 and 1B2 [Geo-reference]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
25		Scene center latitude (frame)	Img_FrameSceneCenterLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
26		Scene center longitude (frame)	Img_FrameSceneCenterLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.

Summary Information（AVNIR-2）(4/7)

No.	Group	Item	Keyword	Stored Value (Range)
27	Image Information (continued) Img	Latitude of upper left of scene (frame)	Img_FrameSceneLeftTopLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
28		Longitude of upper left of scene (frame)	Img_FrameSceneLeftTopLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
29		Latitude of upper right of scene (frame)	Img_FrameSceneRightTopLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
30		Longitude of upper right of scene (frame)	Img_FrameSceneRightTopLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
31		Latitude of lower left of scene (frame)	Img_FrameSceneLeftBottomLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
32		Longitude of lower left of scene (frame)	Img_FrameSceneLeftBottomLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
33		Latitude of lower right of scene (frame)	Img_FrameSceneRightBottomLatitude	-90.000 to 90.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
34		Longitude of lower right of scene (frame)	Img_FrameSceneRightBottomLongitude	-179.999 to 180.000（degree） (This item is stored in case of level 1B2 [Geo-Coded]) Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.

Summary Information（AVNIR-2）(5/7)

No.	Group	Item	Keyword	Stored Value (Range)
35	Image Information (continued) Img	Elevation angle of the sun	Img_SunAngleElevation	-90.00 to 90.00（degree） Value to 2 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
36		Azimuth angle of the sun	Img_SunAngleAzimuth	0.00 to 359.99（degree） Value to 2 decimal places will be always displayed.
37		Pointing angle	Img_PointingAngle	-44.000 to 44.000（degree） Value to 3 decimal places will be always displayed. Sign will not be added in case of zero and positive numbers.
38		Incident angle	Img_SceneCenterAngle	L90.0 to L0.1, 0.0, R0.1 to R90.0（degree） L: Left direction, R: Right direction Value to 1 decimal place will be always displayed. Sign will not be added in case of zero.
39		Orientation angle	Img_SceneCenterOrientation	0.0 to 359.9（degree） Value to 1 decimal place will be always displayed.
40		Gain mode Band 1	Img_GainModeBand1	1 to 4
41		Gain mode Band 2	Img_GainModeBand2	1 to 4
42		Gain mode Band 3	Img_GainModeBand3	1 to 4
43		Gain mode Band 4	Img_GainModeBand4	1 to 4
44		Exposure coefficient Band 1	Img_ExposureOfBand1	0.0000 to 1.0000
45		Exposure coefficient Band 2	Img_ExposureOfBand2	0.0000 to 1.0000
46		Exposure coefficient Band 3	Img_ExposureOfBand3	0.0000 to 1.0000
47		Exposure coefficient Band 4	Img_ExposureOfBand4	0.0000 to 1.0000
48		Saturation rate Band 1	Img_SaturationLevelOfBand1	0.00 to 100.00 (%)
49		Saturation rate Band 2	Img_SaturationLevelOfBand2	0.00 to 100.00 (%)
50		Saturation rate Band 3	Img_SaturationLevelOfBand3	0.00 to 100.00 (%)
51		Saturation rate Band 4	Img_SaturationLevelOfBand4	0.00 to 100.00 (%)
52		Cloud coverage reference information (whole image)	Img_CloudQuantityOfAllImage	0: 0 to 2% 1: 3 to 10% 2:11 to 20% 3: 21 to 30% 4: 31 to 40% 5: 41 to 50% 6: 51 to 60% 7: 61 to 70% 8: 71 to 80% 9: 81 to 90% 10: 91 to 100% 99: No assessment
53	Product Information Pdi	Product data size	Pdi_ProductDataSize	0.0 to 9999.9（Unit: Mbytes = 1024KByte）
54		Number of level 1 product files	Pdi_CntOfL1ProductFileName	8 (level 1A, level 1B1), 7 (level 1B2)

Summary Information（AVNIR-2）(6/7)

No.	Group	Item	Keyword	Stored Value (Range)
55	Product Information (continued) Pdi	Level 1 product file name	Pdi_L1ProductFileNamenn nn: 01 to 99	Volume directory (1A, 1B1, 1B2) VOL-ssssssssssssss-ppppppp Leader (1A, 1B1, 1B2) LED-ssssssssssssss-ppppppp Image (1A, 1B1, 1B2) IMG-XX-ssssssssssssss-ppppppp Trailer (1A, 1B1, 1B2) TRL-ssssssssssssss-ppppppp Supplemental (1A, 1B1) SUP-ssssssssssssss-ppppppp sssssssssssssss: Scene ID, ppppppp: Product ID, XX: Band No.（01 to 04）
56		Bit / Pixel	Pdi_BitPixel	"8" (Fixed)
57		Number of pixels	Pdi_NoOfPixels	0 to 99999
				It is the number of pixels only for the image data not including the prefix and suffix in the image record.
58		Number of lines	Pdi_NoOfLines	0 to 99999
				It is the number of lines of the image data not including the file descriptor in the image file.
59		Product format	Pdi_ProductFormat	CEOS: Fixed
60		The number of line-generated image files	Pdi_CntOfLineProcessedImageName	n = 1 to 4
61		File name of line generated image	Pdi_LineProcessedImageNamen n: 1 to 4	Relative file name (four files) based on the work order
62	Auto-verification result Ach	Time system data	Ach_TimeCheck	OK/NG
63		Attitude system data	Ach_AttitudeCheck	OK/NG (It is stored in case where the attitude data precision to be used is AOCS_Precision/PCD_Precision/Standard.)
64		Absolute navigation status	Ach_AbsoluteNavigationStatus	OK/FAIR/NG (It is stored in case where the orbit data precision to be used is
65		Temperature data	Ach_TemperatureCheck	OK/NG
66		Precision orbit data	Ach_PrecisionOrbitCheck	OK/FAIR/NG (It is stored in case where the orbit data precision to be used is Precision.)
67		Onboard orbit data	Ach_OnBoardOrbitCheck	OK/FAIR/NG (It is stored in case where the orbit data precision to be used is
68		Precision attitude data	Ach_PrecisionAttitudeCheck	OK/FAIR/NG (It is stored in case where the attitude data precision to be used is OnSitePrecision.)

Summary Information（AVNIR-2）(7/7)

No.	Group	Item	Keyword	Stored Value (Range)
69	Auto-verification result (continued)	Onboard attitude data	Ach_OnBoardAttitudeCheck	OK/FAIR/NG (It is stored in case where the attitude data precision to be used is AOCS_Precision/PCD_Precision/Standard.)
70	Ach	Gain mode	Ach_GainMode	OK/NG
71		Exposure coefficient	Ach_Exposure	OK/NG
72		Pointing	Ach_Pointing	OK/NG
73		Line loss	Ach_LossLines	OK/FAIR/NG
74		IDCP stop signal	Ach_IDCP_StopSignal	OK/FAIR/NG
75		Buffer memory 2bit error	Ach_BufferMemory2BitError	OK/FAIR/NG
76		Saturation rate	Ach_SaturationLevel	OK/NG
77		DEM correction result	Ach_DEM_Correction	OK/NG (It is stored when DEM correction is specified in 1B2 option of product ID. In case of NG, accuracy is not guaranteed because interpolation is carried out in the error area.)
78		Absolute navigation time	Ach_AbsoluteNavigationTime	OK/NG (Evaluate whether it will be changed as NG→FAIR in initial operational evaluation.)
79	Version Ver	OS（Linux)	Ver_OS_VersionInDataProcessingUnit	XX～XX OS (Linux) version of data processing subsystem (Any character string)
80	Result Information Rad	Work result code	Rad_PracticeResultCode	00: OK 01: OK this time with visual inspection 02: OK under the conditions (There is no NG at the auto-verification) 03: OK under the conditions (There is NG at the auto-verification) 04: OK under the conditions (There is NG at the DEM correction result)
81		Data processing host name	Rad_ProcessedHostName	XXXXXXXX Host name which executed data processing.
82		Number of CDRs/DVD-Rs	Rad_NoOfCDR	N: 1 to 9 Number of CDRs/DVD-Rs which was created when output media was specified
83	Label Information Lbi	Satellite name	Lbi_Satellite	ALOS (Fixed)
84		Sensor name	Lbi_Sensor	AVNIR-2 (Fixed)
85		Processing level	Lbi_ProcessLevel	xxx 1A :Level 1A 1B1:Level 1B1 1B2:Level 1B2
86		Station code	Lbi_ProcessFacility	HEOC (Fixed)
87		Observation date	Lbi_ObservationDate	YYYYMMDD