EUMETSAT

ASCAT Level 1: Product Format Specification

Doc.No. : EPS.MIS.SPE.97233
Issue : v12 e-signed
Date : 18 March 2019

EUMETSAT
Eumetsat-Allee 1, D–64295 Darmstadt, Germany
Tel: +49 6151 807-7
Fax: +49 6151 807 555
www.eumetsat.int

Page left intentionally blank

Document Change Record

Version	Date of Version	Document Change Request (DCR) Number	Description of Changes
Issue 2 Rev 0	25/05/1999		First Issue
Issue 2 Draft B	23/07/1999		Addressed RIDs
Issue 3 Draft A	27/06/2000	EUM.EPS. SYS.DCN. 032	Incorporate change in EPS Generic Product Specification, Issue 3
Issue 4 Draft A	15/11/2000		Add GTS Product section, Simplified document layout
Issue 4 Draft B	14/05/2001		• The annex with the description of ASCAT specific records has been totally redone, • Reference Documents section added • Footer Data Set sections removed • Level 1a Pointer section added • Level 1a Global External Data Sets included (Table 1) • Level 1a Global External Data Sets included (Table 2) • Navigation Status section in VIADD section removed • General definition of Level 1A MDR and ADR changed • Level 1B section fully re-written • Occurrence information modified and confirmed • Updated Signature Table • Removed GTS Section (to be handled in PGS)
Issue 5 Rev 0	01/06/2001		Issue for CGS PDR
Issue 5 Rev 1	13/06/2001		Revised issue for CGS PDR, Updated signature table
Issue 6 Rev 0	08/02/2002		Revised issue for Internal Review
Issue 6 Rev 1	28/02/2002		Revised issue for Internal Review
Issue 6 Rev 1	12/03/2002	EPS System Forum issue 1859	Additional revision to remove the end of dump degraded product generation concept
Issue 6 Rev 2	18/04/2002	EUM.EPS. SYS.DCR. 02.103	Annex: Change of dimensions for field A_TX in VIADR_IP; Addition of X_ORBIT and X_ATTITUDE to VIADR_PP.

Version	*Date of Version*	*Document Change Request (DCR) Number*	*Description of Changes*
Issue 6 Rev 3	06/06/2002	EUM.EPS. SYS.DCR. 02.125	• Sec 1: Deleted any reference to the Product Conventions Document, deleted the corresponding reference (former AD3); Deleted issue numbers of RD1 and RD2. Latest issue is assumed implicit. • Full doc: naming of the MDR records for L1b 25km, 50km and Full made consistent across the document • Sec 4.3.2: Last paragraph deleted as obsolete • Sec 4.3.3: Last paragraph added • Full doc and Annex: Concept of absolute dump number dropped. Dump identified by start and stop orbits in the dump • Annex: Revised for consistency with PGS and GPFS. See detailed changes marked in Annex itself
Issue 6 Rev 4	23/08/2002	EUM.EPS. SYS.DCR. 02.157	Sec 3.3: Amend the record subclass of MDR-1A from a value of 1 to a value of 0 (Table 3) Annexes: Annex becomes Annex 2. Annex 1 inserted to include table with meaning of values of Boolean and enumerated fields (tables 16 and 17)
Issue 6 Rev 4	23/08/2002	EUM.EPS. SYS.DCR. 02.142/157	Annex 2: See detailed changes marked in Annex 2 itself
Issue 6 Rev 4	13/11/2002	EUM.EPS. SYS.DCR. 02.170	Section 6: Added Section 6 - Record Format Version Control
Issue 6 Rev 4	10/12/2002	EUM.EPS. SYS.DCR. 02.237	Annex 2: VIADR-PP: update of AGPO -associated parameters
Issue 6 Rev 4	16/12/2002	EUM.EPS. SYS.DCR. 02.247	Annex 2: VIADR-IP: update of chirp-related parameters
Issue 6 Rev 5	15/03/2004	EUM.EPS. SYS.DCR. 03.171	Annex 2: Correction of typos in offset column in VIADR-PP and VIADR-IP (format not changed, thus record version numbers not changed) RX_FILTER_SHAPE scaling factor changed from 4 to 6. Field type changed from unsigned to signed Sec 6: MDR-1A record version changed
Issue 6 Rev 5	31/03/2004	EUM.EPS. SYS.DCR. 04.025	Annex 2: Added Antenna and SFE temperature range fields to VIADR-PP
Issue 6 Rev 6	25/11/2005	EUM.SYS. DCR. 05.0274	Sec 6 and Annex 2: Dimensions in MDR-1B FULL corrected and Record format Version number updated

Version	*Date of Version*	*Document Change Request (DCR) Number*	*Description of Changes*
Issue 6 Rev 7	11/12/2005	EUM.SYS. DCR. 05.0283	Sec 6: Corrected typo in Record format version number in table 16
Issue 6 Rev 8	03/04/2006	EPS_- DCR_- EUM_761	Sec 3.1: Remove DEBLOOMING_KERNELS GEADR subclass Sec 1.4: Add Auxiliary Data Inventory (EUM.EPS. SYS.LIS. 00.002) as reference document Sec 3.1, 4.1: Add OSV and LSM GEADR subclasses, added information about actual implemented DEB file name
Issue 7 Rev 0	01/12/2007	EPS_AB_- DCR_- EUM_28	• Sec 3: Addition of SPHR and VIADR-VER, Removal of VIADR-TR, -PP, -IP, -DUMP, Introduction of new VEADR records: VEADR-INS, PRC, -NTB. • Sec 4: Addition of SPHR and VIADR-PR, Midification of GEADR records: Removed DEBLOOMING_KERNELS and added OSV and LSM, Removal of VIADR-TR, -PP, -IP, -DUMP. Introduction of new VEADR records: VEADR-INS, PRC, -NTB. And -DEB.
Issue 7 Rev 0	07/12/2007	EPS_AB_- DCR_- EUM_28	Sec 5, Sec 6 and Annex 2: Updated to be in line with changes in sections 3 and 4.
Issue 7 Rev 0	14/02/2008	EPS_AB_- DCR_- EUM_37	Annex 2: Missing value convention for SPHR fields and size of SPHR records and correct typos in field names. Section 6: Added version control for new SPHR
Issue 7 Rev 0	19/02/2008	EPS_AB_- DCR_- EUM_37	Section 3.3. and 4.3: Remove references to old VIADRs (editorial)
v8A	30/04/2008		• Signature table updated. • Table captions standardised (which also corrected missing entries in List of Tables) and references to sections, tables etc. automated. • Annex 1 and 2 re-titled Appendix A and B. • Several typos corrected.
v8A	30/04/2008		• Signature table updated. • Table captions standardised (which also corrected missing entries in List of Tables) and references to sections, tables etc. automated. • Annex 1 and 2 re-titled Appendix A and B. • Several typos corrected.
v8B	08/09/2008		Appendix B: Added link to Annex file in Hummingbird.
v8C	27/04/2010	ODT_- DCR_155	Add record subclass info.

Version	*Date of Version*	*Document Change Request (DCR) Number*	*Description of Changes*
	23/02/2011	ODT_-DCR_234	Annex: Field description updates (see Annex for full details).
V9	02/07/2012	TBC	• Input to ECPD #304 • Chapters 3, 4 and 5: Added VEADR-XCL and VEADR-OSV to all products • Chapters 3, 4 and 5: Removed GEADR-OSV from all products • Chapters 3 and 5: updated of L1a flags and definition • Chapters 4 and 5: Added VIADR-GRID for the ASCA_-SZF products • Chapters 4 and 5: Removed VEADR-DEB • Section 4.6.3: updated of SZF product description • Chapters 4 and 5: renamed MDR-1B-25KM, MDR-1B-50KM with MDR-1B-125 and MDR-1B-250 • Chapter 6: added new versions of SPHR, VIADR-VER, MDR-1B-FULL, MDR-1B-25KM (MDR-1B-125) and MDR-1B-50KM (MDR-1B-250), and new entry for VIADR-GRID • Appendix A: Updated to reflect L1a flag changes and included explicit definition of all Boolean fields • Appendix B: Clean-up of several field descriptions • Appendix B: SPHR clean-up • Appendix B: added VIADR-GRID • Appendix B: MDR-1B-FULL: Full revision • Appendix B: MDR-1A: Flag cleanup, removal of several unnecessary fields • Appendix B: renamed MDR-1B-25KM, MDR-1B-50KM with MDR-1B-125 and MDR-1B-250 - addition/removal of fields
V10	02/07/2012	TBC	Updated signature table and distribution list. Updated link to Annex.
V10A	08/10/2014	AR_14637	Added significant bit to FLAGFIELD_RFR (PGP drops)
V11 Draft	04/05/2016		Add SRF parameters to SZF, Add F_RES to SZO/R (not implemented)

Version	*Date of Version*	*Document Change Request (DCR) Number*	*Description of Changes*
V12	18/03/2019	ECP 1043	• Consolidation of product quality flags in MDR-1A, MDR-1B-FULL, MDR-1B-125 and MDR-1B-250, including update of flag counters in SPHR • Remove SRF parameters and F_RES from MDR-1B-125 and MDR-1B-250 (unused) • Update of scaling factor (SF) of Land Contamination Ratio (LCR). • Added missing AS_DES_PASS flag description for MDR-1B-250 and MDR-1B-125 • Corrected AS_DES_PASS flag values (EPS/AR/17517) • Updated Annex reference

Table of Contents

List of Tables

1 INTRODUCTION

1.1 Purpose and Scope

This document is the Advanced Scatterometer (ASCAT) Level 1 Product Format Specification. The generic product format specification used by this document is defined in the EPS Generic Product Format Specification [AD–1]. The current version of this document describes the ASCAT Level 1 Product Format Version 13.1. This format version has been issued in order to consolidate the product flags and to introduce the Land Contamination Ratio (LCR).

1.2 Structure of the Document

The document is organised in three sections, including the introduction:

- Section 1 describes the scope of the document
- Section 2 contains general aspects of the ASCAT Level 1 product formats
- Sections 3 and 4 describe the instrument and level specific records for Level 1A and 1B products
- Section 5 details the occurrence rates of the various records within Level 1A or 1B product
- Section 6 provides a history of version numbers for the records defined within the document.
- Appendix A summarises the meaning of Boolean and enumerated field values
- Appendix B shows the composition of the product quality flag variable
- Appendix C links to detailed tables describing the record formats

1.3 Applicable Documents

[AD–1] EPS Generic Product Format Specification (EPS.GGS.SPE.96167)

[AD–2] EPS Ground Segment ASCAT Product Generation Function Specification (EPS/SYS/SPE/990009)

1.4 Reference Documents

[RD–1] ASCAT Measurement Data Interface Specification (MO.TN.DOR.SC.0015)

[RD–2] ASCAT TM/TC ICD (MO-IC-DOR-SC-0031)

[RD–3] Auxiliary Data Inventory (EUM.EPS.SYS.LIS.00.002)

2 FORMAT OF ASCAT LEVEL 1 PRODUCTS

2.1 Overview

The product format for both ASCAT Level 1A and 1B products is based on the generic product format as described in [AD–1]. This document details the instrument-specific and level-specific additions required for ASCAT Level 1 products

2.2 Generic Record Header Fields

All generic record header fields of the instrument/level specific records defined in this document shall have an INSTRUMENT_GROUP value of ASCAT.

3 LEVEL 1A

ASCAT Level 1A corresponds to echo source packets and associated data, referenced to by the echo source packets localisation time (T_0, see Section [AD–2]). The START/STOP times indicated in the MPHR and the corresponding VEADRs and VIADRs are also referenced by the echo source packet localisation time T_0.

3.1 Secondary Product Header Record

The Level 1A SPHR is detailed in Appendix C to this document. Note that the SPHR is common to both the Level 1A and Level 1B products and has a subclass ID value of one.

3.2 Global External Auxiliary Data Records

There is one subclass of GEADR for the ASCAT Level 1A Product.

Subclass	Description	Subclass ID
LSM Land Sea Mask File	(xxxx_LSM_xx_) [RD–3]	2

3.3 Global Internal Auxiliary Data Record

There is no GIADR defined for the Level 1A product.

3.4 Variable External Auxiliary Data Records

The following subclasses of VEADR are present for ASCAT Level 1A Product.

Subclass	Description	Subclass ID
VEADR-PRC	Processing parameters file (ASCA_PRC_xx) [RD–3]	1
VEADR-INS	Instrument parameters file (ASCA_INS_xx) [RD–3]	2
VEADR-NTB	Normalisation Table (ASCA_NTB_xx) [RD–3]	3
VEADR-XCL	Antenna gain patterns file (ASCA_XCL_xx) [RD–3]	5
VEADR-OSV	Orbit State Vector prediction file (xxxx_OSV_xx) [RD–3]	6

Tab. 2: VEADR subclasses for ASCAT Level 1A Product.

3.5 Variable Internal Auxiliary Data Records

The following subclasses of VIADR are present for ASCAT Level 1A Product. The contents and format of VIADR-OA and VIADR-VER are detailed in Appendix C of this document.

Subclass	Description	Subclass ID
VIADR-OA	Orbit/attitude parameters	4
VIADR-VER	Processor and auxiliary file versions used	6

Tab. 3: VIADR subclasses for ASCAT Level 1A Product

3.6 Measurement Data Records

A Level 1A MDR contains one ASCAT measurement source packet plus other associated data, i.e., geometry, applicable reference functions, quality flags and qualifiers and interpolated telemetry. There is one subclass of MDR for the Level 1A product.

Subclass	Description	Subclass ID
MDR-1A	Level 1A measurement and associated data	0

The contents and format of MDR-1A are detailed in Appendix C to this document. The contents of the Quality Flags and Qualifiers fields in MDR-1A are explained in the following paragraphs. The meaning of each bit flag is described in Appendix A.

The 32-bit FLAGFIELD associated with a source packet echo line contains flags related to the quality of the reference functions. Its structure is described in Appendix B.

4 LEVEL 1B

There are three ASCAT Level 1B products:

- Level 1B Full
- Level 1B 12.5 km
- Level 1B 25 km

ASCAT Level 1B Full data correspond to the σ_0 values generated from individual echo samples within an echo line in a source packet, together with associated data, referenced by the echo source packet localisation time (T_0, see [AD–2]). The START/STOP times indicated in the MPHR and the corresponding VEADR's and VIADR's, are also referenced by the echo source packet localisation time T_0. The MDR sequence in the ASCAT Level 1B Full product matches that of the corresponding input Level 1A product.

ASCAT Level 1B 12.5 and 25 km data correspond to re-sampled (spatially averaged) σ_0 values, on a 12.5 and 25 km grid, respectively. The product is organised as successive lines of nodes along track, referenced to by the orbit time that corresponds to that line of nodes. See [AD–2]. The START/STOP times indicated in the MPHR and the corresponding VEADRs and VIADRs, are also referenced with respect to that time.

4.1 Secondary Product Header Record

The Level 1B SPHR is detailed in Appendix B to this document. Note that the SPHR is common to both the Level 1A and Level 1B products and has a subclass ID value of 1.

4.2 Global External Auxiliary Data Records

There is one subclass of GEADR for the ASCAT Level 1B Product.

Subclass	Description	Subclass ID
LSM	Land Sea Mask File (xxxx_LSM_xx_) [RD–3]	2

4.3 Global Internal Auxiliary Data Record

There is no GIADR defined for the Level 1B product.

4.4 Variable External Auxiliary Data Records

The following subclasses of VEADR are present for ASCAT Level 1B Product.

Subclass	Description	Subclass ID
VEADR-PRC	Processing parameters file (ASCA_PRC_xx) [RD 3]	1
VEADR-INS	Instrument parameters file (ASCA_INS_xx) [RD 3]	2
VEADR-NTB	Normalisation Table (ASCA_NTB_xx) [RD 3]	3
VEADR-XCL	Antenna gain patterns file (ASCA_XCL_xx) [RD 3]	5
VEADR-OSV	Orbit State Vector prediction file (xxxx_OSV_xx) [RD 3]	6

Tab. 4: VEADR subclasses for ASCAT Level 1B Products

4.5 Variable Internal Auxiliary Data Records

The following subclasses of VIADR are present for ASCAT Level 1B Product. The contents and format of VIADR-OA, VIADR-VER and VIADR-GRID are detailed in Appendix B to this document.

Subclass	Description	Subclass ID
VIADR-OA	Orbit/attitude parameters	4
VIADR-VER	Processor and auxiliary file versions used	6
VIADR-GRID	Only used in SZF products	8

Tab. 5: VIADR subclasses for ASCAT Level 1B Products

4.6 Measurement Data Record

4.6.1 Record Subclasses

Subclass	Description	Subclass ID
MDR-1B-FULL	Only used in SZF products	3
MDR-1B-125	Only used in SZR products	1
MDR-1B-250	Only used in SZO products	2

Tab. 6: MDR subclasses for ASCAT Level 1B Products

The contents and format of MDR-1B-125, MDR-1B-250 and MDR-1B-FULL are detailed in to this document. A 32-bit FLAGFIELD contains flags related to the quality of the reference functions, its structure is documented in Appendix B.

4.6.2 Level 1B Full-Resolution Product

The ASCAT instrument fires sequentially six antennas, which produce measurements along six different footprints (beams) on the Earth surface. Every ASCAT source packet in Level 1A contains 256 detected power echoes along the antenna elevation angle which, after internal calibration, normalisation and localisation, give 256 geographically-localised σ_0 values at full resolution, per beam. In this context, full resolution refers to the resolution provided by the measurement system, which is limited by the antenna diffraction effects across beam, and by the range discrimination along beam.

The Level 1B full-resolution MDRs follow the same sequence and are organised as the Level 1A MRDs, i.e., according to the original echo source packets localisation time (T_0. See [AD–2]). Each MDR contains a subset of the 256 geographically-localised σ_0 values, plus associated data. The number of σ_0 values included in the Level 1B full-resolution product is 192, and this number is common for all beams. These 192 values are selected from the original 256, as those covering the nominal 500 km ASCAT swaths for the re-sampled products, see Section 5.

The contents of the Quality Flags and Qualifiers fields in MDR-1B-FULL are equivalent to those in MDR-1A, as listed in Appendix B.

4.6.3 Level 1B 12.5 km and 25 km Products

The Level 1B 12.5 km and 25 km product data is organised:

- by lines of nodes along the swath
- by nodes across the swath
- by σ_0 within a node

Each MDR contains data of the three types, defining fields of three different dimensions. Associated data of the same dimensions, related for example to geometry or quality flags, are also included in the MDR. The position of the nodes in these products does not correspond to the original measuring footprint. The data are a result of spatial re-sampling; hence the geographical location of each node is defined in that process.

Along the swath, lines of nodes are generated with a fixed time interval, which corresponds to a distance in kilometres of approximately 12.5 km or 25 km. The exact spacing between lines depends on the orbit height, which varies slightly around the orbit and between orbits. Across the swath, lines of nodes are generated on a fixed distance in kilometres of 12.5 km or 25 km. This results in 82 nodes (41 per swath) for the 12.5 km product and 42 nodes (21 per swath) for the 25 km product. Every line of nodes contains data from both swaths, ordered from left swath to right swath and from left to right within the swaths, if one moves in the direction of the instrument.

The number of σ_0 values in an ASCAT Level 1B product node is three, as the name *triplet* indicates.

5 OCCURRENCE INFORMATION

5.1 Level 1A

Record	Occurrence
MPHR	Once per product
SPHR	Once per product
GEADR-LSM	Once per product
VIADR-OA –VER,	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
VEADR-PRC, –INS, –NTB, –XCL, –OSV	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
MDR-1A	Once per measurement source packet

Tab. 7: Occurrence information for Level 1A records

5.2 Level 1B-Full

Record	Occurrence
MPHR	Once per product
SPHR	Once per product
GEADR-LSM	Once per product
VIADR-OA, –VER, –GRID	Occurs at least once. Reoccurs each time the applicability of the information changes within the product.
VEADR-PRC, –INS, –NTB, –XCL, –OSV	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
MDR-1B-FULL	Once per every antenna beam firing sequence.

Tab. 8: Occurrence information for Level 1B-Full records

5.3 Level 1B-12.5km

Record	Occurrence
MPHR	Once per product
SPHR	Once per product
GEADR-LSM	Once per product
VIADR-OA, -VER	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
VEADR-PRC, -INS, -NTB, -XCL, -OSV	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
MDR-1B-125	Once per every 12.5 km grid line of nodes.

Tab. 9: Occurrence information for Level 1B-12.5 km records

5.4 Level 1B-25km

Record	Occurrence
MPHR	Once per product
SPHR	Once per product
GEADR-LSM	Once per product
VIADR-OA, -VER	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
VEADR-PRC, -INS, -NTB, -XCL, -OSV	Occurs at least once. Re-occurs each time the applicability of the information changes within the product.
MDR-1B-250	Once per every 25 km grid line of nodes.

Tab. 10: Occurrence information for Level 1B-12.5 km records

6 RECORD FORMAT VERSION CONTROL

Record Subclass	Format Version Number	Defined in PFS Issue #
SPHR	**3**	**12**
	2	9.0
	1	7.0
VIADR-OA	**2**	**6.4**
	1	6.3 (CDR)
VIADR-VER	**2**	**9.0**
	1	7.0
VIADR-GRID	**1**	**9.0**
MDR-1A	**5**	**12**
	4	9.1
	3	6.5
	2	6.4
	1	6.3 (CDR)
MDR-1B-FULL	**5**	**12**
	4	9.0
	3	6.6
	2	6.4
	1	6.3 (CDR)
MDR-1B-250	**4**	**12**
	3	9.0
	2	6.4
	1	6.3 (CDR)
MDR-1B-125	**4**	**12**
	3	9.0
	2	6.4
	1	6.3 (CDR)

Tab. 11: Record Format Version Numbers

The product format version summarising the latest baseline corresponds to 13.1. This number is reflected in the following MPHR fields of all ASCAT Level 1 products:

- PRODUCT_MAJOR_VERSION = 13
- PRODUCT_MINOR_VERSION = 01

A MEANING OF VALUES IN BOOLEAN AND ENUMERATED FIELDS

Record	Field	value = 0	value = 1
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	DEGRADED_INST_MDR	Nominal	Degraded
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	DEGRADED_PROC_MDR	Nominal	Degraded
MDR-1A	LEFT_RIGHT_SWATH	Left Swath	Right Swath
MDR-1B-250, MDR-1B-125	SWATH_INDICATOR	Left Swath	Right Swath
MDR-1B-250, MDR-1B-125	F_KP	Kp estimate at nominal quality	Kp estimate at non-nominal quality
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	AS_DES_PASS	Descending pass	Ascending pass
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_NOISE	If noise packets sequence nominal	If noise packets interpolated during processing
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_PG	Nominal PGP	Degraded PGP
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: V_PG	Valid PGP	Not valid PGP
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_FILTER	Nominal hrx	Degraded hrx
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: V_FILTER	Valid hrx	Not valid hrx
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_PGP_OOL	Estimated power gain product nominal.	Estimated power gain product out of limits.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_NP_OOL	Measured noise nominal.	Measured noise out of limits.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_PGP_DROP	Continuous PGP	Drop in PGP
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_ATTITUDE	Nominal attitude (yaw steering)	Non-nominal attitude

Continued on next page

Continued from previous page

Record	Field	value = 0	value = 1
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_OMEGA	Correct instrument parameter configuration	Instrument parameter configuration mismatch
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_MAN	No manoeuvre	Manoeuvre
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_OSV	OSV file available to the processing	OSV file not available
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_E_TEL_PRES	Interpolated HKTM telemetry present	Interpolated HKTM telemetry missing
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_ TEL_IR	All interpolated HKTM telemetry parameters within prescribed thresholds	Some interpolated HKTM telemetry parameters out of prescribed thresholds
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_REF	If F_PGP and F_ NP are 0.	If F_PGP or F_ NP are 1.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_SA	If no risk of solar array panel reflections interference.	If risk of solar array panel reflections interference.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_LAND	no land	land
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_GEO	If geolocation algorithm converged.	If geolocation algorithm failed.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_SIGN	If sigma0 in linear units is positive.	If sigma0 in linear units is negative and value in dB has been calculated from its unsigned value.
MDR-1A, MDR-1B-FULL, MDR-1B-250, MDR-1B-125	FLAGFIELD: F_COM_OP	If instrument data taken during operational phase.	If instrument data taken during commissioning phase.

Tab. 12: Meaning of Boolean value fields

Record	Field	Meaning
MDR-1B-250 MDR-1B-125	F_USABLE	0 = GOOD 1 = USABLE 2 = NON USABLE (see [AD–2])
MDR-1B-FULL	BEAM_NUMBER	0 = (value reserved) 1 = Left Fore Antenna 2 = Left Mid Antenna 3 = Left Aft Antenna 4 = Right Fore Antenna 5 = Right Mid Antenna 6 = Right Aft Antenna

Tab. 13: Meaning of enumerated field values

B FLAGFIELD

The flagfield defined below is common to all L1 products.

Bit	Contents	Possible values
0	F_NOISE	0 or 1
1	F_PG	0 or 1
2	V_PG	0 or 1
3	F_FILTER	0 or 1
4	V_FILTER	0 or 1
5	F_PGP_OOL	0 or 1
6	F_NP_OOL	0 or 1
7	F_PGP_DROP	0 or 1
8	F_ATTITUDE	0 or 1
9	F_OMEGA	0 or 1
10	F_MAN	0 or 1
11	F_OSV	0 or 1
12	F_E_TEL_PRES	0 or 1
13	F_E_TEL_IR	0 or 1
14	F_REF	0 or 1
15	F_SA	0 or 1
16	F_LAND	0 or 1
17	F_GEO	0 or 1
18	F_SIGN	0 or 1
19	F_COM_OP	0 or 1
20-31	Spare	0

Tab. 14: Structure of FLAGFIELD

C DETAILED SPECIFICATION OF ASCAT LEVEL-1 DATA RECORDS

Detailed format specifications are included for the following Variable Internal and Measurement Data Records in ASCAT Level 1 products:

- SPHR
- VIADR-OA
- VIADR-VER
- VIADR-GRID
- MDR-1A
- MDR-1B-250
- MDR-1B-125
- MDR-1B-FULL

See Annex below

FIELD	DESCRIPTION	SF	UNITS	EQUIVALENT TYPE	ENCODE CHARS	FIELD SIZE	OFFSET
N_F_GEO	Number of instances where F_GEO = 1	0	count	*U-INTEGER*	8	41	1127
N_F_SIGN	Number of instances where F_SIGN = 1	0	count	*U-INTEGER*	8	41	1168
N_F_COM_OP	Number of instances where F_COM_OP = 1	0	count	*U-INTEGER*	8	41	1209
L1b SZO/R product details Note: If the SPHR is part of a L1A product, the field values in this section will be filled in with the value 99999999							
N_L1B_MDR	Total number of MDRs in the L1B product	0	count	*U-INTEGER*	8	41	1250
N_EMPTY_S0_TRIP	Number of fully empty s0 triplets	0	count	*U-INTEGER*	8	41	1291
N_L1B_MDR_F	Number of s0 FORE valid values	0	count	*U-INTEGER*	8	41	1332
N_EMPTY_S0_TRIP_F	Number of s0 FORE default values	0	count	*U-INTEGER*	8	41	1373
N_L1B_MDR_M	Number of s0 MID valid values	0	count	*U-INTEGER*	8	41	1414
N_EMPTY_S0_TRIP_M	Number of s0 MID default values	0	count	*U-INTEGER*	8	41	1455
N_L1B_MDR_A	Number of s0 AFT valid values	0	count	*U-INTEGER*	8	41	1496
N_EMPTY_S0_TRIP_A	Number of s0 AFT default values	0	count	*U-INTEGER*	8	41	1537
L1b product quality Note: If the SPHR is part of a L1A product, the field values in this section will be filled in with the value 99999999							
N_F_KP_F	Number of instances where the flag F_KP is set to 1for FORE s0s	0	count	*U-INTEGER*	8	41	1578
N_F_USABLE_F	Number of instances where the flag F_USABLE is set to 2 for FORE s0s	0	count	*U-INTEGER*	8	41	1619
N_F_SA_F	Number of instances where F_SA is greater than 0 for FORE s0s	0	count	*U-INTEGER*	8	41	1660
N_F_REF_F	Number of instances where F_REF is greater than 0 for FORE s0s	0	count	*U-INTEGER*	8	41	1701
N_F_LAND_F	Number of instances where F_LAND is greater than 0 for FORE s0s	0	count	*U-INTEGER*	8	41	1742
N_F_KP_M	Number of instances where the flag F_KP is set to 1 for MID s0s	0	count	*U-INTEGER*	8	41	1783
N_F_USABLE_M	Number of instances where the flag F_USABLE is set to 2 for MID s0s	0	count	*U-INTEGER*	8	41	1824
N_F_SA_M	Number of instances where F_SA is greater than 0 for MID s0s	0	count	*U-INTEGER*	8	41	1865
N_F_REF_M	Number of instances where F_REF is greater than 0 for MID s0s	0	count	*U-INTEGER*	8	41	1906
N_F_LAND_M	Number of instances where F_LAND is greater than 0 for MID s0s	0	count	*U-INTEGER*	8	41	1947
N_F_KP_A	Number of instances where the flag F_KP is set to 1 for AFT s0s	0	count	*U-INTEGER*	8	41	1988
N_F_USABLE_A	Number of instances where the flag F_USABLE is set to 2 for AFT s0s	0	count	*U-INTEGER*	8	41	2029
N_F_SA_A	Number of instances where F_SA is greater than 0 for AFT s0s	0	count	*U-INTEGER*	8	41	2070
N_F_REF_A	Number of instances where F_REF is greater than 0 for AFT s0s	0	count	*U-INTEGER*	8	41	2111
N_F_LAND_A	Number of instances where F_LAND is greater than 0 for AFT s0s	0	count	*U-INTEGER*	8	41	2152
PROCESSING_MESSAGE_1	Processing Message free text	N/A	N/A	*CHAR*	50	83	2193
PROCESSING_MESSAGE_2	Processing Message free text	N/A	N/A	*CHAR*	50	83	2276
Size of the Record							**2359**

Doc Ref: EPS.MIS.SPE.97233.ANX
ASCAT Level 1 Product Format Specification - Annex
Worksheet: VIADR-VER

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
PROCESSOR_VERSION1	PPF major release number	n/a	n/a	1	1	1	enumerated	1	1	20
PROCESSOR_VERSION2	PPF release number	n/a	n/a	1	1	1	enumerated	1	1	21
PROCESSOR_VERSION3	PPF patch number	n/a	n/a	1	1	1	enumerated	1	1	22
PRC_VERSION1	ASCA_PRC_xx_ Major Version	n/a	n/a	1	1	1	enumerated	1	1	23
PRC_VERSION2	ASCA_PRC_xx_ Minor Version	n/a	n/a	1	1	1	enumerated	1	1	24
INS_VERSION1	ASCA_INS_xx_ Major Version	n/a	n/a	1	1	1	enumerated	1	1	25
INS_VERSION2	ASCA_INS_xx_ Minor Version	n/a	n/a	1	1	1	enumerated	1	1	26
NTB_VERSION1	ASCA_NTB_xx_ Major Version	n/a	n/a	1	1	1	enumerated	1	1	27
NTB_VERSION2	ASCA_NTB_xx_ Minor Version	n/a	n/a	1	1	1	enumerated	1	1	28
XCL_VERSION1	ASCA_XCL_xx_ Major Version	n/a	n/a	1	1	1	enumerated	1	1	29
XCL_VERSION2	ASCA_XCL_xx_ Minor Version	n/a	n/a	1	1	1	enumerated	1	1	30
TOTAL SIZE										31

Doc Ref: EPS.MIS.SPE.97233.ANX
ASCAT Level 1 Product Format Specification - Annex
Worksheet: VIADR-OA

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
AC_UTC_TIME	Ascending node UTC time	n/a	UTC	1	1	1	long cds time	8	8	20
AC_SV_POSITION	State vector at Ascending Node - Position	4	k m	3	1	1	integer8	8	24	28
AC_SV_VELOCITY	State vector at Ascending Node - Velocity	4	m/s	3	1	1	integer8	8	24	52
ATT_YS_LAW	Attitude Yaw Steering Law: Amplitude parameters: Cx (pitch), Cy (roll) and Cz (yaw)	6	radians	3	1	1	integer4	4	12	76
ATT_DIST_LAW	Attitude Distortion Law parameters, DIM1 is for 3 different coefficients, DIM3 is for 4 different values per coefficient, DIM2 is for three different attitude angles	6	n/a	3	3	4	integer4	4	144	88
TOTAL SIZE										232

Doc Ref: EPS.MIS.SPE.97233.ANX
ASCAT Level 1 Product Format Specification - Annex
Worksheet: VIADR-GRID

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
UTC_LINE_NODES	UTC time of reference line of nodes along the swath	n/a	UTC	1	1	1	short cds time	6	6	20
ABS_LINE_NUMBER	Absolute (unique) number for a reference line of nodes along the swath, generated every 6.25 km or, more accurately, 0.9375 s. Each line has 162 points, 81 across the left swath, 81 across the right swath. The time associated with each row corresponds to (ABS_LINE_NUMBER * 0.9375) seconds after 2000/01/01 00:00:00	0	count	1	1	1	integer4	4	4	26
LATITUDE_LEFT	Latitude values (-90 to 90 deg) for 81 points spaced by 6.25km across the left swath.	6	deg	81	1	1	integer4	4	324	30
LONGITUDE_LEFT	Longitude values (0 to 360 deg) for 81 points spaced by 6.25km across the left swath.	6	deg	81	1	1	integer4	4	324	354
LATITUDE_RIGHT	Latitude values (-90 to 90 deg) for 81 points spaced by 6.25km across the right swath.	6	deg	81	1	1	integer4	4	324	678
LONGITUDE_RIGHT	Longitude values (0 to 360 deg) for 81 points spaced by 6.25km across the right swath.	6	deg	81	1	1	integer4	4	324	1002
TOTAL SIZE										**1326**

Doc Ref: EPS.MIS.SPE.97233.ANX
ASCAT Level 1 Product Format Specification - Annex
Worksheet: MDR-1A

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
Quality of MDR has been degraded from nominal due to a processing degradation.										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument degradation.	n/a	n/a	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation.	n/a	n/a	1	1	1	boolean	1	1	21
ASCAT Measurement source packet										
PH	Packet Primary Header		see RD-1	3	1	1	bitst(16)	2	6	22
SH	Secondary Header		see RD-1	1	1	1	bitst(64)	8	8	28
SBT_TIMETAG	SBT at Time Tag		see RD-1	1	1	1	bitst(48)	6	6	36
PRI_COUNT_TIMETAG	PRI Count at Time Tag		see RD-1	1	1	1	bitst(16)	2	2	42
TAG_FIELD	Tag Field		see RD-1	1	1	1	bitst(8)	1	1	44
GP_FLAG	Ground Processor Flags		see RD-1	1	1	1	bitst(8)	1	1	45
PRI_COUNT	PRI Count		see RD-1	1	1	1	bitst(16)	2	2	46
OB_SW_CONFIG	On Board Software Configuration		see RD-1	1	1		bitst(16)	2	2	48
OB_PARA_CONFIG	On Board Parameter Configuration		see RD-1	1	1	1	bitst(16)	2	2	50
SPARE	Spare		see RD-1	1	1	1	bitst(16)	2	2	52
INST_CONFIG	Instrument Configuration		see RD-1	1	1	1	bitst(16)	2	2	54
SFE_TEMP	SFE Temperatures 1-6		see RD-1	6	1	1	bitst(16)	2	12	56
ANT_TEMP	Antenna Temperatures 1-12		see RD-1	12	1	1	bitst(16)	2	24	68
RECEIVER_GAIN	Receiver Gain		see RD-1	1	1	1	bitst(16)	2	2	92
OUT_OF_RANGE_COUNT	Out-of-range Count		see RD-1	1	1	1	bitst(16)	2	2	94
INT_TRANS_POWERS	Integrated Tranmitted Powers 1-4		see RD-1	4	1	1	bitst(16)	2	8	96
INT_REFL_PLOWERS	Integrated Reflected Powers 1-4		see RD-1	4	1	1	bitst(16)	2	8	104
INT_CAL_POWERS	Integrated Calibration Powers 1-4		see RD-1	4	1	1	bitst(16)	2	8	112
CAL_POWERS	Calibration Powers 1-4		see RD-1	2	3	4	bitst(16)	2	48	120
ECHO_DATA	Echo data		see RD-1	256	1	1	bitst(16)	2	512	168
PACKET_ERROR_CTRL_FIELD	Packet Error Control Field		see RD-1	1	1	1	bitst(16)	2	2	680
ASOCIATED DATA										
General appended data										
UTC_SOURCE_PACKET	UTC time associated to source packet (T_E)	0	UTC	1	1	1	long cds time	8	8	682
ORBIT_NUMBER	Orbit number	0	count	1	1	1	u-integer4	4	4	690
AS_DES_PASS	Ascending/descending pass indicator (0=DESC, 1=ASC)	n/a	n/a	1	1	1	boolean	1	1	694
BEAM_NUMBER	Antenna Beam number	n/a	n/a	1	1	1	enumerated	1	1	695
Appended geometry information										
UTC_LOCALISATION	UTC time associated to the echo data (localisation time T_0)	0	UTC	1	1	1	long cds time	8	8	696
LATITUDE	Geodetic Latitude	6	deg	256	1	1	integer4	4	1024	704

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
LONGITUDE	East Longitude (0-360 deg)	6	deg	256	1	1	integer4	4	1024	1728
TRF_P	Terrestrial Reference Frame coordinates x, y and z	3	km	256	3	1	integer4	4	3072	2752
LCR	Land Contamination Ratio estimate (based on SRF)	4	n/a	256	1	1	u-integer2	2	512	5824
INCIDENCE ANGLE	Incidence angle	2	deg	256	1	1	u-integer2	2	512	6336
AZIMUTH ANGLE	Azimuth angle of the up-wind direction for a given antenna beam (range: -180 to +180, where minus is west and plus is east with respect to North)	2	deg	256	1	1	integer2	2	512	6848
Applicable reference functions										
RX_FILTER_SHAPE	Rx Filter shape function	6	n/a	256	1	1	integer4	4	1024	7360
NOISE_POWER	Noise Power value	4	n/a	1	1	1	u-integer4	4	4	8384
POWER_GAIN_PRODUCT	Power Gain Product value	4	n/a	1	1	1	u-integer4	4	4	8388
NORMAL_FACTORS_NOM	Normalisation Factors for nominal satellite pointing at that orbit time	2	Watt	256	1	1	u-integer4	4	1024	8392
Quality Flags & Qualifiers										
FLAGFIELD	Flag field related to summary qualifiers (256-dim) - bits defined in PFS Doc	n/a	n/a	256	1	1	U-integer4	4	1024	9416
Appended Interpolated Telemetry										
(Equipment Power Bus Voltages)										
DPU_A_Volt	Power bus voltage DPU A		see RD-2	1	1	1	integer2	2	2	10440
DPU_B_Volt	Power bus voltage DPU B		see RD-2	1	1	1	integer2	2	2	10442
RFU_A_Volt	Power bus voltage RFU A		see RD-2	1	1	1	integer2	2	2	10444
RFU_B_Volt	Power bus voltage RFU B		see RD-2	1	1	1	integer2	2	2	10446
SFE_A_Volt	Power bus voltage SFE A		see RD-2	1	1	1	integer2	2	2	10448
SFE_B_Volt	Power bus voltage SFE B		see RD-2	1	1	1	integer2	2	2	10450
HPA_A_Volt	Power bus voltage HPA A		see RD-2	1	1	1	integer2	2	2	10452
HPA_B_Volt	Power bus voltage HPA B		see RD-2	1	1	1	integer2	2	2	10454
(Equipment Power Bus Powers)										
DPU_A_Pow	Power bus power DPU A		see RD-2	1	1	1	integer2	2	2	10456
DPU_B_Pow	Power bus power DPU B		see RD-2	1	1	1	integer2	2	2	10458
RFU_A_Pow	Power bus power RFU A		see RD-2	1	1	1	integer2	2	2	10460
RFU_B_Pow	Power bus power RFU B		see RD-2	1	1	1	integer2	2	2	10462
SFE_A_Pow	Power bus power SFE A		see RD-2	1	1	1	integer2	2	2	10464
SFE_B_Pow	Power bus power SFE B		see RD-2	1	1	1	integer2	2	2	10466
HPA_A_Pow	Power bus power HPA A		see RD-2	1	1	1	integer2	2	2	10468

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
HPA_B_Pow	Power bus power HPA B		see RD-2	1	1	1	integer2	2	2	10470
(Equipment Reference Voltages)										
OFFSET_AD	Offset references for equipment temperatures (AD590 channels)		see RD-2	1	1	1	integer2	2	2	10472
GAIN_AD	Gain references for equipment temperatures (AD590 channels)		see RD-2	1	1	1	integer2	2	2	10474
FWD_CAL_ADC_VR1	ref. Voltage 1 of Fwd/Cal PowerADC		see RD-2	1	1	1	integer2	2	2	10476
FWD_CAL_ADC_VR2	ref. Voltage 2 of Fwd/Cal PowerADC		see RD-2	1	1	1	integer2	2	2	10478
REFL_ADC_VR1	ref. Voltage 1 of Reflected PowerADC		see RD-2	1	1	1	integer2	2	2	10480
REFL_ADC_VR2	ref. Voltage 2 of Reflected PowerADC		see RD-2	1	1	1	integer2	2	2	10482
MAIN_ADC_VR1			see RD-2	1	1	1	integer2	2	2	10484
MAIN_ADC_VR2			see RD-2	1	1	1	integer2	2	2	10486
(Unit/Equipment Temperatures)										
T_SSPA1_A	SSPA power stage temperature		see RD-2	1	1	1	integer2	2	2	10488
T_SSPA2_A	SSPA output isolator temperature		see RD-2	1	1	1	integer2	2	2	10490
T_EPC_A	EPC temperature		see RD-2	1	1	1	integer2	2	2	10492
T_RFU_A	RFU temperature		see RD-2	1	1	1	integer2	2	2	10494
T_DPU_A	DPU temperature		see RD-2	1	1	1	integer2	2	2	10496
T_SSPA1_B	SSPA power stage temperature		see RD-2	1	1	1	integer2	2	2	10498
T_SSPA2_B	SSPA output isolator temperature		see RD-2	1	1	1	integer2	2	2	10500
T_EPC_B	EPC temperature		see RD-2	1	1	1	integer2	2	2	10502
T_RFU_B	RFU temperature		see RD-2	1	1	1	integer2	2	2	10504
T_DPU_B	DPU temperature		see RD-2	1	1	1	integer2	2	2	10506
T_PDU	PDU temperature		see RD-2	1	1	1	integer2	2	2	10508
T_ICU	ICU internal thermistor		see RD-2	1	1	1	integer2	2	2	10510
TOTAL SIZE										**10512**

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
Quality of MDR has been degraded from nominal due to a processing degradation.										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument	n/a	n/a	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation.	n/a	n/a	1	1	1	boolean	1	1	21
ANTENNA BEAM associated data										
UTC_LOCALISATION	UTC time associated to the echo data (localisation time T_0)	0	UTC	1	1	1	short cds time	6	6	22
SAT_TRACK_AZI	Azimuth angle bearing (range: 0 to 360) of nadir track velocity	2	deg	1	1	1	u-integer2	2	2	28
AS_DES_PASS	Ascending/descending pass indicator (0=DESC, 1=ASC)	n/a	n/a	1	1	1	boolean	1	1	30
BEAM_NUMBER	Antenna Beam number	n/a	n/a	1	1	1	enumerated	1	1	31
SIGMA0_FULL	Full-resolution sigma_0 values	6	dB	192	1	1	integer4	4	768	32
INC_ANGLE_FULL	Full-resolution incidence angle values	2	deg	192	1	1	u-integer2	2	384	800
AZI_ANGLE_FULL	Azimuth angle of the up-wind direction for a given antenna beam (range: -180 to +180, where minus is west and plus is east with respect to North)	2	deg	192	1	1	integer2	2	384	1184
LATITUDE_FULL	Latitude (-90 to 90 deg)	6	deg	192	1	1	integer4	4	768	1568
LONGITUDE_FULL	Longitude (0 to 360 deg)	6	deg	192	1	1	integer4	4	768	2336
LCR	Land Contamination Ratio estimate (based on SRF)	4	n/a	192	1	1	u-integer2	2	384	3104
FLAGFIELD	Flag field containing quality information	n/a	n/a	192	1	1	u-integer4	4	768	3488
SIZE OF THE RECORD										**4256**

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
Quality of MDR has been degraded from nominal due to a processing degradation.										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument degradation.	n/a	n/a	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation.	n/a	n/a	1	1	1	boolean	1	1	21
SWATH GRID LINE and associated data										
UTC_LINE_NODES	UTC time of line of nodes	n/a	UTC	1	1	1	short cds time	6	6	22
ABS_LINE_NUMBER	Absolute (unique) counter for the line of nodes (from format version 12.0 onwards only)	n/a	count	1	1	1	integer4	4	4	28
SAT_TRACK_AZI	Azimuth angle bearing (range: 0 to 360) of nadir track velocity	2	deg	1	1	1	u-integer2	2	2	32
AS_DES_PASS	Ascending/descending pass indicator (0=DESC, 1=ASC)	n/a	n/a	1	1	1	boolean	1	1	34
NODE and associated data										
SWATH INDICATOR	Swath (0=LEFT, 1=RIGHT)	n/a	n/a	82	1	1	boolean	1	82	35
LATITUDE	Latitude (-90 to 90 deg)	6	deg	82	1	1	integer4	4	328	117
LONGITUDE	Longitude (0 to 360 deg)	6	deg	82	1	1	integer4	4	328	445
TRIPLET and associated data										
SIGMA0_TRIP	Sigma0 triplet, re-sampled to swath grid, for 3 beams (fore, mid, aft)	6	dB	3	82	1	integer4	4	984	773
KP	Kp for re-sampled sigma0 triplet. Values between 0 and 1	4	n/a	3	82	1	u-integer2	2	492	1757
INC_ANGLE_TRIP	Incidence angle for re-sampled sigma0 triplet.	2	deg	3	82	1	u-integer2	2	492	2249
AZI_ANGLE_TRIP	Azimuth angle of the up-wind direction for a given measurement triplet (range: -180 to +180, where minus is west and plus is east with respect to North)	2	deg	3	82	1	integer2	2	492	2741
NUM_VAL_TRIP	Number of full resolution sigma0 values contributing to the re-sampled sigma0 triplet.	0	count	3	82	1	u-integer4	4	984	3233
F_KP	Flag related to the quality of the Kp estimate (0=NOMINAL, 1=NON-NOMINAL)	n/a	n/a	3	82	1	boolean	1	246	4217
F_USABLE	Flag related to the usability of the sigma0 triplet (0=GOOD, 1=USABLE, 2=NOT USABLE)	n/a	n/a	3	82	1	enumerated	1	246	4463

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
F_LAND	Flag related to presence of land in the re-sampled sigma0 triplet (based on land mask; value between 0 and 1 shows the fraction of original samples affected)	3	n/a	3	82	1	u-integer2	2	492	4709
LCR	Land Contamination Ratio estimate (based on SRF)	4	n/a	3	82	1	u-integer2	2	492	5201
FLAGFIELD	Flag field containing quality information	n/a	n/a	3	82	1	u-integer4	4	984	5693
SIZE OF THE RECORD										**6677**

Doc Ref: EPS.MIS.SPE.97233.ANX
ASCAT Level 1 Product Format Specification - Annex
Worksheet: MDR-1B-250

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
RECORD_HEADER	Generic Record Header			1	1	1	REC_HEAD	20	20	0
Quality of MDR has been degraded from nominal due to a processing degradation.										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument degradation.	n/a	n/a	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation.	n/a	n/a	1	1	1	boolean	1	1	21
SWATH GRID LINE and associated data										
UTC_LINE_NODES	UTC time of line of nodes	n/a	UTC	1	1	1	short cds time	6	6	22
ABS_LINE_NUMBER	Absolute (unique) counter for the line of nodes (from format version 12.0 onwards only)	n/a	count	1	1	1	integer4	4	4	28
SAT_TRACK_AZI	Azimuth angle bearing (range: 0 to 360) of nadir track velocity	2	deg	1	1	1	u-integer2	2	2	32
AS_DES_PASS	Ascending/descending pass indicator (0=DESC, 1=ASC)	n/a	n/a	1	1	1	boolean	1	1	34
NODE and associated data										
SWATH INDICATOR	Swath (0=LEFT, 1=RIGHT)	n/a	n/a	42	1	1	boolean	1	42	35
LATITUDE	Latitude (-90 to 90 deg)	6	deg	42	1	1	integer4	4	168	77
LONGITUDE	Longitude (0 to 360 deg)	6	deg	42	1	1	integer4	4	168	245
TRIPLET and associated data										
SIGMA0_TRIP	Sigma0 triplet, re-sampled to swath grid, for 3 beams (fore, mid, aft)	6	dB	3	42	1	integer4	4	504	413
KP	Kp for re-sampled sigma0 triplet. Values between 0 and 1	4	n/a	3	42	1	u-integer2	2	252	917
INC_ANGLE_TRIP	Incidence angle for re-sampled sigma0 triplet.	2	deg	3	42	1	u-integer2	2	252	1169
AZI_ANGLE_TRIP	Azimuth angle of the up-wind direction for a given measurement triplet (range: -180 to +180, where minus is west and plus is east with respect to North)	2	deg	3	42	1	integer2	2	252	1421
NUM_VAL_TRIP	Number of full resolution sigma0 values contributing to the re-sampled sigma0 triplet.	0	count	3	42	1	u-integer4	4	504	1673
F_KP	Flag related to the quality of the Kp estimate (0=NOMINAL, 1=NON-NOMINAL)	n/a	n/a	3	42	1	boolean	1	126	2177
F_USABLE	Flag related to the usability of the sigma0 triplet (0=GOOD, 1=USABLE, 2=NOT USABLE)	n/a	n/a	3	42	1	enumerated	1	126	2303

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE	OFFSET
F_LAND	Flag related to presence of land in the re-sampled sigma0 triplet (based on land mask; value between 0 and 1 shows the fraction of original samples affected)	3	n/a	3	42	1	u-integer2	2	252	2429
LCR	Land Contamination Ratio estimate (based on SRF)	4	n/a	3	42	1	u-integer2	2	252	2681
FLAGFIELD	Flag field containing quality information	n/a	n/a	3	42	1	u-integer4	4	504	2933
SIZE OF THE RECORD										**3437**

Field Type	Size in Bytes
bitst(16)	2
bitst(24)	3
bitst(32)	4
bitst(48)	6
bitst(64)	8
bitst(8)	1
boolean	1
byte	1
char(1)	1
char(100)	100
char(2)	2
char(3)	3
char(4)	4
char(40)	40
char(88)	88
e-char(1)	1
e-char(2)	2
e-char(3)	3
enumerated	1
general time	15
integer2	2
integer4	4
integer8	8
long cds time	8
REC_HEAD	20
short cds time	6
u-byte	1
u-integer2	2
u-integer4	4
u-integer8	8