

AMSU-A Level 1 Product Format Specification

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Issue / Revision	Date	DCN. No	Changed Pages / Paragraphs
			<ul style="list-style-type: none"> • Deleted out-dated text from Section 5 referring to PDR versions • Added Section 6 with record format version numbers • Removed error states relating to level 0 processing from QUALITY_INDICATOR field (bits 3 – 0) • Removed redundant definitions of fields that occur in both MDR-1A and MDR-1B. All common MDR fields now defined in Section 3.5.1 • Editorial corrections (spelling mistakes) • Section 3.5.1.5 field name corrected • Corrected occurrence tables – removed SPHR and VIADR references
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v7A	14/07/08		<p>Migrated into Hummingbird. Body contents copied into standard template. Editorial updates only:</p> <ul style="list-style-type: none"> - Signature table updated. - Table captions numbering automatically renumbered 18,19,20 to 17,18,19, since previously there was no 17.
v7B	26/08/08		<ul style="list-style-type: none"> • Deleted sentence in Section 1.1 referring to reference AD-3 (replaced by AD-1 – see issue 6.1 update comment). • Added Appendix A with link to Annex file in Hummingbird. • Editorial edits for typos and spelling standardising.

Issue / Revision	Date	DCN. No	Changed Pages / Paragraphs
v7C	11/12/08	EPS_AB_DCR_E UM_76	<ul style="list-style-type: none"> Bit value corrections for tables INSTRUMENT_STATUS_A2_A1, AMSU_A2_INVALID_WORD_FLAG, SCAN_LINE_QUALITY. Sections for tables INSTRUMENT_SECOND_STATUS_A2 and INSTRUMENT_STATUS_A2 (second occurrence) deleted.
v7D	28/09/11	ODT_DCR_155	<ul style="list-style-type: none"> Added record subclass info.
		ODT_DCR_233	<ul style="list-style-type: none"> Annex: Worksheets MDR-1A & MDR-1B, field ANGULAR_RELATION: Added Description note on azimuth angle range.
		TBD– Wait for OPS_ECPD_299 to be approved, then make DOCET	<ul style="list-style-type: none"> Field CALIBRATION_QUALITY replaced by compound data type DATA_CALIBRATION. Annex: Updates to MDR-1A & MDR-1B, and new worksheet COMPOUNDS (see Annex for full details).
v7E	11/12/13	EPS_DOCET_228	Changed description in section 3.5.1.13. Changed the specifications for the 16-bit field 'CALIBRATION_QUALITY' (old section 3.5.1.13). Subdivided this into an 8-bit unsigned integer (u-byte) called 'NEDT_VALUE' and an 8-bit bit string (bitst(8)) called 'CALIBRATION_QUALITY'.
v8			Version 7E changed to version 8 by Document Management System. No changes to version 7E.
V8A	20/06/13		New version of document created to maintain version continuity with previous document. Previous document 211321 given invalid file name by DM tool.

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1 INTRODUCTION

1.1 Purpose and Scope

This document is the Advanced Microwave Sounding Unit-A (AMSU-A) Level 1 Product Format Specification.

The generic product format specification used by this document is defined in the EPS Generic Product Format Specification.

1.2 Structure of the Document

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

Section 1	Describes the purpose of the document and the document structure.
Section 2–4	Detail the product formats for Level 1a and 1b products.
Sections 5	Gives specifications for the occurrence rates of the various records within the Level 1a or 1b product.
Sections 6	Provides a history of version numbers for the records defined within the document.
Appendix A	Provides 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 AMSU-A Level 1 Product Generation Specification	EPS/SYS/SPE/990005

1.4 Acronyms and Abbreviations Used in this Document

Acronym	Meaning
AMSU-A	Advanced Microwave Sounding Unit-A
GEADR	Global External Auxiliary Data Record
GIADR	Global Internal Auxiliary Data Record
MDR	Measurement Data Record
NEdT	Noise Equivalent Delta Temperature
VEADR	Variable External Auxiliary Data Records
VIADR	Variable Internal Auxiliary Data Records

2 STRUCTURE OF AMSU-A LEVEL 1 PRODUCTS FORMAT

2.1 Form

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

3 LEVEL 1A RECORDS

3.1 Secondary Product Header Record

There is no SPHR for Level 1a products.

3.2 Global External Auxiliary Data Record

The global auxiliary datasets that are used by the Level 1 PGF (described in AD 1) but not written into the product are referenced by GEADRs, as specified in [AD 2].

3.2.1 Record Subclasses

The following subclasses of GEADR are present for the AMSU-A Level 1a product.

<i>Subclass</i>	<i>Description</i>	<i>Subclass ID</i>
AMSA_CAL	Calibration and configuration parameters	1
xxxx_BIT	Land/sea/coast database	2
xxxx_TOP	Topography database	3

Table 1: GEADR subclasses

3.3 Global Internal Auxiliary Data Record

There is one subclass of GIADR for the Level 1a Product. This is detailed in the Annex (0) to this document.

3.3.1 Record Subclasses

Record subclass determines the type of auxiliary data referenced.

<i>Subclass</i>	<i>Description</i>	<i>Subclass ID</i>
GIADR-ADCONV	Analogue to digital conversion coefficients	2

Table 2: GIADR subclasses

3.4 Variable External and Internal Auxiliary Data Records

There are no VEADRs or VIADRs defined for the Level 1a product.

3.5 Measurement Data Record

The MDR contains, per scan line, scene counts and calibration counts from cold space and warm target views. The MDR is detailed in the Annex (0) to this document.

3.5.1 Record Subclasses

There is one subclass of MDR for the Level 1a product.

<i>Subclass</i>	<i>Description</i>	<i>Subclass ID</i>
MDR-1A	Scene counts and calibration counts from cold space and warm target views	1

Table 3: MDR Level 1a subclasses

3.5.2 MDR Fields

3.5.2.1 Navigation Status

<i>Bit</i>	<i>Meaning</i>
31 – 17	Not used
16	Earth location corrected for Euler angles
15 – 12	Earth location indicator 0 = earth location available 1 = user ephemeris files older than 24 hours 2 = no earth location available
11 – 8	Spacecraft attitude control 0 = operating in YGC or NOMINAL mode 1 = operating in another mode 2 = attitude exceeds nominal tolerance
7 – 4	Attitude SMODE 0 = NOMINAL mode 1 = rate nulling mode 2 = YGC mode 3 = search mode 4 = coast mode
3 – 0	Attitude mode 0 = NOMINAL mode/no test 1 = yaw axis test in progress 2 = roll axis test in progress 3 = pitch axis test in progress

Table 4: NAVIGATION_STATUS bit string definitions

3.5.2.2 *Instrument_Status_A2*

<i>Bit</i>	<i>Meaning</i>
15	Not used
14 – 13	Cold space cal position. MSB and LSB respectively. 0 = 6.667 1 = 8.333 2 = 9.999 3 = 13.332 degrees.
12	Nadir mode (0 = not in nadir)
11	Cold space cal mode (0 = not in cold cal)
10	Warm target cal mode (0 = not in warm cal)
9	Full scan mode (0 = not in full scan)
8 – 5	Not Used
4	Survival heater power (0 = off)
3	Not used
2	Scanner compensator power (0 = off)
1	Scanner A2 power (0 = off)
0	Not used

Table 5: INSTRUMENT_STATUS_A2 bit string definitions

3.5.2.3 *Instrument_Status_A1*

<i>Bit</i>	<i>Meaning</i>
15	Not used
14 – 13	Cold space cal position. MSB and LSB respectively. 0 = 6.667 1 = 8.333 2 = 9.999 3 = 13.332 degrees.
12	Nadir mode (0 = not in nadir)
11	Cold space cal mode (0 = not in cold cal)
10	Warm target cal mode (0 = not in warm cal)
9	Full scan mode (0 = not in full scan)
8 – 5	Not Used
4	Survival heater power (0 = off)
3	PLLO power (0 = secondary, 1 = primary)
2	Scanner A1-2 power (0 = off)
1	Scanner A1-1 power (0 = off)
0	Not used

Table 6: INSTRUMENT_STATUS_A1 bit string definitions

3.5.2.4 ACQUISITION_STATION_STATUS

Only used for NOAA acquisitions. Set all fields to zero for Metop acquisitions.

Bit	Meaning
15 - 3	Not used
2	Pseudo-noise (0 = normal data; 1 = P/N data)
1	Tape direction (0 = time decrementing)
0	Data mode (0 = test data; 1 = flight data)

Table 7: ACQUISITION_STATION_STATUS bit string definitions

3.5.2.5 AMSU_A1_INVALID_DIGITALB_WORD_FLAG

Bit	Meaning
15	Not used
14	Cold space cal position, msb
13	Cold space cal position, lsb
12	Nadir mode
11	Cold space cal mode
10	Warm target cal mode
9	Full scan mode
8 – 5	Not used
4	Survival heater power
3	PLLO power
2	Scanner A1-2 power
1	Scanner A1-1 power
0	Not used

Table 8: AMSU_A1_INVALID_DIGITALB_WORD_FLAG bit string definitions

3.5.2.6 AMSU_A1_DIGITALB_DATA

<i>Bit</i>	<i>Meaning</i>
15	Not used
14 - 13	Cold space cal position (bit 14 = msb, bit 13 = lsb) 0=6.667 1=8.333 2=9.999 3=13.332 degrees
12	Nadir mode (0 = not in nadir)
11	Cold space cal mode (0 = not in cold cal)
10	Warm target cal mode (0 = not in warm cal)
9	Full scan mode (0 =not in full scan)
8 – 5	Not used
4	Survival heater power (0 = off)
3	PLLO power (0 = secondary, 1 = primary)
2	Scanner A1-2 power (0 = off)
1	Scanner A1-1 power (0 = off)
0	Not used

Table 9: AMSU_A1_DIGITALB_DATA bit string definitions

3.5.2.7 AMSU_A1_INVALID_ANALOG_WORD_FLAG

If bit=0, associated AMSU-A1 analogue housekeeping telemetry word in following fields is valid.

<i>Bit</i>	<i>Meaning</i>
31 – 28	Not used
27 – 1	Word 27 (0 = valid) – Word 1 (0 = valid)
0	Not used

Table 10: AMSU_A1_INVALID_ANALOG_WORD_FLAG bit string definitions

3.5.2.8 AMSU_A2_INVALID_WORD_FLAG

<i>Bit</i>	<i>Meaning</i>
15	Not used
14	Cold space cal position, msb
13	Cold space cal position, lsb
12	Nadir mode (0 = not in nadir)
11	Cold space cal mode (0 = not in cold cal)
10	Warm target cal mode (0 = not in warm cal)
9	Full scan mode (0 =not in full scan)
8 – 5	Not used
4	Survival heater power (0 = off)
3	Not used
2	Scanner compensator power (0 = off)
1	Scanner A2 power (0 = off)
0	Not used

Table 11: AMSU_A2_INVALID_WORD_FLAG bit string definitions

3.5.2.9 AMSU_A2_DIGITALB_FLAG

<i>Bit</i>	<i>Meaning</i>
15	Not used
14 - 13	Cold space cal position, msb and lsb 0=6.667 1=8.333 2=9.999 3=13.332 degrees
12	Nadir mode (0 = not in nadir)
11	Cold space cal mode (0 = not in cold cal)
10	Warm target cal mode (0 = not in warm cal)
9	Full scan mode (0 =not in full scan)
8 – 5	Not used
4	Survival heater power (0 = off)
3	Not used
2	Scanner compensator power (0 = off)
1	Scanner A2 power (0 = off)
0	Not used

Table 12: AMSU_A2_DIGITALB_FLAG bit string definitions

3.5.2.10 AMSU_A2_INVALID_ANALOG_WORD_FLAG

If bit=0, associated AMSU-A2 analogue housekeeping telemetry word in following fields is valid.

<i>Bit</i>	<i>Meaning</i>
31 – 16	Not used
15 – 1	Word 15 (0 = valid) – Word 1 (0 = valid)
0	Not used

Table 13: AMSU_A2_INVALID_ANALOG_WORD_FLAG bit string definitions

3.5.2.11 QUALITY_INDICATOR

If a bit is on (=1) then the statement is true.

<i>Bit</i>	<i>Meaning</i>
31	Do not use scan for dataset generation
30	Time sequence error detected with this scan (see below)
29	Data gap precedes this scan
28	No calibration (see below)
27	No earth location (see below)
26	First good time following a clock update
25	Instrument status changed with this scan
24 - 0	Not used

Table 14: QUALITY_INDICATOR bit string definitions

3.5.2.12 SCAN_LINE_QUALITY

<i>Bit</i>	<i>Meaning</i>
	<i>Time Problem Code</i> (all bits off implies the scan time is as expected)
31 - 26	Not used
25	Lunar flag, scan line contaminated
24	Lunar flag, scan line corrected for contamination
23	Time field is bad but can probably be inferred from the previous good time
22	Time field is bad and can't be inferred from the previous good time
21	This record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update (See bit 26 in QUALITY_INDICATOR Field)
20	Start of a sequence that apparently repeats scan times that have been previously accepted
19 – 16	Not used

Bit	Meaning
	Calibration Code Problem (Note these bits complement the channel indicators; all bits set to 0 indicates normal calibration.)
15	Scan line was not calibrated because of bad time
14	Scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a data gap
13	Scan line was not calibrated because of bad or insufficient PRT data
12	Scan line was calibrated but with marginal PRT data
11	Some uncalibrated channels on this scan. (See channel indicators.)
10	Uncalibrated due to instrument mode.
9	Questionable calibration because of antenna position error of space view
8	Questionable calibration because of antenna position error of black body
	Earth Location Problem Code (all bits off indicates earth location was normal)
7	Not earth located because of bad time; earth location fields zero filled
6	Earth location questionable because of questionable time code. (See time problem flags above.)
5	Earth location questionable – only marginal agreement with reasonableness check.
4	Earth location questionable – fails reasonableness check
3	Earth location questionable because of antenna position check
2 – 0	Not used

Table 15: SCAN_LINE_QUALITY bit string definitions

3.5.2.13 Data Calibration

This is a compound data type. For each channel, it contains information about the actual value of the NEdT and the calibration quality. The content of the individual fields is defined below in Table 16:

Field	Description	SF	Dimension	Type	Type Size	Field Size
NEDT_VALUE	Value of the noise equivalent temperature	2	1, 1, 1	u-byte	1	1
CALIBRATION_QUALITY	Channel Quality Flags	0	1, 1, 1	bitst(8)	1	1

Table 16: Structure of compound data type DATA_CALIBRATION

3.5.2.13.1 NEdT_Value

Type	u-byte	
Description	There is one word for each channel, with channels 1 to 15 in order. Each word contains the actual channel-dependent value of NEdT with a scaling factor of 2; values corresponding to NEdTs larger than 2.55 K will be set to 255.	
Specifications		
Channel 1	0.3 K	
Channel 2	0.3 K	
Channel 3	0.4 K	
Channel 4	0.25 K	
Channel 5	0.25 K	
Channel 6	0.25 K	
Channel 7	0.25 K	
Channel 8	0.25 K	
Channel 9	0.25 K	
Channel 10	0.4 K	
Channel 11	0.4 K	
Channel 12	0.6 K	
Channel 13	0.8 K	
Channel 14	1.2 K	
Channel 15	.5	

Table 17: NeDT Value: Each word contains the actual channel-dependent value of NeDT.

3.5.2.13.2 Calibration_Quality

Type	bitst(8).	
Description	All bits off implies a good calibration.	
Specificactions		
	<i>Bit</i>	<i>Meaning</i>
	7	Actual NEdT value exceeds specification
	6	Not used
	5	No good black body counts for scan line
	4	No good space view counts for scan line
	3	No good PRTs for this line
	2	Some bad black body view counts for this scan line
	1	Some bad space view counts for this scan line
	0	Some bad PRT temperatures on this scan line

Table 18: CALIBRATION_QUALITY bit string definitions

4 LEVEL 1B RECORDS

4.1 Secondary Product Header Record

There is no SPHR for Level 1b products.

4.2 Global External Auxiliary Data Record

The global auxiliary datasets that are used by the Level 1 PGF (described in [AD 1]) but not written into the product are referenced by GEADRs, as specified in [AD 2].

4.2.1 Record Subclasses

The following subclasses of GEADR are present for the AMSU-A Level 1b product.

<i>Subclass</i>	<i>Description</i>	<i>Subclass ID</i>
AMSA_CAL	Calibration and configuration parameters	1
xxxx_BIT	Land/sea/coast database	2
xxxx_TOP	Topography database	3

Table 19: GEADR subclasses

4.3 Global Internal Auxiliary Data Record

There is one subclass of GIADR for the Level 1b Product, the GIADR-ADCONV, which is identical to the Level 1a GIADR-ADCONV.

4.4 Variable External and Internal Auxiliary Data Records

There are no VEADRs or VIADRs defined for the Level 1b product.

4.5 Measurement Data Record

The MDR contains, per scan line, scene radiance for channels 1-15.

The MDR is detailed in the Annex (0) to this document.

4.5.1 Record Subclasses

There is one subclass of MDR for the Level 1b product.

<i>Subclass</i>	<i>Description</i>	<i>Subclass ID</i>
MDR-1B	Scene counts and calibration counts from cold space and warm target views	2

Table 20: MDR Level 1b subclasses

4.5.2 MDR Fields

See also Section 3.5 on Level 1a definitions for details of fields.

5 OCCURRENCE INFORMATION

5.1 Level 1a

<i>Record</i>	<i>Occurrence</i>
MPHR	Once per product
GIADR-ADCONV	Once per product
MDR-1A	Once per scan line

Table 21: Level 1a records occurrence rates

5.2 Level 1b

<i>Record</i>	<i>Occurrence</i>
MPHR	Once per product
GIADR-ADCONV	Once per product
MDR-1B	Once per scan line

Table 22: Level 1b records occurrence rates

6 RECORD FORMAT VERSION CONTROL

This section provides version numbers for the records defined within this document.

<i>Record Subclass</i>	<i>Format Version Number</i>	<i>Issue Defined</i>
GIADR-ADCONV	3	6.4
	2	6.3
	1	6.2 (CDR)
GIADR-TEMP	<i>DELETED</i>	6.3
	1	6.2 (CDR)
MDR-1A	4	7D
	3	6.4
	2	6.3
	1	6.2 (CDR)
MDR-1B	4	7D
	3	6.4
	2	6.3
	1	6.2 (CDR)

Table 23: Record Format Version Numbers

APPENDIX A: DETAILED SPECIFICATION OF AMSU-A LEVEL 1 DATA RECORDS

In the following Annex, detailed format specifications for all the Variable Internal and Measurement Data Records in AMSU-A Level 1 products are included:

- GIADR-ADCONV
- MDR-1A
- MDR-1B

The Annex is accessible under Document Reference: EPS.MIS.SPE.97228.ANX or electronically using the following DM Tool link:

[DOCSLIB #211322-AMSU-A Level 1 Product Format Specification - Annex](#)

Document	
Title	AMSU/A LEVEL 1 PRODUCT FORMAT SPECIFICATION - ANNEX
Reference Number	EPS/MIS/SPE/97228

Revisions	
Rev 2	Corrected GIADR-1A-TEMP A12_WARM_TEMPERATURE_PRT1TO7_COEFFICIENT to show 7, not 6, PRTs
Issue 4 Draft B	<p>Removed redundant records (ie..e ADR-1A and ADR-1b become just ADR)</p> <p>Removed redundant SPHR fields with updated MPHRS in GPFS.</p> <p>Split VIADR record into a number of subclasses [TBC]</p> <p>Moved instrument status from SPHR to VIADR [TBC]</p>
Issue 5 Revision 0	Issue for CGS PDR
Issue 5 Revision 1	Revised Issue for CGS PDR
Issue 6 Revision 0	<p>Moved ADR fields into MDR-1A and MDR-1B</p> <p>Deleted VIADR-1A-INST-STATE. Moved data into MDR-1A</p> <p>Deleted VIADR-A1-TEMP-SENSOR. Moved data into MDR-1A and MDR-1B</p> <p>Deleted VIADR-A1-DIGITAL-B-TM. Moved data into MDR-1A and MDR-1B</p> <p>Deleted VIADR-A1-ANALOG-HK. Moved data into MDR-1A and MDR-1B</p>
Issue 6 Revision 1	<p>VIADR information at scanline rate moved into MDRs</p> <p>Removed contents of SPHR</p>
Issue 6 Rev 2	<p>Deleted SPHR sheet (no contents)</p> <p>Updated types to correct REC_HEAD size</p> <p>Deleted MDR-1A.PLUS85_PHASE_LOCK_CH9TO14</p> <p>Updated scale factors for calibration coefficients in MDRs in line with PGS</p>
Issue 6 Rev 3	EUM.EPS.SYS.DCR.02.167
	MDR-1A/B: Earth location fields changed scale factor from 3 to 4 and data type from integer2 to integer4
	MDR-1B: Coefficient fields data type changed from integer2 to integer4 for:
	PRIMARY_CALIBRATION_SECOND_TERM
	PRIMARY_CALIBRATION_FIRST_TERM
	PRIMARY_CALIBRATION_ZEROOTH_TERM
	SPARE_CALIBRATION_SECOND_TERM
	SPARE_CALIBRATION_FIRST_TERM
	SPARE_CALIBRATION_ZEROOTH_TERM
	MDR-1A/B: TIME_ATTITUDE and SPACECRAFT_ALTITUDE fields data types changed to unsigned

	MDR-1A/1B fields with units of counts data type changed to unsigned:
	REFLECTOR_A11_POSITION
	REFLECTOR_A12_POSITION
	REFLECTOR_A2_POSITION
	REFLECTOR_A11_COLD_POSITION
	REFLECTOR_A12_COLD_POSITION
	REFLECTOR_A2_COLD_POSITION
	REFLECTOR_A11_WARM_POSITION
	REFLECTOR_A12_WARM_POSITION
	REFLECTOR_A2_WARM_POSITION
	A11_SCAN_MOTOR_TEMPERATURE_DATA
	A12_SCAN_MOTOR_TEMPERATURE_DATA
	A11_FEED_HORN_TEMPERATURE_DATA
	A12_FEED_HORN_TEMPERATURE_DATA
	A11_RF_MUX_TEMPERATURE_DATA
	A12_RF_MUX_TEMPERATURE_DATA
	OSCILLATOR_TEMPERATURE_CH3TO8_DATA
	OSCILLATOR_TEMPERATURE_CH15_DATA
	PLLO2_TEMPERATURE_CH9TO14_DATA
	PLLO1_TEMPERATURE_CH9TO14_DATA
	PLLO_REFERENCE_TEMPERATURE_DATA
	MIXER_AMPLIFIER_TEMPERATURE_CH3TO8_DATA
	MIXER_AMPLIFIER_TEMPERATURE_CH9TO14_DATA
	MIXER_AMPLIFIER_TEMPERATURE_CH15_DATA
	IF_AMPLIFIER_TEMPERATURE_CH11TO14_DATA
	IF_AMPLIFIER_TEMPERATURE_CH9TO11_DATA
	DC_CONVERTER_TEMPERATURE_DATA
	IF_AMPLIFIER_TEMPERATURE_CH13TO14_DATA
	IF_AMPLIFIER_TEMPERATURE_CH12_DATA
	A11_RF_SHELF_TEMPERATURE_DATA
	A12_RF_SHELF_TEMPERATURE
	DETECTOR_PREAMPLIFIER_TEMPERATURE_DATA
	A11_WARM_TEMPERATURE_PRT1TO5_DATA

A12_WARM_TEMPERATURE_PRT1TO5_DATA
REFERENCE_VOLTAGE_DATA
A11_SCANNER_MOTOR_TEMPERATURE
A12_SCANNER_MOTOR_TEMPERATURE
A11_RF_SHELF_TEMPERATURE
A12_RF_SHELF_TEMPERATURE
A11_WARM_TEMPERATURE
A12_WARM_TEMPERATURE
A11_ANTENNA_DRIVE_MOTOR_TEMPERATURE
A12_ANTENNA_DRIVE_MOTOR_TEMPERATURE
PLUS15_SIGNAL_PROCESSING
PLUS15_ANTENNA_DRIVE
MINUS15_SIGNAL_PROCESSING
MINUS15_ANTENNA_DRIVE
PLUS8_RECEIVER_AMPLIFIER
PLUS5_SIGNAL_PROCESSING
PLUS5_ANTENNA_DRIVE
PLUS15_PHASE_LOCK_CH9TO14
MINUS15_PHASE_LOCK_CH9TO14
GDO_VOLTAGE_CH3
GDO_VOLTAGE_CH4
GDO_VOLTAGE_CH5
GDO_VOLTAGE_CH6
GDO_VOLTAGE_CH7
GDO_VOLTAGE_CH8
PLLO_PRIMAY_LOCK
PLLO_REDUNDANT_LOCK
GDO_VOLTAGE_CH15
A2_SCAN_MOTOR_TEMPERATURE
A2_FEED_HORN_TEMPERATURE
A2_RF_MUX_TEMPERATURE
A2_MIXER_AMPLIFIER_TEMPERATURE
A2_OSCILLATOR_TEMPERATURE_CH1TO2
A2_COMPENSATION_MOTOR_TEMPERATURE
A2_SUBREFLECTOR_TEMPERATURE

	A2_DC_CONVERTER_TEMPERATURE
	A2_RF_SHELF_TEMPERATURE
	A2_DETECTOR_PREAMPLIFIER_TEMPERATURE
	A2_WARM_TEMPERATURE_PRT1T07
	A2_REFERENCE_VOLTAGE
	A2_ANALOG_SCANNER_MOTOR_TEMPERATURE
	A2_ANALOG_COMPENSATOR_MOTOR_TEMPERATURE
	A2_ANALOG_RF_SHELF_TEMPERATURE
	A2_ANALOG_WARM_TEMPERATURE
	A2_ANALOG_COMENSATOR_MOTOR_CURRENT
	A2_ANALOG_ANTENNA-DRIVE_MOTOR_CURRENT
	A2_ANALOG_PLUS15_SIGNAL_PROCESSING
	A2_ANALOG_PLUS15_ANTENNA-DRIVE
	A2_ANALOG_MINUS15_SIGNAL_PROCESSING
	A2_ANALOG_MINUS15_ANTENNA-DRIVE
	A2_ANALOG_PLU10_RECEIVER
	A2_ANALOG_PLUS5_SIGNAL_PROCESSING
	A2_ANALOG_PLUS5_ANTENNA-DRIVE
	A2_ANALOG_GDO_VOLTAGE_CH1
	A2_ANALOG_GDO_VOLTAGE_CH2
	MDR-1A/1B: CALIBRATION_QUALITY flag array sized increased to 16 (per channel)
	MDR-1A/1B: ANGULAR_RELATION scale factor changed to 2
	MDR-1A/1B: EULER_ANGLES scale factor changed to 2 and field data type changed to integer2
	MDR-1B: SCENE_RADIANCE filed type changed to integer4 and scale factor to 7
	MDR-1A: Following fields changed to unsigned data type:
	SCENE_COUNTS
	COLD_CALIBRATION_COUNTS_VIEW1
	COLD_CALIBRATION_COUNTS_VIEW2
	WARM_CALIBRATION_COUNTS_VIEW1
	WARM_CALIBRATION_COUNTS_VIEW2
	MDR-1B: FOV_DATA_QUALITY units made N/A
	EUM.EPS.SYS.DCR.02.228
	MDR-1A/1B: EULER_ANGLES scale factor changed to 3
	GIADR-TEMP Deleted. Fields redundant with GIADR-ADCONV

	GIADR-ADCONV: For the following fields, scale factors moved from units to scale factors column, and notation clarified for scale factor and units:
	SCAN_MOTOR_A11_TEMPERATURE_COEFFICIENT
	SCAN_MOTOR_A12_TEMPERATURE_COEFFICIENT
	FEED_HORN_A11_TEMPERATURE_COEFFICIENT
	FEED_HORN_A12_TEMPERATURE_COEFFICIENT
	RF_MUX_A11_TEMPERATURE_COEFFICIENT
	RF_MUX_A12_TEMPERATURE_COEFFICIENT
	OSCILLATOR_TEMPERATURE_CH3T08_COEFFICIENT
	OSCILLATOR_TEMPERATURE_CH15_COEFFICIENT
	PLLO2_TEMPERATURE_COEFFICIENT
	PLLO1_TEMPERATURE_COEFFICIENT
	PLLO_REFERENCE_TEMPERATURE_COEFFICIENT
	MIXER_TEMPERATURE_CH3T08_COEFFICIENT
	MIXER_TEMPERATURE_CH9T014_COEFFICIENT
	MIXER_TEMPERATURE_CH15_COEFFICIENT
	AMPLIFIER_TEMPERATURE_CH11T014_COEFFICIENT
	AMPLIFIER_TEMPERATURE_CH9T014_COEFFICIENT
	DC_CONVERTER_TEMPERATURE_COEFFICIENT
	RF_SHELF_A11_TEMPERATURE_COEFFICIENT
	RF_SHELF_A12_TEMPERATURE_COEFFICIENT
	DETECTOR_PREAMPLIFIER_TEMPERATURE_COEFFICIENT
	A11_WARM_TEMPERATURE_PRT1T05_COEFFICIENT
	A12_WARM_TEMPERATURE_PRT1T05_COEFFICIENT
	A2_SCAN_MOTOR_TEMPERATURE_COEFFICIENT
	A2_FEED_HORN_TEMPERATURE_COEFFICIENT
	A2_RF_MUX_TEMPERATURE_COEFFICIENT
	A2_MIXER_AMPLIFIER_TEMPERATURE_CH1_COEFFICIENT
	A2_MIXER_AMPLIFIER_TEMPERATURE_CH2_COEFFICIENT
	A2_OSCILLATOR_TEMPERATURE_CH1_COEFFICIENT
	A2_OSCILLATOR_TEMPERATURE_CH2
	A2_COMPENSATION_MOTOR_TEMPERATURE_COEFFICIENT
	A2_SUBREFLECTOR_TEMPERATURE_COEFFICIENT
	A2_DC_CONVERTER_TEMPERATURE_COEFFICIENT
	A2_RF_SHELF_TEMPERATURE_COEFFICIENT

	A2_DETECTOR_PREAMPLIFIER_TEMPERATURE_COEFFICIENT
	A2_WARM_TEMPERATURE_PRT1T07_COEFFICIENT
	GIADR-ADCONV: Following fields, data type changed to integer4
	SCAN_MOTOR_A11_TEMPERATURE_COEFFICIENT
	SCAN_MOTOR_A12_TEMPERATURE_COEFFICIENT
	FEED_HORN_A11_TEMPERATURE_COEFFICIENT
	FEED_HORN_A12_TEMPERATURE_COEFFICIENT
	RF_MUX_A11_TEMPERATURE_COEFFICIENT
	RF_MUX_A12_TEMPERATURE_COEFFICIENT
	OSCILLATOR_TEMPERATURE_CH3T08_COEFFICIENT
	OSCILLATOR_TEMPERATURE_CH15_COEFFICIENT
	PLL02_TEMPERATURE_COEFFICIENT
	PLL01_TEMPERATURE_COEFFICIENT
	PLL0_REFERENCE_TEMPERATURE_COEFFICIENT
	MIXER_TEMPERATURE_CH3T08_COEFFICIENT
	MIXER_TEMPERATURE_CH9T014_COEFFICIENT
	MIXER_TEMPERATURE_CH15_COEFFICIENT
	AMPLIFIER_TEMPERATURE_CH11T014_COEFFICIENT
	AMPLIFIER_TEMPERATURE_CH9T014_COEFFICIENT
	DC_CONVERTER_TEMPERATURE_COEFFICIENT
	RF_SHELF_A11_TEMPERATURE_COEFFICIENT
	RF_SHELF_A12_TEMPERATURE_COEFFICIENT
	DETECTOR_PREAMPLIFIER_TEMPERATURE_COEFFICIENT
	A11_WARM_TEMPERATURE_PRT1T05_COEFFICIENT
	A12_WARM_TEMPERATURE_PRT1T05_COEFFICIENT
	GIADR-ADCONV: Following fields, data type changed to integer4 and scale factor changed to 3
	A2_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A2_COMPENSATOR_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A2_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A2_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A2_COMPENSATOR_MOTOR_CURRENT_INTERCEPT_SLOPE
	A2_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE
	A2_PLUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	A2_PLUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_MINUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE

	A2_MINUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_PLUS8_RECEIVER_AMPLIFIER_INTERCEPT_SLOPE
	A2_PLUS5_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	A2_PLUS5_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_GDO_VOLTAGE_CH1_INTERCEPT_SLOPE
	A2_GDO_VOLTAGE_CH2_INTERCEPT_SLOPE
	GIADR-ADCONV: Following fields, scale factor changed to 3
	A11_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A12_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A11_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A12_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A11_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A12_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A11_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE
	A12_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE
	PLUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	PLUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	MINUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	MINUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	PLUS8_RECEIVER_AMPLIFIER_INTERCEPT_SLOPE
	PLUS5_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	PLUS5_ANTENNA_DRIVE_INTERCEPT_SLOPE
	PLUS85_PHASE_LOOP_INTERCEPT_SLOPE
	PLUS15_PHASE_LOOP_INTERCEPT_SLOPE
	MINUS15_PHASE_LOOP_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH3_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH4_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH5_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH6_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH7_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH8_INTERCEPT_SLOPE
	PLL0_PRIMARY_LOCK_INTERCEPT_SLOPE
	PLL0_REDUNDANT_LOCK_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH15_INTERCEPT_SLOPE

	GIADR-ADCONV: Units for slope/intercept specified separately for the following fields and added where necessary:
	A11_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A12_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A11_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A12_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A11_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A12_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A11_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE
	A12_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE
	PLUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	PLUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	MINUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	MINUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	PLUS8_RECEIVER_AMPLIFIER_INTERCEPT_SLOPE
	PLUS5_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	PLUS5_ANTENNA_DRIVE_INTERCEPT_SLOPE
	PLUS85_PHASE_LOOP_INTERCEPT_SLOPE
	PLUS15_PHASE_LOOP_INTERCEPT_SLOPE
	MINUS15_PHASE_LOOP_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH3_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH4_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH5_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH6_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH7_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH8_INTERCEPT_SLOPE
	PLL0_PRIMARY_LOCK_INTERCEPT_SLOPE
	PLL0_REDUNDANT_LOCK_INTERCEPT_SLOPE
	GDO_VOLTAGE_CH15_INTERCEPT_SLOPE
	A2_SCAN_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A2_COMPENSATOR_MOTOR_TEMPERATURE_INTERCEPT_SLOPE
	A2_RF_SHELF_TEMPERATURE_INTERCEPT_SLOPE
	A2_WARM_TEMPERATURE_INTERCEPT_SLOPE
	A2_COMPENSATOR_MOTOR_CURRENT_INTERCEPT_SLOPE
	A2_ANTENNA_MOTOR_CURRENT_INTERCEPT_SLOPE

	A2_PLUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	A2_PLUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_MINUS15_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	A2_MINUS15_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_PLUS8_RECEIVER_AMPLIFIER_INTERCEPT_SLOPE
	A2_PLUS5_SIGNAL_PROCESSING_INTERCEPT_SLOPE
	A2_PLUS5_ANTENNA_DRIVE_INTERCEPT_SLOPE
	A2_GDO_VOLTAGE_CH1_INTERCEPT_SLOPE
	A2_GDO_VOLTAGE_CH2_INTERCEPT_SLOPE
	MDR-1A: Dimension 2 of array for the following fields changed from 30 to 1 :
	COLD_CALIBRATION_COUNTS_VIEW1
	COLD_CALIBRATION_COUNTS_VIEW2
	WARM_CALIBRATION_COUNTS_VIEW1
	WARM_CALIBRATION_COUNTS_VIEW2
	MDR-1A: Coefficient fields data type changed from integer2 to integer4 for the following fields:
	PRIMARY_CALIBRATION_SECOND_TERM
	PRIMARY_CALIBRATION_FIRST_TERM
	PRIMARY_CALIBRATION_ZEROOTH_TERM
	SPARE_CALIBRATION_SECOND_TERM
	SPARE_CALIBRATION_FIRST_TERM
	SPARE_CALIBRATION_ZEROOTH_TERM
	GIADR-ADCONV:AMPLIFIER_TEMPERATURE_CH11TO14_COEFFICIENT removed TBC from description
	MDR-1A/1B. Following fields combined....
	PRIMARY_CALIBRATION_SECOND_TERM
	PRIMARY_CALIBRATION_FIRST_TERM
	PRIMARY_CALIBRATION_ZEROOTH_TERM
	SPARE_CALIBRATION_SECOND_TERM
	SPARE_CALIBRATION_FIRST_TERM
	SPARE_CALIBRATION_ZEROOTH_TERM
	...into two fields: PRIMARY_CALIBRATION and SPARE_CALIBRATION so coefficient ordering is consistent with other fields, and NOAA format
	Removed any remaining TBC from descriptions
	GIADR-ADCONV: Corrected ordering of following fields so that coefficients are fastest varying parameters:

	OSCILLATOR_TEMPERATURE_CH3T08_COEFFICIENT MIXER_TEMPERATURE_CH3T08_COEFFICIENT AMPLIFIER_TEMPERATURE_CH9TO14_COEFFICIENT A11_WARM_TEMPERATURE_PRT1T05_COEFFICIENT A12_WARM_TEMPERATURE_PRT1T05_COEFFICIENT A2_WARM_TEMPERATURE_PRT1T07_COEFFICIENT
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	GIADR-ADCONV: Rename field AMPLIFIER_TEMPERATURE_CH9TOCH14_COEFFICIENT to AMPLIFIER_TEMPERATURE_CH9TOCH11_COEFFICIENT
	GIADR-ADCONV: Change size of DIM2 of field AMPLIFIER_TEMPERATURE_CH9TOCH11_COEFFICIENT from 6 to 3
	GIADR-ADCONV: Analog TM Conversions slope and intercept fields changed units of counts to Volts
	GIADR-ADCONV: Analog TM Conversions slope and intercept fields changed units of Kelvin to Centigrade
	GIADR-ADCONV: Analog TM Conversions slope and intercept fields changed units of Amps to milliAmps
	GIADR-ADCONV: Add field LUNAR_ANGLE_THRESHOLD
	MDR-1A/1B : Add fields AMSU_A1_LUNAR_ANGLE and AMSU_A2_LUNAR_ANGLE
	MDR-1A/1B : Renamed first occurrence of field A12_RF_SHELF_TEMERATURE to A12_RF_SHELF_TEMERATURE_DATA
	MDR-1A/1B: Defined values for SURFACE_PROPERTIES flag
Version 7A 14/07/08	Migrated into Hummingbird. Contents identical with issue 6.4.
Version 7B 26/08/08	No changes to annex.
Version 7C 11/12/08	No changes to annex.
Version 7D 22/02/11	ODT_DCR_233 MDR-1A & MDR-1B, field ANGULAR_RELATION: Added Description note on azimuth angle range. EPS Docet 228
Version 7E 20/05/2013	New worksheet to describe compound data type DATA_CALQUAL. MDR-1A & MDR-1B: Field CALIBRATION_QUALITY replaced by DATA_CALIBRATION. Also added to Types sheet. File name corrupted during conversion to new DM tool. Reimported file to maintain version integrity. Added conversion specifications for EPS Docet 228: modified worksheets AMSU-1A and AMSU-1B per specifications in EUM/OPS/TEN/11/3488.

DATA_CALQUAL

FIELD	DESCRIPTION	SF	UNITS	DIM1	DIM2	DIM3	TYPE	TYPE SIZE	FIELD SIZE
NEDT_VALUE	Value of the noise equivalent temperature	2	K	1	1	1	u-byte	1	1
CALIBRATION_QUALITY	Channel Quality Flags	0	N/A	1	1	1	bitst(8)	1	1

SIZE

2

PRIMARY_CALIBRATION	Primary Calibration a2 - a0, ch 1 - 15	a2=19 a1=13 a0=9	a2 = mW/m2/sr/cm-1/cnt^2 a1 = mW/m2/sr/cm-1/cnt a0=mW/m2/sr/cm-1	3	15	1	integer4	4	180	1700
SPARE_CALIBRATION	Spare Calibration a2 - a0, ch 1 - 15	a2=19 a1=13 a0=9	a2 = mW/m2/sr/cm-1/cnt^2 a1 = mW/m2/sr/cm-1/cnt a0=mW/m2/sr/cm-1	3	15	1	integer4	4	180	1880
INSTRUMENT STATE										
INSTRUMENT_STATUS_A1	Instrument status: AMSU-A1	0	N/A	1	1	1	bitst(16)	2	2	2060
INSTRUMENT_STATUS_A2	Instrument status: AMSU-A2	0	N/A	1	1	1	bitst(16)	2	2	2062
Raw Reflector Position Data										
REFLECTOR_A11_POSITION	Reflector A1-1 measurement position, reading 1 and 2 (Earth view 1-30)	0	counts	2	30	1	u-integer2	2	120	2064
REFLECTOR_A12_POSITION	Reflector A1-2 measurement position, reading 1 and 2 (Earth view 1-30)	0	counts	2	30	1	u-integer2	2	120	2184
REFLECTOR_A2_POSITION	Reflector A2 measurement position, reading 1 and 2 (Earth view 1-30)	0	counts	2	30	1	u-integer2	2	120	2304
REFLECTOR_A11_COLD_POSITION	Reflector A1-1 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2424
REFLECTOR_A12_COLD_POSITION	Reflector A1-2 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2428
REFLECTOR_A2_COLD_POSITION	Reflector A2 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2432
REFLECTOR_A11_WARM_POSITION	Reflector A1-1 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2436
REFLECTOR_A12_WARM_POSITION	Reflector A1-2 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2440
REFLECTOR_A2_WARM_POSITION	Reflector A2 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	2444
AMSU-A1 Temperature Sensor Data										
A11_SCAN_MOTOR_TEMPERATURE_DATA	A1-1 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	2448
A12_SCAN_MOTOR_TEMPERATURE_DATA	A1-2 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	2450
A11_FEED_HORN_TEMPERATURE_DATA	A1-1 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	2452
A12_FEED_HORN_TEMPERATURE_DATA	A1-2 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	2454

A11_RF_MUX_TEMPERATURE_DATA	A1-1 RF mux temperature	0 counts	1	1	1	u-integer2	2	2	2456
A12_RF_MUX_TEMPERATURE_DATA	A1-2 RF mux temperature	0 counts	1	1	1	u-integer2	2	2	2458
OSCILLATOR_TEMPERATURE_CH3TO8_DATA	Local oscillator temperature (ch 3-8)	0 counts	6	1	1	u-integer2	2	12	2460
OSCILLATOR_TEMPERATURE_CH15_DA TA	Local oscillator temperature (ch 15)	0 counts	1	1	1	u-integer2	2	2	2472
PLLO2 TEMPERATURE_CH9TO14 DATA	PLLO#2 temperature (one value for ch 9-14)	0 counts	1	1	1	u-integer2	2	2	2474
PLLO1 TEMPERATURE_CH9TO14 DATA	PLLO#1 temperature (one value for ch 9-14)	0 counts	1	1	1	u-integer2	2	2	2476
PLLO_REFERENCE_TEMPERATURE_DAT A	PLLO (reference oscillator) temperature	0 counts	1	1	1	u-integer2	2	2	2478
MIXER_AMPLIFIER_TEMPERATURE_CH3 TO8 DATA	Mixer/IF amplifier temperature (ch 3-8)	0 counts	6	1	1	u-integer2	2	12	2480
MIXER_AMPLIFIER_TEMPERATURE_CH9 TO14 DATA	Mixer/IF amplifier temperature (ch 9/14)	0 counts	1	1	1	u-integer2	2	2	2492
MIXER_AMPLIFIER_TEMPERATURE_CH1 5 DATA	Mixer/IF amplifier temperature (ch 15)	0 counts	1	1	1	u-integer2	2	2	2494
IF_AMPLIFIER_TEMPERATURE_CH11TO1 4 DATA	IF amplifier temperature (ch 11/14)	0 counts	1	1	1	u-integer2	2	2	2496
IF_AMPLIFIER_TEMPERATURE_CH9TO11 _DATA	IF amplifier temperature (ch 9-11)	0 counts	3	1	1	u-integer2	2	6	2498
DC_CONVERTER_TEMPERATURE_DATA	DC/DC converter temperature	0 counts	1	1	1	u-integer2	2	2	2504
IF_AMPLIFIER_TEMPERATURE_CH13TO1 4 DATA	IF amplifier temperature (ch 13-14)	0 counts	2	1	1	u-integer2	2	4	2506
IF_AMPLIFIER_TEMPERATURE_CH12_DA TA	IF amplifier temperature (ch 12)	0 counts	1	1	1	u-integer2	2	2	2510
A11_RF_SHELF_TEMPERATURE_DATA	A1-1 RF shelf temperature	0 counts	1	1	1	u-integer2	2	2	2512
A12_RF_SHELF_TEMPERATURE_DATA	A1-2 RF shelf temperature	0 counts	1	1	1	u-integer2	2	2	2514
DETECTOR_PREAMPLIFIER_TEMPERATU RE_DATA	Detector/preamp assembly temperature	0 counts	1	1	1	u-integer2	2	2	2516
A11_WARM_TEMPERATURE_PRT1TO5_D ATA	A1-1 warm target temp (PRT 1-4 and center 5)	0 counts	5	1	1	u-integer2	2	10	2518
A12_WARM_TEMPERATURE_PRT1TO5_D ATA	A1-2 warm target temp (PRT 1-4 and center 5)	0 counts	5	1	1	u-integer2	2	10	2528
REFERENCE_VOLTAGE_DATA	Reference voltage	0 counts	1	1	1	u-integer2	2	2	2538
AMSU-A1 Digital B Telemetry Flags									
AMSU_A1_INVALID_DIGITALB_WORD_FL AG	Invalid word bit flags: (if bit=0, associated AMSU-A1 digital B telemetry data in following field is valid)	0 N/A	1	1	1	bitst(16)	2	2	2540

AMSU_A1_DIGITALB_DATA	AMSU-A1 digital B telemetry data flags	0	N/A	1	1	1	bitst(16)	2	2	2542
AMSU-A1 Analog Housekeeping Data										
AMSU_A1_INVALID_ANALOG_WORD_FL	Invalid word bit flags:(if bit=0, associated AMSU-A1 analog housekeeping telemetry word in following fields is valid)	0	N/A	1	1	1	bitst(32)	4	4	2544
A11_SCANNER_MOTOR_TEMPERATURE	A1-1 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	2548
A12_SCANNER_MOTOR_TEMPERATURE	A1-2 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	2550
A11_RF_SHELF_TEMPERATURE	A1-1 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	2552
A12_RF_SHELF_TEMPERATURE	A1-2 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	2554
A11_WARM_TEMPERATURE	A1-1 warm load temperature	0	counts	1	1	1	u-integer2	2	2	2556
A12_WARM_TEMPERATURE	A1-2 warm load temperature	0	counts	1	1	1	u-integer2	2	2	2558
A11_ANTENNA_DRIVE_MOTOR_TEMPERATURE	A1-1 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	2560
A12_ANTENNA_DRIVE_MOTOR_TEMPERATURE	A1-2 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	2562
PLUS15_SIGNAL_PROCESSING	+15V signal processing	0	counts	1	1	1	u-integer2	2	2	2564
PLUS15_ANTENNA_DRIVE	+15V antenna drive	0	counts	1	1	1	u-integer2	2	2	2566
MINUS15_SIGNAL_PROCESSING	-15V signal processing	0	counts	1	1	1	u-integer2	2	2	2568
MINUS15_ANTENNA_DRIVE	-15V antenna drive	0	counts	1	1	1	u-integer2	2	2	2570
PLUS8_RECEIVER_AMPLIFIER	+8V receiver amplifier	0	counts	1	1	1	u-integer2	2	2	2572
PLUS5_SIGNAL_PROCESSING	+5V signal processing	0	counts	1	1	1	u-integer2	2	2	2574
PLUS5_ANTENNA_DRIVE	+5V antenna drive	0	counts	1	1	1	u-integer2	2	2	2576
PLUS15_PHASE_LOCK_CH9TO14	+15V phase lock loop (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	2578
MINUS15_PHASE_LOCK_CH9TO14	-15V phase lock loop (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	2580
GDO_VOLTAGE_CH3	GDO Voltage 50.3 GHz (ch 3)	0	counts	1	1	1	u-integer2	2	2	2582
GDO_VOLTAGE_CH4	GDO Voltage 52.8 GHz (ch 4)	0	counts	1	1	1	u-integer2	2	2	2584
GDO_VOLTAGE_CH5	GDO Voltage 53.596 GHz (ch 5)	0	counts	1	1	1	u-integer2	2	2	2586
GDO_VOLTAGE_CH6	GDO Voltage 54.4 GHz (ch 6)	0	counts	1	1	1	u-integer2	2	2	2588
GDO_VOLTAGE_CH7	GDO Voltage 54.94 GHz (ch 7)	0	counts	1	1	1	u-integer2	2	2	2590
GDO_VOLTAGE_CH8	GDO Voltage 55.5 GHz (ch 8)	0	counts	1	1	1	u-integer2	2	2	2592
PLLO_PRIMAY_LOCK	PLLO primary lock detect	0	counts	1	1	1	u-integer2	2	2	2594
PLLO_REDUNDANT_LOCK	PLLO redundant lock detect	0	counts	1	1	1	u-integer2	2	2	2596
GDO_VOLTAGE_CH15	GDO Voltage 89.0 GHz (ch 15)	0	counts	1	1	1	u-integer2	2	2	2598
AMSU-A2 Temperature Sensor Data										
A2_SCAN_MOTOR_TEMPERATURE	A2 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	2600
A2_FEED_HORN_TEMPERATURE	A2 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	2602
A2_RF_MUX_TEMPERATURE	A2 RF mux temperature	0	counts	1	1	1	u-integer2	2	2	2604

A2_MIXER_AMPLIFIER_TEMPERATURE	A2 Mixer/IF amplifier temperature (ch 1-2)	0 counts	2	1	1	u-integer2	2	4	2606
A2_OSCILLATOR_TEMPERATURE_CH1T_O2	A2 Local oscillator temperature (ch 1-2)	0 counts	2	1	1	u-integer2	2	4	2610
A2_COMPENSATION_MOTOR_TEMPERA_TURE	A2 Compensation motor temperature	0 counts	1	1	1	u-integer2	2	2	2614
A2_SUBREFLECTOR_TEMPERATURE	A2 subreflector temperature	0 counts	1	1	1	u-integer2	2	2	2616
A2_DC_CONVERTER_TEMPERATURE	A2 DC/DC converter temperature	0 counts	1	1	1	u-integer2	2	2	2618
A2_RF_SHELF_TEMPERATURE	A2 RF shelf temperature	0 counts	1	1	1	u-integer2	2	2	2620
A2_DETECTOR_PREAMPLIFIER_TEMPER_ATURE	Detector/preamp assembly temperature	0 counts	1	1	1	u-integer2	2	2	2622
A2_WARM_TEMPERATURE_PRT1TO7	A2 warm target temp (PRT 1-6 and center 7)	0 counts	7	1	1	u-integer2	2	14	2624
A2_REFERENCE_VOLTAGE	Reference voltage	0 counts	1	1	1	u-integer2	2	2	2638
AMSU-A2 Digital B Telemetry Flags									
AMSU_A2_INVALID_WORD_FLAG	Invalid word bit flags:(if bit=0, associated AMSU-A2 digital B telemetry data in following field is valid)	0 N/A	1	1	1	bitst(16)	2	2	2640
AMSU_A2_DIGITALB_FLAG	AMSU-A2 digital B telemetry data flags	0 N/A	1	1	1	bitst(16)	2	2	2642
AMSU-A2 Analog Housekeeping Data									
AMSU_A2_INVALID_ANALOG_WORD_FL AG	Invalid word bit flags: (if bit=0, associated AMSU-A2 analog housekeeping telemetry word in following fields is valid)	0 N/A	1	1	1	bitst(32)	4	4	2644
A2_ANALOG_SCANNER_MOTOR_TEMPE_RATURE	A2 scanner motor temperature	0 counts	1	1	1	u-integer2	2	2	2648
A2_ANALOG_COMPENSATOR_MOTOR_T EMPERATURE	A2 Compensator motor temperature	0 counts	1	1	1	u-integer2	2	2	2650
A2_ANALOG_RF_SHELF_TEMPERATURE	A2 RF shelf temperature	0 counts	1	1	1	u-integer2	2	2	2652
A2_ANALOG_WARM_TEMPERATURE	A2 warm load temperature	0 counts	1	1	1	u-integer2	2	2	2654
A2_ANALOG_COMPENSATOR_MOTOR_CU RRENT	Compensator motor current (Avg)	0 counts	1	1	1	u-integer2	2	2	2656
A2_ANALOG_ANTENNA-DRIVE_MOTOR_CURRENT	A2 antenna drive motor current (Avg)	0 counts	1	1	1	u-integer2	2	2	2658
A2_ANALOG_PLUS15_SIGNAL_PROCESSING	+15V signal processing	0 counts	1	1	1	u-integer2	2	2	2660
A2_ANALOG_PLUS15_ANTENNA-DRIVE	+15V antenna drive	0 counts	1	1	1	u-integer2	2	2	2662
A2_ANALOG_MINUS15_SIGNAL_PROCES SING	-15V signal processing	0 counts	1	1	1	u-integer2	2	2	2664

A11_SCAN_MOTOR_TEMPERATURE_DATA	A1-1 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	3230
A12_SCAN_MOTOR_TEMPERATURE_DATA	A1-2 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	3232
A11_FEED_HORN_TEMPERATURE_DA TA	A1-1 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	3234
A12_FEED_HORN_TEMPERATURE_DA TA	A1-2 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	3236
A11_RF_MUX_TEMPERATURE_DATA	A1-1 RF mux temperature	0	counts	1	1	1	u-integer2	2	2	3238
A12_RF_MUX_TEMPERATURE_DATA	A1-2 RF mux temperature	0	counts	1	1	1	u-integer2	2	2	3240
OSCILLATOR_TEMPERATURE_CH3TO 8_DATA	Local oscillator temperature (ch 3-8)	0	counts	6	1	1	u-integer2	2	12	3242
OSCILLATOR_TEMPERATURE_CH15_ DATA	Local oscillator temperature (ch 15)	0	counts	1	1	1	u-integer2	2	2	3254
PLLO2_TEMPERATURE_CH9TO14_DA TA	PLLO#2 temperature (one value for ch 9-14)	0	counts	1	1	1	u-integer2	2	2	3256
PLLO1_TEMPERATURE_CH9TO14_DA TA	PLLO#1 temperature (one value for ch 9-14)	0	counts	1	1	1	u-integer2	2	2	3258
PLLO_REFERENCE_TEMPERATURE_ DATA	PLLO (reference oscillator) temperature	0	counts	1	1	1	u-integer2	2	2	3260
MIXER_AMPLIFIER_TEMPERATURE_C H3TO8_DATA	Mixer/IF amplifier temperature (ch 3-8)	0	counts	6	1	1	u-integer2	2	12	3262
MIXER_AMPLIFIER_TEMPERATURE_C H9TO14_DATA	Mixer/IF amplifier temperature (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	3274
MIXER_AMPLIFIER_TEMPERATURE_C H15_DATA	Mixer/IF amplifier temperature (ch 15)	0	counts	1	1	1	u-integer2	2	2	3276
IF_AMPLIFIER_TEMPERATURE_CH11 TO14_DATA	IF amplifier temperature (ch 11/14)	0	counts	1	1	1	u-integer2	2	2	3278
IF_AMPLIFIER_TEMPERATURE_CH9T O11_DATA	IF amplifier temperature (ch 9-11)	0	counts	3	1	1	u-integer2	2	6	3280
DC_CONVERTER_TEMPERATURE_DA TA	DC/DC converter temperature	0	counts	1	1	1	u-integer2	2	2	3286
IF_AMPLIFIER_TEMPERATURE_CH13 TO14_DATA	IF amplifier temperature (ch 13-14)	0	counts	2	1	1	u-integer2	2	4	3288
IF_AMPLIFIER_TEMPERATURE_CH12 _DATA	IF amplifier temperature (ch 12)	0	counts	1	1	1	u-integer2	2	2	3292
A11_RF_SHELF_TEMPERATURE_DAT A	A1-1 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3294

A12_RF_SHELF_TEMPERATURE_DAT_A	A1-2 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3296
DETECTOR_PREAMPLIFIER_TEMPERATURE_DATA	Detector/preamp assembly temperature	0	counts	1	1	1	u-integer2	2	2	3298
A11_WARM_TEMPERATURE_PRT1TO5_DATA	A1-1 warm target temp (PRT 1-4 and center 5)	0	counts	5	1	1	u-integer2	2	10	3300
A12_WARM_TEMPERATURE_PRT1TO5_DATA	A1-2 warm target temp (PRT 1-4 and center 5)	0	counts	5	1	1	u-integer2	2	10	3310
REFERENCE_VOLTAGE_DATA	Reference voltage	0	counts	1	1	1	u-integer2	2	2	3320
AMSU-A1 Digital B Telemetry Flags										
AMSU_A1_INVALID_DIGITALB_WORD_FLAG	Invalid word bit flags: (if bit=0, associated AMSU-A1 digital B telemetry data in following field is valid)	0	N/A	1	1	1	bitst(16)	2	2	3322
AMSU_A1_DIGITALB_DATA	AMSU-A1 digital B telemetry data flags	0	N/A	1	1	1	bitst(16)	2	2	3324
AMSU-A1 Analog Housekeeping Data										
AMSU_A1_INVALID_ANALOG_WORD_FLAG	Invalid word bit flags:(if bit=0, associated AMSU-A1 analog housekeeping telemetry word in following fields is valid)	0	N/A	1	1	1	bitst(32)	4	4	3326
A11_SCANNER_MOTOR_TEMPERATURE	A1-1 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	3330
A12_SCANNER_MOTOR_TEMPERATURE	A1-2 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	3332
A11_RF_SHELF_TEMPERATURE	A1-1 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3334
A12_RF_SHELF_TEMPERATURE	A1-2 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3336
A11_WARM_TEMPERATURE	A1-1 warm load temperature	0	counts	1	1	1	u-integer2	2	2	3338
A12_WARM_TEMPERATURE	A1-2 warm load temperature	0	counts	1	1	1	u-integer2	2	2	3340
A11_ANTENNA_DRIVE_MOTOR_CURRENT_ERASURE	A1-1 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	3342
A12_ANTENNA_DRIVE_MOTOR_CURRENT_ERASURE	A1-2 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	3344
PLUS15_SIGNAL_PROCESSING	+15V signal processing	0	counts	1	1	1	u-integer2	2	2	3346
PLUS15_ANTENNA_DRIVE	+15V antenna drive	0	counts	1	1	1	u-integer2	2	2	3348
MINUS15_SIGNAL_PROCESSING	-15V signal processing	0	counts	1	1	1	u-integer2	2	2	3350
MINUS15_ANTENNA_DRIVE	-15V antenna drive	0	counts	1	1	1	u-integer2	2	2	3352
PLUS8_RECEIVER_AMPLIFIER	+8V receiver amplifier	0	counts	1	1	1	u-integer2	2	2	3354
PLUS5_SIGNAL_PROCESSING	+5V signal processing	0	counts	1	1	1	u-integer2	2	2	3356
PLUS5_ANTENNA_DRIVE	+5V antenna drive	0	counts	1	1	1	u-integer2	2	2	3358
PLUS15_PHASE_LOCK_CH9TO14	+15V phase lock loop (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	3360

Field Type	Size in Bytes
bitst(16)	2
bitst(24)	3
bitst(32)	4
bitst(8)	1
boolean	1
byte	1
char(1)	1
char(2)	2
char(3)	3
char(4)	4
char(88)	88
DATA_CALQUAL	2
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

NOTE: Table must be sorted into ascending order