

AMSU-A Level 1 Product Format Specification

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Issue 6 Rev 2	14/06/02	EUM.EPS.SYS.D CR.02.118	<ul style="list-style-type: none"> • VEADR/GEADR sections updated to be compatible with latest issue of [AD-1] • Updated text section to match the updates of the Annex • See also DCR in Annex section • Updated section 1.1 Purpose and Scope for CDR • Corrected subheading levels for Section 3.5.1
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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_EUM_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	<p>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'.</p>
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

<i>Acronym</i>	<i>Meaning</i>
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.

<i>Bit</i>	<i>Meaning</i>
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

<i>Bit</i>	<i>Meaning</i>
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>
	Time Problem Code (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

<i>Bit</i>	<i>Meaning</i>
	<i>Calibration Code Problem</i> (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
	<i>Earth Location Problem Code</i> (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:

<i>Field</i>	<i>Description</i>	<i>SF</i>	<i>Dimension</i>	<i>Type</i>	<i>Type Size</i>	<i>Field Size</i>
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	<table border="1"> <tbody> <tr><td>Channel 1</td><td>0.3 K</td></tr> <tr><td>Channel 2</td><td>0.3 K</td></tr> <tr><td>Channel 3</td><td>0.4 K</td></tr> <tr><td>Channel 4</td><td>0.25 K</td></tr> <tr><td>Channel 5</td><td>0.25 K</td></tr> <tr><td>Channel 6</td><td>0.25 K</td></tr> <tr><td>Channel 7</td><td>0.25 K</td></tr> <tr><td>Channel 8</td><td>0.25 K</td></tr> <tr><td>Channel 9</td><td>0.25 K</td></tr> <tr><td>Channel 10</td><td>0.4 K</td></tr> <tr><td>Channel 11</td><td>0.4 K</td></tr> <tr><td>Channel 12</td><td>0.6 K</td></tr> <tr><td>Channel 13</td><td>0.8 K</td></tr> <tr><td>Channel 14</td><td>1.2 K</td></tr> <tr><td>Channel 15</td><td>.5</td></tr> </tbody> </table>	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
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.	
Specifications		
	Bit	Meaning
	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.

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

Doc Ref: EPS.MIS.SPE.97228.ANX
AMSU-A_Level_1_Product_Format_Specification_-_Annex[1].xls
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
GENERIC QUALITY INDICATORS										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument degradation	NA	NA	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation	NA	NA	1	1	1	boolean	1	1	21
MEASUREMENT DATA										
SCENE_COUNTS	Scene counts (ch. 1-15) (Field of View 1-30)	0	counts	15	30	1	u-integer2	2	900	22
COLD_CALIBRATION_COUNTS_VIEW1	Cold space calibration counts (ch. 1-15) view 1	0	counts	15	1	1	u-integer2	2	30	922
COLD_CALIBRATION_COUNTS_VIEW2	Cold space calibration counts (ch. 1-15) view 2	0	counts	15	1	1	u-integer2	2	30	952
WARM_CALIBRATION_COUNTS_VIEW1	Warm target calibration counts (ch 1-15) view 1	0	counts	15	1	1	u-integer2	2	30	982
WARM_CALIBRATION_COUNTS_VIEW2	Warm target calibration counts (ch 1-15) view 2	0	counts	15	1	1	u-integer2	2	30	1012
NAVIGATION DATA AT SCAN LINE										
TIME_ATTITUDE	Time Associated with Attitude Angles	0	s	1	1	1	u-integer4	4	4	1042
EULER_ANGLE	Euler Angles: Roll, Pitch, Yaw	3	deg	3	1	1	integer2	2	6	1046
NAVIGATION_STATUS	Navigation Status Bit Field	0	N/A	1	1	1	bitst(32)	4	4	1052
SPACECRAFT_ALTITUDE	Spacecraft Altitude Above Reference Geoid (MSL)	1	km	1	1	1	u-integer4	4	4	1056
ANGULAR_RELATION	Angular relationships: solar zenith angle, satellite zenith angle, solar azimuth angle, satellite azimuth angle - (points 1 to 30). Note: azimuth angle range is -180 to +180, where minus is west and plus is east.	2	deg	4	30	1	integer2	2	240	1060
EARTH_LOCATION	Earth Location: latitude, longitude (point 1 to 30)	4	deg	2	30	1	integer4	4	240	1300
SURFACE_PROPERTIES	Surface property (0 = water, 1 = mixed/coast, 2 = land) (point 1 to 30)			30	1	1	integer2	2	60	1540
TERRAIN_ELEVATION	Average terrain elevation (point 1 to 30)		m	30	1	1	integer2	2	60	1600
Quality Indicators										
QUALITY_INDICATOR	Quality Indicator Bit Field	0	N/A	1	1	1	bitst(32)	4	4	1660
SCAN_LINE_QUALITY	Scan Line Quality Flags	0	N/A	1	1	1	bitst(32)	4	4	1664
DATA_CALIBRATION	Noise-Equivalent Delta T and Channel Quality Flags	0	N/A	16	1	1	DATA_CALQUAL	2	32	1668
Calibration Coefficients										

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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

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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_DATA	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_DATA	PLLO (reference oscillator) temperature	0	counts	1	1	1	u-integer2	2	2	2478
MIXER_AMPLIFIER_TEMPERATURE_CH3TO8_DATA	Mixer/IF amplifier temperature (ch 3-8)	0	counts	6	1	1	u-integer2	2	12	2480
MIXER_AMPLIFIER_TEMPERATURE_CH9TO14_DATA	Mixer/IF amplifier temperature (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	2492
MIXER_AMPLIFIER_TEMPERATURE_CH15_DATA	Mixer/IF amplifier temperature (ch 15)	0	counts	1	1	1	u-integer2	2	2	2494
IF_AMPLIFIER_TEMPERATURE_CH11TO14_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_CH13TO14_DATA	IF amplifier temperature (ch 13-14)	0	counts	2	1	1	u-integer2	2	4	2506
IF_AMPLIFIER_TEMPERATURE_CH12_DATA	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_TEMPERATURE_DATA	Detector/preamp assembly temperature	0	counts	1	1	1	u-integer2	2	2	2516
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	2518
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	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_FLAGS	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

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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_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	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_PRIMARY_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

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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_CH1TO2	A2 Local oscillator temperature (ch 1-2)	0	counts	2	1	1	u-integer2	2	4	2610
A2_COMPENSATION_MOTOR_TEMPERATURE	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_TEMPERATURE	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_FLAG	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_TEMPERATURE	A2 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	2648
A2_ANALOG_COMPENSATOR_MOTOR_TEMPERATURE	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_COMENSATOR_MOTOR_CURRENT	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_PROCESSING	-15V signal processing	0	counts	1	1	1	u-integer2	2	2	2664

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A2_ANALOG_MINUS15_ANTENNA-DRIVE	-15V antenna drive	0	counts	1	1	1	u-integer2	2	2	2666
A2_ANALOG_PLU10_RECEIVER	+10V receiver	0	counts	1	1	1	u-integer2	2	2	2668
A2_ANALOG_PLUS5_SIGNAL_PROCESSING	+5V signal processing	0	counts	1	1	1	u-integer2	2	2	2670
A2_ANALOG_PLUS5_ANTENNA-DRIVE	+5V antenna drive	0	counts	1	1	1	u-integer2	2	2	2672
A2_ANALOG_GDO_VOLTAGE_CH1	GDO Voltage 23.8 GHz (ch 1)	0	counts	1	1	1	u-integer2	2	2	2674
A2_ANALOG_GDO_VOLTAGE_CH2	GDO Voltage 31.4 GHz (ch 2)	0	counts	1	1	1	u-integer2	2	2	2676
MOON DATA										
AMSU_A1_LUNAR_ANGLE	Angle between moon and space view for AMSU-A1	2	degrees	1	1	1	integer2	2	2	2678
AMSU_A2_LUNAR_ANGLE	Angle between moon and space view for AMSU-A2	2	degrees	1	1	1	integer2	2	2	2680
SIZE OF THE MDR										2682

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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
GENERIC QUALITY INDICATORS										
DEGRADED_INST_MDR	Quality of MDR has been degraded from nominal due to an instrument degradation	NA	NA	1	1	1	boolean	1	1	20
DEGRADED_PROC_MDR	Quality of MDR has been degraded from nominal due to a processing degradation	NA	NA	1	1	1	boolean	1	1	21
MEASUREMENT DATA										
SCENE_RADIANCE	Scene radiance (channels 1-15) (View 1 - 30)	7	mW/m ² /sr/c m ⁻¹	15	30	1	integer4	4	1800	22
FOV_DATA_QUALITY	FOV data quality flags. (all bits off implies acceptable data) - bit 15-1: bit n set to 1 if scene radiance for channel n is physically unreasonable or has not been calculated due to calibration problems. -bit 0 not used	0	NA	1	1	1	bitst(16)	2	2	1822
NAVIGATION DATA AT SCAN LINE										
TIME_ATTITUDE	Time Associated with Attitude Angles	0	s	1	1	1	u-integer4	4	4	1824
EULER_ANGLE	Euler Angles: Roll, Pitch, Yaw	3	deg	3	1	1	integer2	2	6	1828
NAVIGATION_STATUS	Navigation Status Bit Field	0	N/A	1	1	1	bitst(32)	4	4	1834
SPACECRAFT_ALTITUDE	Spacecraft Altitude Above Reference Geoid (MSL)	1	km	1	1	1	u-integer4	4	4	1838
ANGULAR_RELATION	Angular relationships: solar zenith angle, satellite zenith angle, solar azimuth angle, satellite azimuth angle - (points 1 to 30). Note: azimuth angle range is -180 to +180, where minus is west and plus is east.	2	deg	4	30	1	integer2	2	240	1842
EARTH_LOCATION	Earth Location: latitude, longitude (point 1 to 30)	4	deg	2	30	1	integer4	4	240	2082
SURFACE_PROPERTIES	Surface property(0 = water, 1 = mixed/coast, 2 = land) (point 1 to 30)			30	1	1	integer2	2	60	2322
TERRAIN_ELEVATION	Average terrain elevation (point 1 to 30)		m	30	1	1	integer2	2	60	2382
Quality Indicators										
QUALITY_INDICATOR	Quality Indicator Bit Field	0	N/A	1	1	1	bitst(32)	4	4	2442
SCAN_LINE_QUALITY	Scan Line Quality Flags	0	N/A	1	1	1	bitst(32)	4	4	2446
DATA_CALIBRATION	Noise-Equivalent Delta T and Channel Quality Flags	0	N/A	16	1	1	DATA_CALQUAL	2	32	2450
Calibration Coefficients										

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PRIMARY_CALIBRATION	Primary Calibration a2 - a0, ch 1 - 15	a2=19 a1=13 a0=9	a2 = mW/m2/sr/c m-1/cnt^2 a1 = mW/m2/sr/c m-1/cnt a0=mW/m2/ sr/cm-1	3	15	1	integer4	4	180	2482
SPARE_CALIBRATION	Spare Calibration a2 - a0, ch 1 - 15	a2=19 a1=13 a0=9	a2 = mW/m2/sr/c m-1/cnt^2 a1 = mW/m2/sr/c m-1/cnt a0=mW/m2/ sr/cm-1	3	15	1	integer4	4	180	2662
INSTRUMENT STATE										
INSTRUMENT_STATUS_A1	Instrument status: AMSU-A1	0	N/A	1	1	1	bitst(16)	2	2	2842
INSTRUMENT_STATUS_A2	Instrument status: AMSU-A2	0	N/A	1	1	1	bitst(16)	2	2	2844
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	2846
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	2966
REFLECTOR_A2_POSITION	Reflector A2 measurement position, reading 1 and 2 (Earth view 1-30)	0	counts	2	30	1	u-integer2	2	120	3086
REFLECTOR_A11_COLD_POSITION	Reflector A1-1 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3206
REFLECTOR_A12_COLD_POSITION	Reflector A1-2 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3210
REFLECTOR_A2_COLD_POSITION	Reflector A2 cold calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3214
REFLECTOR_A11_WARM_POSITION	Reflector A1-1 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3218
REFLECTOR_A12_WARM_POSITION	Reflector A1-2 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3222
REFLECTOR_A2_WARM_POSITION	Reflector A2 warm calibration position, reading 1 and 2	0	counts	2	1	1	u-integer2	2	4	3226
AMSU-A1 Temperature Sensor Data										

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_DATA	A1-1 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	3234
A12_FEED_HORN_TEMPERATURE_DATA	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_CH3TO8_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_DATA	PLLO#2 temperature (one value for ch 9-14)	0	counts	1	1	1	u-integer2	2	2	3256
PLLO1_TEMPERATURE_CH9TO14_DATA	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_CH3TO8_DATA	Mixer/IF amplifier temperature (ch 3-8)	0	counts	6	1	1	u-integer2	2	12	3262
MIXER_AMPLIFIER_TEMPERATURE_CH9TO14_DATA	Mixer/IF amplifier temperature (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	3274
MIXER_AMPLIFIER_TEMPERATURE_CH15_DATA	Mixer/IF amplifier temperature (ch 15)	0	counts	1	1	1	u-integer2	2	2	3276
IF_AMPLIFIER_TEMPERATURE_CH11TO14_DATA	IF amplifier temperature (ch 11/14)	0	counts	1	1	1	u-integer2	2	2	3278
IF_AMPLIFIER_TEMPERATURE_CH9TO11_DATA	IF amplifier temperature (ch 9-11)	0	counts	3	1	1	u-integer2	2	6	3280
DC_CONVERTER_TEMPERATURE_DATA	DC/DC converter temperature	0	counts	1	1	1	u-integer2	2	2	3286
IF_AMPLIFIER_TEMPERATURE_CH13TO14_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_DATA	A1-1 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3294

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A12_RF_SHELF_TEMPERATURE_DATA	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_TEMPERATURE	A1-1 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	3342
A12_ANTENNA_DRIVE_MOTOR_TEMPERATURE	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

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MINUS15_PHASE_LOCK_CH9TO14	-15V phase lock loop (ch 9/14)	0	counts	1	1	1	u-integer2	2	2	3362
GDO_VOLTAGE_CH3	GDO Voltage 50.3 GHz (ch 3)	0	counts	1	1	1	u-integer2	2	2	3364
GDO_VOLTAGE_CH4	GDO Voltage 52.8 GHz (ch 4)	0	counts	1	1	1	u-integer2	2	2	3366
GDO_VOLTAGE_CH5	GDO Voltage 53.596 GHz (ch 5)	0	counts	1	1	1	u-integer2	2	2	3368
GDO_VOLTAGE_CH6	GDO Voltage 54.4 GHz (ch 6)	0	counts	1	1	1	u-integer2	2	2	3370
GDO_VOLTAGE_CH7	GDO Voltage 54.94 GHz (ch 7)	0	counts	1	1	1	u-integer2	2	2	3372
GDO_VOLTAGE_CH8	GDO Voltage 55.5 GHz (ch 8)	0	counts	1	1	1	u-integer2	2	2	3374
PLLO_PRIMARY_LOCK	PLLO primary lock detect	0	counts	1	1	1	u-integer2	2	2	3376
PLLO_REDUNDANT_LOCK	PLLO redundant lock detect	0	counts	1	1	1	u-integer2	2	2	3378
GDO_VOLTAGE_CH15	GDO Voltage 89.0 GHz (ch 15)	0	counts	1	1	1	u-integer2	2	2	3380
AMSU-A2 Temperature Sensor Data										
A2_SCAN_MOTOR_TEMPERATURE	A2 scan motor temperature	0	counts	1	1	1	u-integer2	2	2	3382
A2_FEED_HORN_TEMPERATURE	A2 feed horn temperature	0	counts	1	1	1	u-integer2	2	2	3384
A2_RF_MUX_TEMPERATURE	A2 RF mux temperature	0	counts	1	1	1	u-integer2	2	2	3386
A2_MIXER_AMPLIFIER_TEMPERATURE	A2 Mixer/IF amplifier temperature (ch 1-2)	0	counts	2	1	1	u-integer2	2	4	3388
A2_OSCILLATOR_TEMPERATURE_CH1TO2	A2 Local oscillator temperature (ch 1-2)	0	counts	2	1	1	u-integer2	2	4	3392
A2_COMPENSATION_MOTOR_TEMPERATURE	A2 Compensation motor temperature	0	counts	1	1	1	u-integer2	2	2	3396
A2_SUBREFLECTOR_TEMPERATURE	A2 subreflector temperature	0	counts	1	1	1	u-integer2	2	2	3398
A2_DC_CONVERTER_TEMPERATURE	A2 DC/DC converter temperature	0	counts	1	1	1	u-integer2	2	2	3400
A2_RF_SHELF_TEMPERATURE	A2 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3402
A2_DETECTOR_PREAMPLIFIER_TEMPERATURE	Detector/preamp assembly temperature	0	counts	1	1	1	u-integer2	2	2	3404
A2_WARM_TEMPERATURE_PRT1TO7	A2 warm target temp (PRT 1-6 and center 7)	0	counts	7	1	1	u-integer2	2	14	3406
A2_REFERENCE_VOLTAGE	Reference voltage	0	counts	1	1	1	u-integer2	2	2	3420
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	3422
AMSU_A2_DIGITALB_FLAG	AMSU-A2 digital B telemetry data flags	0	N/A	1	1	1	bitst(16)	2	2	3424
AMSU-A2 Analog Housekeeping Data										

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AMSU_A2_INVALID_ANALOG_WORD_FLAG	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	3426
A2_ANALOG_SCANNER_MOTOR_TEMPERATURE	A2 scanner motor temperature	0	counts	1	1	1	u-integer2	2	2	3430
A2_ANALOG_COMPENSATOR_MOTOR_TEMPERATURE	A2 Compensator motor temperature	0	counts	1	1	1	u-integer2	2	2	3432
A2_ANALOG_RF_SHELF_TEMPERATURE	A2 RF shelf temperature	0	counts	1	1	1	u-integer2	2	2	3434
A2_ANALOG_WARM_TEMPERATURE	A2 warm load temperature	0	counts	1	1	1	u-integer2	2	2	3436
A2_ANALOG_COMENSATOR_MOTOR_CURRENT	Compensator motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	3438
A2_ANALOG_ANTENNA-DRIVE_MOTOR_CURRENT	A2 antenna drive motor current (Avg)	0	counts	1	1	1	u-integer2	2	2	3440
A2_ANALOG_PLUS15_SIGNAL_PROCESSING	+15V signal processing	0	counts	1	1	1	u-integer2	2	2	3442
A2_ANALOG_PLUS15_ANTENNA-DRIVE	+15V antenna drive	0	counts	1	1	1	u-integer2	2	2	3444
A2_ANALOG_MINUS15_SIGNAL_PROCESSING	-15V signal processing	0	counts	1	1	1	u-integer2	2	2	3446
A2_ANALOG_MINUS15_ANTENNA-DRIVE	-15V antenna drive	0	counts	1	1	1	u-integer2	2	2	3448
A2_ANALOG_PLU10_RECEIVER	+10V receiver	0	counts	1	1	1	u-integer2	2	2	3450
A2_ANALOG_PLUS5_SIGNAL_PROCESSING	+5V signal processing	0	counts	1	1	1	u-integer2	2	2	3452
A2_ANALOG_PLUS5_ANTENNA-DRIVE	+5V antenna drive	0	counts	1	1	1	u-integer2	2	2	3454
A2_ANALOG_GDO_VOLTAGE_CH1	GDO Voltage 23.8 GHz (ch 1)	0	counts	1	1	1	u-integer2	2	2	3456
A2_ANALOG_GDO_VOLTAGE_CH2	GDO Voltage 31.4 GHz (ch 2)	0	counts	1	1	1	u-integer2	2	2	3458
MOON DATA										
AMSU_A1_LUNAR_ANGLE	Angle between moon and space view for AMSU-A1	2	degrees	1	1	1	integer2	2	2	3460
AMSU_A2_LUNAR_ANGLE	Angle between moon and space view for AMSU-A2	2	degrees	1	1	1	integer2	2	2	3462
SIZE OF THE MDR										3464

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