

**Data Access**

- [FTPS from the MMS SDC \(not with most browsers\)](#)
- [HTTPS from the MMS SDC](#)
- [FTPS from SPDF \(not with most browsers\)](#)
- [HTTPS from SPDF](#)
- [CDAWeb](#)
- [HAPI: CDAWeb HAPI Server](#)

## MMS 1 Digital Signal Processor (DSP) Search Coil Magnetometer (SCM), Magnetic Field Power Spectral Density, Level 2 (L2), Fast Mode, 2 s Data

Le Contel, O., Ergun, R.E., Torbert, R.B., Mirioni, L., and Burch, J.L. (2022). MMS 1 Digital Signal Processor (DSP) Search Coil Magnetometer (SCM), Magnetic Field Power Spectral Density, Level 2 (L2), Fast Mode, 2 s Data [Data set]. NASA Space Physics Data Facility. <https://doi.org/10.48322/jt8z-7x15>. Accessed on 2023-April-5.

**ResourceID**

spase://NASA/NumericalData/MMS/1/FIELDS/DSP/Fast/Level2/MagneticFieldPowerSpectralDensity/P

**Description**

The MMS magnetic field power spectral density (BPSD) is computed onboard by the Digital Signal Processor (DSP). The fast Fourier transform (FFT) calculation is performed on a digitized version of analog signals from the Search Coil Magnetometer (SCM) in the SCM123 coordinate system, see SCM data product guide for details, <https://lasp.colorado.edu/mms/sdc/public/datasets/fields/>. This data product is computed in space from individual components that are not synchronized to the 1 second pulse. Therefore, the timing between channels can be inaccurate by a fraction of a second. The samples times are interval start times taken from the x component. The spectra are calculated via a 1024-point FFT algorithm on piecewise continuous sets of waveform data. Nine signals can be processed simultaneously. Six of the twelve DC-coupled E, DC-coupled V, or SCM signals (16384 samples/s) are selected for spectral processing at 100% duty cycle. In addition, the three AC-coupled signals (262,144 kS/s) each can be processed at 6.25% duty cycle. Each of the nine signals has 16, 1024-point FFT operations every second; the field-programmable gate array (FPGA) performs 144 FFTs per second. The FFT is performed by an arithmetic logic unit (ALU), which is controlled by a state machine. Both are hard-coded into the FPGA. The operation starts by applying a 1024-point Hanning window onto a waveform. Next, an FFT is implemented. The FFT is broken into a series of "butterfly" operations performed by the ALU. The result has real and imaginary data. Power spectra are calculated by taking the sum of squares of real and imaginary values (the ALU includes a multiplier), which produces a power spectrum with 512 frequency bins. The frequency bins are then combined to give pseudo-logarithmic frequency spacing  $(\Delta f)/f$ . The spectra are reduced to 88 frequency bins with  $(\Delta f)/f$  between 6% and 12% when possible. Narrow-band emissions can be fit to an accuracy of  $(\Delta f)/f \sim 3\%$ , allowing for an accurate determination of plasma density. The spectra can be averaged in time. The fastest reporting rate of any signal is 16 spectra per second. Reporting rates can be as slow as one spectra every 16 s (averaging 256 spectra). The DSP and SCM instrument papers can be found at <https://link.springer.com/article/10.1007/s11214-014-0115-x> and <https://link.springer.com/article/10.1007/s11214-014-0096-9>, respectively. The DSP and SCM data product guides can be found at <https://lasp.colorado.edu/mms/sdc/public/datasets/fields/>.

**Details**

[View XML](#) | [View JSON](#) | [Edit](#)

Version:2.5.0

**NumericalData****ResourceID**

spase://NASA/NumericalData/MMS/1/FIELDS/DSP/Fast/Level2/MagneticFieldPowerSpectralDensity/PT2S

**ResourceHeader****ResourceName**

MMS 1 Digital Signal Processor (DSP) Search Coil Magnetometer (SCM), Magnetic Field Power Spectral Density, Level 2 (L2), Fast Mode, 2 s Data

**AlternateName**

MMS1\_DSP\_FAST\_L2\_BPSD

**DOI**

<https://doi.org/10.48322/jt8z-7x15>

**ReleaseDate**

2023-03-04 12:34:56.789

**RevisionHistory****RevisionEvent****ReleaseDate**

2021-04-27 15:38:11

**Note**

Only known prior ReleaseDate of the metadata

**RevisionEvent****ReleaseDate**

2022-08-04 12:34:56.789

**Note**

Added DOI and PublicationInfo minted by LFB, updated the RepositoryID, updated the SPDF MetadataContact Person to Robert M. Candey, metadata updated to SPASE 2.4.1, reviewed by LFB 20220803

**RevisionEvent****ReleaseDate**

2023-03-04 12:34:56.789

**Note**

Standardized the ResourceName Format, Set AlternateName equal to the ProductKey, Revised the Acknowledgement, PublicationInfo Authors, and Contact Person list per request of the MMS DSP/SCM team, metadata updated to SPASE 2.5.0, reviewed by LFB 20230304

**Description**

The MMS magnetic field power spectral density (BPSD) is computed onboard by the Digital Signal Processor (DSP). The fast Fourier transform (FFT) calculation is performed on a digitized version of analog signals from the Search Coil Magnetometer (SCM) in the SCM123 coordinate system, see SCM data product guide for details, <https://lasp.colorado.edu/mms/sdc/public/datasets/fields/>. This data product is computed in space from individual components that are not synchronized to the 1 second pulse. Therefore, the timing between channels can be inaccurate by a fraction of a second. The samples times are interval start times taken from the x component. The spectra are calculated via a 1024-point FFT algorithm on piecewise continuous sets of waveform data. Nine signals can be processed simultaneously. Six of the twelve DC-coupled E, DC-coupled V, or SCM signals (16384 samples/s) are selected for spectral processing at 100% duty cycle. In addition, the three AC-coupled signals (262,144 kS/s) each can be processed at 6.25% duty cycle. Each of the nine signals has 16, 1024-point FFT operations every second; the field-programmable gate array (FPGA) performs 144 FFTs per second. The FFT is performed by an arithmetic logic unit (ALU), which is controlled by a state machine. Both are hard-coded into the FPGA. The operation starts by applying a 1024-point Hanning window onto a waveform. Next, an FFT is implemented. The FFT is broken into a series of "butterfly" operations performed by the ALU. The result has real and imaginary data. Power spectra are calculated by taking the sum of squares of real and imaginary values (the ALU includes a multiplier), which produces a power spectrum with 512 frequency bins. The frequency bins are then combined to give pseudo-logarithmic frequency spacing  $(\Delta f)/f$ . The spectra are reduced to 88 frequency bins with  $(\Delta f)/f$  between 6% and 12% when possible. Narrow-band emissions can be fit to an accuracy of  $(\Delta f)/f \sim 3\%$ , allowing for an accurate determination of plasma density. The spectra can be averaged in time. The fastest reporting rate of any signal is 16 spectra per second. Reporting rates can be as slow as one spectra every 16 s (averaging 256 spectra). The DSP and SCM instrument papers can be found at <https://link.springer.com/article/10.1007/s11214-014-0115-x> and <https://link.springer.com/article/10.1007/s11214-014-0096-9>, respectively. The DSP and SCM data product guides can be found at <https://lasp.colorado.edu/mms/sdc/public/datasets/fields/>.

**Acknowledgement**

Please acknowledge O. Le Contel, R.E. Ergun, R.B. Torbert, L. Mirioni, and J.L. Burch for use of these data

**PublicationInfo****Authors**

Le Contel, Olivier; Ergun, Robert, E.; Torbert, Roy, B.; Mirioni, Laurent; Burch, James, L.

**PublicationDate**

2022-01-01 00:00:00

**PublishedBy**

NASA Space Physics Data Facility

**Contacts**

	<b>Role</b>	<b>Person</b>	<b>StartDate</b>	<b>StopDate</b>	<b>Note</b>
1.	InstrumentLead CoInvestigator	<a href="spase://SMWG/Person/Olivier.Le.Contel">spase://SMWG/Person/Olivier.Le.Contel</a>			
2.	InstrumentLead CoInvestigator	<a href="spase://SMWG/Person/Robert.E.Ergun">spase://SMWG/Person/Robert.E.Ergun</a>			
3.	InstrumentLead CoInvestigator	<a href="spase://SMWG/Person/Roy.B.Torbert">spase://SMWG/Person/Roy.B.Torbert</a>			
4.	MetadataContact	<a href="spase://SMWG/Person/Laurent.Mirioni">spase://SMWG/Person/Laurent.Mirioni</a>			
5.	PrincipalInvestigator	<a href="spase://SMWG/Person/James.L.Burch">spase://SMWG/Person/James.L.Burch</a>			
6.	HostContact	<a href="spase://SMWG/Person/MMS_SDC_POC">spase://SMWG/Person/MMS_SDC_POC</a>			
7.	MetadataContact	<a href="spase://SMWG/Person/Robert.M.Candey">spase://SMWG/Person/Robert.M.Candey</a>			
8.	MetadataContact	<a href="spase://SMWG/Person/Lee.Frost.Bargatze">spase://SMWG/Person/Lee.Frost.Bargatze</a>			

**InformationURL****Name**

The Magnetospheric Multiscale (MMS) Mission home page at Goddard Space Flight Center (GSFC)

**URL**

<https://mms.gsfc.nasa.gov/>

**Description**

The Magnetospheric Multiscale (MMS) Mission Home Page hosted by the Goddard Space Flight Center (GSFC).

**PriorIDs**

spase://VSPO/NumericalData/MMS/1/FIELDS/DSP/Fast/Level2/MagneticFieldPowerSpectralDensity/PT2S

**AccessInformation****RepositoryID**

[spase://SMWG/Repository/UCOLO/LASP/MMS\\_SDC](spase://SMWG/Repository/UCOLO/LASP/MMS_SDC)

**Availability**

Online

**AccessRights**

Open

**AccessURL****Name**

FTPS from the MMS SDC (not with most browsers)

**URL**

<ftps://lasp.colorado.edu/mms/sdc/public/data/mms1/dsp/fast/l2/bpsd/>

**Description**

In CDF via ftp from the MMS Science Data Center

**AccessURL****Name**

HTTPS from the MMS SDC

**URL**

<https://lasp.colorado.edu/mms/sdc/public/data/mms1/dsp/fast/l2/bpsd/>

**Description**

In CDF via http from the MMS Science Data Center

**Format**

CDF

**Encoding**

None

**Acknowledgement**

Please acknowledge O. Le Contel, R.E. Ergun, R.B. Torbert, L. Mirioni, and J.L. Burch. Also please acknowledge the data providers and CDAWeb when using these data.

**AccessInformation****RepositoryID**

<spase://SMWG/Repository/NASA/GSFC/SPDF/CDAWeb>

**Availability**

Online

**AccessRights**

Open

**AccessURL****Name**

FTPS from SPDF (not with most browsers)

**URL**

<ftps://spdf.gsfc.nasa.gov/pub/data/mms/mms1/dsp/fast/l2/bpsd/>

**Description**

In CDF via ftp from SPDF

**AccessURL****Name**

HTTPS from SPDF

**URL**

<https://spdf.gsfc.nasa.gov/pub/data/mms/mms1/dsp/fast/l2/bpsd/>

**Description**

In CDF via http from SPDF

**AccessURL****Name**

CDAWeb

**URL**

[https://cdaweb.gsfc.nasa.gov/cgi-bin/eval2.cgi?dataset=MMS1\\_DSP\\_FAST\\_L2\\_BPSD&index=sp\\_phys](https://cdaweb.gsfc.nasa.gov/cgi-bin/eval2.cgi?dataset=MMS1_DSP_FAST_L2_BPSD&index=sp_phys)

**ProductKey**

MMS1\_DSP\_FAST\_L2\_BPSD

**Description**

Access to ASCII, CDF, and plots via NASA/GSFC CDAWeb

**Format**

CDF

**Encoding**

None

**Acknowledgement**

Please acknowledge O. Le Contel, R.E. Ergun, R.B. Torbert, L. Mirioni, and J.L. Burch. Also please acknowledge the data providers and CDAWeb when using these data.

**AccessInformation****RepositoryID**

<spase://SMWG/Repository/NASA/GSFC/SPDF/CDAWeb>

**Availability**

Online

**AccessRights**

Open

**AccessURL****Name**

CDAWeb HAPI Server

**URL**

<https://cdaweb.gsfc.nasa.gov/hapi>

**Style**

HAPI

**ProductKey**

MMS1\_DSP\_FAST\_L2\_BPSD

**Description**

Web Service to this product using the HAPI interface

**Format**

CSV

**Acknowledgement**

Please acknowledge O. Le Contel, R.E. Ergun, R.B. Torbert, L. Mirioni, and J.L. Burch. Also please acknowledge the data providers and CDAWeb when using these data.

**ProcessingLevel**

Calibrated

**InstrumentIDs**

<spase://SMWG/Instrument/MMS/1/FIELDS/DSP>

<spase://SMWG/Instrument/MMS/1/FIELDS/SCM>

**MeasurementType**

MagneticField

**MeasurementType**

Waves.Passive

**TemporalDescription****TimeSpan****StartDate**

2015-03-17 00:00:00.000

**RelativeStopDate**

-P2M

**Cadence**

PT2S

**ObservedRegion**

Earth.Magnetosheath

**ObservedRegion**

Earth.Magnetosphere

**ObservedRegion**

Earth.Magnetosphere.Magnetotail

**ObservedRegion**

Earth.Magnetosphere.Main

**ObservedRegion**

Earth.Magnetosphere.RadiationBelt

**ObservedRegion**

Earth.NearSurface.EquatorialRegion

**ObservedRegion**

Earth.NearSurface.Plasmasphere

**ObservedRegion**

Heliosphere.NearEarth

## Parameter #1

**Name**

Epoch

**ParameterKey**

Epoch

**Description**

Epoch

**Caveats**

This parameter exhibits an increasing monotonic progression.

**Cadence**

PT2S

**Units**

ns

**UnitsConversion**

1.0e-9&gt;s

**RenderingHints****AxisLabel**

Epoch

**ValueFormat**

e14.8

**ScaleType**

LinearScale

**ValidMin**

1970-01-01T00:00:00.000000000

**ValidMax**

2030-01-01T00:00:01.999999999

**FillValue**

9999-12-31T23:59:59.999999999

**Support****SupportQuantity**

Temporal

## Parameter #2

**Name**

mms1\_dsp\_bpsd\_scm1\_fast\_l2

**Set**

Time series defined by using: EPOCH

**ParameterKey**

mms1\_dsp\_bpsd\_scm1\_fast\_l2

**Description**

SCM BPSD, Component 1

**Caveats**

Average Type: standard

**Cadence**

PT2S

**Units**nT<sup>2</sup>/Hz**UnitsConversion**1.e-18>T<sup>2</sup>/Hz**CoordinateSystem****CoordinateRepresentation**

Cartesian

**CoordinateSystemName**

SC

**RenderingHints****DisplayType**

Spectrogram

**ValueFormat**

e13.6

**ScaleMin**

1.0e-09

**ScaleMax**

0.01

**ScaleType**

LogScale

**Structure****Size**

56

**Element****Name**

1

**Index**

1

**RenderingHints****AxisLabel**

8.0

**Element****Name**

2

**Index**

2

**RenderingHints****AxisLabel**

24.0

**Element****Name**

3

**Index**

3

**RenderingHints****AxisLabel**

40.0

**Element****Name**

4

**Index**

4

**RenderingHints****AxisLabel**

56.0

**Element****Name**

5

**Index**

5

**RenderingHints****AxisLabel**

72.0

**Element****Name**

6

**Index**

6

**RenderingHints****AxisLabel**

88.0

**Element****Name**

7

**Index**

7

**RenderingHints****AxisLabel**

104.0

**Element****Name**

8

**Index**

8

**RenderingHints****AxisLabel**

120.0

**Element****Name**

9

**Index**

9

**RenderingHints****AxisLabel**

136.0

**Element****Name**

10

**Index**

10

**RenderingHints****AxisLabel**

152.0

**Element****Name**

11

**Index**

11

**RenderingHints****AxisLabel**

168.0

**Element****Name**

12

**Index**

12

**RenderingHints****AxisLabel**

184.0

**Element****Name**

13

**Index**

13

**RenderingHints****AxisLabel**

200.0

**Element****Name**

14

**Index**

14

**RenderingHints****AxisLabel**

216.0

**Element****Name**

15

**Index**

15

**RenderingHints****AxisLabel**  
232.0**Element****Name**  
16**Index**  
16**RenderingHints****AxisLabel**  
248.0**Element****Name**  
17**Index**  
17**RenderingHints****AxisLabel**  
262.0**Element****Name**  
18**Index**  
18**RenderingHints****AxisLabel**  
296.0**Element****Name**  
19**Index**  
19**RenderingHints****AxisLabel**  
304.0**Element****Name**  
20**Index**  
20**RenderingHints****AxisLabel**  
336.0**Element****Name**  
21**Index**  
21**RenderingHints****AxisLabel**  
368.0**Element****Name**  
22**Index**  
22**RenderingHints****AxisLabel**  
400.0**Element**



**Name**

23

**Index**

23

**RenderingHints****AxisLabel**

432.0

**Element****Name**

24

**Index**

24

**RenderingHints****AxisLabel**

464.0

**Element****Name**

25

**Index**

25

**RenderingHints****AxisLabel**

496.0

**Element****Name**

26

**Index**

26

**RenderingHints****AxisLabel**

576.0

**Element****Name**

27

**Index**

27

**RenderingHints****AxisLabel**

672.0

**Element****Name**

28

**Index**

28

**RenderingHints****AxisLabel**

736.0

**Element****Name**

29

**Index**

29

**RenderingHints****AxisLabel**

800.0

**Element****Name**

30

**Index**

30

**RenderingHints**

<b>AxisLabel</b>
864.0
<b>Element</b>
<b>Name</b>
31
<b>Index</b>
31
<b>RenderingHints</b>
<b>AxisLabel</b>
928.0
<b>Element</b>
<b>Name</b>
32
<b>Index</b>
32
<b>RenderingHints</b>
<b>AxisLabel</b>
992.0
<b>Element</b>
<b>Name</b>
33
<b>Index</b>
33
<b>RenderingHints</b>
<b>AxisLabel</b>
1088.0
<b>Element</b>
<b>Name</b>
34
<b>Index</b>
34
<b>RenderingHints</b>
<b>AxisLabel</b>
1216.0
<b>Element</b>
<b>Name</b>
35
<b>Index</b>
35
<b>RenderingHints</b>
<b>AxisLabel</b>
1344.0
<b>Element</b>
<b>Name</b>
36
<b>Index</b>
36
<b>RenderingHints</b>
<b>AxisLabel</b>
1472.0
<b>Element</b>
<b>Name</b>
37
<b>Index</b>
37
<b>RenderingHints</b>
<b>AxisLabel</b>
1600.0
<b>Element</b>
<b>Name</b>
38

**Index**

38

**RenderingHints****AxisLabel**  
1728.0**Element****Name**

39

**Index**

39

**RenderingHints****AxisLabel**  
1856.0**Element****Name**

40

**Index**

40

**RenderingHints****AxisLabel**  
1984.0**Element****Name**

41

**Index**

41

**RenderingHints****AxisLabel**  
2176.0**Element****Name**

42

**Index**

42

**RenderingHints****AxisLabel**  
2432.0**Element****Name**

43

**Index**

43

**RenderingHints****AxisLabel**  
2688.0**Element****Name**

44

**Index**

44

**RenderingHints****AxisLabel**  
2944.0**Element****Name**

45

**Index**

45

**RenderingHints****AxisLabel**  
3200.0

**Element****Name**

46

**Index**

46

**RenderingHints****AxisLabel**

3456.0

**Element****Name**

47

**Index**

47

**RenderingHints****AxisLabel**

3712.0

**Element****Name**

48

**Index**

48

**RenderingHints****AxisLabel**

3968.0

**Element****Name**

49

**Index**

49

**RenderingHints****AxisLabel**

4352.0

**Element****Name**

50

**Index**

50

**RenderingHints****AxisLabel**

4864.0

**Element****Name**

51

**Index**

51

**RenderingHints****AxisLabel**

5376.0

**Element****Name**

52

**Index**

52

**RenderingHints****AxisLabel**

5888.0

**Element****Name**

53

**Index**

53

**RenderingHints****AxisLabel**  
6400.0**Element****Name**  
54**Index**  
54**RenderingHints****AxisLabel**  
6912.0**Element****Name**  
55**Index**  
55**RenderingHints****AxisLabel**  
7424.0**Element****Name**  
56**Index**  
56**RenderingHints****AxisLabel**  
7936.0**ValidMin**  
0.0**ValidMax**  
100000.0**FillValue**  
-1.0e+31**Wave****WaveType**  
PlasmaWaves**Qualifier**  
Component.I**WaveQuantity**  
Intensity

## Parameter #3

**Name**  
mms1\_dsp\_bpsd\_scm2\_fast\_l2**Set**  
Time series defined by using: EPOCH**ParameterKey**  
mms1\_dsp\_bpsd\_scm2\_fast\_l2**Description**  
SCM BPSD, Component 2**Caveats**  
Average Type: standard**Cadence**  
PT2S**Units**  
nT<sup>2</sup>/Hz**UnitsConversion**  
1.e-18>T<sup>2</sup>/Hz**CoordinateSystem****CoordinateRepresentation**  
Cartesian**CoordinateSystemName**

SC

**RenderingHints****DisplayType**

Spectrogram

**ValueFormat**

e13.6

**ScaleMin**

1.0e-09

**ScaleMax**

0.01

**ScaleType**

LogScale

**Structure****Size**

56

**Element****Name**

1

**Index**

1

**RenderingHints****AxisLabel**

8.0

**Element****Name**

2

**Index**

2

**RenderingHints****AxisLabel**

24.0

**Element****Name**

3

**Index**

3

**RenderingHints****AxisLabel**

40.0

**Element****Name**

4

**Index**

4

**RenderingHints****AxisLabel**

56.0

**Element****Name**

5

**Index**

5

**RenderingHints****AxisLabel**

72.0

**Element****Name**

6

**Index**

6

**RenderingHints**

<b>AxisLabel</b>
88.0
<b>Element</b>
<b>Name</b>
7
<b>Index</b>
7
<b>RenderingHints</b>
<b>AxisLabel</b>
104.0
<b>Element</b>
<b>Name</b>
8
<b>Index</b>
8
<b>RenderingHints</b>
<b>AxisLabel</b>
120.0
<b>Element</b>
<b>Name</b>
9
<b>Index</b>
9
<b>RenderingHints</b>
<b>AxisLabel</b>
136.0
<b>Element</b>
<b>Name</b>
10
<b>Index</b>
10
<b>RenderingHints</b>
<b>AxisLabel</b>
152.0
<b>Element</b>
<b>Name</b>
11
<b>Index</b>
11
<b>RenderingHints</b>
<b>AxisLabel</b>
168.0
<b>Element</b>
<b>Name</b>
12
<b>Index</b>
12
<b>RenderingHints</b>
<b>AxisLabel</b>
184.0
<b>Element</b>
<b>Name</b>
13
<b>Index</b>
13
<b>RenderingHints</b>
<b>AxisLabel</b>
200.0
<b>Element</b>
<b>Name</b>
14

**Index**

14

**RenderingHints****AxisLabel**

216.0

**Element****Name**

15

**Index**

15

**RenderingHints****AxisLabel**

232.0

**Element****Name**

16

**Index**

16

**RenderingHints****AxisLabel**

248.0

**Element****Name**

17

**Index**

17

**RenderingHints****AxisLabel**

262.0

**Element****Name**

18

**Index**

18

**RenderingHints****AxisLabel**

296.0

**Element****Name**

19

**Index**

19

**RenderingHints****AxisLabel**

304.0

**Element****Name**

20

**Index**

20

**RenderingHints****AxisLabel**

336.0

**Element****Name**

21

**Index**

21

**RenderingHints****AxisLabel**

368.0



**Element****Name**  
22**Index**  
22**RenderingHints****AxisLabel**  
400.0**Element****Name**  
23**Index**  
23**RenderingHints****AxisLabel**  
432.0**Element****Name**  
24**Index**  
24**RenderingHints****AxisLabel**  
464.0**Element****Name**  
25**Index**  
25**RenderingHints****AxisLabel**  
496.0**Element****Name**  
26**Index**  
26**RenderingHints****AxisLabel**  
576.0**Element****Name**  
27**Index**  
27**RenderingHints****AxisLabel**  
672.0**Element****Name**  
28**Index**  
28**RenderingHints****AxisLabel**  
736.0**Element****Name**  
29**Index**  
29

**RenderingHints****AxisLabel**  
800.0**Element****Name**  
30**Index**  
30**RenderingHints****AxisLabel**  
864.0**Element****Name**  
31**Index**  
31**RenderingHints****AxisLabel**  
928.0**Element****Name**  
32**Index**  
32**RenderingHints****AxisLabel**  
992.0**Element****Name**  
33**Index**  
33**RenderingHints****AxisLabel**  
1088.0**Element****Name**  
34**Index**  
34**RenderingHints****AxisLabel**  
1216.0**Element****Name**  
35**Index**  
35**RenderingHints****AxisLabel**  
1344.0**Element****Name**  
36**Index**  
36**RenderingHints****AxisLabel**  
1472.0**Element****Name**

37
<b>Index</b>
37
<b>RenderingHints</b>
<b>AxisLabel</b>
1600.0
<b>Element</b>
<b>Name</b>
38
<b>Index</b>
38
<b>RenderingHints</b>
<b>AxisLabel</b>
1728.0
<b>Element</b>
<b>Name</b>
39
<b>Index</b>
39
<b>RenderingHints</b>
<b>AxisLabel</b>
1856.0
<b>Element</b>
<b>Name</b>
40
<b>Index</b>
40
<b>RenderingHints</b>
<b>AxisLabel</b>
1984.0
<b>Element</b>
<b>Name</b>
41
<b>Index</b>
41
<b>RenderingHints</b>
<b>AxisLabel</b>
2176.0
<b>Element</b>
<b>Name</b>
42
<b>Index</b>
42
<b>RenderingHints</b>
<b>AxisLabel</b>
2432.0
<b>Element</b>
<b>Name</b>
43
<b>Index</b>
43
<b>RenderingHints</b>
<b>AxisLabel</b>
2688.0
<b>Element</b>
<b>Name</b>
44
<b>Index</b>
44
<b>RenderingHints</b>
<b>AxisLabel</b>

2944.0

**Element****Name**

45

**Index**

45

**RenderingHints****AxisLabel**

3200.0

**Element****Name**

46

**Index**

46

**RenderingHints****AxisLabel**

3456.0

**Element****Name**

47

**Index**

47

**RenderingHints****AxisLabel**

3712.0

**Element****Name**

48

**Index**

48

**RenderingHints****AxisLabel**

3968.0

**Element****Name**

49

**Index**

49

**RenderingHints****AxisLabel**

4352.0

**Element****Name**

50

**Index**

50

**RenderingHints****AxisLabel**

4864.0

**Element****Name**

51

**Index**

51

**RenderingHints****AxisLabel**

5376.0

**Element****Name**

52

**Index**

52

**RenderingHints****AxisLabel**  
5888.0**Element****Name**  
53**Index**  
53**RenderingHints****AxisLabel**  
6400.0**Element****Name**  
54**Index**  
54**RenderingHints****AxisLabel**  
6912.0**Element****Name**  
55**Index**  
55**RenderingHints****AxisLabel**  
7424.0**Element****Name**  
56**Index**  
56**RenderingHints****AxisLabel**  
7936.0**ValidMin**

0.0

**ValidMax**

100000.0

**FillValue**

-1.0e+31

**Wave****WaveType**  
PlasmaWaves**Qualifier**  
Component.J**WaveQuantity**  
Intensity**Parameter #4****Name**  
mms1\_dsp\_bpsd\_scm3\_fast\_I2**Set**  
Time series defined by using: EPOCH**ParameterKey**  
mms1\_dsp\_bpsd\_scm3\_fast\_I2**Description**  
SCM BPSD, Component 3**Caveats**  
Average Type: standard

**Cadence**

PT2S

**Units**nT<sup>2</sup>/Hz**UnitsConversion**1.e-18>T<sup>2</sup>/Hz**CoordinateSystem****CoordinateRepresentation**

Cartesian

**CoordinateSystemName**

SC

**RenderingHints****DisplayType**

Spectrogram

**ValueFormat**

e13.6

**ScaleMin**

1.0e-09

**ScaleMax**

0.01

**ScaleType**

LogScale

**Structure****Size**

56

**Element****Name**

1

**Index**

1

**RenderingHints****AxisLabel**

8.0

**Element****Name**

2

**Index**

2

**RenderingHints****AxisLabel**

24.0

**Element****Name**

3

**Index**

3

**RenderingHints****AxisLabel**

40.0

**Element****Name**

4

**Index**

4

**RenderingHints****AxisLabel**

56.0

**Element****Name**

5

**Index**

5

**RenderingHints****AxisLabel**

72.0

**Element****Name**

6

**Index**

6

**RenderingHints****AxisLabel**

88.0

**Element****Name**

7

**Index**

7

**RenderingHints****AxisLabel**

104.0

**Element****Name**

8

**Index**

8

**RenderingHints****AxisLabel**

120.0

**Element****Name**

9

**Index**

9

**RenderingHints****AxisLabel**

136.0

**Element****Name**

10

**Index**

10

**RenderingHints****AxisLabel**

152.0

**Element****Name**

11

**Index**

11

**RenderingHints****AxisLabel**

168.0

**Element****Name**

12

**Index**

12

**RenderingHints****AxisLabel**

184.0

**Element****Name**

13
<b>Index</b>
13
<b>RenderingHints</b>
<b>AxisLabel</b>
200.0
<b>Element</b>
<b>Name</b>
14
<b>Index</b>
14
<b>RenderingHints</b>
<b>AxisLabel</b>
216.0
<b>Element</b>
<b>Name</b>
15
<b>Index</b>
15
<b>RenderingHints</b>
<b>AxisLabel</b>
232.0
<b>Element</b>
<b>Name</b>
16
<b>Index</b>
16
<b>RenderingHints</b>
<b>AxisLabel</b>
248.0
<b>Element</b>
<b>Name</b>
17
<b>Index</b>
17
<b>RenderingHints</b>
<b>AxisLabel</b>
262.0
<b>Element</b>
<b>Name</b>
18
<b>Index</b>
18
<b>RenderingHints</b>
<b>AxisLabel</b>
296.0
<b>Element</b>
<b>Name</b>
19
<b>Index</b>
19
<b>RenderingHints</b>
<b>AxisLabel</b>
304.0
<b>Element</b>
<b>Name</b>
20
<b>Index</b>
20
<b>RenderingHints</b>
<b>AxisLabel</b>



336.0

**Element****Name**  
21**Index**  
21**RenderingHints****AxisLabel**  
368.0**Element****Name**  
22**Index**  
22**RenderingHints****AxisLabel**  
400.0**Element****Name**  
23**Index**  
23**RenderingHints****AxisLabel**  
432.0**Element****Name**  
24**Index**  
24**RenderingHints****AxisLabel**  
464.0**Element****Name**  
25**Index**  
25**RenderingHints****AxisLabel**  
496.0**Element****Name**  
26**Index**  
26**RenderingHints****AxisLabel**  
576.0**Element****Name**  
27**Index**  
27**RenderingHints****AxisLabel**  
672.0**Element****Name**  
28**Index**

28

**RenderingHints****AxisLabel**  
736.0**Element****Name**  
29**Index**  
29**RenderingHints****AxisLabel**  
800.0**Element****Name**  
30**Index**  
30**RenderingHints****AxisLabel**  
864.0**Element****Name**  
31**Index**  
31**RenderingHints****AxisLabel**  
928.0**Element****Name**  
32**Index**  
32**RenderingHints****AxisLabel**  
992.0**Element****Name**  
33**Index**  
33**RenderingHints****AxisLabel**  
1088.0**Element****Name**  
34**Index**  
34**RenderingHints****AxisLabel**  
1216.0**Element****Name**  
35**Index**  
35**RenderingHints****AxisLabel**  
1344.0**Element**

---

**Name**  
36

---

**Index**  
36

---

**RenderingHints**  
**AxisLabel**  
1472.0

---

**Element**

---

**Name**  
37

---

**Index**  
37

---

**RenderingHints**  
**AxisLabel**  
1600.0

---

**Element**

---

**Name**  
38

---

**Index**  
38

---

**RenderingHints**  
**AxisLabel**  
1728.0

---

**Element**

---

**Name**  
39

---

**Index**  
39

---

**RenderingHints**  
**AxisLabel**  
1856.0

---

**Element**

---

**Name**  
40

---

**Index**  
40

---

**RenderingHints**  
**AxisLabel**  
1984.0

---

**Element**

---

**Name**  
41

---

**Index**  
41

---

**RenderingHints**  
**AxisLabel**  
2176.0

---

**Element**

---

**Name**  
42

---

**Index**  
42

---

**RenderingHints**  
**AxisLabel**  
2432.0

---

**Element**

---

**Name**  
43

---

**Index**  
43

---

**RenderingHints**

---

<b>AxisLabel</b> 2688.0
<b>Element</b>
<b>Name</b> 44
<b>Index</b> 44
<b>RenderingHints</b>
<b>AxisLabel</b> 2944.0
<b>Element</b>
<b>Name</b> 45
<b>Index</b> 45
<b>RenderingHints</b>
<b>AxisLabel</b> 3200.0
<b>Element</b>
<b>Name</b> 46
<b>Index</b> 46
<b>RenderingHints</b>
<b>AxisLabel</b> 3456.0
<b>Element</b>
<b>Name</b> 47
<b>Index</b> 47
<b>RenderingHints</b>
<b>AxisLabel</b> 3712.0
<b>Element</b>
<b>Name</b> 48
<b>Index</b> 48
<b>RenderingHints</b>
<b>AxisLabel</b> 3968.0
<b>Element</b>
<b>Name</b> 49
<b>Index</b> 49
<b>RenderingHints</b>
<b>AxisLabel</b> 4352.0
<b>Element</b>
<b>Name</b> 50
<b>Index</b> 50
<b>RenderingHints</b>
<b>AxisLabel</b> 4864.0
<b>Element</b>
<b>Name</b> 51

**Index**

51

**RenderingHints****AxisLabel**  
5376.0**Element****Name**

52

**Index**

52

**RenderingHints****AxisLabel**  
5888.0**Element****Name**

53

**Index**

53

**RenderingHints****AxisLabel**  
6400.0**Element****Name**

54

**Index**

54

**RenderingHints****AxisLabel**  
6912.0**Element****Name**

55

**Index**

55

**RenderingHints****AxisLabel**  
7424.0**Element****Name**

56

**Index**

56

**RenderingHints****AxisLabel**  
7936.0**ValidMin**

0.0

**ValidMax**

100000.0

**FillValue**

-1.0e+31

**Wave****WaveType**

PlasmaWaves

**Qualifier**

Component.K

**WaveQuantity**

Intensity

Parameter #5

**Name**

mms1\_dsp\_bpsd\_omni\_fast\_I2

**Set**

Time series defined by using: EPOCH

**ParameterKey**

mms1\_dsp\_bpsd\_omni\_fast\_I2

**Description**

SCM BPSD, Omni-directional

**Caveats**

Average Type: standard

**Cadence**

PT2S

**Units**nT<sup>2</sup>/Hz**UnitsConversion**1.e-18>T<sup>2</sup>/Hz**RenderingHints****DisplayType**

Spectrogram

**ValueFormat**

e13.6

**ScaleMin**

1.0e-09

**ScaleMax**

0.01

**ScaleType**

LogScale

**Structure****Size**

56

**Element****Name**

1

**Index**

1

**RenderingHints****AxisLabel**

8.0

**Element****Name**

2

**Index**

2

**RenderingHints****AxisLabel**

24.0

**Element****Name**

3

**Index**

3

**RenderingHints****AxisLabel**

40.0

**Element****Name**

4

**Index**

4

**RenderingHints****AxisLabel**

56.0

**Element**

**Name**

5

**Index**

5

**RenderingHints****AxisLabel**

72.0

**Element****Name**

6

**Index**

6

**RenderingHints****AxisLabel**

88.0

**Element****Name**

7

**Index**

7

**RenderingHints****AxisLabel**

104.0

**Element****Name**

8

**Index**

8

**RenderingHints****AxisLabel**

120.0

**Element****Name**

9

**Index**

9

**RenderingHints****AxisLabel**

136.0

**Element****Name**

10

**Index**

10

**RenderingHints****AxisLabel**

152.0

**Element****Name**

11

**Index**

11

**RenderingHints****AxisLabel**

168.0

**Element****Name**

12

**Index**

12

**RenderingHints**

<b>AxisLabel</b>
184.0
<b>Element</b>
<b>Name</b>
13
<b>Index</b>
13
<b>RenderingHints</b>
<b>AxisLabel</b>
200.0
<b>Element</b>
<b>Name</b>
14
<b>Index</b>
14
<b>RenderingHints</b>
<b>AxisLabel</b>
216.0
<b>Element</b>
<b>Name</b>
15
<b>Index</b>
15
<b>RenderingHints</b>
<b>AxisLabel</b>
232.0
<b>Element</b>
<b>Name</b>
16
<b>Index</b>
16
<b>RenderingHints</b>
<b>AxisLabel</b>
248.0
<b>Element</b>
<b>Name</b>
17
<b>Index</b>
17
<b>RenderingHints</b>
<b>AxisLabel</b>
262.0
<b>Element</b>
<b>Name</b>
18
<b>Index</b>
18
<b>RenderingHints</b>
<b>AxisLabel</b>
296.0
<b>Element</b>
<b>Name</b>
19
<b>Index</b>
19
<b>RenderingHints</b>
<b>AxisLabel</b>
304.0
<b>Element</b>
<b>Name</b>
20



**Index**

20

**RenderingHints****AxisLabel**

336.0

**Element****Name**

21

**Index**

21

**RenderingHints****AxisLabel**

368.0

**Element****Name**

22

**Index**

22

**RenderingHints****AxisLabel**

400.0

**Element****Name**

23

**Index**

23

**RenderingHints****AxisLabel**

432.0

**Element****Name**

24

**Index**

24

**RenderingHints****AxisLabel**

464.0

**Element****Name**

25

**Index**

25

**RenderingHints****AxisLabel**

496.0

**Element****Name**

26

**Index**

26

**RenderingHints****AxisLabel**

576.0

**Element****Name**

27

**Index**

27

**RenderingHints****AxisLabel**

672.0

**Element****Name**  
28**Index**  
28**RenderingHints****AxisLabel**  
736.0**Element****Name**  
29**Index**  
29**RenderingHints****AxisLabel**  
800.0**Element****Name**  
30**Index**  
30**RenderingHints****AxisLabel**  
864.0**Element****Name**  
31**Index**  
31**RenderingHints****AxisLabel**  
928.0**Element****Name**  
32**Index**  
32**RenderingHints****AxisLabel**  
992.0**Element****Name**  
33**Index**  
33**RenderingHints****AxisLabel**  
1088.0**Element****Name**  
34**Index**  
34**RenderingHints****AxisLabel**  
1216.0**Element****Name**  
35**Index**  
35

**RenderingHints****AxisLabel**  
1344.0**Element****Name**  
36**Index**  
36**RenderingHints****AxisLabel**  
1472.0**Element****Name**  
37**Index**  
37**RenderingHints****AxisLabel**  
1600.0**Element****Name**  
38**Index**  
38**RenderingHints****AxisLabel**  
1728.0**Element****Name**  
39**Index**  
39**RenderingHints****AxisLabel**  
1856.0**Element****Name**  
40**Index**  
40**RenderingHints****AxisLabel**  
1984.0**Element****Name**  
41**Index**  
41**RenderingHints****AxisLabel**  
2176.0**Element****Name**  
42**Index**  
42**RenderingHints****AxisLabel**  
2432.0**Element****Name**

43
<b>Index</b>
43
<b>RenderingHints</b>
<b>AxisLabel</b>
2688.0
<b>Element</b>
<b>Name</b>
44
<b>Index</b>
44
<b>RenderingHints</b>
<b>AxisLabel</b>
2944.0
<b>Element</b>
<b>Name</b>
45
<b>Index</b>
45
<b>RenderingHints</b>
<b>AxisLabel</b>
3200.0
<b>Element</b>
<b>Name</b>
46
<b>Index</b>
46
<b>RenderingHints</b>
<b>AxisLabel</b>
3456.0
<b>Element</b>
<b>Name</b>
47
<b>Index</b>
47
<b>RenderingHints</b>
<b>AxisLabel</b>
3712.0
<b>Element</b>
<b>Name</b>
48
<b>Index</b>
48
<b>RenderingHints</b>
<b>AxisLabel</b>
3968.0
<b>Element</b>
<b>Name</b>
49
<b>Index</b>
49
<b>RenderingHints</b>
<b>AxisLabel</b>
4352.0
<b>Element</b>
<b>Name</b>
50
<b>Index</b>
50
<b>RenderingHints</b>
<b>AxisLabel</b>

4864.0

**Element****Name**

51

**Index**

51

**RenderingHints****AxisLabel**

5376.0

**Element****Name**

52

**Index**

52

**RenderingHints****AxisLabel**

5888.0

**Element****Name**

53

**Index**

53

**RenderingHints****AxisLabel**

6400.0

**Element****Name**

54

**Index**

54

**RenderingHints****AxisLabel**

6912.0

**Element****Name**

55

**Index**

55

**RenderingHints****AxisLabel**

7424.0

**Element****Name**

56

**Index**

56

**RenderingHints****AxisLabel**

7936.0

**ValidMin**

0.0

**ValidMax**

100000.0

**FillValue**

-1.0e+31

**Wave****WaveType**

PlasmaWaves

**Qualifier**

Total

**WaveQuantity**

## Intensity

## Parameter #6

**Name**

epoch\_timetag

**ParameterKey**

epoch\_timetag

**Description**

Epoch Time Tag

**Caveats**

This parameter exhibits an increasing monotonic progression.

**Cadence**

PT2S

**Units**

ns

**UnitsConversion**

1.0e-9&gt;s

**RenderingHints****AxisLabel**

epoch\_timetag

**ScaleType**

LinearScale

**ValidMin**

2000-01-01T00:00:00.000000000

**ValidMax**

2030-01-01T00:00:01.999000000

**FillValue**

9999-12-31T23:59:59.999999999

**Support****SupportQuantity**

Temporal

## Parameter #7

**Name**

mms1\_dsp\_seqcnt\_bpsd

**Set**

Time series defined by using: EPOCH\_TIMETAG

**ParameterKey**

mms1\_dsp\_seqcnt\_bpsd

**Description**

Sequence Count

**Cadence**

PT2S

**RenderingHints****DisplayType**

TimeSeries

**ValueFormat**

i6

**ScaleType**

LinearScale

**ValidMin**

0

**ValidMax**

65535

**FillValue**

65535

**Support****SupportQuantity**

Other

## Parameter #8

**Name**

---

mms1\_b\_freq

---

**ParameterKey**

mms1\_b\_freq

---

**Description**

SCM BPSD, Frequency Midpoints

---

**Cadence**

PT2S

---

**RenderingHints**

---

**ValueFormat**

e10.6

---

**Structure**

---

**Size**

56

---

**Element**

---

**Name**

1

---

**Index**

1

---

**Element**

---

**Name**

2

---

**Index**

2

---

**Element**

---

**Name**

3

---

**Index**

3

---

**Element**

---

**Name**

4

---

**Index**

4

---

**Element**

---

**Name**

5

---

**Index**

5

---

**Element**

---

**Name**

6

---

**Index**

6

---

**Element**

---

**Name**

7

---

**Index**

7

---

**Element**

---

**Name**

8

---

**Index**

8

---

**Element**

---

**Name**

9

---

**Index**

9

---

**Element**

---

**Name**

10

<b>Index</b>	10
<b>Element</b>	
<b>Name</b>	11
<b>Index</b>	11
<b>Element</b>	
<b>Name</b>	12
<b>Index</b>	12
<b>Element</b>	
<b>Name</b>	13
<b>Index</b>	13
<b>Element</b>	
<b>Name</b>	14
<b>Index</b>	14
<b>Element</b>	
<b>Name</b>	15
<b>Index</b>	15
<b>Element</b>	
<b>Name</b>	16
<b>Index</b>	16
<b>Element</b>	
<b>Name</b>	17
<b>Index</b>	17
<b>Element</b>	
<b>Name</b>	18
<b>Index</b>	18
<b>Element</b>	
<b>Name</b>	19
<b>Index</b>	19
<b>Element</b>	
<b>Name</b>	20
<b>Index</b>	20
<b>Element</b>	
<b>Name</b>	21
<b>Index</b>	21
<b>Element</b>	
<b>Name</b>	22
<b>Index</b>	22



<b>Element</b>
<b>Name</b>
23
<b>Index</b>
23
<b>Element</b>
<b>Name</b>
24
<b>Index</b>
24
<b>Element</b>
<b>Name</b>
25
<b>Index</b>
25
<b>Element</b>
<b>Name</b>
26
<b>Index</b>
26
<b>Element</b>
<b>Name</b>
27
<b>Index</b>
27
<b>Element</b>
<b>Name</b>
28
<b>Index</b>
28
<b>Element</b>
<b>Name</b>
29
<b>Index</b>
29
<b>Element</b>
<b>Name</b>
30
<b>Index</b>
30
<b>Element</b>
<b>Name</b>
31
<b>Index</b>
31
<b>Element</b>
<b>Name</b>
32
<b>Index</b>
32
<b>Element</b>
<b>Name</b>
33
<b>Index</b>
33
<b>Element</b>
<b>Name</b>
34
<b>Index</b>
34
<b>Element</b>

**Name**  
35

**Index**  
35

**Element**

**Name**  
36

**Index**  
36

**Element**

**Name**  
37

**Index**  
37

**Element**

**Name**  
38

**Index**  
38

**Element**

**Name**  
39

**Index**  
39

**Element**

**Name**  
40

**Index**  
40

**Element**

**Name**  
41

**Index**  
41

**Element**

**Name**  
42

**Index**  
42

**Element**

**Name**  
43

**Index**  
43

**Element**

**Name**  
44

**Index**  
44

**Element**

**Name**  
45

**Index**  
45

**Element**

**Name**  
46

**Index**  
46

**Element**

**Name**  
47

---

**Index**  
47

---

**Element**

---

**Name**  
48

---

**Index**  
48

---

**Element**

---

**Name**  
49

---

**Index**  
49

---

**Element**

---

**Name**  
50

---

**Index**  
50

---

**Element**

---

**Name**  
51

---

**Index**  
51

---

**Element**

---

**Name**  
52

---

**Index**  
52

---

**Element**

---

**Name**  
53

---

**Index**  
53

---

**Element**

---

**Name**  
54

---

**Index**  
54

---

**Element**

---

**Name**  
55

---

**Index**  
55

---

**Element**

---

**Name**  
56

---

**Index**  
56

---

**ValidMin**

0.0

---

**ValidMax**

8192.0

---

**FillValue**

-1.0e+31

---

**Support**

---

**SupportQuantity**

Other