SINEX_BIAS—Solution (Software/technique) INdependent EXchange Format for GNSS Biases Version 1.00

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0. Revision History

0.1. Major Update from V0.01 to V1.00:

- This major update includes generalizations, extensions, and a considerable number of added detailed definitions, descriptions, and examples.

- With this version (1.00), Bias-SINEX was completely decoupled from the SINEX format and corresponding format descriptions. This implies that only format blocks included in this format description are allowed for a Bias-SINEX file of V1.00.

- `YY:DDD:SSSSS` time tags are an essential property of the established SINEX. The previously used 2-digit year tag (`YY`) was generally replaced by a 4-digit year tag (`YYYY`) for Bias-SINEX.

1. Foreword and Acknowledgment

In 2011, a preliminary bias data format, called *SINEX_BIAS V0.01*, was proposed by Tim Springer (ESA/ESOC) for handling of GNSS bias estimates as part of the TGVF

(Time and Geodetic Validation Facility) and the OVF (Orbit Validation Facility) of Galileo [Springer, 2011]. This format proposal was made on the basis of the *SINEX_TRO Format for combination of TROpospheric estimates Version 0.01* [Gendt, 1997].

The *SINEX_BIAS Format Version 1.00* is the result of a substantial update made on the basis of the *SINEX_BIAS V0.01*. It includes generalizations, extensions, and a considerable number of added detailed definitions, descriptions, and examples. The SINEX_BIAS format description document was completely rewritten. The original bias format concept—using the SINEX formalism—as formed by Tim Springer is acknowledged.

2. The Philosophy and General Features

2.1. Bias Data Format

In the face of a steadily growing variety of GNSS signals and observables, an adequate data format for GNSS bias products became indispensable.

The files should have a simple, but flexible structure, so that the IGS Analysis Centers (ACs) can format their bias estimates in a straightforward manner as well as users of IGS products can easily read and handle the bias products.

The proposed format is based on syntax elements of the SINEX Format [SINEX 2.02]. The following (general) format blocks were taken over from [SINEX 2.02]:

```
FILE/REFERENCE            (Mandatory)
FILE/COMMENT              (Optional)
INPUT/ACKNOWLEDGMENTS     (Optional)
```

Dedicated format blocks are defined to provide all necessary information that is directly connected with GNSS bias estimates:

```
BIAS/DESCRIPTION            (Mandatory)
BIAS/RECEIVER_INFORMATION   (Optional)
BIAS/SOLUTION               (Mandatory)
```

Other SINEX format blocks (than those listed above) are not allowed.

Auxiliary comment lines may be added according to the rules specified in Section 4.5.1. For the clarity sake, beginning and ends of format blocks are preferable.

2.2. Main Features of SINEX_BIAS

The `BIAS/SOLUTION` format structure of SINEX_BIAS V1.00 does allow the following main features:

- biases are specified for a given time interval of validity, defined by start and end time;

- biases may be augmented by their slope parameters;

- support of biases corresponding to: (i) *system*, (ii) *satellite*, (iii) *receiver*, (iv) *satellite-receiver*, and even (v) biases attributed to (user-defined) *receiver groups*;

- *relative* (differential) or *absolute* (observable-specific) bias parameters.

- consideration of bias parameters with respect to *code* and *phase* observations;

The above listing of features shows a distinct flexibility for handling of any kind of GNSS bias values.

3. SINEX_BIAS File Naming

In the following, we provide a file naming convention for both *short* and *long* filenames. Filenames may be in *uppercase* or in *lowercase*. The filename extension should be: `.BIA` or `.bia` (conforming to the SINEX keyword "`BIA`" internally used).

3.1. Short Filenames

The SINEX_BIAS files are named:

<div align="center">

`CCCWWWWD.BIA`

</div>

where

CCC:	3-figure Analysis Center (AC) designator
WWWW:	GPS week
D:	Day of week (0–6) or 7 for a weekly file

Example: `COD18646.BIA[.gz]`

3.2. Long Filenames

Based on a proposal for a new product naming convention worked out by colleagues from GFZ in analogy with the new RINEX naming scheme, SINEX_BIAS files should be named in the following manner:

The full filename specification is given with:

`AAAVPPPTTT_YYYYDDDHHMM_LEN_SMP_CNT.FMT[.*]`

```
01-03  AAA   3-char AC name (e.g.: DLR for "Deutsches Zentrum f\r Luft- und Raumfahrt")
04     V     1-char version/solution identifier (here: nominally 0)
05-07  PPP   3-char campaign/project specification (e.g.: MGX)
08-10  TTT   3-char product type specification (FIN=final, RAP=rapid, ULT=ultra-rapid, NRT=near-real-time)
11     _     1-char separator (underscore)
12-15  YYYY  4-digit year of start epoch
16-18  DDD   3-digit day-of-year of start epoch
19-20  HH    2-digit hour of start epoch (here: 00)
21-22  MM    2-digit minute of start epoch (here: 00)
23     _     1-char separator (underline)
24-26  LEN   2-digits+1-char intended (nominal) product period (units: Y=years, W=weeks, D=days, M=minutes, S=seconds)
             (here: 01D for 1-day)
27     _     1-char separator (underline)
28-30  SMP   2-digits+1-char sampling interval (units: Y=years, W=weeks, D=days, M=minutes, S=seconds)
             (here: 01D for 1-day)
31     _     1-char separator (underscore)
32-34  CNT   3-char content type (REL or ABS for relative or absolute bias information)
35     .     1-char separator
36-38  FMT   3-char format extension (fixed: BIA)

Optional:
39     .     extension
40-XX        compression file type (here: ".gz")
```

Example: `DLR0MGXFIN_20150010000_01D_01D_REL.BIA.gz`

4. SINEX_BIAS Version 1.00—Detail Format Description

4.1. Header and Footer Lines (Mandatory)

```
Description:

The Header line must be the first line in a SINEX_BIAS file.
The Footer line must be the last  line in a SINEX_BIAS file.

Contents:
      _____
      |_____H_E_A_D_E_R___L_I_N_E_____|
      |               |                                 |             |
      |__Field_____|_____Description_____|___Format____|
      |               |                                 |             |
      | File Identifier| %=BIA                          |    A5       |
      |_____|_____|_____|
      |               |                                 |             |
      | Format Version | Four digits indicating the version|  1X,F4.2  |
      |               | of SINEX_BIAS format used.      |             |
      |               | '1.00' for this version.        |             |
      |_____|_____|_____|
      |               |                                 |             |
      | File Agency   | Identify the agency creating the |  1X,A3     |
      | Code          | SINEX_BIAS file.                |             |
      |_____|_____|_____|
      |               |                                 |             |
      | Time          | Creation time of this SINEX_BIAS | 1X,I4.4,':', |
      |               | file.                           | I3.3,':',I5.5|
      |_____|_____|_____|
      |               |                                 |             |
      | Agency Code   | Identify the agency providing the |  1X,A3     |
      |               | data in the SINEX_BIAS file.    |             |
      |_____|_____|_____|
      |               |                                 |             |
      | Time          | Start time of solution in the   | 1X,I4.4,':', |
      |               | this SINEX_BIAS file (see also  | I3.3,':',I5.5|
      |               | 'TIME_SYSTEM' descriptor).      |             |
      |_____|_____|_____|
      |               |                                 |             |
      | Time          | End time of the solution in the | 1X,I4.4,':', |
      |               | this SINEX_BIAS file (see also  | I3.3,':',I5.5|
      |               | 'TIME_SYSTEM' descriptor).      |             |
      |_____|_____|_____|
      |               |                                 |             |
      | Bias Mode     | Declare whether relative ('R') or |  1X,A1     |
      |               | absolute ('A') bias estimates are |           |
      |               | provided in the SINEX_BIAS      |             |
```

```
|               |  solution (must be conform to the  |              |
|               |  'BIAS_MODE' descriptor).          |              |
|_____|_____|_____|
|               |                                   |              |
| Number of Est-| Number of bias estimates included |  1X,I8.8     |
| timates       | in the SINEX_BIAS file.           |              |
|               | Note: Possible slope parameters   |              |
|               | are not counted. This count thus  |              |
|               | corresponds to the number of bias |              |
|               | parameter lines.                  |              |
|_____|_____|_____|
                                                    |              |
                                                    |     74       |
                                                    |_____|
```

```
 _____
|_____F_O_O_T_E_R___L_I_N_E_____|
|               |                                   |              |
|__Field_____|_____Description_____|___Format_____|
|               |                                   |              |
| File Identifier| %=ENDBIA                         |     A8       |
|_____|_____|_____|
                                                    |              |
                                                    |     8        |
                                                    |_____|
```

4.2. FILE/REFERENCE Block (Mandatory)

Description:

This block provides information on the Organization, point of contact, the
software and hardware involved in the creation of the file.

Contents:

```
 _____
|_____F_I_L_E___R_E_F_E_R_E_N_C_E___D_A_T_A___L_I_N_E_____|
|               |                                   |              |
|__Field_____|_____Description_____|___Format_____|
|               |                                   |              |
| Information   | Describes the type of information |  1X,A18      |
| Type          | present in the next field. May    |              |
|               | take on the following values:     |              |
|               |                                   |              |
|               | 'DESCRIPTION' - Organization(s)   |              |
|               |                 gathering/altering|              |
|               |                 the file contents.|              |
|               | 'OUTPUT'      - Description of the|              |
|               |                 file contents.    |              |
|               | 'CONTACT'     - Address of the    |              |
|               |                 relevant contact. |              |
|               |                 e-mail            |              |
|               | 'SOFTWARE'    - Software used to   |              |
|               |                 generate the file.|              |
|               | 'HARDWARE'    - Computer hardware  |              |
|               |                 on which above    |              |
|               |                 software was run.  |              |
|               | 'INPUT'       - Brief description  |              |
|               |                 of the input used |              |
|               |                 to generate this  |              |
|               |                 solution.         |              |
|               |                                   |              |
|               | Any of the above fields may be    |              |
|               | and in any order.                 |              |
|_____|_____|_____|
|               |                                   |              |
| Information   | Relevant information for the type |  1X,A60      |
|               | indicated by the previous field.  |              |
|_____|_____|_____|
                                                    |              |
                                                    |     80       |
                                                    |_____|
```

4.3. FILE/COMMENT Block (Optional)

Description:

This block can be used to provide general comments about the SINEX data
file.

Contents:

```
 _____
|_____F_I_L_E___C_O_M_M_E_N_T___D_A_T_A___L_I_N_E_____|
|               |                                |             |
|__Field_____|_____Description_____|___Format____|
|               |                                |             |
| Comment       | Any general comment providing  |   1X,A79    |
|               | relevant information about the |             |
|               | SINEX file.                    |             |
|_____|_____|_____|
                                                 |             |
                                                 |     80      |
                                                 |_____|
```

4.4. INPUT/ACKNOWLEDGMENTS Block (Optional)

Description:

This block defines the agency codes contributing to the SINEX file.

Contents:

```
 _____
|___I_N_P_U_T___A_C_K_N_O_W_L_E_D_G_M_E_N_T_S___D_A_T_A___L_I_N_E___|
|               |                                |             |
|__Field_____|_____Description_____|___Format____|
|               |                                |             |
| [Agency Code] | Agency(ies) contributing to this |  1X,A3    |
|               | SINEX file.                    |             |
|_____|_____|_____|
|               |                                |             |
| Agency        | Description of agency code.    |   1X,A75    |
| Description   |                                |             |
|_____|_____|_____|
                                                 |             |
                                                 |     80      |
                                                 |_____|
```

4.5. Some General SINEX Syntax Elements

4.5.1. Comment Lines

A comment line (not to be confused with the FILE/COMMENT Block) can be written
anywhere within the header and the footer line. All comment lines must start with a
"*" in the first column. With the use of this character information can be hidden from
the software reading the file without deleting it from the file. A comment line is defined
as follows:

```
 _____
|_____C_O_M_M_E_N_T___D_A_T_A___L_I_N_E_____|
|               |                                |             |
|__Field_____|_____Description_____|___Format____|
|               |                                |             |
| Comment       | Any general comment relevant to|   '*',A79   |
|               | the SINEX file.                |             |
|_____|_____|_____|
                                                 |             |
                                                 |     80      |
                                                 |_____|
```

6

4.5.2. YYYY:DDD:SSSSS Time Tags

Please note that time tags are commonly given in a `YYYY:DDD:SSSSS` formatted representation.

```
 -------------------------------------------------------------
|               |                                |            |
|__Field_____|_____Description_____|___Format___|
|               |                                |            |
| Time          | YYYY = 4-digit year,           | I4.4,      |
|               | DDD = 3-digit day in year,     | ':',I3.3,  |
|               | SSSSS = 5-digit seconds in day.| ':',I5.5   |
|_____|_____|_____|
```

4.5.3. Floating Number Exponent

For increased portability, the floating number exponent of "E" should be used rather than "D" or "d" which is not recognized by some compiler/installations.

4.6. BIAS/DESCRIPTION Block (Mandatory)

```
Description:

This block gives important parameters from the analysis and defines
the fields in the block 'BIAS/SOLUTION'.

Contents:
 -------------------------------------------------------------
|_____BIAS/DESCRIPTION__D_A_T_A__L_I_N_E_____|
|               |                                |            |
|__Field_____|_____Description_____|___Format___|
|               |                                |            |
| Information   | Describes the type of information | 1X,A39  |
| Type          | present in the next field. May  |          |
|               | take on the following values:   |          |
|               |                                 |          |
|               | 'OBSERVATION_SAMPLING'          |          |
|               |   - Observation sampling interval | 1X,I12 |
|               |     [sec] used for data analysis. |        |
|               |   Optional information.         |          |
|               | 'PARAMETER_SPACING'            |          |
|               |   - Parameter spacing interval  | 1X,I12   |
|               |     [sec] used for parameter    |          |
|               |     representation.             |          |
|               |   Optional information.         |          |
|               | 'DETERMINATION_METHOD'         |          |
|               |   - Determination method used to | 1X,A39  |
|               |     generate the bias results.  |          |
|               |     Recommended entries are:    |          |
|               |     o 'INTRA-FREQUENCY_BIAS_ESTIMATION' |  |
|               |       (analysis of differences  |          |
|               |       between observables of the |         |
|               |       same frequency)           |          |
|               |     o 'INTER-FREQUENCY_BIAS_ESTIMATION' |  |
|               |       (analysis of differences  |          |
|               |       between observables of    |          |
|               |       different frequencies     |          |
|               |       relying on a ionosphere   |          |
|               |       reduction model)          |          |
|               |       Note: Intra-frequency bias |         |
|               |       parameters are explicitly |          |
|               |       included here.            |          |
|               |     o 'CLOCK_ANALYSIS'          |          |
|               |       (analyzing the ionosphere- |         |
|               |       free linear combination)  |          |
|               |     o 'IONOSPHERE_ANALYSIS'     |          |
|               |       (analyzing the geometry-  |          |
|               |       free linear combination)  |          |
|               |     o 'COMBINED_ANALYSIS'       |          |
|               |       (results from both clock  |          |
```

```
|               |     and ionosphere analysis)    |          |       |
|               |     o 'CALIBRATION'              |          |       |
|               |       (hardware calibration)    |          |       |
|               |     o 'COMBINATION'             |          |       |
|               |       (results from a combination|         |       |
|               |       of various bias products) |          |       |
|               |   Optional information.         |          |       |
|               | 'BIAS_MODE'                     |          |       |
|               |   - The bias mode describes how |  1X,A39  |       |
|               |     the included GNSS bias values|         |       |
|               |     have to be interpreted and  |          |       |
|               |     applied, respectively.      |          |       |
|               |     Possible modes are:         |          |       |
|               |     o 'RELATIVE'                |          |       |
|               |     o 'ABSOLUTE'                |          |       |
|               |     Obviously, this implies that|          |       |
|               |     inclusion of either         |          |       |
|               |     o relative (differential) or|          |       |
|               |     o absolute (pseudo-absolute)|          |       |
|               |     GNSS bias values is allowed |          |       |
|               |     in a SINEX_BIAS file.       |          |       |
|               |     Note: The bias mode is part |          |       |
|               |     of the SINEX_BIAS header line|         |       |
|               |     (encoded with 'R' or 'A'). |          |       |
|               |   Mandatory information.        |          |       |
|               | 'TIME_SYSTEM'                   |          |       |
|               |   - The time tags specified in  |  1X,A3   |       |
|               |     the BIAS/SOLUTION block have|          |       |
|               |     be given in a common time   |          |       |
|               |     system.                     |          |       |
|               |     Possible time systems are:  |          |       |
|               |     o RINEX GNSS system flag    |          |       |
|               |       (e.g. 'G '),             |          |       |
|               |     o 'UTC' for Coordinated     |          |       |
|               |       Universal Time,           |          |       |
|               |     o 'TAI' for International   |          |       |
|               |       Atomic Time.              |          |       |
|               |   Mandatory information.        |          |       |
|               | 'RECEIVER_CLOCK_REFERENCE_GNSS' |          |       |
|               |   - Reference GNSS used for     |  1X,A1   |       |
|               |     receiver clock estimation.  |          |       |
|               |     System code according to    |          |       |
|               |     RINEX3 standards.           |          |       |
|               |     E.g.: 'G'                  |          |       |
|               |   Mandatory if the provided bias|          |       |
|               |   results are consistent with the|         |       |
|               |   ionosphere-free LC and if     |          |       |
|               |   station biases are included   |          |       |
|               |   (else unnecessary).           |          |       |
|               | 'SATELLITE_CLOCK_REFERENCE_OBSERVABLES'|   |       |
|               |   - Each involved GNSS,         |  1X,A1,  |       |
|               |   - reference code observable of|  2X,A4,  |       |
|               |     the first frequency,        |          |       |
|               |   - reference code observable of|  1X,A4   |       |
|               |     the second frequency.       |          |       |
|               |     NOTE: Observable codes have |          |       |
|               |     to be declared following    |          |       |
|               |     RINEX3 standards.           |          |       |
|               |     Supported GNSS are:         |          |       |
|               |       G - GPS                   |          |       |
|               |       R - GLONASS               |          |       |
|               |       E - Galileo               |          |       |
|               |       J - QZSS                  |          |       |
|               |       C - BeiDou                |          |       |
|               |       I - IRNSS                 |          |       |
|               |       S - SBAS payload          |          |       |
|               |     Data record has to be       |          |       |
|               |     repeated for multiple GNSS. |          |       |
|               |     NOTE: In case of  biases    |          |       |
|               |     considered specific to each |          |       |
|               |     station-satellite link, the |          |       |
|               |     two observable code fields  |          |       |
|               |     should be blank.            |          |       |
|               |   Mandatory if the provided bias|          |       |
|               |   results are consistent with the|         |       |
|               |   ionosphere-free LC            |          |       |
|               |   (else unnecessary).           |          |       |
|               |                                 |          |       |
|               | Any of the above fields may be  |          |       |
|               | and in any order.               |          |       |
|_____|_____|_____|       |
                                                  |          |       |
                                                  |    80    |       |
                                                  |_____|
```

4.7. BIAS/RECEIVER_INFORMATION Block (Optional)

Description:

The satellite bias characteristics may be considerably different among
receivers. Therefore, it might make sense to group (for the computation of
the satellite biases) the receivers of all involved stations according to
a particular assignment scheme. The BIAS/RECEIVER_INFORMATION block may be
used to provide a corresponding station list, giving the assignment of
each involved station (and each constellation) to the appropriate receiver
group.

Contents:

```
     _____
    |_____BIAS/RECEIVER_INFORMATION__D_A_T_A__L_I_N_E_____|
    |                |                                 |               |
    |__Field_____|_____Description_____|___Format_____|
    |                |                                 |               |
    | Station Name   | Station codes are encoded using a |  1X,A9      |
    | Identifier     | 9-character field.               |               |
    |                | NOTE: For backward compatibility, |              |
    |                | left-aligned 4-character station  |              |
    |                | codes are also permitted.         |              |
    |                | REMARK: Blank station name fields |              |
    |                | are allowed to assign approximate |              |
    |                | receiver bias values just on the  |              |
    |                | basis of the involved receiver    |              |
    |                | type and receiver firmware.       |              |
    |_____|_____|_____|
    |                |                                 |               |
    | Constellation  | Constellation code:             |  1X,A1        |
    |                |    G - GPS                       |               |
    |                |    R - GLONASS                   |               |
    |                |    E - Galileo                   |               |
    |                |    J - QZSS                      |               |
    |                |    C - BeiDou                    |               |
    |                |    I - IRNSS                     |               |
    |                |    S - SBAS payload              |               |
    |                | A blank field would indicate no  |              |
    |                | constellation dependence.        |              |
    |_____|_____|_____|
    |                |                                 |               |
    | Receiver Group | Left-aligned receiver group name |  1X,A9       |
    | Identifier     | with a leading '@' (specific to  |              |
    |                | the given constellation).        |              |
    |                | Mandatory field.                 |              |
    |_____|_____|_____|
    |                |                                 |               |
    | Time           | Start time for the assignment of |  1X,I4.4,    |
    |                | a station to a receiver group.   |  ':',I3.3,   |
    |                |                                 |  ':',I5.5    |
    |_____|_____|_____|
    |                |                                 |               |
    | Time           | End time for the assignment.     |  1X,I4.4,    |
    |                |                                 |  ':',I3.3,   |
    |                |                                 |  ':',I5.5    |
    |_____|_____|_____|
    |                |                                 |               |
    | Receiver Type  | Receiver type (c.f. the naming   |  1X,A20      |
    |                | conventions for IGS equipment    |              |
    |                | descriptions, rcvr_ant.tab)      |              |
    |                | Mandatory field.                 |              |
    |_____|_____|_____|
    |                |                                 |               |
    | Receiver       | Receiver firmware version        |  1X,A20      |
    | Firmware       | (preferably left-aligned).       |              |
    |                | Optional field.                  |              |
    |_____|_____|_____|
    |                                                  |               |
    |                                                  |  94           |
    |                                                  |_____|
```

Example:

```
*---------------------------------------------------------------------
```

9

```
+BIAS/RECEIVER_INFORMATION
*STATION__ C GROUP____ DATA_START____ DATA_END_____ RECEIVER_TYPE_____ RECEIVER_FIRMWARE___
   MAO0    G @MP0      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN0    G @MP0      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN1    G @MP1TRI   2015:276:00000 2015:276:86399 TRIMBLE NETR9        5.10
   STFU    G @MP1JAV-1 2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   TEST    G @MP1JAV-2 2015:276:00000 2015:276:86399 JAVAD TR_VS          3.6.4
   XYYX    G @MP1TRI   2015:276:00000 2015:276:86399 TRIMBLE NETR5        4.93
   WTZZ    G @MP_      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   MAO0    E @ALL      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN0    E @ALL      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN1    E @ALL      2015:276:00000 2015:276:86399 TRIMBLE NETR9        5.10
   STFU    E @ALL      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   TEST    E @ALL      2015:276:00000 2015:276:86399 JAVAD TR_VS          3.6.4
   WTZZ    E @ALL      2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
*-----------------------------------------------------------------------------
*LEGEND:   G @MP0      Receivers with disabled multipath (MP) mitigation.
*LEGEND:   G @MP1JAV-1 JAVAD TRE-G3TH receivers with MPNEW  MP mitigation enabled.
*LEGEND:   G @MP1JAV-2 JAVAD TRIUMPH  receivers with MPNEW  MP mitigation enabled.
*LEGEND:   G @MP1TRI   TRIMBLE        receivers with Everest MP mitigation enabled.
*LEGEND:   G @MP_      Extra group with unknown MP mitigation mode.
*LEGEND:   E @ALL      No grouping for the indicated system.
*-----------------------------------------------------------------------------
-BIAS/RECEIVER_INFORMATION
*-----------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 DSB  G001 G01 @MP0      C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G001 G01 @MP1TRI   C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G001 G01 @MP1JAV-1 C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G001 G01 @MP1JAV-2 C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G001 G01 @MP_      C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G002 G02 @MP0      C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G002 G02 @MP1TRI   C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G002 G02 @MP1JAV-1 C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G002 G02 @MP1JAV-2 C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  G002 G02 @MP_      C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  E001 E01 @ALL      C1X  C5X  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
 DSB  E002 E02 @ALL      C1X  C5X  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
-BIAS/SOLUTION
*-----------------------------------------------------------------------------
```

An adequate LEGEND has to be included using auxiliary comment lines. The above example gives an idea how such a LEGEND sequence could be arranged (preferably in a quasi-standardized, human readable format).

Please note that the `BIAS/RECEIVER_INFORMATION` block is, moreover, usable for specification of the receiver type and receiver firmware in the standard case (without extra receiver grouping):

Example:

```
*-----------------------------------------------------------------------------
+BIAS/RECEIVER_INFORMATION
*STATION__ C GROUP____ DATA_START____ DATA_END_____ RECEIVER_TYPE_____ RECEIVER_FIRMWARE___
   MAO0                2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN0                2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   SIN1                2015:276:00000 2015:276:86399 TRIMBLE NETR9        5.10
   STFU                2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
   TEST                2015:276:00000 2015:276:86399 JAVAD TR_VS          3.6.4
   XYYX                2015:276:00000 2015:276:86399 TRIMBLE NETR5        4.93
   WTZZ                2015:276:00000 2015:276:86399 JAVAD TRE-G3TH DELTA 3.6.4
-BIAS/RECEIVER_INFORMATION
*-----------------------------------------------------------------------------
```

4.8. BIAS/SOLUTION Block (Mandatory)

```
Description:

This block contains the GNSS bias estimates for all time intervals.
```

Contents:

```
 _____
|_____BIAS/SOLUTION__D_A_T_A__L_I_N_E_____|
|                 |                                    |             |
|__Field_____|_____Description_____|___Format_____|
|                 |                                    |             |
| BIAS            | Bias type identifier.              |  1X,A4      |
|                 | Available types are:               |             |
|                 |   'DSB ': Differential Signal      |             |
|                 |           Bias (DSB);              |             |
|                 |   'ISB ': Ionosphere-free (linear  |             |
|                 |           combination) Signal      |             |
|                 |           Bias (ISB);              |             |
|                 |   'OSB ': Observable-specific      |             |
|                 |           Signal Bias (OSB).       |             |
|                 | Mandatory field.                   |             |
|_____|_____|_____|
|                 |                                    |             |
| SVN             | Satellite SVN code "CNNN":         |  1X,A4      |
|                 |   "C"   - satellite system flag    |             |
|                 |           (according to RINEX3);   |             |
|                 |   "NNN" - SVN number (or GLONASS   |             |
|                 |           number).                 |             |
|_____|_____|_____|
|                 |                                    |             |
| PRN             | Satellite PRN code "CNN":          |  1X,A3      |
|                 |   "C"   - satellite system flag    |             |
|                 |           (according to RINEX3);   |             |
|                 |   "NN"  - PRN number (or GLONASS   |             |
|                 |           slot number).            |             |
|                 |                                    |             |
|                 | IMPORTANT NOTE: To enable an       |             |
|                 | unambiguous association of PRN     |             |
|                 | and SVN numbers, BOTH values must  |             |
|                 | be given if a bias refers to a     |             |
|                 | specific satellite rather than a   |             |
|                 | generic constellation.             |             |
|_____|_____|_____|
|                 |                                    |             |
| Station Name    | Station codes are encoded using a  |  1X,A9      |
| Identifier      | 9-character field (or a receiver   |             |
| Identifier      | group name).                       |             |
|                 | NOTE: For backward compatibility,  |             |
|                 | left-aligned 4-character station   |             |
|                 | codes are also permitted.          |             |
|_____|_____|_____|
|                 |                                    |             |
| OBS1 and OBS2   | Observables used for estimating    |  2(1X,A4)   |
| Observable      | the biases. The observable codes   |             |
| Codes           | have to be given according to the  |             |
|                 | RINEX3 format definitions.         |             |
|                 | The OBS2 field remains blank in    |             |
|                 | case of absolute (OSB) estimates.  |             |
|                 |                                    |             |
|                 | IMPORTANT NOTE: Please be aware    |             |
|                 | that distinction between           |             |
|                 | - code (or pseudorange) and        |             |
|                 | - phase biases                     |             |
|                 | is done on the basis of the given  |             |
|                 | GNSS observable codes!             |             |
|_____|_____|_____|
|                 |                                    |             |
| Time            | Start time for the bias estimate.  |  1X,I4.4,   |
|                 |                                    |  ':',I3.3,  |
|                 |                                    |  ':',I5.5   |
|_____|_____|_____|
|                 |                                    |             |
| Time            | End time for the bias estimate.    |  1X,I4.4,   |
|                 |                                    |  ':',I3.3,  |
|                 |                                    |  ':',I5.5   |
|_____|_____|_____|
|                 |                                    |             |
| Unit            | Bias estimates are given in the    |  1X,A4      |
|                 | specified unit. Unit has to be     |             |
|                 | 'ns' (nanoseconds) for code        |             |
|                 | biases; phase biases may be given  |             |
|                 | in 'cyc' (cycles).                 |             |
|_____|_____|_____|
|                 |                                    |             |
| Bias Parameter  | Estimated (offset) value of the    |  1X,E21.15  |
| Estimate        | bias parameter.                    |             |
|_____|_____|_____|
|                 |                                    |             |
```

```
| Bias Parameter | Estimated standard deviation for |   1X,E11.6  |
| Standard       | the bias parameter.              |             |
| Deviation      | NOTE: Bias values taken over from|             |
|                | an external source should be     |             |
|                | indicated with a zero value.     |             |
|_____|_____|_____|
|                |                                  |             |
| Slope          | Estimated value of the slope     |   1X,E21.15 |
| Estimate       | parameter (in ns/n).             |             |
|                | Optional (else blank).           |             |
|_____|_____|_____|
|                |                                  |             |
| Slope          | Estimated standard deviation for |   1X,E11.6  |
| Standard       | the slope parameter (in ns/s).   |             |
| Deviation      | Optional (else blank).           |             |
|_____|_____|_____|
                                                    |             |
                                                    |     137     |
                                                    |_____|
```

5. General Notes on Bias Handling

5.1. Bias Parameter Representation in the Time Domain

- Biases are specified for a given time interval of validity, defined by start and end time.

- Biases may be augmented by their slope parameters.

- If a slope parameter is specified, the bias is referring to the middle of the given time interval.

- In case of open interval, when end time is indicated as undefined, the bias refers to the start time of the interval.

- In case of open interval, when start time is indicated as undefined, the bias refers to the end time of the interval.

- The unit of the slope has to be ns/s for code biases (or cyc/s for phase biases).

Figure 1 shows the situation with *offsets only* (top) and with *offsets and slopes* (bottom). The bottom subfigure of Figure 1 indicates that, in principle, Bias-SINEX V1.00 would allow to provide bias parameter information *without discontinuities* (at the time interval boundaries).

Finally, it should be obvious that, in the extreme case, provision of epoch bias parameters is possible (by shortening the time intervals accordingly). For an epoch-specific bias product, OBSERVATION_SAMPLING and PARAMETER_SPACING are assumed to be equal.

5.2. Notes on SVN/PRN and STATION Usage in BIAS/SOLUTION Block

The fields SVN/PRN and STATION may used for coding of biases with four different characteristics:
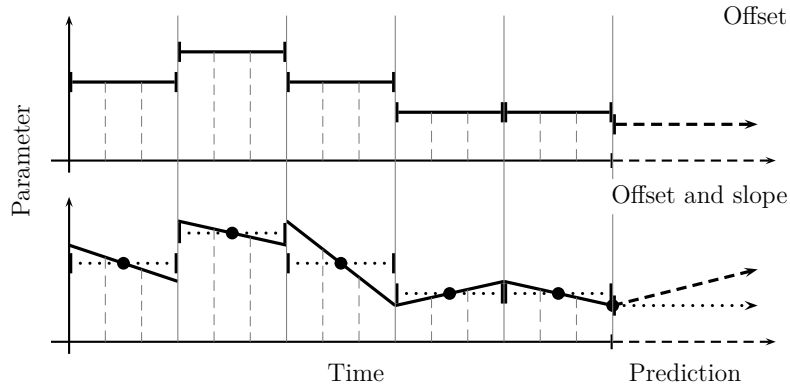
Figure 1: Bias parameter representation *without* (top) and *with* slopes (bottom), as supported by the Bias-SINEX V1.00.

- **Satellite bias:** If a bias depends only on a satellite, SVN/PRN should be filled, STATION may be left empty.

- **Station bias:** If a bias depends only on a station and a particular GNSS, STATION should be filled and SVN/PRN should have the system code only (e.g. "G", "R", "E", "C").

- **Satellite-station bias:** If a bias depends on both satellite and station, all three fields, SVN/PRN/STATION, should be used.

- **System bias:** If a bias depends only on a particular GNSS, SVN/PRN should have the system code only (e.g. "G", "R", "E", "C").

Examples for the four cases (listed above) may look like:

```
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 DSB  G063 G01           C1W  C1C  2015:276:00000 2015:276:86399 ns   0.148022937908458E+01 .398201E-01
 ISB  C    C    ABMF     C1I  C7I  2015:276:00000 2015:276:86399 ns   0.240909461328850E+02 .835246E+00
 ISB  R730 R01  AUCK     C1P  C2P  2015:276:00000 2015:276:86399 ns   0.104868834341878E+02 .101419E+01
 ISB  G    G              C1W  C2W  2015:276:00000 2015:276:86399 ns   0.000000000000000E+00 .000000E+00
-BIAS/SOLUTION
*-------------------------------------------------------------------------------
```

5.3. Order of BIAS/SOLUTION Data Records

BIAS/SOLUTION data records may be listed in any arbitrary order. However, we recommend to list the included bias parameters starting with those responding to (i) system, (ii) satellite, (iii) receiver, (iv) satellite-receiver, (v) other. Furthermore, to keep the bias parameters in chronological (and alphabetical) order may be helpful.

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5.4. Definition of GNSS Receiver Groups

The need for a possibility to define *receiver groups* (or families) came up during the discussions at the IGS Bias Workshop 2015. In order to handle satellite bias information specific to individual receiver (or station) groups, a dedicated (optional) SINEX block, BIAS/RECEIVER_INFORMATION, was added to Bias-SINEX V1.00.

If receivers are distinguished not for all constellations, then one could introduce either (a) an accumulative group name (e.g. "All") or (b) no group for such constellations. For better readability, variant (a) should be preferred.

Even though the SINEX_BIAS Format would allow to describe a *residual* satellite bias parameter, $\delta B_{\text{satellite(receiver\_group)}}$, following

$$B_{\text{total}} = B_{\text{satellite}} + \delta B_{\text{satellite(receiver\_information)}} + B_{\text{receiver}}, \tag{1}$$

the above given bias parameter representation should be avoided (as the separation of all components may become rather complicated). Based on receiver-group-specific satellite bias parameters, $B_{\text{satellite(receiver\_group)}}$, the total bias, B_{total}, should be represented as follows:

$$B_{\text{total}} = B_{\text{satellite(receiver\_group)}} + B_{\text{receiver}}. \tag{2}$$

6. Basic Definitions and Rules Concerning GNSS Biases

6.1. Sign Convention

The following sign convention is used for bias values:

$$\text{bias} = \text{observation} - \text{true (or unbiased) observation} \tag{3a}$$
$$\text{observation} = \text{true observation} + \text{bias} \tag{3b}$$
$$\text{true observation} = \text{observation} - \text{bias} \tag{3c}$$

Numerical example: ground truth 11, observed 7, bias (or error) -4.

6.2. Bias Arithmetics

In the following, B is used to address a bias value (or parameter). O denotes an observation value.

6.2.1. Basic Bias Equation

Using this notation, we may write:

$$\tilde{O}_{\text{true}} = O_{\text{observed}} - B. \tag{4}$$

6.2.2. Satellite and Receiver Bias Components (and Total Bias)

The **total bias** (or overall bias), if a separation into a satellite component, $B_{\text{satellite}}$, and into a receiver component, B_{receiver}, is assumed, is defined as follows:

$$B_{\text{total}} = B_{\text{satellite}} + B_{\text{receiver}} \tag{5}$$

6.2.3. GNSS Signal Bias

We use the following notation to address a GNSS signal bias:

$$B_{(\text{constellation,observable})}. \tag{6}$$

For example, $B_{(\text{G,C1W})}$ would correspond to a bias for the GPS (G) code (C) first-frequency (1) W-tracking (W) observable.

6.3. Three Types of Signal Biases

We distinguish between three types of signal biases:

- **Observable-specific Signal Bias**, labeled with **OSB**, or $B_{\text{O(constellation,observable)}}$;

- **Differential Signal Bias**, labeled with **DSB**, or $B_{\text{D(constellation,observable1,observable2)}}$;

- **Ionosphere-free linear combination Signal Bias**, or simply **Ionosphere-free Signal Bias**, labeled with **ISB**, or $B_{\text{I(constellation,observable1,observable2)}}$.

The originally used term "Code" (present in the widely used acronym DCB) was replaced by "Signal" (thus leading to DSB) as the SINEX_BIAS Format now also covers biases with respect to phase observations. The term "Signal" may be used to address both code and phase observations and biases, respectively.

For consistency reasons, the term "ionosphere-free (linear combination) Signal Bias" (ISB) was introduced. This ISB may be interpreted as a generalization of the widely established "Inter-System Bias" (also abbreviated with ISB). Following the new, generalized ISB interpretation, a satellite bias component is also admitted by our bias model (in addition to the station bias component as described by the existing ISB interpretation). This means that a station ISB may be interpreted—independently of the terminology complied with—still in the same way.

6.3.1. Differential Signal Bias (DSB)

A Differential Signal Bias corresponds to the difference of two Signal Biases (that are commonly inaccessible in the absolute sense). An example for a DSB is:

$$B_{\text{D(G,C1W,C1C)}} = B_{(\text{G,C1W})} - B_{(\text{G,C1C})} \tag{7}$$

Using Equation (7), we may show that direct estimation of $B_{\mathrm{D(G,C1W,C1C)}}$ is possible by analyzing the difference of $O_{\mathrm{(G,C1W)}}$ and $O_{\mathrm{(G,C1C)}}$ observation data:

$$B_{\mathrm{D(G,C1W,C1C)}} = (O_{\mathrm{(G,C1W)}} - \tilde{O}_{\mathrm{(G,C1)}}) - (O_{\mathrm{(G,C1C)}} - \tilde{O}_{\mathrm{(G,C1)}}) = O_{\mathrm{(G,C1W)}} - O_{\mathrm{(G,C1C)}} \tag{8}$$

where $\tilde{O}_{\mathrm{(G,C1)}}$ is used to denote the true (or unbiased) observations.

Such a DSB correction may be applied in the following way:

$$O_{\mathrm{(G,C1W)}} = O_{\mathrm{(G,C1C)}} + B_{\mathrm{D(G,C1W,C1C)}} \tag{9}$$

Differential Signal Biases between different signal frequencies are, of course, also foreseen, e.g.:

$$B_{\mathrm{D(G,C1W,C2W)}} = B_{\mathrm{(G,C1W)}} - B_{\mathrm{(G,C2W)}}. \tag{10}$$

6.3.2. Ionosphere-free Signal Bias (ISB)

The Ionosphere-free Signal Bias (ISB) has to be interpreted as

$$B_{\mathrm{I(G,C1W,C2W)}} = \kappa_1 B_{\mathrm{(G,C1W)}} + \kappa_2 B_{\mathrm{(G,C2W)}}, \tag{11}$$

where κ_1 and κ_2 are the two factor used for the computation of the ionosphere-free linear combination. To be more specific, $\kappa_1 = \nu_1^2/(\nu_1^2 - \nu_2^2) = 2.546$, $\kappa_2 = -\nu_2^2/(\nu_1^2 - \nu_2^2) = -1.546$ (for GPS); ν_i is the frequency of the i-th carrier. GPS C1W and C2W observables are assumed in this example.

6.3.3. Observable-specific Signal Bias (OSB)

Using Equations (11) and (10) we may write the following equation system:

$$B_{\mathrm{I(G,C1W,C2W)}} = \kappa_1 B_{\mathrm{O(G,C1W)}} + \kappa_2 B_{\mathrm{O(G,C2W)}} \tag{12a}$$

$$B_{\mathrm{D(G,C1W,C2W)}} = B_{\mathrm{O(G,C1W)}} - B_{\mathrm{O(G,C2W)}} \tag{12b}$$

The first equation describes the relationship of the Observable-specific Signal Biases (OSBs), $B_{\mathrm{O(G,C1W)}}$ and $B_{\mathrm{O(G,C2W)}}$, for the ionosphere-free case (clock analysis), the second equation in accordance with the geometry-free case (ionosphere analysis). The equation system describes the parameter transformation from OSB to ISB/DSB bias representation.

The inverse parameter transformation, from differential (relative) ISB/DSB to observable-specific (pseudo-absolute) OSB, may be derived by inversion of the matrix specified above:

$$B_{\mathrm{O(G,C1W)}} = B_{\mathrm{I(G,C1W,C2W)}} + \kappa_2 B_{\mathrm{D(G,C1W,C2W)}} \tag{13a}$$

$$B_{\mathrm{O(G,C2W)}} = B_{\mathrm{I(G,C1W,C2W)}} - \kappa_1 B_{\mathrm{D(G,C1W,C2W)}}. \tag{13b}$$

Let us give a numerical example. The following OSB values, $B_{\mathrm{O(G,C1W)}} = +10.73\,\mathrm{ns}$ and $B_{\mathrm{O(G,C2W)}} = +15.73\,\mathrm{ns}$, are conform to the following ISB/DSB values, $B_{\mathrm{I(G,C1W,C2W)}} = +3\,\mathrm{ns}$ and $B_{\mathrm{D(G,C1W,C2W)}} = -5\,\mathrm{ns}$.

For a user, consideration of an OSB bias correction would be very convenient, as just the observable type has to be known, e.g.:

$$O_{\mathrm{(G,C1(ref))}} = O'_{\mathrm{(G,C1)}} = O_{\mathrm{(G,C1C)}} - B_{\mathrm{O(G,C1C)}}, \tag{14}$$

where, assuming GPS C1W/C2W reference observables, $O'_{\mathrm{(G,C1)}} = O_{\mathrm{(G,C1W)}} - B_{\mathrm{O(G,C1W)}}$.

A reader of this document should be aware of the fact that GNSS Signal Biases are commonly inaccessible in the *absolute* sense. This implies that, taking the example with $B_{\mathrm{O(G,C1C)}}$, $B_{\mathrm{O(G,C1C)}} \neq B_{\mathrm{(G,C1C)}}$, meaning that that any OSB, B_{O}, may be expected to be shifted by an arbitrary offset, ΔB, with respect to the (commonly unavailable and thus unknown) true bias, B:

$$B = B_{\mathrm{O}} + \Delta B. \tag{15}$$

Therefore, Observable-specific Signal Biases B_{O} have to be interpreted as *pseudo-absolute* bias information.

The same is obviously also valid for: $O' \neq \tilde{O}$. To be more specific, OSB-corrected observations are **not** conforming with true observations, meaning that, for the above chosen example, $O'_{\mathrm{(G,C1)}} \neq \tilde{O}_{\mathrm{(G,C1)}}$.

Important Notes:

For *pseudo-absolute* bias values, the selection of the reference observables is absolutely essential.

- **Pro:** A user may just consider bias correction values specific to the given observable types.

- **Con:** OSB-corrected observations are consistent to the original definition of the reference observables—and, consequently, consistent to a GNSS clock product relying on the same definition.

6.4. GPS Group Delay

It is worth mentioning that Equation (13a) actually corresponds to the relationship between the interfrequency "group delays," τ_{GD}, broadcast by the GPS system and the interfrequency satellite DSB, $B_{\mathrm{(G,C1W,C2W)}}$:

$$\tau_{\mathrm{GD}} = \kappa_2\, B_{\mathrm{(G,C1W,C2W)}} + \tau_0. \tag{16}$$

There may be an arbitrary offset, indicated by τ_0. Consequently, the size of τ_{GD} corresponds to the single-frequency pseudorange correction according to Equation (13a) (strictly speaking only for $O_{\mathrm{(G,C1W)}}$, not for $O_{\mathrm{(G,C1C)}}$ observations, assuming GPS satellite clock information being consistent to $B_{\mathrm{I(G,C1W,C2W)}} = 0$.

6.5. Datum Definition for ISB Bias Parameters in Multi-GNSS Clock Analysis

ISB bias parameters of more than one GNSS considered are directly connected with respect to each other. A clear definition of the ISB bias datum is therefore needed. As a consequence of this, we suggest that those receiver ISB bias parameters which are assumed to be zero must be explicitly included and listed in a SINEX_BIAS file (see, e.g., Examples 0, 2B, 3B, 4B, 5, 7B). Note that this should concern all ISB bias parameters with respect to the given "RECEIVER_CLOCK_REFERENCE_GNSS" and stations/receivers with the given "SATELLITE_CLOCK_REFERENCE_OBSERVABLES" (of that reference system). Last but not least, we may argue that the inclusion of "zero-valued", or "reference" receiver ISB bias parameters is not only a cosmetic issue. To have corresponding "reference" observable codes available (for the respective observation pair used) and to see whether a respective observation pair was actually used, respectively, are strong reasons that legitimate this requirement (of inclusion).

There seems to be no necessity for an inclusion of corresponding "reference" satellite ISB bias parameters. Nevertheless, the provision of corresponding satellite ISB information in SINEX_BIAS is self-evident and, therefore, actually may be strongly recommended— as the datum definition as imposed on the bias solution then becomes crystal-clear to a user of such a bias product. This is achieved, by the way, for all satellite ISB involving examples included in Appendix A (Examples 1B, 2B, 3B, 4B, 5, 7B).

6.6. GPS Observables From Cross-Correlation Receivers in RINEX2 and CC2NONCC

Cross-correlation receivers (or simply CC-receivers) provide under Antispoofing (AS) a particular code (or pseudorange) observable for the second frequency. Using the RINEX2 notation, the recorded observable, here called P2', may be written as:

$$P2' = C1 + (P2 - P1) \tag{17}$$

However, such observables are labeled in RINEX2 observation files with P2 (in RINEX3 unambiguously with C2D). It is therefore necessary to apply corresponding DSB corrections to C1 and P2' (in order to make them consistent to P1 and P2):

$$P1 = C1 + B_{\text{P1-C1}} \tag{18a}$$
$$P2 = P2' + B_{\text{P1-C1}} \tag{18b}$$

where $B_{\text{P1-C1}}$ denotes the satellite P1-C1 DSB information (as provided, e.g, by CODE [Schaer, 2001]).

CC2NONCC, originally developed by Jim Ray, was a RINEX2 observation conversion utility for exactly this (P1–C1) bias correction. This utility program should no longer be used. P1–C1 bias information should be considered directly by the analysis software.

It should be emphasized that IGS ACs processing RINEX2 observation files (e.g. as part of a reprocessing effort) are actually forced to consider the list of concerned CC-receivers from a separate metadata file.

The list of known cross-correlation (CC) receivers (following the IGS naming convention as given in `rcvr_ant.tab`) includes:

```
AOA ICS-4000Z
ROGUE SNR-12
ROGUE SNR-12 RM
ROGUE SNR-8
ROGUE SNR-800
ROGUE SNR-8000
ROGUE SNR-8100
ROGUE SNR-8C
SPP GEOTRACER100
TOPCON GP-DX1
TOPCON TT4000SSI
TRIMBLE 4000SSE
TRIMBLE 4000SSI
TRIMBLE 4000SST
```

When using a wildcard character "*", the CC-receiver list may be reduced to:

```
AOA ICS-4000Z
ROGUE*
SPP GEOTRACER100
TOPCON GP-DX1
TOPCON TT4000SSI
TRIMBLE 4000SS*
```

CC-receivers behave differently if Antispoofing (AS) is turned off. Instead of C1/P2', P1/P2 may be expected. For this reason, a list of AS-free periods might be useful (especially for reprocessings):

```
! Check whether time argument in a AS-free period
! ---------------------------------------------
  IF ((mjd >           0d0 .AND. mjd < 49383.00000d0) .OR. &
      (mjd > 49826.87499d0 .AND. mjd < 49847.83334d0) .OR. &
      (mjd > 49886.99999d0 .AND. mjd < 49909.00002d0) .OR. &
      (mjd > 49999.99999d0 .AND. mjd < 50022.00001d0) .OR. &
      (mjd > 50480.99999d0 .AND. mjd < 50503.00000d0)) THEN
    asmode = 0
  ENDIF
```

7. How to Use a SINEX_BIAS File?

(Here, a corresponding section will be added, summarizing the most important steps when using the information from a SINEX_BIAS file.)

8. Additional Remarks

8.1. "_X" Observable Issue

RINEX3 includes a clear definition of 3-character observable codes with respect to each supported GNSS system. However, one may have a suspicion that some receiver manufacturer misuse the third character of the corresponding RINEX3 observable code, i.e., they give an "X", independent of the tracking mode that was effectively used.

It will be one of the tasks for the IGS Bias and Calibration Working Group (BCWG) to identify such cases of misuse.

8.2. How to handle known GNSS observables with unknown tracking mode?

In the extreme case, one could think about treating affected observables in a **receiver-group** or even in a **GLONASS-like** mode, where pseudorange biases are treated **satellite-receiver-group-specific** and **satellite-receiver-specific**, respectively.

References

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RINEX: The Receiver Independent Exchange Format Version 3.03: ftp://igscb.jpl.nasa.gov/igscb/data/format/rinex303.pdf

RINEX Extensions to Handle Clock Information Version 3.00/3.02: ftp://igscb.jpl.nasa.gov/igscb/data/format/rinex_clock300.txt ftp://igscb.jpl.nasa.gov/igscb/data/format/rinex_clock302.txt

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Appendix A Examples for Submissions of Bias Estimates in Bias-SINEX V1.00

The Bias-SINEX V1.00 example files included in extracts in this appendix may be shortly characterized as follows:

EXAMPLE_0.BIA: 2-GNSS (G/E) receiver ISB product from **clock analysis**.

EXAMPLE_1A.BIA: 2-GNSS (G/R) satellite OSB product from combined (clock and ionosphere) analysis.

EXAMPLE_1B.BIA: 2-GNSS (G/R) satellite ISB/DSB product from combined (clock and ionosphere) analysis.

EXAMPLE_2A.BIA: 2-GNSS (G/R) satellite and receiver OSB product from combined (clock and ionosphere) analysis.

EXAMPLE_2B.BIA: 2-GNSS (G/R) satellite and receiver ISB/DSB product from combined (clock and ionosphere) analysis.

EXAMPLE_3A.BIA: 2-GNSS (G/R) satellite and receiver OSB product from combined (clock and ionosphere) analysis (using a refined bias model for GLONASS).

EXAMPLE_3B.BIA: 2-GNSS (G/R) satellite and receiver ISB/DSB product from combined (clock and ionosphere) analysis (using a refined bias model for GLONASS).

EXAMPLE_4A.BIA: 4-GNSS (G/R/E/C) satellite and receiver OSB product from combined (clock and ionosphere) analysis.

EXAMPLE_4B.BIA: 4-GNSS (G/R/E/C) satellite and receiver ISB/DSB product from combined (clock and ionosphere) analysis.

EXAMPLE_5.BIA: 4-GNSS (G/R/E/C) satellite and receiver ISB/DSB product from **clock analysis**.

EXAMPLE_6.BIA: 4-GNSS (G/R/E/C) satellite and receiver DSB product from **ionosphere analysis**.

EXAMPLE_7A.BIA: 4-GNSS (G/R/E/C) satellite and receiver OSB product from combined (clock and ionosphere) analysis (using a refined bias model for GLONASS).

EXAMPLE_7B.BIA: 4-GNSS (G/R/E/C) satellite and receiver ISB/DSB product from combined (clock and ionosphere) analysis (using a refined bias model for GLONASS).

EXAMPLE_8.BIA: 4-GNSS (G(R/E/C) satellite and receiver DSB product from **inter-frequency** (and intra-frequency) **bias estimation** (computed at DLR).

All examples included in this appendix are available as plain text files at:

`ftp://ftp.aiub.unibe.ch/bcwg/format/examples/`

Note that all *relative* (DSB/ISB) bias examples provided by CODE are directly derived from *absolute* (OSB) bias files. No further transformations with respect to datum definition are applied.

A.1 Example 0: Original Bias-SINEX V0.01 Example Updated to V1.00 Standards

```
%=BIA 1.00 PF2 2011:180:59736 PF2 2011:113:86385 2011:114:86385 R 00000024
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
+FILE/REFERENCE
 REFERENCE FRAME     IGS08
 DESCRIPTION         European Space Operation Center (ESOC)
 INPUT               ESOC solutions in normal equation format
 OUTPUT              ESOC solutions in Bias-SINEX format
 CONTACT             Tim.Springer@esa.int.nospam
 HARDWARE            Linux dgnl2 2.6.27.19-5-default #1 SMP 2009-02-28 04:40:21
 SOFTWARE            Napeos 3.6 TAS 07/06/2011
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                         300
 PARAMETER_SPACING                            86400
 DETERMINATION_METHOD                CLOCK_ANALYSIS
 BIAS_MODE                          RELATIVE
 TIME_SYSTEM                        G
 RECEIVER_CLOCK_REFERENCE_GNSS       G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  E  C1C  C7Q
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G    G   GIEN      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GKIR      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GKOU      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GLPG      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GMAL      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GMIZ      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GNNO      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GNOR      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GOUS      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GTHT      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GUSN      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  G    G   GVES      C1W  C2W  2011:113:86385 2011:115:00285 ns    0.000000000000000E+00 .000000E+00
 ISB  E    E   GIEN      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.157174143960592E+03 .259286E+02
 ISB  E    E   GKIR      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.153942459345551E+03 .259286E+02
 ISB  E    E   GKOU      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.163243805130824E+03 .259285E+02
 ISB  E    E   GLPG      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.151698143836368E+03 .259290E+02
 ISB  E    E   GMAL      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.156472089904428E+03 .259285E+02
 ISB  E    E   GMIZ      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.167156432084244E+03 .259321E+02
 ISB  E    E   GNNO      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.156922861008147E+03 .259665E+02
 ISB  E    E   GNOR      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.153679440866705E+03 .259285E+02
 ISB  E    E   GOUS      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.101593337222667E+03 .259439E+02
 ISB  E    E   GTHT      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.159918985571303E+03 .259356E+02
 ISB  E    E   GUSN      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.149146613879327E+03 .259279E+02
 ISB  E    E   GVES      C1C  C7Q  2011:113:86385 2011:115:00285 ns    -.156221372596643E+03 .259288E+02
-BIAS/SOLUTION
*-------------------------------------------------------------------------------
%=ENDBIA
```

A.2 Example 1: GPS/GLONASS 30-Day Bias Results for the Satellite Constellations

Please note that the dublicated entries for GLONASS satellite R802/R09 are due to a frequency switch that took place during this particular 30-day period.

A.2.1 Example 1A: GPS/GLONASS 30-Day Bias Results Using Absolute Parameter Representation

```
%=BIA 1.00 COD 2016:327:30548 IGS 2016:296:00000 2016:333:00000 A 00000194
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S 30-DAY BIAS SOLUTION (OBSERVED UNTIL 2016:325)          22-NOV-16 08:28
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____ INFO_____
 DESCRIPTION       CODE, Astronomical Institute, University of Bern
 OUTPUT            CODE IGS 30-day bias solution for G/R satellites
 CONTACT           code@aiub.unibe.ch
 SOFTWARE          Bernese GNSS Software Version 5.3
 HARDWARE          UBELIX: Linux, x86_64
 INPUT             CODE IGS 1-day final and rapid bias solutions for G/R
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                    300
 PARAMETER_SPACING                       86400
 DETERMINATION_METHOD                    COMBINED_ANALYSIS
 BIAS_MODE                               ABSOLUTE
 TIME_SYSTEM                             G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   R  C1P  C2P
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 OSB  G063 G01           C1C       2016:296:00000 2016:333:00000 ns             10.2472        0.0062
 OSB  G063 G01           C1W       2016:296:00000 2016:333:00000 ns             11.6848        0.0052
 OSB  G063 G01           C2C       2016:296:00000 2016:333:00000 ns             10.4707        0.0218
 OSB  G063 G01           C2W       2016:296:00000 2016:333:00000 ns             19.2442        0.0066
 OSB  G061 G02           C1C       2016:296:00000 2016:333:00000 ns            -12.8012        0.0063
 OSB  G061 G02           C1W       2016:296:00000 2016:333:00000 ns            -14.0674        0.0052
 OSB  G061 G02           C2W       2016:296:00000 2016:333:00000 ns            -23.1682        0.0067
 OSB  G069 G03           C1C       2016:296:00000 2016:333:00000 ns              6.6195        0.0062
 OSB  G069 G03           C1W       2016:296:00000 2016:333:00000 ns              7.9813        0.0052
 OSB  G069 G03           C2C       2016:296:00000 2016:333:00000 ns              6.8733        0.0216
 OSB  G069 G03           C2W       2016:296:00000 2016:333:00000 ns             13.1448        0.0066
 ...
 OSB  G064 G30           C1C       2016:296:00000 2016:333:00000 ns             10.2746        0.0062
 OSB  G064 G30           C1W       2016:296:00000 2016:333:00000 ns              9.8828        0.0051
 OSB  G064 G30           C2C       2016:296:00000 2016:333:00000 ns              9.9357        0.0226
 OSB  G064 G30           C2W       2016:296:00000 2016:333:00000 ns             16.2764        0.0065
 OSB  G052 G31           C1C       2016:296:00000 2016:333:00000 ns             -8.0699        0.0063
 OSB  G052 G31           C1W       2016:296:00000 2016:333:00000 ns             -7.1540        0.0052
 OSB  G052 G31           C2C       2016:296:00000 2016:305:00000 ns            -19.1332        0.0598
 OSB  G052 G31           C2W       2016:296:00000 2016:333:00000 ns            -11.7822        0.0067
 OSB  G070 G32           C1C       2016:296:00000 2016:333:00000 ns              5.3363        0.0063
 OSB  G070 G32           C1W       2016:296:00000 2016:333:00000 ns              6.8952        0.0052
 OSB  G070 G32           C2C       2016:296:00000 2016:333:00000 ns              4.9872        0.0246
```

```
OSB  G070 G32        C2W    2016:296:00000 2016:333:00000 ns             11.3560   0.0066
OSB  R730 R01        C1C    2016:296:00000 2016:333:00000 ns              8.9156   0.0071
OSB  R730 R01        C1P    2016:296:00000 2016:333:00000 ns              9.0864   0.0055
OSB  R730 R01        C2P    2016:296:00000 2016:333:00000 ns             15.0203   0.0074
OSB  R747 R02        C1C    2016:296:00000 2016:333:00000 ns             -0.0239   0.0070
OSB  R747 R02        C1P    2016:296:00000 2016:333:00000 ns              0.8287   0.0055
OSB  R747 R02        C2P    2016:296:00000 2016:333:00000 ns              1.3699   0.0073
OSB  R744 R03        C1C    2016:296:00000 2016:333:00000 ns             -4.1631   0.0070
OSB  R744 R03        C1P    2016:296:00000 2016:333:00000 ns             -5.5382   0.0055
OSB  R744 R03        C2P    2016:296:00000 2016:333:00000 ns             -9.1550   0.0073
...
OSB  R802 R09        C1C    2016:296:00000 2016:312:00000 ns             -5.8091   0.0085
OSB  R802 R09        C1C    2016:323:00000 2016:333:00000 ns             -5.5794   0.0556
OSB  R802 R09        C1P    2016:296:00000 2016:312:00000 ns             -4.2120   0.0063
OSB  R802 R09        C1P    2016:323:00000 2016:333:00000 ns             -5.0339   0.0291
OSB  R802 R09        C2P    2016:296:00000 2016:312:00000 ns             -6.9627   0.0089
OSB  R802 R09        C2P    2016:323:00000 2016:333:00000 ns             -8.3213   0.0478
...
OSB  R731 R22        C1C    2016:296:00000 2016:333:00000 ns              1.1425   0.0070
OSB  R731 R22        C1P    2016:296:00000 2016:333:00000 ns              1.3014   0.0055
OSB  R731 R22        C2P    2016:296:00000 2016:333:00000 ns              2.1513   0.0073
OSB  R732 R23        C1C    2016:296:00000 2016:333:00000 ns             12.8989   0.0070
OSB  R732 R23        C1P    2016:296:00000 2016:333:00000 ns             11.4900   0.0055
OSB  R732 R23        C2P    2016:296:00000 2016:333:00000 ns             18.9937   0.0073
OSB  R735 R24        C1C    2016:296:00000 2016:333:00000 ns             -7.5262   0.0072
OSB  R735 R24        C1P    2016:296:00000 2016:333:00000 ns             -8.2674   0.0056
OSB  R735 R24        C2C    2016:296:00000 2016:323:00000 ns              4.5014   0.2309
OSB  R735 R24        C2P    2016:296:00000 2016:333:00000 ns            -13.6665   0.0075
OSB  R801 R26        C1P    2016:296:00000 2016:333:00000 ns             -0.2722   0.0158
OSB  R801 R26        C2P    2016:296:00000 2016:333:00000 ns             -0.4500   0.0256
-BIAS/SOLUTION
%=ENDBIA
```

A.2.2 Example 1B: GPS/GLONASS 30-Day Bias Results Using Relative Parameter Representation

```
%=BIA 1.00 COD 2016:327:30548 IGS 2016:296:00000 2016:333:00000 R 00000194
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S 30-DAY BIAS SOLUTION (OBSERVED UNTIL 2016:325)        22-NOV-16 08:28
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS 30-day bias solution for G/R satellites
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS 1-day final and rapid bias solutions for G/R
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____  VALUE(S)_____
 OBSERVATION_SAMPLING                          300
 PARAMETER_SPACING                           86400
 DETERMINATION_METHOD                     COMBINED_ANALYSIS
 BIAS_MODE                                RELATIVE
 TIME_SYSTEM                              G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES    G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES    R  C1P  C2P
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
```

```
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB G063 G01          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G063 G01          C1W  C1C  2016:296:00000 2016:333:00000 ns                1.4376      0.0081
 DSB G063 G01          C2W  C2C  2016:296:00000 2016:333:00000 ns                8.7736      0.0228
 DSB G063 G01          C1W  C2W  2016:296:00000 2016:333:00000 ns               -7.5594      0.0084
 ISB G061 G02          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G061 G02          C1W  C1C  2016:296:00000 2016:333:00000 ns               -1.2662      0.0082
 DSB G061 G02          C1W  C2W  2016:296:00000 2016:333:00000 ns                9.1008      0.0085
 ISB G069 G03          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G069 G03          C1W  C1C  2016:296:00000 2016:333:00000 ns                1.3618      0.0081
 DSB G069 G03          C2W  C2C  2016:296:00000 2016:333:00000 ns                6.2715      0.0226
 DSB G069 G03          C1W  C2W  2016:296:00000 2016:333:00000 ns               -5.1635      0.0084
 ...
 ISB G064 G30          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G064 G30          C1W  C1C  2016:296:00000 2016:333:00000 ns               -0.3918      0.0081
 DSB G064 G30          C2W  C2C  2016:296:00000 2016:333:00000 ns                6.3406      0.0235
 DSB G064 G30          C1W  C2W  2016:296:00000 2016:333:00000 ns               -6.3936      0.0083
 ISB G052 G31          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G052 G31          C1W  C1C  2016:296:00000 2016:333:00000 ns                0.9159      0.0082
 DSB G052 G31          C2W  C2C  2016:296:00000 2016:305:00000 ns                7.3510      0.0602
 DSB G052 G31          C1W  C2W  2016:296:00000 2016:333:00000 ns                4.6282      0.0085
 ISB G070 G32          C1W  C2W  2016:296:00000 2016:333:00000 ns                     0           0
 DSB G070 G32          C1W  C1C  2016:296:00000 2016:333:00000 ns                1.5589      0.0082
 DSB G070 G32          C2W  C2C  2016:296:00000 2016:333:00000 ns                6.3687      0.0255
 DSB G070 G32          C1W  C2W  2016:296:00000 2016:333:00000 ns               -4.4608      0.0084
 ISB R730 R01          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R730 R01          C1P  C1C  2016:296:00000 2016:333:00000 ns                0.1707      0.0090
 DSB R730 R01          C1P  C2P  2016:296:00000 2016:333:00000 ns               -5.9339      0.0092
 ISB R747 R02          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R747 R02          C1P  C1C  2016:296:00000 2016:333:00000 ns                0.8526      0.0089
 DSB R747 R02          C1P  C2P  2016:296:00000 2016:333:00000 ns               -0.5412      0.0091
 ISB R744 R03          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R744 R03          C1P  C1C  2016:296:00000 2016:333:00000 ns               -1.3751      0.0089
 DSB R744 R03          C1P  C2P  2016:296:00000 2016:333:00000 ns                3.6168      0.0091
 ...
 ISB R802 R09          C1P  C2P  2016:296:00000 2016:312:00000 ns                     0           0
 ISB R802 R09          C1P  C2P  2016:323:00000 2016:333:00000 ns                     0           0
 DSB R802 R09          C1P  C1C  2016:296:00000 2016:312:00000 ns                1.5971      0.0105
 DSB R802 R09          C1P  C1C  2016:323:00000 2016:333:00000 ns                0.5455      0.0627
 DSB R802 R09          C1P  C2P  2016:296:00000 2016:312:00000 ns                2.7507      0.0109
 DSB R802 R09          C1P  C2P  2016:323:00000 2016:333:00000 ns                3.2874      0.0559
 ...
 ISB R731 R22          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R731 R22          C1P  C1C  2016:296:00000 2016:333:00000 ns                0.1589      0.0089
 DSB R731 R22          C1P  C2P  2016:296:00000 2016:333:00000 ns               -0.8499      0.0091
 ISB R732 R23          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R732 R23          C1P  C1C  2016:296:00000 2016:333:00000 ns               -1.4089      0.0089
 DSB R732 R23          C1P  C2P  2016:296:00000 2016:333:00000 ns               -7.5037      0.0091
 ISB R735 R24          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R735 R24          C1P  C1C  2016:296:00000 2016:333:00000 ns               -0.7412      0.0091
 DSB R735 R24          C2P  C2C  2016:296:00000 2016:323:00000 ns              -18.1679      0.2311
 DSB R735 R24          C1P  C2P  2016:296:00000 2016:333:00000 ns                5.3991      0.0093
 ISB R801 R26          C1P  C2P  2016:296:00000 2016:333:00000 ns                     0           0
 DSB R801 R26          C1P  C2P  2016:296:00000 2016:333:00000 ns                0.1778      0.0301
-BIAS/SOLUTION
%=ENDBIA
```

A.3 Example 2: GPS/GLONASS 1-Day Bias Results for the Satellites and Stations

This is an example, where the GLONASS biases are treated in a GPS-like manner (composed of a station and a satellite component).

Note: More than two observable types (per GNSS) are considered for the stations: IRKJ (R), MORP (G), NOVM (R), STHL (G), UNB3 (R), YSSK (G).

A.3.1 Example 2A: GPS/GLONASS 1-Day Bias Results Using Absolute Parameter Representation

```
%=BIA 1.00 COD 2016:327:06748 IGS 2016:323:00000 2016:324:00000 A 00001078
```

```
*-------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------
* CODE'S BIAS COMBINATION RESULTS FOR DAY 323, 2016            22-NOV-16 01:51
*-------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____ INFO_____
 DESCRIPTION       CODE, Astronomical Institute, University of Bern
 OUTPUT            CODE IGS 1-day final bias solution for G/R
 CONTACT           code@aiub.unibe.ch
 SOFTWARE          Bernese GNSS Software Version 5.3
 HARDWARE          UBELIX: Linux, x86_64
 INPUT             CODE IGS 1-day final bias solution for G/R
-FILE/REFERENCE
*-------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*-------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                        300
 PARAMETER_SPACING                           86400
 DETERMINATION_METHOD                   COMBINED_ANALYSIS
 BIAS_MODE                              ABSOLUTE
 TIME_SYSTEM                            G
 RECEIVER_CLOCK_REFERENCE_GNSS          G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  R  C1P  C2P
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 OSB  G063 G01          C1C       2016:323:00000 2016:324:00000 ns            10.2669         0.0257
 OSB  G063 G01          C1W       2016:323:00000 2016:324:00000 ns            11.7118         0.0174
 OSB  G063 G01          C2C       2016:323:00000 2016:324:00000 ns             1.4388         0.1059
 OSB  G063 G01          C2W       2016:323:00000 2016:324:00000 ns            19.2886         0.0281
 OSB  G061 G02          C1C       2016:323:00000 2016:324:00000 ns           -12.9423         0.0261
 OSB  G061 G02          C1W       2016:323:00000 2016:324:00000 ns           -14.1561         0.0176
 OSB  G061 G02          C2W       2016:323:00000 2016:324:00000 ns           -23.3143         0.0286
 OSB  G069 G03          C1C       2016:323:00000 2016:324:00000 ns             6.7186         0.0255
 OSB  G069 G03          C1W       2016:323:00000 2016:324:00000 ns             8.0486         0.0173
 OSB  G069 G03          C2C       2016:323:00000 2016:324:00000 ns            -2.0569         0.1068
 OSB  G069 G03          C2W       2016:323:00000 2016:324:00000 ns            13.2556         0.0279
 ...
 OSB  G064 G30          C1C       2016:323:00000 2016:324:00000 ns            10.0846         0.0253
 OSB  G064 G30          C1W       2016:323:00000 2016:324:00000 ns             9.7220         0.0171
 OSB  G064 G30          C2C       2016:323:00000 2016:324:00000 ns             0.8388         0.1169
 OSB  G064 G30          C2W       2016:323:00000 2016:324:00000 ns            16.0116         0.0276
 OSB  G052 G31          C1C       2016:323:00000 2016:324:00000 ns            -7.9979         0.0262
 OSB  G052 G31          C1W       2016:323:00000 2016:324:00000 ns            -7.1772         0.0177
 OSB  G052 G31          C2W       2016:323:00000 2016:324:00000 ns           -11.8205         0.0287
 OSB  G070 G32          C1C       2016:323:00000 2016:324:00000 ns             5.3521         0.0259
 OSB  G070 G32          C1W       2016:323:00000 2016:324:00000 ns             6.8831         0.0175
 OSB  G070 G32          C2C       2016:323:00000 2016:324:00000 ns            -4.2246         0.1270
 OSB  G070 G32          C2W       2016:323:00000 2016:324:00000 ns            11.3361         0.0284
 OSB  R730 R01          C1C       2016:323:00000 2016:324:00000 ns             8.3904         0.0295
 OSB  R730 R01          C1P       2016:323:00000 2016:324:00000 ns             8.7860         0.0197
 OSB  R730 R01          C2P       2016:323:00000 2016:324:00000 ns            14.5238         0.0322
 OSB  R747 R02          C1C       2016:323:00000 2016:324:00000 ns            -0.2074         0.0291
 OSB  R747 R02          C1P       2016:323:00000 2016:324:00000 ns             0.6427         0.0195
 OSB  R747 R02          C2P       2016:323:00000 2016:324:00000 ns             1.0624         0.0318
 OSB  R744 R03          C1C       2016:323:00000 2016:324:00000 ns            -4.2002         0.0295
 OSB  R744 R03          C1P       2016:323:00000 2016:324:00000 ns            -5.6064         0.0196
 OSB  R744 R03          C2P       2016:323:00000 2016:324:00000 ns            -9.2678         0.0320
 ...
 OSB  R731 R22          C1C       2016:323:00000 2016:324:00000 ns             1.1950         0.0295
 OSB  R731 R22          C1P       2016:323:00000 2016:324:00000 ns             1.3469         0.0197
 OSB  R731 R22          C2P       2016:323:00000 2016:324:00000 ns             2.2265         0.0321
 OSB  R732 R23          C1C       2016:323:00000 2016:324:00000 ns            12.5549         0.0293
 OSB  R732 R23          C1P       2016:323:00000 2016:324:00000 ns            11.2952         0.0196
 OSB  R732 R23          C2P       2016:323:00000 2016:324:00000 ns            18.6717         0.0319
 OSB  R735 R24          C1C       2016:323:00000 2016:324:00000 ns            -8.0778         0.0300
 OSB  R735 R24          C1P       2016:323:00000 2016:324:00000 ns            -8.6117         0.0200
```

```
OSB  R735 R24           C2P    2016:323:00000 2016:324:00000 ns            -14.2356     0.0326
OSB  R801 R26           C1P    2016:323:00000 2016:324:00000 ns             -0.5690     0.0892
OSB  R801 R26           C2P    2016:323:00000 2016:324:00000 ns             -0.9406     0.1474
OSB  G    G    ABPO     C1W    2016:323:00000 2016:324:00000 ns             10.7019     0.0819
OSB  G    G    ABPO     C2W    2016:323:00000 2016:324:00000 ns             17.6255     0.1348
OSB  G    G    ADIS     C1W    2016:323:00000 2016:324:00000 ns              3.8142     0.0732
OSB  G    G    ADIS     C2W    2016:323:00000 2016:324:00000 ns              6.2817     0.1206
OSB  R    R    ADIS     C1P    2016:323:00000 2016:324:00000 ns            -77.0195     0.1347
OSB  R    R    ADIS     C2P    2016:323:00000 2016:324:00000 ns            -66.8570     0.1687
OSB  G    G    ALBH     C1W    2016:323:00000 2016:324:00000 ns            -21.7009     0.0524
OSB  G    G    ALBH     C2W    2016:323:00000 2016:324:00000 ns            -35.7401     0.0863
OSB  R    R    ALBH     C1P    2016:323:00000 2016:324:00000 ns            -85.8706     0.1141
OSB  R    R    ALBH     C2P    2016:323:00000 2016:324:00000 ns           -106.5825     0.1355
...
OSB  G    G    IRKJ     C1W    2016:323:00000 2016:324:00000 ns             14.8010     0.0589
OSB  G    G    IRKJ     C2W    2016:323:00000 2016:324:00000 ns             24.3764     0.0970
OSB  R    R    IRKJ     C1C    2016:323:00000 2016:324:00000 ns            -65.2665     0.2023
OSB  R    R    IRKJ     C1P    2016:323:00000 2016:324:00000 ns            -62.7987     0.1241
OSB  R    R    IRKJ     C2P    2016:323:00000 2016:324:00000 ns            -53.0231     0.1512
...
OSB  G    G    MORP     C1C    2016:323:00000 2016:324:00000 ns             32.5085     0.0530
OSB  G    G    MORP     C2C    2016:323:00000 2016:324:00000 ns             69.8325     0.0750
OSB  G    G    MORP     C2W    2016:323:00000 2016:324:00000 ns             53.5396     0.0873
...
OSB  G    G    NOVM     C1W    2016:323:00000 2016:324:00000 ns              1.4209     0.0594
OSB  G    G    NOVM     C2W    2016:323:00000 2016:324:00000 ns              2.3402     0.0978
OSB  R    R    NOVM     C1C    2016:323:00000 2016:324:00000 ns            -82.7551     0.2011
OSB  R    R    NOVM     C1P    2016:323:00000 2016:324:00000 ns            -80.5400     0.1251
OSB  R    R    NOVM     C2P    2016:323:00000 2016:324:00000 ns            -79.8149     0.1524
...
OSB  G    G    STHL     C1C    2016:323:00000 2016:324:00000 ns            -10.7345     0.1696
OSB  G    G    STHL     C1W    2016:323:00000 2016:324:00000 ns            -14.6278     0.0723
OSB  G    G    STHL     C2W    2016:323:00000 2016:324:00000 ns            -24.0912     0.1190
OSB  R    R    STHL     C1P    2016:323:00000 2016:324:00000 ns            -84.9543     0.1303
OSB  R    R    STHL     C2P    2016:323:00000 2016:324:00000 ns            -95.6580     0.1646
...
OSB  G    G    UNB3     C1C    2016:323:00000 2016:324:00000 ns             17.9949     0.0531
OSB  G    G    UNB3     C2W    2016:323:00000 2016:324:00000 ns             29.6365     0.0875
OSB  R    R    UNB3     C1C    2016:323:00000 2016:324:00000 ns             28.8462     2.4819
OSB  R    R    UNB3     C1P    2016:323:00000 2016:324:00000 ns             24.8359     0.1144
OSB  R    R    UNB3     C2C    2016:323:00000 2016:324:00000 ns             25.3506     3.0497
OSB  R    R    UNB3     C2P    2016:323:00000 2016:324:00000 ns             35.5470     0.1367
...
OSB  G    G    YSSK     C1C    2016:323:00000 2016:324:00000 ns             21.5268     0.1774
OSB  G    G    YSSK     C1W    2016:323:00000 2016:324:00000 ns             21.8867     0.0579
OSB  G    G    YSSK     C2W    2016:323:00000 2016:324:00000 ns             36.0461     0.0953
...
OSB  G    G    ZIMJ     C1W    2016:323:00000 2016:324:00000 ns            -12.7744     0.0444
OSB  G    G    ZIMJ     C2W    2016:323:00000 2016:324:00000 ns            -21.0387     0.0731
OSB  R    R    ZIMJ     C1P    2016:323:00000 2016:324:00000 ns              8.8714     0.1162
OSB  R    R    ZIMJ     C2P    2016:323:00000 2016:324:00000 ns             23.0797     0.1350
OSB  G    G    ZIMM     C1C    2016:323:00000 2016:324:00000 ns             17.9427     0.0448
OSB  G    G    ZIMM     C2W    2016:323:00000 2016:324:00000 ns             29.5506     0.0738
OSB  G    G    ZWE2     C1W    2016:323:00000 2016:324:00000 ns             -0.3741     0.0469
OSB  G    G    ZWE2     C2W    2016:323:00000 2016:324:00000 ns             -0.6161     0.0771
-BIAS/SOLUTION
%=ENDBIA
```

A.3.2 Example 2B: GPS/GLONASS 1-Day Bias Results Using Relative Parameter Representation

```
%=BIA 1.00 COD 2016:327:06748 IGS 2016:323:00000 2016:324:00000 R 00001078
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S BIAS COMBINATION RESULTS FOR DAY 323, 2016              22-NOV-16 01:51
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS 1-day final bias solution for G/R
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS 1-day final bias solution for G/R
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
```

```
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*--------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*--------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                         300
 PARAMETER_SPACING                            86400
 DETERMINATION_METHOD                  COMBINED_ANALYSIS
 BIAS_MODE                             RELATIVE
 TIME_SYSTEM                           G
 RECEIVER_CLOCK_REFERENCE_GNSS         G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES R  C1P  C2P
-BIAS/DESCRIPTION
*--------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G063 G01           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G063 G01           C1W  C1C  2016:323:00000 2016:324:00000 ns                  1.4448      0.0310
 DSB  G063 G01           C2W  C2C  2016:323:00000 2016:324:00000 ns                 17.8498      0.1096
 DSB  G063 G01           C1W  C2W  2016:323:00000 2016:324:00000 ns                 -7.5769      0.0330
 ISB  G061 G02           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G061 G02           C1W  C1C  2016:323:00000 2016:324:00000 ns                 -1.2138      0.0315
 DSB  G061 G02           C1W  C2W  2016:323:00000 2016:324:00000 ns                  9.1582      0.0336
 ISB  G069 G03           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G069 G03           C1W  C1C  2016:323:00000 2016:324:00000 ns                  1.3300      0.0308
 DSB  G069 G03           C2W  C2C  2016:323:00000 2016:324:00000 ns                 15.3125      0.1104
 DSB  G069 G03           C1W  C2W  2016:323:00000 2016:324:00000 ns                 -5.2070      0.0328
 ...
 ISB  G064 G30           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G064 G30           C1W  C1C  2016:323:00000 2016:324:00000 ns                 -0.3626      0.0305
 DSB  G064 G30           C2W  C2C  2016:323:00000 2016:324:00000 ns                 15.1728      0.1201
 DSB  G064 G30           C1W  C2W  2016:323:00000 2016:324:00000 ns                 -6.2896      0.0325
 ISB  G052 G31           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G052 G31           C1W  C1C  2016:323:00000 2016:324:00000 ns                  0.8207      0.0316
 DSB  G052 G31           C1W  C2W  2016:323:00000 2016:324:00000 ns                  4.6433      0.0337
 ISB  G070 G32           C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G070 G32           C1W  C1C  2016:323:00000 2016:324:00000 ns                  1.5311      0.0313
 DSB  G070 G32           C2W  C2C  2016:323:00000 2016:324:00000 ns                 15.5608      0.1301
 DSB  G070 G32           C1W  C2W  2016:323:00000 2016:324:00000 ns                 -4.4530      0.0333
 ISB  R730 R01           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R730 R01           C1P  C1C  2016:323:00000 2016:324:00000 ns                  0.3956      0.0355
 DSB  R730 R01           C1P  C2P  2016:323:00000 2016:324:00000 ns                 -5.7378      0.0378
 ISB  R747 R02           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R747 R02           C1P  C1C  2016:323:00000 2016:324:00000 ns                  0.8501      0.0350
 DSB  R747 R02           C1P  C2P  2016:323:00000 2016:324:00000 ns                 -0.4197      0.0373
 ISB  R744 R03           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R744 R03           C1P  C1C  2016:323:00000 2016:324:00000 ns                 -1.4062      0.0354
 DSB  R744 R03           C1P  C2P  2016:323:00000 2016:324:00000 ns                  3.6613      0.0376
 ...
 ISB  R731 R22           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R731 R22           C1P  C1C  2016:323:00000 2016:324:00000 ns                  0.1519      0.0355
 DSB  R731 R22           C1P  C2P  2016:323:00000 2016:324:00000 ns                 -0.8796      0.0377
 ISB  R732 R23           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R732 R23           C1P  C1C  2016:323:00000 2016:324:00000 ns                 -1.2597      0.0352
 DSB  R732 R23           C1P  C2P  2016:323:00000 2016:324:00000 ns                 -7.3765      0.0374
 ISB  R735 R24           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R735 R24           C1P  C1C  2016:323:00000 2016:324:00000 ns                 -0.5339      0.0361
 DSB  R735 R24           C1P  C2P  2016:323:00000 2016:324:00000 ns                  5.6240      0.0382
 ISB  R801 R26           C1P  C2P  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  R801 R26           C1P  C2P  2016:323:00000 2016:324:00000 ns                  0.3716      0.1723
 ISB  G    G    ABPO     C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G    G    ABPO     C1W  C2W  2016:323:00000 2016:324:00000 ns                 -6.9236      0.1578
 ISB  G    G    ADIS     C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G    G    ADIS     C1W  C2W  2016:323:00000 2016:324:00000 ns                 -2.4675      0.1411
 ISB  R    R    ADIS     C1P  C2P  2016:323:00000 2016:324:00000 ns                 -92.5808      0.4276
 DSB  R    R    ADIS     C1P  C2P  2016:323:00000 2016:324:00000 ns                 -10.1625      0.2158
 ISB  G    G    ALBH     C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G    G    ALBH     C1W  C2W  2016:323:00000 2016:324:00000 ns                 14.0393      0.1010
 ISB  R    R    ALBH     C1P  C2P  2016:323:00000 2016:324:00000 ns                 -54.1556      0.3557
 DSB  R    R    ALBH     C1P  C2P  2016:323:00000 2016:324:00000 ns                 20.7119      0.1772
 ...
 ISB  G    G    IRKJ     C1W  C2W  2016:323:00000 2016:324:00000 ns                       0           0
 DSB  G    G    IRKJ     C1W  C2W  2016:323:00000 2016:324:00000 ns                 -9.5754      0.1135
```

```
ISB  R   R    IRKJ    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -77.7676    0.3902
DSB  R   R    IRKJ    C1P  C2P   2016:323:00000 2016:324:00000 ns                    -9.7756    0.1956
DSB  R   R    IRKJ    C1P  C1C   2016:323:00000 2016:324:00000 ns                     2.4677    0.2373
...
ISB  G   G    MORP    C1C  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    MORP    C1C  C2W   2016:323:00000 2016:324:00000 ns                   -21.0312    0.1022
DSB  G   G    MORP    C2W  C2C   2016:323:00000 2016:324:00000 ns                   -16.2928    0.1151
...
ISB  G   G    NOVM    C1W  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    NOVM    C1W  C2W   2016:323:00000 2016:324:00000 ns                    -0.9193    0.1144
ISB  R   R    NOVM    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -81.6503    0.3932
DSB  R   R    NOVM    C1P  C2P   2016:323:00000 2016:324:00000 ns                    -0.7251    0.1971
DSB  R   R    NOVM    C1P  C1C   2016:323:00000 2016:324:00000 ns                     2.2151    0.2368
...
ISB  G   G    STHL    C1W  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    STHL    C1W  C2W   2016:323:00000 2016:324:00000 ns                     9.4634    0.1392
DSB  G   G    STHL    C1W  C1C   2016:323:00000 2016:324:00000 ns                    -3.8933    0.1843
ISB  R   R    STHL    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -68.5644    0.4151
DSB  R   R    STHL    C1P  C2P   2016:323:00000 2016:324:00000 ns                    10.7036    0.2099
...
ISB  G   G    UNB3    C1C  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    UNB3    C1C  C2W   2016:323:00000 2016:324:00000 ns                   -11.6417    0.1024
ISB  R   R    UNB3    C1P  C2P   2016:323:00000 2016:324:00000 ns                     8.4345    0.3574
DSB  R   R    UNB3    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -10.7111    0.1783
DSB  R   R    UNB3    C1P  C1C   2016:323:00000 2016:324:00000 ns                    -4.0103    2.4846
DSB  R   R    UNB3    C2P  C2C   2016:323:00000 2016:324:00000 ns                    10.1964    3.0528
...
ISB  G   G    YSSK    C1W  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    YSSK    C1W  C2W   2016:323:00000 2016:324:00000 ns                   -14.1595    0.1115
DSB  G   G    YSSK    C1W  C1C   2016:323:00000 2016:324:00000 ns                     0.3598    0.1866
...
ISB  G   G    ZIMJ    C1W  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    ZIMJ    C1W  C2W   2016:323:00000 2016:324:00000 ns                     8.2643    0.0856
ISB  R   R    ZIMJ    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -12.8850    0.3596
DSB  R   R    ZIMJ    C1P  C2P   2016:323:00000 2016:324:00000 ns                   -14.2083    0.1782
ISB  G   G    ZIMM    C1C  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    ZIMM    C1C  C2W   2016:323:00000 2016:324:00000 ns                   -11.6079    0.0864
ISB  G   G    ZWE2    C1W  C2W   2016:323:00000 2016:324:00000 ns                          0         0
DSB  G   G    ZWE2    C1W  C2W   2016:323:00000 2016:324:00000 ns                     0.2420    0.0903
-BIAS/SOLUTION
%=ENDBIA
```

A.4   Example 3: GPS/GLONASS 1-Day Bias Results for the Satellites and Stations

This is an example, where the GLONASS biases are treated specific to each station-satellite link.

Note: More than two observable types (per GNSS) are considered for the stations: IRKJ (R), MORP (G), NOVM (R), STHL (G), UNB3 (R), YSSK (G).

A.4.1   Example 3A: GPS/GLONASS 1-Day Bias Results Using Absolute Parameter Representation

```
%=BIA 1.00 COD 2016:327:08338 IGS 2016:323:00000 2016:324:00000 A 00009549
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S BIAS COMBINATION RESULTS FOR DAY 323, 2016               22-NOV-16 01:51
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS 1-day final bias solution for G/R
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS 1-day final bias solution for G/R
-FILE/REFERENCE
```

```
*-----------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*-----------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-----------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                        300
 PARAMETER_SPACING                         86400
 DETERMINATION_METHOD                COMBINED_ANALYSIS
 BIAS_MODE                           ABSOLUTE
 TIME_SYSTEM                         G
 RECEIVER_CLOCK_REFERENCE_GNSS       G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  R
-BIAS/DESCRIPTION
*-----------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 OSB  G063 G01           C1C       2016:323:00000 2016:324:00000 ns            10.2979        0.0111
 OSB  G063 G01           C1W       2016:323:00000 2016:324:00000 ns            11.7277        0.0075
 OSB  G063 G01           C2C       2016:323:00000 2016:324:00000 ns             1.4288        0.0455
 OSB  G063 G01           C2W       2016:323:00000 2016:324:00000 ns            19.3149        0.0121
 OSB  G061 G02           C1C       2016:323:00000 2016:324:00000 ns           -12.8354        0.0113
 OSB  G061 G02           C1W       2016:323:00000 2016:324:00000 ns           -14.0975        0.0076
 OSB  G061 G02           C2W       2016:323:00000 2016:324:00000 ns           -23.2178        0.0124
 OSB  G069 G03           C1C       2016:323:00000 2016:324:00000 ns             6.6791        0.0110
 OSB  G069 G03           C1W       2016:323:00000 2016:324:00000 ns             8.0355        0.0075
 OSB  G069 G03           C2C       2016:323:00000 2016:324:00000 ns            -2.1231        0.0459
 OSB  G069 G03           C2W       2016:323:00000 2016:324:00000 ns            13.2340        0.0121
 ...
 OSB  G064 G30           C1C       2016:323:00000 2016:324:00000 ns            10.1714        0.0110
 OSB  G064 G30           C1W       2016:323:00000 2016:324:00000 ns             9.7539        0.0074
 OSB  G064 G30           C2C       2016:323:00000 2016:324:00000 ns             0.8872        0.0502
 OSB  G064 G30           C2W       2016:323:00000 2016:324:00000 ns            16.0642        0.0120
 OSB  G052 G31           C1C       2016:323:00000 2016:324:00000 ns            -8.0684        0.0113
 OSB  G052 G31           C1W       2016:323:00000 2016:324:00000 ns            -7.2040        0.0076
 OSB  G052 G31           C2W       2016:323:00000 2016:324:00000 ns           -11.8646        0.0124
 OSB  G070 G32           C1C       2016:323:00000 2016:324:00000 ns             5.3565        0.0112
 OSB  G070 G32           C1W       2016:323:00000 2016:324:00000 ns             6.9019        0.0076
 OSB  G070 G32           C2C       2016:323:00000 2016:324:00000 ns            -4.2758        0.0545
 OSB  G070 G32           C2W       2016:323:00000 2016:324:00000 ns            11.3670        0.0123
 OSB  G    G    ABPO     C1W       2016:323:00000 2016:324:00000 ns            10.9184        0.0355
 OSB  G    G    ABPO     C2W       2016:323:00000 2016:324:00000 ns            17.9819        0.0585
 OSB  G    G    ADIS     C1W       2016:323:00000 2016:324:00000 ns             3.9598        0.0317
 OSB  G    G    ADIS     C2W       2016:323:00000 2016:324:00000 ns             6.5216        0.0522
 OSB  R730 R01 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -68.5694        0.2246
 OSB  R730 R01 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -52.5603        0.2702
 OSB  R747 R02 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -73.6348        0.2150
 OSB  R747 R02 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -62.0217        0.2523
 OSB  R744 R03 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -88.9341        0.2140
 OSB  R744 R03 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -78.9872        0.2539
 ...
 OSB  R731 R22 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -70.7452        0.2322
 OSB  R731 R22 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -64.1090        0.2727
 OSB  R732 R23 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -67.8707        0.2605
 OSB  R732 R23 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -51.7869        0.3202
 OSB  R735 R24 ADIS      C1P       2016:323:00000 2016:324:00000 ns           -86.2275        0.2640
 OSB  R735 R24 ADIS      C2P       2016:323:00000 2016:324:00000 ns           -78.3718        0.3220
 OSB  G    G    ALBH     C1W       2016:323:00000 2016:324:00000 ns           -21.6200        0.0226
 OSB  G    G    ALBH     C2W       2016:323:00000 2016:324:00000 ns           -35.6070        0.0371
 OSB  R730 R01 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -78.3478        0.1941
 OSB  R730 R01 ALBH      C2P       2016:323:00000 2016:324:00000 ns           -90.4057        0.2290
 OSB  R747 R02 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -86.5767        0.2158
 OSB  R747 R02 ALBH      C2P       2016:323:00000 2016:324:00000 ns          -103.1267        0.2573
 OSB  R744 R03 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -89.2557        0.2110
 OSB  R744 R03 ALBH      C2P       2016:323:00000 2016:324:00000 ns          -119.3690        0.2553
 ...
 OSB  R731 R22 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -87.0721        0.1870
 OSB  R731 R22 ALBH      C2P       2016:323:00000 2016:324:00000 ns          -103.0162        0.2215
 OSB  R732 R23 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -75.8298        0.1777
 OSB  R732 R23 ALBH      C2P       2016:323:00000 2016:324:00000 ns           -89.4746        0.2120
 OSB  R735 R24 ALBH      C1P       2016:323:00000 2016:324:00000 ns           -93.4667        0.1884
 OSB  R735 R24 ALBH      C2P       2016:323:00000 2016:324:00000 ns          -120.4333        0.2231
```

```
...
OSB  G    G   ZIMJ    C1W       2016:323:00000 2016:324:00000 ns              -12.6915     0.0191
OSB  G    G   ZIMJ    C2W       2016:323:00000 2016:324:00000 ns              -20.9022     0.0315
OSB  R730 R01 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns               17.3268     0.1845
OSB  R730 R01 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               37.3232     0.2180
OSB  R747 R02 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns               11.9682     0.1857
OSB  R747 R02 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               24.6734     0.2190
OSB  R744 R03 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns                1.9201     0.2566
OSB  R744 R03 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               15.2821     0.3115
...
OSB  R731 R22 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns               11.6387     0.1889
OSB  R731 R22 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               24.8991     0.2224
OSB  R732 R23 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns               18.9889     0.2605
OSB  R732 R23 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               42.0121     0.3163
OSB  R735 R24 ZIMJ    C1P       2016:323:00000 2016:324:00000 ns                0.5682     0.1969
OSB  R735 R24 ZIMJ    C2P       2016:323:00000 2016:324:00000 ns               11.1736     0.2352
OSB  G    G   ZIMM    C1C       2016:323:00000 2016:324:00000 ns               18.0267     0.0193
OSB  G    G   ZIMM    C2W       2016:323:00000 2016:324:00000 ns               29.6889     0.0317
OSB  G    G   ZWE2    C1W       2016:323:00000 2016:324:00000 ns               -0.3192     0.0202
OSB  G    G   ZWE2    C2W       2016:323:00000 2016:324:00000 ns               -0.5258     0.0332
-BIAS/SOLUTION
%=ENDBIA
```

A.4.2 Example 3B: GPS/GLONASS 1-Day Bias Results Using Relative Parameter Representation

```
%=BIA 1.00 COD 2016:327:08338 IGS 2016:323:00000 2016:324:00000 R 00009549
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S BIAS COMBINATION RESULTS FOR DAY 323, 2016                22-NOV-16 01:51
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS 1-day final bias solution for G/R
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS 1-day final bias solution for G/R
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE final product series for the IGS.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE
 DOI: 10.7892/boris.75876
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                    300
 PARAMETER_SPACING                       86400
 DETERMINATION_METHOD                    COMBINED_ANALYSIS
 BIAS_MODE                               RELATIVE
 TIME_SYSTEM                             G
 RECEIVER_CLOCK_REFERENCE_GNSS           G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   R
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G063 G01          C1W  C2W  2016:323:00000 2016:324:00000 ns                      0           0
 DSB  G063 G01          C1W  C1C  2016:323:00000 2016:324:00000 ns                 1.4298      0.0134
 DSB  G063 G01          C2W  C2C  2016:323:00000 2016:324:00000 ns                17.8861      0.0471
 DSB  G063 G01          C1W  C2W  2016:323:00000 2016:324:00000 ns                -7.5872      0.0143
 ISB  G061 G02          C1W  C2W  2016:323:00000 2016:324:00000 ns                      0           0
 DSB  G061 G02          C1W  C1C  2016:323:00000 2016:324:00000 ns                -1.2621      0.0136
 DSB  G061 G02          C1W  C2W  2016:323:00000 2016:324:00000 ns                 9.1203      0.0145
 ISB  G069 G03          C1W  C2W  2016:323:00000 2016:324:00000 ns                      0           0
```

```
  DSB  G069 G03        C1W  C1C  2016:323:00000 2016:324:00000 ns              1.3564      0.0133
  DSB  G069 G03        C2W  C2C  2016:323:00000 2016:324:00000 ns             15.3572      0.0474
  DSB  G069 G03        C1W  C2W  2016:323:00000 2016:324:00000 ns             -5.1985      0.0142
 ...
  ISB  G064 G30        C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G064 G30        C1W  C1C  2016:323:00000 2016:324:00000 ns             -0.4174      0.0132
  DSB  G064 G30        C2W  C2C  2016:323:00000 2016:324:00000 ns             15.1770      0.0516
  DSB  G064 G30        C1W  C2W  2016:323:00000 2016:324:00000 ns             -6.3103      0.0141
  ISB  G052 G31        C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G052 G31        C1W  C1C  2016:323:00000 2016:324:00000 ns              0.8644      0.0136
  DSB  G052 G31        C1W  C2W  2016:323:00000 2016:324:00000 ns              4.6606      0.0145
  ISB  G070 G32        C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G070 G32        C1W  C1C  2016:323:00000 2016:324:00000 ns              1.5454      0.0135
  DSB  G070 G32        C2W  C2C  2016:323:00000 2016:324:00000 ns             15.6429      0.0559
  DSB  G070 G32        C1W  C2W  2016:323:00000 2016:324:00000 ns             -4.4651      0.0144
  ISB  G    G    ABPO  C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ABPO  C1W  C2W  2016:323:00000 2016:324:00000 ns             -7.0636      0.0684
  ISB  G    G    ADIS  C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ADIS  C1W  C2W  2016:323:00000 2016:324:00000 ns             -2.5618      0.0611
  ISB  R730 R01  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -93.0832      0.7032
  DSB  R730 R01  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -16.0091      0.3514
  ISB  R747 R02  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -91.4172      0.6673
  DSB  R747 R02  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -11.6130      0.3315
  ISB  R744 R03  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns           -104.1653      0.6667
  DSB  R744 R03  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns             -9.9469      0.3320
 ...
  ISB  R731 R22  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -80.9069      0.7210
  DSB  R731 R22  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns             -6.6362      0.3582
  ISB  R732 R23  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -92.4990      0.8217
  DSB  R732 R23  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -16.0838      0.4128
  ISB  R735 R24  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns            -98.2566      0.8303
  DSB  R735 R24  ADIS  C1P  C2P  2016:323:00000 2016:324:00000 ns             -7.8557      0.4163
 ...
  ISB  G    G    ALBH  C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ALBH  C1W  C2W  2016:323:00000 2016:324:00000 ns             13.9869      0.0435
  ISB  R730 R01  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -59.8841      0.6037
  DSB  R730 R01  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             12.0579      0.3002
  ISB  R747 R02  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -61.2345      0.6734
  DSB  R747 R02  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             16.5500      0.3358
  ISB  R744 R03  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -43.1446      0.6618
  DSB  R744 R03  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             30.1134      0.3312
 ...
  ISB  R731 R22  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -62.6576      0.5823
  DSB  R731 R22  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             15.9441      0.2899
  ISB  R732 R23  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -54.9362      0.5546
  DSB  R732 R23  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             13.6448      0.2766
  ISB  R735 R24  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns            -52.1741      0.5867
  DSB  R735 R24  ALBH  C1P  C2P  2016:323:00000 2016:324:00000 ns             26.9666      0.2921
 ...
  ISB  G    G    ZIMJ  C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ZIMJ  C1W  C2W  2016:323:00000 2016:324:00000 ns              8.2107      0.0368
  ISB  R730 R01  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -13.2926      0.5741
  DSB  R730 R01  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -19.9964      0.2856
  ISB  R747 R02  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns             -7.4866      0.5773
  DSB  R747 R02  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -12.7052      0.2871
  ISB  R744 R03  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -18.5405      0.8059
  DSB  R744 R03  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -13.3620      0.4036
 ...
  ISB  R731 R22  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns             -8.6662      0.5871
  DSB  R731 R22  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -13.2604      0.2918
  ISB  R732 R23  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -16.2655      0.8182
  DSB  R732 R23  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -23.0233      0.4098
  ISB  R735 R24  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -15.6713      0.6150
  DSB  R735 R24  ZIMJ  C1P  C2P  2016:323:00000 2016:324:00000 ns            -10.6054      0.3068
  ISB  G    G    ZIMM  C1C  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ZIMM  C1C  C2W  2016:323:00000 2016:324:00000 ns            -11.6623      0.0371
  ISB  G    G    ZWE2  C1W  C2W  2016:323:00000 2016:324:00000 ns                   0           0
  DSB  G    G    ZWE2  C1W  C2W  2016:323:00000 2016:324:00000 ns              0.2065      0.0389
 -BIAS/SOLUTION
 %=ENDBIA
```

A.5 Example 4: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results for the Satellites and Stations

Note: The GLONASS biases are treated in a GPS-like manner (composed of a station and a satellite component).

A.5.1 Example 4A: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results Using Absolute Parameter Representation

```
%=BIA 1.00 COD 2016:330:30148 IGS 2016:271:00000 2016:272:00000 A 00001915
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX BIAS COMBINATION RESULTS FOR DAY 271, 2016          25-NOV-16 08:21
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____ INFO_____
 DESCRIPTION       CODE, Astronomical Institute, University of Bern
 OUTPUT            CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT           code@aiub.unibe.ch
 SOFTWARE          Bernese GNSS Software Version 5.3
 HARDWARE          UBELIX: Linux, x86_64
 INPUT             CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                         300
 PARAMETER_SPACING                            86400
 DETERMINATION_METHOD                    COMBINED_ANALYSIS
 BIAS_MODE                               ABSOLUTE
 TIME_SYSTEM                             G
 RECEIVER_CLOCK_REFERENCE_GNSS           G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   R  C1P  C2P
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   E  C1C  C5Q
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   C  C2I  C7I
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 OSB  G063 G01          C1C       2016:271:00000 2016:272:00000 ns               10.1185      0.0154
 OSB  G063 G01          C1W       2016:271:00000 2016:272:00000 ns               11.5480      0.0099
 OSB  G063 G01          C2C       2016:271:00000 2016:272:00000 ns               10.7923      0.0224
 OSB  G063 G01          C2S       2016:271:00000 2016:272:00000 ns               10.6411      0.0469
 OSB  G063 G01          C2W       2016:271:00000 2016:272:00000 ns               19.0189      0.0154
 OSB  G063 G01          C2X       2016:271:00000 2016:272:00000 ns               11.0136      0.0299
 OSB  G061 G02          C1C       2016:271:00000 2016:272:00000 ns              -12.5805      0.0167
 OSB  G061 G02          C1W       2016:271:00000 2016:272:00000 ns              -13.8916      0.0106
 OSB  G061 G02          C2W       2016:271:00000 2016:272:00000 ns              -22.8786      0.0167
 OSB  G069 G03          C1C       2016:271:00000 2016:272:00000 ns                6.3292      0.0152
 OSB  G069 G03          C1W       2016:271:00000 2016:272:00000 ns                7.7680      0.0098
 OSB  G069 G03          C2C       2016:271:00000 2016:272:00000 ns                6.3726      0.0222
 OSB  G069 G03          C2S       2016:271:00000 2016:272:00000 ns                6.4530      0.0455
 OSB  G069 G03          C2W       2016:271:00000 2016:272:00000 ns               12.7935      0.0153
 OSB  G069 G03          C2X       2016:271:00000 2016:272:00000 ns                5.8428      0.0279
 ...
 OSB  G064 G30          C1C       2016:271:00000 2016:272:00000 ns               10.2336      0.0150
 OSB  G064 G30          C1W       2016:271:00000 2016:272:00000 ns                9.8797      0.0097
 OSB  G064 G30          C2C       2016:271:00000 2016:272:00000 ns                9.5838      0.0216
 OSB  G064 G30          C2S       2016:271:00000 2016:272:00000 ns                9.8167      0.0459
 OSB  G064 G30          C2W       2016:271:00000 2016:272:00000 ns               16.2713      0.0151
 OSB  G064 G30          C2X       2016:271:00000 2016:272:00000 ns               10.0010      0.0284
 OSB  G052 G31          C1C       2016:271:00000 2016:272:00000 ns               -8.1839      0.0158
 OSB  G052 G31          C1W       2016:271:00000 2016:272:00000 ns               -7.2561      0.0102
 OSB  G052 G31          C2C       2016:271:00000 2016:272:00000 ns              -18.4654      0.0223
 OSB  G052 G31          C2S       2016:271:00000 2016:272:00000 ns              -18.7563      0.0515
 OSB  G052 G31          C2W       2016:271:00000 2016:272:00000 ns              -11.9504      0.0159
 OSB  G052 G31          C2X       2016:271:00000 2016:272:00000 ns              -18.0693      0.0294
 OSB  G070 G32          C1C       2016:271:00000 2016:272:00000 ns                5.1753      0.0156
 OSB  G070 G32          C1W       2016:271:00000 2016:272:00000 ns                6.8556      0.0100
 OSB  G070 G32          C2C       2016:271:00000 2016:272:00000 ns                4.5923      0.0216
 OSB  G070 G32          C2S       2016:271:00000 2016:272:00000 ns                4.7685      0.0529
 OSB  G070 G32          C2W       2016:271:00000 2016:272:00000 ns               11.2908      0.0157
```

```
OSB  G070 G32     C2X        2016:271:00000 2016:272:00000 ns            4.0940    0.0297
OSB  R730 R01     C1C        2016:271:00000 2016:272:00000 ns            8.5536    0.0178
OSB  R730 R01     C1P        2016:271:00000 2016:272:00000 ns            8.6866    0.0111
OSB  R730 R01     C2C        2016:271:00000 2016:272:00000 ns           11.6278    0.0201
OSB  R730 R01     C2P        2016:271:00000 2016:272:00000 ns           14.3594    0.0176
OSB  R747 R02     C1C        2016:271:00000 2016:272:00000 ns            0.4449    0.0173
OSB  R747 R02     C1P        2016:271:00000 2016:272:00000 ns            0.8567    0.0108
OSB  R747 R02     C2C        2016:271:00000 2016:272:00000 ns            1.7145    0.0198
OSB  R747 R02     C2P        2016:271:00000 2016:272:00000 ns            1.4161    0.0171
OSB  R744 R03     C1C        2016:271:00000 2016:272:00000 ns           -5.1898    0.0172
OSB  R744 R03     C1P        2016:271:00000 2016:272:00000 ns           -5.9092    0.0108
OSB  R744 R03     C2C        2016:271:00000 2016:272:00000 ns           -9.4988    0.0199
OSB  R744 R03     C2P        2016:271:00000 2016:272:00000 ns           -9.7682    0.0170
...
OSB  R731 R22     C1C        2016:271:00000 2016:272:00000 ns            1.1577    0.0173
OSB  R731 R22     C1P        2016:271:00000 2016:272:00000 ns            1.0525    0.0108
OSB  R731 R22     C2C        2016:271:00000 2016:272:00000 ns            1.9180    0.0201
OSB  R731 R22     C2P        2016:271:00000 2016:272:00000 ns            1.7399    0.0171
OSB  R732 R23     C1C        2016:271:00000 2016:272:00000 ns           12.2262    0.0191
OSB  R732 R23     C1P        2016:271:00000 2016:272:00000 ns           11.1258    0.0119
OSB  R732 R23     C2C        2016:271:00000 2016:272:00000 ns           15.8499    0.0216
OSB  R732 R23     C2P        2016:271:00000 2016:272:00000 ns           18.3916    0.0189
OSB  R735 R24     C1C        2016:271:00000 2016:272:00000 ns           -7.8472    0.0180
OSB  R735 R24     C1P        2016:271:00000 2016:272:00000 ns           -8.5037    0.0112
OSB  R735 R24     C2C        2016:271:00000 2016:272:00000 ns          -12.1577    0.0205
OSB  R735 R24     C2P        2016:271:00000 2016:272:00000 ns          -14.0572    0.0178
OSB  R801 R26     C1C        2016:271:00000 2016:272:00000 ns           -1.2352    0.0789
OSB  R801 R26     C1P        2016:271:00000 2016:272:00000 ns           -0.7177    0.0399
OSB  R801 R26     C2C        2016:271:00000 2016:272:00000 ns           -0.5809    0.0655
OSB  R801 R26     C2P        2016:271:00000 2016:272:00000 ns           -1.1865    0.0657
OSB  E208 E08     C1C        2016:271:00000 2016:272:00000 ns           -9.9791    0.0336
OSB  E208 E08     C1X        2016:271:00000 2016:272:00000 ns           -9.8329    0.1289
OSB  E208 E08     C5Q        2016:271:00000 2016:272:00000 ns          -17.8953    0.0601
OSB  E208 E08     C5X        2016:271:00000 2016:272:00000 ns          -18.6430    0.1340
OSB  E208 E08     C7Q        2016:271:00000 2016:272:00000 ns          -18.8698    0.0550
OSB  E208 E08     C8Q        2016:271:00000 2016:272:00000 ns          -18.9366    0.0555
OSB  E209 E09     C1C        2016:271:00000 2016:272:00000 ns           -5.0047    0.0244
OSB  E209 E09     C1X        2016:271:00000 2016:272:00000 ns           -5.3069    0.1098
OSB  E209 E09     C5Q        2016:271:00000 2016:272:00000 ns           -8.9749    0.0434
OSB  E209 E09     C5X        2016:271:00000 2016:272:00000 ns           -9.7429    0.1162
OSB  E209 E09     C7Q        2016:271:00000 2016:272:00000 ns           -9.8429    0.0384
OSB  E209 E09     C8Q        2016:271:00000 2016:272:00000 ns           -9.5748    0.0389
OSB  E101 E11     C1C        2016:271:00000 2016:272:00000 ns          -20.0952    0.0258
OSB  E101 E11     C1X        2016:271:00000 2016:272:00000 ns          -19.3054    0.1137
OSB  E101 E11     C5Q        2016:271:00000 2016:272:00000 ns          -36.0361    0.0460
OSB  E101 E11     C5X        2016:271:00000 2016:272:00000 ns          -36.0619    0.1197
OSB  E101 E11     C7Q        2016:271:00000 2016:272:00000 ns          -36.1338    0.0419
OSB  E101 E11     C8Q        2016:271:00000 2016:272:00000 ns          -36.0161    0.0422
...
OSB  E205 E24     C1C        2016:271:00000 2016:272:00000 ns           37.5494    0.0929
OSB  E205 E24     C1X        2016:271:00000 2016:272:00000 ns           38.6664    0.3540
OSB  E205 E24     C5Q        2016:271:00000 2016:272:00000 ns           67.3362    0.1665
OSB  E205 E24     C5X        2016:271:00000 2016:272:00000 ns           70.9915    0.3674
OSB  E205 E24     C7Q        2016:271:00000 2016:272:00000 ns           69.0560    0.1387
OSB  E205 E24     C8Q        2016:271:00000 2016:272:00000 ns           69.0810    0.1439
OSB  E203 E26     C1C        2016:271:00000 2016:272:00000 ns           -0.8064    0.0254
OSB  E203 E26     C1X        2016:271:00000 2016:272:00000 ns           -0.8570    0.1037
OSB  E203 E26     C5Q        2016:271:00000 2016:272:00000 ns           -1.4461    0.0453
OSB  E203 E26     C5X        2016:271:00000 2016:272:00000 ns           -1.7902    0.1085
OSB  E203 E26     C7Q        2016:271:00000 2016:272:00000 ns           -2.1133    0.0398
OSB  E203 E26     C8Q        2016:271:00000 2016:272:00000 ns           -1.9841    0.0403
OSB  E206 E30     C1C        2016:271:00000 2016:272:00000 ns           -3.9773    0.0279
OSB  E206 E30     C1X        2016:271:00000 2016:272:00000 ns           -3.6541    0.1140
OSB  E206 E30     C5Q        2016:271:00000 2016:272:00000 ns           -7.1323    0.0498
OSB  E206 E30     C5X        2016:271:00000 2016:272:00000 ns           -7.8418    0.1194
OSB  E206 E30     C7Q        2016:271:00000 2016:272:00000 ns           -8.6446    0.0453
OSB  E206 E30     C8Q        2016:271:00000 2016:272:00000 ns           -8.5730    0.0457
OSB  C005 C06     C2I        2016:271:00000 2016:272:00000 ns           -8.5994    0.0233
OSB  C005 C06     C6I        2016:271:00000 2016:272:00000 ns           -5.9723    0.2247
OSB  C005 C06     C7I        2016:271:00000 2016:272:00000 ns          -14.3818    0.0387
OSB  C007 C07     C2I        2016:271:00000 2016:272:00000 ns          -13.5612    0.0257
OSB  C007 C07     C6I        2016:271:00000 2016:272:00000 ns          -17.4573    0.2495
OSB  C007 C07     C7I        2016:271:00000 2016:272:00000 ns          -22.6801    0.0427
OSB  C008 C08     C2I        2016:271:00000 2016:272:00000 ns          -10.9001    0.0256
OSB  C008 C08     C6I        2016:271:00000 2016:272:00000 ns          -11.6079    0.2756
OSB  C008 C08     C7I        2016:271:00000 2016:272:00000 ns          -18.2295    0.0426
...
OSB  C013 C12     C2I        2016:271:00000 2016:272:00000 ns            1.4981    0.0217
OSB  C013 C12     C6I        2016:271:00000 2016:272:00000 ns            9.2455    0.3034
OSB  C013 C12     C7I        2016:271:00000 2016:272:00000 ns            2.5055    0.0359
OSB  C015 C14     C2I        2016:271:00000 2016:272:00000 ns           -1.4346    0.0236
OSB  C015 C14     C6I        2016:271:00000 2016:272:00000 ns            2.0533    0.3538
OSB  C015 C14     C7I        2016:271:00000 2016:272:00000 ns           -2.3993    0.0391
OSB  C017 C15     C2I        2016:271:00000 2016:272:00000 ns           25.0763    0.0198
```

```
OSB  C017 C15          C7I      2016:271:00000 2016:272:00000 ns            41.9380   0.0328
OSB  G    G    ABPO    C1C      2016:271:00000 2016:272:00000 ns            10.7111   0.1291
OSB  G    G    ABPO    C1W      2016:271:00000 2016:272:00000 ns            11.1623   0.1247
OSB  G    G    ABPO    C2W      2016:271:00000 2016:272:00000 ns            18.3837   0.2054
OSB  G    G    ADIS    C1C      2016:271:00000 2016:272:00000 ns             1.8458   0.1030
OSB  G    G    ADIS    C1W      2016:271:00000 2016:272:00000 ns             1.3745   0.0970
OSB  G    G    ADIS    C2W      2016:271:00000 2016:272:00000 ns             2.2638   0.1598
OSB  R    R    ADIS    C1C      2016:271:00000 2016:272:00000 ns           -78.9895   0.1440
OSB  R    R    ADIS    C1P      2016:271:00000 2016:272:00000 ns           -79.8247   0.1370
OSB  R    R    ADIS    C2P      2016:271:00000 2016:272:00000 ns           -70.0032   0.1859
OSB  G    G    ALBH    C1C      2016:271:00000 2016:272:00000 ns           -17.9825   0.0902
OSB  G    G    ALBH    C1W      2016:271:00000 2016:272:00000 ns           -21.1692   0.0837
OSB  G    G    ALBH    C2C      2016:271:00000 2016:272:00000 ns           -26.6337   0.1396
OSB  G    G    ALBH    C2W      2016:271:00000 2016:272:00000 ns           -34.8646   0.1378
OSB  R    R    ALBH    C1C      2016:271:00000 2016:272:00000 ns           -84.0298   0.1295
OSB  R    R    ALBH    C1P      2016:271:00000 2016:272:00000 ns           -85.8746   0.1231
OSB  R    R    ALBH    C2C      2016:271:00000 2016:272:00000 ns          -104.7213   0.1623
OSB  R    R    ALBH    C2P      2016:271:00000 2016:272:00000 ns          -105.5521   0.1630
...
OSB  G    G    ALIC    C1C      2016:271:00000 2016:272:00000 ns           -33.1066   0.0850
OSB  G    G    ALIC    C2S      2016:271:00000 2016:272:00000 ns           -45.2484   0.1422
OSB  G    G    ALIC    C2W      2016:271:00000 2016:272:00000 ns           -54.5247   0.1400
OSB  R    R    ALIC    C1C      2016:271:00000 2016:272:00000 ns           -27.6935   0.1292
OSB  R    R    ALIC    C2C      2016:271:00000 2016:272:00000 ns           -29.8687   0.1697
OSB  R    R    ALIC    C2P      2016:271:00000 2016:272:00000 ns           -33.1632   0.1696
OSB  E    E    ALIC    C1C      2016:271:00000 2016:272:00000 ns            42.8437   0.1686
OSB  E    E    ALIC    C5Q      2016:271:00000 2016:272:00000 ns            41.8360   0.2200
OSB  E    E    ALIC    C7Q      2016:271:00000 2016:272:00000 ns            34.6993   0.2120
OSB  E    E    ALIC    C8Q      2016:271:00000 2016:272:00000 ns            37.6232   0.2142
OSB  C    C    ALIC    C2I      2016:271:00000 2016:272:00000 ns            33.0258   0.1458
OSB  C    C    ALIC    C7I      2016:271:00000 2016:272:00000 ns             6.6430   0.1885
...
OSB  G    G    ZIM3    C1C      2016:271:00000 2016:272:00000 ns            21.7697   0.0782
OSB  G    G    ZIM3    C2W      2016:271:00000 2016:272:00000 ns            35.8534   0.1287
OSB  G    G    ZIM3    C2X      2016:271:00000 2016:272:00000 ns            42.0040   0.1294
OSB  R    R    ZIM3    C1C      2016:271:00000 2016:272:00000 ns            29.7776   0.1235
OSB  R    R    ZIM3    C1P      2016:271:00000 2016:272:00000 ns            26.5470   0.1169
OSB  R    R    ZIM3    C2C      2016:271:00000 2016:272:00000 ns            37.6099   0.1527
OSB  R    R    ZIM3    C2P      2016:271:00000 2016:272:00000 ns            37.6654   0.1534
OSB  E    E    ZIM3    C1X      2016:271:00000 2016:272:00000 ns            16.8441   0.1550
OSB  E    E    ZIM3    C5X      2016:271:00000 2016:272:00000 ns            29.8820   0.2015
OSB  C    C    ZIM3    C2I      2016:271:00000 2016:272:00000 ns            10.4639   0.2658
OSB  C    C    ZIM3    C6I      2016:271:00000 2016:272:00000 ns           -42.8452   0.5952
OSB  C    C    ZIM3    C7I      2016:271:00000 2016:272:00000 ns            -7.7160   0.3132
OSB  G    G    ZIMJ    C1C      2016:271:00000 2016:272:00000 ns           -10.7730   0.0925
OSB  G    G    ZIMJ    C1W      2016:271:00000 2016:272:00000 ns           -12.6255   0.0847
OSB  G    G    ZIMJ    C2W      2016:271:00000 2016:272:00000 ns           -20.7935   0.1395
OSB  G    G    ZIMJ    C2X      2016:271:00000 2016:272:00000 ns           -12.5430   0.1385
OSB  R    R    ZIMJ    C1C      2016:271:00000 2016:272:00000 ns             8.2543   0.1313
OSB  R    R    ZIMJ    C1P      2016:271:00000 2016:272:00000 ns             8.6199   0.1237
OSB  R    R    ZIMJ    C2C      2016:271:00000 2016:272:00000 ns            22.8947   0.1630
OSB  R    R    ZIMJ    C2P      2016:271:00000 2016:272:00000 ns            23.7439   0.1639
OSB  E    E    ZIMJ    C1X      2016:271:00000 2016:272:00000 ns            -8.3411   0.1919
OSB  E    E    ZIMJ    C5X      2016:271:00000 2016:272:00000 ns             6.0309   0.2355
OSB  G    G    ZIMM    C1C      2016:271:00000 2016:272:00000 ns            18.4106   0.1059
OSB  G    G    ZIMM    C2W      2016:271:00000 2016:272:00000 ns            30.3212   0.1744
OSB  G    G    ZIMM    C2X      2016:271:00000 2016:272:00000 ns            39.2877   0.1741
OSB  G    G    ZWE2    C1C      2016:271:00000 2016:272:00000 ns             2.9704   0.1144
OSB  G    G    ZWE2    C1W      2016:271:00000 2016:272:00000 ns            -0.1800   0.1093
OSB  G    G    ZWE2    C2W      2016:271:00000 2016:272:00000 ns            -0.2964   0.1801
-BIAS/SOLUTION
%=ENDBIA
```

A.5.2 Example 4B: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results Using Relative Parameter Representation

```
%=BIA 1.00 COD 2016:330:30148 IGS 2016:271:00000 2016:272:00000 R 00001915
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX BIAS COMBINATION RESULTS FOR DAY 271, 2016        25-NOV-16 08:21
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
```

```
 HARDWARE            UBELIX: Linux, x86_64
 INPUT              CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                         300
 PARAMETER_SPACING                           86400
 DETERMINATION_METHOD                   COMBINED_ANALYSIS
 BIAS_MODE                              RELATIVE
 TIME_SYSTEM                            G
 RECEIVER_CLOCK_REFERENCE_GNSS          G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  R  C1P  C2P
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  E  C1C  C5Q
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES  C  C2I  C7I
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G063 G01          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G063 G01          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.4295     0.0183
 DSB  G063 G01          C2W  C2C  2016:271:00000 2016:272:00000 ns                  8.2266     0.0272
 DSB  G063 G01          C2W  C2S  2016:271:00000 2016:272:00000 ns                  8.3778     0.0494
 DSB  G063 G01          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -7.4709     0.0183
 DSB  G063 G01          C2W  C2X  2016:271:00000 2016:272:00000 ns                  8.0053     0.0336
 ISB  G061 G02          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G061 G02          C1W  C1C  2016:271:00000 2016:272:00000 ns                 -1.3111     0.0198
 DSB  G061 G02          C1W  C2W  2016:271:00000 2016:272:00000 ns                  8.9871     0.0197
 ISB  G069 G03          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G069 G03          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.4388     0.0181
 DSB  G069 G03          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.4209     0.0269
 DSB  G069 G03          C2W  C2S  2016:271:00000 2016:272:00000 ns                  6.3405     0.0480
 DSB  G069 G03          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -5.0255     0.0181
 DSB  G069 G03          C2W  C2X  2016:271:00000 2016:272:00000 ns                  6.9507     0.0318
 ...
 ISB  G064 G30          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G064 G30          C1W  C1C  2016:271:00000 2016:272:00000 ns                 -0.3539     0.0179
 DSB  G064 G30          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.6874     0.0263
 DSB  G064 G30          C2W  C2S  2016:271:00000 2016:272:00000 ns                  6.4545     0.0483
 DSB  G064 G30          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -6.3916     0.0179
 DSB  G064 G30          C2W  C2X  2016:271:00000 2016:272:00000 ns                  6.2703     0.0321
 ISB  G052 G31          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G052 G31          C1W  C1C  2016:271:00000 2016:272:00000 ns                  0.9278     0.0188
 DSB  G052 G31          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.5150     0.0274
 DSB  G052 G31          C2W  C2S  2016:271:00000 2016:272:00000 ns                  6.8059     0.0539
 DSB  G052 G31          C1W  C2W  2016:271:00000 2016:272:00000 ns                  4.6943     0.0189
 DSB  G052 G31          C2W  C2X  2016:271:00000 2016:272:00000 ns                  6.1189     0.0334
 ISB  G070 G32          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  G070 G32          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.6803     0.0185
 DSB  G070 G32          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.6985     0.0267
 DSB  G070 G32          C2W  C2S  2016:271:00000 2016:272:00000 ns                  6.5223     0.0552
 DSB  G070 G32          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -4.4352     0.0186
 DSB  G070 G32          C2W  C2X  2016:271:00000 2016:272:00000 ns                  7.1968     0.0335
 ISB  R730 R01          C1P  C2P  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  R730 R01          C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.1329     0.0210
 DSB  R730 R01          C2P  C2C  2016:271:00000 2016:272:00000 ns                  2.7316     0.0267
 DSB  R730 R01          C1P  C2P  2016:271:00000 2016:272:00000 ns                 -5.6729     0.0208
 ISB  R747 R02          C1P  C2P  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  R747 R02          C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.4118     0.0204
 DSB  R747 R02          C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.2984     0.0262
 DSB  R747 R02          C1P  C2P  2016:271:00000 2016:272:00000 ns                 -0.5595     0.0203
 ISB  R744 R03          C1P  C2P  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  R744 R03          C1P  C1C  2016:271:00000 2016:272:00000 ns                 -0.7194     0.0203
 DSB  R744 R03          C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.2694     0.0262
 DSB  R744 R03          C1P  C2P  2016:271:00000 2016:272:00000 ns                  3.8590     0.0201
 ...
 ISB  R731 R22          C1P  C2P  2016:271:00000 2016:272:00000 ns                       0          0
 DSB  R731 R22          C1P  C1C  2016:271:00000 2016:272:00000 ns                 -0.1051     0.0204
 DSB  R731 R22          C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.1781     0.0264
```

```
DSB  R731 R22         C1P  C2P   2016:271:00000 2016:272:00000 ns            -0.6874    0.0203
ISB  R732 R23         C1P  C2P   2016:271:00000 2016:272:00000 ns                 0         0
DSB  R732 R23         C1P  C1C   2016:271:00000 2016:272:00000 ns            -1.1004    0.0225
DSB  R732 R23         C2P  C2C   2016:271:00000 2016:272:00000 ns             2.5417    0.0287
DSB  R732 R23         C1P  C2P   2016:271:00000 2016:272:00000 ns            -7.2658    0.0223
ISB  R735 R24         C1P  C2P   2016:271:00000 2016:272:00000 ns                 0         0
DSB  R735 R24         C1P  C1C   2016:271:00000 2016:272:00000 ns            -0.6565    0.0212
DSB  R735 R24         C2P  C2C   2016:271:00000 2016:272:00000 ns            -1.8995    0.0272
DSB  R735 R24         C1P  C2P   2016:271:00000 2016:272:00000 ns             5.5535    0.0211
ISB  R801 R26         C1P  C2P   2016:271:00000 2016:272:00000 ns                 0         0
DSB  R801 R26         C1P  C1C   2016:271:00000 2016:272:00000 ns             0.5175    0.0884
DSB  R801 R26         C2P  C2C   2016:271:00000 2016:272:00000 ns            -0.6056    0.0928
DSB  R801 R26         C1P  C2P   2016:271:00000 2016:272:00000 ns             0.4687    0.0768
ISB  E208 E08         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E208 E08         C1C  C1X   2016:271:00000 2016:272:00000 ns            -0.1462    0.1332
DSB  E208 E08         C1C  C5Q   2016:271:00000 2016:272:00000 ns             7.9161    0.0689
DSB  E208 E08         C5Q  C5X   2016:271:00000 2016:272:00000 ns             0.7478    0.1469
DSB  E208 E08         C5Q  C7Q   2016:271:00000 2016:272:00000 ns             0.9745    0.0815
DSB  E208 E08         C5Q  C8Q   2016:271:00000 2016:272:00000 ns             1.0414    0.0818
ISB  E209 E09         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E209 E09         C1C  C1X   2016:271:00000 2016:272:00000 ns             0.3022    0.1124
DSB  E209 E09         C1C  C5Q   2016:271:00000 2016:272:00000 ns             3.9701    0.0498
DSB  E209 E09         C5Q  C5X   2016:271:00000 2016:272:00000 ns             0.7680    0.1240
DSB  E209 E09         C5Q  C7Q   2016:271:00000 2016:272:00000 ns             0.8681    0.0580
DSB  E209 E09         C5Q  C8Q   2016:271:00000 2016:272:00000 ns             0.6000    0.0583
ISB  E101 E11         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E101 E11         C1C  C1X   2016:271:00000 2016:272:00000 ns            -0.7897    0.1166
DSB  E101 E11         C1C  C5Q   2016:271:00000 2016:272:00000 ns            15.9409    0.0527
DSB  E101 E11         C5Q  C5X   2016:271:00000 2016:272:00000 ns             0.0259    0.1283
DSB  E101 E11         C5Q  C7Q   2016:271:00000 2016:272:00000 ns             0.0977    0.0622
DSB  E101 E11         C5Q  C8Q   2016:271:00000 2016:272:00000 ns            -0.0200    0.0624
...
ISB  E205 E24         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E205 E24         C1C  C1X   2016:271:00000 2016:272:00000 ns            -1.1170    0.3660
DSB  E205 E24         C1C  C5Q   2016:271:00000 2016:272:00000 ns           -29.7868    0.1906
DSB  E205 E24         C5Q  C5X   2016:271:00000 2016:272:00000 ns            -3.6553    0.4034
DSB  E205 E24         C5Q  C7Q   2016:271:00000 2016:272:00000 ns            -1.7198    0.2167
DSB  E205 E24         C5Q  C8Q   2016:271:00000 2016:272:00000 ns            -1.7447    0.2200
ISB  E203 E26         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E203 E26         C1C  C1X   2016:271:00000 2016:272:00000 ns             0.0506    0.1068
DSB  E203 E26         C1C  C5Q   2016:271:00000 2016:272:00000 ns             0.6397    0.0520
DSB  E203 E26         C5Q  C5X   2016:271:00000 2016:272:00000 ns             0.3441    0.1176
DSB  E203 E26         C5Q  C7Q   2016:271:00000 2016:272:00000 ns             0.6672    0.0603
DSB  E203 E26         C5Q  C8Q   2016:271:00000 2016:272:00000 ns             0.5379    0.0607
ISB  E206 E30         C1C  C5Q   2016:271:00000 2016:272:00000 ns                 0         0
DSB  E206 E30         C1C  C1X   2016:271:00000 2016:272:00000 ns            -0.3232    0.1173
DSB  E206 E30         C1C  C5Q   2016:271:00000 2016:272:00000 ns             3.1551    0.0571
DSB  E206 E30         C5Q  C5X   2016:271:00000 2016:272:00000 ns             0.7094    0.1293
DSB  E206 E30         C5Q  C7Q   2016:271:00000 2016:272:00000 ns             1.5123    0.0673
DSB  E206 E30         C5Q  C8Q   2016:271:00000 2016:272:00000 ns             1.4407    0.0676
ISB  C005 C06         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C005 C06         C7I  C6I   2016:271:00000 2016:272:00000 ns            -8.4095    0.2280
DSB  C005 C06         C2I  C7I   2016:271:00000 2016:272:00000 ns             5.7824    0.0452
ISB  C007 C07         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C007 C07         C7I  C6I   2016:271:00000 2016:272:00000 ns            -5.2227    0.2531
DSB  C007 C07         C2I  C7I   2016:271:00000 2016:272:00000 ns             9.1188    0.0499
ISB  C008 C08         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C008 C08         C7I  C6I   2016:271:00000 2016:272:00000 ns            -6.6216    0.2789
DSB  C008 C08         C2I  C7I   2016:271:00000 2016:272:00000 ns             7.3294    0.0497
...
ISB  C013 C12         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C013 C12         C7I  C6I   2016:271:00000 2016:272:00000 ns            -6.7400    0.3055
DSB  C013 C12         C2I  C7I   2016:271:00000 2016:272:00000 ns            -1.0074    0.0419
ISB  C015 C14         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C015 C14         C7I  C6I   2016:271:00000 2016:272:00000 ns            -4.4526    0.3560
DSB  C015 C14         C2I  C7I   2016:271:00000 2016:272:00000 ns             0.9647    0.0457
ISB  C017 C15         C2I  C7I   2016:271:00000 2016:272:00000 ns                 0         0
DSB  C017 C15         C2I  C7I   2016:271:00000 2016:272:00000 ns           -16.8618    0.0383
ISB  G    G    ABPO   C1W  C2W   2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ABPO   C1W  C2W   2016:271:00000 2016:272:00000 ns            -7.2214    0.2404
DSB  G    G    ABPO   C1W  C1C   2016:271:00000 2016:272:00000 ns             0.4512    0.1795
ISB  G    G    ADIS   C1W  C2W   2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ADIS   C1W  C2W   2016:271:00000 2016:272:00000 ns            -0.8892    0.1869
DSB  G    G    ADIS   C1W  C1C   2016:271:00000 2016:272:00000 ns            -0.4713    0.1415
ISB  R    R    ADIS   C1P  C2P   2016:271:00000 2016:272:00000 ns           -94.8638    0.4487
DSB  R    R    ADIS   C1P  C2P   2016:271:00000 2016:272:00000 ns            -9.8215    0.2310
DSB  R    R    ADIS   C1P  C1C   2016:271:00000 2016:272:00000 ns            -0.8352    0.1988
ISB  G    G    ALBH   C1W  C2W   2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ALBH   C1W  C2W   2016:271:00000 2016:272:00000 ns            13.6953    0.1612
DSB  G    G    ALBH   C1W  C1C   2016:271:00000 2016:272:00000 ns            -3.1868    0.1231
DSB  G    G    ALBH   C2W  C2C   2016:271:00000 2016:272:00000 ns            -8.2308    0.1961
ISB  R    R    ALBH   C1P  C2P   2016:271:00000 2016:272:00000 ns           -55.7435    0.3993
DSB  R    R    ALBH   C1P  C2P   2016:271:00000 2016:272:00000 ns            19.6774    0.2042
DSB  R    R    ALBH   C1P  C1C   2016:271:00000 2016:272:00000 ns            -1.8448    0.1787
```

```
DSB  R  R  ALBH  C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.8308    0.2300
...
ISB  G  G  ALIC  C1C  C2W  2016:271:00000 2016:272:00000 ns                       0         0
DSB  G  G  ALIC  C1C  C2W  2016:271:00000 2016:272:00000 ns                 21.4181    0.1638
DSB  G  G  ALIC  C2W  C2S  2016:271:00000 2016:272:00000 ns                 -9.2763    0.1996
ISB  R  R  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns                -19.3181    0.4176
DSB  R  R  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns                  5.4697    0.2132
DSB  R  R  ALIC  C2P  C2C  2016:271:00000 2016:272:00000 ns                 -3.2945    0.2399
ISB  E  E  ALIC  C1C  C5Q  2016:271:00000 2016:272:00000 ns                 44.1920    0.4919
DSB  E  E  ALIC  C1C  C5Q  2016:271:00000 2016:272:00000 ns                  1.0077    0.2771
DSB  E  E  ALIC  C1C  C7Q  2016:271:00000 2016:272:00000 ns                  8.1444    0.2709
DSB  E  E  ALIC  C1C  C8Q  2016:271:00000 2016:272:00000 ns                  5.2205    0.2726
ISB  C  C  ALIC  C2I  C7I  2016:271:00000 2016:272:00000 ns                 72.2615    0.4583
DSB  C  C  ALIC  C2I  C7I  2016:271:00000 2016:272:00000 ns                 26.3828    0.2383
...
ISB  G  G  ZIM3  C1C  C2X  2016:271:00000 2016:272:00000 ns                       0         0
DSB  G  G  ZIM3  C1C  C2X  2016:271:00000 2016:272:00000 ns                -20.2343    0.1512
DSB  G  G  ZIM3  C2X  C2W  2016:271:00000 2016:272:00000 ns                  6.1505    0.1825
ISB  R  R  ZIM3  C1P  C2P  2016:271:00000 2016:272:00000 ns                  9.5220    0.3778
DSB  R  R  ZIM3  C1P  C2P  2016:271:00000 2016:272:00000 ns                -11.1184    0.1929
DSB  R  R  ZIM3  C1P  C1C  2016:271:00000 2016:272:00000 ns                 -3.2306    0.1700
DSB  R  R  ZIM3  C2P  C2C  2016:271:00000 2016:272:00000 ns                  0.0556    0.2164
ISB  E  E  ZIM3  C1X  C5X  2016:271:00000 2016:272:00000 ns                 -0.6006    0.4517
DSB  E  E  ZIM3  C1X  C5X  2016:271:00000 2016:272:00000 ns                -13.0380    0.2542
ISB  C  C  ZIM3  C2I  C7I  2016:271:00000 2016:272:00000 ns                 37.5005    0.8087
DSB  C  C  ZIM3  C2I  C7I  2016:271:00000 2016:272:00000 ns                 18.1799    0.4108
DSB  C  C  ZIM3  C2I  C6I  2016:271:00000 2016:272:00000 ns                 53.3091    0.6519
ISB  G  G  ZIMJ  C1W  C2X  2016:271:00000 2016:272:00000 ns                       0         0
DSB  G  G  ZIMJ  C1W  C2X  2016:271:00000 2016:272:00000 ns                 -0.0825    0.1623
DSB  G  G  ZIMJ  C1W  C1C  2016:271:00000 2016:272:00000 ns                 -1.8525    0.1254
DSB  G  G  ZIMJ  C2X  C2W  2016:271:00000 2016:272:00000 ns                  8.2505    0.1966
ISB  R  R  ZIMJ  C1P  C2P  2016:271:00000 2016:272:00000 ns                -14.5386    0.4013
DSB  R  R  ZIMJ  C1P  C2P  2016:271:00000 2016:272:00000 ns                -15.1239    0.2053
DSB  R  R  ZIMJ  C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.3656    0.1803
DSB  R  R  ZIMJ  C2P  C2C  2016:271:00000 2016:272:00000 ns                  0.8492    0.2312
ISB  E  E  ZIMJ  C1X  C5X  2016:271:00000 2016:272:00000 ns                -27.5709    0.5482
DSB  E  E  ZIMJ  C1X  C5X  2016:271:00000 2016:272:00000 ns                -14.3721    0.3038
ISB  G  G  ZIMM  C1C  C2X  2016:271:00000 2016:272:00000 ns                       0         0
DSB  G  G  ZIMM  C1C  C2X  2016:271:00000 2016:272:00000 ns                -20.8771    0.2038
DSB  G  G  ZIMM  C2X  C2W  2016:271:00000 2016:272:00000 ns                  8.9665    0.2464
ISB  G  G  ZWE2  C1W  C2W  2016:271:00000 2016:272:00000 ns                       0         0
DSB  G  G  ZWE2  C1W  C2W  2016:271:00000 2016:272:00000 ns                  0.1164    0.2107
DSB  G  G  ZWE2  C1W  C1C  2016:271:00000 2016:272:00000 ns                 -3.1504    0.1583
-BIAS/SOLUTION
%=ENDBIA
```

A.6   Example 5: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results From (Dual-Frequency) Clock Analysis

Note: The GLONASS biases are treated in a GPS-like manner (composed of a station and a satellite component).

```
%=BIA 1.00 COD 2016:318:60608 IGS 2016:271:00000 2016:272:00000 R 00001372
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX CLOCK ANALYSIS FOR DAY 271, 2016                  13-NOV-16 16:49
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
```

```
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-----------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                       300
 PARAMETER_SPACING                        86400
 DETERMINATION_METHOD                    CLOCK_ANALYSIS
 BIAS_MODE                               RELATIVE
 TIME_SYSTEM                             G
 RECEIVER_CLOCK_REFERENCE_GNSS           G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   R  C1P  C2P
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   E  C1C  C5Q
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   C  C2I  C7I
-BIAS/DESCRIPTION
*-----------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G063 G01           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G063 G01           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.4723      0.0155
 DSB  G063 G01           C2W  C2C  2016:271:00000 2016:272:00000 ns                  1.5926      0.1327
 DSB  G063 G01           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ISB  G061 G02           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G061 G02           C1W  C1C  2016:271:00000 2016:272:00000 ns                 -1.3099      0.0171
 DSB  G061 G02           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ISB  G069 G03           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G069 G03           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.4089      0.0152
 DSB  G069 G03           C2W  C2C  2016:271:00000 2016:272:00000 ns                 -0.7304      0.1282
 DSB  G069 G03           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ...
 ISB  G064 G30           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G064 G30           C1W  C1C  2016:271:00000 2016:272:00000 ns                 -0.3393      0.0152
 DSB  G064 G30           C2W  C2C  2016:271:00000 2016:272:00000 ns                 -0.2521      0.1266
 DSB  G064 G30           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ISB  G052 G31           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G052 G31           C1W  C1C  2016:271:00000 2016:272:00000 ns                  0.8103      0.0158
 DSB  G052 G31           C2W  C2C  2016:271:00000 2016:272:00000 ns                 -0.0693      0.1912
 DSB  G052 G31           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ISB  G070 G32           C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G070 G32           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.7331      0.0158
 DSB  G070 G32           C2W  C2C  2016:271:00000 2016:272:00000 ns                 -0.9028      0.1341
 DSB  G070 G32           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -0.0000      0.0021
 ISB  R730 R01           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R730 R01           C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.0339      0.0200
 DSB  R730 R01           C2P  C2C  2016:271:00000 2016:272:00000 ns                  2.2959      0.1795
 DSB  R730 R01           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  R747 R02           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R747 R02           C1P  C1C  2016:271:00000 2016:272:00000 ns                  1.0759      0.0193
 DSB  R747 R02           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -1.4546      0.1919
 DSB  R747 R02           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  R744 R03           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R744 R03           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -1.5743      0.0190
 DSB  R744 R03           C2P  C2C  2016:271:00000 2016:272:00000 ns                  1.6890      0.1823
 DSB  R744 R03           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ...
 ISB  R731 R22           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R731 R22           C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.4498      0.0189
 DSB  R731 R22           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.7661      0.1775
 DSB  R731 R22           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  R732 R23           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R732 R23           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -1.7220      0.0211
 DSB  R732 R23           C2P  C2C  2016:271:00000 2016:272:00000 ns                  2.5214      0.1804
 DSB  R732 R23           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  R735 R24           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R735 R24           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -0.9716      0.0194
 DSB  R735 R24           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -1.3669      0.1810
 DSB  R735 R24           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  R801 R26           C1P  C2P  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  R801 R26           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  E208 E08           C1C  C5Q  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  E208 E08           C1C  C1X  2016:271:00000 2016:272:00000 ns                 -0.5731      0.0532
 DSB  E208 E08           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  E209 E09           C1C  C5Q  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  E209 E09           C1C  C1X  2016:271:00000 2016:272:00000 ns                 -0.1348      0.0449
 DSB  E209 E09           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ISB  E101 E11           C1C  C5Q  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  E101 E11           C1C  C1X  2016:271:00000 2016:272:00000 ns                 -0.7131      0.0466
 DSB  E101 E11           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  0.0000      0.0000
 ...
 ISB  E205 E24           C1C  C5Q  2016:271:00000 2016:272:00000 ns                       0           0
```

```
DSB  E205 E24       C1C C1X  2016:271:00000 2016:272:00000 ns          0.9095    0.1462
DSB  E205 E24       C1C C5Q  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
DSB  E205 E24       C5Q C5X  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  E203 E26       C1C C5Q  2016:271:00000 2016:272:00000 ns               0         0
DSB  E203 E26       C1C C1X  2016:271:00000 2016:272:00000 ns         -0.1575    0.0427
DSB  E203 E26       C1C C5Q  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  E206 E30       C1C C5Q  2016:271:00000 2016:272:00000 ns               0         0
DSB  E206 E30       C1C C1X  2016:271:00000 2016:272:00000 ns         -0.7945    0.0469
DSB  E206 E30       C1C C5Q  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C005 C06       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C005 C06       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C007 C07       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C007 C07       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C008 C08       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C008 C08       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
...
ISB  C013 C12       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C013 C12       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C015 C14       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C015 C14       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C017 C15       C2I C7I  2016:271:00000 2016:272:00000 ns               0         0
DSB  C017 C15       C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ABPO C1W C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ABPO C1W C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ADIS C1W C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ADIS C1W C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  R    R    ADIS C1P C2P  2016:271:00000 2016:272:00000 ns        -94.8476    0.2761
DSB  R    R    ADIS C1P C2P  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ALBH C1W C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ALBH C1W C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  R    R    ALBH C1P C2P  2016:271:00000 2016:272:00000 ns        -55.7377    0.2606
DSB  R    R    ALBH C1P C2P  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
...
ISB  G    G    ALIC C1C C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ALIC C1C C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  R    R    ALIC C1C C2P  2016:271:00000 2016:272:00000 ns        -19.4217    0.2771
DSB  R    R    ALIC C1C C2P  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  E    E    ALIC C1C C5Q  2016:271:00000 2016:272:00000 ns         43.3178    0.3565
DSB  E    E    ALIC C1C C5Q  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C    C    ALIC C2I C7I  2016:271:00000 2016:272:00000 ns         40.5556    0.3134
DSB  C    C    ALIC C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
...
ISB  G    G    ZIM3 C1C C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ZIM3 C1C C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  R    R    ZIM3 C1P C2P  2016:271:00000 2016:272:00000 ns          9.5410    0.2510
DSB  R    R    ZIM3 C1P C2P  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  E    E    ZIM3 C1X C5X  2016:271:00000 2016:272:00000 ns         -0.3950    0.3290
DSB  E    E    ZIM3 C1X C5X  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  C    C    ZIM3 C2I C7I  2016:271:00000 2016:272:00000 ns          5.7880    0.6481
DSB  C    C    ZIM3 C2I C7I  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ZIMJ C1W C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ZIMJ C1W C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  R    R    ZIMJ C1P C2P  2016:271:00000 2016:272:00000 ns        -14.5380    0.2610
DSB  R    R    ZIMJ C1P C2P  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  E    E    ZIMJ C1X C5X  2016:271:00000 2016:272:00000 ns        -27.2796    0.4313
DSB  E    E    ZIMJ C1X C5X  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ZIMM C1C C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ZIMM C1C C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
ISB  G    G    ZWE2 C1W C2W  2016:271:00000 2016:272:00000 ns               0         0
DSB  G    G    ZWE2 C1W C2W  2016:271:00000 2016:272:00000 ns          0.0000    0.0000
-BIAS/SOLUTION
%=ENDBIA
```

A.7 Example 6: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results From (Multi-Frequency) Ionosphere Analysis

Note: The GLONASS biases are treated in a GPS-like manner (composed of a station and a satellite component).

```
%=BIA 1.00 COD 2016:317:53400 IGS 2016:271:00000 2016:272:00000 R 00000747
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX IONOSPHERE ANALYSIS FOR DAY 271, 2016            12-NOV-16 14:49
*-------------------------------------------------------------------------------
+FILE/REFERENCE
```

```
*INFO_TYPE_____  INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____  VALUE(S)_____
 OBSERVATION_SAMPLING                  300
 PARAMETER_SPACING                     86400
 DETERMINATION_METHOD                  IONOSPHERE_ANALYSIS
 BIAS_MODE                             RELATIVE
 TIME_SYSTEM                           G
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 DSB  G063 G01           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.4933      0.0406
 DSB  G063 G01           C2W  C2C  2016:271:00000 2016:272:00000 ns                  8.5221      0.1138
 DSB  G063 G01           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -7.4615      0.0382
 DSB  G061 G02           C1W  C1C  2016:271:00000 2016:272:00000 ns                 -1.2453      0.0445
 DSB  G061 G02           C1W  C2W  2016:271:00000 2016:272:00000 ns                  8.9998      0.0419
 DSB  G069 G03           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.2470      0.0400
 DSB  G069 G03           C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.0166      0.1068
 DSB  G069 G03           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -5.0692      0.0378
 ...
 DSB  G064 G30           C1W  C1C  2016:271:00000 2016:272:00000 ns                 -0.3173      0.0395
 DSB  G064 G30           C2W  C2C  2016:271:00000 2016:272:00000 ns                  7.0553      0.1073
 DSB  G064 G30           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -6.3697      0.0373
 DSB  G052 G31           C1W  C1C  2016:271:00000 2016:272:00000 ns                  0.8940      0.0417
 DSB  G052 G31           C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.5793      0.1581
 DSB  G052 G31           C1W  C2W  2016:271:00000 2016:272:00000 ns                  4.6719      0.0394
 DSB  G070 G32           C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.5936      0.0410
 DSB  G070 G32           C2W  C2C  2016:271:00000 2016:272:00000 ns                  5.9449      0.1159
 DSB  G070 G32           C1W  C2W  2016:271:00000 2016:272:00000 ns                 -4.4494      0.0386
 DSB  R730 R01           C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.5332      0.0453
 DSB  R730 R01           C2P  C2C  2016:271:00000 2016:272:00000 ns                  2.2418      0.1467
 DSB  R730 R01           C1P  C2P  2016:271:00000 2016:272:00000 ns                 -5.6055      0.0417
 DSB  R747 R02           C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.5266      0.0438
 DSB  R747 R02           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.0338      0.1552
 DSB  R747 R02           C1P  C2P  2016:271:00000 2016:272:00000 ns                 -0.6524      0.0405
 DSB  R744 R03           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -1.1271      0.0434
 DSB  R744 R03           C2P  C2C  2016:271:00000 2016:272:00000 ns                  1.1673      0.1444
 DSB  R744 R03           C1P  C2P  2016:271:00000 2016:272:00000 ns                  3.8998      0.0403
 ...
 DSB  R731 R22           C1P  C1C  2016:271:00000 2016:272:00000 ns                  0.1445      0.0436
 DSB  R731 R22           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -0.4808      0.1418
 DSB  R731 R22           C1P  C2P  2016:271:00000 2016:272:00000 ns                 -0.7309      0.0406
 DSB  R732 R23           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -1.1545      0.0485
 DSB  R732 R23           C2P  C2C  2016:271:00000 2016:272:00000 ns                  2.0525      0.1432
 DSB  R732 R23           C1P  C2P  2016:271:00000 2016:272:00000 ns                 -7.2153      0.0451
 DSB  R735 R24           C1P  C1C  2016:271:00000 2016:272:00000 ns                 -0.8244      0.0455
 DSB  R735 R24           C2P  C2C  2016:271:00000 2016:272:00000 ns                 -1.9135      0.1419
 DSB  R735 R24           C1P  C2P  2016:271:00000 2016:272:00000 ns                  5.5760      0.0426
 DSB  R801 R26           C1P  C2P  2016:271:00000 2016:272:00000 ns                  0.4175      0.1395
 DSB  E208 E08           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  7.8875      0.1246
 DSB  E208 E08           C5Q  C5X  2016:271:00000 2016:272:00000 ns                 -9.0287      0.1128
 DSB  E209 E09           C1C  C1X  2016:271:00000 2016:272:00000 ns                 -9.4658      0.0538
 DSB  E209 E09           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  3.9917      0.0905
 DSB  E101 E11           C1C  C1X  2016:271:00000 2016:272:00000 ns                -36.8528      0.0555
 DSB  E101 E11           C1C  C5Q  2016:271:00000 2016:272:00000 ns                 15.9612      0.0956
 ...
 DSB  E205 E24           C1C  C1X  2016:271:00000 2016:272:00000 ns                 62.6121      0.1871
 DSB  E205 E24           C1C  C5Q  2016:271:00000 2016:272:00000 ns                -29.7918      0.3499
 DSB  E205 E24           C5Q  C5X  2016:271:00000 2016:272:00000 ns                 60.1022      0.3114
 DSB  E203 E26           C1C  C1X  2016:271:00000 2016:272:00000 ns                 -1.7249      0.0528
 DSB  E203 E26           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  0.6259      0.0945
```

```
DSB  E206 E30           C1C C1X  2016:271:00000 2016:272:00000 ns          -8.0813      0.0579
DSB  E206 E30           C1C C5Q  2016:271:00000 2016:272:00000 ns           3.0516      0.1032
DSB  C005 C06           C2I C7I  2016:271:00000 2016:272:00000 ns           5.7892      0.0916
DSB  C007 C07           C2I C7I  2016:271:00000 2016:272:00000 ns           9.0780      0.1014
DSB  C008 C08           C2I C7I  2016:271:00000 2016:272:00000 ns           7.3133      0.1019
...
DSB  C013 C12           C2I C7I  2016:271:00000 2016:272:00000 ns          -0.9965      0.0860
DSB  C015 C14           C2I C7I  2016:271:00000 2016:272:00000 ns           1.0051      0.0929
DSB  C017 C15           C2I C7I  2016:271:00000 2016:272:00000 ns         -16.8447      0.0781
DSB  G    G    ABPO     C1W C2W  2016:271:00000 2016:272:00000 ns          -7.2511      0.5391
DSB  G    G    ADIS     C1W C2W  2016:271:00000 2016:272:00000 ns          -1.0699      0.4168
DSB  R    R    ADIS     C1P C2P  2016:271:00000 2016:272:00000 ns          -9.9958      0.4106
DSB  G    G    ALBH     C1W C2W  2016:271:00000 2016:272:00000 ns          13.6037      0.3644
DSB  R    R    ALBH     C1P C2P  2016:271:00000 2016:272:00000 ns          19.5869      0.3501
...
DSB  G    G    ALIC     C1C C2W  2016:271:00000 2016:272:00000 ns          21.5845      0.3646
DSB  R    R    ALIC     C1C C2P  2016:271:00000 2016:272:00000 ns           5.6251      0.3568
DSB  E    E    ALIC     C1C C5Q  2016:271:00000 2016:272:00000 ns           1.2516      0.4370
DSB  C    C    ALIC     C2I C7I  2016:271:00000 2016:272:00000 ns          26.5532      0.3890
...
DSB  G    G    ZIM3     C1C C2W  2016:271:00000 2016:272:00000 ns         -14.0309      0.3163
DSB  R    R    ZIM3     C1P C2P  2016:271:00000 2016:272:00000 ns         -11.0850      0.3033
DSB  E    E    ZIM3     C1X C5X  2016:271:00000 2016:272:00000 ns         -13.0087      0.3651
DSB  C    C    ZIM3     C2I C7I  2016:271:00000 2016:272:00000 ns          18.2243      0.5064
DSB  G    G    ZIMJ     C1W C2W  2016:271:00000 2016:272:00000 ns           7.8852      0.3433
DSB  R    R    ZIMJ     C1P C2P  2016:271:00000 2016:272:00000 ns         -15.3237      0.3273
DSB  E    E    ZIMJ     C1X C5X  2016:271:00000 2016:272:00000 ns         -14.6920      0.3905
DSB  G    G    ZIMM     C1C C2W  2016:271:00000 2016:272:00000 ns         -11.9106      0.4571
DSB  G    G    ZWE2     C1W C2W  2016:271:00000 2016:272:00000 ns           0.0871      0.4705
-BIAS/SOLUTION
%=ENDBIA
```

A.8 Example 7: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results for the Satellites and Stations

Note: The GLONASS biases are treated specific to each station-satellite link.

A.8.1 Example 7A: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results Using Absolute Parameter Representation

```
%=BIA 1.00 COD 2016:318:64695 IGS 2016:271:00000 2016:272:00000 A 00010102
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX BIAS COMBINATION RESULTS FOR DAY 271, 2016        13-NOV-16 17:30
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____ INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
```

```
                OBSERVATION_SAMPLING                           300
                PARAMETER_SPACING                            86400
                DETERMINATION_METHOD               COMBINED_ANALYSIS
                BIAS_MODE                         ABSOLUTE
                TIME_SYSTEM                       G
                RECEIVER_CLOCK_REFERENCE_GNSS     G
                SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
                SATELLITE_CLOCK_REFERENCE_OBSERVABLES   E  C1C  C5Q
                SATELLITE_CLOCK_REFERENCE_OBSERVABLES   C  C2I  C7I
               -BIAS/DESCRIPTION
               *-------------------------------------------------------------------------------
               +BIAS/SOLUTION
               *BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
                OSB  G063 G01           C1C       2016:271:00000 2016:272:00000 ns              10.3278      0.0138
                OSB  G063 G01           C1W       2016:271:00000 2016:272:00000 ns              11.7029      0.0093
                OSB  G063 G01           C2C       2016:271:00000 2016:272:00000 ns              10.8012      0.0463
                OSB  G063 G01           C2W       2016:271:00000 2016:272:00000 ns              19.2740      0.0151
                OSB  G061 G02           C1C       2016:271:00000 2016:272:00000 ns             -12.6159      0.0152
                OSB  G061 G02           C1W       2016:271:00000 2016:272:00000 ns             -13.9221      0.0102
                OSB  G061 G02           C2W       2016:271:00000 2016:272:00000 ns             -22.9289      0.0166
                OSB  G069 G03           C1C       2016:271:00000 2016:272:00000 ns               6.4232      0.0137
                OSB  G069 G03           C1W       2016:271:00000 2016:272:00000 ns               7.8228      0.0093
                OSB  G069 G03           C2C       2016:271:00000 2016:272:00000 ns               6.9164      0.0442
                OSB  G069 G03           C2W       2016:271:00000 2016:272:00000 ns              12.8838      0.0150
                ...
                OSB  G064 G30           C1C       2016:271:00000 2016:272:00000 ns              10.3236      0.0136
                OSB  G064 G30           C1W       2016:271:00000 2016:272:00000 ns               9.8971      0.0092
                OSB  G064 G30           C2C       2016:271:00000 2016:272:00000 ns               9.5525      0.0439
                OSB  G064 G30           C2W       2016:271:00000 2016:272:00000 ns              16.2999      0.0148
                OSB  G052 G31           C1C       2016:271:00000 2016:272:00000 ns              -8.0663      0.0143
                OSB  G052 G31           C1W       2016:271:00000 2016:272:00000 ns              -7.1970      0.0096
                OSB  G052 G31           C2C       2016:271:00000 2016:272:00000 ns             -18.3793      0.0660
                OSB  G052 G31           C2W       2016:271:00000 2016:272:00000 ns             -11.8531      0.0156
                OSB  G070 G32           C1C       2016:271:00000 2016:272:00000 ns               5.2391      0.0141
                OSB  G070 G32           C1W       2016:271:00000 2016:272:00000 ns               6.8678      0.0095
                OSB  G070 G32           C2C       2016:271:00000 2016:272:00000 ns               5.1718      0.0471
                OSB  G070 G32           C2W       2016:271:00000 2016:272:00000 ns              11.3109      0.0154
                OSB  E208 E08           C1C       2016:271:00000 2016:272:00000 ns              -9.9580      0.0319
                OSB  E208 E08           C1X       2016:271:00000 2016:272:00000 ns              -9.7008      0.0746
                OSB  E208 E08           C5Q       2016:271:00000 2016:272:00000 ns             -17.8574      0.0572
                OSB  E208 E08           C5X       2016:271:00000 2016:272:00000 ns             -18.4332      0.0802
                OSB  E209 E09           C1C       2016:271:00000 2016:272:00000 ns              -5.2116      0.0228
                OSB  E209 E09           C1X       2016:271:00000 2016:272:00000 ns              -5.2992      0.0641
                OSB  E209 E09           C5Q       2016:271:00000 2016:272:00000 ns              -9.3458      0.0407
                OSB  E209 E09           C5X       2016:271:00000 2016:272:00000 ns              -9.6753      0.0707
                OSB  E101 E11           C1C       2016:271:00000 2016:272:00000 ns             -20.2840      0.0242
                OSB  E101 E11           C1X       2016:271:00000 2016:272:00000 ns             -19.6743      0.0661
                OSB  E101 E11           C5Q       2016:271:00000 2016:272:00000 ns             -36.3747      0.0433
                OSB  E101 E11           C5X       2016:271:00000 2016:272:00000 ns             -36.4661      0.0725
                ...
                OSB  E205 E24           C1C       2016:271:00000 2016:272:00000 ns              38.5336      0.0844
                OSB  E205 E24           C1X       2016:271:00000 2016:272:00000 ns              38.5149      0.2032
                OSB  E205 E24           C5Q       2016:271:00000 2016:272:00000 ns              69.1012      0.1513
                OSB  E205 E24           C5X       2016:271:00000 2016:272:00000 ns              70.5856      0.2170
                OSB  E203 E26           C1C       2016:271:00000 2016:272:00000 ns              -0.8090      0.0238
                OSB  E203 E26           C1X       2016:271:00000 2016:272:00000 ns              -0.4850      0.0604
                OSB  E203 E26           C5Q       2016:271:00000 2016:272:00000 ns              -1.4508      0.0426
                OSB  E203 E26           C5X       2016:271:00000 2016:272:00000 ns              -1.3323      0.0656
                OSB  E206 E30           C1C       2016:271:00000 2016:272:00000 ns              -3.8351      0.0263
                OSB  E206 E30           C1X       2016:271:00000 2016:272:00000 ns              -3.3128      0.0661
                OSB  E206 E30           C5Q       2016:271:00000 2016:272:00000 ns              -6.8774      0.0472
                OSB  E206 E30           C5X       2016:271:00000 2016:272:00000 ns              -7.5079      0.0718
                OSB  C005 C06           C2I       2016:271:00000 2016:272:00000 ns              -8.5051      0.0249
                OSB  C005 C06           C7I       2016:271:00000 2016:272:00000 ns             -14.2241      0.0416
                OSB  C007 C07           C2I       2016:271:00000 2016:272:00000 ns             -13.3816      0.0276
                OSB  C007 C07           C7I       2016:271:00000 2016:272:00000 ns             -22.3796      0.0460
                OSB  C008 C08           C2I       2016:271:00000 2016:272:00000 ns             -11.1308      0.0276
                OSB  C008 C08           C7I       2016:271:00000 2016:272:00000 ns             -18.6153      0.0460
                ...
                OSB  C013 C12           C2I       2016:271:00000 2016:272:00000 ns               1.5571      0.0236
                OSB  C013 C12           C7I       2016:271:00000 2016:272:00000 ns               2.6042      0.0394
                OSB  C015 C14           C2I       2016:271:00000 2016:272:00000 ns              -1.3611      0.0256
                OSB  C015 C14           C7I       2016:271:00000 2016:272:00000 ns              -2.2762      0.0427
                OSB  C017 C15           C2I       2016:271:00000 2016:272:00000 ns              24.8429      0.0212
                OSB  C017 C15           C7I       2016:271:00000 2016:272:00000 ns              41.5478      0.0353
                OSB  G    G   ABPO      C1W       2016:271:00000 2016:272:00000 ns              10.2975      0.0350
                OSB  G    G   ABPO      C2W       2016:271:00000 2016:272:00000 ns              16.9594      0.0576
                OSB  G    G   ADIS      C1W       2016:271:00000 2016:272:00000 ns               0.5612      0.0338
                OSB  G    G   ADIS      C2W       2016:271:00000 2016:272:00000 ns               0.9242      0.0557
                OSB  R730 R01 ADIS      C1P       2016:271:00000 2016:272:00000 ns             -70.7927      0.2634
                OSB  R730 R01 ADIS      C2P       2016:271:00000 2016:272:00000 ns             -59.0991      0.3144
                OSB  R747 R02 ADIS      C1P       2016:271:00000 2016:272:00000 ns             -72.7564      0.2523
                OSB  R747 R02 ADIS      C2P       2016:271:00000 2016:272:00000 ns             -67.6211      0.3000
                OSB  R744 R03 ADIS      C1P       2016:271:00000 2016:272:00000 ns             -89.4622      0.2740
```

```
OSB   R744 R03 ADIS     C2P        2016:271:00000 2016:272:00000 ns             -84.7405    0.3330
...
OSB   R731 R22 ADIS     C1P        2016:271:00000 2016:272:00000 ns             -77.8769    0.2848
OSB   R731 R22 ADIS     C2P        2016:271:00000 2016:272:00000 ns             -68.8814    0.3448
OSB   R732 R23 ADIS     C1P        2016:271:00000 2016:272:00000 ns             -71.4845    0.3013
OSB   R732 R23 ADIS     C2P        2016:271:00000 2016:272:00000 ns             -56.7297    0.3688
OSB   R735 R24 ADIS     C1P        2016:271:00000 2016:272:00000 ns             -89.2835    0.2987
OSB   R735 R24 ADIS     C2P        2016:271:00000 2016:272:00000 ns             -87.7182    0.3551
OSB   G    G    ALBH     C1W        2016:271:00000 2016:272:00000 ns             -21.9000    0.0282
OSB   G    G    ALBH     C2W        2016:271:00000 2016:272:00000 ns             -36.0681    0.0465
OSB   R730 R01 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -79.1270    0.2125
OSB   R730 R01 ALBH     C2P        2016:271:00000 2016:272:00000 ns             -91.6685    0.2512
OSB   R747 R02 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -87.0687    0.2044
OSB   R747 R02 ALBH     C2P        2016:271:00000 2016:272:00000 ns            -104.0878    0.2370
OSB   R744 R03 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -90.1912    0.2253
OSB   R744 R03 ALBH     C2P        2016:271:00000 2016:272:00000 ns            -119.5990    0.2661
...
OSB   R731 R22 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -87.7648    0.2360
OSB   R731 R22 ALBH     C2P        2016:271:00000 2016:272:00000 ns            -103.9171    0.2790
OSB   R732 R23 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -76.7091    0.2386
OSB   R732 R23 ALBH     C2P        2016:271:00000 2016:272:00000 ns             -90.4797    0.2807
OSB   R735 R24 ALBH     C1P        2016:271:00000 2016:272:00000 ns             -96.1746    0.2225
OSB   R735 R24 ALBH     C2P        2016:271:00000 2016:272:00000 ns            -123.6701    0.2608
...
OSB   G    G    ALIC     C1C        2016:271:00000 2016:272:00000 ns             -32.8312    0.0293
OSB   G    G    ALIC     C2W        2016:271:00000 2016:272:00000 ns             -54.0711    0.0483
OSB   R730 R01 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -18.4693    0.3293
OSB   R730 R01 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -17.5511    0.4007
OSB   R747 R02 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -27.9960    0.2441
OSB   R747 R02 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -31.9897    0.2896
OSB   R744 R03 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -32.5636    0.2385
OSB   R744 R03 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -43.5283    0.2865
...
OSB   R731 R22 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -27.6741    0.2538
OSB   R731 R22 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -32.1567    0.3042
OSB   R732 R23 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -16.2039    0.2643
OSB   R732 R23 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -16.1039    0.3181
OSB   R735 R24 ALIC     C1C        2016:271:00000 2016:272:00000 ns             -36.1808    0.2552
OSB   R735 R24 ALIC     C2P        2016:271:00000 2016:272:00000 ns             -47.7822    0.3048
OSB   E    E    ALIC     C1C        2016:271:00000 2016:272:00000 ns              43.1103    0.0902
OSB   E    E    ALIC     C5Q        2016:271:00000 2016:272:00000 ns              42.3377    0.1111
OSB   C    C    ALIC     C2I        2016:271:00000 2016:272:00000 ns              33.2044    0.0754
OSB   C    C    ALIC     C7I        2016:271:00000 2016:272:00000 ns               7.1025    0.0898
...
OSB   G    G    ZIM3     C1C        2016:271:00000 2016:272:00000 ns              21.1314    0.0242
OSB   G    G    ZIM3     C2W        2016:271:00000 2016:272:00000 ns              34.8023    0.0398
OSB   R730 R01 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              35.3327    0.2269
OSB   R730 R01 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              50.5692    0.2721
OSB   R747 R02 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              29.7395    0.2448
OSB   R747 R02 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              39.1639    0.2940
OSB   R744 R03 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              16.9745    0.2316
OSB   R744 R03 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              25.9818    0.2764
...
OSB   R731 R22 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              29.1750    0.2216
OSB   R731 R22 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              38.9350    0.2644
OSB   R732 R23 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              35.0787    0.2247
OSB   R732 R23 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              54.0604    0.2672
OSB   R735 R24 ZIM3     C1P        2016:271:00000 2016:272:00000 ns              15.7359    0.2261
OSB   R735 R24 ZIM3     C2P        2016:271:00000 2016:272:00000 ns              21.0274    0.2697
OSB   E    E    ZIM3     C1X        2016:271:00000 2016:272:00000 ns              16.1695    0.0812
OSB   E    E    ZIM3     C5X        2016:271:00000 2016:272:00000 ns              28.6800    0.0968
OSB   C    C    ZIM3     C2I        2016:271:00000 2016:272:00000 ns               9.3773    0.1565
OSB   C    C    ZIM3     C7I        2016:271:00000 2016:272:00000 ns              -9.4678    0.1914
OSB   G    G    ZIMJ     C1W        2016:271:00000 2016:272:00000 ns             -12.9759    0.0257
OSB   G    G    ZIMJ     C2W        2016:271:00000 2016:272:00000 ns             -21.3706    0.0423
OSB   R730 R01 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns              16.6035    0.2310
OSB   R730 R01 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns              36.6292    0.2783
OSB   R747 R02 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns              11.5609    0.2443
OSB   R747 R02 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns              24.4054    0.2937
OSB   R744 R03 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns               1.2235    0.2335
OSB   R744 R03 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns              14.3774    0.2781
...
OSB   R731 R22 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns              11.1871    0.2238
OSB   R731 R22 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns              24.2708    0.2663
OSB   R732 R23 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns              18.0685    0.3168
OSB   R732 R23 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns              40.9095    0.3842
OSB   R735 R24 ZIMJ     C1P        2016:271:00000 2016:272:00000 ns              -2.1929    0.2323
OSB   R735 R24 ZIMJ     C2P        2016:271:00000 2016:272:00000 ns               8.4616    0.2751
OSB   E    E    ZIMJ     C1X        2016:271:00000 2016:272:00000 ns              -8.7924    0.1016
OSB   E    E    ZIMJ     C5X        2016:271:00000 2016:272:00000 ns               5.2047    0.1140
OSB   G    G    ZIMM     C1C        2016:271:00000 2016:272:00000 ns              17.9179    0.0237
OSB   G    G    ZIMM     C2W        2016:271:00000 2016:272:00000 ns              29.5098    0.0391
OSB   G    G    ZWE2     C1W        2016:271:00000 2016:272:00000 ns               0.3888    0.0249
OSB   G    G    ZWE2     C2W        2016:271:00000 2016:272:00000 ns               0.6403    0.0410
```

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```
 -BIAS/SOLUTION
 %=ENDBIA
```

A.8.2 Example 7B: GPS/GLONASS/Galileo/BeiDou 1-Day Bias Results Using Relative Parameter Representation

```
%=BIA 1.00 COD 2016:318:64695 IGS 2016:271:00000 2016:272:00000 R 00010102
*-------------------------------------------------------------------------------
* Bias Solution INdependent EXchange Format (Bias-SINEX)
*-------------------------------------------------------------------------------
* CODE'S MGEX BIAS COMBINATION RESULTS FOR DAY 271, 2016        13-NOV-16 17:30
*-------------------------------------------------------------------------------
+FILE/REFERENCE
*INFO_TYPE_____ INFO_____
 DESCRIPTION        CODE, Astronomical Institute, University of Bern
 OUTPUT             CODE IGS MGEX 1-day bias solution for G/R/E/C
 CONTACT            code@aiub.unibe.ch
 SOFTWARE           Bernese GNSS Software Version 5.3
 HARDWARE           UBELIX: Linux, x86_64
 INPUT              CODE IGS MGEX 1-day bias solution(s) for G/R/E/C
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
*PRODUCT_REFERENCE_____
 CODE product series for the IGS MGEX project.
 Published by Astronomical Institute, University of Bern.
 URL: http://www.aiub.unibe.ch/download/CODE_MGEX
 DOI: 10.7892/boris.75882.
-FILE/COMMENT
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 COD Center for Orbit Determination in Europe, AIUB, Switzerland
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                         300
 PARAMETER_SPACING                          86400
 DETERMINATION_METHOD                    COMBINED_ANALYSIS
 BIAS_MODE                               RELATIVE
 TIME_SYSTEM                             G
 RECEIVER_CLOCK_REFERENCE_GNSS           G
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   G  C1W  C2W
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   E  C1C  C5Q
 SATELLITE_CLOCK_REFERENCE_OBSERVABLES   C  C2I  C7I
-BIAS/DESCRIPTION
*-------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 ISB  G063 G01          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G063 G01          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.3751      0.0167
 DSB  G063 G01          C2W  C2C  2016:271:00000 2016:272:00000 ns                  8.4729      0.0487
 DSB  G063 G01          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -7.5711      0.0177
 ISB  G061 G02          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G061 G02          C1W  C1C  2016:271:00000 2016:272:00000 ns                 -1.3062      0.0183
 DSB  G061 G02          C1W  C2W  2016:271:00000 2016:272:00000 ns                  9.0068      0.0195
 ISB  G069 G03          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G069 G03          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.3996      0.0166
 DSB  G069 G03          C2W  C2C  2016:271:00000 2016:272:00000 ns                  5.9674      0.0467
 DSB  G069 G03          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -5.0609      0.0176
 ...
 ISB  G064 G30          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G064 G30          C1W  C1C  2016:271:00000 2016:272:00000 ns                 -0.4265      0.0164
 DSB  G064 G30          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.7474      0.0463
 DSB  G064 G30          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -6.4028      0.0175
 ISB  G052 G31          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G052 G31          C1W  C1C  2016:271:00000 2016:272:00000 ns                  0.8693      0.0172
 DSB  G052 G31          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.5262      0.0678
 DSB  G052 G31          C1W  C2W  2016:271:00000 2016:272:00000 ns                  4.6561      0.0183
 ISB  G070 G32          C1W  C2W  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  G070 G32          C1W  C1C  2016:271:00000 2016:272:00000 ns                  1.6287      0.0171
 DSB  G070 G32          C2W  C2C  2016:271:00000 2016:272:00000 ns                  6.1391      0.0496
 DSB  G070 G32          C1W  C2W  2016:271:00000 2016:272:00000 ns                 -4.4431      0.0181
 ISB  E208 E08          C1C  C5Q  2016:271:00000 2016:272:00000 ns                       0           0
 DSB  E208 E08          C1C  C1X  2016:271:00000 2016:272:00000 ns                 -0.2572      0.0811
 DSB  E208 E08          C1C  C5Q  2016:271:00000 2016:272:00000 ns                  7.8994      0.0655
```

```
DSB  E208 E08        C5Q  C5X  2016:271:00000 2016:272:00000 ns            0.5758    0.0985
ISB  E209 E09        C1C  C5Q  2016:271:00000 2016:272:00000 ns                 0         0
DSB  E209 E09        C1C  C1X  2016:271:00000 2016:272:00000 ns            0.0877    0.0680
DSB  E209 E09        C1C  C5Q  2016:271:00000 2016:272:00000 ns            4.1342    0.0466
DSB  E209 E09        C5Q  C5X  2016:271:00000 2016:272:00000 ns            0.3295    0.0816
ISB  E101 E11        C1C  C5Q  2016:271:00000 2016:272:00000 ns                 0         0
DSB  E101 E11        C1C  C1X  2016:271:00000 2016:272:00000 ns           -0.6097    0.0704
DSB  E101 E11        C1C  C5Q  2016:271:00000 2016:272:00000 ns           16.0907    0.0496
DSB  E101 E11        C5Q  C5X  2016:271:00000 2016:272:00000 ns            0.0915    0.0844
...
ISB  E205 E24        C1C  C5Q  2016:271:00000 2016:272:00000 ns                 0         0
DSB  E205 E24        C1C  C1X  2016:271:00000 2016:272:00000 ns            0.0188    0.2200
DSB  E205 E24        C1C  C5Q  2016:271:00000 2016:272:00000 ns          -30.5676    0.1732
DSB  E205 E24        C5Q  C5X  2016:271:00000 2016:272:00000 ns           -1.4844    0.2646
ISB  E203 E26        C1C  C5Q  2016:271:00000 2016:272:00000 ns                 0         0
DSB  E203 E26        C1C  C1X  2016:271:00000 2016:272:00000 ns           -0.3240    0.0649
DSB  E203 E26        C1C  C5Q  2016:271:00000 2016:272:00000 ns            0.6418    0.0488
DSB  E203 E26        C5Q  C5X  2016:271:00000 2016:272:00000 ns           -0.1185    0.0782
ISB  E206 E30        C1C  C5Q  2016:271:00000 2016:272:00000 ns                 0         0
DSB  E206 E30        C1C  C1X  2016:271:00000 2016:272:00000 ns           -0.5223    0.0711
DSB  E206 E30        C1C  C5Q  2016:271:00000 2016:272:00000 ns            3.0423    0.0540
DSB  E206 E30        C5Q  C5X  2016:271:00000 2016:272:00000 ns            0.6305    0.0859
ISB  C005 C06        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C005 C06        C2I  C7I  2016:271:00000 2016:272:00000 ns            5.7190    0.0485
ISB  C007 C07        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C007 C07        C2I  C7I  2016:271:00000 2016:272:00000 ns            8.9980    0.0536
ISB  C008 C08        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C008 C08        C2I  C7I  2016:271:00000 2016:272:00000 ns            7.4845    0.0537
...
ISB  C013 C12        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C013 C12        C2I  C7I  2016:271:00000 2016:272:00000 ns           -1.0471    0.0460
ISB  C015 C14        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C015 C14        C2I  C7I  2016:271:00000 2016:272:00000 ns            0.9152    0.0498
ISB  C017 C15        C2I  C7I  2016:271:00000 2016:272:00000 ns                 0         0
DSB  C017 C15        C2I  C7I  2016:271:00000 2016:272:00000 ns          -16.7049    0.0412
ISB  G    G    ABPO  C1W  C2W  2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ABPO  C1W  C2W  2016:271:00000 2016:272:00000 ns           -6.6619    0.0674
ISB  G    G    ADIS  C1W  C2W  2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ADIS  C1W  C2W  2016:271:00000 2016:272:00000 ns           -0.3630    0.0651
ISB  R730 R01  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -88.6985    0.8224
DSB  R730 R01  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -11.6936    0.4102
ISB  R747 R02  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -80.6197    0.7867
DSB  R747 R02  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns           -5.1353    0.3920
ISB  R744 R03  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -96.6923    0.8608
DSB  R744 R03  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns           -4.7217    0.4313
...
ISB  R731 R22  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -91.6512    0.8936
DSB  R731 R22  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns           -8.9955    0.4473
ISB  R732 R23  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -94.0777    0.9490
DSB  R732 R23  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -14.7547    0.4762
ISB  R735 R24  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns          -91.6802    0.9313
DSB  R735 R24  ADIS  C1P  C2P  2016:271:00000 2016:272:00000 ns           -1.5652    0.4640
ISB  G    G    ALBH  C1W  C2W  2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ALBH  C1W  C2W  2016:271:00000 2016:272:00000 ns           14.1681    0.0544
ISB  R730 R01  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -59.9230    0.6612
DSB  R730 R01  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           12.5414    0.3290
ISB  R747 R02  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -61.0082    0.6321
DSB  R747 R02  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           17.0191    0.3130
ISB  R744 R03  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -45.1605    0.7010
DSB  R744 R03  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           29.4078    0.3487
...
ISB  R731 R22  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -63.0314    0.7344
DSB  R731 R22  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           16.1524    0.3654
ISB  R732 R23  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -55.6228    0.7412
DSB  R732 R23  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           13.7706    0.3683
ISB  R735 R24  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns          -54.0720    0.6905
DSB  R735 R24  ALBH  C1P  C2P  2016:271:00000 2016:272:00000 ns           27.4955    0.3429
...
ISB  G    G    ALIC  C1C  C2W  2016:271:00000 2016:272:00000 ns                 0         0
DSB  G    G    ALIC  C1C  C2W  2016:271:00000 2016:272:00000 ns           21.2399    0.0565
ISB  R730 R01  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -19.8752    1.0350
DSB  R730 R01  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns           -0.9182    0.5186
ISB  R747 R02  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -21.8808    0.7606
DSB  R747 R02  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns            3.9936    0.3788
ISB  R744 R03  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -15.7739    0.7462
DSB  R744 R03  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns           10.9647    0.3728
...
ISB  R731 R22  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -20.8100    0.7936
DSB  R731 R22  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns            4.4827    0.3962
ISB  R732 R23  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -16.3569    0.8275
DSB  R732 R23  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns           -0.0999    0.4135
ISB  R735 R24  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns          -18.4162    0.7969
DSB  R735 R24  ALIC  C1C  C2P  2016:271:00000 2016:272:00000 ns           11.6014    0.3975
ISB  E    E    ALIC  C1C  C5Q  2016:271:00000 2016:272:00000 ns           44.1442    0.2581
```

```
DSB  E    E    ALIC   C1C  C5Q  2016:271:00000 2016:272:00000 ns              0.7727    0.1431
ISB  C    C    ALIC   C2I  C7I  2016:271:00000 2016:272:00000 ns             72.0222    0.2302
DSB  C    C    ALIC   C2I  C7I  2016:271:00000 2016:272:00000 ns             26.1019    0.1173
...
ISB  G    G    ZIM3   C1C  C2W  2016:271:00000 2016:272:00000 ns                   0         0
DSB  G    G    ZIM3   C1C  C2W  2016:271:00000 2016:272:00000 ns            -13.6709    0.0465
ISB  R730 R01  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             12.0018    0.7094
DSB  R730 R01  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns            -15.2365    0.3542
ISB  R747 R02  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             15.3084    0.7659
DSB  R747 R02  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             -9.4244    0.3826
ISB  R744 R03  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns              3.1819    0.7231
DSB  R744 R03  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             -9.0074    0.3606
...
ISB  R731 R22  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             14.2299    0.6917
DSB  R731 R22  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             -9.7601    0.3449
ISB  R732 R23  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns              6.0129    0.7007
DSB  R732 R23  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns            -18.9817    0.3491
ISB  R735 R24  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns              7.6333    0.7057
DSB  R735 R24  ZIM3   C1P  C2P  2016:271:00000 2016:272:00000 ns             -5.2915    0.3519
ISB  E    E    ZIM3   C1X  C5X  2016:271:00000 2016:272:00000 ns             -0.5695    0.2298
DSB  E    E    ZIM3   C1X  C5X  2016:271:00000 2016:272:00000 ns            -12.5105    0.1263
ISB  C    C    ZIM3   C2I  C7I  2016:271:00000 2016:272:00000 ns             37.4032    0.4823
DSB  C    C    ZIM3   C2I  C7I  2016:271:00000 2016:272:00000 ns             18.8451    0.2473
ISB  G    G    ZIMJ   C1W  C2W  2016:271:00000 2016:272:00000 ns                   0         0
DSB  G    G    ZIMJ   C1W  C2W  2016:271:00000 2016:272:00000 ns              8.3947    0.0495
ISB  R730 R01  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -14.0608    0.7235
DSB  R730 R01  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -20.0257    0.3617
ISB  R747 R02  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns             -8.1072    0.7647
DSB  R747 R02  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -12.8445    0.3820
ISB  R744 R03  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -18.9185    0.7285
DSB  R744 R03  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -13.1539    0.3631
...
ISB  R731 R22  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns             -8.8474    0.6980
DSB  R731 R22  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -13.0837    0.3479
ISB  R732 R23  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -16.9069    0.9946
DSB  R732 R23  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -22.8411    0.4980
ISB  R735 R24  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -18.5076    0.7232
DSB  R735 R24  ZIMJ   C1P  C2P  2016:271:00000 2016:272:00000 ns            -10.6545    0.3600
ISB  E    E    ZIMJ   C1X  C5X  2016:271:00000 2016:272:00000 ns            -27.5203    0.2824
DSB  E    E    ZIMJ   C1X  C5X  2016:271:00000 2016:272:00000 ns            -13.9971    0.1527
ISB  G    G    ZIMM   C1C  C2W  2016:271:00000 2016:272:00000 ns                   0         0
DSB  G    G    ZIMM   C1C  C2W  2016:271:00000 2016:272:00000 ns            -11.5919    0.0457
ISB  G    G    ZWE2   C1W  C2W  2016:271:00000 2016:272:00000 ns                   0         0
DSB  G    G    ZWE2   C1W  C2W  2016:271:00000 2016:272:00000 ns             -0.2515    0.0480
-BIAS/SOLUTION
%=ENDBIA
```

A.9 Example 8: Multi-GNSS Bias Results From Inter-Frequency Bias Estimation at DLR

```
%=BIA 1.00 DLR 2017:020:61958 DLR 2016:271:00000 2016:272:00000 R 00001375
*-------------------------------------------------------------------------------
+FILE/REFERENCE
 DESCRIPTION        Multi-GNSS DCBs from RINEX/IONEX analysis
 INPUT              Daily 30 s RINEX files, ehrg IONEX files
 OUTPUT             DLR's daily DCB solution for satelites and receivers
 HARDWARE           rt078 Linux x86_64 3.16.7-42-desktop
 SOFTWARE           IONDCB
-FILE/REFERENCE
*-------------------------------------------------------------------------------
+FILE/COMMENT
- Multi-GNSS differential code biases (DCBs) in this product have been derived
  from observations of the IGS MGEX network. Details of the DCB estimation
  process are described in
    Montenbruck O., Hauschild A., Steigenberger P., "Differential Code Bias
    Estimation using Multi-GNSS Observations and Global Ionosphere Maps";
    Navigation - Journal of the ION 61(3):191-201 (2014).
    DOI 10.1002/navi.64
- A zero-mean constellation condition is applied to separate satellite and
  receiver biases on a daily basis.
- Standard deviations reflect the uncertainty of individual satellite and
  station biases adjusted from the observed set of satellite+station biases.
- This file provides the following DCBs
    GPS     C1C-C1W,C1C-C2W,C2W-C2S,C2W-C2L,C2W-C2X,C1C-C5Q,C1C-C5X
    GLONASS C1C-C1P,C1C-C2C,C1C-C2P
    GALILEO C1C-C5Q,C1X-C5X,C1C-C7Q,C1X-C7X,C1C-C8Q,C1X-C8X
    BEIDOU  C2I-C7I,C2I-C6I
-FILE/COMMENT
```

```
*-------------------------------------------------------------------------------
+INPUT/ACKNOWLEDGMENTS
*AGY DESCRIPTION_____
 DLR Deutsches Zentrum fuer Luft- und Raumfahrt, Oberpfaffenhofen, Germany
 IGS International GNSS Service
-INPUT/ACKNOWLEDGMENTS
*-------------------------------------------------------------------------------
+BIAS/DESCRIPTION
*KEYWORD_____ VALUE(S)_____
 OBSERVATION_SAMPLING                        30
 PARAMETER_SPACING                        86400
 DETERMINATION_METHOD                 INTER-FREQUENCY_BIAS_ESTIMATION
 BIAS_MODE                            RELATIVE
 TIME_SYSTEM                          G
-BIAS/DESCRIPTION
*---------------------------------------------------------------------------------------------------------------------------
+BIAS/SOLUTION
*BIAS SVN_ PRN STATION__ OBS1 OBS2 BIAS_START____ BIAS_END_____ UNIT __ESTIMATED_VALUE____ _STD_DEV___ __ESTIMATED_SLOPE____ _STD_DEV___
 DSB  G063 G01           C1C  C1W  2016:271:00000 2016:272:00000 ns                 -1.2623      0.0057
 DSB  G063 G01           C1C  C2W  2016:271:00000 2016:272:00000 ns                 -9.0228      0.0486
 DSB  G063 G01           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  0.8652      0.0674
 DSB  G063 G01           C1C  C5X  2016:271:00000 2016:272:00000 ns                  1.2337      0.0581
 DSB  G063 G01           C2W  C2L  2016:271:00000 2016:272:00000 ns                  1.3722      0.0168
 DSB  G063 G01           C2W  C2S  2016:271:00000 2016:272:00000 ns                  1.3944      0.0132
 DSB  G063 G01           C2W  C2X  2016:271:00000 2016:272:00000 ns                  1.2461      0.0196
 DSB  G061 G02           C1C  C1W  2016:271:00000 2016:272:00000 ns                  1.2082      0.0065
 DSB  G061 G02           C1C  C2W  2016:271:00000 2016:272:00000 ns                 10.4595      0.0511
 DSB  G069 G03           C1C  C1W  2016:271:00000 2016:272:00000 ns                 -1.7490      0.0058
 DSB  G069 G03           C1C  C2W  2016:271:00000 2016:272:00000 ns                 -6.5377      0.0461
 DSB  G069 G03           C1C  C5Q  2016:271:00000 2016:272:00000 ns                 -1.9954      0.0618
 DSB  G069 G03           C1C  C5X  2016:271:00000 2016:272:00000 ns                 -2.5512      0.0567
 DSB  G069 G03           C2W  C2L  2016:271:00000 2016:272:00000 ns                 -0.3590      0.0172
 DSB  G069 G03           C2W  C2S  2016:271:00000 2016:272:00000 ns                 -0.2728      0.0165
 DSB  G069 G03           C2W  C2X  2016:271:00000 2016:272:00000 ns                 -0.6500      0.0188
 ...
 DSB  G064 G30           C1C  C1W  2016:271:00000 2016:272:00000 ns                  0.3219      0.0059
 DSB  G064 G30           C1C  C2W  2016:271:00000 2016:272:00000 ns                 -6.1357      0.0478
 DSB  G064 G30           C1C  C5Q  2016:271:00000 2016:272:00000 ns                 -0.6456      0.0615
 DSB  G064 G30           C1C  C5X  2016:271:00000 2016:272:00000 ns                 -0.8242      0.0558
 DSB  G064 G30           C2W  C2L  2016:271:00000 2016:272:00000 ns                 -0.2684      0.0179
 DSB  G064 G30           C2W  C2S  2016:271:00000 2016:272:00000 ns                 -0.5506      0.0137
 DSB  G064 G30           C2W  C2X  2016:271:00000 2016:272:00000 ns                 -0.4168      0.0167
 DSB  G052 G31           C1C  C1W  2016:271:00000 2016:272:00000 ns                 -0.9221      0.0065
 DSB  G052 G31           C1C  C2W  2016:271:00000 2016:272:00000 ns                  3.5830      0.0488
 DSB  G052 G31           C2W  C2L  2016:271:00000 2016:272:00000 ns                 -0.2124      0.0202
 DSB  G052 G31           C2W  C2S  2016:271:00000 2016:272:00000 ns                 -0.7704      0.0164
 DSB  G052 G31           C2W  C2X  2016:271:00000 2016:272:00000 ns                 -0.2291      0.0178
 DSB  G070 G32           C1C  C1W  2016:271:00000 2016:272:00000 ns                 -1.7581      0.0060
 DSB  G070 G32           C1C  C2W  2016:271:00000 2016:272:00000 ns                 -6.1630      0.0533
 DSB  G070 G32           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  3.0644      0.0785
 DSB  G070 G32           C1C  C5X  2016:271:00000 2016:272:00000 ns                  3.2527      0.0572
 DSB  G070 G32           C2W  C2L  2016:271:00000 2016:272:00000 ns                 -0.1437      0.0196
 DSB  G070 G32           C2W  C2S  2016:271:00000 2016:272:00000 ns                  0.0948      0.0201
 DSB  G070 G32           C2W  C2X  2016:271:00000 2016:272:00000 ns                 -0.2913      0.0170
 DSB  R730 R01           C1C  C1P  2016:271:00000 2016:272:00000 ns                  0.1838      0.0654
 DSB  R730 R01           C1C  C2C  2016:271:00000 2016:272:00000 ns                 -2.9537      0.1609
 DSB  R730 R01           C1C  C2P  2016:271:00000 2016:272:00000 ns                 -5.9295      0.1377
 DSB  R747 R02           C1C  C1P  2016:271:00000 2016:272:00000 ns                 -0.0850      0.0603
 DSB  R747 R02           C1C  C2C  2016:271:00000 2016:272:00000 ns                 -1.2230      0.1519
 DSB  R747 R02           C1C  C2P  2016:271:00000 2016:272:00000 ns                 -1.1490      0.1336
 DSB  R744 R03           C1C  C1P  2016:271:00000 2016:272:00000 ns                 -0.4942      0.0675
 DSB  R744 R03           C1C  C2C  2016:271:00000 2016:272:00000 ns                  3.7317      0.1875
 DSB  R744 R03           C1C  C2P  2016:271:00000 2016:272:00000 ns                  4.1332      0.1638
 ...
 DSB  R731 R22           C1C  C1P  2016:271:00000 2016:272:00000 ns                  0.6999      0.0598
 DSB  R731 R22           C1C  C2C  2016:271:00000 2016:272:00000 ns                 -1.0580      0.1498
 DSB  R731 R22           C1C  C2P  2016:271:00000 2016:272:00000 ns                 -0.6577      0.1332
 DSB  R732 R23           C1C  C1P  2016:271:00000 2016:272:00000 ns                  0.5033      0.0653
 DSB  R732 R23           C1C  C2C  2016:271:00000 2016:272:00000 ns                 -3.7297      0.1989
 DSB  R732 R23           C1C  C2P  2016:271:00000 2016:272:00000 ns                 -6.5267      0.1634
 DSB  R735 R24           C1C  C1P  2016:271:00000 2016:272:00000 ns                 -0.2299      0.0915
 DSB  R735 R24           C1C  C2C  2016:271:00000 2016:272:00000 ns                  4.1652      0.2191
 DSB  R735 R24           C1C  C2P  2016:271:00000 2016:272:00000 ns                  6.3655      0.1629
 DSB  R801 R26           C1C  C1P  2016:271:00000 2016:272:00000 ns                 -0.4673      0.0975
 DSB  R801 R26           C1C  C2C  2016:271:00000 2016:272:00000 ns                  1.1682      0.5762
 DSB  R801 R26           C1C  C2P  2016:271:00000 2016:272:00000 ns                  0.8455      0.4349
 DSB  E208 E08           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  8.7878      0.0796
 DSB  E208 E08           C1C  C7Q  2016:271:00000 2016:272:00000 ns                  8.9239      0.0746
 DSB  E208 E08           C1C  C8Q  2016:271:00000 2016:272:00000 ns                  8.9346      0.0649
 DSB  E208 E08           C1X  C5X  2016:271:00000 2016:272:00000 ns                  8.6416      0.0597
 DSB  E208 E08           C1X  C7X  2016:271:00000 2016:272:00000 ns                  8.8926      0.0735
 DSB  E208 E08           C1X  C8X  2016:271:00000 2016:272:00000 ns                  8.8164      0.0754
 DSB  E209 E09           C1C  C5Q  2016:271:00000 2016:272:00000 ns                  4.3407      0.0668
 DSB  E209 E09           C1C  C7Q  2016:271:00000 2016:272:00000 ns                  4.7771      0.0648
```

```
DSB  E209  E09         C1C  C8Q  2016:271:00000 2016:272:00000 ns          4.5292     0.0597
DSB  E209  E09         C1X  C5X  2016:271:00000 2016:272:00000 ns          4.5023     0.0642
DSB  E209  E09         C1X  C7X  2016:271:00000 2016:272:00000 ns          4.8211     0.0829
DSB  E209  E09         C1X  C8X  2016:271:00000 2016:272:00000 ns          4.5783     0.0834
DSB  E101  E11         C1C  C5Q  2016:271:00000 2016:272:00000 ns         16.6208     0.0656
DSB  E101  E11         C1C  C7Q  2016:271:00000 2016:272:00000 ns         16.1333     0.0609
DSB  E101  E11         C1C  C8Q  2016:271:00000 2016:272:00000 ns         16.0951     0.0561
DSB  E101  E11         C1X  C5X  2016:271:00000 2016:272:00000 ns         16.8986     0.0651
DSB  E101  E11         C1X  C7X  2016:271:00000 2016:272:00000 ns         16.4758     0.0807
DSB  E101  E11         C1X  C8X  2016:271:00000 2016:272:00000 ns         16.4771     0.0782
...
DSB  E205  E24         C1C  C5Q  2016:271:00000 2016:272:00000 ns        -32.0209     0.0672
DSB  E205  E24         C1C  C7Q  2016:271:00000 2016:272:00000 ns        -31.7053     0.0641
DSB  E205  E24         C1C  C8Q  2016:271:00000 2016:272:00000 ns        -31.8710     0.0573
DSB  E205  E24         C1X  C5X  2016:271:00000 2016:272:00000 ns        -31.9837     0.0628
DSB  E205  E24         C1X  C7X  2016:271:00000 2016:272:00000 ns        -31.5128     0.0788
DSB  E205  E24         C1X  C8X  2016:271:00000 2016:272:00000 ns        -31.7273     0.0772
DSB  E203  E26         C1C  C5Q  2016:271:00000 2016:272:00000 ns          1.0149     0.0602
DSB  E203  E26         C1C  C7Q  2016:271:00000 2016:272:00000 ns          1.2124     0.0567
DSB  E203  E26         C1C  C8Q  2016:271:00000 2016:272:00000 ns          1.0943     0.0519
DSB  E203  E26         C1X  C5X  2016:271:00000 2016:272:00000 ns          0.8630     0.0558
DSB  E203  E26         C1X  C7X  2016:271:00000 2016:272:00000 ns          1.0388     0.0680
DSB  E203  E26         C1X  C8X  2016:271:00000 2016:272:00000 ns          0.9627     0.0696
DSB  E206  E30         C1C  C5Q  2016:271:00000 2016:272:00000 ns          4.3180     0.0746
DSB  E206  E30         C1C  C7Q  2016:271:00000 2016:272:00000 ns          4.4955     0.0703
DSB  E206  E30         C1C  C8Q  2016:271:00000 2016:272:00000 ns          4.4480     0.0658
DSB  E206  E30         C1X  C5X  2016:271:00000 2016:272:00000 ns          4.2607     0.0640
DSB  E206  E30         C1X  C7X  2016:271:00000 2016:272:00000 ns          4.5638     0.0796
DSB  E206  E30         C1X  C8X  2016:271:00000 2016:272:00000 ns          4.3718     0.0825
DSB  C003  C01         C2I  C6I  2016:271:00000 2016:272:00000 ns         10.2521     0.1033
DSB  C003  C01         C2I  C7I  2016:271:00000 2016:272:00000 ns         14.3876     0.1037
DSB  C016  C02         C2I  C6I  2016:271:00000 2016:272:00000 ns         -3.0786     0.1517
DSB  C016  C02         C2I  C7I  2016:271:00000 2016:272:00000 ns          4.6829     0.1545
DSB  C004  C03         C2I  C6I  2016:271:00000 2016:272:00000 ns          0.3736     0.1155
DSB  C004  C03         C2I  C7I  2016:271:00000 2016:272:00000 ns          3.7422     0.1174
...
DSB  C012  C11         C2I  C6I  2016:271:00000 2016:272:00000 ns          0.2528     0.2225
DSB  C012  C11         C2I  C7I  2016:271:00000 2016:272:00000 ns         -7.4242     0.1431
DSB  C013  C12         C2I  C6I  2016:271:00000 2016:272:00000 ns         -0.0975     0.2274
DSB  C013  C12         C2I  C7I  2016:271:00000 2016:272:00000 ns         -6.0312     0.1348
DSB  C015  C14         C2I  C6I  2016:271:00000 2016:272:00000 ns          3.5404     0.2415
DSB  C015  C14         C2I  C7I  2016:271:00000 2016:272:00000 ns         -4.4217     0.1496
DSB  G     G    AIRA   C1C  C2W  2016:271:00000 2016:272:00000 ns        -19.4284     0.1489
DSB  G     G    AIRA   C1C  C5X  2016:271:00000 2016:272:00000 ns        -20.3950     0.1863
DSB  G     G    AIRA   C2W  C2X  2016:271:00000 2016:272:00000 ns          1.2090     0.0495
DSB  R     R    AIRA   C1C  C1P  2016:271:00000 2016:272:00000 ns          3.2185     0.1418
DSB  R     R    AIRA   C1C  C2C  2016:271:00000 2016:272:00000 ns        -11.7972     0.5280
DSB  R     R    AIRA   C1C  C2P  2016:271:00000 2016:272:00000 ns        -12.0523     0.5400
DSB  E     E    AIRA   C1X  C5X  2016:271:00000 2016:272:00000 ns        -15.6324     0.2760
DSB  G     G    ALIC   C1C  C2W  2016:271:00000 2016:272:00000 ns         21.1666     0.0867
DSB  G     G    ALIC   C1C  C5Q  2016:271:00000 2016:272:00000 ns         13.8693     0.1560
DSB  G     G    ALIC   C2W  C2S  2016:271:00000 2016:272:00000 ns         -2.2996     0.0339
DSB  R     R    ALIC   C1C  C2C  2016:271:00000 2016:272:00000 ns          1.9061     0.2493
DSB  R     R    ALIC   C1C  C2P  2016:271:00000 2016:272:00000 ns          5.1175     0.2577
DSB  E     E    ALIC   C1C  C5Q  2016:271:00000 2016:272:00000 ns          0.0636     0.1917
DSB  E     E    ALIC   C1C  C7Q  2016:271:00000 2016:272:00000 ns          7.7336     0.1808
DSB  E     E    ALIC   C1C  C8Q  2016:271:00000 2016:272:00000 ns          4.9499     0.1506
DSB  G     G    AREG   C1C  C2W  2016:271:00000 2016:272:00000 ns        -13.2222     0.1120
DSB  G     G    AREG   C1C  C5X  2016:271:00000 2016:272:00000 ns        -23.1050     0.1423
DSB  G     G    AREG   C2W  C2X  2016:271:00000 2016:272:00000 ns          0.8766     0.0303
DSB  R     R    AREG   C1C  C1P  2016:271:00000 2016:272:00000 ns          3.1099     0.1339
DSB  R     R    AREG   C1C  C2C  2016:271:00000 2016:272:00000 ns         -7.8661     0.4922
DSB  R     R    AREG   C1C  C2P  2016:271:00000 2016:272:00000 ns         -7.9545     0.4498
DSB  E     E    AREG   C1X  C5X  2016:271:00000 2016:272:00000 ns        -18.9376     0.1536
DSB  E     E    AREG   C1X  C7X  2016:271:00000 2016:272:00000 ns        -10.1820     0.1337
DSB  E     E    AREG   C1X  C8X  2016:271:00000 2016:272:00000 ns        -13.2978     0.1597
...
DSB  G     G    YEL2   C1C  C1W  2016:271:00000 2016:272:00000 ns          1.0793     0.0080
DSB  G     G    YEL2   C1C  C2W  2016:271:00000 2016:272:00000 ns          5.8504     0.0802
DSB  G     G    YEL2   C1C  C5Q  2016:271:00000 2016:272:00000 ns         -3.0413     0.1237
DSB  G     G    YEL2   C2W  C2L  2016:271:00000 2016:272:00000 ns         -0.2192     0.0263
DSB  R     R    YEL2   C1C  C2C  2016:271:00000 2016:272:00000 ns         -6.1340     0.2986
DSB  R     R    YEL2   C1C  C2P  2016:271:00000 2016:272:00000 ns         -5.8990     0.2816
DSB  E     E    YEL2   C1C  C5Q  2016:271:00000 2016:272:00000 ns        -13.7796     0.1314
DSB  E     E    YEL2   C1C  C7Q  2016:271:00000 2016:272:00000 ns         -2.1732     0.1236
DSB  E     E    YEL2   C1C  C8Q  2016:271:00000 2016:272:00000 ns         -6.1892     0.1198
DSB  C     C    YEL2   C2I  C7I  2016:271:00000 2016:272:00000 ns         15.3839     0.4058
DSB  G     G    ZIM3   C1C  C2W  2016:271:00000 2016:272:00000 ns        -13.7039     0.0966
DSB  G     G    ZIM3   C1C  C5X  2016:271:00000 2016:272:00000 ns        -16.7538     0.1105
DSB  G     G    ZIM3   C2W  C2X  2016:271:00000 2016:272:00000 ns          0.6715     0.0356
DSB  R     R    ZIM3   C1C  C1P  2016:271:00000 2016:272:00000 ns          3.0797     0.1255
DSB  R     R    ZIM3   C1C  C2C  2016:271:00000 2016:272:00000 ns         -7.3293     0.3914
DSB  R     R    ZIM3   C1C  C2P  2016:271:00000 2016:272:00000 ns         -7.4327     0.3647
DSB  E     E    ZIM3   C1X  C5X  2016:271:00000 2016:272:00000 ns        -12.5791     0.1332
```

```
 DSB  E   E   ZIM3    C1X  C7X  2016:271:00000 2016:272:00000 ns                    -7.9414      0.1421
 DSB  E   E   ZIM3    C1X  C8X  2016:271:00000 2016:272:00000 ns                   -11.6255      0.1115
 DSB  G   G   ZIMJ    C1C  C1W  2016:271:00000 2016:272:00000 ns                     1.8261      0.1252
 DSB  G   G   ZIMJ    C1C  C2W  2016:271:00000 2016:272:00000 ns                    10.3006      0.1190
 DSB  G   G   ZIMJ    C1C  C5X  2016:271:00000 2016:272:00000 ns                    -4.3410      0.1144
 DSB  G   G   ZIMJ    C2W  C2X  2016:271:00000 2016:272:00000 ns                    -1.0418      0.0552
 DSB  R   R   ZIMJ    C1C  C1P  2016:271:00000 2016:272:00000 ns                    -0.4854      0.1628
 DSB  R   R   ZIMJ    C1C  C2C  2016:271:00000 2016:272:00000 ns                   -15.4303      0.6283
 DSB  R   R   ZIMJ    C1C  C2P  2016:271:00000 2016:272:00000 ns                   -14.9611      0.4616
 DSB  E   E   ZIMJ    C1X  C5X  2016:271:00000 2016:272:00000 ns                   -13.9267      0.1646
-BIAS/SOLUTION
*
*------------------------------------------------------------------------------------------------
%=ENDBIA
```