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Interface Specification for GPAS-MADOCA Product

Global Postioning Augumentation Service Corporation

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Code	Date	Description
NC	Aug.2020	Initial release (No Change)

Tabel Contents

1 Scope

This interface specification, presents the overview of MADOCA-SEAD (Multi-GNSS Advanced Demonstration tool for Orbit and Clock Analysis Supply of “MADOCA-PPP”-Enabled Advanced Demonstration system) and an data interface required by the MADOCA-products Users.

2 Document

Japan Aerospace Exploration Agency: Interface Specification for MADOCA-SEAD(revB)

2.1 JAXA-MADOCA Applicable Documents

(1) RTCM SPECIAL COMMITTEE NO. 104, RTCM Paper 228-2013-SC104-STD, RTCM STANDARD 10403.2 DIFFERENTIAL GNSS (GLOBAL NAVIGATION SATELLITE SYSTEMS) SERVICES – VERSION 3 with Amendment 2, Nov, 2013.
(2) RTCM SPECIAL COMMITTEE NO. 104, RTCM Paper 107-2014-SC104-818, Proposal of new RTCM SSR Messages SSR Stage 1: Galileo, QZSS, SBAS. BDS for RTCM STANDARD 10403.2, v.6, May, 2014.
(3) RTCM SPECIAL COMMITTEE NO. 104, Proposal of new RTCM SSR Messages SSR Stage 2: Satellite Phase Biases for RTCM STANDARD 10403.2, v.5, April, 2014.
(4) RTCM STANDARD 10410.1 NETWORKED TRANSPORT OF RTCM via INTERNET PROTOCOL (Ntrip) - Version 2.0, June, 2011

Above RTCM format documents are published for a fee by RTCM. Draft versions are published ONLY to RTCM members.

2.2 Reference Documents

(1) M. Ge et al., Resolution of GPS carrier-phase ambiguities in Precise Point Positioning (PPP) with daily observation, J Geod., 2008.

3 Overview of GPAS-MADOCA

MADOCA-Product is the demonstration system for the precise positioning using the precise information of the satellite orbit and clock. This system estimates the orbit and clock of Multi-GNSS, such as GPS, QZS, GLONASS,precisely and provides theestimated products as the correction information for satellite navigation message, called “MADOCA-products”. Figure 3-1 shows the overview of GPAS-MADOCA system.

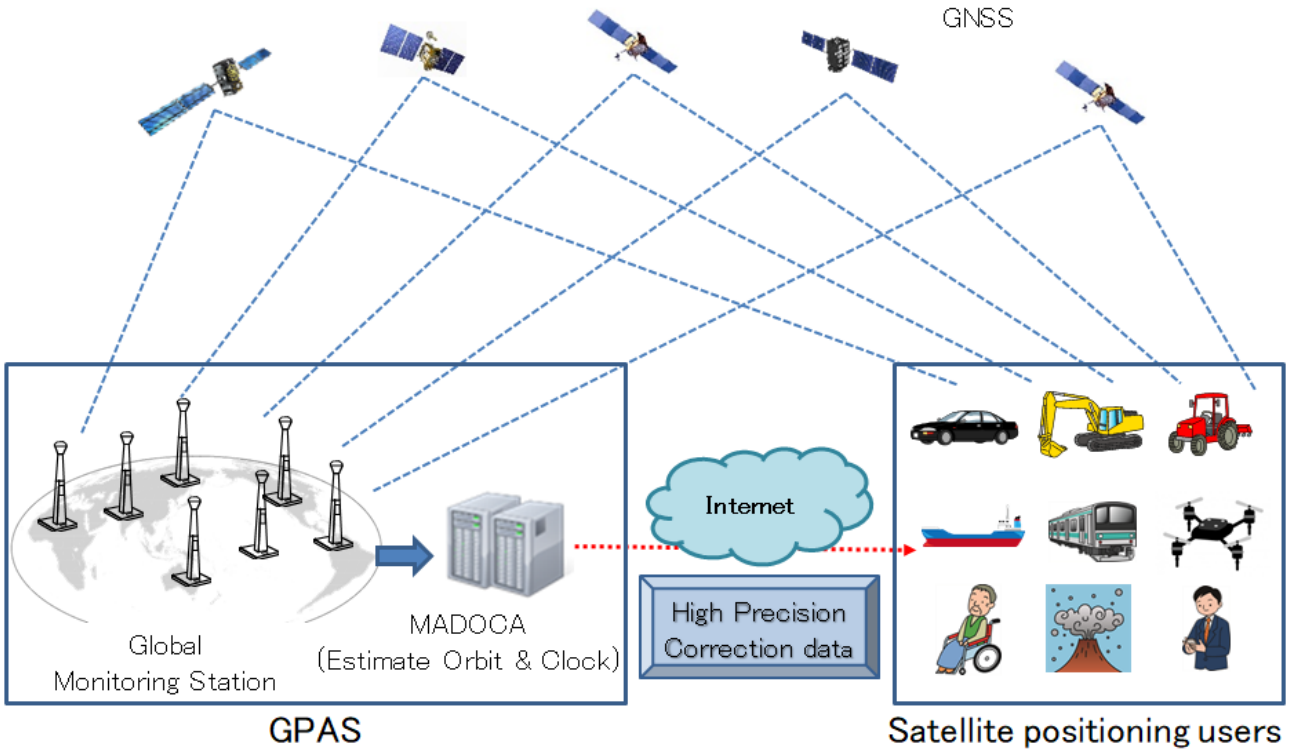

Figure 3-1 Overview of GPAS-MADOCA System

4 MADOCA Product via internet

MADOCA-Products follow the international standard format “RTCM10403.2” (Reference: Applicable Documents(2),(3),(4)) basically and use NTRIP Protocol (Reference: Applicable Document(5)).

4.1 Protcol

MADOCA-Product adopts NTRIP protocol. Please refer to the Applicable Document(5) for the details.

4.2 Format

MADOCA-Product adopts the “RTCM SSR(State Space Representation)” in the international standard format “RTCM10403.2” except for some messages (Reference: Table 4.1-1 Note 5). In the RTCM SSR format, “Message Type Number” is defined for each correction information type, such as the orbit , clock, URA or code biases and MADOCA-products Users can receive only their required information. Table 4.1-1 shows the list of message type number provided from MADOCA-SEAD. Please refer to Applicable Documents(2),(3),(4) and the section 5 in this document for the details.

4.3 Considerations for Use

(1)Handling of SSR-IOD Value

The MADOCA-products are provided as the correction information for Satellite Navigation Message. IODE value, which indicates the corrected Satellite Navigation Message, is included only in the SSR Orbit Correction Message (Reference: Table 4.1-1) and the other SSR Messages are linked by “SSR-IOD”, which is incremented when the estimation of orbit and clock is updated. So, MADOCA-products Users should use the SSR Messages of the same SSR-IOD value. Please refer to the applicable documents(2),(3),(4) for the details.

表 4-1 List of Message type number provided from Madoca Product

No.	Message Type Number	Message Name	No. of bits	Remarks
1	1057	SSR GPS Orbit Correction	68＋135×NS※2	
2	1058	SSR GPS Clock Correction	67+76×NS※2	
3	1059	SSR GPS Code Bias	67＋11×NS※2＋19×ΣNCB※3	
4	1061	SSR GPS URA	67＋12×NS※2	
5	1062	SSR GPS High Rate Clock Correction	67＋28×NS※2	
6	1063	SSR GLONASS Orbit Correction	65＋134×NS※2	
7	1064	SSR GLONASS Clock Correction	64+75×NS※2	
8	1065	SSR GLONASS Code Bias	64＋10×NS※2＋19×ΣNCB※3	
9	1067	SSR GLONASS URA	64＋11×NS※2	
10	1068	SSR GLONASS High Rate Clock Correction	64＋27×NS※2	
11	1246※1	SSR QZSS Orbit Correction	66※6＋133×NS※2	
12	1247	SSR QZSS Clock Correction	67+74×NS※2	
13	1248※1	SSR QZSS Code Bias	65※6＋9×NS※2＋19×ΣNCB※3	
14	1250※1	SSR QZSS URA	65※6＋10×NS※2	
15	1251※1	SSR QZSS High Rate Clock Correction	65※6＋26×NS※2	
16	11※5※7	SSR GPS Carrier Phase Bias	69＋28×NS※2＋49×ΣNPB※4	
17	13※5※7	SSR QZSS Carrier Phase Bias	67※6＋26×NS※2＋49×ΣNPB※4	

※1 Defined in the RTCM draft version format (Reference: Applicable Document(3)).

※2 NS：The number of satellites.

※3 NCB：The number of Code Biases per individual satellite.

※4 NPB：The number of Carrier Phase Biases per individual satellite. MADOCA-SEAD provides Carrier Phase Biases pereach frequency of individual satellite.

※5 Carrier Phase Biases are provided in the original format based on RTCM draft version format (Reference: ApplicableDocument(4)).

※6 4 bits are assigned to the DF for “the number of QZSS satellites”. In tihe future, the No of bits for this DF will bechanged to “6 bits” in order to follow RTCM official message.

※7 The reading phase bias is estimated every 15 minutes,Product is missing at the timing of the estimation process.

5 Data Format

5.1 SSR Orbit Correction Messages

The contents of SSR Orbit Correction Messages for GPS, GLONASS, QZSS are shown from Table 5.1-1 to Table 5.1-3. The content and format of them follows RTCM SSR format (Reference: Applicable Documents(2),(3)). A symbol beginning with "DF" in the column "Remarks" indicates “Data Field” defined in RTCM format. The update interval of the correction massage is sees the following.

Product	Interval		RTCM Message Type		
	Estimate	Provide	GPS	GLO	QZS
Orbit correction	30	1	1057	1063	1246

(1)GPS Orbit Correction (Message Type Number: 1057)

The contents of SSR GPS Orbit Correction Messages are shown in Table 5.1-1.

Table 5.1-1 SSR GPS Orbit Correction Messages (Message Type Number: 1057)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	int12	12	0 – 4095	SSR Message Type Number (Value:1057)	DF002
2	GPS Epoch Time 1s	int20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	Satellite Reference Datum	bit(1)	1	0 or 1	Orbit corrections refer to Satellite Reference Datum (0:ITRF, 1:Regional)	DF375
6	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
7	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
8	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
9	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	Subtotal (#1 ~ #9)	68				
#10～#17 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	GPS Satellite ID	uint6	6	1-32	GPS Satellite ID	
11	GPS IODE	uint8	8	-	IODE value of broadcast ephemeris used for calculation of Correction Differences.	
12	Delta Radial	int22	22	±209.7151[m]	Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.1[mm] DF365
13	Delta Along Track	int20	20	±209.7148[m]	Along Track orbit correction for	Resolution:

					broadcast ephemeris,as show in #11 IODE.	0.4[mm] DF366
14	Delta Cross-Track	int20	20	±209.7148[m]	Cross Track orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.4[mm] DF367
15	Dot Delta Radial	int21	21	±1.048575[m/s]	Velocity of Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.001[mm/s] DF368
16	Dot Delta Along-Track	int19	19	±1.048572[m/s]	Velocity of Along orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.004[mm/s] DF369
17	Dot Delta Cross-Track	int19	19	±1.048572[m/s]	Velocity of Cross orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.004[mm/s] DF370
	Subtotal (#10 ~ #17)	135				
	Total	**68＋135×NS**				

(2) QZSS Orbit Correction (Message Type Number: 1246)

The contents of SSR QZSS Orbit Correction Messages are shown in Table 5.1-2.

Table 5.1-2 SSR QZSS Orbit Correction Messages (Message Type Number: 1246)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1246)	DF002
2	QZSS Epoch Time 1s	uint20	20	0 – 604799[s]	QZSS reference time (Full seconds since the beginning of the GPS week)	DF460(※1)
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	Satellite Reference Datum	bit(1)	1	0 or 1	Orbit corrections refer to Satellite Reference Datum (0:ITRF, 1:Regional)	DF375
6	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
7	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
8	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
9	No. of Satellites	uint4	4	0 – 15	Number of Satellites included in the message	Original DF
	SubTotal(#1~#9)	66				
#10～#17 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	QZSS Satellite ID	uint4	4	1-10	QZSS Satellite ID※2	DF429
11	QZSS IODE	uint8	8	0-255	IODE value of broadcast ephemeris used for calculation of Correction Differences.	DF434
12	Delta Radial	int22	22	±209.7151[m]	Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.1[mm] DF365

13	Delta Along Track	int20	20	±209.7148[m]	Along Track orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.4[mm] DF366
14	Delta Cross-Track	int20	20	±209.7148[m]	Cross Track orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.4[mm] DF367
15	Dot Delta Radial	int21	21	±1.048575[m/s]	Velocity of Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.001[mm/s] DF368
16	Dot Delta Along-Track	int19	19	±1.048572[m/s]	Velocity of Along orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.004[mm/s] DF369
17	Dot Delta Cross-Track	int19	19	±1.048572[m/s]	Velocity of Cross orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.004[mm/s] DF370
	SubTotal(#10-17)	133				
	Total	66+133×NS				

※1 Defined in draft version of RTCM (Refer to Applicable Document(3)).

※2 QZSS satellite ID is defined as below; (This information is as of revB establishment. For the latest information, Refer to PS/IS-QZSS documents published by the Cabinet Office.) URL: https://sys.qzss.go.jp/dod/constellation.html

QZSS Satellite ID

ID	QZSS Satellite PRN	
	PRN Number	Satellite name
1	193	QZS-1
2	194	QZS-2
3	195	QZS-4
4	196	—
5	197	—
6	198	—
7	199	QZS-3
8	200	—
9	201	—
10	202	—

(3) GLONASS Orbit Correction (Message Type Number: 1063)

The contents of SSR GLONASS Orbit Correction Messages are shown in Table 5.1-3.

Table 5.1-3 SSR GLONASS Orbit Correction Messages (Message Type Number: 1063)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1063)	DF002
2	GLONASS Epoch Time 1s	uint17	17	0 – 86399[s]	GLONASS reference time (Full seconds since the beginning of the GLONASS day)	DF386
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	Satellite Reference Datum	bit(1)	1	0 or 1	Orbit corrections refer to Satellite Reference Datum (0:ITRF, 1:Regional)	DF375
6	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
7	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
8	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
9	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	SubTotal(#1~#9)	65				
#10 ~ #17 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	GLONASS Satellite ID	uint5	5	1-24	GLONASS Satellite ID	DF252
11	GLONASS IODE	uint8	8	0-255	IODE value of broadcast ephemeris used for calculation of Correction Differences.	DF459(※)
12	Delta Radial	int22	22	±209.7151[m]	Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.1[mm] DF365

13	Delta Along Track	int20	20	±209.7148[m]	Along Track orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.4[mm] DF366
14	Delta Cross-Track	int20	20	±209.7148[m]	Cross Track orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.4[mm] DF367
15	Dot Delta Radial	int21	21	±1.048575[m/s]	Velocity of Radial orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.001[mm/s] DF368
16	Dot Delta Along-Track	int19	19	±1.048572[m/s]	Velocity of Along orbit correction for broadcast ephemeris,as show in #11 IODE.	Resolution: 0.004[mm/s] DF369
17	Dot Delta Cross-Track	int19	19	±1.048572[m/s]	Velocity of Cross-Track orbit correction for broadcast ephemeris.,as show in #11 IODE.	Resolution: 0.004[mm/s] DF370
	SubTotal (#10-17)	134				
	Total	**65+134×NS**				

5.2 SSR Clock Correction

The contents of SSR Clock Correction Messages for GPS, QZSS,GLONASS are shown from Table 5.2-1 to Table 5.2-3. The content and format of them follows RTCM SSR format (Reference: Applicable Documents(2),(3)). A symbol beginning with "DF" in the column "Remarks" indicates “Data Field” defined in RTCM format. The update interval of the correction massage is sees the following.

Product	Interval		RTCM Message Type		
	Estimate	Provide	GPS	GLO	QZS
Clock correction	1	1	1058	1064	1247

(1) GPS Clock Correction (Message Type Number : 1057)

The contents of SSR GPS Orbit Correction Messages are shown in Table 5.2-1.

Table 5.2-1 GPS Clock Correction (Message Type Number: 1058)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	int12	12	0 – 4095	SSR Message Type Number (Value:1058)	DF002
2	GPS Epoch Time 1s	int20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	subtotal(#1~#8)	67				
#10～#13 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	GPS Satellite ID	uint6	6	1-32	GPS Satellite ID	DF068
11	Delta Clock C0	int22	22	±209.7151 m	C0 polynomial coefficient for correction of broadcast satellite clock.	DF376 分解能：0.1mm
12	Delta Clock C1	int21	21	±1.048575 m/s	C1 polynomial coefficient for correction of broadcast satellite clock.	DF377 分解能：0.001 mm/s
13	Delta Clock C2	int27	27	±1.34217726m/s2	C2 polynomial coefficient for correction of broadcast satellite clock.	DF378 分解能：0.00002 mm/s2
	subtotal(#10~#13)	76				
	TOTAL	**68＋76×NS**				

(2) QZSS Clock Correction (Message Type Number : 1247)

The contents of SSR GPS Orbit Correction Messages are shown in Table 5.2-2.

Table 5.2-2 QZSS Clock Correction (Message Type Number: 1247)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	int12	12	0 – 4095	SSR Message Type Number (Value:1247)	DF002
2	GPS Epoch Time 1s	int20	20	0 – 604799[s]	QZSS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	subtotal(#1~#8)	67				
#10～#13 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	QZSS Satellite ID	uint4	4	1-10	QZSS Satellite ID	DF429
11	Delta Clock C0	int22	22	±209.7151 m	C0 polynomial coefficient for correction of broadcast satellite clock.	DF376 分解能：0.1mm
12	Delta Clock C1	int21	21	±1.048575 m/s	C1 polynomial coefficient for correction of broadcast satellite clock.	DF377 分解能：0.001 mm/s
13	Delta Clock C2	int27	27	±1.34217726m/s2	C2 polynomial coefficient for correction of broadcast satellite clock.	DF378 分解能：0.00002 mm/s2
	Subtotal(#10~#13)	74				
	TOTAL	**67＋74×NS**				

(3) GLONASS Clock Correction (Message Type Number : 1064)

The contents of SSR GPS Orbit Correction Messages are shown in Table 5.2-3.

Table 5.2-3 GLONASS Clock Correction (Message Type Number: 1064)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	int12	12	0 – 4095	SSR Message Type Number (Value:1064)	DF002
2	GLONASS Epoch Time 1s	Int17	17	0 – 604799[s]	GLONASS reference time (Full seconds since the beginning of the GPS week)	DF386
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	subtotal(#1~#8)	64				
#10～#13 are repeated for each satellites (1 ~ NS (No. of Satellites))						
10	GLONASS Satellite ID	uint5	5	1-24	GLONASS Satellite ID	DF384
11	Delta Clock C0	int22	22	±209.7151 m	C0 polynomial coefficient for correction of broadcast satellite clock.	DF376 分解能：0.1mm
12	Delta Clock C1	int21	21	±1.048575 m/s	C1 polynomial coefficient for correction of broadcast satellite clock.	DF377 分解能：0.001 mm/s
13	Delta Clock C2	int27	27	±1.34217726m/s2	C2 polynomial coefficient for correction of broadcast satellite clock.	DF378 分解能：0.00002 mm/s2
	subtotal(#10~#13)	75				
	TOTAL	**64＋75×NS**				

5.3 SSR Code Bias Messages

The contents of SSR Code Bias Messages for GPS, GLONASS, QZSS are shown from Table 5.3-1 to Table 5.3-3. The content and format of them follows RTCM SSR format (Reference: Applicable Documents(2), (3)). A symbol beginning with "DF" in the column "Remarks" indicates “Data Field” defined in RTCM format. The update interval data field of code bias message is fixed at the maximum value because it is longer than the range that can be represented by the RTCM SSR format.

(1) GPS Code Bias (Message Type Number : 1059)

The contents of SSR GPS Cpde Bias Messages are shown in Table 5.3-1.

Table 5.3-1 SSR GPS Code Bias Messages (Message Type Number: 1059)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1059)	DF002
2	GPS Epoch Time 1s	uint20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.(Value:15)	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	ndicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	SubTotal(#1～#8)	67				
#9 ~ #12 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	GPS Satellite ID	uint6	6	1 – 32	GPS Satellite ID	DF068
10	No. of Code Biases Processed	uint5	5	0 – 31	Number of Code Biases for one individual satellite, as show in #12.	DF379
	SubTotal (#9～#10)	11				
#11 and #12 are repeated for NCB (No. of Code Biases Processed: see #10) times						
11	GPS Signal and Tracking Mode Indicator	uint5	5	0 – 31	No. of Code Bias Indicator to specify the GPS signal and tracking mode.	DF380
12	Code Bias	int14	14	±81.91[m]	Code Bias for specified Signal, as show in #11.	Resolution: 0.01[m] DF383

	SubTotal (#11～#12)	19
	Total	**67＋11×NS＋19×ΣNCB**

(2) QZSS Code Bias (Message Type Number: 1248)

The contents of SSR QZSS Code Bias Messages are shown in Table 5.3-2.

Table5.3-2 SSR QZSS Code Bias Correction Messages (Message Type Number: 1248)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 － 4095	SSR Message Type Number (Value:1248)	DF002
2	QZSS Epoch Time 1s	uint20	20	0 － 604799[s]	QZSS Reference time (Full seconds since the beginning of the GPS week)	DF460(※1)
3	SSR Update Interval	bit(4)	4	0 － 15	The SSR Update Intervals for this message.(Value:15)	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 － 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 － 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 － 15	SSR Solution ID number	DF415
8	No. of Satellites	uint4	4	0 － 15	Number of Satellites included in the message	Original DF
	SubTotal (#1～#8)	65				
#9 ~ #12 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	QZSS Satellite ID	uint4	4	1 － 10	QZSS Satellite ID※2	DF429
10	No. of Code Biases Processed	uint5	5	0 － 31	Number of Code Biases for one individual satellite,as show in #9.	DF379
	SubTotal (#9～#10)	9				
#11 and #12 are repeated for NCB (No. of Code Biases Processed: see #10) times						
11	QZSS Signal and Tracking Mode Indicator	uint5	5	0 － 31	No. of Code Bias Indicator to specify the QZSS signal and tracking mode.※3	DF461(※1)
12	Code Bias	int14	14	±81.91[m]	Code Bias for specified Signal, as show in #11.	Resolution: 0.01[m] DF383

	SubTotal(#11～#12)	19
	合計	**65＋9×NS＋19×ΣNCB**

※1 Defined in draft version of RTCM (Refer to Applicable Document(3)).

※2 Defined in Table 5.1-2 Note2.

※3 Indicator to specify the QZSS signal and tracking is defined as below;

Indicator to specify the QZSS signal and tracking

ID	QZSS Signal and Tracking
0	L1 C/A
1	L1 L1C (D)
2	L1 L1C (P)
3	L2 L2C (M)
4	L2 L2C (L)
5	L2 L2C (M+L)
6	L5 I
7	L5 Q
8	L5 I+Q
9~	Reserved

(3) GLONASS Code Bias (Message Type Number : 1065)

The contents of SSR GLONASS Code Bias Messages are shown in Table 5.3-3.

Table 5.3-3 SSR GLONASS Code Bias Messages (Message Type Number: 1065)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1065)	DF002
2	GLONASS Epoch Time 1s	Uint17	17	0 – 604799[s]	GLONASS reference time (Full seconds since the beginning of the GLONASS day)	DF386
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.(Value15)	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 15	Number of Satellites included in the message.	DF387
	SubTotal (#1～#8)	64				
#9 ~ #12 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	GLONASS Satellite ID	uint5	5	1-24	GLONASS Satellite ID.	DF384
10	No. of Code Biases Processed	uint5	5	0 – 31	Number of Code Biases for one individual satellite,as show in #9.	DF379
	SubTotal (#9～#10)	10				
#11 and #12 are repeated for NCB (No. of Code Biases Processed: see #10) times						
11	GLONASS Signal and Tracking Mode Indicator	uint5	5	0 – 31	No. of Code Bias Indicator to specify the GLONASS signal and tracking mode	DF380
12	Code Bias	int14	14	±81.91[m]	Code Bias for specified Signal,as show in #11.	Resolution: 0.01[m]

						DF383
	Subtotal (#11～#12)	19				
	Total	**64+10×NS＋19×ΣNCB**				

5.4 SSR URA quality Messages

The contents of SSR URA quality Messages for GPS, GLONASS, QZSS, GALILEO and BDS are shown from Table 5.3-1 to Table 5.3-5. The content and format of them follows RTCM format (Reference: Applicable Documents(2),(3)). A symbol beginning with "DF" in the column "Remarks" indicates “Data Field” defined in RTCM format. The update interval of the correction massage is sees the following.

Product	Interval		RTCM Message Type		
	Estimate	Provide	GPS	GLO	QZS
URA	1	1	1061	1067	1250

(1) GPS URA (Message Type Number : 1061)

The contents of SSR GPS URA Messages are shown in Table 5.4-1.

Table 5.4-1 SSR GPS URA Messages (Message Type Number: 1061)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1061)	DF002
2	GPS Epoch Time 1s	uint20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	Uint6	6	0 – 63	Number of Satellites included in the message	DF387
	SubTotal (#1～#8)	67				
#9 and #10 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	GPS Satellite ID	Uint6	6	1 – 32	GPS Satellite ID	DF068
10	No. of Code Biases Processed	bit(6)	6	bits5 – 3: 0 – 7 bits0 – 2: 0 – 7	SSR User Range Accuracy (URA) (1 sigma) represented by a combination of URA_CLASS (high 3 bits) and URA_VALUE (low 3 bits).	DF389
	Subtotal (#9~#10)	12				
	Total	**67+12×NS**				

(2) QZSS URA (Message Type Number: 1250)

The contents of SSR QZSS URA quality information Messages are shown in Table 5.4-2.

Table5.4-2 SSR QZSS URA Messages (Message Type Number: 1250)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1250)	DF002
2	QZSS Epoch Time 1s	uint20	20	0 – 604799[s]	QZSS Reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint4	4	0 – 15	Number of Satellites included in the message	Original DF
	小計(#1～#8)	65				
#9～#10 は No. of Satellites（衛星数：NS）回繰り返し						
9	QZSS Satellite ID	uint4	4	1 – 10	QZSS 衛星番号(※2)	DF429
10	No. of Code Biases Processed	uint5	6	bits5 – 3: 0 – 7 bits0 – 2: 0 – 7	上位3 ビットの URA_CLASS と下位3 ビットのURA_VALUE で表されるSSR URA(1σ)	DF389
	小計(#9～#10)	10				
	合計	**65+10×NS**				

※1 Defined draft version of RTCM (refer to Applicable Document(3)).

※2 Defined in Table 5.1-2 Note 2.

(3) GLONASS URA (Message Type Number : 1067)

The contents of SSR GLONASS URA Messages are shown in Table 5.4-3.

Table 5.4-3 SSR GLONASS URA Messages (Message Type Number: 1067)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1067)	DF002
2	GLONASS Epoch Time 1s	uint20	20	0 – 86399[s]	GLONASS reference time (Full seconds since the beginning of the GLONASS day)	DF386
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	Subtotal (#1 ~ #8)	67				
#9 and #10 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8)						
9	GLONASS Satellite ID	Uint5	5	1-24	GLONASS Satellite ID	DF384
10	No. of Code Biases Processed	bit(6)	6	bits5 – 3: 0 – 7 bits0 – 2: 0 – 7	SSR User Range Accuracy (URA) (1 sigma) represented by a combination of URA_CLASS (high 3 bits) and URA_VALUE (low 3 bits).	DF389
	Subtotal (#9~#10)	12				
	Total	**67+12×NS**				

5.5 SSR High Rate Clock Correction Messages

The contents of SSR High Rate Clock Correction Messages for GPS, GLONASS, QZSS are shown from Table 5.5-1 to Table 5.5-3. The content and format of them are based on RTCM format (Reference: Applicable Documents(2),(3)) and please refer to section 4.2.4 in this document about their difference. A symbol beginning with "DF" in the column "Remarks" indicates “Data Field” defined in RTCM format. The update interval of the correction massage
is sees the following.

Product	Interval		RTCM Message Type		
	Estimate	Provide	GPS	GLO	QZS
HR-Clock correction※	1	1	1062	1068	1251

※In the current system, the data is 0 output.

(1) GPS High Rate Clock Correction (Message Type Number: 1062)

The contents of SSR GPS High Rate Clock Correction Messages are shown in Table 5.5-1.

Table5.5-1 SSR GPS High Rate Clock Correction Messages (Message Type Number: 1062)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1057)	DF002
2	GPS Epoch Time 1s	uint20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	Subtotal (#1 ~ #8)	67				
#9 and #10 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	GPS Satellite ID	uint6	6	1-32	GPS Satellite ID	DF068
10	High Rate Clock Correction	int22	22	±209.7151[m]	High Rate Clock correction Value	DF390
	Subtotal (#9~#10)	28				
	Total	**67+28×NS**				

(2) QZSS High Rate Clock Correction (Message Type Number: 1251)

The contents of SSR QZSS High Rate Clock Correction Messages are shown in Table 5.5-2.

Table5.5-2 SSR QZSS High Rate Clock Correction Messages (Message Type Number: 1251)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value:1251)	DF002
2	QZSS Epoch Time 1s	Uint20	20	0 – 604799[s]	QZSS Reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 – 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 – 15	SSR Solution ID number	DF415
8	No. of Satellites	uint4	4	0 – 15	Number of Satellites included in the message	Original DF
	Subtotal (#1 ~ #8)	65				
#9 and #10 are repeated for each satellites (1 -–NS (No. of Satellites: see #8))						
9	QZSS Satellite ID	uint4	4	1-32	QZSS Satellite ID (※2)	DF429
10	High Rate Clock Correction	int22	22	±209.7151[m]	High Rate Clock correction Value	DF390
	Subtotal (#9+#10)	26				
	Total	**65+26×NS**				

※1 Defined draft version of RTCM (refer to Applicable Document(3)).

※2 Defined in Table 5.1-2 Note2.

(3) GLONASS High Rate Clock Correction (Message Type Number: 1068)

The contents of SSR GLONASS High Rate Clock Correction Messages are shown in Table 5.5-3.

Table 5.5-3 SSR GLONASS High Rate Clock Correction Messages (Message Type Number: 1068)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 － 4095	SSR Message Type Number (Value:1068)	DF002
2	GLONASS Epoch Time 1s	uint17	17	0 － 604799[s]	GLONASS reference time (Full seconds since the beginning of the GLONASS day)	DF458(※)
3	SSR Update Interval	bit(4)	4	0 － 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 － 15	Issue Of Data number for SSR in this message.	DF413
6	SSR Provider ID	uint16	16	0 － 65535	SSR Provider ID number	DF414
7	SSR Solution ID	uint4	4	0 － 15	SSR Solution ID number	DF415
8	No. of Satellites	uint6	6	0 － 63	Number of Satellites included in the message	DF387
	Subtotal (#1 ~ #8)	64				
#9 and #10 are repeated for each satellites (1 ~ NS (No. of Satellites: see #8))						
9	GLONASS Satellite ID	uint5	5	1-24	GLONASS Satellite ID	DF384
10	High Rate Clock Correction	int22	22	±209.7151[m]	High Rate Clock correction Value	DF390
	Subtotal (#9～#10)	27				
	Total	**64＋27×NS**				

5.6 Carrier Phase Bias

The contents of SSR Carrier Phase Bias Correction Messages for GPS, QZSS are shown in Table 5.5-1 to Table 5.5-2. In MADOCA-SEAD, carrier phase biases are provided per each frequency of individual satellite and used for PPP-AR with the method of FCB (Fractional Cycle Bias)(Reference: Reference Document(1)).

A notation that starts with "DF" in the column "Remarks" indicates the corresponding datafield in the documentation of RTCM version 10403.2 (Reference: Applicable Documents(2),(3),(4)) excluding the column Standard deviation for carrier phase biases. The unused datafields, which are described as “Not defined in MADOCA” in the remarks column, are set to zero. The update interval of the correction massage is sees the following.

Product	Interval※		RTCM Message Type		
	Estimate	Provide	GPS	GLO	QZS
Carrier Phase Bias	1	1	11	—	13

※The reading phase bias is estimated every 15 minutes,Product is missing at the timing of the estimation process.

(1) GPS Carrier Phase Bias (Message Type Number: 11)

The contents of SSR GPS Carrier Phase Bias Correction Messages are shown in Table5.6-1.

Table5.6-1 SSR GPS Carrier Phase Bias Correction Messages (Message Type Number: 11)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value: 11※1)	DF002
2	GPS Epoch Time 1s	uint20	20	0 – 604799[s]	GPS reference time (Full seconds since the beginning of the GPS week)	DF385
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1 (fix to 0)	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413 Not defined in MADOCA
6	SSR Provider ID	uint16	16	0 – 65535 (fix to 0)		DF414 Not defined in MADOCA
7	SSR Solution ID	uint4	4	0 – 15 (fix to 0)		DF415 Not defined in MADOCA
8	Dispersive Bias Consistency Indicator	bit(1)	1	0 or 1 (fix to 0)		DF486※2 Not defined in MADOCA
9	MW Consistency Indicator	bit(1)	1	0 or 1 (fix to 0)		DF487※2 Not defined in MADOCA
10	No. of Satellites	uint6	6	0 – 63	Number of Satellites included in the message	DF387
	Subtotal (#1~#10)	69				
#11～#14 are repeated for each satellites (1 ~ NS (No. of Satellites: see #10))						
11	GPS Satellite ID	uint6	6	1 – 32	GPS Satellite ID	DF068

12	No of Phase Biases Processed	uint5	5	0 – 31	No of Phase Biases Processed for one individual satellite,as show in #11.	DF479(※2)
13	Yaw Angle	uint9	9	0 – (2 – 1/256) [semi-circles] (fix to 0)	Yaw Angle	DF480(※2)
14	Delta Radial	Int8	8	±(127/8192) [semi-circles / second] (approx. ±2.79 [degree/second]) (fix to 0)	Yaw Rate	DF481(※2)
	Subtotal (#11～#14)	28				
	#15～#20 are repeated for NPB (No. of Phase Biases Processed: see #12) times					
15	GPS Signal and Tracking Mode Indicator	uint	5	0 – 31	GPS Signal and Tracking Mode Indicator	DF382
16	Signal Integer Indicator	Int1	1	0 or 1 (fix to 0)		DF483※2 Not defined in MADOCA
17	Signals Wide-Lane Integer Indicator	Int(2)	2	00, 01, 10, 11 (fix to 0)		DF484※2 Not defined in MADOCA
18	Signal Discontinuity Counter	uint4	4	0 – 15 (fix to 0)		DF485※2 Not defined in MADOCA
19	Phase Bias(FCB)	int19	19	±52.4287 [m]	Phase Bias (FCB) for #12 Signal.	Resolution: 0.0001[m] DF482(※2)
20	Standard deviation of Phase Bias(FCB)	uint17	17	0 – 13.1071 [m]	Standard deviation of Phase Bias (FCB) for #12 Signal.	Resolution: 0.0001[m] Orignal DF
	Subtotal (#15-#20)	49				
	Total	69＋28×NS +49×ΣNPB				

※2 Defined in draft version of RTCM (refer to Applicable Document(3)).

※3 Defined draft version of RTCM (refer to Applicable Document(4)).

(2) QZSS Carrier Phase Bias (Message Type Number: 13)

The contents of SSR QZSS Carrier Phase Bias Correction Messages are shown in Table5.6-2.

Table5.6-2 SSR QZSS Carrier Phase Bias Correction Messages (Message Type Number: 13)

#	Name	Data Type	No. of Bits	Possible Range	Contents	Remarks
1	Message Number	uint12	12	0 – 4095	SSR Message Type Number (Value: 13※1)	DF002
2	QZSS Epoch Time 1s	uint20	20	0 – 604799[s]	QZSS Reference time (Full seconds since the beginning of the GPS week)	DF460(※3)
3	SSR Update Interval	bit(4)	4	0 – 15	The SSR Update Intervals for this message.	DF391
4	Multiple Message Indicator	bit(1)	1	0 or 1(fix to 0))	Indicator for transmitting messages with the same Message Number and Epoch Time (1: multiple message transmitted)	DF388
5	IOD SSR	uint4	4	0 – 15	Issue Of Data number for SSR in this message.	DF413 Not defined in MADOCA
6	SSR Provider ID	uint16	16	0 – 65535(fix to 0))		DF414 Not defined in MADOCA
7	SSR Solution ID	uint4	4	0 – 15(fix to 0))		DF415 Not defined in MADOCA
8	Dispersive Bias Consistency Indicator	bit(1)	1	0 or 1 (fix to 0))		DF486※3 Not defined in MADOCA
9	MW Consistency Indicator	bit(1)	1	0 or 1 (fix to 0))		DF487※3 Not defined in MADOCA
10	No. of Satellites	uint4	4	0 – 15	Number of Satellites included in the message	Original DF
	Subtotal (#1 ~ #8)	67				
#11～#14 are repeated for each satellites (1 ~ NS (No. of Satellites: see #10))						
11	QZSS Satellite ID	uint4	4	1 – 10	QZSS Satellite ID (※2)	DF429※2

12	No of Phase Biases Processed	uint5	5	0 – 31	No of Phase Biases Processed for one individual satellite,as show in #11.	DF479(※2)
13	Yaw Angle	uint9	9	0 – (2 – 1/256) [semi-circles] (fix to 0)	Yaw Angle	DF480(※2)
14	Yaw Radial	Int8	8	±(127/8192) [semi-circles / second] (approx. ±2.79 [degree/second]) (fix to 0)	Yaw Rate	DF481(※2)
	Subtotal (#11 ~ #14)	26				
	#15～#20 are repeated for NPB (No. of Phase Biases Processed: see #12) times					
15	QZSS Signal and Tracking Mode Indicator	uint5	5	0 – 31	QZSS Signal and Tracking Mode Indicator	DF461(※3)
16	Signal Integer Indicator	Int1	1	0 or 1 (fix to 0)		DF483※4 Not defined in MADOCA
17	Signals Wide-Lane Integer Indicator	Int(2)	2	00, 01, 10, 11 (fix to 0)		DF484※4 Not defined in MADOCA
18	Signal Discontinuity Counter	uint4	4	0 – 15 (fix to 0)		DF485※4 Not defined in MADOCA
19	Phase Bias(FCB)	int19	19	±52.4287 [m]	Phase Bias (FCB) for #12 Signal.	Resolution: 0.0001[m] DF482(※4)
20	Standard deviation of Phase Bias(FCB)	uint17	17	0 – 13.1071 [m]	Standard deviation of Phase Bias (FCB) for #12 Signal.	Resolution: 0.0001[m] Original DF
	Subtotal (#15 ~ #20)	49				
	Total	67＋26×NS +49×ΣNPB				

※1 Defined in Table 5.1-2 Note2。

※2 Defined in draft version of RTCM (refer to Applicable Document(3)).

※3 Defined in draft version of RTCM (refer to Applicable Document(4)).