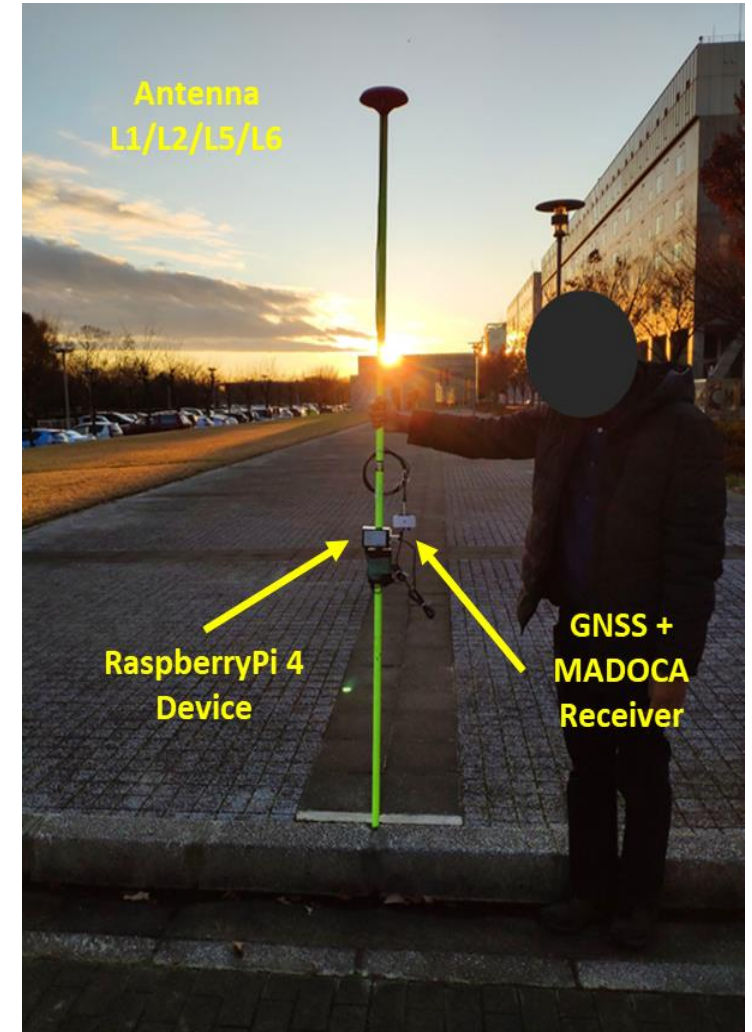


Receiver Setup for MADOCA-PPP

MAD-WIN, MAD- π , MADROID

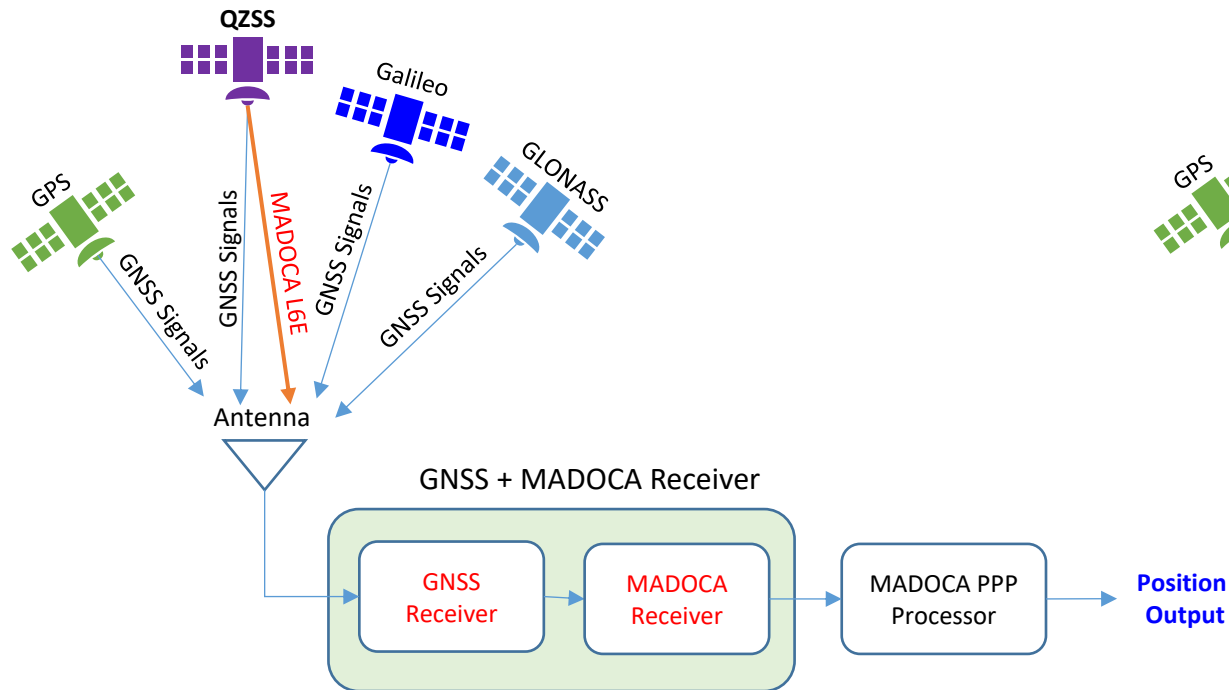
Target Receiver: F9P/D9C

Dinesh Manandhar, Associate Professor
Center for Spatial Information Science (CSIS), The University of Tokyo
dinesh@csis.u-tokyo.ac.jp

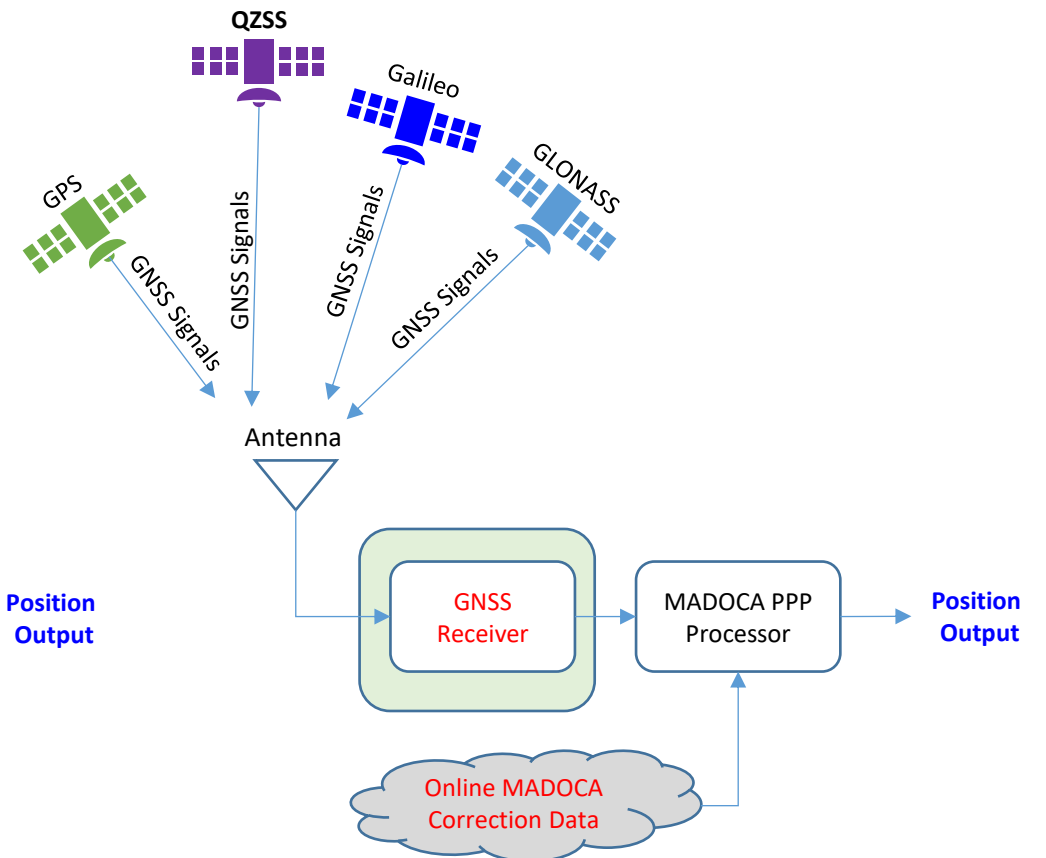


MADOCA Receiver System

GNSS Receiver + MADOCA Decoder



GNSS Receiver Only



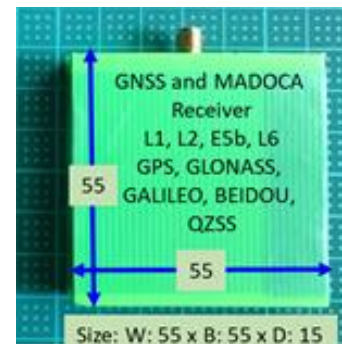
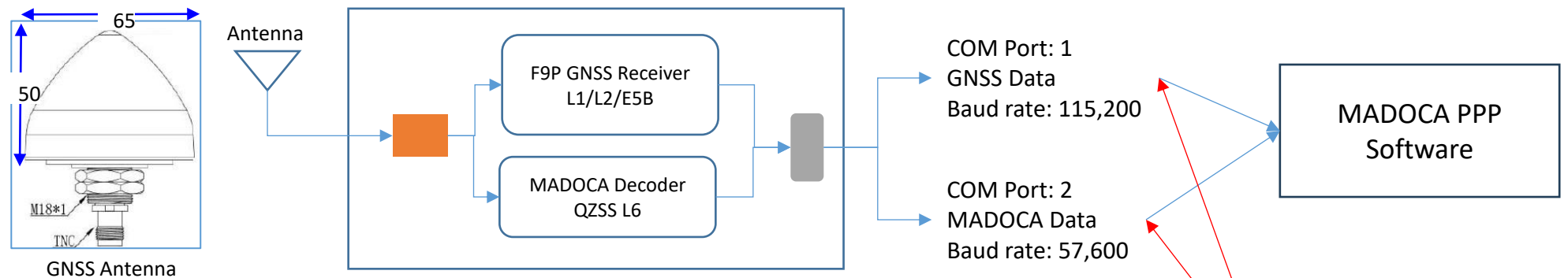
Software Information

- MADOCA PPP Software
 - MAD-WIN
 - Best for Accuracy Evaluation, Research
 - Continuous data logging
 - MAD-PI
 - Best for remote or outdoor continuous data logging
 - Unattended data logging in a system such as Buoy, Drone, Boat etc.
 - MADROID
 - Good for short-duration data logging, field test and demo
- Release
 - MAD-WIN: Version 20241230
- Known Bugs or Issues
 - Less accurate solution in Kinematic Mode

Other Software

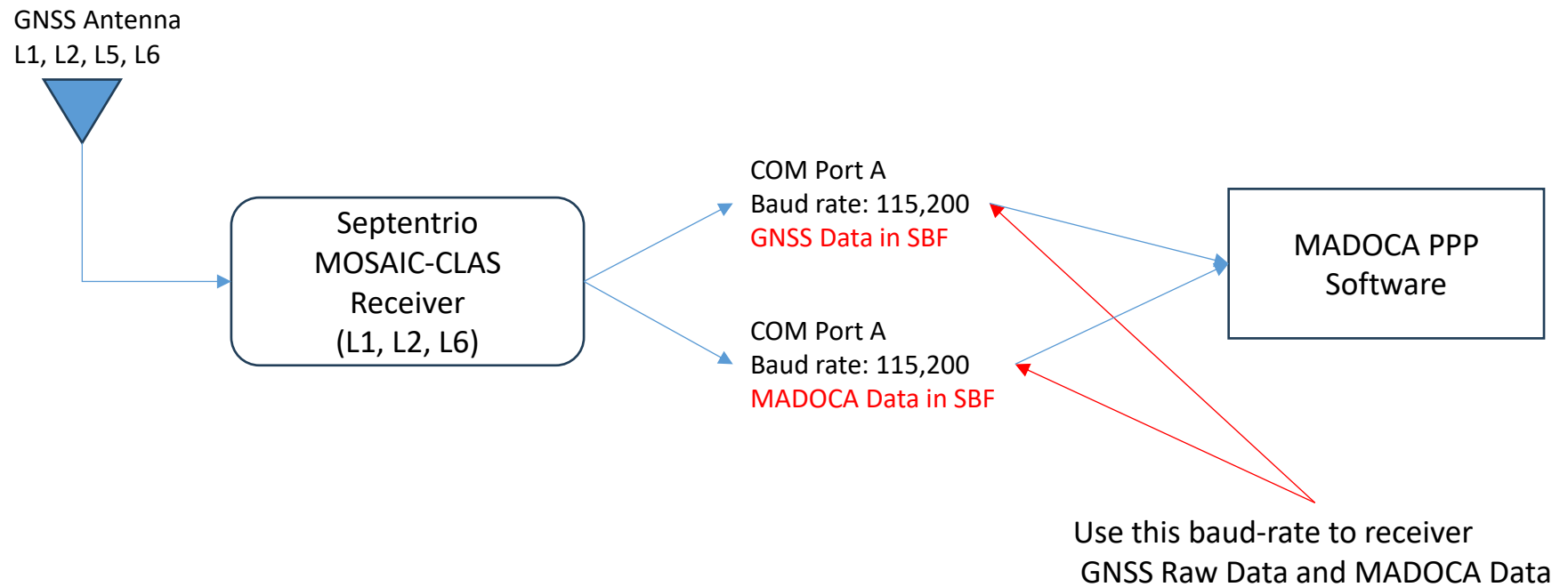
- U-center
 - To setup u-blox receivers (F9P and D9C)
- RX Tools
 - To setup Septentrio receivers
- RTKLIB
 - To analyze data
 - Extremely useful tool for data logging and data analysis
 - SPS, DGPS, RTK, PPP Analysis
 - Plot results
 - Stream data through serial ports or NTRIP

MADOCA PPP Receiver System (u-blox)



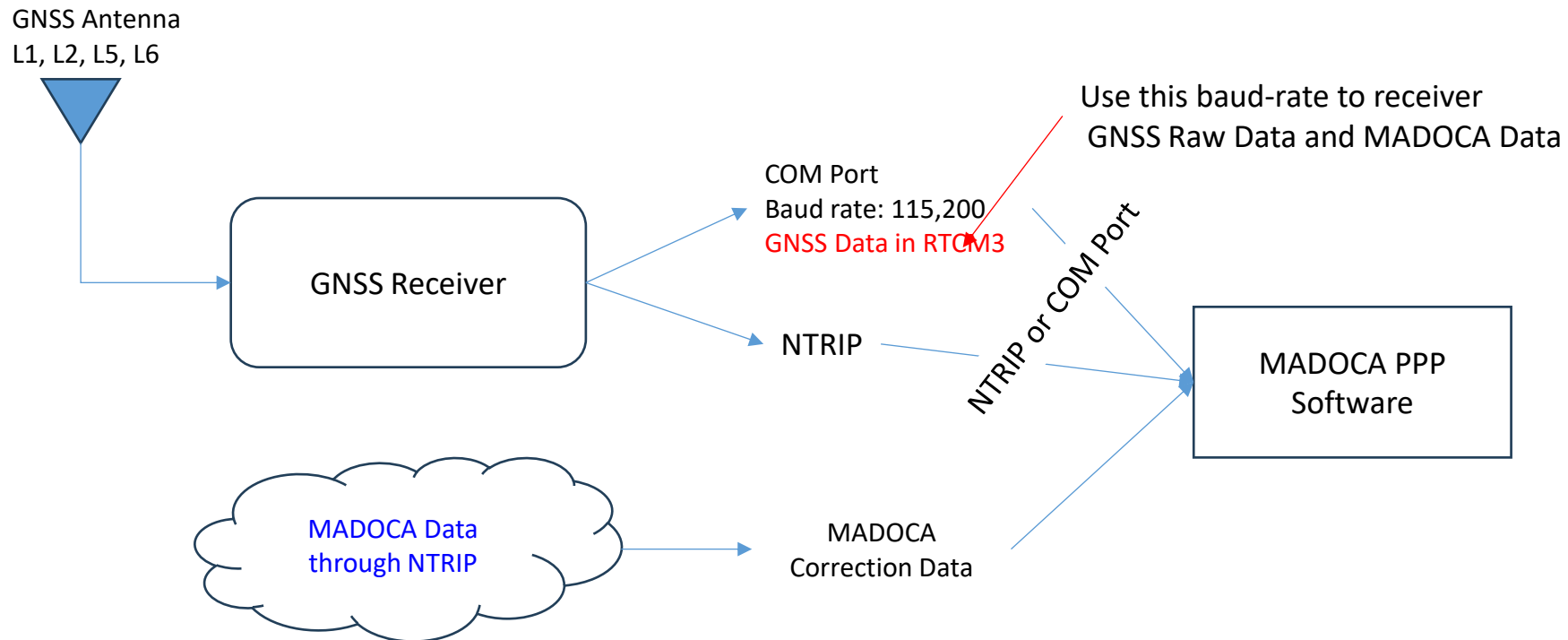
Use this baud-rate to receiver
GNSS Raw Data and MADOCA Data

MADOCA Receiver System (Septentrio)



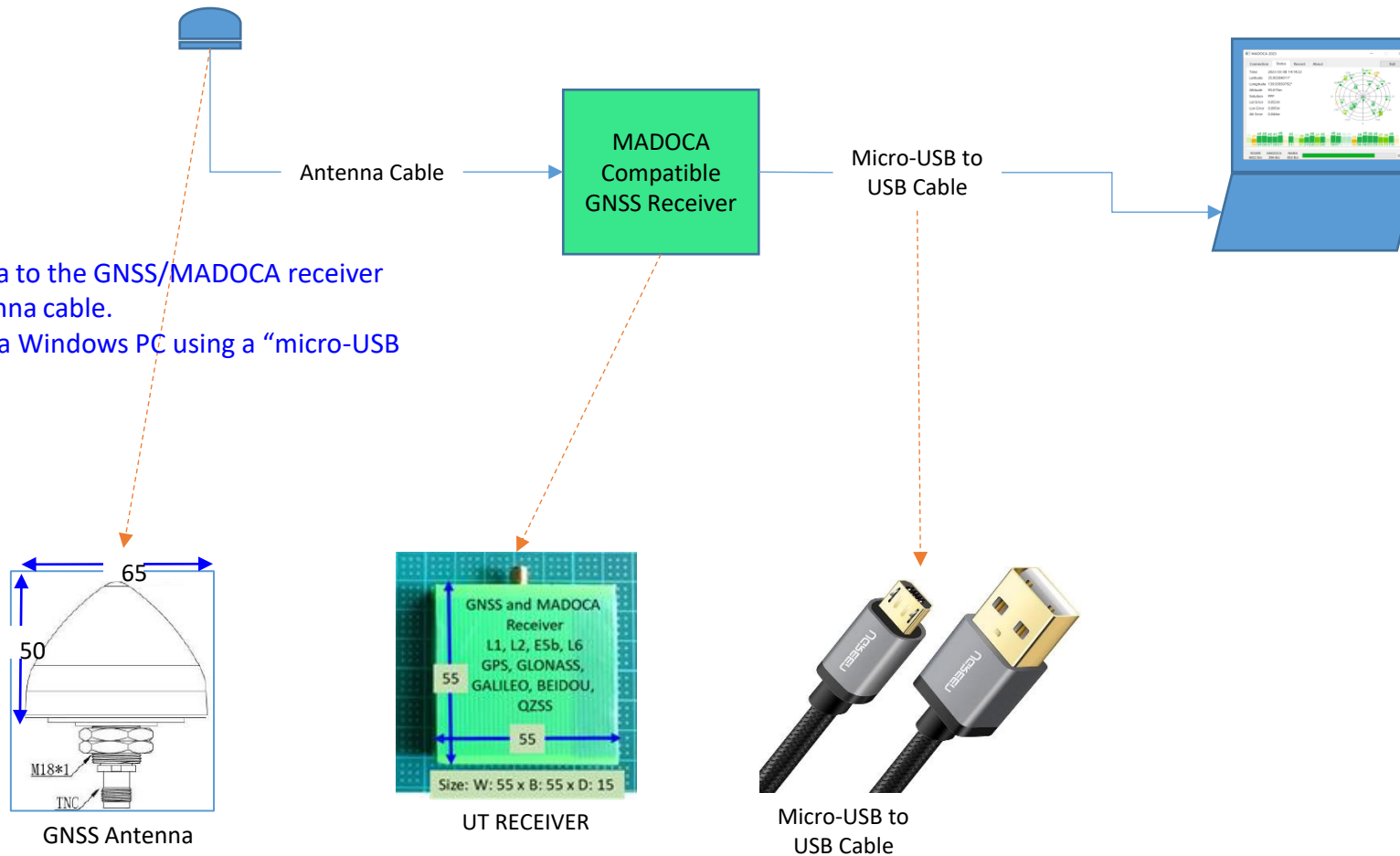
MADOCA Receiver System (GNSS Receiver)

- If you have a GNSS receiver it can be used for MADOCA PPP
- The receiver shall be able to output raw data necessary for RTK in RTCM3, UBX, or SBF format
- Get MADOCA PPP data through the NTRIP server from a service provider



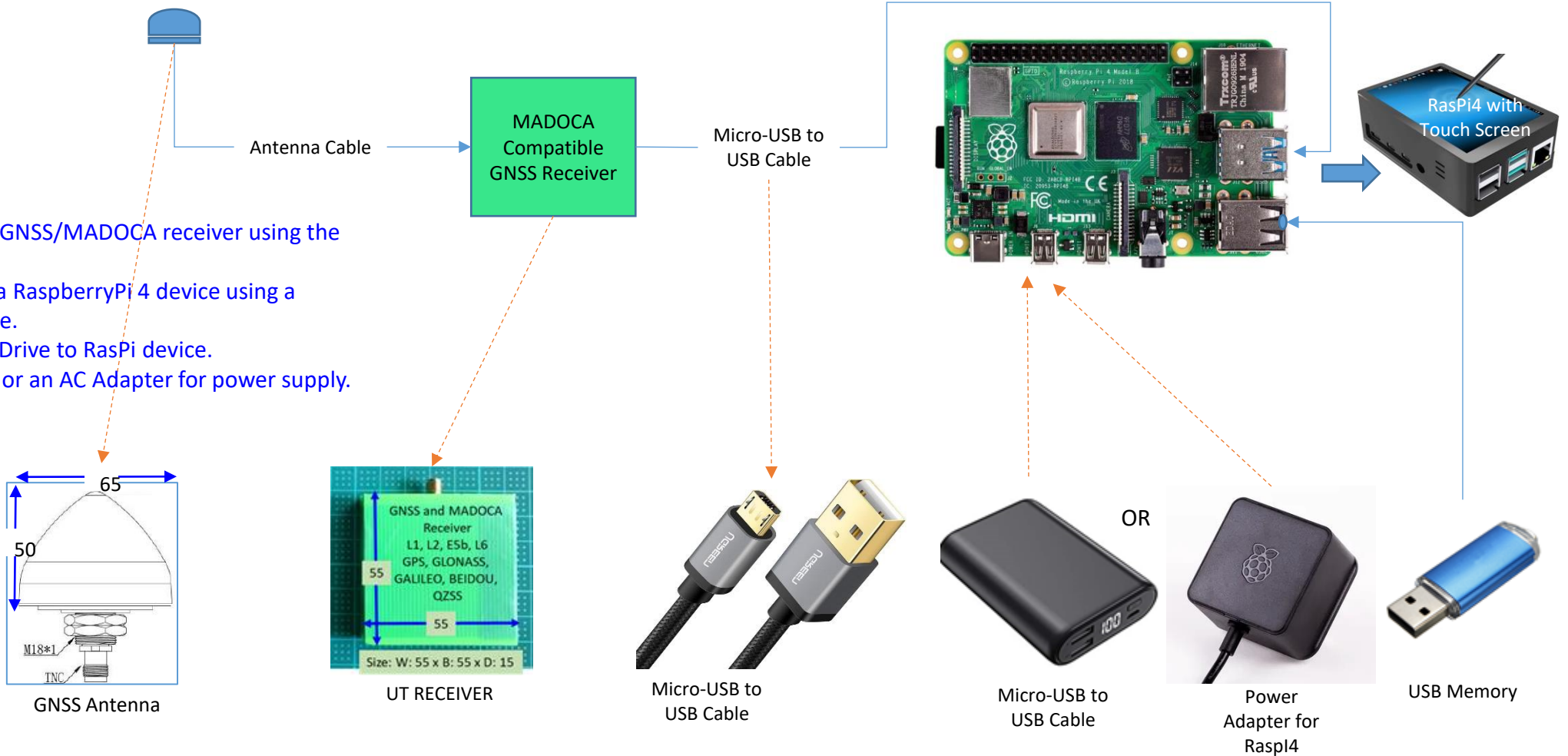
MAD-WIN: MADOCA for Windows OS

- Connect a GNSS Antenna to the GNSS/MADOCA receiver using the provided antenna cable.
- Connect the receiver to a Windows PC using a “micro-USB to USB” cable.



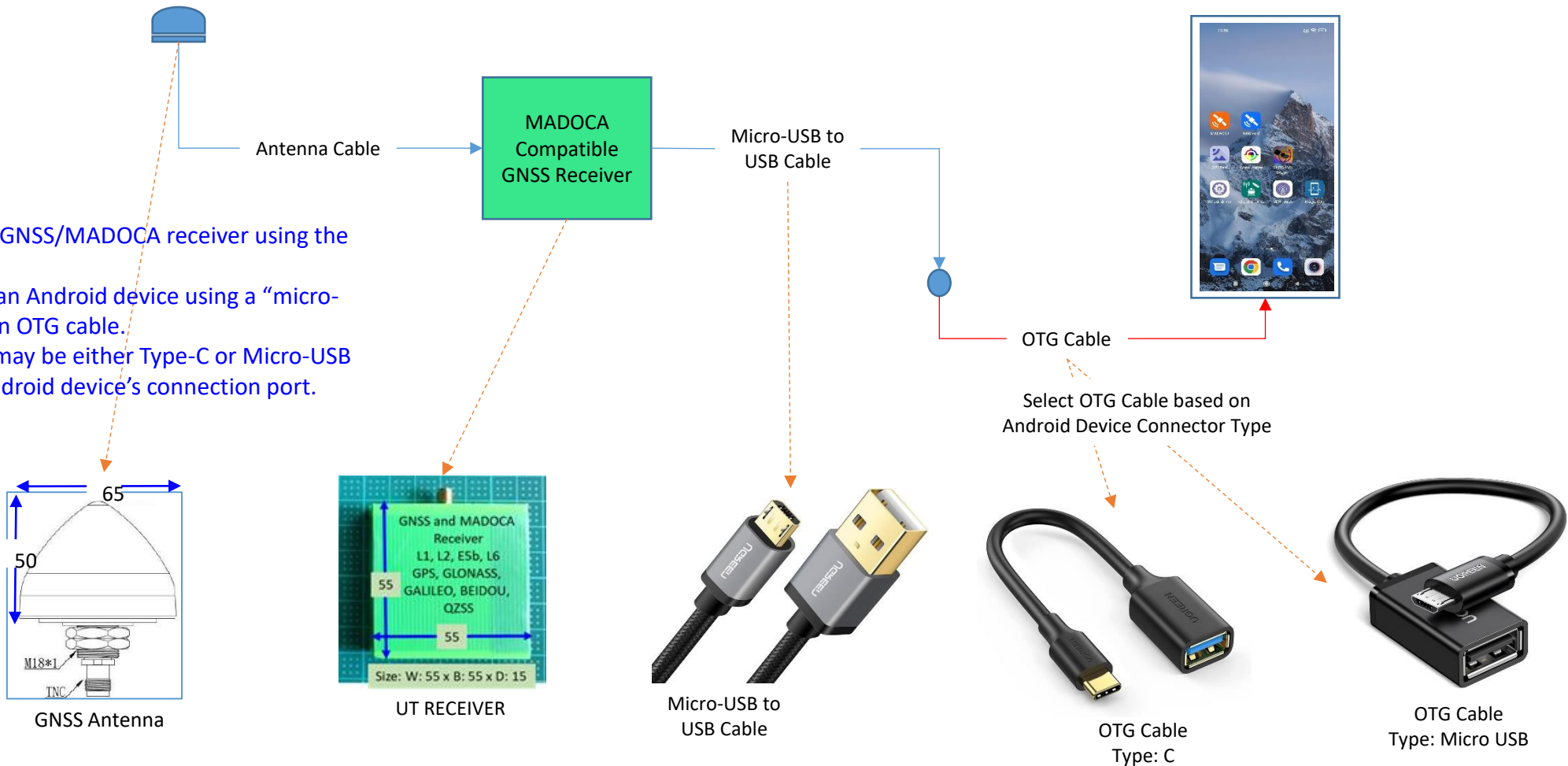
MAD-PI: MADOCA for RaspberryPi

- Connect Antenna to the GNSS/MADOCA receiver using the provided antenna cable.
- Connect the receiver to a RaspberryPi 4 device using a “micro-USB to USB” cable.
- Connect a USB Memory Drive to RasPi device.
- Either use a Power Bank or an AC Adapter for power supply.



MADROID: MADOCA for Android

- Connect Antenna to the GNSS/MADOCA receiver using the provided antenna cable.
- Connect the receiver to an Android device using a “micro-USB to USB” cable and an OTG cable.
- OTG (On-The-Go) cable may be either Type-C or Micro-USB Type depending upon android device’s connection port.



MAD-WIN Setting

The screenshot shows the MADOCA 20241230 application window with the following settings and annotations:

- Connection:**
 - Rover:** RX, Online (GNSS). Annotation: "GNSS Receiver connected by Serial Port".
 - Correction:** DX, SX, Online (MADOCA). Annotations: "Select 'DX' if a MADOCA D9C Receiver is connected by Serial Port" and "Select 'SX' if Septentrio Receiver is used for Rover".
 - Processing Mode:** PPP-Static, PPP-Kinematic.
 - Settings:**
 - Reset Every 120 min.
 - File Break 1 hr. Annotation: "Select it to breakdown the file".
- Buttons:** Exit, Setup (for Rover and Correction), Start.
- Status Bar:** ROVER, MADOCA, NMEA, OFF.

Select 'ONLINE' if MADOCA Data is received over NTRIP

The screenshot shows the Rover Settings dialog box with the following settings and annotations:

- Serial Port:** Port COM9, Baud 115200. Annotation: "COM Port Setting".
- NTRIP Setting:** Address, Port 2101, Mount Point, User Name utuser, Password. Annotation: "NTRIP Setting".
- Format:** ubx.
- Buttons:** Cancel, Save.

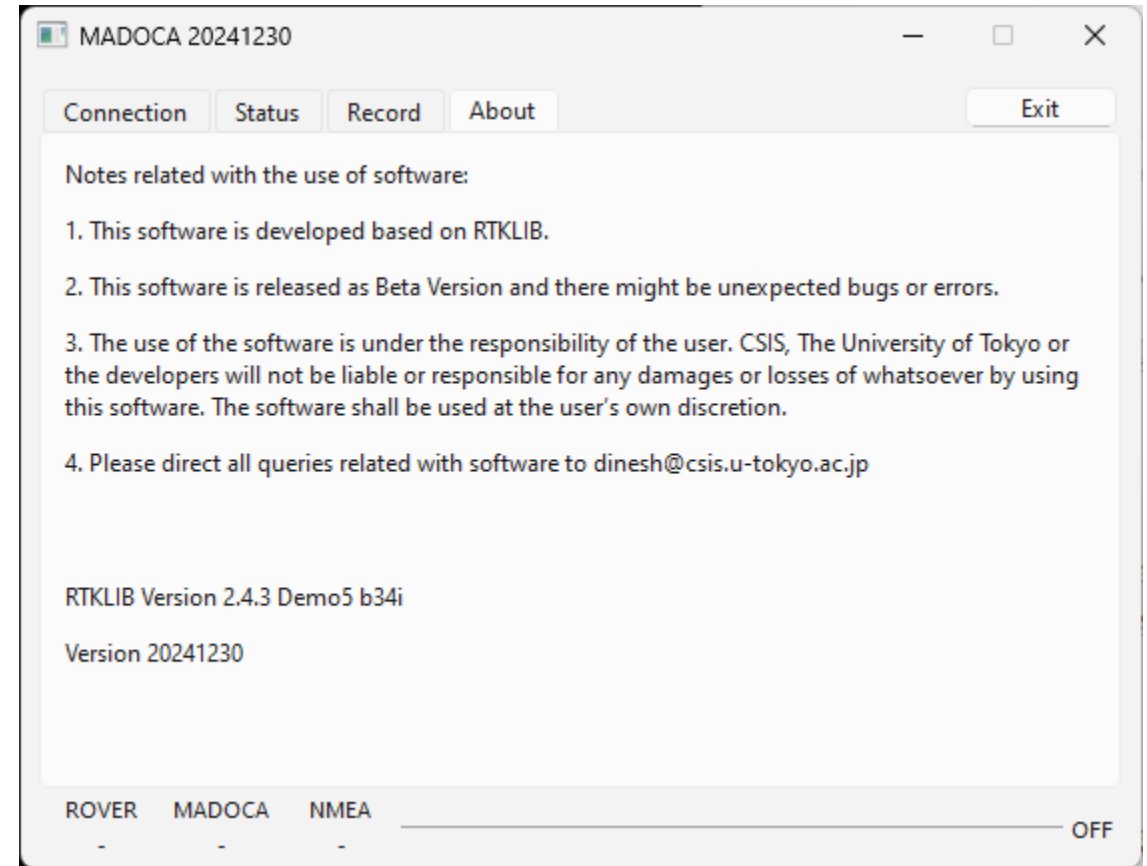
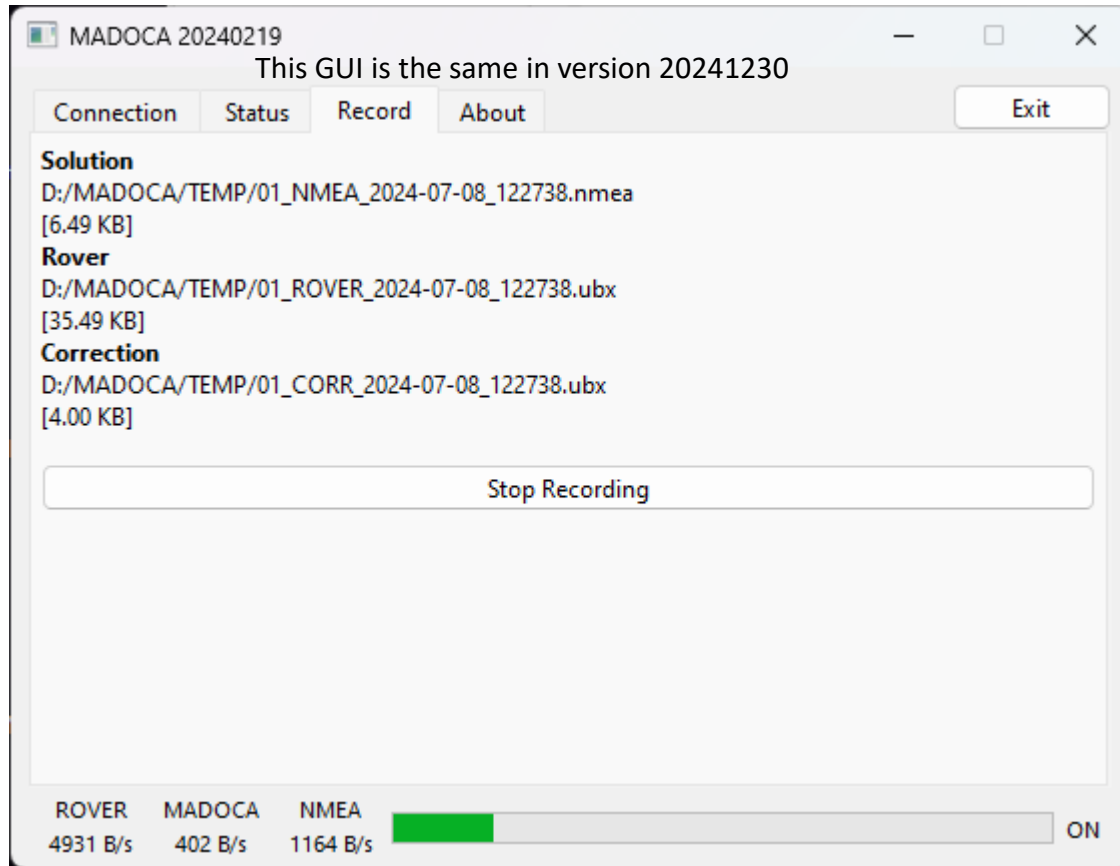
Select 'DX' if a MADOCA D9C Receiver is connected by Serial Port

Select 'SX' if Septentrio Receiver is used for Rover

Select it to analyze convergence time.

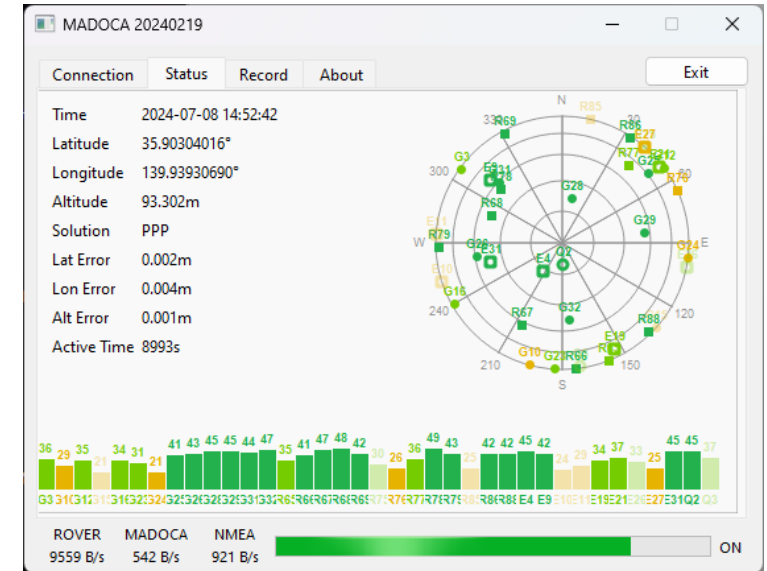
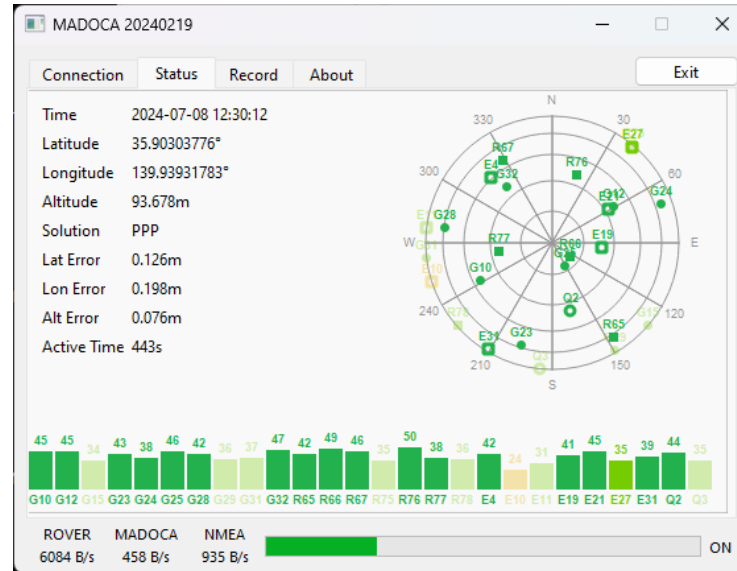
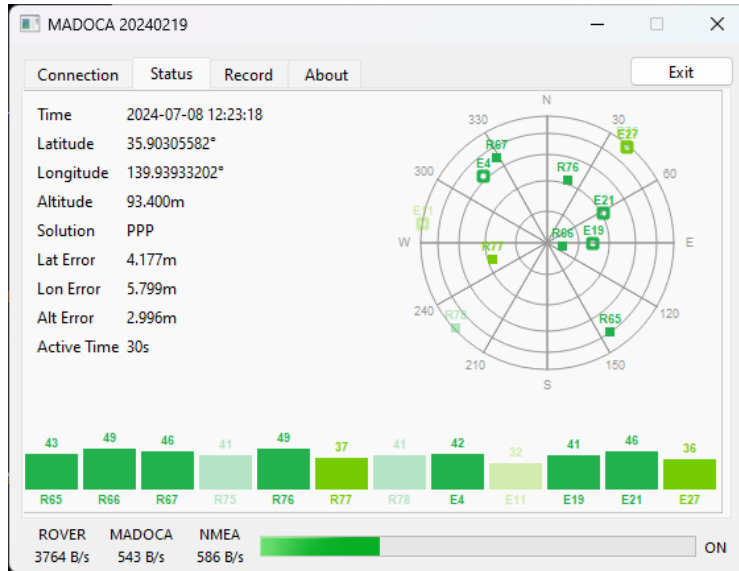
Select it to breakdown the file

MAD-WIN Setting



MAD-WIN Setting

These GUIs are the same in version 20241230



Center for Spatial Information Science

21:31 75%

MADROID ABOUT

Connection: **USB** (USB BT BTLE)

Device: USB-Serial (Dual Channel) [Interface 0] ubx (sbfc rctm3)

Format: **ubx** (ubx sbf rctm3)

Correction Format: **ubx** (ubx sbf rctm3)

Correction Source: **DX** (Online DX SX)

Processing Settings

Rover Mode: **PPP-Static** (Single PPP-Kinematic PPP-Static)

Elevation Mask: 10

Antenna Model: AS-ANT2BCAL

Antenna Height (m): 0.0

Stop Rover

Setup Status Skyplot

21:34 74%

MADROID ABOUT

UTC Time: 12:34:42

Lat: [redacted]
Lon: [redacted]
UTM X [redacted]
UTM Y [redacted]
Elv: 53.222m
Speed: 0.17 m/s
Fix: PPP

Satellites in view: 12
Satellites in use: 9
PDOP: 2.50 HDOP: 1.70 VDOP: 1.80
Horizontal Accuracy: 1.5m
Vertical Accuracy: 15.0cm

**Not a good location for the test
Shall be done in open sky**

47 43 49 31 37 39 45 30 35 51 49 54
G G G G E E E E R R R R R R
9 17 19 22 2 5 5 9 66 67 68 81

Setup Status Skyplot

21:35 74%

MADROID ABOUT

544 B/s[129 KB]

Solution Output

Connected
127.0.0.1:49196 [TCP/IP Client]
598 B/s[114 KB]

GNSS Status

Date: Feb 20, 2024
Time: 12:35:03
Latitude: [redacted]
Longitude: [redacted]
X: [redacted]
Y: [redacted]

Ellipsoidal Height: 53.072m
Orthometric Height: 15.022m
Fix Type: PPP
Speed: 0.05 m/s
HDOP: 1.7
VDOP: 1.8
PDOP: 2.5
Satellites in View: 12
Satellites in Use: 10
Latitude Error: 0.632m
Longitude Error: 1.367m
Altitude Error: 0.137m

NMEA: 2024_02_20_21_30_40.txt(115KB)
RAW: 2024_02_20_21_30_40.ubx(987KB)
CORR: 2024_02_20_21_30_40.ubx(130KB)

Stop Recording

Setup Status Skyplot

21:35 74%

MADROID ABOUT

Version: **20240211**

Valid Until 31 December 2024

Notes related with the use of software:

1. This software is developed based on RTKLIB.
2. This software is released as Beta Version and there might be unexpected bugs or errors.
3. The software expires on 31st DEC every year. Please contact dinesh@csis.u-tokyo.ac.jp to renew the license to use after 31st DEC. We plan to update the version by the end of 31st Dec. If you plan to use for dedicated applications, please contact us.
4. The use of the software is under the responsibility of the user. CSIS, The University of Tokyo or the developers will not be liable or responsible for any damages or losses of whatsoever by using this software. The software shall be used at the user's own discretion.
5. Please direct all queries related with software to dinesh@csis.u-tokyo.ac.jp

Close

Setup Status Skyplot

Setup GNSS / MADOCA Receiver (u-Blox)

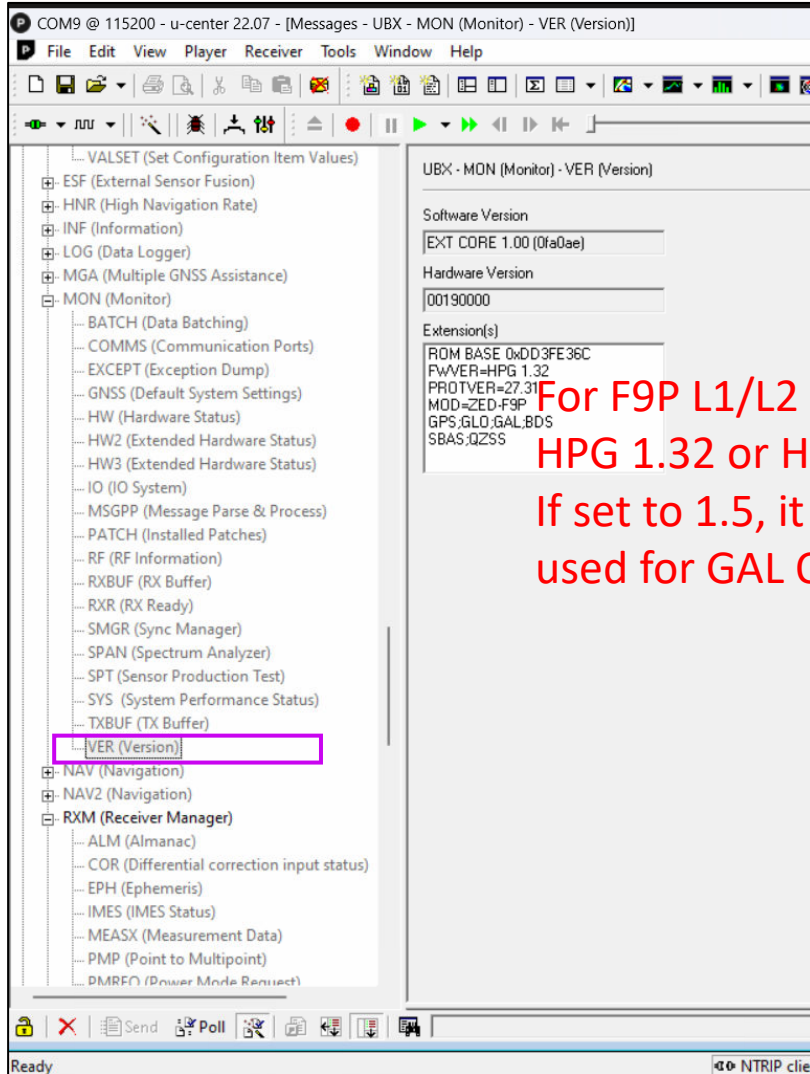
GNSS Receiver (F9P)

- Update Firmware
 - Must set to Version 1.32 or higher
- Set Baud Rate: 115,200
 - Must set to this baud rate
- Set NMEA Version 4.11
 - To support new satellite sentence types
 - Used for SKYPLOT display
 - No impact on MADOCA results
- Set Numbering Used for SV
 - For QZSS 3-digit SV numbering
- Set Dynamic Model
 - Stationary, Pedestrian, Automobile
- Enable GNSS RAWX
 - Pseudorange, Carrier Phase, Doppler etc.
 - Used to generate RINEX OBS file
- Enable SFRBX (Subframe Data)
 - Navigation Data
 - Used to generate RINEX NAV File

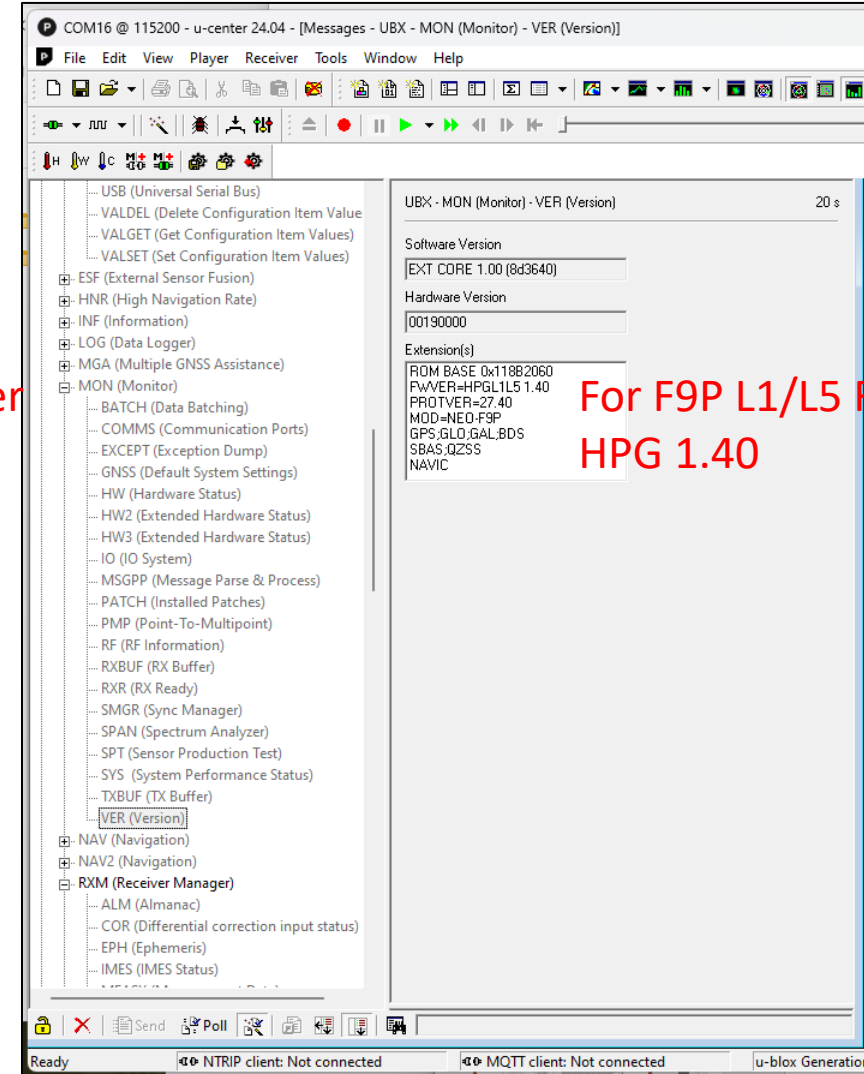
MADOCA Receiver (D9C)

- Set Baud Rate: 57,600
 - Must set to this baud rate
- Set NMEA Version 4.10
- Use Generation 9 Configuration View
 - Advance Configurations → CGF QZSS
 - Allows two channels to output the same data
 - Such as L6E and L6E or L6D and L6D and select the best one
 - But, the current MAD-WIN does not work well with this setup
 - Set Channel 1 to L6D
 - Set Channel 2 to L6E
- Select ERROR CORRECT Mode for RS Decoder

Firmware Version for F9P (L1/L2) and F9P (L1/L5)



For F9P L1/L2 Receiver
HPG 1.32 or Higher
If set to 1.5, it can be
used for GAL OSNMA



For F9P L1/L5 Receiver
HPG 1.40

Receiver Setup (F9P)

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - CFG (Config) - GNSS (GNSS Config)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - GNSS (GNSS Config)

ID	GNSS	Configure	Enable	min	max	Signals
0	GPS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8	16	<input checked="" type="checkbox"/> L1C/A
1	SBAS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3	3	<input checked="" type="checkbox"/> L1C/A
2	Galileo	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4	12	<input checked="" type="checkbox"/> E1
3	BeiDou	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4	18	<input checked="" type="checkbox"/> B1
4	IMES	<input type="checkbox"/>	<input type="checkbox"/>	0	0	<input type="checkbox"/> L1C/A
5	QZSS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0	3	<input checked="" type="checkbox"/> L1C/A <input type="checkbox"/> L1S
6	GLONASS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8	12	<input checked="" type="checkbox"/> L10F
7	NAVIC					

Number of channels available: 60
Number of channels to use: 60 Auto set

For specific SBAS configuration use

Ready | NTRIP client: Not connected | MQTT client: Not connected | u-blox Generation 9

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - CFG (Config) - NAV5 (Navigation 5)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - NAV5 (Navigation 5) 8 s

Navigation Modes
Dynamic Model: 0 - Portable

Fix Mode: 3 - Auto 2D/3D
UTC Standard: 0 - Automatic
Fixed Altitude: 0.00 [m]
Fixed Altitude Var: 1.00 [m/m]

Navigation Input Filters
Min SV Elevation: 0 [deg]
C/N0 Threshold: 0 [#SVs]
C/N0 Threshold: 0 [dBHz]

Navigation Output Filters
DR Timeout: 0 [s]
PDDP Mask: 25.0
TDOP Mask: 25.0
P Acc Mask: 100 [m]
P Acc ADR Mask: 0 [m]
T Acc Mask: 350 [m]
Static Hold Threshold: 0.00 [m/s]
Static Hold Exit Dist: 0 [m]

DGNSS
DGNSS Timeout: 60 [s]

Ready | NTRIP client: Not connected | MQTT client: Not connected | u-blox Generation 9

Receiver Setup (F9P)

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - CFG (Config) - NMEA (NMEA Protocol)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - NMEA (NMEA Protocol)

CFG-NMEA-DATA2

Filters

- Permit position output for failed and invalid fixes
- Permit position output for invalid fixes
- Permit time output for invalid times
- Permit date output for invalid dates
- Restrict output to GPS SVs only
- Permit COG output even if COG frozen

GNSS to filter out:

- GPS
- SBAS
- QZSS
- GLONASS
- BeiDou
- Galileo

NMEA Version: 4.11

Max SVs per Talker Id: 0 - Standard

Mode Flags:

- Compatibility mode
- High precision mode
- Consider mode
- Strict limit 82 chars max

Numbering used for SVs not supported by NMEA: 1 - Extended (3 digit)

Main Talker ID: 0 - System dependent

GSV Talker ID: 0 - GNSS Specific

BeiDou Talker ID: []

Remember to set the NMEA parser's custom talker ID in Tools->Preferences (Generic Tab)

Ready | NTRIP client: Not connected | MQTT client: Not connected | u-blox Generation 9 | COM16 115200 No files

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - CFG (Config) - PRT (Ports)]

File Edit View Player Receiver Tools Window Help

UBX - CFG (Config) - PRT (Ports)

Target: 1 - UART1

Protocol in: 0+1+5 - UBX+NMEA+RTCM3

Protocol out: 0+1+5 - UBX+NMEA+RTCM3

Baudrate: 115200

Databits: 8

Stopbits: 1

Parity: None

Bit Order: LSB First

Extended TX timeout (>=Fw7.00)

TX-Ready Feature (>=Fw7.00)

- Enable
- Inverse Polarity (low-active)

Threshold: 0

PIO: 0

Ready | NTRIP client: Not connected | MQTT client: Not connected | u-blox Generation 9 | COM16 115200 No files

Receiver Setup (F9P)

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - RXM (Receiver Manager) - RAWX (Multi-GNSS Raw Measurement Data)]

File Edit View Player Receiver Tools Window Help

NAV (Navigation)
NAV2 (Navigation)
RXM (Receiver Manager)
ALM (Almanac)
COR (Differential correction input status)
EPH (Ephemeris)
IMES (IMES Status)
MEASX (Measurement Data)
PMP (Point to Multipoint)
PMREQ (Power Mode Request)
QZSSL6 (QZSS L6 message)
RAW (Raw Measurement Data)
RAWX (Multi-GNSS Raw Measurement Data)
RLM (Return Link Message)
RTCM (RTCM input status)
SFRB (Subframe Data)

UBX - RXM (Receiver Manager) - RAWX (Multi-GNSS Raw Measurement Data) 0 s

Local Time: 2318.522360.003000000 [s]
Leap seconds: 18 [VALID] [s] Clock reset

SV	Sign...	G...	Pseudo Range [m]	Carrier Phase [c...	Dopple...	Lock T...	SNR	PR Std...	CP Std...	DO St...	P...	C...	H...
S137	L1C/A	-	38140460.65	200429453.92	447.8	64500	43	0.08	0.008	0.128	Y	Y	Y
S128	L1C/A	-	40568035.25	213186446.22	448.2	64500	41	0.08	0.008	0.256	Y	Y	Y
G03	L1C/A	-	21253375.56	111697212.21	1819.6	64500	50	0.08	0.004	0.032	Y	Y	Y
B08	B1D1	-	40104685.39	208835625.24	1813.4	64500	38	0.16	0.012	0.256	Y	Y	Y
B09	B1D1	-	41239591.60	214745341.67	-1424.5	64500	35	0.32	0.012	0.512	Y	Y	Y
B13	B1D1	-	40825805.78	212590696.06	1729.1	64500	34	0.32	0.020	0.512	Y	Y	Y
B16	B1D1	-	42226814.93	219886071.69	-1212.0	64500	37	0.32	0.012	0.256	Y	Y	Y
R10	L1OF	-7	21424141.53	114202720.88	-1550.0	64500	48	0.32	0.004	0.064	Y	Y	Y
R09	L1OF	-2	23101056.72	123358341.92	-3690.9	64500	48	0.32	0.004	0.064	Y	Y	Y
R11	L1OF	0	22670383.85	121143650.77	2481.4	15900	29	1.28	0.031	1.024	Y	Y	Y
R05	L1OF	1	22579416.91	120700124.16	3637.9	10420	31	2.56	0.023	1.024	Y	Y	Y
R19	L1OF	3	22579412.37	126620745.17	-1988.2	0	24	5.12	0.012	8.192	Y	Y	N
G30	L1C/A	-	25748901.07	135300312.84	-1949.9	64500	36	0.32	0.012	0.256	Y	Y	Y
E02	E1C	-	26120665.49	137258007.92	-2242.3	64500	46	0.08	0.004	0.064	Y	Y	Y
E15	E1C	-	26133199.66	137330894.76	1918.6	64500	30	0.64	0.023	0.512	Y	Y	Y
Q02	L1C/A	-	38052540.34	199967423.26	933.6	64500	49	0.08	0.004	0.032	Y	Y	Y
B33	B1D1	-	24543304.16	127803416.17	1071.8	64500	47	0.08	0.004	0.128	Y	Y	Y
B37	B1D1	-	25367361.80	13209526.31	-2163.7	64500	45	0.08	0.004	0.128	Y	Y	Y
B38	B1D1	-	38974328.30	202949553.52	1620.2	64500	45	0.08	0.004	0.128	Y	Y	Y
R21	L1OF	4	23391594.24	125173235.26	2598.9	31640	32	1.28	0.023	1.024	Y	Y	Y
R04	L1OF	6	22598311.92	121012981.59	330.3	64500	36	0.64	0.016	0.512	Y	Y	Y
G14	L1C/A	-	21457223.58	112758470.78	734.3	0	23	2.56	-	2.048	Y	Y	N
Q04	L1C/A	-	37668374.49	197948641.98	642.9	64500	42	0.08	0.004	0.128	Y	Y	Y
Q07	L1C/A	-	38140465.34	200429483.18	447.8	64500	39	0.32	0.012	0.256	Y	Y	Y
E30	E1C	-	24613024.16	129342309.58	141.9	64500	36	0.32	0.012	0.256	Y	Y	Y
B41	B1D1	-	25241813.78	131440749.87	3308.3	64500	45	0.08	0.004	0.128	Y	Y	Y
B42	B1D1	-	26989945.86	140538523.28	-1551.1	0	21	5.12	-	8.192	Y	Y	N
B43	B1D1	-	26612931.70	138580490.30	-1753.7	64500	39	0.08	0.008	0.256	Y	Y	Y
B06	B1D1	-	41881663.63	218088804.76	-1278.0	64500	36	0.32	0.016	0.512	Y	Y	Y
E36	E1C	-	26990328.11	141835166.67	-1663.0	64500	33	0.64	0.016	0.512	Y	Y	Y
G06	L1C/A	-	25480960.89	133903352.99	3189.6	0	25	2.56	-	2.048	Y	Y	N
Q02	L5Q	-	38052542.45	143326346.97	697.2	64500	49	0.08	0.004	0.064	Y	Y	Y
G03	L5Q	-	21253375.59	83402817.21	1358.9	64500	48	0.08	0.004	0.064	Y	Y	Y
G06	L5Q	-	25480962.13	99932771.08	2381.9	40840	25	0.64	0.039	0.512	Y	Y	Y
E30	E5AQ	-	24613026.51	96586807.16	105.5	64500	32	0.32	0.020	0.512	Y	Y	Y
G30	L5Q	-	25746809.62	101035995.11	-1456.0	64500	39	0.16	0.008	0.256	Y	Y	Y
E02	E5AQ	-	26120671.98	102503113.62	-1674.4	64500	38	0.16	0.008	0.256	Y	Y	Y
E15	E5AQ	-	26133204.02	102552306.11	1432.5	64500	28	0.32	0.023	0.512	Y	Y	Y
Q04	L5Q	-	37668380.82	147818814.72	480.2	64500	43	0.08	0.008	0.128	Y	Y	Y
G14	L5Q	-	21457234.13	84202797.90	547.7	64500	27	1.28	0.027	0.512	Y	Y	Y
B33	B2Ap	-	24543331.54	96313310.99	807.5	64500	43	0.08	0.004	0.128	Y	Y	Y
R37	R2Ap	-	25367570.34	96547776.55	-1630.7	64500	44	0.08	0.004	0.128	Y	Y	Y

Ready NTRIP client: Not connected MQTT client: Not connected u-blox Generation 9 COM16 115200 No file

COM16 @ 115200 - u-center 24.04 - [Messages - UBX - RXM (Receiver Manager) - SFRBX (Subframe Data NG)]

File Edit View Player Receiver Tools Window Help

NAV (Navigation)
NAV2 (Navigation)
RXM (Receiver Manager)
ALM (Almanac)
COR (Differential correction input status)
EPH (Ephemeris)
IMES (IMES Status)
MEASX (Measurement Data)
PMP (Point to Multipoint)
PMREQ (Power Mode Request)
QZSSL6 (QZSS L6 message)
RAW (Raw Measurement Data)
RAWX (Multi-GNSS Raw Measurement Data)
RLM (Return Link Message)
RTCM (RTCM input status)
SFRB (Subframe Data)
SFRBX (Subframe Data NG)

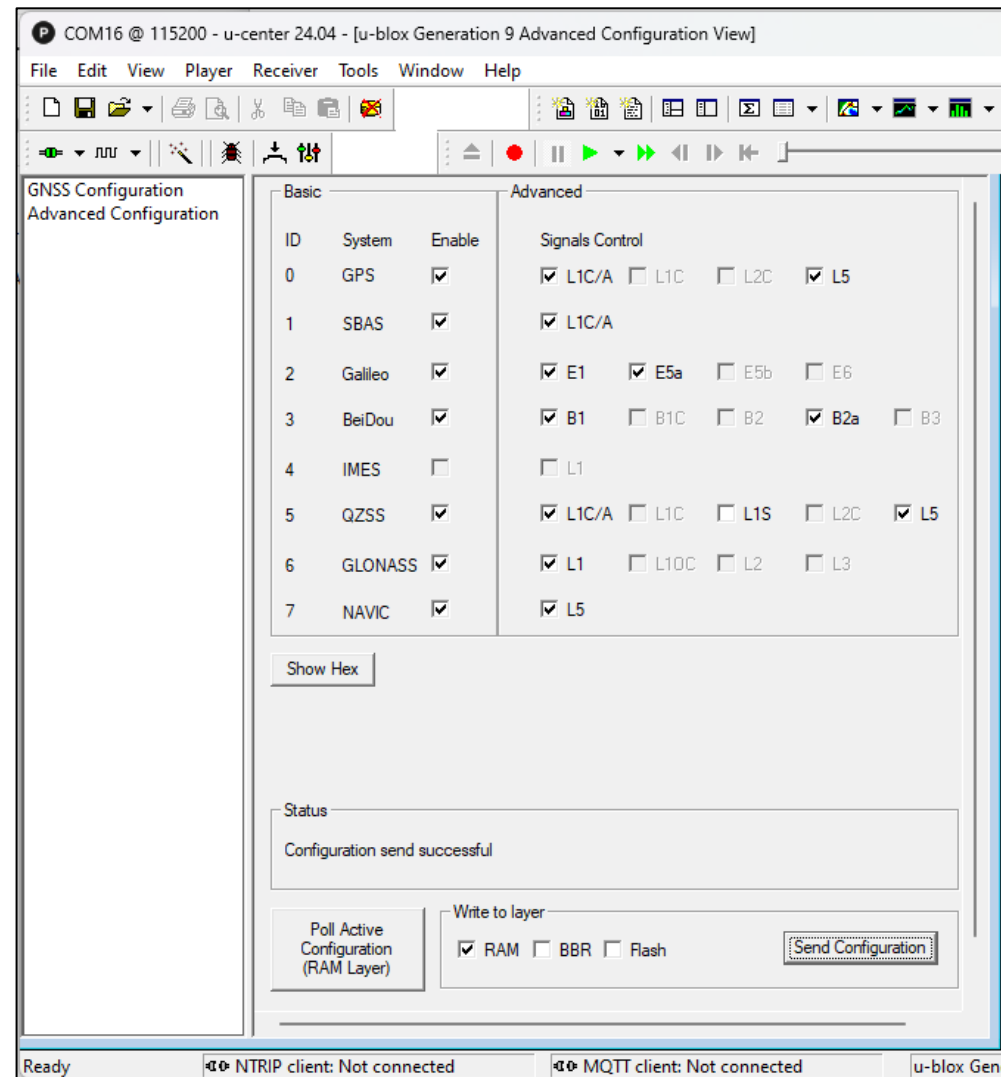
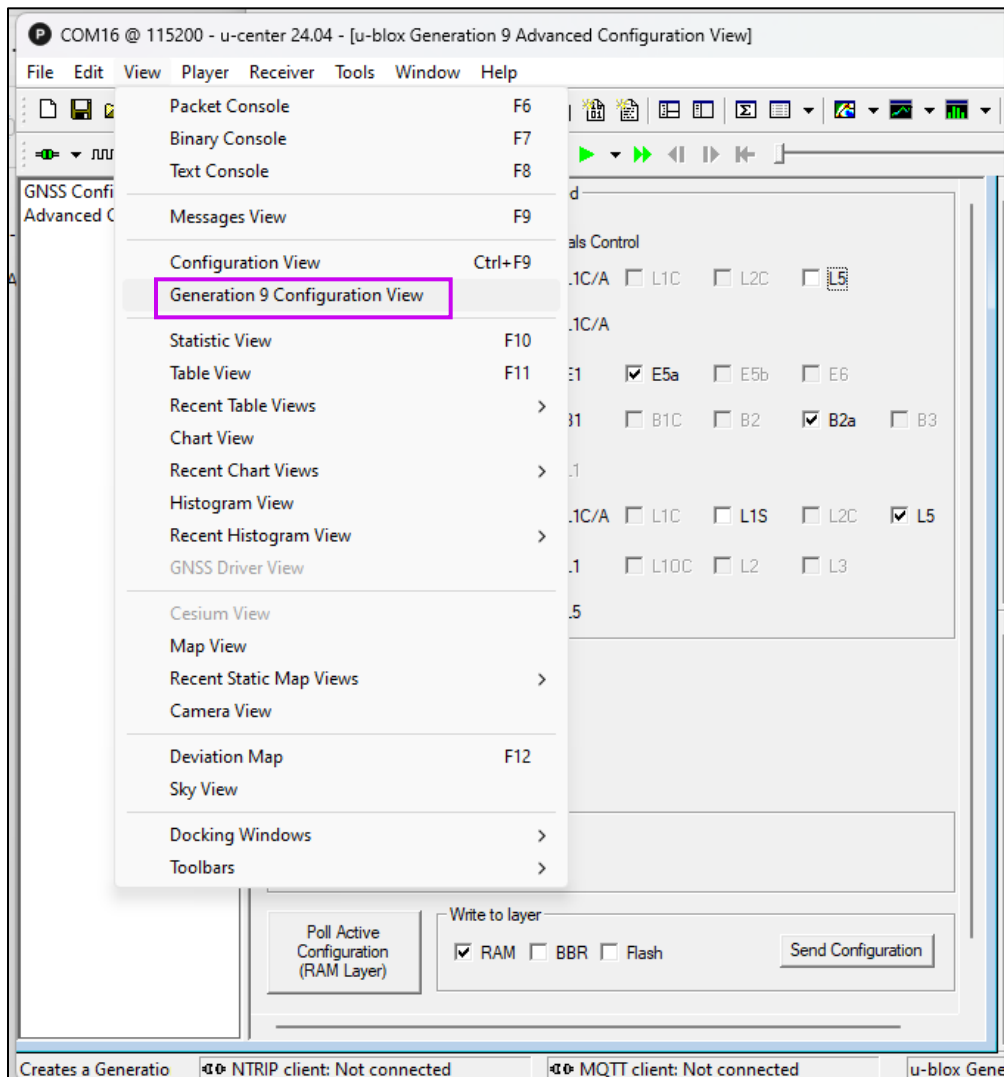
UBX - RXM (Receiver Manager) - SFRBX (Subframe Data NG) 0 s

denotes data received on subChn Strip Parity Bits

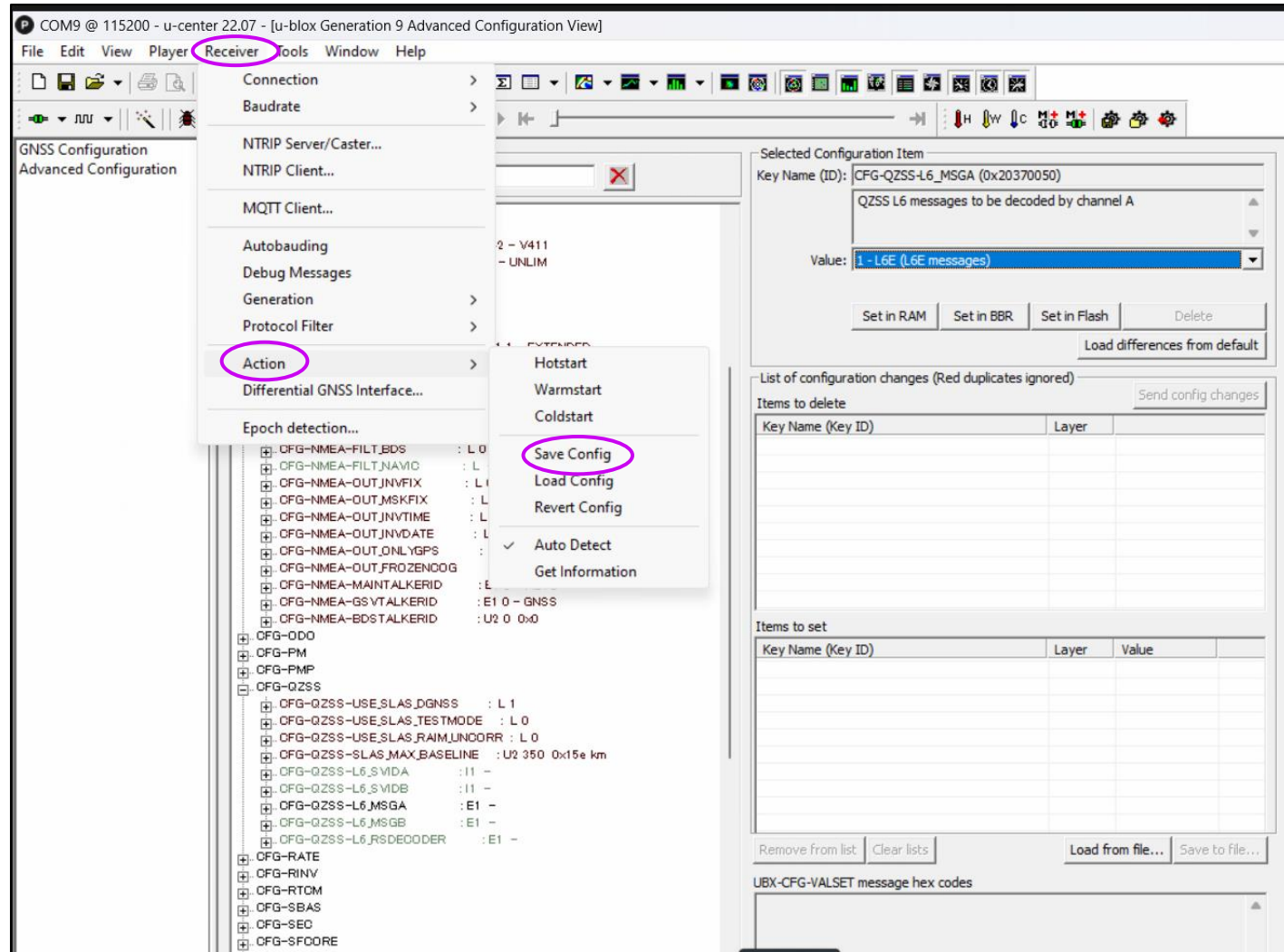
SV	MSG	DATA (* denotes invalid words)
BDS 6 B1D1 0	1	389017F5 21E00010 0784FE6E 38855FE6 3420166F 34488C49 0230B1E4 1C0021C9 087860DF 1186E124
BDS 8 B1D1 0	5/5	389057FC 134016BF 251488BC 0009343C 0C073C13 1011A880 127C7F83 3F6691FC 220ABFDE 15703D8B
BDS 9 B1D1 0	1	389017F5 21E00010 0784FE6E 388450E8 2720166F 34488C49 0230B1E4 1C0007C9 09786F47 22132188
BDS 13 B1D1 0	1	389017F5 21E00010 0784FE6E 3889807E 1C20166F 34488C49 0230B1E4 1FFE9C88 2D9E0EC 004CA867
BDS 14 B1D1 0	1	389017F5 1A68002D 0784FD6B 080430F6 142017FC 3409C1FE 218E51FA 00153867 2F31FDC 3F6E87C3
BDS 16 B1D1 0	1	389017F5 21E00010 0784FE6E 388E0074 2F20166F 34488C49 0230B1E4 1C0095CA 16D65FC4 31B5A111
BDS 23 B1D1 0	3	389037FB 16D3E3C9 004CF884 3E2080E4 015FDD49 295FFF2F 383F98FE 189016AF 35B30FB 02D9DEC2
BDS 33 B1D1 0	1	389017F5 21E01015 0784FE6E 38A3E82A 3E201E1F 34488C49 0230B1E4 1C0041CA 00FFA07F 00700125
BDS 33 B2Ad 0	??	84BAAD04 06219E61 8AE4FA8E C3EED37C 14F3FF88 001FFCC8 003048BC 02E63FFD 4AFAAC41
BDS 37 B1D1 0	1	389017F5 21E01015 0784FE6E 3885ED4F 1620166F 34488C49 0230B1E4 1C0042C1 128CC60 04480163
BDS 37 B2Ad 0	??	94BAAD04 0236FCE8 85E4D176 8A4ED375 F68FF5F FF840072 AC0298CA 04DC2006 00F330DB
BDS 38 B1D1 0	1	389017F5 21E01015 0784FE6E 388190E4 1920164F 34488C49 0230B1E4 1C000A02 24D5C0FF 0145211F
BDS 38 B2Ad 0	??	88BAAD04 061A39F3 30451FFE 180FAE65 2F23FF0B FE3FF870 27FED784 05AF7FF4 886F2283
BDS 39 B1D1 0	4/6	389047F3 13401B38 04E33858 00440965 30605191 310EE0D7 0A407F7A 3FD9643E 21E28F11 1E000747
BDS 41 B1D1 0	1	389017F5 21E01015 0784FE6E 38813C47 1320166F 34488C49 0230B1E4 1C0040C7 2FC76076 04D5216F
BDS 41 B2Ad 0	??	A4BAAD04 1E21A678 5704F904 3E38D4BC 1603FB3 FFB3FFC5 C80411A4 02E287FC F2835A5E
BDS 42 B1D1 0	3	389037FB 2123F7FD 044F9060 38E308C9 03A7FD49 296400B9 01412D11 10D3F56 3CEEC42 33EFA888
BDS 42 B2Ad 0	??	A8BA9FD4 1E21A7FF D044F90E 34AED2DA 150C00C8 00CFFFB6 20040680 02DFDFDC 5D2EE2E8
BDS 43 B1D1 0	1	389017F5 21E01015 0784FE6E 388DD078 1D20164F 34488C49 0230B1E4 1C0004AC 3C200090 00BA01CE
BDS 43 B2Ad 0	??	ACBAAD04 080C02C5 BC04D80E E8DECAAD F00BFFB0 00EFFFF8 F003A414 03301FF8 664E9C1C
BDS 46 B1D1 0	4/13	389047F3 16E83756 04EB6894 0001C808 13A0D020 11343D9E 36147FB3 3FD2270E 1A31F3FC 311AF7B2
GAL 2 E1B 0	E0X	00955555 55555555 55555555 5439C000 BE226488 80B2386A AAAA4982 DA4BC000
GAL 2 E5A1 0	??	0C6B2761 C5400B3E D40122A2 086E0E87 17E50A0C 87C3439F E209568D A3400000
GAL 15 E1B 0	E0X	00955555 55555555 55555555 5439C000 BE224000 0000002A AAAA8F0 E508C000
GAL 15 E5A1 0	??	0C6B286C ED050C1D 16DC198B FD8C1184 15C4FC84 8701439F E20956C1 3F9C0000
GAL 30 E1B 0	E0X	00955555 55555555 55555555 5439C000 BE224000 0000002A AAAA8F0 E508C000
GAL 30 E5A1 0	??	0C652746 C6E829F4 853421AA 07A80E86 185C0A24 86D9439F E2095666 9CD40000
GAL 36 E1B 0	E0	00955555 55555555 55555555 5439C000 BE224F99 49328A2A AAAA6AD1 7DCBC000
GAL 36 E5A1 0	??	0C6B286D 6B441C61 804F1942 FC601348 1388FB3C 87C9439F E2095449 11680000
GLO 3 L1OF 5	15 1/3549	7ED6425E 29348FC7 241E4800
GLO 4 L1OF 6	1 3/3555	08106146 C0B2CF5E F0447000
GLO 5 L1OF 1	1 3/3555	0810804D 65C0388F 65458000
GLO 9 L1OF 2	1 3/3555	08106048 E5E32D01 64F5C800
GLO 10 L1OF 7	1 3/3555	08106419 07342754 68B97000
GLO 11 L1OF 0	11 1/3549	5EBA912F D1348FA0 28519800
GLO 19 L1OF 3	1 3/3555	08106446 2A8C2F95 A5504800
GLO 21 L1OF 4	13 2/3555	6F7394A8 51B48FF0 BBE7C800
GPS 2 L1C/A 0	3	22C10E0F 2A82EB8F 0011D135 A872C373 001749F2 99E2E008 06D9F421 885172AB 3FAEF22E 9D40264F
GPS 3 L5I 0	??	8BD0EA0D BB3AE8FD A46C7D3C 095CA800 030009FE EC0080AC 1303FEFE 3C0ADFCC 0E847E41 A8B580
GPS 3 L1C/A 0	3	22C10E0F 2A82EB8F 3FF79C34 38756826 80048A01 8857286B 08010801 B9591BE3 3FEA3EAF 17E3B267
GPS 6 L5I 0	??	8B19EAAD BB5D68FD A23929D8 7F456800 080005FD E407A04D 1303FEFE 3C0ADFCC 0E4764D6 0EC8814

Ready NTRIP client: Not connected MQTT client: Not connected u-blox Generation 9 COM16 115200 No file

Receiver Setup (F9P)



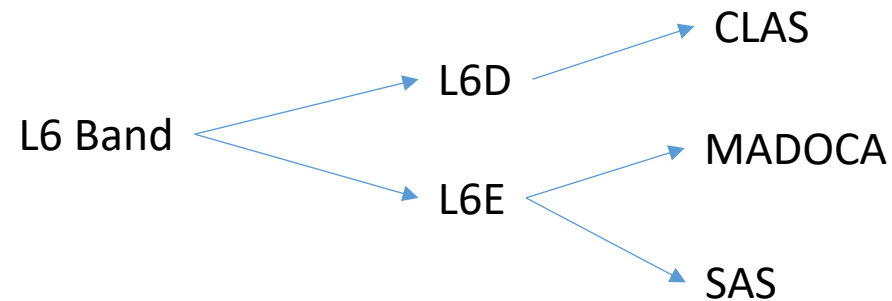
Receiver Setup; Saving the Configurations



Reference Slides

QZSS L6 Band, CLAS, MADOCA, and SAS

◆ QZSS Transmits L6 signal for High-Accuracy Services using CLAS and MADOCA

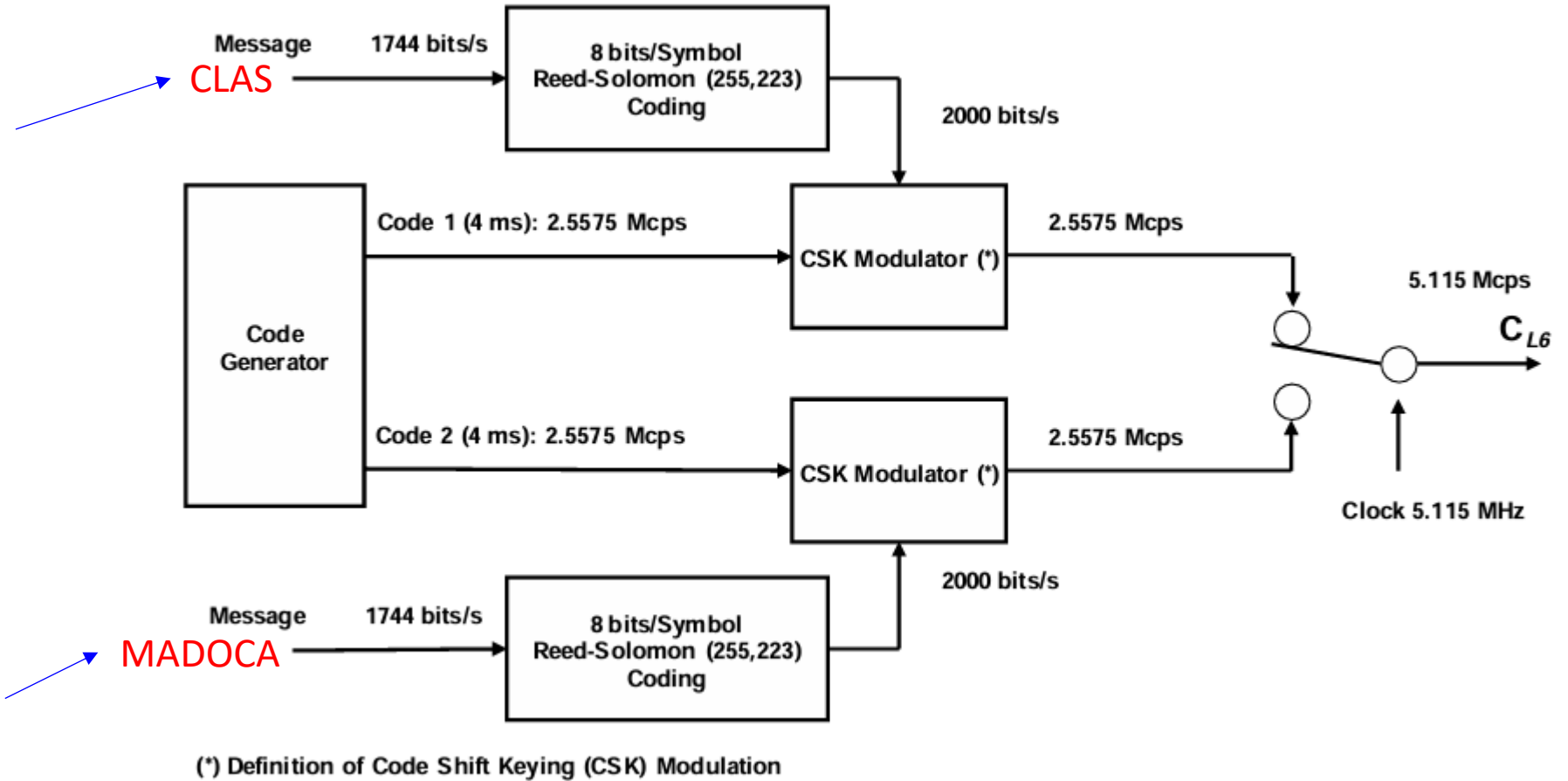


SAS: QZSS Signal Authentication Service for QZSS, GPS, and Galileo Signals in L1/E1b and L5/E5a Bands (LNAV, CNAV, CNAV-2, INAV, FNAV Messages)

- MADOCA PPP:
 - **M**ulti-GNSS **A**Dvanced **O**rbit and **C**lock **A**ugmentation - Precise Point Positioning
- MADOCA PPP service is provided by QZSS using L6 Band (1278.75MHz)
 - L6 Band has L6D and L6E signals
 - L6D is used for CLAS (Centimeter Level Augmentation Service)
 - L6E is used for MADOCA

QZSS L6 Signal Structure

- Navigation Data
Includes data necessary for High-Accuracy service
- Satellite Orbit Error
 - Satellite Clock Error
 - Signal Bias Data
 - Ionospheric Related Data



- Navigation Data
Includes data necessary for High-Accuracy service
- Satellite Orbit Error
 - Satellite Clock Error
 - Signal Bias Data

Source: Quasi-Zenith Satellite System Interface Specification, Centimeter Level Augmentation Service, (IS-QZSS-L6-005), <https://qzss.go.jp/en/technical/download/pdf/ps-is-qzss/is-qzss-l6-005.pdf?t=1720501474703>