

# Pocket SDR Signal IDs

Ver. 0.9 2024-01-05  
Ver. 0.10b 2024-01-07

# Pocket SDR Signal IDs (1/3)

| System                  | Carrier Freq. (MHz) | Signal   | I/Q | Min Rec. Power (dBW) | Modulation      | Primary Code  |             |            | Overlay Code  |            | Navigation Data |                   |            |          | Notes        | Pocket SDR Signal ID |
|-------------------------|---------------------|----------|-----|----------------------|-----------------|---------------|-------------|------------|---------------|------------|-----------------|-------------------|------------|----------|--------------|----------------------|
|                         |                     |          |     |                      |                 | Length (chip) | Rate (Mcps) | Cycle (ms) | Length (chip) | Cycle (ms) | Data            | Symbol Rate (sps) | Rate (bps) | FEC      |              |                      |
| GPS<br>[1][2][3]        | 1575.42             | L1C/A    | Q   | -158.5               | BPSK(1)         | 1023          | 1.023       | 1          | -             | 1          | LNAV            | 50                | 50         | -        |              | L1CA                 |
|                         |                     | L1P(Y)*1 | I   | -161.5               | BPSK(10)        | 1week         | 10.23       | 1week      | -             | 1week      | LNAV            | 50                | 50         | -        |              | -                    |
|                         |                     | L1M*3    | I   | ?                    | BOC(10,5)       | ?             | 5.115       | ?          | ?             | ?          | ?               | ?                 | ?          | ?        | Block IIR-M~ | -                    |
|                         |                     | L1C-D    | I   | -163.0               | BOC(1,1)        | 10230         | 1.023       | 10         | -             | 10         | CNAV-2          | 100               | 50         | BCH,LDPC | GPS III~     | L1CD                 |
|                         |                     | L1C-P    | I   | -158.25              | TMBOC(6,1,4/33) | 10230         | 1.023       | 10         | 1800          | 18000      | -               | -                 | -          | -        |              | L1CP                 |
|                         | 1227.6              | L2C/A    | Q   | -164.5               | BPSK(1)         | 1023          | 1.023       | 1          | -             | 1          | LNAV            | 50                | 50         | -        | Block IIR-M~ | -                    |
|                         |                     | L2P(Y)*1 | I   | -164.5/-161.5        | BPSK(10)        | 1week         | 10.23       | 1week      | -             | 1week      | LNAV            | 50                | 50         | -        |              | -                    |
|                         |                     | L2M*3    | I   | ?                    | BOC(10,5)       | ?             | 5.115       | ?          | ?             | ?          | ?               | ?                 | ?          | ?        | Block IIR-M~ | -                    |
|                         |                     | L2C-M    | Q/I | -160.0/-158.5        | BPSK(1), TDM    | 10230         | 0.5115      | 20         | -             | 20         | LNAV            | 50                | 50         | -        | Block IIR-M~ | -                    |
|                         |                     | L2C-L    |     |                      |                 | 767250        | 0.5115      | 1500       | -             | 1500       | CNAV            | 50                | 25         | 1/2      |              | L2CM                 |
|                         | 1176.45             | L5-I     | I   | -157.9/-157.0        | BPSK(10)        | 10230         | 10.23       | 1          | 10 (NH)       | 10         | CNAV            | 100               | 50         | 1/2      | Block IIF~   | L5I                  |
|                         |                     | L5-Q     | Q   | -157.9/-157.0        | BPSK(10)        | 10230         | 10.23       | 1          | 20 (NH)       | 20         | -               | -                 | -          | -        |              | L5Q                  |
| GLONASS<br>[4][5][6][7] | 1602.0 + 0.5625K*2  | L1C/A    | I   | -161.0               | BPSK(0.5)       | 511           | 0.511       | 1          | -             | 1          | GLO-STR         | 100               | 50         | -        |              | G1CA                 |
|                         |                     | L1P      | Q   | ?                    | BPSK(5)         | 5110000       | 5.11        | 1000       | -             | 1000       | ?               | ?                 | ?          | -        |              | -                    |
|                         | 1600.995            | L1OCd    | Q   | ?                    | BPSK(1), TDM    | 1023          | 0.5115      | 2          | 2             | 4          | GLO-STR         | 250               | 125        | 1/2      | GLO-K2~      | -                    |
|                         |                     | L1OCp    |     |                      |                 | 4092          | 2.046       | 2          | 4 (MS)        | 8          | -               | -                 | -          | -        |              | -                    |
|                         |                     | L1SC*4   | I   | ?                    | ?               | ?             | ?           | ?          | ?             | ?          | ?               | ?                 | ?          | ?        |              | -                    |
|                         | 1246.0 + 0.4375K*2  | L2C/A    | I   | -167.0               | BPSK(0.5)       | 511           | 0.511       | 1          | -             | 1          | GLO-STR         | 100               | 50         | -        |              | G2CA                 |
|                         |                     | L2P      | Q   | ?                    | BPSK(5)         | 5110000       | 5.11        | 1000       | -             | 1000       | ?               | ?                 | ?          | -        |              | -                    |
|                         | 1248.06             | L2CSI    | Q   | ?                    | BPSK(1), TDM    | ?             | 0.5115      | ?          | ?             | ?          | ?               | ?                 | ?          | ?        | GLO-K2~      | -                    |
|                         |                     | L2OCp    |     |                      |                 | 10230         | 0.5115      | 20         | 50            | 1000       | -               | -                 | -          | -        |              | -                    |
|                         | 1202.025            | L2SC*4   | I   | ?                    | ?               | ?             | ?           | ?          | ?             | ?          | ?               | ?                 | ?          | ?        |              | -                    |
|                         |                     | L3OCd    | I   | ?                    | BPSK(10)        | 10230         | 10.23       | 1          | 5 (BC)        | 5          | GLO-STR         | 200               | 100        | 1/2      | GLO-K1~      | G3OCD                |
|                         |                     | L3OCp    | Q   | ?                    | BPSK(10)        | 10230         | 10.23       | 1          | 10 (NH)       | 10         | -               | -                 | -          | -        |              | G3OCP                |
| Galileo <sup>[8]</sup>  | 1575.42             | E1-A     | Q   | ?                    | BOC(15,2.5)     | ?             | 2.5575      | ?          | ?             | ?          | G/NAV           | ?                 | ?          | ?        | PRS          | -                    |
|                         |                     | E1-B     | I   | -157.0               | CBOC(6,1,1/11)  | 4092          | 1.023       | 4          | -             | 4          | I/NAV           | 250               | 125        | 1/2      | OS, SoL, CS  | E1B                  |
|                         |                     | E1-C     | Q   |                      | CBOC(6,1,1/11)  | 4092          | 1.023       | 4          | 25            | 100        | -               | -                 | -          | -        |              | E1C                  |
|                         | 1176.45             | E5a-I    | I   | -155.0               | BPSK(10)        | 10230         | 10.23       | 1          | 20            | 20         | F/NAV           | 50                | 25         | 1/2      | OS, CS       | E5AI                 |
|                         |                     | E5a-Q    | Q   |                      | BPSK(10)        | 10230         | 10.23       | 1          | 100           | 100        | -               | -                 | -          | -        |              | E5AQ                 |
|                         | 1207.14             | E5b-I    | I   | -155.0               | BPSK(10)        | 10230         | 10.23       | 1          | 4             | 4          | I/NAV           | 250               | 125        | 1/2      | OS, SoL, CS  | E5BI                 |
|                         |                     | E5b-Q    | Q   |                      | BPSK(10)        | 10230         | 10.23       | 1          | 100           | 100        | -               | -                 | -          | -        |              | E5BQ                 |

\*1 AS ON, \*2 K = {-7 ... +6}, \*3 Military Signal, \*4 Secured Service Signal

# Pocket SDR Signal IDs (2/3)

| System                             | Carrier Freq. (MHz) | Signal               | I/Q | Min Rec. Power (dBW)  | Modulation      | Primary Code  |             |            | Overlay Code  |            | Navigation Data |                   |            |          | Notes       | Pocket SDR Signal ID |
|------------------------------------|---------------------|----------------------|-----|-----------------------|-----------------|---------------|-------------|------------|---------------|------------|-----------------|-------------------|------------|----------|-------------|----------------------|
|                                    |                     |                      |     |                       |                 | Length (chip) | Rate (Mcps) | Cycle (ms) | Length (chip) | Cycle (ms) | Data            | Symbol Rate (sps) | Rate (bps) | FEC      |             |                      |
| Galileo (Cont.)                    | 1191.795            | E5a+b <sup>*5</sup>  | -   | (-152.0)              | 8-PSK(10)       | 10230         | 10.23       | 1          | 100           | 100        | -               | -                 | -          | -        |             | -                    |
|                                    |                     | E6-A                 | Q   | ?                     | BOC(10,5)       | ?             | 5.115       | ?          | ?             | ?          | G/NAV           | ?                 | ?          | ?        | PRS         | -                    |
|                                    | 1278.75             | E6-B                 | I   | -155.0                | BPSK(5)         | 5115          | 5.115       | 1          | -             | 1          | C/NAV           | 1000              | 500        | 1/2      | CAS, HAS    | E6B                  |
|                                    |                     | E6-C                 | Q   |                       | BPSK(5)         | 5115          | 5.115       | 1          | 100           | 100        | -               | -                 | -          | -        |             | E6C                  |
| QZSS<br>[9][10][11][12]            | 1575.42             | L1C/A                | I/Q | -158.5 <sup>*6</sup>  | BPSK(1)         | 1023          | 1.023       | 1          | -             | 1          | LNAV            | 50                | 50         | -        |             | L1CA                 |
|                                    |                     | L1C/B                | I   | -158.5                | BOC(1,1)        | 1023          | 1.023       | 1          | -             | 1          | LNAV            | 50                | 50         | -        |             | L1CB                 |
|                                    |                     | L1C-D                | I   | -163.0 <sup>*7</sup>  | BOC(1,1)        | 10230         | 1.023       | 10         | -             | 10         | CNAV2           | 100               | 50         | BCH,LDPC |             | L1CD                 |
|                                    |                     | L1C-P                | Q   | -158.25               | BOC(1,1)        | 10230         | 1.023       | 10         | 1800          | 18000      | -               | -                 | -          | -        | Block I     | L1CP                 |
|                                    |                     |                      | I   | -158.25 <sup>*8</sup> | TMBOC(6,1,4/33) | 10230         | 1.023       | 10         | 1800          | 18000      | -               | -                 | -          | -        | Block II    | L1CP                 |
|                                    |                     | L1S                  | I   | -161.0/-158.5         | BPSK(1)         | 1023          | 1.023       | 1          | -             | 1          | L1S             | 500               | 250        | 1/2      | SLAS        | L1S                  |
|                                    | 1227.6              | L2C-M                | I   | -160.0/-158.5         | BPSK(1), TDM    | 10230         | 0.5115      | 20         | -             | 20         | CNAV            | 50                | 25         | 1/2      |             | L2CM                 |
|                                    |                     | L2C-L                |     |                       |                 | 767250        | 0.5115      | 1500       | -             | 1500       | -               | -                 | -          | -        |             | -                    |
|                                    | 1176.45             | L5-I                 | I   | -157.9/-157.0         | BPSK(10)        | 10230         | 10.23       | 1          | 10 (NH)       | 10         | CNAV            | 100               | 50         | 1/2      |             | L5I                  |
|                                    |                     | L5-Q                 | Q   | -157.9/-157.0         | BPSK(10)        | 10230         | 10.23       | 1          | 20 (NH)       | 20         | -               | -                 | -          | -        |             | L5Q                  |
|                                    |                     | L5S-I                | I   | -157.0 <sup>*9</sup>  | BPSK(10)        | 10230         | 10.23       | 1          | -             | 1          | L5S             | 500               | 250        | 1/2      | Normal mode | L5SI                 |
|                                    |                     |                      |     |                       |                 |               |             |            | 2 (MC)        | 2          | L5S             | 500               | 250        | 1/2      | Verif. mode | L5SIV                |
|                                    |                     | L5S-Q                | Q   |                       | BPSK(10)        | 10230         | 10.23       | 1          | 20 (NH)       | 20         | -               | -                 | -          | -        | Normal mode | L5SQ                 |
|                                    |                     |                      |     |                       |                 |               |             |            | 2 (MC)        | 2          | -               | -                 | -          | -        | Verif. mode | L5SQV                |
|                                    | 1278.75             | L6D                  | I   | -155.7                | BPSK(5), TDM    | 10230         | 2.5575      | 4          | -             | 4          | L6D             | 2000              | 2000       | RS       | CLAS        | L6D                  |
|                                    |                     | L6L                  |     |                       |                 | 1048575       | 2.5575      | 410        | 2             | 820        | -               | -                 | -          | -        | Block I     | -                    |
|                                    |                     | L6E                  |     |                       |                 | 10230         | 2.5575      | 4          | -             | 4          | L6E             | 2000              | 2000       | RS       | MADOCA-PPP  | L6E                  |
| BeiDou<br>[13][14][15]<br>[16][17] | 1561.098            | B1I                  | I   | -163.0                | BPSK(2)         | 2046          | 2.046       | 1          | 20 (NH)       | 20         | D1              | 50                | 50         | BCH      |             | B1I                  |
|                                    |                     |                      |     |                       |                 |               |             | 1          | -             | 1          | D2              | 500               | 500        | BCH      | GEO         | B1I                  |
|                                    |                     | B1Q <sup>*10</sup>   | Q   | ?                     | BPSK(2)         | ?             | 2.046       | ?          | ?             | ?          | ?               | ?                 | ?          | ?        |             | -                    |
|                                    | 1575.42             | B1C-D                | I   | -159.0/               | BOC(1,1)        | 10230         | 1.023       | 10         | -             | 10         | B-CNAV1         | 100               | 50         | NB-LDPC  |             | B1CD                 |
|                                    |                     | B1C-P                | Q   | -161.0                | QMBOC(6,1,4/33) | 10230         | 1.023       | 10         | 1800          | 18000      | -               | -                 | -          | -        |             | B1CP                 |
|                                    |                     | B1A-D <sup>*10</sup> | I   | ?                     | BOC(14,2)       | ?             | ?           | ?          | ?             | ?          | ?               | ?                 | ?          | ?        |             | -                    |
|                                    |                     | B1A-P <sup>*10</sup> | Q   |                       |                 | ?             | ?           | ?          | ?             | ?          | -               | -                 | -          | -        |             | -                    |
|                                    | 1176.45             | B2a-D                | I   | -156.0/               | BPSK(10)        | 10230         | 10.23       | 1          | 5             | 5          | B-CNAV2         | 50                | 25         | NB-LDPC  |             | B2AD                 |
|                                    |                     | B2a-P                | Q   | -158.0                | BPSK(10)        | 10230         | 10.23       | 1          | 100           | 100        | -               | -                 | -          | -        |             | B2AP                 |
|                                    | 1207.14             | B2I                  | I   | ?                     | BPSK(2)         | 2046          | 2.046       | 1          | 20 (NH)       | 20         | D1              | 50                | 50         | BCH      |             | B2I                  |
| 1                                  |                     |                      |     |                       |                 |               |             | -          | 1             | D2         | 500             | 500               | BCH        | GEO      | B2I         |                      |

\*5 AltBOC \*6 -164.0 dBW (SVID=7), \*7 -167.2 dBW (SVID=7), \*8 -162.4 dBW (SVID=7), \*9 -162.6 dBW (SVID=3), \*10 Authorized signal

# Pocket SDR Signal IDs (3/3)

| System         | Carrier Freq. (MHz) | Signal               | I/Q | Min Rec. Power (dBW) | Modulation     | Primary Code  |             |            | Overlay Code  |            | Navigation Data |                   |            |          | Notes      | Pocket SDR Signal ID |
|----------------|---------------------|----------------------|-----|----------------------|----------------|---------------|-------------|------------|---------------|------------|-----------------|-------------------|------------|----------|------------|----------------------|
|                |                     |                      |     |                      |                | Length (chip) | Rate (Mcps) | Cycle (ms) | Length (chip) | Cycle (ms) | Data            | Symbol Rate (sps) | Rate (bps) | FEC      |            |                      |
| BeiDou (Cont.) | 1207.14             | B2Q <sup>*10</sup>   | Q   | ?                    | BPSK(10)       | 10230         | 10.23       | 1          | ?             | ?          | ?               | ?                 | ?          | ?        |            | -                    |
|                |                     | B2b-I                | I   | -160.0/-162.0        | BPSK(10)       | 10230         | 10.23       | 1          | -             | 1          | B-CNAV3         | 1000              | 500        | NB-LDPC  | BDS-3      | B2BI                 |
|                |                     | B2b-Q <sup>*10</sup> | Q   | ?                    | BPSK(10)       | 10230         | 10.23       | 1          | ?             | ?          | B2b-PPP         | 1000              | 500        | NB-LDPC  | BDS-3, GEO | B2BI                 |
|                | 1191.795            | B2a+b <sup>*11</sup> | -   | ?                    | 8-PSK(10)      | 10230         | 10.23       | 1          | ?             | ?          | -               | -                 | -          | -        | BDS-3      | -                    |
|                |                     | B3I                  | I   | -163.0               | BPSK(10)       | 10230         | 10.23       | 1          | 20 (NH)       | 20         | D1              | 50                | 50         | BCH      |            | B3I                  |
|                | 1268.52             | B3Q <sup>*10</sup>   | Q   | ?                    | BPSK(10)       | ?             | 10.23       | ?          | ?             | ?          | D2              | 500               | 500        | BCH      | GEO        | B3I                  |
|                |                     | B3A-D <sup>*10</sup> | I   | ?                    | BPSK(10)       | ?             | 10.23       | ?          | ?             | ?          | ?               | ?                 | ?          | ?        |            | -                    |
|                |                     | B3A-P <sup>*10</sup> | Q   | ?                    | BPSK(10)       | ?             | 10.23       | ?          | ?             | ?          | ?               | ?                 | ?          | ?        | BDS-3      | -                    |
|                |                     | L1-SPS-D             | Q   | -159.6               | BOC(1,1)       | 10230         | 1.023       | 10         | -             | 10         | IRN-NAV         | 100               | 50         | BCH,LDPC | NVS-01~    | I1SD                 |
|                |                     | L1-SPS-P             | I   | -158.2               | MBOC(6,1,4/33) | 10230         | 1.023       | 10         | 1800          | 18000      | -               | -                 | -          | -        |            | I1SP                 |
| NavIC [18][19] | 1575.42             | L5-SPS               | *12 | -159.0               | BPSK(1)        | 1023          | 1.023       | 1          | -             | 1          | IRN-NAV         | 50                | 25         | 1/2      |            | I5S                  |
|                |                     | L5-RS-D              | *12 | ?                    | BOC(5,2)       | ?             | 2.046       | ?          | ?             | ?          | ?               | 50                | 25         | 1/2      | *10        | -                    |
|                | 1176.45             | L5-RS-P              | *12 | ?                    | BOC(5,2)       | ?             | 2.046       | ?          | ?             | ?          | -               | -                 | -          | -        | *10        | -                    |
|                |                     | S-SPS                | *12 | -162.3               | BPSK(1)        | 1023          | 1.023       | 1          | -             | 1          | IRN-NAV         | 50                | 25         | 1/2      |            | ISS                  |
|                |                     | S-RS-D               | *12 | ?                    | BOC(5,2)       | ?             | 2.046       | ?          | ?             | ?          | ?               | 50                | 25         | 1/2      | *10        | -                    |
|                | 2492.028            | S-RS-P               | *12 | ?                    | BOC(5,2)       | ?             | 2.046       | ?          | ?             | ?          | -               | -                 | -          | -        | *10        | -                    |
|                |                     | L1C/A                | I   | -                    | BPSK(1)        | 1023          | 1.023       | 1          | -             | 1          | SBAS            | 500               | 250        | 1/2      | PRN120-158 | L1CA                 |
| SBAS           | 1176.45             | L5-I                 | I   | -                    | BPSK(10)       | 10230         | 10.23       | 1          | 2 (MC)        | 2          | L5 SBAS         | 500               | 250        | 1/2      | PRN120-158 | L5I                  |
|                |                     | L5-Q                 | Q   | -                    | BPSK(10)       | 10230         | 10.23       | 1          | 2 (MC)        | 2          | -               | -                 | -          | -        |            | L5Q                  |

\*10 Authorized signal, \*11 ACE-BOC, \*12 Interplex Modulation

[1] IS-GPS-200K, Navstar GPS space segment/navigation user interfaces - interface specification, 2019, [2] IS-GPS-800F, Navstar GPS space segment/user segment L1C interface - interface specification, 2019, [3] IS-GPS-705A, Navstar GPS space segment/user segment L5 interface - interface specification, 2010, [4] GLONASS interface control document - navigation radiosignal in bands L1, L2, version 5.1, 2008, [5] GLONASS interface control document - code division multiple access open service navigation signal in L1 frequency band, edition 1.0, 2016, [6] GLONASS interface control document - code division multiple access open service navigation signal in L2 frequency band, edition 1.0, 2016, [7] GLONASS interface control document - code division multiple access open service navigation signal in L3 frequency band, edition 1.0, 2016, [8] European GNSS (Galileo) open service signal-in-space interface control document (OS SIS ICD), Issue 1, Revision 3, 2016, [9] Quasi-Zenith satellite system interface specification - satellite positioning, navigation and timing service (IS-QZSS-PNT-003), 2018, [10] Quasi-zenith satellite system interface specification - sub-meter level augmentation service (IS-QZSS-L1S-003), 2018, [11] Quasi-zenith satellite system interface specification - centimeter level augmentation service (IS-QZSS-L6-003), 2018, [12] Quasi-zenith satellite system interface specification - positioning technology verification service (IS-QZSS-TV-004), 2023, [13] BeiDou navigation satellite system signal in space interface control document - open service signal B1I, version 3, 2019, [14] BeiDou navigation satellite system signal in space interface control document - open service signal B1C, version 1.0, 2017, [15] BeiDou navigation satellite system signal in space interface control document - open service signal B2a, version 1.0, 2017, [16] BeiDou navigation satellite system signal in space interface control document - open service signal B3I, version 1.0, 2018, [17] BeiDou navigation satellite system signal in space interface control document - Precise Point Positioning service signal PPP-B2b, version 1.0, 2020, [18] Indian Regional Navigation Satellite System, Signal in space ICD for standard positioning service version 1.1, 2017, [19] NAVIC signal in space ICD for standard positioning service in L1 frequency version 1.0, 2023