CHANGE NOTICE

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Document Title: NAVSTAR GPS Space Segment/Navigation User Interfaces

RFC Title: Health Bit Clarification

Reason For Change (Driver):
The CNAV & CNAV-2 health summary bits for L1, L2, and L5 are not clearly defined and can be interpreted in multiple ways.
Documents affected: IS-GPS-200, IS-GPS-705, IS-GPS-800, and ICD-GPS-870

(Pre-RFC 788)

Description of Change:
Clarify the definition of the health summary bits. In addition, establish precedence for health indicators that eliminates ambiguity. May require a fix to message types.

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AUTHORIZED SIGNATURES	**REPRESENTING**	**DATE**
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CODE IDENT 66RP1

IS200-1731 :
Insertion after object IS200-1421:

6.4.5 Health Code Setting of '11110'

Section Number :
6.4.6

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
User Protocol for Signal Availability and Health Information

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1732 :
Insertion below object IS200-1731

Section Number :
6.4.6.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
The GPS enterprise provides users with information in multiple ways which indicates the health of each satellite's broadcast signal components. Occasionally, the indications provided one way will conflict with the indications provided another way. The recommended user protocol for interpreting these indications is given below. The Control Segment will manage the GPS constellation assuming this protocol; users should plan accordingly. Users who vary from this protocol assume the responsibility to assess and mitigate any risk that might arise from that variance. The information is presented in the order of a typical acquisition sequence, but once satellites are successfully being tracked, the user should react to changing indications in any order in which they may be received.

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1733 :
Insertion after object IS200-1732

Section Number :
6.4.6.1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
User Protocol

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

IS200-1734 :
Insertion below object IS200-1733

Section Number :
6.4.6.1.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :

1. Constellation Almanac. LNAV almanac users should not use signals that appear to be from dummy satellites as defined via a currently broadcast LNAV almanac (see paragraphs 3.2.1). CNAV almanac users should not use signals that appear to be from satellites for which a CNAV almanac is not currently being broadcast in Message Types 12, 31, and/or 37 (see paragraph 30.3.3.4).

2. SV Configuration Code. Signals not identified as existing by the broadcast SV configuration code (see paragraph 20.3.3.5.1.4) for a satellite should be ignored.

3. Signal Alarm Indication. Signals from a satellite that are subject to a signal alarm indication (see paragraph 6.4.6.2) should be ignored.

4. CEI Data Set. Signals from a satellite that are indicated as bad by the CEI data set in use from that satellite should be ignored. See paragraph 6.2.9 for a description of the CEI data set. See paragraph 20.3.3.5.1.3 or 30.3.3.1.1.2 for a description of the CEI data set health settings.

5. Marginal Indication. Signals from a satellite that are indicated as marginal (see paragraph 6.4.6.3) by that satellite may be ignored.

6. Other. Signals from a satellite whose suitability for use are suspect for other valid reasons (e.g., Receiver Autonomous Integrity Monitoring [RAIM]) may be ignored.

Note: Priority of SPS SIS Health Information. Satellite health indications in LNAV subframes 4 and 5 (see paragraphs 30.3.3.5.1.3 and 40.3.3.5.1.3) and CNAV health indications in Message Types 12, 31, and/or 37 (see paragraph 30.3.3.4) may not be the most recent indications of the health of a satellite. They indicate the health of the satellites in the constellation when the almanac was generated for upload to the satellite from which the almanac was obtained. The current availability and health of a satellite signal should be determined based on the criteria described in items 1-6 above.

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

IS200-1735 :
Insertion after object IS200-1733

Section Number :
6.4.6.2

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
Alarm Indications

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1736 :
Insertion below object IS200-1735

Section Number :
6.4.6.2.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
An otherwise healthy signal-in-space (SIS) signal or marginal SIS signal becomes unhealthy when it is the subject of a SIS alarm indication. The presence of any of the following alarm indications listed below means the information provided by the signal may not be correct.
Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1737 :
Insertion after object IS200-1736

Section Number :
6.4.6.2.1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
Common Alarm Indications

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1738 :
Insertion below object IS200-1737

Section Number :
6.4.6.2.1.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
The following alarm indications are common to all code signals.
  The code signal becomes untrackable (e.g., ≥ 20 dB decrease in transmitted signal power, ≥ 20 dB increase in correlation loss):
  (a)   The code signal ceases transmission.
  (b)   The elimination of the standard code (e.g., gibberish code).
  (c)   The substitution of non-standard code for the standard code (see paragraph 3.2.1.6)

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1739 :
Insertion after object IS200-1737

Section Number :
6.4.6.2.2

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
Specific Alarm Indications

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

IS200-1740 :
Insertion below object IS200-1739

Section Number :
6.4.6.2.2.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
The following alarm indications are specific to the code signals listed below.
C/A-Code or P(Y)-Code Signal
(a)   The failure of parity on 5 successive words of LNAV data (3 seconds) (see paragraphs 20.3.5 and 40.3.5).
(b)   The broadcast IODE does not match the 8 LSBs of the broadcast IODC (excluding normal data set cutovers, see paragraph 20.3.3.4.1).
(c)   The transmitted bits in subframe 1, 2, or 3 are all set to 0's or all set to 1's.
(d)   Default LNAV data is being transmitted in subframes 1, 2, or 3 (see paragraph 20.3.2).
(e)   The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 20.3.3).

CM-Code Signal
(a)   The failure of the cyclic redundancy check (CRC) on 5 successive CNAV messages (60 seconds) (see paragraph 30.3.5).
(b)   The broadcast time of ephemeris (t_{oe}) is not current or does not match the broadcast time of clock (t_{oc}) (excluding normal data set cutovers, see paragraphs 30.3.3.1.1 and 30.3.4.4).
(c)   The broadcast t_{op} is not consistent across the Message Types 10, 11 and Type 30's messages which comprise the current CEI data set (excluding normal data set cutovers, see paragraph 30.3.4.4).
(d)   The transmitted bits in Message Types 10, 11 and Type 30's are all set to 0's or all set to 1's.
(e)   The 8-bit preamble does not equal 10001011_2, decimal 139, or hexadecimal 8B (see paragraph 30.3.3).

Notes:

1. *A SIS alarm indication exists when the satellite is not trackable because it is not transmitting the standard PRN code modulation on the L-band carrier signal. These SIS alarm indications are specifically called out above because of their relatively high probability of occurrence.*

2. *The SIS alarm indications related to the LNAV and CNAV message data are considered "weak" indications since receivers do not necessarily continuously read each satellite's LNAV or CNAV message data either by design or by circumstance (e.g., radio-frequency interference [RFI] can prevent reading LNAV or CNAV message data). These weak SIS alarm indications are assumed to have a five-minute lag time before receivers take notice of them for alerting purposes.*

3. *The SIS alarm indications related to the LNAV or CNAV message data are indicative of a problem onboard the satellite. GPS receivers may perceive similar indications caused by local effects that are unrelated to the broadcast SIS.*

4. *In addition to SIS alarm indications, other conditions may also cause GPS signals to become temporarily untrackable, such as ionospheric signal fades, local signal masking, or local interference.*

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1741 :
Insertion after object IS200-1735

Section Number :
6.4.6.3

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS :
"Marginal" Indications.

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-1740 :
Insertion below object IS200-1739

Section Number :
6.4.6.3.0-1

WAS :
N/A

Redlines :
<INSERTED OBJECT>

IS:
The C/A-code signal is marginal when the C/A-code signal would otherwise have been defined as healthy except that one or more of the following three warning conditions is or are present:

1. The C/A-code signal indicates that any one of the satellite's SIS components may not be fully capable. More specifically, the Most Significant Bit (MSB) of the six-bit health status word given in subframe 1 of the LNAV message is set to 0_2 ("all LNAV data are OK") and the 5 Least Significant Bits (LSBs) of the six-bit health status word in subframe 1 of the LNAV message are set to anything other than 00000_2 (all signals are OK), 00010_2 (all signals dead), or 11100_2 ("SV is temporarily out"). See paragraphs 20.3.3.3.1.4 and 20.3.3.5.1.3.

2. The URA alert flag is raised (i.e., bit 18 of the LNAV HOW is set to 1) and the URA does not apply. This means the URA may be worse than the URA index value transmitted in subframe 1. See paragraph 20.3.3.2.

3. The transmitted URA index in subframe 1 is greater than or equal to 8 ("N"=8). A URA index of 8 or greater indicates that the URA is greater than 48 meters. An index of 15 indicates that the URA is greater than 6144 meters or that there is no URA prediction available. See paragraph 20.3.3.3.1.3.

The health of the CM-code and CL-code signals is marginal when the signals would otherwise have been defined as healthy except that one or more of the following three warning conditions is or are present:

1. Default CNAV data (i.e., Message Type 0) is being transmitted in lieu of Message Type 10, 11 and/or Message Type 30's on the CM-code signal (e.g., a current and consistent CEI data set is not available). See paragraph 30.3.3.

2. The URA alert flag is raised (i.e., bit 38 of each CNAV message is set to 1) and therefore the CM-code signal URA components do not apply to the CM-code and CL-code signals. This means the CM-code and CL-code signal URA may be worse than indicated by the URA index components transmitted in Message Type 10 and Message Type 30's. See paragraph 30.3.3.

3. Either or both the URA_{ED} index in Message Type 10 and the URA_{NED0} index in Message Type 30's transmitted in the CM-code signal are greater than or equal to 8 ("N"=8). A URA_{ED} index or URA_{NED0} index of 8 or greater indicates that the URA is greater than 48 meters. An index of 15 indicates that the URA is greater than 6144 meters or that there is no URA prediction available. See paragraphs 30.3.3.1.1.4 and 30.3.3.2.4.

The P(Y)-code SIS health is marginal when the P(Y)-code SIS would otherwise have been defined as healthy except that one or more of the following three warning conditions is or are present:

1. The Most Significant Bit (MSB) of the six-bit health status word given in subframe 1 of the LNAV message is set to 0_2 and the 5 Least Significant Bits (LSBs) of the six-bit health status word in subframe 1 of the LNAV message are set to anything other than 00000_2 (all signals are OK), 00010_2 (all signals dead), or 11100_2 (SV is temporarily out). See paragraphs 20.3.3.3.1.4 and 20.3.3.5.1.3.

2. The URA alert flag transmitted as bit 18 of the HOW is set to 1 and the URA does not apply as defined in ICD-GPS-224 and ICD-GPS-225.

3. The transmitted URA index "N"=15.

Rationale :
Operational protocols section to address health bit ambiguity and provide users with interpretation for conflicting health information

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IS200-407 :

Section Number :
20.3.3.5.1.4.0-1

WAS :
Page 25 of subframe 4 shall contain a four-bit-long term for each of up to 32 SVs to indicate the A-S status and the configuration code of each SV. The MSB of each four-bit term shall be the A-S flag with a "1" indicating that A-S is ON. The three LSBs shall indicate the configuration of each SV using the following code:

Code   SV Configuration

000   Reserved in order to preserve future use of these values in a future revision of this IS. Until such a revision, the User Segment developing to this version of this IS should interpret these values as indicating that no information in this data field is presently usable as a means to identify the actual SV configuration.

001   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).

010   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).

011   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).

100   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).

101, 110, 111   Reserved in order to preserve future use of these values in a future revision of this IS. Until such a revision, the User Segment developing to this version of this IS should interpret these values as indicating that no information in this data field is presently usable as a means to identify the actual SV configuration.

Redlines :

Page 25 of subframe 4 shall contain a four-bit-long term for each of up to 32 SVs to indicate the A-S status and the configuration code of each SV. The MSB of each four-bit term shall be the A-S flag with a "1" indicating that A-S is ON. The three LSBs shall indicate the configuration of each SV using the following code:

Code   SV Configuration

000   ~~Reserved in order to preserve future use of these values in a future revision of this IS. Until such a revision, the User Segment developing to this version of this IS should interpret these values as indicating that no information in this data field is presently usable as a means to identify the actual SV configuration.~~ No information is available.

001   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).

010   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).

011   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).

100   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).

101~~,~~   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, Regional Military Protection capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS IIIF SVs).

110, 111   Reserved in order to preserve future use of these values in a future revision of this IS. Until such a revision, the User Segment developing to this version of this IS should interpret these values as indicating that no information in this data field is presently usable as a means to identify the actual SV configuration.

IS :

Page 25 of subframe 4 shall contain a four-bit-long term for each of up to 32 SVs to indicate the A-S status and the configuration code of each SV. The MSB of each four-bit term shall be the A-S flag with a "1" indicating that A-S is ON. The three LSBs shall indicate the configuration of each SV using the following code:

<u>Code</u>   <u>SV Configuration</u>

000   No information is available.

001   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2 (e.g. Block II/Block IIA/IIR SV).

010   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code signal capability, L2C signal capability (e.g., Block IIR-M SV).

011   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L2C signal capability, L5 signal capability (e.g., Block IIF SV).

100   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS III SVs).

101   A-S capability, plus flags for A-S and "alert" in HOW; memory capacity as described in paragraph 20.3.2, M-code capability, Regional Military Protection capability, L1C signal capability, L2C signal capability, L5 signal capability, no SA capability (e.g., GPS IIIF SVs).

110, 111   Reserved in order to preserve future use of these values in a future revision of this IS. Until such a revision, the User Segment developing to this version of this IS should interpret these values as indicating that no information in this data field is presently usable as a means to identify the actual SV configuration.

Rationale :

Add GPS IIIF capabilities to SV Configuration codes and update "000" from Reserved to SV does not exist.

IS200-510 :

Section Number :
30.3.1.0-1

WAS :
The CNAV data, $D_C(t)$, is a higher precision representation and nominally contains more accurate data than the LNAV data, D(t), described in Appendix II. Also, the CNAV data stream uses a different parity algorithm.

Redlines :
The <u>CEI data set provided in the </u>CNAV data, $D_C(t)$, is a higher precision representation and nominally contains more accurate data than<u> the CEI data set provided in</u> the LNAV data, D(t), described in Appendi~~x~~<u>ces</u> II<u> and IV</u>. Also, the CNAV data stream uses a different parity algorithm.

IS :
The CEI data set provided in the CNAV data, $D_C(t)$, is a higher precision representation and nominally contains more accurate data than the CEI data set provided in the LNAV data, D(t), described in Appendices II and IV. Also, the CNAV data stream uses a different parity algorithm.

Rationale :
Provide clarifying details: CEI data in CNAV is more accurate, but the almanac is not as accurate.

IS200-511 :

Section Number :
30.3.1.0-2

WAS :
Users are advised that the CNAV data, $D_C(t)$, described in this appendix and the LNAV data, D(t), described in Appendix II, should not be mixed in any user algorithms or applications. Each of the two data sets should be treated as a set and used accordingly.

Redlines :
Users are advised that the <u>CEI data sets provided in the </u>CNAV data, $D_C(t)$, described in this appendix and<u> the CEI data sets provided in</u> the LNAV data, D(t), described in Appendi~~x~~<u>ces</u> II<u> and IV</u>, should not be mixed in any user algorithms or applications. Each of the two data sets should be treated as a set and used accordingly.

IS :
Users are advised that the CEI data sets provided in the CNAV data, $D_C(t)$, described in this appendix and the CEI data sets provided in the LNAV data, D(t), described in Appendices II and IV, should not be mixed in any user algorithms or applications. Each of the two data sets should be treated as a set and used accordingly.

Rationale :
Specify that the CEI data sets may not be mixed with each other. Therefore, as an example, users may utilize the SV configuration in LNAV to determine what codes on what carriers the summary bits in CNAV apply to.

IS200-539 :

Section Number :
30.3.3.1.1.2.0-1

WAS :
The three, one-bit, health indication in bits 52 through 54 of Message Type 10 refers to the L1, L2, and L5 signals of the transmitting SV. The health of each signal is indicated by:

>   0 = Signal OK,
>   1 = Signal bad or unavailable.

Redlines :
The three, one-bit, health indication in bits 52 through 54 of Message Type 10 refers to the L1, L2, and L5 ~~signals~~<u>carrier</u> of the transmitting SV. The health of each ~~signal~~<u>carrier</u> is indicated by:

>   0 = ~~Signal~~<u>All codes and data on this carrier are</u> OK,

>   1 = ~~Signal~~<u>Some or all codes and data on this carrier are</u> bad or unavailable.

IS :
The three, one-bit, health indication in bits 52 through 54 of Message Type 10 refers to the L1, L2, and L5 carrier of the transmitting SV. The health of each carrier is indicated by:

>   0 = All codes and data on this carrier are OK,
>   1 = Some or all codes and data on this carrier are bad or unavailable.

Rationale :
Clarify definition of health bits in this section to specify carriers; if a carrier is bad, all codes and data on the carriers are bad. Resolves health bit ambiguity.

IS200-540 :

Section Number :

30.3.3.1.1.2.0-2

WAS :

The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV.

Redlines :

The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, ~~The~~the transmitted health data may not correspond to the actual health of the transmitting SV. For more information about user protocol for interpreting health indications see paragraph 6.4.6.

IS :

The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV. For more information about user protocol for interpreting health indications see paragraph 6.4.6.

Rationale :

Clarify that health bit will be set relative to the capability of each SV as assigned by the SV configuration code. Additionally as established with LNAV health data, the SV will be set as "healthy" if lack of a capability is inherent relative to the SV configuration code. Add reference to the new user protocol section for further clarification of health indications.

IS200-598 :

Section Number :
30.3.3.4.4.0-1

WAS :
The three, one-bit, health indication in bits 155, 156, and 157 of Message Type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 signals of the SV whose PRN number is specified in the message or in the packet. For each health indicator, a "0" signifies that all signals on the associated frequency are okay and "1" signifies that some or all signals on the associated frequency are bad. The predicted health data will be updated at the time of upload when a new midi almanac or reduced almanac has been built by the CS. The transmitted health data may not correspond to the actual health of the transmitting SV or other SVs in the constellation.

Redlines :
The three, one-bit, health indication in bits 155, 156, and 157 of Message Type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 ~~signals~~carrier of the SV whose PRN number is specified in the message or in the packet.

The health ~~For~~of each ~~health~~carrier ~~indicator,~~is ~~a~~indicated ~~"~~by:

     0~~"~~ ~~signifies~~= ~~that a~~All ~~signals~~codes ~~on~~and ~~the~~data ~~associated~~on ~~frequency~~this carrier are ~~okay~~OK,

     1 = Some or all codes and ~~"1"~~data ~~signifies~~on ~~that~~this ~~some~~carrier are bad or ~~all~~unavailable.

The ~~signals~~health ~~on~~bit indication shall be given relative to the ~~associated~~capabilities ~~frequency~~of ~~are~~each ~~bad~~SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability. The predicted health data will be updated at the time of upload when a new ~~midi almanac or~~CEI ~~reduced~~data ~~almanac~~set has been built by the CS. ~~The~~Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV~~. or~~For ~~other~~more ~~SVs~~information ~~in~~about ~~the~~user ~~constellation~~protocol for interpreting health indications see paragraph 6.4.6.

IS :
The three, one-bit, health indication in bits 155, 156, and 157 of Message Type 37 and bits 29, 30 and 31 of each packet of reduced almanac refers to the L1, L2, and L5 carrier of the SV whose PRN number is specified in the message or in the packet.

The health of each carrier is indicated by:

> 0 = All codes and data on this carrier are OK,

> 1 = Some or all codes and data on this carrier are bad or unavailable.

The health bit indication shall be given relative to the capabilities of each SV as designated by the configuration code in the LNAV message (see paragraph 20.3.3.5.1.4). Accordingly, any SV which does not have a certain capability will be indicated as "healthy" if the lack of this capability is inherent in its design or if it has been configured into a mode which is normal from a user standpoint and does not require that capability. The predicted health data will be updated at the time of upload when a new CEI data set has been built by the CS. Therefore, the transmitted health data may not correspond to the actual health of the transmitting SV. For more information about user protocol for interpreting health indications see paragraph 6.4.6.

Rationale :
Clarify definition of health bits in this section to specify carriers; if a carrier is bad, all codes and data on the carriers are bad. Also clarify that health bit will be set relative to the capability of each SV as assigned by the SV configuration code. Additionally as established with LNAV health data, the SV will be set as "healthy" if lack of a capability is inherent relative to the SV configuration code. Add reference to the new user protocol section for further clarification of health indications. Resolves health bit ambiguity.