**HKMCC Commissioning Test Plan/Report for SGBs**

**July 2024**

DMCC Test Configuration:

DMCC = HKMCC (where the JAMCC is the HMCC)

MEOLUT 4773 (Hong Kong): Fast-moving DOA capable, not SGB processing anomaly capable, **not EHE compliant**.

MEOLUT 4774 (Hong Kong): not Fast-moving DOA capable, is SGB processing anomaly capable **and EHE compliant**. MEOLUT configured for testing only.

GEOLUT 4775 (Hong Kong). GEOLUT configured for testing only. Tracks satellite 222 (Luch-5A).

The HKMCC and the JAMCC are LGM and SGB capable.

SIT messages for the HMCC and Hong Kong RCC are sent automatically to the HMCC FTP server.

In any simulated alert message, the associated data times (MF 14 or MF 14a/14b) will be set to a current value (e.g., within the last 18 hours) so that the DMCC does not filter the alert as “old” data. For tests that involve the use of encoded position, the satellite list (MF 83) will be updated to ensure that the encoded position is within the footprint of all satellites, so that the DMCC does not filter the encoded position, unless it is otherwise noted that the encoded position is outside the satellite footprint

All operational MEO and LEO satellites will be configured as operational in the DMCC and associated TLEs/orbit vectors will be current within 7 days, to ensure that encoded position is properly validated.

To facilitate testing that requires that the encoded position be within the satellite footprint, the DMCC may be configured to disable the satellite footprint check for encoded position, as feasible. The HKMCC will be configured to disable the satellite footprint check for encoded position.

The DMCC is configured to filter alerts with a detect time older than [18] hours

The DMCC is configured to keep alert sites open for [x hours or minutes], unless a confirmed cancellation is received or the alert site is manually closed.

As applicable, the DMCC is configured to close an alert site [xx minutes / hours] after a confirmed cancellation unless newer non-cancellation alert data is received after the confirmed cancellation.

The DMCC is configured to process SGB alert data operationally, except when SGB alert filtering is being tested.

Test Overview – all message fields are valid unless otherwise noted. All output SIT 185 messages should be reviewed for compliance with A.002. (If the DMCC has implemented the “re-organized” SIT 185 message, as approved by CSC-66, then a “Confirmed Position” alert is evidenced by the presence of an MCC Reference Position.) Unless otherwise noted, all input alerts are sent from the Hong Kong MEOLUTs with beacon message Rotating Field 0 and do not contain an uncorroborated MEOSAR alert. Alerts sent to a “non-capable” MCC should in SIT 185 message format enveloped in a SIT 915 message.

In the description of “Test Details and Results” below, the text “Internally sent” indicates that the test message was injected at the DMCC; otherwise, the message was sent to the DMCC by the HMCC. The sample SIT messages provided below contain many relevant input data field values (e.g., source MCC, destination MCC, SIT number, Source ID, beacon message, DOA position) but the actual send time, alert data times and list of satellites may differ from the corresponding values provided in the sample SIT messages.

**Reporting detailed test results.** Results for a given test will be reported in a format similar to the test description. An example is provided below.

#### Test description: Send a SIT 145 message to the USMCC for an Albanian coded ELT(DT) with FGB message bits 41 – 42 = 11 (invalid value) and DOA position in Mexico. Expected result: the USMCC sends a SIT 185 Initial Located Alert to the Mexico SPOC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCCnor an alert to the LADR(since the beacon message is not usable).

Test condition: sent SIT 145 message #**12345** to the USMCC **on 25 Feb 13:01** for an Albanian coded ELT(DT) with FGB message bits 41 – 42 = 11 (invalid value) and DOA position in Mexico.

Result: the USMCC sent SIT 185 Initial Located Alert message# **30001** to the Mexico SPOC with DOA position that noted the unreliable beacon message and did not send an NOCR to the JAMCCnor an alert to the LADR

Status: Passed

If the Status is “Failed”, then the description of the failure(s) is highlighted. A Status of “Failed” or “Partial Failure” is highlighted in Red. A Status of “Passed” is highlighted in Green. Once the DMCC passes a test that is previously failed, then the highlight is removed from the previous “Failed” test. Test results pending DMCC feedback are highlighted in blue.

**High Level Comments on Tests Performed**

In cases where a test (or series of tests) was invalid due to an incorrect test script details on the test(s) are not provided in this Report.

#### **1) MCC Requirement** - **Process MCC formatted SGB alert SIT messages**.

#### Beacon messages will contain various beacon types and vessel types, to enable verification of related information in output SIT 185 messages.

#### Collectively, the following sets of tests (with a few additional tests listed in other sections) are designed to verify the DMCC capability to receive and distribute each type of SGB alert SIT message, and to validate basic MCC requirements, such as generating NOCRs, position conflict alerts and position confirmation alerts.

#### At a minimum, one input SIT message in each of the following categories should be tested:

#### GEOSAR SIT messages 322, 323, 324 and 332;

#### MEOSAR “no DOA position SIT messages 342, 343, 344 and 336;

#### MEOSAR “DOA position” SIT messages 345, 346, 347 and 337; and

#### RLS SIT messages 334, 338 and 339

#### Note that if an input SIT message from a test series is processed without first processing the preceding SIT message in the test series, then the expected results may differ from what is noted for that input message within the full test series. After an MCC for a given MCC vendor is commissioned as SGB capable, it is advisable to test SIT messages that have not yet been verified for the MCC vendor, as available, in the commissioning of other MCCs for that vendor.

#### **Series A:**

**Test Message 1-1-1**

#### a) Send a SIT 322 message to the HKMCC using LUT 4775 (Hong Kong GEOLUT) for a SGB Canadian coded RLS capable ELT with encoded position in Hong Kong (17.243,115.768) and in the satellite footprint.

#### Expected result: the HKMCC sends a SIT 332 (NOCR) message to the JAMCC and a SIT 185 Initial Located Alert to the Hong Kong RCC.

#### Note: Encoded location is in the footprint of GEO satellite 222.

Input:.

Result:

Status:

**Test Message 1-1-2**

#### b) Send a SIT 323 message to the HKMCC for the same ELT with encoded position conflict in Australia (-30,140) and in the satellite footprint.

#### Expected result: the HKMCC sends a SIT 185 Position Conflict Alert to the Hong Kong RCC and a SIT 323 to the JAMCC.

Input:

Result:

#### Status:

**Test Message 1-1-3**

#### c) Send a SIT 324 message to the HKMCC for the same ELT with an encoded position conflict in Hong Kong (17.140,116.926) and in the satellite footprint.

#### Expected result: the HKMCC sends a SIT 323 message to the JAMCC (for the USMCC) and a SIT 185 Position Conflict Alert to the Hong Kong RCC.

Input:

Result:

#### Status:

**Test Message 1-1-4**

#### d) Send a SIT 346 message to the HKMCC from non fast-moving beacon capable LUT 4774 (Hong Kong MEOLUT) for the same ELT with a DOA position conflict (18.620,115.810) in Hong Kong and no encoded position.

#### Expected result: the HKMCC sends a SIT 346 to the JAMCC and a SIT 185 Position Conflict Alert to the Hong Kong RCC.

#### Note: this test verifies that DOA position is used for a non-ELT(DT) from a LUT that is not fast-moving beacon capable; see a related test of DOA position filtering for an ELT(DT) alert from a LUT that is not fast-moving beacon capable in section 5.

Input:

Result:

#### Status:

**Test Message 1-1-5**

#### e) Send a SIT 324 message to the HKMCC with LUT 4475 for the same ELT with an encoded position (18.624,115.817) in the satellite footprint and matching the previous DOA position, and beacon message Rotating Field 0.

#### Expected result: the HKMCC sends a SIT 334 (RLS) message to JAMCC (for the FMCC for RLSP Galileo) and a SIT 324 to the JAMCC and a SIT 185 Position Confirmed Alert to the Hong Kong RCC.

Input:

Result:

#### Status:

#### **Series B**:

**Test Message 1-2-1**

#### a) Send a SIT 342 message to the HKMCC (an uncorroborated MEOSAR alert) from LUT 4773 for a Canadian coded RLS capable PLB with no encoded position

#### Expected result: the HKMCC sends a SIT 342 message to the SGB capable JAMCC.

#### Note: satellite footprint requirements in following tests: 1-2-2, 1-2-3, 1-2-4 and 1-2-6.

Input:

Result:

Status:

**Test Message 1-2-2**

#### b) Send a SIT 342 message to the HKMCC from SGB processing capable LUT 4774 for the same PLB with encoded position in Hong Kong (18.24301,115.76801) and in the satellite footprint (same single burst and satellite as the previous message).

#### Expected result: the HKMCC sends a SIT 336 (NOCR) and SIT 342 message to the JAMCC and a SIT 185 Initial Located Alert to the Hong Kong RCC.

Input:

Result:

Status:

**Test Message 1-2-3**

#### c) Send a SIT 343 message to the HKMCC from LUT 4773 for the same PLB with an encoded position conflict in Australia (-30,140) and in the satellite footprint.

#### Expected result: the HKMCC sends a SIT 343 message to the JAMCC and a SIT 185 Position Conflict Alert to the Hong Kong RCC.

Input:

Result:

Status:

**Test Message 1-2-4**

#### d) Send a SIT 344 message to the HKMCC from LUT 4773 for the same PLB with encoded position conflict in Australia (-31,140) and in the satellite footprint.

#### Expected result: the HKMCC sends a SIT 343 message to the JAMCC and a SIT 185 Position Conflict Alert to the Hong Kong RCC.

Input:

Result:

Status:

**Test Message 1-2-5**

#### e) Send a SIT 345 message to the HKMCC from LUT 4773 for the same PLB with a DOA position conflict (17.246,114.761) and no encoded position.

#### Expected result: the HKMCC sends a SIT 346 message to the JAMCC and a SIT 185 Position Conflict Alert to the Hong Kong RCC with EHE excluded (since LUT 4773 is not EHE compliant).

Input:

Result:

Status:

**Test Message 1-2-6**

#### f) Send a SIT 338 message to the HKMCC from LUT 4773 for the same PLB with encoded position (17.20001,114.70001) in the satellite footprint and matching the previous DOA position, and beacon message rotating field 2 (RLS, Type 1 and Galileo capable).

#### Expected result: the HKMCC sends a SIT 338 (RLS) message to the JAMCC (for the FMCC), a SIT 344 message to the JAMCC, and a SIT 185 Position Confirmed Alert to the Hong Kong RCC.

Input:.

Result:.

Status:

**Test Message 1-2-7**

#### g) Send a SIT 339 message to the HKMCC from LUT 4773 for the same PLB with a matching DOA position (17.2,114.8), no encoded position, beacon message rotating field 2 (RLS, Type 1 Capable and Acknowledged, Galileo capable), and Last Burst Time (MF 14b) 1 minute after the Last Burst Time in the previous alert.

#### Expected result: the HKMCC sends a SIT 339 (RLS) message to the JAMCC (for the FMCC) and does not send the alert to the Hong Kong RCC.

Input:.

Result:.

Status:

#### **Series C**:

**Test Message 1-3-1**

#### a) Send a SIT 345 message to the HKMCC from LUT 4773 for an Hong Kong (Aircraft Operator) coded ELT with a DOA position (51.5, -100.3) in Canada, and no encoded position.

#### Expected result: the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC) and a SIT 185 NOCR message to Hong Kong RCC.

Input:

Result:

Status:

**Test Message 1-3-2**

#### b) Send a SIT 347 message to the HKMCC from LUT 4773 for the same ELT with a matching DOA position (51.4, -100.3) in Canada, no encoded position and Last Burst Time 31 minutes from the Last Burst Time in the previous alert.

#### Expected result: the HKMCC sends a SIT 347 message to the JAMCC (for the USMCC) and (optionally) a SIT 185 Position Confirmed alert to Hong Kong RCC.

Input:

Result:

Status:

#### **2) MCC Requirement - Beacon Message Validation (General)**

#### Unless otherwise noted, each of the following input alert messages contains a distinct 23 Hex Id, SGB message bit 43 = 0 (not test), and MF 91 = ‘0’ (BCH ok). No encoded beacon message information except the 23 Hex Id should be included in a SIT 185 message noting that the beacon message is not reliable. All tests contain data from LUT 4773 unless otherwise noted. A given beacon message should only contain one invalid field, so that it is clear what invalid field resulted in the beacon message being deemed unreliable.

#### At least 50% of the tests for which compliance has not yet been verified for the MCC vendor in a separate MCC commissioning should be performed. Also, at least 6 of the following tests should be performed, including tests a) to d).

**Test Message 2-1-1**

a) Prerequisite: the DMCC successfully sent a message for at least one SGB test script. This test contains two test messages and verifies that an alert without DOA position is properly filtered if the beacon message is invalid.

#### i) Send a SIT 322 message to the HKMCC from GEOLUT 4775 for a Mexican coded ELT(DT) with SGB message bits 91 - 93 = 100 (24 Bit Address), bits 118 – 132 = QAN (valid 3LD), bits 133 - 137 = 00010 (invalid), Rotating Field = 1 (ELT(DT)), and encoded position in Hong Kong (17.24,115.76) in the satellite footprint.

#### Note: location is in the footprint of satellite 222.

#### Expected result: the HKMCC sends no alert due to the unreliable beacon message.

Input:

Result:

Status:

**Test Message 2-1-2**

#### ii) Prerequisite: the DMCC was successful for the previous test message.

#### Send the same SIT 322 message to the HKMCC as in the previous test, but with SGB message bits 133 - 137 = 00000 (valid). Note this changes the hex id of the beacon from test 2-1-1.

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC, a SIT 332 (NOCR) message to the JAMCC (for the USMCC and for the LADR).

Input:

Result:

Status:

**Test Message 2-2**

#### b) Send a SIT 345 message to the HKMCC with 2 solutions for a USA coded PLB with DOA position in Hong Kong (17.123,115.123). In solution 1, SGB message bit 1 = 1 (self-test). Solution 2 is identical, except that SGB message bit 1 = 0, and the Last Burst Time (MF 14b) = + 10 minutes.

#### Expected result: the HKMCC does not send solution 1. The HKMCC sends solution 2 as a SIT 185 Initial Located Alert to the Hong Kong RCC and as a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 2-3**

c) Send a SIT 345 message to the JAMCC from LUT 4773 for a Canadian coded PLB with SGB message bit 42 = 0 (not RLS), bit 43 = 1 (test), bits 91 - 93 = 111 (System Test) and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends no alert message.

Input:

Result:

Status:

**Test Message 2-4**

d) Send the same SIT 345 message to the JAMCC as in item c), except SGB message bit 43 = 0 (not test), bits 91 - 93 = 111 (System Test).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position (17.123,115.123) noting that the beacon message is not reliable. No NOCR is sent.

Input:

Result:

Status:

**Test Message 2-5**

e) Send a SIT 345 message to the HKMCC from LUT 4773 with country code = 779 (invalid), a Vessel / Aircraft ID in SGB message bits 91 - 93 = 011 (Aircraft Registration Marking), DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes that the beacon message is not reliable. No NOCR is sent.

Input:

Result:

Status:

**Test Message 2-6**

f) Send a SIT 345 message to the HKMCC from LUT 4773 for a Canadian coded ELT with the Vessel / Aircraft ID in SGB message bits 91 - 93 = 110 (invalid value) and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes that the beacon message is not reliable. No NOCR is sent.

Input:

Result:

Status:

**Test Message 2-7**

#### g) Send a SIT 345 message to the HKMCC from LUT 4773 for a Canadian coded ELT with SGB message bit 42 = 1 (RLS), bit 43 = 1 (test), bits 91 - 93 = 111 (System Test) and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT sends a SIT 337 message (NOCR) to the JAMCC for the USMCC (test coded RLS beacon alerts are sent to MCCs, per A.001 section 4.2.10.1) and does not send the alert to Hong Kong RCC because it is test coded.

Input:

Result:

Status:

**Test Message 2-8**

#### h) Send a SIT 345 message to the JAMCC for a Canadian coded beacon with SGB message bit 43 = 0 (not test), bits 91 - 93 = 010 (Radio Call Sign), bits 138 – 140 = 111 (System Test beacon type), DOA position in Mexico (+21.4, -099.3) and encoded position in Hong Kong (17.3,115.8).

#### Note: Encoded location must be in the footprint of the satellites.

#### Expected result: the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC) and does not send an alert to the Hong Kong RCC (the encoded position is not usable since the beacon message is unreliable per A.001 Table 4-6).

Input:

Result:

Status:

**Test Message 2-9**

#### i) Send a SIT 345 message to the HKMCC for a Mexican coded EPIRB with SGB message bits 91 - 93 = 010 (Radio Call Sign), bits 136 – 137 = 01 (invalid) and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-10**

#### j) Send a SIT 345 message to the HKMCC for a USA coded ELT with SGB message bits 91 - 93 = 011 (Tail Number), bits 136 – 137 = 10 (invalid) and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-11**

k) Send a SIT 345 message to the HKMCC for a Mexican coded ELT with SGB message bits 91 - 93 = 100 (24 Bit Address), bits 118 – 122 = 00000 (invalid Baudot code), bits 133 - 137 = 00000 (valid), and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

l) This test contains two test messages.

**Test Message 2-12-1**

#### i) Send a SIT 345 message to the HKMCC for a Bolivian coded PLB with SGB message bits 91 - 93 = 101 (Aircraft Operator), bits 109 – 120 = 0 (invalid Serial number), bits 121 - 137 = all ones (valid), and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-12-2**

#### ii) Send the same SIT 345 message to the HKMCC as in the previous test message, but with SGB message bits 109 – 120 = 1 (valid Serial number), bits 121 - 137 = 131070 (invalid), and DOA position in Hong Kong (17.134,115.134)

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC). Since the 15 Hex Id matches the 15 Hex Id in the previous test message, but the 23 Hex Id is different, the *distribution of the Initial Located alert verifies that the 23 Hex Id is used for matching* (per test section “Use of the 23 Hex ID for SGBs for matching)”.

Input:

#### Result:

Status:

**Test Message 2-13**

#### m) Send a SIT 345 message to the HKMCC for a Canadian coded beacon with SGB message bits 138 – 140 = 101 (invalid beacon type) and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

n) This test contains two test messages.

**Test Message 2-14-1**

#### i) Send a SIT 345 message to the HKMCC for a Canadian coded PLB with MF 91 = ‘N’ (BCH code not correctable) and DOA position in Hong Kong (17.123,115.123).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-14-2**

#### ii) Prerequisite: the DMCC was successful for the previous test message.

#### Send the same SIT 345 message to the HKMCC as in the previous test, but with MF 91 = ‘6’ (BCH code ok) and the Last Burst Time (MF 14b) + 31 minutes.

#### Expected result: the HKMCC sends a SIT 185 Position Confirmed Alert to the Hong Kong RCC with DOA position and beacon message information, and sends a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-15**

#### o) Send a SIT 345 message to the JAMCC for a Honduran coded PLB, DOA position in Hong Kong (17.123,115.123) and an invalid encoded position (22.0, 180.006).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message (per A.001 Table 4-6) and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-16**

#### p) Send a SIT 345 message to the HKMCC for a Honduran coded PLB, DOA position in Hong Kong (17.123,115.123) with SGB message bits 155- 158 = 15 (cancellation), Spare Field bits 141 – 154 = all zeroes, Fixed Cancellation bits 159 – 200 = not all ones (invalid), and the Method of Deactivation (bits 201 - 202) = 1 (automatic by beacon).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-17**

#### q) Send a SIT 345 message to the HKMCC for a Mexican coded PLB, DOA position in Hong Kong (17.123,115.123) with SGB message bits 155- 158 = 15 (cancellation), Spare Field bits 141 – 154 = 1 (not all zeroes, invalid), Fixed Cancellation bits 159 – 200 = all ones, and the Method of Deactivation (bits 201 - 202) = 1 (automatic by beacon).

#### Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position that notes the unreliable beacon message and does not send an NOCR to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 2-18**

#### r) Send a SIT 345 message to the HKMCC from LUT 4773 for a Canadian EPIRB with an encoded location (-30,+140) in Australia and a DOA location (17.123,115.123) in Hong Kong. Rotating field 0 and bits 199-200 are 11 which is invalid (MCC-154).

#### Expected result: the HKMCC sends a SIT 185 Conflict Alert to the Hong Kong RCC with encoded and DOA positions. However, the SIT 185 does not use data from the rotating field as rotating field is invalid. SIT 346 and optional SIT 337 (NOCR) to the JAMCC.

Input:

#### Result:

Status:

**Test Message 2-19**

#### r) Send a SIT 322 message to the HKMCC from LUT 4775 for a Canadian ELT(DT) with an encoded location (17,115) in Hong Kong. Rotating field 1 and bits 190-191 are 11 which is invalid (MCC-154).

#### Expected result: the HKMCC sends a SIT 185 Distress Tracking Initial Located Alert to the Hong Kong RCC with encoded position. However, the SIT 185 does not use data from the rotating field (such as altitude or battery life) as rotating field is invalid. SIT 322 to the JAMCC (for the LADR) and optional SIT 337 (NOCR).

Input:

#### Result:

Status:

#### **3) MCC Requirement - Beacon Message Validation (Rotating Fields) and Rotating Field Updates**

Unless otherwise noted, all beacon message field values are valid and no encoded position is included. Bit values within the rotating field are provided per A.001 Table 4-7. Additional tests may be performed beyond the tests described below. These tests also verify the DMCC capability to distribute SGB alerts based on a rotating field update (per A.001 section 3.2.3.2).

At a minimum, at least one test series should be run per MCC commissioning campaign. For the first SGB capable MCC commissioned for a given MCC vendor, Series C should be run for an ELT(DT). In any subsequent SGB MCC commissioning for the same MCC vendor, priority should be given to any test series for which the MCC vendor’s compliance has not yet been verified

#### **Series A**:

**Test Message 3-1-1**

a) Send a SIT 345 message to the HKMCC from LUT 4773 for a Mexican coded PLB with Rotating Field type (bit 155 – 158) = 3 (National Use) and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position and no information from the national use rotating field, and sends a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 3-1-2**

b) Send the same SIT 345 message to the HKMCC except Time Last (MF 14b) = +30 seconds vs the time in solution a), Rotating Field type = 0 (G.008 Objective Requirement) and SGB message bits 194 – 195 (rotating field bits 40 – 41) = 11 (invalid Activation Method).

Expected result: the HKMCC does not send the alert since the rotating field is invalid (and the data time difference does not warrant a new alert).

Input:

#### Result:

Status:

**Test Message 3-1-3**

#### c) Send the same SIT 345 message to the HKMCC as solution b), except SGB message bits 194 – 195 (rotating field bits 40 – 41) = 00 (Activation Method is manual) and SGB message bits 199-200 (rotating field bits 45 – 46 = 10).

#### Expected result: the HKMCC sends a SIT 185 Rotating Field Update Alert to the Hong Kong RCC with appropriate rotating field values set, including Activation Method, elapsed time, and remaining battery capacity. Optionally, the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC for the Mexican SPOC).

Input:

#### Result:

Status:

#### **Series B**:

**Test Message 3-2-1**

a) Send a SIT 345 message to the HKMCC for a Mexican coded ELT with Rotating Field type = 0, valid rotating field values, and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position and information from the rotating field, and sends a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 3-2-2**

b) Send a SIT 345 message to the HKMCC for the same beacon with the same data except Time Last = +6 minutes vs the time in solution a), SGB rotating field message bits 42 – 44 (bits 196-198) (Remaining Battery Capacity) = 110 (invalid).

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC with no information provided from the rotating field and a SIT 345 to the JAMCC (for the USMCC).

Input:

Result:

Status:

#### **Series C**:

**Test Message 3-3-1**

a) Send a SIT 345 message to the HKMCC for a Mexican coded ELT(DT) with Rotating Field type = 1 (ELT(DT)), valid rotating field values, a 3LD, and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position and rotating field information, an optional SIT 337 (NOCR) message to the JAMCC (for the USMCC) and a SIT 345 to the JAMCC (for the LADR).

Input:

Result:

Status:

**Test Message 3-3-2**

b) Send the same SIT 345 message to the HKMCC except Time Last = +5 seconds vs the time in solution a), SGB message bits 159 – 175 (rotating field bits 5 – 21, Time of Last Encoded Position update) = 86400 (invalid).

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC with no information provided from the rotating field and a SIT 345 to the JAMCC (for the LADR). This test also verifies the DMCC distribution of ELT(DT) alerts based a detect time difference of at least three (3) seconds, per A.001 section 3.2.3.2.2.

Input:

Result:

Status:

**Test Message 3-3-3**

c) Send the same SIT 345 message to the HKMCC as solution a) except Time Last = +10 seconds vs the time in solution a), SGB message bits 186 – 189 (rotating field bits 32 – 35, Triggering Event) = 0000 (invalid).

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC with no information provided from the rotating field and a SIT 345 to the JAMCC (for the LADR and optionally to the USMCC).

Input:

Result:

Status:

**Test Message 3-3-4**

d) Send the same SIT 345 message to the HKMCC as solution a) except Time Last = +15 seconds vs the time in solution a), SGB message bits 186 – 189 (rotating field bits 32 – 35) = 0100 (valid), bits 159 – 175 (rotating field bits 5 – 21) = all ones (value not available).

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC with available information provided from the rotating field and a SIT 345 to the JAMCC (for the LADR).

Input:

Result:

Status:

**Series D:**

**Test Message 3-4-1**

a) Send a SIT 345 message to the HKMCC for a Mexican coded EPIRB with SGB message bit 42 = 1 (RLS), Rotating Field type = 2 (RLS), SGB message bits 192 – 202 (rotating field bits 38 – 48) not all-zero (invalid), SGB message bits 167 – 169 (rotating field bits 13 – 15) = 010 (RLSP = GLONASS), and DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with no rotating field information and sends a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 3-4-2**

b) Send the same SIT 345 message to the HKMCC as solution a) except Time Last = +1 minute, valid rotating field Type 2 (RLS) values, including rotating field bits 13 – 15 = 001 (RLSP = Galileo).

Expected result: the HKMCC sends a Rotating Field Update Alert to the Hong Kong RCC with DOA position and rotating field information. Optionally, the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 3-4-3**

c) Send the same SIT 345 message to the HKMCC as solution a) except Time Last = -1 minute vs solution a), and Rotating Field type = 0 (G.008 Objective Requirement) with valid rotating field values.

Expected result: the HKMCC sends a Rotating Field Update Alert to the Hong Kong RCC with DOA position and Rotating Field 0 information. Optionally, the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 3-4-4**

d) Send the same SIT 345 message to the HKMCC as solution b) except Time Last = +10 minutes vs solution b).

Expected result: the HKMCC sends a Position Update Alert to the Hong Kong RCC with DOA position and Rotating Field 2 information. Optionally, the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC).

Input:

Result:

Status:

**Test Message 3-4-5**

e) Send the same SIT 345 message to the HKMCC as solution c) except Time Last = +11 minutes vs solution c), and an update to SGB message bits 196 – 198 (rotating field bits 42 – 44, Remaining Battery Capacity).

Expected result: the HKMCC sends a Rotating Field Update Alert to the Hong Kong RCC with DOA position and Rotating Field 0 information. Optionally, the HKMCC sends a SIT 345 message to the JAMCC (for the USMCC).

Input:

Result:

Status:

#### **4) MCC Requirement - Filter SGB alerts prior to operational use**

#### **Series A**:

**Test Message 4-1-1**

#### a) Prerequisite: the DMCC distribution of SGB alerts has been verified **and the DMCC is configured to filter SGB alerts (requires near real-time coordination with the DMCC)**.

#### Send a SIT 345 message to the HKMCC for a USA coded 24 Bit Address ELT(DT) with a DOA position (17.123,115.123) in Hong Kong and no encoded position.

#### Expected result: the HKMCC filters the alert (i.e., does not distribute the alert to any destination).

Input:

Result:

#### Status:

**Test Message 4-1-2**

#### b) Prerequisite: the DMCC passes the previous test and **DMCC is reconfigured to process SGB alerts**.

#### Send the same SIT 345 message identified above to the HKMCC.

#### Expected result: the JAMCC sends an optional SIT 337 (NOCR) message to the JAMCC (for the USMCC), a SIT 185 Initial Located Alert to the Hong Kong RCC, and a SIT 345 to the JAMCC (for the LADR).

Input:

Result:

#### Status:

#### **5) MCC Requirement** - **Filter DOA position for ELT(DT)s from LUTs not commissioned for fast moving beacons**

**Test Message 5-1**

#### a) Send a SIT 345 message to the HKMCC from not fast-moving beacon accuracy capable LUT 4774 for a Brazilian (24 Bit Address) coded ELT(DT) with a DOA position in Hong Kong (17.123,115.123) and no encoded position.

#### Expected result: the HKMCC filters the DOA position and sends a SIT 342 message to the JAMCC (for the USMCC and the LADR) with no position data.

Input:

#### Result:

Status:

#### **6) MCC Requirement - Use of the 23 Hex ID for SGBs for matching**

#### This is tested in Beacon Message validation messages: Test Message 2-l-i and Test Message 2-l-ii. Run these two scripts as part of this section if they are not run as part of Beacon Message validation.

#### 7) **MCC Requirement – ELT(DT) Alert Distribution**

#### **Assumptions:** 1) the DMCC is configured to send each ELT(DT) burst within the first 30 seconds after beacon activation (per A.001 version March 2022), rather than within the first 15 minutes (per A.001 version June 2021). 2) The DMCC is updated (per A.001 version March 2022) to send the “best” new solution once the 10 minute threshold for sending a new alert has expired (MCC-153).

#### **Series A**:

Due to the 10 minute timing introduced by MCC-153, the following tests assume tests 7-A-a to 7-A-h all sent at 0101 and processing sequentially by the HKMCC.

**Test Message 7-1-1**

a) Send a SIT 322 message to the HKMCC for a Canadian coded ELT(DT) with Rotating Field type = 1 (ELT(DT)), valid rotating field values, and no encoded position.

Expected result: the HKMCC sends a SIT 322 message to the JAMCC (for the USMCC and for the LADR).

Input:

#### Result:

Status:

**Test Message 7-1-2**

b) Send the same SIT 322 message to the HKMCC as solution a) except with encoded position in Hong Kong (17.3,115.5) and in the satellite footprint.

Expected result: the HKMCC sends an Initial Located Alert to the Hong Kong RCC, an optional SIT 332 (NOCR) message to the JAMCC (for the USMCC) and a SIT 322 to the JAMCC (for the USMCC and the LADR).

Input:

#### Result:

Status:

**Test Message 7-1-3**

c) Send the same SIT 322 message to the HKMCC as solution a) except with Detect Time (MF 14) = +5 seconds.

Expected result: the HKMCC sends an Updated Unlocated Alert to the Hong Kong RCC and a SIT 322 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-1-4**

d) Send the same SIT 322 message to the HKMCC as solution b) except with Detect Time (MF 14) = +6 seconds and no encoded location.

(For test of encoded location filtering see test 12-3-1).

Expected result: the HKMCC does not send an alert to the Hong Kong RCC or to the JAMCC.

Input:

Result:

Status:

**Test Message 7-1-5**

e) Send the same SIT 322 message to the HKMCC as solution b) except with Detect Time (MF 14) = -5 seconds vs solution b).

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC and a SIT 322 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-1-6**

f) Send a SIT 322 message to the HKMCC with Detect Time (MF 14b) = +10 seconds vs solution a) with the encoded position in solution b) and in the satellite footprint.

Expected result: the HKMCC sends a Position Update alert to the Hong Kong RCC and a SIT 322 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-1-7**

g) *Test eliminated*.

**Test Message 7-1-8**

h) Send a SIT 345 message to the HKMCC with Detect Time (MF 14b) = +10 seconds vs solution a) with DOA position (17.3,115.500) and matching encoded position (per solution b) **within the satellite footprint**.

Expected result: the HKMCC sends a DOA Position Match Alert to the Hong Kong RCC. No message to the JAMCC for the LADR (per A.001 section 3.13.b, the alert is not sent to the LADR because position data was already sent with a reference time within 3 seconds). Also a SIT 345 message to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 7-1-9**

i) Send a SIT 345 message to the HKMCC with Detect Time (MF 14b) = +10 seconds vs solution a) with DOA position (16.548,115.761) in conflict with its encoded position (from test 7-1-2) within the satellite footprint.

Expected result: the HKMCC does not send the alert to the Hong Kong RCC since DOA position data was already sent with a reference time within 3 seconds (per A.001 section 3.2.3.2.2 item c) and does not send a message to the JAMCC (for the LADR).

Input:

#### Result:

Status:

#### **Series B**:

Due to the 10 minute timing introduced by MCC-153, the following tests assume all tests are sent at the same time of 0204 and processed sequentially by the HKMCC.

**Test Message 7-2-1**

a) Send a SIT 345 message to the HKMCC for a USA coded ELT(DT) with Rotating Field type = 1 (ELT(DT)), valid rotating field values, DOA position in Hong Kong (17.300,114.800), in conflict with the encoded position (17.500,114.800) and in the satellite footprint.

Expected result: the HKMCC sends a SIT 185 Position Conflict Alert to the Hong Kong RCC, an optional SIT 337 (NOCR) message to the JAMCC (for the USMCC) and a SIT 346 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-2-2**

b) Send the same SIT 345 message to the HKMCC except with Detect Time (MF 14b) = +35 seconds.

Expected result: the HKMCC does not send the alert to the Hong Kong RCC since the Detect Time exceeds the 30 second threshold for sending every beacon burst (i.e., per A.001, a new “burst” is associated with a reference time delta of at least 3 seconds) and sends a SIT 346 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-2-3**

c) Prerequisite: the DMCC passed the previous two tests.

Send the same SIT 345 message to the HKMCC as solution b) except with the DOA position in Russia (55.6, 36.8) and in conflict with its encoded position.

Expected result: the HKMCC sends a SIT 185 Position Conflict alert to the Hong Kong RCC and a SIT 346 to the JAMCC (for the CMC, since the DOA position is in a new SRR (per A.001 section 3.2.3.2.2 item e), optionally to the USMCC).

Input:

#### Result:

Status:

**Test Message 7-2-4**

d) Send the same SIT 345 message to the HKMCC as solution b) except with Detect Time (MF 14b) = +3 minutes and 55 seconds from last burst in solution a).

Expected result: the HKMCC does not send the alert to the Hong Kong RCC and sends a SIT 346 to the JAMCC (for the LADR).

Input:

#### Result:

Status:

**Test Message 7-2-5**

e) Send the same SIT 345 message to the HKMCC as solution b) except with Detect Time (MF 14b) = +3 minutes and 55 seconds and with no encoded position.

Expected result: the HKMCC initially does not send any SITs. There is no LADR SIT as within 3 seconds of previous LADR message. No SIT 185 as outside 30 second period.

However, at 021035, after 10 minutes from reference time in 7-2-3 (020035), the HKMCC, using the data in 7-2-4 (as it contains an encoded location) sends a SIT 185 Position Update alert to the Hong Kong RCC. No SIT 346 is sent to the JAMCC as data in 7-2-4 was previously sent.

Input:

#### Result:

Status:

**8) MCC Requirement – Distribute ELT(DT) alerts to the LADR**

#### Limited verification provided in the above section “ELT(DT) Alert Distribution”.

#### **9) MCC Requirement – Distribute SGB alerts (other than ELT(DT) alerts)**

#### Addressed in testing of other requirements, including SIT messages format and beacon message validation. Tests for processing anomalies are provided below.

**Test Message 9-1**

a) Send a SIT 342 message to the HKMCC from not “processing anomaly” capable LUT 4773 for an unregistered Canadian coded ELT in an uncorroborated alert (i.e., from a single satellite per MF 83 and the detect times in MF 14a and MF 14b are within 2.5 seconds) and encoded position in Hong Kong (17.3,115.8).

Expected result: the HKMCC sends a SIT 336 (NOCR) message to the SGB capable JAMCC (for the USMCC) and does not send the alert to the Hong Kong RCC.

Input:

#### Result:

Status:

**Test Message 9-2**

b) Send a similar uncorroborated SIT 342 message to the HKMCC but with encoded position in Hong Kong (17.3,115.8) for an unregistered Mexican coded ELT from SGB processing anomaly capable LUT 4774.

Expected result: the HKMCC sends a sends a SIT 336 (NOCR) message to the JAMCC (for the USMCC) and a SIT 185 Initial Located Alert to the Hong Kong RCC with the note “UNCORROBORATED MEOSAR ALERT”.

Input:

#### Result:

Status:

**10) MCC Requirement - Process Cancellation messages**

Test the DMCC capability to generate a confirmed SGB cancellation message, if and only if, the required sequence (3 cancellation messages within 110 seconds, with no intervening non-cancellation message) is met.

**Test Message 10-1**

a) Send a SIT 345 message to the HKMCC for a Brazilian coded ELT with a non-cancellation beacon message, DOA position in Hong Kong (17.123,115.123) and no encoded position.

Expected result: the JAMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with DOA position and a SIT 337 (NOCR) message to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 10-2**

b) Send a SIT 345 message with two solutions to the HKMCC with the same data as in solution a), except that each beacon message indicates cancellation, the Time of Last Burst (MF 14b) is +297 seconds in solution 1 and +301 seconds in solution 2 vs solution a).

Expected result: one of two scenarios –

Scenario 1 (the DMCC does not treat the first cancellation message as a “rotating field” that warrants distribution to the SPOC, as there is no useful information in the rotating field). The HKMCC sends a SIT 185 Position Update Alert to the Hong Kong RCC for solution 2. This test shows that the DMCC treats an unconfirmed cancellation as a regular alert and sends a Position Update for an SGB prior to position confirmation based on a 5-minute threshold (A.001 section 3.2.3.2.1).

Scenario 2 (the DMCC treats the first cancellation message as a new rotating field that warrants distribution to the SPOC). The HKMCC sends a SIT 185 Rotating Field Update Alert to the Hong Kong RCC for solution 1 and does not send solution 2. Also, optionally a SIT 345 to the JAMCC (for the USMCC).

Note: while a cancellation message is technically a “rotating field”, an unconfirmed cancellation message does not provide useful data to the SPOC, which is the rationale for sending an alert due to new rotating field information. *Per section 2.19 of the EWG-3/2022 Report, the EWG noted general agreement that Scenario 1 is correct*, but until A.001 is clarified, the distribution (or non-distribution) of a cancellation message as a normal rotating field is acceptable.

Input:

#### Result:

Status:

**Test Message 10-3**

c) Send a SIT 342 message to the HKMCC for same beacon, with a non-cancellation message and the Time of Last Burst (MF 14b) is + 5 seconds vs solution 2 in message b).

Expected result: the HKMCC does not send the alert.

Input:

#### Result:

Status:

**Test Message 10-4**

d) Send a SIT 346 message with two solutions to the HKMCC with the same data as in in solution 2 of cancellation message b), except the Time of Last Burst (MF 14b) is +10 seconds in solution 1 and +20 seconds in solution 2 of message b), and DOA position in solution 2 in Hong Kong (17.123,116.123) is in conflict with the previous DOA position.

Expected result: the HKMCC sends a SIT 185 Position Conflict Alert to the Hong Kong RCC with DOA position for solution 2. A User Cancellation alert is not sent because of the most recent non-cancellation message. Optionally, a SIT 346 to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 10-5**

e) Send a SIT 345 message to the HKMCC with the same data as in solution 1 of message d), except that the Time of Last Burst (MF 14b) is +119 seconds (outside the 110 second threshold for cancellation).

Expected result: the HKMCC does not send a SIT 185 User Cancellation Alert (or any alert) to the Hong Kong RCC.

Input:

#### Result:

Status:

**Test Message 10-6**

f) Send a SIT 345 message to the HKMCC with the same data as in solution 1 of message d), except that the Time of Last Burst (MF 14b) is +109 seconds (within the 110 second threshold for cancellation).

Expected result: the HKMCC sends a SIT 185 User Cancellation Alert to the Hong Kong RCC with DOA position. Optionally, a SIT 345 to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**11) MCC Requirements – Process data selectively and filter data**

Overview: Verify DMCC Operator ability to configure the DMCC to process SGBs specially by Hex ID

**Test Message 11-1**

a) Prerequisite: the HKMCC is configured to distribute alerts for US test coded ELT SGB Hex ID ADD4000A70D8000 only to the Hong Kong RCC.

Send a SIT 345 message to the HKMCC from EHE capable LUT 4774 for the US test protocol ELT identified above with DOA position in Hong Kong (17.123,115.123).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to the Hong Kong RCC with the EHE included and sends no alert to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 11-2**

b) Prerequisite: The HKMCC is reconfigured to distribute alerts for the beacon activation (alert site) to the USMCC but not to the Hong Kong RCC.

Send the same SIT 345 message to the HKMCC except with a DOA position conflict in Hong Kong (17.456,115.456) and Time of Last Burst (MF 14b) is +10 minutes.

Expected result: the HKMCC sends a SIT 346 message to the JAMCC (for the USMCC) and sends no alert to the Hong Kong RCC.

Input:

#### Result:

Status:

**12) MCC Requirement - Generate SIT 185 messages for ELT(DT) and SGB alerts**

SIT 185 message generation is tested extensively in previous tests. Other tests of the distribution of SGB alerts in SIT 185 messages to non-SGB capable MCCs are provided below. These tests are only required if the DMCC distributes alerts directly to another MCC that is not SGB capable (i.e., to a nodal MCC or a CDDR MCCs), including when it backs up another MCC.

Test messages 12-1 and 12-2 not required for HKMCC as it does not send alerts directly to another MCC that is not SGB capable.

**Test Message 12-3-1**

c) Test the DMCC capability to filter encoded position that is outside the satellite footprint, if this capability is not tested otherwise.

Prerequisite: the DMCC is configured to filter encoded position data that is outside the satellite footprint.

i) Send a SIT 322 message to the HKMCC for a Hong Kong coded PLB with encoded position in Brazil (-7.7, -035.1) and outside the satellite 222 footprint.

Expected result: the HKMCC sends a SIT 185 Initial Alert (Unlocated) to Hong Kong with no encoded position and sends no alert to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 12-3-2**

ii) The DMCC is reconfigured to not filter encoded position that is outside the satellite footprint. Send the same SIT 322 message to the HKMCC, except with Detect Time (MF 14) = + 5 minutes. Use a GEO satellite that has the encoded location in Brazil in its footprint (216 is over Brazil).

Expected result: the HKMCC sends a SIT 185 Initial Located Alert to HKMCC with encoded position and sends a SIT 322 message to the JAMCC (for the USMCC).

Input:

#### Result:

Status:

**Test Message 12-4**

d) Send a SIT 345 message to the HKMCC from LUT 6601 for an Hong Kong (Aircraft Operator) coded ELT with a DOA position (51.5, -100.3) in Canada, and no encoded position. MCC-180 MEOLUT La Reunion 6601 is commissioned for FGB EHE compliance but not SGB.

Expected result: the HKMCC sends a SIT 185 NOCR Alert to Hong Kong RCC. MF#54d showing accuracy as unknown.

Input:

#### Result:

Status: