

Agenda Item 5.7

BEACON TEST POLICY

1. ACTION REQUIRED

India, in response to action item JC-19/AI.7 invites the Joint Committee to review proposed beacon test policy and recommend general Cospas-Sarsat policy as appropriate.

2. BACKGROUND

Cospas-Sarsat as a global system has several tests requirements, and needs to be supported to meet specific operational objectives. In order to reduce the load on the System, these tests need to be controlled by allowing only specific tests and exercises, which are absolutely necessary to support various System requirements (such as System commissioning, annual System level test etc.).

3. GENERAL TEST REQUIREMENTS

Test requirements in Cospas-Sarsat System may be broadly divided into two categories:

3.1 Category-1 Tests:

All the tests defined in this category can be carried out using test protocol beacons. Different types of tests that are generally carried out in this category are:

- Several agencies, before buying the 406 MHz beacons, as a part of their procurement procedure, undertake field trials to ensure functioning of the particular beacon model as per Cospas-Sarsat specifications such as detection of beacon under various conditions, Doppler and GPS performance and location accuracies, activation mechanisms etc.,
- Some agencies have requirements to test the beacons in specific configurations (customized environment) particularly mounting/housing the beacon in specific mechanical structure to ensure proper antenna deployment and detection of the signal by satellite,
- Cospas-Sarsat MCC undertakes periodic tests to check end-to-end performance of the system. LUT/MCC ground system developers, beacon manufacturers/developers, and space segment designers carry out certain tests to qualify their systems,
- Some tests are done by users to evaluate functioning of specific external interfaces with the beacon like external GPS interface etc. For system demonstration, awareness and training, tests are carried out by Cospas-Sarsat MCCs and SAR agencies,

- Various System related tests like Cospas-Sarsat LUT/MCC commissioning, annual System level test etc. are carried out. Some test beacons are continuously transmitted for orbitography purposes.

3.2 Category-2 Tests:

Following are some of the tests in this category, which could be permitted using live beacons (operationally coded beacons):

- Every country as a part of their national requirements undertakes periodic SAR exercises to demonstrate and exercise SAR capabilities,
- Some tests are done to evaluate global Cospas-Sarsat System performance by radiating beacon from remote inaccessible areas with thick forest,
- Some users tests their beacons to ensure and gain confidence on their beacon functioning and overall system functioning.

4. DIFFICULTIES/PROBLEMS FACED

On couple of occasions, vendors approached us (sometimes directly) with short notice to carryout a test to qualify their beacons. Most of the vendors send their sales and marketing reps not having full technical knowledge (like what are test requirements, what results are expected, what is a test set up/configuration). Many of them do not know about test protocol coding, do not come prepared with coding interface, do not have an idea about approved coding protocols for a specific beacon etc. Sometimes tests are conducted when an aircraft is airborne, and asks for detection details. Even a copy of Cospas-Sarsat type approved certificate is not produced. User is informed that the beacon is type approved or in a process of approval, and would send the certificate later. In such situations MCCs are under pressure to accept testing with operational protocol (live beacons).

Some agencies due to lack of knowledge/understanding, carry out live beacon testing without intimation to MCC/RCC/MRCC concerned.

Many agencies having beacon test requirements do not have test beacons, as well as coding interface, and hence insist on testing with operationally coded beacons.

5. TEST POLICIES

General test policies are described below:

- 406 MHz beacons coded with operational protocols shall not be used for tests, except on rare occasions under the guidance and control of the national Cospas-Sarsat MCC, or for international exercises coordinated by the Cospas-Sarsat. All MCCs shall be notified about the tests conducted using 406 MHz operationally coded beacons (Live Beacons),

- Tests using 406 MHz beacons coded with the Test Protocols may be performed by anyone in coordination with the national MCC. Coordination with other Cospas-Sarsat MCCs shall be performed by the MCC concerned,
- If an operationally coded beacon **has to be used**, a minimum of two (2) day's notice must be given to the MCC and the objective of the test must be stated which will be used to determine if approval for the test should be given,
- The party wishing to conduct tests with 406 MHz beacons with a 121.5 MHz transmitting capability should inform appropriate aviation authorities to disregard the test signal radiation,
- Manufacturers, and space and ground segments providers can undertake tests with test-coded beacons provided the 121.5 MHz transmitter is disabled,
- If more than three (3) operational or test coded beacons are to be activated at one time, thirty (30) days notice is required to be given by the agency/person wishing to conduct the test to the MCC in accordance with Cospas-Sarsat practice,
- The following information is required to be provided by the tester (in the prescribed format as enclosed in attachment-1) to the MCC prior to any test being undertaken:
 - Date / Time / Duration of Test;
 - 15/30-HEX ID;
 - Position of the Test (GPS position is preferred);
 - Confirmation of transmission of 121.5/243 homing; and
 - Objective of test.
- As Cospas-Sarsat system is designed for detection and locating stationary beacons, hence testing from moving crafts does not provide rational results. Such tests cannot be allowed,
- MCC personnel can assist the tester of the beacon(s) in determining the most appropriate satellite pass and satellite / Local User Terminal combination. The beacon will need to be switched on some ten (10) minutes prior to the pass to allow for the beacon oscillator to warm up.

Beacon testing (using test protocol or operationally coded beacons) loads the ground and space systems, and SAR agencies with extra workload, and therefore it shall be allowed on case-by-case basis only if genuinely needed. National administrations, in most of the cases national MCCs, shall permit beacon testing after reviewing test requirements to ensure beacon test is absolutely necessary, and authorize suitable coding protocol based on the type of test to be carried out.

An agency requiring beacon test can apply to Cospas-Sarsat MCC in a prescribed format as enclosed in **Attachment-1**. If test requirements are found to be satisfactory, the test will be authorized. Vendor need not approach the MCC directly, and should come through national user agency. Agencies should schedule the test in advance with proper test coded beacons and provide proper documents regarding Cospas-Sarsat type approval certification.

6. RECOMMENDATIONS

Joint Committee is requested to consider following recommendations:

- a) It is recommended that **category-1 tests** may be permitted, if test objective is found to be satisfactory, using test protocol beacons only. If necessary, the MCC concerned may inform scheduled test requirements to all Cospas-Sarsat MCC and Cospas-Sarsat secretariat in advance to monitor and assess system test requirements;
- b) The **category-2 tests** may be permitted using operationally coded beacons by following proper test procedures i.e. by sending advance information to all MCCs, neighbouring RCCs and MRCCs, Cospas-Sarsat secretariat etc;
- c) Certain tests, which are not technically viable (like detection from moving beacons), may not be permitted;
- d) The beacon test requirements may be obtained in the format enclosed in **Attachment-1** to assess and regulate beacon testing;
- e) Review outdated beacon models (with obsolete technologies), which are inferior compared to contemporary equivalent beacon models in terms of technology, effectiveness and cost. This may be done through a scheduled phase-out plan; and
- f) Regular Test and orbitography beacon network may be optimized to reduce the load on the overall system.

ATTACHMENT-1

FORMAT FOR REQUESTING BEACON TEST

Contact Person (Name & Designation):

Name of the Agency:

Mailing Address:

Phone:

FAX:

Email:

Test Objective:

Test Position: Latitude _____, Longitude _____

Test Configuration/Setup (Please give full details of all the tests to be conducted, exact conditions/test setup under which the beacon will be radiating, such as whether fitted on the aircraft, floating in water, open area or any other condition):

Duration of Test:

End use Application (of the beacon to be tested):

Beacon Information:

Beacon hex Code (15 Hex):

Beacon hex Code (30 Hex):

Beacon Model No.:

Beacon Manufacturer:

Cospas-Sarsat Type Approval Code (CSTAC) – Please enclose a copy of the Cospas-Sarsat type approval certificate:

Coding Protocol:

Authorized Protocols:

Whether 121.5 transmitter is disabled: Yes / No

(It is recommended to disable 121.5/243 MHz transmitters to avoid interference with ATC)

Additional Information if any required – please specify

[**Note:** Detection information in the Cospas-Sarsat standard distress message format (SIT 185) will be provided by the MCC]:

Date:

Authorized Signature

(Attachment-1 contd.)

For MCC Use Only

Test requirement is critically examined and found to be justified for the given objective, hence approved for carrying out the test on_____.

Test Ref. No.:

Signature

NOTE:

Test will be supported only when test objective is found to be satisfactory and justified

Test will not be repeated for same beacon model and same objective

Only test Protocol should be used for beacon testing. Test will not be supported for operationally coded beacons, as it generates a global alert.

Live testing with operationally coded beacons is permitted only in certain cases depending upon test requirements.

Turn off 121.5/243 MHz homer transmitter to avoid interference with air traffic management

The MCC does not guarantee repeat performance of the same beacon and other beacons with the same model no. in future

In order to plan the beacon test exercise, send your request one week in advance. The dates for the test will be provided by the MCC based on convenience.

Once test schedule is finalized and given to the concerned agency, it will not be changed or rescheduled unless found to be absolutely necessary

Beacon test support is provided to authorized agencies only, on request from senior authorities from the agency concerned.

On approval and before starting the test, get satellite pass schedule from the MCC and radiate the beacon only during given timing slots.

Turn on the beacon 10 minutes before the given time slot to allow warm-up of the beacon transmitter.

Concerned agency to coordinate with nearby ATC to obtain clearance for radiating 121.5/243/ 406 MHz test signals.

- END OF DOCUMENT JC-20/5/9 -