

Traffic Alert and Collision Avoidance System (TCAS) Certification Testing

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Summary:

This license application is being filed in lieu of an STA extension of WD9XPD, file 0127-EX-ST-2009. We request the same terms and conditions of the STA be applied to the experimental license, in particular special condition (5), which is essential to this testing requirement:

"Altitude setting is required to be forced to either below sea level or above 90000 ft to prevent false TCAS alert from aircrafts flying nearby. Forcing the altitude of the transponder above sea level can be done provided that the event is coordinated with and approved by the local FAA and ARTCC and lasts a very minimal amount of time. When attempting to cause the test aircraft false to receive false TCAS alerts, the transponder with the false altitude setting will not be turned on until the test aircraft establishes contact with the ground test site and is within 7 NM. The ground transponder then will be immediately shut off after the test aircraft receives the false alert."

FAA Coordination:

NG T090458 (See Attached exhibit)

Test Requirement:

As part of the FAA mandated aircraft certification program, special TCAS testing is required to demonstrate/certify TCAS operation on aircraft. The two primary FAA documents that guide the testing of TCAS systems are Advisory Circulars 20-131A and 20-151.

To paraphrase the two documents, Boeing must verify proper operation by observing at least 1 traffic advisory (TA) and at least 1 resolution advisory (RA). These advisories may be generated by "Encounters with an operating Mode C transponder installed at a fixed ground location, which reports an appropriate test altitude". The fixed ground station method is the safest means to trigger RAs and TAs in flight, where the aircraft under test is flying against a "hovering ghost target", instead of another in-flight aircraft.

The test procedure requires that an IFF transponder located on the ground be used to verify proper TCAS operation on the in-flight aircraft under test. **The transponder set is located on the ground, and configured to simulate an aircraft at altitude, typically between 5,000 and 15,000 feet. The aircraft under test will fly in the vicinity of the test set in order to verify proper TCAS detection and alerting. Figure (1) depicts a functional diagram of the test.**

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The specific test data is provided below:

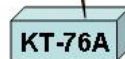
- Location
 - a. Mansfield, WA; 47-48-35N, 119-38-10W
- Purpose - Required as part of aircraft flight certification
- Frequency of Operation - 1090 MHz
- Emission - 11M9V7D
- Maximum ERP - 250 Watts, peak
- Ground Transponder Type - King KT-76A

TCAS Test Functional Diagram

In-Flight Aircraft Under Test



1090 MHz
11M0V7D
(simulating a second
aircraft at altitude)



Located on the ground

Figure 1