

Test Narrative

This experimental license is required to conduct FAA mandated testing necessary to support certification for High Intensity Radiated Fields (HIRF) on the Honda Aircraft Company (HAC) Model HA-420 business jet aircraft. The test data will be used to validate low frequency HIRF models and ensure compliance with HIRF requirements as specified by:

1. HAC document HA-100-00005, "Certification Plan for The HondaJet Model HA-420 Electromagnetic and Environmental Effects."
2. FAA Advisory Circular AC-20-158 "The Certification of Aircraft Electrical and Electronic Systems for Operation in the High-Intensity Radiated Fields (HIRF) Environment."
3. 14CFR23 § 23.1308 "HIRF Protection."

The HIRF assessment to be performed is comprised of Low Level Swept Current (LLSC) and Low Level Swept Field (LLSF) tests. These are low power tests which are only used to map coupling and shielding functions, and not intended to generate equipment upset. The LLSC test will involve illuminating the aircraft with a low level external HIRF to measure the transfer function between the external field and the aircraft and equipment wire bundle currents. By calculating the ratio between the induced wire bundle current and the illuminating antenna field strength and normalizing this ratio to 1 V/m HAC will obtain the transfer function in terms of induced current per unit of external field strength. The LLSF will be performed on the aircraft from 100 MHz to 18 GHz. The internal RF fields in the vicinity of the equipment will be measured instead of the wire bundle currents. The relation between the internal and external field provides the attenuation of the structure for each tested location.

Dwell Time

During the LLSC test method the dwell time per frequency point will be 1.0 millisecond per point based on 501 steps in a 500 millisecond maximum sweep.

- 0.5 - 25.5 MHz: sweep time 500 ms, 501 frequency steps, dwell time at each discrete frequency = 1 ms.
- 25 - 45 MHz: sweep time 500 ms, 501 frequency steps, dwell time at each discrete frequency = 1 ms.
- 40 - 205 MHz: sweep time 500 ms, 501 frequency steps, dwell time at each discrete frequency = 1 ms.
- 200 - 400 MHz: sweep time 500 ms, 501 frequency steps, dwell time at each discrete frequency = 1 ms.

During the LLSF test method the dwell time per frequency point will be 0.3 milliseconds per point based on 501 steps in a 140 millisecond maximum sweep.

- 100 MHz - 1 GHz: sweep time 140 ms, 501 frequency steps, dwell time at each discrete frequency = 0.3 ms.
- 1 - 8 GHz: sweep time 140 ms, 501 frequency steps, dwell time at each discrete frequency = 0.3 ms.
- 8 - 18 MHz: sweep time 140 ms, 501 frequency steps, dwell time at each discrete frequency = 0.3 ms.

Modulation

All testing is performed using a Continuous Wave (CW) signal (i.e. no modulation). Therefore, no actual data is being transmitted during the test.

Power

Transmitted powers are only high enough to allow accurate monitoring using a sensitive receiver system. All transmitted power levels will remain less than the specified band specific Effective Radiated Power (ERP) as specified in the application.