



Wireless Aircraft Data Link Product Description – System Overview

The Wireless Aircraft Data Link (WADL) System provides a means of transferring data files to and from aircraft while they are on the ground at WADL equipped airports. WADL supports multiple applications requiring bi-directional data communications. Files can be downloaded from the aircraft or uploaded to the aircraft once the aircraft is within communication range of the fixed airport infrastructure.

The WADL system is designed for commercial airlines and relies on Part 15.247 transceivers conforming to the 802.11b specification for aircraft to fixed ground site communications. The WADL System operates on one of 11 possible frequency channels defined by 802.11b in the 2412 to 2462 MHz frequency band at data rates of 11 Mbps, 5.5 Mbps, 2 Mbps and 1 Mbps. The data rate is adjusted automatically as the noise and signal strength of the communication path vary.

The system consists primarily of two parts an Aircraft Segment, installed on commercial aircraft and a Ground Segment that provides the bi-directional wireless access between aircraft and the LiveTV network.

Aircraft Segment Description

Aircraft are equipped with a Wireless Aircraft Unit (WAU) containing an FCC Part 15.247 approved transceiver, an RF Assembly containing an LNA/PA and an antenna mounted to the top of the fuselage. A block diagram of the Aircraft Segment is shown below in Figure 1.

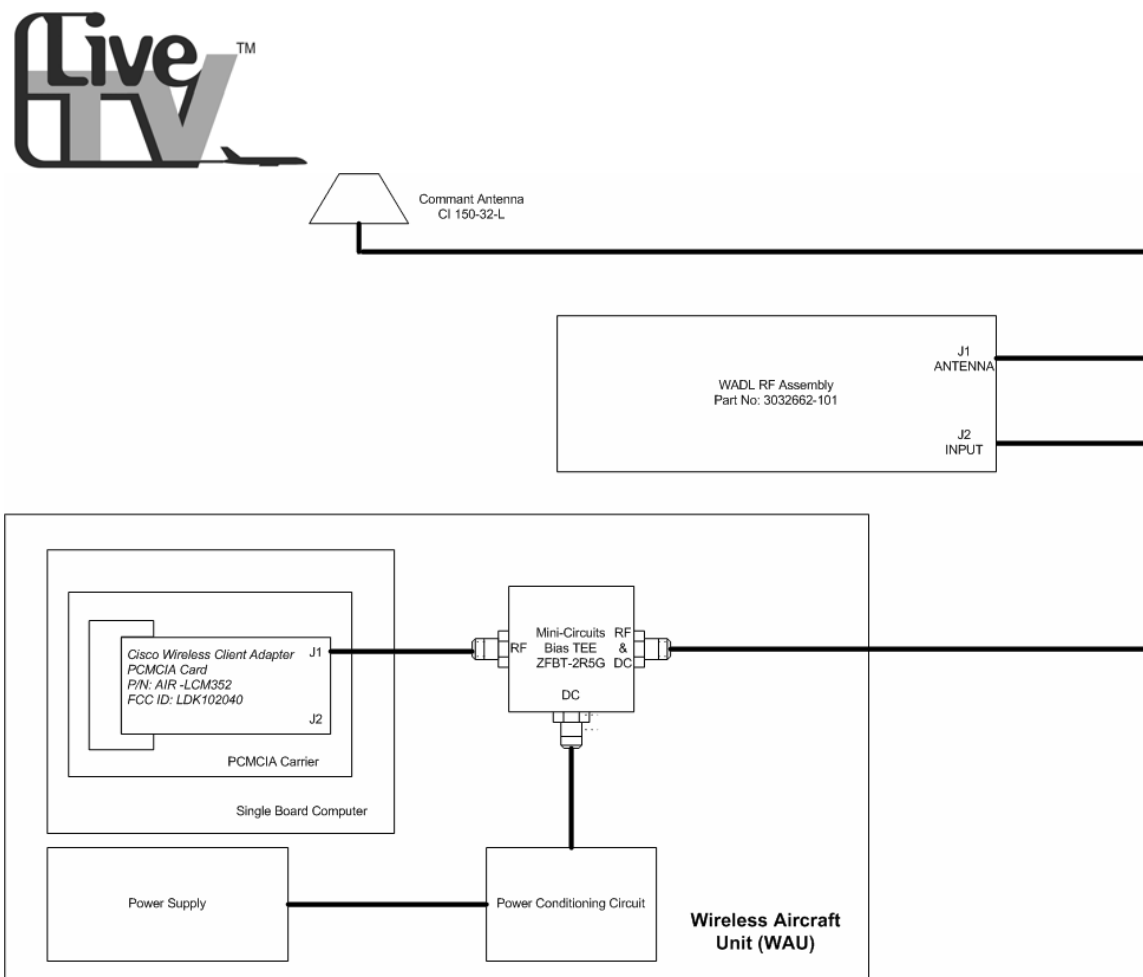


Figure 1
WADL Aircraft Segment Block Diagram

The Part 15.247 transceiver used in the WADL System is an FCC approved Client Adapter, FCC ID LDK102040 shown below in Figure 2.



Figure 2
Cisco Aironet FCC ID LDK102040 Approved Transceiver Module



The Client Adapter is housed in the Wireless Aircraft Unit shown below in Figure 3. The Client Adapter is installed in a PCMCIA card carrier and interfaces through a PC104 bus to a Single Board Computer. The WAU is basically a computer built and packaged for use on commercial aircraft configured with an 802.11b wireless Client Adapter.



Figure 3
Wireless Aircraft Unit (WAU)

The Client Adapter in the WAU connects to J2 of the WADL RF Assembly through an RF Cable Assembly with a loss of about 5 dB. The WADL RF Assembly is shown below in Figure 4. The cable loss will vary with the length of cable in a particular installation. Because of this a Client Adapter was chosen with variable transmit power capability. The Cisco Client Adapter has transmit power settings of 100, 50, 30, 20, 5 and 1mW that are used to compensate for the potential variance in cable loss between the Part 15 transceiver and the WADL RF Assembly.

The WADL RF Assembly contains an automatic level control circuit that assures constant transmit output power as long as the transmit power from the transceiver is within the input dynamic range (0 to 10 dBm) of the power amplifier. If the transmit power from the transceiver is below the minimum required to switch from receive to transmit, the RF Unit remains in the receive mode. The RF Assembly also contains an LNA to improve the system Noise Figure.

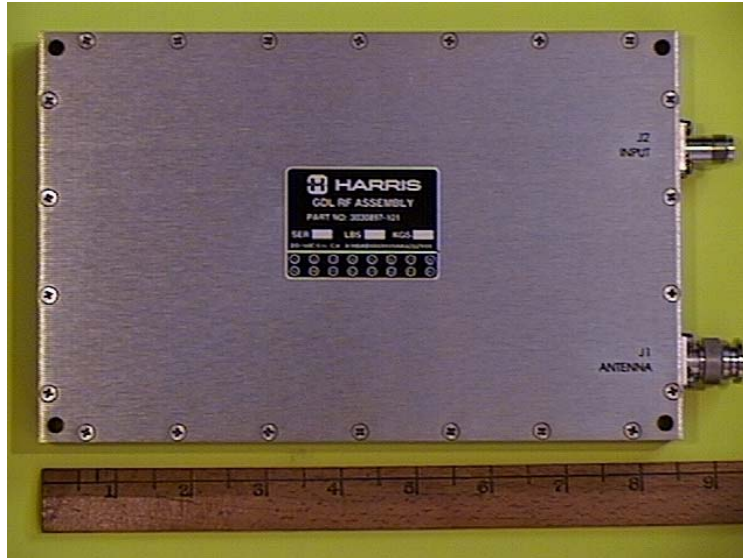


Figure 4
WADL RF Assembly

The WAU resides in a rack, typically in the aft cargo bay. The RF Assembly is mounted above the passenger cabin just below the antenna. The Aircraft Antenna is mounted to a doubler plate on top of the aircraft. A TNC connector underneath the Aircraft Antenna penetrates the doubler plate. A short RF Cable connects the RF Assembly at J1 to the Aircraft Antenna (Commant Part No CI 150-32-L).

Ground Segment Description

The WADL Ground Segment is basically a standard 802.11b Access Point that is compatible with the Client Adapter on board the aircraft. There are several commercially available Access Points that are WI FI certified as compatible with the Cisco Client Adapter. The Access Point connects to the LiveTV network over an Ethernet connection.