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August 1, 2018

Federal Communications
Commission 445 12th Street, SW
Washington, DC 20554

Dear Sirs;

Attached please find an application to renew radio license call sign WH2XNL on behalf of the Harris Corporation. Harris is seeking to continue to operate an AirTel portable VDL test unit nationwide.

Aviation Spectrum Resources Inc. (ASRI) concurs with this request for Harris to test with Airtel units on frequencies 136.975 MHz, 136.650 MHz, and 136.800 MHz.

Harris will test over-the-air operations to test service volumes at various airports throughout the country. Harris plans to use a small mag mount antenna on a vehicle and connected to the Airtel unit to emulate an aircraft and execute a message handshake.

The list of proposed airports to operate at have not changed from the original request.

This concurrence is provided so long as no harmful interference is created to other licensed operations.

If you have any questions regarding the application you may contact me at email address ccw@asri.aero.

Sincerely,

A handwritten signature in black ink, appearing to read 'Christopher Wheatley', is written over a faint, light-colored rectangular stamp.

Christopher Wheatley
Aviation Spectrum Resources Inc.
Frequency Management

HARRIS VDL TESTING AIRPORTS

Airport Code	City	State	Address
ABQ	Albuquerque	NM	Albuquerque International Airp
ACY	Atlantic City	NJ	Atlantic City International Airport
ATL	Atlanta	GA	Atlanta Hartsfield Airport
AUS	Austin	TX	Austin Bergstrom International
BDL	Windsor Locks	CT	Bradley International Airport
BNA	Nashville	TN	Nashville Municipal Airport
BOS	Boston	MA	General Edward Lawrence Logan Intl
BUR	Burbank	CA	Bob Hope Airport
BWI	Baltimore	MD	Baltimore Washington Intl Airport
CLE	Cleveland	OH	Site B: Hopkins Intl Airport
CLT	Charlotte	NC	Charlotte Douglas International
CVG	Covington	KY	Greater Cincinnati Intl Airport
DAL	Dallas	TX	Dallas Love Field
DCA	Arlington	VA	Ronald Reagan Washington Natl Airport
DEN	Denver	CO	Denver International Airport
DFW	Dallas	TX	Dallas Fort Worth Regional Airport
DTW	Detroit	MI	Detroit Metropolotin Wayne County Airpor
EWB	Newark	NJ	Newark Liberty International
FLL	Fort Lauderdale	FL	Fort Lauderdale/Hollywood International
HOU	Houston	TX	Houston Hobby Airport
HPN	White Plains	NY	Westchester County Airport
IAD	Chantilly	VA	Washington Dulles International Airport
IAH	Houston	TX	Geoge Bush Intercontinental
IND	Indianapolis	IN	Indianapolis International Airport
JAX	Jacksonville	FL	Jacksonville Intl Airport
JFK	New York	NY	John F Kennedy International Airport
LAS	Las Vegas	NV	Mc Carran International Airport
LAX	Los Angeles	CA	Los Angeles International Airport
LGA	New York	NY	New York La Guardia Airport
MCI	Kansas City	MO	Kansas City International Airport
MCO	Orlando	FL	Orlando International Airport
MDW	Chicago	IL	Chicago Midway Intl Airport
MEM	Memphis	TN	Memphis International Airport
MIA	Miami	FL	Miami International Airport
MSP	Minneapolis	MN	Minneapolis Saint Paul International Air
MSY	New Orleans	LA	Louis Armstrong New Orleans Intl Arpt
OAK	Oakland	CA	Metropolitan Oakland International
ONT	Ontario	CA	Ontario International Aiport
ORD	Chicago	IL	Chicago OHare International Airport
PBI	West Palm Beach	FL	West Palm Beach Intl Airport
PHL	Philadelphia	PA	Philadelphia Intl Arpt - Essington Ave
PHX	Phoenix	AZ	Sky Harbor International Airport
PIT	Pittsburgh	PA	Pittsburgh International Airport
PVD	Providence	RI	Providence Green Airport
RDU	Raleigh	NC	Raleigh-Durham International
SAN	San Diego	CA	Lindburgh San Diego Intl Airpo

HARRIS VDL TESTING AIRPORTS

SAT	San Antonio	TX	San Antonio International Airport
SDF	Louisville	KY	Staniford Field
SEA	Seattle	WA	Seattle Tacoma Intl Airport
SFO	San Francisco	CA	San Francisco Intl Arpt
SJC	San Jose	CA	San Jose International Airport
SLC	Salt Lake City	UT	Salt Lake City International Arpt
SMF	Sacramento	CA	Sacramento Metropolitan Airpor
SNA	Santa Ana	CA	John Wayne Airport Orange Coun
STL	St Louis	MO	Lambert St Louis International
TEB	Teterboro	NJ	Teterboro Municipal Airport
TPA	Tampa	FL	Tampa International Airport.

**United States of America
FEDERAL COMMUNICATIONS COMMISSION
EXPERIMENTAL
RADIO STATION CONSTRUCTION PERMIT
AND LICENSE**

EXPERIMENTAL

(Nature of Service)

XC MO

(Class of Station)

WH2XNL

(Call Sign)

0369-EX-RR-2016

(File Number)

NAME Harris Corporation

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions and requirements set forth in this license, the licensee hereof is hereby authorized to use and operate the radio transmitting facilities hereinafter described for radio communications in accordance with the program of experimentation described by the licensee in its application for license.

Operation: In accordance with Sec. 5.3(c) of the Commission's Rules

Station Locations

(1) MOBILE: Nationwide

Frequency Information

MOBILE: Nationwide

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance (+/-)
136.65 MHz	MO	14K0G1D	50 mW (ERP)	0.002 %
136.8 MHz	MO	14K0G1D	50 mW (ERP)	0.002 %
136.975 MHz	MO	14K0G1D	50 mW (ERP)	0.002 %

This authorization effective November 01, 2016 and
will expire 3:00 A.M. EST November 01, 2018

**FEDERAL
COMMUNICATIONS
COMMISSION**



Special Conditions:

- (1) This authorization is issued for the express purpose of conducting experimental operations described in the related application and required by FAA contract no. DTFAWA-12-D-00058. The use of this radio station in any other manner or for any other purpose will constitute a violation of the privileges herein authorized. Except as subsequently authorized by the Commission, this radio station shall not be operated after the expiration date of the contract designated in the related application and enumerated above.
- (2) Operation is limited to the airports listed in the exhibit entitled "List of Airports" in application file number 0799-EX-PL-2014.



Portable Test Equipment

SOLUTIONS



PORTABLE TEST EQUIPMENT

The implementation of the Data Link is one of the key methods to significantly reduce the congestion and improve safety in the air-ground voice channel. It increases Air Traffic Control (ATC) efficiency and capacity. Airtel ATN has specialised in data communications solutions for the aviation industry since 1993.

Airtel ATN's Portable Test Data Link solutions are in use by avionics manufacturers around the world.

HARDWARE

MTP

The Multi Test Platform (MTP) Test and Diagnostic Station combines the Mini-VDR with a PC, power supplies and control circuits to provide a fully portable testing and monitoring station.

MTP is built in a rugged carry case. All elements are situated on the main mounting plate which provides easy access for servicing and repair. It supports the hardware functionality required by, but not limited to, the VDB Generator and PVDL software applications.

The MTP is ruggedised with 4 or 8 hours of battery life enabling use in hangars. Airline Maintenance Operators use it to simulate ground Air Traffic Control Centre data. It monitors signal strength and tests ACARS, ATN – CPDLC and FANS aircraft.



Item	Details
Computer	Dell, Latitude E6430 ATG
Mini-VDR	Mini-VDR P/N – 3101
GPS	Garmin GPS18x
Antenna	The unit has its own antenna with the option to connect an external antenna
DC Power	MTP is powered by 14.4V Li-ion batteries. The unit has 2 battery slots enabling 4 or 8 hours operation. One or both batteries can be easily removed and stored. AC adapters are supplied for both the laptop and the MTP. The MTP has a dual internal battery charger.
Case	Pelican 1500 carry-on case. Optional wheels and retractable handle
Weight	12.5 Kg (approx) excluding accessories
Dimensions	470 x 357 x 176mm

MINI VDR

The Mini-VDR is a 50mW signal generator/signal detector-decoder and is a low power realisation of an ARINC 750 VDR. It detects and generates the VHF D8PSK and MSK encoded signals in the range 118.000 to 137.000 MHz. The Mini-VDR is integrated into the MTP platform and exchanges data via RS-232 or USB to the PVDL software application running on the MTPs integrated notebook PC. The Mini-VDR is powered by 12VDC provided by the MTP platform.

The Mini-VDR is situated on a mounting plate and is not visible during operation. For monitoring purposes there are external LEDs on the mounting plate available representing Chan Busy and Operate.

The MTP is a complete ready-to-go system. However, both the Mini-VDR and software are available separately if required.



Item	Details
Power	12V DC, 1.2A max, 600mA average
Dimensions	80 x 80 x 265 mm
Weight	1.2 kg
Frequency	118.000 to 137 MHz
Transmitter RF Power... Emissions RF Mask	50mW (+17dBm) per RTCA/DO-224 per RTCA/DO-224
Receiver Sensitivity Input Range Adj Channel Rejection	BER of 10 ⁻³ at -98dBm -107dBm to +7dBm 60dB min
Interface I/O	ADS-ASIP via USB RF: 50 ohm BNC

SOFTWARE

PVDL-ASA

PVDL-ASA is the VDL Mode 2 aircraft station emulation software with the addition of the full ARINC 618 POA aircraft implementation. In VDL M2 it establishes links with ground stations by first receiving in range Ground Station Information Frames (GSIFs), building a table of available ground stations and then initiating the link establishment procedure. The system is then available to exchange air-ground data under the control of the VDL Mode 2 protocols as defined by the ICAO SARPS and AEEC 631.

PVDL-AS also includes the complete AOA (ACARS over AVL) message handling and protocol conformance as defined by ARINC 618.

PVDL-GS

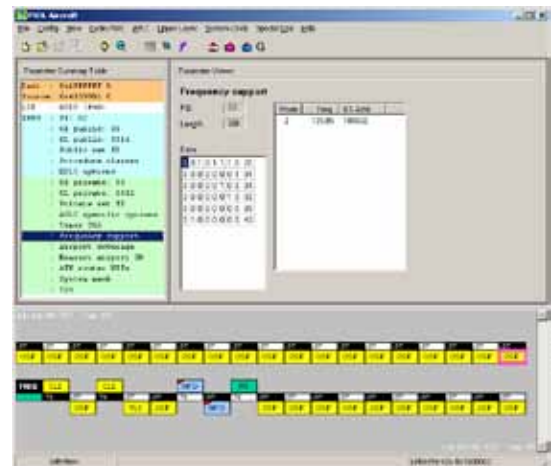
PVDL-GS is the software application that emulates the operation of a VDL Mode 2 ground station. It transmits GSIFs, accepts links with aircraft systems and exchanges data under the control of the VDL Mode 2 protocols as defined by the ICAO SARPS and AEEC 631. It includes a fully integrated A618 protocol engine to support AOA (ACARS-over-AVL) message handling and protocol conformance.

The PVDL-GS software application performs AVL frame extraction and assembly, along with Reed-Solomon manipulation.

It controls all aspects of Mini-VDR behaviour including operating frequency, transmit power and MAC parameters.

PVDL is configurable to act as two individual ground stations and, in this mode conducts link handoff with the aircraft under test.

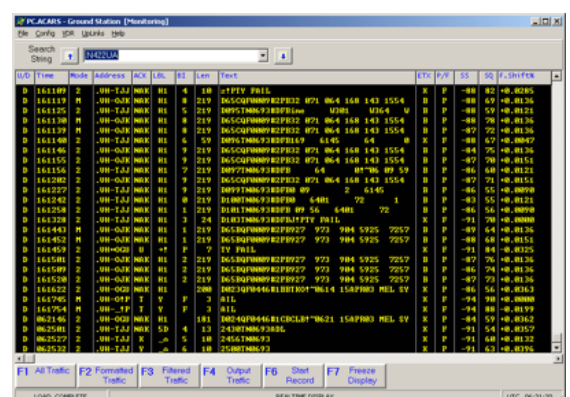
In Concurrent Mode, the PVDL ground station transmits ACARS MSK squitter uplinks - on an entirely different frequency. This option allows avionics under test to detect the presence of the VDL Mode 2 ground station based on its advertised presence in the squitter content.



PC.ACARS

POA (Plain old ACARS) is the industry standard ACARS protocol and as part of the PVDL-ASA package, runs as a separate PC.ACARS application on the MTP platform.

This is supplied as either an AEEC 618 equipped Ground Station (PC.ACARS-G) or Aircraft (PC.ACARS-A). PC.ACARS can be used actively - to participate in communications - or passively for monitoring and logging received data.



ATN CPDLC TEST TOOLS (GMT/GAT)

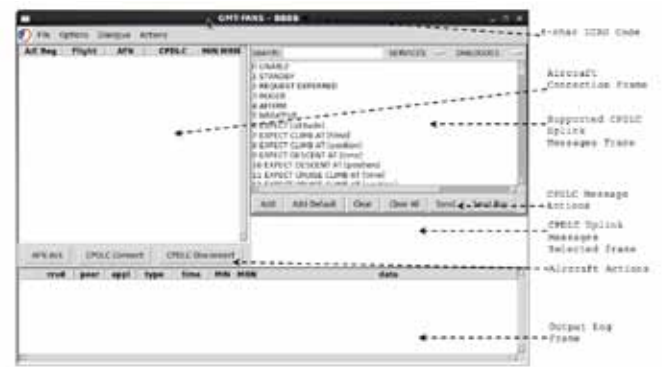
The Ground Manual Tool (GMT-ATN) provides a GUI for sending/receiving CM/CPDLC primitives. The ATC centre responds automatically to aircraft downlink messages. The automatic responses can be configured via a script.

- CM-Logon, CM-Contact, CM-Abort
- CPDLC Start, CPDLC End and CPDLC User Abort services
- Handles multiple aircraft on the ground side
- Supports standard and protected mode CPDLC
- Supports uplink and downlink message set specified in the EUROCAE ED-110B
- Supports single and concatenated uplink and downlink messages
- Supports Error Test Cases: invalid message sequences, invalid message identifiers or references, missing LACK and unsupported messages
- Automatic messages: automatic generation of messages with the possibility of configuring the transmission rate
- All uplink and downlink exchanges are logged for further analysis
- Supports ATN B2 (Version 1) and Sesar Version H

FANS CPDLC TEST TOOLS

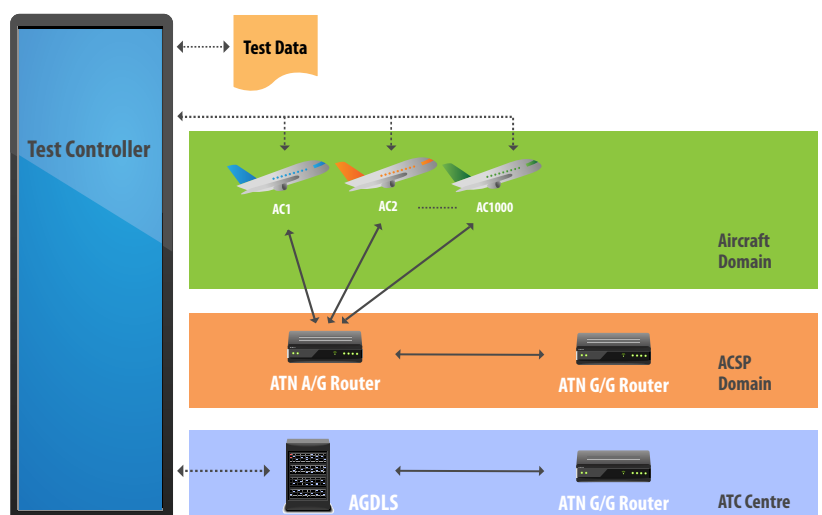
The GMT-FANS provides a HMI to send/receive AFN/CPDLC.

- Automatic/manual AFN Logon Ack on reception of AFN Logon
- Builds and sends AFN contact
- Receives AFN Response/Complete messages
- Supports single and concatenated sequence of up to 5 downlink CPDLC messages
- Automatic/manual CPDLC connect request
- Automatic/manual selection of message identification, message reference and time stamp
- Supports uplink and downlink message set specified in document ED-100A
- Logs all events



CPDLC MULTI-AIRCRAFT TEST CONTROLLER (GVS)

- Automation of system testing for one or several ATC systems
- Control of 1000 ATN/FANS aircraft
- Simulation of ATN/FANS network
- Emulation of a Ground ATC System independent of the System Under Test
- Support of several aircraft groups. This allows each group to act independently
- TCL script-driven interface



VDB/GBAS GENERATOR

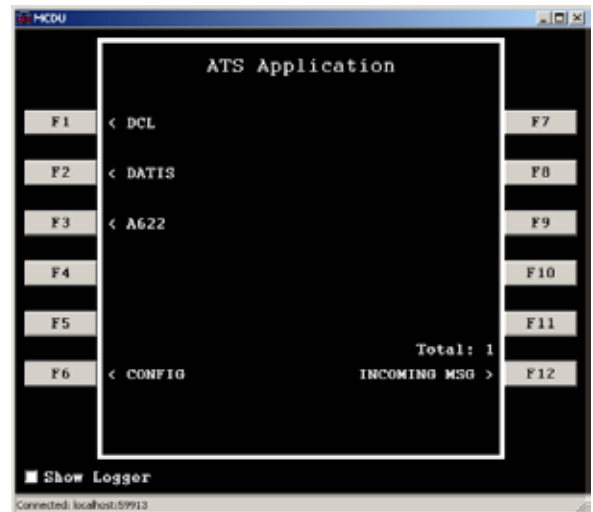
The VDB Generator is a software application that also utilises the D8PSK capability of the Mini-VDR hardware. It simulates a VDB/GBAS Ground Station by providing a versatile source of VDB messages to exercise message decoding in the aircraft VDR or MMR under test.

Depending on the test undertaken, the VDB Generator application provides the ability to construct fully compliant DO-246 data, or constructs data sequences designed to test the upper or lower level decoding.

VDB Generator facilitates DO-253 MOPS testing including: steady carrier, amplitude variation within allocated time slot, frequency, transmit power, symbol rate, corruption of CRC values.

D-ATIS/DCL AIRCRAFT STATION (ATS-A)

PC.ACARS-A/ATS-A is a test and development tool that can be used to monitor and test the operation of Air Traffic Services data over ACARS by decoding and displaying data transactions between air and ground for supported message types. It provides functionality similar to that of an aircraft for sending and receiving supported ATS messages. PC.ACARS-A/ATS-A requires an installation of PC.ACARS-A.

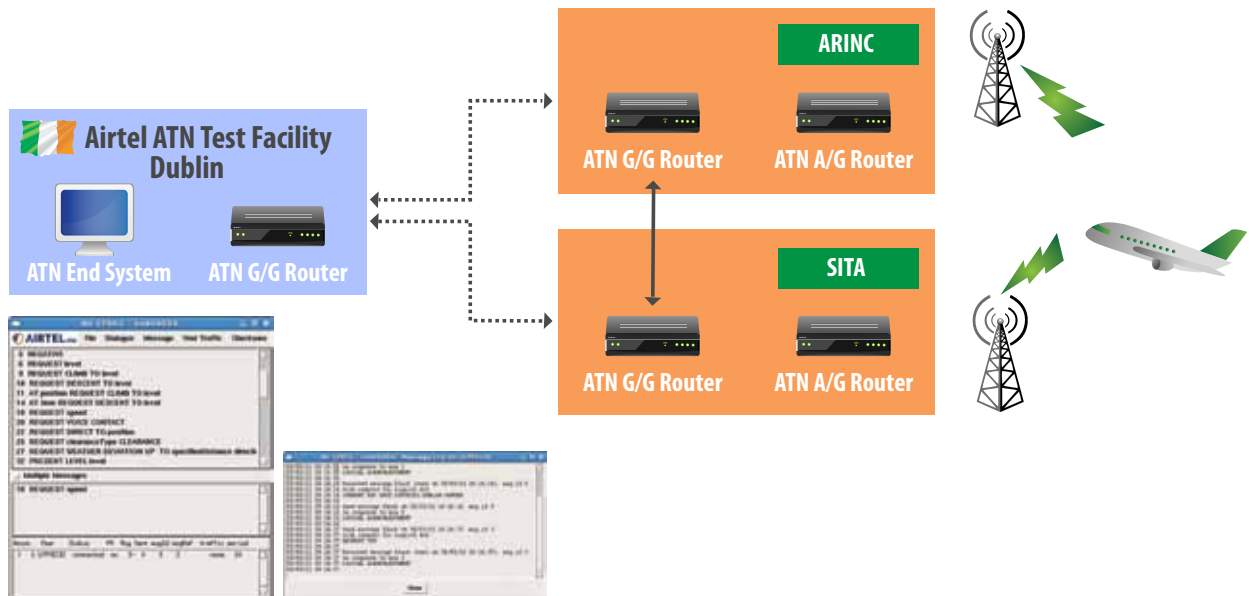


VMON (VDL MONITORING SYSTEM)

The VMON enables users monitor and log any VHF aeronautical band channel. It does this through the use of an Airtel ATN Mini-VDR. Users can observe the minimum, maximum and average signal levels as well as the type and amount of channel utilisation over a given time. The data is logged to a Comma Separated Value (CSV) file for post-analysis. A GPS module is used to track the time and position of the data collected within the log.

The VMON can also act as a Remote Monitoring Unit (RMU) and connect to the MOON Central Monitoring Server (CMS).

AIRTEL ATN CPDLC TEST SERVICE



Airtel ATN provides a commercial CPDLC test facility in Dublin. Airtel ATN is the first commercial company in the world to provide this testing service to aircraft operators.

The CM/CPDLC test facility simulates two Air Traffic Control centres (TESTEAT and TESTEIAU) connected to ARINC or SITA's ATN/VDL network. Airtel ATN's Test Facility tests CM and CPDLC including CPDLC hand off between ATC centres..

Airtel ATN is working with a number of aircraft operators to meet the 2013 and 2015 deadlines.

AIRTEL ATN

Airtel ATN is an independent, Irish company dedicated to providing Data Link Solutions to the Aerospace Industry since 1993. Airtel ATN's solutions have been integrated with a number of different systems. The company is the only organisation to supply operational airborne and ground systems.

Airtel ATN provides a complete range of ATN compliant products for operational use and validation including:

- Air/Ground Data Link Server
- Air/Ground and Ground/Ground Routers
- Airborne ATN Router
- Airborne and Ground Test/Validation Suites
- MTP Multi Test Platform (including VDL Mode 2) and mini VDRs
- VDL Mode 2 Ground Station technology

AIRTEL ATN PORTABLE TEST EQUIPMENT CUSTOMERS





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