

VHF DATA Radio

**EVR750-04-0100A
EVR750-04-0200A
EVR750-04-0100B**

**Similarity analysis with already qualified
P/N EVR750-03-0100A
and configuration status**

CONTENT

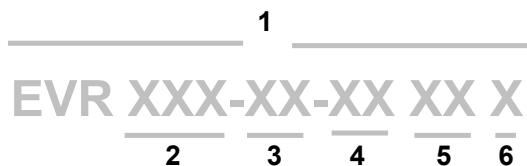
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1. Introduction

THALES Communications since 1997 had been assigned for all the previous (TRT) granted code by the FCC with a applicant/grantee code : (KVJ) under the name of Thomson-CSF Communications

Equipment EVR750-04-0100A & EVR750-04-0200A are directly derived from EVR716-01-0100A and EVR750-03-0100A already qualified and FCC granted under FCC ID : KVJEVR716.

2. Composition of the Part-Number



1 : Complete P/N

2 : Version

716: according to ARINC 716 (voice + ACARS)
750: according to ARINC 750 (Mode A and/or VDL)

3 : Type

01: voice 25kHz/8.33kHz + ACARS (118-137MHz)
03: idem 01 + digital interface with ATSU (Mode A)
04: idem 03 + VDL Mode 2
11: idem 01 with specificity for 2nd level aircraft

4 : Optional Maintenance SW addressing

01: Airbus maintenance by default
(Airbus and Boeing maintenance by pin programming)
02: Boeing maintenance by default
(Airbus and Boeing maintenance by pin programming)

5 : Software Evolution

00: basic 25kHz + 8.33kHz
50: only 25kHz

6 : Hardware Evolution

A : Basic

3. Operating mode and designation

References :

- UIT (Ed.2001) : Article 1 + Appendix 1
- RECOMMANDATION UIT-R SM.1138

Description	Operating mode	Necessary band	Designation as per UIT-APPENDICE 1 - 2001	
			basic	full
Voice mode 25kHz, modulation AM-DSB, channeling 25kHz	mode 0A	6000 Hz	A3E	6K00A3EJN
Voice mode 8.33, modulation AM-DSB, channeling 8,33kHz	mode 0B	6000 Hz	A3E	6K00A3EJN
Mode ACARS, Data 2400b/s, modulation AM-MSK with external modem	mode 1A	13.2 kHz	A2D	13K2A2DBN
Mode A, Data ACARS 2400b/s, modulation AM-MSK with internal modem	mode 1C	13.2 kHz	A2D	13K2A2DBN
VDL Mode 2, Data 31.5kb/s, phase modulation D8PSK	mode 2	16 kHz	G1D	16K0G1DEN

4. P/N differences

The main difference between both type of equipment is a software upgrade in order to equip EVR750-04-0100A with the data mode VDL2 (mode 2) in addition to the basic modes (listed here below).

Modes		EVR716-01-0100A	EVR750-03-0100A	EVR750-04-0100A & 0200A
Description	Code			
Voice with 25kHz channelling	0A	X	X	X
Voice with 8.33kHz channelling	0B	X	X	X
ACARS Data AM-MSK (2400b/s)	1A	X	X	X
Mode A: Data AM-MSK (2400b/s-internal modem)	1C	-	X	X
VDL Mode 2 - D8PSK (31.5kb/s)	2	-	-	X

Additionally, it is intended to replace the "Power Supply" unit by a new unit, provided by CONVERGIE company.

So the Qualification is conducted with two equipment configurations :

- Configuration n°1 with the new Power Supply Unit (P/N= EVR750-04-0100B)
- Configuration n°2 with the basic Power Supply Unit (P/N= EVR750-04-0100A or EVR750-04-0200A).

Due to the similarity between the equipment already qualified and the new configurations, the qualification tests are limited to those detailed in §.4, as agreed by SFACT (letter 2002/QUAL_EVR750-04 SFACT/N.ST/AVI dated 03/04/02).

5. Comparison between EVR750-04-0100A/0200A and EVR750-03-0100A

Equipment EVR750-04-0100A/0200A are directly derived from EVR750-03-0100A.

- The hardware is the same except for minor modifications due to VDL2 implementation. All the differences are detailed here below.
- The software is upgraded to implement the mode 2 functionality (VDL2).

UNIT	EVR750-03-0100A	EVR750-04-0100A	COMPARISON
Chassis	4672968B	4672968B	Identical
Power Storage	4672972B	4672972B	Identical
HIRF	4689462C	4689462C	Identical
DPU	4689459B	4689459C	Identical with following ECOs : - ECO n° 01 40 002
Transmitter	4672971C	4672971D	Identical with following ECOs : - ECO n° 00 40 007 - ECO n° 01 40 004 - ECO n° 02 40 008
Receiver	4689678C	4689678D or 4689678E	Identical with following ECOs : - ECO n° 98 40 033 - ECO n° 01 40 024 - ECO n° 01 40 025 - ECO n° 01 40 005 - ECO n° 01 40 006
Power Supply	5611203A	5611203A	Identical

List of the Engineering Change Orders (ECO)

DPU (Data Processing Unit)

- a) ECO n° 01 40 002 : Improvement of the Rx/Tx turn-around time in mode 2 (VDL2)
(change of a resistor value).

Transmitter Unit

- b) ECO n° 00 40 007 : Improvement of spurious Emissions in mode 2 (transmit).
(six components changed)
- c) ECO n° 01 40 004 : Improvement of vibrations protection.
(change of the type of four capacitors)
- d) ECO n° 02 40 008 : Transmission not affected by power switchings of 10ms.

Receiver Unit

- e) ECO n° 98 40 033 : Modification of the AGC at IF stage to reduce the time response in mode 2.
- f) ECO n° 01 40 024 : Reduction of Rx/Tx turn-around time and front end AGC improvement in mode 2.
- g) ECO n° 01 40 025 : Reduction of carrier detection and override threshold variation in the climatic range.
- h) ECO n° 01 40 005 : Improvement of vibrations protection.
(change of the type of four capacitors)
- i) ECO n° 01 40 006 : Improvement of VDL2 interferences on AM (Eurocontrol S/P)
(Change of a resistor value).

P/N= 4689678D when ECOs are manually applied.

P/N= 4689678E when ECOs are integrated in the printed board.

Notes

- Items (a, b, d, e, f, i) are related only to mode 2 (no impact on voice modes).
- Items (c, h) are referred to a technological improvement (type of capacitors).

6. Comparison between EVR750-04-0100B and EVR750-04-0100A/0200A

Equipment EVR750-04-0100B is the same as EVR750-04-0100A/0200A, except that the basic Power Supply Unit (P/N: 5611203A) is replaced by a new Power Supply Unit (P/N: 56151480AA).

7. Qualification Tests

7.1. EVR750-04-0100B

EVR750-04-0100B is equipped with a new Power Supply Unit, therefore all the tests as described in MOPS ([4] & [5]) are applied.

The following table (Table 1) gives for every environmental section (according to [6]-DO160) which test shall be done to validate the equipment configuration.

7.2. EVR750-04-0100A/0200A

EVR750-04-0100A/0200A are identical to EVR750-03-0100A (already qualified), except for a software upgrade (for VDL2) and some minor modifications related to VDL2 operating.

The qualification tests are conducted according to the following list.

Electrical tests

- All the tests in accordance with MOPS ED-23B (Voice)
- All the tests in accordance with MOPS ED-92 (VDL2)

Environmental tests

- All the tests in accordance with MOPS ED-92 (VDL2)

The following table (Table 2) gives for every environmental section (according to [6]-DO160) which test shall be done to validate the equipment configuration.

TABLE 1 - QUALIFICATION TESTS FOR EVR750-04-0100B (equipped with the new PSU)		
ELECTRICAL MEASUREMENTS		
Mode Voice According to MOPS requirements ED-23B		X
Mode VDL2 According to MOPS requirements ED-92		X
ENVIRONMENT MEASUREMENTS According to ED-23B (voice) & ED-92 (VDL2)		
Section 4 - High & Low Temperature	Voice	X
	VDL2	X
Section 4 - Altitude/Decomp./Overpressure	Voice	X
	VDL2	X
Section 5 - Temperature variation	Voice	X
	VDL2	X
Section 6 - Humidity	Voice	X
	VDL2	X
Section 7 - Operational shocks	Voice	X
	VDL2	X
Section 8 - Vibrations	Voice	X
	VDL2	X
Section 9 -	NA	-
Section 10 -	NA	-
Section 11 -	NA	-
Section 12 -	NA	-
Section 13 -	NA	-
Section 14 -	NA	-
Section 15 - Magnetic effect	Voice	X
	VDL2	X
Section 16 - Power input	Voice	X
	VDL2	X
Section 17 - Voltage spike	Voice	X
	VDL2	X
Section 18 - AF conducted susceptibility	Voice	X
	VDL2	X
Section 19 - Induced signal susceptibility	Voice	X
	VDL2	X
Section 20 - RF susceptibility	Voice	X
	VDL2	X
Section 21 - Emission of RF energy	Voice	X
	VDL2	X
Section 22 - Lightning induced transient susceptibility	Voice	X
	VDL2	X
Section 23 - Lightning direct effects	NA	-
Section 24 - Icing	NA	-
Section 25 - Electrostatic discharge	Voice	X
	VDL2	X

TABLE 2 - QUALIFICATION TESTS FOR EVR750-04-0100A (equipped with the basic PSU)		
ELECTRICAL MEASUREMENTS		
Mode Voice According to MOPS requirements ED-23B		X
Mode VDL2 According to MOPS requirements ED-92		X
ENVIRONMENT MEASUREMENTS According to ED-23B (voice) & ED-92 (VDL2)		
Section 4 - High & Low Temperature	Voice	X
	VDL2	X
Section 4 - Altitude/Decomp./Overpressure	Voice	-
	VDL2	X
Section 5 - Temperature variation	Voice	X
	VDL2	X
Section 6 - Humidity	Voice	-
	VDL2	X
Section 7 - Operational shocks	Voice	-
	VDL2	X
Section 8 - Vibrations	Voice	X
	VDL2	X
Section 9 -	NA	-
Section 10 -	NA	-
Section 11 -	NA	-
Section 12 -	NA	-
Section 13 -	NA	-
Section 14 -	NA	-
Section 15 - Magnetic effect	Voice	-
	VDL2	X
Section 16 - Power input	Voice	-
	VDL2	X
Section 17 - Voltage spike	Voice	-
	VDL2	X
Section 18 - AF conducted susceptibility	Voice	-
	VDL2	X
Section 19 - Induced signal susceptibility	Voice	-
	VDL2	X
Section 20 - RF susceptibility	Voice	-
	VDL2	X
Section 21 - Emission of RF energy	Voice	-
	VDL2	X
Section 22 - Lightning induced transient susceptibility	Voice	-
	VDL2	X
Section 23 - Lightning direct effects	NA	-
Section 24 - Icing	NA	-
Section 25 - Electrostatic discharge	Voice	-
	VDL2	X

8. Configuration status

Conditions	Section DO160	EVR750-04-0100A	EVR750-04-0100B
Functional Tests		EVR750-04-0100A-E9	EVR750-04-0100A-E9
Temperature and altitude	4	EVR750-04-0100A-E9	EVR750-04-0100A-E9
In-flight loss of cooling	4	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Temperature Variation	5	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Humidity	6	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Operational Shocks and Crash Safety	7	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Crash Safety Shocks	7	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Vibration	8	EVR750-04-0100A-E9	EVR750-04-0100A-E9
Magnetic Effect	15	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Power Input	16	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Voltage Spikes	17	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Audio Frequency Conducted Susceptibility	18	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Induced Signal Susceptibility	19	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Radio Frequency Susceptibility	20	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Emission of Radio Frequency Energy	21	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Lightning Induced Transient Susceptibility	22	EVR750-04-0100A-E8	EVR750-04-0100A-E8
Electrostatic Discharge	25	EVR750-04-0100A-E8	EVR750-04-0100A-E8

Change from E8 to E9

ECO n° 02 40 008 : see §.2. The transmitter inhibition during short power cut-off is suppressed (required by AIRBUS). All the functional tests (y/c climatic tests) have been done in this configuration. This transmitter inhibition cannot have an impact on environmental tests.

Change from E9 to E10

ECO n° 02 40 009 : Software changes to take into account VDL2 protocols issues. E10 is the status used to pass "AIRBUS ATP" on 07-nov-02.