

EXHIBIT D



ENHANCED VHF RADIO

EVR716-11-0300A
EVR716-11-0350A

DECLARATION OF DESIGN AND PERFORMANCE

APPROVED BY :
THOMSON-CSF

ÉTABLI / WRITTEN D. BOURDARIAS	DATE 1999/05/06	The logo for Thomson-CSF Communications, featuring a stylized diamond-shaped icon to the left of the company name in a bold, sans-serif font.
VÉRIFIÉ / CHECKED	DATE	

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M. KWARTNIK	1999/05/06	EVR 716			
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RÉVISIONS			
REV	RAISON DE L'ÉVOLUTION / <i>CHANGE REASON</i>	DATE AAAA-MM-JJ	APPROUVÉ APPROVED
AA	Creation	1998/06/29	D. BOYET
AB	Updating for EVR716-01-0300A-PB02 (suppression of «click»when switching from 25kHz to 8.33kHz and cosite improvement)	1998/09/29	D. BOURDARIAS
AC	Updating for EVR716-11-0300A-PC03 (change of P/N,test improvement,squelch hysteresis increase,sidetone delay decrease)	1998/11/27	D. BOURDARIAS
AD	Updating for production equipment EVR716-11-0300A	1998/12/28	D. BOURDARIAS
AE	Additional informations related to EVR716-11-0350A version CMM reference added.	1999/01/04	D. BOURDARIAS
AF	Modification of CID index(p.4) and DO160 categories (P.9)	1999/01/28	D. BOURDARIAS
AG	Updating; revision of CID	1999/04/16	D. BOURDARIAS
AH	JTSO C128 added in §.3. Deviations for –40°C (§8). Change of specification agreement QAC reference.	1999/05/06	D. BOURDARIAS

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AIRCRAFT TYPE : DASH8-400
RESPONSIBLE PARTNER : SEXTANT

1. NAME AND ADDRESS OF SUPPLIER

THOMSON-CSF COMMUNICATIONS
160, boulevard de Valmy B.P. 82
92704 Colombes Cedex France

2. REFERENCES

Type : Enhanced VHF Radio 716 transceiver

Part number : EVR716-11-0300A (for 25kHz+8.33kHz)
EVR716-11-0350A (for 25kHz only)

Hardware record reference : N°5611200A

Configuration Index Document : N° 4689709A021 (AG)

Short description : The EVR transceiver ensures, on board Air Transport Aircraft, the transmission and reception of voice and data, in the aeronautical VHF band (118 to 137MHz).
The EVR716 version operates according to the voice and data modes defined by the ARINC 716 characteristics, i.e. for voice modes : Double Side Bands Amplitude Modulation, with 25 kHz or 8.33kHz channel spacing ; and for data mode, ACARS mode with an external MSK modem.

Weight : less than 9.3 lb

Overall dimensions : (200 x 94.4 x 387.5)mm max
« 3 MCU »

Classification of the equipment : Essential

Software record reference : N° 5611209C for EVR716-11-0300A
N° 5620726A for EVR716-11-0350A

Software level : complete software includes :
- CSCI MAIN (EVR716) software
According to DO-178B/Level C
- CSCI DPS (EVR716) software
According to DO-178B/Level C
- CSCI Maintenance software
According to DO178-B/Level D

CMM Reference : N° 36710381-AA (ATA N° 23-11-02)

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3. APPLICABLE SPECIFICATION REFERENCE

Specification reference : JTSC 2C37e
JTSC 2C38e
JTSC C128
TSC C37d
TSC C38d
TSC C128
RTCA DO-160C / EUROCAE ED-14C
RTCA DO-186A / EUROCAE ED-23B
RTCA DO-207 / EUROCAE ED-67
RTCA DO-178B / EUROCAE ED-12B
DTRD 8-020
DTRD 8-010
ESP 89

Quality assurance manual : Ref: MQ.CNI

Specification Agreement QAC : MOP Ref: 46596630 Rev.AA

4. RATED PERFORMANCE OF THE ARTICLE

Technical specifications (SSS/SSDD) : N° 4689709A305 (AB)

Acceptance Test Procedure (ATP) : N° 4689710A090 (AB)

Acceptance Test Report (ATR) : N° 4689710A088 (AC)

:

Failure analysis (FMEA) : N° 4672550A530

5. PARTICULARS OF APPROVALS HELD FOR THE EQUIPMENT

Not applicable on account of it is a new equipment.

6. REFERENCE TO QUALIFICATION TESTS REPORTS AND SOFTWARE ACCOMPLISHMENT SUMMARY

Qualification Test Procedure (QTP) : N° 4689709A206 (AE)

Qualification Test Report (QTR) : N° 4689709A279 (AB)

Software Accomplishment Summary : N° 4681336A555 (AC)

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7. SERVICE AND INSTRUCTION MANUAL REFERENCE NUMBER

Operation and Installation Manual : N°36710392-AA

8. DEVIATIONS

For DO-160C environmental conditions

Equipment is full compliant with the electrical specifications given in §.9.1, for environmental conditions defined in §.9.2 (DO-160C) : No deviation

For De Havilland environmental conditions

Equipment is full compliant from -25°C to +70°C: No deviation.

Deviations at -40°C:

- Frequency accuracy: < 5.5 ppm
- Rx bandwidth at ±8kHz for 25kHz mode: < 7dB
- Rx bandwidth at ±2.78kHz for 8.33kHz mode: < 7dB
- Selectivity at ±7.37kHz for 8.33kHz mode: > 55dB.

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9. STATEMENT OF CONFORMANCE WITH APPROPRIATE SPECIFICATIONS AND REQUIREMENTS

9.1. ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SPECIFICATION
GENERAL	
Operational modes	Voice/25kHz (0A) Voice/8.33kHz (0B) Data AM/MSK (1A) (with external modem)
Equipment classes (ED-23B/DO-186A)	- Reception: Class C and Class E - Transmission: Class 3 and Class 5
Power Requirements Power Consumption (28V) Power drop-out transparency	28VDC < 160 W (Transmission) < 36 W (Reception) > 50ms (Reception)
Form Factor	3MCU, ARINC Specification 600
Operating Temperature Storage Temperature	-40°C to+70°C -55°C to+85°C
Frequency control	Serial Digital in accordance with ARINC 429
Frequency range	117.975 MHz to 137.000 MHz
Channel spacing	25 kHz and 8.33 kHz for EVR716-11-0300A 25 kHz only for EVR716-11-0350A
Frequency stability	<±5 ppm
Duty cycle	Duty cycle of 20% (1mn/4mn) with natural convection.
Channel Switching time	Less than 60ms
Transmit to Receive switching time	Less than 50ms
Receive to transmit switching time	Less than 50ms
RECEIVER	
Sensitivity (modes 0A & 0B)	For a wanted signal of -101dBm, modulated 1kHz/30%, (S+N)/N is greater than 6dB (Nominal).
Selectivity (mode 0A/1A)	>± 8kHz at 6dB bandwidth <±17kHz at 50dB bandwidth <±25kHz at 60dB bandwidth
Selectivity (mode 0B)	>±2.78kHz at 6dB bandwidth <±7.37kHz at 60dB bandwidth
Cross Modulation	Unwanted signal level (1kHz/50%) to obtain -10dB referred to a wanted signal of -87dBm (1kHz/50%): - at ± 25kHz: > -33 dBm - at ± 50kHz: > -27 dBm - at ± 100kHz: > -17.5 dBm

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CHARACTERISTIC		SPECIFICATION
AGC regulation		Within 3dB (-93dBm to -13dBm input); not more than 6dB (-101dBm to +1dBm).
Audio output Level		10mW (adjustable up to 40mW) into (600±20%) ohms resistive load for -53dBm signal modulated 30% at 1000Hz.
Audio output frequency response		Within 6dB from 300 to 2500Hz more than 20dB at 3750Hz.
Audio output harmonic distortion		Not to exceed 7.5% for -53dBm signal modulated 30% at 1000Hz.
Undesired responses		> 70dB.
Intermodulation (FM immunity)		as per ARINC 716 section 3.6.7.5.
Selcal/Data Output	Level	0.5 Vrms (min.) into (600±20%) ohms resistive load
	Frequency response	Selcal (mode 0A): <3dB from 312Hz to 1200Hz AM-MSK (mode 1A): <±6dB from 300Hz to 6600Hz
	Distortion	< 3% for a wanted signal of -53dBm, modulated 30% at 1000Hz
TRANSMITTER		
Output power		> 16W (nominal)
Harmonics		H ₂ < -16 dBm H _n < -26 dBm
Audio Frequency response		Within 6dB from 300Hz to 2500Hz
Modulation level		> 85% for 0.25Vrms at 1000Hz.
Spectrum mask (mode 0B)		For an audio frequency from 300Hz to 10kHz and an audio level attenuated by 10dB/octave from 800Hz to 10kHz, referred to 70% modulation level: < -45 dBc from ±3.2kHz to ±5kHz < -60 dBc from ±5kHz to ±7kHz < -70 dBc for frequency shift greater than ±7kHz
Data Input	Modulation ratio	>80% for a frequency of 1000Hz at -10dBm
	Frequency response	Within 6dB from 600Hz to 6600Hz.
	Distortion	< 10% for 80% modulation ratio over frequency range from 600Hz to 6600Hz

Note: "Nominal" relates to Standard Conditions.

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9.2. ENVIRONMENTAL CHARACTERISTICS

ENVIRONMENT	DO-160C		DE HAVILLAND Specific Conformance
	Section	Category	
Temperature & Altitude	4	A2/D1	DO160C Cat.A2/D1 Extension to -40°C
In-flight loss of cooling	4	Y	-
Temperature Variations	5	B	B
Humidity	6	B	B
Operational Shocks	7	6g/11ms	-
Crash Safety Shocks	7	15g/11ms 1g/3s	-
Vibrations	8	MNBC	DO160C Cat.M
Explosion	9	E2	DO160C Cat.E2
Waterproofness	10	X	X
Fluids	11	X	X
Sand and Dust	12	X	X
Fungus Resistance	13	X	X
Salt Spray	14	X	X
Magnetic Effect	15	A	DO160C Cat.A
Power Input	16	B	MIL-STD-704E
Voltage Spikes (susceptibility)	17	A	DO160C Cat.A
Voltage Spikes (emission)	-	-	MIL6STD 461 CE07
AF Conducted Susceptibility	18	Z	DO160C Cat.Z
Induced Signal Susceptibility	19	Z	DO160C Cat.Z
Radio Frequency Susceptibility (HIRF)	20	U	ESP 89 (level A & C)
Radio Frequency Emission	21	Z	DO160C Cat.Z
Lightning Induced Effects	22	A2E2	ESP 89
Lightning Direct Effects	23	X	X
Icing	24	X	X

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Electrostatic Discharge	-	X	ESP 89-§.1.7.4
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10. RESTRICTION FOR USE

Not applicable.

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Dominique DESAGE

I hereby certify that the information contained in this declaration of design and performance is accurate and the declaration is made under the authority of the Technical Manager.

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THOMSON-CSF COMMUNICATIONS promise to issue any new editions of this document whenever this item of equipment is the subject of a minor or major change, and to apply, when relevant, the software quality assurance plan and configuration management plan.

Date:

Dominique DESAGE
CNI Unit/Technical Director
THOMSON-CSF COMMUNICATIONS

Aircraft Manufacturer Purchaser

Airworthiness Authority

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ENHANCED VHF RADIO

EVR716-11-0300A

EVR716-11-0350A

DECLARATION OF DESIGN AND PERFORMANCE

APPROVED BY :
THOMSON-CSF

 H. BOUDANIAS	DATE 1999/05/06				
 M. KWIAKOWSKI	DATE 1999/05/06	EVR 716			
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Date: 11/1/99

Dominique DESAGE
CMI Unit/Technical Director
THOMSON-CSF COMMUNICATIONS



Aircraft Manufacturer Purchaser

Acceptance Authority

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