

EXHIBIT B :

CLASSIFICATION SOCIÉTÉ CLEARANCE LEVEL	FORMAT SIZE	CODE FABRICANT CAGE CODE	NUMÉRO DOCUMENT / DOCUMENT NUMBER	REV	PAGE
RÉSERVÉ SOCIÉTÉ COMPANY RESTRICTED	A4	F0057	5622287A279	AA	1/26



Airborne Enhanced VHF Radio

FCC RULES COMPLIANCE REPORT

(Part 15 Subpart B, Part 87 Subpart D
& Part 2 Subpart J)

EVR716-11-xxxxx

WRITTEN BY Name: C. BOIT Function: Intégration Radio Date: 24/06/99 Signature:	APPROVED BY Name: M. KWARTNIK Function: Responsable De Configuration Date: 5/11/99 Signature:
CHECKED BY Name: D. BOURDARIAS Function: Responsable Technique Produit Date: 07.10.99. Signature:	(Empty space for signature)
CHECKED BY Name: Function: Date:	(Empty space for signature)

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AA	Creation	1999/06/24	D.BOURDARIAS

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1. DOCUMENT OVERVIEW

This document provides the data showing that the EVR716-11-xxxxx VHF communications transceiver complies with the FCC Rules and Regulations.

The EVR716-11-xxxxx equipment is to be operated under FCC Rules Part 15 Subpart B, Part 87 Subpart D & Part 2 Subpart J.

2. FUNCTION OF EQUIPMENT

2.1. GENERAL

The EVR716-11-xxxxx is an Air Transport VHF communications transceiver operating in the VHF aeronautical band 118-137 MHz and providing voice and data communications.

The EVR716-11-xxxxx equipment meets the EUROCAE ED-23B and RTCA DO-186A Minimum Operational Performance Standard requirements, and the ARINC 716 Characteristics.

Two P/N of the EVR-716 unit are defined:

THOMSON-CSF Part-Number	Features
EVR716-11-0300A	118-136.975 MHz frequency range. 25 kHz and 8.33 kHz channel spacing. Compliant with ICAO Annex 10 FM immunity. Conforms to DO-178B and DO-160C requirements. Fault memory. ACARS compatible (analogue interface). 50 ms power drop-out transparency. Software dataloading via RS-232 interface.
EVR716-11-0350A	Same as EVR716-11-0350A, with 8.33kHz channel spacing inhibited.

There are three modes of operation :

Mode 0A :

Analogue voice with 25 kHz channeling (ED-23B / D0-186A) : receiver class C, transmitter class 3; ARINC 716)

Modulation : Amplitude Modulation with Double-SideBand (A3E)

Mode 0B :

Analogue voice with 8.33 kHz channeling (ED-23B / D0-186A) : receiver class E, transmitter class 5; ARINC 716)

Modulation : Amplitude Modulation with Double-SideBand (A3E)

Mode 1A:

Datalink with 25 kHz channeling (ARINC 716, ARINC 618)

RF Modulation : Minimum Shift Keying - Amplitude Modulated (A3E)

(The MSK modulation is performed outside the VHF transceiver)

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2.2. DESCRIPTION

The EVR716-11-xxxxx equipment is composed of seven Serviceable Replace Units (SRU).

- Transmitter Unit (Tx)
This SRU provides all the functionalities required for transmission.
 - modulation,
 - power amplification stages,
 - regulation loop,
 - transmission synthesizer,
 - ...,
 - except audio processing, filters, compressor performed by the DPU module.
- Receiver Unit (Rx)
This SRU provides all the functionalities required for reception.
 - front end,
 - first intermediate frequency (21.4MHz),
 - second intermediate frequency (455kHz),
 - Demodulation,
 - Rx/Tx switch,
 - reception synthesizer,
 - ...,
 - except audio processing, filters, squelch, limiter performed by the DPU module.
- Data Processing Unit (DPU)
This SRU provides both signal and data digital processing. Three software modules are resident on this unit:
 - the MAIN software that manages the equipment including the BITE functions,
 - the maintenance (MNT) software that ensure interfacing for Airbus maintenace (MNTA) or maintenance (MNTB),
 - the Data Processing Software (DPS) that ensure the VDL data transmission and reception functions.
- Power Supply Unit (PSU)
This SRU provides secondary power supplies from 28VDC primary power supply.
- High Intensity Radio Frequency Unit (HIRF)
This SRU provides all the high intensity radio frequency protection and lightnings protections.
- Power Storage Unit (PST)
This unit protects the transceiver against power supply drop-out (>200ms reception).
- Chassis (CHA)
This SRU provides all the mechanicals and interconnections among the different SRU.

Boeing

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3. PURPOSE OF THE TESTS

The EVR716-11-0300A equipment shall comply with FCC Rules Part 15 Subpart B, Part 87 Subpart D, and Part 2 Subpart J. The following sections provide measurements or calculations proving the compliance with these FCC rules.

3.1. FCC Part 15 Subpart B compliance.

In reception mode, the EVR716-11-0300A equipment shall comply with FCC Rules Part 15 Subpart B (Unintentional Radiators).

Technical requirements are listed below:

- Radiated emission limits (§15.109)
- Antenna power conduction limits for receivers (§15.111).

3.2. FCC Part 87 Subpart D compliance

In transmission mode, the EVR716-11-0300A equipment shall comply with FCC Rules Part 87 Subpart D.

Technical requirements are listed below:

- Power and emissions (§87.131)
- Frequency stability (§87.133)
- Bandwidth of emission (§87.135)
- Types of emission (§87.137)
- Emissions limitations (§87.139)
- Modulation requirements (§87.141).

3.3. FCC Part 2 Subpart J compliance

Technical requirements are listed below:

- Frequency stability for variation of ambient temperature [§ 2.995 (a) (2)]
- Frequency stability for voltage variation [§ 2.995 (d)]
- Occupied bandwidth [§ 2.989 (c) (1)]
- Field strength measurements of spurious emissions in transmission mode
 - Field strength of spurious radiation [§ 2.993]
 - Spurious emissions at antenna terminals [§ 2.991]

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4. MEASUREMENTS OF DATA

4.1. FCC Part 15 Subpart B.

4.1.1. Radiated emissions limits.

(According to §15.109)

The equipment powered and operated in its reception mode must not emit RF radiated field levels in excess of the specified limits.

The specified frequency range applied to the measurement of radiated emissions in reception mode is from 30MHz to 2000MHz. (See §15.33(b)).

With the receiver antenna terminal connected to a resistive termination (50 ohms) equal to the impedance specified for the antenna, the radiated emissions measurements are noted in the following table:

Frequency of emissions (MHz)	Field strength Tolerance specified at 3m (d ₁) (µV/m)	Field strength Tolerance specified at 3m (d ₁) 20log(level/1 µV) (dBµV/m)	Field strength Tolerance extrapolation at 1m (d ₂) 10log(d ₁ ² /d ₂ ²)=9.5dB (dBµV/m)	Field strength * Measurement at 1m (dBµV/m)
30 – 88	<100	<40.0	<49.5	< 5 **
88 – 216	<150	<43.5	<53.0	< 10 **
216 – 960	<200	<46.0	<55.5	< 25 **
960 – 2000	<500	<54.0	<63.5	< 30 **

(*): These results are extracted from EVR716-11-0300A Qualification Test Report Ref: 4689709A279(AC) Chapt.21. (**): The radiated levels noted are due to the floor noise of the measurement set-up.

CONCLUSION :

Equipment EVR716-11-0300A is compliant with the requirement.

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4.1.2. Antenna power conduction limits for receivers.

(According to §15.111)

With the receiver antenna terminal connected to a resistive termination (50 ohms) equal to the impedance specified for the antenna, the power at the antenna terminal at any frequency specified above shall not exceed 2.0 nW (-57dBm).

The specified frequency range applied to the measurement of antenna power conduction limits in reception mode is from 30MHz to 2000MHz. (See §15.33(c)).

Results (from 1215MHz to 2000MHz) are given below:

EVR716-11-0300A S/N=0336		DATE: 15/05/99	
SPURIOUS EMISSIONS IN MODE 0A ACCORDING TO FCC PART15 Subpart B			
Spectrum analyzer is connected to the receiver input in order to measure the emitted power level. The tuning frequency of the spectrum is scanned from 1215MHz to 2000MHz. Floor noise of spectrum analyzer is at -93dBm. F0=128.5MHz			
TEMPERATURE : +25°C			
SPURIOUS FREQUENCY (MHz)		EMITTED POWER LEVEL (dBm)	
-		From 1215MHz to 2000MHz : no spurious emissions at more than -90dBm.	
TOLERANCE		< 2nW (i.e.< -57dBm)	

CONCLUSION :

The power level delivered by the receiver to the antenna is less than 0.001nW from 30MHz to 2000MHz, which is compliant with the requirement (<2nW).

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4.2. FCC Part 87 Subpart D.

4.2.1. Power and emissions.

(According to §87.131)

The power (Carrier Wave) is measured at the transmitter output terminals connected to a resistive termination (50 ohms) equal to the impedance specified for the antenna.

The tolerance for aeronautical frequencies in mode A3E is: $pY < 55 \text{ Watts}$.

RESULTS:

The results, given in tables 1, 2 and 3, are extracted from the EVR716-11-0300A Qualification Test Report Ref:4689709A279 (AC) Chapt.6-§.A4-1.2/§.A4-2.1/§.A4-3.1.

Voice/25kHz (mode 0A)

Maximum power is measured at 121.500 MHz:

$$P_{CW} = 20.9 \text{ W (with a modulation ratio } m = 85.9\%)$$

$$\text{Mean Power (pY)} = P_{CW} \times (1 + (m^2/2))$$

$$pY = 28.6 \text{ W}$$

Voice/8.33kHz (mode 0B)

Maximum power is measured at 118.000 MHz:

$$P_{CW} = 20.6 \text{ W (with a modulation ratio } m = 86.5\%)$$

$$\text{Mean Power (pY)} = P_{CW} \times (1 + (m^2/2))$$

$$pY = 28.3 \text{ W}$$

ACARS/25kHz (mode 1A)

Maximum power is measured at 121.500 MHz:

$$P_{CW} = 20.8 \text{ W (with a modulation ratio } m = 86.2\%)$$

$$\text{Mean Power (pY)} = P_{CW} \times (1 + (m^2/2))$$

$$pY = 28.5 \text{ W}$$

CONCLUSION :

Equipment is compliant with the requirement.

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TABLE 1
EVR716-11-0300A / Output Power in Mode 0A

EVR TRANSCEIVER N° : 336				DATE : 30-apr-98	
OUTPUT POWER ON 50 OHMS (MODE 0A)					
POWER SUPPLY=28VDC			TEMPERATURE: +25°C		
Frequency	Output Power	Modulation Ratio	(S+N)/N Ratio	Distortion	Residual FM Deviation
(MHz)	(Watt)	(%)	(dB)	(%)	(kHz)
118.000	20.8	85.9	46.2	2.2	0.6
121.500	20.9	85.9	46.0	2.3	0.7
124.975	20.7	86.3	46.3	2.1	0.7
125.000	20.7	86.2	46.3	2.2	0.7
129.000	19.9	86.0	46.2	2.1	0.6
132.975	20.1	86.0	46.2	2.1	0.6
133.000	19.8	86.3	46.1	2.2	0.6
135.000	19.9	86.3	46.2	2.1	0.6
136.975	19.7	86.3	46.1	2.1	0.6
Tol. (SSS)	>16W	>80%	>35 dB	< 10%	< ±3kHz

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TABLE 2
EVR716-11-0300A / Output Power in Mode 0B

EVR TRANSCEIVER N° : 336			DATE : 30-apr-98		
OUTPUT POWER ON 50 OHMS (MODE 0B)					
POWER SUPPLY=28VDC			TEMPERATURE: +25°C		
Frequency	Output Power	Modulation Ratio	(S+N)/N Ratio	Distortion	Residual FM Deviation
(MHz)	(Watt)	(%)	(dB)	(%)	(kHz)
118.000	20.6	86.5	48.0	2.5	0.6
118.008	20.5	86.6	48.4	2.5	0.6
120.116	20.5	86.4	48.4	2.6	0.6
124.325	20.6	86.5	48.2	2.5	0.8
128.433	19.7	87.0	48.1	2.4	0.6
130.500	19.7	86.7	48.0	2.4	0.6
132.642	19.8	86.6	48.0	2.4	0.6
134.775	19.6	86.7	47.7	2.4	0.6
136.883	19.5	86.8	47.9	2.4	0.6
136.992	19.5	86.9	47.8	2.4	0.6
Tol. (SSS)	>16W	>80%	>35 dB	< 10%	< ±3kHz

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TABLE 3
EVR716-11-0300A / Output Power in Mode 1A

EVR TRANSCEIVER N° : 336			DATE : 30-apr-98	
OUTPUT POWER ON 50 OHMS (MODE 1A)				
POWER SUPPLY : 28VDC			TEMPERATURE: +25°C	
Frequency	Output power CW	Distortion	(S+N)/N	Modulation ratio
(MHz)	(W)	%	dB	%
118.000	20.5	2.2	4.5	86.2
121.500	20.8	2.3	43.4	86.2
125.000	20.5	2.2	43.4	86.2
129.000	19.9	2.1	43.4	86.3
133.000	19.7	2.2	43.4	86.1
135.000	19.7	2.1	43.3	86.2
136.975	19.6	2.1	43.5	86.5
TOLERANCE (SSS)	> 16W	< 10%	> 35 dB (COMPRESSOR ON)	> 80 %

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4.2.2. Frequency stability

(According to §87.133)

The tolerance is: $< \pm 30$ ppm ("Band-100 to 137MHz: Aircraft and other mobile stations in the Aviation Services").

Table 4 gives the results extracted from the EVR716-11-0300A Qualification Test Report Ref:4689709A279 (AC) Chapt.6-§.A4-1.5.

TABLE 4
EVR716-11-0300A / Frequency accuracy

EVR TRANSCEIVER N° : 336		DATE : 30-apr-98
FREQUENCY ACCURACY (MODE 0A)		
POWER SUPPLY = 28VDC		TEMPERATURE: +25°C
Frequency (MHz)	Variation (Hz)	Accuracy (ppm)
118.000	-270	-2.3
128.500	-310	-2.4
136.975	-320	-2.3
FCC TOL.	NA	< ± 30 ppm
TOL. (SSS)	NA	< ± 5 ppm

CONCLUSION :

Equipment is compliant with the requirement.

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4.2.3. Bandwidth of emission.

(According to §87.135)

Authorized bandwidth

In the band 117.975-136MHz, the authorized bandwidth is ± 12.5 kHz for transmitters type accepted after January 1, 1974. Emission designator: 6K00A3E (according to §87.137).

In Voice/8.33kHz (mode 0B), the authorized bandwidth shall be ± 4.166 kHz.

Occupied bandwidth

Occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total mean power of a given emission.

Test procedure

In modes 0A & 0B (according to EUROCAE ED-23B):

The level of the audio signal is adjusted to produce 70% modulation at 1000Hz (compressor OFF). Then the frequency of the audio signal is varied in the range 300Hz - 10kHz, at the constant above mentioned level between 300Hz and 800Hz, and following a slope of -10dB/octave, between 800Hz and 10kHz.

In mode 1A:

Binary "ones" and binary "zeros" (sequence 2^7-1) are modulated by using 1200Hz and 2400Hz tones, producing data transmission at a bit rate of 2400 bits/s.

The level of the signal is adjusted to produce 70% modulation (compressor OFF).

RESULTS

TABLE 5
EVR716-11-0300A / Occupied bandwidth

EVR TRANSCEIVER N° : 336		DATE : 15-may-99	
OCCUPIED BANDWIDTH (F0= 130 MHz)			
POWER SUPPLY = 28VDC		TEMPERATURE: +25°C	
Mode	Measured (for 99% of the transmitted power)	FCC Tolerance	
0A	3.7 kHz	< 25 kHz (±12.5kHz)	
0B	3.4 kHz	< 8.4 kHz (±4.2kHz)	
1A	5.9 kHz	< 25 kHz (±12.5kHz)	

CONCLUSION : Equipment is compliant with the requirement.

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4.2.4. Types of emissions.

(According to §87.137)

(See §4.3.3 of this document "Authorized bandwidth")

4.2.5. Emissions limitations

(According to §87.139)

Voice/25kHz (mode 0A)

Results are given hereafter.

EVR716-11-0300A S/N= 0336		DATE: 15/05/99
FCC SPECTRUM (MODE 0A) (Edition 10/01/95 – Part 87 – Subpart D-§.87.139)		
POWER SUPPLY: 28VDC A.F.= 1000 Hz The mean power of any emissions must be attenuated below the mean power of the transmitter (pY) when the frequency is removed from the assigned frequency by more than (see tolerance below).		
F0= 128.500 MHz		
Frequency	Attenuation (dB)	Tolerance (dB)
From 12.5kHz to 25kHz	> 70 dB	> 25 dB
From 25kHz to 62.5kHz	> 80 dB	> 35 dB
> 62.5 kHz	> 80 dB	> 43+10 log ₁₀ pY (>57dB)

Voice/8.33kHz (mode 0B)

According §87.139(a) of FCC requirements, the mean power of any emissions is attenuated below the mean power (pY), when the frequency is removed from the assigned frequency, by more than:

- >25dBc from 4.165kHz to 8.33 kHz,
- >35dBc from 8.33kHz to 20.825kHz,
- >43+10log (pY) from frequencies upper than 20.825kHz. (that is >57dBc)

These tolerances are included into transmitter spectrum mask specified in ED-23B requirements and ARINC716 characteristics. This diagram is given on next page (diagram n°1).

CONCLUSION : Equipment is compliant with the requirement.

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Diagram n°1 – Transmitter spectrum in mode 8.33kHz

4.2.6. Modulation requirements

(According to §87.141(a))

An audio compressor is included in the EVR716-11-0300A equipment, which maintains the modulation ratio between 85% and 100%.

Results, extracted from EVR716-11-0300A Qualification Test Report Ref:4689709A279 (AC) Chapt.6-§.A4-2.3, are given hereafter.

EVR TRANSCEIVER N° : 336		DATE : 30-apr-98	
COMPRESSOR			
POWER SUPPLY : 28 VDC F0= 128.433 MHz (mode 0B)		TEMPERATURE: +25°C	
AF input level (mVrms)	Output level Vrms	Modulation ratio %	(S+N)/N (dB)
77	2.5	87.1	47.7
250	2.5	87.0	47.7
500	2.5	87.1	47.3
1000	2.5	87.0	47.7
2500	2.5	87.0	47.5
FCC Tolerance	-	85% < m < 100%	-
TOLERANCE (SS)	2.5V (±0.6V) from 250 to 2500 mV	80% < m <100% from 250 to 2500 mV	> 35dB from 250 to 2500 mV

CONCLUSION : Equipment is compliant with the requirement.

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4.3. FCC Part 2 Subpart J.

4.3.1. Frequency stability for variation of ambient temperature [§ 2.995 (a) (2)]

Results, extracted from EVR716-11-0300A Qualification Test Report Ref:4689709A279 (AC) Chapt.6-§.A9-1.5/A1-1.5/A4-1.5, are given hereafter.

MEASUREMENTS AT 25°C

EVR TRANSCEIVER N° : 336		DATE : 30-jul-98
FREQUENCY ACCURACY (MODE 0A)		
POWER SUPPLY = 28VDC		TEMPERATURE: +25°C
Frequency (MHz)	Variation (Hz)	Accuracy (ppm)
118.000	-270	-2.3
128.500	-300	-2.3
136.975	-320	-2.3
FCC Tol.	NA	< ± 30 ppm
TOL. (SSS)	NA	< ± 5 ppm

MEASUREMENTS AT -40°C

EVR TRANSCEIVER N° : 336		DATE : 29-apr-98
FREQUENCY ACCURACY (MODE 0A)		
POWER SUPPLY = 28VDC		TEMPERATURE: -40°C
Frequency (MHz)	Variation (Hz)	Accuracy (ppm)
118.000	-240.0	-2.0
128.500	-270.0	-2.1
128.500136.97 5	-270.0	-2.0
FCC Tol.	NA	< ± 30 ppm
TOL. (SSS)	NA	< ± 5.5 ppm

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MEASUREMENTS AT +70°C

EVR TRANSCEIVER N° : 336		DATE : 29-apr-98
FREQUENCY ACCURACY (MODE 0A)		
POWER SUPPLY = 28VDC		TEMPERATURE: +70°C
Frequency (MHz)	Variation (Hz)	Accuracy (ppm)
118.000	+460	+3.9
128.500	+500	+3.9
136.975	+540	+3.9
FCC Tol.	NA	< ± 30 ppm
TOL. (SSS)	NA	< ± 5 ppm

CONCLUSION : Equipment is compliant with the requirement.

4.3.2. Frequency stability for voltage variation [§ 2.995 (d)]

EVR TRANSCEIVER N° 336		DATE: 17/05/99
Frequency accuracy (Mode OA)		
F=128 MHz		Temperature: 25 °C
POWER SUPPLY (V)	VARIATION (Hz)	ACCURACY (ppm)
17	-270	- 2.1
23	-270	-2.1
28	-270	-2.1
32.2	-270	-2.1
FCC Tolerance	NA	< ± 30 ppm

CONCLUSION : Equipment is compliant with the requirement.

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4.3.3. Occupied bandwidth [§ 2.989 (c) (1)]

4.3.3.1. Test procedure

In mode OA & OB:

The level N1 of the audio signal is adjusted to produce 50% modulation at 2500 Hz;

Then, an audio signal level $N2=N1+16$ dB is applied on the transceiver;

4.3.3.2. Results

$N1= 50$ mVrms;

For $N2= 315$ mVrms,

In mode OA, the occupied bandwidth including 99% of transmitted power is:

"OPB"=5.4 kHz.

In mode OB, the occupied bandwidth including 99% of transmitted power is:

"OPB"=5.4 kHz.

CONCLUSION : Taking into account the tolerances given in §.4.2.3, the equipment is compliant.

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4.3.4. Field strength measurement of spurious emission in transmission mode.

4.3.4.1. Field strength of spurious radiation [§ 2.993]

The following results are extracted from EVR716-11-0300A Qualification Test Report Ref: 4689709A279 (AC) Chapt.21.

(According to section 21 "Emission of Radio Frequency Energy"- Category Z - of RTCA DO-160C).

The equipment powered and operated in its transmission mode must not emit RF radiated field levels in excess of the specified limits. This does not include any radiation on the selected frequency.

With the transmitter antenna terminal connected to a resistive termination (50 ohms) equal to the impedance specified for the antenna, the radiated emissions measurements are noted in the following table:

Frequency of emissions (MHz)	Field strength Tolerance specified at d_1 m ($\mu\text{V/m}$)	Field strength Tolerance specified at d_1 m $20\log(\text{level}/1\mu\text{V})$ (dB $\mu\text{V/m}$)	Field strength Tolerance extrapolation at 1m (d_2) $10\log(d_1^2/d_2^2)$ (dB $\mu\text{V/m}$)	Field strength * Measurement at 1m (dB $\mu\text{V/m}$)
0.150 - 0.490	<2400/F(kHz) ($d_1=300\text{m}$) giving: <16 at 150kHz ($d_1=300\text{m}$) < 5 at 490kHz ($d_1=300\text{m}$)	<24 at 150kHz ($d_1=300\text{m}$) <14 at 490kHz ($d_1=300\text{m}$)	<73.5 at 150kHz ($d_2=1\text{m}$) <63.5 at 490kHz ($d_2=1\text{m}$)	<15 at 150kHz ** < 8 at 490kHz **
0.490 - 1.705	<24000/F(kHz) ($d_1=30\text{m}$) giving: <49 at 490kHz ($d_1=30\text{m}$) <14 at 1705kHz ($d_1=30\text{m}$)	<34 at 490kHz ($d_1=30\text{m}$) <23 at 1705kHz ($d_1=30\text{m}$)	<63.5 at 490kHz ($d_2=1\text{m}$) <52.5 at 1705kHz ($d_2=1\text{m}$)	< 8 at 490kHz ** < 8 at 1705kHz **
1.705 - 30.0	<30 ($d_1=30\text{m}$)	<29.5 ($d_1=30\text{m}$)	<59 ($d_2=1\text{m}$)	<15 **
30 - 88	<100 ($d_1=3\text{m}$)	<40 ($d_1=3\text{m}$)	<49.5 ($d_2=1\text{m}$)	<2 **
88 - 216	<150 ($d_1=3\text{m}$)	<43.5 ($d_1=3\text{m}$)	<53 ($d_2=1\text{m}$)	<10 ** (except F0=128.5MHz)
216 - 960	<200 ($d_1=3\text{m}$)	<46 ($d_1=3\text{m}$)	<55.5 ($d_2=1\text{m}$)	<25 ** (except H ₂ =257MHz)
960 - 1370	<500 ($d_1=3\text{m}$)	<54 ($d_1=3\text{m}$)	<63.5 ($d_2=1\text{m}$)	<30 **

(*): these results are taken from Test Report ref: 4689709A279 (AC).

(**): The radiated levels noted are due to the floor noise of the measurement set-up.

CONCLUSION : The equipment is compliant with the requirement.

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4.3.4.2. Spurious emissions at antenna terminals [§ 2.991]

4.3.4.2.1 Harmonics

The following results are extracted from EVR716-11-0300A Qualification Test Report Ref: 4689709A279 (AC)
Chapt.6-§.A9-1.6/A1-1.6/A4-1.6

MEASUREMENTS AT 25°C

EVR TRANSCEIVER N°: 336		DATE : 30-jul-98	
HARMONICS (MODE 0A)			
POWER SUPPLY : 28 VDC		TEMPERATURE: +25°C	
Frequency (MHz)	H2 (dBm)	H3 (dBm)	Hn (dBm)
118.000	-25.0	-32.3	< -36
128.500	-25.2	-32.6	< -36
136.975	-22.1	-31.5	< -36
SSS Tol.	< -16 dBm	< -26 dBm	< -26 dBm

MEASUREMENTS AT -40°C

EVR TRANSCEIVER N°: 336		DATE : 29-apr-98	
HARMONICS (MODE 0A)			
POWER SUPPLY : 28 VDC		TEMPERATURE: -40°C	
Frequency (MHz)	H2 (dBm)	H3 (dBm)	Hn (dBm)
118.000	-26.5	-31.7	< -36
128.500	-26.6	-32.2	< -36
136.975	-20.0	-32.4	< -36
SSS Tol.	< -16 dBm	< -26 dBm	< -26 dBm

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MEASUREMENTS AT +70°C

EVR TRANSCEIVER N°: 336		DATE : 29-apr-98	
HARMONICS (MODE 0A)			
POWER SUPPLY : 28 VDC		TEMPERATURE: +70°C	
Frequency (MHz)	H2 (dBm)	H3 (dBm)	Hn (dBm)
118.000	-25.6	-32.4	< -36
128.500	-25.2	-32.2	< -36
136.975	-20.8	-32.2	< -36
Tol.	< -16 dBm	< -26 dBm	< -26 dBm

CONCLUSION : 2nd Harmonic is less than -64dBc below the carrier.
 3rd and other Harmonics are less than -76dBc below the carrier.
 The equipment is compliant.

4.3.4.2.2. Spurious emissions

4.3.4.2.2.1. Test procedure

This test requires the use of a special test bench fitted for broad-band noise measurements; the principle of this bench is to reject the transmitted carrier, using a very selective cavity filter. So the spectrum analyser can be used to measure extremely low noise levels without any risk of saturation due to the power carrier.

4.3.4.2.2.2. Test results

Results are given through the following curves (n° 1 to 6).
 No spurious at more than -26dBm.

CONCLUSION

Taking into account the following specifications :
 - from 50kHz to 1215 MHz (except 108 to 112MHz) : < -16dBm
 - from 108MHz to 112MHz : < -26dBm
 the equipment is compliant.

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5. conclusion

LIST OF COMPLIANCY			
FCC ref.	Characteristics	See §.	Compliance analysis
Part 15 Subpart B	Radiated emission limits	§.4.1.1	Compliant
	Antenna power conduction limits for receivers	§.4.1.2	Compliant
Part 87 Subpart D	Power and emissions	§.4.2.1	Compliant
	Frequency stability	§.4.2.2	Compliant
	Bandwidth of emissions	§.4.2.3	Compliant
	Types of emission	§.4.2.4	No comment.
	Emissions limitations	§.4.2.5	Compliant
	Modulation requirements	§.4.2.6	Compliant
Part 2 Subpart J	Frequency stability for variation of ambient temperature	§.4.3.1	Compliant
	Frequency stability for voltage variation	§.4.3.2	Compliant
	Occupied bandwidth	§.4.3.3	Compliant
	Field strength of spurious radiation	§.4.3.4.1	Compliant
	Spurious emissions at antenna terminals	§.4.3.4.2	Compliant

All the results obtained with the VHF transceiver EVR716-11-0300A are compliant with the requirements.

CONCLUSION: The VHF transceiver EVR716-11-0100A is compliant with the FCC Rules.

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