

# RADIO TEST REPORT

No. 306718R1-1

## EQUIPMENT UNDER TEST

Equipment: Bluetooth BT Adapter  
Type / model: BT Adapter  
Manufacturer: CARDO SYSTEMS, Inc.  
Tested by request of: CARDO SYSTEMS, Inc.

## SUMMARY

The equipment complies with the requirements of the following standards:

FCC, Part 15, Subpart B (2001) and Subpart C (2001);  
RSS-210, Issue 5 (November 2001)

**Note:** Just the results of two out-of-band spurious emissions tests are presented to show the similarity of the EUT to the Cardo Headset tested before (see Bluetooth Radio Test Report No. 306718R1).

Date of issue: July 1, 2003

Tested by:

Vladimir Bazhanov

Approved by:

Björn Rosenquist

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## 1. CLIENT INFORMATION

The EUT has been tested by request of

Company: CARDO SYSTEMS, INC.  
199 High Tower Blvd., Pittsburgh,  
PA 15205  
Name of contact: Yosi Twina

## 2. EQUIPMENT UNDER TEST (EUT)

### 2.1 Identification of the EUT according to the manufacturer/client declaration

Equipment: Bluetooth BT Adapter  
Type/Model: BT Adapter  
Brand name: Allways  
Serial number: -  
FCC ID Number: -  
Manufacturer: CARDO SYSTEMS, Inc.  
Rating/Supplying voltage: 3,8 V DC (3,2 ... 4,25 V DC)  
Rating RF output power: 0 dBm (Power class 2)  
Antenna gain: 1,9 dBi  
External antenna connector: NO  
Operating temperature range: 0 to 50 °C  
Frequency range: 2400 – 2483,5 MHz  
Number of channels: 79  
Modulation characteristics: GFSK  
Stand by mode supported: Yes

### 2.2 Additional hardware information about the EUT

The EUT consists of the following unit:

Unit	Type and version	Serial number
Allways adapter	AWAD010110101	-

### 2.3 Additional software information about the EUT

During the tests the EUT supported the following software:

Software	Version	Comment
HCI firmware	16.4	CSR firmware BC02x_HCI_1V1_16.4_56

### 2.4 Peripheral equipment

Peripheral equipment is defined as equipment needed for correct operation of the EUT, but not included as a part of the testing and evaluation of the EUT.

Equipment	Manufacturer / Type	Serial number
Laptop PC with the SW Bluetest Casira, v.1.18	Yam San / NC-90025	-

### 2.5 Modifications during the test

No modifications have been made during the tests.

### **3. TEST SPECIFICATIONS**

#### **3.1 Standards**

FCC (2001): Subpart B – Unintentional radiators and Subpart C – Intentional Radiators; §15.247 for frequency hopping systems operating in the 2400 – 2483.5 MHz and 5725 – 5850 MHz; §15.205 for restricted bands; §15.109, §15.209 and §15.249 for radiated limits.

RSS-210, Issue 5 (November 2001): Low Power Licence-Exempt Radiocommunication Devices.

#### **3.2 Additions, deviations and exclusions from standards and accreditation**

Since the EUT includes the same pre-qualified radio module and no significant schematic changes compared to the Cardo Allways Headset tested before (see SEMKO Radio Test Report No. 306718R1), just two out-of-band spurious emissions tests have been performed to show the similarities of the two devices.

No other additions, deviations or exclusions have been made from standards and accreditation.

#### **3.3 Test set-up**

The EUT was tested supplied from internal battery. Measurement set-ups for the out-of-band spurious emissions tests are described in Section 5.4. The frequencies and hopping mode of the EUT were controlled by the software Bluetest Casira, v.1.18 (see Section 2.4).

#### 4. TEST SUMMARY

The results in this report apply only to the sample tested.

<b>FCC reference</b>	<b>Test</b>	<b>Result</b>	<b>Note</b>
15.247(b)	Peak output power	NT	
15.247(a)	TX Output Spectrum – 20 dB Bandwidth	NT	
15.247(a)	Carrier frequency separation	NT	
15.247(a)	Number of hopping frequencies (channels)	NT	
15.247(a)	Time of occupancy (dwell time)	NT	
15.247(c)	Band edge compliance	NT	
15.247 (d)	Peak power spectral density	NT	
15.109 (a)	Out of band spurious emissions, radiated	Pass *	
15.249(c)	Out of band spurious emissions, radiated	Pass *	

NT = Not Tested

\* Just two out-of-band spurious emissions tests have been performed (see Section 3.2).

## 5. RADIATED SPURIOUS EMISSIONS

### 5.1 Operating environment

Temperature: 20 – 22 °C (15 - 35 °C)  
 Relative Humidity: 35 - 39 % (20 - 75 %)

### 5.2 Measurement uncertainty

Radiated disturbance electric field intensity, 30 – 1000 MHz: ± 4,6 dB  
 Radiated disturbance electric field intensity, 1000 – 26000 MHz: ± 6,0 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA -4/02-1997.  
 The measurement uncertainty is given with a confidence of 95%.

### 5.3 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
<i>Test site: Semi-anechoic shielded chamber, 10 x 20 x 8,5 m (W x L x H)</i>			30300
Software:	Rohde & Schwarz	ES-K1, V1.60	
Measurement receiver:	Rohde & Schwarz	ESAI	2973/2974
Antenna amplifier:	SEMKO		7992/7993
Antenna, bilog:	Chase	CBL6111B	971
<i>Test site: Bluetooth anechoic shielded chamber, 3,7 x 7,0 x 2,4 m (W x L x H)</i>			12285
Software:	Rohde & Schwarz	ES-K1, V1.60	
Signal analyser:	Rohde & Schwarz	FSIQ 40	9192
Preamplifier:	MITEQ	AFS6/AFS44	12335
Antenna:			
Double Ridge Guide Horn:	EMCO	3115	4936

## 5.4 Measurement set-up

### 5.4.1 Test site: Semi-anechoic shielded chamber (30 – 1000 MHz)

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 10 m and the EUT was placed on a non-metallic table, 0,8 m above the reference ground plane. The specified test mode was enabled. Test set-up photo is given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,5 m, 2,5 m and 3,5 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test set-up photo:

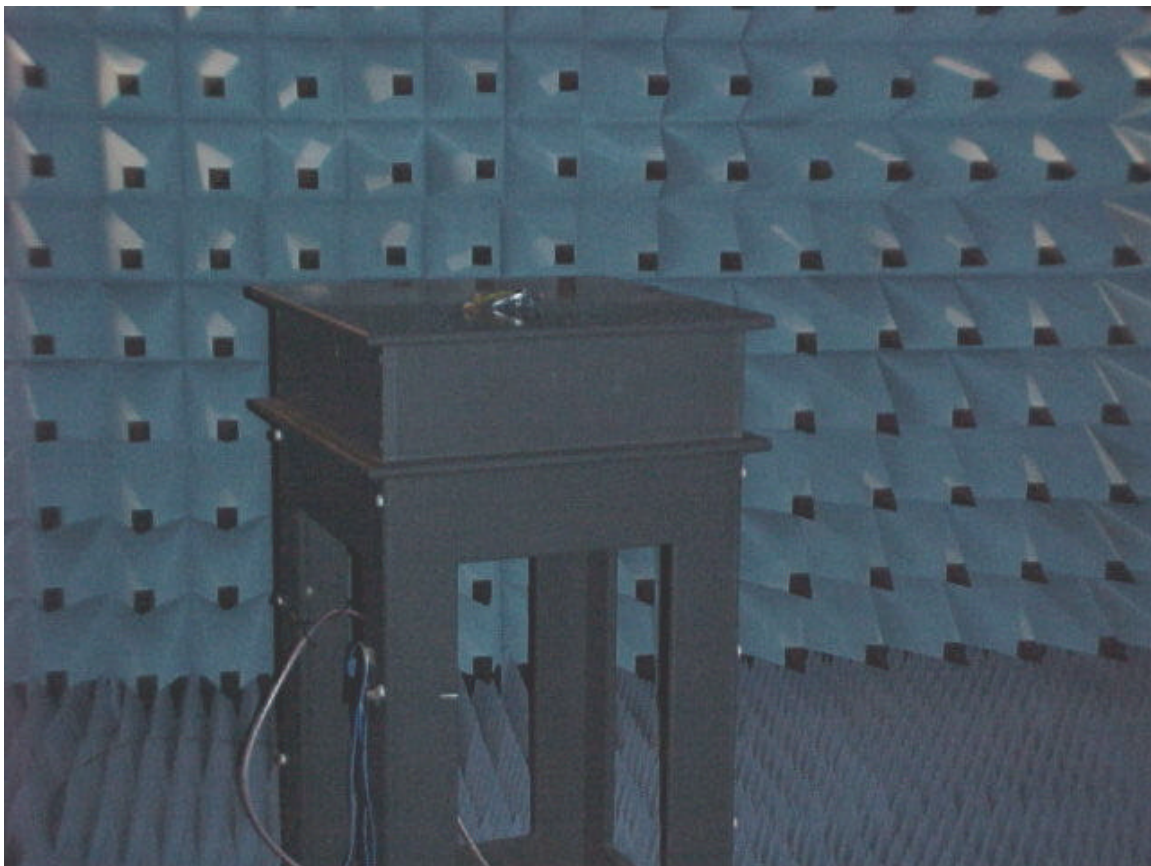




#### 5.4.2 Test site: Bluetooth anechoic shielded chamber (1 – 26 GHz)

In the Bluetooth anechoic chamber the EUT was placed on a non-metallic table, 1,4 m above the floor. The radiated disturbance electric field intensity was measured at a distance of 3 m. The specified test mode was enabled.

An overview sweep with peak detection of the electric field intensity was performed with the spectrum analyser in max-hold and with the antenna placed 1,4 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps. Test set-up photo is shown below.

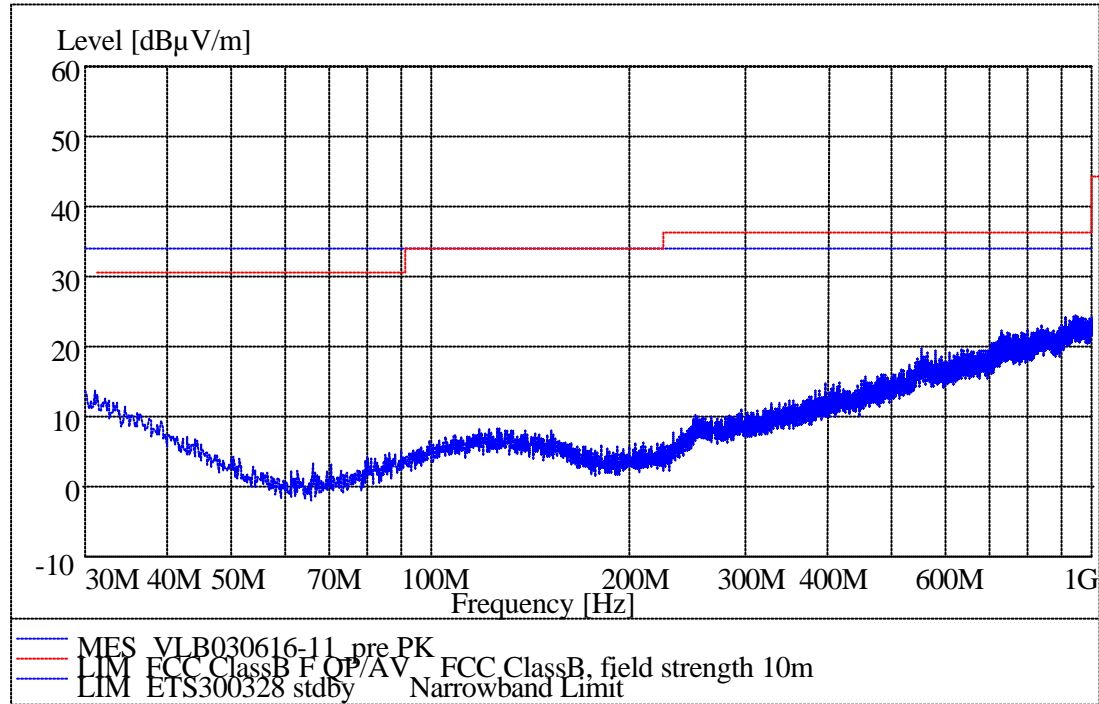


## 5.5 Test protocol

### 5.5.1 Semi-anechoic shielded chamber

Date of test: June 16, 2003

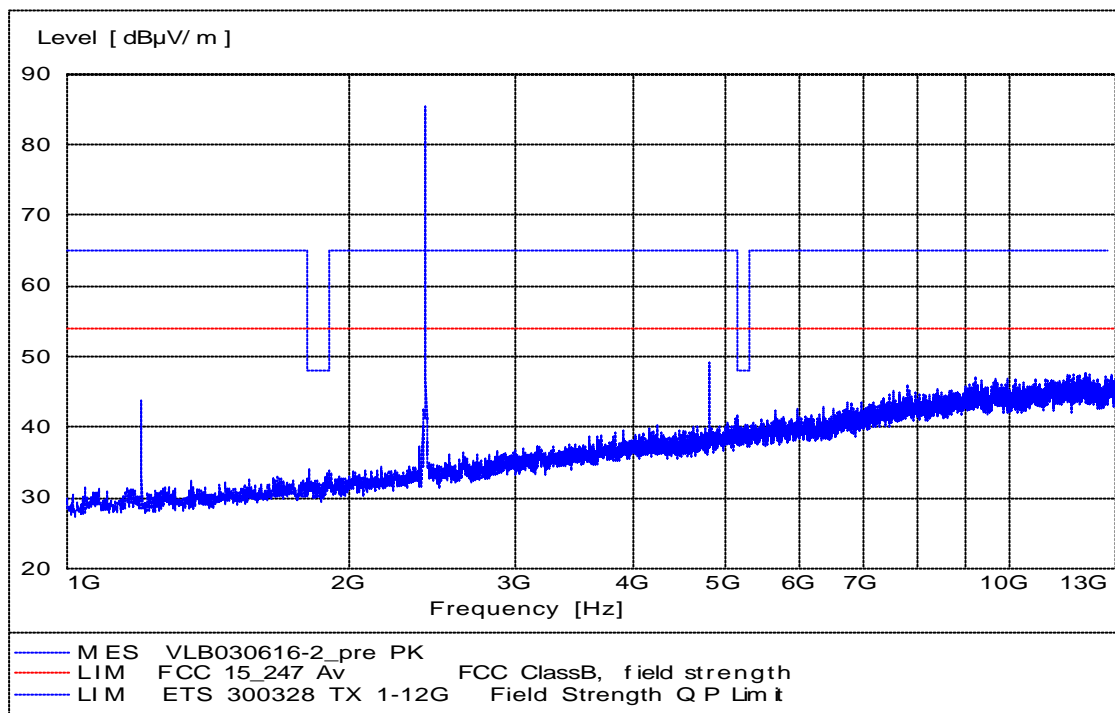
30 – 1000 MHz, max peak at a distance of 10 m in the stand by mode



### 5.5.2 Bluetooth anechoic shielded chamber

Date of test: June 16, 2003

1000 – 13000 MHz, max peak at a distance of 3 m on the lower TX channel



### 5.5.3 Data summary

Field strength of spurious emissions						
Frequency [MHz]	RBW [kHz]	Measured level		Limit		Note
		Peak [dB(μV/m)]	QP/AV [dB(μV/m)]	Peak [dB(μV/m)]	QP/AV [dB(μV/m)]	
30 – 88	120	<14	-	-	29,5	10 m distance
88 – 216	120	<10	-	-	33	“
216 – 960	120	<25	-	-	35,6	“
960 – 1000	120	<25	-	-	43,5	“
4804,6	1000	49	-	74	54	3 m distance

**APPENDIX – PHOTO OF THE EUT**

