

## **Test Report for Unlicensed Low Power Transmitter**

**Description of device:** Biometric sensor operating at 2.4 GHz ISM band

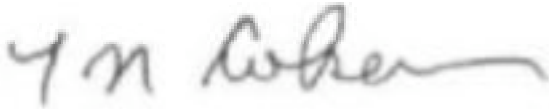
**Applicable Rule Parts:** 15.205, 15.207, 15.249

**Applicant:** Aliph  
410 Jessie Street - Unit 601  
San Francisco, CA 94103  
tel 415 512 9191  
fax 415 512 9190

**FCC ID: QSA ALIPH-RAV-REVB**

Emissions limits and test data are found below.

The Aliph GEMS biometric sensor meets all emissions requirements for certification under Parts 2 and 15 of FCC Rules.



THOMAS N. COKENIAS  
EMC and Radio Regulatory Consultant

26 February 2003

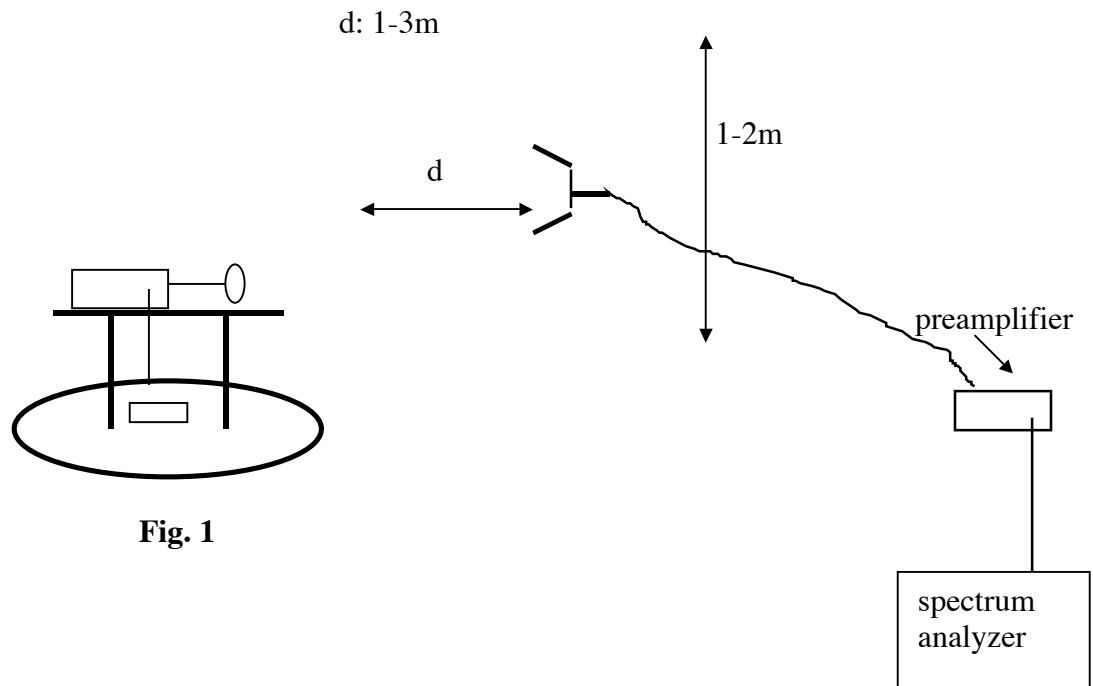
## TEST RESULTS

### 15.205, 15.209, 15.249 Radiated Emissions

#### Test Equipment Used

HP8593EM Analyzer  
Miteq NSP2600-44 Preamp  
EMCO 3115 Antenna

#### Test Set-up, 1-40 GHz



**Fig. 1**

#### Test Procedure

The EUT was placed on a wooden turntable located 3m from the search antenna. The EUT was activated to transmit continuously. Radiated emissions from fundamental operating frequency to the 10<sup>th</sup> harmonic, for search antenna in both vertical and horizontal polarities.

The test was repeated for each of the patch antennas sold with the product. For all tests the battery eliminator was plugged into the EUT, and a set of earphones was connected to the audio output jack.

#### Test Results

Data shows the EUT meets all radiated requirements specified in 15.205 and 15.249. Measurements were made for each antenna from 1-25 GHz for each of four antenna types supplied with the EUT:

<u>Antenna Model/Type</u>	<u>Gain, dBi</u>
9p6+8_80	-14.4

Harmonic and spurious measurements indicated that radiated levels were independent of antenna used, emissions were the same for each antenna, and regardless of whether an antenna was connected. Radiated spurs and harmonics seemed to be leaking from the rear of the unit. Measured levels were well within limits, most were at instrument noise floor.

### Test Set-up Photograph



02/19/03      **High Frequency Measurement**  
**Compliance Certification Services, Morgan Hill Open Field Site**

Test Engr: VIEN TRAN  
 Project #: 03U1844-1  
 Company: ALIPH  
 EUT Descrip. BIOMETRIC SENSOR:  
 FCC ID: QSAALIPH-RAV-REVB  
 Test Target: EN55022 CLASS B  
 Mode Oper: Stand Alone

**Test Equipment:**

Cable ( feet )	EMCO Horn 1-18GHz	Pre-amplifier 1-26GHz	Spectrum Analyzer	Horn > 18GHz
14 ▼	T60; S/N: 2238 @3m ▼	HP 8449B ▼	E4440A ▼	T87; ARA 18-26GHz; S/N:1049 ▼

**Peak Measurements:**

1 MHz Resolution Bandwidth  
 1MHz Video Bandwidth

**Average Measurements:**

1 MHz Resolution Bandwidth  
 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.448	9.8	50.0	50.0	29.7	3.1	0.0	0.0	0.0	82.7	82.7	114.0	94.0	-31.3	-11.3	H
2.448	9.8	47.0	46.1	29.7	3.1	0.0	0.0	0.0	79.7	78.8	114.0	94.0	-34.3	-15.2	V
4.896	9.8	44.3	37.9	33.2	5.4	-34.6	0.0	0.0	48.3	41.9	74.0	54.0	-25.7	-12.1	V
7.344	9.8	41.5	30.1	36.3	6.8	-34.6	0.0	0.0	50.0	38.6	74.0	54.0	-24.0	-15.4	V
9.792	9.8	40.1	29.9	38.5	8.0	-34.6	0.0	0.0	52.0	41.7	74.0	54.0	-22.0	-12.3	V
12.240	9.8	43.8	35.9	39.4	8.9	-33.3	0.0	0.0	58.7	50.9	74.0	54.0	-15.3	-3.1	V
14.688	9.8	42.3	32.1	40.5	10.2	-33.0	0.0	0.0	60.0	49.8	74.0	54.0	-14.0	-4.2	V
17.136	9.8	41.4	29.4	41.8	11.6	-32.9	0.0	0.0	61.9	49.9	74.0	54.0	-12.1	-4.1	V
19.584	9.8	42.6	30.0	33.5	12.8	-32.7	0.0	0.0	56.1	43.5	74.0	54.0	-17.9	-10.5	V
22.031	9.8	41.6	29.9	35.1	13.9	-33.6	0.0	0.0	57.0	45.3	74.0	54.0	-17.0	-8.7	V
24.480	9.8	44.2	32.6	36.2	15.6	-34.0	0.0	0.0	61.9	50.2	74.0	54.0	-12.1	-3.8	V
4.896	9.8	44.6	36.1	33.2	5.4	-34.6	0.0	0.0	48.5	40.0	74.0	54.0	-25.5	-14.0	H
7.344	9.8	45.1	35.1	36.3	6.8	-34.6	0.0	0.0	53.6	43.6	74.0	54.0	-20.4	-10.4	H
9.792	9.8	42.0	30.4	38.5	8.0	-34.6	0.0	0.0	53.8	42.2	74.0	54.0	-20.2	-11.8	H
12.240	9.8	42.9	29.6	39.4	8.9	-33.3	0.0	0.0	57.9	44.6	74.0	54.0	-16.1	-9.4	H
14.688	9.8	41.7	29.4	40.5	10.2	-33.0	0.0	0.0	59.4	47.1	74.0	54.0	-14.6	-6.9	H
17.136	9.8	41.5	29.3	41.8	11.6	-32.9	0.0	0.0	62.0	49.8	74.0	54.0	-12.0	-4.2	H
19.584	9.8	41.6	30.1	33.5	12.8	-32.7	0.0	0.0	55.1	43.6	74.0	54.0	-18.9	-10.4	H
22.031	9.8	42.5	31.5	35.1	13.9	-33.6	0.0	0.0	57.9	46.9	74.0	54.0	-16.1	-7.1	H
24.480	9.8	43.2	32.4	36.2	15.6	-34.0	0.0	0.0	60.9	50.1	74.0	54.0	-13.1	-3.9	H
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit		
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit		
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit		
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit		
CL	Cable Loss					HPF	High Pass Filter								