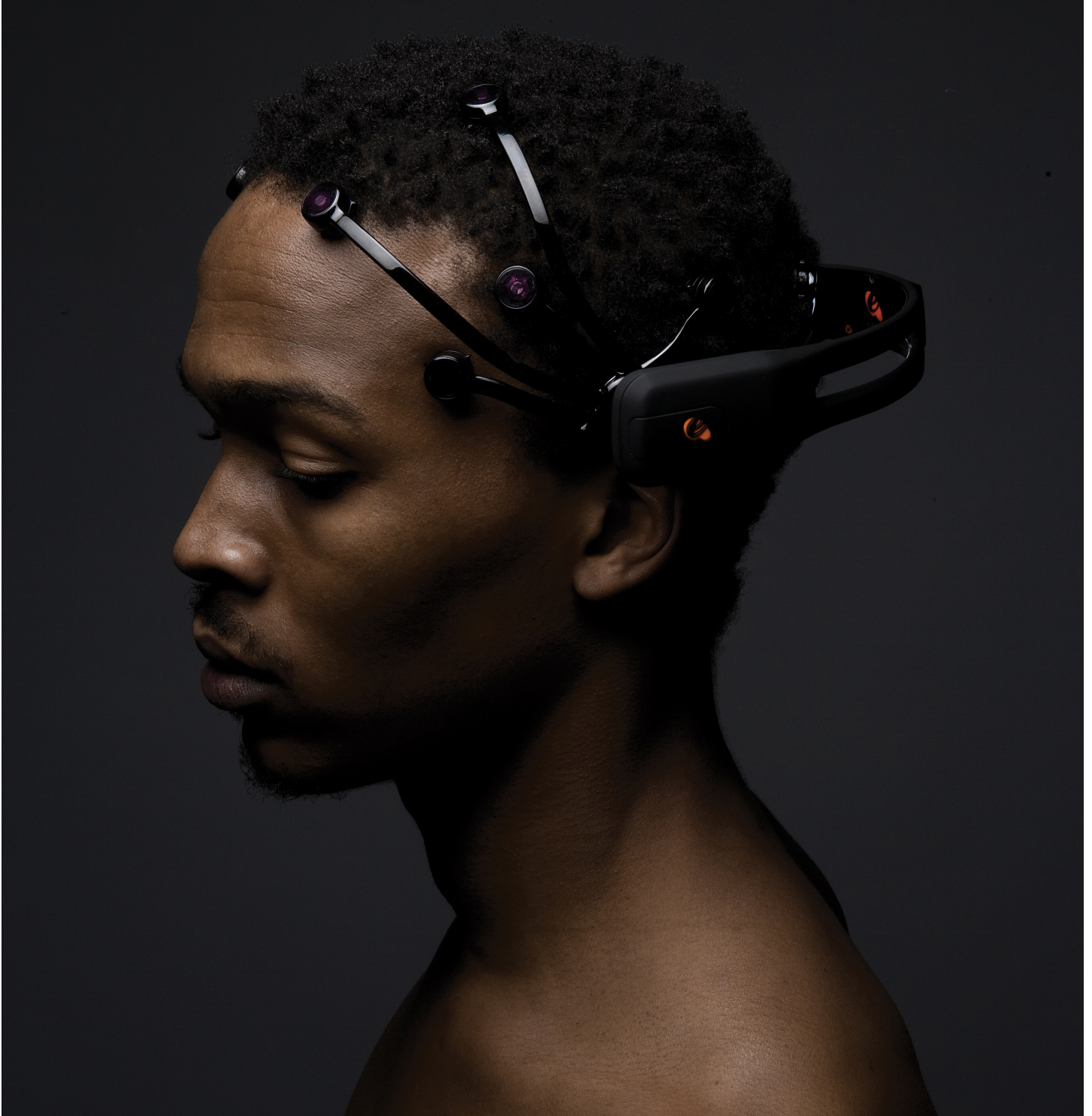
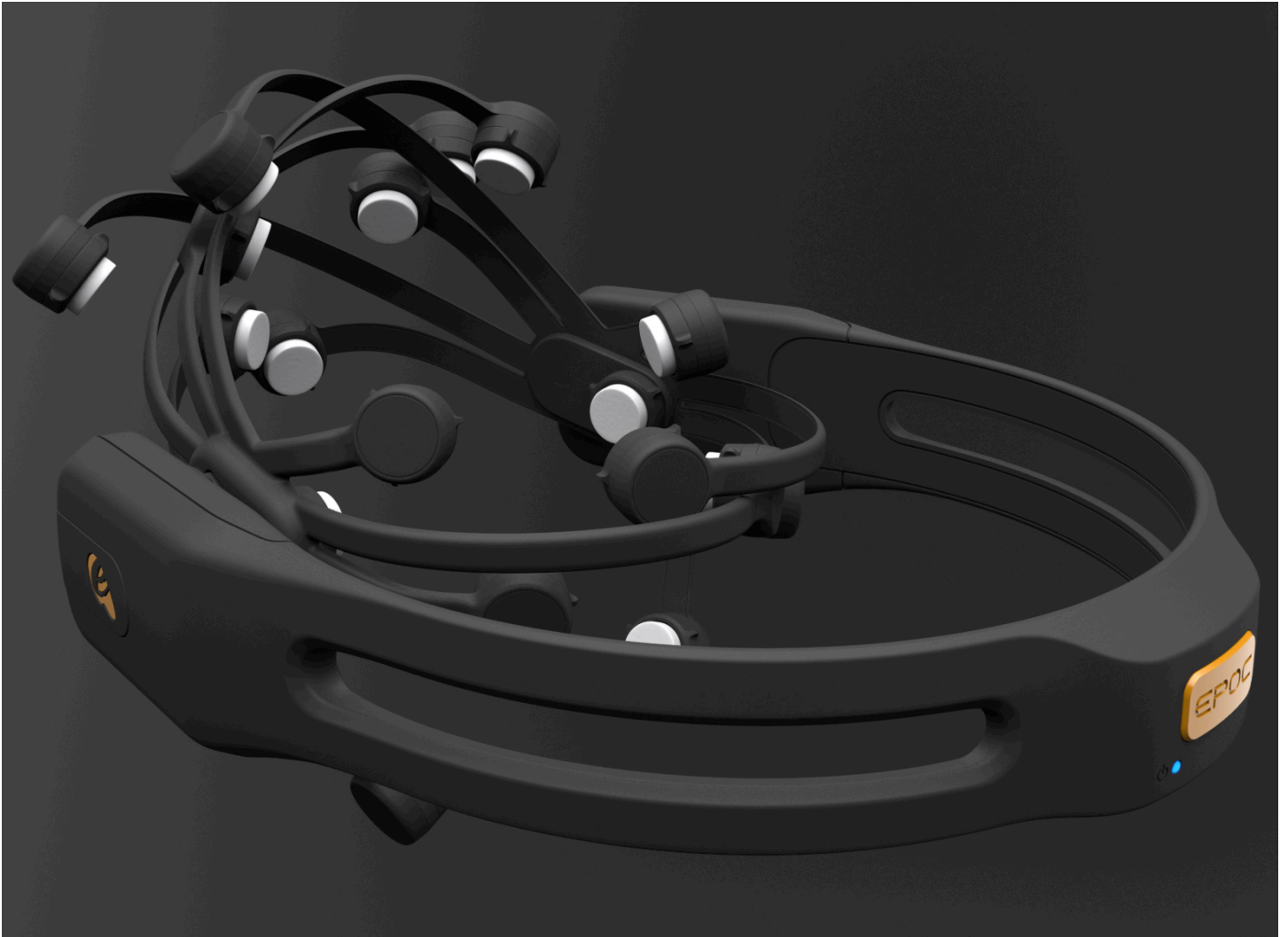


EMOTIV

# SDK



RESEARCH EDITION SPECIFICATIONS



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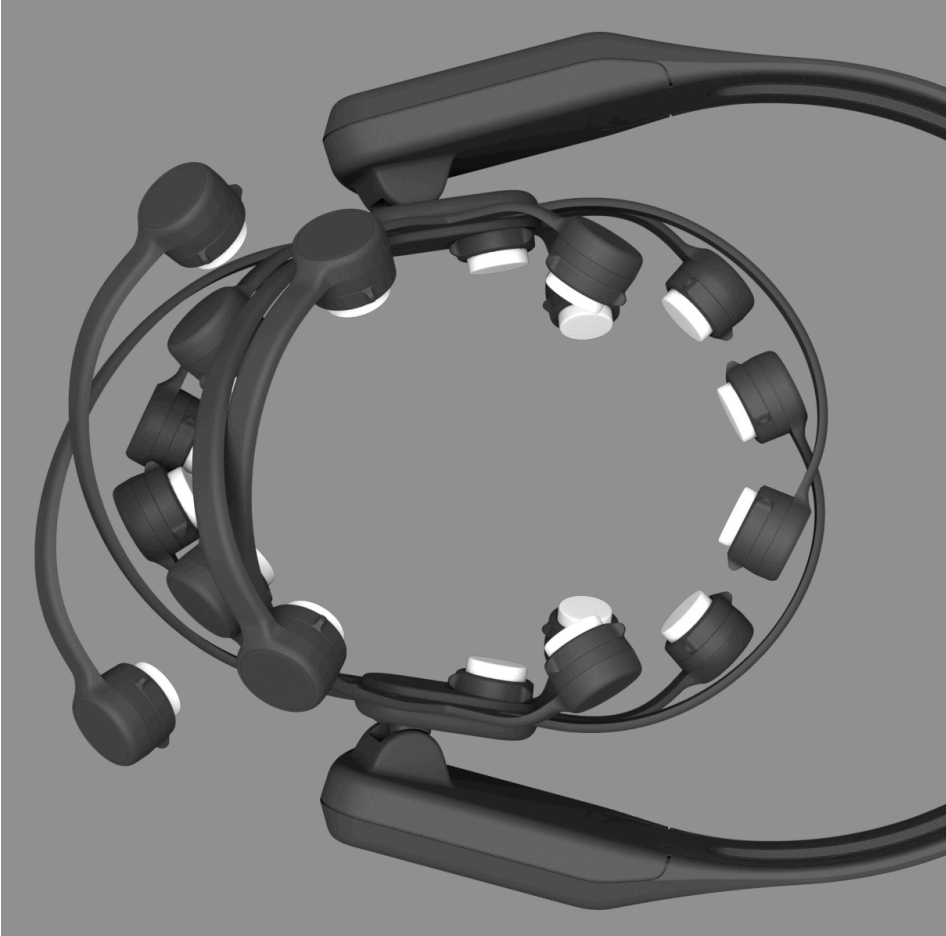
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SDK Headset



# Research Edition Overview



*A high-fidelity, 14-channel EEG headset designed for practical consumer applications*

## Emotiv SDK Research Edition

The Emotiv SDK Research Edition is a single user license for companies/ Educations that are creating proprietary applications and/or are also developing new applications/ detections using raw EEG data from the Emotiv EPOC.

The Emotiv SDK includes a high resolution, neuro-signal acquisition and processing wireless neuroheadset, TestBench , and our proprietary software toolkit that exposes our APIs and detection libraries.

## Affectiv™ Suite

The Affectiv suite monitors the user's emotional states in real-time. It provides

an extra dimension in game interaction by allowing the computer to respond to a user's emotions. In a game, characters can transform in response to the player's feeling. Music, scene lighting and effects can be tailored to heighten the experience for the user in real-time. The Affectiv suite can be used to monitor player state of mind and allow developers to adjust difficulty to suit each situation. Affectiv suite can be combined with other inputs such as eye tracking devices to provide real-time feedback from the entire user experience for neuromarketing applications. Adaptive interfaces can monitor user engagement, boredom, excitement, frustration and meditation level in real time.

## Cognitiv™ Suite

The Cognitiv suite reads and interprets a user's conscious thoughts and intent. Users can manipulate virtual or real objects using only the power of their thought! For the first time, the fantasy of magic and supernatural power can be experienced.

## Expressiv™ Suite

The Expressiv suite uses the signals measured by the neuroheadset to interpret player facial expressions in real-time. It provides a natural enhancement to game interaction by allowing game characters to come to life. When a user smiles, their avatar can mimic the expression even before they are aware of their own feelings. Artificial intelligence can now respond to players naturally, in ways only humans have been able to until now.



# SDK Headset

	SDK HEADSET
Number of channels	14 (plus CMS/DRL references, P3/P4 locations)
Channel names (International 10-20 locations)	AF3, F7, F3, FC5, T7, P7, O1, O2, P8, T8, FC6, F4, F8, AF4
Sampling method	Sequential sampling. Single ADC
Sampling rate	128 SPS (2048 Hz internal)
Resolution	14 bits 1 LSB = 0.51 $\mu$ V (16 bit ADC, 2 bits instrumental noise floor discarded)
Bandwidth	0.2 - 45Hz, digital notch filters at 50Hz and 60Hz
Filtering	Built in digital 5th order Sinc filter
Dynamic range (input referred)	8400 $\mu$ V (pp)
Coupling mode	AC coupled
Connectivity	Proprietary wireless, 2.4GHz band
Power	LiPoly
Battery life (typical)	12 hours
Impedance Measurement	Real-time contact quality using patented system

## EMC and Telecom: Class B

ETSI EN 300 440-2 V1.4.1

EN 301 489-1

EN 301 489-3

AS/NZS CISPR22 :2009

AS/NZS 4268 :2008

FCC CFR 47 Part 15C (identifiers XUE-EPOC01, XUE-USBD01)

## Safety:

EN 60950-1:2006

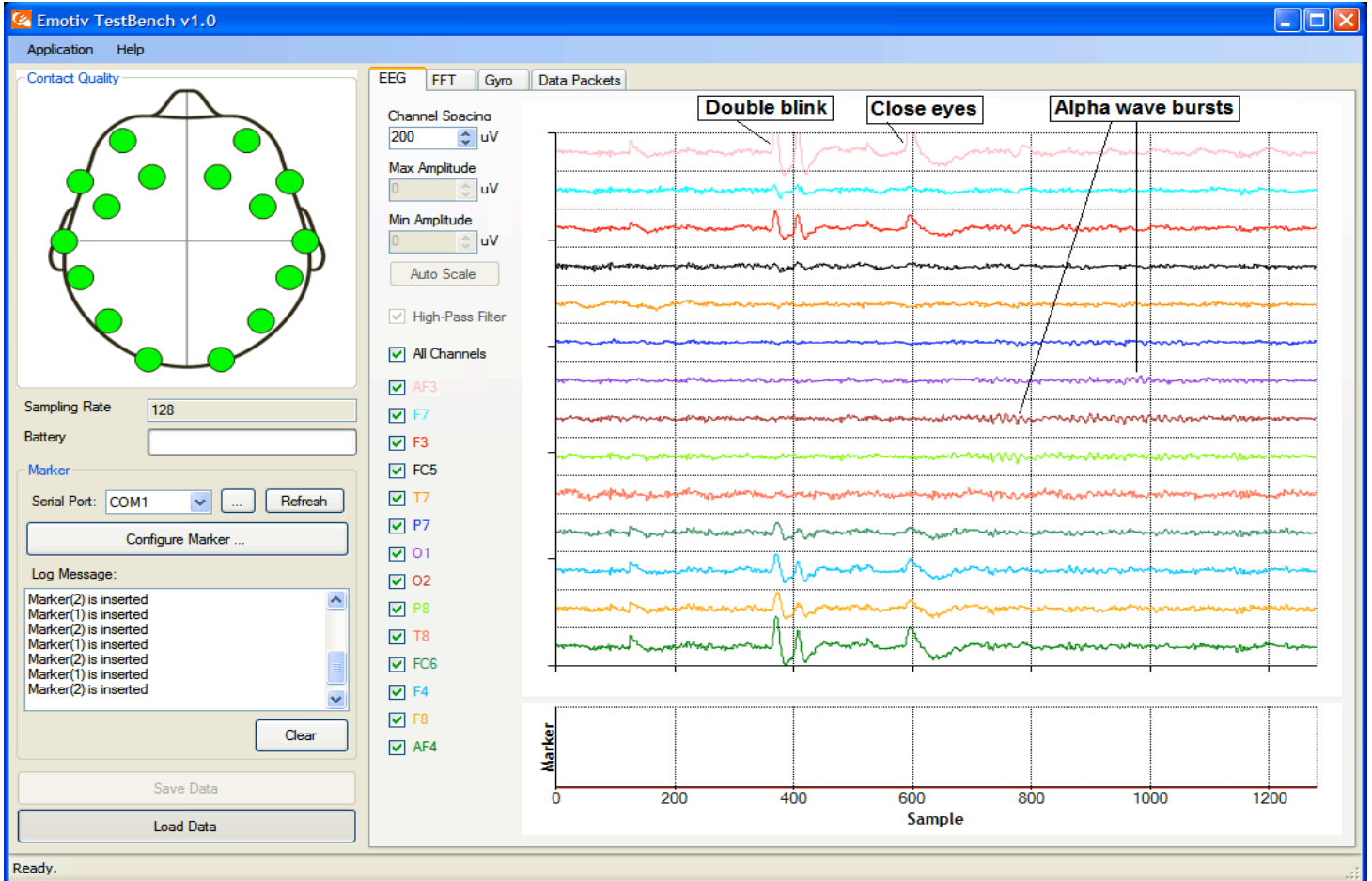
IEC 60950-1:2005 (2nd Edition)

AS/NZS 60950.1:2003 including amendments 1, 2 & 3

CB Certificate JPTUV-029914 (TUV Rheinland)



# TestBench™



Real-time display of the Emotiv headset data stream, including EEG, contact quality, FFT, gyro (if fitted – custom option), wireless packet acquisition/loss display, marker events, headset battery level.

Marker definitions can be saved and reloaded. Markers are displayed in real time and playback modes.

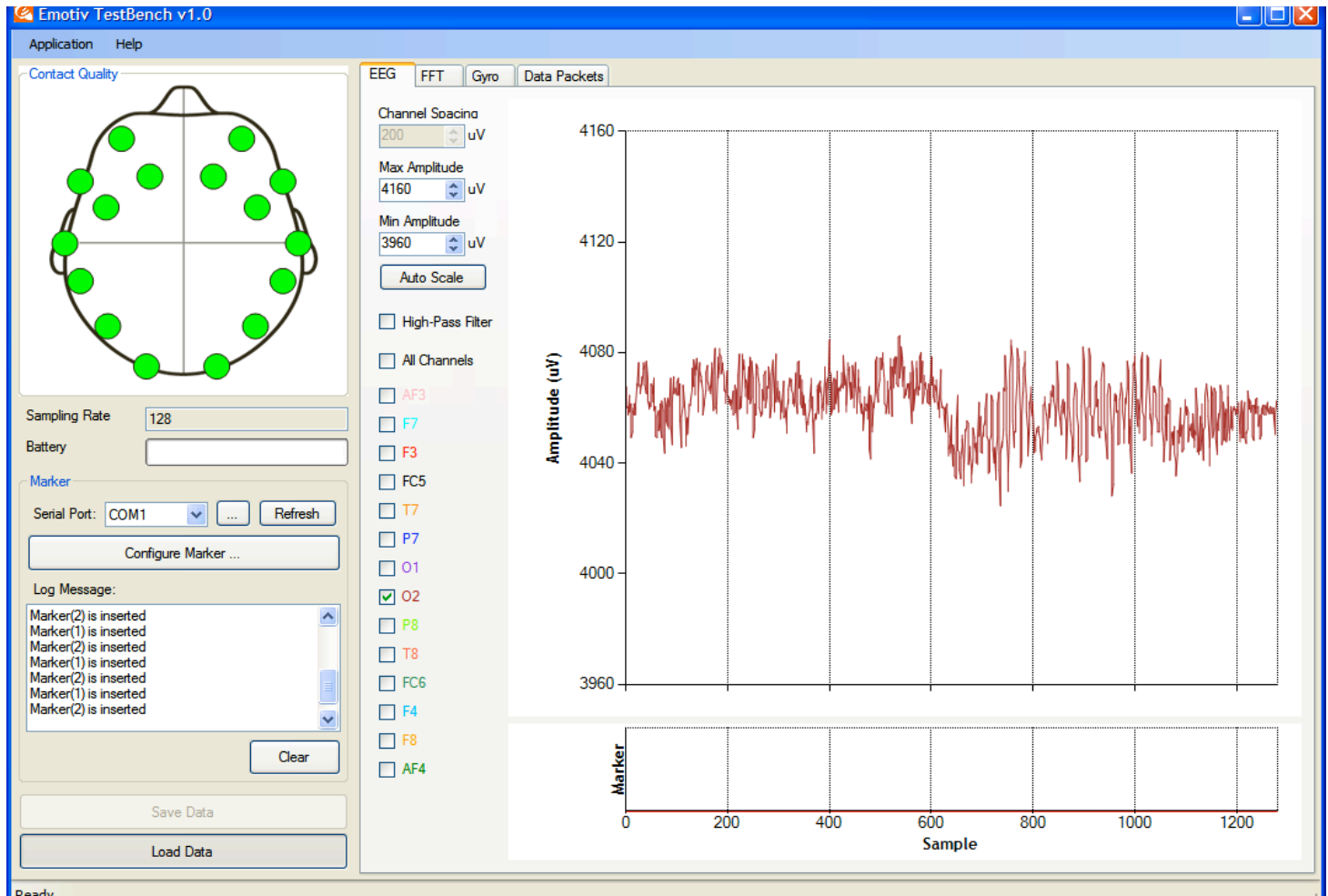
Export screenshot for documentation.

Record and replay files in binary EEGLAB format1. Command line file converter included to produce .csv format.

Define and insert timed markers into the data stream, including on-screen buttons and defined serial port events. Markers are stored in EEG data file.



# TestBench™



## Features

### EEG display:

5 second rolling time window (chart recorder mode)

ALL or selected channels can be displayed

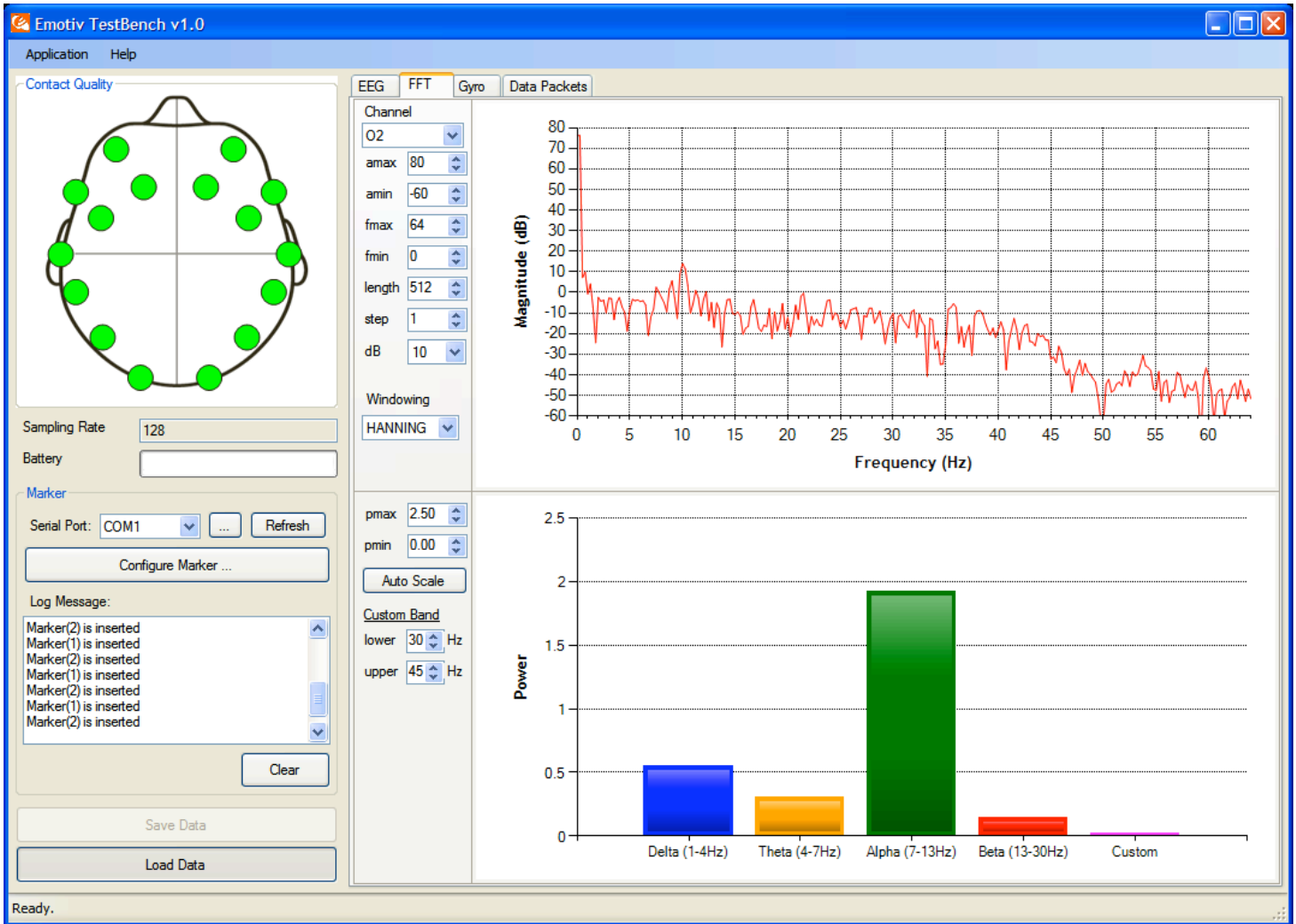
Automatic or manual scaling (individual channel display mode)

Adjustable channel offset (multi-channel display mode)

Synchronized marker window



# TestBench™



**Features**

**FFT display:**

Selected channel only

ALL or selected channels can be displayed

Adjustable sampling window size (in samples)

Adjustable update rate (in samples)

dB mode – power or amplitude calculations

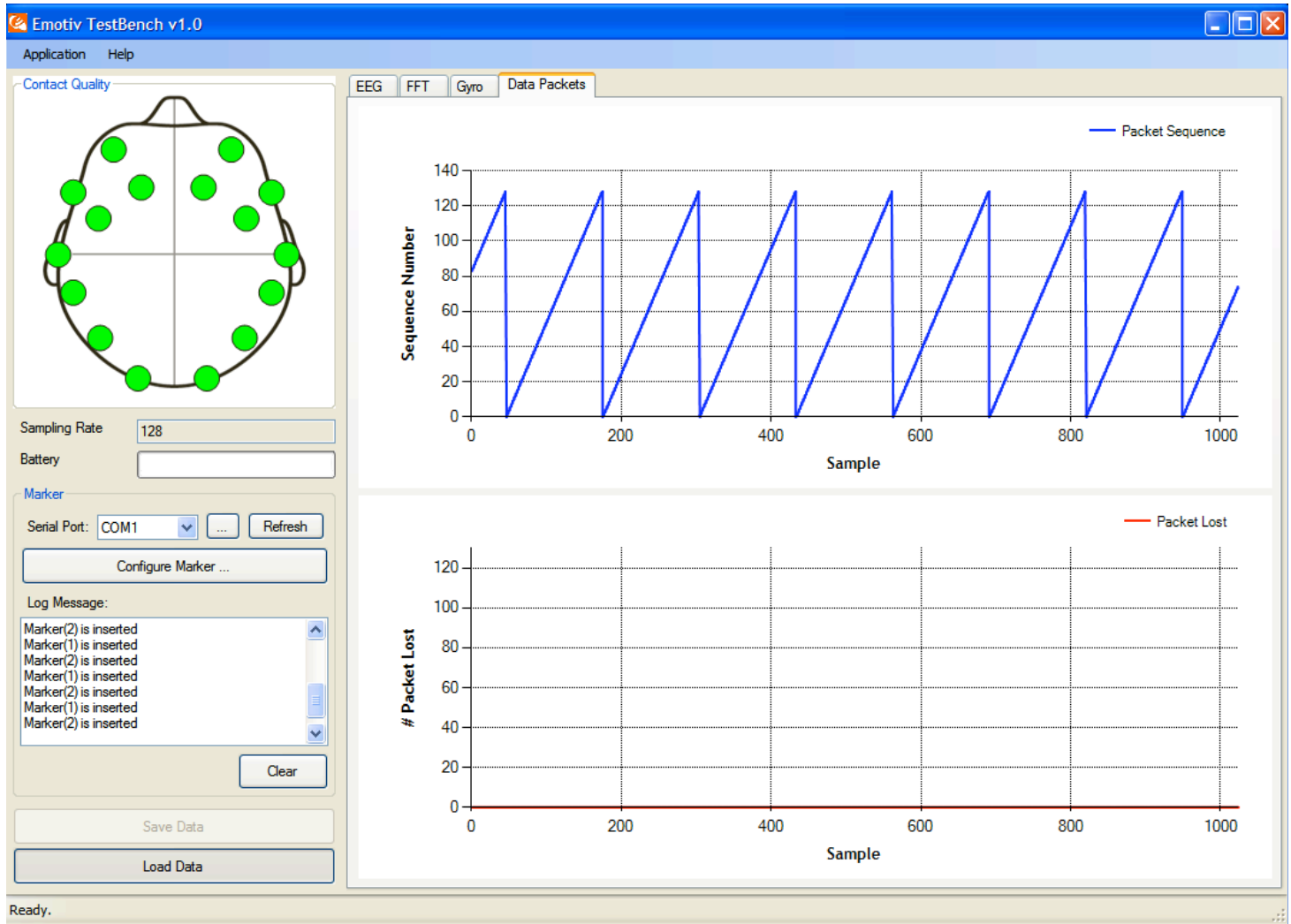
dB scale

FFT window methods: Hanning, Hamming, Hann, Blackman, Rectangle

Predefined and custom sub-band histogram display – Delta, Theta, Alpha, Beta, custom bands



# TestBench™



**Features**

**Gyro display: (NOTE: custom option – gyros not fitted to consumer headset)**

5 second rolling time window (chart recorder mode)

X and Y deflection

**Data Packet display:**

5 second rolling graph of Packet Counter output

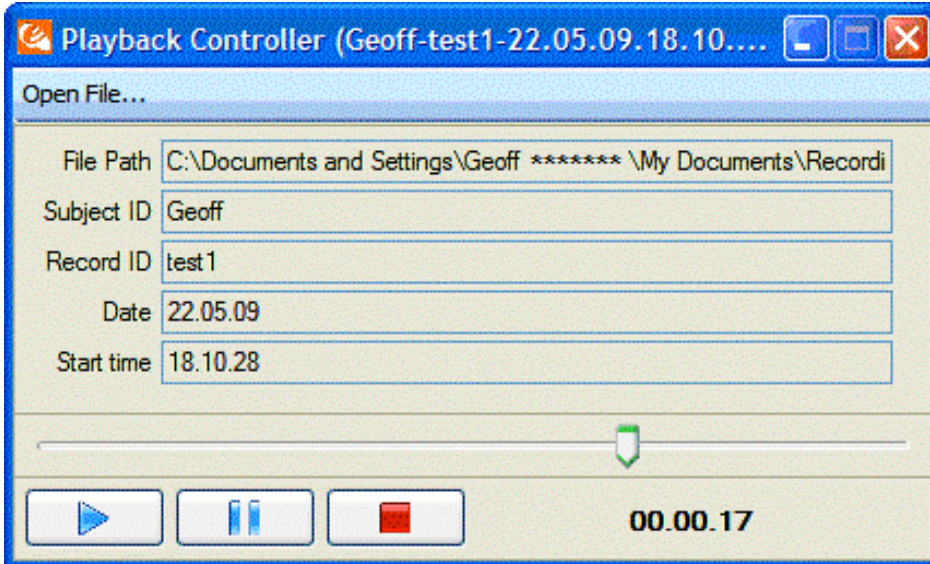
Packet loss – integrated count of missing data packets

Verify data integrity for wireless transmission link





# TestBench™



## Features

### Data Recording and Playback:

Fully adjustable slider, play/pause/exit controls.

Subject and record ID, date, start time recorded in file naming convention.

The example below references file "Geoff-test1-22.05.09.18.10.27.edf"