# Electrocardiogram (ECG) HMGULA_ECG_001

## Purpose

To provide a high throughput method to obtain Electrocardiograms in a conscious mouse.

## Experimental Design

- **Minimum number of animals :** 5M + 5F
- **Age at test:** Week 59
- **Sex:** We would expect the results of this test to show sexual dimorphism

## Procedure

1. The lead plates are to be snapped into place onto the top of the pre-amplifier tower. The covering is removed to reveal three gel coated pads surrounded by a sticking plate. The plate will need to be covered with the extra cover in the package.
2. Turn on the combined amplifier and the pre-amplifier tower.
3. Double click the icon ECG acquisition on the acquisition computer.
4. Open the ECG set up file (for default settings).
6. Place mouse on pad, lowering the Red Acrylic Cubby to surround the mouse on 3 sides discouraging escape.
7. Press Start.
8. After the desired acquisition time, (5-10 minutes) stop the reading. There will be one long reading.
9. Save the data.
10. For additional readings create a new session using the same settings as before.
11. When saving sections with good readings, highlight the selected area and then save.

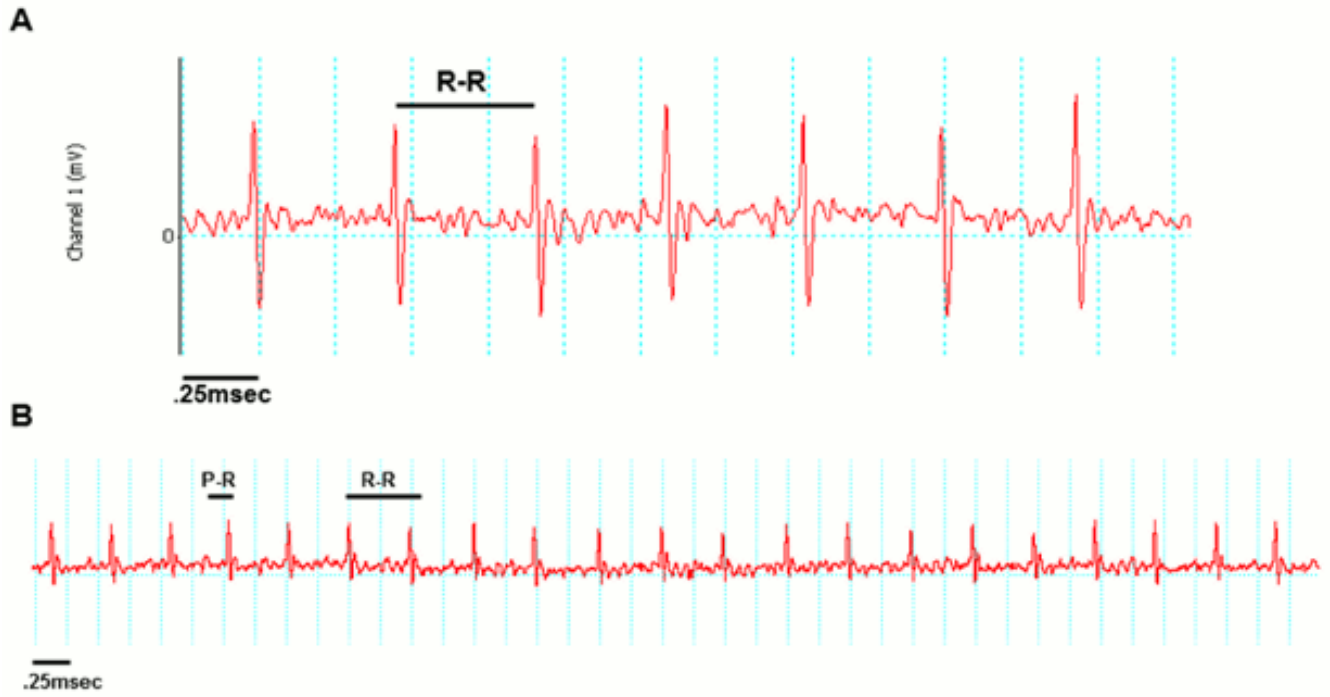
## Notes

### Data Analysis

1. Open Emouse Analyses icon
2. Select ECG signals
3. Choose folder (all readings in folder will show)
4. Click PNN X (for mice: N-N> than 6 ms)
5. Choose file(s) by highlighting
6. Go
7. Bottom file is the corrected file
8. Red dots should be on peak of R waves, if image appears inverted click invert
9. Click Add, or minus if R waves are not marked with red dots or if too many are marked
    - L click to zoom in

    - R click to zoom out
10. ‘What if?’ button to remove unwanted sections
    - L click image (zooms in)
    - L click left boundary
    - L click right boundary
11. Options- click more if want to exclude more sections
12. Undo available
13. Go
14. Here can input animal data if desired
15. Save- For the first mouse in in group, hit save, a new results folder will be created within the folder with the mouse data. Then can click quick save or next.
16. For the rest of the mice in the series, can hit quick save at this point- saves in last selected file – will group all files together in same excel sheet.
17. Open Emouse Analyses icon
18. Select ECG signals
19. Choose folder (all readings in folder will show)
20. Click PNN X (for mice: N-N> than 6 ms)
21. Choose file(s) by highlighting
22. Go
23. Bottom file is the  corrected file
24. Red dots should be on peak of R waves, if image appears inverted click invert
25. Click Add, or minus if R waves are not marked  with red dots or if too many are marked
    - L click to zoom in
    - R click to zoom out
26. ‘What if?’ button to remove unwanted sections
    - L click image (zooms in)
    - L click left boundary
    - L click right boundary
27. Options- click more if want to exclude more sections
28. Undo available
29. Go
30. Here can input animal data if desired
31. Save- For the first mouse in in group, hit save, a new results folder will be created within the folder with the mouse data. Then can click quick save or next
32. For the rest of the mice in the series, can hit quick save at this point- saves in last selected file - will group all files together in same excel sheet

Examples of good readings




## Data QC

Analysis room should be dim and quiet. Keep the door closed preferably while analysis is taking place.

Figure A. Taking a reading

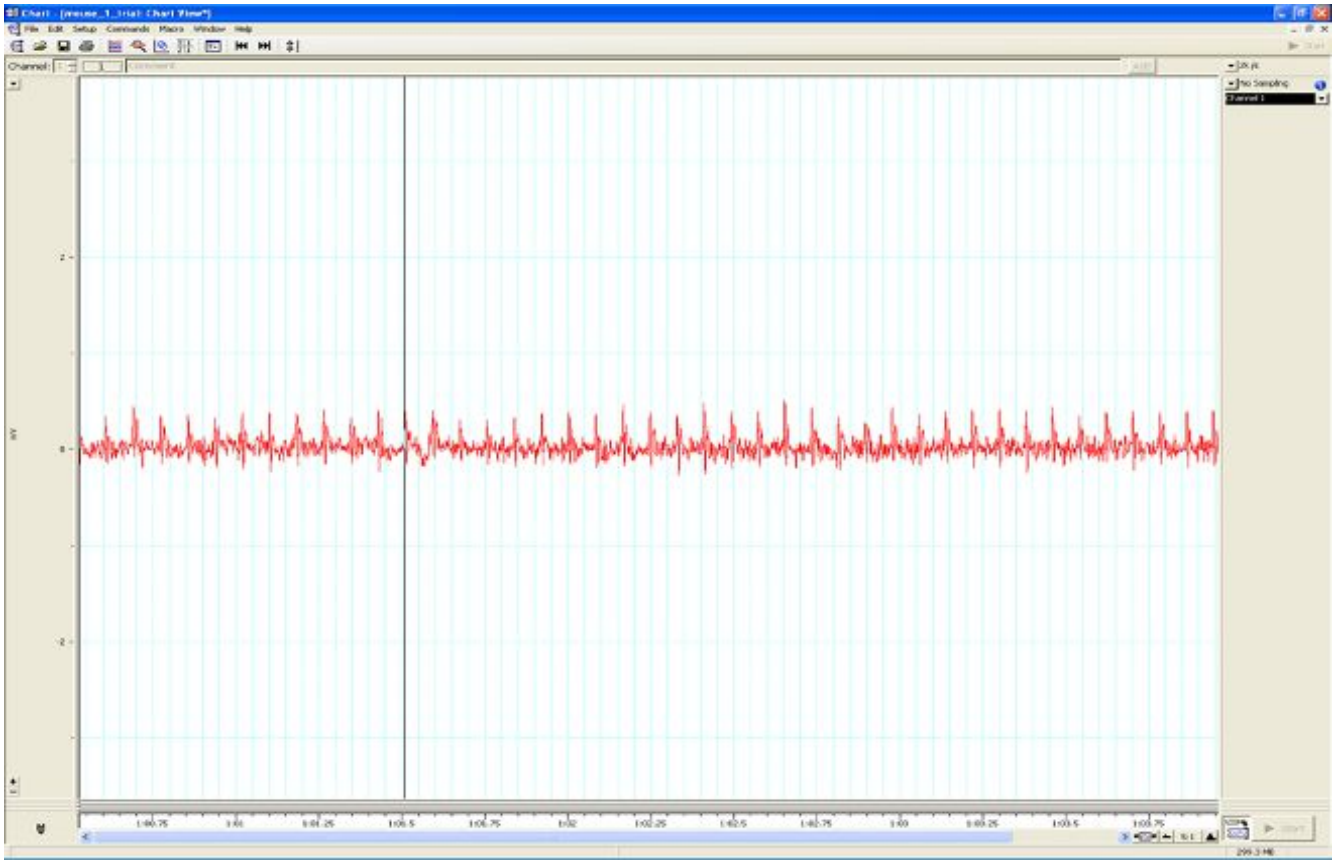


Figure B. Saving a section of the reading

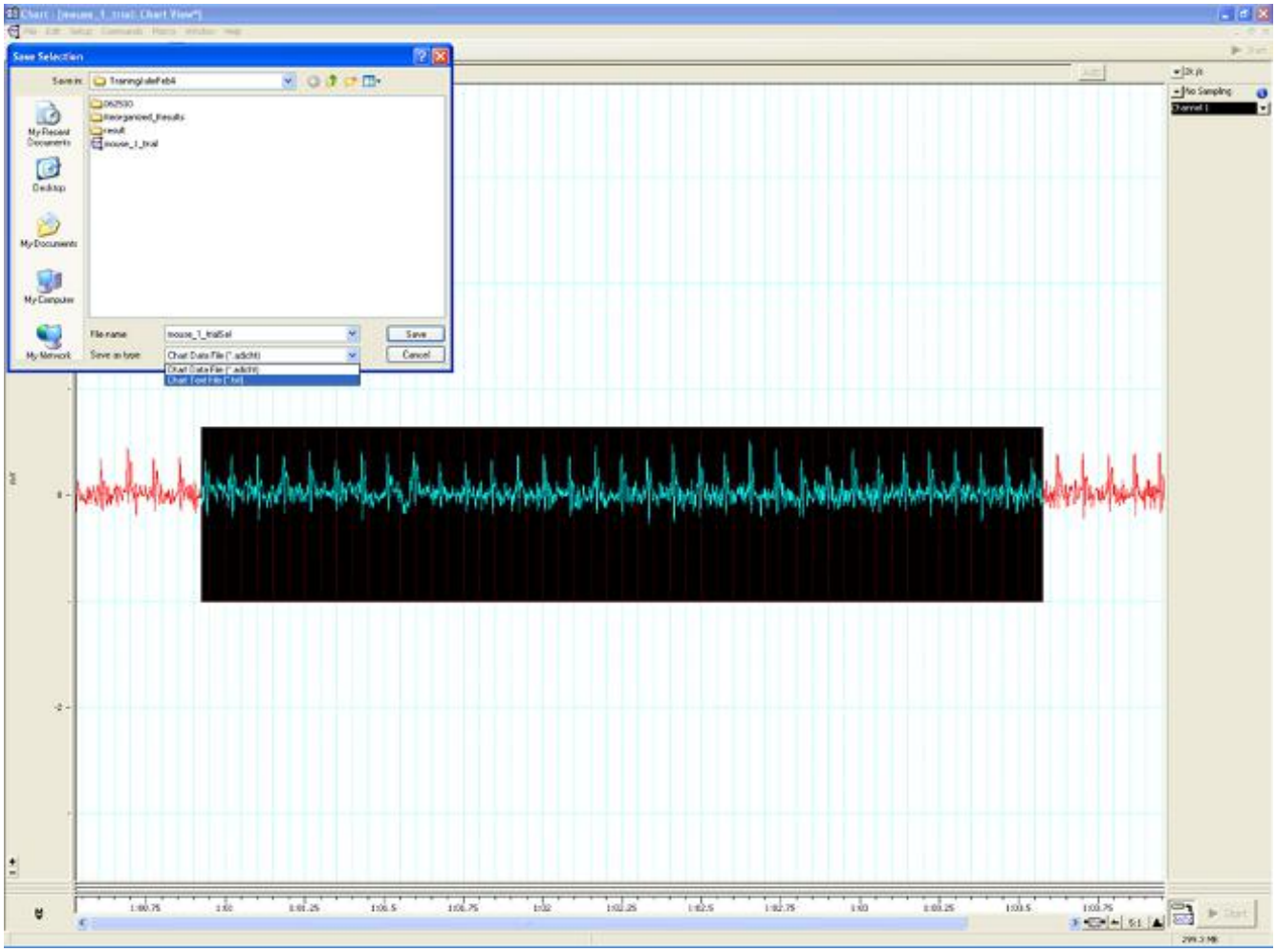
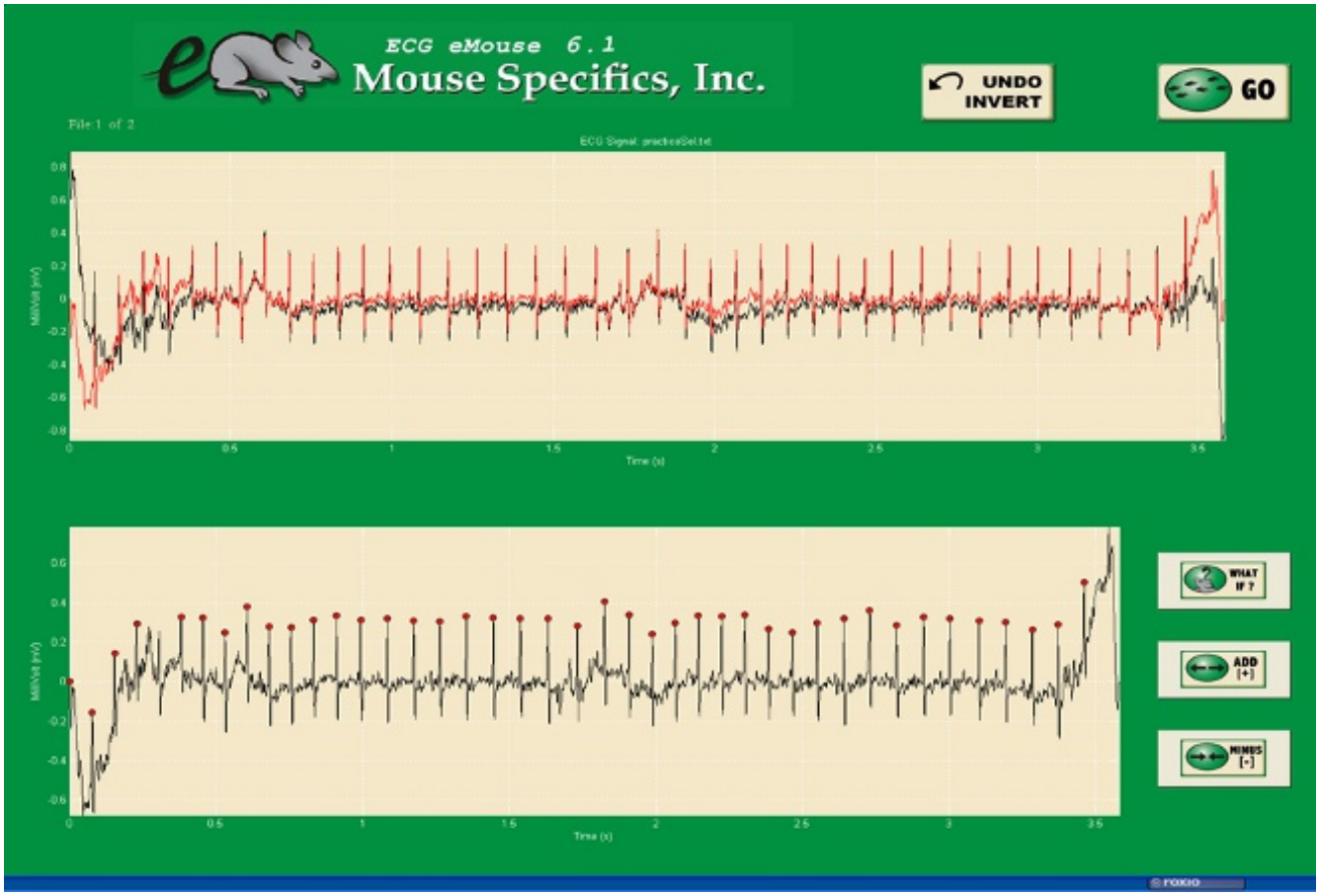



Figure C. Analysis phase, with the options to remove sections on the ‘What if?’ button below.




## Parameters and Metadata

### Mean R amplitude HMGULA_ECG_013_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** mV

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### PR HMGULA_ECG_006_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Unit Measured:** ms

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## Analysis Software HMGULA_ECG_024_001 | v1.0

procedureMetadata

**Req. Analysis:** true **Req. Upload:** false **Is Annotated:** false

**Options:** eMouse, Matlab,

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## Equipment Model HMGULA_ECG_018_001 | v1.0

procedureMetadata

**Req. Analysis:** true **Req. Upload:** true **Is Annotated:** false

**Options:** Iso-DAM8A, ECGenie, ML870/p, ML866, ML826/FE132, ECGenie + gel pads, PowerLab: 4/35,

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## QRS HMGULA_ECG_007_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Unit Measured:** ms

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## Mean SR amplitude HMGULA_ECG_012_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** mV

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## pNN5(6>ms) HMGULA_ECG_015_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

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## Noise level HMGULA_ECG_021_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## HRV HMGULA_ECG_010_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** true

**Unit Measured:** bpm

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## rMSSD HMGULA_ECG_014_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** true

**Unit Measured:** ms

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## QTc Dispersion HMGULA_ECG_011_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** ms

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## Equipment Manufacturer HMGULA_ECG_017_001 | v1.0

procedureMetadata

**Req. Analysis:** true **Req. Upload:** true **Is Annotated:** false

**Options:** AD Instruments, World Precision Instruments, Mouse Specifics, Inc.,

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## RR HMGULA_ECG_004_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Unit Measured:** ms

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## Number of signals HMGULA_ECG_001_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

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## Waveform Image Comment HMGULA_ECG_026_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## Waveform Image HMGULA_ECG_025_001 | v1.0

seriesMediaParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Increments:** Minimum 1

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## QTc HMGULA_ECG_009_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** ms

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## CV HMGULA_ECG_003_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** true

**Unit Measured:** %

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## Date equipment last calibrated HMGULA_ECG_023_001 | v1.1

procedureMetadata

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## ST HMGULA_ECG_008_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Unit Measured:** ms

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## PQ HMGULA_ECG_005_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** true

**Unit Measured:** ms

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## Light level HMGULA_ECG_022_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## Anesthetic HMGULA_ECG_019_001 | v1.0

procedureMetadata

**Req. Analysis:** true **Req. Upload:** true **Is Annotated:** false

**Options:** Tribromoethanol, Isoflurane, Avertin, No anesthesia,

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## Experimenter ID HMGULA_ECG_020_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

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## Equipment ID HMGULA_ECG_016_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

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## HR HMGULA_ECG_002_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Unit Measured:** bpm

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