# RADIO REPORT

**FCC 47 CFR Part 15C**

**Periodic operation in the 40.66-40.70 MHz and above 70 MHz band**

| | |
|---|---|
| **Report Reference No** | G0M-2303-1995-TFC231PT-P024-V02 |
| **Testing Laboratory** | Eurofins Product Service GmbH |
| Address | Storkower Str. 38c<br>15526 Reichenwalde<br>Germany |
| Accreditation | DAkkS - Registration number : D-PL-12092-01-04 (FCC)<br>FCC Filed Test Laboratory, Reg.-No.: 96970 |
| **Applicant** | BodyCAP |
| **Address** | 3 Rue du Docteur Laennc<br>14200 Hérouville saint clair<br>France |
| **Test Specification** | 47 CFR Part 15C |
| Non-Standard Test Method | None |
| **Equipment under Test (EUT):** | |
| Product Description | Core Body temperature monitoring equipement |
| Model(s) | eCelsius Medical Pill P024-M |
| Additional Model(s) | None |
| Brand Name(s) | eCelsius Medical system |
| Hardware Version(s) | V5 |
| Software Version(s) | V1.1.0.1 |
| FCC ID | 2AENH016 |
| **Test Result** | **PASSED** |

| | | |
|---|---|---|
| **Possible test case verdicts:** | | |
| Required by standard but not tested | N/T | |
| Not required by standard | N/R | |
| Not applicable to EUT | N/A | |
| Test object does meet the requirement | P(PASS) | |
| Test object does not meet the requirement | F(FAIL) | |
| **Testing:** | | |
| Test Lab Temperature | 20 - 23 °C | |
| Test Lab Humidity | 32 – 38 % | |
| Date of receipt of test item | 2024-04-26 (Sample 48345)<br>2024-04-23 (Sample 48319)<br>2024-03-21 (Sample 48077)<br>2024-04-23 (Sample 47698) | |
| **Report:** | | |
| Compiled by | Ehsan Sohrabi | |
| Tested by (+ signature)<br>(Responsible for Test) | Ehsan Sohrabi |  |
| Approved by (+ signature)<br>(Test Lab Engineer) | Florian Voigt |  |
| Date of Issue | 2024-08-28 | |
| Total number of pages | 49 | |
| **General Remarks:** | | |
| **The test results presented in this report relate only to the object tested.**<br>**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**<br>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. | | |
| **Additional Comments:** | | |
| --- | | |

## VERSION HISTORY

| Version History | | | |
|---|---|---|---|
| Version | Issue Date | Remarks | Revised By |
| 01 | 2024-06-27 | Initial Release | -- |
| 02 | 2024-08-28 | Replaced document: G0M-2303-1995-TFC231PT-P024-V01<br>Replaced by: G0M-2303-1995-TFC231PT-P024-V02<br><br>Reason:<br>Correction of Duty cycle and DCCF | E. Sohrabi |

## ABBREVIATIONS AND ACRONYMS

| Acronyms | |
|---|---|
| Acronym | Description |
| EUT | Equipment Under Test |
| FCC | Federal Communications Commission |
| ISED | Innovation, Science and Economic Development Canada |
| RBW | Resolution bandwidth |
| RMS | Root mean square |
| VBW | Video bandwidth |
| $V_{NOM}$ | Nominal supply voltage |

## REPORT INDEX

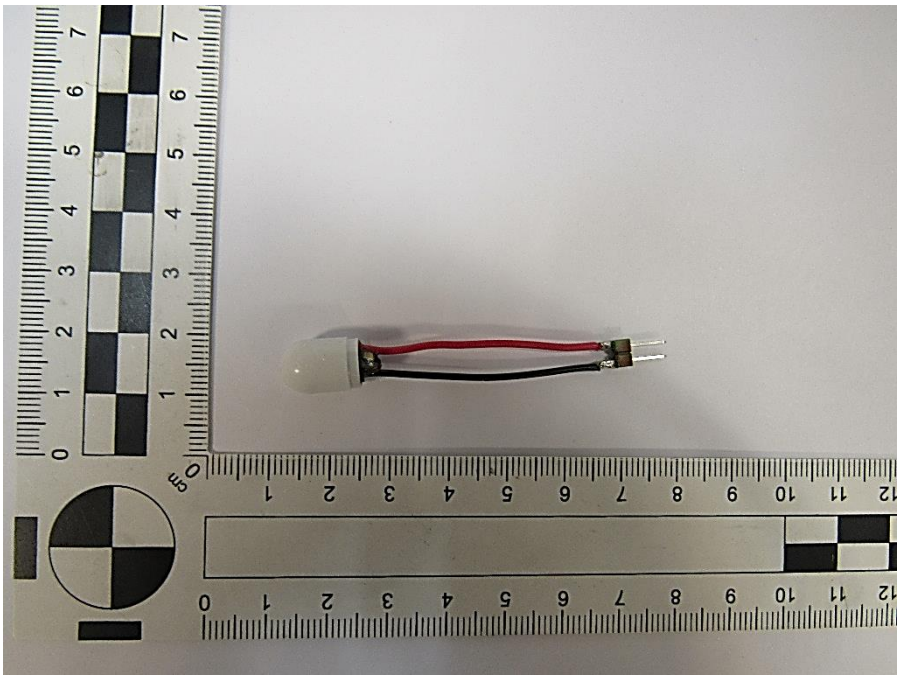
# 1 Equipment (Test Item) Under Test

| | | | |
|---|---|---|---|
| Description | Core Body temperature monitoring equipement | | |
| Model | eCelsius Medical Pill P024-M | | |
| Additional Model(s) | None | | |
| Brand Name(s) | eCelsius Medical system | | |
| Sample Identification | EUT # | Sample-ID | Serial Number |
| | EUT 1<br>EUT 2<br>EUT 3<br>EUT 4 | Radiated: 48345<br>Radiated: 48319<br>Conducted: 48077<br>Conducted: 47698 | Prototype |
| Hardware Version(s) | V5 | | |
| Software Version(s) | V1.1.0.1 | | |
| FCC ID | 2AENH016 | | |
| Equipment type | End Product | | |
| Radio type | Transceiver | | |
| Radio technology | SRD | | |
| Modulation | GFSK | | |
| Number of antenna ports | 1 | | |
| Antenna | Type | Integrated antenna | |
| | Model | PCB Antenna | |
| | Manufacturer | BodyCAP | |
| | Gain | 0dBi (customer declaration) | |
| Supply Voltage | $V_{NOM}$ | 3.1 VDC | |
| Operating Temperature | $T_{NOM}$ | 37 °C | |
| AC/DC-Adaptor | None | | |
| Manufacturer | ASICA<br>55 Rue du Grand Jardin<br>35400 Saint-Malo | | |

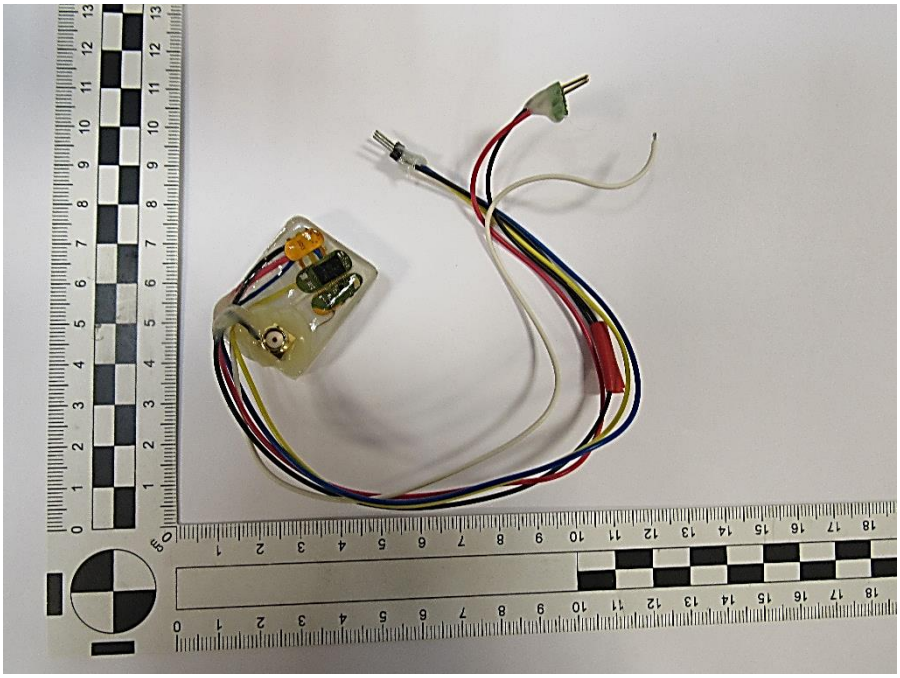
## 1.1 Photos – Equipment External

**EUT 1- Radiated**

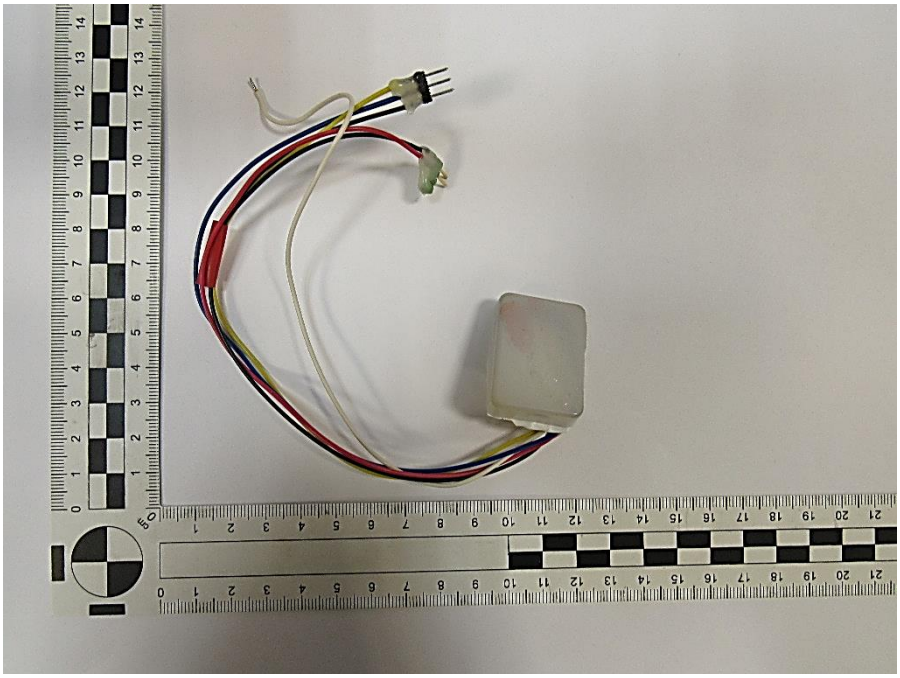
**EUT 2- Radiated**



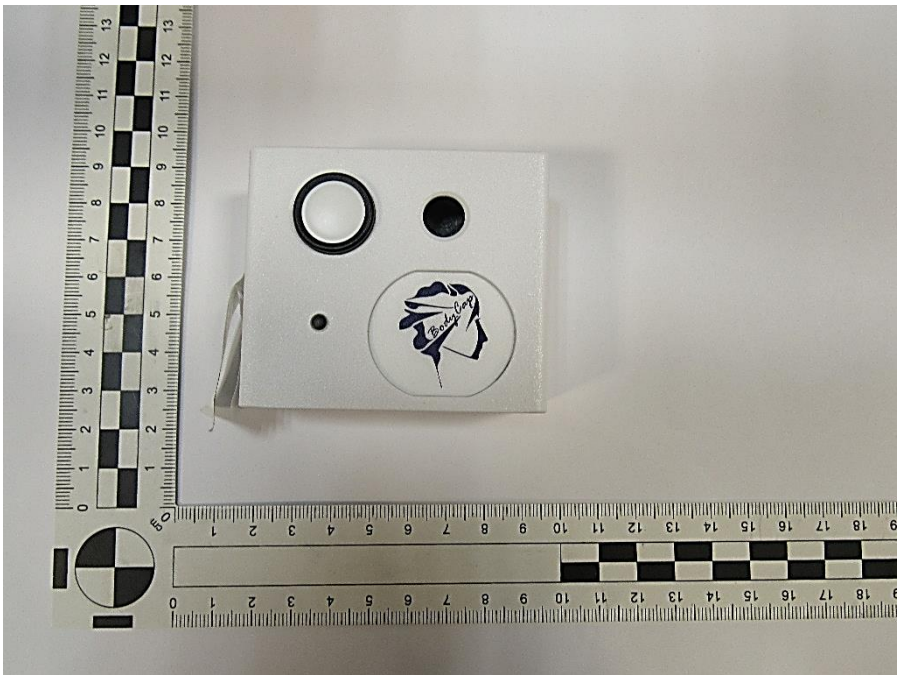
**EUT top view - Conducted sample**



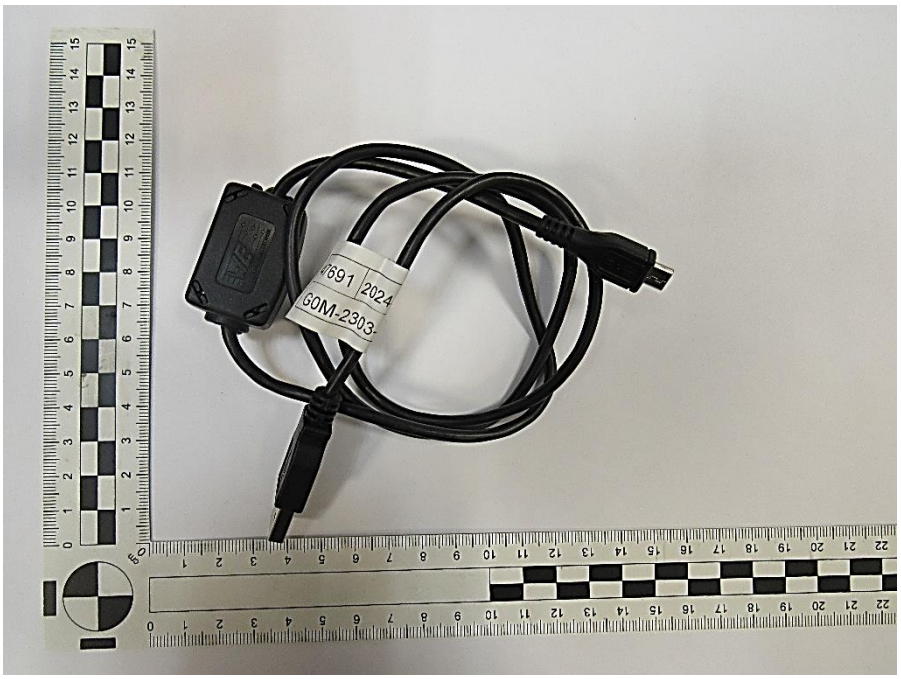
**EUT bottom view - Conducted sample**

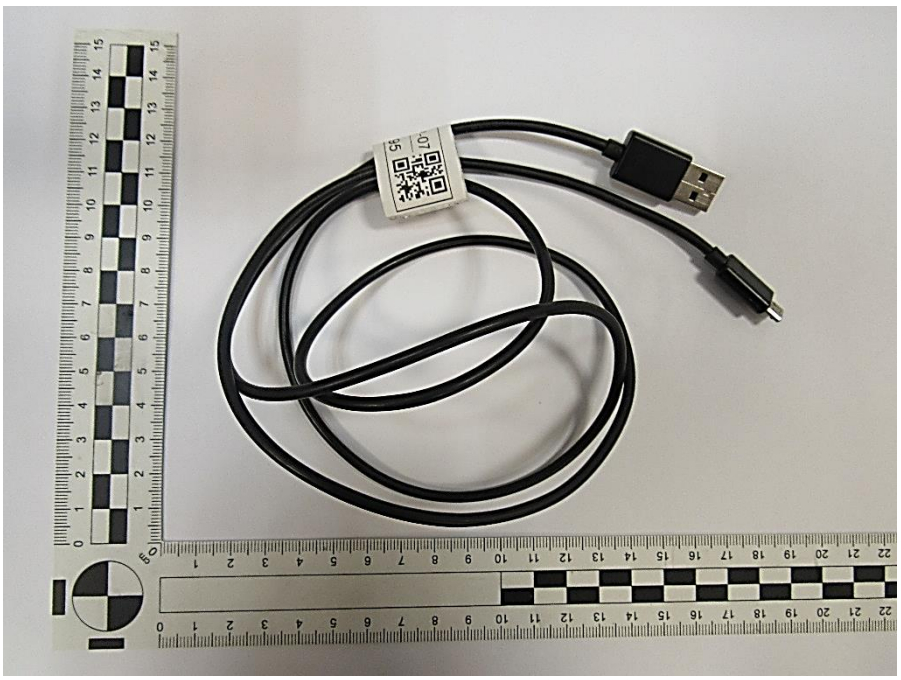


**Activator**



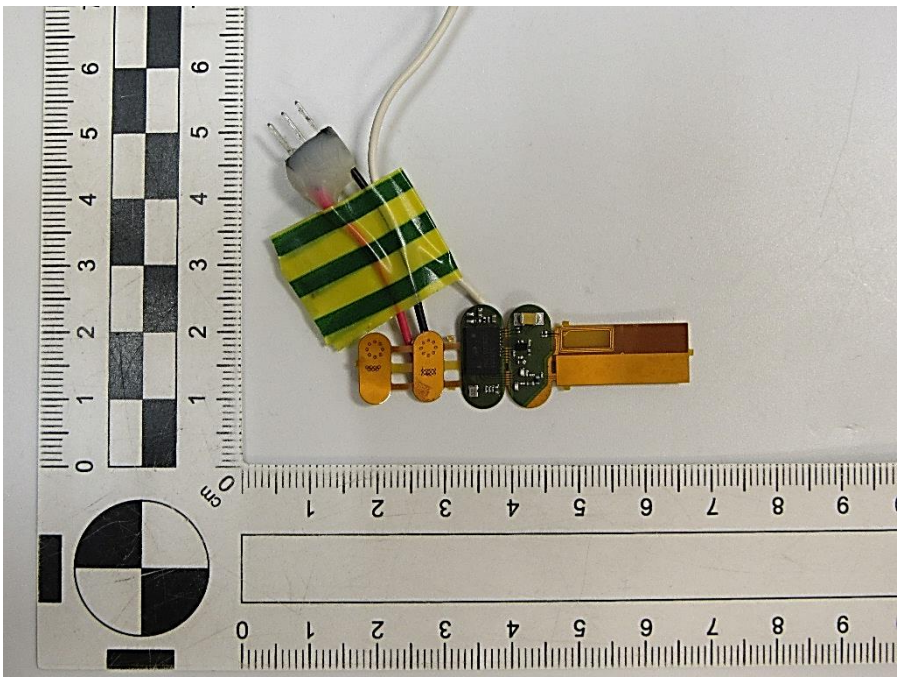
**Monitor**

| Activator cable |
| --- |
|  |

| USB cable for monitor |
| --- |
|  |

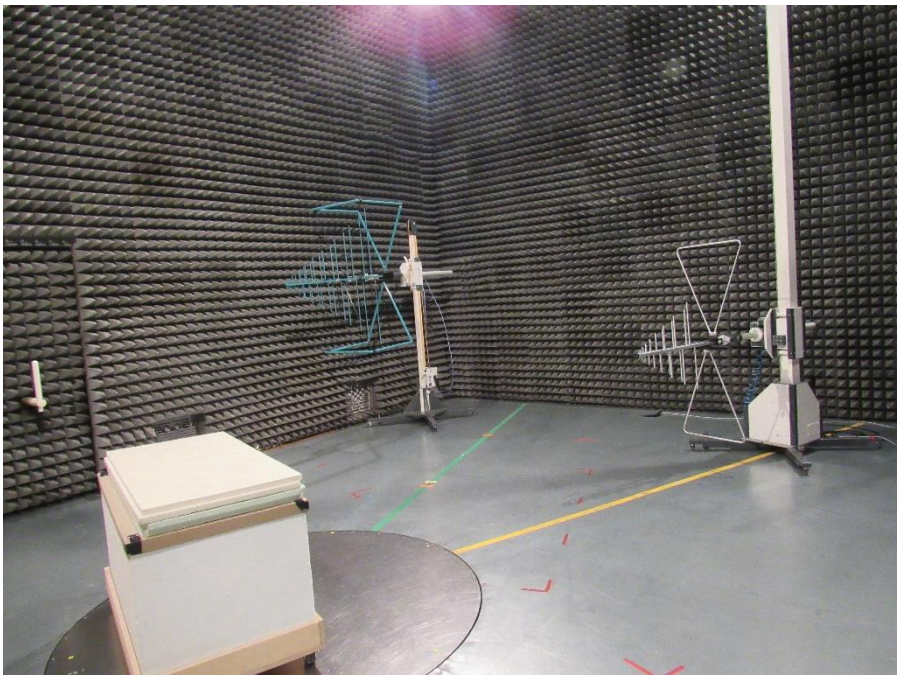
## 1.2 Photos – Equipment Internal

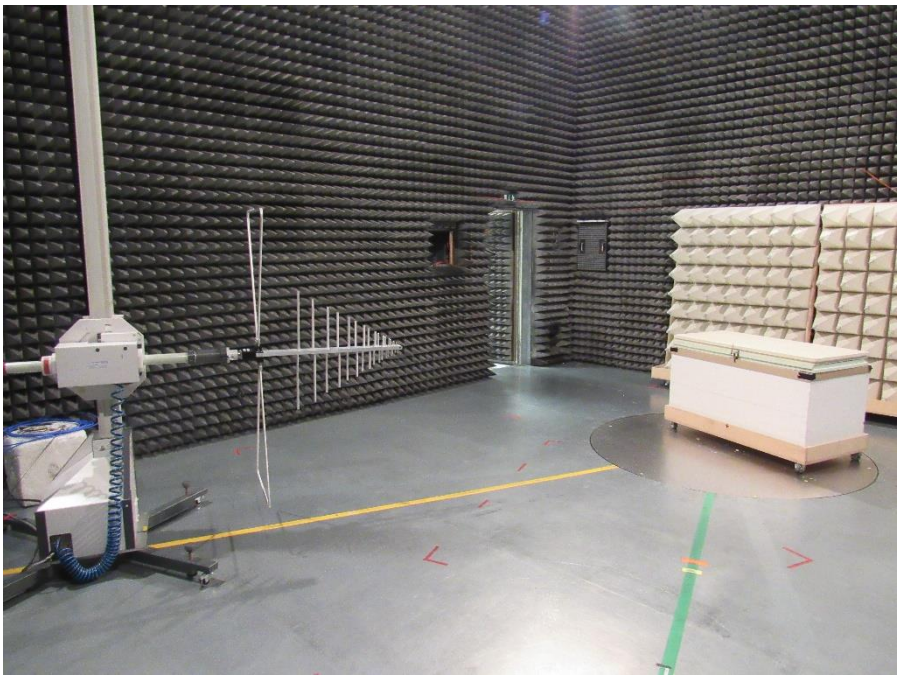
**PCB top view - P024**



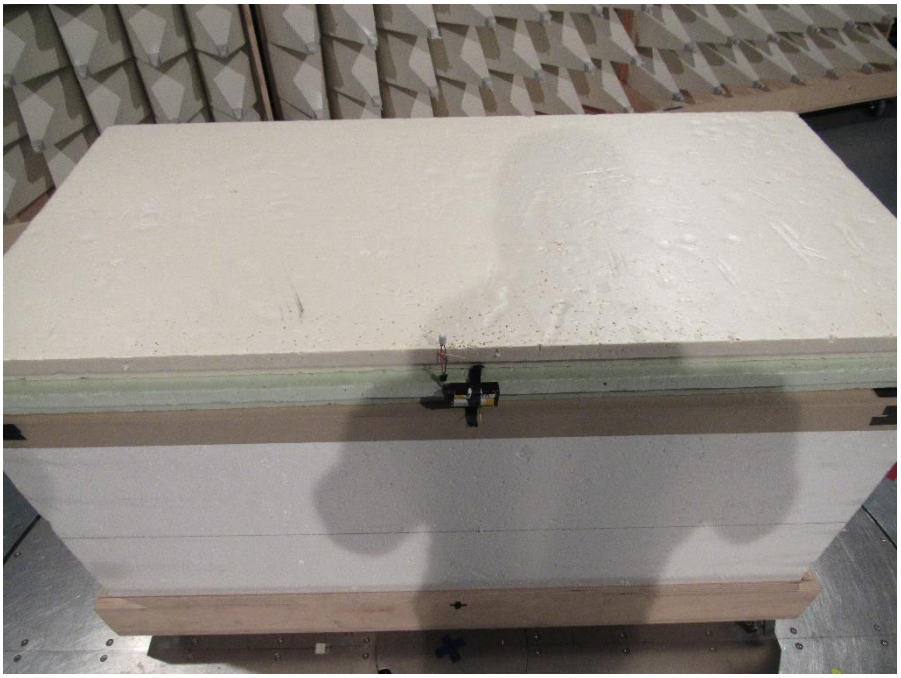
**PCB bottom view - P024**

## 1.3 Photos – Test Setup

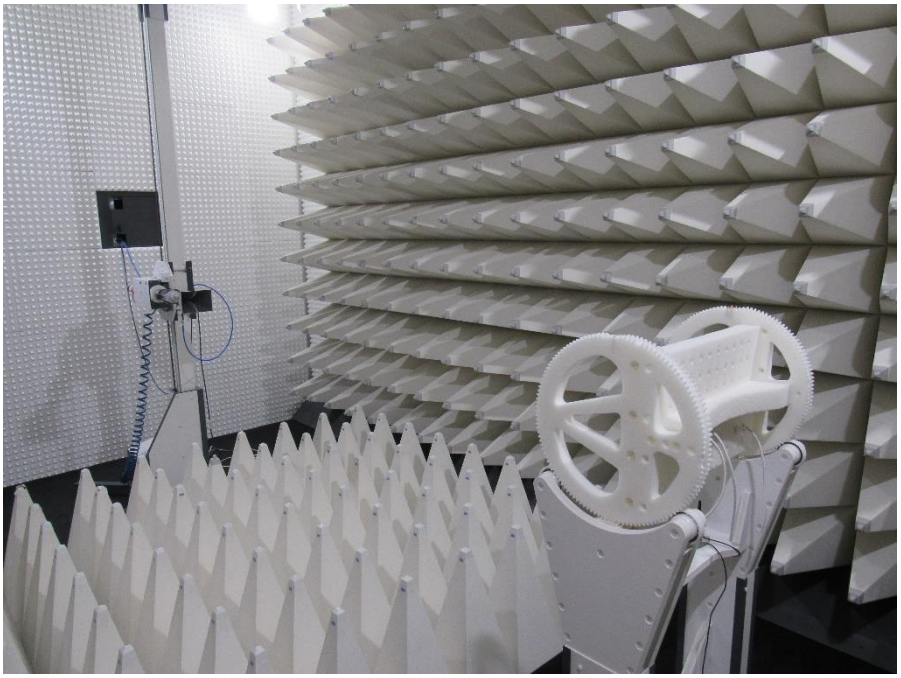
| Setup for measurements below 1 GHz |
| --- |
|  |

| Setup for measurements below 1 GHz |
| --- |
|  |

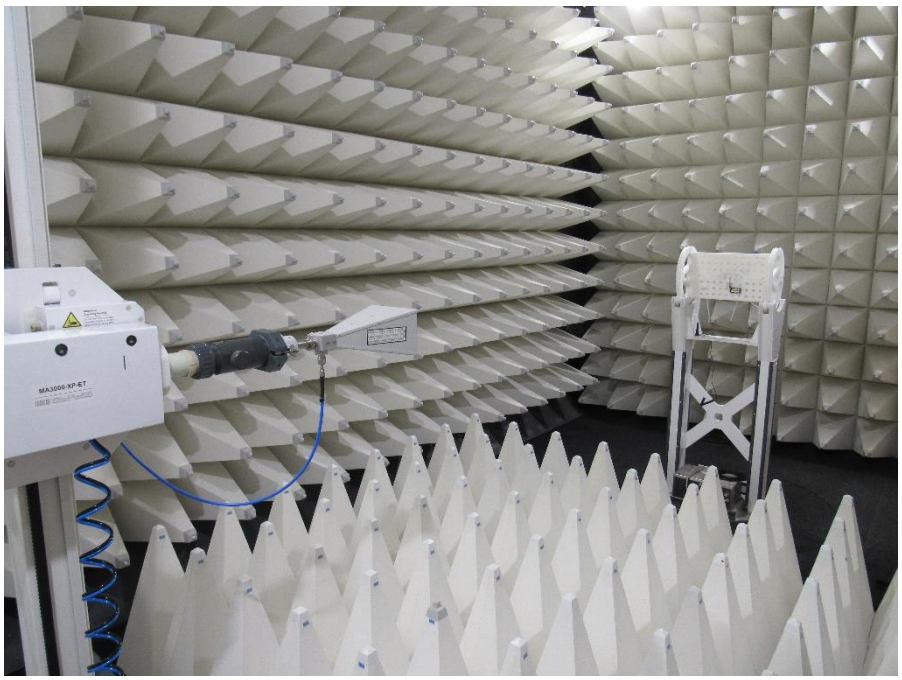
**EUT test setup below 1 GHz**



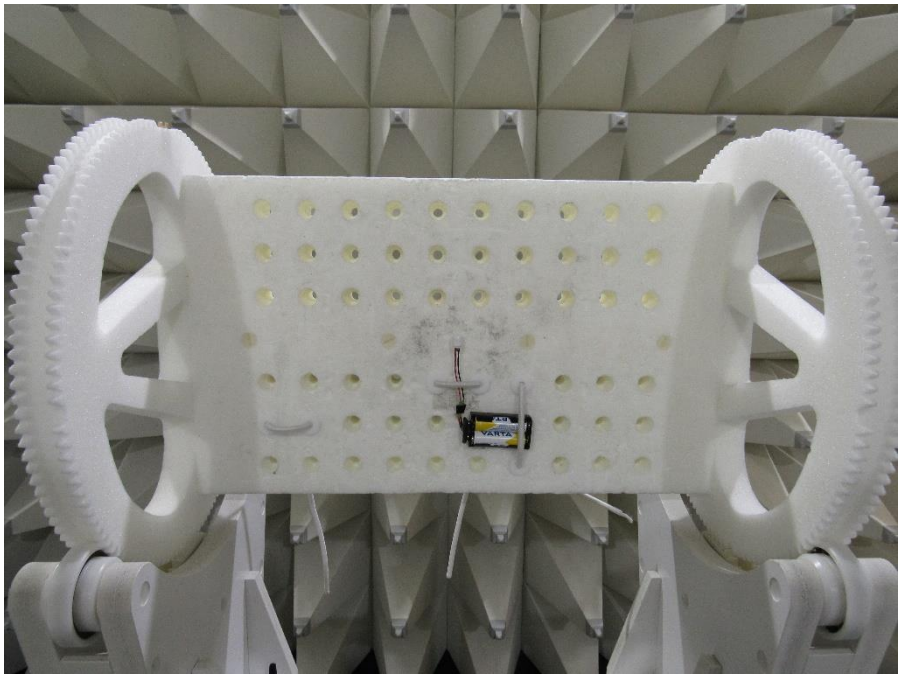
**Setup for measurements above 1 GHz**

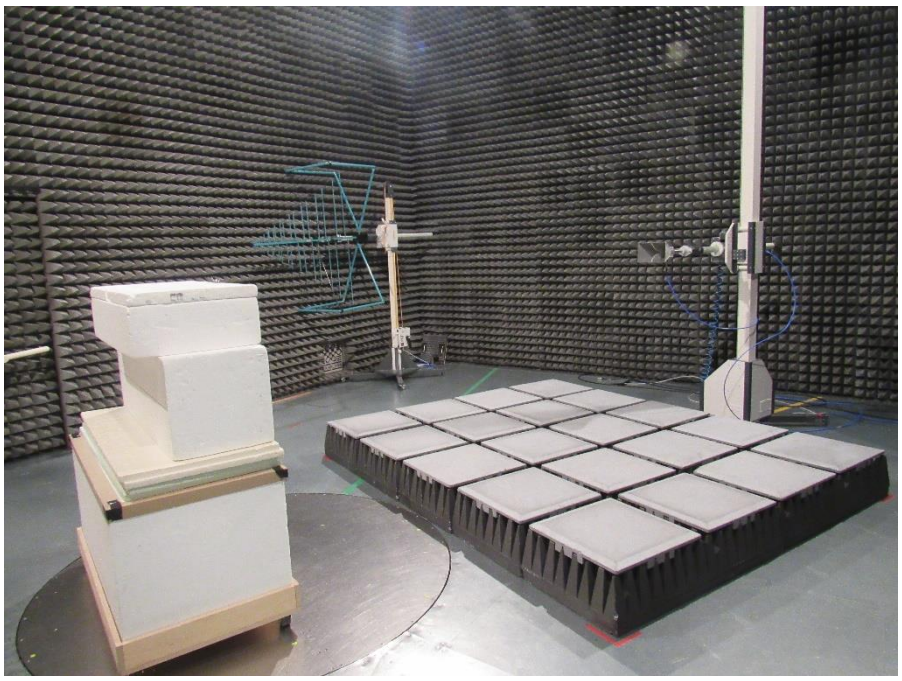


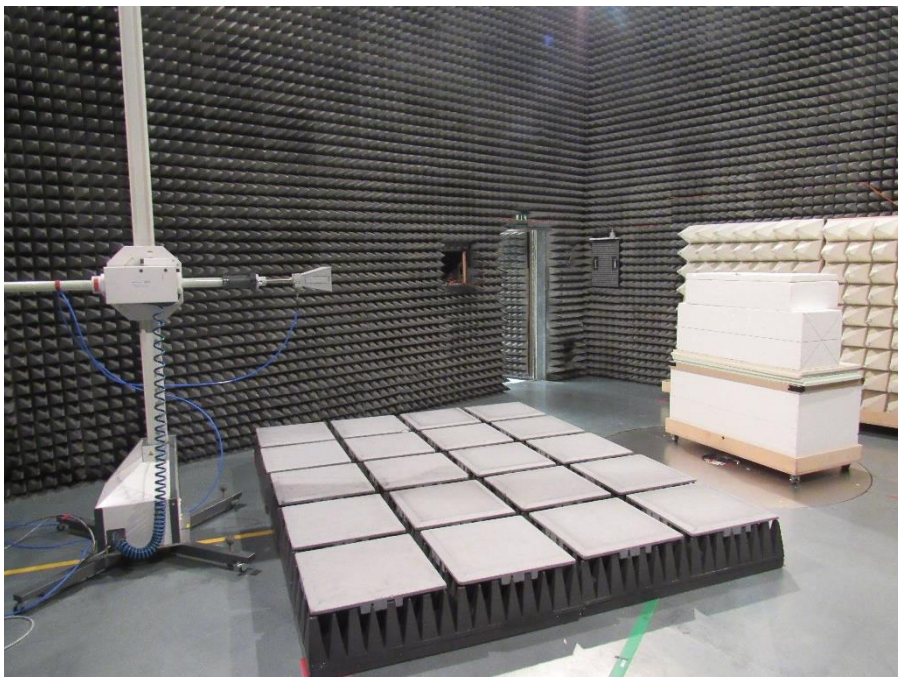
**Setup for measurements above 1 GHz**

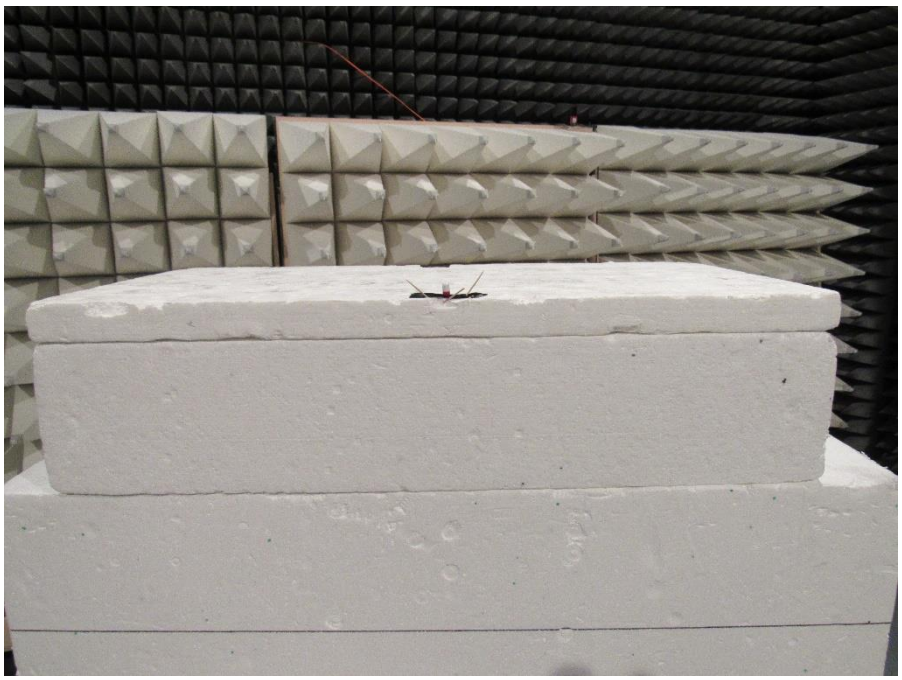


**EUT test setup above 1 GHz**



| Setup for measurements above 1 GHz |
| --- |
|  |

| Setup for measurements above 1 GHz |
| --- |
|  |

| EUT setup |
| --- |
|  |

## 1.4 Support Equipment

| Product Type | Device | Manufacturer | Model | Comment |
|---|---|---|---|---|
| AE | Laptop | Lenovo | --- | To connect the EUT to uniflash software |
| AE | eCelsius Medical Monitor | BodyCAP | P040-M | P040-M |
| AE | eCelsius Medical Activator | BodyCAP | P030-M | P030-M |
| CBL | USB cable | --- | --- | To connect the activator to the laptop |
| SFT | uniflash | --- | SI.8.5.4539 | For EUT configuration |
| Description: | | | | |
| AE | Auxiliary Equipment | | | |
| SIM | Simulator | | | |
| CBL | Connecting Cable | | | |
| SFT | Software | | | |
| Comment: -- | | | | |

## 1.5 Duty cycle Correction Factor (Method of calculation of average field strength)

### 1.5.1 Information

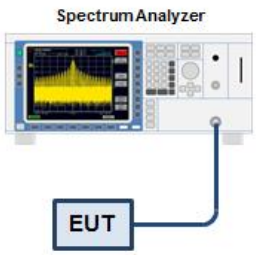
| Test Information | |
|---|---|
| Measurement Method | ANSI C63.10 11.6 |

### 1.5.2 Requirements

| Requirements | |
|---|---|
| Duty cycle | Duty cycle correction |
| ≥ 98 % | No correction required |
| < 98 % | Correction required (20 x $Log_{10}$(1/DC) |

### 1.5.3 Setup

**Test Setup**




### 1.5.4 Equipment

| Test Equipment | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum analyzer | R&S | FSP30 | EF00312 | 2023-08 | 2024-08 |

### 1.5.5 Procedure

**Test Procedure**

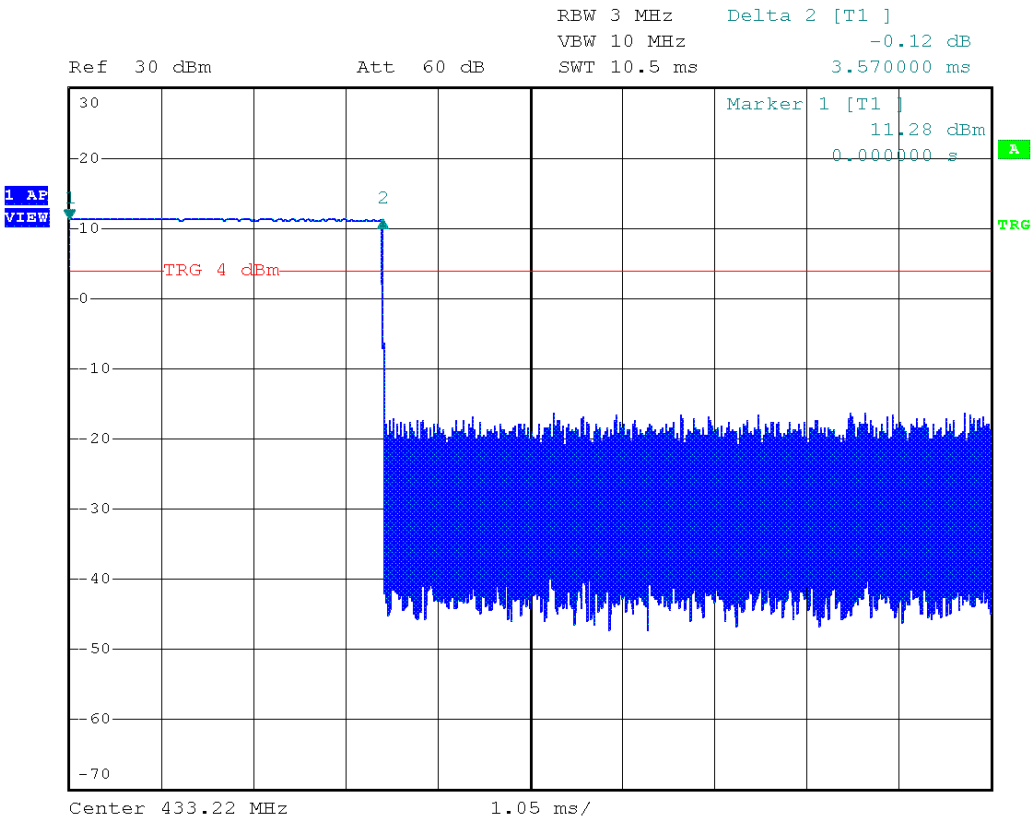
1. EUT set to test mode
2. Span is set to zero span
3. Detector set to peak
4. Sweep time is set long enough to capture at least 5 bursts
5. Envelope peak value of emission spectrum is selected
6. The maximum burst duration $T_{ON}$ is measured using two markers set to the start and the end of the longest burst
7. The minimum idle duration $T_{OFF}$ is measured using two markers set to the start and the end of the shortest idle period
8. Calculation of $T_{TOTAL} = T_{ON} + T_{OFF}$ but not exceeding 100 ms
9. The averaging duty cycle is calculated by AVDC = $T_{ON}$ (ms) / $T_{TOTAL}$ (ms)
10. The averaging duty cycle calculation factor is calculated by AVDCCF = 20 x log (AVDC)

1.5.6 Results

| Average Duty Cycle Calculation Results | | | | | |
|---|---|---|---|---|---|
| Mode | $T_{ON}$ | $T_{TOTAL}$ (measured) | $T_{TOTAL}$ (corrected) | Duty Cycle | Average Calculation Factor [dB] |
| Normal | 3.57 ms | 15040 ms | 100 ms | 0.035 | -29.12 |

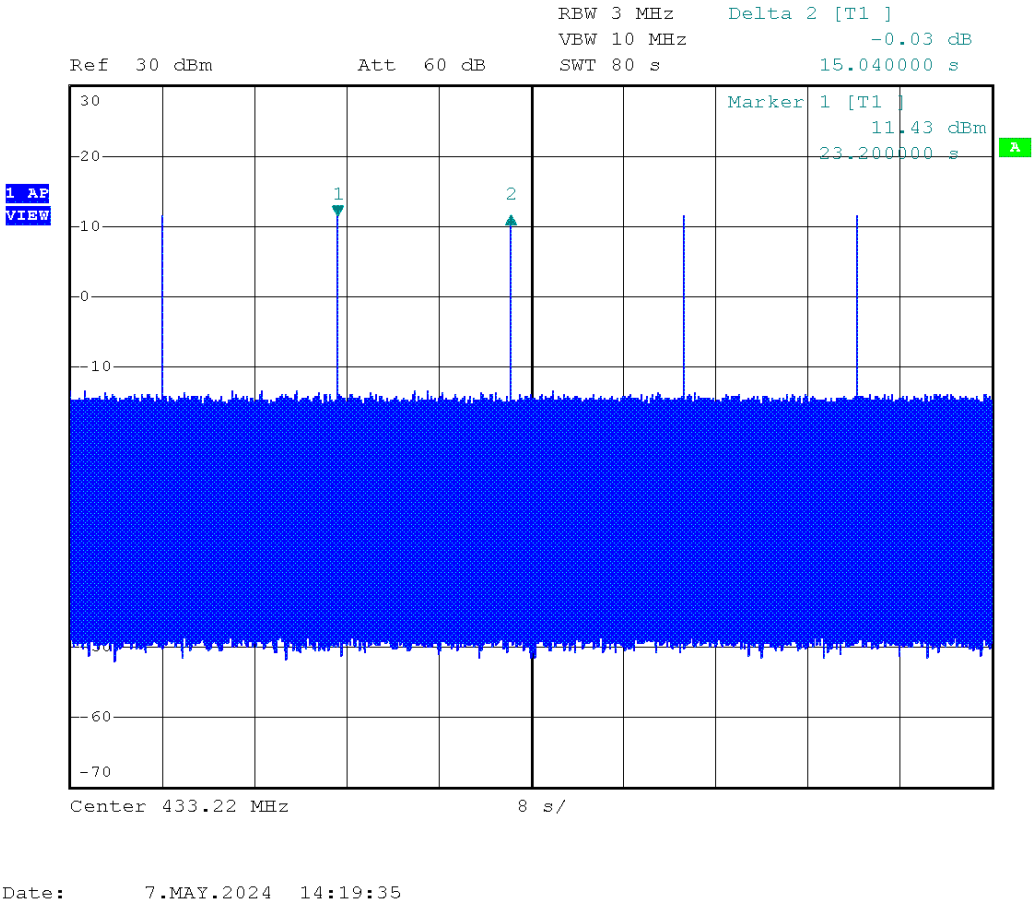
**Duty Cycle $T_{ON}$**

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48077 |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Operating Conditions: | Tnom/Vnom |
| Mode: | Normal |



## Duty Cycle $T_{off}$

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48077 |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Operating Conditions: | Tnom/Vnom |
| Mode: | Normal |



## 1.6 Test Modes

| Mode | Description |
|---|---|
| Transmit | Mode = Transmit<br>Modulation = GFSK<br>Duty cycle = 100 %<br>Pulse repetition time = 0 ms<br>Pulse length = N/A |
| Normal | Mode = Transmit<br>Modulation = GFSK<br>Duty cycle = 0.0236 %<br>Pulse repetition time = 15040 ms<br>Pulse length = 3.57 ms |
| Transmit DC | Mode = Transmit<br>Modulation = GFSK<br>Duty cycle = 0.35 %<br>Pulse repetition time = 1000 ms<br>Pulse length = 3.57 ms |
| Comment: -- | |

## 1.7 Test Frequencies

| Designator | Mode | Channel | Frequency [MHz] |
|---|---|---|---|
| F1 | Tx / Rx | 1 | 433.22 |
| F2 | Tx / Rx | 8 | 434.62 |

## 1.8 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

| | | | | | |
|---|---|---|---|---|---|
| Reading + AF | = Net Reading | : | Net reading | - FCC limit | = Margin |
| +21.5 dBµV | + 26 dB = 47.5 dBµV/m | : | 47.5 dBµV/m | - 57.0 dBµV/m | = -9.5 dB |

## 2 Result Summary

| FCC 47 CFR Part 15C | | | | |
|---|---|---|---|---|
| **Product Standard Reference** | **Requirement** | **Reference Method** | **Result** | **Remarks** |
| FCC 15.231(a)(1) | Deactivation of manually operated transmitter | non specific | N/R | EUT not manually operated |
| FCC 15.231(a)(2) | Cease of transmission of automatically operated transmitter | non specific | N/R | We tested according to FCC 15.231(e) |
| FCC 15.231(e) | Limit of transmission time | non specific | PASS | --- |
| FCC 15.231(a)(4) | Radio control during emergencies | non specific | N/R | EUT not for emergencies |
| FCC 15.231(a)(5) | Transmission of set-up information for security systems | non specific | N/R | EUT not for security systems |
| FCC 15.231(c) | Emission bandwidth | non specific | PASS | --- |
| FCC 15.231(d) | Emission bandwidth for the 40.66-40.70 MHz band | non specific | N/R | EUT is not operating in the 40.66-40.70 MHz band |
| FCC 15.231(d) | Frequency Stability for the 40.66-40.70 MHz band | non specific | N/R | EUT is not operating in the 40.66-40.70 MHz band |
| FCC 15.231(e) | Reduced field strength and spurious emissions of radiators operating at a rate exceeding 15.231(a) | ANSI C63.10 | PASS | --- |
| FCC 15.207 | AC power line conducted emissions | ANSI C63.10 | N/R | EUT exclusively battery powered |
| Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028.<br>These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019.<br>Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed. | | | | |

| Possible Test Case Verdicts | |
|---|---|
| PASS | Test object does meet the requirements |
| FAIL | Test object does not meet the requirements |
| N/T | Required by standard but not tested |
| N/R | Not required by standard for the test object |

## 2.1 Test Conditions and Results - Limit of transmission time

### 2.1.1 Information

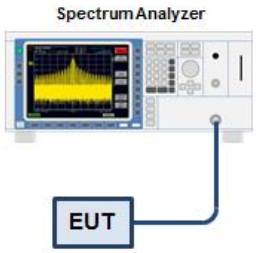
| Test Information | |
|---|---|
| Reference | FCC 15.231 (e) |
| Measurement Method | non specific |
| Operator | Ehsan Sohrabi |
| Date | 2024-05-07 |

### 2.1.2 Limits

| Limits |
|---|
| The duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds. |

### 2.1.3 Setup

**Test Setup**




### 2.1.4 Equipment

| Test Equipment | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum analyzer | R&S | FSP30 | EF00312 | 2023-08 | 2024-08 |

### 2.1.5 Procedure

**Test Procedure**

1. EUT set to test mode
2. Center frequency is set to test frequency
3. Span it set to zero span
4. Resolution bandwidth is set large enough to accurately capture transmission bursts
5. Total transmission time is measured

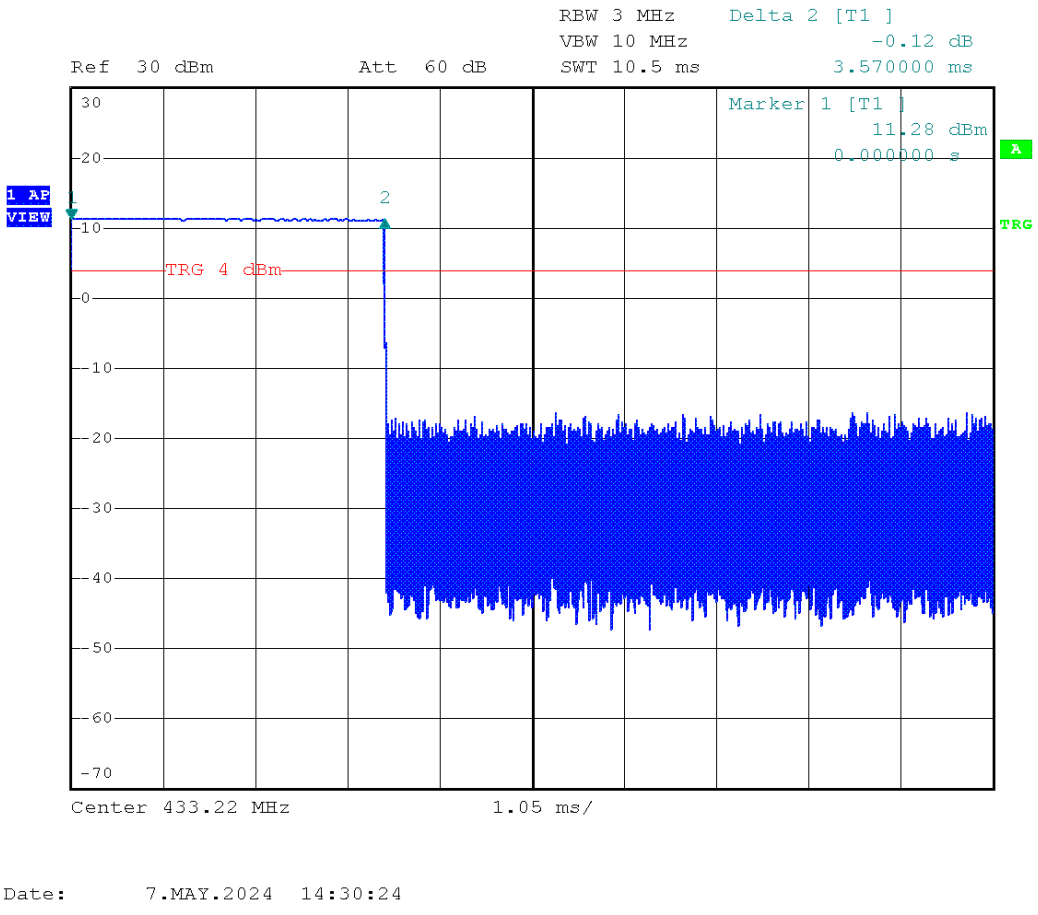
2.1.6 Results

| Test Results | | | |
|---|---|---|---|
| Channel [MHz] | Duration of one burst [s] | Limit [s] | Margin [s] |
| 433.22 | 0.00357 | 1 | -0.993 |

| Test Results | | | |
|---|---|---|---|
| Channel [MHz] | Silent period [s] | Limit [s] | Margin [s] |
| 433.22 | 15.04 | 10 | 5.04 |

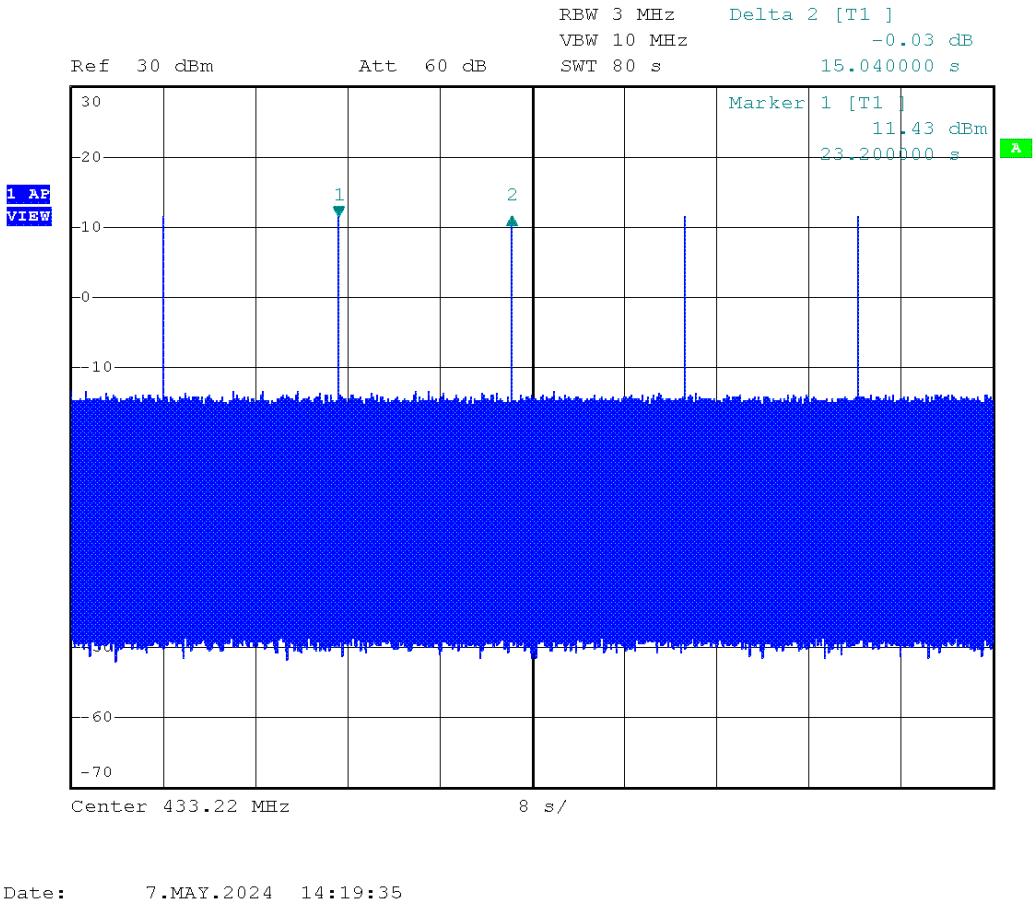
## Ton

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48077 |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Operating Conditions: | Tnom/Vnom |
| Mode: | Normal |
| Note 1: | CH= 433.22, Duration of one burst |



## Toff

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48077 |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Operating Conditions: | Tnom/Vnom |
| Mode: | Normal |
| Note 1: | CH= 433.22, Silent period |



## 2.2 Test Conditions and Results - Reduced Field strength of fundamental and spurious emissions

### 2.2.1 Information

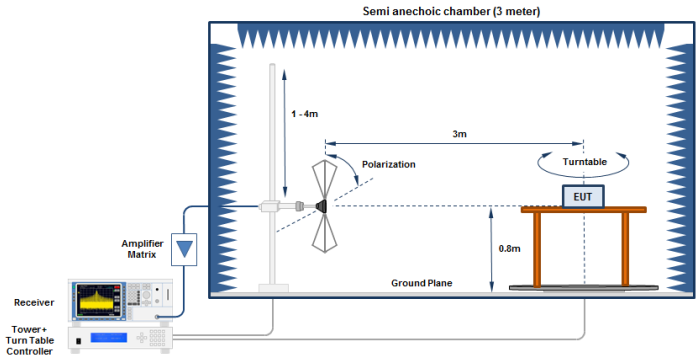
| Test Information | |
|---|---|
| Reference | FCC 15.231(e) |
| Measurement Uncertainty | ± 5.95 dB |
| Measurement Method | ANSI C63.10 6.4, 6.5, 6.6, 11.12 |
| Operator | Ehsan Sohrabi |
| Date | 2024-05-29 - 2024-06-06 |

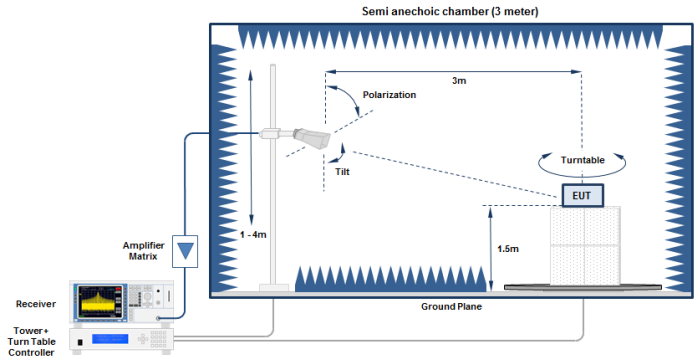
### 2.2.2 Limits

| Limits | | | |
|---|---|---|---|
| Fundamental Frequency [MHz] | Fundamental Limit [dBµV/m] | Spurious Limit [dBµV/m] | Measurement distance [m] |
| 40.66-40.70 | 60.00 | 40.00 | 3 |
| 70-130 | 53.97 | 33.97 | 3 |
| 130-174 | 53.97 – 63.52 | 33.97 – 43.52 | 3 |
| 174-260 | 63.52 | 43.52 | 3 |
| 260-470 | 63.52 – 73.97 | 43.52 – 53.97 | 3 |
| > 470 | 73.97 | 53.97 | 3 |
| Detector = Quasi-Peak or Average | | | |

### 2.2.3 Setup

**Test Setup 30 MHz - 1000 MHz**



| Test Setup > 1 GHz |
|---|
|  |



2.2.4 Equipment

| Test Software | | | |
|---|---|---|---|
| Description | Manufacturer | Name | Version |
| EMC Software | DARE Instruments | RadiMation | 2020.1.8 |

| Test Equipment 30 - 1000 MHz | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber | Frankonia | AC1 | EF00062 | 2022-11 | 2025-11 |
| EMI Test Receiver | Rohde & Schwarz Vertriebs GmbH | ESU26 | EF00887 | 2024-01 | 2025-01 |
| Antenna | Schwarzbeck | VULB 9168 | EF01824 | 2022-10 | 2025-10 |

| Test Equipment > 1 GHz | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Anechoic Chamber | Frankonia | AC2 | EF01616 | 2023-12 | 2024-12 |
| Spectrum Analyzer | Frankonia | FSW 43 | EF00896 | 2023-08 | 2024-08 |
| Antenna | Schwarzbeck | BBHA 9120B | EF01678 | 2024-05 | 2027-05 |

2.2.5 Procedure

| Test Procedure 30 MHz - 1000 MHz |
|---|
| 1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground<br>2. EUT set to test mode<br>3. The receiver is set to peak detection with max hold<br>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m<br>5. All significant emissions are measured again using the corresponding final detector |

| Test Procedure > 1 GHz |
|---|
| 1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground<br>2. EUT set to test mode<br>3. The receiver is set to peak detection with max hold<br>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m<br>5. All significant emissions are measured again using the corresponding final detector |

2.2.6 Results

| Test Results - Field strength of fundamental | | | | | | |
|---|---|---|---|---|---|---|
| Channel [MHz] | Emission [MHz] | Level [dBµV/m] | Det. | Pol. | Limit [dBµV/m] | Margin [dB] |
| 433.22 | 433.2672 | 72.10 | pk | hor | 92.90 | -20.76 |
| 433.22 | 433.2672 | 42.98 | avg | hor | 72.90 | -29.92 |
| 433.22 | 433.2702 | 79.60 | pk | ver | 92.90 | -13.29 |
| 433.22 | 433.2702 | 50.48 | avg | ver | 72.90 | -22.42 |
| 434.62 | 434.6681 | 81.40 | pk | ver | 92.90 | -11.50 |
| 434.62 | 434.6681 | 52.28 | avg | ver | 72.9 | -20.62 |
| 434.62 | 434.6705 | 76.00 | pk | hor | 92.90 | -16.94 |
| 434.62 | 434.6705 | 46.88 | avg | hor | 72.90 | -26.02 |
| Comment 1: We measured the pill in transmit mode to measure peak level and then calculate the average level according to calculation factor (AVDCCF= -29.12 dB).<br>Comment 2: The average level is calculated according to below formula:<br>Average level (dBuV/m) = Peak level (dBuV/m) + AVDCCF | | | | | | |

| Test Results - Field strength of spurious emissions | | | | | | |
|---|---|---|---|---|---|---|
| Channel [MHz] | Emission [MHz] | Level [dBµV/m] | Det. | Pol. | Limit [dBµV/m] | Margin [dB] |
| 433.22 | 866.56 | 56.00 | pk | hor | 72.90 | -16.90 |
| 433.22 | 866.56 | 41.45 | avg | hor | 52.90 | -26.02 |
| 433.22 | 2166 | 55.18 | pk | ver | 74.00 | -18.82 |
| 433.22 | 2166 | 26.06 | avg | ver | 54.00 | -27.94 |
| 433.22 | 3032 | 65.80 | pk | hor | 74.00 | -08.20 |
| 433.22 | 3032 | 36.68 | avg | hor | 54.00 | -17.32 |
| 433.22 | 3465 | 52.03 | pk | hor | 74.00 | -21.97 |
| 433.22 | 3465 | 22.91 | avg | hor | 54.00 | -31.09 |
| 433.22 | 3899 | 50.36 | pk | hor | 74.00 | -23.64 |
| 433.22 | 3899 | 21.24 | avg | hor | 54.00 | -32.76 |
| 434.62 | 869.30 | 55.70 | pk | hor | 72.90 | -17.20 |
| 434.62 | 869.30 | 26.58 | avg | hor | 52.90 | -26.32 |
| 434.62 | 1304 | 41.36 | pk | hor | 74.00 | -32.64 |
| 434.62 | 1304 | 12.24 | avg | hor | 54.00 | -41.76 |
| 434.62 | 2173 | 56.01 | pk | ver | 74.00 | -17.99 |
| 434.62 | 2173 | 26.89 | avg | ver | 54.00 | -27.11 |
| 434.62 | 2607 | 53.20 | pk | ver | 74.00 | -20.80 |
| 434.62 | 2607 | 24.08 | avg | ver | 54.00 | -29.92 |
| 434.62 | 3042 | 66.24 | pk | hor | 74.00 | -07.76 |
| 434.62 | 3042 | 37.12 | avg | hor | 54.00 | -16.88 |
| 434.62 | 3477 | 50.06 | pk | hor | 74.00 | -23.94 |
| 434.62 | 3477 | 20.94 | avg | hor | 54.00 | -33.06 |
| 434.62 | 3912 | 50.19 | pk | hor | 74.00 | -23.81 |
| 434.62 | 3912 | 21.07 | avg | hor | 54.00 | -32.93 |
| Comment 1: We measured the pill in test mode to measure peak level and then calculate the average level according to calculation factor (AVDCCF= -29.12 dB).<br>Comment 2: The average level is calculated according to below formula:<br>Average level (dBuV/m) = Peak level (dBuV/m) + AVDCCF | | | | | | |

| Test Results - Field strength of spurious emissions | | | | | | |
|---|---|---|---|---|---|---|
| Channel [MHz] | Emission [MHz] | Level [dBµV/m] | Det. | Pol. | Limit [dBµV/m] | Margin [dB] |
| 433.22 | 1733 | 60.81 | pk | hor | 74.00 | -13.19 |
| 433.22 | 1733 | 33.12 | avg | hor | 54.00 | -20.88 |
| 433.22 | 1733 | 48.99 | pk | ver | 74.00 | -25.01 |
| 433.22 | 1733 | 26.23 | avg | ver | 54.00 | -27.77 |
| 434.62 | 1738.5 | 61.09 | pk | hor | 74.00 | -12.91 |
| 434.62 | 1738.5 | 33.82 | avg | hor | 54.00 | -20.18 |
| 434.62 | 1738.5 | 47.41 | pk | ver | 74.00 | -26.59 |
| 434.62 | 1738.5 | 25.94 | avg | ver | 54.00 | -28.06 |
| Comment 1: For the fourth harmonic we tested the pill in transmit DC mode to measure peak and average level simultaneously. | | | | | | |

## 2.3 Test Conditions and Results - Emission Bandwidth

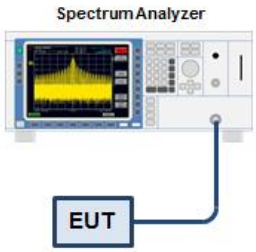
### 2.3.1 Information

| Test Information | |
|---|---|
| Reference | FCC 15.231(c) |
| Measurement Method | non specific |
| Operator | Ehsan Sohrabi |
| Date | 2024-05-07 |

### 2.3.2 Limits

| Limits |
|---|
| 0.25 % of center frequency |

### 2.3.3 Setup

| Test Setup |
|---|
|  |



### 2.3.4 Equipment

| Test Equipment | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum analyzer | R&S | FSP30 | EF00312 | 2023-08 | 2024-08 |

### 2.3.5 Procedure

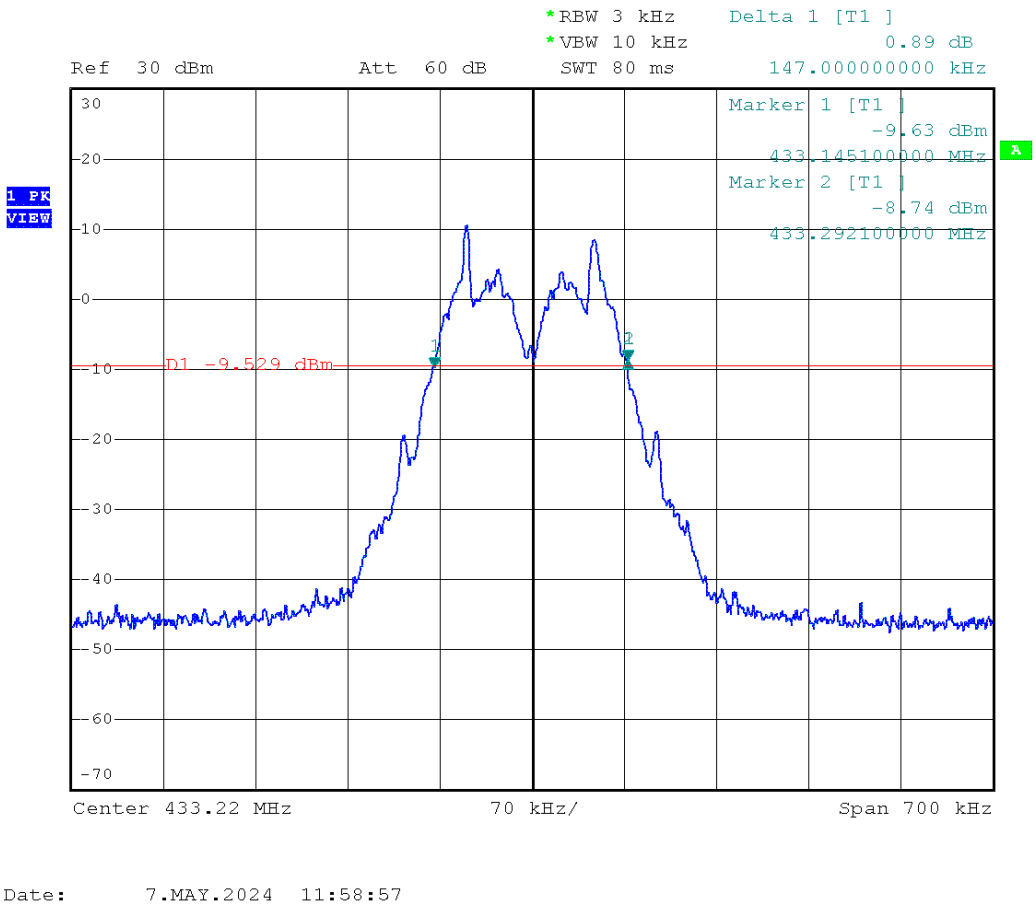
| Test Procedure |
|---|
| 1. EUT set to test mode (Communication tester is used if needed)<br>2. Span set to at least twice the emission spectrum<br>3. Resolution bandwidth set to 1% of span<br>4. For Industry Canada the occupied bandwidth (99%) is measurement with spectrum analyzer built in measurement function<br>5. For FCC the 20 dB bandwidth is measurement with spectrum analyzer |

2.3.6 Results

| Test Results | | | |
|---|---|---|---|
| Channel [MHz] | Emission Bandwidth [kHz] | Limit [kHz] | Margin [kHz] |
| 433.22 | 147.0 | 1083.05 | -936.05 |
| 434.62 | 147.0 | 1086.55 | -939.55 |

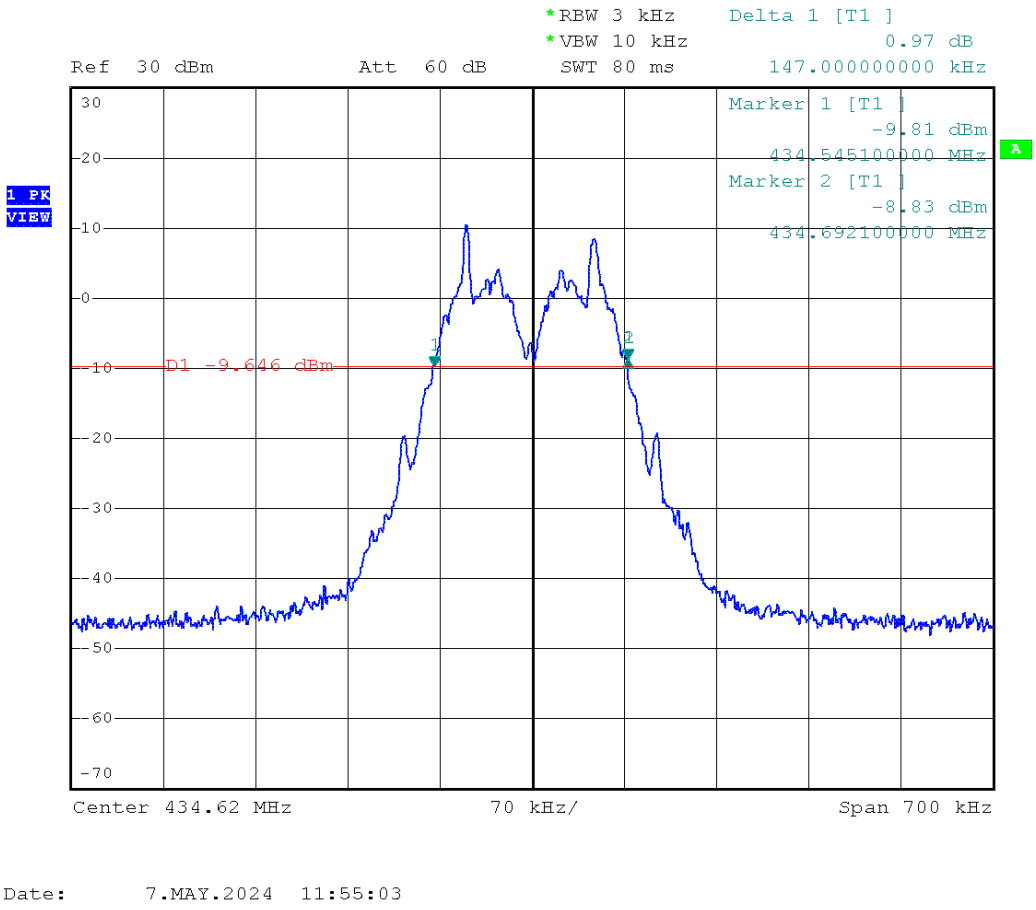
## Emission Bandwidth

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 47698 |
| Reference Standards: | FCC 15.231 |
| Reference Method: | ANSI C63.10:2013, Section 6.9.2 |
| Operating Frequency: | 433.22 MHz |
| Operating Conditions: | Tnom/Vnom |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Emission Bandwidth [kHz]: | 147.0 |
| Emission Bandwidth Limit [kHz]: | 1083.05 |
| Mode: | Transmit |



## Emission Bandwidth

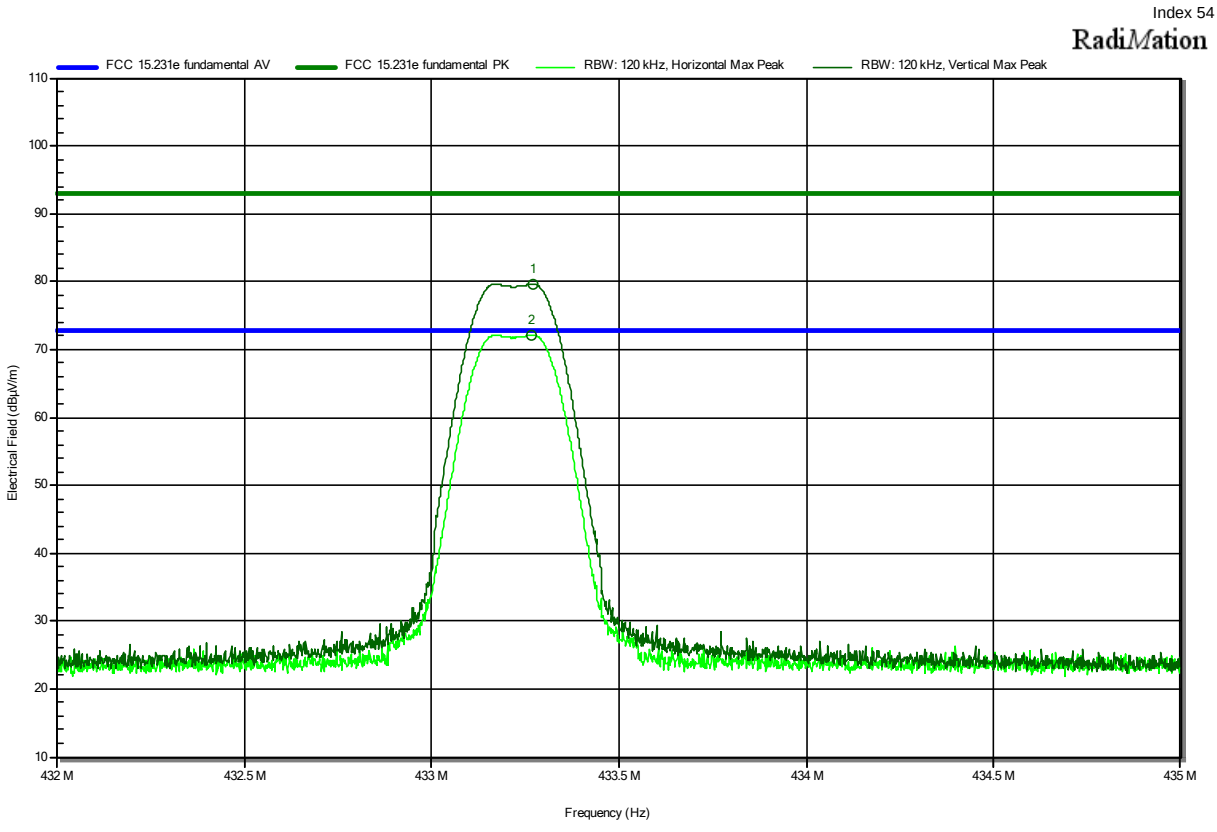
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 47698 |
| Reference Standards: | FCC 15.231 |
| Reference Method: | ANSI C63.10:2013, Section 6.9.2 |
| Operating Frequency: | 434.62 MHz |
| Operating Conditions: | Tnom/Vnom |
| Operator: | Ehsan Sohrabi |
| Test Site: | Eurofins Product Service GmbH |
| Test Date: | 2024-05-07 |
| Emission Bandwidth [kHz]: | 147.0 |
| Emission Bandwidth Limit [kHz]: | 1086.55 |
| Mode: | Transmit |



# ANNEX A Field strength of fundamental

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

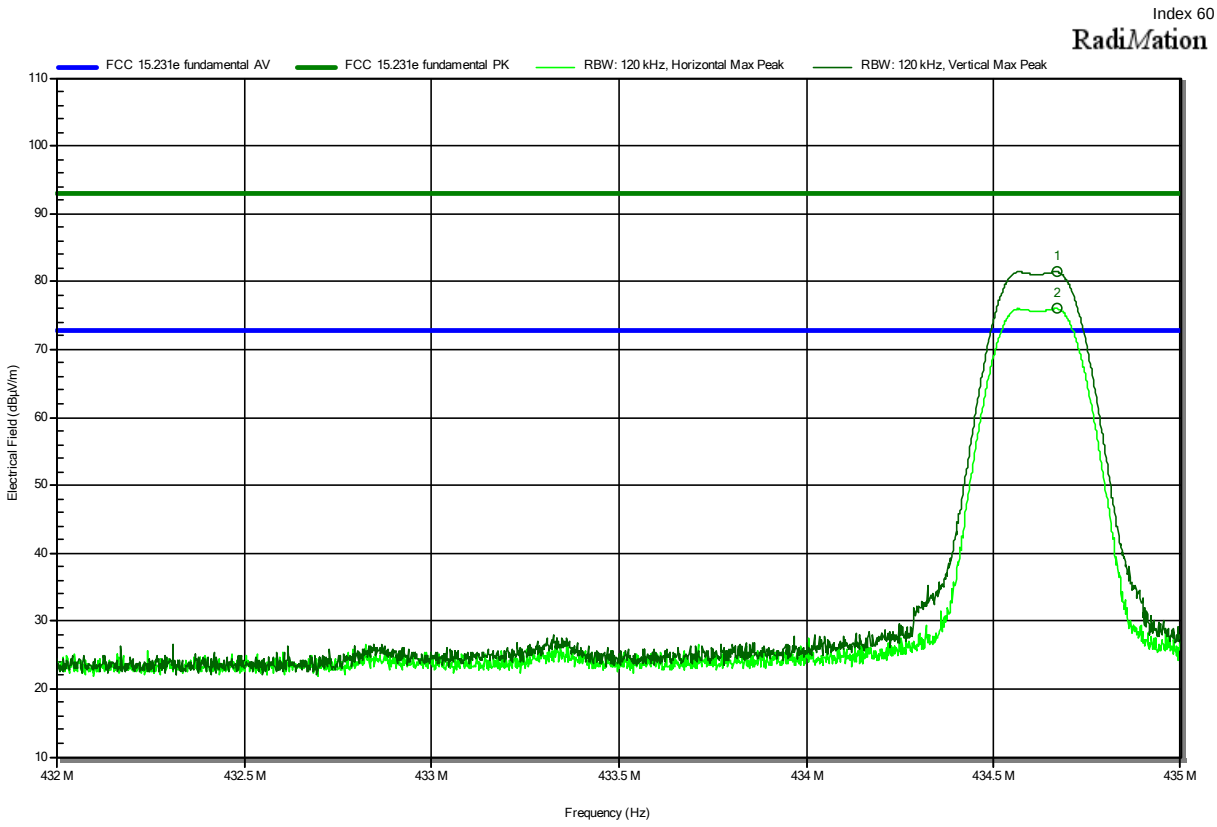
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck VULB 9168 |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-29 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 433.2672 MHz | 72.1 dBµV/m | 92.9 dBµV/m | -20.76 dB | Pass | Horizontal |
| 433.2702 MHz | 79.6 dBµV/m | 92.9 dBµV/m | -13.29 dB | Pass | Vertical |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck VULB 9168 |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-29 |

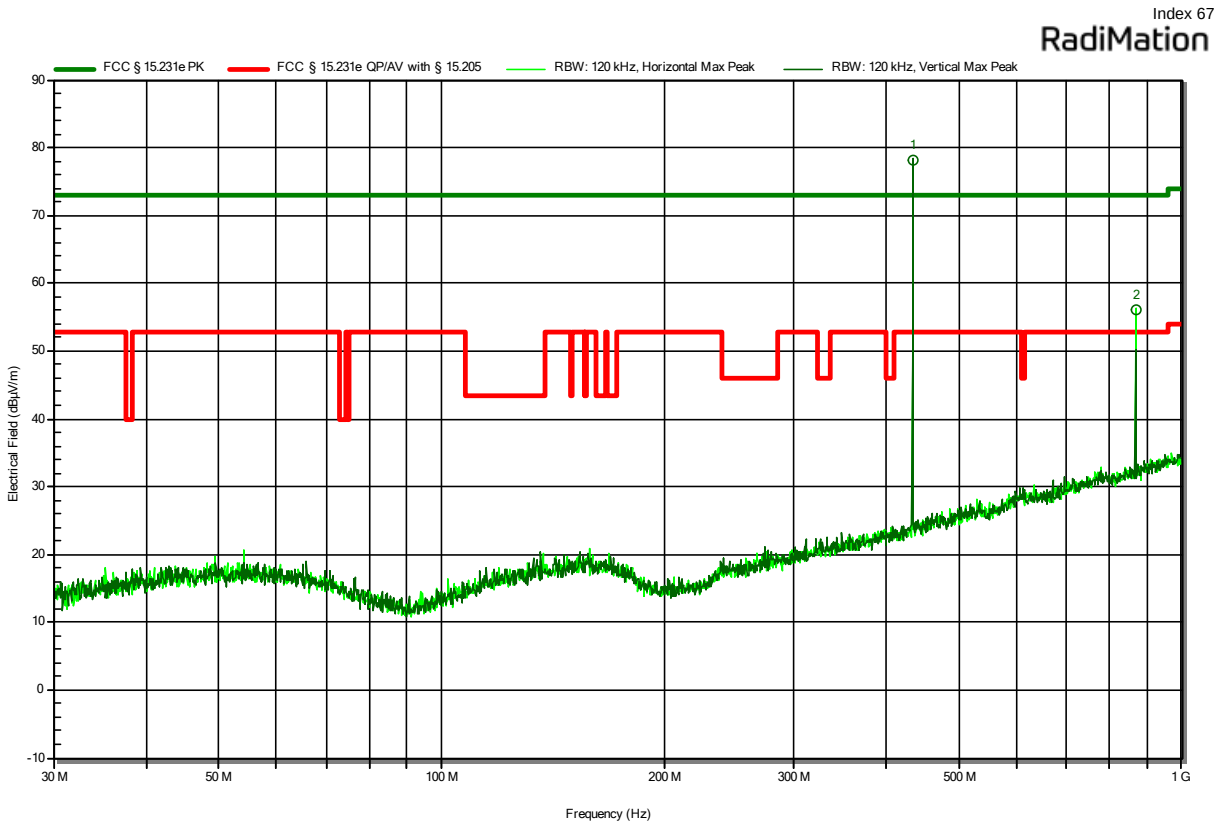



| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 434.6681 MHz | 81.4 dBµV/m | 92.9 dBµV/m | -11.5 dB | Pass | Vertical |
| 434.6705 MHz | 76 dBµV/m | 92.9 dBµV/m | -16.94 dB | Pass | Horizontal |

# ANNEX B Transmitter spurious emissions

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

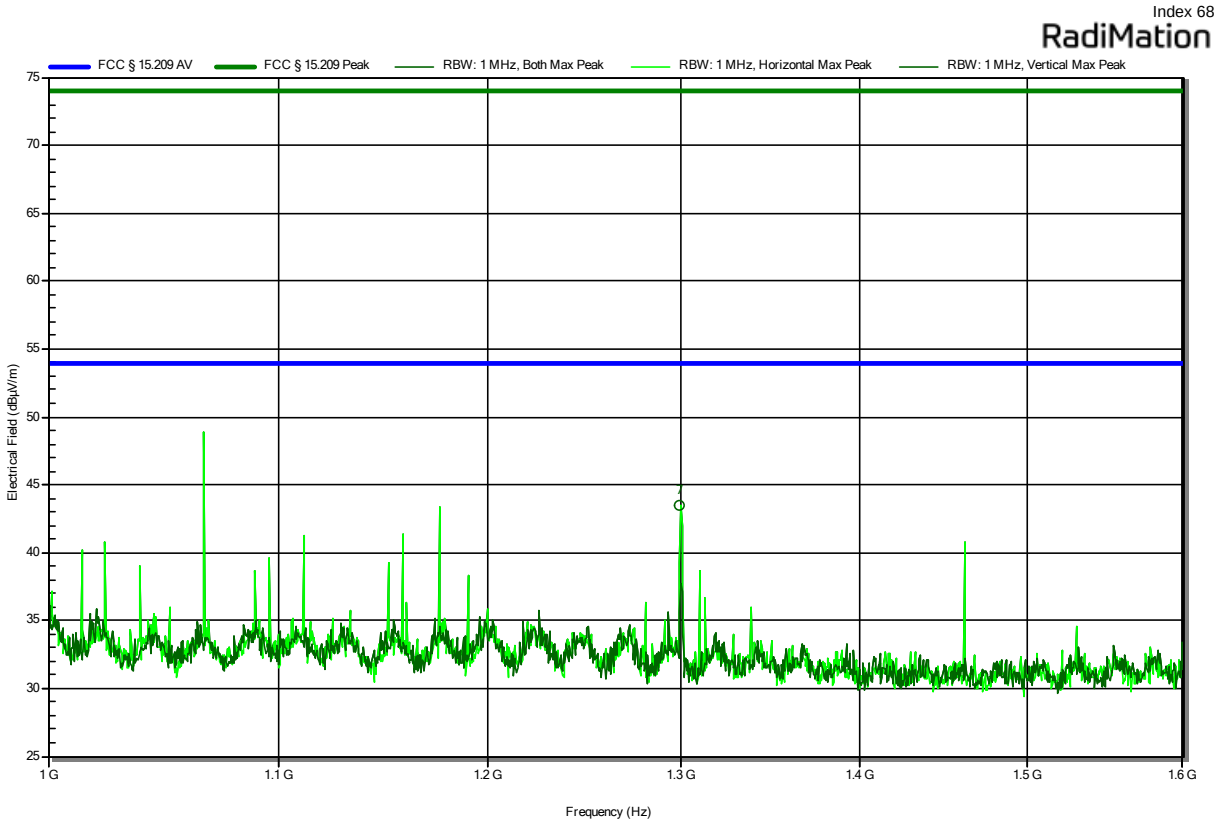
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck VULB 9168 |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-29 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 433.229 MHz | 78.1 dBµV/m | 72.9 dBµV/m | 5.2 dB | Carrier | Vertical |
| 866.5603 MHz | 56 dBµV/m | 72.9 dBµV/m | -16.9 dB | Pass | Horizontal |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

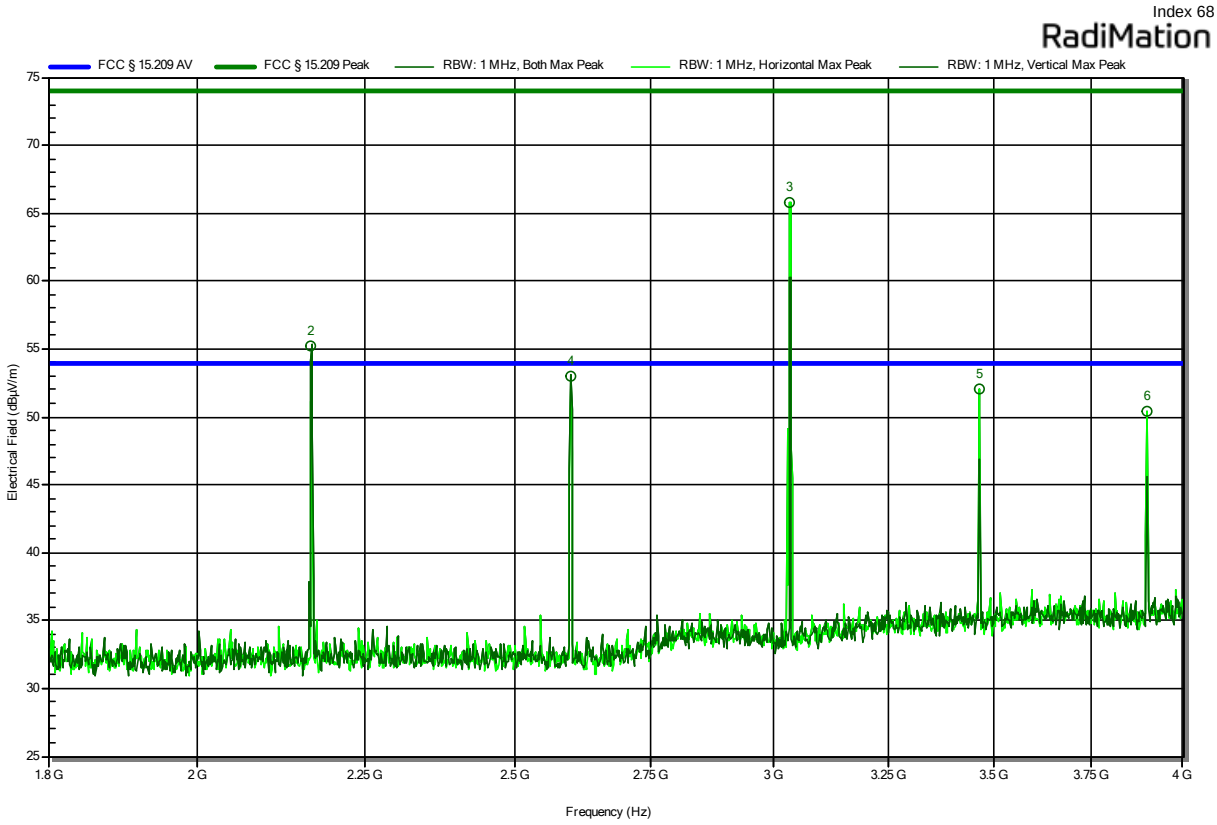
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Ehsan Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120B |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-30 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1.299 GHz | 43.53 dBµV/m | 74 dBµV/m | -30.47 dB | Pass | Horizental |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

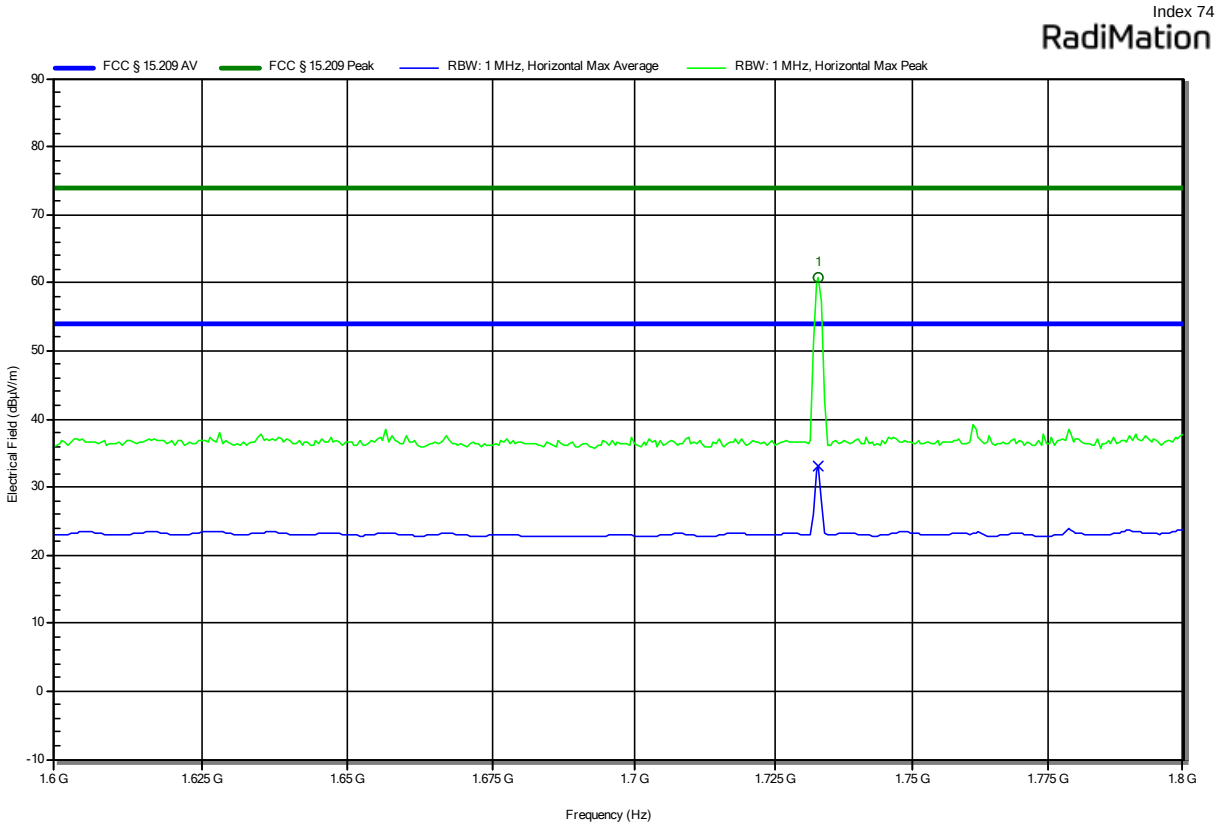
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Ehsan Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120B |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-30 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 2.166 GHz | 55.18 dBµV/m | 74 dBµV/m | -18.82 dB | Pass | Vertical |
| 2.599 GHz | 53.05 dBµV/m | 74 dBµV/m | -20.95 dB | Pass | Vertical |
| 3.032 GHz | 65.8 dBµV/m | 74 dBµV/m | -8.2 dB | Pass | Horizontal |
| 3.465 GHz | 52.03 dBµV/m | 74 dBµV/m | -21.97 dB | Pass | Horizontal |
| 3.899 GHz | 50.36 dBµV/m | 74 dBµV/m | -23.64 dB | Pass | Horizontal |

**Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231**

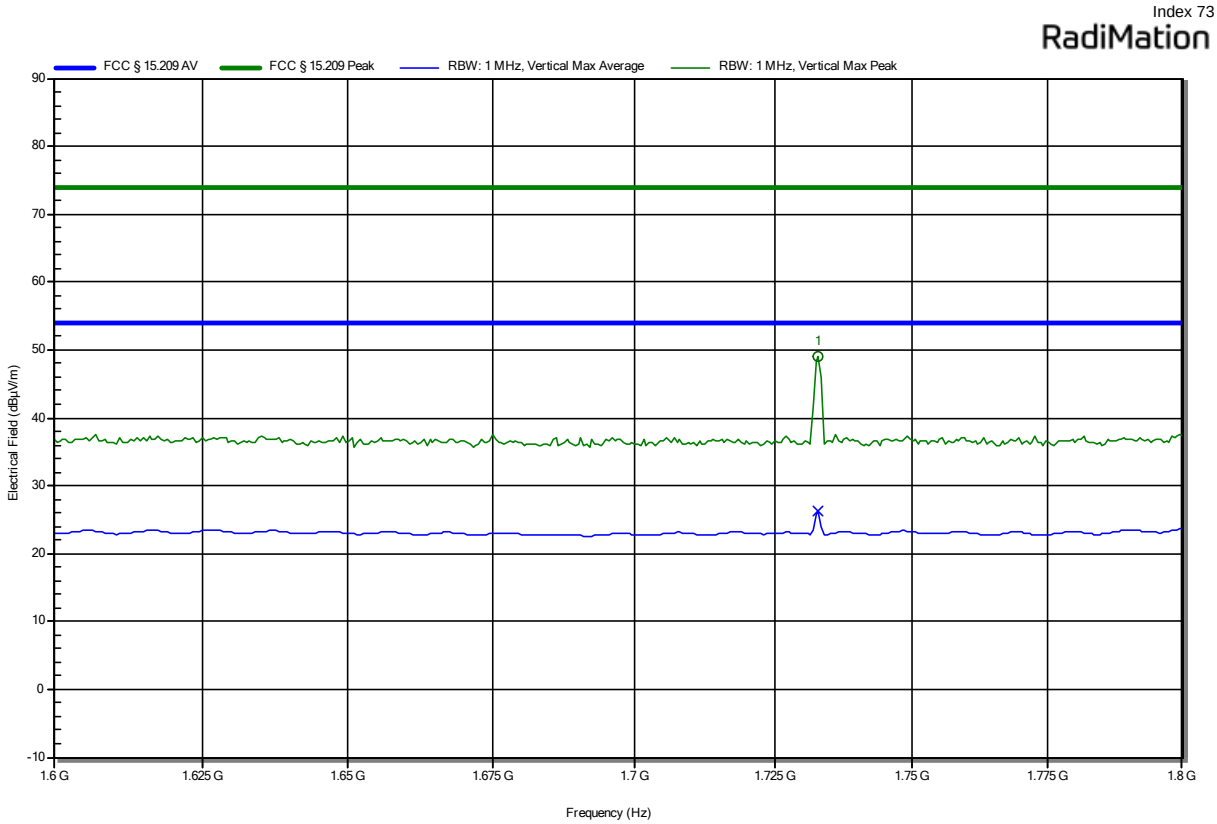
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48345 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2023.2.6 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120D |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit DC |
| Test Date: | 2024-06-06 |
| Note: | Antenna Horizental, 4th Harmonic |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1733 MHz | 60.81 dBµV/m | 74 dBµV/m | -13.19 dB | Pass | Horizontal |

**Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231**

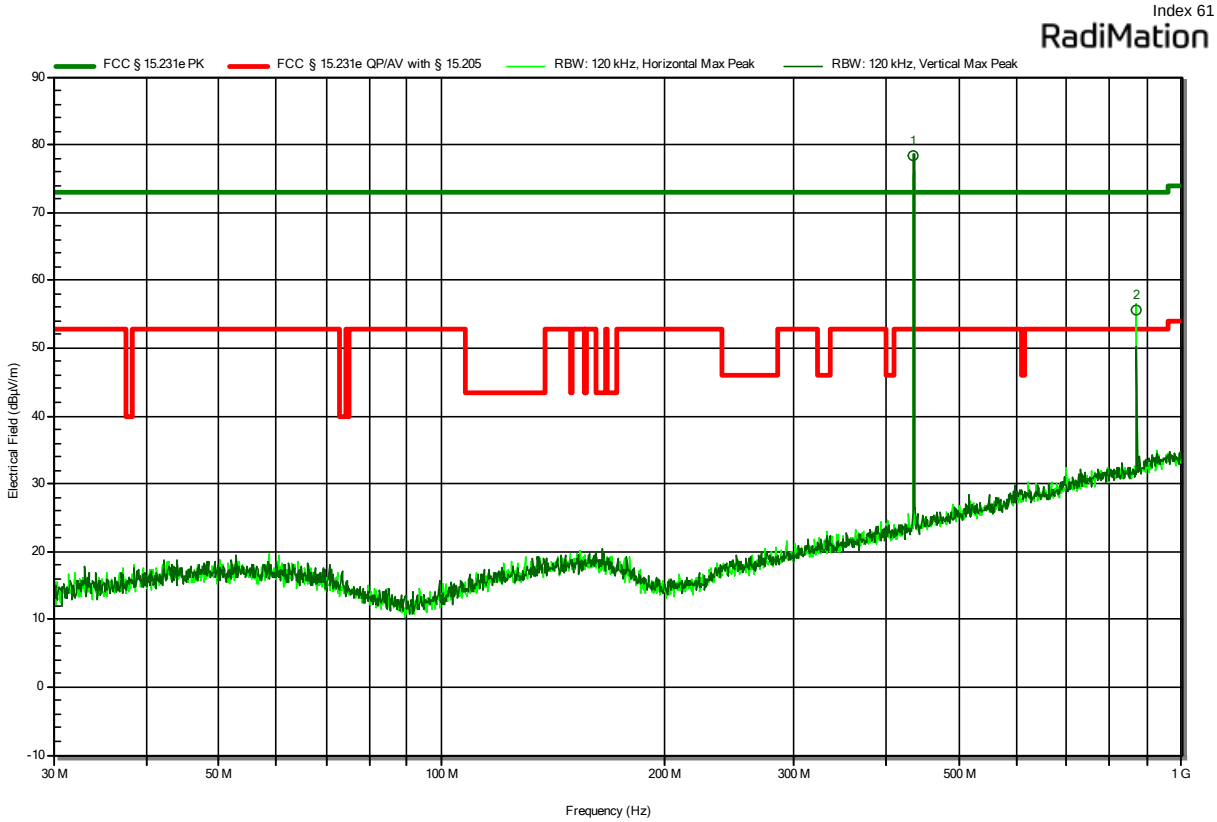
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48345 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2023.2.6 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120D |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 433.22 MHz, P024 pill, Transmit DC |
| Test Date: | 2024-06-06 |
| Note: | Antenna Vertical, 4th Harmonic |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1733 MHz | 48.99 dBµV/m | 74 dBµV/m | -25.01 dB | Pass | Vertical |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

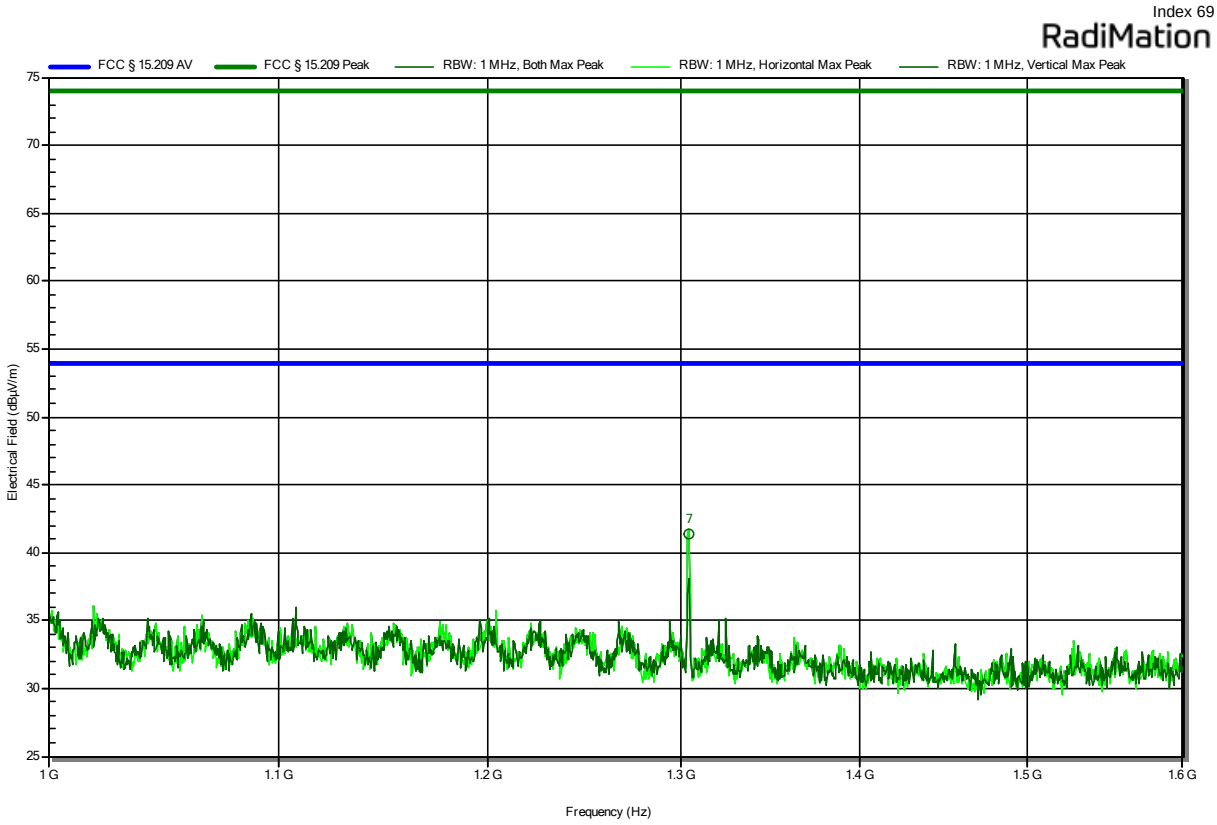
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck VULB 9168 |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-29 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 434.6193 MHz | 78.4 dBµV/m | 72.90 dBµV/m | 5.5 dB | Carrier | Vertical |
| 869.3087 MHz | 55.7 dBµV/m | 72.90 dBµV/m | -17.2 dB | Pass | Horizontal |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Ehsan Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120B |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-30 |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1.304 GHz | 41.36 dBµV/m | 74 dBµV/m | -32.64 dB | Pass | Horizontal |

## Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48319 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Ehsan Sohrabi |
| Measurement software: | RadiMation, version 2020.1.8 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120B |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit |
| Test Date: | 2024-05-30 |

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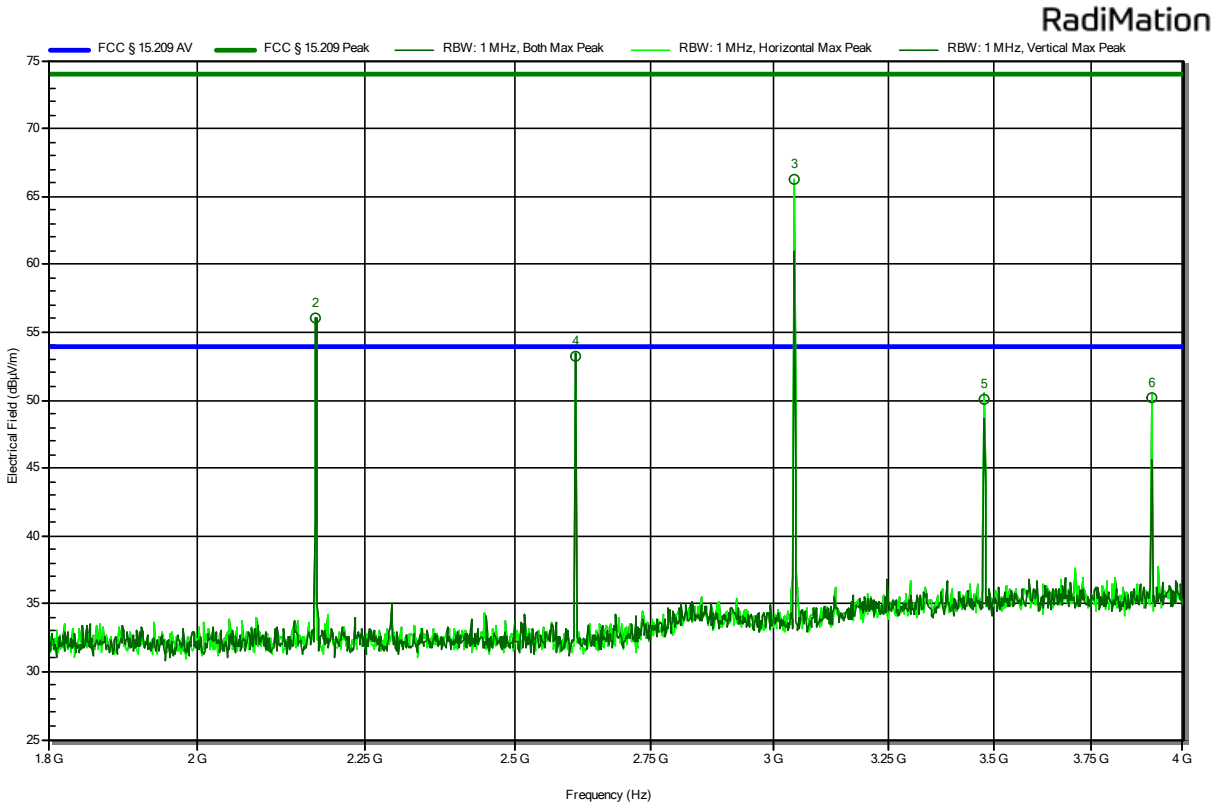
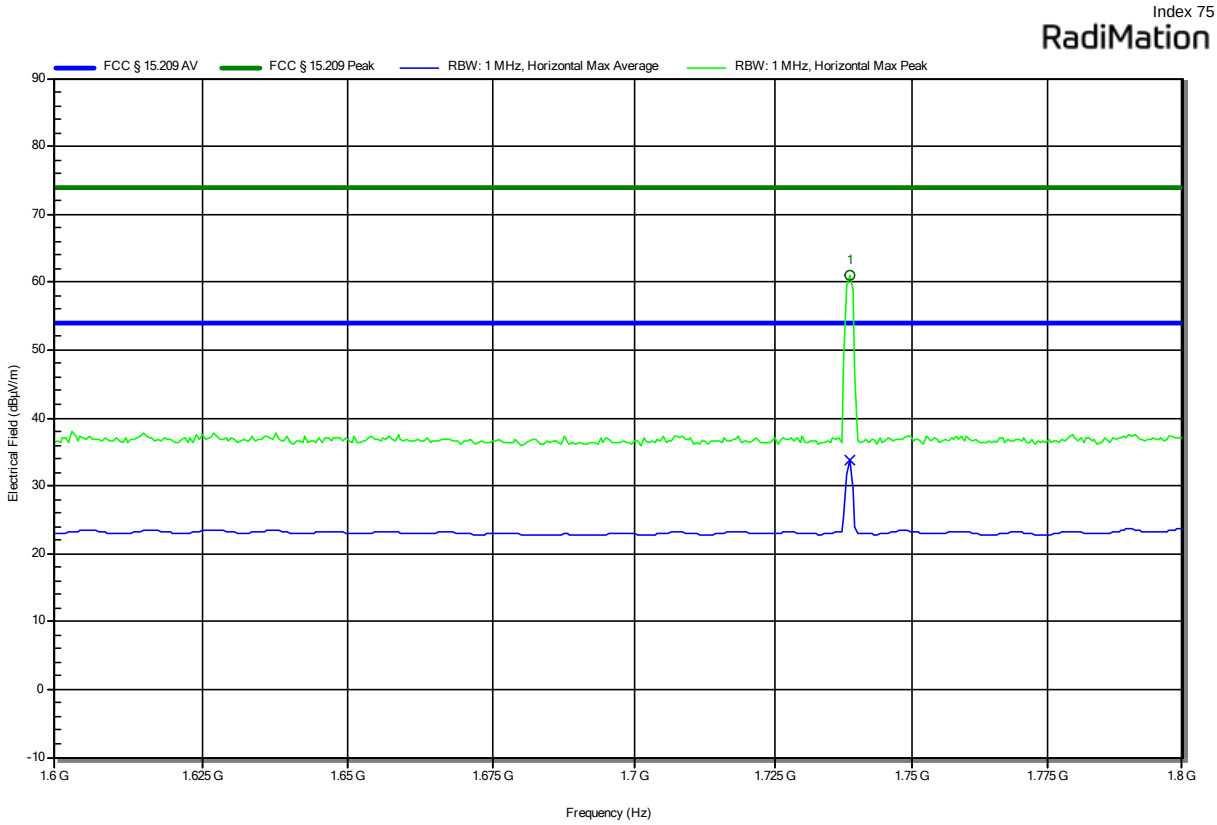



| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 2.173 GHz | 56.01 dBµV/m | 74 dBµV/m | -17.99 dB | Pass | Vertical |
| 2.607 GHz | 53.2 dBµV/m | 74 dBµV/m | -20.8 dB | Pass | Vertical |
| 3.042 GHz | 66.24 dBµV/m | 74 dBµV/m | -7.76 dB | Pass | Horizontal |
| 3.477 GHz | 50.06 dBµV/m | 74 dBµV/m | -23.94 dB | Pass | Horizontal |
| 3.912 GHz | 50.19 dBµV/m | 74 dBµV/m | -23.81 dB | Pass | Horizontal |

**Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231**

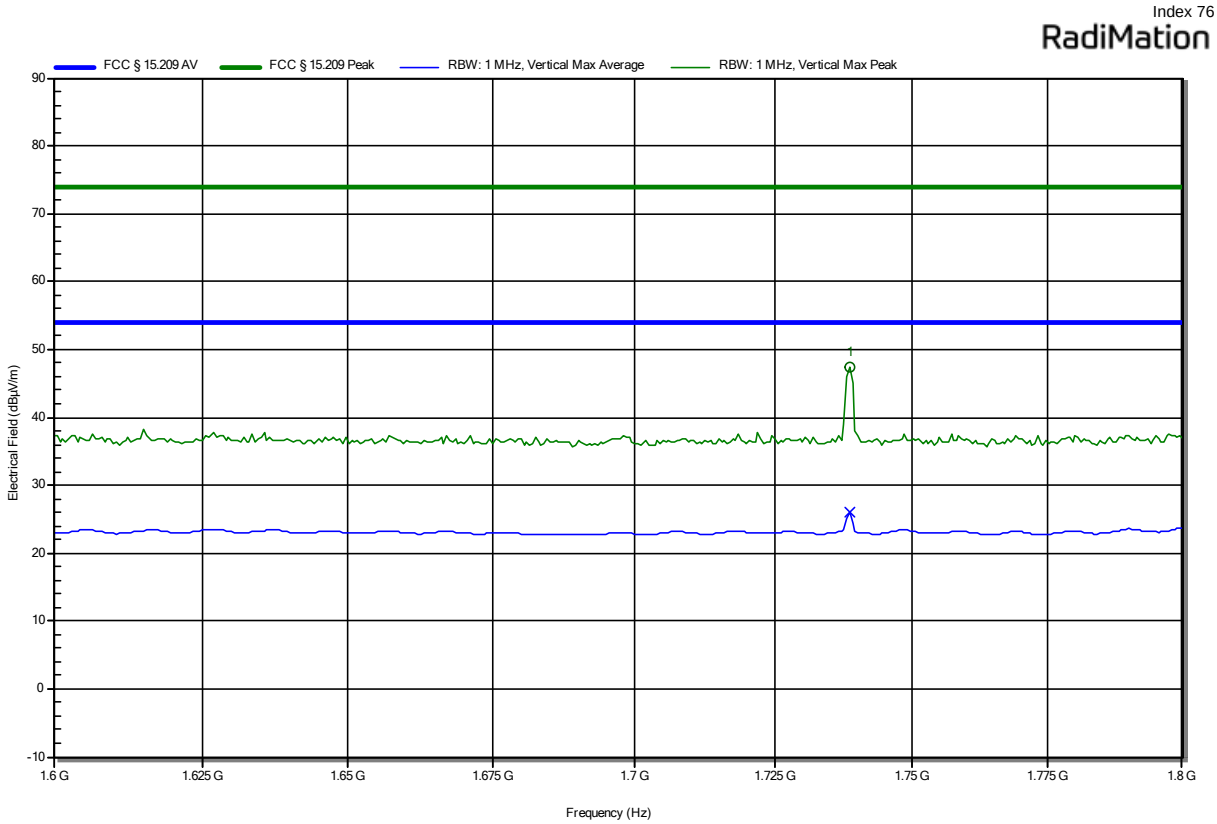
| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48345 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2023.2.6 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120D |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit DC |
| Test Date: | 2024-06-06 |
| Note: | Antenna Horizental, 4th Harmonic |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1738.5 MHZ | 61.09 dBµV/m | 74 dBµV/m | -12.91 dB | Pass | Horizontal |

**Radiated Spurious Emissions according to 47 CFR Part 15 Subpart C §15.231**

| | |
|---|---|
| Project Number: | G0M-2303-1995 |
| Applicant: | BodyCAP |
| Model Description: | Core Body temperature monitoring equipment |
| Model: | eCelsius Medical Pill P024-M |
| Test Sample ID: | 48345 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Sohrabi |
| Measurement software: | RadiMation, version 2023.2.6 |
| Test Conditions: | Tnom: 22 °Celsius, Vnom: 3.1 VDC |
| Antenna: | Schwarzbeck BBHA 9120D |
| Measurement distance: | 3 m |
| Mode: | Tx; GFSK; CH= 434.62 MHz, P024 pill, Transmit DC |
| Test Date: | 2024-06-06 |
| Note: | Antenna Vertical, 4th Harmonic |




| Frequency | Peak | Peak Limit | Peak Difference | Peak Status | Polarization |
|---|---|---|---|---|---|
| 1738.5 MHz | 47.41 dBµV/m | 74 dBµV/m | -26.59 dB | Pass | Vertical |

========== END OF THE TEST REPORT ==========