



**Date: 20 September 2023**

**I.T.L. Product Testing Ltd.  
FCC Spot Test Report**

**for**

**PetPace Ltd.**

**Equipment under test:**

**IoT Module**

**Model: PC2**

**Manufacturer: Nordic Semiconductor**

**FCC ID: 2ACUD-PC2M**

Tested by:   
L. Tenenbaum

Approved by:   
M. Zohar

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# 1. General Information

## 1.1 Administrative Information

|                               |                                                                                                                                  |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Applicant:                    | PetPace Ltd.                                                                                                                     |
| Equipment Under Test (E.U.T): | IoT Module                                                                                                                       |
| Model:                        | PC2                                                                                                                              |
| Equipment Serial No.:         | N/A                                                                                                                              |
| Date of Receipt of E.U.T:     | 24 Aug. 2023                                                                                                                     |
| Start of Test:                | 24 Aug. 2023                                                                                                                     |
| End of Test:                  | 24 Aug. 2023                                                                                                                     |
| Test Laboratory Location:     | I.T.L. Product Testing Ltd.<br>3 Ha'oreg Street, Modi'in Maccabim Reut<br>7177909, Israel<br>1 Batsheva St., Lod 7120101, Israel |
| Test Specifications:          | FCC Part 15, Subpart C, Section 15.247<br>FC KDB 484596 D01 Referencing Test<br>Data v01                                         |

## 1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

## 1.3 Product Description

The EUT is an IoT module.

## 1.4 Measurement Uncertainty

### Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15: 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

$\pm 3.44$  dB



### **Radiated Emission**

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)  
for open site:

30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):  
 $\pm 4.96$  dB

1 GHz to 6 GHz

Expanded Uncertainty (95% Confidence, K=2):  
 $\pm 5.19$  dB

>6 GHz

Expanded Uncertainty (95% Confidence, K=2):  
 $\pm 5.51$  dB

## 2. System Test Configuration

### 2.1 Justification

1. This report describes the E.U.T. spot testing, as part of its integration into a pet collar (FCC ID 2ACUD-PC2, model number: PC2) as a component, as was required by the TCB (Timco Engineering Inc.) in accordance with FCC KDB 484596 D01, to show compliance with the E.U.T.'s original test results<sup>1</sup>.
2. The following frequencies were tested for spurious emission: 780 MHz, 831 MHz, 1740 MHz, and 1880 MHz.
3. During the tests the E.U.T. in Tx mode.
4. The evaluation was performed while the E.U.T was on battery operation.

### 2.2 EUT Exercise Software

No special exercise software was used.

### 2.3 Special Accessories

No special accessories were used.

### 2.4 Equipment Modifications

No modification was made.

### 2.5 Configuration of Tested System



Figure 1. Configuration of Tested System Radiated

<sup>1</sup> The E.U.T. (FCC ID: 2ANPO00NRF9160) was originally tested on 11-23-2018 by Dekra Testing & Certification, S.A.U. (see test report no. 58741RRF.003)

### 3. Test Setup Photos



Figure 2 9 kHz 30 MHz

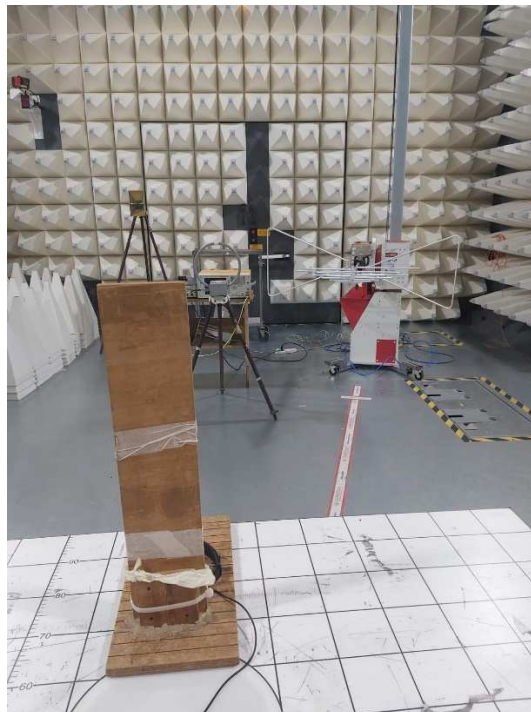


Figure 3 30 MHz - 1 GHz

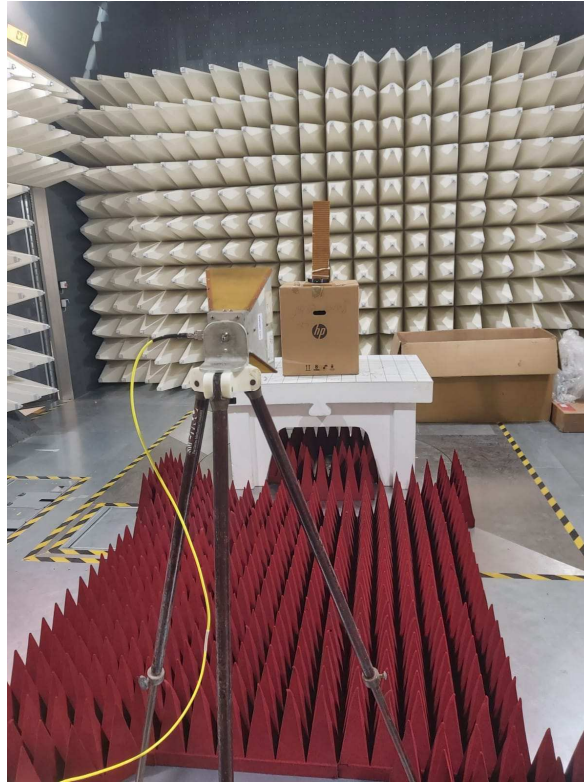


Figure 4 1-18 GHz

## 4. Spot Test

### 4.1 Test Specification

FCC 47 CFR §27.53 (c),(h)

ISED RSS-139 Clause 4.6, 6.6

### 4.2 Test Procedure

(Temperature (22°C)/ Humidity (61%RH))

The frequency range 9.0 kHz to 18.0 GHz was scanned in four bands.

Different RBW were set according to the frequency ranges.

These frequencies were measured using a peak detector.

### 4.3 Test Limit

LTE BAND IV. FCC §27.53 (h). RSS-139 Clause 6.6.

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. P in watts.

LTE BAND XIII.

FCC §27.53 (c).

- On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB.
- On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.

RSS-130 Clause 4.6.

- The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB.

The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least  $65 + 10 \log_{10} p$  (watts), dB, for mobile and portable equipment.

### 4.4 Test Results

JUDGEMENT: PASS

### Original report's test results:

#### LTE Band IV

##### 1. CHANNEL: LOWEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

##### 2. CHANNEL: MIDDLE

No spurious signals were found at less than 20dB respect to the limit in all the range.

##### 3. CHANNEL: HIGHEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

#### LTE Band XIII

##### 1. CHANNEL: LOWEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

##### 2. CHANNEL: MIDDLE

| Frequency (MHz) | Level (dBm) | Limit (dBm) |
|-----------------|-------------|-------------|
| 774.980         | -54.02      | -35.00      |

##### 3. CHANNEL: HIGHEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

Antenna Polarization: Horizontal/Vertical

Frequency Range: 9kHz to 18.0 GHz

Antenna gain mode : 2.0 dBi

Detector: Peak, Average

| Operation Frequency | Freq. | Pol   |                                                                                        | Peak Reading | Peak Limit | Peak Margin | Average Reading | Average Limit | Average Margin |
|---------------------|-------|-------|----------------------------------------------------------------------------------------|--------------|------------|-------------|-----------------|---------------|----------------|
| (MHz)               | (MHz) | (H/V) |                                                                                        | (dBμV/m)     | (dBμV/m)   | (dB)        | (dBμV/m)        | (dBμV/m)      | (dB)           |
| 780.0               |       |       | No radiated spurious emissions were detected at less than 6 dB in respect to the limit |              |            |             |                 |               |                |
| 831.0               |       |       |                                                                                        |              |            |             |                 |               |                |
| 1740.0              |       |       |                                                                                        |              |            |             |                 |               |                |
| 1880.0              |       |       |                                                                                        |              |            |             |                 |               |                |

Figure 5. Radiated Emission Results for 11dBi antenna gain

## 4.5 Test Equipment Used

| I.T.L. # | Instrument                    | Manufacturer    | Model   | Serial No. | Last Calibration Date | Next Calibration Due |
|----------|-------------------------------|-----------------|---------|------------|-----------------------|----------------------|
| 1037     | Low Noise Amplifier 16-30 GHz | Sophia Wireless | LNA28-B | 232        | May 16, 2022          | Sep 15, 2023         |

| I.T.L. # | Instrument                              | Manufacturer            | Model                      | Serial No.          | Last Calibration Date | Next Calibration Due |
|----------|-----------------------------------------|-------------------------|----------------------------|---------------------|-----------------------|----------------------|
| 1353     | Horn Antenna                            | ARA                     | SWH-28                     | 1007                | Nov 2, 2021           | Nov 2, 2024          |
| 1366     | Horn Antenna                            | EMCO                    | 3115                       | 9702-511            | May 25, 2021          | May 25, 2024         |
| 1778     | Cable for KA Band Antenna               | OSR Electronics (Serge) | 37297C KPS                 | 1503-590 (05032006) | May 16, 2022          | Sep 15, 2023         |
| 1783     | 20 cm Cable for KA Band Antenna         | Rhophase Microwave      | 01536 263440 (A1673)       | A1673               | May 16, 2022          | Sep 15, 2023         |
| 1998     | Band pass filter (9GHz to 18GHz)        | OSR                     | 0                          | 0                   | May 16, 2022          | Sep 15, 2023         |
| 2053     | BandPass Filter 18GHz-40GHz             | OSR                     | HPF 18GHz - 40GHz          | 0                   | May 16, 2022          | Sep 15, 2023         |
| 2163     | Signal analyzer                         | Keysight                | EXA signal analyzer N9010A | my511700 71         | Feb 13, 2022          | Feb 13, 2024         |
| 2199     | Trilog broadband antenna 30 MHz - 7 GHz | Schwarzbeck             | VULB 9162                  | 585                 | Sep 12, 2022          | Sep 12, 2024         |
| 2210     | Semi Anechoic Chamber                   | Frankonia Group         | SAC-3                      | 0                   | May 23, 2023          | May 23, 2024         |

Figure 6 Test Equipment Used



## 5. Antenna Information

The antenna gain is 2.0 dBi, type: integral.

The above information was provided by the applicant.

## 6. Appendix A - Correction Factors

| ITL # 1075: Active Loop Antenna |             |           |  |                 |             |           |
|---------------------------------|-------------|-----------|--|-----------------|-------------|-----------|
| Frequency (MHz)                 | MAF (dBs/m) | AF (dB/m) |  | Frequency (MHz) | MAF (dBs/m) | AF (dB/m) |
| 0.01                            | -33.1       | 18.4      |  | 2.0             | -40.0       | 11.5      |
| 0.02                            | -37.2       | 14.3      |  | 3.0             | -40.0       | 11.5      |
| 0.03                            | -38.2       | 13.3      |  | 4.0             | -40.1       | 11.4      |
| 0.05                            | -39.8       | 11.7      |  | 5.0             | -40.2       | 11.3      |
| 0.1                             | -40.1       | 11.4      |  | 6.0             | -40.4       | 11.1      |
| 0.2                             | -40.3       | 11.2      |  | 7.0             | -40.4       | 11.1      |
| 0.3                             | -40.3       | 11.2      |  | 8.0             | -40.4       | 11.1      |
| 0.5                             | -40.3       | 11.2      |  | 9.0             | -40.5       | 11.0      |
| 0.7                             | -40.3       | 11.2      |  | 10.0            | -40.5       | 11.0      |
| 1.0                             | -40.1       | 11.4      |  | 20.0            | -41.5       | 10.0      |

| ITL # 1352: Horn Antenna |           |                 |           |
|--------------------------|-----------|-----------------|-----------|
| Frequency (MHz)          | AF (dB/m) | Frequency (MHz) | AF (dB/m) |
| 0.75                     | 25        | 9.5             | 38        |
| 1.0                      | 23.5      | 10.0            | 38.5      |
| 1.5                      | 26.0      | 10.5            | 38.5      |
| 2.0                      | 29.0      | 11.0            | 38.5      |
| 2.5                      | 27.5      | 11.5            | 38.5      |
| 3.0                      | 30.0      | 12.0            | 38.0      |
| 3.5                      | 31.5      | 12.5            | 38.5      |
| 4.0                      | 32.5      | 13.0            | 40.0      |
| 4.5                      | 32.5      | 13.5            | 41.0      |
| 5.0                      | 33.0      | 14.0            | 40.0      |
| 5.5                      | 35.0      | 14.5            | 39.0      |
| 6.0                      | 36.5      | 15.0            | 38.0      |
| 6.5                      | 36.5      | 15.5            | 37.5      |
| 7.0                      | 37.5      | 16.0            | 37.5      |
| 7.5                      | 37.5      | 16.5            | 39.0      |
| 8.0                      | 37.5      | 17.0            | 40.0      |
| 8.5                      | 38.0      | 17.5            | 42.0      |
| 9.0                      | 37.5      | 18.0            | 42.5      |

| ITL # 1353: Horn Antenna (@ 3m distance) <sup>2</sup> |                                |                 |                                |
|-------------------------------------------------------|--------------------------------|-----------------|--------------------------------|
| Frequency (MHz)                                       | Measured antenna factor (dB/m) | Frequency (MHz) | Measured antenna factor (dB/m) |

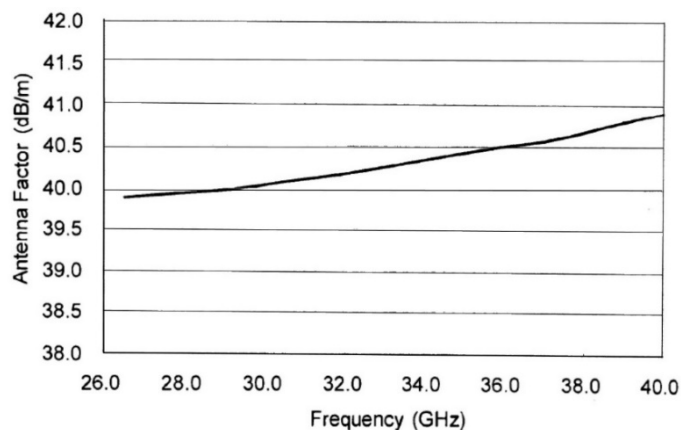
<sup>2</sup> The antenna factor shall be added to the receiver reading in dBμV to obtain field strength in dBμV/m

|         |      |         |      |
|---------|------|---------|------|
| 18000.0 | 32.4 | 22500.0 | 33.0 |
| 18500.0 | 32.0 | 23000.0 | 33.1 |
| 19000.0 | 32.3 | 23500.0 | 33.8 |
| 19500.0 | 32.4 | 24000.0 | 33.5 |
| 20000.0 | 32.3 | 24500.0 | 33.5 |
| 20500.0 | 32.8 | 25000.0 | 33.8 |
| 21000.0 | 32.8 | 25500.0 | 33.9 |
| 21500.0 | 32.7 | 26000.0 | 34.2 |
| 22000.0 | 33.1 | 26500.0 | 34.7 |

**ITL #1840: Anechoic Chamber RF Cable**

| Frequency (MHz) | Cable Loss (dB) | Frequency (MHz) | Cable Loss (dB) |
|-----------------|-----------------|-----------------|-----------------|
| 1000.0          | -1.4            | 10000.0         | -6.0            |
| 1500.0          | -1.7            | 10500.0         | -6.2            |
| 2000.0          | -2.0            | 11000.0         | -6.2            |
| 2500.0          | -2.3            | 11500.0         | -6.0            |
| 3000.0          | -2.6            | 12000.0         | -6.0            |
| 3500.0          | -2.8            | 12500.0         | -6.1            |
| 4000.0          | -3.1            | 13000.0         | -6.3            |
| 4500.0          | -3.3            | 13500.0         | -6.5            |
| 5000.0          | -3.6            | 14000.0         | -6.7            |
| 5500.0          | -3.7            | 14500.0         | -7.0            |
| 6000.0          | -4.0            | 15000.0         | -7.3            |
| 6500.0          | -4.4            | 15500.0         | -7.5            |
| 7000.0          | -4.7            | 16000.0         | -7.6            |
| 7500.0          | -4.8            | 16500.0         | -8.0            |
| 8000.0          | -5.0            | 17000.0         | -8.0            |
| 8500.0          | -5.1            | 17500.0         | -8.1            |
| 9000.0          | -5.6            | 18000.0         | -8.2            |
| 9500.0          | -5.8            |                 |                 |

**ITL # 1777: 26.5-40 GHz Horn Antenna**





**ITL # 2199 Trilog Broadband Antenna30 MHz - 1 GHz +  
RF cables**

| Frequency (MHz) | Measured antenna factor (dB/m) | Frequency (MHz) | Measured antenna factor (dB/m) |
|-----------------|--------------------------------|-----------------|--------------------------------|
| 30.00           | 14.30                          | 80.00           | 11.10                          |
| 40.00           | 16.20                          | 90.00           | 13.40                          |
| 50.00           | 17.40                          | 100.00          | 15.20                          |
| 60.00           | 16.30                          | 150.00          | 11.40                          |
| 70.00           | 13.00                          | 200.00          | 14.10                          |
| 80.00           | 11.10                          | 300.00          | 16.10                          |
| 90.00           | 13.40                          | 400.00          | 18.10                          |
| 100.00          | 15.20                          | 500.00          | 19.50                          |
| 150.00          | 11.40                          | 600.00          | 21.10                          |
| 30.00           | 14.30                          | 700.00          | 22.50                          |
| 40.00           | 16.20                          | 800.00          | 23.50                          |
| 50.00           | 17.40                          | 900.00          | 24.70                          |
| 60.00           | 16.30                          | 1000.00         | 25.50                          |
| 70.00           | 13.00                          |                 |                                |

**End of Test Report**