



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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I.T.L. Product Testing Ltd. This report relates only to items tested.



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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. 3 Ha'oreg Street, Modi'in Maccabim Reut 7177909, Israel 1 Batsheva St., Lod 7120101, Israel
Test Specifications:	FCC Part 15, Subpart C, Section 15.247 FC KDB 484596 D01 Referencing Test 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):

± 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):

± 4.96 dB

1 GHz to 6 GHz

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

±5.19 dB

>6 GHz

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

±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 results¹.
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

¹ 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

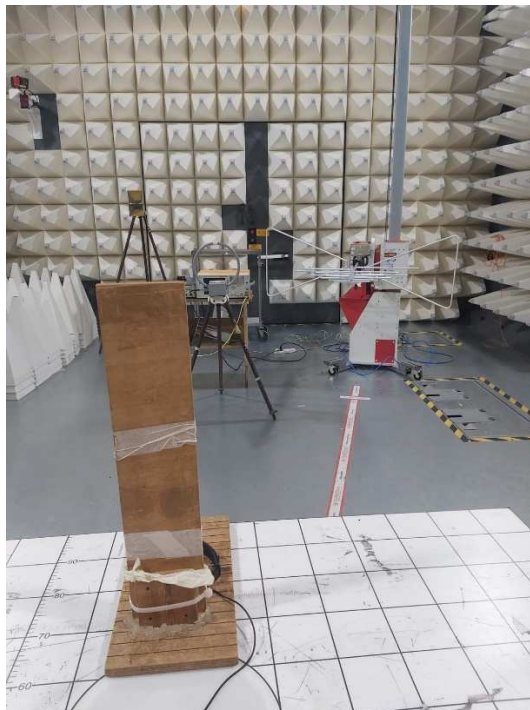


Figure 3 30 MHz - 1 GHz

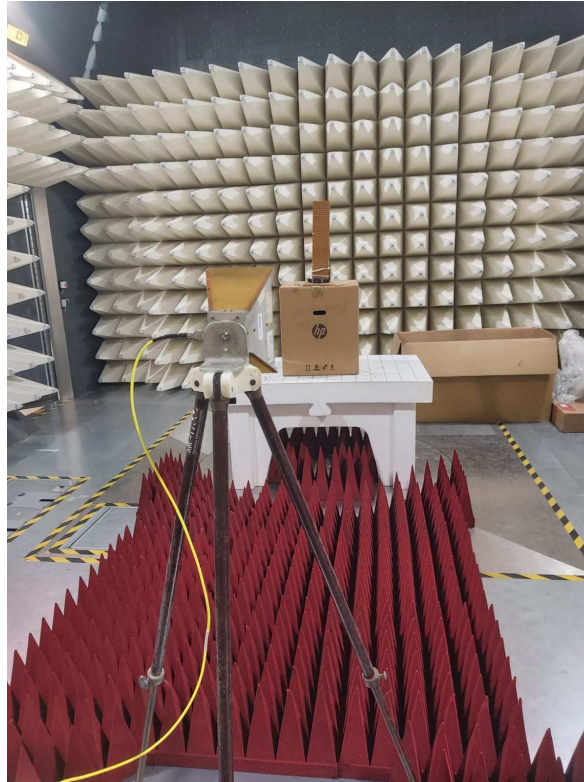


Figure 4 1-18 GHz



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) ²			
Frequency (MHz)	Measured antenna factor (dB/m)	Frequency (MHz)	Measured antenna factor (dB/m)

² The antenna factor shall be added to the receiver reading in dB μ V to obtain field strength in dB μ V/m

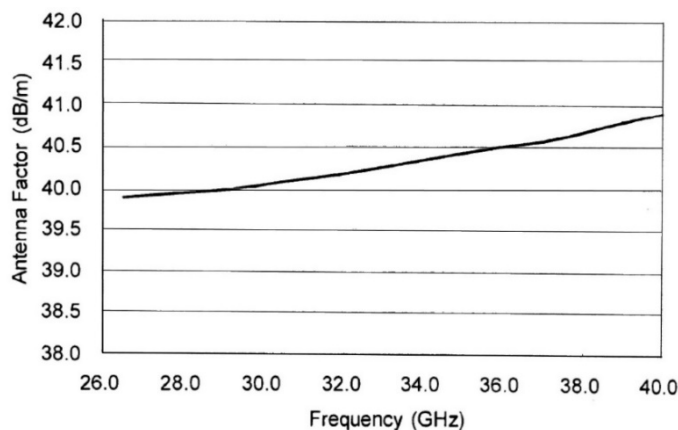


18000.0	32.4	22500.0	33.0
18500.0	32.0	23000.0	33.1
19000.0	32.3	23500.0	33.8
19500.0	32.4	24000.0	33.5
20000.0	32.3	24500.0	33.5
20500.0	32.8	25000.0	33.8
21000.0	32.8	25500.0	33.9
21500.0	32.7	26000.0	34.2
22000.0	33.1	26500.0	34.7

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**

Frequenc y (MHz)	Measured antenna factor (dB/m)	Frequenc y (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