

RF Exposure Evaluation Report

FCC 47 CFR § 2.1091

for
Smart Container Tracker

Model: Net Feasa

Prepared for:
Net Feasa Limited
An Cooleen, Dingle, V92 P9NX, co. kerry, Ireland

Prepared by
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No.11, Wugong 6th Rd., Wugu Dist.,
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Issued Date: September 12, 2024

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Project No: TM-2404000334P
Report No.: TMWK2404001332KS

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 12, 2024	Initial Issue	ALL	Peggy Tsai

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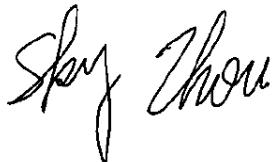
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1 Attestation of Test Results

Applicant	Net Feasa Limited An Cooleen,Dingle,V92 P9NX, co. kerry, Ireland
Manufacturer	Net Feasa Limited An Cooleen,Dingle,V92 P9NX, co. kerry, Ireland
Model Name	N743, N743G
Applicable Standards	FCC 47 CFR § 2.1091 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 Published RF exposure KDB procedures
Receive EUT Date:	May 23, 2024

Compliance Certification Services Inc. , tested the above equipment in accordance with the requirements set forth in the above standards. Determination of compliance is based on the results of the compliance measurement,not taking into account measurement instrumentation uncertainty.All indications of Pass/Fail in this report are opinions expressed by Compliance Certification Services Inc, based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved & Released By:



Sky Zhou
Asst. Section Manager

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2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1091, the following FCC Published RF exposure [KDB](#) procedures:

- 447498 D04 Interim General RF Exposure Guidance v01
- 865664 D02 RF Exposure Reporting v01r02

3 Device Under Test (DUT) Information

3.1 DUT Description

Product	Smart Container Tracker	
Trade Name	Net Feasa	
Model No.	N743, N743G	
Model Discrepancy	Difference of the model numbers (list on this report) is just for external color difference as below:	
	Model Number	External color
	N743	Black
	N743G	Gray
EUT Serial #	HOH44E00009	
Software Version	1.0	
Hardware Version	R01A	
Sample Stage	Identical prototype	

3.2 Wireless Technologies

Frequency bands	<ul style="list-style-type: none"><input type="checkbox"/> Bluetooth: 2402MHz-2480MHz<input type="checkbox"/> 802.11b/g/n HT20: 2412MHz ~ 2462 MHz<input type="checkbox"/> 802.11n HT40/ac VHT40/ax HE40: 2422MHz ~ 2452MHz<input type="checkbox"/> 802.11a/n HT20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz<input type="checkbox"/> 802.11ac VHT20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz<input type="checkbox"/> 802.11ax HE20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5720MHz / 5745MHz ~ 5825MHz<input type="checkbox"/> 802.11n HT40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz<input type="checkbox"/> 802.11ac VHT40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz<input type="checkbox"/> 802.11ax HE40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5710MHz / 5755MHz ~ 5795MHz<input type="checkbox"/> 802.11ac VHT80: 5210MHz / 5290MHz / 5530MHz ~ 5690MHz / 5775MHz<input type="checkbox"/> 802.11ax HE80: 5210MHz / 5290MHz / 5530MHz ~ 5690MHz / 5775MHz <p><input checked="" type="checkbox"/> Others: LoRa: 903.9 ~ 905.3 MHz</p> <p>GSM/GPRS: GSM/GPRS 850: 850 MHz GSM/GPRS1900: 1900 MHz</p> <p>LTE CAT-M1/NB2: LTE Band2: 1850-1910 MHz LTE Band4: 1710-1755 MHz LTE Band5: 824-849 MHz LTE Band8: 880-915 MHz LTE Band12: 699-716 MHz LTE Band13: 777-787 MHz LTE Band25: 1850-1915MHz LTE Band26: 814-849 MHz LTE Band66: 1710-1780MHz LTE Band85: 698-716 MHz</p>
Exposure classification	<ul style="list-style-type: none"><input type="checkbox"/> Occupational/Controlled exposure<input checked="" type="checkbox"/> General Population/Uncontrolled exposure

Antenna Specification	Type: Dielectric Chip Antenna LoRa: Gain: 4.87 dBi GSM/GPRS 850: Gain: 4.15 dBi GSM/GPRS1900: 3.73 dBi LTE Band2: Gain: 3.73 dBi LTE Band4: Gain: 2.94 dBi LTE Band5: Gain: 4.15 dBi LTE Band8: Gain: 4.30 dBi LTE Band12: Gain: 0.13 dBi LTE Band13: Gain: 2.23 dBi LTE Band25: Gain: 3.73 dBi LTE Band26: Gain: 3.80 dBi LTE Band66: Gain: 2.94 dBi LTE Band85: Gain: 0.13 dBi LoRa: Antenna Gain : 4.87 dBi (Numeric gain: 3.07) Worst GSM/GPRS 850 Antenna Gain: 4.15 dBi (Numeric gain: 2.60) Worst GSM/GPRS1900 Antenna Gain: 3.73 dBi (Numeric gain: 2.36) Worst LTE Band2: Antenna Gain: 3.73 dBi (Numeric gain: 2.36) Worst LTE Band4: Antenna Gain: 2.94 dBi (Numeric gain: 1.97) Worst LTE Band5: Antenna Gain: 4.15 dBi (Numeric gain: 2.60) Worst LTE Band8: Antenna Gain: 4.30 dBi (Numeric gain: 2.69) Worst LTE Band12: Antenna Gain : 0.13 dBi (Numeric gain: 1.03) Worst LTE Band13: Antenna Gain: 2.23 dBi (Numeric gain: 1.67) Worst LTE Band25: Antenna Gain: 3.73 dBi (Numeric gain: 2.36) Worst LTE Band26: Antenna Gain: 3.80 dBi (Numeric gain: 2.40) Worst LTE Band66: Antenna Gain: 2.94 dBi (Numeric gain: 1.97) Worst LTE Band85: Antenna Gain: 0.13 dBi (Numeric gain: 1.03) Worst
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Maximum Tune up power	LoRa:	14.50 dBm	(28.184 mW)
	WWAN		
	GSM/GPRS 850 (Burst Power):	33.50 dBm	(2238.72 mW)
	GSM/GPRS 850 (Frame Power)	24.50 dBm	(281.84 mW)
	GSM/GPRS1900 (Burst Power):	30.50 dBm	(1122.02 mW)
	GSM/GPRS 1900 (Frame Power)	21.50 dBm	(141.25 mW)
	LTE Band2:	24.50 dBm	(281.838 mW)
	LTE Band4:	24.50 dBm	(281.838 mW)
	LTE Band5:	24.50 dBm	(281.84 mW)
	LTE Band8:	24.50 dBm	(281.84 mW)
	LTE Band12:	24.50 dBm	(281.84 mW)
	LTE Band13:	24.50 dBm	(281.84 mW)
	LTE Band25:	24.50 dBm	(281.84 mW)
	LTE Band26:	24.50 dBm	(281.84 mW)
	LTE Band66:	24.50 dBm	(281.84 mW)
	LTE Band85:	24.50 dBm	(281.838 mW)

Notes:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. The Lora tune up power referred the AVG power of the test report TMWK2404001328KR for RF Exposure assessment purpose.
4. The WWAN tune up power referred the HL7812 Radio module report for RF Exposure assessment purpose.

4 Maximum Permissible Exposure

4.1 Limits for Maximum Permissible Exposure (MPE)

Table 1 - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* 900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* 100	30
1.34-30	824/f	2.19/f	* 180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

4.2 MPE Calculation Method

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{ Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

If, Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

4.3 MPE EXEMPTION

(A) The available maximum time-averaged power is no more than 1 mW

(B) The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

(C) Using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2 .
1.34-30	3,450 R^2/f^2 .
30-300	3.83 R^2 .
300-1,500	0.0128 R^2f .
1,500-100,000	19.2 R^2 .

Note: R is in meters, f is in MHz.

4.4 Multiple RF sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^a \frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^c \frac{\text{Evaluated}_k}{\text{Exposure Limit}_k} \leq 1$$

5 MPE Exemption Option B

Lora

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
Lora	903.70	0.2	14.5	4.87	19.37	17.22	52.723	1844	Complies

WWAN

Mode	Frequency (MHz)	R(m)	Max Tune-up power (dBm)	G(dBi)	Max Tune-up EIRP (dBm)	Max Tune-up ERP (dBm)	Max Tune-up ERP (mW)	ERP Threshold (mW)	MPE Exemption
GSM/GPRS 850	824.00	0.2	24.5	4.15	28.65	26.50	446.684	1681	Complies
GSM/GPRS1900	1850.00	0.2	21.5	3.73	25.23	23.08	203.236	3060	Complies
LTE Band 2	1850.00	0.2	24.5	3.73	28.23	26.08	405.509	3060	Complies
LTE Band 4	1710.00	0.2	24.5	2.94	27.44	25.29	338.065	3060	Complies
LTE Band 5	824.00	0.2	24.5	4.15	28.65	26.50	446.684	1681	Complies
LTE Band 8	897.50	0.2	24.5	4.30	28.80	26.65	462.381	1831	Complies
LTE Band 12	699.00	0.2	24.5	0.13	24.63	22.48	177.011	1426	Complies
LTE Band 13	777.00	0.2	24.5	2.23	26.73	24.58	287.078	1585	Complies
LTE Band 25	1850.00	0.2	24.5	3.73	28.23	26.08	405.509	3060	Complies
LTE Band 26	814.00	0.2	24.5	3.80	28.30	26.15	412.098	1661	Complies
LTE Band 66	1710.00	0.2	24.5	2.94	27.44	25.29	338.065	3060	Complies
LTE Band 85	698.00	0.2	24.5	0.13	24.63	22.48	177.011	1424	Complies

6 Simultaneous Transmission Analysis

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations	
		LoRa	WWAN
1			

6.1 Sum of the Lora + WWAN

Mode	Frequency (MHz)	Max Tune-up ERP(mW)	ERP Threshold(mW)	simultaneous Transmission	simultaneous Transmission Limit
Lora	903.70	52.723	1844	0.294	≤ 1
GSM/GPRS 850	824.00	446.684	1681		

7 Facilities

All measurement facilities used to collect the measurement data are located at

- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.
- No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan.

--End of Test Report--