COMPLIANCE ENGINEERING IRELAND LTD

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.088T

Compliance Engineering Ireland Ltd
Clonross Lane, Derrockstown, Dunshaughlin
Co. Meath, Ireland A85 XN59
Ph +353 1 8017000 , 8256722

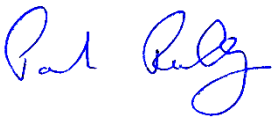
Project No.	23E10703-3b
Quotation	Q23-2508-1
Prepared For	Nordic ID Oy
Company Address	Joensuunkatu 7E Fi-24100 Salo, Finland
Contact	Rauno Nikkilä
Contact Email	rauno.nikkila@nordicid.com
Contact Phone	+358 (0)50 5689803
Prepared By	Compliance Engineering Ireland
Test Lab Address	Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath, Ireland
Tested By	Joy Dalayap
Test Report By	Michael Kirby
FCC Test Firm Designation	IE0002
ISED CAB identifier	IE0001
Date	25h Jan 2023
EUT Description	Industrial RFID Reader
FCC ID	SCC10811A
IC ID	5137A-10811A
Authorised by	**Paul Reilly**
Authorised Signature:	

Table of Contents

RF Exposure Exhibit– Technical Report

1.0 Overview

Manufacturer declaration

The EUT is capable of operating with 2 types of antenna

Antenna type #1 = External Antenna max gain 6dBi (3.85 dBd)
Antenna type #2 = Internal Antenna

The EUT is designed for fixed / mobile applications application environments.

1.1 Fixed / Mobile Application

MPE for bystanders which are considered to be ≥20cm away from the front of the transmit antenna

2.0 Maximum Permissible Exposure FCC

47 CFR Sections 1.1307, 1.1310, 2.1091,

447498 D01 General RF Exposure Guidance v06

2.1 Antenna #1 External Antenna Gain (6dBi) General population /Un-controlled Environments

$$S = \frac{PG}{4\pi R^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Prediction frequency:	902.75	MHz
Conducted Output Power	27.45	dBm
Antenna Gain	6	dBi
Antenna Gain	3.85	dBd
Tune up tolerance	1.00	dB
Time Averaging Factor	0	dB
ERP Peak	34	dBm
ERP Peak	2786	mW
Prediction distance:	20	cm
Prediction frequency:	902.75	MHz
MPE limit for Uncontrolled/General Population exposure at prediction frequency:	0.600	mW/cm^2
Power density at prediction frequency:	0.554	mW/cm^2
Power density at prediction frequency:	5.543	W/m^2
Test Result	Pass	

Notes

The table above shows that for a prediction distance of 20 cm, RF exposure evaluation is not required.

Also for a prediction distance of 20 cm, RF exposure evaluation is not required for controlled environments (as the limit is 3.01mW/cm^2 in that case).

2.2 Antenna #2 Internal Antenna General population /Un-controlled Environments

$$S = \frac{PG}{4\pi R^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Prediction frequency:	902.75	MHz
Rated Output Power	35	dBm
Rated Power Tolerance	1.00	dB
Time Averaging Factor	0	dB
Rated Power plus tolerance	36	dBm
Rated Power plus tolerance	3981	mW
Prediction distance:	23	cm
Prediction frequency:	902.75	MHz
MPE limit for Uncontrolled/General Population exposure at prediction frequency:	0.600	mW/cm^2
Power density at prediction frequency:	0.599	mW/cm^2
Power density at prediction frequency:	5.989	W/m^2
Test Result	Pass	
Exempt from routine evaluation for RF Exposure 0.599 < = 0.6		

Notes

The table above shows that for a prediction distance of 23cm, routine RF exposure evaluation is not required.

2.3 Antenna #2 Internal Antenna Controlled Environments

$$S = \frac{PG}{4\pi R^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Prediction frequency:	902.75	MHz
Rated Output Power	35	dBm
Rated Power Tolerance	1.00	dB
Time Averaging Factor	0	dB
Rated Power plus tolerance	36	dBm
Rated Power plus tolerance	3981	mW
Prediction distance:	20	cm
Prediction frequency:	902.75	MHz
MPE limit for Controlled/Occupational exposure at prediction frequency:	3.010	mW/cm^2
Power density at prediction frequency:	0.792	mW/cm^2
Power density at prediction frequency:	7.920	W/m^2
Test Result	Pass	
Exempt from routine evaluation for RF Exposure 0.792 < = 3.01		

Notes

The table above shows that for a prediction distance of 20 cm, RF exposure evaluation is not required.

3.0 Maximum Permissible Exposure IC

Limits for Routine Evaluation — RF Exposure Evaluation

Limits as per RSS 102 Issue 5 (Mar 2015) Amd 1 Feb 2021 Table 4

3.1 Antenna#1 External Antenna Gain 6dBi General population /Un-controlled Environments (IC)

$$S = \frac{PG}{4\pi R^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Prediction frequency:	902.75	MHz
Conducted Output Power	27.45	dBm
Antenna Gain	6	dBi
EIRP Peak	33.45	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	33.45	dBm
EIRP Peak	2.21	W
Prediction distance:	25.4	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency and prediction distance:	2.730	W/m^2
Power Density Limit for Uncontrolled/General Population exposure at prediction frequency:	2.741	W/m^2
EUT power meets the Power Density Limits for RF Exposure 2.73 < = 2.741		

Notes

The table above shows that for a prediction distance of 25.4cm, RF exposure evaluation is not required.

3.2 Antenna #1 External Antenna Gain 6dBi Controlled Environments (IC)

$$S = \frac{PG}{4\pi R^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Prediction frequency:	902.75	MHz
Conducted Output Power	27.45	dBm
Antenna Gain	6	dBi
EIRP Peak	33.45	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	33.45	dBm
EIRP Peak	2.21	W
Prediction distance:	25.4	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency and prediction distance:	2.730	W/m^2
Power Density limit for Controlled/Occupational exposure at prediction frequency:	19.395	W/m^2
EUT power meets the Power Density Limits for RF Exposure 2.73 < = 19.395		

Notes

The table above shows that for a prediction distance of 20cm, RF exposure evaluation is not required .

3.3 Internal Antenna General population /Un-controlled Environments (IC)

Note the Radiated field strength was measured at 3 metres and
the conversion formula below was used to determine the EIRP in dBm

$$EIRP\ (dBm) = E_{3m}\ (dBuV/m) - 95.2$$

Prediction frequency:	914.75	MHz
Radiated Field Strength at 3metres	130.4	dBuV/m
Adjustment for antenna 3m distance	-95.2	dB
EIRP Peak	35.2	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	35.20	dBm
EIRP Peak	3.31	W
Prediction distance:	30.9	cm
Prediction frequency:	914.75	MHz
Power density at prediction frequency and prediction distance:	2.760	W/m^2
Power Density Limit for Uncontrolled/General Population exposure at prediction frequency:	2.766	W/m^2
EUT power meets the Power Density Limits for RF Exposure 2.76 < = 2.766		

Notes

The table above shows that for a prediction distance of 30.9cm, RF exposure evaluation is not required.

3.4 Internal Antenna Controlled Environments (IC)

Note the Radiated field strength was measured at 3 metres and
the conversion formula below was used to determine the EIRP in dBm

$$EIRP\ (dBm) = E_{3m}\ (dBuV/m) - 95.2$$

Prediction frequency:	914.75	MHz
Radiated Field Strength at 3metres	130.4	dBuV/m
Adjustment for antenna 3m distance	-95.2	dB
EIRP Peak	35.2	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	35.20	dBm
EIRP Peak	3.31	W
Prediction distance:	20	cm
Prediction frequency:	914.75	MHz
Power density at prediction frequency and prediction distance:	6.588	W/m^2
Power Density limit for Controlled/Occupational exposure at prediction frequency:	19.523	W/m^2
EUT power meets the Power Density Limits for RF Exposure 6.588 < = 19.523		

Notes

The table above shows that for a prediction distance of 20cm, RF exposure evaluation is not required.

End of Report