
COMPLIANCE
ENGINEERING
IRELAND LTD



**Compliance Engineering
Ireland Ltd**

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

Table of Contents

1.0 OVERVIEW..... 3

2.0 MAXIMUM PERMISSIBLE EXPOSURE FCC..... 4

2.1 EXTERNAL ANTENNA GAIN (4dBi) GENERAL POPULATION /UN-CONTROLLED ENVIRONMENTS..... 4

2.2 EXTERNAL ANTENNA GAIN (-4dBi) GENERAL POPULATION /UN-CONTROLLED ENVIRONMENTS..... 5

3.0 MAXIMUM PERMISSIBLE EXPOSURE IC 6

3.1 EXTERNAL ANTENNA GAIN 4dBi GENERAL POPULATION /UN-CONTROLLED ENVIRONMENTS (IC) 6

3.2 EXTERNAL ANTENNA GAIN -4dBi GENERAL POPULATION /UN-CONTROLLED ENVIRONMENTS (IC)..... 7

RF Exposure Exhibit– Technical Report

1.0 Overview

Manufacturer declaration

There are 2 external antenna options

- a) Nordic ID Oy, part num NPG00001 model 813-S0 Gain 4dBi
- b) Nordic ID Oy, part num ANS00004 model SA0408 Gain -4dBi

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

1.1 Fixed / Mobile Application

MPE for bystanders which are considered to be ≥ 20 cm 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 External Antenna Gain (4dBi) General population /Un-controlled Environments

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

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

Prediction frequency:	902.75	MHz
Conducted Output Power	20.02	dBm
Antenna Gain	4	dBi
Tune up tolerance	0.00	dB
Time Averaging Factor	0	dB
EIRP Peak	24	dBm
EIRP Peak	252	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:	0.050	mW/cm^2
Power density at prediction frequency:	0.502	W/m^2
Test Result	Pass	
Exempt from routine evaluation for RF Exposure 0.05 <= 0.6		

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 External Antenna Gain (-4dBi) General population /Un-controlled Environments

where:

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

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	20.02	dBm
Antenna Gain	-4	dBi
Tune up tolerance	0.00	dB
Time Averaging Factor	0	dB
EIRP Peak	16	dBm
EIRP Peak	40	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:	0.008	mW/cm ²
Power density at prediction frequency:	0.080	W/m ²
Test Result	Pass	
Exempt from routine evaluation for RF Exposure 0.008 <= 0.6		

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/cm² in that case).

3.0 Maximum Permissible Exposure IC

Limits for Routine Evaluation — RF Exposure Evaluation

Limits as per RSS 102 Issue 6 (Dec 2023) Table 7

3.1 External Antenna Gain 4dBi General population /Un-controlled Environments (IC)

where:

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

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:	914.75	MHz
Conducted Output Power	20.02	dBm
Antenna Gain	4	dBi
EIRP Peak	24.02	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	24.02	dBm
EIRP Peak	252.35	mW
Prediction distance:	20	cm
Prediction frequency:	914.75	MHz
Power density at prediction frequency and prediction distance:	0.502	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 0.502 <= 19.523		

Notes

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

Also for a prediction distance of 20 cm, RF exposure evaluation is not required for controlled environments (as the limit is 19.523 W/m^2 in that case).

3.2 External Antenna Gain -4dBi General population /Un-controlled Environments (IC)

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

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

Prediction frequency:	914.75	MHz
Conducted Output Power	20.02	dBm
Antenna Gain	-4	dBi
EIRP Peak	16.02	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	16.02	dBm
EIRP Peak	39.99	mW
Prediction distance:	20	cm
Prediction frequency:	914.75	MHz
Power density at prediction frequency and prediction distance:	0.080	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 0.08 <= 19.523		

Notes

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

Also for a prediction distance of 20 cm, RF exposure evaluation is not required for controlled environments (as the limit is 19.523 W/m^2 in that case).

End of Report