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Test Report By	Daniel Ikeh/Michael Kirby
FCC Test Firm Registration	409640
IC Site Registration	IE0001
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EUT Description	RFID Module
FCC ID	SCCNUR31W
IC ID	5137A-NUR31W
Authorised by	Paul Reilly
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RF Exposure Exhibit– Technical Report

1.0 Overview

Manufacturer declaration
2 alternative antennas are available

Antenna #1 = Nordic ID Sampo S0 max gain 5dBi

Antenna #2 = Nordic ID HH8X max gain 3.3dBi

Max rated output power for the module is 30dBm conducted

The RFID module 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 Max Antenna Gain antenna #1 (5dBi) 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

Conducted Output Power	30	dBm
Antenna Gain	5	dBi
Time Averaging Factor	0	dB
Tune up factor	0	dB
EIRP Peak	35.00	dBm
EIRP Peak	3162	mW
Prediction distance:	20.5	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency:	0.599	mW/cm ²
Power density at prediction frequency:	5.988	W/m ²
MPE limit for Uncontrolled/General Population exposure at prediction frequency:	0.600	mW/cm ²
Fraction of the limit (0.599/0.6)	99.8	%
Result => Exempt from RF Exposure evaluation		

Notes

The table above shows that for a prediction distance of 20.5 cm, RF exposure evaluation is not required.

2.2 Max Antenna Gain antenna #2 (3.3 dBi) 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

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

Conducted Output Power	30	dBm
Antenna Gain	3.3	dBi
Time Averaging Factor	0	dB
Tune up factor	0	dB
EIRP Peak	33.30	dBm
EIRP Peak	2138	mW
Prediction distance:	20	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency:	0.425	mW/cm ²
Power density at prediction frequency:	4.253	W/m ²
MPE limit for Uncontrolled/General Population exposure at prediction frequency:	0.600	mW/cm ²
Fraction of the limit (0.425/0.6)	70.9	%
Result => Exempt from RF Exposure evaluation		

Notes

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

2.3 Max Antenna Gain antenna #1 (5dBi) 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

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

Conducted Output Power	30	dBm
Antenna Gain	5	dBi
Time Averaging Factor	0	dB
Tune up factor	0	dB
EIRP Peak	35.00	dBm
EIRP Peak	3162	mW
Prediction distance:	20	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency:	0.629	mW/cm ²
Power density at prediction frequency:	6.291	W/m ²
MPE limit for Controlled/Occupational exposure at prediction frequency:	3.010	mW/cm ²
Fraction of the limit (0.629/3.01)	20.9	%
Result => Exempt from RF Exposure evaluation		

Notes

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

2.4 Max Antenna Gain antenna #2 (3.3 dBi) 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

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

Conducted Output Power	30	dBm
Antenna Gain	3.3	dBi
Time Averaging Factor	0	dB
Tune up factor	0	dB
EIRP Peak	33.30	dBm
EIRP Peak	2138	mW
Prediction distance:	20	cm
Prediction frequency:	902.75	MHz
Power density at prediction frequency:	0.425	mW/cm ²
Power density at prediction frequency:	4.253	W/m ²
MPE limit for Controlled/Occupational exposure at prediction frequency:	3.010	mW/cm ²
Fraction of the limit (0.425/3.01)	14.1	%
Result => Exempt from RF Exposure evaluation		

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 Gain 5dBi General population /Un-controlled Environments (IC)

Prediction frequency:	902.75	MHz
Conducted power at the antenna port	30	dBm
Antenna Gain	5	dBi
EIRP Peak	35	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	35.000	dBm
EIRP Peak	3.160	W
MPE Exemption limit for Uncontrolled/General Population exposure at prediction frequency:	2.74	W
Prediction distance:	30.3	cm
Power density at prediction frequency:	2.74	W/m ²
Fraction of the limit (2.74/2.74)	99.95	%
Result => Exempt from RF Exposure Evaluation		

Notes

The table above shows that for a prediction distance of 30.3cm, RF exposure evaluation is not required.

3.2 Antenna Gain 3.3dBi General population /Un-controlled Environments (IC)

Prediction frequency:	902.75	MHz
Conducted power at the antenna port	30	dBm
Antenna Gain	3.3	dBi
EIRP Peak	33.3	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	33.300	dBm
EIRP Peak	2.14	W
MPE Exemption limit for Uncontrolled/General Population exposure at prediction frequency:	2.74	W
Prediction distance:	25	cm
Power density at prediction frequency:	2.72	W/m ²
Fraction of the limit (2.72/2.74)	99.22	%
Result => Exempt from RF Exposure Evaluation		

Notes

The table above shows that for a prediction distance of 25cm, RF exposure evaluation is not required.

3.3 Antenna Gain 5dBi Controlled Environments (IC)

Prediction frequency:	902.75	MHz
Conducted power at the antenna port	30	dBm
Antenna Gain	5	dBi
EIRP Peak	35	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	35.000	dBm
EIRP Peak	3.160	W
MPE Exemption limit for Controlled/Occupational exposure at prediction frequency:	19.39	W
Prediction distance:	20	cm
Power density at prediction frequency:	6.29	W/m ²
Fraction of the limit (6.29/19.39)	32.43	%
Result => Exempt from RF Exposure Evaluation		

Notes

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

3.4 Antenna Gain 3.3dBi Controlled Environments (IC)

Prediction frequency:	902.75	MHz
Conducted power at the antenna port	30	dBm
Antenna Gain	3.3	dBi
EIRP Peak	33.3	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
EIRP Peak	33.300	dBm
EIRP Peak	2.14	W
MPE Exemption limit for Controlled/Occupational exposure at prediction frequency:	19.39	W
Prediction distance:	20	cm
Power density at prediction frequency:	4.25	W/m ²
Fraction of the limit (4.25/19.39)	21.91	%
Result => Exempt from RF Exposure Evaluation		

Notes

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

End of Report