

RF Exposure Estimation

1. Introduction

Applicant:	NDI TOOLS LLC
Address:	733 Ehrhorn Avenue, Mountain View, California, United States
Product:	Wireless transmission (For Multifunctional Soil Survey Instrument)
FCC ID:	2BANG4009
Model No.:	ND4009T
Reference RF report #	709502308669-00B

2. B.2 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance. The 1 mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph § 1.1307(b)(3)(ii)(A). The 1 mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

3. RF Exposure Evaluation

Per the test report included herein, for 434.00MHz

According to C63.10-2020 Annex G

$$\text{EIRP} = \text{pt} \times \text{gt} = (\text{E} \times \text{d})^2 / 30 \quad (\text{G.1})$$

where

pt is the transmitter output power in watts

gt is the numeric gain of the transmitting antenna (dimensionless)

E is the electric field strength in V/m

d is the measurement distance in meters (m)

$$\text{ERP} = \text{EIRP} / 1.64 = (\text{E} \times \text{d})^2 / (30 \times 1.64) = (\text{E} \times \text{d})^2 / 49.2 \quad (\text{G.2})$$

Transmitter output power for 434.00MHz Function

Field strength (E):	66.60(dBuV/m) = 0.002138(V/m)
Measurement distance (D):	3 (m)
Transmitter output power (TP):	0.0000000836166(W)
Transmitter output power (TP):	0.0000836166 (mW)



We used the maximum ERP/EIRP to perform RF exposure exemption evaluation.

	Evaluation method	Exempt Limit (mW)	Verdict
☒	Blanket 1 mW Blanket Exemption	1mW	Yes
☐	MPE-based Exemption (ERP)	7mW (ERP)	N/A
☐	SAR-based Exemption (Pth)	3060mW	N/A

So, the device is qualified for SAR test exemption, the exemption report is in lieu of the SAR report.

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

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-----End of Test Report-----