



Maximum Permissible Exposure Report

1. Product Information

FCC ID	:	YRW-LINEAPRO7IM
Product name	:	LineaPro 7 Industrial
Test Model	:	LineaPro 7 Industrial
Additional Model No.	:	Linea Pro Rugged SE
Power supply	:	Input: 5V===2.4A Battery: 3.6V===, 2280mAh
NFC	:	
Operating Frequency	:	13.56MHz
Modulation Type	:	ASK
Antenna Description	:	FPC Antenna, 0dBi(Max.)
Hardware version	:	01.xx
Software version	:	01.05.xx.xx
Exposure category	:	General population/uncontrolled environment
EUT Type	:	Production Unit
Device Type	:	Portable Device

2. Evaluation method and Limit

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.22 The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc."

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} (\text{GHz})] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where:}$$

• f (GHz) is the RF channel transmit frequency in GHz



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below
The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter modules in host devices that operate in the mixed mobile and portable host platform exposure conditions. The grantee is responsible for documenting this according to Class I permissive change requirements. Antennas that qualify for standalone SAR test exclusion must apply the estimated standalone SAR to determine simultaneous transmission test exclusion.

- a) The $[\sum \text{ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg}] + [\sum \text{ of MPE ratios}]$ is ≤ 1.0 .
- b) The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04 , and the $[\sum \text{ of MPE ratios}]$ is ≤ 1.0 .

At frequencies below 100 MHz, the following may be considered for SAR test exclusion, and as illustrated in Appendix C:

- a) The power threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $[1 + \log(100/f(\text{MHz}))]$ for test separation distances > 50 mm and < 200 mm
- b) The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$ for test separation distances ≤ 50 mm
- c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

3. Refer Evaluation Method

- [ANSI C95.1–1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- [FCC KDB publication 447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
- [FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.
- [FCC CFR 47 part2 2.1093](#): Radiofrequency radiation exposure evaluation: portable devices

4. Antenna Information

EUT can only use antennas certificated as follows provided by manufacturer;

Internal/External Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Notes
Antenna	FPC Antenna	13.553-13.567 MHz	0dBi	NFC Antenna





5. Conducted Power

[NFC]

Mode	Frequency (MHz)	Field Strength (dBuV/m@3m)	EIRP(dBm)	Conducted Output Power(dBm)
ASK	13.56MHz	43.08	-51.18	-51.18

Note: Add the appropriate maximum ground reflection factor to the EIRP

so for NFC: $E(\text{dBuV/m@3m}) = \text{EIRP}(\text{dBm}) - 20 \lg 3(\text{m}) + 104.8 = \text{EIRP}(\text{dBm}) + 94.26$; $\text{EIRP} = E - 94.26$

[NFC]

Frequency	13.56MHz
Target (dBm)	-51
Tolerance ± (dB)	1.0

<BT>

<BT> maximum output power including tune up tolerance from modular BT401 (FCC ID: GT3FC018) MPE report No. 33HE0044-SH-A;

Band	Maximum Conducted Output Power including Tune up Tolerance (dBm)
BT(2408-2480)	3.8

Turn-up: 3±1

6. Evaluation Results

Band/Mode		f (MHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold (mW)	SAR Test Exclusion
				dBm	mW		
NFC	ASK	13.56	5	-50	0.00001	0.00000023<442.97	Yes

Band/Mode		f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
				dBm	mW		
BT		2.480	5	4.0	2.5119	0.7911<3.0	Yes

Remark:

- Output power including tune up tolerance;
- When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.





7. Simultaneous Transmission for SAR Exclusion

The sample support one NFC, BT modulars and difference antennas, can support NFC, BT simultaneously transmission;

Simultaneous transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\Sigma\Sigma$ of MPE ratios ≤ 1.0

Mode	NFC MPE (mW/cm ²)	BT MPE (mW/cm ²)	Σ MPE ratios	Limit	Results
NFC Ant + BT Ant	0.00000023	0.7911	0.79110023	1.0	PASS

Remark:

1. Output power including turn-up tolerance;
2. Output power is burst average power;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer;
4. MPE values = $PG/4\pi R^2$

8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

-----THE END OF REPORT-----

