

RF Exposure Test Report



Report Number : 6128624034601
Applicant : HiTi Digital, Inc.
Product : HiTi PHOTO PRINTER
Model : P525L
FCC ID : W5388D2035002

In accordance with

FCC Rule Part §1.1307

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved By	Jack Chang		2024.10.20
Prepared By	Ariel Hsu		2024.10.20

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY

TÜV SÜD Asia Ltd., reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Asia Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Asia Ltd. issued reports.

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1 General Information

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

History of this test report

Issue	Description of Change	Date of Issue
1	Initial Issue	2024-10-20

1.2 Introduction

The information contained in this report is intended to show verification of RF qualification approval.

Applicant	:	HiTi Digital, Inc.
Address	:	7F, No. 207-2, Sec. 3, Beixin Rd., Xindian Dist., 231 New Taipei City, TAIWAN
Manufacturer	:	HiTi Digital, Inc.
Address	:	7F, No. 207-2, Sec. 3, Beixin Rd., Xindian Dist., 231 New Taipei City, TAIWAN
Product Name	:	HiTi PHOTO PRINTER
Model Number(s)	:	P525L
Trade name	:	HiTi Digital Inc.
Firmware Version	:	V1.29.0.T
Hardware Version	:	V1.6.36.60
Test Laboratory	:	TÜV SÜD Asia Ltd., Taiwan Branch
Address	:	7F., No. 37, Sec. 2, Zhongyang S. Rd., Beitou District, Taipei City 11270, R.O.C. Taiwan
Test Location	:	TÜV SÜD Asia Ltd., Taiwan Branch, Guishan Laboratory
Address	:	No. 31, Dinghu Road, Guishan District, Taoyuan City, TAIWAN (R.O.C.)

The test facility is accredited by TAF (member of ILAC), under number 2573 according to ISO/IEC 17025: 2017.



1.3 Deviation from standards

None

1.4 Reference Test Report

Test Lab	TÜV SÜD Asia Ltd., Taiwan Branch
Report Number	6128624034501

2 General EUT Information

All information in this chapter was provided by the applicant.

2.1 Variation of family model(s)

2.1.1 List of family model(s)

Brand	Type Identification	Difference
HiTi Digital Inc.	P5XXX	The X in model name can be 0-9, A-Z, a-z or blank for marketing purpose and All models are electrically identical.
	U8XXX	
	RXXX	
	DS6XXX	

2.2 Technical Specification of EUT

Items	EUT information
Operating Frequency	13.56 MHz
Channel number	1
Field Strength of Fundamental	46.3 dB μ V/m @3m
Extreme Temperature Range	0 ~ 35 °C
Operation Voltage	100-240 Vac
Modulation	ASK
Antenna Type	Loop Antenna

2.3 Antenna Information

Antenna Type	Supplier	Model	Frequency (MHz)	Peak Antenna Gain (dBi)
Loop	HITI	P525L	13.56	N/A

3 General Configurations

3.1 FCC

Single RF Source

As per §1.1307(b)(3)(i),

1. The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
2. Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Note: when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

3. Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

**Table 1 to § 1.1307(b)(3)(i)(C) –
Single RF Sources Subject to Routine Environmental Evaluation**

RF Source frequency (MHz)			Minimum Distance			Threshold ERP (W)
fL		fH	$\lambda L / 2\pi$		$\lambda H / 2\pi$	
0.3	-	1.34	159m	-	35.6m	1920 R ²
1.34	-	30	35.6m	-	1.6m	3450 R ² /f ²
30	-	300	1.6m	-	159mm	3.83 R ²
300	-	1500	159mm	-	31.8mm	0.0128 R ² f
1500	-	100000	31.8mm	-	0.5mm	19.2R ²

R= minimum separation distance in meter

f = frequency in MHz

Multiple RF Sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Based on KDB447498D01v06 4.3.1 c), SAR test exclusion threshold for NFC (13.56MHz) shall be evaluated as below,

- I. For test separation distances ≤ 50 mm, the power threshold determined by the equation in 4.3.1 c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
- II. The power threshold at 50mm/100 MHz in 4.3.1 b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$ where f is 13.56MHz
- III. The power threshold in 4.3.1 b) is $[\text{Power allowed at numeric threshold for 50 mm in 4.3.1 a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]$ mW, for 100 MHz to 1500 MHz where test separation distance is 50mm, frequency is 100MHz.
- IV. Power allowed at numeric threshold for 50 mm in 4.3.1 a) is $[3/\sqrt{f(\text{GHz})}] \cdot (\text{test separation distance})$

Hence, SAR test exclusion threshold is calculated in reverse sequence:

- 1) $[3/\sqrt{0.1}] \cdot 50 = 474.3416\text{mW}$
- 2) $474.3416 + (50-50) \cdot (100/150) = 474.3416\text{mW}$
- 3) $474.3416 \cdot [1 + \log(100/13.56)] = 885.9470\text{mW}$
- 4) $885.9470 \cdot 0.5 = 442.974\text{mW}$

3.1.1 Evaluation Results

Single RF Source Evaluation Results

NFC					
Frequency (MHz)	E-FIELD (dBuV/m)	Test Distance (m)	EIRP (dBm)	EIRP (mW)	Threshold (mW)
13.56	46.3	3	-48.85757	0.0000130	442.974

Note:

$$\text{EIRP (dBm)} = (\text{E-FIELD (dBuV/m)} + 20\log(d(m)) - 104.7)$$

$$\text{EIRP (mW)} = (10^{(\text{EIRP (dBm)} / 10)}) / 1000$$

$$\text{Distance Factor} = 40\log(\text{Test Distance (m)} / \text{Separation Distance (m)})$$