

MPE Report

Applicant : CASTLES TECHNOLOGY CO., LTD.
Product Type : POS Terminal
Trade Name : CASTLES TECHNOLOGY
Model Number : UPT1000M
Test Specification : ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013
47 CFR § 2.1091 / 47 CFR § 1.1310
Received Date : May 27, 2019
Test Period : Jun. 03, 2019
Issue Date : Jul. 03, 2019

Issue by

Approved By : Edison Hu Tested By : Kris Pan
(Edison Hu) (Kris Pan)

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C.)
Tel : +886-3-2710188 / Fax : +886-3-2710190



Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

- 1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.



Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jul. 03, 2019	Initial Issue	Shelly Chen



Contents

1.	Reference Testing Standards	4
2.	Description of Equipment under Test (EUT)	4
3.	Human Exposure Assessment	5
4.	RF Output Power	6
5.	Test Result	7



1. Reference Testing Standards

Standard	Description	Version
ANSI/IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	2005

2. Description of Equipment under Test (EUT)

Applicant	CASTLES TECHNOLOGY CO., LTD. 6F., No.207-5, Sec. 3, Beixin Rd., Xindian Distric, New Taipei City 23143, Taiwan	
Manufacturer	CASTLES TECHNOLOGY CO., LTD. 6F., No.207-5, Sec. 3, Beixin Rd., Xindian Distric, New Taipei City 23143, Taiwan	
Product Type	POS Terminal	
Trade Name	CASTLES TECHNOLOGY	
Model Number	UPT1000M	
FCC ID	WIYUPT1000-MI	
Frequency Range	Operate Band	Frequency Range (MHz)
	Bluetooth BR/EDR	2402 - 2480
Antenna Information	Type	Max. Gain (dBi)
	Dipole antenna	1.29
Antenna Delivery	1TX	
RF Evaluation	0.002 mW/cm ²	
Operate Temp. Range	-20 ~ +65°C	

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



3. *Human Exposure Assessment*

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons.” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation

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

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.



4. RF Output Power

Operate Band	Frequency (MHz)	Packet Type	Average Conducted power (dBm)
Bluetooth BR GFSK	2402.0	DH1	8.37
		DH3	8.37
		DH5	8.44
	2441.0	DH1	8.94
		DH3	9.00
		DH5	9.06
	2480.0	DH1	8.61
		DH3	8.65
		DH5	8.76
Bluetooth EDR $\pi/4$ -DQPSK	2402.0	DH1	5.70
		DH3	5.71
		DH5	5.74
	2441.0	DH1	5.52
		DH3	5.58
		DH5	5.60
	2480.0	DH1	5.61
		DH3	5.64
		DH5	5.65
Bluetooth EDR 8DPSK	2402.0	DH1	5.71
		DH3	5.73
		DH5	5.81
	2441.0	DH1	6.01
		DH3	6.23
		DH5	6.35
	2480.0	DH1	5.62
		DH3	5.66
		DH5	5.75



5. Test Result

Antenna	Band	Test mode/ RB/ Data rate	Frequency (MHz)	Limit (mw)/cm ²	Distance [R] (cm)	max tune-up Power [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw)/cm ²
Bluetooth Antenna	Bluetooth BR	1M	2402.0	1	20	9.50	1.29	1.35	1	12.03	0.002
			2441.0	1	20	9.50	1.29	1.35	1	12.03	0.002
			2480.0	1	20	9.50	1.29	1.35	1	12.03	0.002
	Bluetooth EDR	2M/3M	2402.0	1	20	6.50	1.29	1.35	1	6.03	0.001
			2441.0	1	20	6.50	1.29	1.35	1	6.03	0.001
			2480.0	1	20	6.50	1.29	1.35	1	6.03	0.001

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.

---END---