



시험 성적서

TEST REPORT

페이지(page) : (1) / (총(Total) 7)

성적서 번호 Report No.		ICRT-TR-E223288-0A	
신청자 Client	기관명 Name	Ltech Inc.	
	주 소 Address	RM.528.5FL, 229, Yangji-ro, Bucheon-si, Gyeonggi-do, S. Korea	
시험대상품목 Sample description		BLE Module	
모델명 Type designation		PLE-52	
정 격 Ratings		DC 3.3 V	
시험장소 Place of test		☒ 고정시험(Inside test) ☐ 현장시험(Field test) 주소지(Address): 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea	
시험기간 Date of test		11. Oct. 2022 ~ 14. Dec. 2022	
시험방법/항목 Test Method/Item		FCC rule §1.1310	
시험결과 Test Results		Refer to 3. Test Summary	
확 인 Affirmation	작성자 Tested by	기술책임자 Technical Manager	
	성 명 Name	성 명 Name	
	Eun-Hye, Gwak (Signature)	Tae-Yang, Yoon (Signature)	
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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E223288-0A	2022.12.14	Initial Issue	All



1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	Ltech Inc.
Address	RM.528.5FL, 229, Yangji-ro, Bucheon-si, Gyonggi-do, S. Korea
Contact Person	Seungmun Lee
Telephone No.	+82-2-2619-9662
Fax No.	-
E-mail	Lee@L-tech.com

1.2 Manufacturer Information

Manufacturer	Ltech Inc.
Address	RM.528.5FL, 229, Yangji-ro, Bucheon-si, Gyonggi-do, S. Korea

1.3 Test Laboratory Information

Conducted tests were performed at	
Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
RRA No.	KR0165
KOLAS No.	KT652



2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	BLE Module
Brand Name	-
Model Name	PLE-52
Additional Model Name	-
FCC ID	2A88K-PLE52

2.2 Additional Information

Equipment Class	DTS - Digital Transmission System		
Device Type	Stand-alone		
Operating Frequency	Bluetooth LE (1/2 Mbps)	2 402 MHz ~ 2 480 MHz	
RF Output Power	Bluetooth LE (1/2 Mbps)	1 Mbps	-5.61 dBm
		2 Mbps	-5.62 dBm
Number of Channel	Bluetooth LE (1/2 Mbps)	40	
Modulation Type	GFSK		
Antenna Type	Chip Antenna		
Antenna Gain	0.5 dBi		
Antenna Operating Mode	Single Antenna Equipment with only one antenna		

2.3 Mode of operation during the test

- The EUT is continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

2.4 Modifications of EUT

- None



3. Maximum Permissible Exposure

3.1 RF Exposure calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500 \text{ mW/cm}^2$ for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm^2 exposure is calculated as follows:

$$E = \sqrt{(30 * P * G)} / d, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm^2 , Z = Impedance of free space, 377Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G)} / (377 * 10 S)$$

Changing to units of mW and cm , using $P (\text{mW}) = P (\text{W}) / 1000$, $d (\text{cm}) = 0.01 * d (\text{m})$

$$d = 0.282 * \sqrt{(P * G)} / S$$

Where

d = distance in cm , P = Power in mW , G = Numeric antenna gain, and S = Power density in mW/cm^2



3.1 Result

According to above equation, the following result was obtained.

Operating Mode	Target Power W / tolerance	Max tune up power		Antenna Gain		Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(mW)	Log	Linear		
Bluetooth LE (1 Mbps)	-5.61 ± 1.0	-4.61	0.35	0.50	1.12	0.000 1	1.00
Bluetooth LE (2 Mbps)	-5.62 ± 1.0	-4.62	0.35	0.50	1.12	0.000 1	

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 0.35 * 1.12 / (4 * \pi * 20^2) = 0.000 1$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

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