TEST REPORT

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1. Client

- Name : ATTOWAVE Co., Ltd.
- Address : 1005, 10F Leader's Tower, 60-15 Gasan-dong, Gumchun-gu, Seoul, 153-801 Korea
- Date of Receipt : 2020-09-21

2. Use of Report : Certification

3. Name of Product and Model : Bluetooth Module / BTM0

4. Manufacturer and Country of Origin : ATTOWAVE Co., Ltd. / Korea

5. FCC ID : W75-BTM0

6. Date of Test : 2020-09-25 to 2020-10-13

7. Test Standards : 47 CRF Part 1.1310

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Hosung Lee (Signature)	Technical Manager Name : Heesu Ahn (Signature)

2020-11-12

KCTL Inc.

Report revision history

Date	Revision	Page No
2020-11-09	Originally issued	-
2020-11-12	Updated host device information	4

General remarks for test reports

Nothing significant to report.

CONTENTS

1. General information

Client	:	ATTOWAVE Co., Ltd.
Address	:	1005, 10F Leader's Tower, 60-15 Gasan-dong, Gumchun-gu, Seoul, 153-801 Korea
Manufacturer	:	ATTOWAVE Co., Ltd.
Address	:	1005, 10F Leader's Tower, 60-15 Gasan-dong, Gumchun-gu, Seoul, 153-801 Korea
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 Industry Canada Registration No. : 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Bluetooth Module
Model	:	BTM0
Frequency range	:	2 402 ㎒ ~ 2 480 ㎒ (Bluetooth (BLE))
Modulation technique	:	Bluetooth(BLE)_GFSK
Number of channels	:	Bluetooth(BLE)_40ch
Power source	:	DC 3.3 V
Antenna specification	:	Micro-strip Antenna
Antenna gain	:	-0.106 dBi
Software version	:	V1.00
Hardware version	:	B
Test device serial No.	:	N/A
Operation temperature	:	-30 ℃ ~ 85 ℃

2.1. Host device information

Product Name	Model Name	FCC ID
RADAR DETECTOR	ODIN C-497	QKK-ODN

Note: The EUT is authorized for use in specific End-product.

2.2. Frequency/channel operations

This device contains the following capabilities:
Bluetooth Low Energy

Ch.	Frequency (㎒)
00	2 402
.	.
19	2 442
.	.
39	2 480

Table 2.2.1. Bluetooth Low Energy

3. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.
All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)
Conducted RF power	1.23 ㏈

4. RF Exposure

FCC

Regulation

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC rules and Regulations.
The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1.
According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency Range (㎒)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [㎽/㎠]	Averaging Time [minute]
(A) Limits for Occupational / Controlled Exposure				
0.3 ~ 3.0	614	1.63	*100	6
3.0 ~ 30	1842/f	4.89/f	*900/f^2	6
30 ~ 300	61.4	0.163	1.0	6
300 ~ 1 500	/	/	f/300	6
1 500 ~ 15 000	/	/	5	6
(B) Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*100	30
1.34 ~ 30	824/f	2.19/f	*180/f^2	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

*f=frequency in ㎒, *= plane-wave equivalent power density*

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100 ㎑

4.1. Test results

FCC

MPE (Maximum Permissive Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad \left(\Rightarrow R = \sqrt{PG/4\pi S}\right)$$

S = power density [㎽/㎠]
P = Power input to 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 [㎝]

Calculation Result of RF exposure (FCC)

Maximum tune-up tolerance

Mode	Frequency [㎒]	Max Tune-up Power [dBm]	Max Tune-up Power [㎽]	Ant Gain [dBi]	Power density at 20 ㎝ [㎽/㎠]	Limit [㎽/㎠]
BLE/1 Mbps	2 480	-1.00	0.79	-0.10	0.000 15	1.000 00

Note.

1. The power density P_d (5th column) at a distance of 20 ㎝ calculated from the friis transmission Formula is far below the limit of 1 ㎽/㎠.

End of test report