FCC RF Exposure TEST REPORT

Project Number	**: EA1803C-152**
Test Report Number	**: TR-W1808-026**
Type of Equipment	**: BLE MODULE**
FCC ID	**: 2AP7P-BLE-MODULE**
Model Name	**: BLE-MODULE**
Multiple Model Name	**: N/A**
Applicant	**: Aladdin co., Ltd.**
Address	**: 3, World Cup buk-ro 42na-gil, Mapo-gu, Seoul, Republic of Korea**
Manufacturer	**: HDS co., Ltd.**
Address	**: A-1301, Smart Bay, 123, Beolmal-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea**
Regulation	**: FCC Part 15 Subpart C Section 15.247**
Total page of Report	**: 6 Pages**
Date of Receipt	**: 2018-03-30**
Date of Issue	**: 2018-08-14**
Test Result	**: PASS**

This test report only contains the result of a single test of the sample supplied for the examination.
It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by	Song, In-young / Senior Engineer	Signature	2018-08-14 Date
Reviewed by	Choi, Yeong-min / Technical Manager	Signature	2018-08-14 Date

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Release Control Record

Issue Report No.	Issued Date	Revisions	Effect Section
TR-W1808-026	2018-08-14	Initial Release	All

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1. EUT (Equipment Under Test) INFORMATION

1.1 General Description

The Aladdin co., Ltd., Model BLE-MODULE (referred to as the EUT in this report) is a BLE MODULE, which is a complete Bluetooth low energy SoC (4.2 specification).The product specification described herein was obtained from product data sheet or user's manual.

Operating Frequency	2 402 ~ 2 480 MHz
Max. RF Output Power	-2.56 dBm
Modulation Types	Bluetooth Low Energy
Number of Channels	40 CH
Channel Bandwidth	2 MHz
Generated or used Freq. in EUT	16 MHz
Type of Antenna	■ Integrated Type (Chip Type) □ Dedicated Type
Antenna Gain	3.78 dBi
Operating Temperature	-20 °C ~ + 55 °C
Normal Test Voltage	DC 3.0 V
Test SW Version	Connection Manager Version 3.0.8
RF power setting in TEST SW	N/A
Software Version	1.0
Hardware Version	1.0

1.2 RF Output Power

Operating Mode	Channel	Frequency (MHz)	Output Power(dBm)
Bluetooth LE	0	2 402	-2.58
	19	2 440	-2.56
	39	2 480	-2.88

2. TEST RESULT

2.1 SAR Exclusion calculation

According to FCC KDB 447498 D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] x [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,

where,

f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation
The result is rounded to one decimal place for comparison

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 is applied to determine SAR test exclusion.

For the present device, the declared output power is -2.56 dBm at Low Channel

So, max. power of channel, including tune-up tolerance = 0.56 mW
min. test separation distance = 5 mm
f(GHz) = 2.440

(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)] X [√f(GHz)]
= (0.56 / 5) x (√2.440) = 0.18 ≤ 3.00

Hence the SAR Exclusion Threshold condition is satisfied and the SAR evaluation for general population exposure conditions is not required.

2.2 MPE Calculation

MPE Calculation formula: $S= (P \times G) / (4 \times \pi \times R^2)$

where;

S = power density in mW/cm^2

P = output power to antenna in mW

G = gain of antenna in linear scale

$\pi \approx 3.1416$

R = distance between observation point and center of the radiator in cm

$(0.56 \times 2.39) / (4 \times 3.1416 \times 20^2) = 0.000\ 3\ mW/cm^2$

Requirement 1 mW/cm^2 satisfied. (FCC Part 1.1310 Table 1 Limits for maximum permissible exposure)