

RF Exposure Report

(Portable mode)

Report No.: SA191225C12-1

FCC ID: QOQ-GM220P

Test Model: MGM220P22A

Series Model: BGM220P22A, BGX220P22A

Received Date: Dec. 25, 2019

Test Date: Mar. 20, 2020

Issued Date: Mar. 20, 2020

Applicant: Silicon Laboratories Finland Oy

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
SA191225C12-1	Original release	Mar. 20, 2020

1 Certificate of Conformity

Product: Zigbee and Bluetooth Low Energy wireless radio modules, Bluetooth Low Energy wireless radio modules
Brand: Silicon Labs
Test Model: MGM220P22A
Series Model: BGM220P22A, BGX220P22A
Sample Status: Engineering sample fully representing the production model
Applicant: Silicon Laboratories Finland Oy
Test Date: Mar. 20, 2020
Standards: FCC Part 2 (Section 2.1093)
References Test Guidance: KDB 447498 D01 General RF Exposure Guidance v06
IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

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Polly Chien / Specialist

Approved by : Bruce Chen, **Date:** Mar. 20, 2020
Bruce Chen / Senior Project Engineer

2 Evaluation Result

Following FCC KDB 447498 D01 "General SAR test exclusion guidance"

The corresponding SAR Exclusion Threshold condition, listed below:

- 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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$$

$$\leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, 16 where}$$
 - $f(\text{GHz})$ 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.
- 2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
 - a) [Threshold at 50 mm in step 1) + (test separation distance - 50mm) · ($f(\text{MHz})/150$)] mW, at 100MHz to 1500 MHz
 - b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz
- 3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion.
 - a) The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $[1 + \log(100/f(\text{MHz}))]$ for test separation distances > 50 mm and < 200 mm.
 - b) The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$ for test separation distances ≤ 50 mm.
 - c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

3 SAR Test Exclusion Thresholds

FCC	Power	Duty Cycle	Calculated Power	SAR exemption power(dBm) at 5mm	Result
BT	9.1dBm=8.128mW	97.1%(0.13)	9.1-0.13=8.97dBm	9.86	Pass
Zigbee	8.9dBm=7.762mW	67.5%(1.71)	8.9-1.71=7.19dBm	9.86	Pass
SRD	9.11dBm=8.147mW	36%(14.44)	9.11-14.44=-5.33dBm	9.86	Pass

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The Chip antenna with 1.86dBi gain.
3. The power of the EUT is less than the requirement test limit on FCC Body & Extremity SAR, therefore the shortest distance of 5mm is used during the test and the exemption for the SAR evaluation is valid at any distance.
4. Calculate SAR test exclusion thresholds from condition "1" formulas.

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