

RF Exposure Evaluation Report

Report Reference No......: **MTEB24040317 -H**

FCC ID.....: **2AG9Y-25041-003**

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Date of issue.....: **Apr.24,2024**

Representative Laboratory Name.: **Shenzhen Most Technology Service Co., Ltd.**

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Applicant's name.....: **MAXXSONICS USA INC**

Address: 851 E Park Avenue Libertyville, IL 60048

Test specification/ Standard: **47 CFR Part 1.1307;47 CFR Part 1.1310**
KDB447498D01 General RF Exposure Guidance v06

TRF Originator.....: Shenzhen Most Technology Service Co., Ltd.

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Test item description: **MARINE & POWERSPORTS**

Trade Mark: Kawasaki

Model/Type reference.....: 25041-003

Listed Models: 25041-005, GMR-7V2

Modulation Type: GFSK, $\pi/4$ DQPSK, 8DPSK

Operation Frequency.....: 2402MHz to 2480MHz

Hardware Version.....: GMR-7V2-231226

Software Version: KAWASAKI-240112-1

Rating: DC 12V by DC Source

Result.....: **PASS**

TEST REPORT

Equipment under Test : MARINE & POWERSPORTS

Model /Type : 25041-003

Listed Models : 25041-005, GMR-7V2

Remark 1 : Difference in Appearance and model names

Applicant : **MAXXSONICS USA INC**

Address : 851 E Park Avenue Libertyville, IL 60048

Manufacturer : **MAXXSONICS USA INC**

Address : 851 E Park Avenue Libertyville, IL 60048

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2024.04.24	Initial Issue	Alisa Luo

2. SAR Evaluation

2.1 RF Exposure Compliance Requirement

2.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

2.1.2 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$ Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.1.3 EUT RF Exposure

BT classic

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	1.998	1.998 ± 1	2.998
Middle(2441MHz)	2.390	2.390 ± 1	3.39
Highest(2480MHz)	2.313	2.313 ± 1	3.313

$\pi/4$ DQPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	2.891	2.891 ± 1	3.891
Middle(2441MHz)	3.306	3.306 ± 1	4.306
Highest(2480MHz)	3.176	3.176 ± 1	4.176

8DPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	3.129	3.129 ± 1	4.129
Middle(2441MHz)	3.553	3.553 ± 1	4.553
Highest(2480MHz)	3.483	3.483 ± 1	4.483

Worst case: 8DPSK						
Channel	Maximum tune-up Power (dBm)	Maximum tune-up Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Middle(2441MHz)	4.553	2.85	2	0.0009	1.0	Pass

Note: 1) Refer to report MTEB24040317-R for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (2.85 \cdot 1.58) / (4 \cdot 3.1416 \cdot 20^2) = 0.0009$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

.....THE END OF REPORT.....