Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

RF Exposure Evaluation Report

Report Reference No.....:	**MTEB22111601-H**	
FCC ID..... :	**2A9SC-TNPHASER02**	
Compiled by (position+printed name+signature)..:	File administrators Alisa Luo	
Supervised by (position+printed name+signature)..:	Test Engineer Sunny Deng	
Approved by (position+printed name+signature)..:	Manager Yvette Zhou	
Date of issue.....:	**November 18,2022**	
Representative Laboratory Name .:	**Shenzhen Most Technology Service Co., Ltd.**	
Address .....:	No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.	
Applicant's name.....:	**SHENZHEN MARVO TECHNOLOGY CO., LTD**	
Address .....:	601-604, 6th Floor, Building A,DongFangYaYuan, ChenTian community,Xixiang, BaoMin 2nd Road, Bao'an District, Shenzhen, China	
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.	

Test item description .....:	Computer Speaker
Trade Mark .....:	Tilted Nation、Marvo
Manufacturer .....:	SHENZHEN MARVO TECHNOLOGY CO., LTD
Model/Type reference.....:	TNPHASER
Listed Models .....:	TNPHASERW, TNPHASER-B, TNPHASER-W, SD-022 SD-***(***stand for 0-9), SG-***(***stand for 0-9), SK-***(***stand for 0-9),SP-***BT(***stand for 0-9)
Modulation Type.....:	GFSK, π/4DQPSK, 8DPSK
Operation Frequency.....:	2402MHz to 2480MHz
Hardware Version.....	V2.0
Software Version	AFF2
Rating .....:	DC 5V by USB Port
Result.....:	PASS

TEST REPORT

Equipment under Test	:	Computer Speaker
Model /Type	:	TNPHASER
Listed Models	:	TNPHASERW, TNPHASER-B, TNPHASER-W, SD-022 SD-***(***stand for 0-9), SG-***(***stand for 0-9), SK-***(***stand for 0-9),SP-***BT(***stand for 0-9)
Remark		All the model are the same circuit and RF module, only for model name. Test sample model: SD-022 (TNPHASER)
Applicant	:	SHENZHEN MARVO TECHNOLOGY CO., LTD
Address	:	601-604, 6th Floor, Building A,DongFangYaYuan, ChenTian community,Xixiang, BaoMin 2nd Road, Bao'an District, Shenzhen, China
Manufacturer	:	SHENZHEN MARVO TECHNOLOGY CO., LTD
Address	:	601-604, 6th Floor, Building A,DongFangYaYuan, ChenTian community,Xixiang, BaoMin 2nd Road, Bao'an District, Shenzhen, China

Test Result:	**PASS**

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2022-11-18	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: Pd = (Pout*G)/(4* Pi * R 2) Where
Pd = power density in mW/cm2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416

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

Antenna Gain: -0.58dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.4 in linear scale. Output Power Into Antenna & RF Exposure Evaluation Distance:

EDR

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power (dBm)
Lowest(2402 MHz)	4.443	4.443±1	5.443
Middle(2441MHz)	4.120	4.120±1	5.120
Highest(2480MHz)	3.951	3.951±1	4.951

π/4DQPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power (dBm)
Lowest(2402 MHz)	4.230	4.230±1	5.230
Middle(2441MHz)	4.011	4.011±1	5.011
Highest(2480MHz)	4.360	4.360±1	5.360

8DPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power (dBm)
Lowest(2402 MHz)	4.012	4.012±1	5.012
Middle(2441MHz)	3.082	3.082±1	4.082
Highest(2480MHz)	3.366	3.366±1	4.366

EDR

Worst case: GFSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm2)	Limit	Result
Highest(2441 MHz)	5.443	3.50	-0.58	0.0006	1.0	Pass

Note: 1) Refer to report **MTEB22111601-R** for EUT test Max Conducted average Output Power value.

Note: 2) Pd = (Pout*G)/(4* Pi * R2)=(3.50*0.87)/(4*3.1416*20^2)=0.0006

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

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