

SAR Evaluation Report

Applicant:	WOW Technologies (Singapore) Pte Ltd
Address of Applicant:	62 Burn Road #06-01 TSH Centre Singapore
Manufacturer:	WOW Technologies (Singapore) Pte Ltd
Address of Manufacturer:	62 Burn Road #06-01 TSH Centre Singapore
Product name:	TOWER SPEAKERS
Model:	TOWER SPEAKERS, TW-22
Rating(s):	Input: 120 Vac, 60 Hz
Trademark:	NAKAMICHI (For model TOWER SPEAKERS), HAIYA (For model TW-22)
Standards:	47 CFR Part 1.1307 (2013) 47 CFR Part 2.1093 (2013) KDB447498D01 General RF Exposure Guidance v05
FCC ID:	2AGB6TWSPK
Date of Receipt:	2016-07-27
Date of Test:	2016-07-27~2016-08-04
Date of Issue:	2016-08-05
Test Result	Pass*

* In the configuration tested, the test item complied with the standards specified above.

Authorized Signature:

Aug.05, 2016 Pauler Li 

Project Manager

Date

Name/Position

Signature

Possible test case verdicts:

test case does not apply to the test object ...: N/A

test object does meet the requirement: P (Pass)

test object does not meet the requirement ...: F (Fail)

Testing Laboratory information:

Testing Laboratory Name: I-Test Laboratory

Address.....: 1-2 floor, South Block, Building A2 , No 3 Keyan Lu,
Science City, Guangzhou, Guangdong Province, P.R. China

Testing location : Same as above

Tel : 0086-20-32209330

Fax : 0086-20-62824387

E-mail : itl@i-testlab.com

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report would be invalid test report without all the signatures of testing technician and approver.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

General product information:

The models TOWER SPEAKERS and TW-22 are identical to each other except for model designation.
All tests were performed on the model TOWER SPEAKERS as representative.

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2 General Information

2.1 Client Information

Applicant: WOW Technologies (Singapore) Pte Ltd
Address of Applicant: 62 Burn Road #06-01 TSH Centre Singapore

2.2 General Description of E.U.T.

Name: TOWER SPEAKERS
Model No.: TOWER SPEAKERS
Trade Mark: NAKAMICHI
Operating Frequency: 2402 MHz to 2480 MHz for Bluetooth.
Channels: 79 channels with 1MHz step for Bluetooth
Bluetooth Version: 3.0
Modulation Technique: Frequency Hopping Spread Spectrum (FHSS)
Type of Modulation: GFSK, ($\pi/4$) DQPSK, 8DPSK for Bluetooth
Dwell time: Per channel is less than 0.4s.
Antenna Type: PCB Antenna
Antenna gain: 0dBi max
Function: Bluetooth speaker

2.3 Details of E.U.T.

EUT Power Supply: AC for power supply
Input: 120 Vac, 60 Hz
Test mode: The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2441MHz) and highest (2480MHz) are chosen for Bluetooth full testing.
Normal mode: the Bluetooth has been tested on the Modulation of GFSK;
EDR mode: the Bluetooth has been tested on the Modulation of ($\pi/4$)DQPSK and 8DPSK, compliance test and record the worst case on ($\pi/4$)DQPSK and 8DPSK
Power cord: 1.5m*2 AC power cord

2.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

2.5 Test Location

All tests were performed at:

I-Test Laboratory

1-2 floor, South Block, Building A2 , No 3 Keyan Lu, Science City, Guangzhou, Guangdong Province, P.R. China

0086-20-32209330

itl@i-testlab.com

No tests were sub-contracted.

2.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

2.7 Abnormalities from Standard Conditions

None.

2.8 Other Information Requested by the Customer

None.

2.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS(Lab code:L4957)
- FCC (Registration No.:935596)
- IC (Registration NO.:8368A)

3 SAR Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 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.

3.1.2 Limits

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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR,}$$

So,

$$\text{Numeric Threshold} = (\text{max. power of channel}) / (\text{Min Test separation Distance}) \times [\sqrt{f(\text{GHz})}]$$

$$\text{max. power of channel} = (\text{Numeric Threshold}) \times (\text{Min Test separation Distance}) / [\sqrt{f(\text{GHz})}]$$

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

2. For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$\{[\text{Power allowed at numeric threshold for 50 mm in step 1}]\} + \{[(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\} \text{ mW, for } > 1500 \text{ MHz and } \leq 6 \text{ GHz}$$

3.1.3 EUT RF Exposure

For 3.0 (classic mode):

The Max Conducted peak Output Power is 1.80dBm in Lowest channel(2.402 GHz);

The best case gain of the antenna is 0dBi

$\text{EIRP} = 1.80\text{dBm} + 0\text{dBi} = 1.80\text{dBm}$

1.80dBm logarithmic terms convert to numeric result is nearly 1.5 mW

$\text{EIRP} = 1.5 \text{ mW}$

According to the formula, calculate the EIRP test result:

$$\{[\text{Power allowed at numeric threshold for 50 mm}]\} + \{[(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$$

$$\text{SAR Exclusion Threshold} = (3.0 \times 50) / \sqrt{2.402} + [(200 - 50) \times 10] = 1596.8 \text{ mW}$$

So the SAR report is not required.