

RF EXPOSURE REPORT

Applicant	Tonly Technology Co., Ltd.
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Manufacturer or Supplier	Sony Corporation
Address	1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan
Product	WIRELESS SPEAKER
Brand Name	SONY
Model	YY7857E
Additional Model & Model Difference	N/A
Date of tests	Oct. 16, 2023 ~ Oct. 23, 2023

☒ **FCC Part 2 (Section 2.1091)**

☒ **KDB 447498 D04 Interim General RF Exposure Guidance v01**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Nov. 03, 2023

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Test Report No.: FM2309WDG0011-1

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FM2309WDG0011-1	Original release	Nov. 03, 2023

1. CERTIFICATION

FCC ID:	ZVA0YY7857E
PRODUCT:	WIRELESS SPEAKER
BRAND NAME:	SONY
MODEL NO.:	YY7857E
ADDITIONAL NO.:	N/A
TEST SAMPLE:	Engineering Sample
APPLICANT:	Tonly Technology Co., Ltd.
STANDARDS:	FCC Part 2 (Section 2.1091)
	KDB 447498 D04 Interim General RF Exposure Guidance v01

Note: This product contains BT module, please refer to FCC ID:2AMX3BMS002



2. RF EXPOSURE DEFINE

"Blanket" Exemption – §1.1307(b)(3)(i)(A)

- Regardless of the separation distance, the maximum time-averaged power is no more than 1mw.

"MPE" Exemption – §1.1307(b)(3)(i)(C)

- The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.
- Table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits.

RF Source frequency (MHz)	Minimum Distance		Threshold ERP (watts)
	$\lambda_L/ 2\pi$	$\lambda_H/ 2\pi$	
0.3-1.34	159 m–35.6 m		1,920 R ² .
1.34-30	35.6 m–1.6 m		3,450 R ² /f ² .
30-300	1.6 m–159 mm		3.83 R ² .
300-1,500	159 mm–31.8 mm		0.0128 R ² f.
1,500-100,000	31.8 mm–0.5 mm		19.2 R ² .
R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.			

- For mobile devices that are not exempt per Table 1 of §1.1307(b)(1)(i)(C) and device at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

"SAR" Exemption – §1.1307(b)(3)(i)(B)

- the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

And

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

3. MULTIPLE RF SOURCES ARE EXEMPT

Multiple RF sources are exempt– §1.1307(b)(3)(ii)

(a) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(b) Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated_k term) should be used to determine exemption for simultaneous transmission according to Formula below,

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE should be less than 1, to determine simultaneous transmission exposure compliance.

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for *P_{th}*, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source *i* at a distance between 0.5 cm and 40 cm (inclusive).

P_{th,i} = the exemption threshold power (*P_{th}*) according to [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for fixed, mobile, or portable RF source *i*.

ERP_j = the ERP of fixed, mobile, or portable RF source *j*.

ERP_{th,j} = exemption threshold ERP for fixed, mobile, or portable RF source *j*, at a distance of at least $\lambda/2\pi$ according to the applicable formula of [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section.

Evaluated_k = the maximum reported SAR or MPE of fixed, mobile, or portable RF source *k* either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit_k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source *k*, as applicable from [§ 1.1310 of this chapter](#).



4. SAR TEST EXCLUSION THRESHOLDS

The antennas provided to the EUT, please refer to the following table:

Mode	Transmitter Circuit	Antenna Type	Antenna Gain (dBi)
2.4GHz Wireless (GFSK)	Chain 0	PCB antenna	2
BT-BDR (GFSK)	Chain 0	PCB antenna	3.8
BT-EDR (8DPSK)	Chain 0	PCB antenna	3.8
BT-LE (GFSK, 1Mbps)	Chain 0	PCB antenna	3.8
BT-LE (GFSK, 2Mbps)	Chain 0	PCB antenna	3.8

The measured EIRP

Mode	Frequency (MHz)	Conducted Averaged Power (dBm)	EIRP (dBm)
2.4GHz Wireless (GFSK)	2474	5.28	7.28
BT-BDR (GFSK)	2402	7.04	10.84
BT-EDR (8DPSK)	2402	4.57	8.37
BT-LE (GFSK, 1Mbps)	2402	2.02	5.82
BT-LE (GFSK, 2Mbps)	2402	-0.89	2.91

Remark: For BT data, please refer to module certification FCC ID:2AMX3BMS002

The tuned EIRP (declared by client)

Mode	Frequency (MHz)	Target Power (dBm)	Tolerance (dBm)	Lower Tolerance (dBm)	Upper Tolerance (dBm)
2.4GHz Wireless (GFSK)	2406-2474	7	+/-1.5	5.5	8.5
BT-BDR (GFSK)	2402-2480	11	+/-1.5	9.5	12.5
BT-EDR (8DPSK)	2402-2480	8	+/-1.5	6.5	9.5
BT-LE (GFSK, 1Mbps)	2402-2480	6	+/-1.5	4.5	7.5
BT-LE (GFSK, 2Mbps)	2402-2480	3	+/-1.5	1.5	4.5

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as Mobile Device.

SAR Exemption §1.1307(b)(3)(i)(C)				
2.4GHz Wireless (GFSK)				
Frequency (MHz)	Max. EIRP (dBm)	Max. EIRP (mW)	Limit Threshold (mW)	Test Result
2406-2474	8.5	7.079	768	Pass

BT-BDR (GFSK)				
2402-2480	12.5	17.783	768	Pass

Note: Limit Threshold=19.2*R² (R=0.2m)

CONCLUSION:

The BT and 2.4GHz wireless can transmit simultaneously, the formula of calculated the MPE is:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

(7.079/768)+(17.783/768)=0.03237<1, which is less than the “1” limit.

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