



ELEMENT WASHINGTON DC LLC

7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
<http://www.element.com>

RF EXPOSURE EVALUATION Maximum Permissible Exposure (MPE)

Applicant Name:
Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0075
Japan

Date of Testing:
02/08/2023 - 03/03/2023
Test Report Issue Date:
04/14/2023
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2302060006-16.PY7

FCC ID:	PY7-84558E
APPLICANT:	Sony Corporation

EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
Citizens Band End User Devices (CBE)
Digital Transmission System (DTS)
Part 15 Spread Spectrum Transmitter (DSS)
Unlicensed National Information Infrastructure TX (NII)
15E 6 GHz Low Power Indoor Client (6XD)
FCC Rule Part: FCC Part 1 (§1.1310) and Part 2 (§2.1091)
Test Procedure(s): KDB 447498 D01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC KDB 447498 D01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez
Executive Vice President




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1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	...	...	f/300	6
1500-100,000	...	...	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

Table 1-1. Limits for Maximum Permissible Exposure (MPE)

1.2 EUT Description


The **Sony FCC ID: PY7-84558E** is a Portable Handset containing 2.4GHz transmit output ports, 5GHz, and 6GHz transmit output ports capable for transmitting 802.11a/b/g/n/ac/ax modes and GSM/GPRS, WCDMA/HSPA, and Multi-band LTE, Multi-band 5G NR operation. This MPE evaluation will cover RF Exposure for simultaneous transmission modes of transmitters operating at maximum power.

EUT:

Company Name: Sony Corporation

FCC ID: PY7-84558E

Antenna(s): Please see technical description for list of available antenna options

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1.3 Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by each transmitter used in this product was initially measured by a power meter or spectrum analyzer and the powers were recorded. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated at a distance of 20cm.

Friis Transmission Formula

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

Where,

P_d = Power Density (mW/cm²) π = 3.1416
 P_{out} = output power to antenna (mW) r = distance between observation point and center of the radiator (cm)
 G = gain of antenna in linear scale

Calculated MPE

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1-1.

There is no co-location between the electric fields of any two transmitters therefore following power densities are calculated for each individual transmitter by frequency at 20cm spacing:

Tech	Max Power (dBm)	Max Power (mW)	Ant Gain (dBi)	MPE (mW/cm ²)	MPE Limit (mW/cm ²)	% MPE
LTE Band 66	24	251.189	-2.44	0.028	1.000	2.85%


Table 1-2. Calculated MPE Data for Cellular Band (FR1 EN-DC – AG0)

Tech	Max Power (dBm)	EIRP (mW)	Ant Gain (dBi)	MPE (mW/cm ²)	MPE Limit (mW/cm ²)	% MPE
FR1 n41	26	398.107	-3.95	0.032	1.000	3.19%

Table 1-3. Calculated MPE Data for Cellular Band (FR1 EN-DC – AG0)

Tech	Max Power (dBm)	EIRP (mW)	Ant Gain (dBi)	MPE (mW/cm ²)	MPE Limit (mW/cm ²)	% MPE
FR1 n77	27.5	562.341	-2.38	0.065	1.000	6.47%

Table 1-4. Calculated MPE Data for Cellular Band (AG1)

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Tech	Max Power (dBm)	Max Power (mW)	Dir. Ant Gain (dBi)	MPE (mW/cm ²)	MPE Limit (mW/cm ²)	% MPE
2.4GHz WiFi (Chain0+1)	17	50.119	0.80	0.012	1.000	1.20%


Table 1-5. Calculated MPE Data for 2.4GHz Band

Tech	Max Power (dBm)	Max Power (mW)	Dir. Ant Gain (dBi)	MPE (mW/cm ²)	MPE Limit (mW/cm ²)	% MPE
5GHz WiFi (Chain0+1)	14.5	28.184	3.18	0.012	1.000	1.17%

Table 1-6. Calculated MPE Data for 5GHz Band


<u>Simultaneous Scenarios</u>	% MPE
2.4GHz + 5/6GHz + FR1 EN-DC AG#0 + AG#1	15.70%

Table 1-7. Co-location MPE Data for Simultaneous Transmission

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2.0 CONCLUSION

The device meets the mobile RF exposure limit at a 20cm separation distance as specified in §2.1091 of the FCC Rules. An appropriate RF exposure compliance statement will be placed in the user's manual.

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