FCC RF EXPOSURE REPORT

For

Wi-Fi/BT Transceiver

MODEL NUMBER: WCD940M

REPORT NUMBER: 4791021404-RF-6

ISSUE DATE: November 9, 2023

FCC ID: A3LWCD940M

Prepared for

Samsung Electronics Co Ltd
19 Chapin Rd., Building D, Pine Brook New Jersey, 07058 United States

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	November 9, 2023	Initial Issue	

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Samsung Electronics Co Ltd
Address:	19 Chapin Rd., Building D, Pine Brook New Jersey, 07058 United States

Manufacturer Information1

Company Name:	Chendu Xuguang Technology Co.,Ltd.
Address:	No.86 2nd section, Park Road, Longquanyi Disreict, Chengdu City, Sichuan Province, P.R.China

Manufacturer Information2

Company Name:	CHEMTRONICS CO., LTD.
Address:	35, Buk-ri, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

Manufacturer Information3

Company Name:	CHEMTROVINA COMPANY LIMITED
Address:	Nhon Trach 2 - Loc Khang IZ, Hiep Phuoc Town, Nhon Trach District, Dong Nai Province, Vietnam

Manufacturer Information4

Company Name:	Shenzhen Zowee Technology Co.,Ltd.
Address:	Block 5, Science & Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen
Company Name:	Shenzhen Zowee Smart Manufacturing Co., Ltd
Address:	Factory 1, Factory 2-3 and Dormitory No. 1 & Dormitory No. 2, No. 149, Tangxiachong Second Industrial Road, Tangxiachong Community, Yanluo Street, Bao'an District, Shenzhen City; Has business premises for production and business activities (Floor 1~5), Block D, Factory 10, Tongfu Road, Tangxiachong Community, Yanluo Street
Company Name:	TianJin Zowee Technology Development Co., Ltd.
Address:	NO.71 Xinhuan South Street, West Zone of Tianjin Economic and Technology Development Zone

Manufacturer Information5

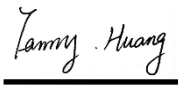
Company Name:	SEONG JI SAI GON COMPANY LIMITED
Address 1:	No.02, St.3A, Bien Hoa II industrial Zone, Long Binh Tan Ward, Bien Hoa City, Dong Nai Province, VietNam
Address 2:	Nha xuong C, D, Lo.X2, Khu Cong Nghiep Ho Nai, Xa Ho Nai3, Huyen Trang Bom, Tinh Dong Nai, VietNam

EUT Information

EUT Name:	Wi-Fi/BT Transceiver
Model:	WCD940M
Brand:	Samsung
Sample Received Date:	September 27, 2023
Sample Status:	Normal
Sample ID:	6637995
Date of Tested:	October 16, 2023 to November 9, 2023

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
447498 D04 Interim General RF Exposure Guidance v01	**PASS**

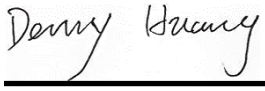
Prepared By:



Fanny Huang

Engineer Project Associate

Checked By:



Denny Huang

Senior Project Engineer

Approved By:

Stephen Guo

Operations Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with 47 CFR FCC Part 1 Subpart I, section 1.1307 and KDB 447498 D04 Interim General RF Exposure Guidance v01.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.

4. REQUIREMENT

LIMIT AND CALCULATION METHOD

According to 447498 D04 Interim General RF Exposure Guidance v01,

2.1.4 MPE-Based Exemption

An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to λ/2π, where λ is the free-space operating wavelength in meters. 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.10 For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

B.4 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of λ/4.

As for devices with antennas of length greater than λ/4 where the gain is not well defined, but always less than that of a half-wave dipole (length λ/2), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

MPE-based Exemption

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\,\text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B.1)}$$

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \quad \text{(B.2)}$$

where

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

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Fixed RF sources operating in the same time-averaging period- § 1.1307(b)(3)(ii)(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 (Evaluatedk term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a}\frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1 \quad \text{(C.1)}$$

CALCULATED RESULTS

For Single RF Source

Operating Mode	Max. Tune up Power	Antenna Gain	EIRP	ERP	ERP	Distance	Limit Threshold
	(dBm)	(dBi)	(dBm)	(dBm)	(mW)	(cm)	(mW)
BLE	12	1.33	13.33	11.18	13.122	20	3060
BT	12	1.33	13.33	11.18	13.122	20	3060
WIFI2.4G	22	0.85	22.85	20.7	117.490	20	3060
WIFI5G	23	2.54	25.54	23.39	218.273	20	3060

Simultaneous Operations Case 1

Operating Mode	ERP	Limit Threshold	Ratio	Sum of Ratios	Limit of Ratios
	(mW)	(mW)			
BT	13.122	3060	0.00429	0.04269	1
WIFI2.4G	117.490	3060	0.03840		

Simultaneous Operations Case 2

Operating Mode	ERP	Limit Threshold	Ratio	Sum of Ratios	Limit of Ratios
	(mW)	(mW)			
BT	13.122	3060	0.00429	0.07562	1
WIFI5G	218.273	3060	0.07133		

Note:
1. The calculated distance is 20 cm.
2. The power comes from operation description.

END OF REPORT