FCC 47 CFR § 2.1091

RF EVALUATION REPORT (MPE)

FOR

GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

MODEL NUMBER: SM-S918B/DS, SM-S918B

FCC ID: A3LSMS918B

REPORT NUMBER: 4790541052-S3V1

ISSUE DATE: 10/28/2022

Prepared for

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IAS ACCREDITED

Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	10/28/2022	Initial Issue	--

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1. Attestation of SAR Characterization

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.
FCC ID	A3LSMS918B
Model Number	SM-S918B/DS, SM-S918B
Applicable Standards	FCC 47 CFR § 2.1091 KDB 680106 D01 RF Exposure Wireless Charging Apps
Date Tested	10/13/2022
Test Results	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government

Approved & Released By:	Prepared By:
	
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory	Sunghoon Kim Senior Laboratory Engineer UL Korea, Ltd. Suwon Laboratory

2. Test Methodology

All calculations were made in accordance with FCC OET Bulletin 65 Edition 97-01.

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Shield Room 1

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. Equipment Under Test

4.1. Description of EUT

The EUT has WPT (Wireless Power Transfer) feature which has inductive charging coil to charge phone or watch. The charging frequency is between 110 kHz to 148 kHz, and the maximum power consumption is 9.0 W in charging status.

4.2. Worst-case configuration

Test configuration	Description
DUT to Phone test configuration 1	Charging from Phone to DUT
DUT to Phone test configuration 2	Charging from Phone to DUT (TA Charging from DUT)
DUT to Phone test configuration 3 (Cross position)	Charging from Phone to DUT
DUT to Phone test configuration 4 (Cross position)	Charging from Phone to DUT (TA Charging from DUT)
DUT to Watch test configuration 5	Charging from Watch to DUT
DUT to Watch test configuration 6	Charging from Watch to DUT (TA Charging from DUT)

Note:

Configuration 2, 4 and 6 were tested with the worst case of configuration 1, 3 and 5.

4.3. KDB 680106 D01 SECTION 5.b) EQUIPMENT APPROVAL CONSIDERATIONS

Requirement	Device informations
(1) Power transfer frequency is less than 1 MHz.	Yes. Operating Frequency is between 110kHz to 148 kHz.
(2) Output power from each primary coil is less than or equal to 15 watts.	Yes. Maximum power is 9.0 Watts.
(3) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Yes.
(4) Client device is placed directly in contact with the transmitter.	Yes.
(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	Yes.
(6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Yes. The aggregate field at 15 cm or 20cm from the device are 9.90 % of the FCC H field limit.

4.4. Description of Test setup

SUPPORT EQUIPMENT & PERIPHERALS

SUPPROT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Numver	FCC ID
Phone	Samsung Electronics Co., Ltd.	SM-G986B/DS	R3CMB0C70XN	A3LSMG986B
Watch	Samsung Electronics Co., Ltd.	SM-R835F	RFAM90ZXFTF	A3LSMR835
Traver Adapter	Samsung Electronics Co., Ltd.	EP-TA800	R37N9BV0382HM3	DoC
USB Data Cable	Samsung Electronics Co., Ltd.	EP-DN980BBE	N/A	-

TEST SETUP

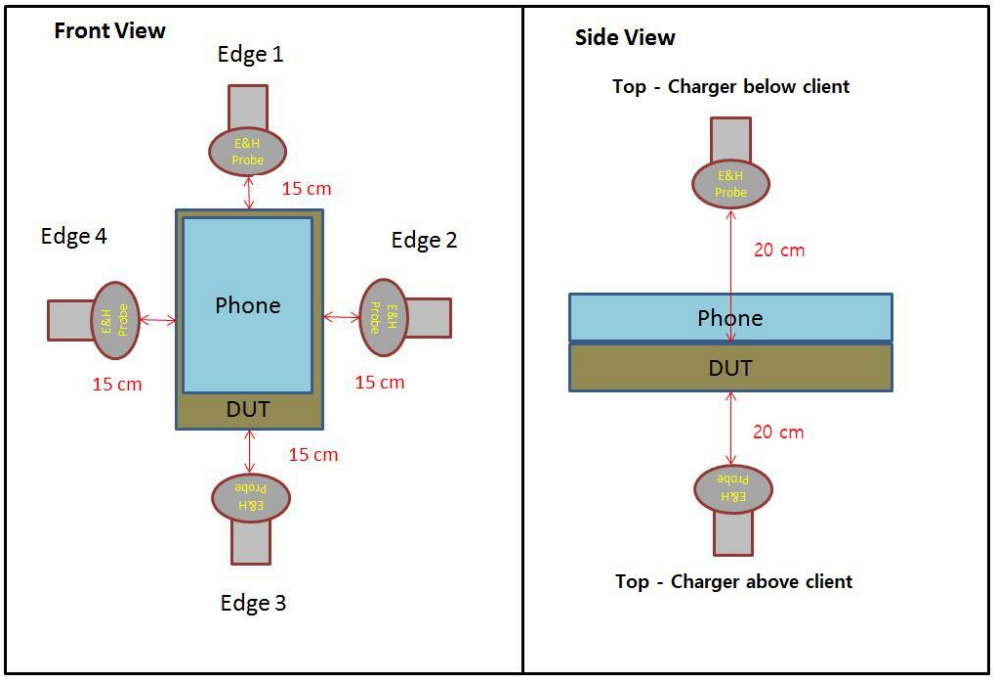
The following three modes are tested in test configurations

Mode
Operating (SUPPORT Equipment, <10% Power Charging)
Operating (SUPPORT Equipment, 50~55% Power Charging)
Operating (SUPPORT Equipment, 90~95% Power Charging)

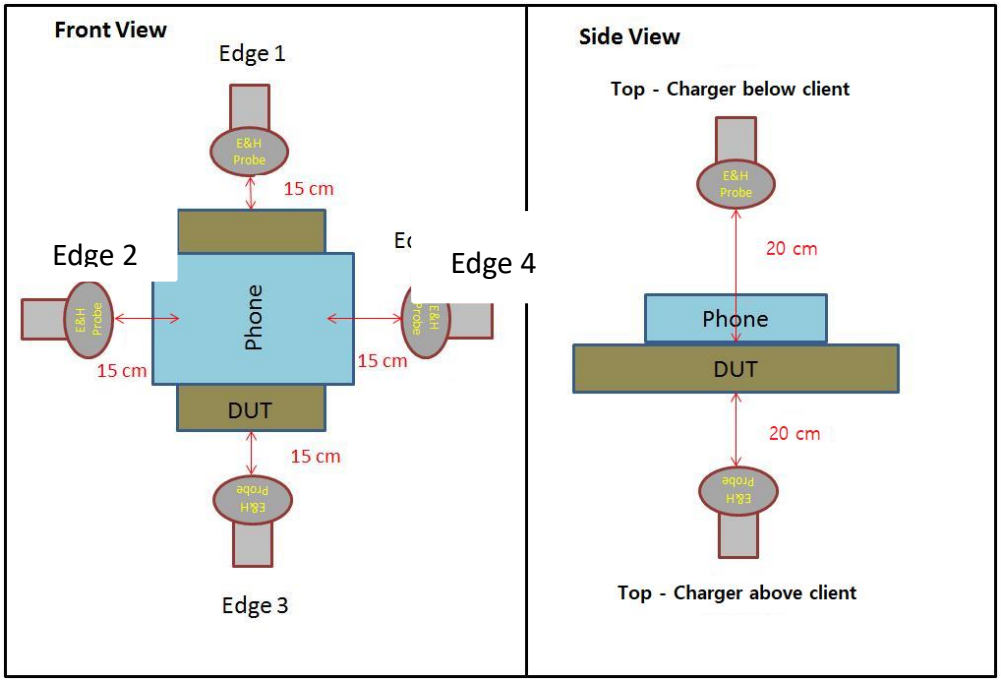
MEASUREMENT TEST SETUP

The measurement was taken using a probe placed 15 cm surrounding the device and 20 cm above the top surface of the EUT. Measurements were taken the top (charger below/above client) and all sides of the EUT per KDB680106 D01.

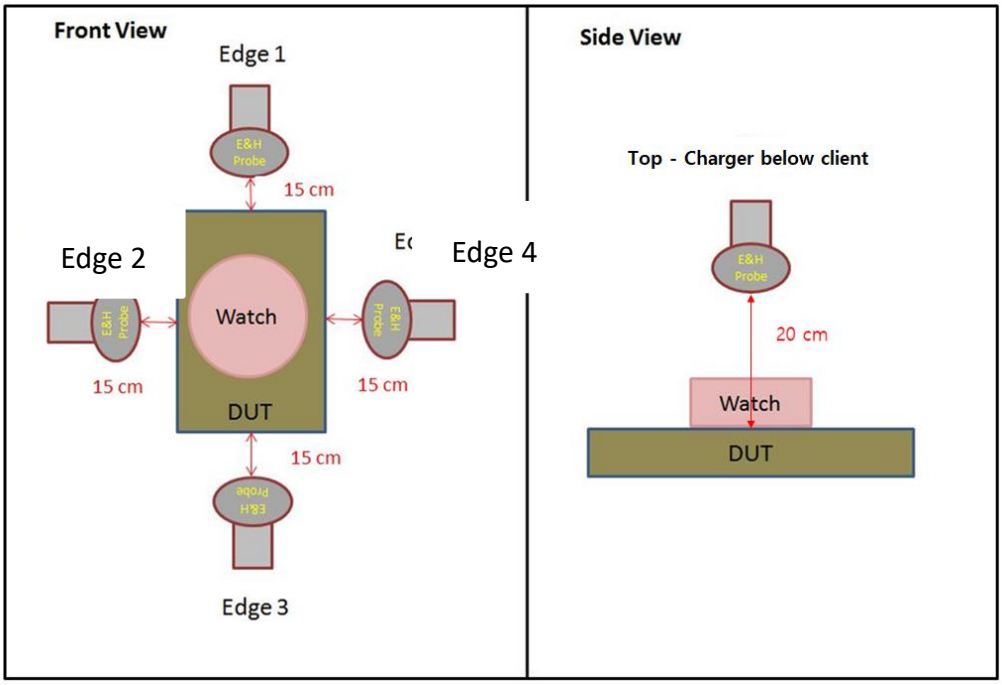
DUT to phone test Configuration 1 & 2



DUT to phone test Configuration 3 & 4



DUT to Watch test Configuration 5 & 6



5. Test and Measurement equipment

The following test and measurement equipment was used for the tests documented in this report;

Test equipment (Measurement probe)				
Description	**Manufacturer**	**Model**	**S/N**	**Cal due.**
E-H Field Analyzer	**Narda**	**EHP-200AC**	**170WX91008**	**8-23-2023**

6. Maximum Permissive RF exposure

6.1. FCC Limits and Summary

6.1.1. FCC Limits

§ 1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter.

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

6.2. Test Results

6.2.1. FCC RF Exposure

H-FIELD MEASUREMENTS

Note: Peak measurement were performed. Additional test was performed in each Test mode by moving the probe surrounding the device to find the maximum exposure.

TEST results of DUT to phone test Configuration 1 & 2

FCC RF Exposure Result

Test Configuration	Test mode	Test distance	Test Position	H-Field Limit (A/m)	H-Field meas. data (A/m)
Configuration 1	Operating Real Product (Power <10% charging)	15 cm probe to edges of EUT and 20 cm probe to top surface of the EUT	Top - charger above client	1.63	0.0296
			Top - charger below client		0.0305
			Edge 1		0.0296
			Edge 2		0.0293
			Edge 3		0.0308
			Edge 4		0.0303
			Max		0.0308
	Operating Real Product (Power 50~55% charging)		Top - charger above client		0.0296
			Top - charger below client		0.0293
			Edge 1		0.0305
			Edge 2		0.0298
			Edge 3		0.0296
			Edge 4		0.0296
			Max		0.0305
	Operating Real Product (Power 90~95% charging)		Top - charger above client		0.0293
			Top - charger below client		0.0305
			Edge 1		0.0308
			Edge 2		0.0305
			Edge 3		0.0326
			Edge 4		0.0305
			Max		**0.0326**
Configuration 2	Operating Real Product (Power 90~95% charging)		Edge 3		0.0305

TEST results of DUT to phone test Configuration 3 & 4

FCC RF Exposure Result

Test Configuration	Test mode	Test distance	Test Position	H-Field Limit (A/m)	H-Field meas. data (A/m)
Configuration 3	Operating Real Product (Power <10% charging)	15 cm probe to edges of EUT and 20 cm probe to top surface of the EUT	Top - charger above client	1.63	0.0352
			Top - charger below client		0.0477
			Edge 1		0.0412
			Edge 2		0.1614
			Edge 3		0.0417
			Edge 4		0.0864
			Max		**0.1614**
	Operating Real Product (Power 50~55% charging)		Top - charger above client		0.0377
			Top - charger below client		0.0453
			Edge 1		0.0426
			Edge 2		0.1544
			Edge 3		0.0323
			Edge 4		0.0839
			Max		0.1544
	Operating Real Product (Power 90~95% charging)		Top - charger above client		0.0382
			Top - charger below client		0.0506
			Edge 1		0.0437
			Edge 2		0.1490
			Edge 3		0.0338
			Edge 4		0.0847
			Max		0.1490
Configuration 4	Operating Real Product (Power <10% charging)		Edge 2		0.1544

TEST results of DUT to phone test Configuration 5 & 6

FCC RF Exposure Result

Test Configuration	Test mode	Test distance	Test Position	H-Field Limit (A/m)	H-Field meas. data (A/m)
Configuration 5	Operating Real Product (Power <10% charging)	15 cm probe to edges of EUT and 20 cm probe to top surface of the EUT	Top - charger below client	1.63	0.0296
			Edge 1		0.0497
			Edge 2		0.0305
			Edge 3		0.0885
			Edge 4		0.0317
			Max		**0.0885**
	Operating Real Product (Power 50~55% charging)		Top - charger below client		0.0293
			Edge 1		0.0492
			Edge 2		0.0297
			Edge 3		0.0935
			Edge 4		0.0288
			Max		**0.0935**
	Operating Real Product (Power 90~95% charging)		Top - charger below client		0.0305
			Edge 1		0.0412
			Edge 2		0.0314
			Edge 3		0.1104
			Edge 4		0.0305
			Max		**0.1104**
Configuration 6	Operating Real Product (Power 90~95% charging)		Edge 3		0.0935

6.2.2. FCC SUMMARY OF RESULTS

H-Field Limit		
FCC RF Exposure	Maximum meas data (A/m)	Percentage (%)
1.63	0.1614	**9.90**

Conclusion:

H-Field result is less than 50% of the MPE limit.

Appendixes

Refer to separated files for the following appendixes.

4790541052-S3 FCC Report MPE_App A_Test setup photos

END OF REPORT