74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
TEL: +82-31-645-6300 FAX: +82-31-645-6401

WPC RF Exposure Report

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue:** May 18, 2023 **Test Report No.:** HCT-SR-2305-FC011 **Test Site: HCT CO., LTD.**

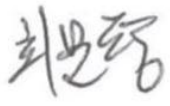
FCC ID: A3LSMF946B

Equipment Type:	**Mobile Phone**
Application Type	**Certification**
FCC Rule Part(s):	**FCC Part 1 SUBPART I** **FCC Part 2 SUBPART J** **KDB 680106 D01**
Model Name:	**SM-F946B/DS**
Additional Model Name:	**SM-F946B**
Date of Test:	**Apr. 28, 2023**

This device has been shown to be capable of compliance for the above standards for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

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.

Tested By



Moon-Pyung, Choi
Test Engineer
SAR Team
Certification Division

Reviewed By

Yun-jeang, Heo
Technical Manager
SAR Team
Certification Division

DOCUMENT HISTORY

Rev.	DATE	DESCRIPTION
0	May 18, 2023	First Approval Report

Table of Contents

1. Test Methodology

The DUT was assessed in accordance with FCC KDB 680106 D01 RF Exposure Wireless Charging App v03r01.

2. Test Location.

2.1 Test Laboratory.

Company Name:	HCT Co., LTD
Address:	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of Korea
Telephone:	+82 31 645 6300
Fax.:	+82 31 645 6401

2.2 Test Facillities

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Korea:	National Radio Research Agency (Designation No. KR0032)
	KOLAS (Tesing No. KT197)

3. DEVICE UNDER TEST DESCRIPTION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Model Name:	SM-F946B/DS
Multi-Model Name:	SM-F946B
EUT Type:	Mobile Phone
Application Type:	Certification

3.1 Description of DUT

The DUT is a mobile phone with a WPT (Wireless Power Transfer) feature using an inductive charging coil to charge a phone and a watch. The charing frequency is between 110 kHz to 148 kHz, and the maximum transfer power consumption is 9 W in charging status.

3.2 Test Configurations

Test configurations	Description
DUT to Phone test configuration 1	Charging from Phone to DUT
DUT to Phone test configuration 2	Charging from Phone to DUT(TA Carging from DUT)
DUT to Phone test configuration 3	Charging from Phone to DUT
DUT to Phone test configuration 4	Charging from Phone to DUT(TA Carging from DUT)
DUT to Phone test configuration 5	Charging from Watch to DUT
DUT to Phone test configuration 6	Charging from Watch to DUT(TA Carging from DUT)
DUT to Phone test configuration 7	Charging from Ear buds to DUT
DUT to Phone test configuration 8	Charging from Ear buds to DUT(TA Carging from DUT)

Note :
1. Configuration 2,4,6 and 8 were tested with the worst case of configuration 1,3,5 and 7

3.3 KDB 680106 D01 v03 SECTION 5.b) EQUIPMENT APPROVAL CONSIDERATIONS

Requirement	Device
(1) Power transfer frequency is less than 1 MHz.	Yes. Operation Frequency is between 110 kHz to 148 Khz.
(2) Output power from each primary coil is less than or equal to 15 watts.	Yes. Maximum power is 9 Watts.
(3) The transfer system includes only single primary and secondarty coils. This includes charging systems that may have multiple primary coils and client 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 expousure conditions only(portable exposure conditions are not convered 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 strengths at 15 cm from the device is 27.4 % of the FCC H field limit.

3.4 DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT & PERIPHERALS

SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Watch	SAMSUNG Electronics Co., Ltd.	SM-R835F	RFAM80Q6NJW	A3LSMR835
Ear Buds	SAMSUNG Electronics Co., Ltd	SM-R180	RF2N60L5FGB	A3LSMR180L A3LSMR180R
Phone	SAMSUNG Electronics Co., Ltd.	SM-G986B/DS	R5CN1003ZRA	A3LSMG986B

TEST SETUP

The following three modes are tested in test configuration;

All Position of client device were investigated and the worst position results are reported.

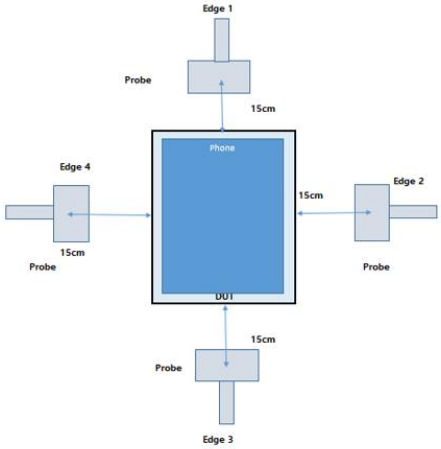
Mode
Operating (SUPPORT Equipment, <10% Power Charging)
Operating (SUPPORT Equipment, 50~55% Power Charging)
Operating (SUPPORT Equipment, 90~95% Power Charging)

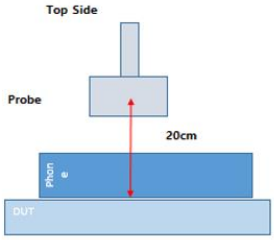
MEASUREMENT TEST SETUP

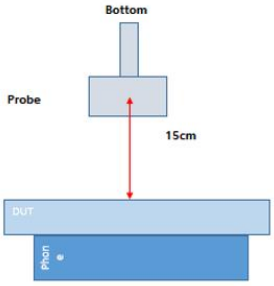
The measurement was taken using a probe place 15 cm from the edges of DUT or 20 cm above the DUT. Measurement were from the top and all sides of the DUT per KDB680106 D01 v03. Additionally, as the DUT to phone configuration could result with the DUT place either above or below the phone, measurements were performed 'below' th DUT by flipping the DUT/phone so that the DUT was uppermost.

The probe was moved along the edges or above the DUT to a position that showed the maximum field strength. This position was used for the reported result.

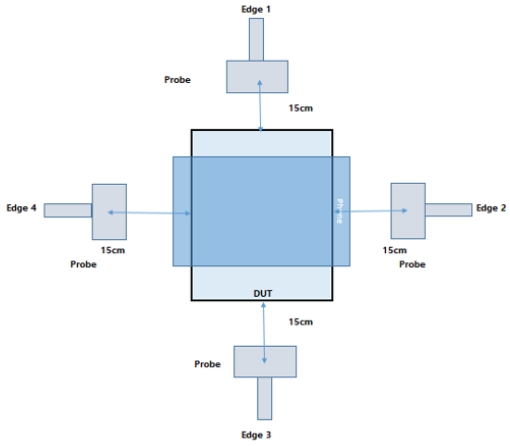
DUT to phone test Configuration 1 & 2

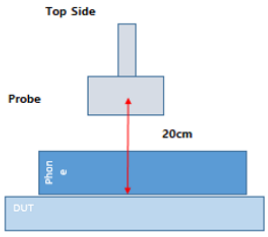


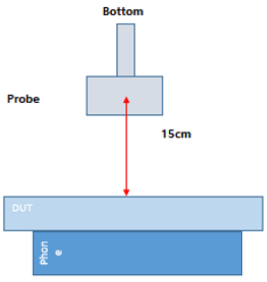




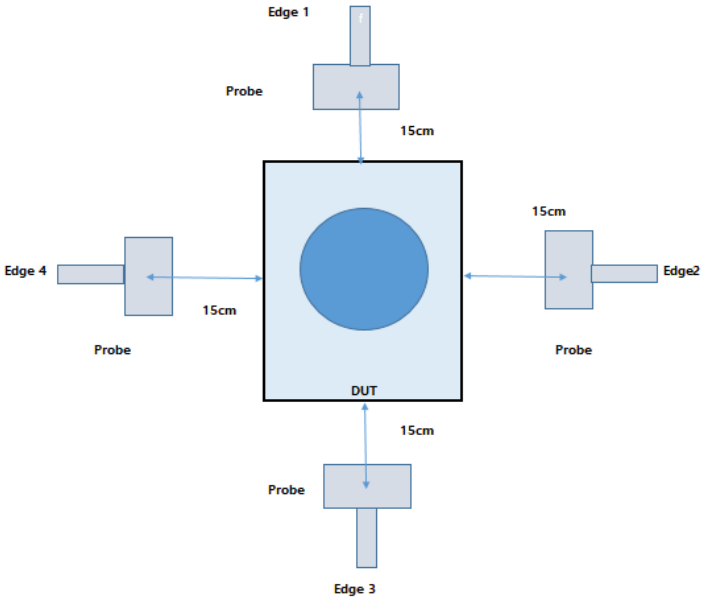
DUT to phone test Configuration 3 & 4

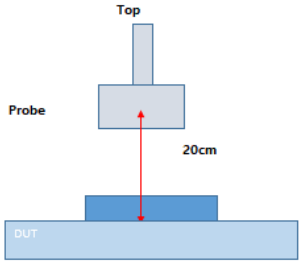






DUT to Watch/Ear buds test Configuration 5 & 6 and 7 & 8





4. TEST AND MEASUREMENT EQUIPMENT

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

Manufacturer	Model name	Description	S/N	Calib. Date	Calib.Due
Narda	EHP 200AC	Electric and Magnetic Field Probe	170WX91009	07/29/2022	07/29/2024

5. MAXIMUM PERMISSIBLE RF EXPOSURE

1.13010 The criteria listed in Table 1 shall be used to evaluate the enviromental 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 th 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. TEST RESULTS

H-Field Measurements

Note : peak measurements were performed. RMS values were calculated from the peak measurement.

Please refer to the formula for calculating the RMS value: [Field Strength * √Duty Cycle]

Fold Close

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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.193
		15 cm	Bottom		0.199
			Edge 1		0.199
			Edge 2		0.191
			Edge 3		0.200
			Edge 4		0.193
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.195
		15 cm	Bottom		0.179
			Edge 1		0.176
			Edge 2		0.168
			Edge 3		0.177
			Edge 4		0.216
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.191
		15 cm	Bottom		0.164
			Edge 1		0.222
			Edge 2		0.164
			Edge 3		0.181
			Edge 4		**0.228**
Configuration 2	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.227

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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.232
		15 cm	Bottom		0.200
			Edge 1		0.193
			Edge 2		0.202
			Edge 3		0.262
			Edge 4		0.440
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.229
		15 cm	Bottom		0.239
			Edge 1		0.228
			Edge 2		0.218
			Edge 3		0.297
			Edge 4		0.440
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.228
		15 cm	Bottom		0.169
			Edge 1		0.216
			Edge 2		0.210
			Edge 3		0.246
			Edge 4		**0.447**
Configuration 4	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.422

TEST results of DUT to Watch 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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.202
		15 cm	Edge 1		0.193
			Edge 2		0.191
			Edge 3		0.193
			Edge 4		0.207
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.202
		15 cm	Edge 1		0.169
			Edge 2		0.156
			Edge 3		0.216
			Edge 4		0.200
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.199
		15 cm	Edge 1		0.200
			Edge 2		0.187
			Edge 3		0.154
			Edge 4		**0.219**
Configuration 6	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.213

TEST results of DUT to Ear Buds test Configuration 7&8

FCC RF Exposure Result					
Test Configuration	**Test mode**	**Test distance**	**Test Position**	**H-Field Limit (A/m)**	**H-Field meas data (A/m)**
Configuration 7	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.200
		15 cm	Edge 1		0.197
			Edge 2		0.200
			Edge 3		0.196
			Edge 4		0.202
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.201
		15 cm	Edge 1		0.202
			Edge 2		0.200
			Edge 3		0.165
			Edge 4		0.202
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.204
		15 cm	Edge 1		0.216
			Edge 2		0.235
			Edge 3		0.235
			Edge 4		**0.239**
Configuration 8	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.235

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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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.189
		15 cm	Bottom		0.193
			Edge 1		0.209
			Edge 2		0.110
			Edge 3		0.192
			Edge 4		0.200
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.191
		15 cm	Bottom		0.200
			Edge 1		0.209
			Edge 2		0.086
			Edge 3		0.212
			Edge 4		0.184
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.186
		15 cm	Bottom		0.219
			Edge 1		0.217
			Edge 2		0.090
			Edge 3		0.196
			Edge 4		**0.220**
Configuration 2	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.216

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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.193
		15 cm	Bottom		0.193
			Edge 1		0.193
			Edge 2		0.118
			Edge 3		0.199
			Edge 4		0.266
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.191
		15 cm	Bottom		0.193
			Edge 1		0.212
			Edge 2		0.157
			Edge 3		0.199
			Edge 4		**0.290**
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.192
		15 cm	Bottom		0.232
			Edge 1		0.220
			Edge 2		0.118
			Edge 3		0.218
			Edge 4		0.266
Configuration 4	Operation Real Product (Power <10% charging)	15 cm	Edge 4	1.63	0.282

TEST results of DUT to Watch 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	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.191
		15 cm	Edge 1		0.186
			Edge 2		0.131
			Edge 3		0.191
			Edge 4		0.245
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.187
		15 cm	Edge 1		0.206
			Edge 2		0.131
			Edge 3		0.176
			Edge 4		0.241
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.191
		15 cm	Edge 1		0.225
			Edge 2		0.135
			Edge 3		0.191
			Edge 4		0.275
Configuration 6	Operation Real Product (Power <10% charging)	15 cm	**Edge 4**	1.63	**0.276**

TEST results of DUT to Ear Buds test Configuration 7&8

FCC RF Exposure Result					
Test Configuration	**Test mode**	**Test distance**	**Test Position**	**H-Field Limit (A/m)**	**H-Field meas data (A/m)**
Configuration 7	Operation Real Product (Power <10% charging)	20 cm	Top	1.63	0.184
		15 cm	Edge 1		0.197
			Edge 2		0.126
			Edge 3		0.193
			Edge 4		0.209
	Operation Real Product (Power 50~55% charging)	20 cm	Top	1.63	0.183
		15 cm	Edge 1		0.193
			Edge 2		0.141
			Edge 3		0.161
			Edge 4		0.240
	Operation Real Product (Power 90~95% charging)	20 cm	Top	1.63	0.184
		15 cm	Edge 1		0.201
			Edge 2		0.153
			Edge 3		0.177
			Edge 4		0.185
Configuration 8	Operation Real Product (Power <10% charging)	15 cm	**Edge 4**	1.63	0.241

7. Conclusion

	H-Field (A/m)
MPE Limit	1.63
Maximum Measurement Result	**0.447**
Percentage (%)	**27.4**

H-Field test result was less than 50% of MPE Limit