CERTIFICATION TEST REPORT

Report Number. : 4790047196-E9V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-G780G/DSM, SM-G780G/DS, SM-G780G
FCC ID	:	A3LSMG780G1
EUT Description	:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC
Test Standard(s)	:	FCC 47 CFR PART 1 SUBPART I FCC 47 CFR PART 2 SUBPART J

Date Of Issue:
2021-08-25

Prepared by:
UL Korea, Ltd.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, LTD. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

IAS ACCREDITED
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2021-08-18	Initial issue	Sungeun Lee
V2	2021-08-24	Updated to address TCB's question	Sungeun Lee
V3	2021-08-25	Updated to address TCB's question	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC

MODEL: SM-G780G/DSM, SM-G780G/DS, SM-G780G

SERIAL NUMBER: R38R301JQPW (RADIATED);

DATE TESTED: 2021-08-17

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 1 SUBPART I	Complies
FCC PART 2 SUBPART J	

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 For
UL Korea, Ltd. By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Sungeun Lee
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

All calculations were made in accordance with KDB 680106 D01 RF Exposure Wireless Charging Apps v03r01.

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.

This report covers the Samsung models SM-G780G/DSM, SM-G780G/DS and SM-G780G. These models are identical in hardware except SM-G780G/DSM is supported MST and SM-G780G/DS has dual SIM tray and SM-G780G has single SIM tray.
All serise model was same hardware thus, SM-G780G/DS(Dual SIM tray) was set for final test.

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	Charging from Phone to DUT
DUT to Phone test configuration 4	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 v03 SECTION 5.b) EQUIPMENT APPROVAL CONSIDERATIONS

Requirement	Device
(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 system may consist of more than one source primary coils, charging one or more clients. If more than one primary coil is present, the coil pairs may be powered on at the same time.	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 anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the surface from all coils that by design can simultaneously transmit, and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit.	Yes. The aggregate field at 15 cm from the device are 20.18 % 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-TA200	R37M194G2J1SE3	DoC
USB Data Cable	Samsung Electronics Co., Ltd.	EP-DR140AWE	-	-

TEST SETUP

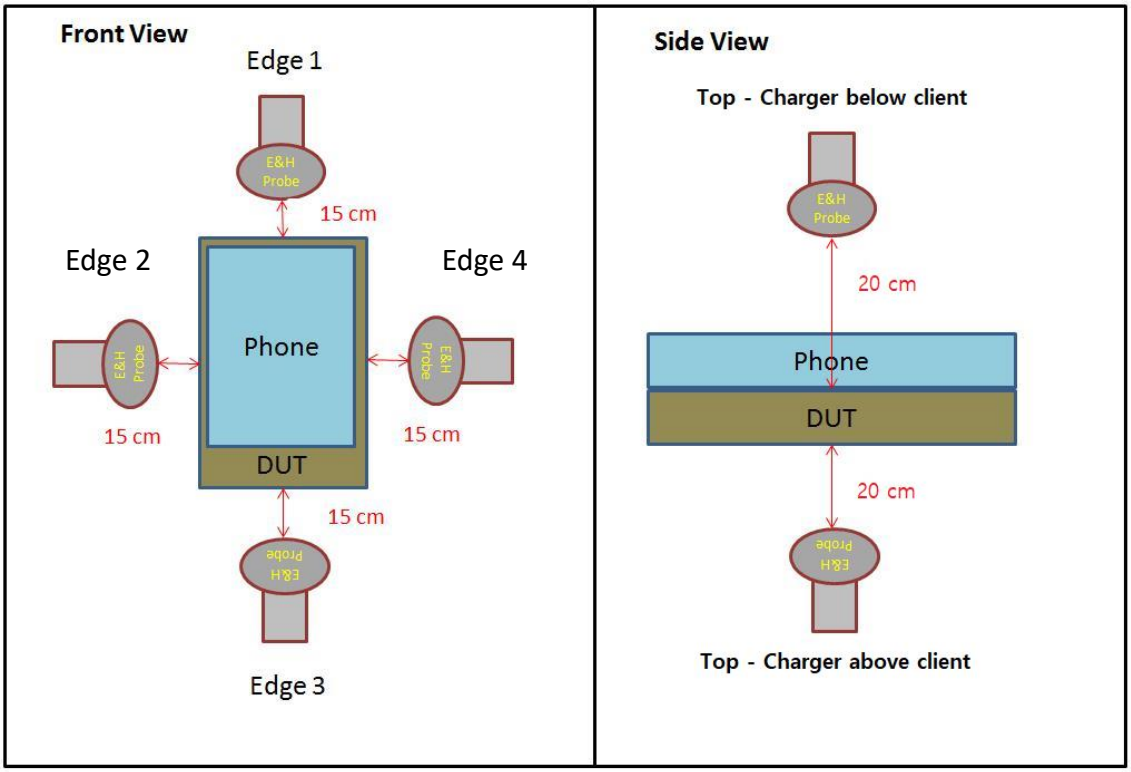
The following three modes are tested in test configurations;

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

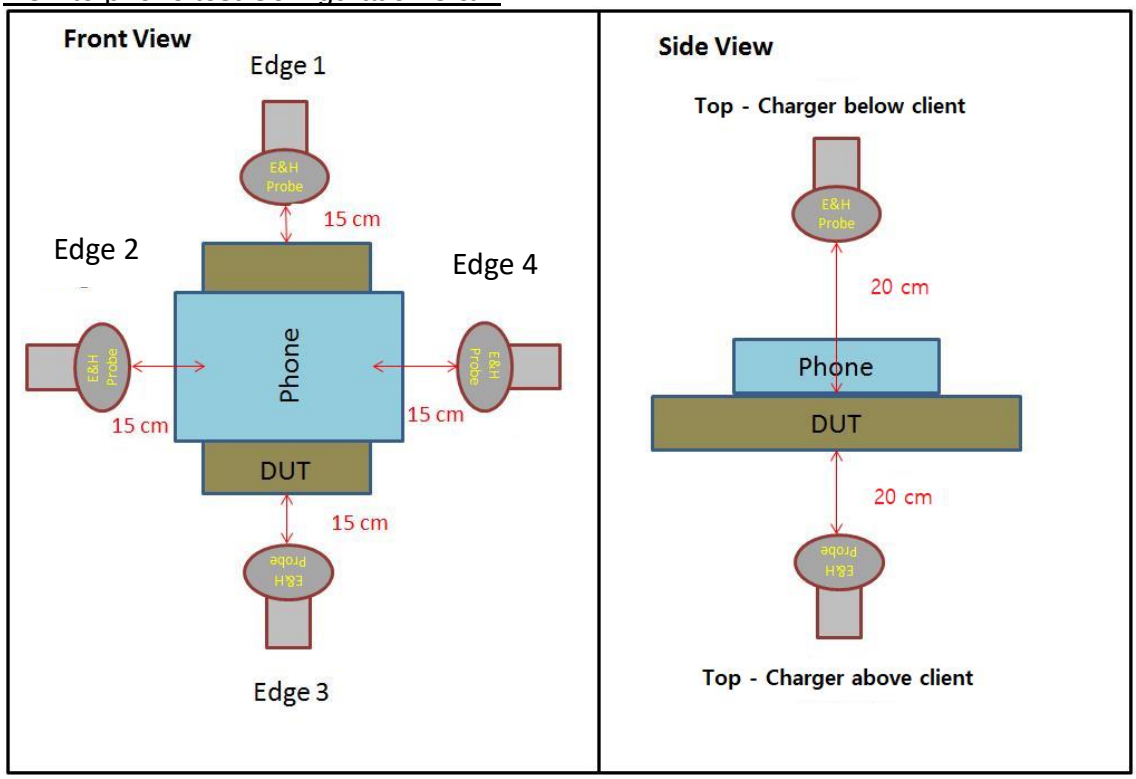
MEASUREMENT TEST SETUP

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 v03 and RF Exposure Procedures (Wireless Power Transfer) in TCB Workshop October, 2018.

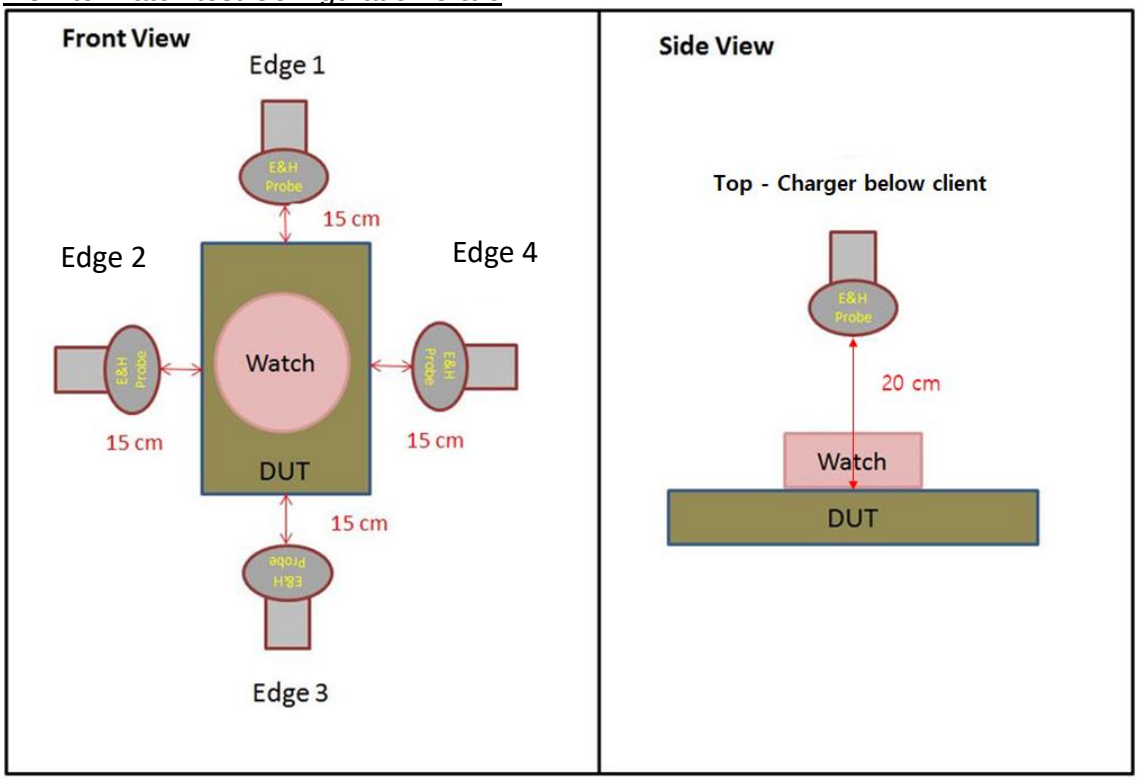
DUT to phone test Configuration 1 & 2



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 List					
Description	Manufacturer	Model	Serial Numver	Cal Date	Cal Due
Electric and Magnetic Field Probe	Narda	EHP-200AC	170WX91008	8/6/2021	8/6/2022

6. Maximum PERMISSIBLE 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. RMS values were calculated from the peak measurement.

Please refer to the formula for calculating the RMS values: [Field Strength x √Duty Cycle].

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	0.208
			Top - charger below client		0.208
			Edge 1		0.207
			Edge 2		0.208
			Edge 3		0.201
			Edge 4		0.208
			max		0.208
	Operating Real Product (Power 50~55% charging)		Top - charger above client		**0.211**
			Top - charger below client		0.210
			Edge 1		0.206
			Edge 2		0.204
			Edge 3		0.199
			Edge 4		0.207
			max		**0.211**
	Operating Real Product (Power 90~95% charging)		Top - charger above client		0.203
			Top - charger below client		0.207
			Edge 1		0.197
			Edge 2		0.209
			Edge 3		0.201
			Edge 4		0.203
			max		0.209
Configuration 2	Operating Real Product (Power 50~55% charging)		Top - charger above client		0.211
			max		**0.215**

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	0.201
			Top - charger below client		0.217
			Edge 1		0.205
			Edge 2		0.264
			Edge 3		0.218
			Edge 4		0.238
			max		0.264
	Operating Real Product (Power 50~55% charging)		Top - charger above client		0.201
			Top - charger below client		0.218
			Edge 1		0.203
			Edge 2		0.277
			Edge 3		0.210
			Edge 4		0.239
			max		0.277
	Operating Real Product (Power 90~95% charging)		Top - charger above client		0.194
			Top - charger below client		0.229
			Edge 1		0.201
			Edge 2		**0.289**
			Edge 3		0.205
			Edge 4		0.242
			max		**0.289**
Configuration 4	Operating Real Product (Power 90~95% charging)		Edge 2		0.289
			max		**0.296**

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	**0.324**
			Edge 1		0.208
			Edge 2		0.204
			Edge 3		0.208
			Edge 4		0.202
			max		**0.324**
	Operating Real Product (Power 50~55% charging)		Top - charger below client		0.298
			Edge 1		0.207
			Edge 2		0.209
			Edge 3		0.205
			Edge 4		0.203
			max		0.298
	Operating Real Product (Power 90~95% charging)		Top - charger below client		0.285
			Edge 1		0.204
			Edge 2		0.204
			Edge 3		0.211
			Edge 4		0.202
			max		0.285
Configuration 6	Operating Real Product (Power <10% charging)		Top - charger below client		0.324
			max		**0.329**

6.2.2. FCC SUMMARY OF RESULTS

H-Field Limit		
FCC RF Exposure	Maximum meas data (A/m)	Percentage (%)
1.63	0.329	**20.18**

Conclusion:

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

END OF TEST REPORT