



FCC Part 1 Subpart I
FCC Part 2 Subpart J

CERTIFICATION TEST REPORT

FOR

**GSM/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac/11ax HE20/40/80, ANT+ and
NFC**

MODEL NO: SM-G970F/DS AND SM-G970F

FCC ID: AL3SMG970F

REPORT NUMBER: 12563734-E10V3

ISSUE DATE: January 25, 2019

Prepared for

**SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU,
SUWON-SI, GYEONGGI-DO, 16677, KOREA**

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	01/03/2019	Initial Issue	
V2	1/24/2019	Reformatted report	Dave Weaver
V3	1/25/2019	Updated report based upon TCB feedback.	Dave Weaver

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
 129 SAMSUNG-RO, YEONGTONG-GU,
 SUWON-SI, GYEONGGI-DO, 16677, KOREA.

EUT DESCRIPTION: GSM/WCDMA/LTE phone with BT, DTS/UNII a/b/g/n/ac/11ax
 HE20/40/80, ANT+ and NFC

MODEL NUMBER: SM-G970F/DS and SM-G970F

SERIAL NUMBER: R38KBQFAE3T

DATE TESTED: December 12, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I	Complies
FCC PART 2 SUBPART J	
KDB 680106 D01	

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
 UL Verification Services Inc. By:



Dave Weaver
 OPERATIONS LEADER
 UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The EUT was assessed in accordance with KDB 680106 D01 RF Exposure Wireless Charging App v03.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 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.

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)
<input checked="" type="checkbox"/> Immunity Area	<input type="checkbox"/> Chamber G (IC:22541-4)
	<input type="checkbox"/> Chamber H (IC:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

4. EQUIPMENT UNDER TEST

4.1. 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 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	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)

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 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 from the device are 3.68 % of the FCC H field limit.

4.4. DESCRIPTION OF TEST SETUP SUPPORT EQUIPMENT & PERIPHERALS

SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Numver	FCC ID
Watch	Samsung Electronics Co., Ltd.	SM-R805U	R5AK704QDRJ	A3LSMG805
Phone	Samsung Electronics Co., Ltd.	SM-G965F	RF8K11FQ5NP	A3LSMG965
Travel Adapter	Samsung Electronics Co., Ltd.	EP-TA200	R37J1PD4JZ1DK3	DoC
USB Data Cable	Samsung Electronics Co., Ltd.	EP-DG970BBE	-	-

TEST SETUP

The following three modes are tested in test configurations;

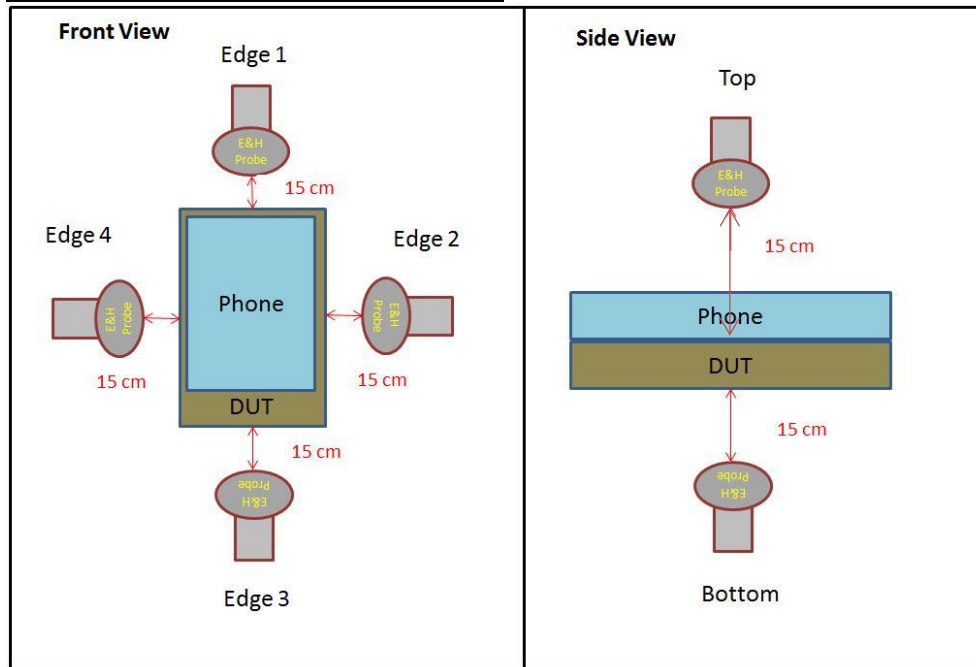
Mode
Operating (SUPPORT Equipment, <10% Power Charging)
Operating (SUPPORT Equipment, 50~55% Power Charging)
Operating (SUPPORT Equipment, 90~95% Power Charging)

MEASUREMENT TEST SETUP

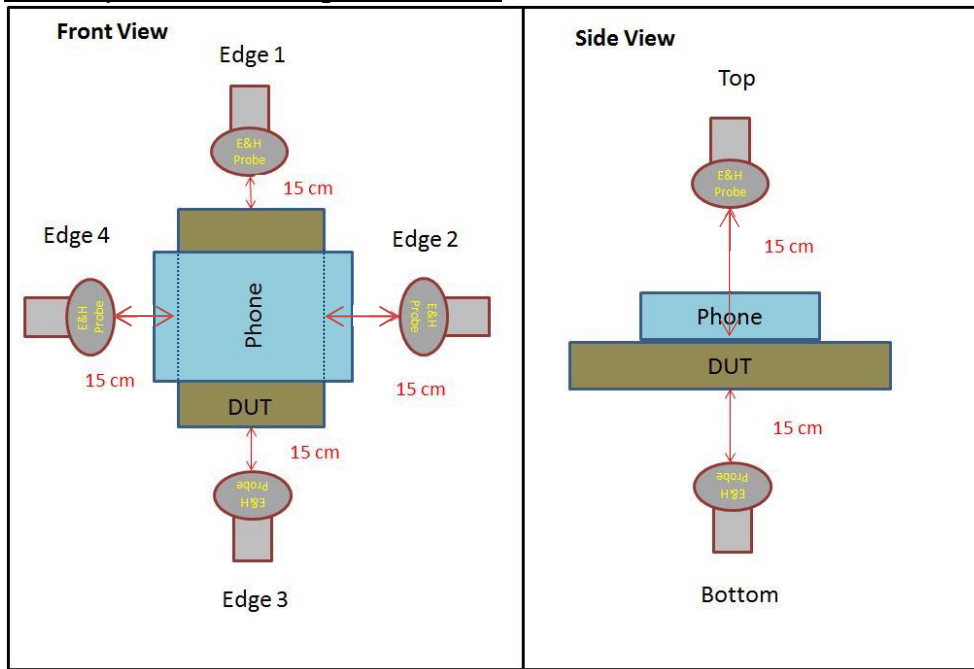
The measurement was taken using a probe placed 15 cm from the edges of DUT or 15 cm above the DUT. Measurements were taken from the top and all sides of the DUT per KDB680106 D01 v03. Additionally, as the DUT to phone configuration could result with the DUT placed either above or below the phone, measurements were performed 'below' the 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.

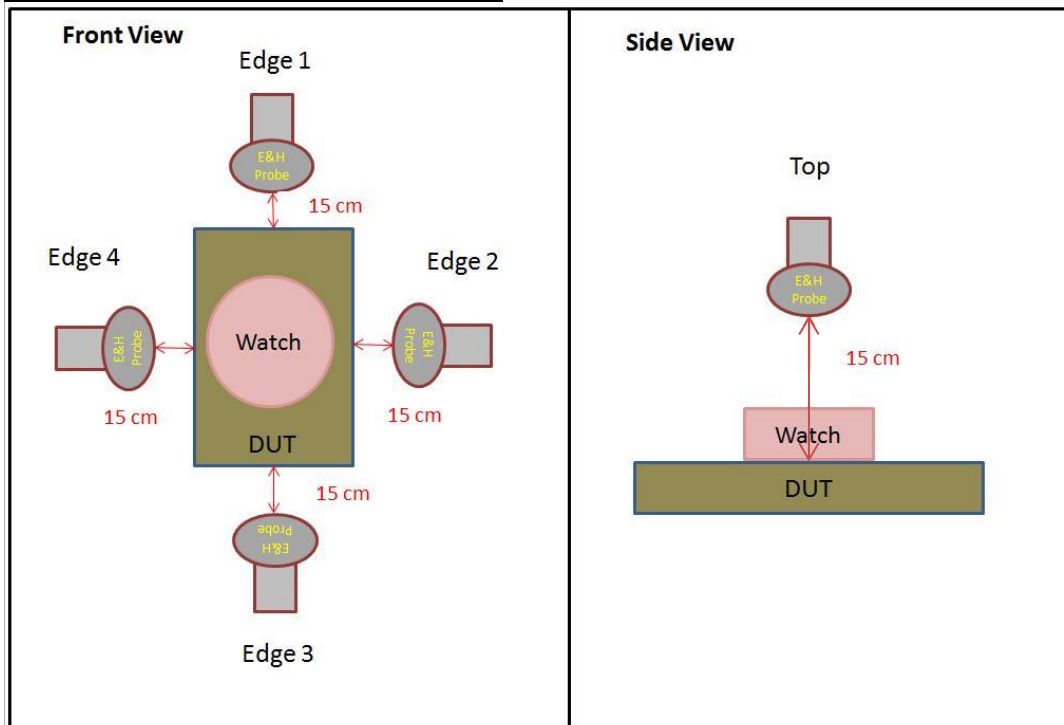
DUT to phone test Configuration 1 & 2



DUT to phone test Configuration 3 & 4



DUT to Watch 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 Number	Cal Date	Cal Due
Electric and Magnetic Field Probe	Narda	EHP-200A	T1085	10/24/2018	10/24/2019

6. MAXIMUM PERMISSIBLE RF EXPOSURE

6.1. FCC RULES

§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

E-FIELD AND H-FIELD MEASUREMENTS - GLASS

Note : Peak measurements were performed.

TEST results of DUT to phone test Configuration 1 & 2

FCC RF Exposure Result							
Test Configuration	Test mode	Test distance	Test Position	E-Field Limit (V/m)	E-Field meas data (V/m)	H-Field Limit (A/m)	H-Field meas data (A/m)
Configuration 1	Operating Real Product (Power <10% charging)	15 cm	Top	614	Not Required	1.63	0.01
			Bottom				0.01
			Edge 1				0.02
			Edge 2				0.02
			Edge 3				0.01
			Edge 4				0.01
	Operating Real Product (Power 50-55% charging)	15 cm	Top	614		0.01	
			Bottom			0.01	
			Edge 1			0.02	
			Edge 2			0.03	
			Edge 3			0.04	
			Edge 4			0.02	
	Operating Real Product (Power 90-95% charging)	15 cm	Top	614		0.01	
			Bottom			0.01	
			Edge 1			0.04	
Edge 2			0.03				
Edge 3			0.01				
Edge 4			0.01				
Configuration 2	Operating Real Product (Power 50-55% charging)	15 cm	Edge 3	614		1.63	0.04

TEST results of DUT to phone test Configuration 3 & 4

FCC RF Exposure Result							
Test Configuration	Test mode	Test distance	Test Position	E-Field Limit (V/m)	E-Field meas data (V/m)	H-Field Limit (A/m)	H-Field meas data (A/m)
Configuration 3	Operating Real Product (Power <10% charging)	15 cm	Top	614	Not Required	1.63	0.02
			Bottom				0.01
			Edge 1				0.02
			Edge 2				0.04
			Edge 3				0.01
			Edge 4				0.03
	Operating Real Product (Power 50-55% charging)	15 cm	Top	614		0.01	
			Bottom			0.01	
			Edge 1			0.03	
			Edge 2			0.03	
			Edge 3			0.02	
			Edge 4			0.03	
	Operating Real Product (Power 90-95% charging)	15 cm	Top	614		0.01	
			Bottom			0.01	
			Edge 1			0.03	
Edge 2			0.02				
Edge 3			0.01				
Edge 4			0.01				
Configuration 4	Operating Real Product (Power <10% charging)	15 cm	Edge 2	614		1.63	0.03

TEST results of DUT to watch test Configuration 5 & 6

FCC RF Exposure Result							
Test Configuration	Test mode	Test distance	Test Position	E-Field Limit (V/m)	E-Field meas data (V/m)	H-Field Limit (A/m)	H-Field meas data (A/m)
Configuration 5	Operating Real Product (Power <10% charging)	15 cm	Top	614	Not Required	1.63	0.05
			Edge 1				0.04
			Edge 2				0.04
			Edge 3				0.04
			Edge 4				0.03
	Operating Real Product (Power 50-55% charging)	15 cm	Top	614		0.01	
			Edge 1			0.06	
			Edge 2			0.06	
			Edge 3			0.04	
			Edge 4			0.06	
	Operating Real Product (Power 90-95% charging)	15 cm	Top	614		1.63	0.03
			Edge 1				0.02
			Edge 2				0.01
Edge 3			0.01				
Edge 4			0.01				
Configuration 6	Operating Real Product (Power 50-55% charging)	15 cm	Edge 1	614		1.63	0.04

6.2.2. FCC SUMMARY OF RESULTS

H-Field Limit		
FCC RF Exposure	Maximum meas data (A/m)	Percentage (%)
1.63	0.06	3.68

Conclusion:

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