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

# RF Exposure Report

| | |
|---|---|
| **Applicant Name:**<br>**SAMSUNG Electronics Co., Ltd.**<br>129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea | **Date of Issue:** May 19, 2023<br>**Test Report No.: HCT-SR-2305-FC013**<br>**Test Site: HCT CO., LTD.** |

## FCC ID: A3LSMF946B

| | |
|---|---|
| **Equipment Type:** | **Mobile Phone** |
| **Application Type** | **Certification** |
| **FCC Rule Part(s):** | **47 CFR part 2.1093** |
| **Model Name:** | **SM-F946B/DS** |
| **Additional Model Name:** | **SM-F946B** |
| **Date of Test:** | **05/03/2023** |

This device has been shown to be capable of compliance for the above standars 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 19, 2023 | First Approval Report |

# Table of Contents

# 1. Test Methodology

- FCC KDB Publication 447498 D04 RF Exposure Procedures v01

# 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 |
| **Additional Model Name:** | SM-F946B |
| **EUT Type:** | Mobile Phone |
| **Application Type:** | Certification |

**Digitizer Fuction**

| Frequency [kHz] | Operation mode [531.25 ~593.75] |
|---|---|
| 531.25 | Spen digitizer(Button) |
| 593.75 | Spen digitizer(Writing, Hover) |

**S-PEN( Model name : EJ-PF946 , Manufacturer : WACOM)**

DUT has a grid of wire throughout the surface which generates an electromagnetic field. These electromagnetic fields are picked up by the pen when it approaches near the surface.

Inside the s-pen, there is a coil of wire which picks up those electromagnetic fields and transforms them into electrical energy. Kind of similar to how wireless chargers convert EM-waves into electric power.

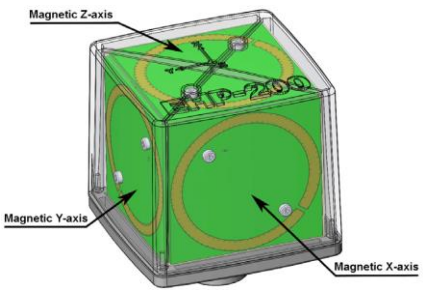
The generated electrical energy is then used to record the pressure, tilt and other data(Button clicks). The generated data goes back to the coil and gets converted into waves that get picked up by the DUT.

# 4. TEST 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 |

EHP-200AC, the magnetic sensor system is composed by three magnetic loops positioned orthogonal each other. The electric sensor system is composed by three orthogonal parallel plates capacitors installed on the opposite side of the magnetic loops. The uncertainty due to the anisotropy of the magnetic loops and the plates capacitors in the probe is described in the probe manufacturer's specification [1], with values up to ± 0.8dB (10 %). The sensitive elements are located approximately 8 mm below the external surface as shown in below Table




| Measurement probe specification | |
|---|---|
| Model | EHP-200AC |
| Frequency | 3 kHz – 30 MHz |
| Linearity | ± 0.5 dB @ 1MHz to full scale |
| Frequency Response | ± 0.5 dB for Electric field<br>± 0.8 dB for Magnetic field |
| Anisotropy | ±0.8 dB (10%) at 1 MHz |
| Dimensions | 92 × 92 × 109 mm<br>[Center : 46 x 46 x54.5 mm] |
| Application | Electric and Magnetic field |
| **The sensitive elements** are located **approximately 8 mm** below the external surface | |

# 5. MAXIMUM PERMISSIBLE RE EXPOSURE

## 5.1 FCC RULES

1.13010 The criteria listed in Table 1 shall be used to evaluate the envirimental impact of human exposure to radio-frequency(RF) ragiation as specified in 1.1307(b), except in the case of portable devices which shall ge 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

## 6.1 Measurement Setup

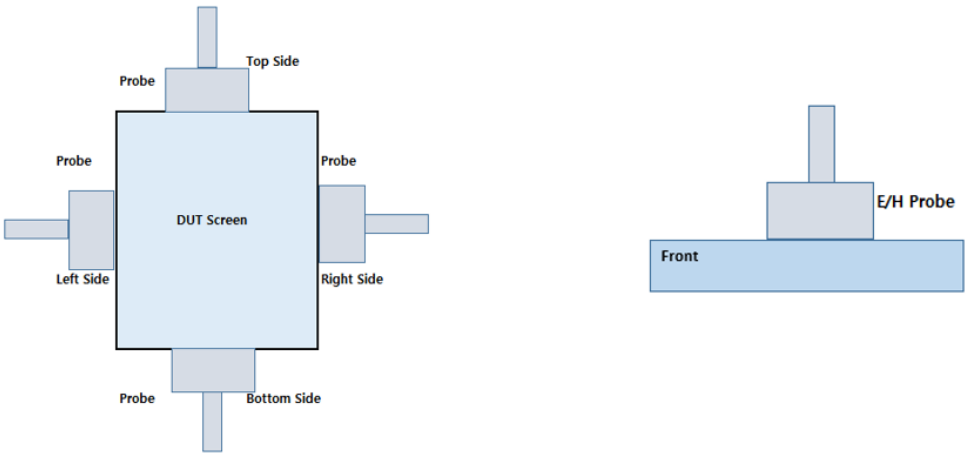



Figure1. H-Field and E-Field Measurement set up

## 6.2 Measurement Results

Digitizer function test of the DUT is set to forced operation mode through the manufacturer's FTM program and E-Field and H-Field are measured using the narda EHP-200AC probe.

| Mode | Distance | H-field Measurement ( A/m ) | | | | | FCC Limit H-Field [A/m] |
|---|---|---|---|---|---|---|---|
| | | Front [screen] | Left | Right | Top | Bottom | |
| Standalone | 0cm | 0.0938 | 0.0064 | 0.0071 | 0.0058 | 0.0073 | 1.63 |
| | Margin Limit[%] | 5.75% | 0.39% | 0.44% | 0.36% | 0.45% | |
| | Seperation Distance | E-field Measurement ( V/m ) | | | | | FCC Limit E-Field[V/m] |
| | | Front [screen] | Left | Right | Top | Bottom | |
| | 0cm | 0.3795 | 0.3795 | 0.3709 | 0.3611 | 0.3611 | 614 |
| | Margin Limit[%] | 0.0618% | 0.0618% | 0.0604% | 0.0588% | 0.0588% | |

Among all measured results of the digitizer function of the DUT, the worst case measurement result is reported.