

# FCC NFC REPORT

## Class II Permissive Change

**Applicant Name:**  
SAMSUNG Electronics Co., Ltd.

**Address:**  
129, Samsung-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

**Date of Issue:**

April 30, 2019

**Location:**

HCT CO., LTD.,

74, Seoicheon-ro 578beon-gil, Majang-myeon,  
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

**Report No.:** HCT-RF-1904-FC052

**FCC ID:** A3LSMA6060

**APPLICANT:** SAMSUNG Electronics Co., Ltd.

**Model:** SM-A6060

**Additional Model:** SM-M405F/DS

**EUT Type:** Mobile Phone

**RF Output Field Strength:** 13.47 dBuV/m @30 m

**Frequency of Operation:** 13.5595 MHz

**Modulation type:** ASK

**FCC Classification:** Low Power Communication Device – Transmitter

**FCC Rule Part(s):** FCC Part 15.225 Subpart C

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



**Report prepared by : Jung Ki Lim**  
**Engineer of Telecommunication testing center**



**Approved by : Jong Seok Lee**  
**Manager of Telecommunication testing center**

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## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1904-FC052	April 30, 2019	- First Approval Report

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## 1. EUT DESCRIPTION

Model	SM-A6060
Additional Model	SM-M405F/DS
EUT Type	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BA606ABN Type: Li-ion battery
Travel Adapter Information	Model : EP-TA200 Manufacture: DYREL
Frequency of Operation	13.5595 MHz
Transmit Power	13.47 dBuV/m @30 m
Modulation Type	ASK
Antenna Type	FPCB
Date(s) of Tests	January 31, 2019 ~ March 11, 2019 (SM-A6060) April 15, 2019 ~ April 26, 2019 (SM-M405F/DS)

## **2. TEST METHODOLOGY**

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

### **EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### **EUT EXERCISE**

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.225 under the FCC Rules Part 15 Subpart C.

## **GENERAL TEST PROCEDURES**

### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013).

## **DESCRIPTION OF TEST MODES**

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

### **3. INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

### **4. FACILITIES AND ACCREDITATIONS**

#### **FACILITIES**

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil,

Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

#### **EQUIPMENT**

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5. ANTENNA REQUIREMENTS**

#### **According to FCC 47 CFR §15.203:**

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

\* The antennas of this E.U.T are permanently attached.

\* The E.U.T Complies with the requirement of §15.203

## 6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty ( $\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

## 7. DESCRIPTION OF TESTS

### 7.1. Radiated Test

#### Limit (Operation within the band 13.110 MHz – 14.010 MHz)

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
13.553 – 13.567	15,848	30
13.410 ≤ f ≤ 13.553 13.567 ≤ f ≤ 13.710	334	30
13.110 ≤ f ≤ 13.410 13.710 ≤ f ≤ 14.010	106	30

Note:

1. 15,848 uV/m = 84.0 dBuV/m
2. 334 uV/m = 50.47 dBuV/m
3. 106 uV/m = 40.51 dBuV/m

#### Limit (Radiated Spurious Emissions)

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	**100	3
88-216	**150	3
216-960	**200	3
Above 960	500	3

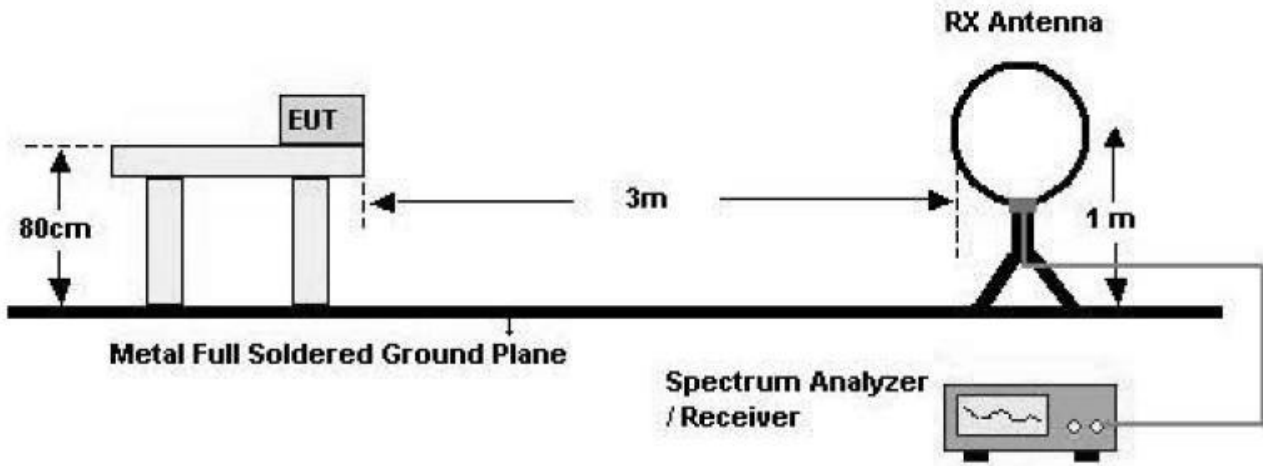
\*\*:

Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

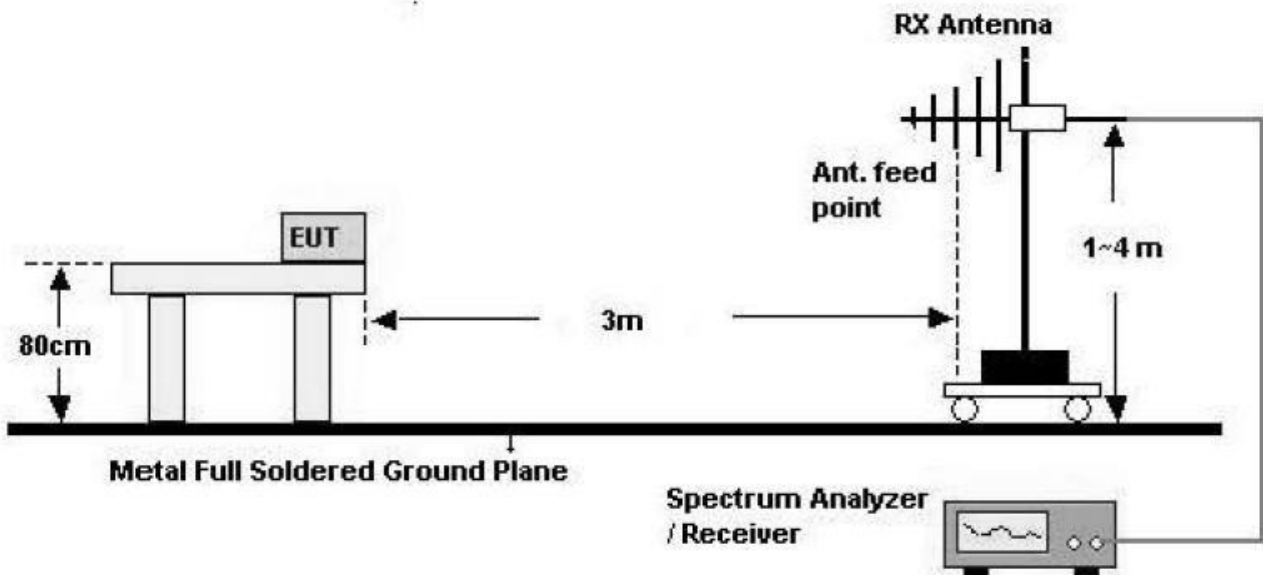


## Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz

**Test Procedure of inband**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor =  $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$

Measurement Distance : 3 m (Below 30 MHz)

**7. Spectrum Setting**

- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW  $\geq 3 \cdot \text{RBW}$

8. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
9. The test results for below 30 MHz is correlated to an open site.

The result on OFS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

**Test Procedure of Radiated spurious emissions(Below 30 MHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) =  $40 \cdot \log(3 \text{ m}/300 \text{ m}) = -80 \text{ dB}$

Measurement Distance : 3 m

7. Distance Correction Factor(0.490 MHz – 30 MHz) =  $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$

Measurement Distance : 3 m

**8. Spectrum Setting**

- Frequency Range = 9 kHz ~ 30 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW  $\geq 3 \cdot \text{RBW}$

9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. The test results for below 30 MHz is correlated to an open site.

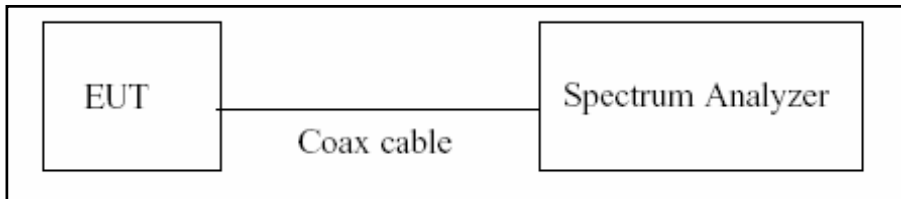
The result on OFS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

**Test Procedure of Radiated spurious emissions(Above 30 MHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting
  - Frequency Range = 30 MHz ~ 1 GHz
  - Detector = Peak
  - Trace = Maxhold
  - RBW = 100 kHz
  - VBW  $\geq$  3\*RBW
6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)

## 7.2. 20dB Bandwidth

### Test Configuration



### Test Procedure

The 20 dB bandwidth was measured by using a spectrum analyzer.

- 1) RBW = Auto
- 2) VBW = Auto
- 3) Span = Adequately in the operating Tx.
- 4) Detector = Peak
- 5) Trace mode = Max hold
- 6) Allow the trace to stabilize

Note :

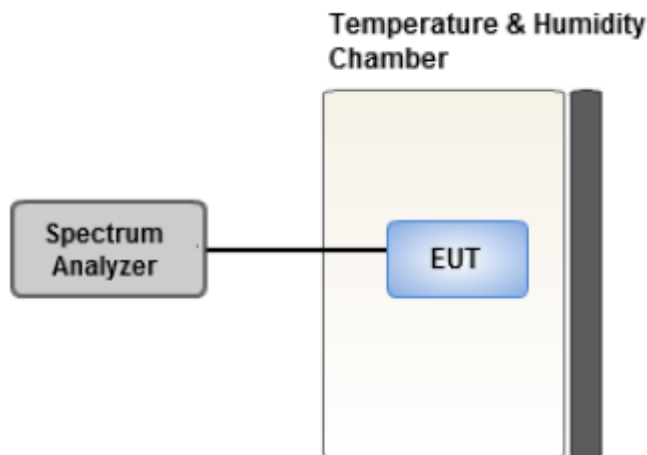
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

### 7.3. Frequency Stability

#### Limit

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency.

#### Test Configuration



#### Test Procedure.

For battery operated equipment, the equipment tests shall be performed using a new battery.

- 1) Turn the EUT OFF and place it inside the environmental temperature chamber.  
For devices that have oscillator heaters, energize only the heater circuit.
- 2) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
- 3) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- 4) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency.
- 5) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency.

#### Note:

- 1) Temperature:  
The temperature is varied from  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  using an environmental chamber.
- 2) Primary Supply Voltage :  
The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment.  
For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

## 7.4. AC Power line Conducted Emissions

### Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

\*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

### Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.
5. The EUT is the device operating below 30 MHz.
  - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
  - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

### Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

## **7.5. Worst case configuration and mode**

### **Radiated test**

1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone, Stand alone + external accessories(earphone, etc)
  - Worstcase : Stand alone
2. EUT Axis : Z
3. All type and bitrate were investigated and the worst case results are reported.  
(Worst case : Type A, 106 kbps)
4. All position of loop antenna were investigated and the worst case configuration results are reported.
  - Position : Horizontal, Vertical, Parallel to the ground plane
  - Worstcase : Horizontal

### **AC Power line Conducted Emissions**

1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone+Earphone+Travel Adapter, Stand alone+Travel Adapter
  - Worstcase : Stand alone+Travel Adapter

### **20dB Bandwidth & Frequency Stability**

1. All type and bitrate were investigated and the worst case results are reported.  
(Worst case : Type A, 106 kbps)

### **Test scenario**

: The test scenario for spot check is based on the worst-case of original report results.

## 8. TEST SUMMARY

Regulation	Requirement	Result	Status
Part 15.225 (a)	Radiated Electric Field Emissions (13.553MHz to 13.567MHz)	Pass	C <sup>Note3</sup>
Part 15.225 (b)	Radiated Electric Field Emissions (13.410 ≤ f ≤ 13.553, 13.567 ≤ f ≤ 13.710)	Pass	C <sup>Note3</sup>
Part 15.225 (c)	Radiated Electric Field Emissions (13.110 ≤ f ≤ 13.410, 13.710 ≤ f ≤ 14.010)	Pass	C <sup>Note3</sup>
Part 15.209	Radiated Electric Field Emissions (9kHz to 30MHz)	Pass	C <sup>Note3</sup>
Part 15.209	Radiated Electric Field Emissions (30MHz to 1GHz)	Pass	C <sup>Note3</sup>
Part 15.225 (e)	Frequency Stability	Pass	NT <sup>Note2</sup>
Part 15.207	AC power conducted emissions (150kHz to 30MHz)	Pass	Pass
Part 15.215 (c)	20 dB Bandwidth	Pass	NT <sup>Note2</sup>

**Note:**

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply

2. C2PC model is electrically identical to the Original model.

The Product Equality Declaration includes detailed information about the changes between the devices.

3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 9

4. Original model : SM-A6060

C2PC model : SM-M405F/DS



## 9. TEST RESULT

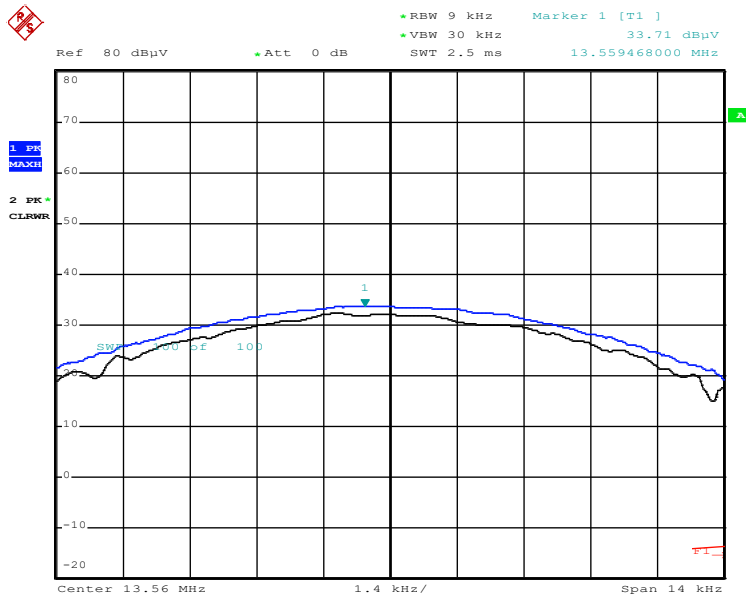
Test Item	Measured Frequency (MHz)	SM-A6060 (dBuV/m)	SM-M405F/DS (dBuV/m)	Deviation (dB)
Fundamental	13.5595	13.47	13.25	0.22
RSE	30M ~1GHz	32.15	32.91	-0.76

## 10. TEST PLOT

### Fundamental

Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5594	33.71	19.54	-40.00	13.25	84.00	70.75

Detect : PK

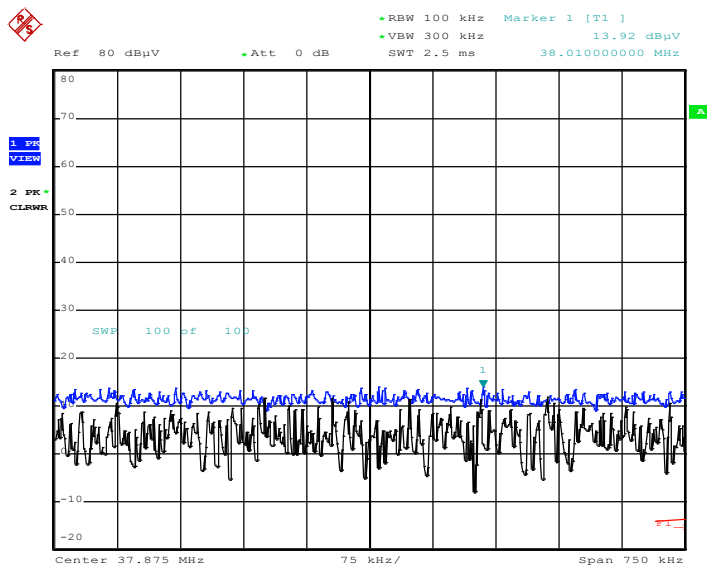


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## RSE

Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)
38.01	13.92	18.50	0.49	H	32.91	40.00	7.09

Detect : PK



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# 11. POWERLINE CONDUCTED EMISSIONS

## Conducted Emissions (Line 1)

NFC TERM MODE L1

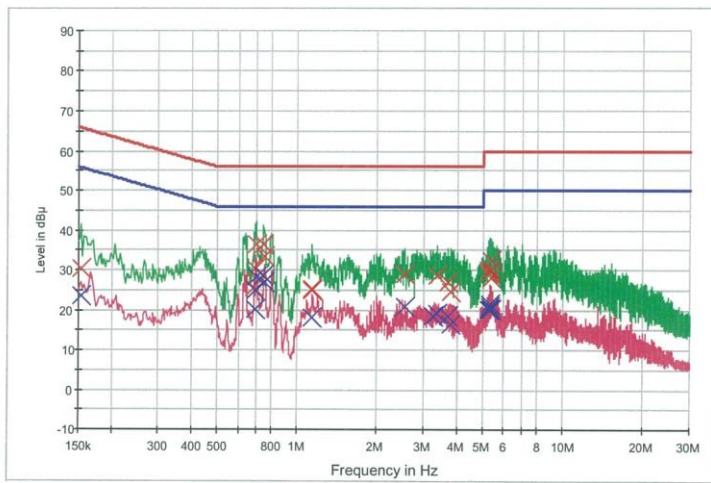
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### HCT TEST Report

#### Common Information

EUT: SM-M405FDS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC TERM MODE L1

FCC CLASS B\_Exten Cable



— FCC CLASS B\_QP     — FCC CLASS B\_AV     — Preview Result 1-PK+  
— Preview Result 2-AVG     X Final Result 1-QPK     X Final Result 2-CAV

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	30.3	9.000	Off	L1	9.7	35.5	65.8
0.690000	25.6	9.000	Off	L1	9.8	30.4	56.0
0.694000	30.3	9.000	Off	L1	9.8	25.7	56.0
0.704000	36.5	9.000	Off	L1	9.8	19.5	56.0
0.746000	36.5	9.000	Off	L1	9.8	19.5	56.0
0.756000	33.4	9.000	Off	L1	9.8	22.6	56.0
1.134000	24.9	9.000	Off	L1	9.8	31.1	56.0
1.140000	25.3	9.000	Off	L1	9.8	30.7	56.0
2.540000	29.1	9.000	Off	L1	9.9	26.9	56.0
3.356000	28.7	9.000	Off	L1	9.9	27.3	56.0
3.682000	26.9	9.000	Off	L1	10.0	29.1	56.0
3.790000	24.5	9.000	Off	L1	10.0	31.5	56.0
5.260000	29.2	9.000	Off	L1	10.0	30.8	60.0
5.312000	30.1	9.000	Off	L1	10.0	29.9	60.0
5.322000	29.8	9.000	Off	L1	10.0	30.2	60.0
5.358000	32.3	9.000	Off	L1	10.0	27.7	60.0
5.364000	30.0	9.000	Off	L1	10.0	30.0	60.0
5.368000	28.1	9.000	Off	L1	10.0	31.9	60.0

2019-04-26

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NFC TERM MODE L1

2 / 2

**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	23.6	9.000	Off	L1	9.7	32.2	55.8
0.694000	20.3	9.000	Off	L1	9.8	25.7	46.0
0.698000	24.9	9.000	Off	L1	9.8	21.1	46.0
0.702000	28.4	9.000	Off	L1	9.8	17.6	46.0
0.746000	28.7	9.000	Off	L1	9.8	17.3	46.0
0.750000	27.0	9.000	Off	L1	9.8	19.0	46.0
1.140000	18.2	9.000	Off	L1	9.8	27.8	46.0
2.542000	20.9	9.000	Off	L1	9.9	25.1	46.0
3.232000	18.5	9.000	Off	L1	9.9	27.5	46.0
3.354000	19.1	9.000	Off	L1	9.9	26.9	46.0
3.682000	18.6	9.000	Off	L1	10.0	27.4	46.0
3.790000	16.5	9.000	Off	L1	10.0	29.5	46.0
5.260000	20.2	9.000	Off	L1	10.0	29.8	50.0
5.310000	20.9	9.000	Off	L1	10.0	29.1	50.0
5.314000	20.2	9.000	Off	L1	10.0	29.8	50.0
5.318000	21.5	9.000	Off	L1	10.0	28.5	50.0
5.364000	20.1	9.000	Off	L1	10.0	29.9	50.0
5.368000	20.2	9.000	Off	L1	10.0	29.8	50.0

2019-04-26

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## Conducted Emissions (Line 2)

Test

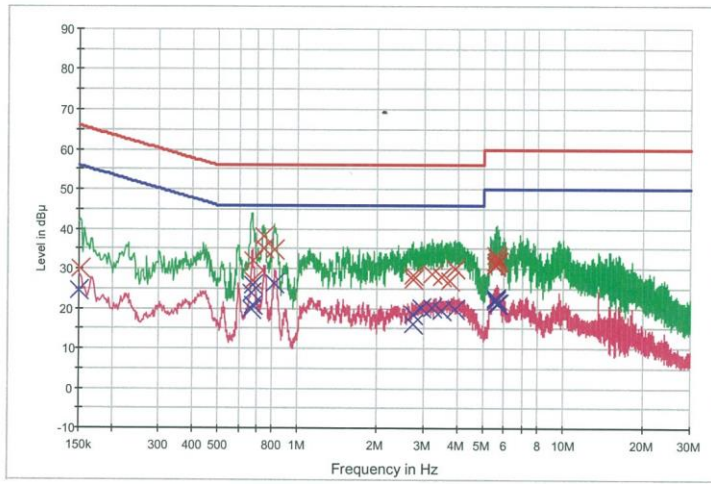
1 / 2

### HCT TEST Report

#### Common Information

EUT: SM-M405FDS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC TERM MODE N

FCC CLASS B\_Exten Cable



— FCC CLASS B\_QP      — FCC CLASS B\_AV      — Preview Result 1-PK+  
— Preview Result 2-AVG      x Final Result 1-QPK      x Final Result 2-CAV

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	30.0	9.000	Off	N	9.8	35.8	65.9
0.676000	27.0	9.000	Off	N	9.9	29.0	56.0
0.680000	32.1	9.000	Off	N	9.9	23.9	56.0
0.742000	35.2	9.000	Off	N	9.9	20.8	56.0
0.746000	38.1	9.000	Off	N	9.9	17.9	56.0
0.818000	34.9	9.000	Off	N	9.9	21.1	56.0
2.716000	27.2	9.000	Off	N	10.1	28.8	56.0
2.724000	28.3	9.000	Off	N	10.1	27.7	56.0
3.216000	28.6	9.000	Off	N	10.1	27.4	56.0
3.502000	27.9	9.000	Off	N	10.1	28.1	56.0
3.740000	27.0	9.000	Off	N	10.2	29.0	56.0
3.940000	29.9	9.000	Off	N	10.2	26.1	56.0
5.570000	31.0	9.000	Off	N	10.3	29.0	60.0
5.586000	30.5	9.000	Off	N	10.3	29.5	60.0
5.594000	33.5	9.000	Off	N	10.3	26.5	60.0
5.598000	31.6	9.000	Off	N	10.3	28.4	60.0
5.650000	32.6	9.000	Off	N	10.3	27.4	60.0
5.676000	31.6	9.000	Off	N	10.3	28.4	60.0

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Test

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	24.5	9.000	Off	N	9.8	31.5	56.0
0.666000	19.8	9.000	Off	N	9.9	26.2	46.0
0.672000	23.9	9.000	Off	N	9.9	22.1	46.0
0.676000	25.9	9.000	Off	N	9.9	20.1	46.0
0.680000	20.9	9.000	Off	N	9.9	25.1	46.0
0.820000	26.4	9.000	Off	N	9.9	19.6	46.0
2.716000	18.4	9.000	Off	N	10.1	27.6	46.0
2.724000	16.2	9.000	Off	N	10.1	29.8	46.0
2.932000	20.2	9.000	Off	N	10.1	25.8	46.0
3.216000	20.1	9.000	Off	N	10.1	25.9	46.0
3.502000	19.5	9.000	Off	N	10.1	26.5	46.0
3.940000	19.8	9.000	Off	N	10.2	26.2	46.0
5.570000	21.8	9.000	Off	N	10.3	28.2	50.0
5.588000	21.8	9.000	Off	N	10.3	28.2	50.0
5.594000	22.7	9.000	Off	N	10.3	27.3	50.0
5.598000	22.1	9.000	Off	N	10.3	27.9	50.0
5.656000	21.3	9.000	Off	N	10.3	28.7	50.0
5.676000	21.3	9.000	Off	N	10.3	28.7	50.0

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## Conducted Emissions (Line 3)

NFC UNTERM MODE L1

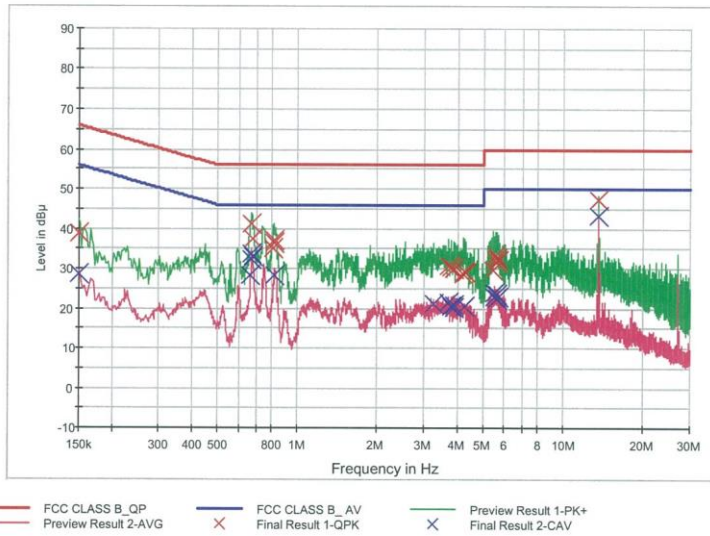
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### HCT TEST Report

#### Common Information

EUT: SM-M405FDS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC UNTERM MODE L1

FCC CLASS B\_Exten Cable



#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	38.7	9.000	Off	L1	9.7	27.4	66.0
0.674000	41.1	9.000	Off	L1	9.8	14.9	56.0
0.680000	37.4	9.000	Off	L1	9.8	18.6	56.0
0.810000	35.0	9.000	Off	L1	9.8	21.0	56.0
0.814000	36.5	9.000	Off	L1	9.8	19.5	56.0
0.818000	37.2	9.000	Off	L1	9.8	18.8	56.0
3.694000	30.5	9.000	Off	L1	10.0	25.5	56.0
3.776000	30.3	9.000	Off	L1	10.0	25.7	56.0
3.866000	30.2	9.000	Off	L1	10.0	25.8	56.0
4.202000	28.6	9.000	Off	L1	10.0	27.4	56.0
4.246000	29.3	9.000	Off	L1	10.0	26.7	56.0
4.316000	29.0	9.000	Off	L1	10.0	27.0	56.0
5.428000	29.7	9.000	Off	L1	10.0	30.3	60.0
5.554000	31.8	9.000	Off	L1	10.1	28.2	60.0
5.590000	33.4	9.000	Off	L1	10.1	26.6	60.0
5.620000	32.9	9.000	Off	L1	10.1	27.1	60.0
5.688000	32.0	9.000	Off	L1	10.1	28.0	60.0
13.560000	47.4	9.000	Off	L1	10.4	12.6	60.0

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NFC UNTERM MODE L1

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.5	9.000	Off	L1	9.7	27.5	56.0
0.666000	28.1	9.000	Off	L1	9.8	17.9	46.0
0.670000	32.3	9.000	Off	L1	9.8	13.7	46.0
0.674000	33.6	9.000	Off	L1	9.8	12.4	46.0
0.678000	33.0	9.000	Off	L1	9.8	13.0	46.0
0.818000	28.3	9.000	Off	L1	9.8	17.7	46.0
3.246000	21.2	9.000	Off	L1	9.9	24.8	46.0
3.694000	21.5	9.000	Off	L1	10.0	24.5	46.0
3.776000	20.5	9.000	Off	L1	10.0	25.5	46.0
3.862000	20.2	9.000	Off	L1	10.0	25.8	46.0
3.866000	20.7	9.000	Off	L1	10.0	25.3	46.0
4.246000	20.5	9.000	Off	L1	10.0	25.5	46.0
5.520000	24.0	9.000	Off	L1	10.0	26.0	50.0
5.530000	22.8	9.000	Off	L1	10.0	27.2	50.0
5.620000	23.5	9.000	Off	L1	10.1	26.6	50.0
5.646000	22.7	9.000	Off	L1	10.1	27.3	50.0
5.688000	23.0	9.000	Off	L1	10.1	27.0	50.0
13.560000	43.2	9.000	Off	L1	10.4	6.8	50.0

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## Conducted Emissions (Line 4)

Test

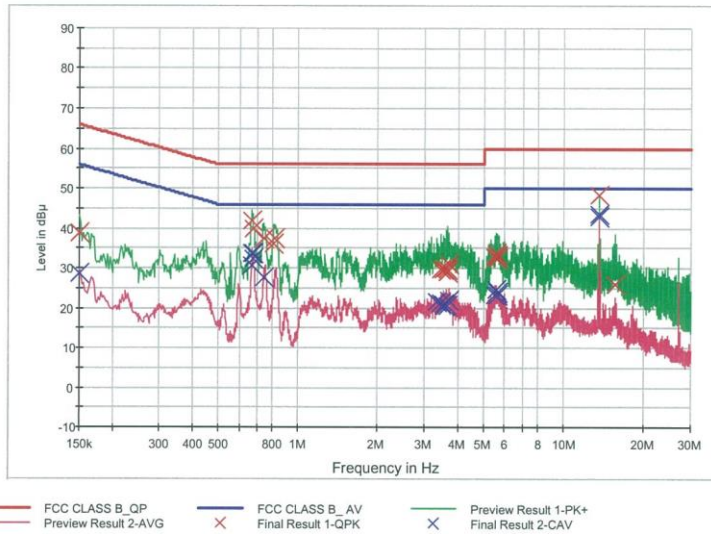
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### HCT TEST Report

#### Common Information

EUT: SM-M405FDS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: NFC UNTERM MODE N

FCC CLASS B\_Exten Cable



#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	38.8	9.000	Off	N	9.8	27.2	66.0
0.672000	41.8	9.000	Off	N	9.9	14.2	56.0
0.676000	39.8	9.000	Off	N	9.9	16.2	56.0
0.742000	37.6	9.000	Off	N	9.9	18.4	56.0
0.812000	36.0	9.000	Off	N	9.9	20.0	56.0
0.822000	37.4	9.000	Off	N	9.9	18.6	56.0
3.446000	29.6	9.000	Off	N	10.1	26.4	56.0
3.540000	29.8	9.000	Off	N	10.1	26.2	56.0
3.612000	30.1	9.000	Off	N	10.1	25.9	56.0
3.644000	28.9	9.000	Off	N	10.1	27.1	56.0
3.656000	29.5	9.000	Off	N	10.1	26.5	56.0
3.696000	31.0	9.000	Off	N	10.2	25.0	56.0
5.530000	32.7	9.000	Off	N	10.3	27.3	60.0
5.594000	33.7	9.000	Off	N	10.3	26.3	60.0
5.612000	33.2	9.000	Off	N	10.3	26.8	60.0
5.648000	32.2	9.000	Off	N	10.3	27.8	60.0
13.560000	48.4	9.000	Off	N	10.6	11.6	60.0
15.634000	25.9	9.000	Off	N	10.7	34.1	60.0

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Test

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.7	9.000	Off	N	9.8	27.3	56.0
0.668000	30.8	9.000	Off	N	9.9	15.2	46.0
0.672000	33.6	9.000	Off	N	9.9	12.4	46.0
0.676000	33.7	9.000	Off	N	9.9	12.3	46.0
0.680000	32.5	9.000	Off	N	9.9	13.5	46.0
0.742000	27.6	9.000	Off	N	9.9	18.4	46.0
3.334000	21.6	9.000	Off	N	10.1	24.4	46.0
3.446000	21.2	9.000	Off	N	10.1	24.8	46.0
3.546000	20.9	9.000	Off	N	10.1	25.1	46.0
3.554000	20.6	9.000	Off	N	10.1	25.4	46.0
3.656000	20.4	9.000	Off	N	10.1	25.6	46.0
3.696000	21.8	9.000	Off	N	10.2	24.2	46.0
5.530000	23.2	9.000	Off	N	10.3	26.8	50.0
5.594000	24.7	9.000	Off	N	10.3	25.3	50.0
5.612000	23.8	9.000	Off	N	10.3	26.2	50.0
5.648000	23.1	9.000	Off	N	10.3	26.9	50.0
13.558000	43.6	9.000	Off	N	10.6	6.4	50.0
13.562000	42.9	9.000	Off	N	10.6	7.1	50.0

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## 12. LIST OF TEST EQUIPMENT

### Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/12/2018	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2018	Annual	100033
ESPAC	SU-642 /Temperature Chamber	08/07/2019	Annual	93000718
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY52090906
Agilent	N9030A / Signal Analyzer	01/10/2019	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/26/2018	Annual	101231
Agilent	N1911A / Power Meter	04/10/2019	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/10/2019	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2018	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/07/2018	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/26/2018	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2018	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

### Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

**Radiated Test**

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	08/23/2018	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	VULB 9160 / TRILOG Antenna	08/09/2018	Biennial	9160-3368
Schwarzbeck	BBHA 9120D / Horn Antenna	08/01/2017	Biennial	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/03/2018	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/28/2018	Annual	101068-SZ
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/07/2018	Annual	8
Wainwright Instruments	WHKX7.0/18G-8SS / High Pass Filter	05/09/2018	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/29/2018	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2019	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/07/2018	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/17/2018	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/10/2018	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/10/2018	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/29/2018	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/26/2019	Annual	3000C000276

**Note:**

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

### 13. ANNEX A\_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1904-FC052-P