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FCC NFC REPORT

Certification

Application Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
17 April 2020

Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2004-FC020

FCC ID: A3LSMA217F

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model(s):	SM-A217F/DSN
EUT Type:	Mobile Phone
RF Output Field Strength:	15.66 dBuV/m @30 m
Modulation type:	13.56 MHz
FCC Classification:	Low Power Communication Device – Transmitter
FCC Rule Part(s):	FCC Rule Part(s): FCC Part 15.225 Subpart C

Engineering Statement:
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. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report prepared by : Jung Ki Lim
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2004-FC020	April 17, 2020	- First Approval Report

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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1. EUT DESCRIPTION

Model	SM-A217F/DSN
Additional Model	-
EUT Type	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BA217ABY Type: Li-ion Battery
Travel Adapter Information	Model : EP-TA200 Manufacture: SOLUM
Data Cable Information	Model : EP-DR140ABE Manufacture: RFTech
Ear-jack Information	Model : EHS61ASFBE Manufacture: Almus
Frequency of Operation	13.56 MHz
Transmit Power	Without Tag: 15.66 dBuV/m @30 m With Tag: 14.96 dBuV/m @30 m
Modulation Type	ASK
Date(s) of Tests	March 31, 2020 ~ April 13, 2020

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.”

(1) The antennas of this E.U.T are permanently attached.

(2) 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_{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 (±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)	5.05

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)

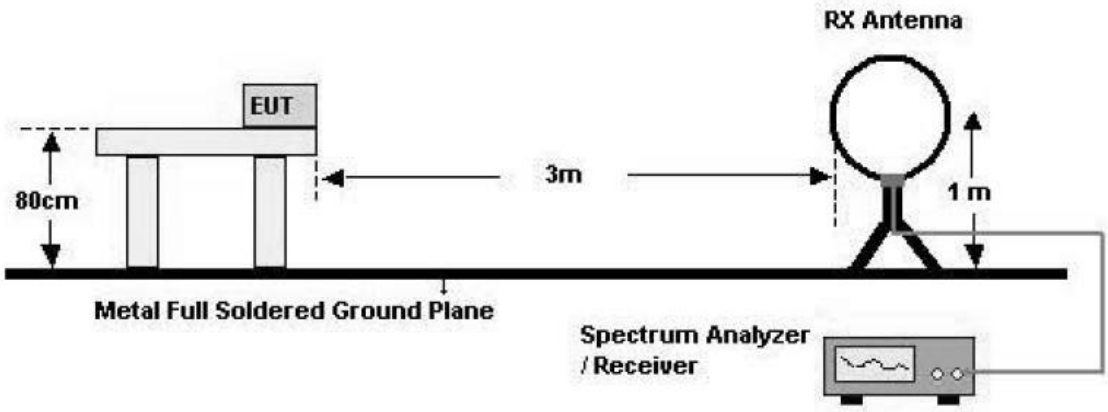
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	※100	3
88-216	※150	3
216-960	※200	3
Above 960	500	3

※:

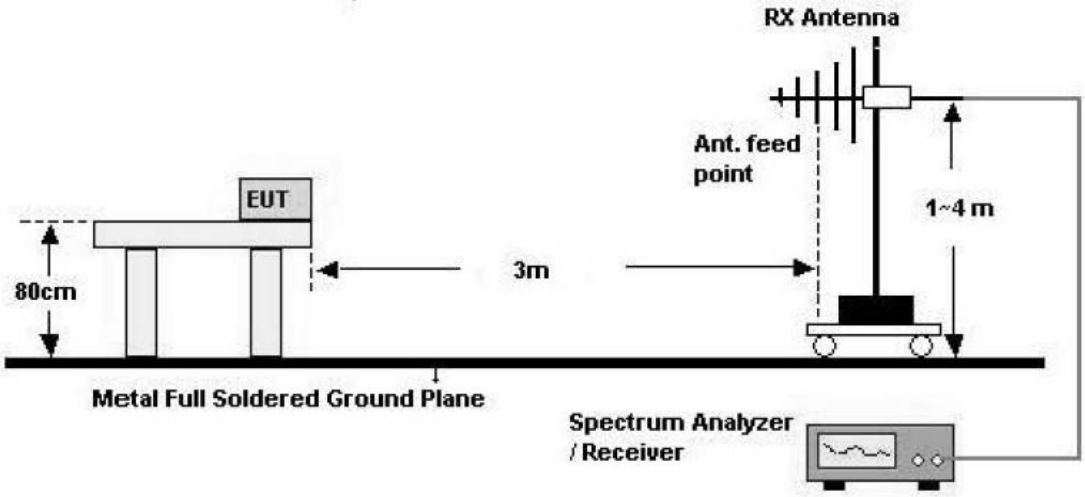
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Test Configuration

Below 30 MHz



30 MHz - 1 GHz



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 and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor = 40log(3 m/30 m) = - 40 dB

   Measurement Distance : 3 m (Below 30 MHz)

7. Spectrum Setting
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
8. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

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 and Parallel to the ground plane 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) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

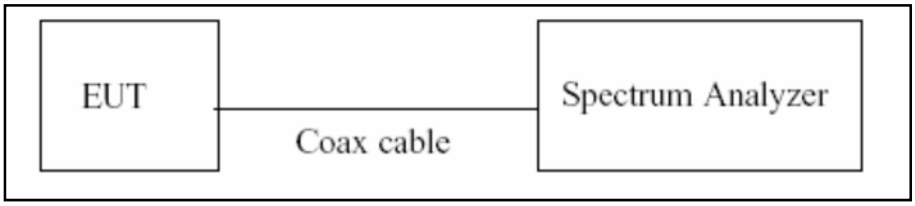
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

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 ≥ 3 x RBW
6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

7.2. 20dB Bandwidth

Test Configuration



Test Procedure

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

(Procedure 6.9.2 in ANSI 63.10-2013)

1) RBW = 1%~5% of the OBW
2) VBW = approximately three times RBW
3) Span =between two times and five times the OBW
4) Detector = Peak
5) Trace mode = Max hold
6) Allow the trace to stabilize

Note :

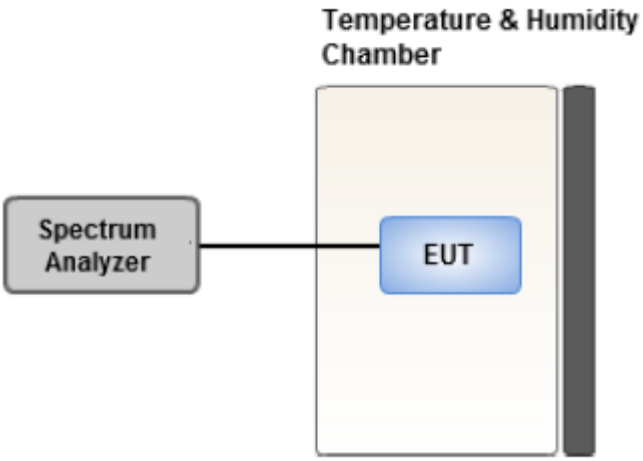
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within ±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 freque
5) ncy tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency._

Note:

1) Temperature:
   The temperature is varied from -20°C to + 50°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 battety 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 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[(a)]	56 to 46[(a)]
0.50 to 5	56	46
5 to 30	60	50

[(a)]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 : Y, 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)

8. TEST SUMMARY

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

9. TEST RESULT

9.1. Operation within the band 13.110 MHz – 14.010 MHz

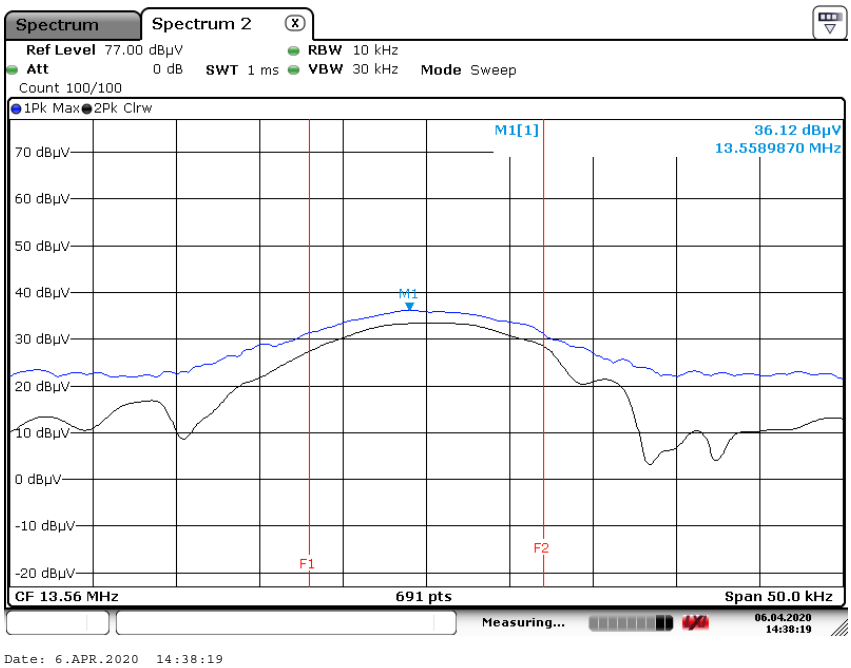
Measured Frequency Range : 13.553 MHz-13.567 MHz							
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5589	36.12	19.54	-40.00	H	15.66	84.00	68.34
13.5593	32.77	19.54	-40.00	V	12.31	84.00	71.69

Measured Frequency Range : 13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz							
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5529	30.74	19.54	-40.00	H	10.28	50.47	40.19
13.5671	30.96	19.54	-40.00	H	10.50	50.47	39.97

Measured Frequency Range : 13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz							
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.1492	24.37	19.54	-40.00	H	3.91	40.51	36.60
13.8235	24.59	19.54	-40.00	H	4.13	40.51	36.38

Note: Without Tag (worst case)

▣ Test Plot



Note:

Plot of worst case are only reported.

With Tag Mode (only fundamental)

Measured Frequency Range : 13.553 MHz-13.567 MHz							
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5593	35.42	19.54	-40.00	H	14.96	84.00	69.04
13.5596	30.54	19.54	-40.00	V	10.08	84.00	73.92

9.2. Radiated Emission 9 kHz – 30 MHz

Measured Frequency Range : 9 kHz - 30 MHz							
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
1.2396	17.04	19.54	-40.00	H	-3.42	29.54	32.96
18.0711	11.35	19.54	-40.00	H	-9.11	29.54	38.65
23.8300	11.15	19.99	-40.00	H	-8.86	29.54	38.40
27.1218	7.65	19.99	-40.00	H	-12.36	29.54	41.90

Note:

1. With Tag (worst case)

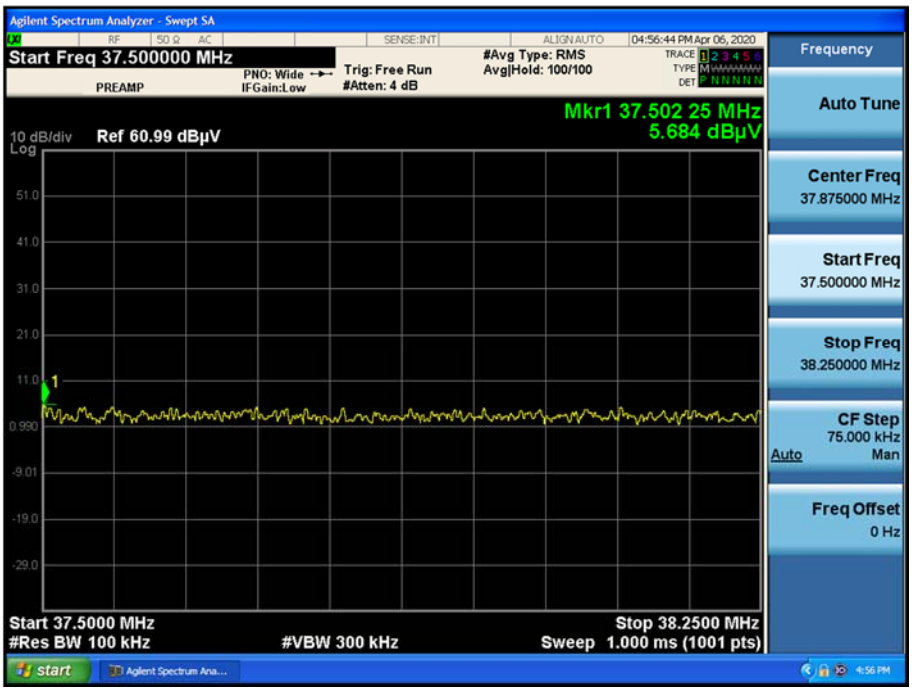
9.3. Radiated Emission 30 MHz – 1000 MHz

Measured Frequency Range : 30 MHz - 1000 MHz							
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)
37.50225※	5.684	18.50	0.49	H	24.67	40.00	15.33
59.78100	5.199	18.20	0.56	H	23.96	40.00	16.04
91.86400	6.126	15.50	0.78	V	22.41	43.50	21.09
118.80400※	6.090	17.70	0.86	H	24.65	43.50	18.85
136.80000※	6.230	18.35	0.91	H	25.49	43.50	18.01
158.01380	5.097	18.80	0.98	V	24.88	43.50	18.62

Note:

1. '※' is the result for restricted band.
2. WithTag (worst case)

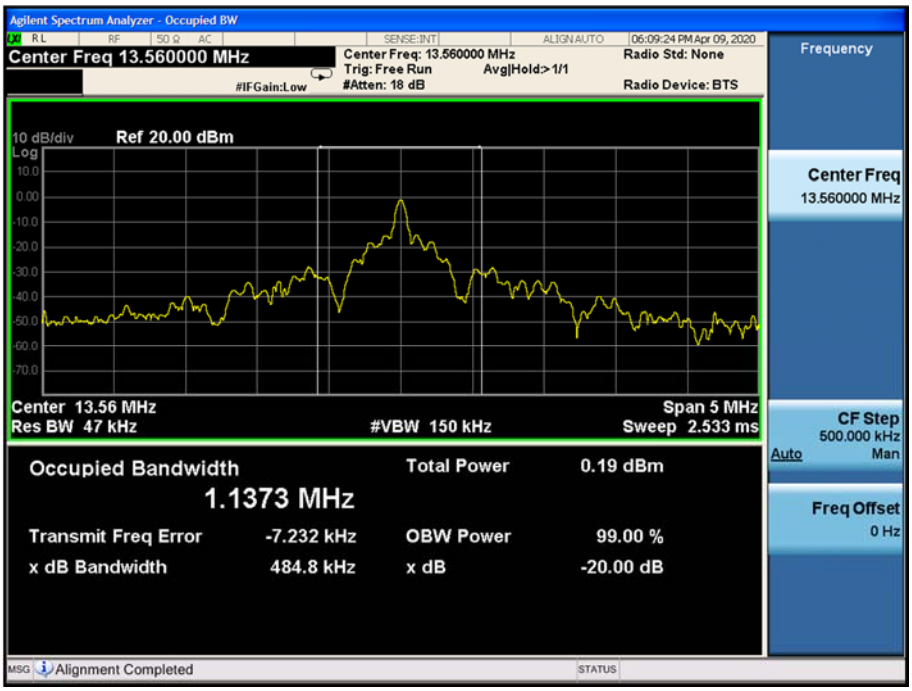
▣ Test Plot



Note:

Plot of worst case are only reported

9.4. 20 dB Bandwidth



9.5. Frequency Stability

Startup

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560095	95	0.0007006
100%		-10	13.560093	93	0.0006858
100%		0	13.560085	85	0.0006268
100%		+10	13.560077	77	0.0005678
100%		+20(Ref.)	13.560071	71	0.0005236
100%		+30	13.560064	64	0.0004720
100%		+40	13.560063	63	0.0004646
100%		+50	13.560059	59	0.0004351
End.point	3.55	+20	13.560071	71	0.0005236

2 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560090	90	0.0006637
100%		-10	13.560085	85	0.0006268
100%		0	13.560083	83	0.0006121
100%		+10	13.560077	77	0.0005678
100%		+20(Ref.)	13.560072	72	0.0005310
100%		+30	13.560069	69	0.0005088
100%		+40	13.560065	65	0.0004794
100%		+50	13.560062	62	0.0004572
End.point	3.55	+20	13.560074	74	0.0005457

5 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560088	88	0.0006490
100%		-10	13.560085	85	0.0006268
100%		0	13.560076	76	0.0005605
100%		+10	13.560074	74	0.0005457
100%		+20(Ref.)	13.560069	69	0.0005088
100%		+30	13.560063	63	0.0004646
100%		+40	13.560057	57	0.0004204
100%		+50	13.560056	56	0.0004130
End.point	3.55	+20	13.560082	82	0.0006047

10 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560085	85	0.0006268
100%		-10	13.560084	84	0.0006195
100%		0	13.560077	77	0.0005678
100%		+10	13.560072	72	0.0005310
100%		+20(Ref.)	13.560062	62	0.0004572
100%		+30	13.560061	61	0.0004499
100%		+40	13.560056	56	0.0004130
100%		+50	13.560054	54	0.0003982
End.point	3.55	+20	13.560075	75	0.0005531

9.6. POWERLINE CONDUCTE EMISSIONS

Conducted Emissions (Line 1)

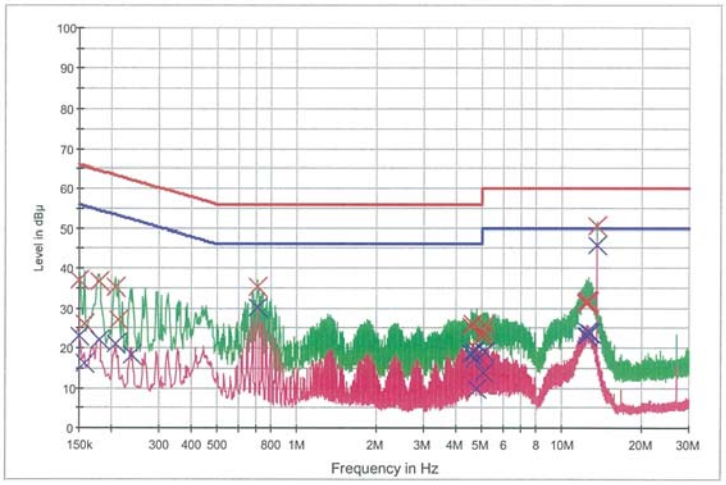
NFC MODE L1 1 / 2

HCT TEST Report

Common Information

EUT:	SM-A217F/DSN
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC MODE L1

FCC CLASS B_Exten Cable



FCC CLASS B_QP
Preview Result 2-AVG
FCC CLASS B_ AV
Final Result 1-QPK
Preview Result 1-PK+
Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	36.9	9.000	Off	L1	9.8	29.1	66.0
0.158000	26.1	9.000	Off	L1	9.8	39.4	65.6
0.178000	36.6	9.000	Off	L1	9.8	28.0	64.6
0.206000	35.3	9.000	Off	L1	9.8	28.1	63.4
0.212000	27.0	9.000	Off	L1	9.8	36.1	63.1
0.708000	35.4	9.000	Off	L1	9.8	20.6	56.0
4.538000	25.5	9.000	Off	L1	10.0	30.5	56.0
4.564000	26.1	9.000	Off	L1	10.0	29.9	56.0
4.724000	19.8	9.000	Off	L1	10.0	36.2	56.0
5.044000	23.0	9.000	Off	L1	10.0	37.0	60.0
5.056000	24.0	9.000	Off	L1	10.0	36.0	60.0
5.092000	25.8	9.000	Off	L1	10.0	34.2	60.0
12.346000	31.2	9.000	Off	L1	10.3	28.8	60.0
12.356000	31.5	9.000	Off	L1	10.3	28.5	60.0
12.364000	32.0	9.000	Off	L1	10.3	28.0	60.0
12.436000	31.6	9.000	Off	L1	10.3	28.4	60.0
12.612000	31.7	9.000	Off	L1	10.3	28.3	60.0
13.560000	50.6	9.000	Off	L1	10.3	9.4	60.0

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NFC MODE L1 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	22.9	9.000	Off	L1	9.8	33.1	56.0
0.158000	16.4	9.000	Off	L1	9.8	39.2	55.6
0.178000	22.1	9.000	Off	L1	9.8	32.5	54.6
0.206000	21.0	9.000	Off	L1	9.8	32.4	53.4
0.238000	18.3	9.000	Off	L1	9.8	33.9	52.2
0.706000	30.2	9.000	Off	L1	9.8	15.8	46.0
4.538000	18.7	9.000	Off	L1	10.0	27.3	46.0
4.626000	17.2	9.000	Off	L1	10.0	28.8	46.0
4.648000	19.0	9.000	Off	L1	10.0	27.0	46.0
4.724000	9.8	9.000	Off	L1	10.0	36.2	46.0
5.056000	13.9	9.000	Off	L1	10.0	36.1	50.0
5.092000	19.0	9.000	Off	L1	10.0	31.0	50.0
12.348000	23.0	9.000	Off	L1	10.3	27.0	50.0
12.390000	24.1	9.000	Off	L1	10.3	25.9	50.0
12.462000	23.1	9.000	Off	L1	10.3	26.9	50.0
12.612000	23.6	9.000	Off	L1	10.3	26.4	50.0
12.666000	23.9	9.000	Off	L1	10.3	26.1	50.0
13.562000	45.7	9.000	Off	L1	10.3	4.3	50.0

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Conducted Emissions (Line 2)

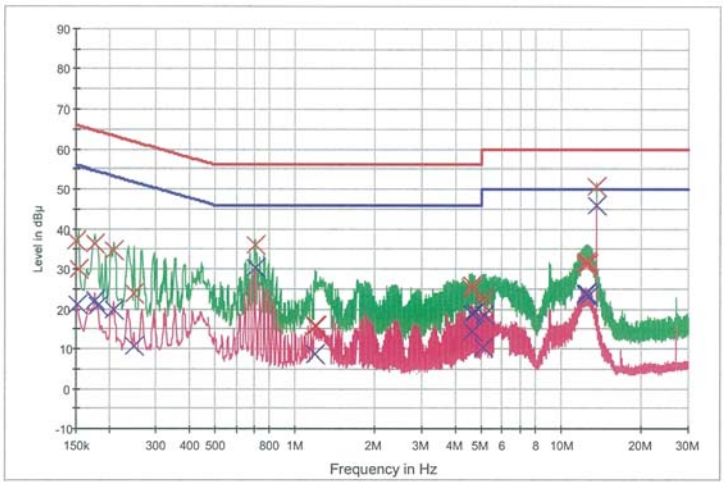
NFC MODE N 1 / 2

HCT TEST Report

Common Information

EUT:	SM-A217F/DSN
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC MODE N

FCC CLASS B_Exten Cable



FCC CLASS B_QP
Preview Result 2-AVG
FCC CLASS B_AV
Final Result 1-QPK
Preview Result 1-PK+
Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	37.1	9.000	Off	N	9.8	28.9	66.0
0.154000	30.1	9.000	Off	N	9.8	35.7	65.8
0.176000	36.6	9.000	Off	N	9.8	28.1	64.7
0.208000	34.8	9.000	Off	N	9.8	28.5	63.3
0.248000	23.8	9.000	Off	N	9.8	38.0	61.8
0.708000	36.0	9.000	Off	N	9.8	20.0	56.0
1.192000	15.6	9.000	Off	N	9.8	40.4	56.0
1.202000	15.9	9.000	Off	N	9.8	40.1	56.0
4.600000	26.0	9.000	Off	N	10.0	30.0	56.0
4.632000	24.8	9.000	Off	N	10.0	31.2	56.0
5.052000	21.3	9.000	Off	N	10.0	38.7	60.0
5.106000	22.9	9.000	Off	N	10.0	37.1	60.0
12.340000	31.6	9.000	Off	N	10.3	28.4	60.0
12.390000	31.6	9.000	Off	N	10.3	28.4	60.0
12.394000	31.1	9.000	Off	N	10.3	28.9	60.0
12.498000	32.0	9.000	Off	N	10.3	28.0	60.0
12.616000	31.2	9.000	Off	N	10.4	28.8	60.0
13.560000	50.8	9.000	Off	N	10.4	9.2	60.0

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NFC MODE N 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	21.1	9.000	Off	N	9.8	34.7	55.9
0.176000	22.1	9.000	Off	N	9.8	32.5	54.7
0.180000	20.7	9.000	Off	N	9.8	33.8	54.5
0.208000	19.9	9.000	Off	N	9.8	33.4	53.3
0.248000	10.8	9.000	Off	N	9.8	41.0	51.8
0.708000	30.4	9.000	Off	N	9.8	15.6	46.0
1.192000	8.5	9.000	Off	N	9.8	37.5	46.0
4.600000	18.9	9.000	Off	N	10.0	27.1	46.0
4.604000	14.6	9.000	Off	N	10.0	31.4	46.0
4.712000	19.2	9.000	Off	N	10.0	26.8	46.0
5.052000	10.4	9.000	Off	N	10.0	39.6	50.0
5.130000	18.6	9.000	Off	N	10.0	31.4	50.0
12.340000	23.8	9.000	Off	N	10.3	26.2	50.0
12.390000	23.7	9.000	Off	N	10.3	26.3	50.0
12.498000	24.0	9.000	Off	N	10.3	26.0	50.0
12.616000	23.3	9.000	Off	N	10.4	26.7	50.0
13.558000	45.9	9.000	Off	N	10.4	4.1	50.0
13.562000	45.8	9.000	Off	N	10.4	4.2	50.0

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10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/11/2019	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/18/2019	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/24/2019	Annual	101231
Agilent	N1911A / Power Meter	09/10/2019	Annual	MY45101406
Agilent	N1921A / Power Sensor	09/06/2019	Annual	MY55220026
Agilent	87300B / Directional Coupler	11/11/2019	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/24/2019	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/18/2019	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/02/2019	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	04/26/2019	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	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/31/2019	Annual	102168
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/10/2020	Annual	1
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX7.0/18G-8SS / High Pass Filter	03/02/2020	Annual	25
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956

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

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2004-FC020-P