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FCC NFC REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
September 04, 2018

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

Report No.: HCT-RF-1809-FC004

FCC ID:	**A3LSMJ610FN**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-J610FN/DS
Additional Model:	SM-J610FN, SM-J415FN/DS, SM-J415FN
EUT Type:	Mobile Phone
RF Output Field Strength:	16.99 dBuV/m @30 m
Frequency of Operation:	13.5598 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 : Kwon Jeong
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-1809-FC004	September 04, 2018	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-J610FN/DS
Additional Model	SM-J610FN, SM-J415FN/DS, SM-J415FN
EUT Type	Mobile Phone
Power Supply	DC 3.80 V
Battery Information	Model: EB-BG610ABE Type: Li-ion Battery
Travel Adapter Information	Model: ETA0U84IWE Manufacture: SAMSUNG
Frequency of Operation	13.5598 MHz
Transmit Power	16.99 dBuV/m @30 m
Modulation Type	ASK
Antenna Type	FPCB Type
Date(s) of Tests	August 28, 2018~ September 04, 2018

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 6.3 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_{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)	5.71

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)

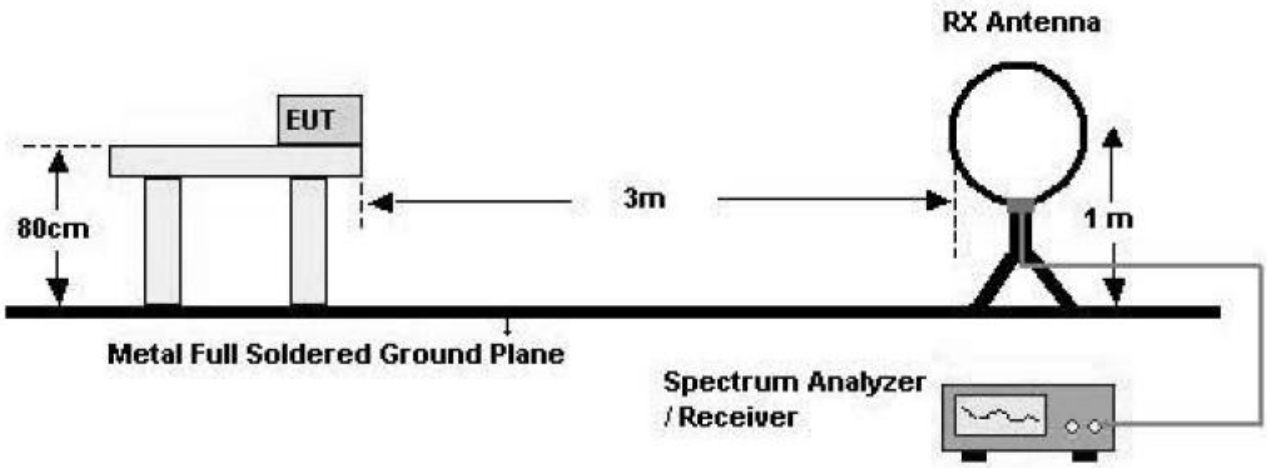
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	**100	3
88-216	**150	3
216-960	**200	3
Above 960	500	3

**:

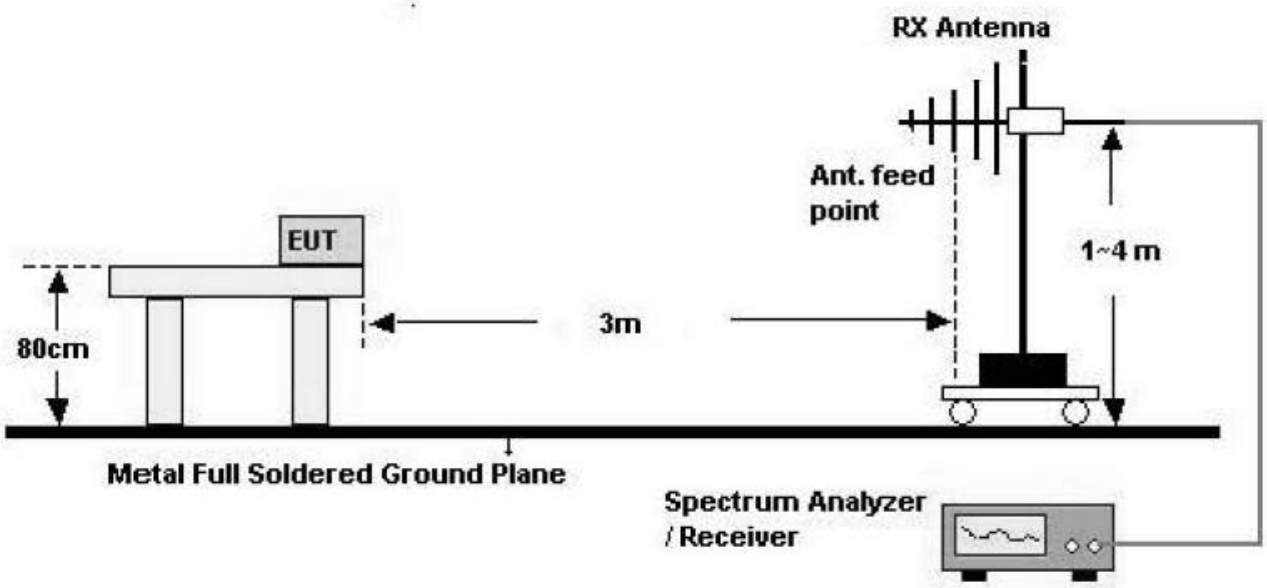
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, 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*log(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*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 OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

Test Procedure of Radiated spurious emissions(Below 30 MHz)

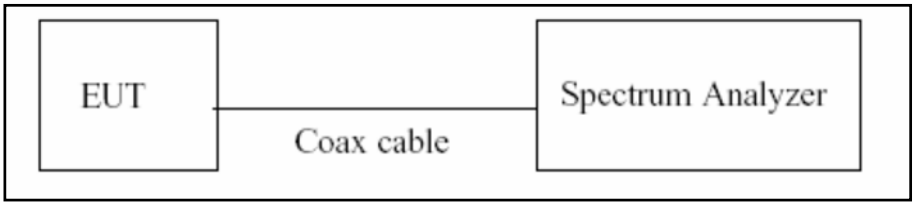
1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting 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*log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40*log(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*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 OATS 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 ≥ 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 :

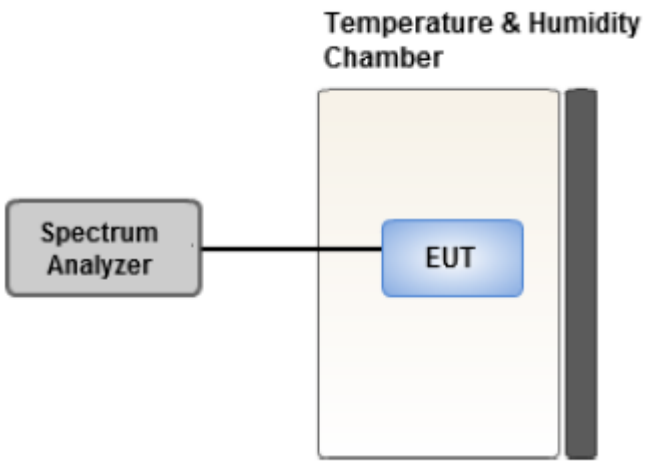
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within ±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 +/- 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*	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 : Y-H
3. All type and bitrate were investigated and the worst case results are reported.
   (Worst case : Type A, 106 kbps)
4. SM-J610FN/DS & Additional Models were tested and the worst case results are reported.
   (Worst case : SM-J610FN/DS)

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
2. SM-J610FN/DS & Additional Models were tested and the worst case results are reported.
   (Worst case : SM-J610FN/DS)

20dB Bandwidth & Frequency Stability

1. All type and bitrate were investigated and the worst case results are reported.
   (Worst case : Type A, 106 kbps)
2. SM-J610FN/DS & Additional Models were tested and the worst case results are reported.
   (Worst case : SM-J610FN/DS)

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

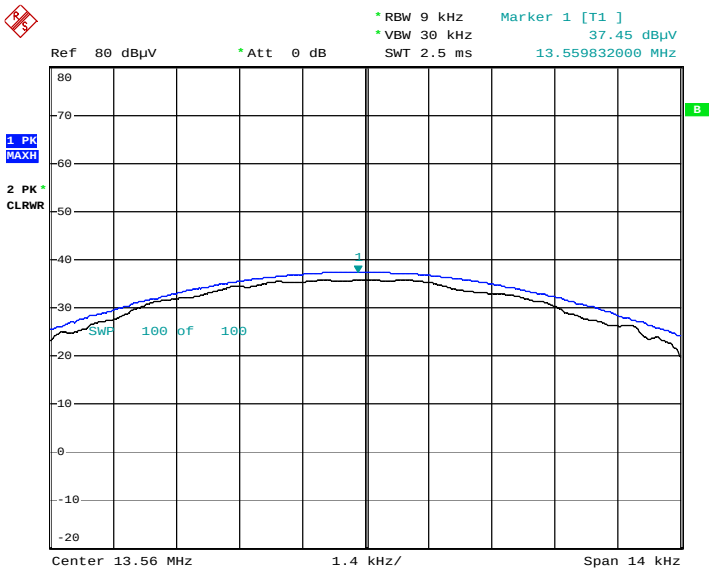
9.1. Operation within the band 13.110 MHz – 14.010 MHz

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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5598	37.45	19.54	-40	16.99	84	67.01
13.5593	31.72	19.54	-40	11.26	84	72.74

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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5530	25.72	19.54	-40	5.26	50.47	45.21
13.6656	25.28	19.54	-40	4.82	50.47	45.65

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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.3488	21.42	19.54	-40	0.96	40.51	39.55
13.7712	21.17	19.54	-40	0.71	40.51	39.8

▣ Test Plot



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Note:

Plot of worst case are only reported.

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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
12.2341	12.43	19.54	-40	-8.03	29.54	37.57
14.0739	11.19	19.54	-40	-9.27	29.54	38.81
27.2790	8.46	19.99	-40	-11.55	29.54	41.09
27.2470	7.59	19.99	-40	-12.42	29.54	41.96

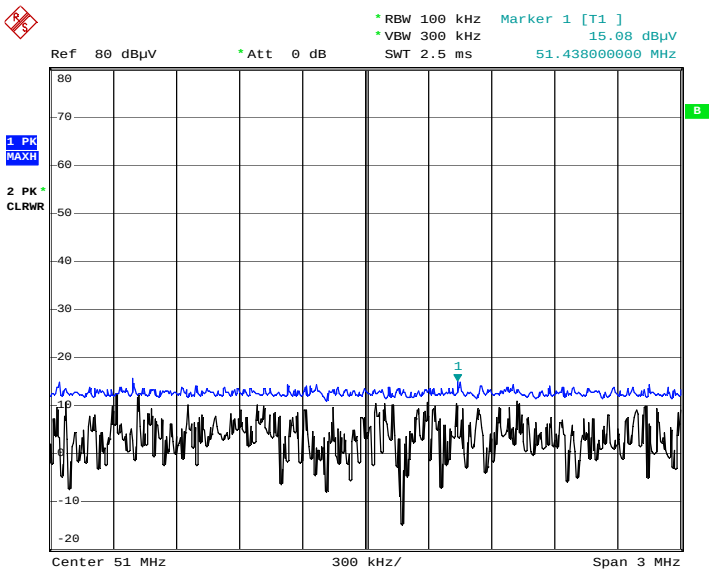
9.3. Radiated Emission 30 MHz – 1000 MHz

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)
*37.5220	14.82	11.72	0.66	H	27.2	40	12.8
51.4380	15.08	12.38	0.7	H	28.16	40	11.84
100.2880	15.2	9.27	0.78	V	25.25	43.52	18.27
*116.0720	14.28	11.64	0.81	H	26.73	43.52	16.79
*135.2280	14.35	12.84	0.88	H	28.07	43.52	15.45
154.6920	14.5	13.41	0.95	V	28.86	43.52	14.66

Note:

1. '*' is the result for restricted band.

▣ Test Plot



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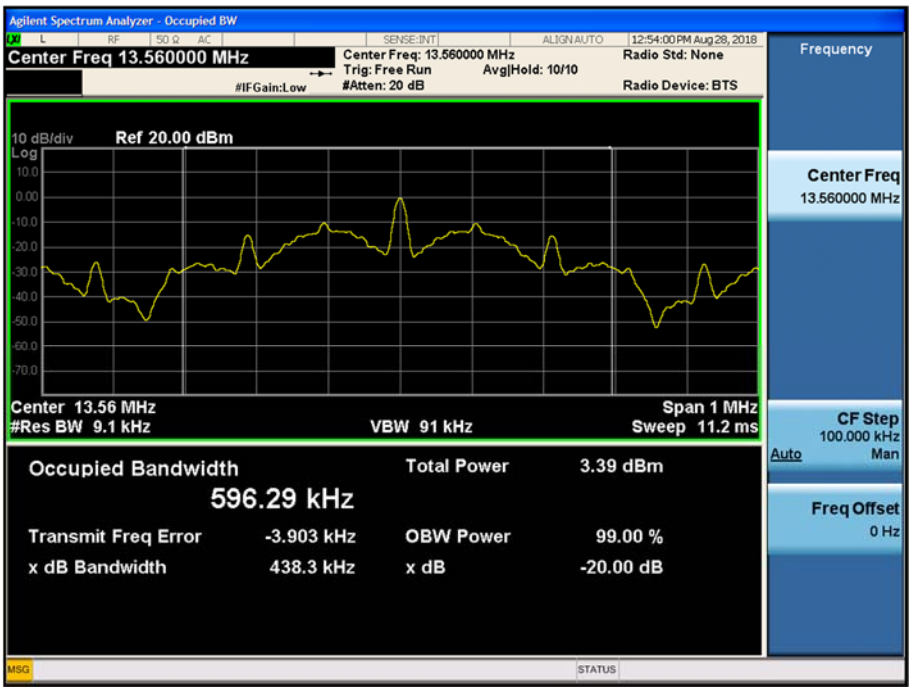
Note:

Plot of worst case are only reported

9.4. 20 dB Bandwidth



9.5. Frequency Stability

Startup

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560075	75	0.0005531
100%		-10	13.560066	66	0.0004867
100%		0	13.560043	43	0.0003171
100%		+10	13.560085	85	0.0006268
100%		+20(Ref.)	13.560059	59	0.0004351
100%		+30	13.560037	37	0.0002729
100%		+40	13.560046	46	0.0003392
100%		+50	13.560027	27	0.0001991
End. Point	3.40	+20	13.560115	115	0.0008481

2 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560118	118	0.0008702
100%		-10	13.560126	126	0.0009292
100%		0	13.560150	150	0.0011062
100%		+10	13.560087	87	0.0006416
100%		+20(Ref.)	13.560062	62	0.0004572
100%		+30	13.560057	57	0.0004204
100%		+40	13.560028	28	0.0002065
100%		+50	13.560157	157	0.0011578
End. Point	3.40	+20	13.560142	142	0.0010472

.

5 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560011	11	0.0000811
100%		-10	13.560056	56	0.0004130
100%		0	13.560089	89	0.0006563
100%		+10	13.560123	123	0.0009071
100%		+20(Ref.)	13.560012	12	0.0000885
100%		+30	13.560118	118	0.0008702
100%		+40	13.560137	137	0.0010103
100%		+50	13.560146	146	0.0010767
End. Point	3.40	+20	13.560127	127	0.0009366

10 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.80	-20	13.560087	87	0.0006416
100%		-10	13.560044	44	0.0003245
100%		0	13.560016	16	0.0001180
100%		+10	13.560099	99	0.0007301
100%		+20(Ref.)	13.560151	151	0.0011136
100%		+30	13.560113	113	0.0008333
100%		+40	13.560187	187	0.0013791
100%		+50	13.560046	46	0.0003392
End. Point	3.40	+20	13.560059	59	0.0004351

9.6. POWERLINE CONDUCTE EMISSIONS

[Unterminate the Antenna]

Conducted Emissions (Line 1)

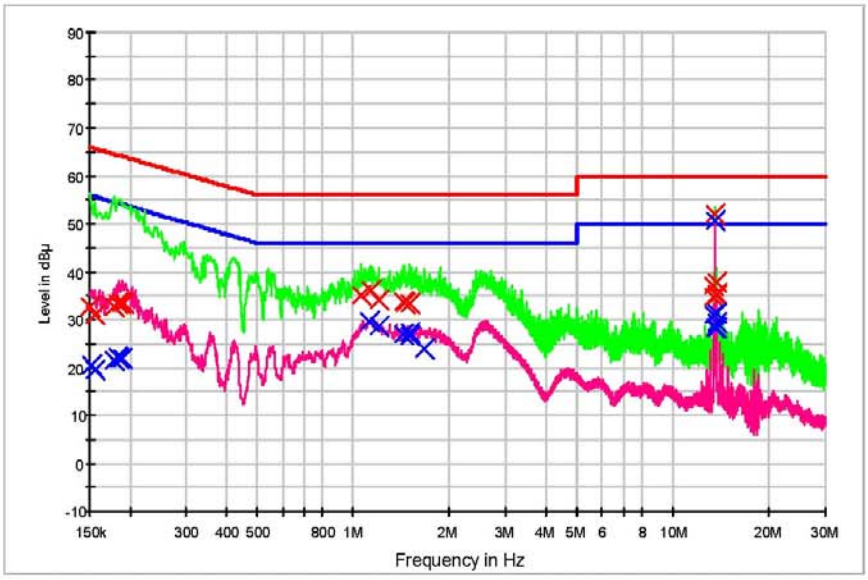
2.4G_N 1 / 2

HCT TEST Report

Common Information

EUT:	SM-J610FNDS
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC(unterm)_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	32.6	9.000	Off	N	9.7	33.4	66.0
0.156000	31.1	9.000	Off	N	9.7	34.6	65.7
0.178000	32.6	9.000	Off	N	9.7	32.0	64.6
0.182000	33.4	9.000	Off	N	9.7	31.0	64.4
0.188000	33.5	9.000	Off	N	9.7	30.6	64.1
0.192000	33.4	9.000	Off	N	9.7	30.6	63.9
1.060000	35.1	9.000	Off	N	9.8	20.9	56.0
1.134000	36.1	9.000	Off	N	9.8	19.9	56.0
1.200000	34.1	9.000	Off	N	9.8	21.9	56.0
1.436000	33.7	9.000	Off	N	9.9	22.3	56.0
1.448000	33.3	9.000	Off	N	9.9	22.7	56.0
1.500000	33.2	9.000	Off	N	9.9	22.8	56.0
13.454000	37.1	9.000	Off	N	10.4	22.9	60.0
13.460000	34.7	9.000	Off	N	10.4	25.3	60.0
13.560000	52.0	9.000	Off	N	10.4	8.0	60.0
13.640000	35.0	9.000	Off	N	10.4	25.0	60.0
13.658000	35.3	9.000	Off	N	10.4	24.7	60.0
13.666000	37.7	9.000	Off	N	10.4	22.3	60.0

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2.4G_N 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	20.6	9.000	Off	N	9.7	35.3	55.9
0.156000	19.6	9.000	Off	N	9.7	36.1	55.7
0.178000	21.4	9.000	Off	N	9.7	33.2	54.6
0.182000	22.4	9.000	Off	N	9.7	32.0	54.4
0.186000	22.0	9.000	Off	N	9.7	32.2	54.2
0.190000	21.8	9.000	Off	N	9.7	32.2	54.0
1.128000	29.8	9.000	Off	N	9.8	16.2	46.0
1.200000	28.5	9.000	Off	N	9.8	17.5	46.0
1.436000	26.9	9.000	Off	N	9.9	19.1	46.0
1.494000	27.2	9.000	Off	N	9.9	18.8	46.0
1.500000	26.7	9.000	Off	N	9.9	19.3	46.0
1.678000	24.0	9.000	Off	N	9.8	22.0	46.0
13.454000	30.9	9.000	Off	N	10.4	19.1	50.0
13.476000	28.2	9.000	Off	N	10.4	21.8	50.0
13.560000	50.6	9.000	Off	N	10.4	-0.6	50.0
13.640000	28.3	9.000	Off	N	10.4	21.7	50.0
13.654000	29.3	9.000	Off	N	10.4	20.7	50.0
13.666000	31.5	9.000	Off	N	10.4	18.5	50.0

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Conducted Emissions (Line 2)

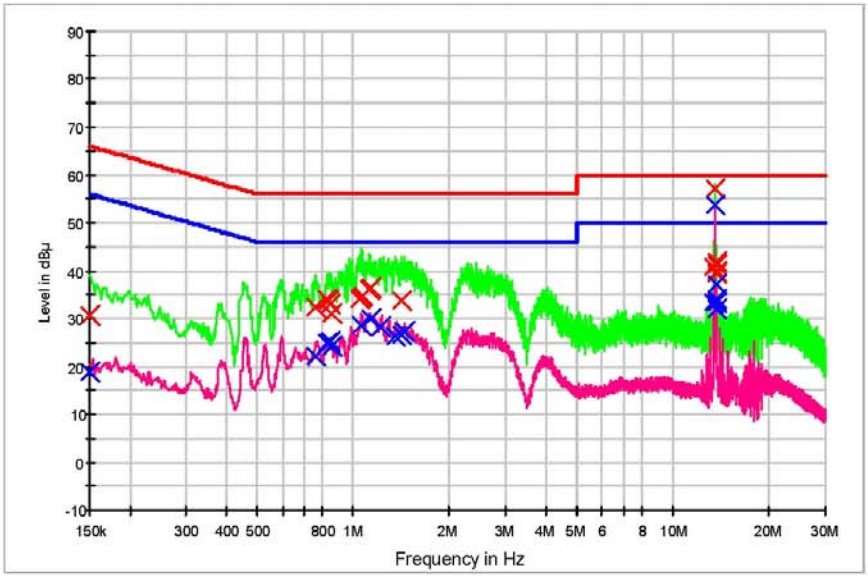
2.4G_L1 1 / 2

HCT TEST Report

Common Information

EUT:	SM-J610FNDS
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC(unterm)_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 (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	30.7	9.000	Off	L1	9.7	35.3	66.0
0.766000	32.4	9.000	Off	L1	9.7	23.6	56.0
0.832000	34.2	9.000	Off	L1	9.7	21.8	56.0
0.840000	33.8	9.000	Off	L1	9.8	22.2	56.0
0.844000	32.9	9.000	Off	L1	9.8	23.1	56.0
0.852000	31.0	9.000	Off	L1	9.8	25.0	56.0
1.050000	34.0	9.000	Off	L1	9.8	22.0	56.0
1.058000	34.5	9.000	Off	L1	9.8	21.5	56.0
1.070000	34.9	9.000	Off	L1	9.8	21.1	56.0
1.118000	36.0	9.000	Off	L1	9.8	20.0	56.0
1.138000	36.6	9.000	Off	L1	9.8	19.4	56.0
1.420000	33.8	9.000	Off	L1	9.9	22.2	56.0
13.452000	41.0	9.000	Off	L1	10.2	19.0	60.0
13.560000	57.1	9.000	Off	L1	10.2	2.9	60.0
13.658000	39.7	9.000	Off	L1	10.2	20.3	60.0
13.664000	41.7	9.000	Off	L1	10.2	18.3	60.0
13.668000	41.2	9.000	Off	L1	10.2	18.8	60.0
13.672000	39.3	9.000	Off	L1	10.2	20.7	60.0

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2.4G_L1 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	18.8	9.000	Off	L1	9.7	37.2	56.0
0.760000	22.1	9.000	Off	L1	9.7	23.9	46.0
0.830000	25.0	9.000	Off	L1	9.7	21.0	46.0
0.834000	24.9	9.000	Off	L1	9.8	21.1	46.0
0.844000	25.2	9.000	Off	L1	9.8	20.8	46.0
0.852000	24.2	9.000	Off	L1	9.8	21.8	46.0
1.058000	28.8	9.000	Off	L1	9.8	17.2	46.0
1.138000	29.9	9.000	Off	L1	9.8	16.1	46.0
1.218000	28.2	9.000	Off	L1	9.8	17.8	46.0
1.352000	26.4	9.000	Off	L1	9.8	19.6	46.0
1.420000	26.7	9.000	Off	L1	9.9	19.3	46.0
1.456000	27.2	9.000	Off	L1	9.9	18.8	46.0
13.456000	33.5	9.000	Off	L1	10.2	16.5	50.0
13.560000	53.6	9.000	Off	L1	10.2	-3.6	50.0
13.658000	32.2	9.000	Off	L1	10.2	17.8	50.0
13.662000	33.5	9.000	Off	L1	10.2	16.5	50.0
13.668000	34.0	9.000	Off	L1	10.2	16.0	50.0
13.772000	37.2	9.000	Off	L1	10.2	12.8	50.0

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[Terminate the Antenna]

Conducted Emissions (Line 1)

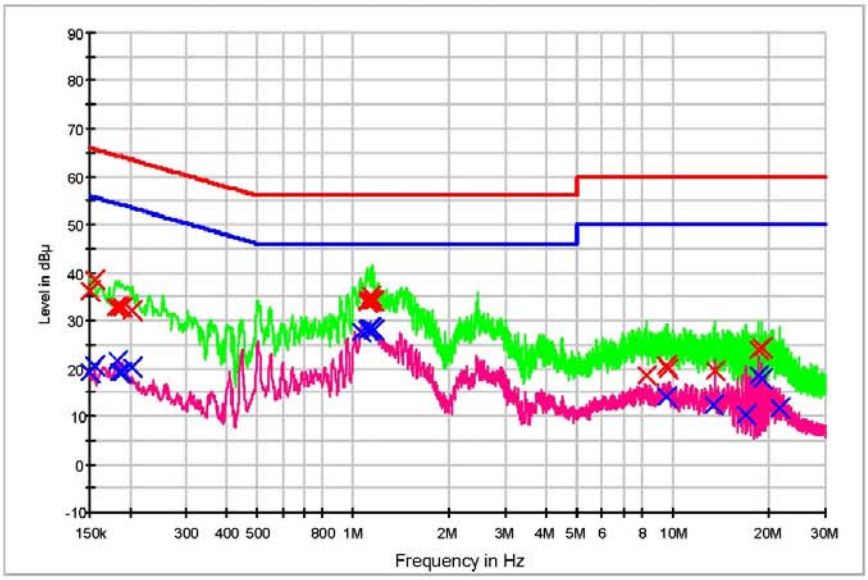
NFC(term)_N 1 / 2

HCT TEST Report

Common Information

EUT:	SM-J610FNDS
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC(term)_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 (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	36.2	9.000	Off	N	9.7	29.8	66.0
0.156000	38.4	9.000	Off	N	9.7	27.3	65.7
0.180000	32.7	9.000	Off	N	9.7	31.7	64.5
0.186000	32.8	9.000	Off	N	9.7	31.5	64.2
0.190000	32.7	9.000	Off	N	9.7	31.3	64.0
0.204000	32.0	9.000	Off	N	9.7	31.5	63.4
1.102000	33.9	9.000	Off	N	9.8	22.1	56.0
1.112000	34.2	9.000	Off	N	9.8	21.8	56.0
1.126000	34.0	9.000	Off	N	9.8	22.0	56.0
1.138000	35.2	9.000	Off	N	9.8	20.8	56.0
1.144000	34.1	9.000	Off	N	9.8	21.9	56.0
1.164000	34.0	9.000	Off	N	9.8	22.0	56.0
8.286000	18.5	9.000	Off	N	10.2	41.5	60.0
9.530000	20.4	9.000	Off	N	10.2	39.6	60.0
9.604000	19.9	9.000	Off	N	10.2	40.1	60.0
13.586000	19.6	9.000	Off	N	10.4	40.4	60.0
18.578000	24.0	9.000	Off	N	10.6	36.0	60.0
19.006000	24.1	9.000	Off	N	10.6	35.9	60.0

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NFC(term)_N 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	19.0	9.000	Off	N	9.7	37.0	56.0
0.156000	20.5	9.000	Off	N	9.7	35.2	55.7
0.182000	21.5	9.000	Off	N	9.7	32.9	54.4
0.186000	19.2	9.000	Off	N	9.7	35.0	54.2
0.190000	19.1	9.000	Off	N	9.7	34.9	54.0
0.204000	20.0	9.000	Off	N	9.7	33.4	53.4
1.052000	27.5	9.000	Off	N	9.8	18.5	46.0
1.102000	27.8	9.000	Off	N	9.8	18.2	46.0
1.112000	27.9	9.000	Off	N	9.8	18.1	46.0
1.116000	28.4	9.000	Off	N	9.8	17.6	46.0
1.138000	28.3	9.000	Off	N	9.8	17.7	46.0
1.164000	27.9	9.000	Off	N	9.8	18.1	46.0
9.530000	13.9	9.000	Off	N	10.2	36.1	50.0
13.444000	12.5	9.000	Off	N	10.4	37.5	50.0
16.930000	10.5	9.000	Off	N	10.6	39.5	50.0
18.578000	18.4	9.000	Off	N	10.6	31.6	50.0
19.010000	17.9	9.000	Off	N	10.6	32.1	50.0
21.584000	11.6	9.000	Off	N	10.7	38.4	50.0

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Conducted Emissions (Line 2)

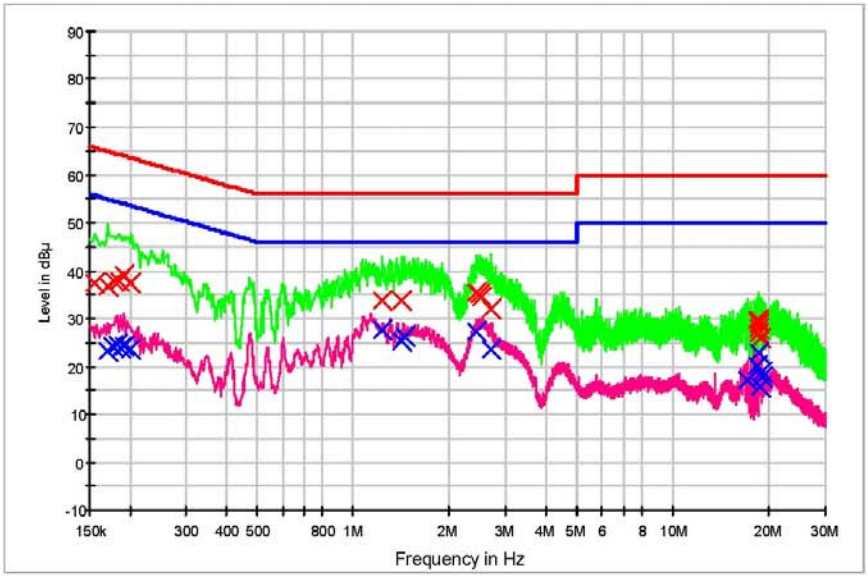
NFC(term)_L1 1 / 2

HCT TEST Report

Common Information

EUT:	SM-J610FNDS
Manufacturer:	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions:	NFC(term)_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 (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156000	37.3	9.000	Off	L1	9.7	28.3	65.7
0.170000	36.8	9.000	Off	L1	9.7	28.1	65.0
0.178000	37.9	9.000	Off	L1	9.7	26.7	64.6
0.186000	37.9	9.000	Off	L1	9.7	26.3	64.2
0.192000	39.3	9.000	Off	L1	9.7	24.6	63.9
0.202000	37.4	9.000	Off	L1	9.7	26.1	63.5
1.230000	33.6	9.000	Off	L1	9.8	22.4	56.0
1.424000	33.6	9.000	Off	L1	9.9	22.4	56.0
2.432000	35.3	9.000	Off	L1	9.9	20.7	56.0
2.484000	35.1	9.000	Off	L1	9.9	20.9	56.0
2.512000	34.5	9.000	Off	L1	9.9	21.5	56.0
2.690000	32.0	9.000	Off	L1	9.9	24.0	56.0
18.370000	29.8	9.000	Off	L1	10.4	30.2	60.0
18.484000	26.9	9.000	Off	L1	10.4	33.1	60.0
18.490000	29.5	9.000	Off	L1	10.4	30.5	60.0
18.570000	29.0	9.000	Off	L1	10.4	31.0	60.0
18.626000	28.0	9.000	Off	L1	10.4	32.0	60.0
18.866000	25.8	9.000	Off	L1	10.4	34.2	60.0

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NFC(term)_L1 2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.170000	23.2	9.000	Off	L1	9.7	31.8	55.0
0.176000	24.1	9.000	Off	L1	9.7	30.6	54.7
0.184000	24.7	9.000	Off	L1	9.7	29.6	54.3
0.188000	24.0	9.000	Off	L1	9.7	30.2	54.1
0.192000	24.2	9.000	Off	L1	9.7	29.8	53.9
0.202000	23.5	9.000	Off	L1	9.7	30.1	53.5
1.230000	27.7	9.000	Off	L1	9.8	18.3	46.0
1.424000	25.4	9.000	Off	L1	9.9	20.6	46.0
1.446000	26.3	9.000	Off	L1	9.9	19.7	46.0
2.432000	27.3	9.000	Off	L1	9.9	18.7	46.0
2.436000	27.3	9.000	Off	L1	9.9	18.7	46.0
2.690000	23.5	9.000	Off	L1	9.9	22.5	46.0
17.050000	17.0	9.000	Off	L1	10.3	33.0	50.0
18.370000	20.2	9.000	Off	L1	10.4	29.8	50.0
18.560000	22.9	9.000	Off	L1	10.4	27.1	50.0
18.866000	15.8	9.000	Off	L1	10.4	34.2	50.0
19.000000	18.7	9.000	Off	L1	10.4	31.3	50.0
19.072000	17.9	9.000	Off	L1	10.4	32.1	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	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2018	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/30/2018	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Agilent	N1911A / Power Meter	04/16/2018	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/16/2018	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2017	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	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/07/2018	Annual	8
Wainwright Instruments	WHFX7.0/18G-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	01/03/2018	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	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/29/2018	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.

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-1809-FC004-P
2	HCT-RF-1809-FC005-P
3	HCT-RF-1809-FC006-P
4	HCT-RF-1809-FC007-P
5	HCT-RF-1809-FC008-P