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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:
November 05, 2021

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2110-FC072-R1

FCC ID:	**A3LSMN980F1**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMN981B1 report.

Model:	SM-N980F/DS
Additional Model:	SM-N980F
EUT Type:	Mobile Phone
RF Output Field Strength:	14.71 dBμV/m @30 m
Frequency of Operation:	13.56 MHz
Modulation type:	ASK
FCC Classification:	Low Power Communication Device Transmitter (DXX)
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.

REVIEWED BY

Report prepared by : Jin Gwan Lee Engineer of Telecommunication Testing Center	Report approved by : Jong Seok Lee Manager of Telecommunication Testing Center

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 (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2110-FC072	October 29, 2021	- First Approval Report
HCT-RF-2110-FC072-R1	November 04, 2021	- FCC ID Revised

Table of Contents

1. EUT DESCRIPTION

Model	SM-N980F/DS
Additional Model	SM-N980F
EUT Type	Mobile Phone
Power Supply	DC 3.88 V
Frequency of Operation	13.56 MHz
Transmit Power	14.71 dBμV/m @30 m
Modulation Type	ASK
Date(s) of Tests	September 27, 2021 ~ October 27, 2021
Serial number	Radiated: UIR1409M Conducted: UIR1403M

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 30 MHz 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 equipment, 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 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (Confidence level about 95 %, k=2)

7. DESCRIPTION OF TESTS

7.1. Radiated Test

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

Frequency (MHz)	Field Strength (μV/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 μV/m = 84.0 dBμV/m
2. 334 μV/m = 50.47 dBμV/m
3. 106 μV/m = 40.51 dBμV/m

Limit (Radiated Spurious Emissions)

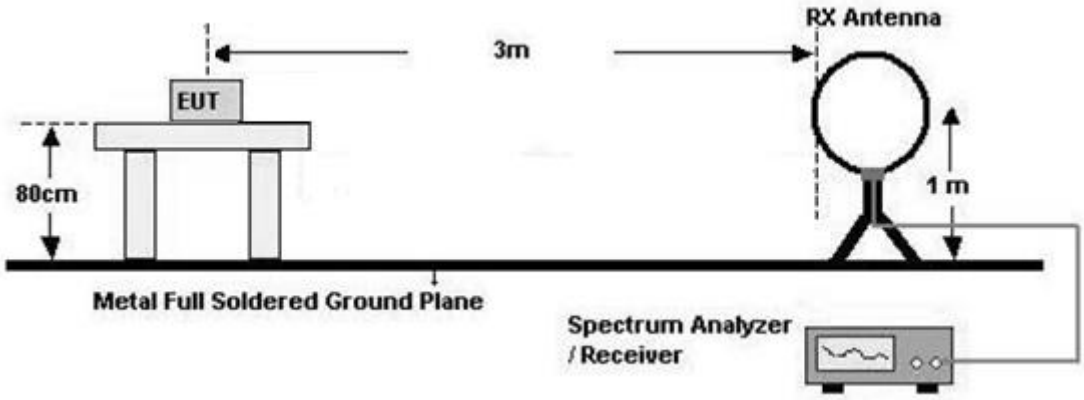
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	※100	3
88-216	※150	3
216-960	※200	3
Above 960	500	3

※:

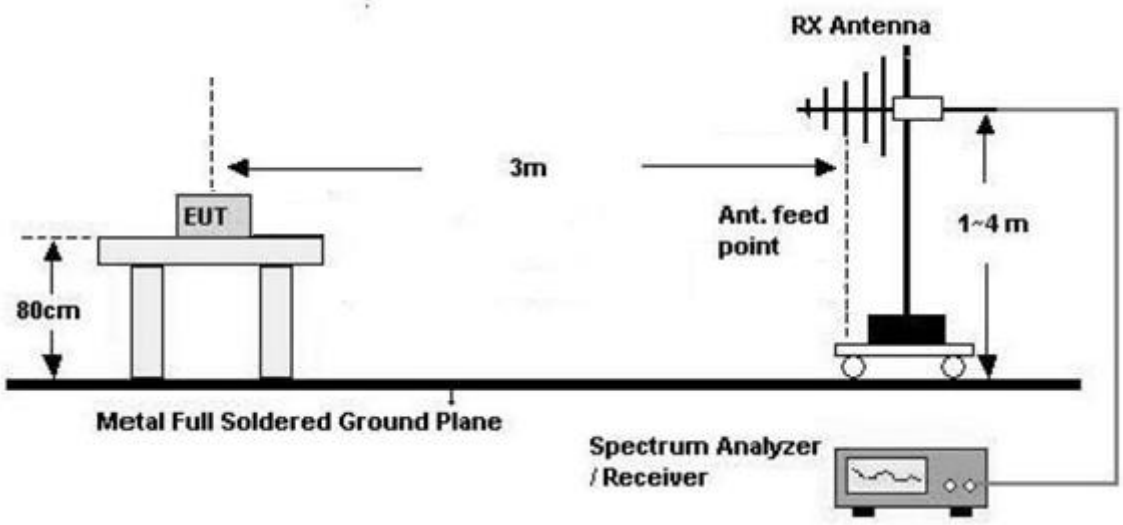
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Test Procedure of in-band

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m 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 = Max Hold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
8. Total = Measured 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 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m 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 = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Measured 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.

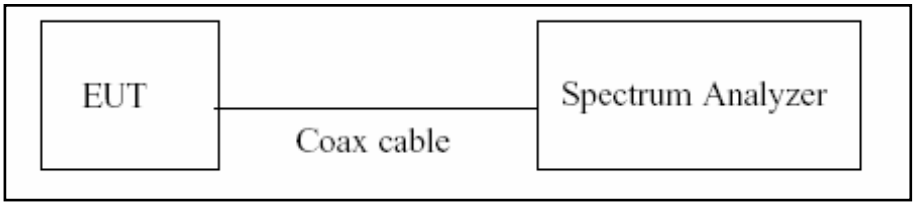
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

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 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
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. Spectrum Setting
   - Frequency Range = 30 MHz ~ 1 GHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 100 kHz
   - VBW ≥ 3 x RBW
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. 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. 20 dB 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 :

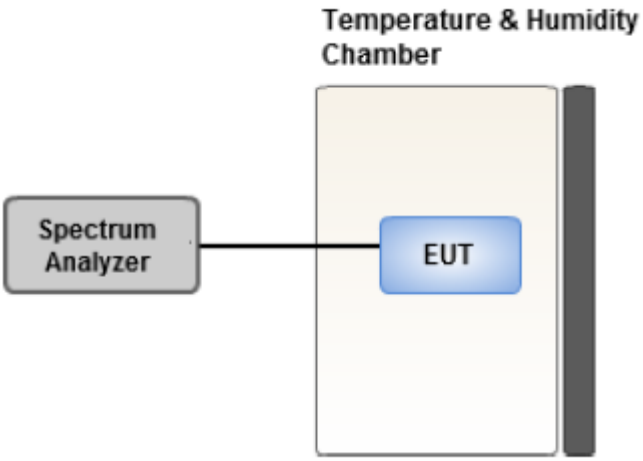
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

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 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 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 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) = Measured 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.
   - Worstcase : Type A, 106 kbps
4. All mode of without tag and with tag were investigated and the worst case configuration results are reported.
   - Worstcase : Without Tag
5. 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
6. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.

(Worst case : SM-N980F/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. All modes(For unterminated the Antenna, terminated the Antenna) of operation were investigated and the worst case configuration results are reported.
   - Worstcase : Unterminated the Antenna
3. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.

(Worst case : SM-N980F/DS)

20 dB Bandwidth & Frequency Stability

1. All type and bitrate were investigated and the worst case results are reported.
   - Worstcase : Type A, 106 kbps
2. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.

(Worst case : SM-N980F/DS)

8. TEST SUMMARY

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

9. TEST RESULT

9.1. Operation within the band 13.110 MHz – 14.010 MHz

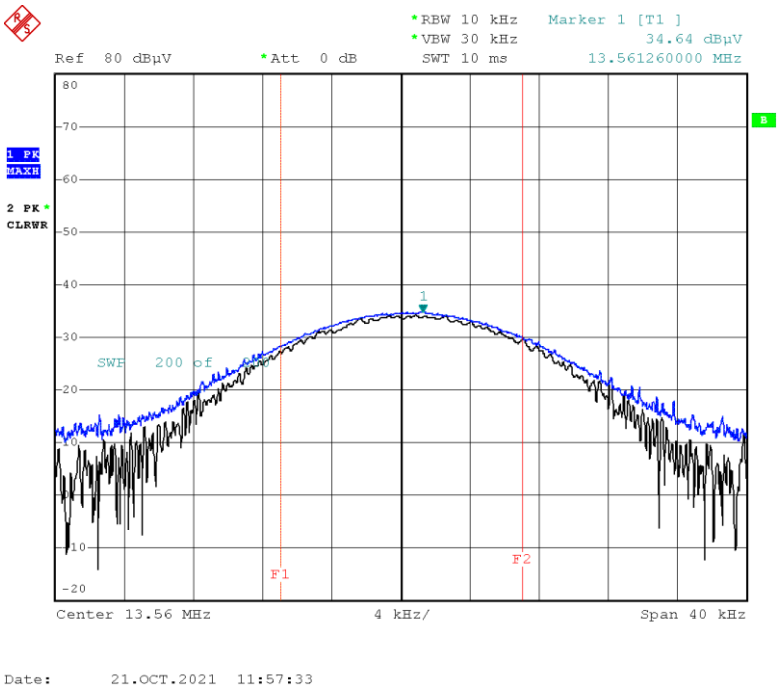
Measured Frequency Range : 13.553 MHz-13.567 MHz							
Frequency (MHz)	Measured Value (dBµV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dBµV/m) @30 m	Limit (dBµV/m) @30 m	Margin (dB)
13.56126	34.64	20.07	-40.00	Z-H	14.71	84.00	69.29
13.52690	32.21	20.07	-40.00	Z-H	12.28	84.00	71.72

Measured Frequency Range : 13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz							
Frequency (MHz)	Measured Value (dBµV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dBµV/m) @30 m	Limit (dBµV/m) @30 m	Margin (dB)
13.55297	27.96	20.07	-40.00	Z-H	8.03	50.47	42.44
13.56697	29.86	20.07	-40.00	Z-H	9.93	50.47	40.54

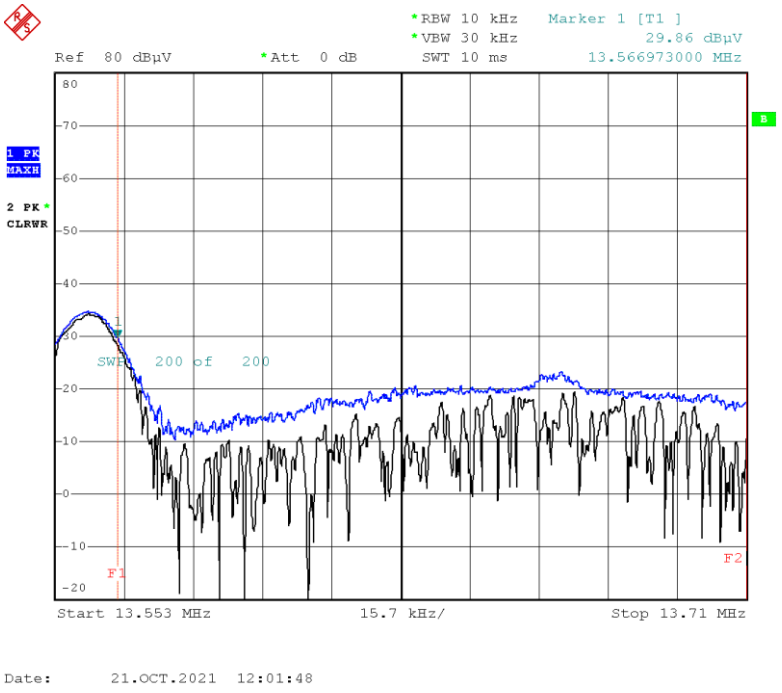
Measured Frequency Range : 13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz							
Frequency (MHz)	Measured Value (dBµV/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dBµV/m) @30 m	Limit (dBµV/m) @30 m	Margin (dB)
13.34712	19.56	20.07	-40.00	Z-H	-0.37	40.51	40.88
13.77305	20.07	20.07	-40.00	Z-H	0.14	40.51	40.37

▣ Test Plot

13.553 MHz ~ 13.567 MHz



Worst Case (13.567 MHz-13.710 MHz)



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)	**Measured Value (dBµV/m) @3 m**	**Ant.Factor +Cable Loss (dB/m)**	**Distance Correction (dB)**	**Ant. POL (H/V)**	**Total (dBµV/m) @30 m**	**Limit (dBµV/m) @30 m**	**Margin (dB)**
6.9952	12.69	19.97	-40.00	Z-H	-7.34	29.54	36.88
11.1000	13.03	20.07	-40.00	Z-H	-6.90	29.54	36.44
12.0700	10.64	20.07	-40.00	Z-H	-9.29	29.54	38.83
14.0979	10.64	20.67	-40.00	Z-V	-8.69	29.54	38.23

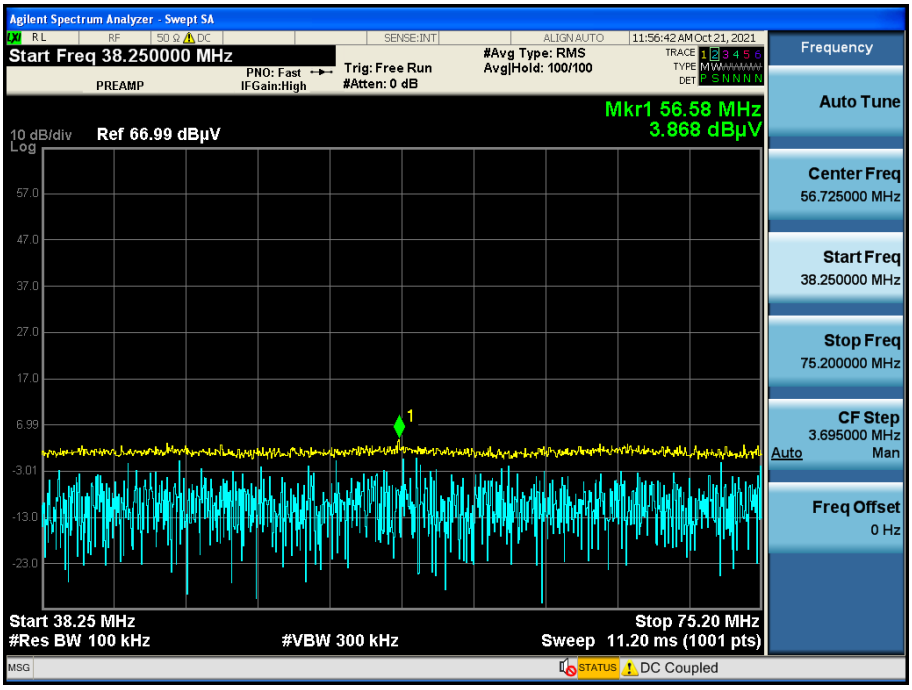
9.3. Radiated Emission 30 MHz – 1000 MHz

Measured Frequency Range : 30 MHz - 1000 MHz							
Frequency (MHz)	Measured Value (dBµV/m) @3 m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBµV/m)	Limit (dBµV/m)	Margin (dB)
36.0675	3.48	19.30	0.47	H	23.25	40.00	16.75
#37.7350	2.89	19.30	0.55	H	22.74	40.00	17.26
56.5800	3.87	18.80	0.70	V	23.37	40.00	16.63
#115.2600	3.63	16.90	1.01	H	21.54	43.50	21.96
#137.8550	3.14	18.80	1.08	H	23.02	43.50	20.48
140.4000	3.51	18.80	1.08	V	23.39	43.50	20.11

Note:

1. # is the result for restricted band.

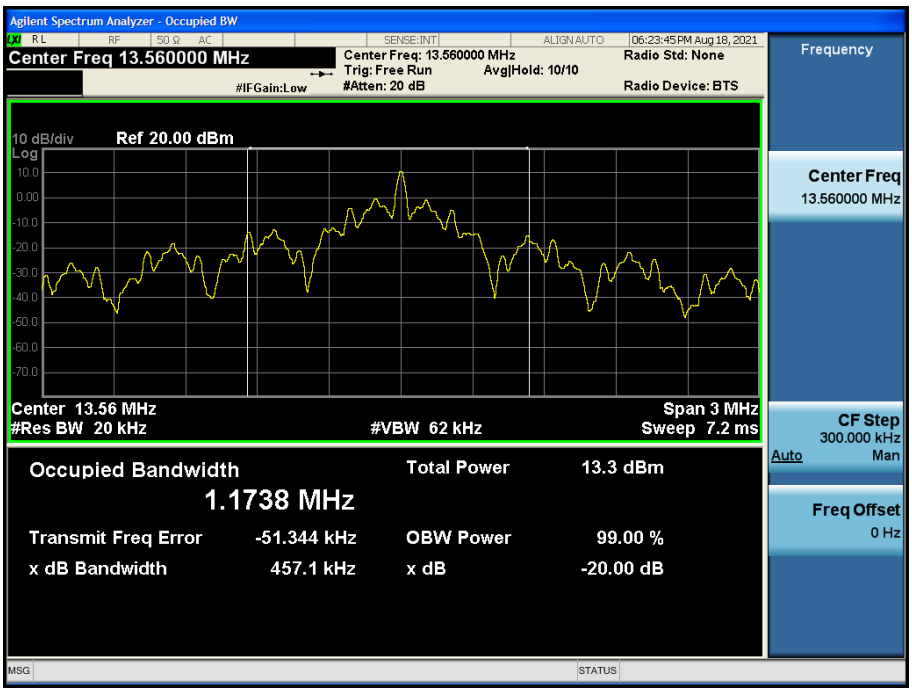
▣ Test Plot



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: 3.88 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.88	-20	13.560040	40	0.0002943
100%		-10	13.560025	25	0.0001812
100%		0	13.560085	85	0.0006302
100%		+10	13.560019	19	0.0001417
100%		+20(Ref.)	13.560021	21	0.0001544
100%		+30	13.560081	81	0.0005968
100%		+40	13.560091	91	0.0006684
100%		+50	13.560040	40	0.0002919
End. Point	3.40	+20	13.560023	23	0.0001691

2 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.88 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.88	-20	13.560024	24	0.0001767
100%		-10	13.560077	77	0.0005645
100%		0	13.560048	48	0.0003572
100%		+10	13.560028	28	0.0002033
100%		+20(Ref.)	13.560018	18	0.0001347
100%		+30	13.560009	9	0.0000683
100%		+40	13.560054	54	0.0003948
100%		+50	13.560042	42	0.0003121
End. Point	3.40	+20	13.560033	33	0.0002443

5 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.88 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.88	-20	13.560013	13	0.0000954
100%		-10	13.560047	47	0.0003442
100%		0	13.560013	13	0.0000937
100%		+10	13.560010	10	0.0000754
100%		+20(Ref.)	13.560032	32	0.0002333
100%		+30	13.560062	62	0.0004599
100%		+40	13.560086	86	0.0006347
100%		+50	13.560097	97	0.0007122
End. Point	3.40	+20	13.560078	78	0.0005774

10 minutes

PERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.88 VDC

DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.88	-20	13.560067	67	0.0004923
100%		-10	13.560098	98	0.0007260
100%		0	13.560090	90	0.0006610
100%		+10	13.560011	11	0.0000800
100%		+20(Ref.)	13.560012	12	0.0000861
100%		+30	13.560059	59	0.0004379
100%		+40	13.560099	99	0.0007273
100%		+50	13.560036	36	0.0002667
End. Point	3.40	+20	13.560023	23	0.0001662

9.6. POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

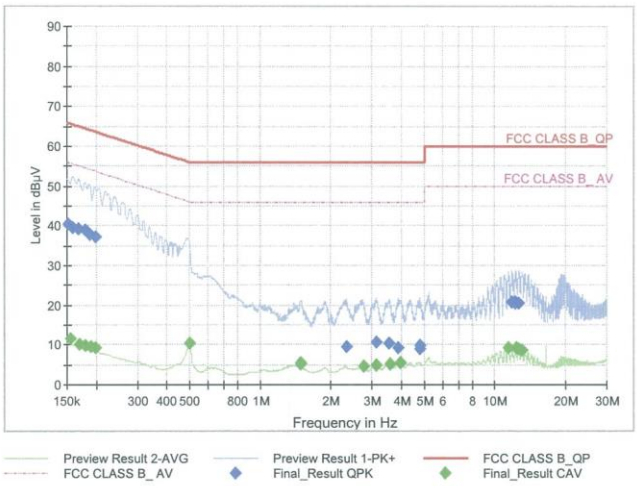
Test 1 / 2

Test Report

Common Information

EUT :	SM-N981B/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	NFC_terminated_L1
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	40.31	65.88	25.57	9.000	L1	OFF	9.6
0.1590	39.51	65.52	26.01	9.000	L1	OFF	9.6
0.1680	39.25	65.06	25.81	9.000	L1	OFF	9.6
0.1793	38.85	64.52	25.67	9.000	L1	OFF	9.6
0.1883	37.66	64.11	26.46	9.000	L1	OFF	9.6
0.1995	37.19	63.63	26.44	9.000	L1	OFF	9.6
2.3338	9.39	56.00	46.61	9.000	L1	OFF	9.7
3.1168	10.61	56.00	45.39	9.000	L1	OFF	9.8
3.5308	10.46	56.00	45.54	9.000	L1	OFF	9.8
3.8863	9.30	56.00	46.70	9.000	L1	OFF	9.8
4.7683	9.06	56.00	46.94	9.000	L1	OFF	9.9
4.7885	9.82	56.00	46.19	9.000	L1	OFF	9.9
11.8243	20.67	60.00	39.33	9.000	L1	OFF	10.1
12.2338	20.60	60.00	39.40	9.000	L1	OFF	10.1
12.2428	20.77	60.00	39.23	9.000	L1	OFF	10.1
12.2540	20.80	60.00	39.20	9.000	L1	OFF	10.1
12.2630	20.88	60.00	39.12	9.000	L1	OFF	10.1
12.6748	20.61	60.00	39.39	9.000	L1	OFF	10.2

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	11.50	55.75	44.26	9.000	L1	OFF	9.6
0.1703	10.24	54.95	44.71	9.000	L1	OFF	9.6
0.1793	9.73	54.52	44.79	9.000	L1	OFF	9.6
0.1905	9.52	54.02	44.49	9.000	L1	OFF	9.6
0.1995	9.09	53.63	44.54	9.000	L1	OFF	9.6
0.5000	10.28	46.00	35.72	9.000	L1	OFF	9.7
1.4833	5.38	46.00	40.62	9.000	L1	OFF	9.7
1.4923	5.33	46.00	40.67	9.000	L1	OFF	9.7
2.7523	4.53	46.00	41.47	9.000	L1	OFF	9.8
3.1325	4.99	46.00	41.01	9.000	L1	OFF	9.8
3.5623	5.15	46.00	40.85	9.000	L1	OFF	9.8
3.9763	5.35	46.00	40.65	9.000	L1	OFF	9.8
11.4215	9.16	50.00	40.84	9.000	L1	OFF	10.1
12.2675	9.14	50.00	40.86	9.000	L1	OFF	10.1
12.6635	9.02	50.00	40.98	9.000	L1	OFF	10.2
12.6725	9.06	50.00	40.94	9.000	L1	OFF	10.2
13.0460	8.72	50.00	41.28	9.000	L1	OFF	10.2
13.0618	8.75	50.00	41.25	9.000	L1	OFF	10.2

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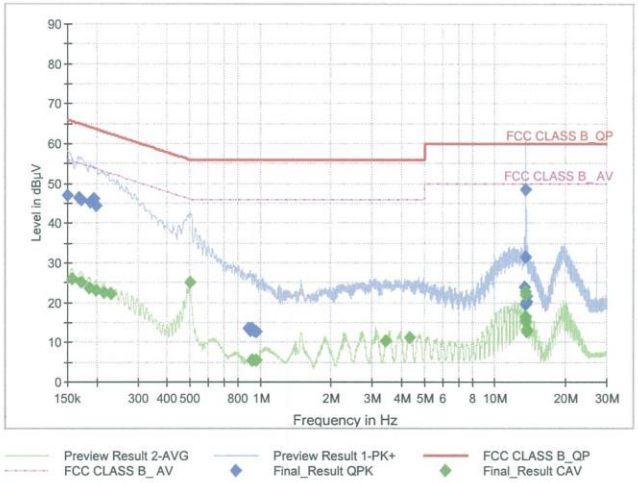
Test 1 / 2

Test Report

Common Information

EUT :	SM-N981B/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	NFC_Unterminated_L1
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	46.90	66.00	19.10	9.000	L1	OFF	9.6
0.1680	46.33	65.06	18.73	9.000	L1	OFF	9.6
0.1725	45.74	64.84	19.10	9.000	L1	OFF	9.6
0.1883	45.30	64.11	18.81	9.000	L1	OFF	9.6
0.1950	46.20	63.82	17.62	9.000	L1	OFF	9.6
0.1995	44.32	63.63	19.31	9.000	L1	OFF	9.6
0.8893	13.42	56.00	42.58	9.000	L1	OFF	9.7
0.9028	13.32	56.00	42.68	9.000	L1	OFF	9.7
0.9095	12.93	56.00	43.07	9.000	L1	OFF	9.7
0.9140	13.54	56.00	42.46	9.000	L1	OFF	9.7
0.9343	13.05	56.00	42.95	9.000	L1	OFF	9.7
0.9568	12.71	56.00	43.29	9.000	L1	OFF	9.7
13.3498	24.02	60.00	35.98	9.000	L1	OFF	10.2
13.4263	31.46	60.00	28.54	9.000	L1	OFF	10.2
13.4848	19.56	60.00	40.44	9.000	L1	OFF	10.2
13.5613	48.50	60.00	11.50	9.000	L1	OFF	10.2
13.6400	20.20	60.00	39.80	9.000	L1	OFF	10.2
13.6918	21.76	60.00	38.24	9.000	L1	OFF	10.2

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1568	26.07	55.63	29.56	9.000	L1	OFF	9.6
0.1725	24.98	54.84	29.85	9.000	L1	OFF	9.6
0.1860	23.72	54.21	30.49	9.000	L1	OFF	9.6
0.1995	22.98	53.63	30.65	9.000	L1	OFF	9.6
0.2153	22.61	53.00	30.39	9.000	L1	OFF	9.6
0.2288	22.25	52.50	30.24	9.000	L1	OFF	9.6
0.4988	24.98	46.02	21.04	9.000	L1	OFF	9.6
0.9140	5.59	46.00	40.41	9.000	L1	OFF	9.7
0.9275	5.40	46.00	40.60	9.000	L1	OFF	9.7
0.9545	5.36	46.00	40.64	9.000	L1	OFF	9.7
3.4228	10.33	46.00	35.67	9.000	L1	OFF	9.8
4.3318	11.31	46.00	34.69	9.000	L1	OFF	9.8
13.4825	16.50	50.00	33.50	9.000	L1	OFF	10.2
13.5455	15.16	50.00	34.84	9.000	L1	OFF	10.2
13.5568	21.95	50.00	28.05	9.000	L1	OFF	10.2
13.5635	22.75	50.00	27.25	9.000	L1	OFF	10.2
13.5748	13.15	50.00	36.85	9.000	L1	OFF	10.2
13.6378	12.62	50.00	37.38	9.000	L1	OFF	10.2

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Conducted Emissions (Line 2)

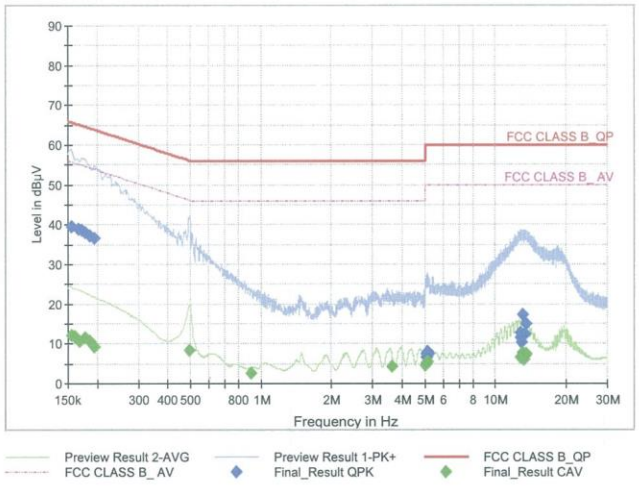
Test 1 / 2

Test Report

Common Information

EUT :	SM-N981B/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	NFC_terminated_N
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	39.48	65.75	26.27	9.000	N	OFF	9.6
0.1658	39.01	65.17	26.16	9.000	N	OFF	9.6
0.1725	38.71	64.84	26.13	9.000	N	OFF	9.6
0.1770	38.11	64.63	26.52	9.000	N	OFF	9.6
0.1860	37.29	64.21	26.92	9.000	N	OFF	9.6
0.1950	36.55	63.82	27.28	9.000	N	OFF	9.6
5.0608	6.73	60.00	53.27	9.000	N	OFF	9.9
5.0900	7.43	60.00	52.57	9.000	N	OFF	9.9
5.0990	7.60	60.00	52.40	9.000	N	OFF	9.9
5.1215	7.80	60.00	52.20	9.000	N	OFF	9.9
5.1508	7.93	60.00	52.07	9.000	N	OFF	9.9
5.1620	7.61	60.00	52.39	9.000	N	OFF	9.9
12.7828	12.83	60.00	47.17	9.000	N	OFF	10.2
12.8188	11.41	60.00	48.59	9.000	N	OFF	10.2
12.8525	10.35	60.00	49.65	9.000	N	OFF	10.2
13.0393	17.32	60.00	42.68	9.000	N	OFF	10.2
13.3228	12.28	60.00	47.72	9.000	N	OFF	10.2
13.5365	14.97	60.00	45.03	9.000	N	OFF	10.2

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	12.22	55.75	43.54	9.000	N	OFF	9.6
0.1613	11.87	55.40	43.53	9.000	N	OFF	9.6
0.1680	10.79	55.06	44.27	9.000	N	OFF	9.6
0.1770	11.56	54.63	43.07	9.000	N	OFF	9.6
0.1860	10.61	54.21	43.61	9.000	N	OFF	9.6
0.1950	9.37	53.82	44.46	9.000	N	OFF	9.6
0.4965	8.51	46.06	37.55	9.000	N	OFF	9.6
0.9095	2.60	46.00	43.40	9.000	N	OFF	9.7
3.6343	4.29	46.00	41.71	9.000	N	OFF	9.8
5.0000	4.76	46.00	41.24	9.000	N	OFF	9.9
5.0720	5.21	50.00	44.79	9.000	N	OFF	9.9
5.1350	5.52	50.00	44.48	9.000	N	OFF	9.9
12.7828	6.50	50.00	43.50	9.000	N	OFF	10.2
13.0663	7.74	50.00	42.26	9.000	N	OFF	10.2
13.1923	6.05	50.00	43.95	9.000	N	OFF	10.2
13.4623	7.59	50.00	42.41	9.000	N	OFF	10.2
13.4960	7.34	50.00	42.66	9.000	N	OFF	10.2
13.5050	7.28	50.00	42.72	9.000	N	OFF	10.2

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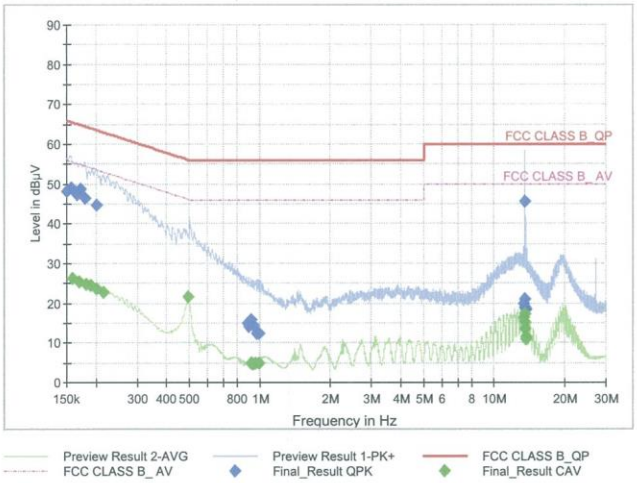
Test Report

Common Information

EUT :	SM-N981B/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	NFC_Unterminated_N
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	48.24	66.00	17.76	9.000	N	OFF	9.6
0.1568	49.16	65.63	16.48	9.000	N	OFF	9.6
0.1658	47.35	65.17	17.82	9.000	N	OFF	9.6
0.1725	48.67	64.84	16.17	9.000	N	OFF	9.6
0.1793	46.52	64.52	18.00	9.000	N	OFF	9.6
0.2018	44.57	63.54	18.97	9.000	N	OFF	9.6
0.8848	14.87	56.00	41.13	9.000	N	OFF	9.7
0.8960	14.27	56.00	41.73	9.000	N	OFF	9.7
0.9185	15.96	56.00	40.04	9.000	N	OFF	9.7
0.9410	14.40	56.00	41.60	9.000	N	OFF	9.7
0.9658	12.42	56.00	43.58	9.000	N	OFF	9.7
0.9883	12.45	56.00	43.55	9.000	N	OFF	9.7
13.3475	19.91	60.00	40.09	9.000	N	OFF	10.2
13.4308	20.95	60.00	39.05	9.000	N	OFF	10.2
13.4803	18.85	60.00	41.15	9.000	N	OFF	10.2
13.5208	18.95	60.00	41.05	9.000	N	OFF	10.2
13.5613	45.50	60.00	14.50	9.000	N	OFF	10.2
13.6400	18.37	60.00	41.63	9.000	N	OFF	10.2

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1590	26.28	55.52	29.23	9.000	N	OFF	9.6
0.1703	25.48	54.95	29.47	9.000	N	OFF	9.6
0.1815	24.88	54.42	29.54	9.000	N	OFF	9.6
0.1905	24.43	54.02	29.59	9.000	N	OFF	9.6
0.2018	23.54	53.54	30.00	9.000	N	OFF	9.6
0.2153	22.80	53.00	30.20	9.000	N	OFF	9.6
0.4943	21.59	46.10	24.51	9.000	N	OFF	9.6
0.9208	4.83	46.00	41.17	9.000	N	OFF	9.7
0.9320	4.85	46.00	41.15	9.000	N	OFF	9.7
0.9433	4.75	46.00	41.25	9.000	N	OFF	9.7
0.9545	4.97	46.00	41.03	9.000	N	OFF	9.7
0.9883	4.89	46.00	41.11	9.000	N	OFF	9.7
13.3498	16.39	50.00	33.61	9.000	N	OFF	10.2
13.4803	15.20	50.00	34.80	9.000	N	OFF	10.2
13.5455	13.63	50.00	36.37	9.000	N	OFF	10.2
13.5590	17.28	50.00	32.72	9.000	N	OFF	10.2
13.5793	11.64	50.00	38.36	9.000	N	OFF	10.2
13.6378	10.87	50.00	39.13	9.000	N	OFF	10.2

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10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
Test Receiver	ESCI	Rohde & Schwarz	100033	06/15/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/15/2022	Annual
Signal Analyzer	N9030A	Agilent	MY50200093	11/17/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75303960	06/10/2022	Annual
Attenuator (10 dB)	8493C-010	Agilent	08285	06/28/2022	Annual
Software	EMC32	Rohde & Schwarz	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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller (Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	Loop Antenna	Rohde & Schwarz	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2021	Biennial
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	101068-SZ	09/15/2022	Annual
Signal Analyzer	N9020A	Agilent	MY50200093	09/07/2022	Annual
Attenuator (10 dB) 56-10	CBLU1183540B-01 56-10	CERNEX WEINSCHEL	N/A	12/23/2021	Annual
Broadband Low Noise Amplifier Attenuator (3 dB)	CBL06185030 18B-03	CERNEX Api tech.	N/A	12/23/2021	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/04/2021	Annual

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-2110-FC072-P