

FCC NFC REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: January 26, 2022
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea	Test Site/Location: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon- si, Gyeonggi-do, 17383 KOREA
	Report No.: HCT-RF-2201-FC084

FCC ID:	A3LSMM236B
APPLICANT:	SAMSUNG Electronics Co., Ltd.
Model:	SM-M236B/DS
Additional Model:	-
EUT Type:	Mobile Phone
RF Output Field Strength:	10.06 dB μ V/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.

Report No.: HCT-RF-2201-FC084

REVIEWED BY



Report prepared by : Jeong Ho Kim
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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2201-FC084	January 26, 2022	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-M236B/DS
Additional Model	-
EUT Type	Mobile Phone
Power Supply	DC 3.86 V
Frequency of Operation	13.56 MHz
Transmit Power	10.06 dB μ V/m @30 m
Modulation Type	ASK
Date(s) of Tests	December 13, 2021 ~ January 26, 2022
Serial number	Radiated : R3CRB0HNWZV Conducted : R3CRB0HPPHA

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 ($\mu\text{V/m}$)	Measurement Distance (m)
13.553 – 13.567	15,848	30
13.410 \leq f \leq 13.553 13.567 \leq f \leq 13.710	334	30
13.110 \leq f \leq 13.410 13.710 \leq f \leq 14.010	106	30

Note:

1. 15,848 $\mu\text{V/m}$ = 84.0 dB $\mu\text{V/m}$
2. 334 $\mu\text{V/m}$ = 50.47 dB $\mu\text{V/m}$
3. 106 $\mu\text{V/m}$ = 40.51 dB $\mu\text{V/m}$

Limit (Radiated Spurious Emissions)

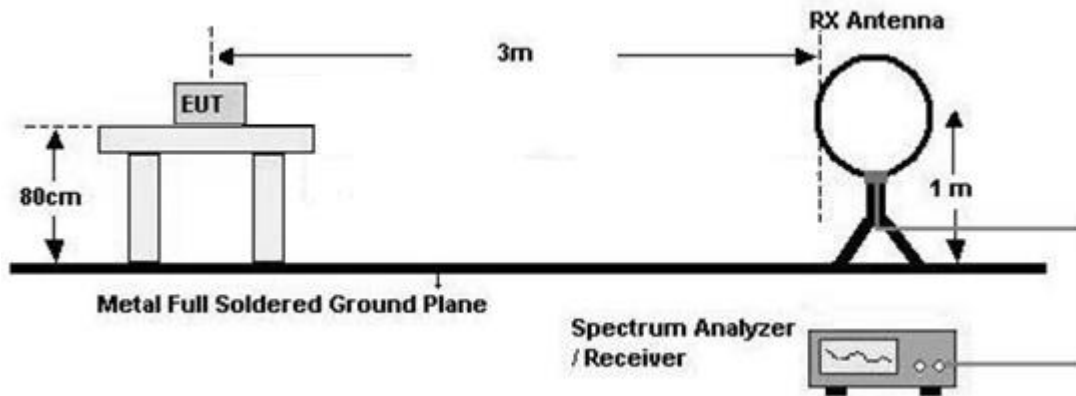
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	* 100	3
88-216	* 150	3
216-960	* 200	3
Above 960	500	3

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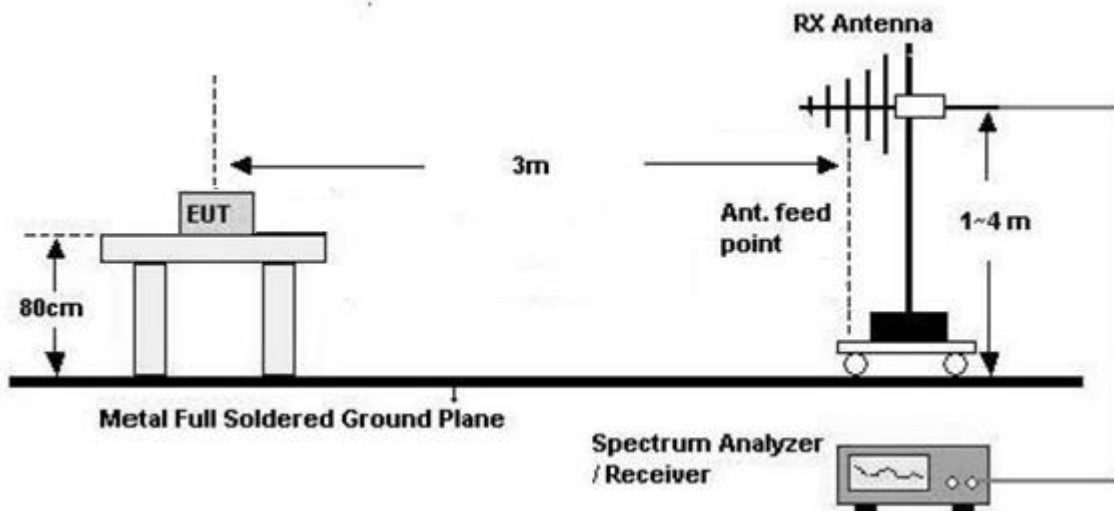
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, 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 = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m (Below 30 MHz)

7. Spectrum Setting

- Detector = Peak
- Trace = Max Hold
- RBW = 9 kHz
- VBW $\geq 3 \times$ 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) = $40\log(3 \text{ m}/300 \text{ m}) = - 80 \text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3 \text{ m}/30 \text{ m}) = - 40 \text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ 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.

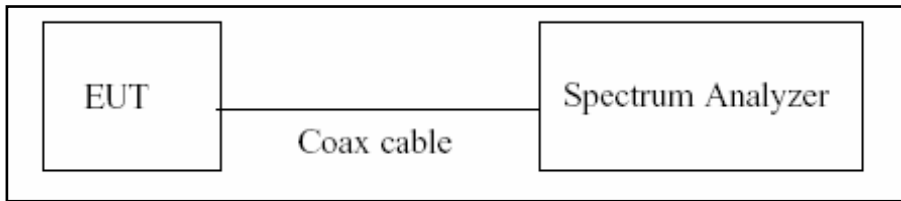
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

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 \geq 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 :

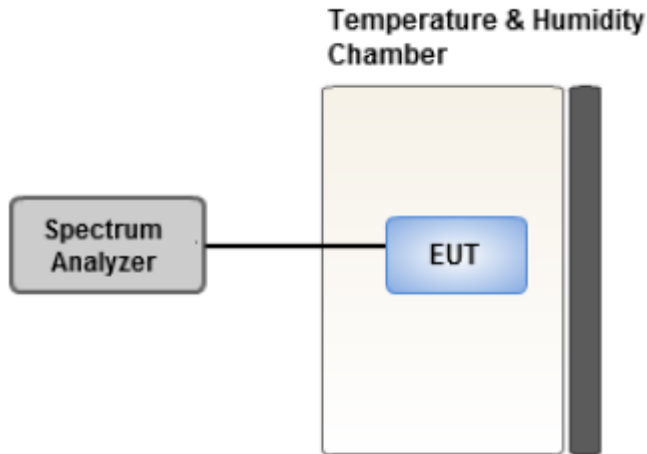
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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

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

20 dB Bandwidth & Frequency Stability

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

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 ($13.410 \leq f \leq 13.553$, $13.567 \leq f \leq 13.710$)	Pass
Part 15.225 (c)	Radiated Electric Field Emissions ($13.110 \leq f \leq 13.410$, $13.710 \leq f \leq 14.010$)	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

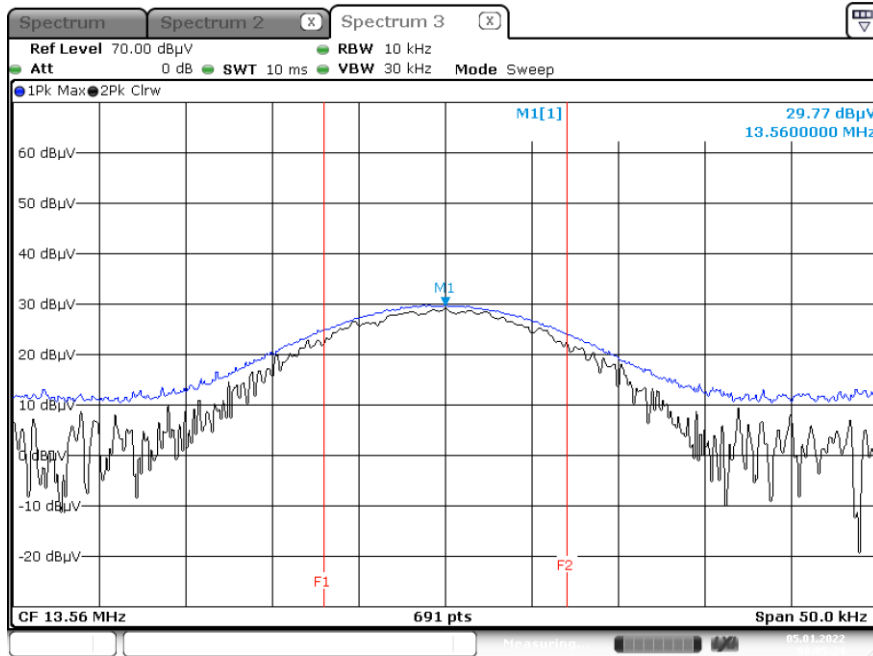
Measured Frequency Range : 13.553 MHz-13.567 MHz							
Frequency (MHz)	Measured Value (dB μ V/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dB μ V/m) @30 m	Limit (dB μ V/m) @30 m	Margin (dB)
13.5600	29.77	20.29	-40.00	Z-H	10.06	84.00	73.94
13.5598	25.57	20.29	-40.00	Z-V	5.86	84.00	78.14

Measured Frequency Range : 13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz							
Frequency (MHz)	Measured Value (dB μ V/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dB μ V/m) @30 m	Limit (dB μ V/m) @30 m	Margin (dB)
13.5529	24.60	20.29	-40.00	Z-H	4.89	50.47	45.58
13.5671	23.45	20.29	-40.00	Z-H	3.74	50.47	46.73

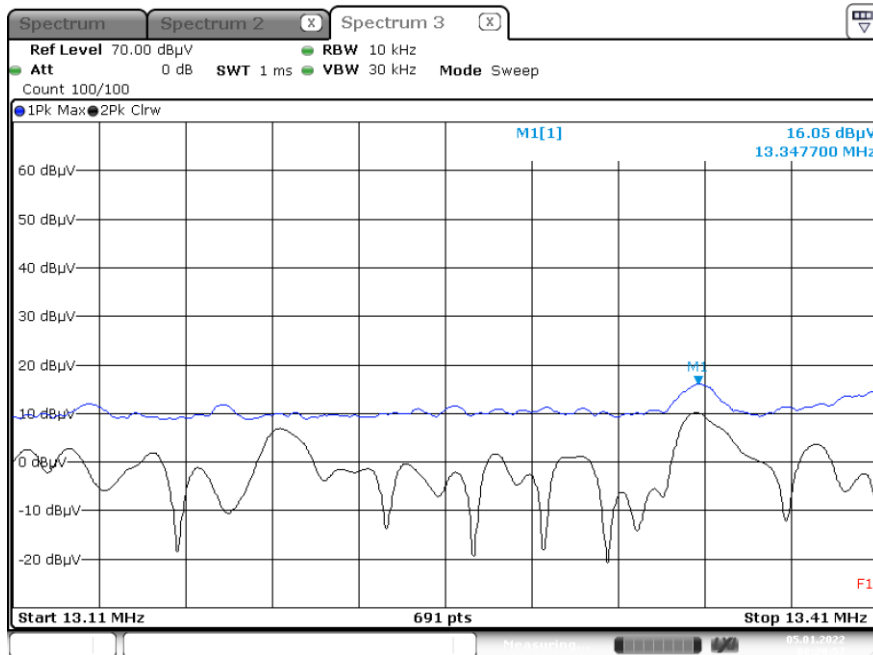
Measured Frequency Range : 13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz							
Frequency (MHz)	Measured Value (dB μ V/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dB μ V/m) @30 m	Limit (dB μ V/m) @30 m	Margin (dB)
13.3477	16.05	20.29	-40.00	Z-H	-3.66	40.51	44.17
13.7719	15.98	20.29	-40.00	Z-H	-3.73	40.51	44.24

Test Plot

13.553 MHz ~ 13.567 MHz



Worst Case (13.110 MHz-13.410 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 (dB μ V/m) @3 m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL (H/V)	Total (dB μ V/m) @30 m	Limit (dB μ V/m) @30 m	Margin (dB)
6.6610	12.98	20.22	-40.00	Z-H	-6.80	29.54	36.34
14.0880	11.21	20.29	-40.00	Z-H	-8.50	29.54	38.04
27.1057	10.20	20.79	-40.00	Z-H	-9.01	29.54	38.55
27.1225	10.15	20.79	-40.00	Z-V	-9.06	29.54	38.60

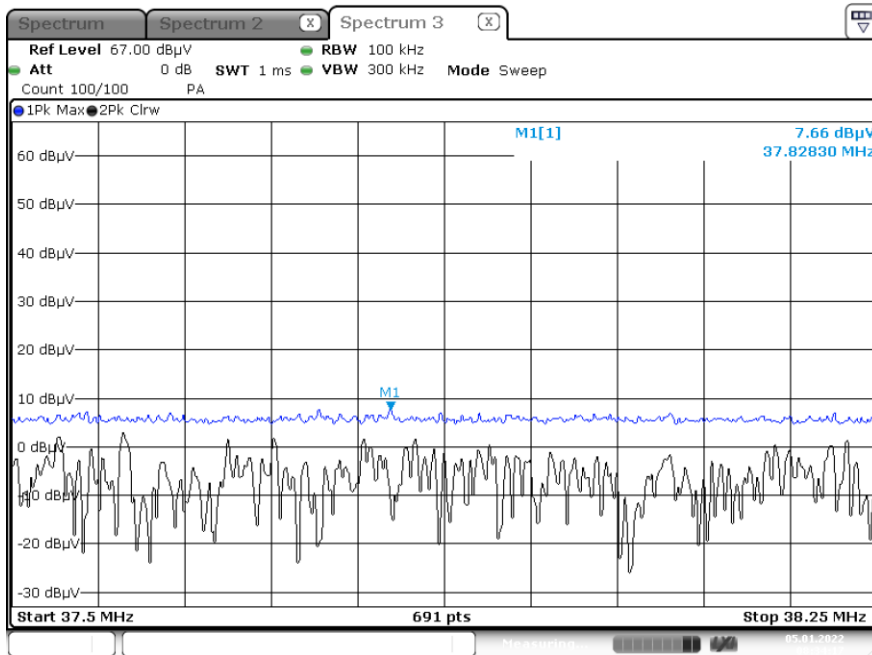
9.3. Radiated Emission 30 MHz – 1000 MHz

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)
36.4310	6.87	18.84	0.73	H	26.44	40.00	13.56
#37.8283	7.66	19.07	0.75	H	27.48	40.00	12.52
96.9640	7.41	14.39	1.14	H	22.94	40.00	17.06
#111.9640	6.87	16.00	1.23	H	24.10	43.50	19.40
#125.8550	7.25	17.47	1.31	H	26.03	43.50	17.47
160.5956	7.13	18.70	1.46	H	27.29	43.50	16.21

Note:

- # is the result for restricted band.

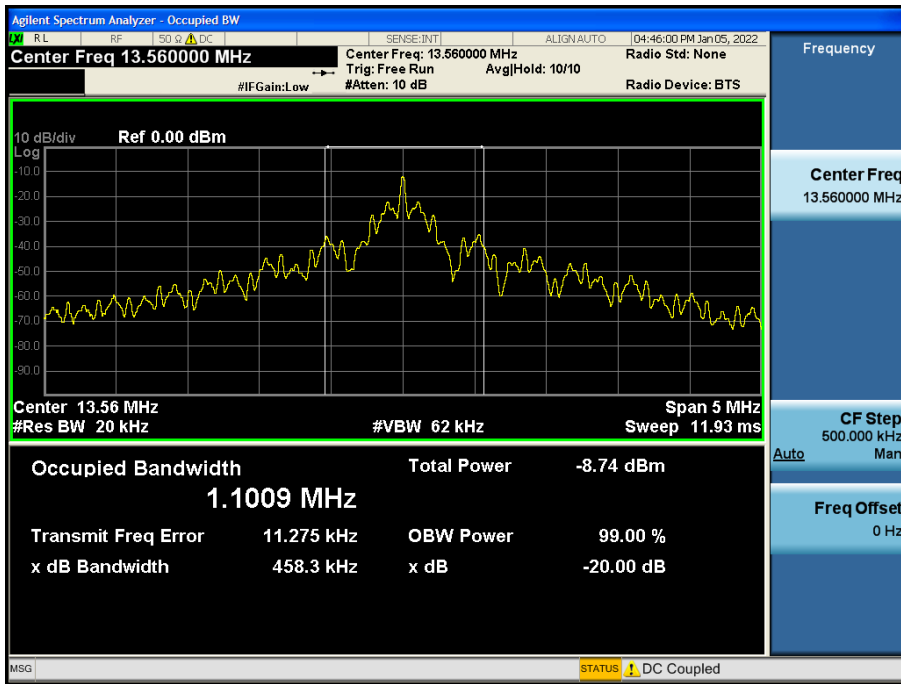
Test Plot



Note:

Plot of worst case are only reported

9.4. 20 dB Bandwidth



9.5. Frequency Stability

Startup

OPERATING FREQUENCY: 13.56 MHz
REFERENCE VOLTAGE: 3.86 VDC
DEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.86	-20	13.560054	54	0.0003999
100%		-10	13.560049	49	0.0003587
100%		0	13.560044	44	0.0003222
100%		+10	13.560041	41	0.0003002
100%		+20(Ref.)	13.560039	39	0.0002839
100%		+30	13.560042	42	0.0003126
100%		+40	13.560051	51	0.0003791
100%		+50	13.560056	56	0.0004129
LOW	3.70	+20	13.560056	56	0.0004119
HIGH	4.40	+20	13.560058	58	0.0004298

2 minutesOPERATING FREQUENCY: 13.56 MHzREFERENCE VOLTAGE: 3.86 VDCDEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.86	-20	13.560058	58	0.0004248
100%		-10	13.560051	51	0.0003742
100%		0	13.560046	46	0.0003389
100%		+10	13.560042	42	0.0003100
100%		+20(Ref.)	13.560040	40	0.0002959
100%		+30	13.560044	44	0.0003234
100%		+40	13.560054	54	0.0003982
100%		+50	13.560059	59	0.0004331
LOW		3.70	+20	13.560058	58
HIGH	4.40	+20	13.560056	56	0.0004098

5 minutesOPERATING FREQUENCY: 13.56 MHzREFERENCE VOLTAGE: 3.86 VDCDEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.86	-20	13.560060	60	0.0004405
100%		-10	13.560053	53	0.0003945
100%		0	13.560049	49	0.0003580
100%		+10	13.560046	46	0.0003383
100%		+20(Ref.)	13.560043	43	0.0003156
100%		+30	13.560045	45	0.0003323
100%		+40	13.560055	55	0.0004088
100%		+50	13.560060	60	0.0004456
LOW		3.70	+20	13.560062	62
HIGH	4.40	+20	13.560062	62	0.0004550

10 minutesOPERATING FREQUENCY: 13.56 MHzREFERENCE VOLTAGE: 3.86 VDCDEVIATION LIMIT: ±0.01 % = ±1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.86	-20	13.560061	61	0.0004469
100%		-10	13.560055	55	0.0004065
100%		0	13.560050	50	0.0003692
100%		+10	13.560047	47	0.0003463
100%		+20(Ref.)	13.560045	45	0.0003283
100%		+30	13.560047	47	0.0003486
100%		+40	13.560056	56	0.0004157
100%		+50	13.560062	62	0.0004583
LOW	3.70	+20	13.560064	64	0.0004742
HIGH	4.40	+20	13.560062	62	0.0004557

9.6. POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

NFC MODE_L1

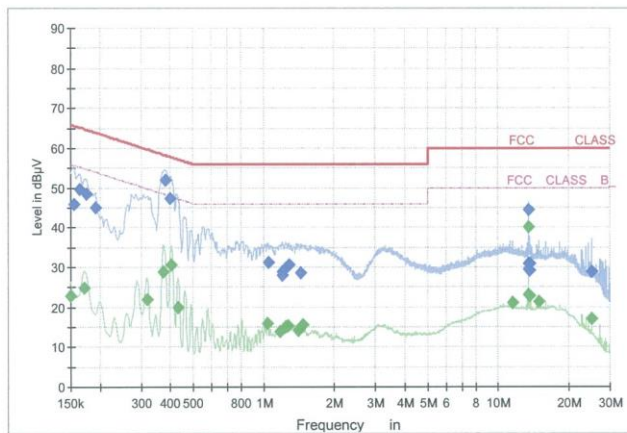
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Test Report

Common Information

EUT : SM-M236B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : NFC MODE_L1

Full Spectrum



— Preview Result — FCC CLASS
 - - - - - FCC CLASS B_ — Final_Result QPK — Final_Result CAV

Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	45.88	65.75	19.87	9.000	L1	OFF	9.6
0.1635	49.53	65.28	15.75	9.000	L1	OFF	9.6
0.1748	48.49	64.73	16.24	9.000	L1	OFF	9.6
0.1928	45.03	63.92	18.88	9.000	L1	OFF	9.6
0.3795	51.86	58.29	6.43	9.000	L1	OFF	9.6
0.3998	47.33	57.86	10.53	9.000	L1	OFF	9.6
1.0445	31.07	56.00	24.93	9.000	L1	OFF	9.7
1.1953	27.98	56.00	28.02	9.000	L1	OFF	9.7
1.2065	28.89	56.00	27.11	9.000	L1	OFF	9.7
1.2448	29.68	56.00	26.32	9.000	L1	OFF	9.7
1.2808	30.67	56.00	25.33	9.000	L1	OFF	9.7
1.4360	28.50	56.00	27.50	9.000	L1	OFF	9.7
13.4555	30.85	60.00	29.15	9.000	L1	OFF	10.2
13.4713	29.51	60.00	30.49	9.000	L1	OFF	10.2
13.5590	44.49	60.00	15.51	9.000	L1	OFF	10.2
13.6423	29.17	60.00	30.83	9.000	L1	OFF	10.2
13.6648	30.76	60.00	29.24	9.000	L1	OFF	10.2
25.1488	28.70	60.00	31.30	9.000	L1	OFF	10.5

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NFC MODE_L1

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	22.73	56.00	33.27	9.000	L1	OFF	9.6
0.1725	24.73	54.84	30.10	9.000	L1	OFF	9.6
0.3188	21.92	49.74	27.82	9.000	L1	OFF	9.6
0.3750	28.92	48.39	19.47	9.000	L1	OFF	9.6
0.4043	30.68	47.77	17.08	9.000	L1	OFF	9.7
0.4313	19.96	47.23	27.27	9.000	L1	OFF	9.7
1.0400	15.81	46.00	30.19	9.000	L1	OFF	9.7
1.1818	13.80	46.00	32.21	9.000	L1	OFF	9.7
1.2403	15.01	46.00	30.99	9.000	L1	OFF	9.7
1.2718	15.18	46.00	30.82	9.000	L1	OFF	9.7
1.4135	14.02	46.00	31.98	9.000	L1	OFF	9.7
1.4743	15.50	46.00	30.50	9.000	L1	OFF	9.7
11.5565	21.12	50.00	28.88	9.000	L1	OFF	10.1
13.4533	23.22	50.00	26.78	9.000	L1	OFF	10.2
13.5590	40.01	50.00	9.99	9.000	L1	OFF	10.2
13.6648	22.87	50.00	27.13	9.000	L1	OFF	10.2
14.9540	21.21	50.00	28.79	9.000	L1	OFF	10.2
25.1510	17.04	50.00	32.96	9.000	L1	OFF	10.5

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Conducted Emissions (Line 2)

NFC MODE_N

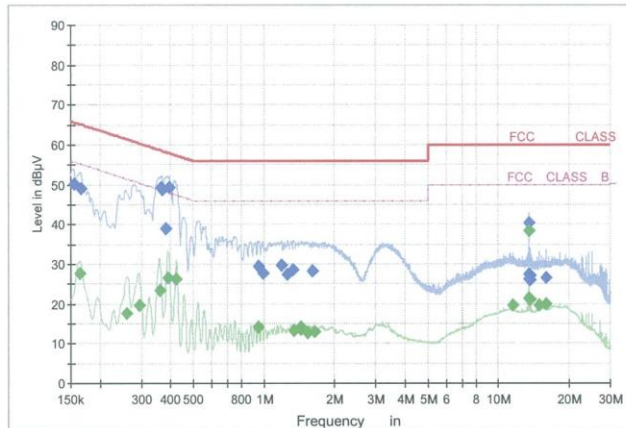
1 / 2

Test Report

Common Information

EUT : SM-M236B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : NFC MODE_N

Full Spectrum



— Preview Result
— FCC CLASS
— Preview Result
◆ Final_Result QPK
— Preview Result
◆ Final_Result CAV
— FCC CLASS
— FCC CLASS B_

Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	50.09	65.75	15.67	9.000	N	OFF	9.6
0.1658	49.05	65.17	16.12	9.000	N	OFF	9.6
0.3638	49.22	58.64	9.42	9.000	N	OFF	9.6
0.3683	48.66	58.54	9.88	9.000	N	OFF	9.6
0.3818	38.96	58.24	19.28	9.000	N	OFF	9.6
0.3930	49.45	58.00	8.55	9.000	N	OFF	9.6
0.9455	29.35	56.00	26.65	9.000	N	OFF	9.7
0.9928	27.81	56.00	28.19	9.000	N	OFF	9.7
1.1885	29.66	56.00	26.34	9.000	N	OFF	9.7
1.2628	27.55	56.00	28.45	9.000	N	OFF	9.7
1.3370	28.59	56.00	27.41	9.000	N	OFF	9.7
1.6183	28.20	56.00	27.80	9.000	N	OFF	9.7
13.4555	27.43	60.00	32.57	9.000	N	OFF	10.2
13.4713	26.13	60.00	33.87	9.000	N	OFF	10.2
13.5590	40.27	60.00	19.73	9.000	N	OFF	10.2
13.6670	27.23	60.00	32.77	9.000	N	OFF	10.2
13.6715	25.87	60.00	34.13	9.000	N	OFF	10.2
15.9755	26.50	60.00	33.50	9.000	N	OFF	10.3

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NFC MODE_N

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1635	27.82	55.28	27.47	9.000	N	OFF	9.6
0.2603	17.71	51.42	33.72	9.000	N	OFF	9.6
0.2940	19.75	50.41	30.66	9.000	N	OFF	9.6
0.3593	23.36	48.75	25.39	9.000	N	OFF	9.6
0.3908	26.66	48.05	21.38	9.000	N	OFF	9.6
0.4245	26.27	47.36	21.09	9.000	N	OFF	9.7
0.9478	14.16	46.00	31.84	9.000	N	OFF	9.7
1.3393	13.14	46.00	32.86	9.000	N	OFF	9.7
1.4360	13.61	46.00	32.39	9.000	N	OFF	9.7
1.4428	14.17	46.00	31.83	9.000	N	OFF	9.7
1.5440	12.74	46.00	33.26	9.000	N	OFF	9.7
1.6498	12.88	46.00	33.12	9.000	N	OFF	9.7
11.5543	19.58	50.00	30.42	9.000	N	OFF	10.1
13.4533	21.35	50.00	28.65	9.000	N	OFF	10.2
13.5590	38.31	50.00	11.69	9.000	N	OFF	10.2
13.6648	21.19	50.00	28.81	9.000	N	OFF	10.2
14.9540	19.55	50.00	30.45	9.000	N	OFF	10.3
15.9733	19.77	50.00	30.23	9.000	N	OFF	10.3

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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
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/17/2022	Annual
Temperature Chamber	SU-642	ESPEC	0093000718	03/15/2022	Annual
Signal Analyzer	N9020A	Agilent	MY51110085	05/03/2022	Annual
DC Power Supply	E3632A	HP	MY40004427	09/15/2022	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/18/2022	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	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Schwarzbeck	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-1039	09/03/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1151	07/29/2023	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/14/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/09/2022	Annual
Attenuator (3 dB)	2-3	Weinschel	BR0617	09/29/2022	Annual
Attenuator(10 dB)	5910-N-50-010	H+S	None	10/29/2022	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	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-2201-FC084-P