

EMI TEST REPORT

FCC CERTIFICATION

Applicant:**SAMSUNG Electronics Co., Ltd.**(Maetan dong) 129, Samsung-ro Yeongtong-gu,
Suwon-si, Gyeonggi-do 16677, Korea**Date of Receipt: September 02, 2016****Date of Issue: September 15, 2016****Test Report No. HCT-E-1609-F004-1****HCT FRN: 0005866421****FCC ID :****A3LSMJ7108**

Rule Part(s) / Standard(s): FCC CFR 47 PART 15 Subpart B Class B
FCC Classification: JBP (Part 15 B – Class B Computing Device Peripheral)
Application Type Class II permission change
EUT Type: Mobile Phone
Model Name: SM-J710FN/DF
Test Port: Micro USB / Earphone Port
Date of Test: September 07, 2016 - September 08, 2016

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1609-F004	September 08, 2016	Initial Release
HCT-E-1609-F004-1	September 15, 2016	Cover page were revised.



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ATTACHMENT: TEST SETUP PHOTOGRAPHS



1. GENERAL INFORMATION

1.1 Description of EUT

Its basic purpose is used for communications.

FCC ID	A3LSMJ7108
Model Name	SM-J710FN/DF
EUT Type	Mobile Phone
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA B2) 826.40 MHz to 846.60 MHz (WCDMA B5) 824 MHz to 849 MHz (LTE B5)
RX Frequency	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 1 932.4 MHz to 1 987.6 MHz (WCDMA B2) 871.40 MHz to 891.60 MHz (WCDMA B5) 869 MHz to 894 MHz (LTE B5)



1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.

Measurement Facilities	Reg. No.
HCT FRN: 0005866421 Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
HCT FRN: 0005866421 Radiated Field strength measurement facility (10 m)	90661 (February 28, 2014)

1.4 Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers 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 : 2006).



1.5 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	SM-J710FN/DF	SAMSUNG	A3LSMJ7108	Notebook PC, Earphone
USB cable	ECB-DU68WE	KSD	-	EUT, Notebook PC
Earphone	EHS61ASFWE	FOSTER	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor, RJ45 cable, Serial mouse
Notebook PC adaptor	Series PPP009L-E	LITE-ON TECHNOLOGY	-	Notebook PC
Gateway	TL-WR747N	TP-LINK	-	RJ45 cable, Gateway adaptor
Gateway adaptor	T120150-2H1	TP-LINK	-	Gateway
Serial mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card	MB-SD32D	SAMSUNG	-	EUT



1.6 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D)0.8
	Earphone	N/A	Y	(D)1.6
Notebook PC	RJ 45	N/A	N	(D)2.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC in	N	N/A	(P)1.8
Gateway	DC in	N	N/A	(P)1.8

* The marked “(D)” means the data cable and “(P)” means the power cable.

1.7 Noise Suppression Parts on Cable. (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	Micro USB	N	N/A	Y	Both End
	Earphone	N	N/A	Y	Both End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	Y	Notebook PC End



2. DESCRIPTION OF TEST

2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

[Conducted Emission Limits]

Frequency (MHz)	Resolution Bandwidth (kHz)	Quasi-Peak (dB(μV))	Average (dB(μV))
0.15 to 0.5	9	66 to 56*	56 to 46*
0.5 to 5	9	56	46
5 to 30	9	60	50

**Decreases with the logarithm of the frequency.*



2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014

- The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.(1 GHz to 40 GHz)

[Radiated Emission Limits]

Frequency (MHz)	Antenna Distance (m)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak ($\text{dB}(\mu\text{V})/\text{m}$)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Peak ($\text{dB}(\mu\text{V})/\text{m}$)	Average ($\text{dB}(\mu\text{V})/\text{m}$)
Above 1 000	3	74	54

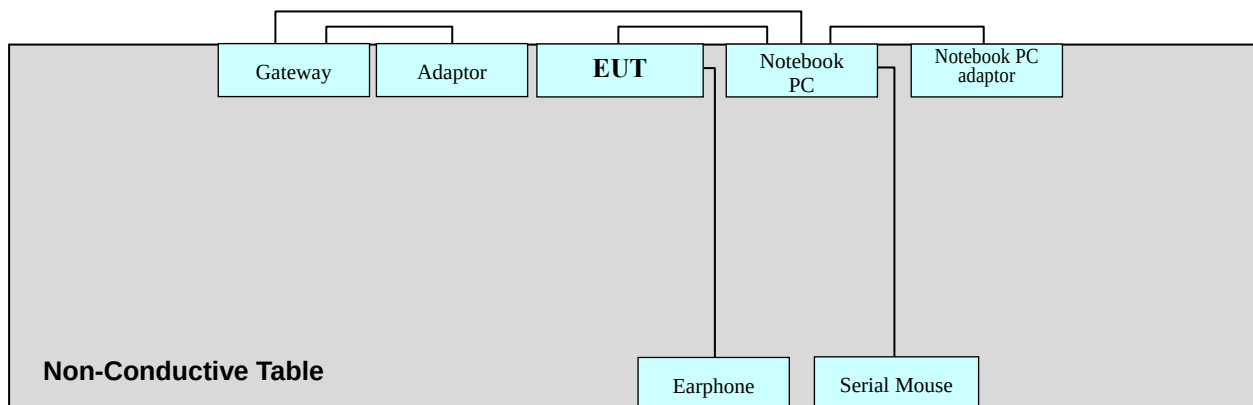


2.2.1 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

2.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz



3. PRELIMINARY TEST

3.1 Conducted Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode

3. 2 Radiated Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode



4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

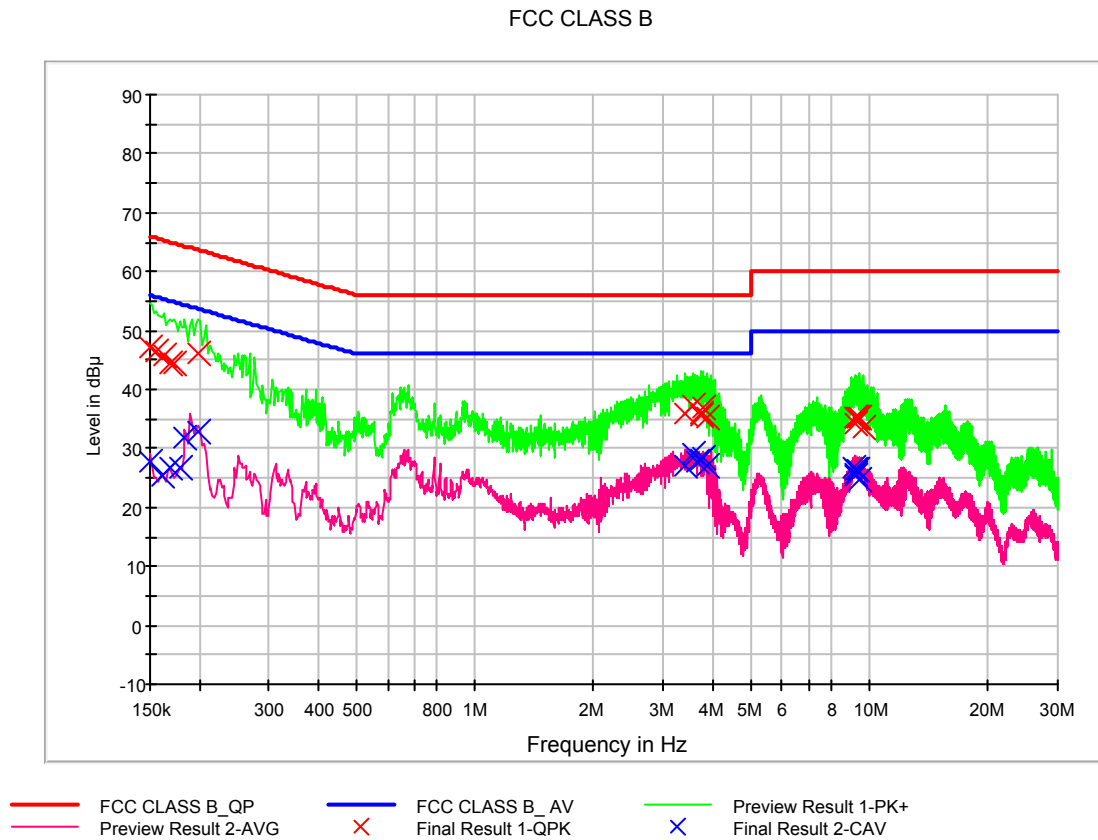
4.1 Conducted Emission Test

The test results of conducted emission at mains ports provide the following information:

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Data Communication mode
Kind of Test Site	Shielded Room
Temperature	23.5 °C
Relative Humidity	49.8 %
Test Date	September 07, 2016

- Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

**Figure 1: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)**



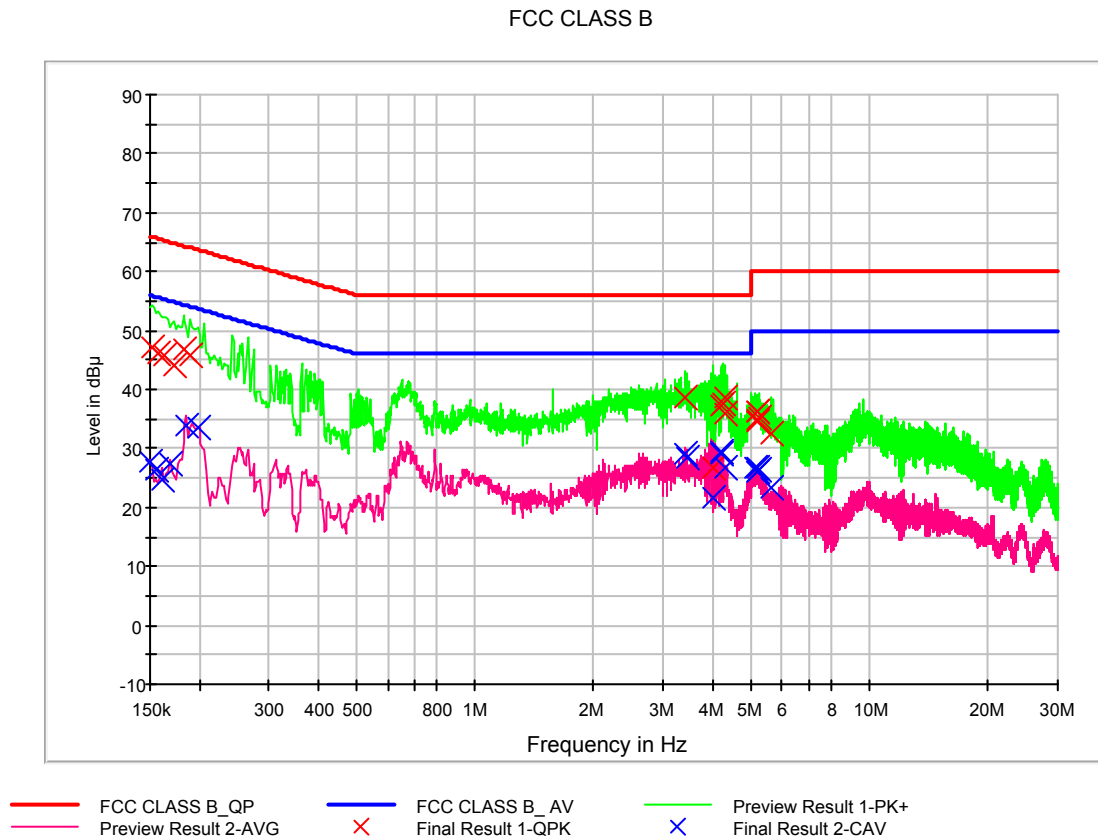
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	47.2	9.000	L1	9.7	18.8	66.0
0.156000	46.4	9.000	L1	9.7	19.3	65.7
0.162000	45.7	9.000	L1	9.7	19.6	65.4
0.168000	44.5	9.000	L1	9.7	20.6	65.1
0.172000	44.3	9.000	L1	9.7	20.5	64.9
0.198000	46.2	9.000	L1	9.7	17.5	63.7
3.394000	35.8	9.000	L1	9.9	20.2	56.0
3.552000	37.3	9.000	L1	9.9	18.7	56.0
3.730000	35.6	9.000	L1	9.9	20.4	56.0
3.738000	36.0	9.000	L1	9.9	20.0	56.0
3.764000	37.0	9.000	L1	9.9	19.0	56.0
3.878000	35.2	9.000	L1	9.9	20.8	56.0
9.154000	34.3	9.000	L1	10.1	25.7	60.0
9.212000	35.3	9.000	L1	10.1	24.7	60.0
9.230000	35.1	9.000	L1	10.1	24.9	60.0
9.344000	35.1	9.000	L1	10.1	24.9	60.0
9.382000	35.1	9.000	L1	10.1	24.9	60.0
9.674000	33.5	9.000	L1	10.1	26.5	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	27.7	9.000	L1	9.7	28.3	56.0
0.160000	25.4	9.000	L1	9.7	30.0	55.5
0.168000	26.7	9.000	L1	9.7	28.4	55.1
0.178000	26.7	9.000	L1	9.7	27.9	54.6
0.184000	31.8	9.000	L1	9.7	22.5	54.3
0.198000	33.0	9.000	L1	9.7	20.7	53.7
3.394000	27.2	9.000	L1	9.9	18.8	46.0
3.552000	29.2	9.000	L1	9.9	16.8	46.0
3.674000	27.8	9.000	L1	9.9	18.2	46.0
3.738000	28.1	9.000	L1	9.9	17.9	46.0
3.766000	28.6	9.000	L1	9.9	17.4	46.0
3.878000	27.0	9.000	L1	9.9	19.0	46.0
9.110000	26.8	9.000	L1	10.1	23.2	50.0
9.154000	25.5	9.000	L1	10.1	24.5	50.0
9.230000	26.6	9.000	L1	10.1	23.4	50.0
9.254000	25.9	9.000	L1	10.1	24.1	50.0
9.302000	26.3	9.000	L1	10.1	23.7	50.0
9.396000	24.8	9.000	L1	10.1	25.2	50.0

**Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)**



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	47.2	9.000	N	9.7	18.7	65.9
0.158000	46.1	9.000	N	9.7	19.4	65.6
0.162000	45.6	9.000	N	9.7	19.7	65.4
0.172000	44.1	9.000	N	9.7	20.8	64.9
0.182000	46.8	9.000	N	9.7	17.6	64.4
0.190000	45.9	9.000	N	9.7	18.1	64.0
3.420000	38.6	9.000	N	9.8	17.4	56.0
4.012000	26.7	9.000	N	9.9	29.3	56.0
4.184000	37.4	9.000	N	9.9	18.6	56.0
4.230000	37.6	9.000	N	9.9	18.4	56.0
4.308000	38.5	9.000	N	9.9	17.5	56.0
4.316000	36.0	9.000	N	9.9	20.0	56.0
5.164000	35.1	9.000	N	9.9	24.9	60.0
5.178000	34.5	9.000	N	9.9	25.5	60.0
5.196000	36.2	9.000	N	9.9	23.8	60.0
5.202000	36.4	9.000	N	9.9	23.6	60.0
5.272000	35.4	9.000	N	9.9	24.6	60.0
5.616000	32.6	9.000	N	9.9	27.4	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	27.7	9.000	N	9.7	28.3	56.0
0.156000	26.3	9.000	N	9.7	29.4	55.7
0.160000	24.5	9.000	N	9.7	30.9	55.5
0.168000	27.4	9.000	N	9.7	27.7	55.1
0.186000	34.0	9.000	N	9.7	20.3	54.2
0.198000	33.6	9.000	N	9.7	20.1	53.7
3.422000	29.1	9.000	N	9.8	16.9	46.0
3.442000	28.3	9.000	N	9.8	17.7	46.0
4.012000	21.7	9.000	N	9.9	24.3	46.0
4.184000	29.5	9.000	N	9.9	16.5	46.0
4.228000	29.1	9.000	N	9.9	16.9	46.0
4.316000	26.8	9.000	N	9.9	19.2	46.0
5.130000	26.7	9.000	N	9.9	23.3	50.0
5.166000	25.9	9.000	N	9.9	24.1	50.0
5.178000	26.1	9.000	N	9.9	23.9	50.0
5.202000	26.6	9.000	N	9.9	23.4	50.0
5.272000	26.3	9.000	N	9.9	23.7	50.0
5.616000	23.2	9.000	N	9.9	26.8	50.0



4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operation Mode	Data Communication mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.5 °C
Relative Humidity	58.3 %
Test Date	September 07, 2016

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
34.647776	26.9	102.0	V	222.0	21.8	13.1	40.0
38.799439	26.9	100.0	V	53.0	22.2	13.1	40.0
58.758317	28.0	115.0	V	251.0	22.5	12.0	40.0
63.486092	29.8	150.0	V	251.0	22.0	10.2	40.0
68.413868	30.0	115.0	V	291.0	21.4	10.0	40.0
77.573307	34.0	250.0	H	109.0	19.4	6.0	40.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak



-For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Operating Frequency	1.4 GHz
Testing Frequency Range	1 GHz to 7 GHz
Operation Mode	Data Communication mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	20.9 °C
Relative Humidity	58.1 %
Test Date	September 08, 2016

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1399.949900	49.2	400.0	V	12.0	-8.9	24.8	74.0
1991.733467	50.7	116.7	V	211.0	-8.4	23.3	74.0
2163.376753	43.2	100.0	V	240.0	-7.6	30.8	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1399.949900	46.5	400.0	V	12.0	-8.9	7.5	54.0
1991.733467	28.8	116.7	V	211.0	-8.4	25.2	54.0
2163.376753	27.6	100.0	V	240.0	-7.6	26.4	54.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage



5. LIST OF TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>CAL Date</u>
<u>Conducted Emission</u>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.09.2016
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-

Radiated Emission

-For measurement below 1 GHz

☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☐ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☒ Trilog Antenna	Schwarzbeck	VULB9168	255	2 year	04.15.2015
☒ Attenuator	HP	8491A	24257	1 year	04.15.2015
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-

-For measurement above 1 GHz

☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Antenna master	INNCO Systems	MA4000-XP-ET	48709515	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.04.2016
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.07.2016
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: Mobile Phone, Model: SM-J710FN/DF, FCC ID: A3LSMJ7108** complies with §15.107 and §15.109 of the FCC rules.