

EMI TEST REPORT

FCC CERTIFICATION

Applicant:

SAMSUNG Electronics Co., Ltd.
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Gyeonggi-do, 16677, Korea

Date of Issue: February 11, 2019**Test Report No. HCT-EM-1902-FC001****Test Site: HCT CO., LTD.****FCC ID :****A3LSMM105G**

Applicable Standards : FCC CFR 47 PART 15 Subpart B Class B
ANSI C63.4-2014

EUT Type : Mobile Phone

Model Name : SM-M105G/DS

Series Model Name : SM-M105G

Date of Test : January 23, 2019 to February 11, 2019

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

Tested By

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REVISION HISTORY

The revision history for this document is shown in table.

Report No.	Issue Date	Information About Changes
HCT-EM-1902-FC001	February 11, 2019	Initial Release



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1. GENERAL INFORMATION

1.1 Description of EUT

Its basic purpose is used for communications.

FCC ID	A3LSMM105G
Model name	SM-M105G/DS
Series model name	SM-M105G
EUT type	Mobile Phone
Frequency band	GSM850, WCDMA850, LTE B5/41, BT BDR/EDR/LE 4.2, WLAN b/g/n
Power rating	Travel adaptor: Input: AC 100 to 240 V, 50/60 Hz, 0.15 A Output: DC 5.0 V 1.0 A Battery: Low : 3.6 V / Normal : 3.85 V / High : 4.35 V, Li-ion Battery

1.2 Equipment Units Tested

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

Device Type	Model Name	Serial Number	Manufacturer	FCC ID / DoC
EUT	SM-M105G/DS	-	SAMSUNG	A3LSMM105G
Notebook PC	ProBook6560b	5CB2053MXF	HP	-
Notebook PC adaptor	Series PPP009L-E	-	LITE-ON TECHNOLOGY (CHANGZHOU)	-
Gateway	TL-WR747N	-	TP Link	-
Gateway adaptor	T090060-2H1	-	TP Link	-
Serial mouse	Serial 2 Button mouse	02031069	Radio Shack	FSUGMZE3
RJ45 cable	-	-	-	-
TA	ETA0U84IWE	-	SALCOMP	-
Data Cable	ECB-DU68WE	-	RFTECH	-
Earphone	EHS61ASFWE	-	YOUNGBO	-
Micro SD card (64 GB)	-	-	SAMSUNG	-



1.3 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) 1.0
	Earphone	N/A	N	(D) 1.2
Notebook PC	RJ 45	N/A	N	(D) 1.6
	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.

1.4 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	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial(Mouse)	N	N/A	Y	Notebook End



1.5. 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. The Normalized site attenuations (30 MHz to 1 GHz) and Site validation (1 GHz to 18 GHz) were performed in accordance with the standard in ANSI C63.4-2014

Measurement Facilities	Registration Number
Radiated Field strength measurement facility 3 m Semi Anechoic chamber	90661
Radiated Field strength measurement facility 10 m Semi Anechoic chamber	

1.6 Calibration of Measuring Instrument

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

1.7 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014.

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 Emission (0.15 MHz to 30 MHz)	1.82 dB
Radiated Emissions (30 MHz to 1 GHz)	5.20 dB
Radiated Emissions (1 GHz to 18 GHz)	5.24 dB
Radiated Emissions (18 GHz to 40 GHz)	5.40 dB



2. 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	06.25.2018
☒ LISN	Rohde & Schwarz	ENV216	102245	1 year	12.12.2018
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	05.03.2018
☒ Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
☒ Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☒ Software	Rohde & Schwarz	EMC32 VER8.54.0	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	07.27.2018
☒ Trilog Antenna	Schwarzbeck	VULB 9168	00847	2 year	04.13.2018
☒ Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO3000/870/ 35990515/L	N/A	-
☒ Turn Table	INNCO Systems	1060	-	N/A	-
☒ Turn Table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
☒ Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
☒ Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☒ Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-
-For measurement above 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	07.27.2018
☒ Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
☒ Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
☒ Turn Table	INNCO Systems	1060	-	N/A	-
☒ Turn Table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	01836	2 year	05.14.2018
☒ Low Noise Amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.06.2018
☐ Power Amplifier	TESTEK	TK-PA1840H	170030-L	1 year	12.17.2018
☐ Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170#786	2 year	12.05.2017
☒ Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
☒ Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☐ Highpass Filter	Wainwright Instruments	WHKX1.0/15G-12SS	42	1 year	08.02.2018
☒ Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-



3. DESCRIPTION OF MEASUREMENTS

3.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

- 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.*



3.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

- a. 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.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. 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.
- f. 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.
- g. 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 ($\mu\text{V}/\text{m}$)	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

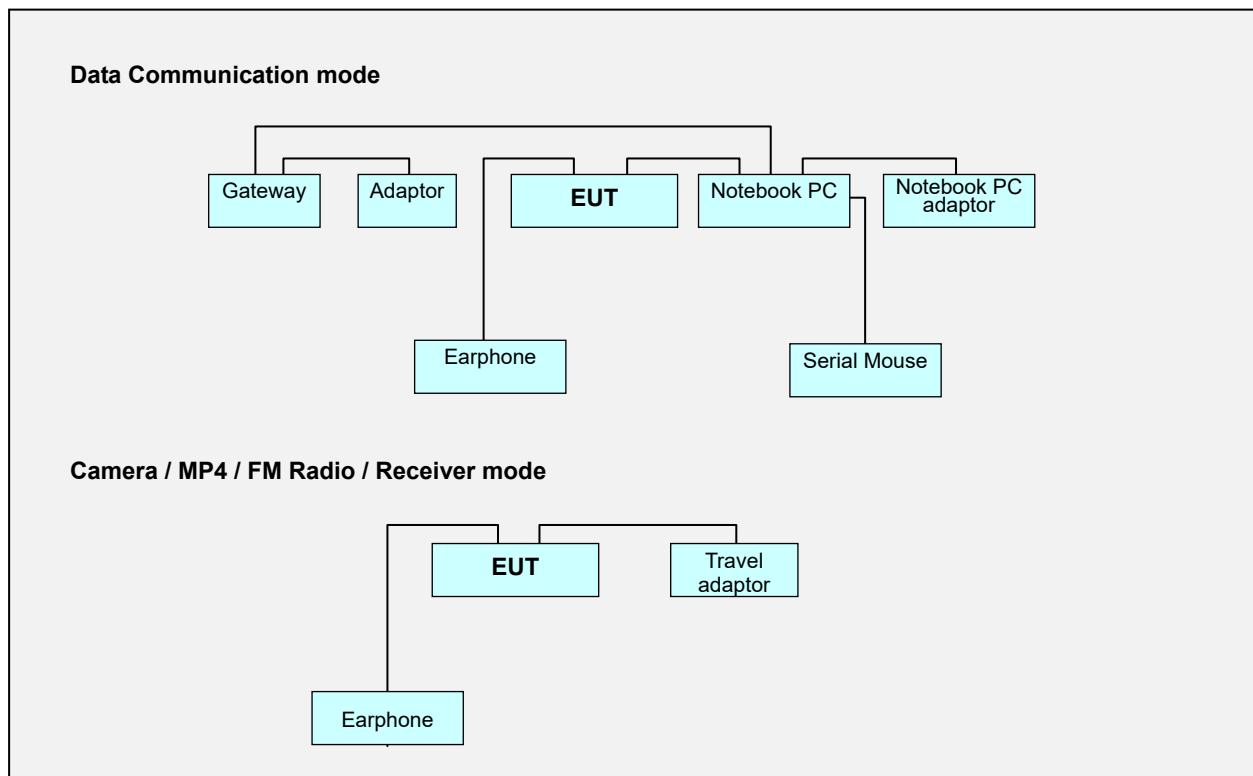


3.2.1 Frequency Range of Radiated Measurements

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

3.3 Configuration of Tested System



Non-Conductive Table
Power Line: 120 VAC, 60 Hz



4. PRELIMINARY TEST

During preliminary tests, the following operating mode was investigated.

- Data Communication
- Rear Camera(Preview/Recording)
- Front Camera(Preview/Recording)
- MP4 Play
- FM Radio mode (Low/Middle/High CH)
- LTE B5 Idle (Middle CH)
- WCDMA 850 Idle (Middle CH)
- GSM 850 Idle (Middle CH)

4.1 Conducted Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes:

- DATA Communication
- Rear Camera Preview +FM Radio (Low CH)
- Front Camera Preview + FM Radio (Middle CH)
- FM Radio (High CH)
- MP4 Play
- Receiver mode (LTE B5 Low CH Idle) + Rear Camera Recording
- Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording
- Receiver mode (LTE B5 High CH Idle)

NOTE.

1. The worst case of operating mode is reported.

4.2 Radiated Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes:

- DATA Communication
- Rear Camera Preview +FM Radio (Low CH)
- Front Camera Preview + FM Radio (Middle CH)
- FM Radio (High CH)
- MP4 Play
- Receiver mode (LTE B5 Low CH Idle) + Rear Camera Recording
- Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording
- Receiver mode (LTE B5 High CH Idle)

NOTE.

1. Three orientations have been investigated and the worst case orientation is reported.
2. The worst case of operating mode is reported.



5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

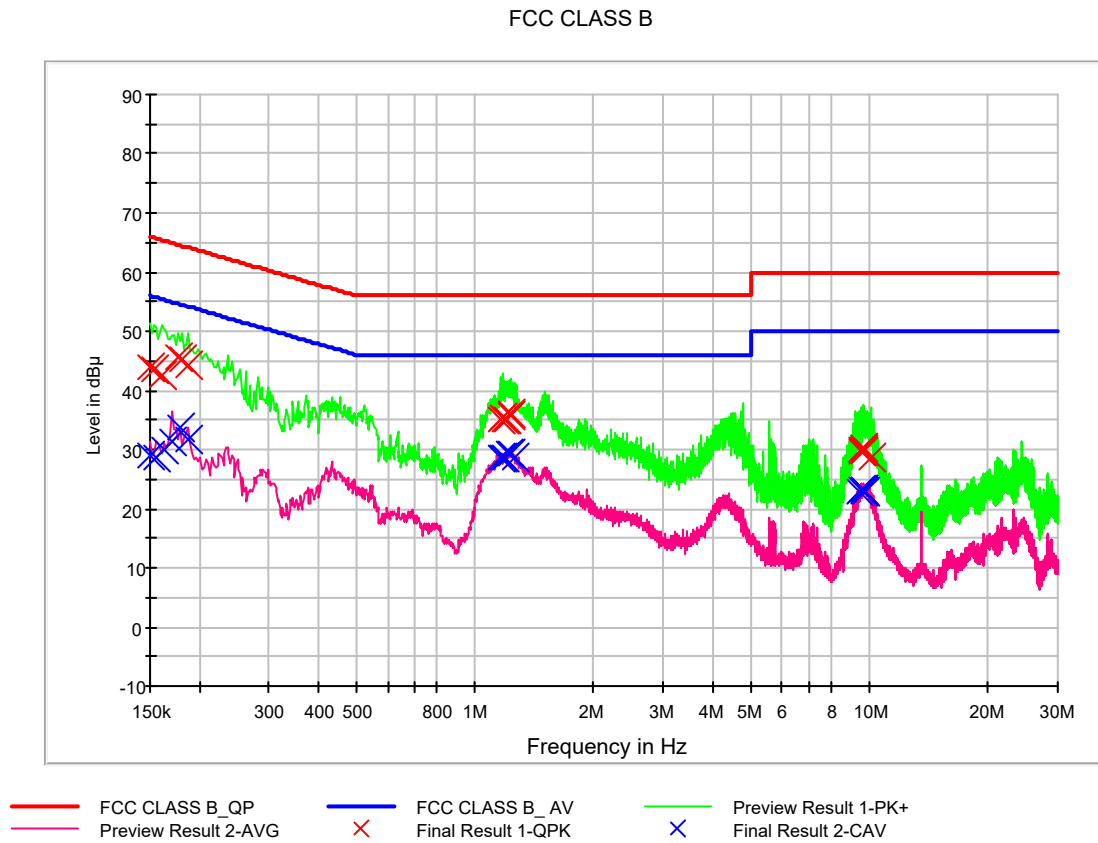
5.1 Conducted Emission

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

Applicable Standards	FCC PART 15 Subpart B Class B ANSI C63.4-2014
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Worst Case of Operating Mode	DATA Communication Front Camera Preview + FM Radio (Middle CH) MP4 Play Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording
Kind of Test Site	Shielded Room
Temperature	21.8 / 22.0 / 20.8 °C
Relative Humidity	44.3 / 43.6 / 41.4 %
Test Date	January 23 / January 29 / January 31, 2019

- 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: Conducted Emission, Data Communication, Line (L1)**



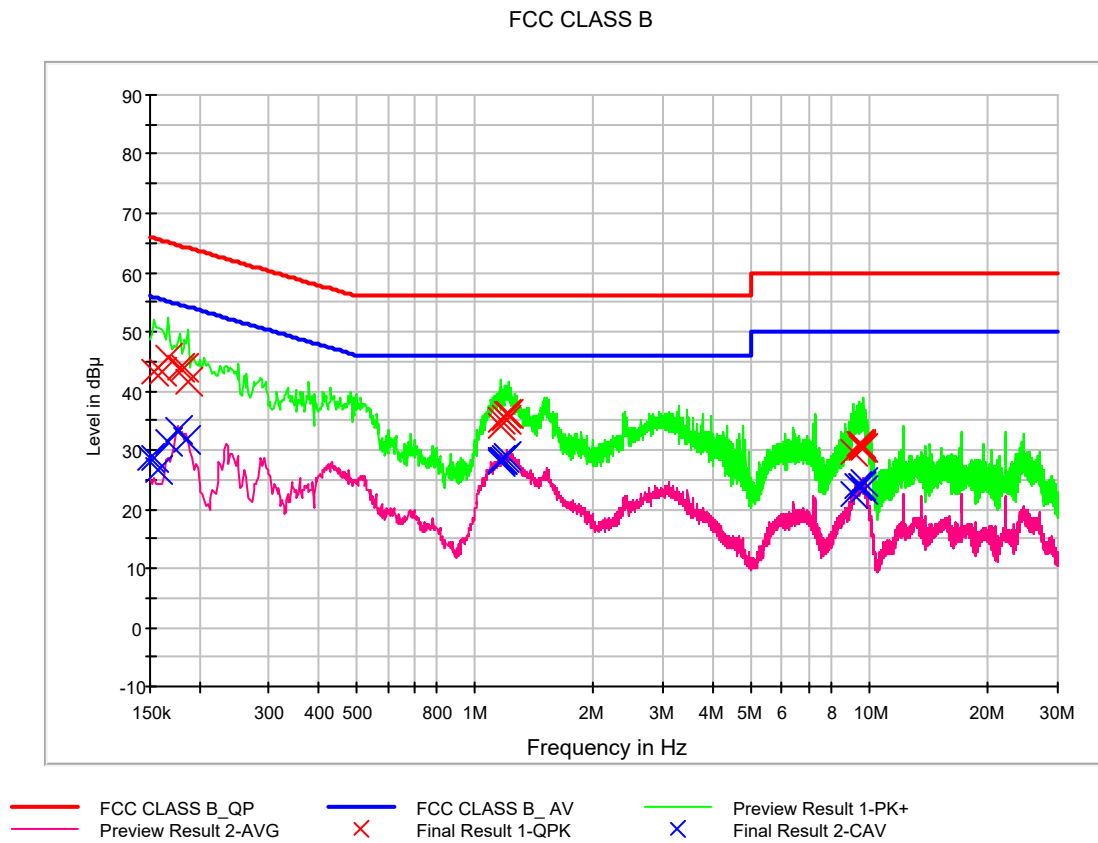
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	44.0	9.000	L1	9.6	22.0	66.0
0.154000	43.4	9.000	L1	9.6	22.4	65.8
0.160000	42.6	9.000	L1	9.6	22.8	65.5
0.176000	45.6	9.000	L1	9.6	19.1	64.7
0.180000	45.3	9.000	L1	9.6	19.2	64.5
0.188000	44.2	9.000	L1	9.7	19.9	64.1
1.160000	35.2	9.000	L1	9.7	20.8	56.0
1.182000	35.4	9.000	L1	9.7	20.6	56.0
1.190000	35.2	9.000	L1	9.7	20.8	56.0
1.210000	35.2	9.000	L1	9.7	20.8	56.0
1.230000	35.7	9.000	L1	9.7	20.3	56.0
1.234000	36.1	9.000	L1	9.7	19.9	56.0
9.576000	29.7	9.000	L1	10.0	30.3	60.0
9.582000	29.9	9.000	L1	10.0	30.1	60.0
9.592000	29.9	9.000	L1	10.0	30.1	60.0
9.602000	29.8	9.000	L1	10.0	30.2	60.0
9.692000	30.3	9.000	L1	10.0	29.7	60.0
10.052000	28.6	9.000	L1	10.0	31.4	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	29.0	9.000	L1	9.6	27.0	56.0
0.156000	28.8	9.000	L1	9.6	26.9	55.7
0.162000	30.1	9.000	L1	9.6	25.2	55.4
0.170000	31.5	9.000	L1	9.6	23.4	55.0
0.178000	33.6	9.000	L1	9.6	20.9	54.6
0.188000	31.8	9.000	L1	9.7	22.4	54.1
1.160000	28.5	9.000	L1	9.7	17.5	46.0
1.182000	28.6	9.000	L1	9.7	17.4	46.0
1.190000	28.7	9.000	L1	9.7	17.3	46.0
1.218000	29.2	9.000	L1	9.7	16.8	46.0
1.232000	29.2	9.000	L1	9.7	16.8	46.0
1.260000	28.7	9.000	L1	9.8	17.3	46.0
9.476000	22.8	9.000	L1	10.0	27.2	50.0
9.582000	23.2	9.000	L1	10.0	26.8	50.0
9.602000	23.0	9.000	L1	10.0	27.0	50.0
9.668000	23.3	9.000	L1	10.0	26.7	50.0
9.692000	23.3	9.000	L1	10.0	26.7	50.0
9.710000	22.8	9.000	L1	10.0	27.2	50.0

**Figure 2: Conducted Emission, Data Communication, Line (N)**



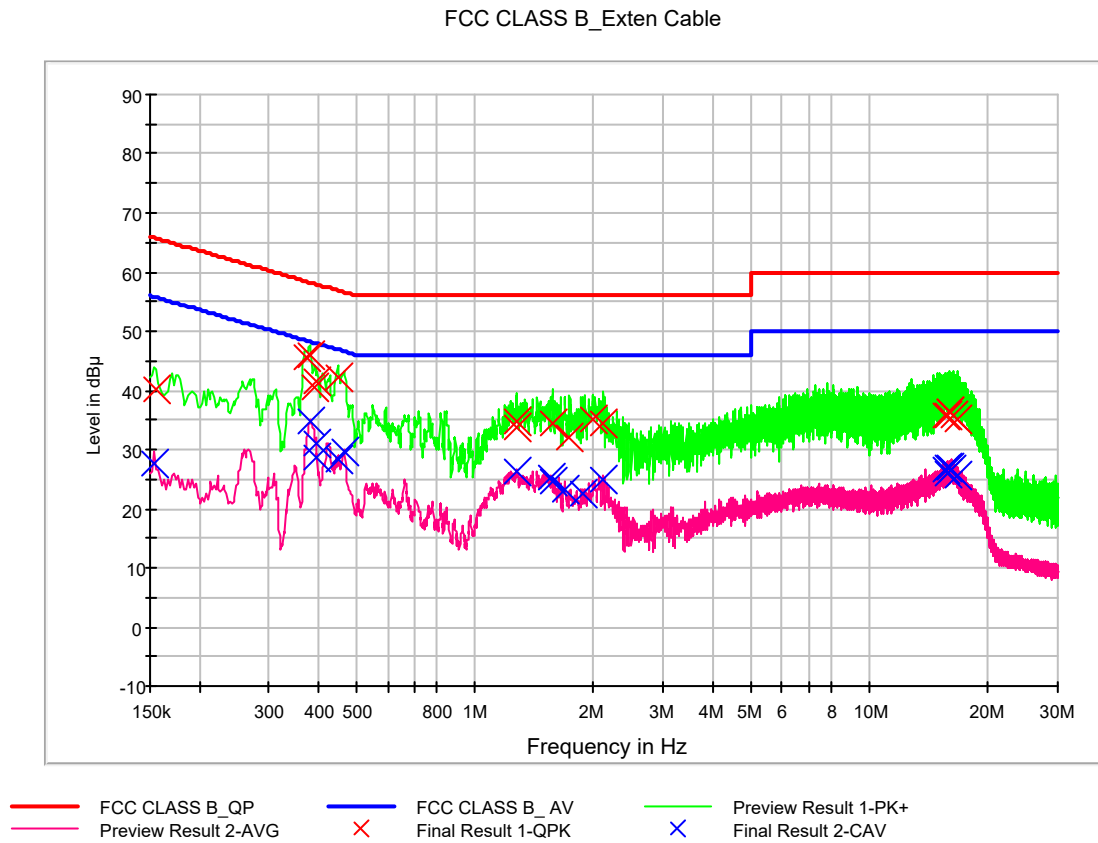
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	43.4	9.000	N	9.6	22.4	65.8
0.160000	43.4	9.000	N	9.6	22.1	65.5
0.166000	45.5	9.000	N	9.6	19.7	65.2
0.178000	43.9	9.000	N	9.6	20.7	64.6
0.184000	43.9	9.000	N	9.6	20.4	64.3
0.188000	41.7	9.000	N	9.6	22.4	64.1
1.162000	34.2	9.000	N	9.7	21.8	56.0
1.166000	35.0	9.000	N	9.7	21.0	56.0
1.190000	35.4	9.000	N	9.7	20.6	56.0
1.196000	36.0	9.000	N	9.7	20.0	56.0
1.210000	35.0	9.000	N	9.7	21.0	56.0
1.220000	36.1	9.000	N	9.7	19.9	56.0
9.142000	29.7	9.000	N	9.9	30.3	60.0
9.438000	30.9	9.000	N	9.9	29.1	60.0
9.512000	30.8	9.000	N	9.9	29.2	60.0
9.552000	30.9	9.000	N	9.9	29.1	60.0
9.588000	30.3	9.000	N	9.9	29.7	60.0
9.662000	30.2	9.000	N	9.9	29.8	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.7	9.000	N	9.6	27.3	56.0
0.154000	28.7	9.000	N	9.6	27.1	55.8
0.158000	26.6	9.000	N	9.6	28.9	55.6
0.166000	31.5	9.000	N	9.6	23.7	55.2
0.176000	33.4	9.000	N	9.6	21.3	54.7
0.186000	31.6	9.000	N	9.6	22.6	54.2
1.162000	28.1	9.000	N	9.7	17.9	46.0
1.166000	28.1	9.000	N	9.7	17.9	46.0
1.176000	28.5	9.000	N	9.7	17.5	46.0
1.180000	28.3	9.000	N	9.7	17.7	46.0
1.188000	28.5	9.000	N	9.7	17.5	46.0
1.198000	28.9	9.000	N	9.7	17.1	46.0
9.142000	22.5	9.000	N	9.9	27.5	50.0
9.296000	23.8	9.000	N	9.9	26.2	50.0
9.512000	23.9	9.000	N	9.9	26.1	50.0
9.552000	24.0	9.000	N	9.9	26.0	50.0
9.644000	24.5	9.000	N	9.9	25.5	50.0
9.662000	23.4	9.000	N	9.9	26.6	50.0

**Figure 3: Conducted Emission, Front Camera Preview + FM Radio (Middle CH), Line (L1)**



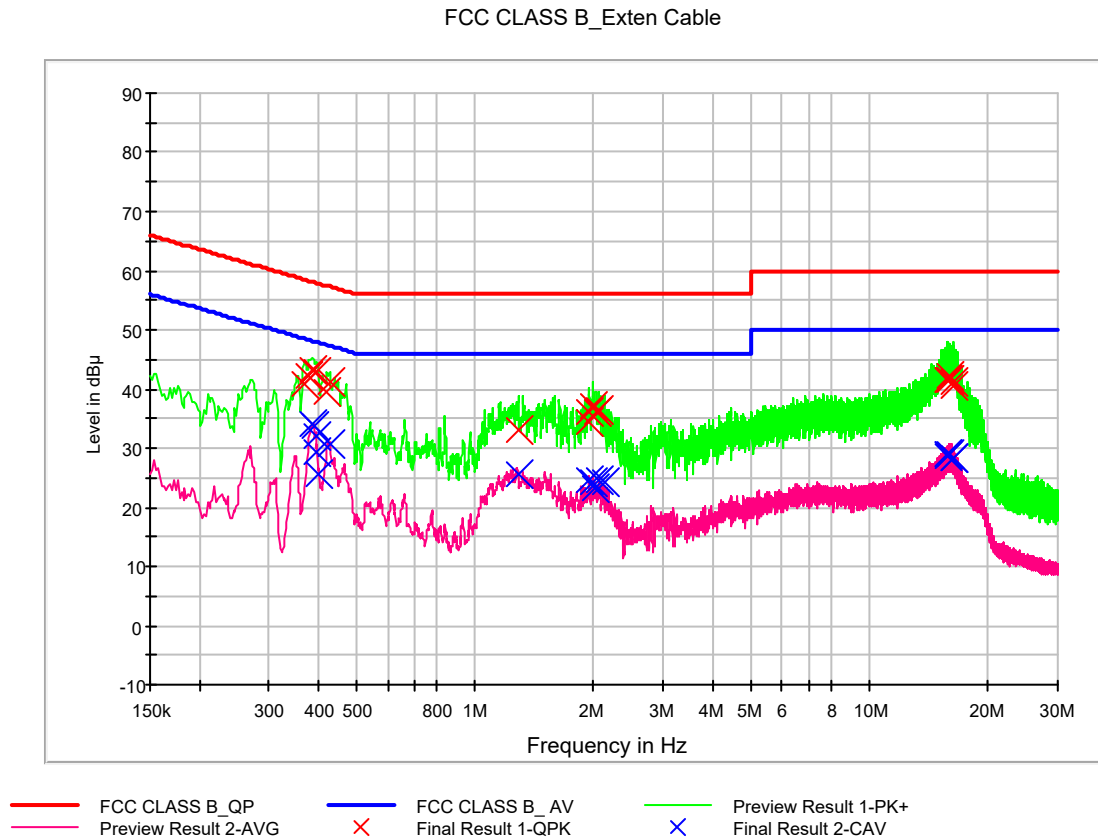
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	40.2	9.000	L1	9.7	25.4	65.7
0.372000	45.5	9.000	L1	9.7	13.0	58.5
0.382000	45.9	9.000	L1	9.7	12.3	58.2
0.392000	40.7	9.000	L1	9.7	17.4	58.0
0.398000	41.5	9.000	L1	9.7	16.4	57.9
0.448000	42.2	9.000	L1	9.7	14.7	56.9
1.270000	34.7	9.000	L1	9.9	21.3	56.0
1.274000	33.7	9.000	L1	9.9	22.3	56.0
1.568000	34.4	9.000	L1	9.9	21.6	56.0
1.738000	32.2	9.000	L1	9.9	23.8	56.0
1.988000	35.1	9.000	L1	9.8	20.9	56.0
2.120000	34.3	9.000	L1	9.9	21.7	56.0
15.628000	35.7	9.000	L1	10.4	24.3	60.0
15.844000	35.7	9.000	L1	10.4	24.3	60.0
15.918000	36.6	9.000	L1	10.4	23.4	60.0
15.960000	36.4	9.000	L1	10.4	23.6	60.0
16.356000	35.8	9.000	L1	10.5	24.2	60.0
16.652000	35.1	9.000	L1	10.5	24.9	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	27.7	9.000	L1	9.7	28.1	55.8
0.384000	34.8	9.000	L1	9.7	13.4	48.2
0.394000	31.0	9.000	L1	9.7	17.0	48.0
0.398000	28.5	9.000	L1	9.7	19.4	47.9
0.448000	28.5	9.000	L1	9.7	18.5	46.9
0.464000	29.8	9.000	L1	9.8	16.8	46.6
1.274000	26.2	9.000	L1	9.9	19.8	46.0
1.558000	25.2	9.000	L1	9.9	20.8	46.0
1.566000	24.5	9.000	L1	9.9	21.5	46.0
1.692000	23.3	9.000	L1	9.9	22.7	46.0
1.868000	22.6	9.000	L1	9.9	23.4	46.0
2.118000	25.0	9.000	L1	9.9	21.0	46.0
15.530000	26.6	9.000	L1	10.4	23.4	50.0
15.818000	26.9	9.000	L1	10.4	23.1	50.0
15.844000	26.0	9.000	L1	10.4	24.0	50.0
15.918000	26.9	9.000	L1	10.4	23.1	50.0
16.142000	26.7	9.000	L1	10.5	23.3	50.0
16.652000	25.8	9.000	L1	10.5	24.2	50.0

**Figure 4: Conducted Emission, Front Camera Preview + FM Radio (Middle CH), Line (N)**



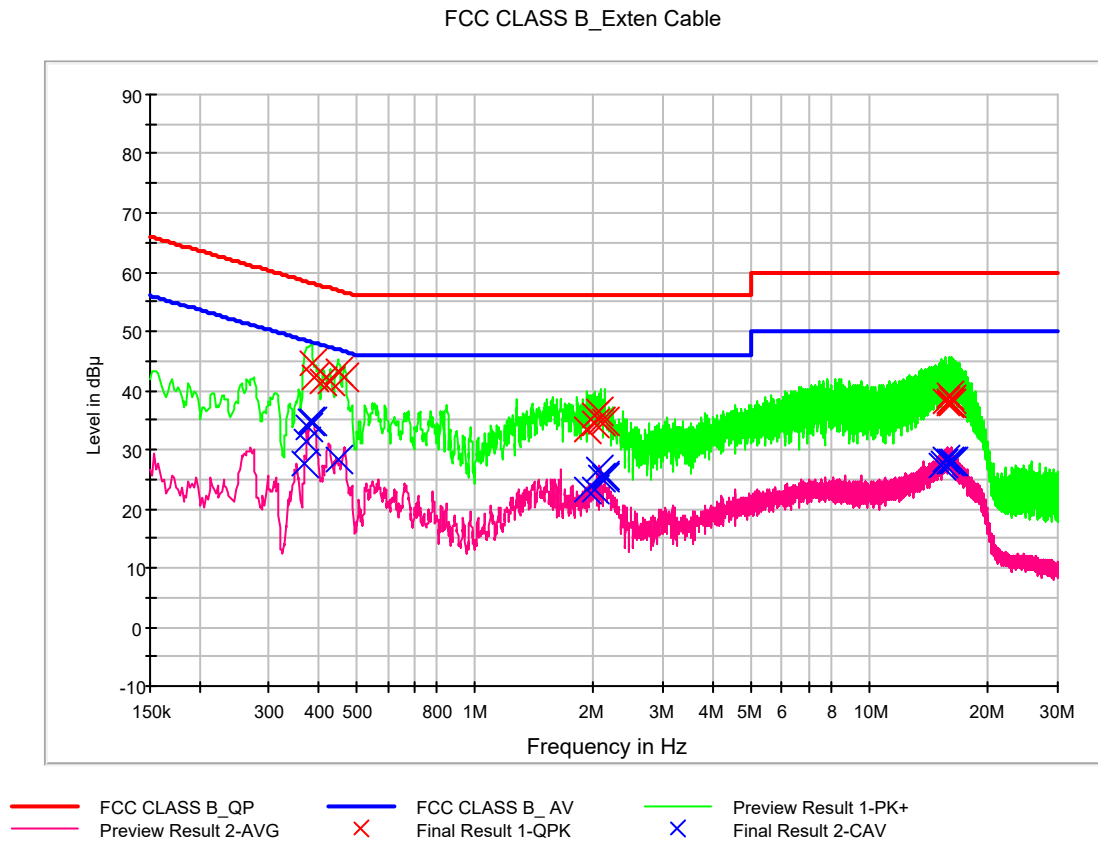
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.370000	40.8	9.000	N	9.9	17.7	58.5
0.380000	42.3	9.000	N	9.9	16.0	58.3
0.388000	43.1	9.000	N	9.9	15.0	58.1
0.398000	43.0	9.000	N	9.9	14.9	57.9
0.422000	39.5	9.000	N	9.9	17.9	57.4
0.428000	41.3	9.000	N	9.9	16.0	57.3
1.288000	33.1	9.000	N	10.0	22.9	56.0
1.944000	34.3	9.000	N	10.0	21.7	56.0
1.950000	36.0	9.000	N	10.0	20.0	56.0
1.994000	37.0	9.000	N	10.0	19.0	56.0
2.026000	36.2	9.000	N	10.0	19.8	56.0
2.064000	36.3	9.000	N	10.0	19.7	56.0
15.738000	41.4	9.000	N	10.7	18.6	60.0
15.796000	41.5	9.000	N	10.7	18.5	60.0
15.982000	42.3	9.000	N	10.7	17.7	60.0
16.042000	41.5	9.000	N	10.7	18.5	60.0
16.364000	40.7	9.000	N	10.7	19.3	60.0
16.418000	41.1	9.000	N	10.7	18.9	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.386000	34.0	9.000	N	9.9	14.1	48.1
0.390000	33.6	9.000	N	9.9	14.4	48.1
0.394000	31.9	9.000	N	9.9	16.1	48.0
0.398000	29.5	9.000	N	9.9	18.4	47.9
0.402000	25.7	9.000	N	9.9	22.1	47.8
0.428000	30.5	9.000	N	9.9	16.8	47.3
1.288000	25.4	9.000	N	10.0	20.6	46.0
1.950000	24.7	9.000	N	10.0	21.3	46.0
1.994000	24.3	9.000	N	10.0	21.7	46.0
2.024000	23.4	9.000	N	10.0	22.6	46.0
2.066000	24.6	9.000	N	10.0	21.4	46.0
2.122000	24.3	9.000	N	10.0	21.7	46.0
15.738000	29.0	9.000	N	10.7	21.0	50.0
15.796000	28.8	9.000	N	10.7	21.2	50.0
15.804000	29.1	9.000	N	10.7	20.9	50.0
16.042000	29.0	9.000	N	10.7	21.0	50.0
16.364000	28.4	9.000	N	10.7	21.6	50.0
16.418000	28.3	9.000	N	10.7	21.7	50.0

**Figure 5: Conducted Emission, MP4 Play Mode, Line (L1)**



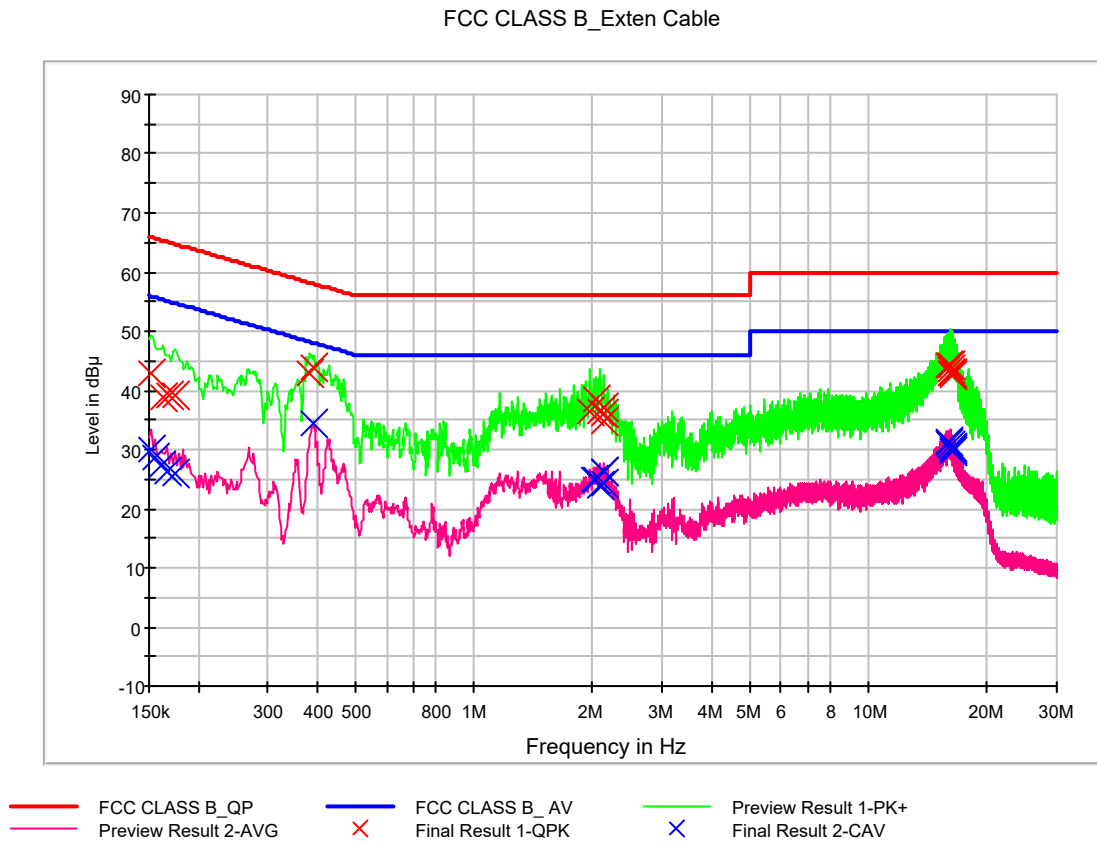
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.386000	44.5	9.000	L1	9.7	13.6	58.1
0.392000	42.2	9.000	L1	9.7	15.8	58.0
0.412000	41.5	9.000	L1	9.7	16.1	57.6
0.430000	41.5	9.000	L1	9.7	15.8	57.3
0.450000	43.3	9.000	L1	9.8	13.6	56.9
0.466000	42.3	9.000	L1	9.8	14.2	56.6
1.914000	33.4	9.000	L1	9.8	22.6	56.0
2.002000	35.6	9.000	L1	9.8	20.4	56.0
2.020000	34.4	9.000	L1	9.8	21.6	56.0
2.072000	36.3	9.000	L1	9.8	19.7	56.0
2.084000	34.7	9.000	L1	9.8	21.3	56.0
2.128000	34.8	9.000	L1	9.9	21.2	56.0
15.594000	38.2	9.000	L1	10.4	21.8	60.0
15.872000	39.3	9.000	L1	10.4	20.7	60.0
15.880000	38.0	9.000	L1	10.4	22.0	60.0
15.930000	37.9	9.000	L1	10.4	22.1	60.0
16.056000	37.6	9.000	L1	10.5	22.4	60.0
16.060000	38.4	9.000	L1	10.5	21.6	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.370000	27.5	9.000	L1	9.7	21.0	48.5
0.374000	31.2	9.000	L1	9.7	17.2	48.4
0.378000	33.6	9.000	L1	9.7	14.7	48.3
0.382000	34.7	9.000	L1	9.7	13.5	48.2
0.386000	34.9	9.000	L1	9.7	13.3	48.1
0.450000	28.3	9.000	L1	9.8	18.6	46.9
1.914000	23.3	9.000	L1	9.8	22.7	46.0
2.020000	23.4	9.000	L1	9.8	22.6	46.0
2.072000	26.6	9.000	L1	9.8	19.4	46.0
2.084000	25.1	9.000	L1	9.8	20.9	46.0
2.126000	25.1	9.000	L1	9.9	20.9	46.0
2.130000	25.5	9.000	L1	9.9	20.5	46.0
15.256000	27.4	9.000	L1	10.4	22.6	50.0
15.378000	27.8	9.000	L1	10.4	22.2	50.0
15.624000	28.3	9.000	L1	10.4	21.7	50.0
15.930000	28.1	9.000	L1	10.4	22.0	50.0
16.056000	28.1	9.000	L1	10.5	21.9	50.0
16.352000	27.9	9.000	L1	10.5	22.1	50.0

**Figure 6: Conducted Emission, MP4 Play Mode, Line (N)**



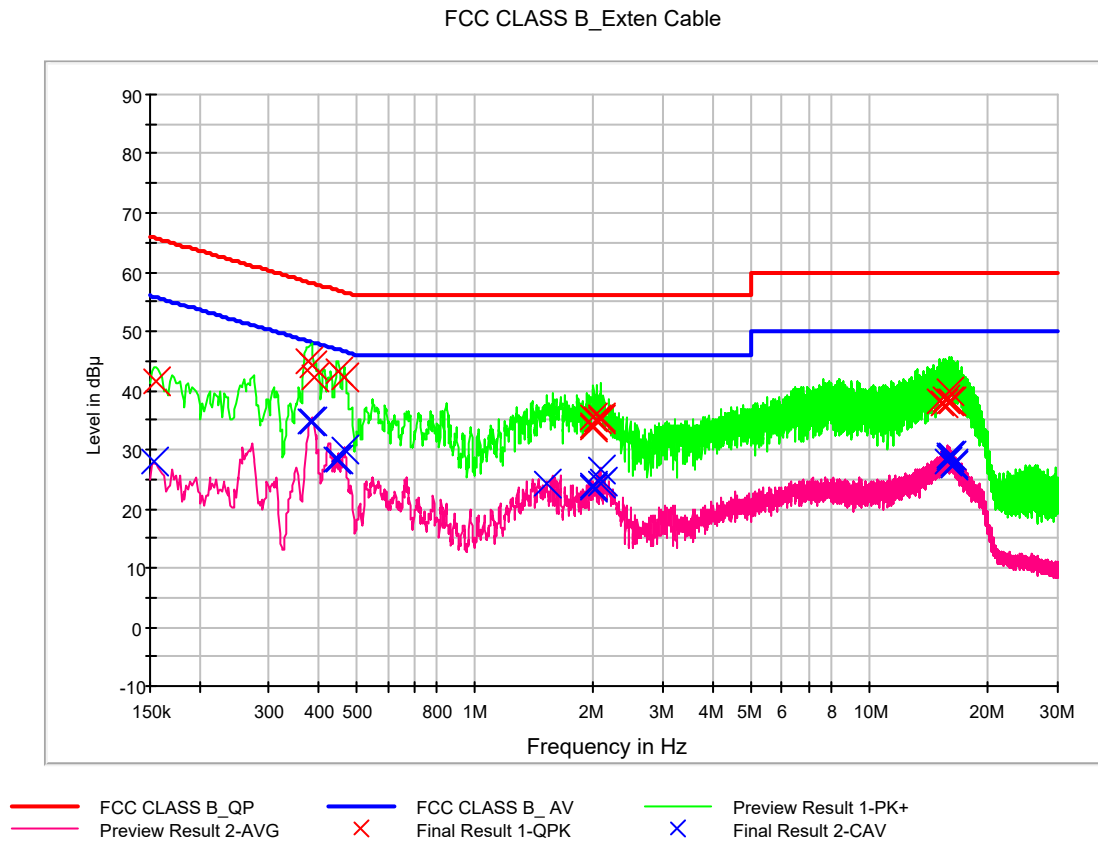
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	43.0	9.000	N	9.8	22.9	65.9
0.162000	38.9	9.000	N	9.8	26.5	65.4
0.168000	39.0	9.000	N	9.8	26.0	65.1
0.174000	39.1	9.000	N	9.8	25.7	64.8
0.384000	42.7	9.000	N	9.9	15.5	58.2
0.392000	44.0	9.000	N	9.9	14.0	58.0
1.958000	36.5	9.000	N	10.0	19.5	56.0
2.034000	38.4	9.000	N	10.0	17.6	56.0
2.092000	36.6	9.000	N	10.0	19.4	56.0
2.126000	36.0	9.000	N	10.1	20.0	56.0
2.130000	37.0	9.000	N	10.1	19.0	56.0
2.140000	34.8	9.000	N	10.1	21.2	56.0
15.978000	44.2	9.000	N	10.7	15.8	60.0
16.132000	43.5	9.000	N	10.7	16.5	60.0
16.156000	44.1	9.000	N	10.7	15.9	60.0
16.198000	43.0	9.000	N	10.7	17.0	60.0
16.270000	42.6	9.000	N	10.7	17.4	60.0
16.320000	42.8	9.000	N	10.7	17.2	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	29.9	9.000	N	9.8	26.0	55.9
0.156000	28.6	9.000	N	9.8	27.0	55.7
0.160000	27.2	9.000	N	9.8	28.3	55.5
0.166000	26.4	9.000	N	9.8	28.7	55.2
0.174000	25.9	9.000	N	9.8	28.9	54.8
0.392000	34.5	9.000	N	9.9	13.6	48.0
2.008000	25.1	9.000	N	10.0	20.9	46.0
2.034000	24.9	9.000	N	10.0	21.1	46.0
2.092000	24.1	9.000	N	10.0	21.9	46.0
2.126000	26.1	9.000	N	10.1	19.9	46.0
2.130000	26.3	9.000	N	10.1	19.7	46.0
2.140000	24.3	9.000	N	10.1	21.7	46.0
15.910000	31.0	9.000	N	10.7	19.0	50.0
15.926000	31.4	9.000	N	10.7	18.6	50.0
16.132000	30.5	9.000	N	10.7	19.5	50.0
16.302000	30.2	9.000	N	10.7	19.8	50.0
16.320000	30.1	9.000	N	10.7	19.9	50.0
16.360000	29.8	9.000	N	10.7	20.2	50.0

**Figure 7: Conducted Emission, Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording, Line (L1)**



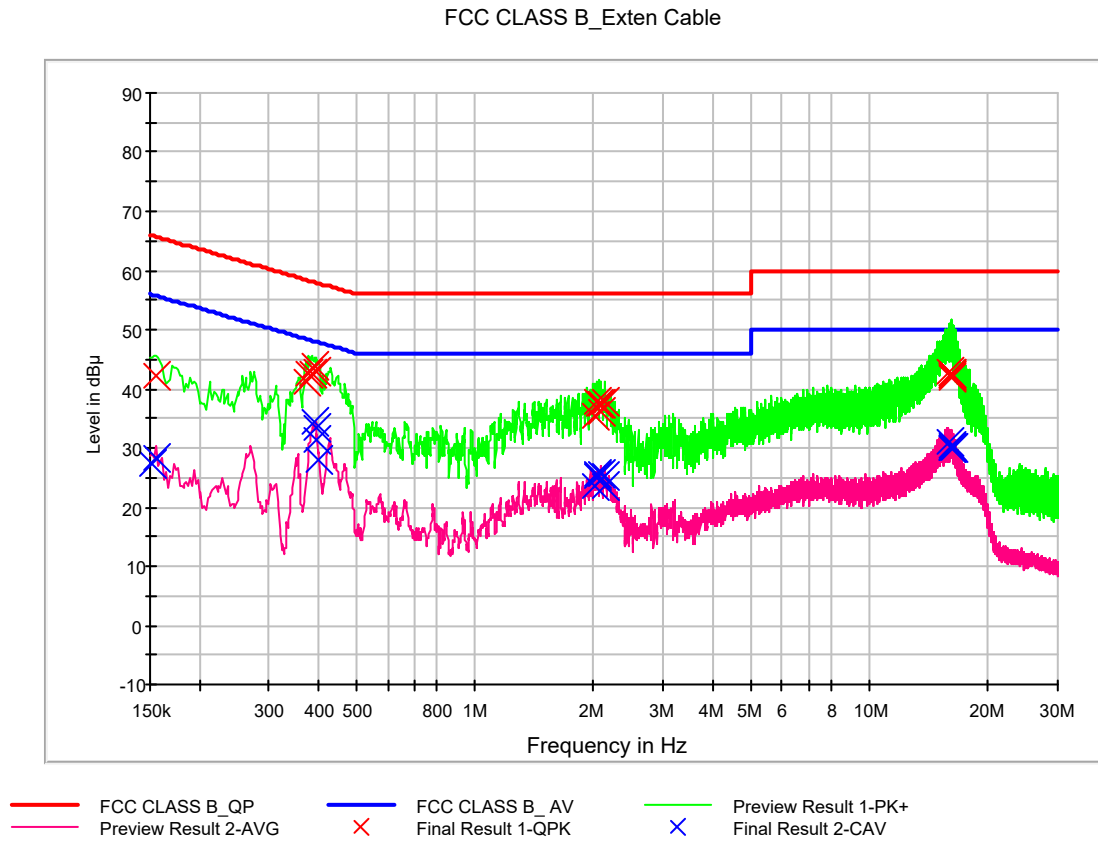
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	41.5	9.000	L1	9.7	24.2	65.7
0.376000	45.1	9.000	L1	9.7	13.3	58.4
0.386000	44.1	9.000	L1	9.7	14.0	58.1
0.392000	42.2	9.000	L1	9.7	15.8	58.0
0.450000	43.3	9.000	L1	9.8	13.6	56.9
0.466000	42.4	9.000	L1	9.8	14.2	56.6
1.988000	33.6	9.000	L1	9.8	22.4	56.0
1.992000	34.2	9.000	L1	9.8	21.8	56.0
2.000000	35.4	9.000	L1	9.8	20.6	56.0
2.036000	35.0	9.000	L1	9.8	21.0	56.0
2.076000	35.3	9.000	L1	9.8	20.7	56.0
2.088000	35.2	9.000	L1	9.8	20.8	56.0
15.096000	38.0	9.000	L1	10.4	22.0	60.0
15.430000	37.8	9.000	L1	10.4	22.2	60.0
15.646000	38.6	9.000	L1	10.4	21.4	60.0
15.876000	39.7	9.000	L1	10.4	20.3	60.0
15.902000	38.1	9.000	L1	10.4	21.9	60.0
16.118000	38.1	9.000	L1	10.5	21.9	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	27.8	9.000	L1	9.7	28.0	55.8
0.382000	34.8	9.000	L1	9.7	13.4	48.2
0.386000	34.8	9.000	L1	9.7	13.3	48.1
0.446000	28.2	9.000	L1	9.7	18.7	46.9
0.450000	28.4	9.000	L1	9.8	18.5	46.9
0.466000	29.9	9.000	L1	9.8	16.7	46.6
1.522000	24.1	9.000	L1	9.9	21.9	46.0
1.992000	23.9	9.000	L1	9.8	22.1	46.0
2.000000	23.7	9.000	L1	9.8	22.3	46.0
2.074000	26.8	9.000	L1	9.8	19.2	46.0
2.088000	24.4	9.000	L1	9.8	21.6	46.0
2.120000	24.5	9.000	L1	9.9	21.5	46.0
15.808000	28.0	9.000	L1	10.4	22.0	50.0
15.868000	28.6	9.000	L1	10.4	21.4	50.0
15.958000	29.0	9.000	L1	10.4	21.0	50.0
16.110000	29.0	9.000	L1	10.5	21.0	50.0
16.316000	27.4	9.000	L1	10.5	22.6	50.0
16.360000	27.6	9.000	L1	10.5	22.4	50.0

**Figure 8: Conducted Emission, Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording, Line (N)**



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	42.1	9.000	N	9.8	23.6	65.7
0.372000	41.2	9.000	N	9.9	17.3	58.5
0.380000	42.7	9.000	N	9.9	15.6	58.3
0.386000	42.7	9.000	N	9.9	15.5	58.1
0.392000	44.0	9.000	N	9.9	14.1	58.0
0.398000	42.9	9.000	N	9.9	15.0	57.9
2.008000	35.5	9.000	N	10.0	20.5	56.0
2.032000	37.8	9.000	N	10.0	18.2	56.0
2.072000	37.4	9.000	N	10.0	18.6	56.0
2.082000	36.1	9.000	N	10.0	19.9	56.0
2.086000	37.5	9.000	N	10.0	18.5	56.0
2.134000	37.6	9.000	N	10.1	18.4	56.0
15.910000	43.0	9.000	N	10.7	17.0	60.0
16.098000	42.3	9.000	N	10.7	17.7	60.0
16.106000	42.4	9.000	N	10.7	17.6	60.0
16.142000	42.4	9.000	N	10.7	17.6	60.0
16.148000	42.0	9.000	N	10.7	18.0	60.0
16.152000	42.5	9.000	N	10.7	17.5	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	27.4	9.000	N	9.8	28.5	55.9
0.156000	28.2	9.000	N	9.8	27.5	55.7
0.390000	34.5	9.000	N	9.9	13.6	48.1
0.394000	33.3	9.000	N	9.9	14.7	48.0
0.398000	31.3	9.000	N	9.9	16.6	47.9
0.402000	28.0	9.000	N	9.9	19.8	47.8
2.008000	23.6	9.000	N	10.0	22.4	46.0
2.032000	25.7	9.000	N	10.0	20.3	46.0
2.036000	25.2	9.000	N	10.0	20.8	46.0
2.082000	25.4	9.000	N	10.0	20.6	46.0
2.134000	25.1	9.000	N	10.1	20.9	46.0
2.138000	23.6	9.000	N	10.1	22.4	46.0
15.952000	31.1	9.000	N	10.7	18.9	50.0
16.098000	30.0	9.000	N	10.7	20.0	50.0
16.106000	30.2	9.000	N	10.7	19.8	50.0
16.148000	29.9	9.000	N	10.7	20.1	50.0
16.152000	30.1	9.000	N	10.7	19.9	50.0
16.338000	29.9	9.000	N	10.7	20.1	50.0



5.2 Radiated Emission

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Applicable Standards	FCC PART 15 Subpart B Class B ANSI C63.4-2014
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Worst Case of Operating Mode	DATA Communication Front Camera Preview + FM Radio (Middle CH) MP4 Play Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.1 / 22.0 °C
Relative Humidity	44.2 / 41.7 %
Test Date	January 23, 2019 / February 11, 2019

- 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



Data Communication

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.828000	21.7	207.9	V	273.0	18.4	18.3	40.0
133.260800	29.3	225.1	H	290.0	19.0	14.2	43.5
199.900000	30.4	117.8	H	30.0	16.8	13.1	43.5
266.527200	34.5	125.1	H	144.0	19.4	11.5	46.0
600.019200	35.4	225.2	V	355.0	27.4	10.6	46.0
800.014400	38.6	192.8	H	44.0	30.1	7.4	46.0

Front Camera Preview + FM Radio (Middle CH)

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.263165	24.2	100.0	V	7.0	18.3	15.8	40.0
44.268000	18.1	100.0	V	244.0	20.1	21.9	40.0
65.606400	16.7	325.2	H	299.0	18.8	23.3	40.0
105.341600	19.0	100.0	V	321.0	16.0	24.5	43.5
156.976800	18.4	225.1	V	252.0	20.1	25.1	43.5
685.028000	28.2	274.8	V	91.0	28.6	17.8	46.0

MP4 Play

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
45.413600	17.6	117.9	V	236.0	20.2	22.4	40.0
59.839200	17.2	175.0	H	112.0	19.6	22.8	40.0
108.764800	14.7	99.9	V	323.0	16.4	28.8	43.5
291.019200	18.3	175.0	V	0.0	20.2	27.7	46.0
701.942400	28.6	274.8	H	17.0	28.8	17.4	46.0
954.216000	31.9	174.9	H	30.0	31.9	14.1	46.0


Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.548538	29.7	100.0	V	8.0	18.3	10.3	40.0
41.913600	25.5	100.0	V	68.0	20.0	14.5	40.0
121.568000	16.4	274.9	H	0.0	17.8	27.1	43.5
142.588000	17.4	174.7	V	345.0	19.8	26.1	43.5
294.271200	18.7	174.8	V	263.0	20.3	27.3	46.0
716.050400	28.9	274.7	V	49.0	29.2	17.1	46.0



-For Measurement Above 1 GHz

Applicable Standards	FCC PART 15 Subpart B Class B ANSI C63.4-2014
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Frequency	2 690 MHz
Tested Frequency Range	1 GHz to 18 GHz
Worst Case of Operating Mode	DATA Communication Front Camera Preview + FM Radio (Middle CH) MP4 Play Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.7 / 22.5 °C
Relative Humidity	43.5 / 42.5 %
Test Date	January 25 / January 28, 2019

- 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



Data Communication

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1400.035000	47.2	322.5	H	346.0	-28.2	26.8	74.0
2016.120000	49.0	100.0	V	54.0	-26.7	25.0	74.0
2666.420000	49.7	100.0	V	0.0	-24.2	24.3	74.0
4481.695000	43.4	219.4	V	38.0	-19.6	30.6	74.0
5998.150000	46.5	349.8	V	106.0	-17.1	27.5	74.0
10967.950000	45.9	205.4	V	313.0	-5.7	28.1	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1400.035000	45.7	322.5	H	346.0	-28.2	8.3	54.0
2016.120000	33.5	100.0	V	54.0	-26.7	20.5	54.0
2666.420000	21.9	100.0	V	0.0	-24.2	32.1	54.0
4481.695000	27.1	219.4	V	38.0	-19.6	26.9	54.0
5998.150000	28.9	349.8	V	106.0	-17.1	25.1	54.0
10967.950000	33.0	205.4	V	313.0	-5.7	21.0	54.0

Front Camera Preview + FM Radio (Middle CH)

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1491.315000	29.9	231.0	V	255.0	-27.8	44.1	74.0
5380.405000	36.3	284.9	H	51.0	-18.0	37.7	74.0
7379.370000	42.5	133.7	V	132.0	-13.1	31.5	74.0
9531.240000	44.5	150.2	V	130.0	-10.0	29.5	74.0
11349.375000	44.8	149.8	H	234.0	-5.0	29.2	74.0
14738.825000	46.5	299.7	V	50.0	-1.4	27.5	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1491.315000	17.5	231.0	V	255.0	-27.8	36.5	54.0
5380.405000	23.7	284.9	H	51.0	-18.0	30.3	54.0
7379.370000	28.4	133.7	V	132.0	-13.1	25.6	54.0
9531.240000	31.6	150.2	V	130.0	-10.0	22.4	54.0
11349.375000	32.4	149.8	H	234.0	-5.0	21.6	54.0
14738.825000	34.0	299.7	V	50.0	-1.4	20.0	54.0



MP4 Play

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2100.085000	34.9	150.0	H	46.0	-26.4	39.1	74.0
4960.105000	37.1	160.5	V	311.0	-18.6	36.9	74.0
7378.160000	41.3	100.0	V	241.0	-13.2	32.7	74.0
9164.895000	43.1	198.4	H	178.0	-10.9	30.9	74.0
10906.445000	45.5	175.7	V	310.0	-5.9	28.5	74.0
14781.375000	46.8	124.8	H	216.0	-1.4	27.2	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2100.085000	24.3	150.0	H	46.0	-26.4	29.7	54.0
4960.105000	23.4	160.5	V	311.0	-18.6	30.6	54.0
7378.160000	28.3	100.0	V	241.0	-13.2	25.7	54.0
9164.895000	30.7	198.4	H	178.0	-10.9	23.3	54.0
10906.445000	32.7	175.7	V	310.0	-5.9	21.3	54.0
14781.375000	34.0	124.8	H	216.0	-1.4	20.0	54.0

Receiver mode (LTE B5 Middle CH Idle) + Front Camera Recording

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
3065.680000	34.0	349.8	V	135.0	-22.7	40.0	74.0
5620.145000	37.3	147.7	H	157.0	-17.6	36.7	74.0
7276.155000	40.6	113.4	V	215.0	-13.6	33.4	74.0
9803.000000	43.6	140.6	V	30.0	-9.6	30.4	74.0
11322.880000	45.5	138.8	H	218.0	-5.1	28.5	74.0
14779.780000	46.4	249.9	V	72.0	-1.4	27.6	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
3065.680000	21.2	349.8	V	135.0	-22.7	32.8	54.0
5620.145000	24.4	147.7	H	157.0	-17.6	29.6	54.0
7276.155000	27.5	113.4	V	215.0	-13.6	26.5	54.0
9803.000000	30.8	140.6	V	30.0	-9.6	23.2	54.0
11322.880000	32.9	138.8	H	218.0	-5.1	21.1	54.0
14779.780000	34.0	249.9	V	72.0	-1.4	20.0	54.0



6. CONCLUSION

The data collected shows that the **EUT Type: Mobile Phone, FCC ID: A3LSMM105G, Model: SM-M105G/DS** complies with §15.107 and §15.109 of the FCC rules.



7. APPENDIX A. TEST SETUP PHOTOGRAPHS

Please refer to Appendix A