REPORT No.: SZ20060377E01

TEST REPORT

APPLICANT	:	LG Electronics USA, Inc.
PRODUCT NAME	:	Smartphone
MODEL NAME	:	LM-K310IM
BRAND NAME	:	LG
FCC ID	:	ZNFK310IM
STANDARD(S)	:	47 CFR Part 15 Subpart B
RECEIPT DATE	:	2020-07-01
TEST DATE	:	2020-07-02 to 2020-07-03
ISSUE DATE	:	2020-08-07

Edited by: He sinuo

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DIRECTORY

Change History		
Version	**Date**	**Reason for Change**
1.0	2020-08-07	First edition

1. Technical Information

Note: Provide by applicant

1.1. Applicant and Manufacturer Information

Applicant:	LG Electronics USA, Inc.
Applicant Address:	111 Sylvan Ave North Building Englewood Cliffs, New Jersey, United States 07632
Manufacturer:	Padget Electronics Private Limited
Manufacturer Address:	B-18, Phase-2, Noida, Uttar Pradesh 201305

1.2. Equipment Under Test (EUT) Description

Product Name:	Smartphone	
Serial No.:	(N/A, marked #1 by test site)	
Hardware Version:	V1.0	
Software Version:	LG_LM-K310IM_Software	
Tx Frequency:	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 40: 2300 MHz ~2400 MHz LTE Band 41: 2535 MHz ~ 2655 MHz Bluetooth 4.2: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz	
Rx Frequency:	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz LTE Band 5: 869 MHz ~ 894 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 40: 2300 MHz ~ 2400 MHz LTE Band 41: 2535 MHz ~ 2655 MHz Bluetooth 4.2: 2402 MHz ~ 2480 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz GPS/Beidou/GLONASS: 1559 MHz ~ 1610 MHz FM: 87.5 MHz ~ 108 MHz	
Ancillary Equipment:	**Battery**	
	Brand Name:	LG
	Model No.:	LG4000STCL02

	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	3900mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.4V
	Manufacturer:	Ningbo Veken Battery Co., Ltd.
	AC Adapter	
	Brand Name:	N/A
	Model No.:	TN-050155U3
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ～ 50/60Hz 0.25A
	Rated Output:	5V⎓1.55A
	Manufacturer:	Shenzhen BMT Electronics Co.,Ltd.
	USB Cable	
	Model:	DA-B0488-BD
	Manufacturer:	Guangdong Wivtak Technology Co., Ltd.

Note:

1. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer

2. Test Results

2.1. Applied Reference Documents

T he objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination Remark
1	15.107	Conducted Emission	2020.07.03	Huang Zhiye	PASS	No deviation
2	15.109	Radiated Emission	2020.07.02	Yang Jie	PASS	No deviation

Note 1: The tests were performed according to the method of measurements prescribed in ANSI C63.4-2014.

Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

2.2. EUT Setup and Operating Conditions

Note: All of the following test modes are tested in all the test items.

Test Modes	
Mode 1 :	GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + GPS Rx + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 2 :	GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + GLONASS Rx + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 3 :	GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + Galileo Rx + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 4 :	**GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + Camera + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card**
Mode 5 :	GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + FM + Battery + USB Cable(Charging from Adapter) + Earphone + Adapter + SIM Card
Mode 6 :	**GSM /LTE Band Idle + Bluetooth Idle + WLAN Idle + PC + Battery + Earphone + USB Cable + SIM Card**
Remark: The above test mode in boldface (Mode 4) was the worst case of radiated emission test, only the test data of the mode was reported. The above test mode in boldface (Mode 6) was the worst case of conducted emission tests, only the test data of the mode was reported.	

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

3. 47 CFR Part 15B Requirements

3.1. Conducted Emission

3.1.1. Requirement

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

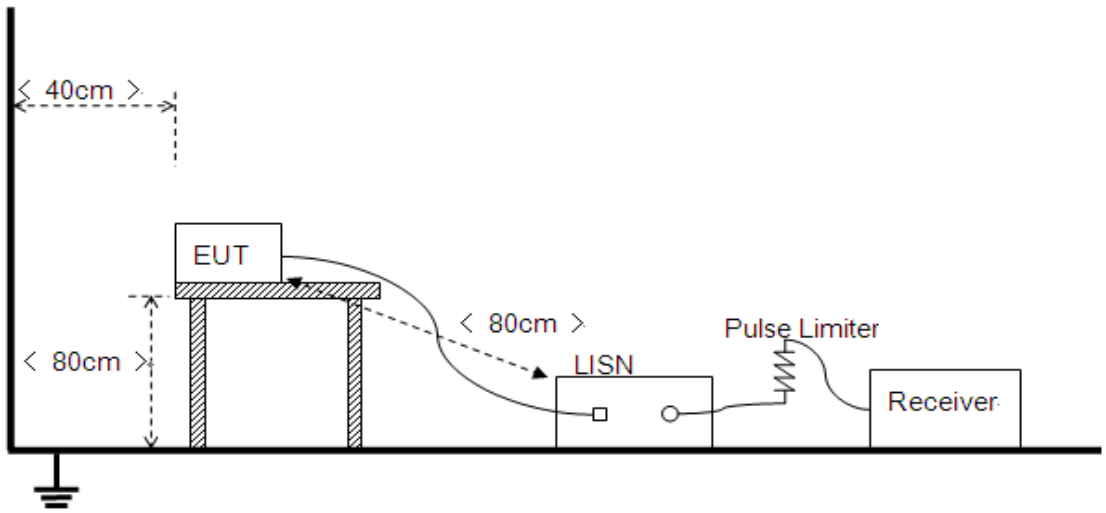
a) The limit subjects to the Class B digital device.

b) The lower limit shall apply at the band edges.

c) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.1.2. Test Setup

Please refer to Annex A for the photographs of the Test Configuration.



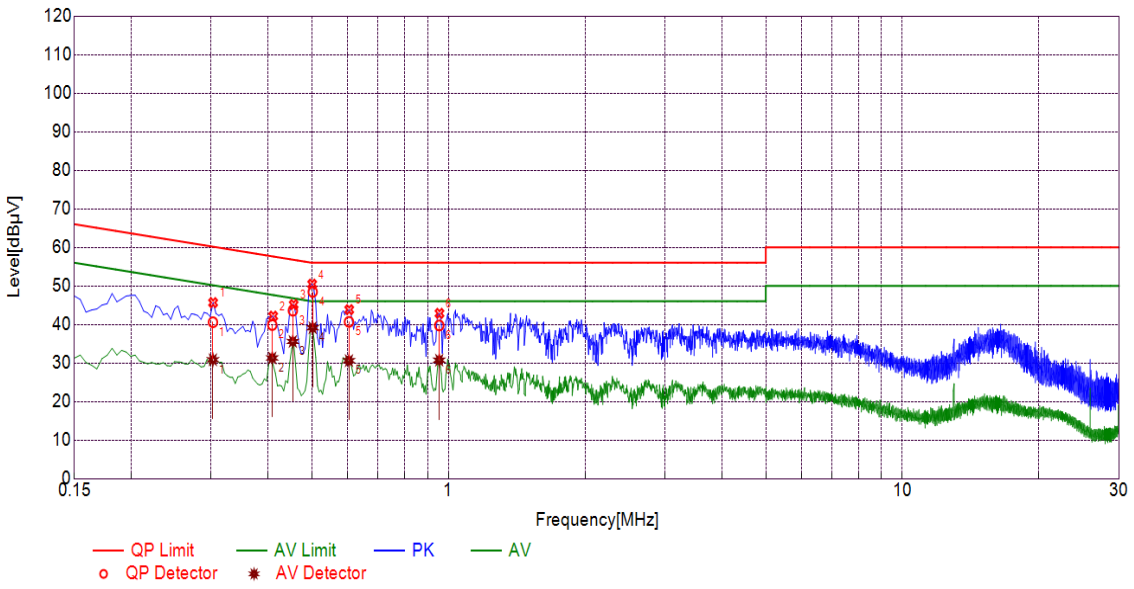
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

The power strip or extension cord has been investigated to make sure that the LISN integrity inma intained with respect to the impedance characteristics as prescribed in ANSI C63.4-2014 at Clause 4.3.

3.1.3. Test Result

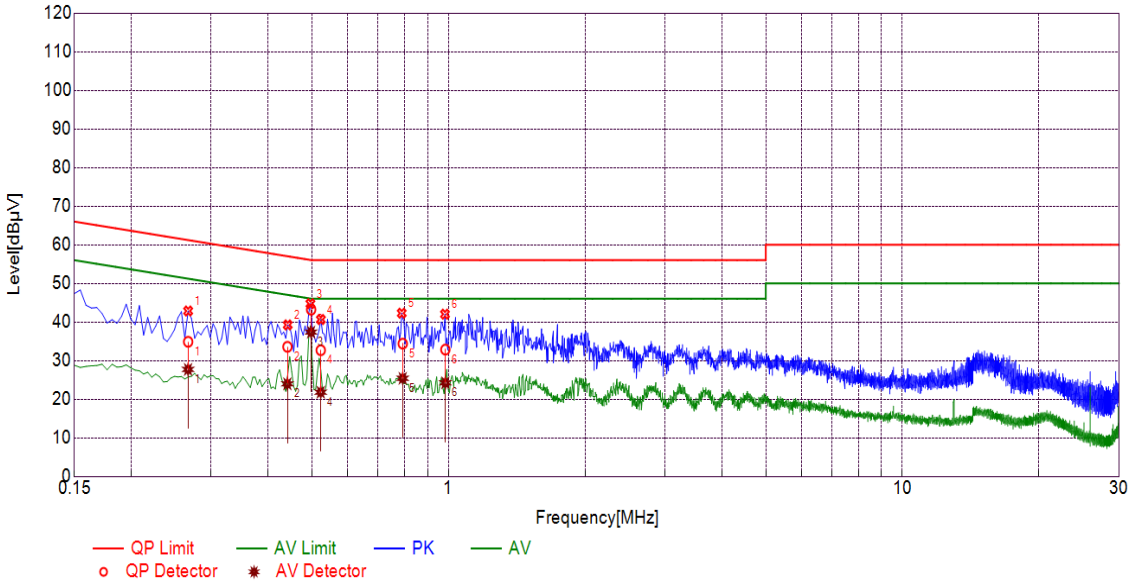
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

A. Test Plot and Suspicious Points:



(Plot A:L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.3027	40.58	30.84	60.17	50.17	Line	PASS
2	0.4090	39.86	31.31	57.67	47.67		PASS
3	0.4540	43.58	35.59	56.80	46.80		PASS
4	0.5021	48.46	39.14	56.00	46.00		PASS
5	0.6036	40.68	30.61	56.00	46.00		PASS
6	0.9542	39.75	30.73	56.00	46.00		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.2669	34.88	27.71	61.21	51.21	Neutral	PASS
2	0.4417	33.58	23.99	57.03	47.03		PASS
3	0.4981	43.20	37.38	56.03	46.03		PASS
4	0.5231	32.69	21.81	56.00	46.00		PASS
5	0.7928	34.39	25.41	56.00	46.00		PASS
6	0.9842	32.85	24.25	56.00	46.00		PASS

3.2. Radiated Emission

3.2.1. Requirement

According to FCC section 15.109 (a), the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency Range (MHz)	Field Strength Limitation at 3m Measurement Dist	
	(μV/m)	(dBμV/m)
30.0 - 88.0	100	20log 100
88.0 - 216.0	150	20log 150
216.0 - 960.0	200	20log 200
Above 960.0	500	20log 500

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Note:

1) The tighter limit shall apply at the boundary between two frequency range.
2) Limitation expressed in dBμV/m is calculated by 20log Emission Level(μV/m).

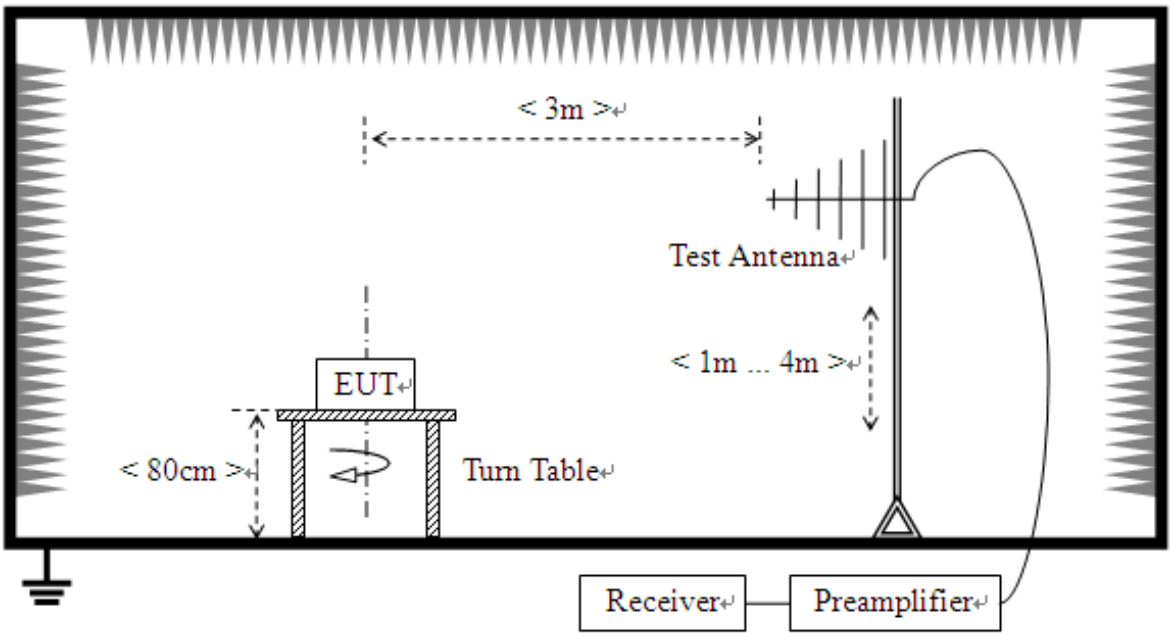
3.2.2. Frequency Range of Measurement

According to 15.33(b)(1), the frequency range of radiated measurement for the EUT is listed in the following table:

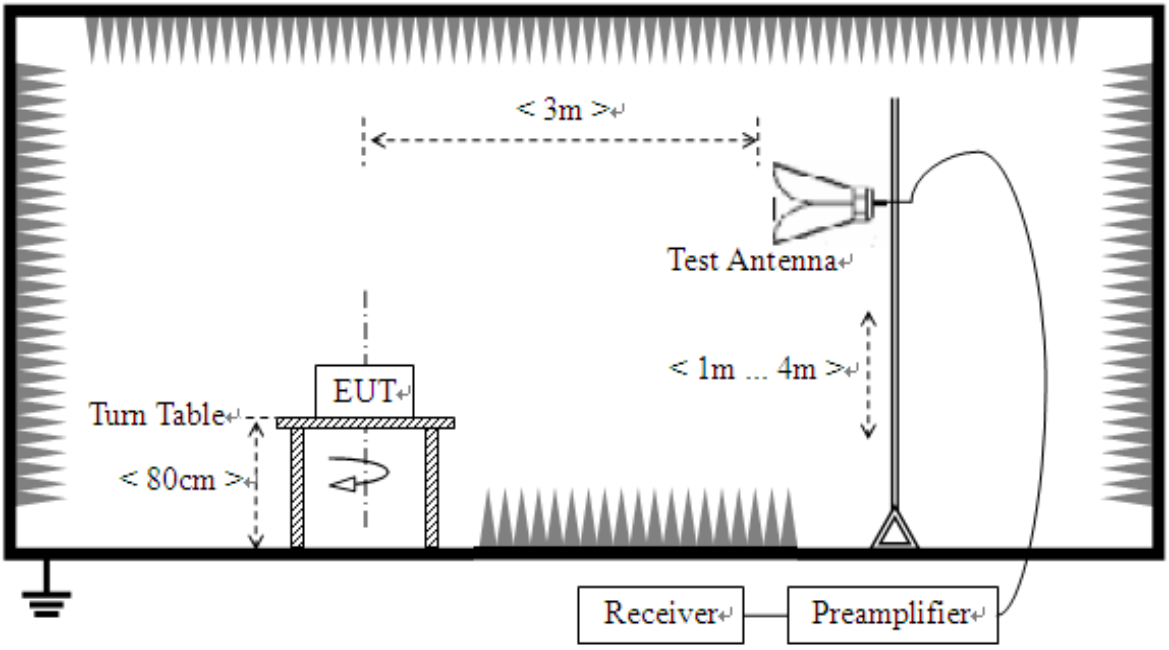
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

3.2.3. Test Setup

1) For radiated emissions from 30MHz to1GHz



2) For radiated emissions above 1GHz



The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

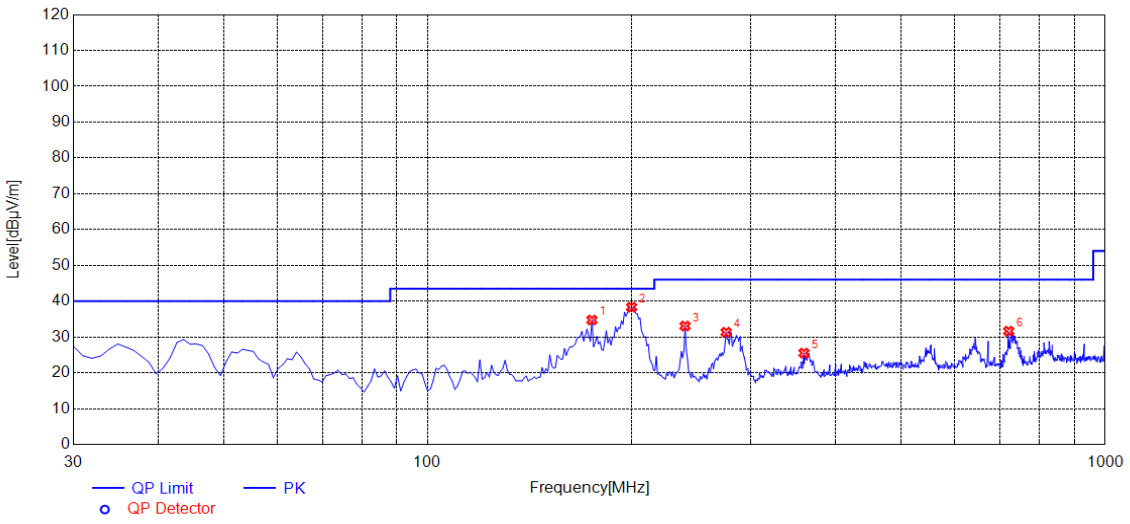
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz)are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

3.2.4. Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

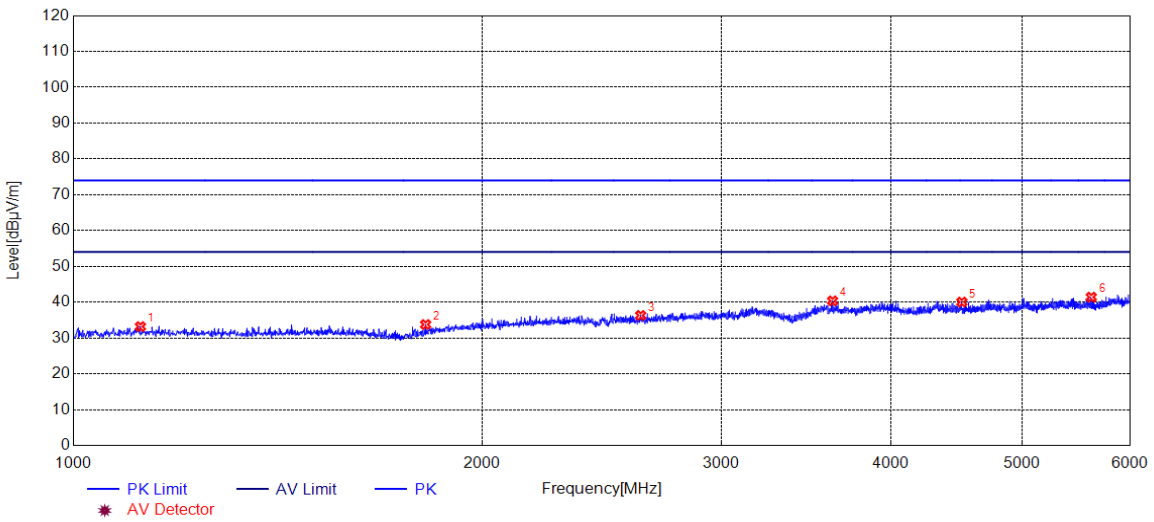
The amplitude of emissions (6GHz-13.5GHz) which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.



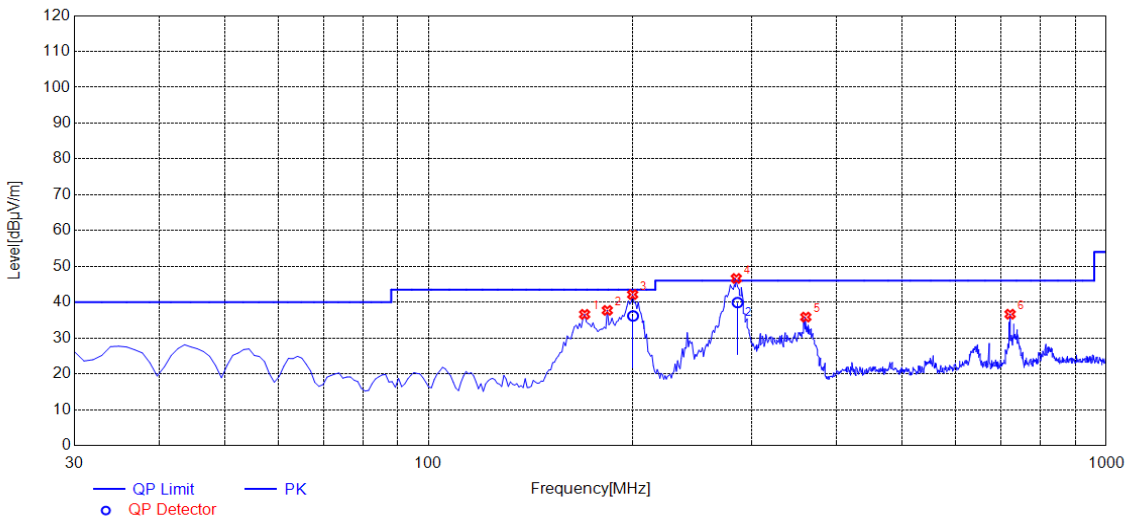
(Plot A: ANT-Vertical,30MHz - 1GHz)

No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	174.6747	34.75	N.A	N.A	N.A	43.50	N.A	V	PASS
2	199.9199	38.34	N.A	N.A	N.A	43.50	N.A	V	PASS
3	239.7297	33.08	N.A	N.A	N.A	46.00	N.A	V	PASS
4	275.6557	31.33	N.A	N.A	N.A	46.00	N.A	V	PASS
5	359.1592	25.52	N.A	N.A	N.A	46.00	N.A	V	PASS
6	720.3604	31.64	N.A	N.A	N.A	46.00	N.A	V	PASS



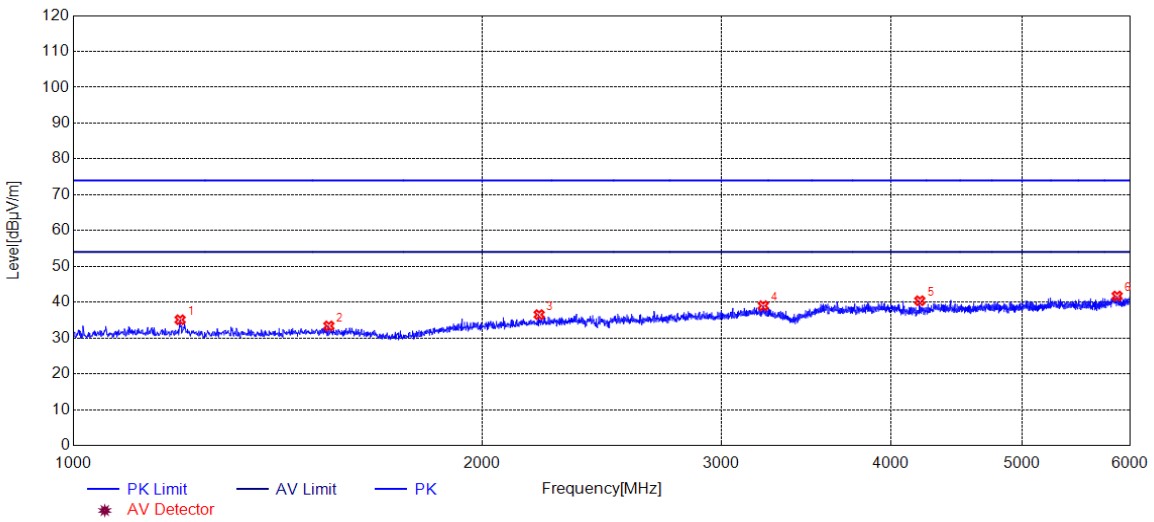
(Plot B: ANT-Vertical,1GHz - 6GHz)

No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1120.0240	33.19	N.A	N.A	74.00	N.A	54.00	V	PASS
2	1817.1634	33.77	N.A	N.A	74.00	N.A	54.00	V	PASS
3	2617.3235	36.31	N.A	N.A	74.00	N.A	54.00	V	PASS
4	3624.5249	40.37	N.A	N.A	74.00	N.A	54.00	V	PASS
5	4513.7027	40.05	N.A	N.A	74.00	N.A	54.00	V	PASS
6	5621.9244	41.42	N.A	N.A	74.00	N.A	54.00	V	PASS



(Plot C:ANT- Horizontal, 30MHz - 1GHz)

No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	169.8198	36.61	N.A	N.A	N.A	43.50	N.A	H	PASS
2	183.4134	37.72	N.A	N.A	N.A	43.50	N.A	H	PASS
3	199.9199	42.14	36.17	N.A	N.A	43.50	N.A	H	PASS
4	284.3944	46.62	39.90	N.A	N.A	46.00	N.A	H	PASS
5	360.1301	35.84	N.A	N.A	N.A	46.00	N.A	H	PASS
6	721.3313	36.66	N.A	N.A	N.A	46.00	N.A	H	PASS



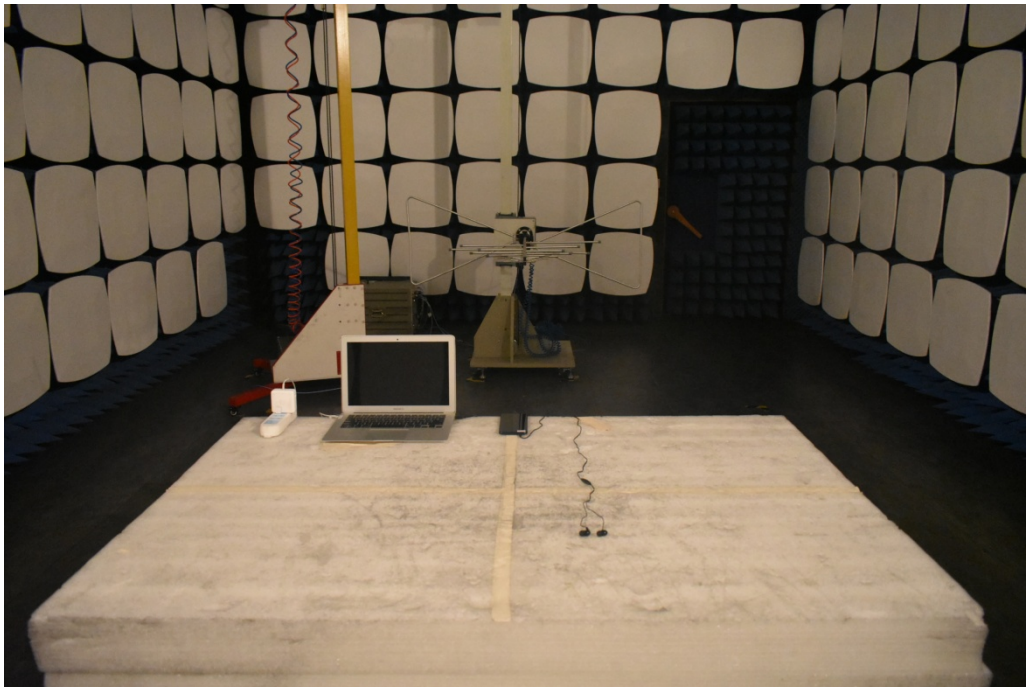
(Plot D:ANT- Horizontal, 1GHz - 6GHz)

No.	Fre. MHz	PK dBµV/m	QP dBµV/m	AV dBµV/m	Limit-PK dBµV/m	Limit-QP dBµV/m	Limit-AV dBµV/m	ANT	Verdict
1	1198.0396	35.10	N.A	N.A	74.00	N.A	54.00	H	PASS
2	1542.1084	33.38	N.A	N.A	74.00	N.A	54.00	H	PASS
3	2203.2406	36.53	N.A	N.A	74.00	N.A	54.00	H	PASS
4	3222.4445	39.01	N.A	N.A	74.00	N.A	54.00	H	PASS
5	4202.6405	40.40	N.A	N.A	74.00	N.A	54.00	H	PASS
6	5873.9748	41.73	N.A	N.A	74.00	N.A	54.00	H	PASS

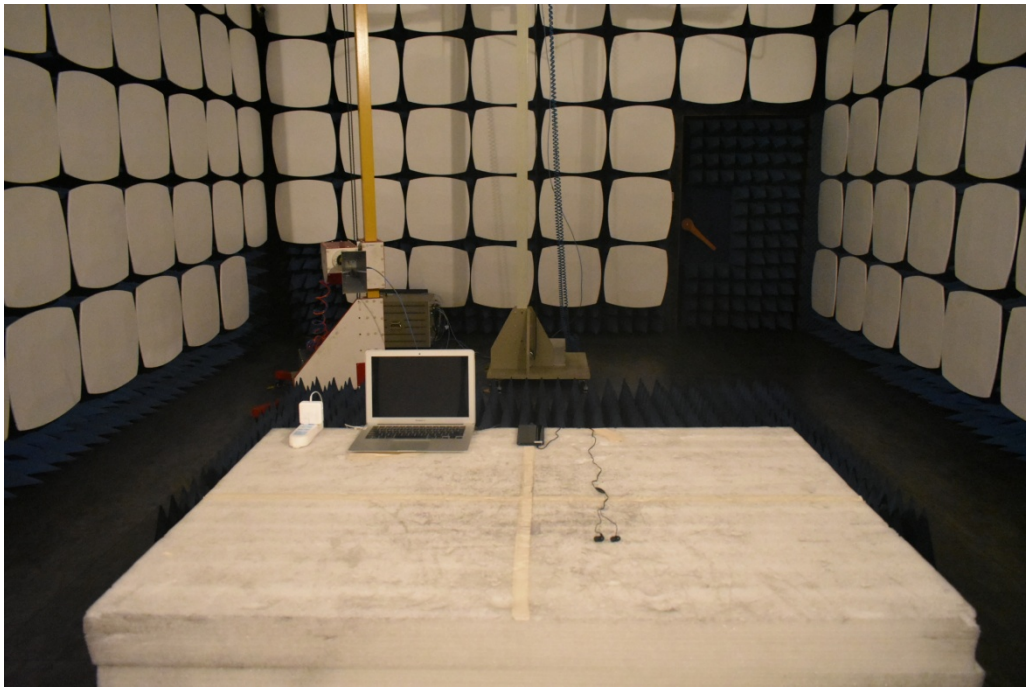
Annex A Photographs of Test Setup

1. Conducted Emission

2. Radiated Emission(30MHz-1GHz)



3. Radiated Emission(above 1GHz)



Annex B Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	9kHz-150kHz	±4.1dB
	150kHz-30MHz	±3.7dB

Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	±5.06dB
	200MHz-1000MHz	±5.24dB
	1GHz-6GHz	±5.18dB
	6GHz-18GHz	±5.48dB

Annex C Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Accreditation Certificate

Accredited Testing Laboratory:	The FCC designation number is CN1192. Test firm registration number is 226174. (Shenzhen Morlab Communications Technology Co., Ltd.)

4. Test Software Utilized

Model	Version Number	Producer
JS32-RE	Version 2.0.2.0	Tonscend
TS+ -[JS32-CE]	Version2.5.0.0	Tonscend

5. Test Equipments Utilized

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2019.07.29	2020.07.28
Test Receiver	R&S	ESPI	101052	2019.07.29	2020.07.28
LISN	Schwarzbeck	NSLK 8127	8127449	2020.03.26	2021.03.25
Pulse Limiter (10dB)	Schwarzbeck	VTSD 9561-F	VTSD 9561 F-B #206	2019.08.13	2020.08.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	VULB 9163-519	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120D-963	2019.05.24	2022.05.23
Test Antenna - Horn	Schwarzbeck	BBHA 9170	BBHA9170#773	2019.05.24	2022.05.23
Radiated Disturbance Preamplifier	rflight	S020180L3203	61171/61172	2019.07.29	2020.07.28
Radiated Disturbance Preamplifier	rflight	S10M100L3802	46732	2019.07.29	2020.07.28
Semi-Anechoic Chamber	CRT	9m*6m*6m	N/A	2020.01.06	2023.01.05

6. Ancillary Equipment Utilized

Description	Manufacturer	Model	Serial No.
PC	APPLE	A1370	N/A
Adapter	APPLE	A1374	N/A

END OF REPORT