

Report No.: ZR/2020/6001706

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TEST REPORT

Application No.: ZR/2020/60017

Applicant: LG Electronics USA, Inc.

Address of Applicant: 111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632

Manufacturer: Huagin Telecom Technology Co.,Ltd.

Address of Manufacturer: No.1 Building, No.9 Building, No.399, Keyuan Road, Zhangjiang Hi-tech

Park, Shanghai, P.R. China

EUT Description: Mobile handset **Model No.:** LM-K420EMW

Trade Mark: LG

FCC ID: ZNFK420EMW

Standard(s): 47 CFR Part 15, Subpart B

Date of Receipt: 2020/6/22

Date of Test: 2020/7/22 to 2020/7/29

Date of Issue: 2020/7/29

Test Result: Pass*

Authorized Signature:

Derek Yang

Derele young

Wireless Laboratory Manager

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^{*} In the configuration tested, the EUT complied with the standards specified above.



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Revision Record										
Version	Version Chapter Date Modifier									
01		2020-07-29		Original						

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Test Summary

Emission Part										
Item	Standard	Method	Requirement	Result						
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass						
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass						
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass						

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

Checked By

David Chen

Test By

David Chen

Reviewer

Daniel Wang Project Engineer

famil

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1 General Information

Device Type :	Mobile handset							
Exposure Category:	uncontrolled environment / general population							
Product Name:	LTE/UMTS/GSM mobile phone							
Model No.(EUT):	LM-K420EMW							
Trade Mark:	LG							
Antenna Type:	Inner Antenna							
	Band	Tx (MHz)	Rx (MHz)					
	GSM850	824~849	869~894					
	GSM1900	1850~1910	1930~1990					
Facerra and Daniela	WCDMA Band II	1850~1910	1930~1990					
Frequency Bands:	WCDMA Band IV	1710~1755	2110~2155					
	WCDMA Band V	824~849	869~894					
	WIFI 2.4G	2412~2472	2412~2472					
	BT	2402~2480	2402~2480					
	Model:	MCS-V02WR						
Adaptor Information 1#:	SEC:	5V/2A						
	Manufacturer:	Sunlin						
	Model:	MCS-V02WA2						
Adaptor Information 2#:	SEC:	5V/2A						
	Manufacturer:	Aohai						
	Model:	MCS-V02WH						
Adaptor Information 3#:	SEC:	5V/2A						
	Manufacturer:	Phihong						
	Model:	BL-T51						
EUT 1 Battery Information	Normal Voltage:	3.87V						
1#:	Rated capacity:	3900mAh						
	Manufacturer:	ATL						
LICD coble information4#:	Model:	DC15WB-G						
USB cable Information1#:	Manufacturer:	Ningbo Broad Telecommunication Co., Ltd						
LICD cable information O''	Model: DC15WX-G							
USB cable Information2#:	Manufacturer:	ASAP Technology(Jiangxi)Co.,Ltd						

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Description of Support Units

Description	Manufacturer	Model No.	Serial No.	
Laptop	Lenovo	T430u	REF. No.SEA1800	
Mouse	Lenovo	M-U0025-O	REF. No.:SEA2400	
Router	NETGEAR	DGN2200	REF. No.SEA2200	

1.2 Test Location

All tests were performed at:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Xi'an Branch
Address:	Single floor D, building 1, Kanghong orange square science and technology park, No.137 keyuan 3rd road, fengdong new town, Xi 'an city, Shaanxi China
Post code:	710000
Telephone:	+86 (0) 29 6282 7885
Fax:	+86 (0) 29 6282 7885
E-mail:	ee.xian@sgs.com

No tests were sub-contracted.

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1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES CO., LTD. XIAN BRANCH is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

Test Site No.:	SG	S Xian Site No.	FCC Designation No.		
	CO01-XA	03CH01-XA	CN1271		

Deviation from Standards

None

1.5 **Abnormalities from Standard Conditions**

None

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2 Emission Test Results

2.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014 Frequency Range: 150kHz to 30MHz

Limit:

0.15M-0.5MHz 66dB(μ V)-56dB(μ V) quasi-peak, 56dB(μ V)-46dB(μ V) average

0.5M-5MHz 56dB(μ V) quasi-peak, 46dB(μ V) average 5M-30MHz 60dB(μ V) quasi-peak, 50dB(μ V) average

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

2.1.1 E.U.T. Operation

Operating Environment:

Temperature: 18.9°C Humidity: 55.1% RH Atmospheric Pressure: 1000 mbar

Pretest these modes a: Transfer data between the EUT and the PC+USB cable1 to find the worst case: b: Transfer data between the EUT and the PC+USB cable2

c: GSM 850 Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter1

d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter2

e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)

+battery+Cable(worst)+adapter3

The worst case for

final test:

a: Transfer data between the EUT and the PC+USB cable1

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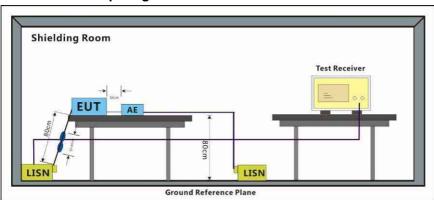
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2.1.2 **Test Setup Diagram**



2.1.3 **Measurement Data**

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected

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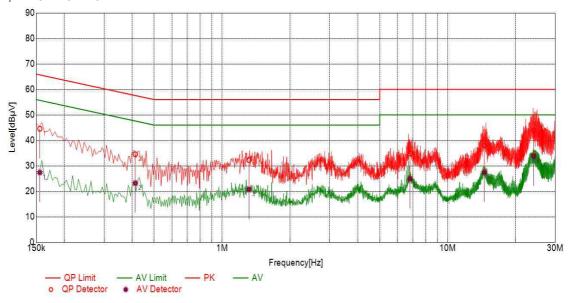
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Mode:I; Line:Live Line



Test Graph

Final	Final Data List										
	Freq.	Factor	QP	QP	QP	AV	AV	AV			
NO.	[MHz]	[dB]	Value	Limit	Margin	Value	Limit	Margin	Туре		
1	0.1557	10.10	44.56	65.69	21.13	27.41	55.69	28.28	L		
2	0.4125	10.10	34.54	57.60	23.06	23.22	47.60	24.38	L		
3	1.3154	10.10	32.27	56.00	23.73	20.74	46.00	25.26	L		
4	6.8174	10.10	34.83	60.00	25.17	24.87	50.00	25.13	L		
5	14.5508	10.11	37.95	60.00	22.05	27.48	50.00	22.52	L		
6	24.0769	10.11	43.86	60.00	16.14	33.83	50.00	16.17	L		

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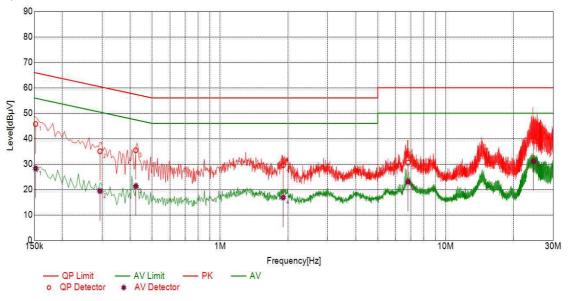
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Mode:I; Line:Neutral Line



Test Graph

Final Data List										
NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Туре	
1	0.1522	10.10	45.74	65.88	20.14	28.32	55.88	27.56	N	
2	0.2936	10.10	35.03	60.42	25.39	19.41	50.42	31.01	N	
3	0.4229	10.10	35.43	57.39	21.96	21.27	47.39	26.12	N	
4	1.9040	10.10	29.58	56.00	26.42	16.86	46.00	29.14	N	
5	6.8154	10.10	30.58	60.00	29.42	23.03	50.00	26.97	N	
6	24.5512	10.11	41.20	60.00	18.80	31.13	50.00	18.87	N	

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2.2 Radiated Emissions (30MHz-1GHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014 Frequency Range: 30MHz to 1GHz

Measurement Distance: 3m

Limit:

30 MHz - 88 MHz $40.0 (\text{dB}\mu\text{V/m})$ quasi-peak 88 MHz - 216 MHz $43.5 (\text{dB}\mu\text{V/m})$ quasi-peak 216 MHz - 960 MHz $46.0 (\text{dB}\mu\text{V/m})$ quasi-peak $54.0 (\text{dB}\mu\text{V/m})$ quasi-peak

Detector: Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

2.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 66.5 % RH Atmospheric Pressure: 1010 mbar

Pretest these
modes to find
the worst case:

a: Transfer data between the EUT and the PC+USB cable1
b: Transfer data between the EUT and the PC+USB cable2

c: GSM 850 Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter1

d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter2

e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)

+battery+Cable(worst)+adapter3

The worst case e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)

for final test: +battery+Cable(worst)+adapter3

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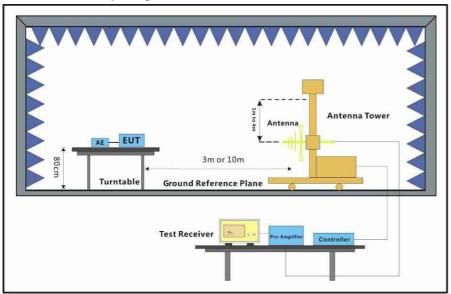
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2.2.2 Test Setup Diagram



2.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

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Mode:m; Polarization:Horizontal



Suspected List

Susp	ected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.8808	15.78	-29.99	40.00	24.22	200	279	Horizontal
2	81.2262	22.17	-35.85	40.00	17.83	200	229	Horizontal
3	108.391	22.43	-32.00	43.50	21.07	200	229	Horizontal
4	167.573	22.20	-34.18	43.50	21.30	200	106	Horizontal
5	310.580	22.12	-27.96	46.00	23.88	100	75	Horizontal
6	675.955	27.54	-19.76	46.00	18.46	200	244	Horizontal

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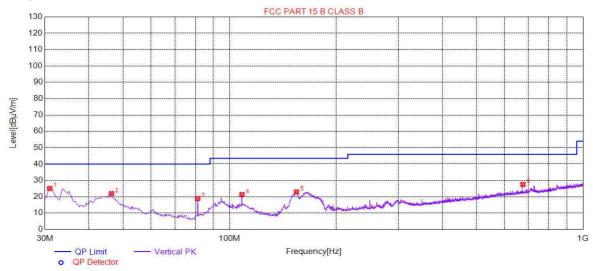
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Mode:m; Polarization:Vertical



Suspected List

- u p - u								
Susp	ected List							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9702	25.08	-30.06	40.00	14.92	100	210	Vertical
2	46.2993	21.98	-30.41	40.00	18.02	100	358	Vertical
3	81.2262	18.89	-35.85	40.00	21.11	100	60	Vertical
4	108.391	21.37	-32.00	43.50	22.13	100	107	Vertical
5	154.572	22.95	-34.87	43.50	20.55	100	14	Vertical
6	675.955	27.55	-19.76	46.00	18.45	100	133	Vertical

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2.3 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B

Test Method: ANSI C63.4:2014 Frequency Range: Above 1GHz

Measurement Distance: 3m

Limit:

Above 1GHz 74(dBµV/m) peak, 54(dBµV/m) average

Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

2.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

Pretest these a: Transfer data between the EUT and the PC+USB cable1 b: Transfer data between the EUT and the PC+USB cable2 c: GSM 850 Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter1

d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)

+battery+Cable(worst)+adapter2

e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)

+battery+Cable(worst)+adapter3

The worst case e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)

for final test: +battery+Cable(worst)+adapter3

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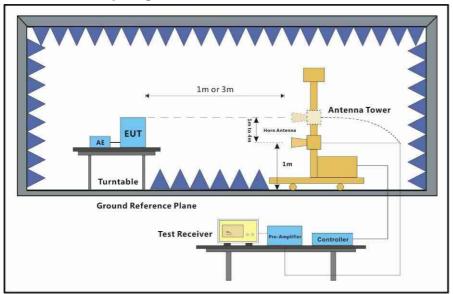
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2.3.2 Test Setup Diagram



2.3.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

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Mode:m; Polarization:Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	3048.60	39.77	-24.44	74.00	34.23	100	203	Horizontal
2	3500.82	29.44	-23.62	54.00	24.56	100	16	Horizontal
3	14120.4	47.30	2.30	54.00	6.70	100	316	Horizontal
4	14147.6	57.44	2.22	74.00	16.56	100	128	Horizontal
5	17795.9	59.85	0.70	74.00	14.15	100	91	Horizontal
6	17984.6	47.39	-0.24	54.00	6.61	100	128	Horizontal

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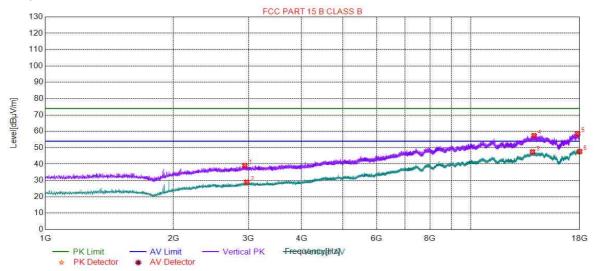
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Mode:m; Polarization:Vertical



Suspected List

	· · · · · · · · · · · · · · · · · · ·							
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2942.34	39.14	-24.65	74.00	34.86	100	43	Vertical
2	2974.64	28.96	-24.58	54.00	25.04	100	81	Vertical
3	13942.7	47.51	2.20	54.00	6.49	100	344	Vertical
4	14064.3	57.44	2.32	74.00	16.56	100	344	Vertical
5	17792.5	58.59	0.72	74.00	15.41	100	307	Vertical
6	17987.2	47.67	-0.26	54.00	6.33	100	157	Vertical

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Equipment List 3

Chamber							
Toot Equipment	Manufacturer	Model No.	Inventory No	Cal. date	Cal.Due date		
Test Equipment	Wanuracturer	wodel No.	Inventory No.	(yyyy-mm-dd)	(yyyy-mm-dd)		
Semi-Anechoic Chamber	Brilliant-emc	966	XAW03-35-01	NCR	NCR		
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020/4/2	2021/4/2		
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020/4/2	2021/4/2		
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019/9/7	2020/9/6		
Receiving antenna	Rosenberger	VULB 9163	XAW01-09-01	2019/10/13	2021/10/12		
Receiving antenna	Rosenberger	BBHA 9120D	XAW01-09-02	2019/10/13	2021/10/12		
Receiving antenna	Rosenberger	BBHA 9170	XAW01-09-03	2019/10/13	2021/10/12		
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR		
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR		
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR		
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR		
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2019/11/18	2020/11/18		
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019/11/18	2020/11/18		
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019/12/3	2020/12/3		
Amplifier	Brilliant-emc	YX28980930	XAW01-41-06	2019/11/18	2020/11/18		
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-19-02	2019-09-16	2020-09-15		

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Measurement Uncertainty

No.	Item	Measurement Uncertainty		
1	Conduction Emission	± 3.4dB (150kHz to 30MHz)		
2		± 4.8dB (30MHz-1GHz)		
	Radiated Emission	± 5.2dB (1GHz-6GHz)		
		± 5.5dB (6GHz-18GHz)		
		± 5.02dB (18GHz-40GHz)		

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Photographs

5.1 **Test Setup Photos**

Refer to Appendix A Photographs of ZR202060017

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

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