

TEST REPORT

Application No.: ZR/2020/60015
Applicant: LG Electronics USA, Inc.
Address of Applicant: 111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632
Manufacturer: Huaqin 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-K420HMW, LM-K420HM
Trade Mark: LG
FCC ID: ZNFK420HMW
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: 2021/8/15

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Simon Ling

Wireless Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/8/12		Original
02		2021/5/25	Leah Chen	1. Modify data conversion error of antenna height 2. Updated equipment list.
03		2021/8/15	Leah Chen	1. Updated Support Units, Test facility and Test Location

Authorized for issue by:	
Prepared By	 <hr/> (Leah Chen) /Engineer
Checked By	 <hr/> (Daniel Wang) /Reviewer



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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



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Contents

1 GENERAL INFORMATION.....	5
1.1 DESCRIPTION OF SUPPORT UNITS.....	6
1.2 TEST LOCATION	7
1.3 TEST FACILITY	7
1.4 DEVIATION FROM STANDARDS	7
1.5 ABNORMALITIES FROM STANDARD CONDITIONS	7
2 EMISSION TEST RESULTS	8
2.1 CONDUCTED EMISSIONS AT MAINS TERMINALS (150KHZ-30MHZ).....	8
2.1.1 E.U.T. Operation.....	8
2.1.2 Test Setup Diagram.....	9
2.1.3 Measurement Data	9
2.2 RADIATED EMISSIONS (30MHZ-1GHZ).....	12
2.2.1 E.U.T. Operation.....	12
2.2.2 Test Setup Diagram.....	13
2.2.3 Measurement Data	13
2.3 RADIATED EMISSIONS (ABOVE 1GHZ).....	16
2.3.1 E.U.T. Operation.....	16
2.3.2 Test Setup Diagram.....	17
2.3.3 Measurement Data	17
3 EQUIPMENT LIST.....	20
4 MEASUREMENT UNCERTAINTY.....	21
5 PHOTOGRAPHS.....	22
5.1 TEST SETUP PHOTOS	22
5.2 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)	22



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1 General Information

Product Name:	Mobile handset		
Model No.(EUT):	LM-K420HMW, LM-K420HM		
Trade Mark:	LG		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824~849	869~894
	GSM1900	1850~1910	1930~1990
	WCDMA Band II	1850~1910	1930~1990
	WCDMA Band IV	1710~1755	2110~2155
	WCDMA Band V	824~849	869~894
	LTE Band 2	1850~1910	1930~1990
	LTE Band 4	1710~1755	2110~2155
	LTE Band 5	824~849	869~894
	LTE Band 7	2500~2570	2620~2690
	LTE Band 12	699~716	729~746
	LTE Band 13	777~787	746~756
	LTE Band 17	704~716	734~746
	LTE Band 66	1710~1780	2110~2180
	WIFI 2.4G	2412~2472	2412~2472
	BT	2402~2480	2402~2480
	FM	/	88~108
GNSS(GPS/BDS/GLONASS/Galileo)	/	1559~1610	
Adaptor Information 1#:	Model:	MCS-V02WR	
	SEC:	5V/2A	
	Manufacturer:	Sunlin	
Adaptor Information 2#:	Model:	MCS-V02WA2	
	SEC:	5V/2A	
	Manufacturer:	Aohai	
Adaptor Information 3#:	Model:	MCS-V02WH	
	SEC:	5V/2A	
	Manufacturer:	Phihong	
Battery Information 1#:	Model:	BL-T51	
	Normal Voltage:	+3.87V	
	Rated capacity:	3900mAh	
	Manufacturer:	ATL	
USB cable Information1#:	Model:	DC15WB-G	
	Manufacturer:	Ningbo Broad Telecommunication Co., Ltd	
USB cable Information2#:	Model:	DC15WX-G	
	Manufacturer:	ASAP Technology(Jiangxi)Co.,Ltd	



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1.1 Description of Support Units

Description	Manufacturer	Model No.	Inventory No.
Router	NETGEAR	R6020	No.XA1401
Computer	Lenovo	L480	No.XA1402
Mouse	A4TECH	OP-520NU USB	No.XA1403



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SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.
Wireless Laboratory

1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi'an, Shaanxi, China 710086 t (86-29) 6282 7885 www.sgsgroup.com.cn
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1.2 Test Location

All tests were performed at:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086
Test engineer:	Ben Huang, Leah Chen

No tests were sub-contracted.

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 (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

- **FCC –Designation Number: CN1271.**

1.4 Deviation from Standards

None

1.5 Abnormalities from Standard Conditions

None



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中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

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

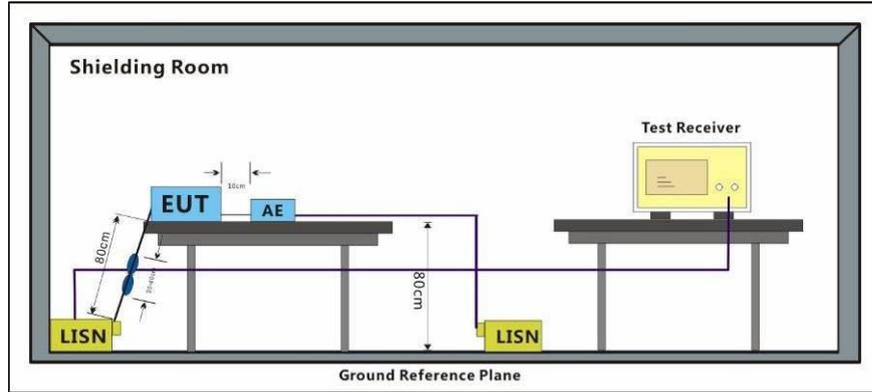
Pretest these modes to find the worst case:

- 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)
+earphone1+battery1+Cable(worst)+adapter1
 - d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)
+earphone2+battery2+Cable(worst)+adapter2
 - e: LTE Band 5 Idle+BT+WLAN +GPS Rx+camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3
 - f: LTE Band 12 Idle +BT+WLAN +GPS Rx+camera (Back)
+earphone(worst)+battery(worst)+ Cable(worst)+ (worst)
 - g: LTE Band 13 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+
Cable(worst)+ (worst)
 - h: LTE Band 17 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+
Cable(worst)+adapter(Worst)
- The worst case for final test:
- f: LTE Band 12 Idle +BT+WLAN +GPS Rx+camera (Back)
+earphone(worst)+battery(worst)+ Cable(worst)+ (worst)



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2.1.2 Test Setup Diagram



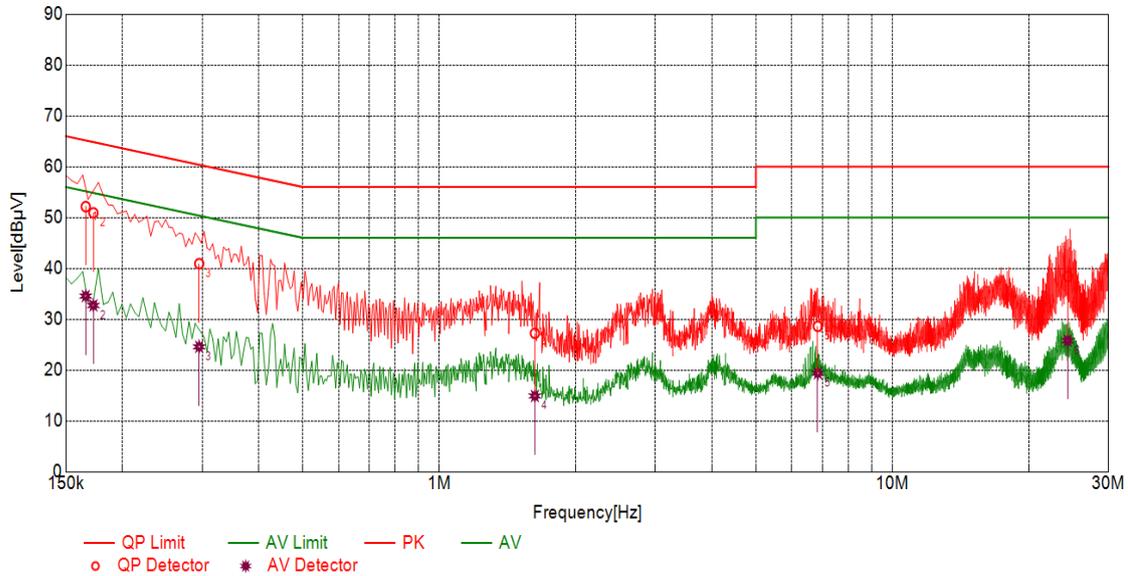
2.1.3 Measurement Data

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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Mode:f; Line:Live Line



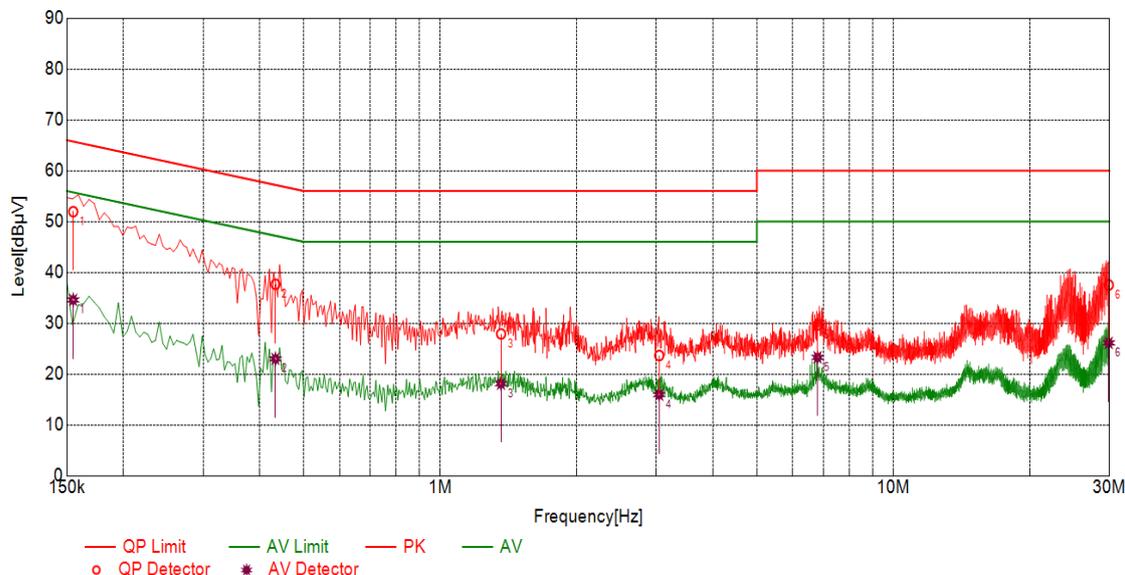
Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1660	10.10	52.15	65.16	13.01	34.55	55.16	20.61	L
2	0.1726	10.10	50.92	64.84	13.92	32.72	54.84	22.12	L
3	0.2954	10.10	40.94	60.37	19.43	24.58	50.37	25.79	L
4	1.6262	10.10	27.24	56.00	28.76	14.91	46.00	31.09	L
5	6.8479	10.10	28.61	60.00	31.39	19.38	50.00	30.62	L
6	24.3792	10.11	38.42	60.00	21.58	25.79	50.00	24.21	L



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Mode:f; Line:Neutral Line



Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1550	10.10	51.95	65.73	13.78	34.58	55.73	21.15	N
2	0.4331	10.10	37.66	57.19	19.53	23.00	47.19	24.19	N
3	1.3627	10.10	27.90	56.00	28.10	18.10	46.00	27.90	N
4	3.0443	10.10	23.67	56.00	32.33	15.96	46.00	30.04	N
5	6.8069	10.10	29.66	60.00	30.34	23.29	50.00	26.71	N
6	29.8813	10.11	37.52	60.00	22.48	26.13	50.00	23.87	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:
 30MHz -88MHz 40.0(dBμV/m) quasi-peak
 88MHz-216MHz 43.5(dBμV/m) quasi-peak
 216MHz-960MHz 46.0(dBμV/m) quasi-peak
 960MHz-1000MHz 54.0(dBμV/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:

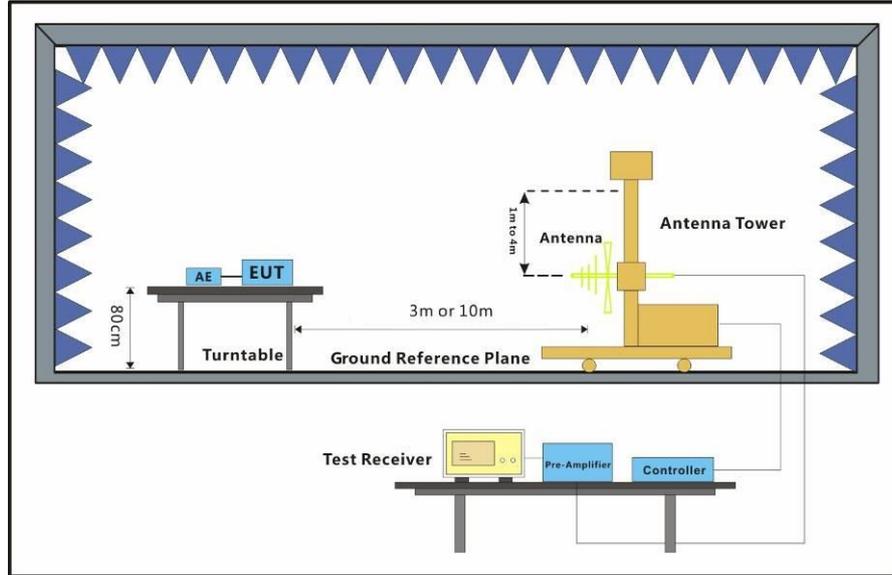
- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card)
+earphone2+battery2+Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +GPS Rx+camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3
- f: LTE Band 12 Idle +BT+WLAN +GPS Rx+camera (Back)
+earphone(worst)+battery(worst)+ Cable(worst)+ (worst)
- g: LTE Band 13 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+
Cable(worst)+ (worst)
- h: LTE Band 17 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+
Cable(worst)+adapter(Worst)

The worst case for final test: a: Transfer data between the EUT and the PC+USB cable1



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2.2.2 Test Setup Diagram



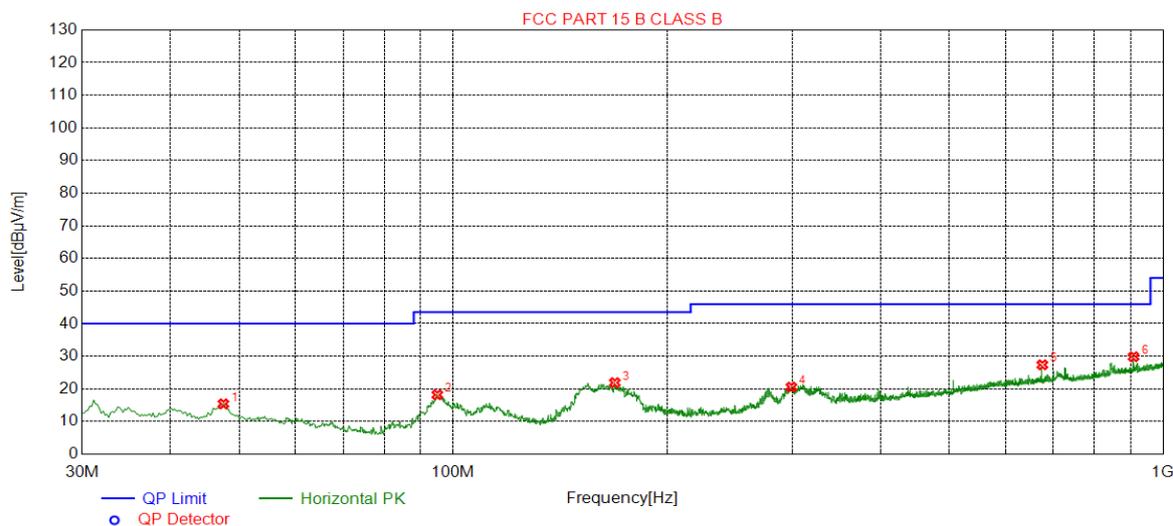
2.2.3 Measurement Data

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:a; Polarization:Horizontal



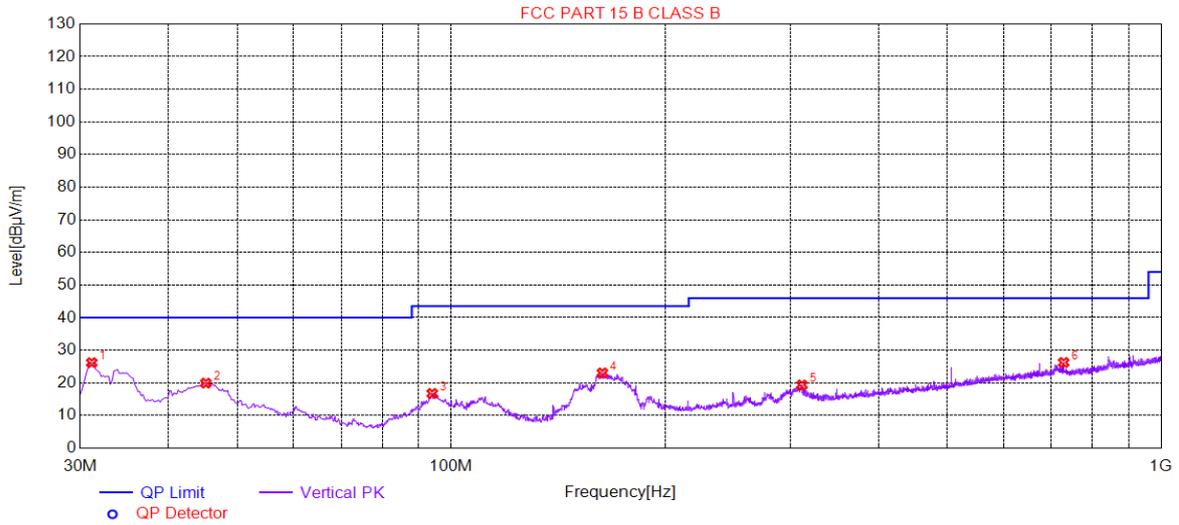
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.4635	15.44	-30.40	40.00	24.56	163	297	Horizontal
2	95.0030	18.22	-32.89	43.50	25.28	217	250	Horizontal
3	168.931	21.93	-34.10	43.50	21.57	218	218	Horizontal
4	299.519	20.58	-28.28	46.00	25.42	142	75	Horizontal
5	675.955	27.40	-19.76	46.00	18.60	152	250	Horizontal
6	908.607	29.88	-15.94	46.00	16.12	140	110	Horizontal



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Mode:a; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.1642	26.23	-30.05	40.00	13.77	227	277	Vertical
2	45.1350	19.95	-30.43	40.00	20.05	157	292	Vertical
3	94.0328	16.79	-33.05	43.50	26.71	161	78	Vertical
4	163.304	23.09	-34.44	43.50	20.41	240	344	Vertical
5	311.938	19.38	-27.93	46.00	26.62	290	360	Vertical
6	728.927	26.29	-18.83	46.00	19.71	172	149	Vertical



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SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.
Wireless Laboratory

1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Xueyuan 3rd Road, Fengdong New Town, Xi'an, Shaanxi, China 710086
中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

t (86-29) 6282 7885 www.sgsgroup.com.cn
t (86-29) 6282 7885 sgs.china@sgs.com

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

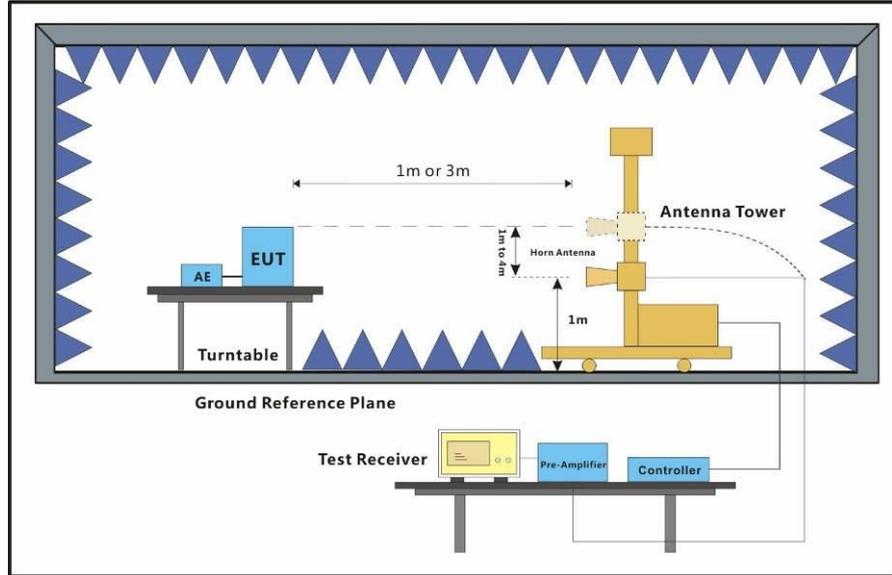
Pretest these modes to find the worst case:

- 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) +earphone1+battery1+Cable(worst)+adapter1
 - d: WCDMA Band V Idle+BT+WLAN +GPS Rx+playing MP4 (SD card) +earphone2+battery2+Cable(worst)+adapter2
 - e: LTE Band 5 Idle+BT+WLAN +GPS Rx+camera (Front) +earphone(worst)+battery(worst)+ Cable(worst)+adapter3
 - f: LTE Band 12 Idle +BT+WLAN +GPS Rx+camera (Back) +earphone(worst)+battery(worst)+ Cable(worst)+ (worst)
 - g: LTE Band 13 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+ Cable(worst)+ (worst)
 - h: LTE Band 17 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+ Cable(worst)+adapter(Worst)
- The worst case for final test: f: LTE Band 12 Idle +BT+WLAN +GPS Rx+camera (Back) +earphone(worst)+battery(worst)+ Cable(worst)+ (worst)



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2.3.2 Test Setup Diagram



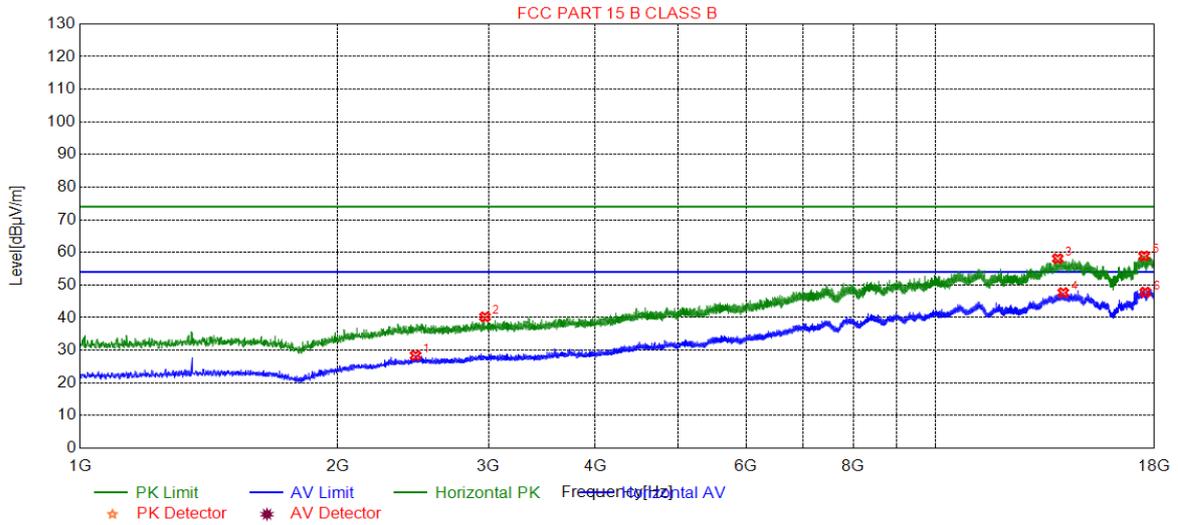
2.3.3 Measurement Data

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:f; Polarization:Horizontal



Suspected List

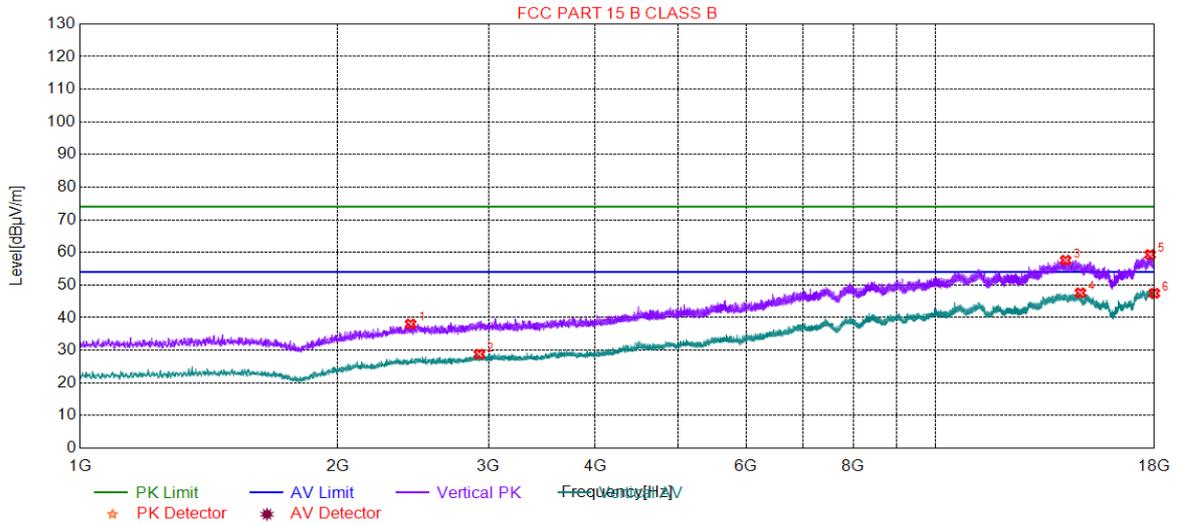
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2466.32	28.42	-26.07	54.00	25.58	139	316	Horizontal
2	2972.09	40.25	-24.58	74.00	33.75	142	53	Horizontal
3	13874.7	58.10	2.07	74.00	15.90	167	53	Horizontal
4	14081.3	47.68	2.34	54.00	6.32	141	128	Horizontal
5	17505.2	58.90	1.61	74.00	15.10	126	128	Horizontal
6	17557.9	47.83	1.28	54.00	6.17	162	203	Horizontal



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 中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086 t (86-29) 6282 7885 sgs.china@sgs.com

Mode:f; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2433.17	38.06	-26.28	74.00	35.94	221	157	Vertical
2	2927.89	28.81	-24.69	54.00	25.19	173	195	Vertical
3	14172.2	57.59	2.15	74.00	16.41	222	43	Vertical
4	14747.7	47.61	1.71	54.00	6.39	233	6	Vertical
5	17786.6	59.34	0.74	74.00	14.66	268	195	Vertical
6	17993.1	47.48	-0.28	54.00	6.52	290	43	Vertical



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中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

t (86-29) 6282 7885 www.sgsgroup.com.cn
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3 Equipment List

RE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020-04-02	2021-04-01
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12
Receiving antenna (15GHz~40GHz)	Schwarzbeck	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	2020-11-17
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2019-11-18	2020-11-17
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR
5G UXM	Keysight	E7515B	XAW01-19-01	2019-08-17	2020-08-16
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01



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CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-03	2019-12-11	2020-12-10
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR
5G UXM	Keysight	E7515B	XAW01-19-01	2019-08-17	2020-08-16
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01

4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.8dB (Below 1GHz)
		± 4.8dB (1GHz to 6GHz)
		± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)



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5 Photographs

5.1 Test Setup Photos

Refer to Photographs of Appendix A - Photographs of Set-Up for ZR/2020/60015

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

