



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: 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-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: 2021/8/14

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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Wireless Laboratory

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-07-29		Original
02		2021/5/31	Leah Chen	1. Modify data conversion error of antenna height 2.Update equipment list
03		2021/8/14	Leah Chen	1.Update Support Units, Test facility and Test Location

*This test report supersedes the original report (report No.:ZR/2020/6001706,issue date: 2020-7-29), original report shall be invalid.

Authorized for issue by:		
Prepared By		 _____ (Leah Chen) /Engineer
Checked By		 _____ (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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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		
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
	WIFI 2.4G	2412~2472	2412~2472
	BT	2402~2480	2402~2480
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	
EUT 1 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.	Serial No.
Router	NETGEAR	R6020	No.XA1401
Computer	Lenovo	L480	No.XA1402
Mouse	A4TECH	OP-520NU USB	No.XA1403

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.



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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 (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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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)
+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

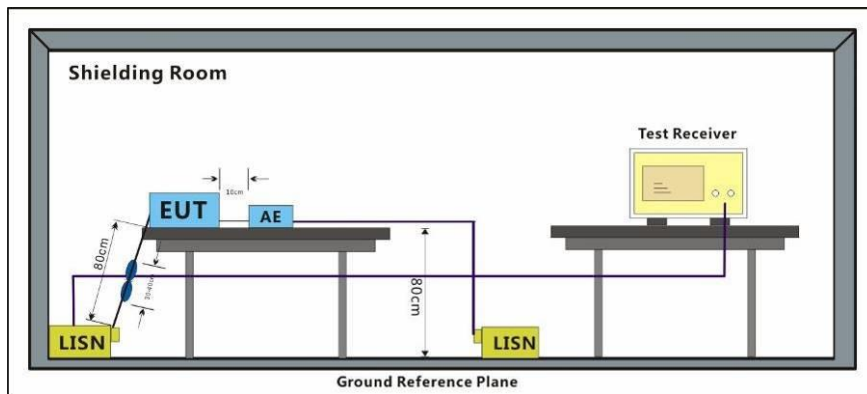


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2.1.2 Test Setup Diagram



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



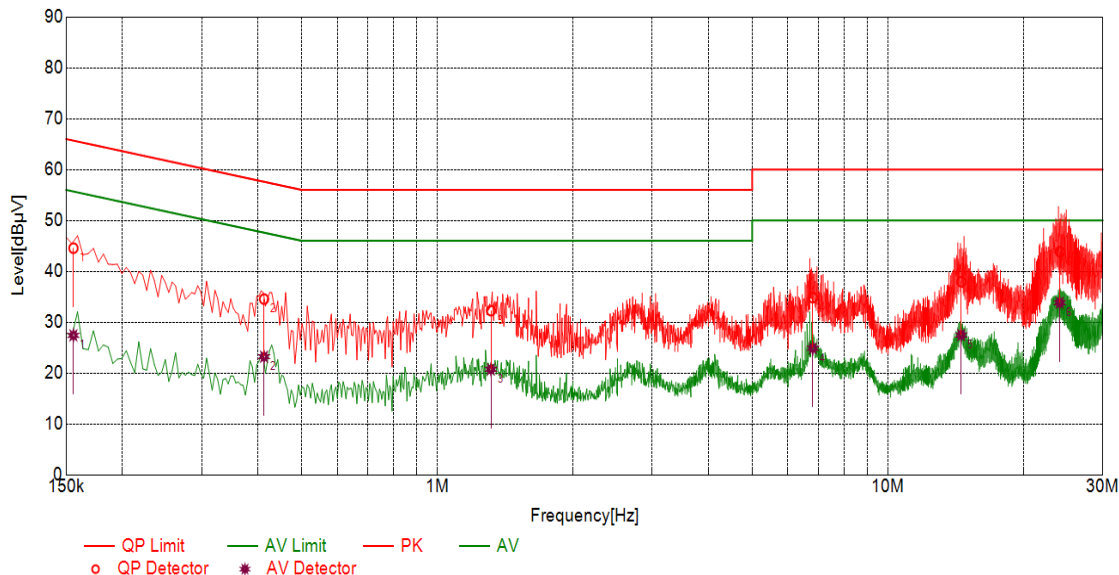
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Mode:I; Line:Live Line



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	0.1557	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



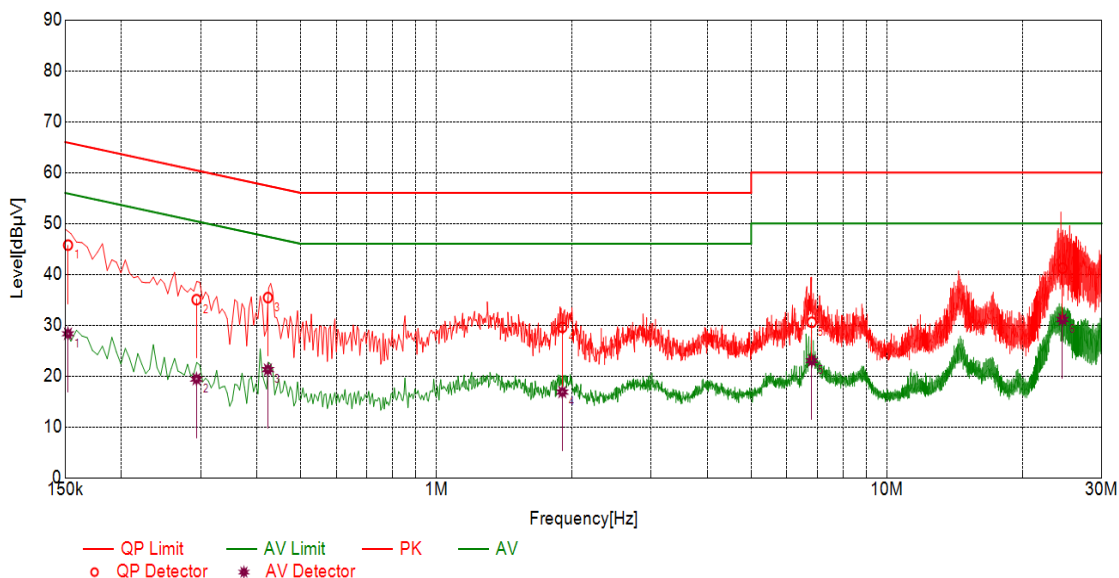
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Mode:I; Line:Neutral Line



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	0.1522	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:	
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

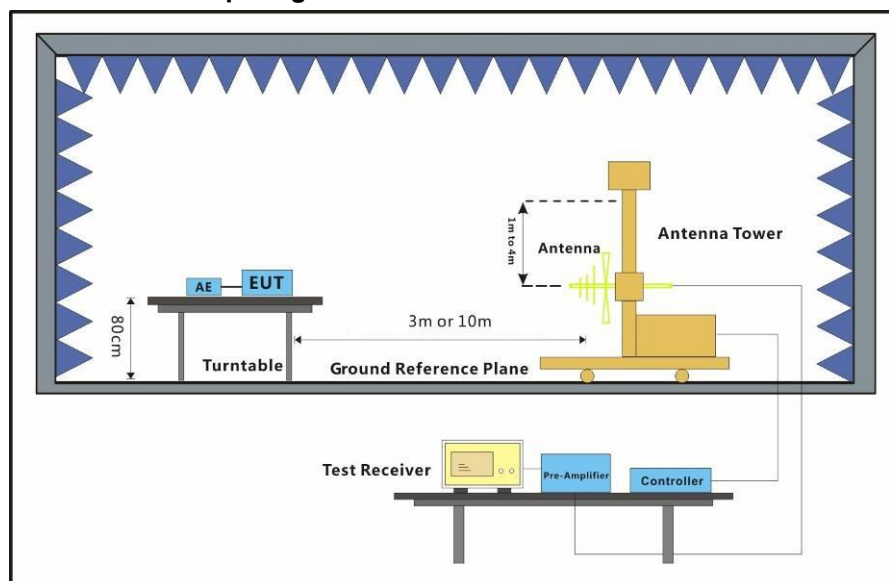
2.2.1 E.U.T. Operation

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) +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:	e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back) +battery+Cable(worst)+adapter3

2.2.2 Test Setup Diagram



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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.



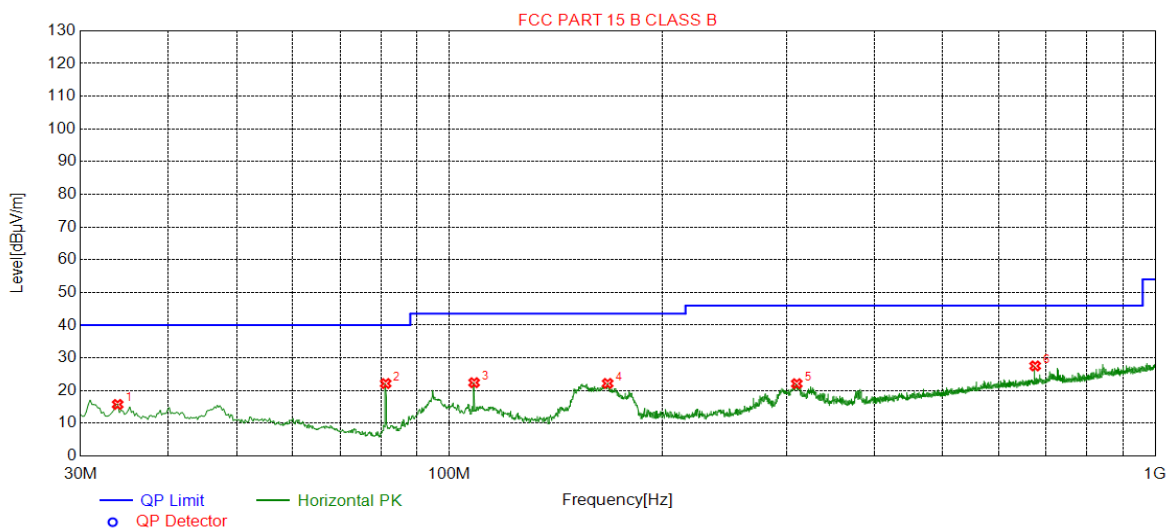
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Mode:m; Polarization:Horizontal



Suspected List

Suspected 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	239	279	Horizontal
2	81.2262	22.17	-35.85	40.00	17.83	227	229	Horizontal
3	108.391	22.43	-32.00	43.50	21.07	158	229	Horizontal
4	167.573	22.20	-34.18	43.50	21.30	236	106	Horizontal
5	310.580	22.12	-27.96	46.00	23.88	163	75	Horizontal
6	675.955	27.54	-19.76	46.00	18.46	203	244	Horizontal



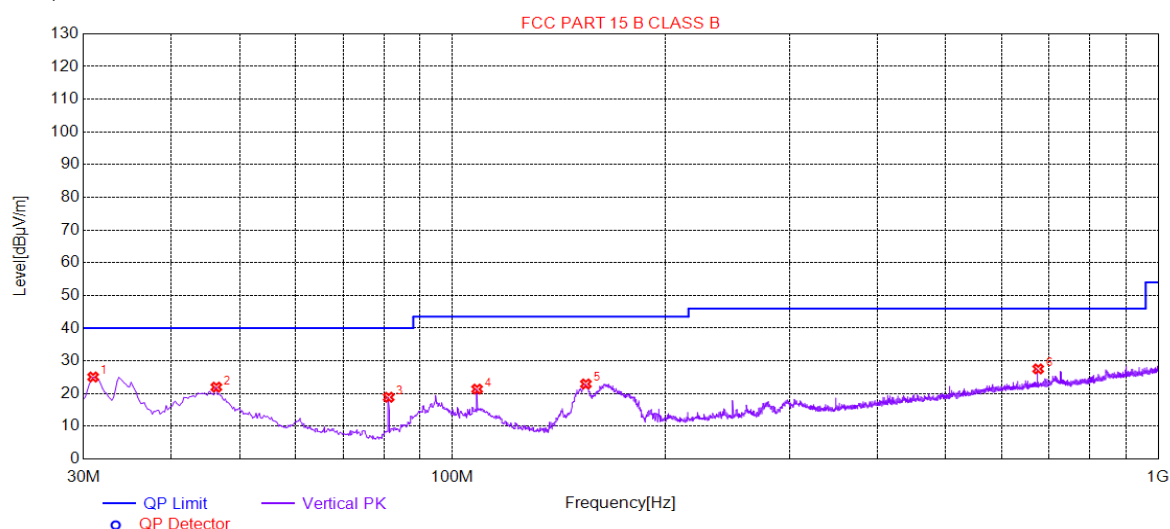
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Mode:m; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9702	25.08	-30.06	40.00	14.92	211	210	Vertical
2	46.2993	21.98	-30.41	40.00	18.02	236	358	Vertical
3	81.2262	18.89	-35.85	40.00	21.11	207	60	Vertical
4	108.391	21.37	-32.00	43.50	22.13	216	107	Vertical
5	154.572	22.95	-34.87	43.50	20.55	206	14	Vertical
6	675.955	27.55	-19.76	46.00	18.45	178	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

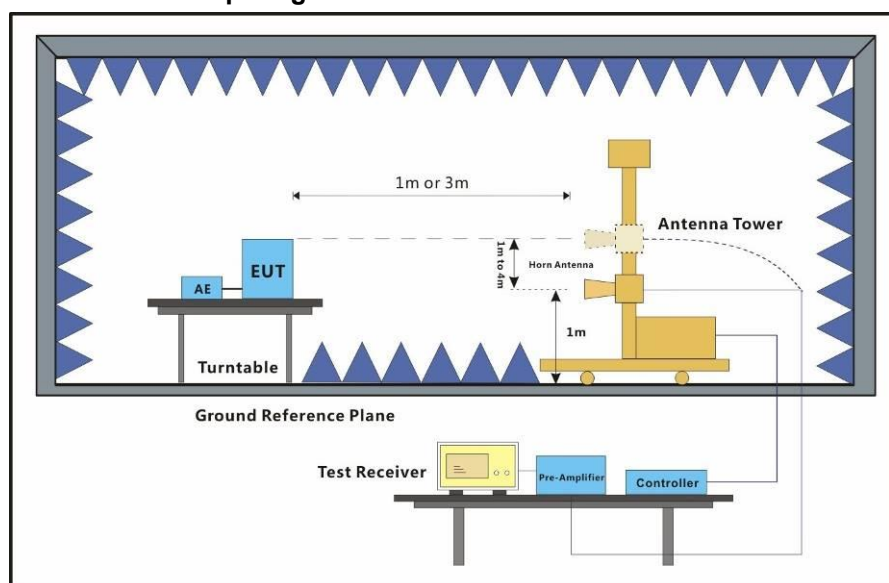
Operating Environment:

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

Pretest these 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 for final test: e: WCDMA Band V Idle+BT+WLAN +GPS Rx+camera (Back)
+battery+Cable(worst)+adapter3

2.3.2 Test Setup Diagram

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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.



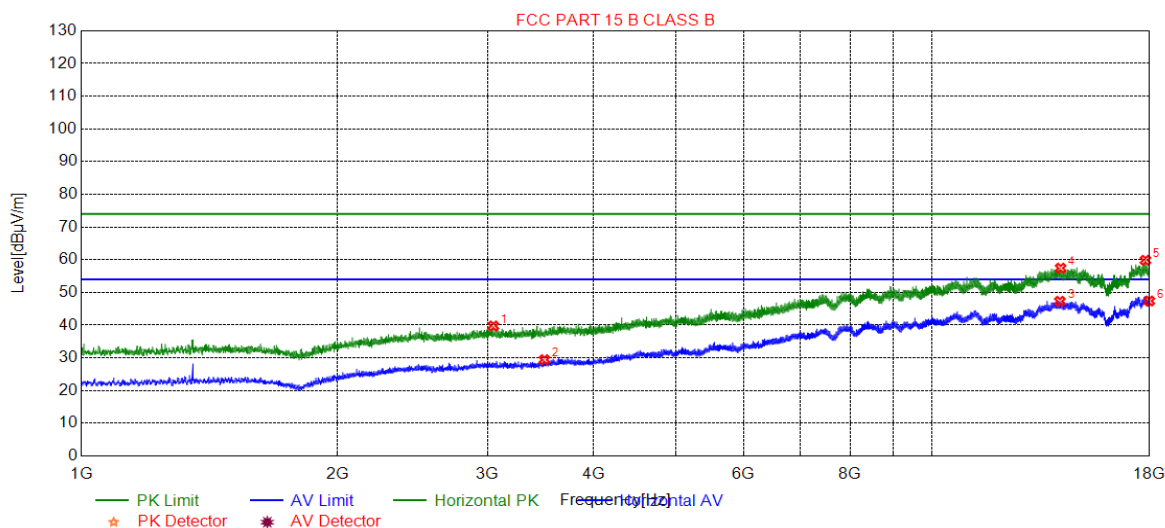
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Mode:m; Polarization:Horizontal



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	231	203	Horizontal
2	3500.82	29.44	-23.62	54.00	24.56	242	16	Horizontal
3	14120.4	47.30	2.30	54.00	6.70	190	316	Horizontal
4	14147.6	57.44	2.22	74.00	16.56	241	128	Horizontal
5	17795.9	59.85	0.70	74.00	14.15	177	91	Horizontal
6	17984.6	47.39	-0.24	54.00	6.61	146	128	Horizontal



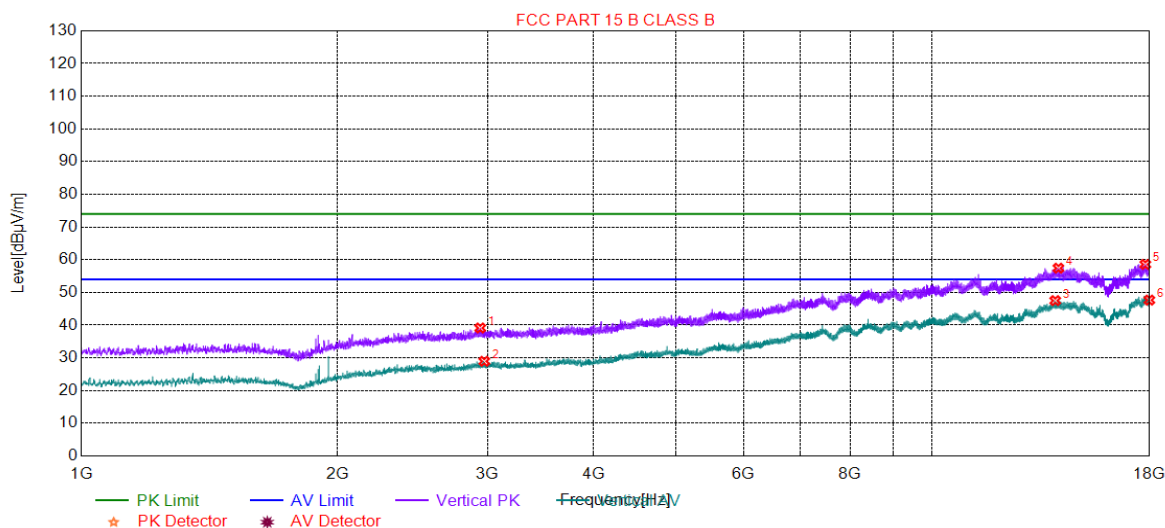
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Mode:m; Polarization:Vertical



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	276	43	Vertical
2	2974.64	28.96	-24.58	54.00	25.04	154	81	Vertical
3	13942.7	47.51	2.20	54.00	6.49	233	344	Vertical
4	14064.3	57.44	2.32	74.00	16.56	286	344	Vertical
5	17792.5	58.59	0.72	74.00	15.41	156	307	Vertical
6	17987.2	47.67	-0.26	54.00	6.33	231	157	Vertical



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3 Equipment List

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	XAW01-04-01	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
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01



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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	2020-04-12	2021-04-11
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
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01



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1 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
2	Radiated Emission	$\pm 4.8\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (1GHz to 6GHz)
		$\pm 4.5\text{dB}$ (6GHz to 18GHz)
		$\pm 5.02\text{dB}$ (Above 18GHz)



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5 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

- End of the Report -



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