

TEST REPORT

Application No.: ZR/2020/70002
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 Name: Mobile handset
Model No.: LM-K420YMW, LM-K420YM
Trade mark: LG
FCC ID: ZNFK420YMW
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020/7/16
Date of Test: 2020/7/16 to 2020/7/31
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:

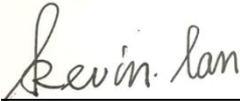
Derek Yang

Wireless Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/8/14		Original
02		2021/5/25	Kevin.Lan	1.Add test site Information 2. Modify data conversion error of antenna height 3.Update equipment list
03		2021/8/14	Kevin.Lan	Updated Support Units, Test facility and Test Location

Authorized for issue by:		
Prepared By		 _____ (Kevin.Lan) /Engineer
Checked By		 _____ (Jim Huang) / Reviewer



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2 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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3 Contents

	Page
1 COVER PAGE.....	1
2 TEST SUMMARY.....	3
3 CONTENTS.....	4
4 GENERAL INFORMATION.....	5
4.1 GENERAL DESCRIPTION OF EUT.....	5
4.2 DESCRIPTION OF SUPPORT UNITS.....	6
4.3 TEST MODES.....	6
4.4 MEASUREMENT UNCERTAINTY.....	6
4.5 TEST LOCATION.....	7
4.6 TEST FACILITY.....	7
4.7 DEVIATION FROM STANDARDS.....	7
4.8 ABNORMALITIES FROM STANDARD CONDITIONS.....	7
5 EQUIPMENT LIST.....	8
6 EMISSION TEST RESULTS.....	10
6.1 CONDUCTED EMISSIONS AT MAINS TERMINALS (150KHZ-30MHZ).....	10
2.1.1 E.U.T. Operation.....	10
2.1.2 Test Setup Diagram.....	10
2.1.3 Measurement Data.....	10
6.2 RADIATED EMISSIONS (30MHZ-1GHZ).....	13
2.1.4 E.U.T. Operation.....	13
2.1.5 Test Setup Diagram.....	13
2.1.6 Measurement Data.....	13
6.3 RADIATED EMISSIONS (ABOVE 1GHZ).....	16
2.1.7 E.U.T. Operation.....	16
2.1.8 Test Setup Diagram.....	16
2.1.9 Measurement Data.....	16
SUSPECTED LIST.....	17
SUSPECTED LIST.....	18
7 PHOTOGRAPHS.....	19
7.1 TEST SETUP.....	19
7.2 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS).....	19



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4 General Information

4.1 General Description of EUT

EUT Description::	Mobile handset		
Model No.:	LM-K420YMW, LM-K420YM		
Trade Mark:	LG		
Sample Type:	<input checked="" type="checkbox"/> Portable Device, <input type="checkbox"/> Module		
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated		
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 V	824~849	869~894
	LTE Band 5	824~849	869~894
	LTE Band 41	2535~2655	2535~2655
	WIFI 2.4G	2412~2472	2412~2472
	BT	2402~2480	2402~2480
	GNSS(GPS/BDS/GLO NASS/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:	Model:	BL-T51	
	Normal Voltage:	+3.87V	
	Rated capacity:	3900mAh	
	Manufacturer:	ATL	
USB cable Information 1#:	Model:	DC15WB-G	
	Manufacturer:	Ningbo Broad Telecommunication Co., Ltd	
USB cable Information 2#:	Model:	DC15WX-G	
	Manufacturer:	ASAP Technology(Jiangxi)Co.,Ltd	



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4.2 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

4.3 Test modes

<p>Pretest these modes to find the worst case and show the worse data in the test items:</p>	<p>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:GSM 850 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+ Cable(worst)+adapter(Worst)</p>
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4.4 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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4.5 Test Location

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

4.6 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.**

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 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	XAW01-04-03	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



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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	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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6 Emission Test Results

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

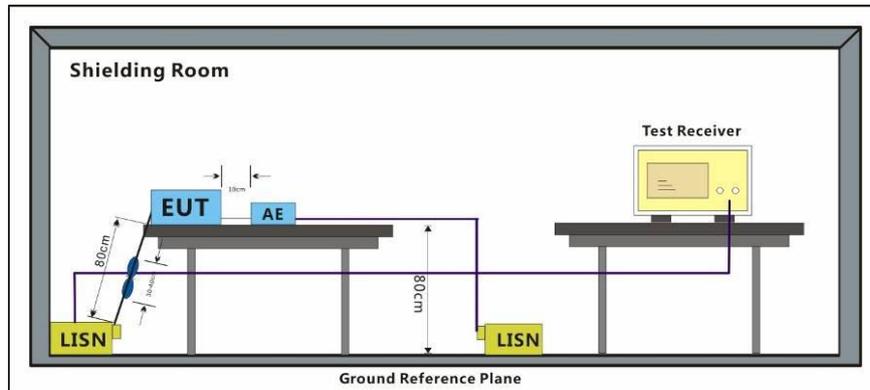
Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

2.1.1 E.U.T. Operation

Operating Environment:

Temperature:	20.3 °C	Humidity:	58.1 % RH	Atmospheric Pressure:	1005 mbar
The worst case for final test:	f:GSM 850 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+ Cable(worst)+adapter(Worst)				

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.

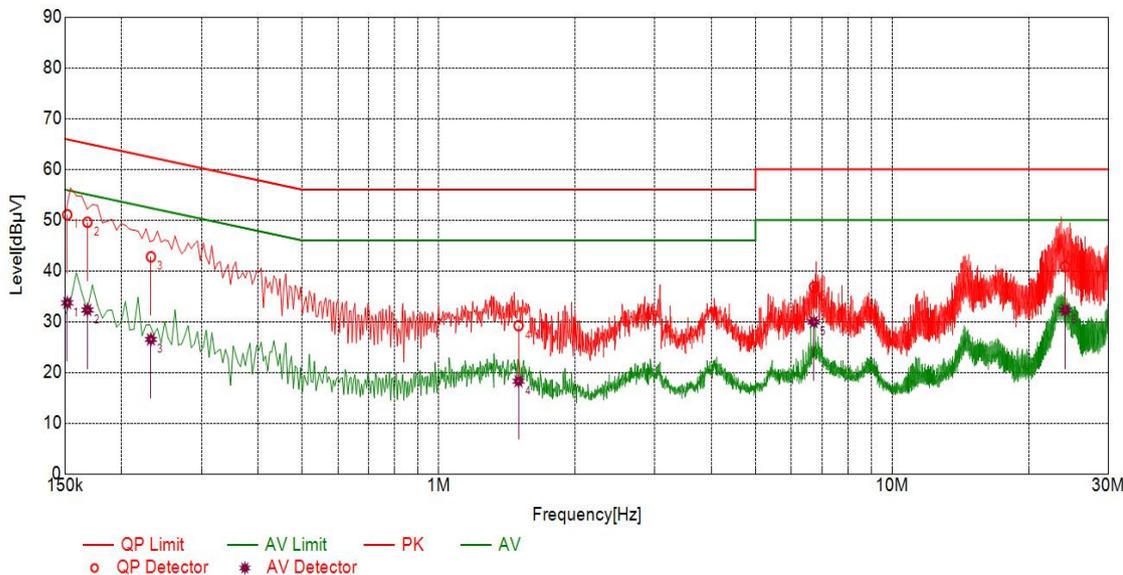


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Mode:f; Line:Live Line



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	0.1518	10.10	51.06	65.90	14.84	33.69	55.90	22.21	L
2	0.1682	10.10	49.58	65.05	15.47	32.29	55.05	22.76	L
3	0.2322	10.10	42.76	62.37	19.61	26.49	52.37	25.88	L
4	1.5009	10.10	29.21	56.00	26.79	18.27	46.00	27.73	L
5	6.7198	10.10	36.82	60.00	23.18	29.93	50.00	20.07	L
6	24.0784	10.11	40.85	60.00	19.15	32.27	50.00	17.73	L

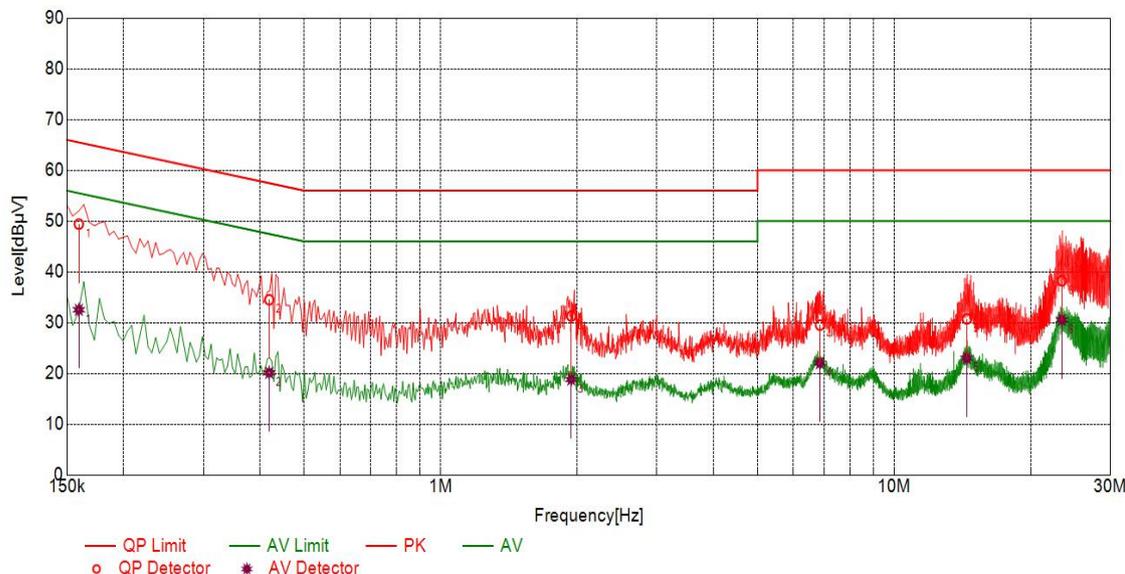


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Mode:f; Line:Neutral Line



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	0.1594	10.10	49.41	65.49	16.08	32.52	55.49	22.97	N
2	0.4190	10.10	34.51	57.47	22.96	20.12	47.47	27.35	N
3	1.9417	10.10	31.27	56.00	24.73	18.81	46.00	27.19	N
4	6.8598	10.10	29.52	60.00	30.48	22.02	50.00	27.98	N
5	14.4602	10.11	30.73	60.00	29.27	22.99	50.00	27.01	N
6	23.4384	10.11	38.25	60.00	21.75	30.55	50.00	19.45	N



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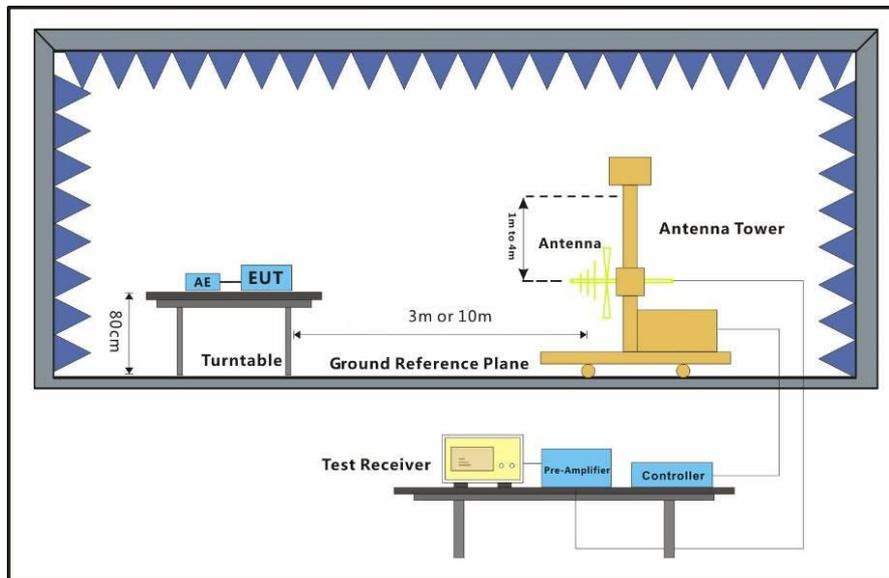
6.2 Radiated Emissions (30MHz-1GHz)

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

2.1.4 E.U.T. Operation

Operating Environment:
 Temperature: 25.4 °C Humidity: 51 % RH Atmospheric Pressure: 1005 mbar
 The worst case a: Transfer data between the EUT and the PC+USB cable 1 for final test:

2.1.5 Test Setup Diagram



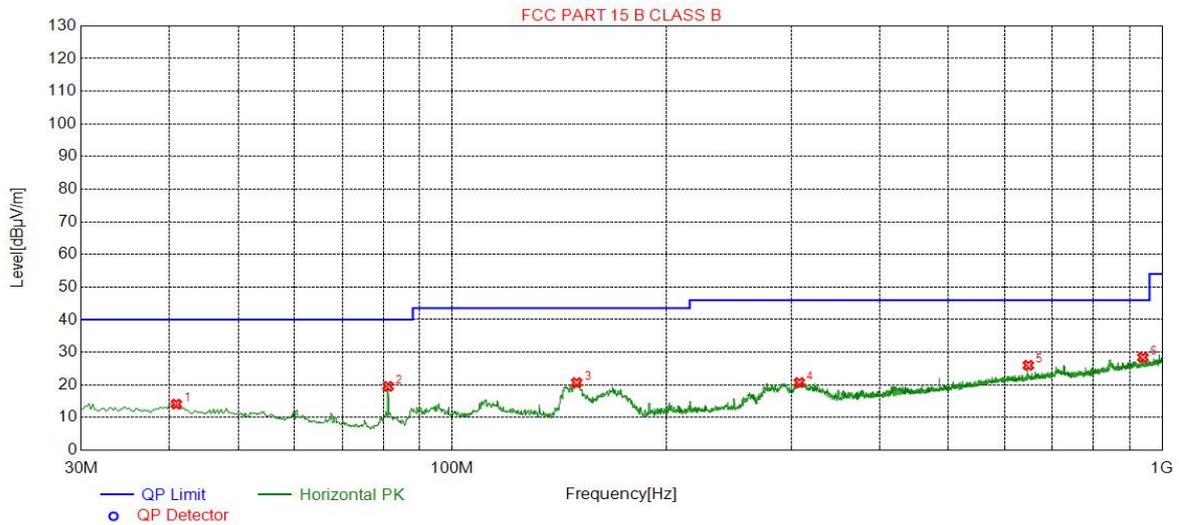
2.1.6 Measurement Data

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



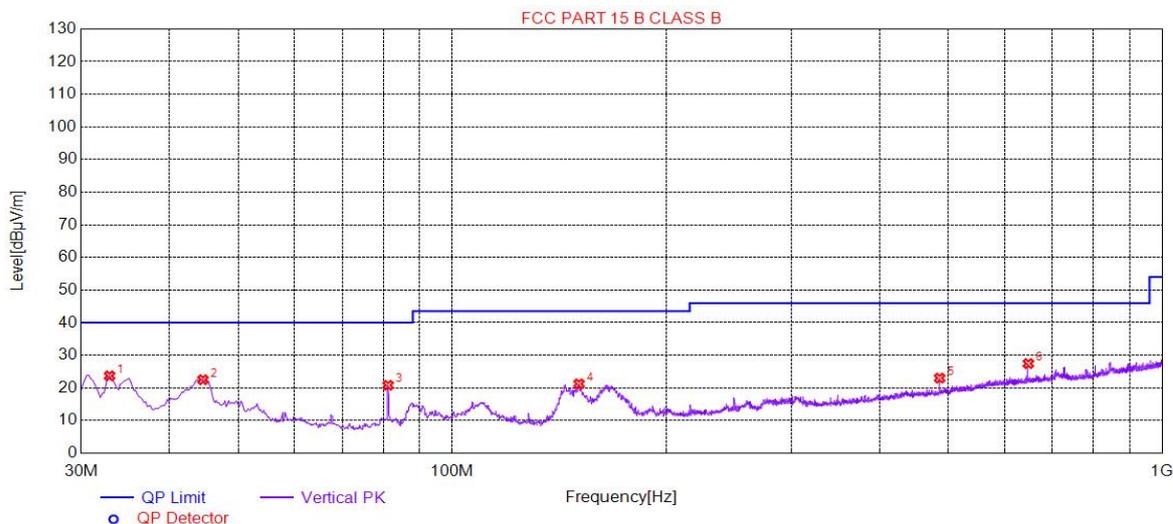
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.8662	14.13	-28.70	40.00	25.87	114	16	Horizontal
2	81.2262	19.57	-35.85	40.00	20.43	165	291	Horizontal
3	149.721	20.71	-35.09	43.50	22.79	133	119	Horizontal
4	308.251	20.73	-28.03	46.00	25.27	207	282	Horizontal
5	648.013	26.02	-20.05	46.00	19.98	112	49	Horizontal
6	939.459	28.44	-15.60	46.00	17.56	109	314	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	32.9106	23.73	-30.01	40.00	16.27	158	276	Vertical
2	44.5529	22.53	-30.24	40.00	17.47	243	276	Vertical
3	81.2262	20.84	-35.85	40.00	19.16	260	353	Vertical
4	150.886	21.27	-35.04	43.50	22.23	155	279	Vertical
5	485.991	23.03	-23.67	46.00	22.97	261	346	Vertical
6	648.013	27.49	-20.05	46.00	18.51	285	346	Vertical



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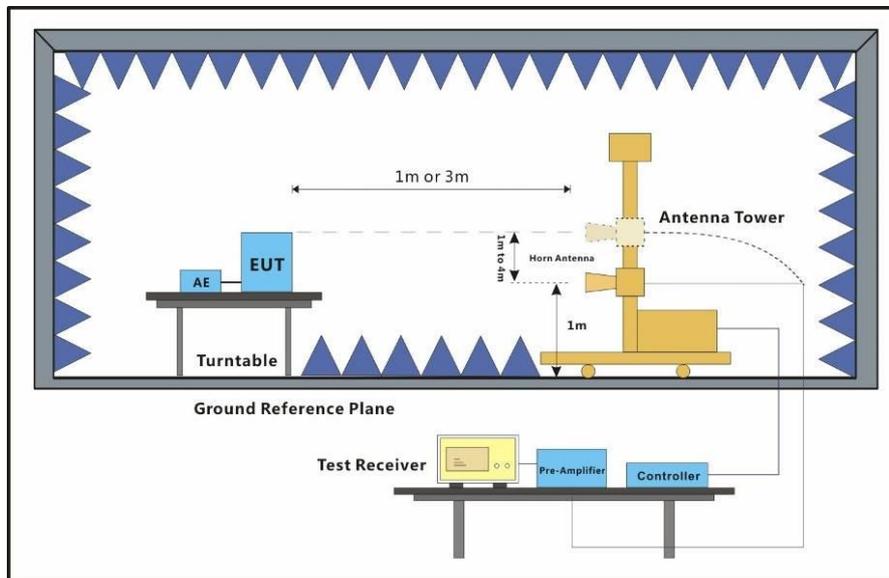
6.3 Radiated Emissions (above 1GHz)

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

2.1.7 E.U.T. Operation

Operating Environment:
 Temperature: 23.3 °C Humidity: 56.2 % RH Atmospheric Pressure: 1005 mbar
 The worst case for final test: f:GSM 850 Idle +BT+WLAN +GPS Rx+earphone(worst)+battery(worst)+Cable(worst)+adapter(Worst)

2.1.8 Test Setup Diagram



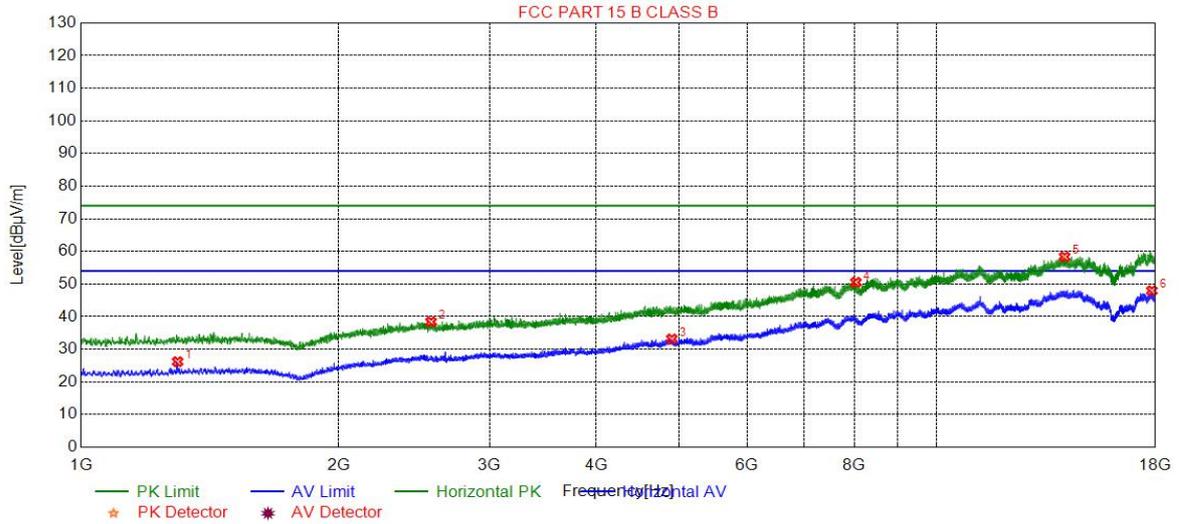
2.1.9 Measurement Data

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



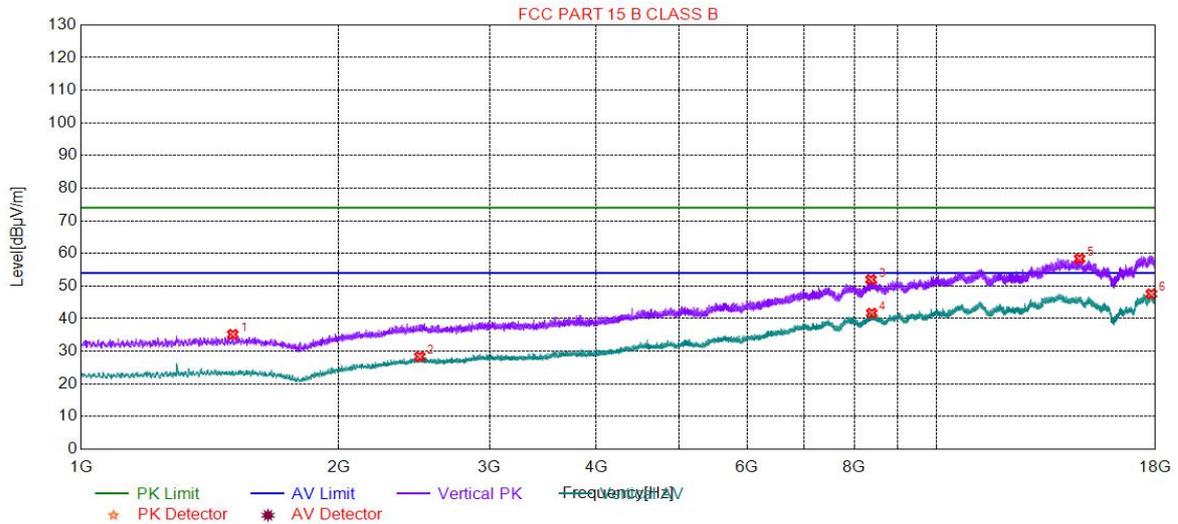
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1296.66	26.23	-30.78	54.00	27.77	148	39	Horizontal
2	2564.07	38.44	-25.91	74.00	35.56	170	321	Horizontal
3	4899.99	33.20	-17.78	54.00	20.80	219	321	Horizontal
4	8039.20	50.53	-8.36	74.00	23.47	189	230	Horizontal
5	14094.9	58.35	2.35	74.00	15.65	145	54	Horizontal
6	17825.7	47.98	0.54	54.00	6.02	154	153	Horizontal



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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	1504.07	35.22	-30.43	74.00	38.78	165	306	Vertical
2	2487.57	28.38	-25.93	54.00	25.62	187	306	Vertical
3	8374.11	51.98	-7.78	74.00	22.02	155	268	Vertical
4	8391.11	41.69	-7.79	54.00	12.31	252	268	Vertical
5	14672.9	58.39	1.66	74.00	15.61	193	53	Vertical
6	17800.2	47.61	0.69	54.00	6.39	165	321	Vertical



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7 Photographs

7.1 Test Setup

Please refer to Test Setup photo.

7.2 EUT Constructional Details (EUT Photos)

Please refer to internal and external photo.

- End of the Report -



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