

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: 2020/8/14

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

Authorized for issue by:			
		 <hr/> (Mike Hu) /Project Engineer	
		 <hr/> (David Chen) /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.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800
Mouse	Lenovo	M-U0025-O	REF. No.:SEA2400
Router	NETGEAR	DGN2200	REF. No.SEA2200

4.3 Test modes

Pretest these modes to find the worst case and show the worse data in the test items:	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)
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4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.5dB (30MHz-1GHz)
		± 4.8dB (1GHz-6GHz)
3	Temperature test	± 1 °C
4	Humidity test	± 3%



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4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594
No tests were sub-contracted.

4.6 Test Facility

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

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2020-05-10	2023-05-09
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2020-07-12	2021-07-11
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019-09-25	2020-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2020-03-13	2021-03-12
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2020-03-13	2021-03-12

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2019-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2020-07-12	2021-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2020-03-13	2021-03-12
Trilog-Broadband Antenna(30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2020-06-29	2024-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2020-03-13	2021-03-12

Radiated Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-12	2021-07-11
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2020-03-13	2021-03-12
Horn Antenna(1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2020-03-13	2021-03-12
Pre-Amplifier(0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-27	2020-09-26



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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-27	2020-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-27	2020-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-27	2020-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-03-13	2021-03-12



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6 Emission Test Results

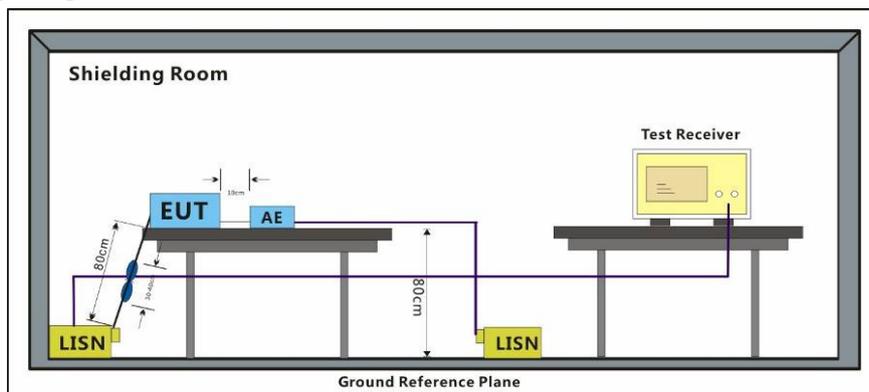
6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

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.

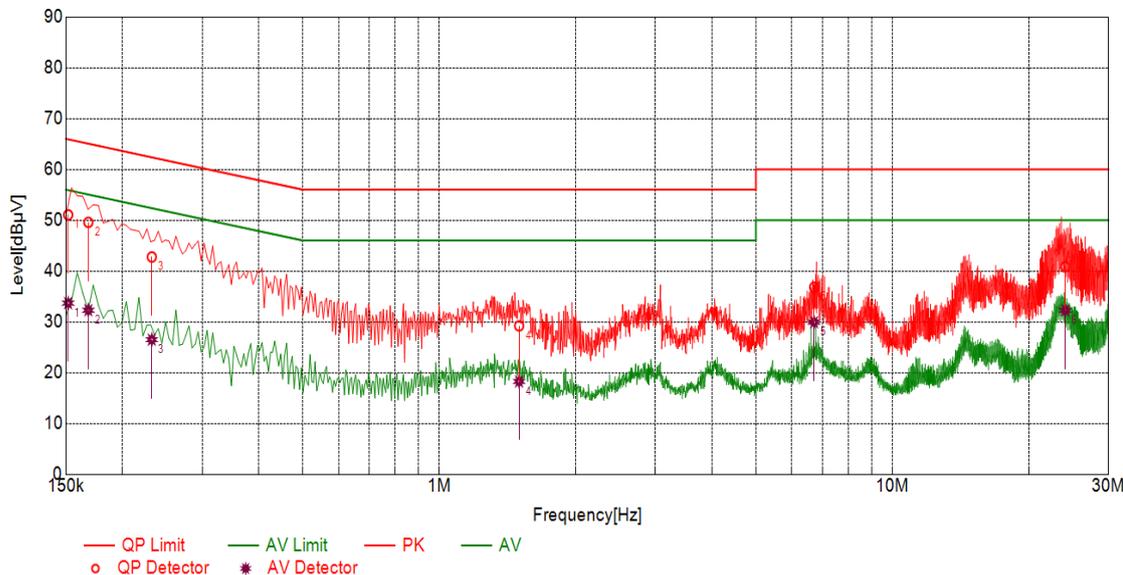


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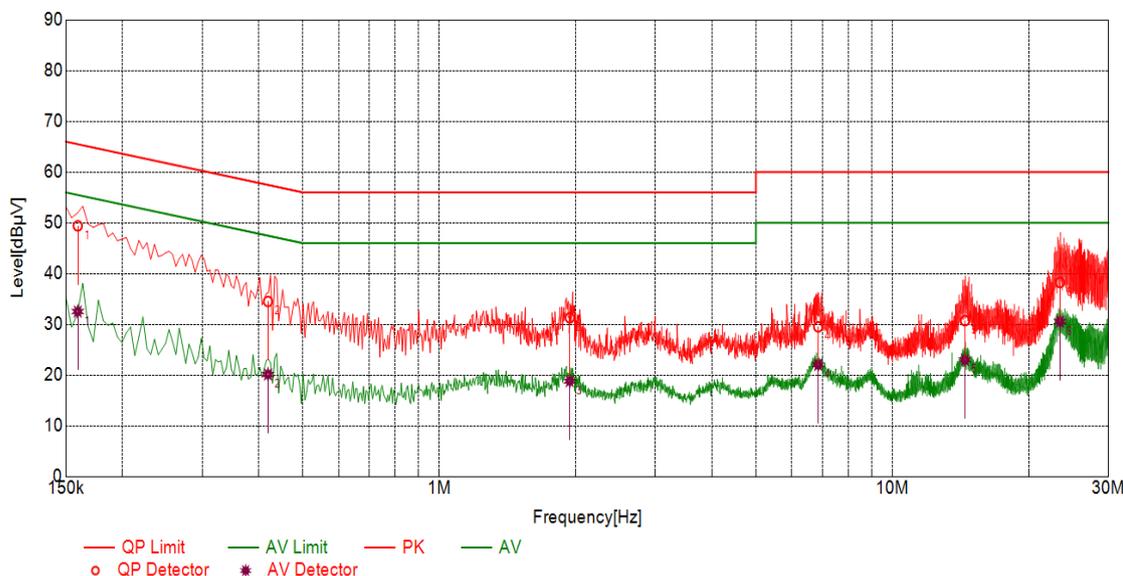
Test Graph

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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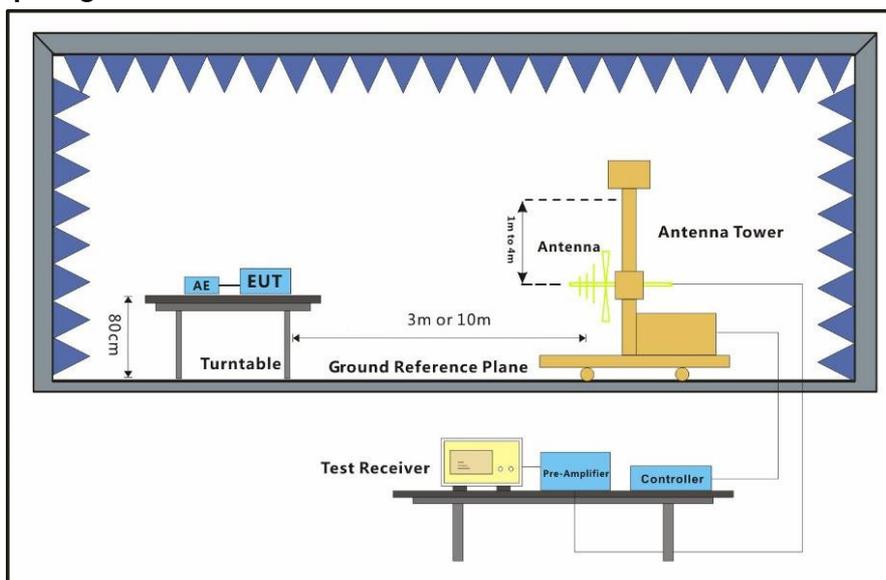
6.2 Radiated Emissions (30MHz-1GHz)

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 cable1
 for final test:

2.1.5 Test Setup Diagram

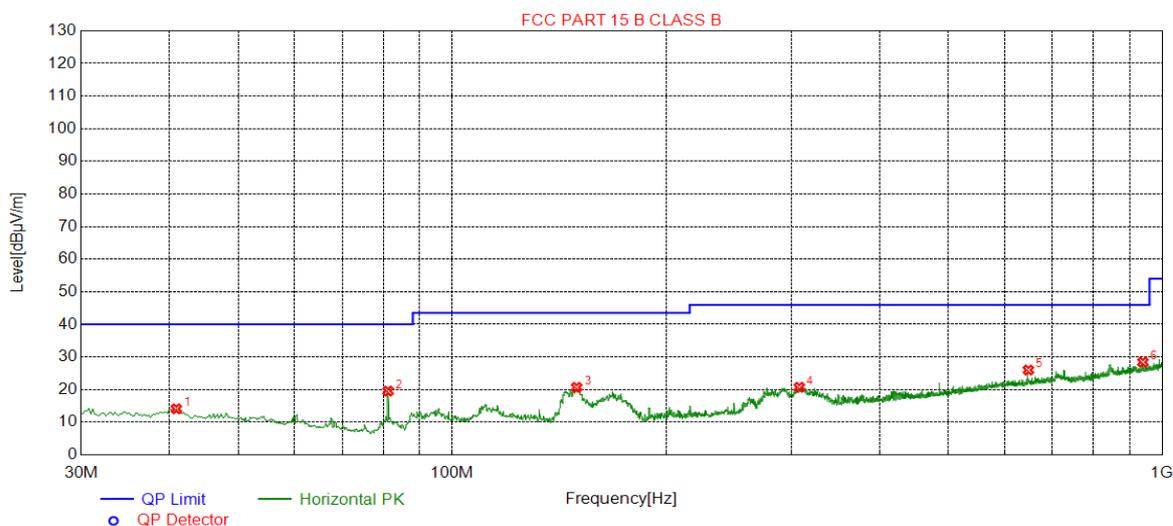


2.1.6 Measurement Data

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.



Mode:a; Polarization:Horizontal



Suspected List

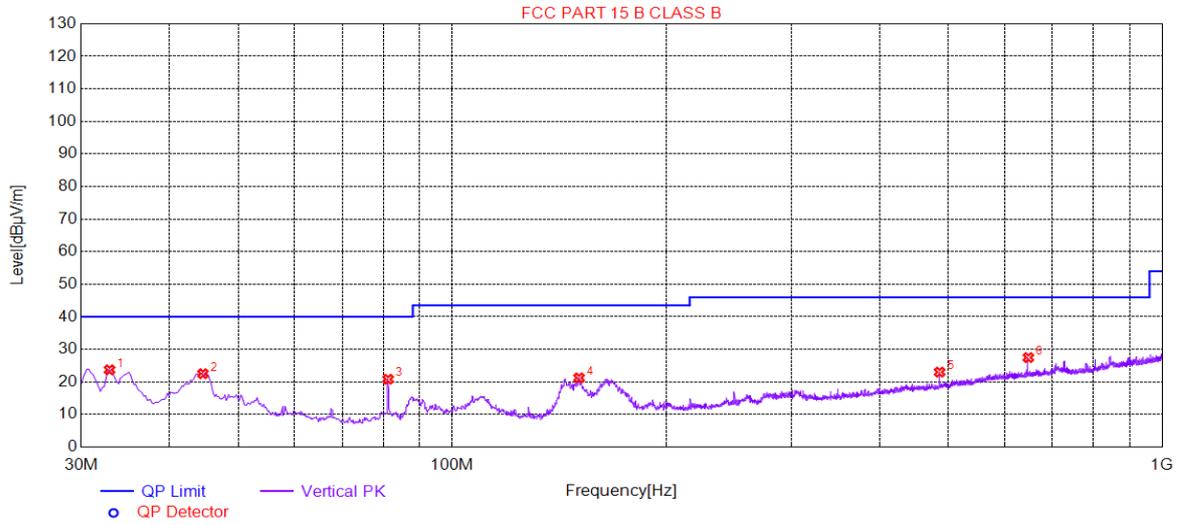
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	40.8662	14.13	-28.70	40.00	25.87	200	16	Horizontal
2	81.2262	19.57	-35.85	40.00	20.43	200	291	Horizontal
3	149.721	20.71	-35.09	43.50	22.79	200	119	Horizontal
4	308.251	20.73	-28.03	46.00	25.27	100	282	Horizontal
5	648.013	26.02	-20.05	46.00	19.98	200	49	Horizontal
6	939.459	28.44	-15.60	46.00	17.56	100	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	100	276	Vertical
2	44.5529	22.53	-30.24	40.00	17.47	100	276	Vertical
3	81.2262	20.84	-35.85	40.00	19.16	200	353	Vertical
4	150.886	21.27	-35.04	43.50	22.23	100	279	Vertical
5	485.991	23.03	-23.67	46.00	22.97	100	346	Vertical
6	648.013	27.49	-20.05	46.00	18.51	100	346	Vertical



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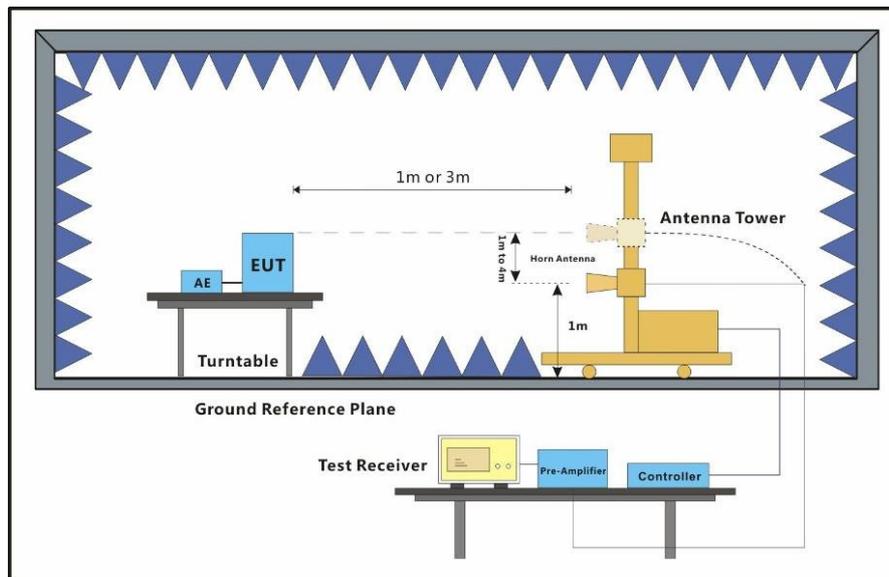
6.3 Radiated Emissions (above 1GHz)

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



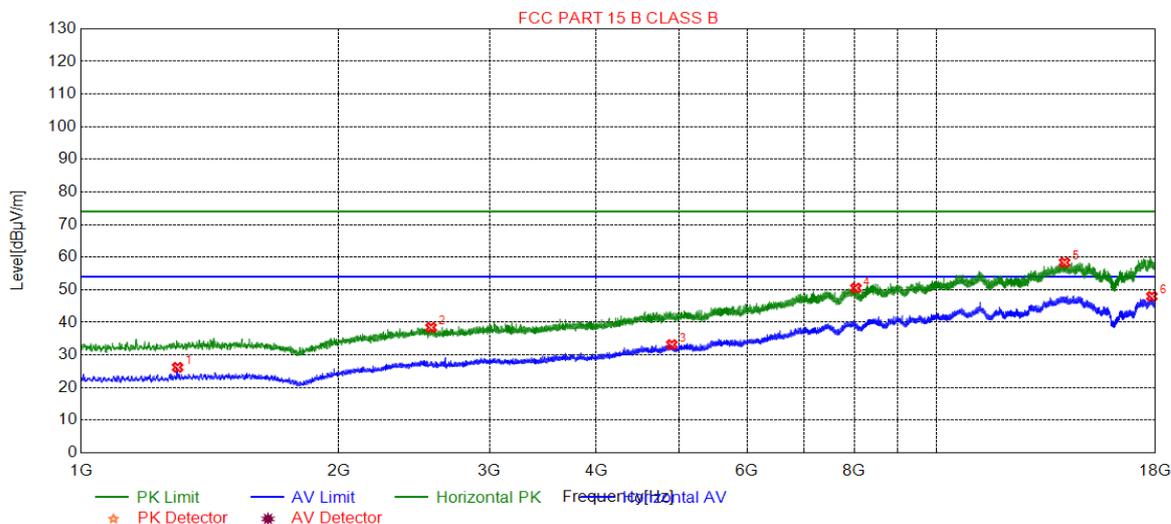
2.1.9 Measurement Data

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	100	39	Horizontal
2	2564.07	38.44	-25.91	74.00	35.56	200	321	Horizontal
3	4899.99	33.20	-17.78	54.00	20.80	200	321	Horizontal
4	8039.20	50.53	-8.36	74.00	23.47	100	230	Horizontal
5	14094.9	58.35	2.35	74.00	15.65	200	54	Horizontal
6	17825.7	47.98	0.54	54.00	6.02	100	153	Horizontal

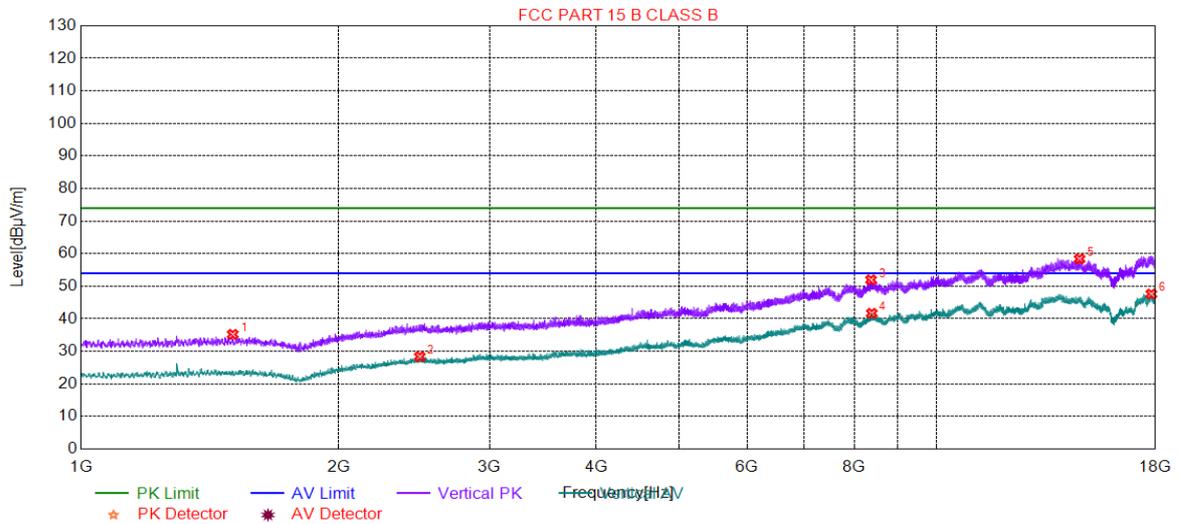


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Mode:f; Polarization:Vertical



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	100	306	Vertical
2	2487.57	28.38	-25.93	54.00	25.62	100	306	Vertical
3	8374.11	51.98	-7.78	74.00	22.02	100	268	Vertical
4	8391.11	41.69	-7.79	54.00	12.31	100	268	Vertical
5	14672.9	58.39	1.66	74.00	15.61	200	53	Vertical
6	17800.2	47.61	0.69	54.00	6.39	200	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 -

