



TEST REPORT

Application No: AR/2020/A0003
Applicant: Xiaomi Communications Co., Ltd.
Address of Applicant: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer: Xiaomi Communications Co., Ltd.
Address of Manufacturer: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
EUT Description: Mobile Phone
Model No.: M2007J22R
Trade Mark: Redmi
FCC ID: 2AFZZJ22G
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020/9/16
Date of Test: 2020/9/16 to 2020/10/10(for original report AR/2020/8000506-01)
2020/10/25to 2020/11/6 (for new report AR/2020/A000306-01)
Date of Issue: 2021/5/25

Test Result:

Pass*

* 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		2020/10/15		Original
02		2021/5/25	Leah Chen	1.Modify data conversion error of antenna height 2.Updated equipment list

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



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

Remark:

This test report (Report No.: AR/2020/A000306-01) is base on the original test report (Report No.: AR/2020/8000506-01).

Review this report and original report, this report just changing the parts according to the declaration letter from client.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.



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1 General Information

Product Name:	Mobile Phone		
Model No.(EUT):	M2007J22R		
Trade Mark:	Redmi		
Hardware Version:	P2		
Software Version:	MIUI12		
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 17	704~716	734~746
	LTE Band 26	814~849	859~894
	LTE Band 38	2570~2620	2570~2620
	Wi-Fi 2.4G	2412~2472	2412~2472
	Bluetooth	2402~2480	2402~2480
	WIFI(5GHz)	5150~5350	5150~5350
		5470~5725	5470~5725
		5725~5850	5725~5850
	GNSS*	1599~1610	
	FM	87.5~108	
	NFC	13.56	

* GNSS = GPS + Glonass + Beidou + Galileo

EUT 1= 4+128G EUT2=4+64G

1.1 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 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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1.3 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

1.4 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.**

1.5 Deviation from Standards

None

1.6 Abnormalities from Standard Conditions

None



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2 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
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03
5G UXM	Keysight	E7515B	XAW01-19-02	2020-09-11	2021-09-10
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

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
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
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
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
5G UXM	Keysight	E7515B	XAW01-04-01	2020-09-11	2021-09-10
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ RE V3.0.0.2	XAW02-05-01	NCR	NCR



3 Emission Test Results

3.1 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:

- 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+playing MP4+earphone+EUT1+USB cable+adapter+ant0
 - 2:GSM1900 Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0
 - 3:WCDMA II Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1
 - 4:WCDMA VI Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1
 - 5:WCDMA V Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0
 - 6:LTE band 2 Link +BT+ WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 - 7:LTE band 4 Idle +BT+FM +WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant1
 - 8:LTE band 5 Idle +BT+FM+WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 - 9:LTE band 7 Idle +BT+FM+WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 - 10:LTE band 38 Link +BT+FM +WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 - 11:Transfer data between the EUT1 and the PC+USB cable
 - 12:Transfer data between the EUT2 and the PC+USB cable
- The worst case for final test: 8:LTE band 5 Idle +BT+FM+WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0



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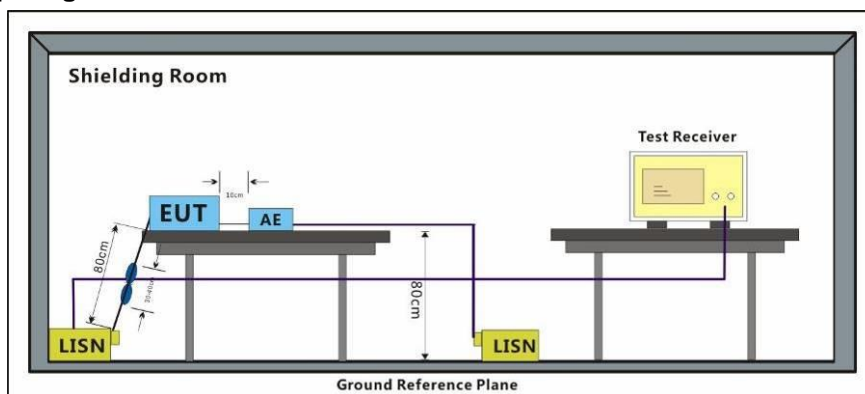
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2.1.2 Test Setup Diagram



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.



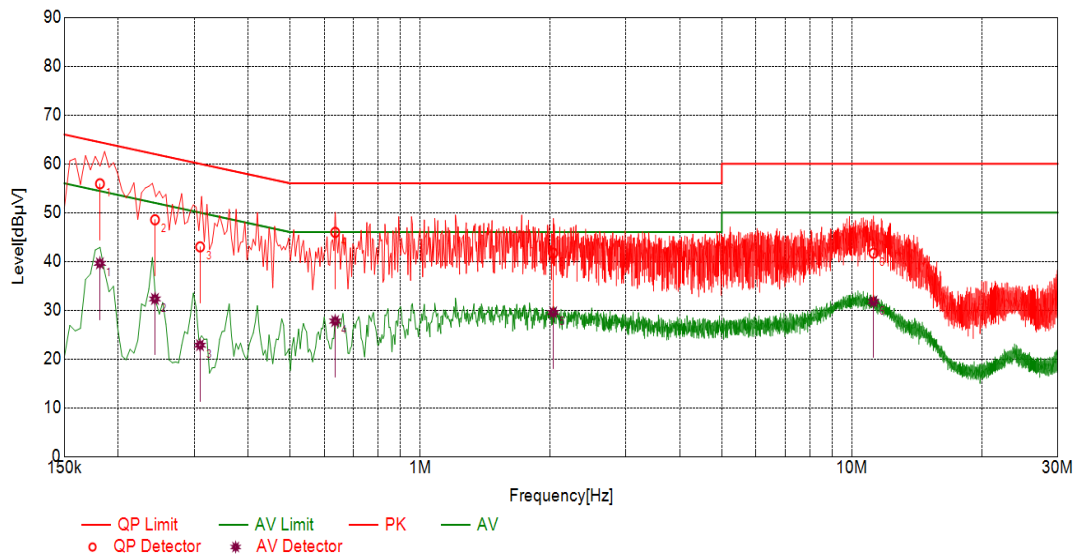
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Mode:8; Line:Live Line



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]
1	0.1814	10.10	55.91	64.42	8.51	39.60	54.42	14.82
2	0.2433	10.10	48.53	61.98	13.45	32.31	51.98	19.67
3	0.3094	10.10	42.98	59.99	17.01	22.83	49.99	27.16
4	0.6360	10.10	45.95	56.00	10.05	27.76	46.00	18.24
5	2.0341	10.10	41.70	56.00	14.30	29.55	46.00	16.45
6	11.2279	10.10	41.68	60.00	18.32	31.78	50.00	18.22



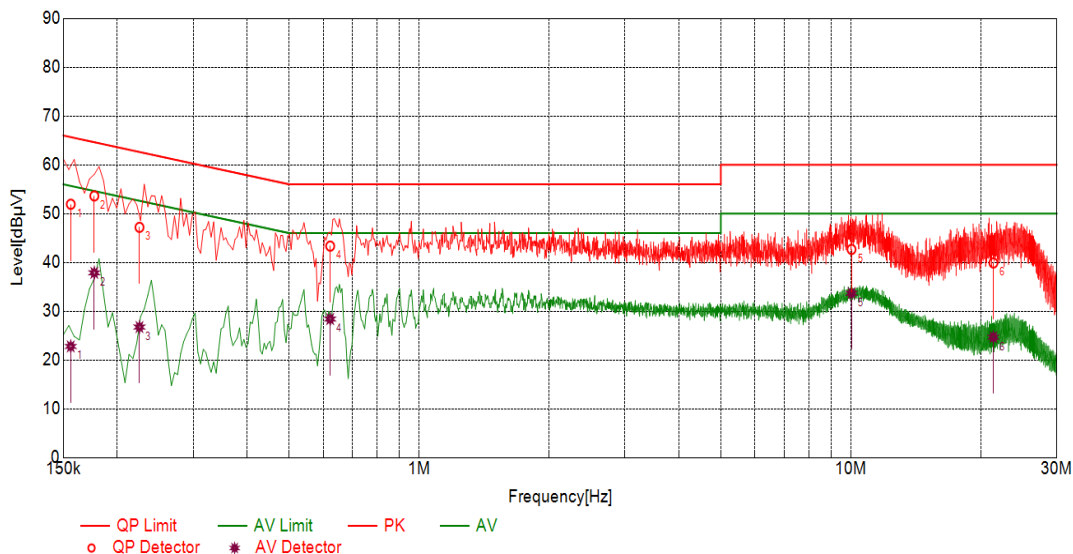
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Mode:8; Line:Neutral Line



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]
1	0.1561	10.10	51.92	65.67	13.75	22.78	55.67	32.89
2	0.1770	10.10	53.62	64.63	11.01	37.86	54.63	16.77
3	0.2252	10.10	47.19	62.62	15.43	26.75	52.62	25.87
4	0.6226	10.10	43.34	56.00	12.66	28.39	46.00	17.61
5	10.0365	10.10	42.67	60.00	17.33	33.68	50.00	16.32
6	21.3868	10.11	39.89	60.00	20.11	24.67	50.00	25.33



3.2 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 °C Humidity: 66.5 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case: 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+playing MP4+earphone+EUT1+USB cable+adapter+ant0

2:GSM1900 Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0

3:WCDMA II Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1

4:WCDMA VI Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1

5:WCDMA V Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0

6:LTE band 2 Link +BT+ WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0

7:LTE band 4 Idle +BT+FM +WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant1

8:LTE band 5 Idle +BT+FM+WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0

9:LTE band 7 Idle +BT+FM+WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0

10:LTE band 38 Link +BT+FM +WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0

11:Transfer data between the EUT1 and the PC+USB cable

12:Transfer data between the EUT2 and the PC+USB cable

The worst case for final test: 11:Transfer data between the EUT1 and the PC+USB cable



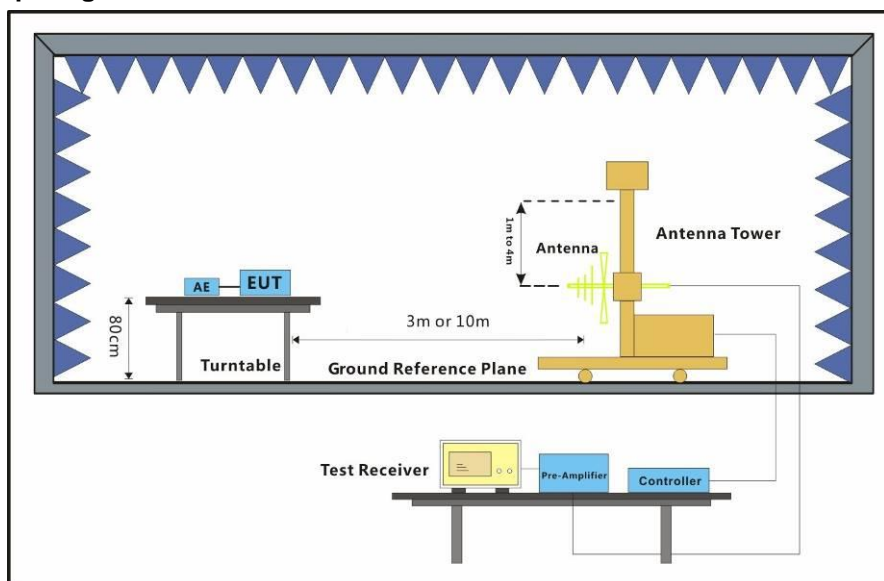
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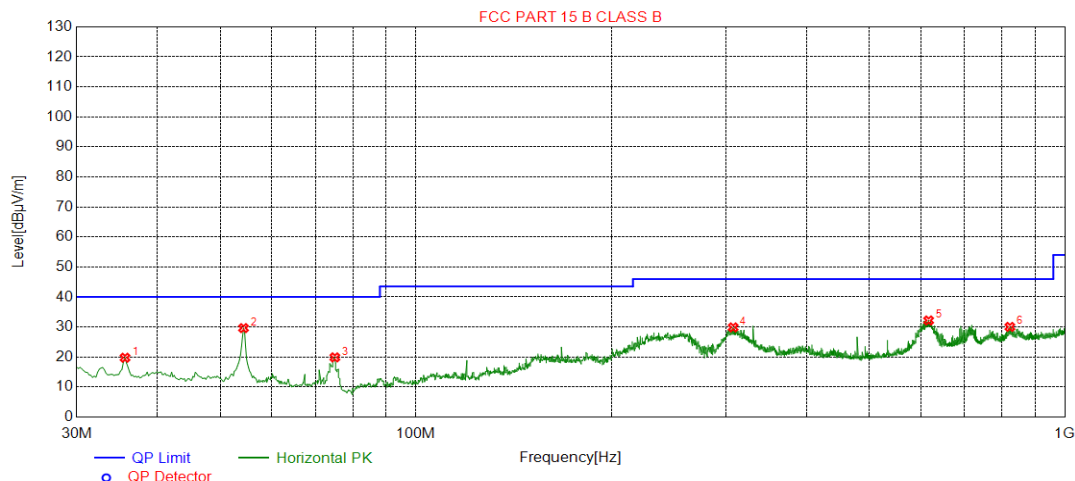
2.1.5 Test Setup Diagram



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:11 Polarization:Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.6271	19.78	-29.76	40.00	20.22	235	223	Horizontal
2	54.2549	29.65	-31.01	40.00	10.35	244	346	Horizontal
3	75.0170	19.90	-35.25	40.00	20.10	222	102	Horizontal
4	308.251	29.88	-28.03	46.00	16.12	106	69	Horizontal
5	616.773	32.19	-20.43	46.00	13.81	200	14	Horizontal
6	822.842	30.05	-17.37	46.00	15.95	230	254	Horizontal

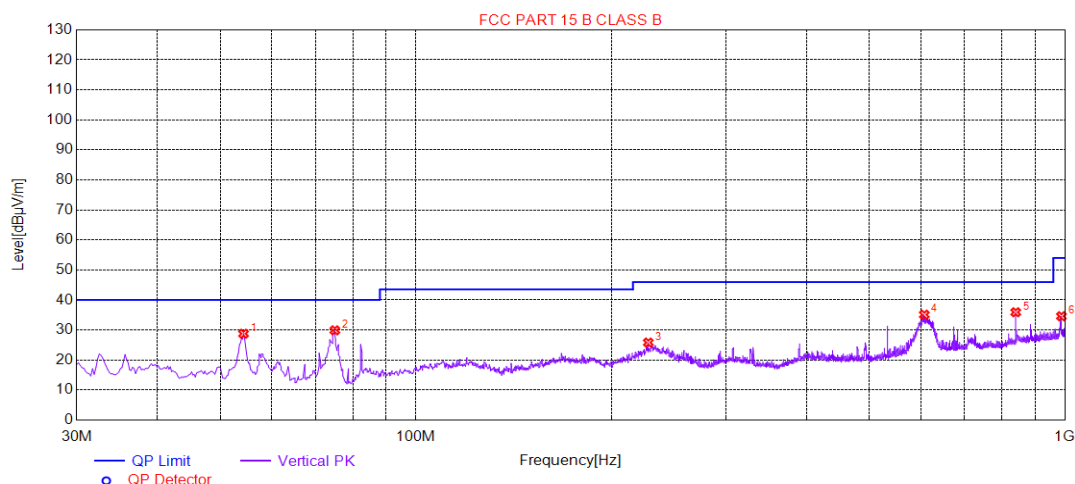


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Mode:11; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.2549	28.77	-31.01	40.00	11.23	184	278	Vertical
2	75.0170	29.91	-35.25	40.00	10.09	263	28	Vertical
3	228.113	25.83	-30.47	46.00	20.17	156	332	Vertical
4	607.459	35.13	-20.54	46.00	10.87	274	354	Vertical
5	840.112	35.94	-17.06	46.00	10.06	232	326	Vertical
6	987.969	34.61	-14.96	54.00	19.39	279	342	Vertical



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3.3 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

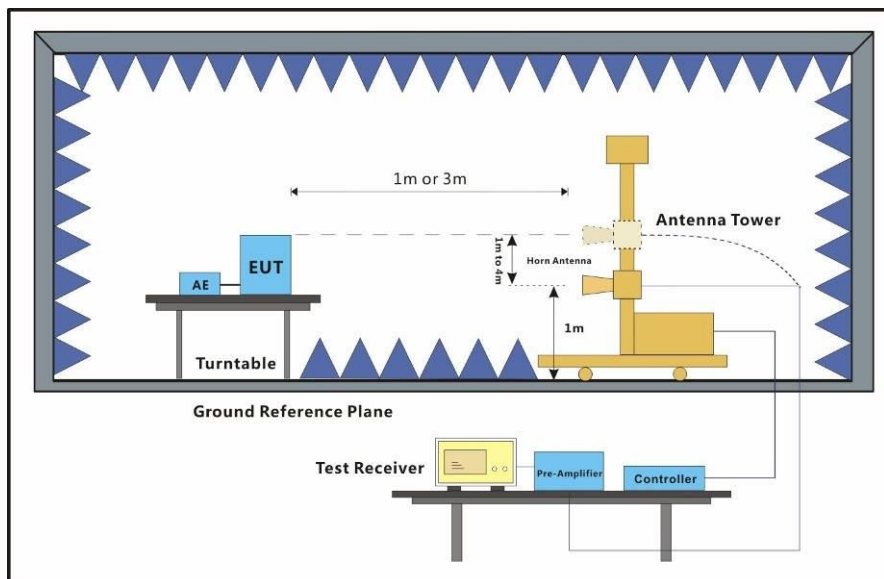
2.1.7 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar
 Pretest these modes to find the worst case:
 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+playing MP4+earphone+EUT1+USB cable+adapter+ant0
 2:GSM1900 Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0
 3:WCDMA II Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1
 4:WCDMA VI Idle +BT+WLAN2.4G+GNSS Rx+camera (Front)+earphone+EUT1+USB cable+adapter+ant1
 5:WCDMA V Idle +BT+WLAN5G+GNSS Rx+camera (Back)+earphone+EUT1+USB cable+adapter+ant0
 6:LTE band 2 Link +BT+ WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 7:LTE band 4 Idle +BT+FM +WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant1
 8:LTE band 5 Idle +BT+FM+WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 9:LTE band 7 Idle +BT+FM+WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 10:LTE band 38 Link +BT+FM +WLAN5G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0
 11:Transfer data between the EUT1 and the PC+USB cable
 12:Transfer data between the EUT2 and the PC+USB cable
 The worst case for final test: 9:LTE band 7 Idle +BT+FM+WLAN2.4G+GNSS Rx+NFC+earphone+EUT1+USB cable+adapter+ant0



2.1.8 Test Setup Diagram

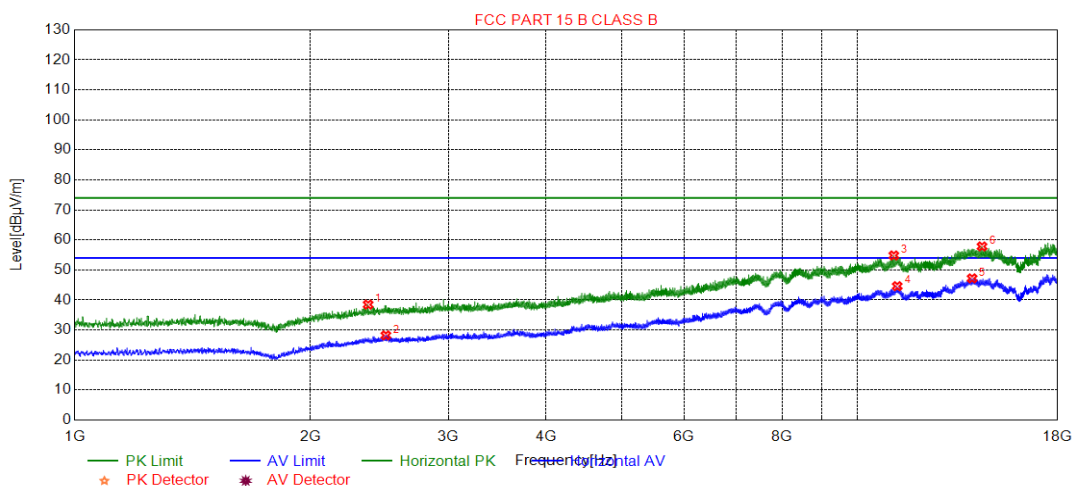


2.1.9 Measurement Data

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.



Mode:9 Polarization:Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2370.26	38.48	-26.59	74.00	35.52	192	92	Horizontal
2	2496.92	28.22	-25.87	54.00	25.78	244	358	Horizontal
3	11118.0	54.85	-2.67	74.00	19.15	194	156	Horizontal
4	11229.4	44.62	-2.81	54.00	9.38	164	206	Horizontal
5	13994.5	47.21	2.24	54.00	6.79	178	269	Horizontal
6	14408.5	57.84	1.92	74.00	16.16	122	206	Horizontal



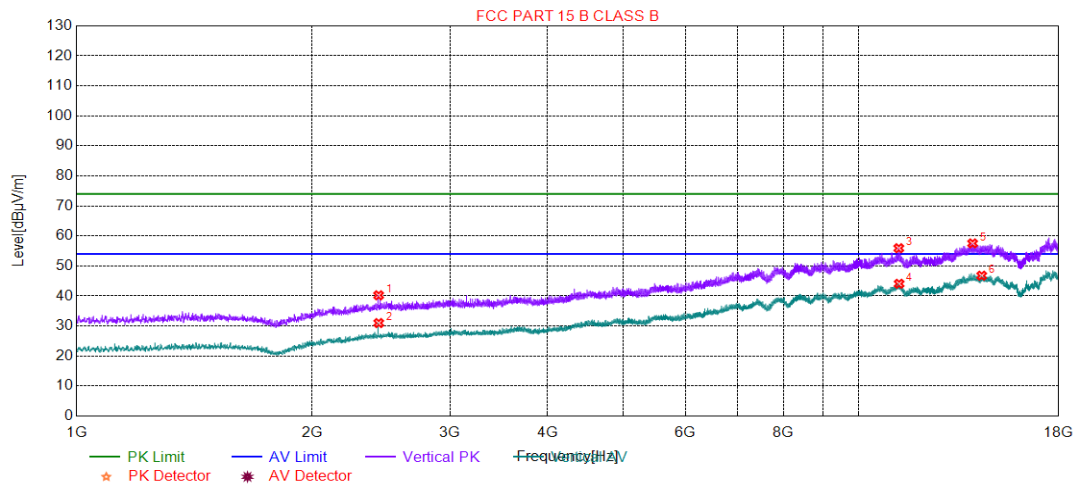
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Mode:9; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2432.32	40.24	-26.28	74.00	33.76	189	53	Vertical
2	2433.17	31.00	-26.28	54.00	23.00	213	53	Vertical
3	11242.1	55.93	-2.80	74.00	18.07	273	204	Vertical
4	11252.3	44.08	-2.78	54.00	9.92	207	307	Vertical
5	13968.2	57.53	2.22	74.00	16.47	157	53	Vertical
6	14347.3	46.78	1.90	54.00	7.22	286	128	Vertical

Remark:

1) Scan from 1GHz to 30GHz, The disturbance above 18GHz was very low and all noise floor. The above radiated emissions were the highest point could be found when testing, so only the above radiated emissions had been displayed.





4 Photographs

4.1 Conducted Emissions at Mains Terminals (150kHz-30MHz) Test Setup

4.2 Radiated Emissions (30MHz-1GHz) Test Setup

4.3 Radiated Emissions (above 1GHz) Test Setup

4.4 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -



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