

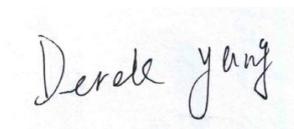
TEST REPORT

Application No.: XAR/2021/10008
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.: M2103K19G / M2103K19PG
Trade Mark: Redmi / POCO
FCC ID: 2AFZZK19G
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2021/2/8
Date of Test: 2021/2/8 to 2021/3/30
Date of Issue: 2021/3/30

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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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2021/3/30		Original



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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

Note: The differences between M2103K19G (K19) and M2103K19PG (K19P) are as below:

Model name	Brand Name	rear cover
M2103K19G	Redmi	The material is the same, drawing is different, laser engraving is different
M2103K19PG	POCO	

Except listings above, the others are all the same as previous version.

Based on the above differences, the main test only performs M2103K19G

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

Checked By



Jimmy Zhu
Reviewer

Test By



Ben Huang
Project Engineer



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

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1 General Information

Product Name:	Mobile Phone		
Model No.(EUT):	M2103K19G / M2103K19PG		
Trade Mark:	Redmi / POCO		
Hardware Version:	P2		
Software Version:	MIUI 12		
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 38	2570~2620	2570~2620
	LTE Band 41	2496~2690	2496~2690
	LTE Band 66	1710~1780	2110~2200
	NR Band n7	2500~2570	2620~2690
	NR Band n38	2570~2620	2570~2620
	NR Band n41	2496~2690	2496~2690
	NR Band n66	1710~1780	2110~2200
	NR Band n77	3700~3980	3700~3980
	NR Band n78	3700~3800	3700~3800
	Wi-Fi 2.4G	2412~2462	2412~2462
	Bluetooth	2402~2480	2402~2480
	Wi-Fi 5G	5150~5850	5150~5850
FM	87~108		
NFC	13.56		
GNSS(GPS+Glonass + Beidou+Galileo)	1599~1610		

EUT 1=4+64G EUT 2= 6+128G EUT 3= 4+128G



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1.1 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	L480	REF. No.SEA1800
Mouse	Lenovo	3D optical Mouse	REF. No.:SEA2400
Router	NETGEAR	R6020	REF. No.SEA2200

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

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.

Test Site No.:	SGS Xian Site No.		FCC Designation No.
	CO01-XA	03CH01-XA	

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:

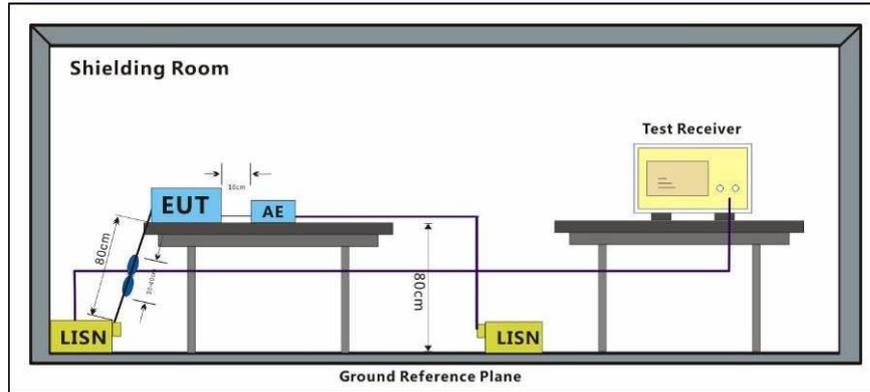
- a: Transfer data between the EUT1 and the PC+USB cable1
- b: Transfer data between the EUT1 and the PC+USB cable2
- c: GSM 850 Idle+ BT+ 2.4G WLAN +GNSS Rx+ NFC +playing MP4+EUT1+ Cable1+ adapter+earphone
- d: WCDMA Band V Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT1+ Cable1+ adapter+earphone
- e: LTE Band 5 Idle+BT+2.4G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
- f: LTE Band 12 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
- g: LTE Band 13 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Back) + EUT1+ Cable1+ adapter+earphone
- h: LTE Band 17 Idle+ BT+2.4G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT1+ Cable2+ adapter+earphone
- i: NR Band n5 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT2+ Cable1+ adapter+earphone
- j: NR Band n7 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ playing MP4 + EUT1+ Cable1+ adapter+earphone
- k: NR Band n66 Idle + BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT3+ Cable1+ adapter+earphone
- The worst case for final test: e: LTE Band 5 Idle+BT+2.4G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone



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2.1.2 Test Setup Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



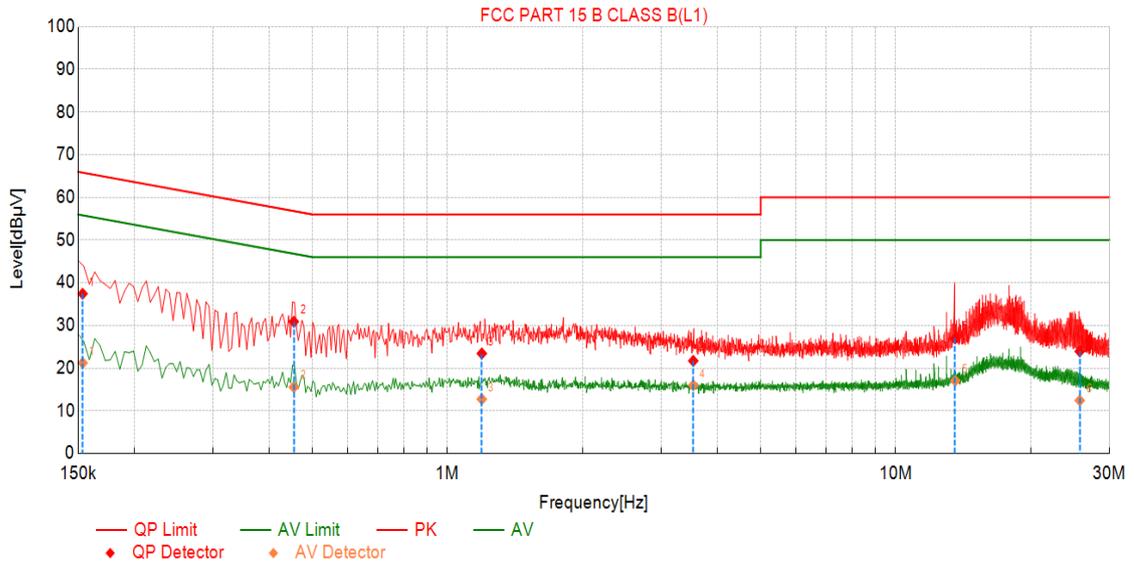
2.1.3 Measurement Data

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:e; Line:Live Line



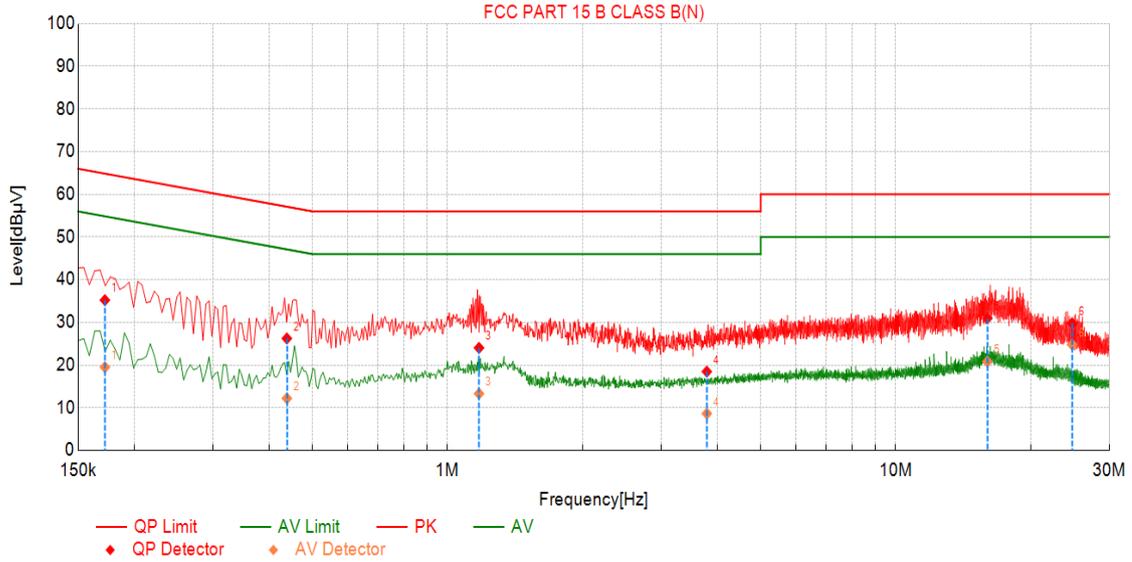
Test Graph

Final Data List								
NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1536	37.43	65.80	28.37	21.21	55.80	34.59	PASS
2	0.4545	30.89	56.79	25.90	15.56	46.79	31.23	PASS
3	1.1936	23.43	56.00	32.57	12.73	46.00	33.27	PASS
4	3.5360	21.70	56.00	34.30	15.97	46.00	30.03	PASS
5	13.5810	26.98	60.00	33.02	17.05	50.00	32.95	PASS
6	25.7415	23.92	60.00	36.08	12.42	50.00	37.58	PASS



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Mode:e; Line:Neutral Line



Test Graph

Final Data List								
NO.	Freq. [MHz]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1722	35.22	64.86	29.64	19.50	54.86	35.36	PASS
2	0.4385	26.23	57.09	30.86	12.20	47.09	34.89	PASS
3	1.1766	24.03	56.00	31.97	13.29	46.00	32.71	PASS
4	3.7915	18.46	56.00	37.54	8.63	46.00	37.37	PASS
5	16.0245	30.97	60.00	29.03	20.82	50.00	29.18	PASS
6	24.7404	29.79	60.00	30.21	24.80	50.00	25.20	PASS



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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

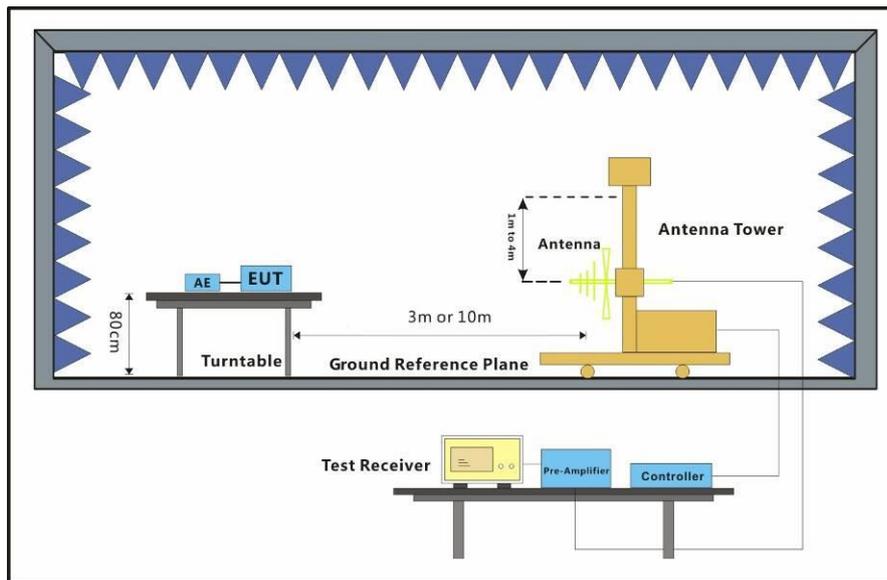
- Pretest these modes to find the worst case:
- a: Transfer data between the EUT1 and the PC+USB cable1
 - b: Transfer data between the EUT1 and the PC+USB cable2
 - c: GSM 850 Idle+ BT+ 2.4G WLAN +GNSS Rx+ NFC +playing MP4+EUT1+ Cable1+ adapter+earphone
 - d: WCDMA Band V Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT1+ Cable1+ adapter+earphone
 - e: LTE Band 5 Idle+BT+2.4G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
 - f: LTE Band 12 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
 - g: LTE Band 13 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Back) + EUT1+ Cable1+ adapter+earphone
 - h: LTE Band 17 Idle+ BT+2.4G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT1+ Cable2+ adapter+earphone
 - i: NR Band n5 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT2+ Cable1+ adapter+earphone
 - j: NR Band n7 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ playing MP4 + EUT1+ Cable1+ adapter+earphone
 - k: NR Band n66 Idle + BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT3+ Cable1+ adapter+earphone
- The worst case for final test: d: WCDMA Band V Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT1+ Cable1+ adapter+earphone



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2.2.2 Test Setup Procedures

1. The EUT was placed in a semi Anechoic Chamber as show below
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna height is adjusted between 1 to 4 meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function with specified bandwidth with Maximum Hold Mode, and the trace was allowed to stabilize.
7. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.



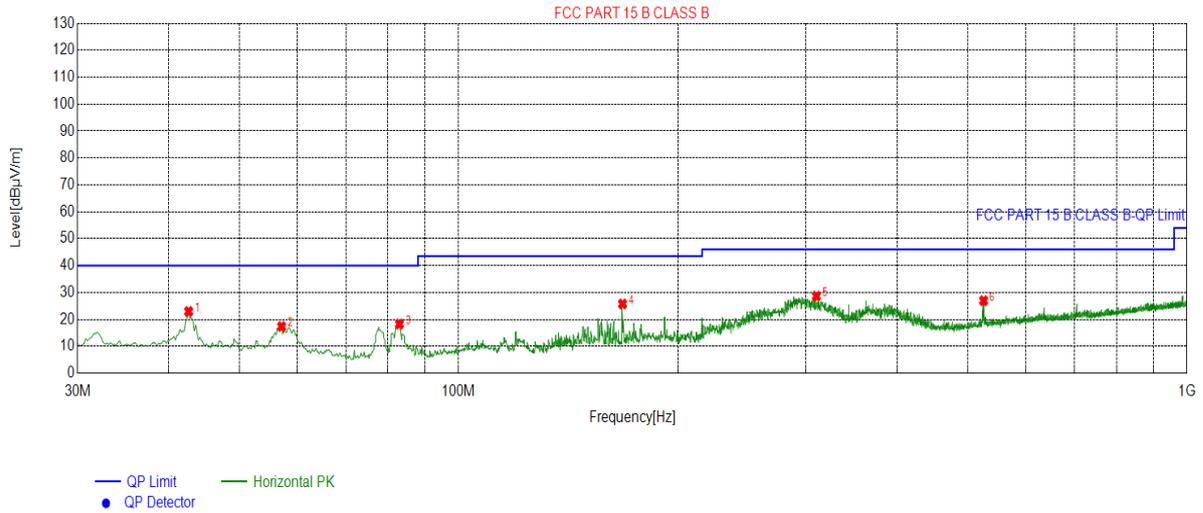
2.2.3 Measurement Data

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. The three polarities of X,Y,Z were measured by EUT, but only the worst data had been displayed.



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Mode:d; Polarization:Horizontal



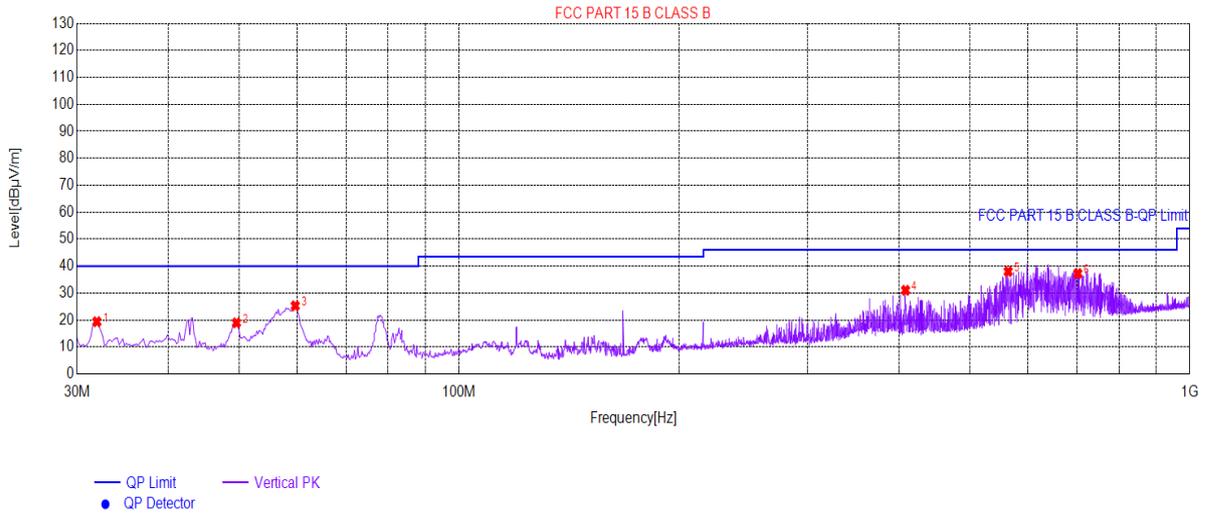
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.6125	22.95	-29.43	40.00	17.05	300	328	Horizontal
2	57.1654	17.35	-31.44	40.00	22.65	400	87	Horizontal
3	82.9726	18.27	-35.43	40.00	21.73	200	51	Horizontal
4	167.961	25.74	-34.16	43.50	17.76	200	243	Horizontal
5	309.998	28.66	-27.98	46.00	17.34	100	65	Horizontal
6	525.769	26.95	-22.66	46.00	19.05	200	80	Horizontal



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Mode:d; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.9404	19.37	-30.03	40.00	20.63	100	166	Vertical
2	49.5979	18.95	-30.37	40.00	21.05	200	282	Vertical
3	59.6879	25.28	-31.81	40.00	14.72	100	263	Vertical
4	408.375	31.03	-25.35	46.00	14.97	100	3	Vertical
5	564.382	38.00	-21.63	46.00	8.00	100	118	Vertical
6	702.732	37.27	-19.45	46.00	8.73	100	156	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 EUT1 and the PC+USB cable1
- b: Transfer data between the EUT1 and the PC+USB cable2
- c: GSM 850 Idle+ BT+ 2.4G WLAN +GNSS Rx+ NFC +playing MP4+EUT1+ Cable1+ adapter+earphone
- d: WCDMA Band V Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT1+ Cable1+ adapter+earphone
- e: LTE Band 5 Idle+BT+2.4G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
- f: LTE Band 12 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Front) + EUT1+ Cable2+ adapter+earphone
- g: LTE Band 13 Idle+ BT+ 5G WLAN +GNSS Rx+ NFC +camera (Back) + EUT1+ Cable1+ adapter+earphone
- h: LTE Band 17 Idle+ BT+2.4G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT1+ Cable2+ adapter+earphone
- i: NR Band n5 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ camera (Back) + EUT2+ Cable1+ adapter+earphone
- j: NR Band n7 Idle+ BT+5G WLAN +GNSS Rx+ NFC+ playing MP4 + EUT1+ Cable1+ adapter+earphone
- k: NR Band n66 Idle + BT+ 5G WLAN +GNSS Rx+ NFC +playing MP4 + EUT3+ Cable1+ adapter+earphone

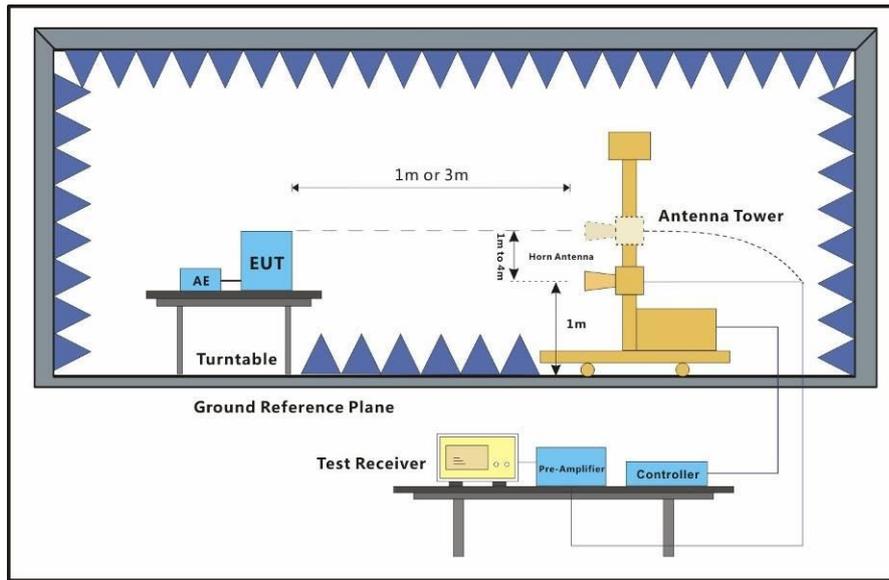
The worst case for final test: c: GSM 850 Idle+ BT+ 2.4G WLAN +GNSS Rx+ NFC +playing MP4+EUT1+ Cable1+ adapter+earphone



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2.3.2 Test Setup Procedures

1. The EUT was placed in a full Anechoic Chamber as show below
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna height is adjusted between 1 to 4 meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak and AV Detect Function with specified bandwidth with Maximum Hold Mode, and the trace was allowed to stabilize.



2.3.3 Measurement Data

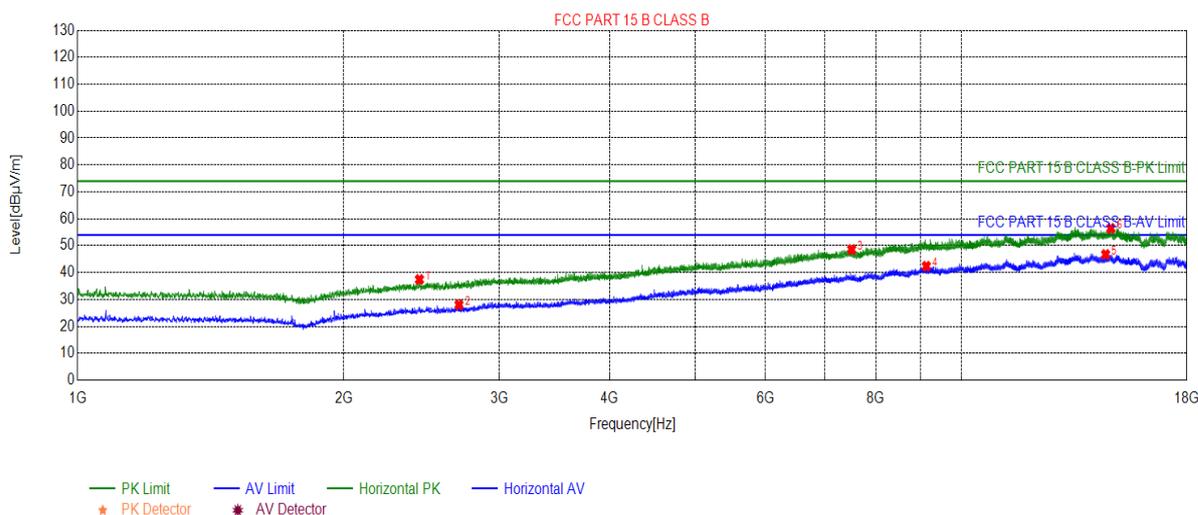
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

The three polarities of X,Y,Z were measured by EUT, but only the worst data had been displayed. Scan from 1GHz to 30GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed.



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Mode:c; Polarization:Horizontal



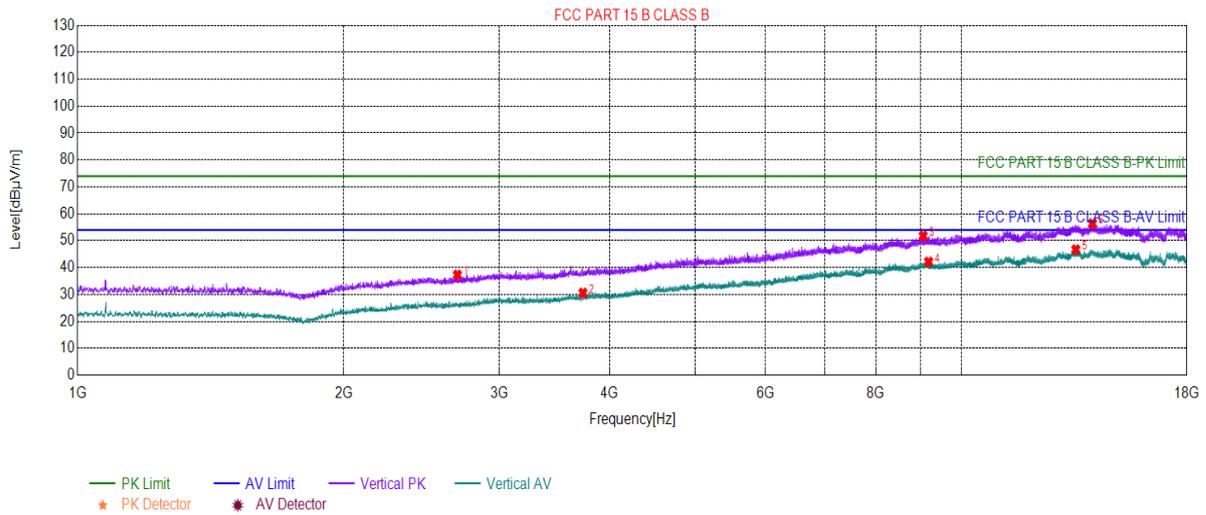
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2436.57	37.43	-26.19	74.00	36.57	209	185	Horizontal
2	2700.93	28.01	-25.15	54.00	25.99	121	80	Horizontal
3	7513.87	48.57	-9.55	74.00	25.43	219	293	Horizontal
4	9128.10	42.37	-5.88	54.00	11.63	178	347	Horizontal
5	14561.5	46.74	0.58	54.00	7.26	259	3	Horizontal
6	14761.3	56.45	0.87	74.00	17.55	209	321	Horizontal



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Mode:c; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2689.88	37.27	-25.21	74.00	36.73	211	73	Vertical
2	3730.33	30.58	-21.47	54.00	23.42	213	313	Vertical
3	9052.45	51.76	-6.05	74.00	22.24	248	82	Vertical
4	9181.65	42.11	-5.79	54.00	11.89	174	169	Vertical
5	13471.8	46.66	0.52	54.00	7.34	236	315	Vertical
6	14072.8	56.37	0.97	74.00	17.63	345	322	Vertical

Remark:

1) Scan from 1GHz to 40GHz, The disturbance between 18GHz to 40GHz was very low, so only 1GHz to 18GHz test data had been displayed. The amplitude of emissions from the Eut which are attenuated more than 20dB below the limit need not be reported



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3 Equipment List

Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Semi-Anechoic Chamber	Brilliant-emc	966	XAW03-35-01	NCR	NCR
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020/4/2	2021/4/2
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020/4/2	2021/4/2
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020/9/7	2021/9/6
Receiving antenna	Rosenberger	VULB 9163	XAW01-09-01	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	BBHA 9120D	XAW01-09-02	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	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	2020/11/18	2021/11/18
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020/11/18	2021/11/18
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020/12/3	2021/12/3
Amplifier	Brilliant-emc	YX28980930	XAW01-41-06	2020/11/18	2021/11/18
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-19-02	2020/9/16	2021/9/15



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4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.4dB (150kHz to 30MHz)
2	Radiated Emission	± 4.8dB (30MHz-1GHz)
		± 5.2dB (1GHz-6GHz)
		± 5.5dB (6GHz-18GHz)
		± 5.02dB (18GHz-40GHz)



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5 Photographs

5.1 Test Setup

Refer to Appendix A Setup Photos.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

