



TEST REPORT

Application No.: AR/2020/C0004
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.: M2010J19SL
Trade Mark: Redmi
FCC ID: 2AFZZJ19SL
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020/12/11
Date of Test: 2020/12/11 to 2020/12/31
Date of Issue: 2020/12/31

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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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/12/31		Original
02		2021/05/28	Leah Chen	1. Modify data conversion error of antenna height 2. Updated equipment list

*This report supersedes our previous report AR/2020/C000406, issued on 2020-12-31, which is hereby deemed null and void.

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



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Wireless Laboratory

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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

Product Name:	Mobile Phone		
Model No.(EUT):	M2010J19SL		
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 38	2570~2620	2570~2620
	LTE Band 41	2496~2690	2496~2690
	LTE Band 66	1710~1780	2110~2200
	Wi-Fi 2.4G	2400~2483.5	2400~2483.5
	Bluetooth	2400~2483.5	2400~2483.5
	Wi-Fi 5G	5150~5850	5150~5850
	FM	87-108	
	GNSS(GPS/Glonass/Bei dou/Galileo)	1559~1610	

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



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1.1 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

1.2 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

1.3 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 EUT1 and the PC+USB cable1
 - b: Transfer data between the EUT1 and the PC+USB cable2
 - c: GSM 850 Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+Cable1+adapter1
 - d: WCDMA Band V Idle+EUT1+BT+WLAN + GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1
 - e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1
 - f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back) +earphone+battery+ Cable1+adapter1
 - g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+ Cable1+adapter1
 - h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
 - i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
 - j: Transfer data between the EUT2 and the PC+USB cable1
- The worst case for final test: e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1



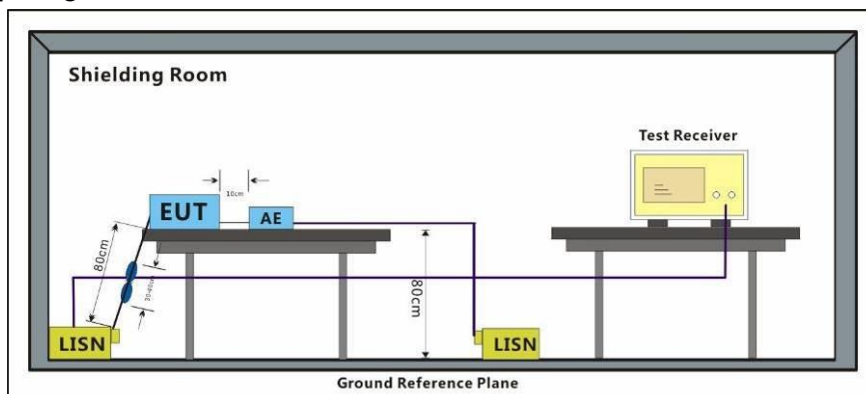
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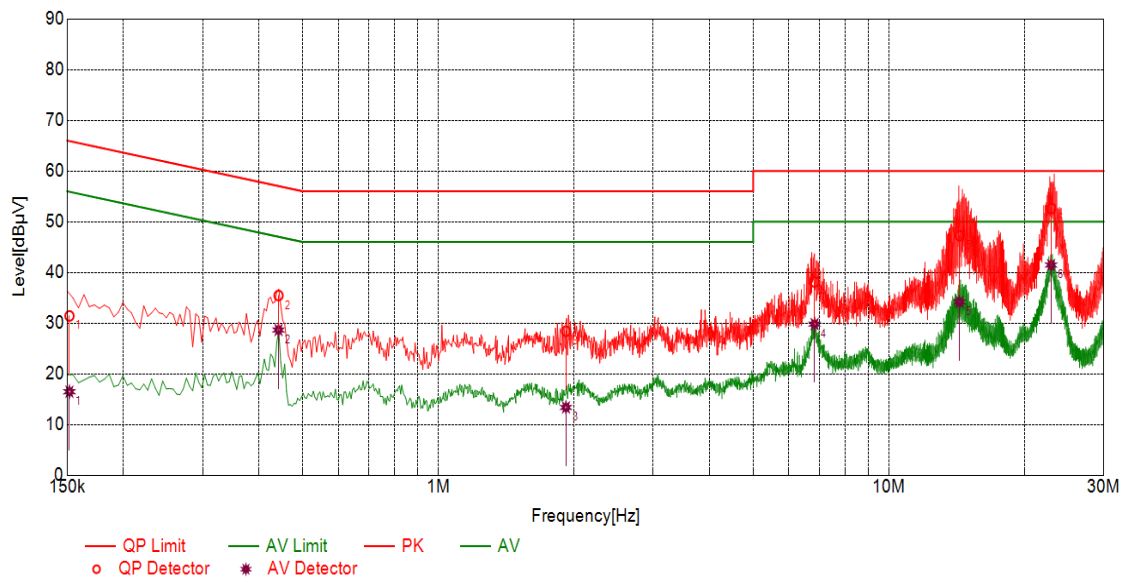
2.1.2 Test Setup Diagram



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.

Mode:d; 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	0.1518	10.10	31.42	65.90	34.48	16.47	55.90	39.43
2	0.4419	10.10	35.44	57.03	21.59	28.65	47.03	18.38
3	1.9202	10.10	28.40	56.00	27.60	13.37	46.00	32.63
4	6.8420	10.10	38.12	60.00	21.88	29.81	50.00	20.19
5	14.3523	10.11	47.25	60.00	12.75	34.17	50.00	15.83
6	22.9176	10.11	52.63	60.00	7.37	41.45	50.00	8.55



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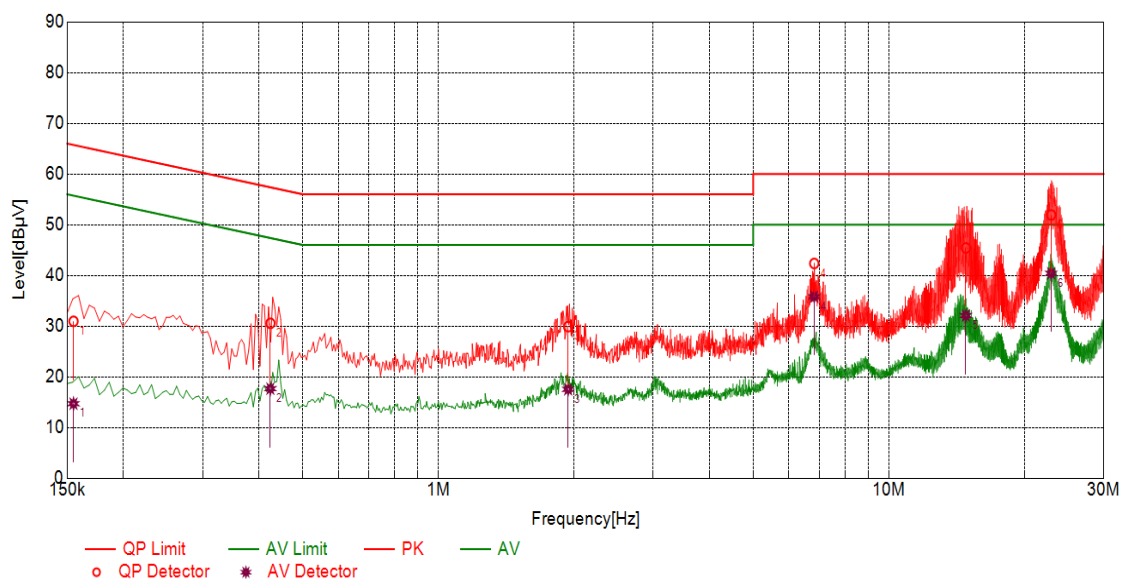
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Mode:d; Line:Neutral Line



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	0.1550	10.10	30.95	65.73	34.78	14.70	55.73	41.03
2	0.4239	10.10	30.55	57.37	26.82	17.66	47.37	29.71
3	1.9416	10.10	29.90	56.00	26.10	17.53	46.00	28.47
4	6.8291	10.10	42.36	60.00	17.64	35.82	50.00	14.18
5	14.8222	10.11	45.42	60.00	14.58	32.08	50.00	17.92
6	22.9201	10.11	51.93	60.00	8.07	40.41	50.00	9.59



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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

2.1.4 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:
- 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+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+Cable1+adapter1
 - d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1
 - e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1
 - f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back) +earphone+battery+ Cable1+adapter1
 - g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+ Cable1+adapter1
 - h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
 - i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
 - j: Transfer data between the EUT2 and the PC+USB cable1

The worst case for final test: b: Transfer data between the EUT1 and the PC+USB cable2

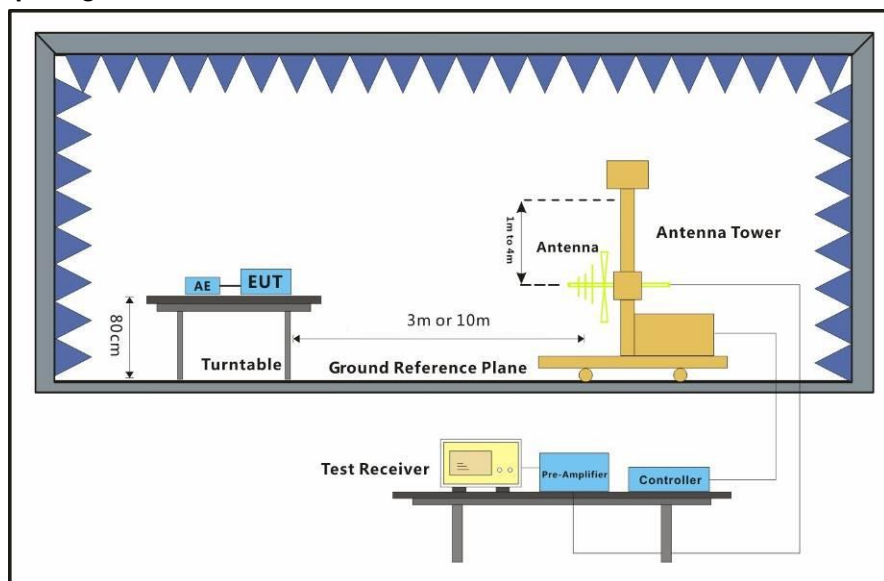


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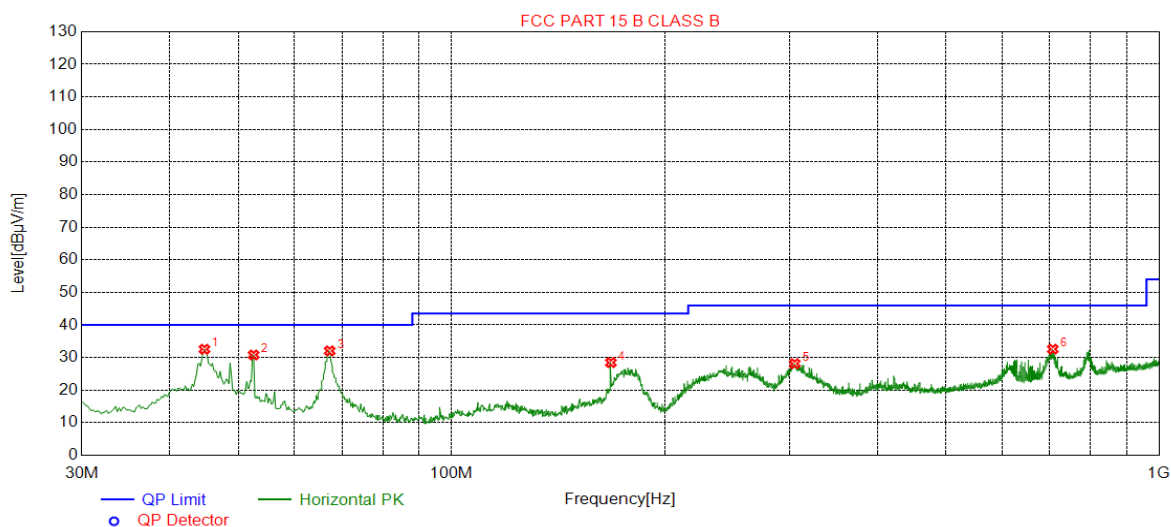
2.1.5 Test Setup Diagram



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:b; Polarization:Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.7469	32.56	40.00	7.44	178	138	Horizontal
2	52.5085	30.80	40.00	9.20	123	98	Horizontal
3	67.2555	32.06	40.00	7.94	249	17	Horizontal
4	167.9616	28.46	43.50	15.04	204	22	Horizontal
5	305.5351	28.13	46.00	17.87	214	274	Horizontal
6	707.7776	32.59	46.00	13.41	128	323	Horizontal



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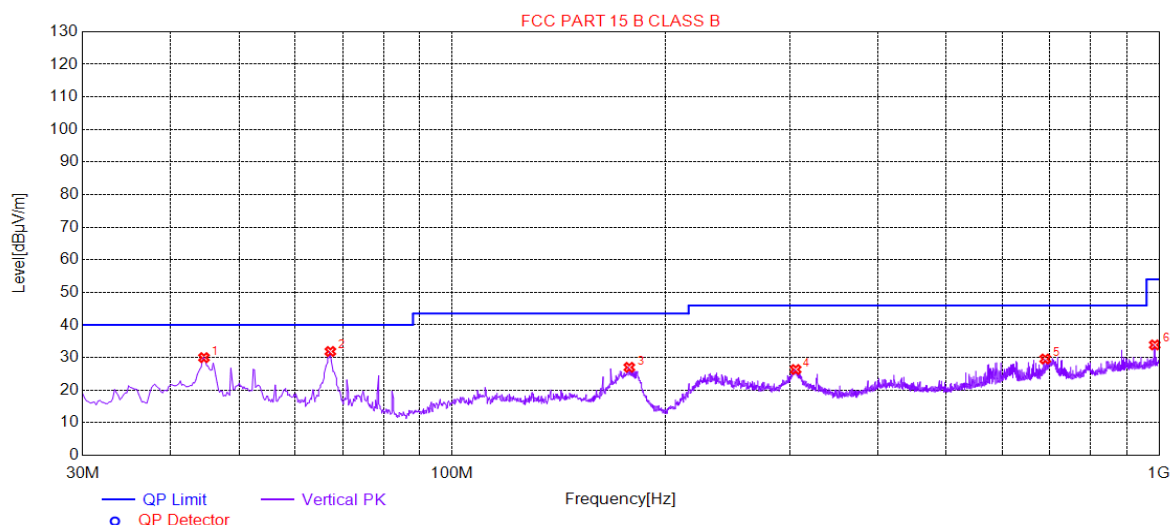
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Mode:b; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.5529	29.99	40.00	10.01	159	245	Vertical
2	67.2555	31.88	40.00	8.12	157	131	Vertical
3	178.0516	27.01	43.50	16.49	208	58	Vertical
4	306.1172	26.34	46.00	19.66	299	356	Vertical
5	690.1200	29.58	46.00	16.42	243	172	Vertical
6	986.0292	33.89	54.00	20.11	186	346	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) 100M 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:

- 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+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+Cable1+adapter1
- d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1
- e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1
- f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back) +earphone+battery+ Cable1+adapter1
- g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+ Cable1+adapter1
- h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
- i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
- j: Transfer data between the EUT2 and the PC+USB cable1

The worst case for final test: d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1



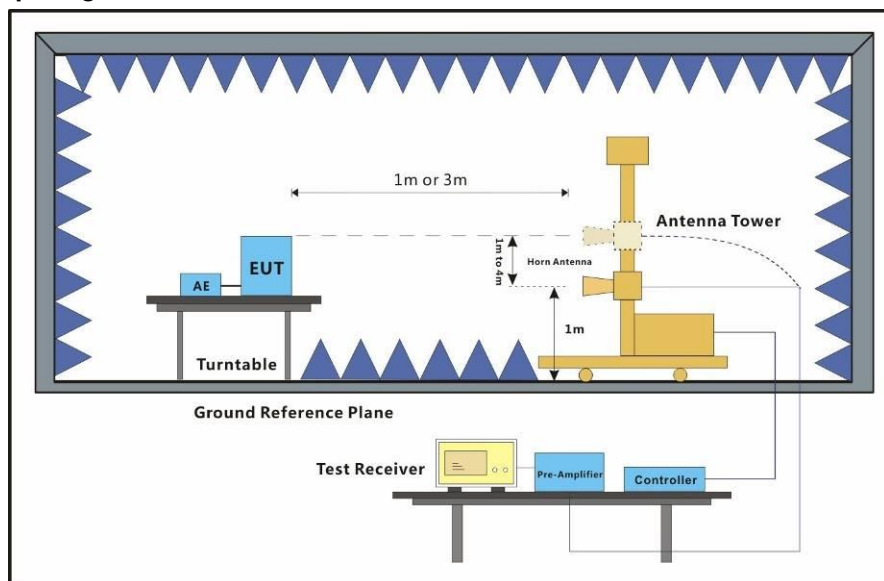
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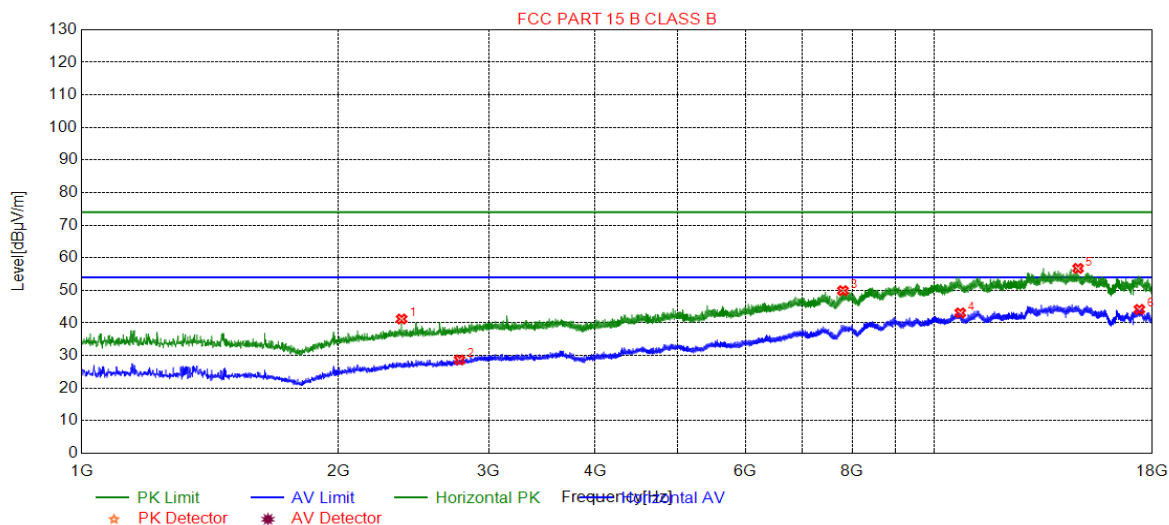
2.1.8 Test Setup Diagram



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:d; Polarization:Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2371.968	41.23	74.00	32.77	129	301	Horizontal
2	2774.038	28.67	54.00	25.33	170	20	Horizontal
3	7806.290	49.92	74.00	24.08	214	276	Horizontal
4	10716.83	43.09	54.00	10.91	136	193	Horizontal
5	14724.78	56.76	74.00	17.24	161	42	Horizontal
6	17376.91	44.18	54.00	9.82	225	59	Horizontal



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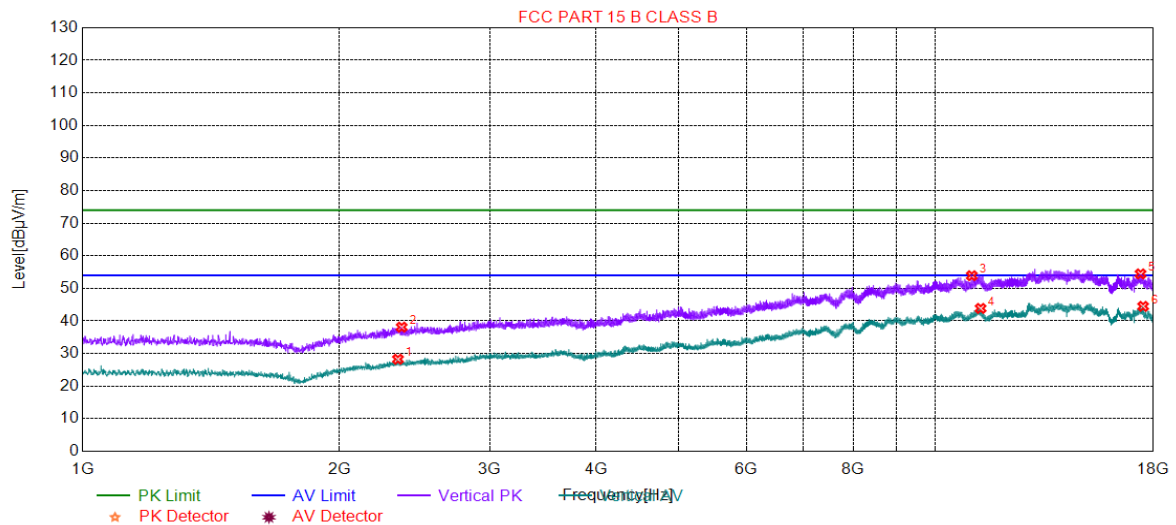
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Mode:d; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2342.217	28.27	54.00	25.73	226	80	Vertical
2	2366.018	38.12	74.00	35.88	264	338	Vertical
3	11024.55	53.91	74.00	20.09	280	145	Vertical
4	11289.76	43.86	54.00	10.14	176	16	Vertical
5	17384.56	54.46	74.00	19.54	247	150	Vertical
6	17506.12	44.50	54.00	9.50	270	194	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

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	2020-09-11	2021-09-10
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05
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

RSE 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	2020-09-11	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
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	2020-10-26	2021-10-25
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020-10-26	2021-10-25
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020-10-27	2021-10-26
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2020-10-26	2021-10-25
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05
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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4 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

Refer to Appendix A - Photographs of Set-Up for AR/2020/C0004.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -



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