

Report No.: AR/2020/A000306

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### 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(for original report AR/2020/8000506)

**Date of Test:** 2020/9/16 to 2020/10/10(for original report AR/2020/8000506)

2020/10/25to 2020/11/6 (for new report AR/2020/A000306)

**Date of Issue:** 2020/10/15(for original report AR/2020/8000506)

2020/11/6 (for new report AR/2020/A000306)

Test Result: Pass\*

#### Authorized Signature:

Derek Yang

Derole yang

#### Wireless Laboratory Manager

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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Revision Record					
Version	Chapter	Date	Modifier	Remark	
01		2020/10/15		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		

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 Test By

David Chen Reviewer

David Chen

Daniel Wang Project Engineer

South

#### Remark:

This test report (Report No.: AR/2020/A000306) is base on the original test report (Report No.: AR/2020/8000506) issued on 2020-10-15.

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	Redmi					
Hardware Version:	P2						
Software Version:	MIUI12						
	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				
Francisco Danda	LTE Band 12	699~716	729~746				
Frequency Bands:	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				
		5150~5350	5150~5350				
	WIFI(5GHz)	5470~5725	5470~5725				
		5725~5850	5725~5850				
	GNSS*	1599~16′	10				
	FM	87.5~10	8				
	NFC	13.56					

<sup>\*</sup> GNSS = GPS + Glonass + Beidou + Galileo EUT 1= 4+128G EUT2=4+64G

#### 1.1 Description of Support Units

2000							
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	± 3.4dB (150kHz to 30MHz)		

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2	Radiated Emission	± 4.8dB (30MHz-1GHz)		
		± 5.2dB (1GHz-6GHz)		
		± 5.5dB (6GHz-18GHz)		
		± 5.02dB (18GHz-40GHz)		
3	Temperature test	± 1°C		
4	Humidity test	± 3%		

#### 1.3 Test Location

All tests were performed at:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	Single floor D, building 1, Kanghong orange square science and technology park, No.137 keyuan 3rd road, fengdong new town, Xi 'an city, Shaanxi China
Post code:	710000
Telephone:	+86 (0) 29 6282 7885
Fax:	+86 (0) 29 6282 7885
E-mail:	ee.xian@sgs.com

No tests were sub-contracted.

#### 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.

Test Site No.:	SGS Xian Site No.		FCC Designation No.	
	CO01-XA	03CH01-XA	CN1271	

#### 1.5 Deviation from Standards

None

#### 1.6 Abnormalities from Standard Conditions

None

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### 2 Equipment List

Radiated Emissions (30MHz~ 40GHz)					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
rest Equipment	Manufacturer	wiodei No.	inventory No.	(yyyy-mm- dd)	(yyyy-mm- dd)
966 Test chamber	Brilliant-emc	NA	XAW040101	2019/6/11	2022/6/9
BiConiLog Antenna (30MHz-3GHz)	rosenberge	VULB 9163	XAW010901	2018/8/8	2021/8/7
Horn Antenna (800MHz- 18GHz)	rosenberger	BBHA 9120D	XAW010902	2018/7/18	2021/7/17
Horn Antenna (18- 40GHz)	rosenberge	BBHA 9170	XAW010903	2018/8/1	2021/7/31
Amplifier(9kHz-3GHz)	Tonscend	TAP00903040	XAW030601	2019/11/1 8	2020/11/18
Amplifier(100MHz- 18GHz)	Tonscend	TAP01018048	XAW030602	2019/11/1 8	2020/11/18
Amplifier(18-40GHz)	Tonscend	TAP18040048	XAW030603	2019/11/1 8	2020/11/18
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03- 02	2020/4/2	2021/4/2
Test receiver	Rohde & Schwarz	ESR	XAW010801	2020/9/2	2021/9/2
MXA signal analyzer	Rohde & Schwarz	FSV	XAW040103	2020/4/2	2021/4/3
Measurement Software	Tonscend	TS+	N/A	N/A	N/A
Filter bank	Tonscend	JS0806-F	N/A	N/A	N/A
Filter bank	Tonscend	JS0806s	N/A	N/A	N/A
5G UXM	Keysight	E7515B	XAW01-04-01	2020/9/11	2021/9/10

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Test Equipment	Manufactura	Madal Na	Cal. date		Cal.Due date
	Manufacturer   Mo	Model No.	Inventory No.	(yyyy-mm- dd)	(yyyy-mm- dd)
Shield Room	Brilliant-emc	NA	XAW08043	NA	NA
Test receiver	Rohde & Schwarz	ESR	XAW010801	2020/9/2	2021/9/2
Artificial network	Rohde & Schwar	ENV216	XAW01-19-02	2020/07/16	2021/7/15
Artificial network	Rohde & Schwar	ENV216	XAW013001	2020/7/16	2021/7/15
Cabel	SGS	NA	NA	NA	NA
Radio communication	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020/4/2	2021/4/2

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analyzer					
5G UXM	Keysight	E7515B	XAW01-04-01	2020/9/11	2021/9/10

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#### **Emission Test Results** 3

#### 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 60dB(µV) quasi-peak, 50dB(µV) average 5M-30MHz

Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz Detector:

#### 2.1.1 E.U.T. Operation

Operating Environment:

Temperature: Humidity: 55.1 % RH Atmospheric Pressure: 1000 mbar Pretest these 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+plaving MP4+earphone+EUT1+USB

modes to find cable+adapter+ant0

the worst case: 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

for final test:

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

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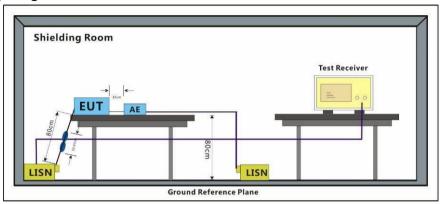
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#### 2.1.2 Test Setup Diagram



#### 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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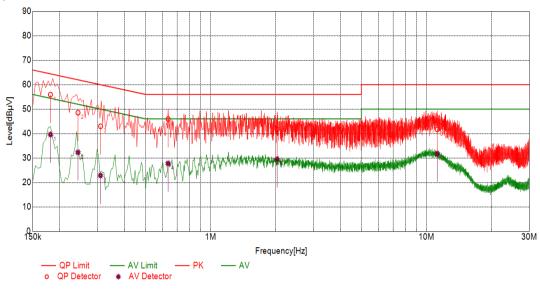
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#### Mode:8; Line:Live Line



#### **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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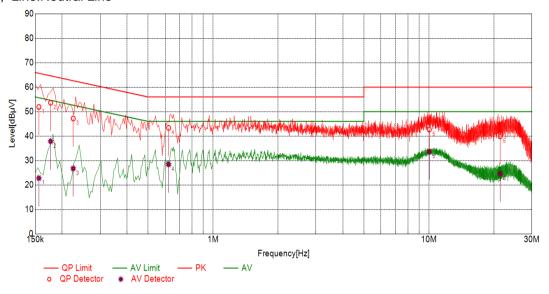
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#### Mode:8: Line:Neutral Line



#### **Test Graph**

Final Data List											
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	ΑV Value [dBμV]	ΑV 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			

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#### 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:

30 MHz - 88 MHz  $40.0 (\text{dB}\mu\text{V/m})$  quasi-peak 88 MHz - 216 MHz  $43.5 (\text{dB}\mu\text{V/m})$  quasi-peak  $46.0 (\text{dB}\mu\text{V/m})$  quasi-peak 960 MHz - 1000 MHz  $54.0 (\text{dB}\mu\text{V/m})$  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 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+playing MP4+earphone+EUT1+USB

modes to find cable+adapter+ant0

the worst case: 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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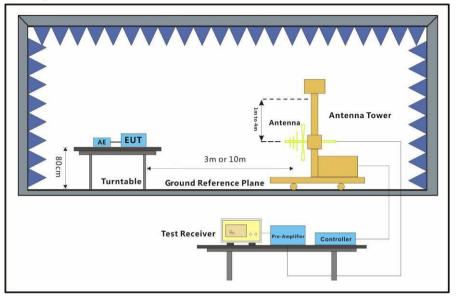
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#### 2.1.5 Test Setup Diagram



#### 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.

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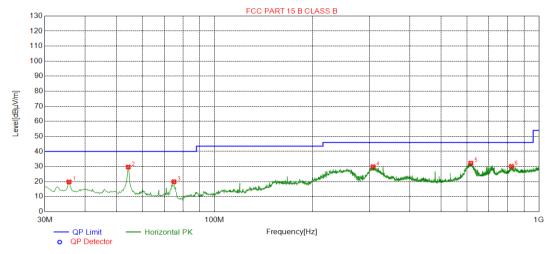
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#### Mode:11 Polarization:Horizontal



#### **Suspected List**

Suspected List										
NO	Freq.	Level	Factor	Limit	Margin	Height	Angle	Doloritu		
NO.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	Polarity		
1	35.6271	19.78	-29.76	40.00	20.22	200	223	Horizontal		
2	54.2549	29.65	-31.01	40.00	10.35	200	346	Horizontal		
3	75.0170	19.90	-35.25	40.00	20.10	100	102	Horizontal		
4	308.251	29.88	-28.03	46.00	16.12	100	69	Horizontal		
5	616.773	32.19	-20.43	46.00	13.81	100	14	Horizontal		
6	822.842	30.05	-17.37	46.00	15.95	100	254	Horizontal		

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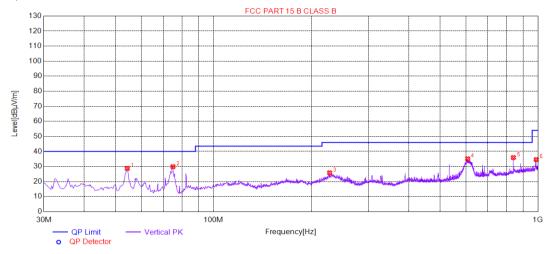
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Mode:11; Polarization:Vertical



#### **Suspected List**

Suspected List										
NO	Freq.	Level	Factor	Limit	Margin	Height	Angle	Dolority		
NO.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	Polarity		
1	54.2549	28.77	-31.01	40.00	11.23	100	278	Vertical		
2	75.0170	29.91	-35.25	40.00	10.09	100	28	Vertical		
3	228.113	25.83	-30.47	46.00	20.17	200	332	Vertical		
4	607.459	35.13	-20.54	46.00	10.87	100	354	Vertical		
5	840.112	35.94	-17.06	46.00	10.06	200	326	Vertical		
6	987.969	34.61	-14.96	54.00	19.39	100	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 1:GSM850 Idle +BT+WLAN2.4G+GNSS Rx+plaving MP4+earphone+EUT1+USB

modes to find cable+adapter+ant0

the worst case: 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

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

for final test: cable+adapter+ant0

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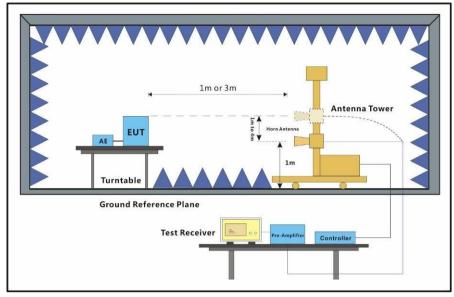
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#### 2.1.8 Test Setup Diagram



#### 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.

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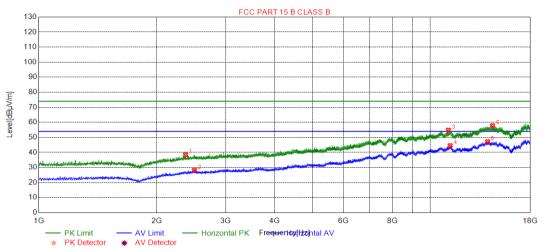
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#### Mode: 9 Polarization: Horizontal



#### **Suspected List**

- u. u p u u	Supported Liet										
Susp	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	100	92	Horizontal			
2	2496.92	28.22	-25.87	54.00	25.78	100	358	Horizontal			
3	11118.0	54.85	-2.67	74.00	19.15	200	156	Horizontal			
4	11229.4	44.62	-2.81	54.00	9.38	100	206	Horizontal			
5	13994.5	47.21	2.24	54.00	6.79	200	269	Horizontal			
6	14408.5	57.84	1.92	74.00	16.16	100	206	Horizontal			

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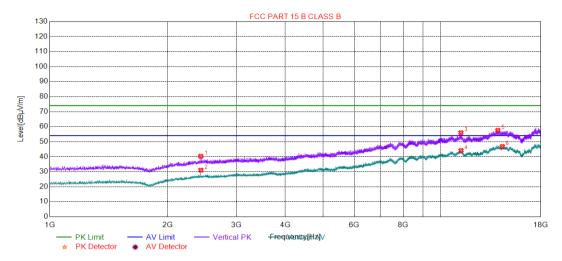
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#### Mode:9; Polarization:Vertical



#### **Suspected List**

Ouspe	Cica List							
Susp	ected 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	100	53	Vertical
2	2433.17	31.00	-26.28	54.00	23.00	100	53	Vertical
3	11242.1	55.93	-2.80	74.00	18.07	100	204	Vertical
4	11252.3	44.08	-2.78	54.00	9.92	200	307	Vertical
5	13968.2	57.53	2.22	74.00	16.47	100	53	Vertical
6	14347.3	46.78	1.90	54.00	7.22	100	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.

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### 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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