

TEST REPORT

Application No.: ZR/2020/50042
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.: M2006C3LVG
Trade Mark: Redmi
FCC ID: 2AFZZC3LVG
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020-05-26
Date of Test: 2020-06-05 to 2020-06-10
Date of Issue: 2021-05-26

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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中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086 t (86-29) 6282 7885 sgs.china@sgs.com

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020-07-06		Original
02		2021-05-26	Leah Chen	1. Modify data conversion error of antenna height 2. Updated equipment list

*This report supersedes our previous report ZR/2020/5004205, issued on 2020-07-06, which is hereby deemed null and void.

Authorized for issue by:		
Prepared By	<i>Leah chen</i>	(Leah Chen) /Engineer
Checked By	<i>Daniel Wang</i>	(Daniel Wang) /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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4 General Information

Product Name:	Mobile Phone		
Model No.(EUT):	M2006C3LVG		
Trade Mark:	Redmi		
FCC ID:	2AFZZC3LVG		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Phase:	Identical Prototype		
Hardware Version:	P2		
Software Version:	MIUI 12		
Antenna Type:	Fixed Internal Antenna		
Device Operating Configurations :			
Modulation Mode:	GSM: GMSK, 8PSK; WCDMA: QPSK, 16QAM(HSPA+); LTE: QPSK, 16QAM WIFI: DSSS, OFDM; BT: GFSK, π/4DQPSK, 8DPSK		
Device Class:	B		
GPRS Multi-slots Class:	12	EGPRS Multi-slots Class:	12
HSDPA UE Category:	24	HSUPA UE Category	7
DC-HSDPA UE Category:	24		
Power Class	4, tested with power level 5(GSM850)		
	1, tested with power level 0(GSM1900)		
	3, tested with power control "all 1"(WCDMA Band II/IV/V)		
	3, tested with power control Max Power(LTE Band 2/4/5/7/38)		
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 38	2570~2620	2570~2620
	Wi-Fi 2.4G	2402~2472	2402~2472
	Bluetooth	2402~2480	2402~2480
	GNSS(GPS/BDS/G LONASS)	/	1559~1610
FM	87.5~108		
Battery Information:	Model:	BN56	
	Normal Voltage:	+3.85V	
	Rated capacity:	4900mAh	
	Manufacturer:	Ningde Amperex Technology Limited	
Adaptor Information1 #:	Model:	MDY-09-EQ	
	Brand Name:	MI	
	SEC:	I/P: 100 - 240 Vac, 0.35 A, O/P: 5.0V, 2A;	



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

1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Xieyuan 3rd Road, Fengdong New Town, Xi'an, Shaanxi, China 710086
中国·西安·洋东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

t (86-29) 6282 7885 www.sgsgroup.com.cn
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	Manufacturer:	Jiangsu Chenyang Electron Co.,Ltd.
Adaptor Information2 #:	Model:	MDY-09-EQ
	Brand Name:	MI
	SEC:	I/P: 100 - 240 Vac, 0.35 A, O/P:5.0V,2A;
	Manufacturer:	Jiangxi jian Aohai Technology Co.,Ltd.
USB Cable Information :	Model:	H52210
	Signal Line	0.8 meter, shielded cable
	Manufacturer:	Dehong

4.1 Description of Support Units

Description	Manufacturer	Model No.	Inventory No.
Router	NETGEAR	R6020	No.XA1401
Computer	Lenove	L480	No.XA1402
Mouse	A4TECH	OP-520NU USB	No.XA1403

4.2 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)



4.3 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

4.4 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.**

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None



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5 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	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2019-07-16	2020-07-15
5G UXM	Keysight	E7515B	XAW01-19-02	2019-08-17	2020-08-16
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	2019-09-07	2020-09-06
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	2019-08-17	2020-08-16
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



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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

6.1.1 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:

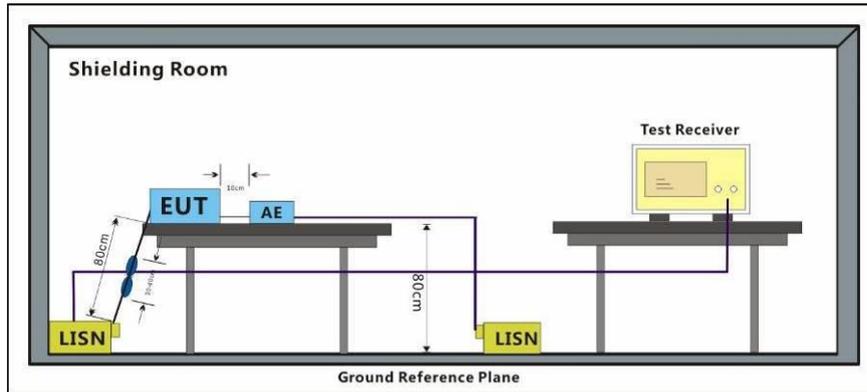
- a: GSM850 Link+BT+WLAN2.4G+GPS Rx+playing MP4 (SD card)+earphone+EUT+USB cable+adapter1
- b: GSM1900 Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
- c: WCDMA II Link +BT+WLAN2.4G+GPS Rx+camera (Front)+earphone+EUT+USB cable+adapter1
- d: WCDMA IV Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
- e: WCDMA V Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
- f: LTE band 2 Link +BT+ WLAN2.4G +GPS Rx +earphone+EUT+USB cable+adapter1
- g: LTE band 4 Idle +BT+FM +WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- h: LTE band 5 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- i: LTE band 7 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- j: LTE band 38 Link +BT+FM +WLAN2.4G+GPS Rx +earphone+EUT+USB cable+adapter1
- k: Transfer data between the EUT and the PC+USB cable
- l: GSM850 Link+BT+WLAN2.4G+GPS Rx+playing MP4 (SD card)+earphone+EUT+USB cable+adapter2

The worst case for final test: a: GSM850 Link+BT+WLAN2.4G+GPS Rx+playing MP4 (SD card)+earphone+EUT+USB cable+adapter1



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6.1.2 Test Setup Diagram



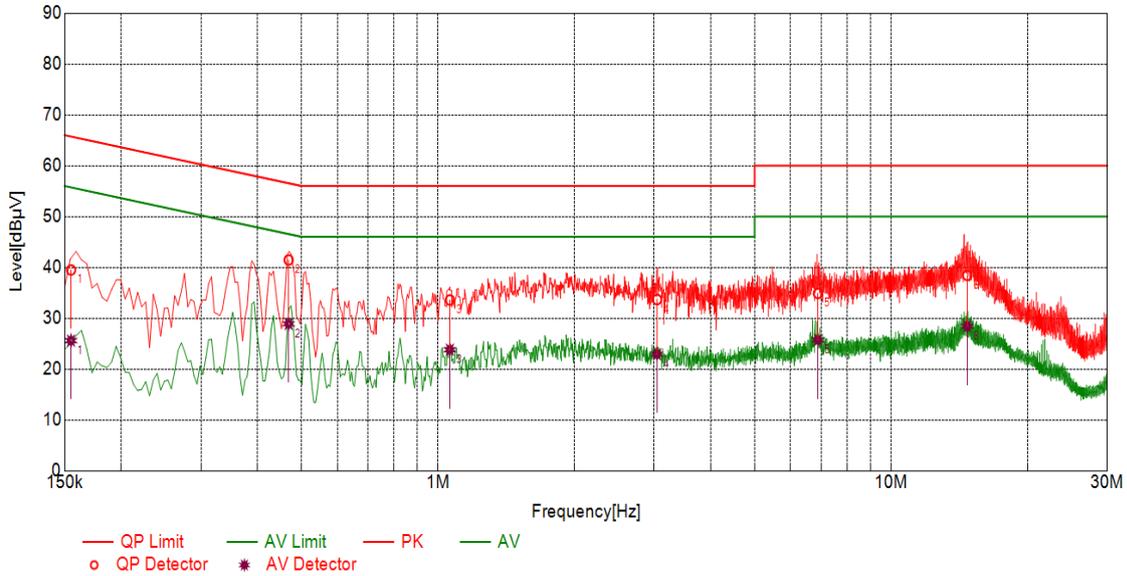
6.1.3 Measurement Data

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:a; Line:Live Line



Final Data List

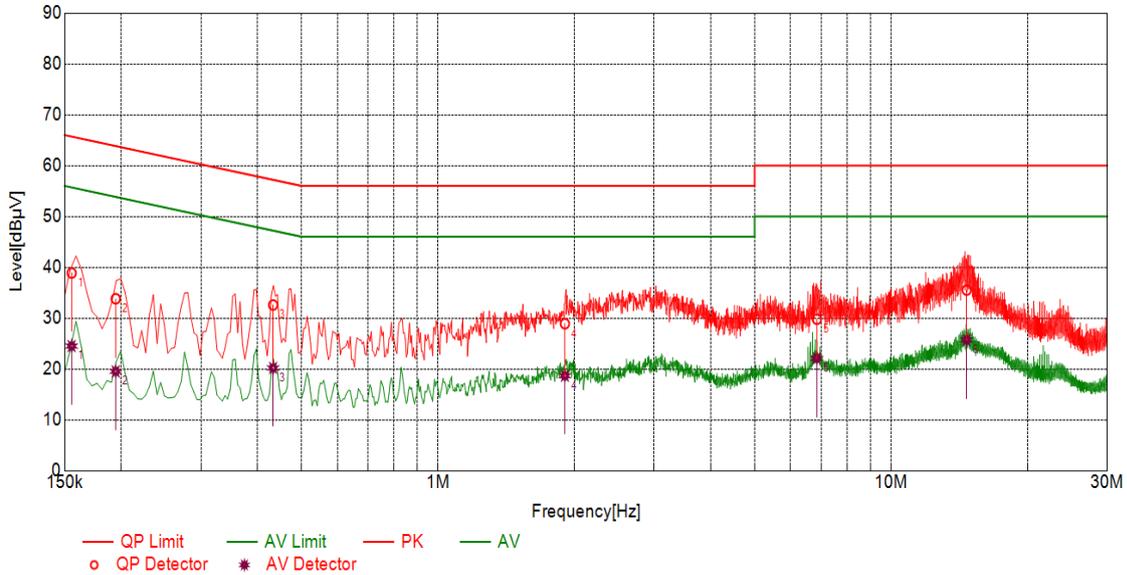
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1550	10.10	39.49	65.73	26.24	25.60	55.73	30.13	L
2	0.4683	10.10	41.47	56.54	15.07	28.89	46.54	17.65	L
3	1.0627	10.10	33.59	56.00	22.41	23.82	46.00	22.18	L
4	3.0443	10.10	33.69	56.00	22.31	22.93	46.00	23.07	L
5	6.8950	10.10	34.89	60.00	25.11	25.73	50.00	24.27	L
6	14.7247	10.11	38.42	60.00	21.58	28.42	50.00	21.58	L



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 中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086 t (86-29) 6282 7885 sgs.china@sgs.com

Mode:a; Line:Neutral Line



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	0.1555	10.10	38.87	65.70	26.83	24.51	55.70	31.19	N
2	0.1945	10.10	33.82	63.84	30.02	19.52	53.84	34.32	N
3	0.4328	10.10	32.60	57.20	24.60	20.20	47.20	27.00	N
4	1.9059	10.10	28.91	56.00	27.09	18.67	46.00	27.33	N
5	6.8565	10.10	29.80	60.00	30.20	22.10	50.00	27.90	N
6	14.6776	10.11	35.52	60.00	24.48	25.72	50.00	24.28	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

6.2.1 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: GSM850 Link+BT+WLAN2.4G+GPS Rx+playing MP4 (SD card)+earphone+EUT+USB cable+adapter1
 - b:GSM1900 Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
 - c:WCDMA II Link +BT+WLAN2.4G+GPS Rx+camera (Front)+earphone+EUT+USB cable+adapter1
 - d:WCDMA IV Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
 - e:WCDMA V Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter2
 - f:LTE band 2 Link +BT+ WLAN2.4G +GPS Rx +earphone+EUT+USB cable+adapter1
 - g:LTE band 4 Idle +BT+FM +WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
 - h:LTE band 5 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
 - i:LTE band 7 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
 - j:LTE band 38 Link +BT+FM +WLAN2.4G+GPS Rx +earphone+EUT+USB cable+adapter1
 - k:Transfer data between the EUT and the PC+USB cable

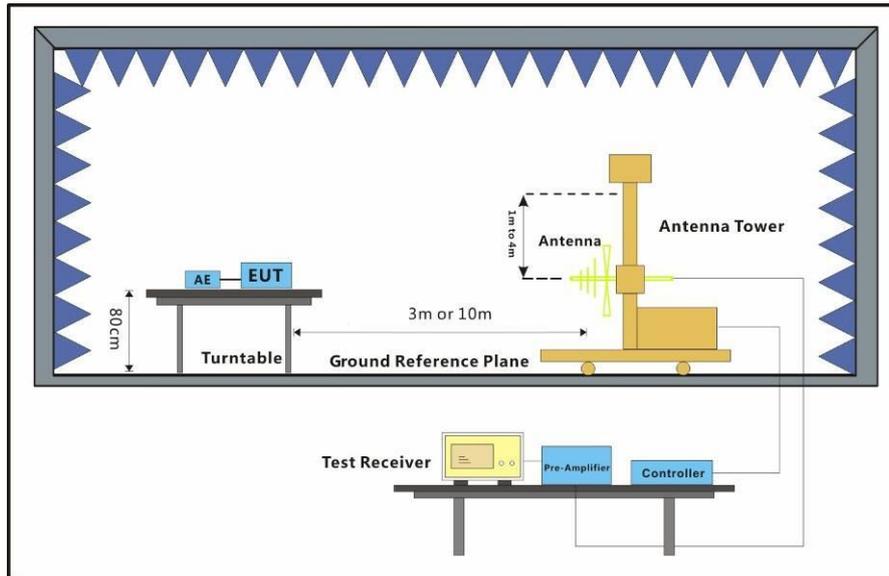
The worst case for final test:

- k:Transfer data between the EUT and the PC+USB cable



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6.2.2 Test Setup Diagram



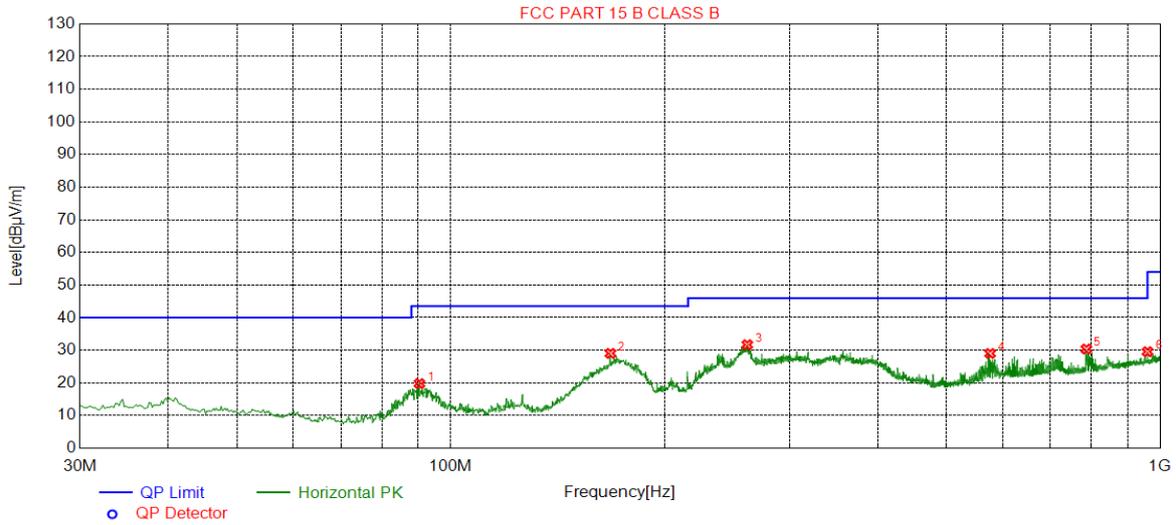
6.2.3 Measurement Data

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.



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Mode:k; Polarization:Horizontal

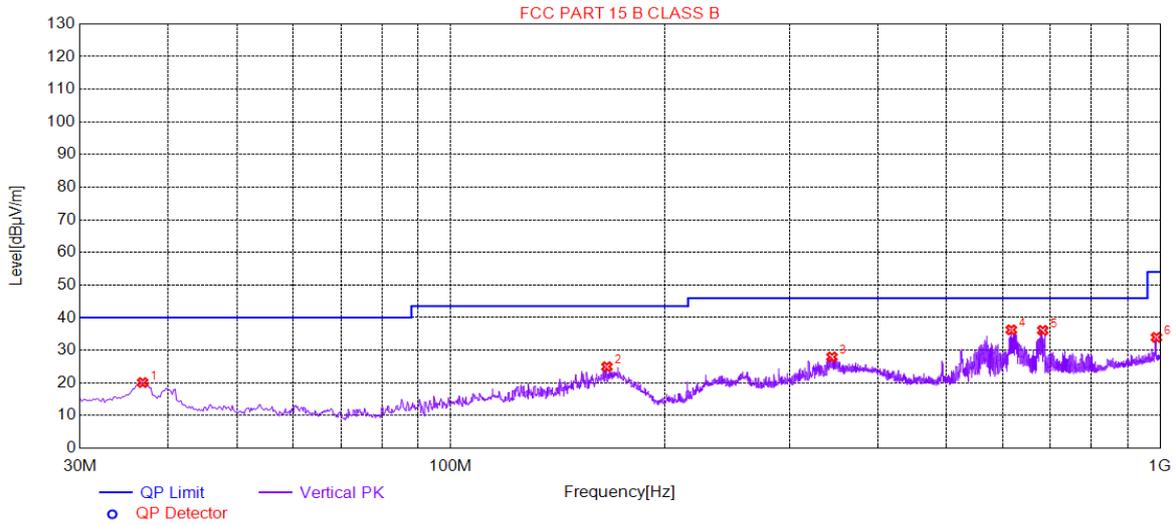


Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	90.3461	19.82	-33.65	43.50	23.68	248	54	Horizontal
2	167.961	29.07	-34.16	43.50	14.43	107	16	Horizontal
3	261.876	31.72	-29.33	46.00	14.28	125	159	Horizontal
4	576.025	29.04	-21.31	46.00	16.96	120	92	Horizontal
5	787.139	30.40	-17.93	46.00	15.60	241	34	Horizontal
6	960.028	29.58	-15.34	54.00	24.42	142	167	Horizontal



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Mode k; Polarization:Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7914	20.13	-29.38	40.00	19.87	226	329	Vertical
2	166.021	24.98	-34.27	43.50	18.52	223	338	Vertical
3	344.730	27.97	-27.00	46.00	18.03	258	14	Vertical
4	616.967	36.28	-20.43	46.00	9.72	220	154	Vertical
5	683.328	36.13	-19.68	46.00	9.87	234	165	Vertical
6	988.357	33.98	-14.95	54.00	20.02	281	352	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

6.3.1 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:

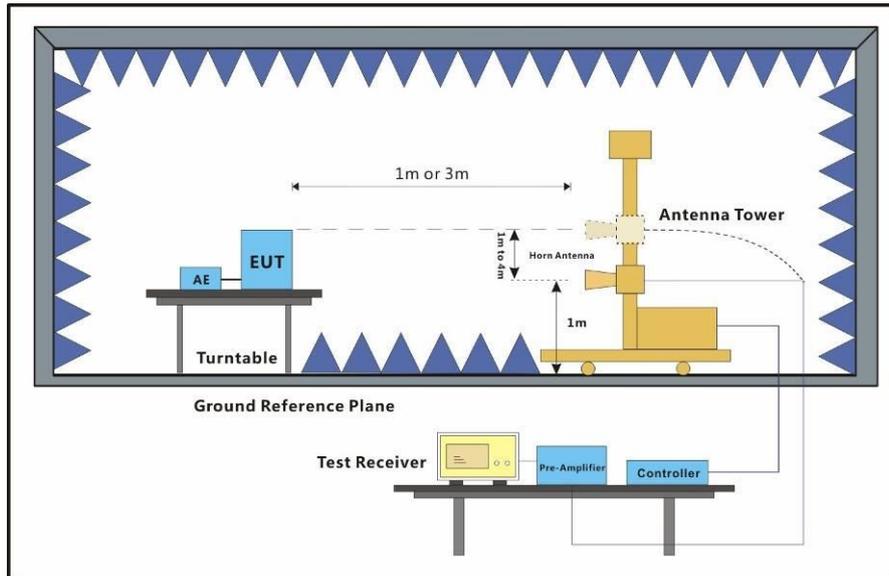
- a: GSM850 Link+BT+WLAN2.4G+GPS Rx+playing MP4 (SD card)+earphone+EUT+USB cable+adapter1
- b:GSM1900 Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
- c:WCDMA II Link +BT+WLAN2.4G+GPS Rx+camera (Front)+earphone+EUT+USB cable+adapter1
- d:WCDMA IV Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter1
- e:WCDMA V Link +BT+WLAN2.4G+GPS Rx+camera (Back)+earphone+EUT+USB cable+adapter2
- f:LTE band 2 Link +BT+ WLAN2.4G +GPS Rx +earphone+EUT+USB cable+adapter1
- g:LTE band 4 Idle +BT+FM +WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- h:LTE band 5 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- i:LTE band 7 Idle +BT+FM+WLAN2.4G+GPS Rx+earphone+EUT+USB cable+adapter1
- j:LTE band 38 Link +BT+FM +WLAN2.4G+GPS Rx +earphone+EUT+USB cable+adapter1
- k:Transfer data between the EUT and the PC+USB cable

The worst case for final test: j:LTE band 38 Link +BT+FM +WLAN2.4G+GPS Rx +earphone+EUT+USB cable+adapter1



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6.3.2 Test Setup Diagram



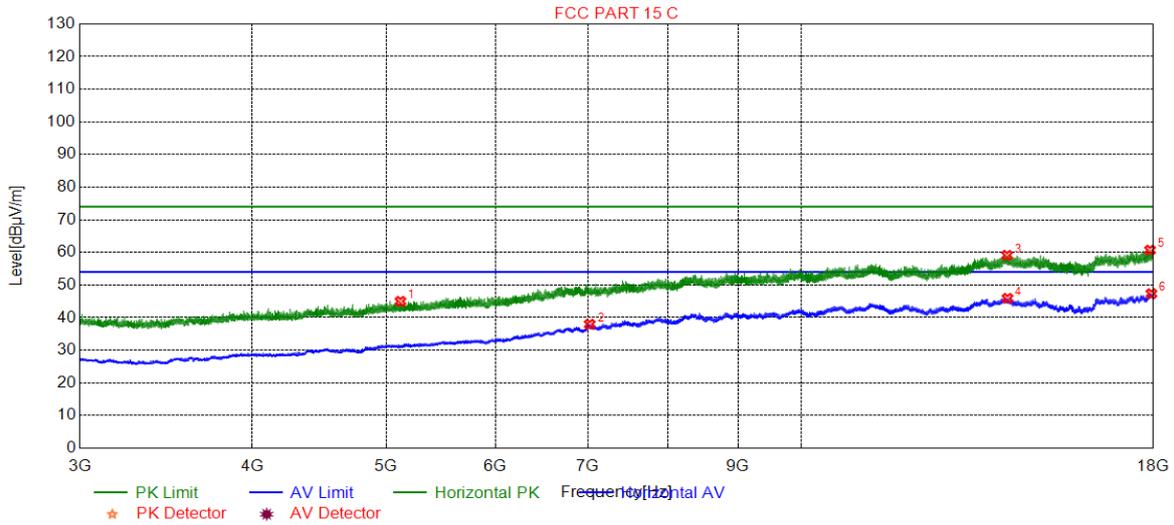
6.3.3 Measurement Data

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.



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Mode:j; Polarization:Horizontal

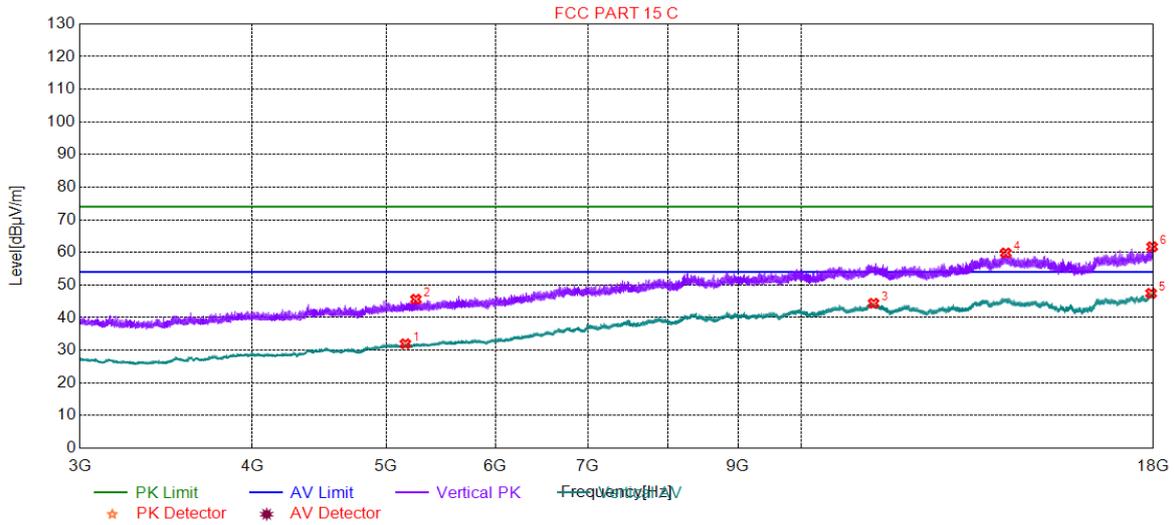


Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5122.61	45.02	-17.08	74.00	28.98	121	100	Horizontal
2	7025.85	38.01	-10.33	54.00	15.99	145	292	Horizontal
3	14098.1	59.13	2.74	74.00	14.87	233	194	Horizontal
4	14109.6	45.95	2.70	54.00	8.05	225	144	Horizontal
5	17897.6	60.70	0.66	74.00	13.30	137	194	Horizontal
6	17938.3	47.36	0.70	54.00	6.64	139	243	Horizontal



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Mode:j; Polarization:Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5165.01	31.99	-16.88	54.00	22.01	252	126	Vertical
2	5256.62	45.66	-16.73	74.00	28.34	163	45	Vertical
3	11281.9	44.42	-2.28	54.00	9.58	254	94	Vertical
4	14068.4	59.83	2.68	74.00	14.17	294	0	Vertical
5	17929.0	47.47	0.70	54.00	6.53	150	143	Vertical
6	17959.2	61.73	0.71	74.00	12.27	217	94	Vertical



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

1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi'an, Shaanxi, China 710086
中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

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t (86-29) 6282 7885 sgs.china@sgs.com

7 Photographs

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

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

7.3 Radiated Emissions (above 1GHz) Test Setup

7.4 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

