Report No.: SEWM2307000261RG08

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TEST REPORT

Application No.: SEWM2307000261RG

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.:** 2312DRA50G

Trade Mark: Redmi

FCC ID: 2AFZZRA50G

Standard(s): FCC 47 CFR Part 15, Subpart B

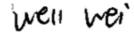
Date of Receipt: 2023/07/31

Date of Test: 2023/08/08 to 2023/08/08

Date of Issue: 2023/08/25

Test Result: Pass*

Authorized Signature:



Well Wei Wireless Laboratory Manager



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^{*} In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record					
Version	Version Chapter Date Modifier Remark					
01		2023/08/25		Original		

Prepared By	(King-p Li) / Test Engineer
Checked By	Stone Ju (Stone Gu) / Reviewer



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Test Summary

Emission Part						
Item	Item Standard Method					
Conducted Emissions at Mains Terminals (150kHz-30MHz)	FCC 47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass		
Radiated Emissions (30MHz-1GHz)	FCC 47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass		
Radiated Emissions (above 1GHz)	FCC 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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General Information 1

EUT Description:	Mobile Phone			
Model No.:	2312DRA50G			
Trade Mark:	Redmi			
Hardware Version:	P2			
Software Version:	MIUI 14			
IMEI:	Sample 1:860949060031322(IMEI1)/860949060031330(IMEI2) Sample 2:860949060037683(IMEI1)/860949060037691(IMEI2) Sample 3:860949060049308(IMEI1)/860949060049316(IMEI2)			
	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 13	777~787	746~756	
Frequency Bands:	LTE Band 17	704~716	734~746	
·	LTE Band 26 (814 to 824 MHz)	814~824	859~869	
	LTE Band 26 (824 to 849 MHz)	824~849	869~894	
	LTE Band 38	2570~2620	2570~2620	
	LTE Band 41	2496~2690	2496~2690	
	LTE Band 66	1710~1780	2110~2200	
	NR Band n5	824~849	869~894	
	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	2110~2180	
	NR Band n77	3450-3550	3450-3550	



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	3700-3980	3700-3980
ND Dand n70	3450-3550	3450-3550
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
NFC	13.56	13.56
GNSS	1	1559~1610

LTE CA:

LTE UL CA 7C; LTE UL CA 38C; LTE UL CA 4A-7A; LTE UL CA 2A-4A; ENDC:

DC_7A_n5A; DC_66A_n7A; DC_66A_n38A;

DC 12A n66A; DC 2A n66A; DC 5A n66A; DC 7A n66A; DC 66A n41A; DC_26A_n41A; DC_2A_n78A; DC_38A_n78A; DC_41A_n78A; DC_5A_n78A; DC_66A_n78A; DC_7A_n78A; DC_26A_n78A;

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

Accessory:

Adapter No.	Model No.	Manufacturer
1	MDY-12-EJ	Salcomp
2	MDY-15-EV	Chenyang

Battery No.	Model No.	Manufacturer
1	BM5V	NVT
2	BM5V	Sunwoda

USB Cable No.	Model No.	Manufacturer
1	L26260	LUXSHARE
2	B26260	Fuhong

Screen no.	Model No.	Manufacturer
1		Wuhan China Star
2		TIANMA



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1.1 Description of Support Units

Description	Manufacturer	Model No.	Inventory No.
Router	Smavwave Technology Co.,Ltd	SRT 421	SUWI-04-34-01
Computer	Lenovo	T14	SUWI-03-33-04
Earphone	One more	EM023	N/A

1.2 Test Location

All tests were performed at:

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	King-p Li

1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an

accredited testing laboratory. Designation Number: CN1312.

Test Firm Registration Number: 717327

1.4 Deviation from Standards

None

1.5 Abnormalities from Standard Conditions

None



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Emission Test Results 2

2.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart B								
Test Method:	ANSI C63.4:2014	ANSI C63.4:2014							
Frequency Range:	150kHz to 30MHz								
Receiver Setup:	RBW = 9kHz, VBW = 30kHz								
	Fraguency Bongo (MHz)	Limit(dBμV)							
	Frequency Range (MHz)	Quasi-peak	average						
	0.15M-0.5MHz	66 ~ 56*	56 ~ 46*						
Limit:	0.5M-5MHz	56	46						
	5M-30MHz	60	50						
	*Decreases with the logarithm of the frequency								
	Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz								

2.1.1 E.U.T. Operation

Operating Environment:

Temperature:	22~23°C
Humidity:	44~46%RH
Atmospheric Pressure:	101.0kPa
	a: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+2.4GWLAN(Idle)+Camera(Rear)+GSM850 (RX) Low+ SIM1
	b: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+5GWLAN(Idle)+Camera(Front)+WCDMA Band 5(RX) Mid +SIM2
	c: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High + SIM1
Pretest these modes to	d: EUT1: adapter(2)+usb Cable(2)+BT(IdIe)+Earphones+5GWLAN(IdIe)+NFC ON+LTE Band 12 (RX) Low + SIM1
find the worst case:	e: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+GNSS+LTE Band 13 (RX) Mid + SIM1
	f: EUT1: adapter(2)+usb Cable(1)+BT(IdIe)+Earphones+5GWLAN(IdIe)+LTE Band 17 (RX) High + SIM1
	g: EUT1: adapter(2)+usb
	Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+Camera(Front)+LTE Band 26 (RX) Low+ SIM1
	h: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+5GWLAN(Idle)+Camera(Front)+LTE Band 5 (RX) High+ SIM1



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	i: EUT2: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+ LTE Band 5 (RX) High+ SIM1
	j: EUT3: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High+ SIM1
	k: EUT1: Transfer data between the EUT and the PC+USB cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	I: EUT1: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	m: EUT2: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	n: EUT3: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	Remark:
	EUT1: 8+128G; EUT2: 12+256G; EUT3: 8+256G;
	g: EUT1: adapter(2)+usb
The worst case for final	Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+Camera(Front)+LTE Band 26 (RX) Low+ SIM1
test:	k: EUT1: Transfer data between the EUT and the PC+USB cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+LTE Band 5 (RX) High+SIM1



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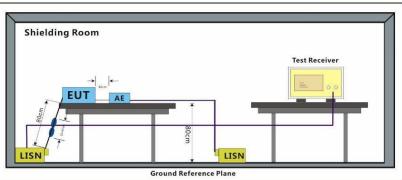


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2.1.2 Test Setup Procedures

- 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.

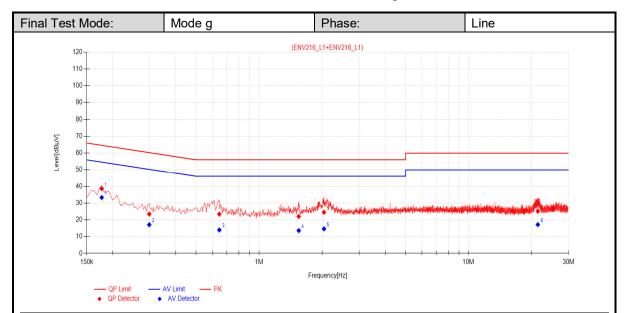


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Data	Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	
1	0.1770	11.73	26.83	38.56	64.63	26.07	21.58	33.31	54.63	21.32	PASS	
2	0.2985	11.63	11.81	23.44	60.28	36.84	5.43	17.06	50.28	33.22	PASS	
3	0.6450	11.65	11.74	23.39	56.00	32.61	2.30	13.95	46.00	32.05	PASS	
4	1.5450	11.73	10.27	22.00	56.00	34.00	1.83	13.56	46.00	32.44	PASS	
5	2.0400	11.73	12.76	24.49	56.00	31.51	2.88	14.61	46.00	31.39	PASS	
6	21.4305	11.99	13.13	25.12	60.00	34.88	5.14	17.13	50.00	32.87	PASS	

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[$dB\mu V$] Value[$dB\mu V$]

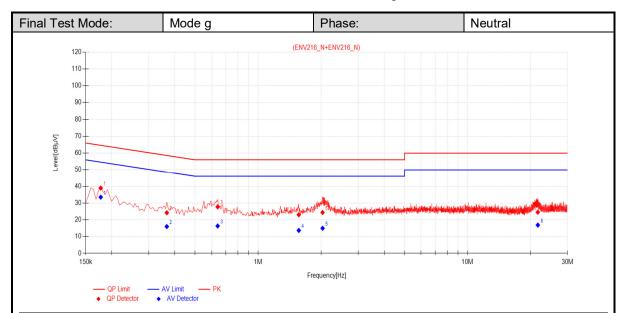


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Data	Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	
1	0.1770	11.73	27.20	38.93	64.63	25.70	21.77	33.50	54.63	21.13	PASS	
2	0.3660	11.61	12.58	24.19	58.59	34.40	4.35	15.96	48.59	32.63	PASS	
3	0.6405	11.65	16.06	27.71	56.00	28.29	4.67	16.32	46.00	29.68	PASS	
4	1.5630	11.73	11.28	23.01	56.00	32.99	1.93	13.66	46.00	32.34	PASS	
5	2.0310	11.73	12.62	24.35	56.00	31.65	3.23	14.96	46.00	31.04	PASS	
6	21.6645	11.99	12.53	24.52	60.00	35.48	4.87	16.86	50.00	33.14	PASS	

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[$dB\mu V$] Value[$dB\mu V$]

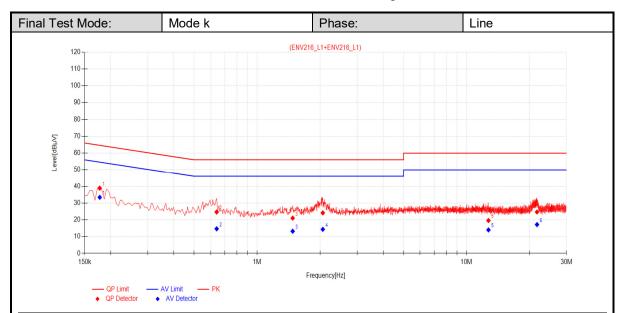


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Data	Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	
1	0.1770	11.73	27.10	38.83	64.63	25.80	21.67	33.40	54.63	21.23	PASS	
2	0.6405	11.65	12.99	24.64	56.00	31.36	2.99	14.64	46.00	31.36	PASS	
3	1.4775	11.72	9.30	21.02	56.00	34.98	1.48	13.20	46.00	32.80	PASS	
4	2.0580	11.73	12.41	24.14	56.00	31.86	2.59	14.32	46.00	31.68	PASS	
5	12.7275	11.89	7.69	19.58	60.00	40.42	2.08	13.97	50.00	36.03	PASS	
6	21.7095	11.99	12.67	24.66	60.00	35.34	5.16	17.15	50.00	32.85	PASS	

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[dB μ V] Value[dB μ V]

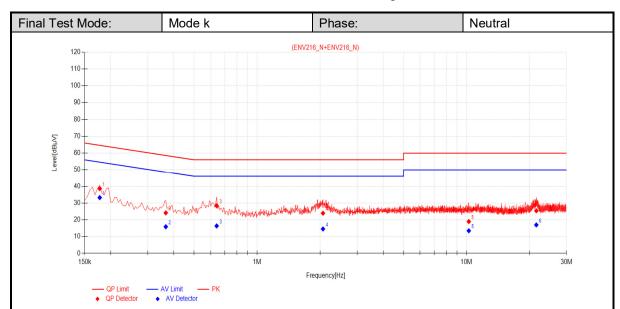


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Data	Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict	
1	0.1770	11.73	26.84	38.57	64.63	26.06	21.49	33.22	54.63	21.41	PASS	
2	0.3660	11.61	12.53	24.14	58.59	34.45	4.25	15.86	48.59	32.73	PASS	
3	0.6405	11.65	16.75	28.40	56.00	27.60	4.70	16.35	46.00	29.65	PASS	
4	2.0625	11.73	12.20	23.93	56.00	32.07	2.82	14.55	46.00	31.45	PASS	
5	10.2525	11.88	7.07	18.95	60.00	41.05	1.58	13.46	50.00	36.54	PASS	
6	21.5475	11.99	13.37	25.36	60.00	34.64	4.95	16.94	50.00	33.06	PASS	

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[dB μ V] Value[dB μ V]



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2.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B								
Test Method:	ANSI C63.4:2014	ANSI C63.4:2014							
Frequency Range:	30MHz to 1GHz	30MHz to 1GHz							
Measurement Distance:	3m								
	Frequency Range (MHz)	Limit(dBµV/m)	Detector						
	30MHz -88MHz	Quasi-peak							
Limit:	88MHz-216MHz	88MHz-216MHz 43.5							
	216MHz-960MHz	46.0	Quasi-peak						
	960MHz-1000MHz	Quasi-peak							
Detector:	Peak for pre-scan (120kHz res	solution bandwidth) 30M	to1000MHz						

2.2.1 E.U.T. Operation

2.2.1 E.U.I. Operation							
Temperature:	22~23°C						
Humidity:	44~46%RH						
Atmospheric Pressure:	101.0kPa						
	a: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+2.4GWLAN(Idle)+Camera(Rear)+GSM850 (RX) Low+ SIM1						
	b: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+5GWLAN(Idle)+Camera(Front)+WCDMA Band 5(RX) Mid +SIM2						
	c: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High + SIM1						
	d: EUT1: adapter(2)+usb Cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+NFC ON+LTE Band 12 (RX) Low + SIM1						
Pretest these modes to	e: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+GNSS+LTE Band 13 (RX) Mid + SIM1						
find the worst case:	f: EUT1: adapter(2)+usb Cable(1)+BT(ldle)+Earphones+5GWLAN(ldle)+LTE Band 17 (RX) High + SIM1						
	g: EUT1: adapter(2)+usb						
	Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+Camera(Front)+LTE Band 26 (RX) Low+ SIM1						
	h: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+5GWLAN(Idle)+Camera(Front)+LTE Band 5 (RX) High+ SIM1						
	i: EUT2: adapter(2)+usb Cable(1)+BT(IdIe)+Earphones+2.4GWLAN(IdIe)+MP4+ LTE Band 5 (RX) High+ SIM1						
	j: EUT3: adapter(2)+usb						
	Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High+ SIM1						



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	k: EUT1: Transfer data between the EUT and the PC+USB cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	l: EUT1: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	m: EUT2: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	n: EUT3: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	o: EUT2: usb Cable Charging to other phone+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+ LTE Band 5 (RX) High+ SIM1
	Remark:
	EUT1: 8+128G; EUT2: 12+256G; EUT3: 8+256G;
	i: EUT2: adapter(2)+usb
The worst case for final test:	Cable(1)+BT(IdIe)+Earphones+2.4GWLAN(IdIe)+MP4+ LTE Band 5 (RX) High+ SIM1
toot.	l: EUT1: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1



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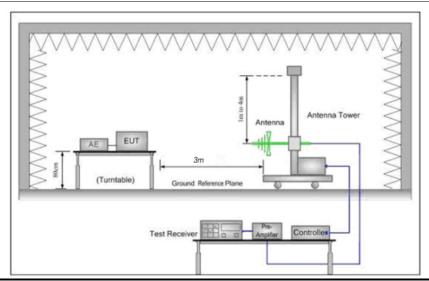


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2.2.2 Test Setup Procedures

- 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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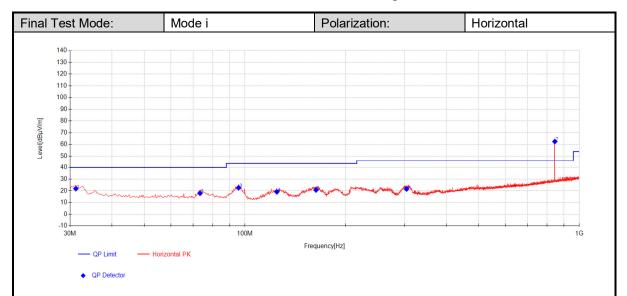
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Data	Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	31.2125	37.76	18.05	-34.01	21.80	40.00	18.20	256	291	Horizontal	
2	73.4075	35.13	16.45	-33.71	17.87	40.00	22.13	142	21	Horizontal	
3	95.7175	40.95	15.16	-33.52	22.59	43.50	20.91	253	116	Horizontal	
4	124.575	34.80	17.60	-33.32	19.08	43.50	24.42	144	0	Horizontal	
5	163.1325	35.71	18.02	-33.03	20.70	43.50	22.80	218	360	Horizontal	
6	304.2675	35.04	18.62	-32.12	21.54	46.00	24.46	139	119	Horizontal	
7*	844.8	63.02	29.13	-29.62	62.52	-	-	169	356	Horizontal	

Remark:

1. The Quasi-Peak measurements were performed on the EUT.

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dB μ V/m] –Value[dB μ V/m]

Note*: #7 is system simulator signal which can be ignored.



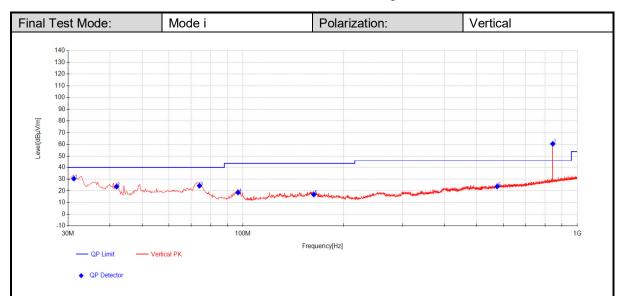
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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.2125	46.36	18.05	-34.01	30.40	40.00	9.60	122	21	Vertical
2	41.8825	37.93	19.61	-33.99	23.54	40.00	16.46	256	272	Vertical
3	74.135	41.72	16.31	-33.70	24.33	40.00	15.67	148	108	Vertical
4	96.6875	36.78	15.24	-33.51	18.51	43.50	24.99	269	21	Vertical
5	162.89	31.79	18.04	-33.03	16.80	43.50	26.70	144	21	Vertical
6	575.3825	29.59	24.76	-30.71	23.64	46.00	22.36	213	99	Vertical
7*	844.5575	61.06	29.12	-29.62	60.56	-	-	155	360	Vertical

Remark:

1. The Quasi-Peak measurements were performed on the EUT.

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dB μ V/m] –Value[dB μ V/m]

Note*: #7 is system simulator signal which can be ignored.

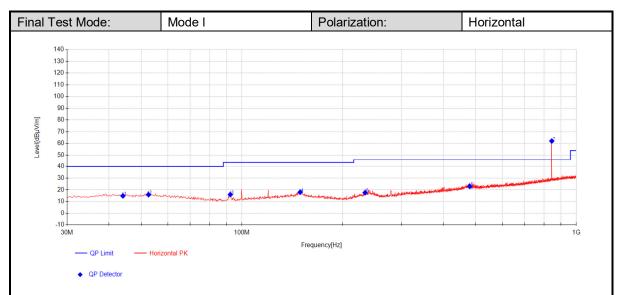


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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.065	29.33	19.50	-33.99	14.84	40.00	25.16	256	262	Horizontal
2	52.5525	30.68	19.10	-33.95	15.83	40.00	24.17	142	21	Horizontal
3	92.3225	34.61	14.89	-33.55	15.95	43.50	27.55	187	283	Horizontal
4	149.31	32.68	18.46	-33.19	17.95	43.50	25.55	269	75	Horizontal
5	233.4575	33.07	16.97	-32.52	17.52	46.00	28.48	133	0	Horizontal
6	480.08	31.09	22.98	-31.20	22.87	46.00	23.13	246	151	Horizontal
7*	844.315	62.57	29.12	-29.63	62.06	-	1	253	352	Horizontal

Remark:

1. The Quasi-Peak measurements were performed on the EUT.

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dB μ V/m] –Value[dB μ V/m]

Note*: #7 is system simulator signal which can be ignored.



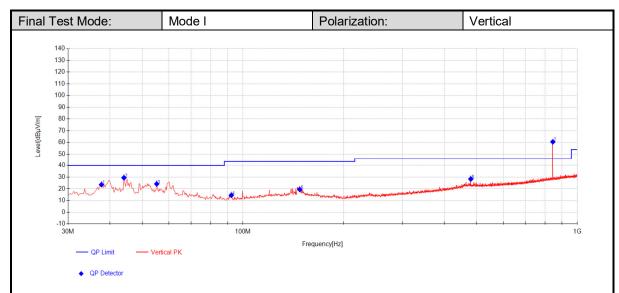
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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.76	38.38	19.16	-34.00	23.54	40.00	16.46	256	360	Vertical
2	44.065	43.93	19.50	-33.99	29.44	40.00	10.56	144	360	Vertical
3	55.22	39.10	18.99	-33.92	24.17	40.00	15.83	231	360	Vertical
4	92.3225	33.12	14.89	-33.55	14.46	43.50	29.04	182	21	Vertical
5	147.855	34.12	18.48	-33.20	19.40	43.50	24.10	154	44	Vertical
6	480.08	36.57	22.98	-31.20	28.35	46.00	17.65	269	32	Vertical
7*	844.8	61.05	29.13	-29.62	60.55	-	-	145	32	Vertical

Remark:

1. The Quasi-Peak measurements were performed on the EUT.

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dB μ V/m] –Value[dB μ V/m]

Note*: #7 is system simulator signal which can be ignored.



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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						
	Frequency (MHz) Limit (dBµV/m)		Detector				
Limit:	Above 1011	74	Peak				
	Above 1GHz 54 Average						
Detector:	Peak for pre-scan (1000kHz resolution bandwidth) 5th harmonic of the highest frequency or 40GHz, whichever is lower.						

2.3.1 E.U.T. Operation	
Temperature:	22~23°C
Humidity:	44~46%RH
Atmospheric Pressure:	101.0kPa
	a: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+2.4GWLAN(Idle)+Camera(Rear)+GSM850 (RX) Low+ SIM1
	b: EUT1: adapter(1)+usb Cable(1)+BT(Idle)+Earphone+5GWLAN(Idle)+Camera(Front)+WCDMA Band 5(RX) Mid +SIM2
	c: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High + SIM1
	d: EUT1: adapter(2)+usb Cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+NFC ON+LTE Band 12 (RX) Low + SIM1
Pretest these modes to	e: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+GNSS+LTE Band 13 (RX) Mid + SIM1
find the worst case:	f: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 17 (RX) High + SIM1
	g: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+Camera(Front)+LTE Band 26 (RX) Low+ SIM1
	h: EUT1: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+5GWLAN(Idle)+Camera(Front)+LTE Band 5 (RX) High+ SIM1
	i: EUT2: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+ LTE Band 5 (RX) High+ SIM1
	j: EUT3: adapter(2)+usb Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+LTE Band 5 (RX) High+ SIM1



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	k: EUT1: Transfer data between the EUT and the PC+USB cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	I: EUT1: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	m: EUT2: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	n: EUT3: Transfer data between the EUT and the PC+USB cable(2)+BT(Idle)+Earphones+5GWLAN(Idle)+LTE Band 5 (RX) High+ SIM1
	o: EUT2: usb Cable Charging to other phone+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+ LTE Band 5 (RX) High+ SIM1
	Remark:
	EUT1: 8+128G; EUT2: 12+256G; EUT3: 8+256G;
The worst sage for final	i: EUT2: adapter(2)+usb
The worst case for final test:	Cable(1)+BT(Idle)+Earphones+2.4GWLAN(Idle)+MP4+ LTE Band 5 (RX) High+ SIM1



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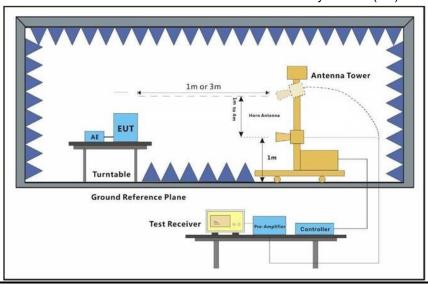


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2.3.2 Test Setup Procedures

- 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 (Distance from antenna to EUT is 1m for measurements >18GHz).
- 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.
- 7. At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB.



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 5th harmonic of the highest frequency or 40GHz, whichever is lower, the disturbance above 18GHz was very low. The points marked on below plots are the highest emissions could be found when testing, so only below points had been displayed.

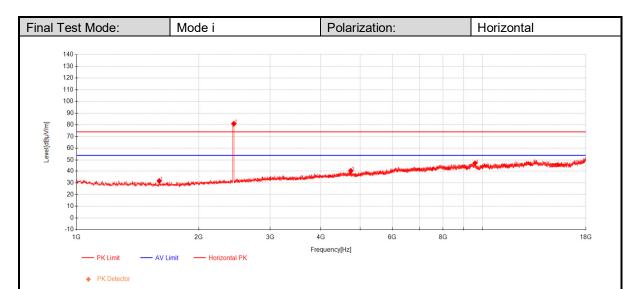


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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1599.25	55.59	24.60	31.67	-48.52	74.00	42.33	125	190	Horizontal
2*	2441.6	100.95	27.27	80.99	-47.24	-	-	126	360	Horizontal
3	4741.7	52.34	32.63	40.40	-44.58	74.00	33.60	223	247	Horizontal
4	9590.1	47.62	37.78	47.23	-38.17	74.00	26.77	187	360	Horizontal

Remark:

- 1. The Peak and Average measurements were performed on the EUT.
- 2. Level = Reading Level + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit[dB μ V/m] – Level[dB μ V/m]

Note*: #2 1G-18G is RF signal which come from Wi-Fi access point used to connect the EUT, and which can be ignored.

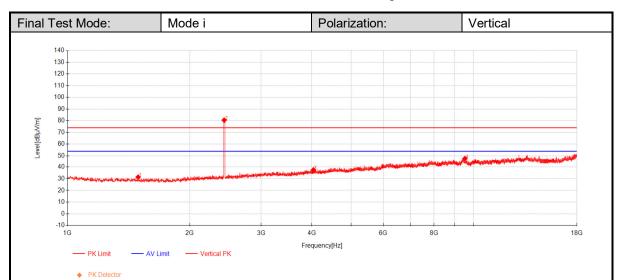


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Data	Data List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1493	55.06	24.87	31.42	-48.51	74.00	42.58	118	2	Vertical
2*	2432.25	100.59	27.25	80.53	-47.32	-	-	265	187	Vertical
3	4035.35	51.72	31.36	37.61	-45.47	74.00	36.39	139	0	Vertical
4	9531.45	48.00	37.76	47.65	-38.11	74.00	26.35	278	55	Vertical

Remark

- 1. The Peak and Average measurements were performed on the EUT.
- 2. Level = Reading Level + AF + Factor:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit[dB μ V/m] – Level[dB μ V/m]

Note*: #2 1G-18G is RF signal which come from Wi-Fi access point used to connect the EUT, and which can be ignored.



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Equipment List

	CE Test System							
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date (yyyy/mm/dd)	Cal Due Date (yyyy/mm/dd)			
Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	2022/11/23	2023/11/22			
Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-01	2022/09/16	2023/09/15			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07			
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR			



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	RE Test System								
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date (yyyy/mm/dd)	Cal Due Date (yyyy/mm/dd)				
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07				
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2023/02/07	2024/02/06				
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10				
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-05	2022/11/23	2023/11/22				
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07				
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2023/05/13	2024/05/12				
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2023/05/13	2024/05/12				
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2023/05/12	2024/05/11				
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2023/02/06	2024/02/05				
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2023/02/06	2024/02/05				
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2023/02/08	2024/02/07				
Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	2022/11/23	2023/11/22				
Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-01	2022/09/16	2023/09/15				
Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-04	NCR	NCR				



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4 Measurement Uncertainty

No.	Item	Measurement Uncertainty			
1	Conduction Emission	± 2.9dB (150kHz to 30MHz)			
		± 4.8dB (30M -1GHz)			
2	Radiated Emission	± 4.8dB (1GHz to 18GHz)			
		± 4.8dB (Above 18GHz)			

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{cispr/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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Photographs 5

5.1 Test Setup

Refer to Appendix A.1 15B Setup Photos.

---End of Report---

