

Report No.: XEWM2304000193RG01

Rev.: 01

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# TEST REPORT

**Application No:** XEWM2304000193RG  
**Applicant:** vivo Mobile Communication Co., Ltd.  
**Address of Applicant:** No.1, vivo Road, Chang'an, Dongguan,Guangdong,China  
**Manufacturer:** vivo Mobile Communication Co., Ltd.  
**Address of Manufacturer:** No.1, vivo Road, Chang'an, Dongguan,Guangdong,China  
**EUT Description:** Mobile Phone  
**Model No.:** V2247  
**Trade Mark:** vivo  
**FCC ID:** 2AUCY-V2247  
**Standard(s):** FCC 47 CFR Part 15, Subpart B  
**Date of Receipt:** 2023/04/21  
**Date of Test:** 2023/04/25 to 2023/04/29  
**Date of Issue:** 2023/05/19

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Peter Tan  
Regulatory Technical Manager





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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023/05/19		Original

<b>Prepared By</b>	 <hr/> (Leah Chen) / Test Engineer
<b>Checked By</b>	 <hr/> (Andy Yao) /Reviewer



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## Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
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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# 1 General Information

Product Name:	Mobile Phone		
Model No. (EUT):	V2247		
Trade Mark:	vivo		
Hardware Version:	MP_0.1		
Software Version:	PD2280IF_EX_A_13.0.6.1.W30		
IMEI:	RE	863548060194937	
	CE	863548060194937	
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 13	777~787	746~756
	LTE Band 17	704~716	734~746
	LTE Band 18 (815 to 824 MHz)	815~824	860~869
	LTE Band 18 (824 to 830 MHz)	824~830	869~875
	LTE Band 19	830~845	875~890
	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	
LTE CA: LTE CA_7C; LTE CA_41C			



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	Wi-Fi 2.4G	2412~2462	2412~2462
	Bluetooth	2402~2480	2402~2480
	Wi-Fi 5G	5150~5850	5150~5850
	FM	/	88~108
	NFC	13.56	13.56
	GNSS(GPS/Galileo /Glonass /Beidou/ SBAS)	/	1559~1610

**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:**

Item No.	Mode No.	Manufacturer	Remark
Adapter	V4440L0A1-US	Dongguan Aohai Technology Co.,Ltd	/
USB cable 1	BK-C-49-B	/	/
USB cable 2	BK-C-50	/	/
Battery	B-Z5	Dongguan NVT Technology Co.,Ltd	/
EUT 1	V2247	/	8G+128G
EUT 2	V2247	/	8G+256G



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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
Mouse	Lenovo	3D optical Mouse	SUWI-03-33-05

**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 Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi' an, Shaanxi China
Post code:	710086
Test engineer:	Ken Liu

**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.

**• Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0095.

IC#: 25613.

**• FCC –Designation Number: CN1337**

SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN1337.

Test Firm Registration Number: 917410

**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		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency Range (MHz)	Limit(dBμV)	
		Quasi-peak	average
	0.15M-0.5MHz	66 ~ 56*	56 ~ 46*
	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:	22~25°C
Humidity:	40~60%RH
Atmospheric Pressure:	96~98 kPa
Pretest these modes to find the worst case:	<ol style="list-style-type: none"> <li>Transfer data from the PC to the EUT1+USB Cable1</li> <li>Transfer data from the PC to the EUT1+USB Cable2</li> <li>Transfer data from the EUT to the PC+USB Cable(worse)</li> <li>Transfer data from the PC to the SD(EUT1)+USB Cable(worse)</li> <li>Transfer data from the SD(EUT1) to the PC+USB Cable(worse)</li> <li>EUT1+WCDMA Band V Idle +BT+WLAN2.4G+GNSS RX +NFC+OTG output</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX +Camera(Front)+LTE Band 12 Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX + Playing MP4+GSM 850 Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +Playing MP4+LTE Band 13 Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +FM+LTE Band 17 Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX+LTE Band 26 Idle</li> <li>EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 5 Idle</li> </ol>



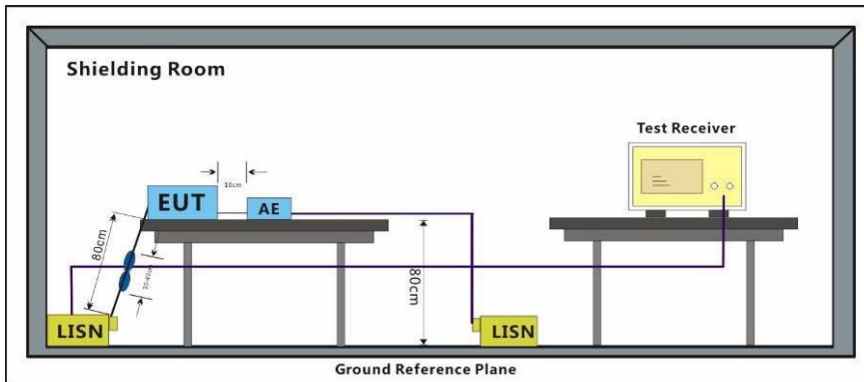
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	<p>14. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX + Playing MP4+LTE Band 18 Idle</p> <p>15. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 19 Idle</p> <p>16. Transfer data from the PC to the EUT2+USB Cable(worse)</p> <p>17. EUT2+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</p>
The worst case for final test:	<p>1. Transfer data from the PC to the EUT1+USB Cable1</p> <p>7. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</p>

**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.

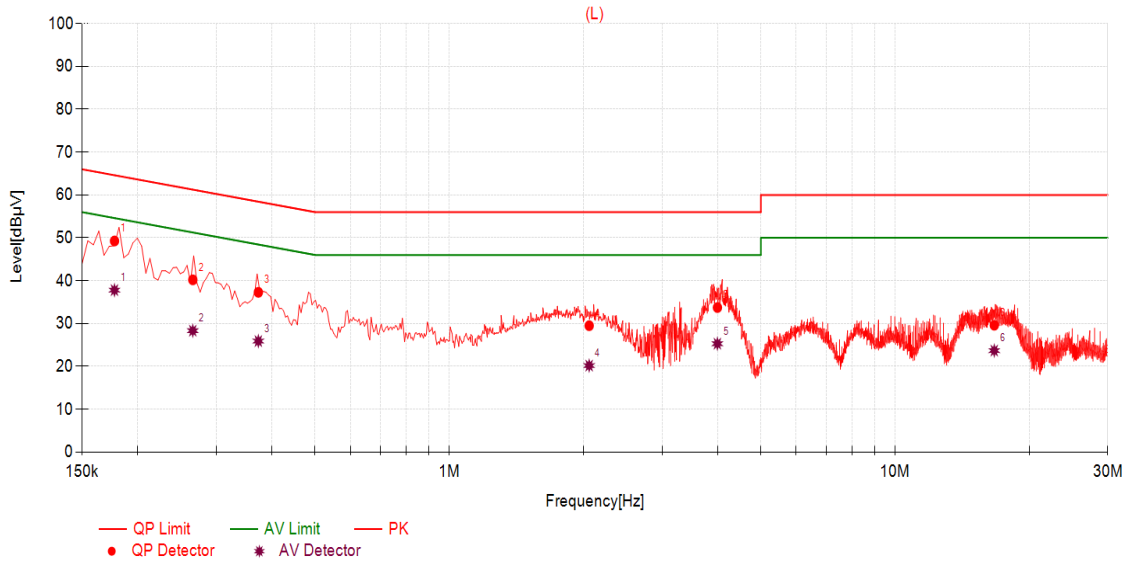


**2.1.3 Measurement Data**

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.



Final Test Mode:	Mode 1	Phase:	Line
------------------	--------	--------	------



**Final 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	0.1773	9.85	39.43	49.28	64.61	15.33	27.95	37.80	54.61	16.81	PASS
2	0.2657	9.89	30.32	40.21	61.25	21.04	18.44	28.33	51.25	22.92	PASS
3	0.3728	9.86	27.44	37.30	58.44	21.14	16.05	25.91	48.44	22.53	PASS
4	2.0594	9.86	19.64	29.50	56.00	26.50	10.33	20.19	46.00	25.81	PASS
5	3.9941	9.84	23.90	33.74	56.00	22.26	15.46	25.30	46.00	20.70	PASS
6	16.6962	10.18	19.43	29.61	60.00	30.39	13.51	23.69	50.00	26.31	PASS

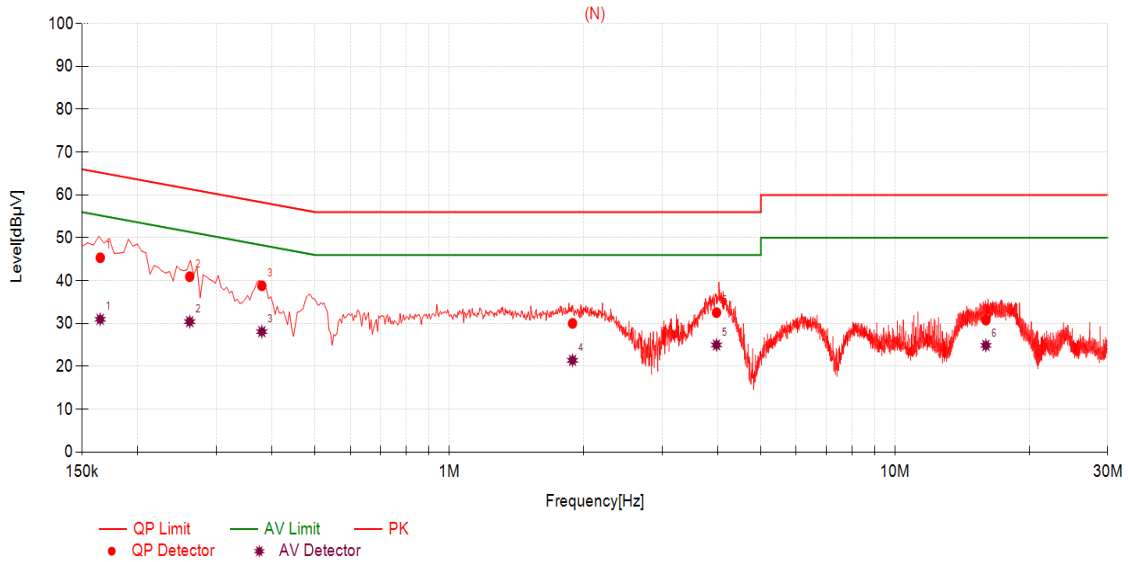
**Remark:**

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



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Final Test Mode:	Mode 1	Phase:	Neutral
------------------	--------	--------	---------



**Final 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	0.1647	9.79	35.57	45.36	65.22	19.86	21.20	30.99	55.22	24.23	PASS
2	0.2615	9.81	31.13	40.94	61.38	20.44	20.63	30.44	51.38	20.94	PASS
3	0.3796	9.80	29.01	38.81	58.29	19.48	18.31	28.11	48.29	20.18	PASS
4	1.8897	9.84	20.20	30.04	56.00	25.96	11.58	21.42	46.00	24.58	PASS
5	3.9758	9.94	22.61	32.55	56.00	23.45	15.08	25.02	46.00	20.98	PASS
6	15.9908	10.28	20.52	30.80	60.00	29.20	14.62	24.90	50.00	25.10	PASS

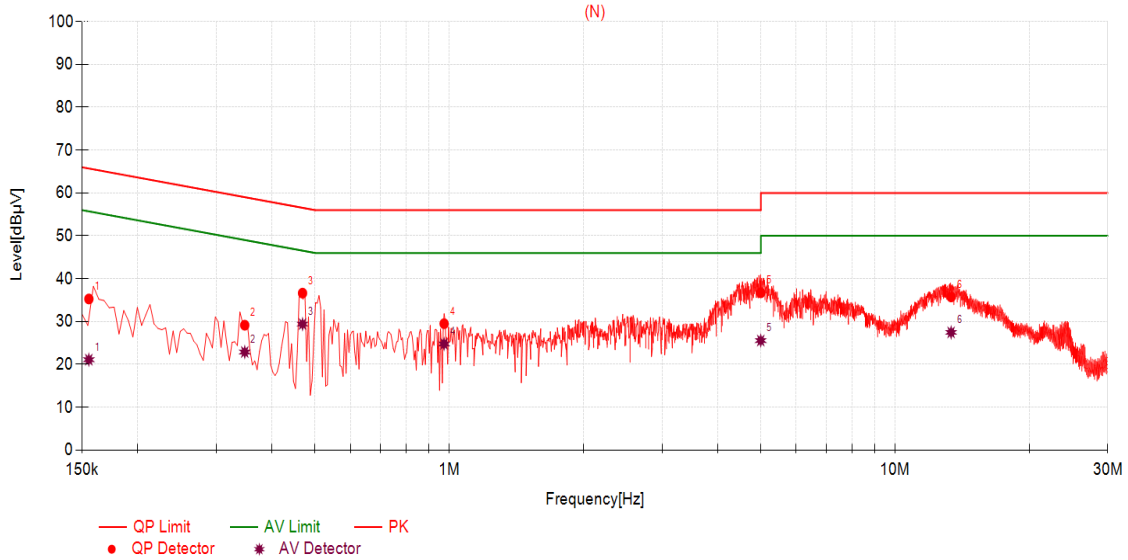
**Remark:**

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



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Final Test Mode:	Mode 7	Phase:	Neutral
------------------	--------	--------	---------

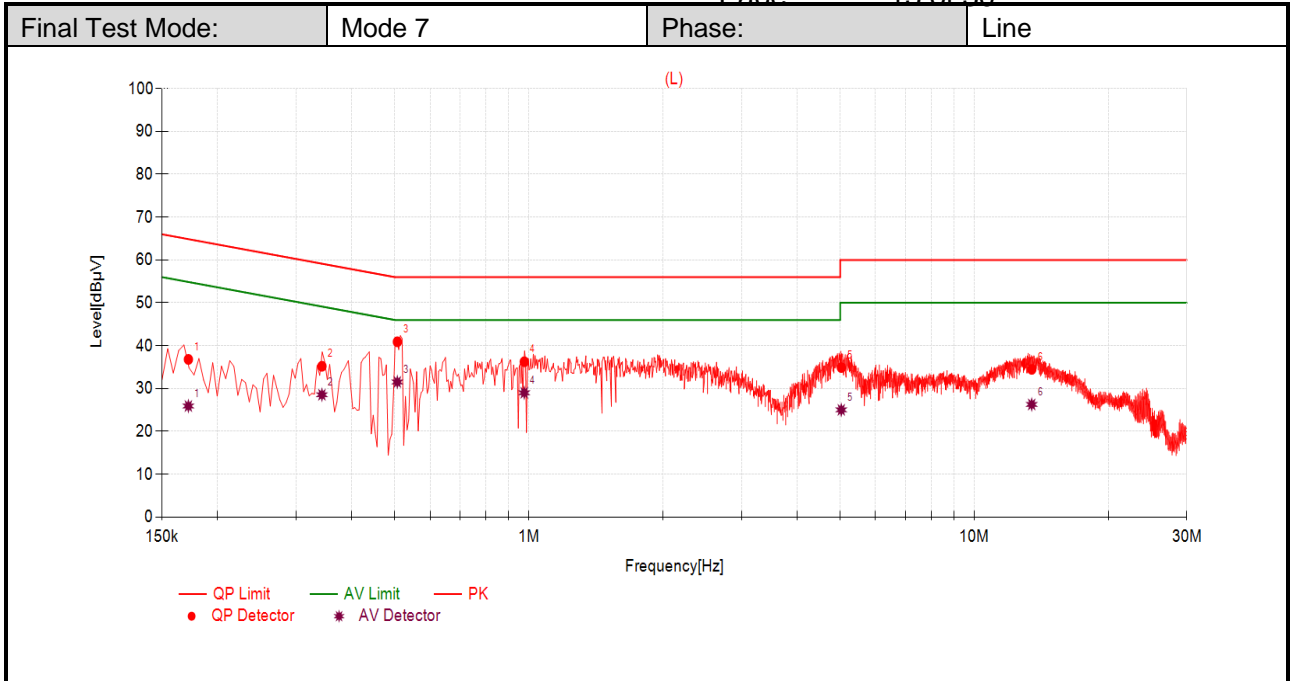


Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1553	9.78	25.49	35.27	65.71	30.44	11.32	21.10	55.71	34.61	PASS
2	0.3475	9.80	19.35	29.15	59.02	29.87	13.09	22.89	49.02	26.13	PASS
3	0.4684	9.85	26.79	36.64	56.54	19.90	19.56	29.41	46.54	17.13	PASS
4	0.9732	9.81	19.70	29.51	56.00	26.49	14.97	24.78	46.00	21.22	PASS
5	4.9970	9.96	26.76	36.72	56.00	19.28	15.61	25.57	46.00	20.43	PASS
6	13.3601	10.24	25.51	35.75	60.00	24.25	17.23	27.47	50.00	22.53	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[dBµV] – Value[dBµV]





Final 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	0.1719	9.85	26.96	36.81	64.87	28.06	16.07	25.92	54.87	28.95	PASS
2	0.3429	9.89	25.32	35.21	59.13	23.92	18.66	28.55	49.13	20.58	PASS
3	0.5064	9.89	31.02	40.91	56.00	15.09	21.64	31.53	46.00	14.47	PASS
4	0.9761	9.85	26.41	36.26	56.00	19.74	19.16	29.01	46.00	16.99	PASS
5	5.0282	9.88	25.03	34.91	60.00	25.09	15.15	25.03	50.00	24.97	PASS
6	13.4585	10.14	24.35	34.49	60.00	25.51	16.15	26.29	50.00	23.71	PASS

**Remark:**

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



**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:	Frequency Range (MHz)	Limit(dBμV/m)	Detector
	30MHz -88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
960MHz-1000MHz	54.0	Quasi-peak	
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHZ		

**2.2.1 E.U.T. Operation**

Temperature:	22~25°C
Humidity:	40~60%RH
Atmospheric Pressure:	96~98 kPa
Pretest these modes to find the worst case:	<ol style="list-style-type: none"> <li>1. Transfer data from the PC to the EUT1+USB Cable1</li> <li>2. Transfer data from the PC to the EUT1+USB Cable2</li> <li>3. Transfer data from the EUT to the PC+USB Cable(worse)</li> <li>4. Transfer data from the PC to the SD(EUT1)+USB Cable(worse)</li> <li>5. Transfer data from the SD(EUT1) to the PC+USB Cable(worse)</li> <li>6. EUT1+WCDMA Band V Idle +BT+WLAN2.4G+GNSS RX +NFC+OTG output</li> <li>7. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</li> <li>8. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX +Camera(Front)+LTE Band 12 Idle</li> <li>9. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX + Playing MP4+GSM 850 Idle</li> <li>10. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +Playing MP4+LTE Band 13 Idle</li> <li>11. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +FM+LTE Band 17 Idle</li> <li>12. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX+LTE Band 26 Idle</li> <li>13. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 5 Idle</li> <li>14. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX + Playing MP4+LTE Band 18 Idle</li> <li>15. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 19 Idle</li> <li>16. Transfer data from the PC to the EUT2+USB Cable(worse)</li> </ol>





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	17. EUT2+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle
The worst case for final test:	5. Transfer data from the SD(EUT1) to the PC+USB Cable(worse) 10. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +Playing MP4+LTE Band 13 Idle



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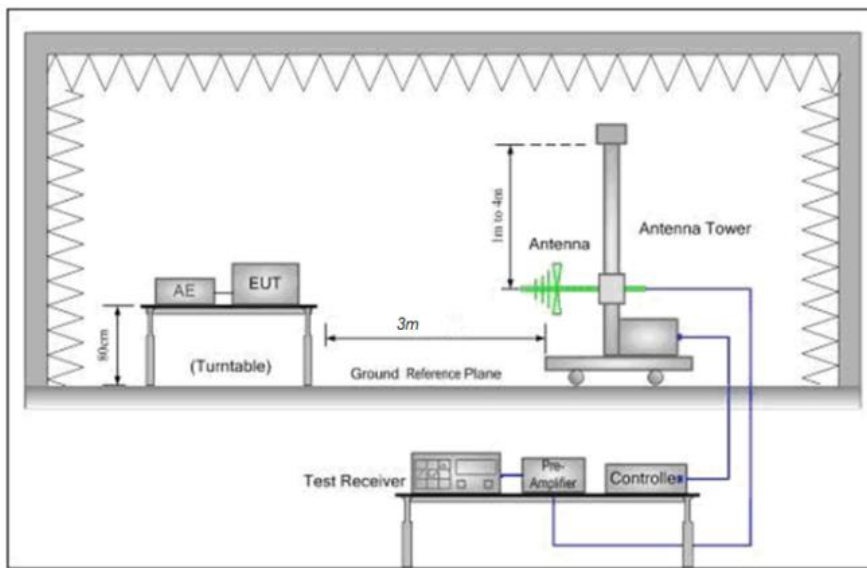
SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.  
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**2.2.2 Test Setup Procedures**

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.



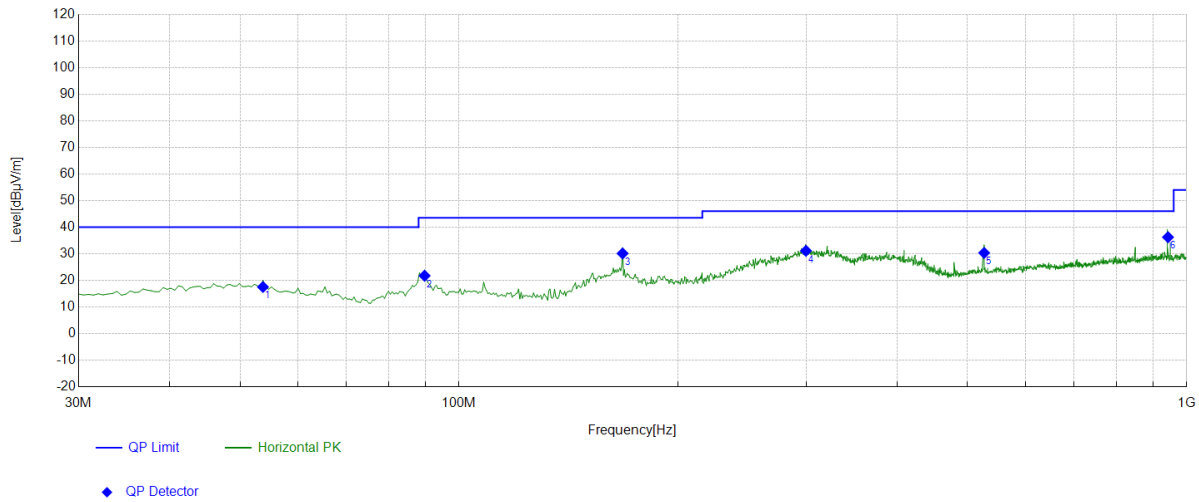
**2.2.3 Measurement Data**

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.





Final Test Mode:	Mode 5	Polarization:	Horizontal
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**Final Data List**

NO.	Freq. [MHz]	AF [dB/m]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.7769	13.84	-27.80	31.49	17.53	40.00	22.47	225	41	Horizontal
2	89.6848	9.61	-27.60	39.75	21.76	43.50	21.74	219	245	Horizontal
3	167.8089	8.86	-26.49	47.75	30.12	43.50	13.38	188	29	Horizontal
4	299.7949	13.21	-25.89	43.79	31.11	46.00	14.89	139	244	Horizontal
5	526.8884	17.54	-24.85	37.66	30.35	46.00	15.65	346	56	Horizontal
6	942.7414	21.85	-23.55	37.94	36.24	46.00	9.76	330	48	Horizontal

**Remark:**

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

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

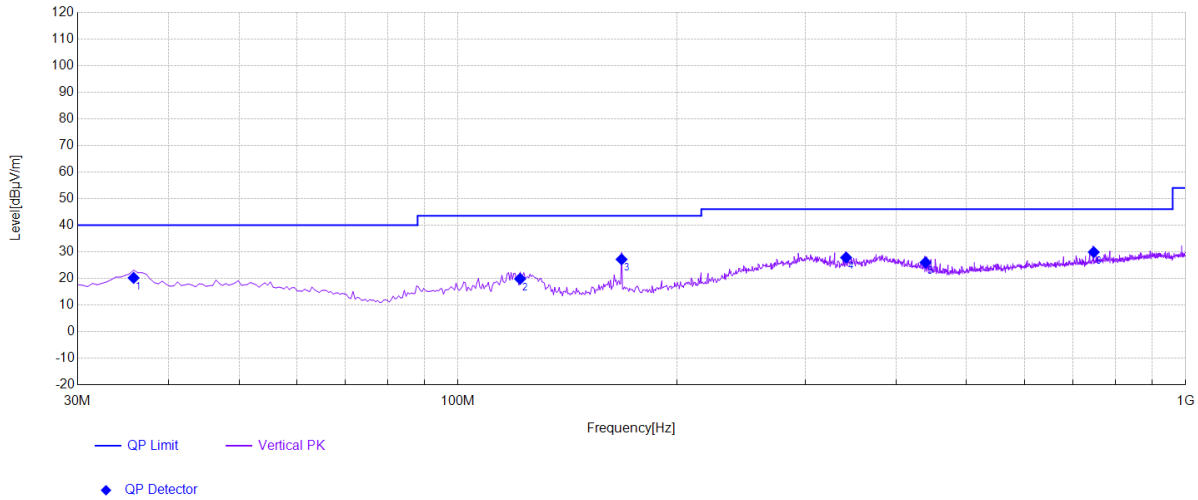
Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dBμV/m] - Value[dBμV/m]



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Final Test Mode:	Mode 5	Polarization:	Vertical
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Final Data List										
NO.	Freq. [MHz]	AF [dB/m]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.8229	11.73	-27.99	36.46	20.20	40.00	19.80	333	341	Vertical
2	121.7109	8.83	-27.22	38.22	19.83	43.50	23.67	265	28	Vertical
3	167.8089	8.86	-26.49	44.78	27.15	43.50	16.35	128	28	Vertical
4	341.5258	14.50	-25.79	39.12	27.83	46.00	18.17	183	355	Vertical
5	439.0595	16.24	-25.22	34.97	25.99	46.00	20.01	374	355	Vertical
6	747.6738	20.15	-24.02	33.73	29.86	46.00	16.14	109	167	Vertical

Remark:

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

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

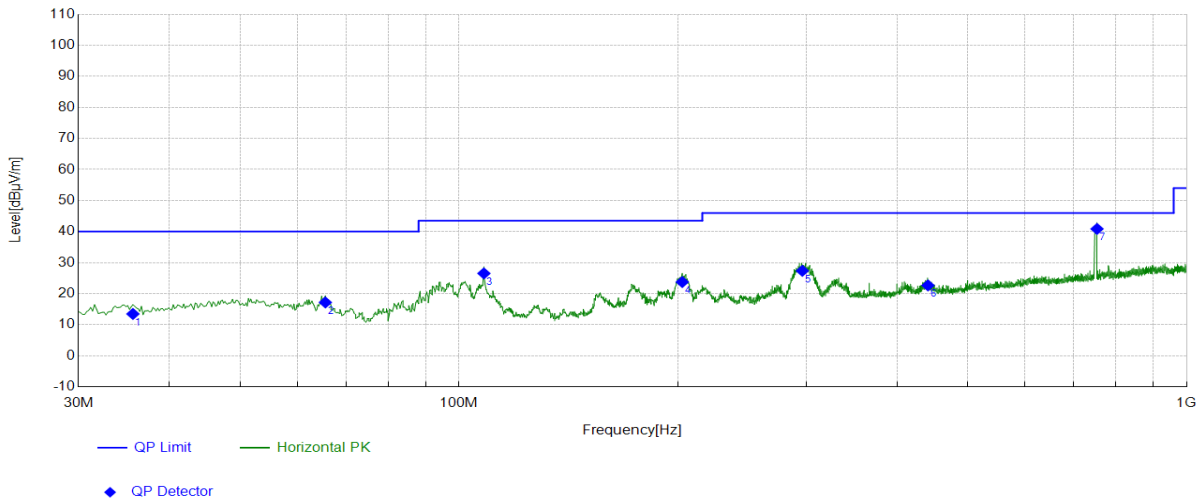
Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dBμV/m] - Value[dBμV/m]



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Final Test Mode:	Mode 10	Polarization:	Horizontal
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Final Data List										
NO.	Freq. [MHz]	AF [dB/m]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.6271	11.65	-27.99	29.83	13.49	40.00	26.51	225	279	Horizontal
2	65.5091	12.00	-27.62	32.81	17.19	40.00	22.81	215	200	Horizontal
3	108.1976	11.78	-27.12	41.88	26.54	43.50	16.96	326	244	Horizontal
4	202.6945	11.29	-26.47	38.95	23.77	43.50	19.73	204	220	Horizontal
5	296.4153	13.34	-25.81	39.85	27.38	46.00	18.62	182	8	Horizontal
6	441.1682	16.18	-25.24	31.74	22.68	46.00	23.32	103	278	Horizontal
7	753.1826	20.35	-24.10	44.62	40.87	-	-	333	337	Horizontal

Remark:

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

2. Value = Reading + AF + Factor:

AF = Antenna Factor(dB/m)

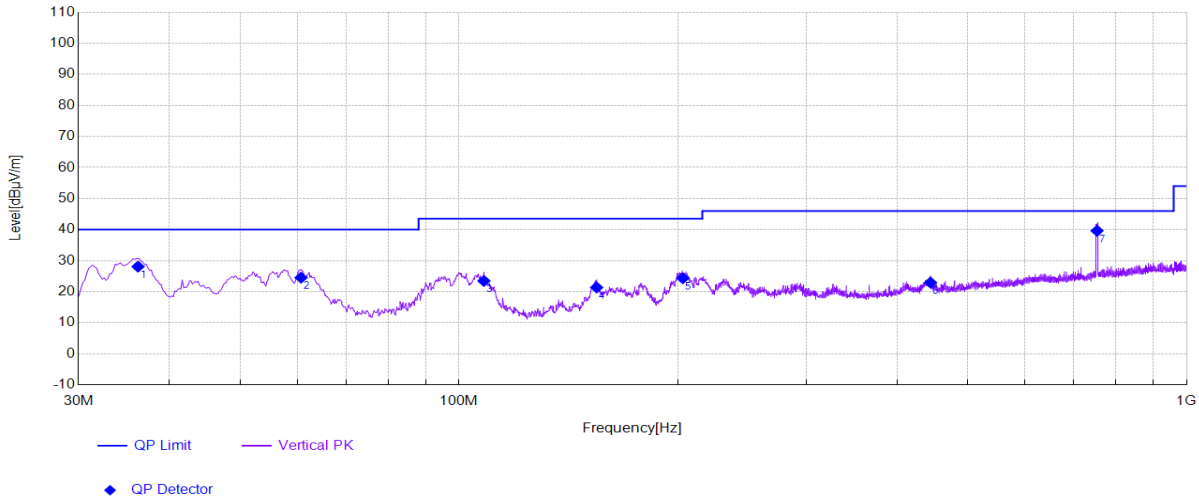
Factor = Cable Factor(dB) - Preamplifier (dB)

Margin = Limit[dBµV/m] -Value[dBµV/m]



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Final Test Mode:	Mode 10	Polarization:	Vertical
------------------	---------	---------------	----------



Final Data List										
NO.	Freq. [MHz]	AF [dB/m]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.2092	11.86	-27.99	44.21	28.08	40.00	11.92	128	44	Vertical
2	60.6581	12.33	-27.93	40.13	24.53	40.00	15.47	109	7	Vertical
3	108.1976	11.78	-27.12	38.82	23.48	43.50	20.02	114	133	Vertical
4	154.5729	8.11	-26.59	39.85	21.37	43.50	22.13	165	354	Vertical
5	203.0826	11.28	-26.49	39.55	24.34	43.50	19.16	134	23	Vertical
6	444.6609	16.11	-25.25	32.06	22.92	46.00	23.08	175	320	Vertical
7	753.1826	20.35	-24.10	43.38	39.63	-	-	144	202	Vertical

Remark:

- The Quasi-Peak measurements were performed on the EUT.
- Value = Reading + AF + Factor:  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier (dB)  
 Margin = Limit[dBµV/m] -Value[dBµV/m]



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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:	Frequency (MHz)	Limit (dBµV/m)	Detector
	Above 1GHz	74 54	Peak 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:	22~25°C
Humidity:	40~60%RH
Atmospheric Pressure:	96~98 kPa
Pretest these modes to find the worst case:	<ol style="list-style-type: none"> <li>1. Transfer data from the PC to the EUT1+USB Cable1</li> <li>2. Transfer data from the PC to the EUT1+USB Cable2</li> <li>3. Transfer data from the EUT to the PC+USB Cable(worse)</li> <li>4. Transfer data from the PC to the SD(EUT1)+USB Cable(worse)</li> <li>5. Transfer data from the SD(EUT1) to the PC+USB Cable(worse)</li> <li>6. EUT1+WCDMA Band V Idle +BT+WLAN2.4G+GNSS RX +NFC+OTG output</li> <li>7. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</li> <li>8. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX +Camera(Front)+LTE Band 12 Idle</li> <li>9. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX + Playing MP4+GSM 850 Idle</li> <li>10. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +Playing MP4+LTE Band 13 Idle</li> <li>11. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX +FM+LTE Band 17 Idle</li> <li>12. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX+LTE Band 26 Idle</li> <li>13. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 5 Idle</li> <li>14. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN+GNSS RX + Playing MP4+LTE Band 18 Idle</li> <li>15. EUT1+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX + Playing MP4+LTE Band 19 Idle</li> <li>16. Transfer data from the PC to the EUT2+USB Cable(worse)</li> <li>17. EUT2+adapter+USB Cable(worse)+BT+NFC+2.4GWLAN +GNSS RX +Camera(Rear)+WCDMA Band V Idle</li> </ol>

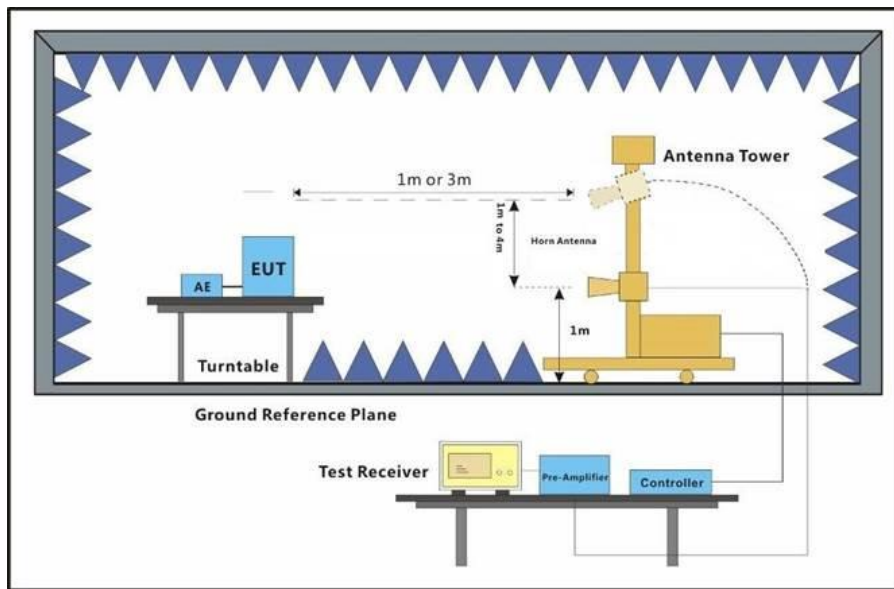


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The worst case for final test:	3. Transfer data from the EUT to the PC+USB Cable(worse) 8. EUT1+adapter+USB Cable(worse)+BT+NFC+5GWLAN +GNSS RX +Camera(Front)+LTE Band 12 Idle
--------------------------------	---

**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  $20 \cdot \text{LOG}(3/1) = 9.54 \text{ dB}$ .



**2.3.3 Measurement Data**

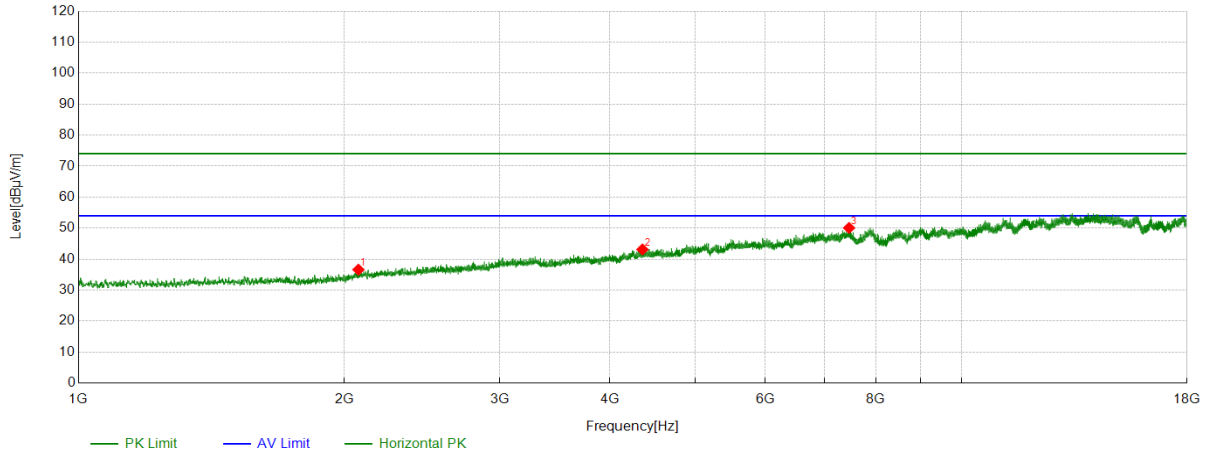
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

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.



Final Test Mode:	Mode 3	Polarization:	Horizontal
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Final Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2075.3038	62.60	27.30	-53.29	36.61	74.00	37.39	254	306	Horizontal
2	4353.4177	60.02	31.92	-48.82	43.12	74.00	30.88	137	232	Horizontal
3	7462.0231	57.88	36.68	-44.49	50.07	74.00	23.93	161	329	Horizontal

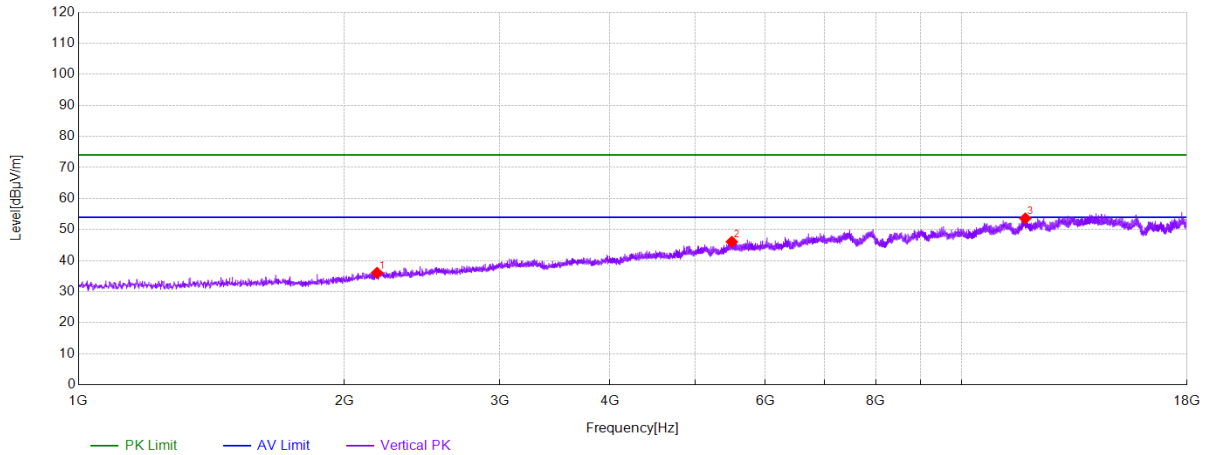
Remark:

- The Peak and Average measurements were performed on the EUT.
- Level = Reading Level + AF + Factor:  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier gain(dB)  
 Margin = Limit[dBµV/m] – Level[dBµV/m]



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Final Test Mode:	Mode 3	Polarization:	Vertical
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Final Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2178.1589	61.76	27.57	-53.22	36.11	74.00	37.89	157	240	Vertical
2	5495.8748	58.86	33.12	-45.91	46.07	74.00	27.93	254	285	Vertical
3	11818.4909	54.90	39.83	-41.12	53.61	74.00	20.39	365	232	Vertical

Remark:

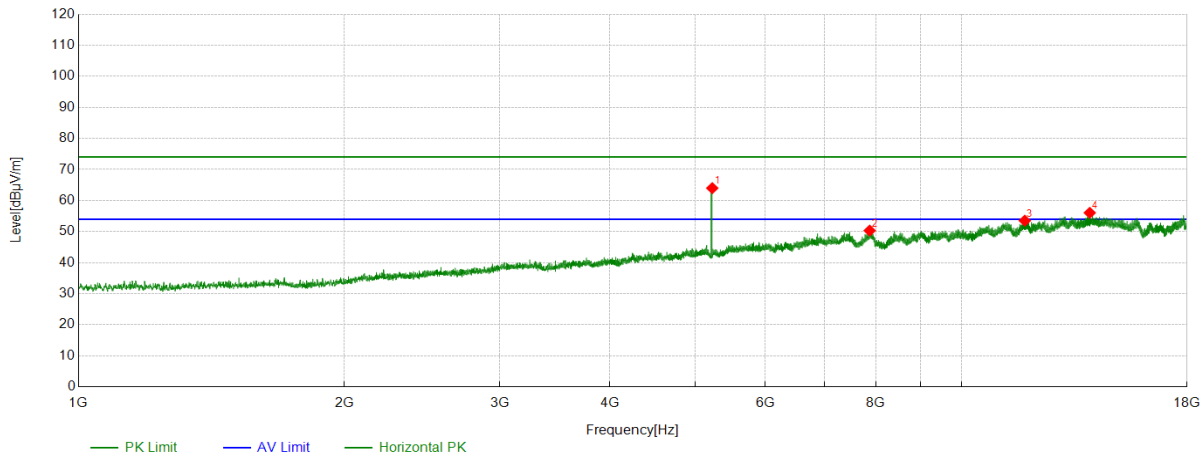
- The Peak and Average measurements were performed on the EUT.
- Level = Reading Level + AF + Factor:  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier gain(dB)  
 Margin = Limit[dBμV/m] – Level[dBμV/m]



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Final Test Mode:	Mode 8	Polarization:	Horizontal
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Final Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5223.0112	78.17	32.81	-46.99	63.99	-	-	175	246	Horizontal
2	7874.2937	57.12	37.25	-44.05	50.32	74.00	23.68	254	16	Horizontal
3	11801.4901	54.71	39.89	-41.08	53.52	74.00	20.48	321	230	Horizontal
4	13980.999	55.13	40.52	-39.60	56.05	74.00	17.95	289	223	Horizontal

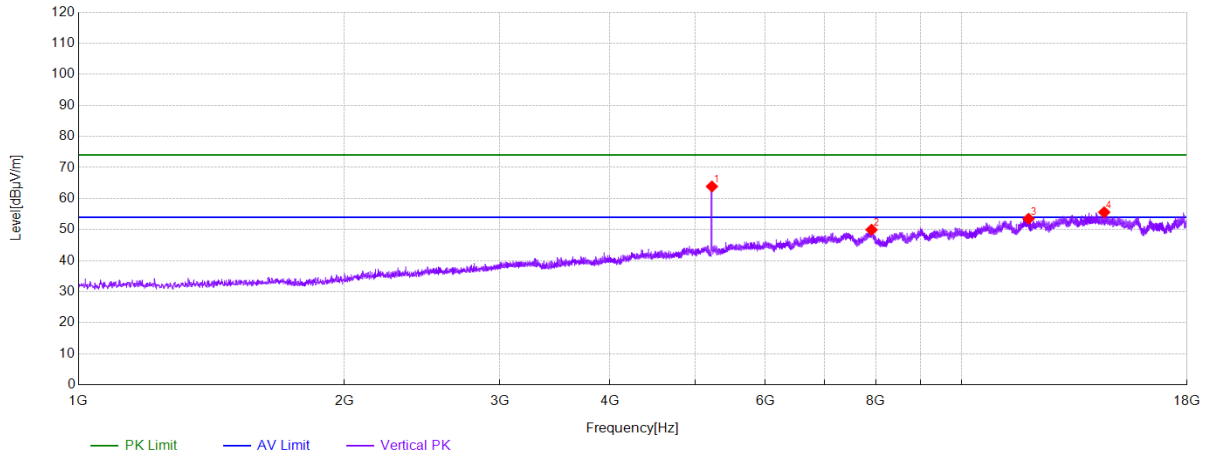
Remark:

- The Peak and Average measurements were performed on the EUT.
- Level = Reading Level + AF + Factor:  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier gain(dB)  
 Margin = Limit[dBµV/m] – Level[dBµV/m]



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Final Test Mode:	Mode 8	Polarization:	Vertical
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Final Data List										
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5217.9109	78.22	32.69	-47.02	63.89	-	-	254	337	Vertical
2	7912.5456	56.77	37.43	-44.25	49.95	74.00	24.05	241	39	Vertical
3	11918.7959	54.59	39.48	-40.57	53.50	74.00	20.50	136	202	Vertical
4	14517.3759	54.90	40.58	-39.88	55.60	74.00	18.40	286	60	Vertical

Remark:

- The Peak and Average measurements were performed on the EUT.
- Level = Reading Level + AF + Factor:  
 AF = Antenna Factor(dB/m)  
 Factor = Cable Factor(dB) - Preamplifier gain(dB)  
 Margin = Limit[dBμV/m] – Level[dBμV/m]



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### 3 Equipment List

CE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Shielding Room	Brilliant-emc	N/A	XAW04-03-01	N/A	N/A
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2022/06/30	2023/06/29
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-07-01	NCR	NCR
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-02	2022/06/30	2023/06/29



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RE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2021/09/09	2024/09/08
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2023/02/16	2024/02/15
Spectrum Analyzer	ROHDE &SCHWARZ	FSV3044	XAW01-13-05	2022/05/24	2023/05/23
Test receiver	ROHDE &SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2022/07/28	2024/07/27
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2022/07/28	2024/07/27
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2022/07/23	2024/07/22
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	TAP9K3G32	XAW01-41-01	2022/05/24	2023/05/23
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2022/09/14	2023/09/13
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2022/09/14	2023/09/13
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2022/09/14	2023/09/13
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-05-01	NCR	NCR



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## 4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.6dB (9kHz to 30MHz)
		± 4.9dB (30MHz to 1GHz)
		± 4.9dB (1GHz to 6GHz)
		± 4.7dB (6GHz to 18GHz)
		± 5.26dB (Above 18GHz)

**Remark:**

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{CISPR/ETSI}$  (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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## 5 Photographs

### 5.1 Test Setup

Refer to Appendix A.1 15B Setup Photos.

---End of Report---



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