

TEST REPORT

Application No: ZR/2020/A0015
Applicant: HMD global Oy
Address of Applicant: Bertel Jungin aukio 9, 02600 Espoo, Finland
Manufacturer: HMD global Oy
Address of Manufacturer: Bertel Jungin aukio 9, 02600 Espoo, Finland
EUT Description: Smart Phone
Model No.: TA-1322
Trade Mark: NOKIA
FCC ID: 2AJOTTA-1322
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020/10/19
Date of Test: 2020/10/23 to 2020/12/10
Date of Issue: 2021/8/20

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Simon Ling

Wireless Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020/12/11		Original
02		2021/1/11	Daniel Wang	Updated battery information
03		2021/5/27	Leah Chen	1. Modify data conversion error of antenna height 2. Updated equipment list
04		2021/8/20	Leah Chen	1. Updated Support Units, Test facility and Test Location 2. Add the factor for radiated emission

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



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Test Summary

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

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower



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1 General Information

Product Name:	Smart Phone		
Model No.(EUT):	TA-1322		
Trade Mark:	NOKIA		
Hardware Version:	V1.0		
Software Version:	00WW_0_070		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824~849	869~894
	GSM1900	1850~1910	1930~1990
	WCDMA Band V	824~849	869~894
	LTE Band 5	824~849	869~894
	LTE Band 7	2500~2570	2620~2690
	LTE Band 38	2570~2620	2570~2620
	LTE Band 41	2535~2655	2535~2655
	Wi-Fi 2.4G	2412~2462	2412~2462
	Bluetooth	2402~2480	2402~2480



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Accessories:

Battery			
Battery1	Ningbo Veken Battery Co., Ltd.	V730	3.85V 3900mAh li-Polymer battery
Battery2	Guangdong Fenghua New Energy Co., Ltd.	V730	3.85V 3900mAh li-Polymer battery
USB Cable			
USB Cable1	GUANGDONG WEIWANGDA ELECTRONICS CO., LTD	DA-B0609-N	Micro_5pin data cable/shielding aluminum foil/1m/AWG24 black
USB Cable2	SUNTOPS ELECTRONICS CO.,LTD	336189	Micro_5pin data cable/shielding aluminum foil/1m/AWG24 black
Adapter			
Adapter1 (EU)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120E8	5V1.0A/100-240V/black
Adapter2 (US)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120U8	5V1.0A/100-240V/black
Adapter3 (AU)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120AU8	5V1.0A/100-240V/black
Adapter4 (UK)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120B8	5V1.0A/100-240V/black
Adapter5 (US)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120U8	5V1.0A/100-240V/black
Adapter6 (EU)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120E8	5V1.0A/100-240V/black
Earphone			
Earphone1	GuangDong AllWin Technology Co.,Ltd	XL-5178	3.5 round wire earbud style/with microphone/black/1.5m/straight
Earphone2	Huizhou New Leader Industry Co., Ltd.	NLD-305M-06SF	3.5 round wire earbud style/with microphone/black/1.5m/straight



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1.1 Description of Support Units

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

1.2 Test Location

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086
Test engineer:	Ben Huang, Leah Chen

1.3 Test Facility

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

- **A2LA (Certificate No. 4854.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

- **FCC –Designation Number: CN1271.**

1.4 Deviation from Standards

None

1.5 Abnormalities from Standard Conditions

None



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2 Emission Test Results

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

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

2.1.1 E.U.T. Operation

Operating Environment:

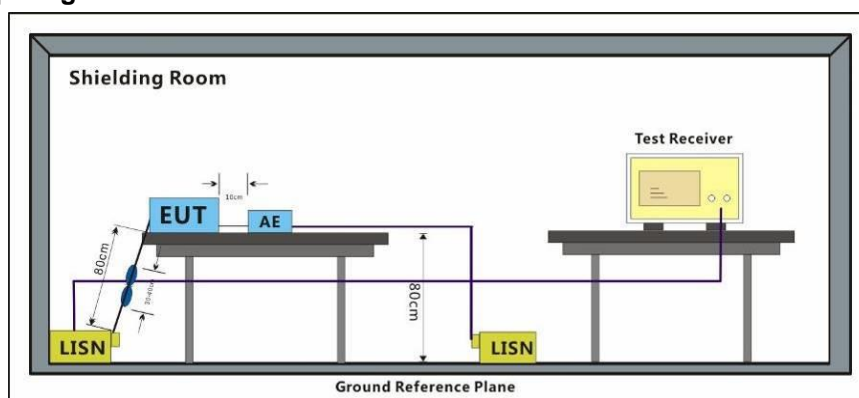
Temperature: 18.9 °C Humidity: 55.1 % RH Atmospheric Pressure: 1000 mbar

Pretest these modes to find the worst case:

- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3

The worst case for final test: c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1

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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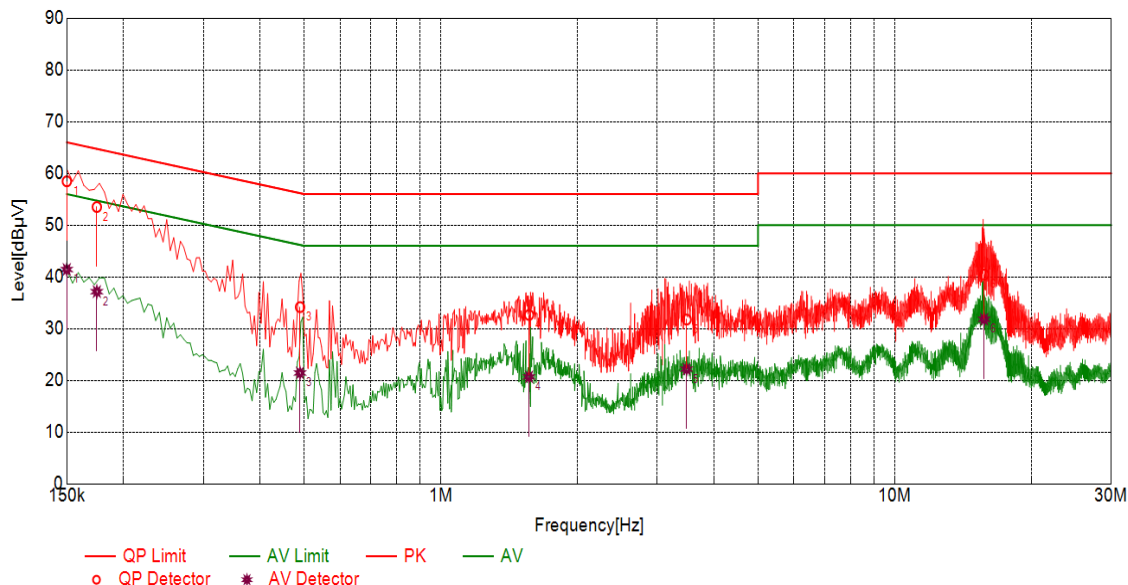
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Firstly Supply:

Mode:c; 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	0.1500	10.10	58.47	66.00	7.53	41.43	56.00	14.57
2	0.1747	10.10	53.51	64.74	11.23	37.14	54.74	17.60
3	0.4897	10.10	34.16	56.17	22.01	21.42	46.17	24.75
4	1.5648	10.10	32.64	56.00	23.36	20.67	46.00	25.33
5	3.4799	10.10	31.76	56.00	24.24	22.17	46.00	23.83
6	15.7416	10.11	40.45	60.00	19.55	31.81	50.00	18.19

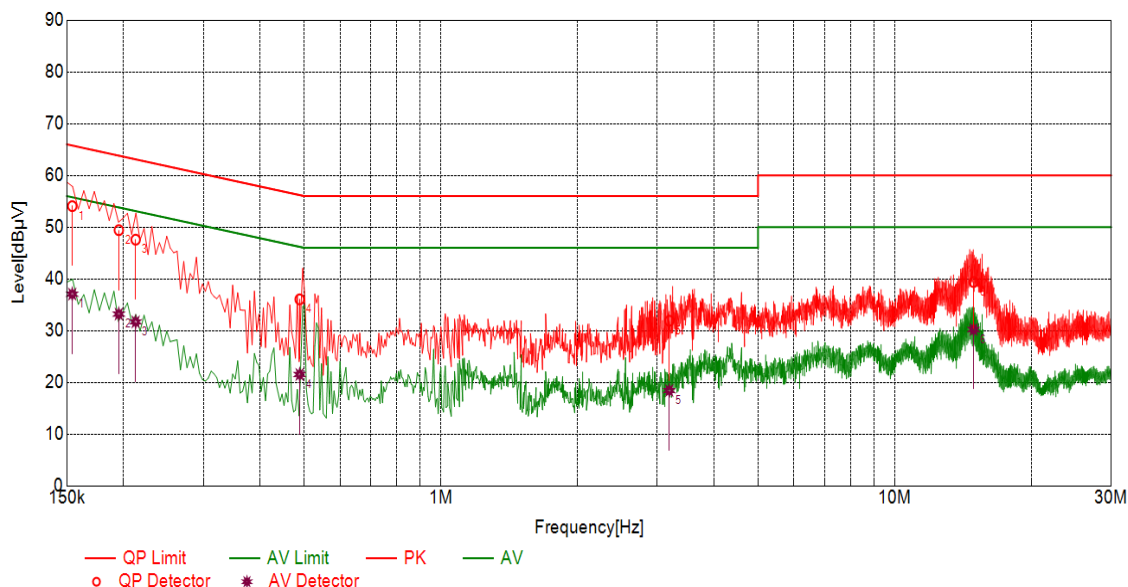


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Mode:c; Line:Neutral Line



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1542	10.10	54.06	65.77	11.71	37.05	55.77	18.72
2	0.1953	10.10	49.42	63.81	14.39	33.19	53.81	20.62
3	0.2127	10.10	47.58	63.10	15.52	31.69	53.10	21.41
4	0.4887	10.10	36.05	56.19	20.14	21.52	46.19	24.67
5	3.1870	10.10	31.91	56.00	24.09	18.41	46.00	27.59
6	14.9232	10.11	39.40	60.00	20.60	30.22	50.00	19.78



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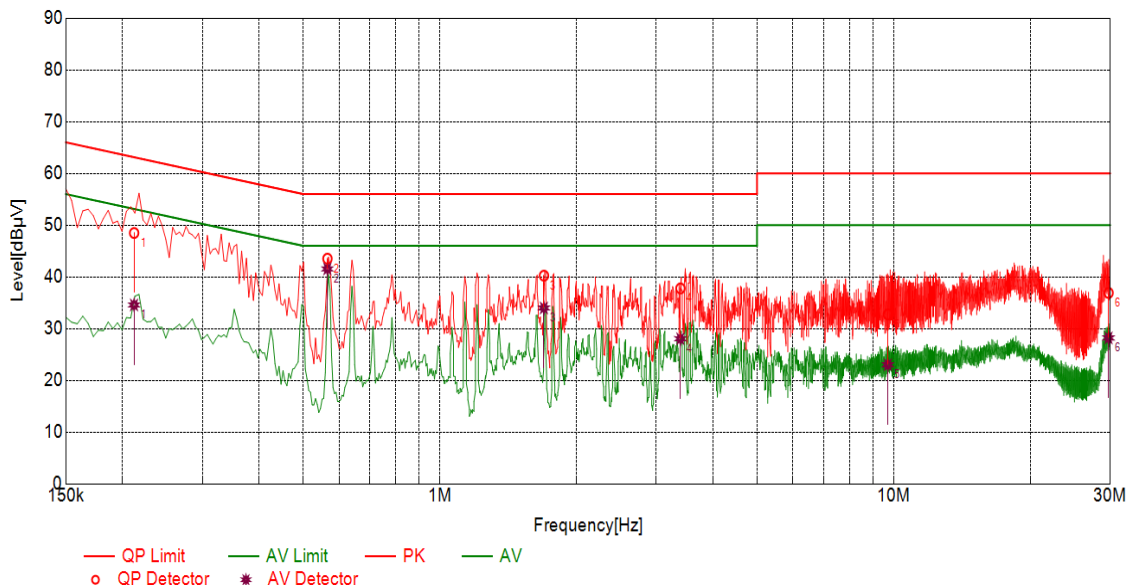
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中国·西安·沣东新城科源三路137号康鸿橙方科技园1号楼D单元1层 邮编: 710086

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

Secondly Supply:

Mode:c; 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]	Type
1	0.2121	10.10	48.48	63.12	14.64	34.57	53.12	18.55	L
2	0.5655	10.10	43.52	56.00	12.48	41.54	46.00	4.46	L
3	1.6961	10.10	40.24	56.00	15.76	33.99	46.00	12.01	L
4	3.3892	10.10	37.78	56.00	18.22	28.04	46.00	17.96	L
5	9.7092	10.10	32.74	60.00	27.26	23.01	50.00	26.99	L
6	29.7383	10.11	36.91	60.00	23.09	28.20	50.00	21.80	L



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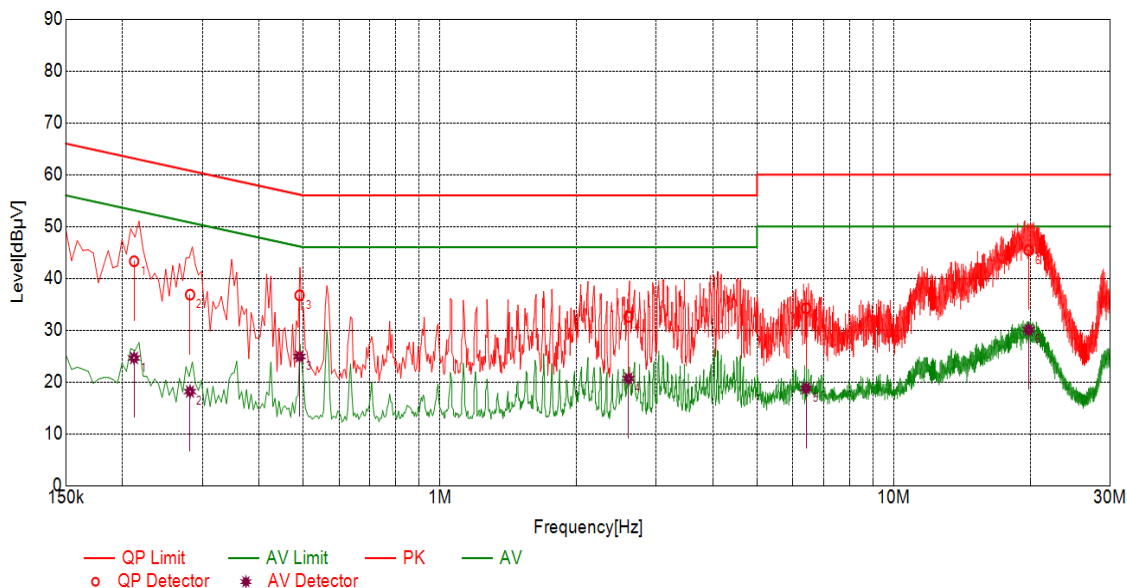
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t (86-29) 6282 7885 www.sgs.com.cn
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Mode:c; Line:Neutral Line



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type
1	0.2121	10.10	43.29	63.12	19.83	24.63	53.12	28.49	N
2	0.2817	10.10	36.85	60.77	23.92	18.16	50.77	32.61	N
3	0.4909	10.10	36.72	56.15	19.43	24.93	46.15	21.22	N
4	2.6051	10.10	32.58	56.00	23.42	20.68	46.00	25.32	N
5	6.4129	10.10	34.22	60.00	25.78	18.78	50.00	31.22	N
6	19.8262	10.11	45.41	60.00	14.59	30.07	50.00	19.93	N



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2.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

2.1.4 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 66.5 % RH Atmospheric Pressure: 1010 mbar

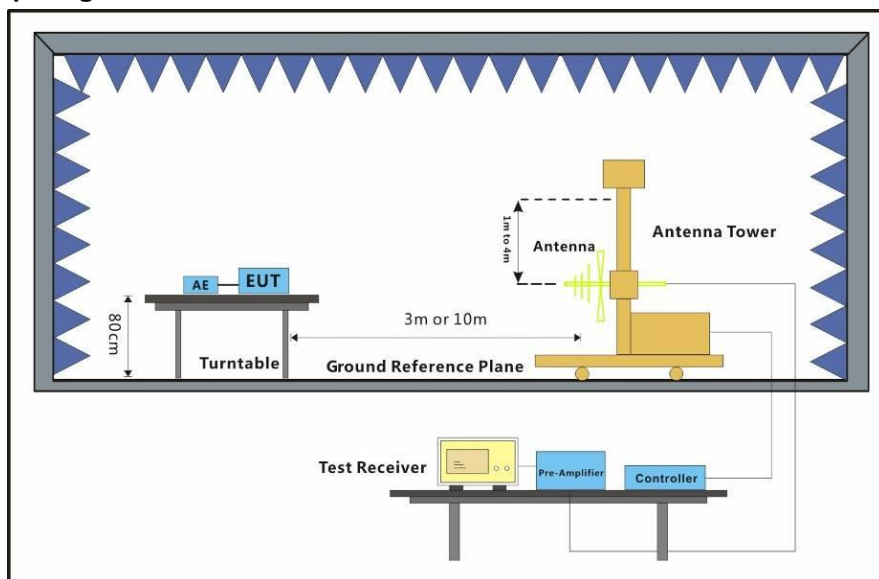
Pretest these modes to find the worst case:

- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3

The worst case for final test:

- a: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1

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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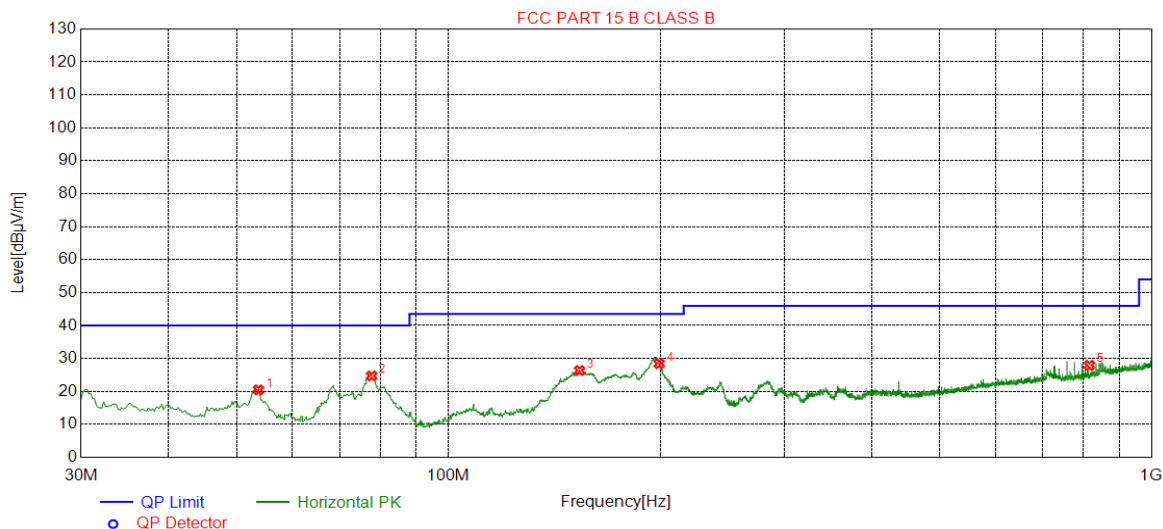
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Firstly Supply:

Mode:a; Polarization:Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.6727	20.49	40.00	19.51	237	228	Horizontal
2	77.7335	24.73	40.00	15.27	109	105	Horizontal
3	153.6027	26.36	43.50	17.14	195	66	Horizontal
4	199.3959	28.45	43.50	15.05	249	224	Horizontal
5	816.0512	27.95	46.00	18.05	230	30	Horizontal



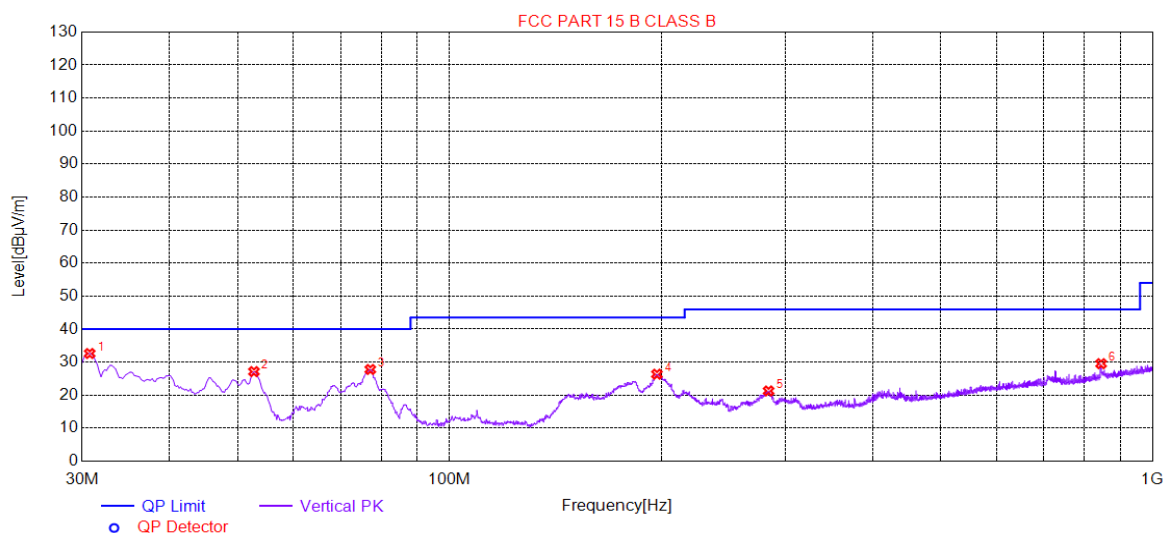
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Mode:a; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.7762	32.64	40.00	7.36	214	0	Vertical
2	52.7025	27.15	40.00	12.85	183	332	Vertical
3	77.1514	27.80	40.00	12.20	164	255	Vertical
4	197.2615	26.37	43.50	17.13	272	240	Vertical
5	284.3849	21.29	46.00	24.71	245	310	Vertical
6	845.1570	29.55	46.00	16.45	182	269	Vertical



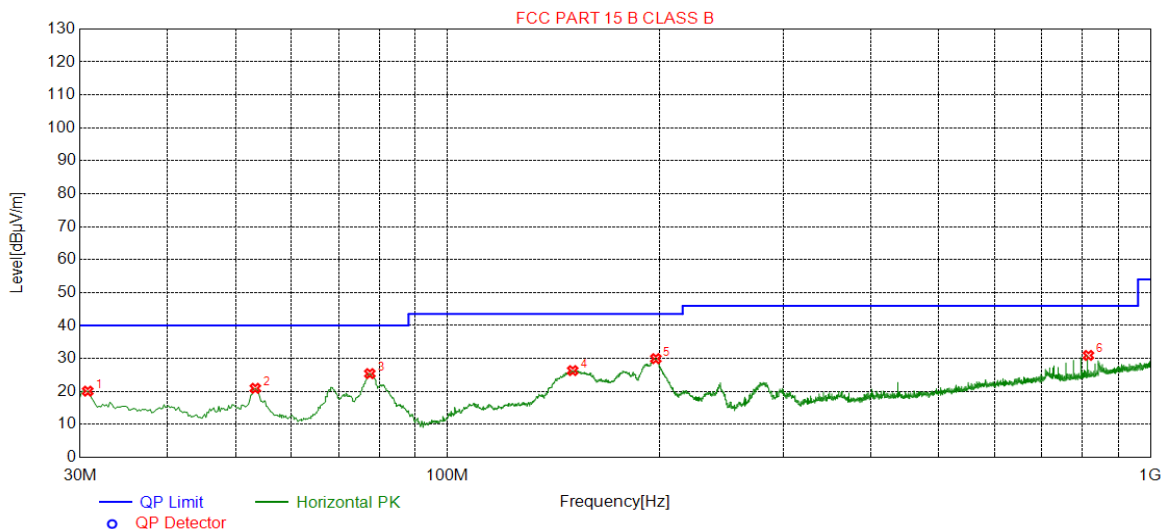
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Secondly Supply:

Mode:a; Polarization:Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.7762	20.10	40.00	19.90	171	265	Horizontal
2	53.2847	20.97	40.00	19.03	188	238	Horizontal
3	77.5395	25.43	40.00	14.57	231	107	Horizontal
4	150.6921	26.34	43.50	17.16	242	63	Horizontal
5	197.8436	29.97	43.50	13.53	140	203	Horizontal
6	816.0512	30.95	46.00	15.05	154	22	Horizontal

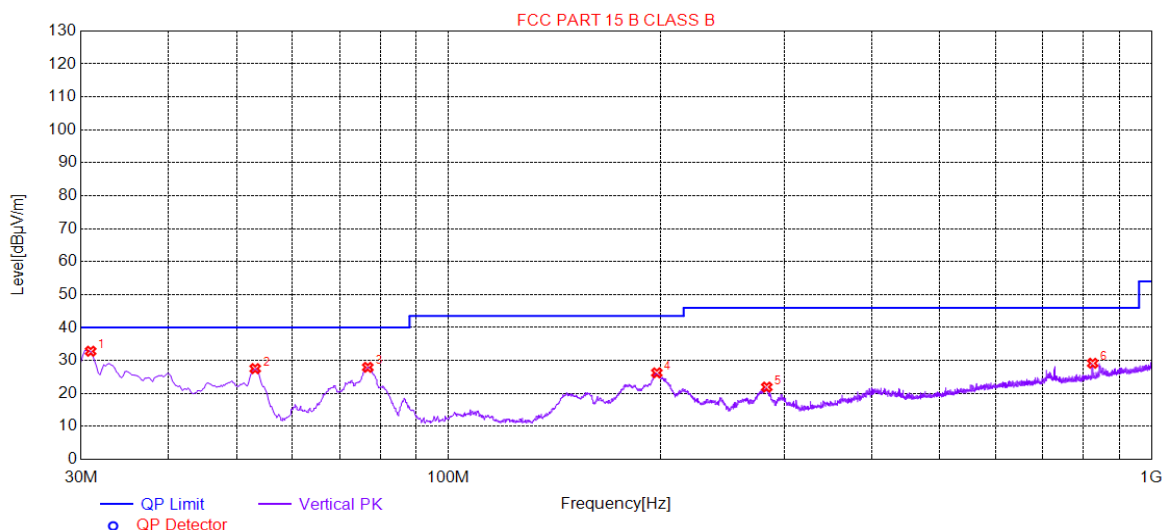


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Mode:a; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9702	32.82	40.00	7.18	156	14	Vertical
2	53.0906	27.54	40.00	12.46	250	0	Vertical
3	76.7634	27.94	40.00	12.06	166	236	Vertical
4	197.8436	26.26	43.50	17.24	190	34	Vertical
5	283.6087	21.94	46.00	24.06	215	224	Vertical
6	824.7830	29.18	46.00	16.82	196	8	Vertical



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2.3 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B
 Test Method: ANSI C63.4:2014
 Frequency Range: Above 1GHz
 Measurement Distance: 3m
 Limit:
 Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average
 Detector: Peak for pre-scan (1000kHz resolution bandwidth) 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 modes to find the worst case:

- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3

The worst case for final test: c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1



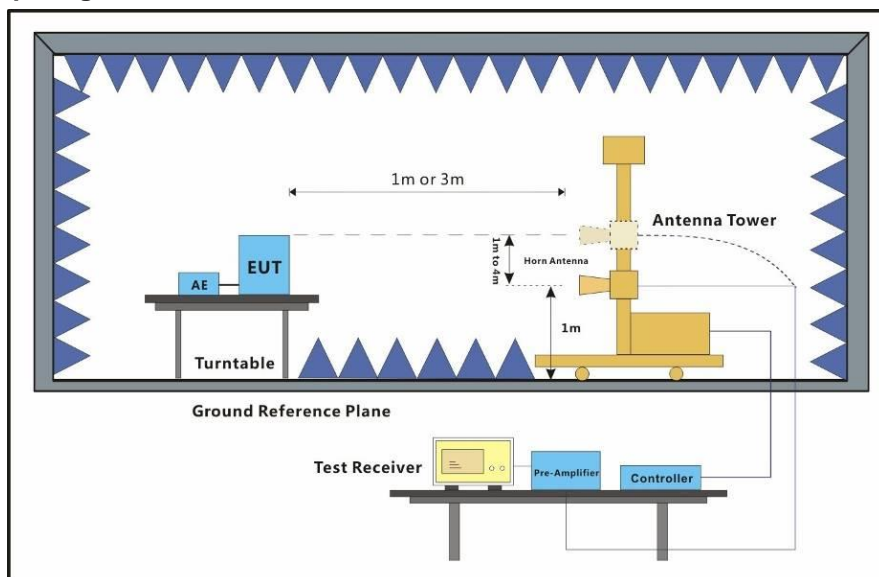
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2.1.8 Test Setup Diagram

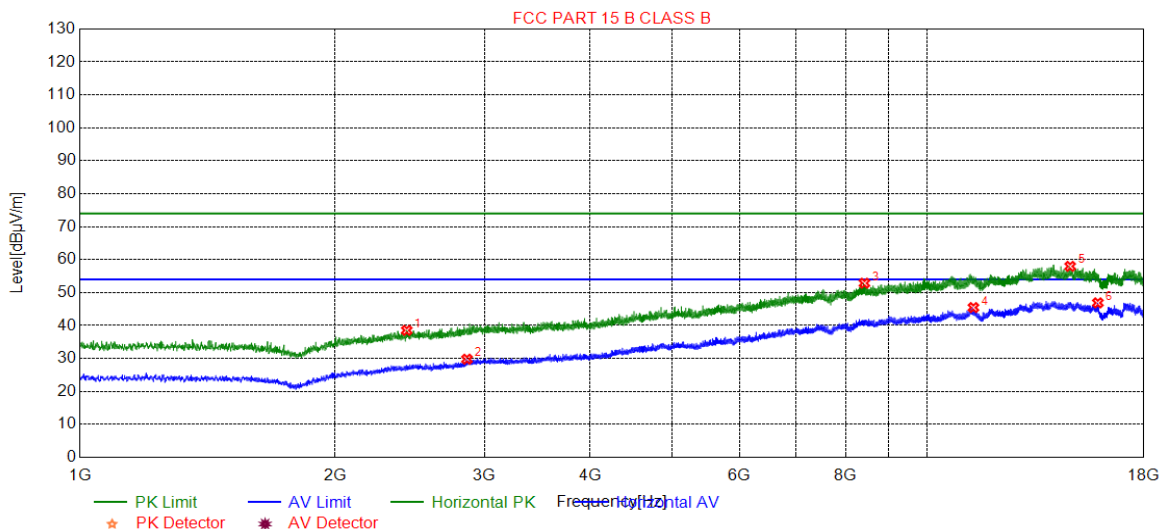


2.1.9 Measurement Data

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

Firstly Supply:

Mode:c; Polarization:Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2429.77	38.55	-26.23	74.00	35.45	196	55	Horizontal
2	2861.59	29.80	-24.21	54.00	24.20	111	33	Horizontal
3	8424.27	52.87	-7.59	74.00	21.13	232	99	Horizontal
4	11326.3	45.47	-3.04	54.00	8.53	299	323	Horizontal
5	14731.5	57.98	0.83	74.00	16.02	206	146	Horizontal
6	15882.5	46.89	-0.47	54.00	7.11	311	323	Horizontal

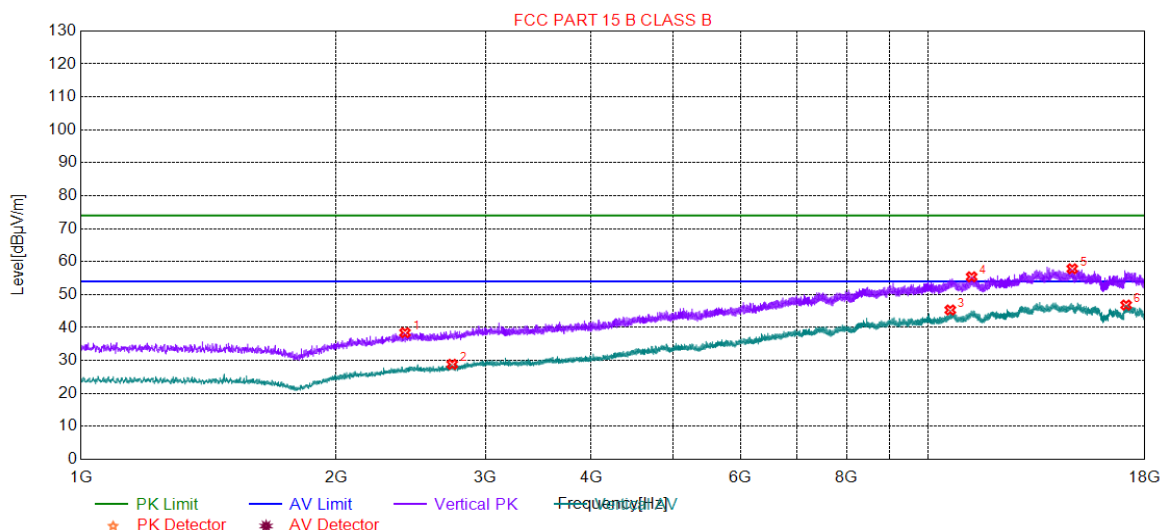


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t (86-29) 6282 7885 sgs.china@sgs.com

Mode:c; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2411.92	38.44	-26.33	74.00	35.56	262	170	Vertical
2	2741.73	28.86	-24.93	54.00	25.14	211	258	Vertical
3	10608.0	45.33	-3.56	54.00	8.67	185	16	Vertical
4	11242.1	55.41	-3.19	74.00	18.59	169	147	Vertical
5	14774.9	57.84	0.89	74.00	16.16	211	106	Vertical
6	17104.9	46.84	-2.72	54.00	7.16	196	322	Vertical



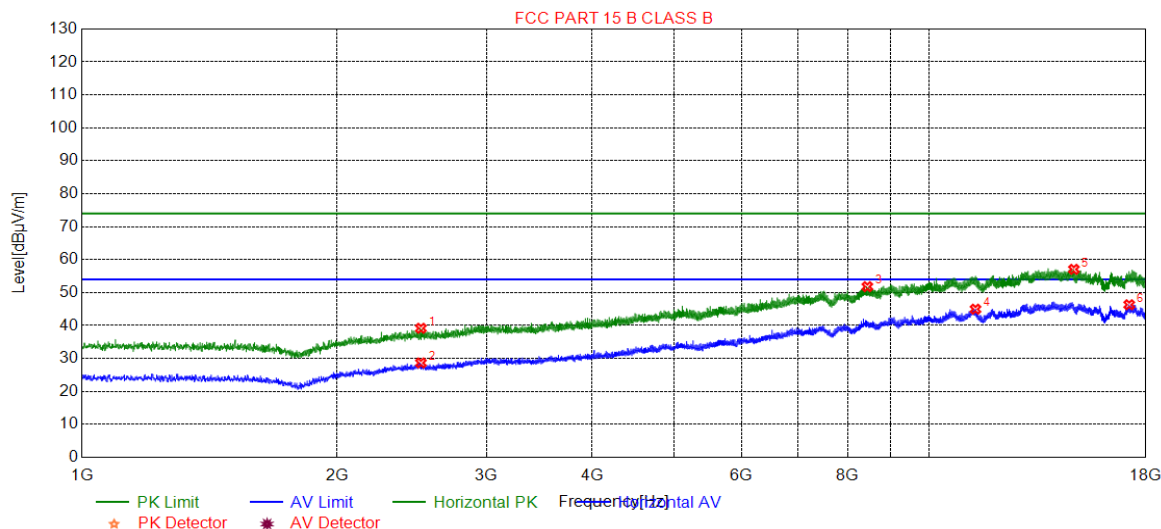
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t (86-29) 6282 7885 www.sgsgroup.com.cn
 t (86-29) 6282 7885 sgs.china@sgs.com

Secondly Supply:

Mode:c; Polarization:Horizontal



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2511.37	39.18	-25.81	74.00	34.82	263	344	Horizontal
2	2511.37	28.67	-25.81	54.00	25.33	222	323	Horizontal
3	8444.67	51.81	-7.53	74.00	22.19	209	360	Horizontal
4	11328.8	44.98	-3.04	54.00	9.02	196	214	Horizontal
5	14799.5	57.07	0.92	74.00	16.93	231	235	Horizontal
6	17201.8	46.33	-2.80	54.00	7.67	184	257	Horizontal

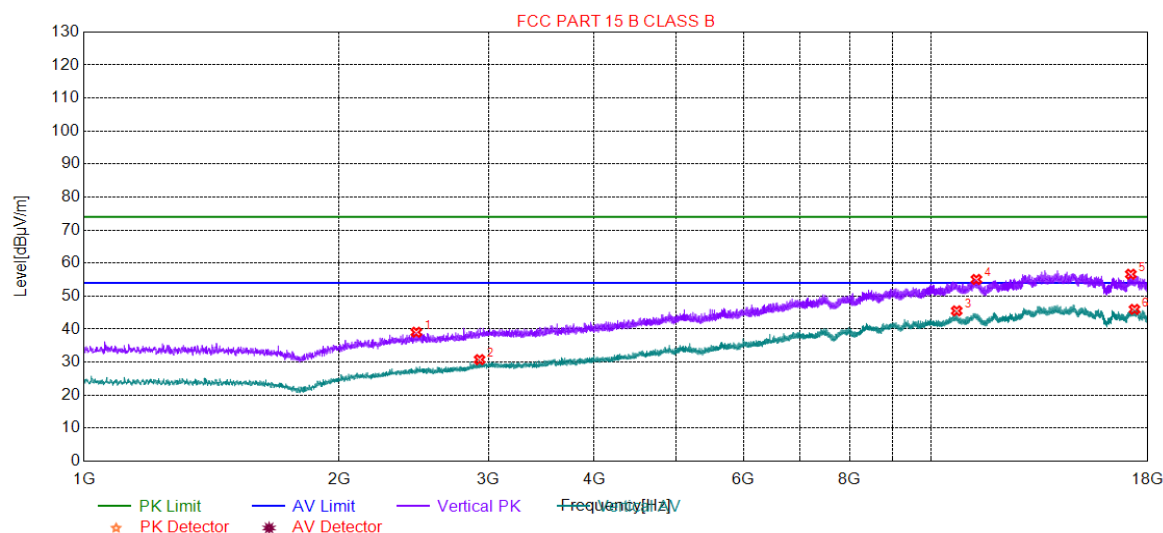


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Mode:c; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2467.17	39.07	-26.01	74.00	34.93	211	344	Vertical
2	2929.59	30.78	-23.84	54.00	23.22	166	258	Vertical
3	10706.6	45.55	-3.53	54.00	8.45	178	59	Vertical
4	11294.0	55.06	-3.08	74.00	18.94	218	280	Vertical
5	17183.1	56.65	-2.78	74.00	17.35	206	83	Vertical
6	17354.8	46.00	-2.73	54.00	8.00	291	146	Vertical



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

t (86-29) 6282 7885 www.sgsgroup.com.cn
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3 Equipment List

CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020-04-02	2021-04-01
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020-09-11	2021-09-10
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2020-08-04	2021-08-03
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
				2020-11-06	2021-11-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR



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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

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

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	2020-09-11	2021-09-10
Receiving antenna (30MHz~3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2019-10-13	2021-10-12
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2019-11-18	2020-11-17
				2020-10-26	2021-10-25
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019-11-18	2020-11-17
				2020-10-26	2021-10-25
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
				2020-10-27	2021-10-26
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2019-11-18	2020-11-17
				2020-10-26	2021-10-25
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
				2020-11-06	2021-11-05
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR



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Wireless Laboratory

V/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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4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
2	Radiated Emission	$\pm 4.8\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (1GHz to 6GHz)
		$\pm 4.5\text{dB}$ (6GHz to 18GHz)
		$\pm 5.02\text{dB}$ (Above 18GHz)

5 Photographs

5.1 Test Setup

Refer to Appendix A - Photographs of Set-Up for ZR/2020/A0015.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -



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