

TEST REPORT

Application No: ZR/2020/A0016
Applicant: HMD global Oy
Address of Applicant: Bertel Jingin aukio 9, 02600 Espoo, Finland
Manufacturer: HMD global Oy
Address of Manufacturer: Bertel Jingin aukio 9, 02600 Espoo, Finland
EUT Description: Smart Phone
Model No.: TA-1323
Trade Mark: NOKIA
FCC ID: 2AJOTTA-1323
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: 2021/8/13

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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Wireless Laboratory

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-1-11		Original
02		2021/5/27	Leah Chen	1. Modify data conversion error of antenna height 2. Updated equipment list
03		2021/8/13	Leah Chen	1.Updated Support Units, Test facility and Test Location

*This report supersedes our previous report ZR/2020/A001605, issued on 2021-01-11, which is hereby deemed null and void.

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-1323		
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 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 17	704~716	734~746
	LTE Band 66	1710~1780	2110~2200
	Wi-Fi 2.4G	2412~2462	2412~2462
	Bluetooth	2402~2480	2402~2480



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Accessory:

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



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



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

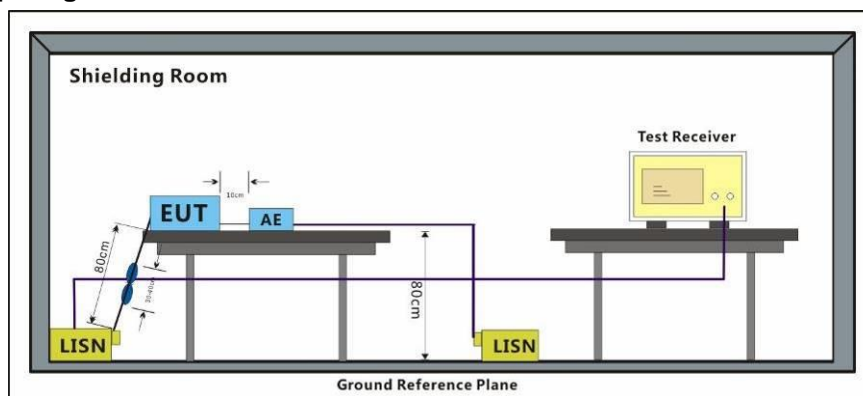
Pretest these modes to find the worst case:

- 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
- f: LTE Band 12 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter4
- g: LTE Band 17 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter5

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.



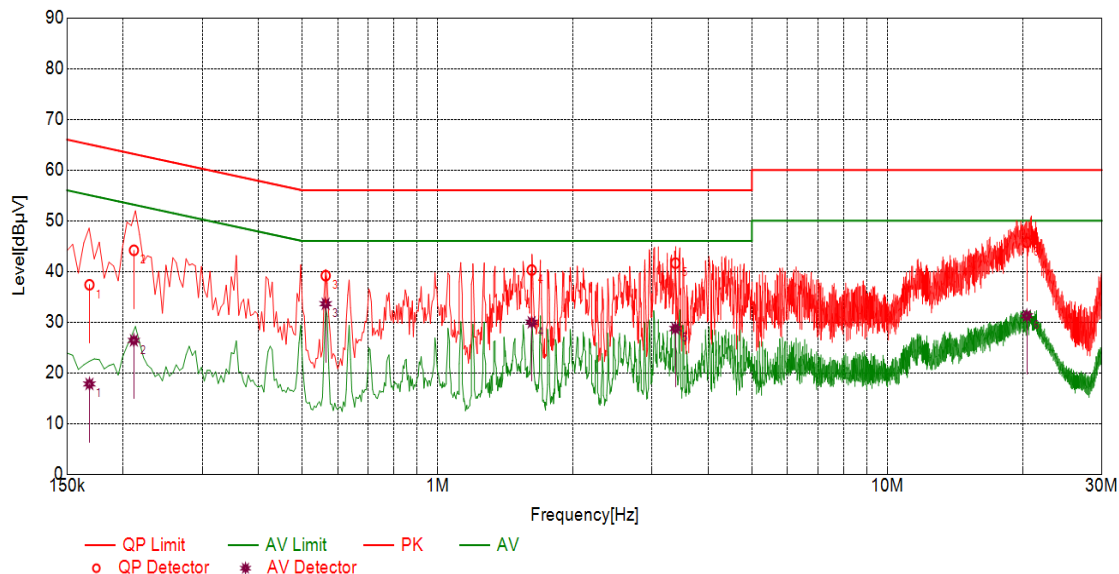
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Firstly Supply:

Mode:c; 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	0.1683	10.10	37.37	65.04	27.67	17.80	55.04	37.24	L
2	0.2113	10.10	44.17	63.15	18.98	26.39	53.15	26.76	L
3	0.5640	10.10	39.16	56.00	16.84	33.61	46.00	12.39	L
4	1.6191	10.10	40.28	56.00	15.72	29.97	46.00	16.03	L
5	3.3797	10.10	41.64	56.00	14.36	28.73	46.00	17.27	L
6	20.4289	10.11	45.73	60.00	14.27	31.25	50.00	18.75	L

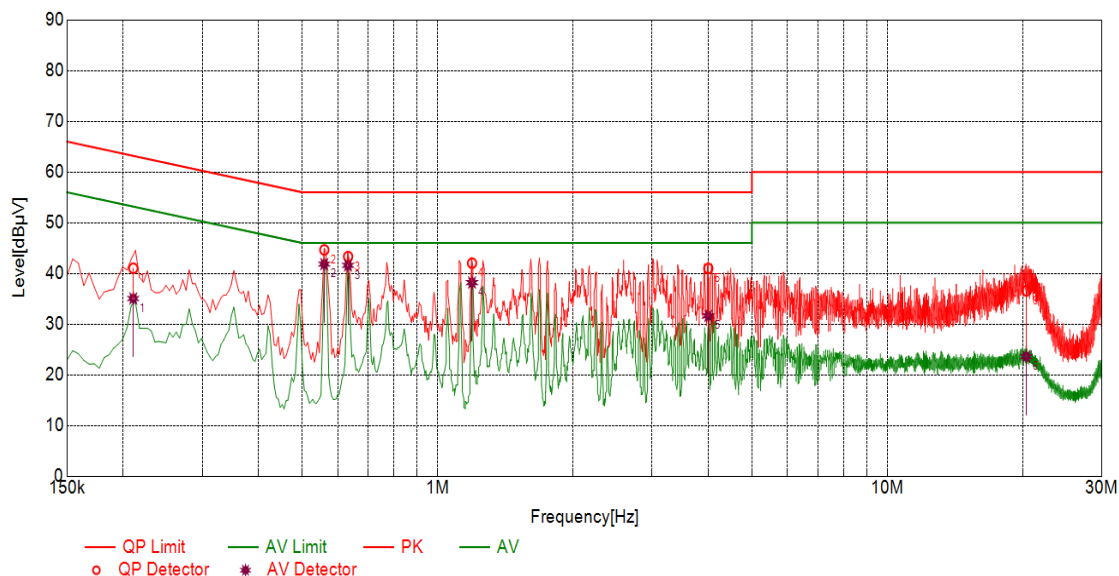


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Mode:c; Line:Neutral Line



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	0.2106	10.10	41.01	63.18	22.17	35.05	53.18	18.13	N
2	0.5600	10.10	44.64	56.00	11.36	41.83	46.00	4.17	N
3	0.6325	10.10	43.33	56.00	12.67	41.59	46.00	4.41	N
4	1.1931	10.10	42.02	56.00	13.98	38.19	46.00	7.81	N
5	3.9988	10.10	40.97	56.00	15.03	31.63	46.00	14.37	N
6	20.3716	10.11	36.57	60.00	23.43	23.60	50.00	26.40	N



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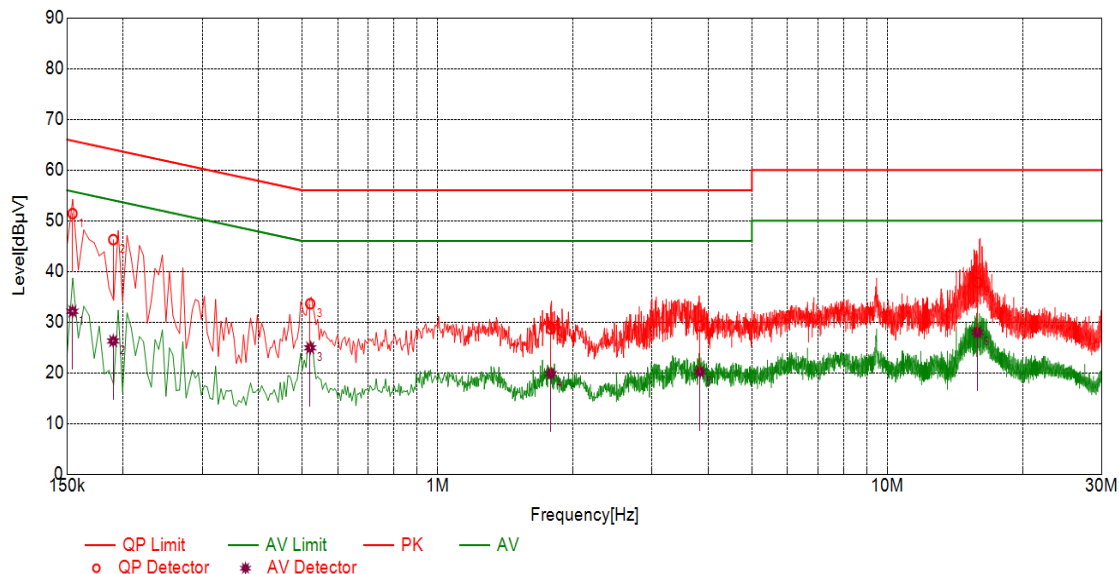
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Mode:c; Line:Live Line



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1	0.1543	10.10	51.40	65.76	14.36	32.12	55.76	23.64	L
2	0.1901	10.10	46.27	64.03	17.76	26.27	54.03	27.76	L
3	0.5211	10.10	33.63	56.00	22.37	24.93	46.00	21.07	L
4	1.7863	10.10	28.68	56.00	27.32	19.83	46.00	26.17	L
5	3.8346	10.10	29.24	56.00	26.76	20.19	46.00	25.81	L
6	15.8582	10.11	37.80	60.00	22.20	27.98	50.00	22.02	L

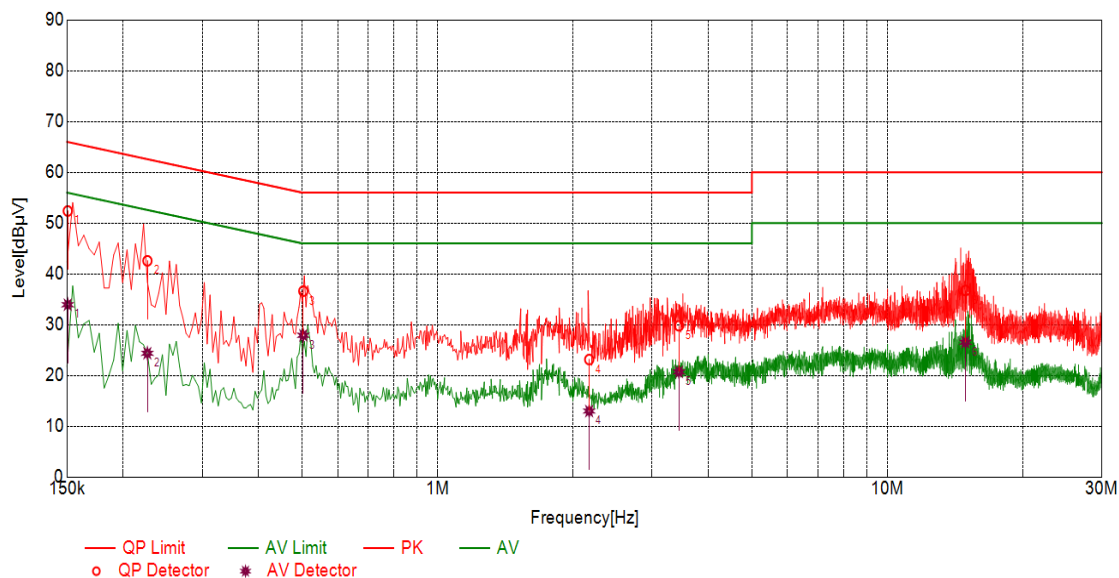


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1	0.1506	10.10	52.38	65.96	13.58	33.93	55.96	22.03	N
2	0.2264	10.10	42.57	62.58	20.01	24.37	52.58	28.21	N
3	0.5030	10.10	36.60	56.00	19.40	27.90	46.00	18.10	N
4	2.1733	10.10	23.14	56.00	32.86	12.98	46.00	33.02	N
5	3.4413	10.10	29.79	56.00	26.21	20.69	46.00	25.31	N
6	14.9219	10.11	36.73	60.00	23.27	26.53	50.00	23.47	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

2.2.1 E.U.T. Operation

Operating Environment:

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

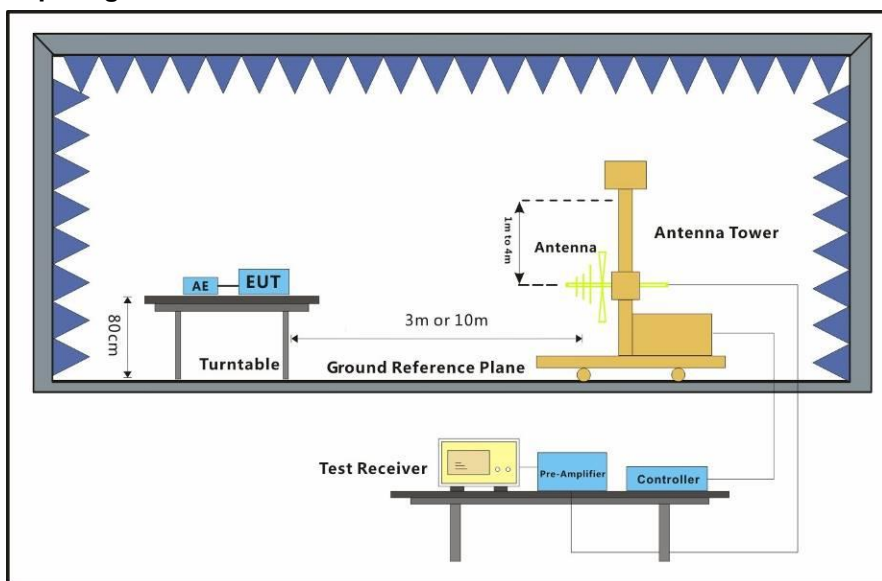
Pretest these modes to find the worst case:

- a: 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
- f: LTE Band 12 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter4
- g: LTE Band 17 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter5

The worst case for final test: a: Transfer data between the EUT and the PC+USB cable1



2.2.2 Test Setup Diagram

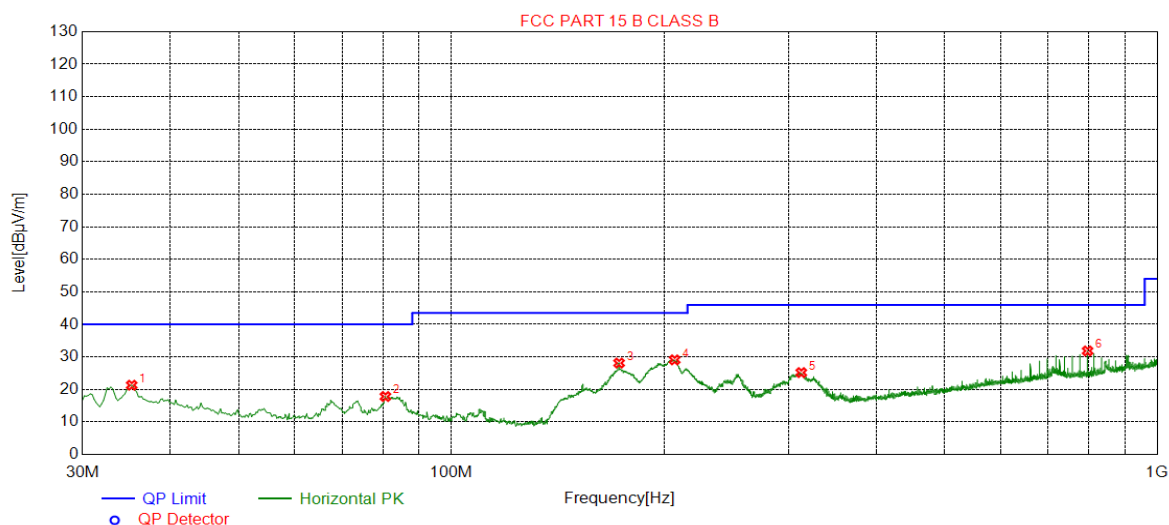


2.2.3 Measurement Data

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.

Firstly Supply:

Mode:a; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	35.2390	21.31	-29.88	40.00	18.69	149	Horizontal
2	80.6441	17.83	-35.99	40.00	22.17	209	Horizontal
3	172.8126	28.12	-33.83	43.50	15.38	240	Horizontal
4	207.1574	29.10	-31.04	43.50	14.40	106	Horizontal
5	313.1026	25.18	-27.89	46.00	20.82	233	Horizontal
6	796.8414	31.85	-17.82	46.00	14.15	164	Horizontal



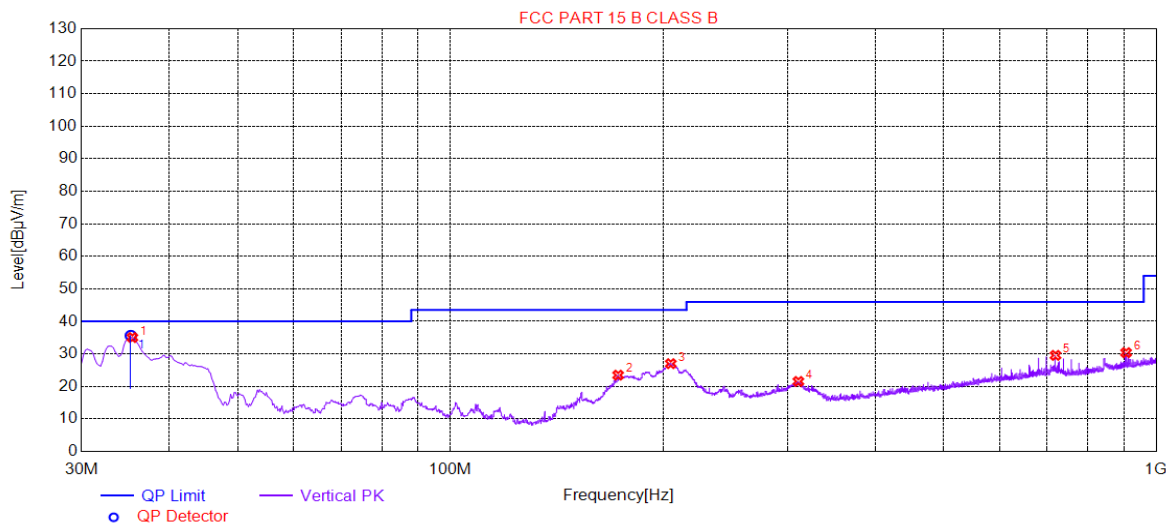
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Mode:a; Polarization:Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	35.4331	35.04	-29.82	40.00	4.96	256	Vertical
2	172.8126	23.48	-33.83	43.50	20.02	150	Vertical
3	205.2170	27.01	-31.08	43.50	16.49	173	Vertical
4	311.1622	21.55	-27.95	46.00	24.45	223	Vertical
5	720.0020	29.56	-19.04	46.00	16.44	171	Vertical
6	906.4733	30.40	-15.96	46.00	15.60	152	Vertical



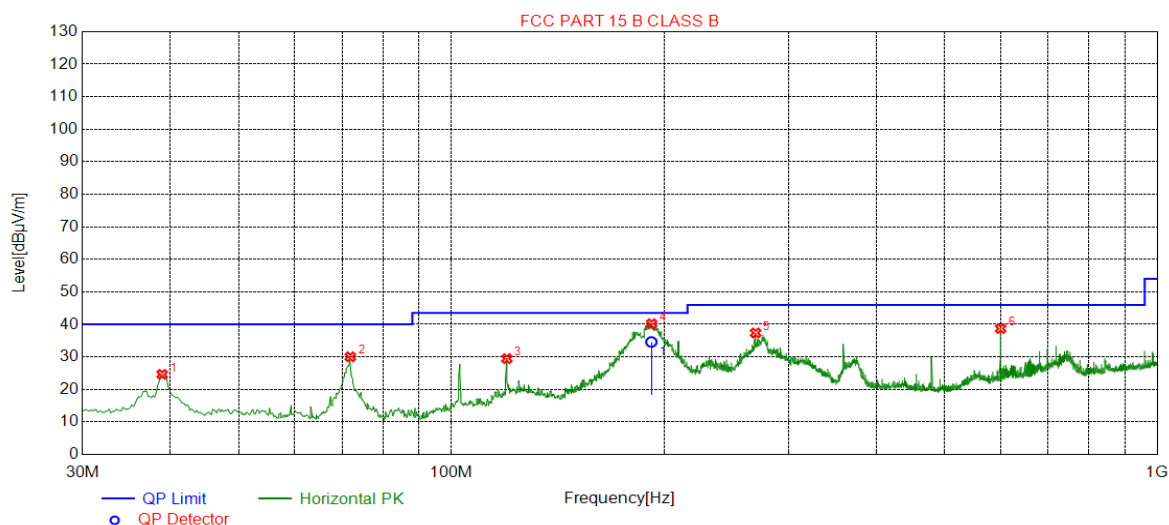
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Secondly Supply:

Mode:a; Polarization:Horizontal

**Suspected List**

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	38.9258	24.63	-28.69	40.00	15.37	291	99	Horizontal
2	71.9124	30.04	-34.73	40.00	9.96	271	79	Horizontal
3	119.8400	29.48	-33.54	43.50	14.02	251	82	Horizontal
4	192.2164	40.21	-32.01	43.50	3.29	269	115	Horizontal
5	269.8320	37.37	-29.17	46.00	8.63	287	133	Horizontal
6	600.0860	38.72	-20.63	46.00	7.28	248	339	Horizontal



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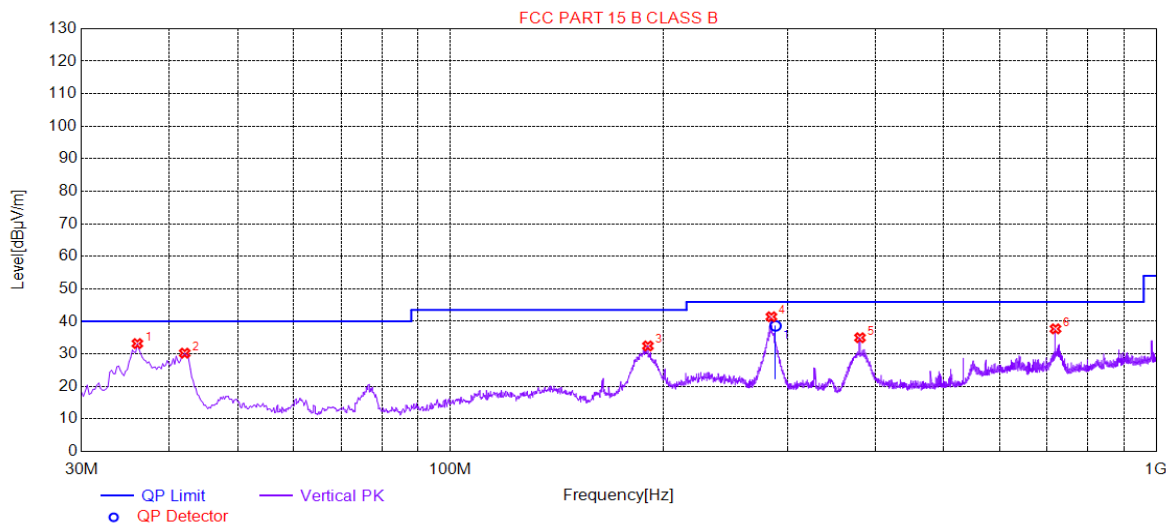
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Mode:a; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.0152	33.19	40.00	6.81	158	271	Vertical
2	42.0304	30.24	40.00	9.76	291	254	Vertical
3	190.4701	32.46	43.50	11.04	213	20	Vertical
4	284.9670	41.44	46.00	4.56	212	146	Vertical
5	380.4341	34.99	46.00	11.01	172	178	Vertical
6	720.0020	37.71	46.00	8.29	274	90	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

2.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

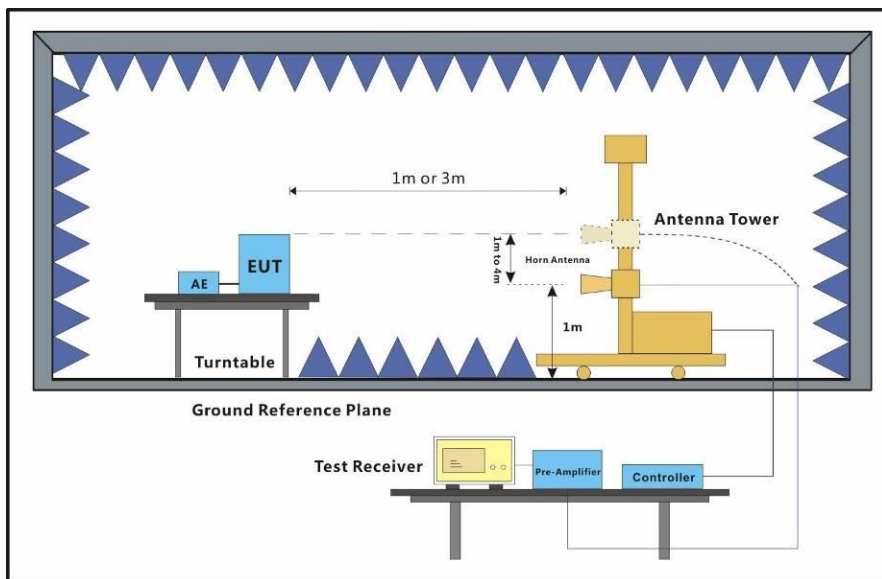
Pretest these modes to find the worst case:

- a: 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
- f: LTE Band 12 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter4
- g: LTE Band 17 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter5

The worst case for final test: d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2



2.3.2 Test Setup Diagram

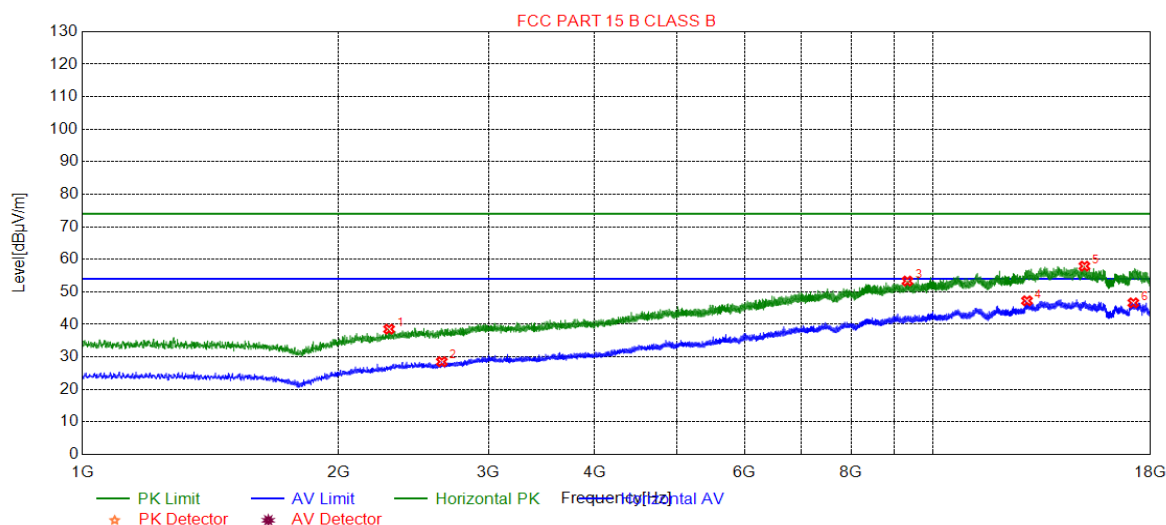


2.3.3 Measurement Data

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.

Firstly Supply:

Mode:d; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2292.914	38.55	-26.75	74.00	35.45	223	Horizontal
2	2644.832	28.53	-25.46	54.00	25.47	189	Horizontal
3	9321.066	53.33	-5.32	74.00	20.67	216	Horizontal
4	12881.89	47.26	-0.02	54.00	6.74	151	Horizontal
5	15047.80	57.91	1.13	74.00	16.09	166	Horizontal
6	17177.15	46.62	-2.78	54.00	7.38	211	Horizontal



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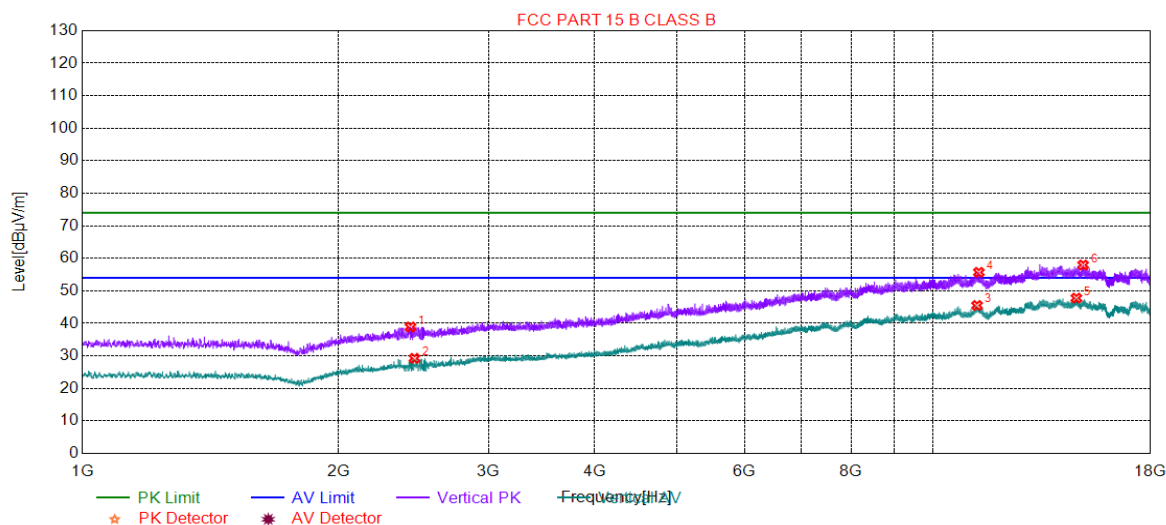
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Mode:d; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2429.771	38.90	-26.23	74.00	35.10	194	Vertical
2	2456.122	29.27	-26.07	54.00	24.73	297	Vertical
3	11254.06	45.51	-3.17	54.00	8.49	289	Vertical
4	11308.46	55.71	-3.06	74.00	18.29	241	Vertical
5	14723.08	47.78	0.81	54.00	6.22	206	Vertical
6	14995.09	57.95	1.12	74.00	16.05	222	Vertical



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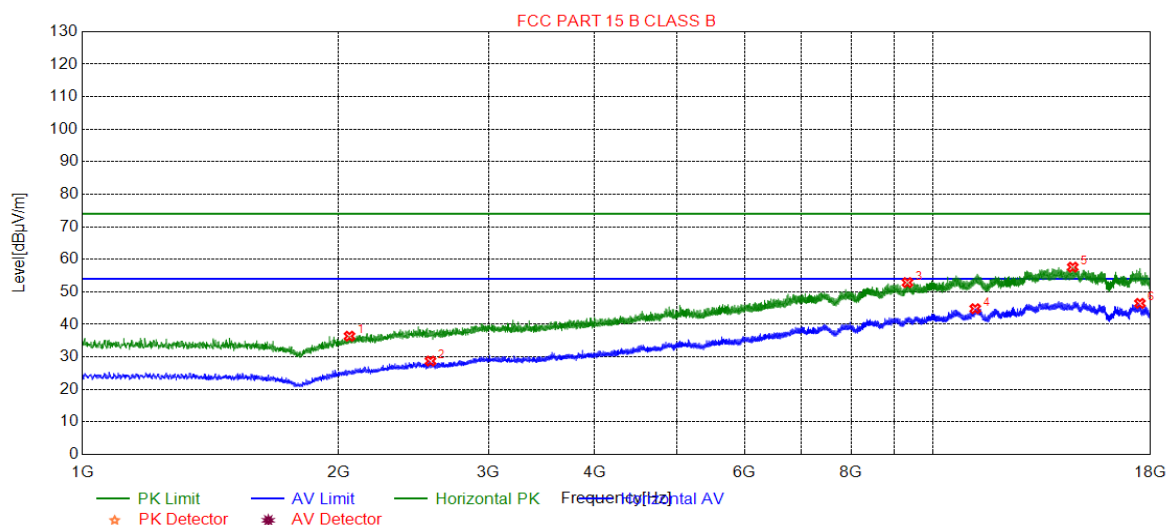
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Secondly Supply:

Mode:d; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2060.0030	36.38	-27.97	74.00	37.62	174	287	Horizontal
2	2564.9282	28.73	-25.76	54.00	25.27	254	192	Horizontal
3	9321.9161	52.87	-5.32	74.00	21.13	265	323	Horizontal
4	11199.6600	44.83	-3.28	54.00	9.17	281	221	Horizontal
5	14581.1291	57.61	0.60	74.00	16.39	224	344	Horizontal
6	17487.4244	46.47	-1.69	54.00	7.53	189	125	Horizontal



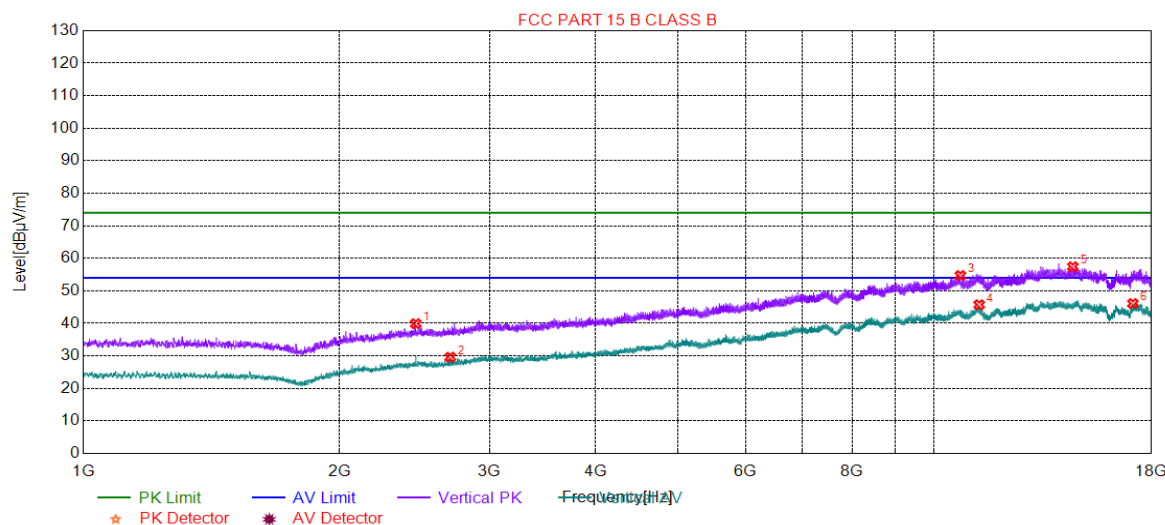
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Mode:d; Polarization:Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2457.8229	39.93	-26.06	74.00	34.07	271	103	Vertical
2	2698.3849	29.62	-25.16	54.00	24.38	259	147	Vertical
3	10728.7364	54.72	-3.58	74.00	19.28	274	235	Vertical
4	11289.7645	45.74	-3.09	54.00	8.26	251	192	Vertical
5	14544.5772	57.43	0.56	74.00	16.57	169	322	Vertical
6	17110.8555	46.11	-2.72	54.00	7.89	281	257	Vertical



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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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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



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/A0016.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -



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