

TEST REPORT

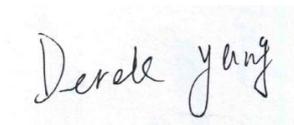
Application No.: ZR/2021/10049
Applicant: HMD Global Oy
Address of Applicant: Bertel Jungin aukio 9, 02600 Espoo, Finland
Manufacturer: HMD Global Oy
Address of Manufacturer: Bertel Jungin aukio 9, 02600 Espoo, Finland
EUT Description: smart phone
Model No.: TA-1344
Trade Mark: Nokia
FCC ID: 2AJOTTA-1344
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2021/1/29(for original report ZR/2021/1004906)
Date of Test: 2021/1/29 to 2021/3/3(for original report ZR/2021/1004906)
Date of Issue: 2021/3/9(for original report ZR/2021/1004906)
 2021/3/18(for new report ZR/2021/1004915)

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

Remark: TA-1341 has the Dual SIM tray, TA-1344 has the single SIM tray;

Authorized Signature:



Derek Yang

Wireless Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021/3/18		Original



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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

Checked By

Jimmy Zhu
Reviewer

Prepared By

Ben Huang
Engineer



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Remark:

This test report (Report No.: ZR/2021/1004915) is based on the original test report (Report No.: ZR/2021/1004906) issued on 2021-03-09.

Review this report and original report, this report just changing the parts according to the declaration letter from client.

According to the declaration from the applicant, the models: **TA-1341** and **TA-1344** are identical in specifications, only different according to the declaration letter from client.

Considering the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report all items do not need to retest and all test data in this report are based on the previous report with report number ZR/2021/1004906.



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1 General Information

Product Name:	smart phone		
Model No.(EUT):	TA-1344		
Trade Mark:	Nokia		
Hardware Version:	V1.0		
Software Version:	00WW_0_226		
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 38	2570~2620	2570~2620
	LTE Band 41	2496~2690	2496~2690
	LTE Band 66	1710~1780	2110~2200
	LTE CA_7C	2500~2570	2620~2690
	LTE CA_38C	2570~2620	2570~2620
	LTE CA_41C	2496~2690	2496~2690
	NR Band N2	1850 ~ 1910	1930 ~1990
	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
	Wi-Fi 2.4G	2400~2483.5	2400~2483.5
	Bluetooth	2400~2483.5	2400~2483.5
	Wi-Fi 5G	5150~5850	5150~5850
FM	88~108		
NFC	13.56		



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Accessory:

Adapter 1	Manufacturer: HUIZHOU PUAN ELECTRONICS CO., LTD Model: 1-CHUSQ302-095
Adapter 2	Manufacturer: HUIZHOU PUAN ELECTRONICS CO., LTD Model: 1-CHUSQ302-096
Adapter 3	Manufacturer: HUIZHOU PUAN ELECTRONICS CO., LTD Model: 1-CHUSQ302-097
Battery	Manufacturer: SUNWODA Electronic Co., Ltd Model: CN110
USB Cable	Manufacturer: HUIZHOU WASHIN ELECTRONICS CO., LTD Model: HX-ZN-06
Earphone	Manufacturer: Huizhou New Leader Industry Co., Ltd. Model: NLD-EM300M-13SF



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1.1 Description of Support Units

Description	Manufacturer	Model No.
Laptop	Lenovo	L480
Mouse	Lenovo	3D optical Mouse
Router	NETGEAR	R6020

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 Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086

No tests were sub-contracted.

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.

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: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1 +battery1 +Cable1 +adapter1
 - c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+ battery1+ Cable1+adapter(worst)
 - d: LTE Band 5 Idle+BT+WLAN ++FM+NFC+ camera (Front) +earphone1+battery1+ Cable1+adapter(worst)
 - e: LTE Band 12 Idle+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)
 - f: NR Band N5+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)

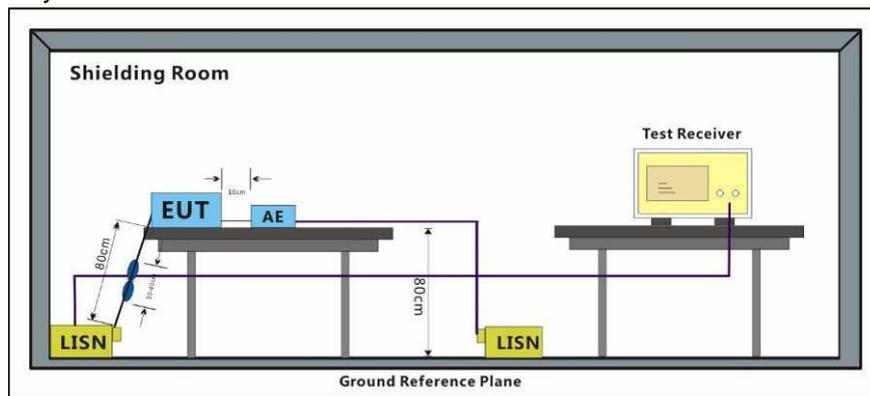
The worst case for final test: c: WCDMA Band V Idle+BT+5G WLAN +GPS Rx+playing MP4+ earphone1+ battery1+ Cable1+adapter2



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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.

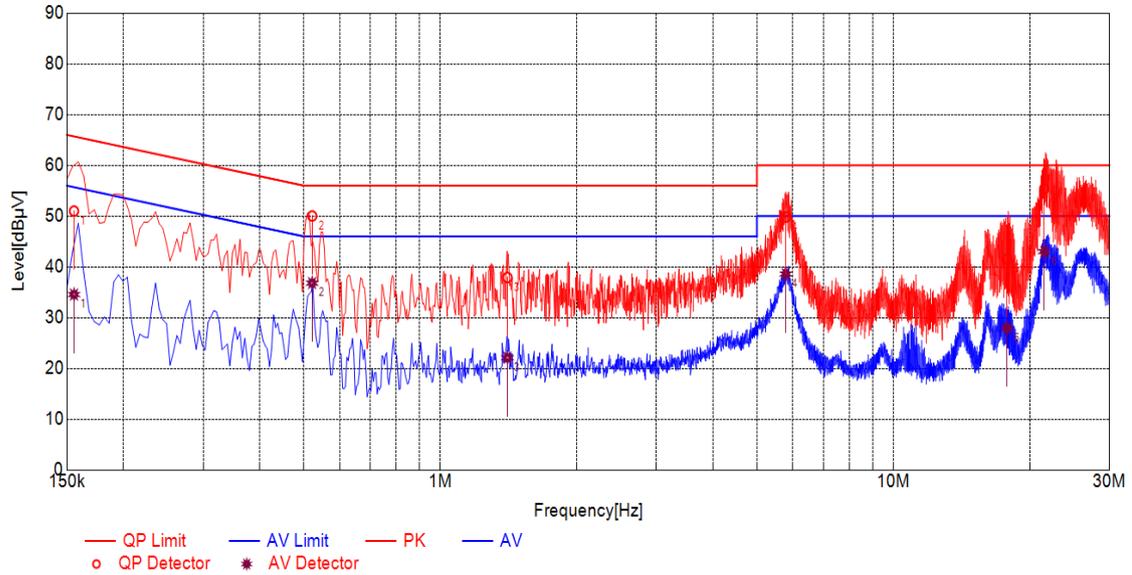


2.1.3 Measurement Data

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.



Mode:c; Line:Live Line



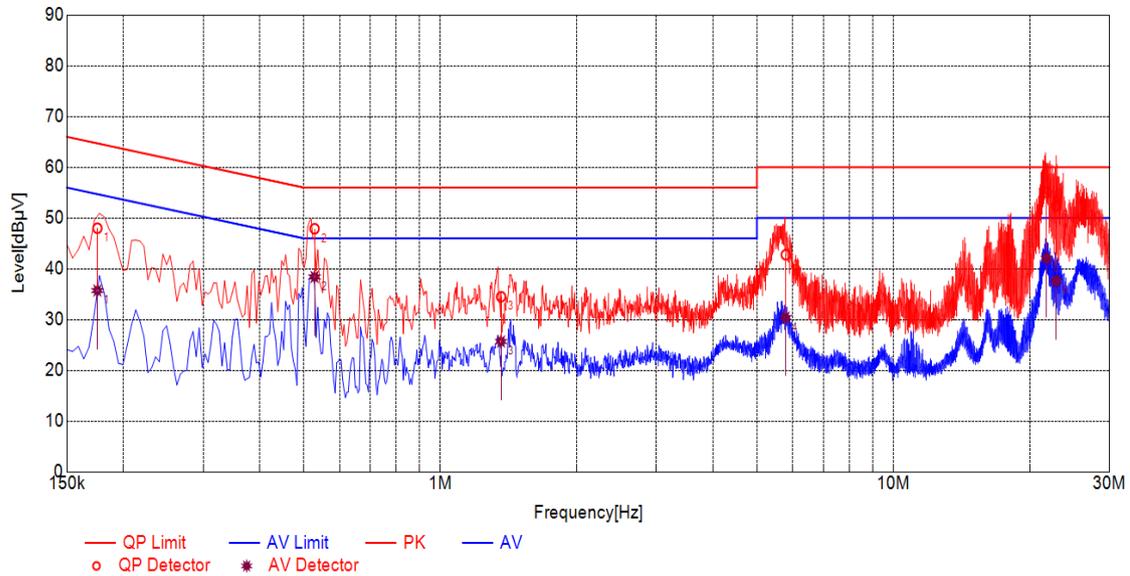
Test Graph

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	0.1556	10.10	51.00	65.70	14.70	34.55	55.70	21.15
2	0.5217	10.10	50.02	56.00	5.98	36.81	46.00	9.19
3	1.4072	10.10	37.91	56.00	18.09	22.08	46.00	23.92
4	5.7900	10.10	49.81	60.00	10.19	38.60	50.00	11.40
5	17.8218	10.11	41.54	60.00	18.46	27.93	50.00	22.07
6	21.5242	10.11	55.41	60.00	4.59	43.00	50.00	7.00



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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	0.1752	10.10	47.99	64.71	16.72	35.72	54.71	18.99
2	0.5281	10.10	47.90	56.00	8.10	38.40	46.00	7.60
3	1.3625	10.10	34.50	56.00	21.50	25.67	46.00	20.33
4	5.7860	10.10	42.76	60.00	17.24	30.39	50.00	19.61
5	21.7858	10.11	55.09	60.00	4.91	42.06	50.00	7.94
6	22.8757	10.11	52.42	60.00	7.58	37.64	50.00	12.36



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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: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1 +battery1 +Cable1 +adapter1
- c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+ battery1+ Cable1+adapter(worst)
- d: LTE Band 5 Idle+BT+WLAN ++FM+NFC+ camera (Front) +earphone1+battery1+ Cable1+adapter(worst)
- e: LTE Band 12 Idle+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)
- f: NR Band N5+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)

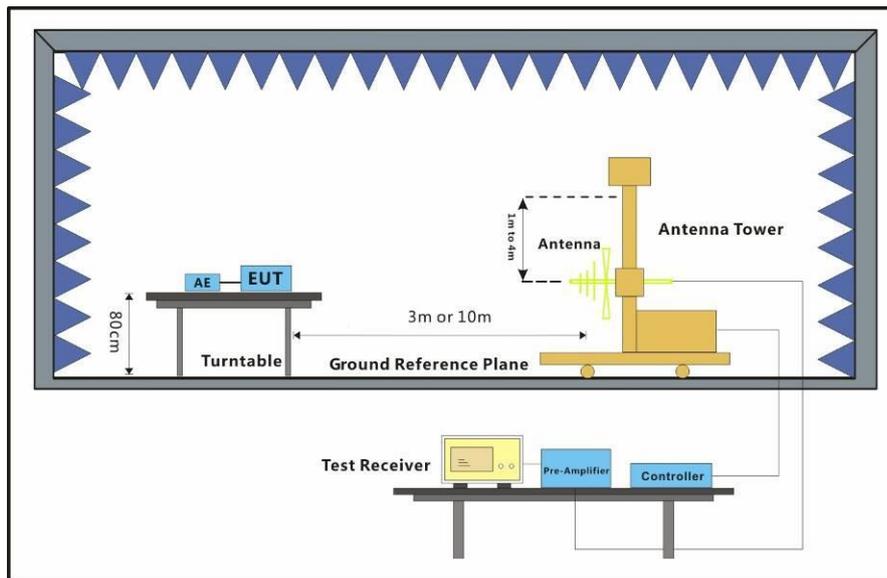
The worst case for final test: a: Transfer data between the EUT and the PC+USB cable1



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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.

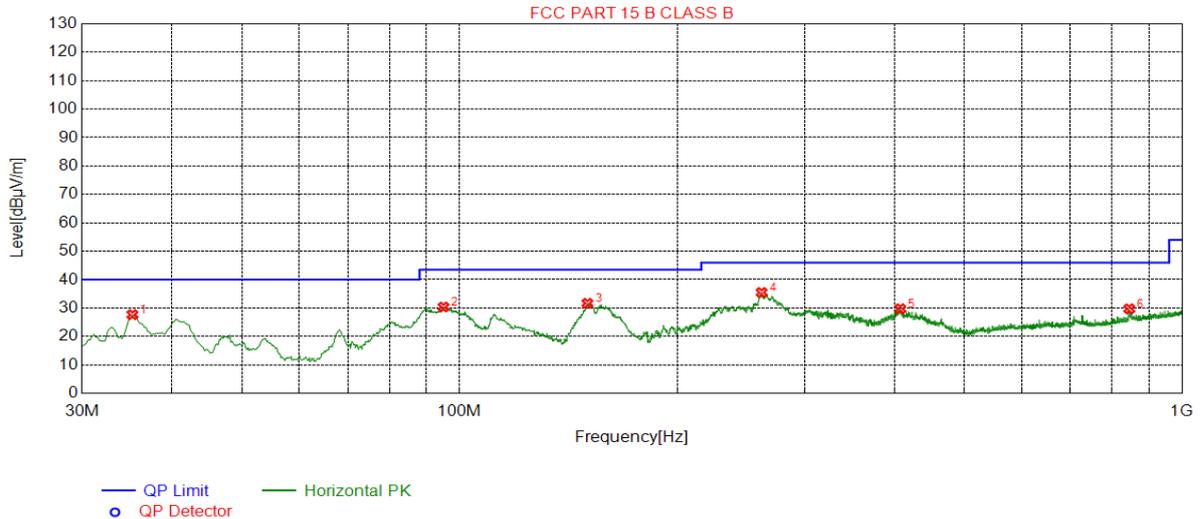


2.2.3 Measurement Data

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.

Mode:a; Polarization:Horizontal



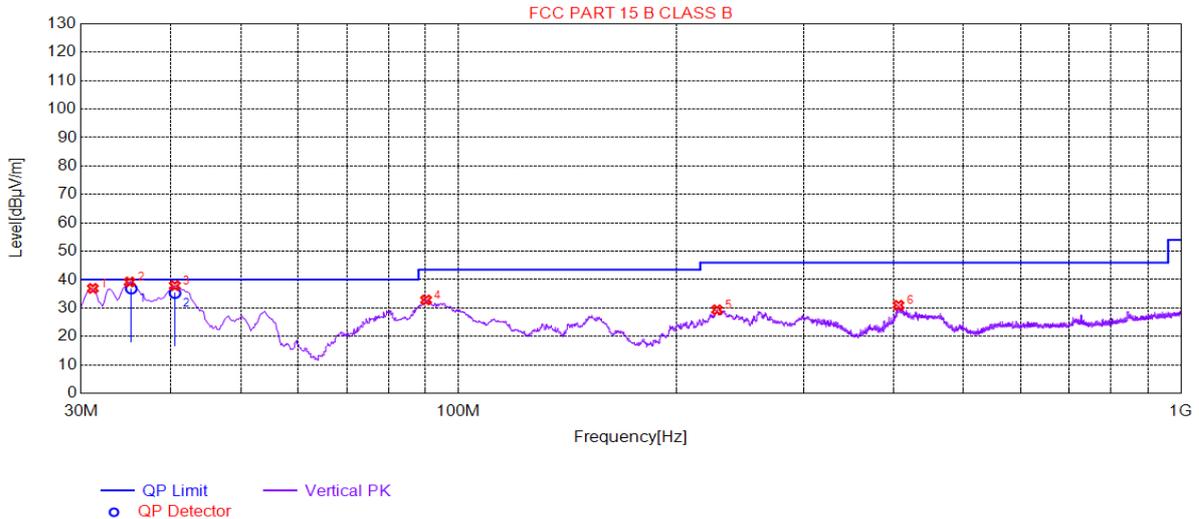
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.2390	27.72	-29.88	40.00	12.28	400	267	Horizontal
2	95.0030	30.39	-32.89	43.50	13.11	300	272	Horizontal
3	150.304	31.70	-35.07	43.50	11.80	200	109	Horizontal
4	261.876	35.52	-29.33	46.00	10.48	100	116	Horizontal
5	407.405	29.79	-25.36	46.00	16.21	100	296	Horizontal
6	845.351	29.76	-16.96	46.00	16.24	100	51	Horizontal



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Mode:a; Polarization:Vertical



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.1642	36.94	-30.05	40.00	3.06	100	14	Vertical
2	35.0450	39.20	-29.95	40.00	0.80	100	360	Vertical
3	40.4781	37.92	-28.54	40.00	2.08	100	347	Vertical
4	90.1520	32.87	-33.69	43.50	10.63	100	78	Vertical
5	227.919	29.41	-30.47	46.00	16.59	100	122	Vertical
6	406.435	31.01	-25.37	46.00	14.99	100	324	Vertical

Final Data List

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.2190	-29.89	36.83	40.00	3.17	101	358.1	Vertical
2	40.4851	-28.62	35.27	40.00	4.73	100	347	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: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1 +battery1 +Cable1 +adapter1
- c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+ battery1+ Cable1+adapter(worst)
- d: LTE Band 5 Idle+BT+WLAN ++FM+NFC+ camera (Front) +earphone1+battery1+ Cable1+adapter(worst)
- e: LTE Band 12 Idle+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)
- f: NR Band N5+BT+WLAN +FM+NFC +camera (Back) +earphone1+battery1+ Cable1+adapter(worst)

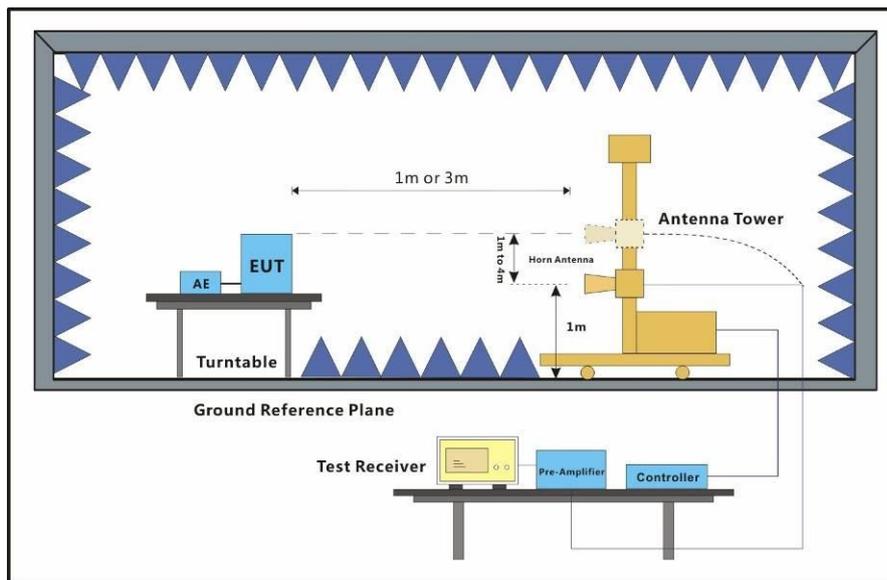
The worst case for final test: c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+ battery1+ Cable1+adapter(worst)



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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.
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.



2.3.3 Measurement Data

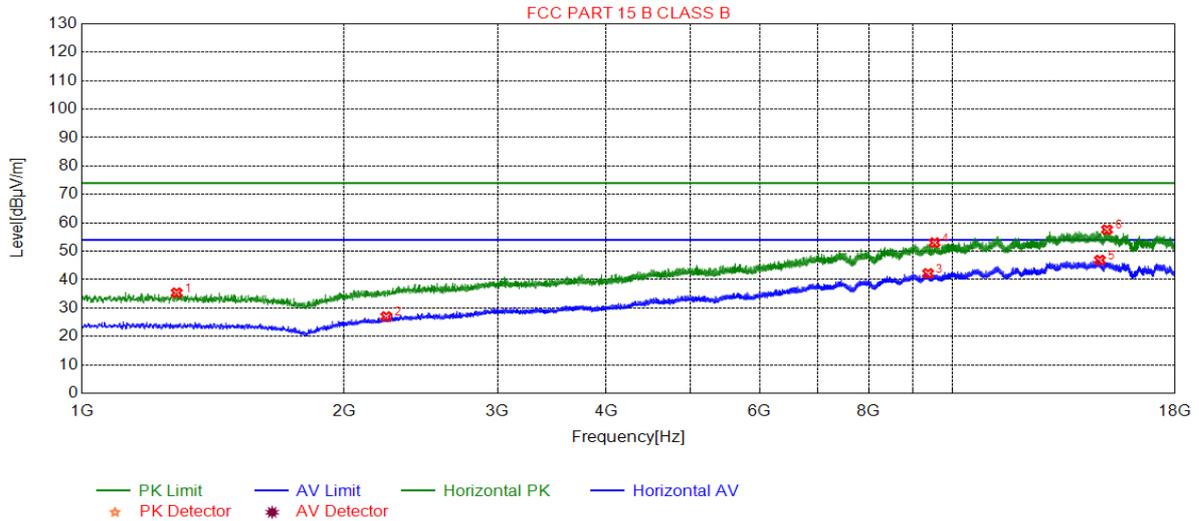
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

The three polarities of X,Y,Z were measured by EUT, but only the worst data had been displayed. Scan from 1GHz to 30GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed.



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Mode:c; Polarization:Horizontal



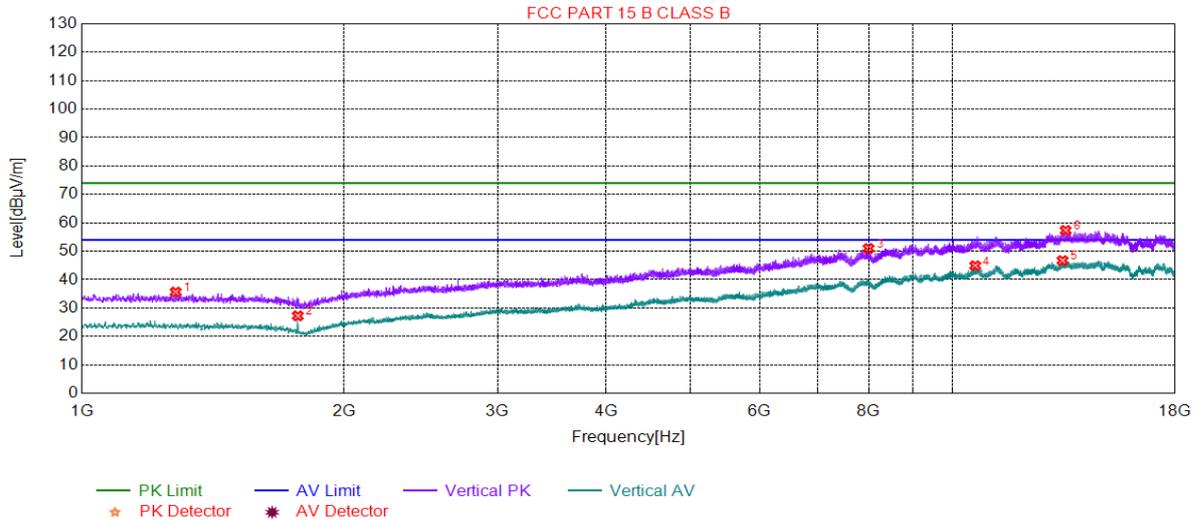
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1284.76	35.40	-29.98	74.00	38.60	100	42	Horizontal
2	2235.96	27.04	-27.27	54.00	26.96	100	107	Horizontal
3	9363.56	42.20	-5.23	54.00	11.80	100	172	Horizontal
4	9527.62	53.01	-5.20	74.00	20.99	100	258	Horizontal
5	14747.7	46.89	0.85	54.00	7.11	100	20	Horizontal
6	15028.2	57.61	1.14	74.00	16.39	100	194	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	1281.36	35.66	-29.98	74.00	38.34	100	298	Vertical
2	1769.28	27.28	-31.82	54.00	26.72	100	124	Vertical
3	8001.80	50.96	-8.27	74.00	23.04	100	146	Vertical
4	10608.0	44.93	-3.56	54.00	9.07	100	124	Vertical
5	13363.0	46.73	0.21	54.00	7.27	100	80	Vertical
6	13472.6	57.34	0.52	74.00	16.66	100	16	Vertical



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3 Equipment List

Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Semi-Anechoic Chamber	Brilliant-emc	966	XAW03-35-01	NCR	NCR
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020/4/2	2021/4/2
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020/4/2	2021/4/2
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020/9/7	2021/9/6
Receiving antenna	Rosenberger	VULB 9163	XAW01-09-01	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	BBHA 9120D	XAW01-09-02	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	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
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2020/11/18	2021/11/18
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020/11/18	2021/11/18
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020/12/3	2021/12/3
Amplifier	Brilliant-emc	YX28980930	XAW01-41-06	2020/11/18	2021/11/18
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-19-02	2020/9/16	2021/9/15



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4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.4dB (150kHz to 30MHz)
2	Radiated Emission	± 4.8dB (30MHz-1GHz)
		± 5.2dB (1GHz-6GHz)
		± 5.5dB (6GHz-18GHz)
		± 5.02dB (18GHz-40GHz)



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5 Photographs

5.1 Test Setup

Refer to Appendix A JBP Setup Photos.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

