

Report No.: ZR/2021/1004906

Page: 1 of 22

### 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-1341
Trade Mark: Nokia

FCC ID: 2AJOTTA-1341

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

**Date of Receipt:** 2021/1/29

**Date of Test:** 2021/1/29 to 2021/3/3

Date of Issue: 2021/4/17

Test Result: Pass\*

Authorized Signature:

Simon Ling

Wireless Laboratory Manager



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sgs.china@sgs.com

<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



Report No.: ZR/2021/1004906

Page: 2 of 22

Revision Record								
Version	Chapter	Date	Modifier	Remark				
01		2021/3/9		Original				
02		2021/4/17	Eason Wang	Update equipment list				

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



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Report No.: ZR/2021/1004906

Page: 3 of 22

### **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				

Test engineer: Leah Chen, Ken Liu, Andy Yao





Report No.: ZR/2021/1004906

Page: 4 of 22

### **Contents**

1	GEN	IERAL INFORMATION	5
	1.1 1.2	DESCRIPTION OF SUPPORT UNITS	
	1.2 1.3	TEST FACILITY	
	1.3	DEVIATION FROM STANDARDS	
	1.5	ABNORMALITIES FROM STANDARD CONDITIONS	
2	EMIS	SSION TEST RESULTS	8
	2.1	CONDUCTED EMISSIONS AT MAINS TERMINALS (150kHz-30MHz)	8
	2.1.1	1 E.U.T. Operation	
	2.1.2		
	2.1.3	3 Measurement Data	9
	2.2	RADIATED EMISSIONS (30MHz-1GHz)	12
	2.2.1	1 E.U.T. Operation	12
	2.2.2	Part Setup Procedures	13
	2.2.3		
	2.3	RADIATED EMISSIONS (ABOVE 1GHz)	
	2.3.1	=	
	2.3.2	·	
	2.3.3	3 Measurement Data	17
3	EQU	IIPMENT LIST	20
4	MEA	SUREMENT UNCERTAINTY	21
5	PHO	TOGRAPHS	22
	5.1	TEST SETUP	22
	5.2	EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)	



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Report No.: ZR/2021/1004906

Page: 5 of 22

### 1 General Information

Product Name:	smart phone										
Model No.(EUT):	TA-1341	TA-1341									
Trade Mark:	Nokia										
Hardware Version:	V1.0										
Software Version:	00WW_0_226										
	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								
Francisco Danda	LTE Band 66	1710~1780	2110~2200								
Frequency Bands:	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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Report No.: ZR/2021/1004906

Page: 6 of 22

#### Accessory:

Adapter 1	Manufacturer: HUIZHOU PUAN ELECTRONICS CO., LTD Model: 1-CHEUQ302-095				
Adapter 2	Manufacturer: HUIZHOU PUAN ELECTRONICS CO., LTD Model: 1-CHUKQ302-096				
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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Report No.: ZR/2021/1004906

Page: 7 of 22

#### 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.

• FCC Designation No.: CN1271

#### 1.4 Deviation from Standards

None

### 1.5 Abnormalities from Standard Conditions

None



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Report No.: ZR/2021/1004906

Page: 8 of 22

### 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( $\mu$ V)-56dB( $\mu$ V) quasi-peak, 56dB( $\mu$ V)-46dB( $\mu$ V) average

0.5M-5MHz 56dB( $\mu$ V) quasi-peak, 46dB( $\mu$ V) average 5M-30MHz 60dB( $\mu$ V) quasi-peak, 50dB( $\mu$ V) 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 a: Transfer data between the EUT and the PC+USB cable1

modes to find b: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1

the worst case: +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

c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+

for final test: battery1+ Cable1+adapter(worst)



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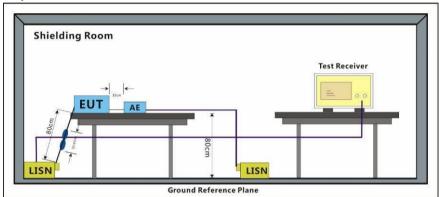


Report No.: ZR/2021/1004906

Page: 9 of 22

#### 2.1.2 Test Setup Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.



#### 2.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.



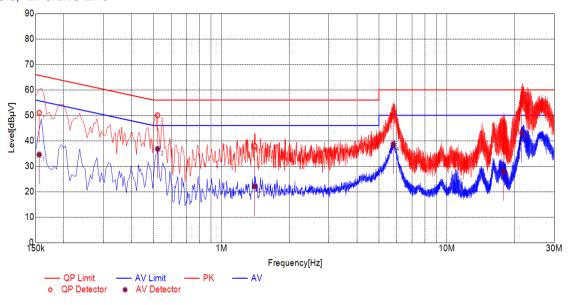
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Report No.: ZR/2021/1004906

Page: 10 of 22

#### Mode:c; Line:Live Line



#### **Test Graph**

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	ΑV Value [dBμV]	ΑV 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	

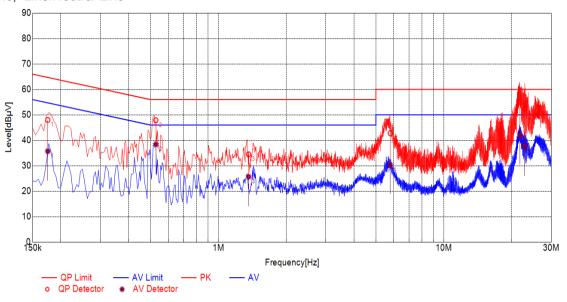




Report No.: ZR/2021/1004906

Page: 11 of 22

#### 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]	ΑV 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			





Report No.: ZR/2021/1004906

Page: 12 of 22

#### 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:

30 MHz - 88 MHz  $40.0 (\text{dB}\mu\text{V/m})$  quasi-peak 88 MHz - 216 MHz  $43.5 (\text{dB}\mu\text{V/m})$  quasi-peak 216 MHz - 960 MHz  $46.0 (\text{dB}\mu\text{V/m})$  quasi-peak  $54.0 (\text{dB}\mu\text{V/m})$  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 a: Transfer data between the EUT and the PC+USB cable1

modes to find b: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1

the worst case: +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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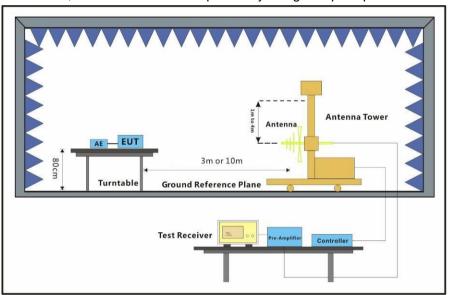


Report No.: ZR/2021/1004906

Page: 13 of 22

#### 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. Quasipeak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

The three polarities of X,Y,Z were measured by EUT, but only the worst data had been displayed.



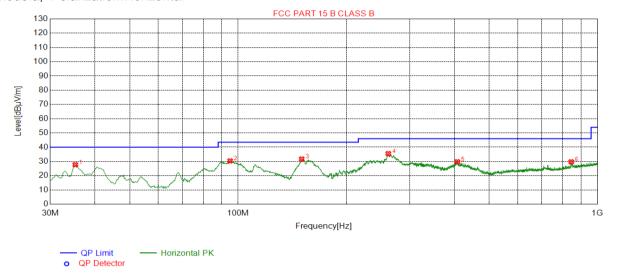
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Report No.: ZR/2021/1004906

Page: 14 of 22

#### Mode:a; Polarization:Horizontal



#### **Suspected List**

- up											
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	140	267	Horizontal			
2	95.0030	30.39	-32.89	43.50	13.11	102	272	Horizontal			
3	150.304	31.70	-35.07	43.50	11.80	196	109	Horizontal			
4	261.876	35.52	-29.33	46.00	10.48	191	116	Horizontal			
5	407.405	29.79	-25.36	46.00	16.21	144	296	Horizontal			
6	845.351	29.76	-16.96	46.00	16.24	136	51	Horizontal			

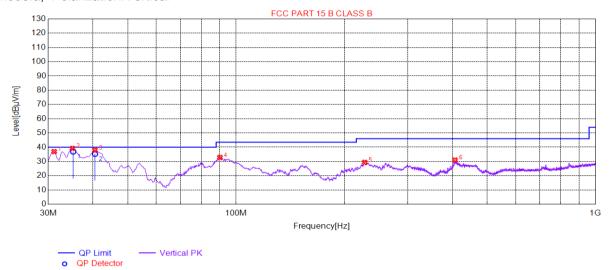




Report No.: ZR/2021/1004906

Page: 15 of 22

#### Mode:a; Polarization:Vertical



#### **Suspected List**

- u p - u								
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	159	14	Vertical
2	35.0450	39.20	-29.95	40.00	0.80	226	360	Vertical
3	40.4781	37.92	-28.54	40.00	2.08	169	347	Vertical
4	90.1520	32.87	-33.69	43.50	10.63	178	78	Vertical
5	227.919	29.41	-30.47	46.00	16.59	246	122	Vertical
6	406.435	31.01	-25.37	46.00	14.99	227	324	Vertical

#### **Final Data List**

Final	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		





Report No.: ZR/2021/1004906

Page: 16 of 22

#### 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 a: Transfer data between the EUT and the PC+USB cable1

modes to find b: GSM 850 Idle+ BT+ 2.4G WLAN +FM+NFC+playing MP4 +earphone1

the worst case: +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

c: WCDMA Band V Idle+BT+5G WLAN +FM+NFC +playing MP4+ earphone1+

for final test: battery1+ Cable1+adapter(worst)



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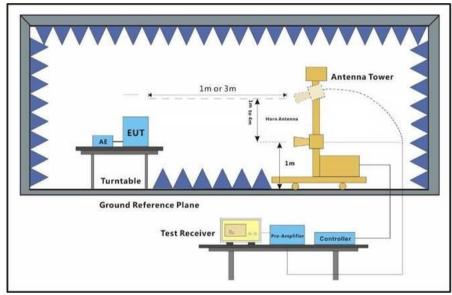


Report No.: ZR/2021/1004906

Page: 17 of 22

#### 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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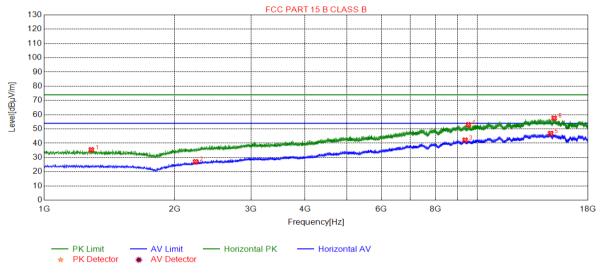
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Report No.: ZR/2021/1004906

Page: 18 of 22

#### Mode:c; Polarization:Horizontal



#### **Suspected List**

Guspee	dispected 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	131	42	Horizontal
2	2235.96	27.04	-27.27	54.00	26.96	106	107	Horizontal
3	9363.56	42.20	-5.23	54.00	11.80	176	172	Horizontal
4	9527.62	53.01	-5.20	74.00	20.99	135	258	Horizontal
5	14747.7	46.89	0.85	54.00	7.11	196	20	Horizontal
6	15028.2	57.61	1.14	74.00	16.39	158	194	Horizontal

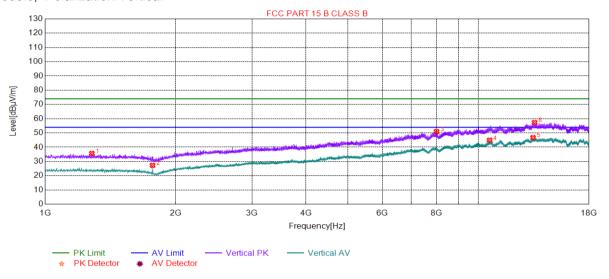




Report No.: ZR/2021/1004906

Page: 19 of 22

#### Mode:c; Polarization:Vertical



#### **Suspected List**

<u>Gaopec</u>	dispersion List								
Susp	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	239	298	Vertical	
2	1769.28	27.28	-31.82	54.00	26.72	197	124	Vertical	
3	8001.80	50.96	-8.27	74.00	23.04	173	146	Vertical	
4	10608.0	44.93	-3.56	54.00	9.07	181	124	Vertical	
5	13363.0	46.73	0.21	54.00	7.27	188	80	Vertical	
6	13472.6	57.34	0.52	74.00	16.66	191	16	Vertical	





Report No.: ZR/2021/1004906

Page: 20 of 22

### 3 Equipment List

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	2020-10-26	2021-10-25		
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020-10-26	2021-10-25		
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020-10-27	2021-10-26		
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2020-10-26	2021-10-25		
5G UXM	Keysight	E7515B	XAW01-04-01	2020-09-11	2021-09-10		
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05		
Measurement Software	Tonscend	TS+ RE V3.0.0.2	XAW02-05-01	NCR	NCR		

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		
5G UXM	Keysight	E7515B	XAW01-19-02	2020-09-11	2021-09-10		
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2020-11-06	2021-11-05		



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Report No.: ZR/2021/1004906

Page: 21 of 22

Measurement Software Tonscend TS+ CE V2.5 XAW02-05-02 NCR NCR

### 4 Measurement Uncertainty

No.	Item	Measurement Uncertainty			
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)			
2		± 4.8dB (Below 1GHz)			
	Radiated Emission	± 4.8dB (1GHz to 6GHz)			
		± 4.5dB (6GHz to 18GHz)			
		± 5.02dB (Above 18GHz)			



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Report No.: ZR/2021/1004906

Page: 22 of 22

### 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 -



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