

## TEST REPORT

**Application No:** ZR/2020/80074  
**Applicant:** vivo Mobile Communication Co., Ltd.  
**Address of Applicant:** #283,BBK Road,Wusha,Chang'An, DongGuan City, China  
**Manufacturer:** vivo Mobile Communication Co., Ltd.  
**Address of Manufacturer:** #283,BBK Road,Wusha,Chang'An, DongGuan City, China  
**EUT Description:** Mobile phone  
**Model No.:** V2028  
**Trade Mark:** vivo  
**FCC ID:** 2AUCY-V2027  
**Standard(s) :** 47 CFR Part 15, Subpart B  
**Date of Receipt:** 2020/9/3  
**Date of Test:** 2020/9/3 to 2020/9/15  
**Date of Issue:** 2020/9/17

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

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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020/9/17		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

*David Chen*

David Chen  
Reviewer

Test By

*Daniel Wang*

Daniel Wang  
Project Engineer

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## 1 General Information

Product Name:	Mobile phone		
Model No.(EUT):	V2028		
Trade Mark:	vivo		
Hardware Version:	MP_0.1		
Software Version:	PD2042F_EX_A_3.3.8		
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 38	2570~2620	2570~2620
	LTE Band 41	2535~2655	2535~2655
	Wi-Fi 2.4G	2412~2472	2412~2472
	Bluetooth	2402~2480	2402~2480
	Wi-Fi 5G	5150~5850	5150~5850
	FM	/	88~108
	GNSS	/	1559~1610

### Accessory:

Accessory Equipment	Manufacturer/trademark	Model	Specification
Adapter1	Dongguan Aohai Technology CO., LTD.	V1020D-EU	DC 5V/2A
Adapter2	Phihong Technology Co., Ltd.	V1020D-US	DC 5V/2A
Earphone	VIVO	XE160	/
Battery	Huizhou Desay Battery Co., Ltd.	B-O5	4910mAh 3.87V
USB Cable	VIVO	BK-C-19	97cm
Remark: All accessory equipment above were conduct test in this report.			

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**Test modes:**

Pretest these modes to find the worst case:	a: Transfer data between the EUT and the PC+USB cable b: Telecom Idle+BT+WLAN5G+GNSS +Playing MP4+USB Cable+adapter1+earphone+Battery c: Telecom Idle+BT+WLAN5G+GNSS +camera(Front)+USB Cable+adapter2+earphone+Battery d: Telecom Idle+BT+WLAN2.4G+GNSS+camera(Back)+USB Cable+adapter(worst)+earphone+Battery e: GSM850 Idle+BT+WLAN2.4G+GNSS+Playing MP4+USB Cable+adapter(worst)+earphone+Battery f: WCDMA Band V Idle+BT+WLAN2.4G+GNSS+Playing MP4+USB Cable+adapter(worst)+earphone+Battery g: LTE Band5 Idle+BT+WLAN2.4G+GNSS+Playing MP4+USB Cable+adapter(worst)+earphone+Battery h: FM mode_98MHz
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## 1.1 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800
Mouse	Lenovo	M-U0025-O	REF. No.:SEA2400
Router	NETGEAR	DGN2200	REF. No.SEA2200

## 1.2 Test Location

All tests were performed at:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Xi'an Branch
Address:	Single floor D, building 1, Kanghong orange square science and technology park, No.137 keyuan 3rd road, fengdong new town, Xi 'an city, Shaanxi China
Post code:	710000
Telephone:	+86 (0) 29 6282 7885
Fax:	+86 (0) 29 6282 7885
E-mail:	ee.xian@sgs.com

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 CO., LTD. XIAN BRANCH

is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

Test Site No.:	SGS Xian Site No.		FCC Designation No.
	CO01-XA	03CH01-XA	CN1271

## 1.4 Deviation from Standards

None

## 1.5 Abnormalities from Standard Conditions

None

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## 2 Emission Test Results

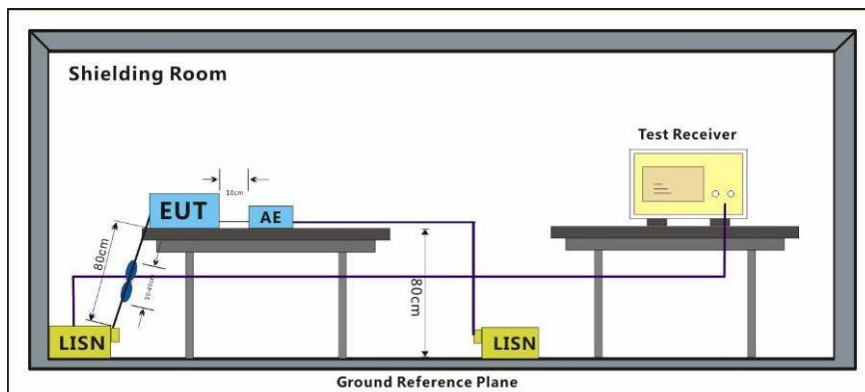
### 2.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

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:	20.5 °C	Humidity:	55.3 % RH	Atmospheric Pressure:	1000 mbar
The worst case for final test:	e: GSM850 Idle+BT+WLAN2.4G+GNSS+Playing MP4+USB Cable+adapter(worst)+earphone+Battery				

#### 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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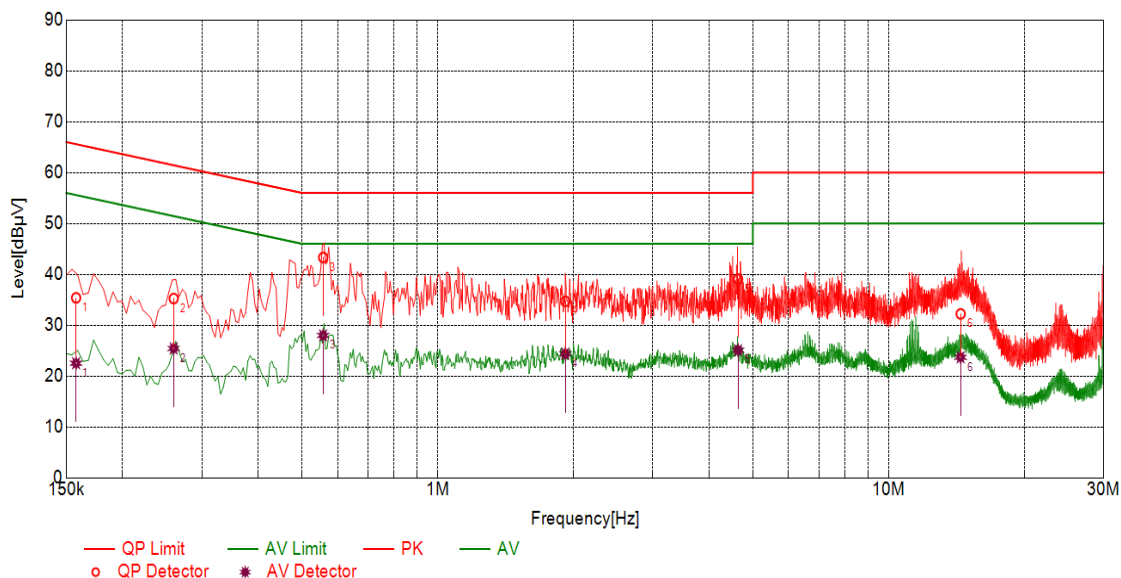
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Mode:e; Line:Live Line



## Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Type
1	0.1578	10.10	35.39	65.58	30.19	22.52	55.58	33.06	L
2	0.2597	10.10	35.24	61.44	26.20	25.43	51.44	26.01	L
3	0.5571	10.10	43.31	56.00	12.69	27.99	46.00	18.01	L
4	1.9187	10.10	34.70	56.00	21.30	24.39	46.00	21.61	L
5	4.6375	10.10	39.06	56.00	16.94	25.07	46.00	20.93	L
6	14.4437	10.11	32.22	60.00	27.78	23.69	50.00	26.31	L

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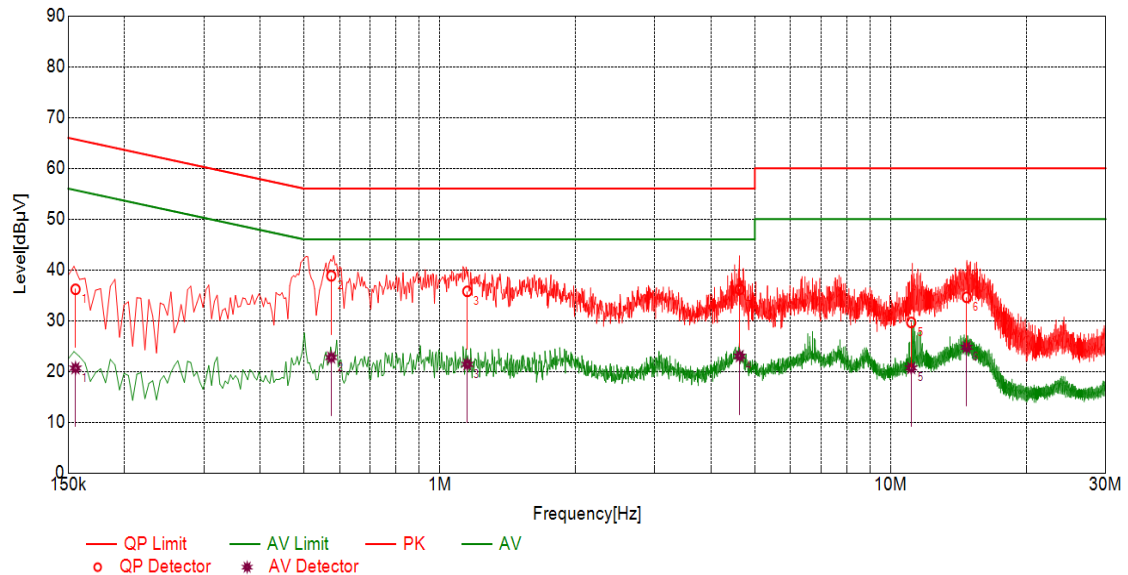
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Mode:e; Line:Neutral Line



## Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Type
1	0.1557	10.10	36.18	65.69	29.51	20.64	55.69	35.05	N
2	0.5748	10.10	38.82	56.00	17.18	22.75	46.00	23.25	N
3	1.1514	10.10	35.77	56.00	20.23	21.39	46.00	24.61	N
4	4.6287	10.10	36.18	56.00	19.82	23.01	46.00	22.99	N
5	11.1116	10.10	29.65	60.00	30.35	20.68	50.00	29.32	N
6	14.7459	10.11	34.60	60.00	25.40	24.76	50.00	25.24	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(dB $\mu$ V/m) quasi-peak
88MHz-216MHz	43.5(dB $\mu$ V/m) quasi-peak
216MHz-960MHz	46.0(dB $\mu$ V/m) quasi-peak
960MHz-1000MHz	54.0(dB $\mu$ V/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

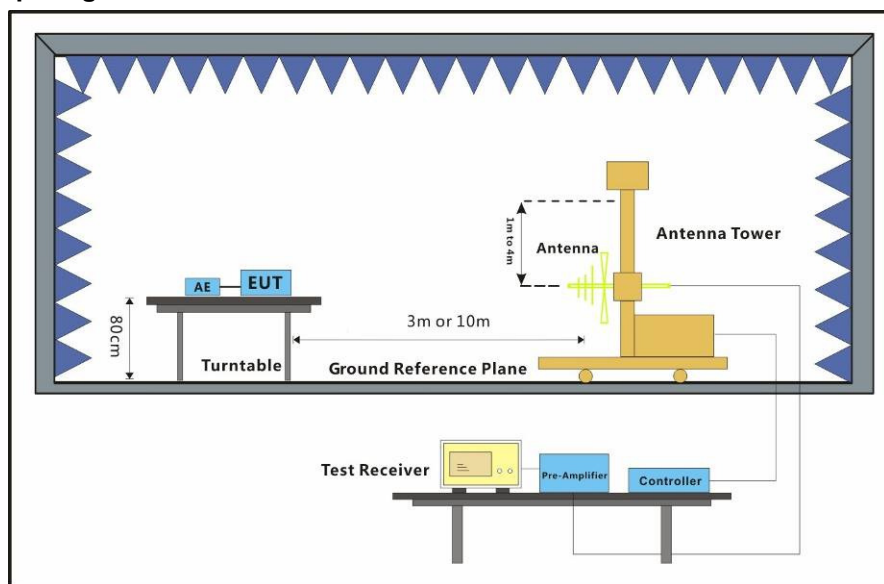
### 2.1.4 E.U.T. Operation

Operating Environment:

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

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

### 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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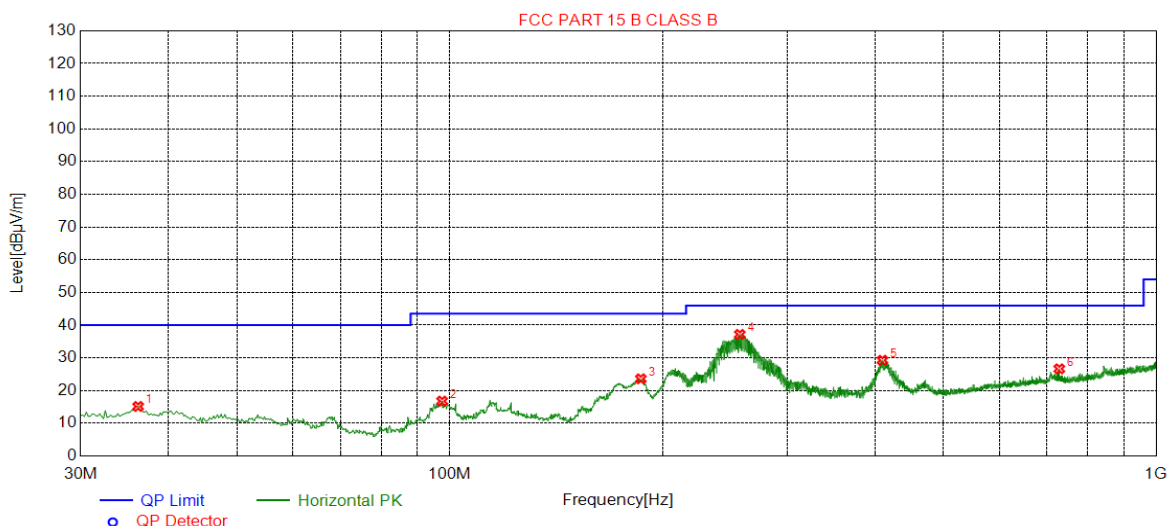
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Mode:a; Polarization:Horizontal

**Suspected List**

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.2092	15.15	-29.57	40.00	24.85	200	257	Horizontal
2	97.5255	16.79	-32.44	43.50	26.71	200	236	Horizontal
3	186.395	23.61	-32.62	43.50	19.89	100	209	Horizontal
4	257.413	37.18	-29.45	46.00	8.82	100	111	Horizontal
5	409.733	29.28	-25.33	46.00	16.72	100	55	Horizontal
6	729.315	26.66	-18.82	46.00	19.34	100	282	Horizontal

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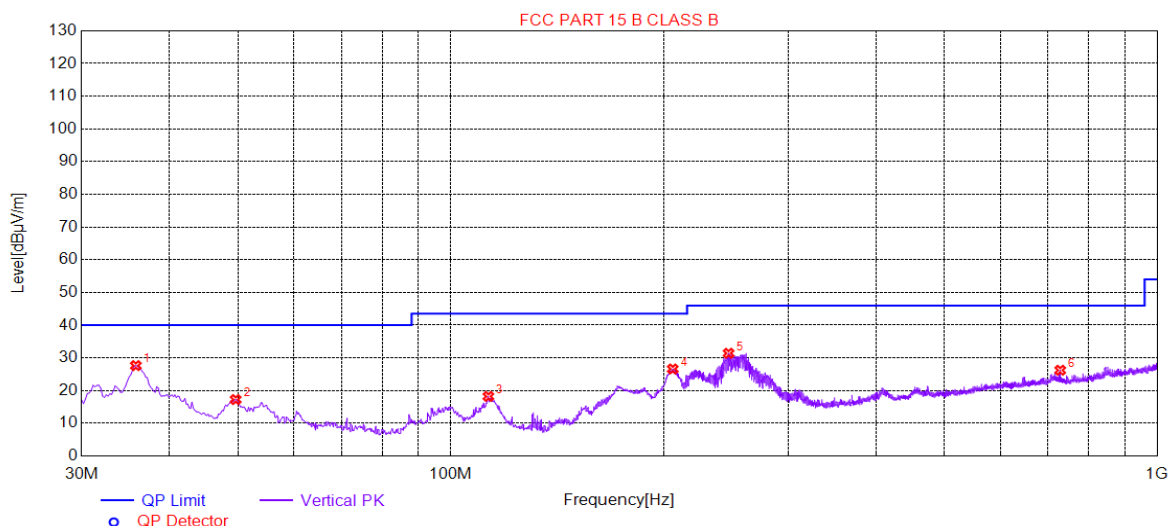
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Mode:a; Polarization:Vertical

**Suspected List**

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.8212	27.64	-29.69	40.00	12.36	100	9	Vertical
2	49.5979	17.26	-30.37	40.00	22.74	100	261	Vertical
3	113.048	18.22	-32.48	43.50	25.28	100	161	Vertical
4	206.187	26.62	-31.06	43.50	16.88	100	287	Vertical
5	247.323	31.42	-29.77	46.00	14.58	100	341	Vertical
6	729.121	26.23	-18.82	46.00	19.77	100	302	Vertical

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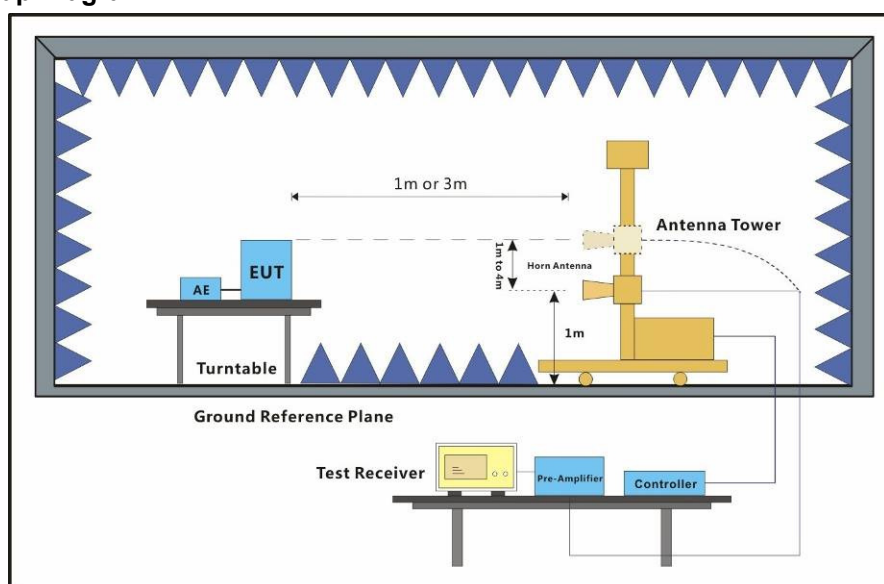
## 2.3 Radiated Emissions (above 1GHz)

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(dB $\mu$ V/m) peak, 54(dB $\mu$ V/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  
The worst case e: GSM850 Idle+BT+WLAN2.4G+GNSS+Playing MP4+USB  
for final test: Cable+adapter(worst)+earphone+Battery

### 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.

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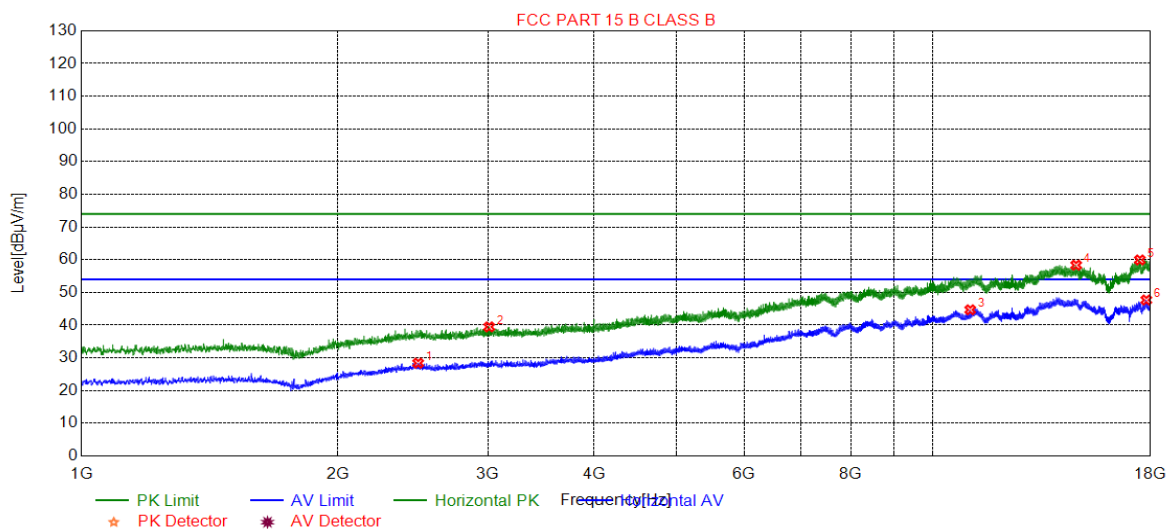
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Mode:e; Polarization:Horizontal



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2485.02	28.39	-25.95	54.00	25.61	100	267	Horizontal
2	3011.20	39.48	-24.50	74.00	34.52	100	305	Horizontal
3	11054.3	44.71	-2.65	54.00	9.29	200	128	Horizontal
4	14719.6	58.35	1.69	74.00	15.65	200	241	Horizontal
5	17488.2	59.95	1.49	74.00	14.05	100	192	Horizontal
6	17795.9	47.70	0.70	54.00	6.30	200	278	Horizontal

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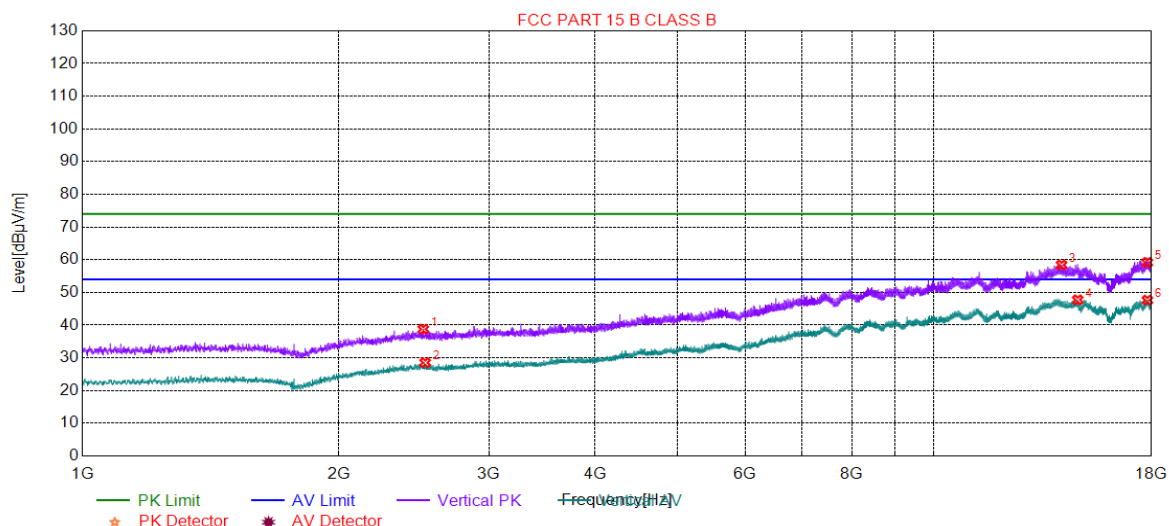
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Mode:e; Polarization:Vertical



### Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2513.07	38.77	-25.86	74.00	35.23	200	91	Vertical
2	2525.82	28.56	-25.87	54.00	25.44	100	232	Vertical
3	14111.0	58.42	2.33	74.00	15.58	100	118	Vertical
4	14742.6	47.76	1.71	54.00	6.24	100	307	Vertical
5	17794.2	59.19	0.71	74.00	14.81	100	269	Vertical
6	17799.3	47.66	0.69	54.00	6.34	100	118	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	2020/9/6	2021/9/5
				2019/9/7	2020/9/6
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	2019/11/18	2020/11/18
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019/11/18	2020/11/18
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019/12/3	2020/12/3
Amplifier	Brilliant-emc	YX28980930	XAW01-41-06	2019/11/18	2020/11/18
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-19-02	2019-09-16	2020/9/15

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## 4 Measurement Uncertainty

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

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## **5 Photographs**

### **5.1 Test Setup**

Refer to Appendix A - Photographs of Set-Up for ZR/2020/80074.

### **5.2 EUT Constructional Details (EUT Photos)**

Refer to Photographs of EUT Constructional Details

- End of the Report -

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