

Report No.: ZR/2020/7000806

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TEST REPORT

Application No: ZR/2020/70008

Applicant: OnePlus Technology (shenzhen) Co., Ltd.

Address of Applicant 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue

North, Futian District, Shenzhen, China.

Manufacturer: OnePlus Technology (shenzhen) Co., Ltd.

Address of Manufacturer: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue

North, Futian District, Shenzhen, China.

EUT Description: Smart Phone

Model No.: BE2011, BE2012, BE2015

Trade Mark: ONEPLUS FCC ID: 2ABZ2-EF164

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

Date of Receipt: 2020/8/10

Date of Test: 2020/8/10 to 2020/8/31

Date of Issue: 2020/9/4

Test Result: Pass*

Authorized Signature:

Derek Yang

Derele yang

Wireless Laboratory Manager

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^{*} In the configuration tested, the EUT complied with the standards specified above.



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Revision Record								
Version	Chapter	Date	Modifier	Remark				
01		2020/9/4		Original				

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Test Summary

Emission Part	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 Test By

David Chen Reviewer

David Chen

Daniel Wang Project Engineer

South

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1 General Information

Product Name:	Smart Phone								
Model No.(EUT):	BE2011, BE2012, BE2015	BE2011, BE2012, BE2015							
Trade Mark:	ONEPLUS								
Hardware Version:	44								
Software Version:	10.5.5.BE82CB								
	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						
	CDMA BC0	824~849	869~894						
	CDMA BC1	1850~1910	1930~1990						
	CDMA BC10	817~824	862~869						
	LTE Band 2	1850~1910	1930~1990						
	LTE Band 4	1710~1755	2110~2155						
	LTE Band 5	824~849	869~894						
Frequency Bands:	LTE Band 7	2500~2570	2620~2690						
	LTE Band 12	699~716	729~746						
	LTE Band 13	777~787	746~756						
	LTE Band 17	704~716	734~746						
	LTE Band 25	1850~1915	1930~1995						
	LTE Band 26	814~849	859~894						
	LTE Band 38	2570~2620	2570~2620						
	LTE Band 41	2496~2690	2496~2690						
	LTE Band 66	1710~1780	2110~2200						
	LTE Band 71	663~698	617~652						
	Wi-Fi 2.4G	2412~2472	2412~2472						
	Bluetooth	2402~2480	2402~2480						
	Wi-Fi 5G	5150~5850	5150~5850						

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The mobile phone BE2012 and BE2015 and BE2011 are GSM/CDMA/WCDMA/LTE mobile phone. The differences between BE2012 and BE2015 and BE2011 are showed in the following table. They only have different model name, other parts of the mobile phone are the same, including Chipsets, the appearance, Bluetooth mode, Wifi mode, Adapter, Battery, and so on.

Model name	BE2012	BE2011	BE2015
Туре	Object of reference	New model	New model
GSM bands	/	The same	The same
WCDMA bands	/	The same	The same
LTE bands	/	The same	The same
SIM card	/	The same	The same
External camera	/	The same	The same
Internal camera	/	The same	The same
FLASH	/	The same	The same
Mainboard	/	The same	The same
PCB layout	/	The same	The same
Appearance	/	The same	The same
Bluetooth mode	/	The same	The same
WLAN mode	/	The same	The same
BT/ WLAN antenna	/	The same	The same
GSM/ WCDMA /LTE antenna	/	The same	The same
Adapter	/	The same	The same
Battery	/	The same	The same
Chipset	/	The same	The same
Memory	/	The same	The same
RF Parameter	/	The same	The same
Dimension	/	The same	The same

Note:

Model No.: BE2011, BE2012, BE2015.

Only the BE2012 was tested, since they only have different model name, other parts of the mobile phone are the same, including Chipsets, the appearance, Bluetooth mode, Wi-Fi mode, Adapter, Battery, and so on.

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Accessory:

Accessory:			
		Battery	
Battery	Huizhou Desay	BLP813	3.87V; 4890mAh/18.92Wh/1cell
	Battery Co., Ltd.		
		USB Cable	
USB Cable1			1.0m shielded cable without core
USB Cable2			1.0m shielded cable without core
		Adapter	
Adapter1 (US)	HUIZHOU GOLDEN LAKE INDUSTRIAL CO.,LTD.	WC018A51JH	I/P:100-240VAC 50/60Hz 0.5A O/P:5VDC 2.0A or 9.0VDC,2.0A
Adapter2 (US)	SHENZHEN KUNXING TECHNOLOGY CO.,LTD.	WC018A51KX	I/P:100-240VAC 50/60Hz 0.5A O/P:5VDC 2.0A or 9.0VDC,2.0A

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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.:	SG	S 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(μ V)-56dB(μ V) quasi-peak, 56dB(μ V)-46dB(μ V) average

0.5M-5MHz 56dB(μ V) quasi-peak, 46dB(μ V) average 5M-30MHz 60dB(μ V) quasi-peak, 50dB(μ 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 cable + Earphone b: GSM 850 Idle + BT+ WLAN + GPS Rx + playing MP4 (SD card) + battery +

the worst case: Cable + adapter + battery + Earphone

c: WCDMA Band V Idle + BT + WLAN + GPS Rx + playing MP4 (SD card) +

Cable + adapter2 + battery + Earphone

d: LTE Band 5 Idle+BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

∟arphone

e: LTE Band 12 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

f: LTE Band 13 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable +

Earphone

g: LTE Band 17 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

h: LTE Band 26 Idle + BT + WLAN + GPS Rx + camera (Back) + battery + Cable

+ Earphone

The worst case d: LTE Band 5 Idle + BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

for final test: Earphone

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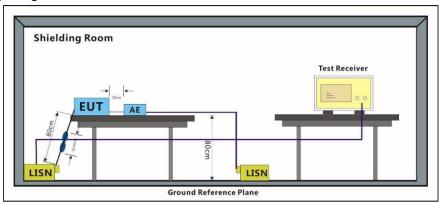
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2.1.2 Test Setup Diagram



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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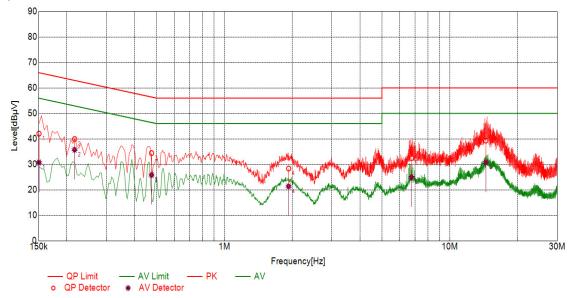
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Final	Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Туре	
1	0.1506	10.10	42.07	65.96	23.89	30.73	55.96	25.23	L	
2	0.2167	10.10	39.94	62.95	23.01	35.72	52.95	17.23	L	
3	0.4755	10.10	34.44	56.42	21.98	25.82	46.42	20.60	L	
4	1.9279	10.10	28.36	56.00	27.64	21.38	46.00	24.62	L	
5	6.7583	10.10	32.48	60.00	27.52	24.94	50.00	25.06	L	
6	14.4419	10.11	39.31	60.00	20.69	30.73	50.00	19.27	L	

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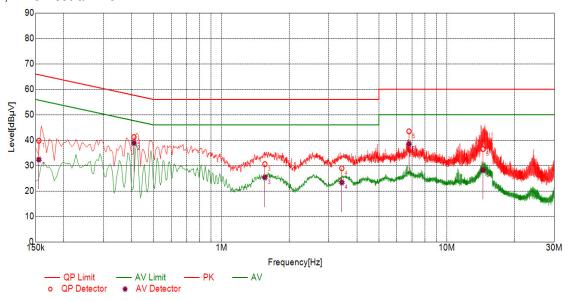
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Mode:; Line:Neutral Line



Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value	QP Limit	QP Margin	AV Value	AV Limit	AV Margin	Туре
1	0.1551	10.10	39.77	65.72	25.95	32.35	55.72	23.37	N
2	0.4098	10.10	41.21	57.65	16.44	38.87	47.65	8.78	N
3	1.5599	10.10	30.57	56.00	25.43	25.38	46.00	20.62	N
4	3.4223	10.10	28.94	56.00	27.06	23.39	46.00	22.61	N
5	6.7967	10.10	43.46	60.00	16.54	38.52	50.00	11.48	N
6	14.4678	10.11	36.49	60.00	23.51	28.30	50.00	21.70	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:

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 960 MHz - 1000 MHz $54.0 (\text{dB}\mu\text{V/m})$ 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

Pretest these
modes to find
the worst case:

a: Transfer data between the EUT and the PC + USB cable + Earphone

b: GSM 850 Idle + BT+ WLAN + GPS Rx + playing MP4 (SD card) + battery +

Cable + adapter + battery + Earphone

Oable + adapter + battery + Larphone

c: WCDMA Band V Idle + BT + WLAN + GPS Rx + playing MP4 (SD card) +

Cable + adapter2 + battery + Earphone

d: LTE Band 5 Idle+BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

Earphone

e: LTE Band 12 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

f: LTE Band 13 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable +

Earphone

g: LTE Band 17 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

h: LTE Band 26 Idle + BT + WLAN + GPS Rx + camera (Back) + battery + Cable

+ Earphone

The worst case d: LTE Band 5 Idle + BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

for final test: Earphone

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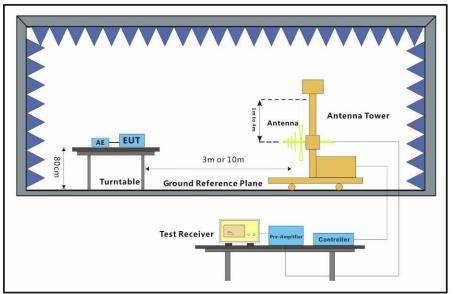
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2.1.5 Test Setup Diagram



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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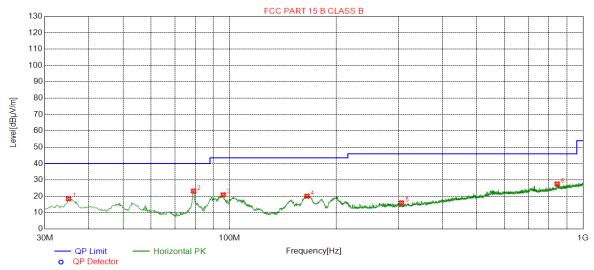
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Mode:; Polarization:Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.0450	18.45	-29.95	40.00	21.55	200	246	Horizontal
2	79.0918	23.17	-35.99	40.00	16.83	200	159	Horizontal
3	95.9732	20.85	-32.72	43.50	22.65	200	255	Horizontal
4	165.633	20.07	-34.30	43.50	23.43	100	212	Horizontal
5	306.311	16.02	-28.08	46.00	29.98	100	215	Horizontal
6	845.157	27.54	-16.97	46.00	18.46	100	285	Horizontal

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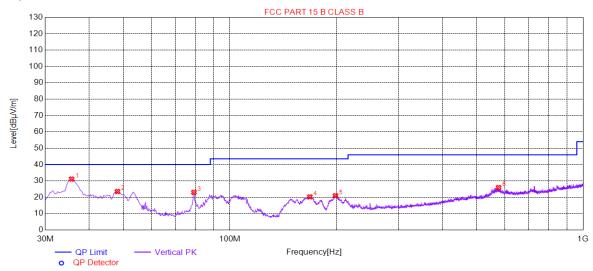
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Mode:; Polarization: Vertical



Suspe	Suspected List								
NO	Freq.	Level	Factor	Limit	Margin	Height	Angle	Dolovitu	
NO.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	Polarity	
1	35.6271	31.15	-29.76	40.00	8.85	100	335	Vertical	
2	48.0456	23.57	-30.39	40.00	16.43	100	4	Vertical	
3	79.0918	23.04	-35.99	40.00	16.96	100	94	Vertical	
4	168.349	20.26	-34.14	43.50	23.24	100	335	Vertical	
5	199.007	20.96	-31.29	43.50	22.54	100	33	Vertical	
6	576.413	25.95	-21.30	46.00	20.05	100	27	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 a: Transfer data between the EUT and the PC + USB cable + Earphone b: GSM 850 Idle + BT+ WLAN + GPS Rx + playing MP4 (SD card) + battery +

the worst case: Cable + adapter + battery + Earphone

c: WCDMA Band V Idle + BT + WLAN + GPS Rx + playing MP4 (SD card) +

Cable + adapter2 + battery + Earphone

d: LTE Band 5 Idle+BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

Earphone

e: LTE Band 12 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

f: LTE Band 13 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable +

Earphone

g: LTE Band 17 Idle + BT + WLAN + GPS Rx + camera (Front) + battery + Cable

+ Earphone

h: LTE Band 26 Idle + BT + WLAN + GPS Rx + camera (Back) + battery + Cable

+ Earphone

The worst case

d: LTE Band 5 Idle + BT+ WLAN + GPS Rx + camera (Front) + battery + Cable +

for final test: Earphone

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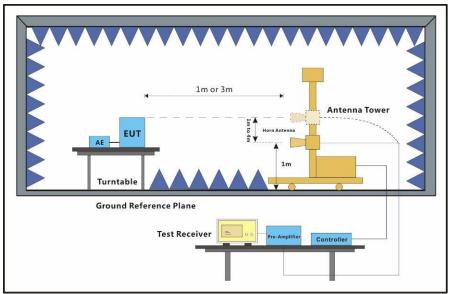
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2.1.8 Test Setup Diagram



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.

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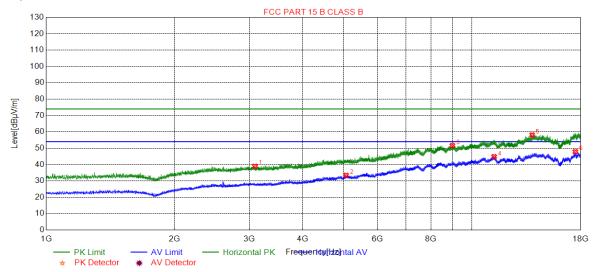
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Mode:; Polarization:Horizontal



Suspe	Suspected List								
NO.	Freq.	Level	Factor	Limit	Margin	Height	Angle	Dolovitu	
NO.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	Polarity	
1	3091.10	38.95	-24.37	74.00	35.05	100	207	Horizontal	
2	5060.65	33.47	-17.35	54.00	20.53	200	306	Horizontal	
3	8989.54	51.64	-6.78	74.00	22.36	100	283	Horizontal	
4	11265.9	44.85	-2.76	54.00	9.15	200	344	Horizontal	
5	13838.1	58.11	1.92	74.00	15.89	100	54	Horizontal	
6	17484.0	47.89	1.44	54.00	6.11	200	306	Horizontal	

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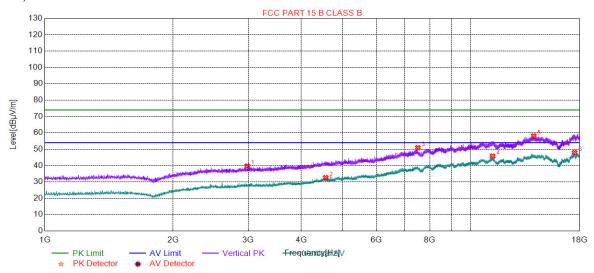
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Mode:; Polarization:Vertical



Suspected List								
NO.	Freq.	Level	Factor	Limit	Margin	Height	Angle	Polarity
110.	[MHz]	[dBµV/m]	[dB]	[dBµV/m]	[dB]	[cm]	[°]	lolarity
1	2985.69	39.78	-24.55	74.00	34.22	100	357	Vertical
2	4560.82	32.61	-19.12	54.00	21.39	100	16	Vertical
3	7505.37	50.92	-9.72	74.00	23.08	100	54	Vertical
4	11237.9	45.79	-2.80	54.00	8.21	200	192	Vertical
5	14038.8	58.11	2.29	74.00	15.89	200	116	Vertical
6	17503.5	47.92	1.62	54.00	6.08	200	154	Vertical

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3 Equipment List

Chamber								
Test Faviores	Manufacturer	Madel No	Inventory No	Cal. date	Cal.Due date			
Test Equipment	Manufacturer	Model No.	Inventory No.	(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	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	± 3.4dB (150kHz to 30MHz)		
		± 4.8dB (30MHz-1GHz)		
2	Radiated Emission	± 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 - Photographs of Set-Up for ZR/2020/70008

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

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