

TEST REPORT

Application No.: ZR/2019/B0019

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

Address of Applicant: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen

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

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

Factory: Jiangxi Risound Electronics Co., Ltd.

Address of Factory: No.271, Innovation Avenue, Jinggangshan Economic and Technological Development Zone, Ji'an City, Jiangxi Province.

EUT Name: OnePlus Bullets Wireless Z

Model No.: E303A

Trade mark: ONEPLUS

FCC ID: 2ABZ2-E303A

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

Date of Receipt: 2019/12/20

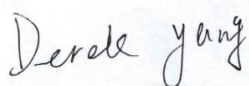
Date of Test: 2019/12/22 to 2019/12/31

Date of Issue: 2021/5/31

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

Authorized Signature:



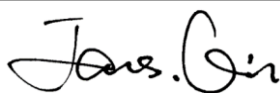

Derek Yang
Wireless Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019/12/31		Original
02		2021/5/31	Flora Wang	1.Add test site Information 2. Modify data conversion error of antenna height 3.Update equipment list

Authorized for issue by:		
Prepared By		 (James Qin) / Engineer
Checked By		 (David Chen) / Reviewer

2 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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4 General Information

4.1 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

4.2 Test modes

Pretest these modes to find the worst case and show the worse data in the test items:	a: Adapter Charging b: Charging+PC c:Playing Music
---	--

4.3 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)



4.4 Test Location

Lab A:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057

Lab B:

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

Remark : All tests were performed at Lab B.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Lab A:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

Lab B:

• 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.



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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 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	2019-09-07	2020-09-06
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-03	2019-12-11	2020-12-10
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR

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	2019-06-27	2020-06-26
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2019-06-27	2020-06-26
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
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
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2019-11-18	2020-11-17
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ RE V3.0.0.2	XAW02-05-01	NCR	NCR



6 Emission Test Results

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

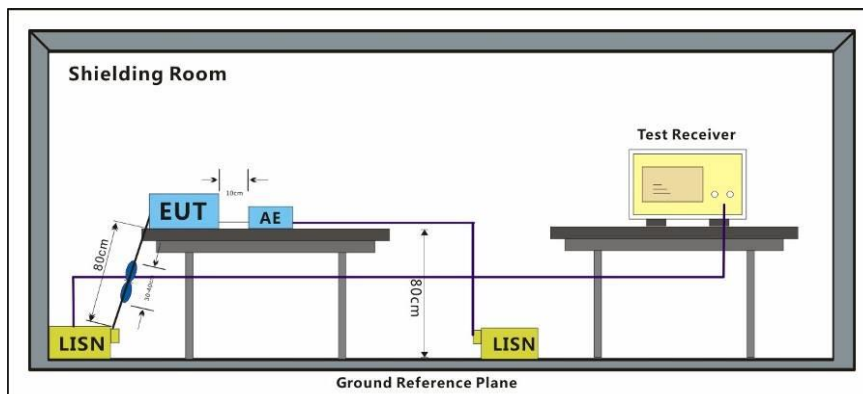
Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

Operating Environment:

Temperature:	20.3 °C	Humidity:	58.1 % RH	Atmospheric Pressure:	1005 mbar
The worst case for final test:	a: Adapter Charging b: Charging+PC				

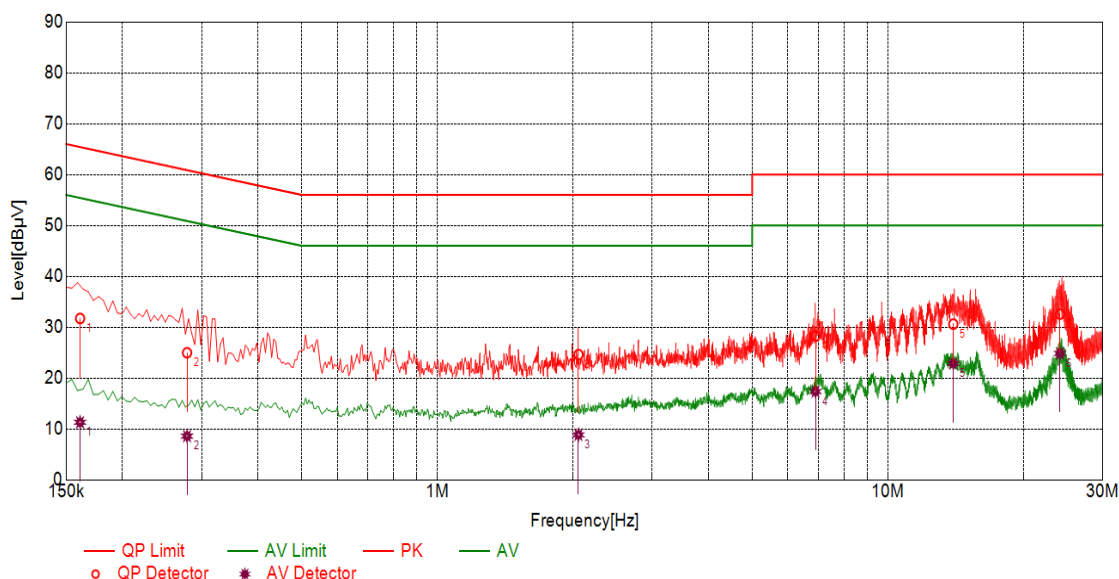
6.1.2 Test Setup Diagram



6.1.3 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.

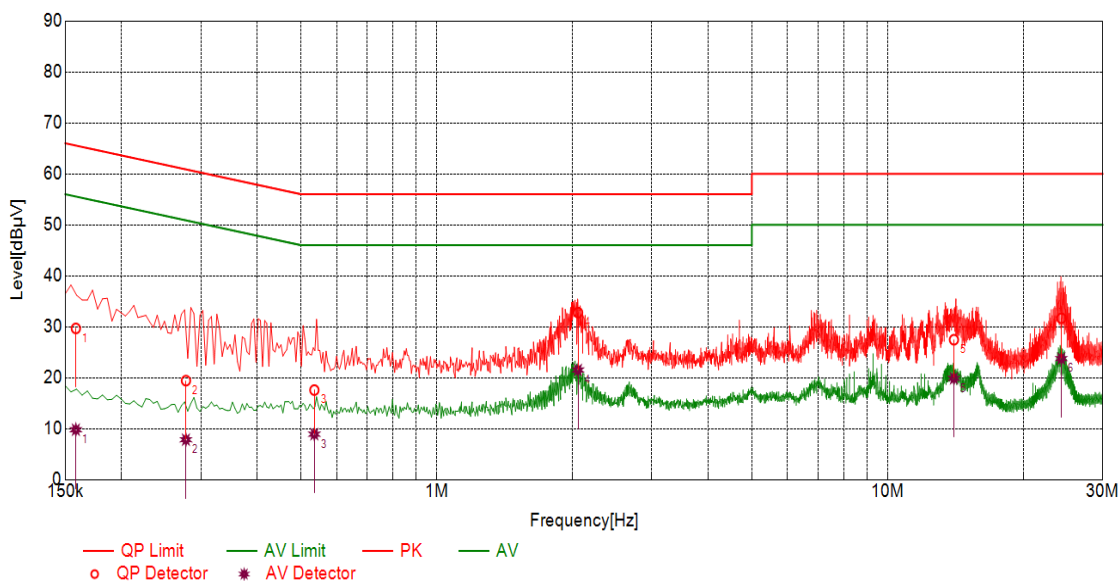
Mode:a; Line:Live Line



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	0.1611	10.10	31.72	65.41	33.69	11.31	55.41	44.10	L
2	0.2783	10.10	24.98	60.87	35.89	8.58	50.87	42.29	L
3	2.0574	10.10	24.62	56.00	31.38	8.84	46.00	37.16	L
4	6.9105	10.10	28.27	60.00	31.73	17.36	50.00	32.64	L
5	13.9680	10.11	30.61	60.00	29.39	22.86	50.00	27.14	L
6	24.0935	10.11	32.57	60.00	27.43	24.85	50.00	25.15	L

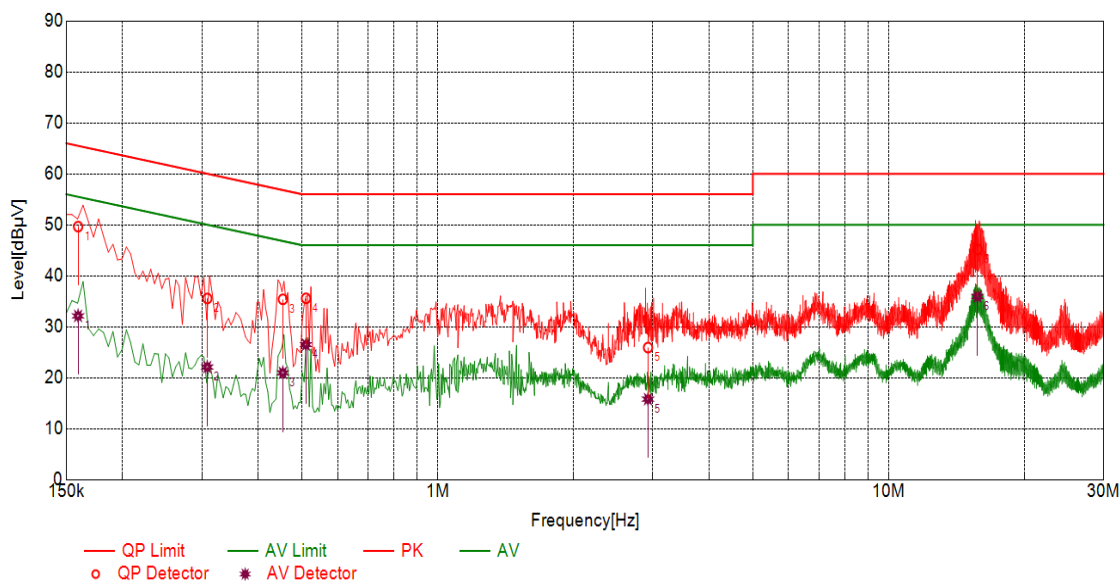
Mode:a; Line:Neutral Line



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	0.1584	10.10	29.67	65.55	35.88	9.79	55.55	45.76	N
2	0.2779	10.10	19.42	60.88	41.46	7.83	50.88	43.05	N
3	0.5354	10.10	17.57	56.00	38.43	8.91	46.00	37.09	N
4	2.0580	10.10	32.78	56.00	23.22	21.51	46.00	24.49	N
5	14.0305	10.11	27.45	60.00	32.55	19.87	50.00	30.13	N
6	24.2794	10.11	31.67	60.00	28.33	23.75	50.00	26.25	N

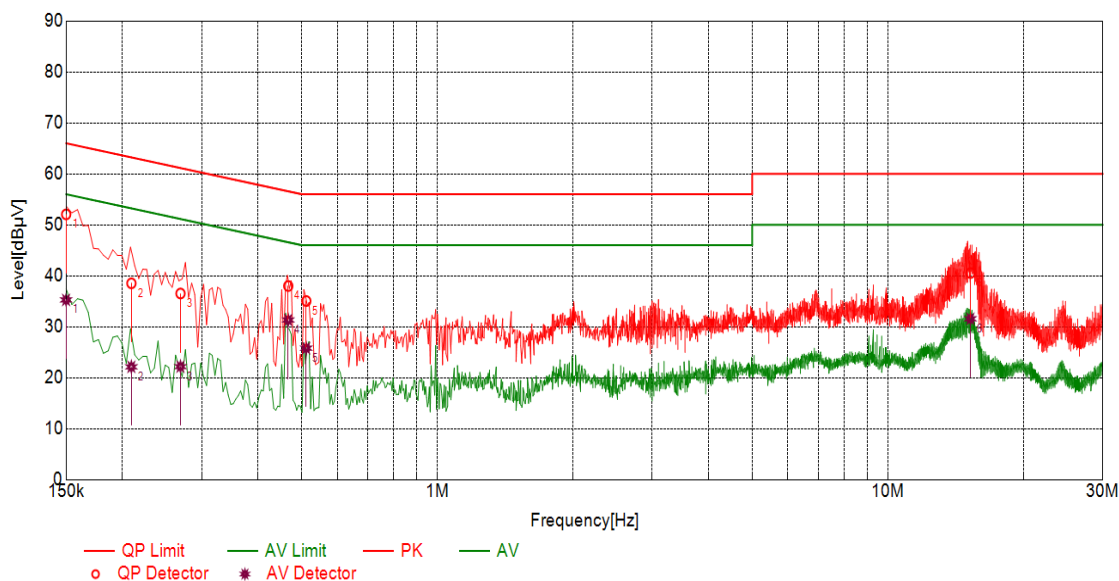
Mode:b; Line:Live Line



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	0.1594	10.10	49.65	65.49	15.84	32.12	55.49	23.37	L
2	0.3083	10.10	35.55	60.02	24.47	22.09	50.02	27.93	L
3	0.4535	10.10	35.38	56.81	21.43	20.95	46.81	25.86	L
4	0.5104	10.10	35.58	56.00	20.42	26.49	46.00	19.51	L
5	2.9266	10.10	25.92	56.00	30.08	15.79	46.00	30.21	L
6	15.7499	10.11	45.15	60.00	14.85	35.93	50.00	14.07	L

Mode:b; 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	0.1500	10.10	52.05	66.00	13.95	35.26	56.00	20.74	N
2	0.2094	10.10	38.52	63.23	24.71	22.13	53.23	31.10	N
3	0.2691	10.10	36.53	61.15	24.62	22.17	51.15	28.98	N
4	0.4668	10.10	37.99	56.57	18.58	31.32	46.57	15.25	N
5	0.5118	10.10	35.05	56.00	20.95	25.79	46.00	20.21	N
6	15.2541	10.11	40.54	60.00	19.46	31.56	50.00	18.44	N



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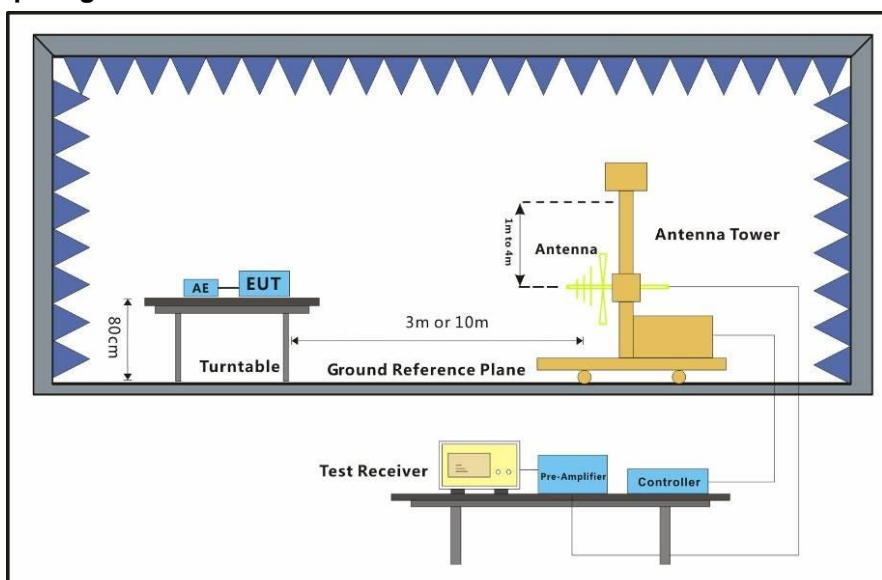
6.2 Radiated Emissions (30MHz-1GHz)

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

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 25.4 °C Humidity: 51 % RH Atmospheric Pressure: 1005 mbar
The worst case a: PLAY MUSIC
for final test: b: Adapter Charging
c: PC Charging

6.2.2 Test Setup Diagram

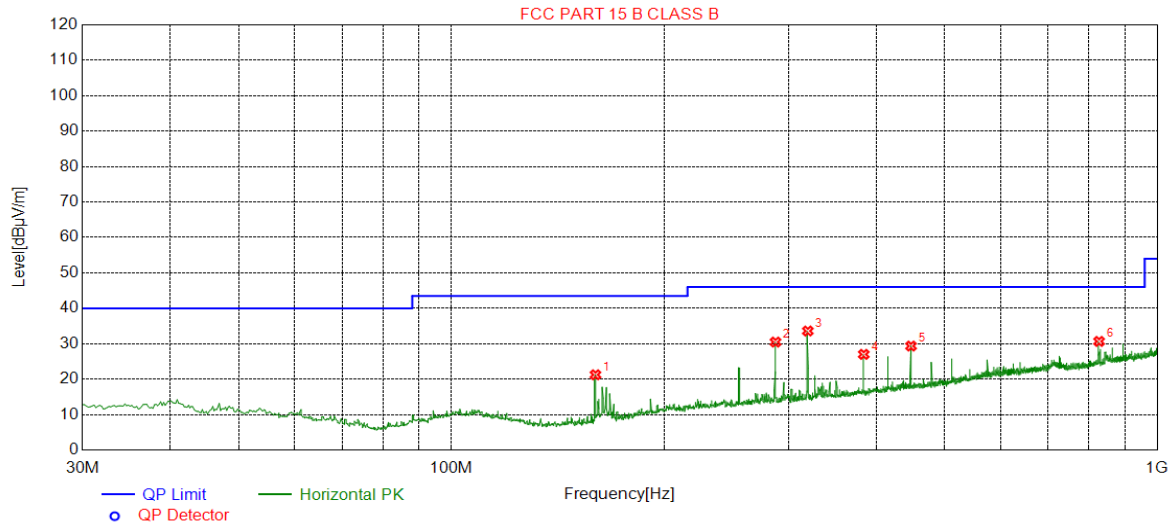


6.2.3 Measurement Data

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.



Mode:a; Polarization:Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	160.0060	21.24	-34.63	43.50	22.26	203	156	Horizontal
2	287.8776	30.47	-28.72	46.00	15.53	117	219	Horizontal
3	319.8940	33.59	-27.70	46.00	12.41	126	272	Horizontal
4	383.9268	27.00	-25.95	46.00	19.00	162	234	Horizontal
5	447.9596	29.35	-24.41	46.00	16.65	144	325	Horizontal
6	827.3055	30.66	-17.29	46.00	15.34	213	40	Horizontal

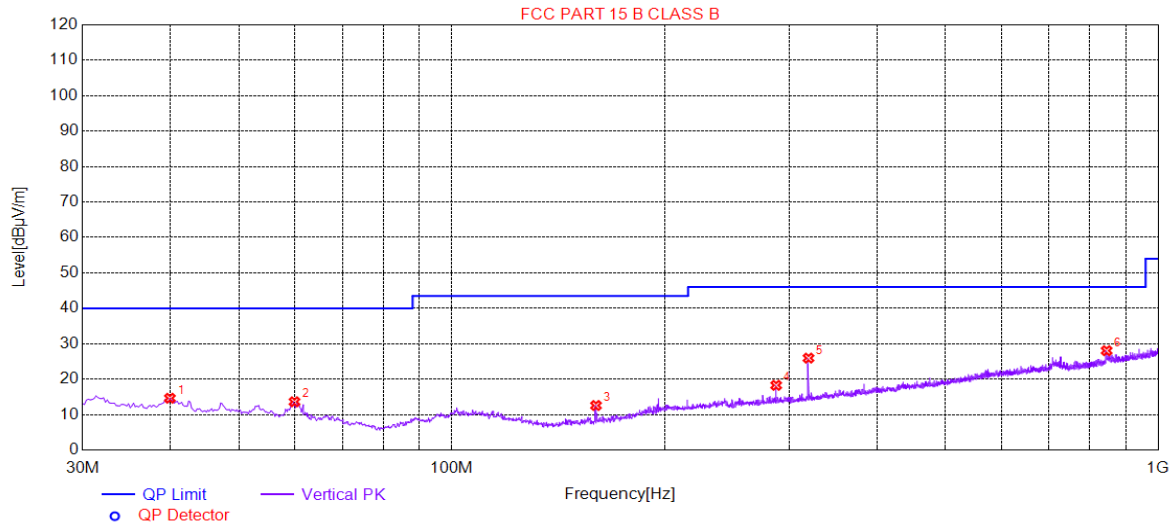


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Mode:a; Polarization:Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.8960	14.62	-28.37	40.00	25.38	194	109	Vertical
2	59.8820	13.62	-31.84	40.00	26.38	165	112	Vertical
3	160.0060	12.57	-34.63	43.50	30.93	179	59	Vertical
4	287.8776	18.27	-28.72	46.00	27.73	184	14	Vertical
5	319.8940	25.94	-27.70	46.00	20.06	233	162	Vertical
6	845.3511	28.04	-16.96	46.00	17.96	289	186	Vertical



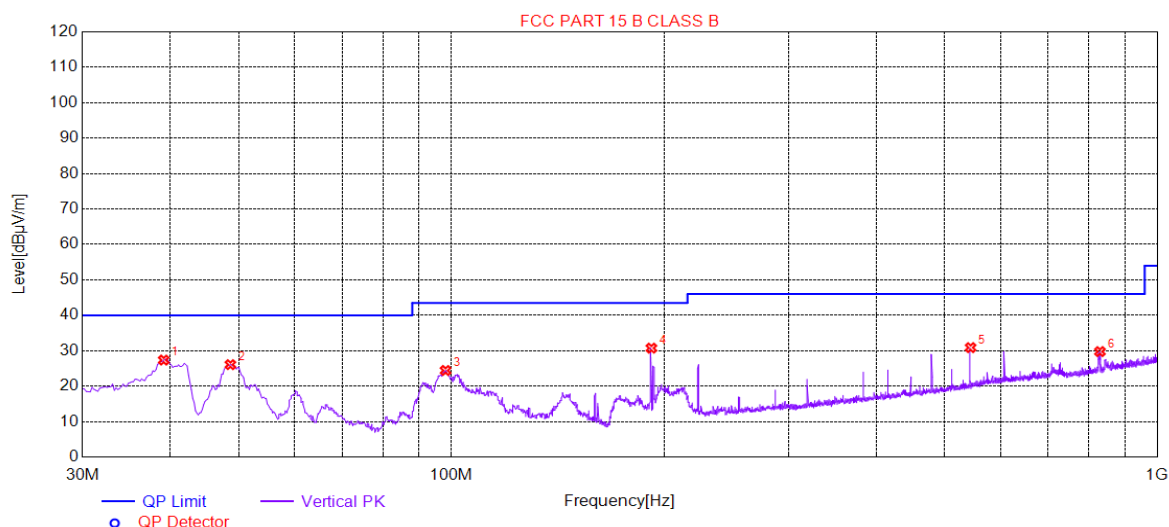
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Mode:b; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.1198	27.36	-28.63	40.00	12.64	269	200	Vertical
2	48.6277	26.07	-30.38	40.00	13.93	264	300	Vertical
3	98.1076	24.43	-32.34	43.50	19.07	239	89	Vertical
4	192.0224	30.73	-32.03	43.50	12.77	292	312	Vertical
5	544.0088	30.88	-22.19	46.00	15.12	230	177	Vertical
6	829.6339	29.76	-17.25	46.00	16.24	245	239	Vertical



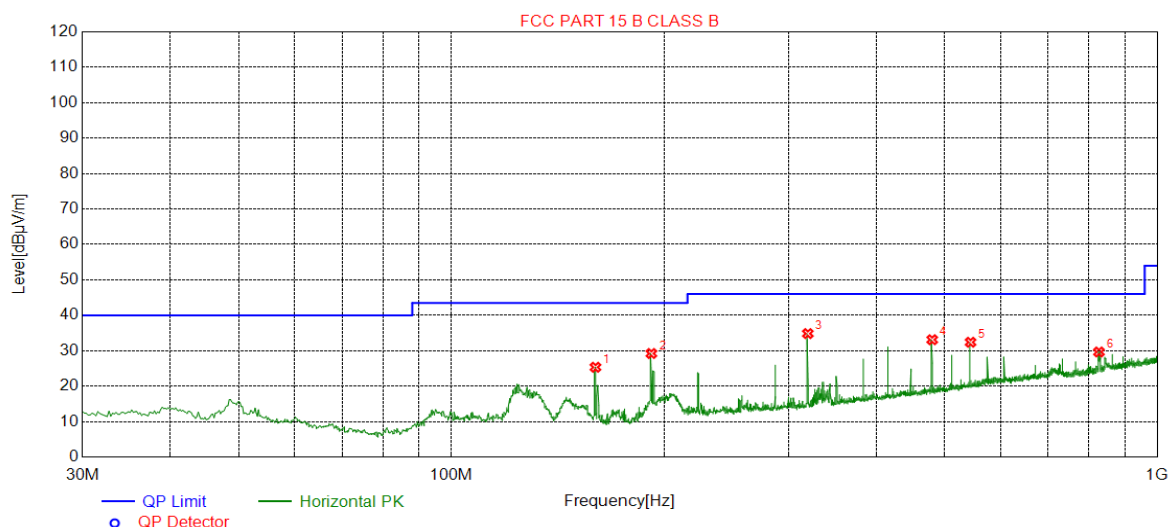
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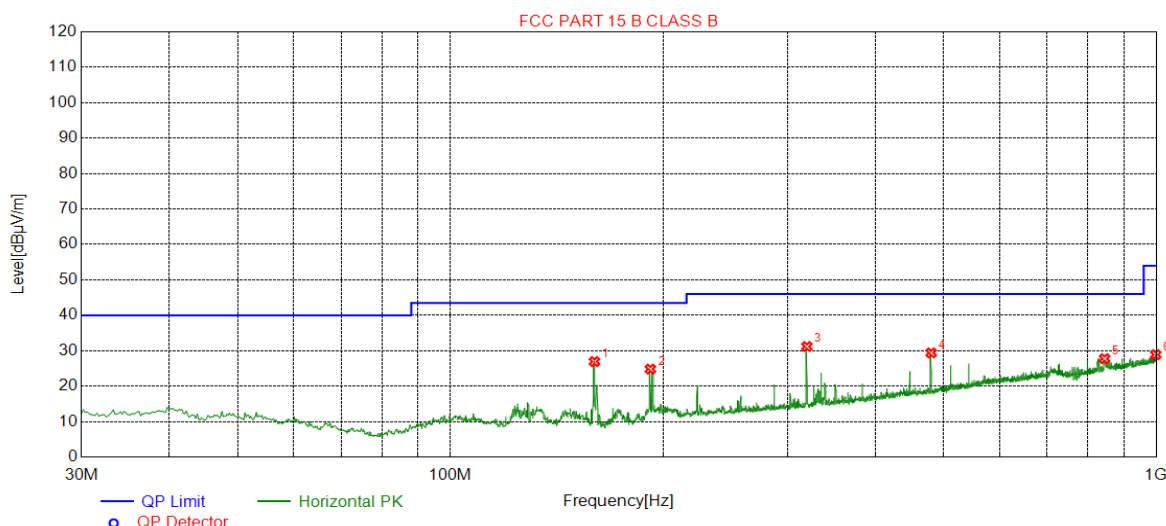
Mode:b; Polarization:Vertical



Suspected List

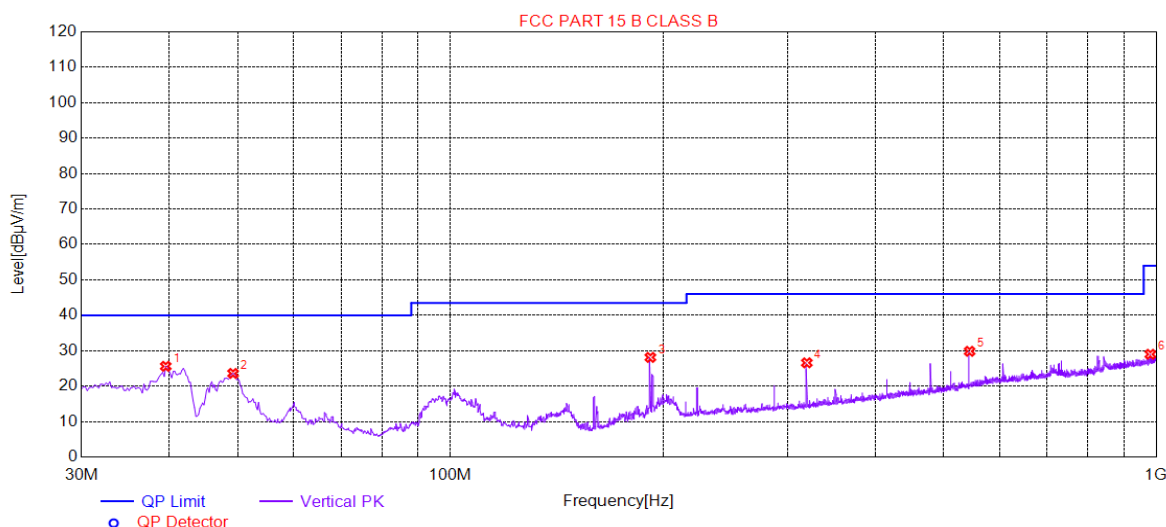
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	160.0060	25.34	-34.63	43.50	18.16	155	191	Horizontal
2	192.0224	29.22	-32.03	43.50	14.28	179	78	Horizontal
3	319.8940	34.84	-27.70	46.00	11.16	188	260	Horizontal
4	479.9760	33.11	-23.82	46.00	12.89	162	260	Horizontal
5	544.0088	32.40	-22.19	46.00	13.60	149	126	Horizontal
6	826.9174	29.65	-17.30	46.00	16.35	104	266	Horizontal

Mode:c; Polarization:Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	160.0060	26.94	-34.63	43.50	16.56	169	188	Horizontal
2	192.0224	24.81	-32.03	43.50	18.69	237	214	Horizontal
3	319.8940	31.19	-27.70	46.00	14.81	211	129	Horizontal
4	479.9760	29.39	-23.82	46.00	16.61	232	254	Horizontal
5	844.9630	27.77	-16.97	46.00	18.23	105	319	Horizontal
6	998.6417	28.89	-14.81	54.00	25.11	248	94	Horizontal

Mode:c; Polarization:Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.5079	25.61	-28.50	40.00	14.39	237	359	Vertical
2	49.2098	23.60	-30.37	40.00	16.40	171	205	Vertical
3	192.0224	28.12	-32.03	43.50	15.38	151	121	Vertical
4	319.8940	26.59	-27.70	46.00	19.41	168	336	Vertical
5	544.0088	29.84	-22.19	46.00	16.16	297	98	Vertical
6	980.9842	29.00	-15.05	54.00	25.00	167	299	Vertical



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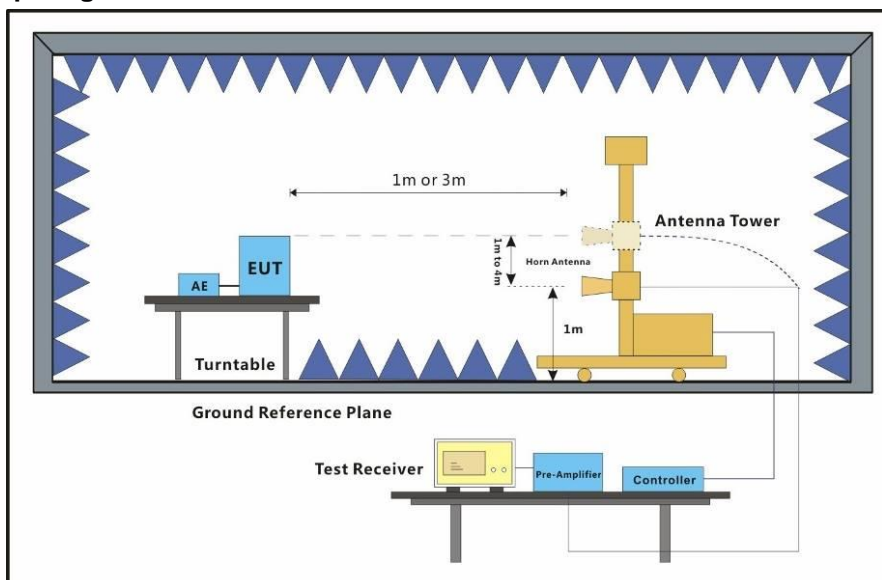
6.3 Radiated Emissions (above 1GHz)

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

6.3.1 E.U.T. Operation

Operating Environment:
Temperature: 23.3 °C Humidity: 56.2 % RH Atmospheric Pressure: 1005 mbar
The worst case for final test:
a: Adapter Charging
b: PC Charging
c: PLAY MUSIC

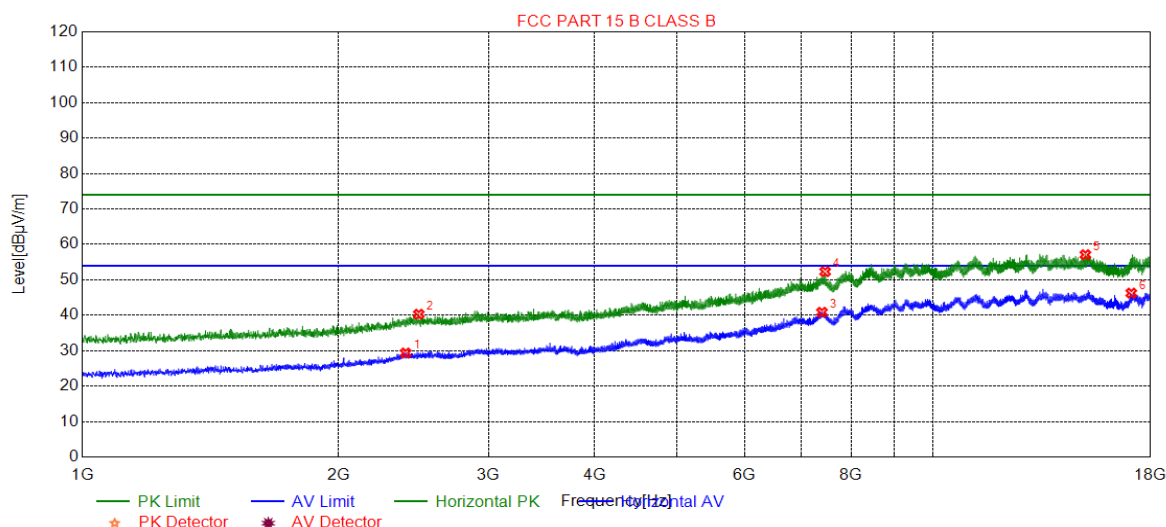
6.3.2 Test Setup Diagram



6.3.3 Measurement Data

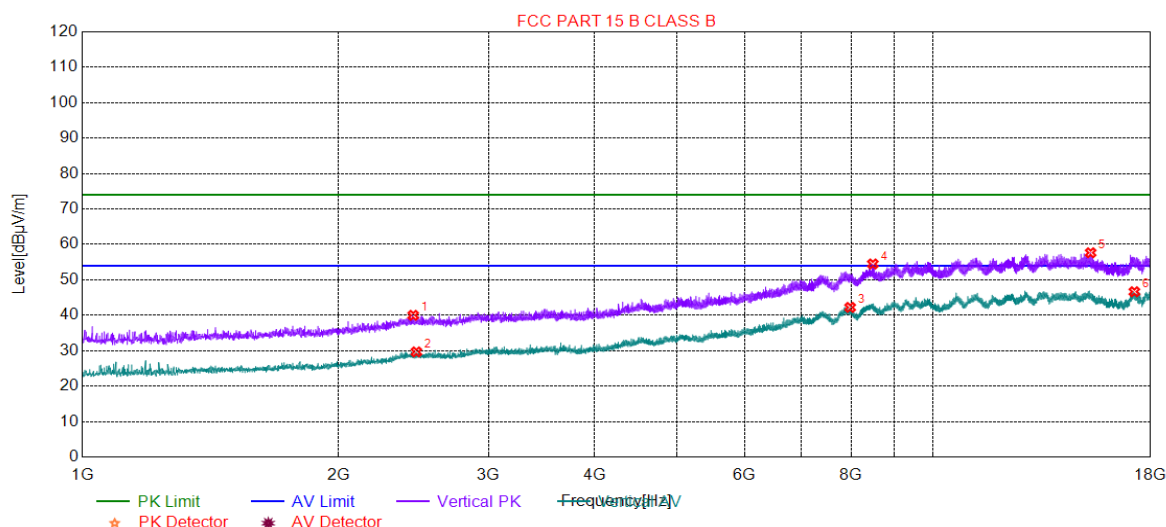
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2398.3199	29.36	-24.57	54.00	24.64	206	69	Horizontal
2	2485.0243	40.31	-24.45	74.00	33.69	102	119	Horizontal
3	7397.4199	40.85	-6.76	54.00	13.15	156	191	Horizontal
4	7461.1731	52.31	-6.94	74.00	21.69	182	292	Horizontal
5	15087.754	57.09	2.08	74.00	16.91	199	360	Horizontal
6	17083.654	46.26	-0.28	54.00	7.74	220	241	Horizontal

Mode:a; Polarization:Vertical



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2447.6224	39.99	-24.49	74.00	34.01	252	342	Vertical
2	2468.8734	29.67	-24.47	54.00	24.33	258	291	Vertical
3	7983.0992	42.23	-5.25	54.00	11.77	168	0	Vertical
4	8488.8744	54.49	-4.11	74.00	19.51	265	240	Vertical
5	15303.665	57.65	2.63	74.00	16.35	169	190	Vertical
6	17225.611	46.65	-0.40	54.00	7.35	254	69	Vertical



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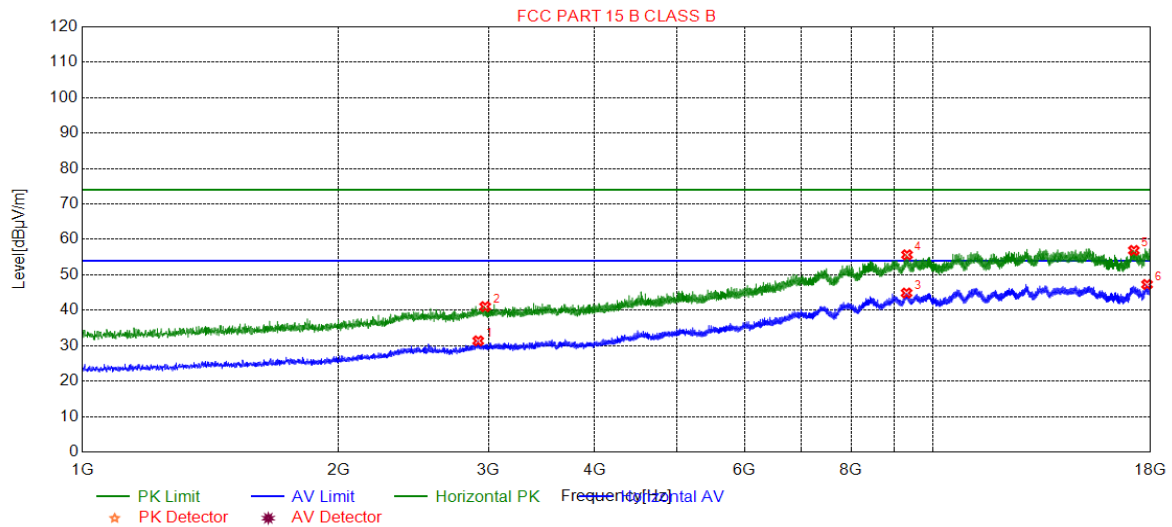
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Mode:b; Polarization:Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.5459	31.38	-22.83	54.00	22.62	238	69	Horizontal
2	2973.7987	41.04	-22.87	74.00	32.96	154	360	Horizontal
3	9300.6650	44.88	-1.46	54.00	9.12	160	139	Horizontal
4	9311.7156	55.66	-1.54	74.00	18.34	243	0	Horizontal
5	17200.960	56.90	-0.26	74.00	17.10	109	69	Horizontal
6	17827.441	47.29	-0.54	54.00	6.71	200	38	Horizontal

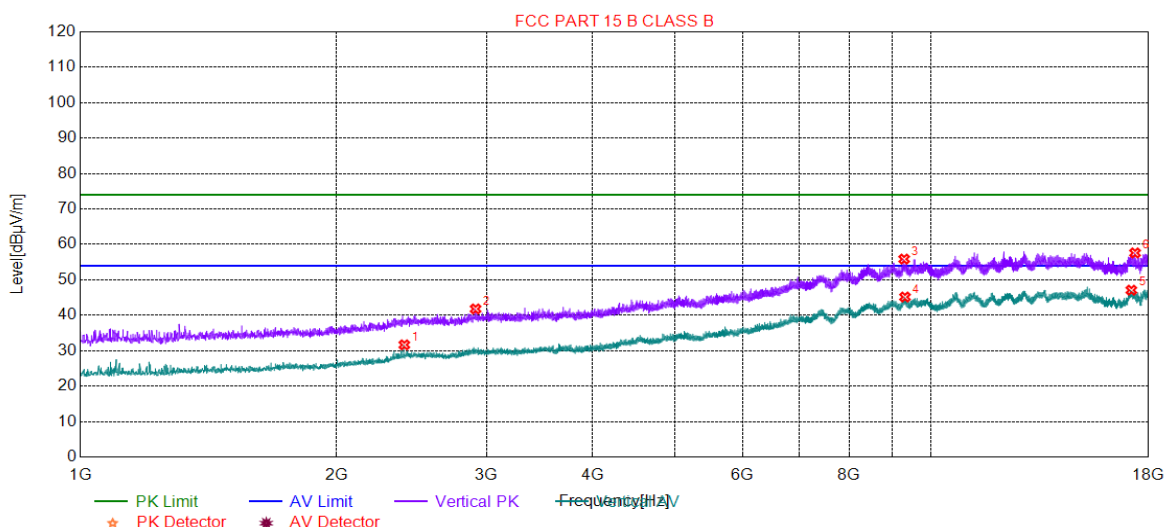


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Mode:b; Polarization:Vertical

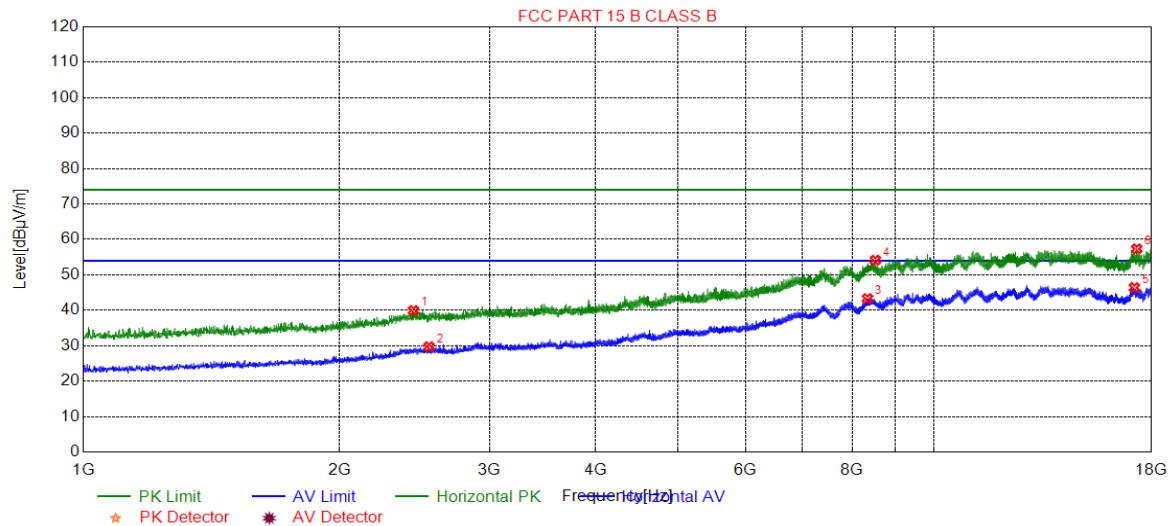


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2402.5701	31.66	-24.55	54.00	22.34	285	0	Vertical
2	2913.4457	41.80	-22.83	74.00	32.20	222	190	Vertical
3	9289.6145	55.86	-1.56	74.00	18.14	238	291	Vertical
4	9310.8655	45.16	-1.53	54.00	8.84	150	119	Vertical
5	17178.008	47.09	-0.25	54.00	6.91	256	291	Vertical
6	17351.417	57.60	-0.80	74.00	16.40	211	291	Vertical



Mode:c; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2442.5221	39.95	-24.50	74.00	34.05	236	271	Horizontal
2	2547.9274	29.74	-24.22	54.00	24.26	108	170	Horizontal
3	8344.3672	43.30	-4.64	54.00	10.70	158	221	Horizontal
4	8524.5762	54.13	-4.10	74.00	19.87	189	342	Horizontal
5	17180.5590	46.42	-0.25	54.00	7.58	122	170	Horizontal
6	17291.0646	57.34	-0.80	74.00	16.66	105	360	Horizontal

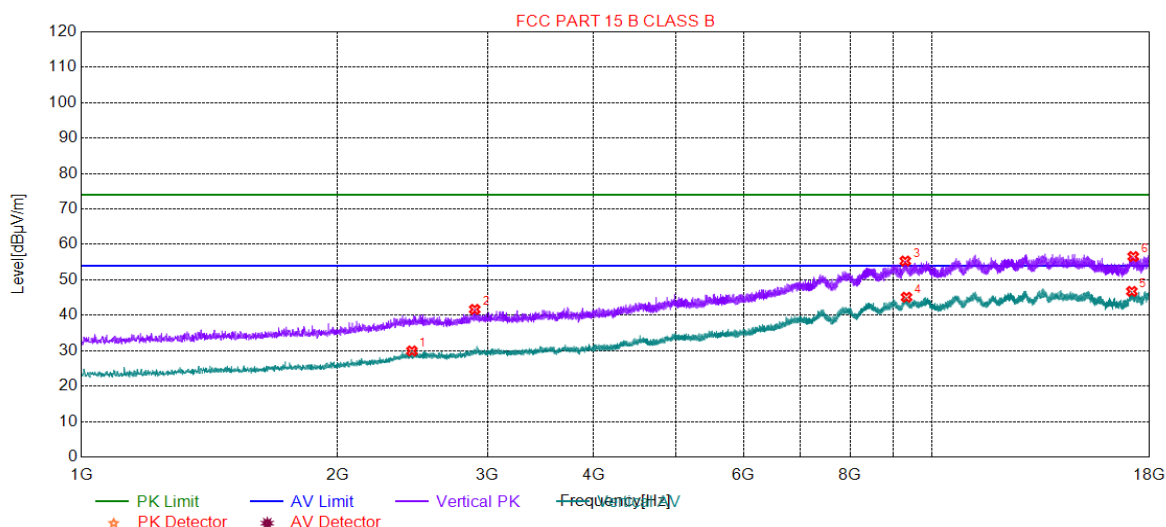


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Mode:c; Polarization:Vertical



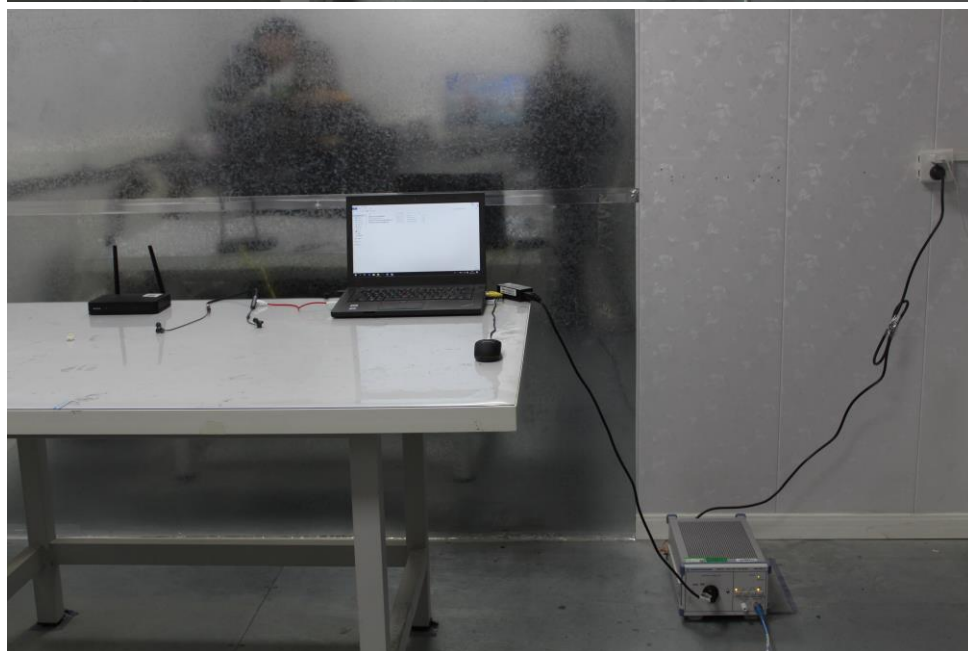
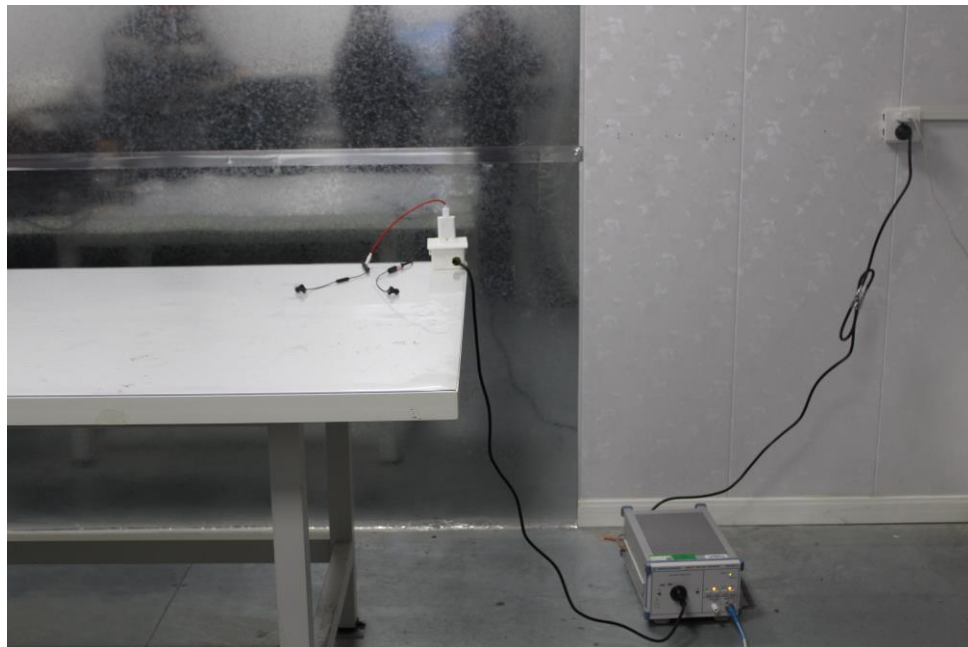
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2445.9223	29.94	-24.49	54.00	24.06	258	140	Vertical
2	2898.9950	41.67	-22.83	74.00	32.33	291	360	Vertical
3	9293.0147	55.32	-1.53	74.00	18.68	170	0	Vertical
4	9323.6162	45.10	-1.63	54.00	8.90	158	270	Vertical
5	17154.2077	46.75	-0.24	54.00	7.25	166	18	Vertical
6	17219.6610	56.58	-0.37	74.00	17.42	244	190	Vertical

7 Photographs

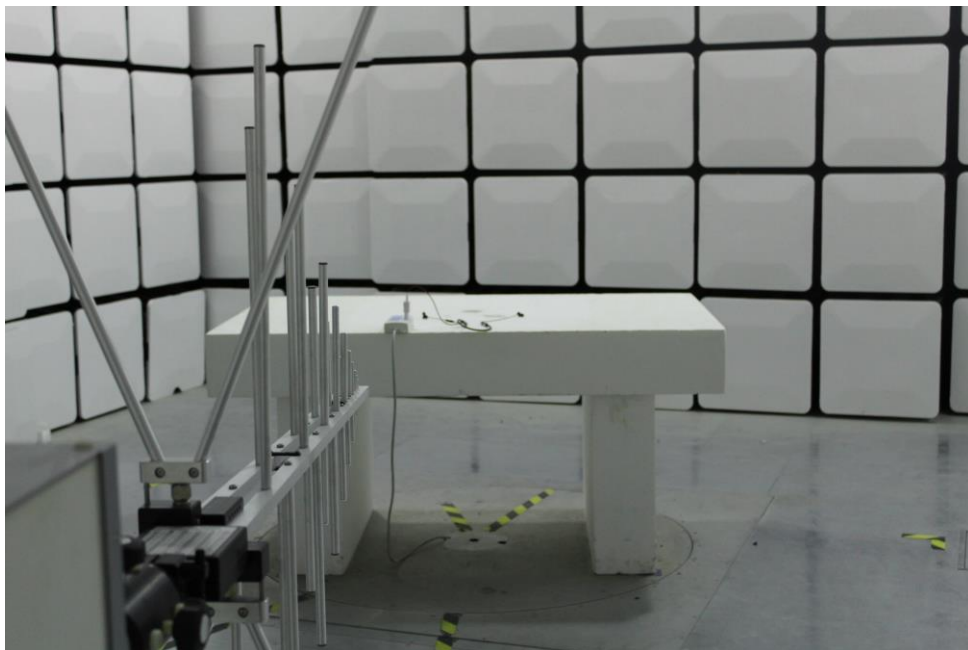
7.1 Conducted Emissions at Mains Terminals (150kHz-30MHz) Test Setup

(Test Location: SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.)



7.2 Radiated Emissions (30MHz-1GHz) Test Setup

(Test Location: SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.)



- End of the Report -