

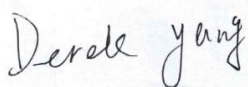
TEST REPORT

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: 2019/12/31

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

Authorized for issue by:				
		 (Mike Hu) /Project Engineer	2019/12/31	Date
		 (David Chen) /Reviewer	2019/12/31	Date

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

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	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.5dB (30MHz-1GHz)
		± 4.8dB (1GHz-6GHz)
3	Temperature test	± 1°C
4	Humidity test	± 3%

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2017-05-10	2020-05-09
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019-07-12	2020-07-11
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019-09-25	2020-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2019-04-02	2020-04-01
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019-04-02	2020-04-01

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2019-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2019-07-12	2020-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019-04-02	2020-04-01
Trilog-Broadband Antenna(30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2020-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2019-04-13	2020-04-12

Radiated Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-12	2020-07-11
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-09	2019-04-13	2020-04-12
Horn Antenna(1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2019-04-13	2021-04-12
Pre-Amplifier(0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-27	2020-09-26





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Shenzhen Branch**

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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-27	2020-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-27	2020-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-27	2020-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-08	2020-04-07



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6 Emission Test Results

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

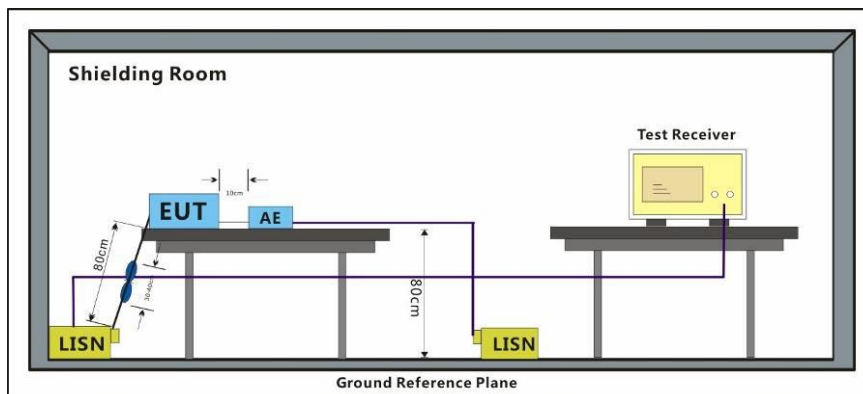
Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan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

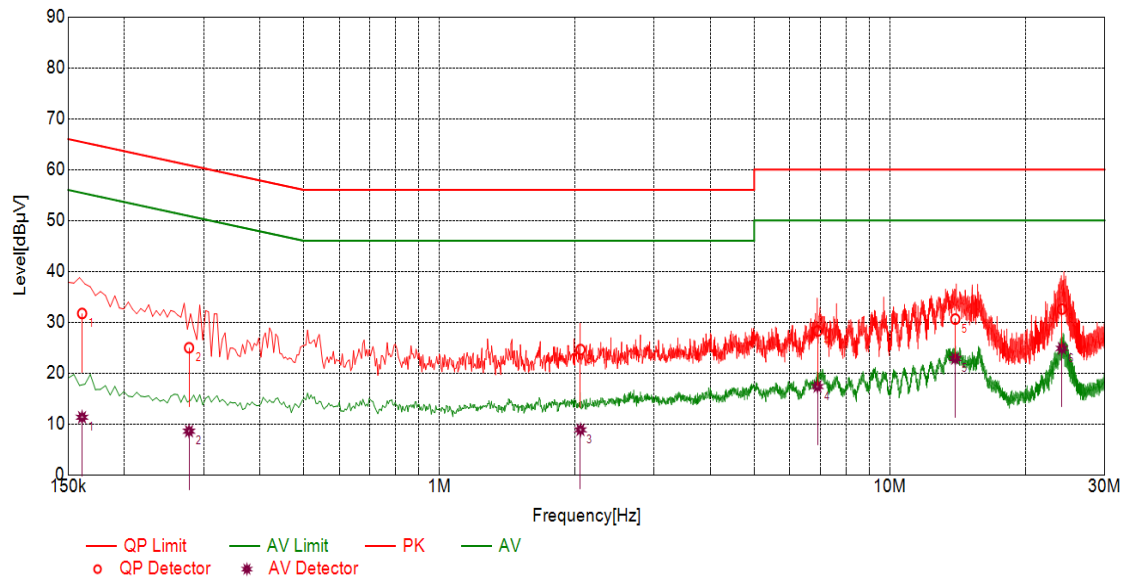


6.1.3 Measurement Data

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

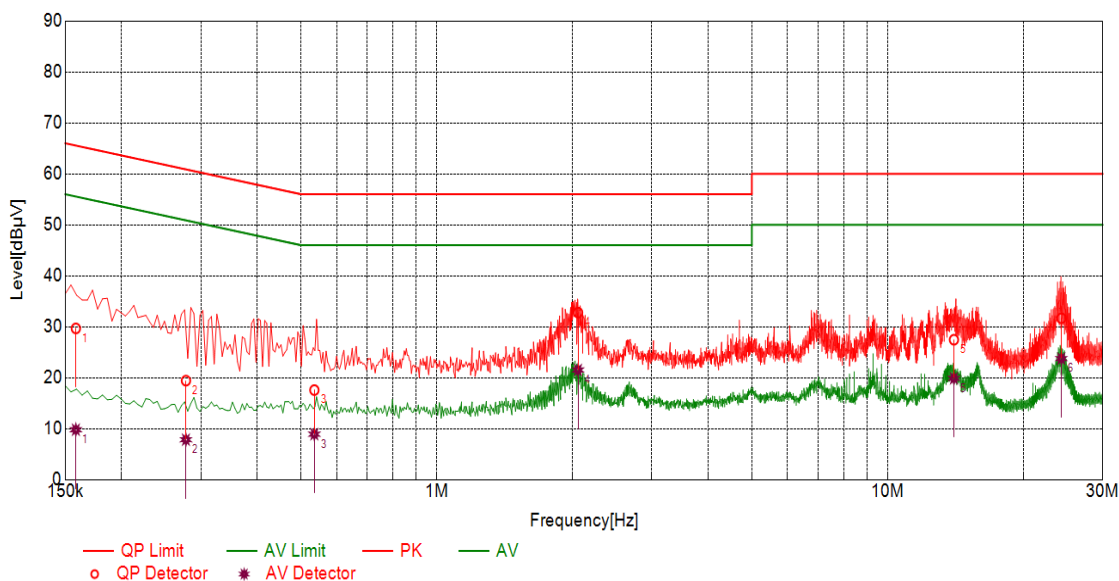


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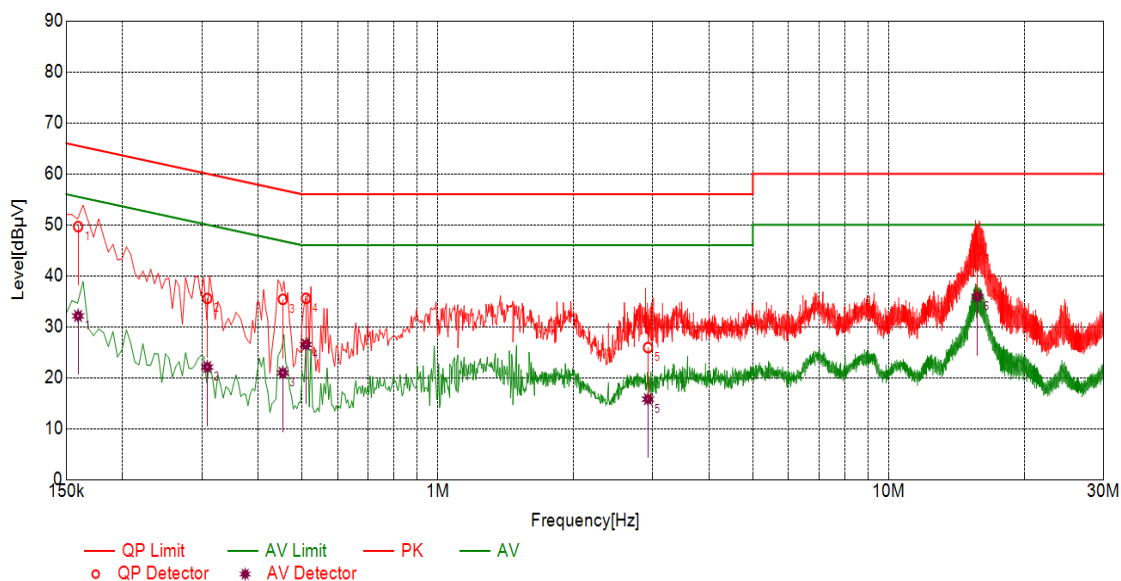
Mode:a; Line:Neutral Line



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

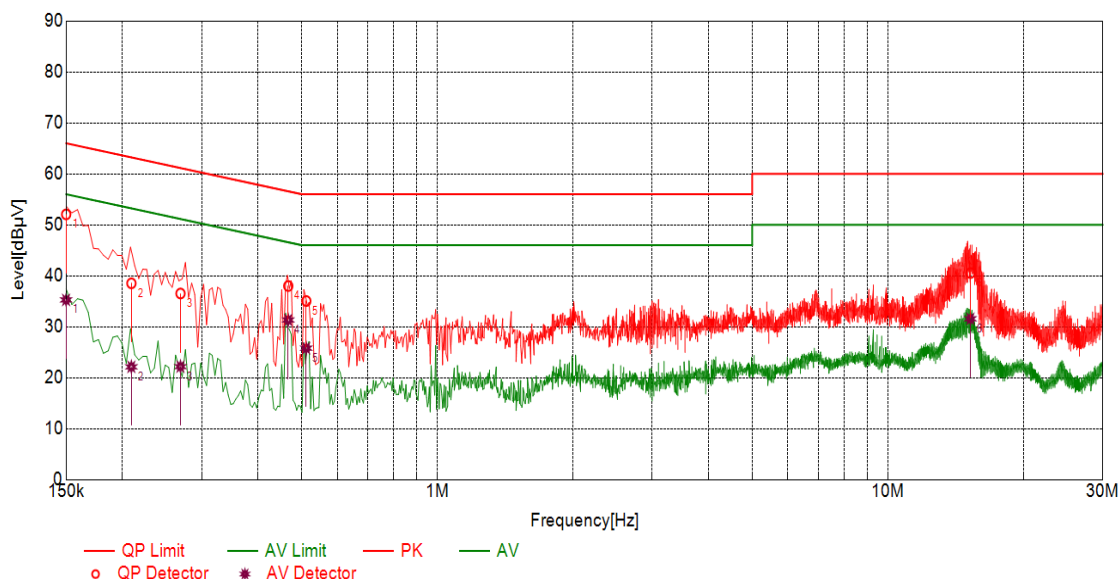
Mode:b; Line:Live Line



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

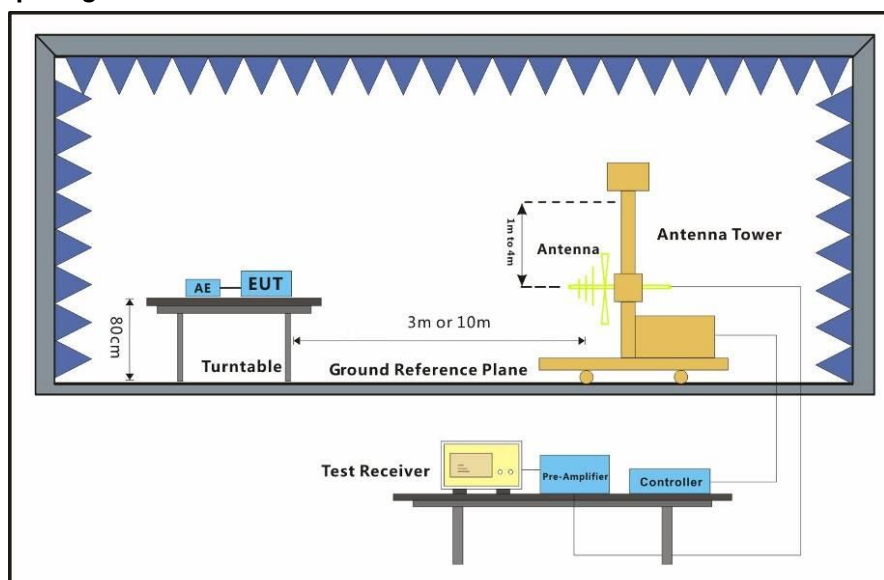
6.2 Radiated Emissions (30MHz-1GHz)

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

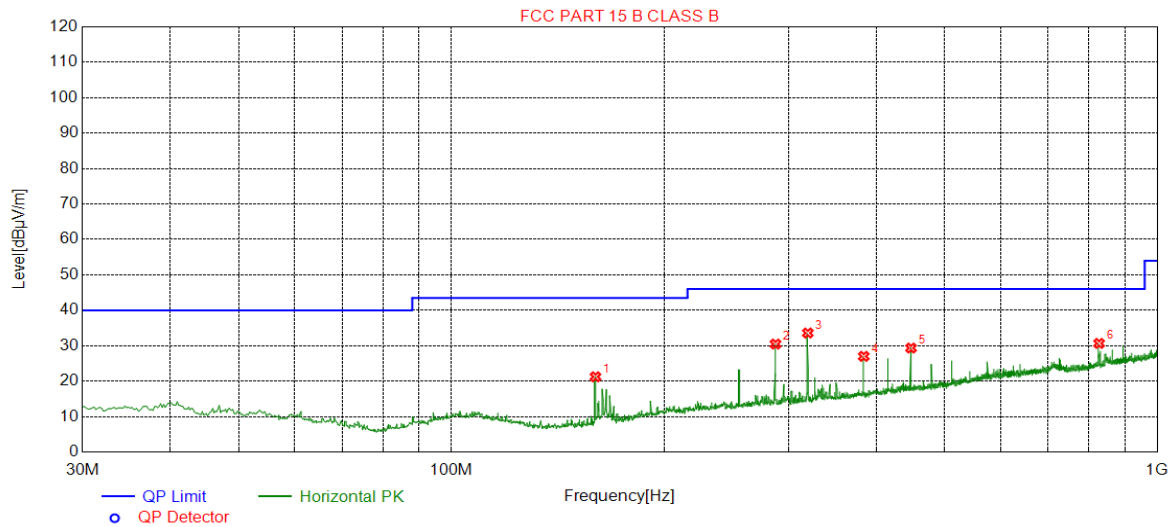


6.2.3 Measurement Data

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	200	156	Horizontal
2	287.8776	30.47	-28.72	46.00	15.53	100	219	Horizontal
3	319.8940	33.59	-27.70	46.00	12.41	100	272	Horizontal
4	383.9268	27.00	-25.95	46.00	19.00	100	234	Horizontal
5	447.9596	29.35	-24.41	46.00	16.65	100	325	Horizontal
6	827.3055	30.66	-17.29	46.00	15.34	100	40	Horizontal



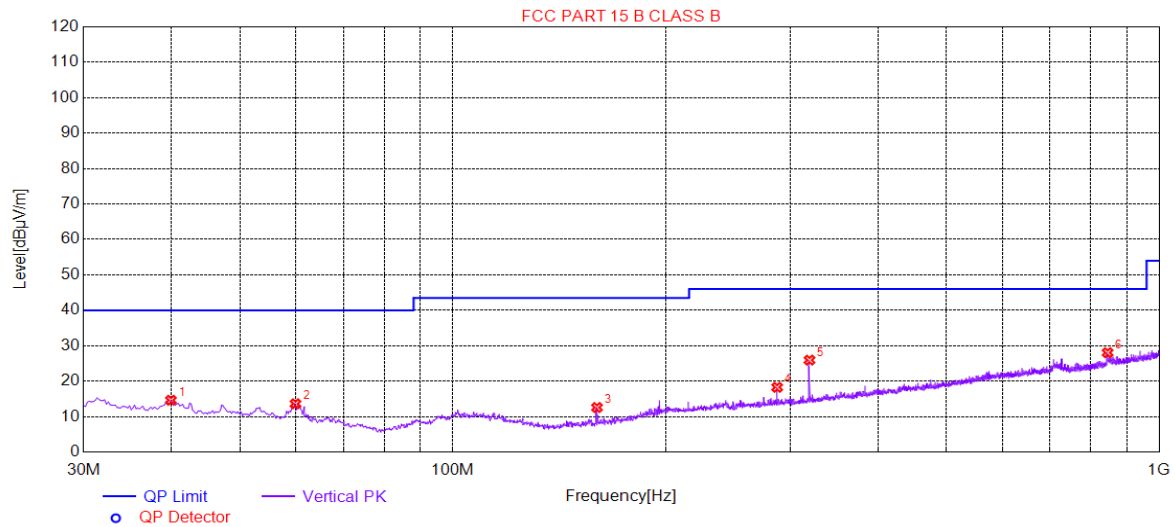
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Mode:a; Polarization:Vertical



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	200	109	Vertical
2	59.8820	13.62	-31.84	40.00	26.38	100	112	Vertical
3	160.0060	12.57	-34.63	43.50	30.93	200	59	Vertical
4	287.8776	18.27	-28.72	46.00	27.73	100	14	Vertical
5	319.8940	25.94	-27.70	46.00	20.06	100	162	Vertical
6	845.3511	28.04	-16.96	46.00	17.96	100	186	Vertical



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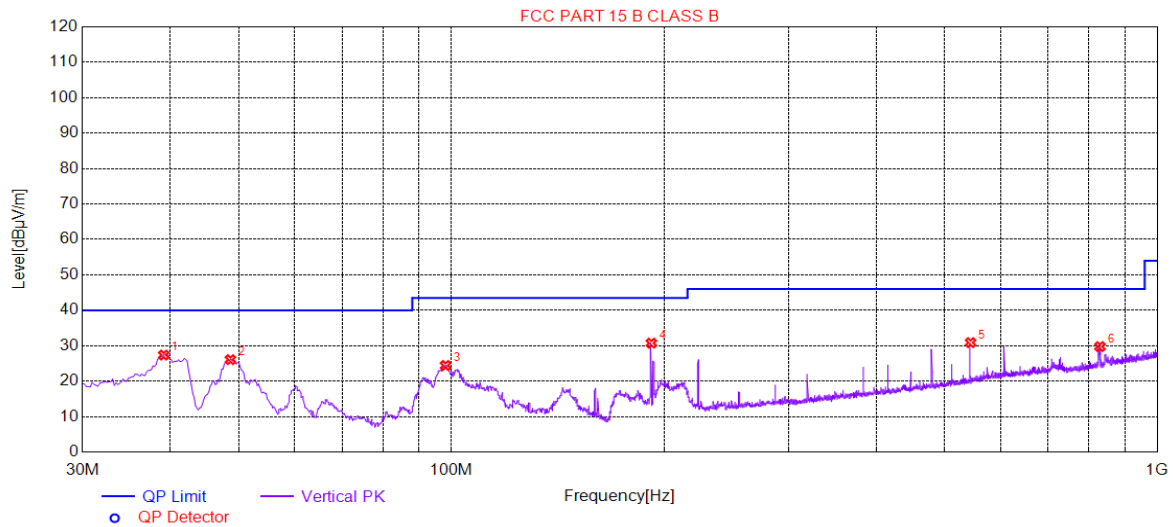
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Mode:b; Polarization:Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.1198	27.36	-28.63	40.00	12.64	100	200	Vertical
2	48.6277	26.07	-30.38	40.00	13.93	100	300	Vertical
3	98.1076	24.43	-32.34	43.50	19.07	100	89	Vertical
4	192.0224	30.73	-32.03	43.50	12.77	100	312	Vertical
5	544.0088	30.88	-22.19	46.00	15.12	200	177	Vertical
6	829.6339	29.76	-17.25	46.00	16.24	100	239	Vertical



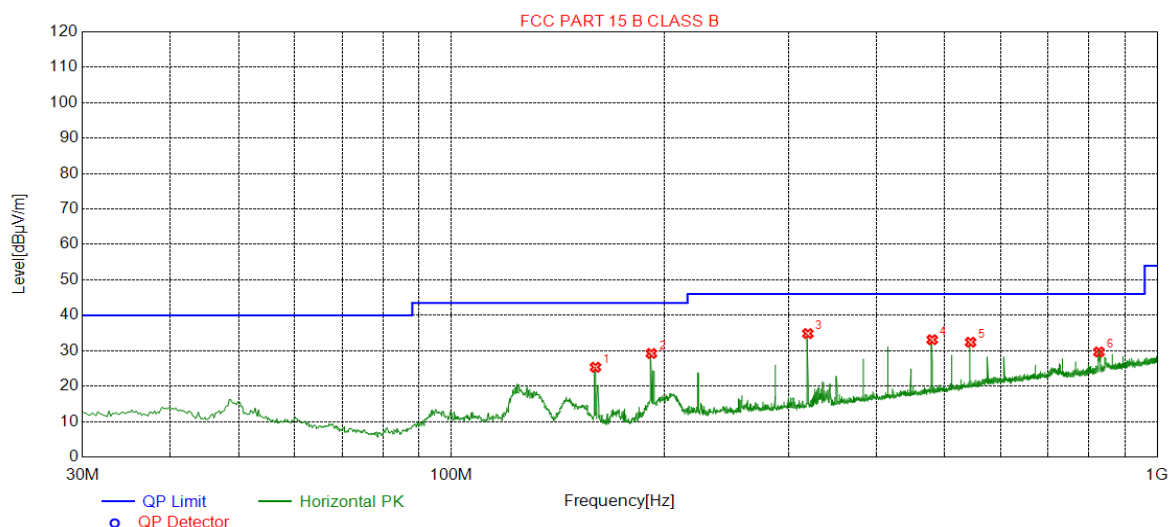
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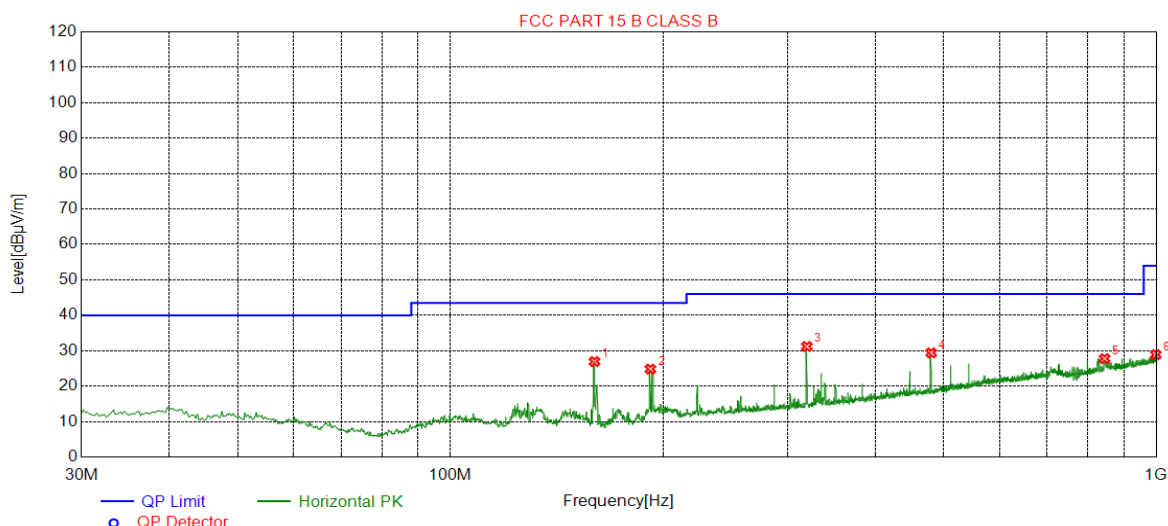
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Mode:b; Polarization:Vertical



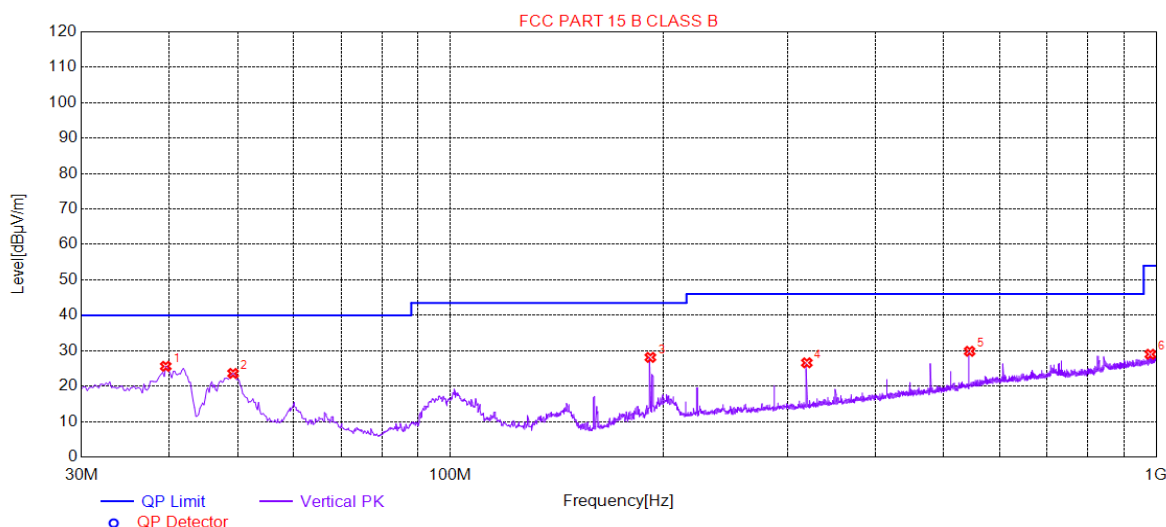
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	160.0060	25.34	-34.63	43.50	18.16	100	191	Horizontal
2	192.0224	29.22	-32.03	43.50	14.28	100	78	Horizontal
3	319.8940	34.84	-27.70	46.00	11.16	100	260	Horizontal
4	479.9760	33.11	-23.82	46.00	12.89	200	260	Horizontal
5	544.0088	32.40	-22.19	46.00	13.60	200	126	Horizontal
6	826.9174	29.65	-17.30	46.00	16.35	200	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	200	188	Horizontal
2	192.0224	24.81	-32.03	43.50	18.69	100	214	Horizontal
3	319.8940	31.19	-27.70	46.00	14.81	100	129	Horizontal
4	479.9760	29.39	-23.82	46.00	16.61	100	254	Horizontal
5	844.9630	27.77	-16.97	46.00	18.23	100	319	Horizontal
6	998.6417	28.89	-14.81	54.00	25.11	100	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	100	359	Vertical
2	49.2098	23.60	-30.37	40.00	16.40	100	205	Vertical
3	192.0224	28.12	-32.03	43.50	15.38	200	121	Vertical
4	319.8940	26.59	-27.70	46.00	19.41	100	336	Vertical
5	544.0088	29.84	-22.19	46.00	16.16	100	98	Vertical
6	980.9842	29.00	-15.05	54.00	25.00	200	299	Vertical



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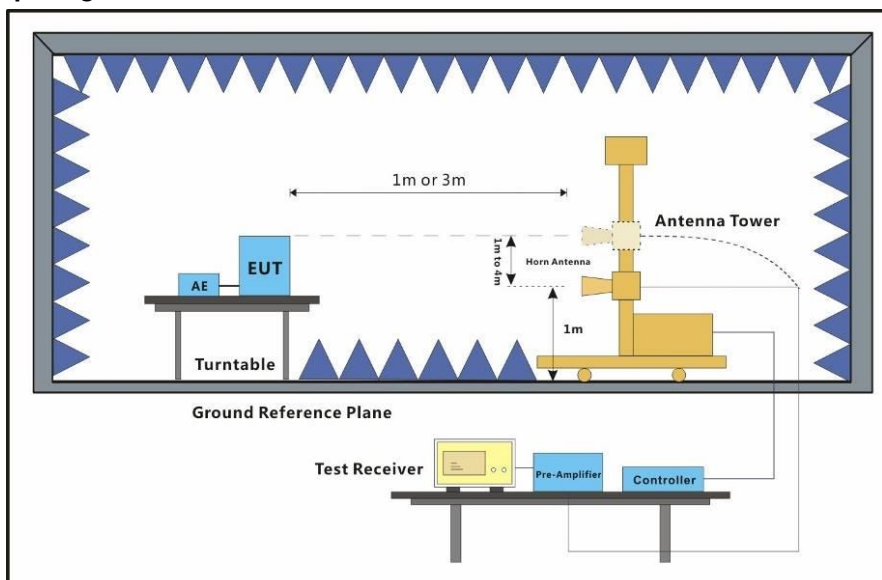
6.3 Radiated Emissions (above 1GHz)

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

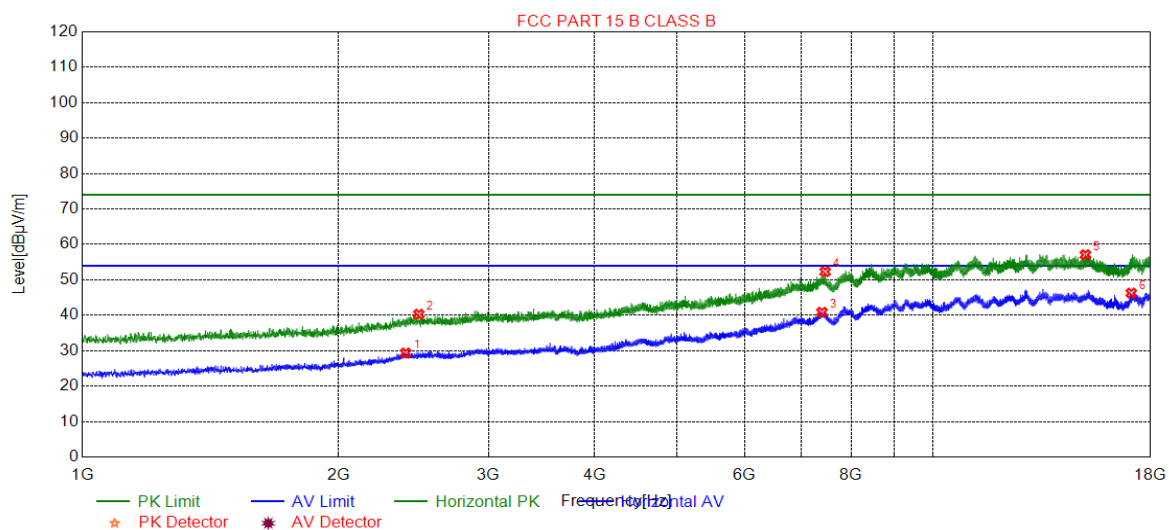
6.3.2 Test Setup Diagram



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

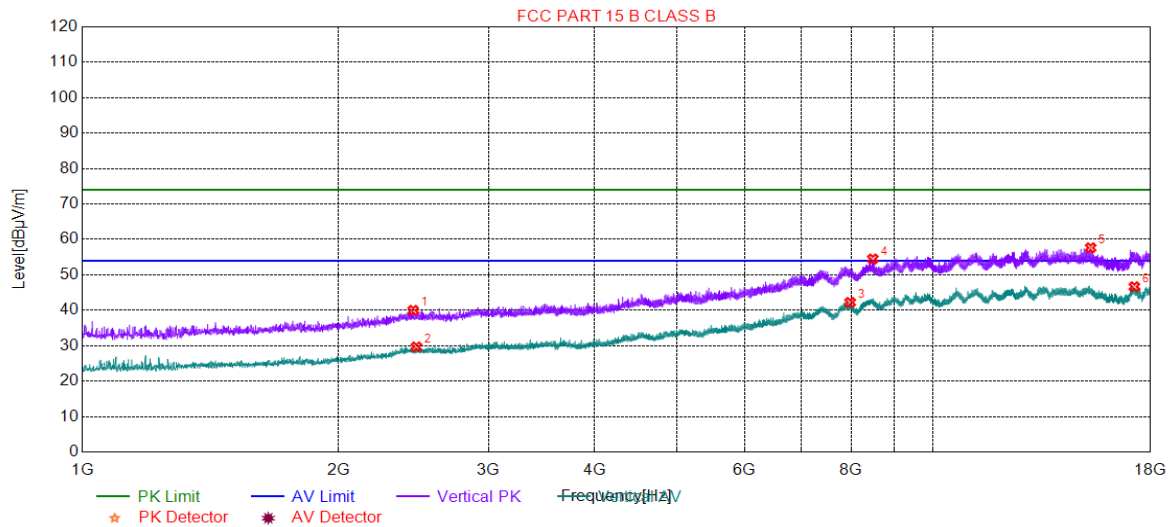


Suspected List

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	100	69	Horizontal
2	2485.0243	40.31	-24.45	74.00	33.69	100	119	Horizontal
3	7397.4199	40.85	-6.76	54.00	13.15	200	191	Horizontal
4	7461.1731	52.31	-6.94	74.00	21.69	200	292	Horizontal
5	15087.754	57.09	2.08	74.00	16.91	100	360	Horizontal
6	17083.654	46.26	-0.28	54.00	7.74	200	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	200	342	Vertical
2	2468.8734	29.67	-24.47	54.00	24.33	200	291	Vertical
3	7983.0992	42.23	-5.25	54.00	11.77	200	0	Vertical
4	8488.8744	54.49	-4.11	74.00	19.51	200	240	Vertical
5	15303.665	57.65	2.63	74.00	16.35	200	190	Vertical
6	17225.611	46.65	-0.40	54.00	7.35	100	69	Vertical



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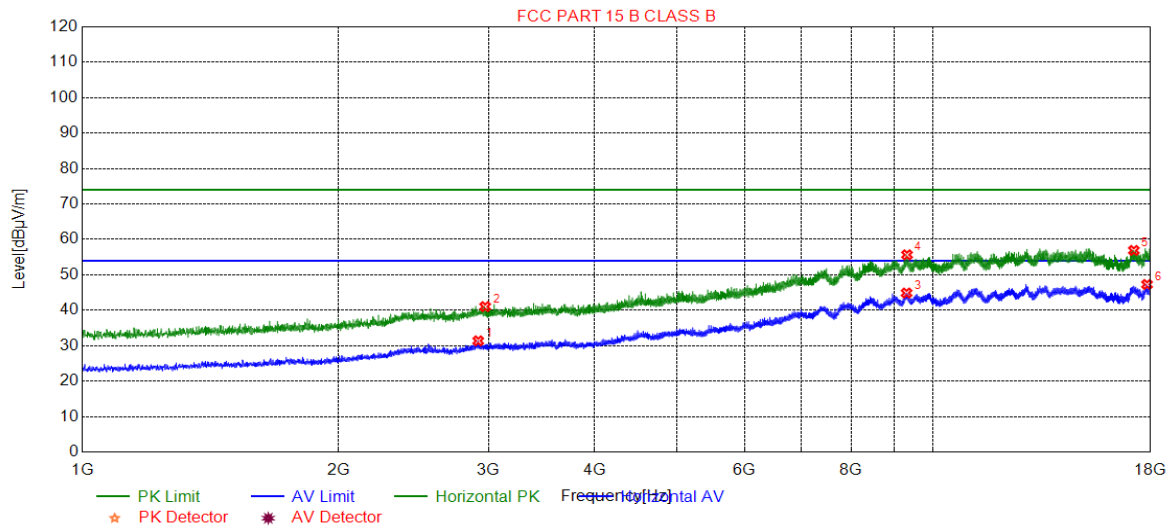
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Mode:b; Polarization:Horizontal



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	100	69	Horizontal
2	2973.7987	41.04	-22.87	74.00	32.96	100	360	Horizontal
3	9300.6650	44.88	-1.46	54.00	9.12	200	139	Horizontal
4	9311.7156	55.66	-1.54	74.00	18.34	200	0	Horizontal
5	17200.960	56.90	-0.26	74.00	17.10	100	69	Horizontal
6	17827.441	47.29	-0.54	54.00	6.71	200	38	Horizontal



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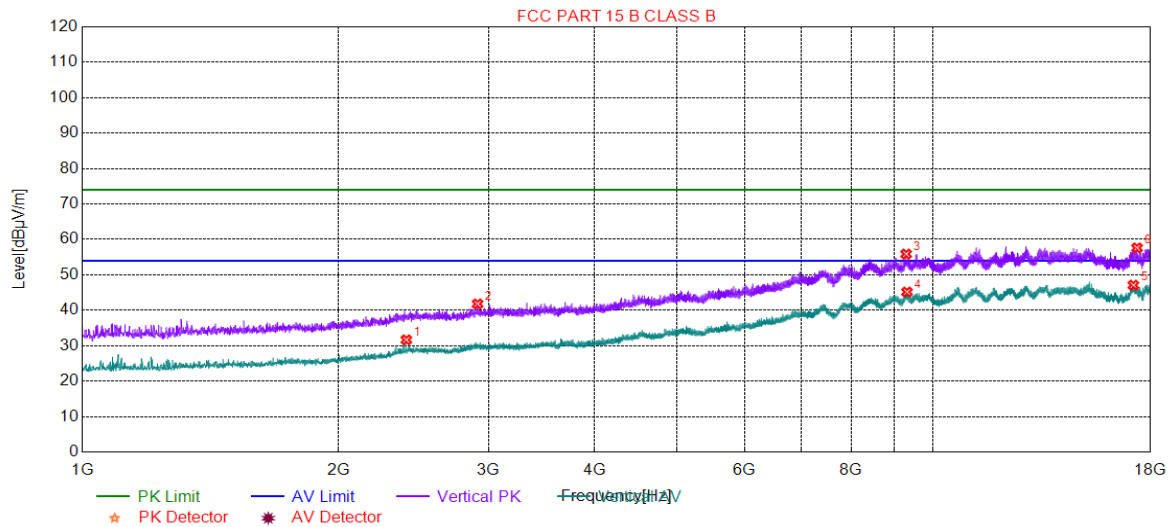
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Mode:b; Polarization:Vertical



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	200	0	Vertical
2	2913.4457	41.80	-22.83	74.00	32.20	200	190	Vertical
3	9289.6145	55.86	-1.56	74.00	18.14	200	291	Vertical
4	9310.8655	45.16	-1.53	54.00	8.84	100	119	Vertical
5	17178.008	47.09	-0.25	54.00	6.91	200	291	Vertical
6	17351.417	57.60	-0.80	74.00	16.40	200	291	Vertical



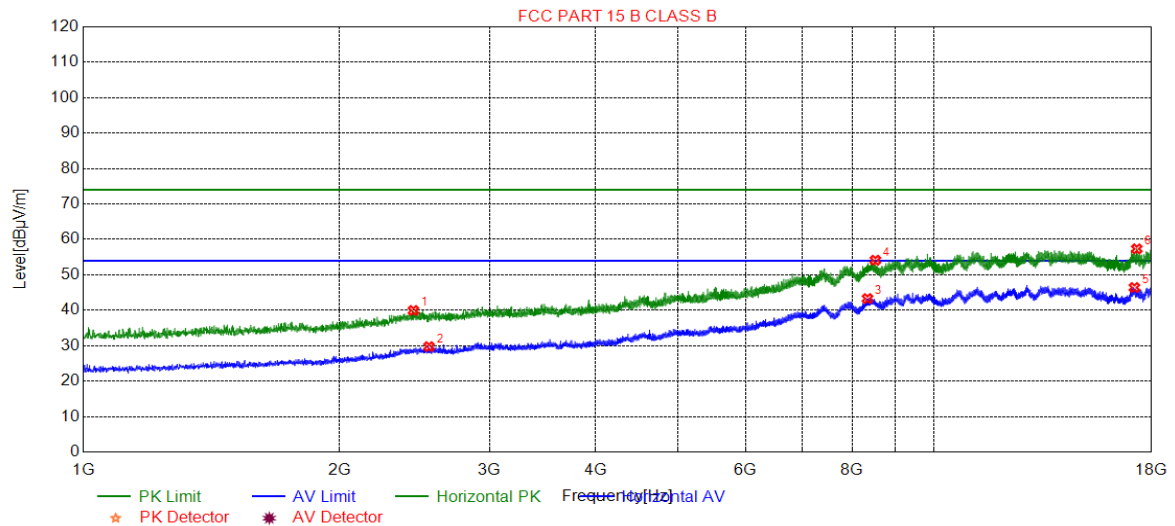
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Mode:c; Polarization:Horizontal



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	200	271	Horizontal
2	2547.9274	29.74	-24.22	54.00	24.26	200	170	Horizontal
3	8344.3672	43.30	-4.64	54.00	10.70	200	221	Horizontal
4	8524.5762	54.13	-4.10	74.00	19.87	100	342	Horizontal
5	17180.5590	46.42	-0.25	54.00	7.58	200	170	Horizontal
6	17291.0646	57.34	-0.80	74.00	16.66	200	360	Horizontal

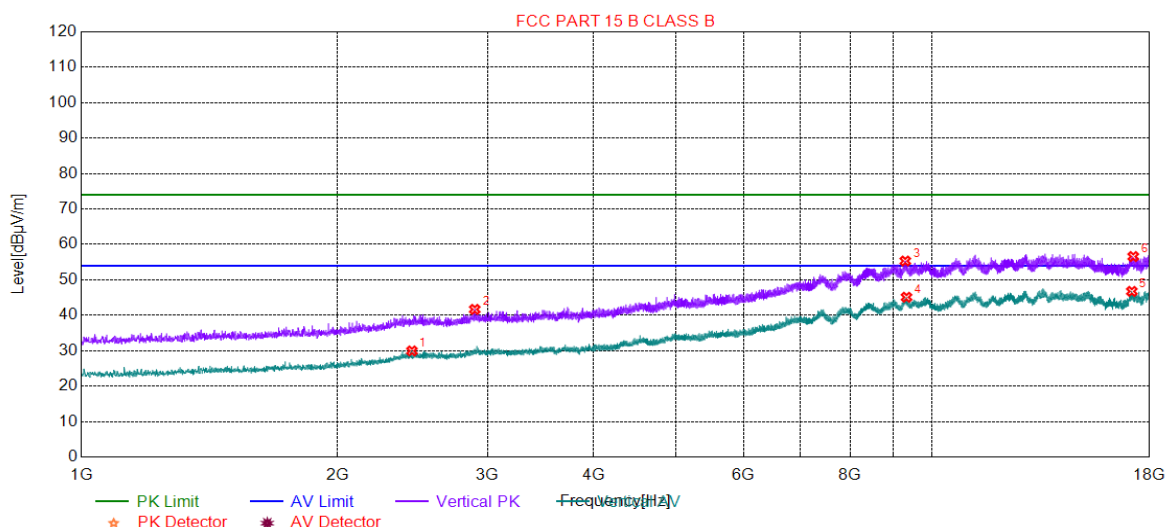


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Mode:c; Polarization:Vertical



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	100	140	Vertical
2	2898.9950	41.67	-22.83	74.00	32.33	200	360	Vertical
3	9293.0147	55.32	-1.53	74.00	18.68	100	0	Vertical
4	9323.6162	45.10	-1.63	54.00	8.90	200	270	Vertical
5	17154.2077	46.75	-0.24	54.00	7.25	200	18	Vertical
6	17219.6610	56.58	-0.37	74.00	17.42	100	190	Vertical