China

FCC - TEST REPORT

Report Number	:	**7088818110929-00**	Date of Issue:	January 9, 2019
Model	:	Z3000		
Product Type	:	AIR PURIFIER		
FCC ID	:	GV3-18Z3000		
Applicant	:	ACCO Brands, Inc.		
Address	:	1500 Fashion Island Blvd., 3rd Floor, San Mateo, CA 94404 California, United States		
Manufacture	:	ACCO Brands, Inc.		
Address	:	1500 Fashion Island Blvd., 3rd Floor, San Mateo, CA 94404 California, United States		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	23		

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
Test Firm Registration Number:	820234
Telephone:	+86 21 6141 0123
Fax:	+86 21 6140 8600

Test Site 2

Company name:	MRT Technology (Suzhou) Co., Ltd. D8 Building, Youxin Industrial Park, No. 2 Tina'ed Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
IC Registration No.:	11384A-1
Telephone:	+86-512-66308358
Fax:	+86-512-66308368

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3 Description of the Equipment Under Test

Product:	AIR PURIFIER
Model no.:	Z3000
FCC ID:	GV3-18Z3000
Input Rated Voltage:	120V~, 60Hz
RF Transmission Frequency:	2462MHz
No. of Operated Channel:	1
Channel Bandwidth:	1MHz
Modulation:	GFSK
Antenna Type:	Integral Antenna
Antenna Gain:	2.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is an AIR PURIFIER.

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
§15.07(a) Conduction Emissions	10	Site 2	☒	☐	☐
§15.205(a), §15.209(a), §15.249(a), §15.249(c) Field strength of emissions and Restricted bands	13	Site 2	☒	☐	☐
FCC §15.215(c) 20dB bandwidth	20	Site 2	☒	☐	☐
§15.249(d) Out of band emissions	22	Site 2	☒	☐	☐
§15.203 Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.
Note 1: §15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
E.U.T Antenna: The EUT antenna is an integrated PCB antenna, the best-case gain of the antenna is 2.0 dBi.
The antenna of the **AIR PURIFIER**, is permanently attached.
There are no provisions for connection to an external antenna.

Conclusion: The EUT unit complies with the requirement of §15.203.

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6 General Remarks

Remarks
This submittal(s) (test report) is intended for FCC ID: GV3-18Z3000 complies with Section 15.203, 15.207, 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: November 20, 2018

Testing Start Date: November 21, 2018

Testing End Date: January 5, 2019

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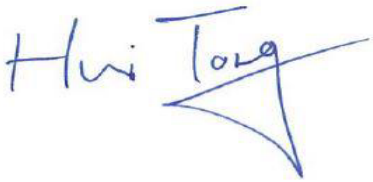
Reviewed by:



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Review Engineer

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Project Engineer

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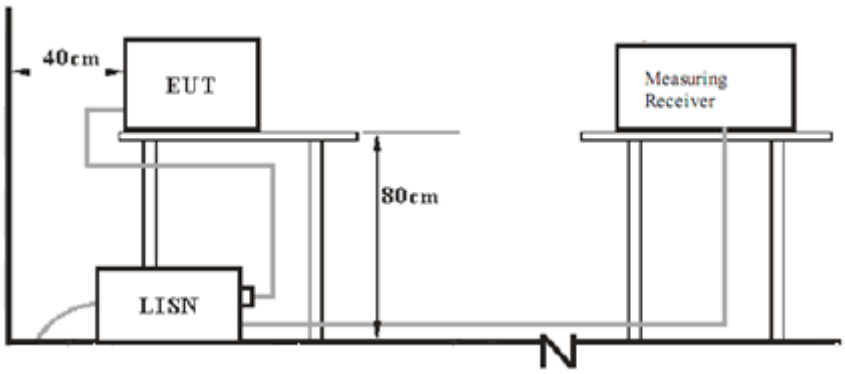
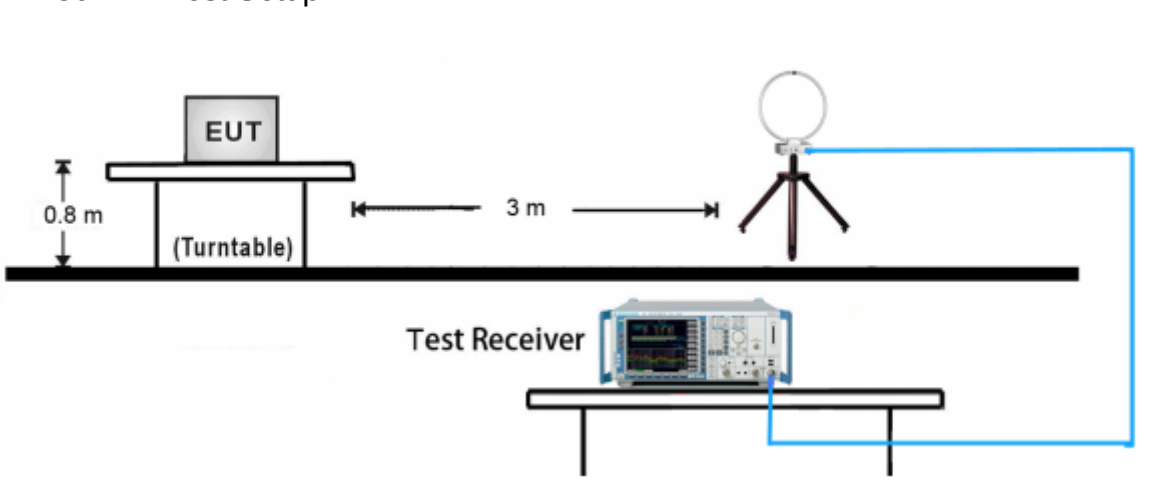
7 Test setups

7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups

9kHz ~ 30MHz Test Setup:



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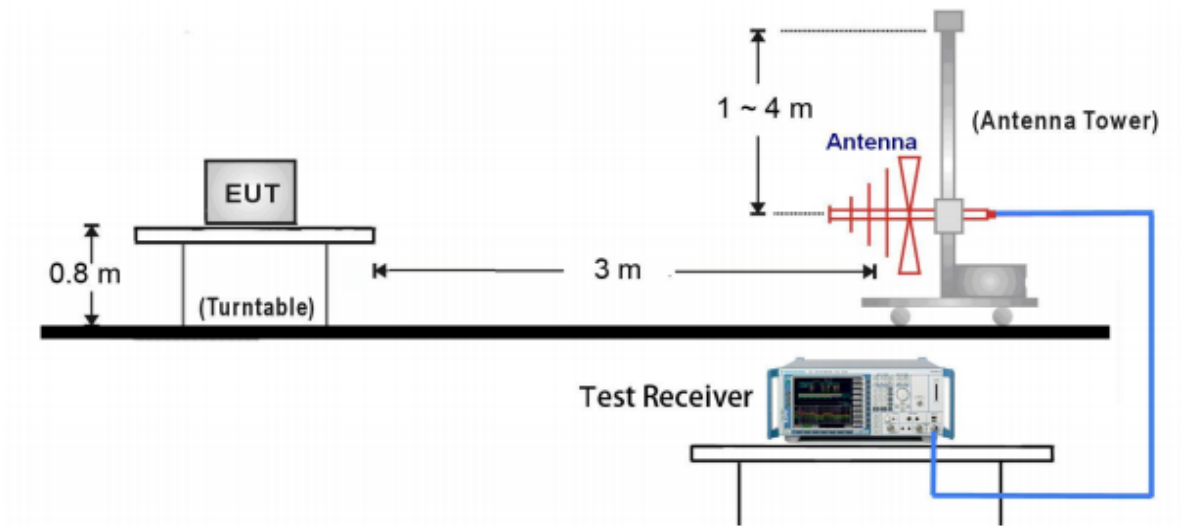
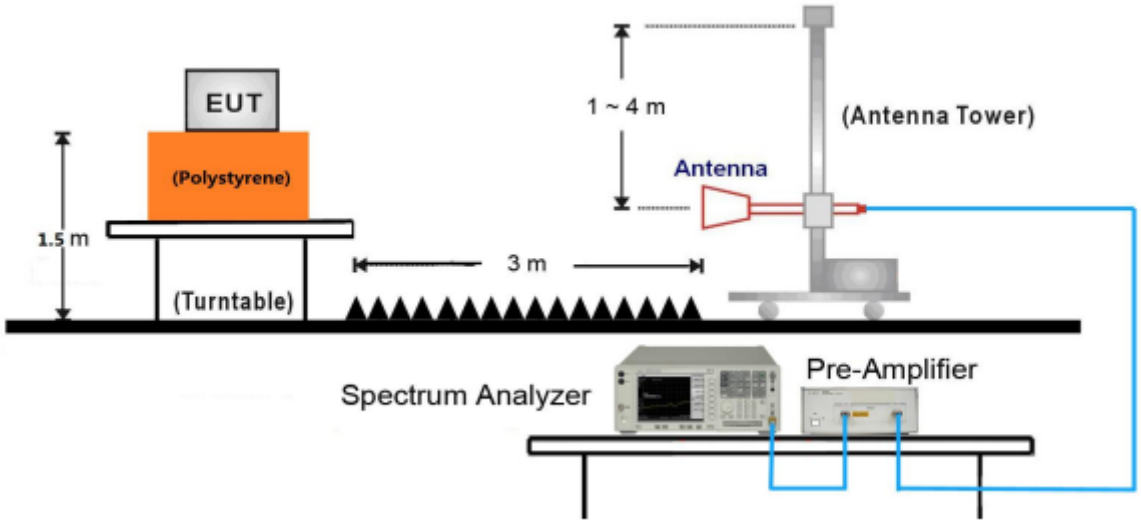
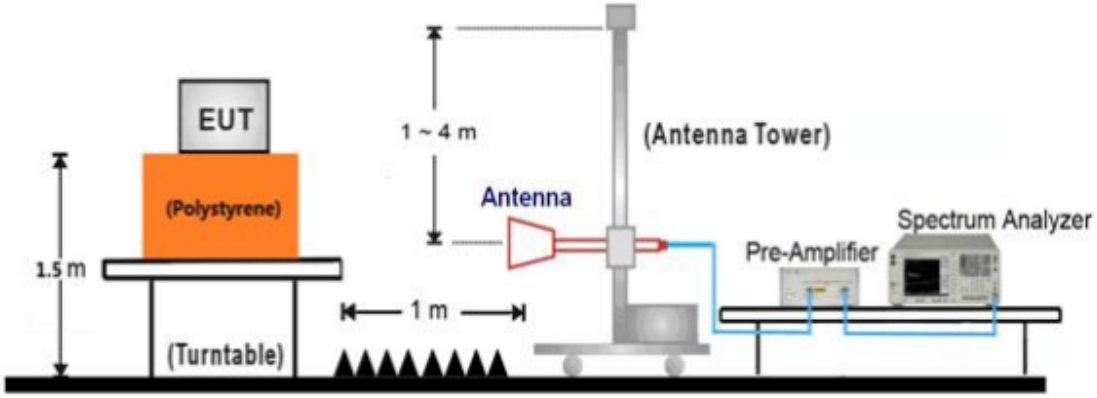
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~ 25GHz Test Setup:



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8 Technical Requirement

8.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.1m above ground plane
2. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

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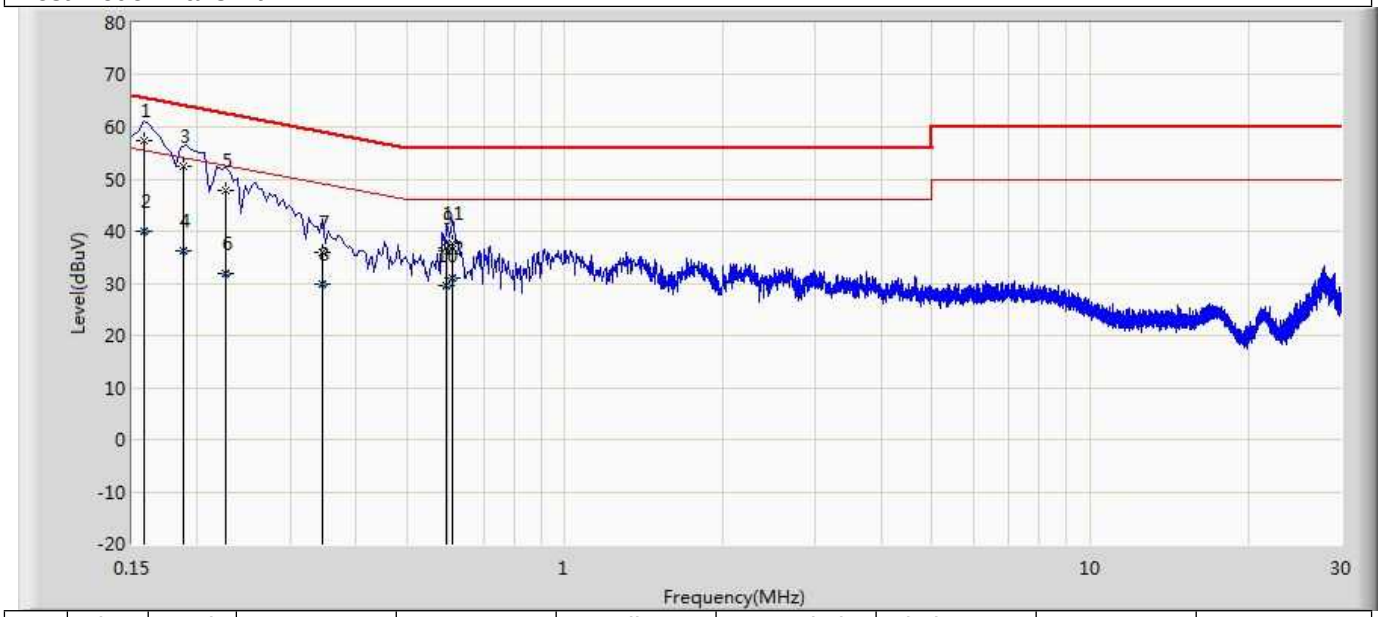
Site: SR2	Time: 2019/01/05 - 10:31
Limit: FCC_Part15.207_CE_AC Power	Engineer: Liz Yuan
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: AIR PURIFIER Z3000	Power: AC 120V/60Hz
Test Mode: Transmit	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	57.311	47.000	-8.257	65.568	10.311	QP
2			0.158	40.111	29.800	-15.457	55.568	10.311	AV
3			0.188	52.334	42.300	-11.791	64.124	10.034	QP
4			0.188	36.234	26.200	-17.891	54.124	10.034	AV
5			0.226	47.895	37.951	-14.700	62.595	9.944	QP
6			0.226	32.003	22.058	-20.593	52.595	9.944	AV
7			0.346	36.054	26.013	-23.004	59.058	10.041	QP
8			0.346	29.965	19.924	-19.093	49.058	10.041	AV
9			0.594	36.941	26.824	-19.059	56.000	10.118	QP
10			0.594	29.497	19.379	-16.503	46.000	10.118	AV
11			0.610	37.739	27.629	-18.261	56.000	10.110	QP
12			0.610	31.021	20.911	-14.979	46.000	10.110	AV

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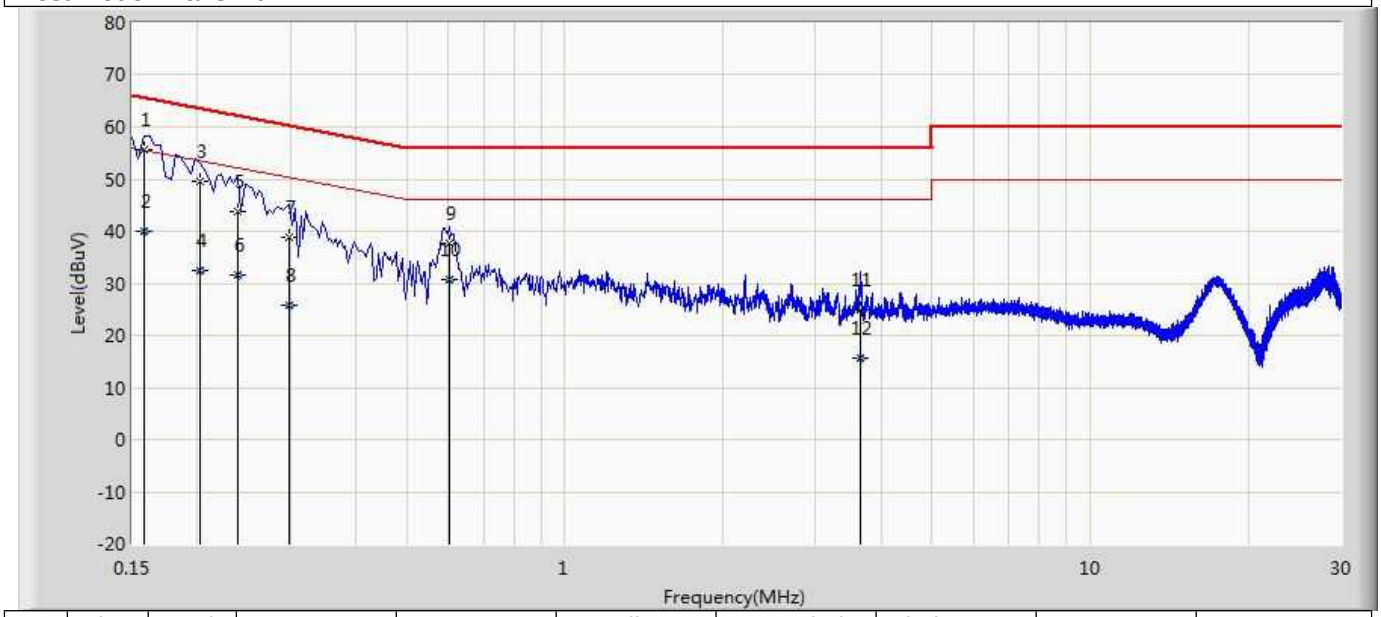
Site: SR2	Time: 2019/01/05 - 10:41
Limit: FCC_Part15.207_CE_AC Power	Engineer: Liz Yuan
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: AIR PURIFIER Z3000	Power: AC 120V/60Hz
Test Mode: Transmit	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	55.690	45.400	-9.879	65.568	10.290	QP
2			0.158	39.990	29.700	-15.579	55.568	10.290	AV
3			0.202	49.630	39.622	-13.898	63.528	10.008	QP
4			0.202	32.389	22.381	-21.139	53.528	10.008	AV
5			0.238	43.690	33.698	-18.476	62.166	9.992	QP
6			0.238	31.715	21.723	-20.451	52.166	9.992	AV
7			0.298	38.791	28.755	-21.507	60.298	10.036	QP
8			0.298	25.798	15.762	-24.500	50.298	10.036	AV
9			0.602	37.645	27.515	-18.355	56.000	10.130	QP
10			0.602	30.757	20.627	-15.243	46.000	10.130	AV
11			3.658	25.062	15.123	-30.938	56.000	9.938	QP
12			3.658	15.780	5.842	-30.220	46.000	9.938	AV

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8.2 Field strength of emissions and Restricted bands

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured ,RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limits

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.
According to §15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
According to §15.205 and Unwanted emissions falling into restricted bands in §15.205 (a) Table 3 shall comply with the limits specified in §15.209.

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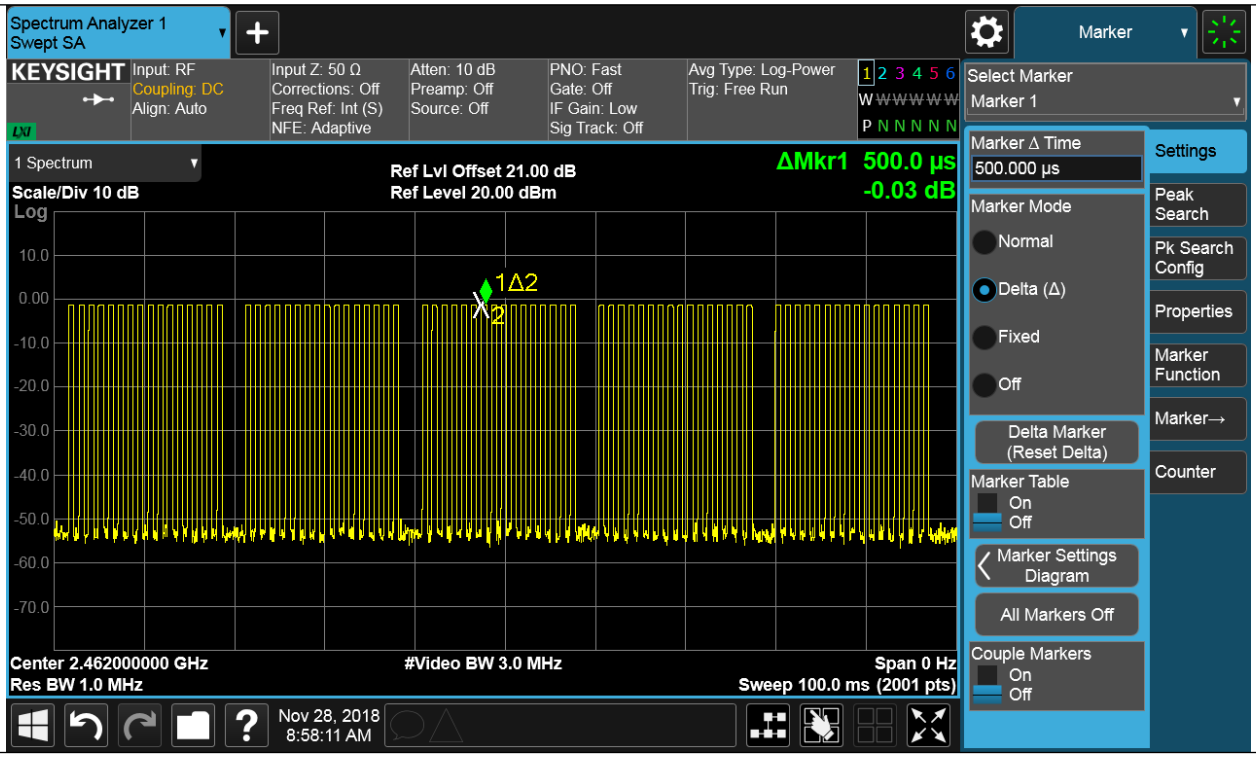
Duty Cycle Factor

Time On (ms)	One Period (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
40	100	40	-7.96

Note: Duty Cycle Factor = 20*Log (Duty Cycle)

Channel 2462MHz



Time On (ms) = 0.5 ms * 16 * 5 = 42 ms

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Field strength of emissions and Restricted bands

2462 MHz

Fundamental

Fundamental Frequency (MHz)	Polarisation (Vertical/ Horizontal)	Reading Level	Factor	Duty Cycle Factor	Field Strength	Over Limit	Limit		Type
		(dBµV/)	(dB)	(dB)	dBµV/m	(dB)	(dBµV/m)	mV/m	AV/PK
2461.715	H	55.3	32.28	N/A	87.58	-26.42	114.0	50	PK
2461.715	H	55.3	32.28	-7.96	79.62	-14.38	94.0		AV
2461.715	V	52.171	32.28	N/A	84.451	-29.549	114.0	50	PK
2461.715	V	52.171	32.28	-7.96	76.491	-17.509	94.0		AV

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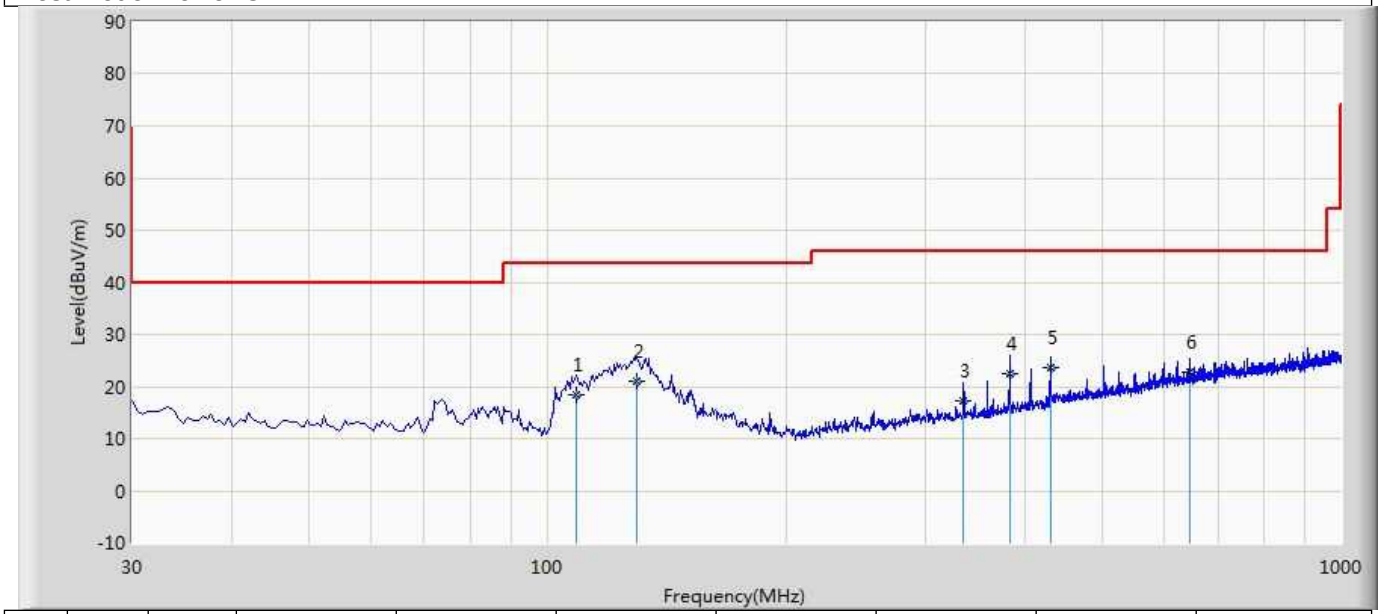
Site: AC1	Time: 2018/11/22 - 00:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Bacon Dong
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Power On	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			109.054	18.433	6.441	-25.067	43.500	11.992	QP
2		*	129.664	21.153	7.334	-22.347	43.500	13.818	QP
3			334.677	17.371	2.105	-28.629	46.000	15.267	QP
4			382.694	22.584	6.335	-23.416	46.000	16.249	QP
5			430.654	23.642	6.221	-22.358	46.000	17.420	QP
6			645.355	22.723	1.335	-23.277	46.000	21.388	QP

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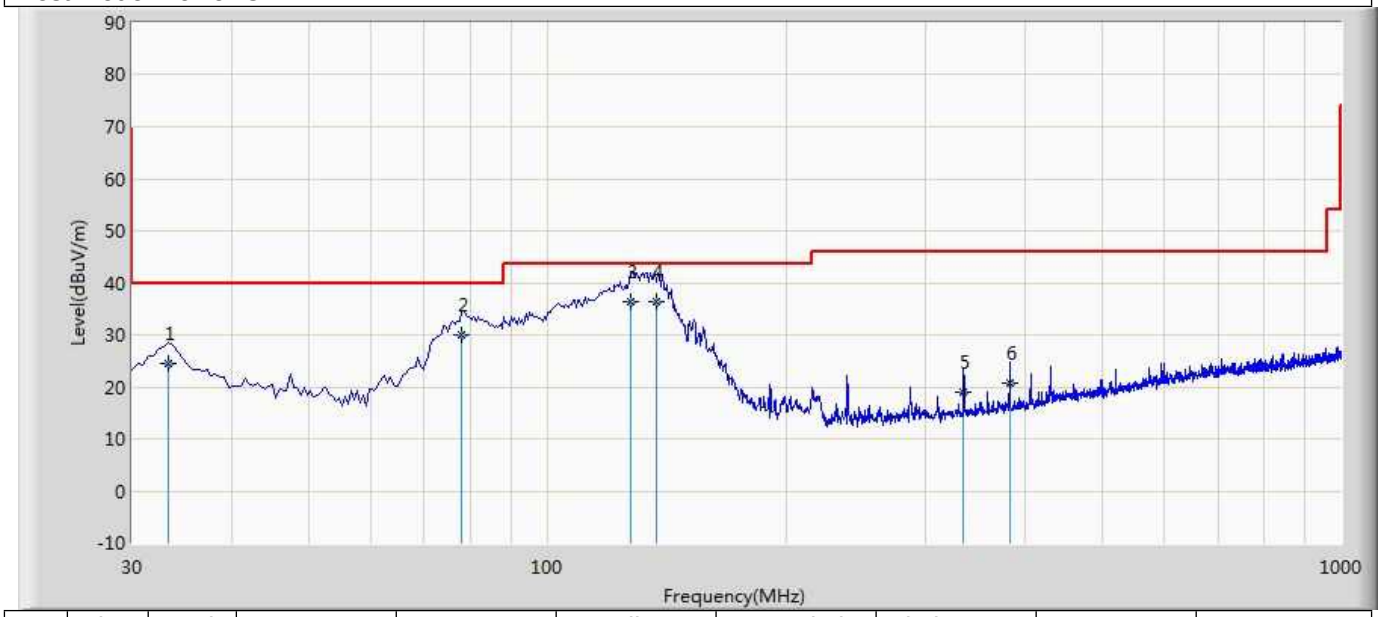
Site: AC1	Time: 2018/11/22 - 00:13
Limit: FCC_Part15.209_RE(3m)	Engineer: Bacon Dong
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Power On	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			33.395	24.519	10.648	-15.481	40.000	13.871	QP
2			78.055	30.059	19.658	-9.941	40.000	10.401	QP
3		*	127.445	36.383	22.700	-7.117	43.500	13.683	QP
4			137.185	36.362	21.984	-7.138	43.500	14.378	QP
5			334.586	18.929	3.665	-27.071	46.000	15.264	QP
6			382.679	20.586	4.338	-25.414	46.000	16.249	QP

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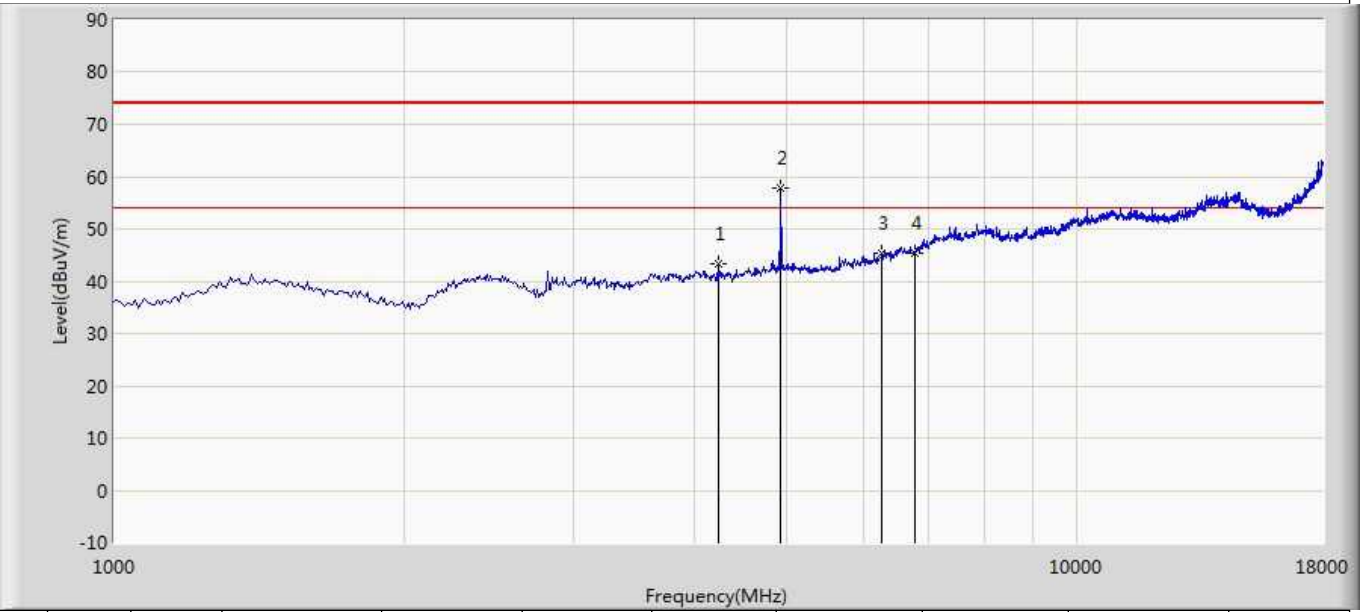
Site: AC1	Time: 2018/11/26 - 16:36
Limit: FCC_Part15.209_R SE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1			4238.500	39.330	4.129	N/A	43.459	74.000	-30.541	PK
			4238.500	39.330	4.129	-7.960	35.499	54.000	-18.501	AV
2		*	4927.000	51.753	6.128	N/A	57.881	74.000	-16.119	PK
			4927.000	51.753	6.128	-7.960	49.921	54.000	-4.079	AV
3			6270.000	36.865	8.619	N/A	45.484	74.000	-28.516	PK
			6270.000	36.865	8.619	-7.960	37.524	54.000	-16.476	AV
4			6797.000	35.078	10.256	N/A	45.334	74.000	-28.666	PK
			6797.000	35.078	10.256	-7.960	37.374	54.000	-16.626	AV

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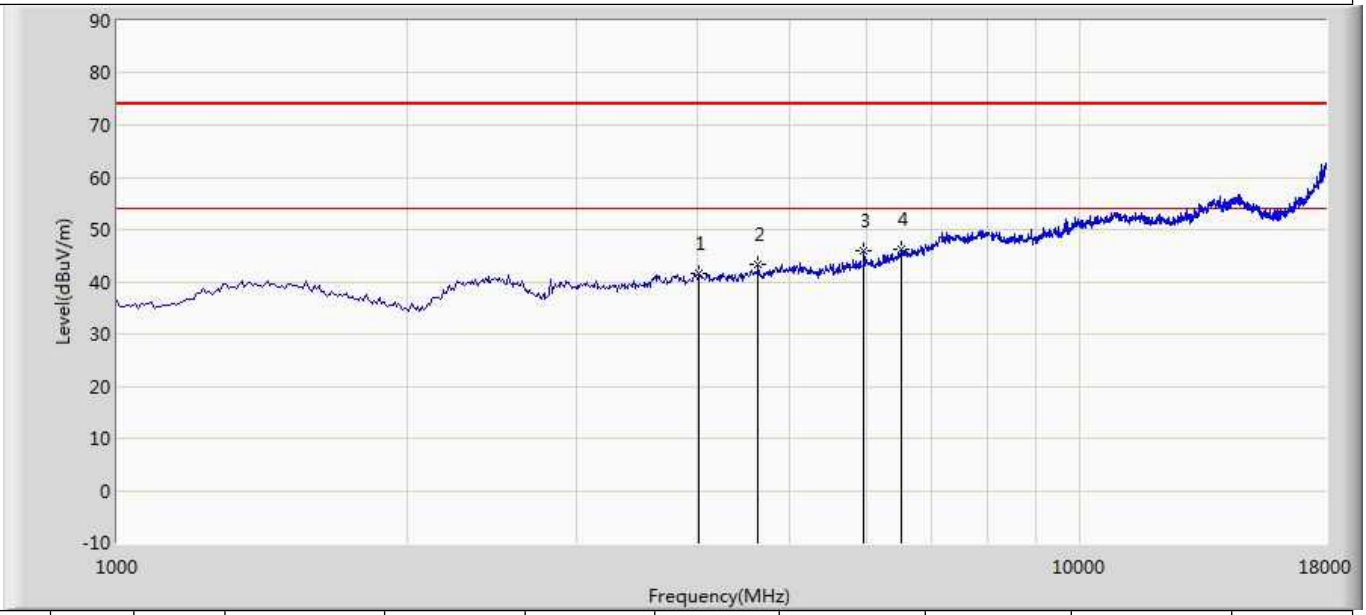
Site: AC1	Time: 2018/11/26 - 16:48
Limit: FCC_Part15.209_R SE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1			4026.000	38.047	3.413	N/A	41.460	74.000	-32.540	PK
			4026.000	38.047	3.413	-7.960	33.500	54.000	-20.500	AV
2		*	4629.500	37.988	5.266	N/A	43.254	74.000	-30.746	PK
			4629.500	37.988	5.266	-7.960	35.294	54.000	-18.706	AV
3			5964.000	38.046	7.862	N/A	45.908	74.000	-28.092	PK
			5964.000	38.046	7.862	-7.960	37.948	54.000	-16.052	AV
4			6525.000	36.226	9.987	N/A	46.213	74.000	-27.787	PK
			6525.000	36.226	9.987	-7.960	38.253	54.000	-15.747	AV

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8.3 20dB Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

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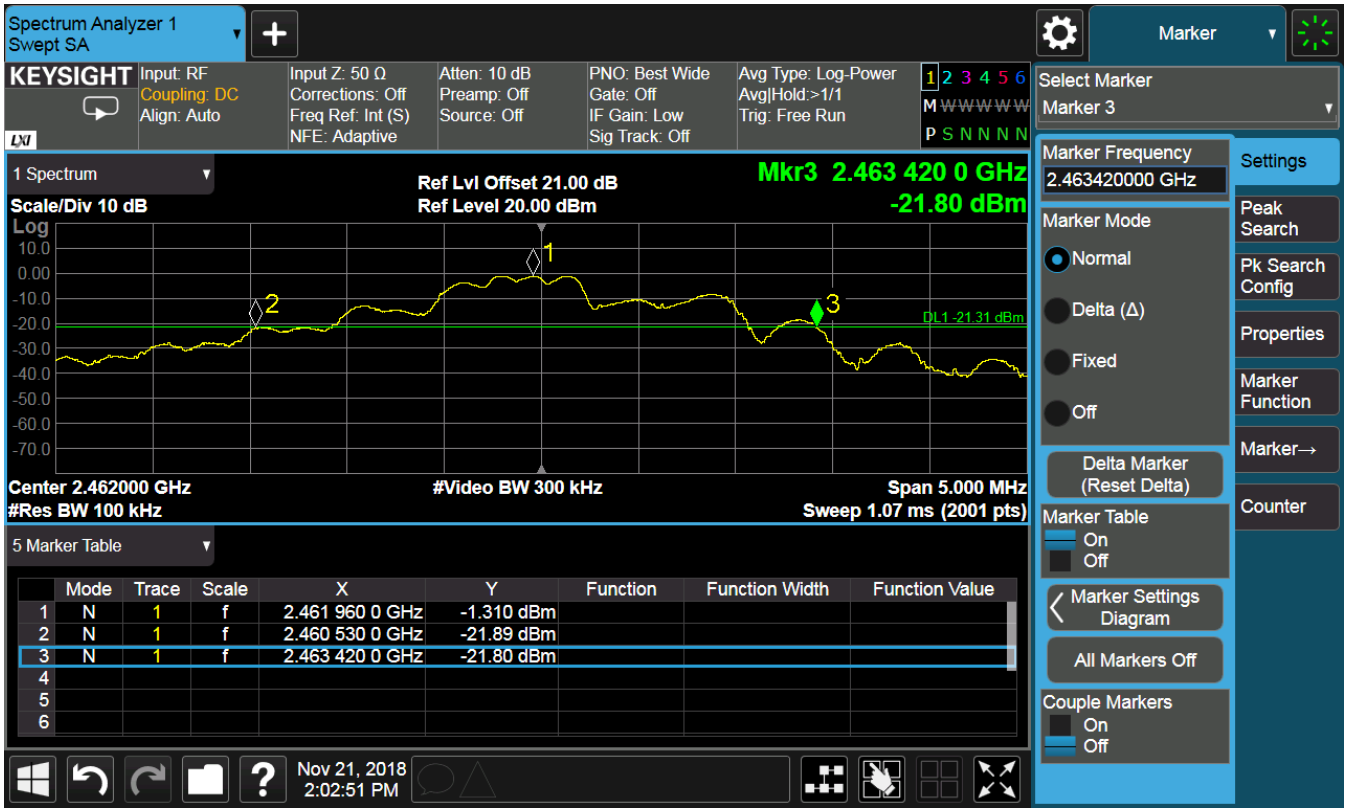
20dB Bandwidth

Frequency MHz	20dB Bandwidth kHz	Limit kHz	Result
2462	2890	NA	PASS



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8.4 Band edge testing

Test Method

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section. .
4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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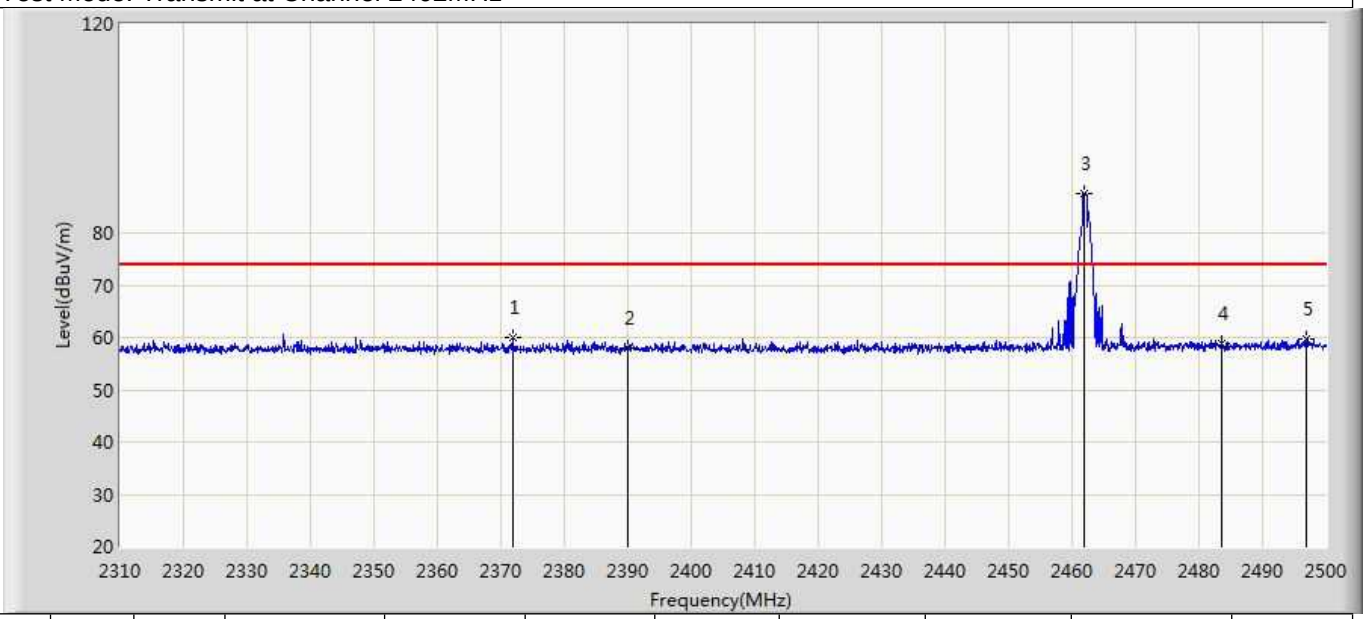
Band edge testing

Site: AC1	Time: 2018/11/26 - 16:51
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1			2371.845	27.527	32.354	N/A	59.881	74.000	-14.119	PK
			2371.845	27.527	32.354	-7.960	51.921	54.000	-2.079	AV
2			2390.000	25.599	32.327	N/A	57.926	74.000	-16.074	PK
			2390.000	25.599	32.327	-7.960	49.966	54.000	-4.034	AV
3		*	2461.810	55.300	32.280	N/A	87.580	114.000	-26.420	PK
		*	2461.810	55.300	32.280	-7.960	79.620	94.000	-14.380	AV
4			2483.500	26.485	32.340	N/A	58.825	74.000	-15.175	PK
			2483.500	26.485	32.340	-7.960	50.865	54.000	-3.135	AV
5			2496.960	27.353	32.390	N/A	59.743	74.000	-14.257	PK
			2496.960	27.353	32.390	-7.960	51.783	54.000	-2.217	AV

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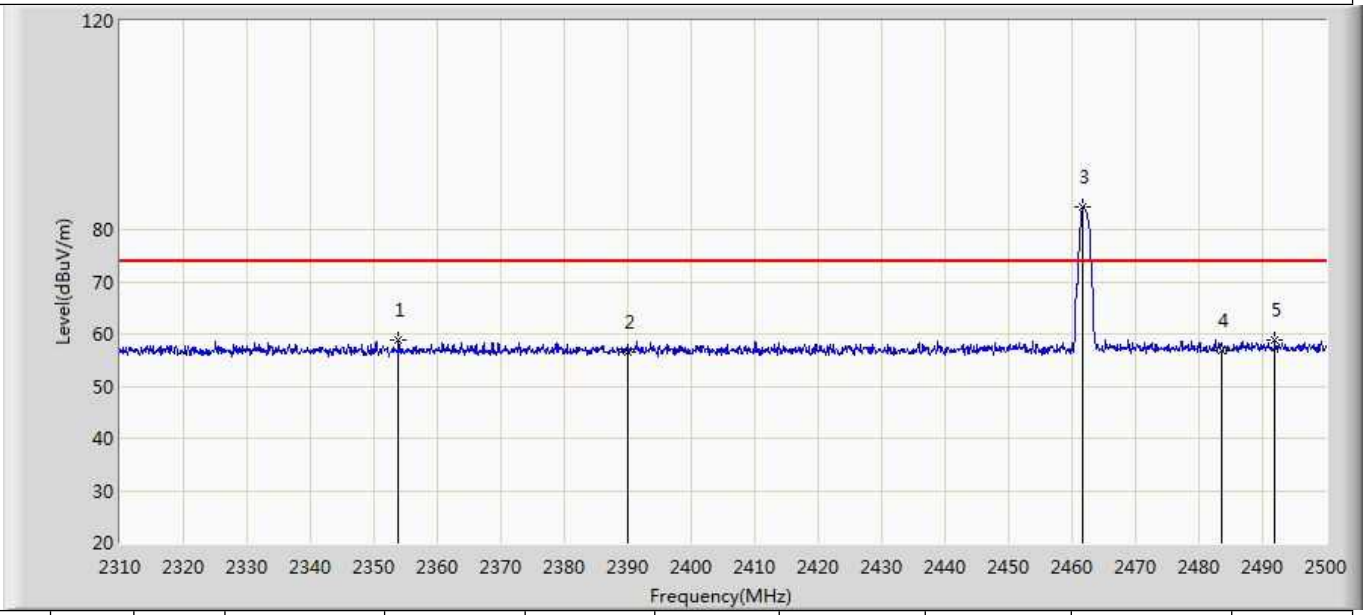
Site: AC1	Time: 2018/11/26 - 17:08
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: AIR PURIFIER (Z3000)	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1			2353.890	26.426	32.390	N/A	58.816	74.000	-15.184	PK
			2353.890	26.426	32.390	-7.960	50.856	54.000	-3.144	AV
2			2390.000	24.236	32.327	N/A	56.563	74.000	-17.437	PK
			2390.000	24.236	32.327	-7.960	48.603	54.000	-5.397	AV
3		*	2461.715	52.171	32.280	N/A	84.451	114.000	-29.549	PK
			2461.715	52.171	32.280	-7.960	76.491	94.000	-17.509	AV
4			2483.500	24.443	32.340	N/A	56.783	74.000	-17.217	PK
			2483.500	24.443	32.340	-7.960	48.823	54.000	-5.177	AV
5			2491.925	26.532	32.372	N/A	58.904	74.000	-15.096	PK
			2491.925	26.532	32.372	-7.960	50.944	54.000	-3.056	AV

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9 Test equipment list

List of Test Instruments

Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2019-8-6
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2019-8-6
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	848	2021-6-10
	Horn Antenna	Rohde & Schwarz	HF907	102393	2021-4-1
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2019-8-6
	3m Semi-anechoic chamber	TDK	9X6X6	----	2021-5-10
CE	EMI Test Receiver	Rohde & Schwarz	ESR 3	101907	2019-8-6
	LISN	Rohde & Schwarz	ENV4200	100224	2019-8-6
	LISN	Rohde & Schwarz	ENV216	101924	2019-8-6

Test Site2

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2019/06/15
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2019/06/15
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2019/08/15
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/14
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2019/09/14
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/20
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2019/10/20
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2019/12/17
Broadband Coaxial Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/16
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/12
Digitial Thermometer & Hygrometer	Testo	608-H1	MRTSUE06403	1 year	2019/08/15
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06213	1 year	2019/05/02

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10 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Test Site1

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, ±2.73dB
Radiated Disturbance	30MHz to 1GHz, ±5.03dB (Horizontal) ±5.11dB (Vertical) 1GHz to 18GHz, ±5.15dB (Horizontal) ±5.12dB (Vertical) 18GHz to 25GHz, ±4.76dB

Test Site2

AC Conducted Emission Measurement - SR2

Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):

150kHz~30MHz: 3.46dB

Radiated Emission Measurement – AC1

Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):

9kHz ~ 1GHz: 4.18dB

1GHz ~ 25GHz: 4.76dB

----------The End----------

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