

Appendix A: Test Results of Bluetooth LE

APPENDIX A: TEST RESULTS OF BLUETOOTH LE	1
APPENDIX A.1: TEST RESULTS OF 6dB BANDWIDTH	2
Test Result	2
Test Graphs	3
APPENDIX A.2: TEST RESULTS OF 99% BANDWIDTH	6
Test Result	6
Test Graphs	7
APPENDIX A.3: TEST RESULTS OF CONDUCTED POWER SPECTRAL DENSITY	10
Test Result	10
Test Graphs	11
APPENDIX A.4: TEST RESULTS OF BAND EDGE MEASUREMENTS	14
Test Result	14
Test Graphs	15
APPENDIX A.5: TEST RESULTS OF CONDUCTED SPURIOUS EMISSION	17
Test Result	17
Test Graphs	18
APPENDIX A.6: TEST RESULTS OF RADIATED SPURIOUS EMISSIONS	25
30 MHz - 1GHz.....	25
1GHz - 18GHz	27
APPENDIX A.7: TEST RESULTS OF RADIATED EMISSIONS IN RESTRICTED BANDS	39
APPENDIX A.8: TEST RESULTS OF CONDUCTED EMISSION ON AC MAINS	47

Appendix A.1: Test Results of 6dB Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.668	2401.664	2402.332	0.5	PASS
		2440	0.668	2439.668	2440.336	0.5	PASS
		2480	0.684	2479.664	2480.348	0.5	PASS
BLE_2M	Ant1	2402	1.260	2401.340	2402.600	0.5	PASS
		2440	1.356	2439.316	2440.672	0.5	PASS
		2480	1.332	2479.340	2480.672	0.5	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480





Appendix A.2: Test Results of 99% Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.94347	2401.5301	2402.4736	---	PASS
		2440	0.92563	2439.5341	2440.4598	---	PASS
		2480	0.94373	2479.5264	2480.4701	---	PASS
BLE_2M	Ant1	2402	1.8576	2401.0768	2402.9344	---	PASS
		2440	1.8596	2439.0795	2440.9391	---	PASS
		2480	1.8785	2479.0650	2480.9435	---	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



BLE 2M Ant1 2480



Appendix A.3: Test Results of Conducted Power Spectral Density

Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-8.59	≤8.00	PASS
		2440	-7.97	≤8.00	PASS
		2480	-7.87	≤8.00	PASS
BLE_2M	Ant1	2402	-12.56	≤8.00	PASS
		2440	-11.51	≤8.00	PASS
		2480	-11.39	≤8.00	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



BLE 2M Ant1 2402



BLE 2M Ant1 2440



BLE 2M Ant1 2480



Appendix A.4: Test Results of Band Edge Measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	6.17	-36.94	≤-13.83	PASS
		High	2480	6.77	-42.98	≤-13.23	PASS
BLE_2M	Ant1	Low	2402	5.06	-32.44	≤-14.94	PASS
		High	2480	4.88	-45.26	≤-15.12	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE 2M Ant1 High 2480



Appendix A.5: Test Results of Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.31	5.31	---	PASS
			30~1000	5.31	-61.54	≤-14.69	PASS
			1000~26500	5.31	-50.82	≤-14.69	PASS
		2440	Reference	5.95	5.95	---	PASS
			30~1000	5.95	-60.6	≤-14.05	PASS
			1000~26500	5.95	-52.88	≤-14.05	PASS
		2480	Reference	6.10	6.10	---	PASS
			30~1000	6.10	-62.17	≤-13.9	PASS
			1000~26500	6.10	-52.35	≤-13.9	PASS
BLE_2M	Ant1	2402	Reference	4.60	4.60	---	PASS
			30~1000	4.60	-60.03	≤-15.4	PASS
			1000~26500	4.60	-45.82	≤-15.4	PASS
		2440	Reference	5.58	5.58	---	PASS
			30~1000	5.58	-61.73	≤-14.42	PASS
			1000~26500	5.58	-48.26	≤-14.42	PASS
		2480	Reference	5.25	5.25	---	PASS
			30~1000	5.25	-61.1	≤-14.75	PASS
			1000~26500	5.25	-49.02	≤-14.75	PASS

Test Graphs

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



BLE_2M_Ant1_2402_0~Reference



BLE_2M_Ant1_2402_30~1000



BLE_2M_Ant1_2402_1000~26500



BLE 2M Ant1 2440 0~Reference



BLE 2M Ant1 2440 30~1000



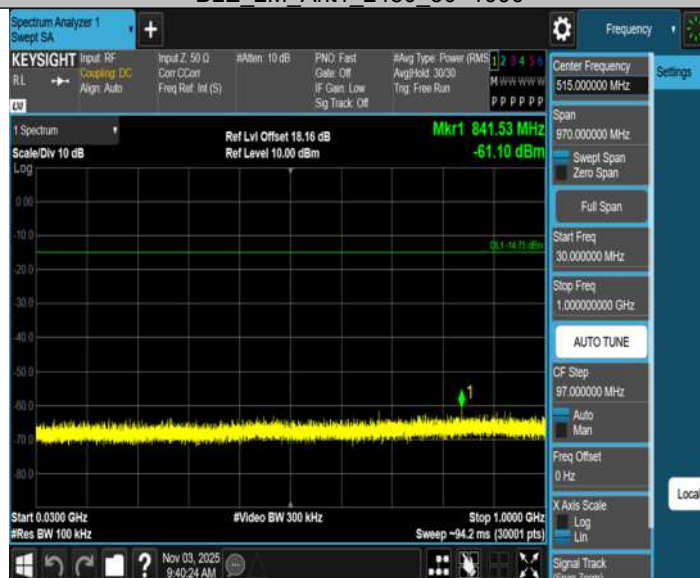
BLE 2M Ant1 2440 1000~26500



BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



Appendix A.6: Test Results of Radiated Spurious Emissions

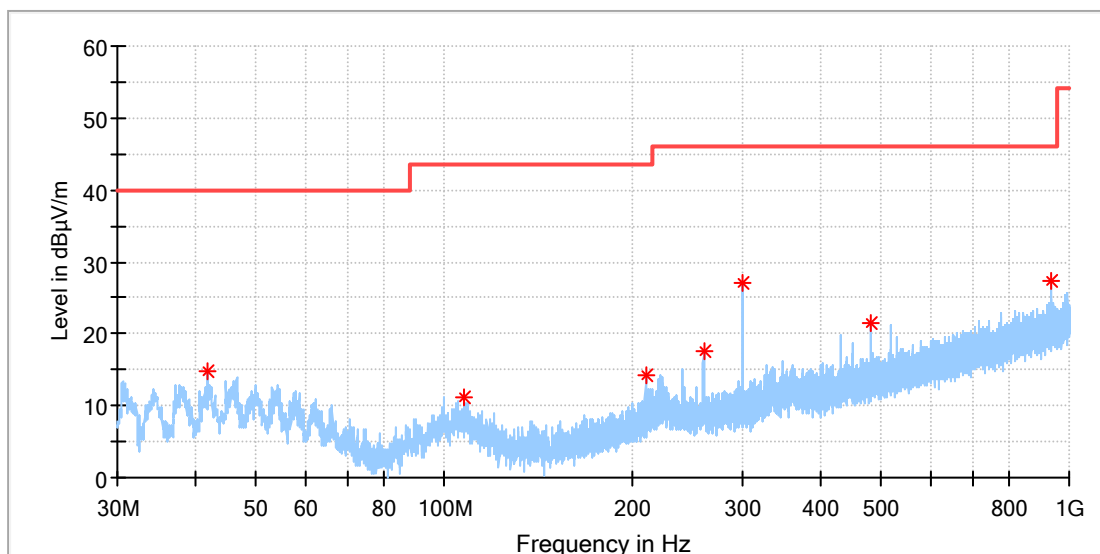
Note:

- 1) This testing was carried out on different modulations, but only the worst case was presented in this report.
- 2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30 MHz - 1GHz

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Model:	RRE0VES
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168580092/A004126573-002
Test Voltage:	Battery
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

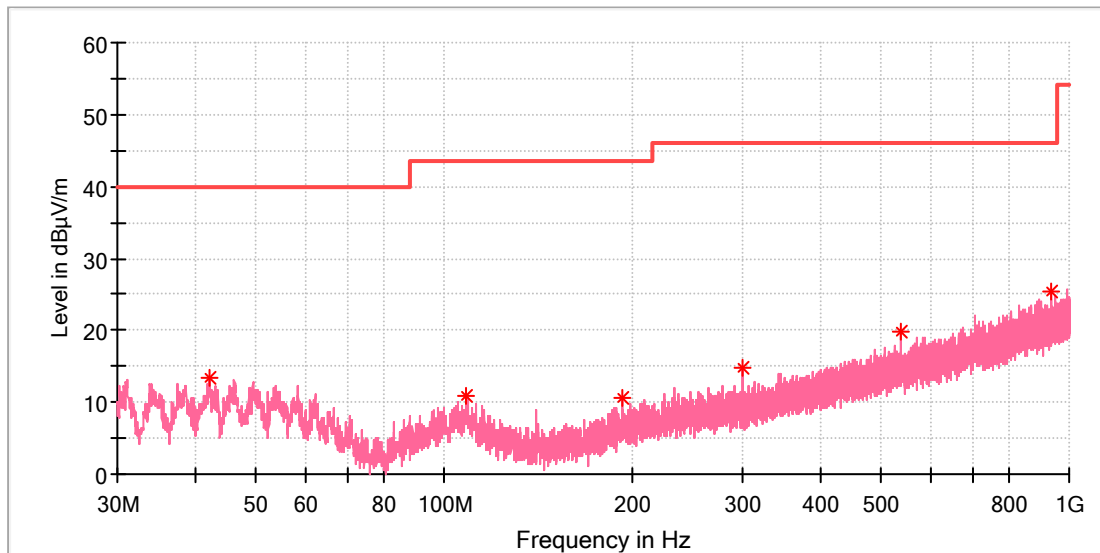
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
41.826539	14.91	40.00	25.09	100.0	H	64.0	-19.7
107.935769	11.13	43.50	32.37	100.0	H	314.0	-19.1
209.897692	14.29	43.50	29.21	100.0	H	46.0	-18.9
260.001923	17.69	46.00	28.31	100.0	H	135.0	-17.1
299.995769	27.20	46.00	18.80	100.0	H	0.0	-16.3
480.080000	21.58	46.00	24.42	100.0	H	83.0	-12.1
938.442308	27.37	46.00	18.63	100.0	H	343.0	-4.4

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---	---	---

EUT Information

EUT Name: Robotic Vacuum Cleaner
Model: RRE0VES
Test Mode: BLE 1M_Mid channel
Order No/Sample No: 168580092/A004126573-002
Test Voltage: Battery
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.162308	13.45	40.00	26.55	100.0	V	192.0	-19.6
108.085000	10.98	43.50	32.52	100.0	V	91.0	-19.1
192.885385	10.68	43.50	32.82	100.0	V	173.0	-19.4
299.995769	14.82	46.00	31.18	100.0	V	306.0	-16.3
539.660385	19.70	46.00	26.30	100.0	V	36.0	-11.0
938.442308	25.26	46.00	20.74	100.0	V	354.0	-4.4

Final Result

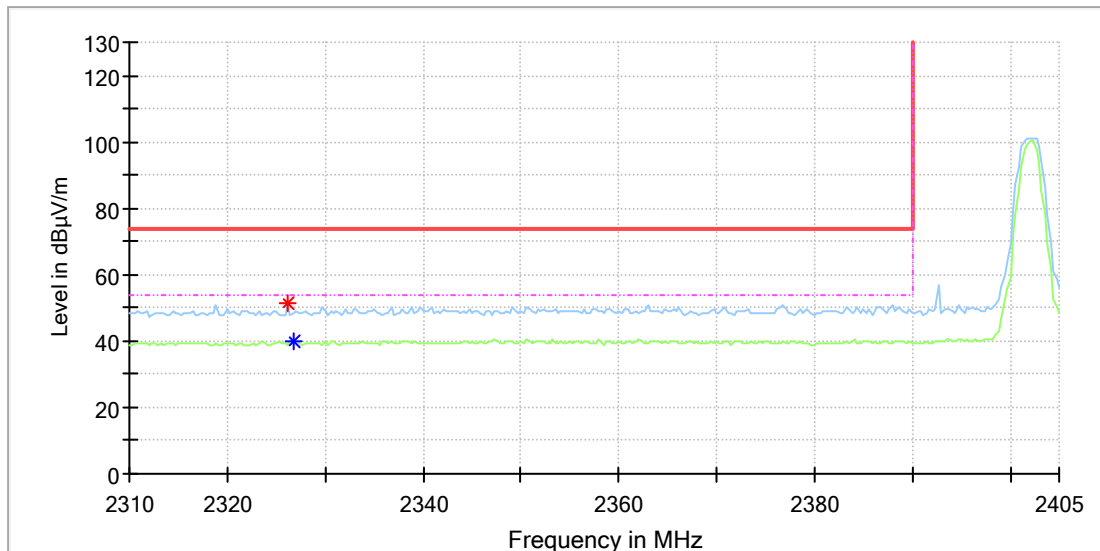
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---		---	---

Appendix A.7: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Model:	RRE0VES
Test Mode:	BLE 1M_Low channel
Order No/Sample No:	168580092/A004126573-002
Test Voltage:	Battery
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

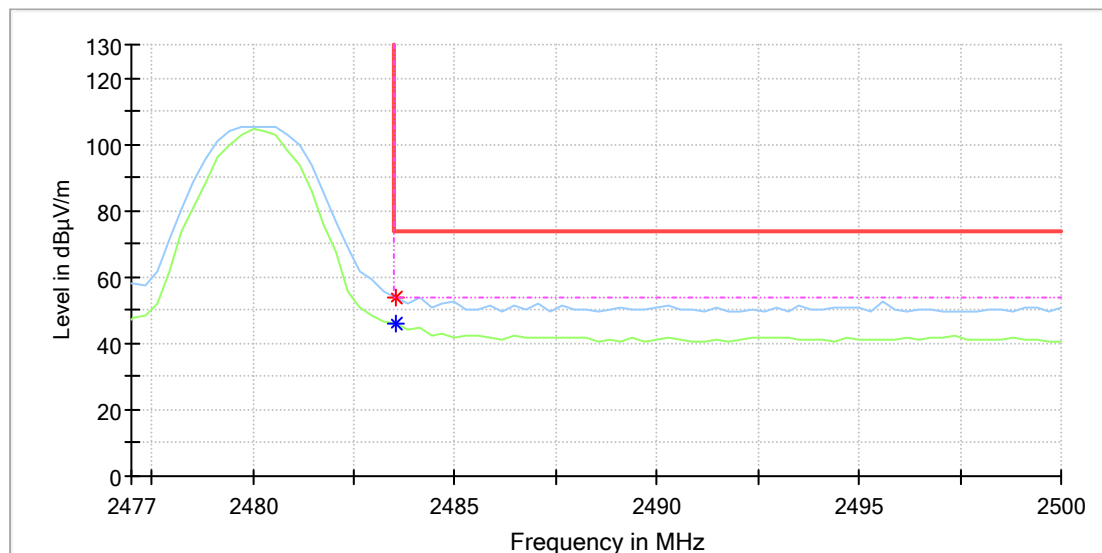
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2326.176471	51.11	---	74.00	22.89	150.0	H	98.0	8.3
2326.764706	---	39.86	54.00	14.14	150.0	H	228.0	8.3

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Model:	RRE0VES
Test Mode:	BLE 1M_High channel
Order No/Sample No:	168580092/A004126573-002
Test Voltage:	Battery
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

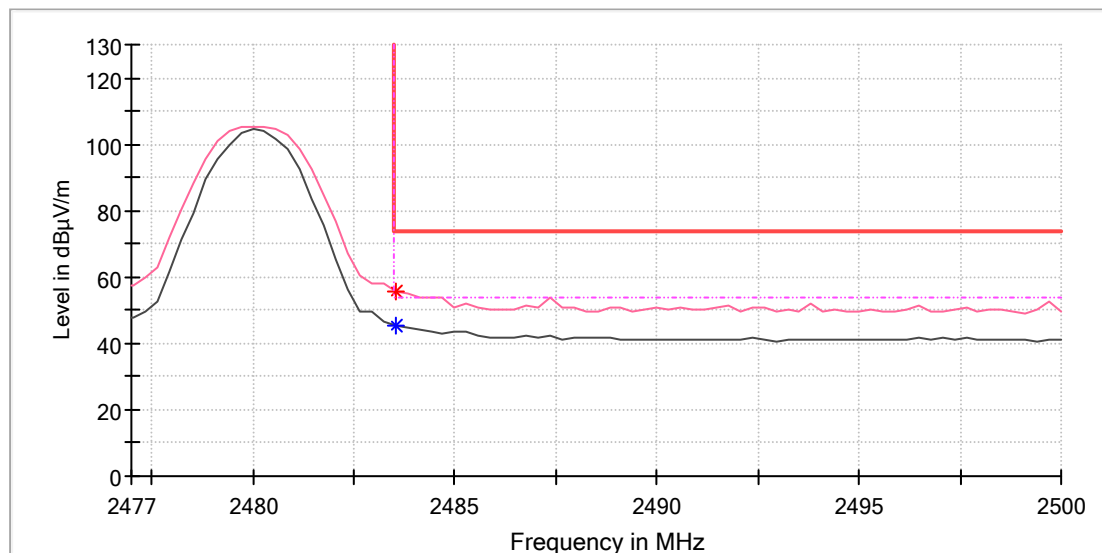
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.529412	---	45.99	54.00	8.01	150.0	H	253.0	9.0
2483.529412	53.95	---	74.00	20.05	150.0	H	253.0	9.0

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---		---	---

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Model:	RRE0VES
Test Mode:	BLE 1M_High channel
Order No/Sample No:	168580092/A004126573-002
Test Voltage:	Battery
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

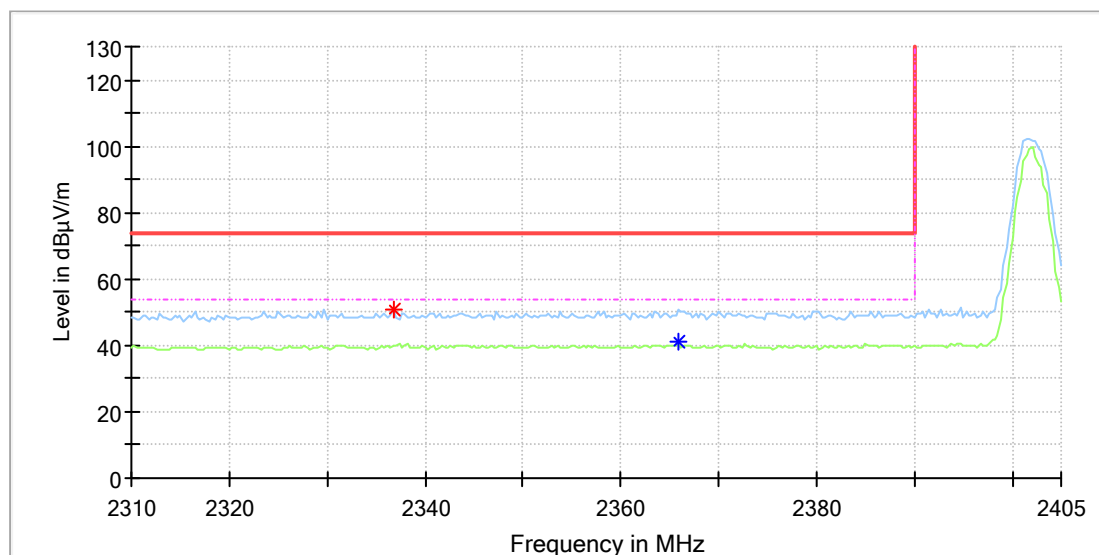
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.529412	55.61	---	74.00	18.39	150.0	V	227.0	9.0
2483.529412	---	45.08	54.00	8.92	150.0	V	227.0	9.0

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---		---	---

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Model:	RRE0VES
Test Mode:	BLE 2M_Low channel
Order No/Sample No:	168580092/A004126573-002
Test Voltage:	Battery
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2336.764706	50.81	---	74.00	23.19	150.0	H	130.0	8.4
2365.882353	---	41.02	54.00	12.98	150.0	H	26.0	8.5

Final Result

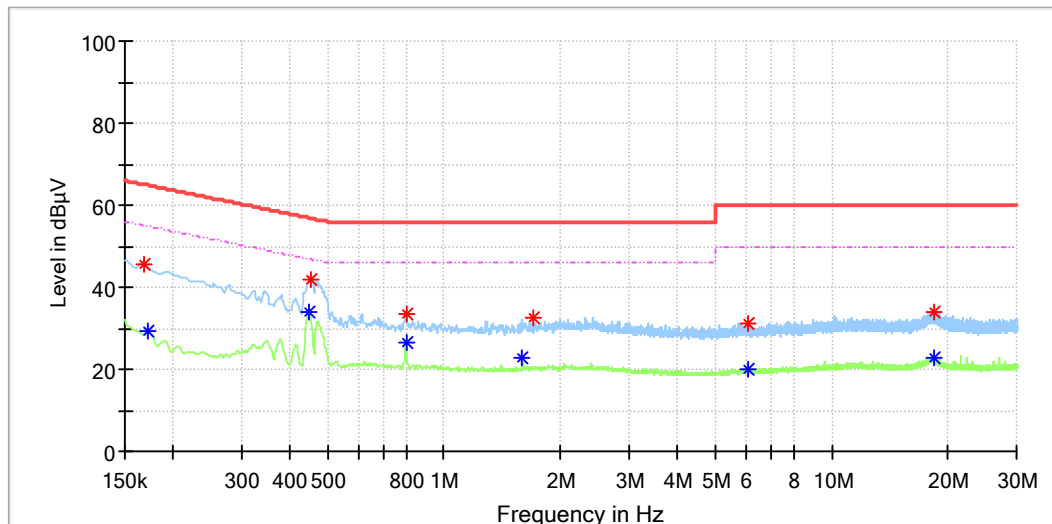
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---	---		---	---

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
----	----	----	----	----	----		----	----

Appendix A.8: Test Results of Conducted Emission on AC Mains

EUT Information

EUT Name:	Robotic Vacuum Cleaner
Order Number:	P02094262
Model:	RRE0VES
Test Mode:	Charging + working
Test Voltage:	AC 120V/ 60Hz
Test Standard:	FCC PART 15
Test By:/Review By:	Simon Feng / Murphy Chen
Tem./Hum./Pressure:	24.0°C/52.1%/101kPa
Remark:	SR 3



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.167	45.6	---	65.09	19.44	L1	9.6
0.172	---	29.1	54.85	25.72	L1	9.6
0.449	---	33.8	46.90	13.06	L1	9.5
0.453	42.0	---	56.81	14.82	L1	9.5
0.797	---	26.4	46.00	19.64	L1	9.7
0.797	33.5	---	56.00	22.46	L1	9.7
1.593	---	22.9	46.00	23.11	L1	9.6
1.692	32.7	---	56.00	23.34	L1	9.6
6.070	---	19.8	50.00	30.18	L1	9.8
6.078	31.1	---	60.00	28.87	L1	9.8
18.324	---	22.7	50.00	27.32	L1	9.7
18.326	34.1	---	60.00	25.85	L1	9.7

Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
---	---	---	---	---	---	---		---

