

RF Exposure Report

FCC ID: 2ASUW4144-4174

Applicant: VBox Communications LTD

Exposure category: General population/uncontrolled environment

EUT Type: Stand alone

Device Type: VBox Android TV Gateway Terrestrial Quad Tuner

Refer Standard: FCC Part 2.1091: Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

FCC MPE Limited:

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Antenna Gain information

2.4GHz/5GHz)Antenna Gain0: 2.0dBi

2.4GHz/5GHz)Antenna Gain1: 2.0dBi

2.4GHz/5GHz)Antenna Gain0+1: 5.01dBi

Note 1: According to KDB 662911, all transmit signals are completely correlated with each other.

2. Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi

Conducted Output Power (dBm)

802.11b mode

Channel	Frequency (MHz)	Output Power(dBm)		Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	
1	2412	17.07	16.89	17 ± 1
6	2437	17.29	17.01	17 ± 1
11	2462	17.16	17.12	17 ± 1

802.11g Test mode

Channel	Frequency (MHz)	Output Power(dBm)		Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	
1	2412	16.97	16.41	16 ± 1
6	2437	16.87	16.47	16 ± 1
11	2462	16.75	16.64	16 ± 1

802.11n-20MHz Test mode

Channel	Frequency (MHz)	Output Power(dBm)			Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	Ant. 0+1	
1	2412	14.38	13.83	17.12	17 ± 1
6	2437	14.25	13.88	17.08	17 ± 1
11	2462	14.23	14.07	17.16	17 ± 1

802.11n-40MHz Test mode

Channel	Frequency (MHz)	Output Power(dBm)			Tune Up tolerance(dBm)
		Ant. 0	Ant. 1	Ant. 0+1	
3	2422	13.85	13.48	16.68	16 ± 1
6	2437	13.82	13.70	16.77	16 ± 1
9	2452	13.73	13.63	16.69	16 ± 1

Conducted Power Test results of band U-NII-1 (5150 ~ 5250 MHz)

802.11a mode				
Frequency (MHz)	Conducted Output Power (dBm)		Tune Up tolerance(dBm)	
	Antenna 0	Antenna 1		
5180	14.20	14.36	14±1	
5220	14.24	14.08	14±1	
5240	14.19	14.17	14±1	
802.11n-HT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5180	14.14	14.45	17.31	17±1
5220	14.11	14.07	17.10	17±1
5240	14.12	13.83	16.99	17±1
802.11n-HT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5190	14.00	13.32	16.68	16±1
5230	13.67	12.92	16.32	16±1
802.11ac-VHT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5180	14.45	14.09	17.28	17±1
5220	14.32	13.83	17.09	17±1
5240	14.34	13.73	17.06	17±1
802.11ac-VHT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5190	13.85	13.32	16.60	16±1
5230	13.50	12.95	16.24	16±1
802.11ac-VHT80 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5210	13.14	11.91	15.58	15±1

Conducted Power Test results of band U-NII-3 (5725 ~ 5850 MHz)

802.11a mode				
Frequency (MHz)	Conducted Output Power (dBm)		Tune Up tolerance(dBm)	
	Antenna 0	Antenna 1		
5745	13.94	14.63	14 ± 1	
5785	13.94	13.22	14 ± 1	
5825	14.23	13.36	14 ± 1	
802.11n-HT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5745	13.91	13.25	16.60	16 ± 1
5785	13.89	13.15	16.55	16 ± 1
5825	14.22	13.26	16.78	16 ± 1
802.11n-HT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5755	13.60	12.71	16.19	16 ± 1
5795	13.73	12.85	16.32	16 ± 1
802.11ac-VHT20 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5745	13.92	13.26	16.61	16 ± 1
5785	13.92	13.19	16.58	16 ± 1
5825	14.32	13.33	16.86	16 ± 1
802.11ac-VHT40 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5755	13.61	12.90	16.28	16 ± 1
5795	13.72	12.90	16.34	16 ± 1
802.11ac-VHT80 mode				
Frequency (MHz)	Conducted Output Power (dBm)			Tune Up tolerance(dBm)
	Antenna 0	Antenna 1	Total	
5775	13.29	12.40	15.88	15 ± 1

Calculation results (for 2.4G WIFI): Worst-case mode

Antenna	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	2412	18	20	0.0397	1.0
	2437	18	20	0.0397	
	2462	18	20	0.0397	
	2422	17	20	0.0316	
	2452	17	20	0.0316	

Calculation results (for 5.2G WIFI band U-NII-1): Worst-Case mode

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	N20	5180	18	20	0.0397	1.0
		5220	18	20	0.0397	
		5240	18	20	0.0397	
	N40	5190	17	20	0.0316	
		5230	17	20	0.0316	
	AC20	5180	18	20	0.0397	
		5220	18	20	0.0397	
		5240	18	20	0.0397	
	AC40	5190	17	20	0.0316	
		5230	17	20	0.0316	
	AC80	5210	16	20	0.0251	

Calculation results (for 5.8G WIFI band U-NII-3): Worst-Case mode

Antenna	Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
0+1(MIMO)	N20	5745	17	20	0.0316	1.0
		5785	17	20	0.0316	
		5825	17	20	0.0316	
	N40	5755	17	20	0.0316	
		5795	17	20	0.0316	
	AC20	5745	17	20	0.0316	
		5785	17	20	0.0316	
		5825	17	20	0.0316	
	AC40	5755	17	20	0.0316	
		5795	17	20	0.0316	
	AC80	5775	16	20	0.0251	

Note: 2.4GHz WLAN and 5GHz WLAN cannot transmit at the same time.