

Maximum Permissible Exposure Evaluation

FCC ID: 2AR44-VXI300

1. Client Information

Applicant	:	Ventus Technologies
Address	:	10 Norden Place, Norwalk, CT 06855, USA
Manufacturer	:	Ventus Technologies
Address	:	10 Norden Place, Norwalk, CT 06855, USA

2. General Description of EUT

EUT Name	:	VXI
Models No.	:	VXI300W
Model Different	:	N/A
Product Description	:	Operation Frequency: 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz U-NII-1: 5180MHz~5240MHz U-NII-3: 5745MHz~5825MHz WCDMA Band II/IV/V LTE Band 2/4/5/7/12/13/26/30/41/66
Power Rating	:	DC 12V from DC Port or DC 48V from POE Port.
Adapter 1#	:	AC Adapter(NBS30D120250VU): Input: AC 100-240V, 50/60Hz, 0.8A ; Output: DC 12V, 2.5A
Adapter 2#	:	POE Power Supply(PIF-4800045-1KMS): Input: AC 100-240V, 50/60Hz, 0.6A ; Output: DC 48V, 0.45A
Software Version	:	1.0
Hardware Version	:	D
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.

MPE Calculations for WIFI

1. Antenna Gain:

Antenna Identification in Internal photos	Antenna type	Operate frequency band	Maximum antenna gain
LTE MAIN Antenna	PFC Antenna	WCDMA Band II/IV/V LTE Band 2/4/5/7/12/13/26/41/66	1.2 dBi
		LTE Band 30	1.0 dBi
LTE AUX Antenna (Rx Only)	PFC Antenna	---	---
2.4G WiFi Ant. 0	Stamp Antenna	2.4GHz – 2.4835 GHz	1.5 dBi
2.4G WiFi Ant. 1	Stamp Antenna	2.4GHz – 2.4835 GHz	1.5 dBi
2.4G WiFi Ant. 2	Stamp Antenna	2.4GHz – 2.4835 GHz	1.5 dBi
5G WiFi Ant. 0	Stamp Antenna	5GHz – 6 GHz	1.5 dBi
5G WiFi Ant. 1	Stamp Antenna	5GHz – 6 GHz	1.5 dBi
5G WiFi Ant. 2	Stamp Antenna	5GHz – 6 GHz	1.5 dBi

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = (PG) / 4\pi R^2$$

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.

R: distance to the center of radiation of the antenna

4. Standalone MPE Evaluation:

[2.4GHz WLAN]

Mode	Channel	Frequency	Peak Conducted Output Power (dBm)			Tolerance ± (dB)	Turn-up Power Tolerance (dB)		
			Ant.0	Ant.1	Ant.2		Ant.0	Ant.1	Ant.2
IEEE 802.11b	1	2412	18.70	18.97	18.64	1.0	18±1	18±1	18±1
	6	2437	18.73	19.04	18.73	1.0	18±1	19±1	18±1
	11	2462	18.48	18.44	17.93	1.0	18±1	18±1	18±1
IEEE 802.11g	1	2412	17.62	17.67	18.17	1.0	17±1	17±1	18±1
	6	2437	17.00	17.44	17.56	1.0	17±1	17±1	17±1
	11	2462	17.20	17.35	17.15	1.0	17±1	17±1	17±1
IEEE 802.11n HT20	1	2412	13.50	13.59	13.93	1.0	13±1	13±1	13±1
	6	2437	13.50	13.68	13.64	1.0	13±1	13±1	13±1
	11	2462	13.21	13.46	13.25	1.0	13±1	13±1	13±1
IEEE 802.11n HT40	3	2422	12.76	12.83	12.96	1.0	12±1	12±1	12±1
	6	2437	12.37	12.55	12.41	1.0	12±1	12±1	12±1
	9	2452	11.99	12.13	11.94	1.0	12±1	12±1	12±1

[5GHz WLAN Band 1]

Mode	Channel	Frequency	Peak Conducted Output Power (dBm)			Tolerance $\pm$ (dB)	Turn-up Power Tolerance (dB)		
			Ant.0	Ant.1	Ant.2		Ant.0	Ant.1	Ant.2
IEEE 802.11a	36	5180	12.51	12.39	14.35	1.0	12 $\pm$ 1	12 $\pm$ 1	14 $\pm$ 1
	40	5200	11.52	11.70	14.28	1.0	11 $\pm$ 1	11 $\pm$ 1	14 $\pm$ 1
	48	5240	12.43	12.26	14.38	1.0	12 $\pm$ 1	12 $\pm$ 1	14 $\pm$ 1
IEEE 802.11n HT20	36	5180	11.81	12.82	12.26	1.0	12 $\pm$ 1	12 $\pm$ 1	14 $\pm$ 1
	40	5200	12.29	12.30	14.38	1.0	12 $\pm$ 1	12 $\pm$ 1	14 $\pm$ 1
	48	5240	12.40	12.70	14.40	1.0	12 $\pm$ 1	12 $\pm$ 1	14 $\pm$ 1
IEEE 802.11ac VHT20	36	5180	10.53	9.83	10.46	1.0	10 $\pm$ 1	10 $\pm$ 1	10 $\pm$ 1
	40	5200	9.10	8.93	11.41	1.0	9 $\pm$ 1	9 $\pm$ 1	11 $\pm$ 1
	48	5240	9.24	9.07	11.34	1.0	9 $\pm$ 1	9 $\pm$ 1	11 $\pm$ 1
IEEE 802.11n HT40	38	5190	11.77	12.52	12.64	1.0	11 $\pm$ 1	12 $\pm$ 1	12 $\pm$ 1
	46	5230	11.08	11.89	12.15	1.0	11 $\pm$ 1	11 $\pm$ 1	12 $\pm$ 1
IEEE 802.11ac VHT40	38	5190	12.43	12.62	12.31	1.0	12 $\pm$ 1	12 $\pm$ 1	12 $\pm$ 1
	46	5230	13.71	11.11	13.96	1.0	13 $\pm$ 1	11 $\pm$ 1	13 $\pm$ 1
IEEE 802.11ac VHT80	42	5210	13.08	11.54	12.05	1.0	13 $\pm$ 1	11 $\pm$ 1	12 $\pm$ 1

[5GHz WLAN Band 3]

Mode	Channel	Frequency	Peak Conducted Output Power (dBm)			Tolerance $\pm$ (dB)	Turn-up Power Tolerance (dB)		
			Ant.0	Ant.1	Ant.2		Ant.0	Ant.1	Ant.2
IEEE 802.11a	149	5745	22.51	21.01	22.18	1.0	22 $\pm$ 1	21 $\pm$ 1	22 $\pm$ 1
	157	5785	21.32	20.46	22.41	1.0	21 $\pm$ 1	20 $\pm$ 1	22 $\pm$ 1
	165	5825	21.00	20.83	21.83	1.0	21 $\pm$ 1	20 $\pm$ 1	21 $\pm$ 1
IEEE 802.11n HT20	149	5745	21.40	20.52	22.21	1.0	21 $\pm$ 1	20 $\pm$ 1	22 $\pm$ 1
	157	5785	20.33	20.07	21.25	1.0	20 $\pm$ 1	20 $\pm$ 1	21 $\pm$ 1
	165	5825	20.03	19.35	21.34	1.0	20 $\pm$ 1	20 $\pm$ 1	21 $\pm$ 1
IEEE 802.11ac VHT20	149	5745	21.55	20.86	20.60	1.0	21 $\pm$ 1	20 $\pm$ 1	20 $\pm$ 1
	157	5785	20.93	19.74	20.78	1.0	20 $\pm$ 1	20 $\pm$ 1	20 $\pm$ 1
	165	5825	19.79	19.86	21.23	1.0	20 $\pm$ 1	20 $\pm$ 1	21 $\pm$ 1
IEEE 802.11n HT40	151	5755	20.80	21.29	22.03	1.0	20 $\pm$ 1	21 $\pm$ 1	22 $\pm$ 1
	159	5795	21.39	21.48	21.44	1.0	21 $\pm$ 1	21 $\pm$ 1	21 $\pm$ 1
IEEE 802.11ac VHT40	151	5755	21.55	20.54	20.34	1.0	21 $\pm$ 1	20 $\pm$ 1	20 $\pm$ 1
	159	5795	21.43	20.62	21.34	1.0	21 $\pm$ 1	20 $\pm$ 1	21 $\pm$ 1
IEEE 802.11ac VHT80	155	5775	12.14	11.12	11.23	1.0	12 $\pm$ 1	11 $\pm$ 1	11 $\pm$ 1

2.4GHz WLAN ANT 0

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	19.00	79.4328	1.50	1.4125	100%	0.0223	1.0000
IEEE 802.11g	18.00	63.0957	1.50	1.4125	100%	0.0177	1.0000
IEEE 802.11n HT20	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000
IEEE 802.11n HT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000

2.4GHz WLAN ANT 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	20.00	100.0000	1.50	1.4125	100%	0.0281	1.0000
IEEE 802.11g	18.00	63.0957	1.50	1.4125	100%	0.0177	1.0000
IEEE 802.11n HT20	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000
IEEE 802.11n HT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000

2.4GHz WLAN ANT 2

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	19.00	79.4328	1.50	1.4125	100%	0.0223	1.0000
IEEE 802.11g	19.00	79.4328	1.50	1.4125	100%	0.0223	1.0000
IEEE 802.11n HT20	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000
IEEE 802.11n HT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000

5GHz WLAN Band 1 ANT 0

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11n HT20	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11ac VHT20	11.00	12.5893	1.50	1.4125	100%	0.0035	1.0000
IEEE 802.11n HT40	12.00	15.8489	1.50	1.4125	100%	0.0045	1.0000
IEEE 802.11ac VHT40	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000
IEEE 802.11ac VHT80	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000

5GHz WLAN Band 1 ANT 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11n HT20	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11ac VHT20	11.00	12.5893	1.50	1.4125	100%	0.0035	1.0000
IEEE 802.11n HT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11ac VHT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11ac VHT80	12.00	15.8489	1.50	1.4125	100%	0.0045	1.0000

5GHz WLAN Band 1 ANT 2

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	15.00	31.6228	1.50	1.4125	100%	0.0089	1.0000
IEEE 802.11n HT20	15.00	31.6228	1.50	1.4125	100%	0.0089	1.0000
IEEE 802.11ac VHT20	12.00	15.8489	1.50	1.4125	100%	0.0045	1.0000
IEEE 802.11n HT40	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000
IEEE 802.11ac VHT40	14.00	25.1189	1.50	1.4125	100%	0.0071	1.0000
IEEE 802.11ac VHT80	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000

5GHz WLAN Band 3 ANT 0

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	23.00	199.5262	1.50	1.4125	100%	0.0561	1.0000
IEEE 802.11n HT20	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11ac VHT20	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11n HT40	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11ac VHT40	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11ac VHT80	13.00	19.9526	1.50	1.4125	100%	0.0056	1.0000

5GHz WLAN Band 3 ANT 1

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11n HT20	21.00	125.8925	1.50	1.4125	100%	0.0354	1.0000
IEEE 802.11ac VHT20	21.00	125.8925	1.50	1.4125	100%	0.0354	1.0000
IEEE 802.11n HT40	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11ac VHT40	21.00	125.8925	1.50	1.4125	100%	0.0354	1.0000
IEEE 802.11ac VHT80	12.00	15.8489	1.50	1.4125	100%	0.0045	1.0000

5GHz WLAN Band 3 ANT 2

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	23.00	199.5262	1.50	1.4125	100%	0.0561	1.0000
IEEE 802.11n HT20	23.00	199.5262	1.50	1.4125	100%	0.0561	1.0000
IEEE 802.11ac VHT20	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11n HT40	23.00	199.5262	1.50	1.4125	100%	0.0561	1.0000
IEEE 802.11ac VHT40	22.00	158.4893	1.50	1.4125	100%	0.0446	1.0000
IEEE 802.11ac VHT80	12.00	15.8489	1.50	1.4125	100%	0.0045	1.0000

WCDMA AND LTE

Operating Mode	Max Time-Avg Conducted Power including Tune-up		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)	MPE Ratio
	dBm	mW					
WCDMA Band II LTE Band 2	24.0	251.1886	1.2	1.3183	0.0659	1.0000	0.0659
WCDMA Band IV LTE Band 4	24.0	251.1886	1.2	1.3183	0.0659	1.0000	0.0659
WCDMA Band V LTE Band 5	24.0	251.1886	1.2	1.3183	0.0659	0.5493	0.1200
LTE Band 7	23.8	239.8833	1.2	1.3183	0.0629	1.0000	0.0629
LTE Band 12	24.0	251.1886	1.2	1.3183	0.0659	0.4660	0.1414
LTE Band 13	24.0	251.1886	1.2	1.3183	0.0659	0.5180	0.1272
LTE Band 26	24.0	251.1886	1.2	1.3183	0.0659	0.5427	0.1214
LTE Band 30	23.0	199.5262	1.0	1.2589	0.0500	1.0000	0.0500
LTE Band 41	23.8	239.8833	1.2	1.3183	0.0629	1.0000	0.0629
LTE Band 66	24.0	251.1886	1.2	1.3183	0.0659	1.0000	0.0659

Remark:

1. Output power (Average) including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.

5. Summary simultaneous transmission information

Modulation Type	Work Frequency Band	Transmit Antenna			Antenna 0 Antenna 1 Antenna 2 Synchronization transmit
		Antenna 0	Antenna 1	Antenna 2	
IEEE 802.11a	5.8G/5.2GHz	Yes	Yes	Yes	No
IEEE 802.11b	2.4GHz	Yes	Yes	Yes	No
IEEE 802.11g	2.4GHz	Yes	Yes	Yes	No
IEEE 802.11n HT20	2.4GHz	Yes	Yes	Yes	Yes
IEEE 802.11n HT20	5.8G/5.2GHz	Yes	Yes	Yes	Yes
IEEE 802.11n HT40	2.4GHz	Yes	Yes	Yes	Yes
IEEE 802.11n HT40	5.8G/5.2GHz	Yes	Yes	Yes	Yes
IEEE 802.11ac VHT20	5.8G/5.2GHz	Yes	Yes	Yes	Yes
IEEE 802.11ac VHT40	5.8G/5.2GHz	Yes	Yes	Yes	Yes
IEEE 802.11ac VHT80	5.8G/5.2GHz	Yes	Yes	Yes	Yes

6. Summary simultaneous transmission results

Antenna 0, Antenna 1 and Antenna 2 for 2.4G WLAN

Modulation Type	MPE _{Antenna0} (mW/cm ²)	MPE _{Antenna1} (mW/cm ²)	MPE _{Antenna2} (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11b	0.0223	0.0281	0.0223	0.0281	1.0	PASS
IEEE 802.11g	0.0177	0.0177	0.0223	0.0223	1.0	PASS
IEEE 802.11n HT20	0.0071	0.0071	0.0071	0.0213	1.0	PASS
IEEE 802.11n HT40	0.0056	0.0056	0.0056	0.0168	1.0	PASS

Antenna 0, Antenna 1 and Antenna 2 for 5G WLAN Band 1

Modulation Type	MPE _{Antenna0} (mW/cm ²)	MPE _{Antenna1} (mW/cm ²)	MPE _{Antenna2} (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11a	0.0056	0.0056	0.0089	0.0089	1.0	PASS
IEEE 802.11n HT20	0.0056	0.0056	0.0089	0.0201	1.0	PASS
IEEE 802.11ac VHT20	0.0035	0.0035	0.0045	0.0115	1.0	PASS
IEEE 802.11n HT40	0.0045	0.0056	0.0056	0.0157	1.0	PASS
IEEE 802.11ac VHT40	0.0071	0.0056	0.0071	0.0198	1.0	PASS
IEEE 802.11ac VHT80	0.0071	0.0045	0.0056	0.0172	1.0	PASS

Antenna 0, Antenna 1 and Antenna 2 for 5G WLAN Band 3

Modulation Type	MPE _{Antenna0} (mW/cm ²)	MPE _{Antenna1} (mW/cm ²)	MPE _{Antenna2} (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11a	0.0561	0.0446	0.0561	0.0561	1.0	PASS
IEEE 802.11n HT20	0.0446	0.0354	0.0561	0.1361	1.0	PASS
IEEE 802.11ac VHT20	0.0446	0.0354	0.0446	0.1246	1.0	PASS
IEEE 802.11n HT40	0.0446	0.0446	0.0561	0.1453	1.0	PASS
IEEE 802.11ac VHT40	0.0446	0.0354	0.0446	0.1246	1.0	PASS
IEEE 802.11ac VHT80	0.0056	0.0045	0.0045	0.0146	1.0	PASS

Maximum Simultaneous transmission MPE Ratios for 2.4GHz WLAN and 5G WLAN and WWAN

Maximum MPE ratio _{2.4G WLAN}	Maximum MPE ratio _{5G WLAN}	Maximum MPE ratio _{WWAN}	ΣMPE ratios	Limit	Results
0.0281	0.1453	0.1414	0.3148	1.0	PASS

7. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----END OF REPORT-----