

Maximum Permissible Exposure Evaluation

FCC ID: 2AW68-NE161134AB

1. Client Information

Applicant	:	Shenzhen SDMC Technology Co.,Ltd.
Address	:	19/F, Changhong Technology Building, No.18, Keji South 12th Road, High-tech Industrial Park, Nanshan District, Shenzhen, China, 518022
Manufacturer	:	Shenzhen SDMC Technology Co.,Ltd.
Address	:	19/F, Changhong Technology Building, No.18, Keji South 12th Road, High-tech Industrial Park, Nanshan District, Shenzhen, China, 518022

2. General Description of EUT

EUT Name	:	AC1600 DOCSIS3.0 24x8 EMTA, AC1600 WiFi Cable Modem Router, EMTA, Cable Modem
Models No.	:	NE1611B, NE1611A, NE1611, NE1634B, NE1634A, NE1634
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is USB port, model name, product name and brand name.
Brand Name	:	SDMC, Claro, A1
Product Description	:	Operation Frequency: 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz U-NII-1: 5180MHz~5240MHz, U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5700MHz U-NII-3: 5745MHz~5825MHz
Power Rating	:	Adapter:(PSA301-120250U) Input: 100-240V~, 50/60Hz 0.8A max. Output: DC 12.0V, 2.5A
Software Version	:	N/A
Hardware Version	:	N/A

MPE Calculations

1. Antenna Gain:

Antenna	Type	Gain(dBi)
1	Copper	2.4G: 4.18
		Band 1: 3.72
		Band 2: 3.72
		Band 3: 3.22
		Band 4: 3.12
2	Copper	2.4G: 4.18
		Band 1: 3.72
		Band 2: 3.72
		Band 3: 3.22
		Band 4: 3.12
3	Copper	Band 1: 3.72
		Band 2: 3.72
		Band 3: 3.22
		Band 4: 3.12

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. Simultaneous transmission MPE Considerations

According to KDB447498:All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1.Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

This means that:

$$\sum \text{ of MPE ratios } \leq 1.0$$

5. Standalone MPE Evaluation:

Worst Data				
Mode	Antenna	Channel	Conducted power[dBm]	Turn-up Power Tolerance(dBm)
5G A Mode	Ant1	5825	16.29	17±1
	Ant2	5825	16.57	17±1
	Ant3	5825	18.68	19±1
5G n20 Mode	Ant1	5745	13.62	13±1
	Ant2	5745	12.84	13±1
	Ant3	5745	13.35	13±1
5G n40 Mode	Ant1	5310	12.49	13±1
	Ant2	5310	12.85	13±1
	Ant3	5310	12.76	13±1
5G ac20 Mode	Ant1	5580	13.06	13±1
	Ant2	5580	12.57	13±1
	Ant3	5580	11.91	12±1
5G ac40 Mode	Ant1	5310	11.65	12±1
	Ant2	5310	12.04	12±1
	Ant3	5310	13.58	13±1
5G ac80 Mode	Ant1	5530	12.08	13±1
	Ant2	5530	12.99	13±1
	Ant3	5530	13.60	13±1
2.4G b mode	Ant1	2462	16.33	17±1
	Ant2	2462	18.07	18±1
2.4G g mode	Ant1	2437	16.71	17±1
	Ant2	2437	17.06	17±1
2.4G n20G mode	Ant1	2412	16.19	17±1
	Ant2	2412	14.92	15±1
2.4G n40 mode	Ant1	15.60	15.60	15±1
	Ant2	14.20	14.20	15±1

2.4GHz WLAN ANT. 1

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	18	63.10	4.18	2.618	20	0.0329	1.0000
IEEE 802.11g	18	63.10	4.18	2.618	20	0.0329	1.0000
IEEE 802.11n20	18	63.10	4.18	2.618	20	0.0329	1.0000
IEEE 802.11n40	16	39.81	4.18	2.618	20	0.0207	1.0000

2.4GHz WLAN ANT. 2

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	19	79.43	4.18	2.618	20	0.0414	1.0000
IEEE 802.11g	18	63.10	4.18	2.618	20	0.0329	1.0000
IEEE 802.11n20	16	39.81	4.18	2.618	20	0.0207	1.0000
IEEE 802.11n40	16	39.81	4.18	2.618	20	0.0207	1.0000

5GHz WLAN ANT. 1

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	18	63.10	3.72	2.355	20	0.0372	1.0000
IEEE 802.11n20	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11n40	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac20	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac40	13	19.95	3.72	2.355	20	0.0093	1.0000
IEEE 802.11ac80	14	25.12	3.72	2.355	20	0.0118	1.0000

5GHz WLAN ANT. 2

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	18	63.10	3.72	2.355	20	0.0372	1.0000
IEEE 802.11n20	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11n40	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac20	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac40	13	19.95	3.72	2.355	20	0.0093	1.0000
IEEE 802.11ac80	14	25.12	3.72	2.355	20	0.0118	1.0000

5GHz WLAN ANT. 3

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	20	100	3.72	2.355	20	0.0469	1.0000
IEEE 802.11n20	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11n40	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac20	13	19.95	3.72	2.355	20	0.0093	1.0000
IEEE 802.11ac40	14	25.12	3.72	2.355	20	0.0118	1.0000
IEEE 802.11ac80	14	25.12	3.72	2.355	20	0.0118	1.0000

Remark:

1. Output power (Average) including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

6. Summary simultaneous transmission information

Modulation Type	Work Frequency Band	Transmit Antenna		Antenna 1 Antenna 2 Synchronization Transmit
		Antenna 1	Antenna 2	
IEEE 802.11a	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	No
IEEE 802.11b	2.4GHz	Yes	Yes	No
IEEE 802.11g	2.4GHz	Yes	Yes	No
IEEE 802.11n HT20	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT20	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11n HT40	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT40	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT20	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT40	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT80	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes

7. Summary simultaneous transmission results

Antenna 1 and Antenna 2 for 2.4GWLAN

Modulation Type	MPE Antenna 1 (mW/cm ²)	MPE Antenna 2 (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11b	0.0329	0.0414	/	1.0	PASS
IEEE 802.11g	0.0329	0.0329	/	1.0	PASS
IEEE 802.11n HT20	0.0329	0.0207	0.0536	1.0	PASS
IEEE 802.11n HT40	0.0207	0.0207	0.0414	1.0	PASS

Antenna 1, Antenna 2 and Antenna 3 for 5GWLAN

Modulation Type	MPE Antenna 1 (mW/cm ²)	MPE Antenna 2 (mW/cm ²)	MPE Antenna 3 (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11a	0.0372	0.0372	0.0469	/	1.0	PASS
IEEE 802.11n HT20	0.0118	0.0118	0.0118	0.0354	1.0	PASS
IEEE 802.11ac VHT20	0.0118	0.0118	0.0118	0.0354	1.0	PASS
IEEE 802.11n HT40	0.0118	0.0118	0.0093	0.0329	1.0	PASS
IEEE 802.11ac VHT40	0.0093	0.0093	0.0118	0.0304	1.0	PASS
IEEE 802.11ac VHT80	0.0118	0.0118	0.0118	0.0354	1.0	PASS

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

Maximum MPE ratio 2.4GWLAN	Maximum MPE ratio 5GWLAN	ΣMPE ratios	Limit	Results
0.0536	0.0469	0.1005	1.0	PASS

8. Conclusion:

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

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