Maximum Permissible Exposure Evaluation

FCC ID: 2A2DZ-TZ-NVR10VP

1. Client Information

Applicant	:	Shenzhen Hiseeu Technolgy Co., Ltd
Address	:	K411, Jinhetian Business Center, No. 329, Longhuan 3rd Road,Longhua District, Shenzhen, Guangdong, China
Manufacturer	:	Shenzhen Hiseeu Technolgy Co., Ltd
Address	:	K411, Jinhetian Business Center, No. 329, Longhuan 3rd Road,Longhua District, Shenzhen, Guangdong, China

2. General Description of EUT

EUT Name	:	NVR
Models No.	:	TZ-NVR10VP, TZ-NVR16A, TZ-NVR12V, TZ-NVR10VD, WK-10VX-4HB615-AT, WK-15V-4HC905-CT, WK-15V-4HD405B-CT, WK-10V-4HDC47-AT, WK-10V-4C70-AT, WK-10V-4HD405-AT, WK-12V-4HB615-CT, WK-10V-4HB615-AT, WK-4WHC905-15V-CT, GWK-10V-2TD714-AT, GWK-10V-4TD714-AT, GWK-4TD714-AT, GWK-2TD714-EG, TZ-NVR10S, WK-4HB315-AT, WK-3C70, WK-4HB315-CT, WK-12V-4HS02-CT, WK-3C40-AT, WK-12HB315-CT, WK-4HD205-AT, WK-4TD504-AT, WK-4HD303-AT, WK-4HBC25-AT, WK-4HB615-EG, WK-12V-4HB613-CT, WK-4HB613-AT, WK-10V-4HB615B-AT, WK-8HB615B-CT, WK-12V-4HD205-CT, WK-4TD714-AT, WK-2TD714-EG, WK-10V-4TD714-AT, WK-10V-2TD714-EG, WK-8HB315-CT, WK-8HB615-CT, WK-12V-4HBC25-CT, WK-4HD405-AT, WK-10V-4HD205-AT, WK-10V-4TD403-AT, WK-4HD313-AT, WK-4C70-AT, WK6-8HB315-CT, WK6-12HB315-CT, WK-8HB613-CT, WK-4HDA03, WK-4HDA03-AT, WK-10V-4HDA03, WK-10V-4HDA03-AT, WK-12V-4HDA03, WK-12V-4HDA03-AT, SFWK-10V-4HD313-AT-3, GWK-10V-4TD714-AT-2, SFWK-4HD313-AT-2, TZ-SFNVR-8A-2, SFTZ-NVR10V-2, US-WK-4C40-AT, US-WK-10V-4TD403-AT, US-WK-3C40-AT, US-WK-4HD303-AT, US-TZ-NVR10VD, US-TZ-NVR16A, US-TZ-NVR16, US-TZ-NVR15V, US-TZ-NVR10VZ,

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		US-TZ-NVR10S, US-TZ-NVR12V, US-WK-10V-4HD405-AT, US-WK-12V-4HS02-CT, US-WK-8HBC45-CT, US-WK-4HS03-AT, US-WK-10VP-4HD405-AT, WK-4HS18-AT, WK-10V-4HS18-AT	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is appearance color.	
Sample ID	:	HC-C-202407-0307-01-01-1#&HC-C-202407-0307-01-01-2#	
Product Description	:	Operation Frequency: (REALTEK 8192FC)	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
		Antenna Gain: (REALTEK 8192FC)	3.74dBi PCB Antenna1 3.46dBi PCB Antenna2
		Operation Frequency: (AIC8800D40L)	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11ax(HE20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz 802.11ax(HE40): 2422MHz~2452MHz U-NII-1: 5180MHz~5240MHz U-NII-3: 5745MHz~5825MHz
		Antenna Gain: (AIC8800D40L)	5.0dBi FPC Antenna for 2.4G WIFI 5.0dBi FPC Antenna for 5G WIFI
Power Rating	:	Adapter(YDY-186) INPUT: AC100-240V~50/60Hz OUTPUT: 12V/1A	
Software Version	:	3.6.2.18F	
Hardware Version	:	MC8810_V161P1_10INCH_XF	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the MPE report used the EUT-2(HC-C-202407-0307-01-01-2#).	

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MPE Calculations for FCC

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

2. **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

3. **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:
   ∑ of MPE ratios ≤ 1.0

4. Standalone MPE Evaluation:

2.4G WIFI Worst Maximum MPE Result(AIC8800D40L)								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
802.11b	1	2412	21.82	21±1	22	5.0	20	0.09971
		2437	22.29	22±1	23	5.0	20	0.12553
		2462	21.14	21±1	22	5.0	20	0.09971
802.11g	1	2412	16.56	16±1	17	5.0	20	0.03153
		2437	15.78	15±1	16	5.0	20	0.02505
		2462	15.03	15±1	16	5.0	20	0.02505
802.11n (HT20)	1	2412	13.47	13±1	14	5.0	20	0.01580
		2437	12.92	12±1	13	5.0	20	0.01255
		2462	12.30	12±1	13	5.0	20	0.01255
802.11n (HT40)	1	2422	13.59	13±1	14	5.0	20	0.01580
		2437	12.68	12±1	13	5.0	20	0.01255
		2452	12.92	12±1	13	5.0	20	0.01255
802.11ax (HE20)	1	2412	13.48	13±1	14	5.0	20	0.01580
		2437	12.95	12±1	13	5.0	20	0.01255
		2462	12.30	12±1	13	5.0	20	0.01255
802.11ax (HE40)	1	2422	13.23	13±1	14	5.0	20	0.01580
		2437	12.92	12±1	13	5.0	20	0.01255
		2452	12.55	12±1	13	5.0	20	0.01255

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Output Power.

5.2G WIFI Worst Maximum MPE Result(AIC8800D40L)								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
802.11a	1	5180	18.06	18±1	19	5.0	20	0.04997
		5200	18.66	18±1	19	5.0	20	0.04997
		5240	20.15	20±1	21	5.0	20	0.07920
802.11n20	1	5180	15.43	15±1	16	5.0	20	0.02504
		5200	16.14	16±1	17	5.0	20	0.03153
		5240	17.35	17±1	18	5.0	20	0.03970
802.11n40	1	5190	13.90	13±1	14	5.0	20	0.01580
		5230	13.75	13±1	14	5.0	20	0.01580
802.11ac20	1	5180	12.02	12±1	13	5.0	20	0.01255
		5200	12.59	12±1	13	5.0	20	0.01255
		5240	13.61	13±1	14	5.0	20	0.01580
802.11ac40	1	5190	12.09	12±1	13	5.0	20	0.01255
		5230	13.75	13±1	14	5.0	20	0.01580
802.11ax20	1	5180	11.74	11±1	12	5.0	20	0.00997
		5200	12.06	12±1	13	5.0	20	0.01255
		5240	13.33	13±1	14	5.0	20	0.01580
802.11ax40	1	5190	11.56	11±1	12	5.0	20	0.00997
		5230	12.92	12±1	13	5.0	20	0.01255

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Output Power.

5.8G WIFI Worst Maximum MPE Result(AIC8800D40L)								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
802.11a	1	5745	23.66	23±1	24	5.0	20	0.15803
		5785	22.81	22±1	23	5.0	20	0.12553
		5825	21.63	21±1	22	5.0	20	0.09971
802.11n20	1	5745	23.31	23±1	24	5.0	20	0.15803
		5785	22.75	22±1	23	5.0	20	0.12553
		5825	21.17	21±1	22	5.0	20	0.09971
802.11n40	1	5755	22.75	22±1	23	5.0	20	0.12553
		5795	22.41	22±1	23	5.0	20	0.12553
802.11ac20	1	5745	23.27	23±1	24	5.0	20	0.15803
		5785	22.19	22±1	23	5.0	20	0.12553
		5825	21.80	21±1	22	5.0	20	0.09971
802.11ac40	1	5755	22.82	22±1	23	5.0	20	0.12553
		5795	21.75	21±1	22	5.0	20	0.09971
802.11ax20	1	5745	18.98	18±1	19	5.0	20	0.04997
		5785	18.51	18±1	19	5.0	20	0.04997
		5825	18.17	18±1	19	5.0	20	0.04997
802.11ax40	1	5755	17.98	17±1	18	5.0	20	0.03970
		5795	17.38	17±1	18	5.0	20	0.03970

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Output Power.

2.4G WIFI Worst Maximum MPE Result Antenna1(REALTEK 8192FC)								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
802.11b	1	2412	16.89	16±1	17	3.74	20	0.02359
		2437	16.65	16±1	17	3.74	20	0.02359
		2462	17.08	17±1	18	3.74	20	0.02970
802.11g	1	2412	12.55	12±1	13	3.74	20	0.00939
		2437	16.84	16±1	17	3.74	20	0.02359
		2462	15.56	15±1	16	3.74	20	0.01874
802.11n (HT20)	1	2412	12.28	12±1	13	3.74	20	0.00939
		2437	13.85	13±1	14	3.74	20	0.01182
		2462	14.41	14±1	15	3.74	20	0.01488
802.11n (HT40)	1	2422	13.33	13±1	14	3.74	20	0.01182
		2437	13.94	13±1	14	3.74	20	0.01182
		2452	15.56	15±1	16	3.74	20	0.01874
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Output Power.								

2.4G WIFI Worst Maximum MPE Result Antenna2(REALTEK 8192FC)								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm^2) [S]
802.11b	1	2412	15.78	15±1	16	3.46	20	0.01757
		2437	15.50	15±1	16	3.46	20	0.01757
		2462	15.75	15±1	16	3.46	20	0.01757
802.11g	1	2412	16.26	16±1	17	3.46	20	0.02212
		2437	17.05	17±1	18	3.46	20	0.02784
		2462	15.27	15±1	16	3.46	20	0.01757
802.11n (HT20)	1	2412	12.09	12±1	13	3.46	20	0.00881
		2437	14.14	14±1	15	3.46	20	0.01396
		2462	14.51	14±1	15	3.46	20	0.01396
802.11n (HT40)	1	2422	13.27	13±1	14	3.46	20	0.01109
		2437	13.78	13±1	14	3.46	20	0.01109
		2452	13.63	13±1	14	3.46	20	0.01109

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Output Power.

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/cm^2)
300-1,500	F/1500
1,500-100,000	1.0

6. Summary simultaneous transmission information

The sample supports three antennas for (2.4G WIFI&5G WIFI) AIC8800D40L Antenna and 2.4G WIFI (REALTEK 8192FC) Antenna1 and 2.4G WIFI (REALTEK 8192FC) Antenna2.
The (2.4G WIFI&5G WIFI) AIC8800D40L Antenna and 2.4G WIFI (REALTEK 8192FC) Antenna1 and 2.4G WIFI (REALTEK 8192FC) Antenna2 can transmit simultaneous.
The (2.4G WIFI&5G WIFI) AIC8800D40L Antenna and 2.4G WIFI (REALTEK 8192FC) Antenna1 and 2.4G WIFI (REALTEK 8192FC) Antenna2 with three different Antenna.
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
∑ of MPE ratios ≤ 1.0

7. Summary simultaneous transmission results

(2.4G WIFI&5G WIFI) AIC8800D40L Antenna + 2.4G WIFI (REALTEK 8192FC) Antenna1 + 2.4G WIFI (REALTEK 8192FC) Antenna2 Maximum Simultaneous transmission MPE Ratios is

0.15803+0.02970+0.02784=0.21557⩽1.0.

8. Conclusion:

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

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