

1 Cover Page

RF Exposure Evaluation Report

Application No.: KSCR2109000108AT
FCC ID: 2ADTD-CP03009601212
Applicant: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Applicant: No.555 Qianmo Road, Binjiang District Hangzhou 310052, China
Manufacturer: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Manufacturer: No.555 Qianmo Road, Binjiang District Hangzhou 310052, China
Factory: 1. Hangzhou Hikvision Technology Co., Ltd.
 2. Hangzhou Hikvision Electronics Co., Ltd.
 3. CHONGQING HIKVISION TECHNOLOGY CO., LTD.
Address of Factory: 1. No.700, Dongliu Road, Binjiang District, Hangzhou City, Zhejiang, 310052, China
 2. No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou, Zhejiang, 310052, China.
 3. Building 18, Louyu Area, C area, Jianqiao industrial park, Chongqing.

Equipment Under Test (EUT):

EUT Name: AX PRO
Model No.: DS-PWA96-M-WA
Add Model No.: DS-PWA96-M-WAUHK, DS-PWA96-M-WACKV, DS-PWA96-M-WAUVS, DS-PWA96-M-WAKVO, DS-PWA96-M-WAHUN
Standard(s) : FCC Rules 47 CFR §2.1091
 KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2021-09-27
Date of Test: 2021-10-02 to 2021-10-15
Date of Issue: 2021-10-18

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
Laboratory Manager

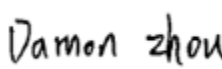
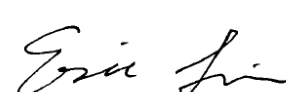
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Revision Record			
Version	Description	Date	Remark
00	Original	2021-10-18	/

Authorized for issue by:		 <hr/> Damon Zhou / Project Engineer		
		 <hr/> Eric Lin / Reviewer		



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3 General Information

3.1 General Description of E.U.T.

Power supply:	AC 100~240V 50/60Hz + DC 3.8V by Rechargeable li-ion Polymer Battery Battery Model: 765965 Capacity: 4520mAh/17.176Wh
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3.2 Technical Specifications

912.5MHz ~ 917.4MHz

Operation Frequency:	912.5MHz ~ 917.4MHz
Spectrum Spread:	Frequency Hopping Spread Spectrum (FHSS)
Number of Channels:	50
Channel Spacing:	100kHz
Modulation Type:	FSK
Antenna Gain:	Antenna 1:2dBi (Provided by manufacturer) Antenna 1:2dBi (Provided by manufacturer)
Antenna Type:	PCB Layout Antenna

2.4G

Antenna Gain:	Ant 1: 2.1dBi (Provided by manufacturer) Ant 2: 2.4dBi (Provided by manufacturer) Directional gain:5.26dBi
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):7
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Antenna Type:	PCB Layout Antenna

920MHz

Antenna Gain:	Ant 1: 3.45dBi (Provided by manufacturer) Ant 2: 3.45dBi (Provided by manufacturer)
Antenna Type:	PCB Layout Antenna
Modulation Type:	FSK
Operation Frequency:	920MHz
Channel Number:	1

NFC 13.56MHz

Antenna Type	Loop antenna
Modulation Type	ASK
Number of Channels	1
Operation Frequency	13.56MHz



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LTE /GNSS MODULE

Support Band:	U.S. Bands: LTE FDD Band 2 LTE FDD Band 4 LTE FDD Band 5 LTE FDD Band 12 LTE FDD Band 13 LTE FDD Band 14 LTE FDD Band 25 LTE FDD Band 26 LTE TDD Band 41 LTE FDD Band 66 LTE FDD Band 71 (Note: Band 2 falls completely within the working range of Band 25, Band 4 falls completely within the working range of Band 66, Band 5 falls completely within the working range of Band 26, no separate test required.)
SIM CARD:	Only support single SIM Card.
Tx Frequency Range:	LTE Band 2:1850~1910MHz LTE Band 4:1710~1755MHz LTE Band 5:824~849MHz LTE Band 12:699~716MHz LTE Band 13:777~787MHz LTE Band 14:788~798MHz LTE Band 25:1850~1915MHz LTE Band 26:814~849MHz LTE Band 41:2496~2690MHz LTE Band 66:1710~1780MHz LTE Band 71:663~698MHz
Rx Frequency Range:	LTE Band 2:1930 ~1990MHz LTE Band 4:2110~2155MHz LTE Band 5:869~894MHz LTE Band 12:729~746MHz LTE Band 13:746~756MHz LTE Band 14:758~768MHz LTE Band 25:1930~1995MHz LTE Band 26:859~894MHz LTE Band 41:2496~2690MHz LTE Band 66:2110~2200MHz LTE Band 71:617~652MHz
Bandwidth:	LTE Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13: 5MHz / 10MHz LTE Band 14: 5MHz / 10MHz LTE Band 25: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz LTE Band 26: 1.4MHz / 3MHz / 5MHz / 10MHz/15MHz LTE Band 41: 5MHz / 10MHz / 15MHz /20MHz LTE Band 66: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz LTE Band 71: 5MHz / 10MHz / 15MHz /20MHz
Type of modulation:	QPSK /16QAM
Antenna Type:	PCB Antenna
Maximum Antenna Gain:	LTE Band 2/4/7/25/41/66: 0.2 dBi LTE Band 5/12/13/14/26/71: 0.2 dBi



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3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• **ISED (CAB Identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development (ISED) Canada as an accredited testing laboratory.

CAB Identifier: CN0072.

• **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600,C-11707, T-11499, G-10216 respectively.



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4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report KSCR210900010801, KSCR210900010802, KSCR21090010803 and STS2006195W01

912.5MHz ~ 917.4MHz

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Maximum Peak Conducted Output Power (mW)	
			Ant1	Ant2	Ant1	Ant2
FSK	SISO	912.5	11.27	11.16	13.40	13.06
		917.4	11.30	11.23	13.49	13.27

2.4GHz Wi-Fi

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11B	2412	17.74	16.88	NA	59.43	48.75	N/A
11B	2437	17.53	17.23	NA	56.62	52.84	N/A
11B	2462	17.25	17.53	NA	53.09	56.62	N/A
11G	2412	17.16	17.34	NA	52.00	54.20	N/A
11G	2437	17.21	17.66	NA	52.60	58.34	N/A
11G	2462	16.97	17.94	NA	49.77	62.23	N/A
11N20MIMO	2412	14.13	14.35	17.25	25.88	27.23	53.09
11N20MIMO	2437	14.21	14.70	17.47	26.36	29.51	55.85
11N20MIMO	2462	14.05	14.98	17.55	25.41	31.48	56.89
11N40MIMO	2422	14.13	13.68	16.92	25.88	23.33	49.20
11N40MIMO	2437	14.12	14.43	17.29	25.82	27.73	53.58
11N40MIMO	2452	14.04	14.63	17.36	25.35	29.04	54.45

920MHz

Test Mode	Channel	Level (dBuV/m)	Power [dBm]	Power [mW]
FSK	920 MHz	90.44	-4.76	0.3342

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} + 20 \log(\text{d[meters]}) - 104.77$$

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2$$

$$= 90.44 \text{ dB}\mu\text{V/m} - 95.2$$

$$= -4.76 \text{ dBm} = 0.3342 \text{ mW}$$



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LTE / MODULE

Refer to STS2006195W01 RF Exposure Report

Mode	LTE Band 2:1850~1910MHz LTE Band 4:1710~1755MHz LTE Band 5:824~849MHz LTE Band 12:699~716MHz LTE Band 13:777~787MHz LTE Band 14:788~798MHz LTE Band 25:1850~1915MHz LTE Band 26:814~849MHz LTE Band 41:2496~2690MHz LTE Band 66:1710~1780MHz LTE Band 71:663~698MHz (Note: Band 2 falls completely within the working range of Band 25, Band 4 falls completely within the working range of Band 66, Band 5 falls completely within the working range of Band 26, no separate test required.)
Detector	PEAK
Band 12	23±1dBm
Band 13	22±1dBm
Band 14	21±1dBm
Band 25	22±1dBm
Band 26	24±1dBm
Band 26(Part 90)	24±1dBm
Band 41	24±1dBm
Band 66	22±1dBm
Band 71	21±1dBm

ANT Gain (G)

Antenna gain :

- B12 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B13 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B14 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B25 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B26 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B41 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B66 : 0.2 dBi (gain of antenna in linear scale=1.05)**
- B71 : 0.2 dBi (gain of antenna in linear scale=1.05)**



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5.2 MPE Calculation

For WiFi:

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) For 912.5MHz ~ 917.4MHz, MPE limit = 912.5MHz / 1500 = 0.608mW/cm².

For 2.4GHz Wi-Fi, MPE limit = 1mW/cm²

For 920MHz, MPE limit = 920/1500 = 0.613mW/cm²

For 912.5MHz ~ 917.4MHz

The max. antenna gain is 2 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
13.49	1.585	20	0.00425	0.608	Pass

For 2.4G WiFi - Antenna1:

The max. antenna gain is 2.1 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
59.43	1.622	20	0.01917	1	Pass

For 2.4G WiFi - Antenna2:

The max. antenna gain is 2.4 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
62.23	1.738	20	0.02151	1	Pass

In MIMO mode:

The max. antenna gain is 5.26 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
56.89	3.357	20	0.03800	1	Pass



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For 920MHz

$$S = \frac{PG}{4R^2\pi} = \frac{0.3342}{4 \times 400 \times 3.14} = 0.000067 \text{ mW/cm}^2 < 0.613 \text{ mW/cm}^2$$

LTE / MODULE

Protocol	ANT Gain(gain of antenna in linear scale)	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Band 12	1.05	716	24	251.19	0.05	0.48
Band 13	1.05	787	23	199.53	0.04	0.52
Band 14	1.05	798	22	158.49	0.03	1.00
Band 25	1.05	1915	23	199.53	0.04	1.00
Band 26	1.05	849	25	316.23	0.07	0.57
Band 26(Part 90)	1.05	849	25	316.23	0.07	0.57
Band 41	1.05	2690	25	316.23	0.07	1.00
Band 66	1.05	1780	23	199.53	0.04	1.00
Band 71	1.05	698	22	158.49	0.03	1.00

Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for 912.5MHz~917.4MHz, 2.4GHz Wi-Fi, 920MHz and LTE / is 0.00425/0.608 + 0.03800/1 + 0.000067/0.613 + 0.7/0.57 = 0.1679 < 1

according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

--End of the Report--



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