1 Cover Page

RF Exposure Evaluation Report

Application No.:	KSCR2110000137AT
FCC ID:	2A3IQ-MD5043SD
Applicant:	Hangzhou HikAuto Technology Co., Ltd.
Address of Applicant:	Room 309, Floor B, Building 2, No. 399, Danfeng Road, Binjiang District, Hangzhou City, Zhejiang Province
Manufacturer:	Hangzhou HikAuto Technology Co., Ltd.
Address of Manufacturer:	Room 309, Floor B, Building 2, No. 399, Danfeng Road, Binjiang District, Hangzhou City, Zhejiang Province
Factory:	Hangzhou HikAuto Technology Co., Ltd.
Address of Factory:	No. 700, Dongliu Road, Binjiang District, Hangzhou City, Zhejiang Province
Equipment Under Test (EUT):	
EUT Name:	Digital Video Recorder
Model No.:	Refer ro page2
Trade mark:	HIKVISON
Standard(s) :	FCC Rules 47 CFR §2.1091
Date of Receipt:	2021-10-09
Date of Test:	2021-10-18 to 2021-11-16
Date of Issue:	2021-11-17
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Model No.:

AE-MD5043-SD/GLF/WI, AE-MD5043-SD ,AE-MD5043-SD/GLF/WI58,AE-MD5XXX-SD/YY/ZZ,AE-MD5043-SDUHK,AE-MD5043-SDCKV,AE-MD5043-SDUVS,AE-MD5043-SDKVO,AE-MD5043-SDHUN,DS-MP3504-SD/GW/WI,DS-MP5604-SD/GW/WI,DS-MP5604-SD/GW/WI58,DS-MP3504-SD/GLF/WI,DS-MP5604-SD/GLF/WI,DS-MP5604-SD/GLF/WI58,DS-MP5XXX-SD/YY/ZZ,DS-MP5604-SDUHK,DS-MP5604-SDCKV,DS-MP5604-SDUVS,DS-MP5604-SDKVO,DS-MP5604-SDHUN,AE-MD5043-SD/GLF/WI(B),AE-MD5043-SD/GLF/WI58(B),AE-MD5XXX-SD/YY/ZZ(B),AE-MD5043-SDUHK(B),AE-MD5043-SDCKV(B),AE-MD5043-SDUVS(B),AE-MD5043-SDKVO(B),AE-MD5043-SDHUN(B),AE-MD5044-SD/GLF/WI,AE-MD5044-SD/GLF/WI58,AE-MD5044-SD/GLF/WI(B),AE-MD5044-SD/GLF/WI58(B),AE-MX0401-SD/GLF/WI,AE-MX0402-SD/GLF/WI,AE-MX0404-SD/GLF/WI,AE-MX0401-SD/GLF/WI58,AE-MX0402-SD/GLF/WI58,AE-MX0404-SD/GLF/WI58,AE-MXXXXX,AE-MXXXXX-SD,AE-MXXXXX-YY/ZZ,AE-MXXXXX-YY/ZZ(B)

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Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2021-11-17	/

Authorized for issue by:				
		Damon zhou		
		Damon Zhou / Project Engineer		
		Eric Lin		
		Eric Lin / Reviewer		

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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 9V-36V

3.2 Technical Specifications

2.4GHz

Antenna Gain:	Ant 1: 1.75dBi (Provided by the manufacturer) Ant 2: 3.38dBi(Provided by the manufacturer) Directional gain:5.65dBi
Antenna Type:	Dipole Antenna
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

5GHz

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(VHT20)	5180-5240	4
		802.11n(HT40)/ac(VHT40)	5190-5230	2
		802.11ac(VHT80)	5210	1
	UNII Band III	802.11a/n(HT20) /ac(VHT20)	5745-5825	5
		802.11n(HT40)/ac(VHT40)	5755-5795	2
		802.11ac(VHT80)	5775	1
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-7 802.11ac: MCS0-9			
Channel Spacing:	802.11a/n(HT20)/ac(VHT20): 20MHz 802.11n(HT40)/ac(VHT40): 40MHz 802.11ac(VHT80): 80MHz			
Antenna Gain:	Ant 1: 1.97dBi (Provided by the manufacturer) Ant 2: 1.89dBi (Provided by the manufacturer) Directional gain:4.94dBi			
Antenna Type:	Dipole Antenna			

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2G

Testing frequency band:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 - 849	869 - 894
	PCS1900	1850 - 1910	1930 - 1990
Type of Modulation:	GMSK(GSM/GPRS/EGPRS), 8PSK (EGPRS)		
Sample Type:	Fixed equipment		
Antenna Type:	Dipole Antenna		
Antenna Gain:	GSM850: 0.52dBi GSM1900: 1.15dBi		

3G

Testing frequency band:	Band	Tx (MHz)	Rx (MHz)
	BAND II	1850 - 1910	1930 - 1990
	BAND V	824 - 849	869 - 894
Type of Modulation:	UL QPSK,16QAM DL QPSK,16QAM		
Sample Type:	Fixed equipment		
Antenna Type:	Dipole Antenna		
Antenna Gain:	WCDMA BAND II: 1.15dBi WCDMA BAND V: 0.52dBi		

4G

	LTE	Duplex	Uplink (MHz)	Downlink (MHz)	Supported Channel Bandwidth					
	BAND	Mode			1.4	3	5	10	15	20
Frequency Band:	2	FDD	1850 - 1910	1930 - 1990	☒	☒	☒	☒	☒	☒
	4	FDD	1710 - 1755	2110 - 2155	☒	☒	☒	☒	☒	☒
	5	FDD	824 - 849	869 - 894	☒	☒	☒	☒	---	---
	28	FDD	703 - 748	758 - 803	---	☒	☒	☒	☒	☒
	66	FDD	1710 - 1780	2110 - 2180	☒	☒	☒	☒	☒	☒
Type of Modulation:	UL: QPSK,16QAM DL: QPSK,16QAM									
Sample Type:	Fixed equipment									
Antenna Type:	Dipole Antenna									
Antenna Gain:	Band 2:1.15dBi Band 4: 1.72dBi Band 5: 0.52dBi Band 28: 0.37dBi Band 66: 1.72dBi									

Note:
The antenna gain value is provided by the customer. The test lab will not be responsible for wrong test result due to incorrect information about antenna gain values.

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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 Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• 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 range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note:Limit for 2.4GHz is 1.0 mW/cm^2,5GHz is 1.0 mW/cm^2,
GSM 850 is 0.55mW/cm^2,GSM 1900 is 1mW/cm^2,
WCDMA B2 is 1mW/cm^2, WCDMA B5 is 1mW/cm^2,
LTE B2 is 1mW/cm^2, LTE B4 is 1mW/cm^2, LTE B5 is 0.55mW/cm^2,
LTE B28 is 0.47mW/cm^2, LTE B66 is 1mW/cm^2.

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5 Measurement and Calculation

5.1 Maximum transmit power

2.4GHz

The Power Data is based on the RF Test Report KSCR211000013701

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	17.67	17.82	NA	58.48	60.53	N/A
11B	2437	17.52	17.55	NA	56.49	56.89	N/A
11B	2462	17.88	17.07	NA	**61.38**	50.93	N/A
11G	2412	17.77	17.83	NA	59.84	**60.67**	N/A
11G	2437	17.58	17.36	NA	57.28	54.45	N/A
11G	2462	17.66	16.87	NA	58.34	48.64	N/A
11N20MIMO	2412	17.86	17.66	20.77	61.09	58.34	**119.40**
11N20MIMO	2437	17.70	17.22	20.48	58.88	52.72	111.69
11N20MIMO	2462	17.74	16.76	20.29	59.43	47.42	106.91
11N40MIMO	2422	17.35	16.57	19.99	54.33	45.39	99.77
11N40MIMO	2437	17.05	16.15	19.63	50.70	41.21	91.83
11N40MIMO	2452	17.09	15.92	19.55	51.17	39.08	90.16

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5GHz

The Power Data is based on the RF Test Report KSCR211000013702

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
802.11a	5180	12.58	12.52	N/A	18.11	17.86	N/A
	5200	12.69	12.71	N/A	18.58	18.66	N/A
	5240	12.55	13.26	N/A	17.99	21.18	N/A
	5745	10.30	14.55	N/A	10.72	28.51	N/A
	5785	10.28	14.27	N/A	10.67	26.73	N/A
	5825	11.18	13.72	N/A	13.12	23.55	N/A
802.11n(HT20)	5180	12.12	12.53	15.34	16.29	17.91	34.20
	5200	12.50	12.74	15.63	17.78	18.79	36.56
	5240	12.47	13.15	15.83	17.66	20.65	38.28
	5745	10.15	14.55	15.90	10.35	28.51	38.90
	5785	10.11	14.29	15.69	10.26	26.85	37.07
	5825	10.66	13.54	15.34	11.64	22.59	34.20
802.11n(HT40)	5190	13.89	12.48	16.25	**24.49**	17.70	42.17
	5230	13.84	13.08	16.49	24.21	20.32	**44.57**
	5755	10.31	14.58	15.96	10.74	**28.71**	39.45
	5795	10.27	13.65	15.29	10.64	23.17	33.81
802.11ac(VHT20)	5180	12.96	12.05	15.54	19.77	16.03	35.81
	5200	12.93	12.30	15.64	19.63	16.98	36.64
	5240	12.76	12.88	15.83	18.88	19.41	38.28
	5745	9.18	14.06	15.28	8.28	25.47	33.73
	5785	9.12	13.81	15.08	8.17	24.04	32.21
	5825	9.93	13.24	14.90	9.84	21.09	30.90
802.11ac(VHT40)	5190	12.45	10.84	14.73	17.58	12.13	29.72
	5230	12.49	11.29	14.94	17.74	13.46	31.19
	5755	8.91	13.13	14.52	7.78	20.56	28.31
	5795	8.66	12.57	14.05	7.35	18.07	25.41
802.11ac(VHT80)	5210	10.70	11.01	13.87	11.75	12.62	24.38
	5775	12.49	12.72	15.62	17.74	18.71	36.48

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2G/3G/4G

The Power Data is based on the RF Test Report B19W50074-MPE-Rev4

Frequency Band	Highest Averaged Power Output(dBm)	Highest Frame-Averaged Output Power (dBm)	Antenna Gain(dBi)
GSM850	35	25.97	0.52
GSM1900	32	22.97	1.15
WCDMA Band2	25	25	1.15
WCDMA Band5	25	25	0.52
LTE Band 2	25.7	25.7	1.15
LTE Band 4	25.7	25.7	1.72
LTE Band 5	25.7	25.7	0.52
LTE Band 28	25.7	25.7	0.37
LTE Band 66	25.7	25.7	1.72

Notes:
1) Division Factors
To average the power, the division factor is as follows:
1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB
2) According to the conducted power as above, the measurements are performed with 1Txslots for 850MHz and 1900MHz.

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5.2 MPE Calculation

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) MPE limit = 1mW/cm²

For 2.4G WiFi - Antenna1:

The max. antenna gain is		1.75	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
61.38	1.496	20	0.01827	1	Pass

For 2.4G WiFi - Antenna2:

The max. antenna gain is		3.38	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
60.67	2.178	20	0.02628	1	Pass

In MIMO mode:

The max. antenna gain is		5.65	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
119.4	3.673	20	0.08724	1	Pass

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For 5G WiFi - Antenna1:

The max. antenna gain is		1.97	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
24.49	1.574	20	0.00767	1	Pass

For 5G WiFi - Antenna2:

The max. antenna gain is		1.89	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
28.71	1.545	20	0.00883	1	Pass

In MIMO mode:

The max. antenna gain is		4.94	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
44.57	3.119	20	0.02765	1	Pass

2G/3G/4G

Frequency Band	Results(mW/m^2)	Limit(mW/m^2)	Verdict
GSM850	0.0887	0.55	Pass
GSM1900	0.0514	1.00	Pass
WCDMA Band2	0.0820	1.00	Pass
WCDMA Band5	0.0709	0.55	Pass
LTE Band 2	0.0963	1.00	Pass
LTE Band 4	0.1098	1.00	Pass
LTE Band 5	0.0833	0.55	Pass
LTE Band 28	0.0805	0.47	Pass
LTE Band 66	0.1098	1.00	Pass

The 2.4G WiFi&5G WiFi&GSM can simultaneous transmitting. But the maximum rate of MPE is = 0.08724/1 + 0.02765/1 + 0.0887/0.55 = 0.2762 <= 1.

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The 2.4G WiFi&5G WiFi&WCDMA can simultaneous transmitting. But the maximum rate of MPE is = 0.08724/1 + 0.02765/1 + 0.0709/0.55 = 0.2438 <= 1.

The 2.4G WiFi&5G WiFi&LTE can simultaneous transmitting. But the maximum rate of MPE is = 0.08724/1 + 0.02765/1 + 0.0805/0.47 = 0.2862 <= 1.

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

--End of the Report--

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