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RF Exposure Evaluation Report

Report No. : CQASZ20200200096E-02
Applicant: Shenzhen Anboqi Technology Co.,Ltd
Address of Applicant: 3F, Building B, No.1, Road 1, Shangxue Technology Park, Bantian Town, Longgang District, Shenzhen, Guangdong province, 518129, China.
Equipment Under Test (EUT):
Product: WIFI IP CCTV CAMERA
Model No.: ABQ-A6, ABQ-A8, ABQ-XXXXY(X stand 0-9, Y stand for A-Z)
Test Model No.: ABQ-A1
Brand Name: Anboqi
FCC ID: 2AL9C-ABQA1
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-02-28
Date of Test: 2020-02-28 to 2020-03-05
Date of Issue: 2020-03-05
Test Result : **PASS***

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

Tested By:

Tom Chen

(Tom chen)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai
(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200200096E-02	Rev.01	Initial report	2020-03-05

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3 General Information

3.1 Client Information

Applicant:	Shenzhen Anboqi Technology Co.,Ltd
Address of Applicant:	3F, Building B, No.1, Road 1, Shangxue Technology Park, Bantian Town, Longgang District, Shenzhen, Guangdong province,518129, China.
Manufacturer:	Shenzhen Anboqi Technology Co.,Ltd
Address of Manufacturer:	3F, Building B, No.1, Road 1, Shangxue Technology Park, Bantian Town, Longgang District, Shenzhen, Guangdong province,518129, China.

3.2 General Description of EUT

Product Name:	WIFI IP CCTV CAMERA
Model No.:	ABQ-A6, ABQ-A8, ABQ-XXXXY(X stand 0-9 ,Y stand for A-Z)
Test Model No.:	ABQ-A1
Trade Mark:	Anboqi
Hardware version:	IPC-RB-BLK530AI-P1-ABQ V2.01
Software version:	General_IPC_XM530_R80X20-PQ_WIFIXM711.711.Nat.dss. OnvifS_V5.00.R02.20190613
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps IEEE for 802.11n(HT40) : 13.5Mbps/27Mbps/40.5Mbps/54Mbps/81Mbps/108Mbps/121.5Mbps/135Mbps
Product Type:	☒ Mobile ☐ Portable ☐ Fix Location
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type:	External antenna
Antenna Gain:	3dBi
Power Supply:	AC/DC Adapter Model: JRA-1202RPPS Input: 100-240~50-60Hz 0.6A Output: 12V 2A

Note:

Model No.: ABQ-A6, ABQ-A8, ABQ-XXXXY(X stand 0-9 ,Y stand for A-Z)

Only the model ABQ-A1 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance, pack and model name.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

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

4.1.3 EUT RF Exposure

1) For WIFI

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

IEEE for 802.11b mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	12.96	12.5±1	13.5	22.387
Middle(2437MHz)	13.59	13.0±1	14.0	25.119
Highest(2462MHz)	13.49	13.5±1	14.5	28.184
IEEE for 802.11g mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.78	11.5±1	12.5	17.783
Middle(2437MHz)	12.51	12.5±1	13.5	22.387
Highest(2462MHz)	12.87	12.5±1	13.5	22.387
IEEE for 802.11n(HT20) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	11.7	11.0±1	11.5	14.125
Middle(2437MHz)	12.33	12.5±1	13.5	22.387
Highest(2462MHz)	12.88	12.5±1	13.5	22.387
IEEE for 802.11n(HT40) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	11.15	11.5±1	12.5	17.783
Middle(2437MHz)	11.52	11.5±1	12.5	17.783
Highest(2452MHz)	12	11.5±1	12.5	17.783

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
28.184	3	0.0112	1.0	PASS

Note: 1) Refer to report No. CQASZ20200200096E-01 for EUT test Max Conducted average Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (28.184 * 2) / (4 * 3.1416 * 20^2) = 0.0112$