



# FCC PART 15.247

# TEST REPORT

# For

# Signify (China) Investment Co., Ltd.

Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233, China

# FCC ID: 2AGBW9290032837

Report Type:		Product Name:
Class II permiss	ive change Report	WiZ Outdoor Camera NAM
Report Number:	RKSB231226001-00E	8
Report Date:	2024-08-29	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S.Government.

# **TABLE OF CONTENTS**

DOCUMENT HISTORY	3
FILING DESCRIPTION	4
GENERAL INFORMATION	5
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
OBJECTIVE	5
Test Methodology	6
MEASUREMENT UNCERTAINTY	6
TEST FACILITY	6
SYSTEM TEST CONFIGURATION	7
DESCRIPTION OF TEST CONFIGURATION	7
EQUIPMENT MODIFICATIONS	7
EUT EXERCISE SOFTWARE	8
SUPPORT EQUIPMENT LIST AND DETAILS	9
BLOCK DIAGRAM OF TEST SETUP	9
SUMMARY OF TEST RESULTS	11
SUMMART OF TEST RESULTS	
TEST EQUIPMENT LIST	12
RF EXPOSURE EVALUATION	13
FCC §15.203 - ANTENNA REQUIREMENT	14
APPLICABLE STANDARD	14
ANTENNA CONNECTOR CONSTRUCTION	14
FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS	15
APPLICABLE STANDARD	15
TEST SYSTEM SETUP	15
EMI TEST RECEIVER SETUP	
TEST PROCEDURE	
TEST RESULTS SUMMARY	10
	10
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMIISSIONS	
APPLICABLE STANDARD	
IEST SYSTEM SETUP	
Test Procedure	
TEST RESULTS SUMMARY	
TEST DATA	21
EUT PHOTOGRAPHS	25
TEST SETUP PHOTOGRAPHS	

# **DOCUMENT HISTORY**

Revision	Release Date	Description of Revision	Report Number
R1V1	2024-08-29	Class II permissive change Report	RKSB231226001-00B

# FILING DESCRIPTION

Report Number	Information about changes
RKSB231226001-00B	Adapter; support; Product Name; Model

Note:

This is a C2PC report, based on CR230741391-00A<sup>\*</sup>, grant on 12/01/2023, the details as below:

- 1. Add an adapter: KA1201A-0502000US.
- 2. Add a support.
- 3. Change tested product name to "WiZ Outdoor Camera NAM".
- 4. Change tested model to "9290041114".

For above differences, we retested items "AC Line Conducted Emissions" and "Spurious Emissions for Below 1 GHz" and We also updated related test photos and all EUT photos, other data and photo are referred to the original report CR230741391-00A\*.

# **GENERAL INFORMATION**

Applicant:	Signify (China) Investment Co., Ltd.
Tested Model:	9290041114
Product Name:	WiZ Outdoor Camera NAM
Power Supply:	DC 5V from adapter
RF Function:	2.4G Wi-Fi
★Maximum Output Power:	802.11b: 18.91 dBm 802.11g: 17.17 dBm 802.11n20: 19.85 dBm 802.11n40: 19.60 dBm
Operating Band/Frequency:	2412~2462 MHz(802.11b/g/n20), 2422~2452 MHz(802.11n40)
Channel Number:	11(802.11b/g/n20), 7(802.11n40)
Channel Separation:	5 MHz
Modulation Type:	DSSS,OFDM
Antenna Type:	FPC antenna
★Maximum Antenna Gain:	Chain 0: 3.72 dBi Chain 1: 4.45 dBi

#### **Product Description for Equipment under Test (EUT)**

Adapter Information: Model: KA1201A-0502000US Input: 100-240V, 50/60Hz, 0.4A Max Output: 5V, 2000mA

Note: The maximum antenna gain and output power are provided by the applicant.

All measurement and test data in this report was gathered from production sample serial number: RKSB231226001-1 (Assigned by the BACL. The EUT supplied by the applicant was received on 2023-12-26.)

#### Objective

This report is prepared for *Signify (China) Investment Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

#### **Test Methodology**

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

#### **Measurement Uncertainty**

Item		Uncertainty
AC Power Line	es Conducted Emissions	3.19dB
RF conducte	ed test with spectrum	0.9dB
RF Output Po	wer with Power meter	0.5dB
	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
De dista de mission	30MHz~1GHz	6.11dB
Radiated emission	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

#### **Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu Province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

# SYSTEM TEST CONFIGURATION

#### **Description of Test Configuration**

Test channel list is as below:

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11. For 802.11n-HT40 mode, EUT was tested with Channel 3, 6 and 9.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

#### **Equipment Modifications**

No modification was made to the EUT tested.

#### **EUT Exercise Software**

RF test tool: Tera Term VT

Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Channel	★Power Level	
Wide			Chain 0	Chain 1
		Low	40	40
802.11b	1 Mbps	Middle	40	40
		High	40	40
		Low	40	40
802.11g	6 Mbps	Middle	40	40
		High	40	40
802.11n-HT20	MCS8	Low	40	40
		Middle	40	40
		High	40	40
802.11n-HT40	MCS8	Low	39	39
		Middle	39	39
		High	38	38

Note:

1. The power level was declared by the applicant.

2. The device supports SISO in all modes, and MIMO 2T2R in 802.11n modes, per pretest, 2T2R mode was the worst mode and reported for 802.11n modes.

### **Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
/	/	/	/

### External I/O Cable

Cable Description	Length(m)	From Port	То
Power Cable 1	6.0	EUT	Adapter
Power Cable 2	1.0	Socket	LISN/AC Source

#### **Block Diagram of Test Setup**

For Conducted Emissions:





#### For Radiated Emissions(Below 1GHz):

# SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result	Remark
<b>§</b> 15.247 (i) & §1.1307	RF Exposure	Compliant	
§15.203	Antenna Requirement Complia		
§15.207 (a)	AC Line Conducted Emissions	Compliant	
§15.205, §15.209, §15.247(d)	Spurious Emissions below 1GHz	Compliant	
§15.205, §15.209, §15.247(d)	Spurious Emissions above 1GHz		See Note*
§15.247 (a)(2)	6 dB Emission Bandwidth		See Note*
§15.247(b)(3)	Maximum Conducted Output Power		See Note*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge		See Note*
§15.247(e)	Power Spectral Density		See Note*

Note: The changes will not affect test data, the data are referred to original report CR230741391-00A\* which provided by applicant.

# **TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	
	Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2023-05-23	2024-05-22	
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10	
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10	
Sonoma Instrument	Amplifier	310N	171205	2023-05-23	2024-05-22	
MICRO-COAX	Coaxial Cable	Cable-8	008	2023-05-23	2024-05-22	
MICRO-COAX	Coaxial Cable	Cable-9	009	2023-05-23	2024-05-22	
MICRO-COAX	Coaxial Cable	Cable-10	010	2023-05-23	2024-05-22	
Rohde & Schwarz	Test Software	EMC32	100361	N/A	N/A	
	Cond	lucted Emission T	est			
Rohde & Schwarz	EMI Test Receiver	ESR3	101746	2023-05-23	2024-05-22	
ROHDE&SCHWARZ	LISN	ENV216	101115	2023-05-23	2024-05-22	
Rohde & Schwarz	Pulse Limiter	ESH3-Z2	0357.8810.54	2023-05-23	2024-05-22	
MICRO-COAX	Coaxial Cable	Cable-15	015	2023-05-23	2024-05-22	
Audix	Test Software	e3	V9	N/A	N/A	

**Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### **RF EXPOSURE EVALUATION**

#### **Applicable Standard**

#### According to § 1.1307(b)(3)(i)

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R <sup>2</sup> .
1.34-30	$3,450 \text{ R}^2/\text{f}^2$ .
30-300	3.83 R <sup>2</sup> .
300-1,500	$0.0128 \text{ R}^2 \text{f}.$
1,500-100,000	19.2R <sup>2</sup> .

#### **Calculated Data:**

		Exemption ERP			Maximum Conducted				
Mode	Frequency Range (MHz)	λ /2π (mm)	(dBm)	( <b>mW</b> )	Evaluation Distance (cm)	Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	ERP (dBm)	MPE- Based Exemption
2.4G Wi-Fi	2412~2462	19.80	28.85	768	20	20	4.45	22.3	Compliant

#### Note:

1. For the above tune up power were declared by the manufacturer.

**Result:** The device meet FCC MPE at 20 cm distance.

# FCC §15.203 - ANTENNA REQUIREMENT

#### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliant with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### Antenna Connector Construction

The EUT has two FPC antennas for Wi-Fi and the chain 0 antenna gain is 3.72 dBi, the chain 1 antenna gain is 4.45 dBi, the antenna was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliant.

# FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

#### **Applicable Standard**

#### FCC §15.207(a)

#### **Test System Setup**



The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

#### **EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	VBW
150 kHz - 30 MHz	9 kHz	30 kHz

#### **Test Procedure**

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

FCC Part 15.247

#### Bay Area Compliance Laboratories Corp. (Kunshan)

#### Level & Over Limit Calculation

The Level is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB) Level (dB $\mu$ V) = Read level (dB $\mu$ V) + Factor (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Level (dB $\mu$ V) - Limit (dB $\mu$ V)

#### **Test Results Summary**

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

#### **Test Data**

#### **Environmental Conditions & Test Information**

Temperature:	15.6 °C
Relative Humidity:	40 %
ATM Pressure:	102.7 kPa
Test Date:	2024-01-25
Test Engineer:	Aaron Sun

EUT operation mode: Transmitting in 802.11n-HT20 Mode high channel (maximum output power mode)

#### AC 120V/60 Hz, Line



0.181 20.50 19.93 40.43 54.43 -14.00 Average

36.29

45.79

7.928 -6.40 20.17 13.77 50.00 -36.23 Average

20.438 0.20 19.84 20.04 50.00 -29.96 Average

20.07 19.07

0.666 13.40 20.07 33.47 56.00 -22.53 QP

7.928 0.70 20.17 20.87 60.00 -39.13 QP

20.438 8.20 19.84 28.04 60.00 -31.96 QP

64.43 -6.10 QP

56.89 -11.10 QP

46.89 -10.60 Average

46.00 -26.93 Average

0.181 38.40 19.93 58.33

20.09

20.09

16.20

25.70

-1.00

3 4

6 7

8

9 10

11

12

0.449

0.449

0.666

#### AC 120V/60 Hz, Neutral



# FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

#### **Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

#### **Test System Setup**

#### Below 1 GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

#### **EMI Test Receiver Setup**

The system was investigated from 9 kHz to 1 GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

Frequency Range	RBW	V VBW IF B/W		Detector
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average
150 kHz - 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average
20  MHz = 1000  MHz	100 kHz	300 kHz	/	Peak
30 MHz – 1000 MHz	/	/	120 kHz	QP

#### **Test Procedure**

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9–90 kHz, 110–490 kHz, employing an average detector, peak and Average detection modes for frequencies above 1GHz.

For 9 kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

#### **Corrected Amplitude & Margin Calculation**

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude  $(dB\mu V/m) =$  Meter Reading  $(dB\mu V) +$  Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dB $\mu$ V/m) – Corrected Amplitude (dB $\mu$ V/m)

#### **Test Results Summary**

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

#### Test Data

#### **Environmental Conditions & Test Information**

Frequency Range:	Below 1 GHz
Temperature:	16.4 °C
Relative Humidity:	40 %
ATM Pressure:	102.7 kPa
Test Date:	2024-01-25
Test Engineer:	Joe Zhang

EUT operation mode: Transmitting

After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

9kHz-30MHz (Transmitting in 802.11n-HT20 Mode high channel (maximum output power mode)

The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

#### 30MHz-1GHz: (maximum output power mode (802.11n ht20))

#### Common Information

Project No:
EUT Model:
Test Mode:
Standard:
Test Equipment:
Temperature:
Humidity:
Barometric Pressure:
Test Engineer:
Test Date:

RKSB231226001 9290041114 Transmitting in 802.11n20 mode low channel FCC Part 15.205&FCC Part 15.209&FCC Part 15.247 ESCI、JB3、310N 16.4℃ 40% 102.7kPa Joe Zhang 2024/1/25



## Critical\_Freqs

Frequency (MHz)	Corrected Amplitude MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
58.857500	28.76	40.00	11.24	100.0	V	190.0	-17.4
72.680000	30.09	40.00	9.91	100.0	V	70.0	-17.0
90.261250	31.81	43.50	11.69	100.0	V	220.0	-17.1
122.756250	28.38	43.50	15.12	100.0	۷	91.0	-11.3
136.457500	31.86	43.50	11.64	100.0	V	343.0	-11.5
280.017500	35.55	46.00	10.45	100.0	V	275.0	-11.1

# **Common Information**

Project No:	RKSB231226001
EUT Model:	9290041114
Test Mode:	Transmitting in 802.11n20 mode middle channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.4℃
Humidity:	40%
Barometric Pressure:	102.7kPa
Test Engineer:	Joe Zhang
Test Date:	2024/1/25



# Critical\_Freqs

Frequency (MHz)	Corrected Amplitude Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
70.255000	30.76	40.00	9.24	100.0	V	130.0	-16.8
78.985000	31.39	40.00	8.61	100.0	V	115.0	-17.5
91.352500	32.36	43.50	11.14	100.0	V	171.0	-16.8
135.851250	30.35	43.50	13.15	100.0	V	264.0	-11.5
280.017500	34.72	46.00	11.28	100.0	V	333.0	-11.1
934.767500	38.30	46.00	7.70	100.0	V	12.0	1.4

Common Information	
Project No:	RKSB231226001
EUT Model:	9290041114
Test Mode:	Transmitting in 802.11n20 mode high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.4°C
Humidity:	40%
Barometric Pressure:	102.7kPa
Test Engineer:	Joe Zhang
Test Date:	2024/1/25



# Critical\_Freqs

Frequency (MHz)	Corrected Amplitude Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
59.342500	28.23	40.00	11.77	100.0	V	0.0	-17.4
70.740000	29.96	40.00	10.04	100.0	V	167.0	-16.8
89.291250	32.11	43.50	11.39	100.0	V	126.0	-17.2
135.851250	30.83	43.50	12.67	100.0	V	342.0	-11.5
280.017500	35.56	46.00	10.44	100.0	V	322.0	-11.1
934.525000	37.67	46.00	8.33	100.0	V	12.0	1.4

# **EUT PHOTOGRAPHS**

Please refer to the attachment EXHIBIT A\_EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B\_EUT INTERNAL PHOTOGRAPHS.

Bay Area Compliance Laboratories Corp. (Kunshan)

# **TEST SETUP PHOTOGRAPHS**

Please refer to the attachment EXHIBIT C\_TEST SETUP PHOTOGRAPHS.

#### **Declarations**

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with " $\star$ ".

2. The test data was only valid for the test sample(s).

3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

#### \*\*\*\*\* END OF REPORT \*\*\*\*\*

FCC Part 15.247