

# **FCC Test Report**

Report No.: AGC11034230404FE10

**FCC ID** : 2AYHE-2303A

**APPLICATION PURPOSE**: Original Equipment

**PRODUCT DESIGNATION**: WiFi IP Camera

BRAND NAME : Reolink

**MODEL NAME** : E1 Outdoor Pro, T1 Outdoor Pro, TP4KW6

**APPLICANT**: Reolink Innovation Limited

**DATE OF ISSUE** : May 12, 2023

**STANDARD(S)** : FCC Part 15.407 **TEST PROCEDURE(S)** : KDB 905462 D02

**REPORT VERSION**: V1.0

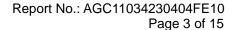
Attestation of Global Concline (Shenzhen) Co., Ltd



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# **Report Revise Record**

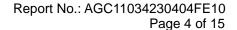
Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 12, 2023	Valid	Initial Release





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## 1. VERIFICATION OF CONFORMITY

Applicant	Reolink Innovation Limited	
Address	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL Hong Kong	
Manufacturer Reolink Innovation Limited		
Address	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL Hong Kong	
Factory	Shenzhen Reolink Technology Co., Ltd	
Address	2-4th Floor, Building 2, Yuanling Industrial Park, ShangWu, Shiyan Street, Bao'an District, Shenzhen, China	
Product Designation	WiFi IP Camera	
Brand Name	Reolink	
Test Model	E1 Outdoor Pro	
Series Model	T1 Outdoor Pro, TP4KW6	
Declaration of Difference	All the same except the model name	
Date of receipt of test item	Apr. 23, 2023	
Date of test	Apr. 23, 2023~May 12, 2023	
Deviation	No any deviation from the test method	
Condition of Test Sample	Normal	
Test Result	Pass	
Report Template	AGCRT-US-BGN/RF	

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in KDB 905462 D02.

Prepared By	Bibo Mang		
	Bibo Zhang (Project Engineer)	May 12, 2023	
Reviewed By	Calin	Liu	
	Calvin Liu (Reviewer)	May 12, 2023	
Approved By	Max 2h	ang	
	Max Zhang Authorized Officer	May 12, 2023	



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## 2. GENERAL INFORMATION

The EUT is designed as "WiFi IP Camera". It is designed by way of utilizing the OFDM technology to achieve the system operation.

	-			
Equipment Type	Outdoor access points	Indoor access points		
Equipment Type	Fixed P2P access points			
Operation Frequency	☐ U-NII 1:5150MHz~5250MHz	☐ U-NII 2A: 5250MHz~5350MHz		
- Character and Market	☐ U-NII 2C:5470MHz~5725MHz	□ U-NII 3: 5725MHz~5850MHz		
DFS Design Type	☐ Master ☐ Slave with radar	detection Slave without radar detection		
TPC Function	☐ Yes			
	For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5260~5320MHz,			
	5500~5720MHz, 5745~5825MHz			
Test Frequency Range	For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5270~5310MHz,			
	5510~5710MHz, 5755~5795MHz			
	For 802.11ac-VHT80: 5210MHz, 5	290MHz, 5530~5690MHz, 5775MHz		
	IEEE 802.11a(HT20): 11.82dBm; II	EEE 802.11n(HT20): 11.21dBm;		
Output Power	IEEE802.11n(HT40): 10.89dBm; IE	EEE 802.11ac(VHT20): 10.87dBm;		
	IEEE802.11ac(VHT40): 10.99dBm; IEEE802.11ac(VHT80): 11.04dBm;			
	IEEE 802.11nHT(20): 13.93 dBm;l	EEE802.11n(HT40): 13.62 dBm		
Output Power_MIMO	IEEE 802.11ac(VHT20): 13.54dBm; IEEE802.11ac(VHT40): 13.79 dBm;			
	IEEE802.11ac(VHT80): 13.69 dBm;			
Modulation	802.11a/n:(64-QAM, 16-QAM, QPSK, BPSK) OFDM			
Wodulation	802.11ac :(256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM			
	802.11a: 6/9/12/18/24/36/48/54Mbps			
Data Rate	802.11n: up to 300Mbps			
	802.11ac: up to 400Mbps			
	7 channels of U-NII-1 Band			
Number of channels	7 channels of U-NII-2A Band			
Number of Chamiles	21 channels of U-NII-2C Band			
	8 channels of U-NII-3 Band			
Hardware Version	N60C05 PWR32			
Software Version	V1			
Antenna Designation	FPC antenna (Comply with requirements of the FCC part 15.203)			
Number of transmit chain	2(802.a/11n/ac all used two antennas, but 802.11a support SISO and			
Number of transmit chain	802.11n/ac support MIMO)			
	Ant 1:	Ant 2:		
	U-NII-1:3.6dBi	U-NII-1:4.56dBi		
Antenna Gain	U-NII-2A:3.3dBi	U-NII-2A:4.21dBi		
	U-NII-2C:3.1dBi	U-NII-2C:3.85dBi		
	U-NII-3:3.7dBi	U-NII-3:3.97dBi		
Power Supply	DC 12V by adapter			



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#### Note:

- 1. This device does not support radar monitoring.
- 2. The signal loading method between the client device and the Master device is TCP technology.
- 3. Distribution of start-up time of Master device and client device:

Equipment	Boot time(s)	
Passive device(client)	10s	
Active device(master)	40s	



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## 3. DESCRIPTION OF TEST MODES

The tests in this section are run sequentially and the UUT must pass all tests successfully.

If the UUT fails any one of the tests it will count as a failure of compliance.

To show compliance, all tests must be performed with waveforms randomly generated as specified with test results meeting the required percentage of successful detection criteria.

One frequency will be chosen from the operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands.

### 4. SUMMARY OF TEST RESULTS

FCC RU	ULES	DESCRIPTION OF TEST	RESULT
§15.407	7(h)(2)	Dynamic Frequency Selection Channel Move Time and Channel Closing Transmission Time	Compliant

#### 5. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

Description	Manufacturer	Model No.	S/N	Calibration Due.	Calibration Due.
MXG X-Series Vector Signal Generator	Agilent	N5182B	MY53050647	Mar. 03, 2023	Mar. 02, 2024
EXA Signal Analyzer	Agilent	N9020A	MY49100060	Aug. 04, 2022	Aug. 03, 2023
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Power spliter	Mini-Circuits	ZFRSC-183-s	3122	N/A	N/A
RF Cable	Harbour	SHWCB-3000-N	N/A	May 13, 2023	May 12, 2025
DFS waveform Generator software	Keysight	N7607C V2.0.0.0	N/A	N/A	N/A
DFS data Analyzer software	Tonscend	JS1120-2	N/A	N/A	N/A
AP(Master)	ZTE	ZXHN F670	N/A	N/A	N/A

FCC ID of AP(Master): Q78-ZXHNF670E



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# 6. DYNAMIC FREQUENCY SELECTION (DFS)

## **6.1. APPLICABILITY OF DFS REQUIREMENTS**

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

	Operational Mode			
Requirement	Master	⊠Client Without Radar	☐Client With Radar	
		Detection	Detection	
Non-Occupancy Period	Yes	Not required	Yes	
DFS Detection Threshold	Yes	Not required	Yes	
Channel Availability Check Time	Yes	Not required	Not required	
U-NII Detection Bandwidth	Yes	Not required	Yes	

Table 2: Applicability of DFS requirements during normal operation

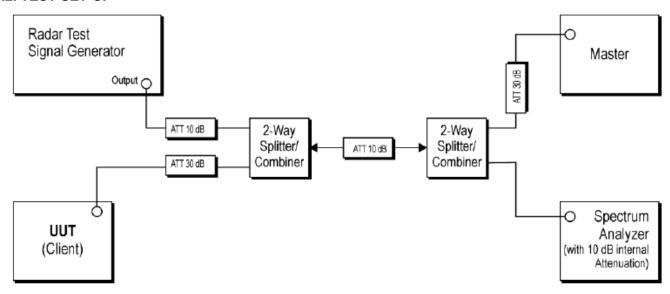
	Operational Mode			
Requirement	☐Master Device or Client with	⊠Client Without Radar		
	Radar Detection	Detection		
DFS Detection Threshold	Yes	Not required		
Channel Closing Transmission Time	Yes	Yes		
Channel Move Time	Yes	Yes		
U-NII Detection Bandwidth	Yes	Not required		

Additional requirements for devices	☐Master Device or Client with	⊠Client Without Radar
with multiple bandwidth modes	Radar Detection	Detection
U-NII Detection Bandwidth and	All BW modes must be tested	Not required
Statistical Performance Check		
Channel Move Time and Channel	Test using widest BW mode	Test using the widest BW mode
Closing Transmission Time	available	available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.



#### 6.2. TEST SET-UP



#### 6.3. LIMITS

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)	
EIRP ≥ 200 milliwatt	-64 dBm	
EIRP < 200 milliwatt and	CO JD	
power spectral density < 10 dBm/MHz	-62 dBm	
EIRP < 200 milliwatt that do not meet the power	C4 dDre	
spectral density requirement	-64 dBm	

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.



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3.

Table 4: DFS Response Requirement Values

Parameter	Value		
Non-occupancy period	Minimum 30 minutes		
Channel Availability Check Time	60 seconds		
Channal Mayo Time	10 seconds		
Channel Move Time	See Note 1.		
	200 milliseconds + an		
	aggregate of 60		
Channel Closing Transmission Time	milliseconds over remaining		
	10 second period.		
	See Notes 1 and 2.		
	Minimum 100% of the U-		
U-NII Detection Bandwidth	NII 99% transmission power bandwidth.		
	See Note 3.		

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.



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#### 6.4. RADAR TEST WAVEFORMS

	Table 5 –	Short	Pulse	Radar	Test	Waveforms
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Radar	Pulse Width	PRI	Number of Pulses	Minimum	Minimum
Type	(µsec)	(µsec)	Percentage of N		Number of
				Successful	Trials
				Detection	
0	1	1428	18	See Note 1	See Note 1

#### **6.5. TEST PROCEDURE**

- 1. When a Client Device without Radar Detection is the UUT, the Master Device is the Radar Detection Device.
- 2. A spectrum analyzer is used to establish the test signal level for each radar type.
- 3. During this process, there are no transmissions by either the Master Device or Client Device.
- 4. The spectrum analyzer is switched to the zero span (time domain) mode at the frequency of the Radar Waveform generator. The peak detector function of the spectrum analyzer is utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) are set to at least 3 MHz.
- 5. The measured channels are 5530MHz in 80MHz Bandwidth and 5290MHz in 80MHz Bandwidth. The Radar signal was the same as transmitted channels, and injected into the antenna port of AP(master) ,measured the DFS parameters. The master transmitted the test data to client, the transmitted duty cycle is 30.8%.

#### **6.6. TEST RESULT**

#### 6.6.1 DFS DETECTION THRESHOLD

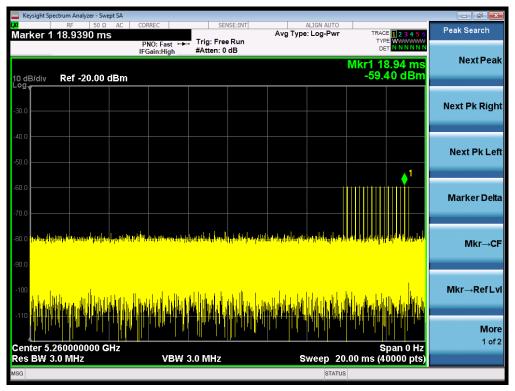
#### Calibration:

For a detection threshold level of -64dBm and the antenna gain is 5dBi, required detection threshold is -59.79dBm (= -64+4.21).

Note: Maximum Transmit Power is greater than 200 milliwatt in this report, so detection threshold level is -64dBm.



# Radar Type 0



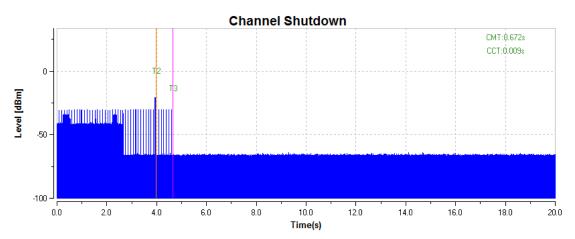
## 6.6.2TEST RESULT

## Channel Move Time and Channel Closing Transmission Time

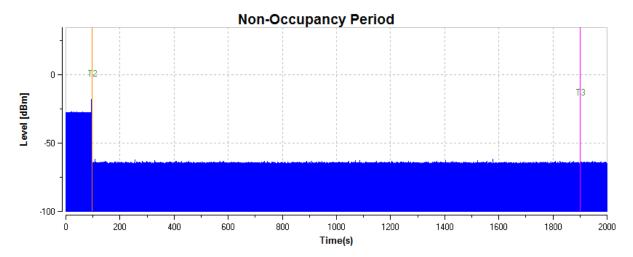
Test Frequency	Requirement	Measurement Level	Limit
EOCOMUL-	Channel Closing Transmission Time	0.009	≤0.26s
5260MHz	Channel Move Time	0.672	≤10s
FFOOM! I=	Channel Closing Transmission Time	0.034s	≤0.26s
5500MHz	Channel Move Time	0.726s	≤10s



# Radar Type 0(20MHz/5260MHz)

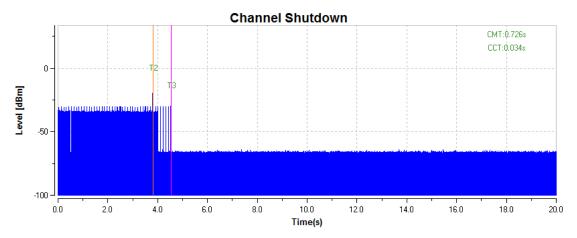


## Non-occupancy Period-Elapse time 30minutes

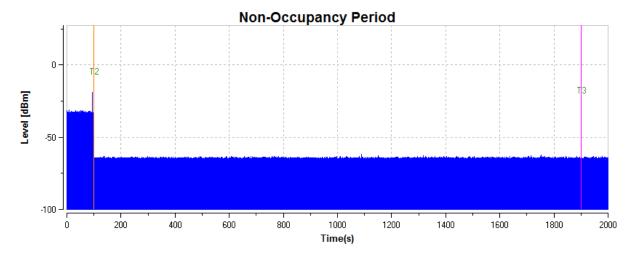




# Radar Type 0(20MHz/5500MHz)



Non-occupancy Period-Elapse time 30minutes



**RESULT: PASS** 



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## **APPENDIX I: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC11034230404AP01

APPENDIX II: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC11034230404AP02

----END OF REPORT----



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