TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14033679 001**	**Seite 1 von 14** *Page 1 of 14*
Auftraggeber: *Client:*	**Supra Foto-Elektronik-Vertriebs-Gmb** **Denisstraße 28A** **D-67663 Kaiserslautern** **Germany**	
Gegenstand der Prüfung: *Test Item:*	**WLAN Network Camera**	
Bezeichnung: *Identification:*	**Maginon IPC-1A**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**00130702039-009**	**Eingangsdatum:** *Date of Receipt:* **02.07.2013**
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 8/F, First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong **Hong Kong Productivity Council** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong	
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample(s) is/are not damaged and suitable for testing.	
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.4-2003** **CISPR 22:1997**	
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay Kowloon, Hong Kong	

geprüft/ *tested by:*			**kontrolliert/** *reviewed by:*		
20.08.2013	Mika Chan Project Manager		20.08.2013	Sharon Li Section Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCCID: Z5CIPC1A-2013**
Other Aspects

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

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Product information

Manufacturers declarations

Items	Description
Power Type	5VDC from adapter
Modulation	DSSS for IEEE 802.11b; OFDM for IEEE 802.11g
Number of antenna assemblies	1
Antenna gain (dBi)	2
Data Modulation	DSSS (DBPSK / DQPSK /CCK); OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/2/5.5/11); OFDM (6/9/12/18/24/36/48/54)
Frequency Band	2400 ~ 2483.5MHz
Channel Number	11b/g: 11
Conducted Output Power	11b:6.57dBm; 11g: 8.24dBm

Carrier Frequency

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		

Product function and intended use

The EUT is a wireless LAN enabled IP digital video camera which streaming the video over the WALN network and it is solely designed for the surveillance of internal areas.

It offers the following function:

- camera head horizontal and vertical patrolling.
- Alarm

For details, please refer to the user manual.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual

Remark

Test Mode:

ifconfig eth1 up
iwpriv eth1 set ATE=ATESTART
iwpriv eth1 set ATECHANNEL=1
iwpriv eth1 set ATETXMCS=7
iwpriv eth1 set ATETXMODE=0
iwpriv eth1 set ATETXBW=0
iwpriv eth1 set ATETXCNT=200
iwpriv eth1 set ATE=TXFRAME
iwpriv eth1 set ATETXPOW0=15
iwpriv eth1 set ATE=TXCONT

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item.

Mode	Data Rate	Channel
802.11b	11Mbps	1 / 6 / 11
802.11g	54Mbps	1 / 6 / 11

Special accessories and auxiliary equipment

The product has been tested together with the following additional accessory:

1) ACDC adaptor (EUT adapter)
Brand: -
Model: BLJ15W050200P-U
Input rating: 100-240V ~ 50-60Hz 500mA
Output rating: DC5V, 2000mA

2) Laptop computer
Brand: Lenovo
Model: T61
S/N: L3-X9333 08/05

AC adaptor
Brand: Lenovo
Model: 92P1103
Input rating: 100-240V ~ 1.7A-0.9A, 50/60Hz
Output rating: 2.0V, 4.5A

3) Wireless LAN router
Product name: Wireless-G Broadband Router with 4-Port Switch
Manufacturer: Buffalo
Model: WHR-G54S
S/N: 94073370409147

AC adaptor
Manufacturer: UNIFIVE
Model: UIA312-3320
Input rating: AC 100-240V ~ 50/60Hz 0.4A
Output rating: DC3.3V, 2A

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Equipment	Manufacturer	Type	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	12-Apr-14
Test Receiver	R & S	ESU40	100190	19-Feb-14
Biconical Antenna	Rohde & Schwarz	HK116	100241	11-Jun-15
Log Periodic Antenna	R & S	HL223	841516/017	10-Jun-15
Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	15-Nov-13
Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	03-Oct-13
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28-Oct-13
Horn Antenna	EMCO	3115	9002-3347	11-Jun-15
Active Loop Antenna	EMCO	6502	9107-2651	11-Jun-15
FSP 30 Spectrum Analyser	R & S	FSP 30	100007	17-Sep-13

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Equipment	Manufacturer	Type	S/N	Due Date
Test Receiver	R & S	ESCS30	100201	26 Feb 14
LISN	R & S	ENV216	100273	06 Mar 14

Results FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Information	**Pass**
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
Results:	Permanent attached antenna
Verdict:	Pass

Subclause 15.204 – Antenna Information		**Pass**
Requirement:	Provide information for every antenna proposed for the use with the EUT	
Results:	a) Antenna type:	Mono Pole
	b) Manufacturer and model no:	N.A.
	c) Gain with reference to an isotropic radiator:	2 dBi
Verdict:	Pass	

Subclause 15.207 – Disturbance Voltage on AC Mains **Pass**

Test Port: AC mains input port of the adapter
Applied Voltage: 120VAC
Adaptor Model: Please refer to page 4

Mode of operation: Video Streaming over WLAN

Live measurement

Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.150	49.0	30.9	66 - 56	56 - 46	Pass
	0.166	46.5	27.2	66 - 56	56 - 46	Pass
	0.174	45.8	27.3	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

Neutral measurement

Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.154	46.7	28.9	66 - 56	56 - 46	Pass
	0.170	44.0	26.4	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

Results: The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1, page 2-3.

Subclause 15.247 (a)(2) – 6dB Bandwidth Measurement	**Pass**
Requirement:	Systems using digital modulation techniques may operate in the 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500kHz. There is no requirement for hybrid system to comply with the 500 KHz minimum bandwidth normally associated with a DTS transmission.

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 100KHz/ 300KHz
Supply voltage : 5.0 VDC from ACDC adapter
Temperature : 23ºC
Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 3-7.

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Verdict
Mode: 802.11b				
LOW	2412	11.8	0.5	Pass
MID	2437	11.9	0.5	Pass
HIGH	2462	11.8	0.5	Pass
Mode: 802.11g				
LOW	2412	16.7	0.5	Pass
MID	2437	16.7	0.5	Pass
HIGH	2462	16.7	0.5	Pass

Subclause 15.247 (b)(3) – Maximum Peak Output Power				**Pass**
Requirement:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz bands: 1 Watt (30dBm)			
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 1MHz / 3MHz Span : >=1.5 x DTS Bandwidth Band limits : DTS bandwidth edges Supply voltage : 5.0 VDC from ACDC adapter Temperature : 23ºC Humidity : 50%				
Results:	For test protocols please refer to Appendix 1, page 8-11.			
Channel	**Channel frequency (MHz)**	**Peak Power Output (dBm)**	**Limit (dBm)**	**Verdict**
Mode: 802.11b				
LOW	2412	6.57	30	Pass
MID	2437	5.81	30	Pass
HIGH	2462	5.76	30	Pass
Mode: 802.11g				
LOW	2412	8.18	30	Pass
MID	2437	8.13	30	Pass
HIGH	2462	8.24	30	Pass

Subclause 15.247 (d) – Spurious Conducted Emissions **Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz
Supply voltage : 5.0 VDC from ACDC adapter
Temperature : 23 ºC
Humidity : 50 %

Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Results: There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(d). For test protocols refer to Appendix 1, page 12-15.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
Mode: 802.11b					
2412	300.00	-44.30	1.13	45.43	Pass
	3180.00	-45.35		46.48	Pass
2437	300.00	-44.35	1.19	45.54	Pass
2462	300.00	-44.94	-0.81	44.13	Pass
	1620.00	-45.45		44.64	Pass
	3240.00	-39.73		38.92	Pass
Mode: 802.11g					
2412	300.00	-43.93	-1.52	42.41	Pass
	3180.00	-46.56		45.04	Pass
2437	300.00	-44.57	-1.75	42.82	Pass
2462	300.00	-44.15	-1.26	42.89	Pass

Subclause 15.247 (d) – Spurious Radiated Emissions	**Pass**

Test Specification : ANSI C63.4 – 2003
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz
1 MHz / 1 MHz for f > 1 GHz
Supply voltage : 5.0 VDC from ACDC adapter
Temperature : 23ºC
Humidity : 50%

Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limit specified in Section 12.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in section15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.

Mode: 802.11b

Tx frequency 2412MHz Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
195.009	34.1	43.5 / QP
800.036	38.4	46.0 / QP
4823.461	54.41	74.0 / P
4827.467	41.54	54.0 / A

Tx frequency 2412MHz Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
180.008	26.4	43.5/ QP
800.037	43.8	46.0 / QP
1439.903	45.41	74.0 / P
1440.048	41.47	54.0 / A

Tx frequency 2437MHz Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
195.009	34.3	43.5/ QP
300.013	40.2	46.0 / QP
4876.169	52.50	74.0 / P
4873.445	39.28	54.0 / A

Tx frequency 2437MHz Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**

800.039	43.8	46.0 / QP
1440.144	50.75	74.0 / P
1440.048	40.65	54.0 / A
Tx frequency 2462MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
195.009	34.3	43.5/ QP
210.010	38.7	43.5/ QP
300.013	40.0	46.0 / QP
1760.049	50.28	74.0 / P
1760.144	26.60	54.0 / A
Tx frequency 2462MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
400.019	37.1	46.0 / QP
720.034	31.8	46.0 / QP
1440.160	50.02	74.0 / P
1440.048	41.85	54.0 / A
Mode: 802.11g		
Tx frequency 2412MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
195.009	34.5	43.5 / QP
210.010	38.5	43.5 / QP
300.015	42.3	46.0 / QP
4823.477	53.59	74.0 / P
4827.243	39.68	54.0 / A
Tx frequency 2412MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
480.023	37.1	46.0 / QP
960.000	38.1	46.0 / QP
Tx frequency 2437MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
195.009	34.1	43.5/ QP
300.013	41.6	46.0 / QP
4873.413	53.44	74.0 / P
4875.176	39.62	54.0 / A
Tx frequency 2437MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
800.039	41.6	46.0 / QP
1440.160	51.06	74.0 / P
1439.935	39.81	54.0 / A
Tx frequency 2462MHz	Vertical Polarization	
Freq	**Level**	**Limit/ Detector**

MHz	dBuV/m	dBuV/m
195.009	34.4	43.5/ QP
800.036	38.7	46.0 / QP
1641.858	43.72	74.0 / P
1641.810	38.16	54.0 / A
Tx frequency 2462MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
180.008	26.6	46.0 / QP
400.019	37.0	46.0 / QP
1440.080	50.79	74.0 / P
1440.048	38.64	54.0 / A

Subclause 15.247 (d) – Band Edge Emissions	**Pass**
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2412MHz, 2462MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100 kHz / 300 kHz Supply voltage : 5.0 VDC from ACDC adapter Temperature : 23ºC Humidity : 50%	
Requirement:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Results:	There is no peak found outside any 100 kHz bandwidth of the operating frequency band. For test protocols refer to Appendix 1, page 16-17.

Subclause 15.205 – Band edge compliance of radiated emissions	**Pass**
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (2412MHz, 2462MHz) Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 1 MHz / 1 MHz Supply voltage : 5.0 VDC from ACDC adapter Temperature : 23ºC Humidity : 50%	
Requirement:	Radiated emissions which fall in the restricted bans, as defined in 15.205 (a), must also comply with the radiated emission limits specified in 15.209(a).
Results:	There is no peak found in the restricted bands. For test protocols refer to Appendix 1, page 18-33.

Subclause 15.247 (e) – Power Spectral Density **Pass**

Requirement: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode (2412MHz, 2437MHz, 2462MHz)
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : =3 KHz / >=3xRBW
span : >=1.5 x DTS BW
Supply voltage : 5.0 VDC from ACDC adapter
Temperature : 23ºC
Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 33-37.

Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
Mode: 802.11b			
2412	-13.58	8.0	Pass
2437	-14.04	8.0	Pass
2462	-14.08	8.0	Pass
Mode: 802.11g			
2412	-15.29	8.0	Pass
2437	-15.48	8.0	Pass
2462	-15.51	8.0	Pass

Verdict: Pass

Subclause 1.1310 – Maximum Permissive Exposure **Pass**

Requirement: According to 1.1310 of the FCC rules, the power density limit for General Population/Uncontrolled Exposure is 1.0mW/cm^2.

S = (10^((P+G)/10))/(4*Pi*D^2)

Where,

D = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm^2

Results:

Mode	Frequency (MHz)	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)
802.11b	2412	20	6.57	2	0.0014	1
802.11g	2462	20	8.24	2	0.0021	1