

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-185-RWD-037

AGR No. : A184A-099

Applicant : Pittasoft Co., Ltd

Address : 7F, BYC HIGH CITY Building A 131, Gasan Digital-ro, Geumcheon-gu, Seoul,
08506, South Korea

Manufacturer : Pittasoft Co., Ltd

Address : 7F, BYC HIGH CITY Building A 131, Gasan Digital-ro, Geumcheon-gu, Seoul,
08506, South Korea

Type of Equipment : Car Dashcam

FCC ID. : YCK-DR900S-2CH

Model Name : DR900S-2CH

Multiple Model Name : DR900S-1CH, DR900S-2CH IR, DR900S-2CH Truck, DR900GW-1CH,
DR900GW-2CH, DR900GW-2CH IR, DR900GW-2CH Truck

Serial number : N/A

Total page of Report : 10 pages (including this page)

Date of Incoming : April 19, 2018

Date of issue : May 18, 2018

SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*

This test report only contains the result of a single test of the sample supplied for the examination.

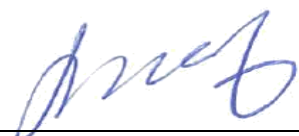
It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Jae-Ho Lee / Chief Engineer
ONETECH Corp.

Approved by:



Keun-Young, Choi / Vice President
ONETECH Corp.

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REVISION HISTORY

Issued Report No.	Issued Date	Revisions	Effect Section
OT-185-RWD-037	May 18, 2018	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : Pittasoft Co., Ltd

Address : 7F, BYC HIGH CITY Building A 131, Gasan Digital-ro, Geumcheon-gu, Seoul, 08506, South Korea

Contact Person : Inseok, Seo / Senior Engineer

Telephone No. : +82-31-776-6400

FCC ID : YCK-DR900S-2CH

Model Name : DR900S-2CH

Brand Name : **BLACKVUE**

Serial Number : N/A

Date : May 18, 2018

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Car Dashcam
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 DTS Meas Guidance
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The Pittasoft Co., Ltd, Model DR900S-2CH (referred to as the EUT in this report) is a Car Dashcam. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Car Dashcam		
FREQUENCY RANGE	WLAN 2.4 GHz Band	2 422 MHz ~ 2 452 MHz (802.11n(HT40))	
	WLAN 5 GHz Band	5 775 MHz (802.11ac(VHT80))	
MAX. RF OUTPUT POWER	WLAN 2.4 GHz Band	802.11n(HT40) (15.89 dBm)	
	WLAN 5 GHz Band	5 725 MHz ~ 5 850 MHz Band	802.11ac(HT80) (8.49 dBm)
MODULATION TYPE	WLAN 2.4 GHz Band	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
	WLAN 5 GHz Band	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)	
ANTENNA TYPE	FPCB Antenna		
ANTENNA GAIN	WLAN 2.4 GHz Band	3.0 dBi	
	WLAN 5 GHz Band	5 725 MHz ~ 5 850 MHz	4.0 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		24 MHz, 26 MHz, 37.125 MHz, 40 MHz	
POWER REQUIREMENT		DC 12 V / DC 24 V	

2.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
DR900S-2CH	Basic Model	<input checked="" type="checkbox"/>
DR900S-1CH	These models are identical to the basic model except for the model name, and have been added at the request of the exporting country buyers.	<input type="checkbox"/>
DR900S-2CH IR		
DR900S-2CH Truck		
DR900GW-1CH		
DR900GW-2CH		
DR900GW-2CH IR		
DR900GW-2CH Truck		

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacture is responsible for the compliance of all variants.

3. EUT MODIFICATIONS

-. None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500 \text{ mW/cm}^2$ for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm^2 exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm^2 , Z = Impedance of free space, 377Ω

E = Electric field strength in V/m , G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using $P (\text{mW}) = P (\text{W}) / 1 000$, $d (\text{cm}) = 0.01 * d (\text{m})$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm^2

4.2 EUT Description

Kind of EUT	Car Dashcam
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input checked="" type="checkbox"/> WLAN: 2 422 MHz ~ 2 452 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 240 MHz <input type="checkbox"/> WLAN: 5 190 MHz ~ 5 230 MHz <input type="checkbox"/> WLAN: 5 210 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input type="checkbox"/> WLAN: 5 755 MHz ~ 5 795 MHz <input checked="" type="checkbox"/> WLAN: 5 775 MHz <input type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz <input type="checkbox"/> GFSK Modulation: 2403 MHz , 2443 MHz , 2478 MHz
Device Category	<input type="checkbox"/> Portable (< 20 cm separation) <input checked="" type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

5. Calculated MPE Safe Distance

5.1 Test data for DC 12 V

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11n(HT40)	15.39 ± 0.5	15.89	38.82	3	1.995	2.48	0.015 4	1.00

According to above table, for 2 400 ~ 2 483.5 MHz Band, safe distance,

$$D = 0.282 * \sqrt{(38.82 * 1.995)/1.00} = 2.48 \text{ cm}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 38.82 * 1.995 / (4 * 3.14 * 20^2) = 0.015 4$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

5.2 Test data for DC 24 V

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11n(HT40)	15.16 ± 0.5	15.66	36.81	3	1.995	2.42	0.014 6	1.00

According to above table, for 2 400 ~ 2 483.5 MHz Band, safe distance,

$$D = 0.282 * \sqrt{(36.81 * 1.995)/1.00} = 2.42 \text{ cm}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 36.81 * 1.995 / (4 * 3.14 * 20^2) = 0.014 6$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

5.3 Calculation Result Of Maximum Conducted Power

Operating Freq. Band	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11n(HT40)	15.39 ± 0.5	15.89	38.82	3	1.995	2.48	0.015 4	1.00
5 725 ~5 850	802.11ac(HT80)	7.99 ± 0.5	8.49	7.06	4	2.512	1.19	0.003 5	1.00

2.4 GHz band + 5 GHz band = (0.015 4 / 1) + (0.003 5 / 1) = 0.018 9

- Therefore the maximum calculations of above situations are less than the “1” limit.



Tested by: Min-Gu Ji / Assistant Manager