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

Test Report No.	**: W165R-D033**
AGR No.	**: A164A-183**
Applicant	**: LG Innotek Co., Ltd.**
Address	**: 26, Hanamsandan 5beon-ro Gwangsan-gu, 506-731, Gwangju, South Korea**
Manufacturer	**: LG Innotek Co., Ltd.**
Address	**: 26, Hanamsandan 5beon-ro Gwangsan-gu, 506-731, Gwangju, South Korea**
Type of Equipment	**: Video Doorbell**
FCC ID.	**: YZP-RNCDSW01A**
Model Name	**: RNCD-SW01A**
Multiple Model Name	**: RNCD-SW01B, RNCD-SW01C**
Serial number	**: N/A**
Total page of Report	**: 9 pages (including this page)**
Date of Incoming	**: May 01, 2016**
Date of issue	**: May 17, 2016**

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: Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director
ONETECH Corp.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W165R-D033	May 17, 2016	Initial Issue	All

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1. VERIFICATION OF COMPLIANCE

Applicant	: LG Innotek Co., Ltd.
Address	: 26, Hanamsandan 5beon-ro Gwangsan-gu, 506-731, Gwangju, South Korea
Contact Person	: Inchang, Jeong / Senior engineer
Telephone No.	: +82-62-950-0332
FCC ID	: YZP-RNCDSW01A
Model Name	: RNCD-SW01A
Serial Number	: N/A
Date	: May 17, 2016

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Video Doorbell
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
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.

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2. GENERAL INFORMATION

2.1 Product Description

The LG Innotek Co., Ltd., Model RNCD-SW01A (referred to as the EUT in this report) is a Video Doorbell. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Video Doorbell		
Temperature Range	-10 ℃ ~ +60 ℃		
Operating Frequency	2 412 MHz ~ 2 462 MHz		
RF Output Power	AC 12 V	Antenna 0	802.11b: 14.37 dBm
			802.11g: 13.48 dBm
			802.11n_HT20: 12.15 dBm
		Antenna 1	802.11b: 14.02 dBm
			802.11g: 13.07 dBm
			802.11n_HT20: 11.78 dBm
		Multiple Antenna	14.98 dBm
	AC 24 V	Antenna 0	802.11b: 14.35 dBm
			802.11g: 13.44 dBm
			802.11n_HT20: 12.10 dBm
		Antenna 1	802.11b: 13.97 dBm
			802.11g: 13.04 dBm
			802.11n_HT20: 12.10 dBm
		Multiple Antenna	15.11 dBm
Number of Channel	11 Channel		
Modulation Type	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)		
Antenna Gain	4.22 dBi		
Antenna Type	PCB Pattern Antenna		
List of each Osc.or crystal Freq.(Freq. >= 1 MHz)	32 MHz, 24 MHz, 32.768 kHz		
Electrical Rating	AC 12 ~ 24 V, 50 Hz		

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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
RNCD-SW01A	Basic Model	☑
RNCD-SW01B, RNCD-SW01C	These models are identical to basic model except for the model color only.	☐

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

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

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3. MAXIMUM PERMISSIBLE EXPOSURE

3.1 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 mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

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

Combing 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 (mW) = P (W) / 1 000, d (cm) = 0.01 * d (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/cm²

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3.2 EUT Description

Kind of EUT	Video Doorbell	
Operating Frequency Band	☐ Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz ■ WLAN: 2 412 MHz ~ 2 462 MHz ☐ Bluetooth: 2 402 MHz ~ 2 480 MHz ☐ GFSK Modulation: 2403 MHz , 2443 MHz , 2478 MHz	
Device Category	☐ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ■ Others	
Max. Output Power	AC 12 V	802.11b: 14.37 dBm, 802.11g: 13.48 dBm, 802.11n_HT20: 12.98 dBm
	AC 24 V	802.11b: 14.35 dBm, 802.11g: 13.44 dBm, 802.11n_HT20: 15.11 dBm
Used Antenna	PCB Pattern Antenna	
Used Antenna Gain	4.22 dBi	
Exposure Evaluation Applied	■ MPE ☐ SAR ☐ N/A	

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3.2 Calculated MPE Safe Distance

3.2.1 Test data for Antenna 0

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/cm²) @ 20 cm Separation	Limit (mW/cm²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11b	14.00 ± 0.5	14.50	28.18	4.22	2.64	2.43	0.014 8	1.00
	802.11g	13.00 ± 0.5	13.50	22.39			2.17	0.011 8	1.00
	802.11n_ HT20	12.00 ± 0.5	12.50	17.78			1.93	0.009 3	1.00

3.2.2 Test data for Antenna 1

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/cm²) @ 20 cm Separation	Limit (mW/cm²)
		(dBm)	(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11b	13.60 ± 0.5	14.10	25.70	4.22	2.64	2.32	0.013 5	1.00
	802.11g	13.00 ± 0.5	13.50	22.39			2.17	0.011 8	1.00
	802.11n_ HT20	11.50 ± 0.5	12.00	15.85			1.82	0.008 3	1.00

3.2.3 Test data for Multiple transmit

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/cm²) @ 20 cm Separation	Limit (mW/cm²)
		(dBm)	(dBm)	(mW)	Log	Linear			
Antenna 0	802.11n_ HT20	12.00 ± 0.5	12.50	17.78	4.22	2.64	1.93	0.009 3	1.00
Antenna 0	802.11n_ HT20	11.50 ± 0.5	12.00	15.85	4.22	2.64	1.82	0.008 3	1.00
Combined	802.11n_ HT20	-	-	-	-	-	-	0.0176	1.00

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