



TEST REPORT

<p>KCTL Inc. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr</p>	<p>Report No.: KR19-SEF0047-B Page (1) of (18)</p>	
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1. Client

- Name : DASAN ELECTRON CO., LTD
- Address : #307, Plant 1 Dong, Kyunggitechno Park, 705, Haeon-ro, Sangnok-gu, Ansan-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2019-03-05

2. Use of Report : -

3. Name of Product and Model : Busylight / Kuando Busylight UC Omega


4. Manufacturer and Country of Origin : DASAN ELECTRON CO., LTD / Korea

5. Date of Test : 2019-03-07

6. Test method used : ANSI C63.4:2014
 FCC Part 15 Subpart B, Class B

7. FCC ID : WF2-BUSYLIGHTLYNC

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by 	Technical Manager 
	Name : Mincheol Baek (Signature)	Name : Gunsu Park (Signature)

2019-03-27

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REPORT REVISION HISTORY

Date	Revision	Page No
2019-03-22	Originally issued(KR19-SEF0047)	-
2019-03-26	FCC ID and Class revise(KR19-SEF0047-A)	-
2019-03-27	Limit revise(KR19-SEF0047-B)	-

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1. Applicant information

Applicant: DASAN ELECTRON CO., LTD
Address: #307, Plant 1 Dong, Kyunggitechno Park, 705, Haeon-ro,
Sangnok-gu, Ansan-si, Gyeonggi-do, Republic of Korea
Telephone: +82-31-500-4641
Fax: +82-31-500-4640
E-mail: mickey@headsetkorea.co.kr
Contact name: Minsoo Jang

Manufacturer: DASAN ELECTRON CO., LTD
Address: #307, Plant 1 Dong, Kyunggitechno Park, 705, Haean-ro,
Sangnok-gu, Ansan-si, Gyeonggi-do, Republic of Korea
Telephone: +82-31-500-4641
Fax: +82-31-500-4640
E-mail: mickey@headsetkorea.co.kr
Contact name: Minsoo Jang

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2. Laboratory information

Address

KCTL Inc. (Suwon Lab.)

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

Telephone Number: 82 31 285 0894

Facsimile Number: 82 505 299 8311

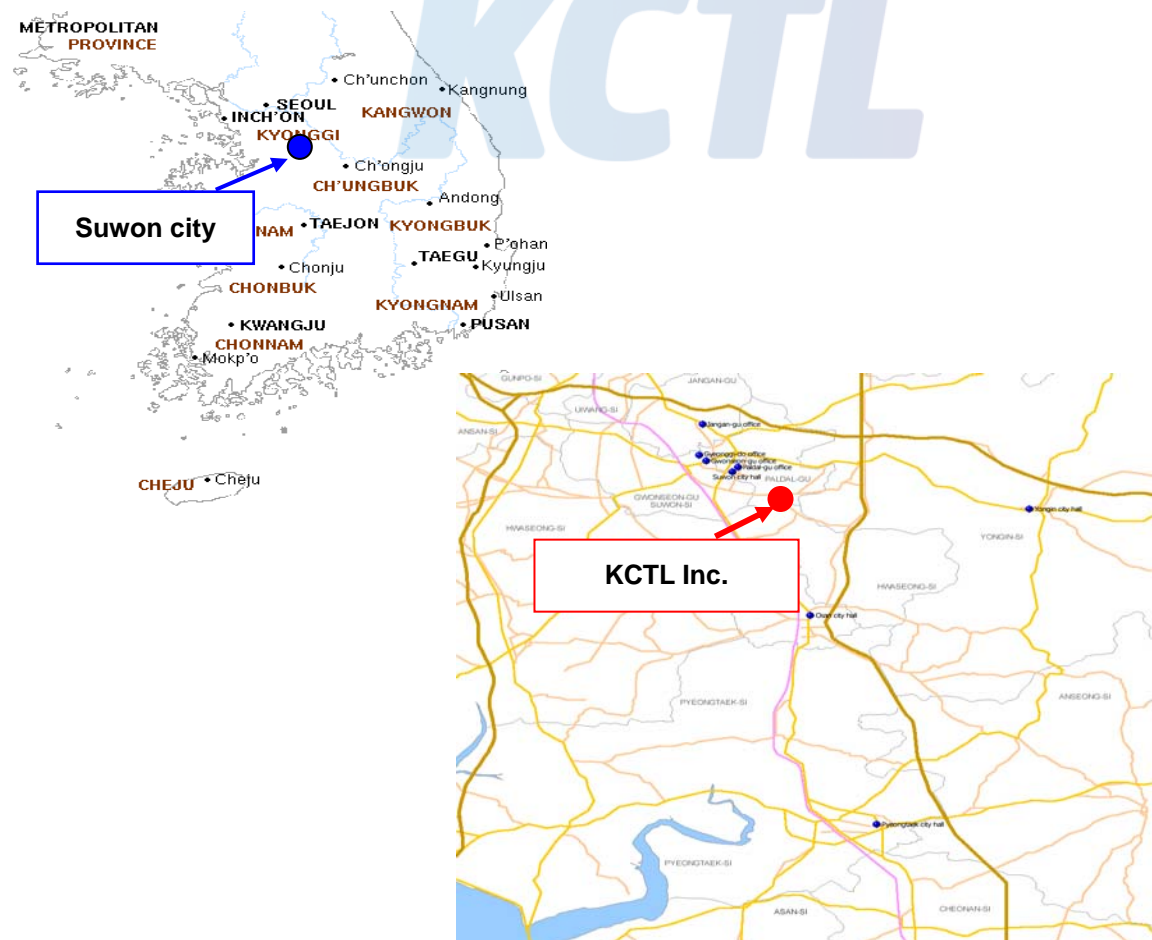
FCC Site Designation No: KR0040

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

SITE MAP



3. Test system configuration

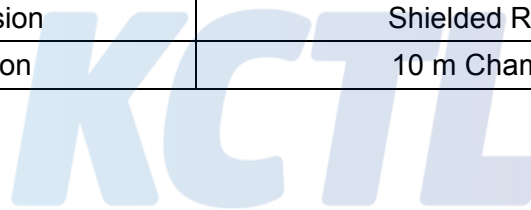
3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber 10 m (RE)	22.3 °C	22.9 % R.H.	-
Shielded room(CE)	21.5 °C	23.8 % R.H.	-

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m Chamber



3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.

The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted Emission measurement (Confidence level about 95 %, $k = 2$)		
Shielded Room (CE#1)	9 kHz ~ 150 kHz: 3.66 dB	
	150 kHz ~ 30 MHz: 3.26 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: 3.48 dB	
	150 kHz ~ 30 MHz: 3.06 dB	
Radiated Emission measurement (Confidence level about 95 %, $k = 2$)		
10 m Chamber (4F)	30 MHz ~ 300 MHz	3 m: 5.32 dB
		10 m: 5.32 dB
	300 MHz ~ 1 000 MHz	3 m: 5.46 dB
		10 m: 5.34 dB
	1 GHz ~ 6 GHz	3 m: 6.32 dB
	6 GHz ~ 18 GHz	3 m: 6.66 dB
18 GHz ~ 40 GHz	3 m: 6.74 dB	
10 m Chamber (2F)	30 MHz ~ 300 MHz	3 m: 4.98 dB
		10 m: 4.96 dB
	300 MHz ~ 1 000 MHz	3 m: 5.14 dB
		10 m: 5.00 dB
	1 GHz ~ 6 GHz	3 m: 6.34 dB
	6 GHz ~ 18 GHz	3 m: 6.68 dB
3 m Chamber (3F)	30 MHz ~ 300 MHz	3 m: 4.90 dB
	300 MHz ~ 1 000 MHz	3 m: 5.06 dB
	1 GHz ~ 6 GHz	3 m: 6.70 dB
	6 GHz ~ 18 GHz	3 m: 6.60 dB

3.3 Measurement Program

These test items were performed by software programs;

Test item	Measurement Program		Used
Conducted Emission	EP5CE_V 5.4.0(TOYO)		☒
Radiated Emission	2F	EP5RE_V 4.6.0(TOYO)	☒
	4F	EP5RE_V 5.11.10(TOYO)	



4. Description of EUT

4.1 General information

Name	Specification
System requirements	<ul style="list-style-type: none"> • Microsoft Lync Server 2010 or Microsoft Lync Online 2010 • Windows XP SP3, Windows Vista or Windows 7
Driver software	<p style="text-align: center;">1. Mass deployment: The driver software can be mass deployed using the .msi-file.</p> <p style="text-align: center;">2. Single user: A single user can also install the driver on his/her PC. Download driver on www.busylight.com/support/lync.</p>
Lamp colours	<p>Busylight UC™ supports the colours of Microsoft Lync</p> <ul style="list-style-type: none"> •Red: Busy/Do Not Disturb •Yellow: Off Work/Be Right Back •Green: Available
Ringtones	<p>Busylight UC™ has 8 different ringtones. These include traditional telephone ringing as well as melodies tailored for the office. Speaker and ringtones are built into the device to avoid conflicts with the PC's audio settings.</p>
Power	<p>Powered via the USB data cable. No need for external power supply.</p>

4.2 Product description

Type of product	Busylight
Model name (Basic)	Kuando Busylight UC Omega
Model name (Variant)	-
Difference	-
Serial no	-
Testing voltage	120 V, 60 Hz
Input rating	DC 5 V
Internal clock frequency	12 MHz
FCC ID	WF2-BUSYLIGHTLYNC
Note	-

4.3 Auxiliary equipments

Type	Model / Part #	S/N	Manufacturer
Note PC	NT271B5E-K301S	JGFE919DB00025Z	SAMSUNG
Adapter	CPA09-026A	-	SAMSUNG

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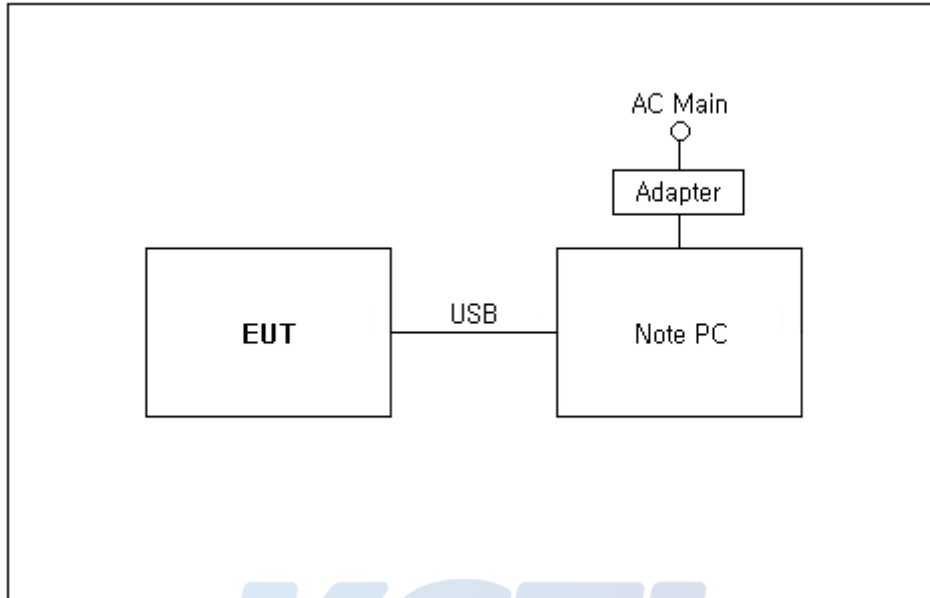
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4.4 Test configuration



	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT	-	Note PC	USB	2.5	Shield
2	Note PC	Power	Adapter	-	1.5	Unshield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test Mode	Normal operating
Test #1	Note PC's use the lighting program and keyboard macros to verify the operation of the EUT.

5. Summary of test results

5.1 Summary of EMI emission test results

Applied	Test items	Test method	Result
☒	Conducted Emission	ANSI C63.4:2014, Class B FCC Part 15 Subpart B ICES-003 Issue 6	Pass
☒	Radiated Emission	ANSI C63.4:2014, Class B FCC Part 15 Subpart B ICES-003 Issue 6	Pass

These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.



6. Test results

6.1 Conducted Emissions

Test specification	ANSI C63.4:2014, Class B FCC Part 15 Subpart B ICES-003 Issue 6		
Testing voltage	120 V, 60 Hz		
Test facility	Shielded room (CE#2)		
Date	2019-03-07		
Temperature (°C)	21.5 °C	Humidity (% R.H.)	23.8 % R.H.
Remarks	Pass		

6.1.1 Limits of conducted emissions measurement

Frequency [MHz]	Class A (dB(μ V))		Class B (dB(μ V))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56 ¹⁾	56 ~ 46 ¹⁾
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

¹⁾ The limit decreases linearly with the logarithm of frequency

6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement.

6.1.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
EMI TEST RECEIVER	ESCI 3	101408	R&S	2019.08.23	☒
TWO-LINE V-NETWORK	ENV216	101584	R&S	2019.04.05	☒
TWO-LINE V-NETWORK	NNLK8121	8121-472	SCHWARZBECK	2019.08.24	☒

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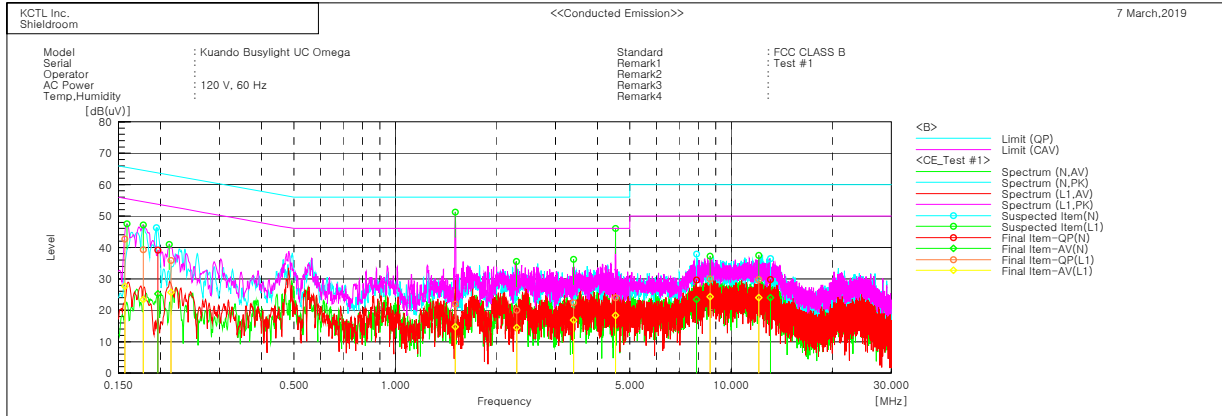
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Suwon-si, Gyeonggi-do, 16677, Korea
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6.1.4 Conducted emissions measurement result

AC Main



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.19663	29.3	15.4	9.8	39.1	25.2	63.8	53.8	24.7	28.6
2	7.89233	19.8	13.6	9.9	29.7	23.5	60.0	50.0	30.3	26.5
3	13.11496	19.7	14.0	10.0	29.7	24.0	60.0	50.0	30.3	26.0

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.1567	32.8	17.8	9.8	42.6	27.6	65.6	55.6	23.0	28.0
2	0.1778	29.4	13.6	9.9	39.3	23.5	64.6	54.6	25.3	31.1
3	0.21492	26.2	16.0	9.7	35.9	25.7	63.0	53.0	27.1	27.3
4	1.51064	12.2	5.0	9.7	21.9	14.7	56.0	46.0	34.1	31.3
5	2.29911	10.3	4.8	9.7	20.0	14.5	56.0	46.0	36.0	31.5
6	3.39971	12.8	7.1	9.7	22.5	16.8	56.0	46.0	33.5	29.2
7	4.53269	14.2	8.6	9.8	24.0	18.4	56.0	46.0	32.0	27.6
8	8.66627	19.9	14.4	10.0	29.9	24.4	60.0	50.0	30.1	25.6
9	12.09814	19.6	13.8	10.1	29.7	23.9	60.0	50.0	30.3	26.1

6.2 Radiated Emission

Test specification	ANSI C63.4:2014, Class B FCC Part 15 Subpart B ICES-003 Issue 6		
Testing voltage	120 V, 60 Hz		
Test facility	10 m Chamber (4F)		
Test distance	3 m		
Date	2019-03-07		
Temperature (°C)	22.3 °C	Humidity (% R.H.)	22.9 % R.H.
Remarks	Pass		

6.2.1 Limits of radiated emission measurement

Frequency [MHz]	Class A (dB(μ V/m)) @ 10 m	Class B (dB(μ V/m)) @ 3 m
30-88	39	40
88-216	43.5	43.5
216-960	46.4	46
Above 960	49.5	54

Note- Alternative standard: CISPR, Pub. 22

6.2.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
EMI TEST RECEIVER	ESR7	101078	R&S	2019.08.23	<input checked="" type="checkbox"/>
Bilog Antenna	CBL 6112D	37876	TESEQ	2020.07.20	<input checked="" type="checkbox"/>
AMPLIFIER	310N	293004	SONOMA	2019.08.24	<input checked="" type="checkbox"/>
ATTENUATOR	8491B	MY39270292	AGILENT	-	<input checked="" type="checkbox"/>
Antenna Mast	MA4640-XP-ET	-	Innco Systems	-	<input checked="" type="checkbox"/>
Turn Table	TT 3.0-3t	-	MATURO	-	<input checked="" type="checkbox"/>
PREAMPLIFIER	8449B	3008A01802	AGILENT	2019.04.05	<input type="checkbox"/>
DOUBLE RIDGED HORN ANTENNA	3115	00086706	ETS-LINDGREN	2019.08.30	<input type="checkbox"/>
Spectrum Analyzer	FSV40	100988	R&S	2020.01.04	<input type="checkbox"/>

6.2.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 6 \text{ dB Att} - \text{A.G})$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G = Amplifier Gain

6 dB Att = 6 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 6 dB, A.G 35 dB

The result is $30 + 12 + 5 + 6 - 35 = 18 \text{ dB } (\mu\text{V/m})$

Bilog Antenna and ATTENUATOR (6 dB) were calibrated together.

AV = CAV : Abbreviation of CISPR Average

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6.2.5 Radiated emission measurement result

30 MHz ~ 1 GHz

