

TEST REPORT

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 443-390, Korea
TEL: 82-70-5008-1021 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR16-SRF0023

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KCTL

1. Client

- Name : Suprema Inc.
- Address : 16F Parkview Office Tower, Jeongja-dong,
Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea
- Date of Receipt : 2016-09-19

2. Use of Report : -

3. Name of Product and Model : BioEntry W2 / BEW2-OAP

4. Manufacturer and Country of Origin : Suprema Inc. / Korea

FCC ID: : TKWBEW2-OAP

5. Date of Test : 2016-09-28 ~ 2016-09-30

6. Test method used : FCC Part 15 Subpart C
Section 15.209

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

Affirmation	Tested by	Technical Manager
	 Name : Downon Ahn (Signature)	 Name : Mingi Son (Signature)

2016-10-07

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

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REPORT REVISION HISTORY

Date	Revision	Page No
2016-10-07	Originally issued	-

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1. Client information

Applicant: Suprema Inc.
Address: 16F Parkview Office Tower, Jeongja-dong, Bundang-gu,
Seongnam, Gyeonggi, 463-863 Korea
Telephone number: +82-31-710-5669
Facsimile number: +82-31-783-4516
Contact person: Dong Mok Shin / swyoon@suprema.co.kr

Manufacturer: Suprema Inc.
Address: 16F Parkview Office Tower, Jeongja-dong, Bundang-gu,
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2. Laboratory information

Address

KCTL Inc.

65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Telephone Number: 82-70-5008-1016 Facsimile Number: 82-505-299-8311

Certificate

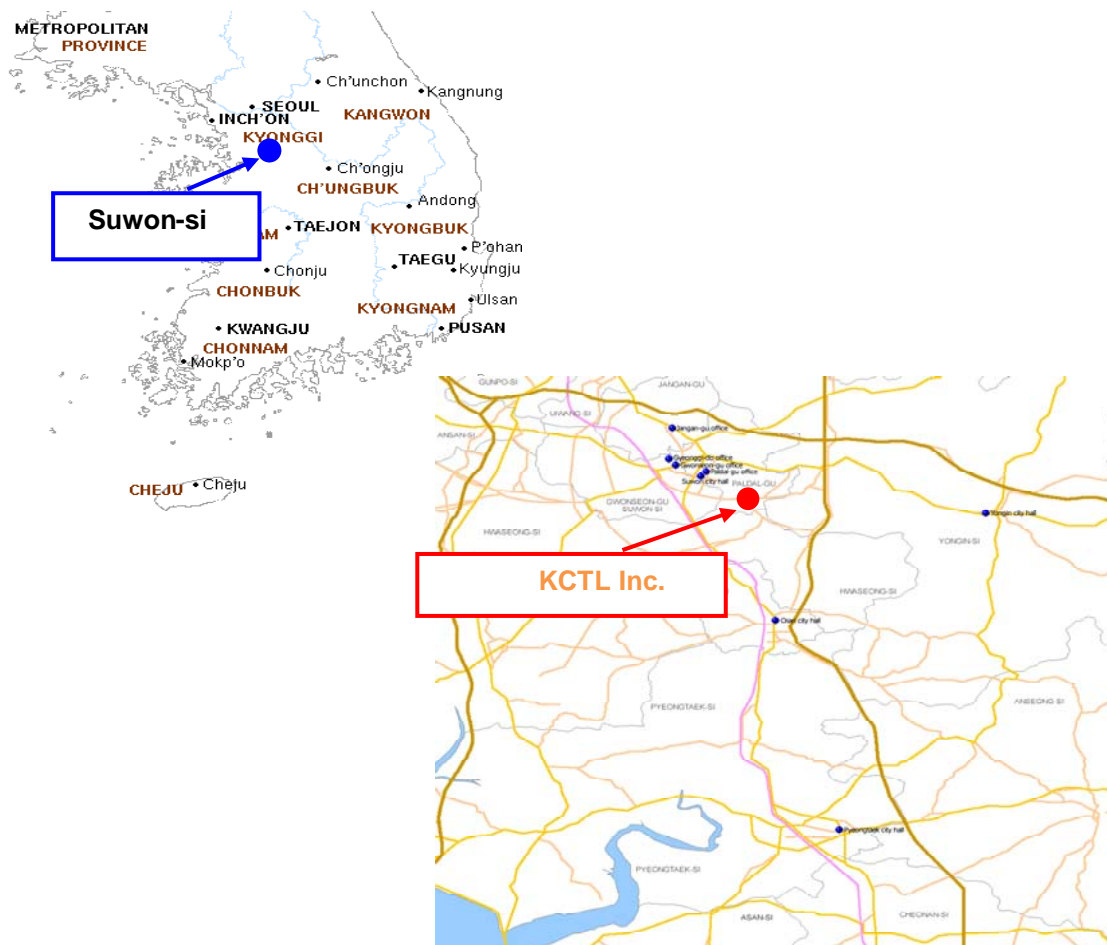
KOLAS No.: KT231

FCC Site Registration No.: 687132

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

IC Site Registration No.:8035A-2

SITE MAP



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3. Description of E.U.T.

3.1 Basic description

Applicant	Suprema Inc.
Address of Applicant	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea
Manufacturer	Suprema Inc.
Address of Manufacturer	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea
Type of equipment	BioEntry W2
Basic Model	BEW2-OAP
Variant Model ₁₎	BEW2-ODP, BEW2-OHP
Serial number	N/A

1) : Buyer model names

3.2 General description

Frequency Range	13.560 MHz (13.56 MHz RFID), 131 kHz (EM/HID Proxy)
Type of Modulation	ASK (13.56 MHz RFID), AM (EM/HID Proxy)
Number of Channels	1 ch (13.56 MHz RFID), 1 ch (EM/HID Proxy)
Type of Antenna	PCB Loop Antenna (RFID), Coil Antenna (EM/HID Proxy)
Power supply	DC 12.0 V , DC 48.0 V (PoE)
Product SW/HW version	V1.0 / V01
Radio SW/HW version	V1.0 / V01
Test SW Version	N/A

3.3 Test frequency

	Frequency
Low frequency	-
Middle frequency	131 kHz
High frequency	-

4. Summary of test results

4.1 Standards & results

FCC Rule	Parameter	Report Section	Test Result
15.203	Antenna Requirement	5.1	C
15.209	Field Strength of Fundamental	5.2	C
15.209	Radiated Emissions	5.3	C
Note 1: C=complies NC= Not complies NT=Not tested NA=Not Applicable Note 2: The worst case is Y scheme(Please refer to the "Test setup photos" to check X, Y, Z configuration).			

4.2 Uncertainty

Measurement Item	Expanded Uncertainty $U = kU_c (k = 2)$	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+4.94 dB, -5.06 dB
		+4.93 dB, -5.05 dB
	300 MHz ~ 1 000 MHz:	+4.97 dB, -5.08 dB
		+4.84 dB, -4.96 dB
Conducted Emissions	9 kHz ~ 150 kHz:	3.75 dB
	150 kHz ~ 30 MHz:	3.36 dB

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5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.1.2 Result

-Complied

Using permanent attached antenna and has no general access to end user after it has been installed.

5.2 Field Strength of Fundamental Emissions

5.2.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field strength (µV/m @ 3m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph(g).fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72 MHz. 76-88 MHz. 174-216 MHz or 470-806 MHz. However, Operation within these frequency bands is permitted under other sections of this part. e.g., Section 15.231 and 15.241.

**Limit : 2400/125=19.2 uV/m @ 300m
 Distance Correction Factor = 40log(test distance /specific distance)

5.2.2 Measurement Procedure

Test Procedure the Radiated Electric Field Strength intensity has been measured on semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9 kHz to 30 MHz at distance 3m The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

Frequency : From 30 MHz to 1 GHz at distance 3m The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.(15.35(a))

below 1GHz : quasi-peak

* Part 15 Section 15.31 (f)(2) (9 kHz-30 MHz)

[Limit at 3 m]=[Limit at 300 m]-40 x log(3[m]/300[m])

[Limit at 3 m]=[Limit at 30 m]-40 x log (3[m]/30[m])

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5.2.3 Test Result

-Complied

- DC 12 V

Measurement Distance: 3 m

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m] at 3m	Result [dB μ V/m] at 300m	Limit [dB μ V/m]	Margin [dB]
QP DATA.										
0.131	H	84.7	-1.9	-31.4	20.5	-12.8	71.9	-8.1	105.26	33.36
PK DATA.										
0.131	H	87.4	-1.9	-31.4	20.5	-12.8	74.6	-5.4	105.26	30.66

- DC 48 V

Measurement Distance: 3 m

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m] at 3m	Result [dB μ V/m] at 300m	Limit [dB μ V/m]	Margin [dB]
QP DATA.										
0.131	H	83.4	-1.9	-31.36	20.5	-12.8	70.6	-9.4	105.26	34.66
PK DATA.										
0.131	H	87.5	-1.9	-31.36	20.5	-12.8	74.7	-5.3	105.26	30.56

Margin (dB) = Limit – Actual

[Result] = Reading – Amp Gain + Attenuator + AF + CL]

1. H = Horizontal, V = Vertical Polarization

2. ATT = Attenuation (10 dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

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5.3 Radiated Emissions

5.3.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$ @ 3 m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph(g), fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, Operation within these frequency bands is permitted under other sections of this part. e.g., Section 15.231 and 15.241.

**Limit : $2400/125=17.78\mu\text{V}/\text{m}$ @ 300 m
Distance Correction Factor = $40\log(\text{test distance} / \text{specific distance})$

5.3.2 Measurement Procedure

The spurious emissions from the EUT will be measured on an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna.

The antenna was positioned 3, 10 or 30 meters horizontally from the EUT.

Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions.

In the case where larger measuring distances are required the results will extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2].

The final measurement will be performed with an EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used according to Section 15.209 (d) [2].

The final level, expressed in dB $\mu\text{V}/\text{m}$, is arrived at by taking the reading from the EMI receiver (Level dB μV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit. The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: ResBW: 200 Hz

150 kHz – 30 MHz: ResBW: 9 kHz

5.3.3 Test Result

-Complied

- DC 12 V

Measurement Distance: 3 m
 -Below 30MHz

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
QP DATA.									
Below 30.00 MHz	Not Detected	-	-	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
PK DATA.									
30.00	V	37.70	1.49	-32.69	25.00	-6.20	31.50	40.00	8.50
42.73	V	40.30	1.46	-32.69	17.93	-13.30	27.00	40.00	13.00
264.01	H	41.20	23.37	-32.55	18.48	-9.30	31.90	46.00	14.10
290.57	H	38.60	4.85	-32.56	19.01	-8.70	29.90	46.00	16.10
312.03	H	39.20	4.86	-32.56	19.50	-8.20	31.00	46.00	15.00
360.04	H	35.50	5.28	-32.58	20.70	-6.60	28.90	46.00	17.10
Above 400.00 MHz	Not Detected	-	-	-	-	-	-	-	-

- Asteriks mean restricted band.

Margin (dB) = Limit – Actual

[Result] = Reading – Amp Gain + Attenuator + AF + CL]

1. H = Horizontal, V = Vertical Polarization

2. ATT = Attenuation (10dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

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**- DC 48 V**

Measurement Distance: 3 m

-Below 30MHz

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
QP DATA.									
Below 30.00 MHz	Not Detected	-	-	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Pol. [V/H]	Reading [dB μ V]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
PK DATA.									
30.97	V	37.30	1.43	-32.69	24.46	-6.80	30.50	40.00	9.50
35.58	V	36.60	1.63	-32.69	21.86	-9.20	27.40	40.00	12.60
264.01	H	41.30	4.77	-32.55	18.48	-9.30	32.00	46.00	14.00
287.54	H	39.80	4.91	-32.56	18.95	-8.70	31.10	46.00	14.90
312.03	H	39.70	4.86	-32.56	19.50	-8.20	31.50	46.00	14.50
360.04	H	35.10	5.28	-32.58	20.70	-6.60	28.50	46.00	17.50
Above 400.00 MHz	Not Detected	-	-	-	-	-	-	-	-

- Asteriks mean restricted band.

Margin (dB) = Limit – Actual

[Result] = Reading – Amp Gain + Attenuator + AF + CL]

1. H = Horizontal, V = Vertical Polarization

2. ATT = Attenuation (10dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

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6. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	EMI TEST RECEIVER	ESCI7	R & S	100732	17.02.26
■	Antenna Mast	MA4000-EP	Innco Systems	303	-
■	Turn Table	DT2000S-1t	Innco Systems	79	-
■	Bilog Antenna	CBL 6112D	TESEQ	37876	18.08.05
■	AMPLIFIER	310N	SONOMA INSTRUMENT	344922	17.08.26
■	COAXIAL FIXED ATTENUATOR	8491B	HP	22981	17.08.25
■	LOOP Antenna	HFH2-Z2	R & S	100355	18.03.03
■	SPECTRUM ANALYZER	FSV30	R & S	100807	17.08.30
■	SIGNAL GENERATOR	SMR40	R & S	10007	17.06.02
■	VECTOR SIGNAL GENERATOR	SMBV100A	R & S	1407.6004K02	17.08.31
■	DC POWER SUPPLY	E3632A	Agilent	MY40016393	17.07.07
■	AC POWER SUPPLY	PCR2000W	KIKUSUI	GB001619	17.08.29