TESTING REPORT

KCTL Inc.
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KCTL
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1. Applicant

Name:	Suprema Inc.
Address:	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863

2. Sample Description:

Type of equipment:	BioStation 2
Basic Model:	BS2-OEPW
Variant Model:	BS2-OHPW

3. Date of Test: July 15 ~ July 23, 2015

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

5. Test Results

Test Item:	Refer to page 7
Result:	Refer to page 8 ~ page 13
Measurement Uncertainty:	Refer to page 7

This result shown in this report refers only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name: SEO, SOO HYEON	Technical Manager Name: SON, MIN GI

2015. 08. 03

KCTL Inc. Testing Laboratory

[Contents]

1. Client information

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

Manufacturer:	Suprema Inc.
Address:	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863

2. Laboratory information

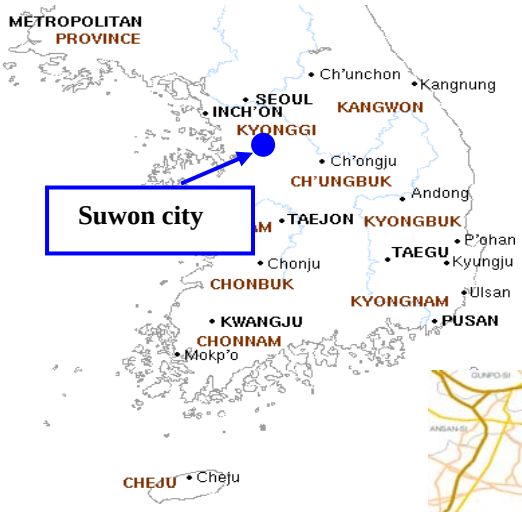
Address

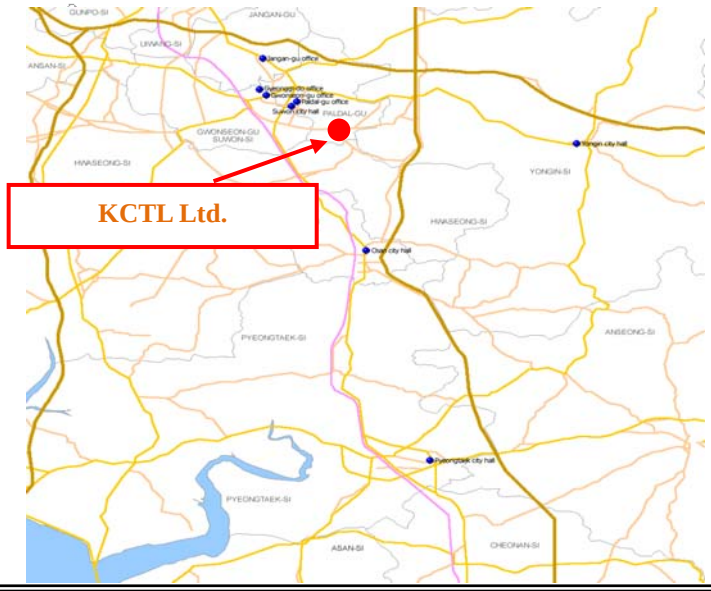
KCTL Ltd.
65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea (443-390)
Telephone Number: +82-70-5008-1016 Facsimile Number: +82-505-299-8311

Certificate

KOLAS No.: 231
FCC Site Designation No.: KR0040
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





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
Manufacturer	Suprema
Address of Manufacturer	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863
Type of equipment	BioStation 2
Basic Model	BS2-OEPW
Variant Model	BS2-OHPW *
Serial number	N/A

* Variant Model has different firm ware.

3.2 General description

Frequency	125 ㎑ (Low power), 2 412 ㎒ ~ 2 462 ㎒ (802.11b/g)
Type of Modulation	ASK (Low power), DSSS, OFDM (802.11b/g)
Number of Channels	1 channel (Low power), 11 Ch (802.11b/g)
Type of Antenna	FPC Antenna
Power supply	DC 12 V (Low power, 802.11b/g), PoE 48 V (Low power)
Product SW/HW version	V01A
Radio SW/HW version	1.0.0
Test SW Version	Tera Term
RF power setting in TEST SW	Adjusting the command as ‘iwpriv wlan0 mp_txpower patha=44’

3.3 Test frequency

	Frequency
Low frequency	-
Middle frequency	125 ㎑
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: C=complies
NC= Not complies
NT=Not tested
NA=Not Applicable

*The test is not applicable since the EUT is not the device that is designed to be connected to the public utility(AC) power line(This EUT is automotive device)

4.2 Uncertainty

Measurement Item	Expanded Uncertainty U = KUc (K = 2)	
Conducted RF power	± 1.30 dB	
Conducted Spurious Emissions	± 1.52 dB	
Radiated Spurious Emissions	30 ㎒ ~ 300 ㎒:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 ㎒ ~ 1 000 ㎒:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
	1 ㎓ ~ 25 ㎓:	+ 6.03 dB, - 6.05 dB
Conducted Emissions	9 ㎑ ~ 150 ㎑:	± 3.75 dB
	150 ㎑ ~ 30 ㎒:	± 3.36 dB

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 permenant 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 (㎒)	Field strength (㎶/m @ 3m)	Distance(m)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	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 ㎒. 76-88 ㎒. 174-216 ㎒ or 470-806 ㎒. 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 ㎑ to 30 ㎒ at distance 3m The EUT was rotated a full revolution in order to obtain the maximumvalue of the electric field intensity.

Frequency : From 30 ㎒ to 1 ㎓ 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 ㎒, 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 1㎓ : quasi-peak

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

5.2.3 Test Result

-Complied

* DC 12 V

Measurement Distance: 3 m

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
0.125	0.2	H	105.7	-12.1	93.6	105.67	12.07

* PoE 48 V

Measurement Distance: 3 m

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
0.125	0.2	H	105.6	-12.1	93.5	105.67	12.17

Margin (dB) = Limit – Actual

[Resultl = 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

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 (㎒)	Field strength (μV/m @ 3 m)	Distance(m)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	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 ㎒. 76-88 ㎒. 174-216 ㎒ or 470-806 ㎒. 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=17.78uV/m @ 300 m
Distance Correction Factor = 40log(test distance /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 ㎑ to 30 ㎒ 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 ㎑ to 90 ㎑ and 110 to 490 ㎑ where an average detector will be used according to Section 15.209 (d) [2].

The final level, expressed in dBμV/m, is arrived at by taking the reading from the EMI receiver (Level dBμV) 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 ㎑ – 150 ㎑: ResBW: 200 ㎐
150 ㎑ – 30 ㎒: ResBW: 9 ㎑

5.3.3 Test Result

-Complied

* DC 12 V

Measurement Distance: 3 m

-Below 30㎒

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
Below 30 ㎒	**Not Detected**	-	-	-	-	-	-

-Above 30㎒

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
43.75	0.2	V	34.20	-16.60	17.60	40.00	22.40
* 324.01	0.2	H	39.60	-14.10	25.50	46.00	20.50
455.95	0.2	H	42.40	-10.80	31.60	46.00	14.40
840.00	0.2	H	40.40	-4.20	36.20	46.00	9.80
Above 900.00 ㎒	**Not Detected**	-	-	-	-	-	-

* Asteriks mean restricted band.

Margin (dB) = Limit – Actual

[Resultl = 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

* The spurious emission at the frequency does not fall in the restricted bands.

** The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

NOTE: All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

* PoE 48 V

Measurement Distance: 3 m

-Below 30㎒

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
Below 30 ㎒	**Not Detected**	-	-	-	-	-	-

-Above 30㎒

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
QP DATA.							
40.34	0.2	V	46.80	-17.40	29.40	40.00	10.60
71.89	0.2	V	52.00	-21.40	30.60	40.00	9.40
107.14	0.2	V	42.80	-18.40	24.40	43.50	19.10
310.27	0.2	H	37.70	-14.50	23.20	46.00	22.80
696.00	0.2	H	41.10	-6.70	34.40	46.00	11.60
Above 700.00 ㎒	**Not Detected**	-	-	-	-	-	-

Margin (dB) = Limit – Actual

[Resultl = 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

* The spurious emission at the frequency does not fall in the restricted bands.

** The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

NOTE: All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

6. Test equipment used for test

	Description	Manufacturer	Model No.	Serial No.	Next Cal Date.
■	BiLog Antenna	Schwarzbeck	VULB 9163	552	16.05.14
■	Loop Antenna	R&S	HFH2-Z2	100355	17.03.03
■	Antenna Mast	Innco Systems	MA4000-EP	303	-
■	Turn Table	Innco Systems	DT2000S-1t	79	-
■	EMI Test Receiver	Schwarzbeck	ESR7	101078	16.02.16
■	DC Power Supply	Agilent	E3632A	MY51220373	15.12.11
■	Amplifier	HP	8447D	2944A07626	16.01.19
■	Attenuator	HP	8491A	MY52460424	16.07.13