verify No.451067431635

위변조방지/진위확인
www.docuqr.com

TEST REPORT

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

KCTL

1. Client

- Name : Suprema Inc.
- Address : 17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
- Date of Receipt : 2021-04-06

2. Use of Report : Certification

3. Name of Product / Model : BioStation2 / BS2-OEPW

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

5. FCC ID : TKWBS2-OEPW2

6. Date of Test : 2021-06-30 to 2021-07-09

7. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test method used : FCC Part 15 Subpart C, 15.209

9. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Eunseong Lim (Signature)	Technical Manager Name : Hyeonsu Jang (Signature)

2021-11-09

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.

REPORT REVISION HISTORY

Date	Revision	Page No
2021-11-09	Originally issued	-

This report shall not be reproduced except in full, without the written approval of KCTL Inc. This document may be altered or revised by KCTL Inc. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KCTL Inc. will constitute fraud and shall nullify the document. This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information 4
2. Device information 4
2.1. Information about derivative model 5
2.2. Frequency/channel operations 5
3. Antenna requirement 6
4. Summary of tests 7
5. Measurement uncertainty 7
6. Test results 8
6.1. Field Strength of Fundamental and Spurious Emission 8
6.2. 20㏈ Bandwidth & Occupied Bandwidth 11
7. Measurement equipment 13

1. General information

Client	:	Suprema Inc.
Address	:	17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
Manufacturer	:	Suprema Inc.
Address	:	17F-5, Parkview officetower,, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13554 Korea (Republic Of)
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132
		VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
		CAB Identifier: KR0040, ISED Number: 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	BioStation2
Model	:	BS2-OEPW
Derivative model	:	BS2-OHPW
Modulation technique	:	ASK (RFID), WIFI(802.11b/g)_DSSS, OFDM
Number of channels	:	1 ch (RFID), 11 ch(WIFI(802.11b/g))
Frequency range	:	125 ㎑ (RFID)
		2 412 ㎒ ~ 2 462 ㎒ (WIFI(802.11b/g))
Power source	:	DC 12 V
Antenna specification	:	PCB Loop Antenna (RFID)
		FPCB antenna (WIFI(802.11b/g))
Antenna gain	:	2.10 dBi (WIFI(802.11b/g))
Software version	:	V1.2
Hardware version	:	V1.2
Operation temperature	:	-20 ℃ ~ 50 ℃
Test device serial No.	:	N/A

2.1. Information about derivative model

The difference between basic model and derivative models is:

All models are made up by same H/W, F/W and compared with basic mode.
Based on the base model, variant models Added HID license for a specific card.
The firmware is the same for each model, but the license is activated / deactivated by registering the model name.

2.2. Frequency/channel operations

This device contains the following capabilities:
RFID (125 ㎑), WIFI (802.11b/g)

Ch.	Frequency (㎑)
01	125

Table 2.2.1. RFID

3. Antenna requirement

Requirement of FCC part section 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 transmitter has permanently attached PCB Loop Antenna (internal antenna) on board.

4. Summary of tests

FCC Part section(s)	Parameter	Test results
15.209(a)	Field Strength of Fundamental and Spurious Emission	Pass
2.1049	20㏈ Bandwidth	Pass
15.203	Antenna requirement	Pass
15.207(a)	AC Conducted Emission	N/A(Note2)

Notes: (N/T: Not Tested, N/A: Not Applicable)

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. This test is not applicable because the EUT only connects DC power line.
3. These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
4. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Y** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Y** orientation.
5. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
6. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.
7. The radiated test was performed with and without passive tag. The test results shown in the following sections represent the worst case emissions.
   - Worst Case : Without passive tag

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

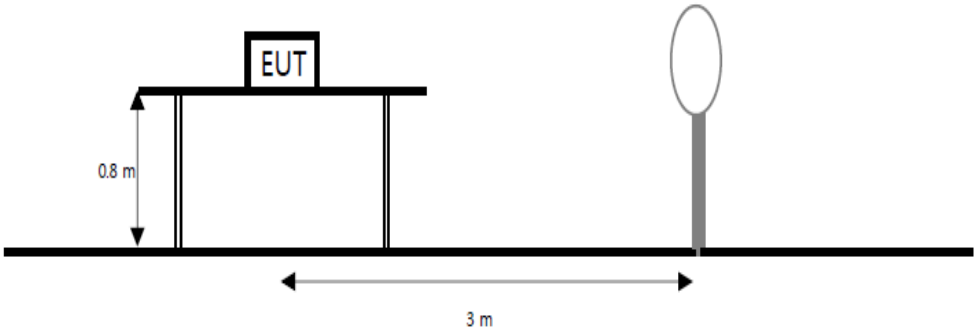
Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	9 ㎑ ~ 30 ㎒	2.3 ㏈
Conducted emissions	9 ㎑ ~ 150 ㎑	3.7 ㏈
	150 ㎑ ~ 30 ㎒	3.3 ㏈

6. Test results

6.1. Field Strength of Fundamental and Spurious Emission

Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒ Emissions



Limit

According to section 15.209(a), RSS-Gen(8.9) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (㎒)	Field strength (㎶/m)	Measurement distance (m)
0.009 - 0.490	2 400/F(㎑)	300
0.490 - 1.705	24 000/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 this 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., Section15.231 and 15.241.

Test procedure
ANSI C63.10-2013

Test settings
Test Procedures for emission from 9 ㎑ to 30 ㎒

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
d. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode.
e. Below 30 ㎒ frequency range, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported and the worse orientations of Face-on and Face-off were set for final test.
   - Face-on = Parallel, Face-off = Perpendicular

Notes:

1. *f* <30 ㎒, extrapolation factor of 40 ㏈/decade of distance. $F_d = 40\log(D_m/Ds)$
   Where:
   F_d = Distance factor in ㏈
   D_m = Measurement distance in meters
   D_s = Specification distance in meters
2. The test measurement distance is 3 meter
3. Limit (㏈(㎶/m)) = For 0.009 ㎒ - 0.490 ㎒, 20*log(2 400/F(㎑)) ㏈(㎶/m)
   For 0.490 ㎒ - 1.705 ㎒, 20*log(24 000/F(㎑)) ㏈(㎶/m)
   For 1.705 ㎒ - 30 ㎒, 20*log(30) = 29.54 ㏈(㎶/m)

Test results

Radiated Emissions Fundamental & 9 ㎑ to 30 ㎒

[Face-on]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
0.123	106.40	PK	19.90	-32.29	-80.00	-92.39	14.01	45.67	31.66
0.123	104.10	AV	19.90	-32.29	-80.00	-92.39	11.71	25.81	14.10
0.187	78.20	AV	19.90	-32.22	-80.00	-92.32	-14.12	22.17	36.29
0.613	62.60	QP	19.90	-32.09	-40.00	-52.19	10.41	31.86	21.45
24.240	48.80	QP	20.77	-30.70	-40.00	-49.93	-1.13	30.00	31.13

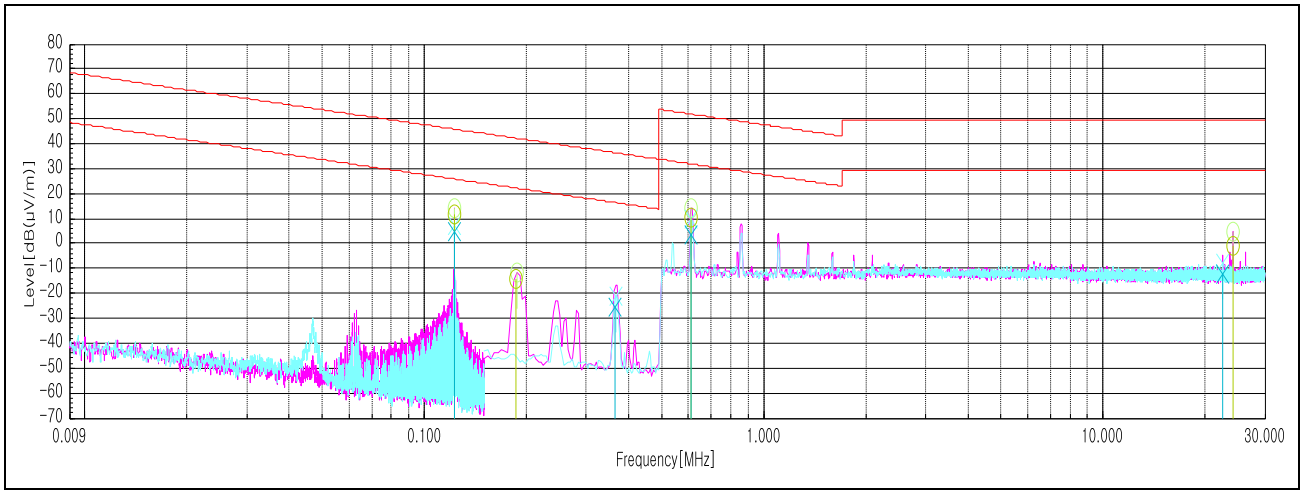
[Face-off]

Frequency	Reading	Detector	Ant. Factor	Amp. + Cable	Distance factor	Factor	Result	Limit	Margin
(㎒)	(dB(㎶))	Mode	(dB)	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
0.123	99.80	PK	19.90	-32.29	-80.00	-92.39	7.41	45.67	38.26
0.123	97.20	AV	19.90	-32.29	-80.00	-92.39	4.81	25.81	21.00
0.366	66.60	AV	19.90	-32.20	-80.00	-92.30	-25.70	19.61	45.31
0.613	55.80	QP	19.90	-32.09	-40.00	-52.19	3.61	31.44	27.83
22.504	37.70	QP	20.70	-30.75	-40.00	-50.05	-12.35	30.00	42.35

Note.

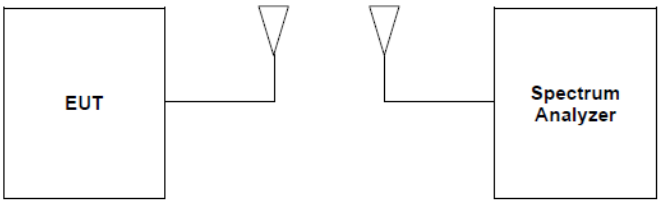
1) Factor(dB) = Antenna Factor + Amp. Gain + Cable Loss + distance factor(dB)

2) -80 is distance factor = 40*log(3/300), -40 is distance factor = 40*log(3/30)



6.2. 20dB Bandwidth

Test setup



Limit

For reporting purpose only

Test settings

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

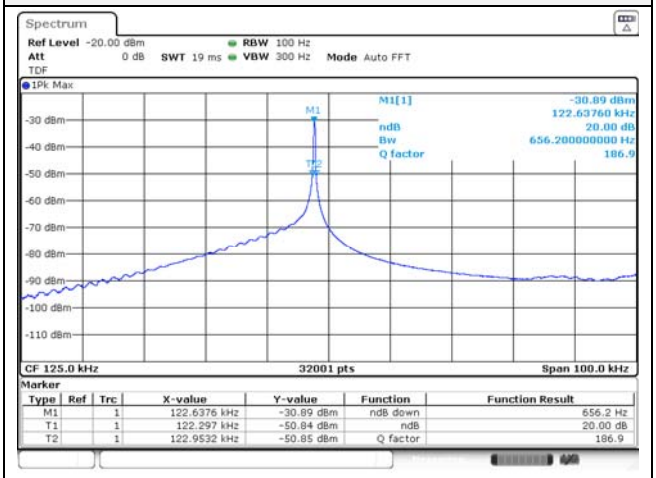
The difference between the two recorded frequencies is the 99% occupied bandwidth.

Test results

Frequency (㎑)	20㏈ Bandwidth (㎑)	Occupied Bandwidth (㎑)	Limit
125	0.66	3.29	Reporting purpose only

Test Plots

20㏈ Bandwidth
125 ㎑



Note. Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	22.01.20
Spectrum Analyzer	R&S	FSV30	100914	22.09.17
DC Power Supply	AGILENT	E3632A	KR94907664	22.05.10
Temp & Humid Chamber	Myeongseong R&P	CTHC-50P-DT	20150824-2	22.07.27
EMI TEST RECEIVER	R&S	ESCI7	101408	22.08.19
Bi-Log Antenna	TESEQ	CBL 6112D	55545	22.04.24
ATTENUATOR	KEYSIGHT	8491B-6dB	MY39271060	21.12.24
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
AMPLIFIER	SONOMA	310N	186280	22.04.03
Antenna Mast	Innco Systems	MA4000-EP	303	N/A
Turn Table	Innco Systems	DT2000	79	N/A
ISOLATION TRANSFORMER	ONETECH CO., LTD	OT-IT500VA	OTR1-16026	22.04.02

End of test report