TEST REPORT

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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 : 2019-06-12

2. Use of Report : -

3. Name of Product and Model : NOVUS / NVS07-D2FR2MKG

4. Manufacturer and Country of Origin : SUPREMA INC / Korea

5. FCC ID : TKWNVS07

6. IC Certification : 23080-NVS07

7. Date of Test : 2019-08-29 to 2019-09-10

8. Test Standards : RSS-102 Issue 5 Mar. 2015
SPR-002 Issue 1 Sep. 2016

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

Affirmation	Tested by	Technical Manager
	Name : Taekyong Nam (Signature)	Name : Seungyong Kim (Signature)

2019-11-13

KCTL Inc.

Report revision history

Date	Revision	Page No
2019-10-10	Initial report	-
2019-11-13	Revised the calibration internal of test equipment	13

Note. The report No. KR19-SRF0156 is superseded by the report No. KR19-SRF0156-A.

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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 Seongam-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 Industry Canada Registration No. : 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	NOVUS
Model	:	NVS07-D2FR2MKG
Frequency range	:	125 ㎑(RFID), 13.56 ㎒(NFC)
Modulation technique	:	ASK
Power source	:	DC 12 V, PoE 48 V
Antenna specification	:	Integrated antenna (NFC / RFID)
Software version	:	V 1.0.0
Hardware version	:	V 1.0.0
Test device serial No.	:	N/A
Operation temperature	:	-20 ℃ ~ 50 ℃

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
I. T. E. Power Supply	BridgePower Corp	JPW128KA1200N05	-	INPUT : 100-240 V / 1.0 A OUTPUT : 12 V / 2.5 A
AC/DC Adapter	SUNELECTRONICS	MH-48175	-	INPUT : 220 V / 1.5 A OUTPUT : 48 V / 1.75 A

2.2. Information about derivative model

The difference between basic model and derivative models is:

The firmware is the same for each model and it has derivative models by optional components. Optional components can be assembled or removed on the base model.

Optional components are like below:
Memory, Fingerprint Sensor, Magnetic Swipe Reader, RFID Module, Keypad, GPS Module

2.3. EUT Description

This device contains the following capabilities:
125 ㎑(RFID), 13.56 ㎒(NFC)

Ch.	Frequency (㎑)
01	125

Table 2.3.1. RFID

2.4. Normal and extreme test conditions

- Ambient Conditions

	Temperature [℃]	Relative humidity [%]
Requirement for tests	15 to 35	20 to 75
Ambient Conditions	22	51

- Test Conditions_Adapter

Test condition	Temperature [℃]	Voltage [V]
LTNV	22	12

Note: N: Normal T: Temperature V: Voltage

- Test Conditions_Adaptor_PoE

Test condition	Temperature [℃]	Voltage [V]
LTNV	22	48

Note: N: Normal T: Temperature V: Voltage

3. 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 (±)	
E-Field	3 ㎑ ~ 10 ㎒	11.04 %
H-Field	3 ㎑ ~ 10 ㎒	13.80 %

4. General Condition

4.1. RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

According to RSS-102 Issue 5, Paragraph “4. Exposure Limits”, Industry of Canada has adopted the RF field strength limits stablished in Healths Canada’s RF exposure guideline, Safety code 6:

Frequency Range (㎒)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10^{21}	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f 0.3417	0.008335 f 0.3417	0.02619f0.6834	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10^{-4} $f^{0.5}$	6.67 x 10^{-5} f	616000/ $f^{1.2}$

Note: f is frequency in ㎒.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

4.2. Exemption Limits for Routine Evaluation – RF Exposure Evaluation

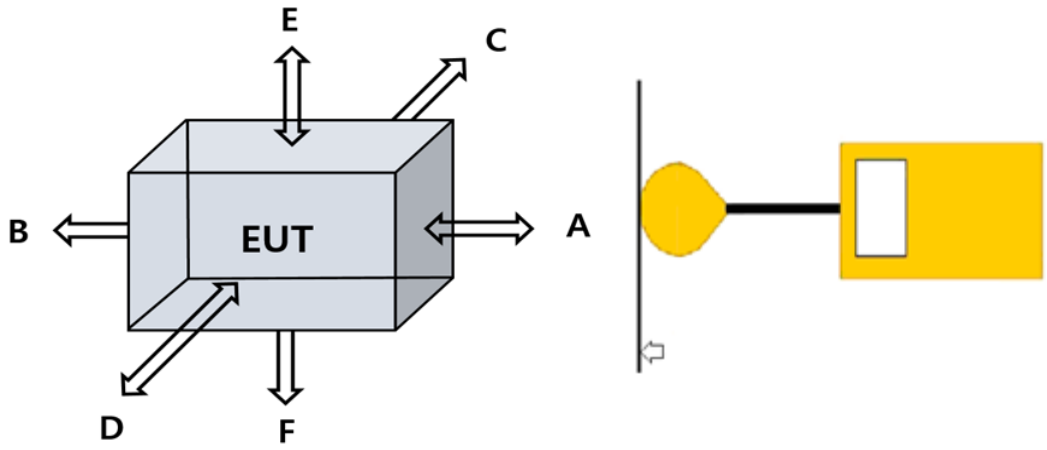
According to RSS-102 Issue 5 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 ㎝, except when the device operates as follows:

- Below 20 ㎒ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1W (adjusted for tune-up tolerance);
- At or above 20 ㎒ and below 48 ㎒ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 4.49/ $f^{0.5}$ W (adjusted for tune-up tolerance), where f is in ㎒;
- At or above 48 ㎒ and below 300 ㎒ and the source-bands, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- At or above 300 ㎒ and below 6 ㎓ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10^{-2} $f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in ㎒;
- At or above 6 ㎓ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance.)

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

5. Test results

5.1. Nerve Simulation (RFID)



*** Measurement Distance**

The measurement distance is the manufacturer's declared separation distance obtained via the information in the user manual. This shall be measured as the distance from the edge of the device to the edge of the measurement probe. The separation distance must be a logical distance based on normal usage conditions.

Notes:

1. The test setup is depended on product type described in the SPR-002.
2. As described in SPR-002, all of axis (top, right, left, bottom, rear and front) was investigated.
3. All of position is measured by 3 axis isotropic probe.
4. The Manufacturer declares proper distance 20 ㎝.
5. If the distance of the passive desk top device is complied with 10 ㎝ distance of SPR-002.

Test procedure

6.6.1 Direct Measurement Methods Against the RSS-102 Nerve Stimulation RLs

The following measurement procedures may be used for direct measurement against the RSS-102 nerve stimulation RLs. Measurements must be taken for both the E-field and H-field, since the measurement distance described in Section 6.4 will be in the near field where the relationship between the E- and H-fields is unknown.

6.6.1.1 Measurement Method When the RBW of the Measurement Probe is Greater Than the 99% OBW or When Using a Broadband Probe

When the RBW of the measurement probe is greater than the 99% OBW, or when using a broadband probe, use the following measurement method:

(a) Set the measurement frequency of the measurement probe to the fundamental frequency of the device under test.
(b) Set the span to encompass the entire emission bandwidth.
(c) Set the RBW greater than the 99% OBW of the fundamental emission.

Note: This step is not required for a broadband measurement probe that integrates the entire frequency range.

(d) Set the detector to Peak and trace display to Max-Hold.
(e) Allow the spectrum to fill; for pulsing devices this may require an increased monitoring period.
(f) Using a marker, set it to the maximum level of the spectral envelope.
(g) Repeat steps (b) to (f) while scanning a parallel plane at the measurement distance on each side of the device to find the peak level.
(h) Repeat steps (b) to (g) for any frequencies where the field value is greater than -20 dBc below the maximum level identified.
(i) If there are multiple frequencies transmitted by the device under test, use equations (2) and (3) to determine compliance.

Note: When scanning around the entire device, the location found to be the maximum for the E- field or H-field may not be the same location as the opposite field.

6.6.1.2 Measurement Method When the RBW of the Measurement Probe is Less Than the 99% OBW.

When the RBW of the measurement probe is less than the 99% OBW, use the following measurement method:

(a) Set the measurement frequency of the measurement probe to the fundamental frequency of the device under test.
(b) Set the span to encompass the entire emission bandwidth.
(c) Set the RBW to approximately equal to but greater than 1% of the 99% OBW of the fundamental emission.
(d) Set the detector to Peak and trace display to Max-Hold.
(e) Allow the spectrum to fill; for pulsing devices, this may require an increased monitoring period.
(f) Capture the trace and sum the spectrum levels (in voltage or current units) at intervals equal to the RBW, extending across the entire spectrum. Alternatively, this may be accomplished using an integration function on the measurement probe.
(g) Repeat steps (b) to (f) while scanning a parallel plane at the measurement distance on each side of the device to find the peak level.
(h) Repeat steps (b) to (g) for any frequencies where the field value is greater than -20 dBc below the maximum level identified.
(i) If there are multiple frequencies transmitted by the device under test, use equations (2) and (3) to determine compliance.

Note: When scanning around the entire device, the location found to be the maximum for the E- field or H-field may not be the same location as the opposite field.

6.6.1.3 Measurement Method for a Single-Axis Probe

For a single-axis probe, use the following measurement method:

(a) Use the appropriate measurement method from Section 6.6.1.1 or Section 6.6.1.2 (depending on the probe capabilities) at the fundamental frequency of the device under test (i.e. without the last step in either Section 6.6.1.1 or Section 6.6.1.2).
(b) Repeat step (a) for the remaining two axes.
(c) Using formula (4) or (5), sum the measurements from the three axes.
(d) Repeat steps (a) to (c) for any harmonic frequencies and any other fundamental frequency and its harmonics transmitted by the device under test.
(e) If there are multiple frequencies transmitted by the device under test, use equation (2) or (3) for determining compliance.

Test results

12V

E-field Measurements

Distance (㎝)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Position F (V/m)	Limit (V/m)
20	0.220 5	0.220 2	0.220 0	0.223 2	0.223 8	0.222 3	83

H-field Measurements

Distance (㎝)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Position F (A/m)	Limit (A/m)
20	0.031 9	0.033 0	0.033 0	0.031 9	0.033 1	0.032 9	90

- Max. E-field : 0.223 8 V/m (E : Top), Max. H-field : 0.033 1 A/m (E : Top)

48 V

E-field Measurements

Distance (㎝)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Position F (V/m)	Limit (V/m)
20	0.565 5	0.810 3	0.715 3	0.808 8	0.974 7	0.936 1	83

H-field Measurements

Distance (㎝)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Position F (A/m)	Limit (A/m)
20	0.032 3	0.031 2	0.032 0	0.032 6	0.032 9	0.032 7	90

- Max. E-field : 0.974 7 V/m (E : Top), Max. H-field : 0.032 9 A/m (E : Top)

6. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
E&H Field Probe	narda	EHP-200A	170WX81015	19.02.08	20.02.08

End of test report