



<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

# FCC CERTIFICATION TEST REPORT

**Test report No.** : TREFCC24-0023  
**Applicant** : KD Navien Co., Ltd.  
**Address** : 95, Suworam-gil, Seotan-myeon, Pyeongtaek-si,  
Gyeonggi-do, 17704, Republic of Korea  
**Manufacturer** : KD Navien Co., Ltd.  
**Address** : 95, Suworam-gil, Seotan-myeon, Pyeongtaek-si,  
Gyeonggi-do, 17704, Republic of Korea  
**Type of equipment** : CarbonCore Heated Mattress Pad  
**Model name** : EME511-KP  
**Variant model name** : EME511-QP, EME511-SP  
**FCC ID** : 2ASTC-EME511  
**Date of incoming** : February 08, 2024  
**Date of test** : February 19, 2024  
**Date of issue** : March 06, 2024  
**Test standards** : ANSI C 63.4-2014  
47 CFR Part 15 Subpart B  
**Type of device** : All other devices  
**Test Result** :  Complied  Not complied

## Summary

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of Lab-T, Inc.

**Prepared by**

GyuBong Nam / EMC Test Engineer

**Approved by**

CheolHo, Lee / Technical manager

If this test report is required for confirmation of authenticity, please contact [info@lab-t.net](mailto:info@lab-t.net)  
This test report is not related to KOLAS.

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a>  2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b>  TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------

## - CONTENTS -

<b>1. REVISION HISTORY .....</b>	<b>3</b>
<b>2. INFORMATION OF TEST LABORATORY .....</b>	<b>4</b>
<b>3. APPLICANT INFORMATION .....</b>	<b>5</b>
<b>4. DESCRIPTION OF EUT (EQUIPMENT UNDER TEST) .....</b>	<b>6</b>
4.1 Product description .....	6
4.2 Product specification .....	6
4.3 EUT internal operating frequency .....	7
4.4 Information of additional model .....	7
4.5 Peripheral equipment .....	7
4.6 Connection cable .....	7
4.7 Test setup and configuration .....	8
4.8 EUT operating test mode(s) .....	8
4.9 EUT modification .....	8
<b>5. TEST STANDARD .....</b>	<b>9</b>
5.1 Standard .....	9
<b>6. EMISSION TEST RESULT .....</b>	<b>10</b>
6.1 Conducted emission .....	10
6.2 Radiated emission (30 MHz ~ 1 000 MHz) .....	16
6.3 Radiated emission (Above 1 GHz) .....	22

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p>2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 1. Revision history

Issued report No.	Version	Issued date	Revision
TREFCC24-0023	Rev. 00	March 06, 2024	Original








	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 2. Information of test laboratory

<b>Corporate name</b>	Lab-T, Inc.
<b>Representative</b>	Duke (Jongyoung) Kim
<b>Address</b>	2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si
	Gyeonggi-do 17036, Korea (Republic of)
<b>Telephone</b>	+82-31-322-6767
<b>Fax</b>	+82-31-322-6768
<b>E-mail</b>	<a href="mailto:info@lab-t.net">info@lab-t.net</a>

<b>Test site</b>	Building L, A, T
<b>Address</b>	2182-40, 2182-44, 2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu
	Yongin-si, Gyeonggi-do 17036, Korea (Republic of)

\* Lab-T, Inc. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	KT703	
Site filing	USA	FCC	KR0159	
	Japan	VCCI	R-14282, C-14764 T-12276, G-10886 G-10887	
	Canada	Industry Canada (IC)	22000	
Certification	Korea	KC	KR0159 (RRA) KC2019-1 (KATS)	
	EU	TUV SUD	CARAT 093449 0008	
	USA	UL	1706-E-197	

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 3. Applicant information

<b>Applicant</b>	KD Navien Co., Ltd.
<b>Address</b>	95, Suworam-gil, Seotan-myeon, Pyeongtaek-si, Gyeonggi-do, 17704, Republic of Korea

<b>Manufacturer</b>	KD Navien Co., Ltd.
<b>Address</b>	95, Suworam-gil, Seotan-myeon, Pyeongtaek-si, Gyeonggi-do, 17704, Republic of Korea
<b>Country of origin</b>	Reublic of Korea

<b>Factory</b>	KD Navien Co., Ltd.
<b>Address</b>	104, Sabgyocheon-Ro, Seonjang-Myeon, Asan-Si, Chungcheongnam-Do, Republic of Korea
<b>Factory (Country)</b>	Reublic of Korea

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 4. Description of EUT (Equipment under test)

### 4.1 Product description

<b>Name of EUT</b>	CarbonCore Heated Mattress Pad
<b>Model name</b>	EME511-KP

### 4.2 Product specification

<b>Classification</b>		<b>EME511</b>
<b>Product Name</b>		CarbonCore Heated Mattress Pad
<b>Model Name</b>	Single	EME511-SP
	Queen	EME511-QP
	King	EME511-KP
<b>Rated Power Consumption</b>		DC24V, 105W (Single), 150W (Queen/King)
<b>Operating &amp; Storage Conditions</b>	<b>Temperature</b>	Operating: 32°F ~ 77°F (0°C ~ 25°C) Storage: -13°F ~ 158°F (-25°C ~ 70°C)
	<b>Humidity</b>	Operating: 10% ~ 90% RH, Non-condensing Storage: 5% ~ 90% RH, Non-condensing
<b>Controller Size</b>		2.1 x 5.9 x 1.0 inch (50 x 150 x 25 mm)
<b>Controller Weight</b>		0.55 lbs (250 g)
<b>Receptacle Size</b>		3.0 x 2.2 x 1.2 inch (75 x 55 x 30 mm)
<b>Receptacle Weight</b>		0.33 lbs (150 g)
<b>Pad Size</b>	Single	37.4 x 76.8 inch (950 x 1,950 mm)
	Queen	57.1 x 76.8 inch (1,450 x 1,950 mm)
	King	65.0 x 76.8 inch (1,650 x 1,950 mm)
<b>Manufactured in</b>		Republic of Korea
<b>Certification</b>		FCC

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 4.3 EUT internal operating frequency

Frequency	Description	Frequency	Description
24 MHz	-	-	-

### 4.4 Information of additional model

Division	Model name	Difference
1	EME511-QP	mat heat line length
2	EME511-SP	Power consumption and mat heat line length

### 4.5 Peripheral equipment

Product	Model name	Serial No.	Manufacturer
CarbonCore Heated Mattress Pad (Basic model)	EME511-KP	-	KD Navien Co., Ltd. / KOREA
Controller (Basic model)	EME511-KP	-	KD Navien Co., Ltd. / KOREA
CarbonCore Heated Mattress Pad (Derivative model)	EME511-SP	-	KD Navien Co., Ltd. / KOREA
Controller (Derivative model)	EME511-SP	-	KD Navien Co., Ltd. / KOREA
AC/DC ADAPTER	A150KDN-VF USA	-	POWERNET Technologies Core. / CHINA

### 4.6 Connection cable

Start-up device		Connected end device		Cable specification	
Name	I/O port	Name	I/O port	Length (m)	Spec.
CarbonCore Heated Mattress Pad (EUT)	6 PIN CONNECTOR	Controller (EUT)	-	1.2	Unshield
Controller (EUT)	DC IN	AC/DC ADAPTER	DC OUT	1.8	Unshield
AC/DC ADAPTER	AC IN	AC Power Source	AC OUT	0.7	Unshield

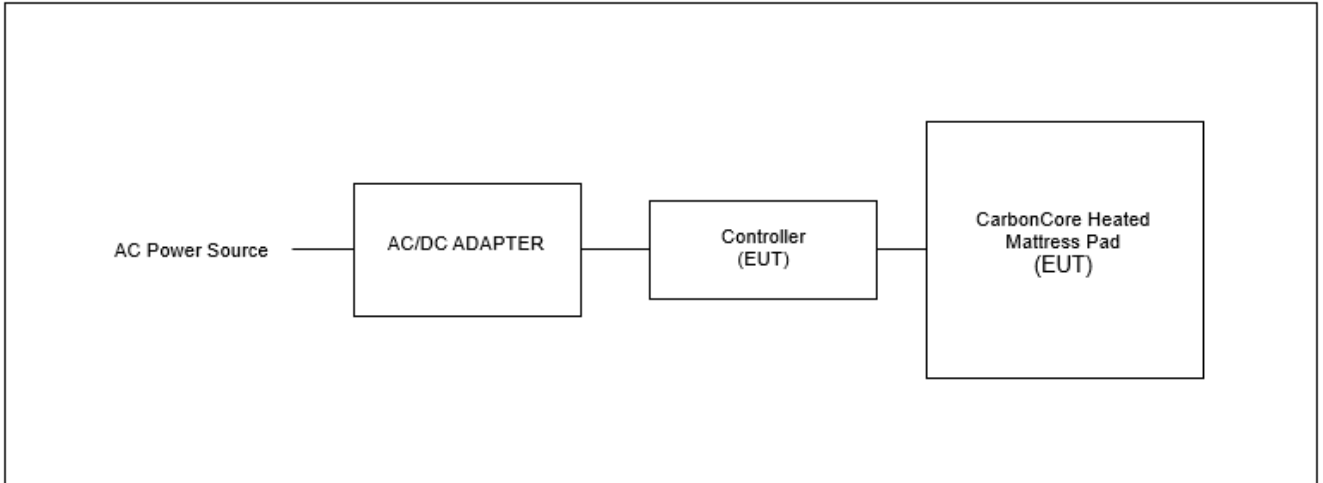


<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

#### 4.7 Test setup and configuration



#### 4.8 EUT operating test mode(s)

- Test the electric mat after setting it to its maximum temperature.
- The basic model (EME511-KP) and the derivative model (EME511-SP) are tested respectively during the test.
- The AC/DC ADAPTER used in the test was not provided and was used as a peripheral device during the test.  
(AC/DC ADAPTER Specification
  - Input : AC 100 V ~ 240 V, 50 / 60 Hz, 2.5 A
  - Output : DC 24 V, 6.25 A, 150 W)

#### 4.9 EUT modification

- Not modification.



	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 5. Test standard

### 5.1 Standard

Test item	Applied standard	Result
Conducted emission	47 CFR FCC Part 15 Subpart B §15.107 (Class B)	C
Radiated emission (30 MHz ~ 1 000 MHz)	47 CFR FCC Part 15 Subpart B §15.109 (Class B)	C
Radiated emission (Above 1 GHz)	47 CFR FCC Part 15 Subpart B §15.109 (Class B)	N/A (*Note 1)
<p>* C=Comply, N/A=Not applicable * Note1 : The frequency is excluded from the test to less than 108 MHz.</p>		

#### [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.

Test item		Uncertainty	Confidence level of approximately
Conducted emission	0.15 kHz ~ 30 MHz	2.36 dB	Least about 95 %, k = 2
Radiated emission (30 MHz ~ 1 000 MHz)	30 MHz ~ 1 000 MHz	4.80 dB	Least about 95 %, k = 2

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 6. Emission test result

### 6.1 Conducted emission

<b>Test standard</b>	<b>47 CFR FCC Part 15 Subpart B §15.107</b>
Test date	2024.02.19
Test facility	Building A Shielded room (#1)
Test voltage	AC 120 V, 60 Hz
Temperature	(21.8 ~ 22.2) °C
Relative humidity	(51.5 ~ 51.9) % R.H.
Test result	Complied

#### 6.1.1 Measurement procedure

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN & ISN, if any. Unused measuring port of the LISN & ISN was resistively terminated by 50 ohm terminator. The measuring port of the LISN for EUT was connected to spectrum analyzer. Using conducted emission test software, the emissions were scanned with peak detector mode. After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has quasi-peak detector and CISPR average detector. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 6.1.2 Test equipment used

Equipment	Model	Manufacturer	Serial number	Next cal. date
EMI Test Receiver	ESR7	R&S	102160	2024.05.31
PULSE LIMITER	TFL-007D	KYORITSU	12-19-121	2024.05.31
LISN	ENV216	R&S	101416	2024.05.31
LISN Control Unit	LISN Controller	TSJ	06660-1	-
LISN Control Unit	LISN Controller	TSJ	06660-2	-
EMI CE Software	EMI-C	TSJ	-	-

\* All test equipment used is calibrated on a regular basis.

### 6.1.3 Conducted emission limit

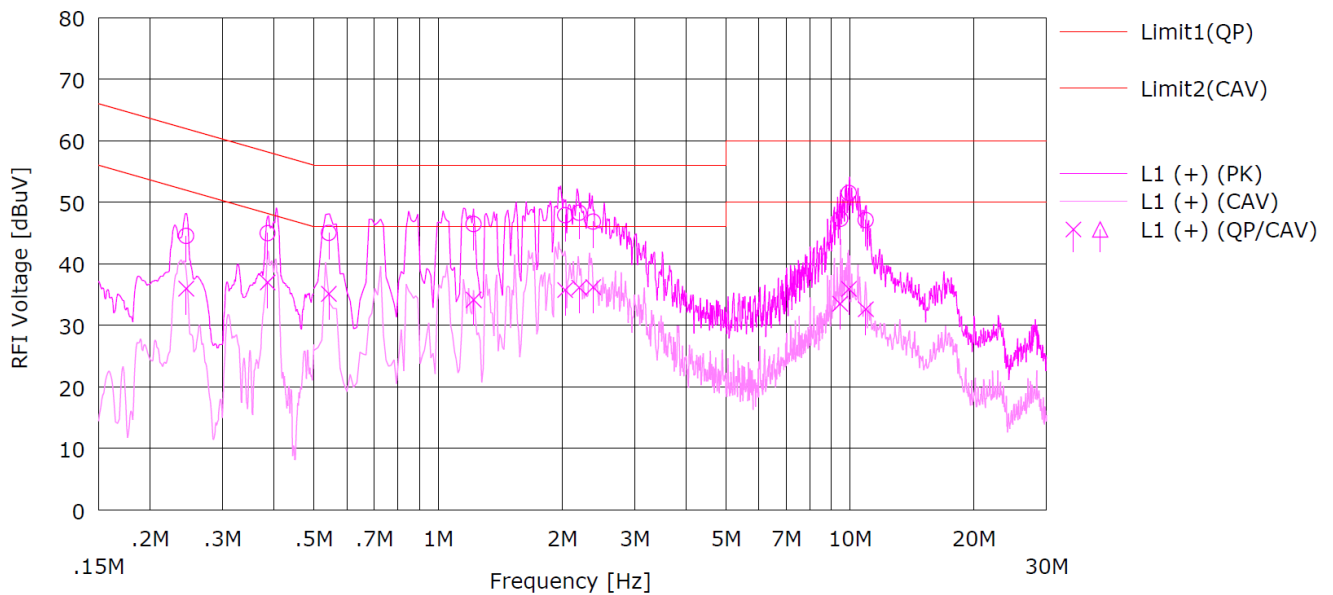
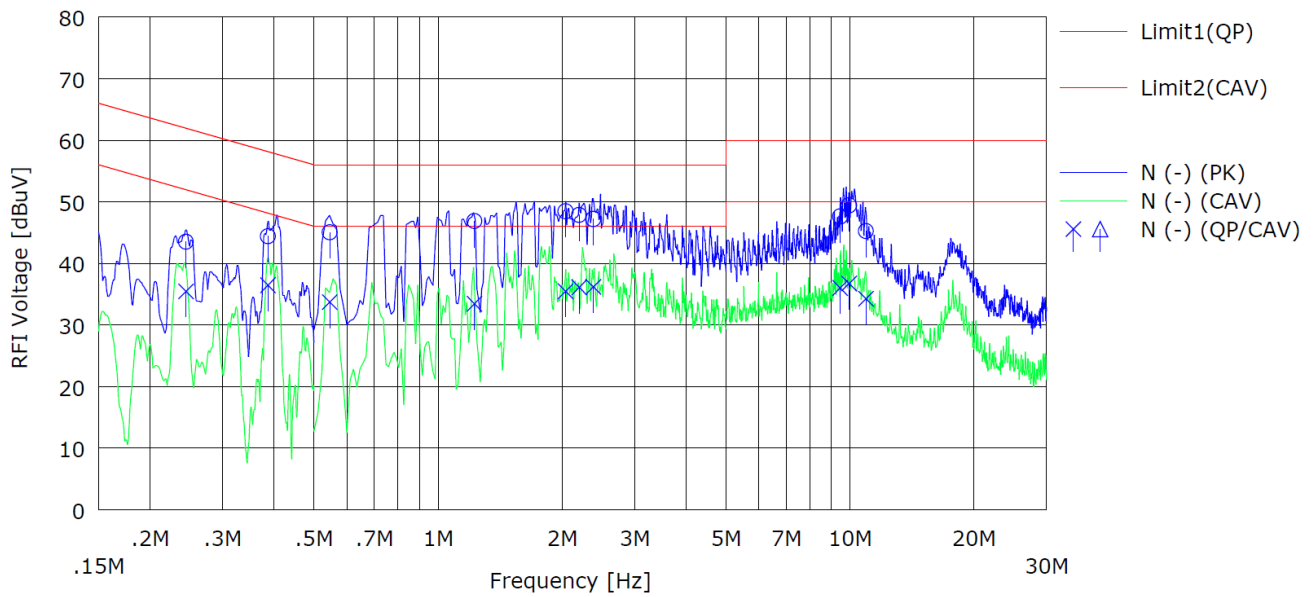
Frequency (MHz)	Class A (dB(μV))		Class B (dB(μV))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	79	66	66 ~ 56*	56 ~ 46*
0.5 to 5	73	60	56	46
5 to 30			60	50

Remark 1: (\*) The limit decreases linearly with the logarithm of frequency.

### 6.1.4 Conducted emission test data

Basic model [EME511-KP]

\* Minimum limit margin is 7.6 dB at 2.04083 MHz. (Quasi-peak)





<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.24454	33.7	25.6	9.8	43.5	35.4	61.9	51.9	18.4	16.5	N (-)
2	0.38657	34.4	26.4	10.0	44.4	36.4	58.1	48.1	13.7	11.7	N (-)
3	0.54599	34.9	23.6	10.1	45.0	33.7	56.0	46.0	11.0	12.3	N (-)
4	1.22532	36.8	23.4	10.1	46.9	33.4	56.0	46.0	9.1	12.6	N (-)
5	2.04083	38.4	25.4	10.1	48.4	35.4	56.0	46.0	7.6	10.6	N (-)
6	2.20044	37.7	26.0	10.1	47.8	36.1	56.0	46.0	8.2	9.9	N (-)
7	2.38125	37.1	26.1	10.1	47.2	36.2	56.0	46.0	8.8	9.8	N (-)
8	9.46702	37.1	25.4	10.6	47.6	36.0	60.0	50.0	12.4	14.0	N (-)
9	9.95206	38.8	26.2	10.6	49.4	36.7	60.0	50.0	10.6	13.3	N (-)
10	10.93404	34.6	23.6	10.6	45.2	34.2	60.0	50.0	14.8	15.8	N (-)
11	0.24470	34.7	26.1	9.8	44.5	36.0	61.9	51.9	17.4	15.9	L1 (+)
12	0.38609	35.0	27.0	10.0	45.0	37.0	58.1	48.1	13.1	11.1	L1 (+)
13	0.54303	34.9	25.0	10.1	45.0	35.1	56.0	46.0	11.0	10.9	L1 (+)
14	1.22033	36.5	24.2	10.0	46.4	34.1	56.0	46.0	9.6	11.9	L1 (+)
15	2.03585	37.9	25.8	10.0	47.9	35.7	56.0	46.0	8.1	10.3	L1 (+)
16	2.20094	38.3	26.2	10.0	48.3	36.1	56.0	46.0	7.7	9.9	L1 (+)
17	2.38025	36.9	26.2	10.0	46.8	36.2	56.0	46.0	9.2	9.8	L1 (+)
18	9.46353	36.8	23.1	10.4	47.3	33.5	60.0	50.0	12.7	16.5	L1 (+)
19	9.94458	41.0	25.5	10.5	51.5	35.9	60.0	50.0	8.5	14.1	L1 (+)
20	10.92506	36.6	22.1	10.5	47.1	32.6	60.0	50.0	12.9	17.4	L1 (+)

\* Remark: "L1": (Line), "N": (Neutral)

\* Results [dB(μV)] = Reading [dB(μV)] + C.FACTOR [dB]

\* C.FACTOR [dB] = LISN insertion Loss [dB] + Cable loss [dB] + Pulse limiter factor [dB]

\* Margin [dB] = Limit [dB(μV)] - Result [dB(μV)]

\* QP: Quasi-peak, CAV: CISPR Average

\* ex) Measure Value[QP]

Frequency: 0.24454 MHz

Results [dB μV] = 43.5, Reading [dB μV] = 33.7, C.FACTOR [dB] = 9.8

43.5 dB μV = 33.7 dB μV + 9.8 dB

Margin [dB μV] = 18.4, Limit [dB μV] = 61.9, Result [dB μV] = 43.5

18.4 dB μV = 61.9 dB μV - 43.5 dB μV



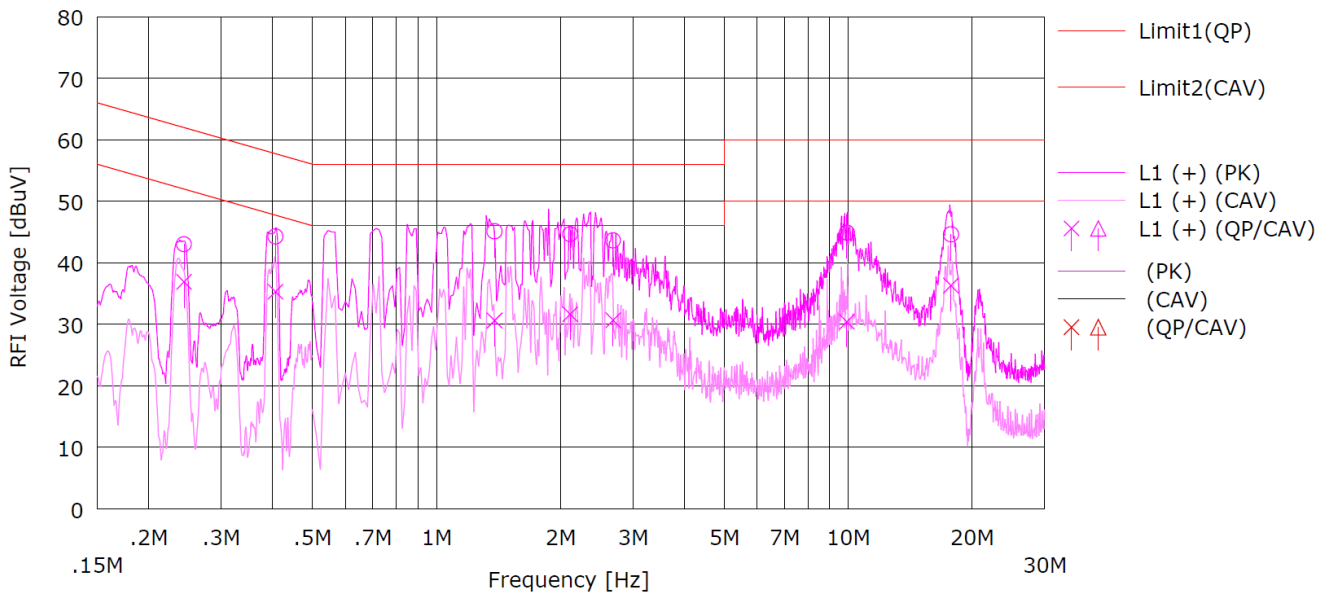
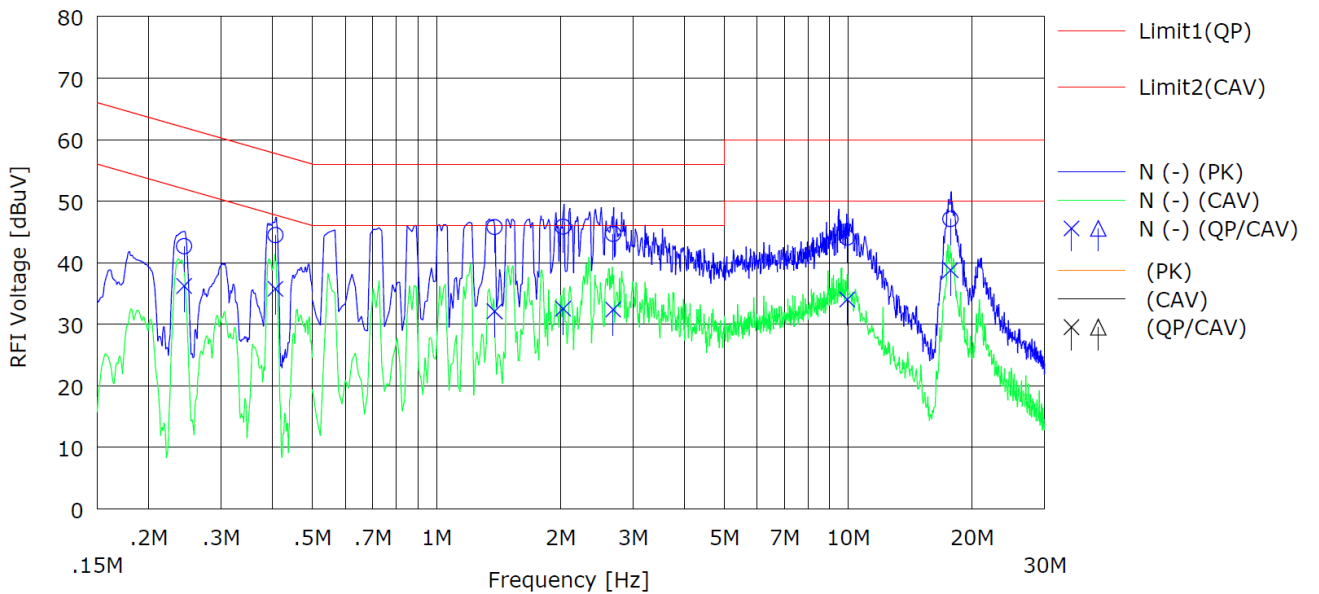
<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

Derivative model [EME511-SP]

\* Minimum limit margin is 10.2 dB at 2.03102 MHz. (Quasi-peak)





<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	CAV [dBuV]		QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	QP [dBuV]	CAV [dBuV]	
1	0.24407	32.9	26.4	9.8	42.7	36.2	62.0	52.0	19.3	15.8	N (-)
2	0.40670	34.4	25.7	10.0	44.4	35.7	57.7	47.7	13.3	12.0	N (-)
3	1.38484	35.7	22.0	10.1	45.8	32.1	56.0	46.0	10.2	13.9	N (-)
4	2.03102	35.7	22.4	10.1	45.8	32.5	56.0	46.0	10.2	13.5	N (-)
5	2.68652	34.6	22.3	10.1	44.7	32.4	56.0	46.0	11.3	13.6	N (-)
6	9.93953	33.5	23.4	10.6	44.1	34.0	60.0	50.0	15.9	16.0	N (-)
7	17.71621	36.2	27.9	10.9	47.1	38.8	60.0	50.0	12.9	11.2	N (-)
8	0.24362	33.2	27.1	9.8	43.0	36.9	62.0	52.0	19.0	15.1	L1 (+)
9	0.40657	34.2	25.3	10.0	44.3	35.3	57.7	47.7	13.4	12.4	L1 (+)
10	1.38484	35.1	20.6	10.0	45.1	30.6	56.0	46.0	10.9	15.4	L1 (+)
11	2.11332	34.7	21.7	10.0	44.6	31.6	56.0	46.0	11.4	14.4	L1 (+)
12	2.68452	33.7	20.7	10.0	43.6	30.7	56.0	46.0	12.4	15.3	L1 (+)
13	9.93204	34.4	20.0	10.5	44.9	30.4	60.0	50.0	15.1	19.6	L1 (+)
14	17.76309	33.9	25.6	10.7	44.6	36.3	60.0	50.0	15.4	13.7	L1 (+)

\* Remark: "L1": (Line), "N": (Neutral)

\* Results [dB(μV)] = Reading [dB(μV)] + C.FACTOR [dB]

\* C.FACTOR [dB] = LISN insertion Loss [dB] + Cable loss [dB] + Pulse limiter factor [dB]

\* Margin [dB] = Limit [dB(μV)] - Result [dB(μV)]

\* QP: Quasi-peak , CAV: CISPR Average

\* ex) Measure Value[QP]

Frequency: 0.24407 MHz

Results [dB μ V] = 42.7, Reading [dB μ V] = 32.9, C.FACTOR [dB]= 9.8

42.7 dB μ V = 32.9 dB μ V + 9.8 dB

Margin [dB μ V] = 19.3, Limit[dB μ V] = 62.0, Result [dB μ V] = 42.7

19.3 dB μ V = 62.0 dB μ V - 42.7 dB μ V

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

## 6.2 Radiated emission (30 MHz ~ 1 000 MHz)

<b>Test standard</b>	<b>47 CFR FCC Part 15 Subpart B §15.109</b>
Test date	2024.02.19
Test facility	Building A 10 m chamber
Test voltage	AC 120 V, 60 Hz
Temperature	(17.3 ~ 17.7) °C
Relative humidity	(47.2 ~ 47.6) % R.H.
Test result	Complied

### 6.2.1 Measurement procedure

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m away from the interference receiving antenna in the 10 m semi-anechoic chamber.

Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For 30 MHz ~ 1 000 MHz frequency range, quasi-peak detector with 120 kHz RBW was used.



	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 6.2.2 Test equipment used

Equipment	Model	Manufacturer	Serial number	Next cal. date
EMI Test Receiver	ESW44	R&S	101839	2024.05.31
Low Noise Preamplifier	MLA-10k01-b01-14	TSJ	2060297	2024.05.31
Bi-Log Antenna	VULB9168	Schwarzbeck	00822	2025.03.09
Attenuator	50FPE-006N	JFW	6 dB-1	2025.03.09
Controller	CO3000	Innco	45450119	-
Antenna Mast	MA4000-EP	Innco	-	-
Turn Table	-	-	-	-
EMI RE Software	EMI-R	TSJ	-	-

\* All test equipment used is calibrated on a regular basis.

### 6.2.3 Radiated emission limit

- The test frequency range of radiated disturbance measurements are listed below

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 - 500	2 000
500 - 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

- Limit for radiated emission below 1 000 MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m distance)
	Quasi-peak (dB(μV/m))	Quasi-peak (dB(μV/m))
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

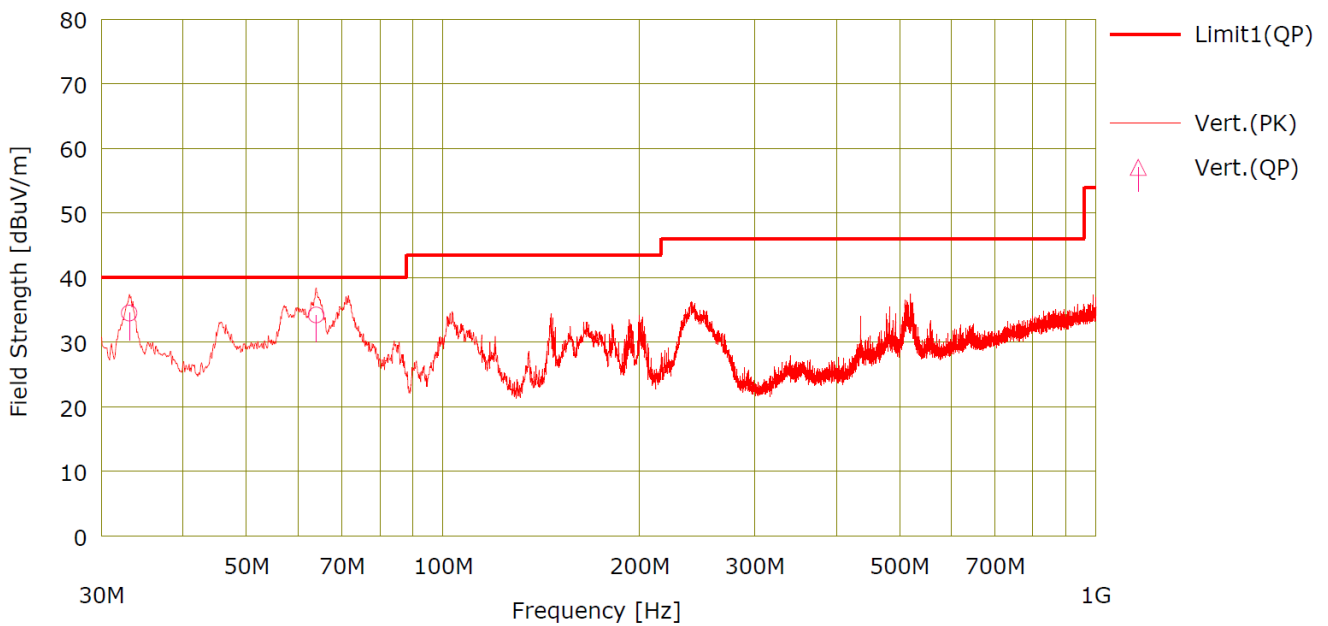
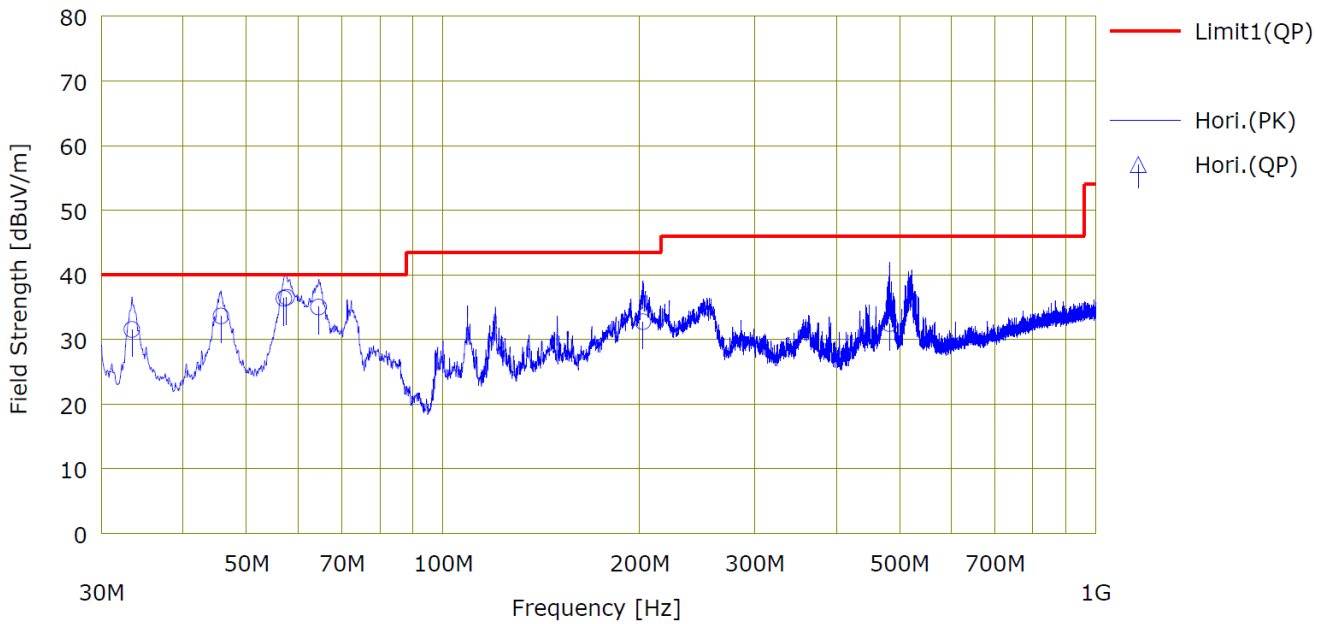
Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

### 6.2.4 Radiated emission test data

Basic model [EME511-KP]

\* Minimum limit margin is 3.5 dB at 57.648 MHz. (Horizontal)





<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

<< QP DATA >>

No.	Freq. [MHz]	Reading	Ant. Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]					
1	33.397	50.8	18.8	-38.0	0.0	31.5	40.0	8.5	Hori.	400	0	VULB9
2	45.713	51.6	19.7	-37.8	0.0	33.6	40.0	6.4	Hori.	400	79	VULB9
3	57.069	54.7	19.2	-37.6	0.0	36.3	40.0	3.7	Hori.	300	74	VULB9
4	57.648	54.9	19.2	-37.6	0.0	36.5	40.0	3.5	Hori.	300	67	VULB9
5	64.532	54.2	18.3	-37.5	0.0	35.0	40.0	5.0	Hori.	300	301	VULB9
6	202.462	52.6	16.5	-36.4	0.0	32.7	43.5	10.8	Hori.	100	21	VULB9
7	482.594	44.3	23.2	-35.1	0.0	32.4	46.0	13.6	Hori.	200	114	VULB9
8	33.105	53.8	18.8	-38.0	0.0	34.5	40.0	5.5	Vert.	100	299	VULB9
9	63.954	53.3	18.4	-37.5	0.0	34.2	40.0	5.8	Vert.	100	354	VULB9

\* Results [dB( $\mu$ V/m)] = Reading [dB( $\mu$ V)] + Antenna factor [dB/m] - Loss

\* Loss = Cable loss [dB] - Amp gain [dB]

\* Margin [dB] = Limit [dB( $\mu$ V/m)] - Results [dB( $\mu$ V/m)]

\* QP: Quasi-peak

\* ex) Measure Value[QP]

Frequency: 33.397 MHz

Results [dB  $\mu$  V/m] = 31.5, Reading [dB  $\mu$  V/m] = 50.8, Antenna factor [dB/m] = 18.8, Loss [dB] = - 38.0, Amp gain [dB] = 0.0

31.5 dB  $\mu$  V/m = 50.8 dB  $\mu$  V/m + 18.8 dB/m - 38.0 dB - 0.0 dB

Margin [dB  $\mu$  V/m] = 8.5, Limit [dB  $\mu$  V/m] = 40.0, Result [dB  $\mu$  V/m] = 31.5

8.5 dB  $\mu$  V/m = 40.0 dB  $\mu$  V/m - 31.5 dB  $\mu$  V/m



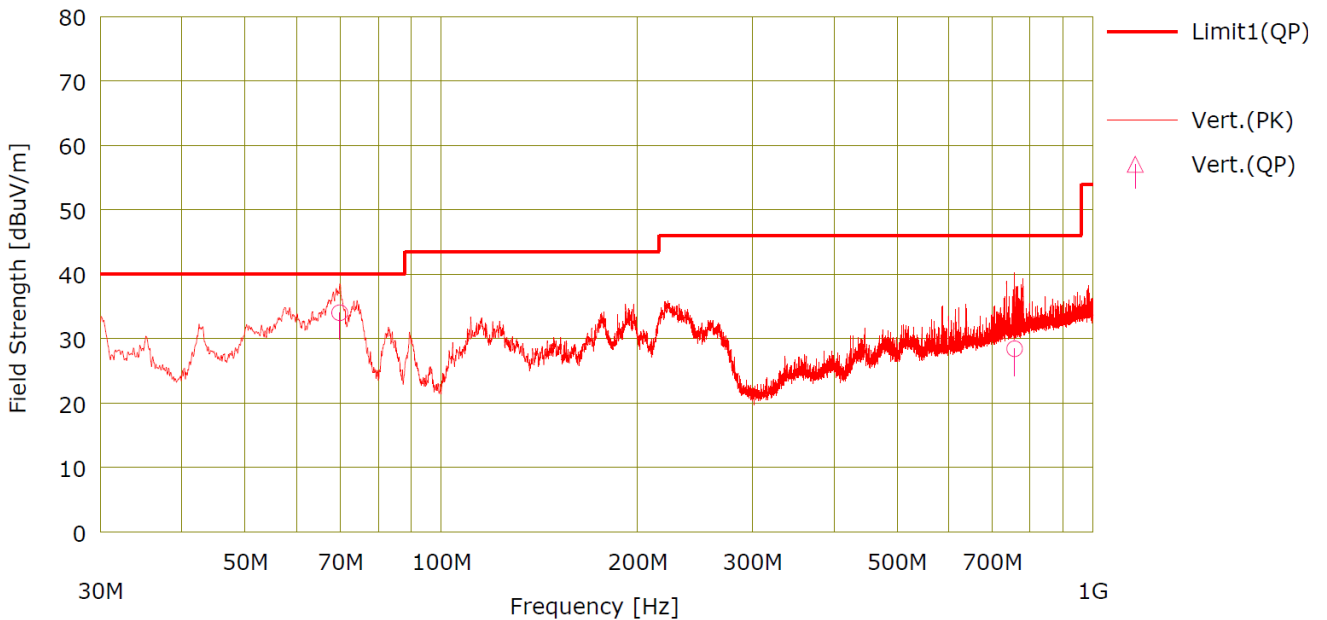
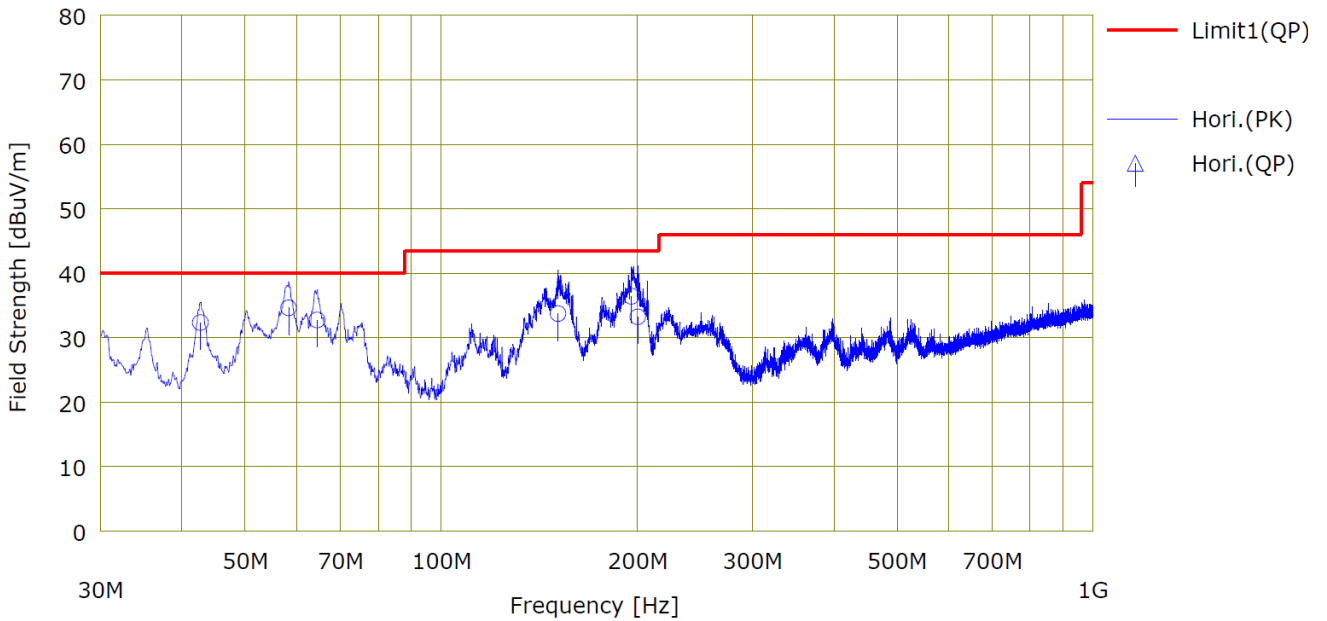
<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

Derivative model [EME511-SP]

\* Minimum limit margin is 5.4 dB at 58.324 MHz. (Horizontal)





<http://www.lab-t.net>

2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu  
Yongin-si, Gyeonggi-do 17036, Korea (Republic of)  
Main: +82-31-322-6767 / Fax: +82-31-322-6768

**Test report No.:**  
TREFCC24-0023

<< QP DATA >>

No.	Freq. [MHz]	Reading	Ant. Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]					
1	42.709	50.6	19.5	-37.8	0.0	32.3	40.0	7.7	Hori.	400	271	VULB9
2	58.324	53.1	19.1	-37.6	0.0	34.6	40.0	5.4	Hori.	300	182	VULB9
3	64.531	51.9	18.3	-37.5	0.0	32.7	40.0	7.3	Hori.	300	290	VULB9
4	151.049	51.2	19.1	-36.6	0.0	33.7	43.5	9.8	Hori.	100	355	VULB9
5	195.778	56.1	16.7	-36.4	0.0	36.4	43.5	7.1	Hori.	100	360	VULB9
6	200.126	52.8	16.8	-36.4	0.0	33.2	43.5	10.3	Hori.	100	352	VULB9
7	69.868	54.4	17.0	-37.4	0.0	34.0	40.0	6.0	Vert.	100	221	VULB9
8	757.817	34.5	27.5	-33.6	0.0	28.4	46.0	17.6	Vert.	200	278	VULB9

\* Results [dB(μV/m)] = Reading [dB(μV)] + Antenna factor [dB/m] - Loss

\* Loss = Cable loss [dB] - Amp gain [dB]

\* Margin [dB] = Limit [dB(μV/m)] - Results [dB(μV/m)]

\* QP: Quasi-peak

\* ex) Measure Value[QP]

Frequency: 42.709 MHz

Results [dB μ V/m] = 32.3, Reading [dB μ V/m] = 50.6, Antenna factor [dB/m] = 19.5, Loss [dB] = - 37.8, Amp gain [dB] = 0.0

32.3 dB μ V/m = 50.6 dB μ V/m + 19.5 dB/m - 37.8 dB - 0.0 dB

Margin [dB μ V/m] = 7.7, Limit [dB μ V/m] = 40.0, Result [dB μ V/m] = 32.3

7.7 dB μ V/m = 40.0 dB μ V/m - 32.3 dB μ V/m

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 6.3 Radiated emission (Above 1 GHz)

Test standard	47 CFR FCC Part 15 Subpart B §15.109
Test date	-
Test facility	-
Test voltage	-
Temperature	-
Relative humidity	-
Test result	Not applicable

#### 6.3.1 Measurement procedure

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.1 m above the reference ground plane and 3 m away from the interference receiving antenna in the 10 m chamber. Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For peak and average detector with 1 MHz RBW were used for above 1 GHz frequency range.

	<p style="text-align: center;"><a href="http://www.lab-t.net">http://www.lab-t.net</a></p> <p style="text-align: center;">2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p style="text-align: center;"><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------

### 6.3.2 Test equipment used

Equipment	Model	Manufacturer	Serial number	Next cal. date
-	-	-	-	-

\* All test equipment used is calibrated on a regular basis

### 6.3.3 Radiated emission limits

Frequency (GHz)	Class A equipment (3 m distance) (dB(μV/m))		Class B equipment (3 m distance) (dB(μV/m))	
	Peak	CISPR Average	Peak	CISPR Average
Above 1	80	60	74	54

	<p><a href="http://www.lab-t.net">http://www.lab-t.net</a> 2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu Yongin-si, Gyeonggi-do 17036, Korea (Republic of) Main: +82-31-322-6767 / Fax: +82-31-322-6768</p>	<p><b>Test report No.:</b> TREFCC24-0023</p>
-----------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------

#### 6.3.4 Radiated emission test data

**N/A**

- END -