

Report No.: KES-EM-23T0089 Page (1) of (22)

EMC TEST REPORT

Test Report No.	:	KES-EM-23T0089
Date of Issue	:	Feb. 07, 2023
Product name	:	ANESTHESIA INJECTION SYSTEM(CRADLE)
Model/Type No.	:	AN100-C
Variant Mode	:	-
Applicant	:	DENTIS CO., LTD.
Applicant Address	:	99, Seongseoseo-ro, Dalseo-gu, Daegu, Republic of Korea
Manufacturer	:	DENTIS MEDICAL DIVISION
Manufacturer Address	:	6, Yuram-ro, Dong-gu, Daegu, Republic of Korea
FCC ID	:	2AXRNAN100-C
Date of Receipt	:	Jan. 10, 2023
Test date	:	Jan. 14, 2023
Test Results	:	🛛 In Compliance 🗌 Not in Compliance

Tested by

Nº EN 00

Tae Yeon, Kim EMC Test Engineer Reviewed by

Im

Dong Hun, Jang EMC Technical Manager



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Feb. 07, 2023	KES-EM-23T0089	Issued

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	General Product Description. Test Voltage & Frequency Variant Model Differences. Device Modifications Equipment Under Test Support Equipments External I/O Cabling EUT Operating Mode(s) Configuration Remarks when standards applied Calibration Details of Equipment Used for Measurement Test Regulations Conducted Emissions at Mains Power Ports Radiated Electric Field Emissions(Below 1 @t/2) NDIX A – TEST DATA. onducted Emissions at Mains Power Ports adiated Electric Field Emissions(Below 1 @t/2) adiated Electric Field Emissions(Below 1 @t/2) NDIX A – TEST DATA. onducted Emissions at Mains Power Ports 1 adiated Electric Field Emissions(Below 1 @t/2) 2 adiated Electric Field Emissions(Above 1 @t/2) 2 2 <



1.0 General Product Description

List	Category		Specification	etc
ANESTHESIA	Weight	g	140	
INJECTION SYSTEM(CRADLE)	Size	mm	176 X 41.4 X 75.3	
Adapter	Rated input	V	AC 100 – 240	
		Hz	50/60	
	Rated output	V	DC 5	
		А	2.0	
	Weight	g	104	

Main Specifications of EUT are:



1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

🖾 AC 120 V, 60 Hz

1.2 Variant Model Differences

Additional derived models with management models by customer.

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
ANESTHESIA INJECTION SYSTEM(CRADLE)	AN100-C	-	DENTIS MEDICAL DIVISION	EUT
Medical Power Supply	ATM012T-W050V	-	Adapter Technology Co., Ltd.	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
ANESTHESIA INJECTION SYSTEM	AN100	-	DENTIS MEDICAL DIVISION	-

1.6 External I/O Cabling

Sta	rt	END	Cable Spec.		
Description	cription I/O Port		I/O Port	Length	Shield
ANESTHESIA INJECTION SYSTEM	Wireless charging surface	ANESTHESIA INJECTION	Wireless charging surface	-	S
Medical Power Supply (EUT)	DC in	SYSTEM(CRADLE) (EUT)	DC out	1.5	U

* Unshielded = U, Shielded = S

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> ■ AC Main □ DC Main

1.7 EUT Operating Mode(s)

Test mode	Test Voltage	Test No.	operating
Wireless charging	AC POWER (AC 120 V, 60 Hz)	-	Checked the LED while wireless charging the ANESTHESIA INJECTION SYSTEM with the ANESTHESIA INJECTION SYSTEM(CRADLE).

EUT Test operating S/W				
Name Version Manufacture Company				
-	-	-		

1.8 Configuration

Medical Power Supply (EUT) ANESTHESIA INJECTION SYSTEM(CRADLE) (EUT) ANESTHESIA INJECTION SYSTEM

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1.9 Remarks when standards applied N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Measurement Procedure

- Conducted Emissions

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 Mz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

- Radiated Electric Field Emissions

The test was done at a SEMI ANECHOIC CHAMBER with quasi-peak detector. The final test data was measured using a Quasi-Peak detector below 1^{GHz} at 10 m or 3 m distance and a Peak and Average detector above 1^{GHz} at 3 m distance. Test was proceeded worst case test mode and cable configuration.

Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Measurement procedures was In accordance with ANSI C63.4-2014 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2



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1.13 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	 EMI (3 m & 10 m Semi-Aechoic Chamber ,10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) 	KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Aechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	TESTING NO. KTA89
USA	FCC	3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	FCC KR0100
Canada	ISED	3 m & 10 m Semi-Aechoic Chamber and Conducted test site	23298
JAPAN	VCCI	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	R -20056, C-20036 T-20040, G-20057
Europe	TÜV SÜD	 EMI (3 m & 10 m Semi-Aechoic Chamber, 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) 	CARAT 001633 0004



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2.0 Test Regulations

The emissions tests were performed according to following regulations:

🛛 47 CFR Part 15, Subpart B

CISPR 22:2009 +A1:2010

Class A

Class A

Class B

Class B

ANSI C63.4a-2017



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2.1 Conducted Emissions at Mains Power Ports

Test Date

Jan. 14, 2023

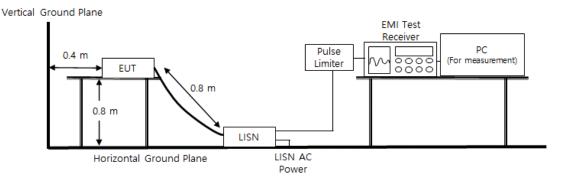
Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
\boxtimes	EMI Test S/W	EMC32	R & S	9.12.00	-	-
\square	EMI TEST RECEIVER	ESR3	R & S	101783	11, 11, 2023	1 Year
\boxtimes	LISN	ENV216	R & S	101787	11, 10, 2023	1 Year
	LISN	ESH2-Z5	R & S	100450	11, 10, 2023	1 Year
\boxtimes	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 10, 2023	1 Year

Diagram of test setup





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Test Conditions

Temperature:	
Relative Humidity:	

(22,6 ± 0,2) ℃ (44,7 ± 0,1) % R.H.

Frequency Range of Measurement

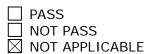
150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:



Remarks

See Appendix A for test data.



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2.2 Radiated Electric Field Emissions (Below 1 612)

Test Date

Jan. 14, 2023

Test Location

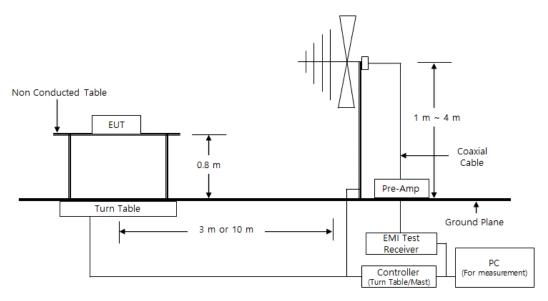
OPEN AREA TEST SITE #2

SEMI ANECHOIC CHAMBER #4(10m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
\square	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-	-
\square	EMI TEST RECEIVER	ESU26	R & S	100551	03, 31, 2023	1 Year
\boxtimes	AMPLIFIER	SCU 01	R & S	100603	11, 10, 2023	1 Year
\boxtimes	TRILOG- BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024	2 Year
\square	ATTENUATOR	8491A	HP	32173	03, 08, 2023	1 Year

Diagram of test setup





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Test Conditions

Temperature: Relative Humidity: (22,3 ± 0,2) ℃ (44,5 ± 0,1) % R.H.

Frequency Range of Measurement

Instrument Settings

IF Band Width: 120 Hz

Test Results

The requirements are:

\boxtimes	PASS
	NOT PASS
	NOT APPLICABLE

Remarks

- See Appendix A for test data.



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2.3 Radiated Electric Field Emissions(Above 1 础)

Test Date

Jan. 14, 2023

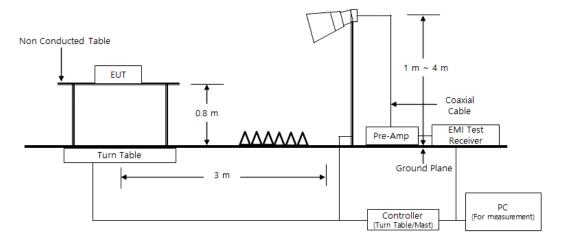
Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due	calibration interval
\boxtimes	EMI Test S/W	ES10/RE	TOYO Corporation	2022.01.000	-	-
\boxtimes	EMI TEST RECEIVER	ESU26	Rohde & Schwarz	100552	03, 31, 2023	1 Year
\boxtimes	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	11, 08, 2023	1 Year
\boxtimes	PREAMPLIFIER	8449B	HP	3008A00538	06, 02, 2023	1 Year
\square	ATTENUATOR	8491B	HP	23094	04, 21, 2023	1 Year

Diagram of test setup



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Test Conditions

Temperature: Relative Humidity: (23,0 ± 0,1) ℃ (45,0 ± 0,2) % R.H.

Frequency Range of Measurement

1 GHz to 5 GHz

Instrument Settings

IF Band Width: 1 Mz

Test Results

The requirements are:

\boxtimes	PASS
	NOT

NOT PASS
NOT APPLICABLE

Remarks

- See Appendix A for test data.

- The Average of the test data is the cispr average result.

- The frequency cannot be determined, so it is measured up to 5 GHz.



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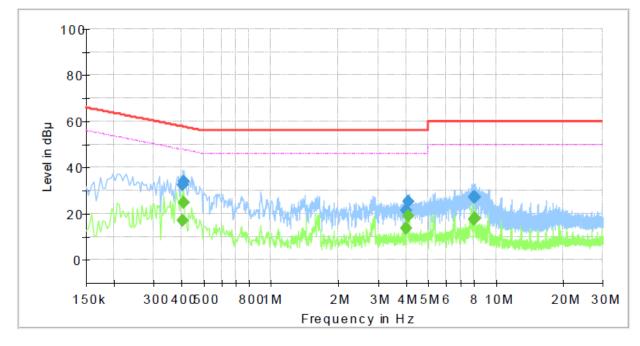
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

HOT LINE

Common Information

Test Description: Model No.: Phase: Mode: Operator Name: Conducted Emission AN100-C L1 Charging / AC 120 V 60 Hz KES



Final_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Meas.	Bandwidth	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	Time (ms)	(kHz)		(dB)
0.406000		17.15	47.73	30.58	1000.0	9.000	L1	19.8
0.406000	32.65		57.73	25.08	1000.0	9.000	L1	19.8
0.410000		24.64	47.65	23.01	1000.0	9.000	L1	19.8
0.410000	34.07		57.65	23.58	1000.0	9.000	L1	19.8
4.006000		13.47	46.00	32.53	1000.0	9.000	L1	20.1
4.006000	21.28		56.00	34.72	1000.0	9.000	L1	20.1
4.062000		18.93	46.00	27.07	1000.0	9.000	L1	20.1
4.062000	25.23		56.00	30.77	1000.0	9.000	L1	20.1
7.998000		17.53	50.00	32.47	1000.0	9.000	L1	20.0
7.998000	26.97		60.00	33.03	1000.0	9.000	L1	20.0
8.070000		17.80	50.00	32.20	1000.0	9.000	L1	20.0
8.070000	27.28		60.00	32.72	1000.0	9.000	L1	20.0

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Model No.:

Operator Name:

Phase:

Mode:

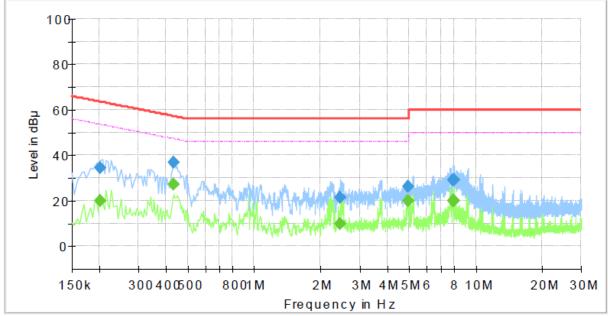
KES Co., Ltd.

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Common Information Test Description:

NEUTRAL LINE

Conducted Emission AN100-C N Charging / AC 120 V 60 Hz KES



Final_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Meas.	Bandwidth	Line	Corr.					
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	Time (ms)	(kHz)		(dB)					
0.202000	34.35		63.53	29.18	1000.0	9.000	Ν	19.6					
0.202000		20.05	53.53	33.48	1000.0	9.000	Ν	19.6					
0.434000		27.23	47.18	19.95	1000.0	9.000	Ν	19.8					
0.434000	36.68		57.18	20.50	1000.0	9.000	Ν	19.8					
2.454000		9.54	46.00	36.46	1000.0	9.000	Ν	20.4					
2.454000	21.12		56.00	34.88	1000.0	9.000	Ν	20.4					
4.938000		20.11	46.00	25.89	1000.0	9.000	Ν	19.9					
4.938000	26.36		56.00	29.64	1000.0	9.000	Ν	19.9					
7.938000		20.00	50.00	30.00	1000.0	9.000	Ν	20.0					
7.938000	29.06		60.00	30.94	1000.0	9.000	Ν	20.0					
8.010000		19.80	50.00	30.20	1000.0	9.000	Ν	20.0					
8.010000	29.07		60.00	30.93	1000.0	9.000	Ν	20.0					

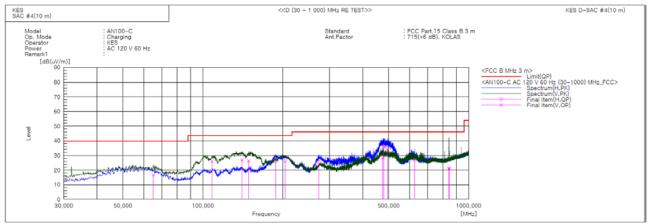
Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB] QuasiPeak / CAverage : The Final Value Reading Value : Not shown in the table. Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))



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Radiated Electric Field Emissions(Below 1 础)



Final Result

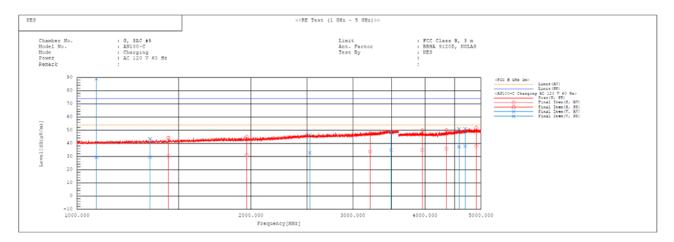
No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle	Remark
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]	
1	65.041	V	40.0	-23.3	16.7	40.0	23.3	110.0	154.0	
2	108.328	V	49.0	-23.0	26.0	43.5	17.5	101.0	104.0	
3	140.338	V	52.6	-25.7	26.9	43.5	16.6	111.0	152.0	
4	148.583	V	51.8	-25.6	26.2	43.5	17.3	123.0	70.0	
5	187.625	Н	49.1	-23.1	26.0	43.5	17.5	216.0	193.0	
6	204.236	Н	48.0	-21.4	26.6	43.5	16.9	184.0	174.0	
7	273.106	Н	44.8	-19.3	25.5	46.0	20.5	126.0	98.0	
8	473.896	V	41.1	-12.8	28.3	46.0	17.7	249.0	348.0	
9	479.110	Н	49.0	-12.7	36.3	46.0	9.7	185.0	92.0	
10	494.994	Н	47.0	-12.2	34.8	46.0	11.2	211.0	95.0	
11	626.793	Н	35.8	-9.0	26.8	46.0	19.2	114.0	272.0	
12	839.950	V	28.4	-7.5	20.9	46.0	25.1	276.0	188.0	
13	846.134	V	28.4	-7.2	21.2	46.0	24.8	100.0	297.0	

Calculation – SAC #4(10 m)



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Radiated Electric Field Emissions(Above 1 砒)



Final Result

No.	Frequency	Pol	Reading AV	Reading PK	c.f	Result AV	Result PK	Limit AV	Limit PK	Margin AV	Margin PK	Height	Angle	Remark
	[MHz]		[dB(µV)]	[dB(µV)]	[dB(1/m)]	[dB(µV/m)] [dB(µV/m)] [d	B(µV/m)] [dB(µ	V/m)] [dB]	[dB]	[cm] [deg]		
1	1080.000	V	31.5	91.1	-2.1	29.4	89.0	54.0	74.0	24.6	-15.0	400.0	91.0	
2	1338.000	V	30.4	44.1	-0.8	29.6	43.3	54.0	74.0	24.4	30.7	396.0	356.8	
3	1439.200	Н	30.5	44.4	-0.3	30.2	44.1	54.0	74.0	23.8	29.9	199.6	226.0	
4	1965.200	Н	29.3	43.3	1.8	31.1	45.1	54.0	74.0	22.9	28.9	186.0	261.6	
5	2526.800	V	29.2	42.8	3.6	32.8	46.4	54.0	74.0	21.2	27.6	151.0	344.8	
6	3214.000	Н	28.4	42.2	5.3	33.7	47.5	54.0	74.0	20.3	26.5	200.0	209.4	
7	3493.200	V	29.1	42.5	5.7	34.8	48.2	54.0	74.0	19.2	25.8	400.0	97.1	
8	3958.400	Н	28.3	43.1	6.7	35.0	49.8	54.0	74.0	19.0	24.2	100.0	268.5	
9	4356.800	Н	27.6	41.5	8.4	36.0	49.9	54.0	74.0	18.0	24.1	400.0	1.0	
10	4578.800	V	28.3	41.9	9.1	37.4	51.0	54.0	74.0	16.6	23.0	101.0	283.8	
11	4693.200	v	28.3	41.6	9.5	37.8	51.1	54.0	74.0	16.2	22.9	400.0	210.6	
12	4906.800	Н	27.3	41.1	10.6	37.9	51.7	54.0	74.0	16.1	22.3	400.0	1.0	

Calculation

Result(PK/CAV) [dB(µV/m)] = (Reading(PK/CAV)[dB(µV)] + c.f[dB(1/m)] Margin(PK/CAV)[dB] = Limit[dB(µV/m)] - Result(PK/CAV) [dB(µV/m)] Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Marjin value