ADDENDUM TEST REPORT

Test Report No. 14007209S-E

Applicant	:	**JVCKENWOOD Corporation**
Type of EUT	:	**GPS NAVIGATION SYSTEM**
Model Number of EUT	:	**DNX5190DABS**
Test standard	:	**ETSI EN 301 489-1 V2.2.3** **ETSI EN 301 489-17 V3.2.4**
Test item	:	**Electrostatic discharge**
Test result	:	**Complied (Refer to Section 3)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers EMC technical requirements.
   It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
7. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
8. The information provided from the customer for this report is identified in Section 1.

Date of test: November 22, 2021

Representative test engineer:
Kento Enomoto
Engineer

Approved by:
Makoto Hosaka
Engineer

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

Testing LAB
RTL02610

REVISION HISTORY

Original Test Report No.: 14007209S-E

Revision	Test report No.	Date	Page revised	Contents
- (Original)	14007209S-E	December 20, 2021	-	-

Reference: Abbreviations (Including words undescribed in this report)

AAN	Asymmetric Artificial Network
AC	Alternating Current
AM	Amplitude Modulation
AMN	Artificial Mains Network
Amp, AMP	Amplifier
ANSI	American National Standards Institute
Ant, ANT	Antenna
AP	Access Point
ASK	Amplitude Shift Keying
Atten., ATT	Attenuator
AV	Average
BPSK	Binary Phase-Shift Keying
BR	Bluetooth Basic Rate
BT	Bluetooth
BT LE	Bluetooth Low Energy
BW	BandWidth
C.F	Correction Factor
Cal Int	Calibration Interval
CAV	CISPR AV
CCK	Complementary Code Keying
CDN	Coupling Decoupling Network
Ch., CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques
Corr.	Correction
CPE	Customer premise equipment
CW	Continuous Wave
DBPSK	Differential BPSK
DC	Direct Current
deg.	degree
DET	Detector
Dmax	maximum absolute voltage change during an observation period
DQPSK	Differential QPSK
DSSS	Direct Sequence Spread Spectrum
EDR	Enhanced Data Rate
e.i.r.p., EIRP	Equivalent Isotropically Radiated Power
EM clamp	Electromagnetic clamp
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EMS	ElectroMagnetic Susceptibility
EN	European Norm
e.r.p., ERP	Effective Radiated Power
EU	European Union
EUT	Equipment Under Test
Fac.	Factor
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
FM	Frequency Modulation
Freq.	Frequency
FSK	Frequency Shift Keying
Fund	Fundamental
FWD	Forward
GFSK	Gaussian Frequency-Shift Keying
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Hori.	Horizontal
HCP	Horizontal coupling plane
ICES	Interference-Causing Equipment Standard
I/O	Input/Output
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
ILAC	International Laboratory Accreditation Conference
ISED	Innovation, Science and Economic Development Canada
ISN	Impedance Stabilization Network
ISO	International Organization for Standardization
JAB	Japan Accreditation Board
LAN	Local Area Network
LCL	Longitudinal Conversion Loss
LIMS	Laboratory Information Management System
LISN	Line Impedance Stabilization Network
MRA	Mutual Recognition Arrangement
N/A	Not Applicable
NIST	National Institute of Standards and Technology
NS	No signal detect.
NSA	Normalized Site Attenuation
NVLAP	National Voluntary Laboratory Accreditation Program
OBW	Occupied Band Width
OFDM	Orthogonal Frequency Division Multiplexing
PE	Protective earth
PK	Peak
P_{LT}	long-term flicker severity
POHC(A)	Partial Odd Harmonic Current
Pol., Pola.	Polarization
PR-ASK	Phase Reversal ASK
P_{ST}	short-term flicker severity
QAM	Quadrature Amplitude Modulation
QP	Quasi-Peak
QPSK	Quadri-Phase Shift Keying
r.m.s., RMS	Root Mean Square
RBW	Resolution Band Width
RE	Radio Equipment
REV	Reverse
RF	Radio Frequency
RFID	Radio Frequency Identifier
RSS	Radio Standards Specifications
Rx	Receiving
SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)
S/N	Signal to Noise ratio
SA, S/A	Spectrum Analyzer
SG	Signal Generator
SVSWR	Site-Voltage Standing Wave Ratio
THC(A)	Total Harmonic Current
THD(%)	Total Harmonic Distortion
TR	Test Receiver
Tx	Transmitting
VBW	Video BandWidth
VCP	Vertical coupling plane
Vert.	Vertical
WLAN	Wireless LAN
xDSL	Generic term for all types of DSL technology (DSL: Digital Subscriber Line)

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Section 1: Customer information

Company Name	:	JVCKENWOOD Corporation
Address	:	2967-3 Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525 Japan
Telephone Number	:	+81-42-646-5525
Contact Person	:	Seigo Tsutsumi

The information provided from the customer is as follows:
- Applicant, Type of EUT, Model Number of EUT on the cover page and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- Section 1: Customer information
- Section 2: Equipment under test (EUT) other than the Receipt Date
- Section 4: Operation of EUT during testing

* The laboratory is exempted from liability of any test results affected from the above information in Section 2 and 4.

Section 2 : Equipment under test (EUT)

2 . 1 Identification of EUT

Type of Equipment	:	GPS NAVIGATION SYSTEM
Model No.	:	DNX5190DABS
Serial No.	:	Refer to SECTION 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	November 16, 2021
Country of Mass-production	:	Indonesia
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2 . 2 Product description

Model: DNX5190DABS (referred to as the EUT in this report) is a GPS NAVIGATION SYSTEM.

Similar model:

Model No	Difference
DNX5190DABS (EUT)	Base
DNX7190DABS	Slide Panel
DDX819WBTS	None Navigation function, Wide Panel
DMX8019S	None Navigation function, None DVD function

Genreral Specification

Clock frequency(ies) in the system: 6.2208 GHz (Maximum)

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS
Antenna type	:	Chip Antenna
Antenna Gain	:	-2.3 dBi
Clock frequency (Maximum)	:	37.4 MHz
Power Supply (radio art input)	:	DC 3.6 V / 3.3 V / 1.8 V

GNSS

Radio Type	:	Receiver
Frequency of Operation	:	See table below.
Antenna type	:	External Antenna
Antenna Gain	:	2 dBi

Supported GNSS and GNSS signals

GNSS	RNSS Frequency Band / Frequency [MHz]		
	1559 to 1610	1215 to 1300	1164 to 1215
BDS	☐B1l 1561.098	-	-
Galileo	☐E1 1575.42	☐E6 1278.75	☐E5a 1176.45 ☐E5b 1207.14
GLONASS	☐G1 1598.0625 - 1605.375	☐G2 1242.9375 - 1248.625	-
GPS	☒L1 1575.42	☐L2 1227.6	☐L5 1176.45
SBAS	☒L1 1575.42	-	☐L5 1176.45

☒ Supported GNSS signal
☐ Not supported GNSS signal

Section 3 : Test specification, procedures and results

3 . 1 Test specification

EMC

ETSI EN 301 489-1 V2.2.3
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements;
Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-17 V3.2.4
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 17: Specific conditions for Broadband Data Transmission Systems;
Harmonised Standard for ElectroMagnetic Compatibility

Test report: 14007209S-E (this report) is for updating the test standard: ETSI EN 301 489-1 V2.1.1 to V 2.2.3 and ETSI EN 301 489-17 V3.1.1 to V3.2.4 and it only includes the requirements newly introduced in ETSI EN 301 489-1 V 2.2.3 and ETSI EN 301 489-17 V3.2.4.
Therefore only following test was performed in this report (See clause 3.2).
Test report: 12685233S-B-R1 (previous report number) and 14007209S-E include information of all the requirements in ETSI EN 301 489-1 V 2.2.3 and ETSI EN 301 489-17 V3.2.4.

* For test report(s) referred in this report, the latest version (including any revisions) is always referred.

3 . 2 Procedures & results

EMS (vehicular use):

Item	Test procedure	Specification	Criteria	Actual performance	Result
Electrostatic discharge	EN 61000-4-2:2009	Enclosure port: Contact: ±4 kV Air: ±8 kV	Clause 6.4, B	Enclosure port: Contact: ±4 kV Air: ±2 kV, ±4 kV, ±8 kV	Complied a)
Note: UL Japan's EMS Work Procedures No. 13-EM-W0417 a) Refer to Appendix 2 (data of Electrostatic discharge)					

3 . 3 Deviation from standard

No addition, exclusion nor deviation has been made from the standard.

3 . 4 Confirmation

UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications ETSI EN 301 489-1 V2.2.3, ETSI EN 301 489-17 V3.2.4 for tested item.

3 . 5 Performance criteria (ETSI EN 301 489-17)

The performance criteria are:

- Performance criteria A for immunity tests with phenomena of a continuous nature;
- Performance criteria B for immunity tests with phenomena of a transient nature;
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance table (clause 6.2, in ETSI EN 301 489-17)

Criteria	During test	After test
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May show loss of function	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function (one or more)	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE: Operate as intended during the test allows a level of degradation in accordance with clause Section 6.2.2, in ETSI EN 301 489-17 *This EUT has been declared by the customer as a device that does not support PER/FER functions.		

Minimum performance level (clause 6.2.2, in ETSI EN 301 489-17)

☐ For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

☒ For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

Performance criteria for Continuous phenomena (clause 6.3, in ETSI EN 301 489-17)

The performance criteria A shall apply.
Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.
Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

Performance criteria for Transient phenomena (clause 6.4, in ETSI EN 301 489-17)

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.
Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.
Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

3 . 6 Uncertainty

The laboratory calculates the uncertainty for the EMS test facilities.
These tests are qualitative tests and the uncertainties do not apply directly to the results.

3 . 7 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10 m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10 m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5 m	No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7
		No.7 Shielded room	2.76 x 3.76 x 2.4
		No.8 Shielded room	3.45 x 5.5 x 2.4
		No.1 Measurement room	2.55 x 4.1 x 2.5

3 . 8 Test setup, test data & test instruments

Refer to Appendix 1 to 3.

Section 4 : Operation of EUT during testing

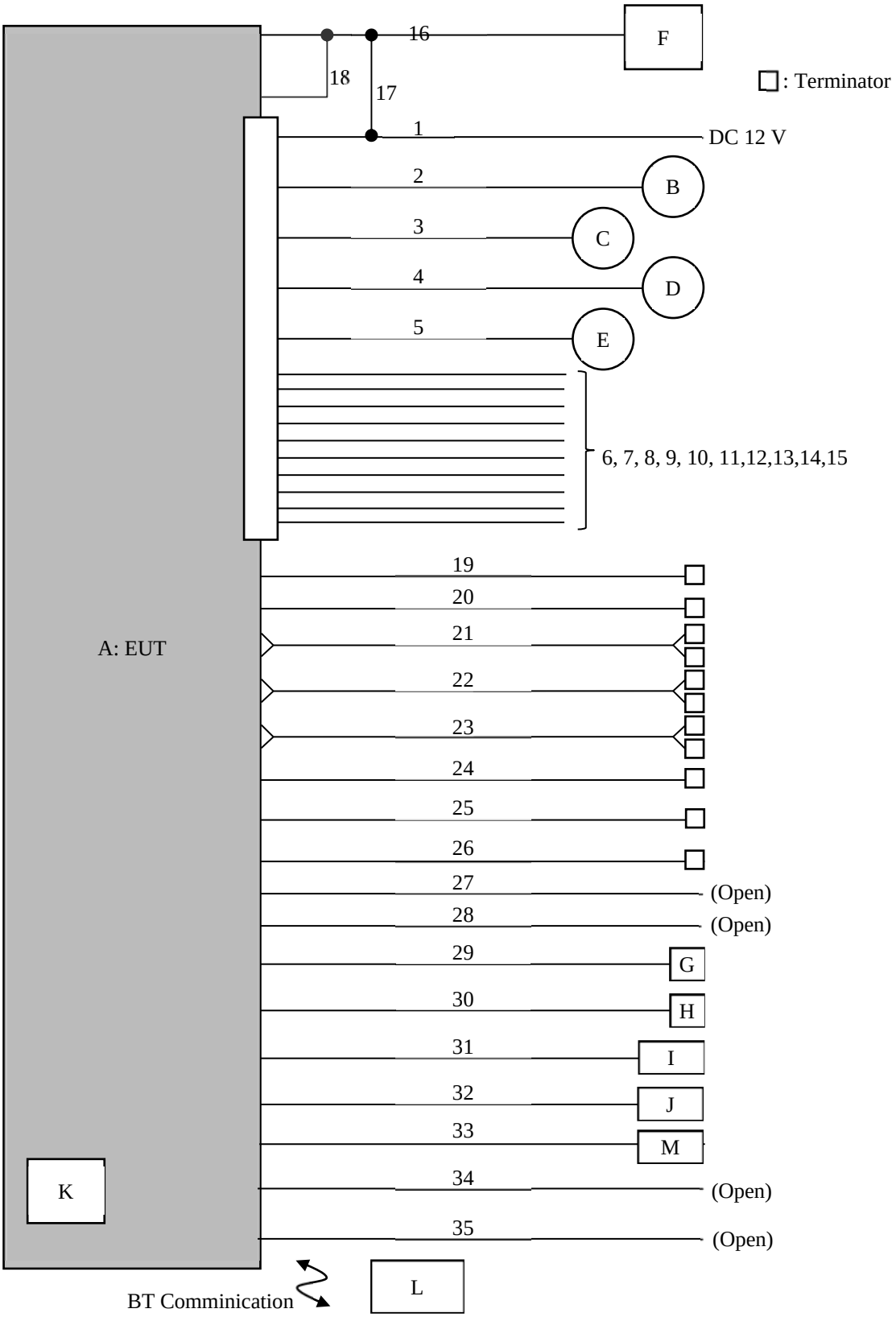
4 . 1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used	:	BT Communication BT Standby	
Firmware	:	SoC	: 0.0.3809.4000
		Syscom	: 1.0.0219.3100
		Panel	: 1.0.0159.3700

Justification: The system was configured in a typical fashion, as a customer would normally use it, for testing.

4 . 2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GPS NAVIGATION SYSTEM	DNX5190DABS	PE-X0002	JVCKENWOOD	EUT
B	Speaker	KFC-RS160	-	KENWOOD	-
C	Speaker	KFC-RS160	-	KENWOOD	-
D	Speaker	KFC-RS160	-	KENWOOD	-
E	Speaker	KFC-RS160	-	KENWOOD	-
F	DASH BOARD CAMERA	DRV-N520	082T1205	JVCKENWOOD	-
G	GPS Antenna	-	-	JVCKENWOOD	-
H	Microphone	-	-	JVCKENWOOD	-
I	USB Memory	-	-	BEST RUNNER	-
J	USB Memory	-	-	BEST RUNNER	-
K	micro SDHC Card	-	-	TDK	-
L	Tablet	Lenovo TB-8704F	HGAJVPX4	Lenovo	-
M	DAB Antenna	-	-	JVCKENWOOD	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC (ACC, B+, GND)	3.0 + 0.5	Unshielded	Unshielded	-
2	Speaker (Front-L)+/-	0.2 + 2.0	Unshielded	Unshielded	-
3	Speaker (Front-R)+/-	0.2 + 2.0	Unshielded	Unshielded	-
4	Speaker (Rear-L)+/-	0.2 + 2.0	Unshielded	Unshielded	-
5	Speaker (Rear-R)+/-	0.2 + 2.0	Unshielded	Unshielded	-
6	ANT. CONT	0.1 + 1.0	Unshielded	Unshielded	-
7	P. CONT	0.1 + 1.0	Unshielded	Unshielded	-
8	ILLUMI	0.2 + 1.0	Unshielded	Unshielded	-
9	REMOTE CONT	0.1 + 1.0	Unshielded	Unshielded	-
10	CAM +	0.1 + 1.0	Unshielded	Unshielded	-
11	CAM -	0.1 + 1.0	Unshielded	Unshielded	-
12	REVERSE	1.9	Unshielded	Unshielded	-
13	MUTE	0.1 + 1.0	Unshielded	Unshielded	-
14	PRK SW	1.9	Unshielded	Unshielded	-
15	SPEED SENSOR	1.9	Unshielded	Unshielded	-
16	DASH CAM	3.5	Unshielded	Unshielded	-
17	DC	0.2	Unshielded	Unshielded	-
18	FRONT VIEW CAMERA	0.2	Shielded	Shielded	-
19	REAR VIEW CAMERA	0.2 + 3.0	Shielded	Shielded	-
20	VIDEO OUT	0.2 + 2.0	Shielded	Shielded	-
21	AUDIO (FRONT)	3.0	Shielded	Shielded	-
22	AUDIO (REAR)	3.0	Shielded	Shielded	-
23	AUDIO (SW)	3.6	Shielded	Shielded	-
24	AV-OUT AUDIO	1.5	Shielded	Shielded	-
25	AV-IN	1.5	Shielded	Shielded	-
26	FM/AM ANT	0.1 + 2.0	Shielded	Shielded	-
27	HDMI	1.7	Shielded	Shielded	-
28	EX/IF	1.0	Shielded	Shielded	-
29	GPS	3.5	Shielded	Shielded	-
30	MIC	3.0	Shielded	Shielded	-
31	USB	0.2 + 1.0	Shielded	Shielded	-
32	USB	0.2 + 1.0	Shielded	Shielded	-
33	DAB	3.5	Shielded	Shielded	-
34	REMOTE IN	0.2 +1.0	Shielded	Shielded	-
35	REMOTE OUT	3.0	Shielded	Shielded	-

Section 5 : Electrostatic discharge

5 . 1 Operating environment

Test room	:	Refer to data
Temperature	:	Refer to data
Humidity	:	Refer to data
Atmosphere	:	Refer to data

5 . 2 Test configuration

The EUT was placed on the 0.5 mm thick insulating support above the horizontal coupling plane (HCP) in size of 1.6 m x 0.8 m that was set on a wooden table height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix 1.

5 . 3 Test conditions

Test levels	:	±4 kV for indirect discharge ±4 kV for direct discharge ±2 kV, ±4 kV, ±8 kV for air discharge
Performance criterion	:	B
Number of discharges	:	Total 20 times (10 times for each polarity of air discharge)
EUT position	:	Table top

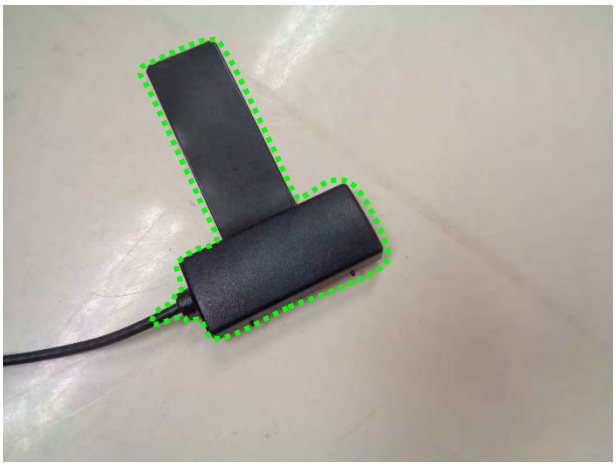
5 . 4 Test procedure

Air discharges were fired beginning with 2 kV at each selected test points.
The performance of the EUT was monitored continuously.

5 . 5 Results

Summary of the test results	:	Pass

Figure 1.
Selected test points for Electrostatic discharge (1/2)



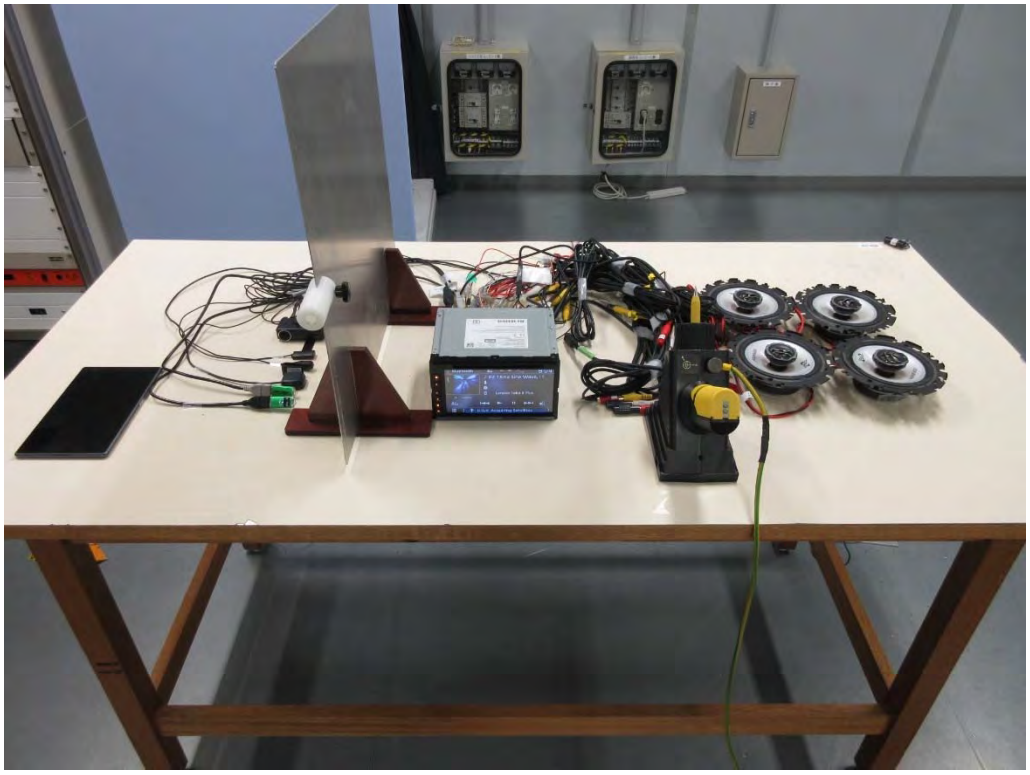
Yellow: Direct discharge
Green: Air discharge

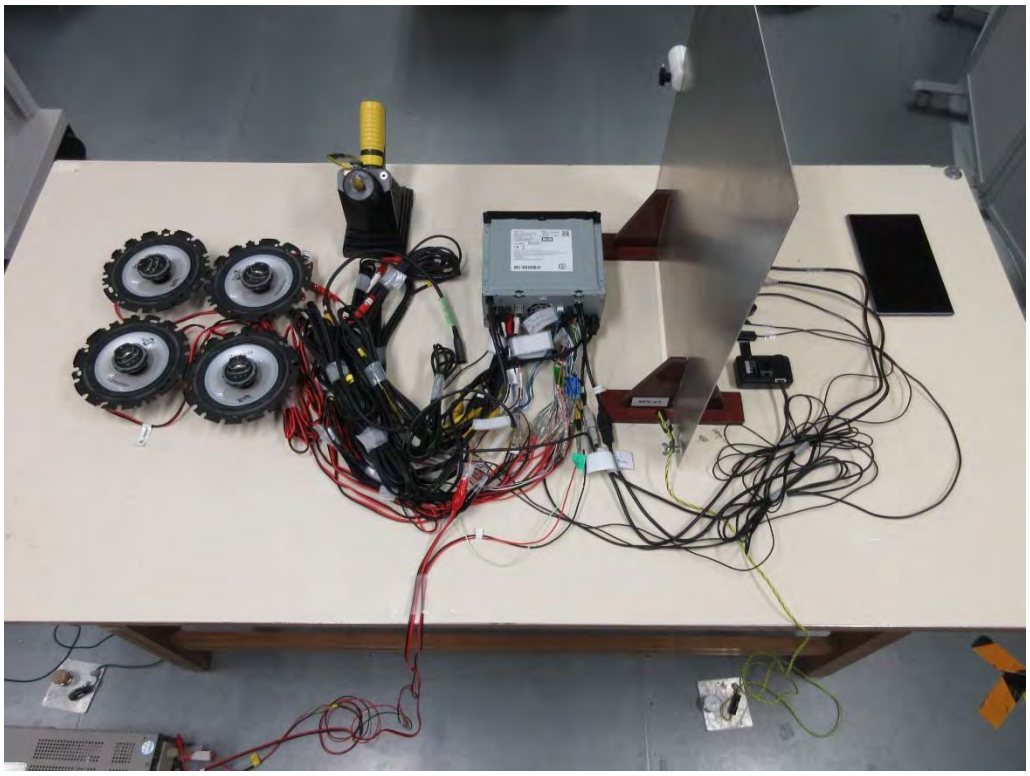
Selected test points for Electrostatic discharge (2/2)

Yellow: Direct discharge
Green: Air discharge

Appendix 1: Photographs of test setup

Electrostatic discharges





Electrostatic discharge

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.6 Shielded room
Order No. : 14007209S

Company : JVCKENWOOD Corporation
Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX5190DABS
Serial No. : PE-X0002
Test Mode : BT Communication / BT Standby
Power : DC 12 V
Standard : EN 301489
: EN 61000-4-2
Criterion : B

Date of test. : November 22, 2021
Temp. / Humid. : 22 deg.C / 45 %RH
Atmosphere : 1008 hPa

Engineer : Kento Enomoto

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8 m)
☐ Floor Standing (Non-metallic pallet height of 0.1 m)
EUT Type : ☐ Grounded ☑ Ungrounded (*1)
*1 ☐ Remained the cable with bleeder resistors(2x470 kΩ) on the EUT during the ESD test.
☐ The enough time interval b/w discharge.
☑ Touching of the EUT with a grounded brush with bleeder resistors(2x470 kΩ) in the grounding cable.
☐ An air-ionizer.

Contact discharge method(HCP, VCP) : Number of discharges for each polarity at each test point. ☑ 10 ☐ 25

Test Level Polarity		Front HCP	Front VCP	Rear HCP	Rear VCP	Right HCP	Right VCP	Left HCP	Left VCP					Remarks
4.0 kV	+	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass					
	-	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass					
kV	+													
	-													
kV	+													
	-													
kV	+													
	-													

Contact discharge method(Direct) : Number of discharges for each polarity at each test point. ☑ 10 ☐ 25

Test Level Polarity		Test Points						Remarks
4.0 kV	+	Pass						Refer to "Selected test points"
	-	Pass						
kV	+							
	-							
kV	+							
	-							
kV	+							
	-							

Air Discharge method : Number of discharges for each polarity at each test point. ☑ 10

Test Level Polarity		Test Points						Remarks
2.0 kV	+	Pass						Refer to "Selected test points"
	-	Pass						
4.0 kV	+	Pass						
	-	Pass						
8.0 kV	+	Pass						
	-	Pass						
kV	+							
	-							

Summary of the test results :
It was returned to normal operation after the test.

Test Result: ☑ **Pass** ☐ **Fail**

APPENDIX 3

Test Instruments

EMS test equipment

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
ESD	SBM-11	144964	Barometer	Sunoh	SBR121	1077	2020/09/30	36
ESD	SES-01	145253	ESD Simulator	Teseq (An Ametek Company)	NSG435	6194	2021/08/25	12
ESD	SES-B1	146002	Carbon Fiber Brush	TSJ (Techno Science Japan)	-	-	-	-
ESD	SES-H1	145349	Horizontal Coupling Plane	NAKANO EMC	-	-	-	-
ESD	SES-V1	145227	Vertical Coupling Plane	NAKANO EMC	-	-	-	-
ESD	SJM-18	147480	Measure	ASKUL	-	-	-	-
ESD	SOS-05	146293	Humidity Indicator	A&D Company	AD-5681	4062518	2021/08/02	12
ESD	STS-03	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2021/09/14	12

*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards
Test Item:
ESD: Electrostatic discharge

End of Report