EMC TEST REPORT

Test Report No.: 12685233S-B

Applicant	:	**JVC KENWOOD Corporation**
Type of Equipment	:	**GPS NAVIGATION SYSTEM**
Model No.	:	**DNX5190DABS**
Test standard	:	**EN 301 489-1 V2.1.1** **EN 301 489-17 V3.1.1** **EN 301 489-19 V2.1.0 (draft)**
Test result	:	**Complied (Refer to Section 3.2)**

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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:
January 8 to 28, 2019

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

REVISION HISTORY

Original Test Report No.: 12685233S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12685233S-B	February 14, 2019	-	-

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SECTION 1: Customer information

Company Name	:	JVC KENWOOD Corporation
Address	:	2967-3 Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525 Japan
Telephone Number	:	+81-42-646-5525
Facsimile Number	:	+81-42-646-1440
Contact Person	:	Seigo Tsutsumi

The information provided from the customer is as follows:
- Applicant, Type of Equipment, Model No. on the cover page and other relevant pages
- Section 1: Customer information
- Section 2: Equipment under test (E.U.T.)
- Section 4: Operation of E.U.T. 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 (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	GPS NAVIGATION SYSTEM
Model No.	:	DNX5190DABS
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample (Information from test lab.)	:	January 7, 2019
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.

General Specification

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

Similar Model

Model Name	Difference
DNX5190DABS	Base
DNX7190DABS	Slide Panel
DDX819WBTS	None Navigation function, Wide Panel
DMX8019S	None Navigation function, None DVD function

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

EMI & EMS

Test specification : EN 301 489-1 V 2.1.1
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements;
Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

Test specification : EN 301 489-17 V3.1.1
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 17: Specific conditions for Broadband Data Transmission Systems;
Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

EN 301 489-19 V2.1.0 (draft)
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band (ROGNSS) providing positioning, navigation, and timing data;
Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

Purpose of Test : Compliance with the RE directive 2014/53/EU

3.2 Procedures and results

EMI (vehicular use)

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission (DC power port)	EN 55032:2015	Clause 8.3.3 Table 5	*1)	12.5 dB Freq.: 0.43244 MHz, Phase: - Detection: AV	Complied a)
Radiated emission	EN 55032:2015	EN55032 Class B	N/A	N/A	N/A *2)

Note: UL Japan's Work Procedures 13-EM-W0420.
*1) The calibration of test receiver contains CISPR 16-1-1 requirements.
*2) The test is not applicable since the EUT does not have ancillary equipment.
a) Refer to APPENDIX 1 (data of Conducted Emission)

EMS (vehicular use)

Requirement	Test Procedure	Specification	Criteria	Actual Performance	Result
Radio-frequency electromagnetic field	EN61000-4-3:2006 +A1: 2008+A2:2010	Enclosure port: 80 MHz-1000 MHz: 3 V/m 1.0 GHz-6 GHz: 3 V/m (unmodulated, r.m.s.) 80 % AM, 1 kHz	CT&CR, A	80 MHz-1000 MHz 1.0 GHz-6.0 GHz *3) 3 V/m (unmodulated, r.m.s.) 80 % AM, 1 kHz	Complied b)
		Enclosure port: 80 MHz-6000 MHz & Spot frequency: 80 MHz, 104 MHz, 136 MHz, 165 MHz, 200 MHz, 260 MHz, 330 MHz, 430 MHz, 560 MHz, 714 MHz, 715 MHz, 716 MHz: 3 V/m (unmodulated, r.m.s.) 80 % AM, 1 kHz 920 MHz ± 1 MHz: 3 V/m (unmodulated, r.m.s.) 50 %, 200 Hz pulses		80 MHz-6000 MHz & Spot frequency: 80 MHz, 104 MHz, 136 MHz, 165 MHz, 200 MHz, 260 MHz, 330 MHz, 430 MHz, 560 MHz, 714 MHz, 715 MHz, 716 MHz: 3 V/m (unmodulated, r.m.s.) 80 % AM, 1 kHz 920 MHz ± 1 MHz: 3 V/m (unmodulated, r.m.s.) 50 %, 200 Hz pulses *4)	
Transients and surges	Pulse 1, 2a, 2b, 3a, 3b => ISO 7637-2:2011 Pulse 4, Starting profile =>ISO 7637-2:2004 =>ISO 16750-2: 2012	(DC power port) Test level III Pulse 1, 2a, 2b, 4, Starting profile: =>10 Pulses Pulse 3a, 3b =>20 min	Refer to 3.4.1	Refer to 8.3	Complied c)
Radio-frequency conducted disturbances	EN 61000-4-6:2009	DC power / Signal port: 0.15 MHz-80 MHz: 3 V (unmodulated, r.m.s.) 80 % AM, 1 kHz	CT&CR, A	3 V (unmodulated, r.m.s.) 80 % AM, 1 kHz	Complied d)

Note: UL Japan's Work Procedures No. 13-EM-W0417.
*3) 2280 MHz to 2603.5 MHz: The exclusion band for equipment operating in the 2.4 GHz band (clause 4.3 of EN 301 489-17)
*4) 1496.649 MHz to 1654.191 MHz: The exclusion band for receiver (clause 4.3.1 of EN 301 489-19)
b) Refer to APPENDIX 1 (data of Radio-frequency electromagnetic field)
c) Refer to SECTION 8 (data of Transients and surges)
d) Refer to APPENDIX 1 (data of Radio-frequency conducted disturbances)

3.3 Addition, deviation, exclusion to standards

No addition, deviation nor exclusion has been made from standards.

3.4 Performance criteria (EMS)

3.4.1 EN 301 489-1 (ISO 7637-2)

For transmitters, pulse 3a and 3b the performance criteria for continuous phenomena for transmitters shall apply.

For pulse 1, 2a, 2b, and 4 the performance criteria for transient phenomena for transmitter shall apply, with the exception that a communication link need not to be maintained during the EMC exposure and may have to be re-established.

For receivers, pulse 3a and 3b the performance criteria for continuous phenomena for receivers shall apply.

For pulse 1, 2a, 2b, and 4 the performance criteria for transient phenomena for receivers shall apply, with the exception that a communication link need not to be maintained during the EMC exposure and may have to be re-established.

3.4.2 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 EN 301 489-17)

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more) May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
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 degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended.
In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for Continuous phenomena applied to Transmitters (CT) (clause 6.3, in EN 301 489-17)
The performance criteria A shall apply.
Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT) (clause 6.4, in EN 301 489-17)
The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.
Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR) (clause 6.5, in EN 301 489-17)
The performance criteria A shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR) (clause 6.6, in EN 301 489-17)
The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

3.4.3 EN 301 489-19

General performance criteria
If the EUT is of a non specialized nature or the EUT is combined with an ancillary equipment, the test modulation, test arrangements, etc. as required in clause 4 shall apply.
The EUT, for all immunity tests according to the present document, except the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2), shall be assessed for:
• the storage of messages in the memory of the EUT at the start of the test;
• unintentional responses of the EUT during the test;
• the maintenance of the EUT memory assessed at the conclusion of the test;
• the ability to receive and store messages at the conclusion of the test.
For the spot frequency test of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the EUT shall be assessed by monitoring the accuracy of the call received alert signal.

Performance criteria for Continuous phenomena applied to ROMES and ROGNSS receivers (CR)
For the EUT, excluding spot frequency tests as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2):
• the general performance criteria set out in clause 6.1;
• during the test no false calls shall occur;
• at the conclusion of the test comprising the series of individual exposures the EUT shall operate as intended with no loss of functions or stored data (messages), as declared by the manufacturer.
For the spot frequency test as part of the immunity test with radiated RF electromagnetic fields (see ETSI EN 301 489-1 [1], clause 9.2) the EUT shall be assessed by monitoring the accuracy of the call received alert signal.

Performance criteria for Transient phenomena applied to ROMES and ROGNSS receivers (TR)
For the EUT:
• the general performance criteria set out in clause 6.1;
• during the test no false calls shall occur;
• at the conclusion of the test comprising the series of individual exposures, the EUT shall operate as intended with no loss of function and/or stored data (messages), as declared by the manufacturer.

Performance criteria for equipment which does not provide a continuous communication link
The provision of ETSI EN 301 489-1 [1], clause 6.3 shall apply with the following modifications.
For EUTs of a specialized nature and/or ancillary equipment tested on a stand alone basis the manufacturer shall define the method of test to determine the acceptable level of performance or degradation of performance during and/or after the test. Under these circumstances the manufacturer will also provide the following information:

3.5 Confirmation

UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications EN 301 489-17 V3.1.1, EN 301 489-19 V2.1.0 (draft) and EN 301 489-1 V2.1.1.

3.6 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k*=2.
As for the RS*, a coverage factor is *k*=1.64.
*RS: Radio-frequency electromagnetic field

EMI
Although this standard determines only the limit value of uncertainty, there is no applicable rule of uncertainty in this. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

Item	Frequency range	No.1 SAC*1 (±)	No.2 SAC(±)	No.3 SAC (±)	No.4/5/6/8 SR*2 (±)
Conducted emission	150 kHz-30 MHz	2.9 dB	2.8 dB	2.9 dB	2.9 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room

Conducted emission
The data listed in this test report has enough margin, more than the site margin.

EMS
These tests are qualitative tests and uncertainties do not apply directly to the results. Consideration of the uncertainty calculated by the laboratory is as follows;

EN 61000-4-3: The measurement uncertainty is given with a confidence of 95 %.
The measurement uncertainty is calculated as the uncertainty of the electric field intensity detected by the probe(s). The uncertainty calculations exclude influence of phenomena like inhomogeneity of the electric field intensity. The measurement uncertainty is: (±) 0.5 V/m.

EN 61000-4-6: The uncertainty of the applied disturbance signal is within the tolerance specified by the standard.

ISO7637-2: The uncertainty of the applied ISO7637, short interruptions test is within the tolerance specified by the standard.

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 configuration photographs, data of EMC test and test instruments

Refer to APPENDIXES in this report.

SECTION 4: Operation of E.U.T. during testing

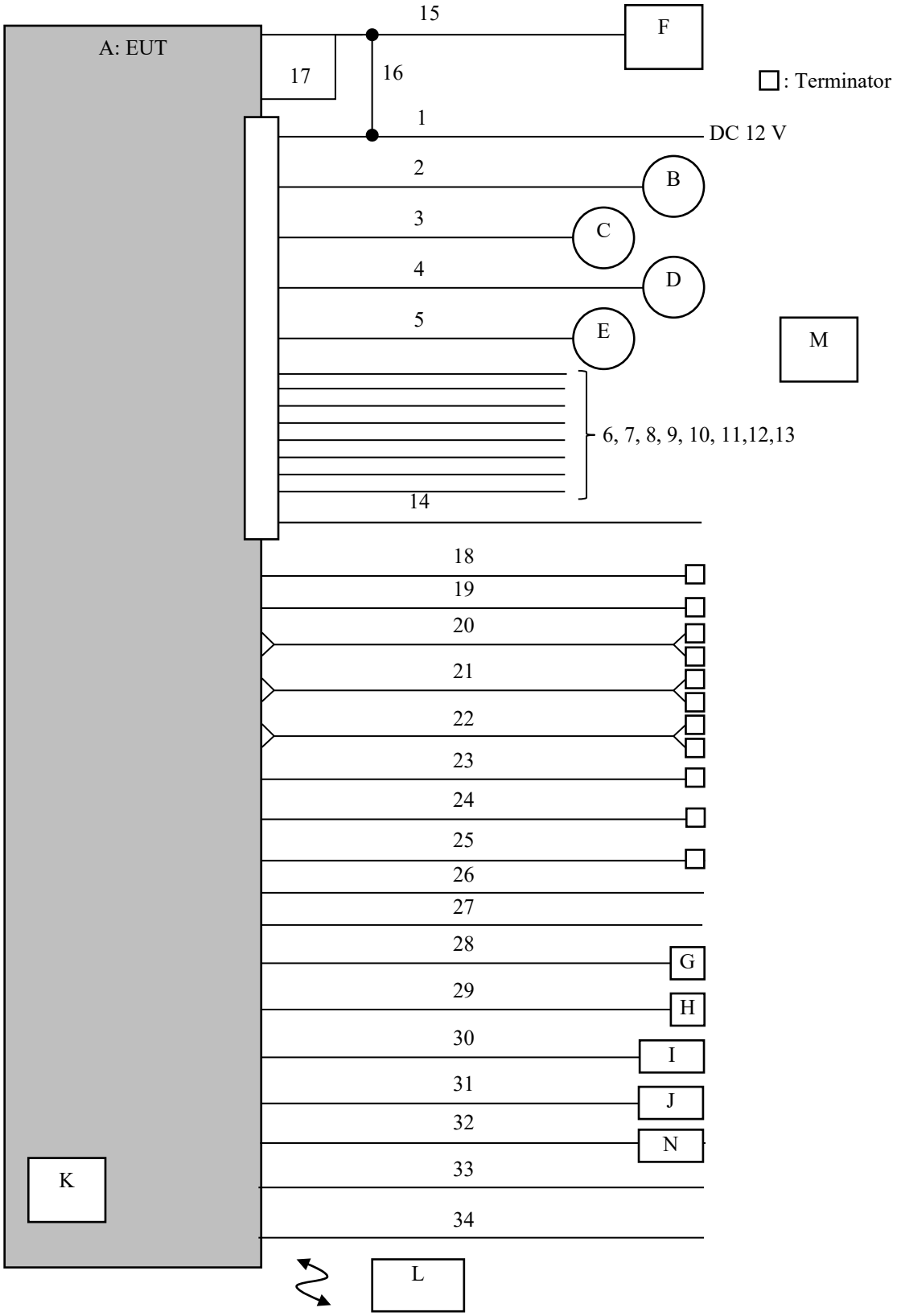
4.1 Operating modes

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 : 1) BT Communication + GPS Standby *EMS test only
2) GPS Receiving + BT Standby *EMS test only
3) BT Communication + GPS Receiving *EMI test only

Software	:	SoC	: 0.0.3209.4000
		Syscom	: 1.0.0209.3100
		Panel	: 1.0.0159.3700

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	JVC KENWOOD	EUT
B	Speaker	LV-002	-	KENWOOD	-
C	Speaker	LV-002	-	KENWOOD	-
D	Speaker	LV-002	-	KENWOOD	-
E	Speaker	LV-002	-	KENWOOD	-
F	DASH BOARD CAMERA	DRV-N520	082T1224	JVC KENWOOD	-
G	GPS Antenna	-	-	JVC KENWOOD	-
H	Microphone	-	-	JVC KENWOOD	-
I	USB Memory	-	-	Apacer	-
J	USB Memory	SDK-USM1GL	-	SONY	-
K	SD MEMORY CARD	-	-	TDK	-
L	iPod touch	A1367	C3LH1SZ4DT75	Apple	-
M	Remote Controller	RC-DV331	-	JVC KENWOOD	-
N	DAB Antenna	-	-	JVC KENWOOD	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC (ACC, B+, GND)	0.15 + 3.0 0.15 + 0.35 *1)	Unshielded	Unshielded	-
2	Speaker	0.15 + 2.0	Unshielded	Unshielded	-
3	Speaker	0.15 + 2.0	Unshielded	Unshielded	-
4	Speaker	0.15 + 2.0	Unshielded	Unshielded	-
5	Speaker	0.15 + 2.0	Unshielded	Unshielded	-
6	ANT. CONT	0.15 + 1.0	Unshielded	Unshielded	-
7	P. CONT	0.15 + 1.0	Unshielded	Unshielded	-
8	ILLUMI	0.15 + 1.0	Unshielded	Unshielded	-
9	REMOTE CONT	0.15 + 1.0	Unshielded	Unshielded	-
10	CAM +	0.15 + 1.0	Unshielded	Unshielded	-
11	CAM -	0.15 + 1.0	Unshielded	Unshielded	-
12	REVERSE	2.0	Unshielded	Unshielded	-
13	MUTE	0.15 + 1.0	Unshielded	Unshielded	
14	PRK SW	2.0	Unshielded	Unshielded	-
15	DASH CAM	3.5	Unshielded	Unshielded	-
16	DC	0.2	Unshielded	Unshielded	-
17	FRONT VIEW CAMERA	0.2	Shielded	Shielded	-
18	REAR VIEW CAMERA	0.2 + 1.8	Shielded	Shielded	-
19	VIDEO OUT	0.2 + 3.0	Shielded	Shielded	-
20	AUDIO (FRONT)	3.0	Shielded	Shielded	-
21	AUDIO (REAR)	3.0	Shielded	Shielded	-
22	AUDIO (SW)	3.0	Shielded	Shielded	-
23	AV-OUT AUDIO	2.0	Shielded	Shielded	-
24	AV-IN	1.5	Shielded	Shielded	-
25	FM/AM Antenna	0.15 + 0.3 *1) 0.15 + 1.5	Shielded	Shielded	-
26	HDMI	2.0	Shielded	Shielded	-
27	EXT-I/F	1.0	Shielded	Shielded	-
28	GPS	3.5	Shielded	Shielded	-
29	Microphone	3.0	Shielded	Shielded	-
30	USB	0.2 + 0.3 *1) 0.2 + 1.0	Shielded	Shielded	-
31	USB	0.2 + 0.3 *1) 0.2 + 1.0	Shielded	Shielded	-
32	DAB Antenna	3.5	Shielded	Shielded	-
33	REMO IN	3.0	Shielded	Shielded	-
34	REMO OUT	3.6	Shielded	Shielded	-

*1) Used for CS and TI test

SECTION 5: Conducted emission

5.1 Operating environment

Test place : See data
Temperature and Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of the EUT, including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from AMN (Artificial Mains Network) and excess DC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through the AMN to the input power source.
Photographs of the set up are shown in Appendix.

5.3 Test conditions

Frequency range : 0.15 MHz – 30 MHz
EUT position : Table top

5.4 Test procedure

The DC power port continuous disturbance voltage has been measured with the EUT.
The EUT was connected to AMN.
An overview sweep with peak detection has been performed.
The measurements have been performed with a quasi-peak detector and if required, with a CISPR average detector.
The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-Peak/ CISPR Average
IF Bandwidth : 9 kHz

5.5 Results

Summary of the test results: Pass

SECTION 6: Radio-frequency electromagnetic field

6.1 Operating environment

Test place	:	See data
Temperature and Humidity	:	See data
Atmosphere	:	See data

6.2 Test configuration

The EUT was placed on a non-conducting table height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix 1.

6.3 Test condition

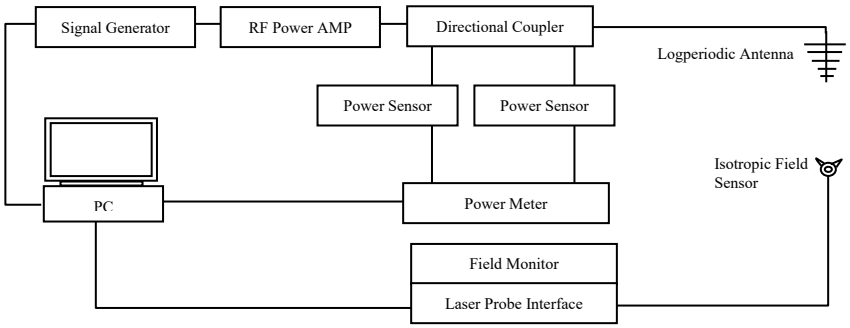
Frequency range	:	80 MHz-1000 MHz, 1.0 GHz- 6.0 GHz 80 MHz, 104 MHz, 136 MHz, 165 MHz, 200 MHz, 260 MHz, 330 MHz, 430 MHz, 560 MHz, 714 MHz, 715 MHz, 716 MHz, 920 MHz ± 1 MHz
Modulation	:	80 % Amplitude modulation, 1 kHz modulation frequency 50 %, 200 Hz pulses (920 MHz ± 1 MHz) (EN 301 489-19)
Antenna	:	Logperiodic (80 MHz-1000 MHz), Horn (1.0 GHz-6.0 GHz)
EUT position	:	Table top

6.4 Generation of the electromagnetic field

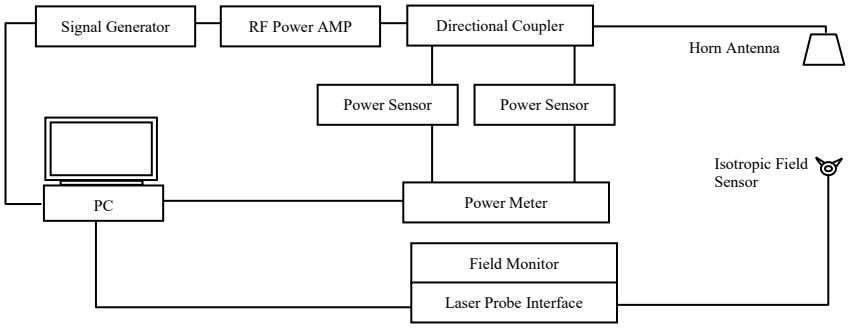
The electromagnetic field is generated from a computer controlled signal generator. The output power is amplified and then radiated from broad band antenna. (Figure 1) At every test frequency the field strength is checked prior to the actual test by placing the field sensor at the same distance from and in the same relative location to the field generating antenna, as will be used by the EUT.

Figure 1. Test System

Frequency range from 80 MHz to 1000 MHz



Frequency range from 1.0 GHz to 6.0 GHz



6.5 Test procedure

During test, the verification of performance was established by monitoring the EUT operation status with a video camera and by hearing the EUT sound with the inter-phone. The test was covered the complete frequency span; two polarization and 4 sides of the EUT facing the antenna.

6.6 Results

The test protocol and results are found in Appendix 2.

Summary of the test results : Pass

Tested Frequency List: 80 MHz -1000 MHz

80.000	102.582	131.539	168.681	216.305	277.386	355.714	456.163	584.982	750.187	962.052
80.800	103.607	132.854	170.367	218.468	280.159	359.271	460.724	590.831	757.688	971.672
81.608	104.643	134.182	172.070	220.652	282.960	362.863	465.331	596.739	765.264	981.388
82.424	105.689	135.523	173.790	222.858	285.789	366.491	469.984	602.706	772.916	991.201
83.248	106.745	136.878	175.527	225.086	288.646	370.155	474.683	608.733	780.645	1000.000
84.080	107.812	138.246	177.282	227.336	291.532	373.856	479.429	614.820	788.451	
84.920	108.890	139.628	179.054	229.609	294.447	377.594	484.223	620.968	796.335	
85.769	109.978	141.024	180.844	231.905	297.391	381.369	489.065	627.177	804.298	
86.626	111.077	142.434	182.652	234.224	300.364	385.182	493.955	633.448	812.341	
87.492	112.187	143.858	184.478	236.566	303.367	389.033	498.894	639.782	820.464	
88.366	113.308	145.296	186.322	238.931	306.40	392.923	503.882	646.179	828.668	
89.249	114.441	146.749	188.185	241.320	309.464	396.852	508.920	652.640	836.954	
90.141	115.585	148.216	190.066	243.733	312.558	400.820	514.009	659.166	845.323	
91.042	116.740	149.698	191.966	246.170	315.683	404.828	519.149	665.757	853.776	
91.952	117.907	151.195	193.885	248.631	318.839	408.876	524.340	672.414	862.313	
92.871	119.086	152.707	195.823	251.117	322.027	412.964	529.583	679.138	870.936	
93.799	120.276	154.234	197.781	253.628	325.247	417.093	534.878	685.929	879.645	
94.737	121.478	155.776	199.758	256.164	328.499	421.263	540.226	692.788	888.441	
95.684	122.692	157.333	201.755	258.725	331.784	425.475	545.628	699.715	897.325	
96.640	123.918	158.906	203.772	261.312	335.101	429.729	551.084	706.712	906.298	
97.606	125.157	160.495	205.809	263.925	338.452	434.026	556.594	713.779	915.361	
98.582	126.408	162.100	207.867	266.564	341.836	438.366	562.159	720.916	924.514	
99.567	127.672	163.721	209.945	269.229	345.254	442.749	567.780	728.125	933.759	
100.562	128.948	165.358	212.044	271.921	348.706	447.176	573.457	735.406	943.096	
101.567	130.237	167.011	214.164	274.640	352.193	451.647	579.191	742.760	952.527	

Tested Frequency List: 1000 MHz -2500 MHz

1000.000	1104.620	1220.183	1347.836	1488.845	1644.607	1816.664	2006.723	2216.665	2448.573
1010.000	1115.666	1232.384	1361.314	1503.733	1661.053	1834.830	2026.790	2238.831	2473.058
1020.100	1126.822	1244.707	1374.927	1518.770	1677.663	1853.178	2047.057	2261.219	2497.788
1030.301	1138.090	1257.154	1388.676	1533.957	1694.439	1871.709	2067.527	2283.831	2500.000
1040.604	1149.470	1269.725	1402.562	1549.296	1711.383	1890.426	2088.202	2306.669	
1051.010	1160.964	1282.422	1416.587	1564.789	1728.496	1909.330	2109.084	2329.735	
1061.520	1172.573	1295.246	1430.752	1580.436	1745.781	1928.423	2130.174	2353.032	
1072.135	1184.298	1308.198	1445.059	1596.240	1763.238	1947.707	2151.475	2376.562	
1082.856	1196.141	1321.280	1459.509	1612.202	1780.870	1967.184	2172.989	2400.327	
1093.684	1208.102	1334.492	1474.104	1628.324	1798.678	1986.855	2194.718	2424.330	

Tested Frequency List: 2500 MHz -6000 MHz

2500.000	2761.553	3050.467	3369.609	3722.141	4111.555	4541.711	5016.872	5541.742
2525.000	2789.168	3080.971	3403.305	3759.362	4152.670	4587.128	5067.040	5597.159
2550.250	2817.059	3111.780	3437.338	3796.955	4194.196	4632.999	5117.710	5653.130
2575.752	2845.229	3142.897	3471.711	3834.924	4236.138	4679.329	5168.887	5709.661
2601.509	2873.681	3174.326	3506.428	3873.273	4278.499	4726.122	5220.575	5766.757
2627.524	2902.417	3206.069	3541.492	3912.005	4321.284	4773.383	5272.780	5824.424
2653.799	2931.441	3238.129	3576.906	3951.125	4364.496	4821.116	5325.507	5882.668
2680.337	2960.755	3270.510	3612.675	3990.636	4408.141	4869.327	5378.762	5941.494
2707.140	2990.362	3303.215	3648.801	4030.542	4452.222	4918.020	5432.549	6000.000
2734.211	3020.265	3336.247	3685.289	4070.847	4496.744	4967.200	5486.874	

* 1496.649 MHz to 1654.191 MHz: The exclusion band for receiver (clause 4.3.1 of EN 301 489-19)
* 2280 MHz to 2603.5 MHz: The exclusion band for equipment operating in the 2.4 GHz band (clause 4.3 of EN 301 489-17)

SECTION 7: Radio frequency, common mode

7.1 Operating environment

Test place : See data
Temperature and Humidity : See data
Atmosphere : See data

7.2 Test configuration

The EUT was placed on a non-metallic pallet of 0.1 m above a reference ground plane.
Photographs of the set up are shown in Appendix 1.

7.3 Test condition

Frequency range : 0.15 MHz to 80 MHz
EUT position : Floor standing

7.4 Test procedure

The test electromagnetic fields were applied to the specified cable by using suitable injection method.
The performance of the EUT was monitored continuously.

7.5 Results

The test protocol and results are found in Appendix 2.

Summary of the test results : Pass

Tested Frequency List: 0.15 MHz - 80 MHz

0.1500	0.2461	0.4057	0.6704	1.1103	1.8415	3.0556	5.0722	8.4220	13.9861	23.2284	38.5809	64.0826
0.1515	0.2485	0.4097	0.6771	1.1214	1.8599	3.0861	5.1229	8.5062	14.1259	23.4606	38.9667	64.7234
0.1530	0.2509	0.4137	0.6838	1.1326	1.8784	3.1169	5.1741	8.5912	14.2671	23.6952	39.3563	65.3706
0.1545	0.2534	0.4178	0.6906	1.1439	1.8971	3.1480	5.2258	8.6771	14.4097	23.9321	39.7498	66.0243
0.1560	0.2559	0.4219	0.6975	1.1553	1.9160	3.1794	5.2780	8.7638	14.5537	24.1714	40.1472	66.6845
0.1575	0.2584	0.4261	0.7044	1.1668	1.9351	3.2111	5.3307	8.8514	14.6992	24.4131	40.5486	67.3513
0.1590	0.2609	0.4303	0.7114	1.1784	1.9544	3.2432	5.3840	8.9399	14.8461	24.6572	40.9540	68.0248
0.1605	0.2635	0.4346	0.7185	1.1901	1.9739	3.2756	5.4378	9.0292	14.9945	24.9037	41.3635	68.7050
0.1621	0.2661	0.4389	0.7256	1.2020	1.9936	3.3083	5.4921	9.1194	15.1444	25.1527	41.7771	69.3920
0.1637	0.2687	0.4432	0.7328	1.2140	2.0135	3.3413	5.5470	9.2105	15.2958	25.4042	42.1948	70.0859
0.1653	0.2713	0.4476	0.7401	1.2261	2.0336	3.3747	5.6024	9.3026	15.4487	25.6582	42.6167	70.7867
0.1669	0.2740	0.4520	0.7475	1.2383	2.0539	3.4084	5.6584	9.3956	15.6031	25.9147	43.0428	71.4945
0.1685	0.2767	0.4565	0.7549	1.2506	2.0744	3.4424	5.7149	9.4895	15.7591	26.1738	43.4732	72.2094
0.1701	0.2794	0.4610	0.7624	1.2631	2.0951	3.4768	5.7720	9.5843	15.9166	26.4355	43.9079	72.9314
0.1718	0.2821	0.4656	0.7700	1.2757	2.1160	3.5115	5.8297	9.6801	16.0757	26.6998	44.3469	73.6607
0.1735	0.2849	0.4702	0.7777	1.2884	2.1371	3.5466	5.8879	9.7769	16.2364	26.9667	44.7903	74.3973
0.1752	0.2877	0.4749	0.7854	1.3012	2.1584	3.5820	5.9467	9.8746	16.3987	27.2363	45.2382	75.1412
0.1769	0.2905	0.4796	0.7932	1.3142	2.1799	3.6178	6.0061	9.9733	16.5626	27.5086	45.6905	75.8926
0.1786	0.2934	0.4843	0.8011	1.3273	2.2016	3.6539	6.0661	10.0730	16.7282	27.7836	46.1474	76.6515
0.1803	0.2963	0.4891	0.8091	1.3405	2.2236	3.6904	6.1267	10.1737	16.8954	28.0614	46.6088	77.4180
0.1821	0.2992	0.4939	0.8171	1.3539	2.2458	3.7273	6.1879	10.2754	17.0643	28.3420	47.0748	78.1921
0.1839	0.3021	0.4988	0.8252	1.3674	2.2682	3.7645	6.2497	10.3781	17.2349	28.6254	47.5455	78.9740
0.1857	0.3051	0.5037	0.8334	1.3810	2.2908	3.8021	6.3121	10.4818	17.4072	28.9116	48.0209	79.7637
0.1875	0.3081	0.5087	0.8417	1.3948	2.3137	3.8401	6.3752	10.5866	17.5812	29.2007	48.5011	80.0000
0.1893	0.3111	0.5137	0.8501	1.4087	2.3368	3.8785	6.4389	10.6924	17.7570	29.4927	48.9861	
0.1911	0.3142	0.5188	0.8586	1.4227	2.3601	3.9172	6.5032	10.7993	17.9345	29.7876	49.4759	
0.1930	0.3173	0.5239	0.8671	1.4369	2.3837	3.9563	6.5682	10.9072	18.1138	30.0854	49.9706	
0.1949	0.3204	0.5291	0.8757	1.4512	2.4075	3.9958	6.6338	11.0162	18.2949	30.3862	50.4703	
0.1968	0.3236	0.5343	0.8844	1.4657	2.4315	4.0357	6.7001	11.1263	18.4778	30.6900	50.9750	
0.1987	0.3268	0.5396	0.8932	1.4803	2.4558	4.0760	6.7671	11.2375	18.6625	30.9969	51.4847	
0.2006	0.3300	0.5449	0.9021	1.4951	2.4803	4.1167	6.8347	11.3498	18.8491	31.3068	51.9995	
0.2026	0.3333	0.5503	0.9111	1.5100	2.5051	4.1578	6.9030	11.4632	19.0375	31.6198	52.5194	
0.2046	0.3366	0.5558	0.9202	1.5251	2.5301	4.1993	6.9720	11.5778	19.2278	31.9359	53.0445	
0.2066	0.3399	0.5613	0.9294	1.5403	2.5554	4.2412	7.0417	11.6935	19.4200	32.2552	53.5749	
0.2086	0.3432	0.5669	0.9386	1.5557	2.5809	4.2836	7.1121	11.8104	19.6142	32.5777	54.1106	
0.2106	0.3466	0.5725	0.9479	1.5712	2.6067	4.3264	7.1832	11.9285	19.8103	32.9034	54.6517	
0.2127	0.3500	0.5782	0.9573	1.5869	2.6327	4.3696	7.2550	12.0477	20.0084	33.2324	55.1982	
0.2148	0.3535	0.5839	0.9668	1.6027	2.6590	4.4132	7.3275	12.1681	20.2084	33.5647	55.7501	
0.2169	0.3570	0.5897	0.9764	1.6187	2.6855	4.4573	7.4007	12.2897	20.4104	33.9003	56.3076	
0.2190	0.3605	0.5955	0.9861	1.6348	2.7123	4.5018	7.4747	12.4125	20.6145	34.2393	56.8706	
0.2211	0.3641	0.6014	0.9959	1.6511	2.7394	4.5468	7.5494	12.5366	20.8206	34.5816	57.4393	
0.2233	0.3677	0.6074	1.0058	1.6676	2.7667	4.5922	7.6248	12.6619	21.0288	34.9274	58.0136	
0.2255	0.3713	0.6134	1.0158	1.6842	2.7943	4.6381	7.7010	12.7885	21.2390	35.2766	58.5937	
0.2277	0.3750	0.6195	1.0259	1.7010	2.8222	4.6844	7.7780	12.9163	21.4513	35.6293	59.1796	
0.2299	0.3787	0.6256	1.0361	1.7180	2.8504	4.7312	7.8557	13.0454	21.6658	35.9855	59.7713	
0.2321	0.3824	0.6318	1.0464	1.7351	2.8789	4.7785	7.9342	13.1758	21.8824	36.3453	60.3690	
0.2344	0.3862	0.6381	1.0568	1.7524	2.9076	4.8262	8.0135	13.3075	22.1012	36.7087	60.9726	
0.2367	0.3900	0.6444	1.0673	1.7699	2.9366	4.8744	8.0936	13.4405	22.3222	37.0757	61.5823	
0.2390	0.3939	0.6508	1.0779	1.7875	2.9659	4.9231	8.1745	13.5749	22.5454	37.4464	62.1981	
0.2413	0.3978	0.6573	1.0886	1.8053	2.9955	4.9723	8.2562	13.7106	22.7708	37.8208	62.8200	
0.2437	0.4017	0.6638	1.0994	1.8233	3.0254	5.0220	8.3387	13.8477	22.9985	38.1990	63.4482	

SECTION 8: Transients and surges (ISO7637-2)

8.1 Operating environment

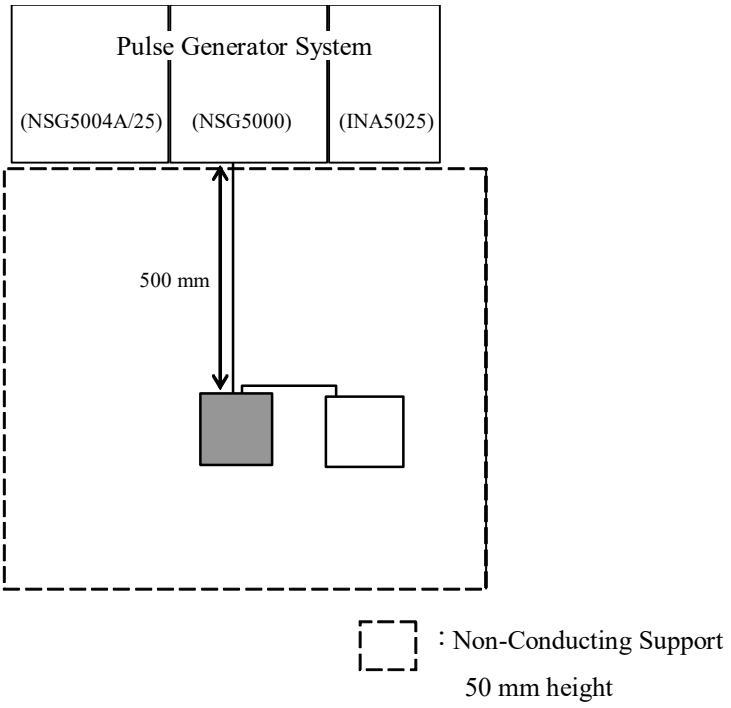
The test was carried out on a reference ground plane in No.5 shielded room..

Temperature : 22 deg. C.
Humidity : 45 % RH
Atmosphere : 1011 hPa

8.2 Test configuration

The EUT was placed on a non-metallic pallet height of 50 mm above the reference ground plane.
Photographs of the set up are shown in Appendix 1.

Figure 2. Drawing of the test set-up



8.3 Test condition

Performance criterion : Refer to 3.4.1.
EUT position : Floor standing
EUT operation mode : Bluetooth communication, Bluetooth Standby

Test level specified in EN 301 489-1 V2.1.1, clause 9.6 was applied.

1) Pulse 1
Test level (Us) : III (-112 V)
Number of Pulses : 10
Ri : 10 ohm
Pulse cycle time (t1) : 0.5 sec
Ua : 13.5 V

2) Pulse 2a
Test level (Us) : III (+55 V)
Number of Pulses : 10
Ri : 2 ohm
Pulse cycle time (t1) : 0.2 sec
Ua : 13.5 V

3) Pulse 2b
Test level (Us) : III (+10 V)
Number of Pulses : 10
Ri : 0 ohm
Td : 200 msec / 2000 msec
Ua : 13.5 V

4) Pulse 3a
Test level (Us) : III (-165 V)
Duration of each test : 20 min
Ua : 13.5 V

5) Pulse 3b
Test level (Us) : III (+112 V)
Duration of each test : 20 min
Ua : 13.5 V

6) Pulse 4
Test level (Us) : III (-6 V)
Number of Pulses : 10
T7 : 40 msec
T9 : 20 sec
T11 : 5 msec / 100 msec
Ua : -2.5 V / -6 V
Ub : 12 V

7) Starting profile
Test level (Us6) : III (+3 V)
Test level (Us) : III (+5 V)
Tf : 5 V
T6 : 15 ms
T7 : 50 ms
T8 : 1000 ms
Tr 100 ms
Number of Pulses : 10

8.4 Test procedure

The test Voltage was applied to the supply line.
The performance of the EUT was monitored continuously.

8.5 Results

The test protocol is found in Table 1.

Summary of the test results: Pass
The equipment operated without any recorded disturbances.

Date: January 11, 2019 by: Tsuyoki Yamagata

Table 1. Test protocol

ISO 7637-2: 2011

Test No.	Pulse	Test level (V)	Pass / Fail
1	1	-112	Pass
2	2a	+55	Pass
3	2b	+10	Pass
4	3a	-165	Pass
5	3b	+112	Pass

ISO 7637-2: 2004

Test No.	Pulse	Test level (V)	Pass / Fail
1	4	-6	Pass

ISO 16750-2:2012

Test No.	Test item	Test level	Pass / Fail
1	Starting profile	III	Pass

APPENDIX 1: Test configuration photographs

Conducted emission

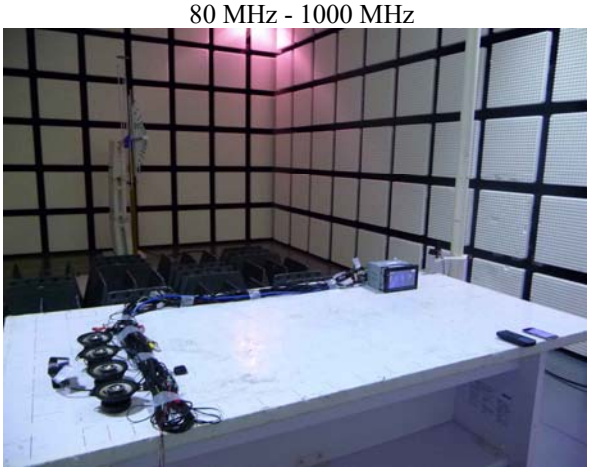
Front

Side

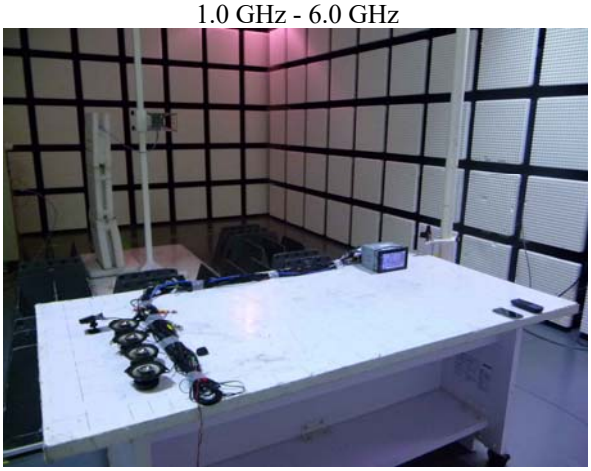
Radio-frequency electromagnetic field (1/2)

BT Communication + GPS Standby

80 MHz - 1000 MHz



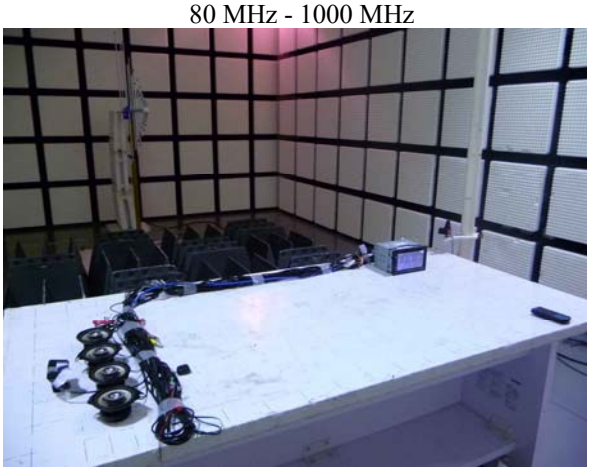
1.0 GHz - 6.0 GHz



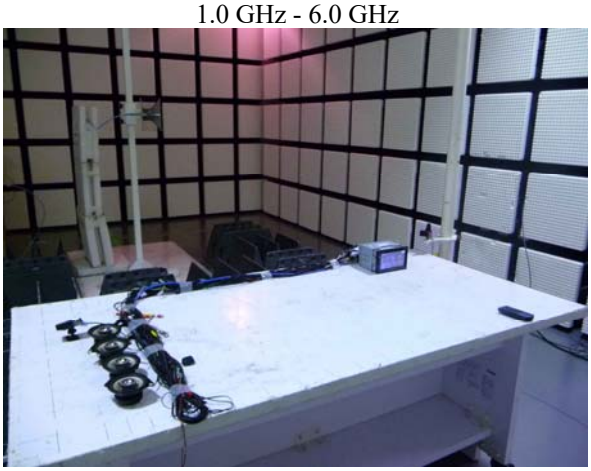
Radio-frequency electromagnetic field (2/2)

GPS Receiving + BT Standby

80 MHz - 1000 MHz

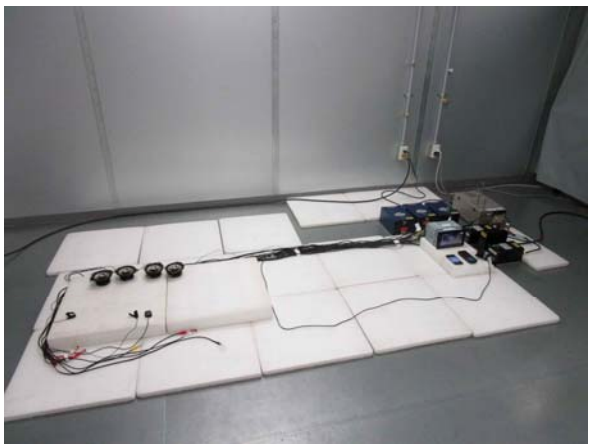


1.0 GHz - 6.0 GHz

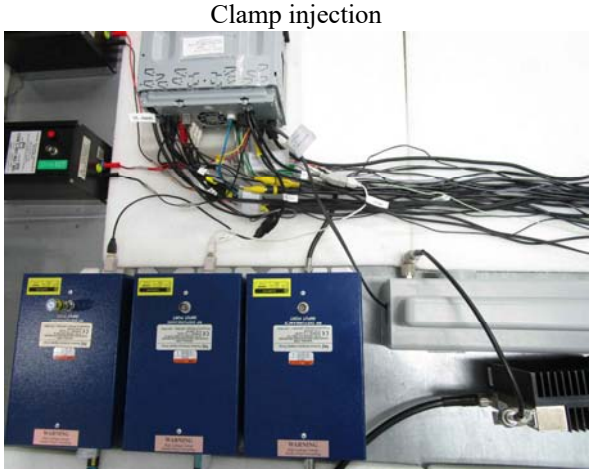


Radio frequency, common mode

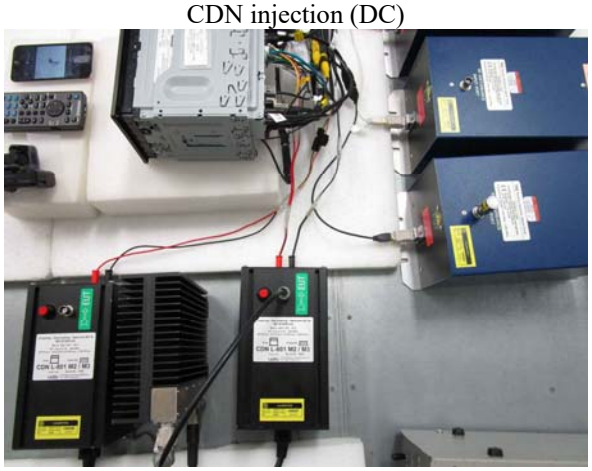
Front



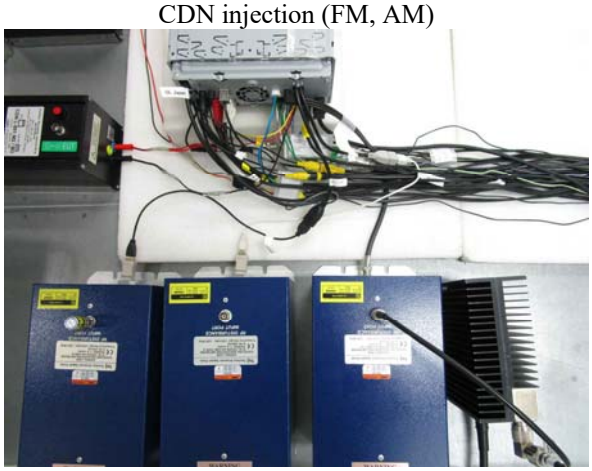
Clamp injection



CDN injection (DC)



CDN injection (FM, AM)



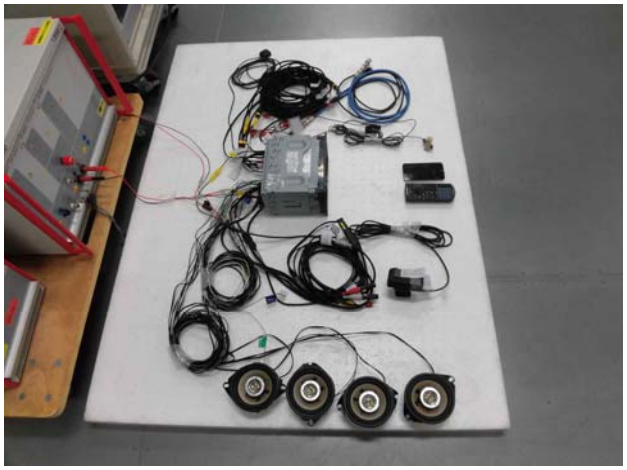
CDN (USB1)

CDN (USB2)

Transients and surges (ISO7637-2)

BT Communication + GPS Standby

GPS Receiving + BT Standby



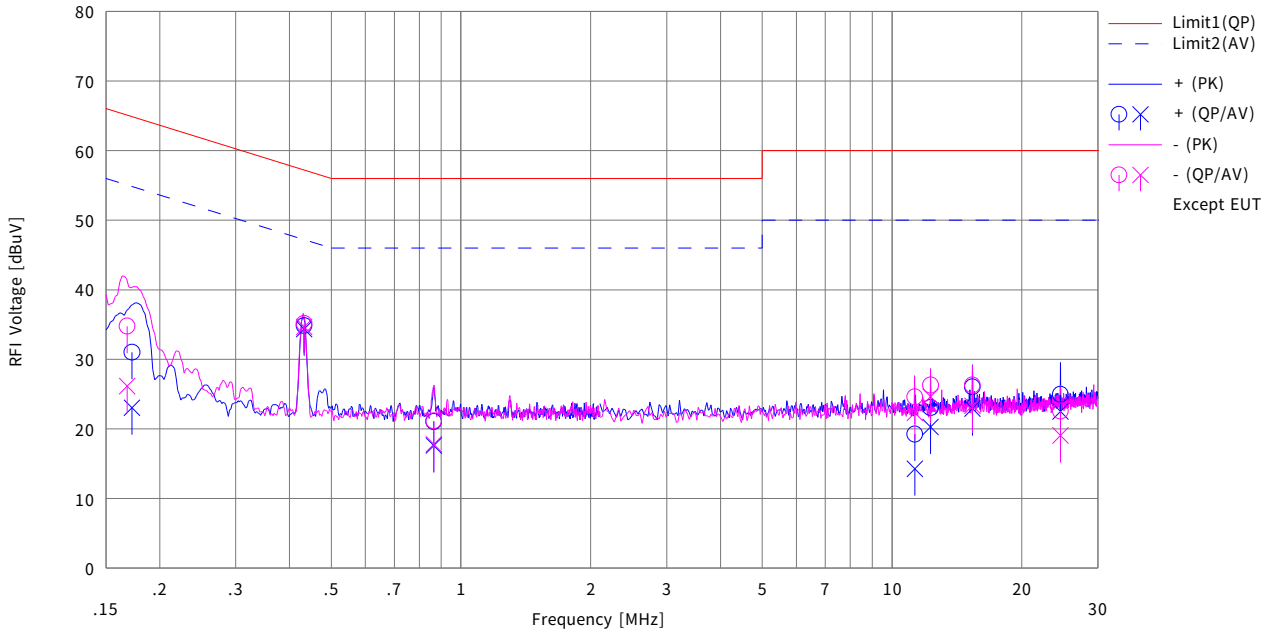
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2019/01/28

Company	: JVC KENWOOD Corporation	Mode	: BT Communication + GPS Receiving
Kind of EUT	: GPS NAVIGATION SYSTEM	Order No.	: 12685233S
Model No.	: DNX5190DABS	Power	: **DC 12 V**
Serial No.	: PE-X0002	Temp./Humi.	: 25 deg.C / 34 %RH
Remarks	: -		

Limit : EN 301489_DC mains

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.17252	17.71	9.71	13.32	31.03	23.03	64.80	54.80	33.7	31.7	+	
2	0.43250	21.65	21.17	13.18	34.83	34.35	57.20	47.20	22.3	12.8	+	
3	0.86432	7.84	4.42	13.20	21.04	17.62	56.00	46.00	34.9	28.3	+	
4	11.29114	5.69	0.71	13.56	19.25	14.27	60.00	50.00	40.7	35.7	+	
5	12.28809	9.49	6.68	13.59	23.08	20.27	60.00	50.00	36.9	29.7	+	
6	15.35945	12.37	9.25	13.67	26.04	22.92	60.00	50.00	33.9	27.0	+	
7	24.57568	11.06	8.62	13.89	24.95	22.51	60.00	50.00	35.0	27.4	+	
8	0.16807	21.41	12.80	13.35	34.76	26.15	65.10	55.10	30.3	28.9	-	
9	0.43244	21.92	21.46	13.20	35.12	34.66	57.20	47.20	22.0	12.5	-	
10	0.86423	7.95	4.58	13.20	21.15	17.78	56.00	46.00	34.8	28.2	-	
11	11.28935	11.02	8.74	13.56	24.58	22.30	60.00	50.00	35.4	27.7	-	
12	12.28774	12.70	11.06	13.58	26.28	24.64	60.00	50.00	33.7	25.3	-	
13	15.35977	12.64	9.65	13.66	26.30	23.31	60.00	50.00	33.7	26.6	-	
14	24.57511	8.69	5.18	13.87	22.56	19.05	60.00	50.00	37.4	30.9	-	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN) SLS-11(+) , SLS-12(-)

Radio frequency electromagnetic field

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.4 Semi-anechoic chamber
Order No. : 12685233S

Company : JVC KENWOOD Corporation
Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX5190DABS
Serial No. : PE-X0002
Test Mode : BT Communication + GPS Standby, BT Standby + GPS Receiving
Power : DC 12 V
Standard : EN 301489
: EN 61000-4-3
Criterion : CT&CR, A

Date of test. : January 11, 2019
Temp. / Humid. : 22 deg.C / 31 %RH
Atmosphere : 1013 hPa
Engineer : Yohsuke Matsuzawa
: Yusuke Ohnuma

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8 m)
☐ Floor Standing (Non-metallic pallet height of 0.1 m)
Freqency step size : 1 %
Dwell time : 2 sec

Freq. Range		80 - 1000 & Spot Frequency* MHz	920 MHz ± 1 MHz	1000 - 6000 MHz	Remarks
Test level		3 V/m	3 V/m	3 V/m	
Modulation		☑ AM 80 % 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☑ Pulse 200 Hz 50 % ☐ Unmodulated	☑ AM 80 % 1 kHz ☐ Pulse Hz % ☐ Unmodulated	
Antenna	Height	1.55 m	1.55 m	1.55 m	
	Distance	2.5 m	2.5 m	2.0 m	
Note					
☑ Front	Hor.	Pass	Pass	Pass	
	Ver.	Pass	Pass	Pass	
☑ Rear	Hor.	Pass	Pass	Pass	
	Ver.	Pass	Pass	Pass	
☑ Right	Hor.	Pass	Pass	Pass	
	Ver.	Pass	Pass	Pass	
☑ Left	Hor.	Pass	Pass	Pass	
	Ver.	Pass	Pass	Pass	
☐ Top	Hor.				
	Ver.				
☐ Bottom	Hor.				
	Ver.				

*GP Receiving: Spot Frequency test : 80, 104, 136, 165, 200, 260, 330, 430, 560, 714, 715, 716 MHz(clause 7.2.2 of EN 301 489-19)
*GPS Receiving: 1496.649 MHz to 1654.191 MHz: The exclusion band for receiver (clause 4.3.1 of EN 301 489-19)
*BT Communication: 2280 MHz to 2603.5 MHz: The exclusion band for equipment operating in the 2.4 GHz band (clause 4.3 of EN 301 489-17)

Test Result: ☑ **Pass** ☐ **Fail**

Conducted disturbances, induced by radio frequency fields

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.2 and No.5 Shielded room
Order No. : 12685233S

Company : JVC KENWOOD Corporation
Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX5190DABS
Serial No. : PE-X0002
Test Mode : BT Communication + GPS Standby, BT Standby + GPS Receiving
Power : DC 12 V
Standard : EN 301489
: EN 61000-4-6
Criterion : CT&CR, A

Date of test. : January 08, 09, 10, 16, 2019
Temp. / Humid. : 24, 25 deg.C / 31, 30 %RH
: 21, 21 deg.C / 30, 50 %RH
Atmosphere : 1017, 1022, 1019, 1005 hPa
Engineer : Yusuke Ohnuma
: Tsuyoki Yamagata
: Yohsuke Matsuzawa

EUT Setup : ☑ Floor Standing (Non-metallic pallet height of 0.1 m)
Elevated Ground Plane : ☑ Not used ☐ Used (*1 Refer to line name)
Frequency step size : 1 %
Dwell time : 2 sec

Freq. Range	0.15 - 80 MHz	- MHz	- MHz	Remarks
Test level	3 V	V	V	
Modulation	☑ AM 80 % 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	
Note				
AC Mains ☐ *1	Pass			☑ CDN M2 ☐ EM Clamp
FM/AM ANT ☐ *1	Pass			☑ CDN C1 ☐ EM Clamp
USB1 ☐ *1	Pass			☑ CDN S4 ☐ EM Clamp
USB2 ☐ *1	Pass			☑ CDN S4 ☐ EM Clamp
Spearker(Front-L) +/- ☐ *1	Pass			☐ CDN ☑ EM Clamp
Spearker(Front-R) +/- ☐ *1	Pass			☐ CDN ☑ EM Clamp
Spearker(Rear-L) +/- ☐ *1	Pass			☐ CDN ☑ EM Clamp
Spearker(Rear-R) +/- ☐ *1	Pass			☐ CDN ☑ EM Clamp
ANT. CONT ☐ *1	Pass			☐ CDN ☑ EM Clamp
P. CONT ☐ *1	Pass			☐ CDN ☑ EM Clamp
ILLUMI ☐ *1	Pass			☐ CDN ☑ EM Clamp
REMOTE CONT ☐ *1	Pass			☐ CDN ☑ EM Clamp
CAM + ☐ *1	Pass			☐ CDN ☑ EM Clamp
CAM - ☐ *1	Pass			☐ CDN ☑ EM Clamp

Test Result: ☑ **Pass** ☐ **Fail**

Conducted disturbances, induced by radio frequency fields

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.2 and No.5 Shielded room
Order No. : 12685233S

Company : JVC KENWOOD Corporation
Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX5190DABS
Serial No. : PE-X0002
Test Mode : BT Communication + GPS Standby, BT Standby + GPS Receiving
Power : DC 12 V
Standard : EN 301489
: EN 61000-4-6
Criterion : CT&CR, A

Date of test. : January 08, 09, 10, 16, 2019
Temp. / Humid. : 24, 25 deg.C / 31, 30 %RH
: 21, 21 deg.C / 30, 50 %RH
Atmosphere : 1017, 1022, 1019, 1005 hPa
Engineer : Yusuke Ohnuma
: Tsuyoki Yamagata
: Yohsuke Matsuzawa

EUT Setup : ☑ Floor Standing (Non-metallic pallet height of 0.1 m)
Elevated Ground Plane : ☑ Not used ☐ Used (*1 Refer to line name)
Frequency step size : 1 %
Dwell time : 2 sec

Freq. Range	0.15 - 80 MHz	- MHz	- MHz	Remarks
Test level	3 V	V	V	
Modulation	☑ AM 80 % 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	
Note				
REVERSE ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
PRK SW ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
MUTE ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
DASH CAM ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
REAR VIEW CAMERA ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
VIDEO OUT ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
AUDIO (FRONT) ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
AUDIO (REAR) ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
AUDIO (SW) ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
AV-OUT AUDIO ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
AV-IN ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
REMO IN ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
REMO OUT ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
EXT-I/F ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp

Test Result: ☑ **Pass** ☐ **Fail**

Conducted disturbances, induced by radio frequency fields

UL Japan, Inc.		Shonan EMC Lab.
Test Room	:	No.2 and No.5 Shielded room
Order No.	:	12685233S

Company	:	JVC KENWOOD Corporation
Equipment	:	GPS NAVIGATION SYSTEM
Model No.	:	DNX5190DABS
Serial No.	:	PE-X0002
Test Mode	:	BT Communication + GPS Standby, BT Standby + GPS Receiving
Power	:	DC 12 V
Standard	:	EN 301489
	:	EN 61000-4-6
Criterion	:	CT&CR, A

Date of test.	:	January 08, 09, 10, 16, 2019
Temp. / Humid.	:	24, 25 deg.C / 31, 30 %RH
	:	21, 21 deg.C / 30, 50 %RH
Atmosphere	:	1017, 1022, 1019, 1005 hPa
Engineer	:	Yusuke Ohnuma
	:	Tsuyoki Yamagata
	:	Yohsuke Matsuzawa

EUT Setup : ☑ Floor Standing (Non-metallic pallet height of 0.1 m)
Elevated Ground Plane : ☑ Not used ☐ Used (*1 Refer to line name)
Frequency step size : 1 %
Dwell time : 2 sec

Freq. Range	0.15 - 80 MHz	- MHz	- MHz	Remarks
Test level	3 V	V	V	
Modulation	☑ AM 80 % 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80 % kHz ☐ Pulse Hz % ☐ Unmodulated	
Note				
Microphone ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
HDMI ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
GPS ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
DAB ☐ *1	Pass			☐ CDN ____ ☑ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp
☐ *1				☐ CDN ____ ☐ EM Clamp

Test Result: ☑ **Pass** ☐ **Fail**

APPENDIX 3

Test Instruments

EMI test equipment

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
COTS-SEMI-5	CE	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE,ME,PE)	-	-	-	-
KJM-02	CE	146432	Measure	TAJIMA	GL19-55	-	-	-	-
SAT13-01	CE	145140	Attenuator	JFW	50FP-013-H2 N	-	2018/2/16	2019/2/28	12
SCC-C9/C10/SRSE-03	CE	145036	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	2018/4/9	2019/4/30	12
SLS-11	CE	145548	LISN	FCC	FCC-LISN	8139	2018/3/28	2019/3/31	12
SLS-12	CE	145549	LISN	FCC	FCC-LISN-5-50-1-01-CISPR25	9598	2018/9/14	2019/9/30	12
SOS-06	CE	146294	Humidity Indicator	A&D	AD-5681	4062118	2018/12/5	2019/12/31	12
STM-08	CE	146190	Terminator	TME	CT-01 BP	-	2018/12/25	2019/12/31	12
STR-08	CE	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2018/11/28	2019/11/30	12
STS-03	CE	146210	Digital Hitester	HIOKI	3805-50	80997823	2018/10/16	2019/10/31	12

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:
CE: Conducted emission

EMS test equipment

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
COTS-SCS	CS	144911	Radio-frequency conducted disturbances soft	TSJ	TEPT-CS2	-	-	-	-
SAT6-CS01	CS	145048	Attenuator	Bird Electronic	100-SA-FFN-06	1002481	2018/4/2	2019/4/30	12
SAT6-CS02	CS	145159	Attenuator	Bird Electronic	100-SA-FFN-06	1002479	2018/4/2	2019/4/30	12
SBM-04	CS	145052	Barometer	Sunoh	SBR121	1072	2017/10/27	2020/10/31	36
SCEMS-J07	CS	144981	Coaxial Cable	Huber+Suhner	RG 223/U 50ohm 530442WP	-	2018/4/3	2019/4/30	12
SCN-02	CS	145205	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2500	2018/11/12	2019/11/30	12
SCN-03	CS	145206	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2501	2018/11/12	2019/11/30	12
SCN-04	CS	145207	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2502	2018/11/12	2019/11/30	12
SCN-05	CS	145208	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2503	2018/11/12	2019/11/30	12
SCN-29	CS	145445	Coupling Decoupling Network	FCC	TSCDN-C1-BNC75	9218	2018/11/12	2019/11/30	12
SCN-30	CS	145446	Coupling Decoupling Network	FCC	TSCDN-S4-USB-A	8036	2018/11/12	2019/11/30	12
SCN-31	CS	145447	Coupling Decoupling Network	FCC	TSCDN-S4-USB-A	9216	2018/11/12	2019/11/30	12
SCP-CS01	CS	145434	Current Probe	FCC	TSMC-33-1	9312	2018/4/3	2019/4/30	12
SDCPL-06	CS	145437	Directional Coupler	WERLATONE	C5086-10	81073	2018/4/2	2019/4/30	12
SDCPL-07	CS	145466	Directional Coupler	WERLATONE	C5086-10	81074	2018/4/2	2019/4/30	12
SECLM-01	CS	145570	EM Injection Clamp	FCC	TSIC-32	9327	2019/1/7	2020/1/31	12
SJM-09	CS	145336	Measure	PROMART	SEN1935	-	-	-	-
SOS-04	CS	146292	Humidity Indicator	A&D	AD-5681	4061512	2018/12/5	2019/12/31	12
SPA-06	CS	145578	RF Power Amplifier	AMPLIFIER RESEARCH	75A250	330792	2018/4/23	2019/4/30	12
SPA-07	CS	145609	RF Power Amplifier	AMPLIFIER RESEARCH	75A250	330791	2018/4/23	2019/4/30	12
SPM-03	CS	146246	Power Meter	AGILENT	E4418B	MY45109208	2018/11/1	2019/11/30	12
SPM-04	CS	146265	Power Meter	AGILENT	E4418B	MY45109229	2018/12/13	2019/12/31	12
SPSO-05	CS	146307	Power Sensor	AGILENT	E9304A	MY41498830	2018/11/1	2019/11/30	12
SPSO-06	CS	146278	Power Sensor	AGILENT	E9304A	MY41498833	2018/12/13	2019/12/31	12
SSA-CS01	CS	145802	Spectrum Analyzer	AGILENT	N9320B	CN03224782	2018/3/13	2019/3/31	12
SSG-05	CS	146229	Signal Generator	AGILENT	N5181A	MY48181132	2018/3/12	2019/3/31	12
SSG-06	CS	145805	Signal Generator	AGILENT	N5181A	MY48181112	2018/11/28	2019/11/30	12
STM-02	CS	145746	Terminator	TME	CT-01 BP	-	2018/12/25	2019/12/31	12
STM-03	CS	146188	Terminator	TME	CT-01 BP	-	2018/12/25	2019/12/31	12
STM-23	CS	146200	Terminator	TME	CT-01 BP	-	2018/1/10	2019/1/31	12
STS-02	CS	145793	Digital Hitester	HIOKI	3805-50	80997819	2018/3/8	2019/3/31	12
SBM-09	CS,TI	144962	Barometer	Sunoh	SBR121	1074	2017/12/13	2020/12/31	36
SJM-17	CS,TI	145339	Measure	ASKUL	-	-	-	-	-

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
SOS-09	CS,TI	146318	Humidity Indicator	A&D	AD-5681	4061484	2018/12/5	2019/12/31	12
STS-05	CS,TI	146212	Digital Hitester	HIOKI	3805-50	80997828	2018/10/16	2019/10/31	12
COTS-SRS	RS	159176	Radiated RF electromagnetic field soft	TSJ	TEPTO-DV(RS)	-	-	-	-
SAEC-04(UFA)	RS	145567	Semi-Anechoic Chamber	TDK	SAEC-04(UFA)	4	2018/5/1	2019/5/31	12
SBM-07	RS	145027	Barometer	Sunoh	SBR121	1075	2017/12/13	2020/12/31	36
SDCPL-02	RS	145281	Directional Coupler	RLC	CHP-1040-D-50-50-MF	909001	-	-	-
SDCPL-04	RS	145390	Directional Coupler	WERLATONE	C3908-10	80906	-	-	-
SDCPL-10	RS	145283	Directional Coupler	RLC	CHP-2080-D-50-50-MF	1424	-	-	-
SFS-04	RS	146657	Isotropic field Probe	ETS LINDGREN	HI-6005/HI-4413P	33981	2018/7/10	2019/7/31	12
SHA-RS03	RS	145824	Horn Antenna	ETS LINDGREN	3115	167179	-	-	-
SJM-15	RS	145338	Measure	ASKUL	-	-	-	-	-
SLA-RS02	RS	145829	Logperiodic Antenna	Schwarzbeck	VULP9118E	VULP9118 E-846	-	-	-
SOS-07	RS	146295	Humidity Indicator	A&D	AD-5681	4063359	2018/10/25	2019/10/31	12
SPA-04	RS	145607	RF Power Amplifier	PRANA	AP32MT235	0302-929	2018/2/27	2019/2/28	12
SPA-12	RS	145579	RF Power Amplifier	R & K	GA102M252-5454R	B40630	2018/9/12	2019/9/30	12
SPA-13	RS	145629	RF Power Amplifier	R & K	GA252M602-5050R	B40630	2018/9/12	2019/9/30	12
SPM-01	RS	146244	Power Meter	AGILENT	E4419B	MY45104212	2019/1/9	2020/1/31	12
SPM-02	RS	146245	Power Meter	AGILENT	E4419B	MY45104213	2019/1/9	2020/1/31	12
SPSO-01	RS	146303	Power Sensor	AGILENT	E9304A	MY41498787	2019/1/9	2020/1/31	12
SPSO-02	RS	146304	Power Sensor	AGILENT	E9304A	MY41498786	2019/1/9	2020/1/31	12
SPSO-03	RS	146305	Power Sensor	AGILENT	E9304A	MY41498835	2019/1/9	2020/1/31	12
SPSO-04	RS	146306	Power Sensor	AGILENT	E9304A	MY41498831	2019/1/9	2020/1/31	12
SSG-04	RS	146228	Signal Generator	AGILENT	N5181A	MY48181114	2018/6/5	2019/6/30	12
SSW-02	RS	145736	RF Switch	TSJ	RFM-3SA3CIL	4333	-	-	-
SSW-05	RS	145739	RF Switch	Micro Wave Factory	MPM-5DT	140518	-	-	-
STS-04	RS	146211	Digital Hitester	HIOKI	3805-50	80997827	2018/3/8	2019/3/31	12
COTS-STI-01	TI	144922	AUTOSTAR Software	Teseq	-	-	-	-	-
STI-01	TI	146186	Transient Generator	Teseq	NSG 5500	090430-01	2018/9/27	2019/9/30	12
STI-02	TI	145743	Power Amplifier 60V-10A	TESEQ GmbH	PA5740	571-0038	2018/9/27	2019/9/30	12
STI-03	TI	146187	Function Generator	Teseq	FG 5620	1271	2018/9/27	2019/9/30	12
STI-04	TI	145744	Resistance Module	Teseq	INA 5025	115	2018/9/27	2019/9/30	12

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:
RS: Radiated RF electromagnetic field,
CS: Radio-frequency conducted disturbances,
TI: Transients and surges immunity (ISO7637-2)

End of Report