JQA File No. : 400-210089-12
Issue Date : November 25, 2021

TEST REPORT

Applicant	:	JVCKENWOOD Corporation
Address	:	2967-3 Ishikawa-machi, Hachioji-shi, Tokyo 192-8525 Japan
Products	:	DIGITAL MEDIA RECEIVER
Model No.	:	KD-X472DBT
Serial No.	:	134X0052 134X0018
Test Standard	:	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09)
Test Results	:	**Passed**
Date of Receipt	:	September 26, 2019, September 30, 2021
Date of Test	:	September 28, 2019 ~ October 8, 2019, October 7, 2021

Makimoto Kazuyuki
Manager
Japan Quality Assurance Organization
SAFETY & EMC CENTER
Testing Dept.
EMC Testing Div.
4-4-4, Minamiosawa, Hachioji-shi, Tokyo 192-0364, Japan

VLAC Lab Accreditation
VLAC-001-5

- The test results in this test report was made by using the measuring instruments which are traceable to national standards of measurement in accordance with ISO/IEC 17025.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents for the equipment under test (EUT) such as identification information in clause 2 and 6 of this report were provided by the applicant. JQA is not responsible for the test results affected by the incorrect information.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

Table of Contents

Page

1 Summary of Test Results 3

2 Description of the Equipment Under Test (EUT) 4

3 Test Location 5

4 Accreditation of Test Laboratory 5

5 Measurement Uncertainty 5

6 Setup of EUT 6

6.1 Test Configuration 6
6.2 Test Arrangement (Drawings) 7
6.3 Operating Condition 8
6.4 Immunity Performance Criteria and Phenomena 8
6.4.1 Performance Criteria and Phenomena 8
6.4.2 Performance Phenomena 9

7 Test Item 10

7.1 DC Conducted emission 10
7.2 Electrostatic Discharge 13
7.3 Radio frequency electromagnetic field 17
7.4 Conducted disturbances induced by RF fields 23
7.5 Transients and Surges 25

REVISION HISTORY

File No.	Contents	Issue Date
400-210089-12	Initial Issue	November 25, 2021

1 Summary of Test Results

Applied Standard : ETSI EN 301 489-1 V2.2.3 (2019-11)
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 (2020-09)
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 17: Specific conditions for Broadband Data Transmission Systems;
Harmonised Standard for ElectroMagnetic Compatibility

Item	Standard (Procedure)	Result	Note
Conducted emission	EN 55032:2015	PASS	-
Radiated emission	EN 55032:2015	Not Applicable	1
Harmonic current emissions	EN61000-3-2:2014	Not Applicable	2
Voltage fluctuations and flicker	EN61000-3-3:2013	Not Applicable	2
Electrostatic discharge	EN61000-4-2:2009	PASS	-
Radio-frequency Electromagnetic Field	EN61000-4-3:2006 +A1:2008+A2:2010	PASS	-
Fast Transients common mode	EN61000-4-4:2012	Not Applicable	2
Surges, line to line and line to ground	EN61000-4-5:2014+A1:2017	Not Applicable	2
Radio-frequency common mode	EN61000-4-6:2014	PASS	-
Voltage dips and interruptions	EN61000-4-11:2004	Not Applicable	2
Vehicular transients and surges	ISO7637-2:2004	PASS	-
1) EUT don't have ancillary equipment. 2) EUT for vehicular use.			

In the approval of test results,

- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty (MIU).
- The expanded MIUs for the CISPR measurement methods determined by JQA are less than U_{cispr} according to CISPR 16-4-2.
- No deviations were employed from the applied standard.
- No measures were taken to reduce the influence of the surroundings.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by
Makimoto Kazuyuki / Manager
SAFETY & EMC CENTER
Testing Dept. EMC Testing Div.

K. Makimoto

Tested by
Naohiko Ueno / Assistant Manager
SAFETY & EMC CENTER
Testing Dept. EMC Testing Div.

N. Ueno

2 Description of the Equipment Under Test (EUT)

2.1 General Information

Manufacturer	JVCKENWOOD Corporation 2967-3 Ishikawa-machi, Hachioji-shi, Tokyo 192-8525 Japan	
Products	DIGITAL MEDIA RECEIVER	
Model No.	KD-X472DBT	
Serial No.	134X0052 134X0018	
Product Type	Pre-Production	
Date of Manufacture	-	
Power Rating	12.0 VDC (Nominal) 10.5-16.0 VDC (Operating voltage range)	
EUT Grounding	None	
Modulation Type	FHSS Bluetooth 4.2 GFSK, π/4DQPSK and 8DPSK	
Type of Equipment	The host equipment (DIGITAL MEDIA RECEIVER) is combined With Bluetooth Vehicular Use Equipment	
Classification / Category	Emissions	Class B Equipment
EUT Highest Frequency Used / Generated	2483.5 MHz (for Transceiver) 8.2 GHz (for Tuner IC)	

3 Test Location

Japan Quality Assurance Organization
SAFETY & EMC CENTER
Testing Dept.
EMC Testing Div.
4-4-4, Minamiosawa, Hachioji-shi, Tokyo 192-0364, Japan

4 Accreditation of Test Laboratory

JQA is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies .

Test Facility	Accreditation or Registration		Expiry Date
	Body	Code/Number	
(1) Safety & EMC Center (2) SAITO (3) SHIKATSU (4) TSURU	VLAC	(1) VLAC-001-5 (2) VLAC-001-2 (3) VLAC-001-3 (4) VLAC-001-4	March 30, 2022
	VCCI	(1) A-0001 (2) A-0002 (3) A-0003 (4) A-0004	September 30, 2022
	BSMI	(2) SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006 (4) SL2-IS-E-6004, SL2-IN-E-6004, SL2-R1/R2-E-6004, SL2-A1-E-6004	August 9, 2023
	FCC	(1) JP5192 (2) JP5008 (3) JP0004 (4) JP0005	March 30, 2022
	IC	(3) JP0014	November 30, 2021
	CNAS	(2) (4) L8352	October 8, 2025
	Conformity assessment body for Japan electrical appliances and material by METI		February 22, 2022

5 Measurement Uncertainty

Measurement Item	Frequency	Uncertainty (*U*)
Conducted emission	150 kHz – 30 MHz	± 2.9 dB
Radiated emission	30 MHz – 200 MHz	± 4.6 dB
	200 MHz – 1000 MHz	± 4.5 dB
	1 GHz – 6 GHz	± 4.2 dB
Harmonic current emissions	-	± 6.7 %
Voltage fluctuations and flicker	-	± 3.0 %
Electrostatic discharge	-	± 3.2 %
Radio-frequency Electromagnetic Field	100 kHz – 1 GHz	±1.5 dB
	1 GHz – 6 GHz	± 2.3 dB
Fast Transients common mode	-	± 6.3 %
Surges, line to line and line to ground	-	± 8.5 %
Radio-frequency common mode	150 kHz – 230 MHz	CDN, ± 1.5 dB EM Clamp ± 3.3 dB
Voltage dips and interruptions	-	± 6.1 %
Vehicular transients and surges	-	± 8.5 %

The reported expanded uncertainty of measurement, *U* is described with using the coverage factor k = 2, to give a level of confidence of approximately 95 %.

6 Setup of EUT

6.1 Test Configuration

Sign	Item	Manufacturer	Model No.	Serial No.
A	DIGITAL MEDIA RECEIVER	JVCKENWOOD Corporation	KD-X472DBT	134X0052 *1 134X0018 *2

*1) for other than electrostatic discharge test.
*2) for electrostatic discharge test.

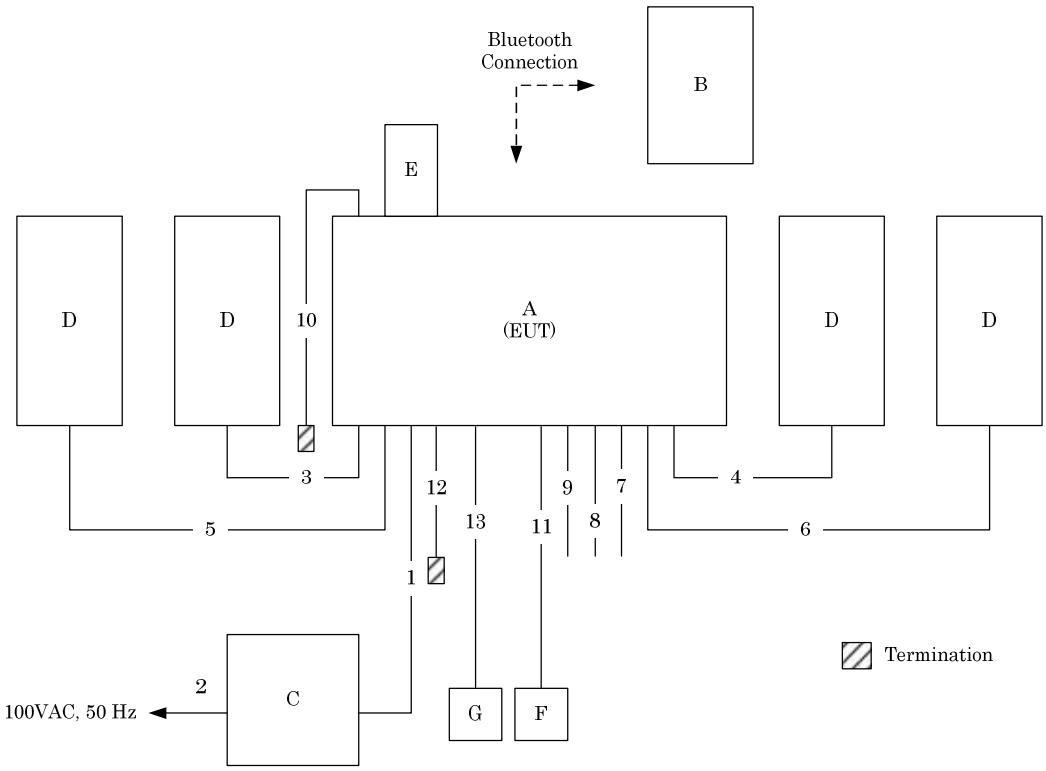
The AE used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.
B	iPhone	Apple Inc.	A1332	86044FU6A4S
C	DC Power Supply	Kikusui Electronics Co., Ltd.	PAN35-20A	GJ000984
D	Dummy Load	-	-	-
E	USB Memory	-	-	-
F	BT Microphone	-	-	-
G	DAB Antenna	-	-	-

Type of Cable used for testing :

No.	Description	Identification (Manu. Etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	DC Power Cable	-	No	No	No	1.0
2	AC Power Cable	-	No	No	No	2.0
3	Front Speaker(Lch) Cable	-	No	No	No	1.2
4	Front Speaker(Rch) Cable	-	No	No	No	1.2
5	Rear Speaker(Lch) Cable	-	No	No	No	1.2
6	Rear Speaker(Rch) Cable	-	No	No	No	1.2
7	Preout Front(L/R) Cable	-	Yes	Yes	No	2.0
8	Preout Rear(L/R) Cable	-	Yes	Yes	No	2.0
9	Preout SW(L/R) Cable	-	Yes	Yes	No	2.0
10	AUX Cable	-	No	No	No	1.0
11	Microphone Cable	-	No	No	No	5.0
12	AM/FM Antenna Cable	-	Yes	Yes	No	1.0
13	DAB Antenna Cable	-	Yes	Yes	No	5.0

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Power Supply Voltage : 12 VDC

Operating Mode

1. Bluetooth Communication (Playback 1kHz Tone Signal from iPhone)

Note : EUT does not have Bluetooth standby mode.

Monitoring

It was observed that the 1kHz tone or Bluetooth spectrum were in normal condition.
Operating display and data log were monitored.

6.4 Immunity Performance Criteria and Phenomena

For this EUT, the applicant or manufacturer have decided that the performance criteria should be applied as mentioned below.

6.4.1 Performance Criteria and Phenomena

Performance criteria A for immunity tests with phenomena of a continuous nature (CT/CR).
Performance criteria B for immunity tests with phenomena of a transient nature (TT/TR).
Performance criteria for immunity tests with power interruptions exceeding a certain time are specified in clause 7.11.4.

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

6.4.2 Performance Phenomena

CT/CR : Continuous phenomena applied to Transmitters and Receivers

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

TT/TR : Performance criteria for Transient phenomena applied to Transmitters and Receivers

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.

In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed.

No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

The performance specification shall be included in the product description and documentation.

The related specifications set out in clause 6.4.1 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses CT/CR and TT/TR.

Performance criteria for ancillary equipment tested on a stand-alone basis

If ancillary equipment is intended to be tested on a stand-alone basis, the performance criteria described in clauses CT/CR and TT/TR are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests.

The performance specification shall be included in the product description and documentation. The related specifications set out in clause 6.4.1 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses CT/CR and TT/TR

7 Test Item

7.1 DC Conducted emission

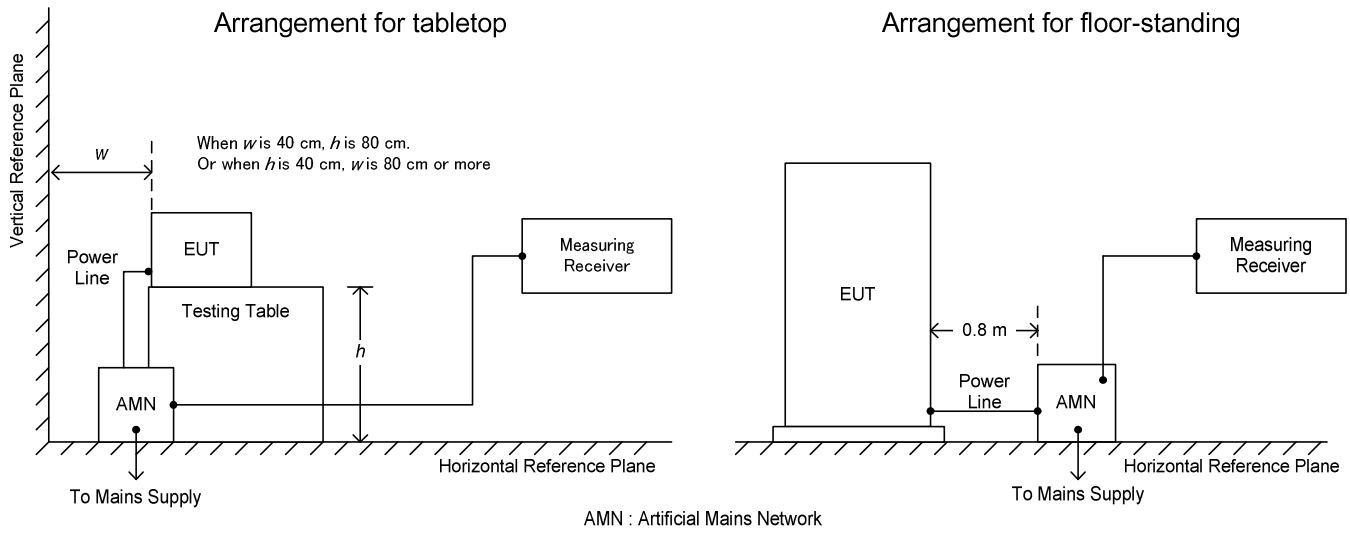
7.1.1 Test Site and Instruments

Test Date : October 6, 2019

ID No.	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
M-1	Shield Room	-	TDK	-	-	-
R04	Test Receiver	ESW44	Rohde & Schwarz	101602	2018/11	1 Year
CB02	RF Cable	RG223/U	HUBER+SUHNER	-	2019/04	1 Year
L09	Artificial Mains Network	NNBM8125	Schwarzbeck Mess-Elektronik	81251823	2018/11	1 Year
L10	Artificial Mains Network	NNBM8125	Schwarzbeck Mess-Elektronik	81251824	2018/11	1 Year
PL02	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	2019/04	1 Year
SW01	EMI Software	-	JQA	5.19.10	-	-

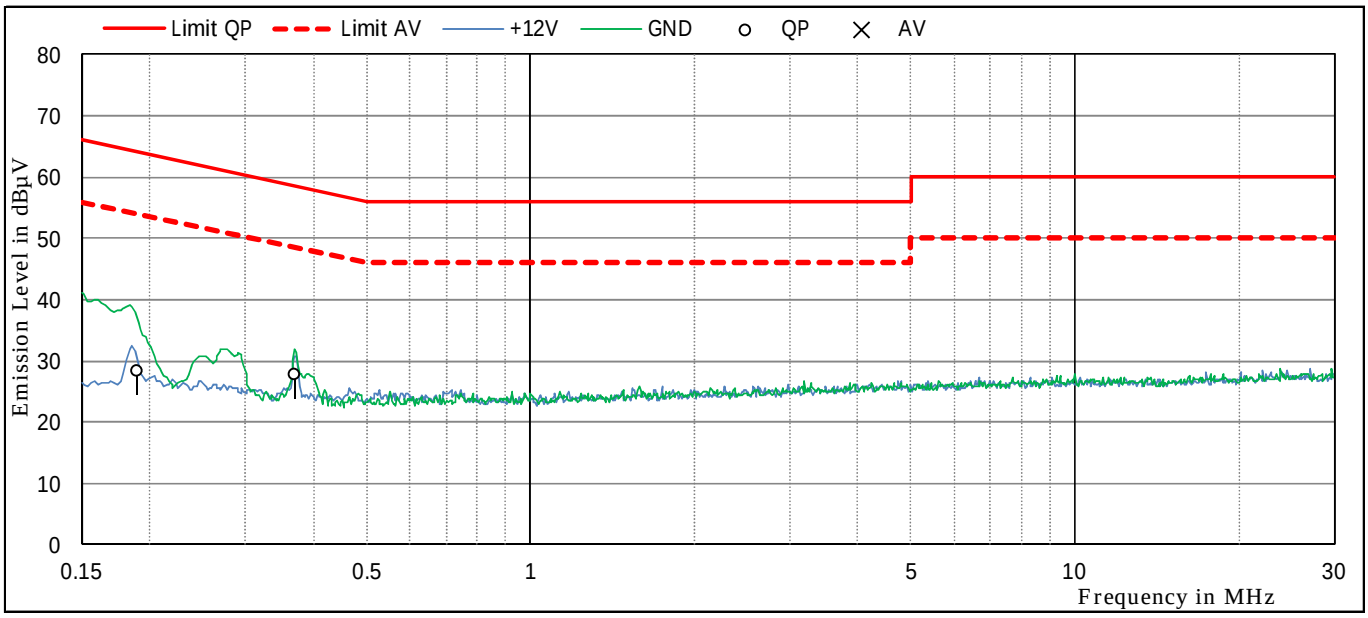
7.1.2 Test Method and Test Setup (Diagrammatic illustration)

The pre-scan measurements were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for formal measurements.
(Reference divisional instruction No. G343669)



7.1.3 Test Data

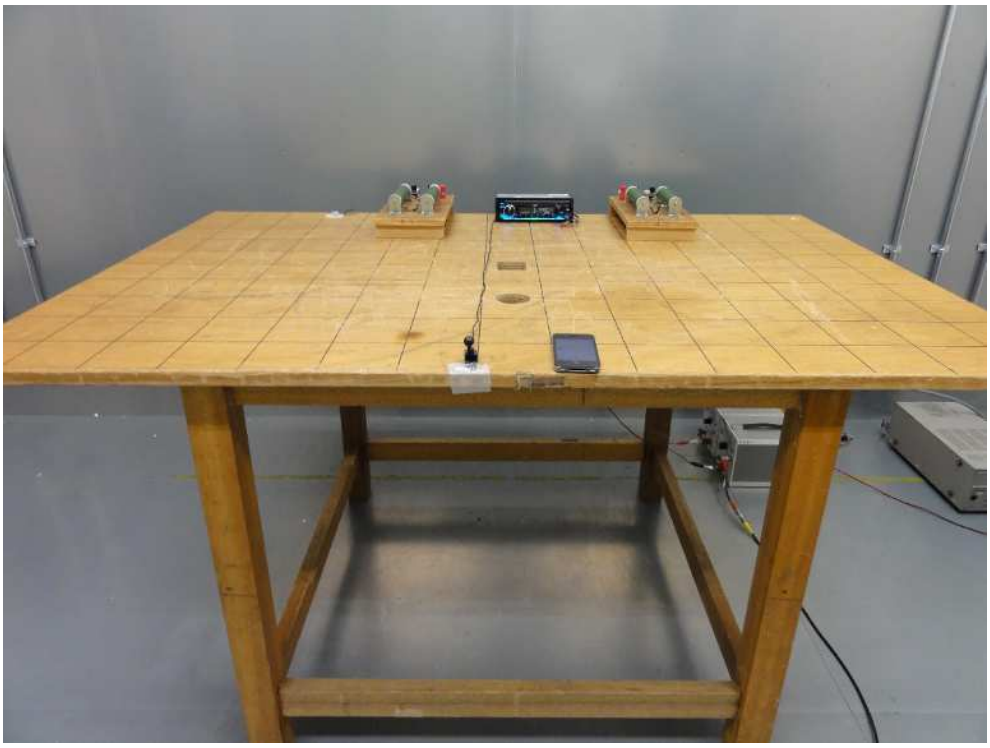
Measurement Date	Ambient Temperature	Relative Humidity	Atmospheric pressure
October 6, 2019	24 ℃	56 %	992 hPa



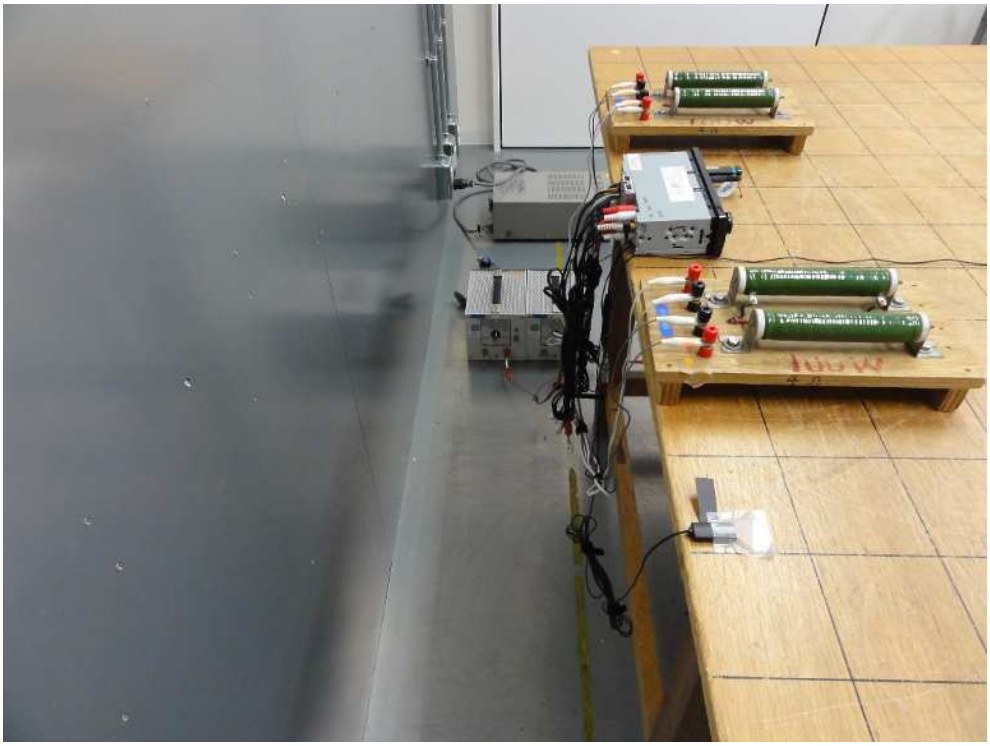
Frequency [MHz]	Terminal	Factor [dB]	Meter Reading [dBµV] QP	Meter Reading [dBµV] AV	Limit [dBµV] QP	Limit [dBµV] AV	Emission Level [dBµV] QP	Emission Level [dBµV] AV	Margin [dB] QP	Margin [dB] AV
0.15	+12V	20.4	< 0.0	-	66.0	56.0	< 20.4	-	> 45.6	-
0.15	GND	20.4	< 0.0	-	66.0	56.0	< 20.4	-	> 45.6	-
0.19	+12V	20.3	7.3	-	64.0	54.0	27.6	-	36.4	-
0.19	GND	20.3	8.1	-	64.0	54.0	28.4	-	35.6	-
0.27	+12V	20.2	< 0.0	-	61.1	51.1	< 20.2	-	> 40.9	-
0.27	GND	20.2	< 0.0	-	61.1	51.1	< 20.2	-	> 40.9	-
0.37	+12V	20.2	7.1	-	58.5	48.5	27.3	-	31.2	-
0.37	GND	20.2	7.7	-	58.5	48.5	27.9	-	30.6	-

Note
1) QP:Quasi-Peak, AV:Average
2) VA:One end & Ground, VB:Other end & Ground
3) The symbol of '<' means 'or less' .
4) The symbol of '>' means 'or greater' .
5) The symbol of '-' means 'Not applicable' .
6) Factor includes Artificial Mains Network factor,Pulse Limiter loss and a cable loss.
7) A sample calculation was made at 0.37MHz
Factor + Meter Reading = 20.2 + 7.7 = 27.9

7.1.4 Test Setup (Photographs)



- Front View -



- Rear View -

Photograph present configuration with maximum emission

7.2 Electrostatic Discharge

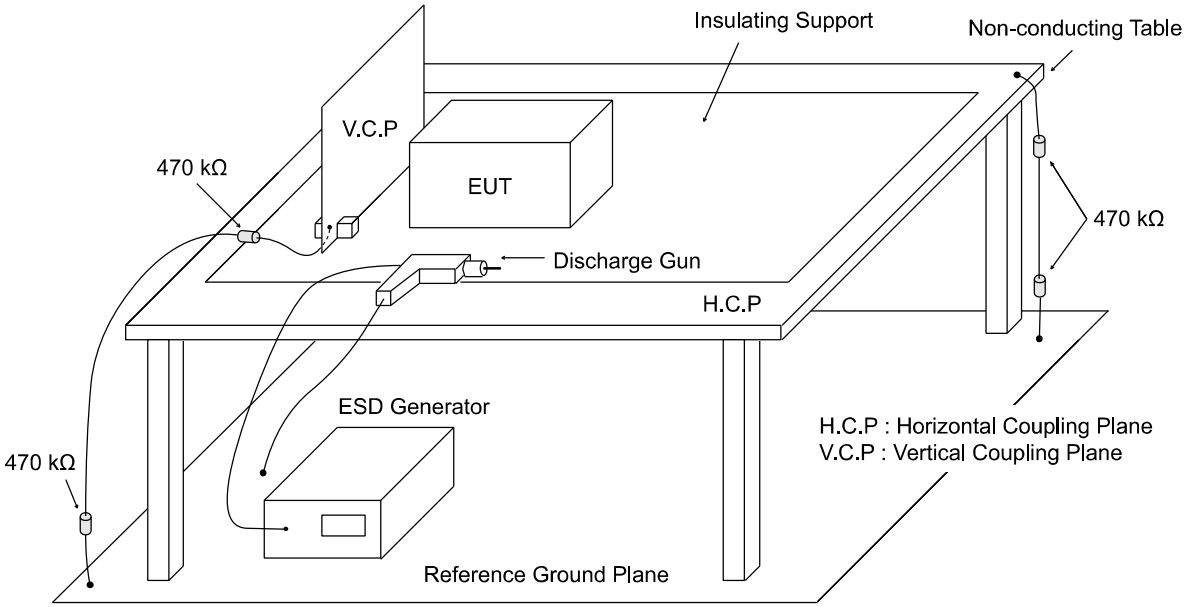
7.2.1 Test Site and Instruments

Test Date : October 7, 2021

ID No.	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
R1	Reverberation chamber	-	TDK	-	-	-
ESD01	ESD Generator	ESS-S3011A	NoiseKen	ESS2062425	2021/05	1 Year
-	Discharge Gun	GT-30RA	NoiseKen	ESS2052365	2021/05	1 Year

7.2.2 Test Method and Test Setup (Diagrammatic illustration)

Test setup is according to the requirements of standard.
Direct discharge and Indirect discharge are applied to the EUT.
Direct discharge (Contact discharge, Air discharge.
Indirect discharge (discharge to the Horizontal and Vertical Coupling plane.)
The operation of the EUT during the test is confirmed by operator, monitor camera or associated equipment.
(Reference divisional instruction No. G34366P)



Typical Arrangement

7.2.3 Test Data

Test Specification		
Number of discharges : 10 times (contact discharge), 10 times (air discharge)		
Port	Test level	Standard Criteria requirements
Enclosure	± 4 kV (contact discharge)	B, TT/TR
	± 8 kV (air discharge)	B. TT/TR

Test Date : October 7, 2021

Ambient Temperature : 25 °C
Relative Humidity : 60 %
Atmospheric Pressure : 1002 hPa

Discharge Method	Discharge Point	Test level (kV)	Results	Note
Contact (indirect)	Horizontal coupling plane	± 2.0	A / Passed	
		± 4.0	A / Passed	
	Vertical coupling plane	± 2.0	A / Passed	
		± 4.0	A / Passed	
Contact (direct)	All conductive point	± 2.0	A / Passed	
		± 4.0	A / Passed	
Air	All insulating surface	± 2.0	A / Passed	
		± 4.0	A / Passed	
		± 8.0	A / Passed	

Discharge Points (Photograph)

○ : Contact Discharge
□ : Air Discharge

7.2.4 Test Setup (Photographs)

7.3 Radio frequency electromagnetic field

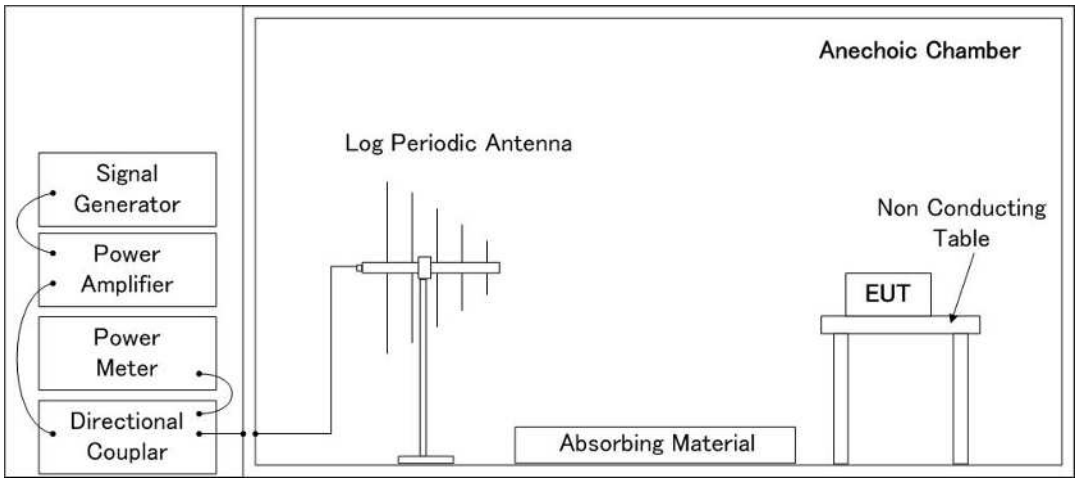
7.3.1 Test Site and Instruments

Test Date : October 4, 2019

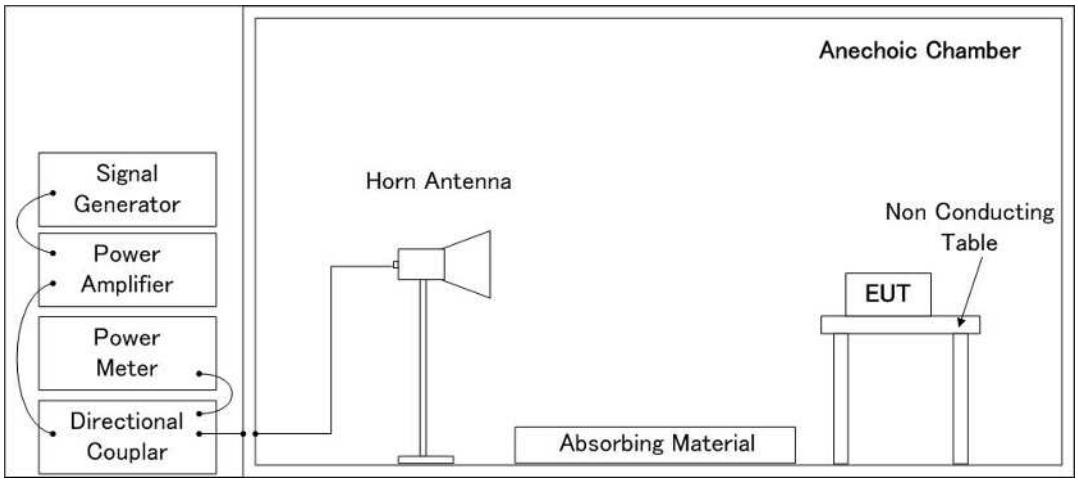
ID No.	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
A-1	Anechoic Chamber	-	TDK	-	2019/06	1 Year
SG08	Vector Signal Generator	SMBV100A	Rohde & Schwarz	263032	2018/11	1 Year
3-C	Log-periodic Antenna	VULP9118-E	Schwarzbeck	VULP9118-E-704	2019/06	1 Year
AH05	Horn Antenna	3115	EMC Test Systems	6442	2019/06	1 Year
3-E	RF Power Amplifier	R122C	RF POWER LABS	092695-2	2019/06	1 Year
3-F	RF Power Amplifier	2068-BBS2Q4AMP	RF Systems	1007 D/C 0633	2019/06	1 Year
3-N	RF Power Amplifier	BBA150-D110E100	Rohde & Schwarz	103162	2019/06	1 Year
3-H	Field Probe	HI-6105USB-20	Laser Data Interface	00071885	2018/10	1 Year
3-I	Power Meter	NRVD	Rohde & Schwarz	101020	2019/06	1 Year
3-J	Insertion Unit	URV5-Z4	Rohde & Schwarz	100193	2019/06	1 Year
3-K	Dual Directional Coupler	C5086-10	Werlatone Inc.	67819	2019/06	1 Year
3-L	Dual Directional Coupler	DC6180A	AR	0328620	2019/06	1 Year
3-M	Dual Directional Coupler	CCS30-B26	Pulsar Microwave	0740	2019/06	1 Year

7.3.2 Test Method and Test Setup (Diagrammatic illustration)

Test setup is according to the requirements of standard.
The Uniformed area (1.5m×1.5m) was calibrated according to the requirements of standard.
The operation of the EUT during the test is confirmed by operator, monitor camera or associated equipment.
(Reference divisional instruction No. G34366Q)



Test Frequency Range : 80 MHz to 1000 MHz



Test Frequency Range : 1.0 GHz to 6.0 GHz

Typical Arrangement

7.3.3 Test Data

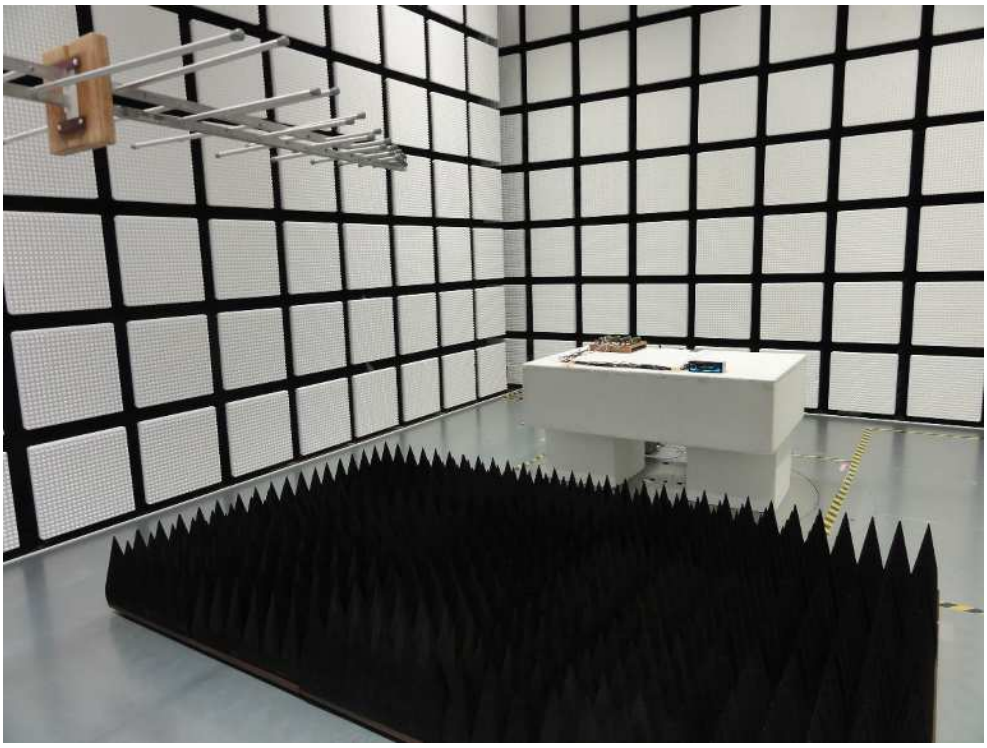
Test Specification		
Modulation : 80 % AM, 1 kHz sine wave		
Dwell time : 1 second		
Frequency step : 1 % of preceding frequency value		
Exclusion band : 2280 – 2607.675 MHz		
Port	Test level	Standard Criteria requirements
Enclosure	3 V/m (80 MHz to 6000 MHz)	A, CT/CR

Test Date : October 4, 2019

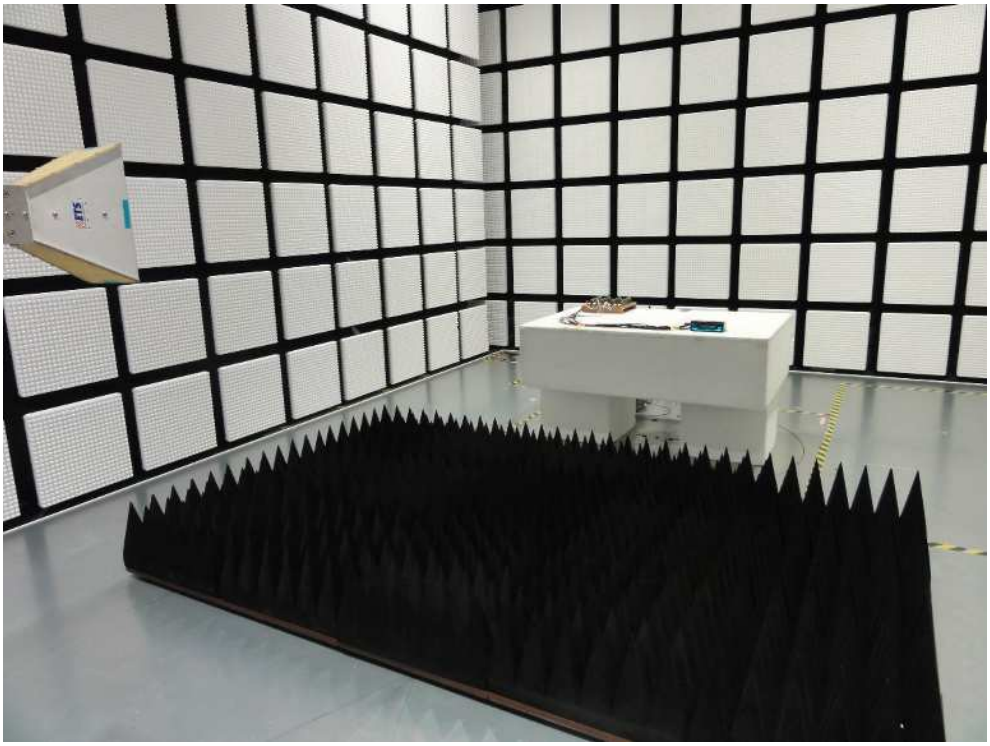
Ambient Temperature : 24 °C
Relative Humidity : 50 %
Atmospheric Pressure : 989 hPa

Test direction	Frequency(MHz)	Polarity	Test level (V/m)	Results	Note
Front	80-6000	Horizontal	3	A / Passed	
		Vertical	3	A / Passed	
Rear	80-6000	Horizontal	3	A / Passed	
		Vertical	3	A / Passed	
Left	80-6000	Horizontal	3	A / Passed	
		Vertical	3	A / Passed	
Right	80-6000	Horizontal	3	A / Passed	
		Vertical	3	A / Passed	

7.3.4 Test Setup (Photographs)



- 80 – 1000 MHz -

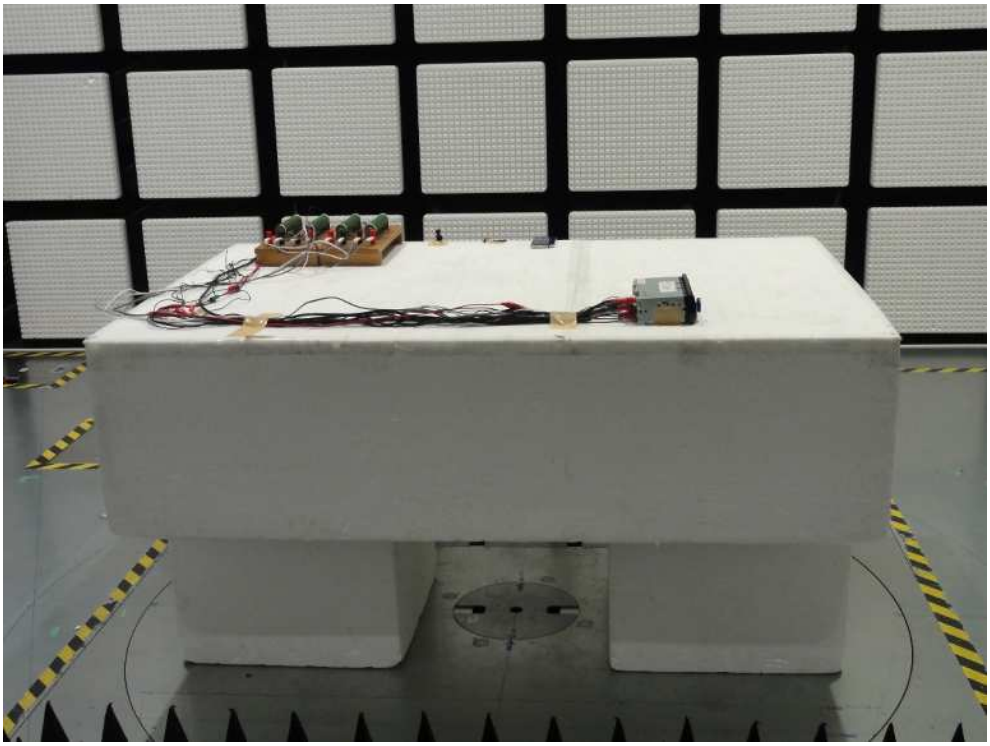


- 1000 – 6000 MHz -

– Front View –

– Rear View –

– Left View –



–Right View –

7.4 Conducted disturbances induced by RF fields

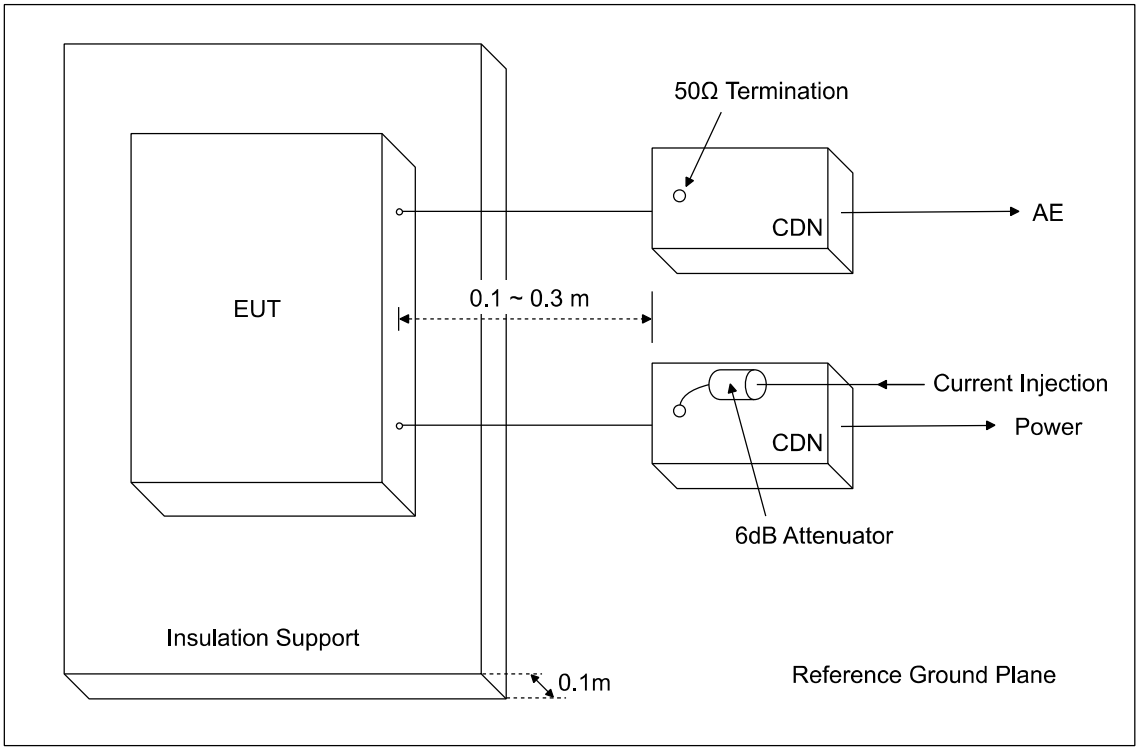
7.4.1 Test Site and Instruments

Test Date : September 28, 2019

ID No.	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
M-1	Shield Room	-	TDK	-	-	-
6-A	Signal Generator	SML01	Rohde & Schwarz	130500190	2019/07	1 Year
6-B	RF Amplifier	FLL-75	Frankonia	0040	2019/09	1 Year
6-C	Attenuator	8341-060	Bird Electronic	766	2019/09	1 Year
6-G	Coupling/Decoupling Network	TSCDN-M2-25A	TSJ(FCC)	06006	2019/07	1 Year
6-J	150-50 ohms Adaptor	FCC-150-50	FCC	380	2019/07	1 Year
6-L	EM Clamp	EM101	Luthi	35196	2019/09	1 Year
SW06	Software	IM5/CS	Toyo Corporation	8.02.220	-	-

7.4.2 Test Method and Test Setup (Diagrammatic illustration)

Test setup is according to the requirements of standard.
The coupling/decoupling network is applied to the Power Line.
The coupling/decoupling network, Direct copular, EM clamp or Current clamp are applied to I/O Line.
The operation of the EUT during the test was confirmed by operator, monitor camera or associated equipment.
(Reference divisional instruction No. G34366T)



Typical Arrangement

7.4.3 Test Data

Test Specification		
Modulation : 80 % AM, 1 kHz sine wave Dwell time : 1 second Frequency step : 1 % of preceding frequency value		
Port	Test level	Standard Criteria
AC power	3 Vrms (150 kHz to 80 MHz)	A, CT/CR
DC power (connected to a DC distribution network)	3 Vrms (150 kHz to 80 MHz)	A, CT/CR
I/O signal/control	3 Vrms (150 kHz to 80 MHz)	A, CT/CR
I/O signal/control connected directly to mains supply	3 Vrms (150 kHz to 80 MHz)	A, CT/CR

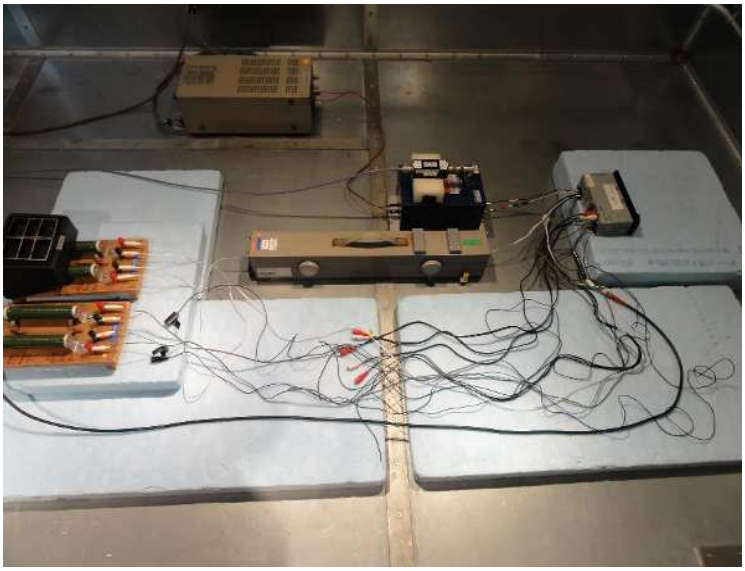
Test Date : September 28, 2019

Ambient Temperature : 22 °C
Relative Humidity : 54 %
Atmospheric Pressure : 990 hPa

Port	Test level (Vrms)	Injection Device	Termination Device	Results	Note
DC Power Cable	3	CDN	--	A/Passed	
Front Speaker (Lch) Cable	3	EM Clamp	CDN M2	A/Passed	
Front Speaker (Rch) Cable	3	EM Clamp	CDN M2	A/Passed	
Rear Speaker (Lch) Cable	3	EM Clamp	CDN M2	A/Passed	
Rear Speaker (Rch) Cable	3	EM Clamp	CDN M2	A/Passed	
Preout Front(L/R) Cable	3	EM Clamp	CDN M2	A/Passed	
Preout Rear(L/R) Cable	3	EM Clamp	CDN M2	A/Passed	
Preout SW(L/R) Cable	3	EM Clamp	CDN M2	A/Passed	
Microphone Cable	3	EM Clamp	CDN M2	A/Passed	
AM/FM Antenna Cable	3	EM Clamp	CDN M2	A/Passed	
DAB Antenna Cable	3	EM Clamp	CDN M2	A/Passed	

Note : The other ports have specifications of less than 3 m, so the test was excluded.

7.4.4 Test Setup (Photographs)



7.5 Transients and Surges

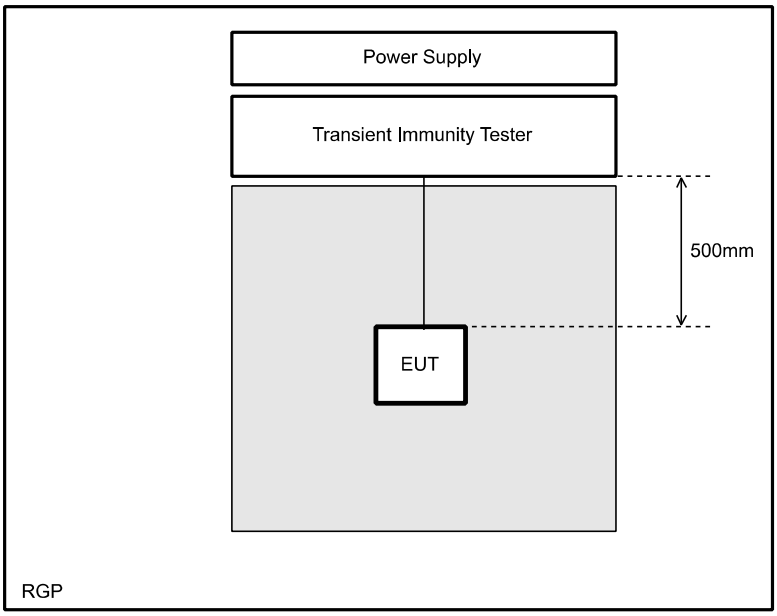
7.5.1 Test Site and Instruments

Test Date : October 8, 2019

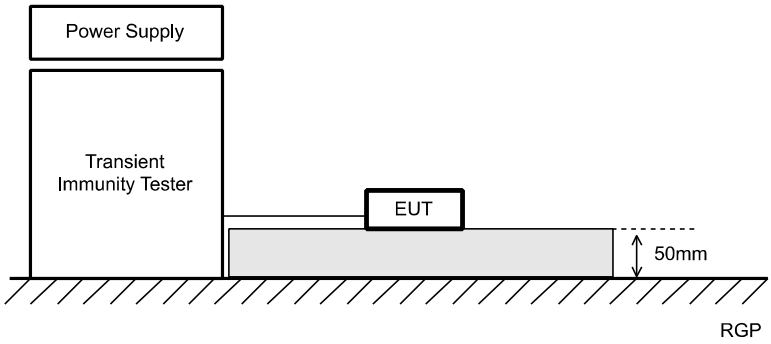
ID No.	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
S-2	Shield Room	-	TDK	-	-	-
E-115	Transient immunity system main frame	KES7702	KIKUSUI	QF001066	2019/07	1year
-	Pulse Unit 3a/3b	KES7731	KIKUSUI	-	2019/07	1year
-	Pulse Unit 2a BP	KES7721	KIKUSUI	-	2019/07	1year
-	Pulse Unit 1-12V BP	KES7711A	KIKUSUI	-	2019/07	1year
-	Pulse Unit 5a/5b	KES7750	KIKUSUI	-	2019/07	1year
-	Load Dump Suppressor	SPEC80677	KIKUSUI	-	2019/07	1year
-	Pulse Unit 1-24V	KES7713B	KIKUSUI	-	2019/07	1year
E-117	Bipolar Power Supply master	PBZ40-10	KIKUSUI	QB001180	2019/07	1year
-	Application Software for KES7000 System	KES7100	KIKUSUI	Ver.1.06	-	-
	Sequence Creation Software Wavy for PBZ	SPEC70506	KIKUSUI	Ver. 6.00	-	-

7.5.2 Test Method and Test Setup (Diagrammatic illustration)

Test setup was according to the requirements of standard.
The coupling/decoupling network is applied to the Power Line.
The operation of the EUT during the test was confirmed by operator, monitor camera or associated equipment.
(Reference divisional instruction No. G70364004)

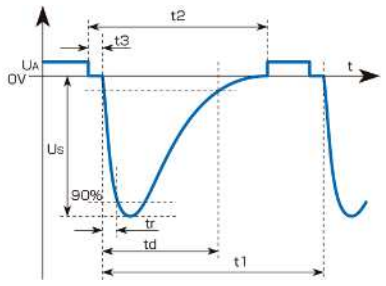
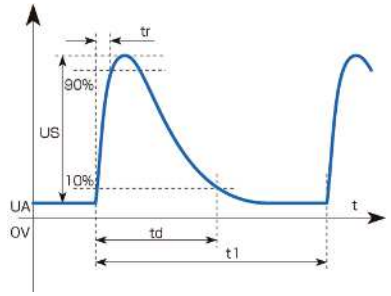
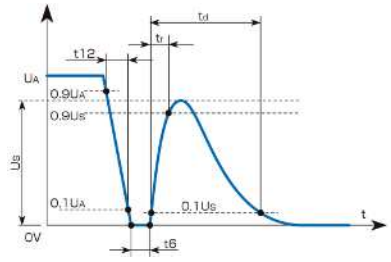
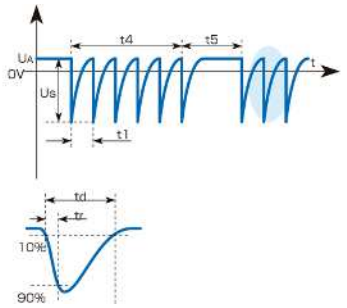
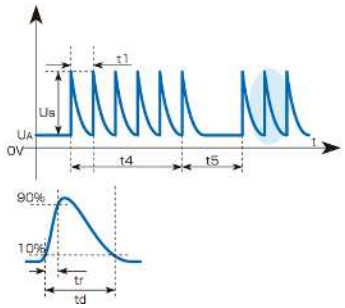
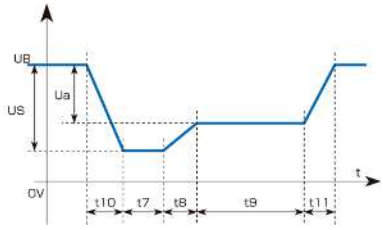


Top View



Side View

7.5.3 Test parameters

Test Parameters for 12 V System		
Pulse 1	Pulse 2a	Pulse 2b
		
U_s = –75 V to –100 V R_i = 10 Ω t_d = 2 msec. t_r = 1 (+0/-0.5) µsec. t_1 = ≥ 0.5 sec. t_2 = 200 msec. t_3 < 100 µsec.	U_s = +37 to +50 V R_i = 2 Ω t_d = 0.05 msec. t_r = 1 (+0/-0.5) µsec. t_1 = 0.2 sec. to 5 sec.	U_s = +10 V R_i = 0 Ω to 0.05 Ω t_d = 0.2 sec. to 2 sec. t_{12} = 1 msec. ± 0.5 msec. t_r = 1 msec. ± 0.5 msec. t_6 = 1 msec. ± 0.5 msec.
Pulse 3a	Pulse 3b	Pulse 4
		
U_s = –112 V to –150 V R_i = 50 Ω t_d = 150 nsec. ± 45 nsec. t_r = 5 nsec. ± 1.5 nsec. t_1 = 100 µsec. t_4 = 10 msec. t_5 = 90 msec.	U_s = +75 V to +100 V R_i = 50 Ω t_d = 150 nsec. ± 45 nsec. t_r = 5 nsec. ± 1.5 nsec. t_1 = 100 µsec. t_4 = 10 msec. t_5 = 90 msec.	U_s = –6 V to –7 V U_a = –2.5 V to –6 V ($\psi_a \leq \psi_a$) R_i = 0 Ω to 0.02 Ω t_7 = 15 msec. to 40 msec. t_8 ≤ 50 msec. t_9 = 0.5 sec. to 20 sec. t_{10} = 5 msec. t_{11} = 5 msec. to 100 msec.

7.5.4 Test Data

Test Specification				
Number of Pulse : 10 pulses (Pulse 1, 2a, 2b and 4) Duration of each test : 20 min. (Pulse 3a, 3b)				
Port	Pulse	Test level		Repetition
		12 V System	24 V System	
DC power	1	– 100 V	– 600 V	0.5 to 5 sec.
	2a	+ 50 V	+ 50 V	0.2 to 5 sec.
	2b	+ 10 V	+ 20 V	0.2 to 2 sec.
	3a	– 150 V	– 200 V	90 to 100 msec.
	3b	+ 100 V	+ 200 V	90 to 100 msec.
	4	– 7 V	– 16 V	*
* When several pulses are to be applied, a minimum delay of 1 min between pulses shall be allowed.				

Test Date : October 8, 2019

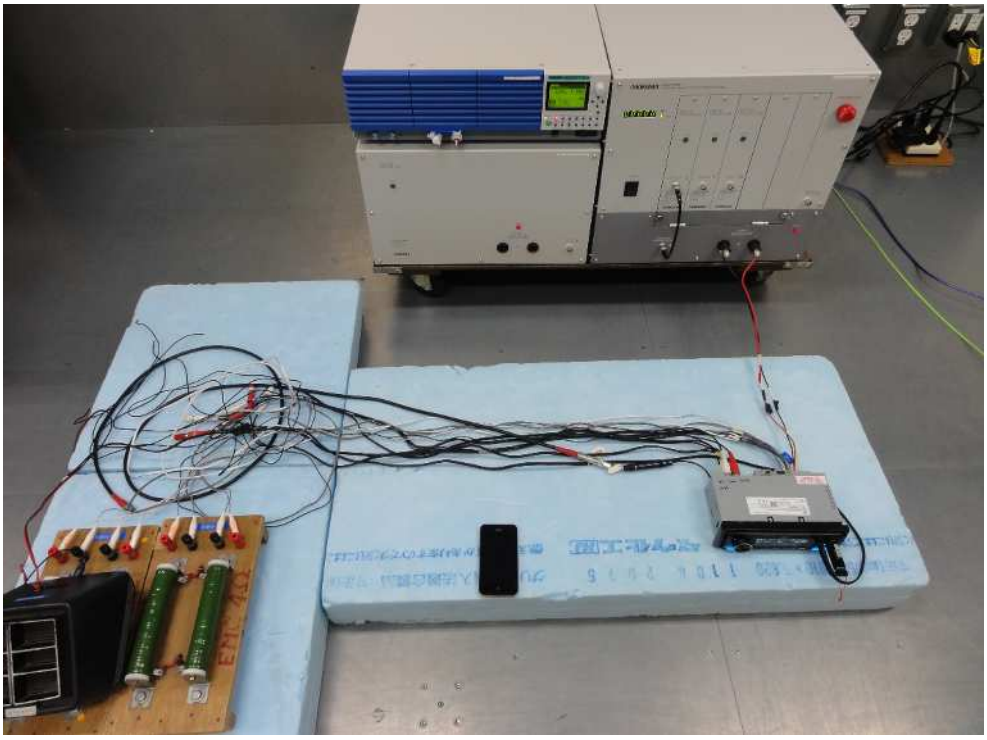
Ambient Temperature : 24 °C
Relative Humidity : 62 %
Atmospheric Pressure : 995 hPa

Pulse	Test level (V)	Repetition	Results	Note
1	– 100	0.5 sec.	Passed	1
2a	+ 50	0.2 sec.	Passed	
2b	+ 10	0.2 sec.	Passed	1
		2 sec.	Passed	1
3a	– 150	100 msec.	Passed	
3b	+ 100	100 msec.	Passed	
4	– 7	1 min.	Passed	1

The variable test parameters used for the test are as follows.
Pulse 1 : t_1 = 0.5 sec.
Pulse 2a : t_1 = 0.2 sec.
Pulse 2b : t_d = 0.2 sec. and 2 sec.
Pulse 4 : U_a = –6 V, t_7 = 15 msec. and 40 msec., t_9 = 20 sec., t_{11} = 5 msec. and 100 msec.

1) The charging was stopped and the power supply was changed to internal battery. After the test, it was recovered automatically.

7.5.5 Test Setup (Photographs)



Appendix A: Similar Models

The EUT has the following similar models.
The similar model details are shown as follow table;

Brand	Contents / Model	Bluetooth Module	Panel coloring	Preout Channel on rear panel	Key color
JVC	KD-X472DBT	Provided	Black	3channels	Variable
JVC	KD-X272DBT	Provided	Black	1channel	Red
JVC	KD-X172DB	Not provided	Black	1channel	Red
JVC	KD-X38MDBT	Provided	Black	1channel	Variable
KENWOOD	KMM-BT506DAB	Provided	Black	2channels	Variable
	KMR-M506DAB	Provided	Silver	2channels	Variable
KENWOOD	KMM-BT407DAB	Provided	Black	1channel	Red
KENWOOD	KMM-DAB307	Provided	Black	1channel	Red

--- END OF REPORT ---