

TEST REPORT



Test Report File No. : S21067-1(1)

Date of Issue : 7, February, 2022

Type : Commercial Microwave Oven

Model No. : NE-21521

Applicant : Panasonic Corporation of North America

Address : Two Riverfront Plaza, Newark, New Jersey, United States, 07102-5490

Manufacturer : Panasonic System Networks Vietnam Co., Ltd

Address : Lot J1-J2, Thang Long Industrial Park, Dong Anh Dist, Hanoi, Vietnam

Test Result Accord : **Positive** **Negative** to the standards at page 4

Approved by:

Reviewed by:

Handwritten signature of Takuya Nakamori in blue ink.

Takuya Nakamori

Laboratory Director,
EMC Test Laboratory

Handwritten signature of Masaki Yamanaka in blue ink.

Masaki Yamanaka

Technical Manager

The test laboratory is not responsible for the data and information provided by the applicant, which may affect the validity of the results.

The results in this report apply only to the tested sample.

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This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the U.S. Government.

This test report replaces already issued S21067-1 (21 January, 2022).

Revision History

Revision	Test Report No.	Date	Description
-	S21067-1	21 January, 2022	Original Issue
(1)	S21067-1(1)	7, February, 2022	Corrected the Applicant (Page 1, 7)

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(*) Data and information are provided by the applicant.
The information on the cover and data is also provided by the customer.

Definitions for Symbols used in this Test Report

Black box indicates (■) that the listed condition, standard, or equipment was applicable for this Report.
Blank box indicates (□) that the listed condition, standard, or equipment was not applicable for this Report.

Test Standards

The tests were performed according to the following standards:

- FCC Rules and Regulations Part 18 Subpart C - Technical Standards
- FCC / OST MP-5 (1986) - Test Procedure

Purpose

The purpose of this report is to show compliance of the Commercial Microwave Oven/Model NE-21521 to the requirement of Part 18 of the FCC Rules and Regulations (47 CFR, PART 18, Subpart C).

Requirement

The test requirements are as follows.

Field strength limits (FCC Part 18, 18.305)

The measured output power was found to be more than 500 W (see 6.3). Therefore, in accordance with Section 18.305 of Subpart C, the measured out-of-band emissions were compared with the limit calculated as following:

$$\text{LFS} = 25 * \text{SQRT} (\text{RF Power Output [W]}/500)$$

$$\text{LFS} = 25 * \text{SQRT} (1852.4 / 500)$$

$$\text{LFS} \approx 48.120 \text{ } \mu\text{V/m}$$

Where: LFS is the maximum allowable field strength for out-of-band emissions in $\mu\text{V/m}$ at a 300 m measurement distance. Power Output is the measure output power in watts.

Limit @300 m [$\mu\text{V/m}$]	Limit @300 m [$\text{dB}\mu\text{V/m}$]	Limit @10 m [$\text{dB}\mu\text{V/m}$]	Limit @3 m [$\text{dB}\mu\text{V/m}$]
48.120	33.646	63.189	73.646

Frequency measurements (OST MP-5, Sec. 4.5)

Measurements are made of:

(a) The variation of frequency with time, using the load specified in Section 4.1 (OST MP-5), starting with the EUT and load at room temperature and continuing until the load quantity has been reduced by evaporation to approximately 20% of the original quantity.

This test is made with nominal rated AC supply voltage.

(b) The variation of frequency for line voltage variation from 80 % to 125 % of nominal rated voltage, starting with the EUT warm from at least 10 minutes use, with a load as specified in Section 4.1 (OST MP-5), and with this load at room temperature at the beginning of the test.

Summary

◆ General Remarks:

- The tests were all good result.
- The Conduction test was not applied because of the EUT is non-consumer equipment.

◆ The Equipment Under Test:

- Fulfill the general approval requirements cited on page 4.
- Not fulfill the general approval requirements cited on page 4.

EUT received date : 29 November, 2021

Testing Start Date : 24 November, 2021

Testing End Date : 18 January, 2022

◆ Final Judgment:

The requirements according to the technical regulations and tested operation modes are

- MET.
- NOT MET.

	Frequency Range (MHz)	Minimum Margin (dB)	Detector
Radiated Emission	0.009 - 30	73.4	AV
	30 - 1000	40.6	AV
	1000 - 25000	15.1	AV
Remark: Port applicable to test : Refer to "Operation of the EUT during Testing " .			

◆ Test Site Description:

This testing was performed at following site:

Name of the Test Site : Panasonic Corporation, Product Analysis Center, EMC Test Laboratory
Sasayama EMC Site

Address : 231-1 Yashiro, Tamba Sasayama-shi, Hyogo, 669-2356 Japan

TEL : +81(79) 552-5681

FAX : +81(79) 552-5682

Sasayama EMC Site is accredited by The Japan Accreditation Board for Conformity Assessment (JAB) for the specific scope of accreditation under Lab. Certificate No. : RTL02730

Environmental Conditions

See each Test Data.

Measurement Uncertainty

The data and results referenced in this document are true and accurate. The test results are traceable to the National or International Standards.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

- Measurement instrumentation uncertainty was “not” taken into account in the determination of compliance.
- Measurement instrumentation uncertainty was taken into account in the determination of compliance.

Our laboratory quotes measurement uncertainty as follows.

Radiated Emission (Magnetic Field) :

0.009 MHz – 30 MHz (0.6 m Loop antenna)	10 m distance	± 2.5 dB
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Radiated Emission (Below 1 GHz : Electric Field) :

30 MHz – 300 MHz (Biconical Antenna)	10 m distance	Horizontal	± 3.8 dB
		Vertical	± 3.7 dB
300 MHz – 1000 MHz (Logperiodic Antenna)	10 m distance	Horizontal	± 2.7 dB
		Vertical	± 3.1 dB

Radiated Emission (Above 1 GHz : Electric Field) :

1 GHz – 6 GHz (Horn Antenna)	3 m distance	± 4.8 dB
6 GHz – 18 GHz (Horn Antenna)	3 m distance	± 5.0 dB
18 GHz – 25 GHz (Horn Antenna)	3 m distance	± 5.4 dB

Equipment under Test*

◆ Applicant

Company Name : Panasonic Corporation of North America

Address : Two Riverfront Plaza, Newark, New Jersey, United States, 07102-5490

◆ Identification of EUT A

Type : Commercial Microwave Oven

Rated Voltage : AC 208 / 230 V, 60 Hz

Model : NE-21521

Rated Power : Output 2100 W (IEC 705)

Serial No : 6CO1140003

Protection class : Class 2

Operating Frequency : 2450 MHz ± 50 MHz

Dimensions W x D x H (mm) : 422 x 508 x 337

Firmware Version : -

Software Version : -

Equipment authorization : Supplier's Declaration of Conformity

FCC ID : ACLAQ3E61

◆ Source of Interference & Internal Frequencies : Highest Frequency 8 MHz

Clock Source	Frequency (MHz)
<u>Microcomputer</u>	<u>8</u>

◆ Noise Suppression Components

None

◆ Measures for Electromagnetic Shielding

None

Operation of the EUT during Testing*

◆ Modification of the EUT

The test laboratory did not modify the EUT during the test.

◆ Power Supply System Utilized

Power supply system : 230 V / 60 Hz / 1φ

◆ Operation mode of the EUT

The equipment under test was operated during the measurement under the following conditions.
Refer to “ Details of Ports “ and “ Block diagram of the equipment under test (EUT) “ for all relevant ports.

- High power mode (P10)

◆ Description of EUT:

Symbol	Type	Model	Serial No.	Manufacturer	EUT condition
A	Commercial Microwave Oven	NE-21521	6CO1140003	Panasonic	Pre-Production

EUT A :

Operating frequency : 2450 MHz
Type of Magnetron : 2M261
Door Seal Type : Choke
Employed mode : Stirrer

The following interface cables and the peripheral devices were connected during the measurement:

◆ Power Cables

No.	Name of Cable Model / Manufacturer	Pin	Length (m)	Shield	Ferrite Quantity	Ground Line
1	AC Power Cord for EUT A SJT / WELL SHIN	3	1.5	Unshielded	None	Yes

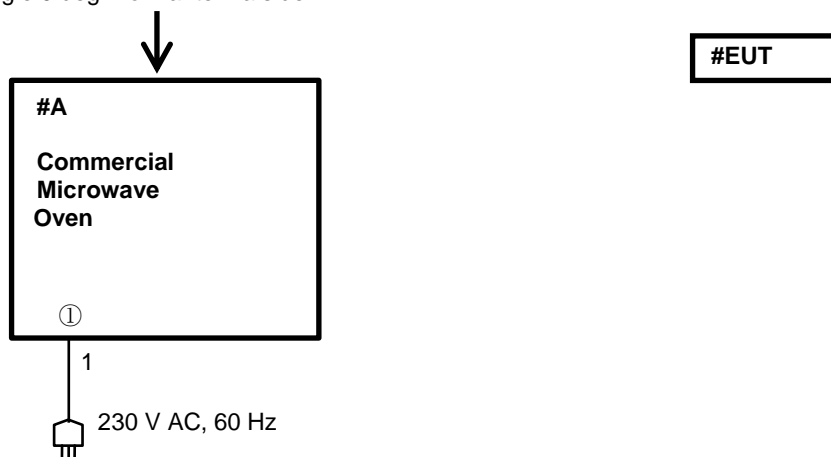
◆ Details of ports

Port No.	Name of port	Remarks
(1)	AC 230 V / 60 Hz	

◆ Block diagram of the EUT

- High power mode (P10)

Terntable is the course of
the angle 0 deg. from antenna side



Test Results and Conditions

Radiated Emission (Magnetic Field)

The measurement of the Radiated Emission (Magnetic Field) in the frequency range 8 MHz - 30 MHz was performed in horizontal and vertical antenna position according to FCC Part 18 at:

Test Location:

- 10 m anechoic chamber

Test Distance:

- 10 m (with a 0.6 m loop antenna)

Test Volume:

- \varnothing 0.64 m

Lists of the Test Equipment: Refer to Appendix A

Result: The requirements are **MET** **NOT MET**

Min. limit margin 73.4 dB at 28.543 MHz
(AV detector receiver with 45 deg antenna polarization)

Test Condition of Instrument
Resolution Bandwidth : 9 kHz (8 MHz to 30 MHz)
EUT Warm-up Time: 10 minutes
Date: 24 November, 2021
Environment: 24 deg.C / 40 % / 988 hPa

Detector Function : Average
Test Mode : High power mode (P10)

Test Voltage : 230 V / 60Hz
Load : 1400 ml Center

Test Data

Antenna Polar.	Freq. [MHz]	Factor [dB/m]	Reading at 10 m [dB μ V]	Emission Level at 10 m [dB μ V/m]	Emission Level at 300 m [dB μ V/m]	Emission Level at 300 m [μ V/m]	Limit at 300 m [μ V/m]	Margin at 300 m [μ V/m]	Margin at 300 m [dB]	Height [cm]	EUT Angle [deg.]
Hori.	22.179	21.3	-3.5	17.8	-41.3	0.00862	48.120	48.111	74.9	200	70
0	25.434	21.3	-3.1	18.2	-40.9	0.00903	48.120	48.111	74.5	200	239
45	28.543	21.3	-2	19.3	-39.8	0.01025	48.120	48.109	73.4	200	38
90	27.287	21.3	-2.2	19.1	-40.0	0.01002	48.120	48.110	73.6	200	10
135	27.594	21.3	-3.2	18.1	-41.0	0.00893	48.120	48.111	74.6	200	325

Factor [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] - Amp. Gain [dB]
Emission Level at 10 m [dB μ V/m] = Reading at 10m [dB μ V] + Factor [dB/m]
Emission Level at 300 m [dB μ V/m] = Emission Level at 10 m [dB μ V/m] + 40log(10/300) [dB]

Note: Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Description of calculation

9 kHz to 30 MHz

Calculation Formula to get field strength at 300 m from the measured at 10 m.

Calculation Formula:

$$\begin{aligned} & \text{Emission Level at 300 m } [\mu\text{V/m}] \\ & = 10^{\{(\text{Emission Level at 10 m } [\text{dB}\mu\text{V/m}] / 20 \} * (10/300)^2} \end{aligned}$$

Example: Frequency 28.543 MHz,
Emission Level at 10 m 19.3 dB μ V/m

$$\begin{aligned} & \text{Emission Level at 300 m } [\mu\text{V/m}] \\ & = 10^{(19.3 / 20) * (10/300)^2} \\ & = 0.01025 \mu\text{V/m} \end{aligned}$$

Photographs of the Test Set-up

The EUT was placed on a 1 m high nonconductive turntable.

The turntable was separated from the antenna by a distance of 10 m.

The operation mode was selected for maximum emission.

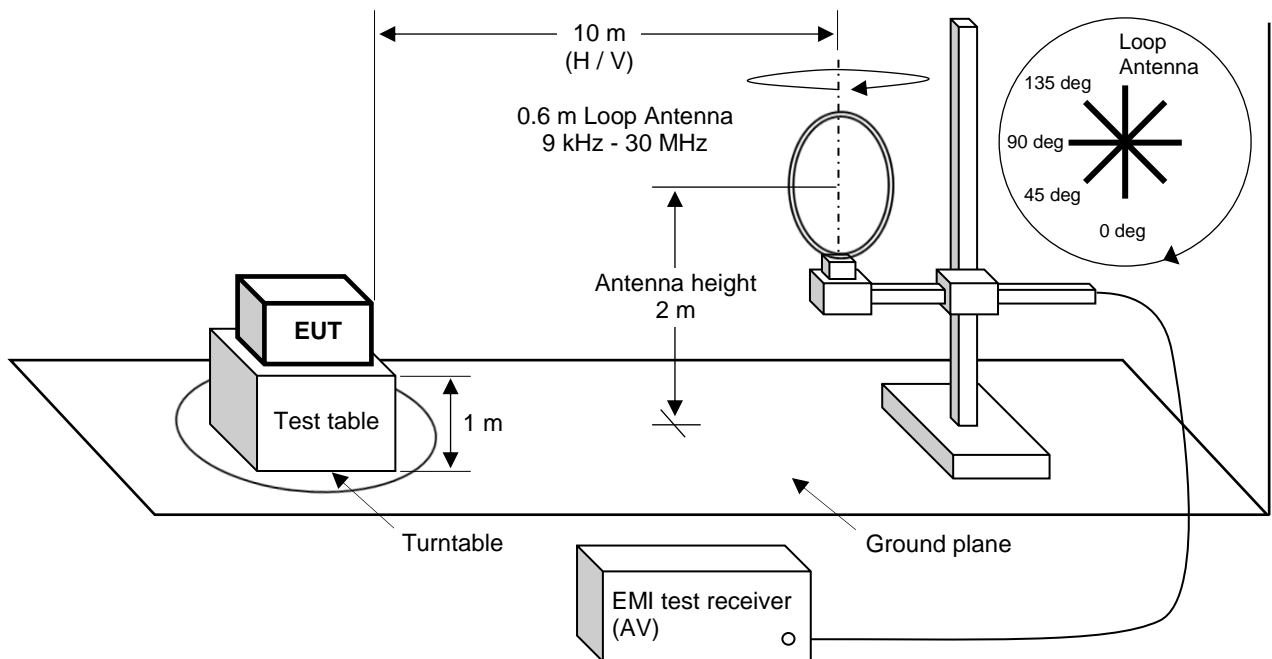
Pre-check : A loop antenna was set at a height of 2 m and a level with a small margin of Vertical axis (0°, 45°, 90°, 135°) and Horizontal Axis was measured using a spectrum analyzer.

Final measurement : Emission levels (AV value) were measured by means of the test receiver referring the result of Pre-check.

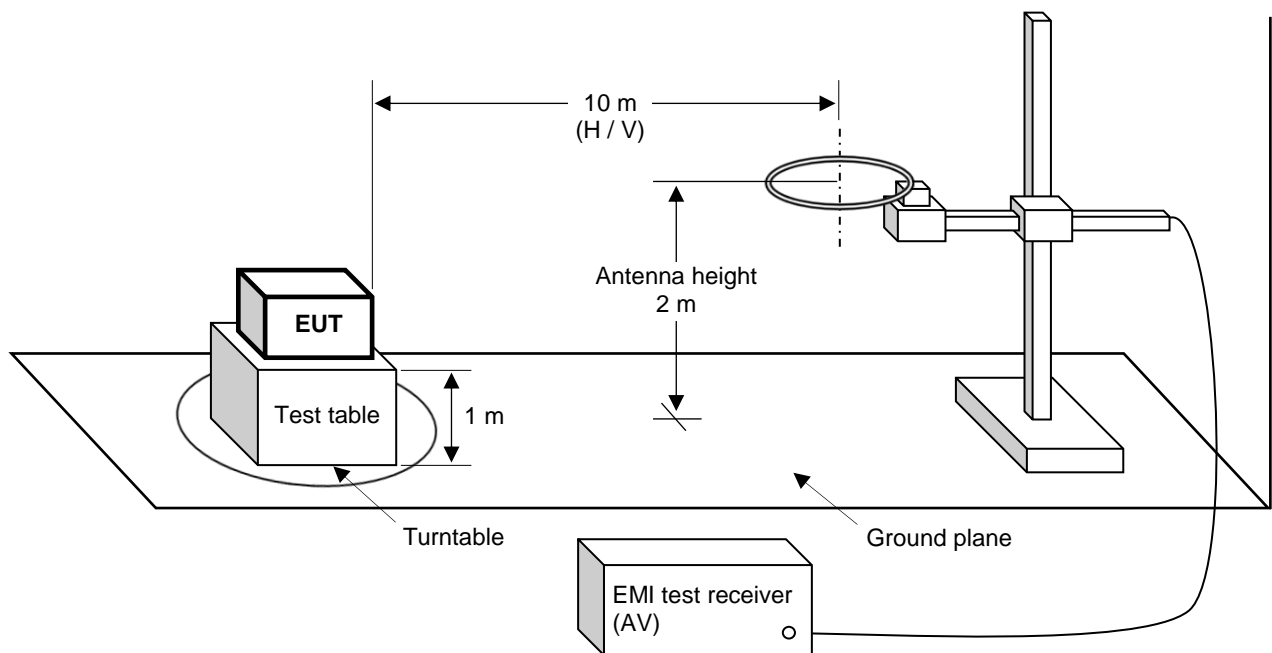
The emission levels from the EUT were maximized changing conditions; Turntable rotation, Antenna height and arrangement of the EUT.

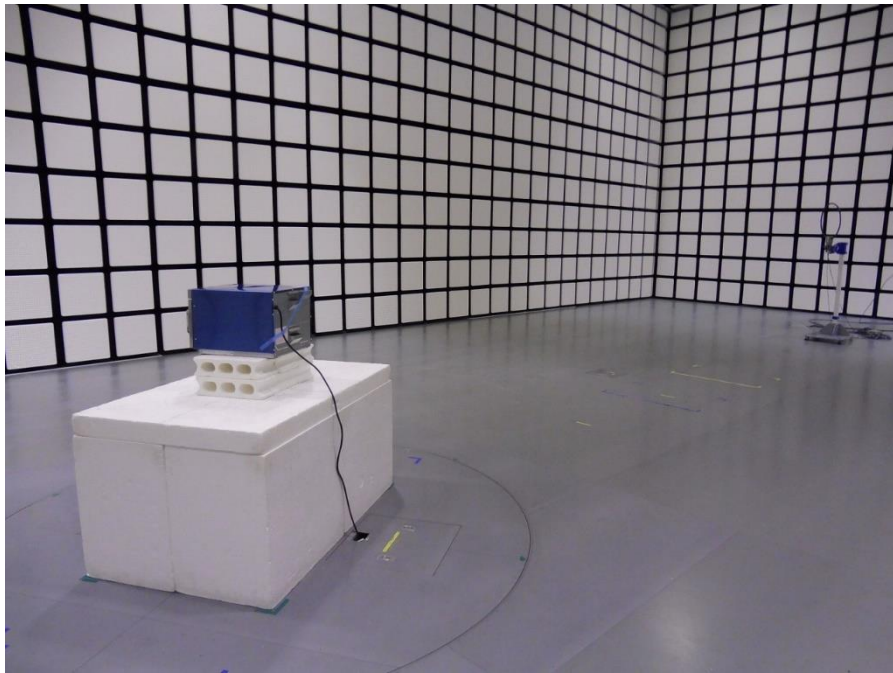
Drawing:

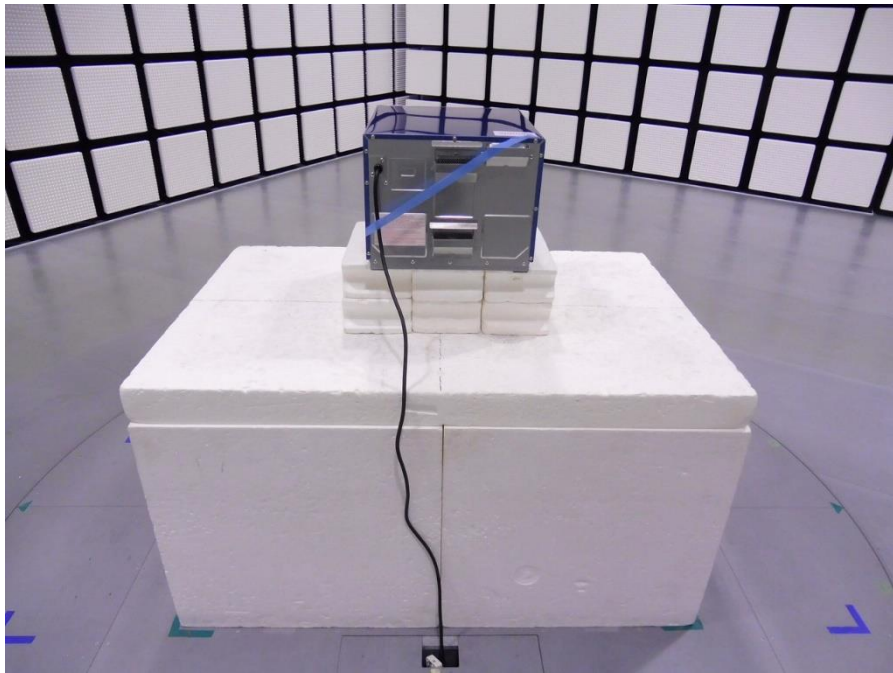
Vertical axis



Horizontal Axis







Description of calculation

30 MHz to 1 GHz

Calculation Formula to get field strength at 300 m from the measured at 10 m.

Calculation Formula:

$$\begin{aligned} & \text{Emission Level at 300 m } [\mu\text{V/m}] \\ & = 10^{\{(\text{Emission Level at 10 m } [\text{dB}\mu\text{V/m}] / 20 \} * (10/300)} \end{aligned}$$

Example: Frequency 199.05 MHz,
Emission Level at 10 m 22.6 dB μ V/m

$$\begin{aligned} & \text{Emission Level at 300 m } [\mu\text{V/m}] \\ & = 10^{(22.6 / 20) * (10/300)} \\ & = 0.450 \mu\text{V/m} \end{aligned}$$

Photographs of the Test Set-up

The EUT was placed on a 1 m high nonconductive turntable.

The turntable was separated from the antenna by a distance of 10 m.

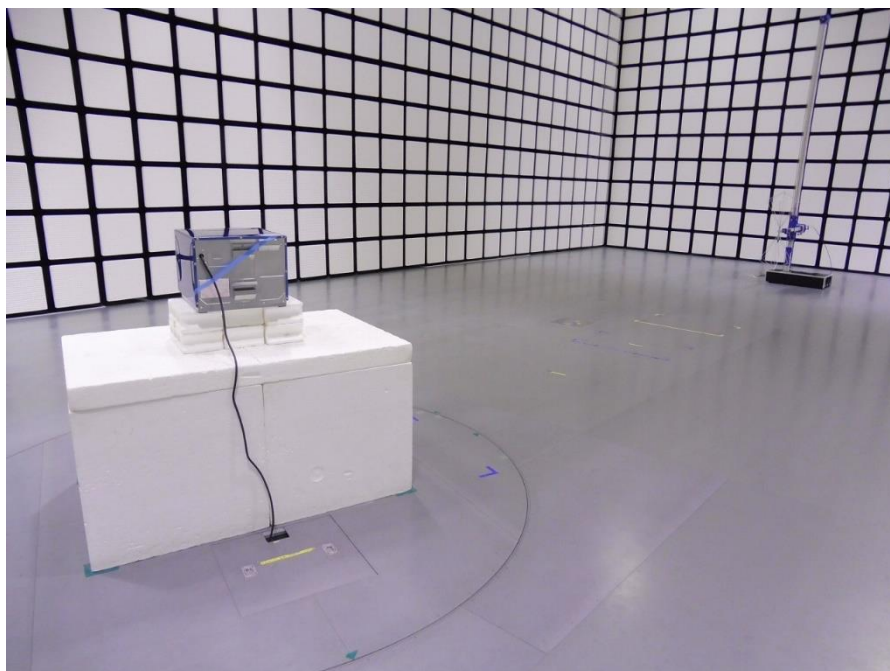
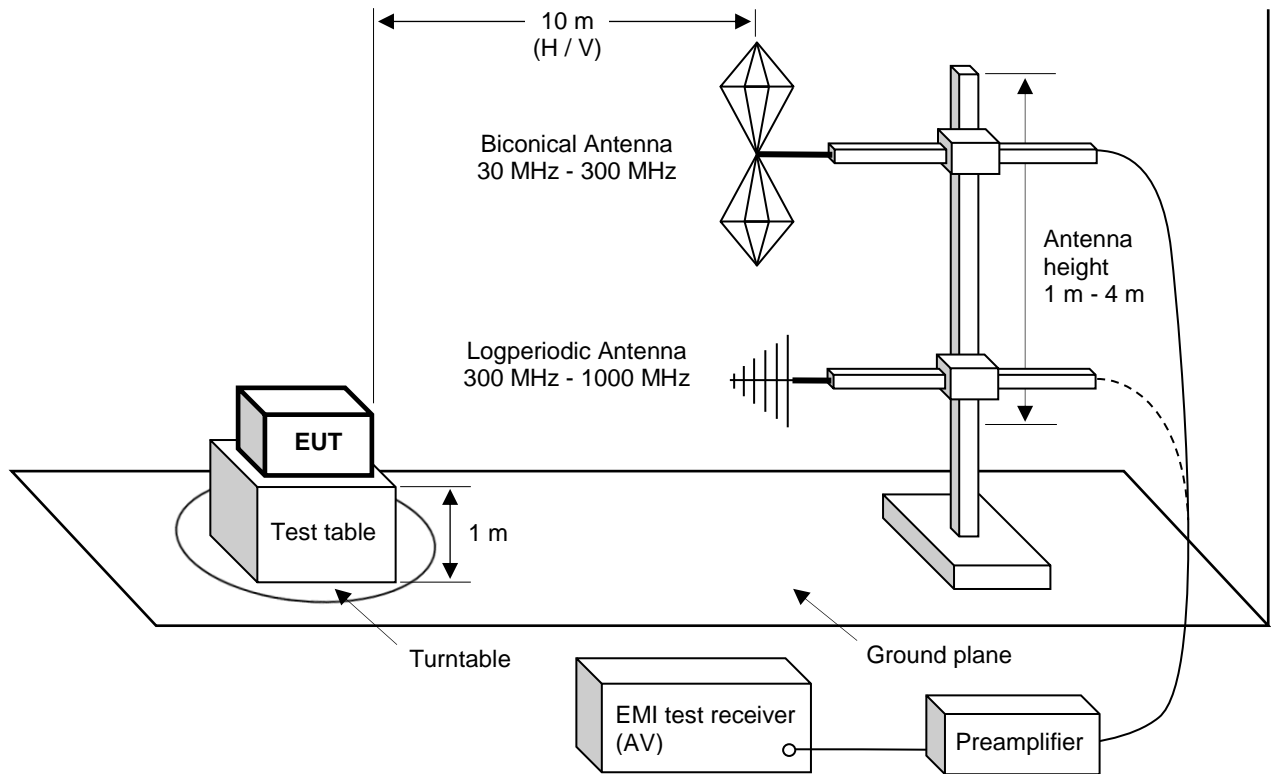
The operation mode was selected for maximum emission.

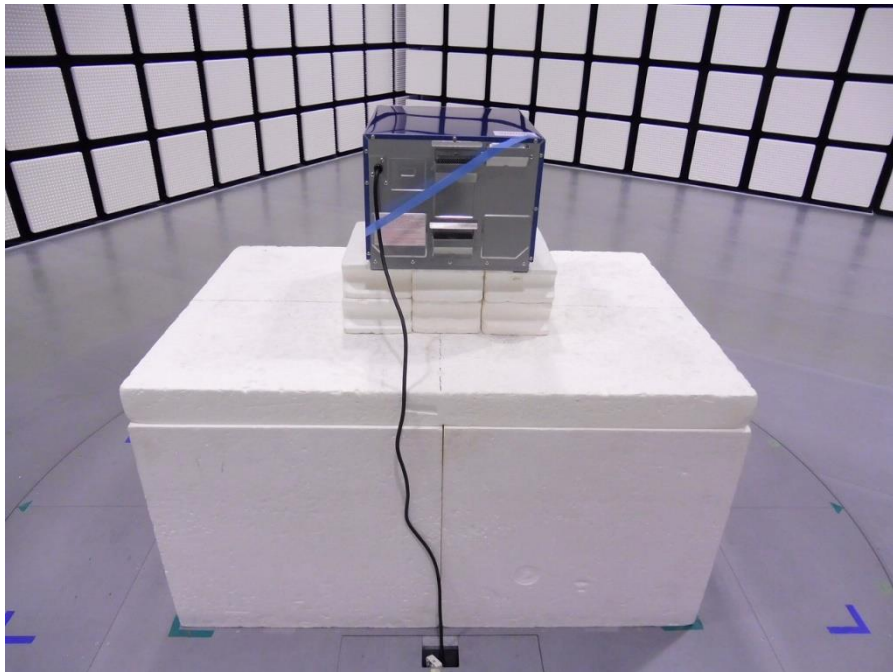
Pre-check: Radiated emission levels (AV value) which have small margin for the regulation were measured by means of spectrum analyzer changing antenna movement (1 m - 4 m) and table rotation (0 degree - 360 degree).

Final measurement: Emission levels (AV value) were measured by means of the test receiver referring the result of Pre-check.

The emission levels from the EUT were maximized changing conditions; Turntable rotation, Antenna height and arrangement of the EUT.

Drawing :





Radiated Emission (Above 1 GHz : Electric Field)

The measurement of the Radiated Emission (Above 1 GHz : Electric Field) in the frequency range 1 GHz - 40 GHz was performed in horizontal and vertical antenna position according to FCC Part 18 at:

Test Location:

- 10 m anechoic chamber

Test Distance:

- 3 m

Test Volume:

- φ 0.64 m

Lists of the Test Equipment:

Refer to Appendix A

Result: The requirements are MET NOT MET

Min. limit margin 15.1 dB at 2399.36 MHz
(AV detector receiver with Vertical antenna polarization)

Frequency [GHz]	θ_{3dB} E Plane [°]	θ_{3dB} H Plane [°]	θ_{3dB} min [°]	W min [m]
1 - 6	32.1	52.5	32.1	1.73

θ_{3dB} : The minimum 3 dB beam width of receive antenna.
W : The dimension of the line tangent to the EUT formed by θ_{3dB} at 3 m.
 $W = 2 \times 3 \text{ [m]} \times \tan(0.5 \times \theta_{3dB}) \doteq 1.73 \text{ m}$

Frequency [GHz]	θ_{3dB} E Plane [°]	θ_{3dB} H Plane [°]	θ_{3dB} min [°]	W min [m]
6 - 18	29	17	17	0.90

θ_{3dB} : The minimum 3 dB beam width of receive antenna.
W : The dimension of the line tangent to the EUT formed by θ_{3dB} at 3 m.
 $W = 2 \times 3 \text{ [m]} \times \tan(0.5 \times \theta_{3dB}) \doteq 0.90 \text{ m}$

Frequency [GHz]	θ_{3dB} E Plane [°]	θ_{3dB} H Plane [°]	θ_{3dB} min [°]	W min [m]
18 - 26.5	9	10	9	0.47

θ_{3dB} : The minimum 3 dB beam width of receive antenna.
W : The dimension of the line tangent to the EUT formed by θ_{3dB} at 3 m.
 $W = 2 \times 3 \text{ [m]} \times \tan(0.5 \times \theta_{3dB}) \doteq 0.47 \text{ m}$

Test Data

Test Condition of Instrument
Resolution Bandwidth : 1 MHz (1 GHz to 25 GHz)

EUT Warm-up Time: 10 minutes
Date: 28 November, 2021
Environment: 24 deg.C / 40 % / 988 hPa

Detector Function : Average
Test Mode : High power mode (P10)

Test Voltage : 230 V / 60Hz
Load : 1400 ml Center

Antenna Polar.	Freq. [MHz]	Factor [dB/m]	Reading at 3 m [dBμV]	Emission Level at 3 m [dBμV/m]	Emission Level at 3 m [μV/m]	Distance Factor K	Emission Level at 300 m [μV/m]	Limit at 300 m [μV/m]	Margin at 300 m [μV/m]	Margin at 300 m [dB]	Height [cm]	EUT Angle [deg.]
Hori.	2398.99	29.6	26.7	56.3	653.1	0.0100	6.531	48.120	41.588	17.3	100	288
Hori.	2507.05	29.7	26.9	56.6	676.1	0.0100	6.761	48.120	41.359	17.0	100	334
Hori.	4614.43	-2.8	38.5	35.7	61.0	0.0100	0.610	48.120	47.510	37.9	100	99
Hori.	4882.23	-2.1	38.4	36.3	65.3	0.0100	0.653	48.120	47.467	37.3	100	99
Hori.	4935.74	-2.0	39.1	37.1	71.6	0.0100	0.716	48.120	47.403	36.5	100	14
Hori.	7048.00	-8.8	42.7	33.9	49.5	0.0100	0.495	48.120	47.624	39.7	100	140
Hori.	7399.00	-9.2	40.8	31.6	38.0	0.0100	0.380	48.120	47.739	42.0	100	168
Hori.	9883.00	-6.3	37.9	31.6	38.0	0.0100	0.380	48.120	47.739	42.0	100	278
Hori.	19736.00	0.4	40.6	41.0	112.2	0.0100	1.122	48.120	46.998	32.6	100	341
Hori.	24761.00	-1.3	41.1	39.8	97.7	0.0100	0.977	48.120	47.142	33.8	100	31
Vert.	2399.36	29.6	28.9	58.5	841.4	0.0100	8.414	48.120	39.706	15.1	100	341
Vert.	2501.23	29.7	27.5	57.2	724.4	0.0100	7.244	48.120	40.875	16.4	100	348
Vert.	2753.55	30.4	26.9	57.3	732.8	0.0100	7.328	48.120	40.791	16.3	100	81
Vert.	4614.52	-2.8	37.5	34.7	54.3	0.0100	0.543	48.120	47.576	38.9	100	63
Vert.	4877.80	-2.1	40	37.9	78.5	0.0100	0.785	48.120	47.334	35.7	100	263
Vert.	4918.96	-2.0	38.3	36.3	65.3	0.0100	0.653	48.120	47.467	37.3	100	263
Vert.	4932.97	-2.0	37.1	35.1	56.9	0.0100	0.569	48.120	47.551	38.5	100	81
Vert.	6530.00	-8.1	41.6	33.5	47.3	0.0100	0.473	48.120	47.646	40.1	100	146
Vert.	6982.00	-8.7	45	36.3	65.3	0.0100	0.653	48.120	47.467	37.3	100	79
Vert.	7403.00	-9.2	44.4	35.2	57.5	0.0100	0.575	48.120	47.544	38.4	100	169
Vert.	11002.00	-4.8	40.9	36.1	63.8	0.0100	0.638	48.120	47.481	37.5	100	10
Vert.	14671.00	-3.8	39.5	35.7	61.0	0.0100	0.610	48.120	47.510	37.9	100	16
Vert.	19753.00	0.4	40.2	40.6	107.2	0.0100	1.072	48.120	47.048	33.0	100	16
Vert.	24631.00	-1.0	42.5	41.5	118.9	0.0100	1.189	48.120	46.931	32.1	100	21

Factor [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] - Amp. Gain [dB] + Distance Factor [dB]
Emission Level at 3 m [dBμV/m] = Reading at 3m [dBμV] + Factor [dB/m]
Emission Level at 300 m [μV/m] = K * Emission Level at 3m [μV/m]

Note: Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Test Voltage : 230 V / 60Hz
 Load : 1400 ml Right Front

Antenna Polar.	Freq. [MHz]	Factor [dB/m]	Reading at 3 m [dB μ V]	Emission Level at 3 m [dB μ V/m]	Emission Level at 3 m [μ V/m]	Distance Factor K	Emission Level at 300 m [μ V/m]	Limit at 300 m [μ V/m]	Margin at 300 m [μ V/m]	Margin at 300 m [dB]	Height [cm]	EUT Angle [deg.]
Hori.	4875.75	-2.1	38.8	36.7	68.4	0.0100	0.684	36.277	35.593	34.5	100	68
Hori.	7398.00	-9.2	39.1	29.9	31.3	0.0100	0.313	36.277	35.964	41.3	100	197
Vert.	4928.88	-2.0	37.6	35.6	60.3	0.0100	0.603	36.277	35.674	35.6	100	68
Vert.	7384.00	-9.2	41.4	32.2	40.7	0.0100	0.407	36.277	35.870	39.0	100	171

Factor [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] - Amp. Gain [dB] + Distance Factor [dB]
 Emission Level at 3 m [dB μ V/m] = Reading at 3m [dB μ V] + Factor [dB/m]
 Emission Level at 300 m [μ V/m] = K * Emission Level at 3m [μ V/m]

Note: Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Test Voltage : 230 V / 60Hz
 Load : 600 ml Center

Antenna Polar.	Freq. [MHz]	Factor [dB/m]	Reading at 3 m [dB μ V]	Emission Level at 3 m [dB μ V/m]	Emission Level at 3 m [μ V/m]	Distance Factor K	Emission Level at 300 m [μ V/m]	Limit at 300 m [μ V/m]	Margin at 300 m [μ V/m]	Margin at 300 m [dB]	Height [cm]	EUT Angle [deg.]
Hori.	4812.85	-2.3	36.7	34.4	52.5	0.0100	0.525	48.120	47.595	39.2	100	6
Hori.	7410.00	-9.2	38.9	29.7	30.5	0.0100	0.305	48.120	47.814	43.9	100	264
Vert.	4937.20	-2.0	37.1	35.1	56.9	0.0100	0.569	48.120	47.551	38.5	100	99
Vert.	7397.00	-9.2	39.6	30.4	33.1	0.0100	0.331	48.120	47.789	43.2	100	92

Factor [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] - Amp. Gain [dB] + Distance Factor [dB]
 Emission Level at 3 m [dB μ V/m] = Reading at 3m [dB μ V] + Factor [dB/m]
 Emission Level at 300 m [μ V/m] = K * Emission Level at 3m [μ V/m]

Note: Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Test Voltage : 230 V / 60Hz
 Load : 600 ml Right Front

Antenna Polar.	Freq. [MHz]	Factor [dB/m]	Reading at 3 m [dB μ V]	Emission Level at 3 m [dB μ V/m]	Emission Level at 3 m [μ V/m]	Distance Factor K	Emission Level at 300 m [μ V/m]	Limit at 300 m [μ V/m]	Margin at 300 m [μ V/m]	Margin at 300 m [dB]	Height [cm]	EUT Angle [deg.]
Hori.	4935.06	-2.0	42.1	40.1	101.2	0.0100	1.012	48.120	47.108	33.5	100	53
Hori.	7406.00	-9.2	40.7	31.5	37.6	0.0100	0.376	48.120	47.744	42.1	100	121
Vert.	4941.04	-1.9	40.9	39.0	89.1	0.0100	0.891	48.120	47.228	34.6	100	240
Vert.	7410.00	-9.2	45.3	36.1	63.8	0.0100	0.638	48.120	47.481	37.5	100	23

Factor [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] - Amp. Gain [dB] + Distance Factor [dB]
 Emission Level at 3 m [dB μ V/m] = Reading at 3m [dB μ V] + Factor [dB/m]
 Emission Level at 300 m [μ V/m] = K * Emission Level at 3m [μ V/m]

Note: Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Photographs of the Test Set-up

The EUT was placed on a 1 m high nonconductive turntable.

The turntable was separated from the antenna by a distance of 3 m.

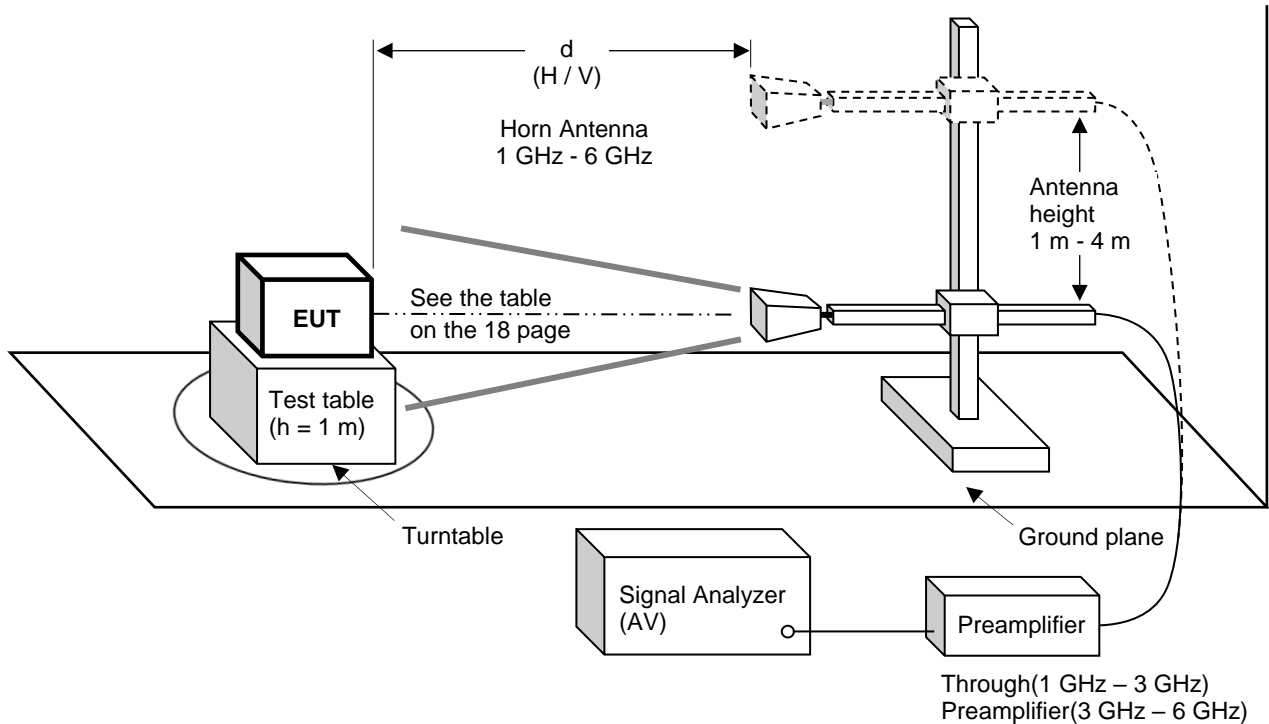
The operation mode was selected for maximum emission.

Pre-check: Radiated emission levels (AV value) which have small margin for the regulation were measured by means of signal analyzer changing antenna movement (1 m - 4 m) and table rotation (0 degree - 360 degree).

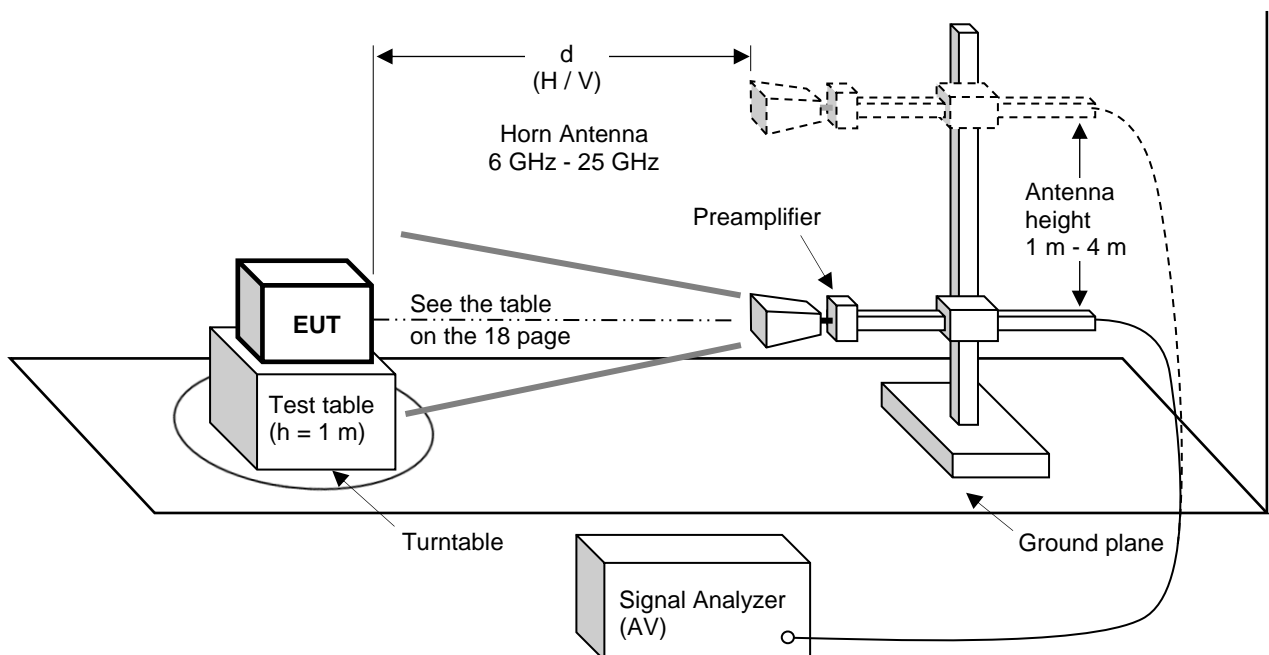
Final measurement: Emission levels (AV value) were measured by means of the signal analyzer (1 GHz - 25 GHz) referring the result of Pre-check.

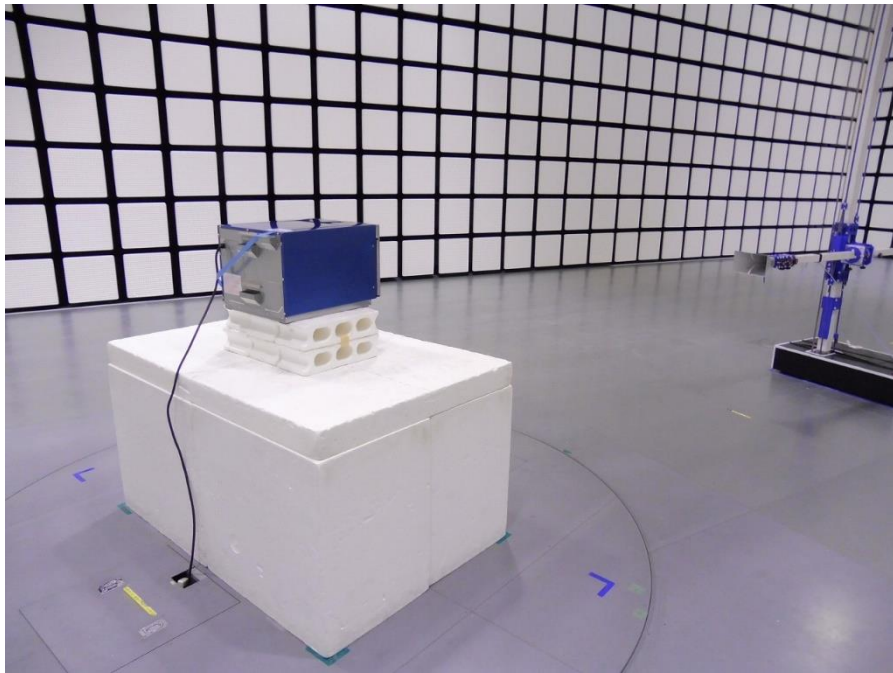
The emission level from the EUT were maximized changing conditions; Turn table rotation, Antenna height, azimuth and arrangement of the EUT.

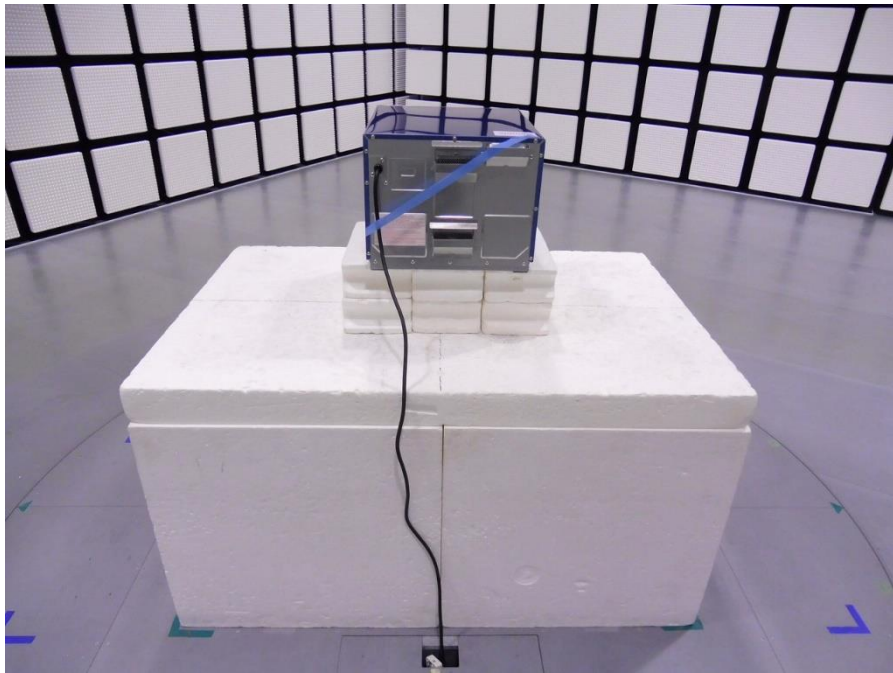
Drawing : 1 GHz - 6 GHz



Drawing : 6 GHz - 25 GHz







Operating Frequency measurements (OST MP-5, 4.5)

The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 2000 ml water load was placed in the center of the oven was operated at maximum output power. The fundamental operating frequency was monitored until the water load was reduced to 20 % of the original load.

Test Location:

- 10 m anechoic chamber

Lists of the Test Equipment:

Refer to Appendix A

[AC 230 V]

Maximum frequency variation

Variation of frequency with time, using the Load

2.453 GHz - 2.469 GHz (2000 ml ~ 400 ml / Load)

EUT Warm-up Time: 10 minutes

Date: 8 December, 2021

Environment: 24 deg.C / 40 % / 988 hPa

	Time (minutes)	Frequency (GHz)	Time (minutes)	Frequency (GHz)	
100%	0	2.467	-	-	
	2	2.465	22	2.468	
	4	2.466	24	2.467	
	6	2.466	26	2.464	
	8	2.465	28	2.460	
	10	2.465	30	2.464	
	12	2.456	32	2.469	
	14	2.453	34	2.467	
	16	2.468	36	2.467	
	18	2.468	38	2.466	
	20	2.469	40	2.467	20%

Variation in Operating Frequency with Line Voltage (OST MP-5, 4.5)

The EUT was operated / warmed by at least 10 minutes of use with a 1000 ml water load at room temperature at the beginning of the test. Then the operating frequency was monitored as the input voltage was varied between 80 % and 125 % of the nominal rating.

Test Location:

- 10 m anechoic chamber

Lists of the Test Equipment: Refer to Appendix A

[AC 230 V]

Variation of frequency for Line Voltage variation

2.464 GHz - 2.472 GHz (184 V ~ 264.5 V / 2000 ml Load)

EUT Warm-up Time: 10 minutes

Date: 18 January, 2022

Environment: 20 deg.C / 43 % / 993 hPa

input voltage (%)	Voltage (V)	Frequency (GHz)
80%	184	2.467
85%	195.5	2.472
90%	207	2.469
95%	218.5	2.468
100%	230	2.467
105%	241.5	2.464
110%	253	2.467
115%	264.5	2.465
125%	287.5	*

* : Powered down for protection.

Appendix A Lists of the Test Equipment

Radiated Emission (Magnetic Field)

Test equipment list used to perform the radiated emission (magnetic field 9 kHz - 30 MHz).

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
EMI test receiver	N9048B	KEYSIGHT	MY60450120	RCV2001	9 kHz - 8.4 GHz	3 August, 2021	31 August, 2022
Loop antenna	HFH2-Z2	Rohde & Schwarz	100014	ANT5063	9 kHz - 30 MHz	19 June, 2021	30 June, 2022

Device	Model No.	Manufacturer	Version	Reg. No.
Software	ES10 RE	TOYO Corporation	2021.04.000	S-SW048-1

Radiated Emission (Electric Field)

Test equipment list used to perform the radiated emission (electric field 30 MHz - 1000 MHz).

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
EMI test receiver	N9048B	KEYSIGHT	MY60450120	RCV2001	9 kHz - 8.4 GHz	3 August, 2021	31 August, 2022
Biconical Antenna	VHA 9103 & BBA 9106	Schwarzbeck	VHA9103 2397	ANT1004	30 MHz - 300 MHz	13 August, 2021	31 August, 2022
Logperiodic Antenna	UHALP 9108-A	Schwarzbeck	UHALP9108-A 0737	ANT1005	300 MHz - 1 GHz	13 August, 2021	31 August, 2022
Preamplifier	310N	SONOMA	394510	AMP0510	100 kHz - 1 GHz	1 April, 2020	30 April, 2022

Device	Model No.	Manufacturer	Version	Reg. No.
Software	ES10 RE	TOYO Corporation	2021.04.000	S-SW048-1

Test equipment list used to perform the Radiated Emission (Electric Field 1 GHz - 6 GHz).

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
Signal Analyzer	N9010B	KEYSIGHT	MY59070439	SPA0439	9 kHz - 40 GHz	2 November, 2021	30 November, 2022
Horn antenna	BBHA 9120D	Schwarzbeck	9120D-938	ANT1006	1 GHz - 18 GHz	17 July, 2021	31 July, 2022
Preamplifier (*1)	8449B	HEWLETT PACKARD	3008A01410	AMP1003	1 GHz - 18 GHz	29 May, 2020	31 May, 2022
Highpass Filter	WHKX 10-2700-3000-18000-40SS	Wainwright	SN 101	FIL0105	3 GHz - 18 GHz	1 June, 2020	31 June, 2022

(*1) : Through(1 GHz – 3 GHz),

Device	Model No.	Manufacturer	Version	Reg. No.
Software	ES10 RE	TOYO Corporation	2021.04.000	S-SW048-1

Test equipment list used to perform the Radiated Emissions (Electric Field 6 GHz - 18 GHz).

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
Signal Analyzer	N9010B	KEYSIGHT	MY59070439	SPA0439	9 kHz - 40 GHz	2 November, 2021	30 November, 2022
Horn antenna	HAP06-18A	Schwarzbeck	-	ANT5059	6 GHz - 18 GHz	11 August 2021	31 August 2022
Preamplifier	HAP06-18A (Preamplifier)	TOYO Corporation	-	AMP5032	6 GHz - 18 GHz	11 August 2021	31 August 2022

Device	Model No.	Manufacturer	Version	Reg. No.
Software	ES10 RE	TOYO Corporation	2021.04.000	S-SW048-1

Test equipment list used to perform the Radiated Emissions (Electric Field 18 GHz – 25 GHz).

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
Signal Analyzer	N9010B	KEYSIGHT	MY59070439	SPA0439	9 kHz - 40 GHz	2 November, 2021	30 November, 2022
Horn antenna	HAP18-26A	Schwarzbeck	-	ANT5060	18 GHz - 26.5 GHz	11 August, 2021	31 August, 2022
Preamplifier	HAP18-26A (Preamplifier)	TOYO Corporation	-	AMP5033	18 GHz - 26.5 GHz	11 August, 2021	31 August, 2022

Device	Model No.	Manufacturer	Version	Reg. No.
Software	ES10 RE	TOYO Corporation	2021.04.000	S-SW048-1

Operating Frequency measurements Variation in Operating Frequency with Line Voltage

Test equipment list used to perform the Operating Frequency measurements and Variation in Operating Frequency with Line Voltage.

Device	Model No.	Manufacturer	Serial. No.	Reg. No.	Frequency range	Last Cal.	Next Cal.
Signal Analyzer	N9010B	KEYSIGHT	MY59070439	SPA0439	9 kHz - 40 GHz	2 November, 2021	30 November, 2022
Horn antenna	BBHA 9120D	Schwarzbeck	9120D-938	ANT1006	1 GHz - 18 GHz	17 July, 2021	31 July, 2022