

TEST REPORT

Applicant : Sakamoto Electric MFG. Co., Ltd.

Address : 3-27-55, Wajiro, Higashi-ku, Fukuoka 811-0202, Japan

Products : XBee3

Model No. : MOD-SELN131

Serial No. : --

Test Standard : CFR 47 FCC Rules and Regulations Part 15 Subpart C

FCC ID : 2BE5W-SELN131

Test Results : **Passed (in partial testing, see test results)**

Date of Receipt : March 18, 2024

Date of Test : March 21 ~ 23, 2024



VLAC
Lab Accreditation
VLAC-001-2

A handwritten signature in black ink, reading "H. Nakamura", is written over a horizontal line.

Hiroyuki Nakamura
Senior Manager
Japan Quality Assurance Organization
Kitakansai Testing Center
Saito EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- 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.

REVISION HISTORY

File No.	Contents	Issue Date
KL80230802	Initial Issue	April 30, 2024

TABLE OF CONTENTS

	Page
1 Summary of Test Results.....	4
2 Description of Equipment Under Test (EUT).....	5
2.1 General Information.....	5
2.2 Host Device Information	5
2.3 Channel List	5
3 Test Location.....	6
4 Accreditation of Test Laboratory	6
5 Measurement Uncertainty	6
6 Setup of EUT	7
6.1 Test Configuration	7
6.2 Test Arrangement (Drawings)	7
6.3 Operating Condition	8
6.4 Duty Cycle	9
7 Test Item	10
7.1 Maximum Conducted Output Power.....	10
7.2 Radiated Spurious Emission	12
8 Test Setup (Photographs).....	36

1 Summary of Test Results

Applied Standard : CFR 47 FCC Rules and Regulations Part 15 – Radio Frequency Devices
Subpart C – Intentional Radiators

Item	FCC rules	Result	Note
Antenna Requirement	§15.203	Passed	1
99% Occupied Bandwidth	--	Not Tested	
6 dB Emission Bandwidth	§15.247(a)(2)	Not Tested	
Power Spectral Density	§15.247(e)	Not Tested	
Maximum Conducted Output Power	§15.247(b)(3)	Passed	
Conducted Spurious Emission	§15.247(d)	Not Tested	
Radiated Spurious Emission	§15.205, §15.209 and §15.247(d)	Passed	
AC Powerline Conducted Emission	§15.207	Not Tested	
RF Exposure	§1.1310, §2.1093 and §15.247(i)	Passed	2
1) The EUT is designed to ensure that no antenna other than that furnished by the manufacturer shall be used. Information for antenna type is described in clause 2. 2) Refer to test report KL80230803.			

In the approval of test results,

- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by
Yasuhisa Sakai / Deputy Senior Manager

Y. Sakai

Tested by
Yuji Shintaku / Assistant Manager

Y. Shintaku

2 Description of Equipment Under Test (EUT)

2.1 General Information

Manufacturer	Digi International Inc. 11001 Bren Road East Minnetonka, MN 55343 USA
Products	XBee3
Model No.	MOD-SELN131
Serial No.	--
Power Rating	3.3VDC
Modulation Technology	Digital transmission system (DTS)
Modulation Type	QPSK
Operating Frequency	2405 MHz (11CH) – 2480 MHz (26CH)
Antenna Type	Integral PCB Antenna
Antenna Gain	0 dBi

2.2 Host Device Information

Manufacturer	Sakamoto Electric MFG. Co., Ltd. 3-27-55, Wajiro, Higashi-ku, Fukuoka 811-0202, Japan
Products	Digital Spirit Level Sensor
Model No.	SELN-131BTM
Serial No.	ZIGBEE 1 (radiated sample), ZIGBEE 2 (conducted sample)
Product Type	Prototype
Date of Manufacture	November 20, 2023
Power Rating	4.5VDC (AAA Lithium Battery ×3) 5VDC (supplied via USB)
Grounding	None

2.3 Channel List

16 channels are provided for ZigBee.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

3 Test Location

Japan Quality Assurance Organization (JQA)
Kitakansai Testing Center Saito EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

4 Accreditation of Test Laboratory

JQA Kitakansai Testing Center Saito EMC Branch is accredited under ISO/IEC 17025 by the following accreditation bodies and the test facility is registered by the following bodies. If the accreditation logo does not appear on this cover, it is outside the scope of ISO/IEC 17025.

VLAC Accreditation No. : VLAC-001-2 (Expiry date : April 30, 2024)
A2LA Accreditation No. : 5498.01 (Expiry date : November 30, 2025)

VCCI Registration No. : A-0002 (Expiry date : April 30, 2024)
FCC Registration No. : JP5008 (Expiry date : April 30, 2024)
ISED Registration No. : JP0014 (Expiry date : November 30, 2025)
BSMI Registration No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006
(Expiry date : September 14, 2025)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Expiry date : February 22, 2025)

5 Measurement Uncertainty

Item	Frequency	Uncertainty (<i>U</i>)
Emission Bandwidth	--	± 0.9 %
Peak Output Power	--	± 0.9 dB
Conducted Emission (Antenna Port)	9 kHz – 1 GHz	± 1.4 dB
	1 GHz – 18 GHz	± 1.7 dB
	18 GHz – 40 GHz	± 2.3 dB
Radiated Emission	9 kHz – 30 MHz	± 3.0 dB
	30 MHz – 200 MHz	± 3.6 dB
	200 MHz – 1000 MHz	± 4.8 dB
	1 GHz – 6 GHz	± 4.7 dB
	6 GHz – 18 GHz	± 4.6 dB
	18 GHz – 40 GHz	± 5.1 dB
AC Powerline Conducted Emission	150 kHz – 30 MHz	± 2.6 dB

Determining compliance with the limits in this test report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty (MIU).

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

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.
A	Digital Spirit Level Sensor	Sakamoto Electric MFG. Co., Ltd.	SELN-131BTM	ZIGBEE 1 ZIGBEE 2

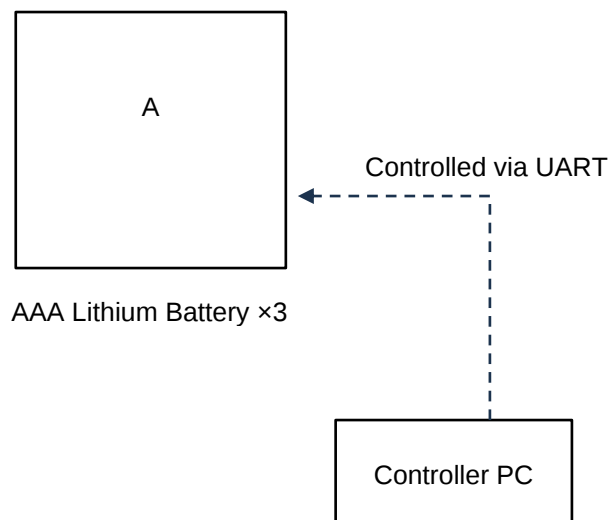
The auxiliary equipment (AE) used for testing :

None

Type of Cable:

None

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Test Mode

The EUT is set with the test mode, the specification of the test mode is as followings.

Tx frequency : 2405 MHz (11CH) – 2480 MHz (26CH)
Modulation Type : QPSK

The tests were performed in the following condition.

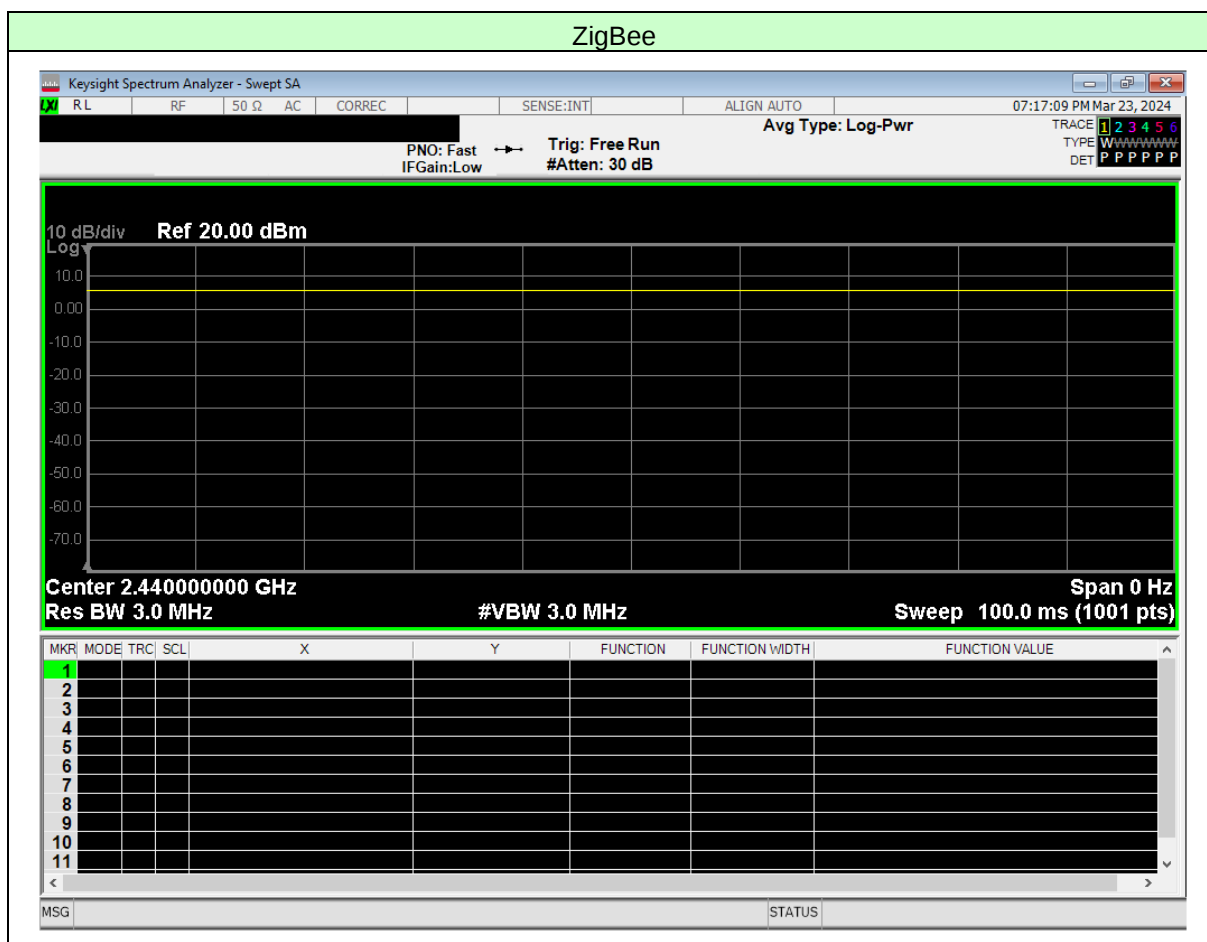
Mode	Modulation	Channel
ZigBee	QPSK	11, 18, 26

The tests were performed using the following test program supplied by applicant;

- Software Name : XBEE3_startup (02 06 2023).vi
- Software Version : 02 06 2023
- Storage Location : Controller PC

6.4 Duty Cycle

Mode	On Time (msec.)	On+Off Time (msec.)	Duty Cycle (%)	Duty Factor (dB)	VBW [$>1/T$] (kHz)
ZigBee	1.000	1.000	100.0	0.00	> 0.01



7 Test Item

7.1 Maximum Conducted Output Power

7.1.1 Test Site and Instruments

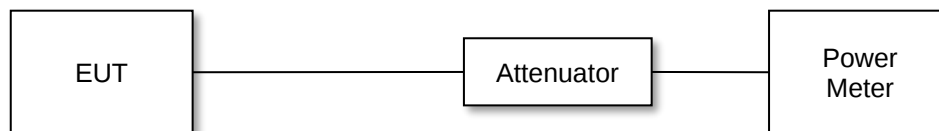
Test Site : Shielded Room S3					
Type	Model	Serial No. (ID)	Manufacturer	Last Cal.	Cal. Due
Power Sensor	MA2491A	1409075 (B-17)	Anritsu	2023/08/14	2024/08/13
Power Sensor	MA2411B	1339136 (B-18)	Anritsu	2023/08/14	2024/08/13
Attenuator	54A-10	W5732 (D-30)	Weinschel	2023/05/26	2024/05/25
Thermo-Hygrometer	testo 608-H2	30050650 (F-71)	testo	2023/04/24	2024/04/23
Barometer	BAROMEX	02952 (F-48)	SATO	2023/08/16	2024/08/15

7.1.2 Test Method and Test Setup (Diagrammatic illustration)

The EUT is connected to the measuring equipment via a suitable attenuator.

The test conditions and methods comply with the following test standards.

- KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2020 +Cor.1-2023 clause 11.9.1.2 (PKPM1) and 11.9.2.3.2 (AVGPM-G)



7.1.3 Test Data

Test Date: March 23, 2024
Temp.: 18 °C, RH: 50 %, Atm.: 1001 hPa

Mode	Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits (dBm)
ZigBee	11	2405	6.90	≤ 30.0
	18	2440	6.83	≤ 30.0
	26	2480	6.75	≤ 30.0

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limits (dBm)
ZigBee	11	2405	6.80	--
	18	2440	6.75	--
	26	2480	6.68	--

7.2 Radiated Spurious Emission

7.2.1 Test Site and Instruments

Test Site : Anechoic Chamber A2					
Type	Model	Serial No. (ID)	Manufacturer	Last Cal.	Cal. Due
Test Receiver	ESR26	101680 (A-76)	Rohde & Schwarz	2024/01/29	2025/01/28
Pre-Amplifier	310N	304573 (A-17)	SONOMA	2023/11/07	2024/11/06
Pre-Amplifier	RP1826G-45H	RP140121-11 (A-53)	EMCS	2023/07/17	2024/07/16
Pre-Amplifier	BZR-01001800-201040-182323-HS	23804 (A-65)	B&Z	2024/02/07	2025/02/06
Loop Antenna	HFH2-Z2	872096/25 (C-2)	Rohde & Schwarz	2023/05/25	2024/05/24
Biconical Antenna	VHBB9124/BBA9106	01314 (C-85)	Schwarzbeck	2023/11/01	2024/10/31
Log-periodic Antenna	VULP9118B	871 (C-39)	Schwarzbeck	2023/11/01	2024/10/31
Horn Antenna	91889-2	568 (C-41-2)	EATON	2023/05/23	2024/05/22
Double-Ridge Guide Horn Antenna	3115	00227684 (C-103)	ETS LINDGREN	2023/05/22	2024/05/21
Horn Antenna	3160-08	9904-1099 (C-59)	EMCO	2023/05/23	2024/05/22
Horn Antenna	3160-09	9808-1117 (C-48)	EMCO	2023/07/17	2024/07/16
RF Cable	SF102E	6683/2E (C-70)	HUBER+SUHNER	2023/04/03	2024/04/02
RF Cable	SF102E	10055/2E (C-75)	HUBER+SUHNER	2023/04/03	2024/04/02
RF Cable	S 10162 B-11 etc.	--- (H-4)	HUBER+SUHNER	2023/11/07	2024/11/06
RF Cable	RG213/U	--- (H-28)	HUBER+SUHNER	2023/05/25	2024/05/24
Band Rejection Filter	BRM50702	371 (D-121)	MICRO-TRONICS	2023/10/05	2024/10/04
EMC Software	EP5/RE	Ver.6.00.120	TOYO	--	--
Thermo-Hygrometer	testo 608-H2	30050646 (F-68)	testo	2023/06/09	2024/06/08
Barometer	BAROMEX	02952 (F-48)	SATO	2023/08/16	2024/08/15

7.2.2 Test Method and Test Setup (Diagrammatic illustration)

The test conditions and methods comply with the following test standards.

- KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2020 +Cor.1-2023 clause 11.12

7.2.2.1 Radiated Spurious Emission 9 kHz – 30 MHz

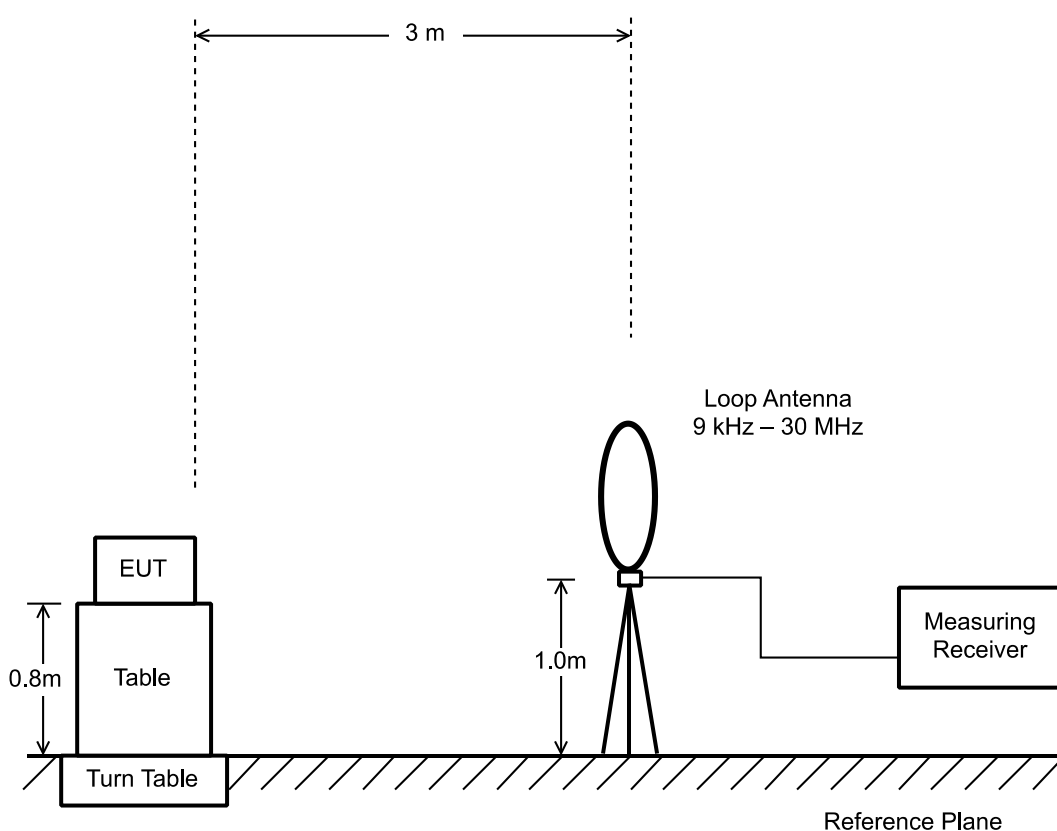
The pre-scan measurements were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT. The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

The measurement were performed about three antenna orientations (parallel, perpendicular, and ground-parallel).

According to KDB 414788, a used anechoic chamber were equivalent to those on an open fields site based on comparison measurements.

This configurations was used for formal measurements.

(Reference divisional instruction No. G703649)

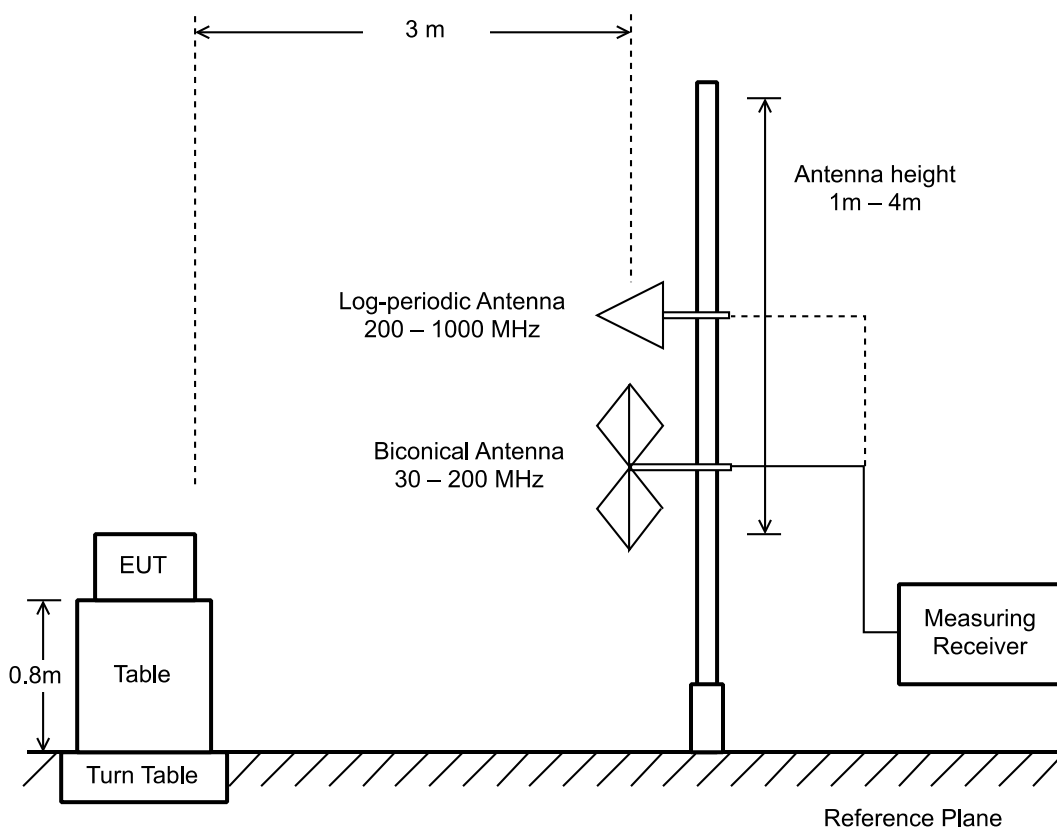


7.2.2.2 Radiated Spurious Emission 30 MHz – 1000 MHz

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. G703649)

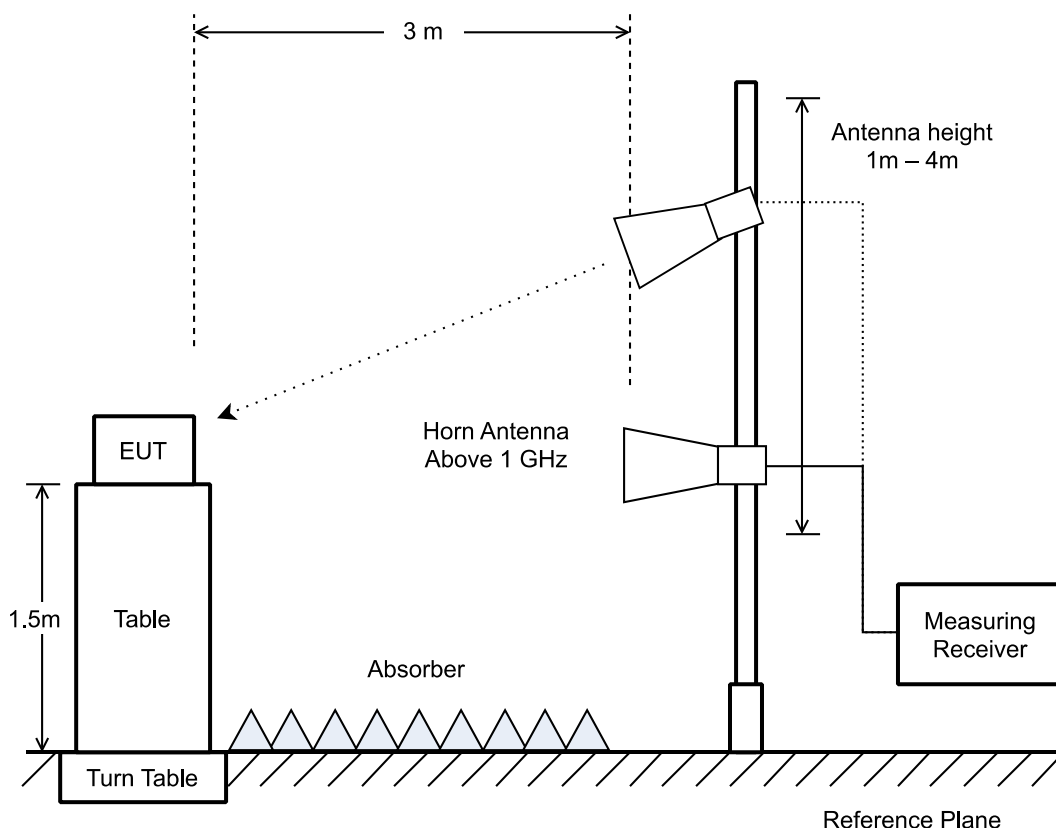


7.2.2.3 Radiated Spurious Emission above 1 GHz

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. G703649)



NOTE 1

When the EUT is manipulated through three different orientations (for example, X, Y and Z axis), the scan height upper range for the measurement antenna is limited to 2.5 m or 0.5 m above the top of the EUT.

NOTE 2

The spectrum analyzer was set to as follows.

Peak Measurements : RBW = 1 MHz, VBW = 3 MHz

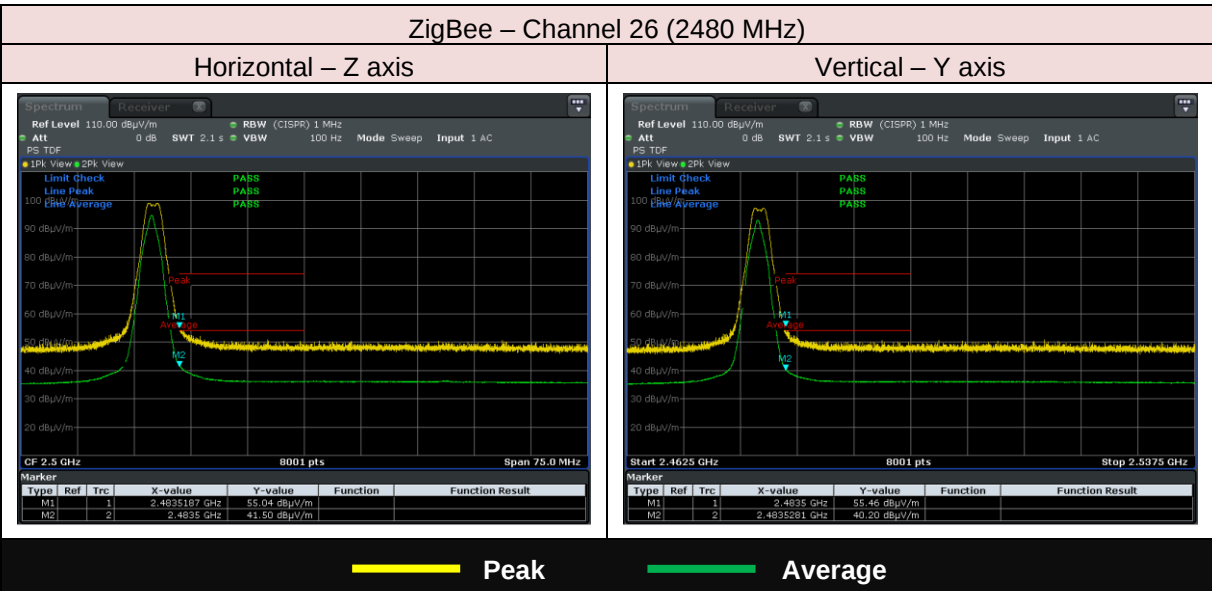
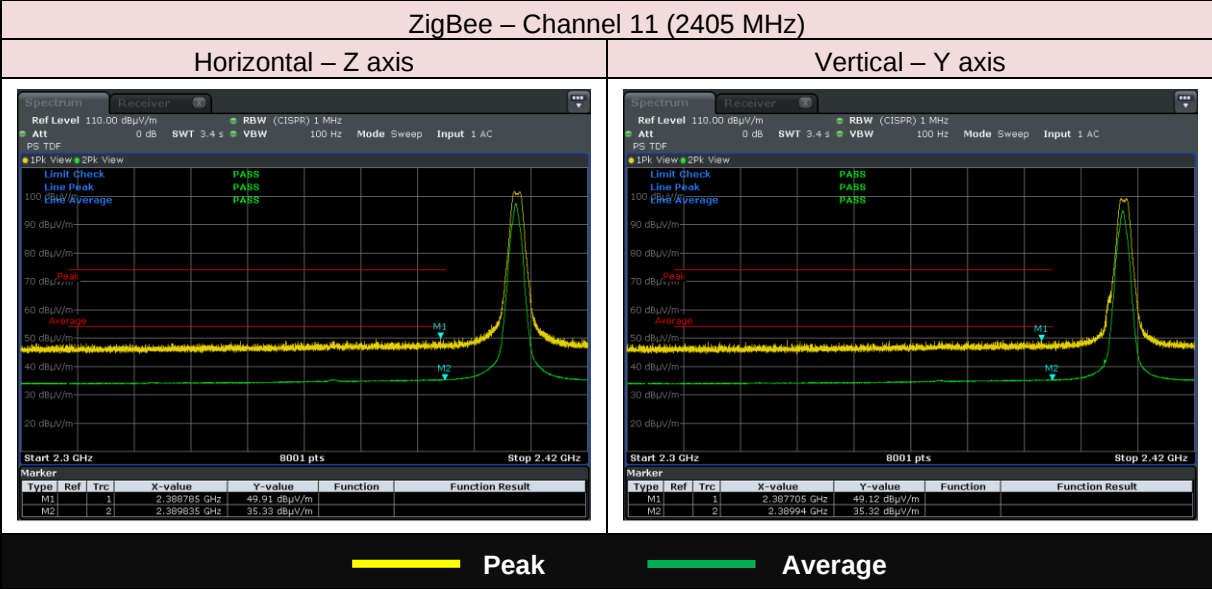
Average Measurements : RBW = 1 MHz, VBW = 100 Hz (refer to clause 6.4)

7.2.3 Test Data

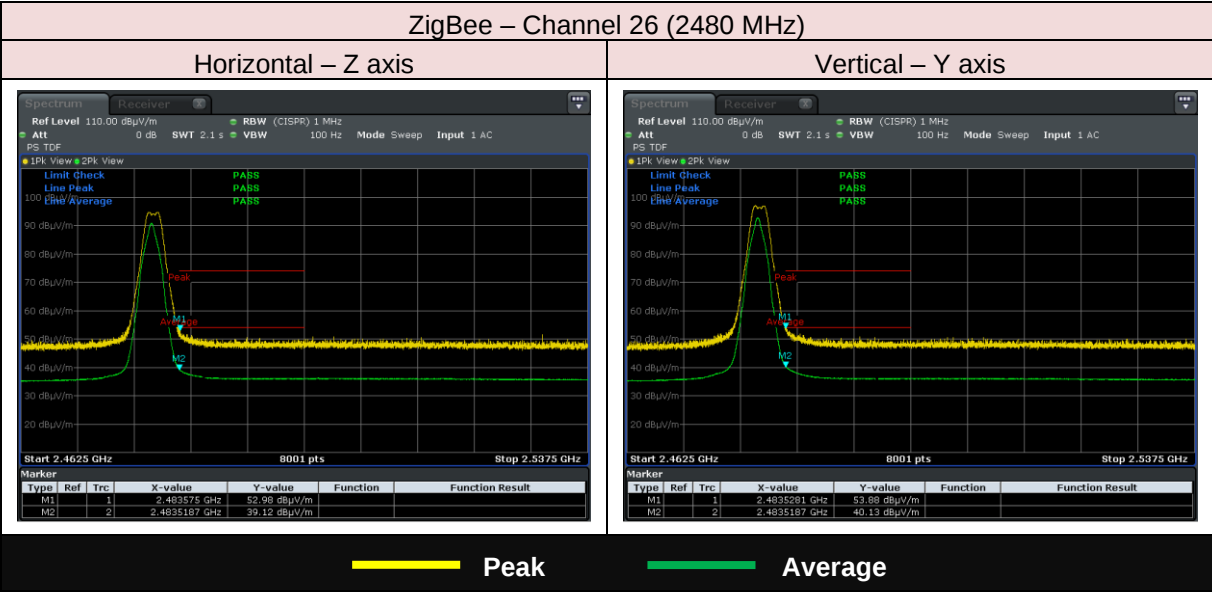
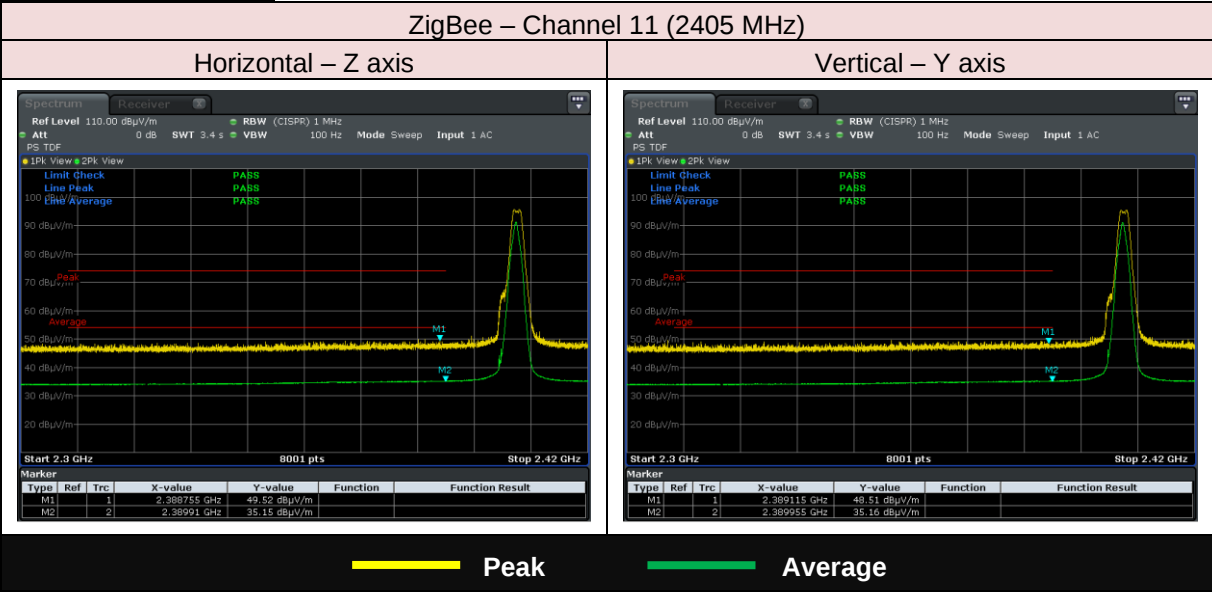
7.2.3.1 Band-edge Emission

Test Date: March 22, 2024
Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

SUS Base-Plate



Aluminum Base-Plate



7.2.3.2 Radiated Spurious Emission 9 kHz – 30 MHz

All modes have been investigated and the worst case mode has been listed.
The orientation of the EUT have been fixed to X axis.

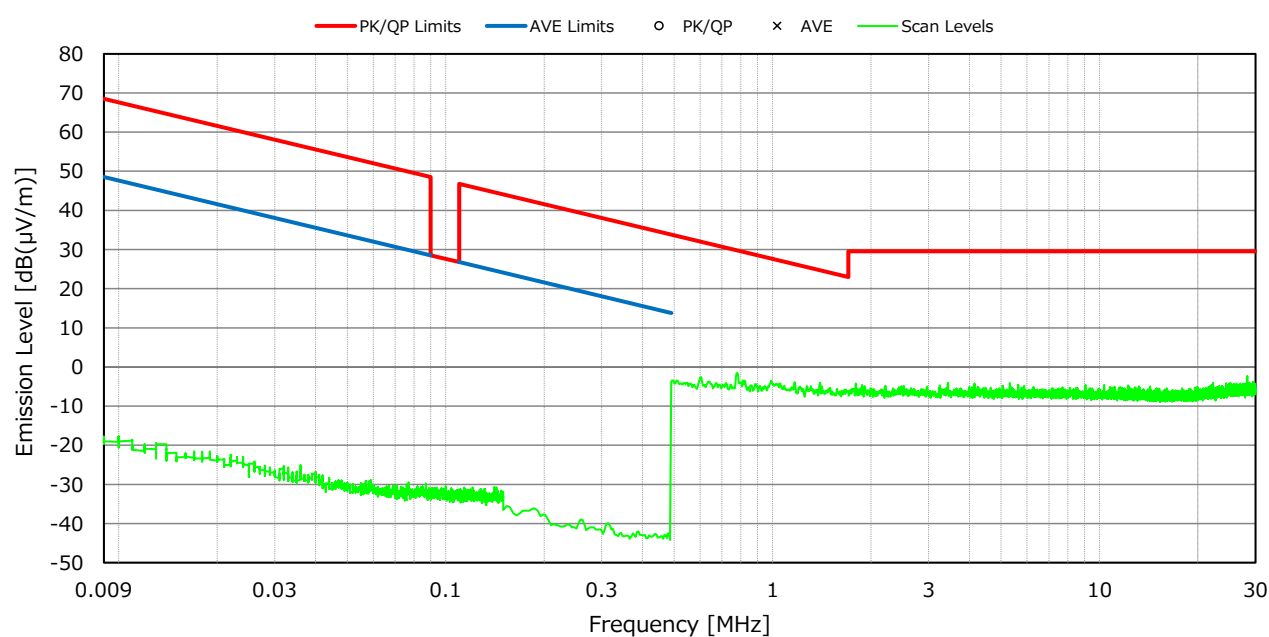
Test voltage : 4.5VDC

Test condition : SUS Base-Plate

Antenna polarization : Perpendicular to measurement axis

Test Date: March 21, 2024

Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 30 m)
- 2) The spectrum was checked from 9 kHz to 30 MHz.
- 3) PK/QP : Quasi-Peak detector, AVE : Average detector
- 4) Bandwidth : 200 Hz (9 kHz - 150 kHz), 9 kHz (150 kHz - 30 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

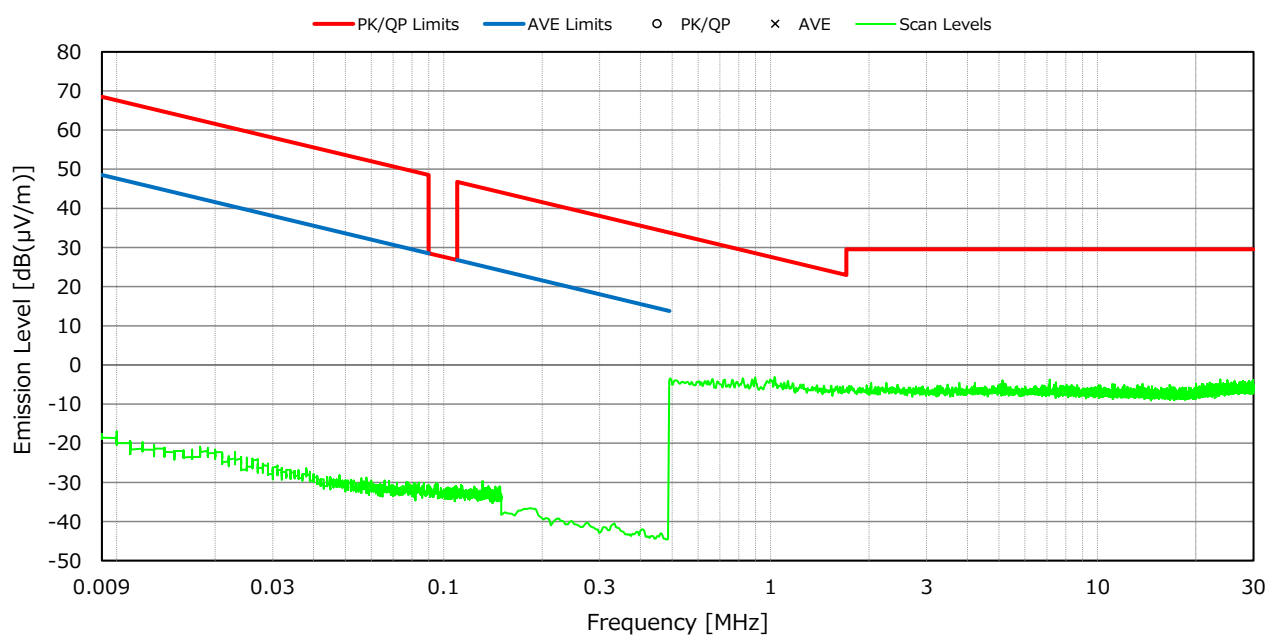
Test voltage : 4.5VDC

Test condition : Aluminum Base-Plate

Antenna polarization : Perpendicular to measurement axis

Test Date: March 21, 2024

Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa



NOTES

- 1) Measurement Distance : 3 m (Specified Distance : 30 m)
- 2) The spectrum was checked from 9 kHz to 30 MHz.
- 3) PK/QP : Quasi-Peak detector, AVE : Average detector
- 4) Bandwidth : 200 Hz (9 kHz - 150 kHz), 9 kHz (150 kHz - 30 MHz)
- 5) All emission levels were below the noise floor, or more than 15 dB below the applied limits.

7.2.3.3 Radiated Spurious Emission 30 MHz – 1000 MHz

All modes have been investigated and the worst case mode has been listed.
The orientation of the EUT have been fixed to X axis.

Test voltage : 4.5VDC

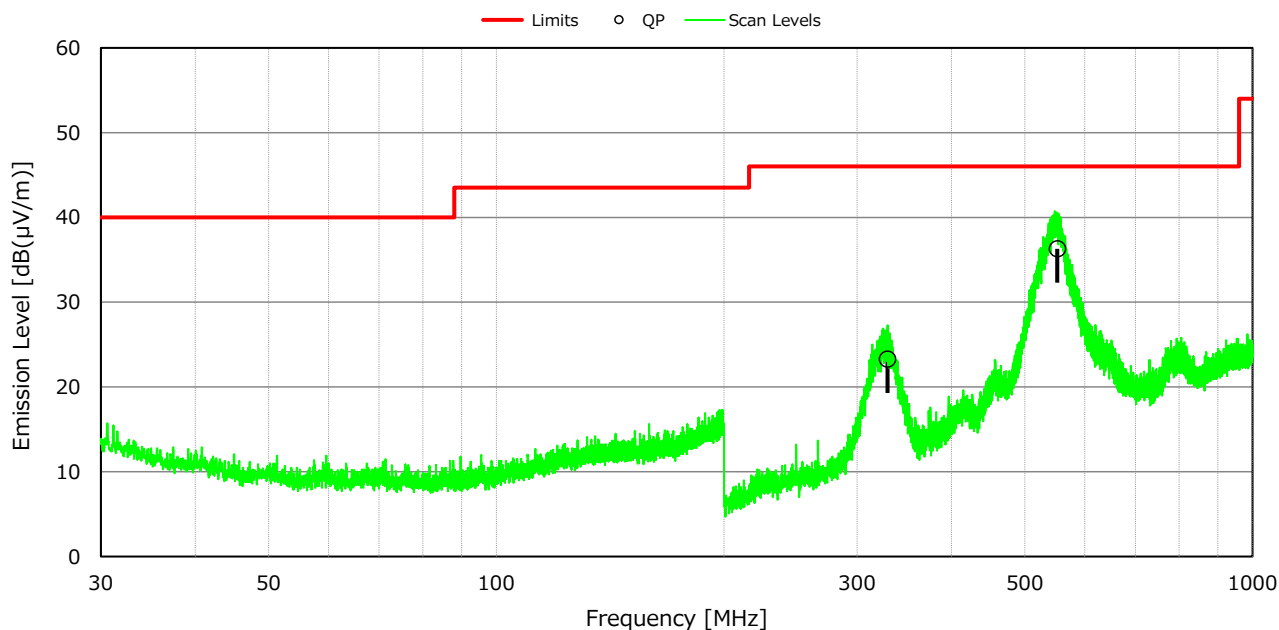
Test condition : SUS Base-Plate

Antenna polarization : Horizontal

Test Date: March 21, 2024

Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
329.171	-14.6	37.9	46.0	23.3	+ 22.7	-
551.988	- 9.1	45.4	46.0	36.3	+ 9.7	-

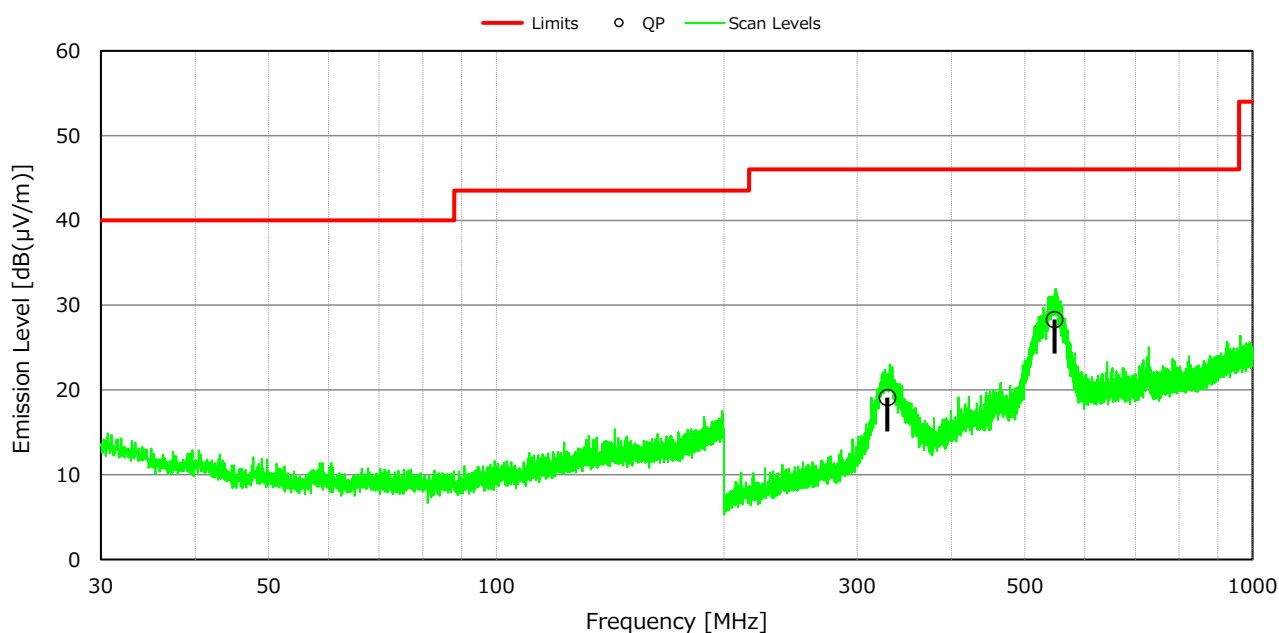


NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -9.1 + 45.4 = 36.3 dB(μV) at 551.988 MHz
Antenna Height : 155 cm, Turntable Rotation Position : 255 °
- 5) QP : Quasi-Peak detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

Test voltage : 4.5VDC**Test condition : SUS Base-Plate****Antenna polarization : Vertical****Test Date: March 21, 2024****Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa**

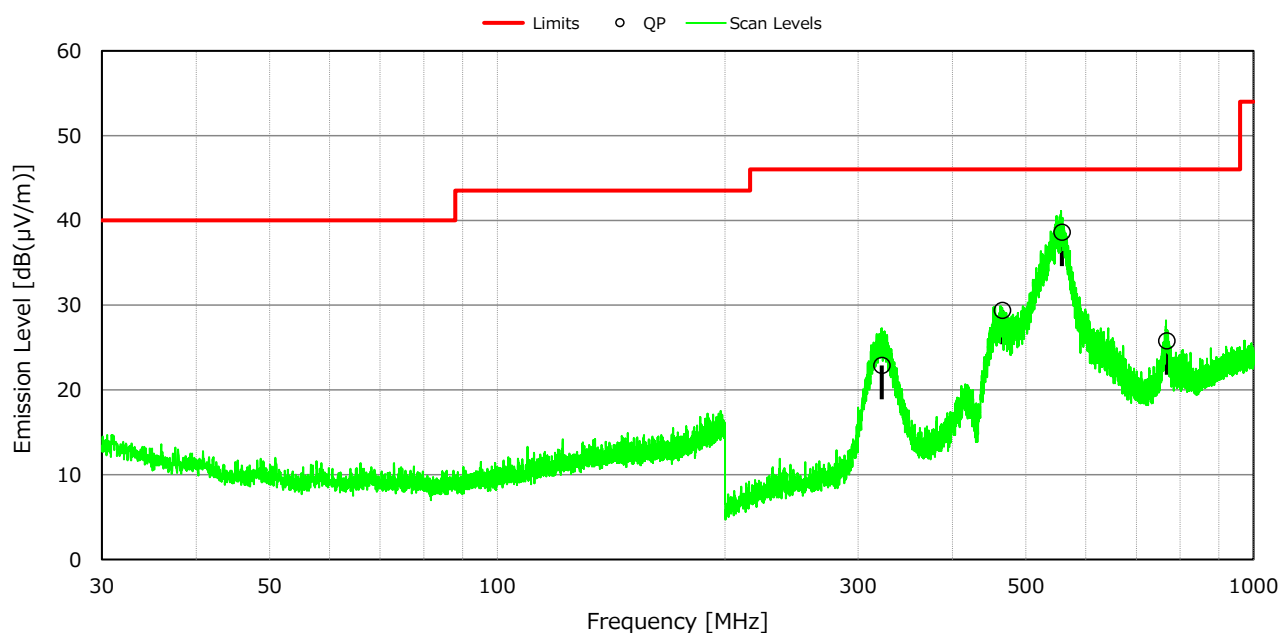
Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
329.036	-14.6	33.7	46.0	19.1	+ 26.9	-
547.227	- 9.1	37.4	46.0	28.3	+ 17.7	-

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -9.1 + 37.4 = 28.3 dB(μV) at 547.227 MHz
Antenna Height : 173 cm, Turntable Rotation Position : 171 °
- 5) QP : Quasi-Peak detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

Test voltage : 4.5VDC**Test condition : Aluminum Base-Plate****Antenna polarization : Horizontal****Test Date: March 21, 2024****Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa**

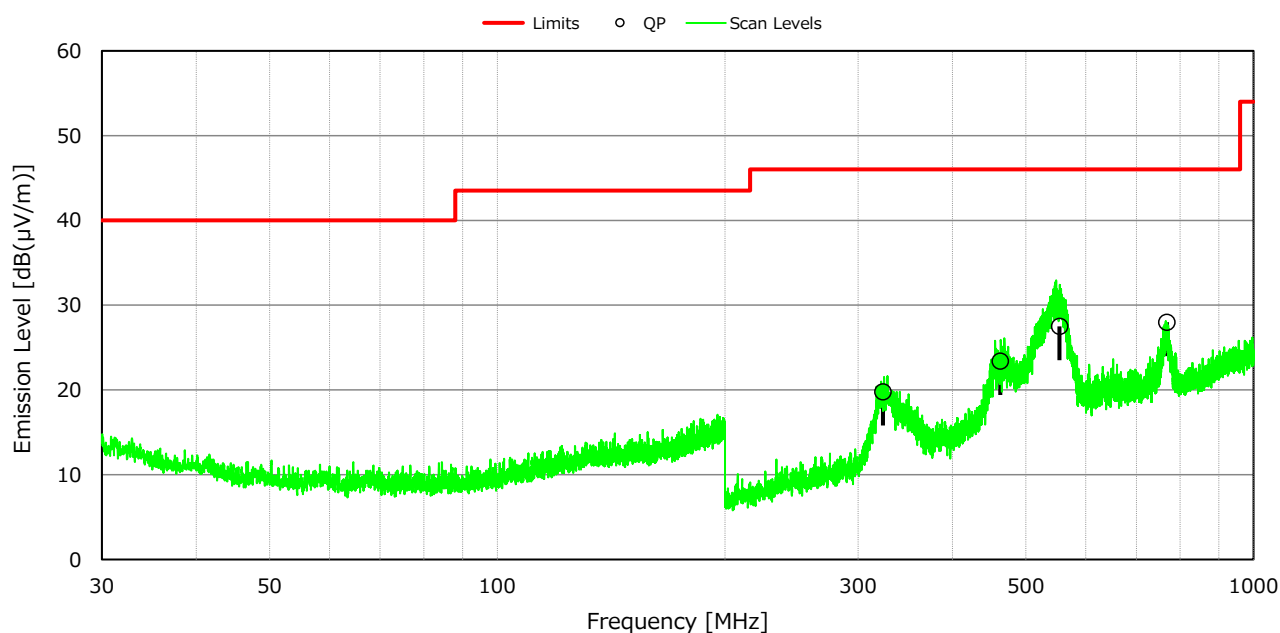
Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
322.525	-14.8	37.7	46.0	22.9	+ 23.1	-
465.377	-11.0	40.4	46.0	29.4	+ 16.6	-
558.086	- 8.9	47.5	46.0	38.6	+ 7.4	-
768.121	- 5.7	31.5	46.0	25.8	+ 20.2	-

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -8.9 + 47.5 = 38.6 dB(μV) at 558.086 MHz
Antenna Height : 148 cm, Turntable Rotation Position : 254 °
- 5) QP : Quasi-Peak detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

Test voltage : 4.5VDC**Test condition : Aluminum Base-Plate****Antenna polarization : Vertical****Test Date: March 21, 2024****Temp.: 22 °C, RH: 41 %, Atm.: 1002 hPa**

Frequency	Factor	Readings	Limits	Results	Margin	Remarks
[MHz]	[dB]	[dB(μV)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	
323.566	-14.8	34.6	46.0	19.8	+ 26.2	-
462.497	-11.0	34.4	46.0	23.4	+ 22.6	-
554.108	- 9.0	36.5	46.0	27.5	+ 18.5	-
768.121	- 5.7	33.7	46.0	28.0	+ 18.0	-

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 30 MHz to 1000 MHz.
- 3) The factor includes the antenna factor and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -5.7 + 33.7 = 28.0 dB(μV) at 768.121 MHz
Antenna Height : 139 cm, Turntable Rotation Position : 183 °
- 5) QP : Quasi-Peak detector
- 6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

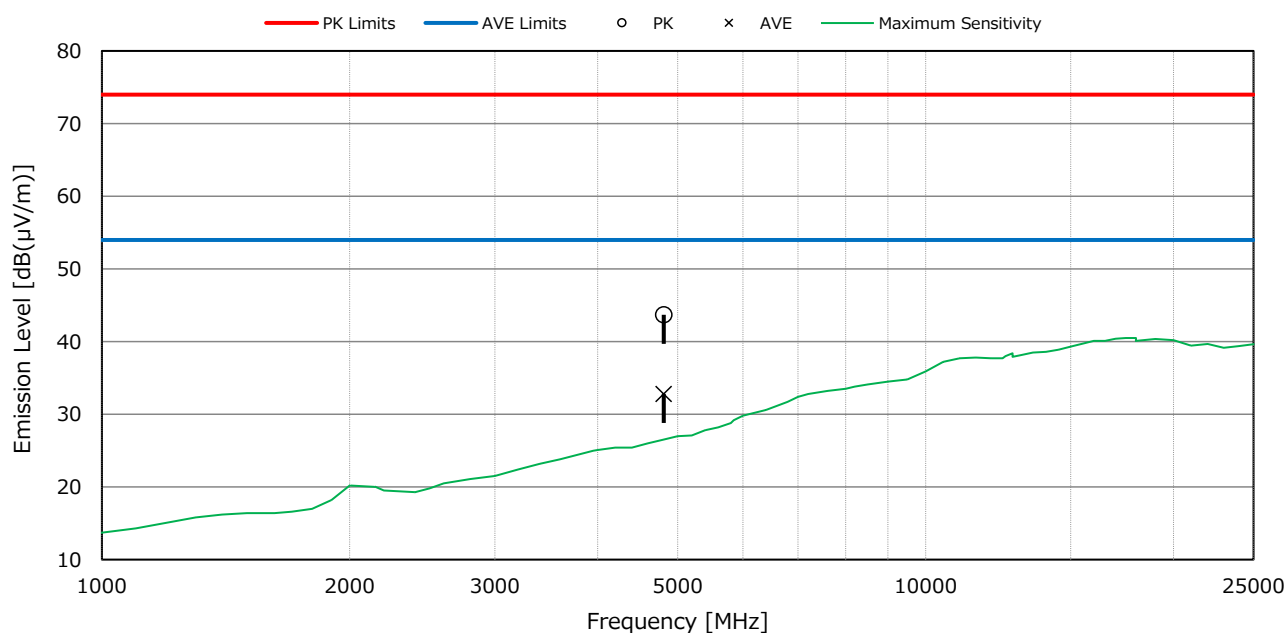
7.2.3.4 Radiated Spurious Emission above 1 GHz

Test voltage : 4.5VDC**Test condition : 11ch (2405MHz) / SUS Base-Plate****Antenna polarization : Horizontal**

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4810.00	- 5.4	49.1	38.2	74.0	54.0	43.7	32.8	+ 30.3	+ 21.2	Z



NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.4 + 38.2 = 32.8 dB(μV) at 4810.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC

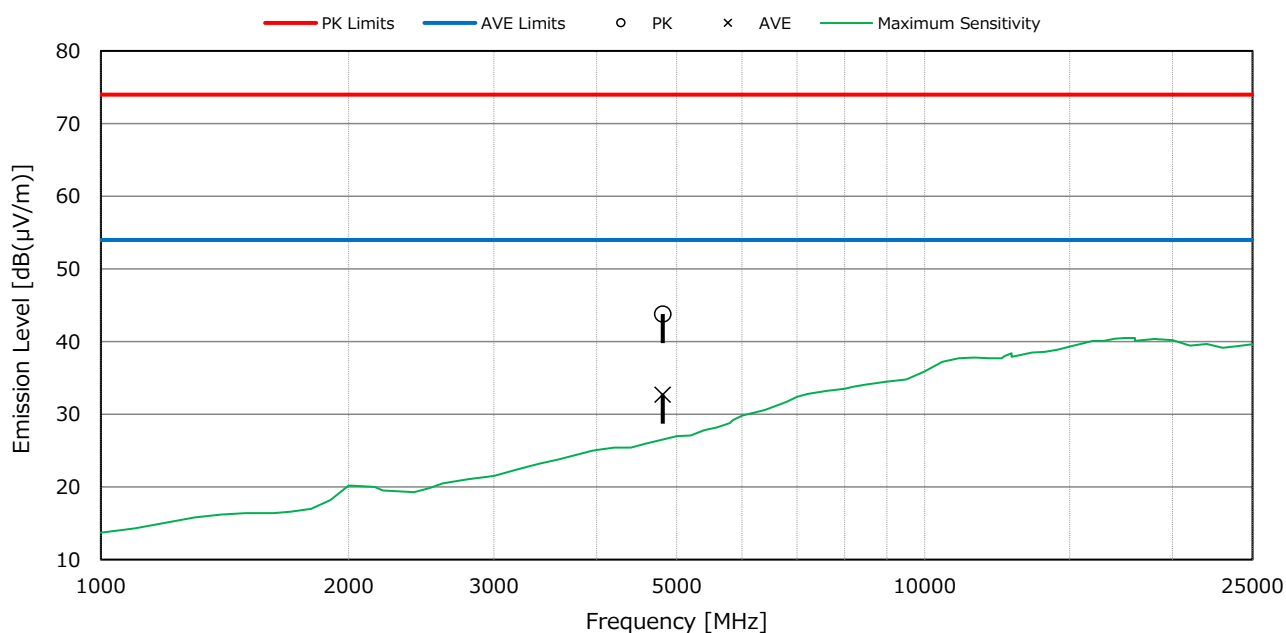
Test condition : 11ch (2405MHz) / SUS Base-Plate

Antenna polarization : Vertical

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4810.00	- 5.4	49.2	38.1	74.0	54.0	43.8	32.7	+ 30.2	+ 21.3	Y



NOTES

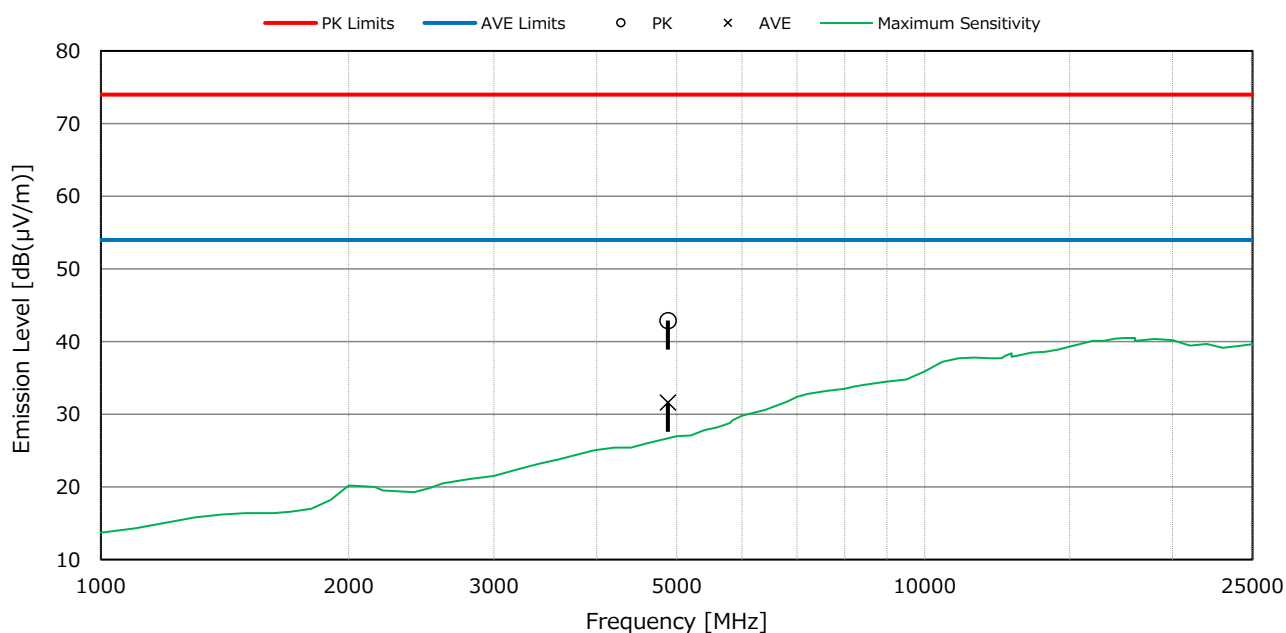
- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.4 + 38.1 = 32.7 dB(μV) at 4810.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 18ch (2440MHz) / SUS Base-Plate****Antenna polarization : Horizontal**

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4880.00	- 5.3	48.2	36.9	74.0	54.0	42.9	31.6	+ 31.1	+ 22.4	Z

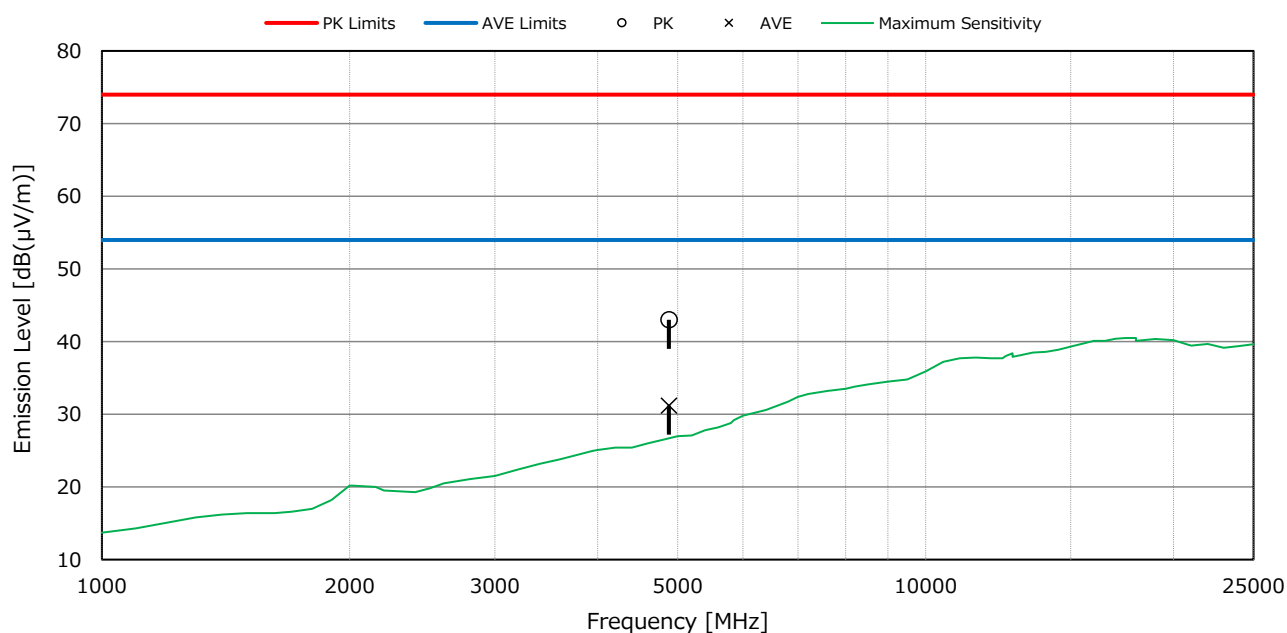


NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.3 + 36.9 = 31.6 dB(μV) at 4880.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 18ch (2440MHz) / SUS Base-Plate****Antenna polarization : Vertical****Test Date: March 22, 2024****Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa**

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4880.00	- 5.3	48.3	36.5	74.0	54.0	43.0	31.2	+ 31.0	+ 22.8	Y

**NOTES**

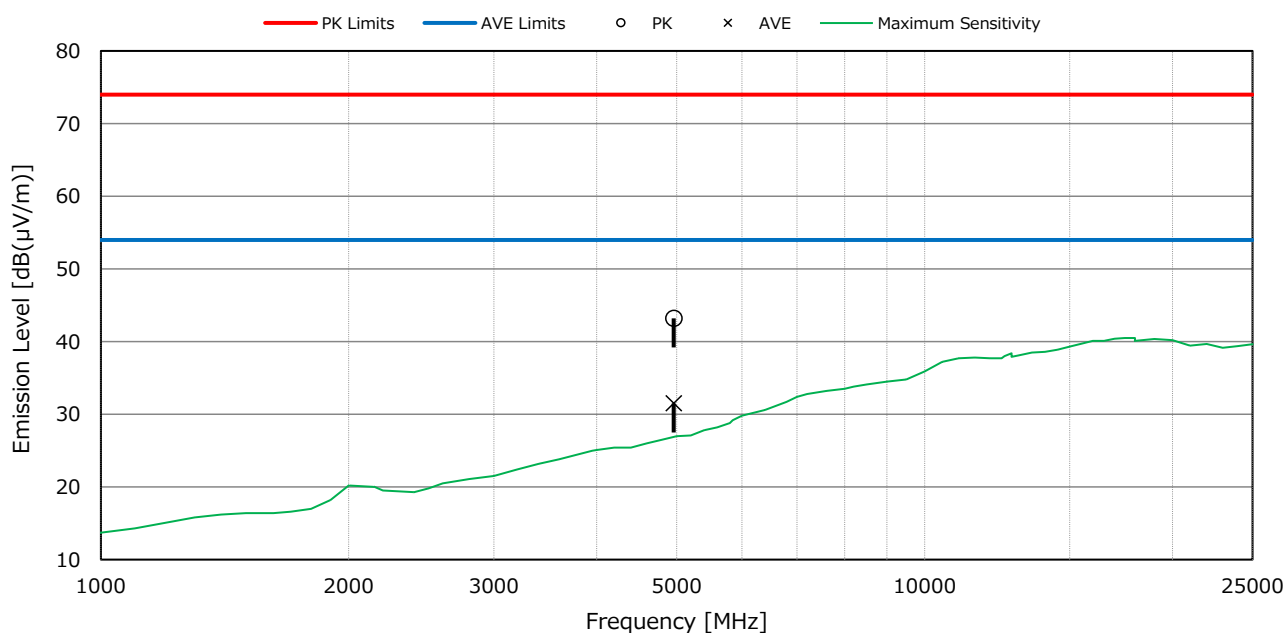
- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.3 + 36.5 = 31.2 dB(μV) at 4880.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 26ch (2480MHz) / SUS Base-Plate****Antenna polarization : Horizontal**

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4960.00	- 5.0	48.2	36.5	74.0	54.0	43.2	31.5	+ 30.8	+ 22.5	Z



NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.0 + 36.5 = 31.5 dB(μV) at 4960.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC

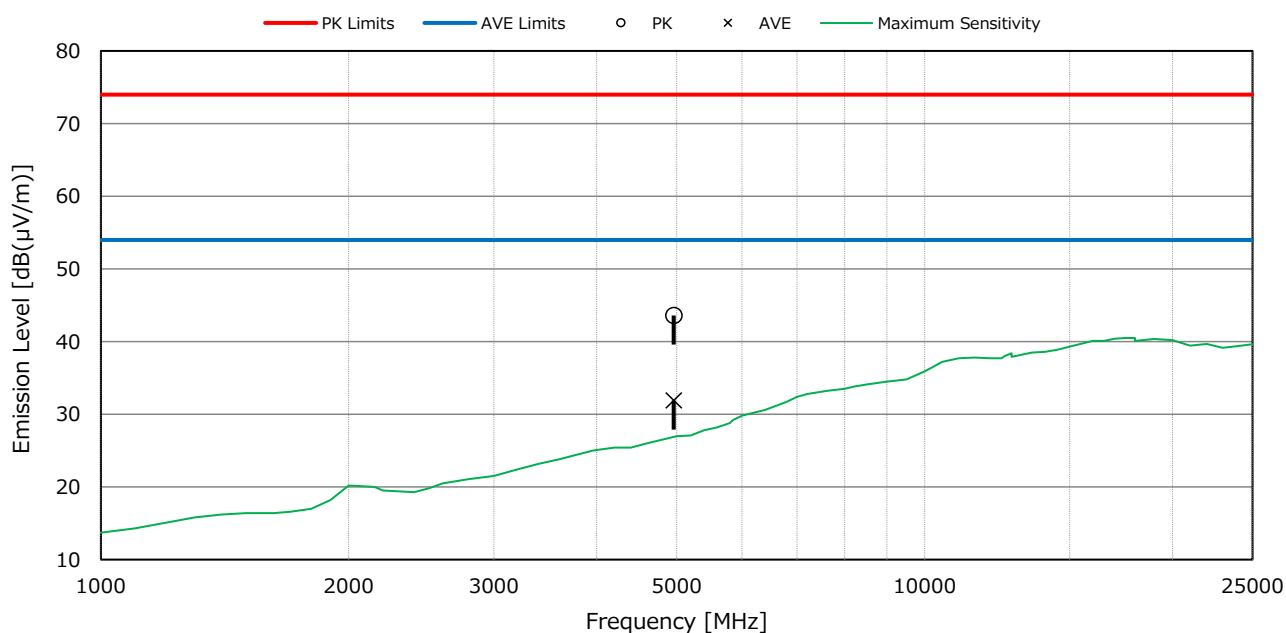
Test condition : 26ch (2480MHz) / SUS Base-Plate

Antenna polarization : Vertical

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4960.00	- 5.0	48.6	36.9	74.0	54.0	43.6	31.9	+ 30.4	+ 22.1	Y



NOTES

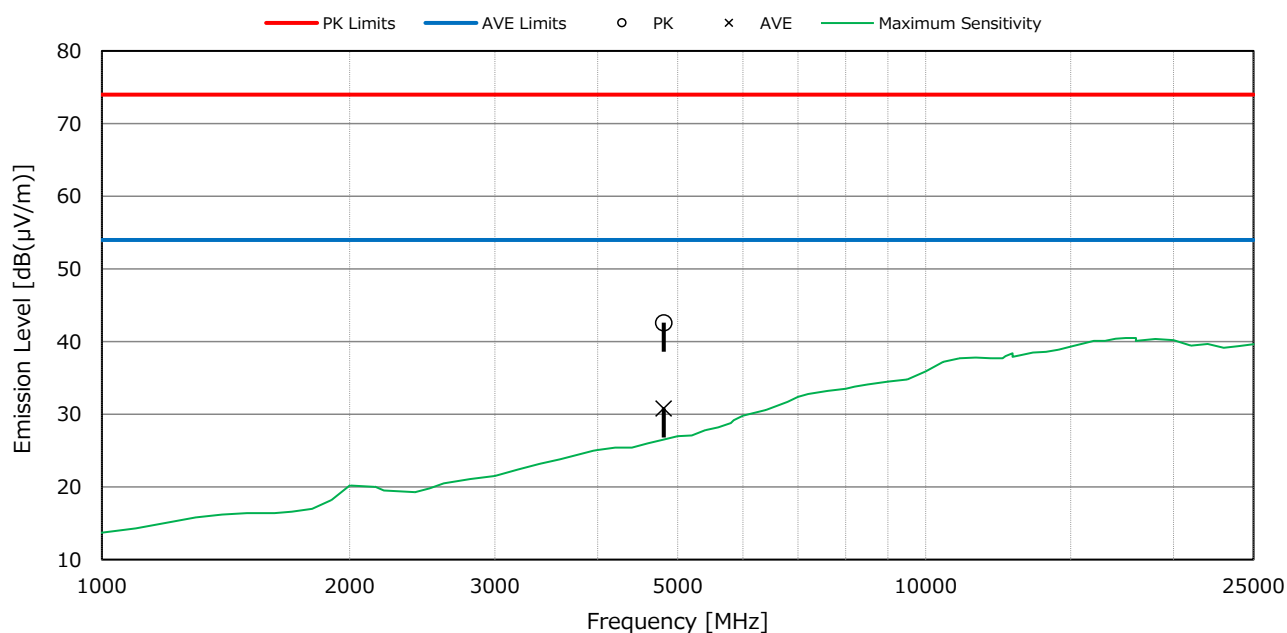
- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.0 + 36.9 = 31.9 dB(μV) at 4960.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 11ch (2405MHz) / Aluminum Base-Plate****Antenna polarization : Horizontal**

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4810.00	- 5.4	48.0	36.2	74.0	54.0	42.6	30.8	+ 31.4	+ 23.2	Z

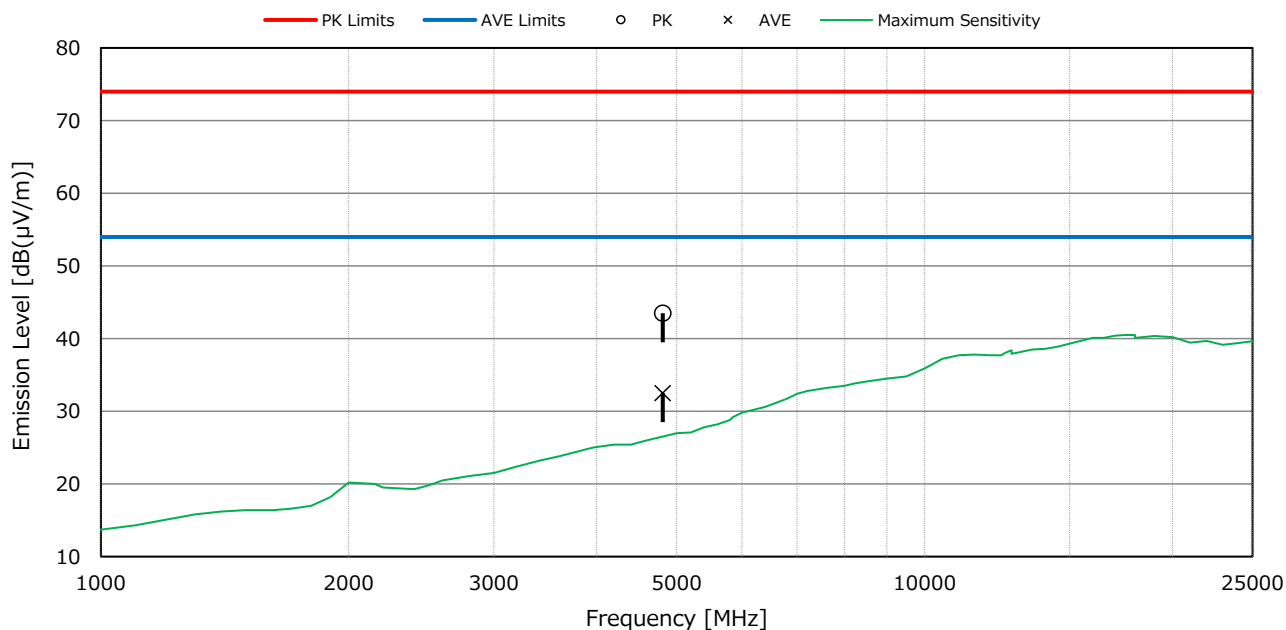


NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.4 + 36.2 = 30.8 dB(μV) at 4810.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 11ch (2405MHz) / Aluminum Base-Plate****Antenna polarization : Vertical****Test Date: March 22, 2024****Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa**

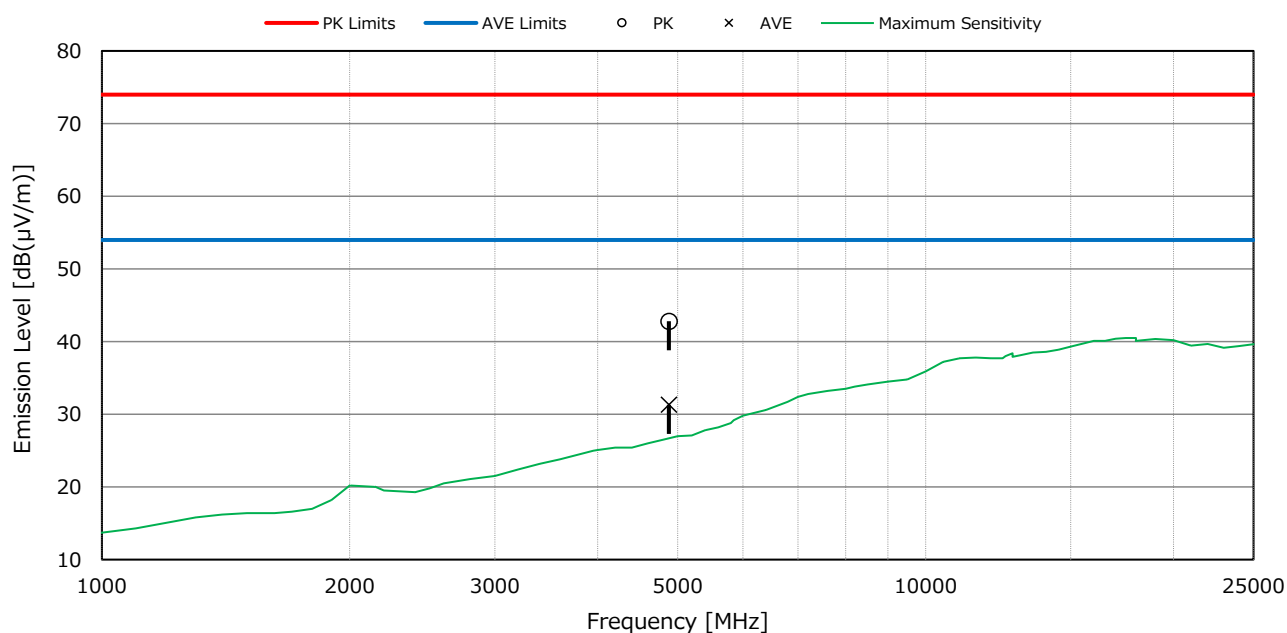
Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4810.00	- 5.4	48.9	37.9	74.0	54.0	43.5	32.5	+ 30.5	+ 21.5	Y

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.4 + 37.9 = 32.5 dB(μV) at 4810.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 18ch (2440MHz) / Aluminum Base-Plate****Antenna polarization : Horizontal****Test Date: March 22, 2024****Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa**

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4880.00	- 5.3	48.1	36.6	74.0	54.0	42.8	31.3	+ 31.2	+ 22.7	Z

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.3 + 36.6 = 31.3 dB(μV) at 4880.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC

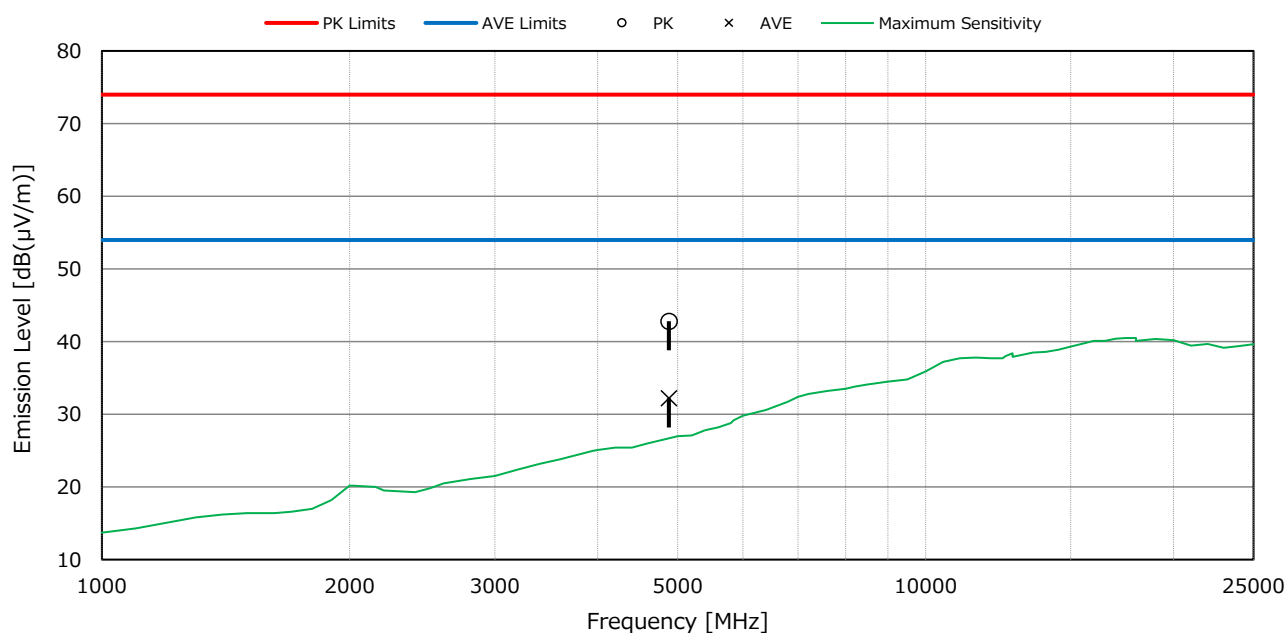
Test condition : 18ch (2440MHz) / Aluminum Base-Plate

Antenna polarization : Vertical

Test Date: March 22, 2024

Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4880.00	- 5.3	48.1	37.5	74.0	54.0	42.8	32.2	+ 31.2	+ 21.8	Y

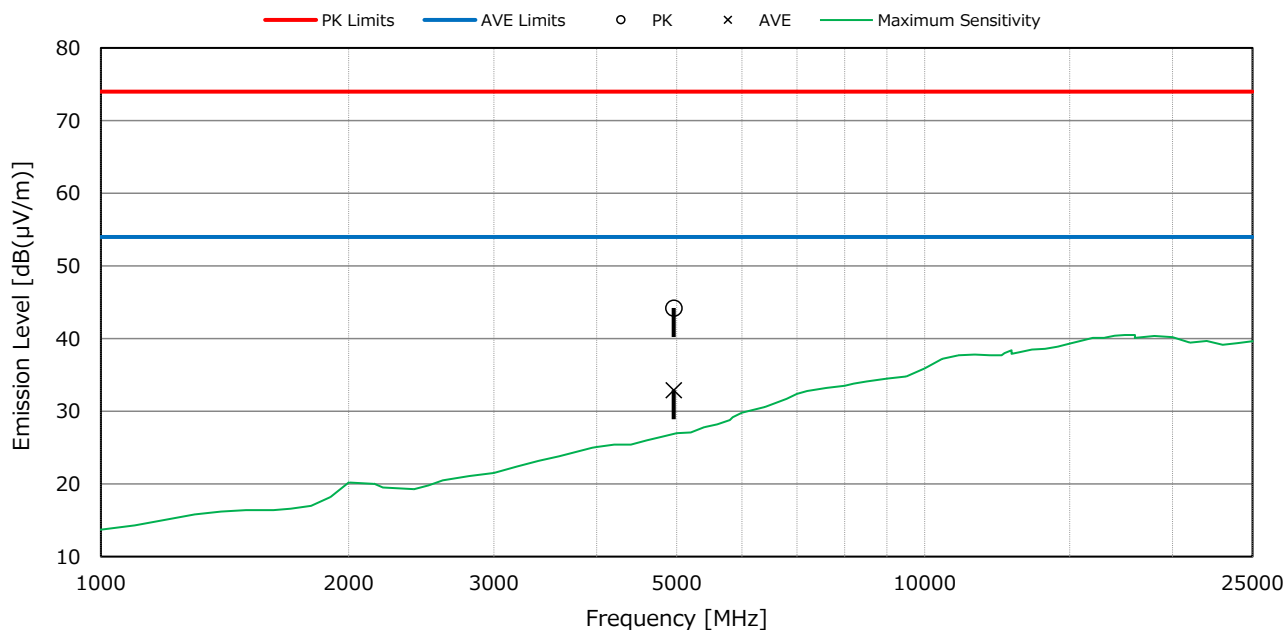


NOTES

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.3 + 37.5 = 32.2 dB(μV) at 4880.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test condition : 26ch (2480MHz) / Aluminum Base-Plate****Antenna polarization : Horizontal****Test Date: March 22, 2024****Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa**

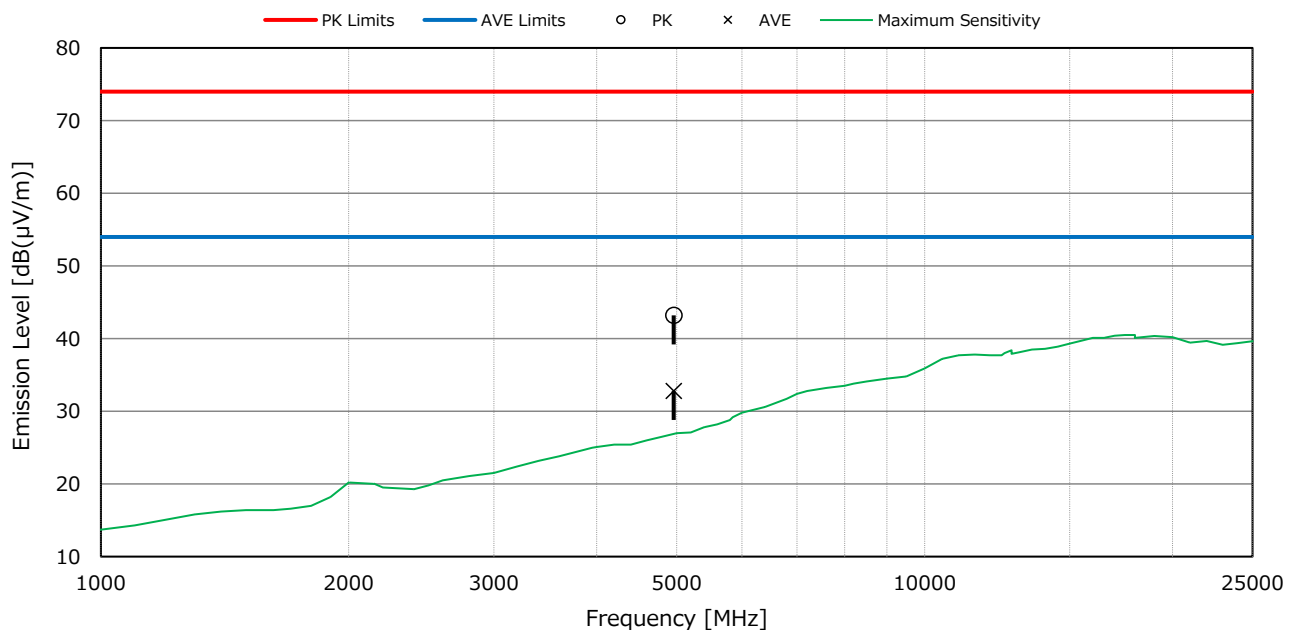
Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4960.00	- 5.0	49.2	37.9	74.0	54.0	44.2	32.9	+ 29.8	+ 21.1	Z

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.0 + 37.9 = 32.9 dB(μV) at 4960.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)

Test voltage : 4.5VDC**Test Date: March 22, 2024****Test condition : 26ch (2480MHz) / Aluminum Base-Plate****Temp.: 22 °C, RH: 35 %, Atm.: 1003 hPa****Antenna polarization : Vertical**

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]		Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
		PK	AVE	PK	AVE	PK	AVE	PK	AVE	
4960.00	- 5.0	48.2	37.8	74.0	54.0	43.2	32.8	+ 30.8	+ 21.2	Y

**NOTES**

- 1) Measurement Distance : 3 m
- 2) The spectrum was checked from 1 GHz to 25 GHz.
- 3) The factor includes the antenna factor, the pre-amplifier gain and the cable loss.
- 4) Calculated result as the worst point shown on underline :
Factor + Reading (AVE) = -5.0 + 37.8 = 32.8 dB(μV) at 4960.00 MHz
- 5) PK : Peak detector, AVE : Average detector
- 6) Bandwidth : 1 MHz (1 GHz - 25 GHz)