Nemko Korea Co., Ltd.

165-51, Yurim-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17042, Korea, Republic of
TEL : + 82 31 330 1700   FAX : + 82 31 322 2332

FCC PART 18 Class II Permissive Change

Applicant :

SAMSUNG ELECTRONICS Co., Ltd.
129, Samsung-ro, Yeongtong-gu Suwon-si,
Gyeonggi-do, 443-742, Korea, Republic of
Attn : Ms. Jiyea Hong

Dates of Issue : May 20, 2024
Test Report No. : REP039732
Test Site : Nemko Korea Co., Ltd.
EMC site, Korea

FCC ID	***A3LMW8000M***
Trade Mark	**SAMSUNG**
Contact Person	**SAMSUNG ELECTRONICS Co., Ltd.** **129, Samsung-ro, Yeongtong-gu Suwon-si,** **Gyeonggi-do, 16677, Korea, Republic of** **Ms. Jiyea Hong** **Telephone No. : + 82 31 8062 9326**

Applied Standard :	FCC Part 18 & Part 2
Classification :	Part 18 Consumer ISM equipment
EUT Type :	Microwave Oven

The device bearing the Trade Mark and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in MP-5:1986.
I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

May 20, 2024
Tested By : Munkyu Jeong
Engineer

May 20, 2024
Reviewed By : Taegyun Kim
Technical Manager

TABLE OF CONTENTS

SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 18.

Responsible Party :	SAMSUNG ELECTRONICS Co., Ltd.
Contact Person :	Ms. Jiyea Hong Tel No.: + 82 31 8062 9326
Manufacturer :	SAMSUNG ELECTRONICS Co., Ltd. 129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 16677, Korea, Republic of

- FCC ID: A3LMW8000M
- Model: MS19DG8500SR
- Variant Model: MS19D*8500**

Model Name	Technical Deviations From Reference Model
MS19D*8500**	1st * : 0-9 or A-Z (Aesthetic type) 2nd & 3rd * : 0-9 or A-Z (Cosmetic color)

- EUT Type: Microwave Oven
- Trade Mark: SAMSUNG
- Serial Number: N/A
- Electric Rating: AC 120 V, 60 Hz, 1 650 W
- Tested Voltage: AC 120 V, 60 Hz
- I/O Port: AC IN
- Clock(s): 10 MHz
- Applied Standard: FCC Part 18 & Part 2
- Test Procedure(s): MP-5:1986
- Dates of Test: April 24, 2024 to May 08, 2024
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: REP039732

INTRODUCTION

The measurement procedure described in MP5:1986 for Methods of Measurement of radiated, powerline conducted radio noise, frequency and power output was used in determining emissions emanating from **Samsung Electronics Co., Ltd.**
FCC ID : **A3LMW8000M, Microwave Oven.**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory***.
The site address is 165-51, Yurim-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17042,
Korea, Republic of.
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.

The Nemko Korea Co., Ltd. has been accredited as a Conformity Assessment Body (CAB).

Nemko Korea Co., Ltd.
165-51, Yurim-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17042, Korea, Republic of.
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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.

ACCREDITATION AND LISTING

Accreditation type		Accreditation number
	CAB Accreditation for DOC	Designation No. KR0026
	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. KT155
	Canada IC Registered site	Company No. 29506
	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
	EMC CBTL	TL124
	KCC(RRL)Designated Lab.	Registration No. KR0026

EUT INFORMATION

EUT Information

Intended use	Household
Type of appliance	Counter Top
Model	MS19DG8500SR
Rated voltage & frequency	AC 120 V, 60 Hz Single Phase
Rated power output	950 W
Rated power consumption	1 650 W
Magnetron	OM-75P by Samsung
Clock Frequency	10 MHz

Component List

Item	Model	Manufacturer	Serial Number
MAGNETRON	OM-75P	Samsung	N/A
H.V TRANS	SHV-UT1136B(F)	DYJWK	N/A
H.V CAPACITOR	CH85-21095	BICAI	N/A
FAN MOTOR	SMF-U1530A	OSUNGG	N/A
Control	MWO_PF8_24	Samsung	N/A

Description of the Changes according to FCC part 2.1043

Report No.	Difference
-	-

DESCRIPTION OF TESTS

Radiation Hazard

A 700 ㎖ water load was placed in the center of the oven.
The power setting was set to maximum power.
While the oven was operating, the Microwave Survey Meter probe was moved slowly around the door seams to check for leakage.

Input Power Measurement

A 700 ㎖ water load was placed in the center of the oven and the oven set to maximum power. A 700 ㎖ water load was chosen for its compatibility.
Input power and current were measured using a Power Analyzer.
Manufacturers to determine their input ratings commonly use this procedure.

Output Power Measurement

The Caloric Method was used to determine maximum output power.
The initial temperature of a 1 000 ㎖ water load was measured. The water load was placed in the center of the oven. The oven was operated at maximum output power for 47 seconds. Then the temperature of the water re-measured.

Frequency Measurements

Following the above test, after operating the oven long enough to assure that stable operating temperature were obtained, the operating frequency was monitored as the input voltage was varied between 80 percent to 125 percent of the nominal rating.
And the load quantity was reduced by evaporation to approximately 20 % of the original quantity with nominal rating.

DESCRIPTION OF TESTS

Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 m shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.
A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 0.5 m away from the side of wall of the shielded room Rohde & Schwarz (ESH2-Z5) of the 50 ohm / 50 uH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.
The EUT is powered from the Rohde & Schwarz (ESH2-Z5).
Power to the LISN s are filtered by high-current high insertion loss power line filters.
The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1/2".
If d.c. power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs,
All interconnecting cables more than 1 m were shortened by non-inductive bundling (serpentine fashion) to a 1 m length.
Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150 ㎑ to 30 ㎒ with 15 s sweep time.
The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESR3).
The detector functions were set to quasi-peak mode & CISPR average mode.
The bandwidth of receiver was set to 9 ㎑. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

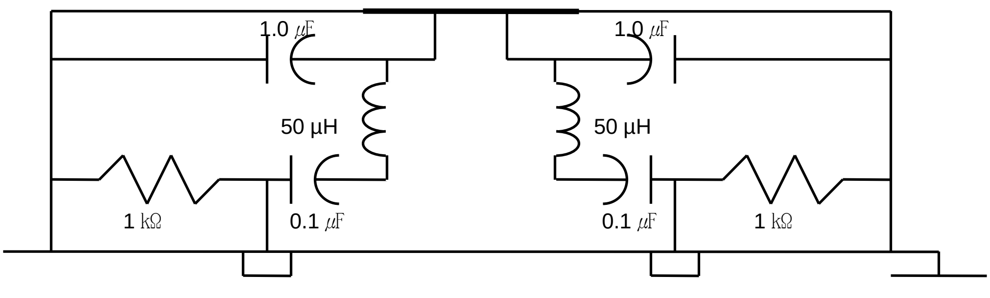


Fig. 2. LISN Schematic Diagram

DESCRIPTION OF TESTS

Radiated Emissions

Measurement were made indoors at 10 m & 3 m using antenna, signal conditioning unit and EMI test receiver to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found.
The spectrum was scanned from 0.15 ㎒ to 30 ㎒ using Loop Antenna (Rohde & Schwarz, HFH2-Z2) and from 30 ㎒ to 1 000 ㎒ using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163). 1 GHz to 6 GHz and 6 GHz to 18 GHz, Double Ridged Horn Antennas (Rohde & Schwarz, HF907) was used.
The test equipment was placed on a Styrofoam table.
Final Measurements were made indoors at 3 m using Loop Antenna (Rohde & Schwarz, HFH2-Z2) for measurement from 0.15 to 30 ㎒ with RBW 9 ㎑ and made indoor at 10 m using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163) for measurement from 30 ㎒ to 1 000 ㎒ with RBW 120 ㎑ and made indoors at 3 m using Double Ridged Horn Antennas (Rohde & Schwarz, HF907).
The detector function were set to quasi peak mode and the bandwidth of the receiver were set to 9 ㎑, 120 ㎑ and peak mode 1 ㎒ depending on the frequency or type of signal.
The Double Ridged Broadband Horn antenna was tuned to the frequency found during preliminary radiated measurements.
The EUT support equipment and interconnecting cables were re-configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic 1.0 X 1.5 meter table.
The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.
The EUT is rotated about its vertical axis on the turntable, and the polarization and height of the receiving antenna are varied to obtain the highest field strength on the particular frequency under observation.
Each EME reported was calibrated using the R/S signal generator.

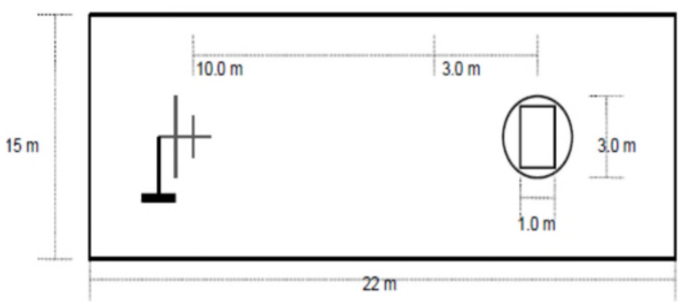


Fig. 3. Dimensions of 10 semi anechoic chamber

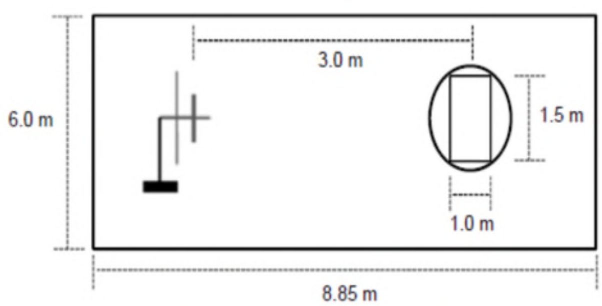


Fig. 4. Dimensions of 3 m full anechoic chamber

TEST DATA

Radiation Hazard

Probe Location	Maximum Leakage [mW/Cm2]	Limit [mW/Cm2]
A	0.10	1.00
B	0.10	1.00
C	0.10	1.00
D	0.10	1.00
E	0.10	1.00
F	0.10	1.00
G	0.10	1.00
H	0.10	1.00

Input Power Measurement

Operation mode	P rated (W)	P (W)	dP (%)	Required dP (%)
Power Input	1 650	1 615	-2.17%	+ 15 %

Output Power Measurement

Quantity of Water [ml]	Mass of the container [g]	Ambient temperature [℃]	Initial temperature [℃]	Final temperature [℃]	Heating time [s]	Power output [W]
1 000	433.5	23.0	10.0	20.2	44	956

Formula :

$$P = \frac{4.187 \times m_w \times (T_1 - T_0) + 0.55 \times m_c \times (T_1 - T_A)}{t}$$

NOTE :

P **is the microwave power output (W)**

m_w **is the mass of the water (g)**

m_c **is the mass of the container (g)**

T_A **is the ambient temperature (℃)**

T_0 **is the initial temperature of the water (℃)**

T_1 **is the final temperature of the water (℃)**

t **is the heating time (s), excluding the magnetron filament heating-up time.**

Tested by : ***Munkyu Jeong***

TEST DATA

Frequency measurements

▶ **Frequency vs Line Voltage Variation Test**

[Room Temperature : 21.2 ± 1.0 ℃]

Line Voltage Variation (AC V)	*Pole	Frequency [㎒]	Allowed Tolerance for the ISM Band
96 (80 %)	H	Lower : 2447.760	Lower : 2 400 ㎒ Upper : 2 500 ㎒
	H	Upper : 2477.159	
	V	Lower : 2450.940	
	V	Upper : 2475.569	
108 (90 %)	H	Lower : 2450.350	
	H	Upper : 2477.199	
	V	Lower : 2426.371	
	V	Upper : 2480.229	
120 (100 %)	H	Lower : 2427.901	
	H	Upper : 2467.970	
	V	Lower : 2424.931	
	V	Upper : 2484.039	
132 (110 %)	H	Lower : 2467.159	
	H	Upper : 2479.069	
	V	Lower : 2427.651	
	V	Upper : 2479.679	
150 (125 %)	H	Lower : 2432.771	
	H	Upper : 2479.989	
	V	Lower : 2433.041	
	V	Upper : 2476.709	

NOTE :

*1. *Pol. H = Horizontal V = Vertical*
2. Initial load : 1 000 ㎖ of water in the beaker.
3. Line voltage varied from 80 % to 125 %.
4. ISM Frequency : 2 450 ㎒, Tolerance : ± 50 ㎒

RESULT : Pass

Tested by : ***Munkyu Jeong***

TEST DATA

▶ **Frequency vs Load Variation Test**

[Room Temperature : 21.2 ± 1.0 ℃]

Volume of water (㎖)	*)Pole	Frequency [㎒]	Allowed Tolerance for the ISM Band
200	H	Lower : 2461.549	Lower : 2 400 ㎒ Upper : 2 500 ㎒
	H	Upper : 2479.139	
	V	Lower : 2462.310	
	V	Upper : 2479.879	
400	H	Lower : 2428.841	
	H	Upper : 2477.409	
	V	Lower : 2458.690	
	V	Upper : 2477.459	
600	H	Lower : 2425.521	
	H	Upper : 2476.129	
	V	Lower : 2426.691	
	V	Upper : 2475.169	
800	H	Lower : 2428.691	
	H	Upper : 2479.489	
	V	Lower : 2425.561	
	V	Upper : 2475.159	
1 000	H	Lower : 2427.901	
	H	Upper : 2467.970	
	V	Lower : 2424.931	
	V	Upper : 2484.039	

NOTE :

*1. *Pol. H = Horizontal, V = Vertical*

2. The water load was varied between 200 ㎖ to 1 000 ㎖.

3. Frequency was measured by using nominal voltage (AC 120 V).

4. ISM Frequency : 2 450 ㎒, Tolerance : ± 50 ㎒

RESULT : Pass

Tested by : ***Munkyu Jeong***

TEST DATA

Conducted Emissions

FCC ID : A3LMW8000M

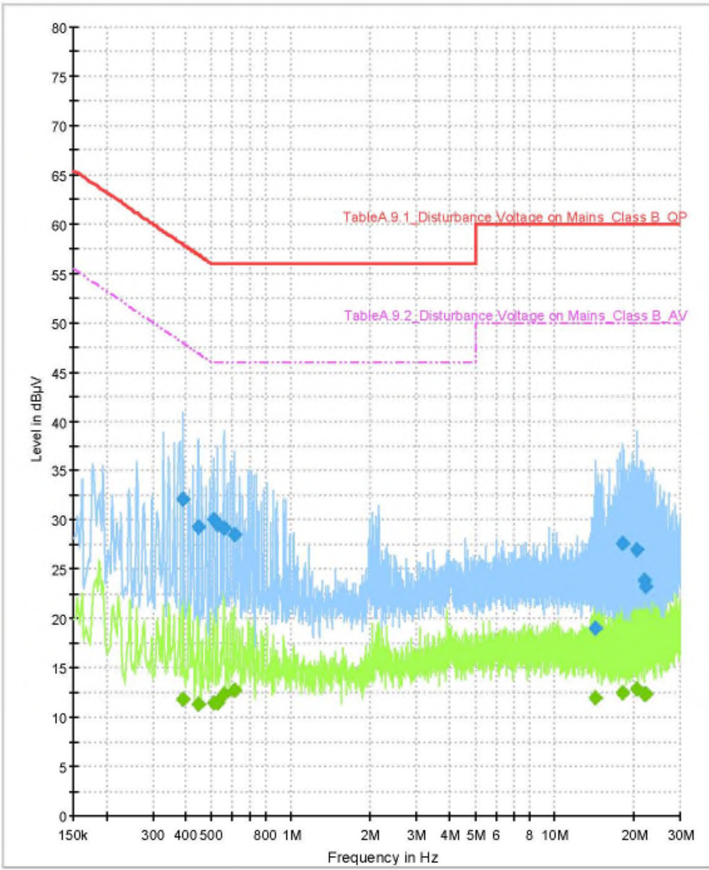
[Room Temperature : 22.0 ± 1.0 ℃]

Test 1 / 2

Test Report

Common Information

Test Description:	Conducted emission (NK-24-E-0518)
Test Site:	Shielded room #1
Test Standard:	FCC Part 18
Environment Conditions:	AC 120 V, 60 Hz
Operator Name:	Munkyu Jeong
Mode:	Microwave Mode



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Test 2 / 2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE
0.391785	---	11.77	47.92	36.15	15000.0	9.000	L1	GND
0.391785	32.08	---	57.92	25.83	15000.0	9.000	L1	GND
0.445515	29.29	---	56.91	27.62	15000.0	9.000	N	GND
0.445515	---	11.35	46.91	35.56	15000.0	9.000	N	GND
0.511185	---	11.42	46.00	34.58	15000.0	9.000	L1	GND
0.511185	30.11	---	56.00	25.89	15000.0	9.000	L1	GND
0.526110	29.53	---	56.00	26.47	15000.0	9.000	L1	GND
0.526110	---	11.37	46.00	34.63	15000.0	9.000	L1	GND
0.558945	29.13	---	56.00	26.87	15000.0	9.000	L1	GND
0.558945	---	12.34	46.00	33.66	15000.0	9.000	L1	GND
0.609690	28.47	---	56.00	27.53	15000.0	9.000	L1	GND
0.609690	---	12.68	46.00	33.32	15000.0	9.000	L1	GND
14.322780	---	11.94	50.00	38.06	15000.0	9.000	N	GND
14.322780	19.01	---	60.00	40.99	15000.0	9.000	N	GND
18.128655	27.64	---	60.00	32.36	15000.0	9.000	L1	GND
18.128655	---	12.47	50.00	37.53	15000.0	9.000	L1	GND
20.412180	---	12.89	50.00	37.11	15000.0	9.000	L1	GND
20.412180	26.96	---	60.00	33.04	15000.0	9.000	L1	GND
21.827070	---	12.30	50.00	37.70	15000.0	9.000	L1	GND
21.827070	23.89	---	60.00	36.11	15000.0	9.000	L1	GND
22.191240	23.30	---	60.00	36.70	15000.0	9.000	L1	GND
22.191240	---	12.30	50.00	37.70	15000.0	9.000	L1	GND

(continuation of the "Final_Result" table from column 14 ...)

Frequency (MHz)	Corr. (dB)	Comment
0.391785	10.6	
0.391785	10.6	
0.445515	10.6	
0.445515	10.6	
0.511185	10.6	
0.511185	10.6	
0.526110	10.6	
0.526110	10.6	
0.558945	10.6	
0.558945	10.6	
0.609690	10.7	
0.609690	10.7	
14.322780	11.0	
14.322780	11.0	
18.128655	11.0	
18.128655	11.0	
20.412180	11.0	
20.412180	11.0	
21.827070	10.9	
21.827070	10.9	
22.191240	10.9	
22.191240	10.9	

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NOTES:

1. ***Measurements using quasi-peak mode & average mode.***
2. ***If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.***
3. ***Line : L = Line , N = Neutral***
4. ***The limit for consumer device is on the FCC Part section 18.307(b).***

Tested by : ***Munkyu Jeong***

TEST DATA

Radiated Emissions (150 ㎑ to 30 ㎒)

FCC ID : A3LMW8000M

[Room Temperature : 22.6 ± 1.0 ℃]

Test 1 / 2

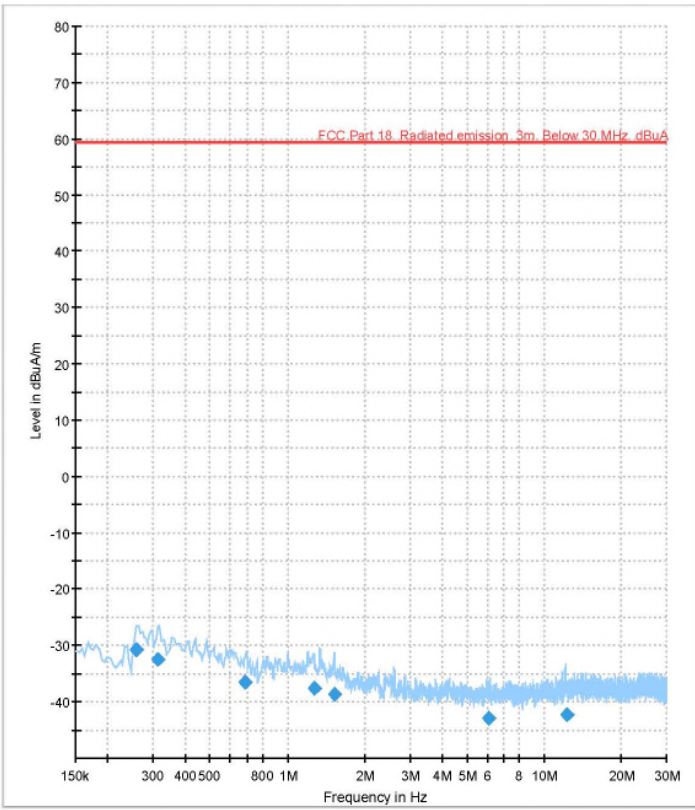
Test Report

Common Information

Test Description:	Radiated Emission(NK-24-E-0518)
Test Site:	10 m chamber (3m)
Test Standard:	FCC Part 18
Environment Conditions:	AC 120 V, 60 Hz
Operator Name:	Munkyu Jeong
Mode:	Microwave Mode

Full Spectrum

Full Spectrum



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Test 2 / 2

Final_Result

Frequency (MHz)	QuasiPeak (dBuA/m)	Limit (dBuA/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.259743	-30.83	59.27	90.10	15000.0	9.000	200.0	H	303.0
0.312419	-32.49	59.27	91.76	15000.0	9.000	200.0	V	299.0
0.685544	-36.59	59.27	95.86	15000.0	9.000	200.0	V	94.0
1.269375	-37.55	59.27	96.82	15000.0	9.000	200.0	V	183.0
1.519588	-38.70	59.27	97.97	15000.0	9.000	200.0	V	27.0
6.089272	-43.01	59.27	102.28	15000.0	9.000	200.0	V	3.0
12.252419	-42.32	59.27	101.59	15000.0	9.000	200.0	H	57.0

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
0.259743	-73.9	
0.312419	-74.3	
0.685544	-75.3	
1.269375	-75.4	
1.519588	-76.3	
6.089272	-79.4	
12.252419	-79.4	

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<Radiated Measurements at 3 meters >

NOTES:

1. ****Pol. H = Horizontal V = Vertical***
2. *****AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.***
3. ***Distance Correction factor : 40 * log (300 / 3) = 80 dBuV/m***
4. ***The limit at 300 meters is 20 * log (25 * SQRT (RF Power / 500)) – 51.5 dB***
5. ***All other emissions were measured while a 700 ㎖ load was placed in the center of the oven.***
6. ***The limit for consumer device is on the FCC Part section 18.305.***

Tested by : ***Munkyu Jeong***

TEST DATA

Radiated Emissions (30 ㎒ to 1 ㎓)

FCC ID : A3LMW8000M

[Room Temperature : 22.3 ± 1.0 ℃]

1 / 2

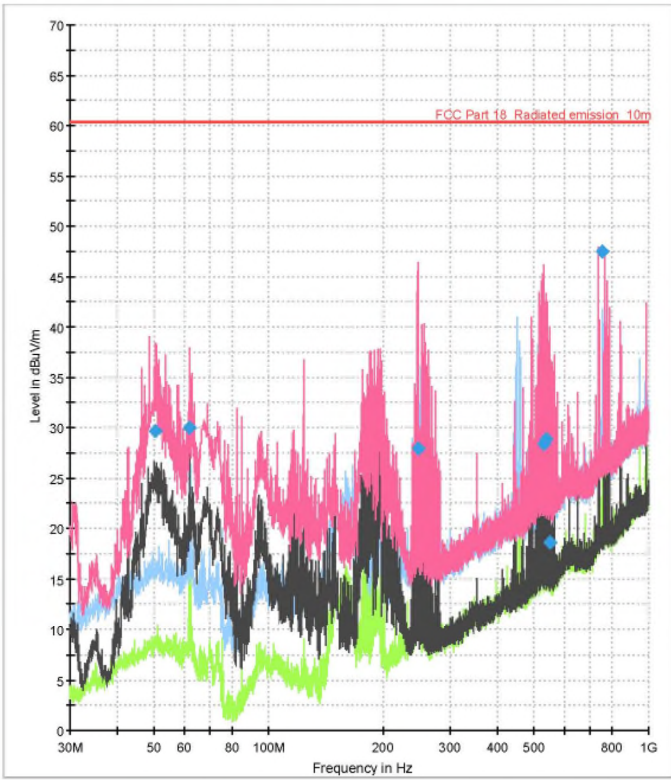
Test Report

Common Information

Test Description:	Radiated Emission(NK-24-E-0518)
Test Site:	10 m chamber #1
Test Standard:	FCC Part 18
Environment Conditions:	AC 120 V, 60 Hz
Operator Name:	Munkyu Jeong
Mode:	Microwave Mode

Full Spectrum

Full Spectrum



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Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
50.370000	29.61	60.31	30.70	15000.0	120.000	215.0	V	15.0
61.794444	29.97	60.31	30.34	15000.0	120.000	394.0	V	277.0
246.902778	27.92	60.31	32.39	15000.0	120.000	115.0	V	10.0
529.657778	28.41	60.31	31.90	15000.0	120.000	200.0	V	203.0
537.148333	28.88	60.31	31.43	15000.0	120.000	115.0	V	34.0
550.620556	18.59	60.31	41.72	15000.0	120.000	110.0	V	58.0
755.452222	47.52	60.31	12.79	15000.0	120.000	115.0	H	127.0

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
50.370000	-11.3	
61.794444	-12.8	
246.902778	-10.0	
529.657778	-3.5	
537.148333	-3.3	
550.620556	-3.3	
755.452222	0.9	

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<Radiated Measurements at 10 meters>

NOTES:

1. ****Pol. H = Horizontal V = Vertical***
2. *****AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.***
3. ***Distance Correction factor : 20 * log (300/10)≒ 29.5 dB ㎶/m***
4. ***The limit at 300 meters is 20 * log (25 * SQRT (RF Power/500))***
5. ***All other emissions were measured while a 700 ㎖ load was placed in the center of the oven.***
6. ***The limit for consumer device is on the FCC Part section 18.305.***

Tested by : ***Munkyu Jeong***

TEST DATA

Radiated Emissions (Above 1 ㎓)

FCC ID : A3LMW8000M

[Room Temperature : 21.1 ± 1.0 ℃]

Frequency	Pol*	Antenna Heights	Turntable Angles	Reading Level	Total Loss**	Result at 3 m		K	Results at 300 m	Limits at 300 m
(MHz)	(H/V)	(cm)	(˚)	(dBμV)	(dB)	(dBμV/m)	(μV/m)		(μV/m)	(μV/m)
2204	V	100	315	59.74	-11.31	48.43	263.94	0.0056	1.47	30.77
4942	V	100	225	42.47	-3.5	38.97	88.82	0.0100	0.89	30.77
7405	H	100	315	44.94	-1.96	42.98	140.93	0.0100	1.41	30.77
8593	V	100	0	34.68	-0.59	34.09	50.64	0.0100	0.51	30.77
12326	H	100	315	34.17	0.06	34.23	51.46	0.0100	0.51	30.77
14793	H	100	315	28.91	3.15	32.06	40.09	0.0100	0.40	30.77

<Radiated Measurements at 3 meters>

NOTES:

1. * Pol. H =Horizontal V=Vertical

2. ** Total Loss = Antenna Factor + Cables Loss + Amplifier + HPF (High Pass Filter)

3. Field Strength (at 300 m) (uV/m) = K * 10 $^{[\text{Fieldstrength at 3 m (dBuV/m)} / 20]}$

4. Where K is given by :

Frequency	K
1830 MHz	.0046
2745 MHz	.0070
3660 MHz	.0090
4575 MHz and above	.0100

For frequencies between those given in the table, the value of K is determined by linear interpolation.

5. The limit at 300 meters is 20 * log (25 * SQRT (RF Power / 500))

6. Load for measurement of radiation on second and third harmonic : Two loads, one of 700 ㎖ and the other of 300 ㎖, of water were used. Each load was tested both with the beaker located in the center of the oven and with it in the corner.

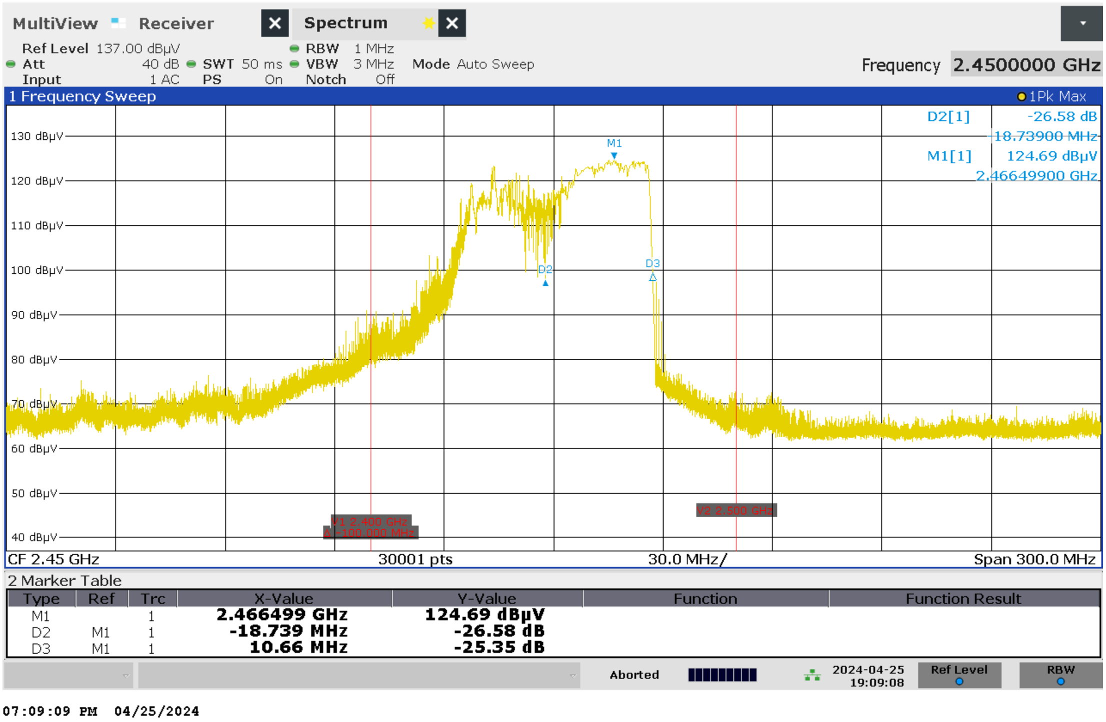
7. The test was performed at peak detector mode with average.

8. The limit for consumer device is on the FCC Part section 18.305.

Tested by : ***Munkyu Jeong***

PLOTS OF EMISSIONS

- **Frequency vs Line Voltage Variation Test**



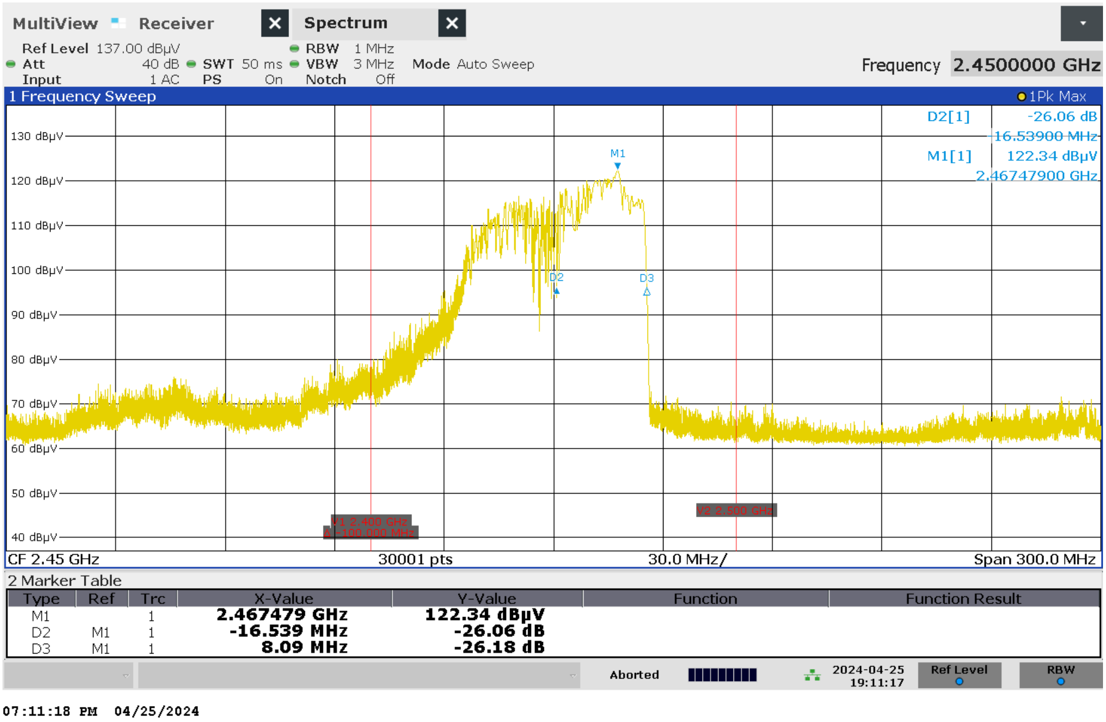
2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.466499 GHz	124.69 dBµV		
D2	M1	1	-18.739 MHz	-26.58 dB		
D3	M1	1	10.66 MHz	-25.35 dB		

Horizontal (96 V, 1 000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Line Voltage Variation Test***

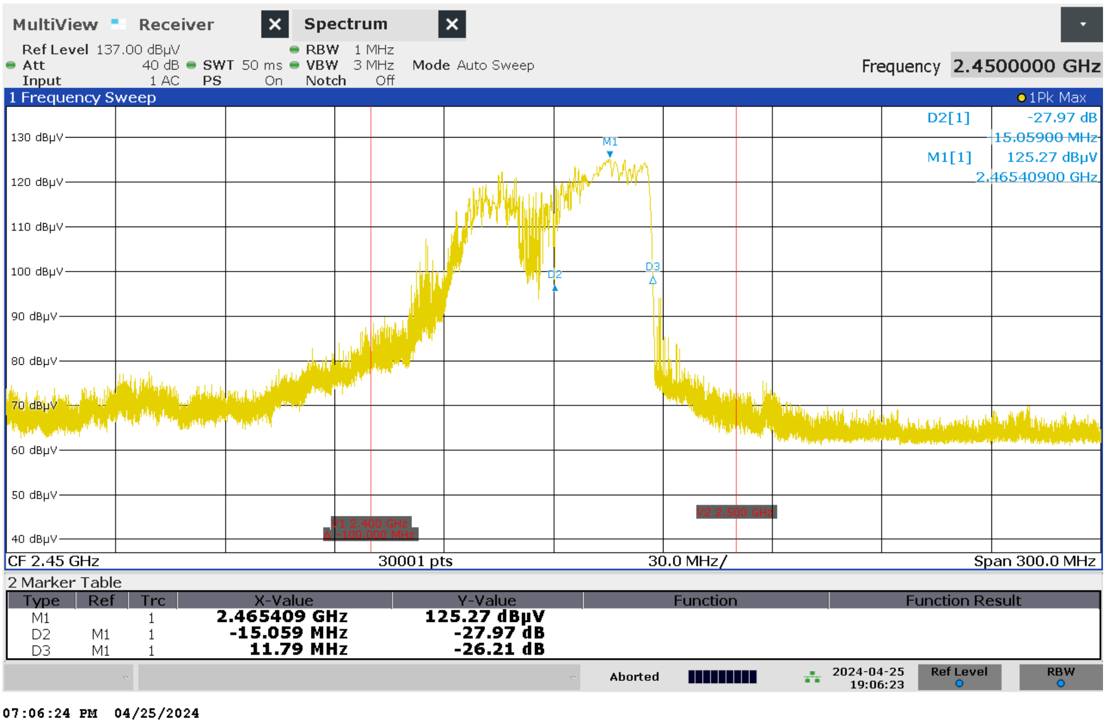


Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.467479 GHz	122.34 dBµV		
D2	M1	1	-16.539 MHz	-26.06 dB		
D3	M1	1	8.09 MHz	-26.18 dB		

Vertical (96 V, 1 000 ㎖)

PLOTS OF EMISSIONS

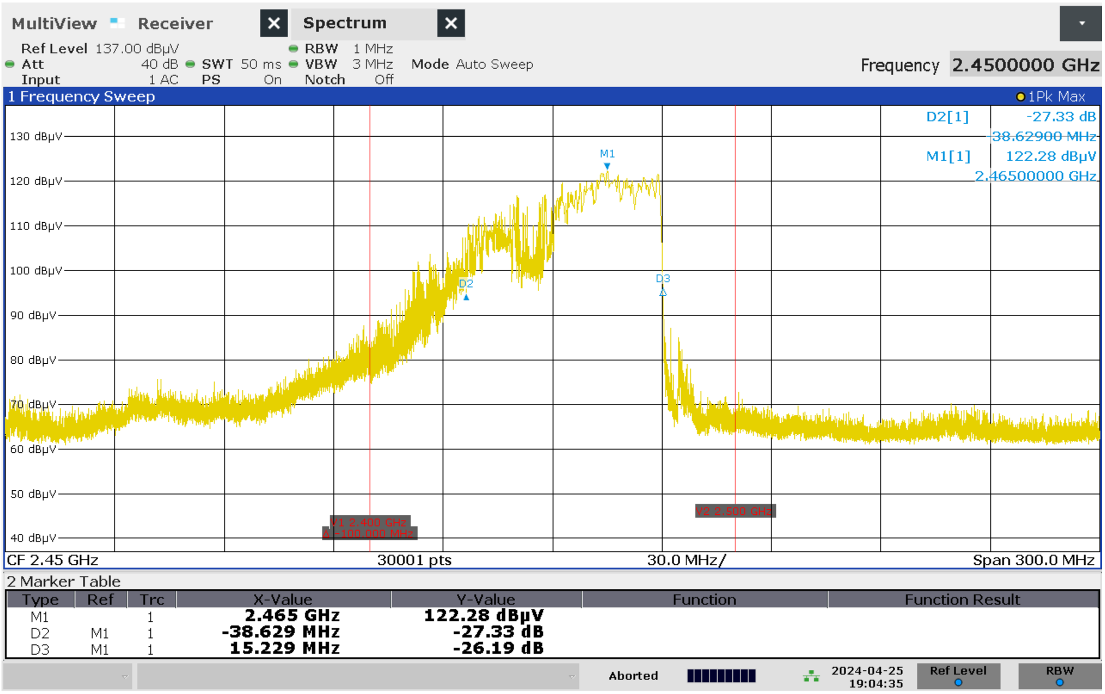
- ***Frequency vs Line Voltage Variation Test***



Horizontal (108 V, 1 000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Line Voltage Variation Test***



Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.465 GHz	122.28 dBµV		
D2	M1	1	-38.629 MHz	-27.33 dB		
D3	M1	1	15.229 MHz	-26.19 dB		

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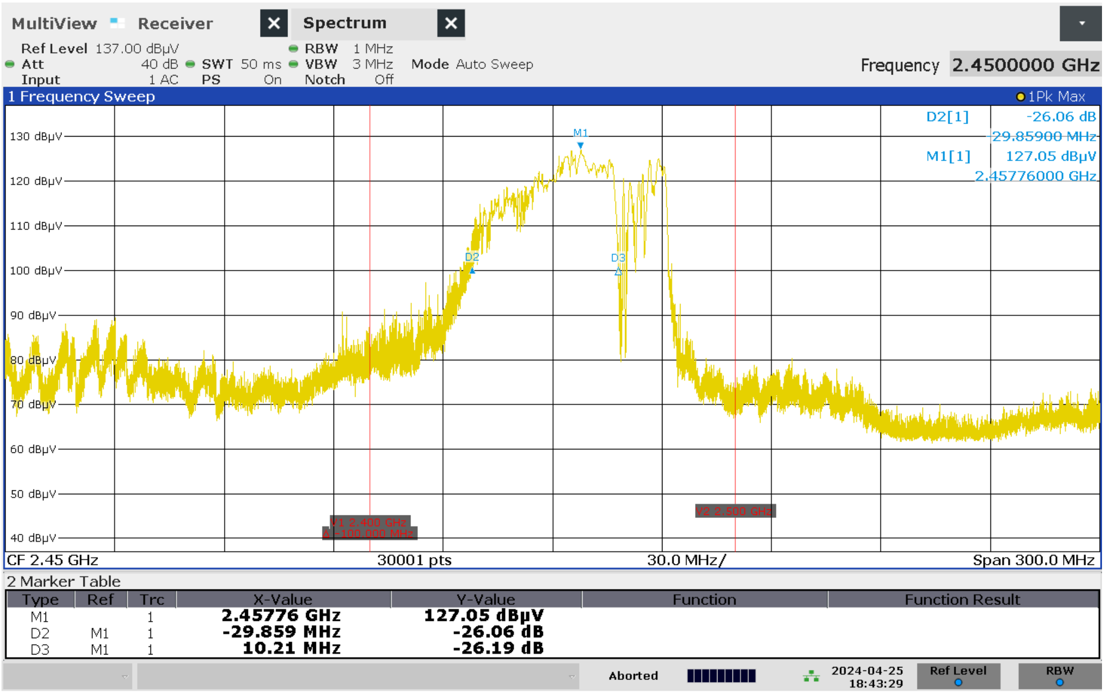
Vertical (108 V, 1 000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Line Voltage Variation Test***



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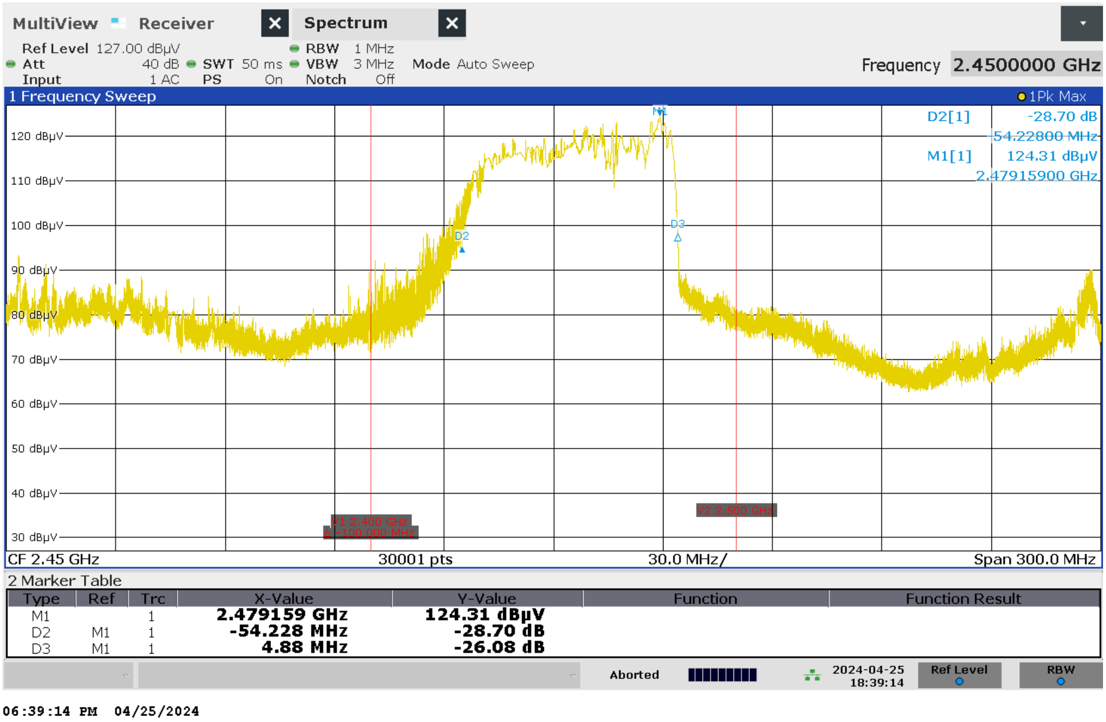
Horizontal (120 V, 1 000 ㎖)

PLOTS OF EMISSIONS

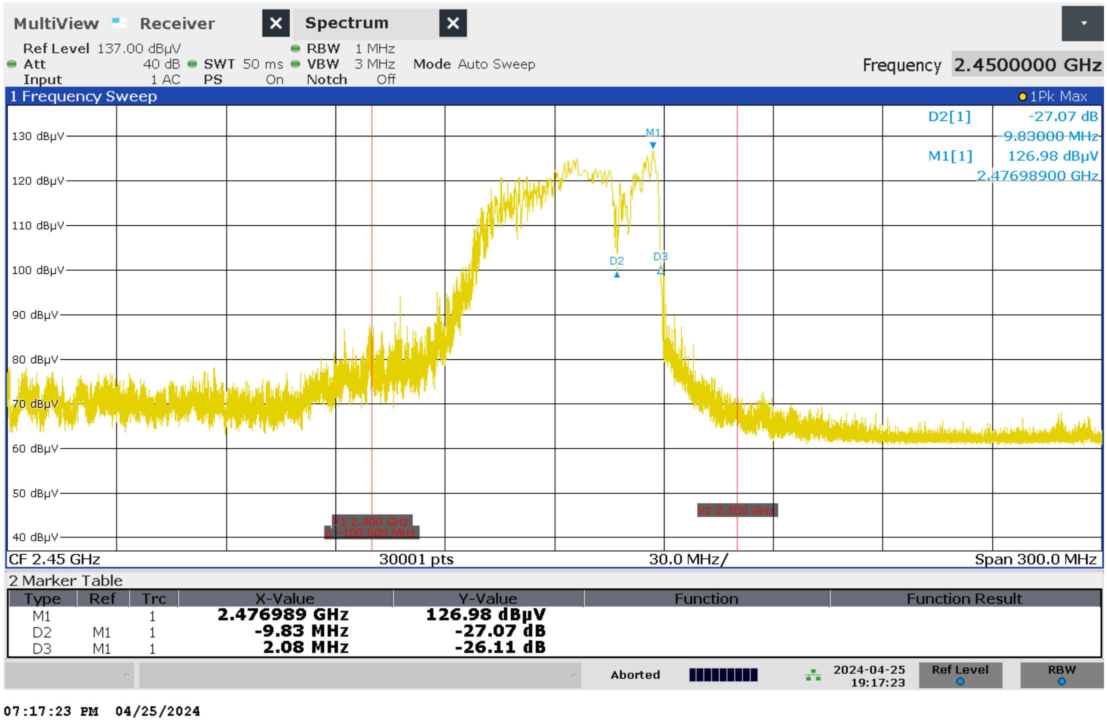
- ***Frequency vs Line Voltage Variation Test***



Vertical (120 V, 1 000 ㎖)

PLOTS OF EMISSIONS

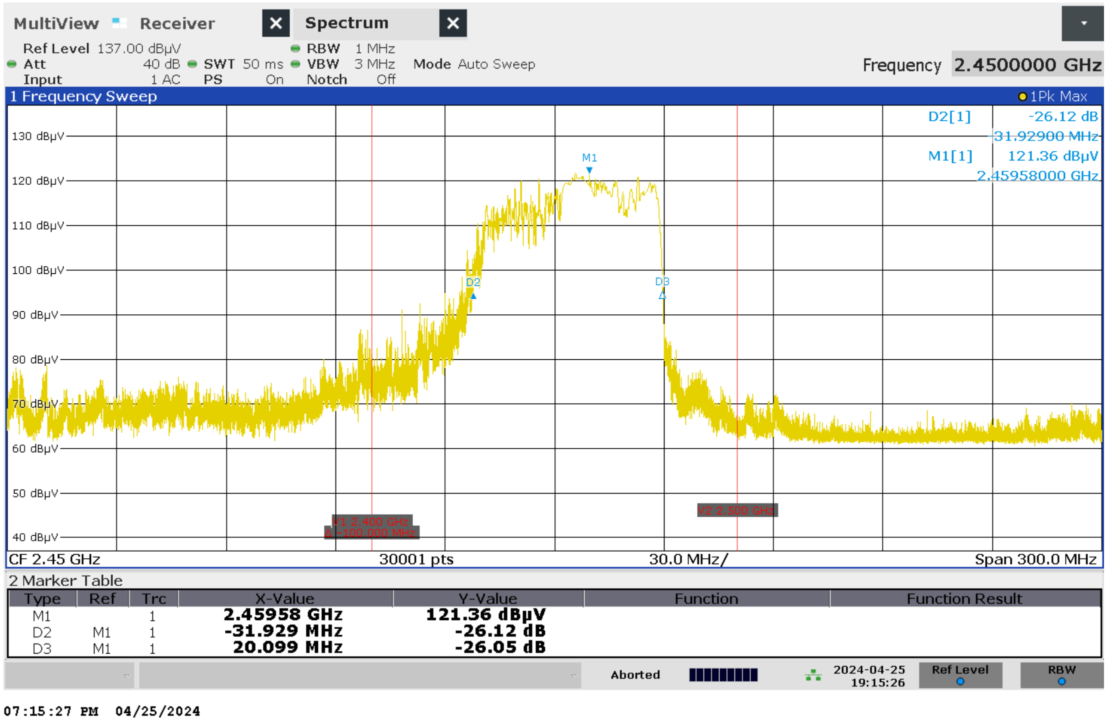
- ***Frequency vs Line Voltage Variation Test***



Horizontal (132 V, 1 000 ㎖)

PLOTS OF EMISSIONS

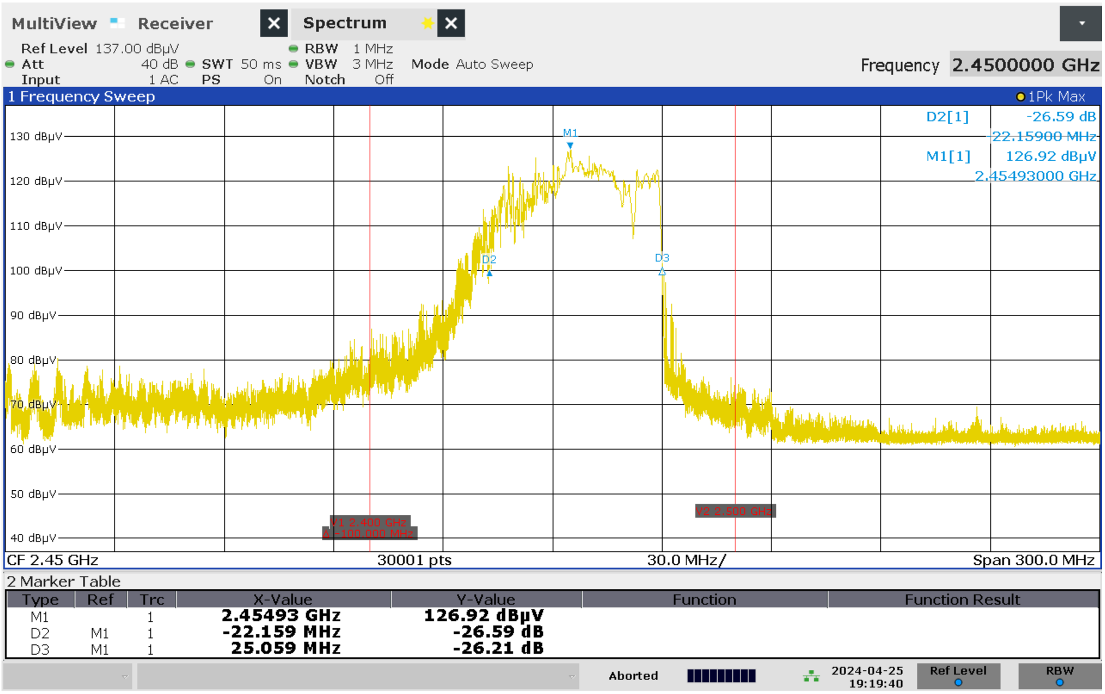
- ***Frequency vs Line Voltage Variation Test***



Vertical (132 V, 1 000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Line Voltage Variation Test***



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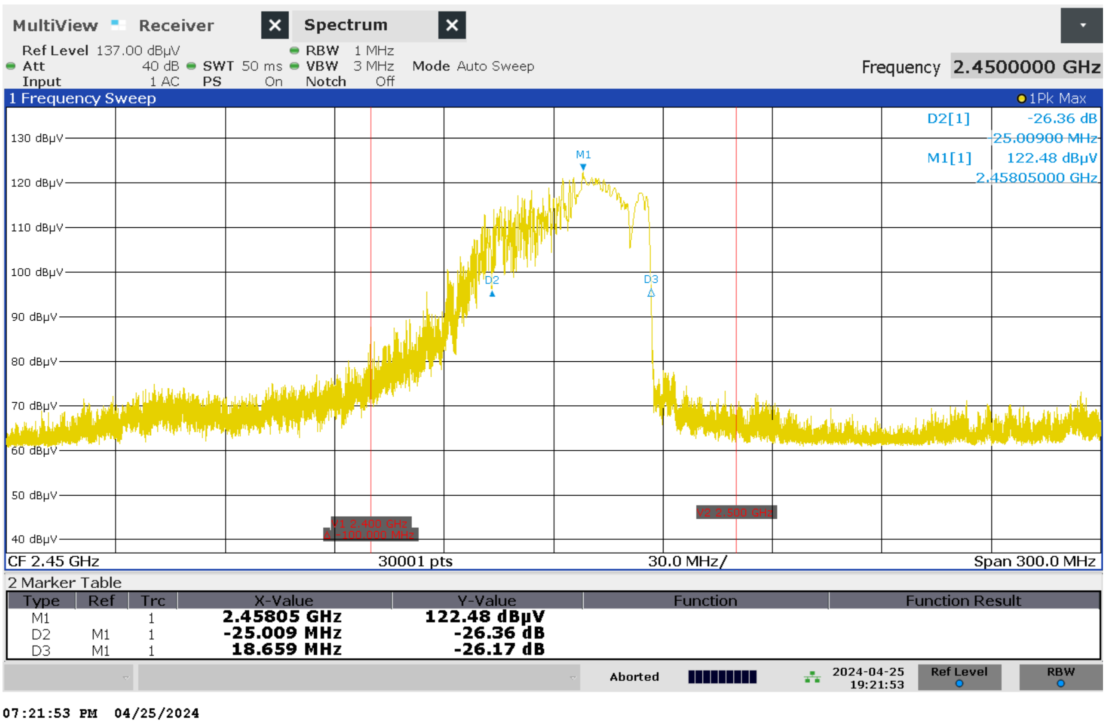
Horizontal (150 V, 1 000 ㎖)

PLOTS OF EMISSIONS

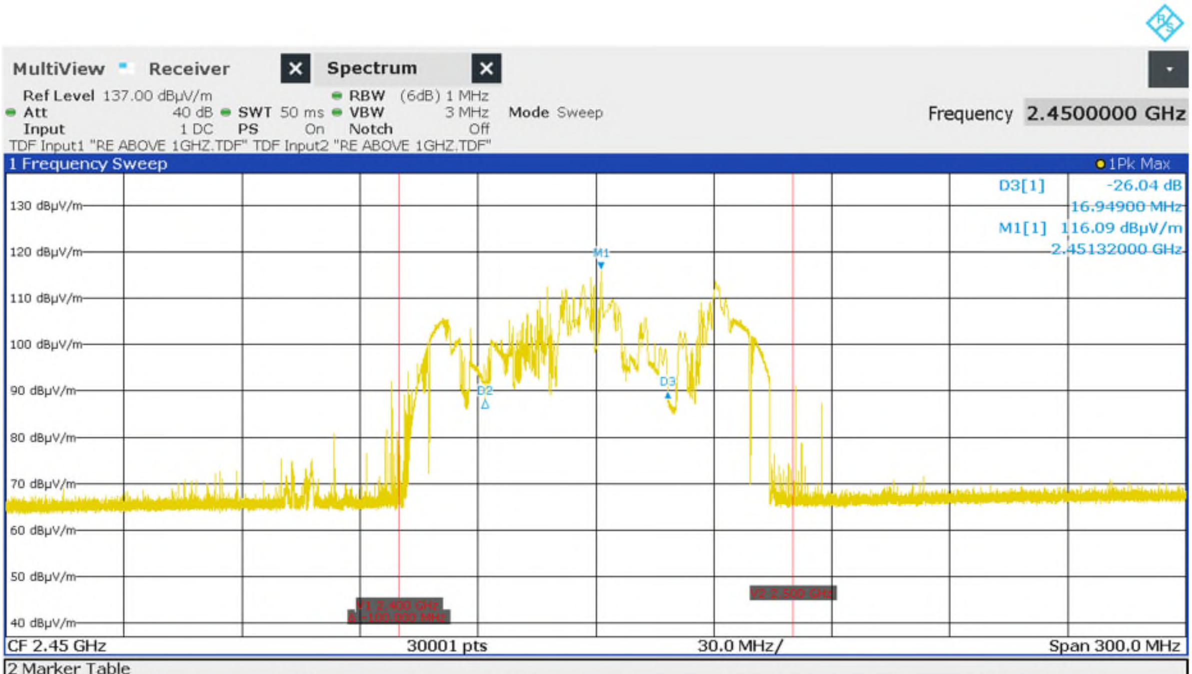
- ***Frequency vs Line Voltage Variation Test***



Vertical (150 V, 1 000 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***

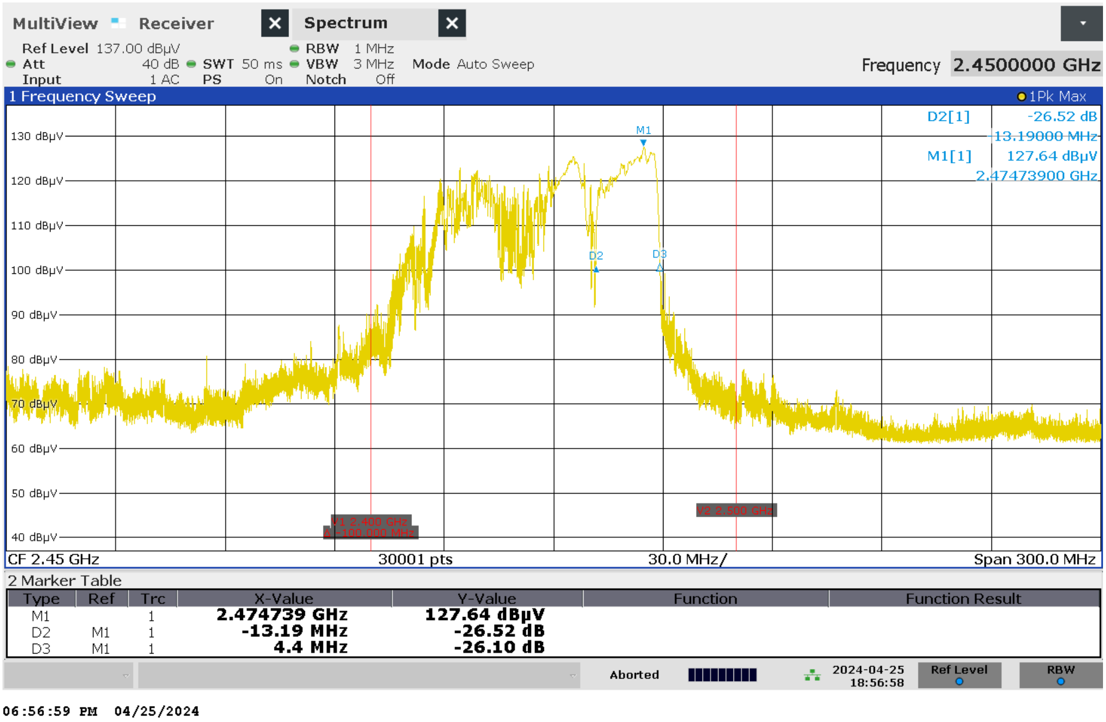


Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.45132 GHz	116.09 dBμV/m		
D2	M1	1	-29.369 MHz	-27.96 dB		
D3	M1	1	16.949 MHz	-26.04 dB		

Horizontal (120 V, 200 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***

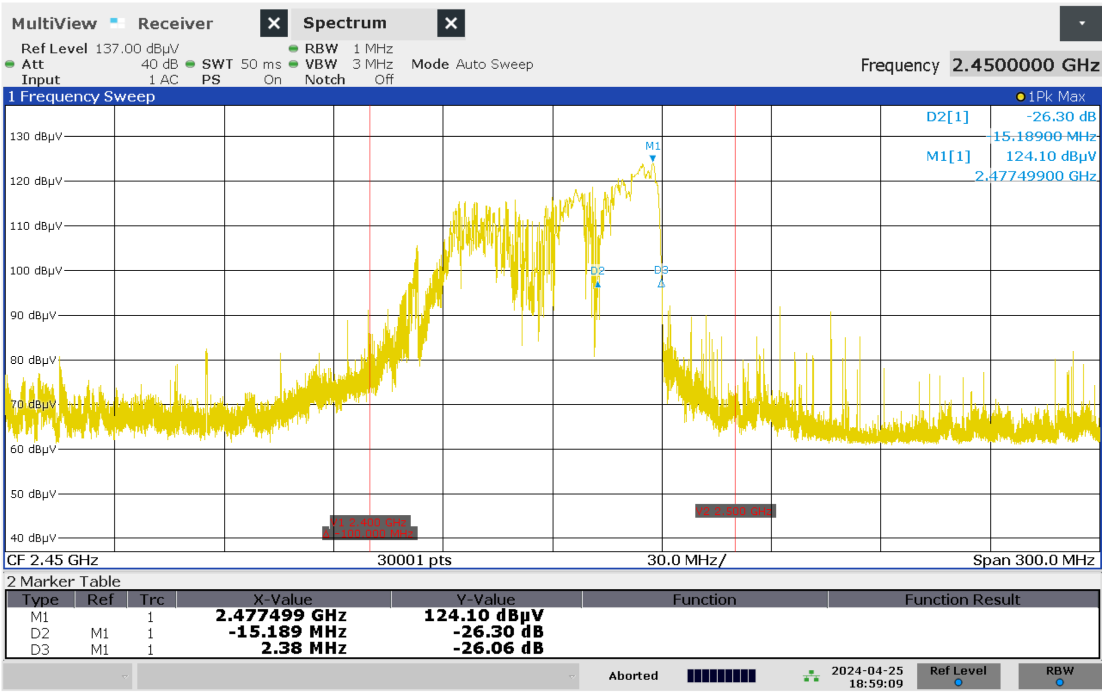


Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.474739 GHz	127.64 dBµV		
D2	M1	1	-13.19 MHz	-26.52 dB		
D3	M1	1	4.4 MHz	-26.10 dB		

Vertical (120 V, 200 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***



Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.477499 GHz	124.10 dBµV		
D2	M1	1	-15.189 MHz	-26.30 dB		
D3	M1	1	2.38 MHz	-26.06 dB		

Aborted 2024-04-25 18:59:09 Ref Level RBW

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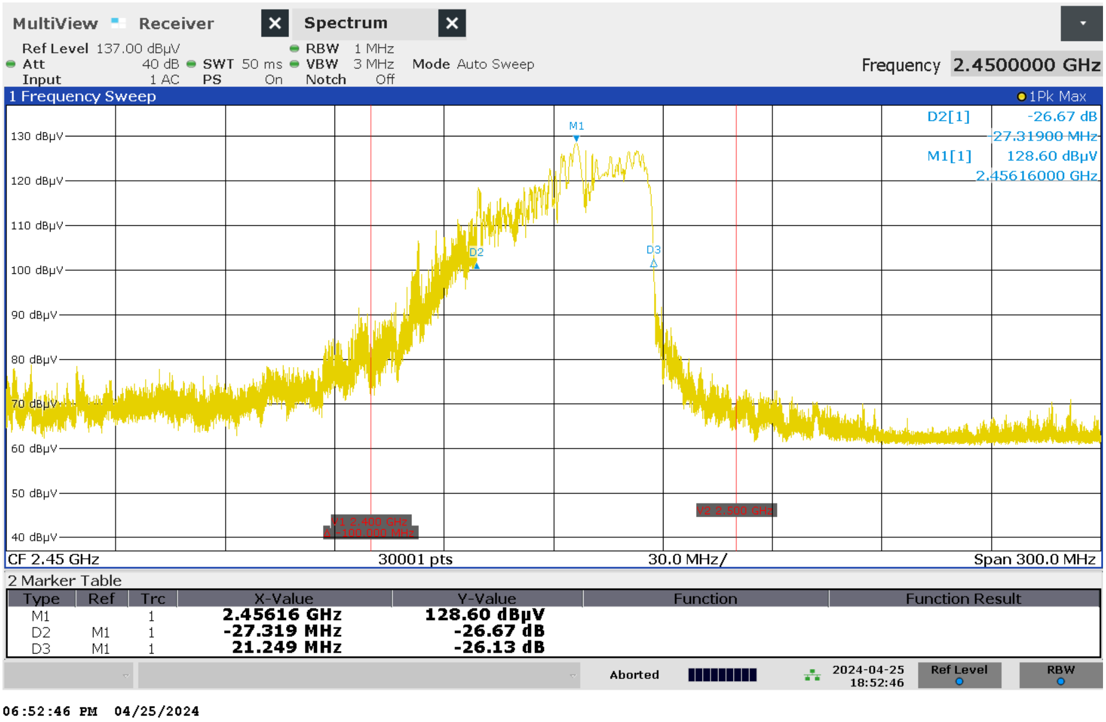
Horizontal (120 V, 400 ㎖)

PLOTS OF EMISSIONS

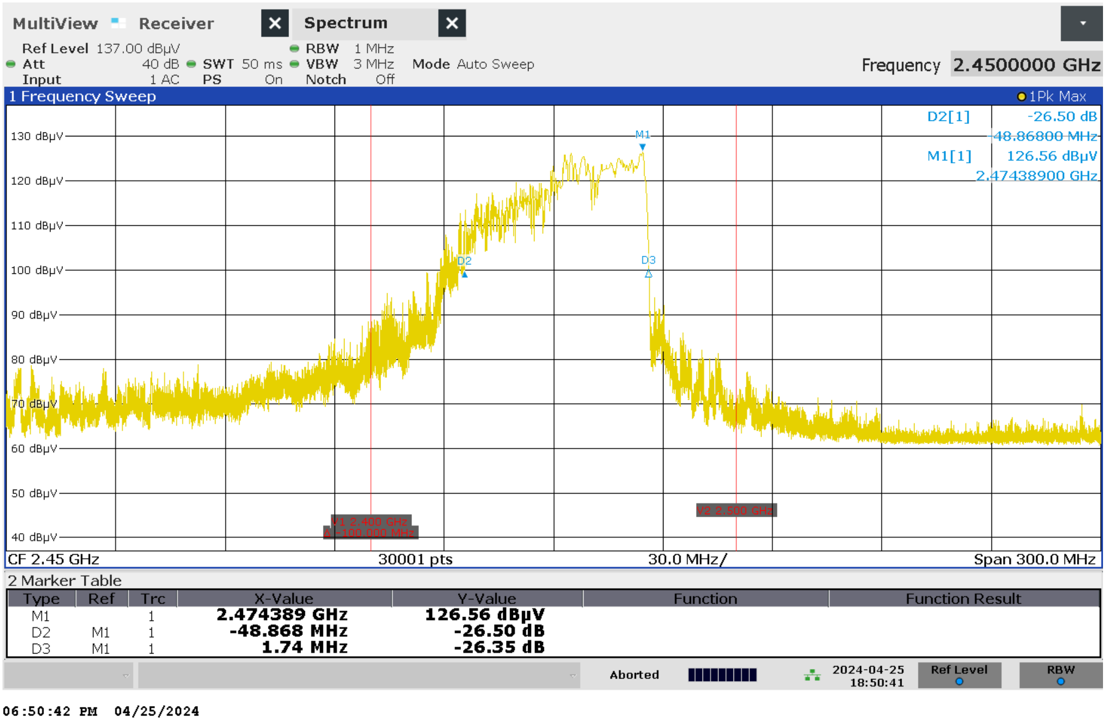
- ***Frequency vs Load Variation Test***



Vertical (120 V, 400 ㎖)

PLOTS OF EMISSIONS

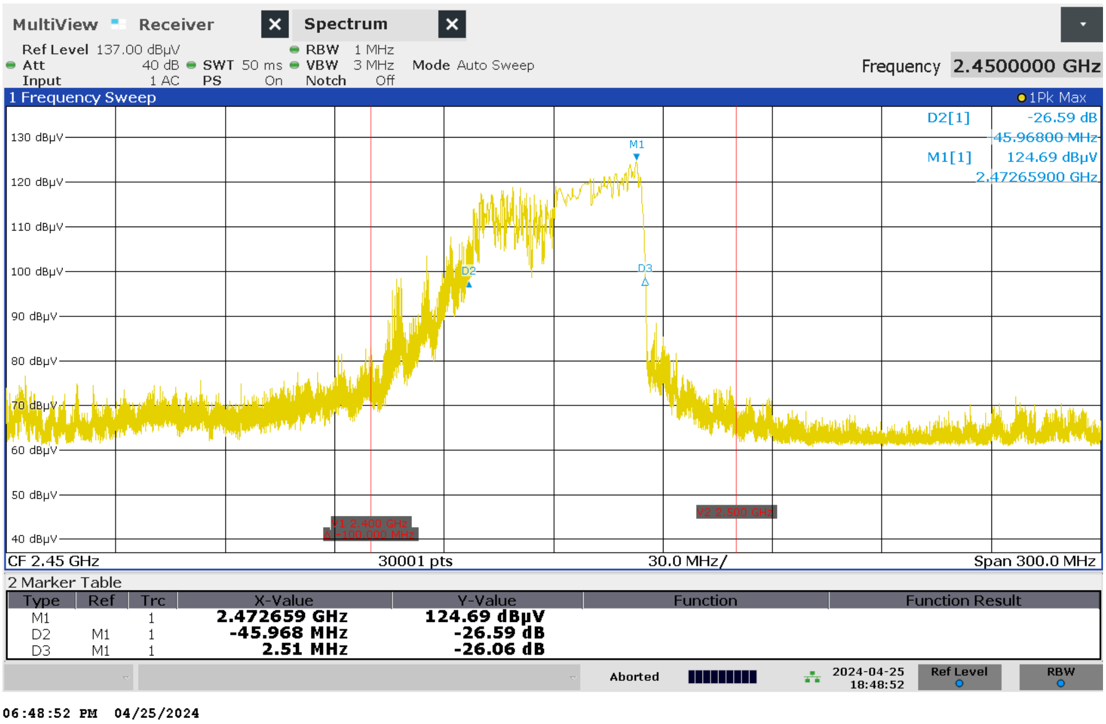
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 600 mℓ)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***

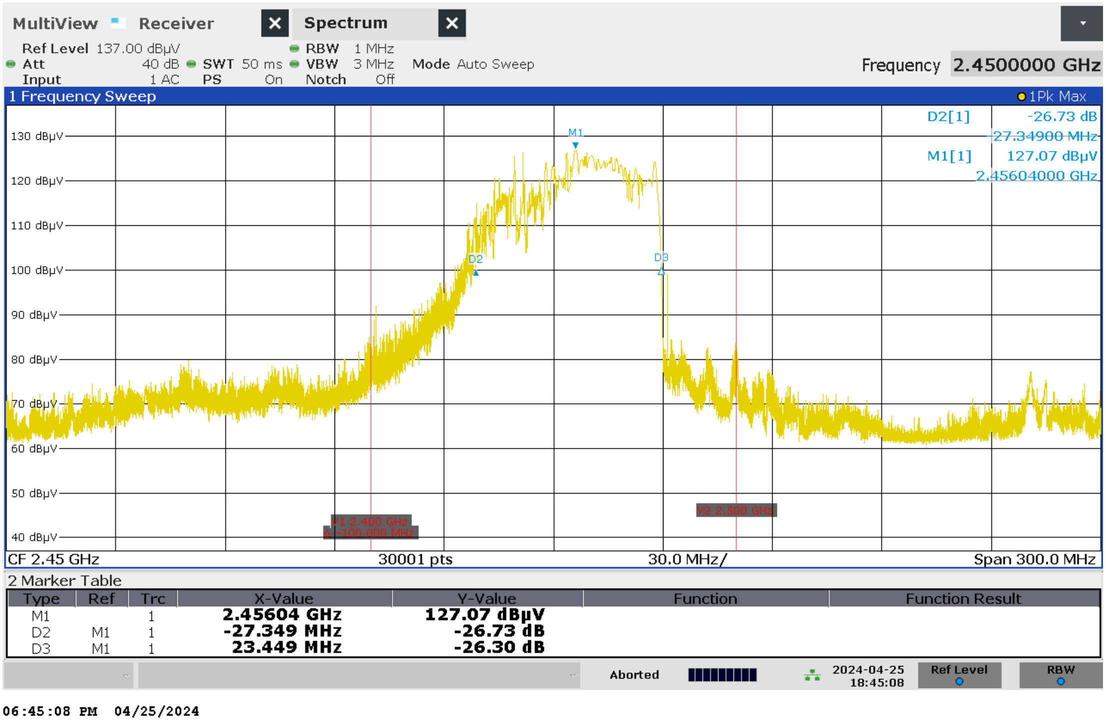


Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.472659 GHz	124.69 dBµV		
D2	M1	1	-45.968 MHz	-26.59 dB		
D3	M1	1	2.51 MHz	-26.06 dB		

Vertical (120 V, 600 ㎖)

PLOTS OF EMISSIONS

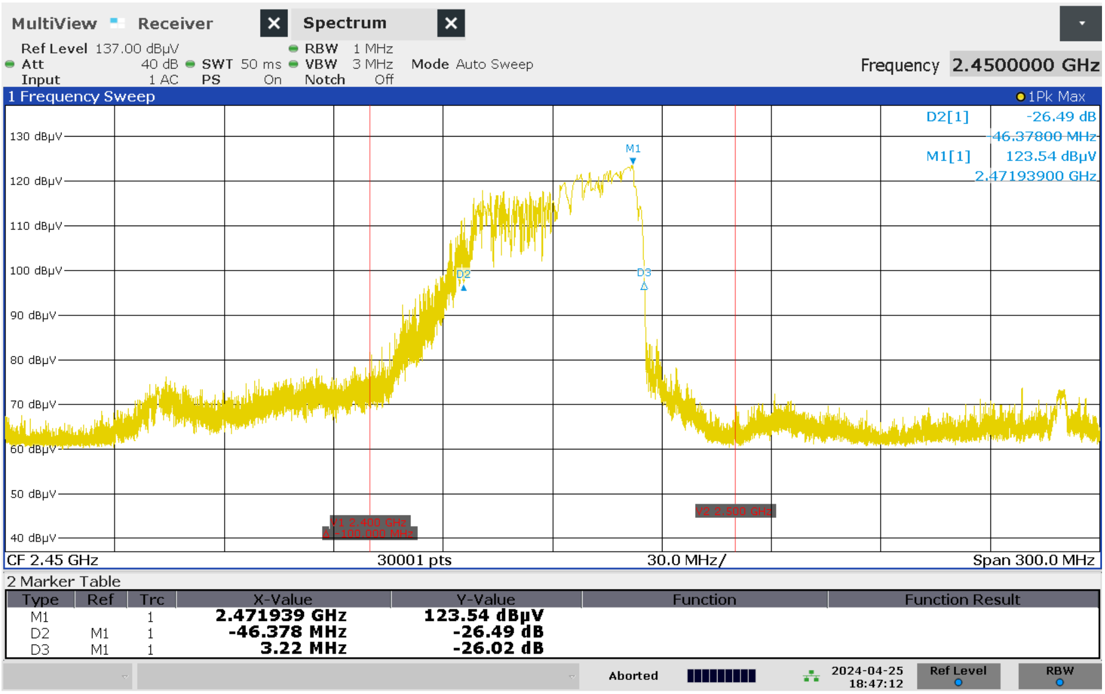
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 800 ㎖)

PLOTS OF EMISSIONS

- ***Frequency vs Load Variation Test***



Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.471939 GHz	123.54 dBµV		
D2	M1	1	-46.378 MHz	-26.49 dB		
D3	M1	1	3.22 MHz	-26.02 dB		

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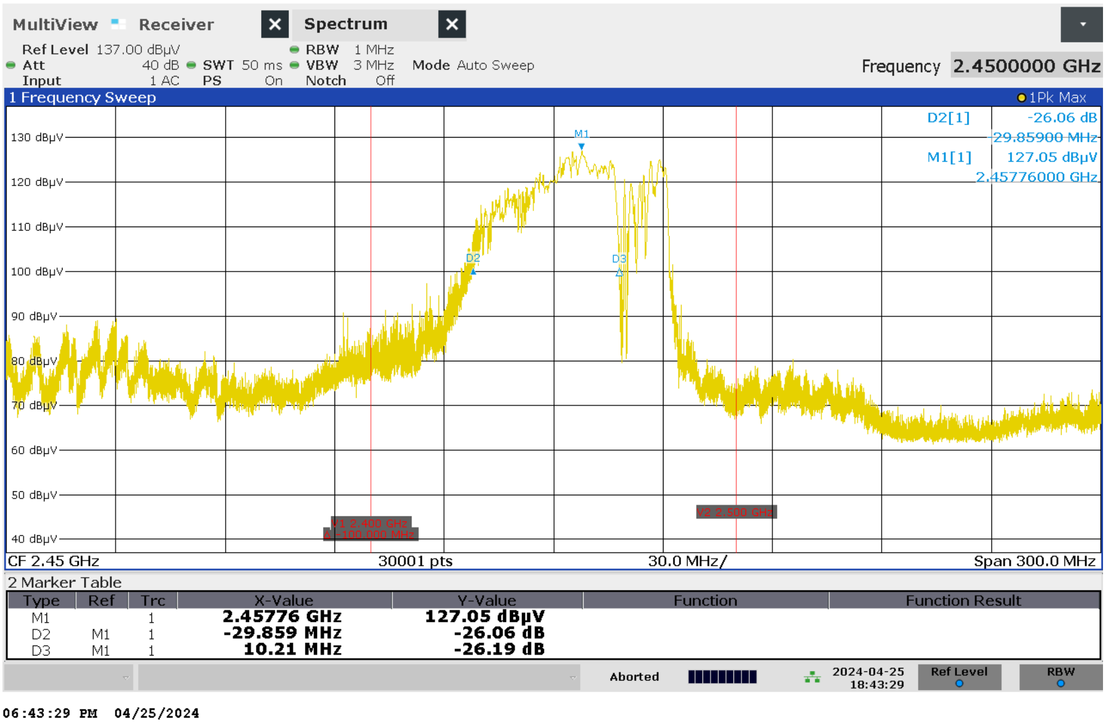
Vertical (120 V, 800 ㎖)

PLOTS OF EMISSIONS

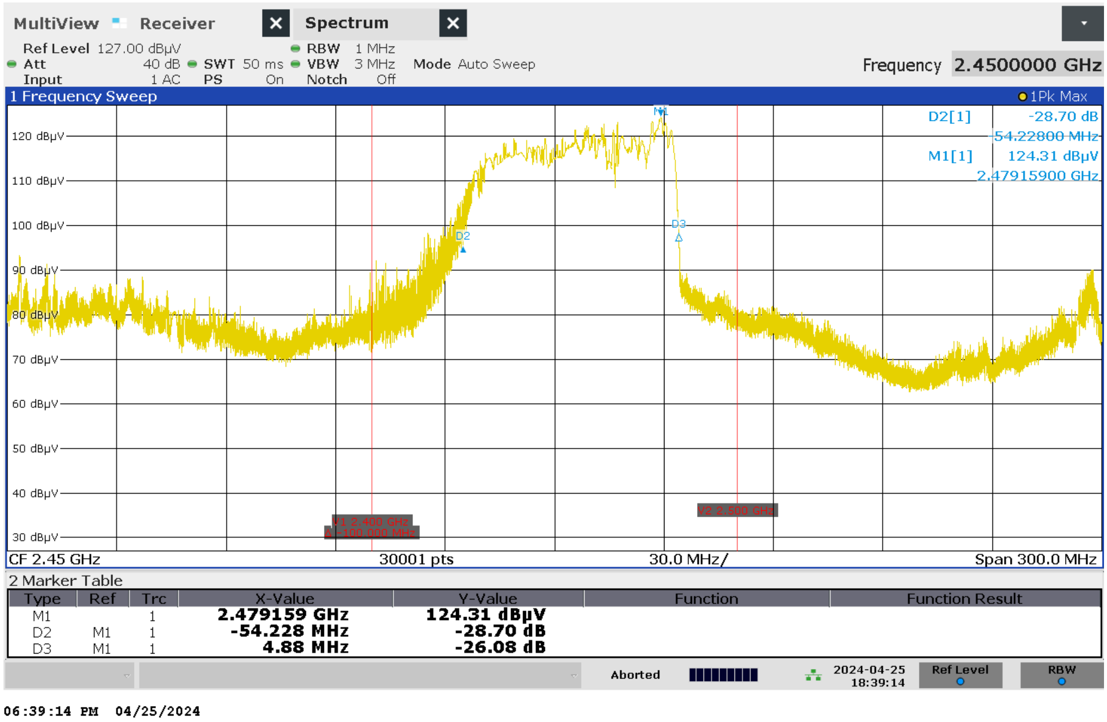
- ***Frequency vs Load Variation Test***



Horizontal (120 V, 1 000 ㎖)

PLOTS OF EMISSIONS

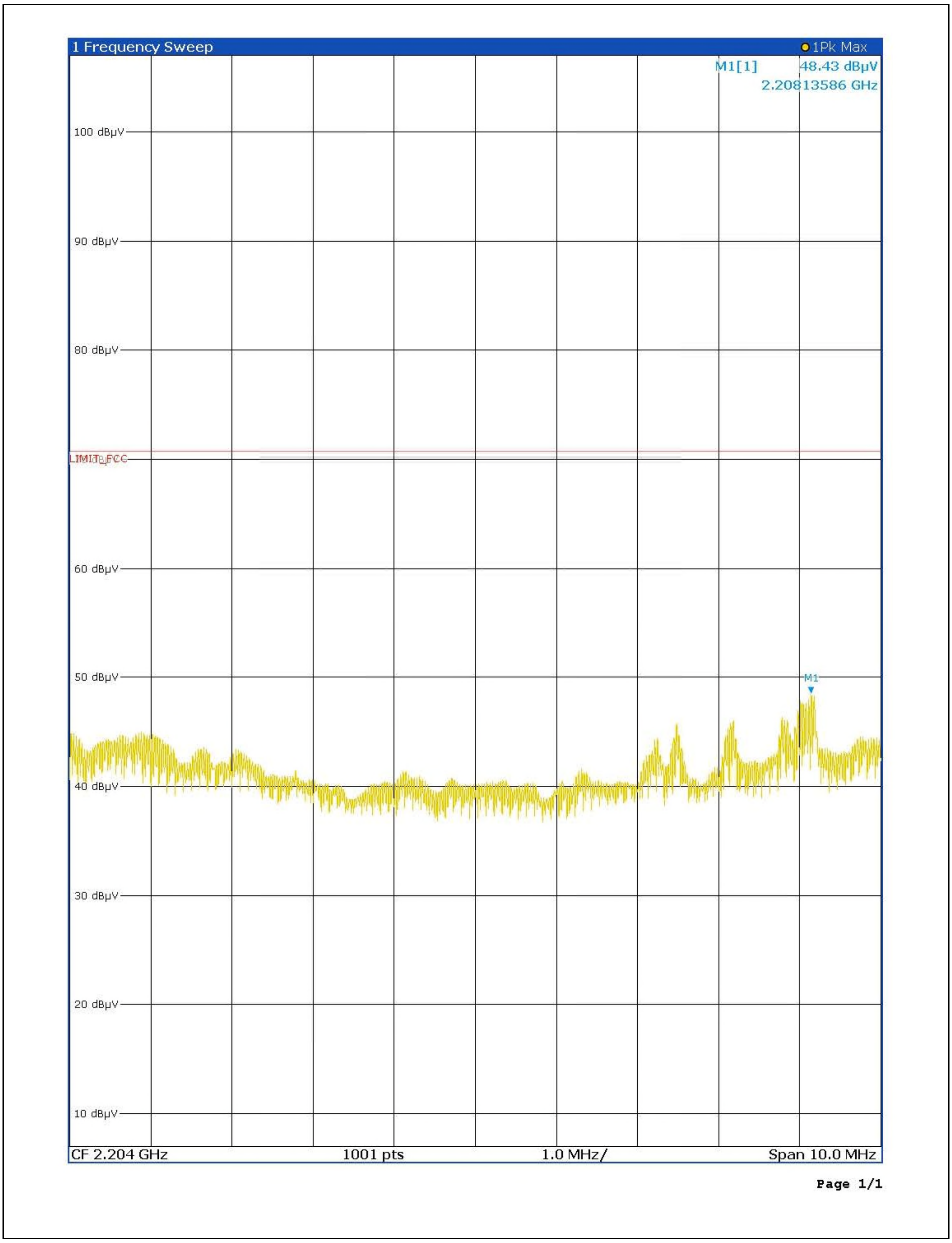
- ***Frequency vs Load Variation Test***



Vertical (120 V, 1 000 ㎖)

PLOTS OF EMISSIONS

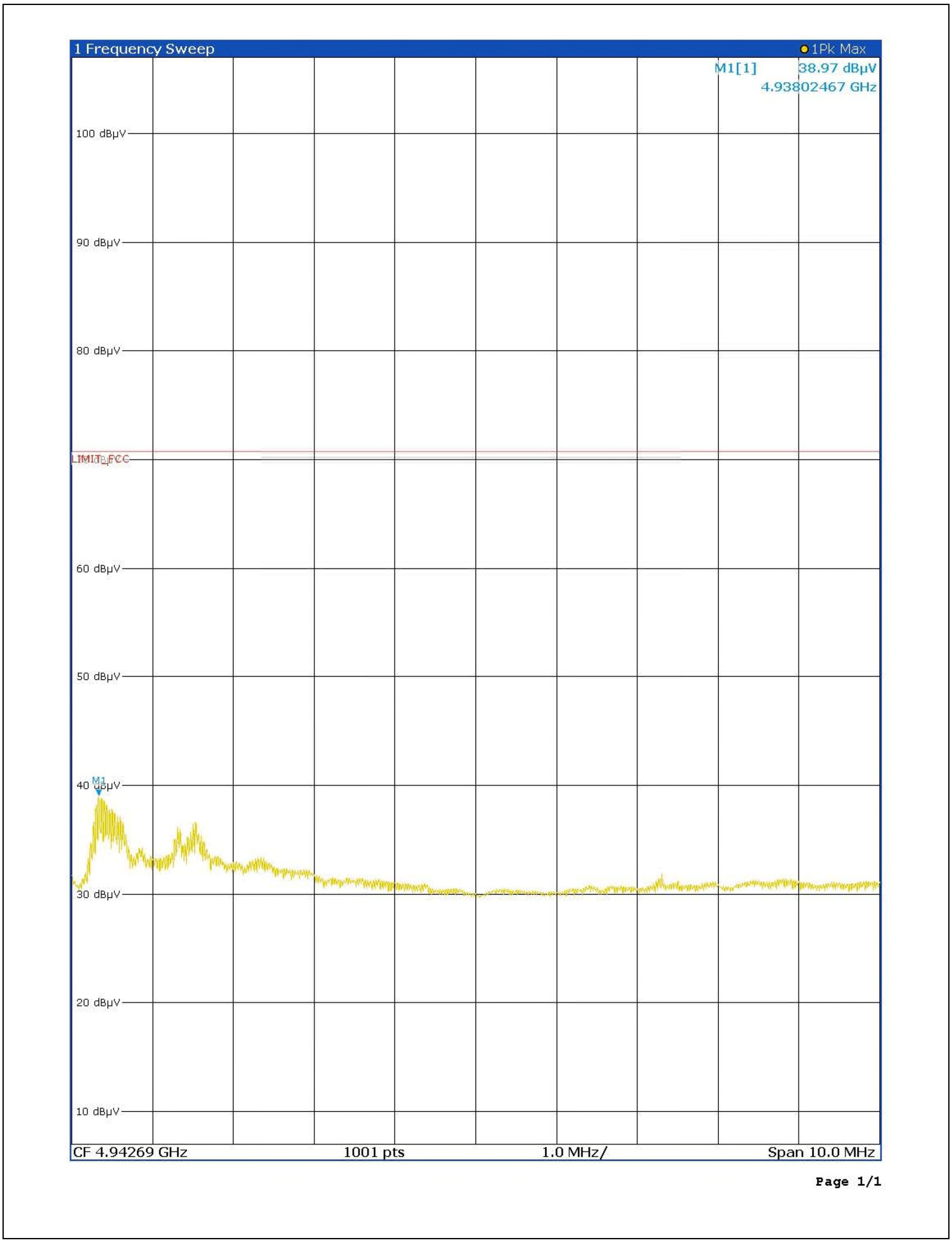
- ***Radiated Emissions (Above 1 GHz)***



2 204 MHz

PLOTS OF EMISSIONS

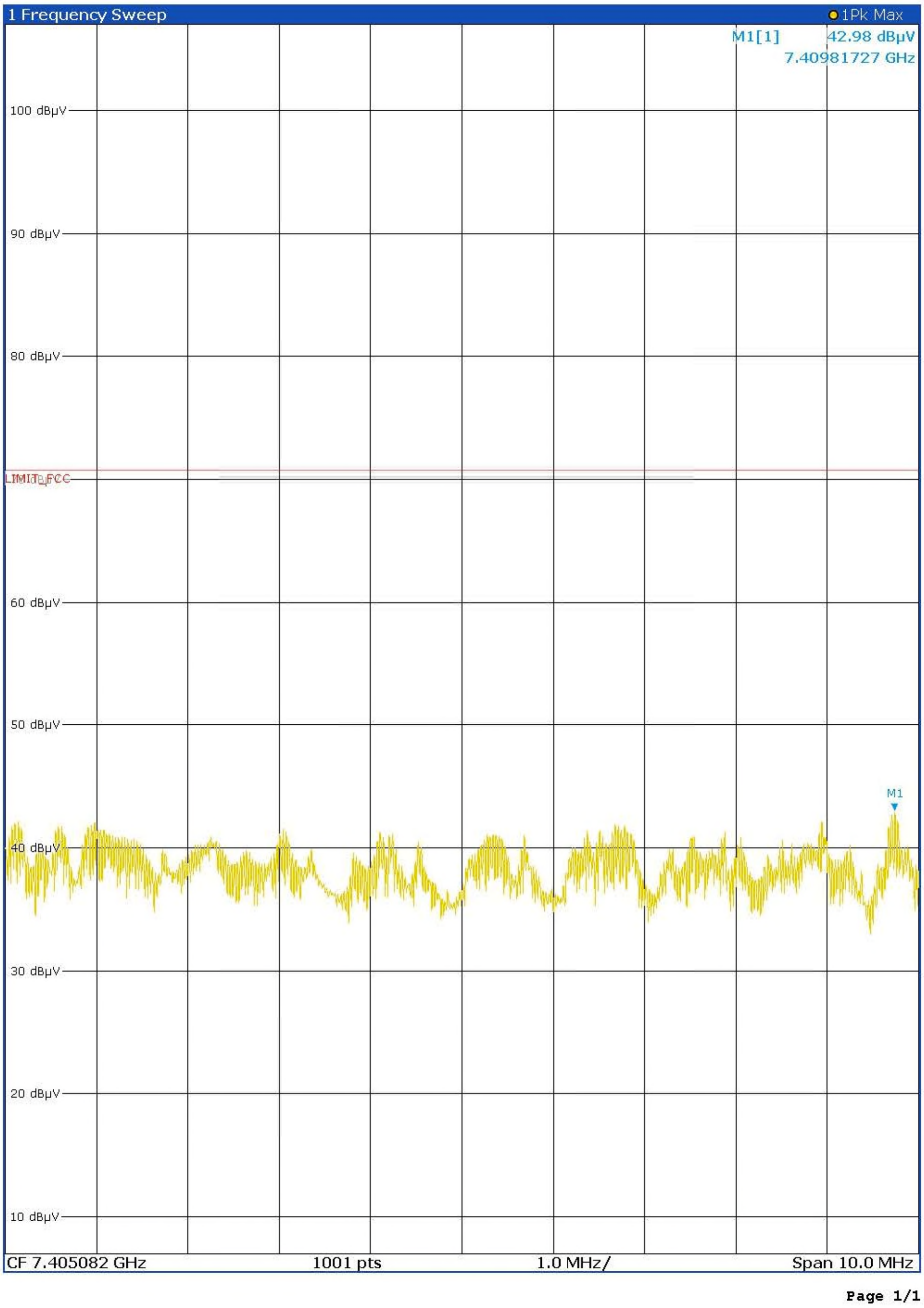
- ***Radiated Emissions (Above 1 GHz)***



4 942 MHz

PLOTS OF EMISSIONS

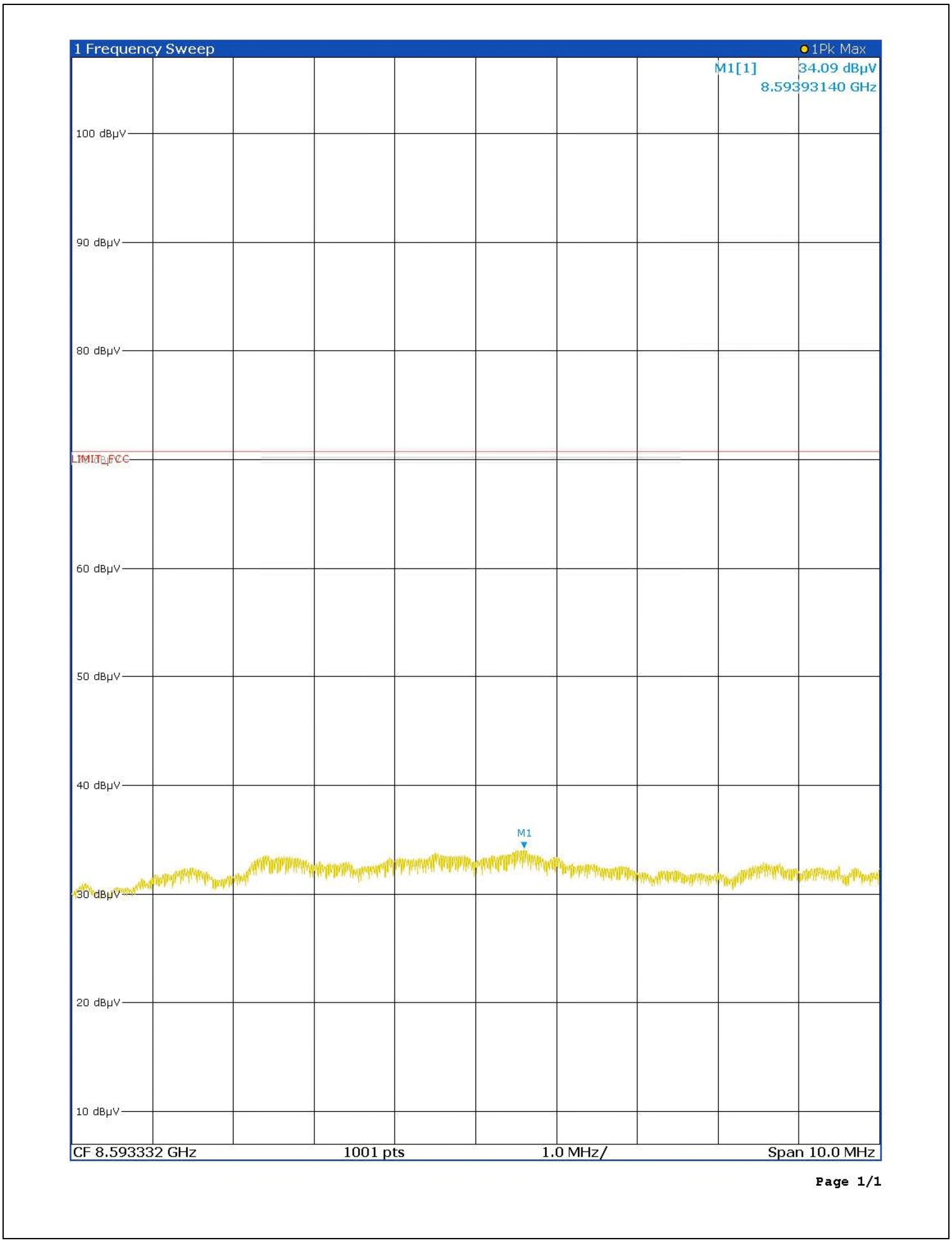
- ***Radiated Emissions (Above 1 GHz)***



7 405 MHz

PLOTS OF EMISSIONS

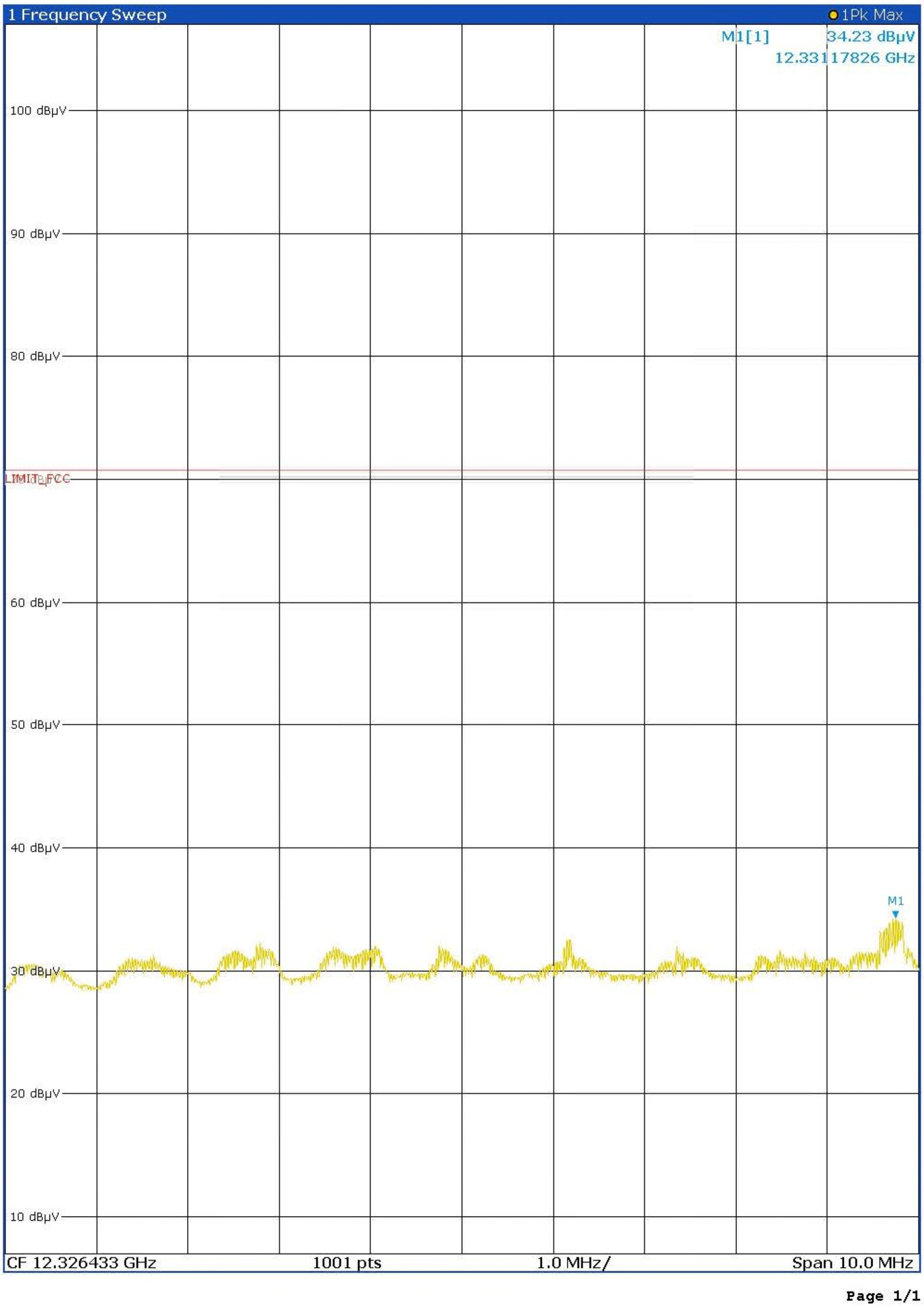
- ***Radiated Emissions (Above 1 GHz)***



8 593 MHz

PLOTS OF EMISSIONS

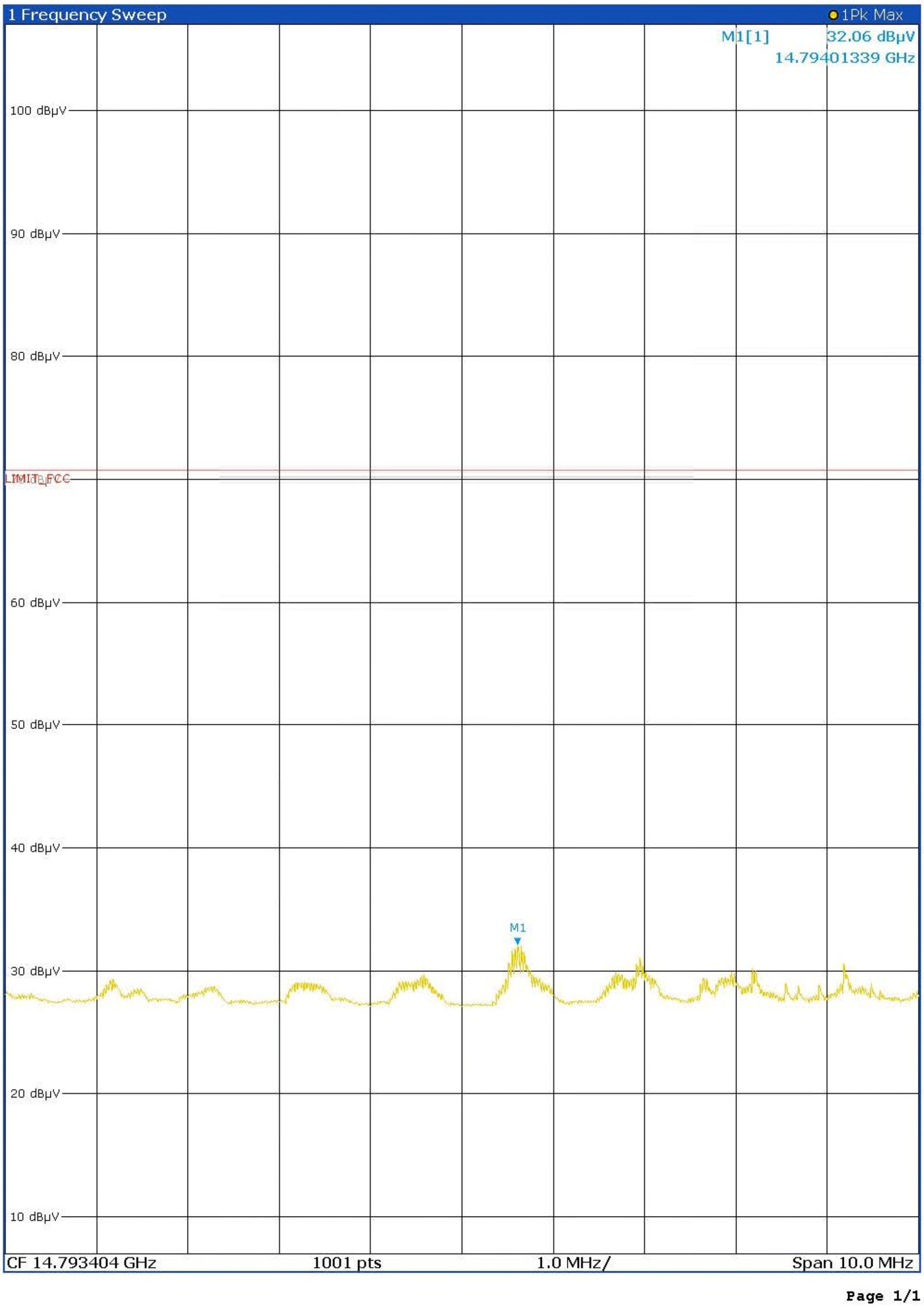
- ***Radiated Emissions (Above 1 GHz)***



12 326 MHz

PLOTS OF EMISSIONS

- ***Radiated Emissions (Above 1 GHz)***



14 793 MHz

ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95 %

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i\,u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	R_i	± 0.15	normal 1	1.00	0.15	1	0.15
AMN Voltage division factor	L_{AMN}	± 0.15	normal 2	2.00	0.08	1	0.08
Sine wave voltage	dV_{SW}	± 0.18	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dV_{PA}	± 0.58	normal 2	2.00	0.29	1	0.29
Pulse repetition rate response	dV_{PR}	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dV_{NF}	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
AMN VDF frequency interpolation	dV_{FI}	± 0.10	rectangular	$\sqrt{3}$	0.06	1	0.06
AMN Impedance	d_Z	± 1.63	Triangular	2.00	0.82	1	0.82
Mismatch : AMN-Receiver	M	± 0.07	U-Shaped	$\sqrt{2}$	0.05	1	0.05
Combined Standard Uncertainty	Normal			u_c = 0.92 dB			
Expended Uncertainty U	Normal (k = 2)			U = 1.84 dB (CL is approx. 95 %)			

2. Radiation Uncertainty Calculation (150 ㎑ to 30 ㎒)

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i\, u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	R_i	± 0.01	normal 1	1.00	0.01	1	0.01
Sine wave voltage	dV_{sw}	± 0.18	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dV_{pa}	± 0.58	normal 2	2.00	0.29	1	0.29
Pulse repetition rate response	dV_{pr}	± 0.70	normal 2	2.00	0.35	1	0.35
Noise floor proximity	dV_{nf}	± 0.50	normal 2	$\sqrt{3}$	0.29	1	0.29
Antenna Factor Calibration	A_F	± 1.50	rectangular	2.00	0.75	1	0.75
Antenna Directivity	A_D	± 0.50	rectangular	$\sqrt{3}$	0.29	1	0.29
Antenna Factor Height Dependence	A_H	± 0.50	rectangular	$\sqrt{3}$	0.29	1	0.29
Antenna Phase Centre Variation	A_P	± 0.2	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	A_i	± 0.3	rectangular	$\sqrt{3}$	0.17	1	0.17
Site Imperfections	S_i	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	D_V	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	D_{bal}	± 1.00	rectangular	$\sqrt{3}$	0.58	1	0.58
Cross Polarization 14)	D_{Cross}	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Mismatch	M	+ 0.89 - 1.00	U-Shaped	$\sqrt{2}$	0.70	1	0.70
Combined Standard Uncertainty	Normal			u_c = 2.23 dB			
Expended Uncertainty U	Normal (k = 2)			U = 4.46 dB (CL is approx. 95 %)			

3. Radiation Uncertainty Calculation (Below 1 ㎓)

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i\,u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	R_i	± 0.08	normal 1	1.00	0.08	1	0.08
Sine wave voltage	dV_{sw}	± 0.18	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dV_{pa}	± 0.58	normal 2	2.00	0.29	1	0.29
Pulse repetition rate response	dV_{pr}	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dV_{nf}	± 0.50	normal 2	2.00	0.29	1	0.29
Antenna Factor Calibration	A_F	± 1.30	normal 2	2.00	0.65	1	0.65
Antenna Directivity	A_D	± 0.50	rectangular	$\sqrt{3}$	0.29	1	0.29
Antenna Factor Height Dependence	A_H	± 1.00	rectangular	$\sqrt{3}$	0.58	1	0.58
Antenna Phase Centre Variation	A_P	± 0.06	rectangular	$\sqrt{3}$	0.03	1	0.03
Antenna Factor Frequency Interpolation	A_i	± 0.30	rectangular	$\sqrt{3}$	0.17	1	0.17
Site Imperfections	S_i	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	D_V	± 0.10	rectangular	$\sqrt{3}$	0.06	1	0.06
Antenna Balance	D_{bal}	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	D_{Cross}	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Mismatch	M	+ 0.89 - 1.00	U-Shaped	$\sqrt{2}$	0.70	1	0.70
Combined Standard Uncertainty	Normal			u_c = 2.19 dB			
Expended Uncertainty U	Normal (k = 2)			U = 4.38 dB (CL is approx. 95 %)			

4. Radiation Uncertainty Calculation (Above 1 ㎓)

Source of Uncertainty	***Xi***	**Uncertainty of *Xi***		**Coverage factor *k***	***u(Xi)* (dB)**	***Ci***	***Ci u(Xi)* (dB)**
		Value (dB)	**Probability Distribution**				
Receiver reading	***Ri***	± 0.25	normal 1	1.00	0.25	1	0.25
Sine wave voltage	***dVsw***	± 0.25	normal 2	2.00	0.13	1	0.13
Pulse amplitude response	***dVpa***	± 0.58	normal 2	2.00	0.29	1	0.29
Pulse repetition rate response	***dVpr***	± 0.58	normal 2	2.00	0.29	1	0.29
Noise floor proximity	***dVnf***	± 0.58	rectangular	$\sqrt{3}$	0.34	1	0.34
Antenna Factor Calibration	***AF***	± 1.60	normal 2	2.00	0.80	1	0.80
Antenna Directivity	***AD***	± 0.87	rectangular	$\sqrt{3}$	0.51	1	0.51
Antenna Phase Centre Variation	***AP***	± 0.2	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	***Ai***	± 0.3	rectangular	$\sqrt{3}$	0.17	1	0.17
Site Imperfections	***Si***	± 3.00	triangular	$\sqrt{6}$	1.23	1	1.23
Separation distance	***DV***	± 0.30	rectangular	$\sqrt{3}$	0.17	1	0.17
Cross Polarization	***DCross***	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Mismatch(Amp-Pre)	***MP***	± 1.50	U-Shaped	$\sqrt{2}$	1.07	1	1.07
Mismatch(Pre-Rec)	***MR***	± 1.40	U-Shaped	$\sqrt{2}$	0.99	1	0.99
Combined Standard Uncertainty	Normal			u_c = 2.29 dB			
Expended Uncertainty *U*	Normal (k = 2)			U = 4.58 dB (CL is approx. 95 %)			

LIST OF TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Due Date	Calibration Interval
1	Software	Rohde & Schwarz	EMC32	Version 11.50.00	-	-
2	EMI TEST RECEIVER	Rohde & Schwarz	ESR3	102930	2024.07.03	1 year
3	ATTENUATOR	FAIRVIEW	SA3N5W-10	N/A	2025.01.10	1 year
4	ESH2-Z5 Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100227	2024.10.11	1 year
5	EMI TEST RECEIVER	Rohde & Schwarz	ESR7	102802	2025.01.08	1 year
6	TRILOG Broadband Test Antenna	SCHWARZBECK	VULB 9163	01432	2025.06.16	2 years
7	ATTENUATOR	FAIRVIEW	SA3N5W-06	N/A	2025.01.09	1 year
8	AMPLIFIER	Sonoma Instrument	310N	186429	2025.02.29	1 year
9	Open Switch and Control Unit	Rohde & Schwarz	OSP230	101830	-	-
10	TILT ANTENNA MAST	innco systems GmbH	MA4640/800-XP-EP	N/A	-	-
11	Turntable	innco systems GmbH	DT3000-3t	N/A	-	-
12	CONTROLLER	innco systems GmbH	CO3000	CO3000/1373/52220621/P	-	-
13	LOOP ANTENNA	Rohde & Schwarz	HFH2-Z2	100279	2025.03.29	1 year
14	Loop Antenna Mast	TESTEK	ANT Stand for Loop	N/A	-	-
15	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	103318	2025.01.08	1 year
16	Turntable	innco systems GmbH	DS2000-S-2t	N/A	-	-
17	CONTROLLER	innco systems GmbH	CO3000	CO3000/1473/54610422/P	-	-
18	Open Switch and Control Unit	Rohde & Schwarz	OSP220	102977	-	-
19	TILT ANTENNA MAST	innco systems GmbH	MA4640/800-XP-EP	N/A	-	-
20	DOUBLE RIDGED HORN ANTENNA	Rohde & Schwarz	HF907	103175	2025.01.11	1 year
21	Signal Conditioning Unit	Rohde & Schwarz	SCU18F	101056	2025.01.09	1 year
22	Signal Conditioning Unit	Rohde & Schwarz	SCU26F	100750	2025.01.11	1 year
23	Horn Antenna	Steatite Antennas	QMS-00225	32226	2025.01.11	1 year
24	WiFi Filter Bank	Rohde & Schwarz	U082	N/A	-	-
25	Software	Rohde & Schwarz	ELEKTRA	Version 5.01.0	-	-
26	Microwave survey meter	ETS Lindgren	1501	00033549	2025.01.10	2 years

APPENDIX A – SAMPLE LABEL

Labeling Requirements

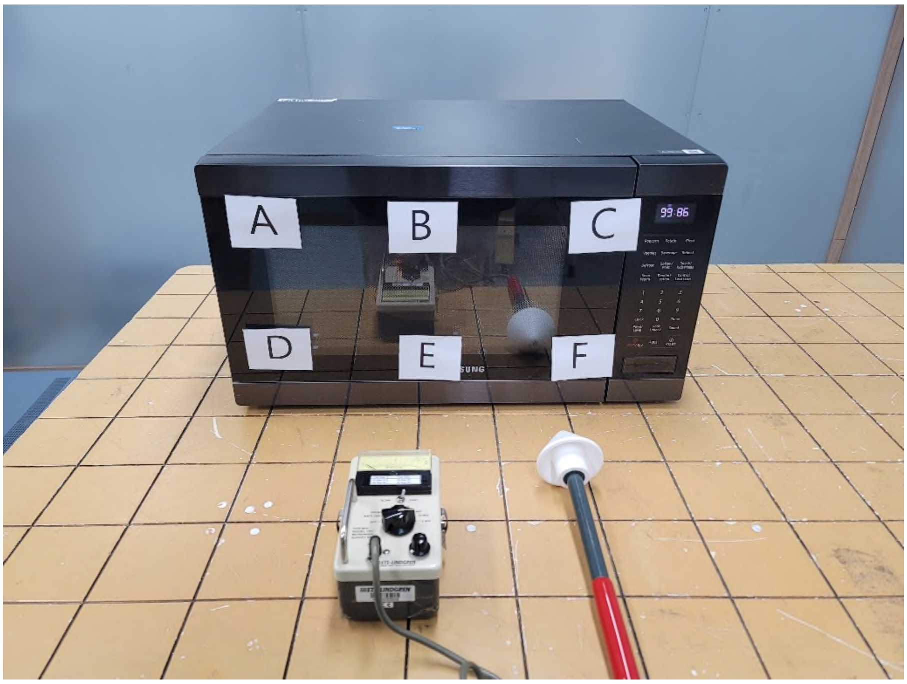
The sample label shown shall be *permanently affixed* at a conspicuous location on the device and be readily visible to the user at the time of purchase.

- **FCC ID Location of EUT**

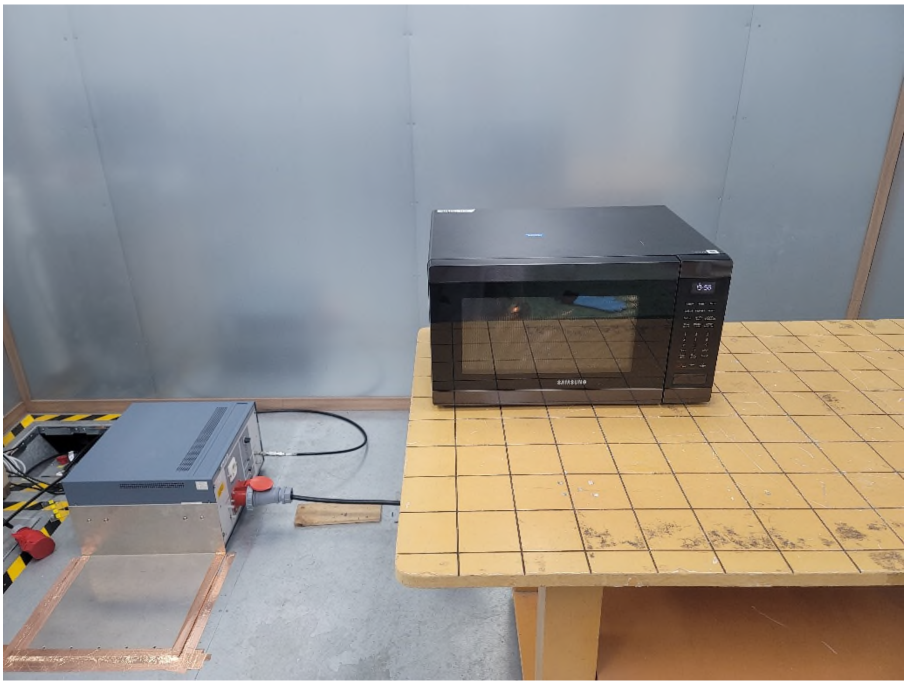
APPENDIX B – PHOTOGRAPHS OF TEST SET-UP

The **Conducted Test Picture** and **Radiated Test Picture** and show the worst-case configuration and cable placement.

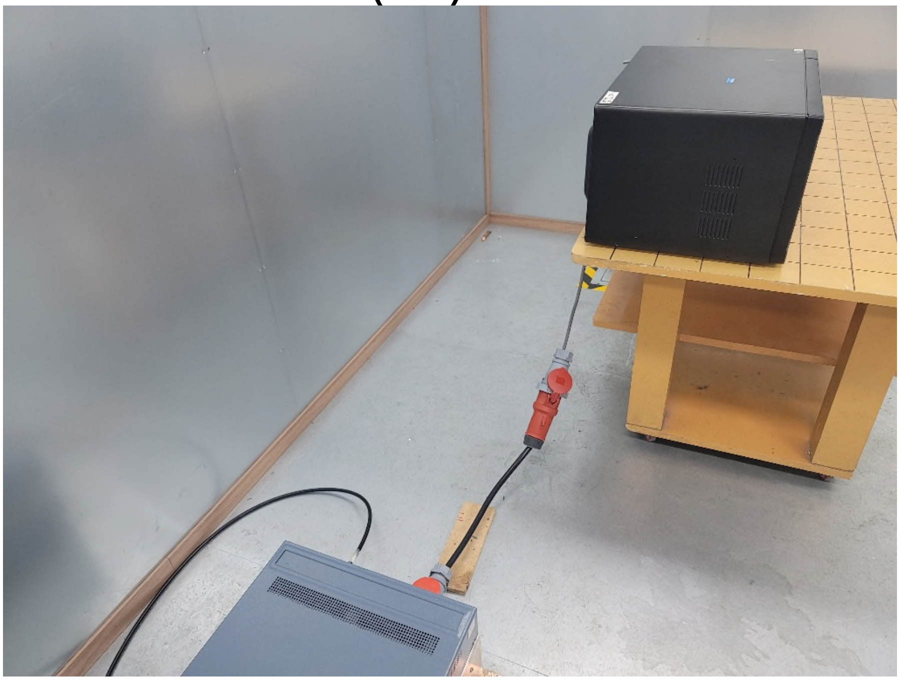
- **Radiation hazard Test Picture**



- **Conducted Test Picture (Front)**

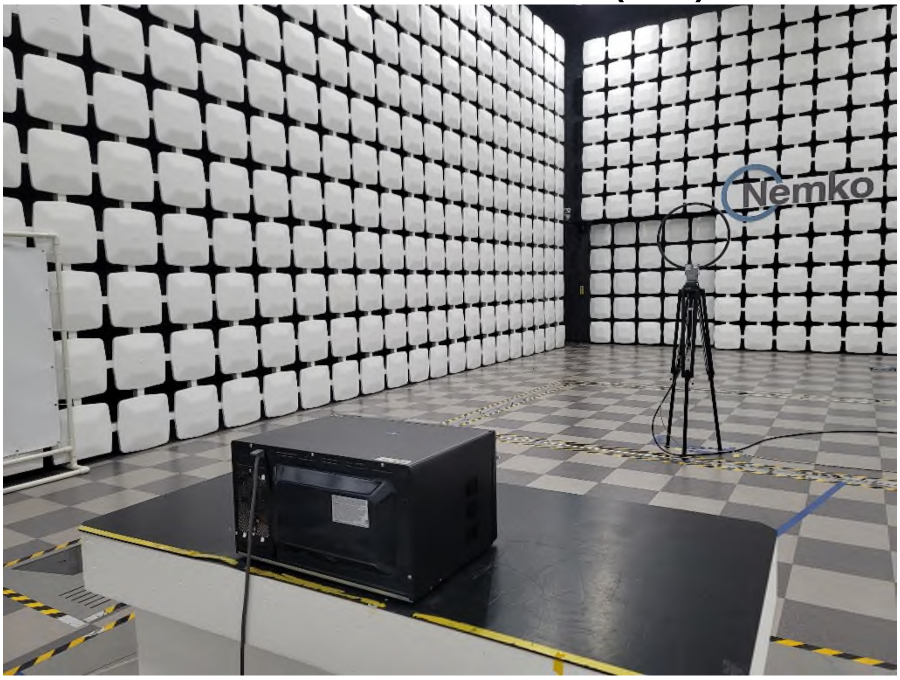


- **Conducted Test Picture (Side)**

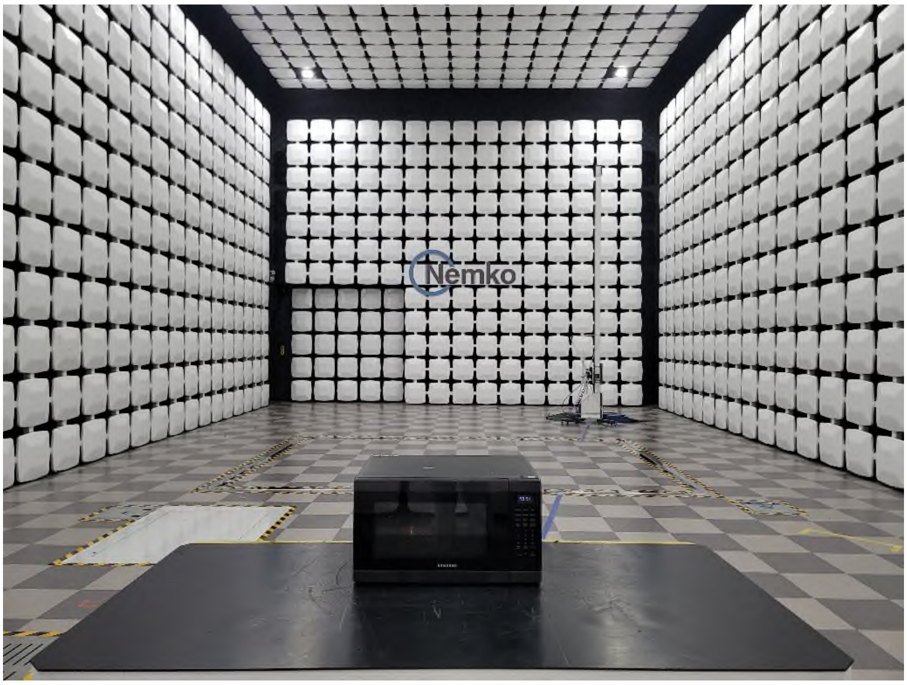


- **Radiated Test Picture : 0.15 ㎒ ~ 30 ㎒ (Front)**

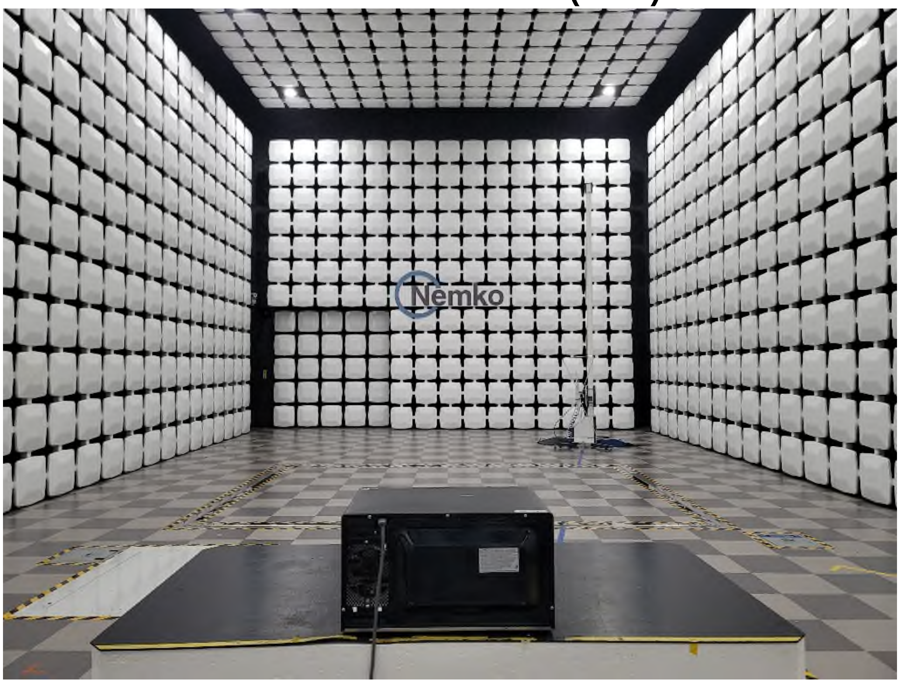
- **Radiated Test Picture : 0.15 ㎒ ~ 30 ㎒ (Rear)**



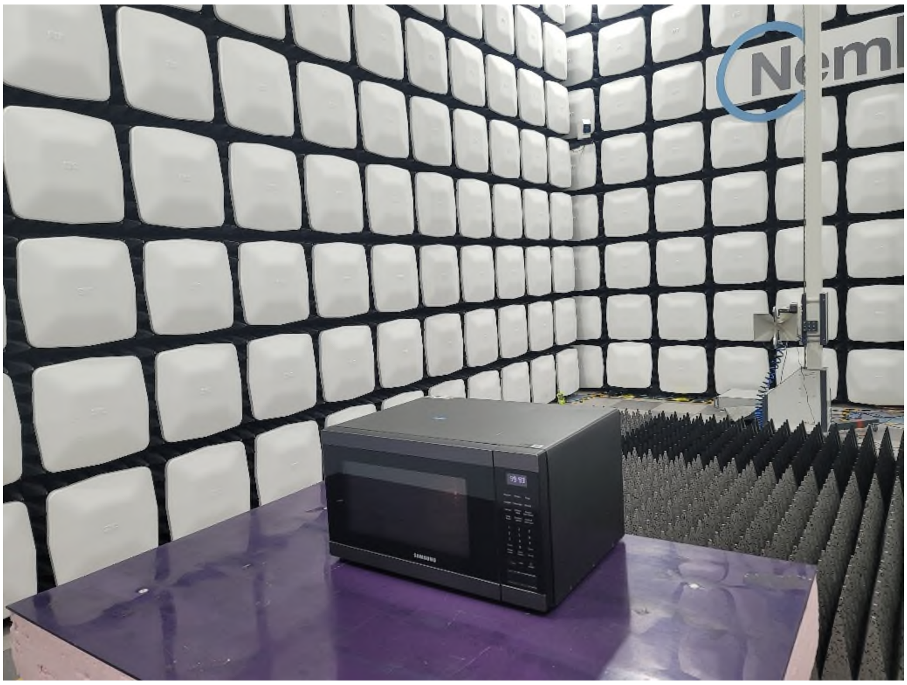
- **Radiated Test Picture : 30 ㎒ ~ 1 ㎓ (Front)**



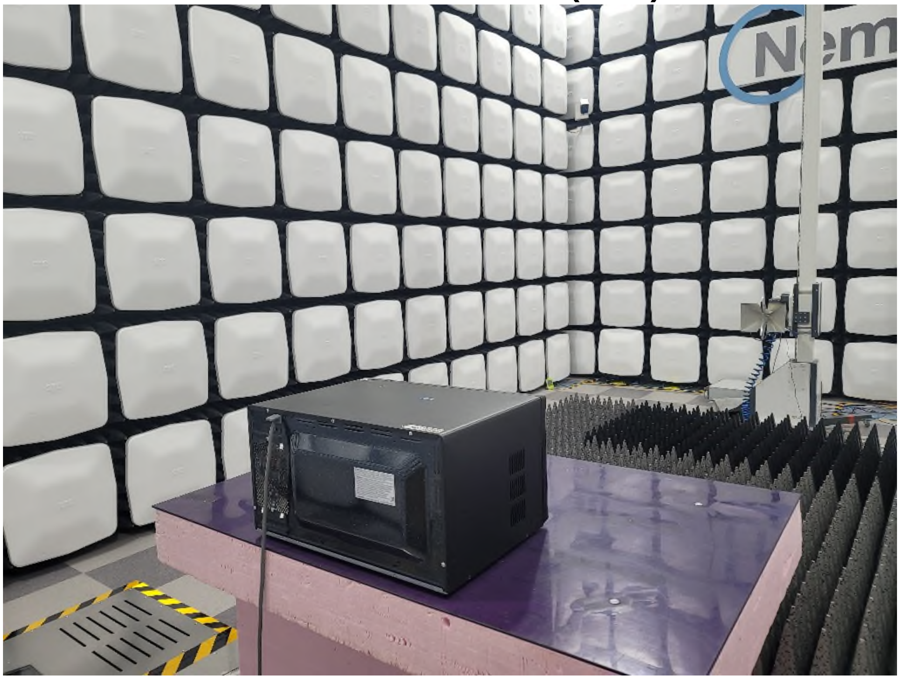
- **Radiated Test Picture : 30 ㎒ ~ 1 ㎓ (Rear)**



- **Radiated Test Picture : 1 ㎓ ~ 18 ㎓ (Front)**



- **Radiated Test Picture : 1 ㎓ ~ 18 ㎓ (Rear)**



APPENDIX C – EUT PHOTOGRAPHS

Front View of EUT

Rear View of EUT

Left View of EUT

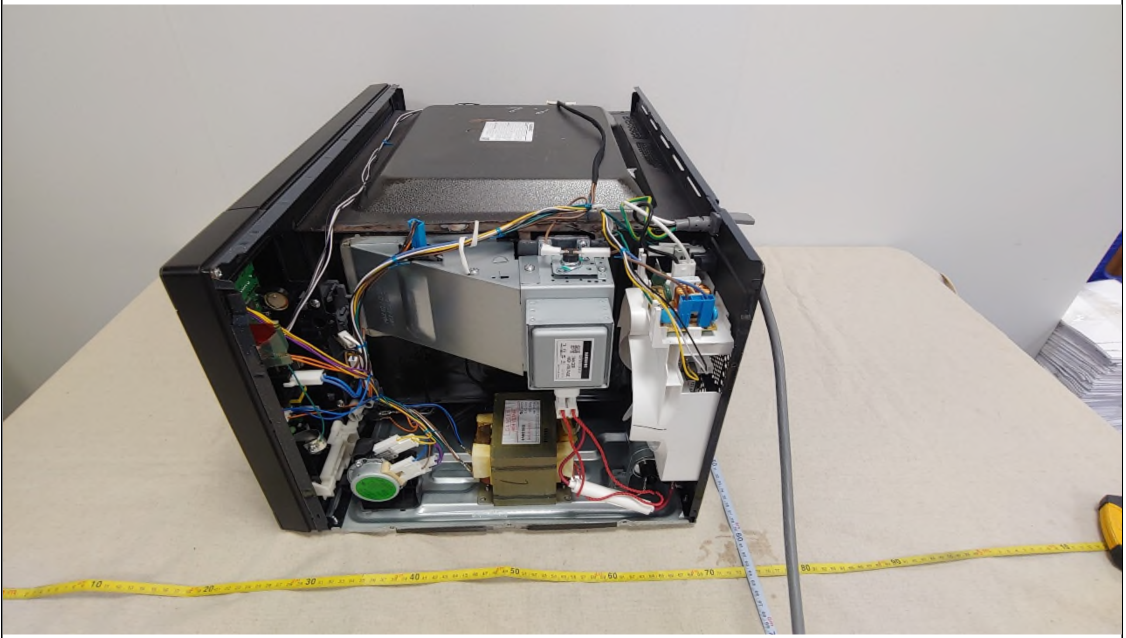
Right View of EUT

Bottom View of EUT

Inside View 1 of EUT

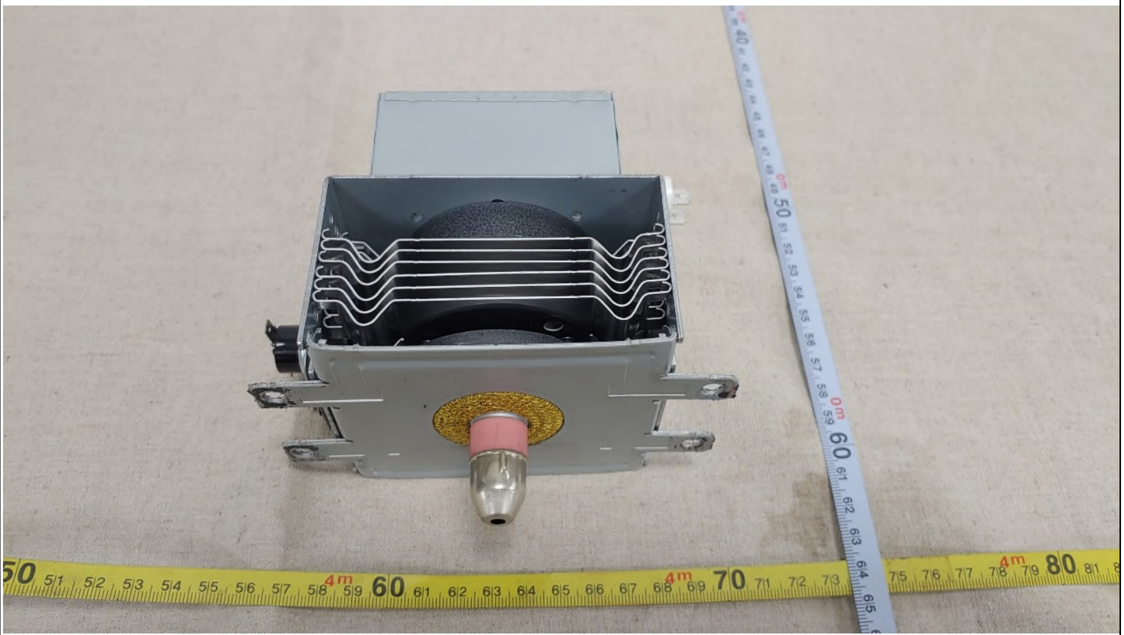
Inside View 2 of EUT

Inside View 3 of EUT

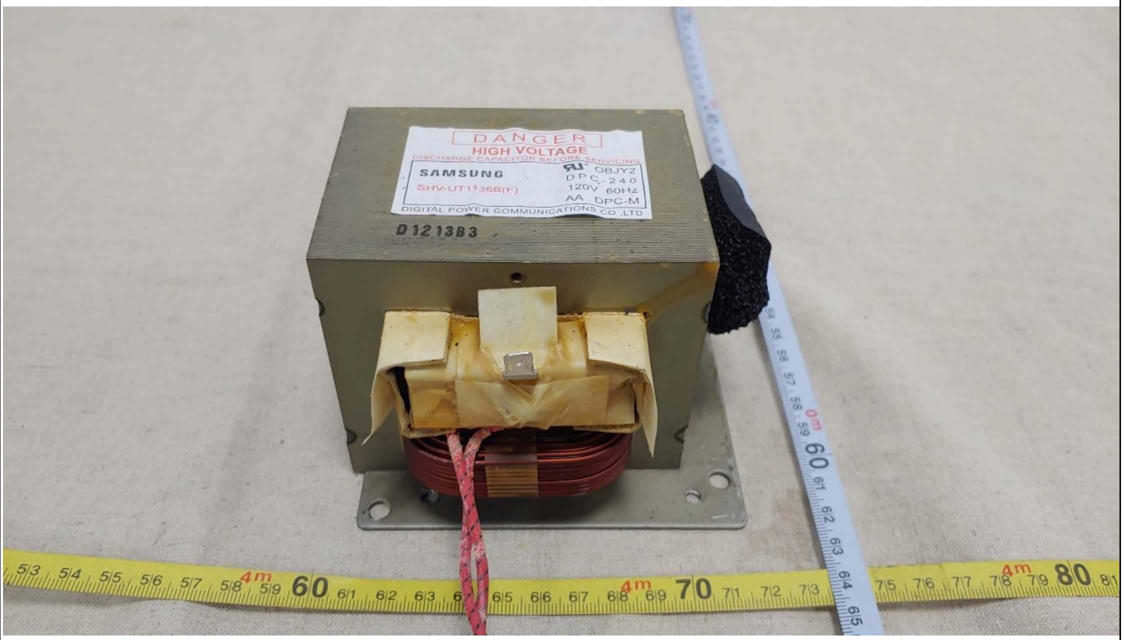


Front View of MAGNETRON

Rear View of MAGNETRON



Front View of H.V TRANS

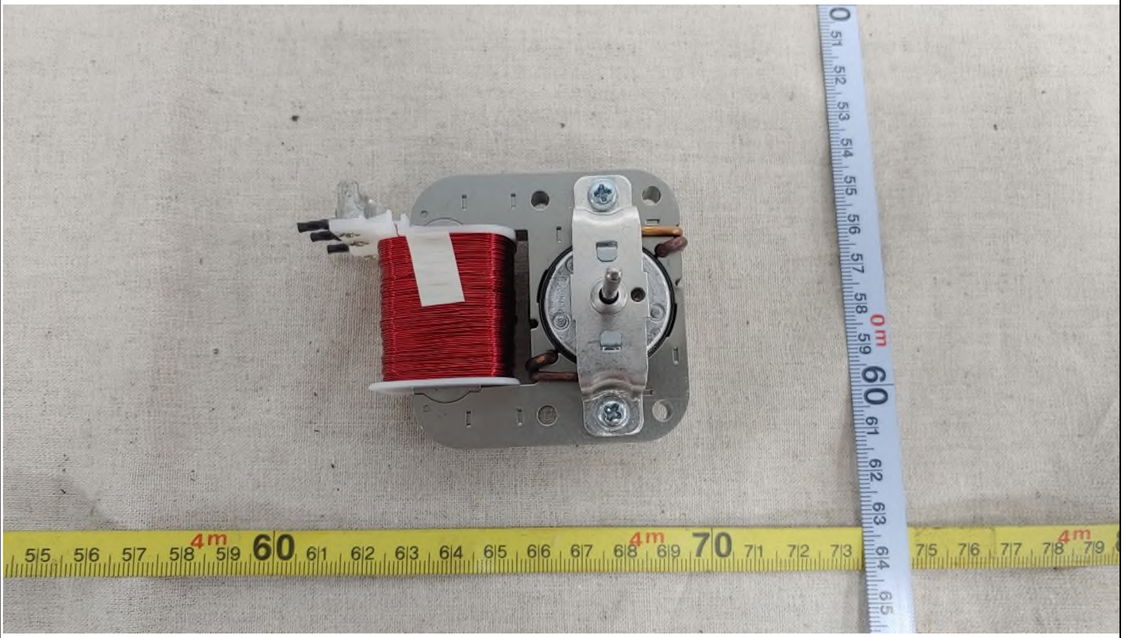


Rear View of H.V TRANS

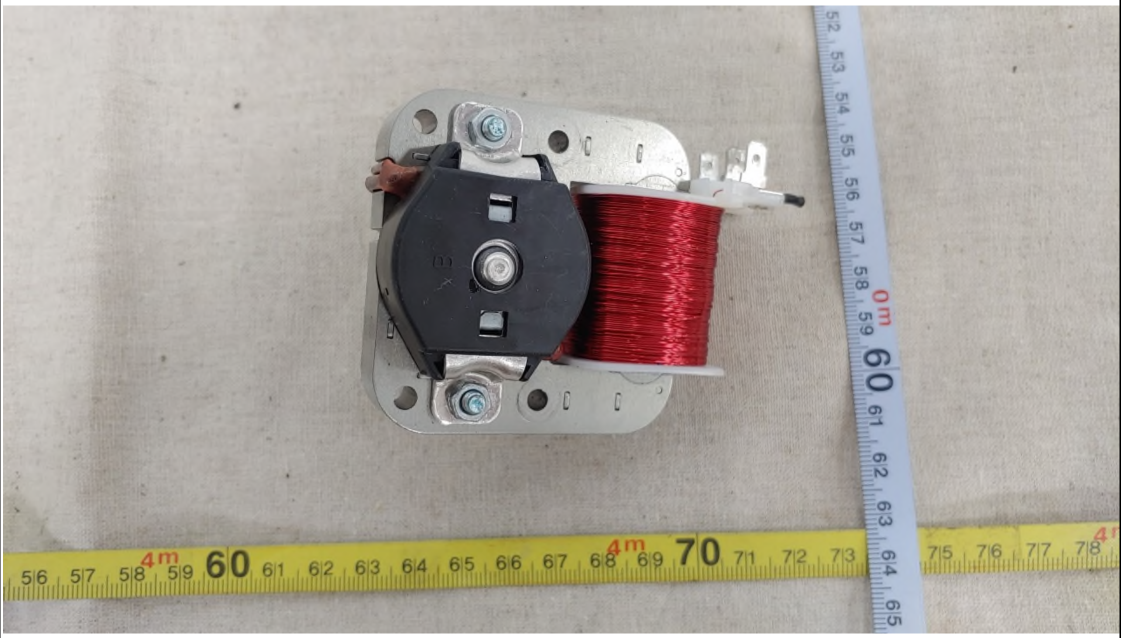
Front View of H.V CAPACITOR

Rear View of H.V CAPACITOR

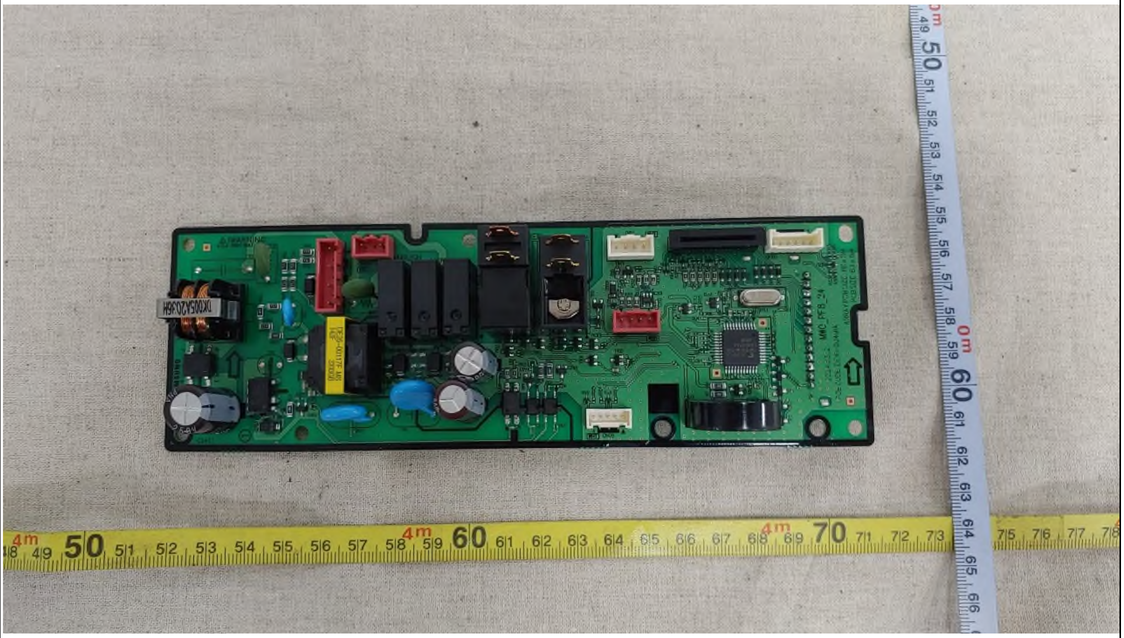
Front View of FAN MOTOR



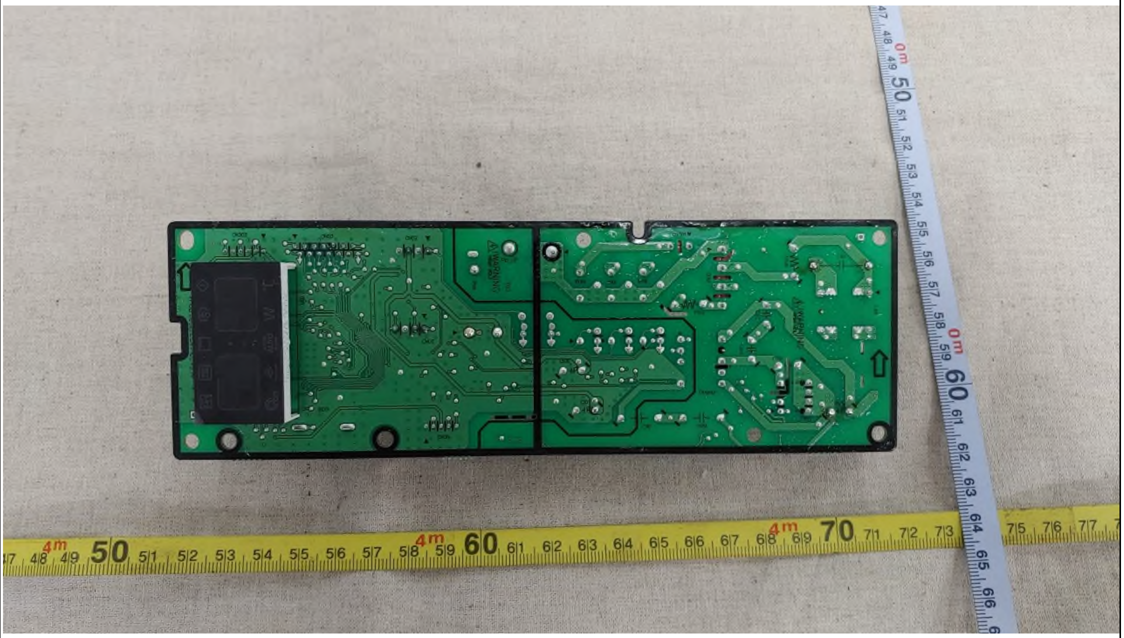
Rear View of FAN MOTOR



Front View of Control



Rear View of Control



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