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Release Control Record

Issue Report No.	Issued Date	Details/Revisions
TR-W2111-047	2021-11-30	Initial Release
-	-	-

1. TEST SUMMARY

1.1 Regulations and results

The sample submitted for evaluation (Referred to below as the EUT) has been tested in accordance with the following regulations or standards.

FCC Reference Section	Description	Result			
		P	F	N.T.	Note
15.109 15.209	Radiated emissions	P			
15.215	20 dB Bandwidth,	P			
15.205	Restricted Bands	P			Note 1
15.107(a) 15.207(a)	AC power line conducted emissions	P			

Remark:

P means Passed

F means Failed

N.T. means Not Tested

Note 1: Transmitting Frequency for the EUT is (147.5 - 148.5) kHz and harmonic and spurious emissions fall in restricted bands met the general radiated emission limit, so the EUT met this requirement.

1.2 Purpose of the test

The test was performed to determine whether the equipment under test fulfills the requirements of the regulation stated in CFR 47 FCC Part 15 Subpart B and C.

1.3 Test Methodology








The tests mentioned in clause 1.1 in this test report were performed according to FCC CFR 47 Part 2, CFR 47 Part 15, ANSI C63.10-2013.

1.4 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

1.5 Test Facility

The measurement facilities are located at 135-60 Gyeongchung-daero, Gonjam-eup, Gwangju-si, Gyeonggi-do 12813, Korea. Our test facilities are accredited as a Conformity Assessment Body (CAB) by the FCC and ISED Canada, designated by the RRA (National Radio Research Agency), and accredited by KOLAS (Korea Laboratory Accreditation Scheme) in Korea and approved by TUV Rheinland, TUV SÜD and Korean Register of Shipping according to the requirement of ISO/IEC 17025.

Laboratory Qualification	Registration No.	Mark
FCC	KR0160	
ISED Canada	12721A	
RRA	KR0160	 National Radio Research Agency
TUV Rheinland	UA 50314109-0002	
TUV SÜD	CARAT 094465 0004 Rev.00	
Korean Agency for Technology and Standards	KT733	
KOREAN REGISTER OF SHIPPING	PCT40841-TL001	

Remark. This report is not related to KOLAS accreditation and relevant regulation.

2. EUT (Equipment Under Test) INFORMATION

2.1 General Description

The JNL Co.,Ltd., Model DR-B (Hereafter referred to as the EUT in this report) is a DERMAROLLER, which is consist of Dermaroller and charging base. The EUT is a roller type beauty device with Electroporation (EP) technology which enables skin care nutrients to effectively permeate deep into the tissues through innovative Multiple Medium Frequency (MF), NNN™ (Need no needle) technology. The product specification described herein was obtained from product data sheet or user's manual.

Kind of Class	DCD- Part 15 Low Power Transmitter Below 1 705 kHz
WPT(Wireless Power Transfer) Frequency	148 kHz
Power Transfer Function	Single fixed power transfer zone, single client
Modulation Types	Load Modulation
Type of Antenna	<input type="checkbox"/> Integrated Type <input checked="" type="checkbox"/> Dedicated Type
	Loop Coil Type
Operating Temperature	- 0 °C ~ + 50 °C
Normal Test Voltage	DC 5 V (powered by AC/DC adapter or USB)
Maximum Power Consumption	1.2 W
Software Version	V1.0
Hardware Version	REV.0

2.2 Additional Model

None

3. TEST CONDITION

3.1 Equipment Used During Test

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

Description		Model No.	FCC ID	Serial No.	Manufacturer.
DERMAROLLER	Cradle	DR-B Cradle	FCC ID: 2A3SS-J1202DR	N/A	JNL Co.,Ltd.
	Client	DR-B Client	N/A	N/A	JNL Co.,Ltd.
AC/DC Adapter		ETA-U90KWK	N/A	N/A	RF Tech (Tianjin) Electronics Co., Ltd.

3.2 Mode of operation during the test

The EUT consists of WPT source and receive-only WPT clients together, so the client device inserted into charging dock of WPT source. Charging base continuously transmitted maximum power for charging client device.

Test Mode	Description
# 1	Only Cradle was operated in standby mode.
# 2	The client was inserted into charging dock on charger and then continuously charged with maximum power.
# 3	Only roller on the client was operated with maximum speed.

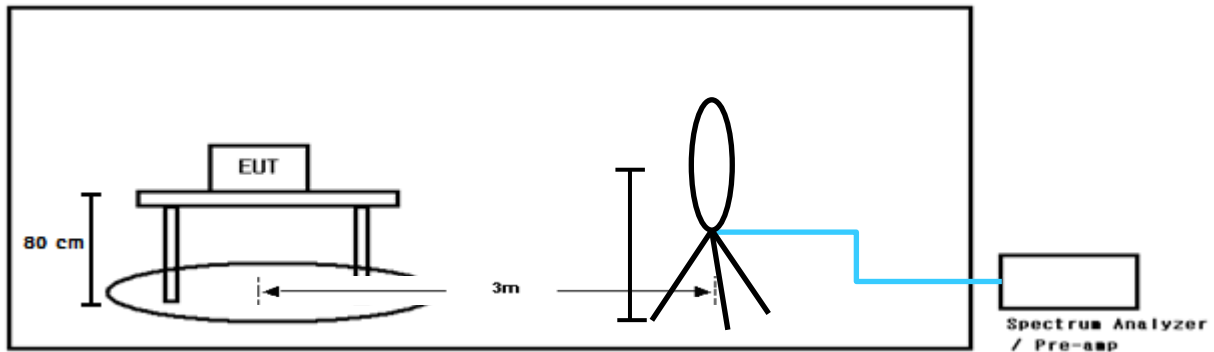
3.3 Preliminary Testing for Worst case configuration

For making charging receive-only WPT client device, the client device shall be inserted into charging dock of the WPT source, so the EUT was tested as normal operation acc. to manufacturer's guidance, and the EUT is a fixed type device, all spurious emission tests were performed in one axis direction.

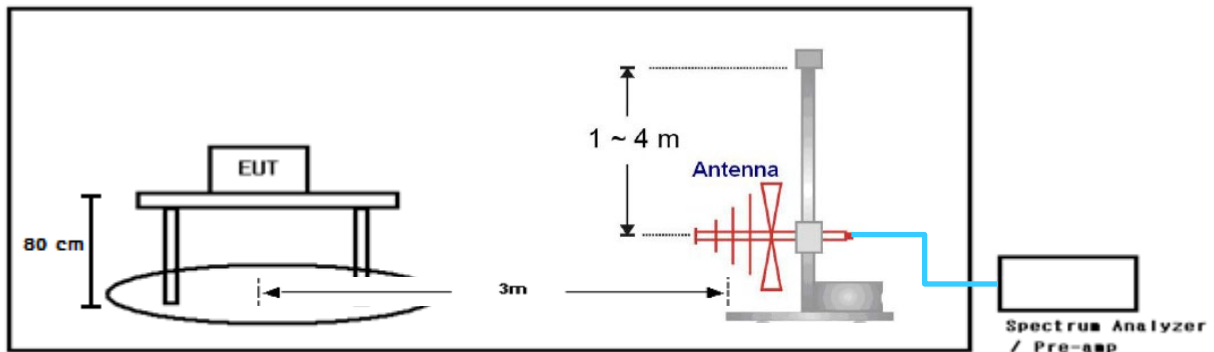
3.3.1 Test Channel and Frequency

Test Mode	Measured Frequency
Mode #1	148.4 kHz
Mode #2	147.6 kHz

3.4 Test Setup Drawing (Radiated Test below 30 MHz)



(Radiated Test below 1 GHz)



3.5 EUT Modifications

- No EMC Relevant Modifications were performed by this test laboratory.

4. ANTENNA REQUIREMENT

According to FCC CFR 47 Part 15 section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provision of this section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31 (d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.1 Conclusion

The EUT has an integral loop coil antenna, so there is no consideration of replacement by the user.

5. TEST RESULT

5.1 Radiated emissions

5.1.1 Regulation

FCC § 15.109(a); Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength ($\mu\text{V/m}$)
30 – 88	100
88 - 216	150
216 - 960	200
Above 960	500

FCC § 15.209(a); Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field strength limit ($\mu\text{V/m}$)	Field strength limit (dB $\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F$ (kHz) = 266.7 – 4.9	48.5 – 13.8	300
0.490 – 1.705	$24000/F$ (kHz) = 49.0 – 14.1	33.8 - 23.0	30
1.705 – 30.0	30	29.5	30
30 – 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

Note: The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands (9 – 90) kHz, (110 – 490) kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

5.1.2 Method of Measurement

The preliminary radiated emission test was performed using the procedure in ANSI C63.9 2014 and ANSI C63.10 2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 10 m Semi Anechoic Chamber

Radiated Emissions Test, 9 kHz to 30 MHz (Magnetic Field Test)

For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. The measuring antenna is an electrically screened loop antenna. Emissions from the EUT are maximized by adjusting the orientation of the Loop antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions if applicable. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

Radiated Emissions Test, below 1 000 MHz

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna. The EUT is situated in three orthogonal planes (if appropriate).

5.1.3 Test Site Requirement for KDB 414788 D01

Acc. to KDB 414788, Semi Anechoic Chamber (SAC) shall be verified test results below 30 MHz with Open Area Test Site (OATS), so we compared test results between the measurements from our SAC and an OATS and found test results almost same, so we **declare test result for below 30 MHz from our SAC is valid and met the requirement acc. to KDB 414788.**

5.1.4 Measurement Uncertainty

Measurement uncertainties were not taken into account and following uncertainty levels have been estimated for tests performed on the apparatus. The measurement uncertainties are given with at least 95 % confidence.

Frequency Range	Uncertainty	Frequency Range	Uncertainty
9 kHz ~ 30 MHz	± 2.85 dB	30 MHz ~ 1 GHz	± 4.30 dB

5.1.5 Sample Calculated Example

At 80 MHz

Limit = 40.0 dBuV/m

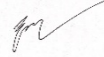
Result(dBuV/m) = Receiver Reading (dBuV) + Antenna Factor (dB/m) - Corr. Factor (dB) = 30

Where, Corr. Factor (dB) = Pre-amplifier (dB) – Cable loss (dB)

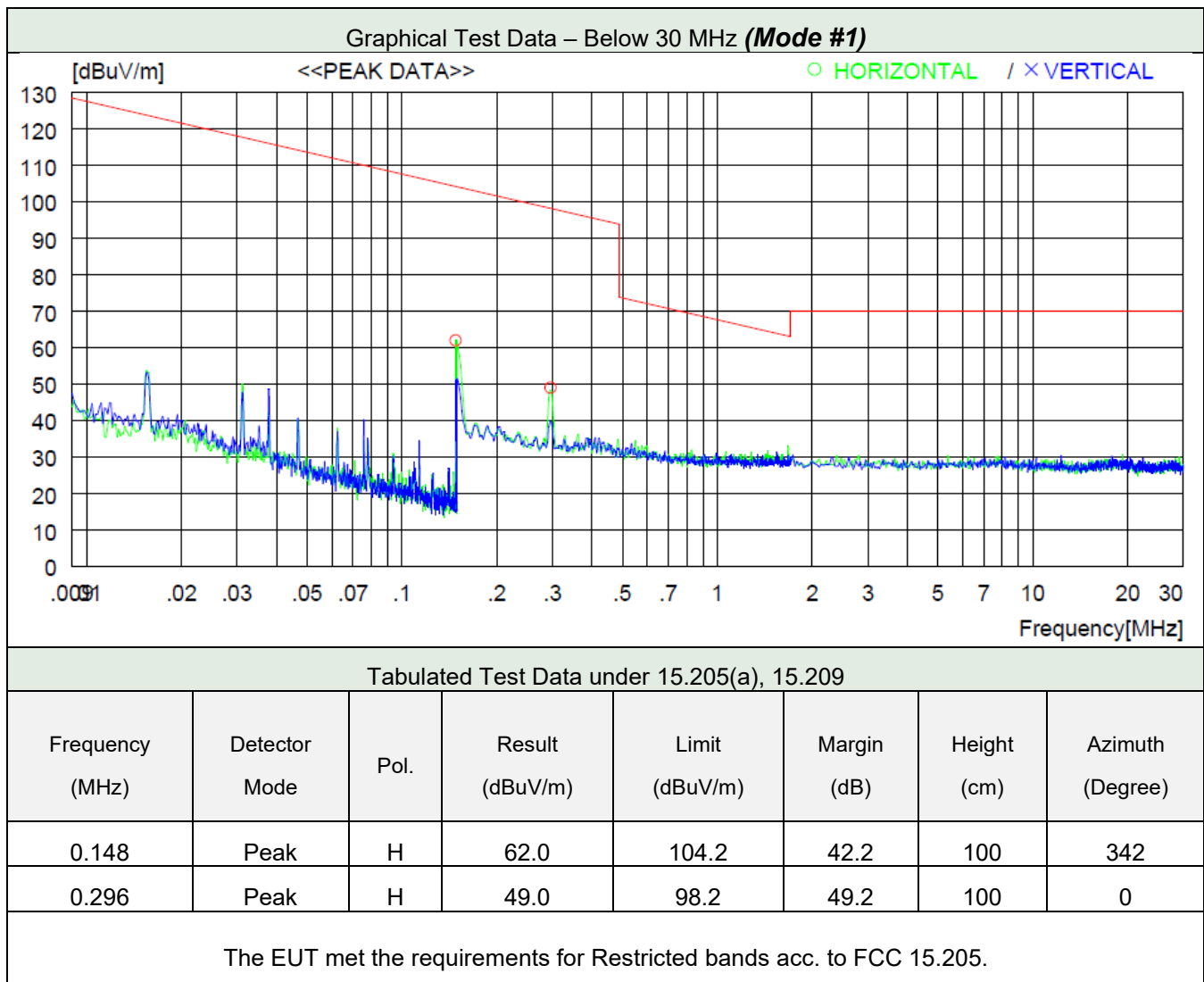
Margin = Limit – Result = 40 – 30 = 10

so the EUT has 10.0 dB margin at 80 MHz

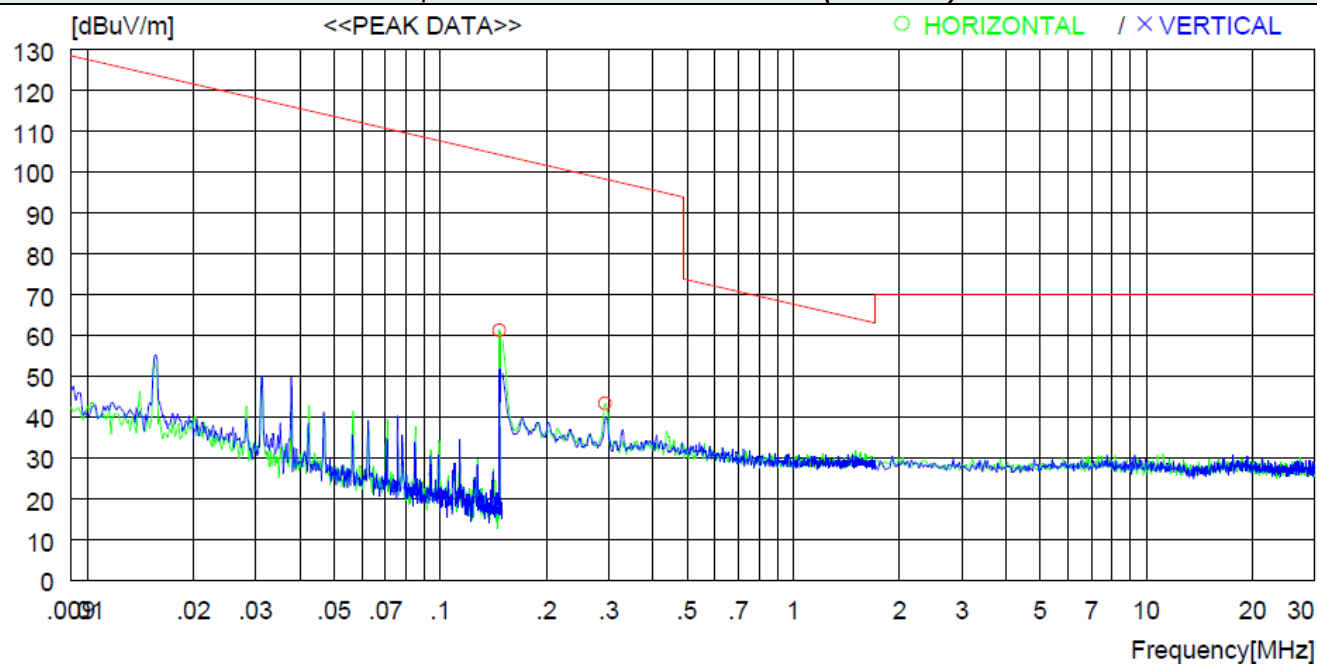
5.1.6 Test Data

Date of Test		2021-11-25		Temperature		(20.60 ± 0.05) °C	
				Relative humidity		(45.10 ± 0.05) % R.H.	
Measurement Frequency Range				9 kHz ~ 1 GHz			
Test Result		PASS		Tested By		Sang-hyeon Park 	
Frequency range		Detector Mode	Resolution BW	Video BW	Video Filtering	Measurement distance	
9 kHz - 150 kHz		Peak or Q.P.	200 Hz	1 kHz	-	3 m	
150 kHz - 30 MHz		Peak or Q.P.	9 kHz	30 kHz	-	3 m	
30 MHz ~ 1 000 MHz		Peak or Q.P.	100 kHz	300 kHz	-	3 m	

5.1.6.1 Test Data below 30 MHz



Graphical Test Data – Below 30 MHz (Mode #2)

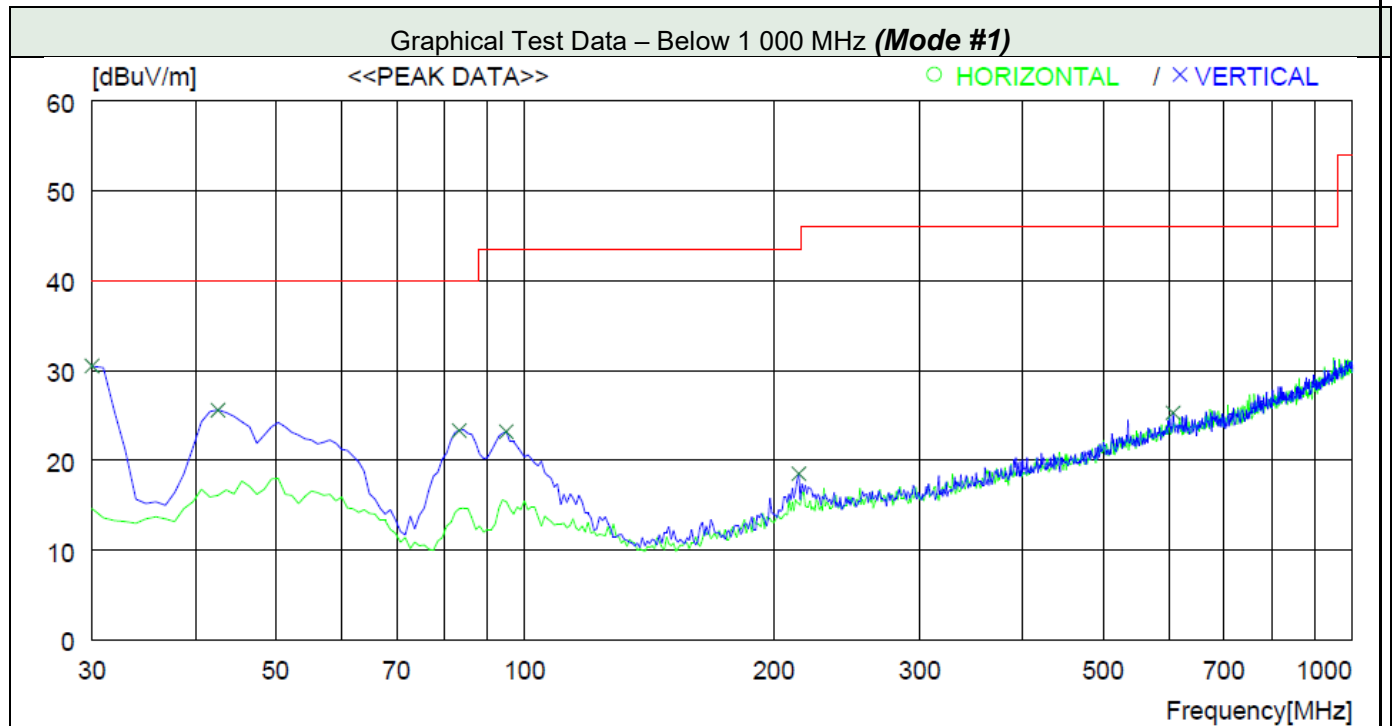


Tabulated Test Data under 15.205(a), 15.209

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (Degree)
0.147	Peak	H	61.2	104.3	43.1	100	359
0.293	Peak	H	43.3	98.3	55.0	100	244

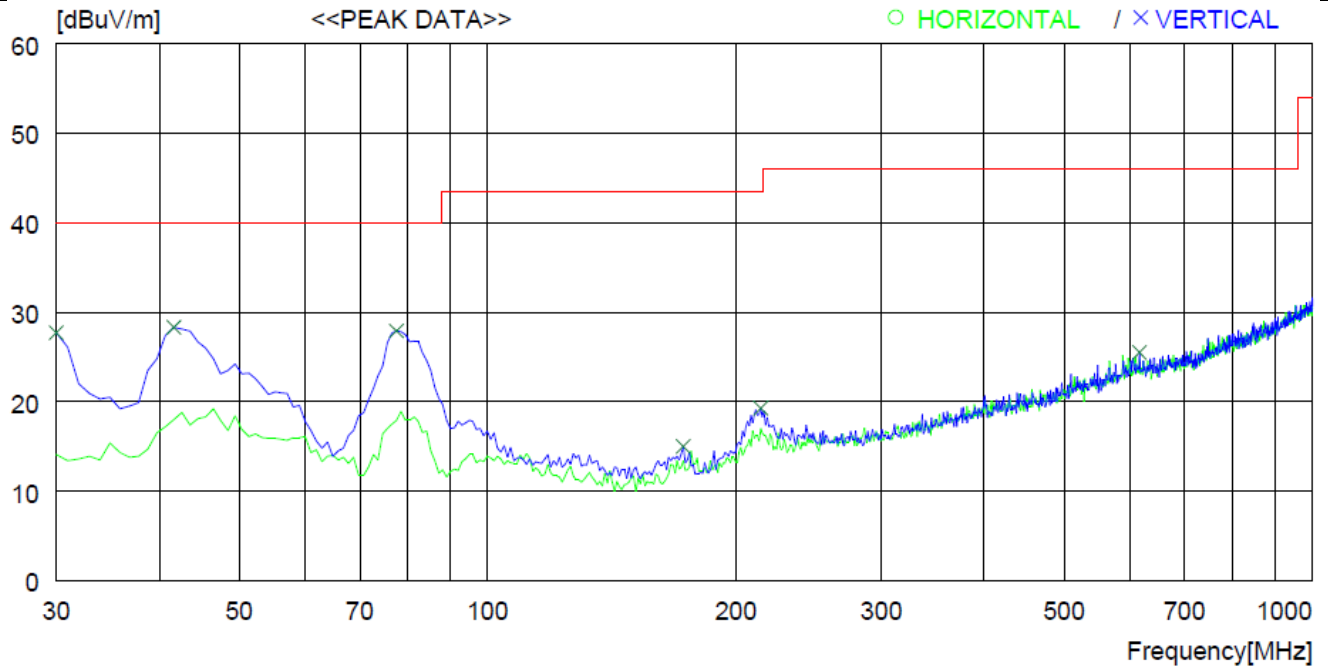
The EUT met the requirements for Restricted bands acc. to FCC 15.205.

5.1.6.2 Test Data from 30 MHz to 1 GHz_Graphical Test Data



Tabulated Test Data under 15.205(a), 15.209										
Frequency (MHz)	Receiver Reading (dBuV)	Detector Mode	Pol.	Ant. Factor (dB/m)	Corr. Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (Degree)
30.000	45.8	Peak	V	10.4	25.7	30.5	40.0	9.5	100	99
42.610	37.2	Peak	V	13.8	25.4	25.6	40.0	14.4	100	0
83.350	40.2	Peak	V	7.9	24.8	23.3	40.0	16.7	100	256
94.990	37.1	Peak	V	10.8	24.7	23.2	43.5	20.3	100	0
214.300	30.4	Peak	V	11.6	23.5	18.5	43.5	25.0	100	0
607.148	27.5	Peak	V	19.2	21.4	25.3	46.0	20.7	300	270

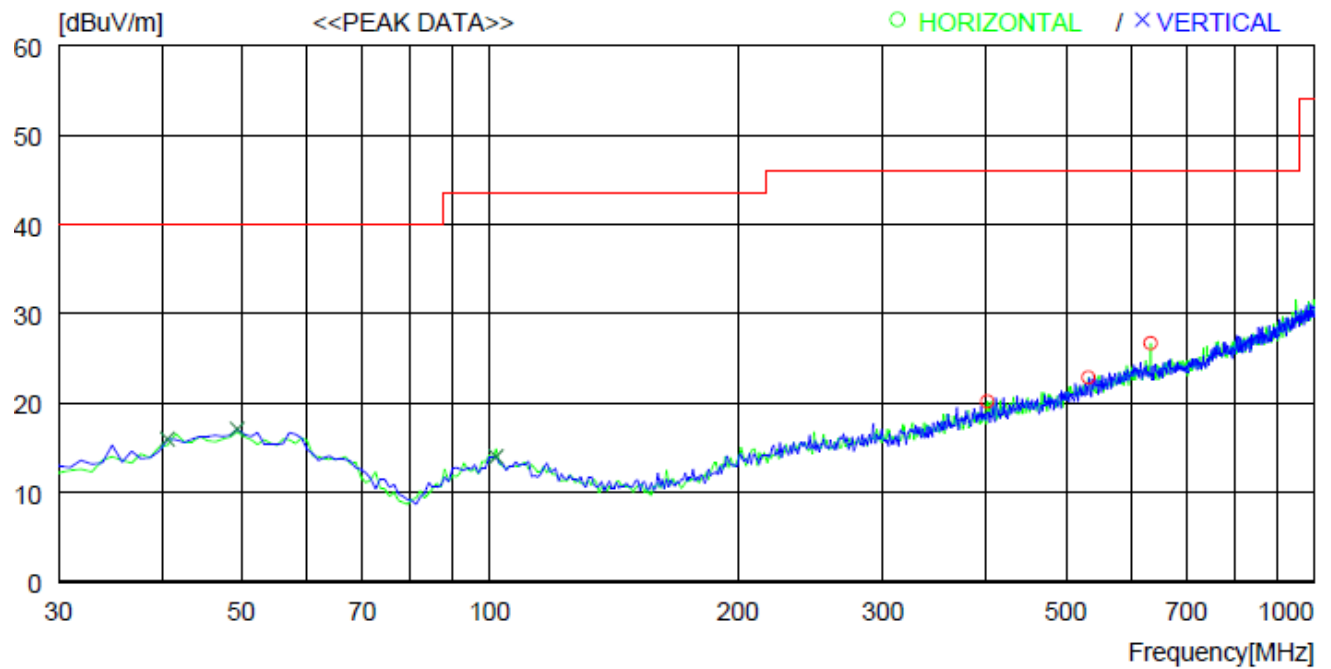
Graphical Test Data – Below 1 000 MHz (Mode #2)



Tabulated Test Data under 15.205(a), 15.209

Frequency (MHz)	Receiver Reading (dBuV)	Detector Mode	Pol.	Ant. Factor (dB/m)	Corr. Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (Degree)
30.000	43.0	Peak	V	10.4	25.7	27.7	40.0	12.3	100	0
41.640	40.1	Peak	V	13.6	25.4	28.3	40.0	11.7	100	161
77.530	45.2	Peak	V	7.6	24.9	27.9	40.0	12.1	100	0
172.590	29.8	Peak	V	9.1	23.9	15.0	43.5	28.5	100	0
214.300	31.2	Peak	V	11.6	23.5	19.3	43.5	24.2	100	0
616.847	27.6	Peak	V	19.3	21.4	25.5	46.0	20.5	200	359

Graphical Test Data – Below 1 000 MHz (Mode #3)



Tabulated Test Data under 15.205(a), 15.209

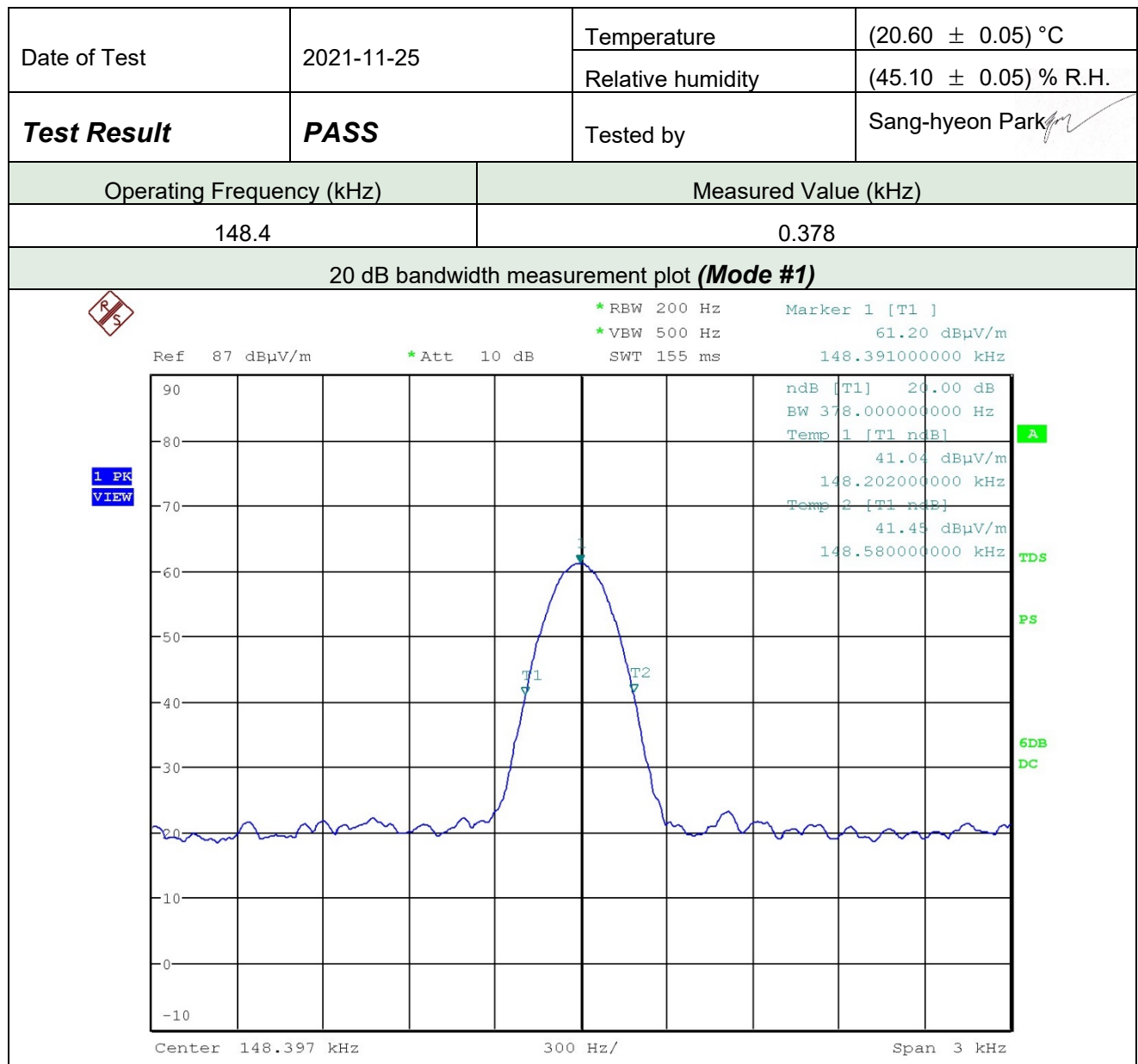
Frequency (MHz)	Receiver Reading (dBuV)	Detector Mode	Pol.	Ant. Factor (dB/m)	Corr. Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Azimuth (Degree)
40.670	28.0	Peak	V	13.4	25.4	16.0	40.0	24.0	100	0
49.400	27.9	Peak	V	14.5	25.3	17.1	40.0	22.9	300	0
101.780	27.1	Peak	V	11.5	24.6	14.0	43.5	29.5	100	303
401.510	27.0	Peak	H	15.6	22.4	20.2	46.0	25.8	400	0
532.460	26.8	Peak	H	17.8	21.7	22.9	46.0	23.1	200	302
633.337	28.8	Peak	H	19.3	21.4	26.7	46.0	19.3	300	58

5.2 20 dB bandwidth

5.2.1 Method of Measurement

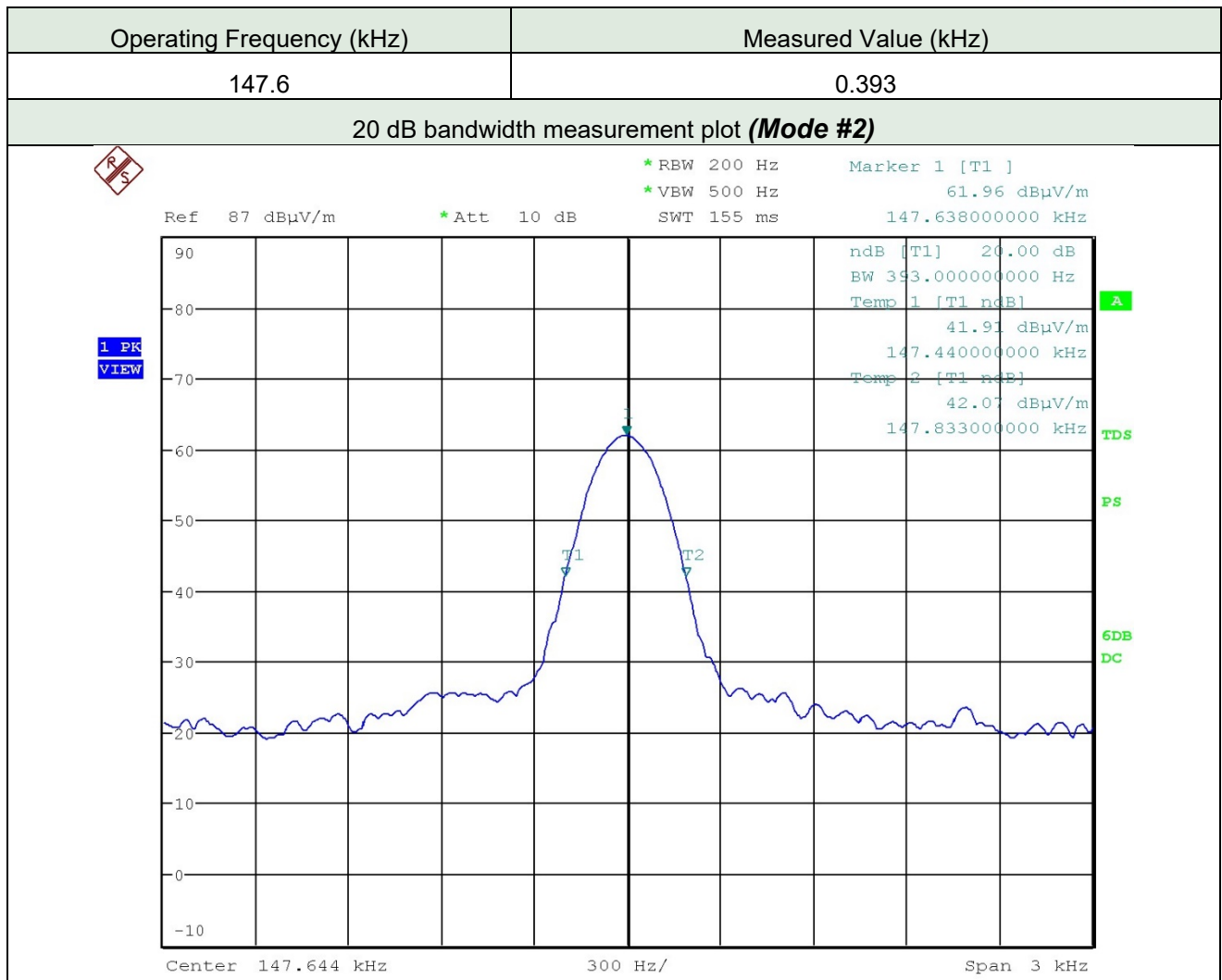
The antenna output of the EUT was connected to the spectrum analyzer. The resolution is set to 200 Hz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.

5.2.2 Test Data



Note: F_L : Lowest frequency at 20 dB bandwidth

F_H : Highest frequency at 20 dB bandwidth



Note: F_L : Lowest frequency at 20 dB bandwidth
 F_H : Highest frequency at 20 dB bandwidth

5.3 AC Power Line Conducted Emission

5.3.1 LIMIT

Acc. to section 15.107(a) and 15.207 (a), following table shall be applied.

Frequency Range (MHz)	Quasi-Peak (dBuV)	Average (dBuV)
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 -30	60	50

5.3.2 Method of Measurement

The EUT was placed on a wooden table, 0.8 m height above the horizontal ground plane and 40 cm from the vertical ground plane. Power was fed to the EUT through a $50\ \Omega$ / $50\ \mu\text{H}$ + $5\ \Omega$ Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

The test was performed for both Neutral and Hot lines.

5.3.3 Measurement Uncertainty

Measurement uncertainties were not taken into account and following uncertainty levels have been estimated for tests performed on the apparatus. The measurement uncertainties are given with at least 95 % confidence.

Frequency Range	Uncertainty
150 kHz ~ 30 MHz	$\pm 2.17\ \text{dB}$

5.3.4 Sample Calculated Example

At 5.3 MHz

QP Limit = 60.0 dBuV


QuasiPeak or CAverage = Receiver reading value + Corr. (dB) = 30 dBuV

Where, Correction Factor (Corr. (dB)) = Insertion loss of LISN + Pulse Limiter factor + Cable loss

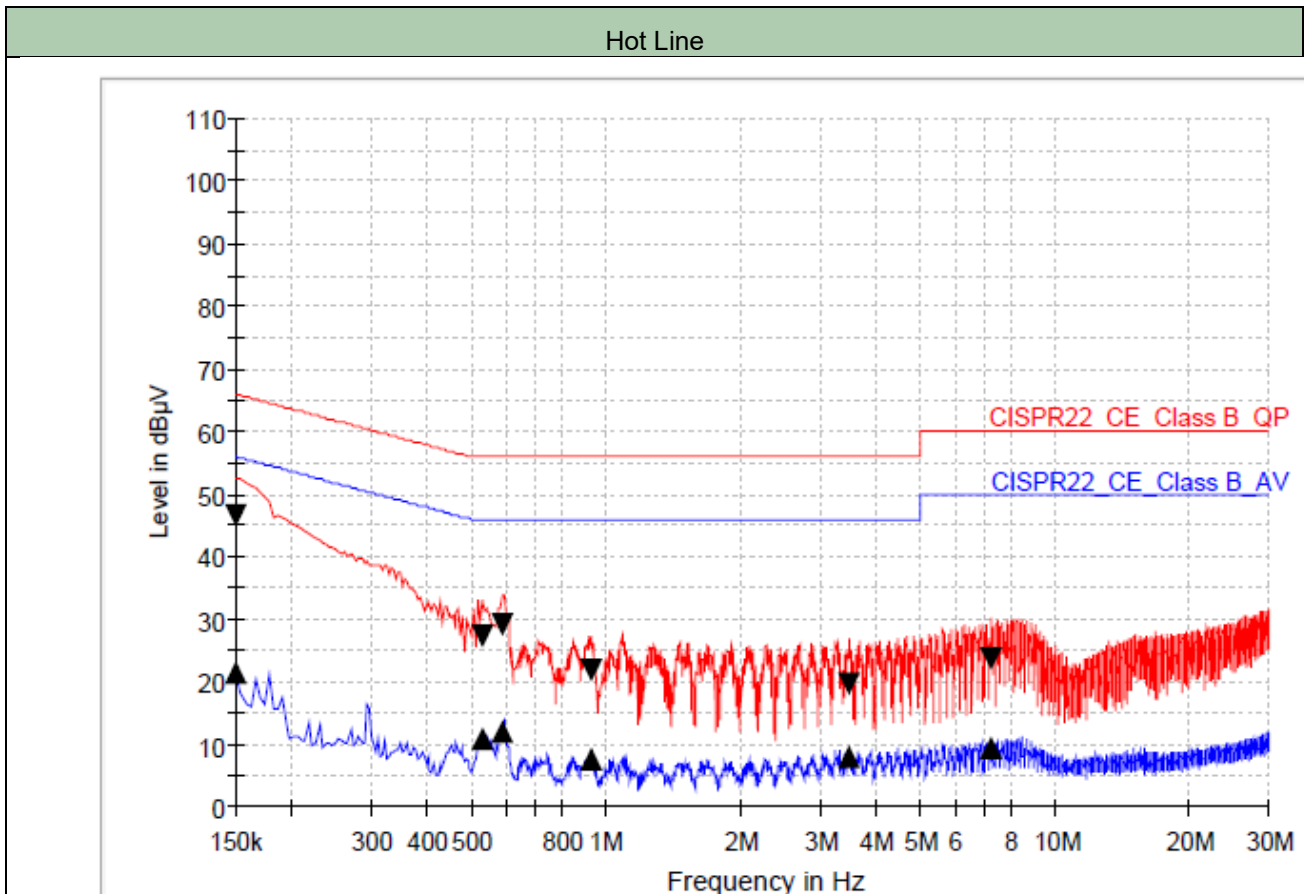
Margin (dB) = Limit (dBuV) – QuasiPeak or CAverage (dBuV) = 60 – 30 = 30

So, the EUT has 30.0 dB margins at 5.3 MHz.

5.3.5 Test Data

Date of Test	2021-11-26	Temperature	(20.60 ± 0.05) °C
		Relative humidity	(44.40 ± 0.05) % R.H.
Measurement Frequency Range		150 kHz ~ 30 MHz	
Test Result	PASS	Tested by	Sang-hyeon Park 

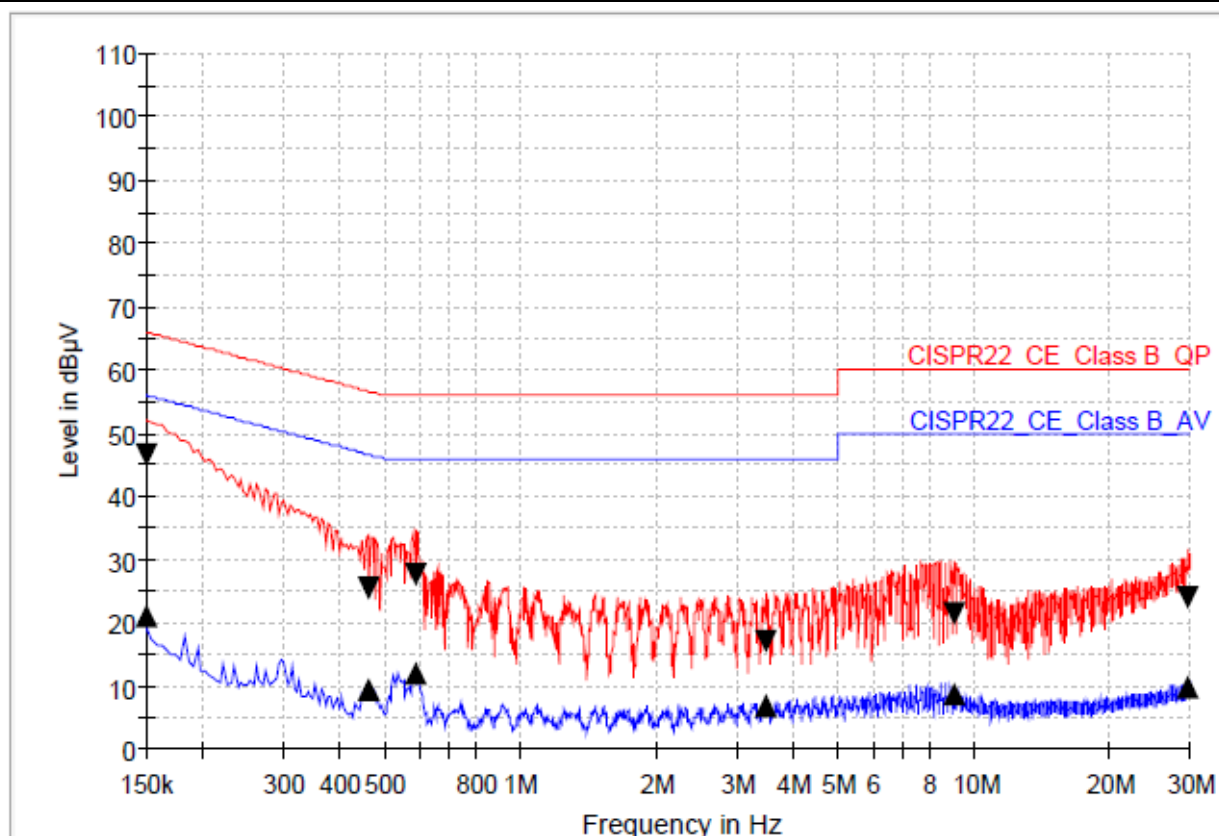
5.3.5.1 Test Data from AC Power Line Conducted Emissions (Mode #1)



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)	Margin - CAV (dB)	Limit - CAV (dBµV)
0.150000	46.5	21.7	9.000	L1	9.6	19.5	66.0	34.3	56.0
0.530000	27.3	10.8	9.000	L1	9.6	28.7	56.0	35.2	46.0
0.586000	29.1	12.0	9.000	L1	9.6	26.9	56.0	34.0	46.0
0.926000	21.8	7.6	9.000	L1	9.6	34.2	56.0	38.4	46.0
3.478000	19.8	8.0	9.000	L1	9.7	36.2	56.0	38.0	46.0
7.234000	23.7	9.6	9.000	L1	9.8	36.3	60.0	40.4	50.0

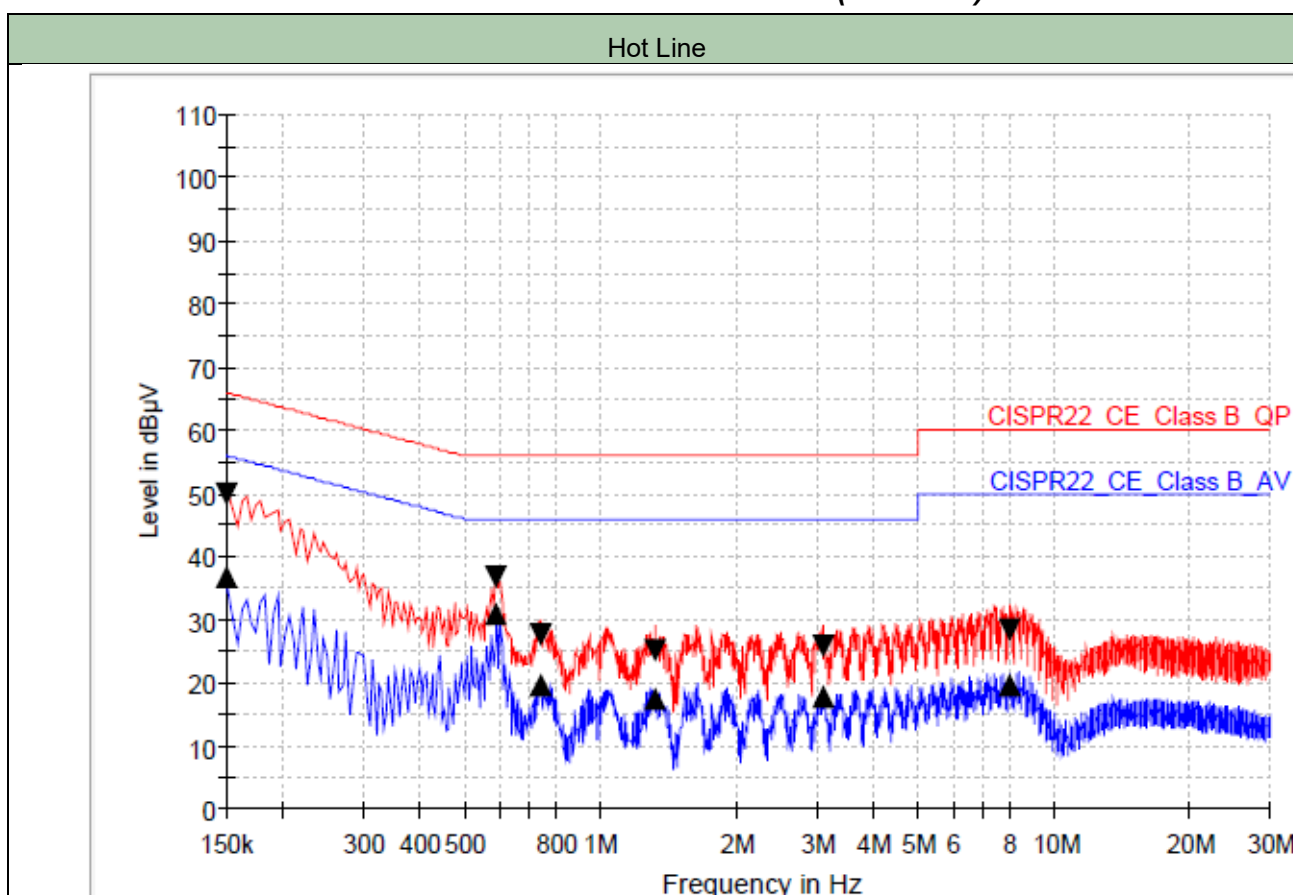
Neutral Line



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	46.6	21.1	9.000	N	9.6	19.4	66.0	34.9	56.0
0.462000	25.6	9.5	9.000	N	9.6	31.0	56.7	37.1	46.7
0.590000	27.5	12.1	9.000	N	9.6	28.5	56.0	33.9	46.0
3.494000	17.2	7.0	9.000	N	9.7	38.8	56.0	39.0	46.0
9.098000	21.4	8.6	9.000	N	9.8	38.6	60.0	41.4	50.0
29.746000	23.9	9.7	9.000	N	10.2	36.1	60.0	40.3	50.0

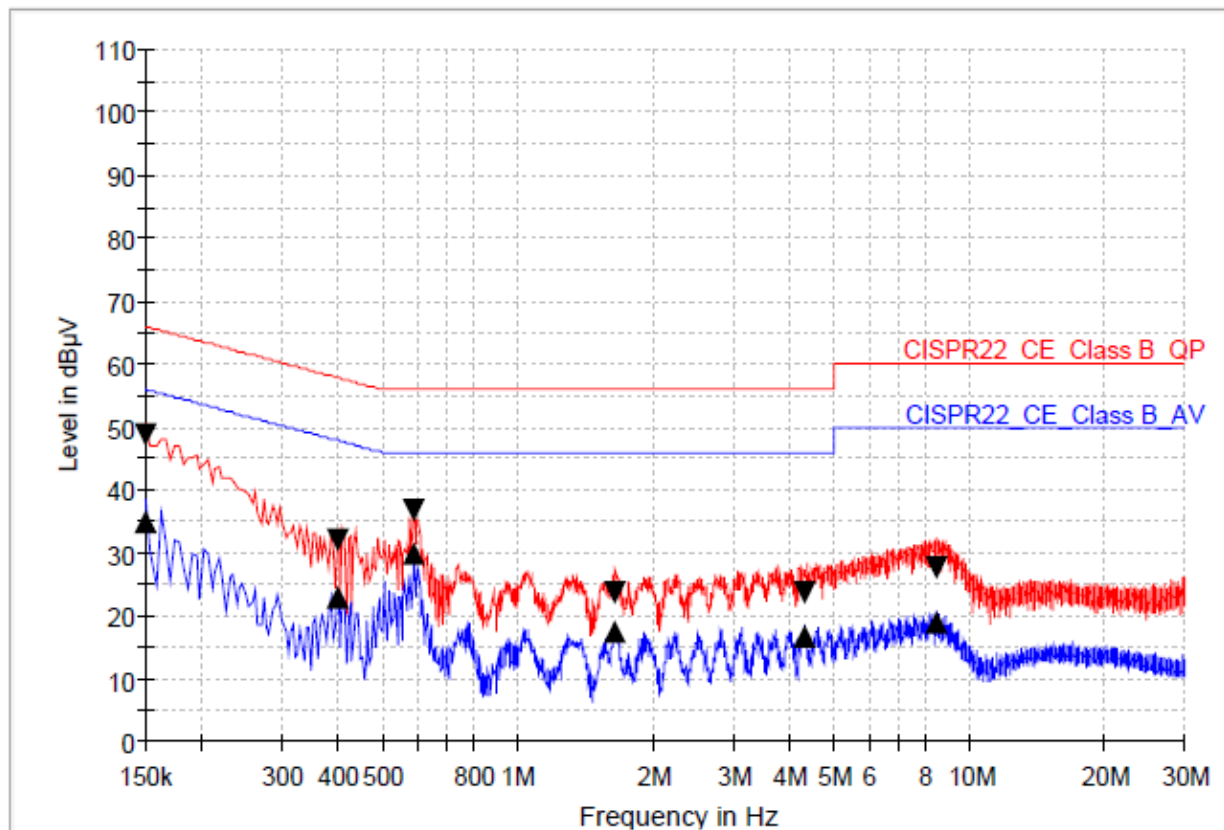
5.3.5.2 Test Data from AC Power Line Conducted Emissions (Mode #2)



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	49.8	36.9	9.000	L1	9.6	16.2	66.0	19.1	56.0
0.590000	36.9	30.9	9.000	L1	9.6	19.1	56.0	15.1	46.0
0.738000	27.6	19.6	9.000	L1	9.6	28.4	56.0	26.4	46.0
1.322000	25.1	17.4	9.000	L1	9.7	30.9	56.0	28.6	46.0
3.090000	25.8	17.9	9.000	L1	9.7	30.2	56.0	28.1	46.0
8.038000	28.5	19.5	9.000	L1	9.8	31.5	60.0	30.5	50.0

Neutral Line



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	48.6	35.1	9.000	N	9.6	17.4	66.0	20.9	56.0
0.398000	32.0	23.1	9.000	N	9.6	25.9	57.9	24.8	47.9
0.590000	36.7	30.0	9.000	N	9.6	19.3	56.0	16.0	46.0
1.650000	23.8	17.5	9.000	N	9.7	32.2	56.0	28.5	46.0
4.306000	23.5	16.9	9.000	N	9.7	32.5	56.0	29.1	46.0
8.502000	27.7	18.8	9.000	N	9.8	32.4	60.0	31.2	50.0

Appendix I – Test Instrumentation

Description	Model No.	Serial No.	Manufacturer.	Due for Cal. Date	Cal. Interval
Signal & Spectrum Analyzer	FSW 43	100578	Rohde & Schwarz	2022-04-19	1 Y
Attenuator	56-10	58769	WEINSCHTEL	2022-01-15	1 Y
Test Receiver	ESU 26	100303	Rohde & Schwarz	2022-01-14	1 Y
Loop Antenna	HFH2-Z2	100341	Rohde & Schwarz	2023-05-14	2 Y
TRILOG Broadband Antenna	VULB9163	9163.799	Schwarzbeck	2023-09-28	2 Y
Attenuator	6dB	272.4110.50	Rohde & Schwarz	2022-01-14	1 Y
Pre-Amplifier	310N	344015	Sonoma Instrument	2022-01-14	1 Y
Slidacs	DSD-1105	M06-117	DIGITAK POWER	N/A	N/A
Turn Table	DT3000-3t	1310814	INNCO SYSTEM	N/A	N/A
Antenna Master	MA4000-EP	4600814	INNCO SYSTEM	N/A	N/A
Camera Controller	HDCon4102	6531445048	PONTIS	N/A	N/A
CO3000 Controller	Co3000-4Port	CO3000/806/ 34130814/L	INNCO SYSTEM	N/A	N/A
Test Receiver	ESCI 7	100722	Rohde & Schwarz	2022-01-14	1 Y
LISN	ENV216	100110	Rohde & Schwarz	2022-01-14	1 Y

The measuring equipment utilized to perform the tests documented in this test report has been calibrated in accordance with manufacturer's recommendations, and is traceable to recognized national standards.