
Project #: PRJ0054766

Company: Echometer Company

EUT Name: Wireless Remote Fire Gun

EUT Model(s): WRFG200, WCGG200, WHT200, WPRT200, W5KG200

FCC and Industry Canada

Wireless Test Report

Prepared for:

Echometer Company
5001 Ditto Lane
Wichita Falls, TX, 76302

By

Nemko USA, Inc.
1601 North A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

September 8, 2025

Written by

Veer Patel
Wireless Engineer



Revision History

Revision Number	Description	Date
Draft01	Initial release for review	8/28/2024
Final01	Final release	11/5/2024
Final02	Updated Model Names	11/5/2024
Final03	References updated	11/11/2024
Final04	Corrected model number	4/22/2025
Final05	Corrected RE limits above 1GHz, 6dB Bandwidth	9/8/2025

Table of Contents

Test Result Summary	6
1.0 Introduction.....	7
1.1 Scope.....	7
1.2 EUT Description	7
1.3 EUT Test Configuration.....	7
1.4 Modifications to Equipment.....	7
1.5 Test Setup.....	7
1.6 Test Site.....	8
1.7 Measurement Corrections.....	8
1.8 Applicable Documents	9
2.0 Occupied Bandwidth.....	10
2.1 Test Procedure.....	10
2.2 Test Criteria.....	10
2.3 Test Results	11
3.0 Fundamental Power.....	13
3.1 Test Procedure.....	13
3.2 Test Criteria.....	13
3.3 Test Results	14
4.0 Power Spectral Density.....	15
4.1 Test Procedure.....	15
4.2 Test Criteria.....	15
4.3 Test Results	16
5.0 Band Edge.....	17
5.1 Test Procedure.....	17
5.2 Test Criteria.....	17
5.3 Test Results	17
6.0 Conducted Antenna Port Spurious Emissions, Transmit Mode	19
6.1 Test Procedure.....	19
6.2 Test Criteria.....	19
6.3 Test Results	19
6.3.1 Test Results	19
7.0 Transmitter Radiated Spurious Emissions	21
7.1 Test Procedure.....	21
7.2 Test Criteria.....	21
7.3 Test Results	21
7.3.1 Test Data, Bottom Channel, 30 MHz to 25 GHz.....	22
7.3.2 Radiated Emissions Test Data	23
7.3.3 Test Data, Middle Channel, 30 MHz to 25 GHz	26
7.3.4 Radiated Emissions Test Data	27
7.3.5 Test Data, Top Channel, 30 MHz to 25 GHz	30
7.3.6 Radiated Emissions Test Data	31
7.3.7 Radiated Emissions Test Data	34
7.3.8 Test summary	34
7.3.9 Observations/special notes	34
7.3.10 Setup details.....	34
7.3.11 Test data.....	35
7.3.12 Radiated Emissions Test Data	38
7.3.13 Test summary.....	38
7.3.14 Observations/special notes.....	38
7.3.15 Setup details.....	38
7.3.16 Test data.....	39
7.3.17 Radiated Emissions Test Data	42
7.3.18 Test summary.....	42
7.3.19 Observations/special notes.....	42
7.3.20 Setup details.....	42
7.3.21 Test data.....	43
7.3.22 Radiated Emissions Test Data	46
7.3.23 Test summary.....	46
7.3.24 Observations/special notes.....	46

7.3.25	Setup details.....	46
7.3.26	Test data.....	47
8.0	Antenna Construction	50
8.1	Procedure.....	50
8.2	Criteria	50
8.3	Results.....	50
9.0	Equipment.....	51
9.1	Conducted Measurements	51
9.2	Radiated Emissions	51
10.0	Measurement Bandwidths.....	52
	Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty.....	53
	End of Report	53

NOTICE:

(1) This Report must not be used to claim product endorsement, by ANAB, NIST, the FCC or any other Agency. This report also does not warrant certification by ANAB or NIST.

(2) This report shall not be reproduced except in full, without the written approval of Nemko USA, Inc.

(3) The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.

Compliance Certificate

FCC MRA Designation Number: US3166

ANAB Accreditation Number: AT-3165.01

Applicant	Device & Test Identification
Echometer Company 5001 Ditto Lane Wichita Falls, TX, 76302	Model(s): WRFG200, WCGG200, WHT200, WPRT200, W5KG200 FCC ID: Q5Q-WRFG200 IC ID: 10048A-WRFG200 Laboratory Project ID: PRJ0054766

The device named above was tested utilizing the following standards and found to be in compliance with the required criteria:

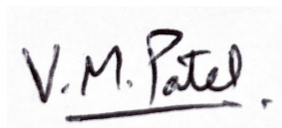
Test Requirements:

Requirement	Reference	Test Description
FCC 47 CFR Part 15 C	15.247	Operation within the bands <u>2400-2483.5 MHz</u>
	15.207	Conducted emission limits
	15.209	Radiated emission limits; general requirements
	15.205	Restricted Bands of Operation
	15.203	Antenna requirement
FCC 47 CFR Part 1 I*	1.1310	Radiofrequency radiation exposure limits
RSS-247	Issue 3	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-Gen	Issue 5	General Requirements and Information for the Certification of Radio Apparatus
RSS-102	Issue 6	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

*MPE is reported separately from this document.

**Corresponding RSS references are listed in the body of the report.

I, Veer Patel, for Nemko USA, Inc., being familiar with the above requirements and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.



Veer Patel
Wireless Engineer

This report has been reviewed and accepted by the Applicant. The undersigned is responsible for ensuring that this device will continue to comply with the requirements listed above.

Representative of Applicant

Test Result Summary

Test	FCC Part 15 Rule Paragraphs	IC RSS References	Test Results
Antenna Requirement	15.203	RSS-Gen 6.8	Pass
Fundamental Power	15.247 (b)(3)	RSS-247 5.4 (d)	Pass
Duty Cycle	15.247 (f)	RSS-247 5.3 (a)	Pass
Power Spectral Density	15.247 (e)	RSS-247 5.2 (b)	Pass
Occupied Bandwidth	15.247 (a)(2), 2.1049	RSS-247 5.2 (a)	Pass
Band Edge	15.247 (d); 15.205 (a)	RSS-247 5.5;	Pass
Transmitter Conducted Spurious Emissions	15.247 (d); 15.209 (a)	RSS-247 5.5; RSS-GEN 6.13	Pass
Transmitter Radiated Spurious Emissions	15.247 (d); 15.209 (a)	RSS-247 5.5; RSS-Gen 6.13 & 8.10	Pass
Receiver Radiated Spurious Emissions	15.109	RSS-Gen 7.3	Pass

1.0 Introduction

1.1 Scope

This report describes the extent to which the equipment under test (EUT) conformed to the intentional radiator requirements of the United States and Canada.

Nemko USA, Inc., follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing.

1.2 EUT Description

Equipment Under Test		
EUT Name:	Wireless Remote Fire Gun	
Model:	WRFG200	
Serial Number:	N/A	
Model Variants:	WCGG200, WHT200, WPRT200, W5KG200	
Description:	Operating Frequency	2.405 – 2.475GHz
	Modulation Type	OQPSK
Input Power:	Internal Battery (Not AC Mains Powered)	

1.3 EUT Test Configuration

The EUT was exercised in a manner consistent with normal operations. The WRFG200 model was used for RF performance measurements. There are 4 other model variants that are electrically identical to the WRFG200:

WCGG200
WPRT200
WHT200
WRFG200-5k

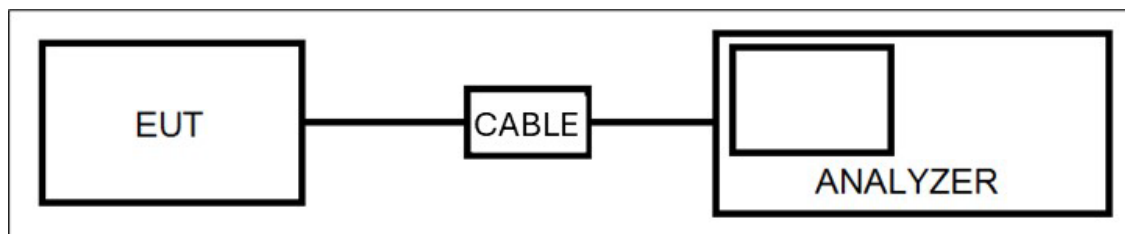
Radiated emissions was performed on the above model variants to ensure compliance due to enclosure differences. Middle channel was used for these test configurations.

1.4 Modifications to Equipment

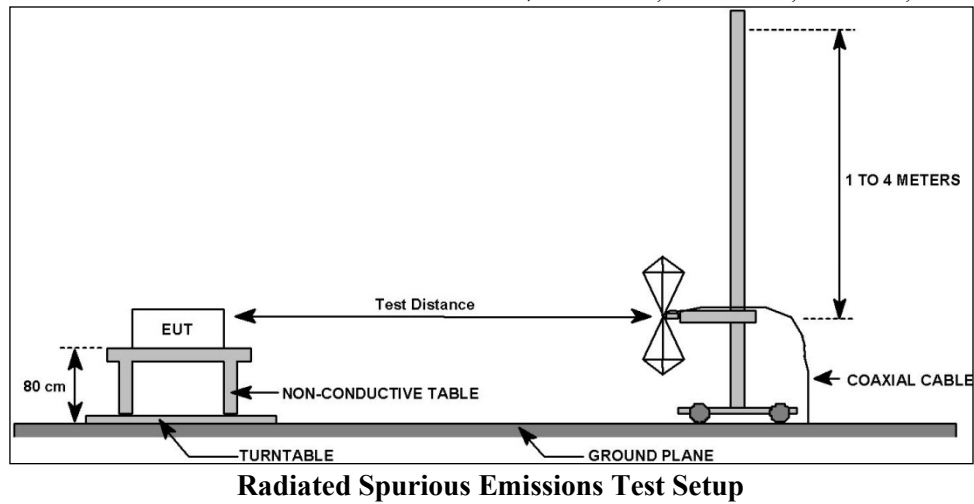
None.

1.5 Test Setup

Below are the examples test setup for Conducted and Radiated measurements.



Conducted Measurement General Test Configuration



1.6 Test Site

Measurements were made at the Nemko USA, Inc. semi-anechoic facility (FCC US3166, IC 3036B-1) in Round Rock, Texas. The site is registered with the FCC under Section 2.948 and Industry Canada per RSS-GEN, and is subsequently confirmed by laboratory accreditation (ANAB). The test site is located at 1601 North A.W. Grimes Boulevard, Suite B, Round Rock, Texas, 78665. CAB Identifier: US 0123.

1.7 Measurement Corrections

Parameter	From Sums Of
Radiated Field Strength	Raw Measured Level + Antenna Factor + Cable Losses – Amplifier Gain
Conducted Antenna Port	Raw Measured Level + Attenuator Factor + Cable Losses
Conducted Mains Port	Raw Measured Level + LISN Factor + Cable/Filter/Limiter Losses

Additionally, measurement distance extrapolation factors (such as $1/d$ above 30 MHz) are applied and documented where used.

1.8 Applicable Documents

Table 1.8.1: Applicable Documents

Document	Title
47 CFR	Part 15 – Radio Frequency Devices Subpart C -Intentional Radiators
RSS-247 Issue 3	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-102 Issue 6	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
RSS-Gen Issue 5	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.10 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
KDB 412172 D01	GUIDELINES FOR DETERMINING THE EFFECTIVE RADIATED POWER (ERP) AND EQUIVALENT ISOTROPICALLY RADIATED POWER (EIRP) OF AN RF TRANSMITTING SYSTEM
KDB 447498 D01	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES
OET Bulletin 65 Edition 97-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

2.0 Occupied Bandwidth

2.1 Test Procedure

The radio was connected via cable to the spectrum analyzer for the measurements. Low, mid, and high channels were measured. ANSI C63.10-2013, section 11.8.2, procedure is used for the measurements. Measurements taken on 3/20/2024 (99%) and 9/8/2025 (6dB).

2.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Limit
15.247(a)(2), 2.1049 // RSS-247 5.2(a) // RSS-Gen 6.7	Minimum 6 dB Bandwidth shall be 500 kHz 99% (all methods)

In cases where the software function fails to find/mark the correct edge of the modulated envelope, a manual measurement (marker-delta over display line) is taken with the same spectrum analyzer settings.

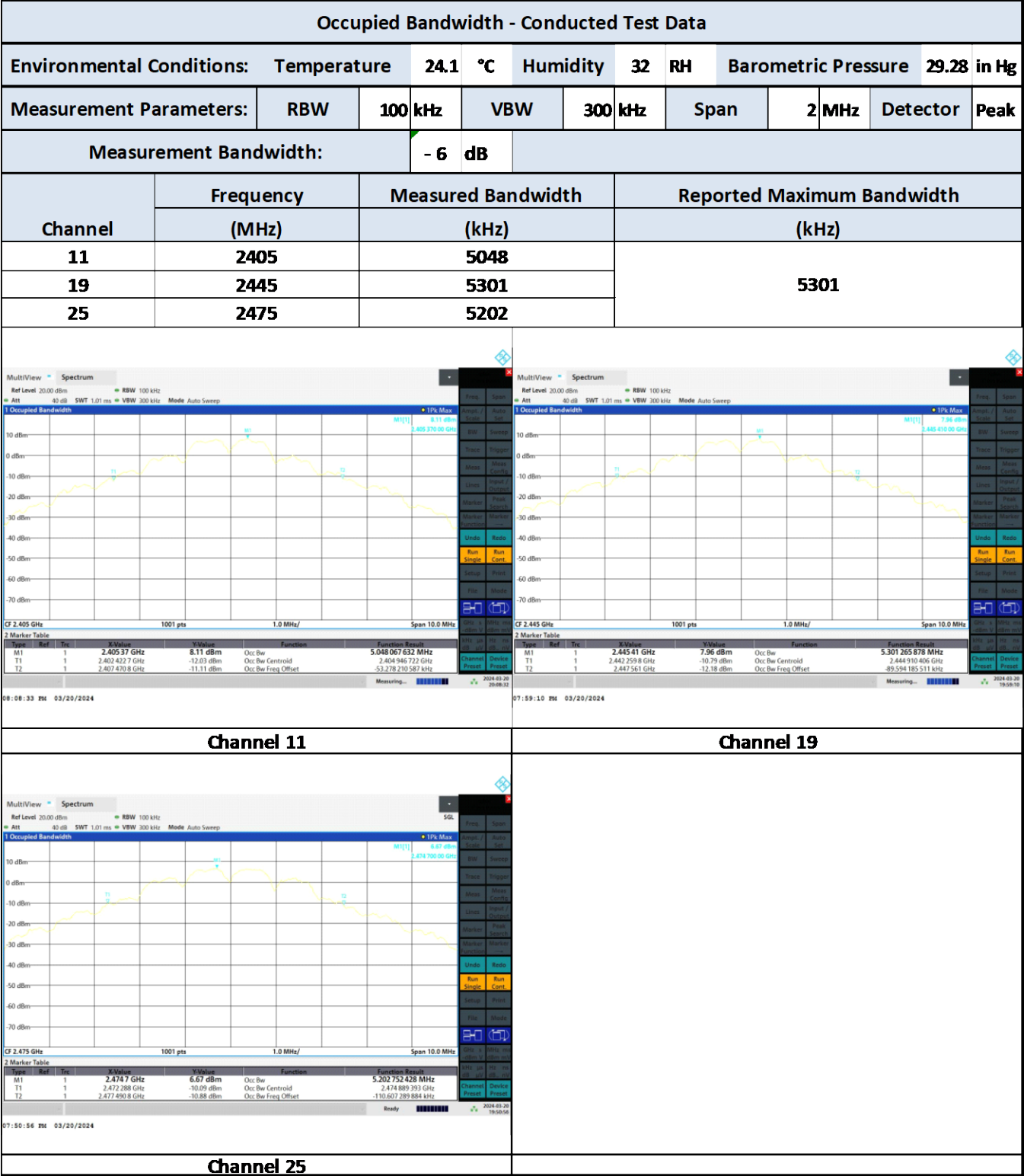
2.3 Test Results

Occupied Bandwidth 6 dB



The EUT met the requirements. Minimum bandwidth = 2702kHz > 500kHz.

Occupied Bandwidth 99%



3.0 Fundamental Power

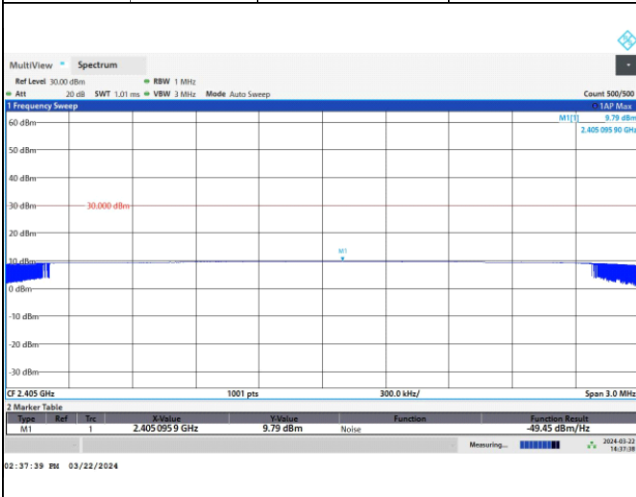
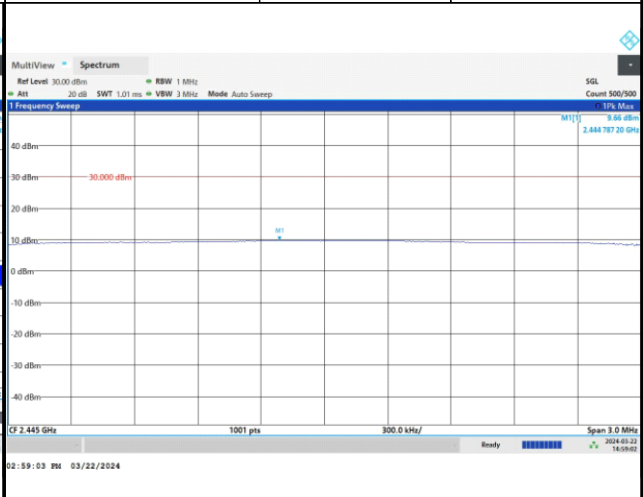
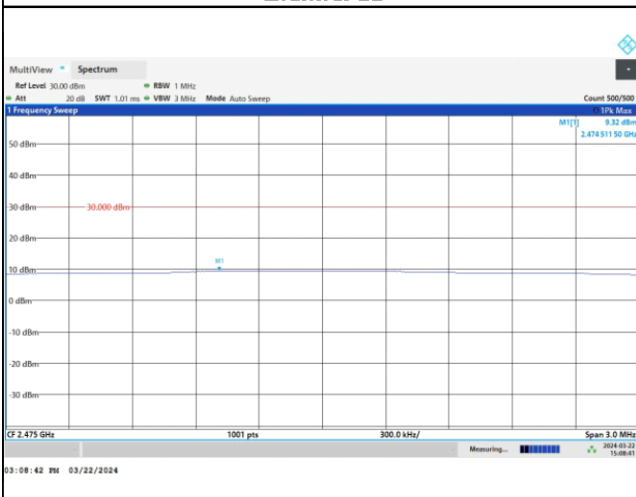
3.1 Test Procedure

The EUT was connected via cable to the spectrum analyzer for the measurements. Low, mid, and high channels were measured. ANSI C63.10-2013, section 11.9.1, procedure is used for the measurements. Measurements taken on 3/22/2024.

3.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Power Limit
15.247(b)(3) // RSS-247 5.4 (d)	1 W peak (+30dBm) Limit Restated as Field: 125.23 dB μ V/m @ 3 m

3.3 Test Results

Fundamental Power									
Environmental Conditions:		Temperature	24.1	°C	Humidity	32	RH	Barometric Pressure	29.28 in Hg
EUT (6 dB) Bandwidth:		0.00	MHz						
Measurement Parameters:		RBW	1	MHz	VBW	3	MHz	Span	3 MHz
								Detector	Peak
Channel	Frequency	Measured Power	Cable Factor	Corrected Power		Limit		Test Result	
	(MHz)	(dBm)	(dB)	(dBm)		(dBm)			
	11	2405	9.79	2.31	12.1		30		
	19	2445	9.66	2.31	11.97		30		
25	2475	9.32	2.31	11.63		30		Pass	
									
Channel 11					Channel 19				
									
Channel 25									

Cable C397 used for conducted power measurements. Cable Factor in table above represents the insertion loss of this cable.

The requirements were satisfied.

4.0 Power Spectral Density

4.1 Test Procedure

The EUT was connected via cable to the spectrum analyzer for the measurements. Low, mid, and high channel were measured. ANSI C63.10-2013, section 11.10.2, procedure is used for the measurements. Measurements taken on 3/22/2024.

4.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Power Spectral Density, Conducted Limit
15.247(e) // RSS-247 5.2 (b)	8 dBm / 3 kHz Restated as field strength: 103.23 dB μ V/m at 3 m

4.3 Test Results

Power Spectral Density - Conducted Test Data									
Environmental Conditions:		Temperature	24.1	°C	Humidity	32	RH	Barometric Pressure	29.28 in Hg
EUT Channel Bandwidth:		2.00	MHz						
Measurement Parameters:		RBW	3 kHz	VBW	10 kHz	Span	3 MHz	Detector	Peak
Channel	Frequency	Measured Power	Cable Factor	Corrected Power		Limit		Test Result	
	(MHz)	(dBm)	(dB)	(dBm)		(dBm)			
11	2405	-3.51	2.31	-1.2		8		Pass	
19	2445	-4.35	2.31	-2.04		8		Pass	
25	2475	-4.96	2.31	-2.65		8		Pass	
									
Channel 11					Channel 19				
									
Channel 25									

Cable C397 used for conducted PSD measurements. Cable Factor in table above represents the insertion loss of this cable.

The requirements were satisfied.

5.0 Band Edge

5.1 Test Procedure

The radio was connected via cable to the spectrum analyzer for the measurements. EUT is placed into normal transmit operation on the nearest band edge channel. The spectrum analyzer is approximately centered on the band edge frequency with span sufficient to include the peak of the adjacent fundamental signal. Measurement includes at least two standard bandwidths from the respective band edge. If required, the band-edge marker-delta method is utilized. ANSI C63.10-2013, section 11.13.2, procedure is used for the measurements. Measurements taken on 4/3/2024.

5.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Unwanted Emissions
15.247 (d), 15.205 (a) // RSS-247 5.5, RSS-Gen 6.13	Emissions Adjacent to Authorized Band

5.3 Test Results

Measurements included fundamental with 2 standard bandwidths (standard bandwidth 1 MHz) beyond the band edges to provide a clear view of the fundamental and the declining emission levels. Beyond this point, the general emission limits are applied in the radiated emission tests reported elsewhere in the report.

This is a conducted measurement with limits derived from the general emission field strength limits. The far field path loss equation is utilized to convert the field strength limits to EIRP limits in dBm as follows:

$$\text{Given EIRP} = E_{\text{dB}\mu\text{V/m}} + 20\text{Log}_{10}(d) - 104.8$$

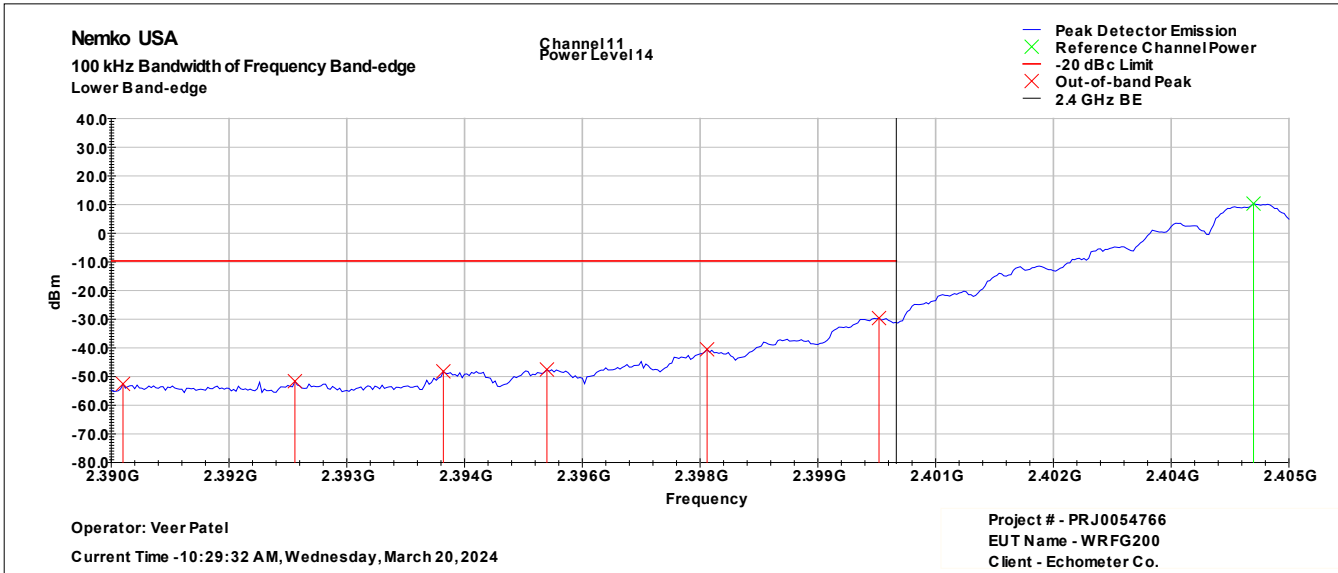
$$\text{EIRP} = 54 \text{ dB}\mu\text{V/m} + 20\text{Log}_{10}(3 \text{ m}) - 104.8 \text{ dB} = -41.25 \text{ dBm} \text{ (commonly -41 dBm is applied)}$$

Emissions below band measured with peak detection in 100 kHz RBW.

Emissions above band measured with peak detection and 1 Hz video average in 1 MHz RBW if the peak emission exceeds the average limit.

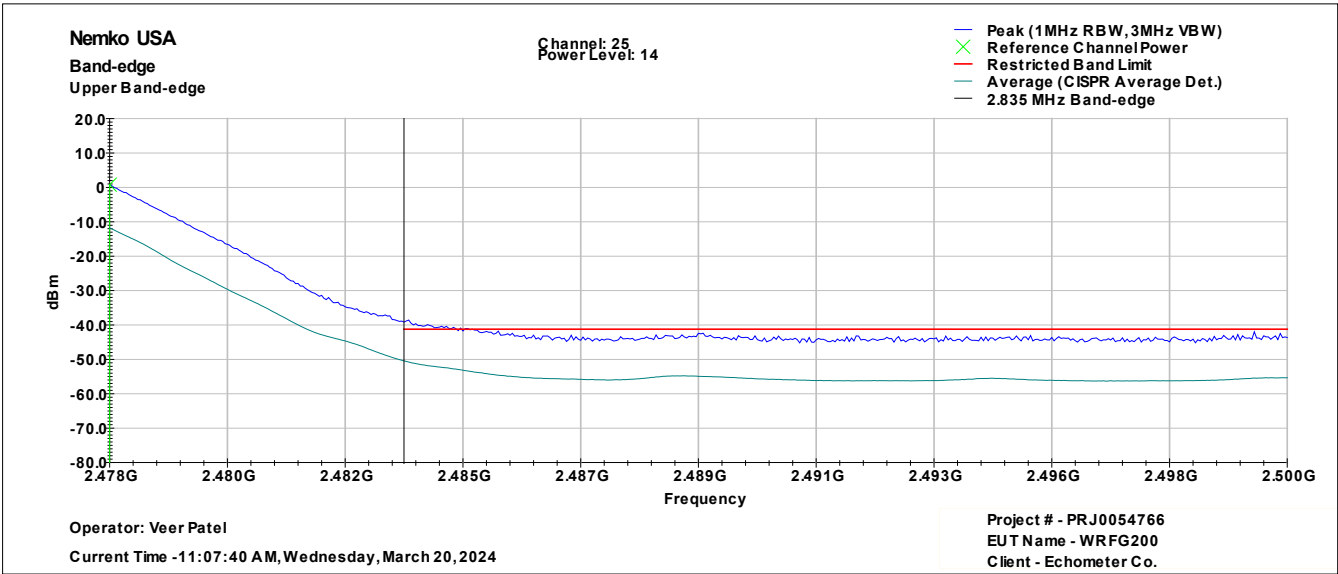
The requirement was satisfied. Test plots and tabular data are presented on the following page.

Lower Band-edge (Ch 11)



Frequency (MHz)	Corrected Reading (dBm)	Limit -20 dBc (dBm)	Margin (dB)	Results
2390.150	-52.581	-9.680	-42.901	PASS
2392.340	-51.654	-9.680	-41.974	PASS
2394.230	-48.192	-9.680	-38.512	PASS
2395.550	-47.544	-9.680	-37.864	PASS
2397.590	-40.519	-9.680	-30.839	PASS
2399.780	-29.635	-9.680	-19.955	PASS

Upper Band-edge (Ch 25)



6.0 Conducted Antenna Port Spurious Emissions, Transmit Mode

6.1 Test Procedure

The radio was connected via cable to the spectrum analyzer for the measurements. Conducted antenna port emissions are measured with the EUT transmitting on Low, Mid, and High channels. ANSI C63.10-2013, section 11.12.2, procedure is used for the measurements. Measurements taken on 8/26/2024.

6.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Unwanted Emissions
15.247 (d), 15.209 (a) // RSS-247 5.5, RSS-Gen 6.13	Antenna Port Conducted Spurious/Harmonic Emissions Transmit Mode

6.3 Test Results

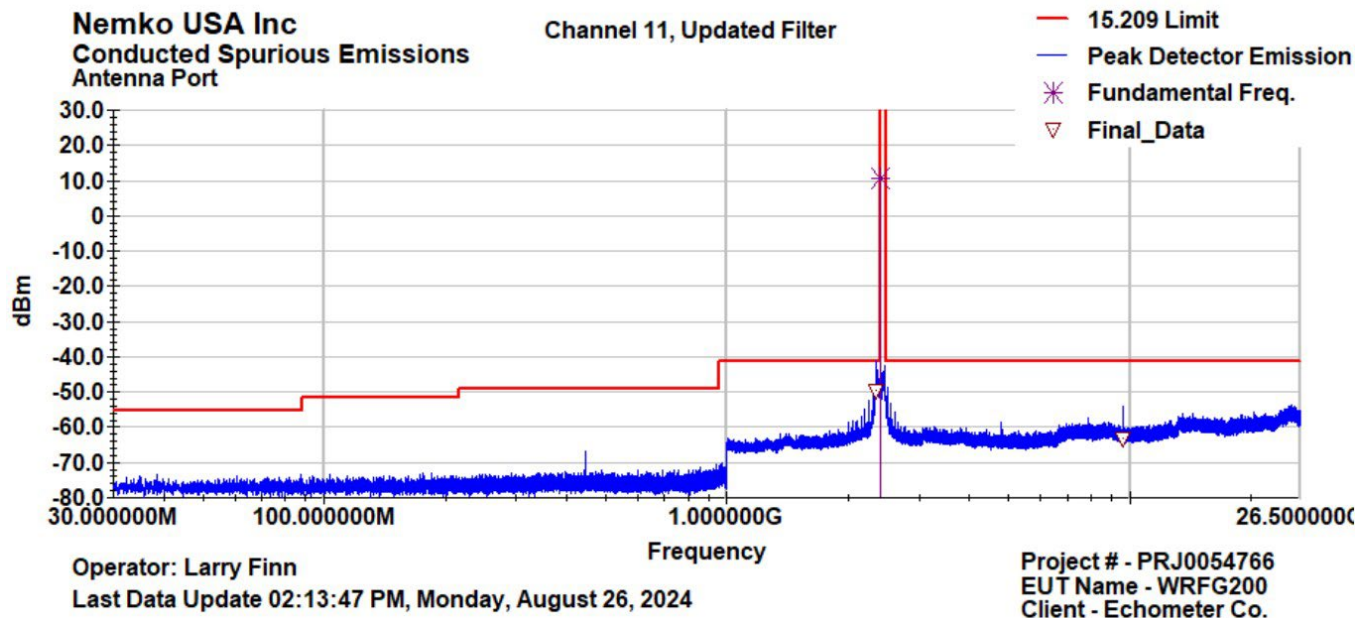
Three channels were tested. EUT was transmitting continuously and modulated.

The top, middle, and bottom channels were tested. Testing was conducted with 1MHz RBW using 15.209 limits.

The EUT satisfied the requirements. Test plots and tabular data are presented on the following page.

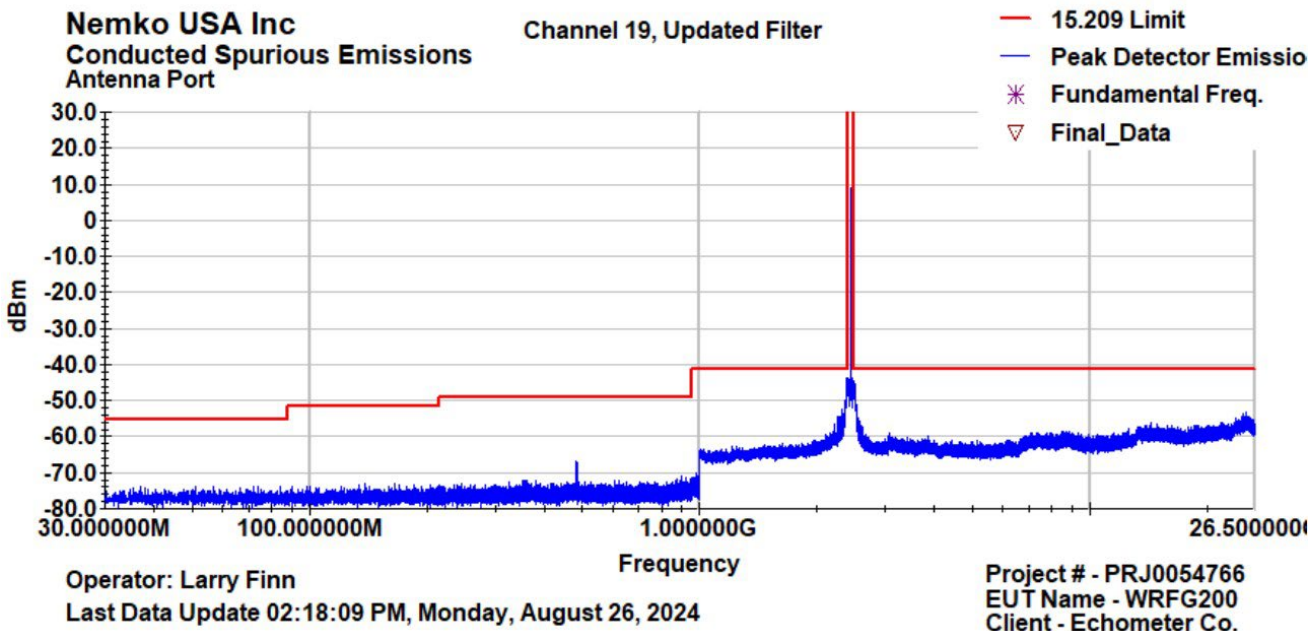
6.3.1 Test Results

Channel 11

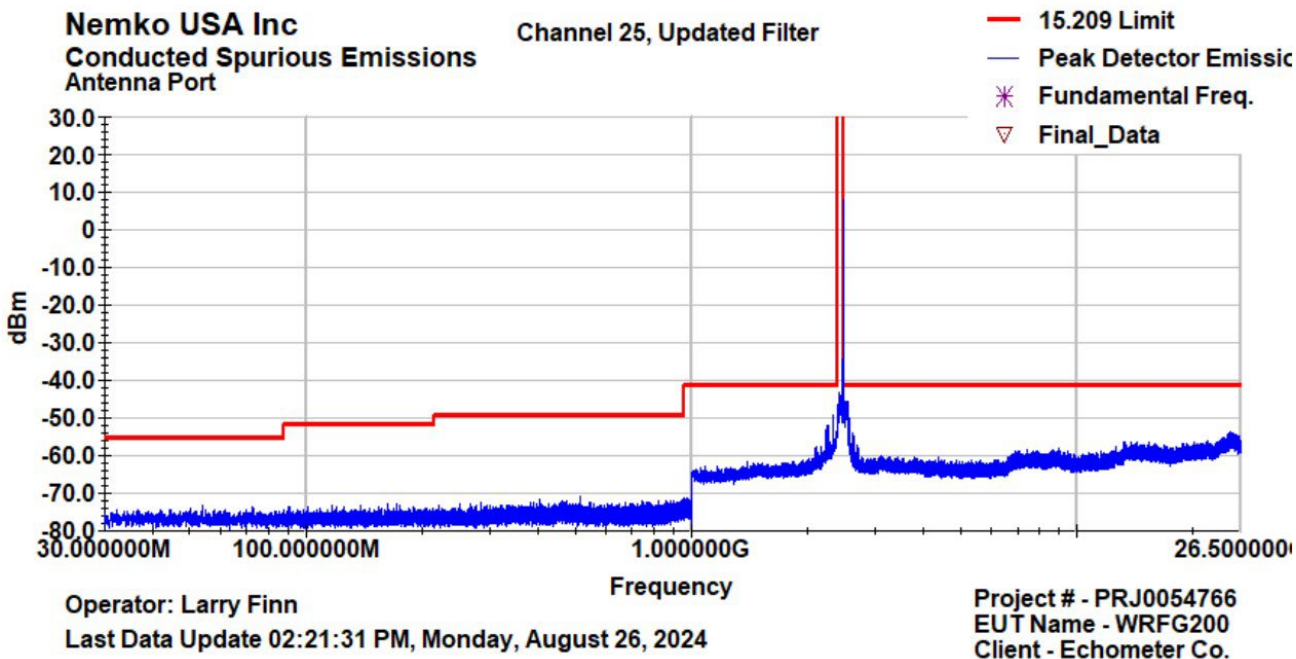


Frequency (MHz)	Final_Data	Limit	Delta	Result
2.352 GHz	-49.369	-41.25	-8.12	PASS
9.619 GHz	-63.086	-41.25	-21.84	PASS

Channel 19



Channel 25



7.0 Transmitter Radiated Spurious Emissions

7.1 Test Procedure

Radiated emissions are measured with the EUT in normal operation transmitting on normal hopping channels. ANSI C63.10-2013, section 6.3, 6.5 and 6.6, procedure is used for the measurements. Measurements taken on April 1-3 2024.

Test Distance, Table Height, and Detection Method

30 MHz to 1 GHz	1 GHz to 18 GHz	18 GHz to 26.5 GHz
10 m, 80 cm	3 m, 1.5 m	1 m, 1.5 m
Quasi-peak	Peak & Average	Peak & Average

7.2 Test Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Parameter
15.247(d), 15.209 (a) // RSS-247 5.5, RSS-Gen 6.13 & 8.10	Field Strength of Radiated Spurious/Harmonic Emissions Transmit Mode

7.3 Test Results

EUT was tested in normal operation and transmitting continuously modulated. Device tested in normal operational orientation. Filters used to remove fundamental during testing.

The EUT satisfied the requirement. Test plots and tabular data are presented on the following page.

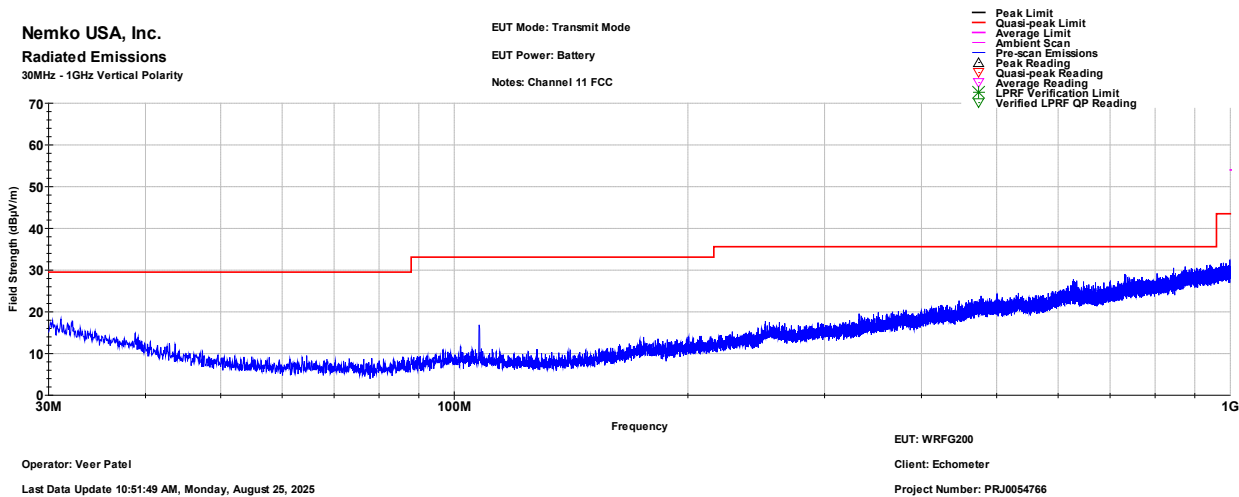
7.3.1 Test Data, Bottom Channel, 30 MHz to 25 GHz**Table 7.3.1.1: Radiated Emissions Test Results Summary:**

Frequency Range	Test Distance (Meters)	Antenna Polarization	Test Results
30MHz to 1GHz	10	Vertical	Pass
		Horizontal	Pass
1GHz to 18GHz	3	Vertical	Pass
		Horizontal	Pass
18GHz to 26.5GHz	1	Vertical	Pass
		Horizontal	Pass
18-26.5 GHz test data scaled to 3m distance			

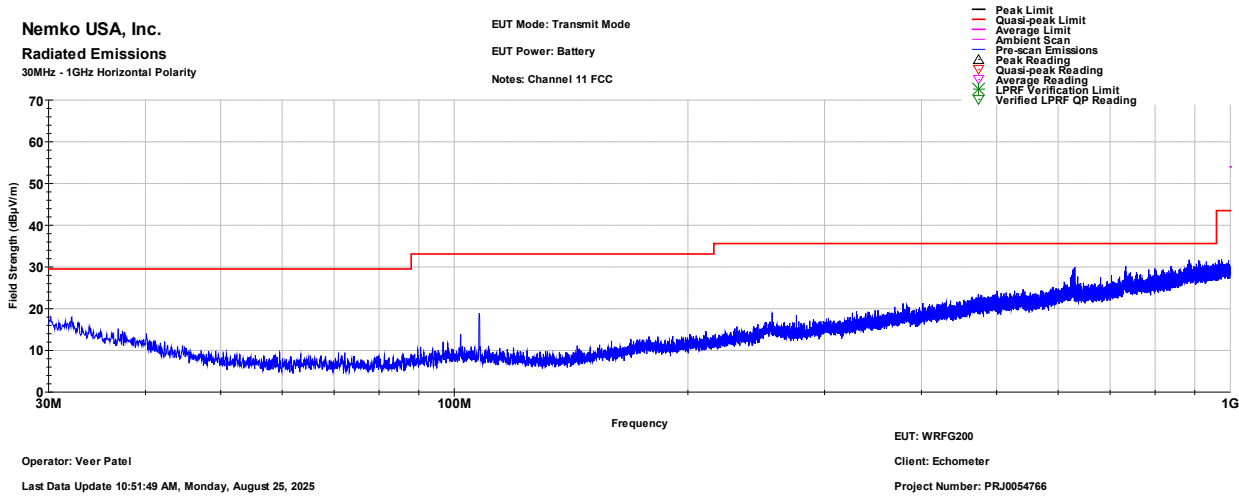
Model: WRFG200

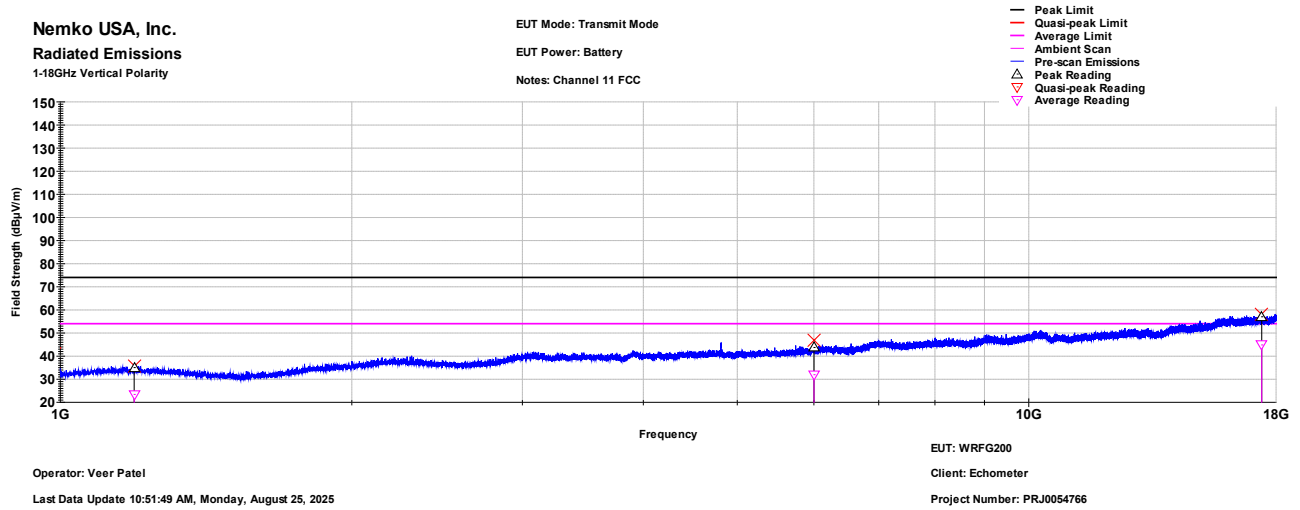
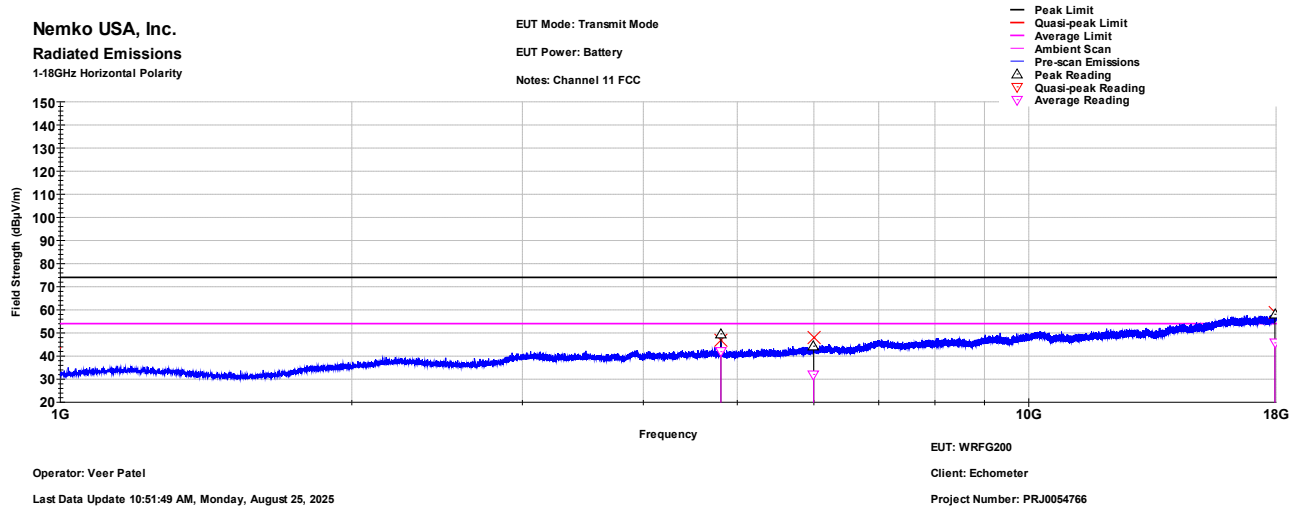
7.3.2 Radiated Emissions Test Data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

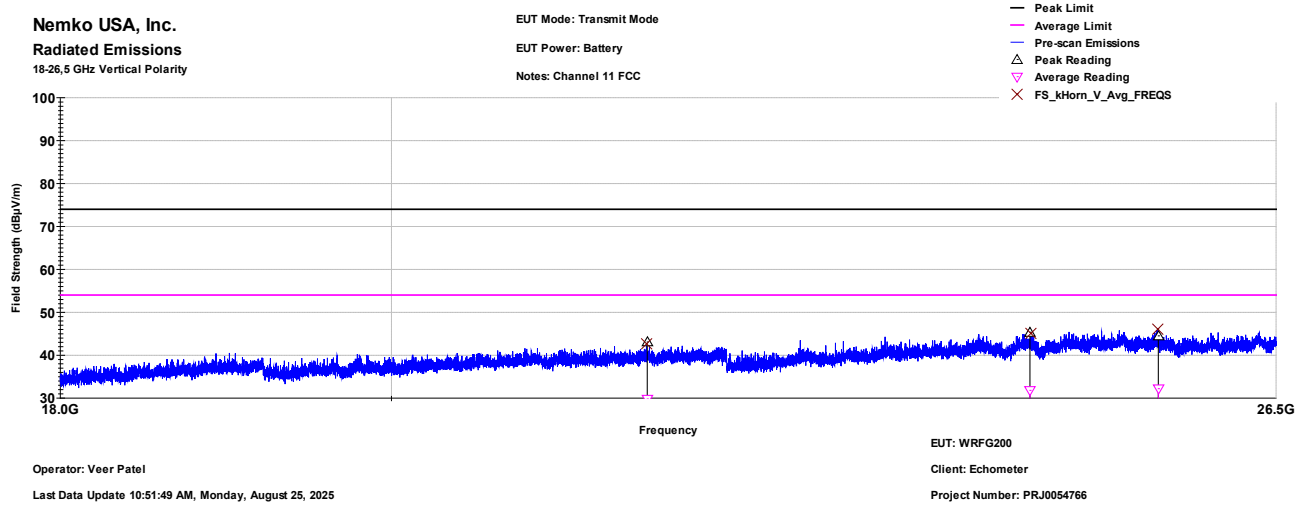


30MHz - 1GHz Horizontal Polarity Measured Emissions Data



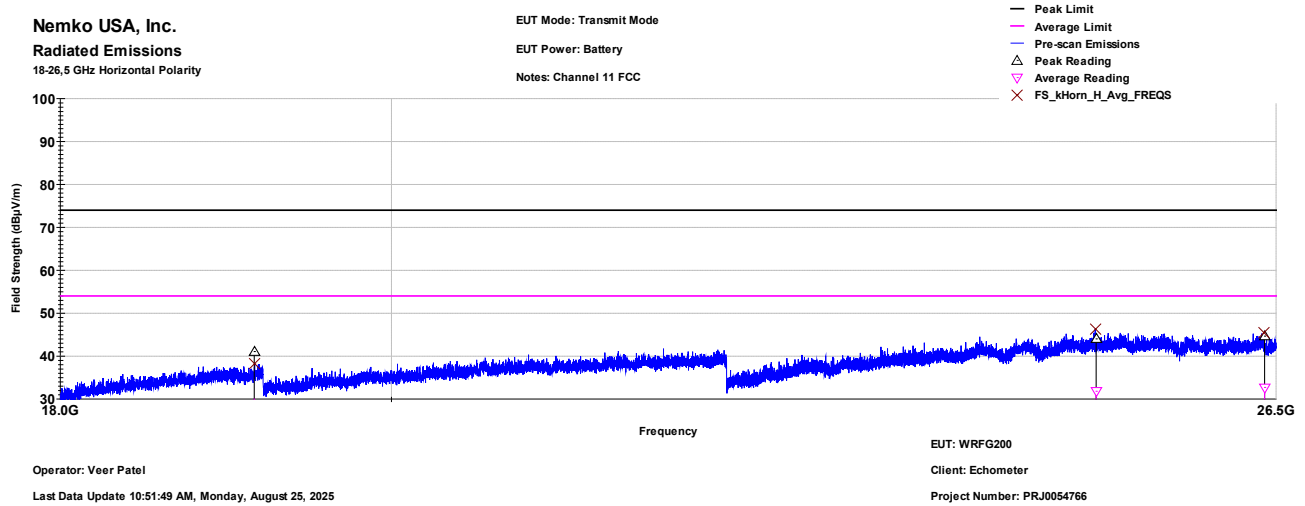
1GHz - 18GHz Vertical Polarity Measured Emissions Data:**1GHz - 18GHz Horizontal Polarity Measured Emissions Data**

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
21695.40	150	100.000	43.072	74.000	-30.928	PASS	29.787	54.000	-24.213	PASS
24504.84	195	100.000	45.340	74.000	-28.660	PASS	31.807	54.000	-22.193	PASS
25525.69	285	100.000	44.499	74.000	-29.501	PASS	32.185	54.000	-21.815	PASS

18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



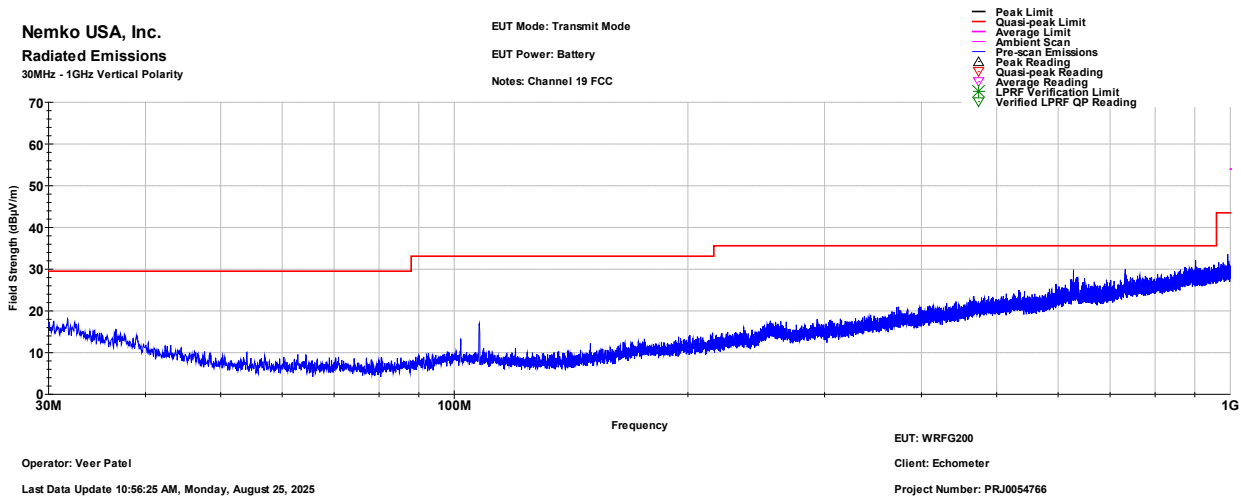
Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
19146.17	335	100.000	41.063	74.000	-32.937	PASS	28.679	54.000	-25.321	PASS
25026.04	35	100.000	44.009	74.000	-29.991	PASS	31.793	54.000	-22.207	PASS
26404.10	245	100.000	44.648	74.000	-29.352	PASS	32.685	54.000	-21.315	PASS

7.3.3 Test Data, Middle Channel, 30 MHz to 25 GHz**Table 7.3.3.1: Radiated Emissions Test Results Summary:**

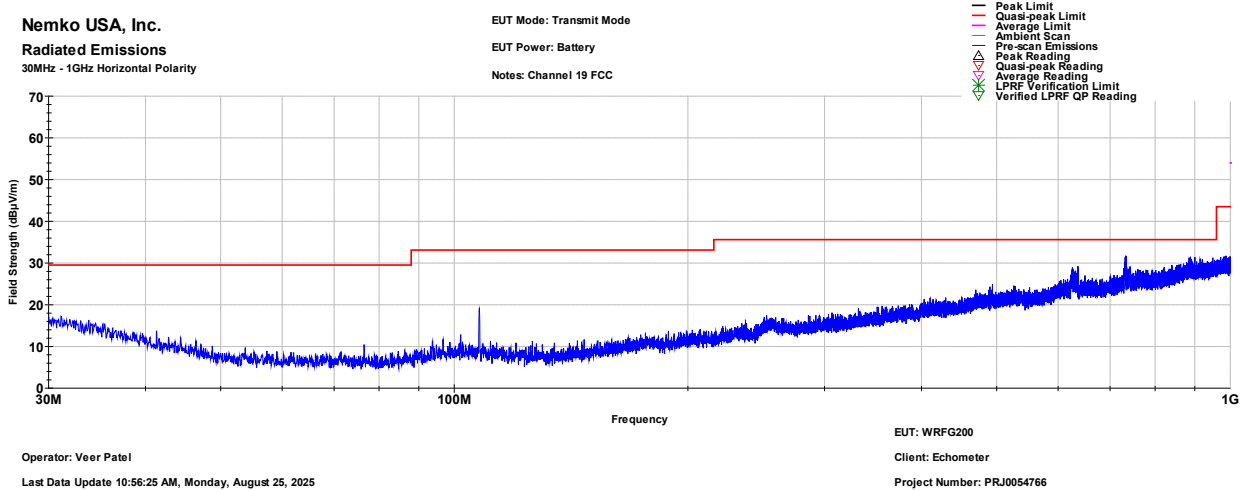
Frequency Range	Test Distance (Meters)	Antenna Polarization	Test Results
30MHz to 1GHz	10	Vertical	Pass
		Horizontal	Pass
1GHz to 18GHz	3	Vertical	Pass
		Horizontal	Pass
18GHz to 26.5GHz	1	Vertical	Pass
		Horizontal	Pass
18-26.5 GHz test data scaled to 3m distance			

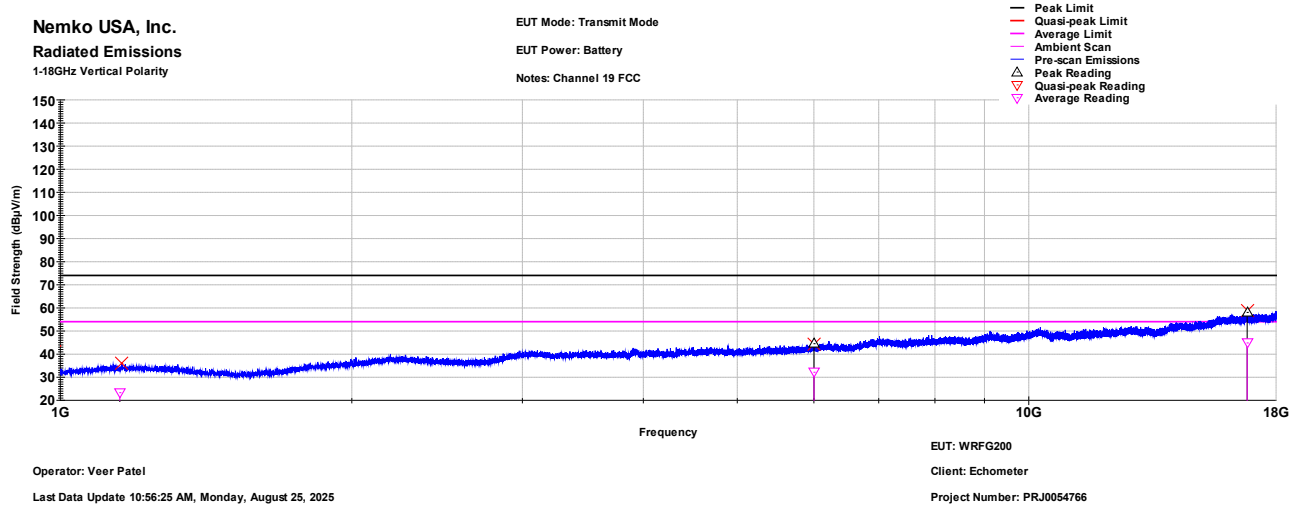
7.3.4 Radiated Emissions Test Data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

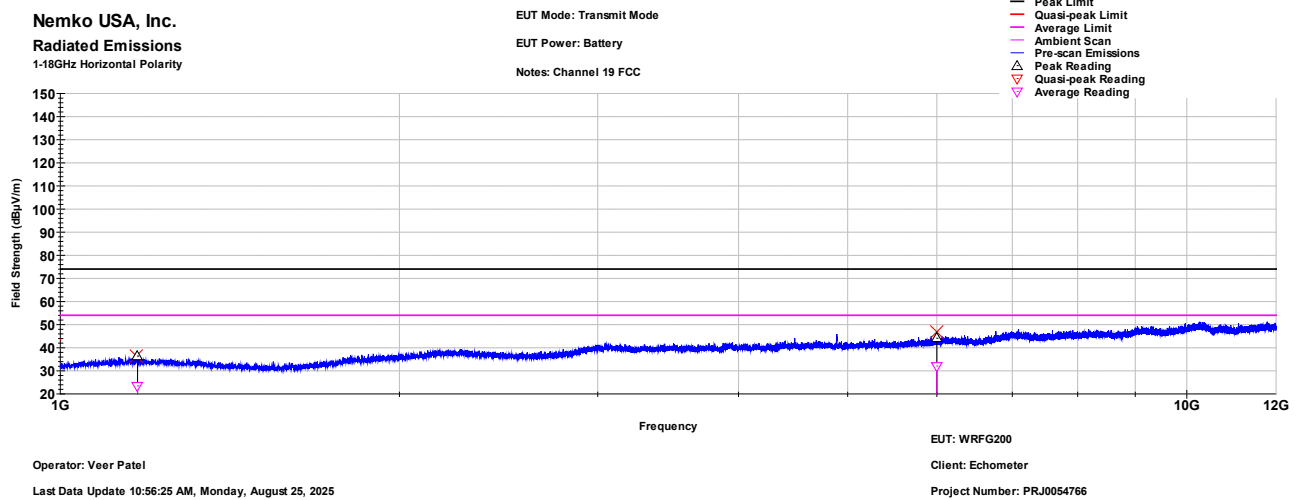


30MHz - 1GHz Horizontal Polarity Measured Emissions Data



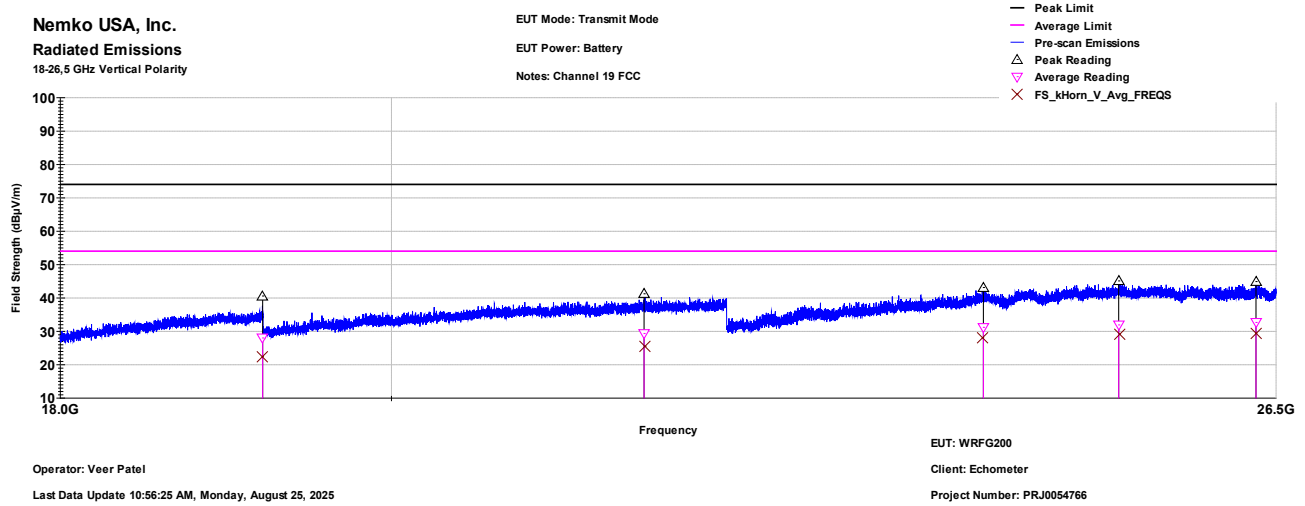
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
1152.25	343	215	-905.721	74.000	-979.721	PASS	23.304	54.000	-30.696	PASS
6000.60	37	100	44.487	74.000	-29.513	PASS	32.115	54.000	-21.885	PASS
16808.00	11	124	58.029	74.000	-15.971	PASS	44.827	54.000	-9.173	PASS

1GHz - 18GHz Horizontal Polarity Measured Emissions Data

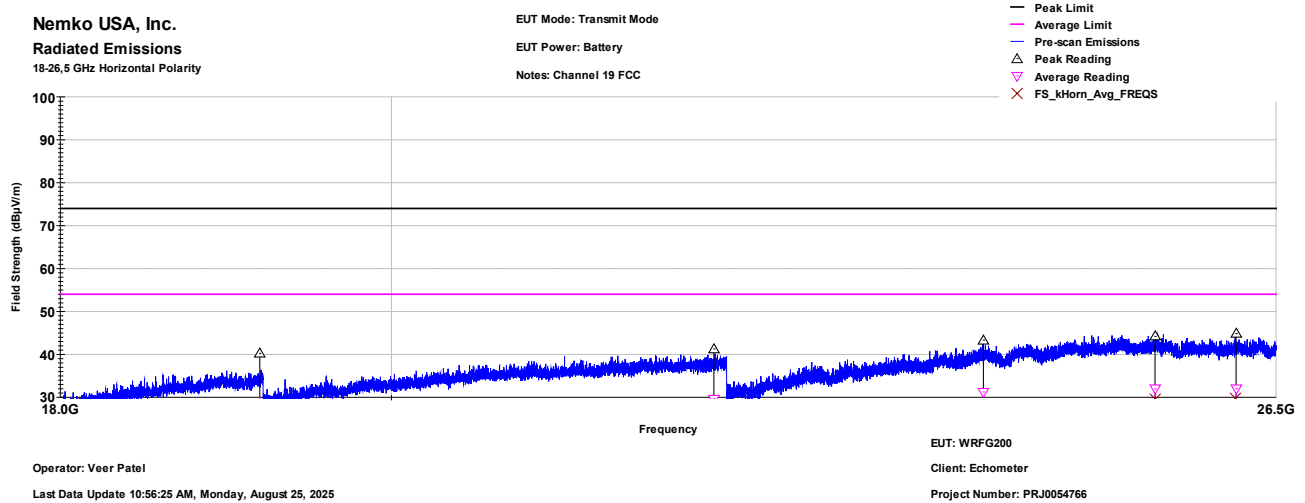
Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
1171.29	165	276	36.355	74.000	-37.645	PASS	23.419	54.000	-30.581	PASS
5999.65	0	100	44.083	74.000	-29.917	PASS	32.090	54.000	-21.910	PASS
17861.71	280	245	58.344	74.000	-15.656	PASS	45.143	54.000	-8.857	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
19196.98	330	100.000	40.594	74.000	-33.406	PASS	28.009	54.000	-25.991	PASS
21673.56	60	100.000	41.242	74.000	-32.758	PASS	29.338	54.000	-24.662	PASS
24144.47	255	100.000	43.134	74.000	-30.866	PASS	31.190	54.000	-22.810	PASS
25205.96	45	100.000	45.104	74.000	-28.896	PASS	31.907	54.000	-22.093	PASS
26331.37	165	100.000	44.904	74.000	-29.096	PASS	32.636	54.000	-21.364	PASS

18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



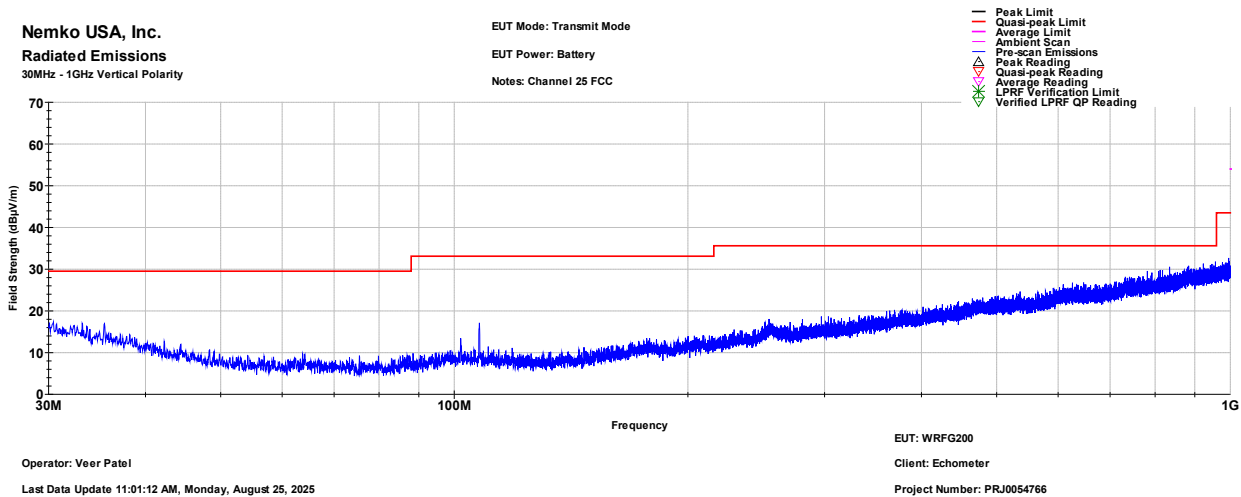
Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
19179.87	80	100.000	40.213	74.000	-33.787	PASS	28.017	54.000	-25.983	PASS
22160.50	155	100.000	41.266	74.000	-32.734	PASS	29.594	54.000	-24.406	PASS
24144.51	305	100.000	43.312	74.000	-30.688	PASS	31.232	54.000	-22.768	PASS
25499.69	35	100.000	44.166	74.000	-29.834	PASS	31.977	54.000	-22.023	PASS
26165.83	170	100.000	44.843	74.000	-29.157	PASS	32.024	54.000	-21.976	PASS

7.3.5 Test Data, Top Channel, 30 MHz to 25 GHz**Table 7.3.5.1: Radiated Emissions Test Results Summary:**

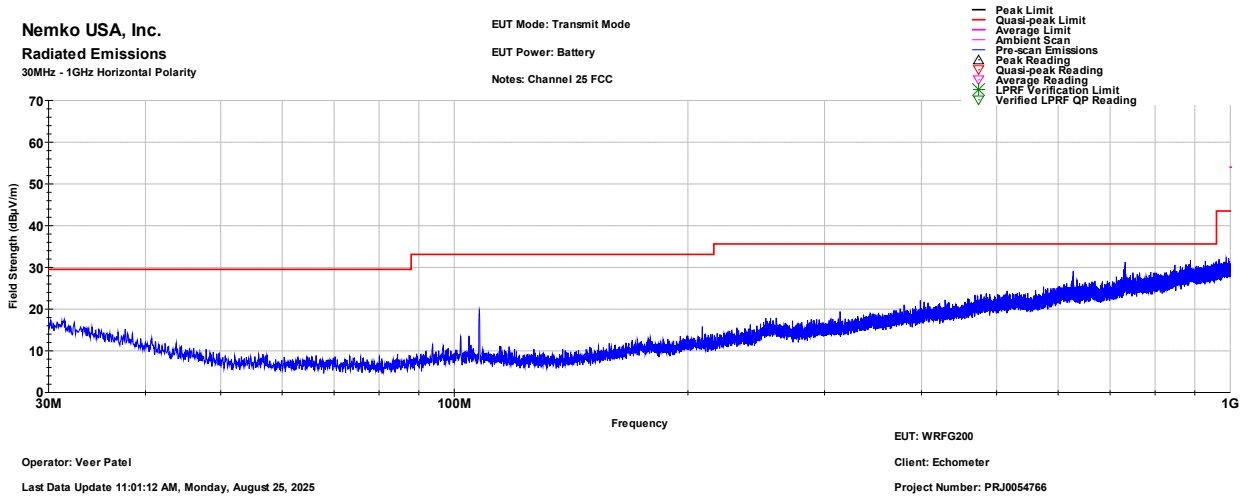
Frequency Range	Test Distance (Meters)	Antenna Polarization	Test Results
30MHz to 1GHz	10	Vertical	Pass
		Horizontal	Pass
1GHz to 18GHz	3	Vertical	Pass
		Horizontal	Pass
18GHz to 26.5GHz	1	Vertical	Pass
		Horizontal	Pass
18-26.5 GHz test data scaled to 3m distance			

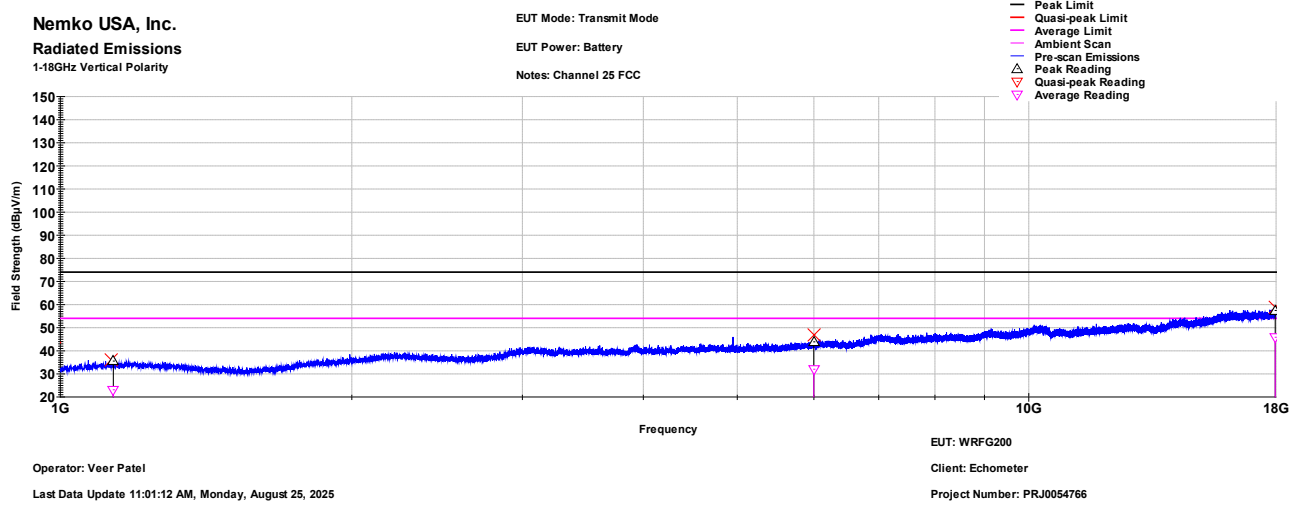
7.3.6 Radiated Emissions Test Data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

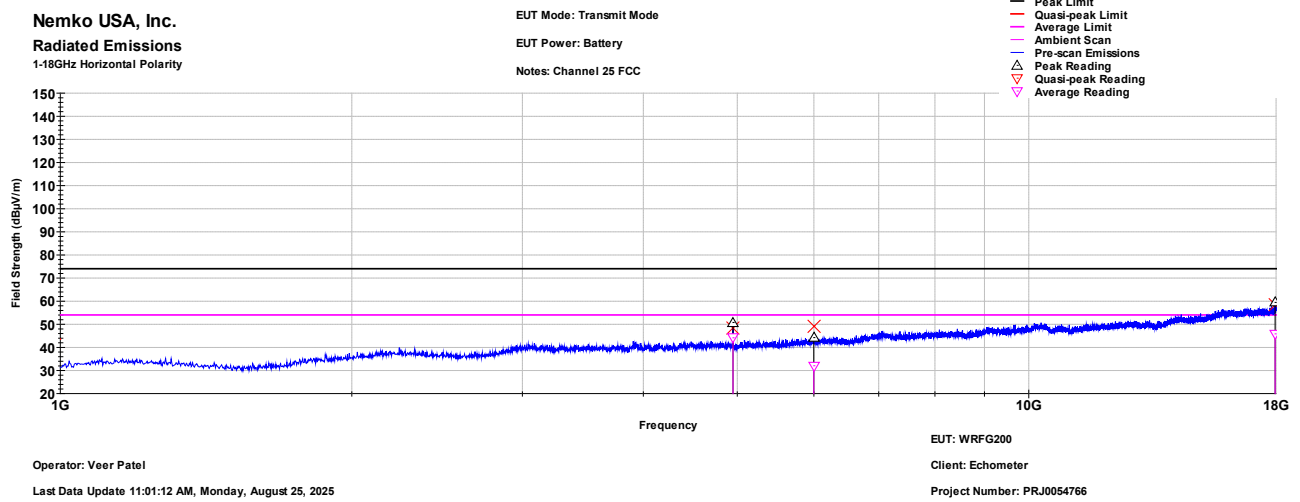


30MHz - 1GHz Horizontal Polarity Measured Emissions Data



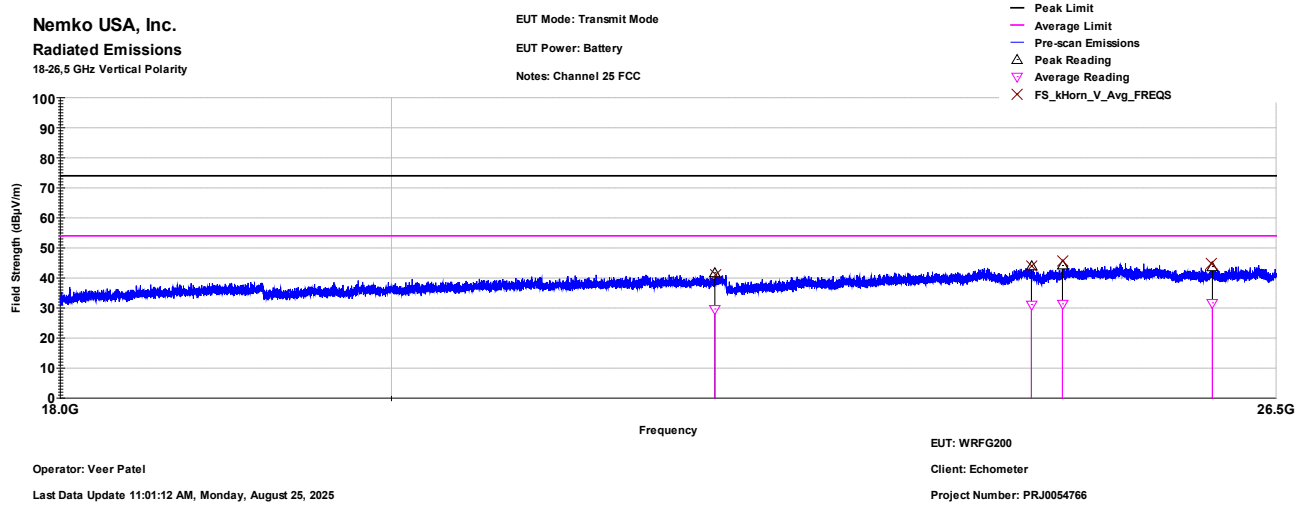
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
1134.45	223	100	35.503	74.000	-38.497	PASS	23.107	54.000	-30.893	PASS
5997.54	62	225	43.860	74.000	-30.140	PASS	31.991	54.000	-22.009	PASS
17965.41	0	215	57.422	74.000	-16.578	PASS	45.831	54.000	-8.169	PASS

1GHz - 18GHz Horizontal Polarity Measured Emissions Data

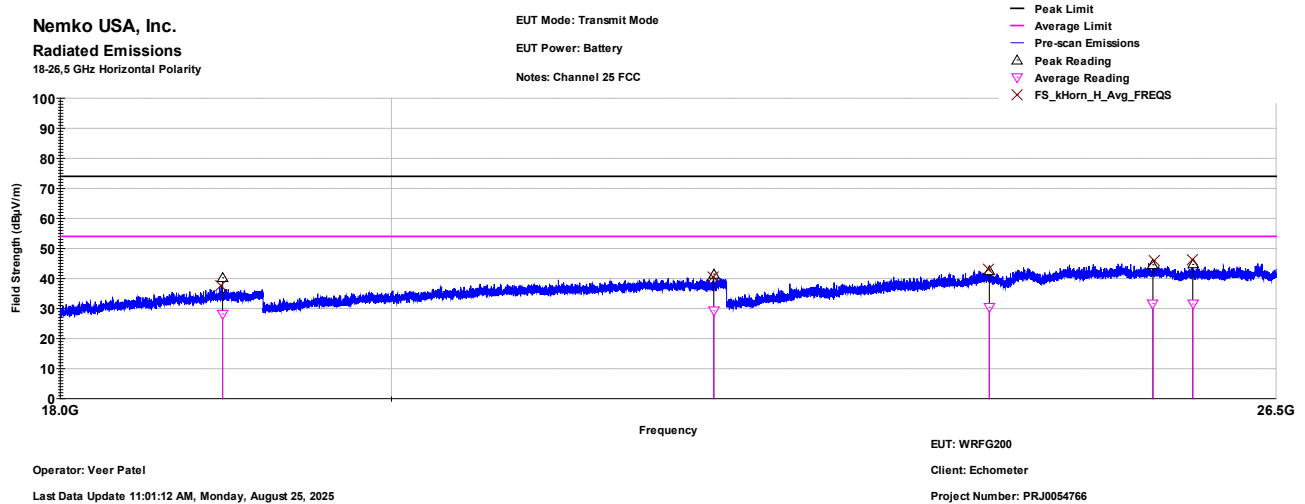
Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
4950.47	49	154	50.749	74.000	-23.251	PASS	44.101	54.000	-9.899	PASS
5998.80	330	337	44.232	74.000	-29.768	PASS	32.006	54.000	-21.994	PASS
17963.01	0	286	59.435	74.000	-14.565	PASS	45.804	54.000	-8.196	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
22167.21	90	100.000	41.718	74.000	-32.282	PASS	29.655	54.000	-24.345	PASS
24515.78	90	100.000	44.000	74.000	-30.000	PASS	31.147	54.000	-22.853	PASS
24759.03	255	100.000	44.115	74.000	-29.885	PASS	31.372	54.000	-22.628	PASS
25969.46	240	100.000	43.772	74.000	-30.228	PASS	31.715	54.000	-22.285	PASS

18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
18953.99	65	100.000	40.202	74.000	-33.798	PASS	28.185	54.000	-25.815	PASS
22160.15	65	100.000	41.442	74.000	-32.558	PASS	29.231	54.000	-24.769	PASS
24189.90	9	100.000	42.608	74.000	-31.392	PASS	30.383	54.000	-23.617	PASS
25481.97	125	100.000	44.567	74.000	-29.433	PASS	31.729	54.000	-22.271	PASS
25807.12	140	100.000	44.645	74.000	-29.355	PASS	31.495	54.000	-22.505	PASS

Model: WCGG200**7.3.7 Radiated Emissions Test Data****7.3.8 Test summary**

Verdict	Pass		
Test date	July 25, 2024	Temperature	23 °C
Test engineer	Enrique Hernandez, EMC Lab Manager	Air pressure	48 mbar
Test location	10m semi anechoic chamber	Relative humidity	988 %

7.3.9 Observations/special notes

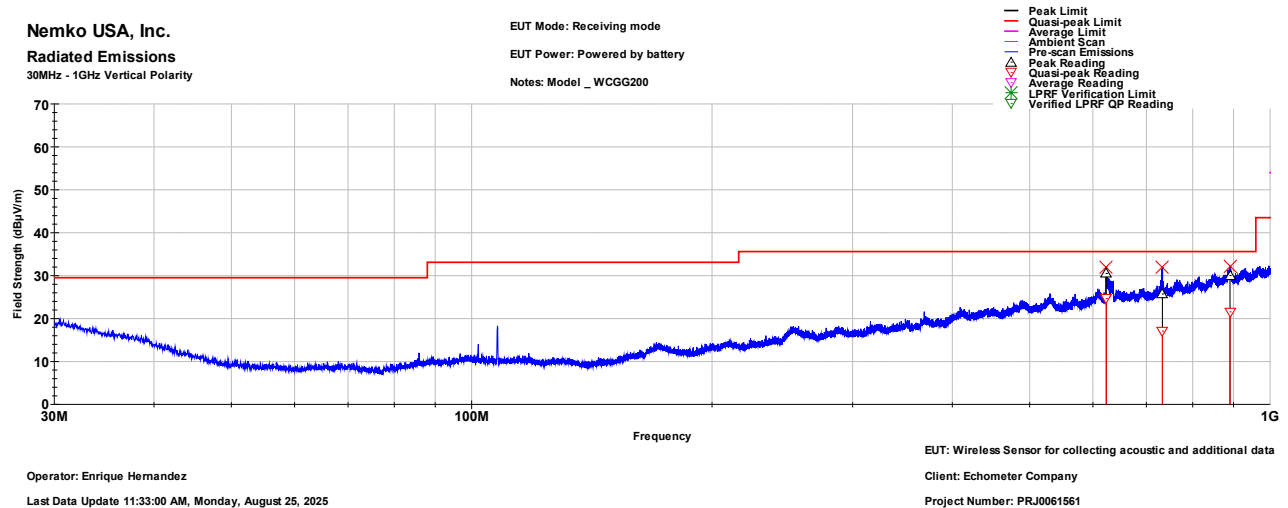
None

7.3.10 Setup details

EUT setup configuration	Table top
Test facility	10 m Semi anechoic chamber
Measuring distance	3 and 10 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

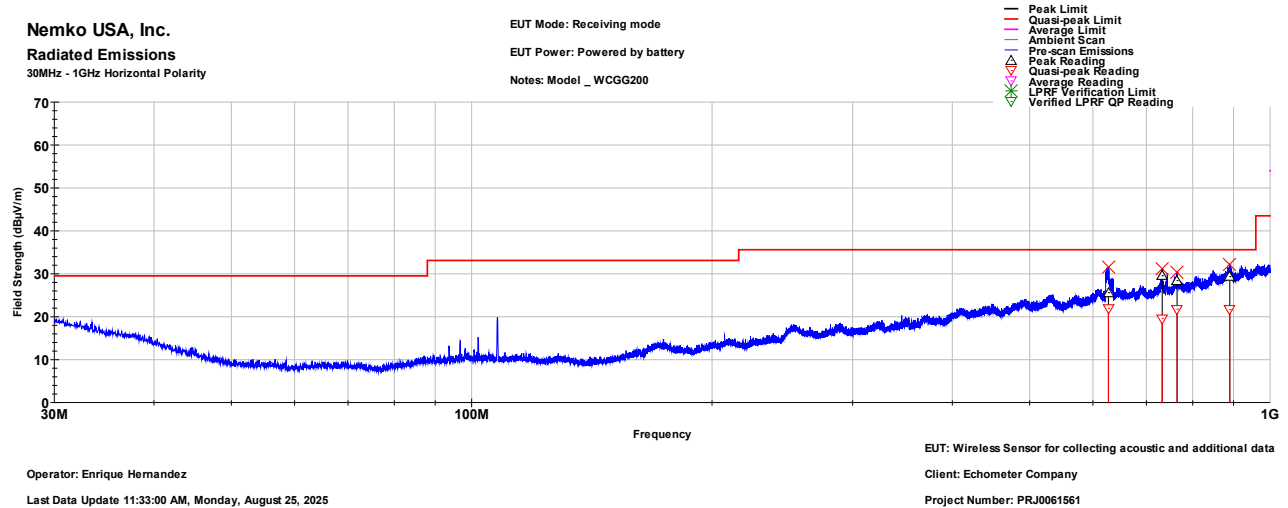
7.3.11 Test data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

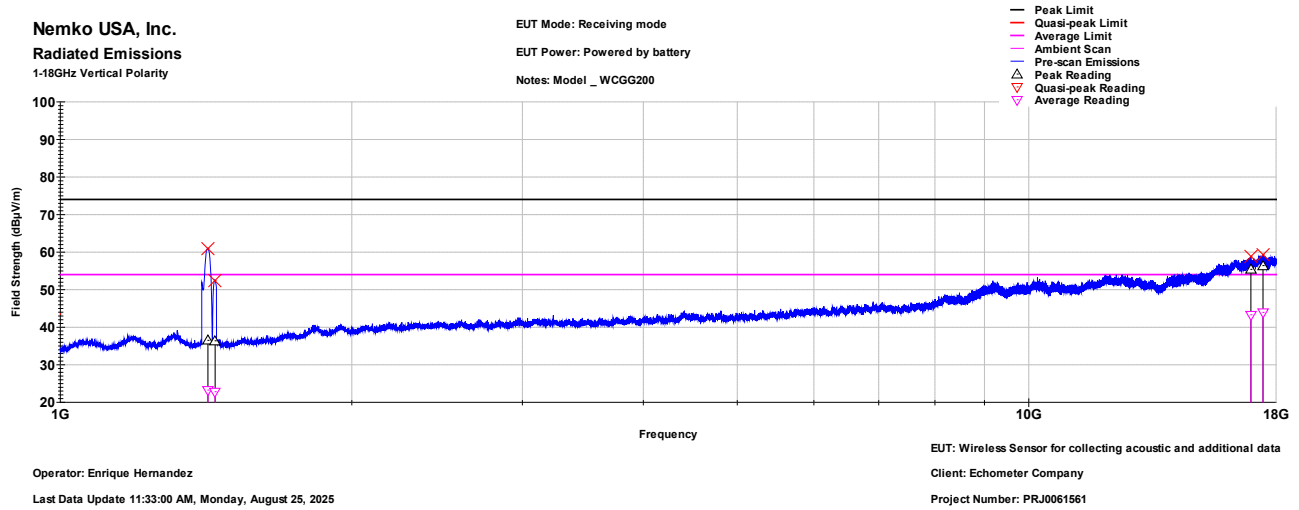


Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
623.543	212.000	382.000	24.678	35.600	-10.922	PASS	30.487
733.127	22.000	156.000	17.076	35.600	-18.524	PASS	25.703
891.077	266.000	250.000	21.547	35.600	-14.053	PASS	30.030

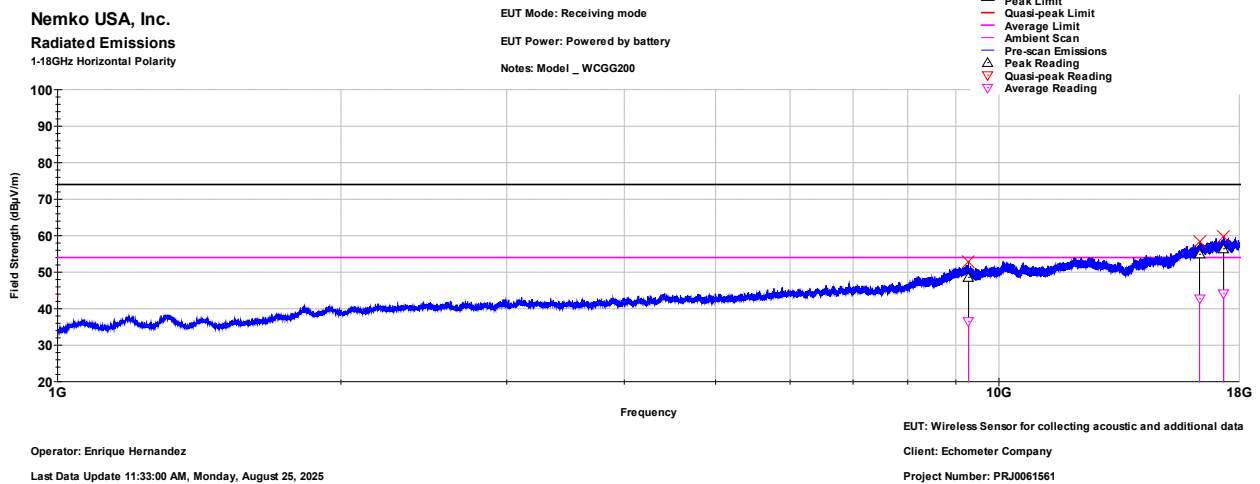
30MHz - 1GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
627.443	113.000	156.000	21.927	35.600	-13.673	PASS	25.584
732.827	274.000	100.000	19.539	35.600	-16.061	PASS	29.523
764.837	23.000	100.000	21.727	35.600	-13.873	PASS	28.401
890.417	219.000	278.000	21.628	35.600	-13.972	PASS	29.323

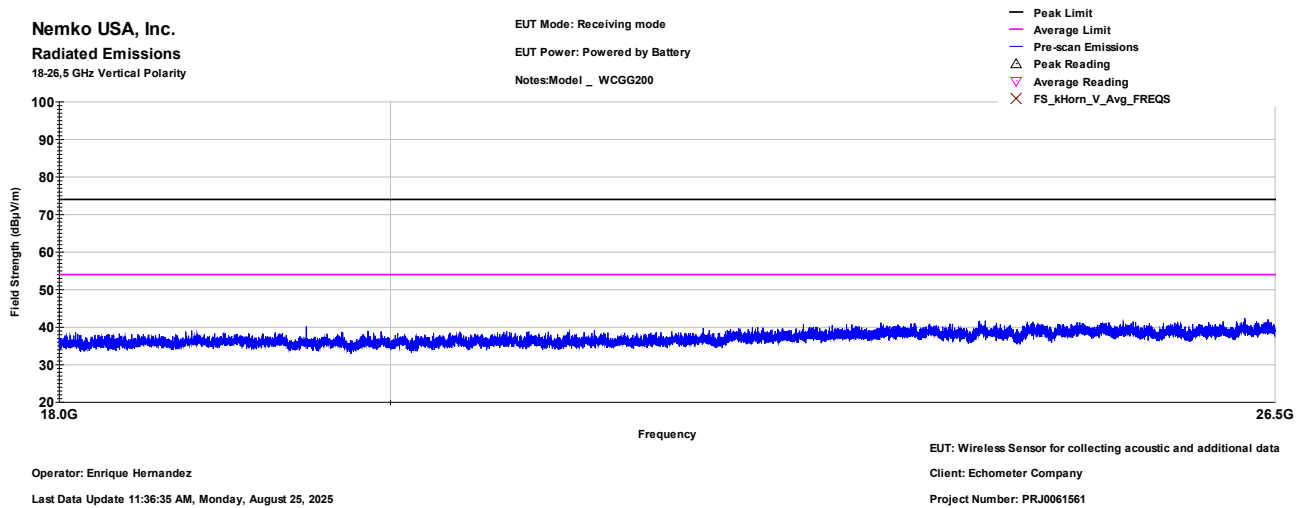
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
1420.75	27	212	36.491	74.000	-37.509	PASS	23.235	54.000	-30.765	PASS
1445.20	100	114	36.382	74.000	-37.618	PASS	22.829	54.000	-31.171	PASS
16956.50	271	237	55.386	74.000	-18.614	PASS	43.317	54.000	-10.683	PASS
17452.33	359	100	56.405	74.000	-17.595	PASS	43.919	54.000	-10.081	PASS

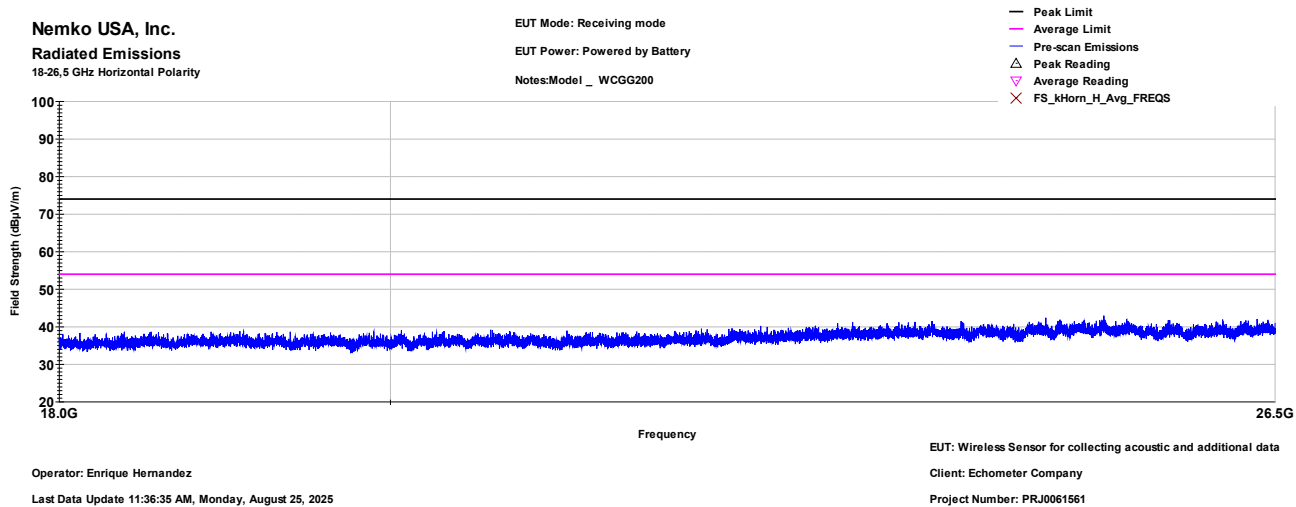
1GHz - 18GHz Horizontal Polarity Measured Emissions Data

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
9283.20	221	274	48.567	74.000	-25.433	PASS	36.426	54.000	-17.574	PASS
16332.50	289	200	54.874	74.000	-19.126	PASS	42.747	54.000	-11.253	PASS
17324.75	98	249	56.409	74.000	-17.591	PASS	44.208	54.000	-9.792	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



Model: WHT200**7.3.12 Radiated Emissions Test Data****7.3.13 Test summary**

Verdict	Pass		
Test date	July 25, 2024	Temperature	23 °C
Test engineer	Enrique Hernandez, EMC Lab Manager	Air pressure	48 mbar
Test location	10m semi anechoic chamber	Relative humidity	988 %

7.3.14 Observations/special notes

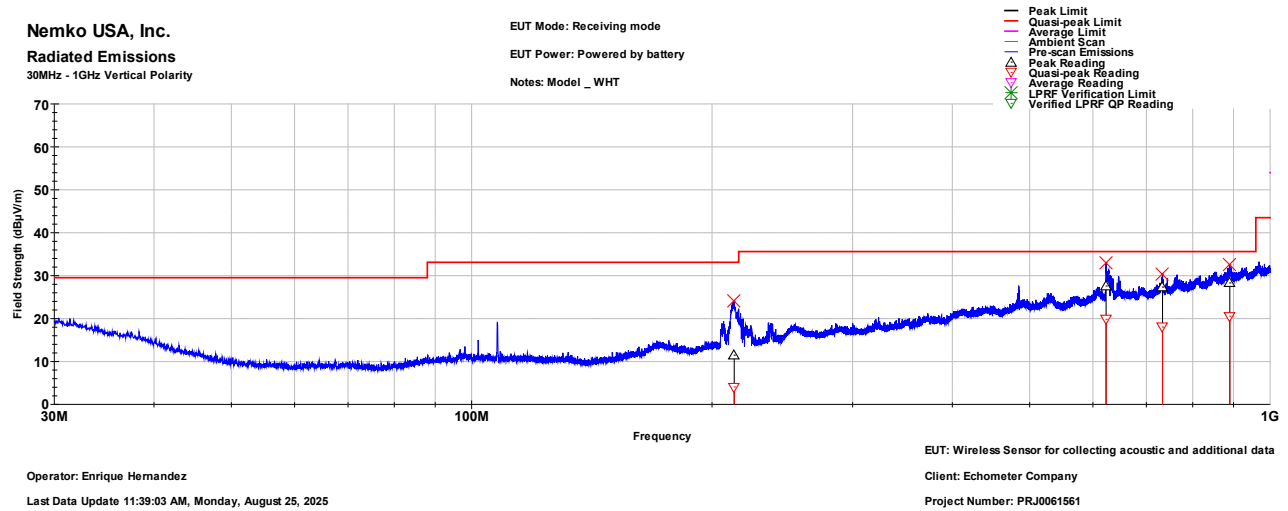
None

7.3.15 Setup details

EUT setup configuration	Table top
Test facility	10 m Semi anechoic chamber
Measuring distance	3 and 10 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

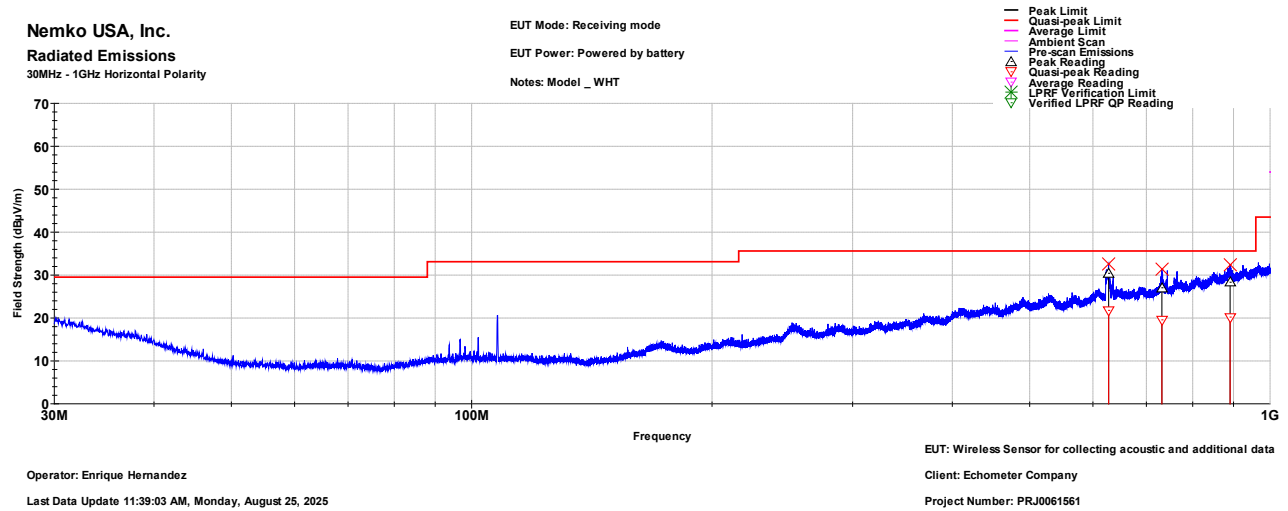
7.3.16 Test data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

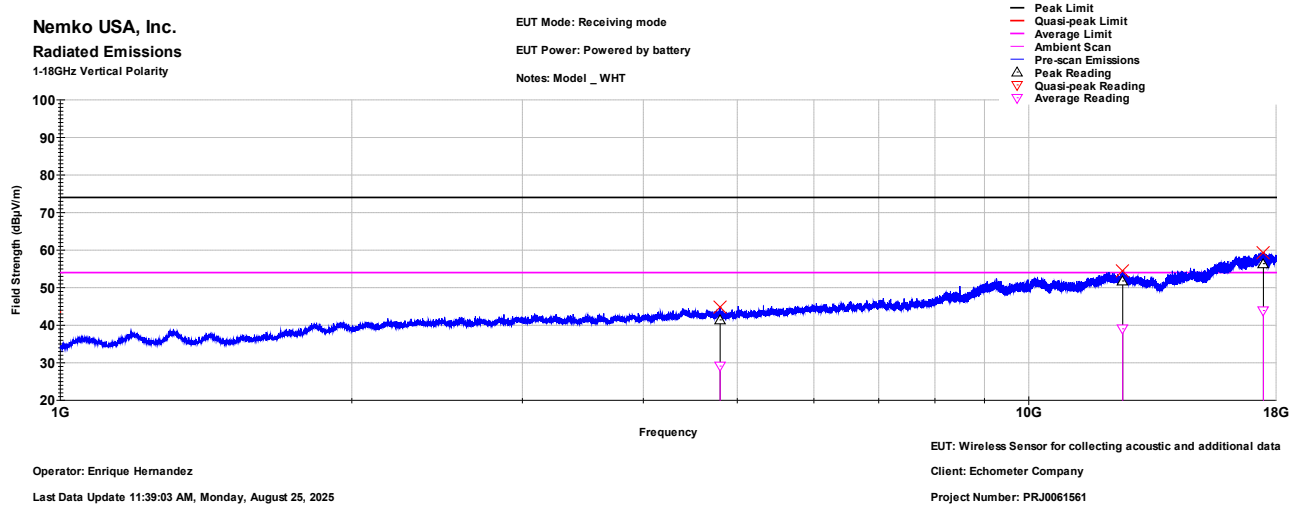


Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBµV)	Quasi-peak Limit (dBµV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBµV)
213.270	84.000	256.000	4.056	33.100	-29.044	PASS	11.440
623.273	168.000	400.000	19.816	35.600	-15.784	PASS	27.564
733.307	247.000	205.000	18.023	35.600	-17.577	PASS	27.317
890.447	292.000	205.000	20.544	35.600	-15.056	PASS	28.290

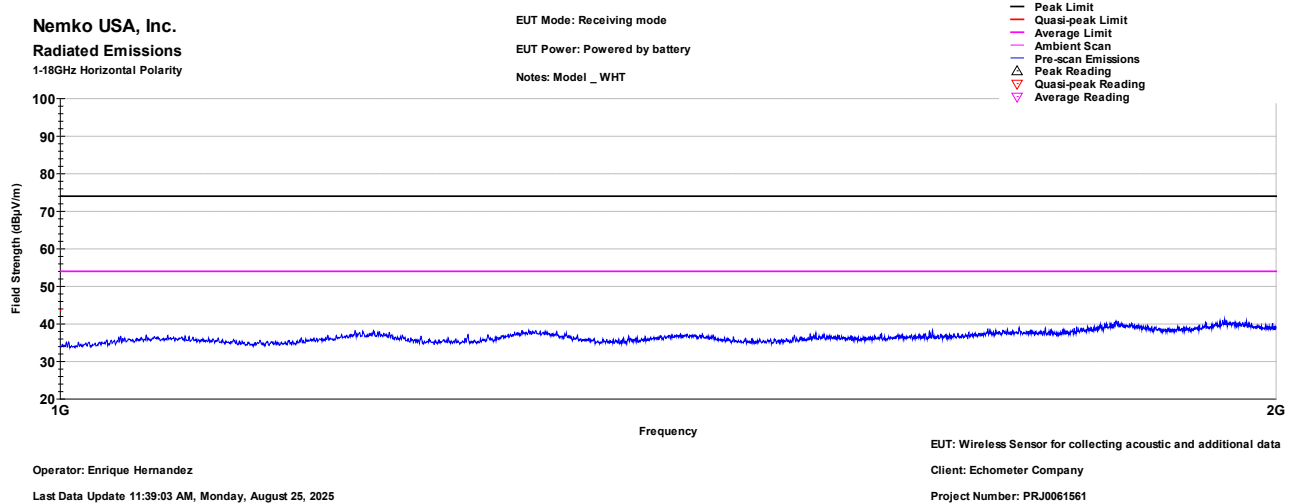
30MHz - 1GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBµV)	Quasi-peak Limit (dBµV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBµV)
627.773	23.000	205.000	21.751	35.600	-13.849	PASS	30.401
732.047	203.000	100.000	19.553	35.600	-16.047	PASS	27.032
891.287	248.000	350.000	20.199	35.600	-15.401	PASS	28.322

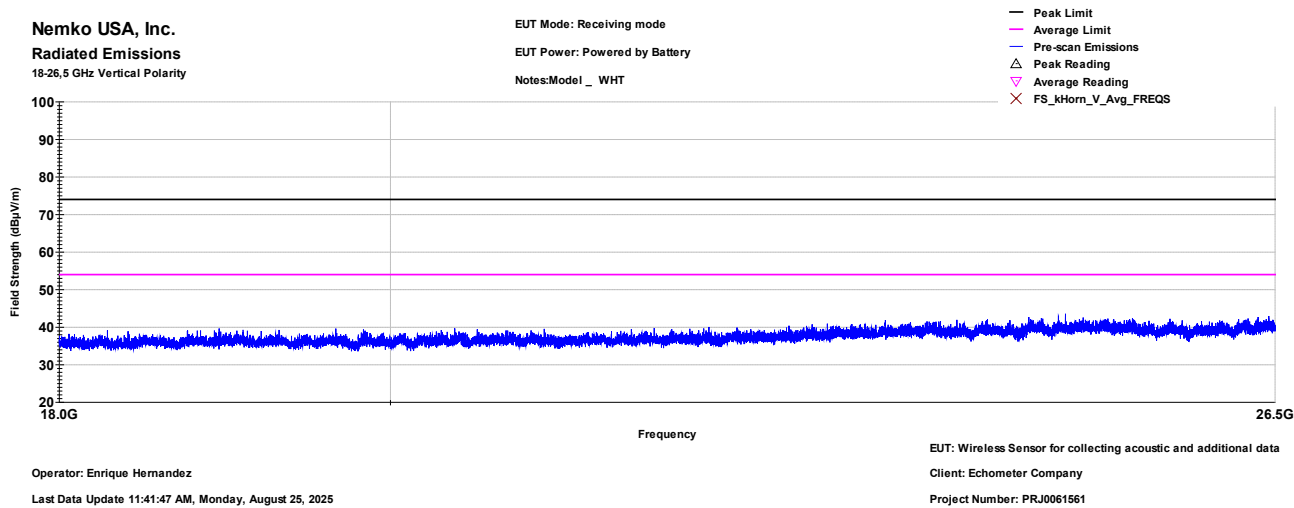
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results
4801.50	241	262	41.421	74.000	-32.579	PASS	29.101	54.000	-24.899	PASS
12501.80	158	311	51.760	74.000	-22.240	PASS	39.035	54.000	-14.965	PASS
17470.33	332	386	56.372	74.000	-17.628	PASS	43.899	54.000	-10.101	PASS

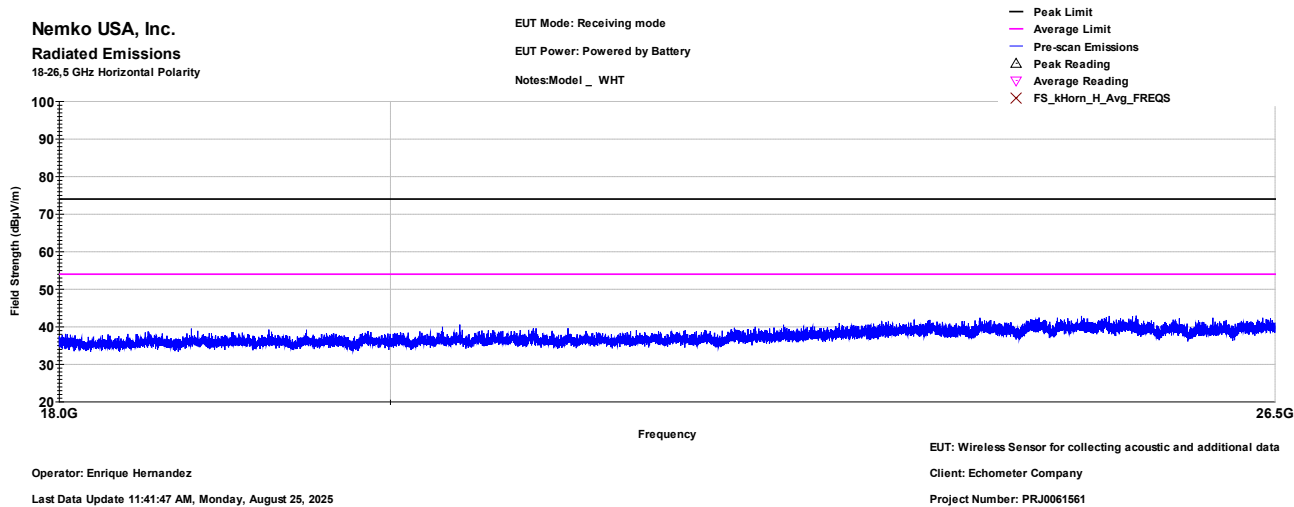
1GHz - 18GHz Horizontal Polarity Measured Emissions Data

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results
4802.20	160	225	42.571	74.000	-31.429	PASS	29.057	54.000	-24.943	PASS
12247.40	332	274	50.697	74.000	-23.303	PASS	38.264	54.000	-15.736	PASS
17352.33	108	361	56.815	74.000	-17.185	PASS	44.245	54.000	-9.755	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



Model: WPRT200**7.3.17 Radiated Emissions Test Data****7.3.18 Test summary**

Verdict	Pass		
Test date	July 25, 2024	Temperature	23 °C
Test engineer	Enrique Hernandez, EMC Lab Manager	Air pressure	48 mbar
Test location	10m semi anechoic chamber	Relative humidity	988 %

7.3.19 Observations/special notes

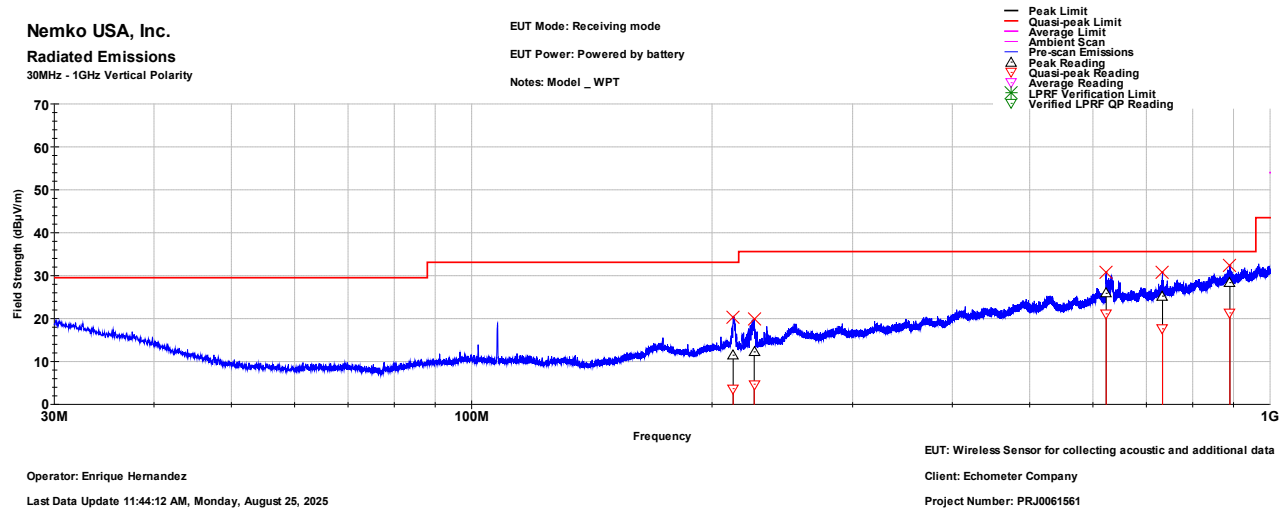
None

7.3.20 Setup details

EUT setup configuration	Table top
Test facility	10 m Semi anechoic chamber
Measuring distance	3 and 10 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

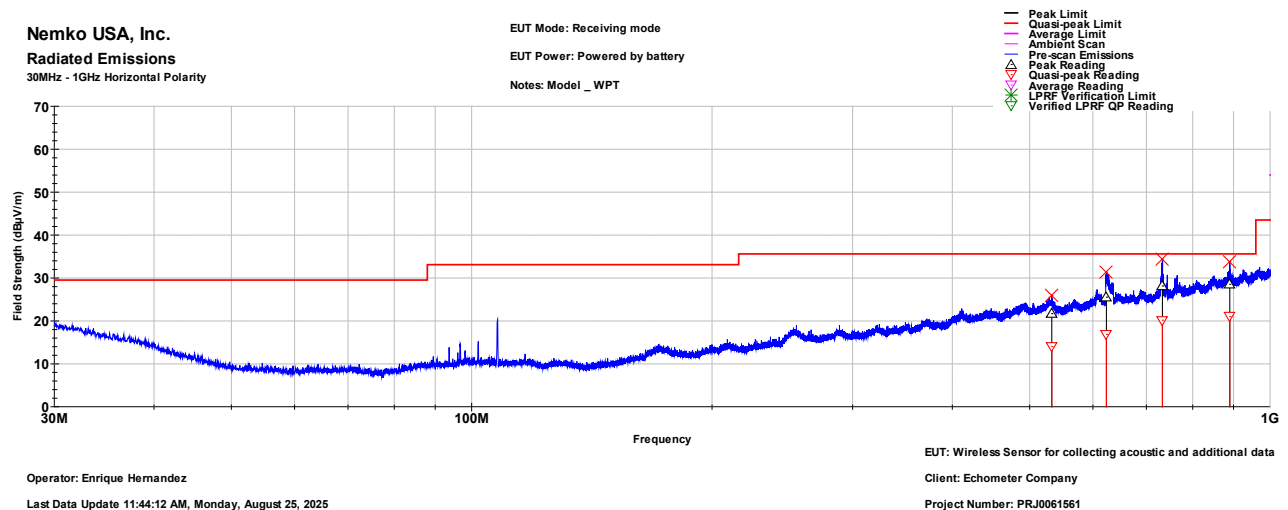
7.3.21 Test data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

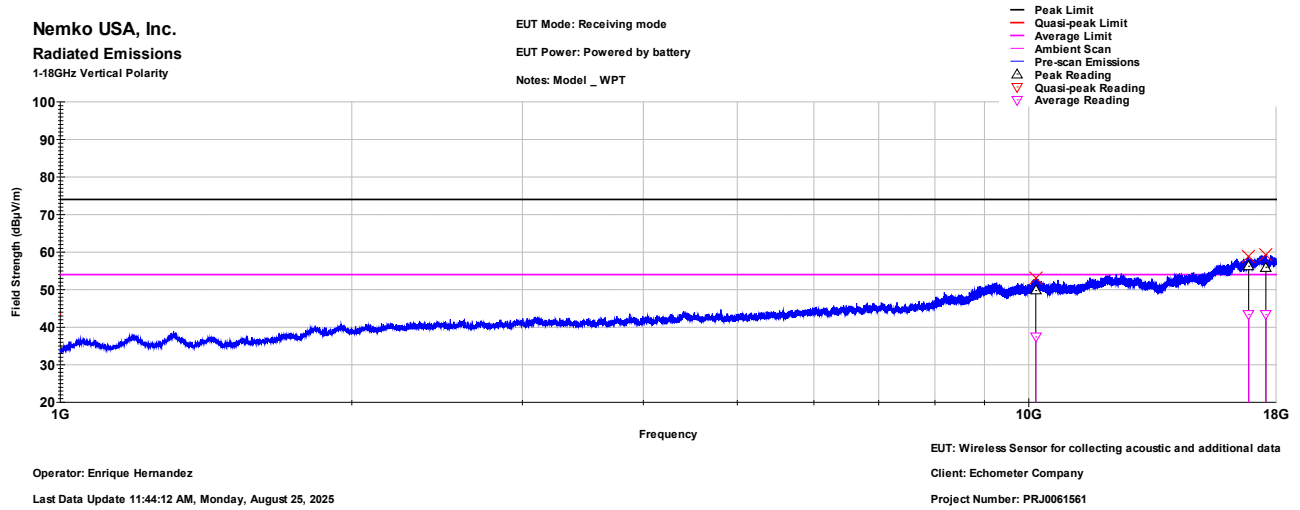


Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
212.580	192.000	218.000	3.664	33.100	-29.436	PASS	11.443
225.870	157.000	191.000	4.698	35.600	-30.902	PASS	12.213
623.483	319.000	150.000	21.090	35.600	-14.510	PASS	25.867
733.367	11.000	175.000	17.586	35.600	-18.014	PASS	25.217
890.747	292.000	368.000	21.307	35.600	-14.293	PASS	28.364

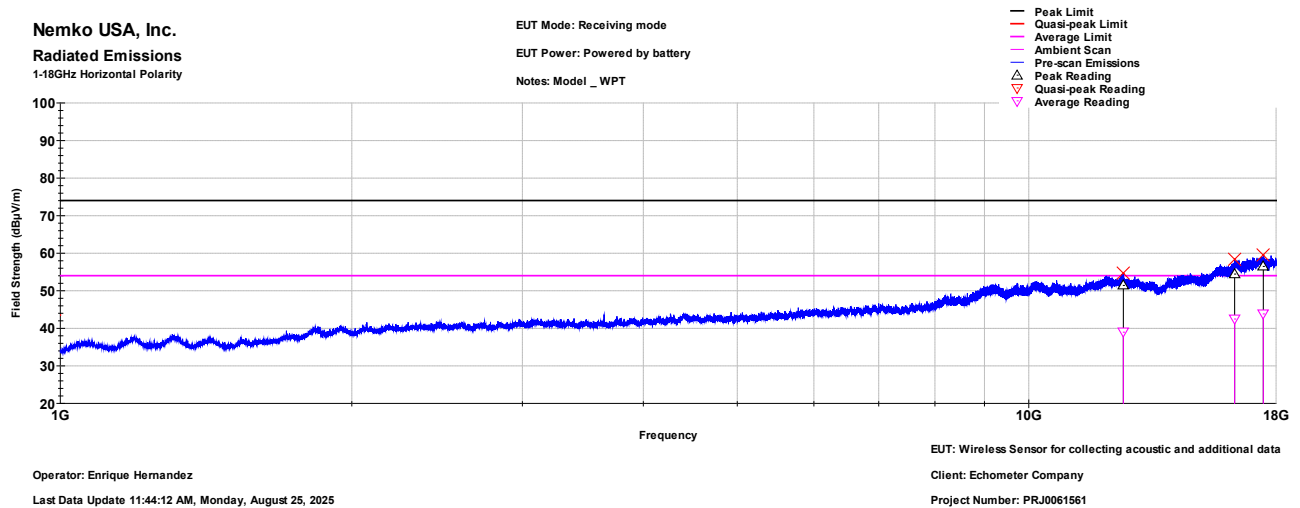
30MHz - 1GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
532.853	139.000	382.000	13.997	35.600	-21.603	PASS	21.686
623.903	292.000	358.000	16.852	35.600	-18.748	PASS	25.526
733.157	23.000	100.000	20.155	35.600	-15.445	PASS	28.122
890.447	212.000	305.000	21.024	35.600	-14.576	PASS	28.505

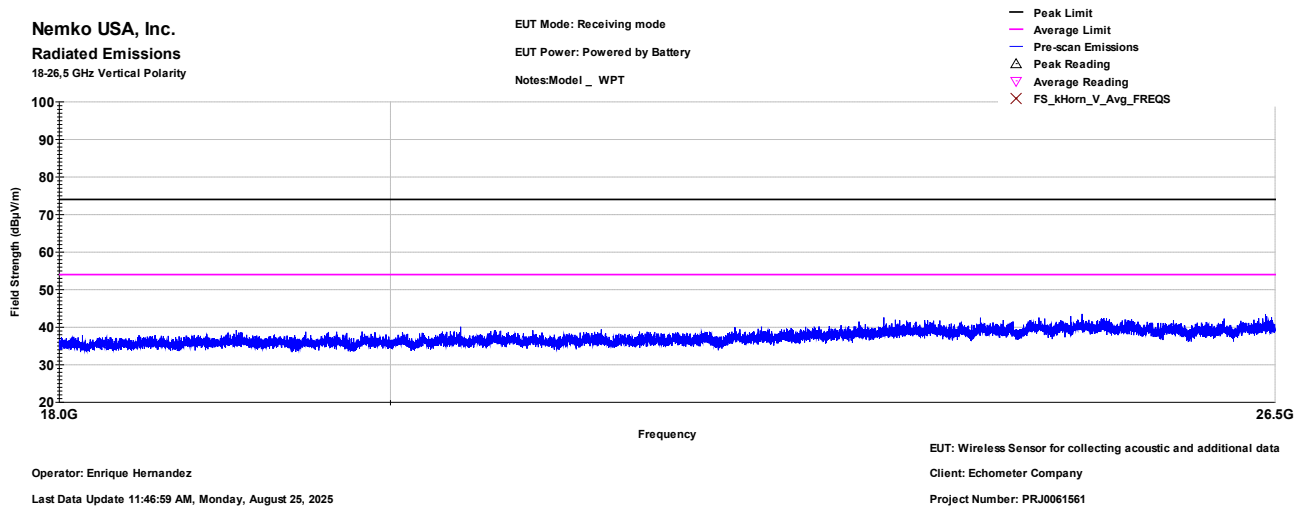
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results
10168.60	279	400	49.762	74.000	-24.238	PASS	37.390	54.000	-16.610	PASS
16867.50	300	139	56.218	74.000	-17.782	PASS	43.369	54.000	-10.631	PASS
17570.83	239	126	55.943	74.000	-18.057	PASS	43.342	54.000	-10.658	PASS

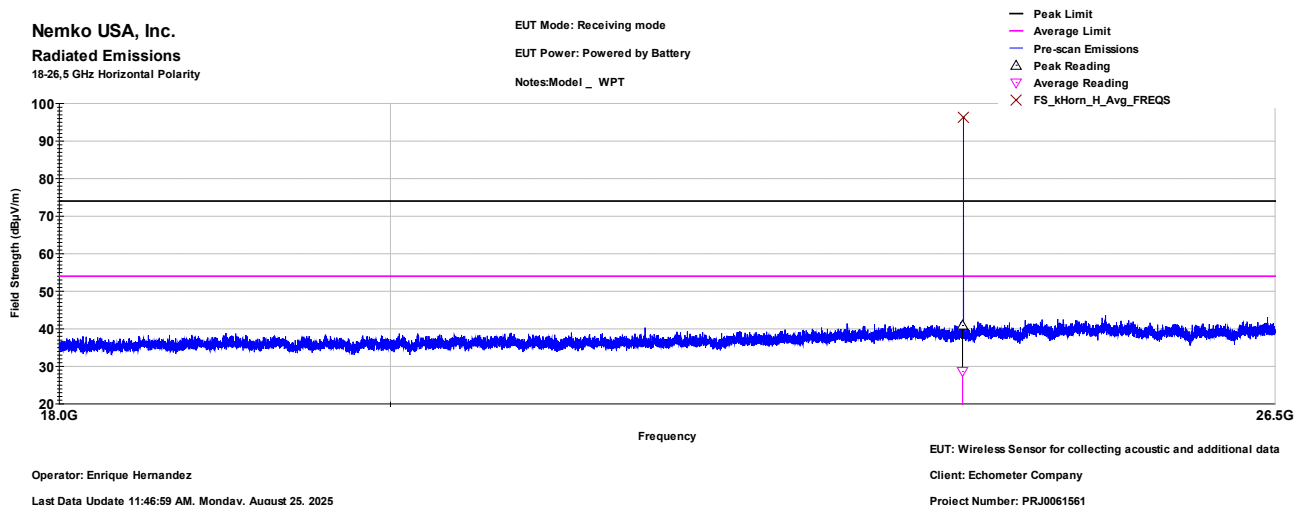
1GHz - 18GHz Horizontal Polarity Measured Emissions Data

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results
12520.50	259	188	51.385	74.000	-22.615	PASS	38.958	54.000	-15.042	PASS
16313.20	239	151	54.416	74.000	-19.584	PASS	42.458	54.000	-11.542	PASS
17466.75	209	151	56.463	74.000	-17.537	PASS	43.813	54.000	-10.187	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Peak Results	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)	Average Results
23992.05	137	100.000	40.871	74.000	-33.129	PASS	28.622	54.000	-25.378	PASS

Model: WRFG200-5k**7.3.22 Radiated Emissions Test Data****7.3.23 Test summary**

Verdict	Pass		
Test date	July 25, 2024	Temperature	23 °C
Test engineer	Enrique Hernandez, EMC Lab Manager	Air pressure	48 mbar
Test location	10m semi anechoic chamber	Relative humidity	988 %

7.3.24 Observations/special notes

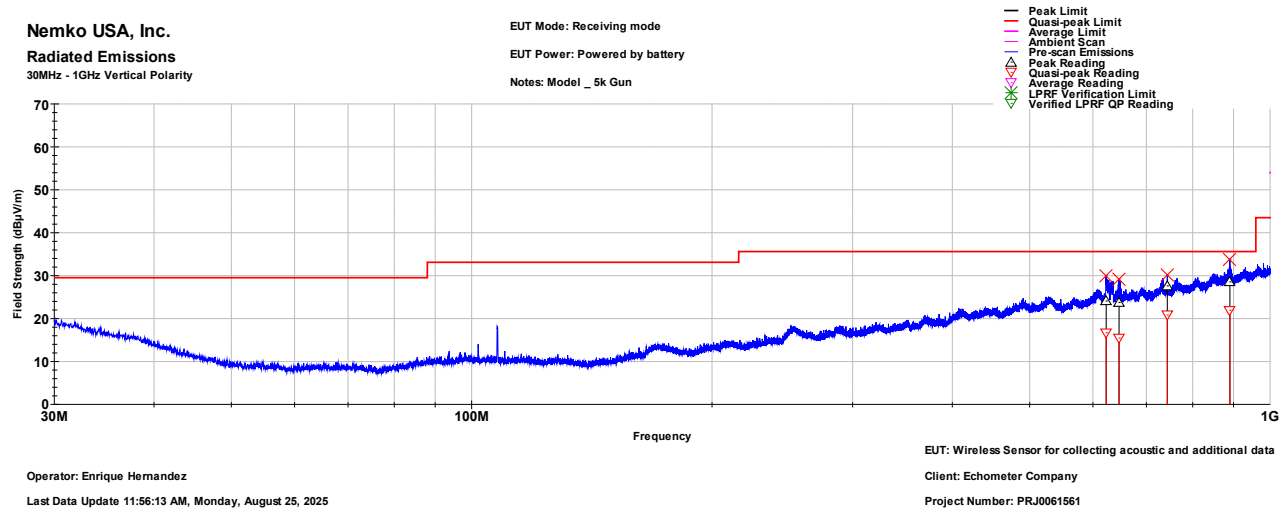
None

7.3.25 Setup details

EUT setup configuration	Table top
Test facility	10 m Semi anechoic chamber
Measuring distance	3 and 10 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

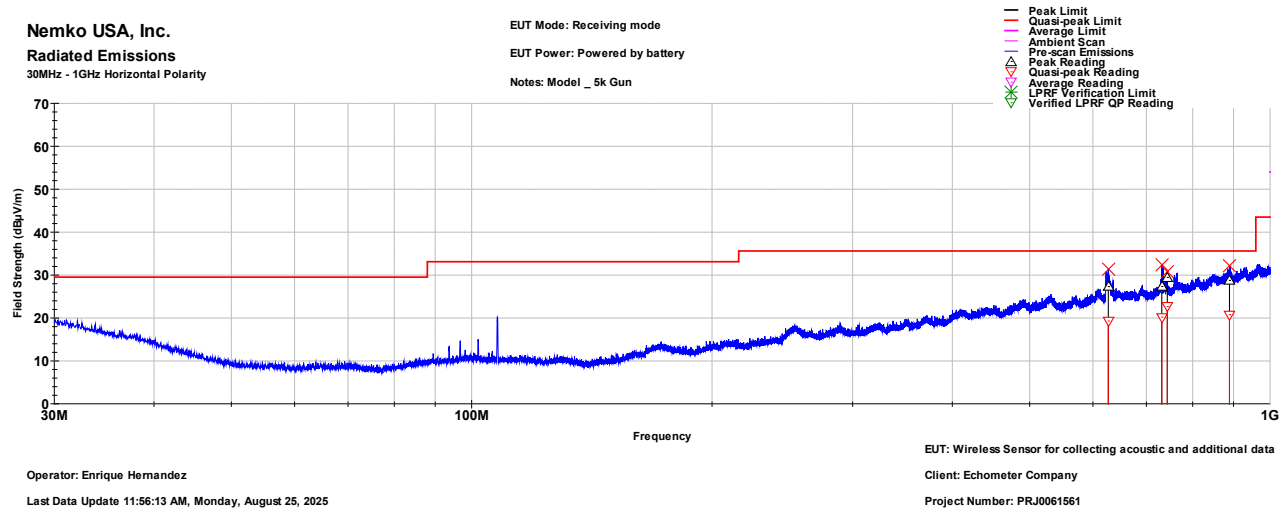
7.3.26 Test data

30MHz - 1GHz Vertical Polarity Measured Emissions Data

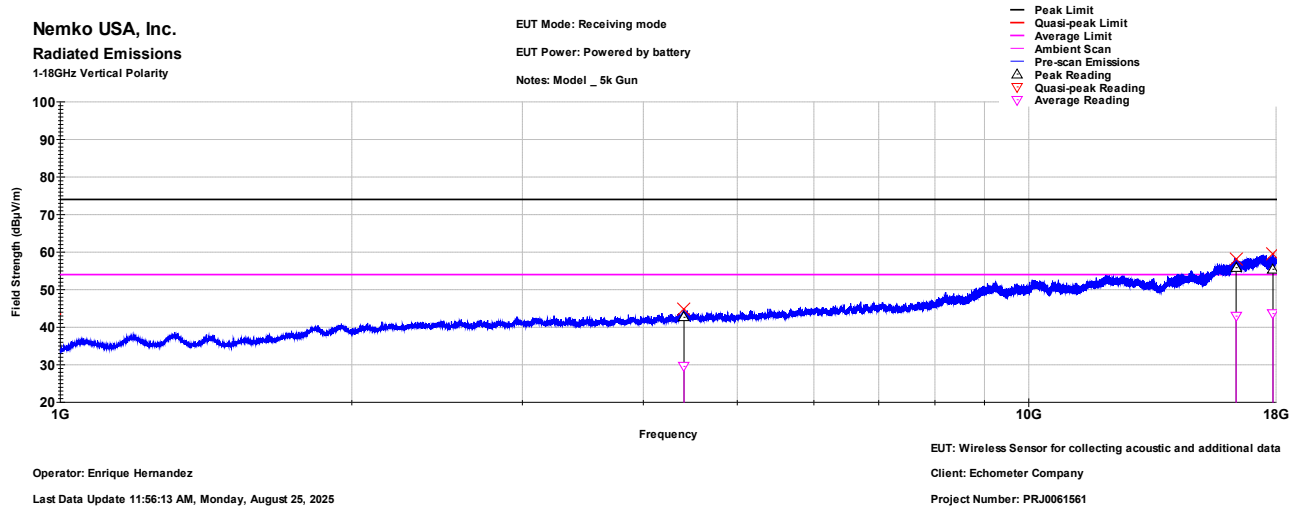


Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
623.513	157.000	150.000	16.676	35.600	-18.924	PASS	24.077
646.943	157.000	335.000	15.429	35.600	-20.171	PASS	23.729
743.597	57.000	205.000	20.818	35.600	-14.782	PASS	27.592
890.687	247.000	205.000	21.929	35.600	-13.671	PASS	28.547

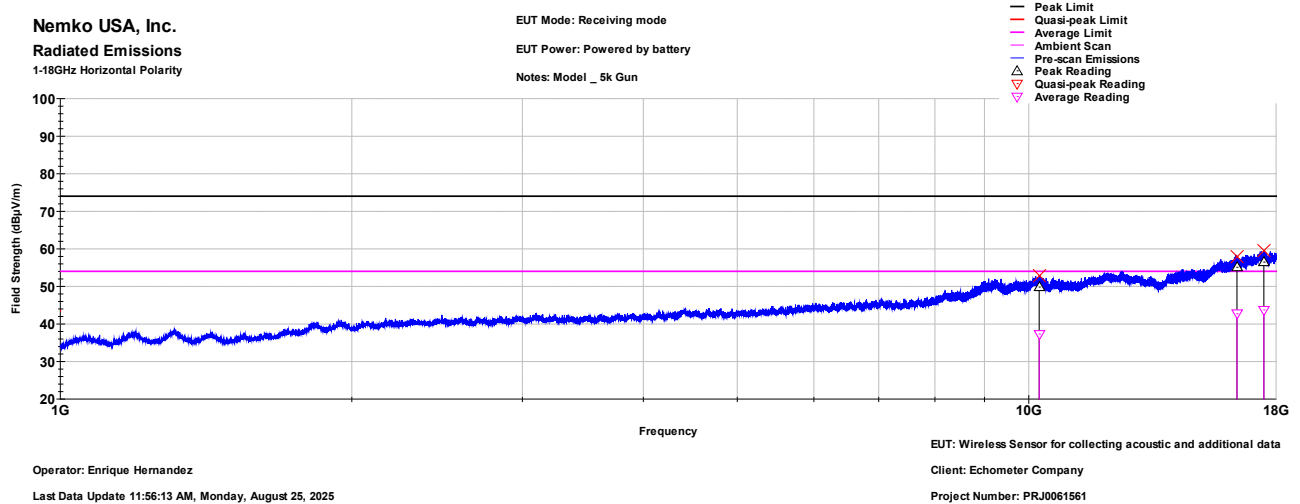
30MHz - 1GHz Horizontal Polarity Measured Emissions Data



Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Quasi-peak Reading (dBμV)	Quasi-peak Limit (dBμV)	Quasi-peak Margin (dB)	Quasi-peak Results	Peak Reading (dBμV)
627.293	41.000	205.000	19.277	35.600	-16.323	PASS	27.290
731.837	33.000	100.000	20.161	35.600	-15.439	PASS	27.322
743.567	57.000	302.000	22.643	35.600	-12.957	PASS	29.438
889.607	248.000	278.000	20.767	35.600	-14.833	PASS	28.746

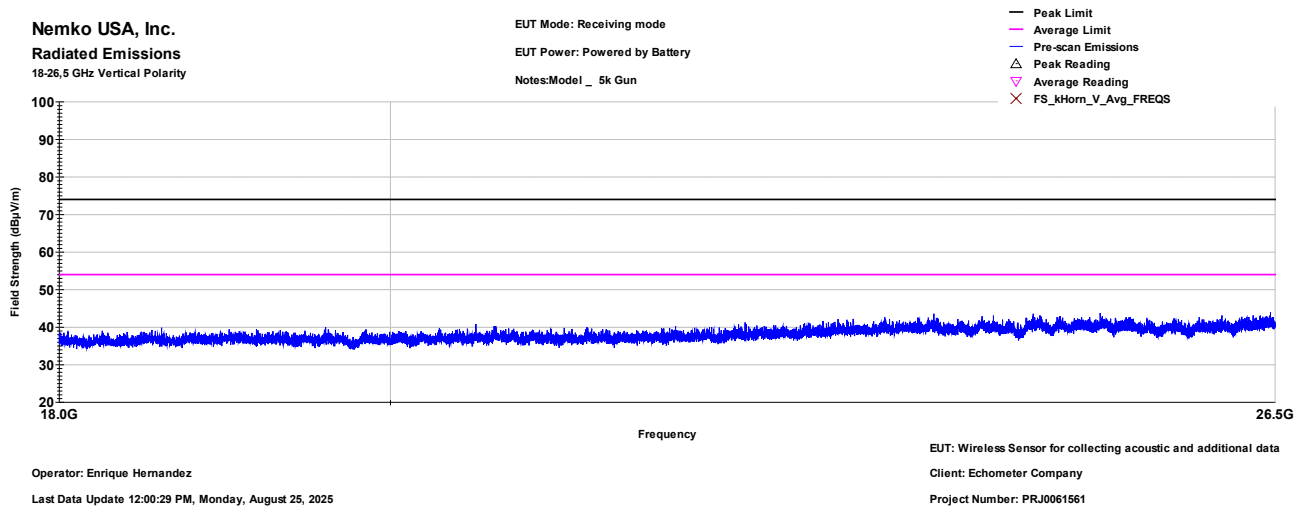
1GHz - 18GHz Vertical Polarity Measured Emissions Data:

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
4405.50	229	364	42.618	74.000	-31.382	PASS	29.556	54.000	-24.444	PASS
16372.00	239	386	55.833	74.000	-18.167	PASS	42.940	54.000	-11.060	PASS
17872.08	219	175	55.407	74.000	-18.593	PASS	43.613	54.000	-10.387	PASS

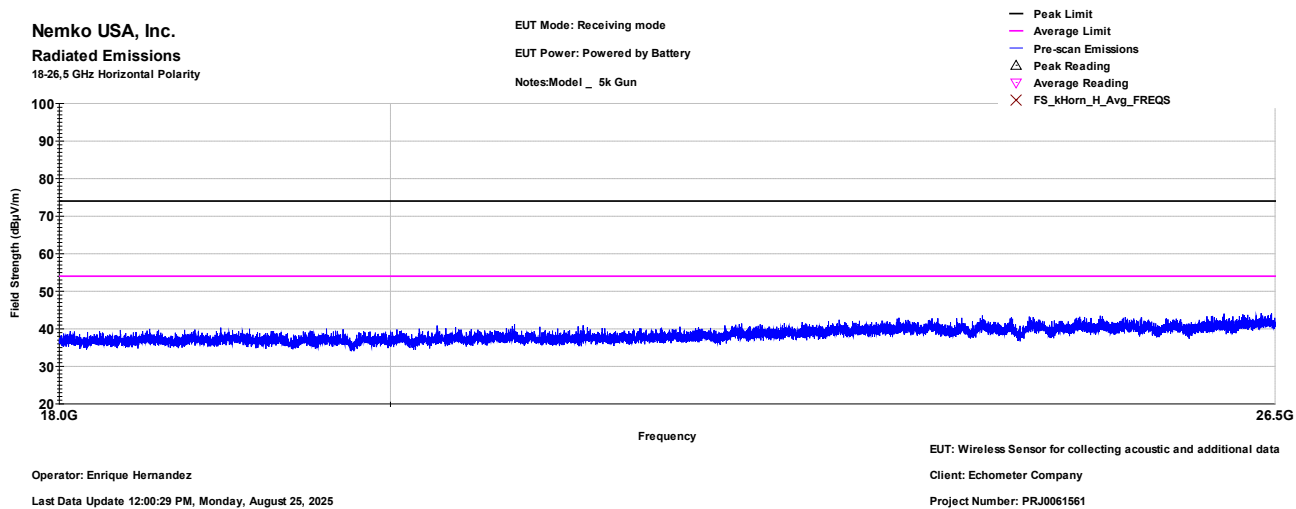
1GHz - 18GHz Horizontal Polarity Measured Emissions Data

Frequency (MHz)	EUT Direction (Degrees)	Antenna Height (cm)	Peak Reading (dBμV)	Peak Limit (dBμV)	Peak Margin (dB)	Peak Results	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)	Average Results
10250.50	69	311	49.814	74.000	-24.186	PASS	37.296	54.000	-16.704	PASS
16403.20	49	386	55.081	74.000	-18.919	PASS	42.701	54.000	-11.299	PASS
17486.25	100	188	56.449	74.000	-17.551	PASS	43.730	54.000	-10.270	PASS

18GHz – 26.5GHz Vertical Polarity Measured Emissions Data



18GHz - 26.5GHz Horizontal Polarity Measured Emissions Data



8.0 Antenna Construction

8.1 Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevent wireless device antennas from being modified by end users.

8.2 Criteria

47 CFR (USA) // IC (Canada)	
Section Reference	Antenna Construction
15.203, 15.247 // RSS-Gen 8.3	Type of Antenna(s) Type of Connector Gain

8.3 Results

Table 8.3.1 Antenna Construction Details
TBD
<p>Manufacturer: Linx Technologies (TE Connectivity)</p> <p>Model/PN: ANT-2.4-CW-RAH</p> <p>Antenna peak gain*: 1.6dBi</p> <p>Antenna Type: Monopole</p> <p>Antenna employs a unique reverse polarity SMA style connector to prevent unauthorized antennas from being substituted.</p> <p>*Provided by antenna manufacturer</p>

User cannot substitute antenna.

Gain is under maximum limit of 6 dBi.

The requirement was satisfied.

9.0 Equipment

9.1 Conducted Measurements

Asset #	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
C414	rosenberger	lu7-022-1000	Cable, RF, SMA-SMA, 1m, DC-26.5GHz	None	8/6/2026
2551	Rohde & Schwarz	FSV3044	Analyzer, Signal, 44 GHz	101602	6/5/2026
1937	Agilent	E4440A - AYZ	PSA , 3 Hz - 26.5 GHz, Opt. AYZ	MY44303298	6/3/2026
2394	Mini-Circuits	VHF-2700+	RF Filter	N/A	7/31/2027
2388	RF-Lambda	RHPF23G08G40	RF Filter	20090700024	8/6/2026
C397	evissaP	eP7101R-132	Cable, RF, SMA-SMA, 11', 2.92mm, DC-40GHz	None	3/1/2026

9.2 Radiated Emissions

Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
Keysight	E4440A-AYZ	PSA Spectrum Analyzer	MY46186204	6/4/2026
Agilent	11713A	Switch Driver	MY44321972	NCR
ETS-Lindgren	3142C	Antenna, Biconilog, 26 MHz-3GHz	49383	4/17/2025
HP	8447D	Preamp, .1-1300MHz	1937A02800	10/22/2026
Miteq	AFS44-00101800-2S-10P-44	Amplifier, 40dB, 100MHz-18GHz	None	1/27/2026
ETS-Lindgren	3117	Antenna, Double Ridged Guide Horn, 1 - 18 GHz	99232	2/24/2027
evissaP	eP7123R-432	Cable, RF, N-N, 36', DC-18GHz	None	2/15/2026
evissaP	eP7123R-384	Cable, RF, N-N, 32', DC-18GHz	None	2/14/2026
evissaP	eP7031R-22FT	Cable, RF, N-N, 22', DC-18GHz	None	3/1/2026
evissaP	eP7031R-30FT	Cable, RF, N-N, 30', DC-18GHz	None	3/1/2026
evissaP	eP7101R-12	Cable, RF, SMA-SMA, 12", 2.92mm, DC-40GHz	None	3/1/2026
TDK	254	Enclosure, Shielded, RFI/EMI, NSA, 3m & 10m, 30MHz - 1 GHz	23177	2/3/2026
evissaP	eP7033R-6FT	Cable, RF, SMA-N, 6', DC-18GHz	None	3/1/2026
evissaP	eP7101R-12	Cable, RF, SMA-SMA, 12", 2.92mm, DC-40GHz	None	3/1/2026
evissaP	eP7033R-6FT	Cable, RF, SMA-N, 6', DC-18GHz	None	3/1/2026
evissaP	eP7033R-6FT	Cable, RF, SMA-N, 6', DC-18GHz	None	3/1/2026

10.0 Measurement Bandwidths

Radiated Emissions Spectrum Analyzer Bandwidth and Measurement Time - Peak Scan				
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6 dB Bandwidth (kHz)	Number of Ranges Used	Measurement Time per Range
0.009	0.15	0.3	2	Multiple Sweeps
0.15	30	9	6	Multiple Sweeps
30	1000	120	2	Multiple 800 mS Sweeps
1000	6000	1000	2	Multiple Sweeps
6000	18000	1000	2	Multiple Sweeps
18000	26500	1000	2	Multiple Sweeps
<p>*Notes:</p> <ol style="list-style-type: none"> 1. The settings above are specifically calculated for the E4440A series of spectrum analyzers, which have 8,000 data points per range. 2. The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz. 3. The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz. 4. The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1000 MHz. 5. The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz. 				

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with ANAB policy. Since Nemko USA, Inc. operates in accordance with ANAB Document Number AR 2250: 2021/06/16, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by ANAB Document Number AR 2250.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at Nemko USA that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of Nemko USA's measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties

Type of Measurement	Frequency Range	Meas. Dist.	Expanded Uncertainty U, dB (k=2)
Mains Conducted Emissions	150 kHz to 30 MHz	N/A	2.82
Telecom Conducted Emissions	150 kHz to 30 MHz	N/A	3.48
Radiated Emissions	30 to 1,000 MHz	10 m	4.82
	1 to 18 GHz	3 m	5.09
	18 to 26 GHz	3 m	4.42
	26 to 40 GHz	0.1 m	5.97

End of Report