FCC & ISED CANADA CERTIFICATION

TEST REPORT

for the

GUIDELINE GEO AB

FCC ID: QLA-GX600MHZHDR

IC ID: 25943-GX600MHZHDR

WLL REPORT# 16749-01 REV 1

Prepared for:

Guideline Geo AB

Lofstroms Allé 6A

SE-172 66 Sundbyberg, Sweden

Prepared By:

Washington Laboratories, Ltd.

4840 Winchester Boulevard

Frederick, Maryland 21703

Testing Certificate AT-1448

FCC & ISED Canada Certification Test Report

for the

Guideline Geo AB

GX600 HDR

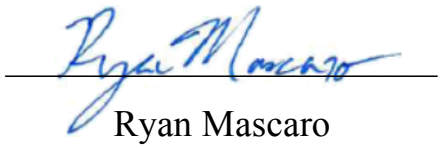
FCC ID: QLA-GX600MHZHDR

ISED ID: 25943-GX600MHZHDR

January 8, 2021

WLL Report# 16749-01 Rev 1

Prepared by:



Ryan Mascaro
RF Test Engineer

Reviewed by:

Steven D. Koster
President

Abstract

This report has been prepared on behalf of Guideline Geo AB to support the attached Application for Equipment Authorization. The test report and application are submitted for an Ultra-Wideband (UWB), Intentional Radiator, Ground Penetrating Radar (GPR) under Part 15.509 of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy and under RSS-210 and RSS-220 of Innovation, Science and Economic Development Canada (ISED). This Certification Test Report documents the test configuration and test results for the Guideline Geo AB GX600 HDR. The information provided on this report is only applicable to device herein documented.

Radiated testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd., located at 4840 Winchester Boulevard, Frederick, MD 21703. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada number is 3035A for Washington Laboratories, Ltd. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory.

The Guideline Geo AB GX600 HDR complies with the limits for an Ultra-Wideband, Ground Penetrating Radar (Transmitter) device under FCC Part 15.509 and Innovation, Science and Economic Development Canada (ISED) RSS-210 and RSS-220.

Revision History	Description of Change	Date
Rev 0	Initial Release	January 8, 2021
Rev 1	Implement ACB Comments	February 12, 2021

Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Compliance Statement

The Guideline Geo AB GX600 HDR complies with the requirements for an Ultra-Wideband (UWB), Intentional Radiator, Ground Penetrating Radar under Part 15.509 and ISED Canada RSS-210/RSS-220.

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed in accordance with the 2014 version of ANSI C63.10. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

The table below shows the results of testing for compliance with an Ultra-Wideband (UWB) Ground Penetrating Radar. Full test results are shown in subsequent sub-sections.

Table 1: Test Summary Table

FCC Rule Part	IC Rule Part	Description	Result
15.509	RSS-220 (v.2018)	Radiated Emissions	Pass

1.3 Contract Information

Customer:	Guideline Geo AB
Purchase Order Number:	Int'l Wire Transfer - 50% Advance deposit
Quotation Number:	72211

1.4 Test and Support Personnel

Washington Laboratories, LTD	Ryan Mascaro
Customer Representative	Johan Friborg

2 Test Results

2.1 Radiated Emissions

FCC Part: §15.509, §15.209 (RSS-210/220)

Test Arrangement: Table-top

Test Date(s): 12/16/2020 and 12/28/2020

Test Engineer: Ryan Mascaro

2.1.1 Requirement

The EUT must comply with the requirements of FCC §15.509(d). The radiated emissions above 960 MHz, from a device operating under the provisions of this section, shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency in MHz	EIRP in dBm
960-1610	-65.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3

Radiated emissions at or below 960 MHz, from a device operating under the provisions of the above-named section, shall not exceed the following limits (FCC §15.209):

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

The EUT must also comply with the requirements for radiated emissions that fall within the GPS restricted bands, a defined in FCC §15.509(e). Emissions from an UWB transmitter operating under the provisions of this section shall not exceed the following average limits when as measured when using a resolution bandwidth of no less than 1kHz:

Frequency in MHz	EIRP in dBm
1164-1240	-75.3
1559-1610	-75.3

2.1.2 Test Procedure

The EUT was placed on an 80 cm high 1 X 1.5 meters non-conductive motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable 360˚. Biconical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The output of the antenna was connected to the input of the spectrum analyzer and the emissions in the frequency range of 30 MHz to 12 GHz were investigated. Peripherals, if applicable, shall be placed on the table in accordance with ANSI C63.4. Both the horizontal and vertical field components were measured. The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak, peak, and/or average as appropriate. All measurements were made at a distance of 3m.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30 MHz to 960 MHz	120 kHz	1 MHz
960 MHz to 12 GHz	1 MHz	3 MHz
1164 MHz to 1240 MHz	1 kHz	3 kHz
1559 MHz to 1610 MHz	1 kHz	3 kHz

2.1.3 Test Data

Table 2 and Table 3 provide the radiated emissions test data, related to the transmitter.

Table 4 provides the digital unintentional emissions test data, not related to the transmitter.

ANSI C63.10 (10.2.2) specifies the use of a bed of anechoic material under the EUT, during test. This application can be seen in Figure 3, of this report.

Table 2: Radiated Emissions Test Data, Transmitter – §15.509(d)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector
60.30	V	180	1.8	42.3	-17.6	17.2	100	-15.3	QP
77.80	V	0	2.2	33	-16.6	6.6	100	-23.6	QP
235.30	V	180	1.8	51.4	-12.7	86.1	200	-7.3	QP
309.66	V	180	1.7	45.3	-10.2	56.9	200	-10.9	QP
438.71	V	90	1.5	32.2	-6.4	19.4	200	-20.3	QP
506.52	V	180	2.0	28.7	-5.1	15.1	200	-22.4	QP
692.76	V	90	1.6	25	-2.9	12.8	200	-23.9	QP
805.12	V	270	1.5	32.4	-0.8	37.9	200	-14.4	QP
77.49	H	270	1.6	47.5	-16.9	33.8	100	-9.4	QP
222.48	H	270	1.9	41.7	-13.7	25.1	200	-18.0	QP
277.47	H	0	1.5	42.9	-10.8	40.1	200	-13.9	QP
355.00	H	90	1.4	35.7	-9.0	21.6	200	-19.3	QP
501.83	H	180	1.4	30.2	-5.4	17.3	200	-21.3	QP
662.13	H	90	1.5	26.7	-3.2	15.0	200	-22.5	QP
799.93	H	180	1.4	36.9	-1.2	60.7	200	-10.4	QP
821.11	H	0	1.3	30.5	-1	29.7	200	-16.6	QP
1054.50	V	270	1.8	36.0	-8.9	22.6	31.5	-2.8	AVG
1102.40	V	90	1.7	34.1	-8.7	18.6	31.5	-4.6	AVG
1599.80	V	180	1.5	16.6	-6.1	3.3	10.0	-9.5	AVG
2079.73	V	0	1.4	36.9	-2.3	53.7	157.7	-9.4	AVG
2239.84	V	180	1.6	37.5	-2.4	56.7	157.7	-8.9	AVG
1054.50	H	270	1.7	35.9	-8.6	23.1	31.5	-2.7	AVG
1102.40	H	180	1.5	34.5	-8.4	20.2	31.5	-3.9	AVG
1599.80	H	180	1.6	15.9	-5.8	3.2	10.0	-9.9	AVG
2079.73	H	90	1.7	36.2	-1.9	52.0	157.7	-9.6	AVG
2239.84	H	90	1.5	36.4	-2.0	52.5	157.7	-9.5	AVG

Table 3: Radiated Emission Test Data, Transmitter – §15.509(e) (GPS Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector
1166.00	V	180.0	1.5	16.9	-8.4	2.7	10.0	-11.5	AVG
1190.00	V	270.0	1.6	16.8	-8.3	2.6	10.0	-11.6	AVG
1220.00	V	180.0	1.7	15.6	-8.2	2.3	10.0	-12.6	AVG
1230.00	V	0.0	1.5	15.3	-8.1	2.3	10.0	-12.8	AVG
1562.00	V	270.0	1.5	15.8	-6.8	2.8	10.0	-11.0	AVG
1587.00	V	180.0	1.5	15.0	-6.6	2.6	10.0	-11.6	AVG
1600.00	V	270.0	1.5	15.3	-6.6	2.7	10.0	-11.2	AVG
1608.00	V	270.0	1.6	14.2	-6.5	2.4	10.0	-12.3	AVG
1166.00	H	270.0	1.4	17.1	-8.4	2.7	10.0	-11.3	AVG
1190.00	H	0.0	1.6	16.9	-8.3	2.7	10.0	-11.4	AVG
1220.00	H	90.0	1.8	15.8	-8.2	2.4	10.0	-12.4	AVG
1230.00	H	0.0	1.5	15.7	-8.1	2.4	10.0	-12.4	AVG
1562.00	H	270.0	1.5	15.9	-6.8	2.9	10.0	-10.9	AVG
1587.00	H	270.0	1.4	15.6	-6.6	2.8	10.0	-11.0	AVG
1600.00	H	270.0	1.7	15.7	-6.6	2.9	10.0	-10.9	AVG
1608.00	H	180.0	1.5	14.8	-6.5	2.6	10.0	-11.7	AVG

Figure 1 and Figure 2 provide plots of the GPS band f.s. measurements, in accordance with Per KDB Pub. 393764 (Answer 6).

Figure 1: Transmitter Plots – GPS Lower Band

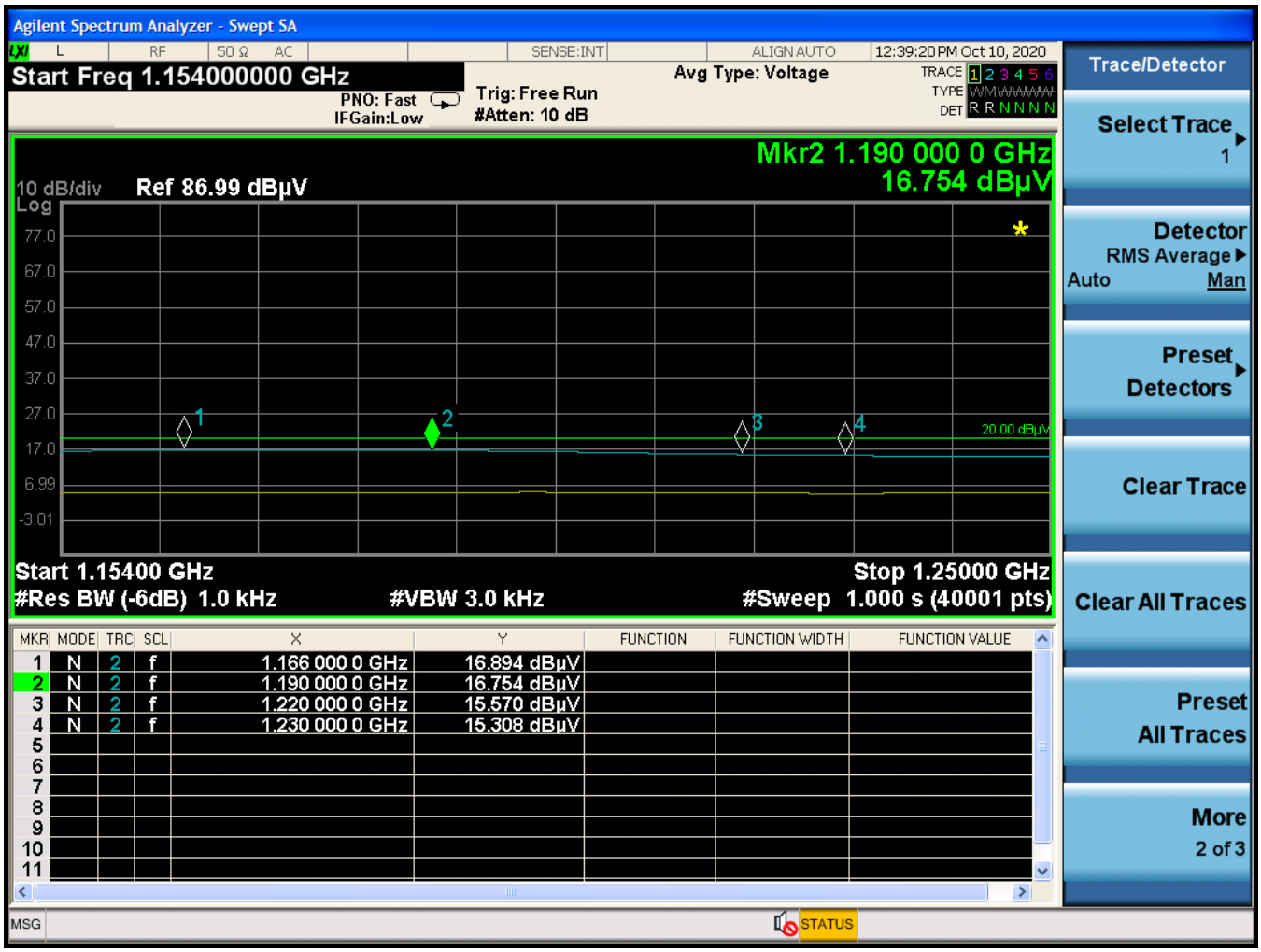


Figure 2: Transmitter Plots – GPS Upper Band

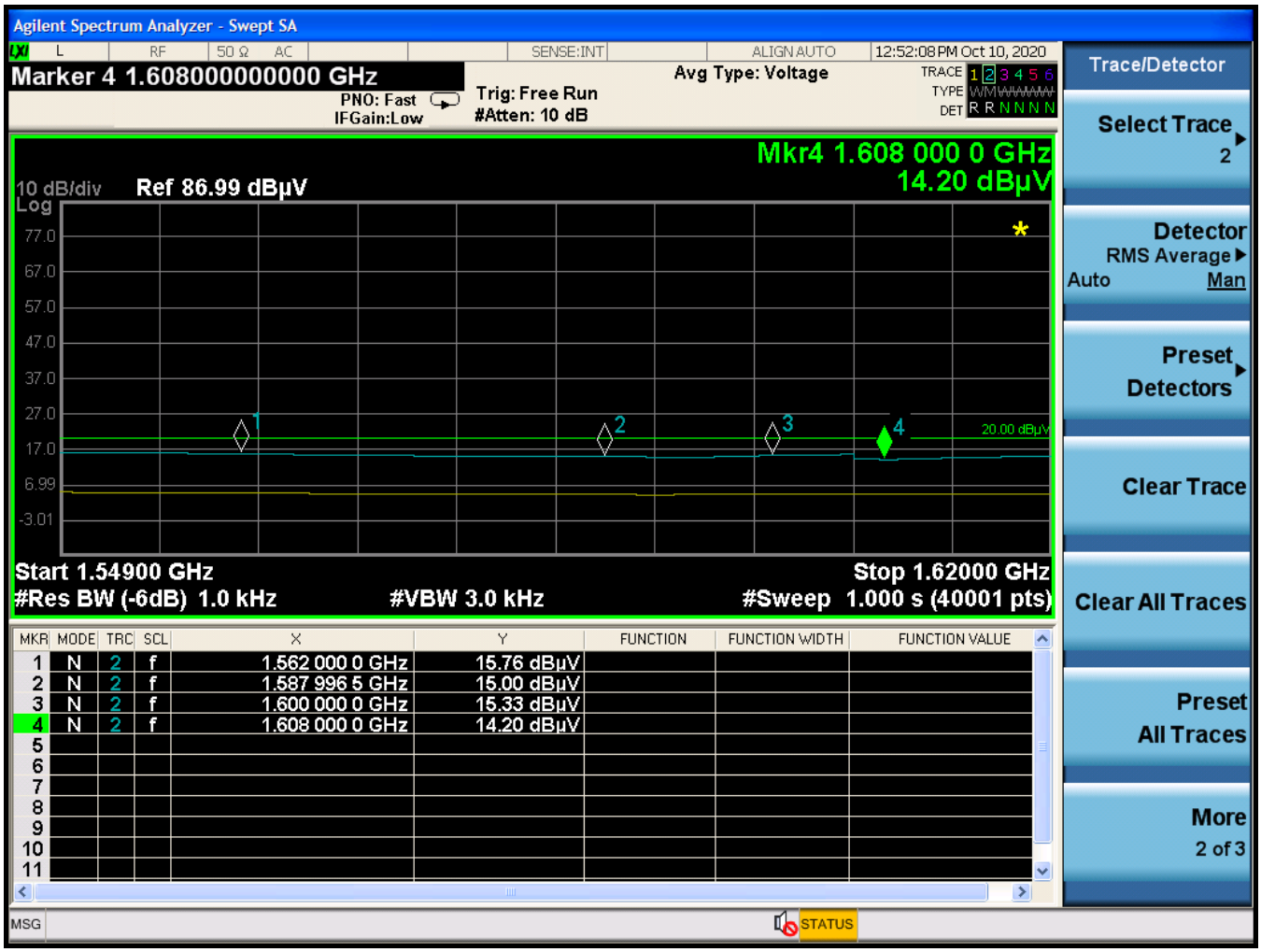


Table 4: Radiated Emission Test Data, Digital Unintentional – §15.209

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector
50.00	V	90.0	2.0	37.2	-16.8	10.4	100.0	-19.7	QP
75.00	V	180.0	1.2	39.5	-16.8	13.7	100.0	-17.2	QP
160.00	V	180.0	1.6	37.1	-12.8	16.5	150.0	-19.2	QP
180.00	V	90.0	2.0	39.2	-13.5	19.2	150.0	-17.9	QP
312.50	V	270.0	1.9	32.6	-10.4	12.9	200.0	-23.8	QP
960.00	V	0.0	1.5	31.5	0.5	39.7	200.0	-14.0	QP
50.00	H	90.0	2.1	32.5	-16.8	6.1	100.0	-24.3	QP
75.00	H	90.0	2.1	33.7	-16.8	7.1	100.0	-23.0	QP
160.00	H	0.0	1.8	36.0	-12.8	14.5	150.0	-20.3	QP
180.00	H	180.0	1.6	42.5	-13.5	28.1	150.0	-14.6	QP
312.50	H	180.0	1.6	31.4	-10.4	11.2	200.0	-25.0	QP
960.00	H	180.0	1.8	34.4	0.5	55.5	200.0	-11.1	QP
1047.00	V	270.0	1.7	63.3	-9.4	493.0	5000.0	-20.1	Peak
1047.00	V	270.0	1.7	37.9	-9.4	26.5	500.0	-25.5	AVG
1119.90	V	180.0	1.4	69.8	-8.8	1126.1	5000.0	-12.9	Peak
1119.90	V	180.0	1.4	37.7	-8.8	28.0	500.0	-25.0	AVG
1439.80	V	180.0	1.6	53.8	-7.2	213.8	5000.0	-27.4	Peak
1439.80	V	180.0	1.6	41.3	-7.2	51.0	500.0	-19.8	AVG
1759.93	V	270.0	1.6	54.8	-5.9	279.2	5000.0	-25.1	Peak
1759.93	V	270.0	1.6	48.6	-5.9	137.2	500.0	-11.2	AVG
2500.00	V	270.0	1.7	50.4	-1.3	283.1	5000.0	-24.9	Peak
2500.00	V	270.0	1.7	36.5	-1.3	57.0	500.0	-18.9	AVG
10700.00	V	180.0	1.4	50.4	16.7	2277.5	5000.0	-6.8	Peak
10700.00	V	180.0	1.4	32.8	16.7	300.2	500.0	-4.4	AVG
1047.00	H	180.0	1.8	53.4	-9.4	158.4	5000.0	-30.0	Peak
1047.00	H	180.0	1.8	38.1	-9.4	27.2	500.0	-25.3	AVG
1119.90	H	270.0	1.5	50.1	-8.8	116.6	5000.0	-32.6	Peak
1119.90	H	270.0	1.5	32.2	-8.8	14.8	500.0	-30.5	AVG
1439.80	H	180.0	1.6	51.9	-7.2	172.8	5000.0	-29.2	Peak
1439.80	H	180.0	1.6	39.4	-7.2	41.0	500.0	-21.7	AVG
1759.93	H	270.0	1.6	55.3	-5.9	296.4	5000.0	-24.5	Peak
1759.93	H	270.0	1.6	46.3	-5.9	104.9	500.0	-13.6	AVG
2500.00	H	180.0	1.7	51.0	-1.3	304.4	5000.0	-24.3	Peak
2500.00	H	180.0	1.7	36.4	-1.3	56.9	500.0	-18.9	AVG
10700.00	H	270.0	1.6	50.2	16.7	2225.7	5000.0	-7.0	Peak
10700.00	H	270.0	1.6	32.8	16.7	299.5	500.0	-4.5	AVG

2.2 AC Conducted Emissions

FCC Part: N/A / IC: RSS-GEN

Test Arrangement: Table-top

Test Date(s): 10/12/2020

Test Engineer: Ryan Mascaro

FCC Class A Compliance Limits		
Frequency	**Quasi-peak**	**Average**
150 kHz – 500 kHz	79 dBµV	66 dBµV
500 kHz – 30 MHz	73 dBµV	60 dBµV

2.2.1 Test Procedure

The EUT's battery charger was placed on an 80 cm high 1 X 1.5 m non-conductive table above a ground plane. Power to the battery charger was provided through a Solar Corporation 50 Ω/50 µH Line Impedance Stabilization Network bonded to a 3 X 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Any peripherals were placed on the table in accordance with ANSI C63.4-2003. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak, peak, or average as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth. For average measurements, the post-detector filter was set to 10 Hz.

The conducted emissions level to be compared to the FCC limit is calculated as shown in the following example.

Example:

Spectrum Analyzer Voltage: VdBµV

LISN Correction Factor: LISN dB

Cable Correction Factor: CF dB

Electric Field: EdBµV = V dBµV + LISN dB + CF dB

2.2.2 Test Data

The EUT's battery charger complies with the Class A Conducted Emissions requirements.

The EUT is battery operated and cannot transmit and charge the battery at the same time.

Table 5 provides the test results for phase and neutral line, AC power conducted emissions.

Table 5: Conducted Emissions Data, Non-Transmitter

NEUTRAL										
Frequency (MHz)	**Level QP (dBµV)**	**Level AVG (dBµV)**	**Cable Loss (dB)**	**LISN Corr (dB)**	**Level QP Corr (dBµV)**	**Level Corr Avg (dBµV)**	**Limit QP (dBµV)**	**Limit AVG (dBµV)**	**Margin QP (dB)**	**Margin AVG (dB)**
0.160	53.6	46.7	10.2	0.6	64.4	57.5	79.0	66.0	-14.6	-8.5
0.188	51.0	44.2	10.2	1.1	62.2	55.4	79.0	66.0	-16.8	-10.6
0.266	44.6	38.0	10.2	0.9	55.7	49.0	79.0	66.0	-23.3	-17.0
0.381	38.2	31.6	10.2	0.9	49.3	42.6	79.0	66.0	-29.7	-23.4
0.726	29.2	22.0	10.3	0.8	40.3	33.1	73.0	60.0	-32.7	-26.9
1.050	26.9	18.9	10.3	0.8	38.0	30.0	73.0	60.0	-35.0	-30.0
8.269	15.8	5.5	11.0	1.7	28.5	18.2	73.0	60.0	-44.5	-41.8
24.715	18.7	5.7	11.6	3.3	33.7	20.7	73.0	60.0	-39.3	-39.3
PHASE / L1										
Frequency (MHz)	**Level QP (dBµV)**	**Level AVG (dBµV)**	**Cable Loss (dB)**	**LISN Corr (dB)**	**Level QP Corr (dBµV)**	**Level Corr Avg (dBµV)**	**Limit QP (dBµV)**	**Limit AVG (dBµV)**	**Margin QP (dB)**	**Margin AVG (dB)**
0.186	51.1	44.3	10.2	1.3	62.6	55.8	79.0	66.0	-16.4	-10.2
0.245	46.1	39.2	10.2	1.2	57.5	50.5	79.0	66.0	-21.5	-15.5
0.392	38.6	31.7	10.2	1.0	49.8	42.9	79.0	66.0	-29.2	-23.1
0.852	27.7	20.9	10.3	0.9	38.9	32.1	73.0	60.0	-34.1	-27.9
4.195	17.1	10.8	10.5	1.2	28.8	22.5	73.0	60.0	-44.2	-37.5
5.770	16.0	8.0	10.8	1.6	28.4	20.4	73.0	60.0	-44.6	-39.6
16.991	25.1	18.8	11.4	3.2	39.7	33.4	73.0	60.0	-33.3	-26.6
25.254	45.0	38.1	11.7	4.1	60.8	53.8	73.0	60.0	-12.2	-6.2

2.3 Transmitter Occupied Bandwidth

2.3.1 Test Procedure

The UWB transmitter was measured to show the intentional bandwidth. The fundamental radio portion of the EUT is designed to operate across the entire frequency range of 200 MHz to 800 MHz.

The frequency range of 30 MHz to 1000 MHz was investigated.

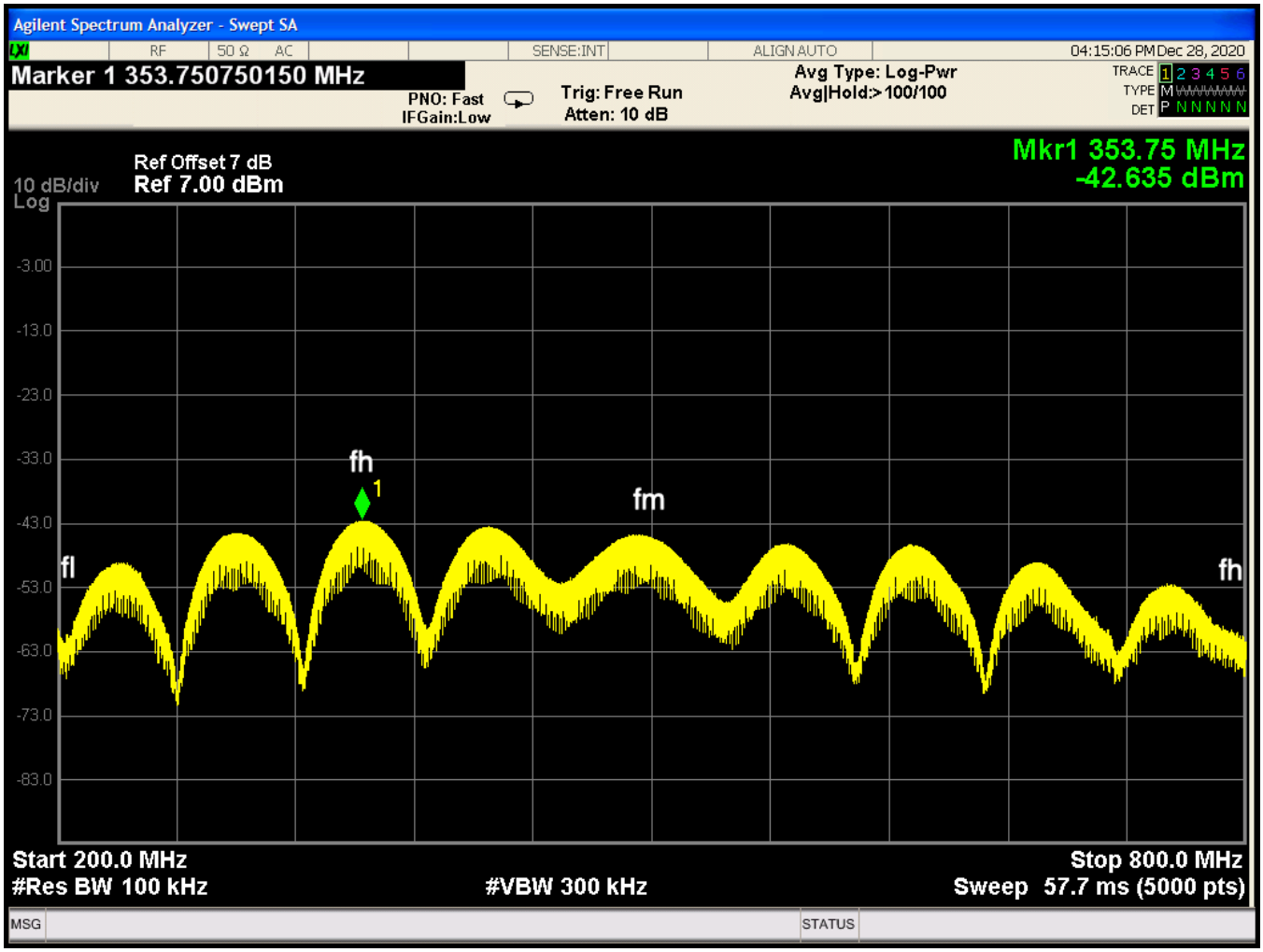
All emissions below 200 MHz are greater than 10 dBc down.

All emissions above 800 MHz are greater than 10 dBc down.

Figure 3 provides a sample of the transmitter bandwidth.

This measurement was performed the test site using the supplied radiating array.

Figure 3: OBW Plot 1



3 Equipment Under Test

3.1 EUT Identification & Description

Table 6: Device Summary

Manufacturer:	Guideline Geo AB
FCC ID:	QLA-GX600MHZHDR
ISED ID:	25943-GX600MHZHDR
Model:	GX600 HDR
Serial Number of Unit Tested	23422001 (Rev.1A)
FCC Rule Parts:	§15.509
ISED Rule Parts:	RSS-210/220
Device Emissions Class	B
Frequency Range:	200 – 800 MHz
Maximum Output Power:	Less than -10 dBm
Modulation:	Impulse Excitation (UWB)
Transmitter Occupied Bandwidth:	600 MHz
FCC Emission Designator:	600MP0N
ISED Emissions Designators:	600MP0N
Keying:	N/A
Type of Information:	N/A
Number of Channels:	N/A
Power Output Level	Fixed
Antenna Connector	Internal, Soldered
Antenna Type	Resistively loaded bow-tie antenna. Guideline Geo, 13-002348
Interface Cables:	Ethernet
Maximum Data Rate	N/A
Power Source & Voltage:	Battery: 12V

The Guideline Geo AB GX600 HDR is an UWB, Ground Penetrating Radar device, used for detailed object mapping of the subsurface. Typical application areas include construction, infrastructure and archaeological purposes.

3.2 Test Configuration

The GX600 HDR was configured in a powered on, steady state.

Table 7: System Configuration List

Name / Description	Model Number	Part Number	Serial Number	Revision
GX600 HDR	21-005600	N/A	23422001	1A
Batteries (2)	21-005000	N/A	14186005 22526001	1A

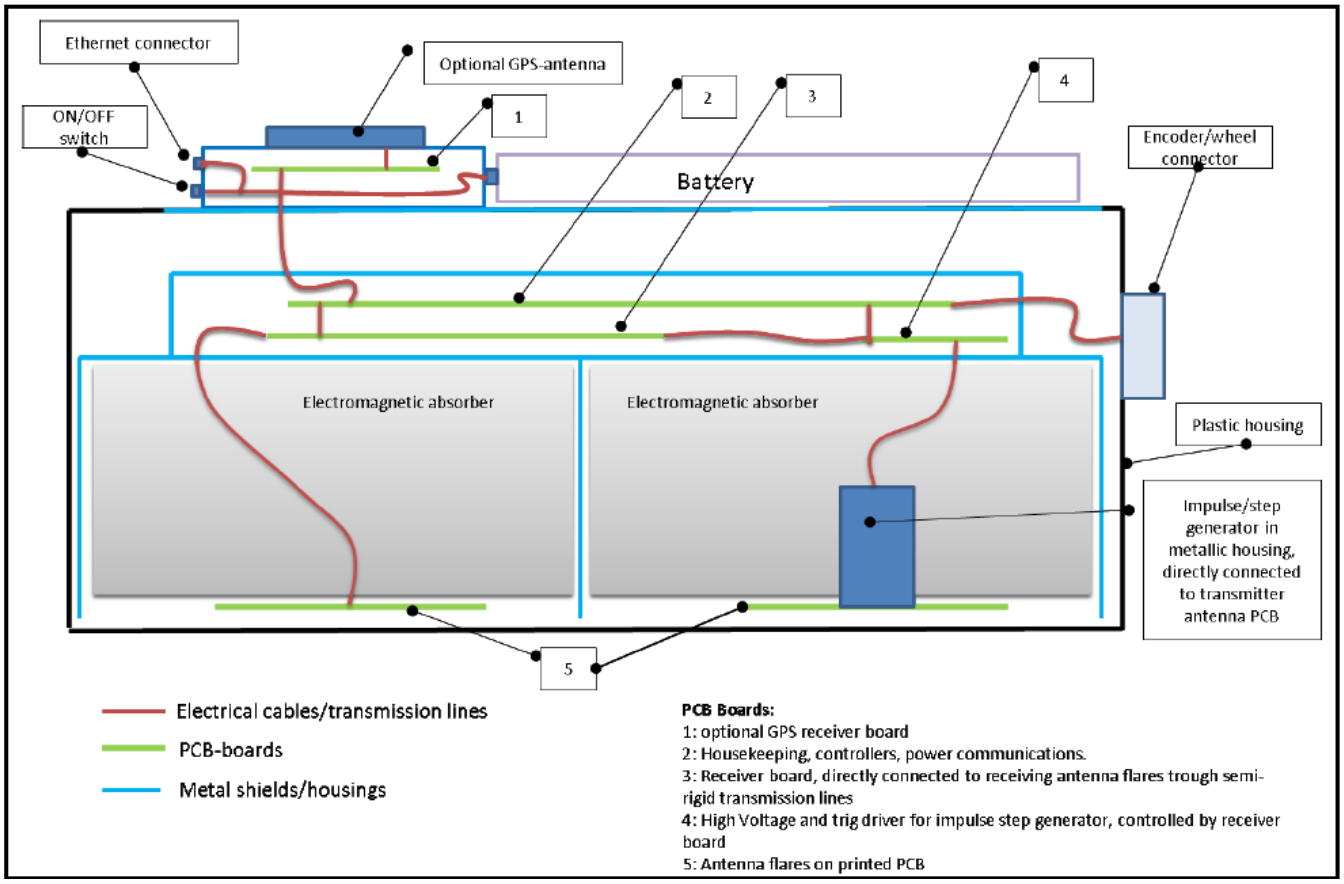
Table 8: Support Equipment

Item	Model/Part Number	Serial Number
N/A	N/A	N/A

Table 9: Cable Configuration

Port Identification	Type/Reason	Cable Length	Shielded (Y/N)	Termination Point
Battery Connection	Connection to EUT	N/A	N/A	Power Connector
Ethernet	LAN	< 3m	No	EUT Comms.

Figure 4: EUT Simple Block Diagram



3.3 Testing Algorithm

The GX600 HDR was tested while transmitting, for radiated measurements.

The EUT cannot operate without a battery.

The EUT cannot operate and charge the battery at the same time.

Worst cast emission levels are provided in the test results data.

3.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Frederick, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada number is 3035A for Washington Laboratories, Ltd. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

3.5 Measurements

3.5.1 References

ANSI C63.2 (Jan-2016) Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 (Jan 2014) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ANSI C63.10 (Jun 2013) American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

ANSI C63.26 (Dec 2015) American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

3.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

Where uc = standard uncertainty
a, b, c,.. = individual uncertainty elements
Diva, b, c = the individual uncertainty element divisor based on the probability distribution
Divisor = 1.732 for rectangular distribution
Divisor = 2 for normal distribution
Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where:
U = expanded uncertainty
k = coverage factor
k ≤ 2 for 95% coverage (ANSI/NCSL Z540-2 Annex G)
uc = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 10 below.

Table 10: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	±2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	±4.55 dB

4 Test Configurations

Figure 5: Radiated Emissions Test Setup, Front View

Figure 6: Radiated Emissions Test Setup, Rear View

Figure 7: Conducted Emissions Test Setup, Front View

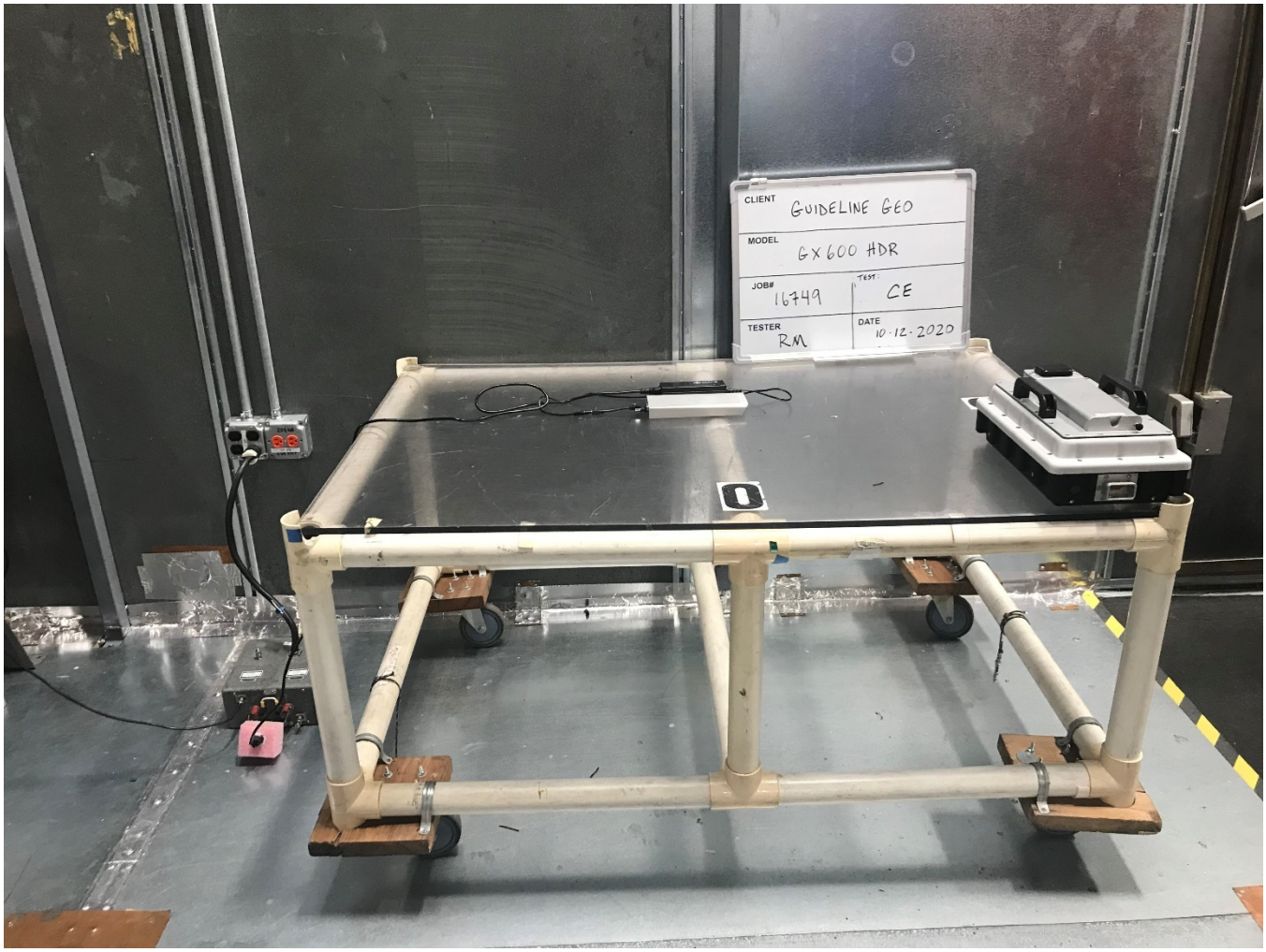


Figure 8: Conducted Emissions Test Setup, Side View

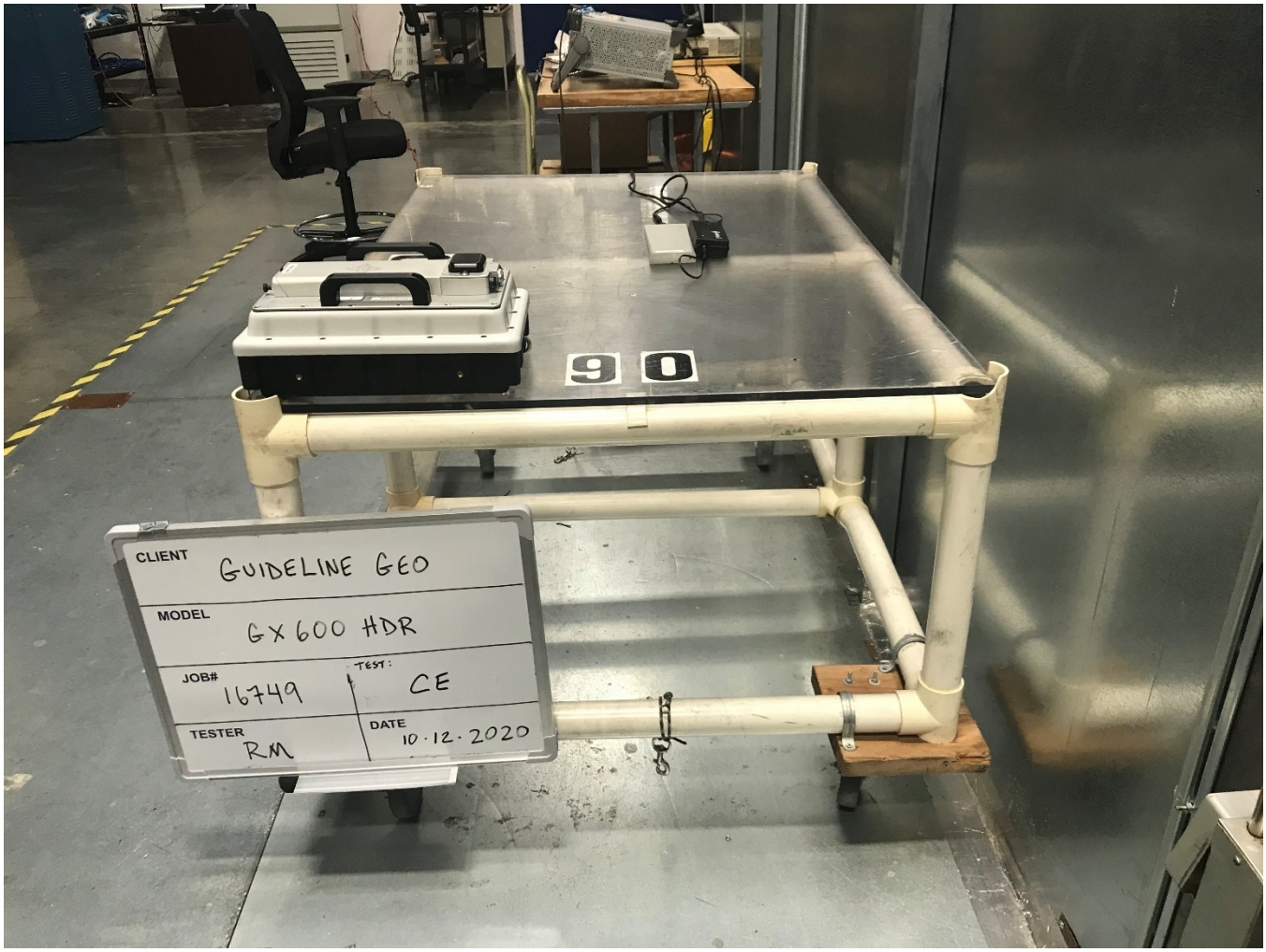
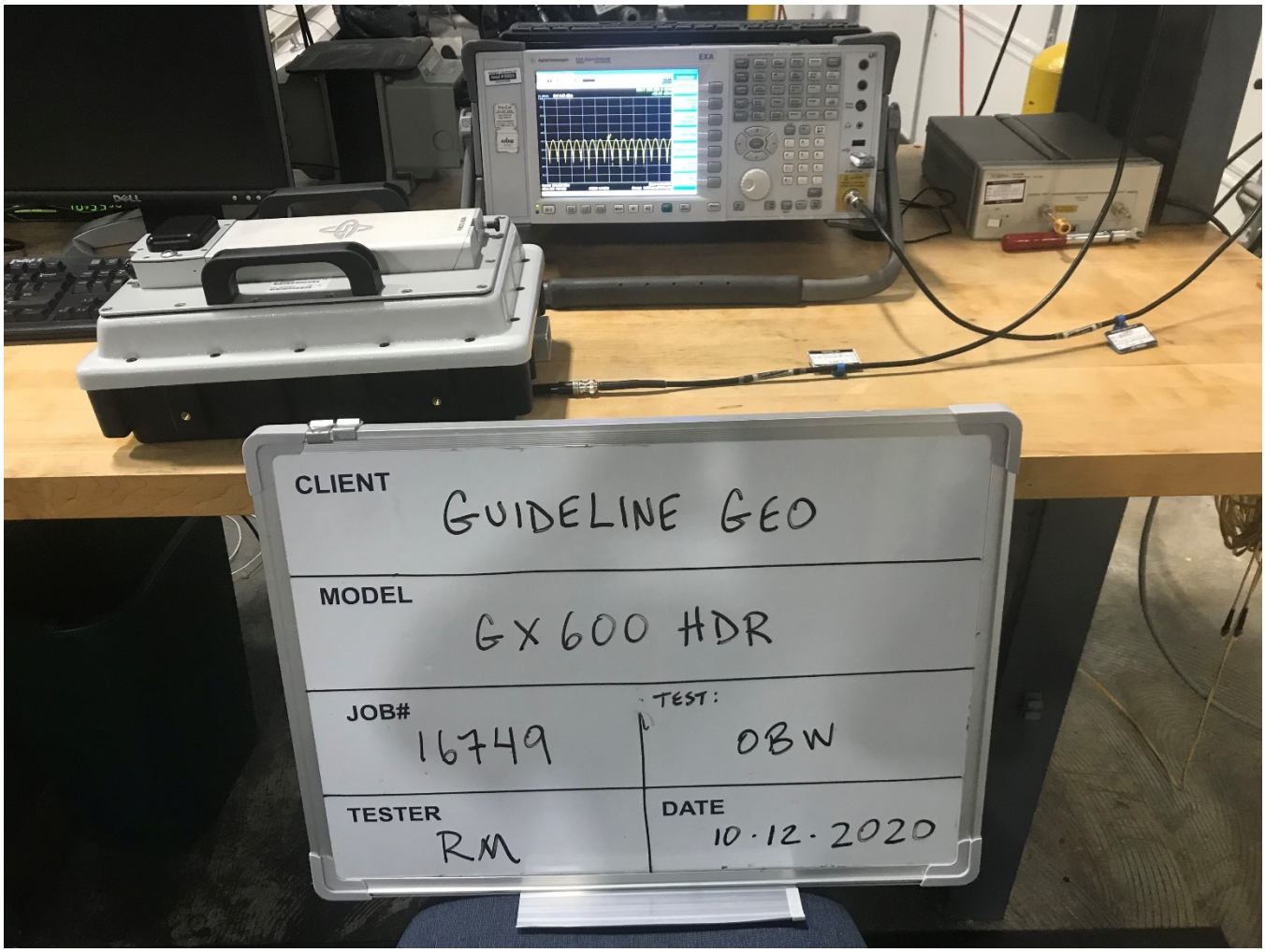


Figure 9: Benchtop Nearfield Emissions Test Setup



5 Test Equipment

Table 11 shows a list of the test equipment used for measurements along with the calibration information.

Table 11: Test Equipment List

Test Name: **Radiated Emissions**			Test Date: **12/28/2020**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
00823	AGILENT	N9010A, SA	5/7/2021
00276	ELECTRO-METRICS	BPA-1000, PreAmp	6/19/2021
00627	AGILENT	8449B, PreAmp	8/31/2021
00644	SUNOL SCIENCES CORP.	JB1 925-833-9936, Ant.	11/9/2022
00425	ARA	DRG-118/A, Ant.	8/18/2022
00849	AH SYSTEMS	SAC-18G-16, Cable	10/10/2021
00826	MEGAPHASE	TM40-K1K5-36, Cable	Cal. Before Use

Test Name: **Conducted Emissions**			Test Date: **10/12/2020**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
00125	SOLAR LISN	8028-50-TS-24-BNC	9/10/2021
00126	SOLAR LISN	8028-50-TS-24-BNC	9/10/2021
00823	AGILENT	N9010A, SA	5/7/2021
00053	HP	11947A, FILTER	2/6/2021