

# Ground 1820 – Waiver DA 25-58 Test Report

[Category]

| Revision | Date       | Author       |
|----------|------------|--------------|
| A        | 2025-12-16 | Jens Abraham |

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# 1 Introduction

This document describes the waiver [1] related test results for a Kontur Ground Penetrating Radar (GPR): *Ground 1820*.

## 1.1 Summary

The *Ground 1820* GPR for normal bandwidth mode and extended bandwidth mode complies with the extra requirements given in waiver DA 25-58 [1], namely lowest frequency of operation, highest frequency of operation, dwell time and duty cycle.

## 1.2 Document Revision History

| Revision | Date       | Changes          |
|----------|------------|------------------|
| A        | 2025-12-16 | Initial Revision |

## 1.3 Abbreviations

- CF: Center Frequency
- DUT: device under test
- RBW: resolution bandwidth
- SWT: sweep time
- VBW: video bandwidth

## 1.4 References

| Reference | Title           | Revision | Date       |
|-----------|-----------------|----------|------------|
| 1         | Waiver DA 25-58 |          | 2025-01-16 |
|           |                 |          |            |
|           |                 |          |            |
|           |                 |          |            |

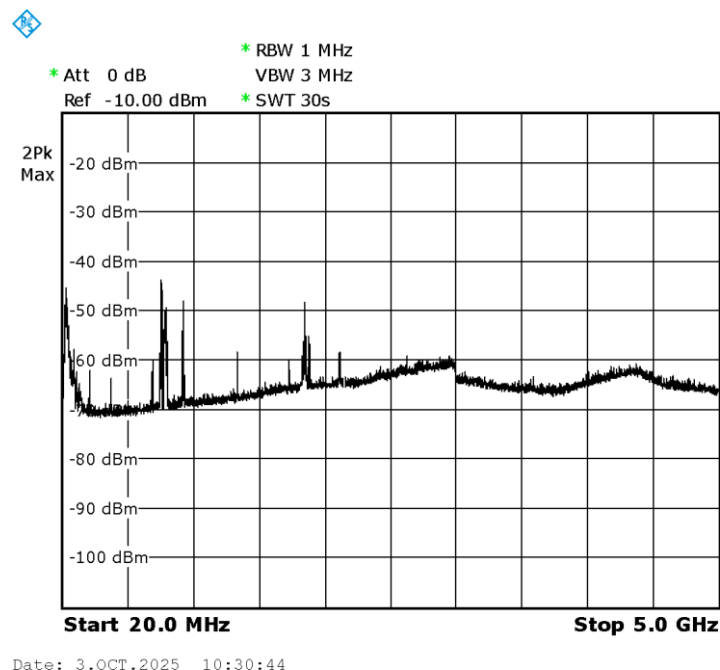
## 2 Measurement Setup

All waiver related tests can be performed with a spectrum analyzer over-the-air by line of sight coupling between the device under test (DUT) *Ground* and a reference antenna at about 1 m distance.

The equipment used is:

- Spectrum analyzer: Rohde & Schwarz – ZVL13
- Reference antenna: Rohde & Schwarz – HL562 (30 MHz – 3 GHz)
- Coax cable: 6.3 m RG-223

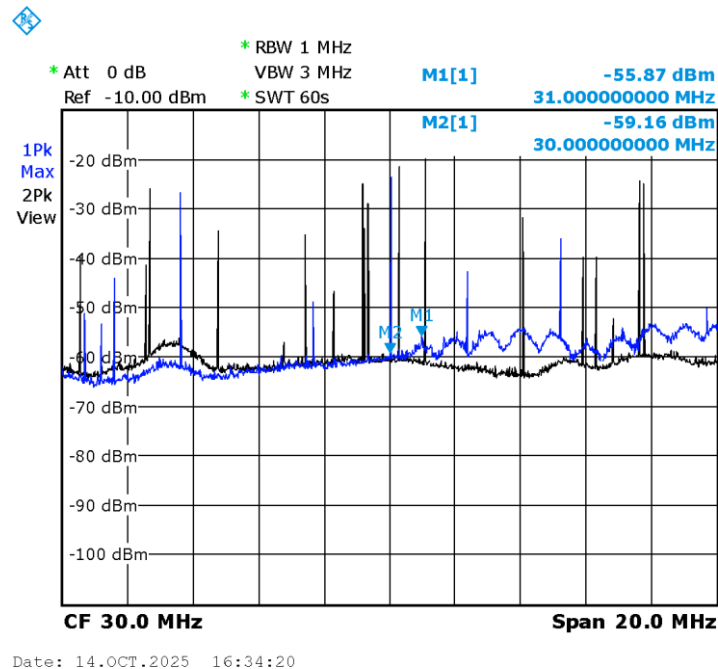
The noise floor of the spectrum analyzer varies between -70 dBm and -60 dBm in the frequency range of interest. Some ambient emissions (e.g. radio, mobile networks, WiFi, BlueTooth) are visible. Moreover, the sensitivity of the spectrum analyzer improves a bit at 3 GHz.



## 3 Measurements

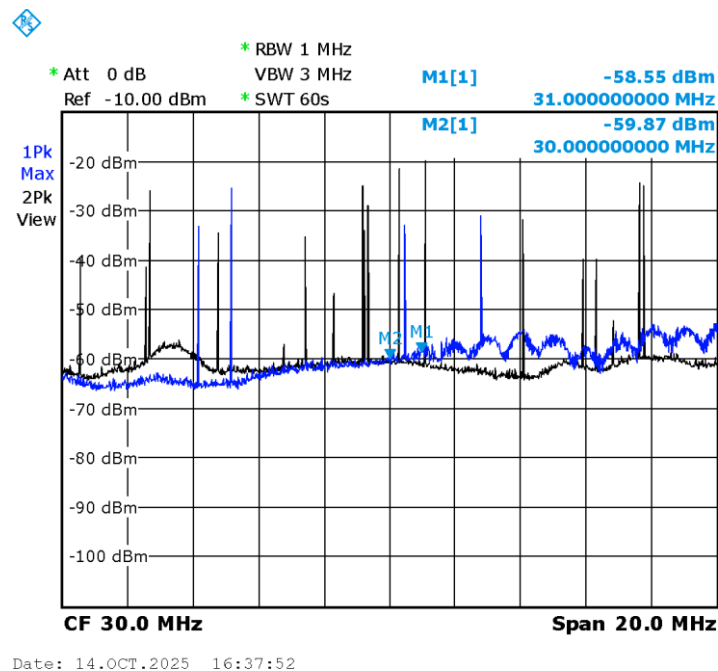
### 3.1 Lowest Frequency of Operation

#### 3.1.1 Normal Bandwidth Mode



The ambient measurement and the measurement with the DUT active are shown in black and blue, respectively. The lowest transmission of the DUT happens at 31 MHz, s.t. the signal is confined in the interval from 30 MHz upwards.

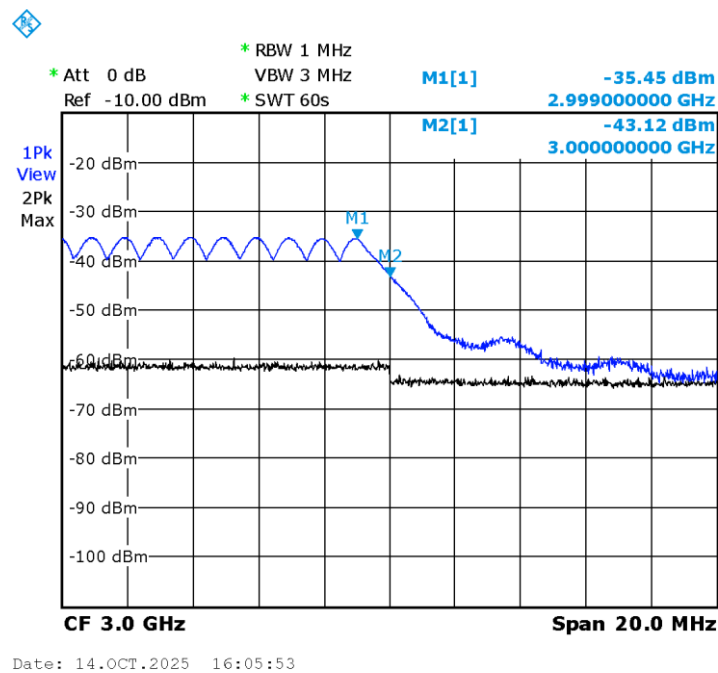
#### 3.1.2 Extended Bandwidth Mode



The DUT has the same lowest frequency for both normal and extended bandwidth.

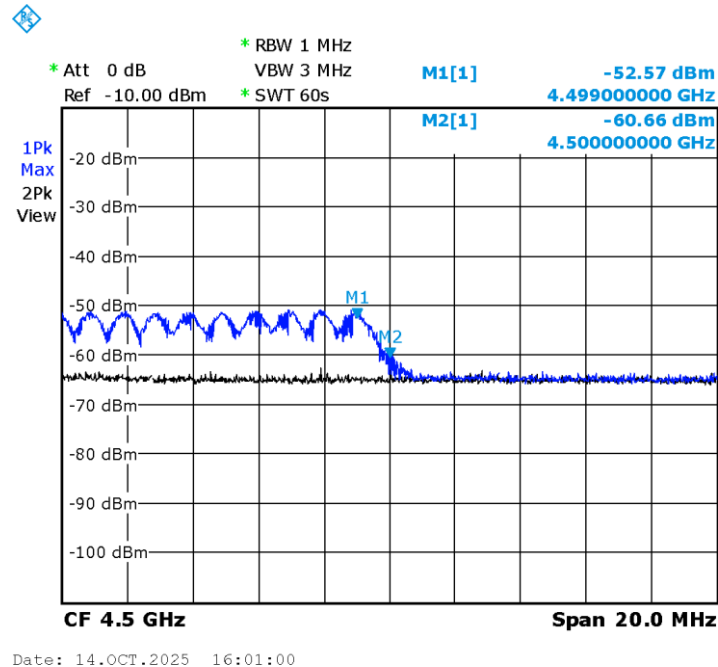
## 3.2 Highest Frequency of Operation

### 3.2.1 Normal Bandwidth Mode



The highest frequency of operation for the normal bandwidth mode is 2999 MHz, s.t. the signal is confined in the interval 30 MHz to 3000 MHz.

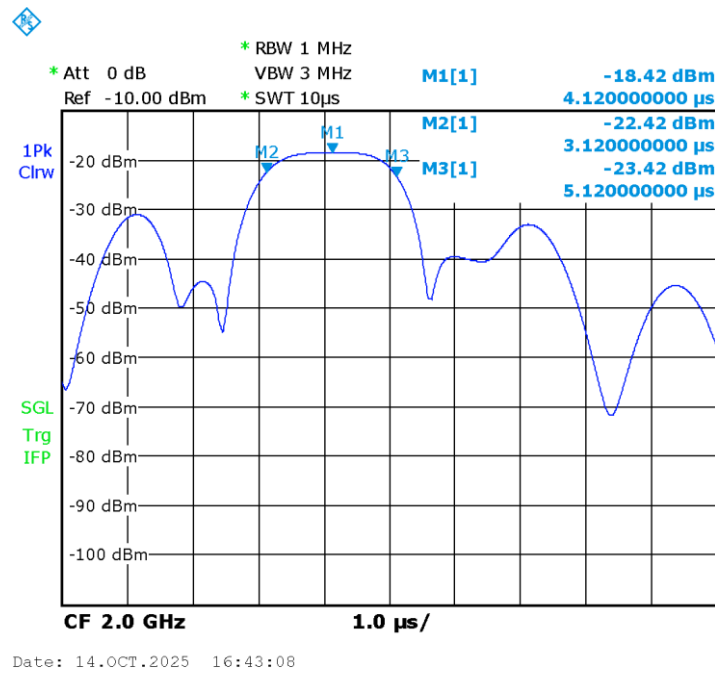
### 3.2.2 Extended Bandwidth Mode



The highest frequency of operation in extended bandwidth mode is 4499 MHz, s.t. the signal is confined in the interval from 30 MHz to 4500 MHz.

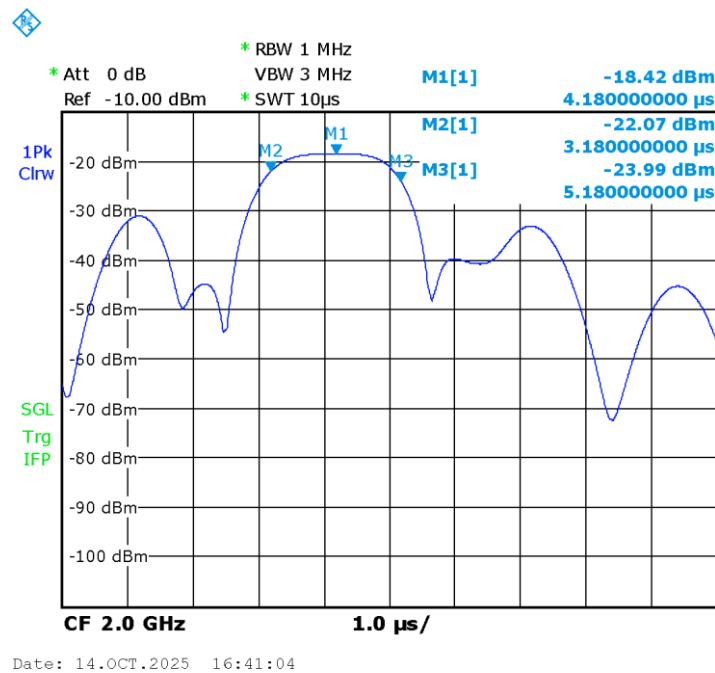
### 3.3 Dwell Time

#### 3.3.1 Normal Bandwidth Mode



The dwell time is measured to be 2  $\mu$ s for normal bandwidth mode.

#### 3.3.2 Extended Bandwidth Mode

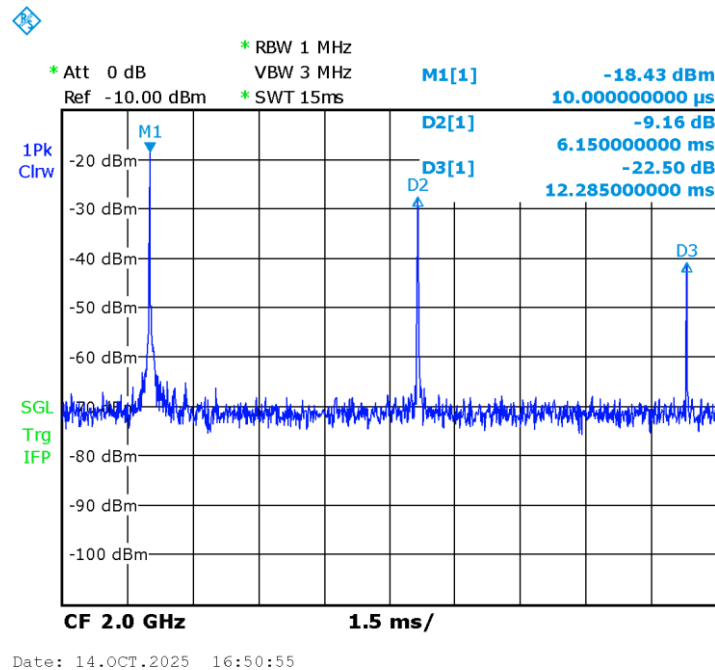


The dwell time for extended bandwidth mode is 2  $\mu$ s.

### 3.4 Duty Cycle

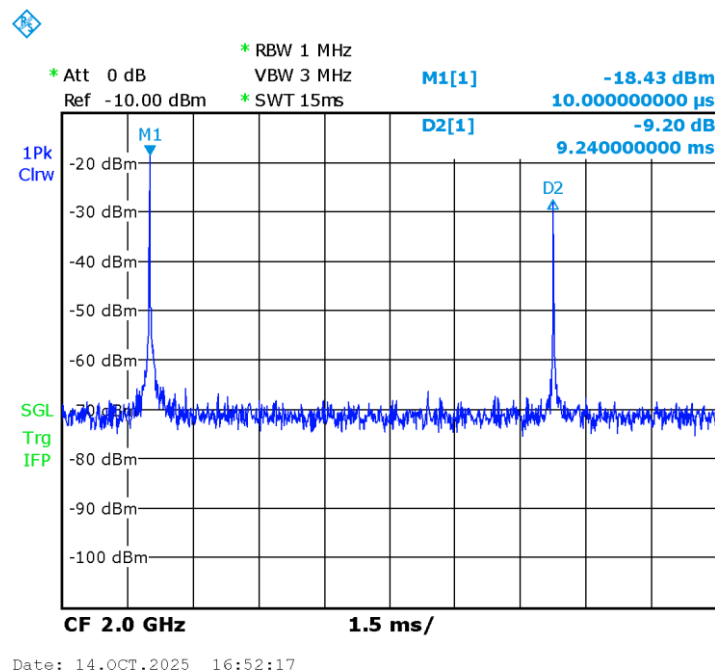
The cycle time is measured to evaluate the duty cycle requirement, by calculating dwell time divided by cycle time.

#### 3.4.1 Normal Bandwidth Mode



The cycle time for normal bandwidth mode is about 6.15 ms, resulting in a duty cycle of 0.033 %.

#### 3.4.2 Extended Bandwidth Mode



The cycle time for extended bandwidth mode is 9.24 ms, resulting in a duty cycle of 0.022 %.