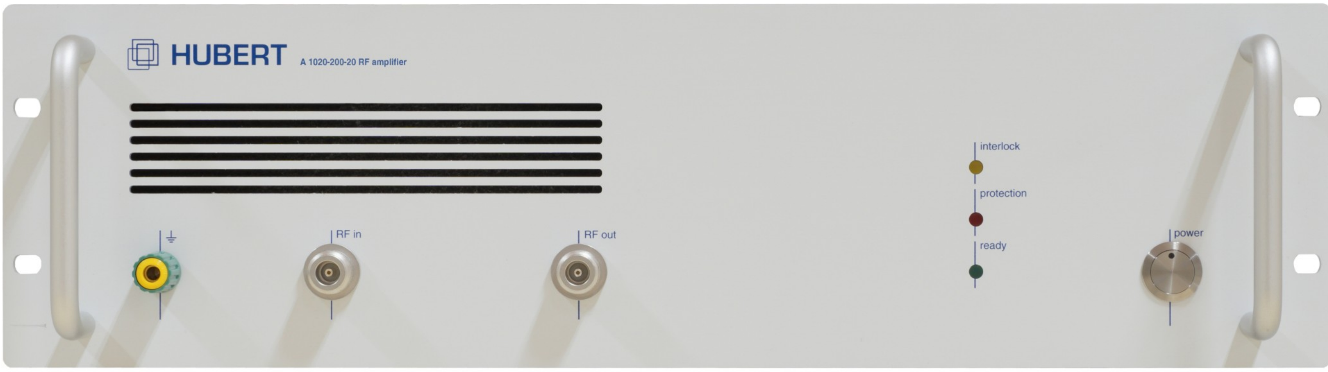
Datasheet



A1020-200-20

Linear RF broadband power amplifier

100 kHz...20 MHz, min. 200 W

MADE IN GERMANY

Revision 2.1

1 Product Description

The A1020-200-20 is a broadband RF amplifier in the frequency range of 100 kHz...20 MHz with a linear output power of at least 200 W.

Due to the continuous miniaturization of electronics, higher and higher frequencies are used e.g. in power supply. Due to their limited frequency range, the usual linear AF amplifiers quickly reach their limit for testing the components and parts used. The A1020-200-20 now allows testing at up to 20 MHz using RF amplifier technology, without the typical problems that can otherwise occur when using RF amplifiers.

The amplification is adapted for the connection of a typical function generator, transients caused by switching relays in the signal path, as is common with these generators, do not lead to defects of the input stage. In addition, the output of function generators in the "off" state is not terminated and represents a good antenna. The input of the A1020-200-20 can be used without problems in idle mode even with coaxial cable connected, without amplifying unwanted signals.

Special attention was paid to a high linear driveability with low distortion for RF amplifiers. The output stage is stable at all loads, critical load conditions lead at most to a safe shutdown of the amplifier.

The amplifier output is designed for a nominal impedance of 50 Ω, as is usual for RF amplifiers. It is permitted to connect and operate a load deviating from this, but the maximum output power cannot then be achieved. For low impedance (recommended < 25 Ω) and high impedance (recommended > 100 Ω) loads, a bidirectional 1:4 matching transformer can therefore be connected as close as possible to the load. This allows voltage or current to be doubled depending on the direction and expands the loads that can be connected in a sensible way and thus the application and test options.

The matching transformer is optimized for the highest possible bandwidth and bidirectionality. On request, other transformation ratios can also be realized, but then they are usually not bidirectional. Contact us with your special requirements. We will check for you what is feasible.

2 Features

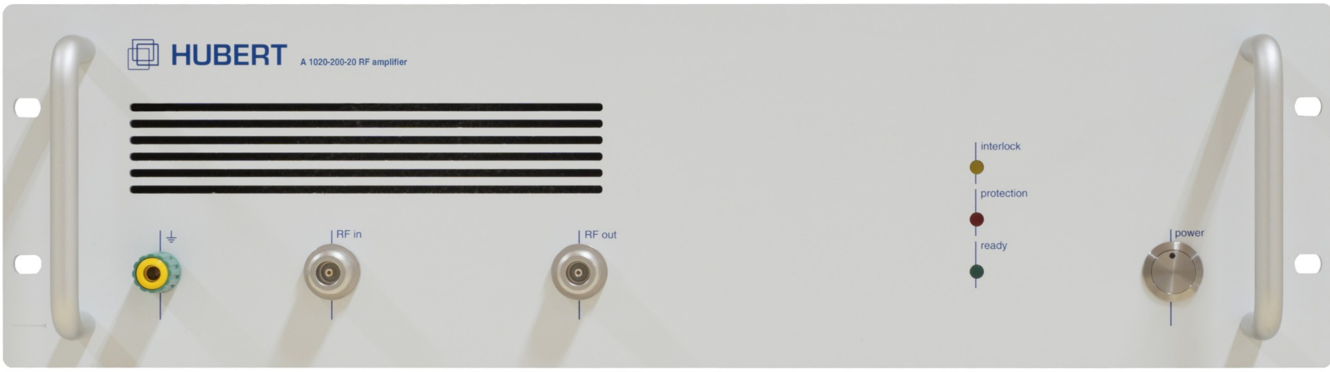
- Universally applicable RF amplifier from 100 kHz...20 MHz
- Linear output power of up to 250 W at 50 Ω
- Very linear gain over frequency
- High stability of gain over temperature
- The ampllifer can reproduce all known forms of modulation of a sinusoidal signal, from Amplitude-Modulation to Frequency- and Phase-Modulation, to pulse and burst signals.
- Optimized for operation with common function generators
- Input impedance 50 Ω, tolerates open leads
- Rated output impedance 50 Ω, output signal stable on all resistive and complex loads
- Optional bidirectional matching transformer (B-MT-1) for operation on low and high impedance loads
- Temperature controlled fan and over temperature shutdown
- Overload shutdown for safe operation
- Monitor output (-50 dB @ 50 Ω) for interference-free monitoring of the output signal
- Interlock for safe shutdown during test setups
- Efficient wide range power supply with a line factor close to 1

3 Applications

- Universally applicable in research and development, also for non-skilled RF users
- Measurements on components such as inductors, transformers, capacitors, etc.
- Control of piezo actuators
- Supply and measurement of ultrasonic transducers

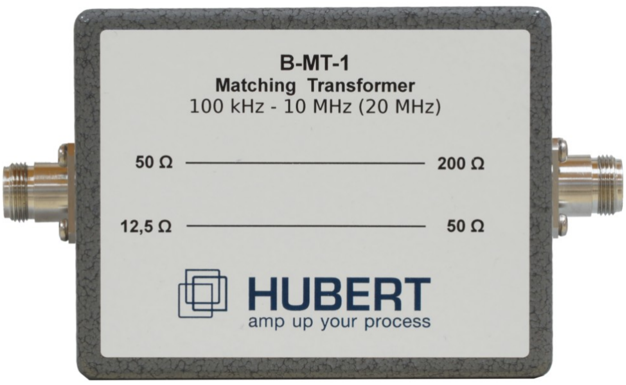
4 Pictures

4.1 A1020-200-20 Frontpanel



4.2 A1020-200-20 Backpanel

4.3 Bi-directional matching transformer B-MT-1



5 Specifications

5.1 Amplifier A1020-200-20

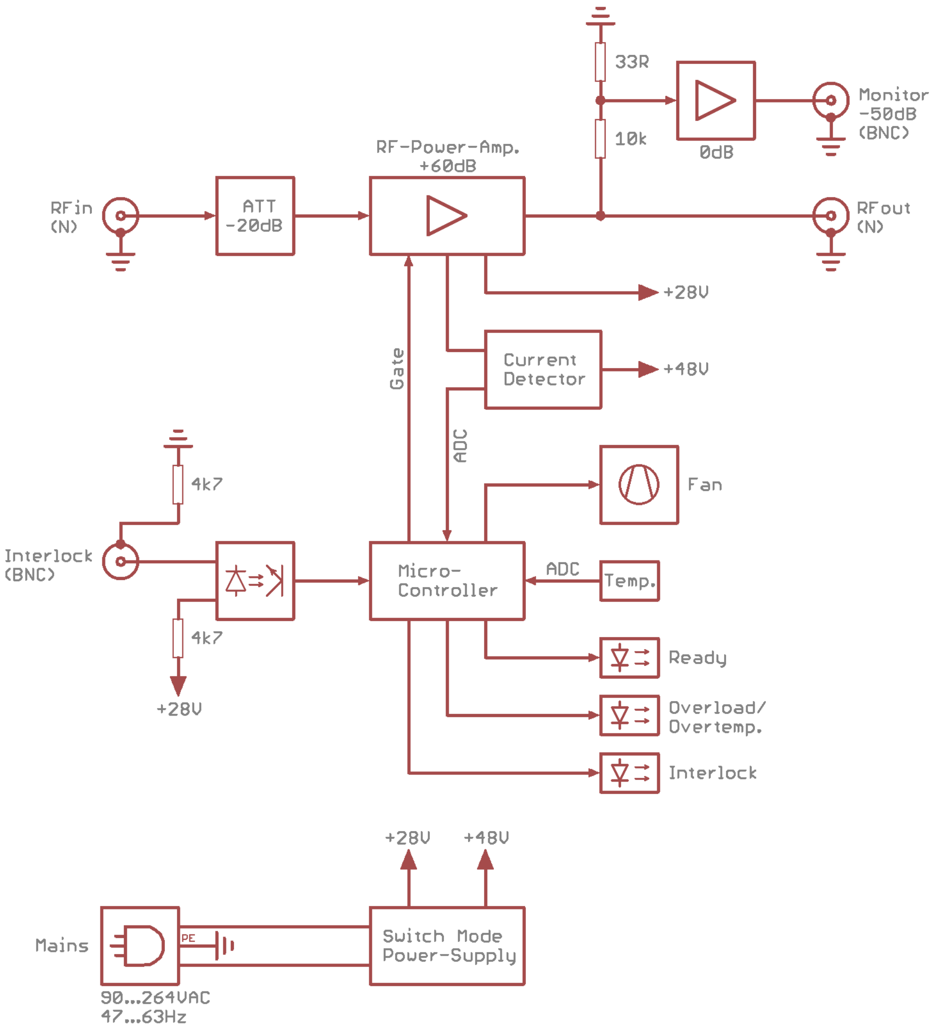
Parameters	Specification	Conditions / Moments
		Mains voltage: 230 V 25^0 C ambient temperature at least 30 min. warm-up time
Operating mode	Push Pull Class A	
Frequency range	100 kHz...20 MHz	
Signal input		50 Ω Source, 50 Ω Load
Connector	N Socket (50 Ω)	
Input impedance	50 Ω nominal	
Input VSWR	1.2:1 max.	
Small signal gain	+41 dB ±1 dB	with 0 dBm Input power
Input level for nominal power	31.6 mW / 15 dBm (1,5 V_{RMS})	
Max. Input level	500 mW / 27 dBm (5 V_{RMS})	Damage possible if exceeded!
Signal output		
Connector	N Socket (50 Ω)	
Linear output power		50 Ω Source, 50 Ω Load
100 kHz...10 MHz	54 dBm (250 W) min.	<1 dB Compression
10 MHz...20 MHz	53 dBm (200 W) min.	<1 dB Compression
Output signal		
Harmonic	≤28 dBc typ.	50 dBm (100 W) Output power
Interference Signals (Spurious)	<100 dBc typ.	50 dBm (100 W) Output power
Noise		Input with 50 Ω termination, 50 Ω load
Broadband noise	8 mV_{RMS} typ.	Measuring bandwidth 20 MHz
	13 mV_{RMS} typ.	Measuring bandwidth 200 MHz
Monitor output		
Connector	BNC Socket (50 Ω))	
Gain	-50 dB±1 dB of output signal	50 Ω Load
Protective circuit		
Overtemperature	Shutdown at 75^0 C	Automatic restart at 50^0 C
Output overload	Shutdown if supply current is exceeded	Mains switch off and on for normal operation necessary
Interlock		
Connector	BNC Socket (50 Ω))	

Function	Floating closing contact <10 kΩ necessary for normal operation	Amplifier is switched off, quiescent current decreases to near zero
Mains voltage	90...264 V_{AC}, 47...63 Hz	
Max. Mains input power	820 W	230 V_{AC} Mains Voltage
Environmental conditions		
Operating temperature	10...40^{0}C	
Operating altitude	Max. 2000 m	
Humidity	80% or less at 40^{0}C	non-condensing
Pollution degree	2	
Overvoltage category	CAT II	
Coolíng	Temperature controlled fan	sufficient distance necessary
Dimensions (B xH xT)	484x155x545 mm	with feet and handles
Weight	ca. 14.5 kg	

5.2 B-MT-1 bi-directional matching transfomator (accessories)

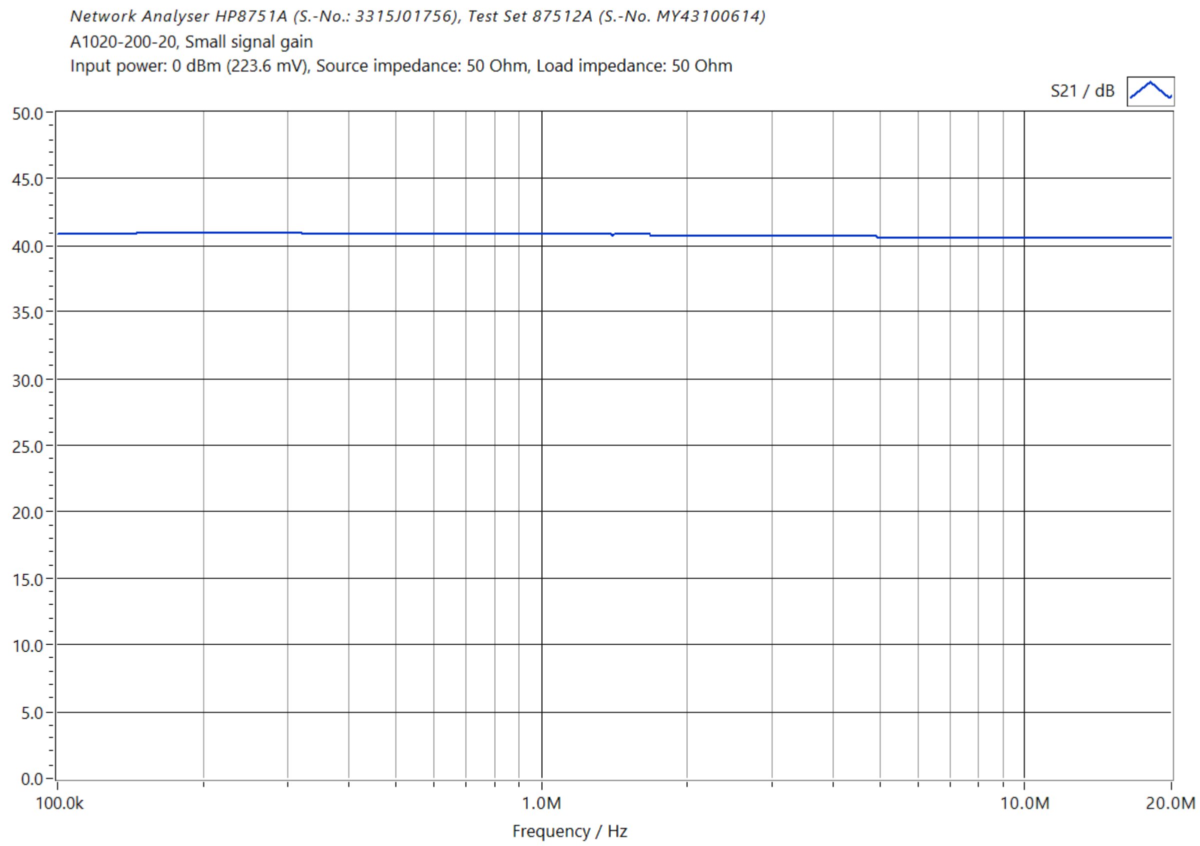
Parameters	Spezification	Conditions / Moments
		25^{0}C Operating temperature
Frequency range	100 kHz...10 MHz (20 MHz)	
Operating mode	Bidirectional	
Downward transformation (1:0.25)	50 Ω :12.5 Ω	
Upward transformation (1:4)	50 Ω :200 Ω	
Connectors	N Socket (50 Ω)	Both sides
Input impedance	50 Ω nominal	
Environmental conditions		
Operating temperature	10...40^{0}C	
Operating altitude	Max. 2000 m	
Humidity	80% or less at 40^{0}C	non-condensing
Dimensions (B xH xT)	160x65x95 mm	With connectors
Weight	ca. 0.5 kg	

6 Block Diagram

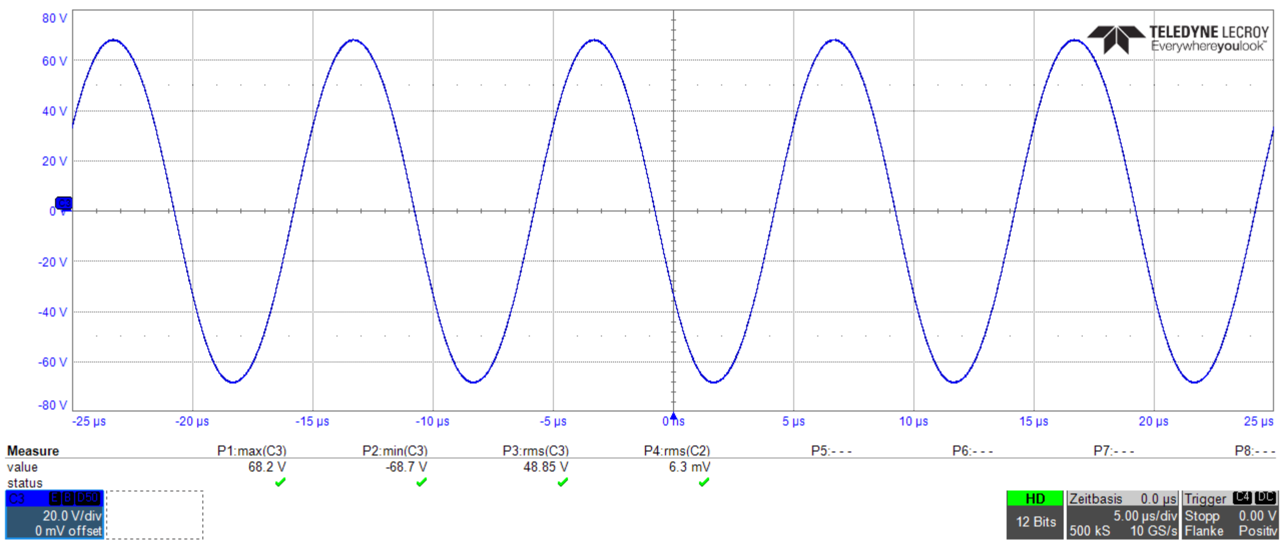


6.1 Diagrams A1020-200-20

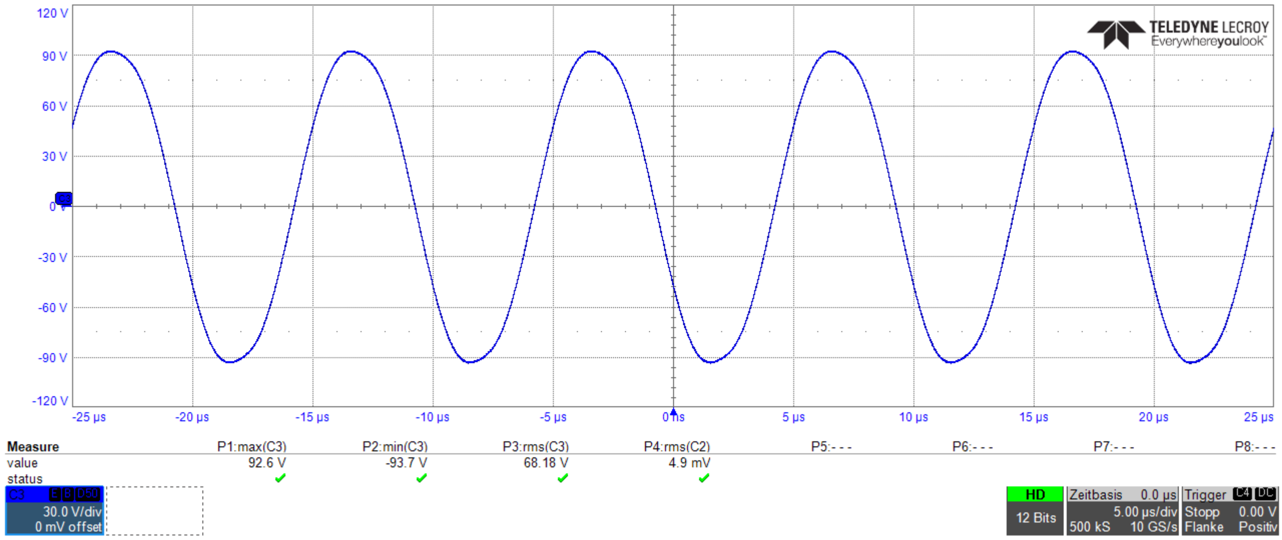
6.1.1 Small signal gain



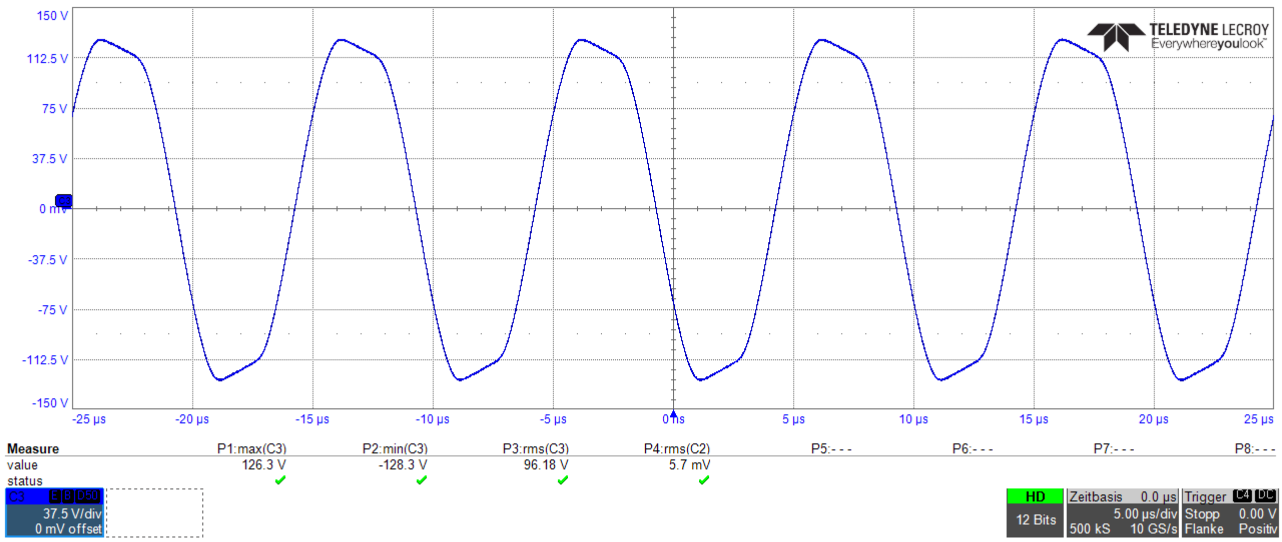
6.1.2 Output voltage 100 kHz/50 W at 50 Ω



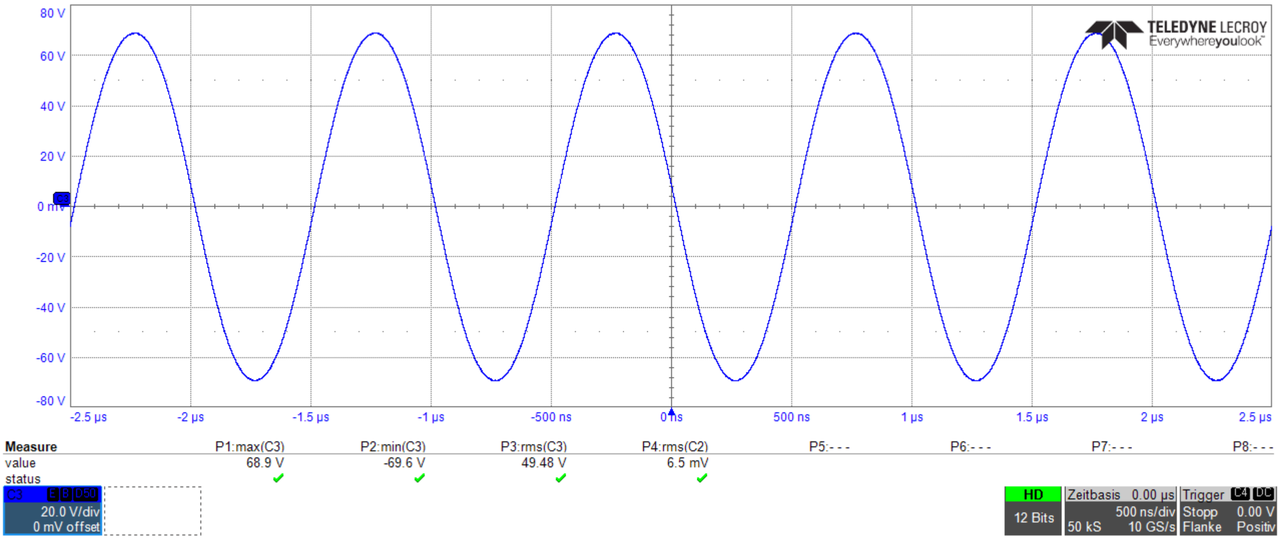
6.1.3 Output voltage 100 kHz/100 W at 50 Ω



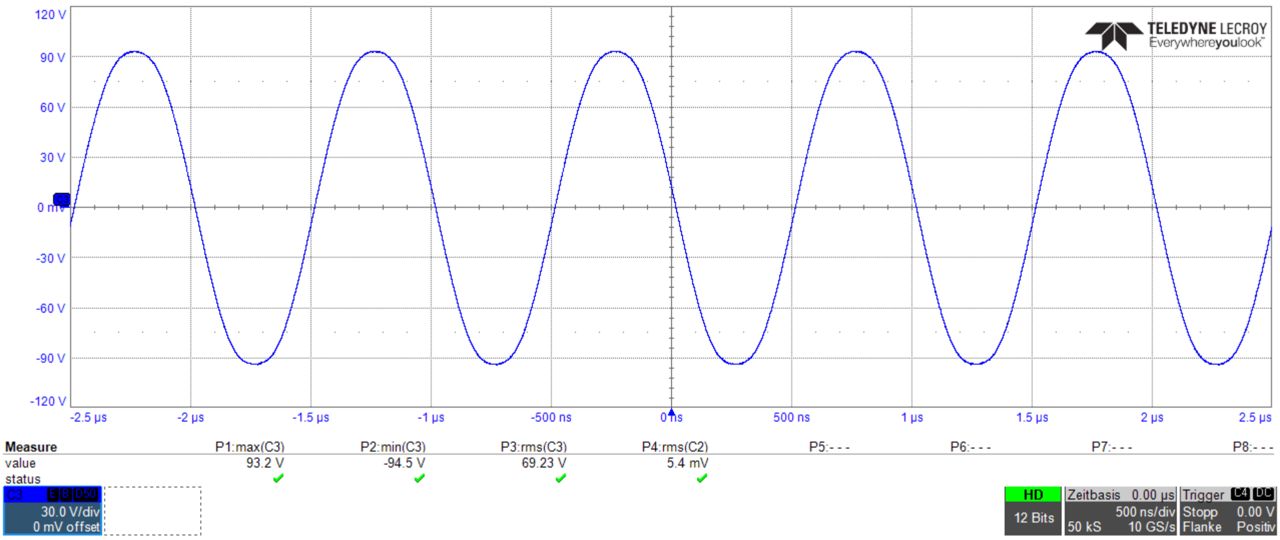
6.1.4 Output voltage 100 kHz/200 W at 50 Ω



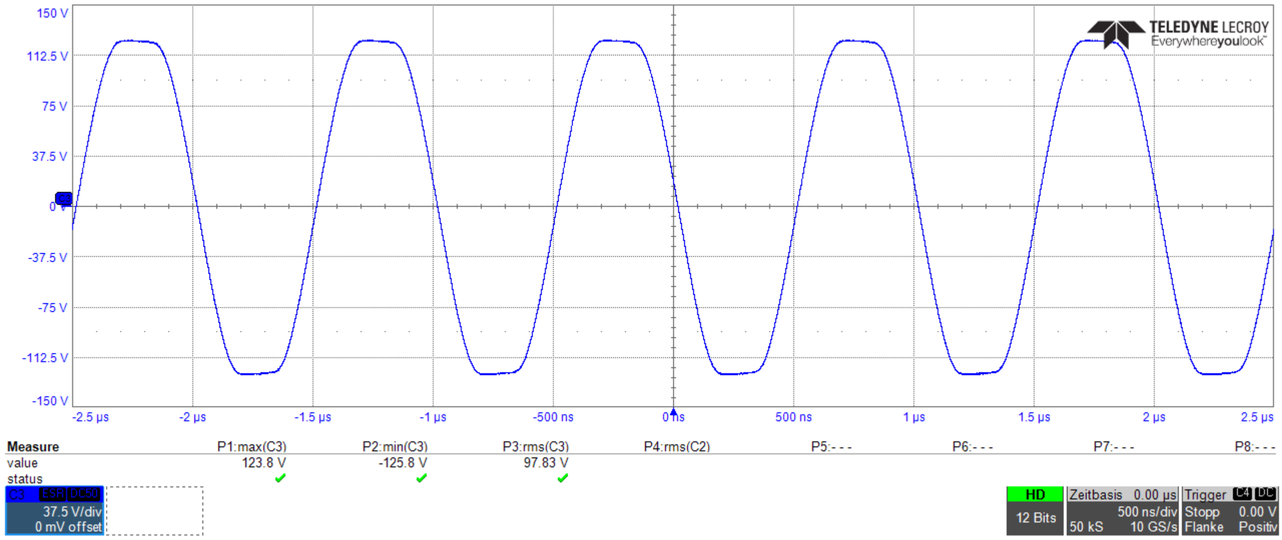
6.1.5 Output voltage 1 MHz/50 W at 50 Ω



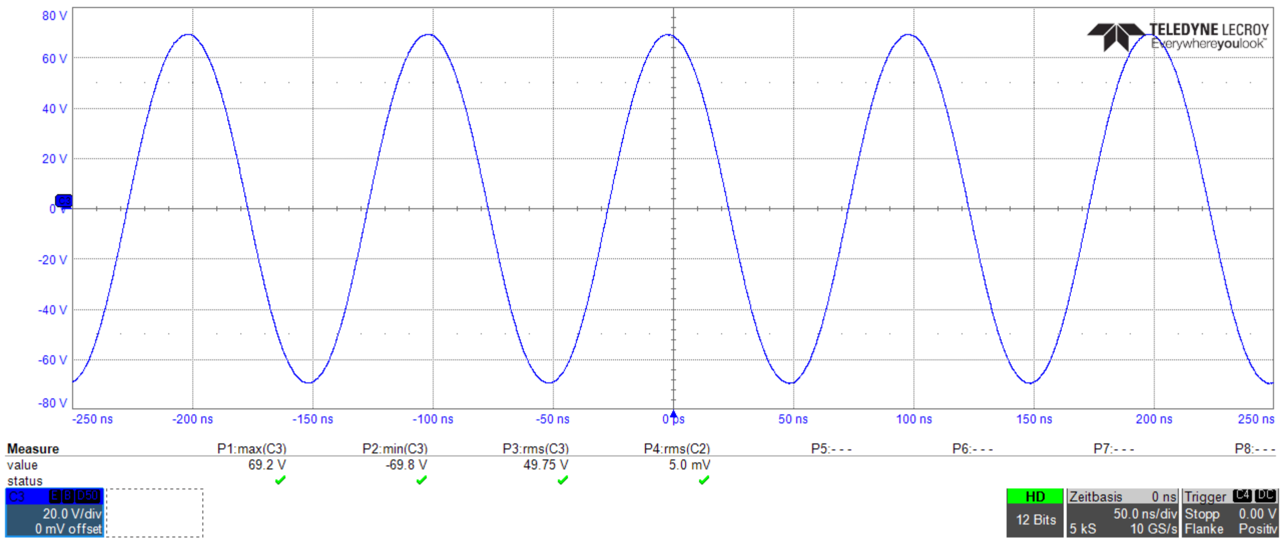
6.1.6 Output voltage 1 MHz/100 W at 50 Ω



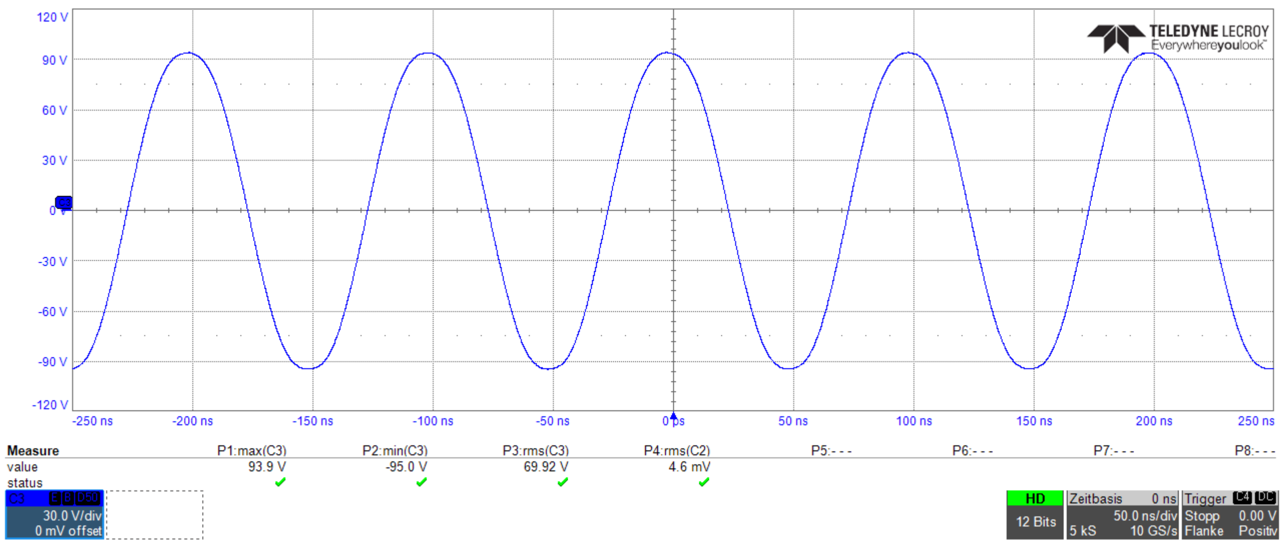
6.1.7 Output voltage 1 MHz/200 W at 50 Ω



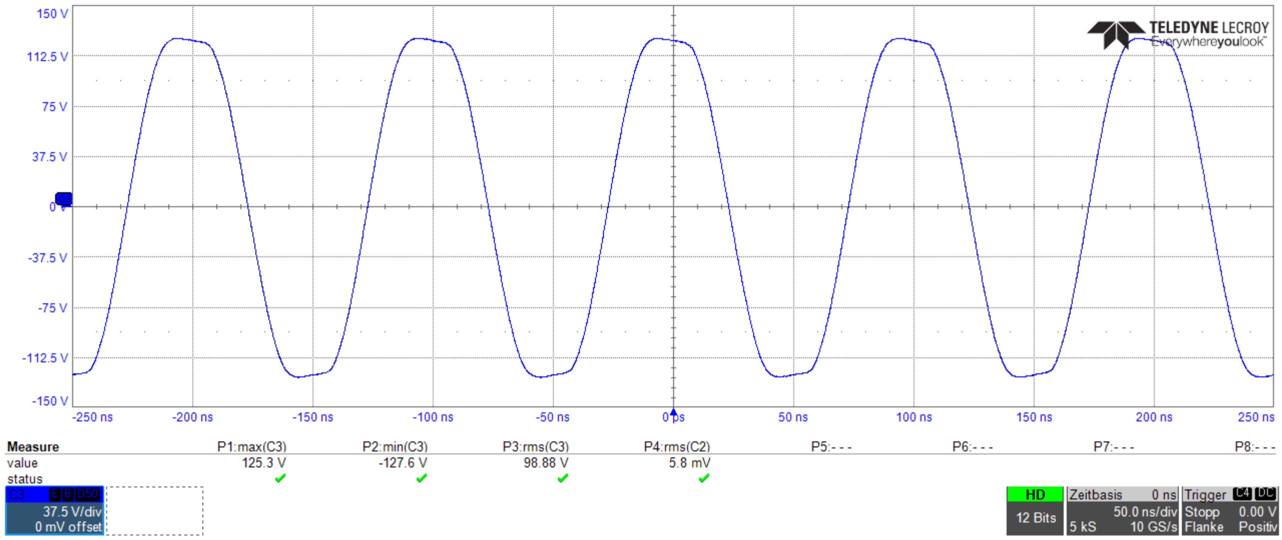
6.1.8 Output voltage 10 MHz/50 W at 50 Ω



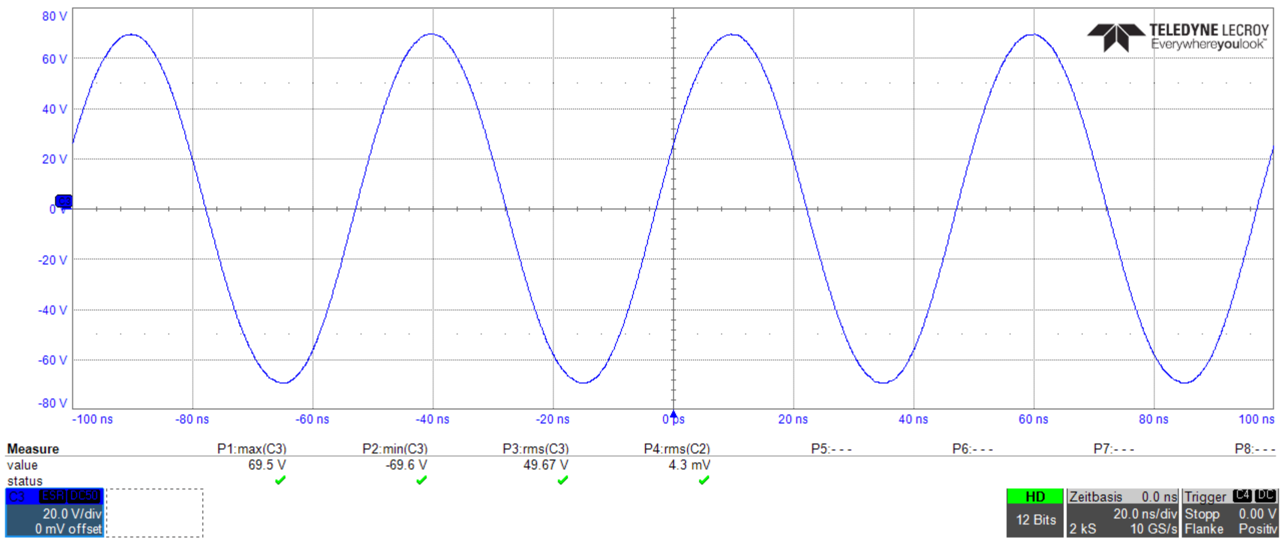
6.1.9 Output voltage 10 MHz/100 W at 50 Ω



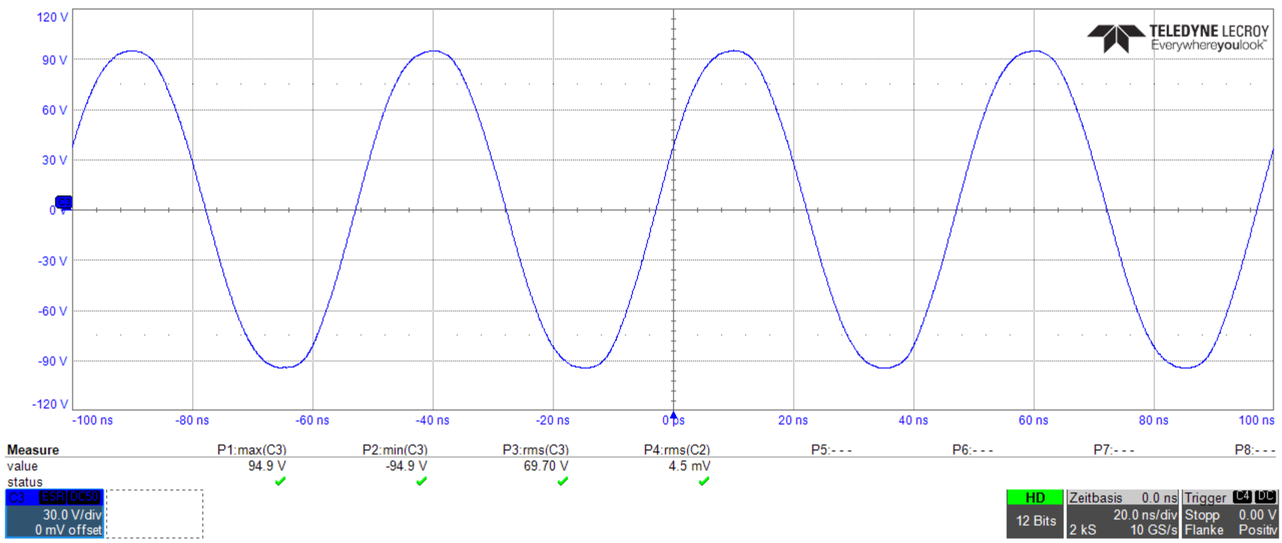
6.1.10 Output voltage 10 MHz/200 W at 50 Ω



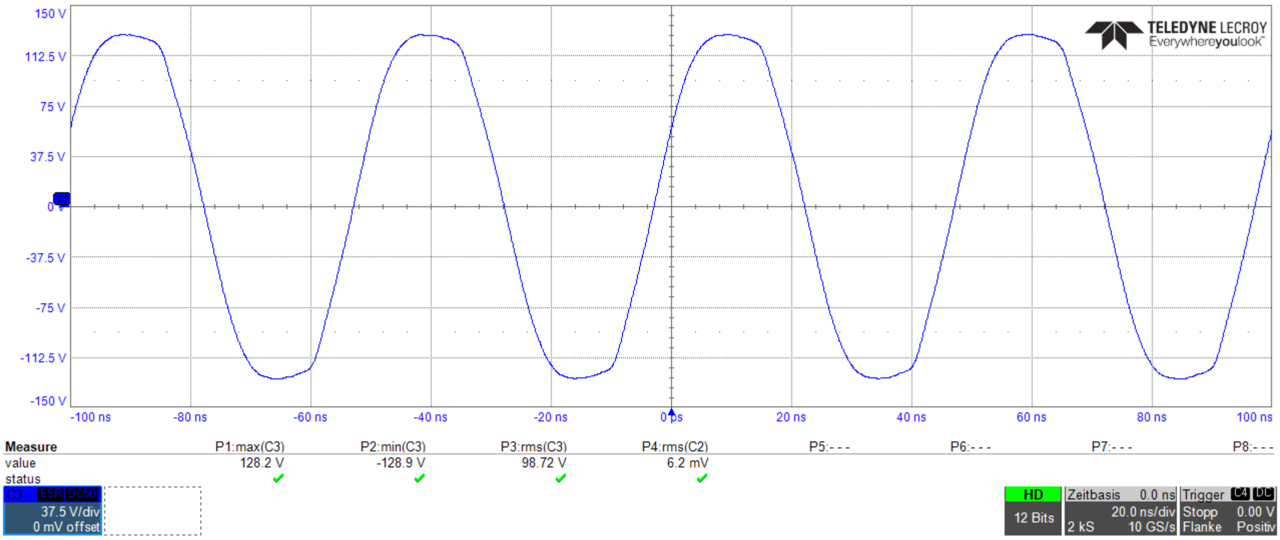
6.1.11 Output voltage 20 MHz/50 W at 50 Ω



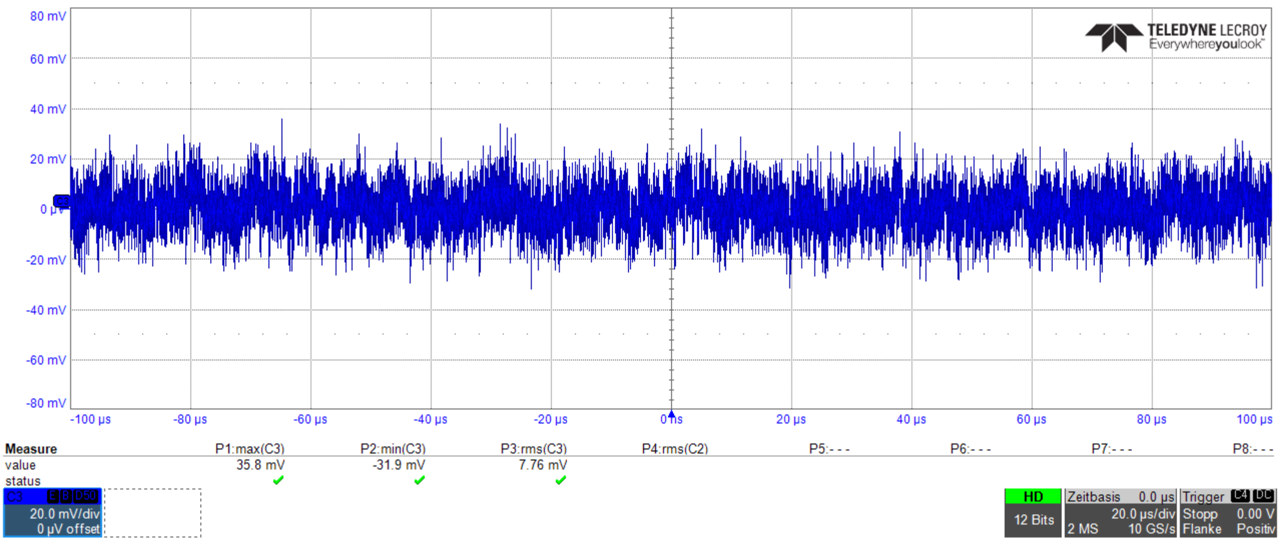
6.1.12 Output voltage 20 MHz/100 W at 50 Ω



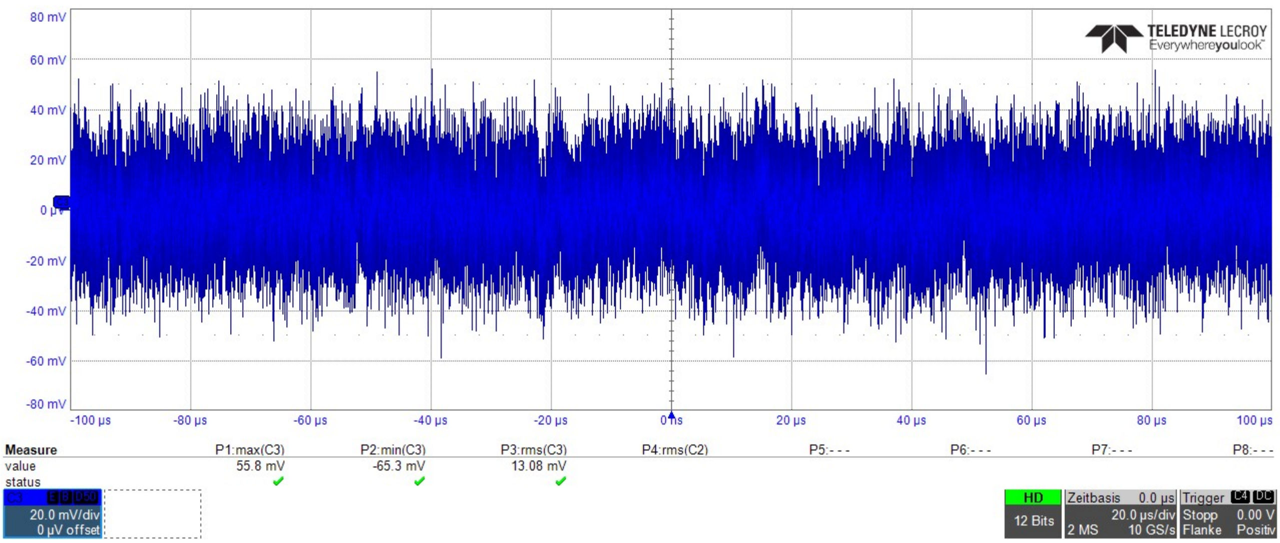
6.1.13 Output voltage 20 MHz/200 W at 50 Ω



6.1.14 Noise at 50 Ω load, measurement bandwidth 20 MHz

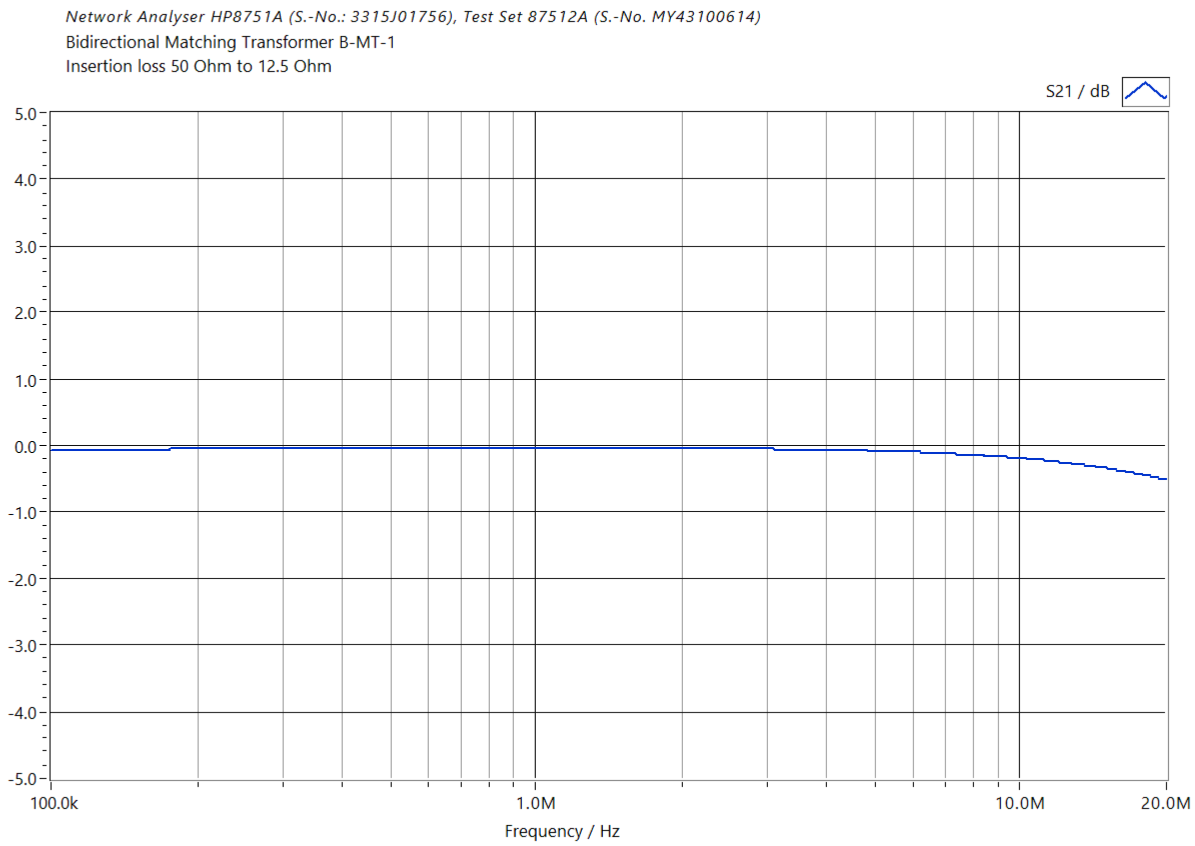


6.1.15 Noise at 50 Ω load, measurement bandwidth 200 MHz

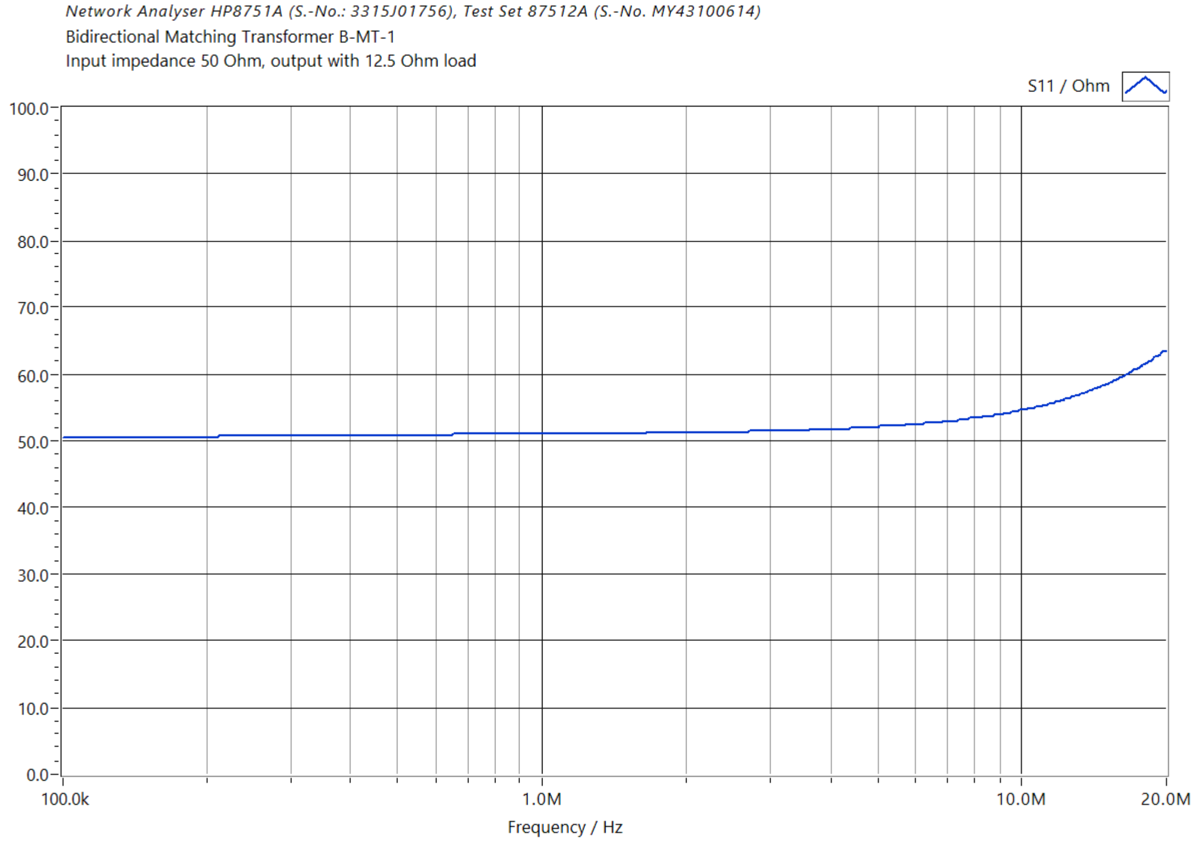


6.2 Diagram Matching-Transformer B_MT-1

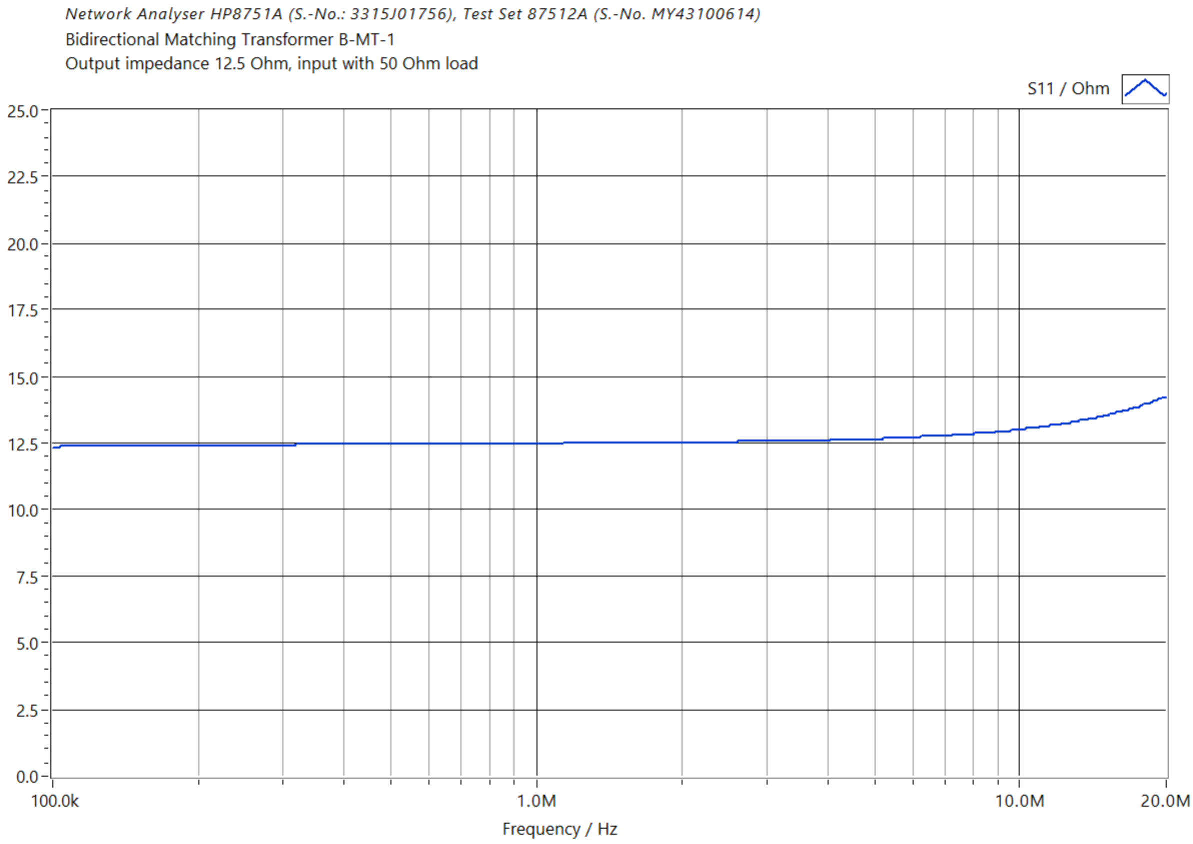
6.2.1 Insertion loss in 50 Ω : 12.5 Ω mode



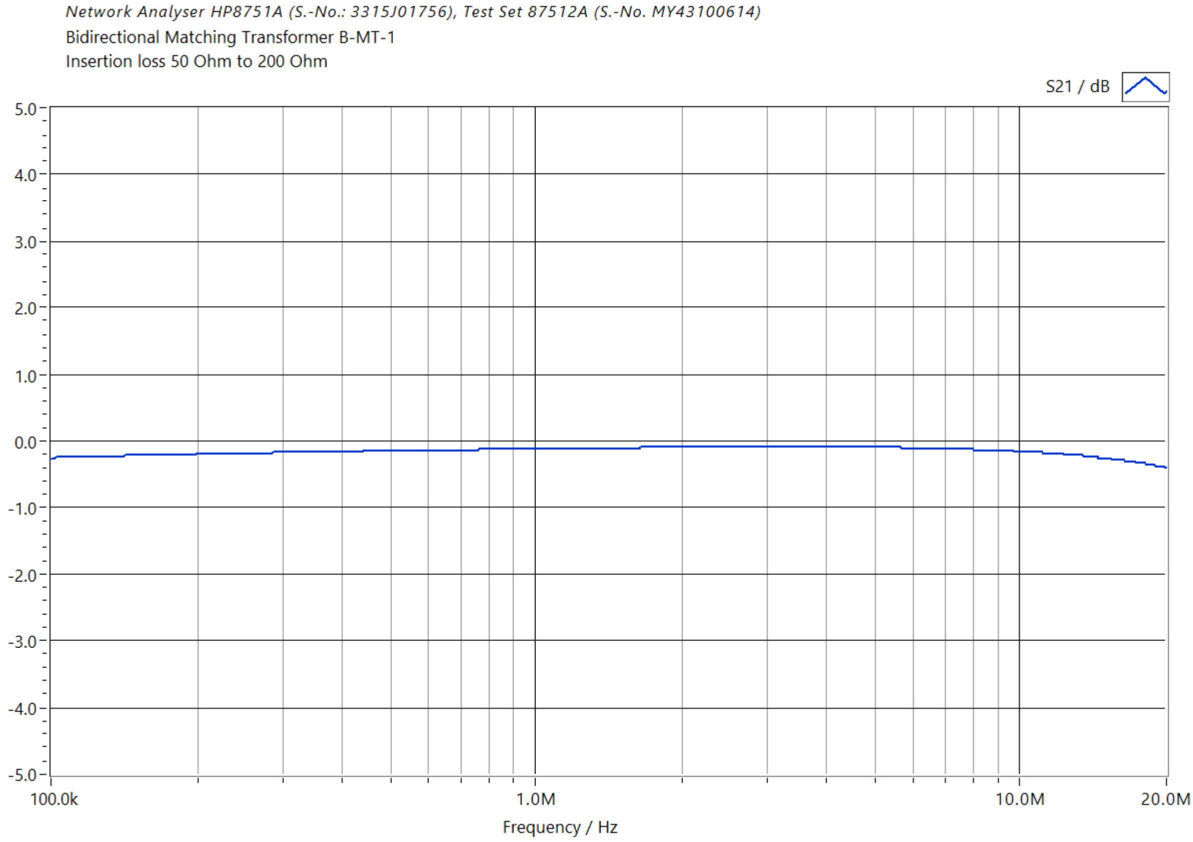
6.2.2 Input impedance in 50 Ω : 12.5 Ω mode



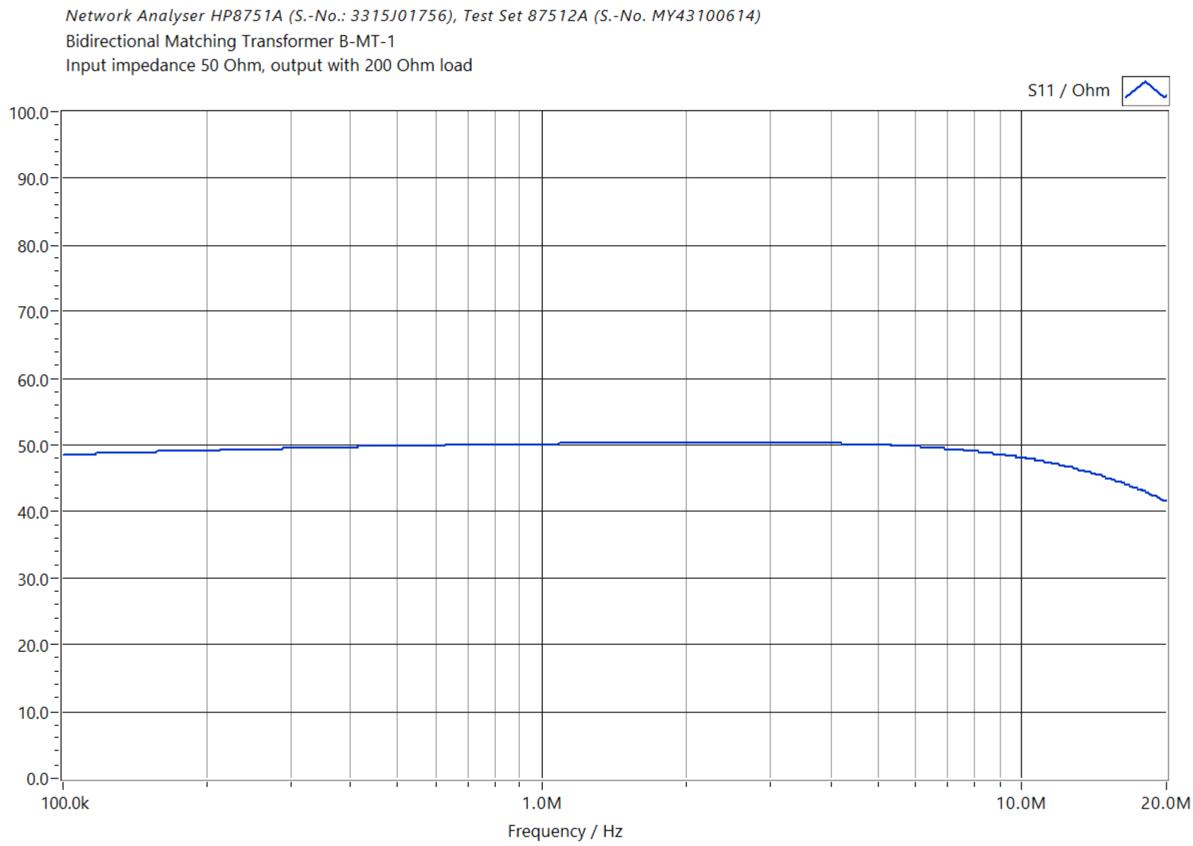
6.2.3 Output impedance in 50 Ω : 12.5 Ω mode



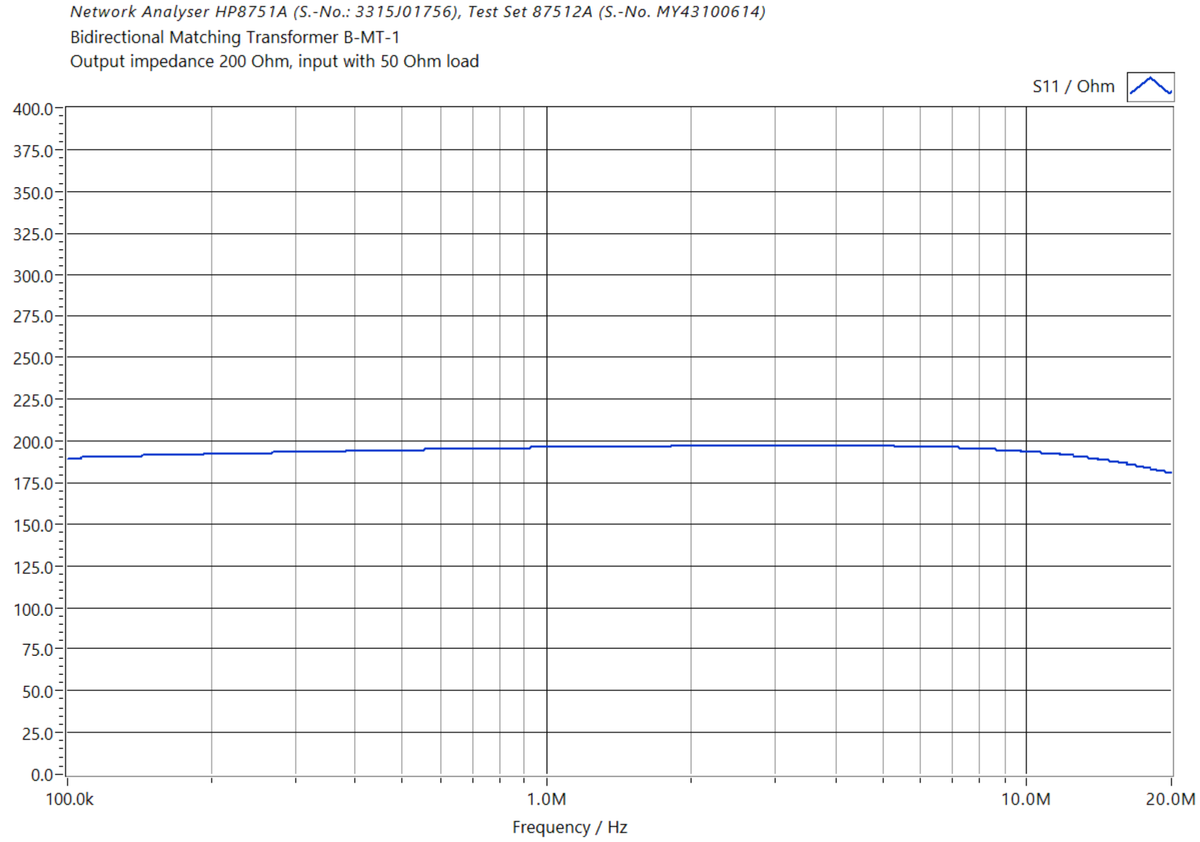
6.2.4 Insertion loss in 50 Ω : 200 Ω mode



6.2.5 Input impedance in 50 Ω : 200 Ω mode

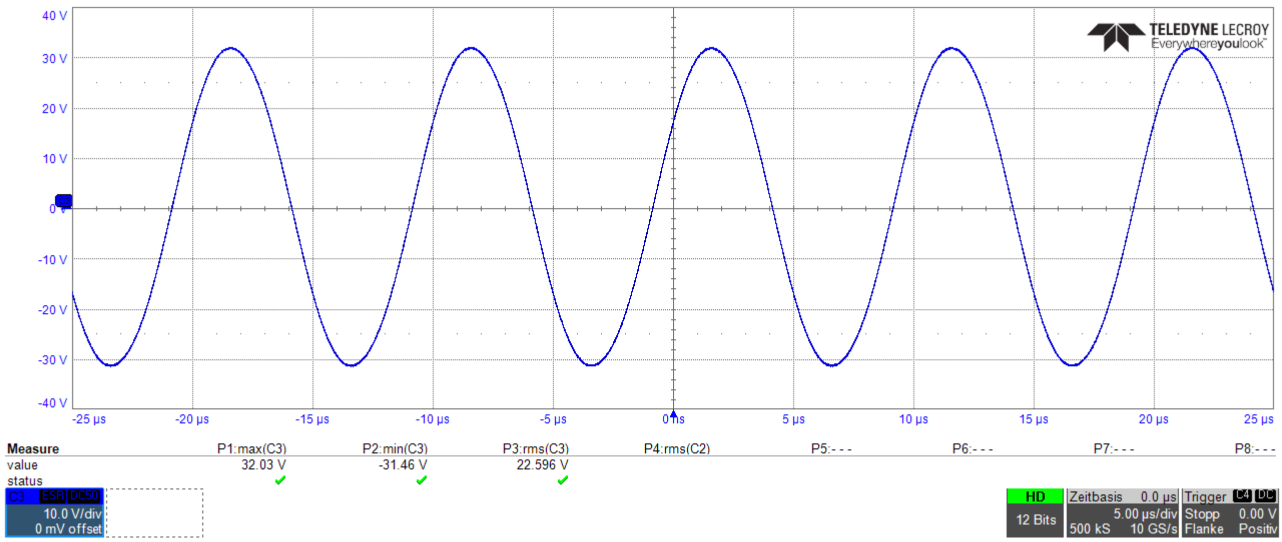


6.2.6 Output impedance in 50 Ω : 200 Ω mode

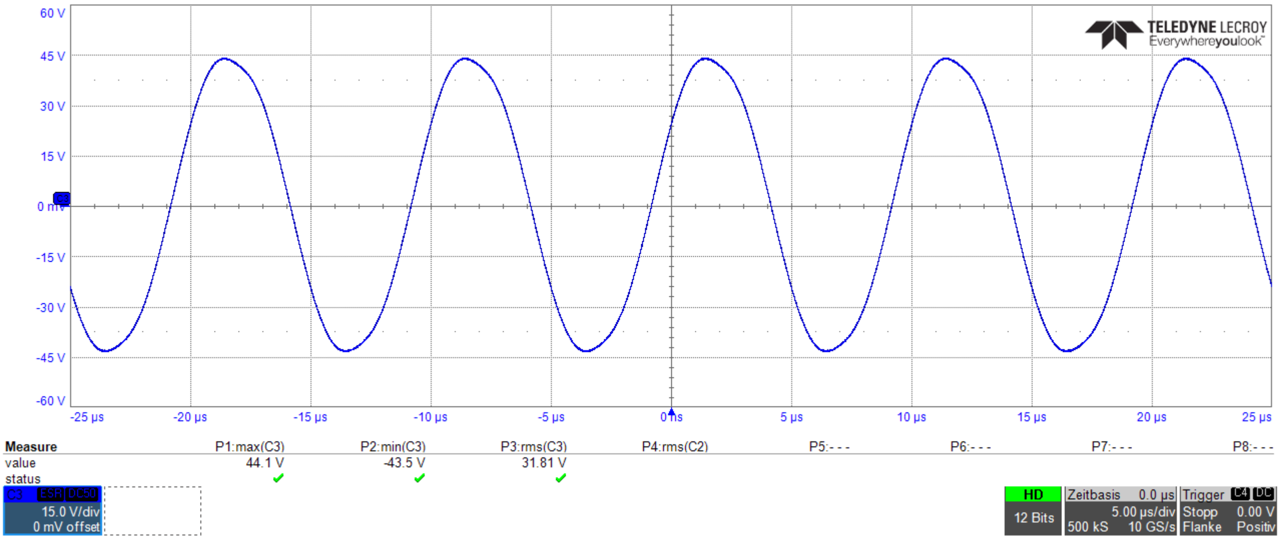


6.3 Diagrams A1020-200-20 with Matching Transformer B-MT-1

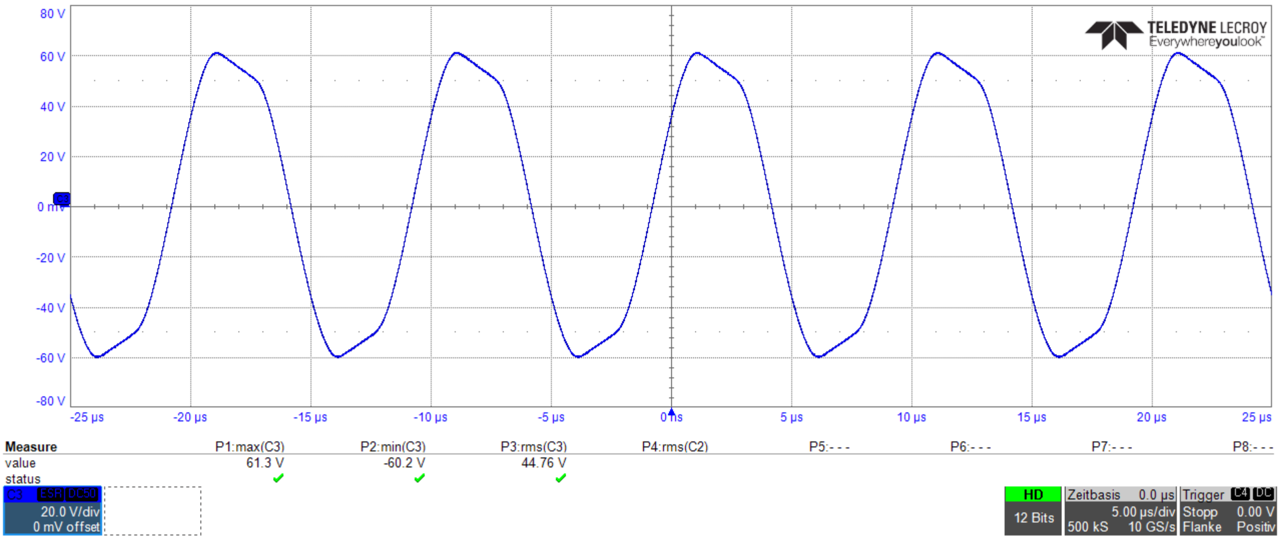
6.3.1 Output voltage 100 kHz/50 W at 12.5 Ω



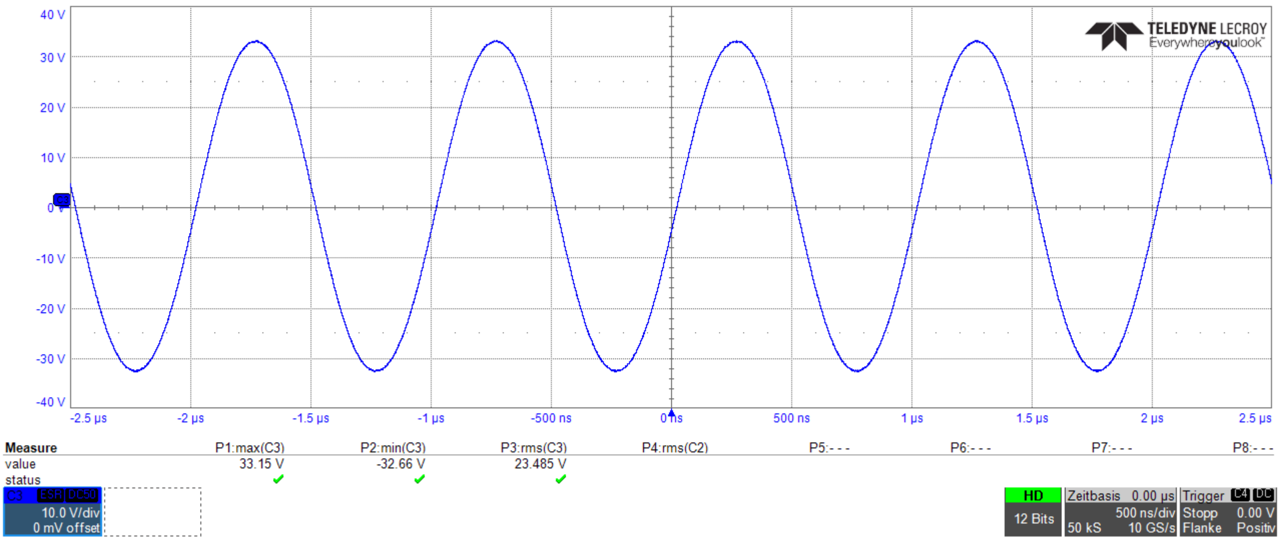
6.3.2 Output voltage 100 kHz/100 W at 12.5 Ω



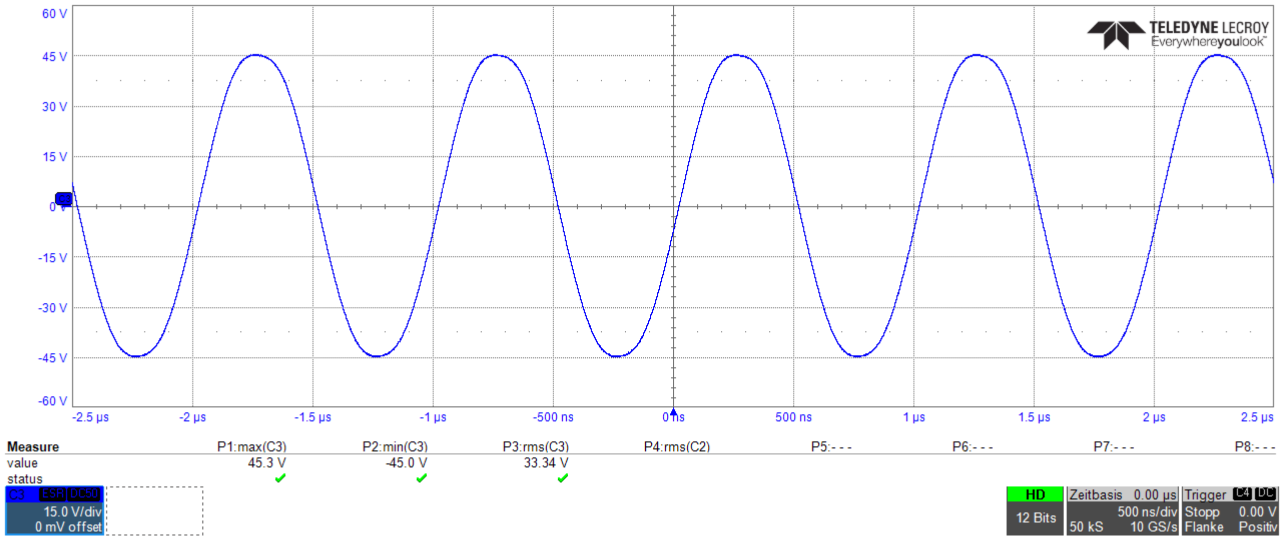
6.3.3 Output voltage 100 kHz/200 W at 12.5 Ω



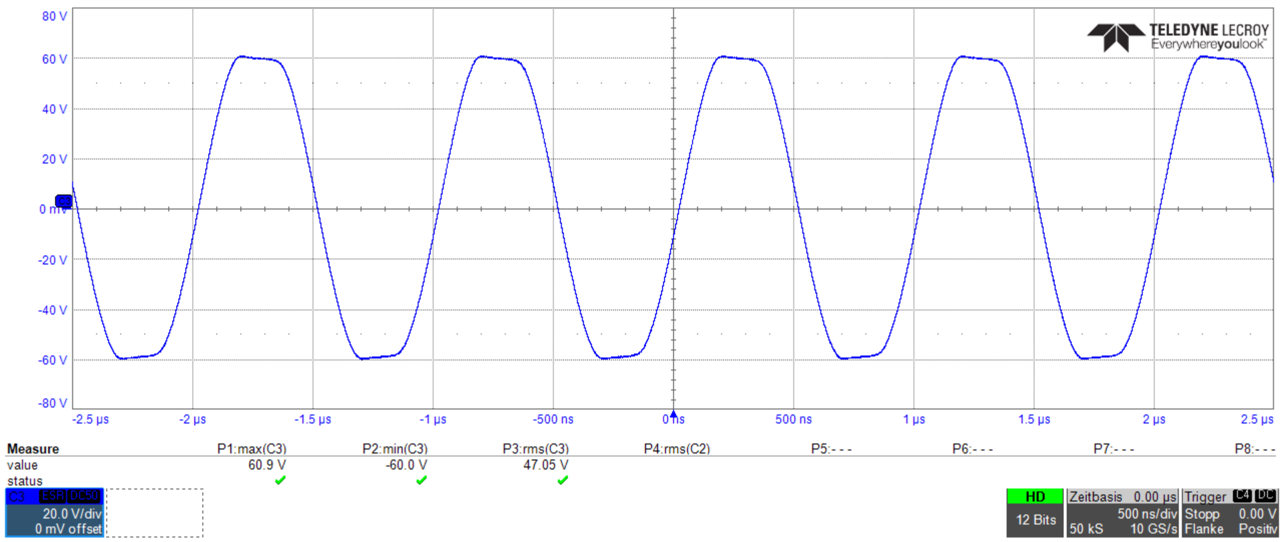
6.3.4 Output voltage 1 MHz/50 W at 12.5 Ω



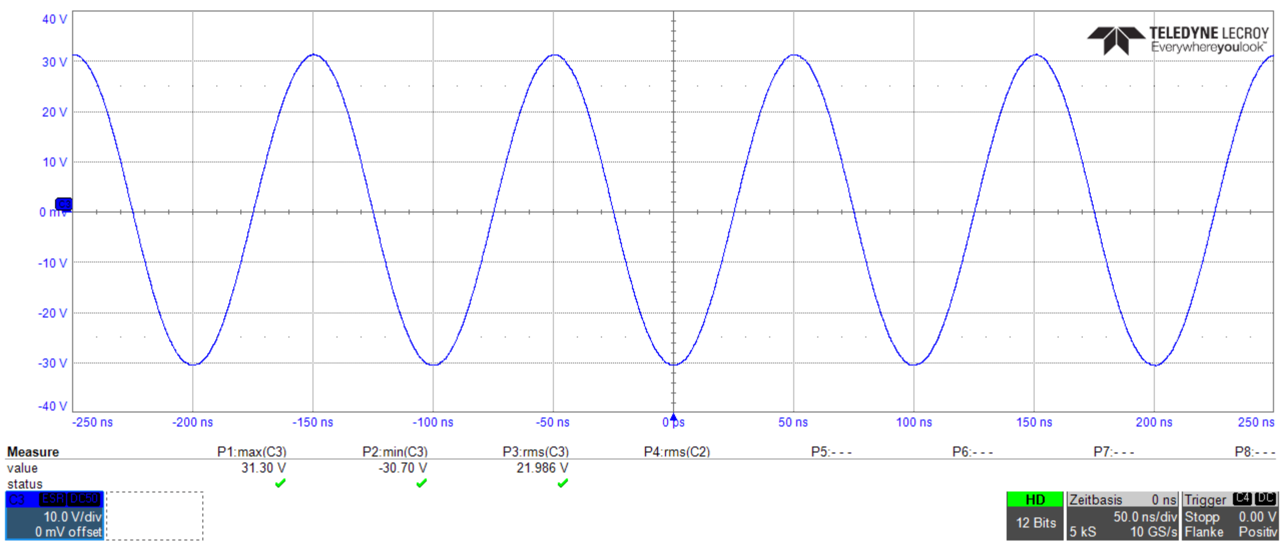
6.3.5 Output voltage 1 MHz/100 W at 12.5 Ω



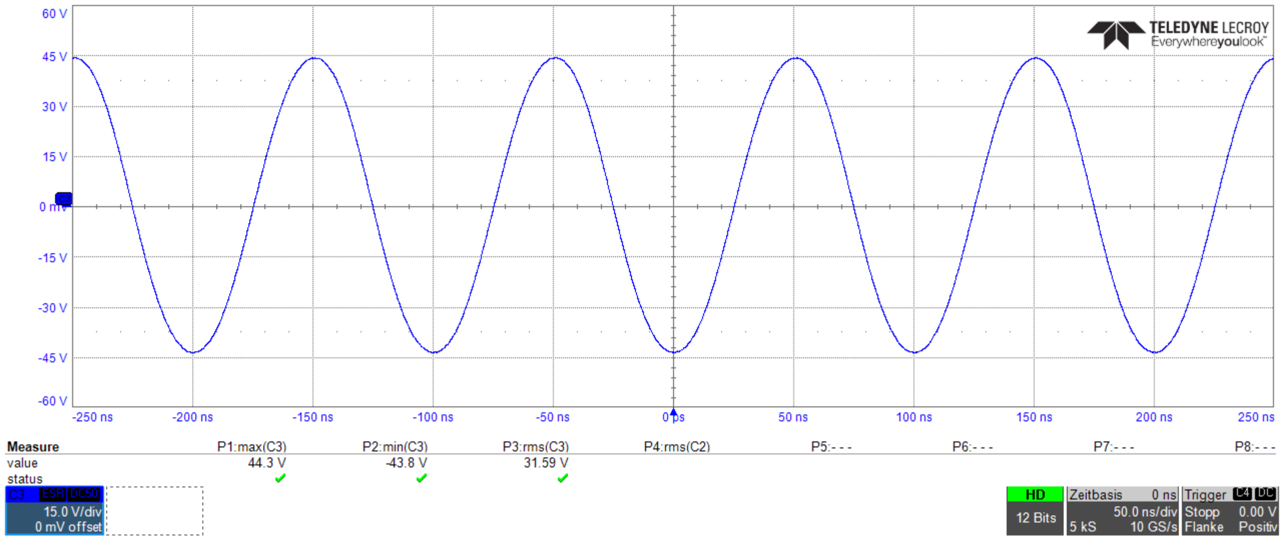
6.3.6 Output voltage 1 MHz/200 W at 12.5 Ω



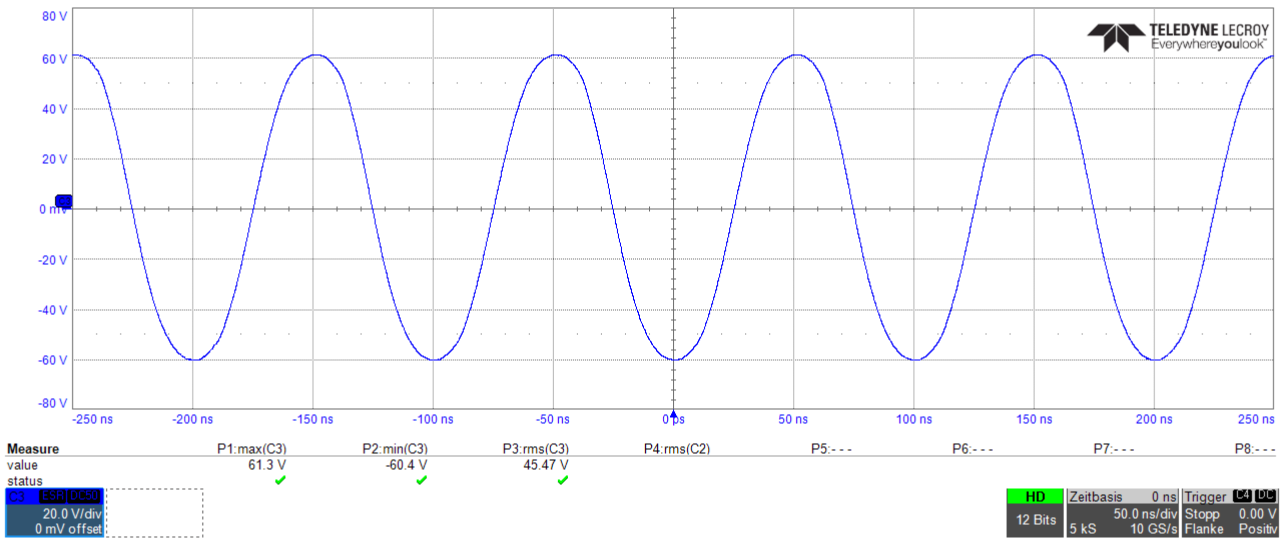
6.3.7 Output voltage 10 MHz/50 W at 12.5 Ω



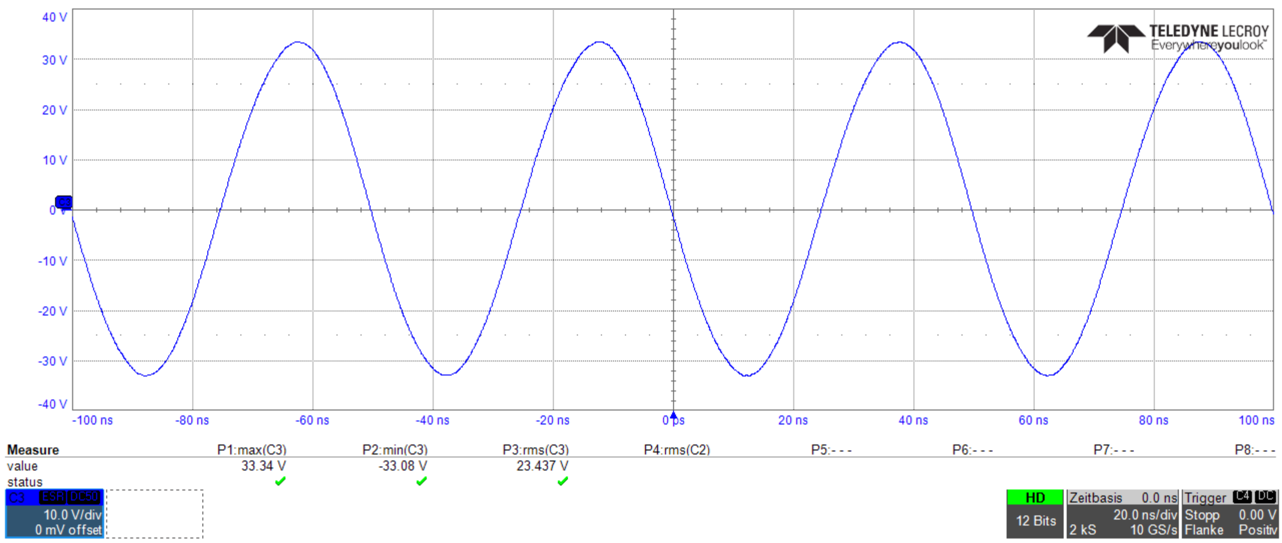
6.3.8 Output voltage 10 MHz/100 W at 12.5 Ω



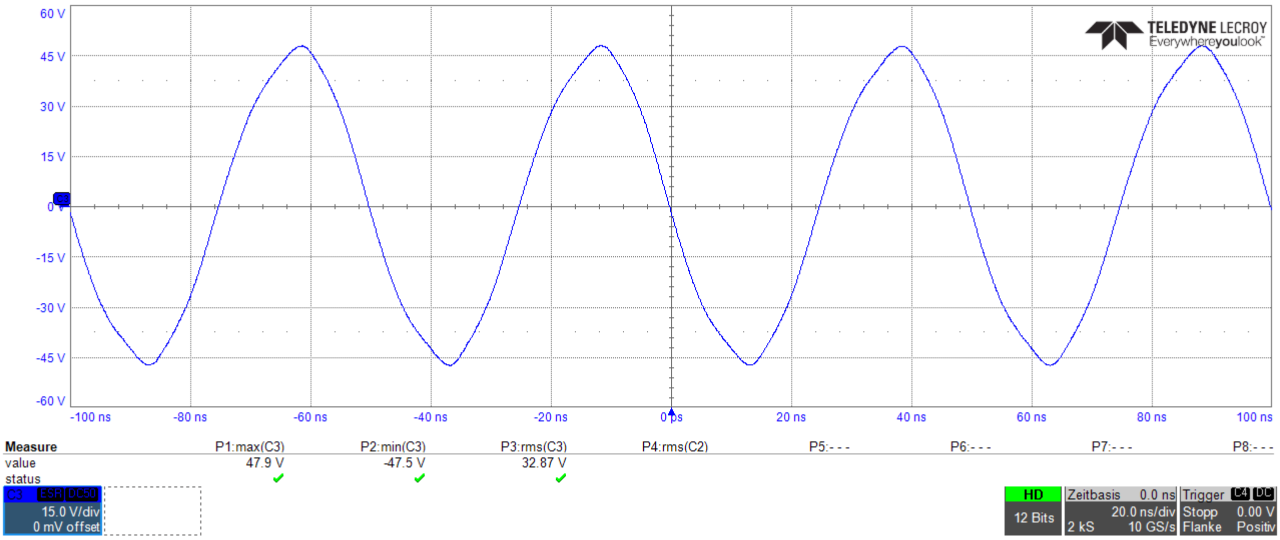
6.3.9 Output voltage 10 MHz/200 W at 12.5 Ω



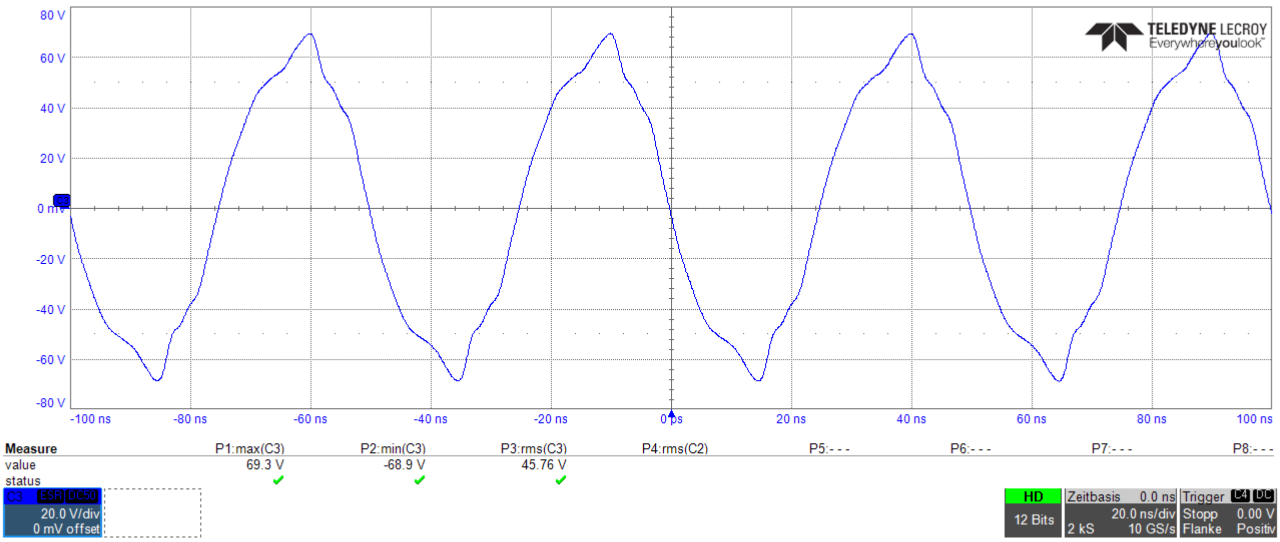
6.3.10 Output voltage 20 MHz/50 W at 12.5 Ω



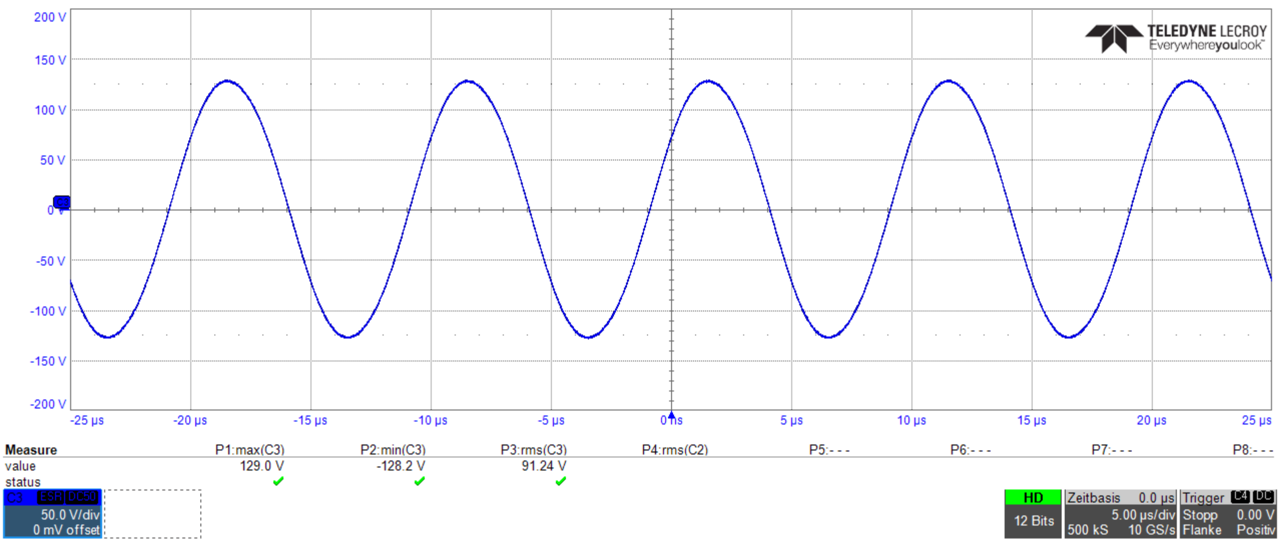
6.3.11 Output voltage 20 MHz/100 W at 12.5 Ω



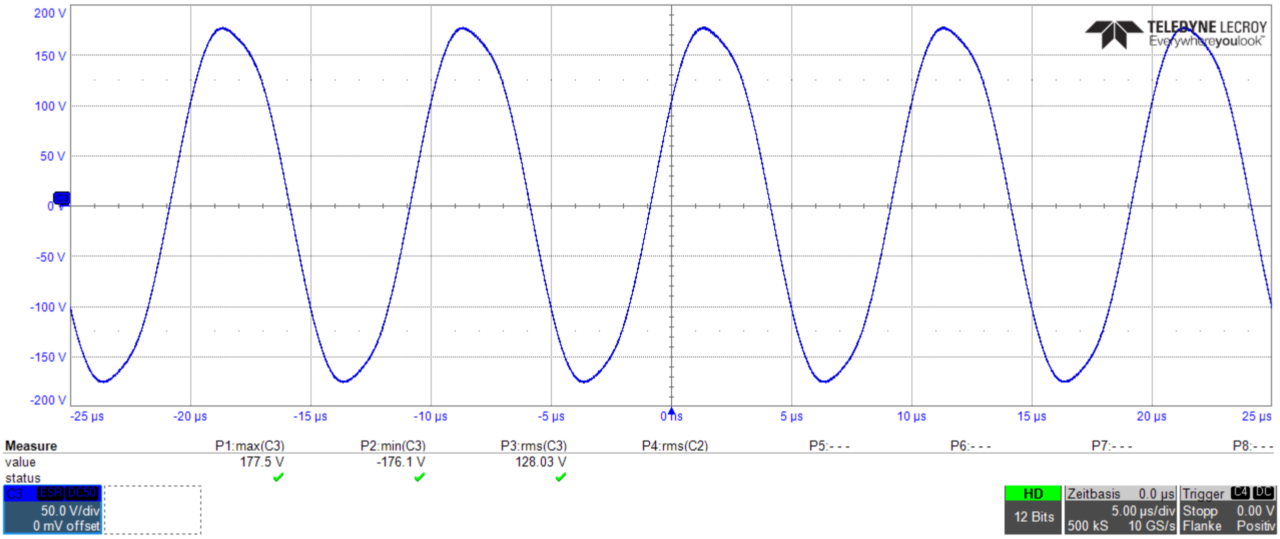
6.3.12 Output voltage 20 MHz/200 W at 12.5 Ω



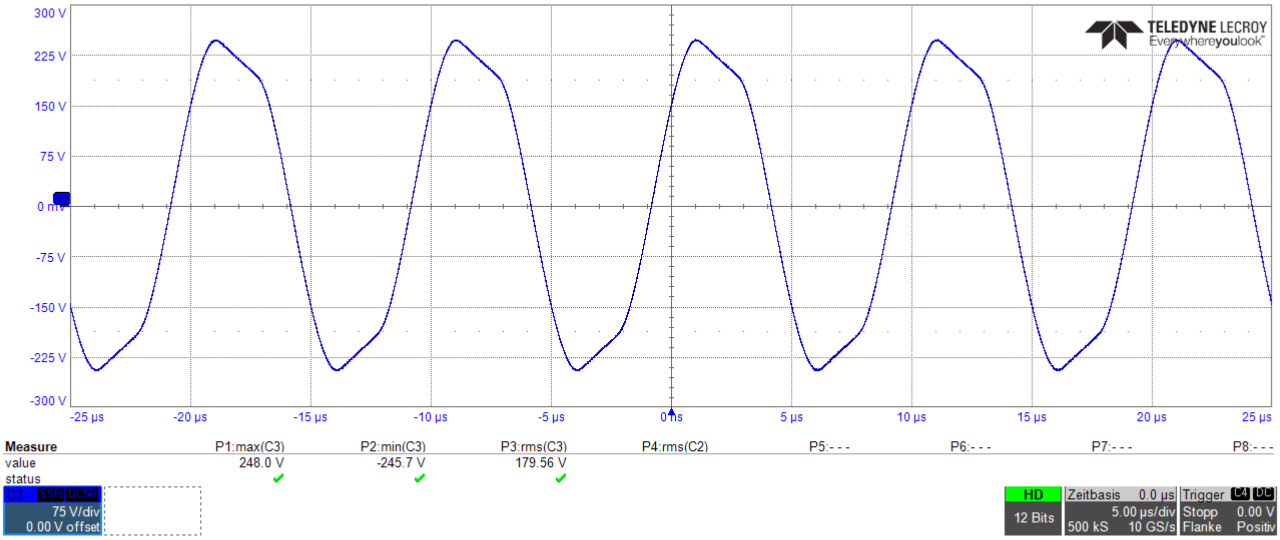
6.3.13 Output voltage 100 kHz/50 W at 200 Ω



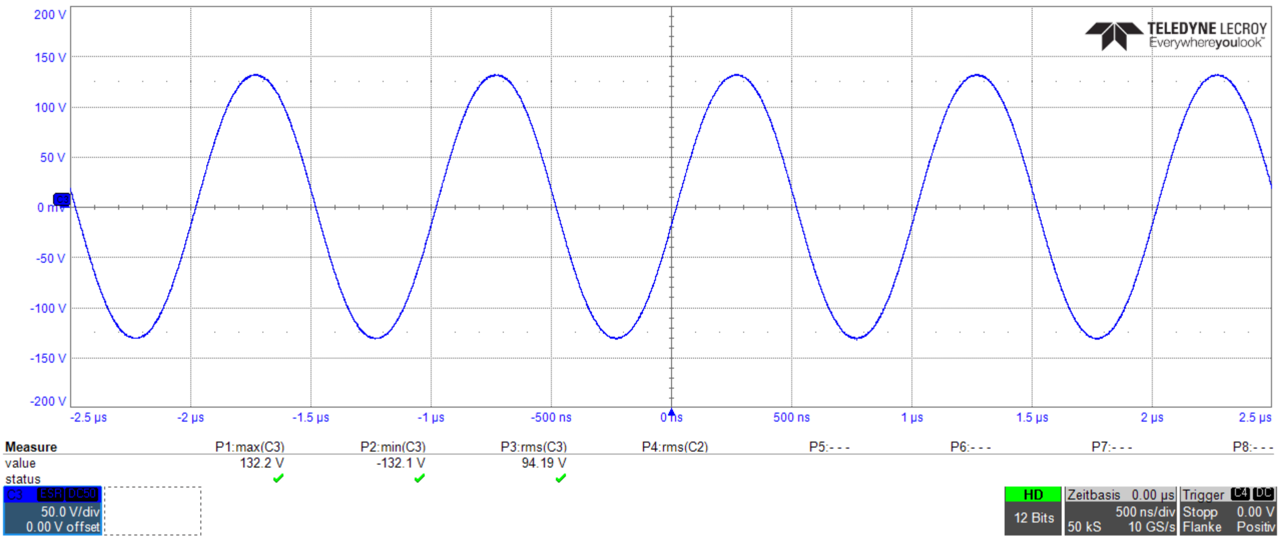
6.3.14 Output voltage 100 kHz/100 W at 200 Ω



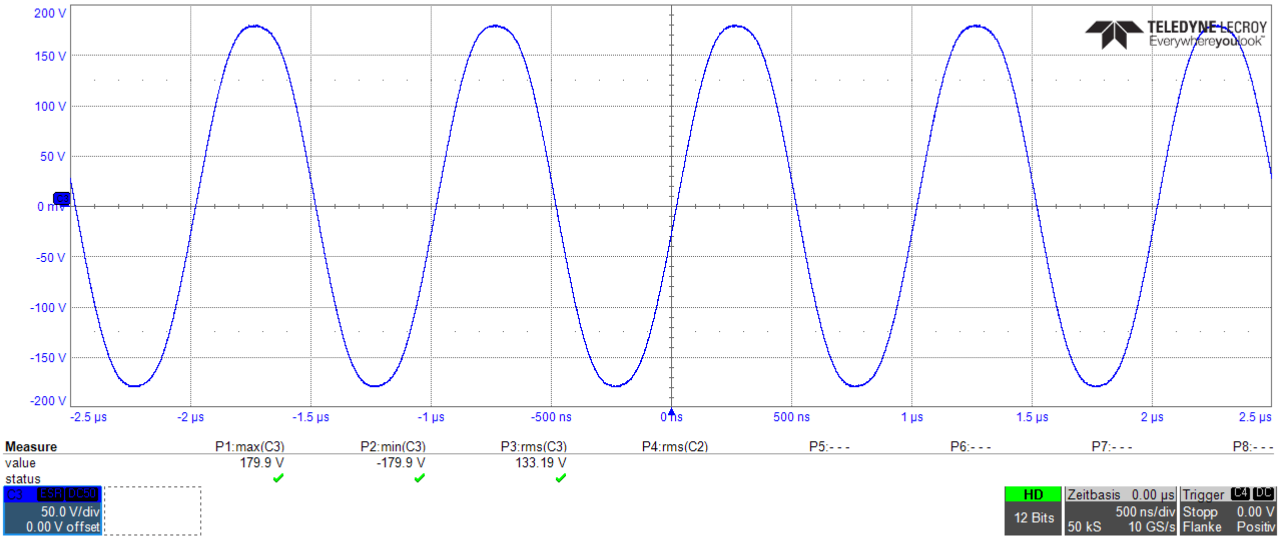
6.3.15 Output voltage 100 kHz/200 W at 200 Ω



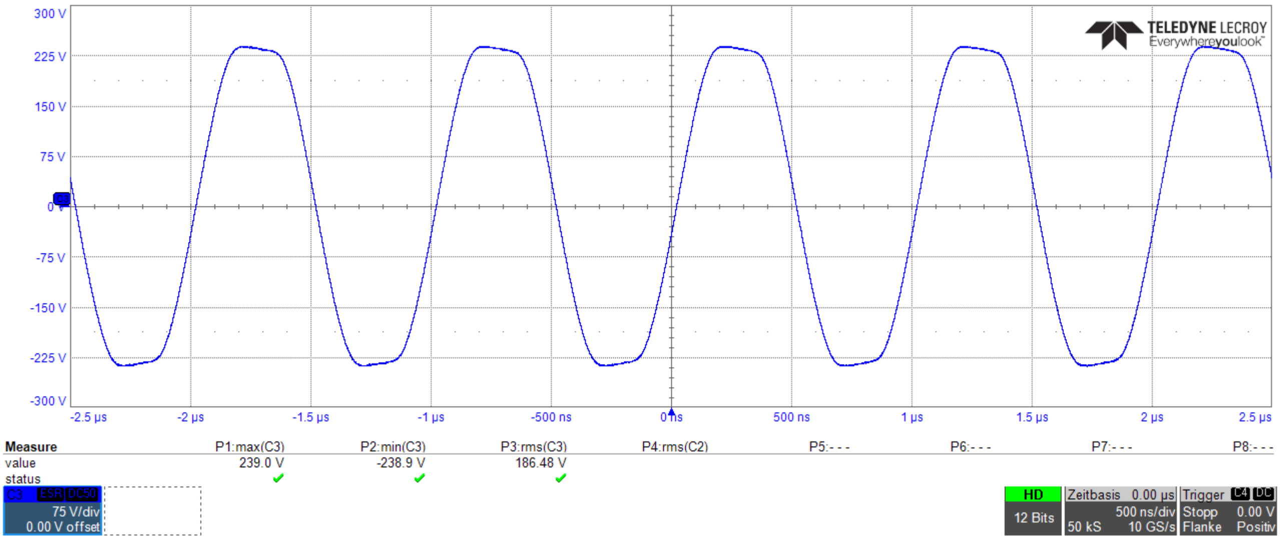
6.3.16 Output voltage 1 MHz/50 W at 200 Ω



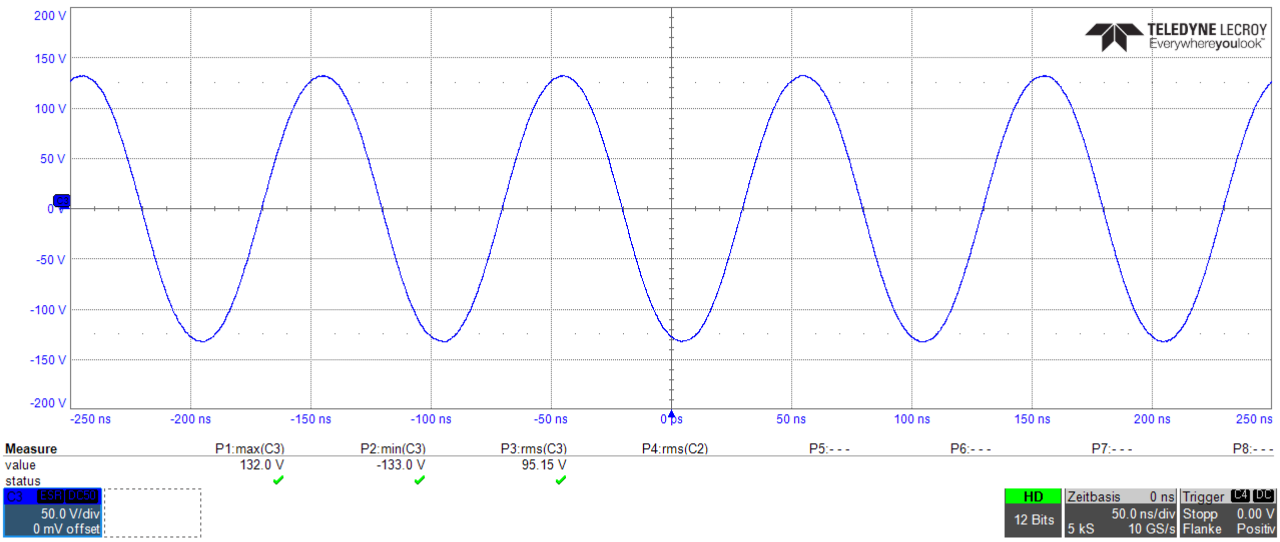
6.3.17 Output voltage 1 MHz/100 W at 200 Ω



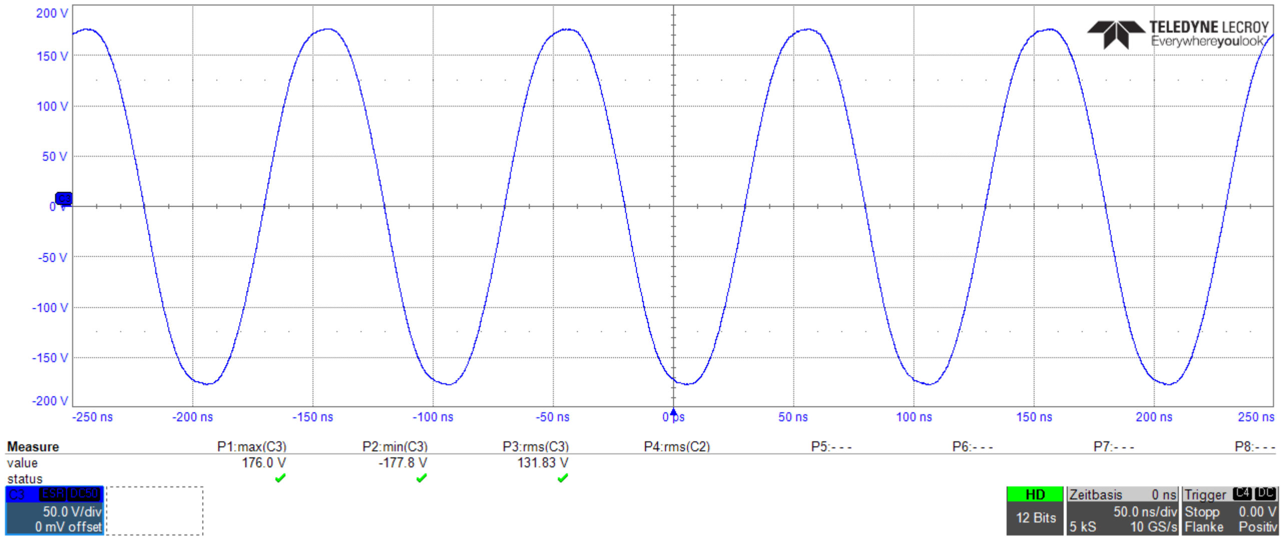
6.3.18 Output voltage 1 MHz/200 W at 200 Ω



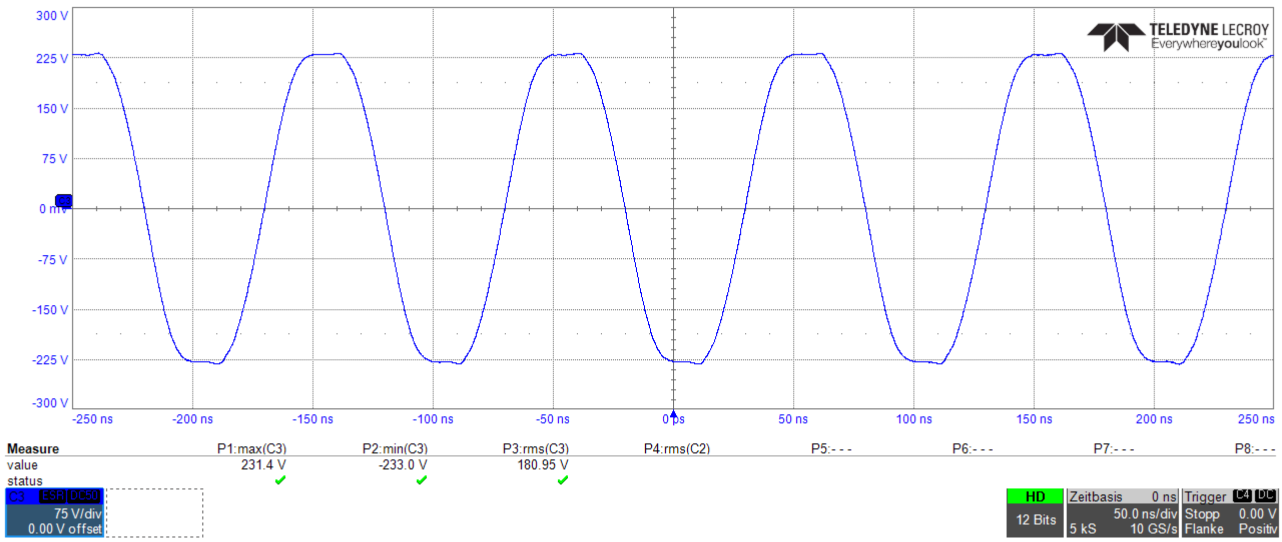
6.3.19 Output voltage 10 MHz/50 W at 200 Ω



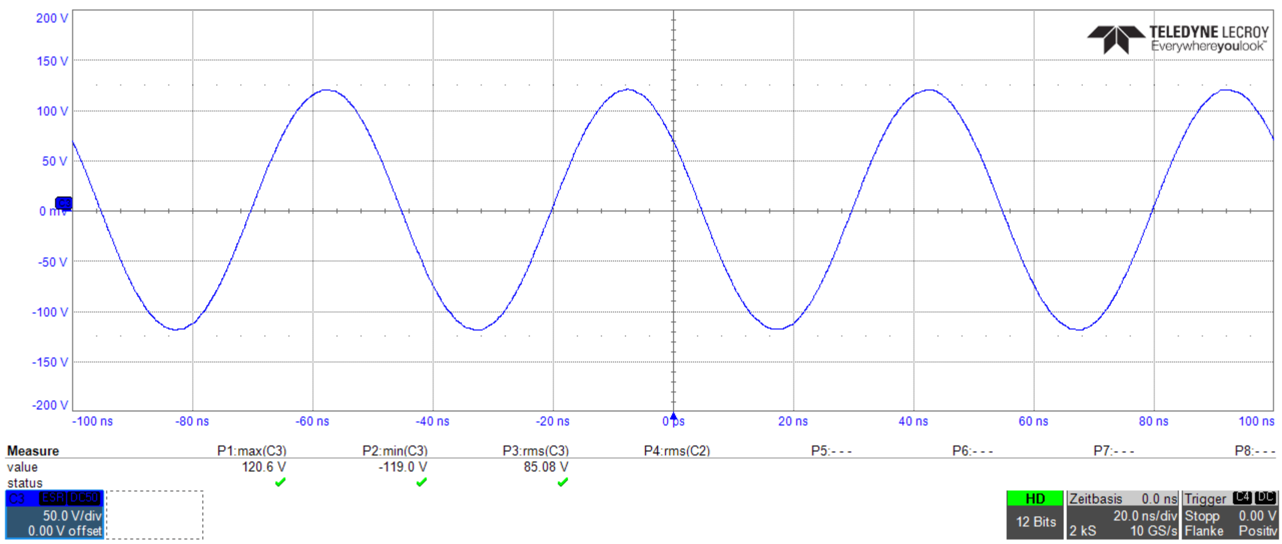
6.3.20 Output voltage 10 MHz/100 W at 200 Ω



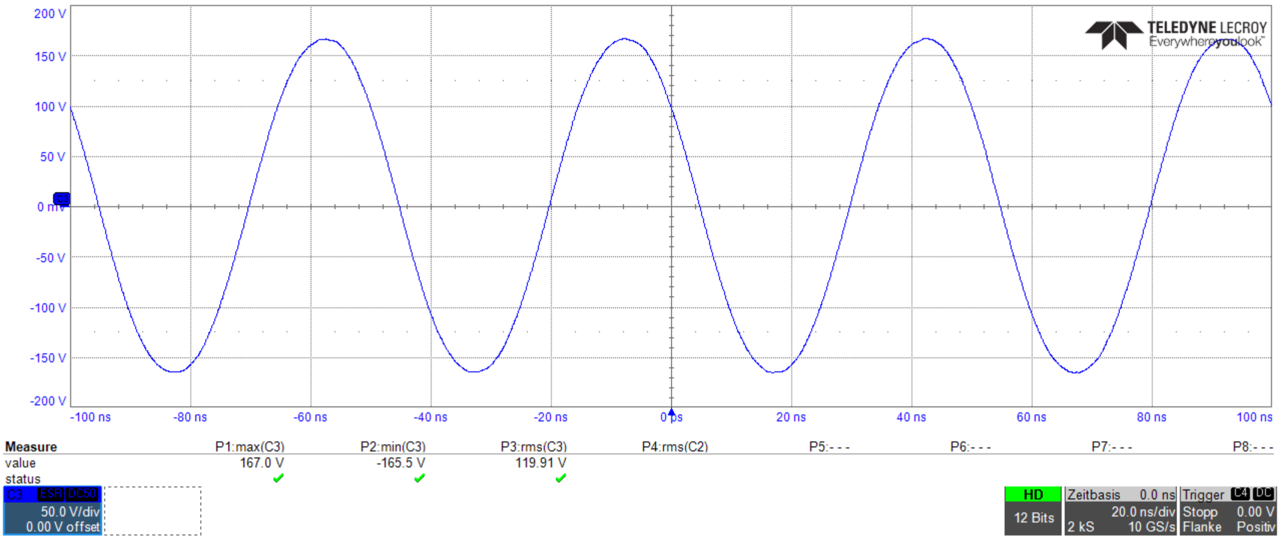
6.3.21 Output voltage 10 MHz/200 W at 200 Ω



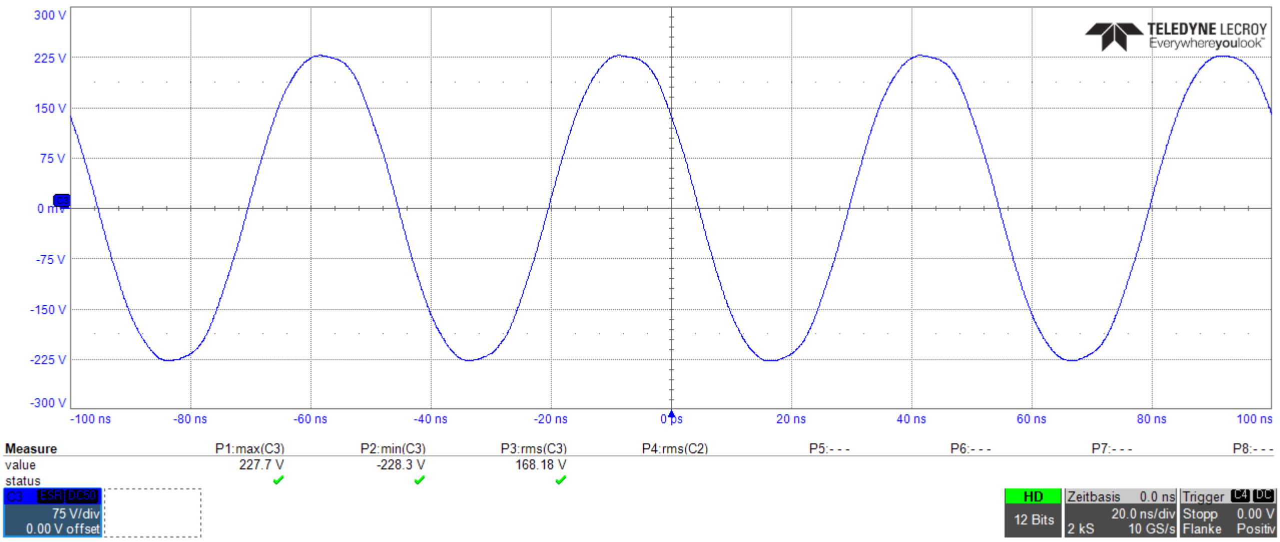
6.3.22 Output voltage 20 MHz/50 W at 200 Ω



6.3.23 Output voltage 20 MHz/100 W at 200 Ω



6.3.24 Output voltage 20 MHz/200 W at 200 Ω



7 Contact

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8 Document History

Revision	Date	Changes
2.0	March 2021	First publication in new housing
2.1	February 2022	Matching transformer added