Prüfbericht-Nr.: *Test report no.:*	**DE25O0IA 001**	**Auftrags-Nr.:** *Order no.:*	1185269 90	Seite 1 von 122 *Page 1 of 122*
Kunden-Referenz-Nr.: *Client reference no.:*	Mail Riham Karim	**Auftragsdatum:** *Order date:*	2025-02-11	
Auftraggeber: *Client:*	Axis Communications AB, Gränden 1, 223 69 LUND, Schweden			
Prüfgegenstand: *Test item:*	Surveillance Radar			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	AXIS D2123-VE Radar White			
Auftrags-Inhalt: *Order content:*	Prüfung der Funkparameter nach FCC & ISED *Test of radio parameters acc. to FCC & ISED*			
Prüfgrundlage: *Test specification:*	Vollprüfung / Complete test FCC CFR 47 Part 15 Subpart C- §15.249 ISED RSS-210:06/2024 Issue 11			

Wareneingangsdatum: *Date of sample receipt:*	2025-01-14
Prüfmuster-Nr.: *Test sample no:*	A003954064-001
Prüfzeitraum: *Testing period:*	2025-03-03 - 2025-07-24
Ort der Prüfung: *Place of testing:*	Nürnberg *Nuremberg*
Prüflaboratorium: *Testing laboratory:*	Wireless Labor *Wireless Test Lab*
Prüfergebnis*: *Test result*:*	Pass

For reasons of confidentiality, no photos of the EUT are included in this report.
For EUT and test setup photos please see the Photo Documentation to this report Number.

geprüft von: *tested by:*	14.11.2025 X Signiert von: Primoz Erzen	**genehmigt von:** *authorized by:*	11/14/2025 X Signed by: Shrinivas Naikar
Datum: *Date:*		**Ausstellungsdatum:** *Issue date:*	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other:* -

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:*	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* *Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

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This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

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Remarks

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Produktbeschreibung
Product description

1	**Test item**	Surveillance Radar
2	**Typ-No.**	AXIS D2123-VE Radar White
3	**Identical Type-No. /Model-No.:**	AXIS D2123-VE Radar Black AXIS D2133-VE Radar White AXIS D2133-VE Radar Black
4	**Test sample obtaining**	☒ Sampling by customer ☐ Sampling by TÜV Rheinland Group ☐ others:
5	**Provided Samples**	A003954064-001
6	**Conducted measurements sample**	A003954064-001 (rad. Sample with Test fixture)
7	**Radiated measurements sample**	A003954064-001 (rad. sample)
8	**Serial-No.**	A003954064-001 (rad. Sample with Test fixture): B8A44FF12CF4 A003954064-001 (rad. sample): B8A44FF12CF4
9	**Supported radio technologies evaluated in this report**	Radar 24GHz
10	**Supported radio technologies not evaluated in this report**	-
11	**Description of EUT**	This product will classify different targets with a 24 Ghz radar and alert if there are any intruders.
12	**Max RF field strength (measured)**	114.75dBµV/m (Peak); 88.75dBµV/m (Average)
13	**Rated Voltage / Frequency**	53.5V DC POE
14	**FCC-ID**	PNB-AXISD2123-VE
15	**IC-ID**	3919A-D2123VE
16	**Antenna Gain (declared)**	11.6 dBi
17	**Radio Module / Antenna Type**	☒ Radio module with antenna on module PCB ☐ Radio module with dedicated antenna ☐ Radio module with user accessible antenna connector
18	**Antenna Type**	☒ Integral antenna (designed as a fixed part of the EUT) ☐ Dedicated antenna (removable, obligation to be used) ☐ Permanent antenna connector
19	**Antenna number of chains**	EUT contains 3 Radar Modules Each Radar Module uses 2 TX-Antennas and 8 RX Antennas
20	**Software / Firmware**	12
21	**Hardware**	R1
22	**Companion Device** used for radio connection with the EUT	EUT in Test Mode. Therefore, no Companion Device was used.
23	**Auxiliary equipment** used to set up the EUT	PC with PUTTY and Test Software provided by customer
24	**Accessory Devices** used together with the EUT	POE-Adapter provided by customer
25	**Temperature Range**	-40°C to + 60°C
26	**Environment**	Indoor and Outdoor

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Bemerkungen/** *Remarks*	**Ergebnis** *Result*
FCC §15.203 ISED RSS-Gen sec. 6.8	Antenna Requirement	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC §15.215 (c)	20Bandwidth	-	P ☒ F ☐ N/A ☐ N/T ☐
ISED RSS-Gen sec. 6.7	Occupied bandwidth 99%	only to be measured but no limits apply.	
FCC §15.249 (a) ISED RSS-210 sec. B.10 a	Field strength of fundamental emissions	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC §15.249 (a-b) ISED RSS-210 sec. B.10 a-b	Field strength of unwanted and harmonic emissions	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC §15.207 ISED RSS-Gen sec. 8.8	AC Power Conducted Emissions	-	P ☒ F ☐ N/A ☐ N/T ☐

Prüfdokumentation

Test documentation

Contents

1 Registration 6
2 EUT Classification 6
2.1 Wireless technologies and frequencies supported by the EUT. 6
2.2 Additional specifications for Applications with FMCW-Modulation 6
2.3 Standard specific classification of the EUT 7
3 Test conditions and configurations 7
3.1 Normal environmental test conditions 7
3.2 Extreme environmental test conditions 7
3.3 Equipment modifications 7
3.4 Antenna assemblies 7
3.5 Test Modes 8
3.6 Measurement Uncertainty 9
4 Test results in detail 10
4.1 Antenna Requirement 10
4.2 20dB / 99% Bandwidth 11
4.3 Field strength of fundamental emissions 37
4.4 Field strength of unwanted and harmonic emissions 53
4.5 AC Power Conducted Emission 101
5 Test Setup Photo 118
6 Application form 119
7 Equipment List 120
7.1 Hardware 120
7.2 Software 121
8 Change history 122

Prüfdokumentation
Test documentation

1 Registration

The measurement facilities for conducted and radiated disturbance measurements of the TÜV Rheinland LGA Products have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. Measurement data will be accepted in conjunction with applications for Certification under Parts 15 and 18 of the Commission's Rules.
FCC Registration Number: 939976
Bundesnetzagentur Registration Number: BNetzA-CAB-17/21-16
The measurement facilities are also recognized by Innovation, Science and Economic Development (ISED) Canada to test to Canadian radio equipment requirements.
Company Number: 11235A
CAB Identifier: DE0018

2 EUT Classification

2.1 Wireless technologies and frequencies supported by the EUT.

The named technologies are only those falling in the specification of the applied standard.

Technology	Frequency Range (TX)	TX Function	Supported by the EUT	Evaluated in this report
SRD 24GHz	24.0 GHz – 24.25GHz	MIMO	☒	☒

SISO: Single Input Single Output; MIMO; Multiple Input Multiple Output

2.2 Additional specifications for Applications with FMCW-Modulation

Peak Power Measurements on FMCW-Signals are to be corrected for the FMCW desensitization factor. Average and RMS Power Measurements (with a sweep time that it is very slow relative to the EUT cycle time) are not desensitized. Therefore, no FMCW desensitization factor is to be used.
The calculated desensitization factor is only valid for the fundamental emission.

Mode	Chirp Bandwidth [MHz]	Chirp duration [µs]	Inter chirp duration [µs]	Chirp slope [MHz/µs]	Frame time		Desensitization factor [dB]		
					active [ms]	total [ms]	RBW 5 MHz	RBW 1 MHz	RBW 30 kHz
Area	185	44.52	22.96	4.16	50	150	0.0	3.2	33.1
Area-coexistence	185	44.52	22.96	4.16	25	150	0.0	3.2	33.1
Area-lowdoppler	185	44.52	21.56	4.16	66.67	133.34	0.0	3.2	33.1
Road	108	26	9.2	4.16	25	100	0.0	3.2	33.1

The Desensitization factor is calculated with the formula:
DesensitizationFactor[dB] = 5*log(1 + 0.1947 * (ChirpSlope[MHz/µs] / RBW[MHz]²)²

2.3 Standard specific classification of the EUT

2.3.1 Test Methods and Guidance Documents

ANSI C63.10:06/2013 Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.10-2020 + Corrigendum 1-2023 + Amendment 1-2024
KDB 558074:04/19 D01 DTS Measurement Guidance v05r02
KDB 662911 D01:10/2011 Multiple Transmitter Output v02r01
ISED RSS-Gen:04/2018 Issue 5 Amendment 2 (Feb 2021)

2.3.2 Type of equipment

Ceiling Mounted Equipment

3 Test conditions and configurations

3.1 Normal environmental test conditions

Environmental condition	Parameter	Range during test
Temperature	°C	21 to 24
Relative humidity	%	20 to 60
Supply voltage	V DC	53.5

3.2 Extreme environmental test conditions

Environmental condition	Parameter	Range
Temperature	°C	-40 to +60
Supply voltage	Volts DC	50 to 57

3.3 Equipment modifications

No modifications were found to be necessary to perform the tests or to achieve compliance.

3.4 Antenna assemblies

No antenna connector is prepared so tests were done in radiated mode.

3.5 Test Modes

3.5.1 Test Modes Setup

Mode description	Mode configuration
All Modes	The auxiliary equipment was connected to the EUT during the tests. The Ethernet Cable was grounded and filtered at the point of feed-trough.The device was setup with SSH-connection via putty. The following commands for setting the mode were being used:
Mode 1: TX-Mode Area_lowdoppler_0dB	radarconf set RadarProfile area_lowdoppler radarconf set TxBackoff 0
Mode 2: TX-Mode Road_0dB	radarconf set RadarProfile road radarconf set TxBackoff 0
Mode 3: TX-Mode Area_lowdoppler_-4dB	radarconf set RadarProfile area_lowdoppler radarconf set TxBackoff 1
Mode 4: TX-Mode Road_-4dB	radarconf set RadarProfile road radarconf set TxBackoff 1

3.6 Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028-1/-2 and ETSI TS 103 051 (radiated measurements) and is documented in the quality system acc. to ISO/IEC 17025:2017.
Furthermore, component and process variability of devices similar to that tested may result in additional deviation.
The stated values are the expanded uncertainty values, the measured value lies within the assigned range of values with a probability of 95% (k = 1.96).
The manufacturer has the sole responsibility of continued compliance of the device.

Test	Value	Unit	Range
Frequency Error	2.7 *10^{-8}	Hz	-
Frequency Stability under low voltage conditions			
Time	1.1*10^{-9}	s	-
Conducted Carrier Power Conducted Spurious Emissions (RX/TX)	1.0	dB	9k-1GHz
	1.7	dB	1GHz-6GHz
	2.8	dB	6GHz-40GHz
Occupied Bandwidth (OBW)	0.1	%	-
TX Power Spectral Density	4.2	mW	9kHz - 6GHz
	1.6	dB	9kHz - 6GHz
Dwell Time	4.6 *10^{-7}	Hz	-
Frequency Separation			-
Measurement of conducted emissions at the power supply connection to LISN	2.3	dB	9kHz – 150kHz
	2.2	dB	150kHz – 30MHz
Measurement of the field strength at distance 3m	1.6	dB	9k-150kHz
	4.5	dB	30-1000MHz
	5	dB	1-6GHz
	5.3	dB	6-40GHz
Temperature	0.8	K	-
Humidity	4	%	-
Voltage (AC/DC)	1.0	%	-

Measured value	Limit	Extended measurement uncertainty (k=1.96)	Confidence interval (95%)
19 dBm @ 2.48GHz	20 dBm	1.7 dB	17.3 dBm – 20.7 dBm

4 Test results in detail

4.1 Antenna Requirement

4.1.1 Requirements / Limits

FCC Part 15, Subpart C, §15.203:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

ISED RSS-Gen sec. 6.8:
The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

4.1.2 Test Results

The antenna is soldered to a printed circuit board. This is sufficient to demonstrate compliance with the antenna requirement in FCC Part 15, Subpart C, §15.203 (acc. KDB 353028 D01) and ISED RSS-Gen sec. 6.8.

4.1.1 **Final test result** (Antenna Requirement)

Final test result	Pass

4.2 20dB / 99% Bandwidth

4.2.1 Requirements / Limits

FCC Part 15, Subpart C, §15.215 (c):
Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.
If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

ISED RSS-Gen sec. 6.7
The occupied bandwidth (99%) shall be reported for all equipment, but no limits apply.
The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

4.2.2 Test Method

The 20 dB bandwidth was measured according to ANSI C63.10 clause 6.9.2 and ISED RSS-Gen sec. 6.7
The 99% bandwidth was measured according to ISED RSS-Gen sec. 6.7.

For EUTs with permanent or temporary antenna connector conducted method was used to measure the 20dB and 99% bandwidth at normal conditions and (if needed) the 20dB bandwidth at extreme conditions. The EUT was connected to the spectrum analyzer via a coax cable with a known loss.

For EUTs with integral antenna only, radiated method was used to measure the 20dB and 99% bandwidth under normal conditions and (if needed) conducted method with a test fixture was used to measure the 20dB bandwidth under extreme conditions.

4.2.3 **Test Setup** (20dB / 99% Bandwidth)

4.2.3.1 Conducted measurements

EUT		A003954064-001 (rad. Sample with Test fixture)
Chamber details		Shielded room
Companion device		EUT in Test Mode. Therefore, no Companion Device was used.
Operation mode		☒ 1: TX-Mode Area_lowdoppler_0dB ☒ 2: TX-Mode Road_0dB ☒ 3: TX-Mode Area_lowdoppler_-4dB ☒ 4: TX-Mode Road_-4dB
Spectrum Analyzer	**Centre Frequency**	24150MHz (Mode Area_lowdoppler); 24110MHz (Mode Road)
	Resolution Bandwidth	2MHz (1% to 5% of the OBW)
	Video Bandwidth	8MHz (>three times RBW)
	Span	300MHz
	Sweep time	1000 ms
	Detector	Peak with max-hold
Further parameters		-
Test engineer		Primoz Erzen

4.2.3.2 Radiated measurements

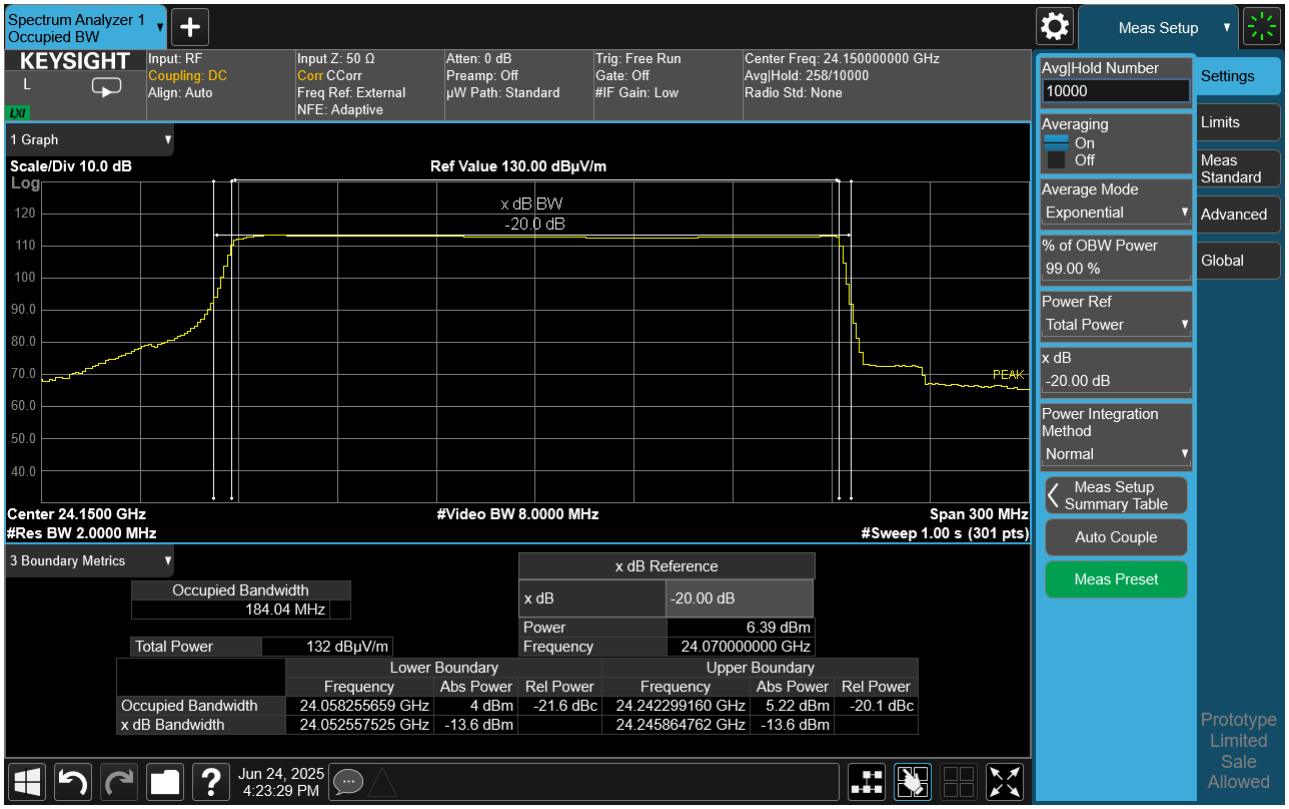
EUT		A003954064-001 (rad. sample)
Chamber details		☒ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC)
Measurement positioning		Distance: EUT height: Antenna height: ☒ 3m ☒ 1.5m ☒ 1.5m ☐ 10m ☐ 0.8m ☐ 1m to 4m – height scan
Receiving Antenna		Horn Antenna 3116C-PA (18-40GHz)
Receiving Antenna Polarization		Horizontal and Vertical
EUT Positioner		40cm x 60cm non-conductive positioner Only on worst case positions of radiated field strength measurement
EUT Turn Table		Only on worst case positions of radiated field strength measurement
Companion device		EUT in Test Mode. Therefore, no Companion Device was used.
Operation mode		☒ 1: TX-Mode Area_lowdoppler_0dB ☒ 2: TX-Mode Road_0dB ☒ 3: TX-Mode Area_lowdoppler_-4dB ☒ 4: TX-Mode Road_-4dB
Spectrum Analyzer	**Centre Frequency**	24150MHz (Mode Area_lowdoppler); 24110MHz (Mode Road)
	Resolution Bandwidth	2MHz (1% to 5% of the OBW)
	Video Bandwidth	8MHz (>three times RBW)
	Span	300MHz
	Sweep time	1000 ms
	Detector	Peak with max-hold
Further parameters		-
Test engineer		Primoz Erzen

4.2.4 Test Results (20dB / 99% Bandwidth)

4.2.4.1 Radiated measurements, normal test conditions

For the radiated measurements the worst case positioning from the fundamental field strength measurements was used.

4.2.4.1.1 Mode Area_lowdoppler_0dB; Azimuth 109deg; Elevation -3deg; Vertical polarization



4.2.4.1.1.1 99 % Bandwidth

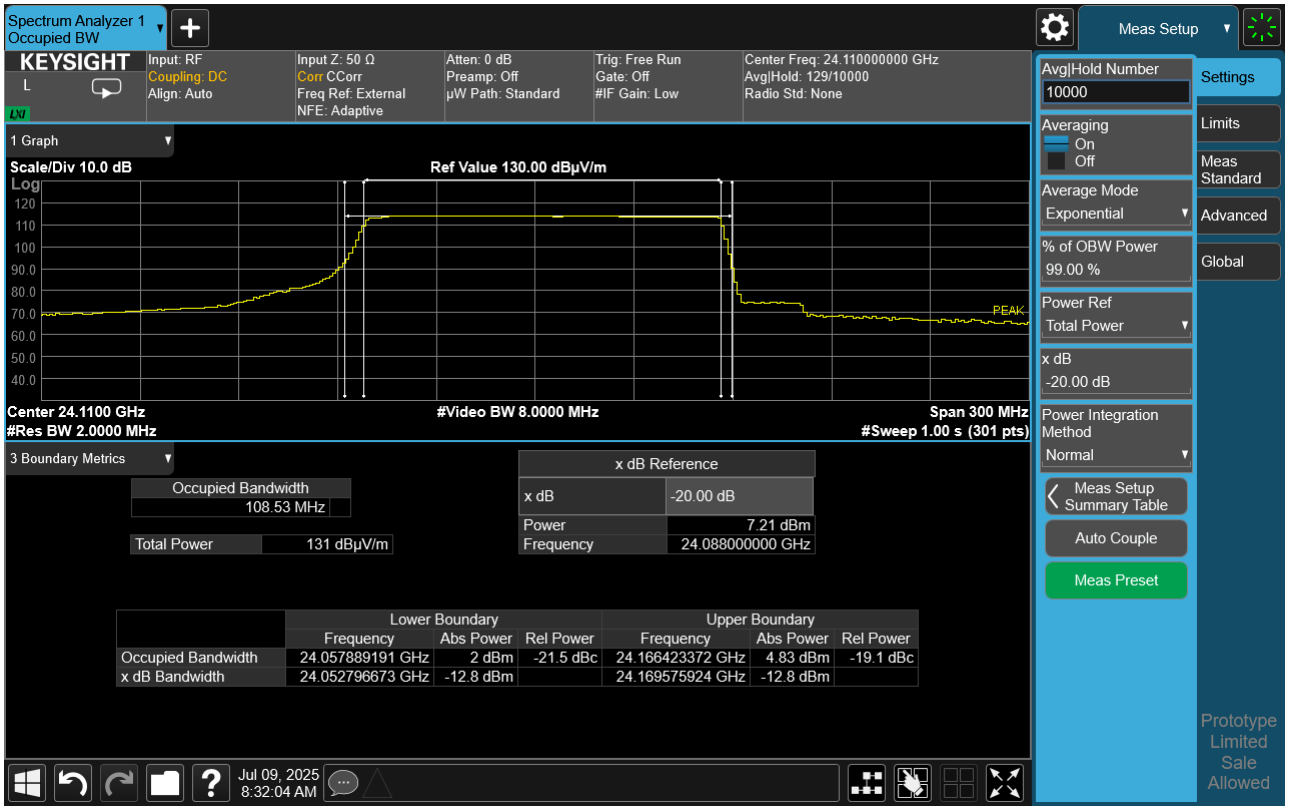
Test Conditions	$f_{L_99\%}$ [MHz]	$f_{H_99\%}$ [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24058	24242	24000	24250	P

4.2.4.1.1.2 20 dB Bandwidth

Test Conditions	f_{L_20dB} [MHz]	f_{H_20dB} [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24053	24246	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.1.2 Mode Road_0dB; Azimuth 105deg; Elevation -1deg; Vertical polarization



4.2.4.1.2.1 99 % Bandwidth

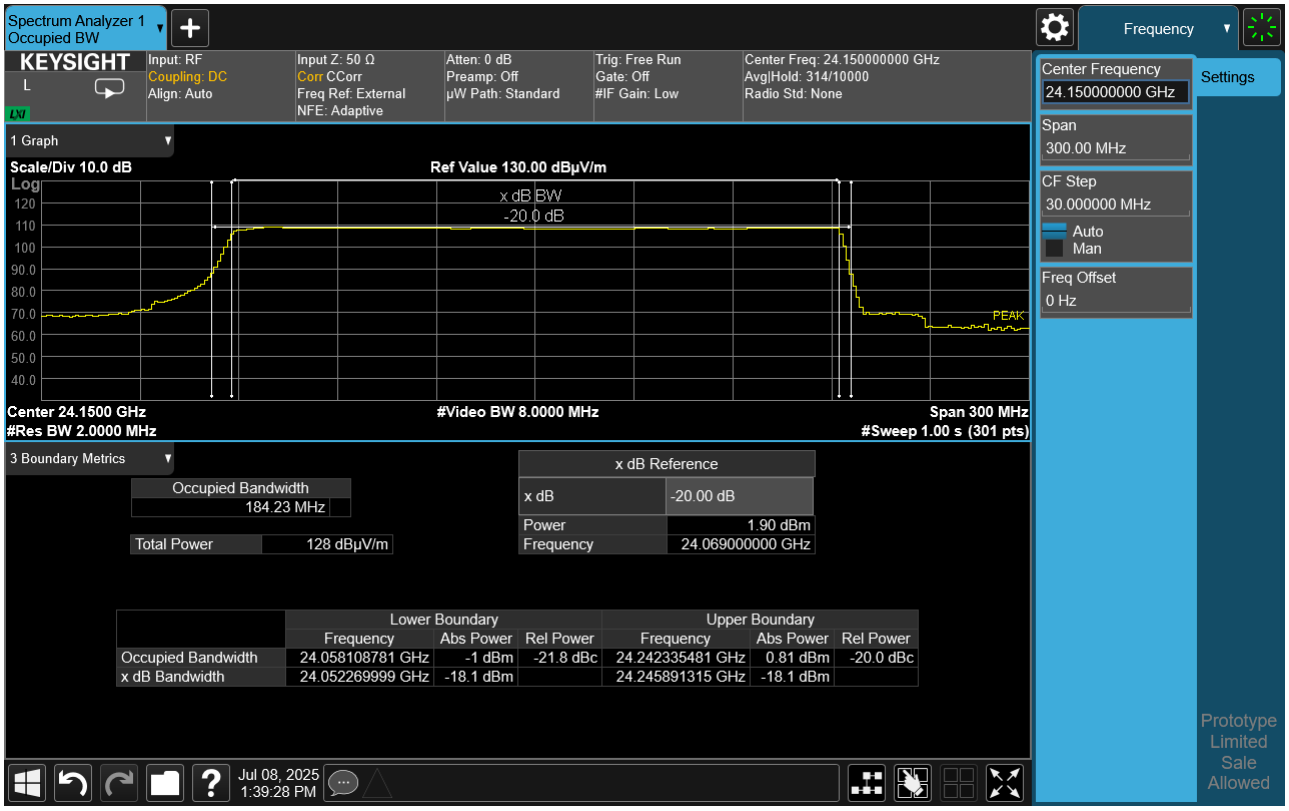
Test Conditions	$f_{L_99\%}$ [MHz]	$f_{H_99\%}$ [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24058	24166	24000	24250	P

4.2.4.1.2.2 20 dB Bandwidth

Test Conditions	f_{L_20dB} [MHz]	f_{H_20dB} [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24053	24170	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.1.3 Mode Area_lowdoppler_-4dB; Azimuth -2deg; Elevation 86deg; Horizontal polarization



4.2.4.1.3.1 99 % Bandwidth

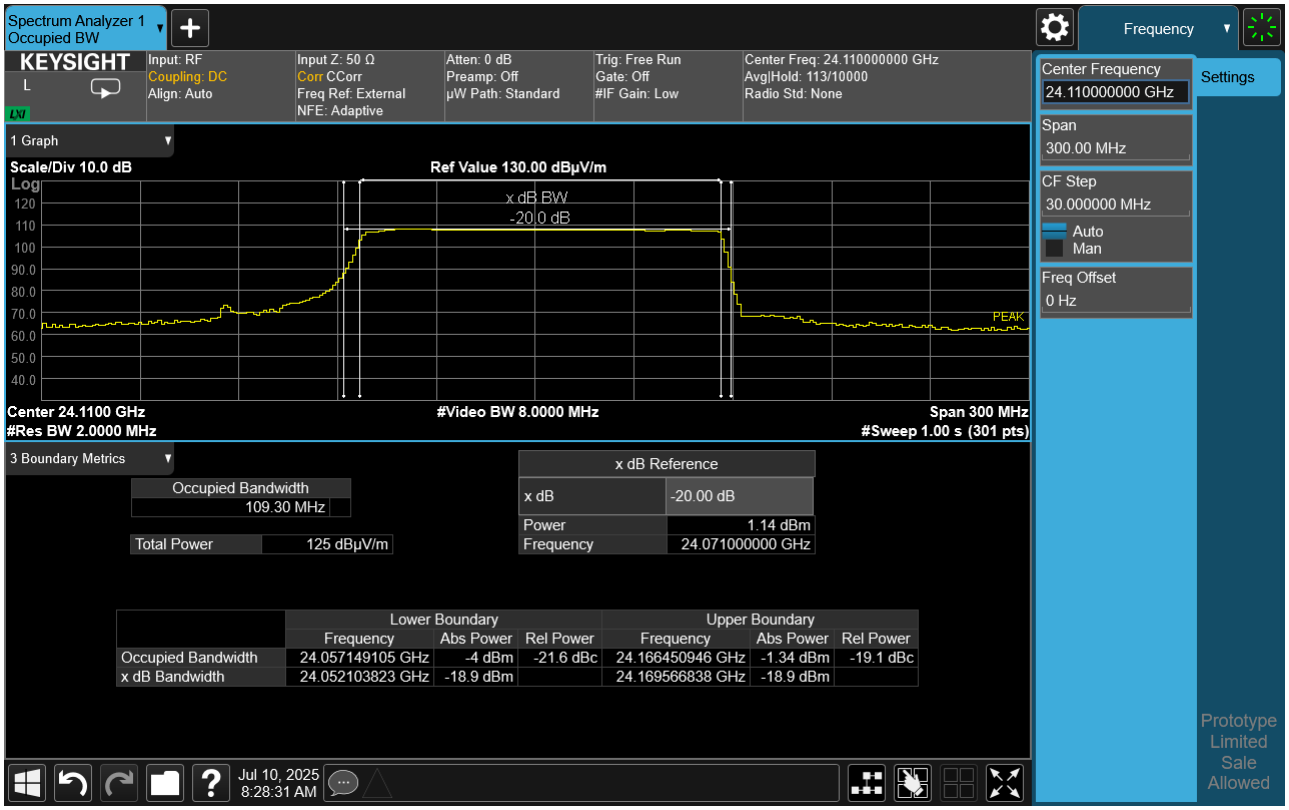
Test Conditions	$f_{L_99\%}$ [MHz]	$f_{H_99\%}$ [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24058	24242	24000	24250	P

4.2.4.1.3.2 20 dB Bandwidth

Test Conditions	f_{L_20dB} [MHz]	f_{H_20dB} [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24052	24246	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.1.4 Mode Road_-4dB; Azimuth -7deg; Elevation 89deg; Horizontal polarization



4.2.4.1.4.1 99 % Bandwidth

Test Conditions	$f_{L_99\%}$ [MHz]	$f_{H_99\%}$ [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24057	24166	24000	24250	P

4.2.4.1.4.2 20 dB Bandwidth

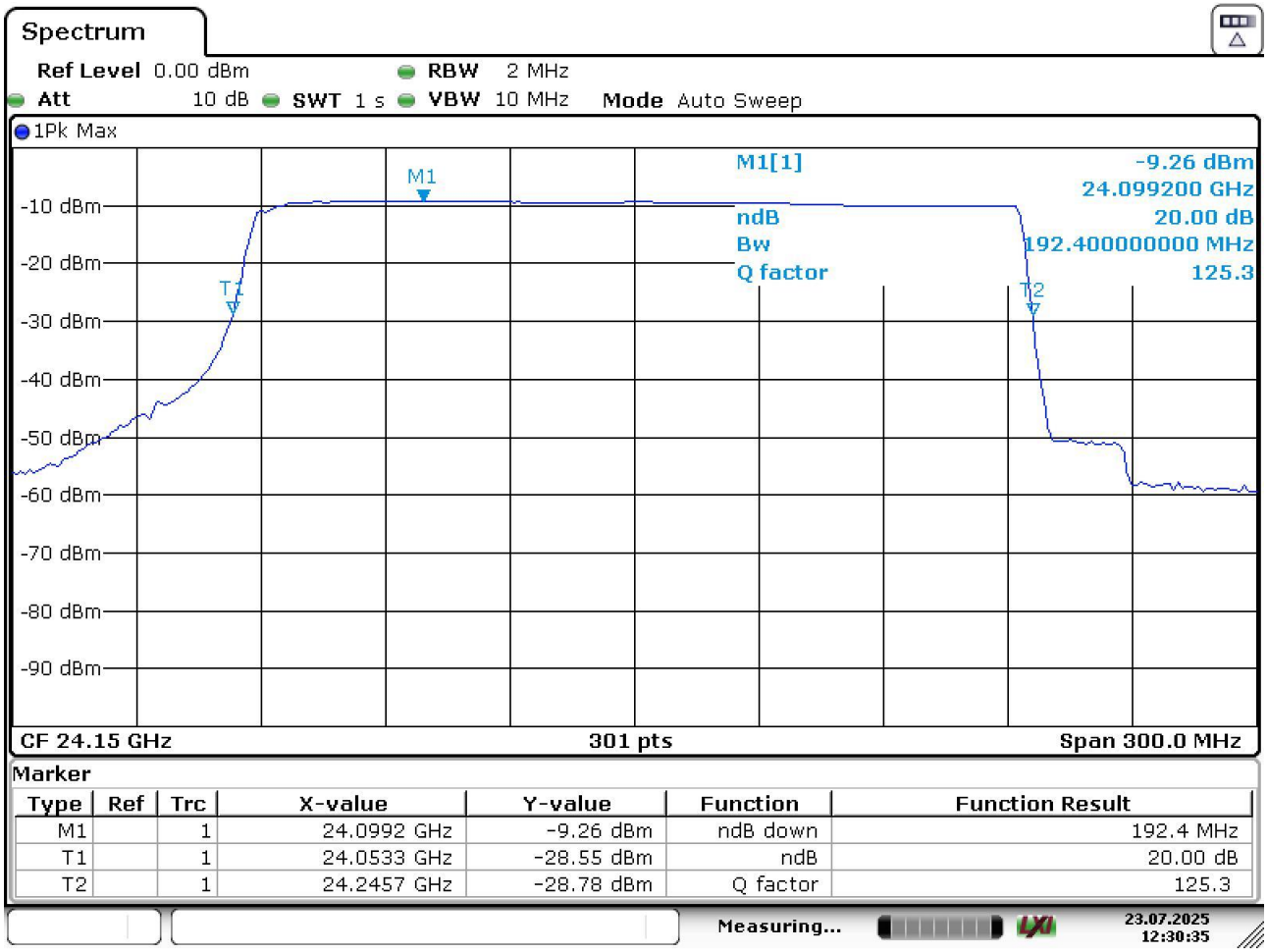
Test Conditions	f_{L_20dB} [MHz]	f_{H_20dB} [MHz]	Limit		Result
			f_L [MHz]	f_H [MHz]	
normal	24052	24170	24000	24250	P

4.2.4.2 Conducted measurements at normal and extreme conditions

No frequency stability is specified in the regulations, and the fundamental emission is not kept within at least the central 80% of the permitted band, therefore the 20dB bandwidth of the emission was additionally measured over the expected variations in temperature and supply voltage.

4.2.4.2.1 Mode Area_lowdoppler_0dB

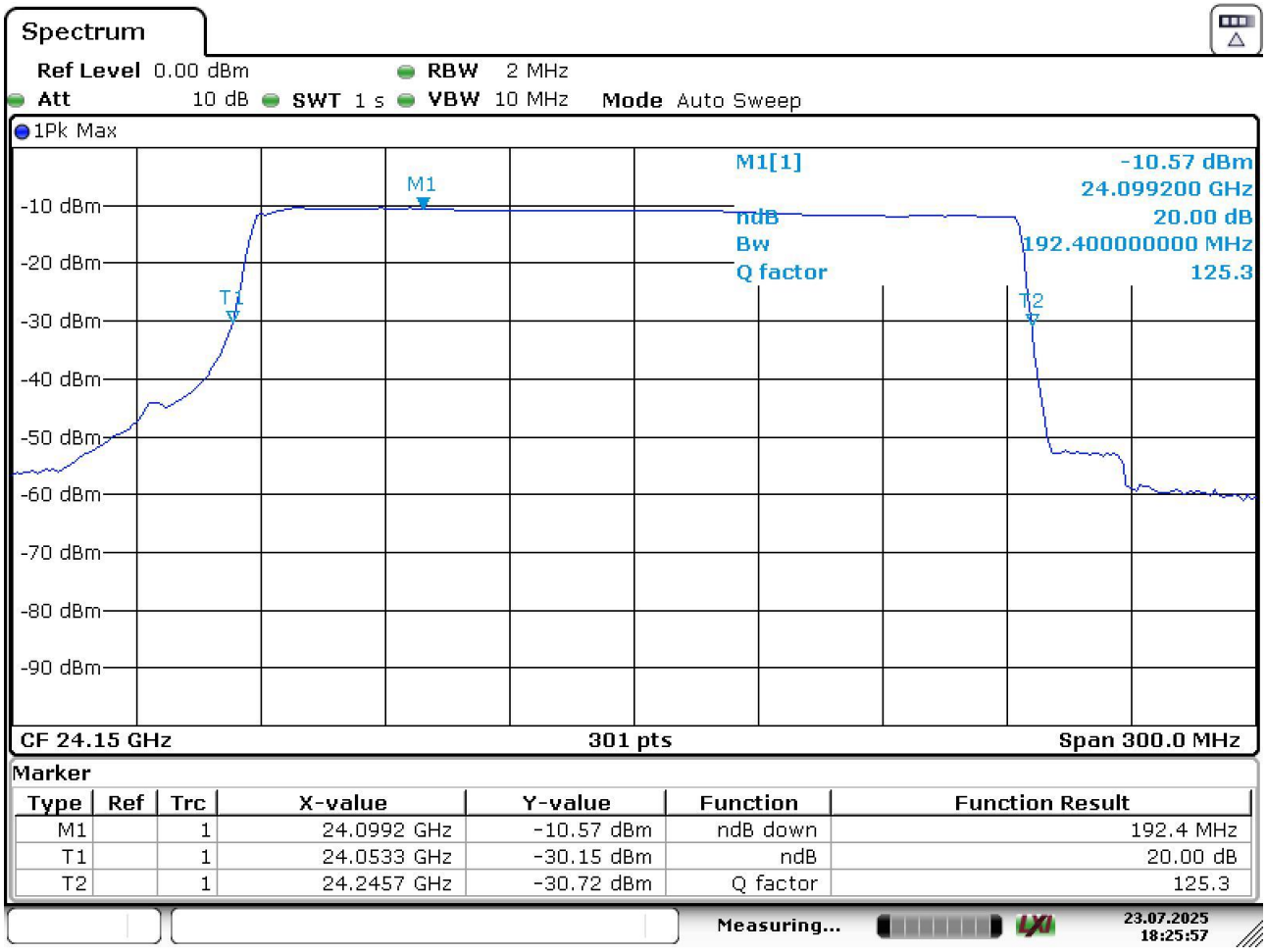
4.2.4.2.1.1 Normal test conditions



Date: 23.JUL.2025 12:30:36

Prüfdokumentation
Test documentation

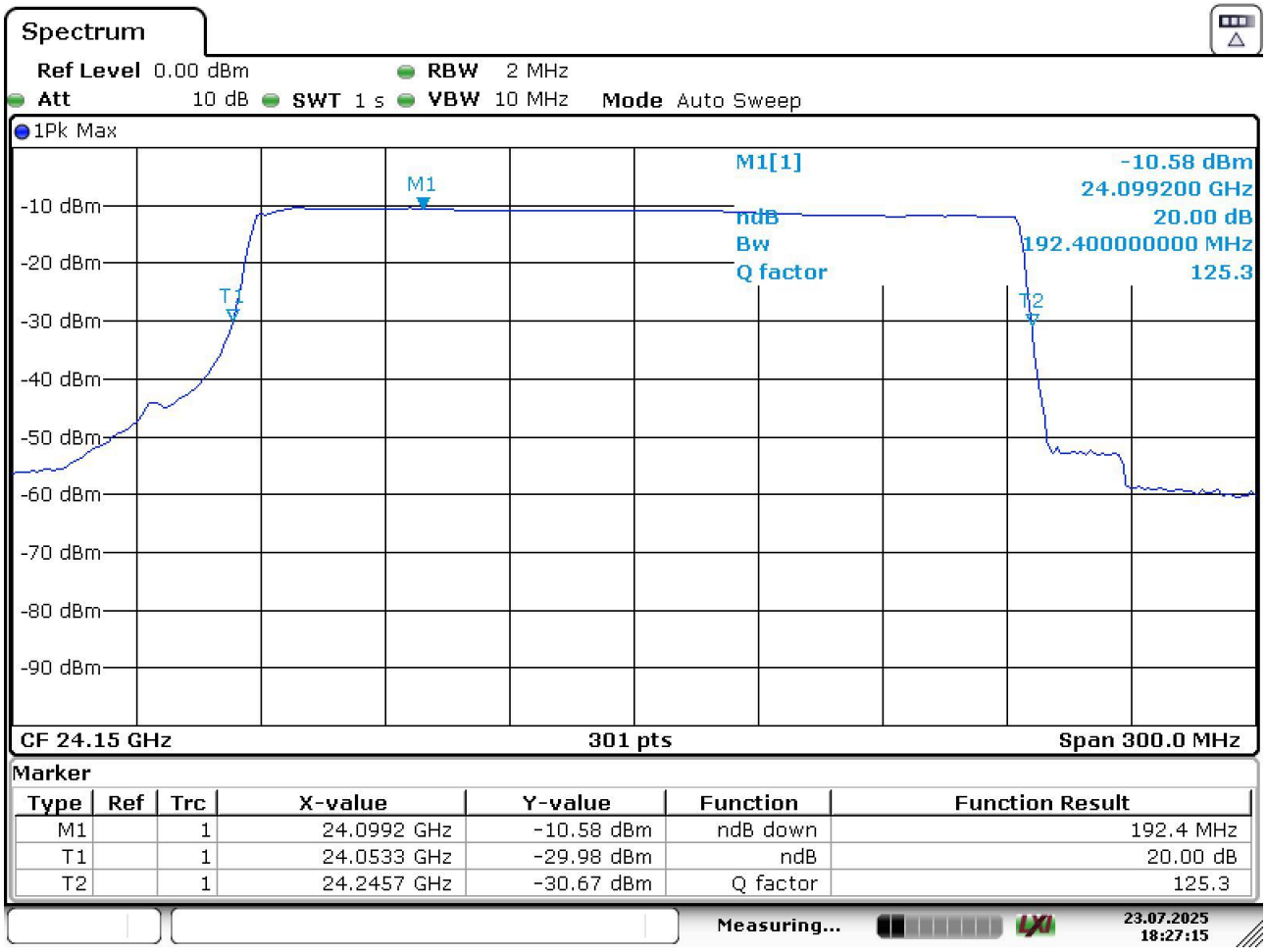
4.2.4.2.1.2 Extreme test conditions +60°C, 57V



Date: 23.JUL.2025 18:25:57

Prüfdokumentation
Test documentation

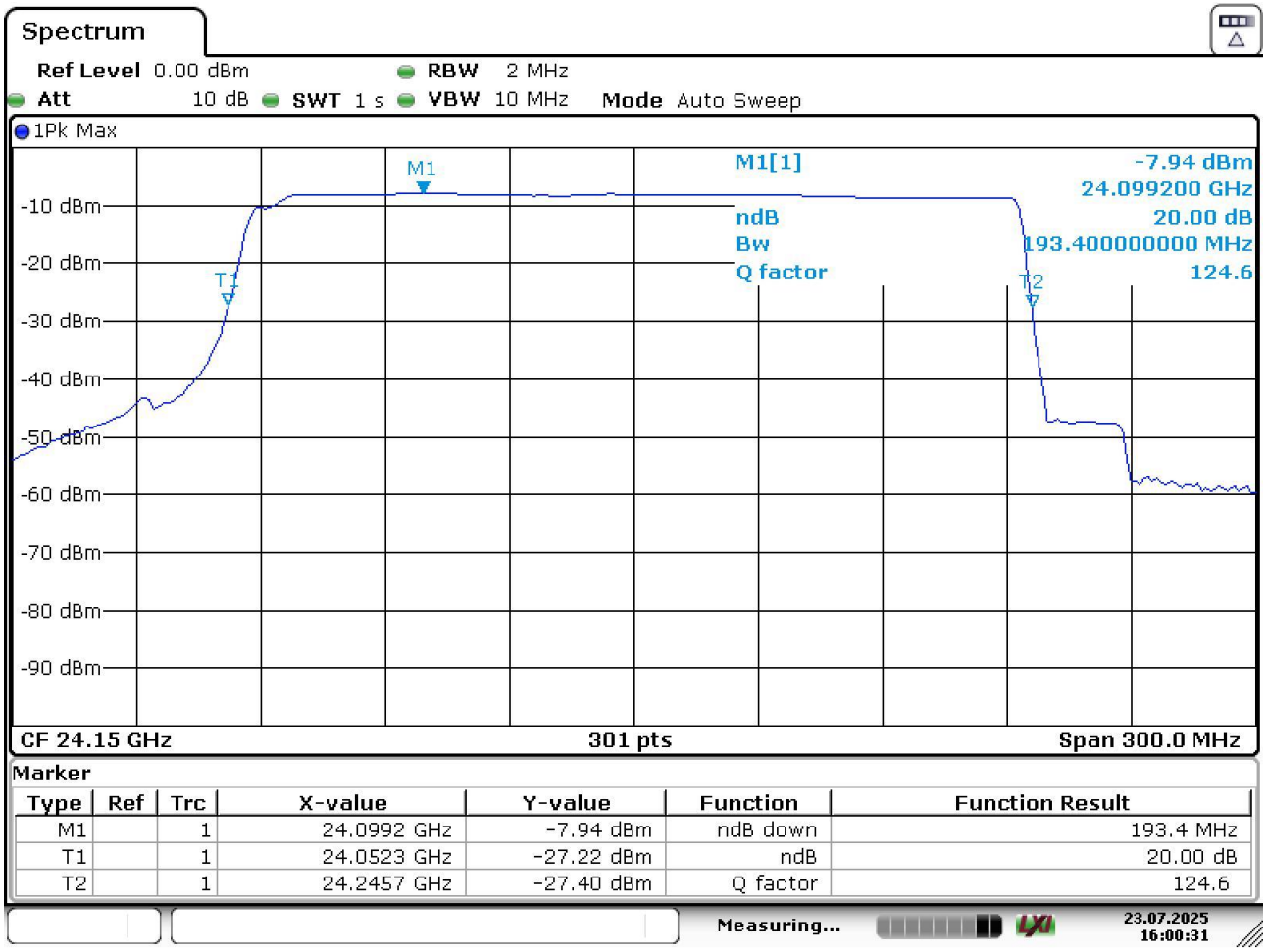
4.2.4.2.1.3 Extreme test conditions +60°C, 50V



Date: 23.JUL.2025 18:27:15

Prüfdokumentation
Test documentation

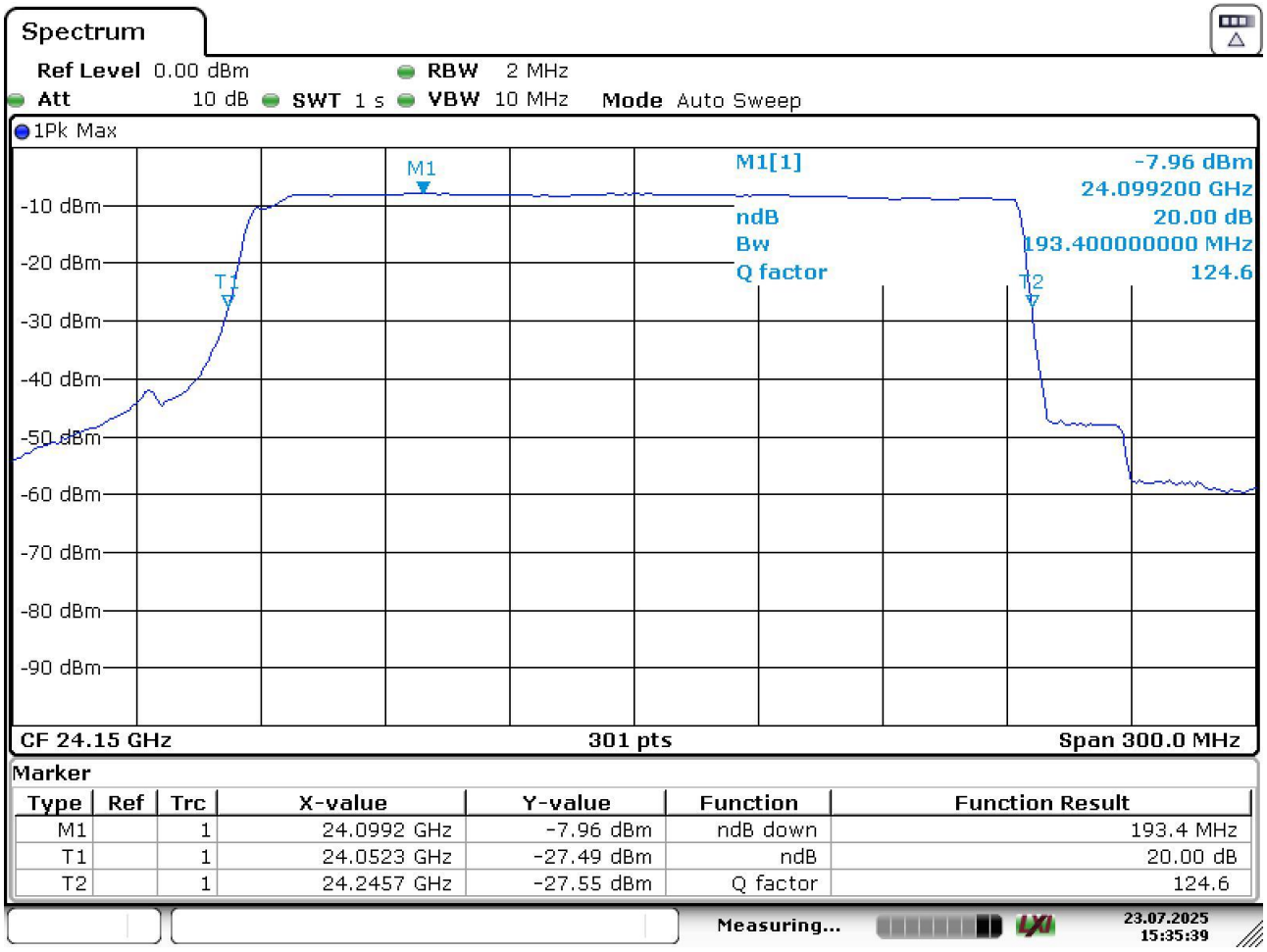
4.2.4.2.1.4 Extreme test conditions -40°C, 57V



Date: 23.JUL.2025 16:00:31

Prüfdokumentation
Test documentation

4.2.4.2.1.5 Extreme test conditions -40°C, 50V



Date: 23.JUL.2025 15:35:39

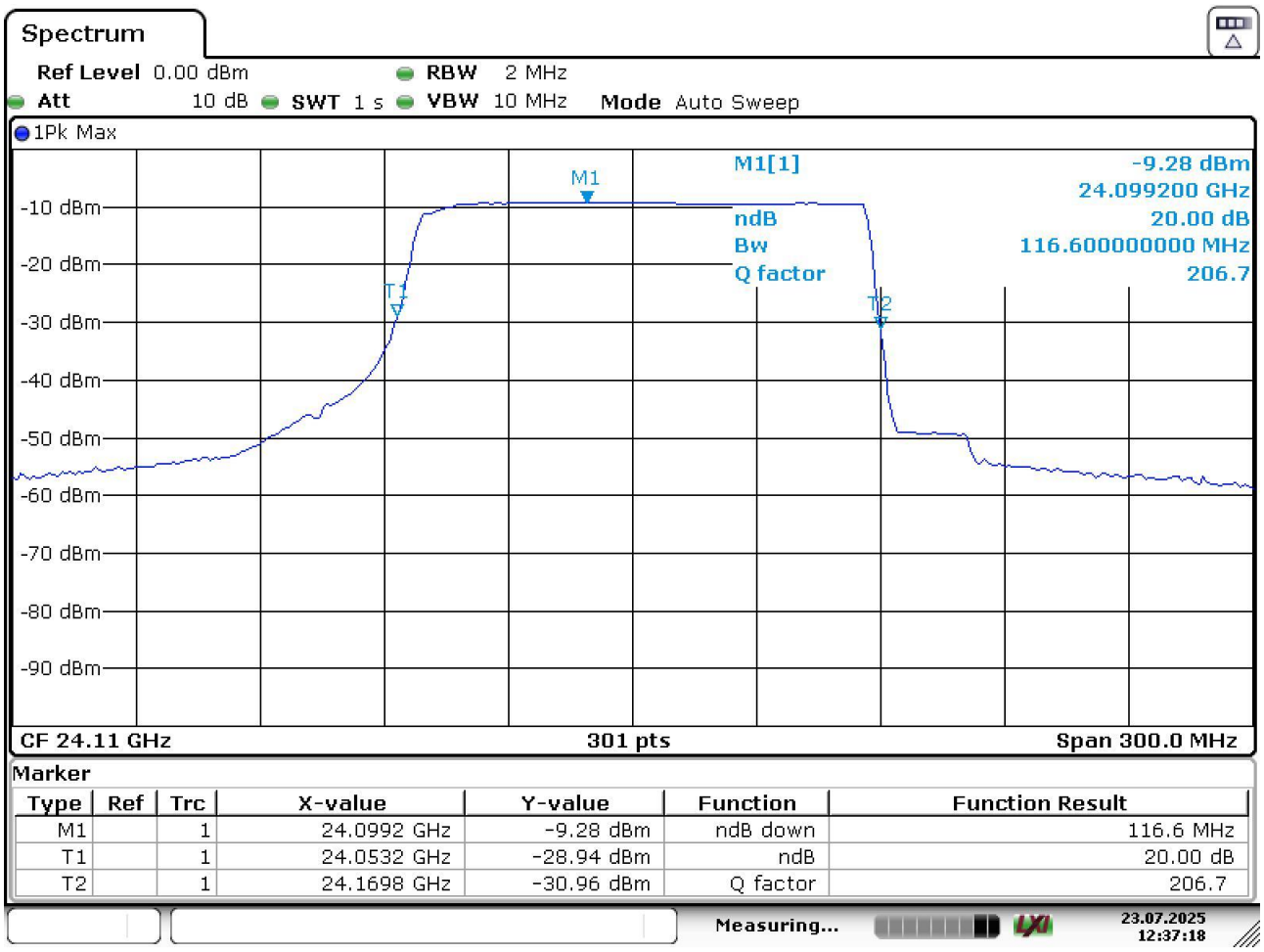
4.2.4.2.1.6 Summary

Test Conditions T [°C] / U [V]	f_L [MHz]	f_H [MHz]	Limit f_L [MHz]	Limit f_H [MHz]	Result
Normal	24053.3	24245.7	24000	24250	P
+60 / 57	24053.3	24245.7	24000	24250	P
+60 / 50	24053.3	24245.7	24000	24250	P
-40 / 57	24052.3	24245.7	24000	24250	P
-40 / 50	24052.3	24245.7	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.2.2 Mode Road_0dB

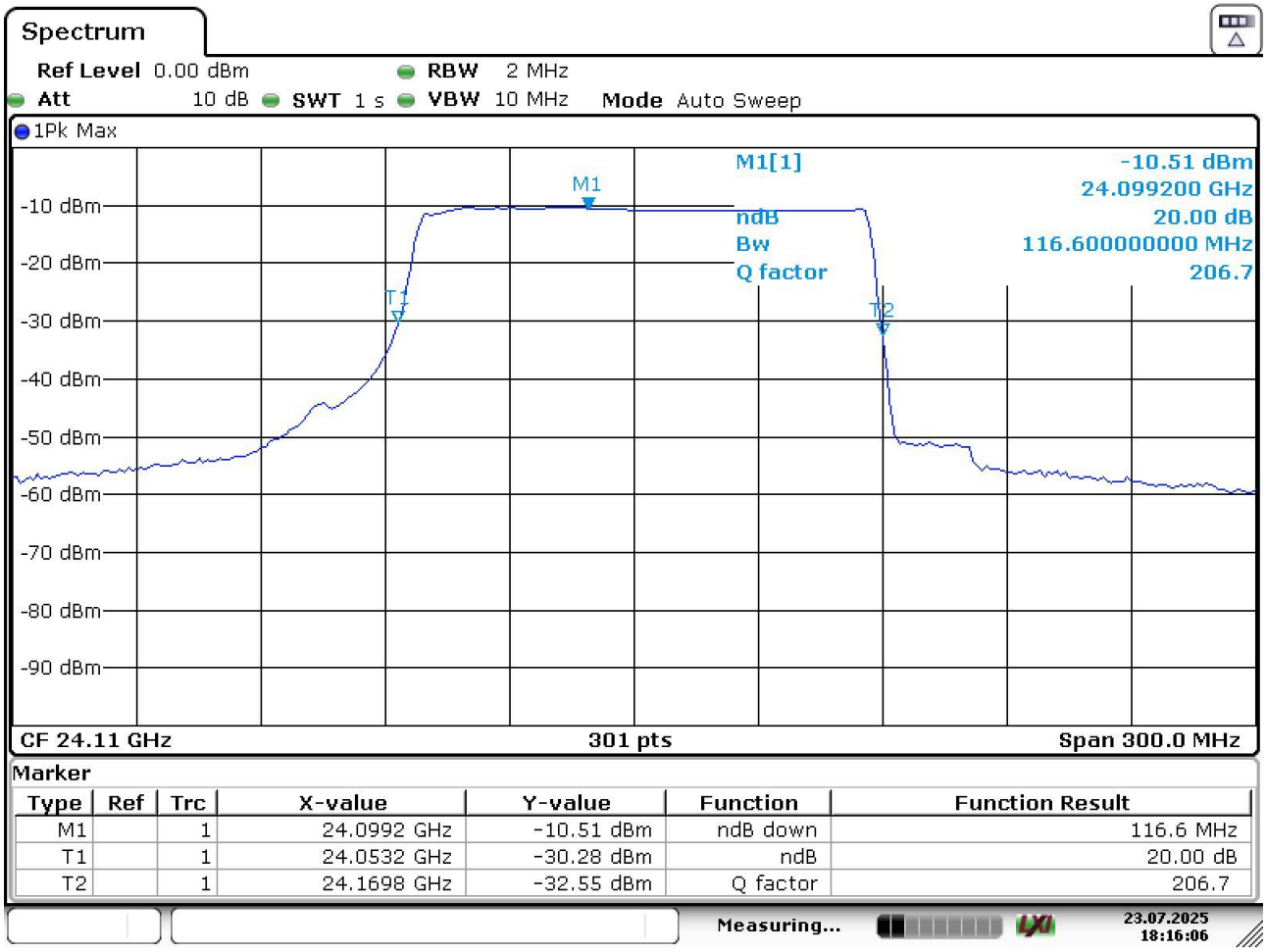
4.2.4.2.2.1 Normal test conditions



Date: 23.JUL.2025 12:37:19

Prüfdokumentation
Test documentation

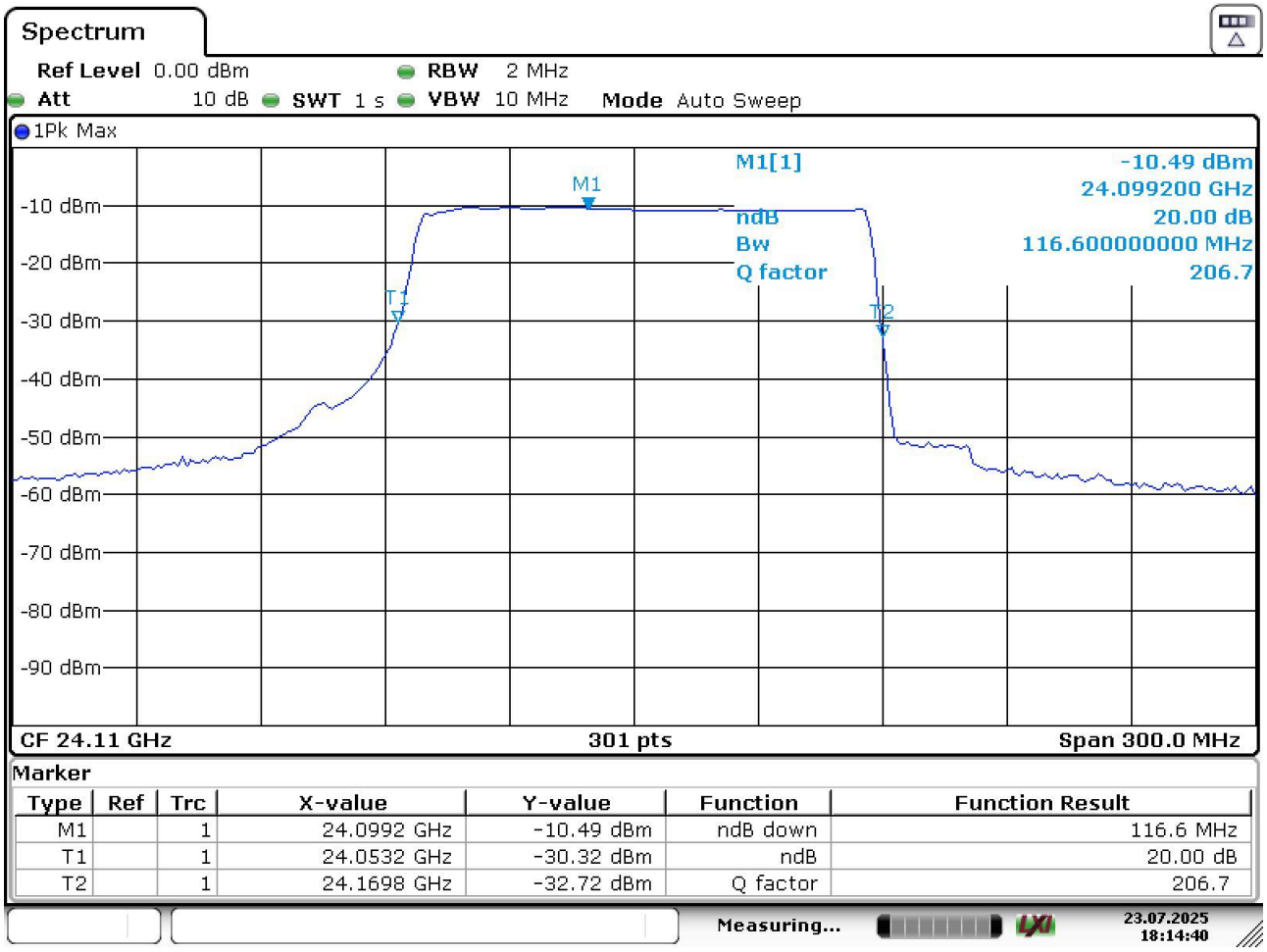
4.2.4.2.2.2 Extreme test conditions +60°C, 57V



Date: 23.JUL.2025 18:16:06

Prüfdokumentation
Test documentation

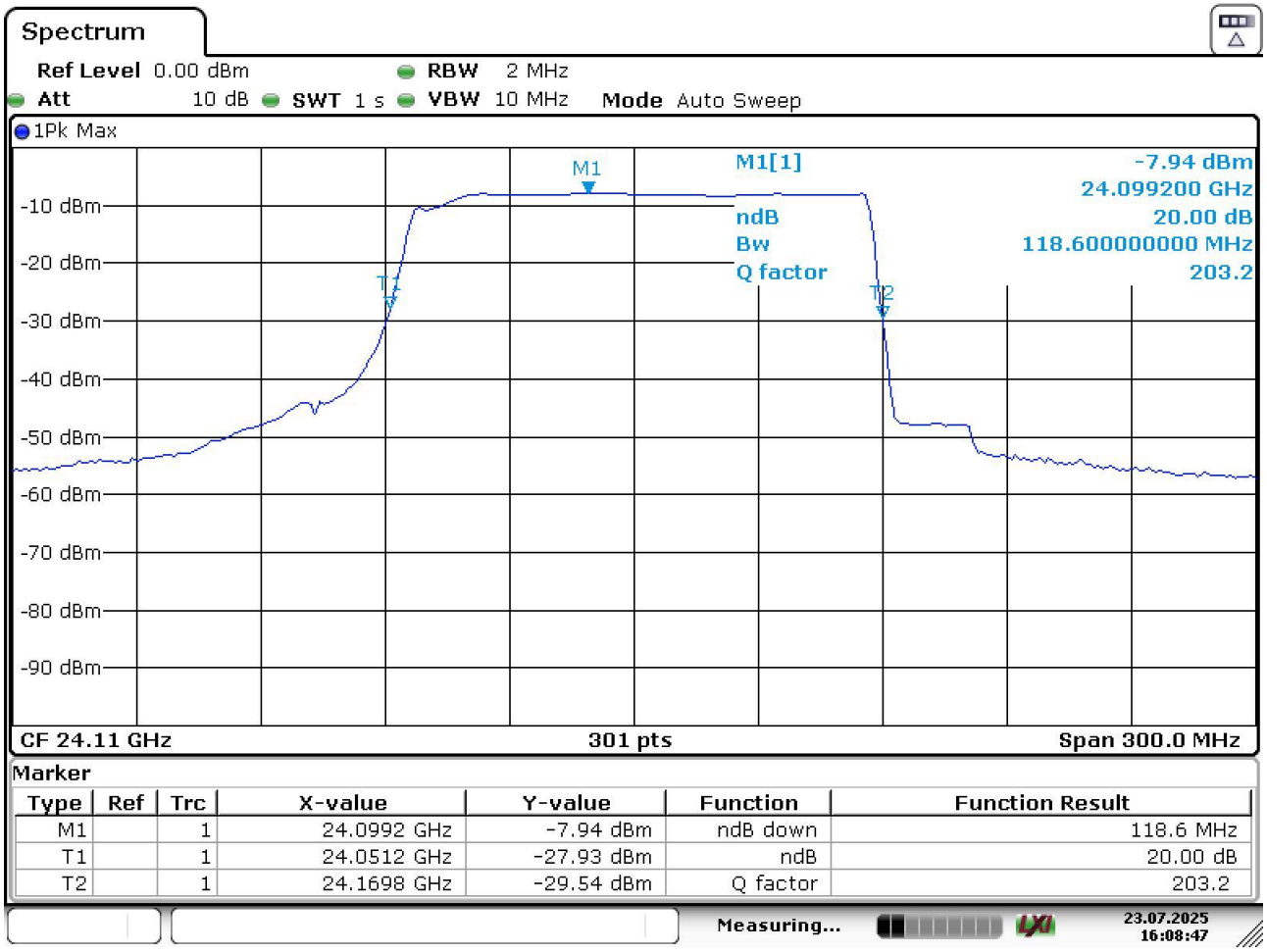
4.2.4.2.2.3 Extreme test conditions +60°C, 50V



Date: 23.JUL.2025 18:14:40

Prüfdokumentation
Test documentation

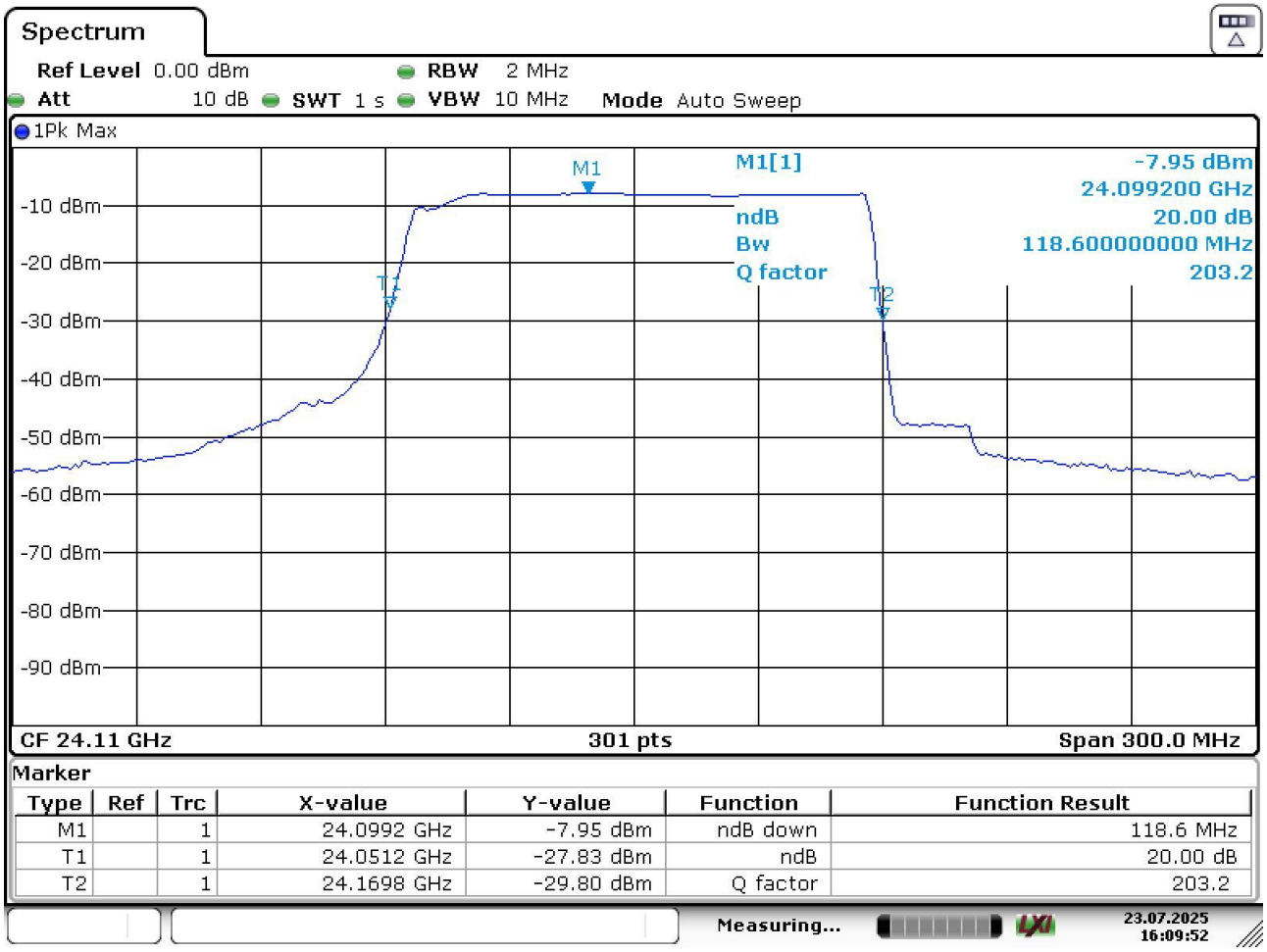
4.2.4.2.2.4 Extreme test conditions -40°C, 57V



Date: 23.JUL.2025 16:08:47

Prüfdokumentation
Test documentation

4.2.4.2.2.5 Extreme test conditions -40°C, 50V



Date: 23.JUL.2025 16:09:52

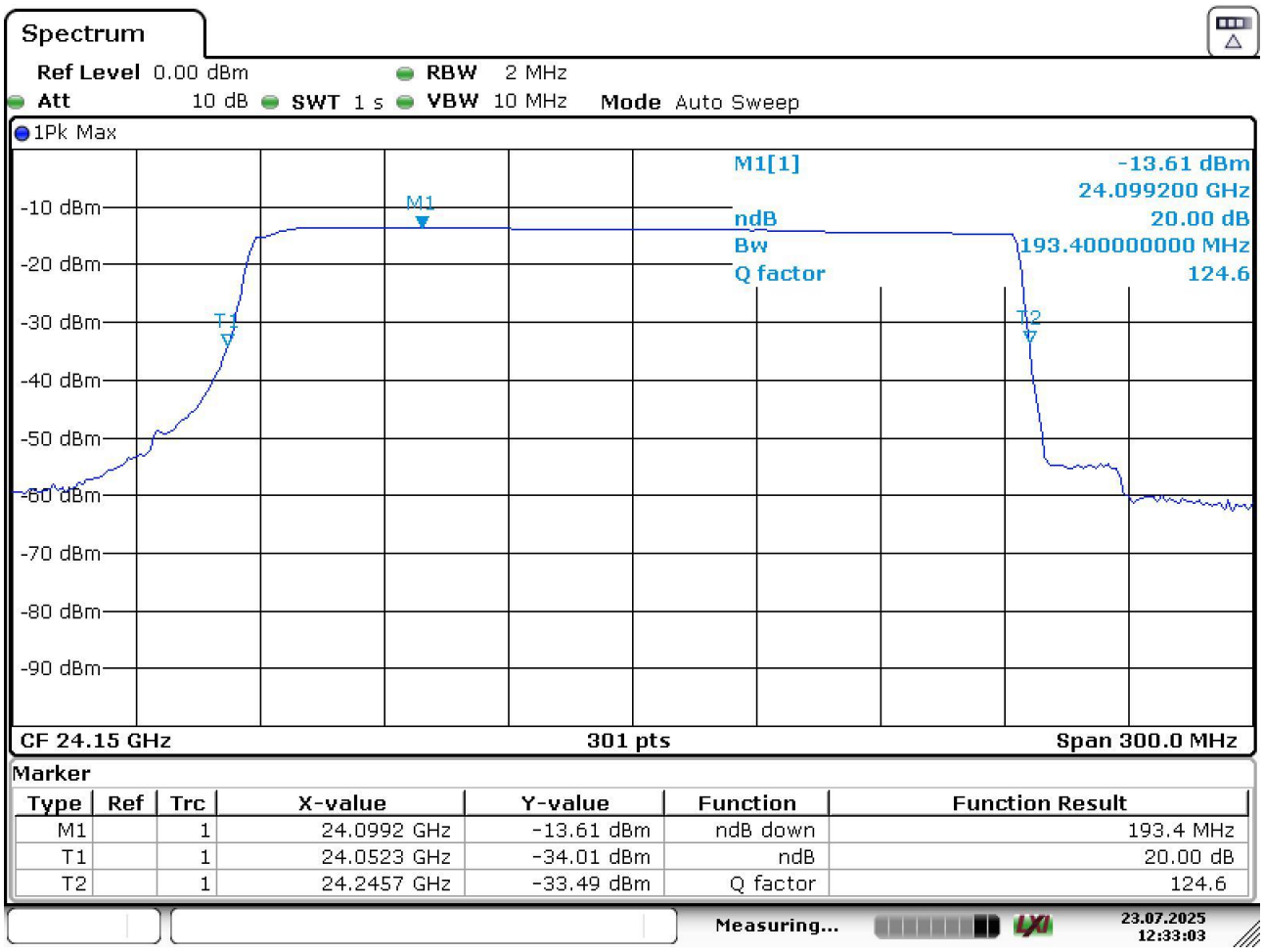
4.2.4.2.2.6 Summary

Test Conditions T [°C] / U [V]	f_L [MHz]	f_H [MHz]	Limit f_L [MHz]	Limit f_H [MHz]	Result
Normal	24053.2	24169.8	24000	24250	P
+60 / 57	24053.2	24169.8	24000	24250	P
+60 / 50	24053.2	24169.8	24000	24250	P
-40 / 57	24051.2	24169.8	24000	24250	P
-40 / 50	24051.2	24169.8	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.2.3 Mode Area_lowdoppler_-4dB

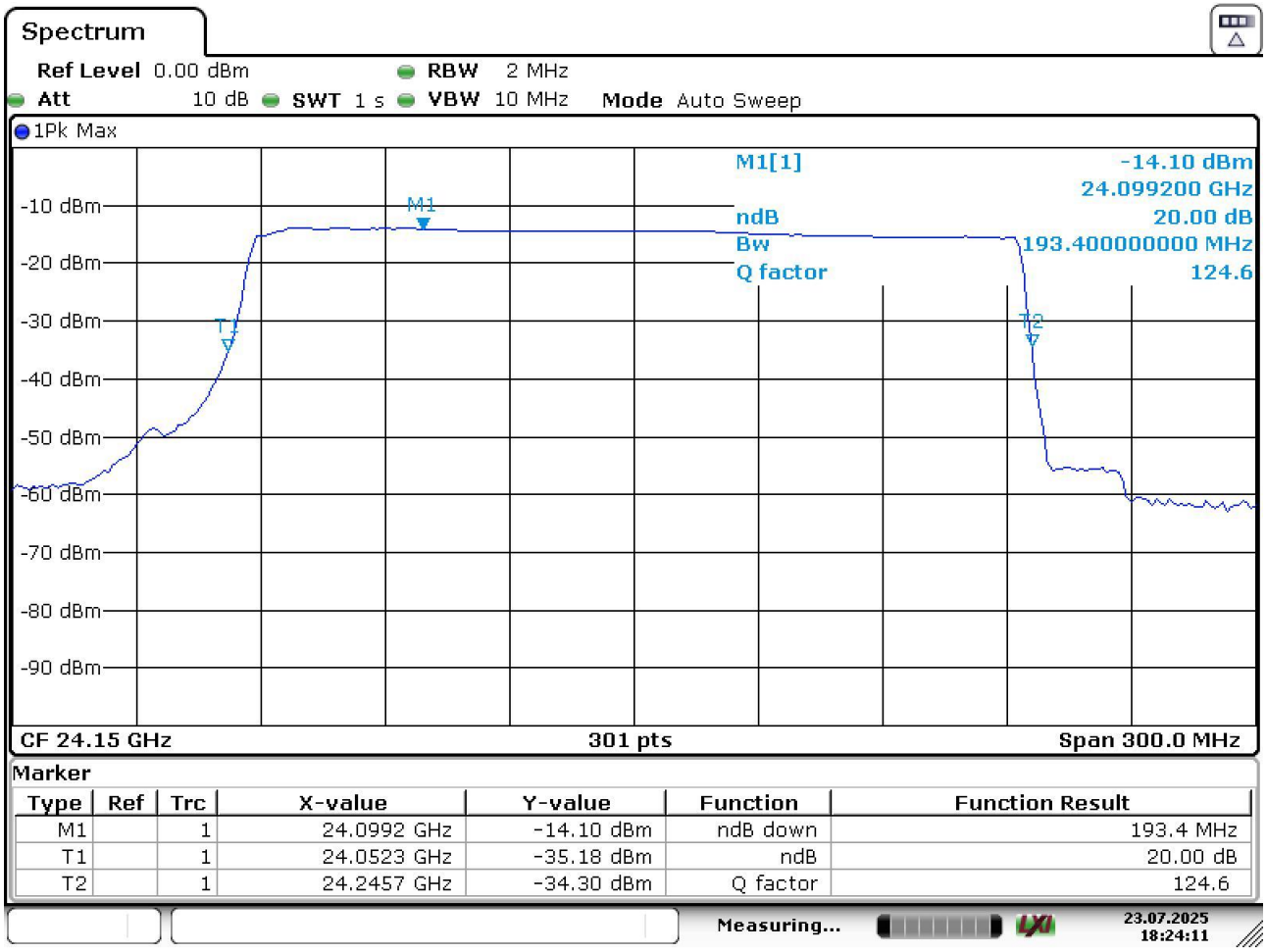
4.2.4.2.3.1 Normal test conditions



Date: 23.JUL.2025 12:33:03

Prüfdokumentation
Test documentation

4.2.4.2.3.2 Extreme test conditions +60°C, 57V

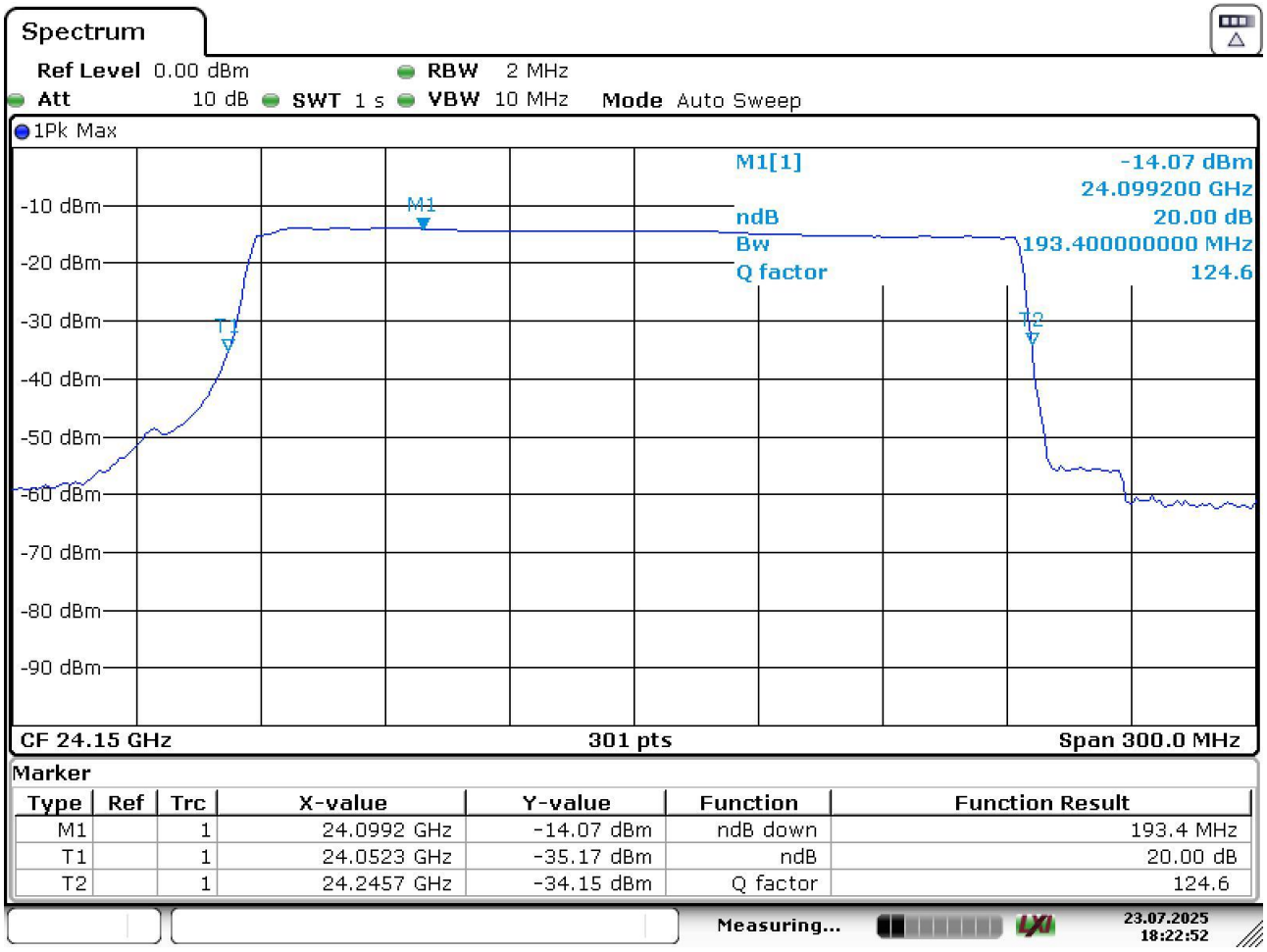


Date: 23.JUL.2025 18:24:12

Prüfdokumentation

Test documentation

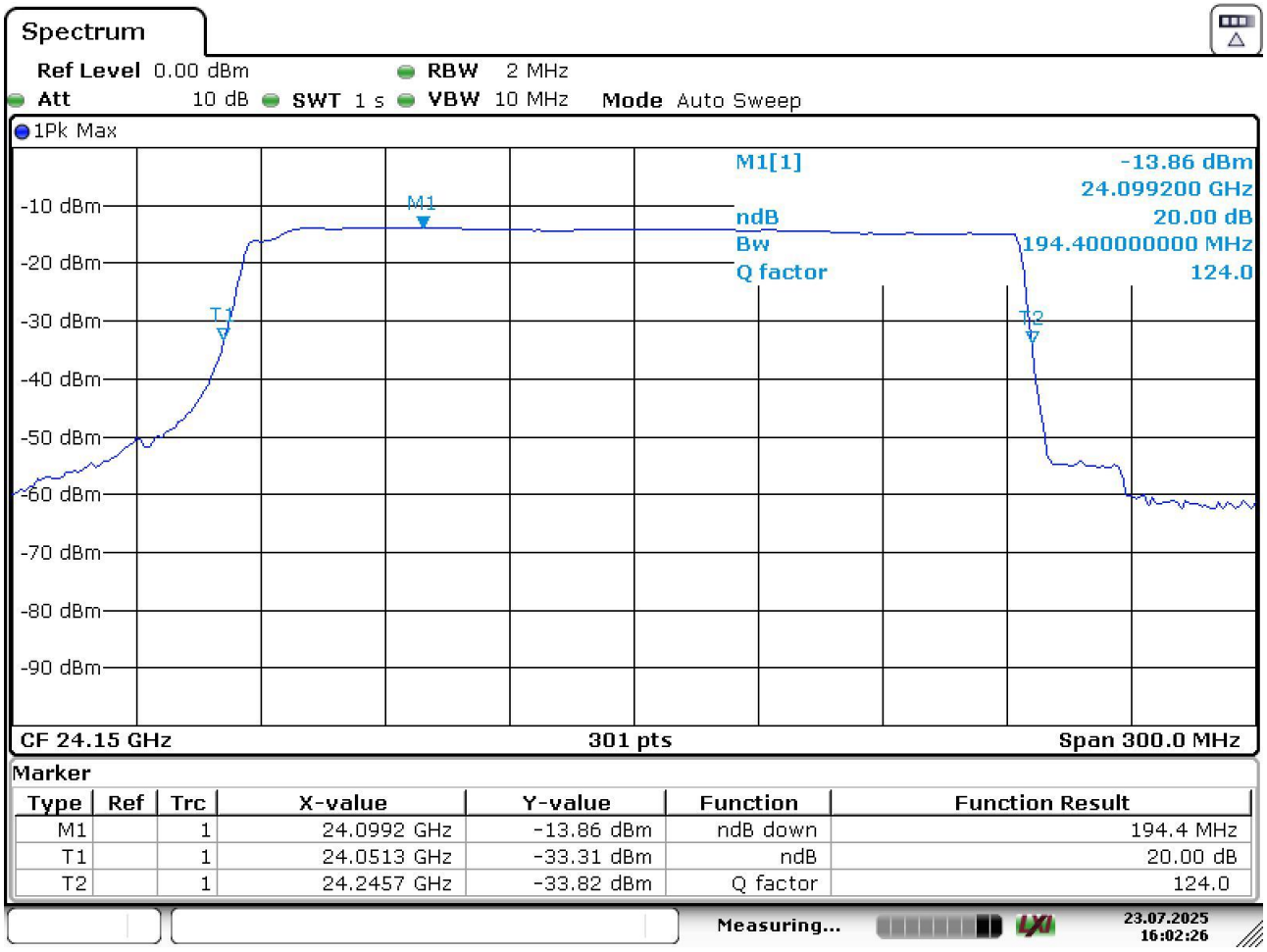
4.2.4.2.3.3 Extreme test conditions +60°C, 50V



Date: 23.JUL.2025 18:22:52

Prüfdokumentation
Test documentation

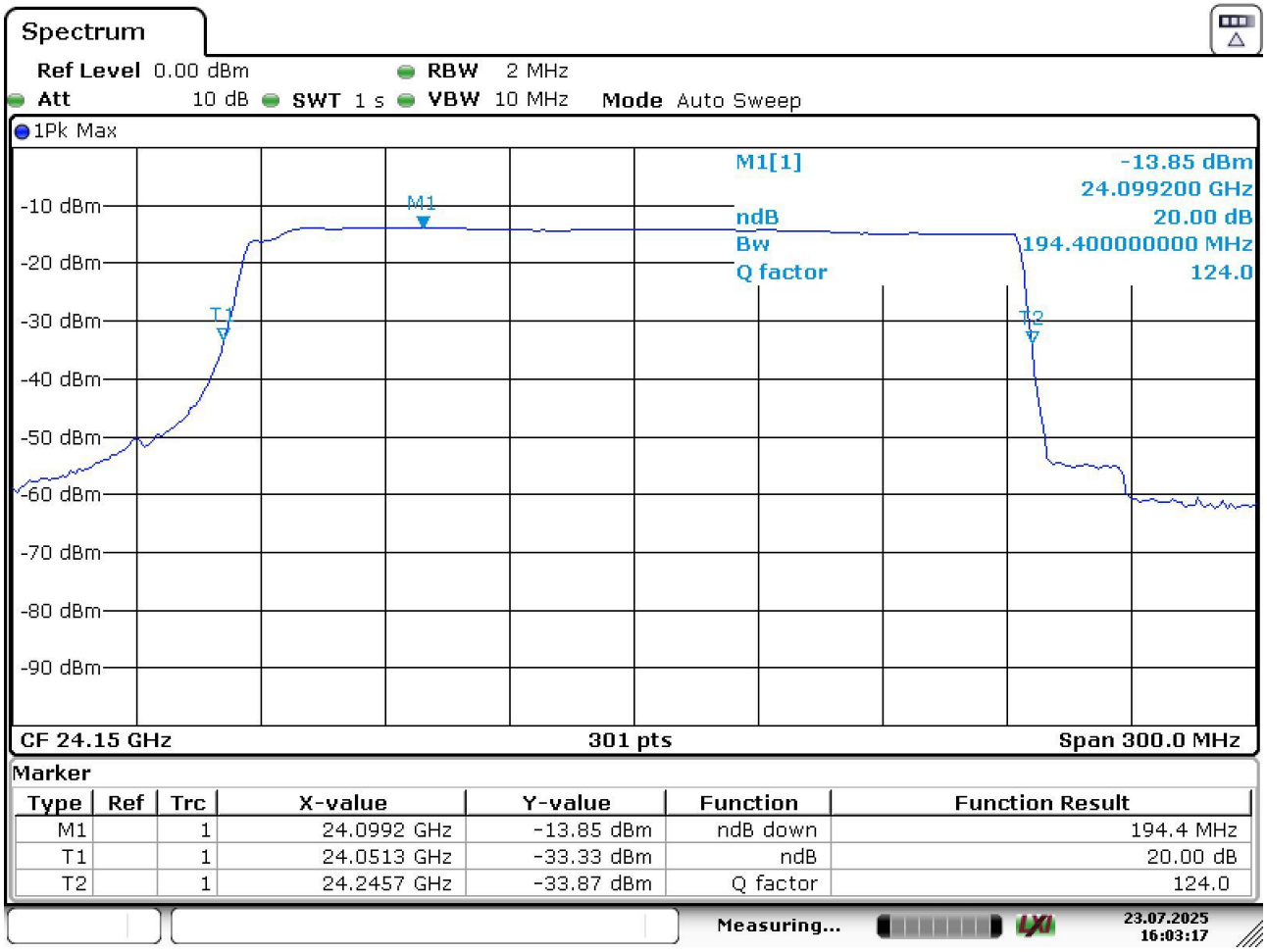
4.2.4.2.3.4 Extreme test conditions -40°C, 57V



Date: 23.JUL.2025 16:02:26

Prüfdokumentation
Test documentation

4.2.4.2.3.5 Extreme test conditions -40°C, 50V



Date: 23.JUL.2025 16:03:16

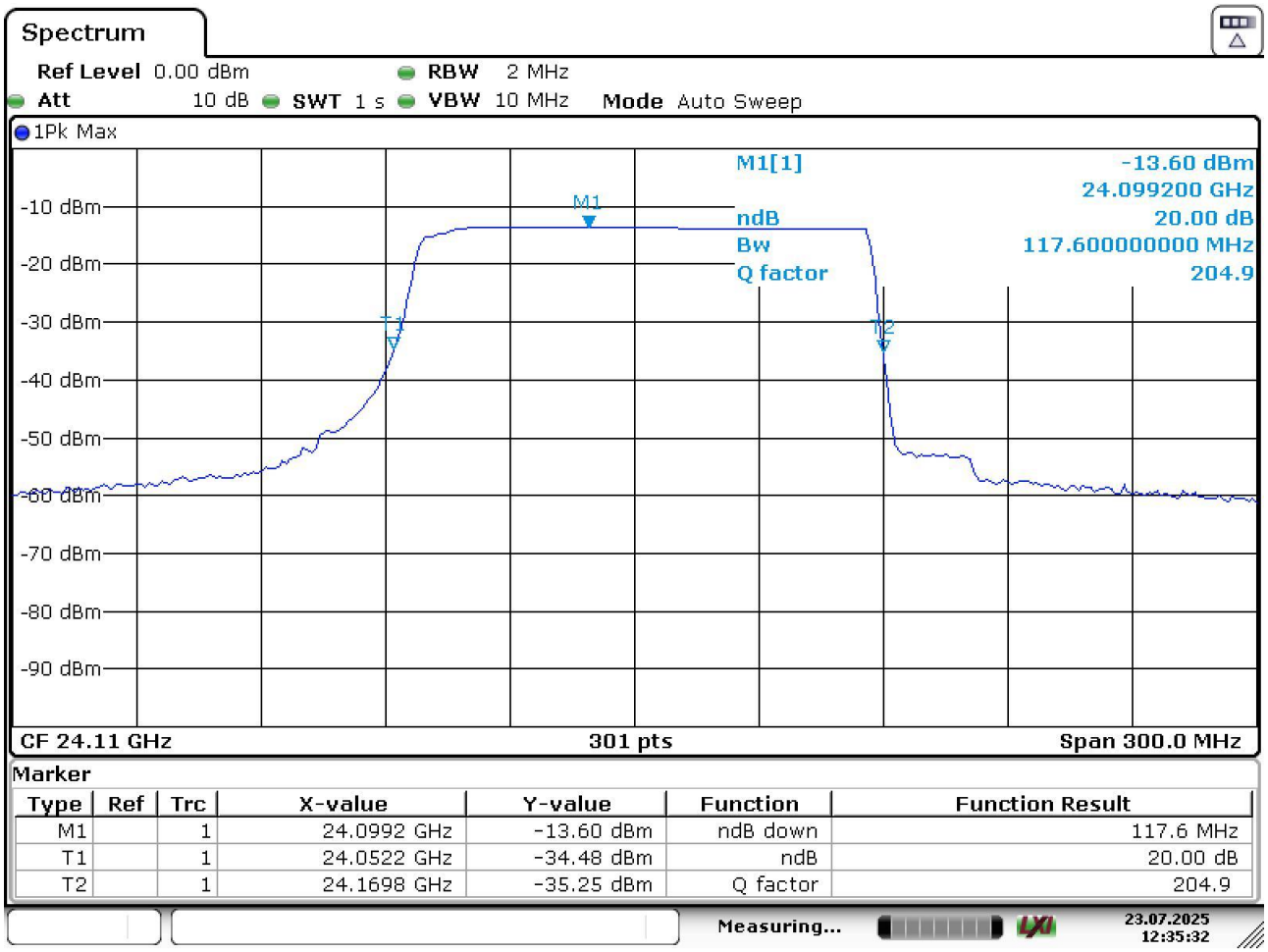
4.2.4.2.3.6 Summary

Test Conditions T [°C] / U [V]	f_L [MHz]	f_H [MHz]	Limit f_L [MHz]	Limit f_H [MHz]	Result
Normal	24052.3	24245.7	24000	24250	P
+60 / 57	24052.3	24245.7	24000	24250	P
+60 / 50	24052.3	24245.7	24000	24250	P
-40 / 57	24051.3	24245.7	24000	24250	P
-40 / 50	24051.3	24245.7	24000	24250	P

Prüfdokumentation
Test documentation

4.2.4.2.4 Mode Road_-4dB

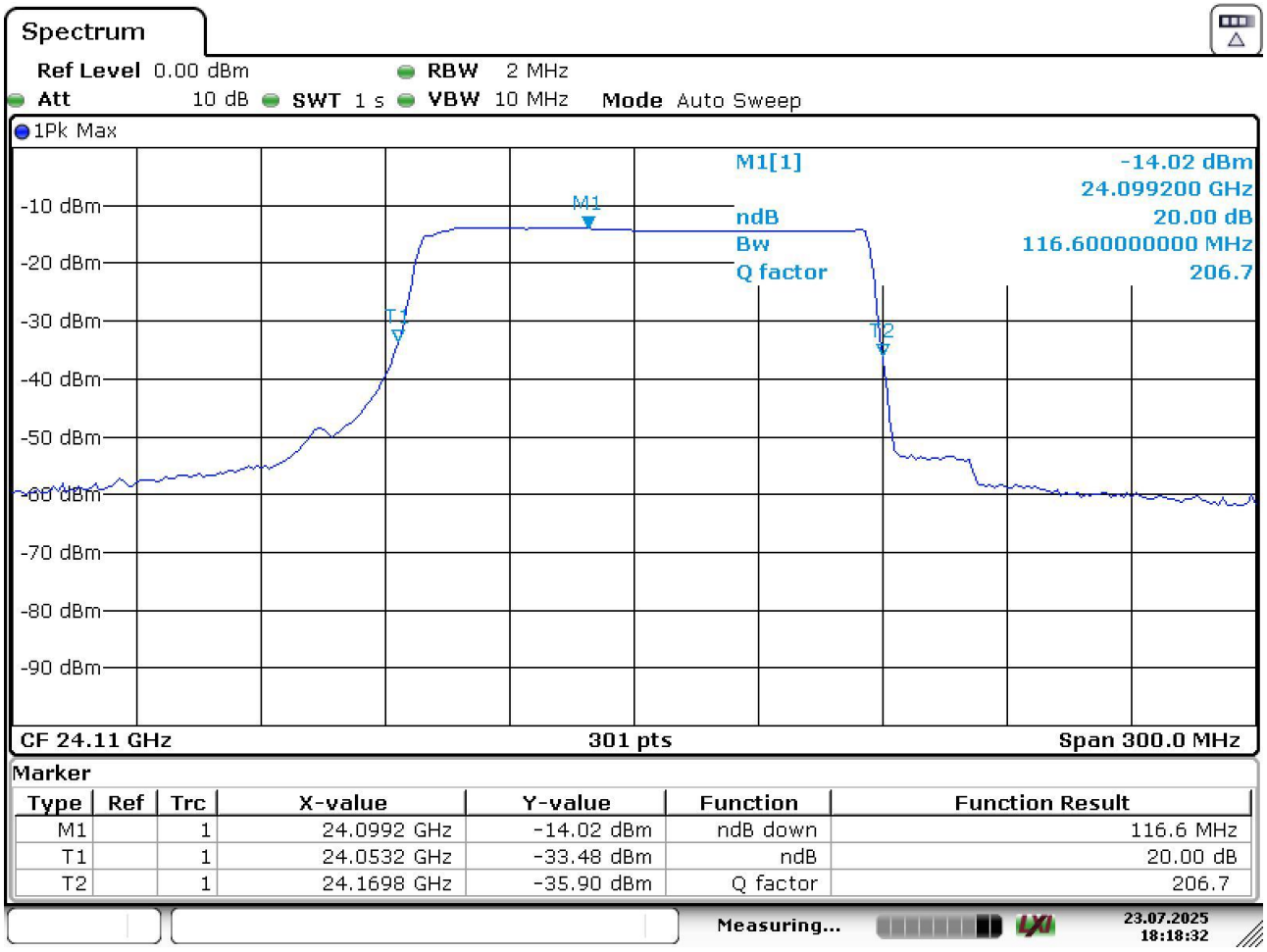
4.2.4.2.4.1 Normal test conditions



Date: 23.JUL.2025 12:35:33

Prüfdokumentation
Test documentation

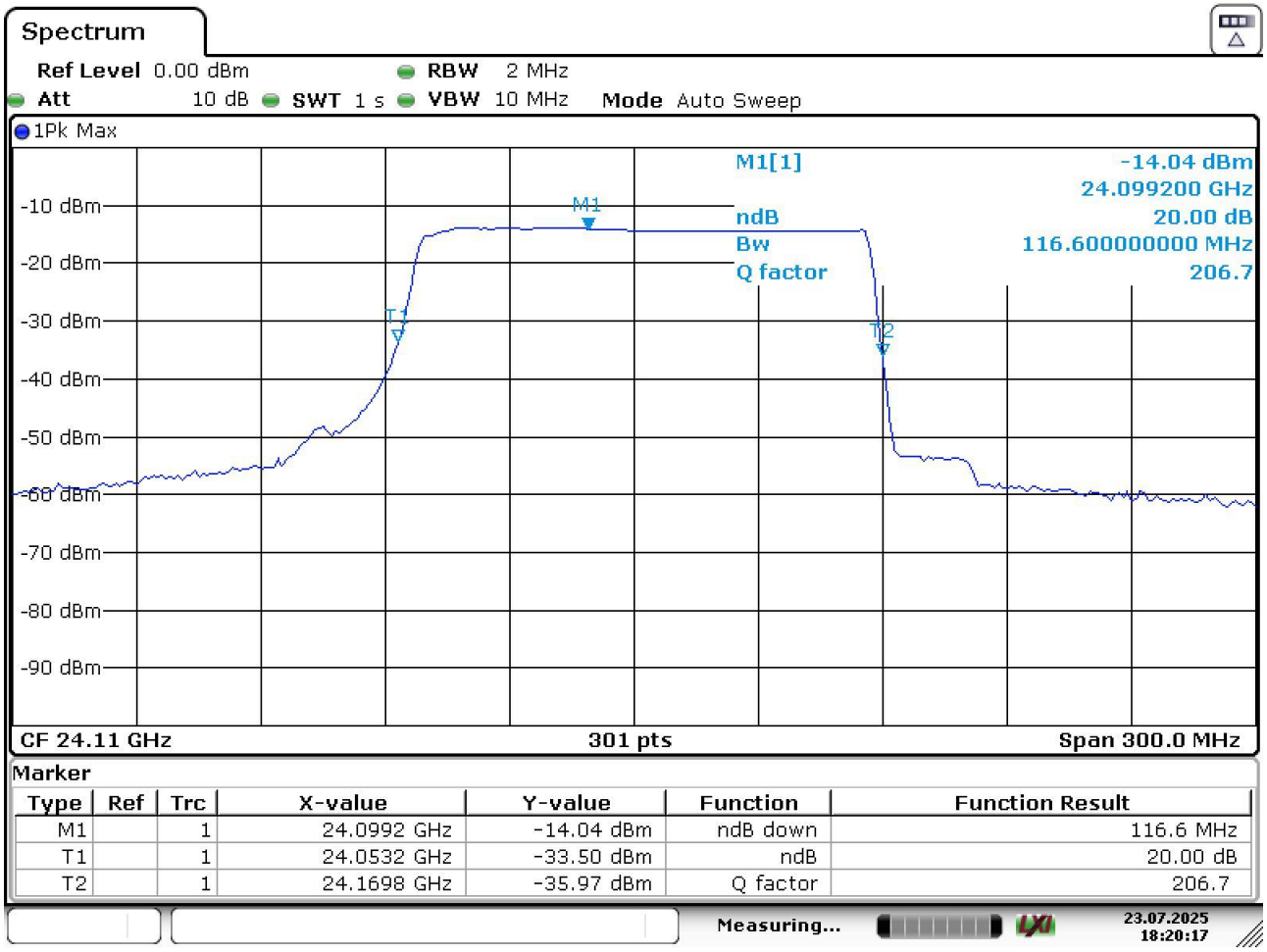
4.2.4.2.4.2 Extreme test conditions +60°C, 57V



Date: 23.JUL.2025 18:18:32

Prüfdokumentation
Test documentation

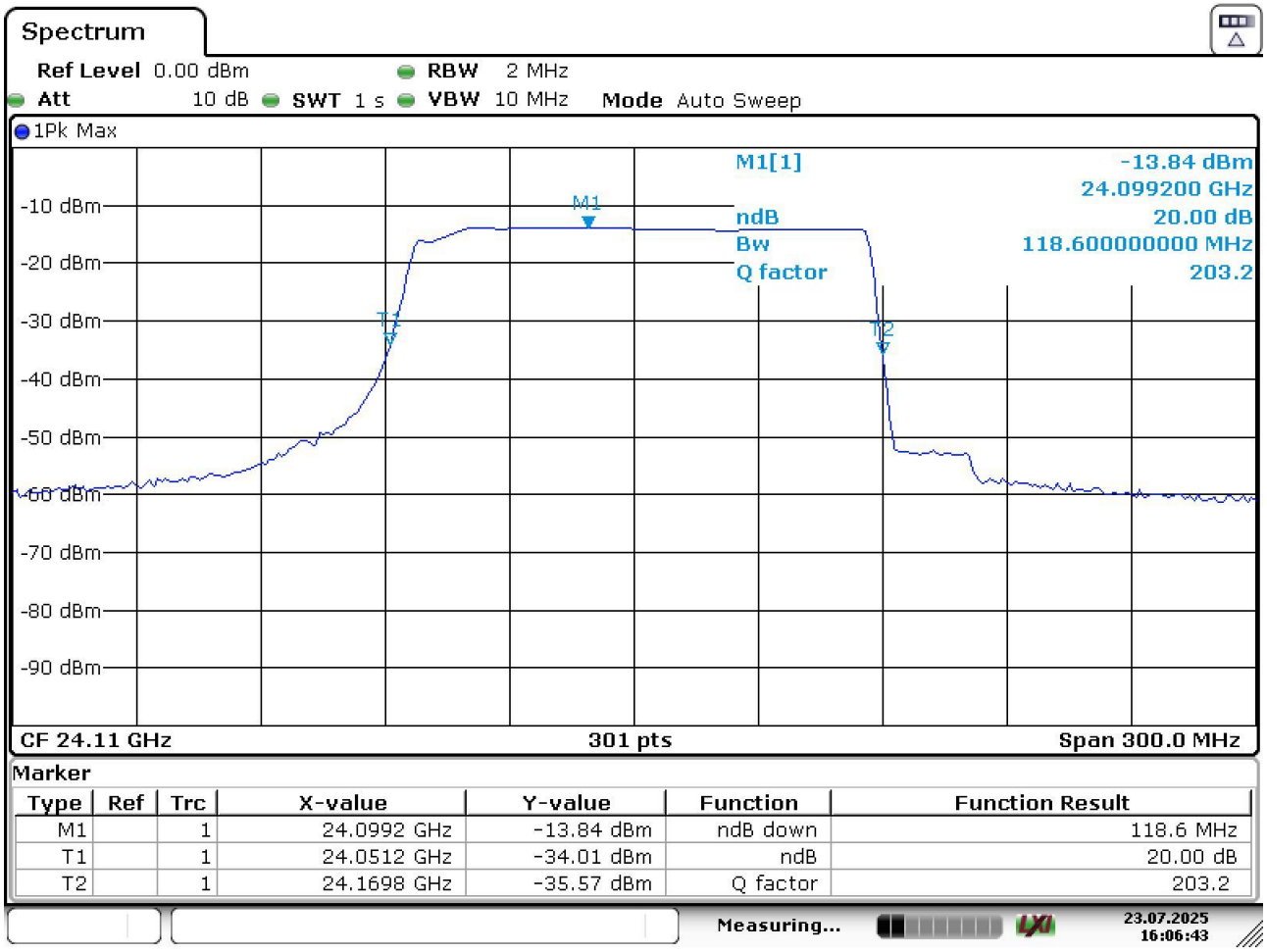
4.2.4.2.4.3 Extreme test conditions +60°C, 50V



Date: 23.JUL.2025 18:20:18

Prüfdokumentation
Test documentation

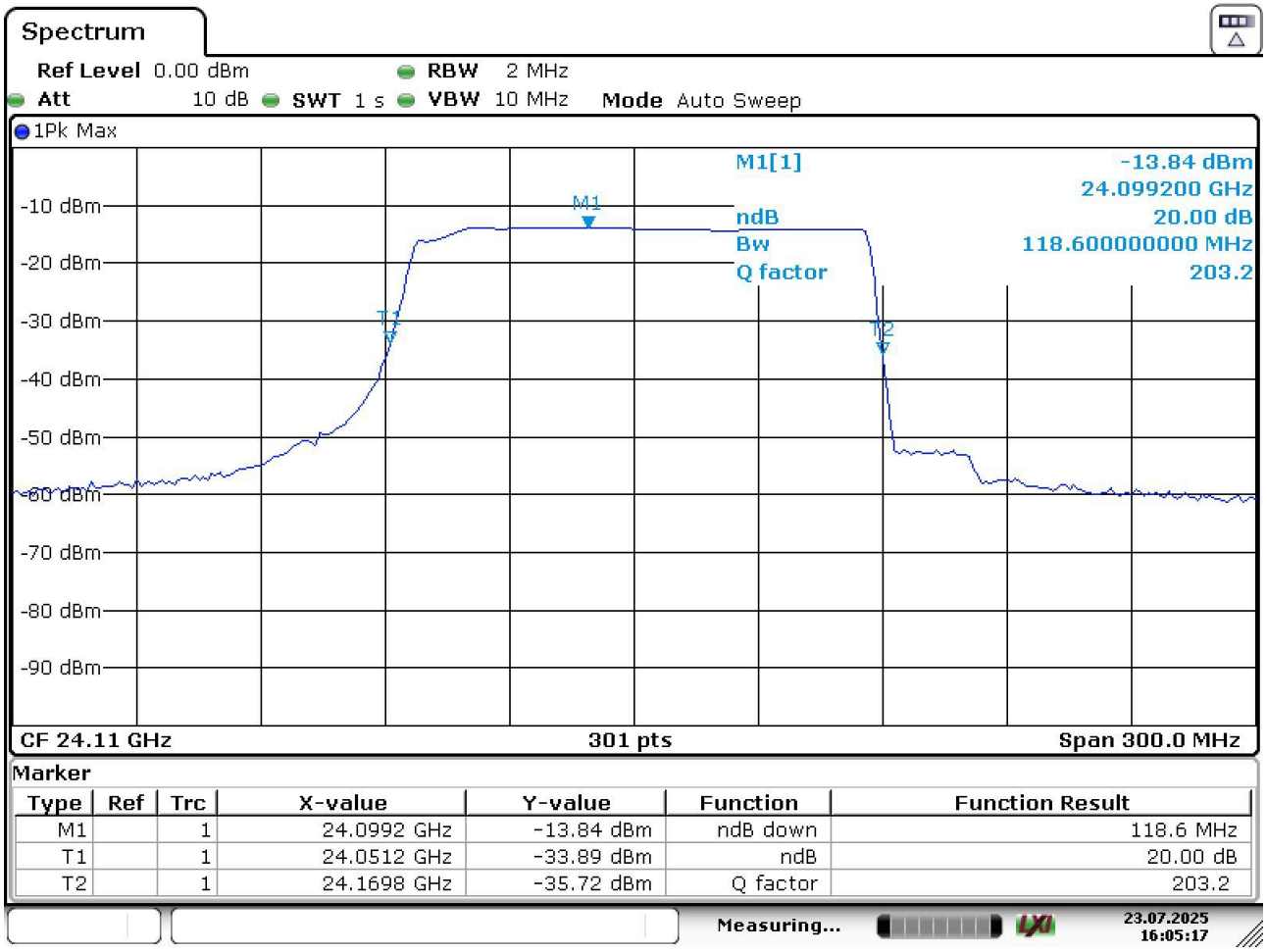
4.2.4.2.4.4 Extreme test conditions -40°C, 57V



Date: 23.JUL.2025 16:06:42

Prüfdokumentation
Test documentation

4.2.4.2.4.5 Extreme test conditions -40°C, 50V



Date: 23.JUL.2025 16:05:17

4.2.4.2.4.6 Summary

Test Conditions T [°C] / U [V]	f_L [MHz]	f_H [MHz]	Limit f_L [MHz]	Limit f_H [MHz]	Result
Normal	24052.2	24169.8	24000	24250	P
+60 / 57	24053.2	24169.8	24000	24250	P
+60 / 50	24053.2	24169.8	24000	24250	P
-40 / 57	24051.2	24169.8	24000	24250	P
-40 / 50	24051.2	24169.8	24000	24250	P

4.2.5 **Final test result** (20dB / 99% Bandwidth)

Final test result	Pass

4.3 Field strength of fundamental emissions

4.3.1 **Requirements / Limits** (no Fixed point-to point System)

FCC §15.249 (a) and ISED RSS-210 sec. B.10 a
The field strength of fundamental emissions measured at the distance of 3 m shall not exceed the following limits.

	Fundamental frequency [MHz]	Limit [mV/m]	Limit [dBµV/m]
☐	902-928	50	94
☐	2400-2483.5	50	94
☐	5725-5875	50	94
☒	24000-24250	250	108

Used conversion factor [mV/m]->[dBµV/m]: $Limit_{dBµV/m}$ = 20 log ($Limit_{mV/m}$ * 1000) dBµV/m
For example, if the $limit_{mV/m}$ is given with 1mV/m, then the $limit_{dBµV/m}$ is calculated to:
$Limit_{dBµV/m}$ = 20*log((1 * 1000)) dBµV/m = 60 dBµV/m.

ISED RSS-210 sec. 7:
Unless otherwise specified, the measurements shall be performed in accordance with ANSI C63.10.

FCC Part 15, Subpart C, §15.35(a); ANSI C63.10:
On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified.

FCC Part 15, Subpart C, §15.35(b); ANSI C63.10:
Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

FCC Part 15, Subpart C, §15.35(b); ANSI C63.10:
..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

FCC Part 15, Subpart C, §15.35(c); ISED RSS-Gen sec. 8.2:
Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value

4.3.2 **Test Method** (Field strength of fundamental emissions)

4.3.2.1 Radiated measurements

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. Preliminary emission testing was performed inside the anechoic chamber. The measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

For the final testing, the placement of EUT and cables were the same as for preliminary testing. The highest emission relative to the limit was measured.

Final testing was performed on an SVSWR compliant test site.

The final average electric field value (E_{final}) is calculated using the following equation:

$$E_{final} = RawRec + Corr$$

While

$$Corr = AF + SigPathAtt + PreampAtt$$

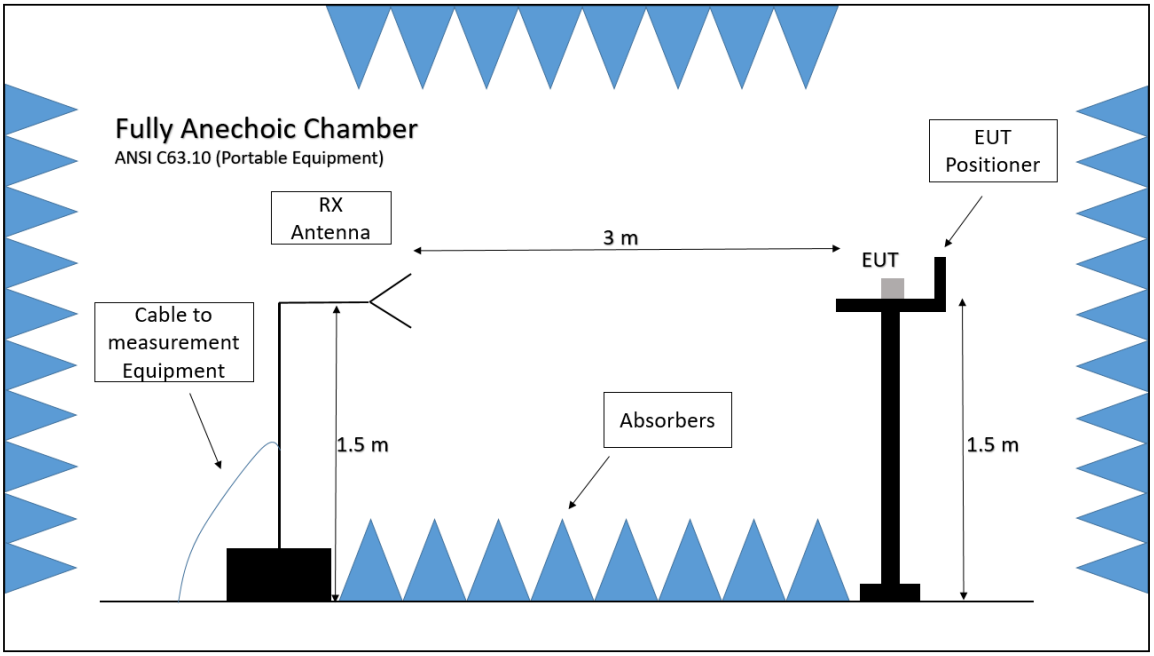
Were

E_{final}: final average electric field value
RawRec: Receiver reading
AF: Antenna factor
SigPathAtt: Signalpath losses
PreampAtt: Preamplifier losses

For example, if a Receiver reading of 1dBµV was measured and the Antenna factor is 2 dB/m, the Signalpath losses are 3dB and the Preamplifier losses are -10dB, then the Correction is calculated to:
Corr = (2+3-10) dB= -5dB and the Final electric field strength E_{Final} is calculated to:
E_{Final} = (1 - 5) dBµV/m = -4 dBµV/m

Prüfdokumentation
Test documentation

4.3.2.1.1 EUT positioning



Prüfdokumentation
Test documentation

4.3.3 **Test setup** (Field strength of fundamental emissions)

4.3.3.1 Radiated measurements

EUT		A003954064-001 (rad. sample)
Chamber details		☒ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC) ☐ Shielded room
Measurement positioning		Distance: ☒ 3m ☐ 10m EUT height: ☒ 1.5m ☐ 0.8m Antenna height: ☒ 1.5m ☐ 1m to 4m – height scan
Receiving Antenna		Horn Antenna 3116C-PA (18-40GHz)
Receiving Antenna Polarization		Horizontal and Vertical
EUT Positioner		40cm x 60cm non-conductive positioner Step size elevation angle 30°
EUT Turn Table		Continuous turning
Companion device		EUT in Test Mode. Therefore, no Companion Device was used.
Operation mode		☒ 1: TX-Mode Area_lowdoppler_0dB ☒ 2: TX-Mode Road_0dB ☒ 3: TX-Mode Area_lowdoppler_-4dB ☒ 4: TX-Mode Road_-4dB
Spectrum Analyzer	**Resolution Bandwidth**	5MHz during exploratory tests 5MHz for final measurements For average field strength measurement on worst case position, the Resolution Bandwidth was reduced to 1MHz
	Video Bandwidth	8MHz during exploratory tests 8MHz for final measurements For average field strength measurement on worst case position, the Video Bandwidth was reduced to 3MHz
	Measurement Time	0.1s during exploratory tests 20s for final measurements For average field strength measurement on worst case position, the measurement time was set to 80.1s (100ms per Sweep Point)
	Span	500MHz during exploratory tests Zero Span for final measurements For average field strength measurement on worst case position, the span was set to 400MHz
	Detector	Peak and RMS during exploratory tests Peak and RMS for final measurements
Further parameters		-
Test engineer		Primoz Erzen