

Prüfbericht-Nr.: <i>Test report no.:</i>	CN252KMR 001	Auftrags-Nr.: <i>Order no.:</i>	158314852	Seite 1 von 74 <i>Page 1 of 74</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2025-06-17	
Auftraggeber: <i>Client:</i>	LEGAMI S.p.A. SB Via Stezzano 18, 24052 Azzano San Paolo BG, Italy			
Prüfgegenstand: <i>Test item:</i>	Pump Up The Volume – Wireless Speaker			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	MSP0003, MSP0004			
Auftrags-Inhalt: <i>Order content:</i>	FCC and ISED Certification			
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15 Subpart C, ANSI C63.10-2013, RSS-247 Issue 3 RSS-Gen Issue 5+Amendment 1+Amendment 2			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2025-06-17			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A004018394-001 to 002			
Prüfzeitraum: <i>Testing period:</i>	2025-06-30 to 2025-07-07			
Ort der Prüfung: <i>Place of testing:</i>	Hong Kong			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland Hong Kong Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	X 	genehmigt von: <i>authorized by:</i>	X 	
Datum: <i>Date:</i>	2025-08-28	Ausstellungsdatum: <i>Issue date:</i>	2025-08-28	Billy Yip
Stellung / Position:	Assistant Test Engineer	Stellung / Position:	Authorizer	
Sonstiges / <i>Other:</i>	“Decision Rule” document announced in our website (https://www.tuv.com/landingpage/en/qm-gcn/) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report. FCC ID: 2BGCL-MSP0003 IC ID: 32529-MSP0003			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* 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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Anmerkungen Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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Product Information

PMN: SPEAKER	HVIN: MSP0003 MSP0004
FVIN: N/A	HMN: N/A

Manufacturers declarations

	Transmitter
Operating frequency range	2402 - 2480MHz
Type of modulation	GFSK, $\pi/4$ -DQPSK
Number of channels	79
Type of antenna	PCB antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	3.7 VDC
Rated transmitter power	Refer to Appendix 5
Occupied bandwidth	Not available
Channel bandwidth	1MHz
Emission designator	F1D, G1D
Frequency stability	Not available

Product function and intended use

The equipment under test (EUT) is a speaker with Bluetooth functionality. It is powered by 3.7VDC battery.
FCC ID: 2BGCL-MSP0003 / IC ID: 32529-MSP0003

Models	Product description
MSP0003	Pump Up The Volume – Wireless Speaker (Panda)
MSP0004	Pump Up The Volume – Wireless Speaker (Cactus)

Submitted documents

Nil

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter

Remark

The test results in this test report are only relevant to the tested sample and do not involve any assessment in the production.

According to the manufacturer declaration of equivalence, construction of models MSP0003 and MSP0004 were identical except the housing. All tests were performed with test sample A004018394-001, model number MSP0004.

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Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level.
The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- Test mode samples with maximum RF output power and duty cycle and capable to transmit continuously at the lowest, middle and highest frequency channels is provided by the applicant for the testing.
-

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Item	Manufacturer	Model	S/N
Adapter	Apple	A2344	---

Countermeasures to achieve EMC Compliance

- None

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Test Methodology

Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360 °, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

Where

- FS = Field Strength in dBuV/m at 3 meters.
- R = Reading of Spectrum Analyzer in dBuV.
- AF = Antenna Factor in dB.
- CF = Cable Attenuation Factor in dB.
- FA = Filter Attenuation Factor in dB.
- PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Conducted Emission Calculation

Receiver reading R_r (dB μ V)
LISN insertion loss L_I (dB)
Cable loss C_I (dB)

$$\text{Result (dB}\mu\text{V)} = R_r + L_I + C_I$$

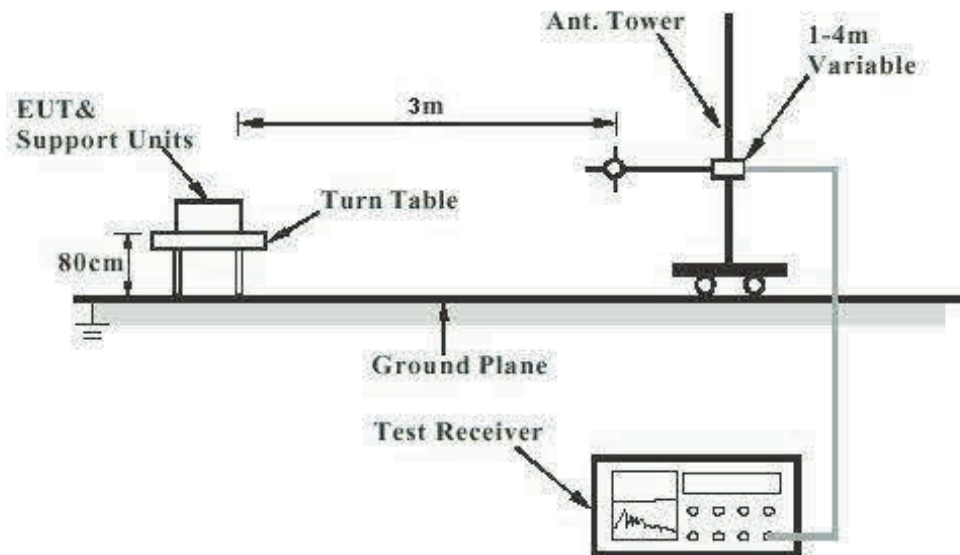
Sample: $R_r = 40.2$ dB μ V
 $L_I = 10.2$ dB
 $C_I = 0.3$ dB

$$\text{Result} = 40.2 + 10.2 + 0.3 = 50.7 \text{ dB}\mu\text{V}$$

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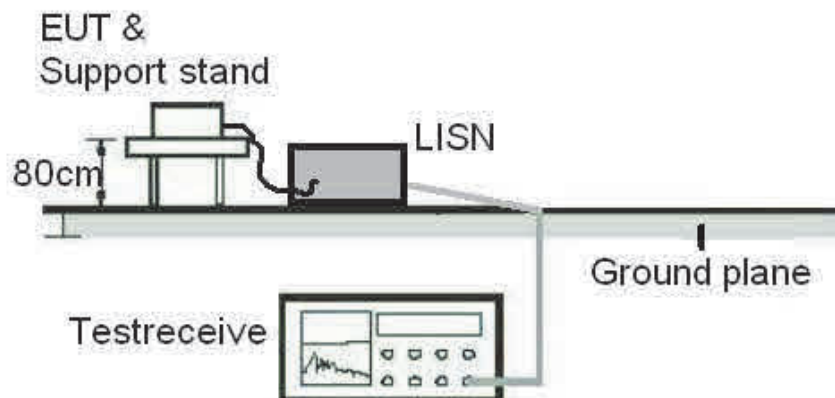
Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



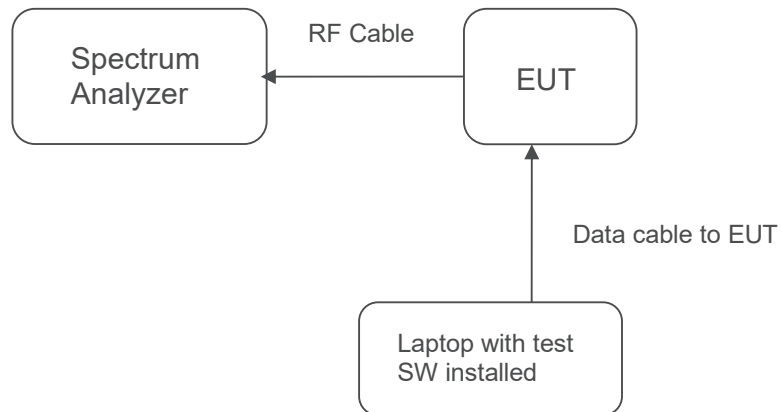
Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



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Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



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Test Facility

Test Laboratory Information

TÜV Rheinland Hong Kong Ltd.

Address: 3-4/F, Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong

Tel.: +852 2192 1000

Fax: +852 2192 1001

Email: service-gc@tuv.com

The test facility is recognized or accredited by the following organizations:

FCC

Designation Number : HK0013

ISED/IC

Company Number : 26152

Hong Kong Productivity Council

Address: LG1/F, HKPC Building 78 Tat Chee Avenue, Kowloon, Hong Kong

Tel.: +852 2788 6396

Fax: +852 2788 5405

Email: emc@hkpc.org

The test facility is recognized or accredited by the following organizations:

FCC

Designation Number : HK0012

ISED/IC

Company Number : 4780A

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List of Test and Measurement Instruments

Hong Kong Productivity Council

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	EMC209	2025-03-04	2026-03-04
Test Receiver	Rohde & Schwarz	ESU40	2025-03-31	2026-03-21
Bi-conical Antenna	Rohde & Schwarz	HK116	2024-10-24	2025-10-24
Log Periodic Antenna	Rohde & Schwarz	HL223	2024-10-25	2025-10-25
Cable	SF118/11N/11N /12000MM	Huber+Suhner	2025-01-06	2026-01-06
Microwave amplifier	COM-POWER Corporation	PAM-118A	2025-03-04	2026-03-04
High Pass Filter	Trilithic	23042	2023-10-29	2025-10-29

TÜV Rheinland Hong Kong Ltd.

Conducted Emission on AC mains port

Equipment	Manufacturer	Type	Cal. Date	Due Date
EMI Test Receiver	R & S	ESR 3	2024-09-09	2025-09-10
LISN	R & S	ENV216	2024-10-21	2025-10-22
RF Coaxial Cable	R & S	N/A	2024-08-06	2025-08-07

Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSV40	2024-08-07	2025-08-06

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Measurement Uncertainty

The estimated combined standard uncertainty for powerline conducted emissions measurements is $\pm 3.22\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 2.44\text{dB}$ (9kHz to 30MHz) and $\pm 5.92\text{dB}$ (30MHz to 1000MHz) and is $\pm 4.92\text{dB}$ (1GHz to 18GHz).

The estimated combined standard uncertainty for antenna conducted emission is $\pm 1.94\text{dB}$

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for the level of confidence is approximately 95%.

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Results FCC Part 15 - Subpart C / RSS-247 Issue 3

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirements:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	a) Antenna type	PCB antenna
	b) Manufacturer and model no.:	N/A
	c) Peak Gain:	-0.64 dBi
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		Pass
FCC Requirements:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.	
Results:	Only one PCB antenna can be used.	
Verdict:	Pass	

RSS-Gen 6.3 – External Control		Pass
IC Requirements:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.	
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
Verdict:	Pass	

RSS-Gen 8.3 – Antenna Requirement		Pass
IC Requirements:	When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.	
Results:	a) Antenna type	PCB antenna
	b) Manufacturer:	N/A
	c) Model no.:	N/A
	d) Peak Gain:	-0.64 dBi
Verdict:	Pass	

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FCC 15.207/ RSS-Gen 8.8 – Conducted Emission on AC Mains

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-07
Mode of operation : BT mode
Port of testing : Temporary antenna port
Supply voltage : 120VAC/60Hz
Temperature : 22.8°C
Humidity : 59.3%

Requirement: Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Results: For test protocols please refer to Appendix 1.

Mode: Charging + Normal Playing Mode

Live

Frequency range (MHz)	Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Remark	Verdict
0.15 - 30	4.112	31.3	56.0	24.7	QP	Pass
	4.569	33.7	56.0	22.3	QP	Pass
	5.026	32.4	60.0	27.6	QP	Pass
	4.112	19.6	46.0	26.5	Average	Pass
	4.569	20.8	46.0	25.2	Average	Pass
	5.026	18.7	50.0	31.2	Average	Pass

Neutral

Frequency range (MHz)	Frequency (MHz)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Remark	Verdict
0.15 - 30	2.756	29.6	56.0	26.4	QP	Pass
	3.674	32.1	56.0	23.9	QP	Pass
	4.605	29.1	56.0	26.9	QP	Pass
	2.756	14.6	46.0	31.4	Average	Pass
	3.674	18.5	46.0	27.5	Average	Pass
	4.605	14.5	46.0	31.5	Average	Pass

Remark: ---

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FCC 15.215(c) / RSS-247 5.1(a) – 20dB Bandwidth

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.
For test protocols refer to Appendix 1.

BDR

Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)	20dB bandwidth (kHz)
2402	2401.594	> 2400	2402.555	< 2483.5	960.500
2441	2440.595	> 2400	2441.557	< 2483.5	961.700
2480	2479.592	> 2400	2480.572	< 2483.5	979.700

EDR

Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)	20dB bandwidth (kHz)
2402	2401.433	> 2400	2402.730	< 2483.5	1296.770
2441	2440.430	> 2400	2441.720	< 2483.5	1289.870
2480	2479.429	> 2400	2480.725	< 2483.5	1295.870

FCC 15.247 (a)(1) / RSS-247 5.1(b) – Carrier Frequency Separation

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

Results: The centre frequencies of the hopping channels are separated by more than the 2/3*20dB bandwidth. For test protocols please refer to Appendix 1.

Note: The limit is maximum 2/3 of the 20dB bandwidth: 864.513kHz

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FCC 15.247 (a)(1)(iii) / RSS-247 5.1(d) – Number of Hopping Frequency

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

Results: Measured quantity of hopping channel is greater than 15 channels. For test protocols please refer to Appendix 1.

FCC 15.247 (a)(1)(iii) / RSS-247 5.1(d) – Time of Occupancy

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.
For test protocols please refer to Appendix 1.

BDR – Hopping On

Data packet	No. of Pulse in sweep time	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
1-DH1	21	0.406	0.135	< 0.4	Pass
1-DH3	10	1.652	0.261	< 0.4	Pass
1-DH5	7	2.899	0.321	< 0.4	Pass

EDR – Hopping On

Data packet	No. of Pulse in sweep time	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
2-DH1	21	0.417	0.138	< 0.4	Pass
2-DH3	12	1.665	0.316	< 0.4	Pass
2-DH5	6	2.897	0.275	< 0.4	Pass

Note:

Dwell Time = Pulse width x Number of Pulse in the Period

Number of Pulse in the Period = Number of Pulse in sweep time x (Period / sweep time)

Period = 0.4 x 79 (channel) = 31.6 seconds

Sweep Time = 2 seconds

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RSS-Gen 6.7 – Occupied Bandwidth

N/A

Test Specification : RSS-Gen
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement : N/A

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.
For test protocols refer to Appendix 1.

BDR

Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (kHz)
2402	2401.627	2402.518	890.311
2441	2440.620	2441.506	886.111
2480	2479.614	2480.517	902.910

EDR

Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (kHz)
2402	2401.474	2402.669	1195.680
2441	2440.468	2441.658	1190.281
2480	2479.469	2480.661	1193.881

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FCC 15.247(b)(1) / RSS-247 5.4(b) – Maximum Peak Conducted Output Power

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: All frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Results: For test protocols please refer to Appendix 1.

BDR

Frequency (MHz)	Measured output power (dBm)	Limit (W)	Limit (dBm)	Verdict
2402	3.63	0.125	20.97	Pass
2441	3.65	0.125	20.97	Pass
2480	2.97	0.125	20.97	Pass

EDR

Frequency (MHz)	Measured output power (dBm)	Limit (W)	Limit (dBm)	Verdict
2402	4.00	0.125	20.97	Pass
2441	4.23	0.125	20.97	Pass
2480	3.64	0.125	20.97	Pass

FCC 15.247(d) / RSS-247 5.5 – Spurious Conducted Emissions

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-07-04
Mode of operation : Tx mode
Port of testing : Temporary antenna port
Supply voltage : 3.7 VDC
Temperature : 22.2°C
Humidity : 56.9%

Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate.
Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method is compliance with the requirement. For test protocols refer to Appendix 1.

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FCC 15.205/ RSS-Gen 8.10 – Radiated Emissions in Restricted Frequency Bands

Pass

Test Specification : ANSI C63.10 – 2013
Test date : 2025-06-30
Mode of operation : Tx mode
Port of testing : Enclosure
Frequency range : 9kHz - 25GHz
Supply voltage : 3.7 VDC
Temperature : 21°C
Humidity : 59%

Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission general limits.

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate.
All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.

Mode: 2402MHz TX

Vertical Polarization

Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
2390.000	30.2	74.0 / PK
2390.000	16.6	54.0 / AV
2400.000	47.0	74.0 / PK
2400.000	27.7	54.0 / AV
4804.022	46.3	74.0 / PK
4804.022	36.6	54.0 / AV

Mode: 2402MHz TX

Horizontal Polarization

Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
2390.000	37.7	74.0 / PK
2390.000	20.4	54.0 / AV
2400.000	51.6	74.0 / PK
2400.000	31.7	54.0 / AV
4804.022	46.9	74.0 / PK
4804.022	37.7	54.0 / AV

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Mode: 2441MHz TX			Vertical Polarization		
Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m	Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
4882.020	42.4	74.0 / PK	4882.020	32.2	54.0 / AV
Mode: 2441MHz TX			Horizontal Polarization		
Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m	Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
4882.016	44.0	74.0 / PK	4882.016	32.9	54.0 / AV
4882.016	32.9	54.0 / AV	9764.044	48.4	74.0 / PK
9764.044	48.4	74.0 / PK	9764.044	38.7	54.0 / AV
9764.044	38.7	54.0 / AV	Mode: 2480MHz TX		
Mode: 2480MHz TX			Vertical Polarization		
Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m	Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
2483.500	37.8	74.0 / PK	2483.500	20.7	54.0 / AV
2483.500	20.7	54.0 / AV	4960.022	39.0	74.0 / PK
4960.022	39.0	74.0 / PK	4960.022	31.0	54.0 / AV
4960.022	31.0	54.0 / AV	Mode: 2480MHz TX		
Mode: 2480MHz TX			Horizontal Polarization		
Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m	Frequency MHz	Level dBuV/m	Limit / Detector dBuV/m
2483.500	43.4	74.0 / PK	2483.500	22.3	54.0 / AV
2483.500	22.3	54.0 / AV	4960.022	40.9	74.0 / PK
4960.022	40.9	74.0 / PK	4960.022	33.8	54.0 / AV
4960.022	33.8	54.0 / AV	9920.043	50.8	74.0 / PK
9920.043	50.8	74.0 / PK	9920.043	40.9	54.0 / AV
9920.043	40.9	54.0 / AV			

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Appendix 1

Test Results

Prüfbericht-Nr.:
 Test report no.:

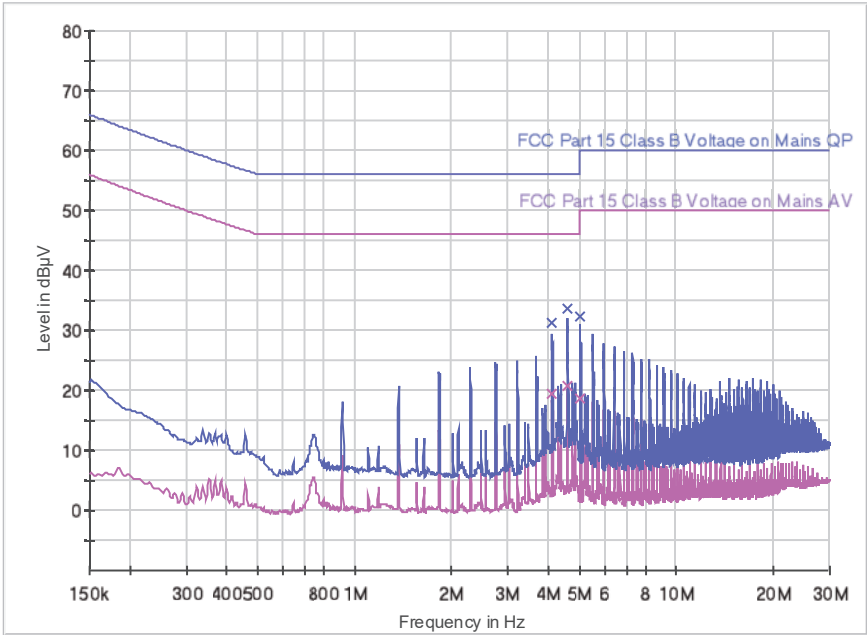
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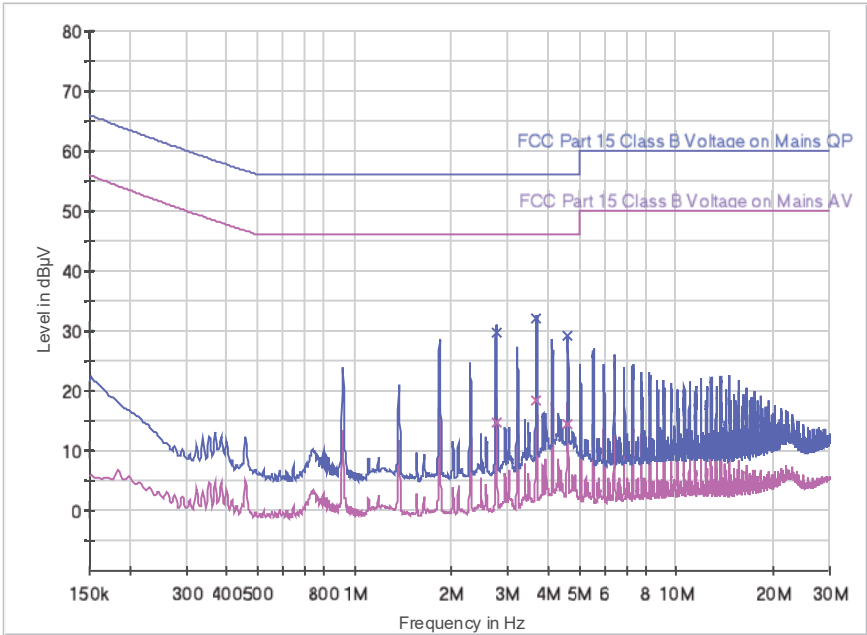
Conducted Emission on AC Mains

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



Live

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



Neutral

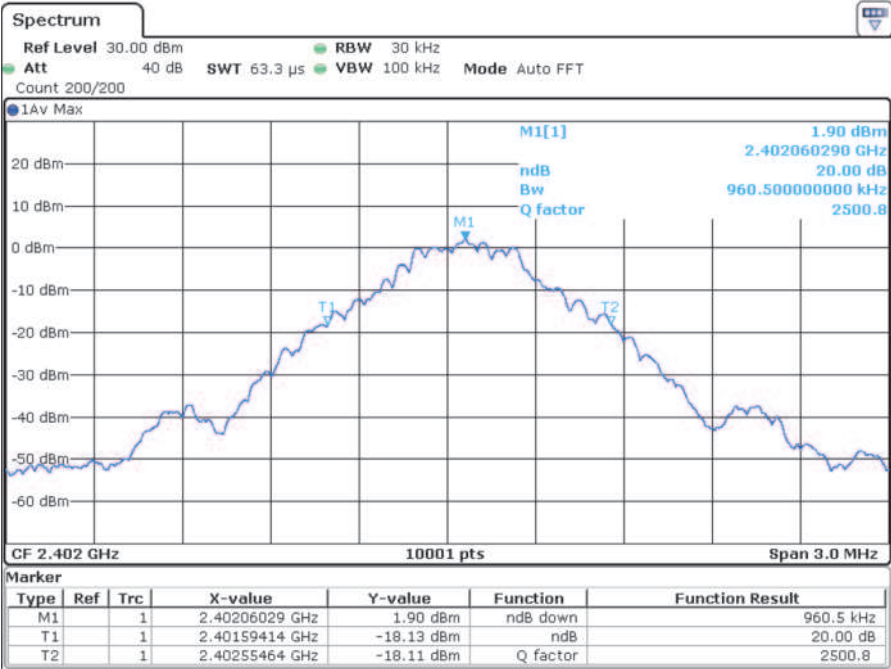
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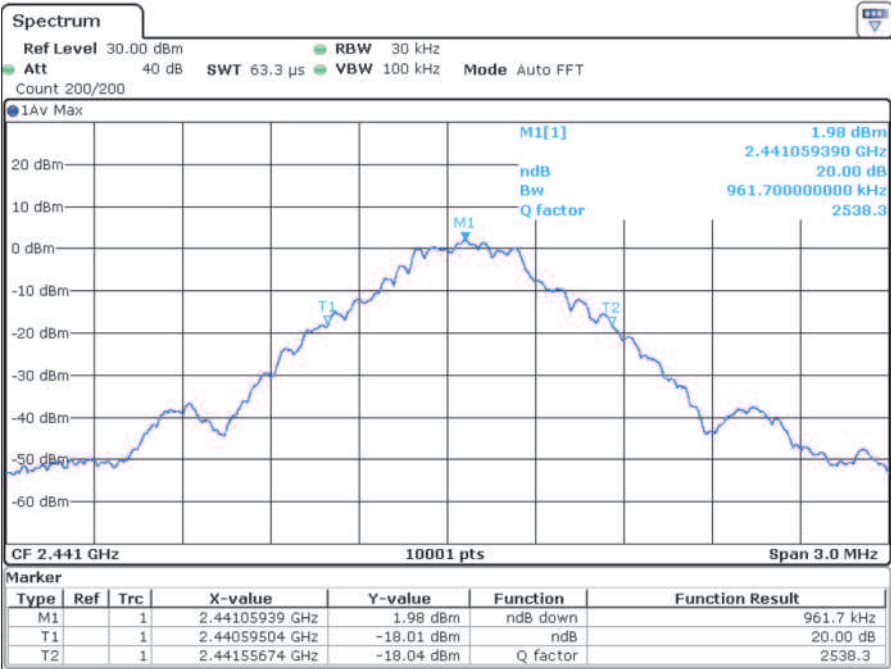
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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20dB Bandwidth



Date: 4. JUL 2025 14:16:44

BDR, Tx frequency: 2402MHz



Date: 4. JUL 2025 14:17:32

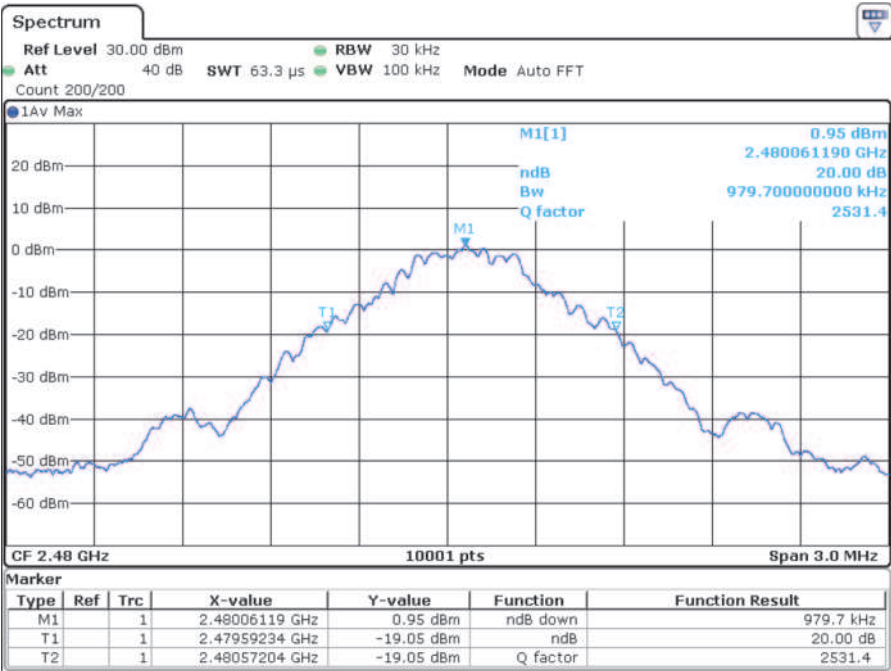
BDR, Tx frequency: 2441MHz

Prüfbericht-Nr.:
 Test report no.:

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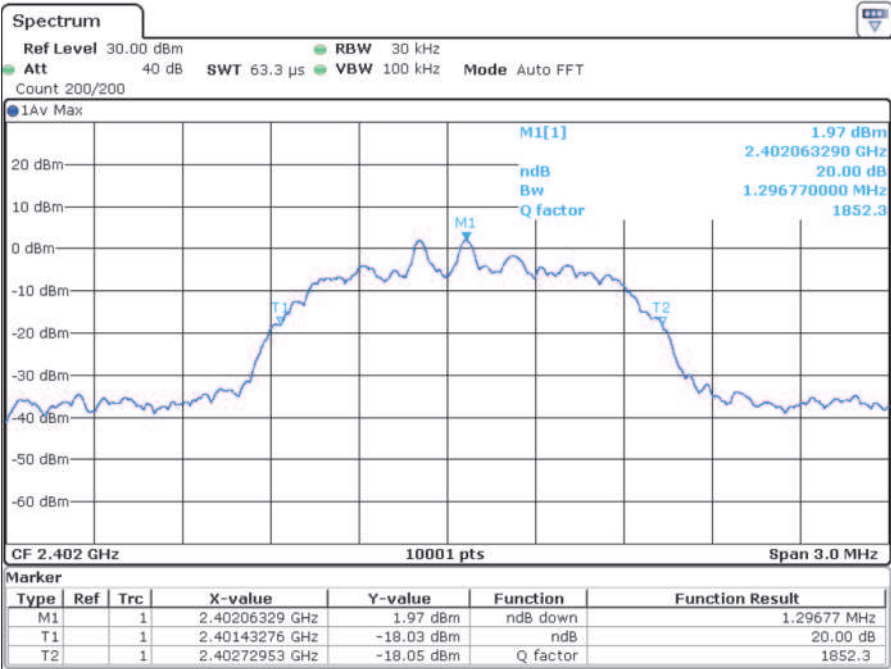
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Date: 4. JUL 2025 14:21:01

BDR, Tx frequency: 2480MHz



Date: 4. JUL 2025 14:16:13

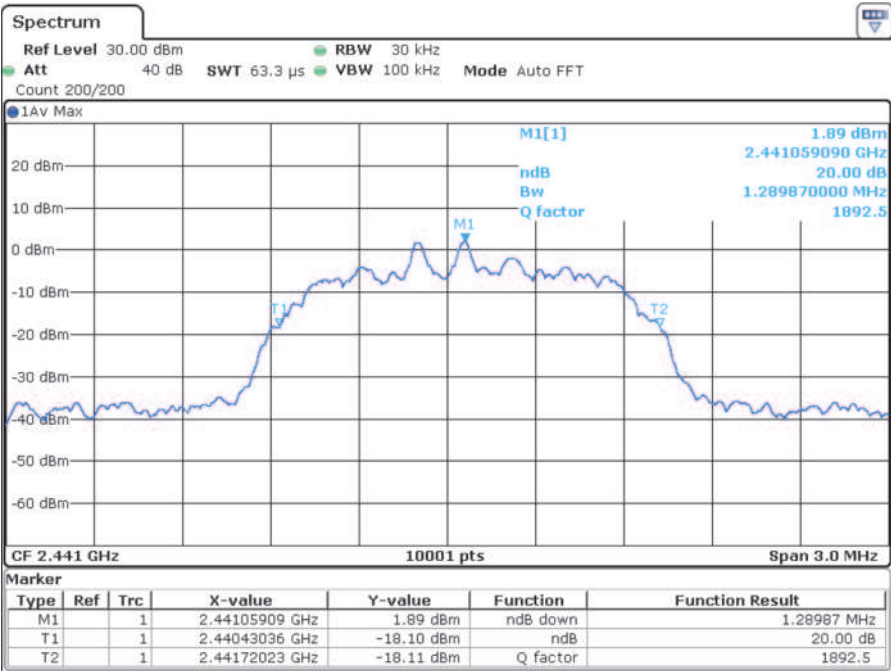
EDR, Tx frequency: 2402MHz

Prüfbericht-Nr.:
 Test report no.:

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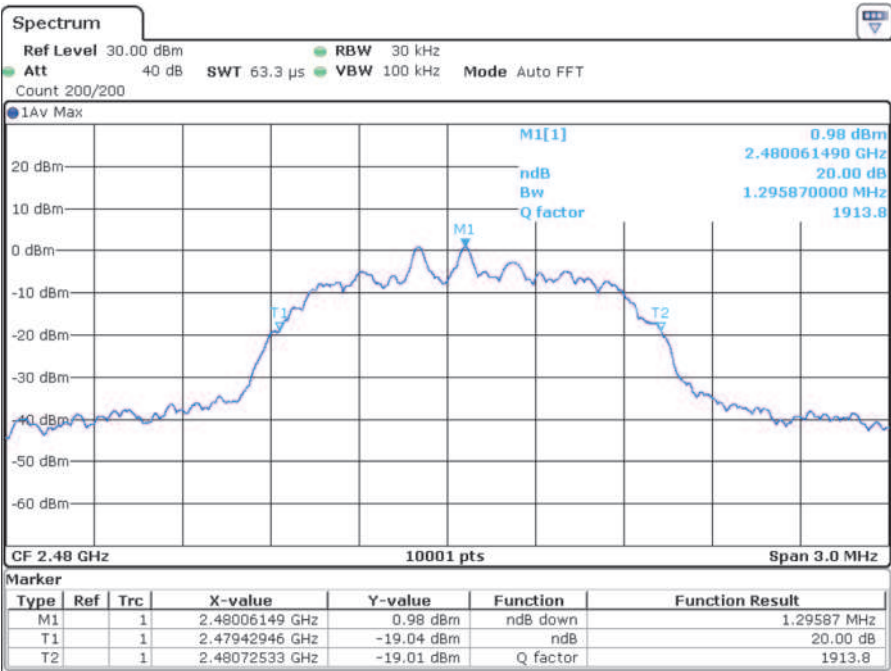
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Date: 4. JUL 2025 14:18:55

EDR, Tx frequency: 2441MHz



Date: 4. JUL 2025 14:19:41

EDR, Tx frequency: 2480MHz

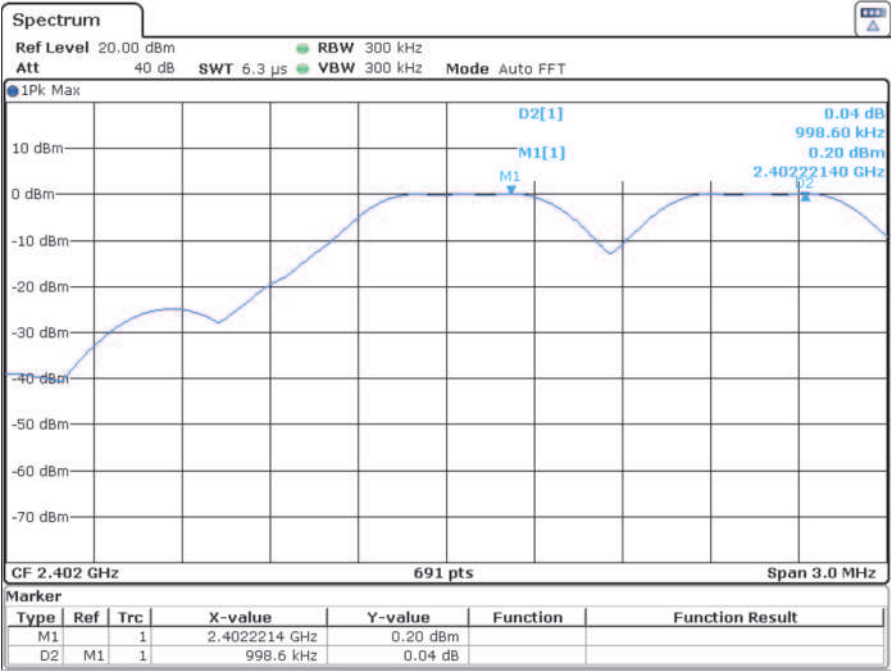
Prüfbericht-Nr.:
 Test report no.:

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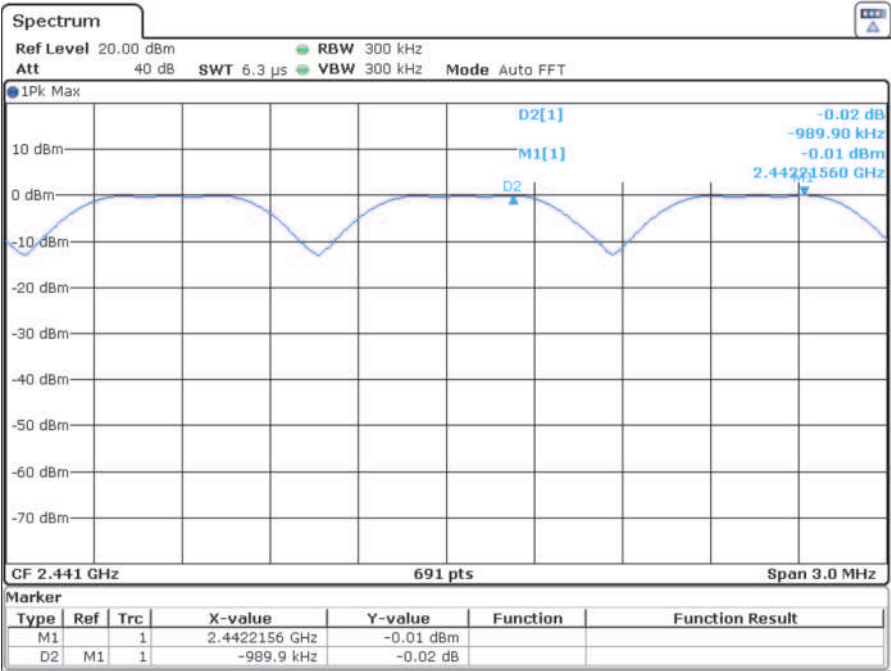
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Carrier Frequency Separation



BDR, Tx frequency: 2402MHz



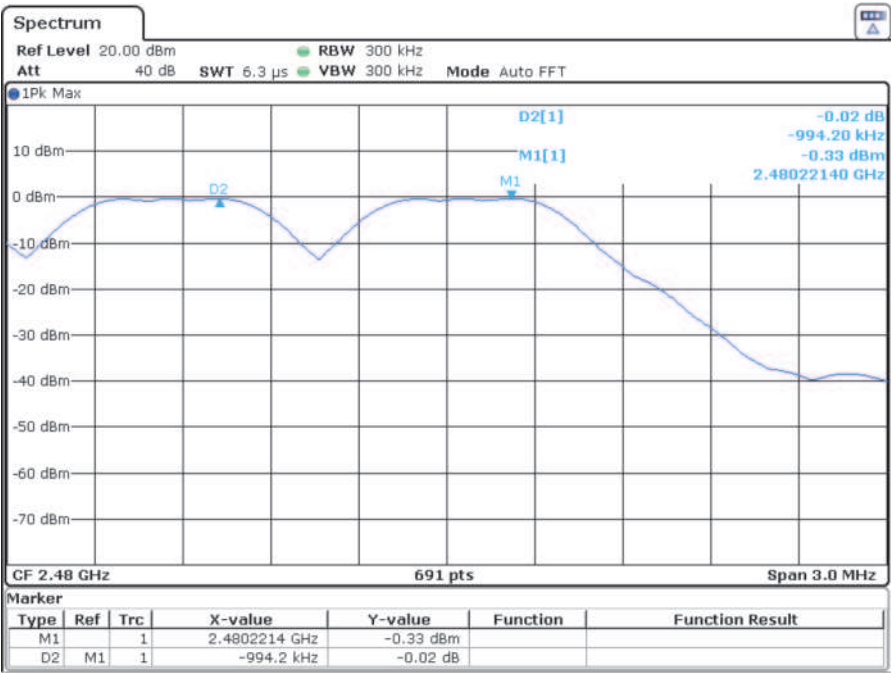
BDR, Tx frequency: 2441MHz

Prüfbericht-Nr.:
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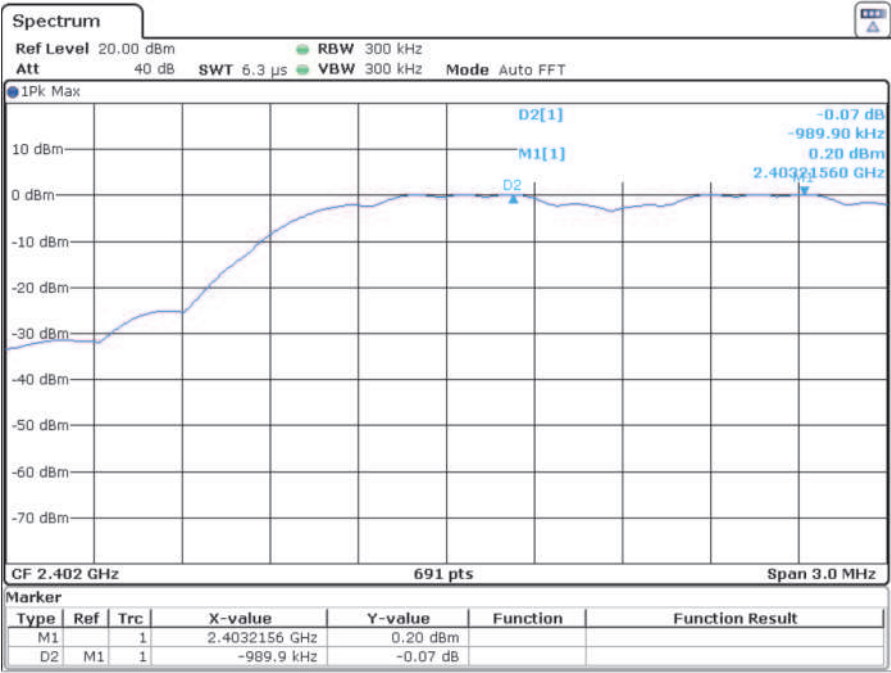
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Date: 4.JUL 2025 17:38:51

BDR, Tx frequency: 2480MHz



Date: 4.JUL 2025 16:32:59

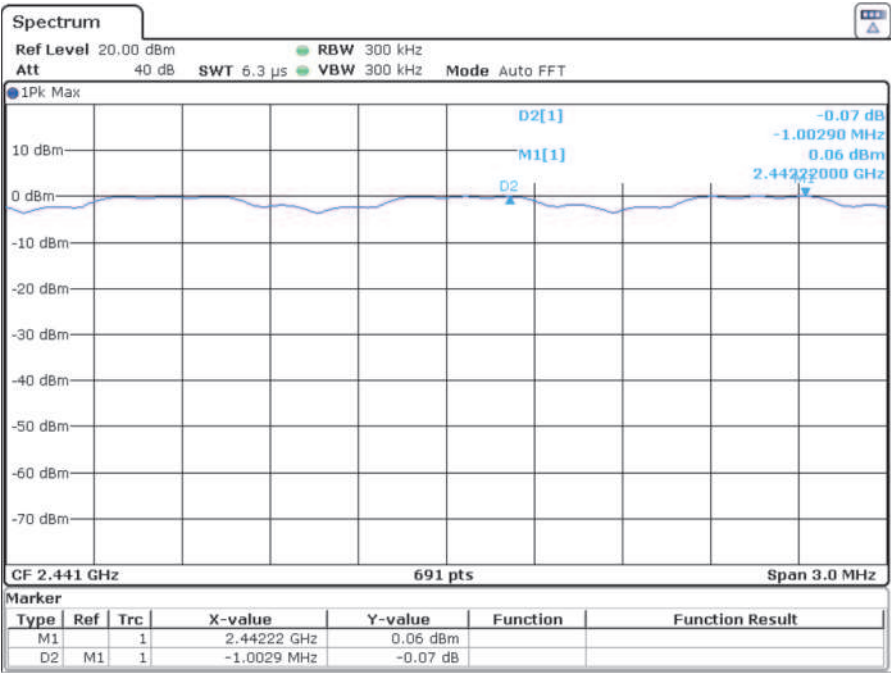
EDR, Tx frequency: 2402MHz

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

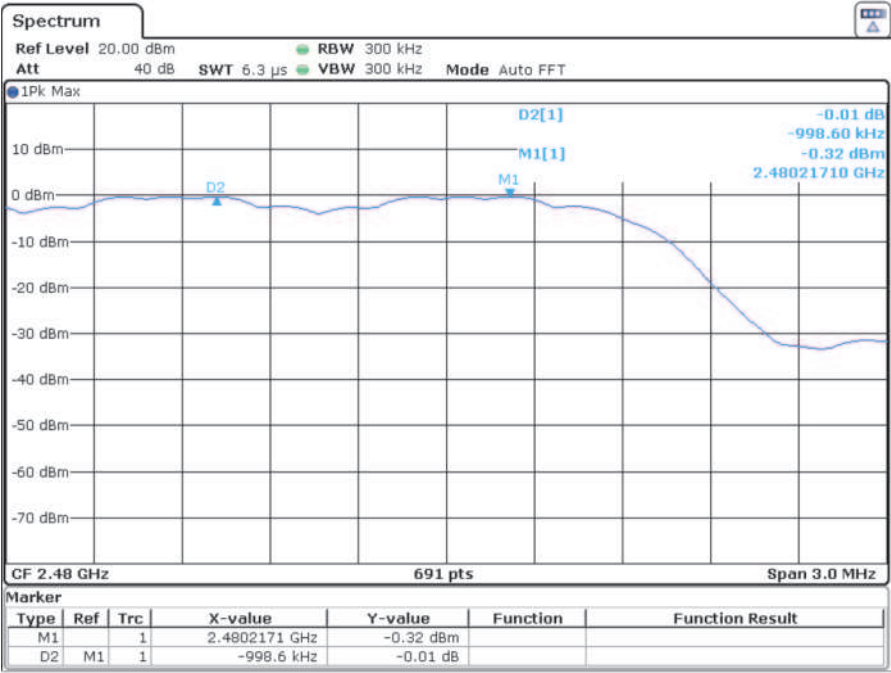
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Date: 4.JUL.2025 17:34:06

EDR, Tx frequency: 2441MHz



Date: 4.JUL.2025 17:43:07

EDR, Tx frequency: 2480MHz

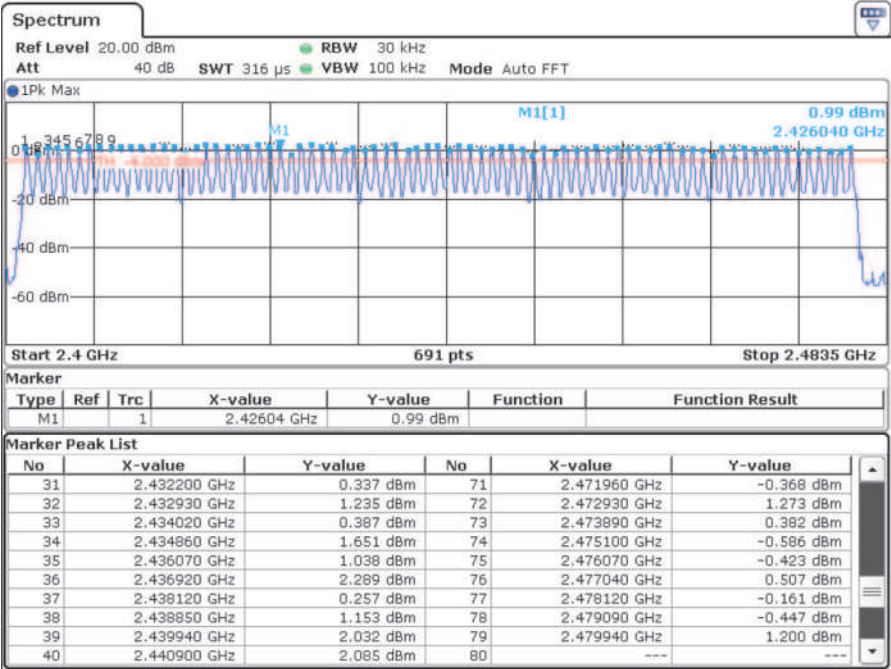
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Test report no.:

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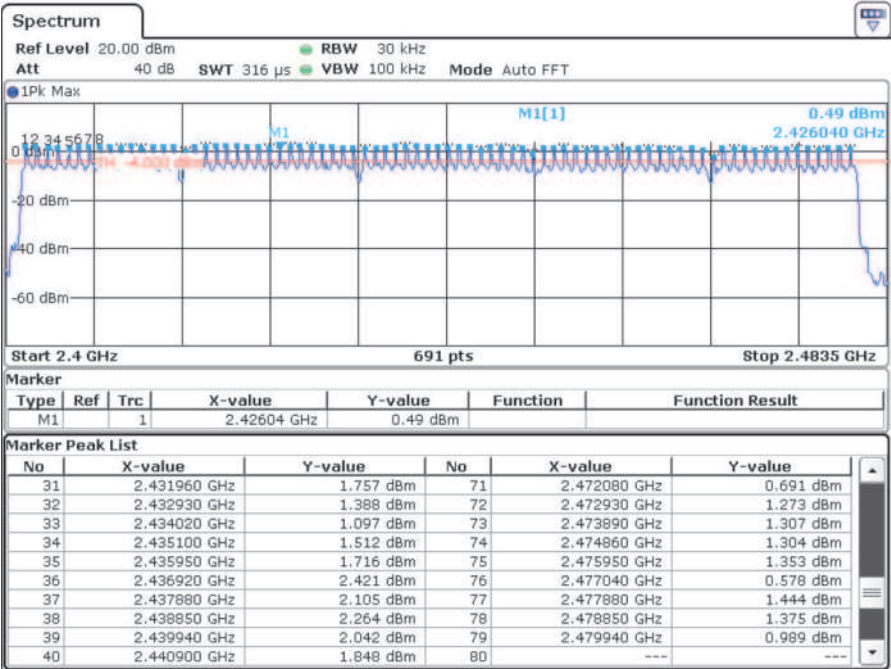
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Number of Hopping Frequency



Date: 4 JUL 2025 14:43:09

BDR, Tx frequency: Frequency hopping



Date: 4 JUL 2025 14:41:53

EDR, Tx frequency: Frequency hopping

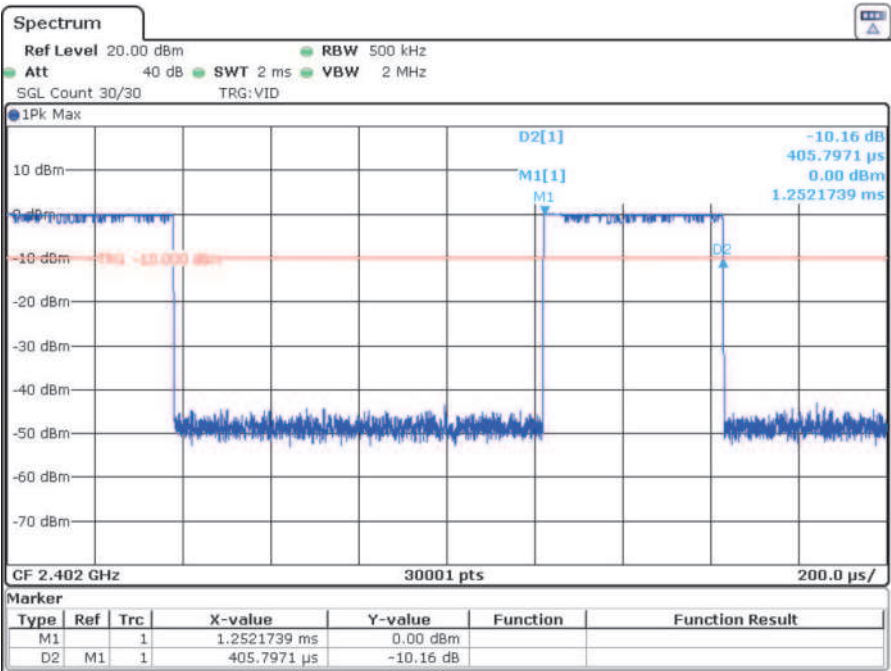
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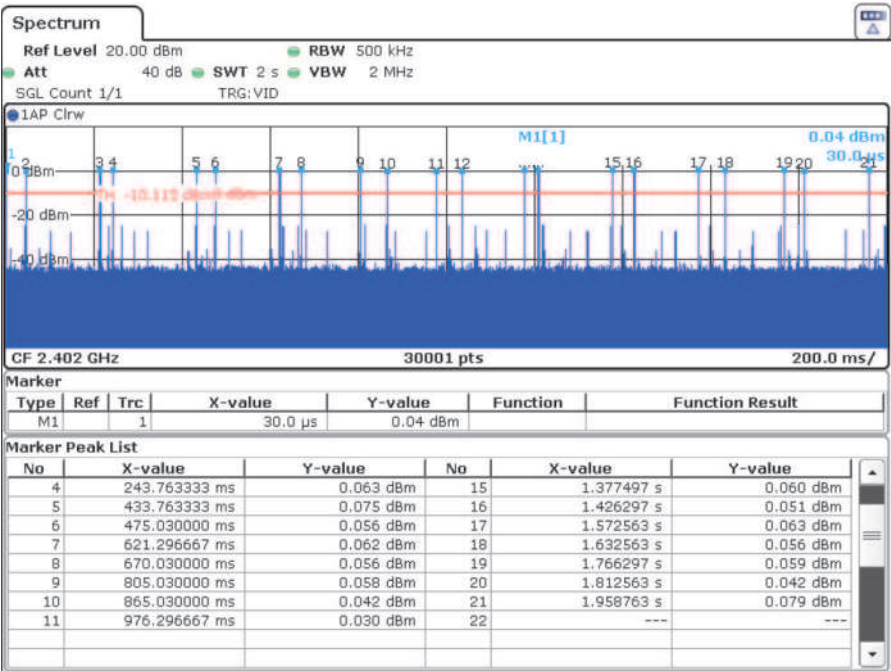
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Time of Occupancy



Date: 4.JUL.2025 16:19:42

BDR, DH1, Pulse width



Date: 4.JUL.2025 17:17:24

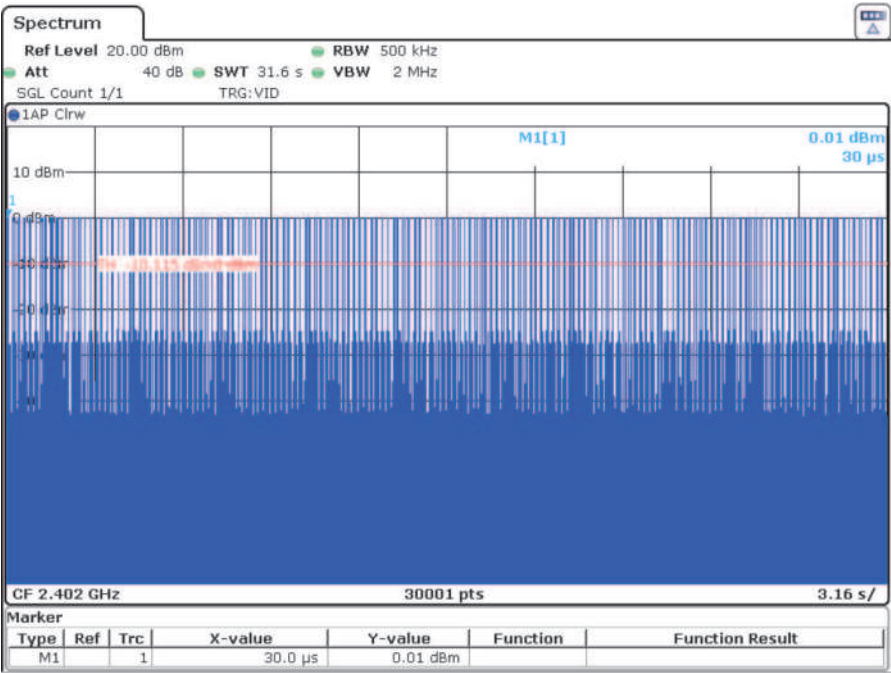
BDR, DH1, No. of Hopping in sweep time

Prüfbericht-Nr.:
 Test report no.:

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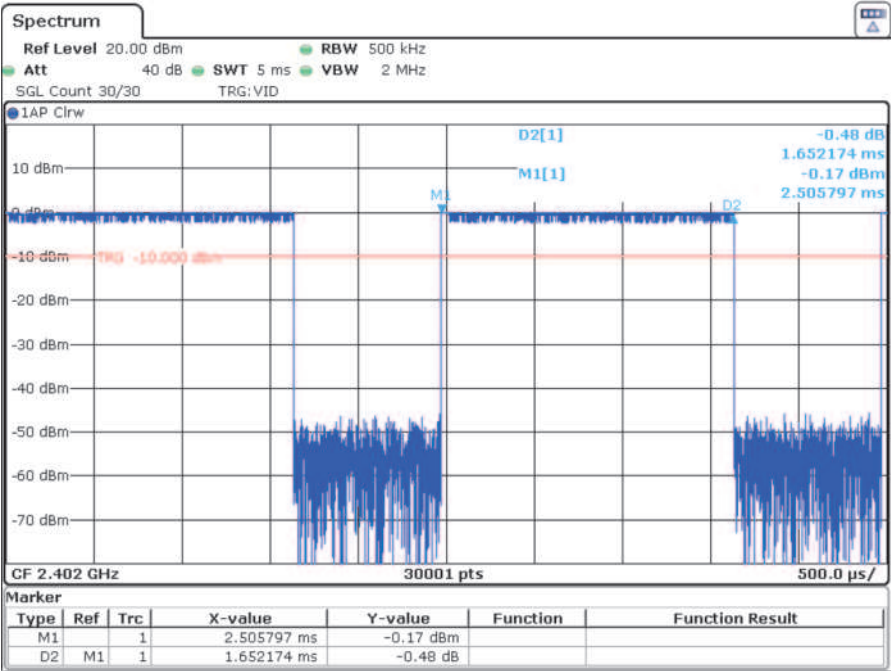
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Date: 4.JUL.2025 17:17:03

BDR, DH1, Tx frequency: Frequency hopping



Date: 4.JUL.2025 16:22:28

BDR, DH3, Pulse width

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

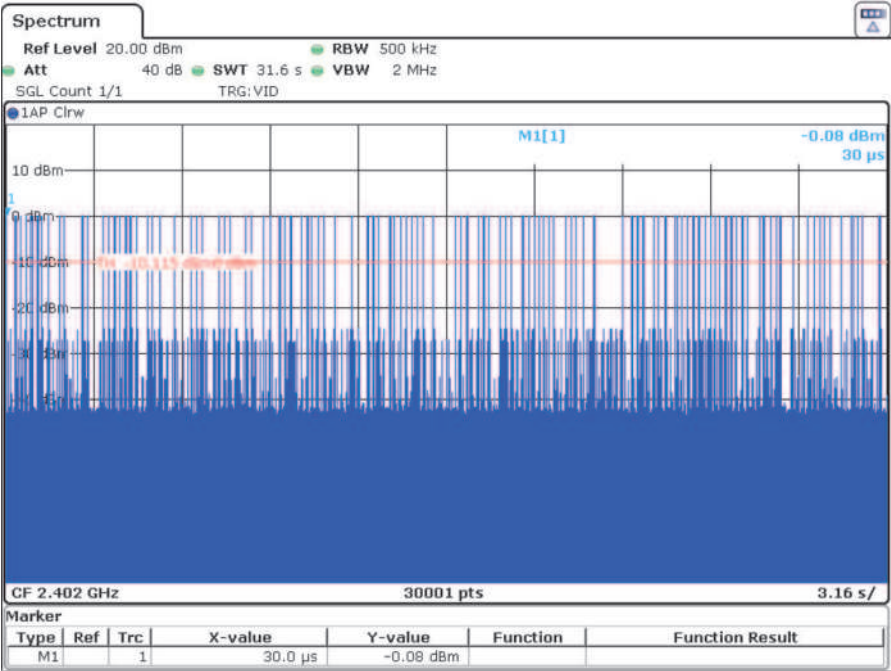
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Date: 4.JUL 2025 17:15:23

BDR, DH3, No. of Hopping in sweep time



Date: 4.JUL 2025 17:16:15

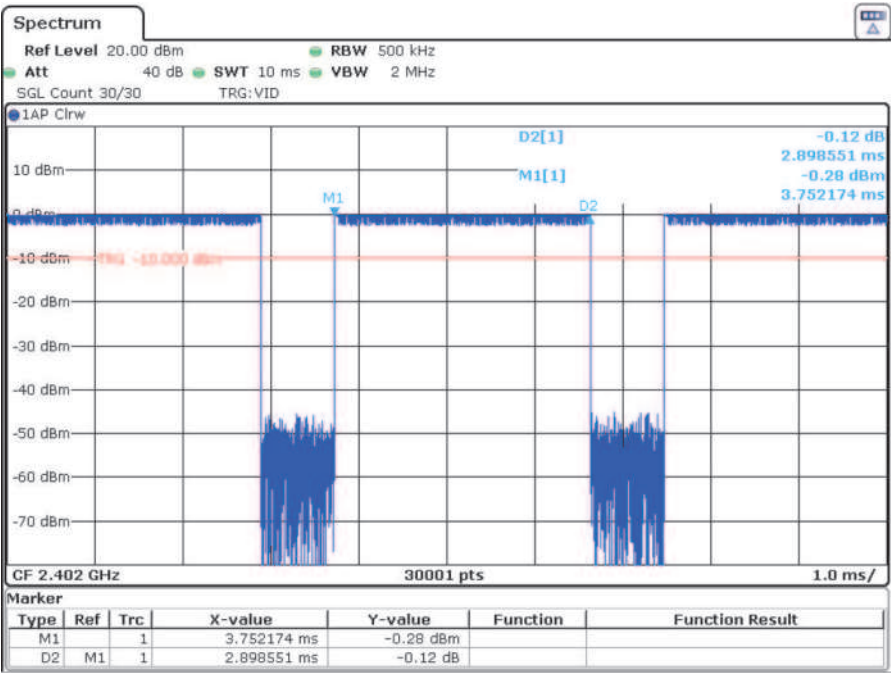
BDR, DH3, Tx frequency: Frequency hopping

Prüfbericht-Nr.:
 Test report no.:

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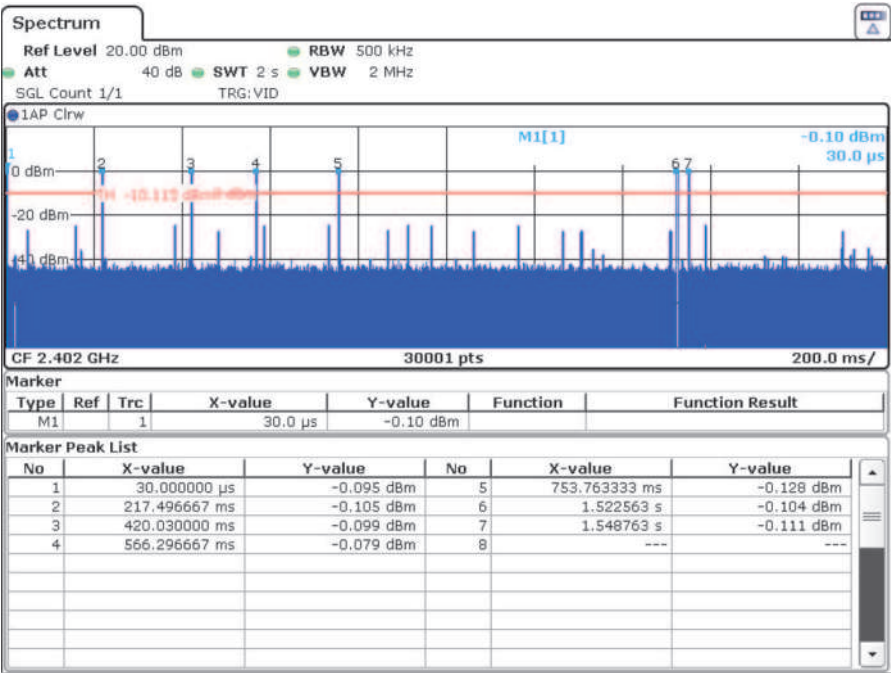
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Date: 4.JUL.2025 16:23:16

BDR, DH5, Pulse width



Date: 4.JUL.2025 17:13:57

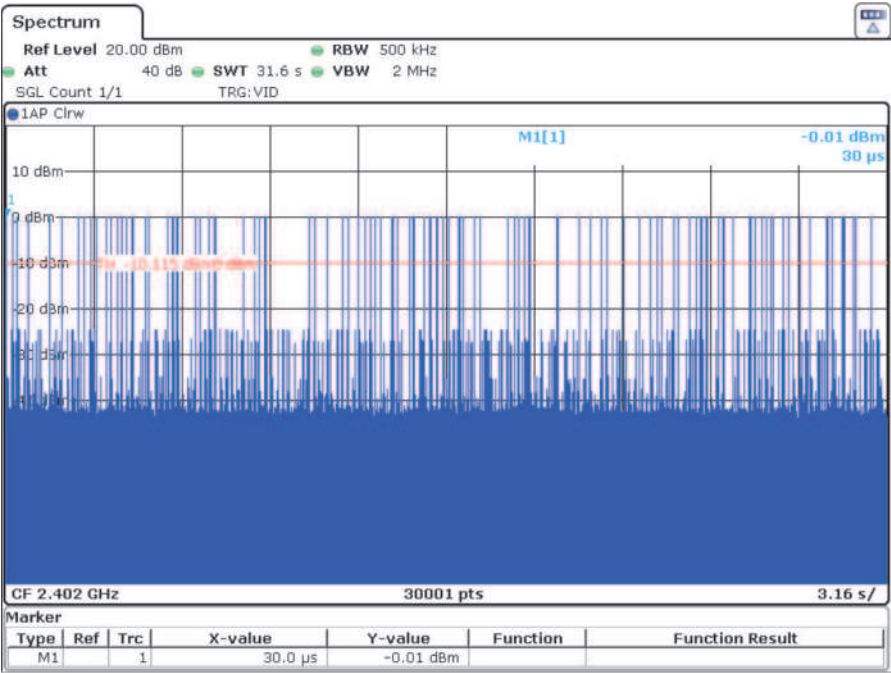
BDR, DH5, No. of Hopping in sweep time

Prüfbericht-Nr.:
 Test report no.:

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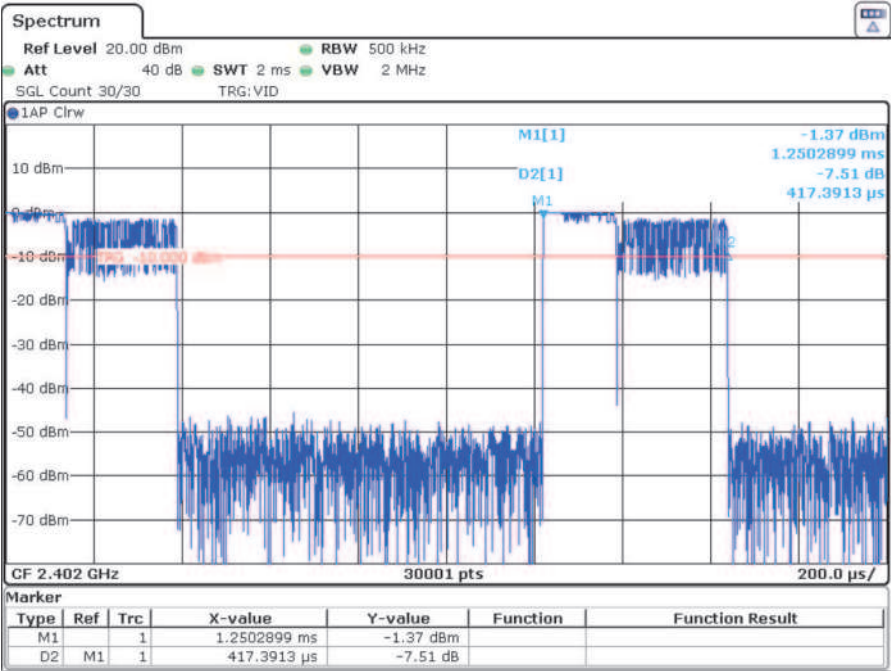
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Date: 4.JUL 2025 17:13:32

BDR, DH5, Tx frequency: Frequency hopping



Date: 4.JUL 2025 16:25:00

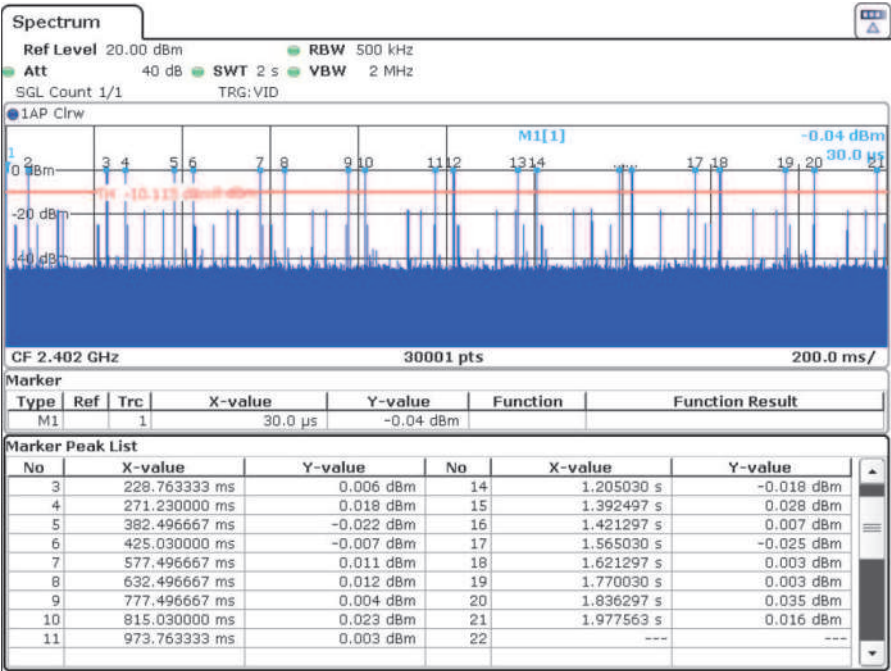
EDR, 2-DH1, Pulse width

Prüfbericht-Nr.:
 Test report no.:

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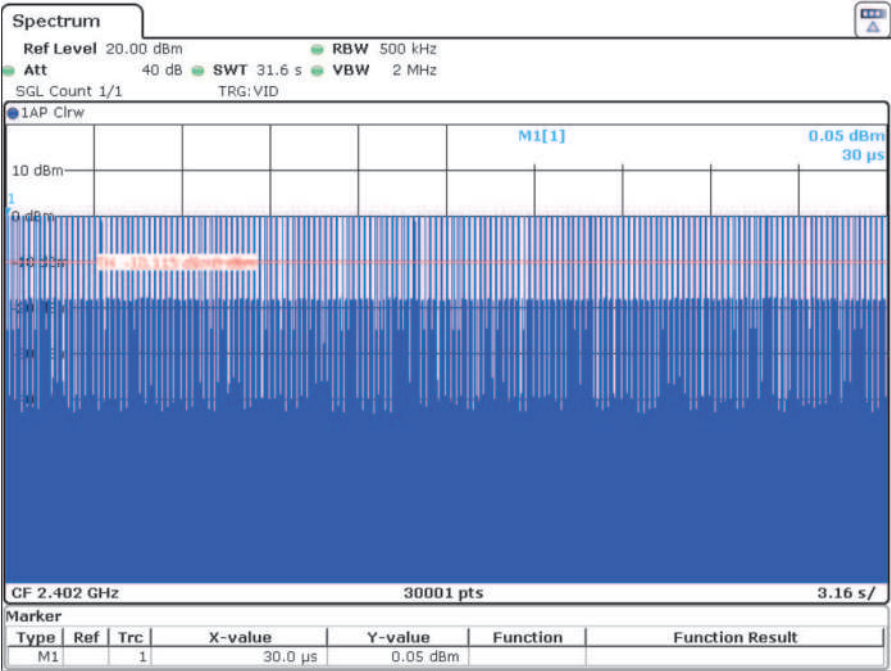
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Date: 4.JUL.2025 17:11:25

EDR, 2-DH1, No. of Hopping in sweep time



Date: 4.JUL.2025 17:12:37

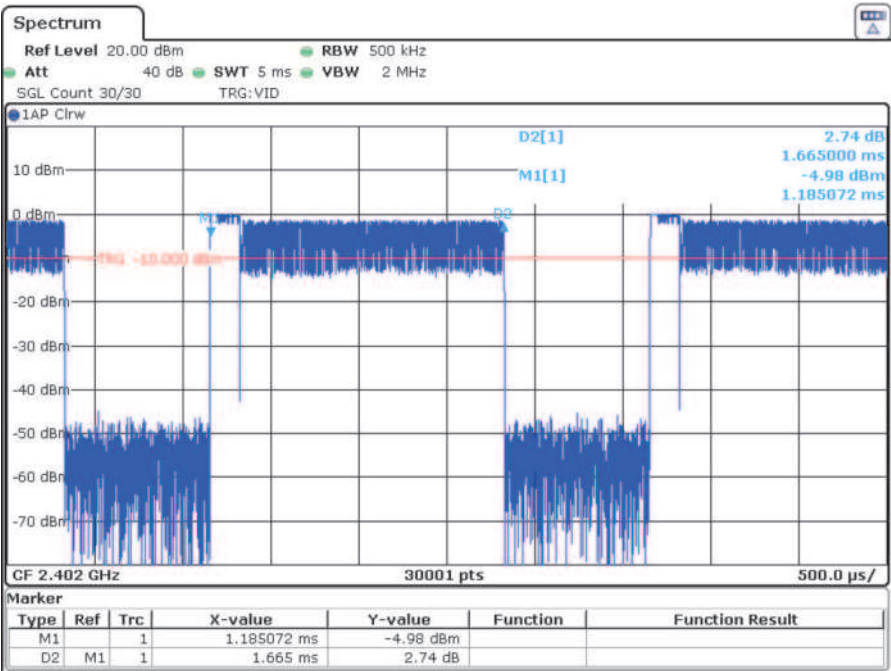
EDR, 2-DH1, Tx frequency: Frequency hopping

Prüfbericht-Nr.:
 Test report no.:

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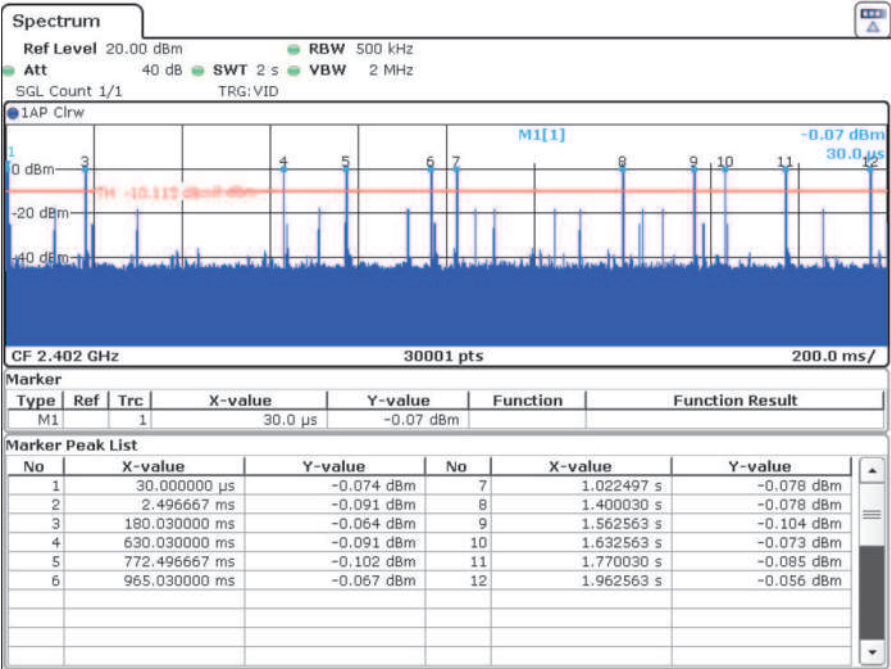
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Date: 4.JUL.2025 16:26:16

EDR, 2-DH3, Pulse width



Date: 4.JUL.2025 17:10:24

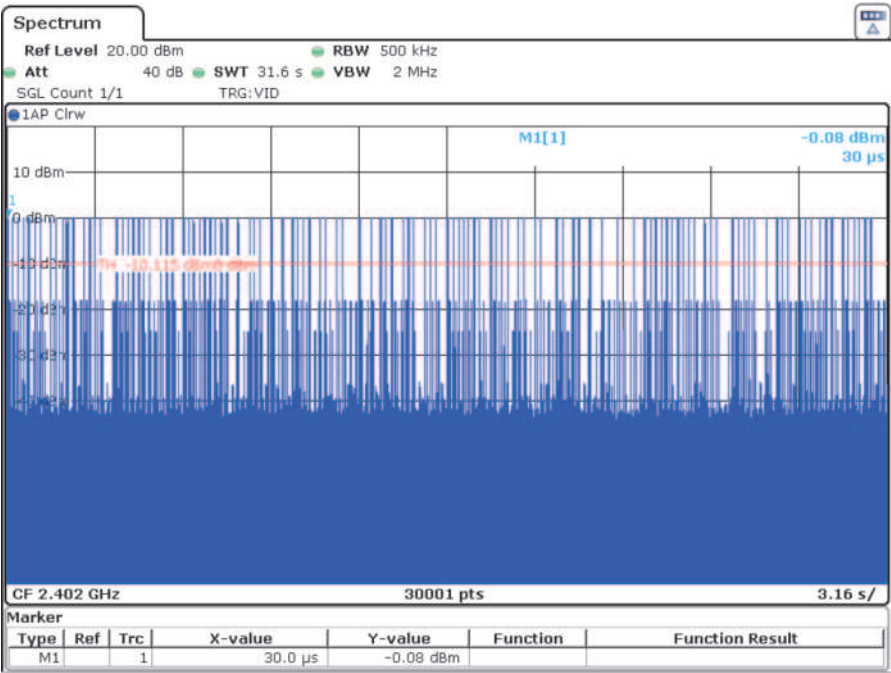
EDR, 2-DH3, No. of Hopping in sweep time

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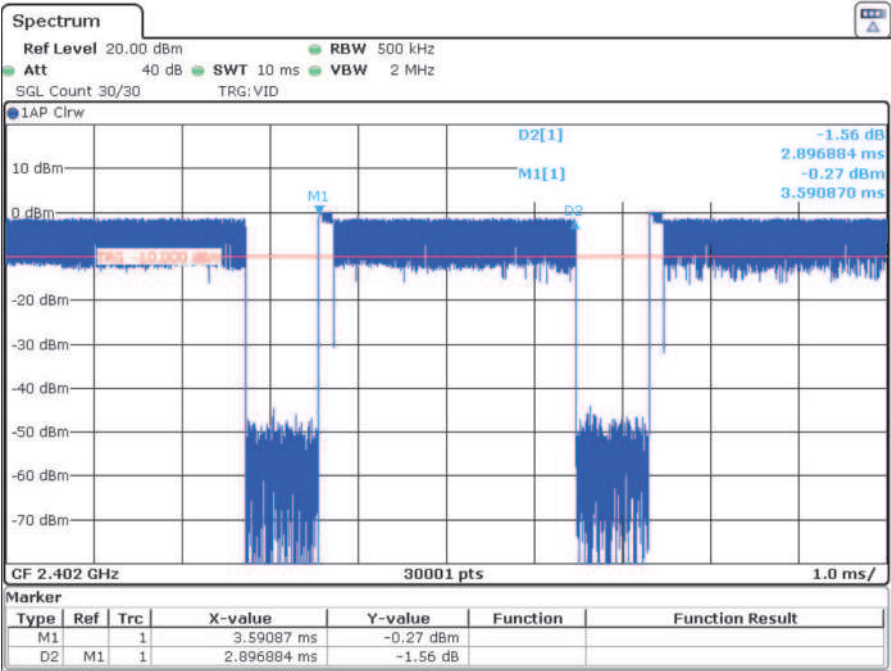
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Date: 4.JUL.2025 17:08:35

EDR, 2-DH3, Tx frequency: Frequency hopping



Date: 4.JUL.2025 16:26:59

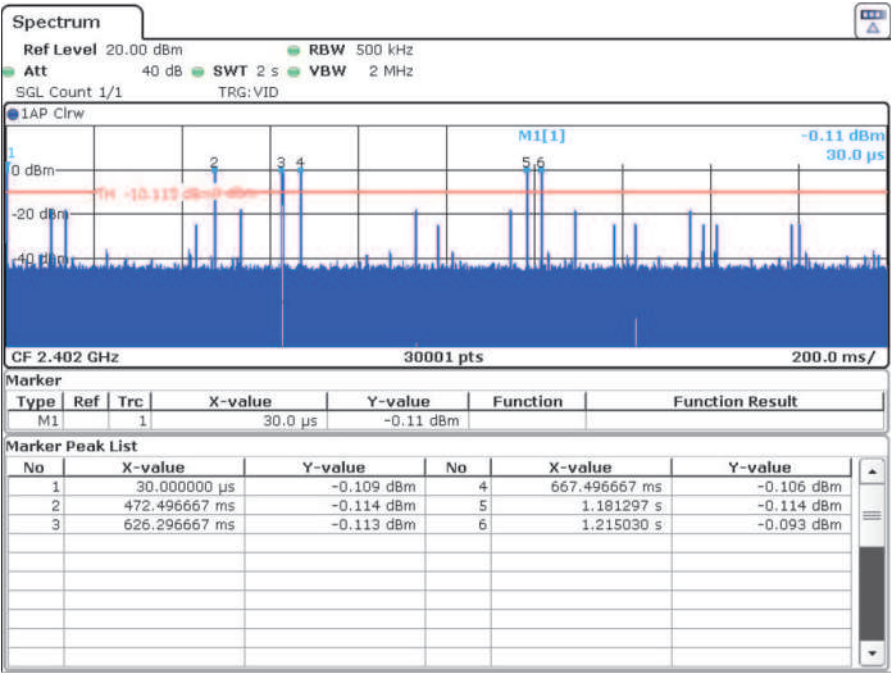
EDR, 2-DH5, Pulse width

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

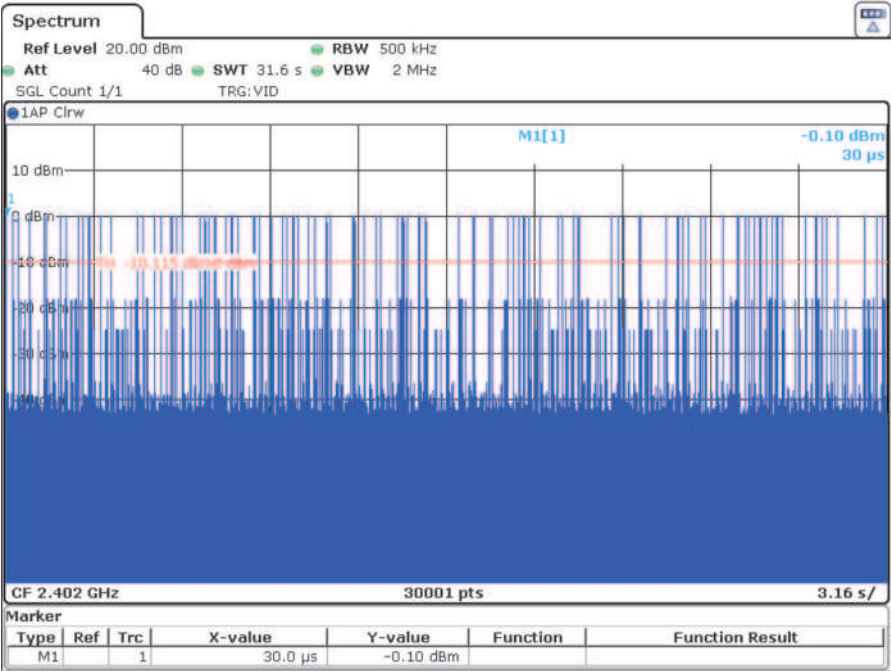
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4. JUL. 2025 17:06:49

EDR, 2-DH5, No. of Hopping in sweep time



Date: 4. JUL. 2025 17:07:47

EDR, 2-DH5, Tx frequency: Frequency hopping

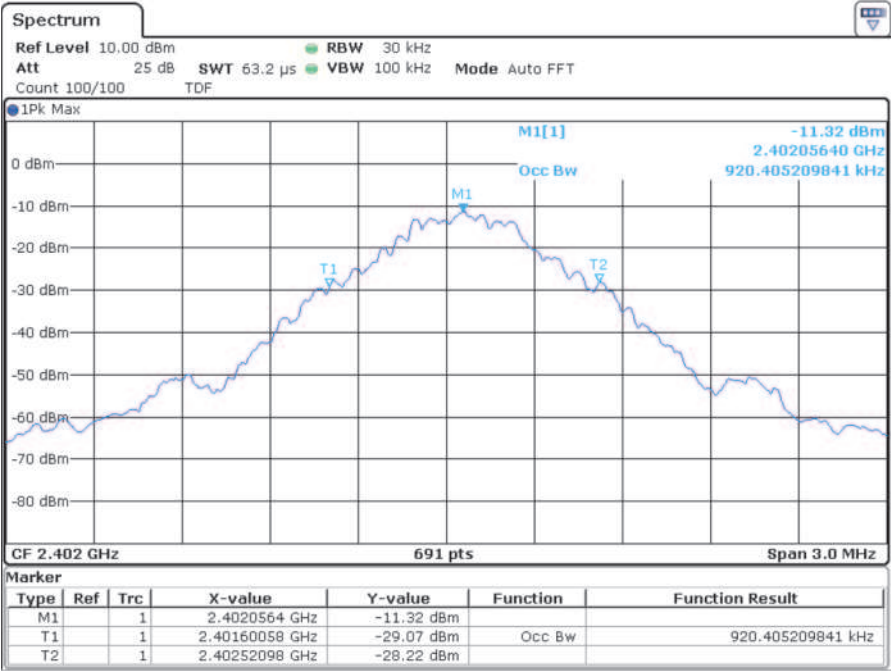
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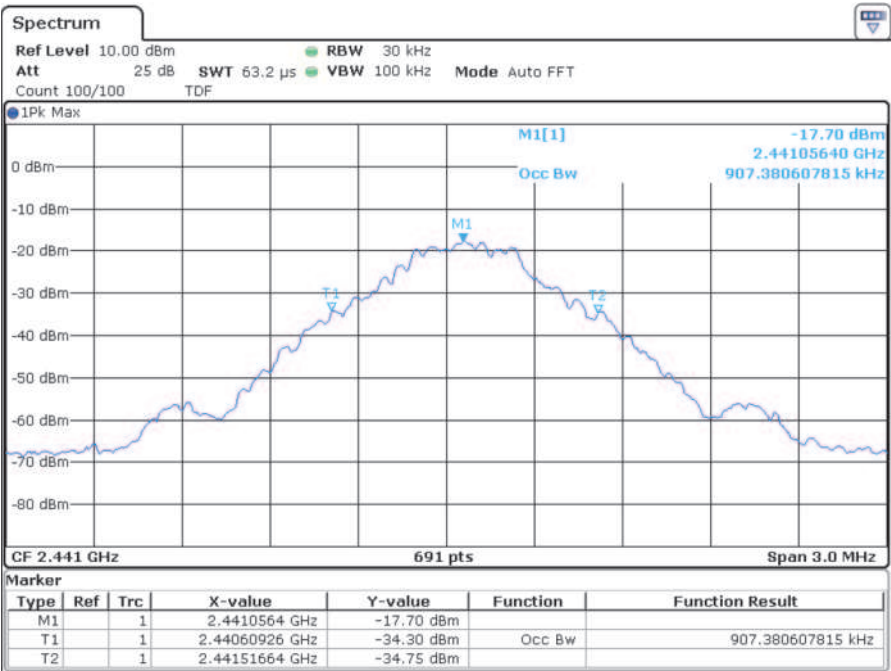
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Occupied Bandwidth



Date: 4.JUL.2025 10:45:38

BDR, Tx frequency: 2402MHz



Date: 4.JUL.2025 10:49:13

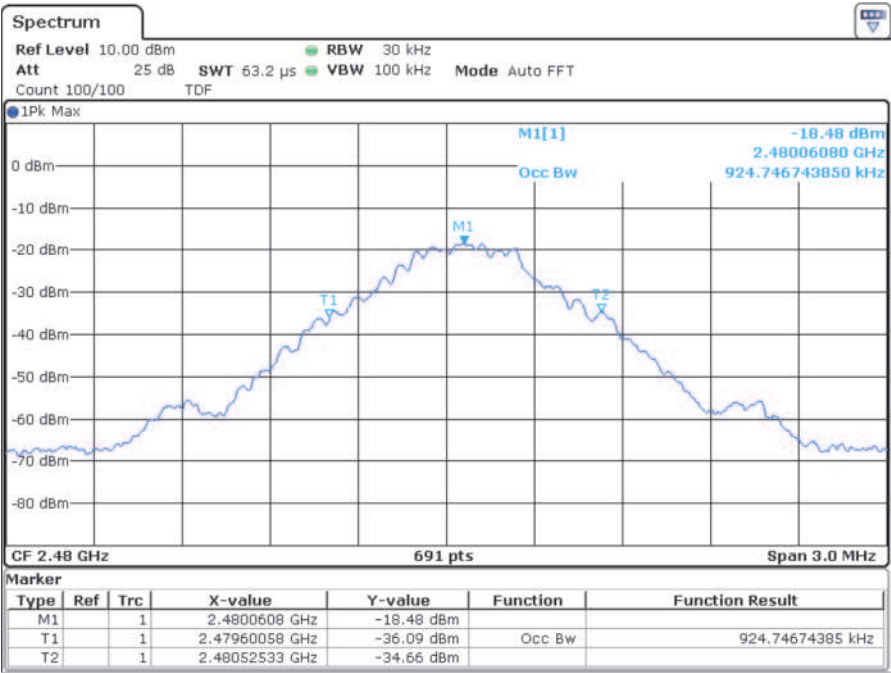
BDR, Tx frequency: 2441MHz

Prüfbericht-Nr.:
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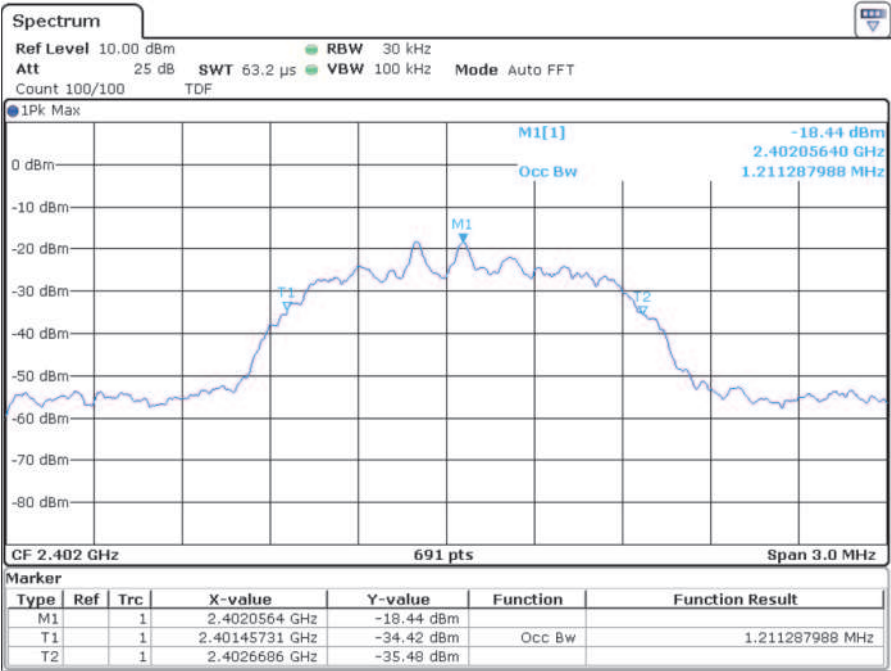
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4.JUL.2025 10:50:36

BDR, Tx frequency: 2480MHz



Date: 4.JUL.2025 10:53:32

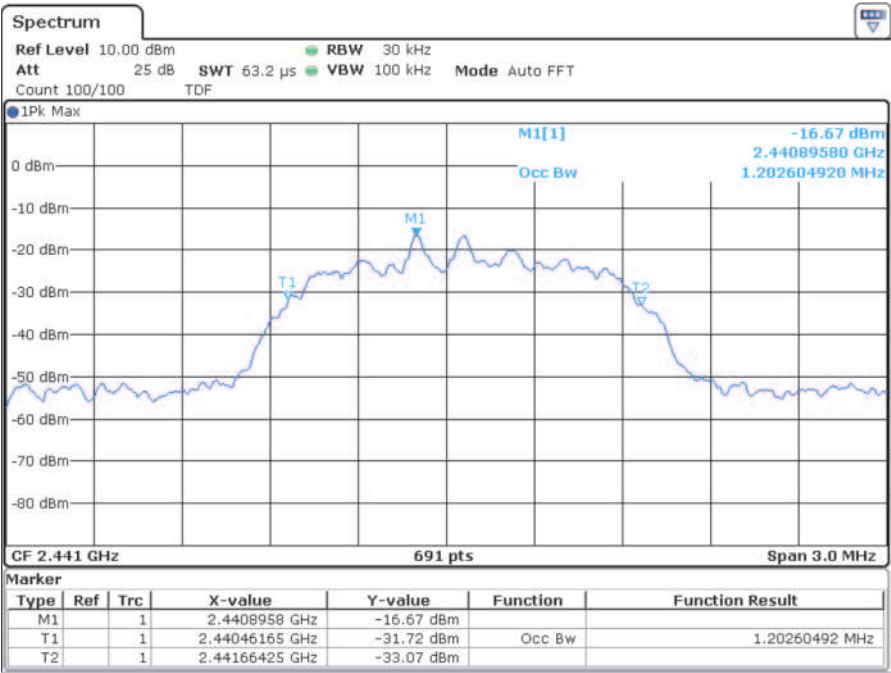
EDR, Tx frequency: 2402MHz

Prüfbericht-Nr.:
 Test report no.:

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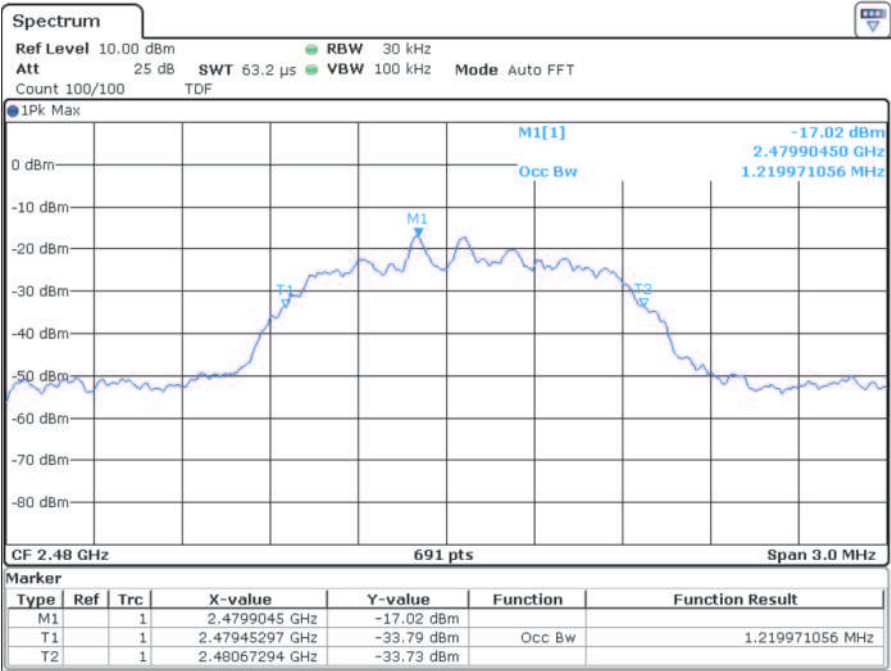
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4.JUL.2025 10:52:38

EDR, Tx frequency: 2441MHz



Date: 4.JUL.2025 10:51:54

EDR, Tx frequency: 2480MHz

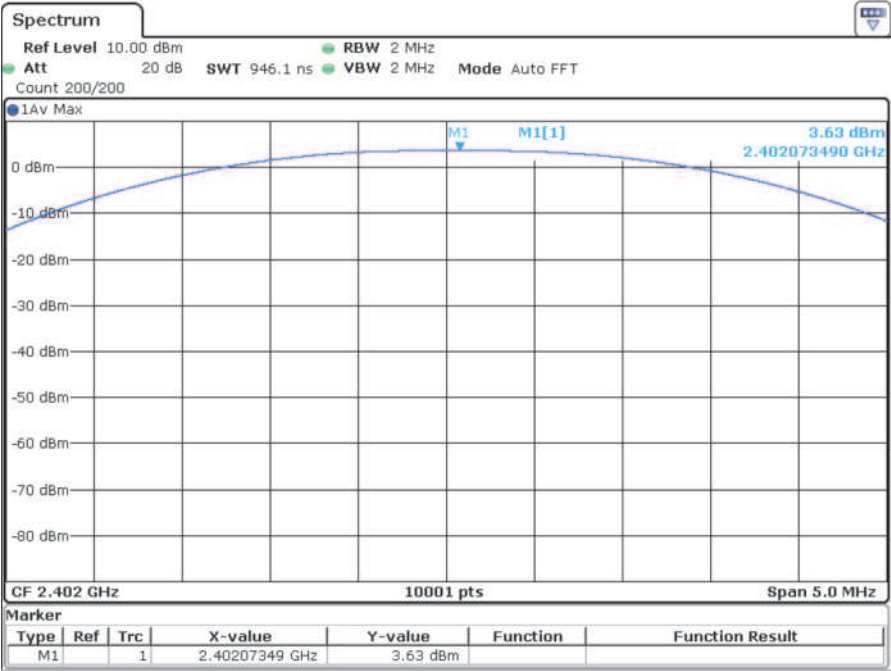
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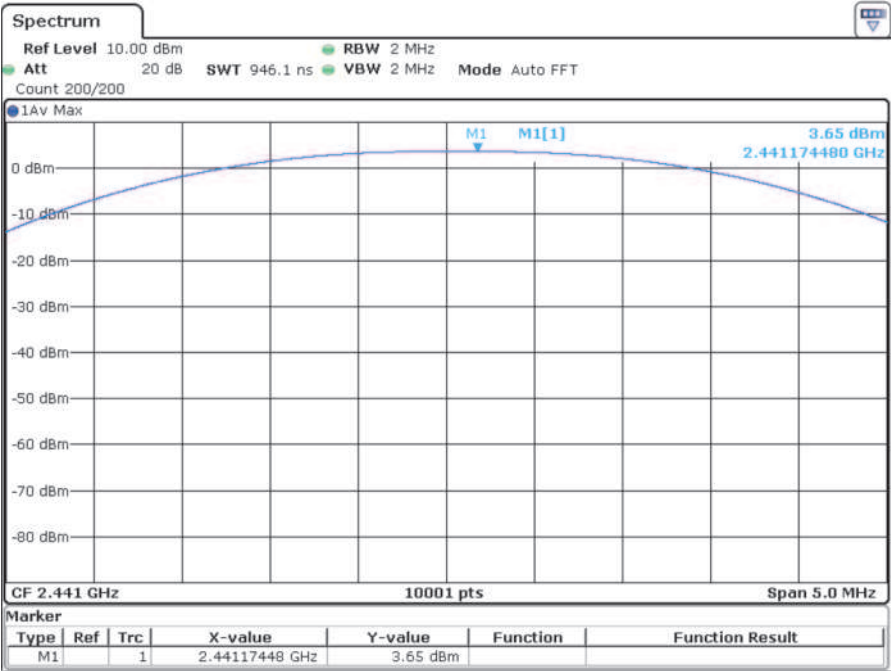
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Maximum Peak Conducted Output Power



Date: 4. JUL 2025 11:36:25

BDR, Tx frequency: 2402MHz



Date: 4. JUL 2025 11:38:27

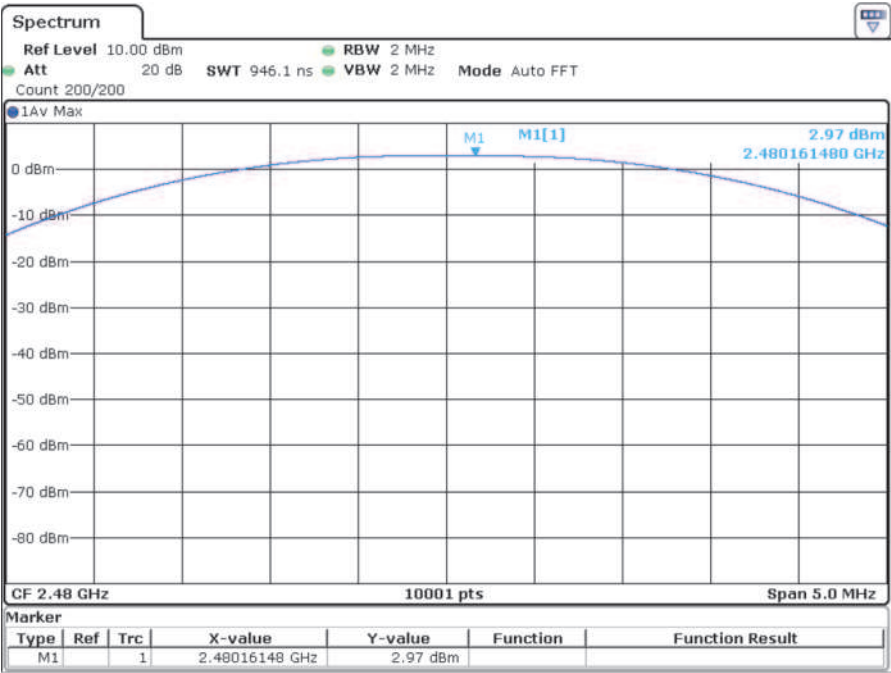
BDR, Tx frequency: 2441MHz

Prüfbericht-Nr.:
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CN252KMR 001

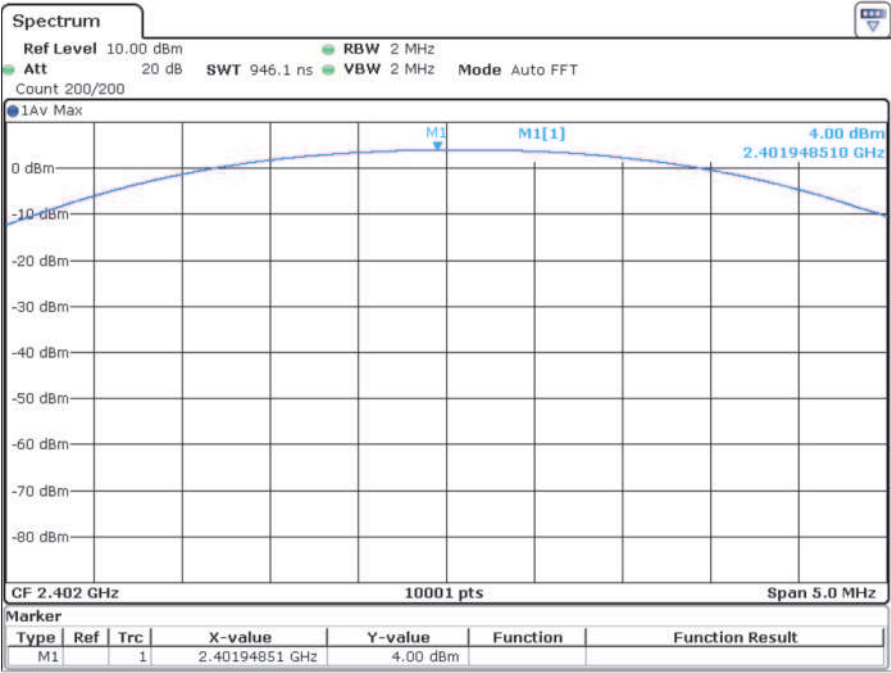
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4.JUL 2025 11:39:00

BDR, Tx frequency: 2480MHz



Date: 4.JUL 2025 11:37:17

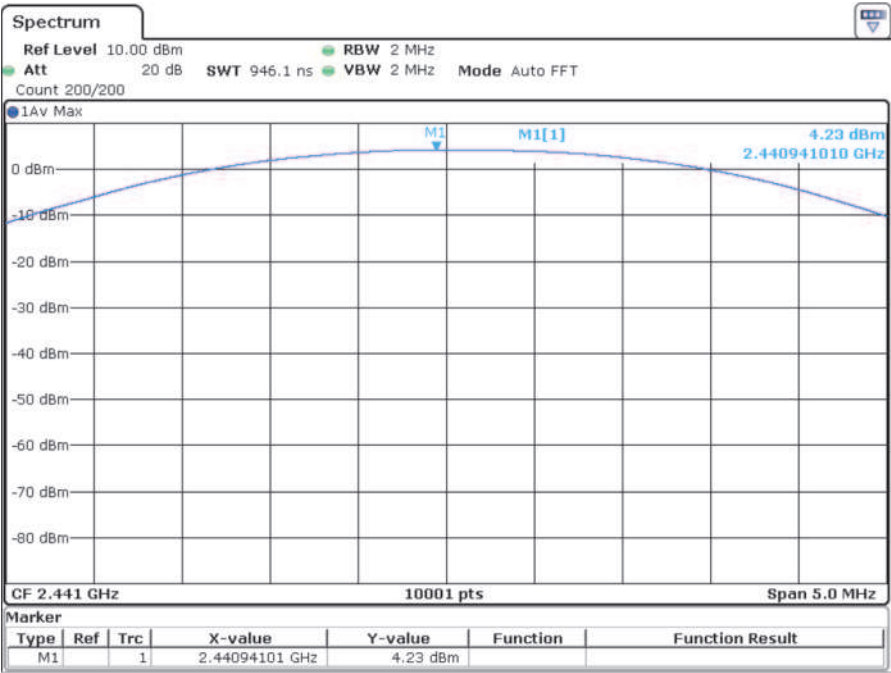
EDR, Tx frequency: 2402MHz

Prüfbericht-Nr.:
 Test report no.:

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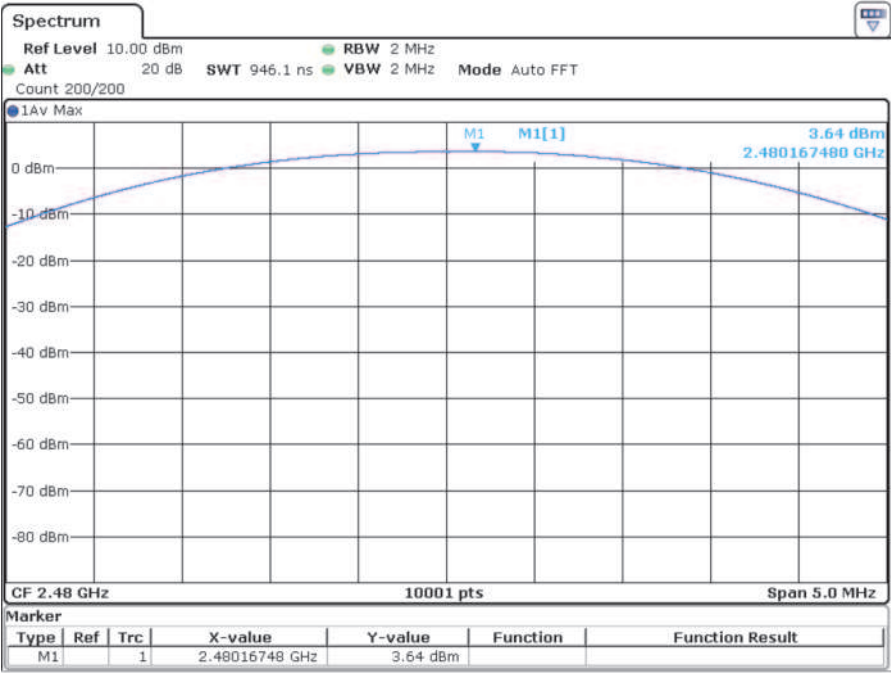
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4. JUL 2025 11:37:54

EDR, Tx frequency: 2441MHz



Date: 4. JUL 2025 11:39:30

EDR, Tx frequency: 2480MHz

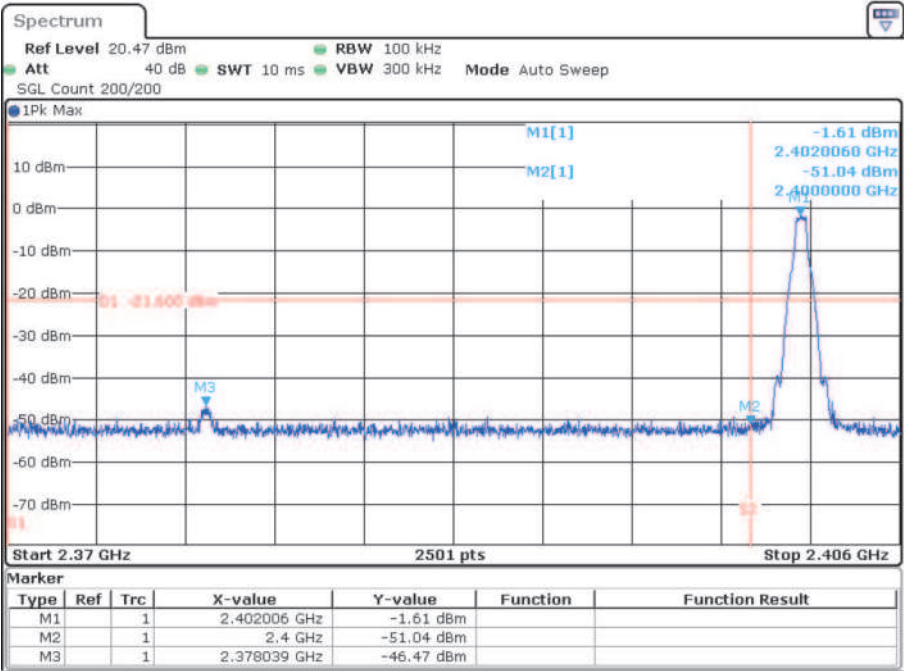
Prüfbericht-Nr.:
 Test report no.:

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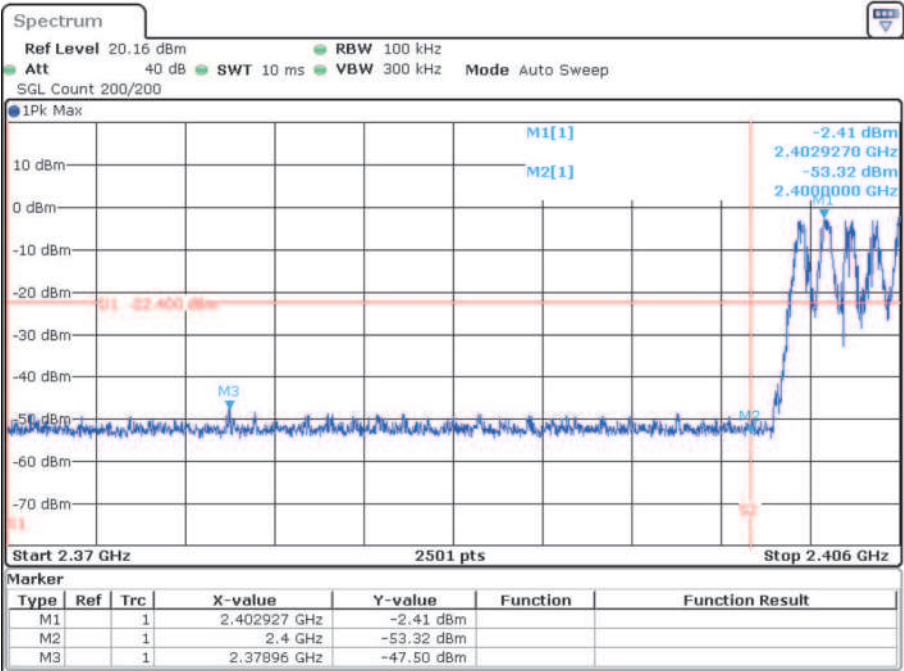
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Spurious Conducted Emissions



BDR, Low Channel, Band Edge



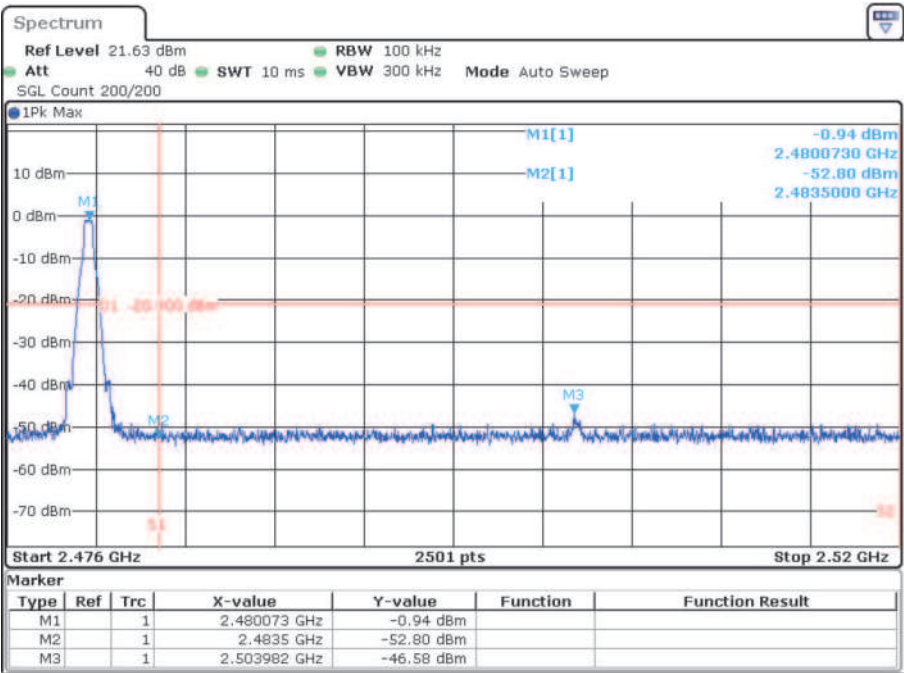
BDR, Low Channel, Band Edge, Frequency hopping

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

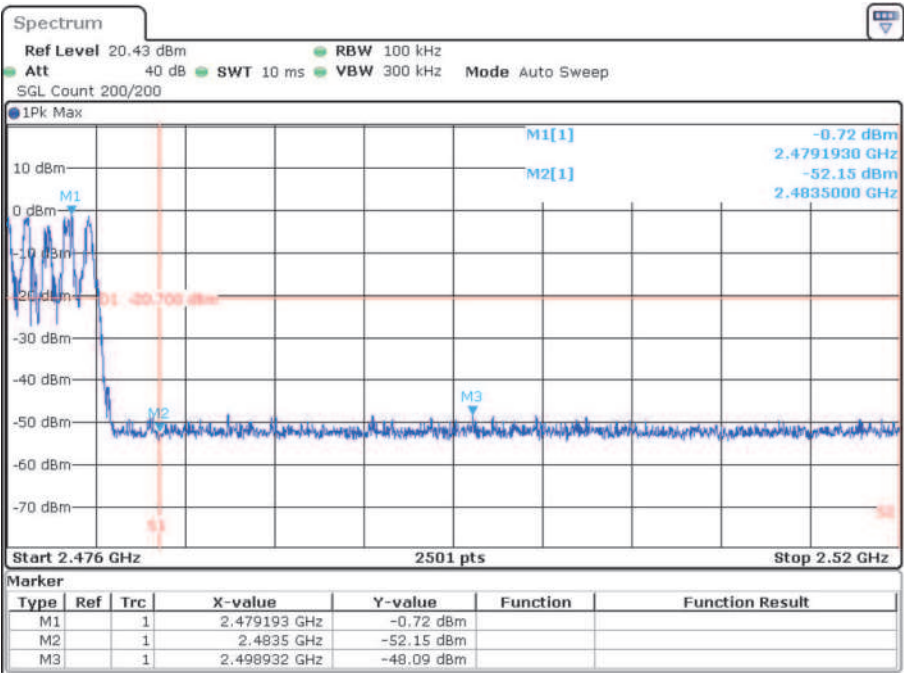
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4 JUL 2025 14:49:47

BDR, High Channel, Band Edge



Date: 4 JUL 2025 14:49:29

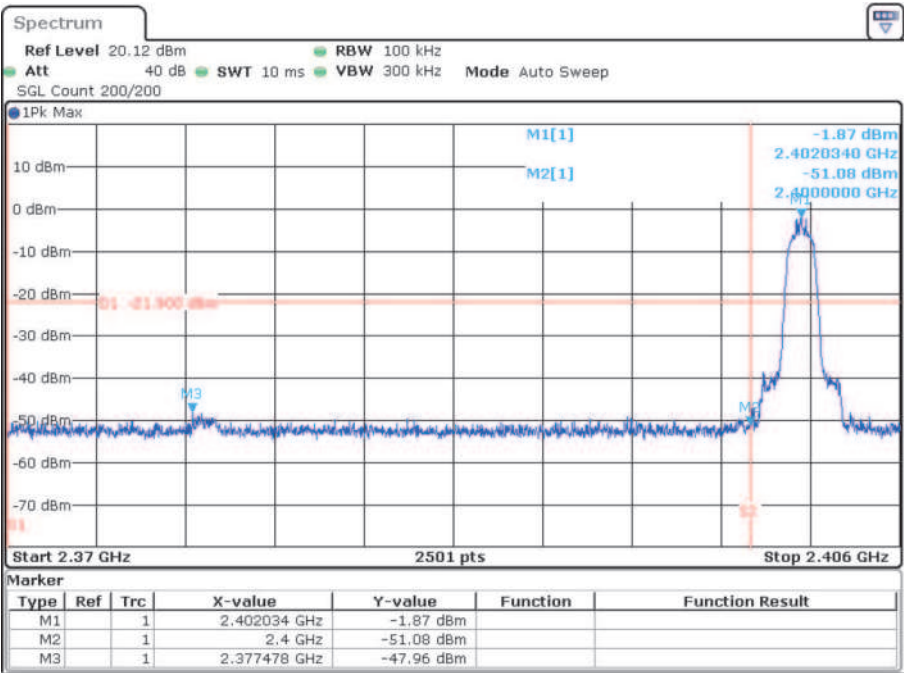
BDR, High Channel, Band Edge, Frequency hopping

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

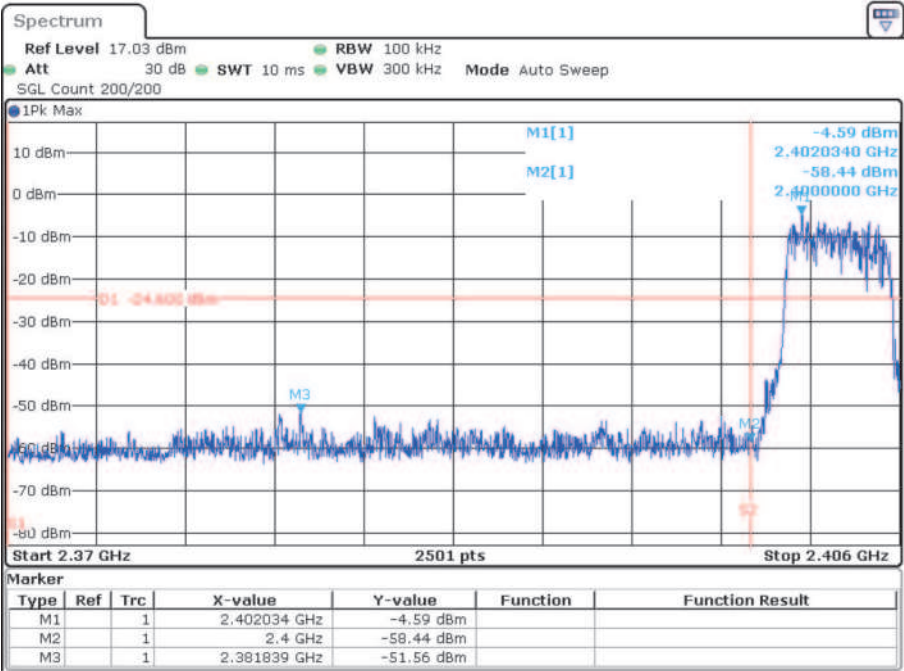
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4 JUL 2025 14:48:35

EDR, Low Channel, Band Edge



Date: 4 JUL 2025 14:48:15

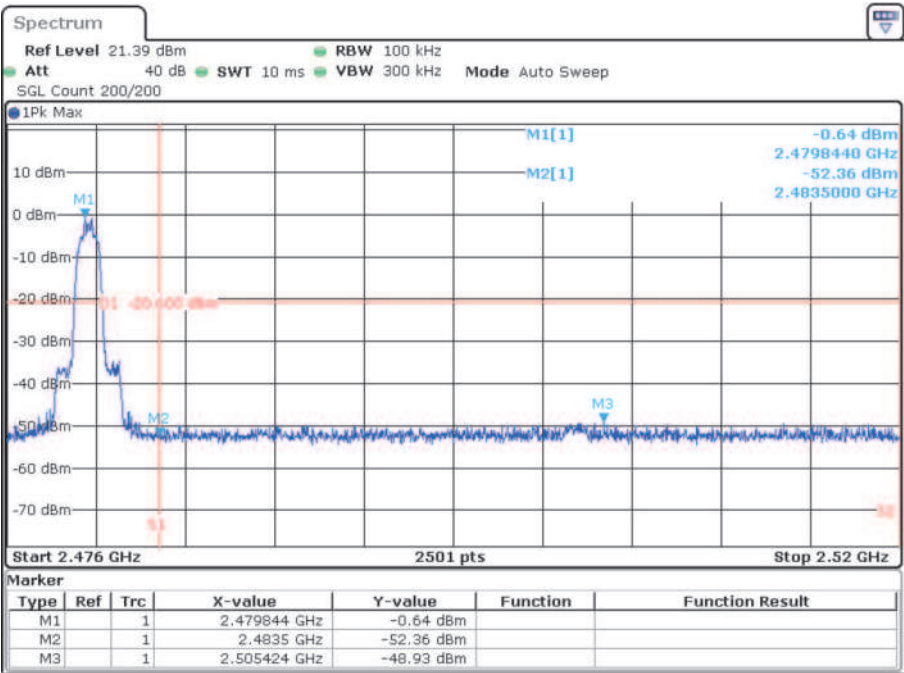
EDR, Low Channel, Band Edge, Frequency hopping

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

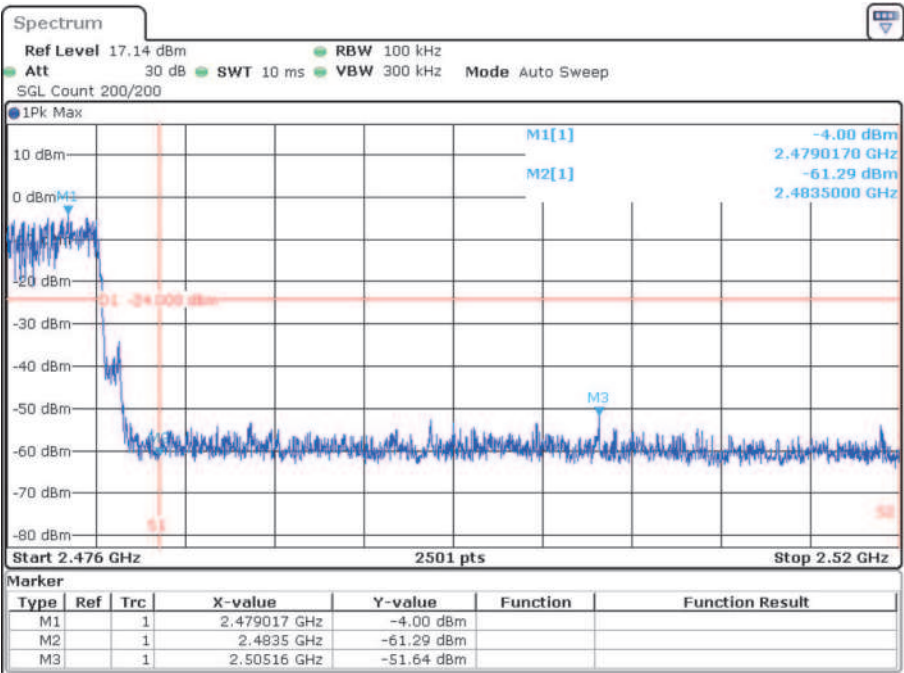
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4 JUL 2025 14:50:56

EDR, High Channel, Band Edge



Date: 4 JUL 2025 14:50:36

EDR, High Channel, Band Edge, Frequency hopping

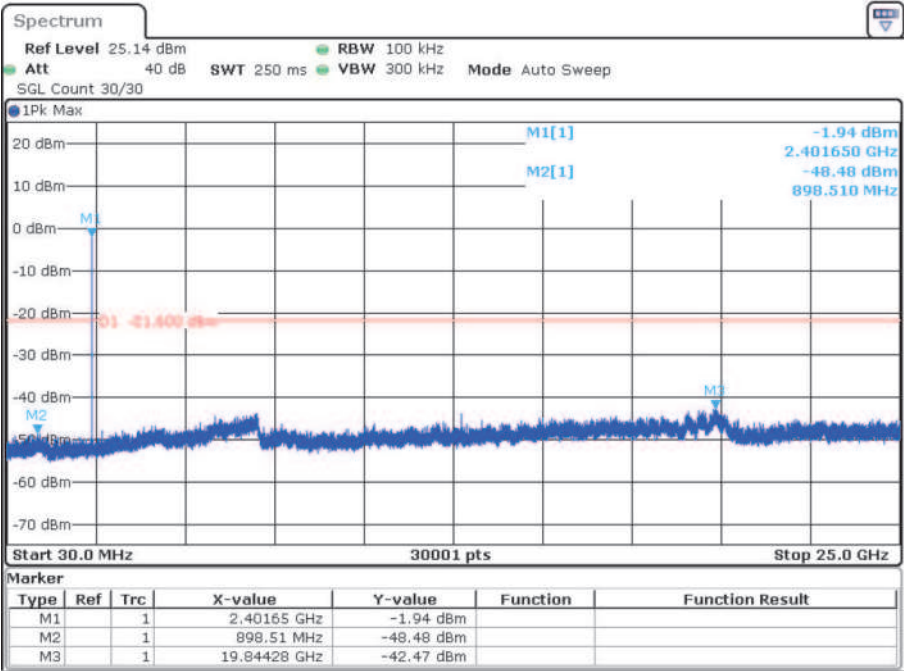
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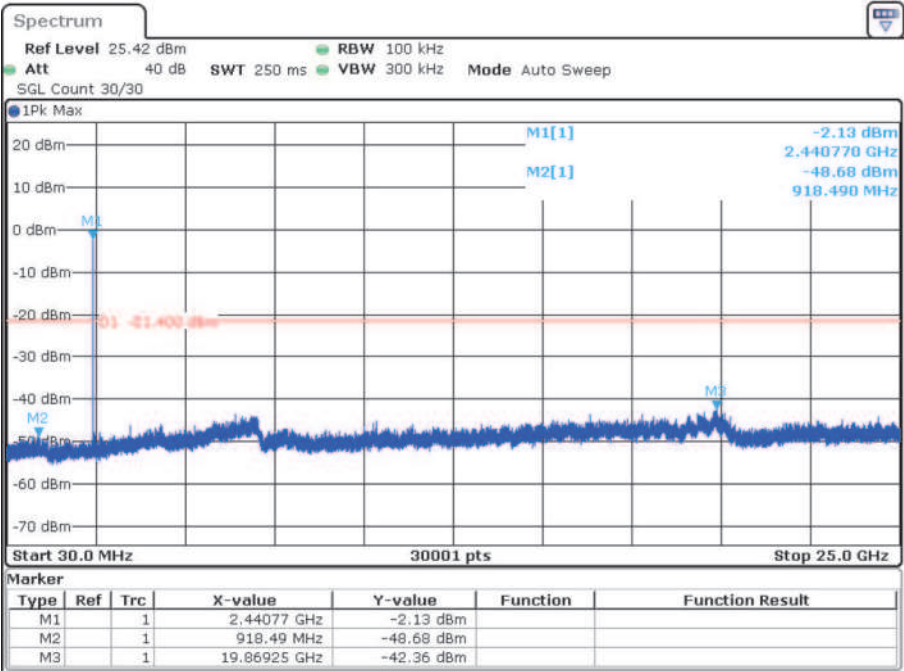
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Prescan



Date: 4 JUL 2025 14:52:45

BDR, Tx frequency: 2402MHz



Date: 4 JUL 2025 14:56:11

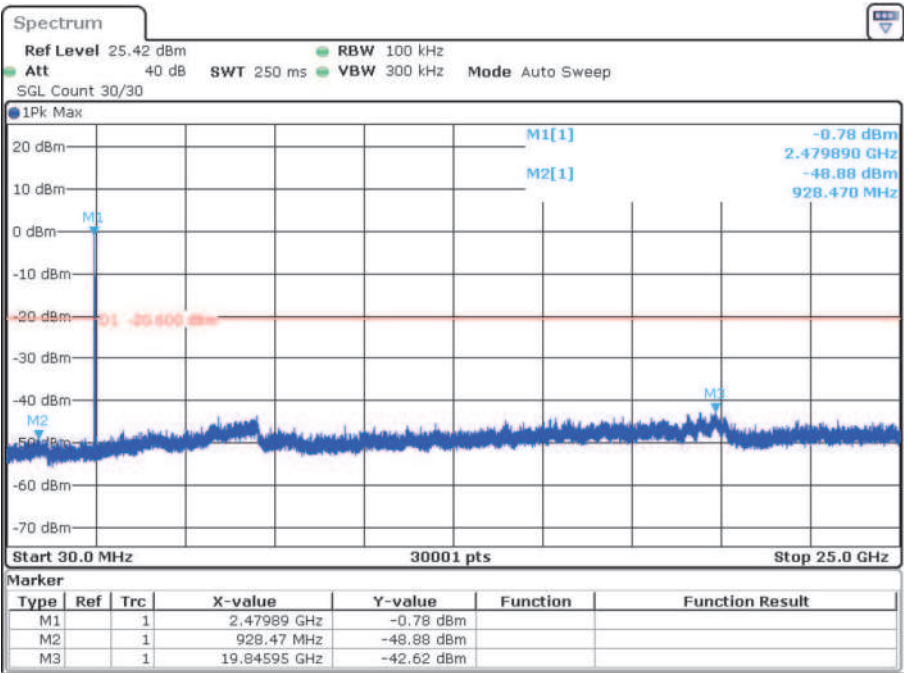
BDR, Tx frequency: 2441MHz

Prüfbericht-Nr.:
 Test report no.:

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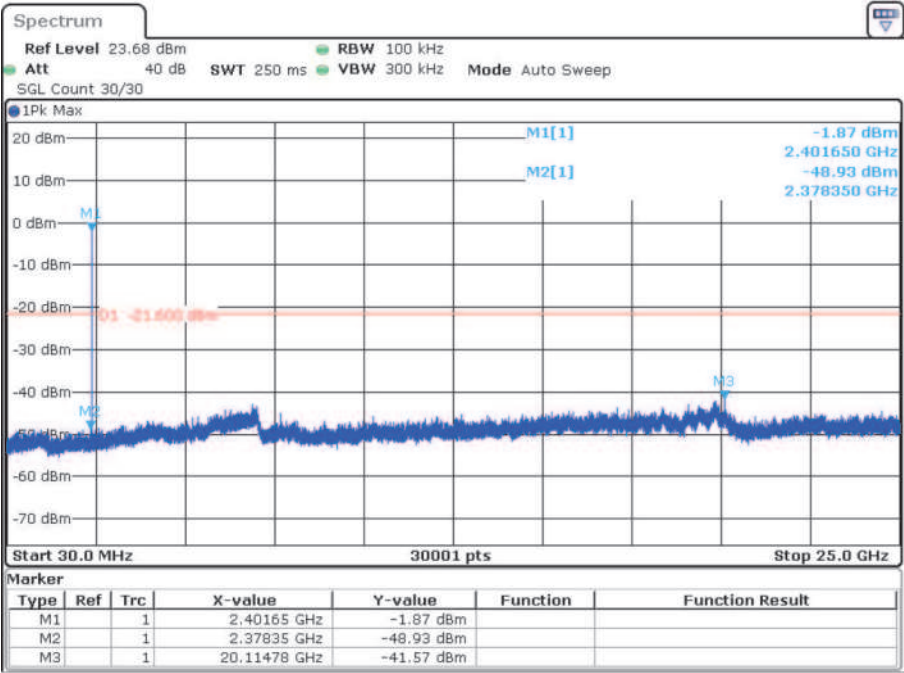
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4 JUL 2025 14:59:40

BDR, Tx frequency: 2480MHz



Date: 4 JUL 2025 14:54:23

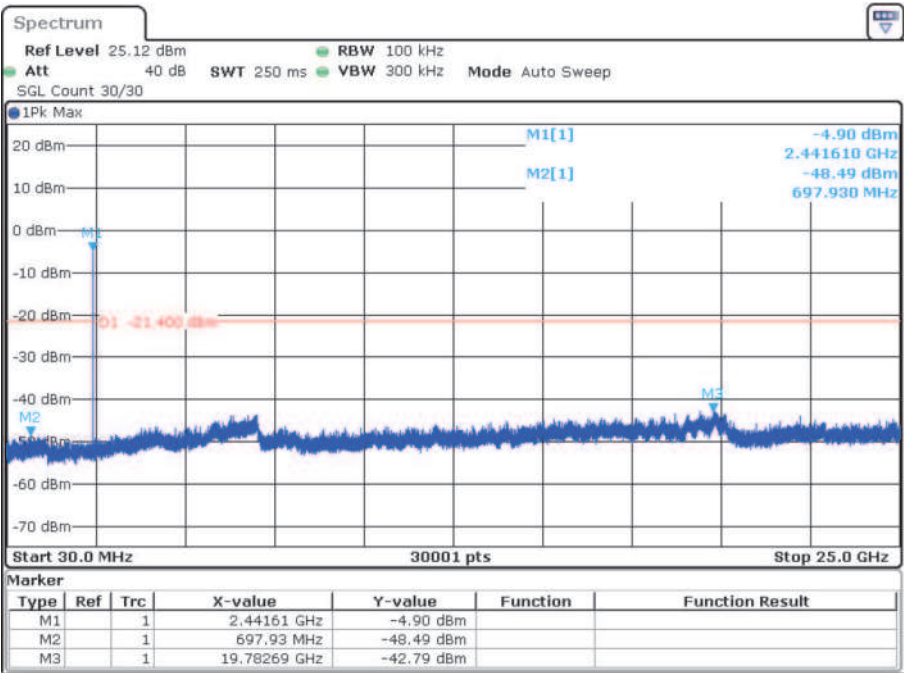
EDR, Tx frequency: 2402MHz

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

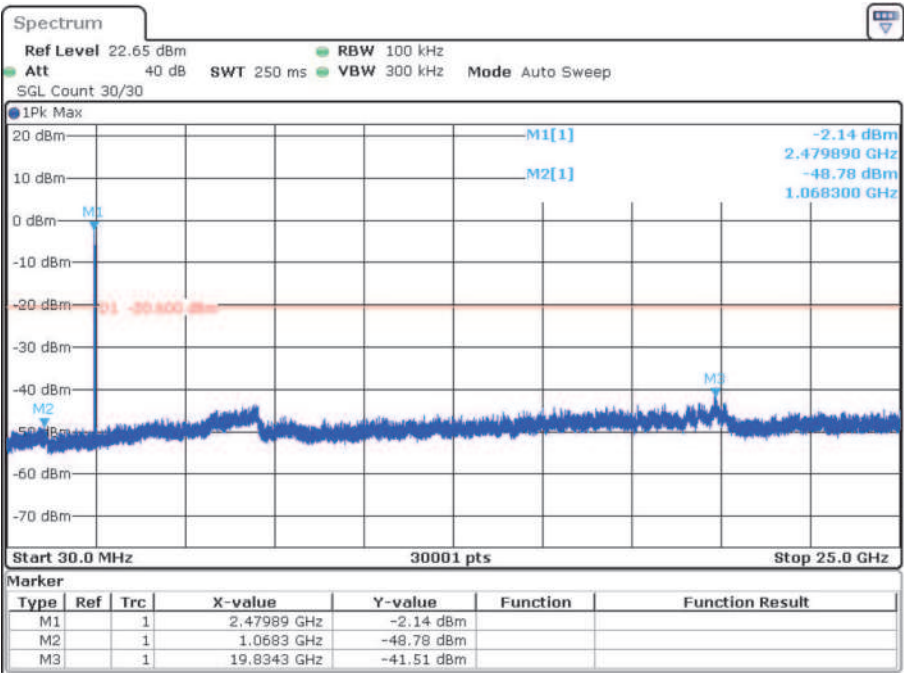
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4 JUL 2025 14:57:49

EDR, Tx frequency: 2440MHz



Date: 4 JUL 2025 15:01:16

EDR, Tx frequency: 2480MHz

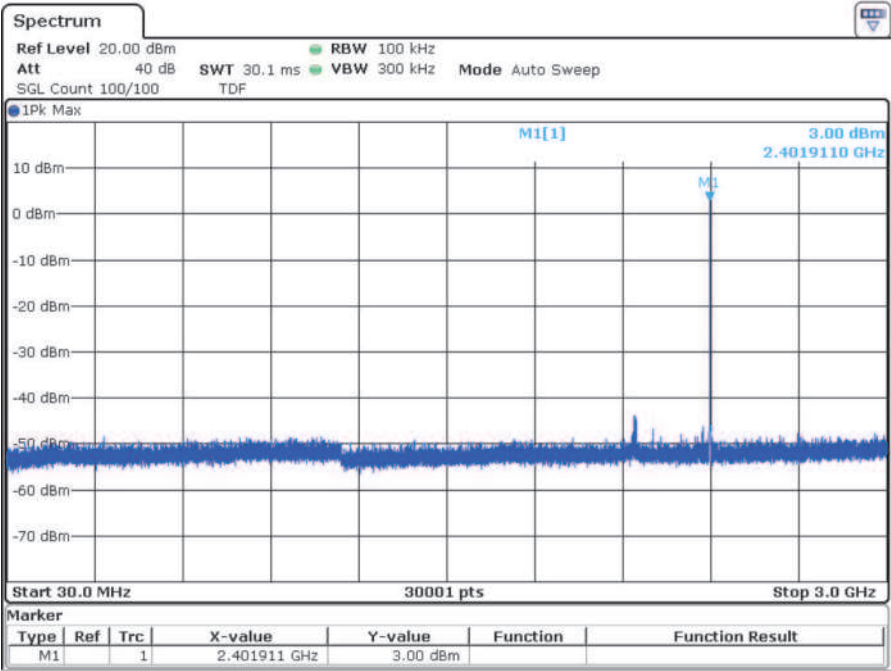
Prüfbericht-Nr.:
 Test report no.:

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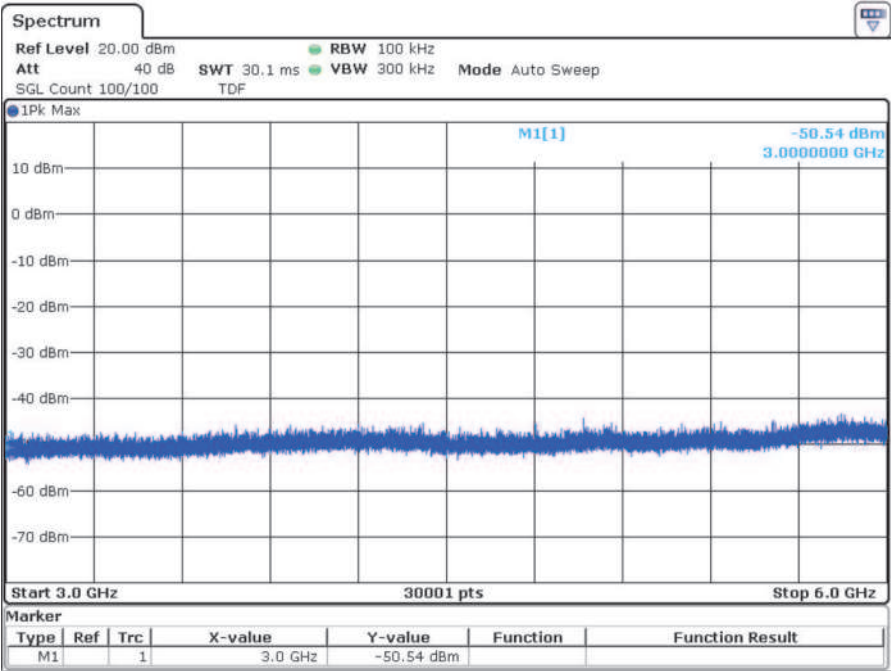
Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Worse Case



Date: 4.JUL.2025 14:49:25

EDR, Tx frequency: 2402MHz, 30MHz – 3GHz



Date: 4.JUL.2025 14:50:35

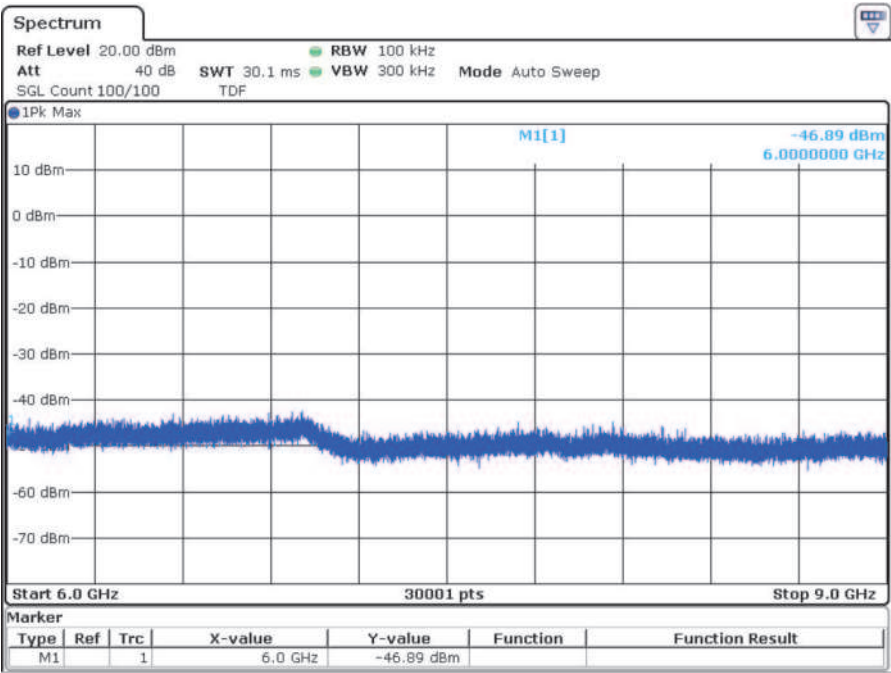
EDR, Tx frequency: 2402MHz, 3GHz – 6GHz

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

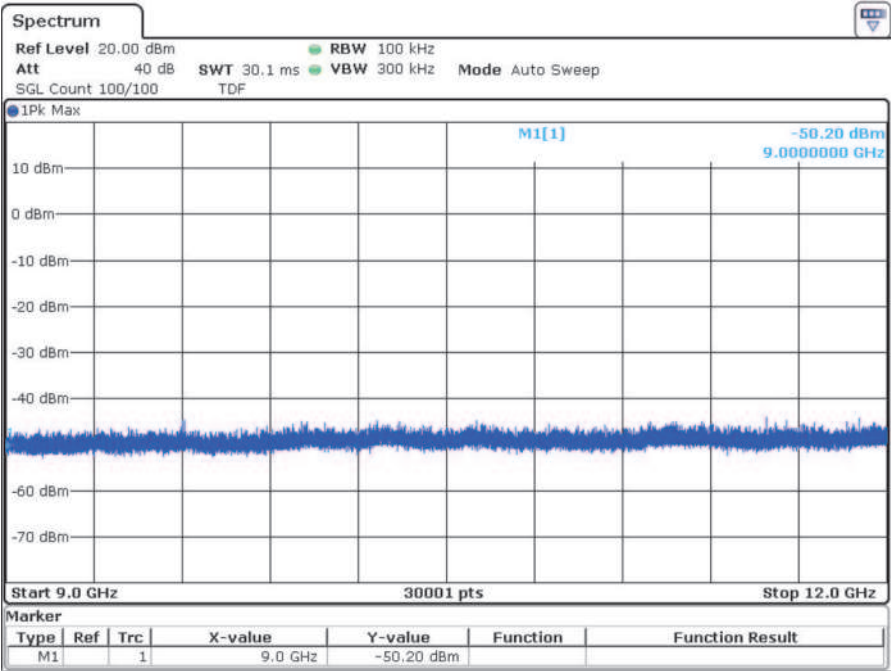
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4.JUL.2025 14:51:15

EDR, Tx frequency: 2402MHz, 6GHz – 9GHz



Date: 4.JUL.2025 14:52:03

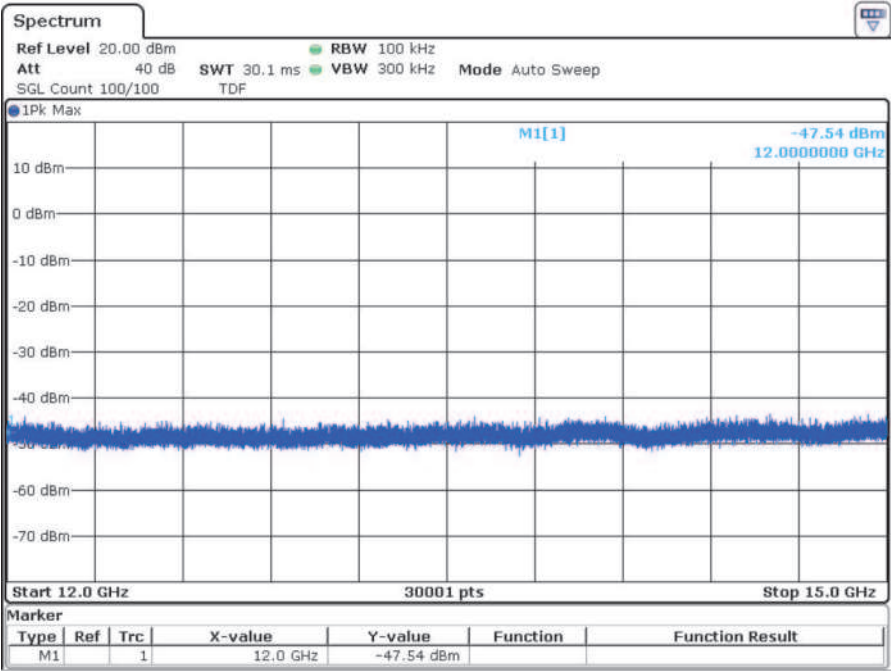
EDR, Tx frequency: 2402MHz, 9GHz – 12GHz

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

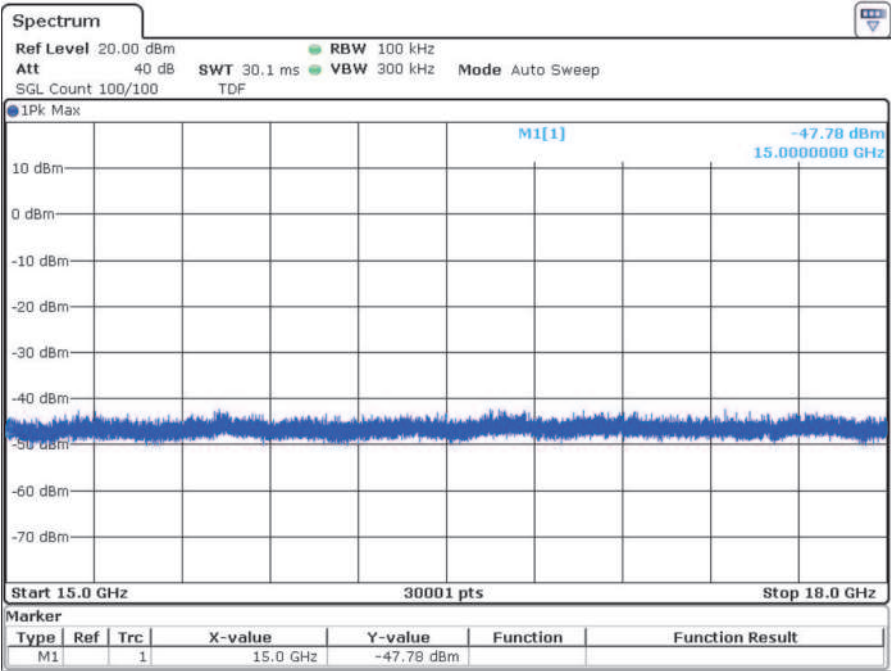
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4.JUL.2025 14:54:20

EDR, Tx frequency: 2402MHz, 12GHz – 15GHz



Date: 4.JUL.2025 14:54:53

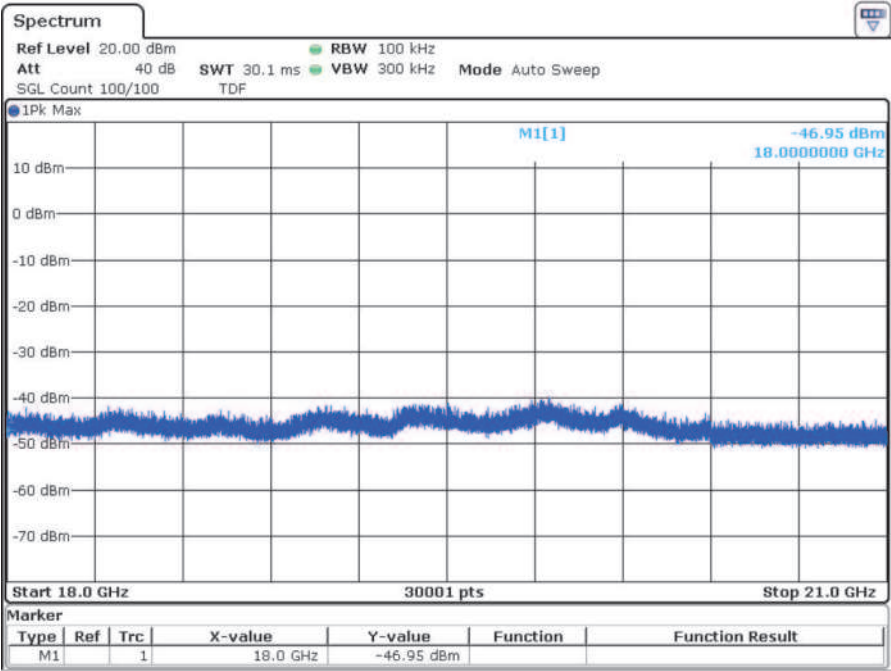
EDR, Tx frequency: 2402MHz, 15GHz – 18GHz

Prüfbericht-Nr.:
 Test report no.:

CN252KMR 001

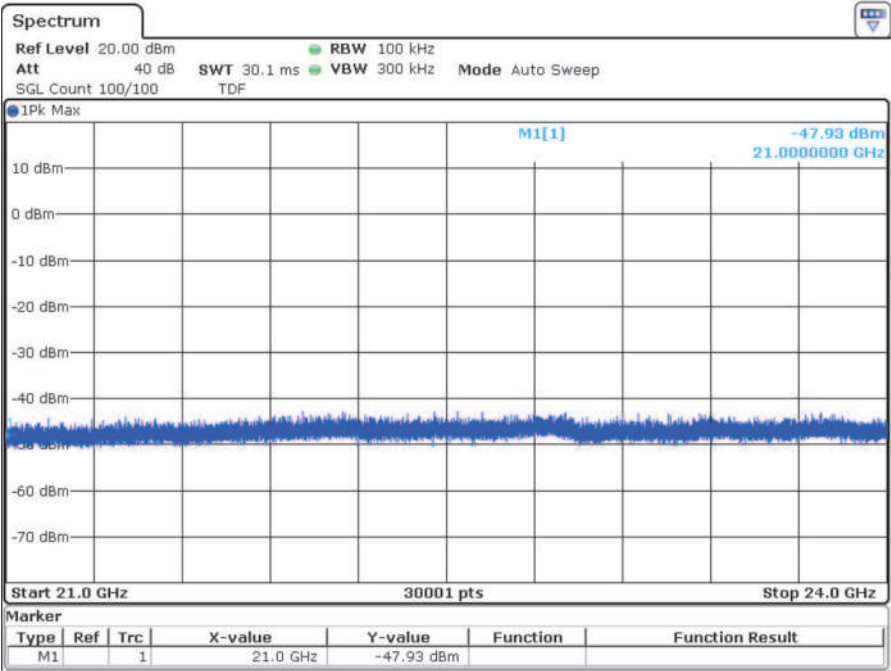
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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Date: 4. JUL. 2025 14:55:29

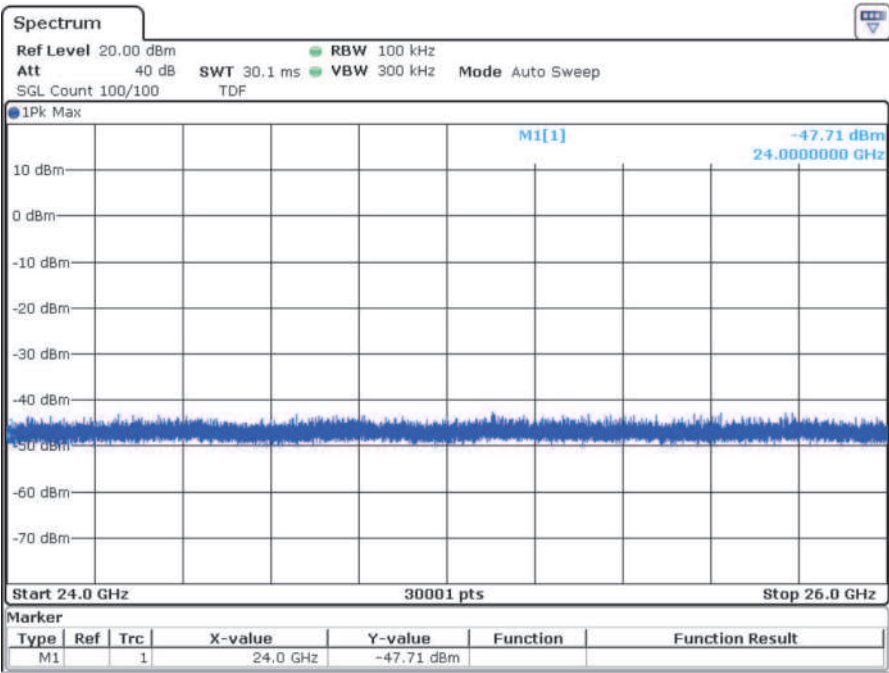
EDR, Tx frequency: 2402MHz, 18GHz – 21GHz



Date: 4. JUL. 2025 14:56:21

EDR, Tx frequency: 2402MHz, 21GHz – 24GHz

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Date: 4.JUL.2025 14:57:33

EDR, Tx frequency: 2402MHz, 24GHz – 26GHz

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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result	

Appendix 5

RF Exposure Information

FCC ID: 2BGCL-MSP0003
IC ID: 32529-MSP0003

Prüfbericht-Nr.:
Test report no.:

CN252KMR 001

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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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Maximum Transmitter Power

Frequency (MHz)	Maximum peak output power (dBm)	Output power (mW)
2402	4.00	2.512
2441	4.23	2.649
2480	3.64	2.312

Note: The maximum peak field strength was taken from table of "Subclause 15.247(b)(3) / RSS-247 5.4 – Maximum Peak Conducted Output Power".

For FCC

According to KDB 447498 D01:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 5 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$
≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

Result:

$$(2.512/5) \cdot \sqrt{2.402} = 0.779 < 3.0$$

$$(2.649/5) \cdot \sqrt{2.441} = 0.828 < 3.0$$

$$(2.312/5) \cdot \sqrt{2.480} = 0.729 < 3.0$$

Conclusion:

No SAR is required.

For ISED

According to table 11 in RSS-102 Issue 6, below exemption limit is applied:

Frequency: 2450 MHz

At separation distance of ≤ 5mm

Exemption limits: 3mW

Results:

max. power of channel = 2.649mW < 3mW

Conclusion:

The maximum peak output power of the transmitter is less than the SAR evaluation exemption threshold and hence it complies with the RSS-102 RF exposure requirement.