Prüfbericht-Nr.: *Test report no.:*	**DE21Q1LN 001**	**Auftrags-Nr.:** *Order no.:*	1079814_71	Seite 1 von 86 *Page 1 of* 86
Kunden-Referenz-Nr.: *Client reference No.:*	N/A	**Auftragsdatum:** *Order date:*	16.10.2020	
Auftraggeber: *Client:*	IONIQ Skincare GmbH & Co. KG Otto-Lilienthal-Straße 18, 88677 Markdorf, Germany			
Prüfgegenstand: *Test item:*	IONIQ-Skincare Body Spray			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	N/A			
Auftrags-Inhalt: *Order content:*	Prüfung der Funkparameter nach FCC *Test of radio parameters acc. to FCC*			
Prüfgrundlage: *Test specification:*	Vollprüfung / Complete test FCC CFR 47 Part 15 Subpart C- §15.247			

Wareneingangsdatum: *Date of sample receipt:*	04.01.2021
Prüfmuster-Nr.: *Test sample no.:*	A002980367-002 A002980367-003
Prüfzeitraum: *Testing period:*	08.02.2021 – 11.02.2021
Ort der Prüfung: *Place of testing:*	Nürnberg *Nuremberg*
Prüflaboratorium: *Testing laboratory:*	Wireless Labor *Wireless Test Lab*
Prüfergebnis*: *Test result*:*	*Pass*

geprüft von: *tested by*:		**genehmigt von:** *authorized by*:	
Datum: *Date:*	19.02.2021	**Datum:** *Issue date:*	19.02.2021
	M. Sc. Alaa Bustati		Dipl. -Ing. Melanie Bense
Stellung / *Position*	Sachverständige(r)/Expert	**Stellung /** *Position*	Team Leader Wireless

Sonstiges / *Other*:

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

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legende:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibierungsprogramms 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. 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.
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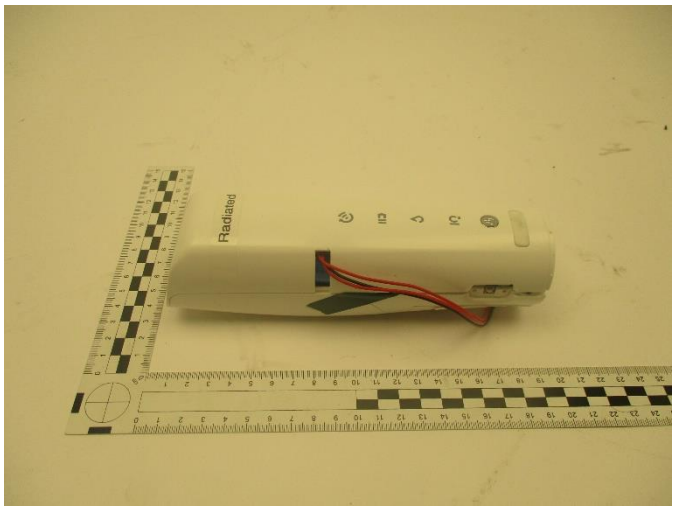
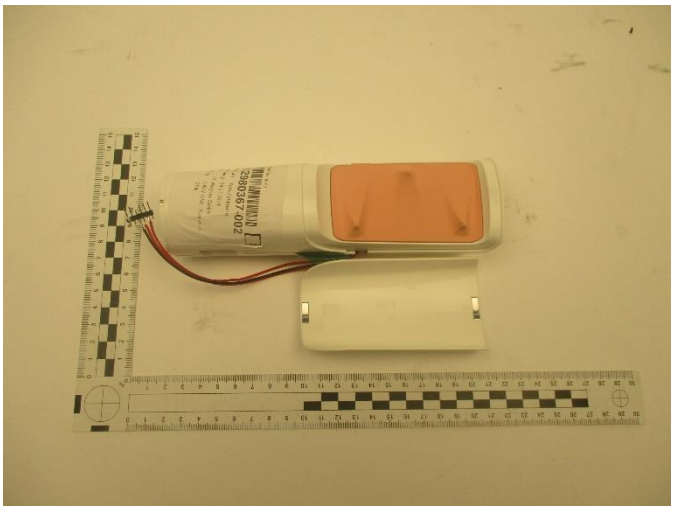
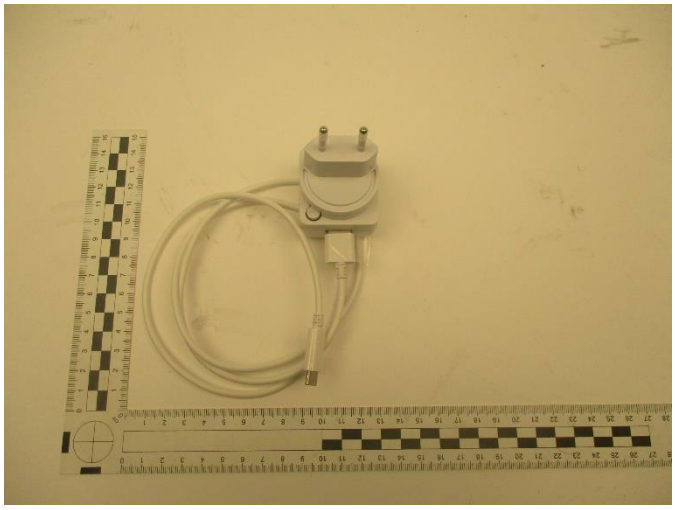
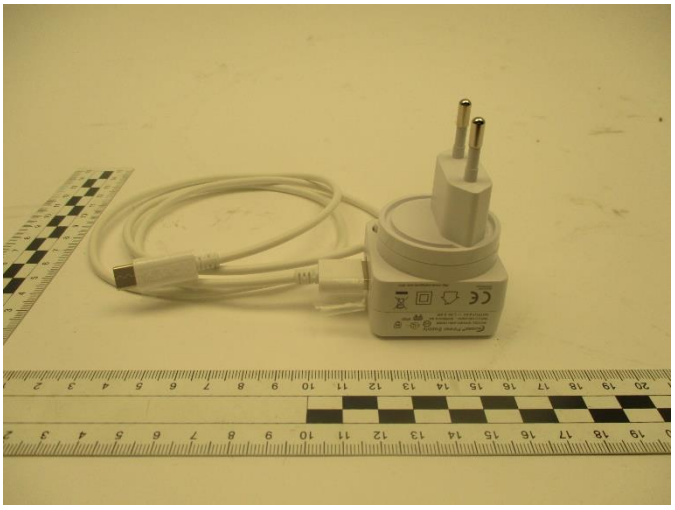
Anmerkungen
Remarks

4	Die Messunsicherheit der in diesem Prüfbericht aufgeführten Messverfahren wird nicht unmittelbar in die Bewertung zur Einhaltung der jeweiligen Grenzwerte mit einbezogen. Es gelten die Anforderungen der Spezifikationen TS 103 051 und TS 100 028-1/-2 in aktueller Form, deren Grundlage der „shared risk“ Ansatz ist. Dieser beschreibt für die jeweilige Norm die maximalen zulässigen Unsicherheitsbeträge unter denen der Messwert als „wahr“ angesehen werden kann. Eine zusätzliche Betrachtung der Messunsicherheit bezüglich des gemessenen Wertes findet bei Unterschreitung der maximalen Unsicherheitsbeträge gemäß den Spezifikationen nicht statt. *The measurement uncertainty of the measurement methods listed in this test report is not directly included in the assessment of compliance with the respective limit values. The requirements of the specifications TS 103 051 and TS 100 028-1/-2 apply in their current form, based on the "shared risk" approach. For the respective standard, this describes the maximum acceptable uncertainty below which the measured value can be regarded as "true". An additional consideration of the measurement uncertainty with regard to the measured value does not take place if the maximum acceptable uncertainties according to the specifications are not reached.*
5	Die Aussage zur Konformität des in diesem Prüfbericht geprüften Produktes wird auf Kundenwunsch nach den Kriterien und Anforderungen der angewendeten Normen durchgeführt. Abweichende Bewertungsbedingungen durch den Kunden werden in den jeweiligen Kapiteln gesondert dokumentiert. Grundsätzlich wird eine Konformitätsbewertung auf Basis der angewendeten Normen durchgeführt, sofern mit dem Kunden keine abweichende Regelung getroffen wurde. *The statement of conformity of the product tested in this test report is carried out according to the criteria and requirements of the applied standards on customer request. Deviating assessment conditions by the customer are documented separately in the respective chapters. In principle, the assessment of conformity is made on the basis of the standards applied, unless otherwise agreed with the customer.*

Produktbeschreibung
Product description

1	**Test item**	IONIQ-Skincare Body Spray
2	**Test sample obtaining**	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:
3	**FCC-ID**	2AYXK–IQS01
4	**Description of EUT**	Skincare device with RFID and BLE
5	**Modulation**	GFSK
6	**Operating Frequency**	2402 MHz – 2480 MHz
7	**Channel Bandwidth**	1 MHz / 2 MHz
8	**Number of Channels**	40
9	**Rated Voltage / Frequency**	Chargeable Battery Output: 3.7 V / DC Charging input: 5 V / DC (USB-C) AC/DC Adapter input: 100-240 V / 50-60 Hz
10	**Antenna Type**	☒ Integral antenna ☐ Permanent antenna connector
11	**Antenna amount of chains**	1
12	**Antenna Gain**	0 dBi
13	**Used Samples**	A002980367-002 (Radiated) A002980367-003 (Conducted)
14	**Accessory Devices**	AC/DC Adapter Model: ICP06C-050-1000B Manufacturer: Shen Zhen Shi Yingyuan Electronics Co.,Ltd
15	**Temperature Range**	-5 °C to 50 °C
16	**Environment**	Indoor and Outdoor
17	**Pictures of the EUT**	

Produktbeschreibung
Product description

Front view	**Back View**
	
Accessory Devices (AC/DC Adapter with cable)	**Accessory Devices (AC/DC Adapter with cable)**
	

Absatz *Clause*	**Anforderungen – Prüfungen /** *Requirements - Tests*	**Bemerkungen /** *Remarks*	**Ergebnis** *Result*
FCC 15.247 (a)(1)	20 dB Bandwidth	Does not apply for DTS equipment	P ☐ F ☐ N/A ☒ N/T ☐
FCC 15.247 (a)(1)	Number of Hopping Frequencies	Does not apply for DTS equipment	P ☐ F ☐ N/A ☒ N/T ☐
FCC 15.247 (a)(1)	Time of Occupancy	Does not apply for DTS equipment	P ☐ F ☐ N/A ☒ N/T ☐
FCC 15.247 (a)(1)	Carrier Frequency Separation	Does not apply for DTS equipment	P ☐ F ☐ N/A ☒ N/T ☐
FCC 15.247 (b)	Maximum Output Power	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.247 (e)	Power Spectral Density	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.247 (a)(2)	6dB Bandwidth	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.247 (d)	Band Edge Measurement	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.247 (d)	Conducted Spurious Emission	-	P ☒ F ☐ N/A ☐ N/T ☐
FCC 15.205, 15.209	Radiated Spurious Emission	-	P ☒ F ☐ N/A ☐ N/T ☐

Absatz *Clause*	**Anforderungen – Prüfungen /** *Requirements - Tests*	**Bemerkungen /** *Remarks*	**Ergebnis** *Result*
FCC 15.207	AC Power Conducted Emissions	-	P ☒ F ☐ N/A ☐ N/T ☐

Prüfdokumentation
Test documentation

Contents

1 EUT Classification

1.1 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)	Supported by the EUT	Evaluated in this report
BLE 4.2	2402 – 2480 MHz	☒	☒

1.2 Standard specific classification of the EUT

1.2.1 Applied standards

FCC CFR 47 Part 15 Subpart C - §15.247

1.2.2 Test Methods and Guidance Documents

ANSI C63.10:2013

KDB 558074 D01 DTS Measurement Guidance v05

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 174176 D01 Line Conducted FAQ v01r01

1.2.3 System Type

DTS (Digital Transmission System)

1.2.4 Type of equipment

Equipment that can be used in multiple orientations

2 General

2.1 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

2.2 Equipment modifications

The DUT is prepared to be on the DTM so that the BLE is ready to be configured through the 'nRF connect software V.3.6.1' for different test cases.

2.3 Test modes

Mode	Description	Mode configuration
1	TX Modulated 2 Mbps with continuous transmission	Using 'nRF connect software': Packet Type: PRBS9 Physical Layer: LE 2Mbps TX Power: 8 dBm Channel: 37 (2402 MHz),17 (2440 MHz), 39 (2480 MHz)
2	TX Modulated 1 Mbps with continuous transmission	Using 'nRF connect software': Packet Type: PRBS9 Physical Layer: LE 1Mbps TX Power: 8 dBm Channel: 37, 17, 39
3	TX Modulated 500 kbps with continuous transmission	Using 'nRF connect software': Packet Type: PRBS9 Physical Layer: LE Coded S2 TX Power: 8 dBm Channel: 37, 17, 39
4	TX Modulated 125 kbps with continuous transmission	Using 'nRF connect software': Packet Type: PRBS9 Physical Layer: LE Coded S8 TX Power: 8 dBm Channel: 37, 17, 39

2.4 Worst case Test Modes

The DUT radiated spurious emission was tested in the worst case configuration with respect to data rate (2 Mbps). The different data rates showed similar results with respect to output power but the conducted spurious emissions and band edge measurements were worse when the DUT operates at 2 Mbps.

Comparison of the lowest margins on the Band Edge when the DUT operates on the lowest channel

Frequency (MHz)	2 Mbps	1 Mbps	500 kbps	125 kbps
2399.975	10 dB	25.3 dB	26 dB	26.9 dB
2399.925	11.1 dB	27 dB	27.5 dB	26.6 dB
2337.975	25.3 dB	25.8 dB	25.6 dB	27.4 dB

Comparison of the lowest margins in conducted spurious emissions when the DUT operates on the lowest channel

Frequency (MHz)	2 Mbps	1 Mbps	500 kbps	125 kbps
2395	5.7 dB	20.3 dB	24.7 dB	23.8 dB
2275.5	22.6 dB	23.2 dB	25.5 dB	25.7 dB
4807	25.1 dB	26.6 dB	27.4 dB	28.3 dB
7206	25.4 dB	27.8 dB	31.6 dB	29.1 dB
9604	29.9 dB	31 dB	31.2 dB	31.8 dB

3 Test conditions

3.1 General

The DUT was tested standalone on the transmit test mode in normal test conditions.

3.2 Normal test conditions

Environmental condition	Parameter	Range
Temperature	°C	22
Relative humidity	%	18
Supply voltage	Volts AC	120 V / 60 Hz

3.3 Antenna assemblies

Antenna connector is prepared so tests were done in conducted and radiated mode.

3.4 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 CISPR 16-4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the quality system acc. to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

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	1.0	dB	9k-1GHz
	1.7	dB	1GHz-6GHz
Conducted Spurious Emissions (RX/TX)	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	%	-

4 Test results in detail

4.1 Maximum Output Power

4.1.1 Requirements / Limits

The maximum output power limit is expressed in terms of either maximum peak conducted output power or maximum conducted output power.

The maximum peak conducted output power is defined as the maximum power level measured with a peak detector using a filter with width and shape of which is sufficient to accept the full signal bandwidth.

The maximum conducted output power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

DTS devices:

FCC Part 15, Subpart C, §15.247 (b) (3)

For systems using digital modulation techniques in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands: 1 watt. Maximum conducted peak output power: 30 dBm (excluding antenna gain, if antennas with directional gains that do not exceed 6 dBi are used).

Frequency Hopping Systems:

FCC Part 15, Subpart C, §15.247 (b) (1)

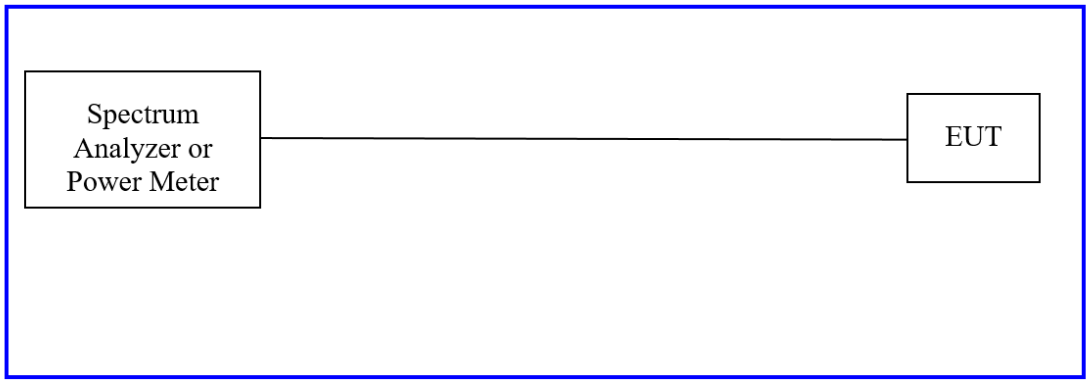
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

FCC Part 15, Subpart C, §15.247 (b) (2)

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

4.1.2 Test Method

Conducted method was used to measure the maximum output power according to ANSI C63.10:2013 clause 11.9.1.1 peak power (RBW > DTS bandwidth). The EUT was connected to the spectrum analyzer via a coax cable with a known loss.

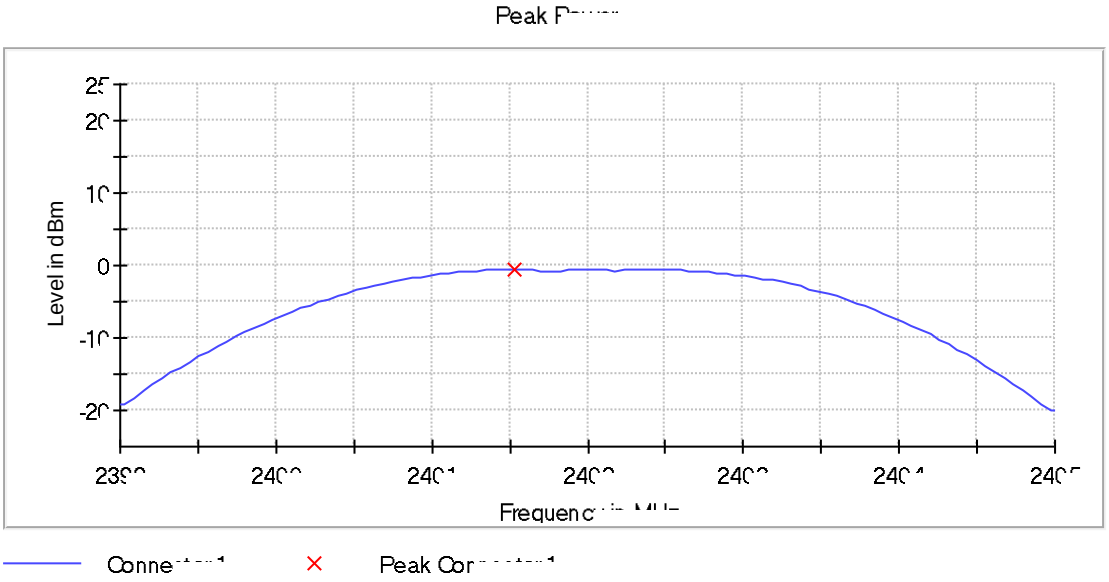


4.1.3 Test setup

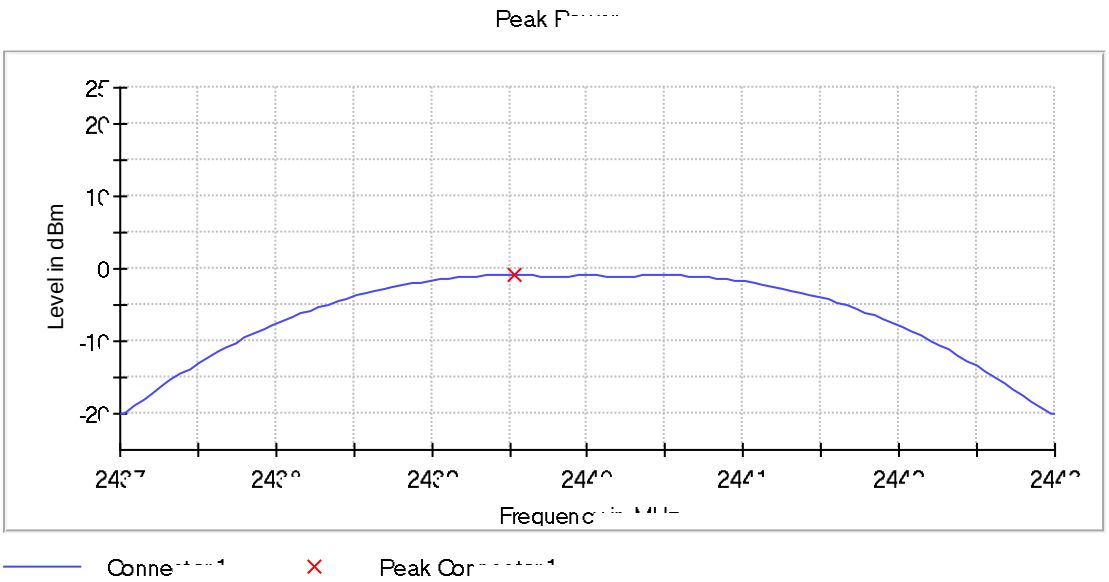
EUT		IONIQ-Skincare Body Spray - A002980367-003 (Conducted)
Test Condition		Normal conditions
Chamber details		☐ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC) ☒ Shielded room
Measurement positioning		Distance: / EUT height: / Antenna height: ☐ 3m / ☐ 1.5m / ☐ 1.5m ☐ 10m / ☐ 0.8m / ☐ 1m to 4m – height scan
		☒ N/A
Companion device		-
Operation mode		Mode 1: TX Modulated 2 Mbps with continuous transmission Mode 2: TX Modulated 1 Mbps with continuous transmission Mode 3: TX Modulated 500 kbps with continuous transmission Mode 4: TX Modulated 125 kbps with continuous transmission
Spectrum Analyzer	**Frequency**	2402 MHz, 2440 MHz, 2480 MHz
	Resolution Bandwidth	1 MHz
	Video Bandwidth	3 MHz
Further parameters		-
Test engineer		M. Sc. Alaa Bustati

4.1.4 Test results

- **Data rate 2 Mbps, Lowest Channel**

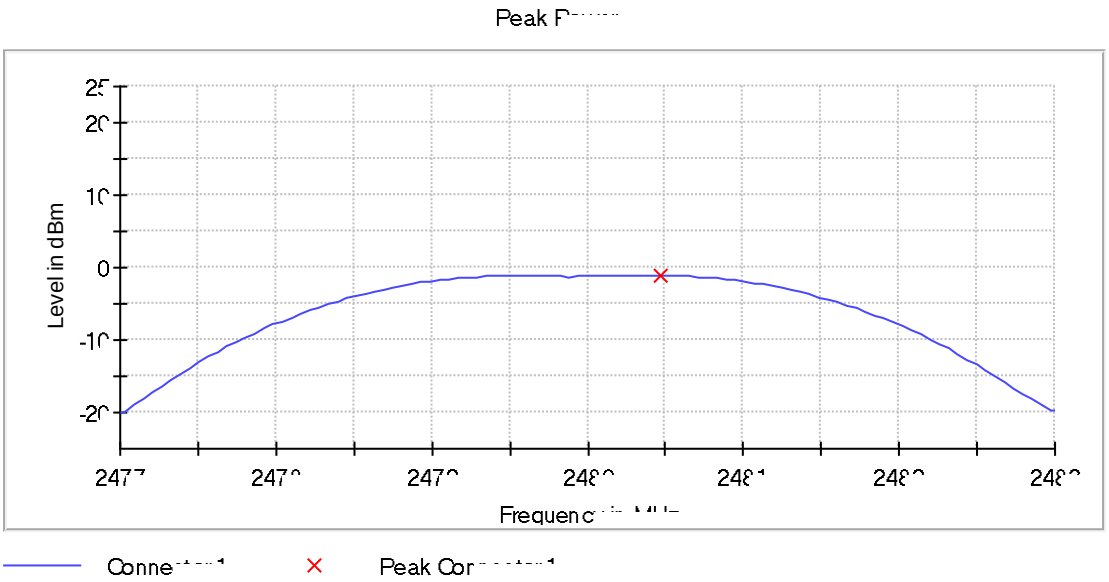


- **Data rate 2 Mbps, Middle Channel**

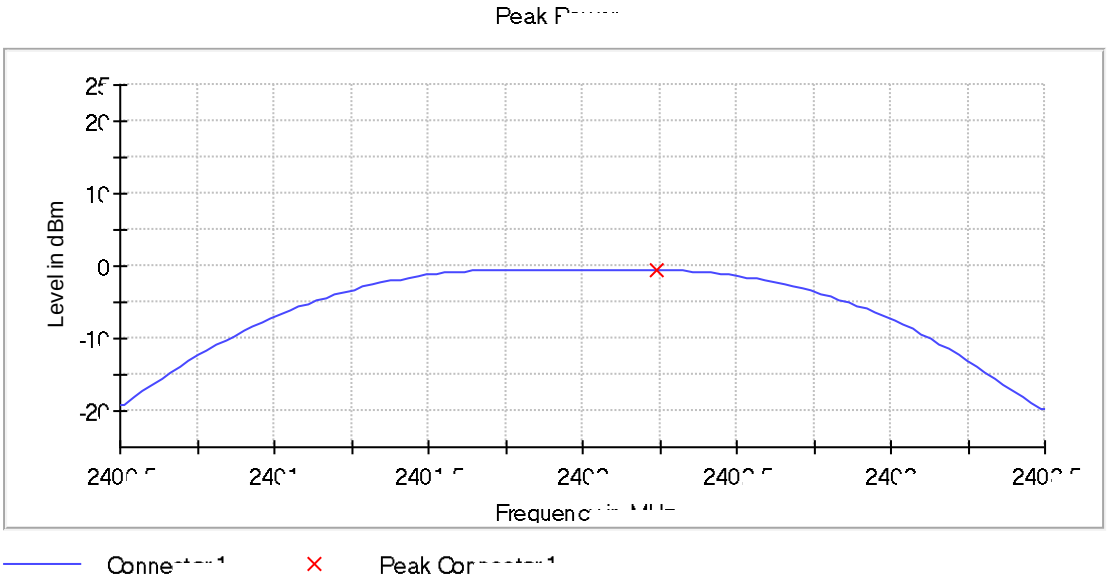


Prüfdokumentation
Test documentation

- **Data rate 2 Mbps, Highest Channel**

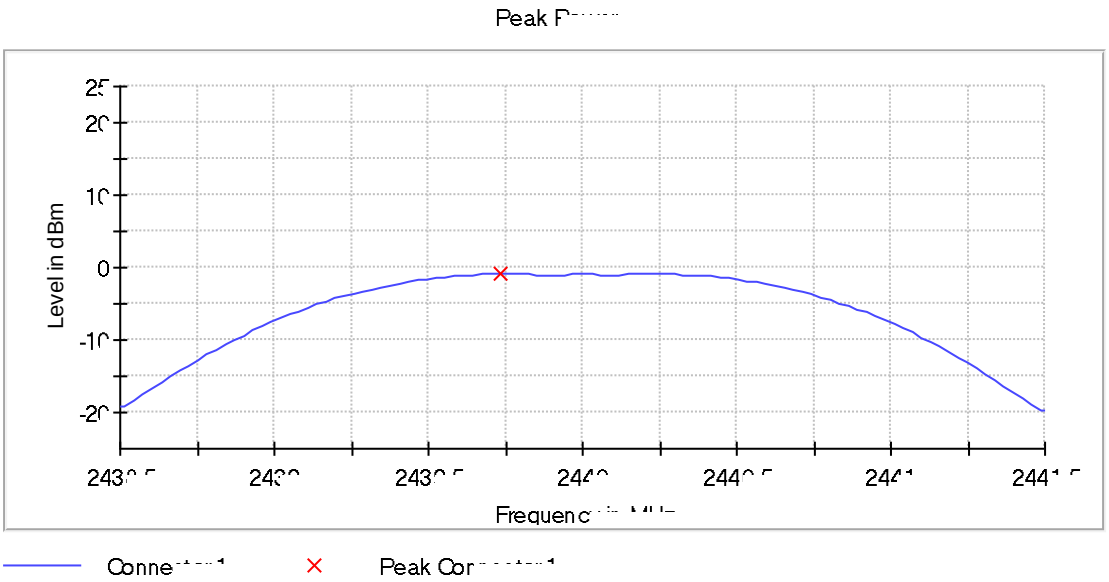


- **Data rate 1 Mbps, Lowest Channel**

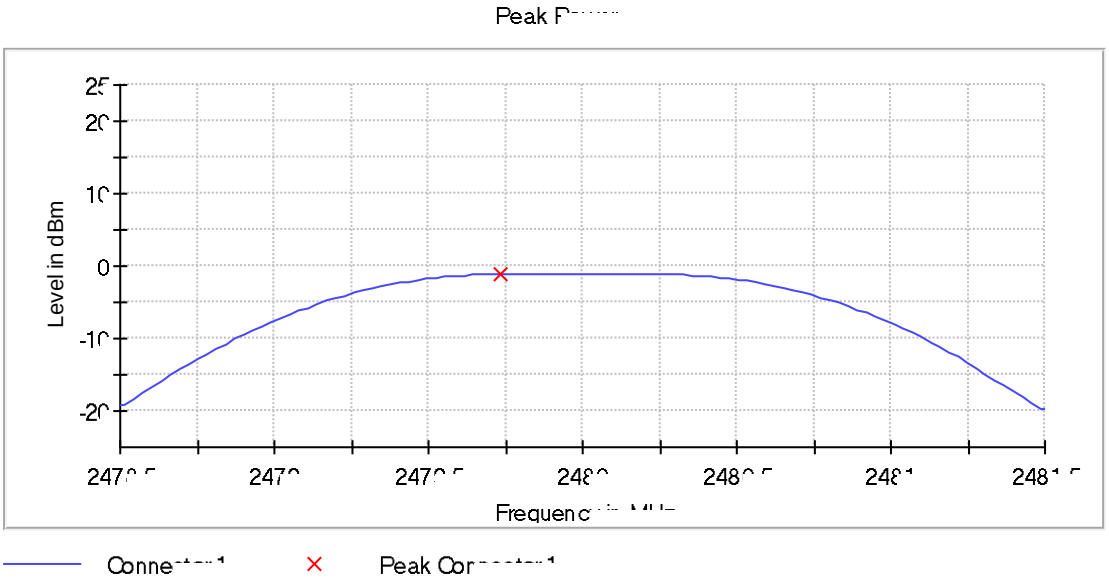


Prüfdokumentation
Test documentation

- **Data rate 1 Mbps, Middle Channel**

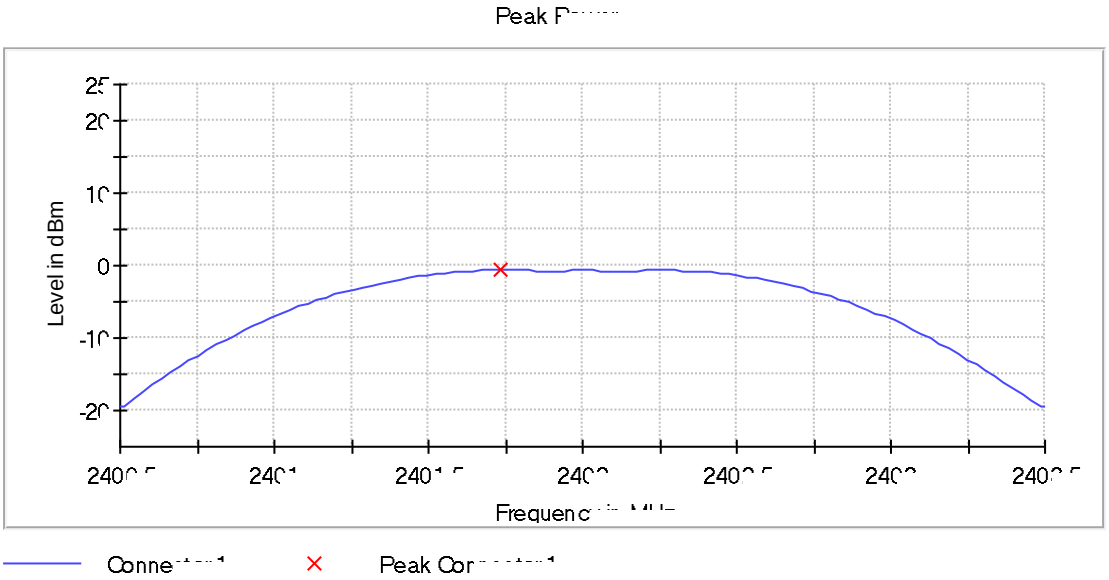


- **Data rate 1 Mbps, Highest Channel**

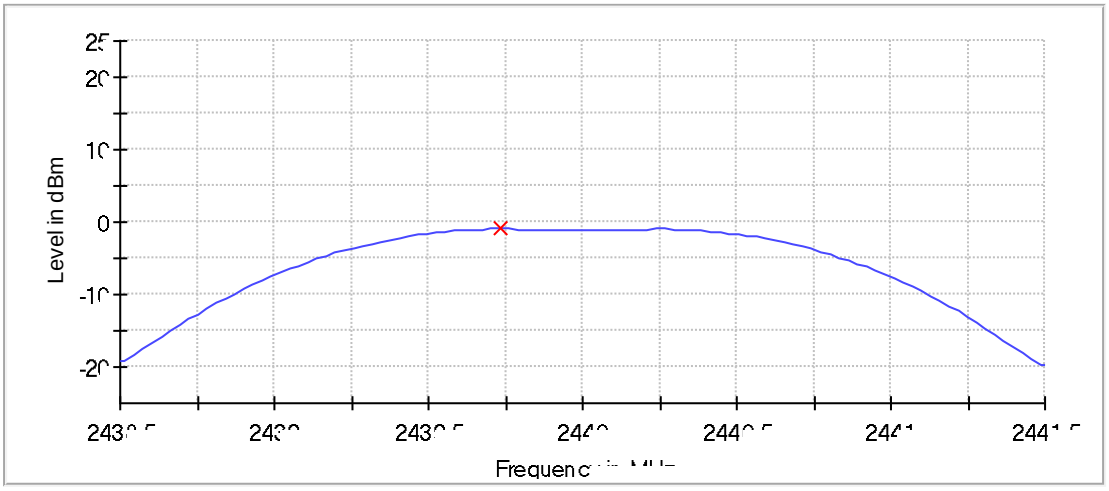


Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Lowest Channel**

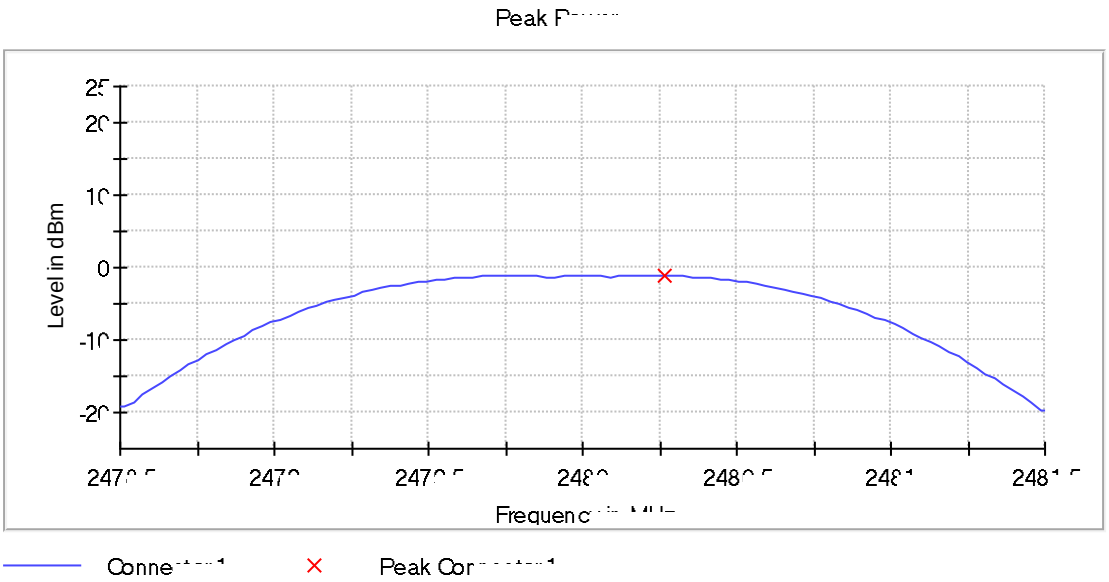


- **Data rate 500 kbps, Middle Channel**

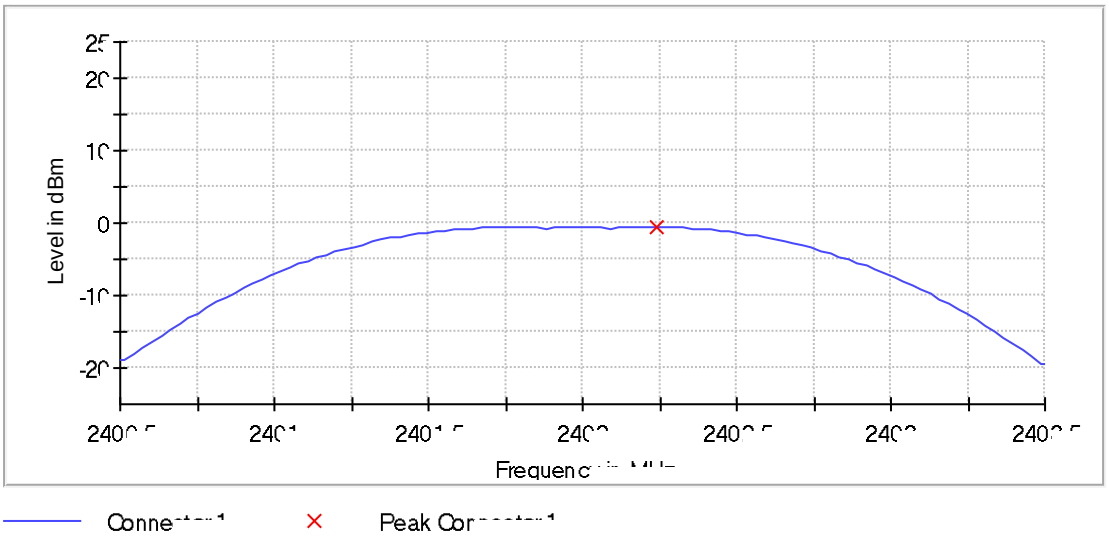


Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Highest Channel**

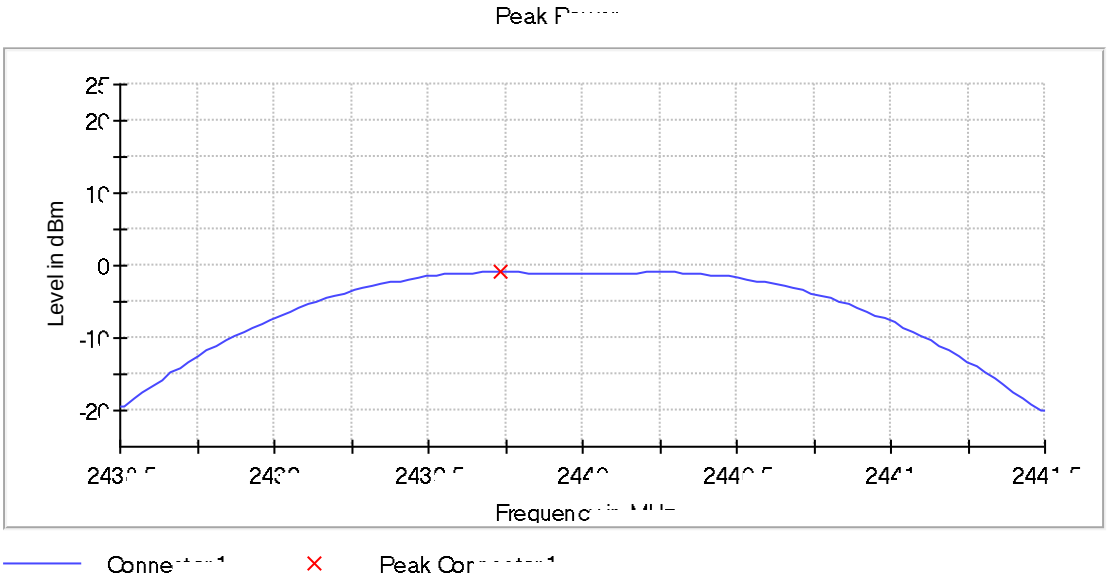


- **Data rate 125 kbps, Lowest Channel**

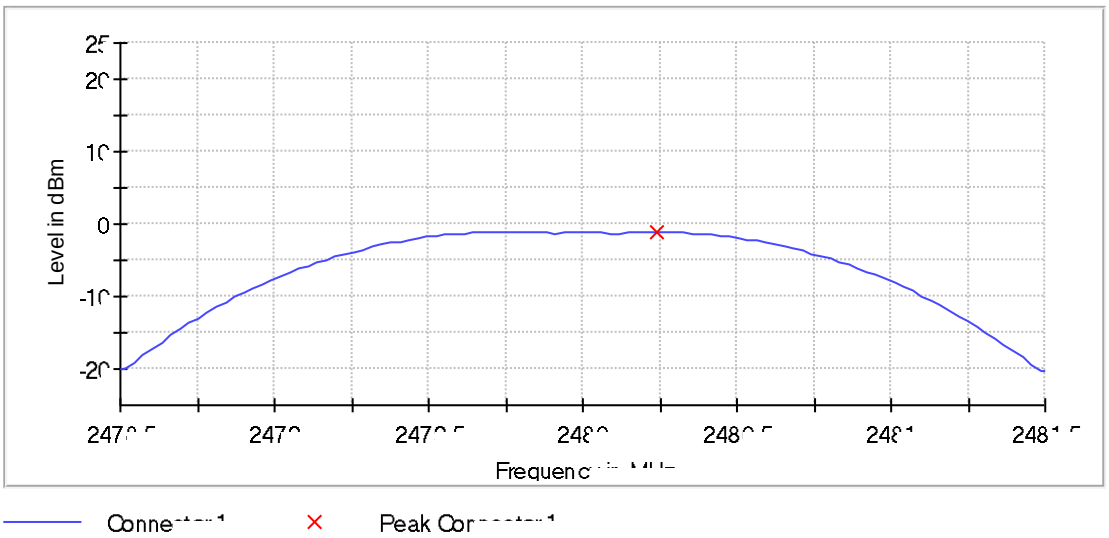


Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Middle Channel**



- **Data rate 125 kbps, Highest Channel**



Prüfdokumentation
Test documentation

Frequency (MHz)	Data rate	Peak conducted output power (dBm)	Limit (dBm)	Test Result
2402	2 Mbps	-0.6	30	Pass
2440	2 Mbps	-0.9		Pass
2480	2 Mbps	-1.1		Pass
2402	1 Mbps	-0.6		Pass
2440	1 Mbps	-0.9		Pass
2480	1 Mbps	-1.1		Pass
2402	500 kbps	-0.6		Pass
2440	500 kbps	-1.0		Pass
2480	500 kbps	-1.2		Pass
2402	125 kbps	-0.6		Pass
2440	125 kbps	-0.9		Pass
2480	125 kbps	-1.2		Pass

Final test result	Pass

4.2 Power Spectral Density

4.2.1 Requirements / Limits

FCC Part 15, Subpart C, §15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.2.2 Test Method

The same method of determining the conducted output power shall be used to determine the power spectral density according to ANSI C63.10:2013 clause 11.10.2 peak PSD.

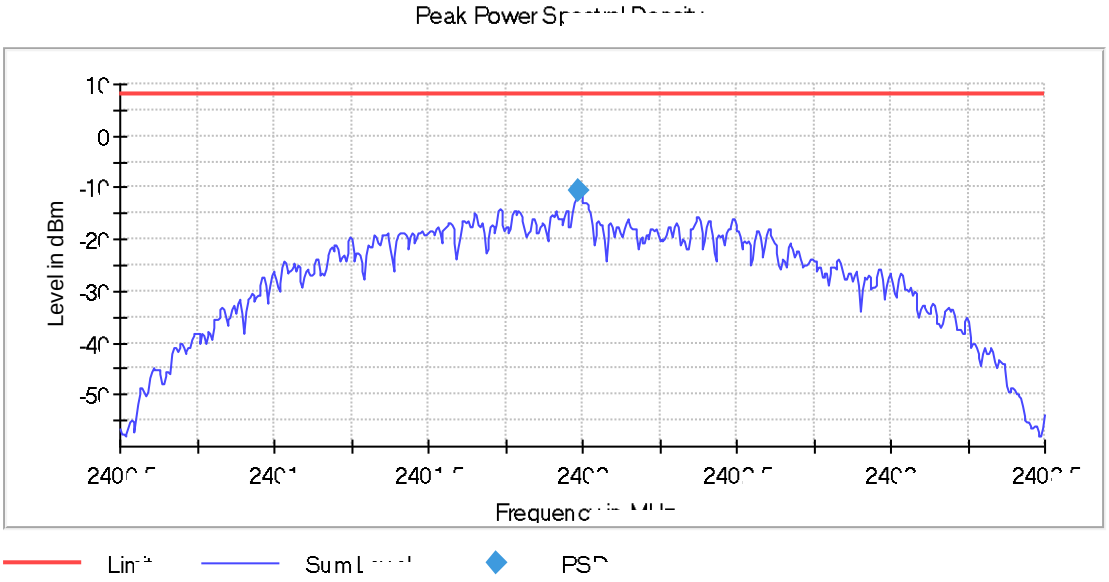
4.2.3 Test setup

EUT		IONIQ-Skincare Body Spray - A002980367-003 (Conducted)
Test Condition		Normal conditions
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 ☒ N/A
Companion device		-
Operation mode		Mode 1: TX Modulated 2 Mbps with continuous transmission Mode 2: TX Modulated 1 Mbps with continuous transmission Mode 3: TX Modulated 500 kbps with continuous transmission Mode 4: TX Modulated 125 kbps with continuous transmission
Spectrum Analyzer	**Centre Frequency**	2402 MHz, 2440 MHz, 2480 MHz
	Resolution Bandwidth	10 kHz
	Video Bandwidth	30 kHz
	Span	1.5 MHz (for 1 Mbps and lower), 3 MHz (for 2 Mbps)
	Sweeptime	1.5 ms (for 1 Mbps and lower), 3 ms (for 2 Mbps)
Further parameters		-
Test engineer		M. Sc. Alaa Bustati

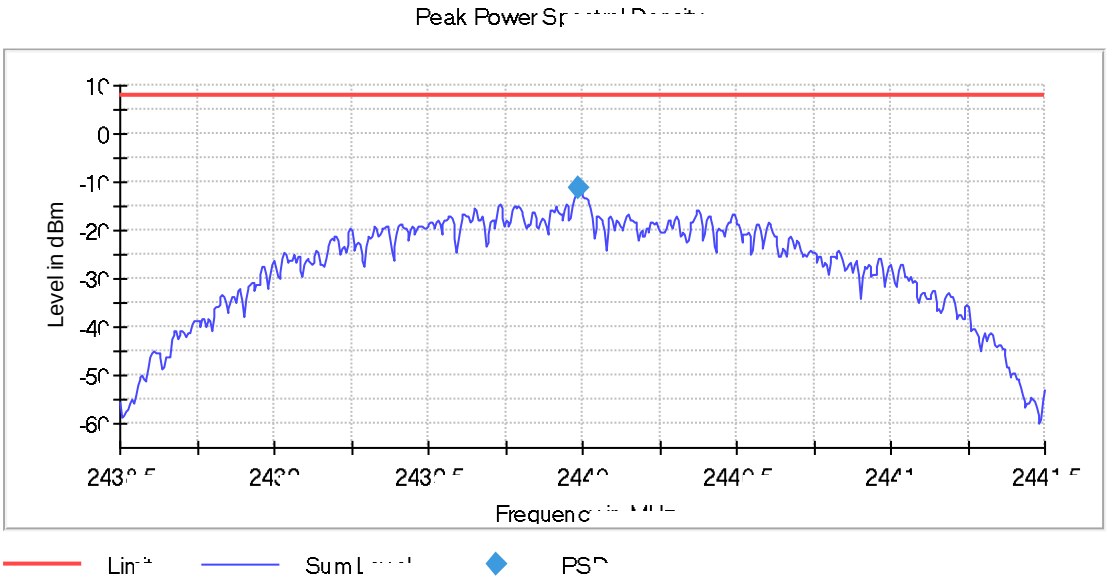
Prüfdokumentation
Test documentation

4.2.4 Test results

- **Data rate 2 Mbps, Lowest Channel**



- **Data rate 2 Mbps, Middle Channel**



Prüfdokumentation
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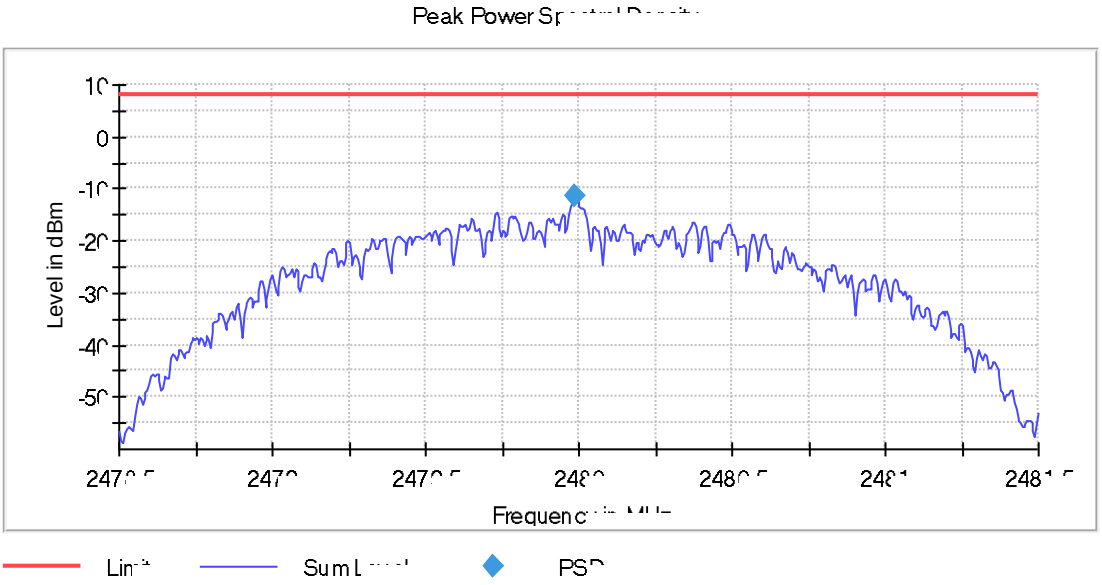
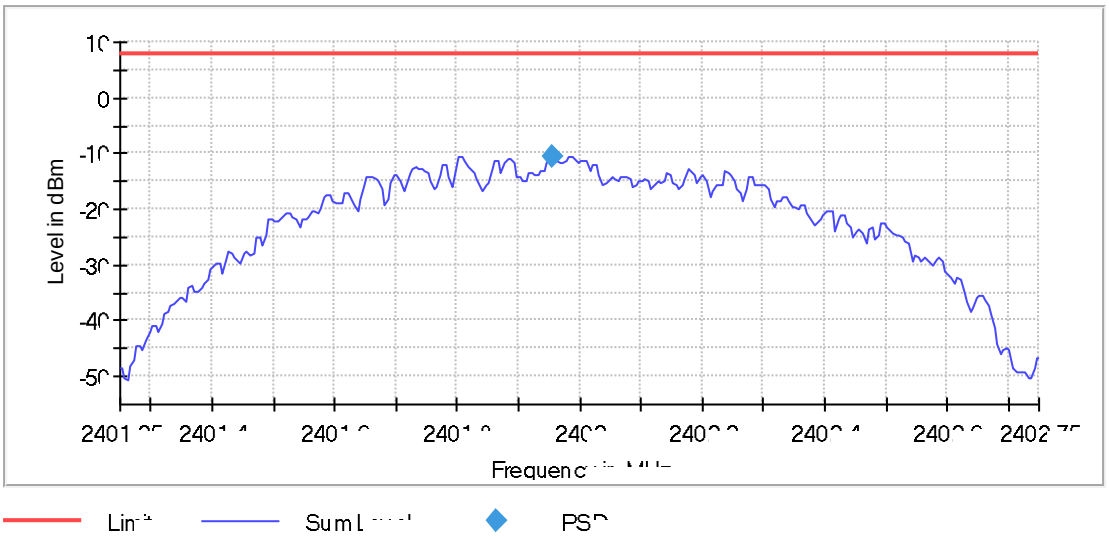
- **Data rate 2 Mbps, Highest Channel**

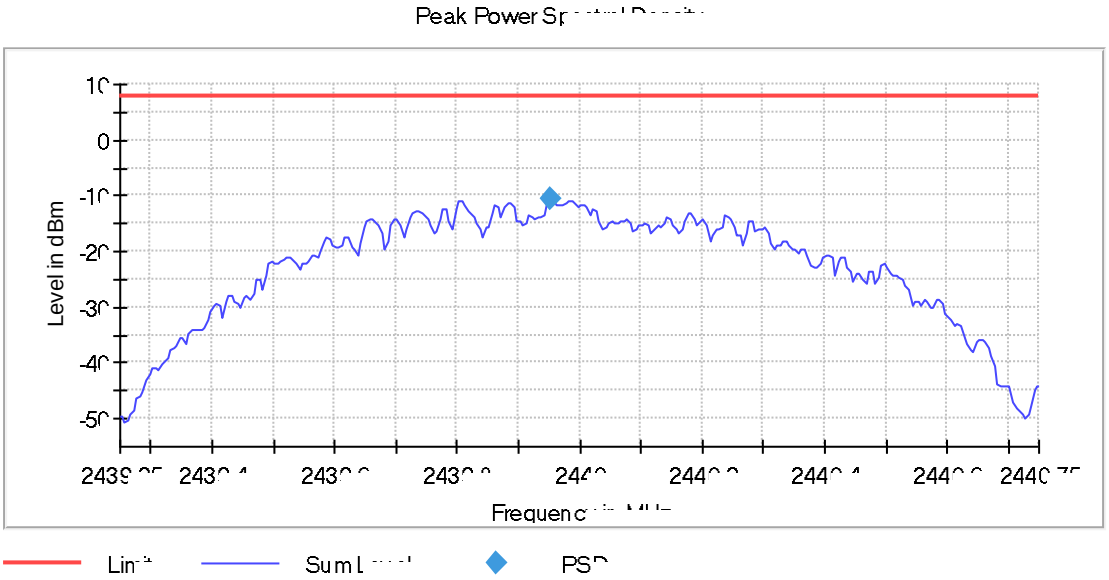


- **Data rate 1 Mbps, Lowest Channel**

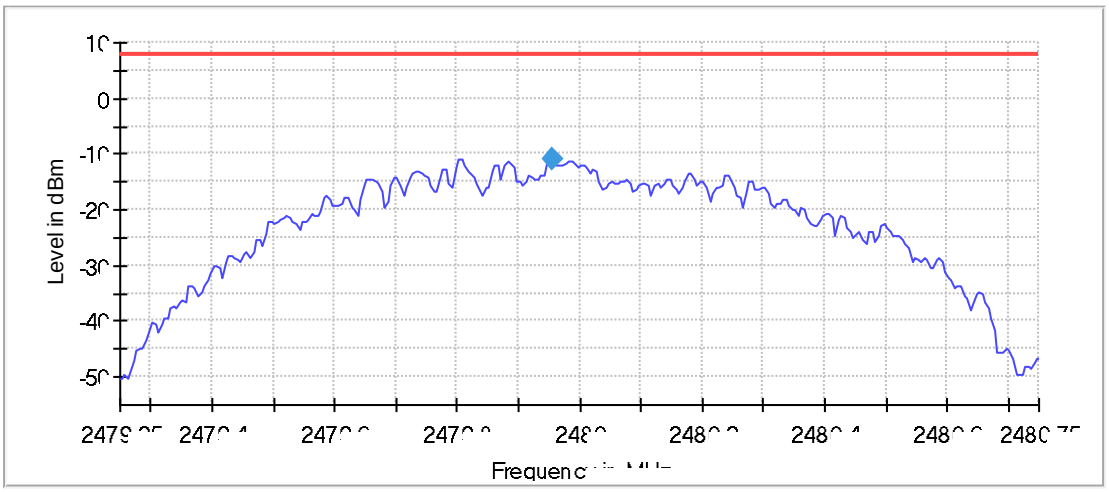


Prüfdokumentation
Test documentation

- **Data rate 1 Mbps, Middle Channel**



- **Data rate 1 Mbps, Highest Channel**



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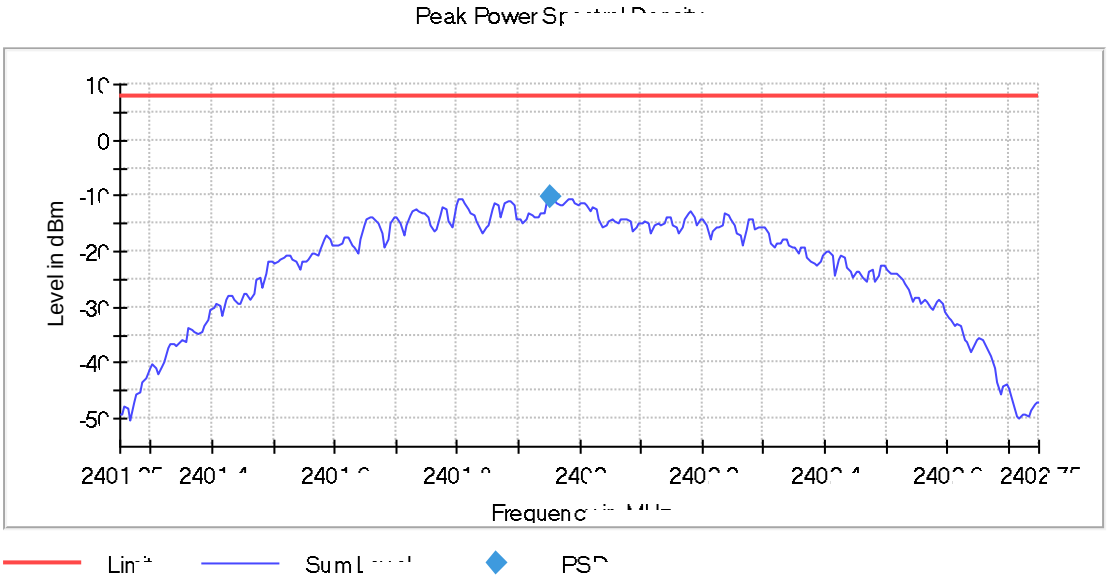
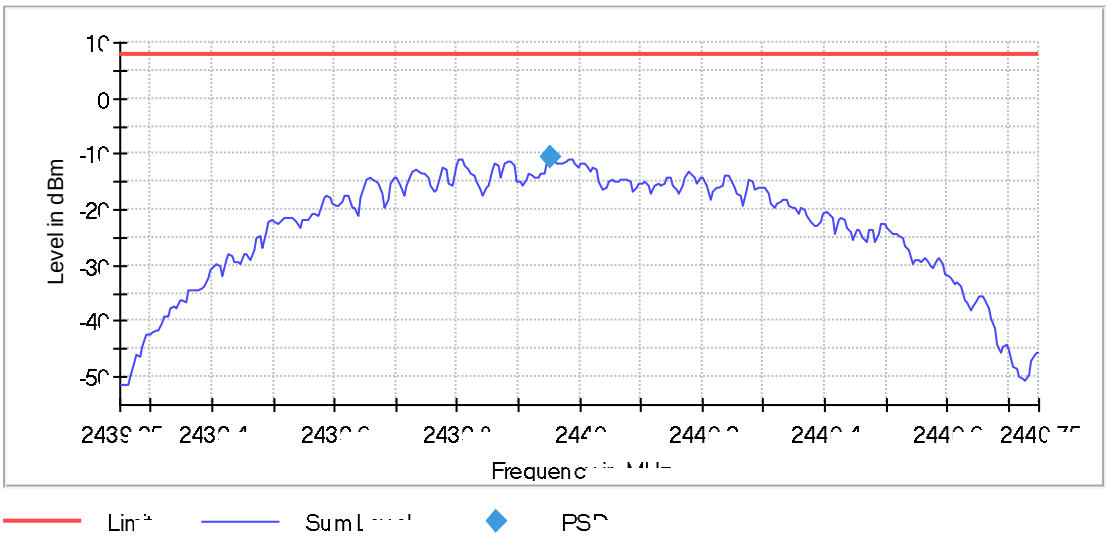
- **Data rate 500 kbps, Lowest Channel**

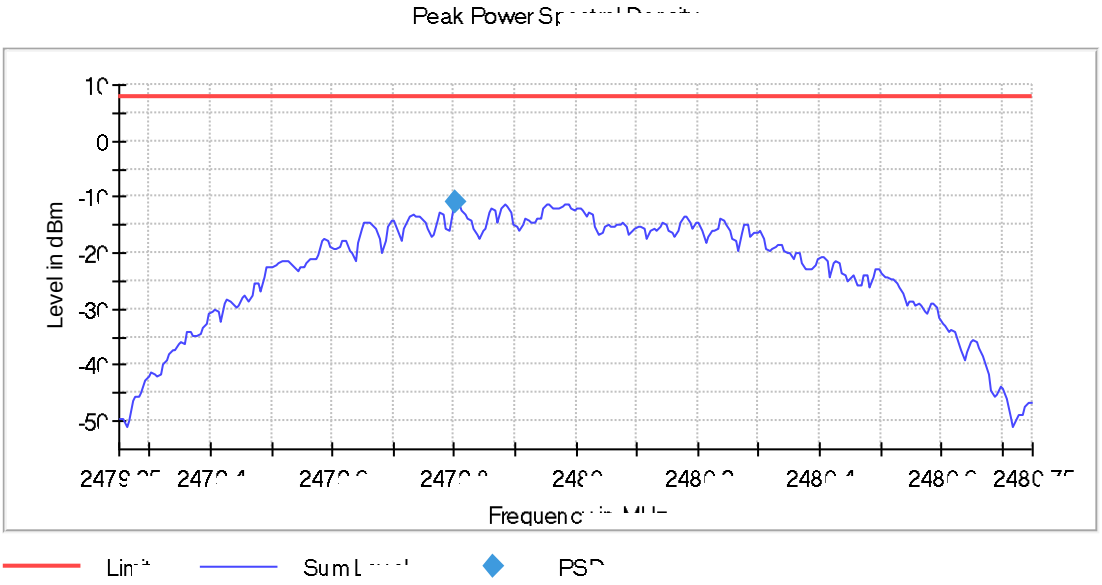


- **Data rate 500 kbps, Middle Channel**

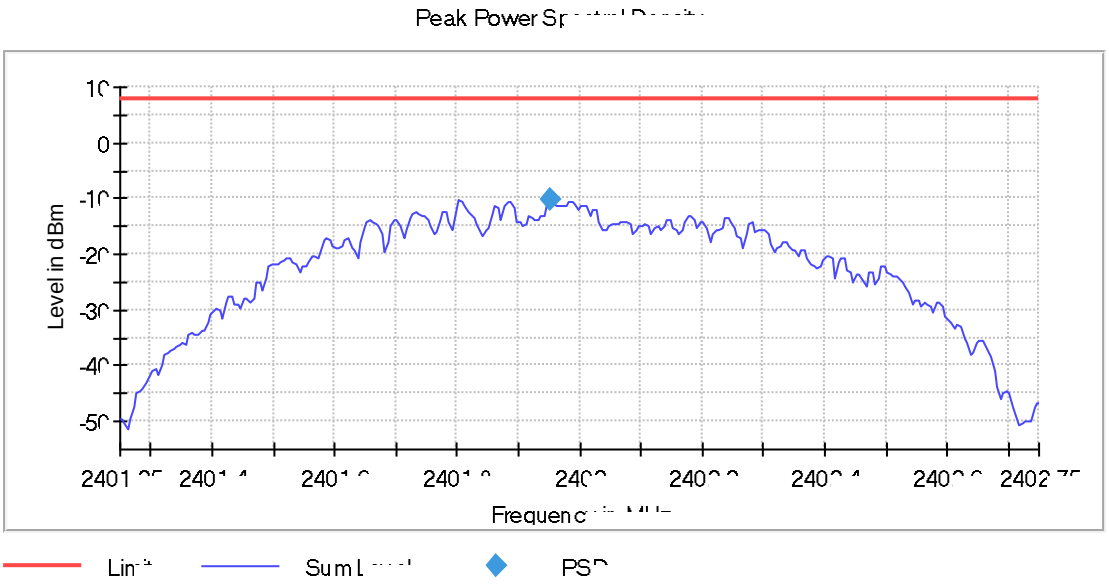


Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Highest Channel**

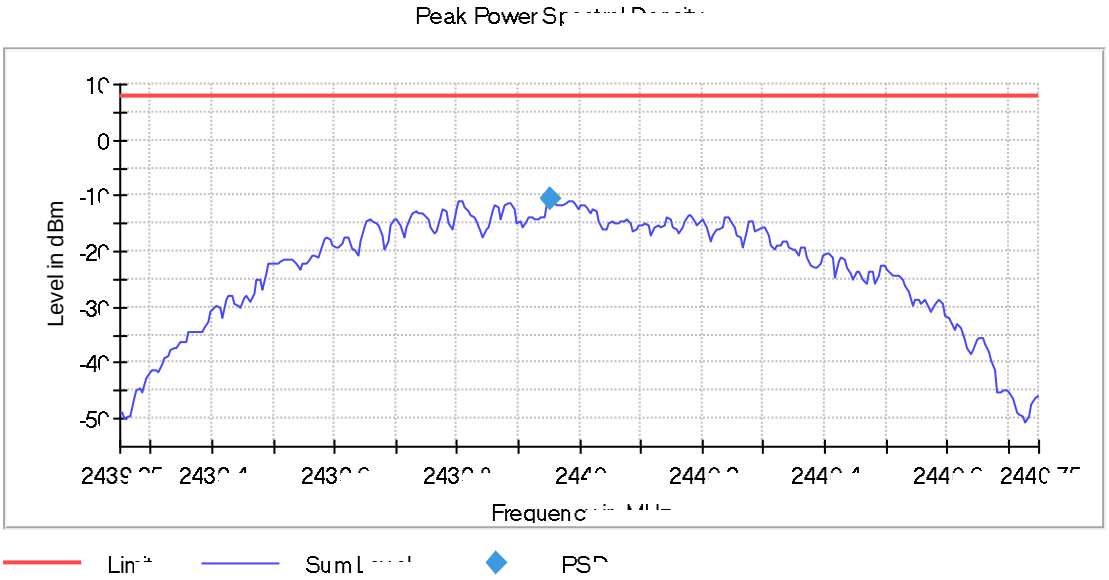


- **Data rate 125 kbps, Lowest Channel**

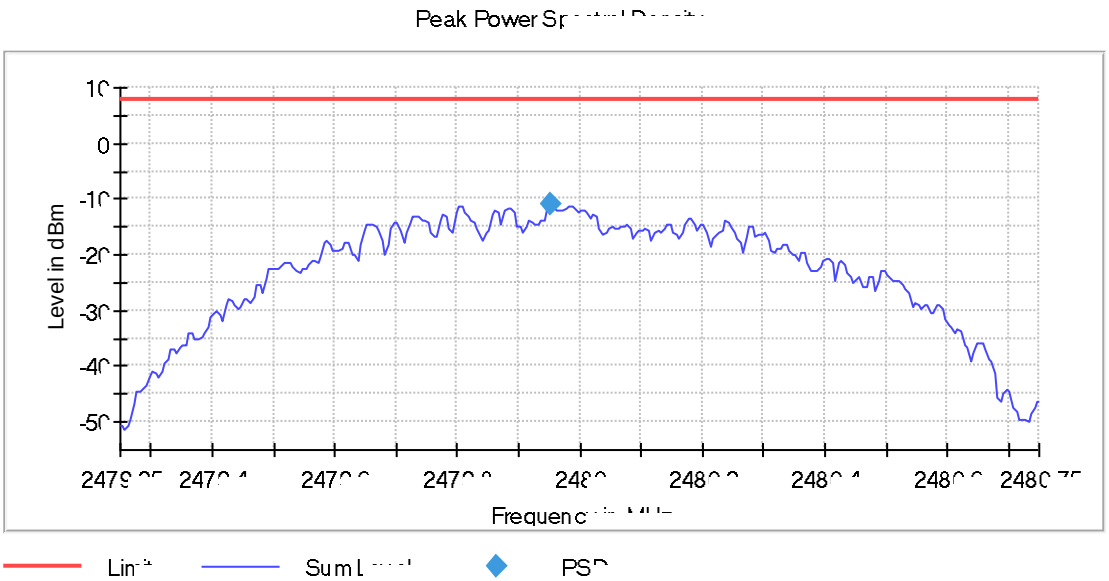


Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Middle Channel**



- **Data rate 125 kbps, Highest Channel**



Prüfdokumentation
Test documentation

Frequency (MHz)	Data rate	Peak conducted power spectral density (dBm)	Limit (dBm)	Test Result
2402	2 Mbps	-10.778	8	Pass
2440	2 Mbps	-11.170		Pass
2480	2 Mbps	-11.412		Pass
2402	1 Mbps	-10.417		Pass
2440	1 Mbps	-10.720		Pass
2480	1 Mbps	-11.015		Pass
2402	500 kbps	-10.340		Pass
2440	500 kbps	-10.737		Pass
2480	500 kbps	-11.080		Pass
2402	125 kbps	-10.355		Pass
2440	125 kbps	-10.711		Pass
2480	125 kbps	-11.093		Pass

Final test result	Pass

4.3 6 dB Bandwidth (DTS bandwidth)

4.3.1 Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (2)

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.3.2 Test Method

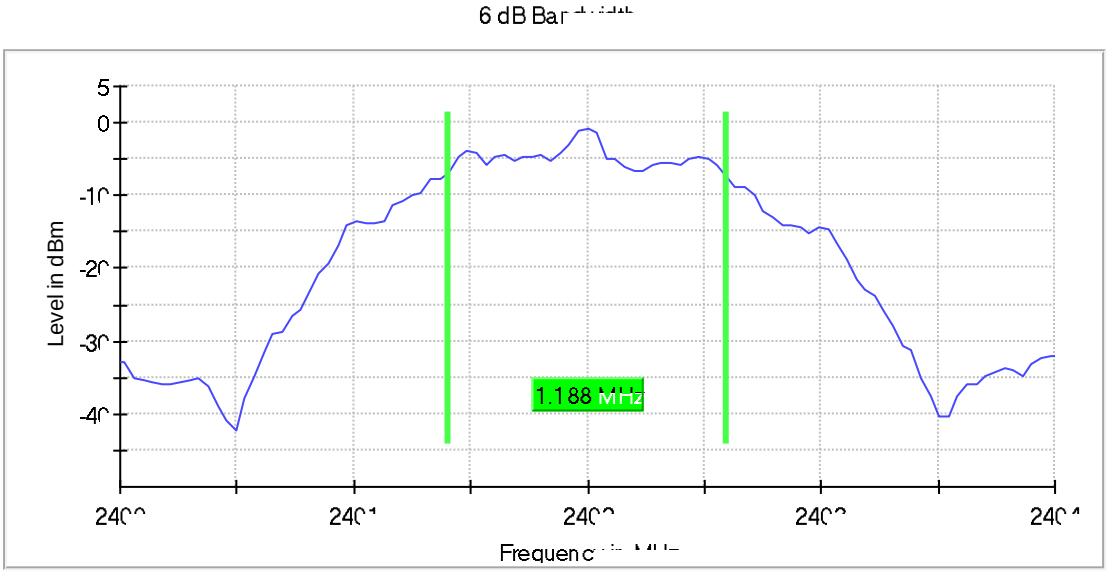
Conducted method was used to measure the 6 dB bandwidth according to ANSI C63.10:2013 clause 6.9.2. The EUT was connected to the spectrum analyzer via a coax cable with a known loss

4.3.3 Test setup

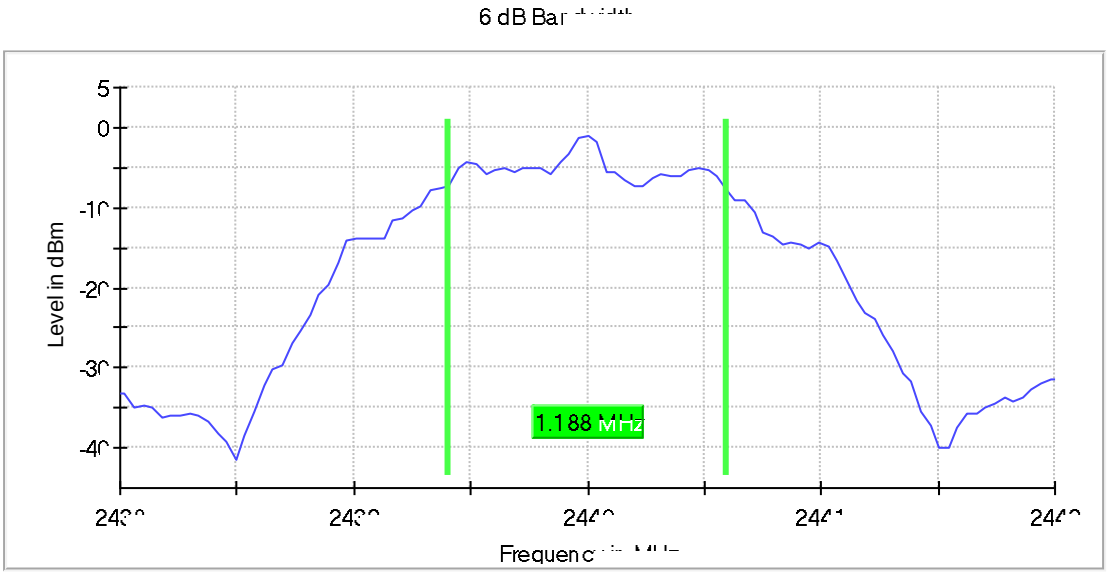
EUT		IONIQ-Skincare Body Spray - A002980367-003 (Conducted)		
Test Condition		Normal conditions		
Chamber details		☐ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC) ☒ Shielded room		
Measurement positioning		Distance: ☐ 3m ☐ 10m	EUT height: ☐ 1.5m ☐ 0.8m	Antenna height: ☐ 1.5m ☐ 1m to 4m – height scan
		☒ N/A		
Companion device		-		
Operation mode		Mode 1: TX Modulated 2 Mbps with continuous transmission Mode 2: TX Modulated 1 Mbps with continuous transmission Mode 3: TX Modulated 500 kbps with continuous transmission Mode 4: TX Modulated 125 kbps with continuous transmission		
Spectrum Analyzer	**Centre Frequency**	2402 MHz, 2440 MHz, 2480 MHz		
	Resolution Bandwidth	100 kHz		
	Video Bandwidth	300 kHz		
	Span	2 MHz (for 1 Mbps and lower) , 4 MHz (for 2 Mbps)		
	Sweep time	18.938 µs		
Further parameters		-		
Test engineer		M. Sc. Alaa Bustati		

4.3.4 Test results

- **Data rate 2 Mbps, Lowest Channel**

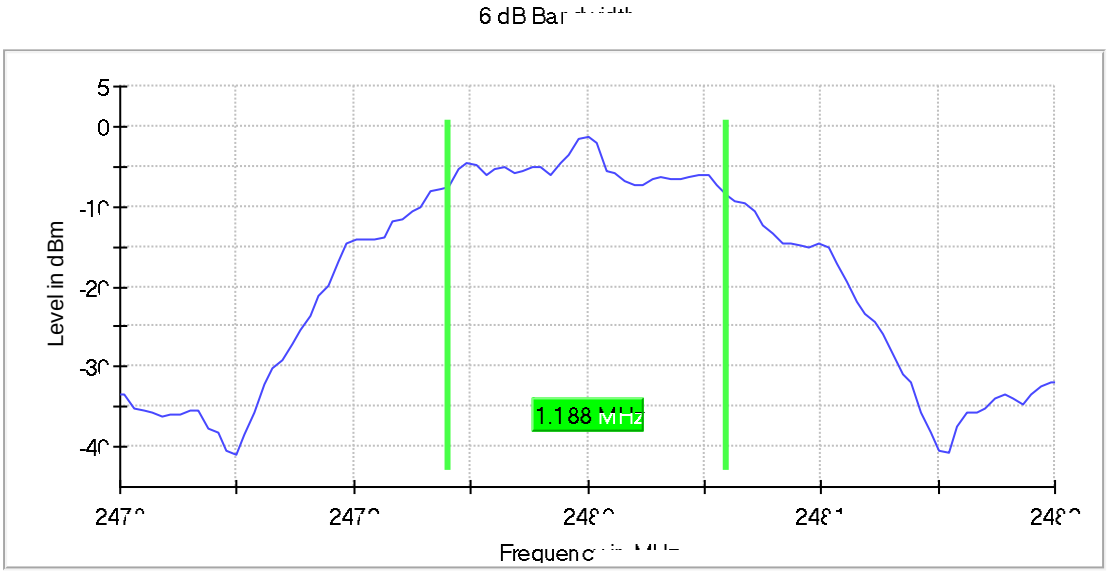


- **Data rate 2 Mbps, Middle Channel**

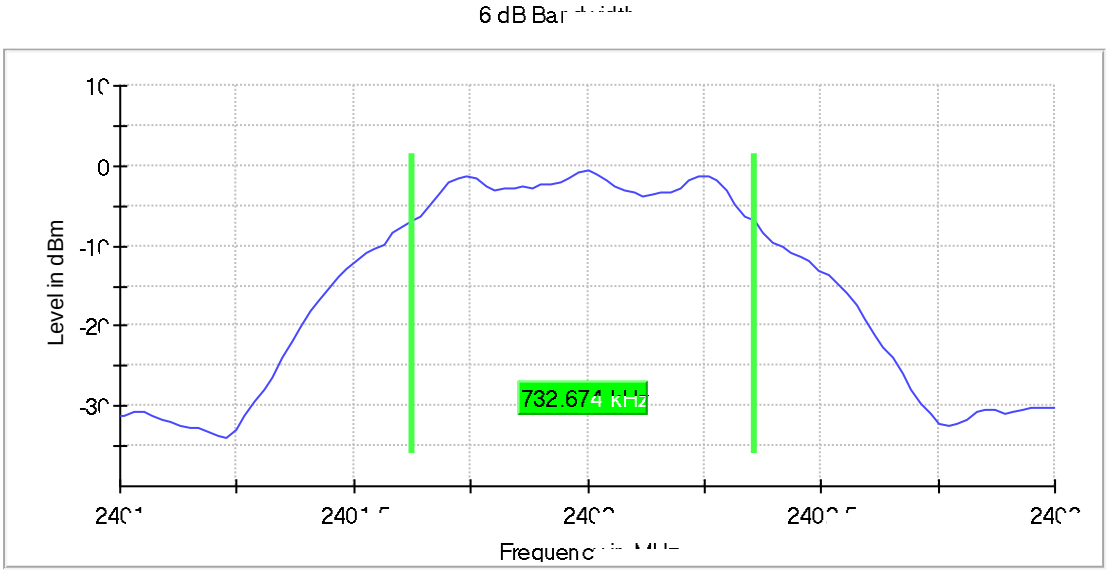


Prüfdokumentation
Test documentation

- **Data rate 2 Mbps, Highest Channel**

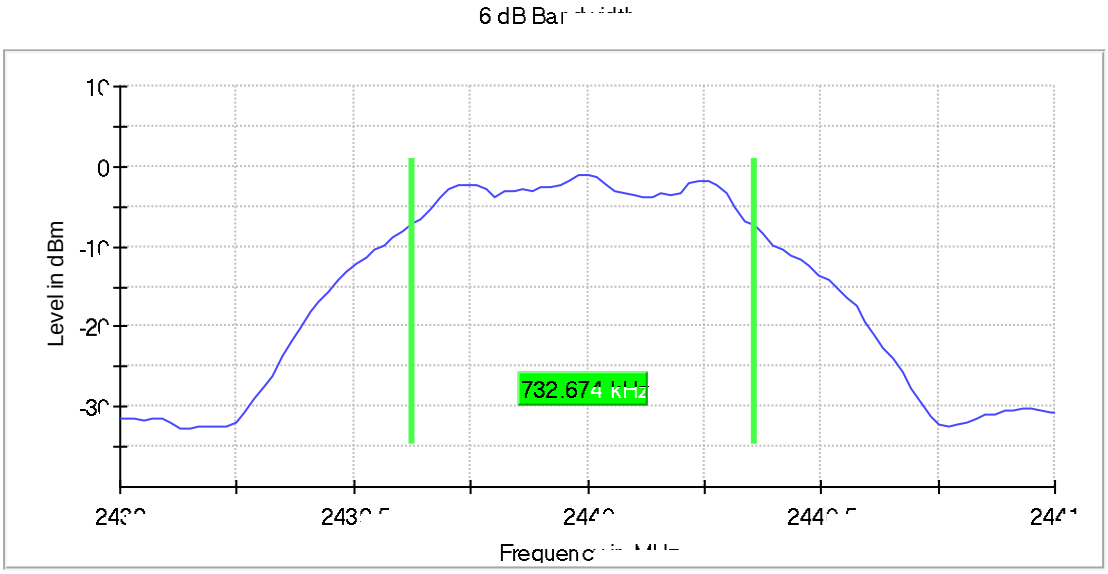


- **Data rate 1 Mbps, Lowest Channel**

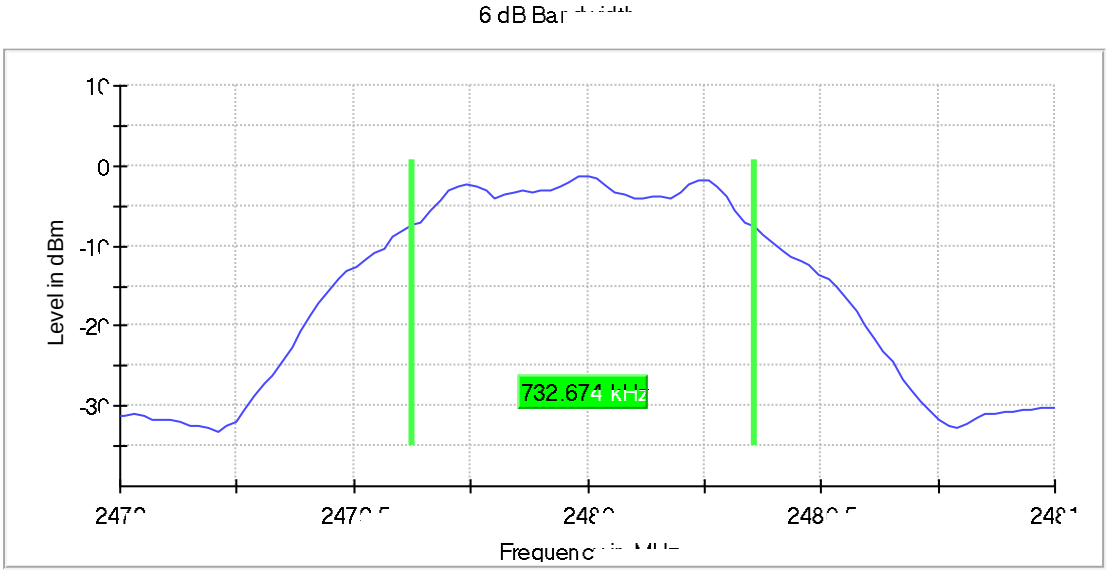


Prüfdokumentation
Test documentation

- **Data rate 1 Mbps, Middle Channel**

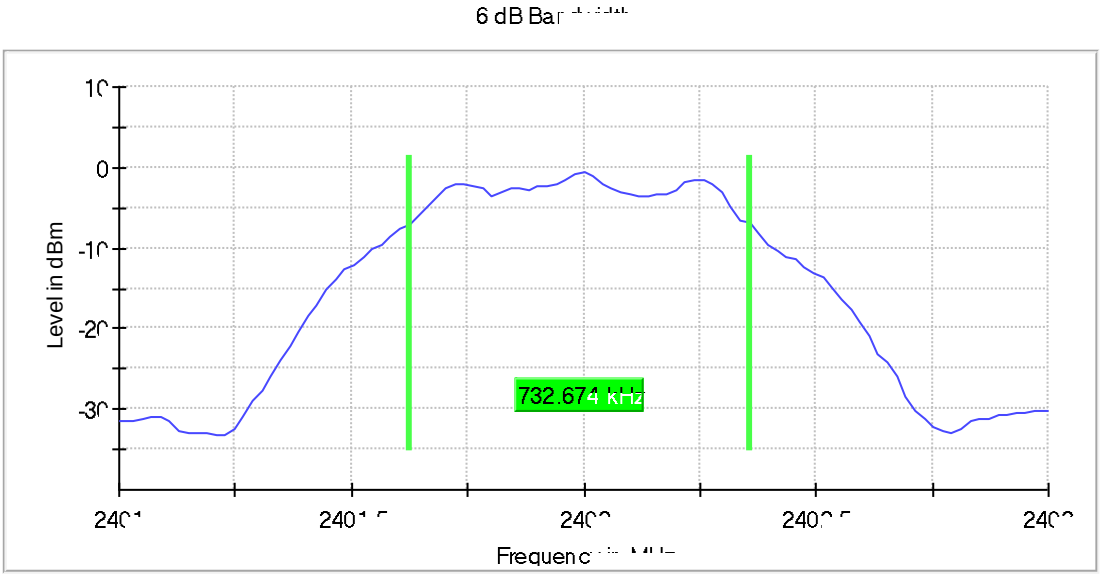


- **Data rate 1 Mbps, Highest Channel**

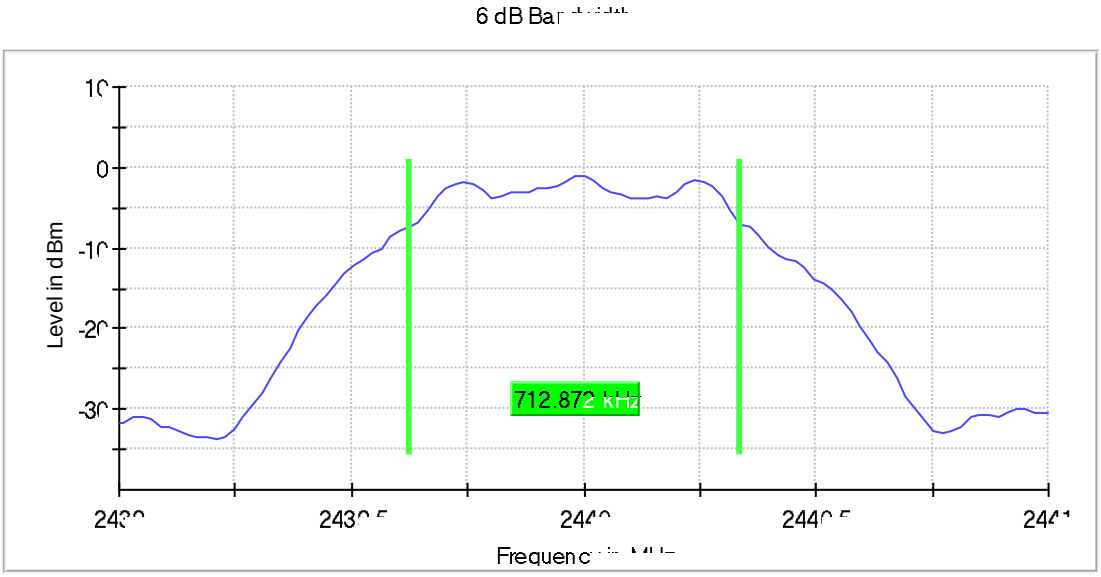


Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Lowest Channel**

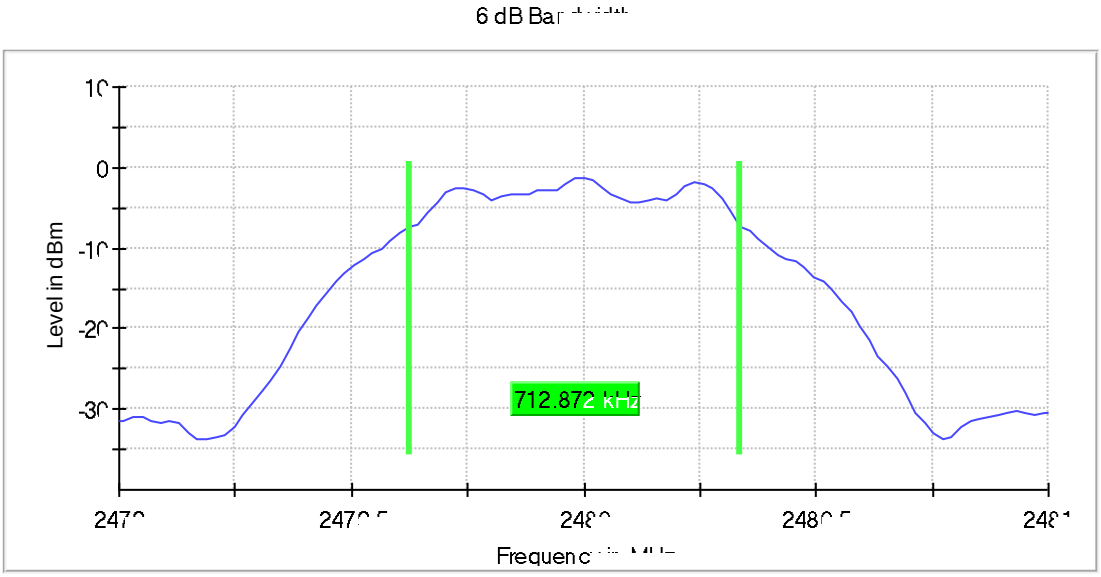


- **Data rate 500 kbps, Middle Channel**

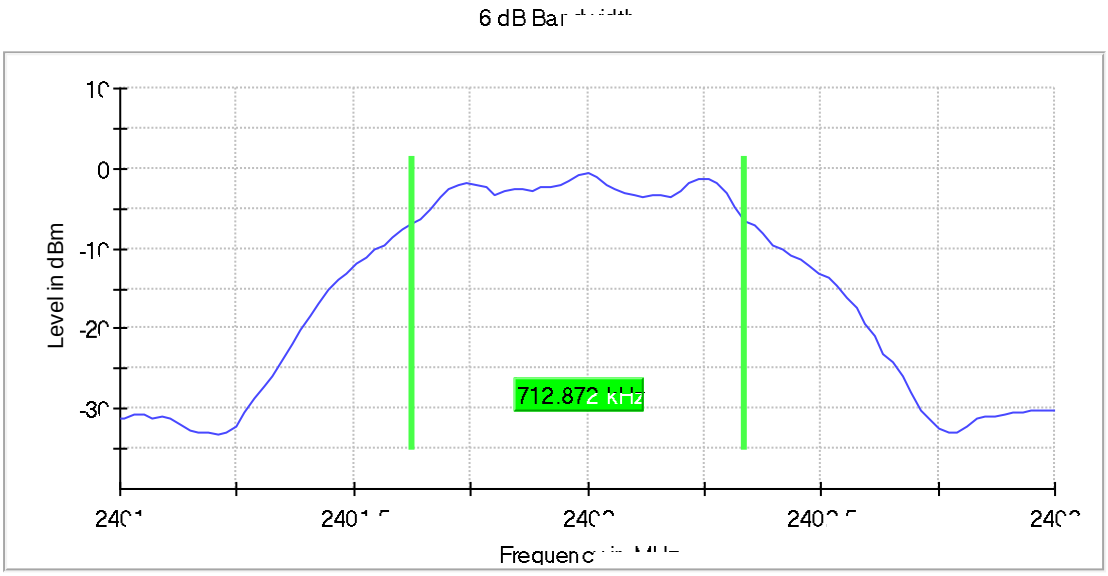


Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Highest Channel**

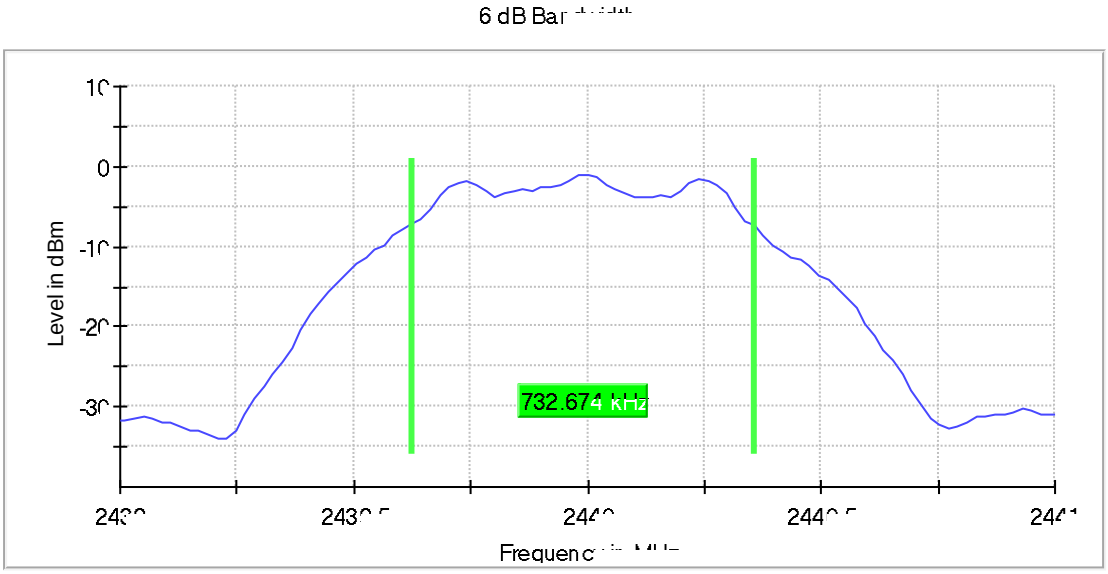


- **Data rate 125 kbps, Lowest Channel**

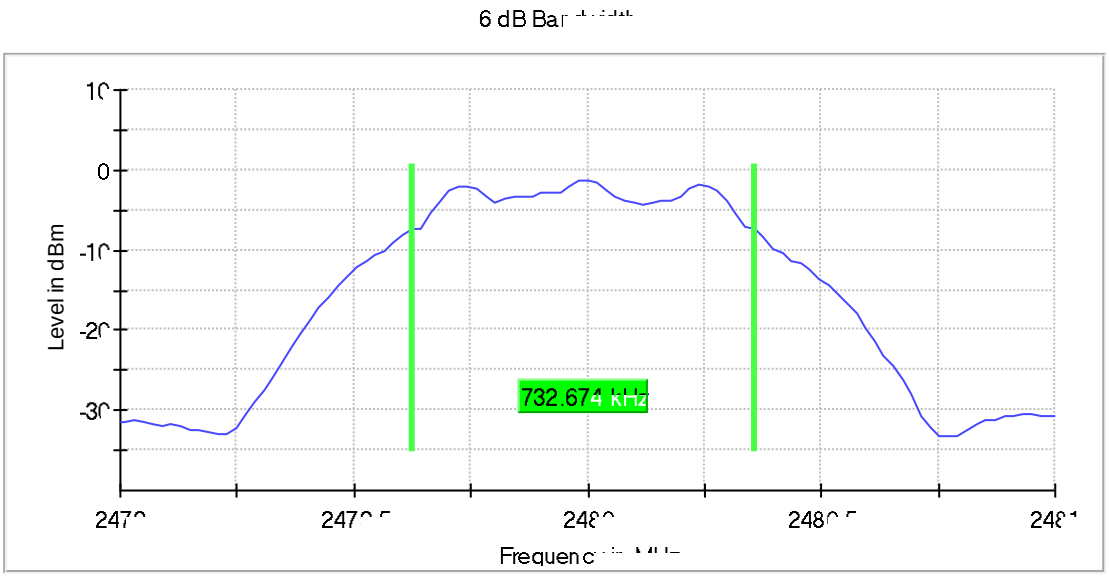


Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Middle Channel**



- **Data rate 125 kbps, Highest Channel**



Prüfdokumentation
Test documentation

Frequency (MHz)	Data rate	6 dB Bandwidth (kHz)	Minimum bandwidth (kHz)	Test Result
2402	2 Mbps	1188.118	500	Pass
2440	2 Mbps	1188.118		Pass
2480	2 Mbps	1188.118		Pass
2402	1 Mbps	732.674		Pass
2440	1 Mbps	732.674		Pass
2480	1 Mbps	732.674		Pass
2402	500 kbps	732.674		Pass
2440	500 kbps	712.872		Pass
2480	500 kbps	712.872		Pass
2402	125 kbps	712.872		Pass
2440	125 kbps	732.674		Pass
2480	125 kbps	732.674		Pass

Final test result	Pass

4.4 Conducted Spurious Emissions

4.4.1 Requirements / Limits

FCC Part 15, Subpart C, §15.247 (d)

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, provide the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this test shall be 30 dB instead of 20 dB

4.4.2 Test Method

Conducted method was used to measure the conducted spurious emissions in frequency range (30 MHz to 25 GHz) according to ANSI C63.10:2013 clause 11.11.3. The EUT was connected to the spectrum analyzer via a coax cable with a known loss.

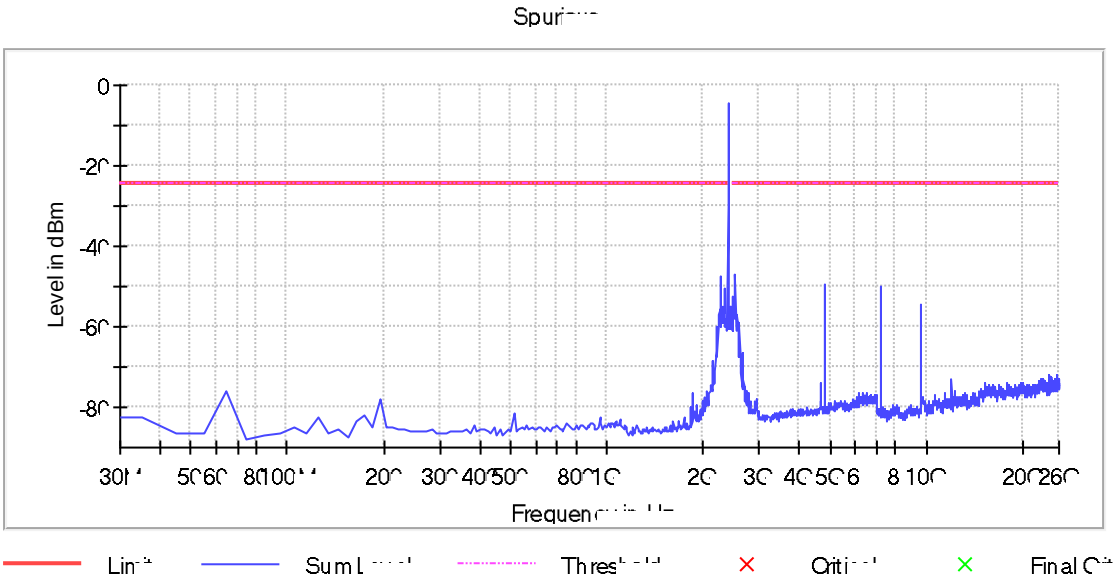
4.4.3 Test Setup

EUT		IONIQ-Skincare Body Spray - A002980367-003 (Conducted)
Test Condition		Normal conditions
Chamber details		☐ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC) ☒ Shielded room
Measurement positioning		Distance: / EUT height: / Antenna height: ☐ 3m / ☐ 1.5m / ☐ 1.5m ☐ 10m / ☐ 0.8m / ☐ 1m to 4m – height scan
		☒ N/A
Companion device		-
Operation mode		Mode 1: TX Modulated 2 Mbps with continuous transmission Mode 2: TX Modulated 1 Mbps with continuous transmission Mode 3: TX Modulated 500 kbps with continuous transmission Mode 4: TX Modulated 125 kbps with continuous transmission
Spectrum Analyzer	**Resolution Bandwidth**	100 kHz
	Video Bandwidth	300 kHz
	Span	30 MHz – 26 GHz
Further parameters		-
Test engineer		M. Sc. Alaa Bustati

Prüfdokumentation
Test documentation

4.4.4 Test results

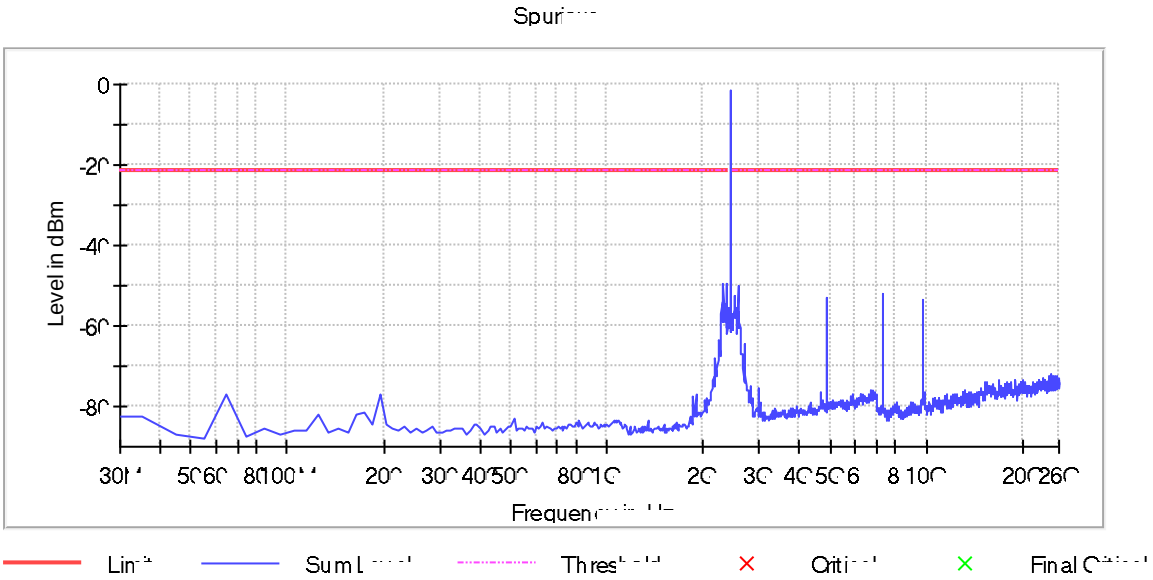
- **Data rate 2 Mbps, Lowest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2395.021008	-30.2	5.7	-24.5	Pass
2528.474182	-47.1	22.6	-24.5	Pass
2275.525210	-47.3	22.7	-24.5	Pass
4807.166065	-49.6	25.1	-24.5	Pass
7205.789099	-49.9	25.4	-24.5	Pass
2335.273109	-50.7	26.2	-24.5	Pass
9604.412133	-54.4	29.9	-24.5	Pass
2295.441176	-54.8	30.3	-24.5	Pass
2255.609244	-55.5	31.0	-24.5	Pass
2508.485657	-55.7	31.2	-24.5	Pass
2315.357143	-55.9	31.3	-24.5	Pass
2488.497131	-56.3	31.8	-24.5	Pass
2518.479919	-56.6	32.1	-24.5	Pass
2325.315126	-56.7	32.2	-24.5	Pass
2245.651261	-56.8	32.3	-24.5	Pass

Prüfdokumentation
Test documentation

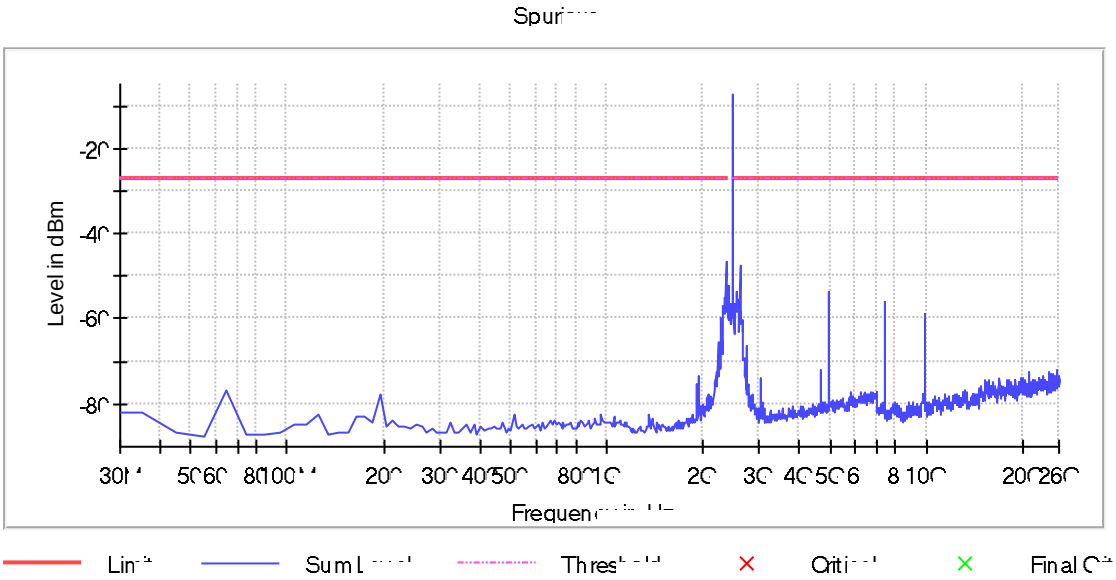
- **Data rate 2 Mbps, Middle Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2315.357143	-49.6	28.2	-21.3	Pass
2375.105042	-49.6	28.2	-21.3	Pass
2568.451232	-49.9	28.6	-21.3	Pass
7315.725988	-52.1	30.8	-21.3	Pass
2508.485657	-52.4	31.1	-21.3	Pass
4877.125903	-52.8	31.5	-21.3	Pass
9754.326073	-53.6	32.3	-21.3	Pass
2295.441176	-54.2	32.8	-21.3	Pass
2335.273109	-54.3	32.9	-21.3	Pass
2548.462707	-55.4	34.1	-21.3	Pass
9764.320336	-55.8	34.4	-21.3	Pass
2518.479919	-55.9	34.6	-21.3	Pass
2355.189076	-56.0	34.7	-21.3	Pass
2498.491394	-56.1	34.8	-21.3	Pass
2588.439758	-56.4	35.0	-21.3	Pass

Prüfdokumentation
Test documentation

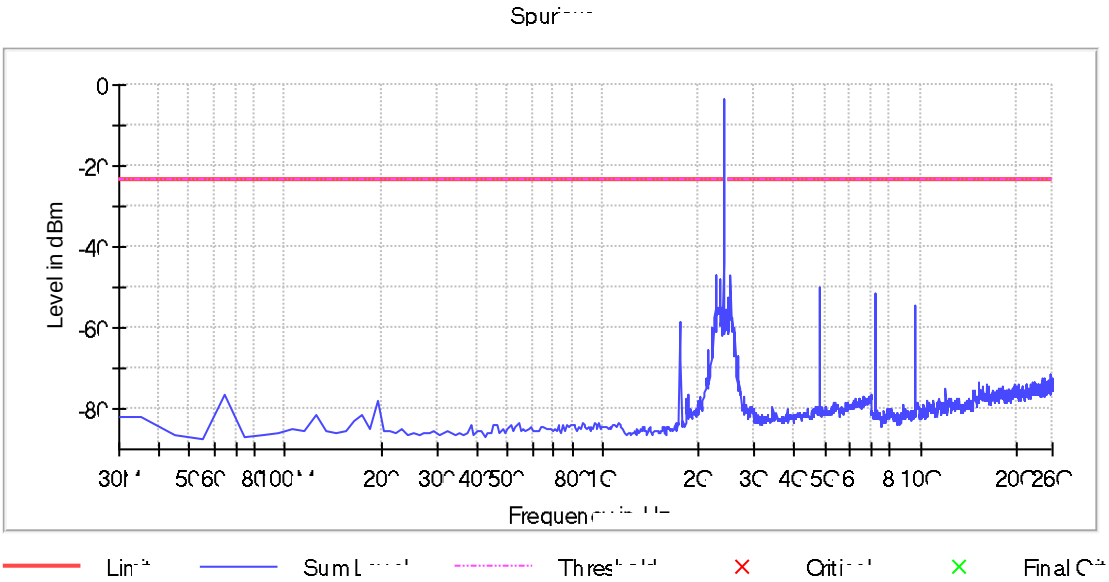
- **Data rate 2 Mbps, Highest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2355.189076	-46.7	19.4	-27.4	Pass
2608.428283	-47.3	20.0	-27.4	Pass
2548.462707	-53.6	26.2	-27.4	Pass
4957.080004	-53.9	26.5	-27.4	Pass
2365.147059	-54.3	27.0	-27.4	Pass
2375.105042	-54.8	27.4	-27.4	Pass
2335.273109	-55.1	27.8	-27.4	Pass
2588.439758	-55.6	28.2	-27.4	Pass
2538.468445	-55.8	28.4	-27.4	Pass
7435.657140	-55.9	28.5	-27.4	Pass
2395.021008	-56.1	28.7	-27.4	Pass
2508.485657	-56.5	29.1	-27.4	Pass
2315.357143	-57.1	29.7	-27.4	Pass
7445.651402	-57.3	29.9	-27.4	Pass
2568.451232	-57.6	30.2	-27.4	Pass

Prüfdokumentation
Test documentation

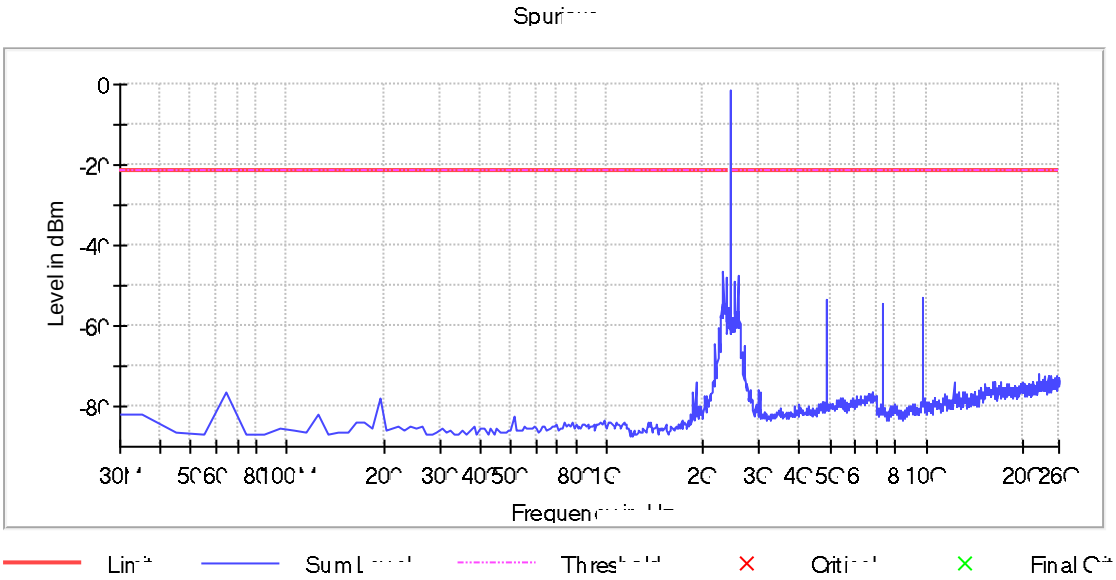
- **Data rate 1 Mbps, Lowest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2395.021008	-43.9	20.3	-23.6	Pass
2275.525210	-46.8	23.2	-23.6	Pass
2528.474182	-47.2	23.6	-23.6	Pass
2335.273109	-48.0	24.4	-23.6	Pass
4807.166065	-50.2	26.6	-23.6	Pass
7205.789099	-51.4	27.8	-23.6	Pass
9604.412133	-54.5	31.0	-23.6	Pass
2365.147059	-54.9	31.4	-23.6	Pass
2295.441176	-55.1	31.5	-23.6	Pass
2255.609244	-55.1	31.6	-23.6	Pass
2315.357143	-55.5	32.0	-23.6	Pass
2305.399160	-56.6	33.0	-23.6	Pass
2325.315126	-56.7	33.1	-23.6	Pass
2285.483193	-57.0	33.4	-23.6	Pass
2488.497131	-57.0	33.4	-23.6	Pass

Prüfdokumentation
Test documentation

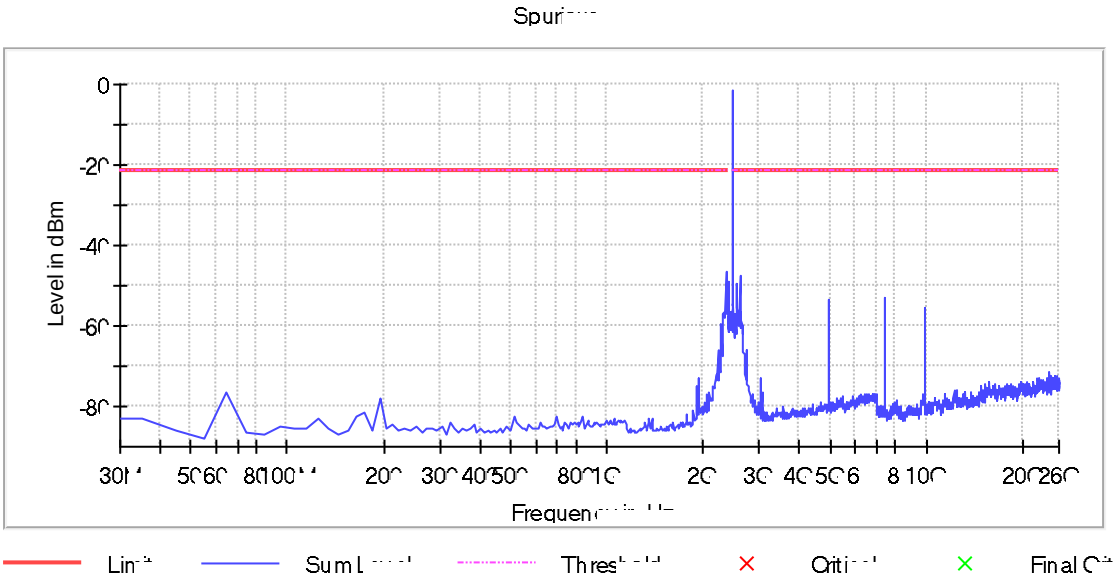
- **Data rate 1 Mbps, Middle Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2315.357143	-46.5	25.2	-21.4	Pass
2568.451232	-47.6	26.2	-21.4	Pass
2375.105042	-48.0	26.6	-21.4	Pass
2508.485657	-49.1	27.7	-21.4	Pass
9754.326073	-53.1	31.7	-21.4	Pass
4877.125903	-53.7	32.3	-21.4	Pass
9764.320336	-54.1	32.7	-21.4	Pass
2295.441176	-54.4	33.0	-21.4	Pass
7325.720251	-54.4	33.0	-21.4	Pass
2335.273109	-54.4	33.1	-21.4	Pass
7315.725988	-55.2	33.8	-21.4	Pass
2355.189076	-55.4	34.0	-21.4	Pass
2325.315126	-56.2	34.8	-21.4	Pass
2518.479919	-56.3	34.9	-21.4	Pass
2588.439758	-56.4	35.0	-21.4	Pass

Prüfdokumentation
Test documentation

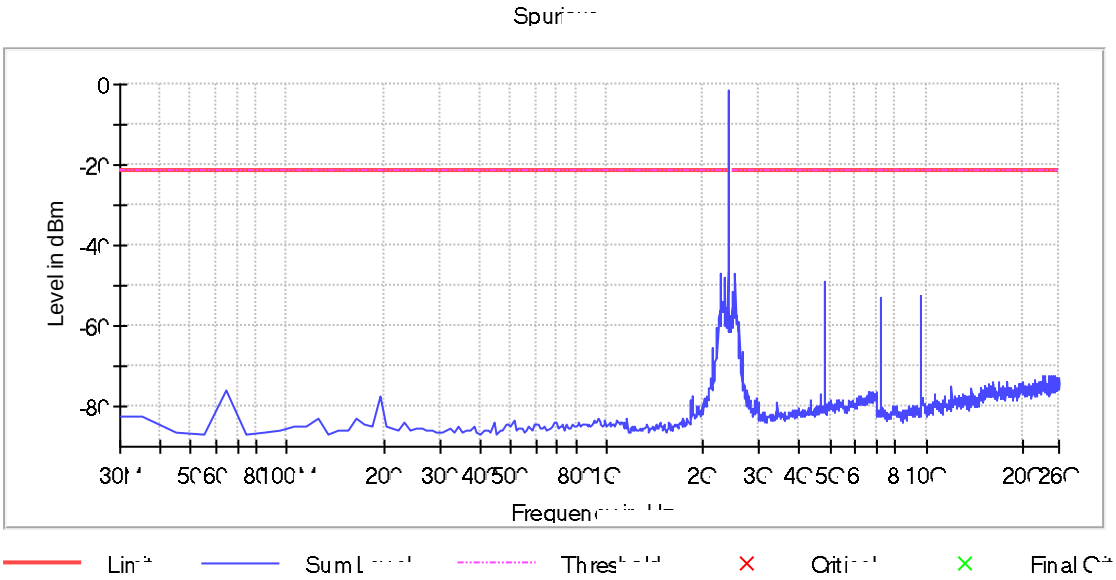
- **Data rate 1 Mbps, Highest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2355.189076	-46.6	25.2	-21.4	Pass
2608.428283	-47.5	26.1	-21.4	Pass
2548.462707	-49.4	28.0	-21.4	Pass
7435.657140	-52.9	31.5	-21.4	Pass
2375.105042	-53.0	31.5	-21.4	Pass
4957.080004	-53.3	31.8	-21.4	Pass
2488.497131	-54.3	32.8	-21.4	Pass
2395.021008	-54.7	33.3	-21.4	Pass
7445.651402	-54.7	33.3	-21.4	Pass
9924.228538	-55.5	34.0	-21.4	Pass
2558.456970	-55.6	34.1	-21.4	Pass
2588.439758	-56.3	34.9	-21.4	Pass
2628.416808	-56.4	35.0	-21.4	Pass
2365.147059	-56.5	35.0	-21.4	Pass
2335.273109	-56.5	35.0	-21.4	Pass

Prüfdokumentation
Test documentation

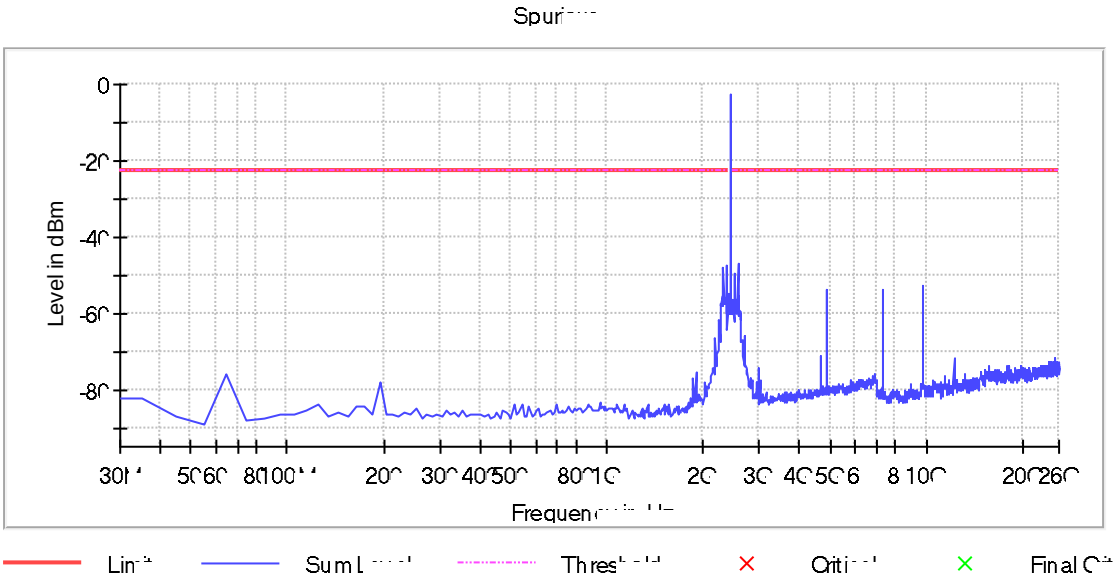
- **Data rate 500 kbps, Lowest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2395.021008	-46.2	24.7	-21.5	Pass
2275.525210	-47.0	25.5	-21.5	Pass
2528.474182	-47.1	25.6	-21.5	Pass
2335.273109	-47.9	26.4	-21.5	Pass
4807.166065	-48.9	27.4	-21.5	Pass
9604.412133	-52.7	31.2	-21.5	Pass
7205.789099	-53.1	31.6	-21.5	Pass
2295.441176	-53.9	32.4	-21.5	Pass
2508.485657	-55.0	33.5	-21.5	Pass
2365.147059	-55.5	34.0	-21.5	Pass
2315.357143	-55.6	34.1	-21.5	Pass
2488.497131	-55.8	34.3	-21.5	Pass
2255.609244	-56.1	34.6	-21.5	Pass
2325.315126	-56.7	35.2	-21.5	Pass
2305.399160	-56.7	35.2	-21.5	Pass

Prüfdokumentation
Test documentation

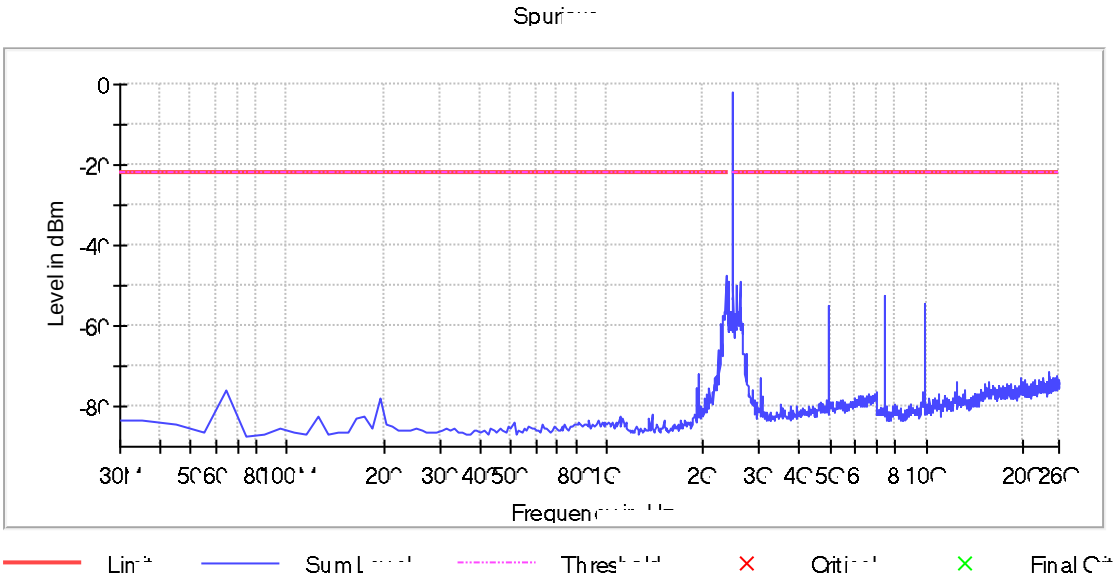
- **Data rate 500 kbps, Middle Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2568.451232	-47.2	24.5	-22.7	Pass
2375.105042	-47.4	24.7	-22.7	Pass
2315.357143	-47.9	25.2	-22.7	Pass
2508.485657	-49.6	26.9	-22.7	Pass
9754.326073	-52.5	29.8	-22.7	Pass
7315.725988	-53.6	30.9	-22.7	Pass
4877.125903	-53.6	30.9	-22.7	Pass
9764.320336	-55.1	32.4	-22.7	Pass
2588.439758	-55.2	32.5	-22.7	Pass
2295.441176	-55.2	32.5	-22.7	Pass
7325.720251	-55.4	32.7	-22.7	Pass
2335.273109	-56.0	33.3	-22.7	Pass
2548.462707	-56.7	34.0	-22.7	Pass
2275.525210	-57.3	34.6	-22.7	Pass
2528.474182	-57.3	34.6	-22.7	Pass

Prüfdokumentation
Test documentation

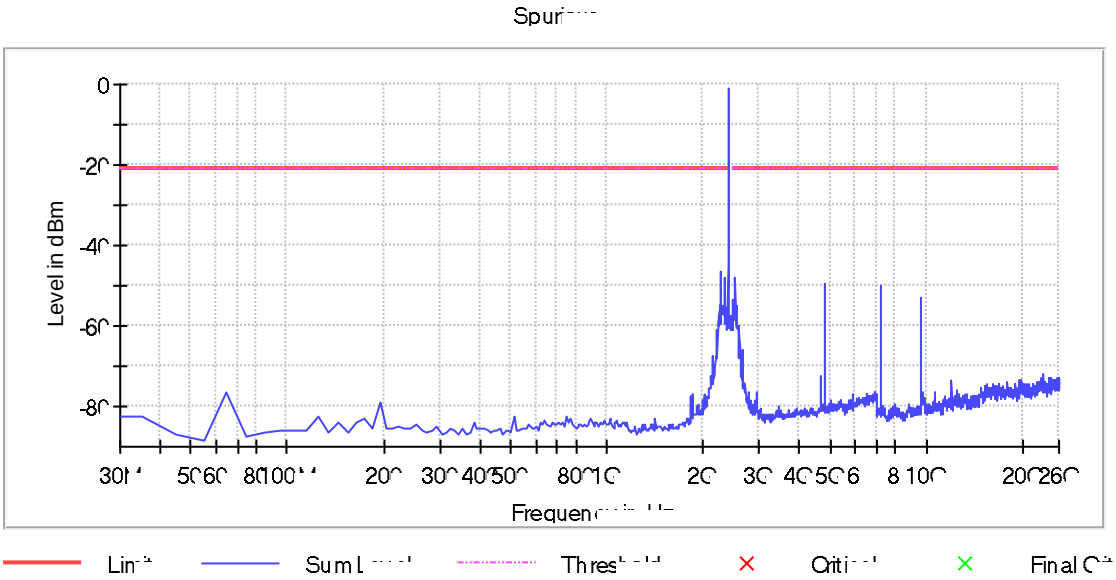
- **Data rate 500 kbps, Highest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2355.189076	-47.6	25.6	-21.9	Pass
2608.428283	-48.8	26.9	-21.9	Pass
2548.462707	-49.8	27.9	-21.9	Pass
2488.497131	-51.0	29.1	-21.9	Pass
7445.651402	-52.4	30.5	-21.9	Pass
7435.657140	-52.6	30.6	-21.9	Pass
2375.105042	-54.5	32.6	-21.9	Pass
9924.228538	-54.6	32.6	-21.9	Pass
4957.080004	-54.9	33.0	-21.9	Pass
2395.021008	-55.3	33.4	-21.9	Pass
2628.416808	-55.7	33.8	-21.9	Pass
2335.273109	-56.3	34.4	-21.9	Pass
2365.147059	-56.5	34.6	-21.9	Pass
2588.439758	-56.7	34.7	-21.9	Pass
9914.234275	-56.8	34.9	-21.9	Pass

Prüfdokumentation
Test documentation

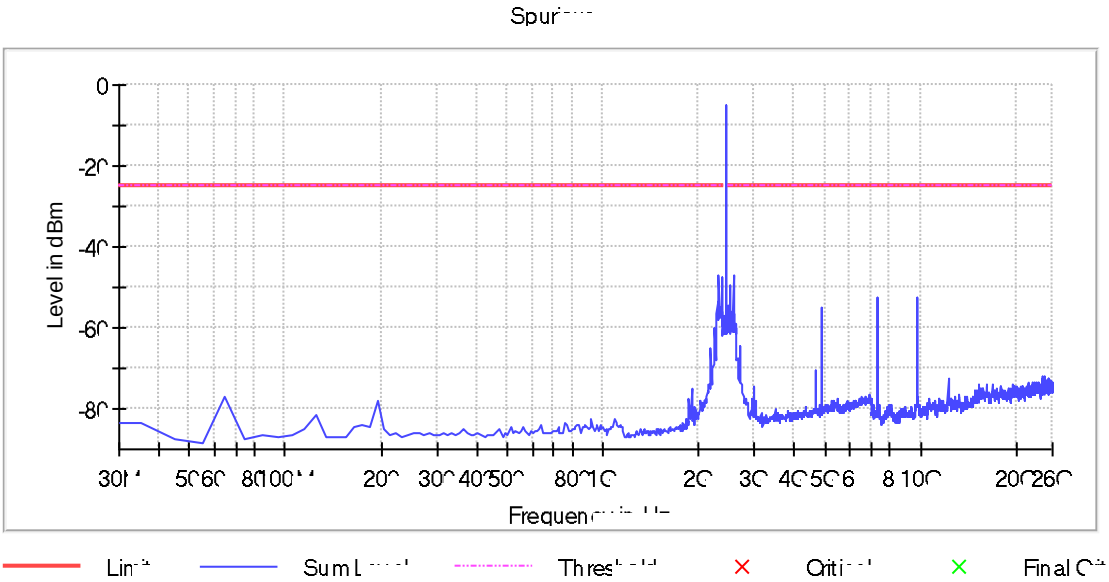
- **Data rate 125 kbps, Lowest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2395.021008	-44.8	23.8	-21.0	Pass
2275.525210	-46.6	25.7	-21.0	Pass
2528.474182	-47.9	26.9	-21.0	Pass
2335.273109	-47.9	27.0	-21.0	Pass
4807.166065	-49.3	28.3	-21.0	Pass
7205.789099	-50.1	29.1	-21.0	Pass
9604.412133	-52.8	31.8	-21.0	Pass
2255.609244	-54.6	33.6	-21.0	Pass
2315.357143	-55.2	34.2	-21.0	Pass
2548.462707	-55.2	34.2	-21.0	Pass
2295.441176	-55.2	34.3	-21.0	Pass
2365.147059	-55.4	34.4	-21.0	Pass
2285.483193	-55.7	34.7	-21.0	Pass
2355.189076	-55.9	34.9	-21.0	Pass
2508.485657	-56.1	35.2	-21.0	Pass

Prüfdokumentation
Test documentation

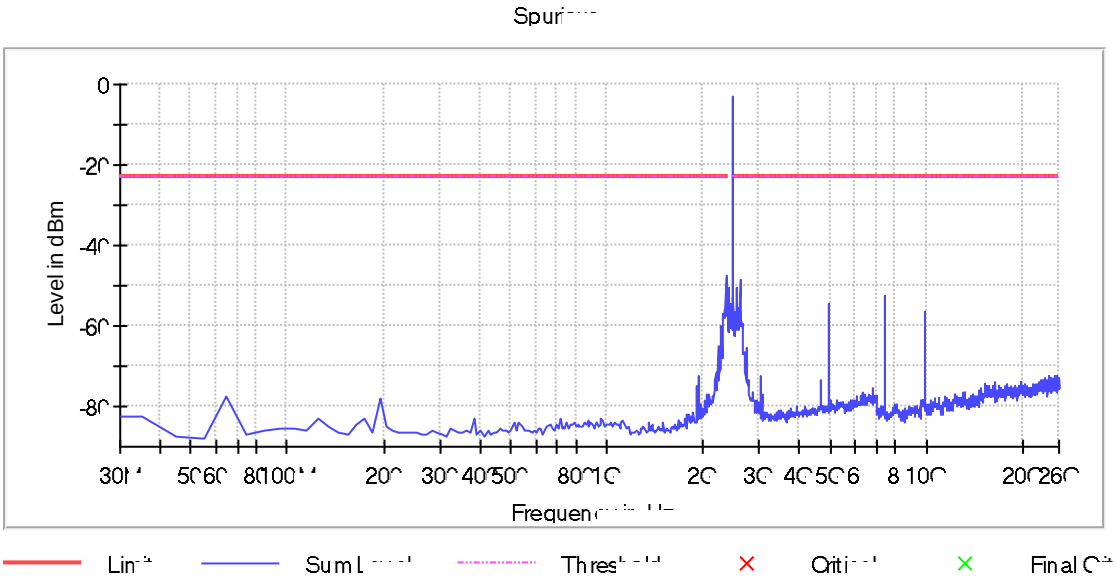
- **Data rate 125 kbps, Middle Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2315.357143	-47.0	22.3	-24.8	Pass
2568.451232	-47.0	22.3	-24.8	Pass
2375.105042	-47.6	22.8	-24.8	Pass
2508.485657	-49.6	24.9	-24.8	Pass
9754.326073	-52.5	27.7	-24.8	Pass
7315.725988	-52.7	27.9	-24.8	Pass
7325.720251	-53.2	28.4	-24.8	Pass
2295.441176	-53.6	28.9	-24.8	Pass
9764.320336	-54.1	29.4	-24.8	Pass
4877.125903	-54.8	30.1	-24.8	Pass
2335.273109	-55.2	30.4	-24.8	Pass
2355.189076	-55.9	31.1	-24.8	Pass
2548.462707	-56.1	31.4	-24.8	Pass
2275.525210	-56.5	31.7	-24.8	Pass
2588.439758	-56.5	31.8	-24.8	Pass

Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Highest Channel**



Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2355.189076	-47.4	24.5	-22.9	Pass
2608.428283	-48.4	25.4	-22.9	Pass
2548.462707	-50.6	27.7	-22.9	Pass
7435.657140	-52.6	29.7	-22.9	Pass
2488.497131	-52.9	30.0	-22.9	Pass
2375.105042	-54.3	31.4	-22.9	Pass
4957.080004	-54.4	31.4	-22.9	Pass
2588.439758	-55.7	32.7	-22.9	Pass
2395.021008	-55.9	33.0	-22.9	Pass
2335.273109	-56.1	33.2	-22.9	Pass
2365.147059	-56.1	33.2	-22.9	Pass
2628.416808	-56.3	33.3	-22.9	Pass
9924.228538	-56.4	33.5	-22.9	Pass
2508.485657	-56.5	33.5	-22.9	Pass
7445.651402	-56.7	33.7	-22.9	Pass

Final test result	Pass

4.5 Band Edge Measurement

4.5.1 Requirements / Limits

FCC Part 15, Subpart C, §15.247 (d)

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, provide the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this test shall be 30 dB instead of 20 dB.

4.5.2 Test Method

Conducted method was used to perform the band edge measurements according to ANSI C63.10:2013 clause 11.13.3.2 Peak detection. The EUT was connected to the spectrum analyzer via a coax cable with a known loss. The measurements are done when DUT is configured to the lowest and highest channels.

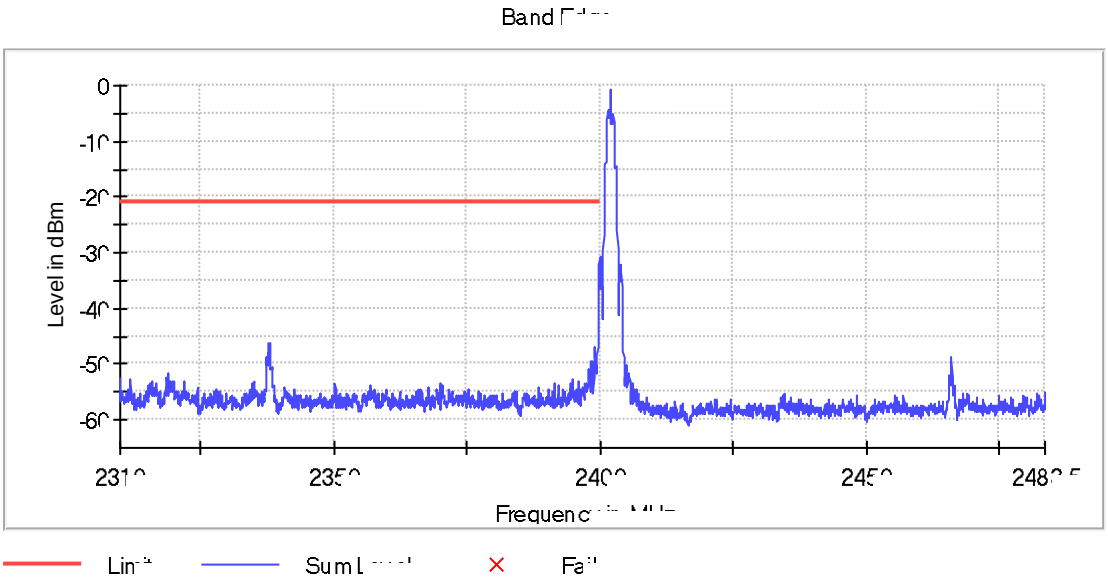
4.5.3 Test Setup

EUT		IONIQ-Skincare Body Spray - A002980367-003 (Conducted)
Test Condition		Normal conditions
Chamber details		☐ 3m Fully Anechoic Chamber (FAC) ☐ 10m Semi Anechoic Chamber (SAC) ☒ Shielded room
Measurement positioning		Distance: / EUT height: / Antenna height: ☐ 3m / ☐ 1.5m / ☐ 1.5m ☐ 10m / ☐ 0.8m / ☐ 1m to 4m – height scan
		☒ N/A
Companion device		-
Operation mode		Mode 1: TX Modulated 2 Mbps with continuous transmission Mode 2: TX Modulated 1 Mbps with continuous transmission Mode 3: TX Modulated 500 kbps with continuous transmission Mode 4: TX Modulated 125 kbps with continuous transmission
Spectrum Analyzer	**Resolution Bandwidth**	100 kHz
	Video Bandwidth	300 kHz
Further parameters		-
Test engineer		M. Sc. Alaa Bustati

Prüfdokumentation
Test documentation

4.5.4 Test results

- **Data rate 2 Mbps, Lowest Channel**



Inband Peak

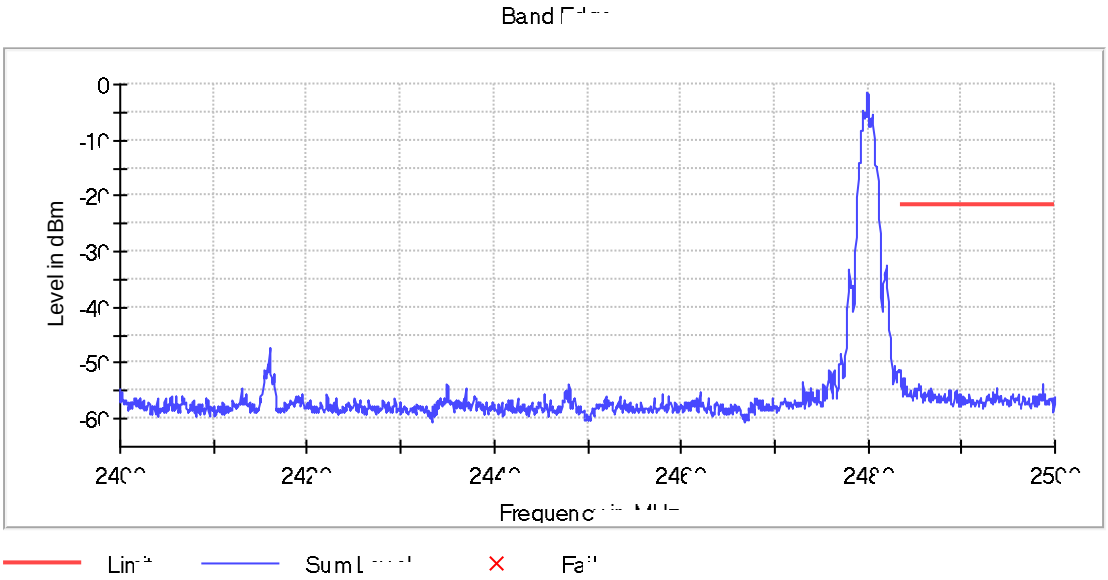
Frequency [MHz]	Level [dBm]
2401.975000	-0.8

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2399.975000	-30.8	10.0	-20.8	Pass
2399.925000	-32.0	11.1	-20.8	Pass
2399.875000	-35.1	14.2	-20.8	Pass
2399.825000	-38.3	17.4	-20.8	Pass
2399.775000	-38.6	17.8	-20.8	Pass
2399.725000	-40.3	19.5	-20.8	Pass
2399.675000	-43.2	22.3	-20.8	Pass
2399.625000	-44.4	23.5	-20.8	Pass
2337.975000	-46.1	25.3	-20.8	Pass
2338.025000	-46.2	25.4	-20.8	Pass
2399.075000	-46.8	26.0	-20.8	Pass
2399.575000	-46.8	26.0	-20.8	Pass
2399.125000	-47.0	26.2	-20.8	Pass
2399.025000	-47.3	26.4	-20.8	Pass
2337.775000	-48.2	27.3	-20.8	Pass

Prüfdokumentation
Test documentation

- **Data rate 2 Mbps, Highest Channel**



Inband Peak

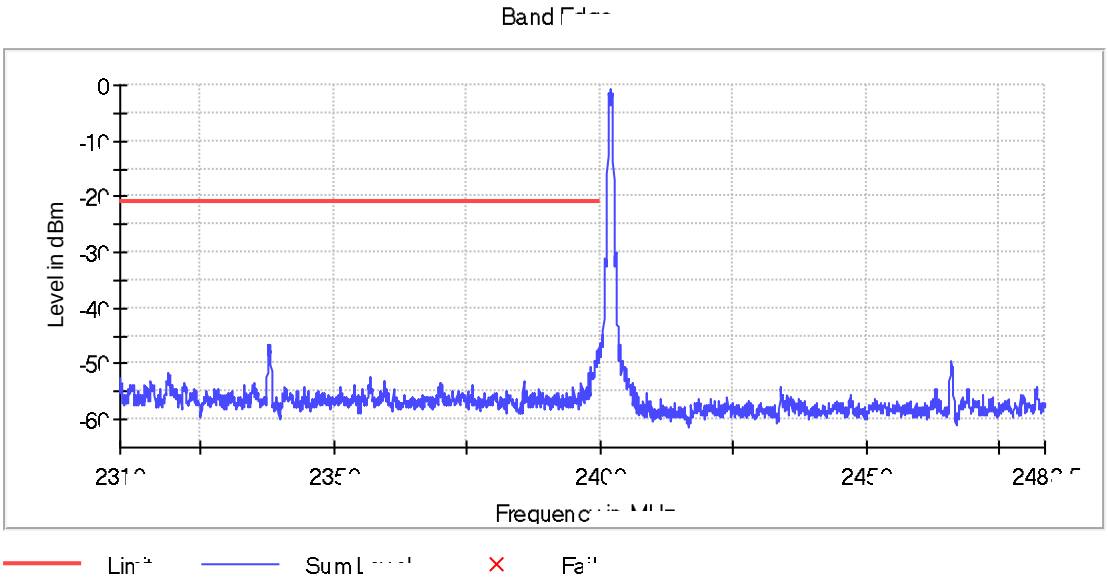
Frequency [MHz]	Level [dBm]
2479.975000	**-1.5**

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2483.825000	-52.5	31.1	-21.5	Pass
2483.875000	-52.8	31.3	-21.5	Pass
2483.775000	-53.4	31.9	-21.5	Pass
2485.475000	-54.0	32.5	-21.5	Pass
2498.725000	-54.0	32.5	-21.5	Pass
2498.675000	-54.0	32.5	-21.5	Pass
2484.125000	-54.1	32.6	-21.5	Pass
2484.075000	-54.2	32.7	-21.5	Pass
2483.575000	-54.2	32.7	-21.5	Pass
2483.525000	-54.3	32.8	-21.5	Pass
2485.625000	-54.3	32.8	-21.5	Pass
2485.425000	-54.3	32.8	-21.5	Pass
2493.825000	-54.4	32.9	-21.5	Pass
2493.775000	-54.5	33.0	-21.5	Pass
2485.525000	-54.6	33.1	-21.5	Pass

Prüfdokumentation
Test documentation

- **Data rate 1 Mbps, Lowest Channel**



Inband Peak

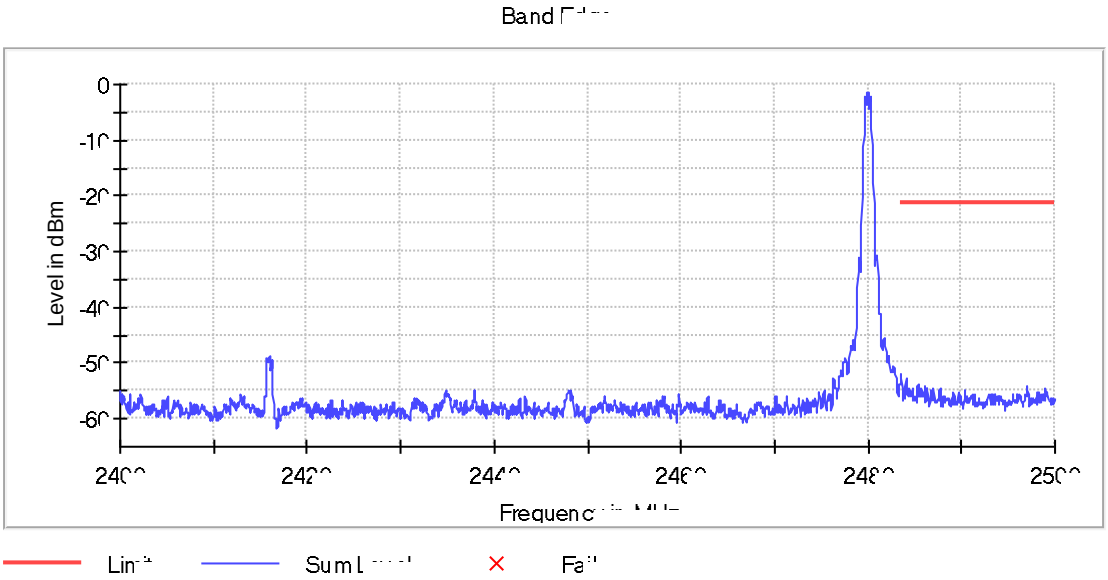
Frequency [MHz]	Level [dBm]
2401.975000	-0.8

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2399.975000	-46.1	25.3	-20.8	Pass
2337.725000	-46.4	25.6	-20.8	Pass
2337.775000	-46.5	25.7	-20.8	Pass
2337.975000	-46.6	25.8	-20.8	Pass
2338.025000	-46.7	25.9	-20.8	Pass
2399.675000	-47.2	26.4	-20.8	Pass
2399.725000	-47.2	26.4	-20.8	Pass
2399.625000	-47.5	26.7	-20.8	Pass
2338.225000	-47.6	26.8	-20.8	Pass
2338.075000	-47.6	26.8	-20.8	Pass
2399.575000	-47.6	26.8	-20.8	Pass
2338.125000	-47.7	26.9	-20.8	Pass
2399.525000	-47.7	26.9	-20.8	Pass
2399.775000	-47.8	27.0	-20.8	Pass
2338.275000	-47.8	27.0	-20.8	Pass

Prüfdokumentation
Test documentation

- **Data rate 1 Mbps, Highest Channel**



Inband Peak

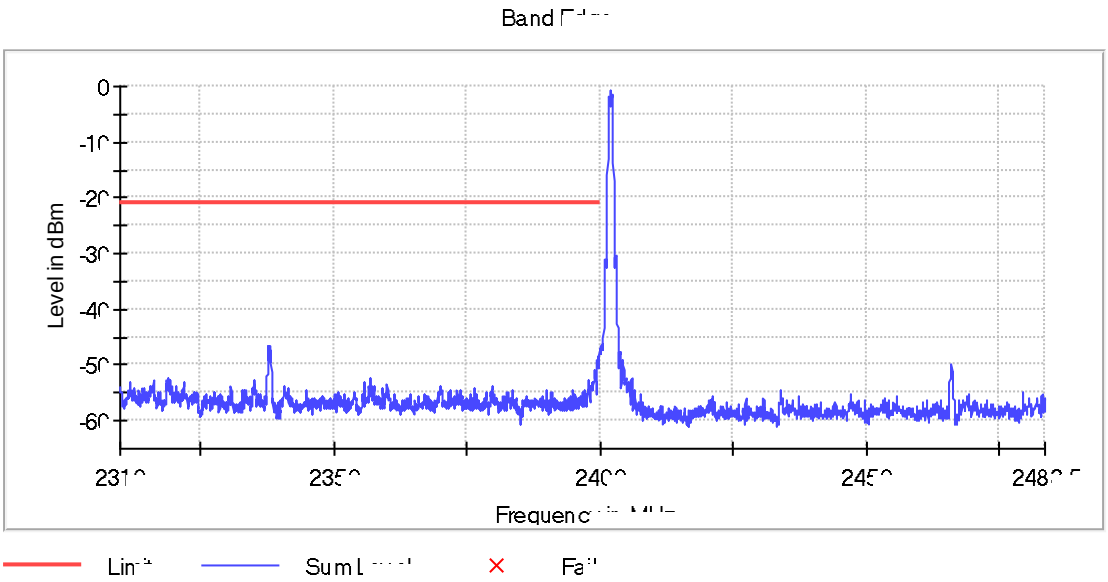
Frequency [MHz]	Level [dBm]
2479.975000	-1.5

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2483.525000	-52.0	30.5	-21.5	Pass
2483.575000	-52.8	31.3	-21.5	Pass
2484.075000	-52.9	31.4	-21.5	Pass
2484.125000	-53.1	31.6	-21.5	Pass
2485.375000	-53.8	32.3	-21.5	Pass
2485.425000	-54.0	32.5	-21.5	Pass
2484.025000	-54.1	32.7	-21.5	Pass
2486.075000	-54.1	32.7	-21.5	Pass
2497.025000	-54.2	32.8	-21.5	Pass
2485.325000	-54.3	32.8	-21.5	Pass
2486.125000	-54.3	32.8	-21.5	Pass
2486.975000	-54.4	32.9	-21.5	Pass
2483.625000	-54.4	33.0	-21.5	Pass
2487.025000	-54.4	33.0	-21.5	Pass
2485.725000	-54.5	33.0	-21.5	Pass

Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Lowest Channel**



Inband Peak

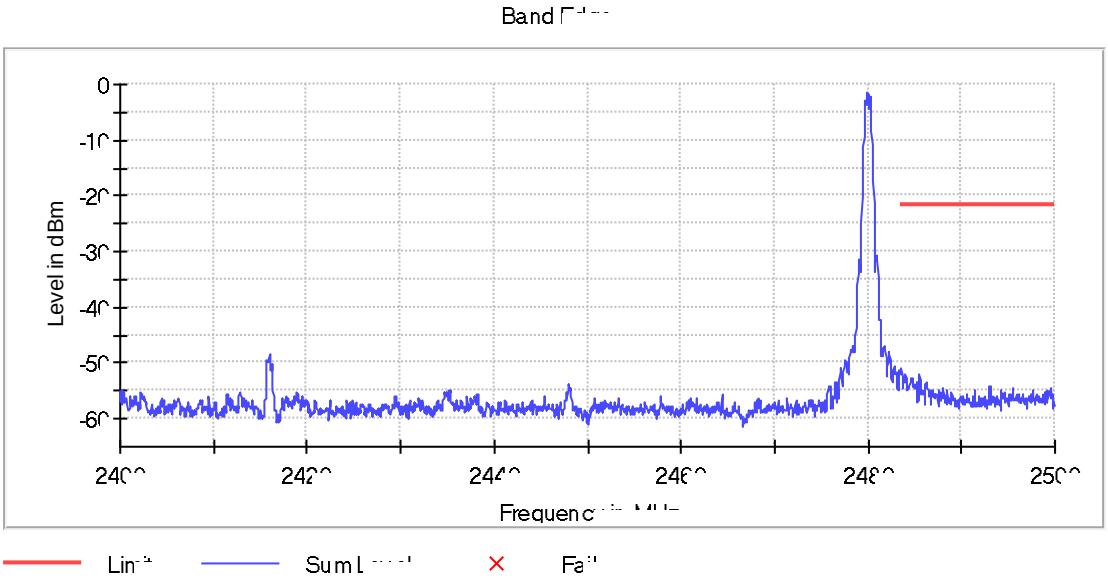
Frequency [MHz]	Level [dBm]
2401.975000	-0.8

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2337.975000	-46.5	25.6	-20.8	Pass
2338.025000	-46.6	25.7	-20.8	Pass
2337.725000	-46.7	25.9	-20.8	Pass
2399.975000	-46.9	26.0	-20.8	Pass
2337.925000	-47.1	26.3	-20.8	Pass
2337.775000	-47.3	26.5	-20.8	Pass
2338.225000	-47.4	26.5	-20.8	Pass
2338.275000	-47.5	26.6	-20.8	Pass
2337.675000	-47.5	26.7	-20.8	Pass
2399.675000	-48.2	27.4	-20.8	Pass
2399.725000	-48.2	27.4	-20.8	Pass
2337.875000	-48.3	27.4	-20.8	Pass
2399.925000	-48.3	27.5	-20.8	Pass
2338.075000	-48.5	27.6	-20.8	Pass
2338.175000	-48.7	27.8	-20.8	Pass

Prüfdokumentation
Test documentation

- **Data rate 500 kbps, Highest Channel**



Inband Peak

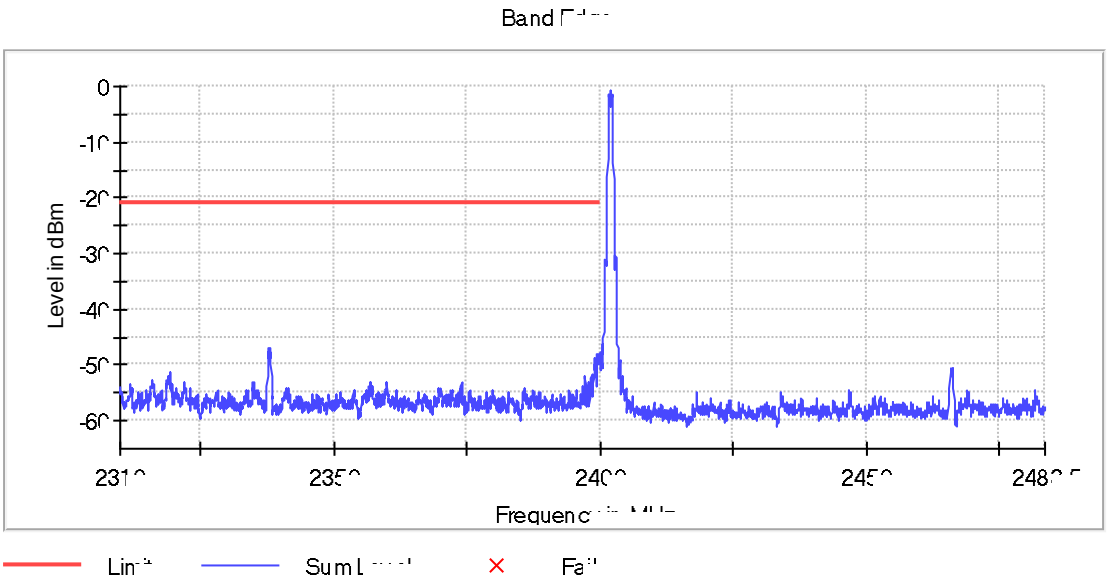
Frequency [MHz]	Level [dBm]
2479.975000	-1.5

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2483.525000	-50.8	29.3	-21.5	Pass
2483.575000	-50.9	29.4	-21.5	Pass
2484.025000	-52.1	30.6	-21.5	Pass
2485.525000	-52.1	30.6	-21.5	Pass
2485.475000	-52.2	30.6	-21.5	Pass
2483.975000	-52.2	30.7	-21.5	Pass
2483.625000	-52.3	30.8	-21.5	Pass
2484.675000	-52.7	31.1	-21.5	Pass
2484.075000	-52.8	31.2	-21.5	Pass
2484.125000	-52.9	31.4	-21.5	Pass
2484.725000	-52.9	31.4	-21.5	Pass
2484.625000	-52.9	31.4	-21.5	Pass
2484.575000	-52.9	31.4	-21.5	Pass
2483.875000	-53.0	31.5	-21.5	Pass
2483.675000	-53.0	31.5	-21.5	Pass

Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Lowest Channel**



Inband Peak

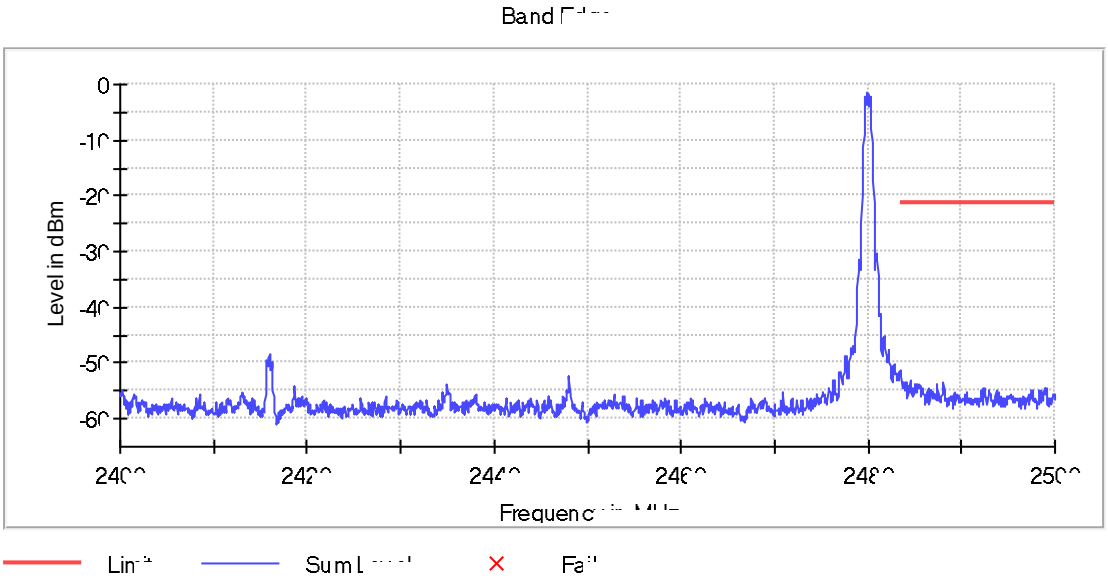
Frequency [MHz]	Level [dBm]
2401.975000	-0.8

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2337.975000	-46.8	26.0	-20.8	Pass
2338.025000	-46.9	26.1	-20.8	Pass
2337.925000	-47.4	26.6	-20.8	Pass
2338.225000	-47.6	26.9	-20.8	Pass
2338.275000	-47.7	26.9	-20.8	Pass
2399.975000	-47.7	26.9	-20.8	Pass
2337.725000	-47.7	26.9	-20.8	Pass
2337.775000	-47.9	27.1	-20.8	Pass
2338.075000	-47.9	27.1	-20.8	Pass
2399.525000	-47.9	27.1	-20.8	Pass
2399.575000	-47.9	27.1	-20.8	Pass
2338.175000	-48.0	27.2	-20.8	Pass
2399.725000	-48.0	27.2	-20.8	Pass
2399.675000	-48.1	27.3	-20.8	Pass
2399.625000	-48.2	27.4	-20.8	Pass

Prüfdokumentation
Test documentation

- **Data rate 125 kbps, Highest Channel**



Inband Peak

Frequency [MHz]	Level [dBm]
2479.975000	-1.5

Measurements

Frequency [MHz]	Level [dBm]	Margin [dB]	Limit [dBm]	Result
2483.525000	-51.4	29.9	-21.5	Pass
2483.575000	-52.3	30.8	-21.5	Pass
2484.525000	-52.9	31.5	-21.5	Pass
2484.575000	-53.1	31.7	-21.5	Pass
2484.025000	-53.5	32.1	-21.5	Pass
2484.075000	-53.6	32.1	-21.5	Pass
2483.725000	-53.6	32.1	-21.5	Pass
2488.075000	-53.6	32.2	-21.5	Pass
2485.525000	-53.6	32.2	-21.5	Pass
2487.375000	-53.7	32.2	-21.5	Pass
2485.175000	-53.7	32.2	-21.5	Pass
2488.025000	-53.7	32.3	-21.5	Pass
2483.675000	-53.8	32.3	-21.5	Pass
2485.225000	-53.8	32.4	-21.5	Pass
2484.125000	-53.9	32.4	-21.5	Pass

Final test result	Pass

4.6 Radiated Spurious Emissions

4.6.1 Requirements / Limits

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode. The emissions shall not exceed the values in FCC Part 15, Subpart C §15.205, §15.209, §15.247(d).

FCC Part 15, Subpart C, §15.247 (d)
... In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency [MHz]	Limit [µV/m]	Measurement distance [m]	Limits [dBµV/m]
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m

The measured values are corrected with an inverse linear distance extrapolation factor (40 dB/decade) according FCC 15.31 (f)(2).

Frequency [MHz]	Limit [µV/m]	Measurement distance [m]	Limits [dBµV/m]
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
960 - 40000	500@3m	3	54.0@3m

§15.35(b) ..., 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....

Used conversion factor:

$$\text{Limit}\,[\text{dB}\mu\text{V/m}] \;=\; 20\log\left(\text{Limit}\,[\mu\text{V/m}] \,/\, 1\mu\text{V/m}\right)$$

4.6.2 Test Method

4.6.2.1 Perliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. Preliminary emission profile testing was performed inside the anechoic chamber. The receiving antenna was placed at a distance of 3m for all measurements. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT. The different measurement setup for each frequency range are shown below.

9 kHz - 30 MHz

Following Measurement Setup is used:

Test Site	Semi-anechoic chamber
Receiving Antenna	Loop antenna (HFH 2)
Receiving Antenna Height	1 m
Receiving Antenna Polarisation	Parallel – Perpendicular
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	22.5°
Receiver Configurations	Average and peak detectors
	RBW: 200Hz (9 - 150 kHz) and 9 kHz (150 kHz – 30 MHz)
	Step Size: 50Hz (9-150kHz) and 2.25kHz (150k-30MHz)
	Sweep Time: 100ms (FFT)

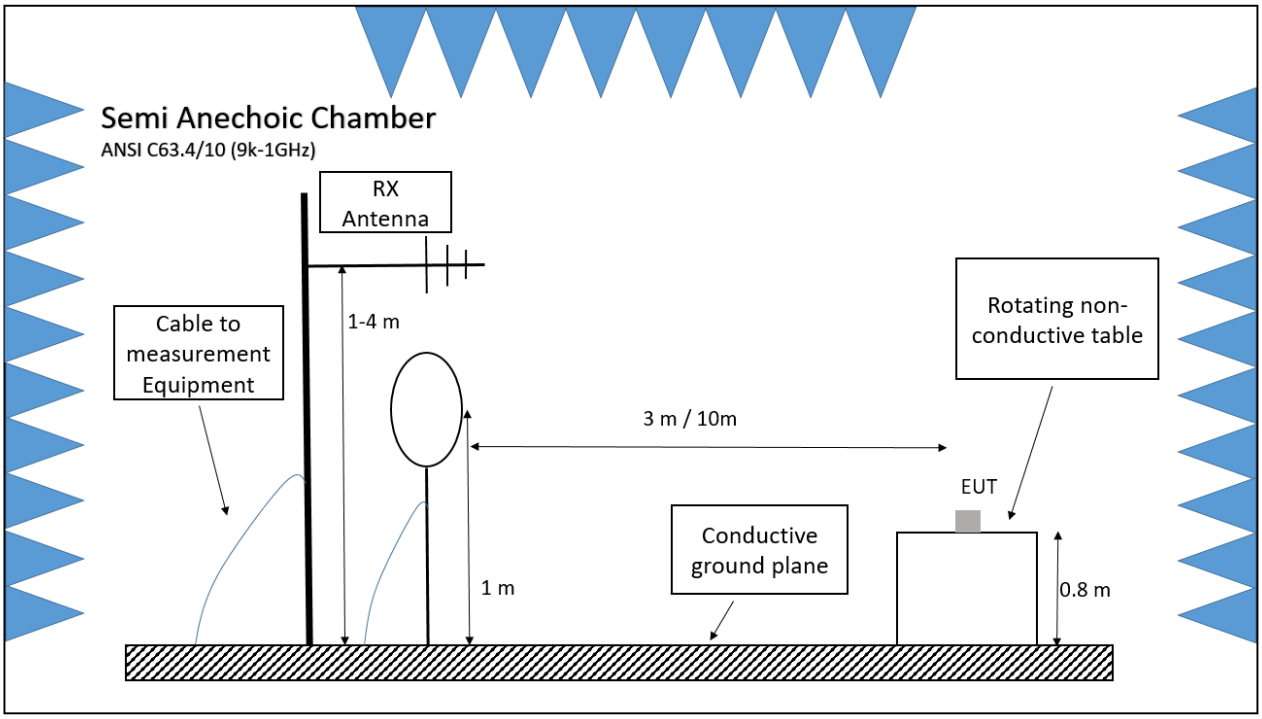
30 MHz - 1 GHz

Following Measurement Setup is used:

Test Site	Semi-anechoic chamber
Receiving Antenna	Hybrid Antenna VULB 9168
Receiving Antenna height	Varied (1m to 4 m, step size 1m)
Receiving Antenna Polarisation	Horizontal– Vertical
EUT Table	1.0m x 1.5m non-conductive table 80cm above the floor
EUT Turn Table Step Size	45°
Receiver Configurations	Peak detector
	RBW :120 kHz
	Step Size: 30kHz (30-1000MHz)
	Sweep Time : 100 ms (FFT)

Prüfdokumentation
Test documentation

For Measurements below 1 GHz, the EUT was positioned as shown in the setup photograph:



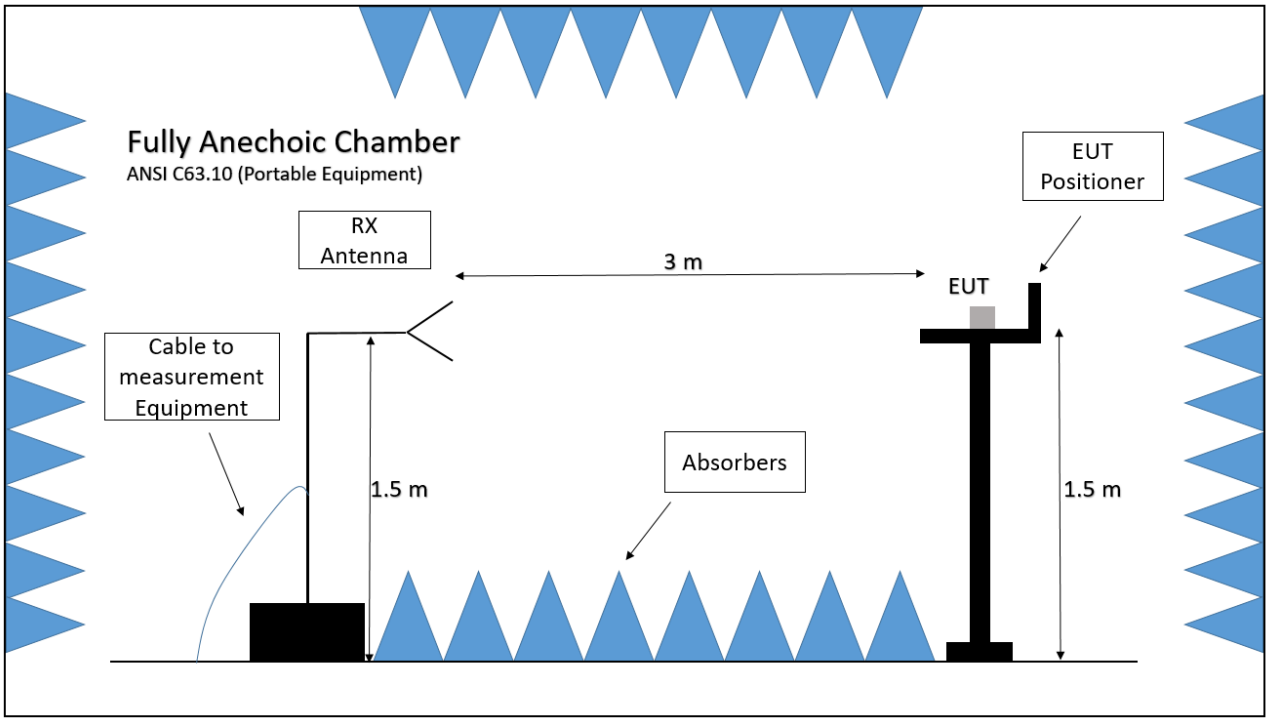
1 GHz - 25 GHz

Following Measurement Setup is used:

Test Site	Fully-anechoic chamber
Receiving Antenna	Horn Antenna HF907 (1-18 GHz), 3116C-PA (18-25 GHz)
Receiving Antenna Height	1.5 m
Receiving Antenna Polarisation	Horizontal– Vertical
EUT Positioner	40 cm x 60 cm non-conductive positioner 1.5 m above the floor / Step size,elevation angle 45°
EUT Turn Table Step Size	45°
Spectrum Analyser	Average and peak detectors
	RBW: 1 MHz
	Sweep Time : 100 ms

Prüfdokumentation
Test documentation

For Measurements over 1 GHz, the EUT was positioned as shown in the setup photograph:



4.6.2.2 Final Test

The placement of EUT and cables were the same as for preliminary testing. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked. For the measurements in the frequency range 30 MHz to 1 GHz for each measured frequency the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. For measurement above 1 GHz the turntable and positioner step sizes were set to a range of 22° and the antenna height is fixed.

For the measurements in the frequency ranges (90-110kHz, 490 kHz-1 GHz) quasi-peak detector is used, while average and peak detectors are used in other ranges.

Final testing was performed on an SVSWR compliant test site.

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

$$E_{final} = \text{RawRec} + \text{Corr.}$$

While

$$\text{Corr.} = \text{Trd. Corr.} + \text{Sig Path} + \text{Preamp}$$

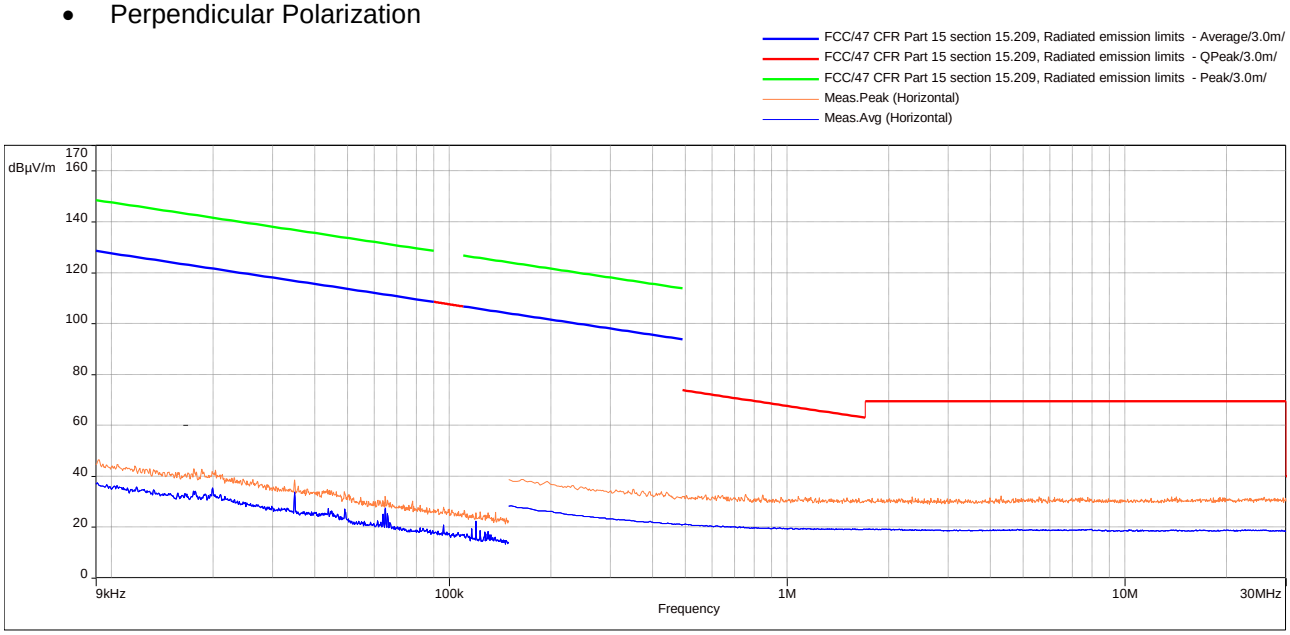
4.6.3 Test Setup

EUT	IONIQ-Skincare Body Spray - A002980367-002 (Radiated)
Test Condition	Normal conditions
Companion device	
Operation mode	Mode 1: TX Modulated 2 Mbps with continuous transmission
Further parameters	-
Test engineer	M. Sc. Alaa Bustati

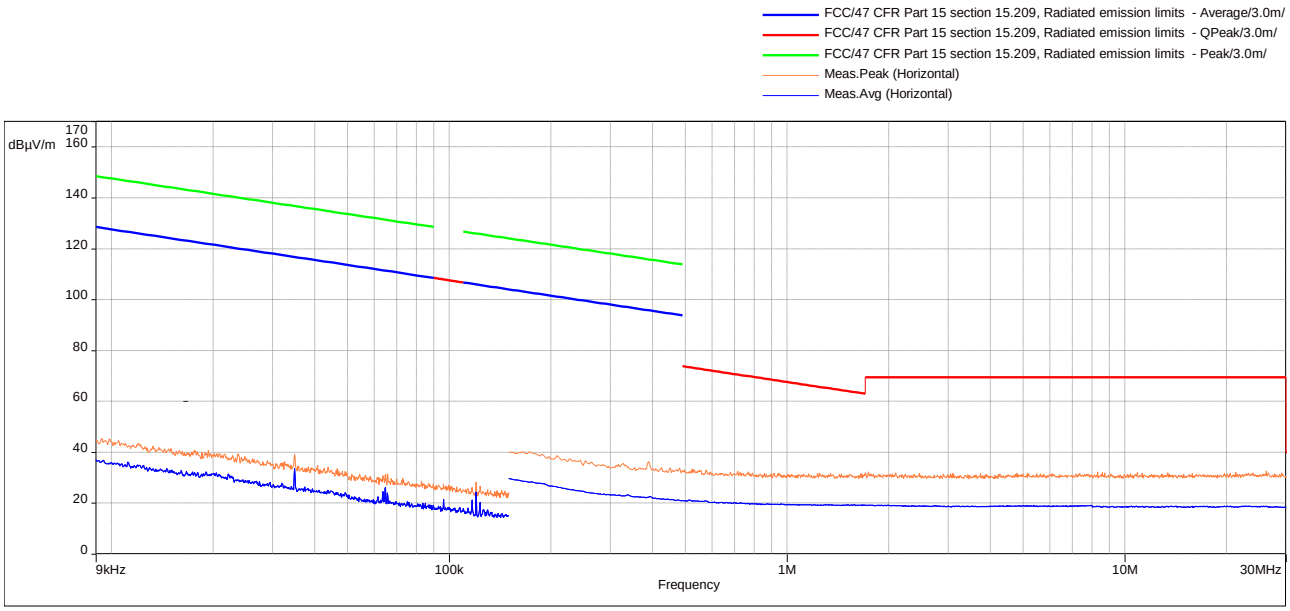
4.6.4 Test results

- **9kHz to 30 MHz, Lowest Channel**

  - Perpendicular Polarization



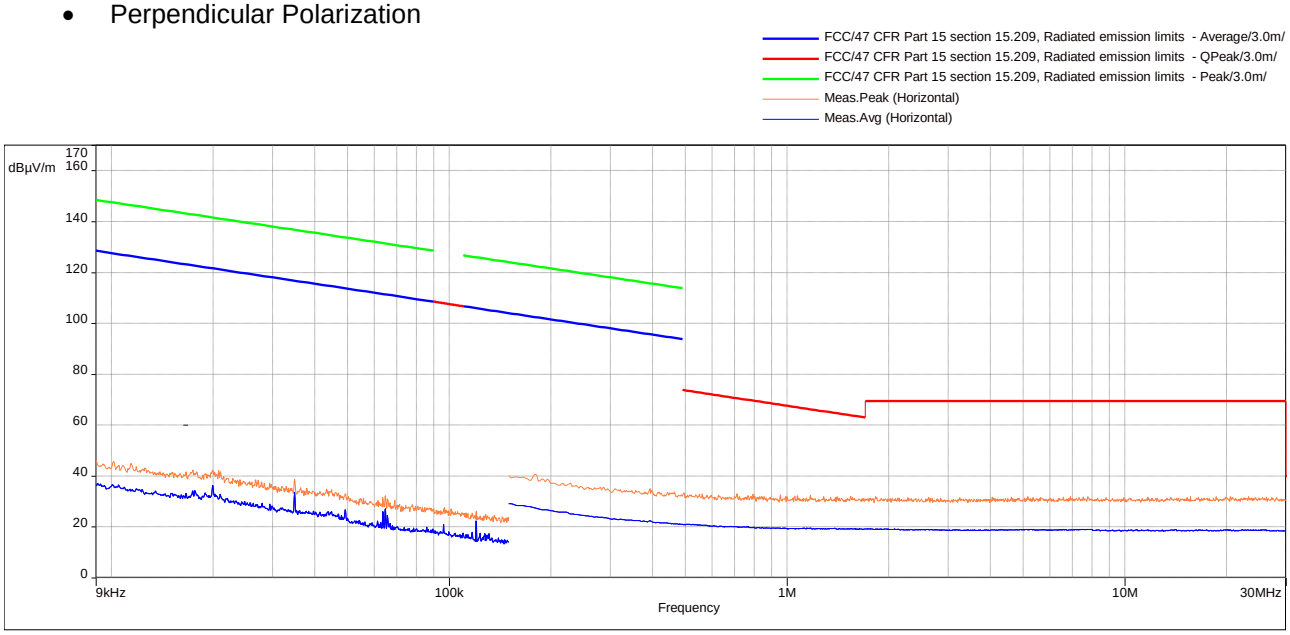
  - Parallel Polarization



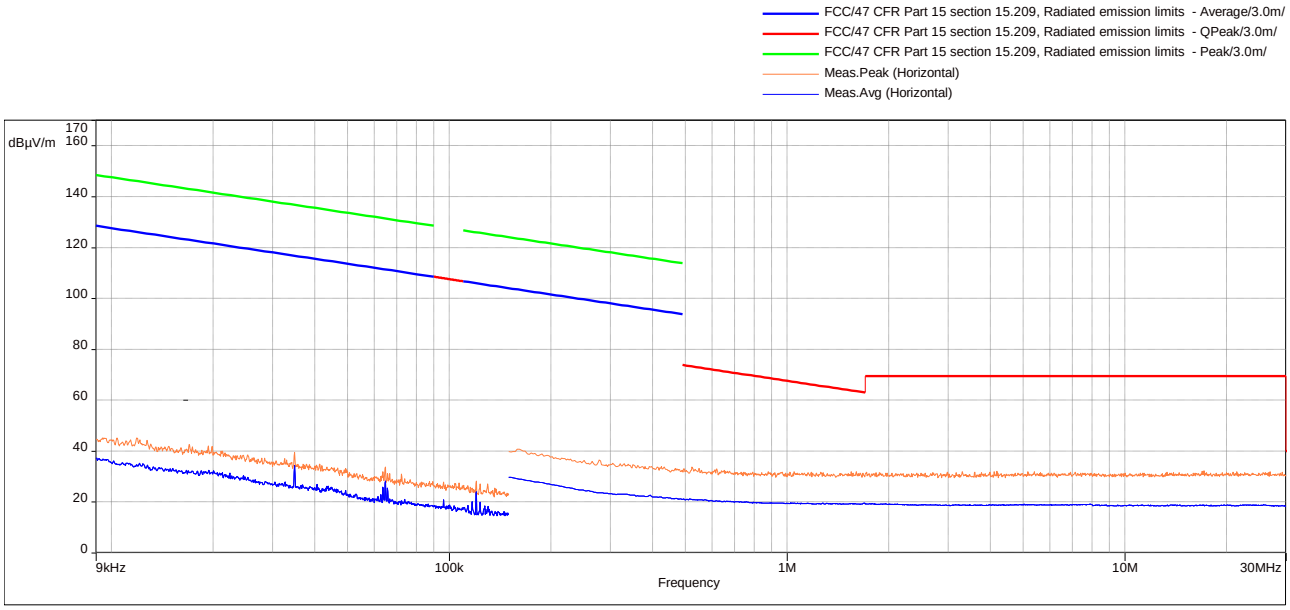
Prüfdokumentation
Test documentation

- **9kHz to 30 MHz, Middle Channel**

  - Perpendicular Polarization



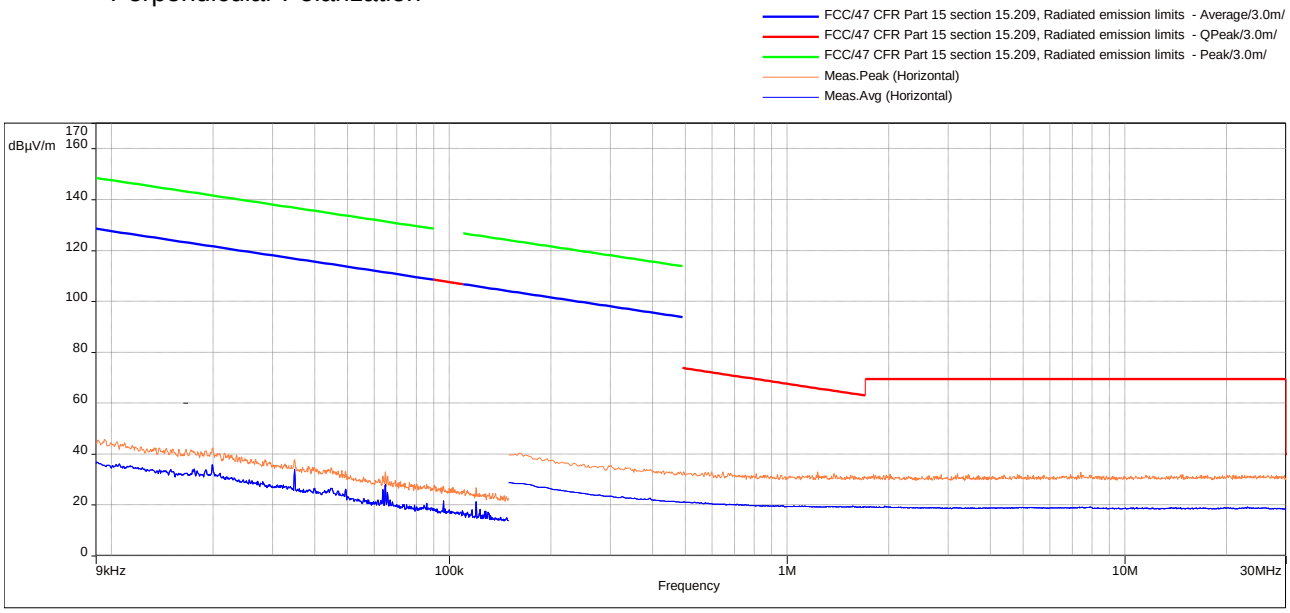
  - Parallel Polarization



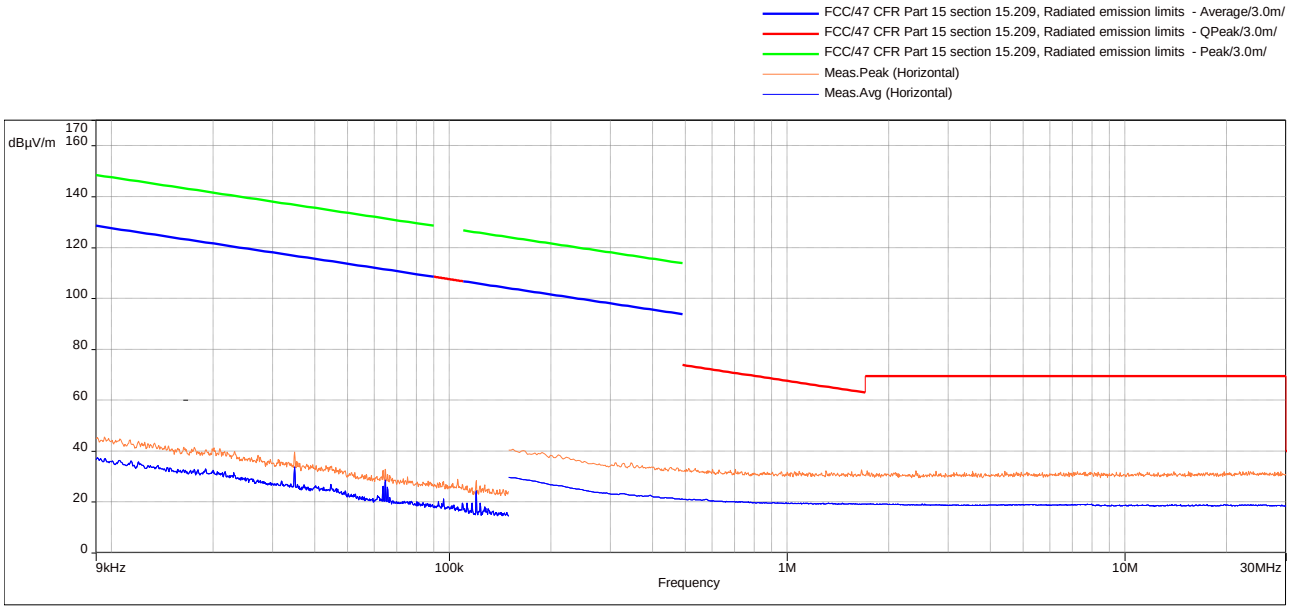
Prüfdokumentation
Test documentation

- **9kHz to 30 MHz, Highest Channel**

  - Perpendicular Polarization



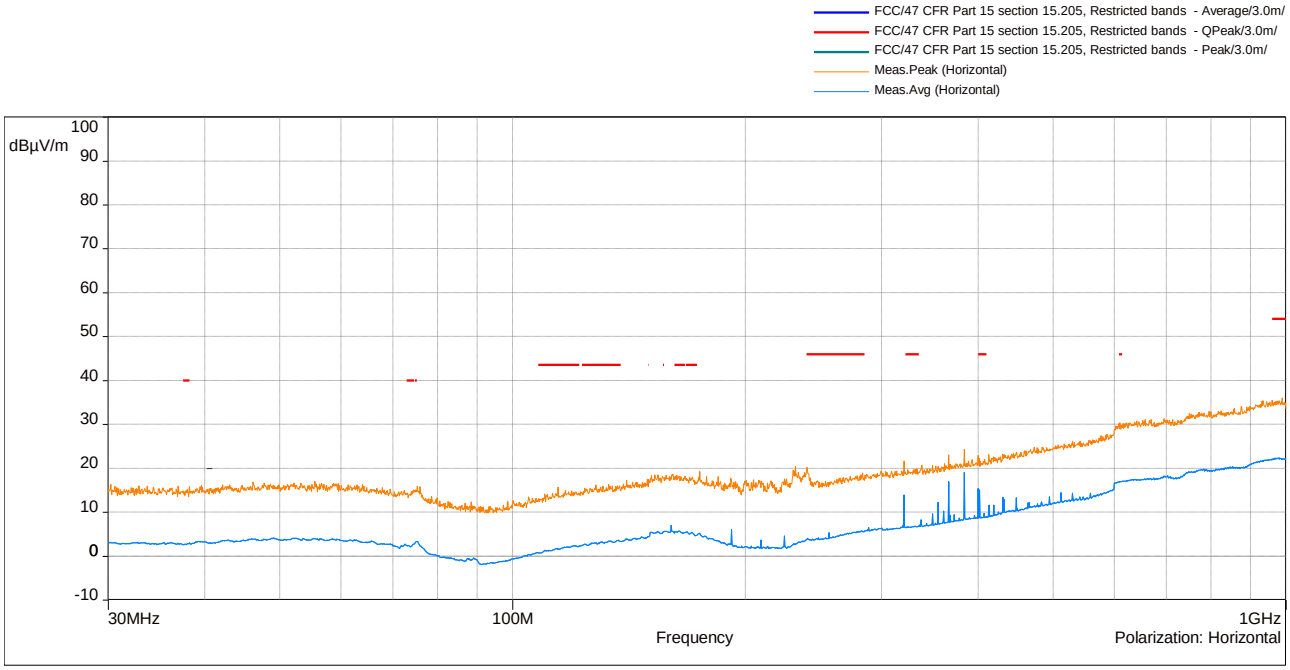
  - Parallel Polarization



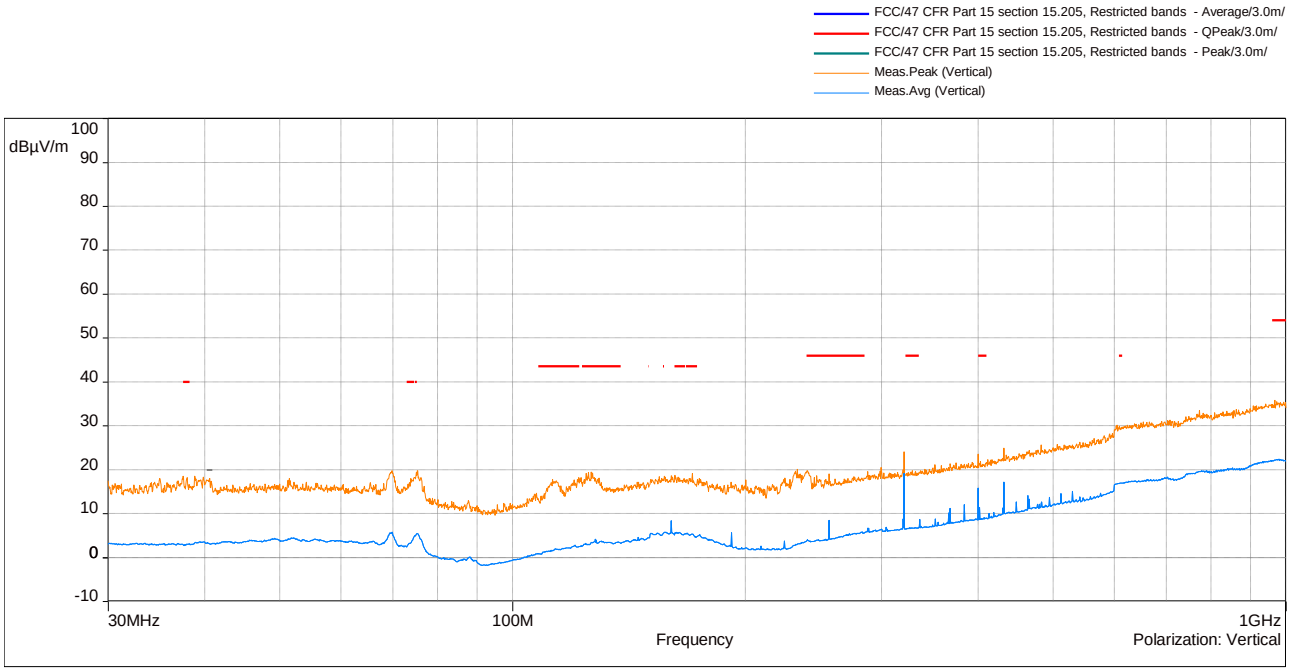
Prüfdokumentation
Test documentation

- **30 MHz – 1 GHz, Lowest Channel**

  - Horizontal Polarization



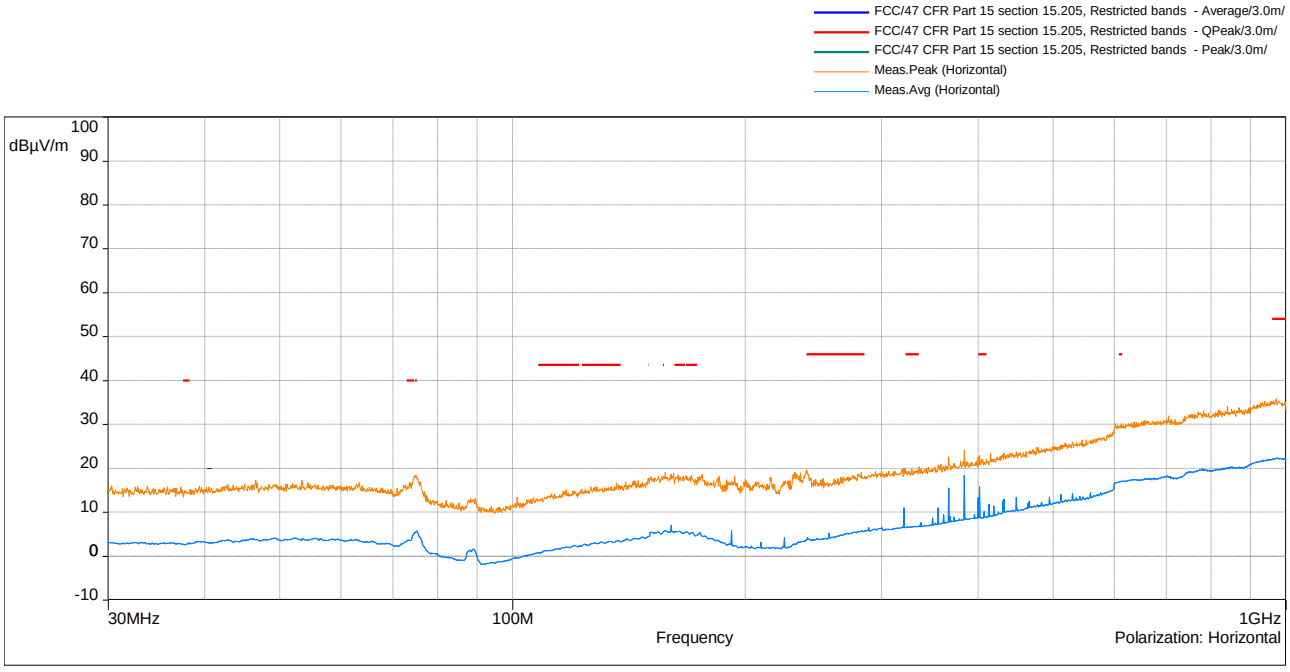
  - Vertical Polarization



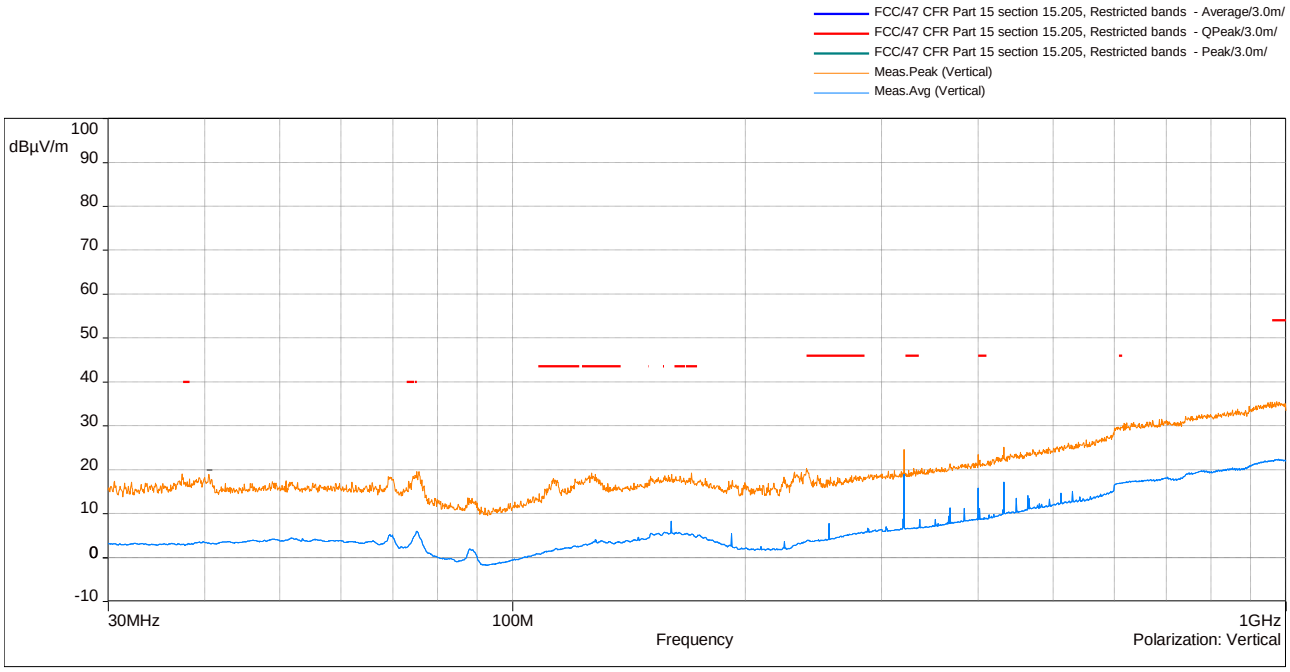
Prüfdokumentation
Test documentation

- **30 MHz – 1 GHz, Middle Channel**

  - Horizontal Polarization



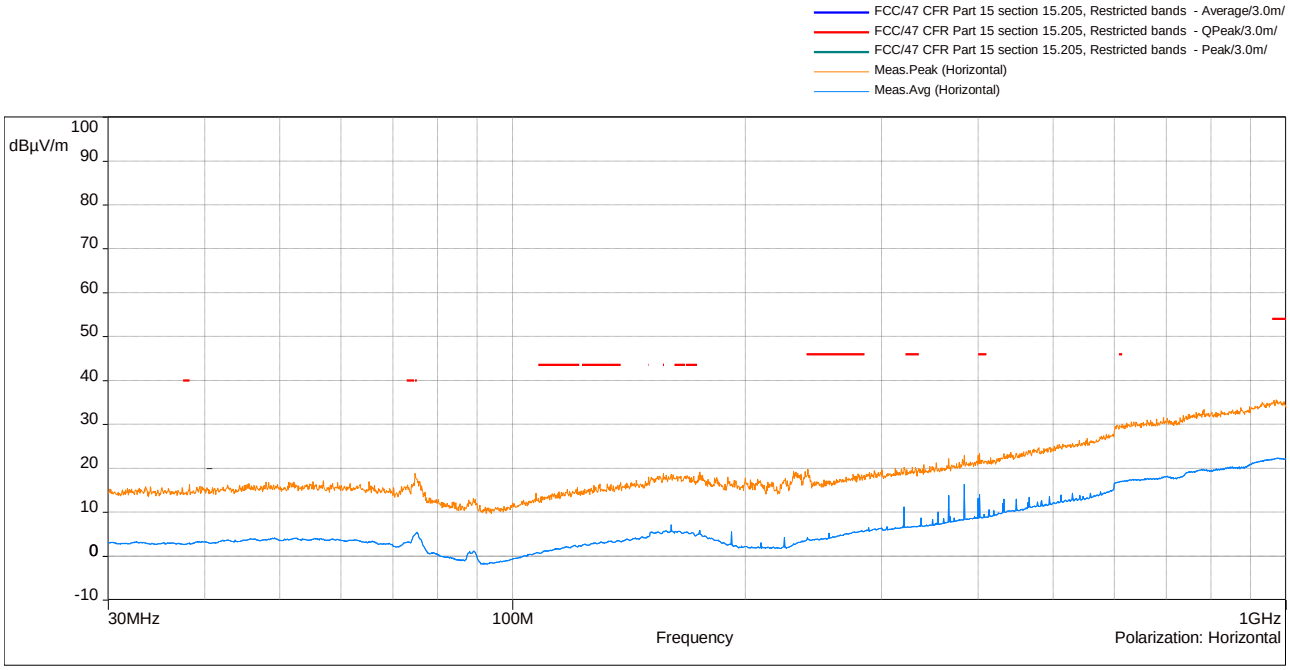
  - Vertical Polarization



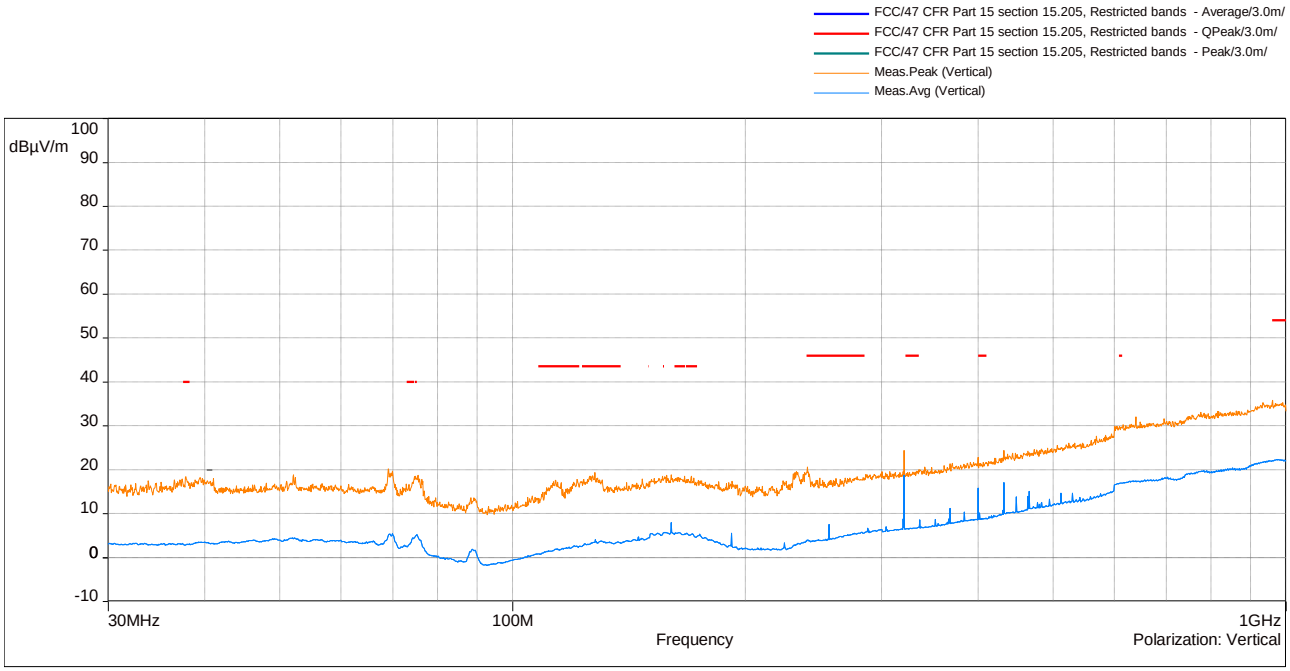
Prüfdokumentation
Test documentation

- **30 MHz – 1 GHz, Highest Channel**

  - Horizontal Polarization

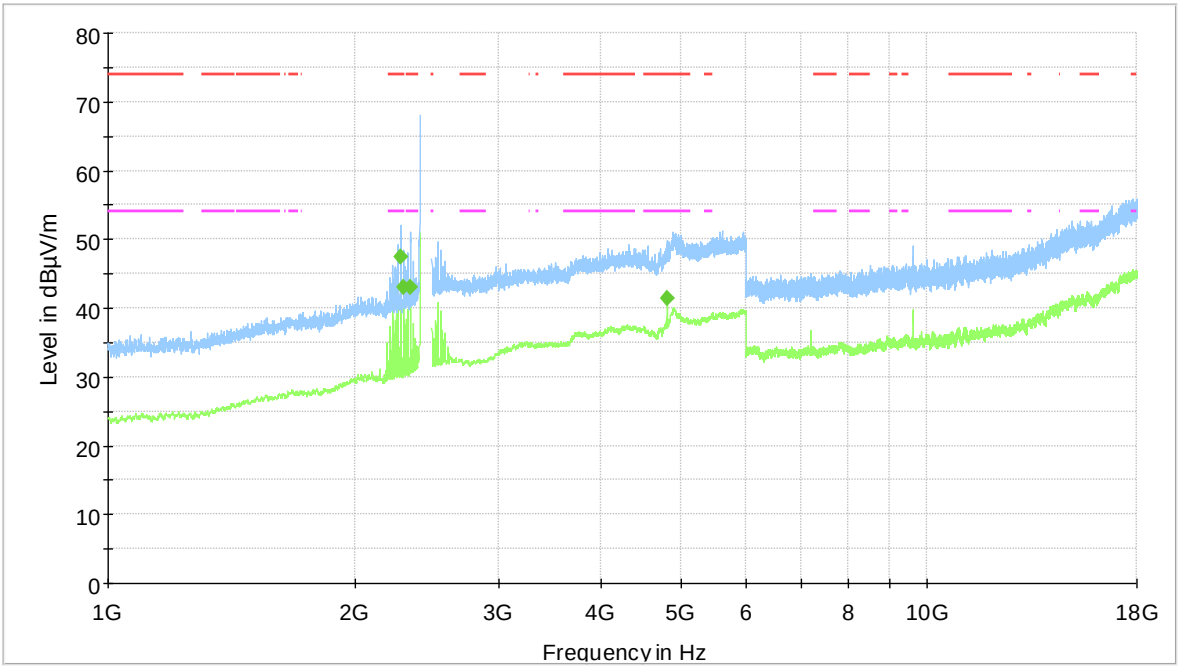


  - Vertical Polarization



Prüfdokumentation
Test documentation

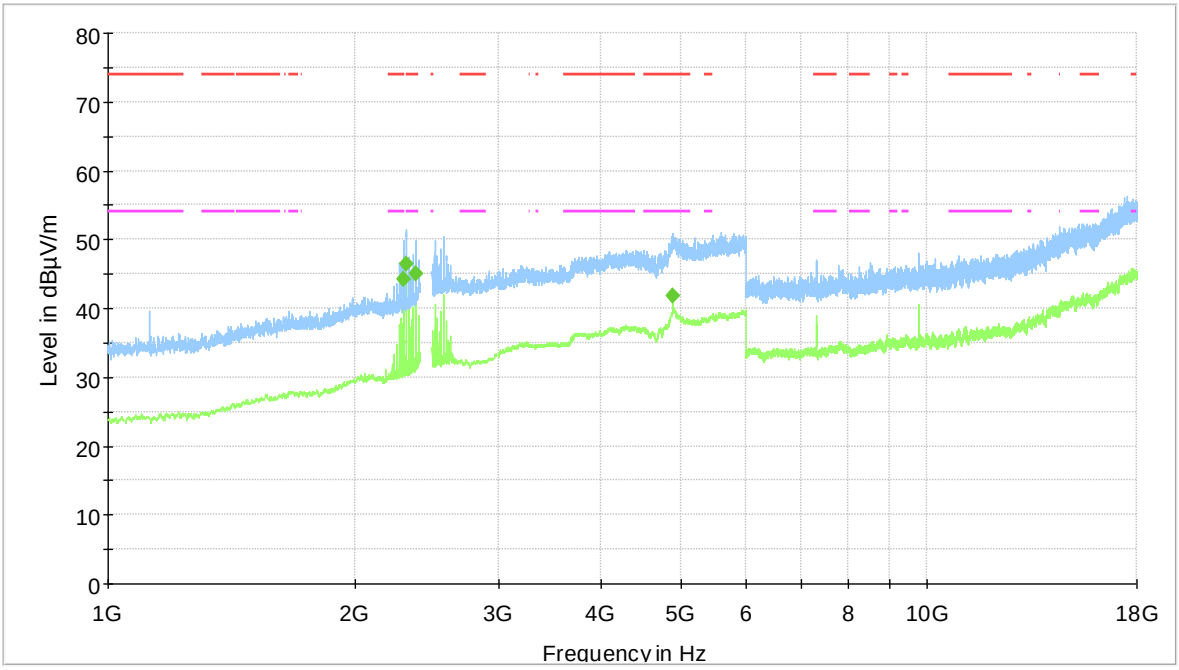
- **1-18 GHz, Lowest Channel**



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2274.016071	---	47.53	54.00	6.47	100.0	1000.000	150.0	H	251.0	0.0	-0.9
2291.421429	---	43.00	54.00	11.00	100.0	1000.000	150.0	H	252.0	360.0	-0.8
2337.989286	---	42.97	54.00	11.03	100.0	1000.000	150.0	H	243.0	22.0	-0.5
4804.143750	---	41.41	54.00	12.59	100.0	1000.000	150.0	H	234.0	8.0	7.7

Prüfdokumentation
Test documentation

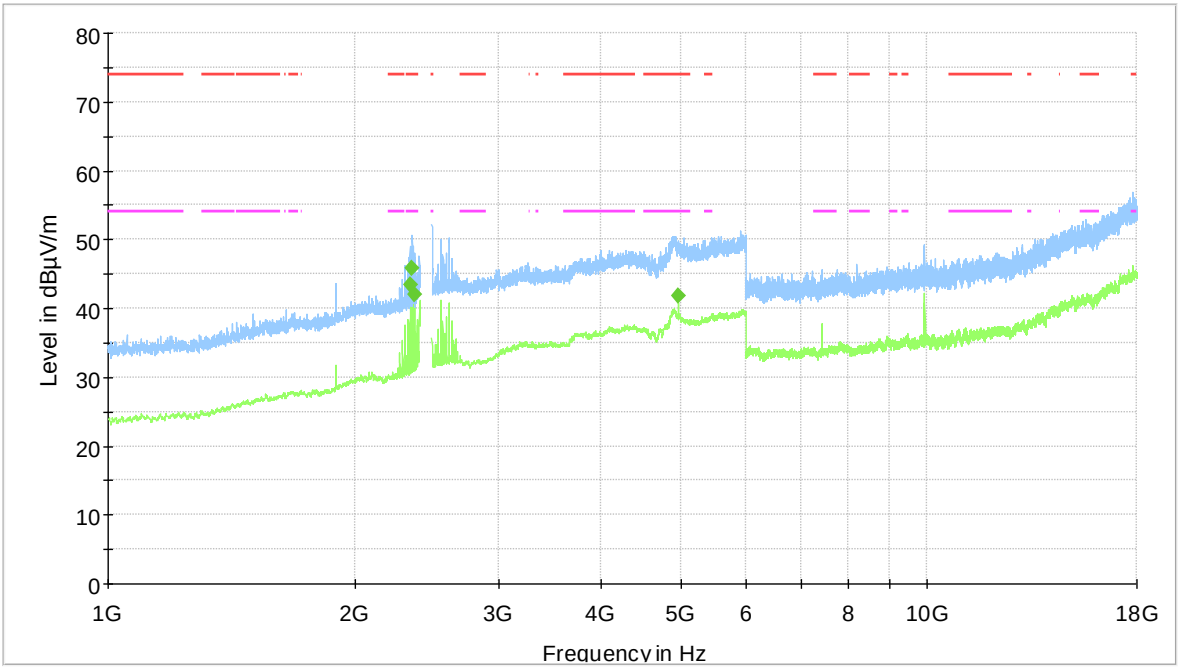
- **1-18 GHz, Middle Channel**



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2294.569643	---	44.27	54.00	9.73	100.0	1000.000	150.0	H	250.0	0.0	-0.8
2311.953571	---	46.45	54.00	7.55	100.0	1000.000	150.0	H	252.0	360.0	-0.7
2375.962500	---	45.12	54.00	8.88	100.0	1000.000	150.0	H	253.0	360.0	0.5
4880.172500	---	41.89	54.00	12.11	100.0	1000.000	150.0	H	172.0	99.0	9.8

Prüfdokumentation
Test documentation

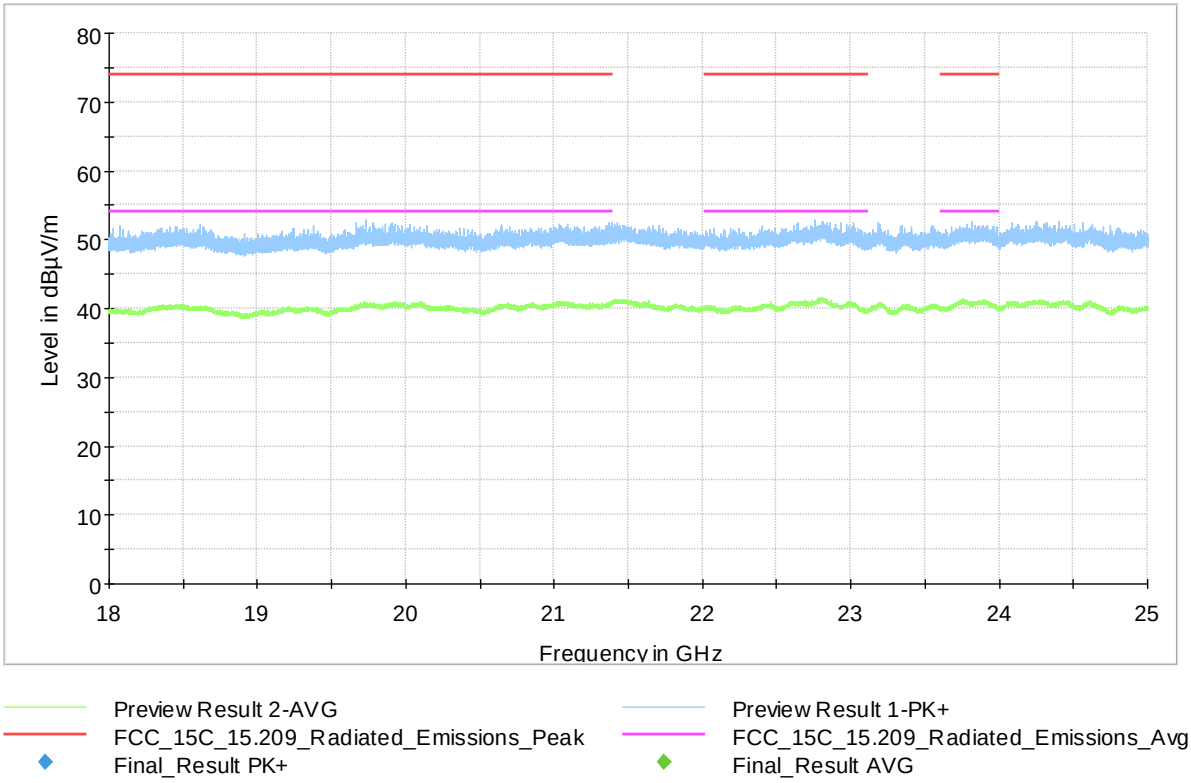
- **1-18 GHz, Highest Channel**



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2334.451786	---	43.37	54.00	10.63	100.0	1000.000	150.0	H	254.0	360.0	-0.5
2351.983929	---	45.81	54.00	8.19	100.0	1000.000	150.0	H	251.0	360.0	-0.5
2369.444643	---	42.06	54.00	11.94	100.0	1000.000	150.0	H	253.0	360.0	0.2
4959.980000	---	41.85	54.00	12.15	100.0	1000.000	150.0	V	295.0	158.0	9.6

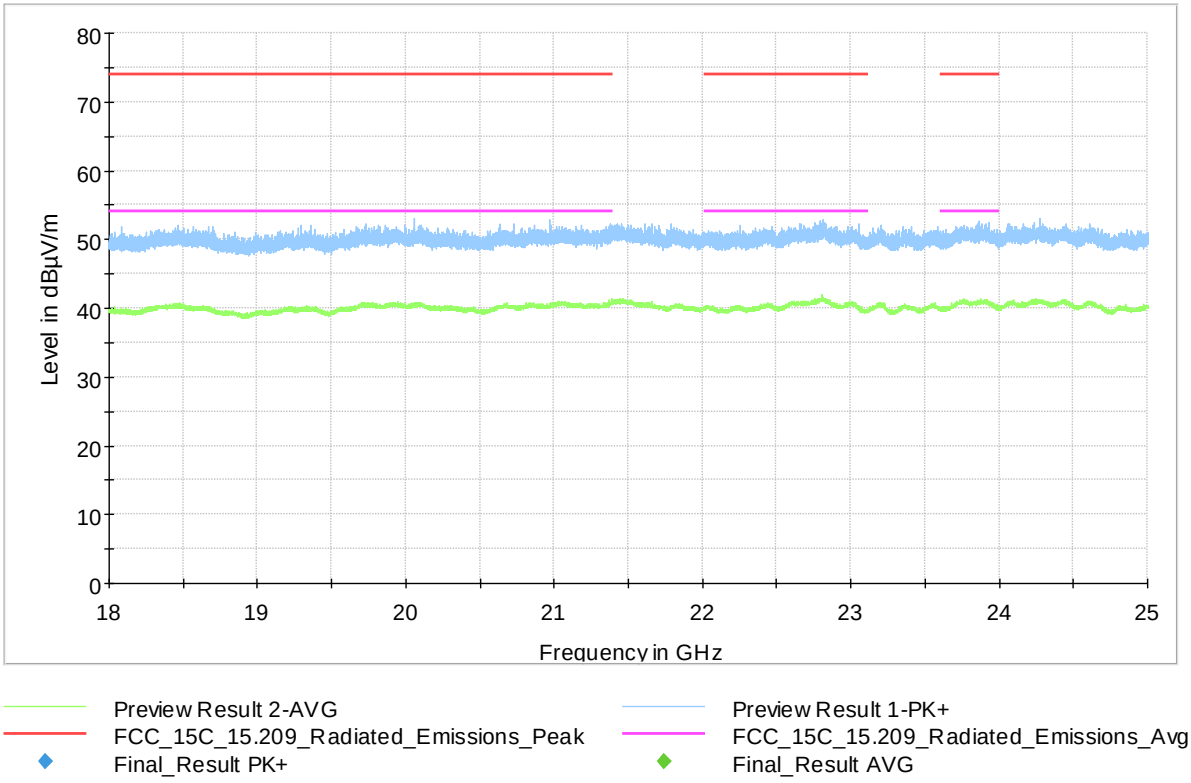
Prüfdokumentation
Test documentation

- **18-25 GHz, Lowest Channel**



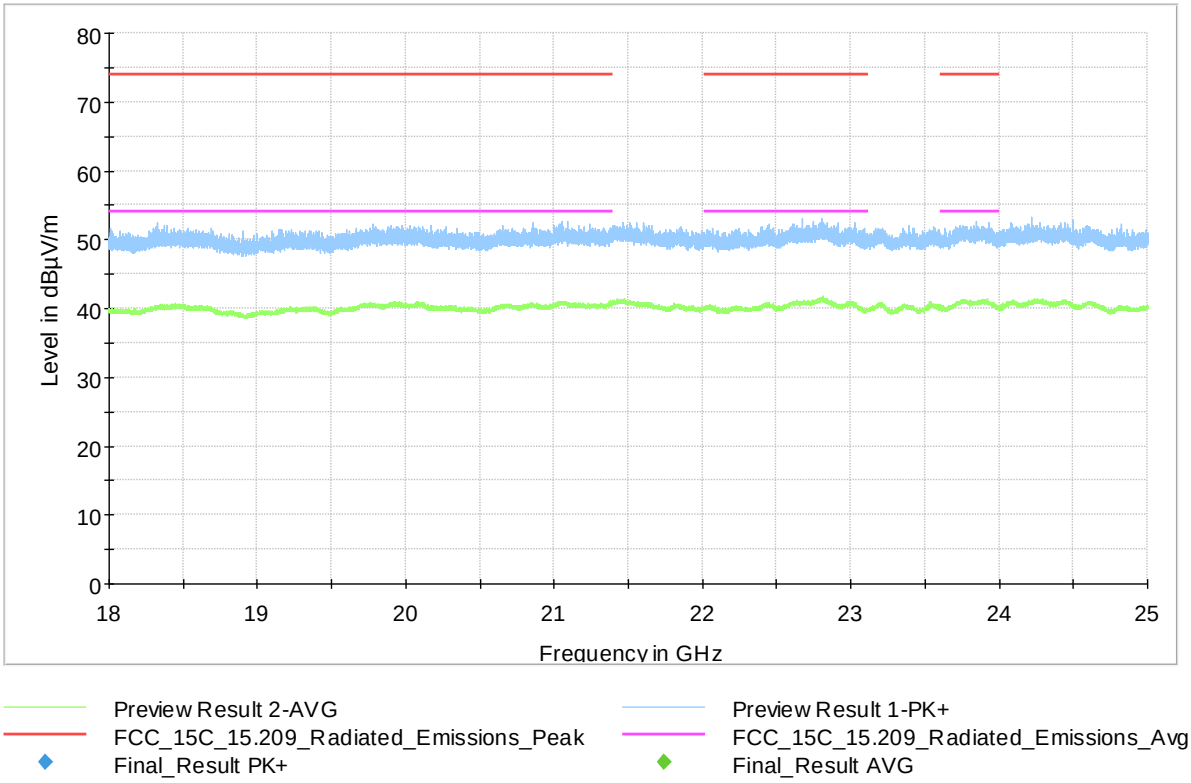
Prüfdokumentation
Test documentation

- **18-25 GHz, Middle Channel**



Prüfdokumentation
Test documentation

- **18-25 GHz, Highest Channel**



Final test result	Pass

4.7 AC Power Conducted Emission

4.7.1 Requirements / Limits

AC power-line conducted emission measurements shall be made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio-noise voltage that is conducted from all of the EUT current-carrying power input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network.

FCC Part 15, Subpart C, §15.207 (a)
... for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN).

FCC Part 15, Subpart C, §15.207, Conducted Emission Limits

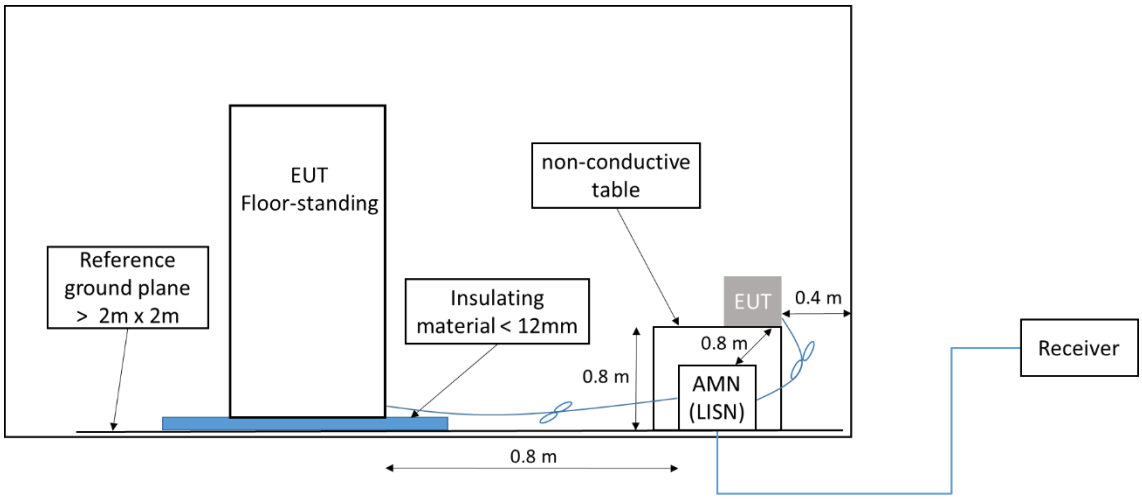
Frequency [MHz]	Conducted Limit [dBµV]	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

*Decreases with logarithm of the frequency

FCC Part 15, Subpart C, §15.207 (c)
... Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

4.7.2 Test Method

The test setup was made according to ANSI C63.10:2013 clauses 6.2.2 & 6.2.3 as shown in the photograph



The EUT was configured to transmit on the lowest channel since it has the highest output power.

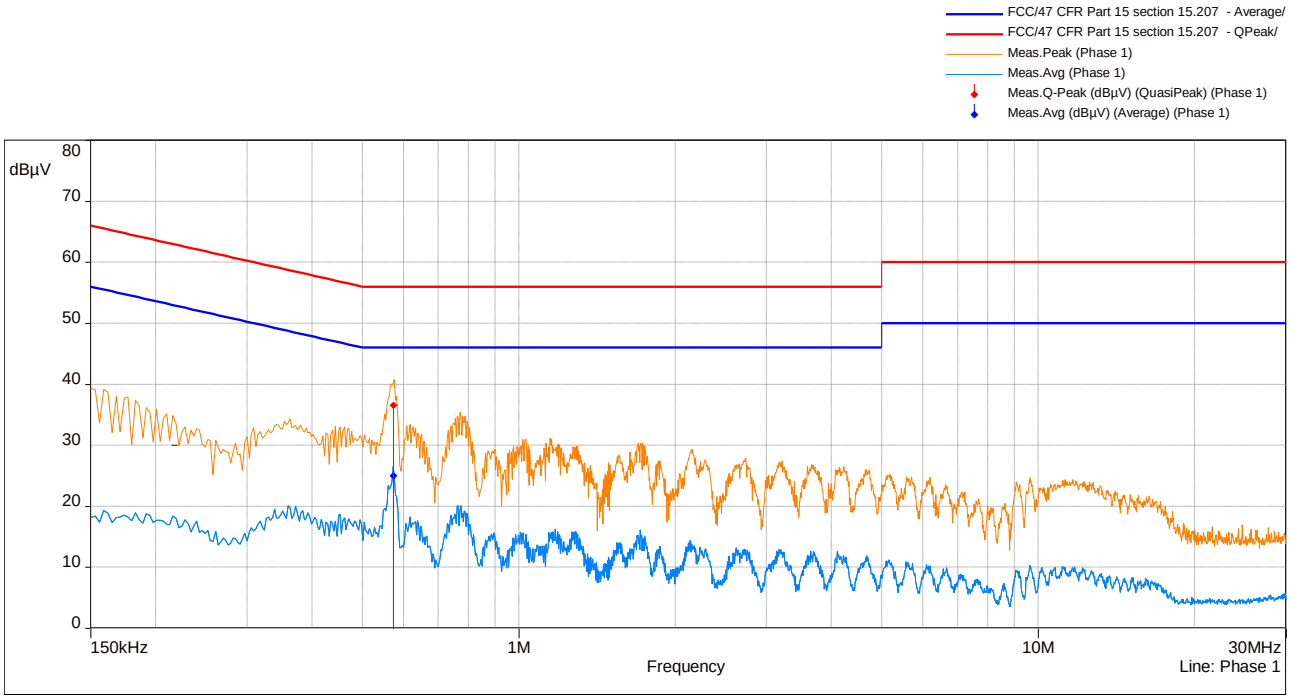
4.7.3 Test Setup

EUT	IONIQ-Skincare Body Spray - A002980367-002 (Radiated)
Test Condition	Normal conditions
Companion device	-
Operation mode	Mode 1: TX Modulated 2 Mbps with continuous transmission (channel 2402 MHz only)
Further parameters	-
Test engineer	M. Sc. Alaa Bustati

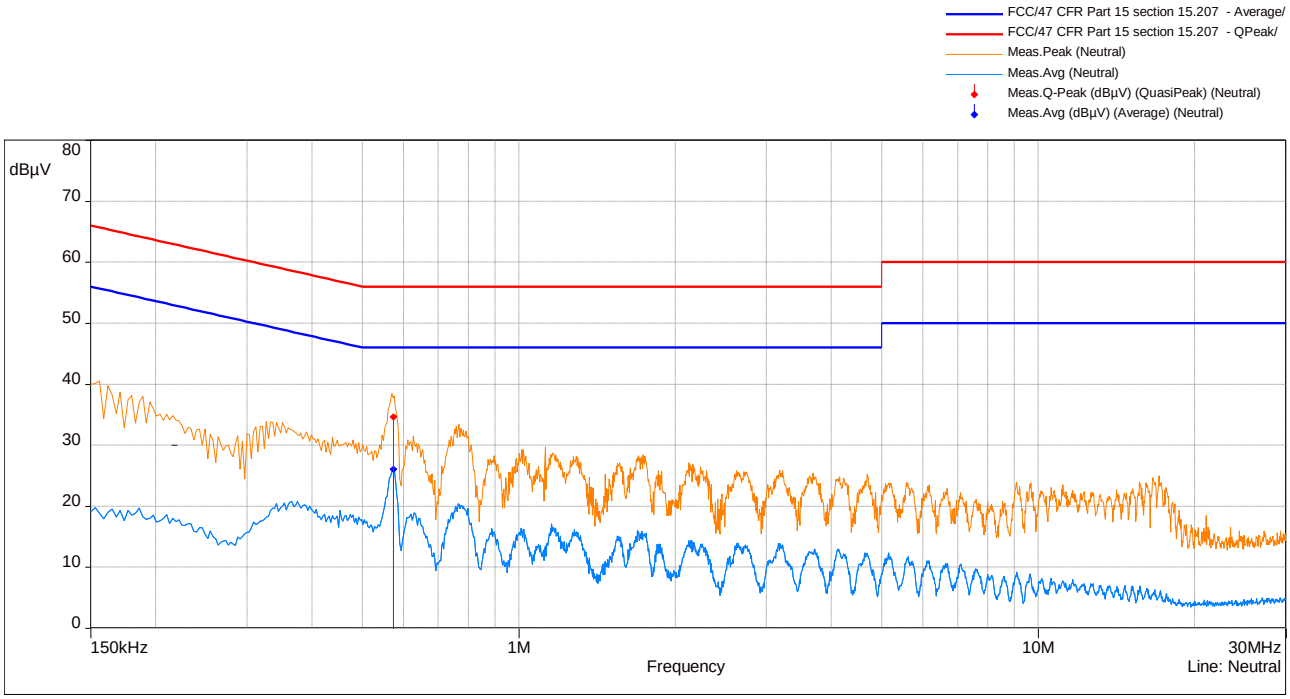
Prüfdokumentation
Test documentation

4.7.4 Test results

- **Line: Phase 1**



- **Line: Neutral**



Prüfdokumentation
Test documentation

Frequency (MHz)	SR	Meas. AVG (dBµV)	Meas. Q-Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Result	Correction (dB)
0.57225	2	26.11	-	46.00	-19.89	Neutral	Pass	10.01
0.573	1	25.02	-	46.00	-20.98	Phase	Pass	10.01
0.57225	2	-	34.68	56.00	-21.32	Neutral	Pass	10.01
0.573	1	-	36.61	56.00	-19.39	Phase	Pass	10.01

Final test result	Pass

Liste der verwendeten Prüfmittel
List of used test equipment

6 Equipment List

6.1 Hardware

Prüfmittel *Test equipment*		**Prüfmittel-Nr. / ID-Nr.** *Equipment No. / ID-No.*	**Letzte Kalibrierung** *Last calibration*	**Nächste Kalibrierung** *Next calibration*
Test System TS8997: Power Meter: OSP-B157 Spectrum Analyzer: FSV-30	Rohde & Schwarz	2728871	07.2019	07.2021
Fully Anechoic Room	Albatross Projects GmbH	2959749	10.2018	10.2021
RSE-Filtersystem	Rohde & Schwarz	9002802	12.2020	12.2021
Signal Analyser UXA N9041B	Keysight	2971644	02.2020	02.2021
Antenna HF907	Rohde & Schwarz	2856263	08.2018	08.2021
Antenna, Double Ridged Horn Antenna 3116C-PA	ETS LINDGREN	2900393	10.2020	10.2022
Antenna HFH 2	Rohde & Schwarz	2728893	06.2018	06.2021
Semi-Anechoic Chamber 30-1000 MHz	Siemens	2729645	06.2020	06.2022
Antenna VULB 9168	Schwarzbeck	2728787	09.2019	09.2022
Receiver ESU 26	Rohde & Schwarz	2728898	08.2020	08.2021
Receiver ESU 8	Rohde & Schwarz	2728148	10.2020	10.2021
Line Impedance Stabilization Network ESH2-Z5	Rohde & Schwarz	2731908	06.2018	06.2021
Limiter ESH3-Z2	Rohde & Schwarz	2730114	05.2019	05.2021

6.2 Software

Test Software	**Developer**	**Version**
EMC32	Rohde & Schwarz	10.60.20
BAT-EMC	NEXIO	3.19.1.25

Änderungsverzeichnis
Change history

7 Change History

Revision Number	List of revisions	Date of issue
DE21Q1LN 001	Initial Release	19.02.2021
Note: Latest revision report will replace all previous reports.		

Ende des Prüfberichts
End of Test Report