Report on the FCC and IC Testing of the eResearchTechnology GmbH Ultrasonic Spirometer Model: iSpiro Pro In accordance with FCC 47 CFR Part 15 C, and ISED RSS-247 and ISED RSS-GEN

Product Service

Add value.
Inspire trust.

Prepared for: eResearchTechnology GmbH
Sieboldstr. 3
97230 Estenfeld, Germany

FCC ID: 2AAUFISPP01
IC: 11335A-ISPP01

COMMERCIAL-IN-CONFIDENCE

Date: 2025-04-02
Document Number: TR-713368494-02 | Revision 0

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Martin Steindl	2025-04-02	Steindl Martin SIGN-ID 1032602
Authorised Signatory	Michael Ingerl	2025-04-03	M. SIGN-ID 1033097

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Engineering Statement:
This measurement shown in this report were made in accordance with the procedures described on test pages.
All reporded testing was carried out on a sample equipment to demonstrate limited compilance with with FCC 47 CFR Part 15 C and ISED RSS-247 and RSS-GEN.
The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Martin Steindl	2025-04-02	Steindl Martin SIGN-ID 1032561

Laboratory Accreditation	Laboratory recognition	Industry Canada test site registration
DAkkS Reg. No. D-PL-11321-11-02 DAkkS Reg. No. D-PL-11321-11-03	Registration No. BNetzA-CAB-16/21-15	3050A-2

Executive Statement:
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15 C:2023 and ISED RSS-247:2023 and RSS-GEN:2018 + Amd.2:2021

DAkkS Deutsche Akkreditierungsstelle D-PL-11321-11-00

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Product Service

Content

Product Service

1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Revision	*Description of changes*	*Date of Issue*
0	First Issue	2025-04-02

Table 1: Report of Modifications

1.2 Introduction

Applicant	eResearchTechnology GmbH Sieboldstr. 3 97230 Estenfeld, Germany
Manufacturer	eResearchTechnology GmbH
Model Number(s)	iSpiro Pro
Serial Number(s)	S409900030
Hardware Version(s)	V0
Software Version(s)	N/A
Number of Samples Tested	1
Test Specification(s) / Issue / Date	FCC 47 CFR Part 15 C : 2024 ISED RSS-247, Issue 3 : 2023 ISED RSS-GEN, Issue 5 + Amendment 2 : 2021
Test Plan/Issue/Date	N/A
Order Number	25000779
Date	
Date of Receipt of EUT	2025-03-05
Start of Test	2025-03-11
Finish of Test	2025-03-20
Name of Engineer(s)	M. Steindl
Related Document(s)	ANSI C63.10: 2013 FCC 47 CFR Part 2 J : 2019 KDB 558074 D01 V05R02 ISED RSS-102, Issue 5, 2015

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15 C is shown below.

Section	*Specification Clause*	*Test Description*	*Result*
2.1	15.203, 15.247(b)	Antenna requirement	Pass
2.2	15.247(a)(2)	Emission Bandwidth	Pass
2.3	15.247(b)(3)	Output Power	Pass
2.4	15.247(e)	Power Spectral Density	Pass
2.5	15.247(d)	Frequency Band Edge	Pass
2.6	15.247(d), 15.205, 15.209	Spurious Emissions	Pass
---	15.207	Conducted Emissions on Mains Terminals	Not applicable

Table 2: Results according to FCC 47 CFR Part 15 C

A brief summary of the tests carried out in accordance with ISED RSS-247 and ISED RSS-GEN is shown below.

Section	*Specification Clause*	*Test Description*	*Result*
2.2	5.2 a.	Emission Bandwidth	Pass
2.3	5.4 d.	Output Power	Pass
2.4	5.2 b.	Power Spectral Density	Pass
2.5	5.5	Frequency Band Edge	Pass
2.6	5.5	Spurious Emissions	Pass

Table 3: Results according to ISED RSS-247

Section	*Specification Clause*	*Test Description*	*Result*
2.2	6.7	Emission Bandwidth	Pass
2.6	8.9, 8.10	Spurious Emissions	Pass
2.7	8.11	Frequency Stability	Pass
---	8.8	Conducted Emissions on Mains Terminals	Not applicable

Table 4: Results according to RSS-Gen

Product Service

1.4 Product Information

1.4.1 Technical Description

Frequency Band:	2400.0 MHz – 2483.5 MHz
Nominal cond. power:	0 dBm
Antenna gain:	5.3 dBi
Supply Voltage:	3.0 V
Supply Frequency:	DC battery supply
Highest clock frequency (non-radio part):	24 MHz

Label

Product Service

1.4.2 List of Antennas

Manufacturer	*Model*	*Antenna impedance*	*Antenna Type*	*Antenna gain*
eResearchTechnology	N/A	N/A	Integrated antenna on printed board	+5.2 dBi

Table 5: List of antennas

1.4.3 EUT Ports / Cables identification

Port	Max Cable Length specified	Usage	Type	Screened
Not applicable	---	---	---	---

Table 6

1.5 Test Configuration

The EUT was configured as stand alone device

1.6 Modes of Operation

The applicant provided a test software for configuring test modes. The tests were performed on lowest (CH37), a middle (CH17) and highest (CH39) BLE channels with five BLE 5 modes (physical layers) with a nominal conducted output power of 0 dBm:

Mode 1:
1M PHY

Mode 2:
1M PHY, Bluetooth 4.x compatible mode

Mode 3:
Coded PHY, S=2

Mode 4:
Coded PHY, S=8

Mode 5:
2M PHY

Product Service

1.7 EUT Modifications Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 7

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
Antenna requirement	M. Steindl
Emission Bandwidth	M. Steindl
Output Power	M. Steindl
Power Spectral Density	M. Steindl
Frequency Band Edge	M. Steindl
Spurious Emissions	M. Steindl
Frequency Stability	M. Steindl

Office Address:
Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

2 Test Details

2.1 Antenna requirement

2.1.1 Specification Reference

FCC 47 CFR Part 15 C, Clauses 15.203, 15.247(b)

2.1.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.1.3 Date of Test

2025-03-11 and 2025-03-12

2.1.4 Specification Limits

FCC 47 CFR 15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some fields disturbance sensors, or to other intentional radiators which must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits are not exceeded.

FCC 47 CFR 15.247(b)
Except for point-to-point operation and multiple directional beams, if the transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.1.5 Test Results

Antenna connector type: N/A
Antenna connector impedance: 50 Ω

Manufacturer	*Model*	*Antenna gain*	*Result*
eResearch	Integrated antenna on printed board	+5.3 dBi	Pass

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2.2 Emission Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.247(a)(2)
ISED RSS-247, Clause 5.2 a.
ISED RSS-Gen, Clause 6.7

2.2.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.2.3 Date of Test

2025-03-11 and 2025-03-12

2.2.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	32 %

2.2.5 Specification Limits

For systems using digital modulation techniques, operating in the 902 MHz – 928 MHz, 2400 MHz – 2483.5 MHz and/or 5725 MHz – 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz

ISED RSS-GEN:
The occupied (99 %) bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSS.

2.2.6 Test Method

The test was performed according to ANSI C63.10, clauses 6.9.3 and 11.8.1

Product Service

2.2.7 Test Results

2.2.7.1 Test Results for 6 dB bandwidth

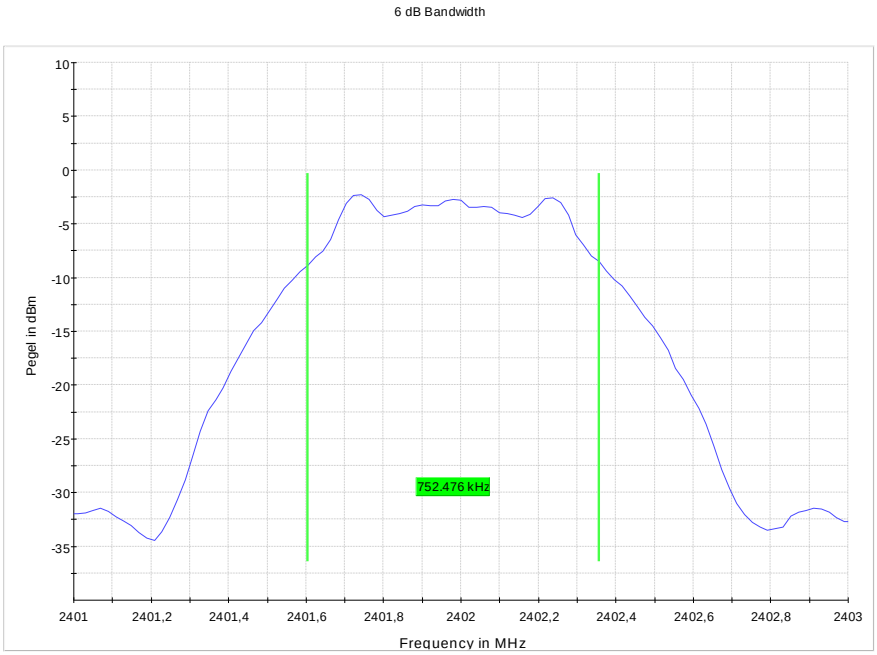
Mode	Frequency Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
1M PHY	2402 MHz	0.752476	≥ 0.500	2401.603960	2402.456436
1M PHY	2440 MHz	0.732674	≥ 0.500	2439.623762	2440.356436
1M PHY	2480 MHz	0.752476	≥ 0.500	2479.603960	2480.356436
1M PHY, BT 4.x	2402 MHz	0.752476	≥ 0.500	2401.603960	2402.356436
1M PHY, BT 4.x	2440 MHz	0.792080	≥ 0.500	2439.584158	2440.376238
1M PHY, BT 4.x	2480 MHz	0.772278	≥ 0.500	2479.603960	2480.376238
Coded PHY S=2	2402 MHz	0.693070	≥ 0.500	2401.643564	2402.336634
Coded PHY S=2	2440 MHz	0.752476	≥ 0.500	2439.603960	2440.356436
Coded PHY S=2	2480 MHz	0.752476	≥ 0.500	2479.603960	2480.356436
Coded PHY S=8	2402 MHz	0.732674	≥ 0.500	2401.623762	2402.356436
Coded PHY S=8	2440 MHz	0.772278	≥ 0.500	2439.603960	2440.376238
Coded PHY S=8	2480 MHz	0.792080	≥ 0.500	2479.584158	2480.376238
2M PHY	2402 MHz	1.544554	≥ 0.500	2401.207821	2402.752475
2M PHY	2440 MHz	1.584158	≥ 0.500	2439.207921	2440.792079
2M PHY	2480 MHz	1.544554	≥ 0.500	2479.207921	2480.752575

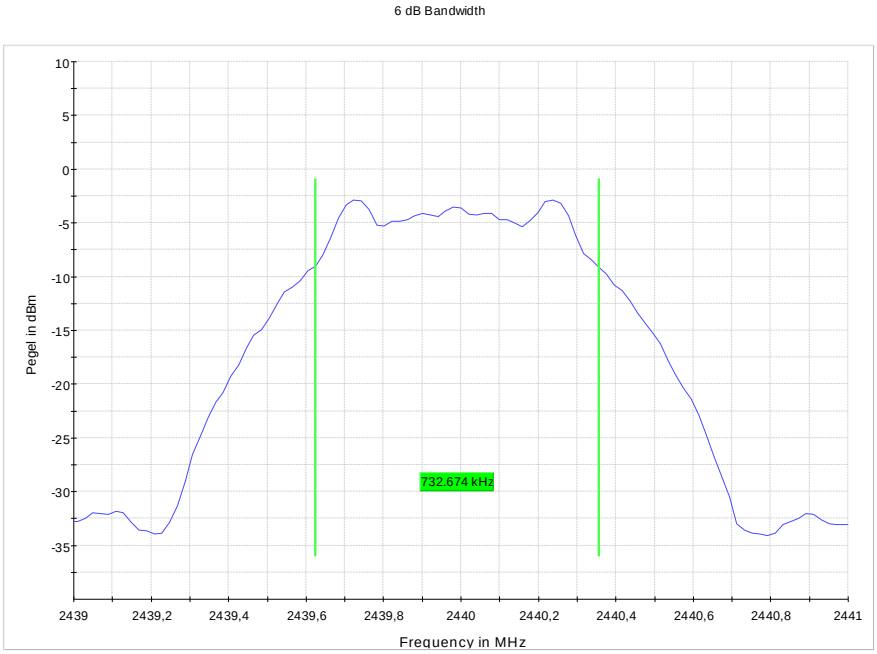
Table 8: 6 dB bandwidth

See plots for details

Product Service

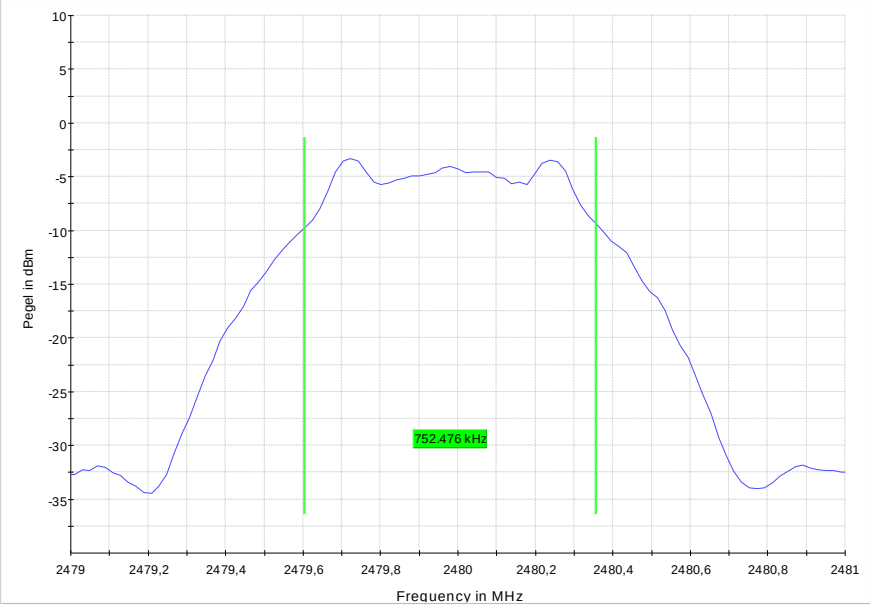
1M PHY





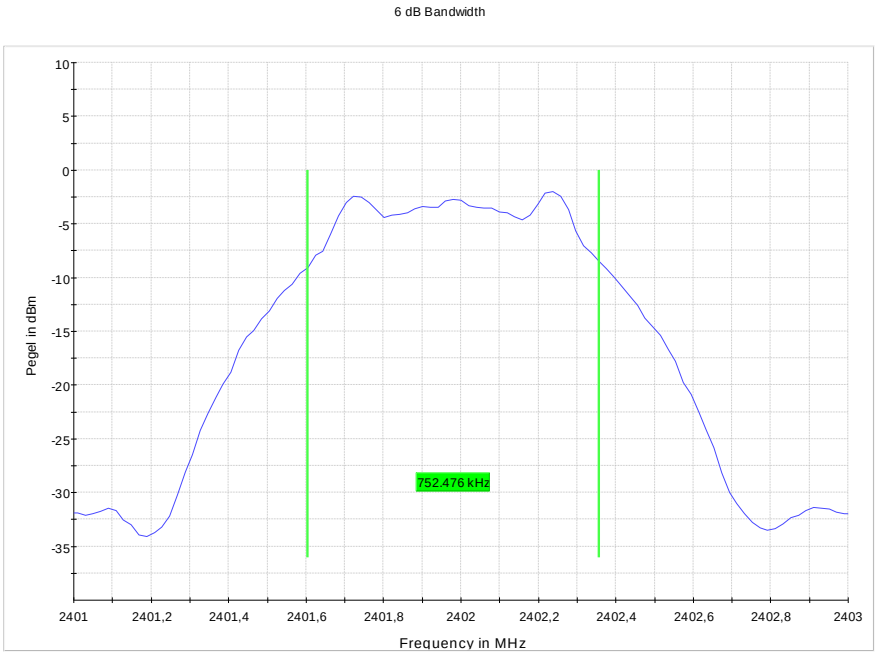
Product Service

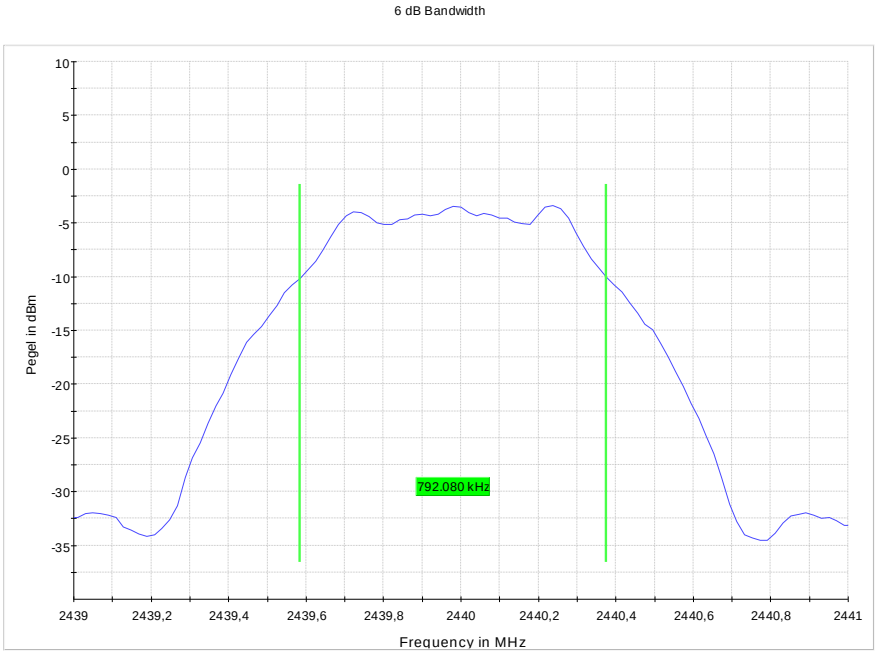
6 dB Bandwidth



Product Service

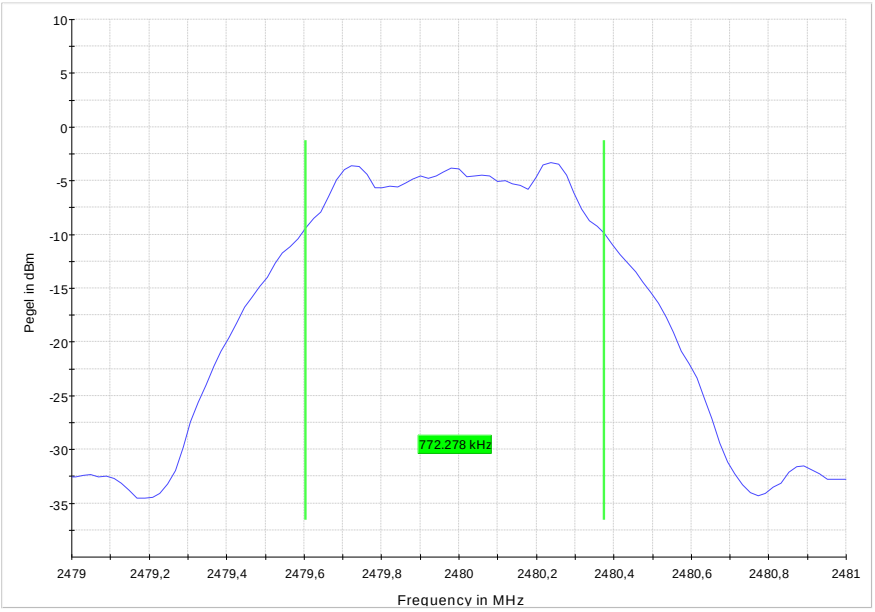
1M PHY, BT 4.x





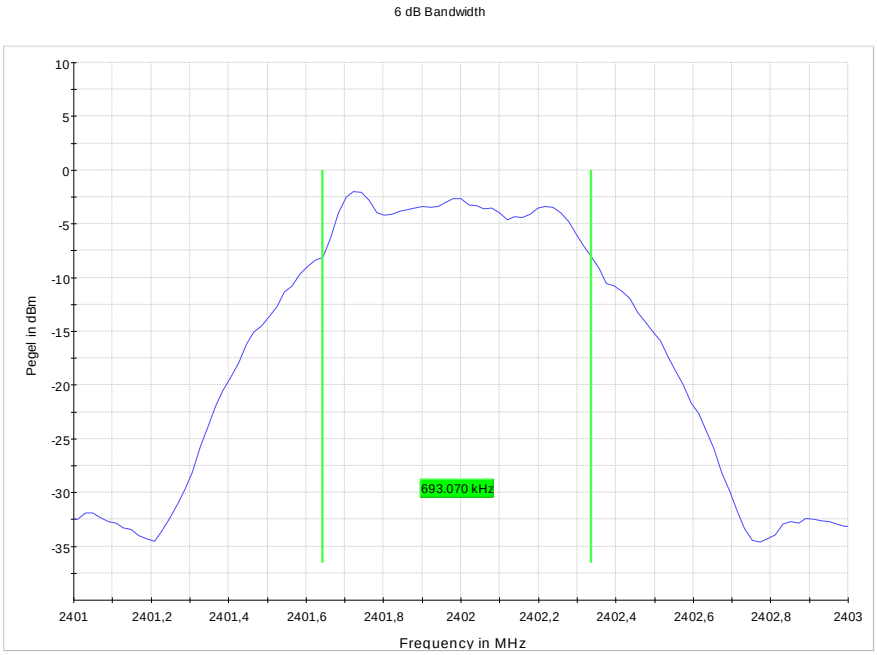
Product Service

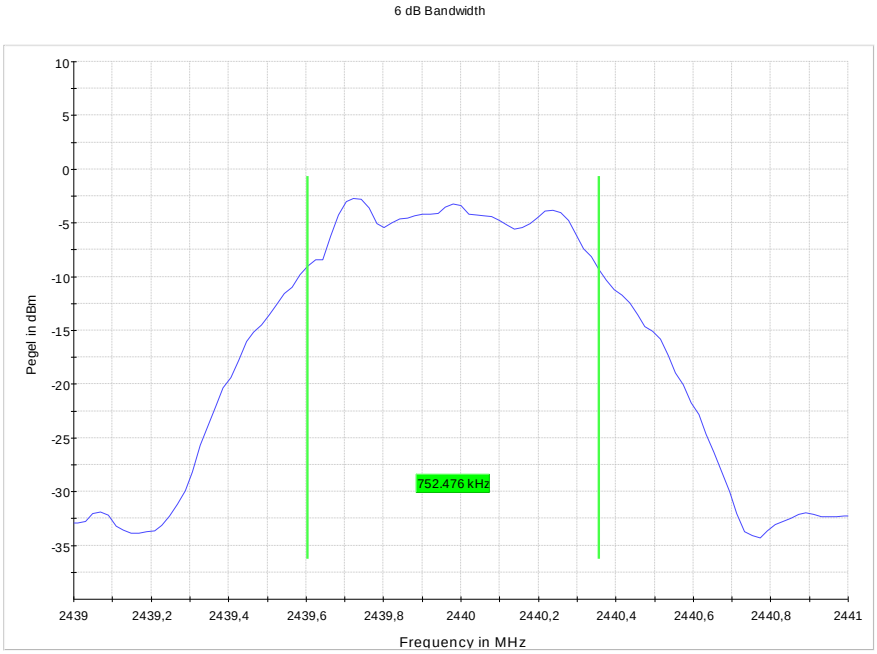
6 dB Bandwidth



Product Service

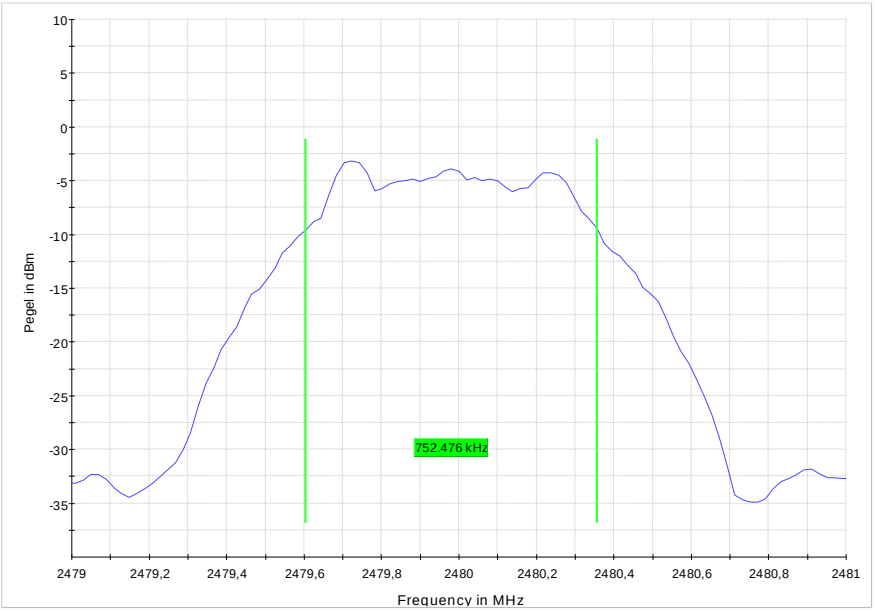
Coded PHY S=2





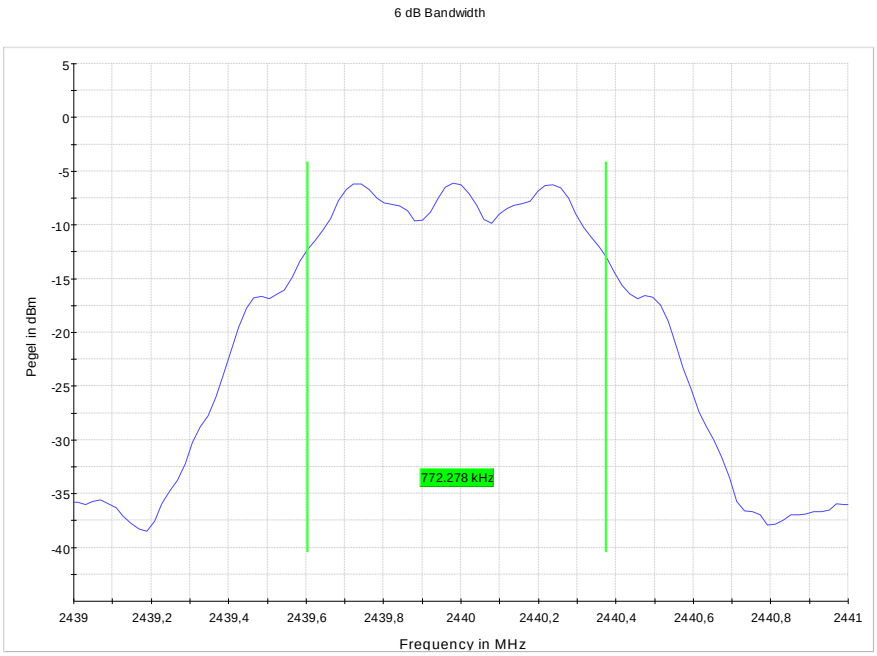
Product Service

6 dB Bandwidth



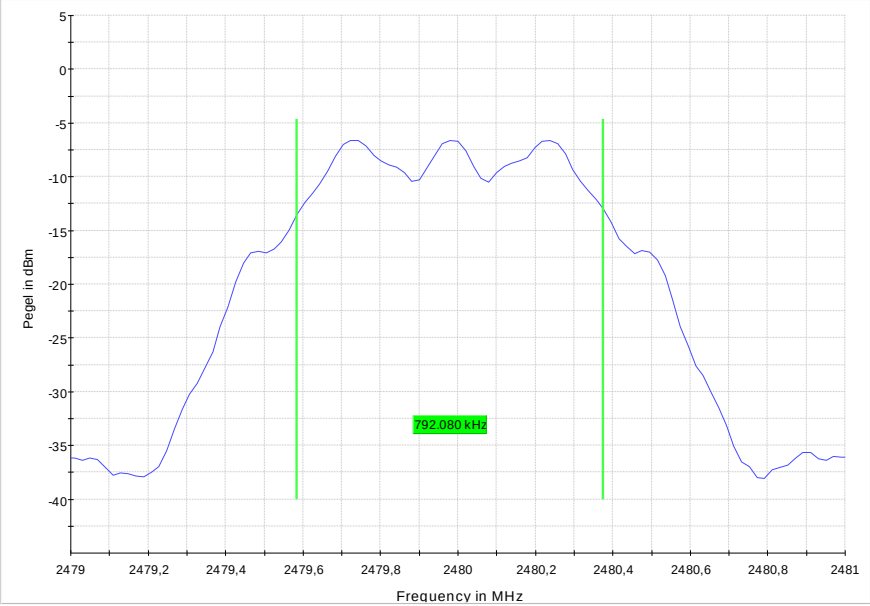
Product Service

Coded PHY S=8



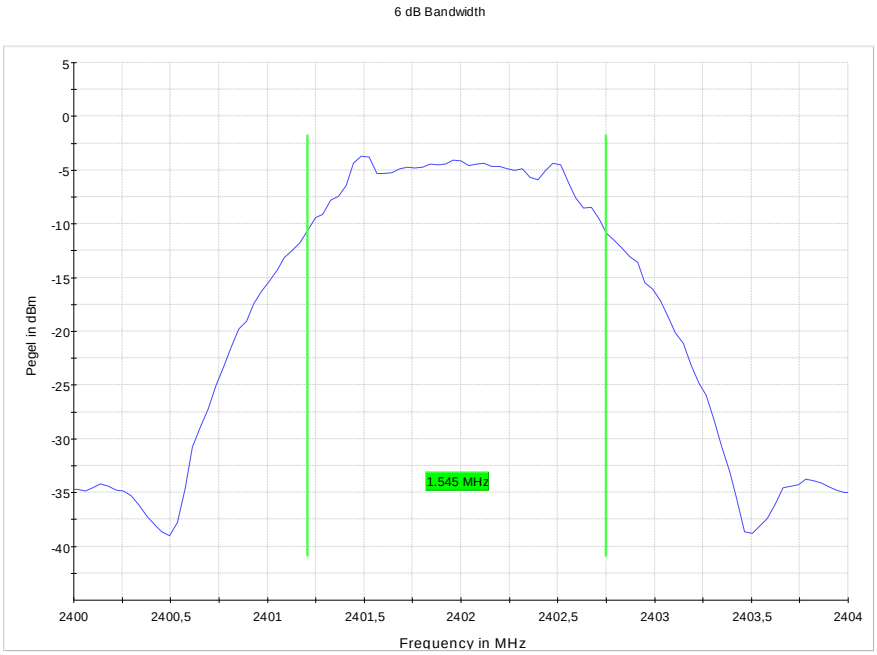
Product Service

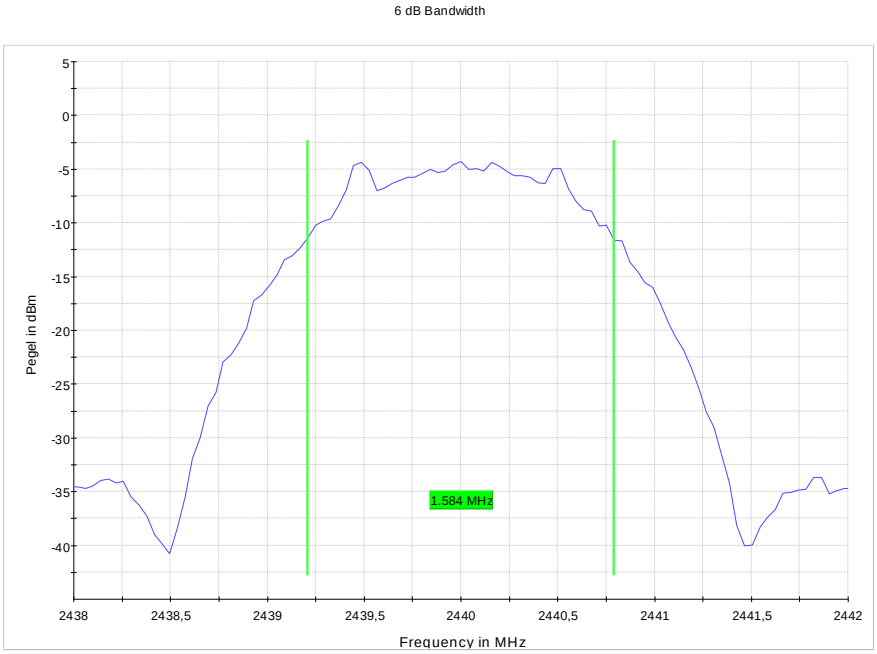
6 dB Bandwidth



Product Service

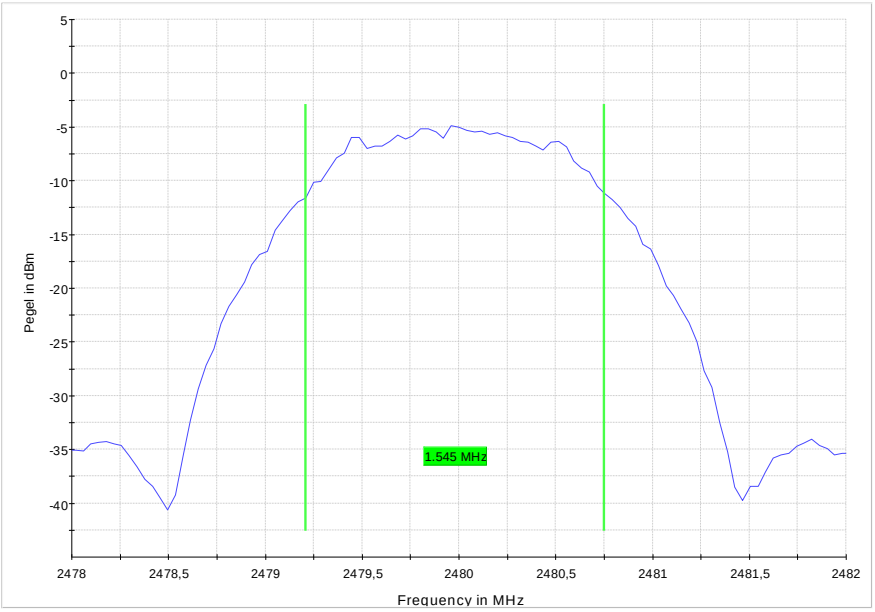
2M PHY





Product Service

6 dB Bandwidth



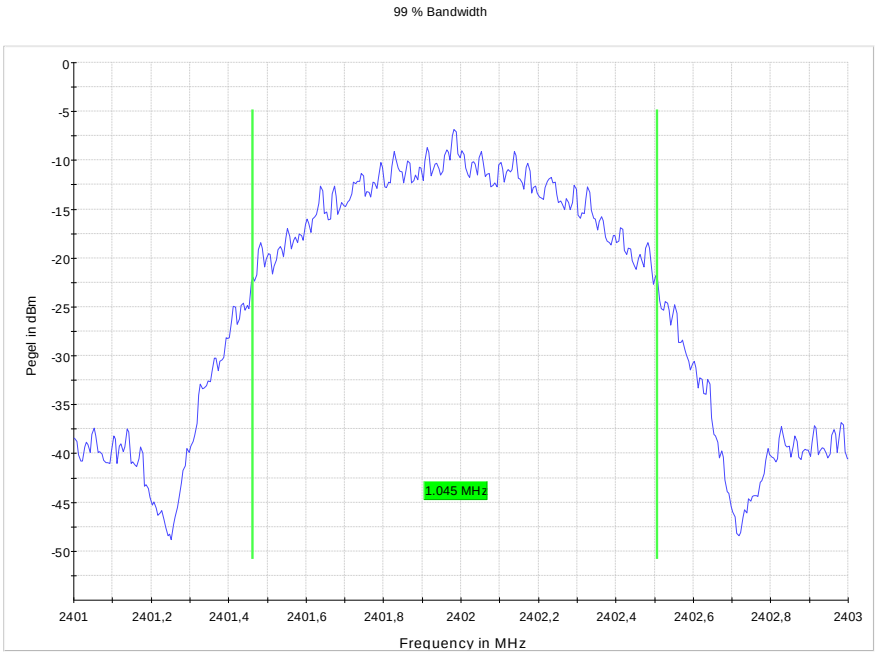
Mode	Frequency Channel	99% Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
1M PHY	2402 MHz	1.045000	2401.462500	2402.507500
1M PHY	2440 MHz	1.060000	2439.452500	2440.512500
1M PHY	2480 MHz	1.060000	2479.452500	2480.512500
1M PHY, BT 4.x	2402 MHz	1.050000	2401.457500	2402.507500
1M PHY, BT 4.x	2440 MHz	1.060000	2439.452500	2440.512500
1M PHY, BT 4.x	2480 MHz	1.065000	2479.447500	2480.512500
Coded PHY S=2	2402 MHz	1.030000	2401.467500	2402.497500
Coded PHY S=2	2440 MHz	1.050000	2439.457500	2440.507500
Coded PHY S=2	2480 MHz	1.050000	2479.457500	2480.507500
Coded PHY S=8	2402 MHz	1.070000	2401.447500	2402.517500
Coded PHY S=8	2440 MHz	1.090000	2439.547500	2440.527500
Coded PHY S=8	2480 MHz	1.090000	2479.437500	2480.527500
2M PHY	2402 MHz	2.070000	2400.945000	2043.015000
2M PHY	2440 MHz	2.080000	2438.935000	2441.015000
2M PHY	2480 MHz	2.090000	2478.935000	2481.025000

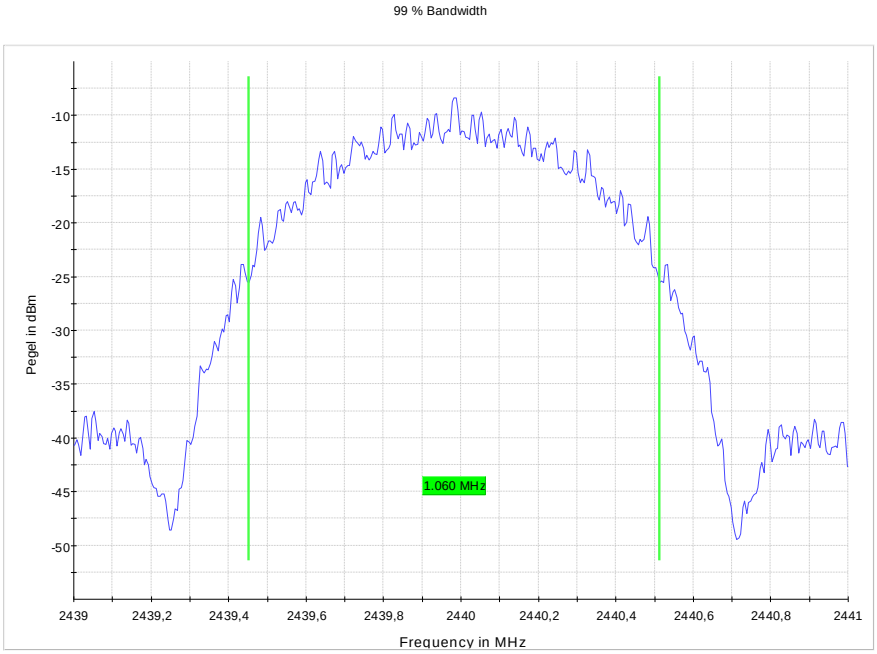
Table 9: 99% bandwidth

See plots for details

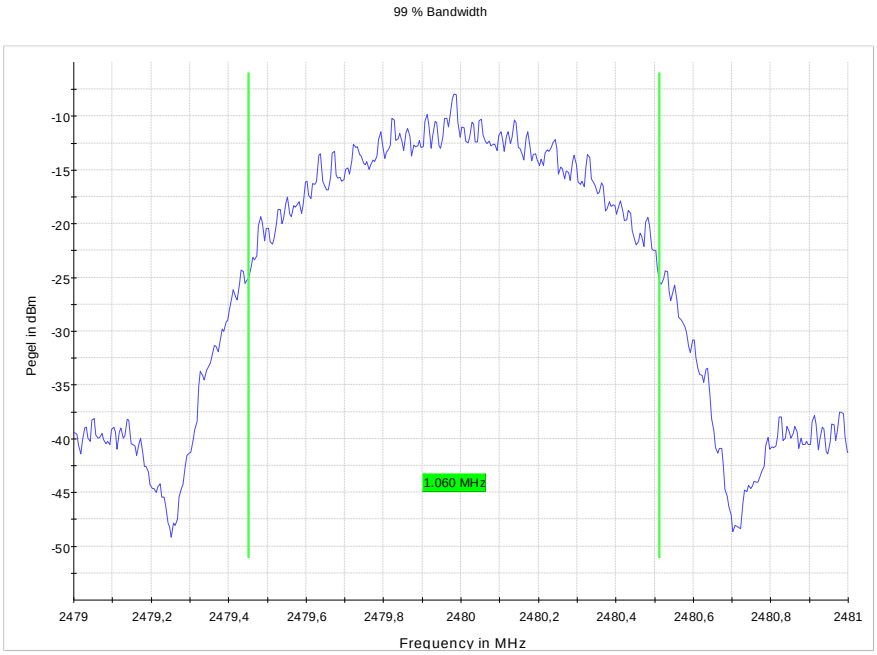
Product Service

1M PHY



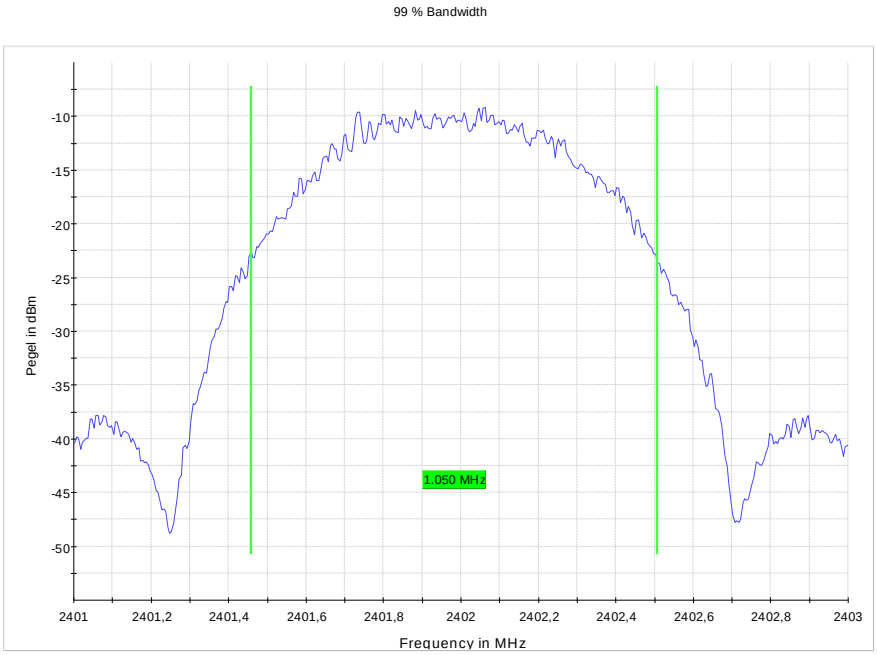


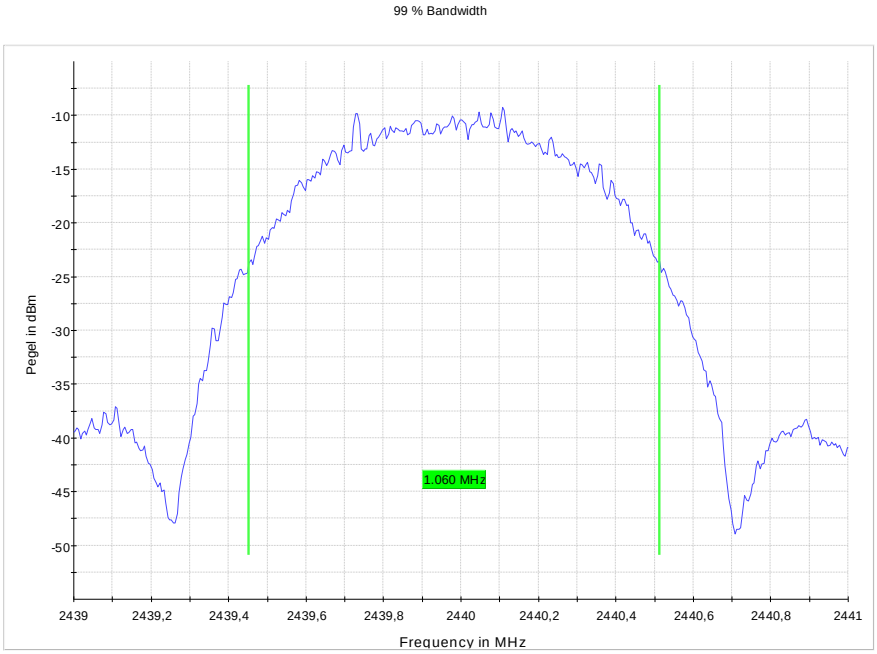
Product Service



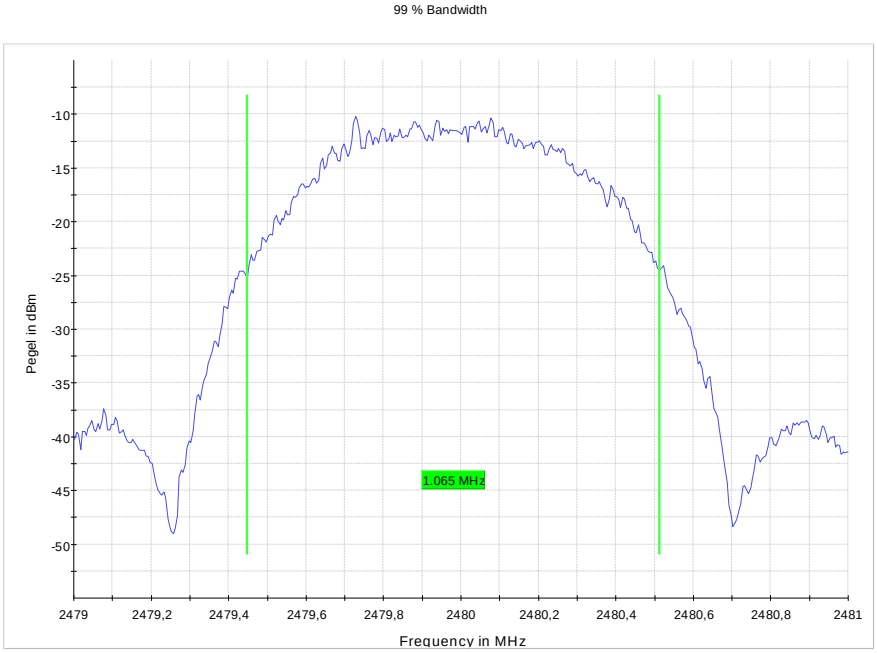
Product Service

1M PHY, BT 4.x





Product Service



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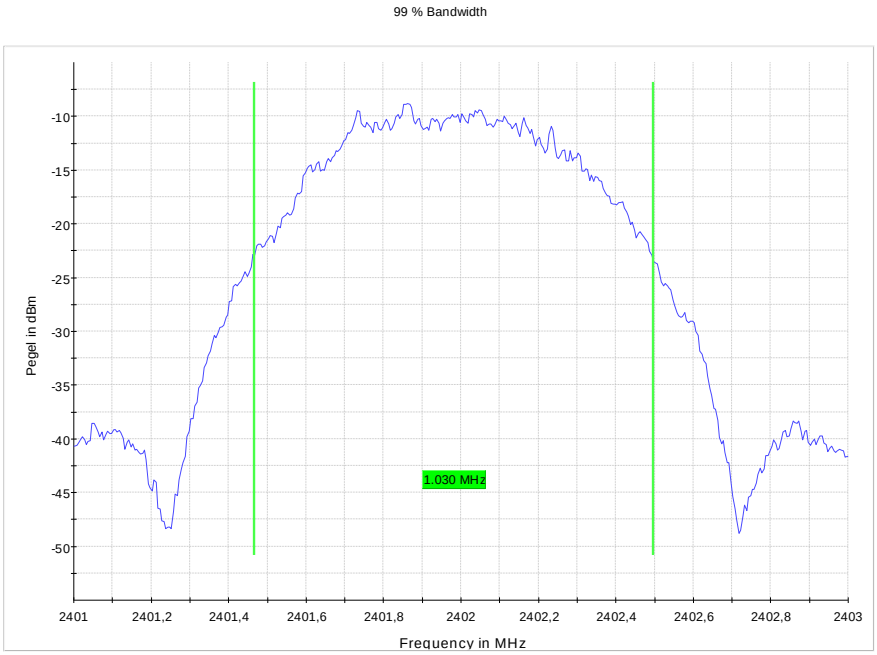
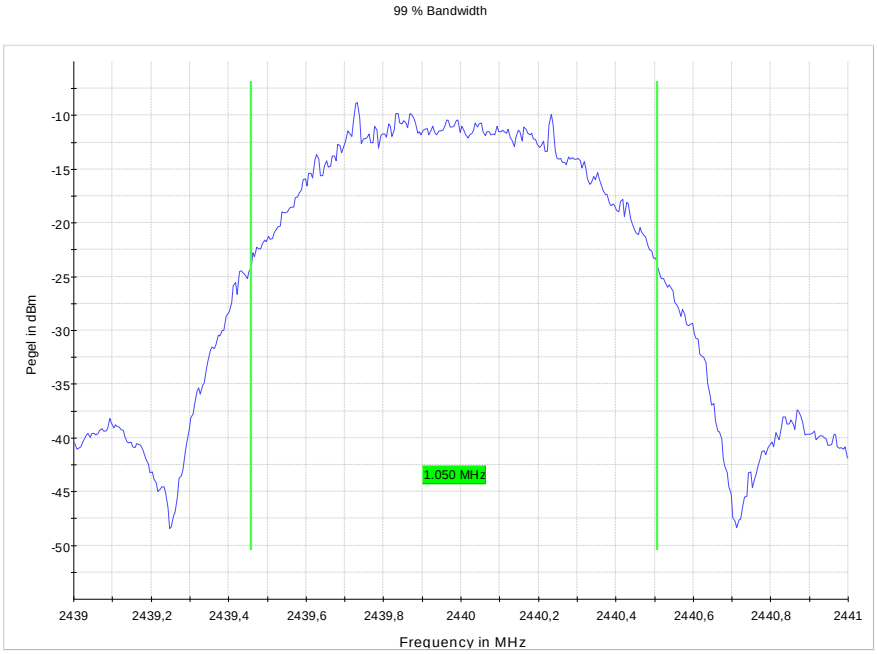
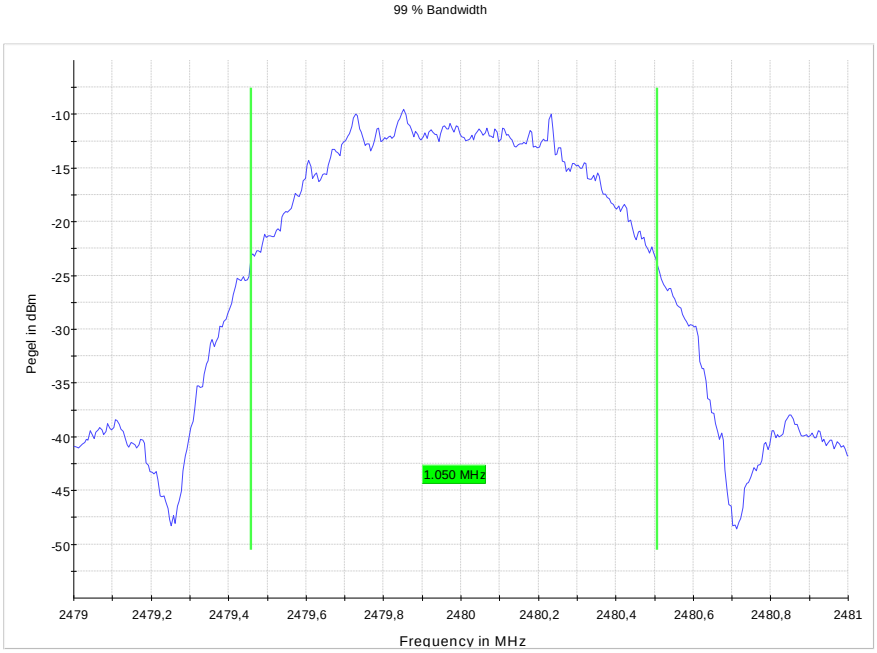
Coded PHY S=2





Product Service



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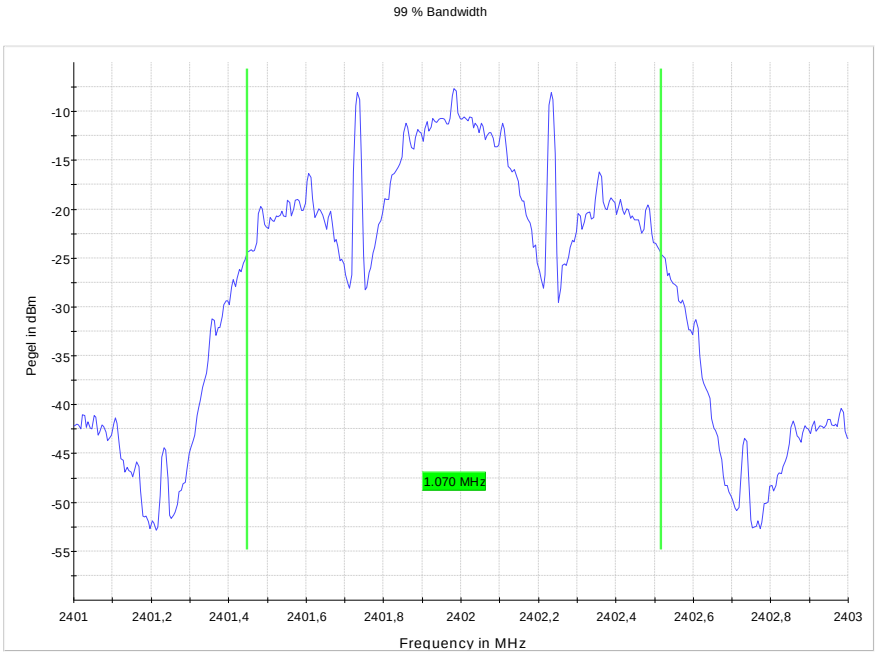
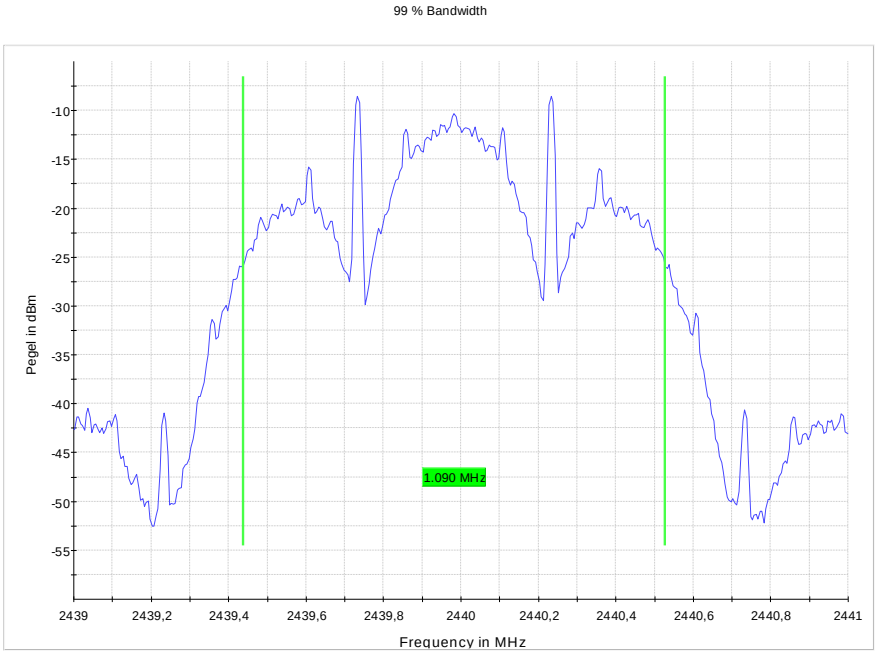
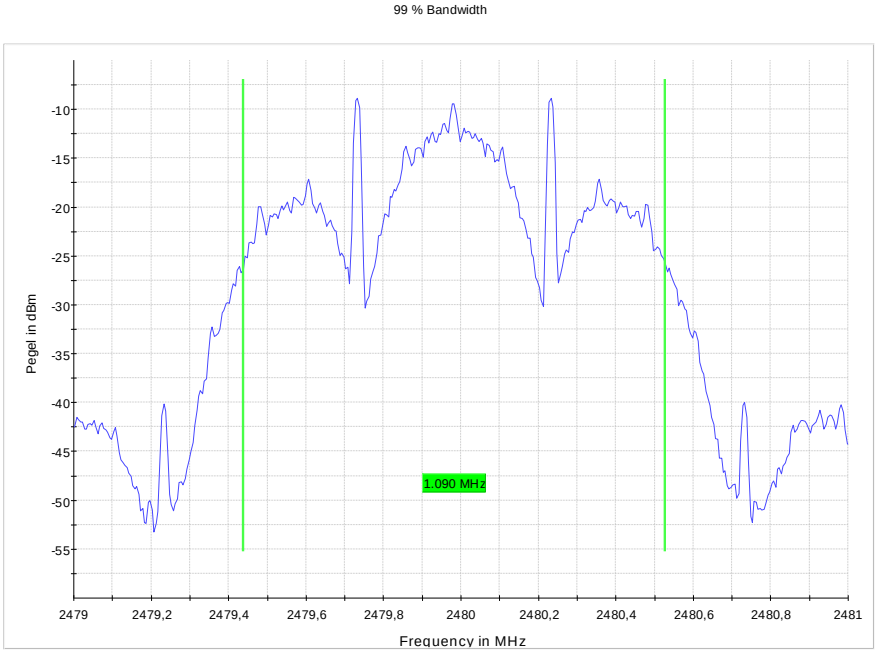
Coded PHY S=8





Product Service



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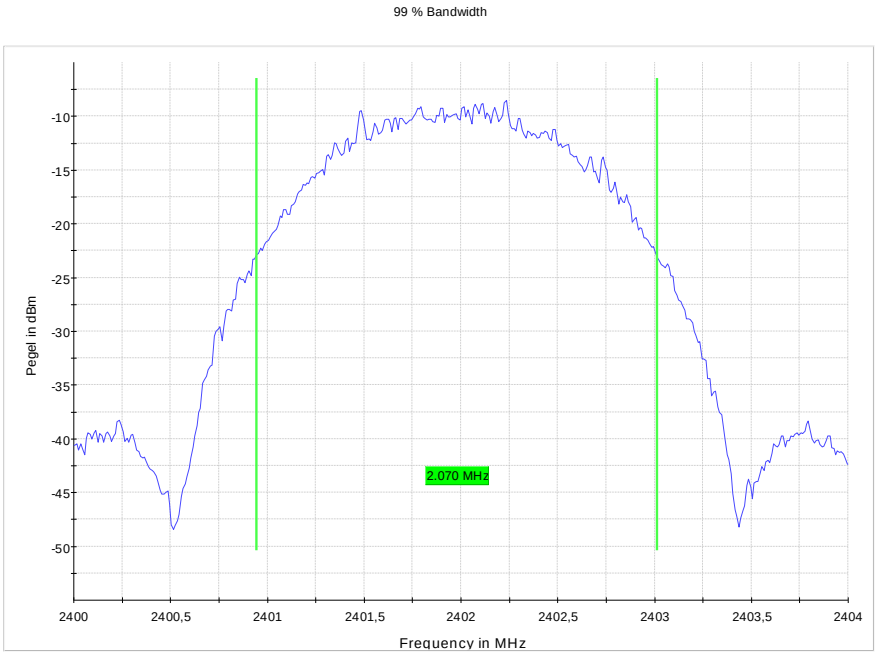
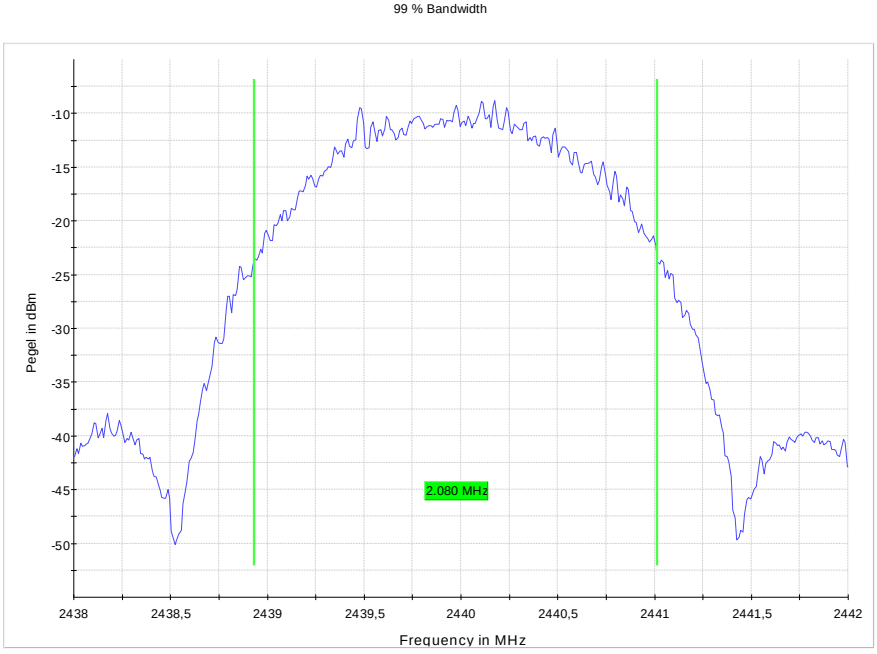
2M PHY





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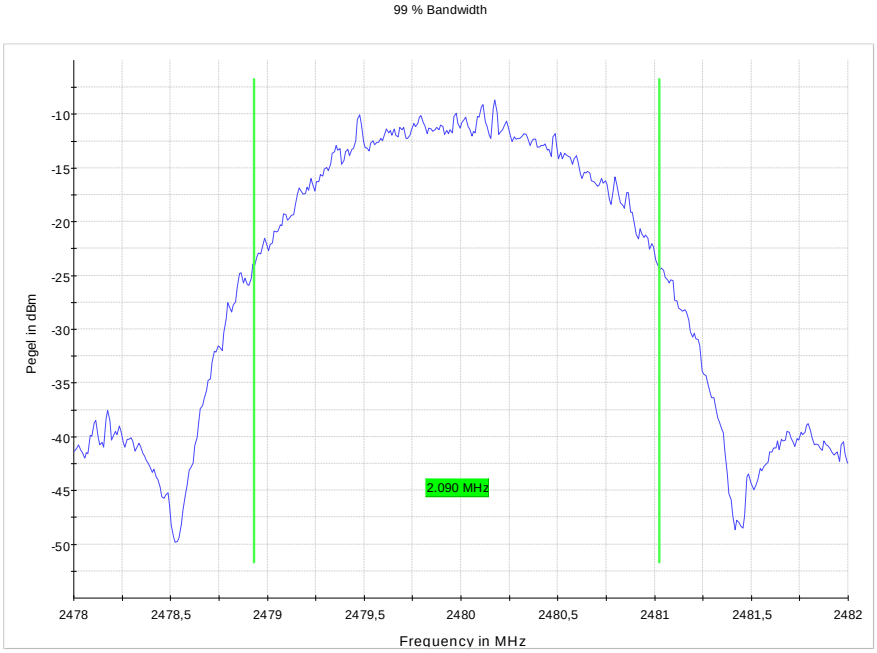


Product Service

2.2.8 Test Location and Test Equipment

The test was carried out in Radio Test Laboratoy

Instrument	*Manufacturer*	*Type No*	*TE No*	*Calibration Period (months)*	*Calibration Due*
Signal and spectrum analysator	Rohde & Schwarz	FSV40 for TS8997	38807	24	2026-03-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2026-07-31
EMC measurement software	Rohde & Schwarz	EMC32 TS8997 – V10.60.00	44381	---	---

Table 10

Product Service

2.3 Output Power

2.3.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.247(b)(3)
ISED RSS-247, Clause 5.4 d.

2.3.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.3.3 Date of Test

2025-03-11 and 2025-03-12

2.3.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	32 %

2.3.5 Specification Limits

The maximum conducted output power shall not exceed 1 W (30 dBm).
The e.i.r.p. shall not exceed 4 W (36 dBm).

2.3.6 Test Method

The test was performed according to ANSI C63.10, section 11.9.
The test was performed using a spectrum analyzer in zero span mode with the frequency set to the channel middle frequency and with RBW = 2 MHz and VBW = 10 MHz.

Product Service

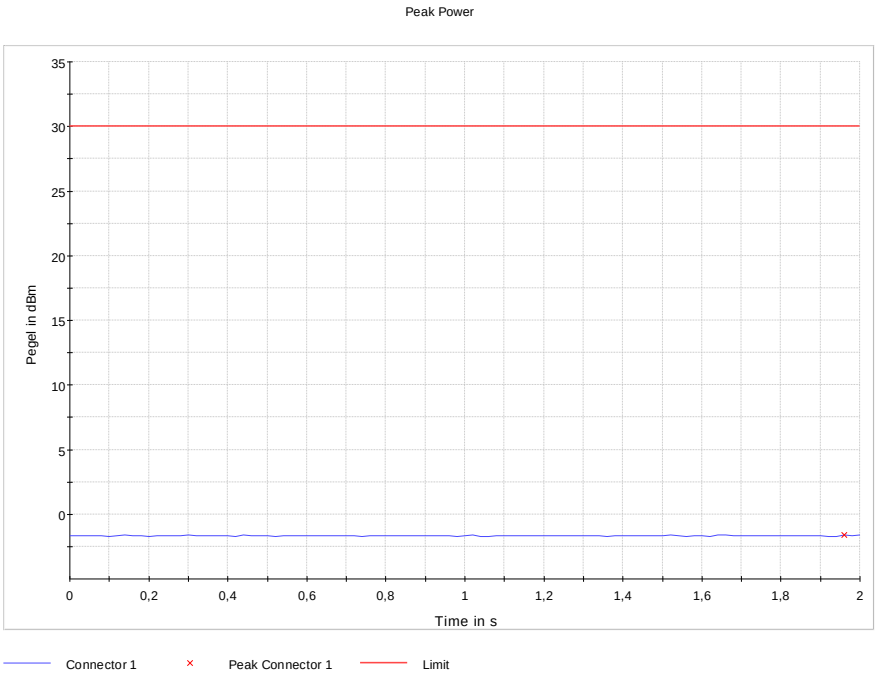
2.3.7 Test Results

Mode	*Frequency Channel*	*Detector*	*Conducted Output Power (dBm)*	*Limit (dBm)*
1M PHY	2402 MHz	PK	-0.5	30.0
1M PHY	2440 MHz	PK	-1.2	30.0
1M PHY	2480 MHz	PK	-1.6	30.0
1M PHY, BT 4.x	2402 MHz	PK	-0.5	30.0
1M PHY, BT 4.x	2440 MHz	PK	-1.2	30.0
1M PHY, BT 4.x	2480 MHz	PK	-1.5	30.0
Coded PHY S=2	2402 MHz	PK	-0.6	30.0
Coded PHY S=2	2440 MHz	PK	-1.1	30.0
Coded PHY S=2	2480 MHz	PK	-1.5	30.0
Coded PHY S=8	2402 MHz	PK	-0.9	30.0
Coded PHY S=8	2440 MHz	PK	-1.5	30.0
Coded PHY S=8	2480 MHz	PK	-1.9	30.0
2M PHY	2402 MHz	PK	-0.6	30.0
2M PHY	2440 MHz	PK	-1.2	30.0
2M PHY	2480 MHz	PK	-1.6	30.0

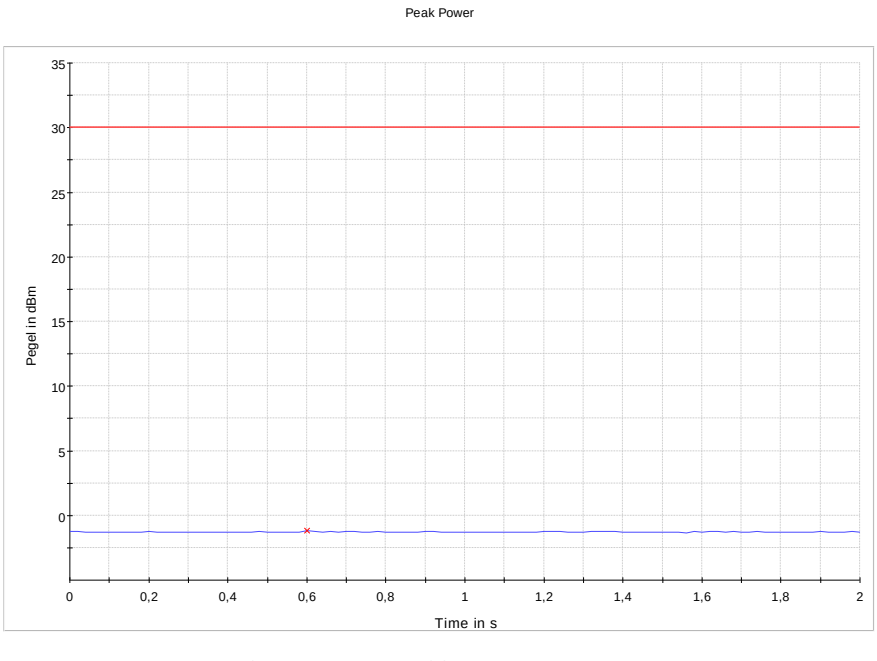
Table 11: Conducted Output Power

Product Service

1M PHY

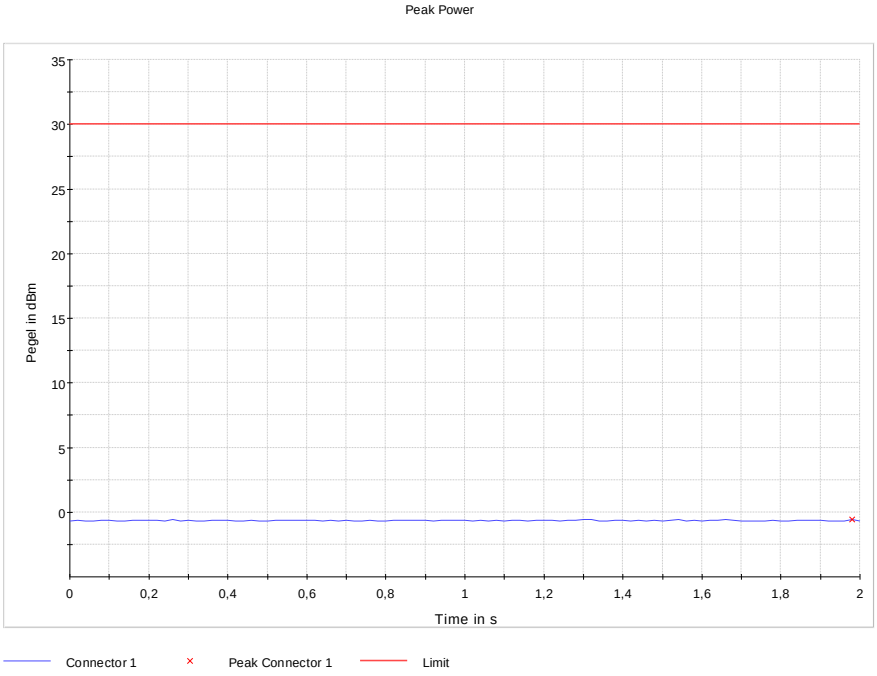


2402 MHz



2440 MHz

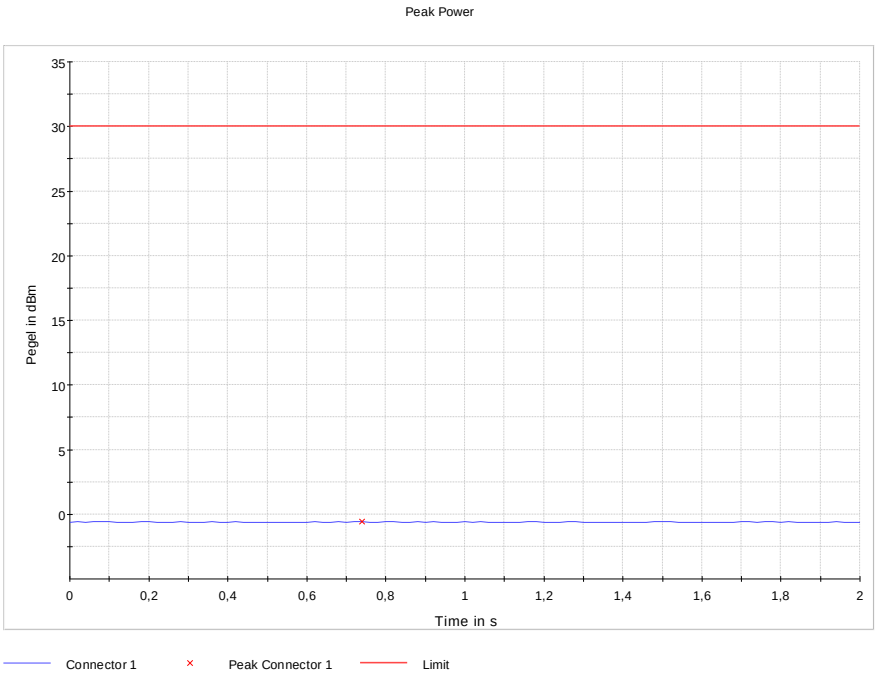
Product Service



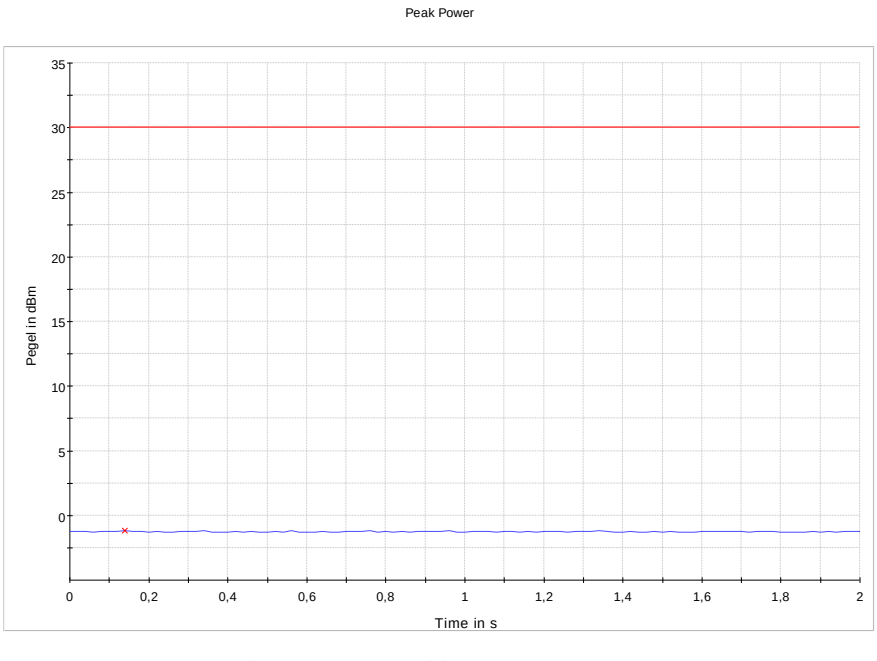
2480 MHz

Product Service

1M PHY, BT 4.x

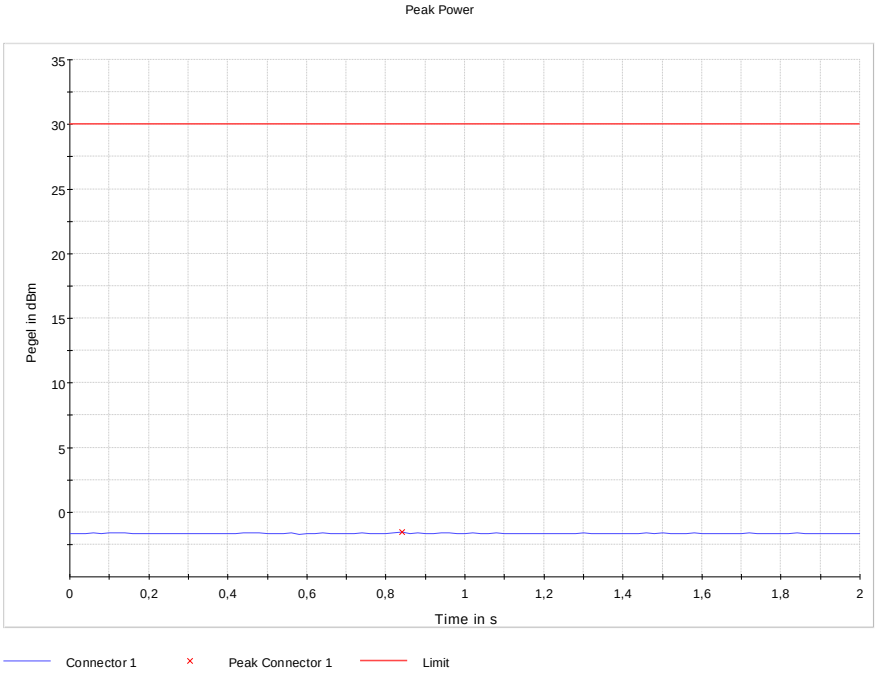


2402 MHz



2440 MHz

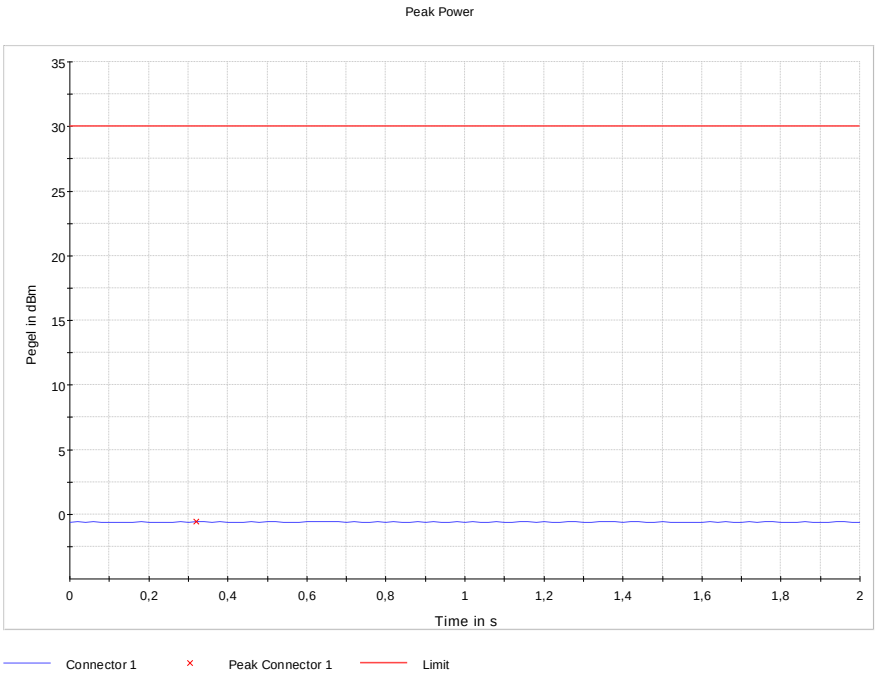
Product Service



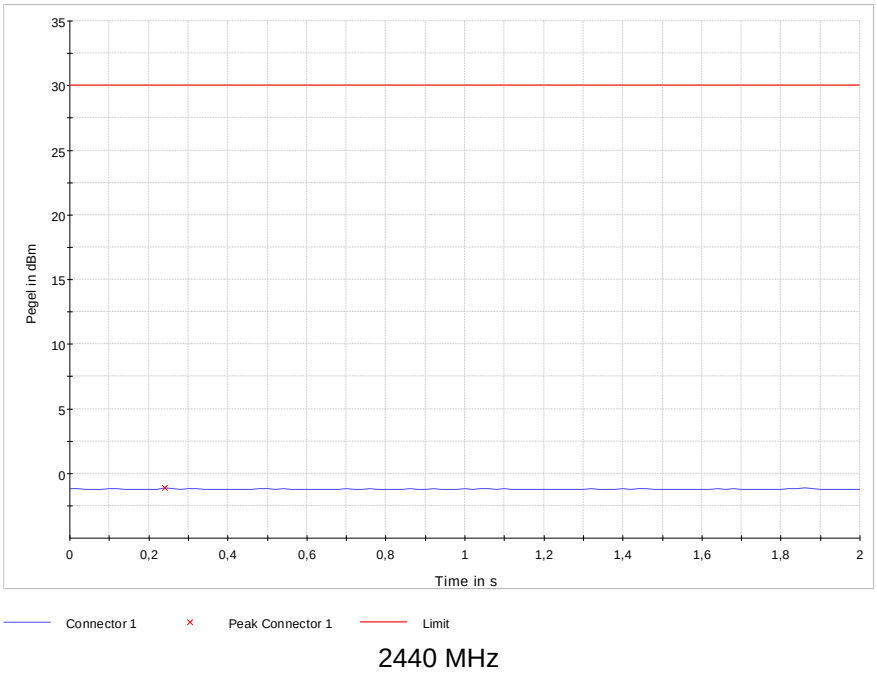
2480 MHz

Product Service

Coded PHY S=2

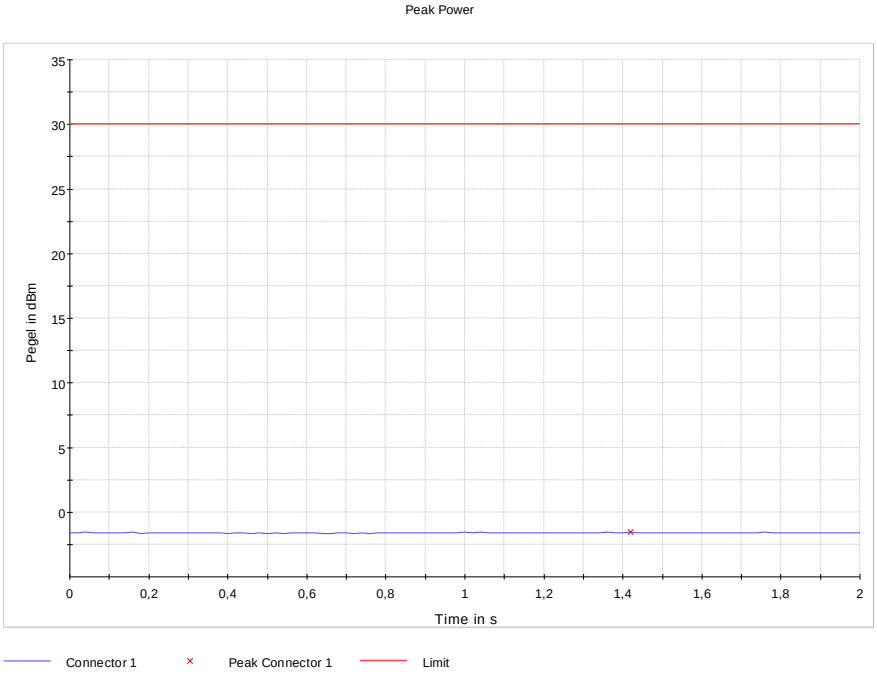


2402 MHz



2440 MHz

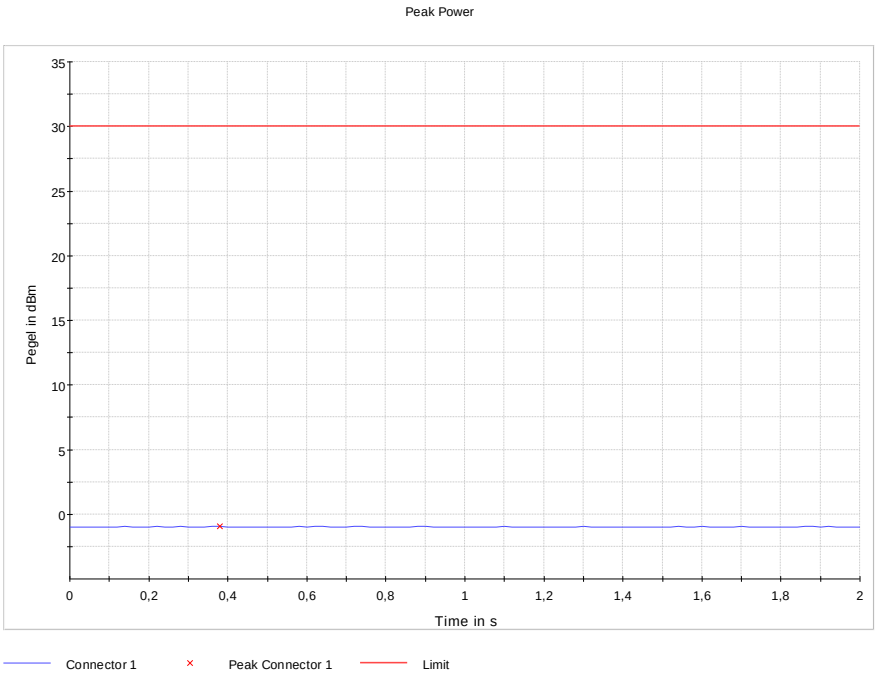
Product Service



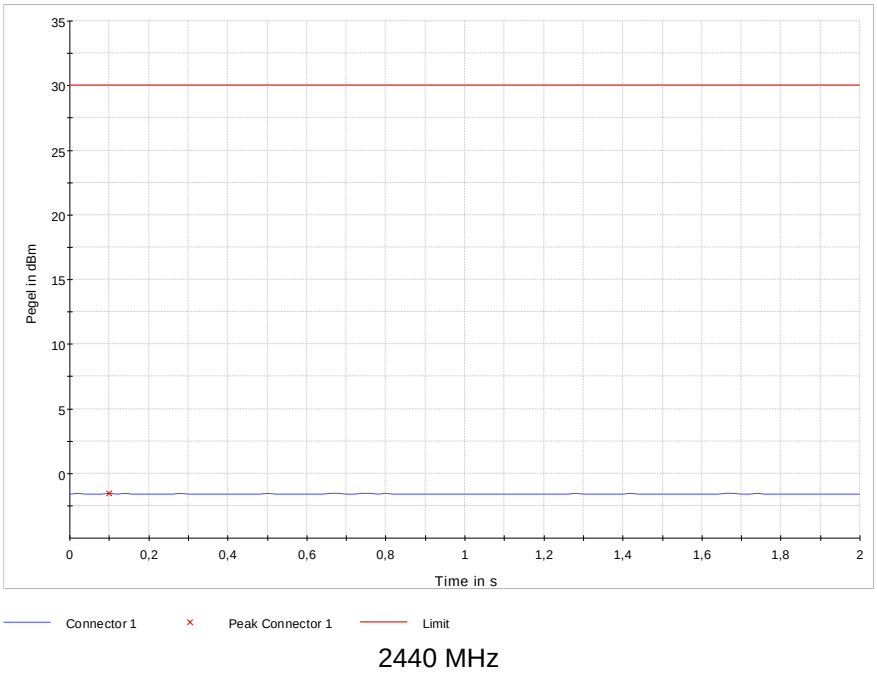
2480 MHz

Product Service

Coded PHY S=8

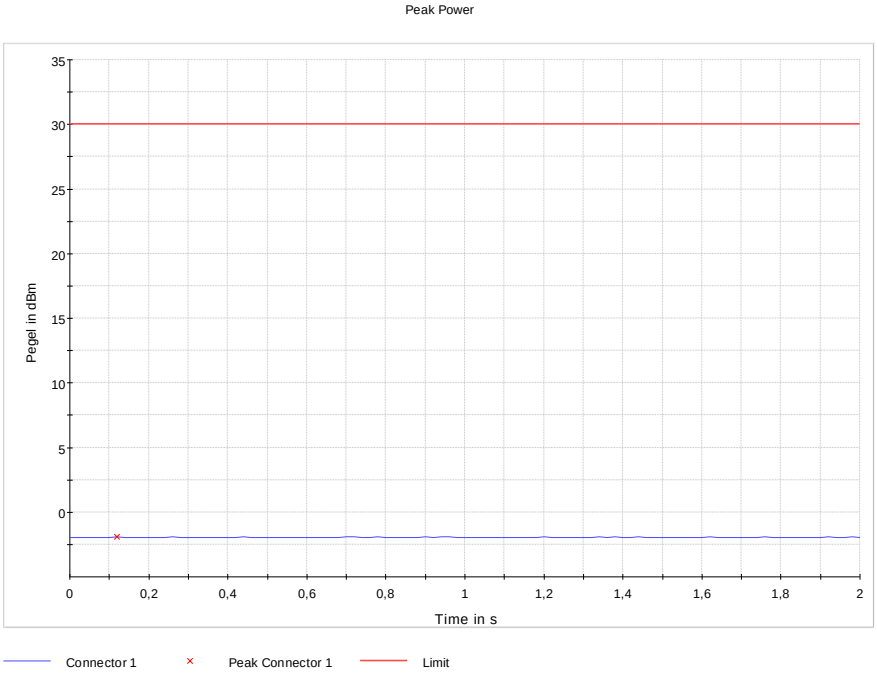


2402 MHz



2440 MHz

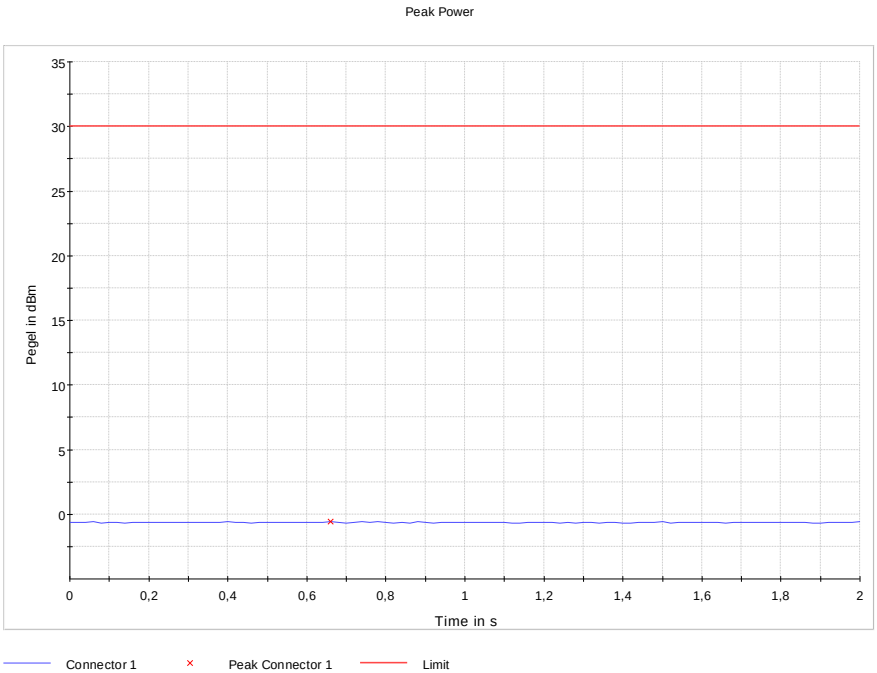
Product Service



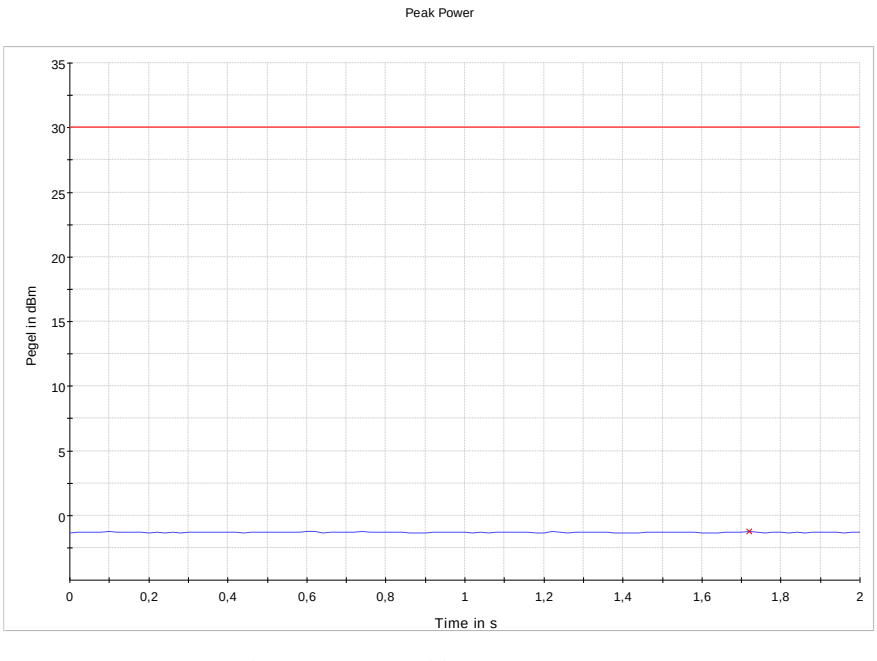
2480 MHz

Product Service

2M PHY

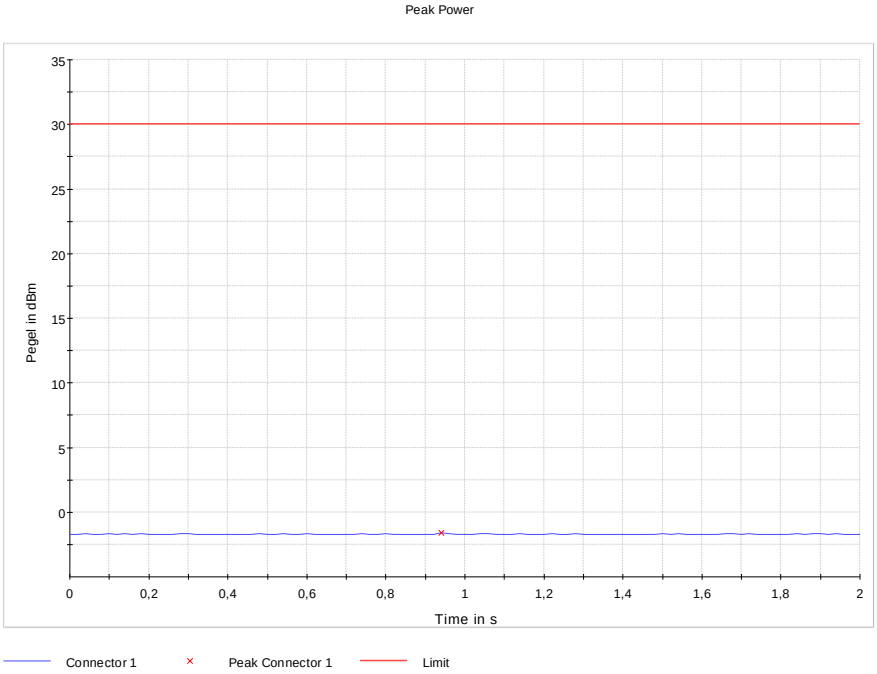


2402 MHz



2440 MHz

Product Service



2480 MHZ

2.3.8 Test Location and Test Equipment

The test was carried out in Radio Test Laboratoy

Instrument	*Manufacturer*	*Type No*	*TE No*	*Calibration Period (months)*	*Calibration Due*
Signal and spectrum analysator	Rohde & Schwarz	FSV40 for TS8997	38807	24	2026-03-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2026-07-31
EMC measurement software	Rohde & Schwarz	EMC32 TS8997 – V10.60.00	44381	---	---

Table 12

Product Service

2.4 Power Spectral Density

2.4.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.247(e)
ISED RSS-247, Clause 5.2 b.

2.4.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.4.3 Date of Test

2025-03-11 and 2025-03-12

2.4.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	32 %

2.4.5 Specification Limits

FCC 47 CFR, section 15.257(e)
ISED RSS-247, Clause 5.2.(b)
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.
The same method (detector) of determining the conducted output power shall be used to determine the power spectral density.

2.4.6 Test Method

The test was performed according to ANSI C63.10, section 11.10

Product Service

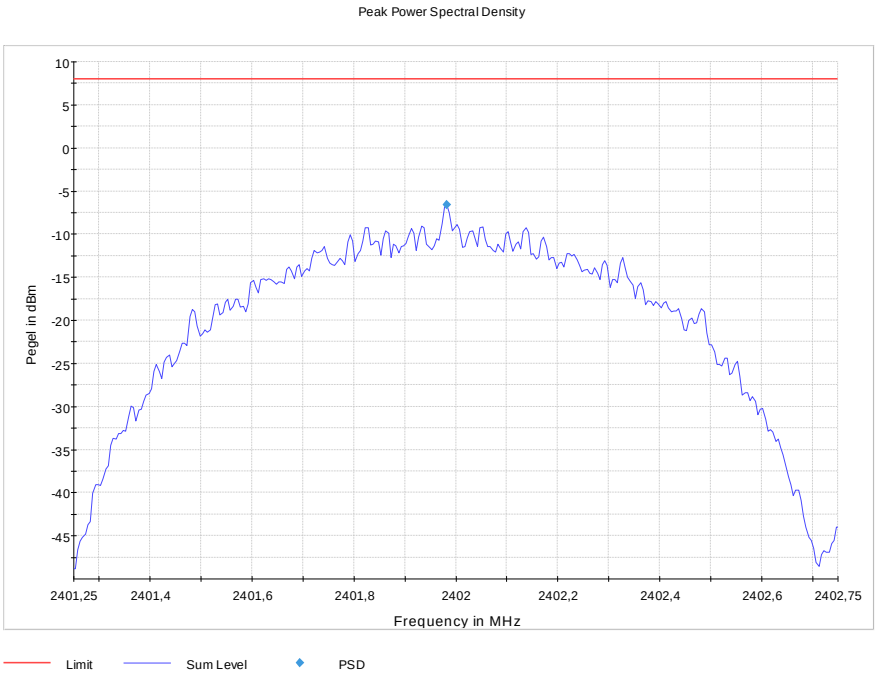
2.4.7 Test Results

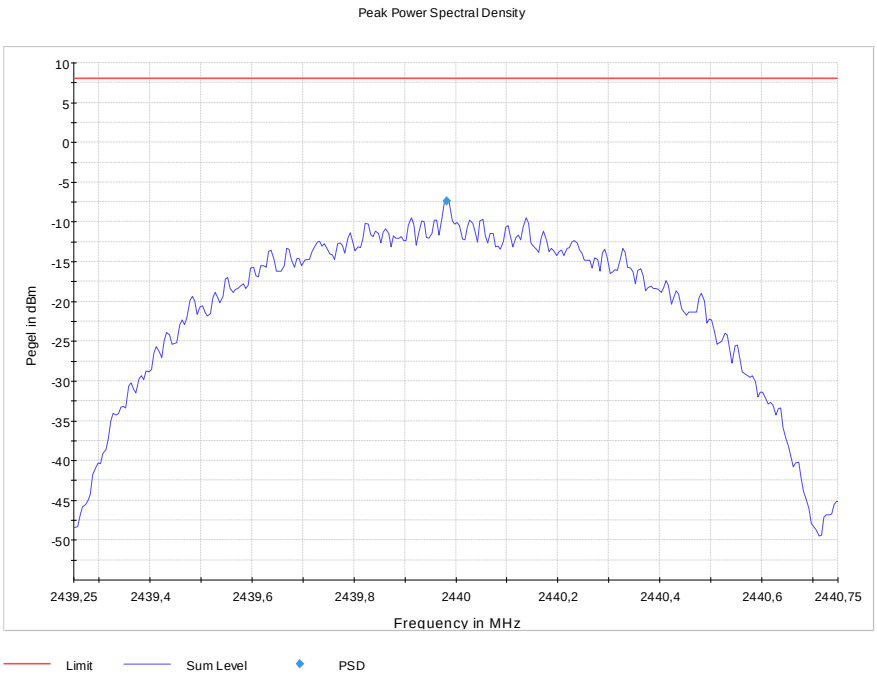
Mode	*Frequency Channel*	Detector	Spectral Power Density (dBm)	Limit (dBm)
1M PHY	2402 MHz	PK	-6.623	8.0
1M PHY	2440 MHz	PK	-7.380	8.0
1M PHY	2480 MHz	PK	-7.810	8.0
1M PHY, BT 4.x	2402 MHz	PK	-7.957	8.0
1M PHY, BT 4.x	2440 MHz	PK	-8.460	8.0
1M PHY, BT 4.x	2480 MHz	PK	-9.738	8.0
Coded PHY S=2	2402 MHz	PK	-8.085	8.0
Coded PHY S=2	2440 MHz	PK	-9.195	8.0
Coded PHY S=2	2480 MHz	PK	-9.056	8.0
Coded PHY S=8	2402 MHz	PK	-6.977	8.0
Coded PHY S=8	2440 MHz	PK	-8.394	8.0
Coded PHY S=8	2480 MHz	PK	-8.577	8.0
2M PHY	2402 MHz	PK	-10.466	8.0
2M PHY	2440 MHz	PK	-11.131	8.0
2M PHY	2480 MHz	PK	-12.255	8.0

Table 13: Spectral Power Density

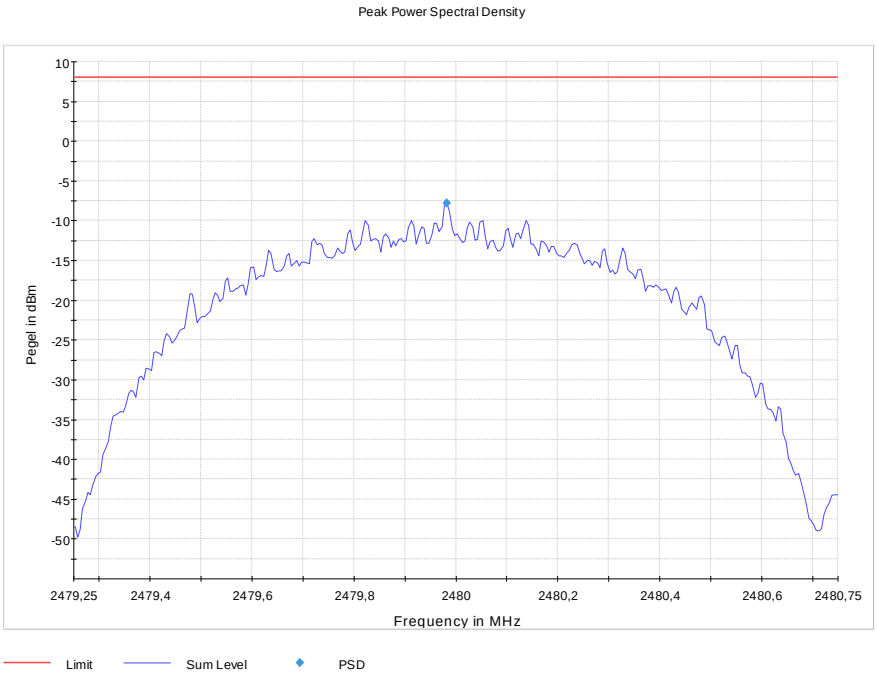
Product Service

1M PHY



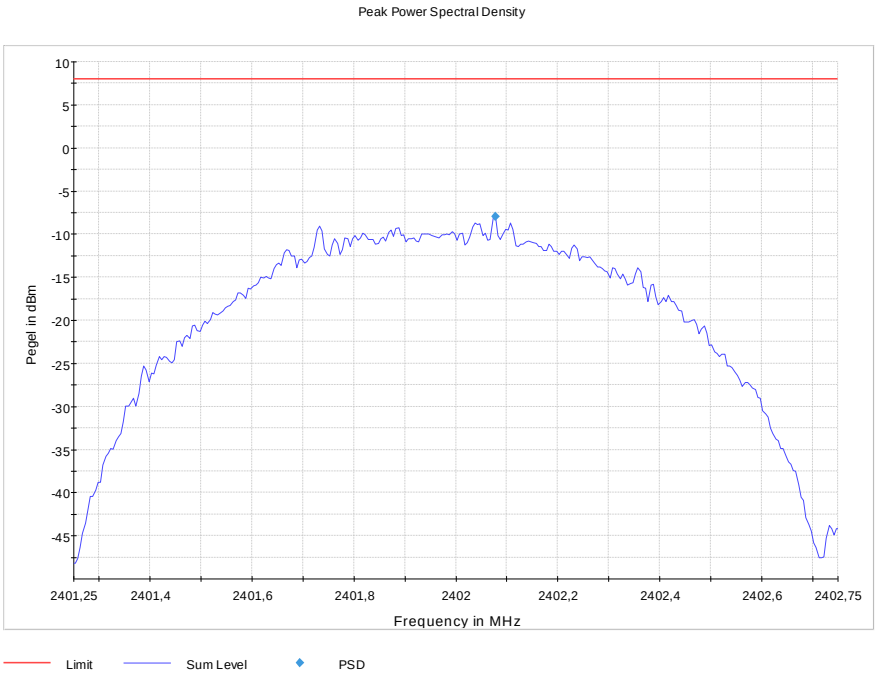


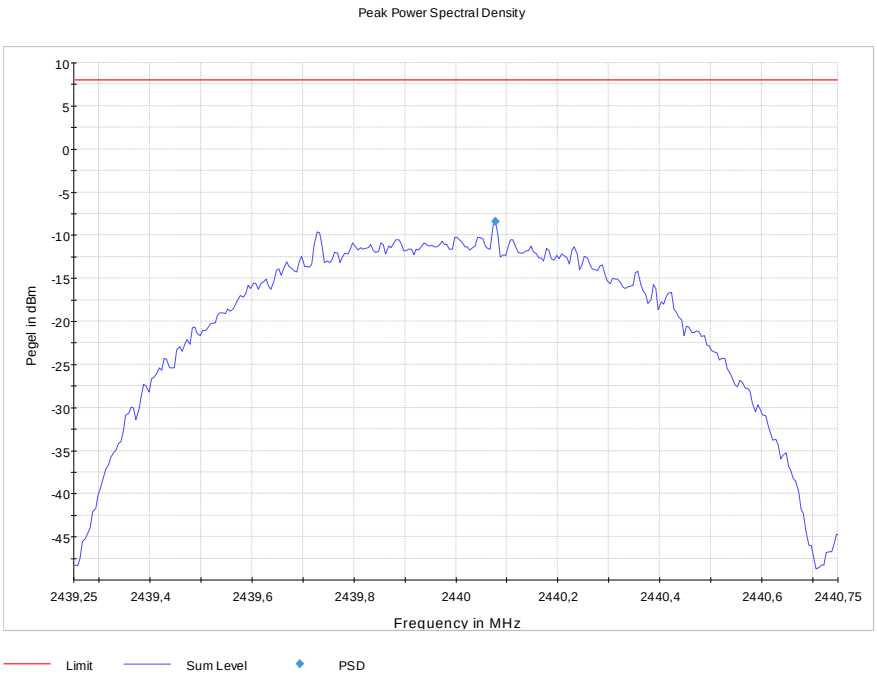
Product Service



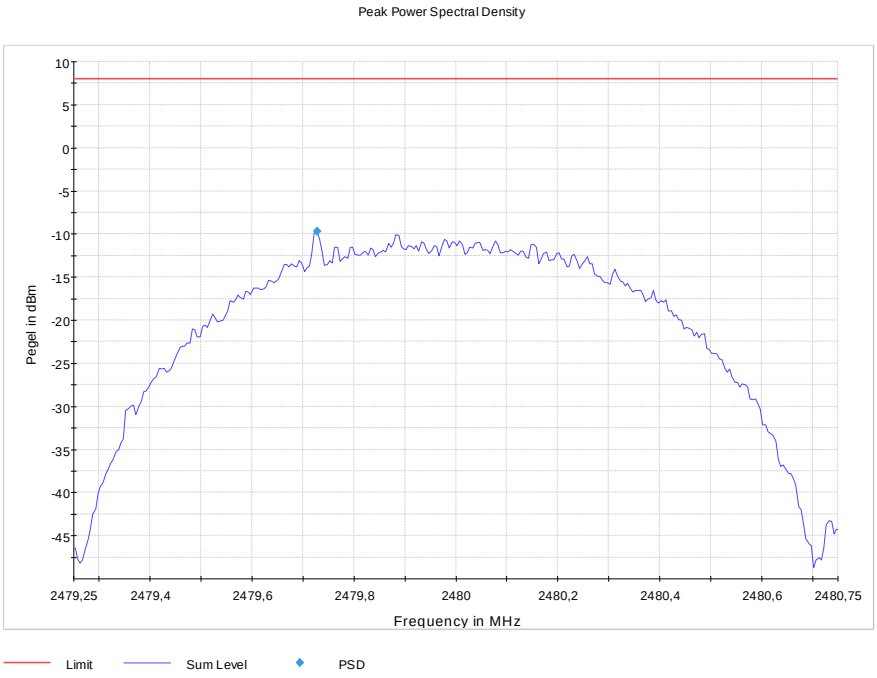
Product Service

1M PHY, BT 4.x



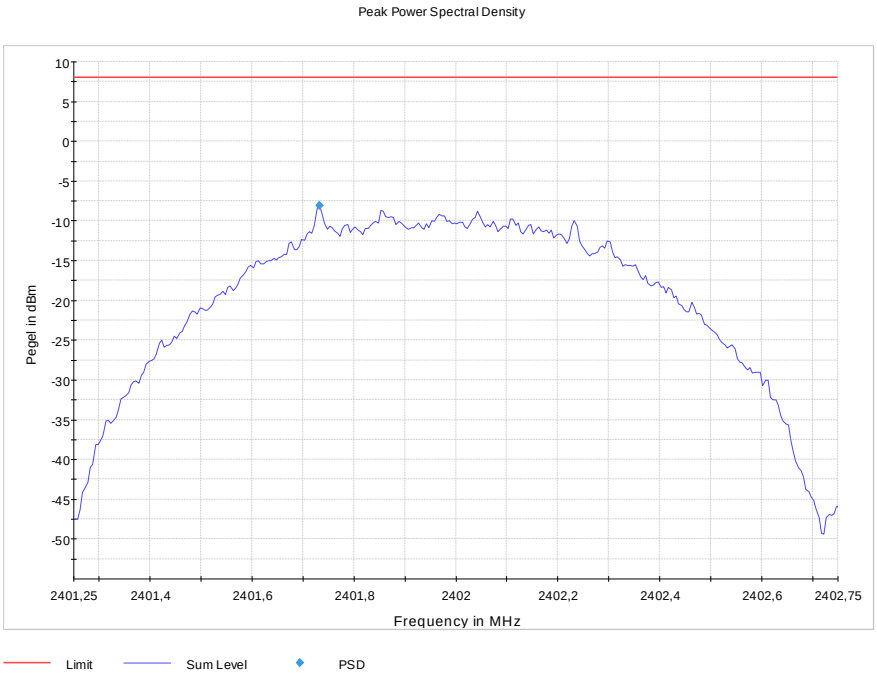


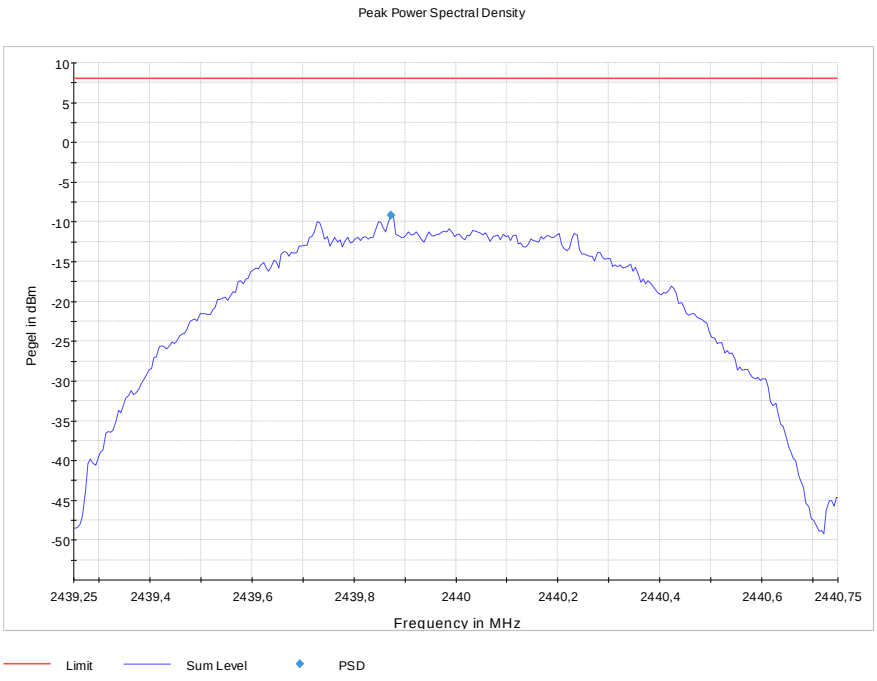
Product Service



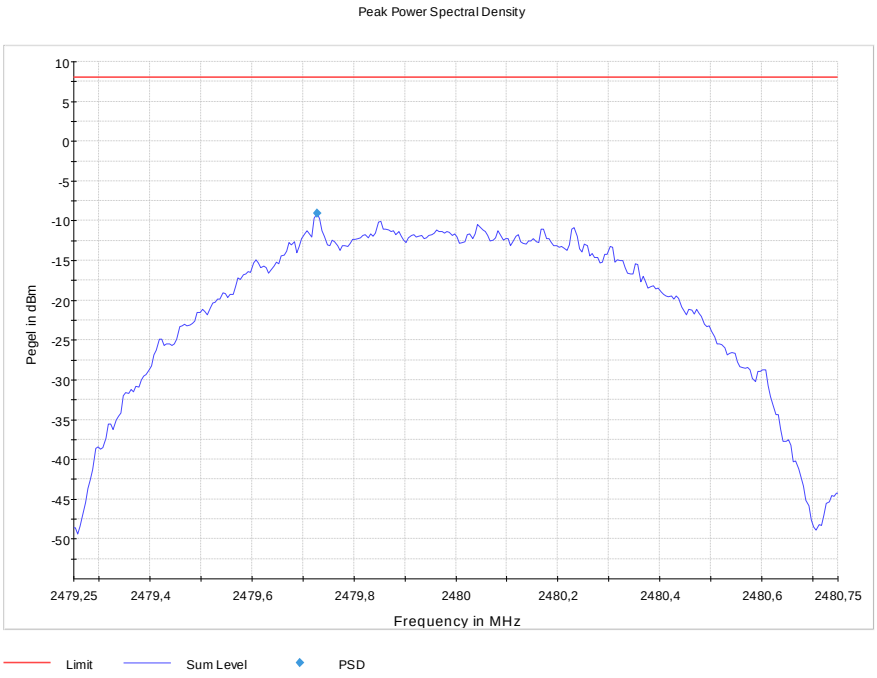
Product Service

Coded PHY S=2



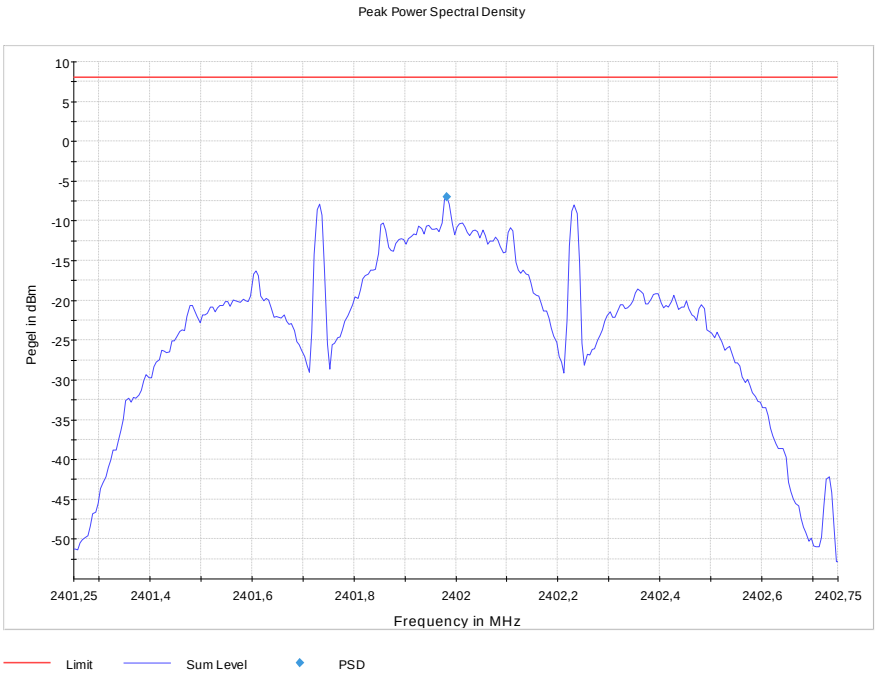


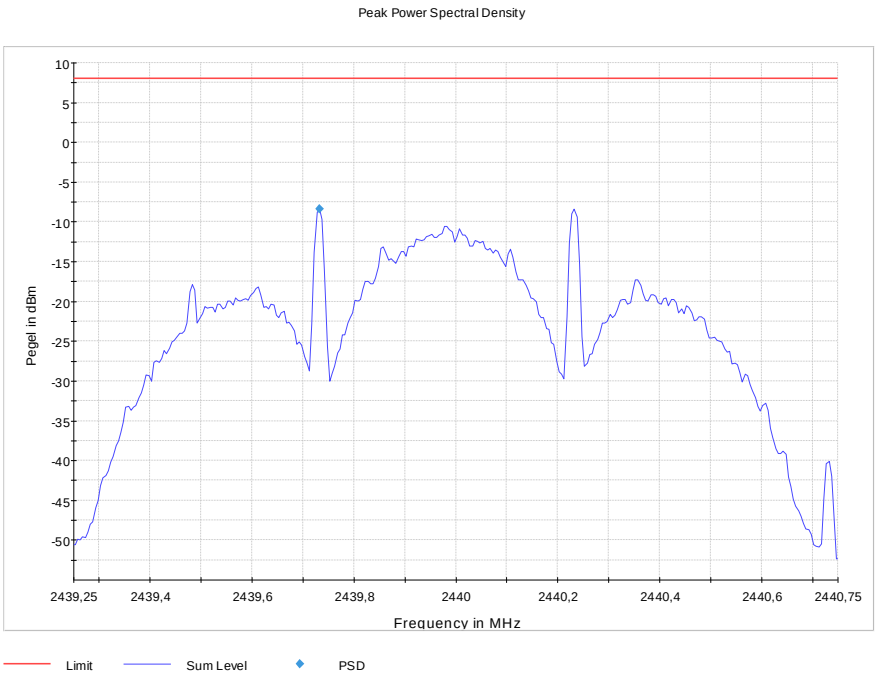
Product Service



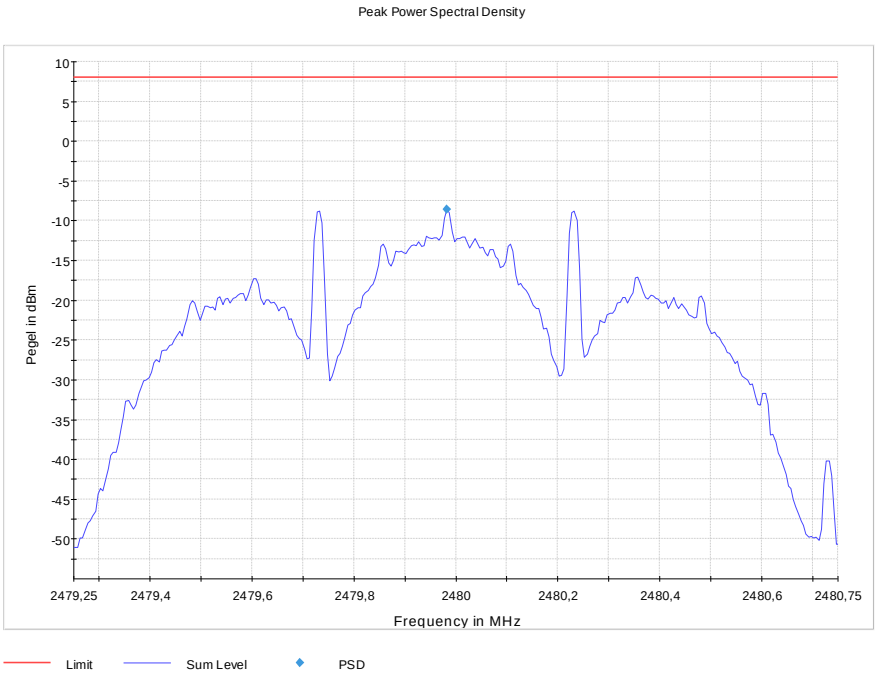
Product Service

Coded PHY S=8



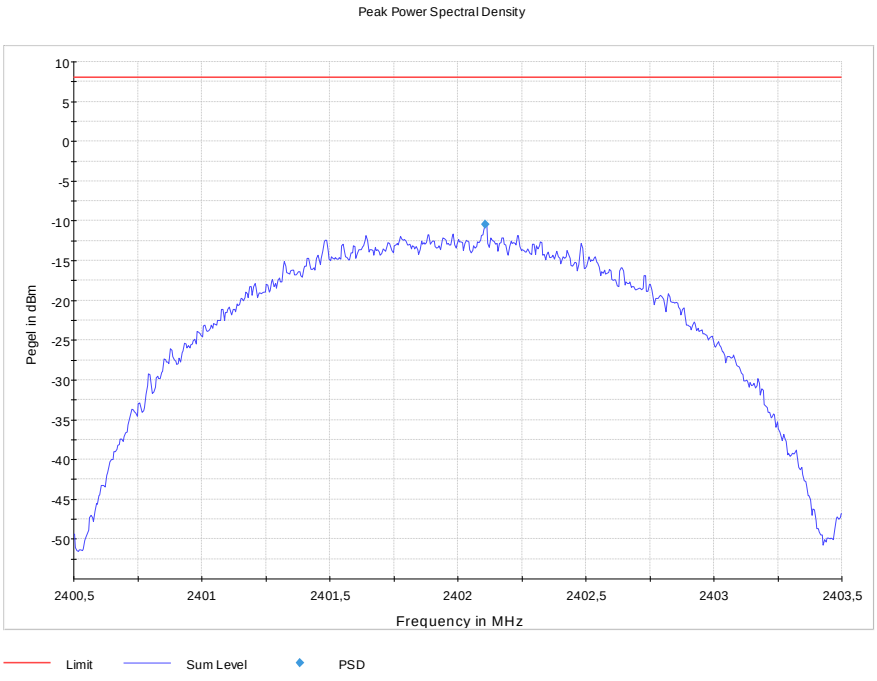


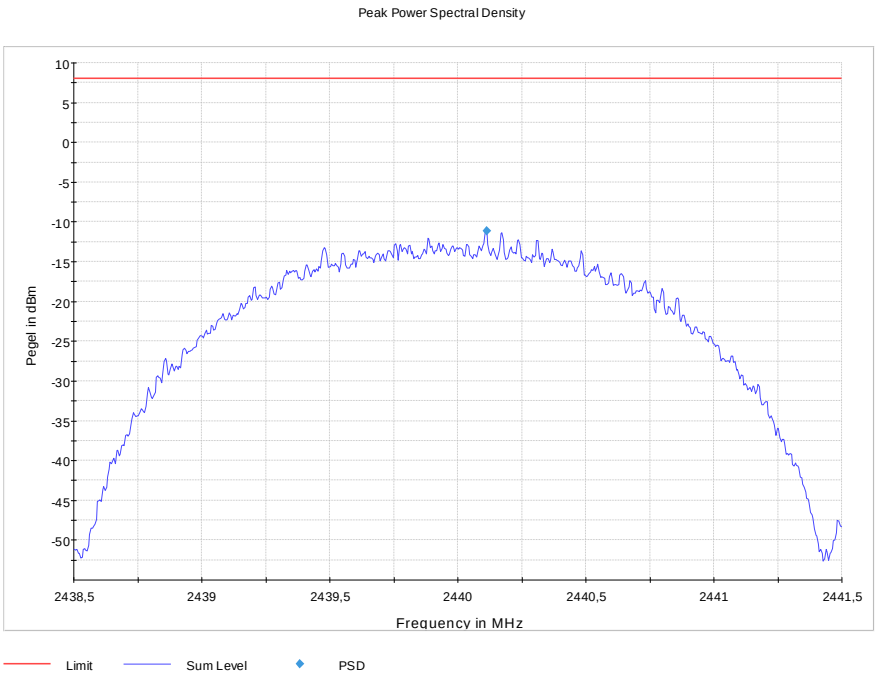
Product Service

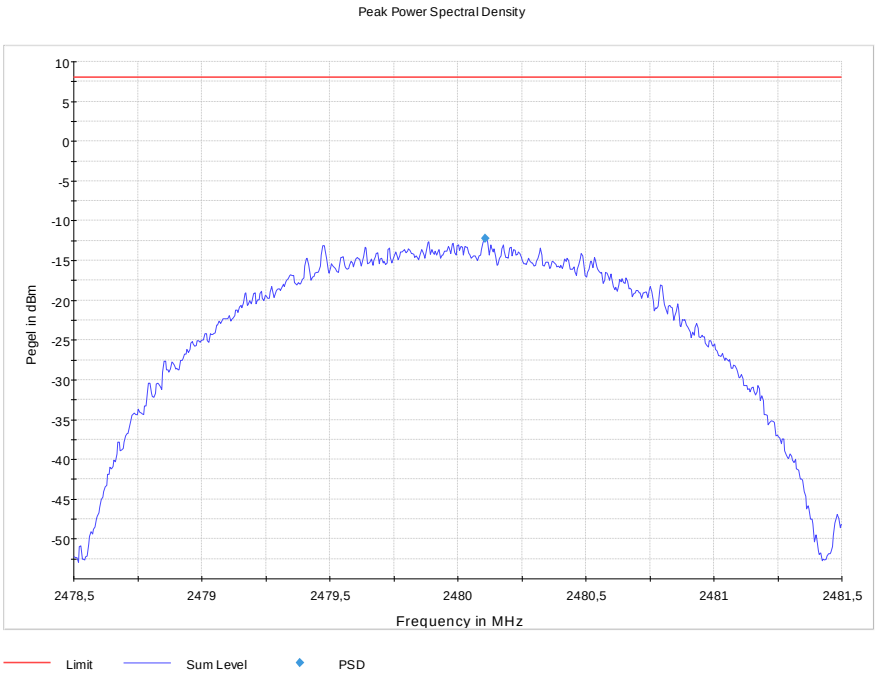


Product Service

2M PHY







2.4.8 Test Location and Test Equipment

The test was carried out in Radio Test Laboratoy

Instrument	*Manufacturer*	*Type No*	*TE No*	*Calibration Period (months)*	*Calibration Due*
Signal and spectrum analysator	Rohde & Schwarz	FSV40 for TS8997	38807	24	2026-03-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2026-07-31
EMC measurement software	Rohde & Schwarz	EMC32 TS8997 – V10.60.00	44381	---	---

Table 14

Product Service

2.5 Frequency Band Edge

2.5.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.247(d)
ISED RSS-247, Clause 5.5

2.5.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.5.3 Date of Test

2025-03-14

2.5.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	32 %

2.5.5 Specification Limits

In any 100 kHz bandwidth outside the frequency band in which the device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either conducted or radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted, the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits is not required.
In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

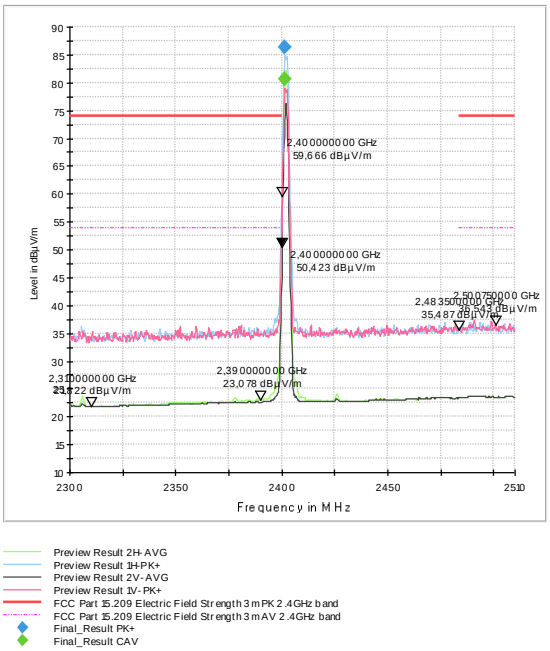
2.5.6 Test Method

The test was performed according to ANSI C63.10, sections 11.11 with the EUT in three orthogonal axes. See section 2.6.6.3 for more information.

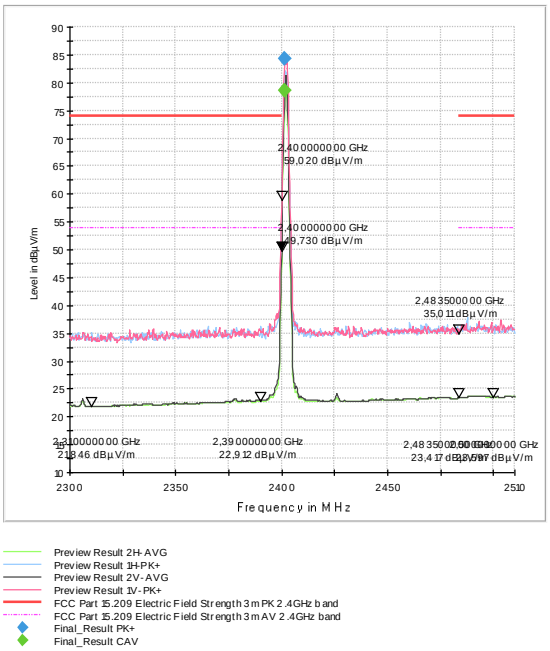
Product Service

2.5.7 Test Results

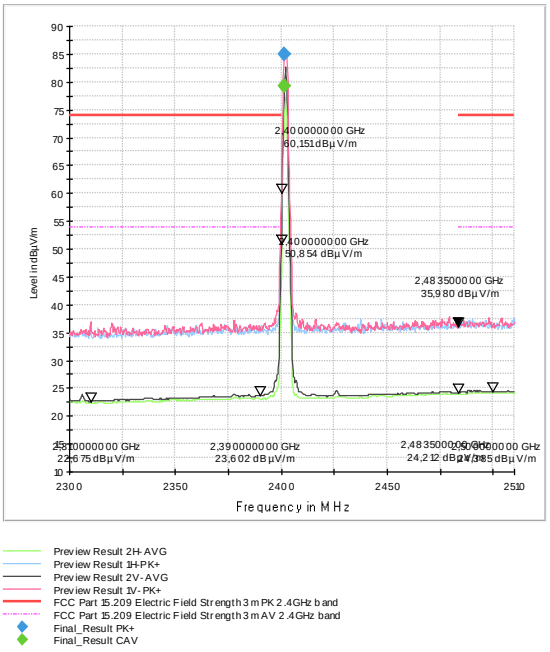
2M PHY, 2402 MHz



EUT flat on table



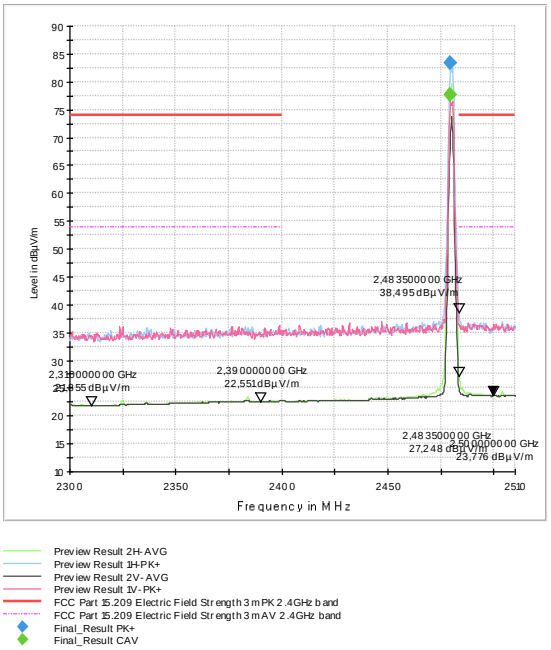
EUT on long side



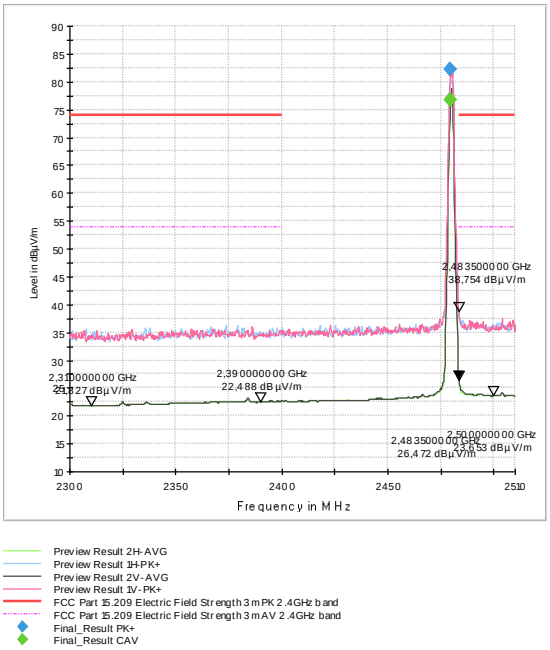
EUT in upright position

Product Service

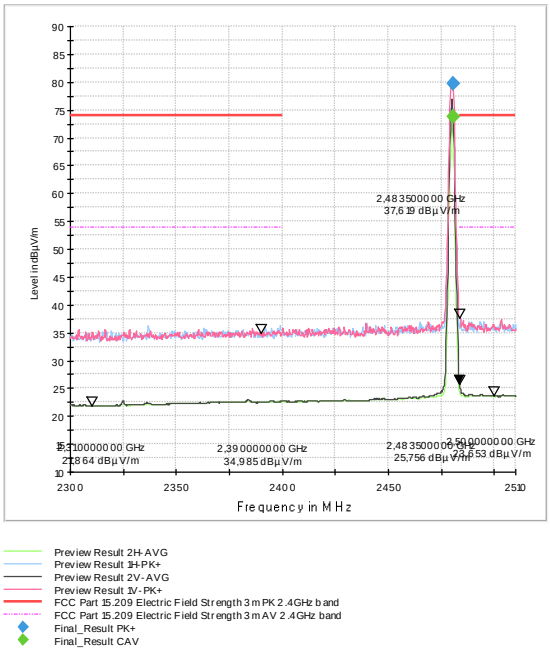
2M PHY, 2480 MHz



EUT flat on table



EUT on long side



EUT in upright position

Product Service

2.5.8 Test Location and Test Equipment

The test was carried out in semi anechoic room, Cabin No. 3

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and 2pectrum analyzer	Rohde & Schwarz	FSV40	20219	24	2026-03-31
Double ridged horn antenna	Rohde & Schwarz	HF907	64145	24	2025-06-30
EMC measurement software	Rohde & Schwarz	EMC32 K3 – V10.60.20	44376	---	---
Semi anechoic room	Frankonia	Cabin No. 3	56331	---	---

Table 15

Product Service

2.6 Spurious emissions

2.6.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.205, 15.209, 15.247(d)
ISED RSS-247, Clause 5.5
ISED RSS-Gen, Clauses 8.9 and 8.10

2.6.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.6.3 Date of Test

2025-03-11 and 2025-03-14

2.6.4 Environmental Conditions

Ambient Temperature	22 °C
Relative Humidity	32 %

2.6.5 Specification Limits

In any 100 kHz bandwidth outside the frequency band in which the device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either conducted or radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted, the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits is not required.
In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

Product Service

General radiated emission limits:					
Frequency Range (MHz)	*Test distance (m)*	*Field strength*		*Field strength*	
		(µA/m)	*(dBµA/m)*	*(µV/m)*	*(dBµV/m)*
0.009 – 0.49	300	6.37 / *f*	20*lg(6.37 / *f*)	2400 / *f*	20*lg(2400 / *f*)
0.49 – 1.705	30	63.7 / *f*	20*lg(63.7 / *f*)	24000 / *f*	20*lg(24000 / *f*)
1.705 - 30	30	0.08	20*lg(0.08 / *f*)	30	20*lg(30 / *f*)
30 – 88	3	---	--	100	40
88 – 216	3	--	--	150	43.5
126 – 960	3	--	--	200	46
above 960	3	--	--	500	54
Note 1: *f* in kHz					

Table 16 General radiated emission limits

At frequencies at or above 30 MHz, measurements may be performed at distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements.

At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempts should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

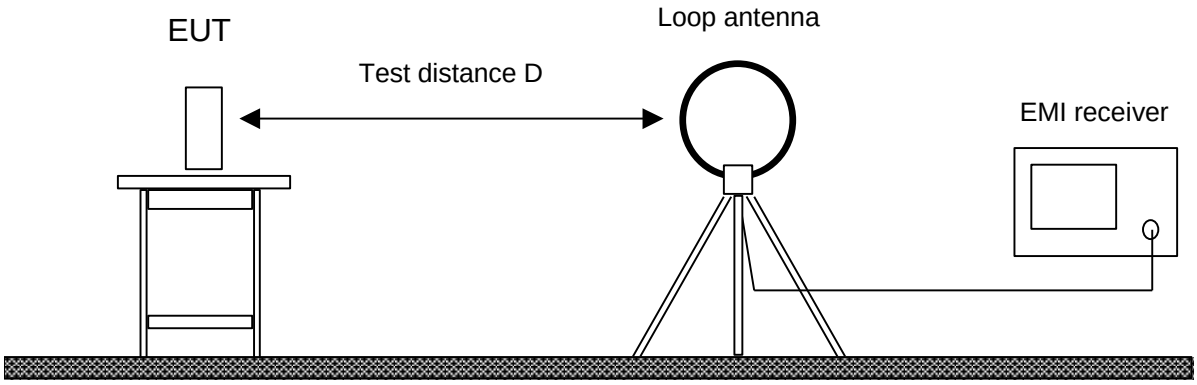
Product Service

2.6.6 Test Method

The test was performed according to ANSI C63.10, sections 11.11 and 11.12

Prescans are performed in six positions of the EUT to get the full spectrum of emission caused by the EUT with the measuring antenna raised and lowered from 1 m to 4 m with vertical and horizontal polarisation to find the combination of table position, antenna height and antenna polarisation for the maximum emission levels.
Data reduction is applied to these results to select those levels having less margin than 10 dB or exceeding the limit using subranges and limited number of maximums.
Further maximisation for adjusting the maximum position is following.
Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

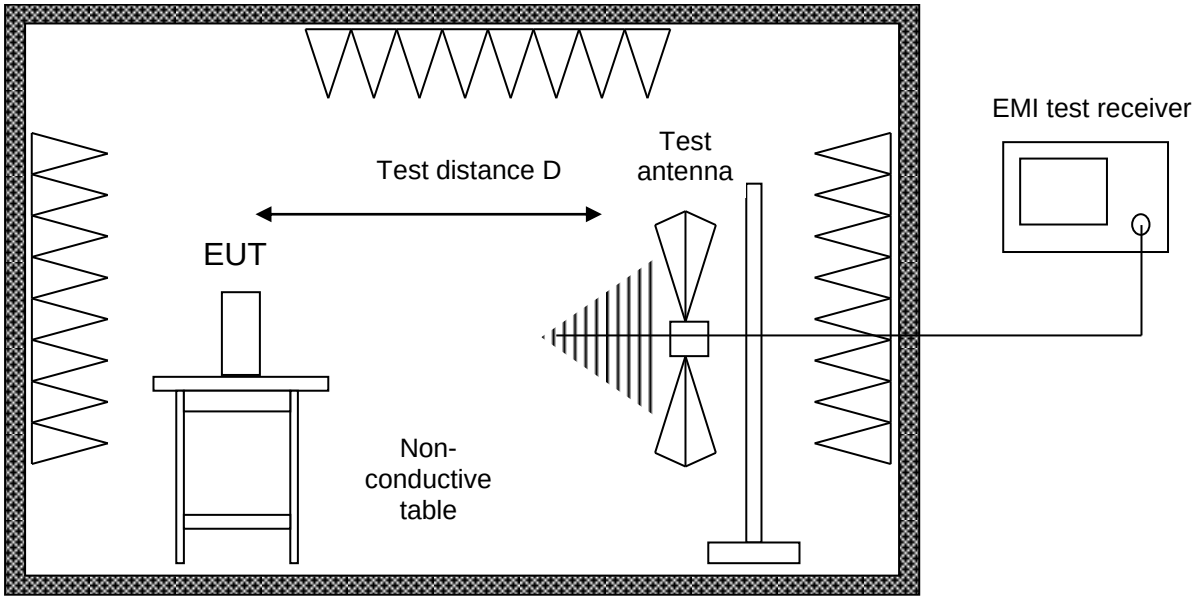
2.6.6.1 Frequency range 9 kHz – 30 MHz



The EUT was placed on a non-conductive table, 0.8 m above the ground.
Radiated emissions in the frequency 9 kHz – 30 MHz is measured within a semi-anechoic room with an active loop antenna with the measurement detector set to peak. In addition in the frequency range 9 kHz to 490 kHz also an average detector was used. The measurement bandwidth of the receiver was set to 300 Hz in the frequency range 9 kHz to 150 kHz and 10 kHz in the frequency range 150 kHz to 30 MHz. Prescans were performed in six positions of the EUT.
For final measurements the detector was set to CISPR quasi-peak and in addition to CISPR average in the frequency range 9 kHz to 490 kHz with a resolution bandwidth 200 Hz in the frequency range 9 kHz to 150 kHz and 9 kHz in the frequency range 150 kHz to 30 MHz. Final tests were performed immediately after a final frequency and zoom (for drifting disturbances) and maximum adjustment.

Product Service

2.6.6.2 Frequency range 30 MHz – 1 GHz

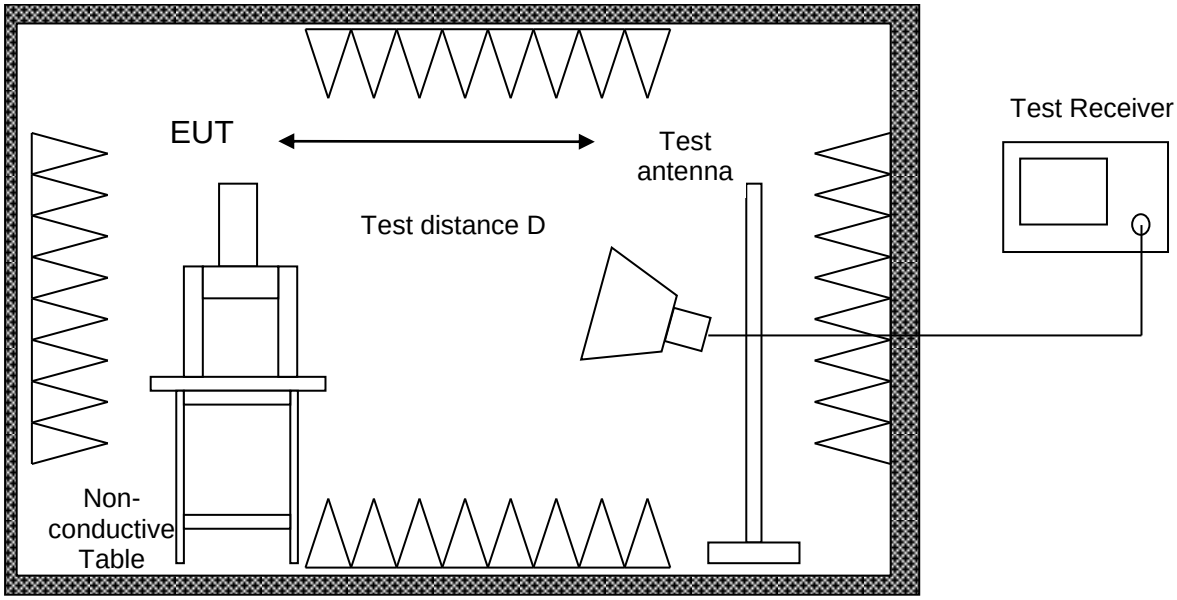


Alternate test site (semi anechoic room)

The EUT was placed on a non-conductive table, 0.8 m above the ground plane
Radiated emissions in the frequency range 30 MHz – 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4. for alternative test sites. A linear polarised logarithmic periodic antenna combined with a 4:1 broadband dipole (“Trilog broadband antenna”) is used.
For prescan tests the test receiver is set to peak-detector with a bandwidth of 120 kHz.
With the measurement bandwidth of the test receiver set to 120 kHz CISPR quasi-peak detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

Product Service

2.6.6.3 Frequency range above 1 GHz



Fully anechoic room

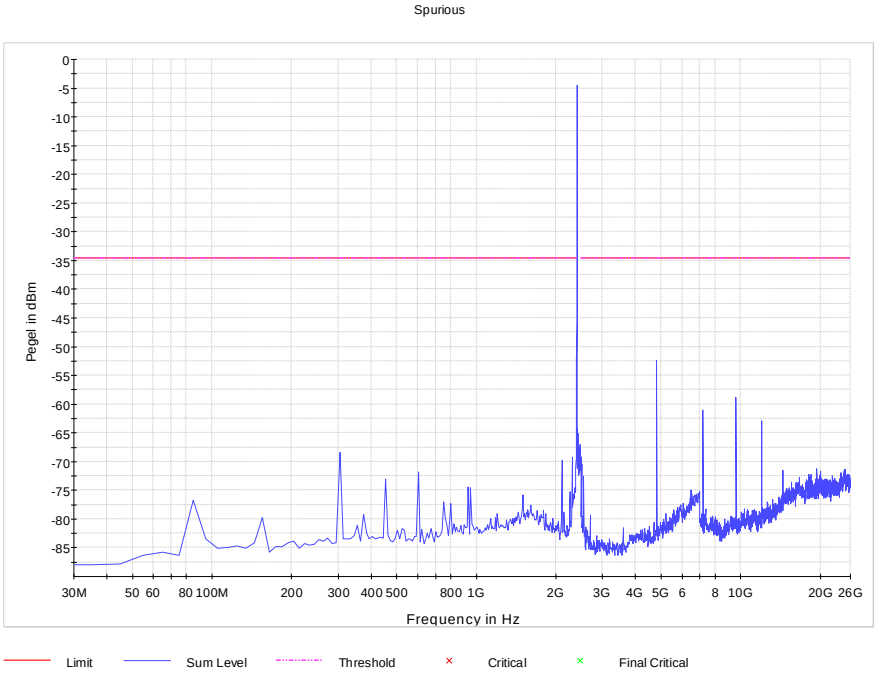
The EUT was placed on a non-conductive table, 1.5 m above the ground plane
Radiated emission tests above 1 GHz are performed in a fully anechoic room with the S_{VSWR} requirements of ANSI C63.4. Measurements are performed both in the horizontal and vertical planes of polarisation using a test receiver with the detector function set to peak and average and the resolution bandwidth set to 1 MHz. Testing above 1 GHz is performed with horn antennas with the EUT in boresight of the antenna.
For prescan tests the test receiver is set to peak- and average-detector with a bandwidth of 1 MHz. With the measurement bandwidth of the test receiver set to 1 MHz and peak- and CISPR average-detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

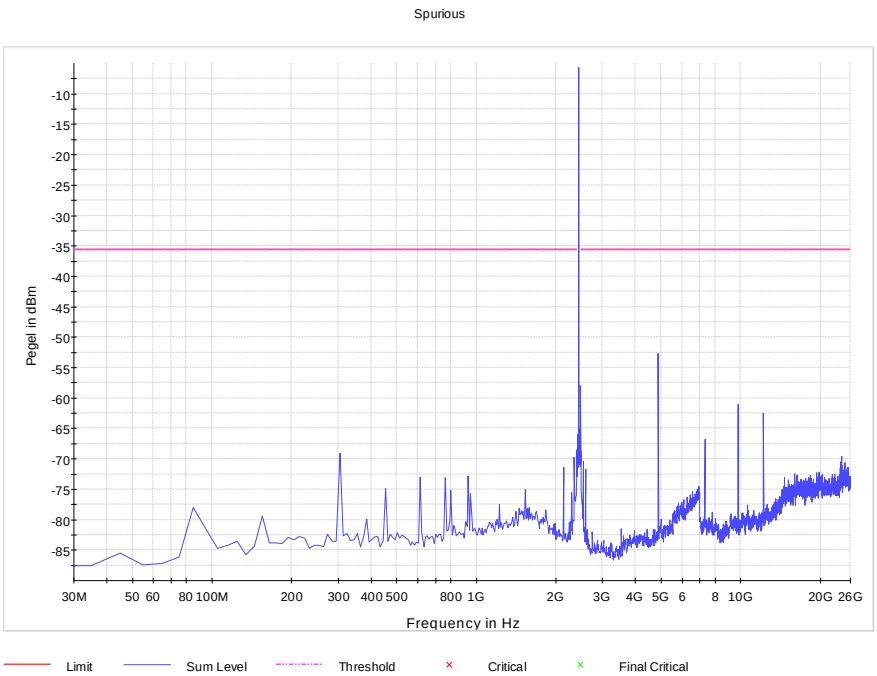
Product Service

2.6.7 Test Results

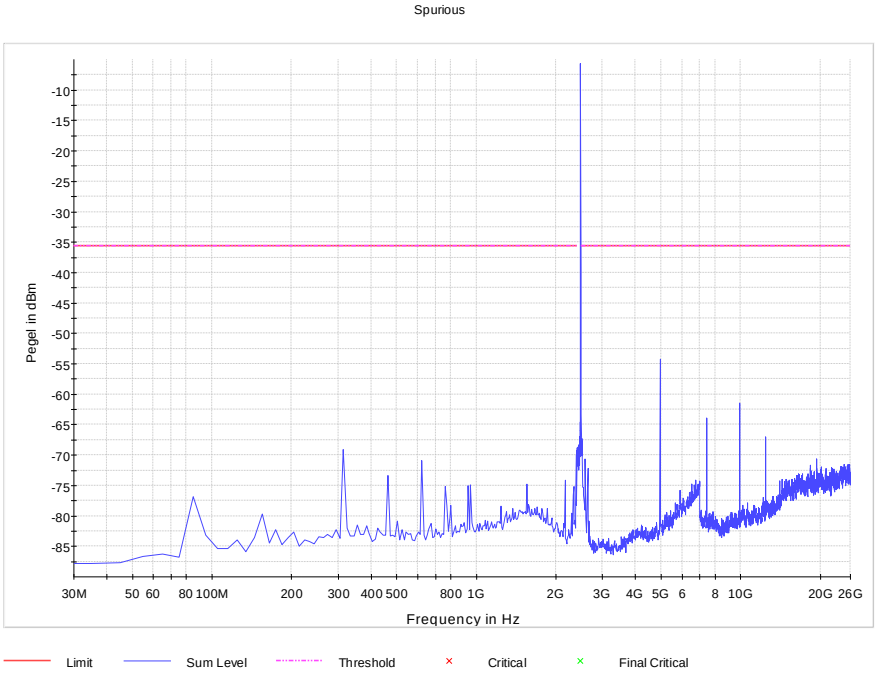
2.6.7.1 Test Results for conducted tests

1M PHY



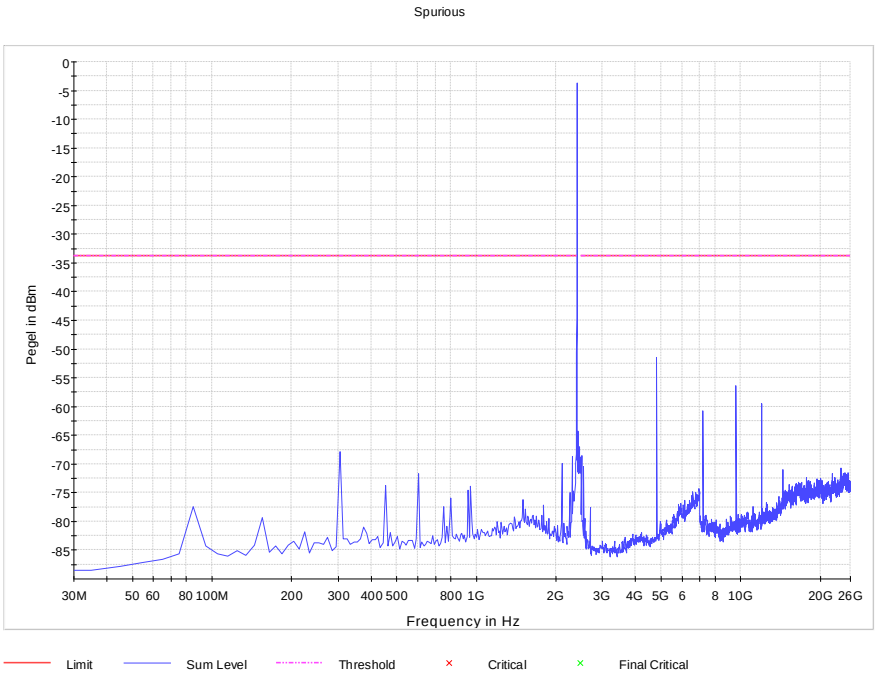


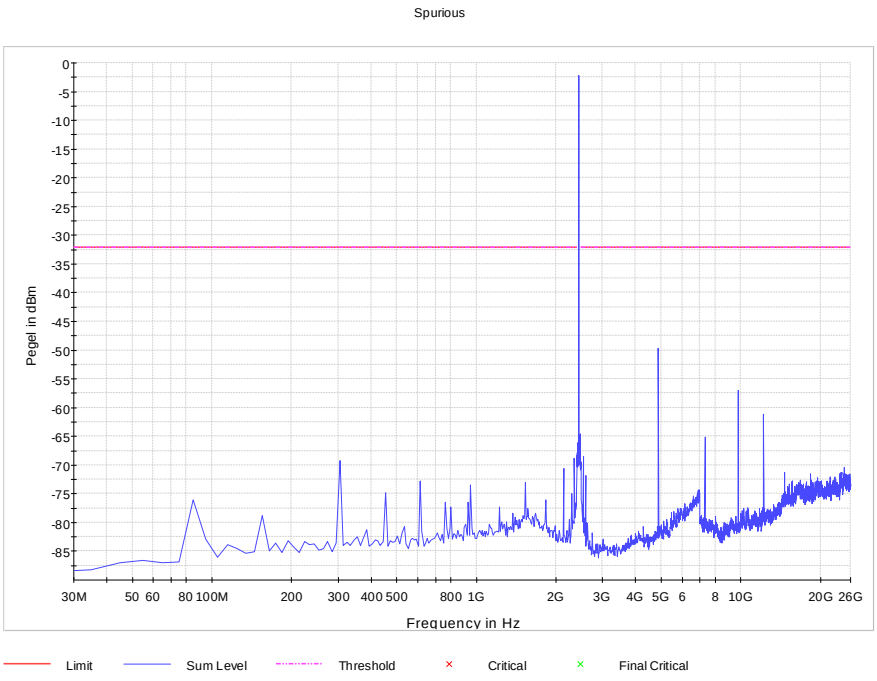
Product Service



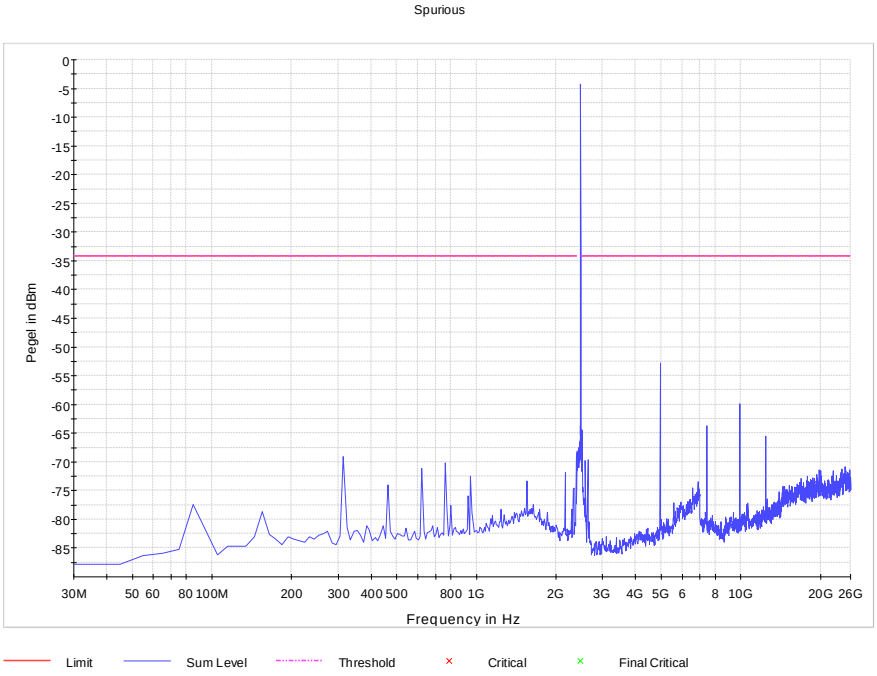
Product Service

1M PHY, BT 4.x



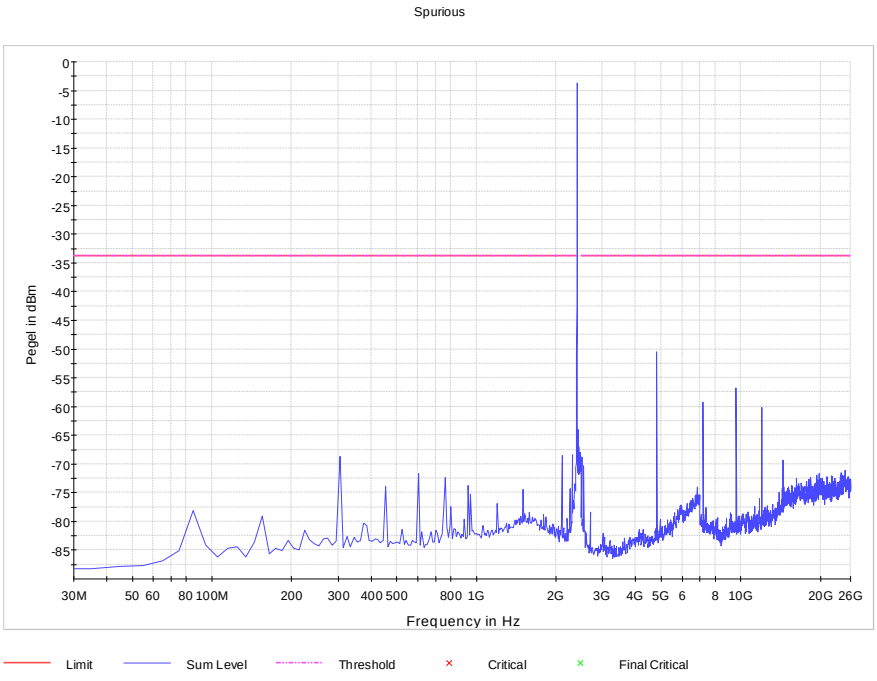


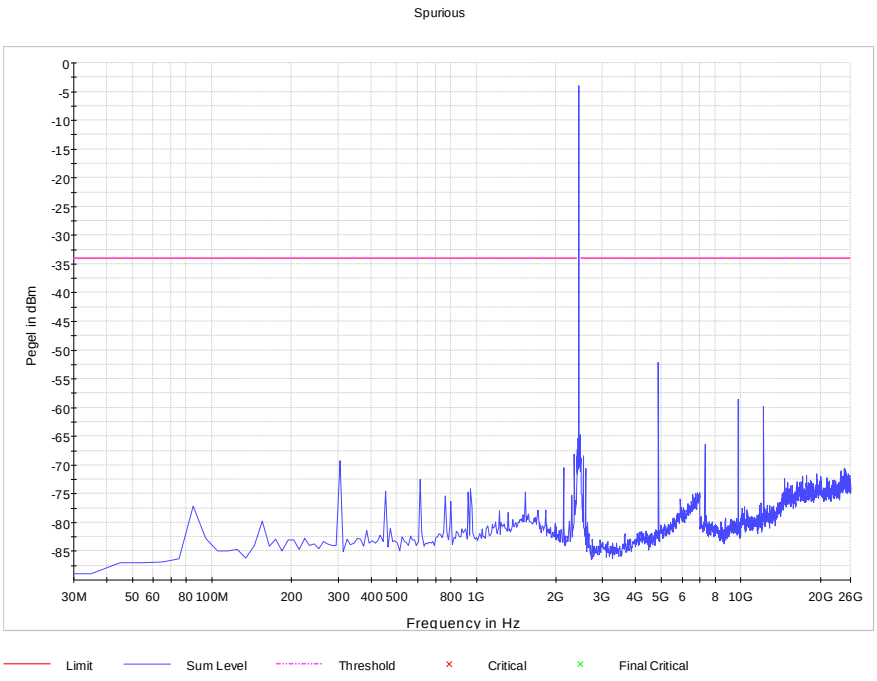
Product Service



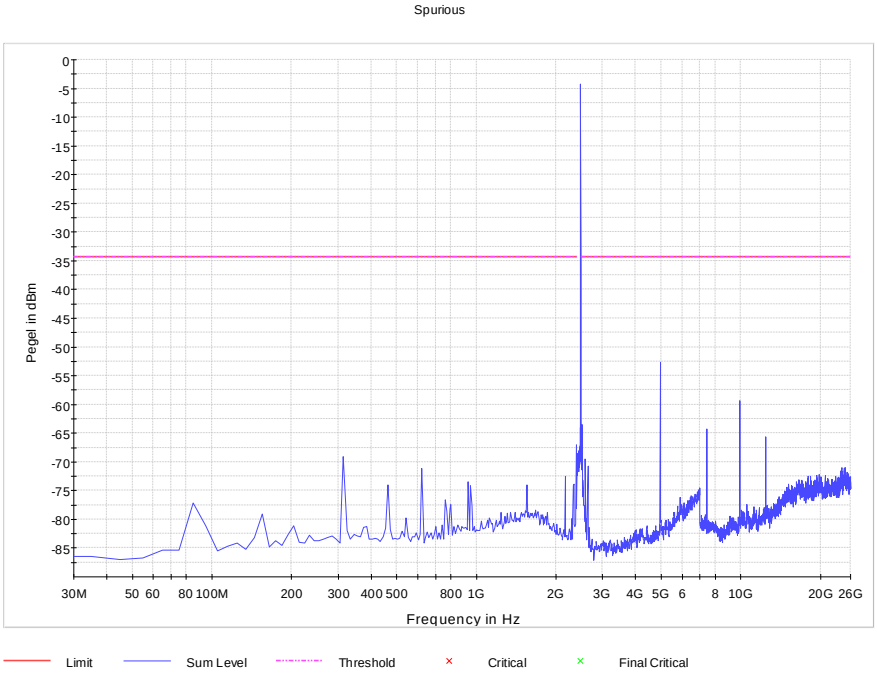
Product Service

Coded PHY S=2



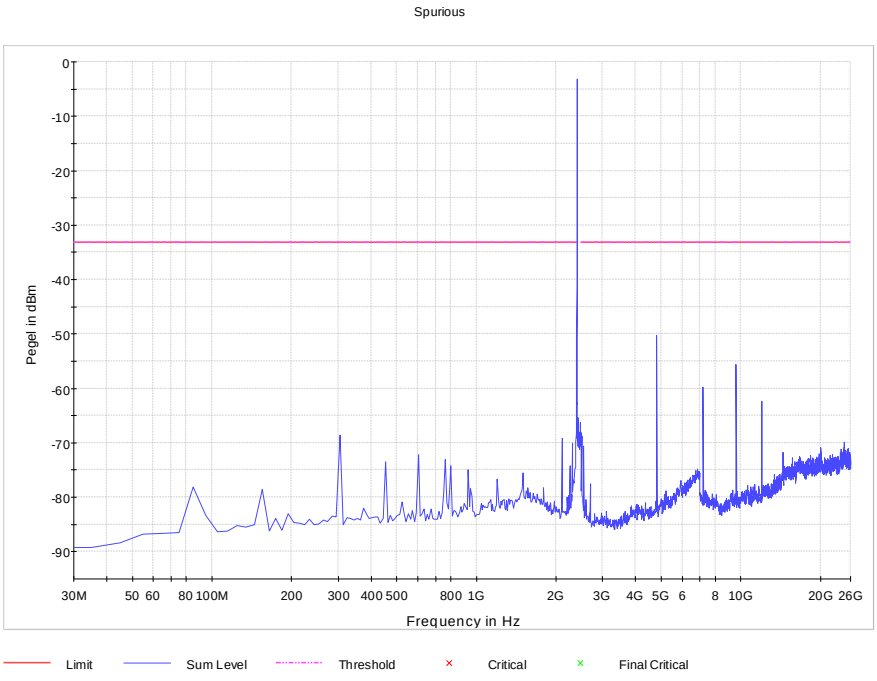


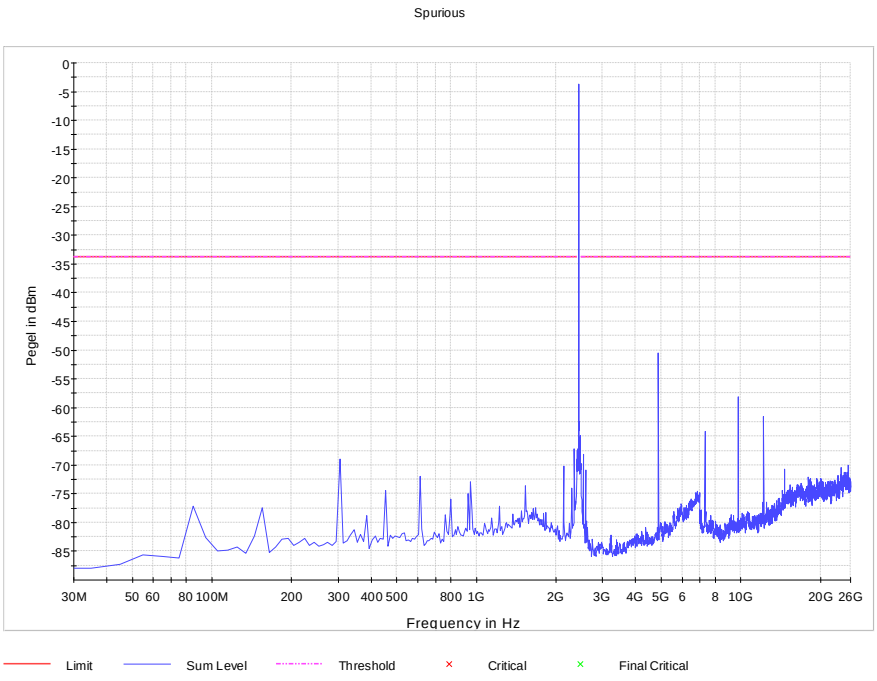
Product Service



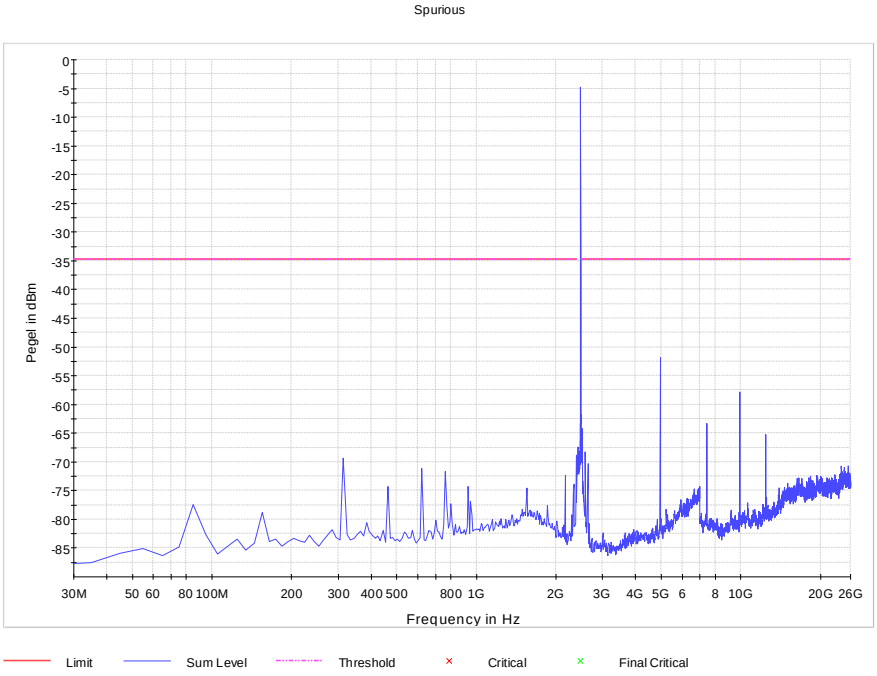
Product Service

Coded PHY S=8



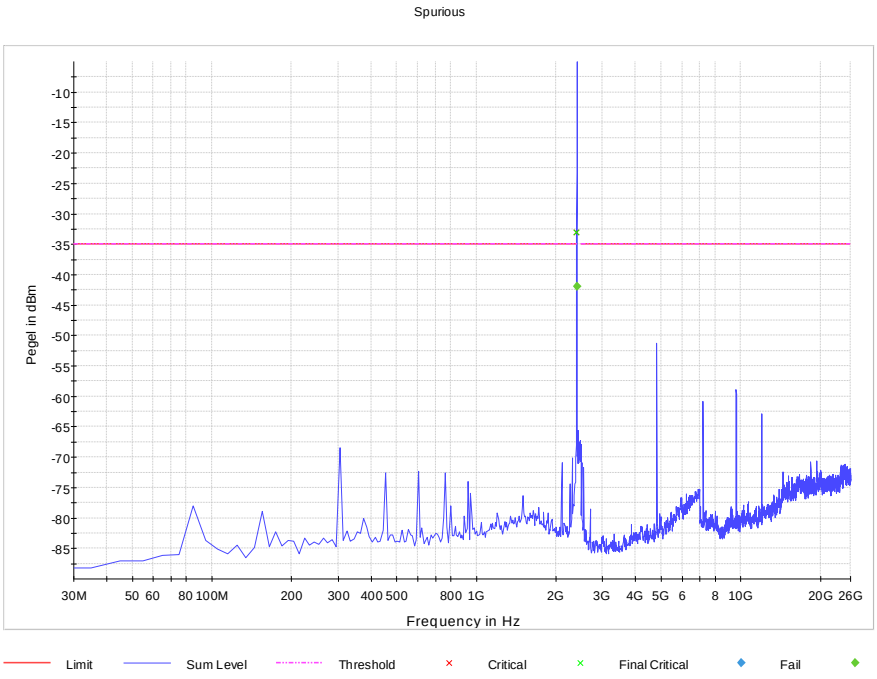


Product Service



Product Service

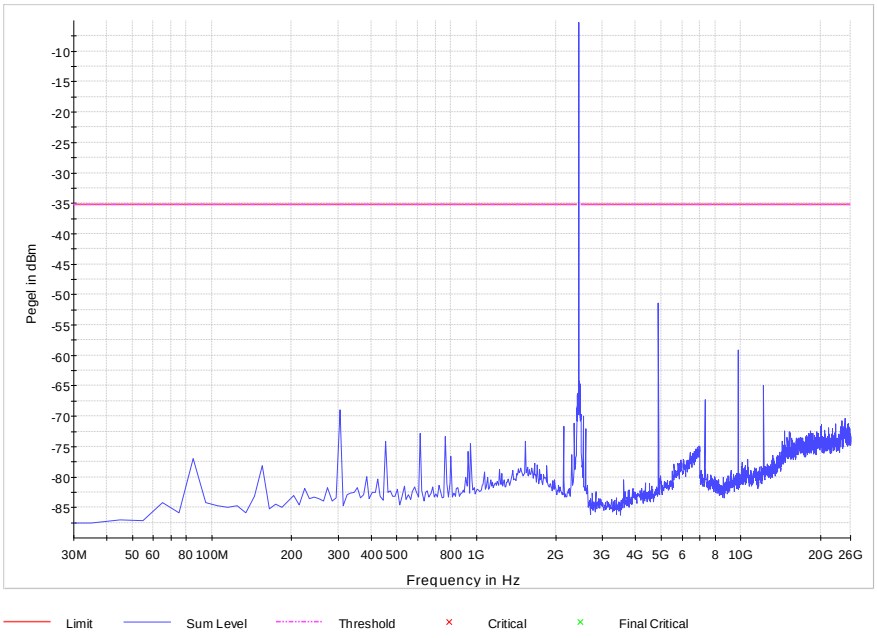
2M PHY



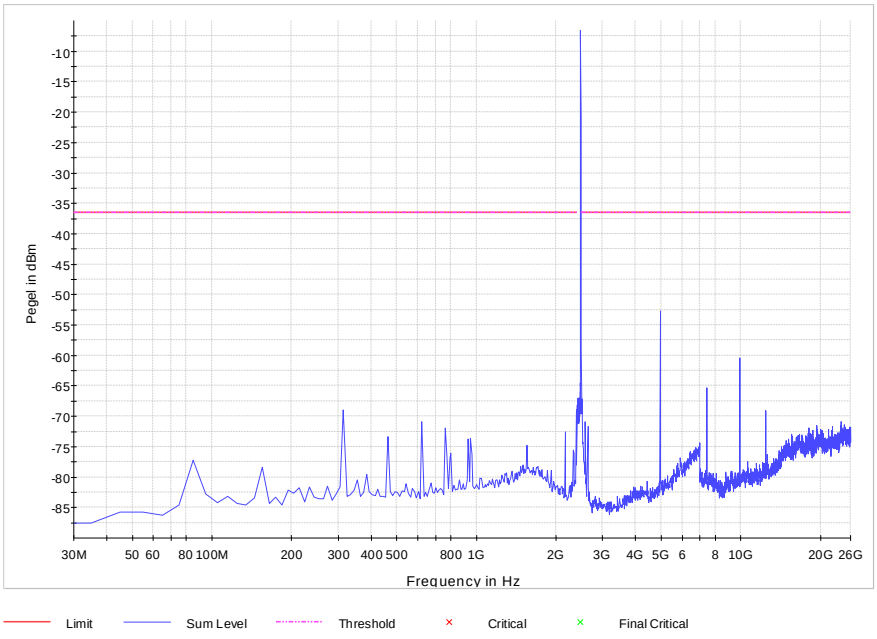
Frequency (MHz)	*Level Pre-measure-ment (dBm)*	*Level (dBm)*	*Limit (dBm)*	*Margin (dB)*
2399.958664	-23.3	-42.0	-35.0	7.0

Product Service

Spurious



Spurious



Product Service

2.6.7.2 Test Results for radiated tests

Tests were performed with mode 2M PHY on lowest, middle and highest channel.

Frequency range	*Limit applied*	*Test distance*
9 kHz – 30 MHz	15.209 / RSS-Gen	3 m
30 MHz – 1 GHz	15.209 / RSS-Gen	3 m
1 – 18 GHz	15.209 / RSS-Gen	1 m
18 – 26 GHz	15.209 / RSS-Gen	3 m

Table 17

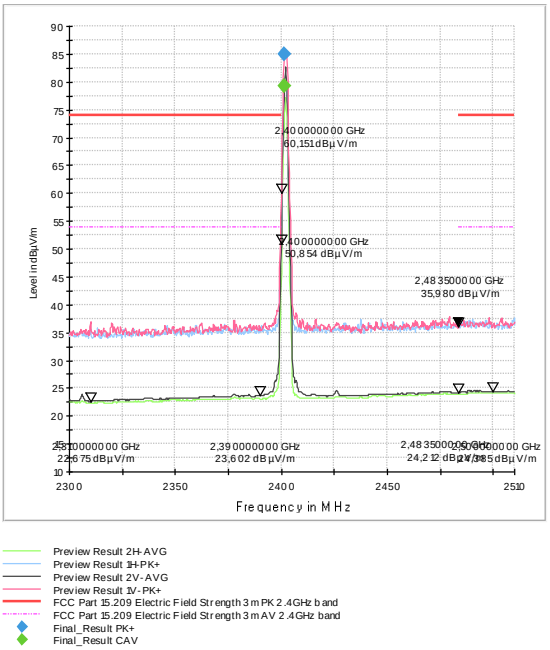
Sample calculation:

Final Value (dBµV/m) = Reading Value (dBµV) + (Cable attenuation (dB) + Antenna Transducer (dB(1/m)))

Additional correction of limit in the frequency range 9 – 490 kHz (300 m to 3 m): +80.0 dB
Additional correction of limit in the frequency range 490 kHz – 30 MHz (30 m to 3 m): +40.0 dB
Additional correction of limit in the frequency ranges above 1 GHz (3 m to 1 m): +9.54 dB

Product Service

2402 MHz, EUT in upright position:

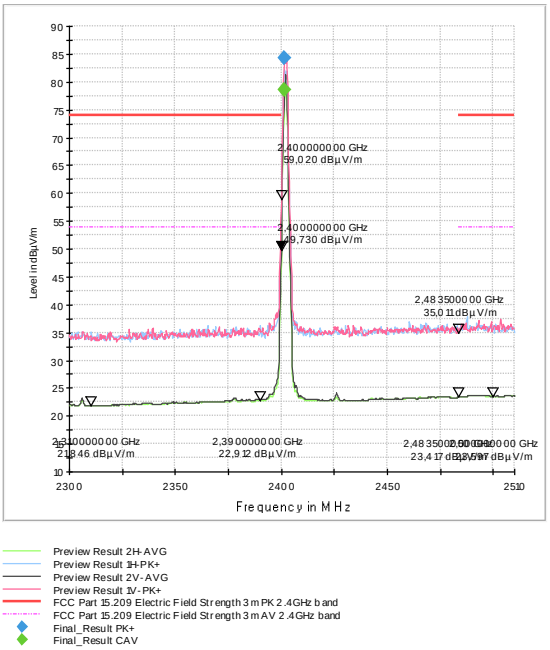


Frequency *MHz*	*Max-Peak* *dBµV/m*	*CAver-age* *dBµV/m*	*Limit* *dBµV/m*	*Mar-gin* *dB*	*Meas. Time* *ms*	*Band-width* *kHz*	*Height* *cm*	*Pol*	*Azi-muth* *deg*	*Corr.* *dB/m*
2401.500000	---	79.23	---*	---	1000.0	1000.000	298.0	V	150.0	25.1
2401.500000	84.87	---	---*	---	1000.0	1000.000	298.0	V	150.0	25.1

*: Carrier frequency

Product Service

2402 MHz, EUT on long side:

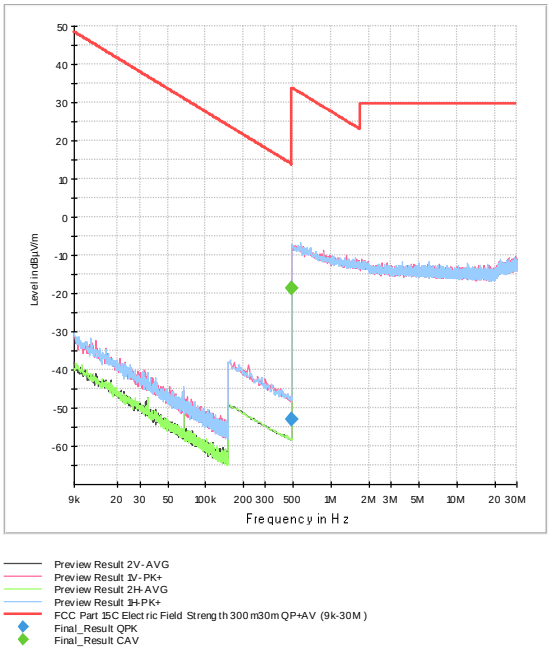


Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2401.500000	---	78.59	---*	---	1000	1000	298.0	V	-155.0	25.1
2401.500000	84.27	---	---*	---	1000	1000	298.0	V	-155.0	25.1

*: Carrier frequency

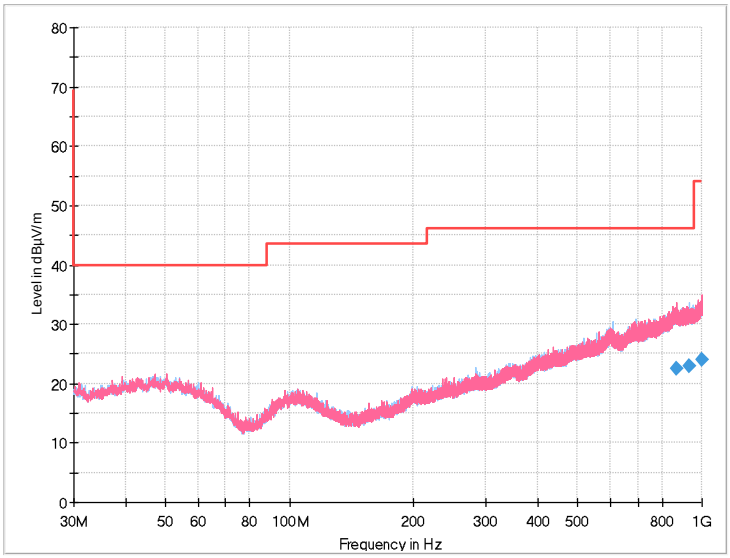
Product Service

2402 MHz, EUT flat on table:



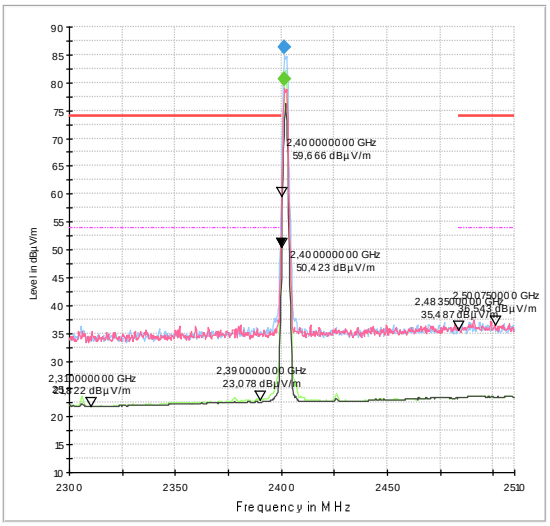
Frequency MHz	*Qua-siPeak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB*
0.490000	---	-18.77	--	---	1000	9	100.0	V	122.0	-60.6
0.490000	-53.12		13.80	66.93	1000	9	100.0	V	122.0	-60.6

Product Service



Frequency MHz	*QuasiPeak dBµV/m*	*Limit dBµV/m*	*Margin dB*	*Meas. Time ms*	*Bandwidth kHz*	*Height cm*	*Pol*	*Azimuth deg*	*Corr. dB/m*
868.080000	22.50	46.02	23.52	1000	120	115.0	V	73.0	29.9
928.620000	22.89	46.02	23.13	1000	120	153.0	H	-139.0	29.9
996.840000	24.02	53.98	29.96	1000	120	302.0	V	166.0	31.0

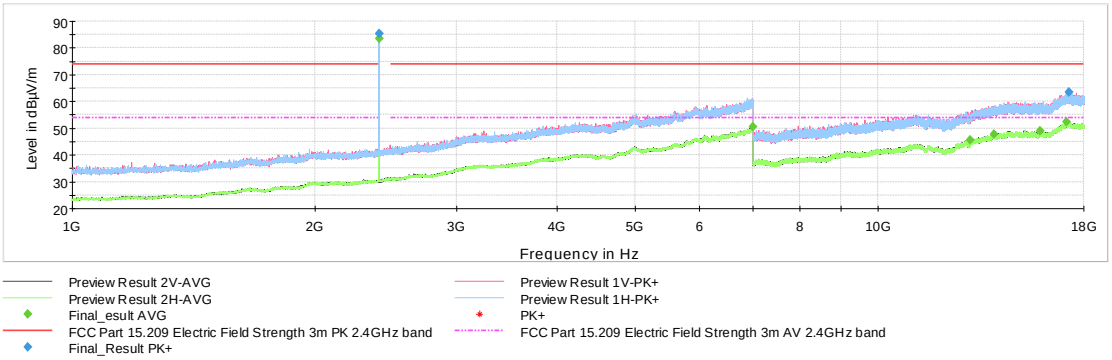
Product Service



Frequency *MHz*	*Max-Peak* *dBµV/m*	*CAver-age* *dBµV/m*	*Limit* *dBµV/m*	*Mar-gin* *dB*	*Meas. Time* *ms*	*Band-width* *kHz*	*Height* *cm*	*Pol*	*Azi-muth* *deg*	*Corr.* *dB/m*
2401.500000	---	80.71	---*	---	1000.0	1000.000	150.0	H	158.0	25.1
2401.500000	86.36	---	---*	---	1000.0	1000.000	150.0	H	158.0	25.1

*: Carrier frequency

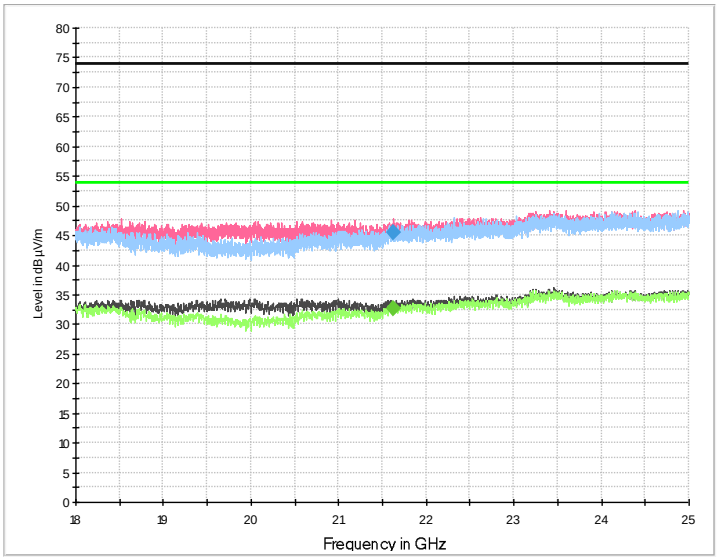
Product Service



Frequency *MHz*	*Max-Peak* *dBµV/m*	*Aver-age* *dBµV/m*	*Limit* *dBµV/m*	*Mar-gin* *dB*	*Meas. Time* *ms*	*Band-width* *kHz*	*Height* *cm*	*Pol*	*Azi-muth* *deg*	*Corr.* *dB*
2401.500000	85.50	---	---*	---	1000	1000	150.0	H	150.0	25.1
2402.000000	---	83.49	---*	---	1000	1000	150.0	H	150.0	25.1
6990.000000	---	50.55	53.98	3.43	1000	1000	150.0	H	-30.0	35.6
13025.000000	---	45.57	53.98	28.41	1000	1000	150.0	V	90.0	42.5
13944.000000	---	47.66	53.98	26.32	1000	1000	250.0	V	-30.0	44.5
15891.000000	---	49.11	53.98	24.87	1000	1000	150.0	V	-90.0	44.5
17129.500000	---	52.25	53.98	1.73	1000	1000	350.0	V	90.0	48.3
17267.000000	63.41	---	73.98	10.57	1000	1000	250.0	H	-150.0	48.0

*: Carrier frequency

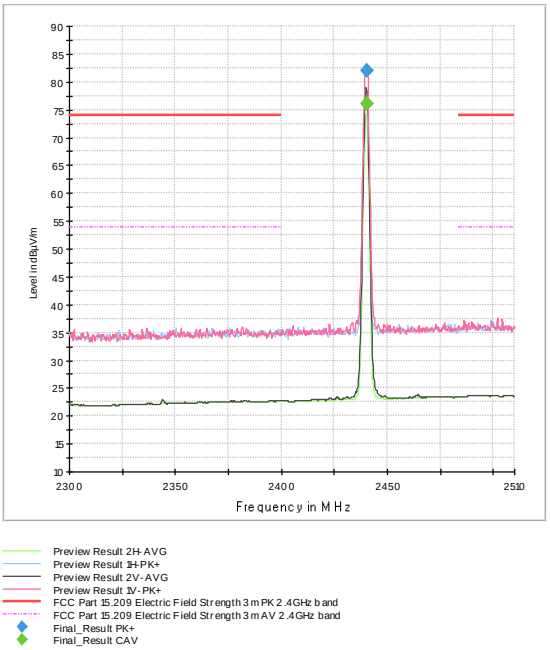
Product Service



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
21624.750000	---	32.57	53.98	21.41	1000	1000	155.0	V	-65.0	26.0
21624.750000	45.56	---	73.98	28.42	1000	1000	155.0	V	-65.0	26.0

Product Service

2440 MHz, EUT in upright position:

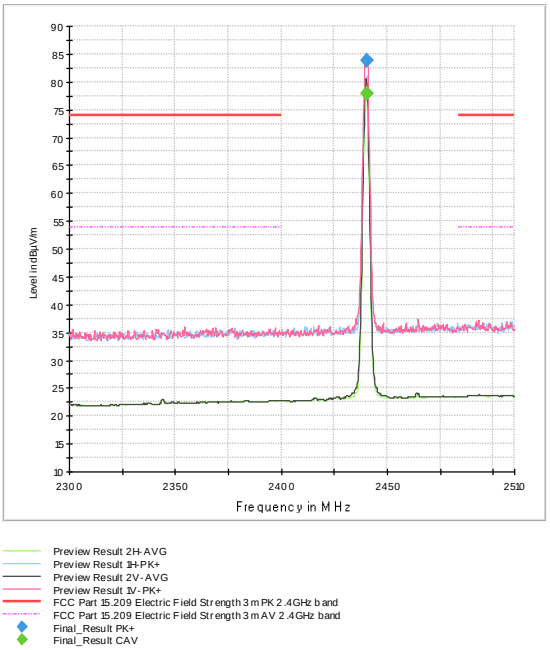


Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2440.500000	---	76.17	---*	---	1000	1000	150.0	V	-143.0	25.4
2440.500000	82.05	---	---*	---	1000	1000	150.0	V	-143.0	25.4

*: Carrier frequency

Product Service

2440 MHz, EUT on long side:

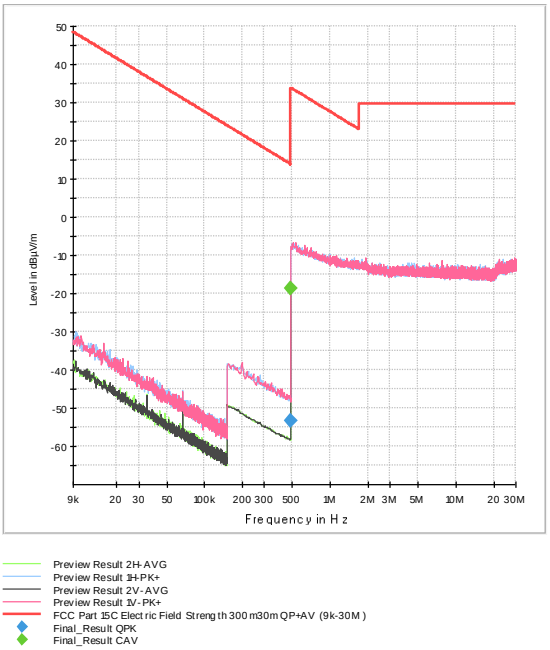


Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2440.500000	---	77.94	---*	---	1000	1000	150.0	V	-158.0	25.4
2440.500000	83.81	---	---*	---	1000	1000	150.0	V	-158.0	25.4

*: Carrier frequency

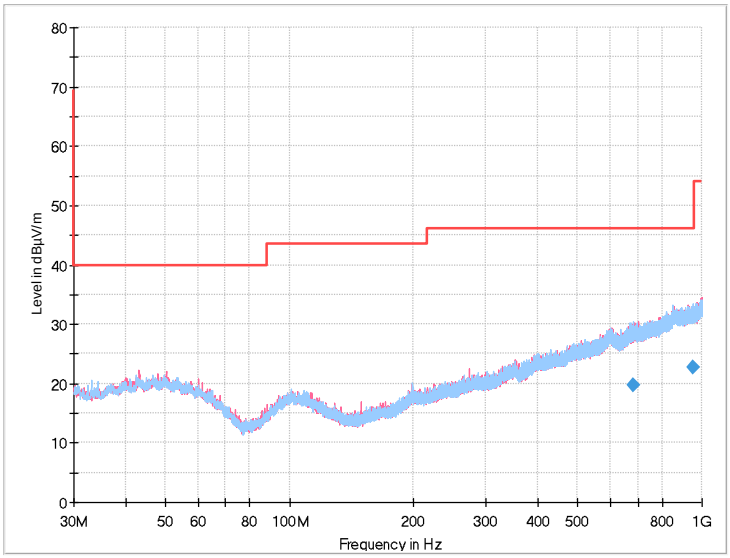
Product Service

2440 MHz, EUT flat on table:



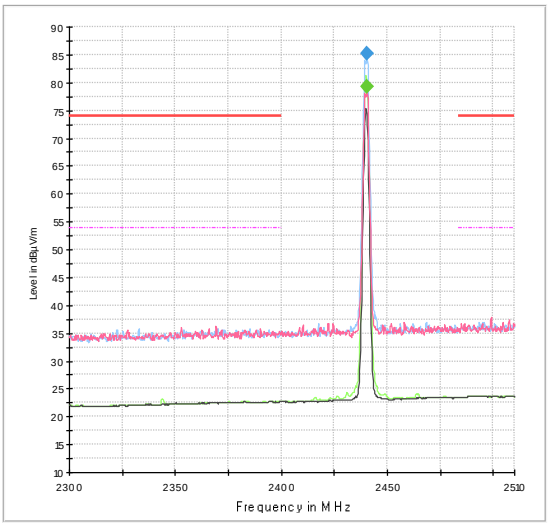
Frequency MHz	*Qua-siPeak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB*
0.490000	---	-18.78	---	---	1000.0	9.000	100.0	H	148.0	-60.6
0.490000	-53.20	---	13.80	67.00	1000.0	9.000	100.0	H	148.0	-60.6

Product Service



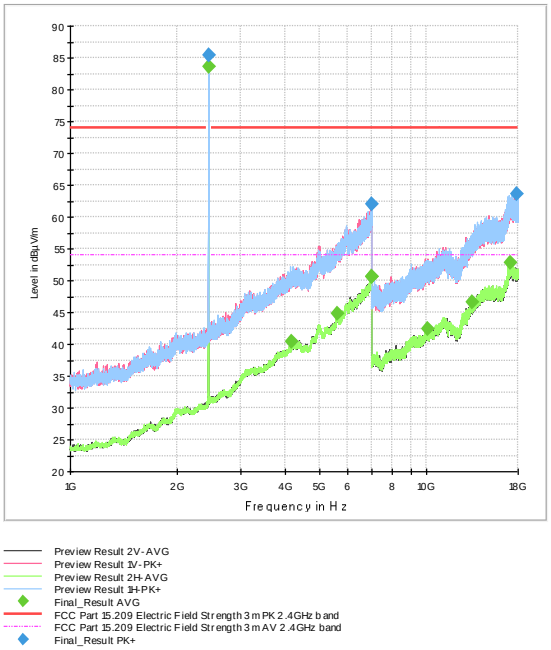
Frequency MHz	*QuasiPeak dBµV/m*	*Limit dBµV/m*	*Margin dB*	*Meas. Time ms*	*Bandwidth kHz*	*Height cm*	*Pol*	*Azimuth deg*	*Corr. dB*
682.320000	19.70	46.02	26.32	1000	120	182.0	H	-174.0	27.2
953.160000	22.82	46.02	23.20	1000	120	149.0	H	5.0	30.1

Product Service



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2440.500000		79.23	---*	---	1000	1000	150.0	H	158.0	25.4
2440.500000	85.11	---	---*	---	1000	1000	150.0	H	158.0	25.4

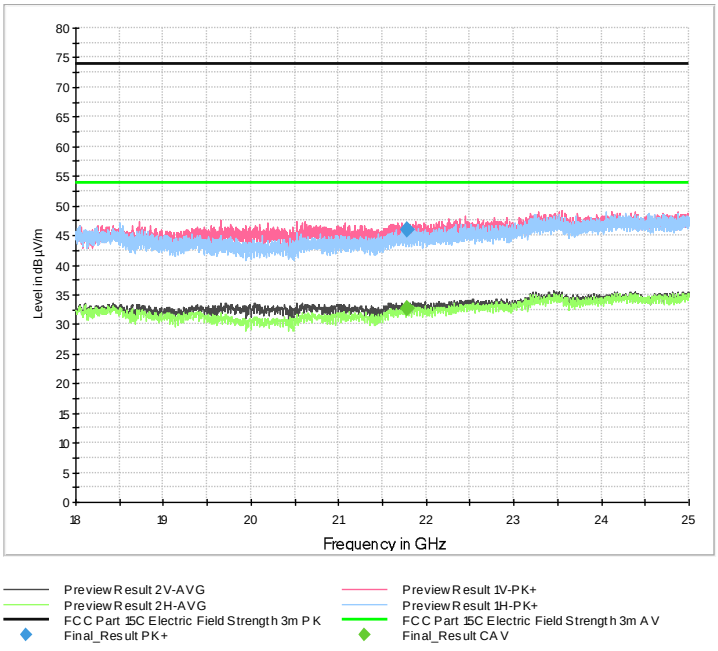
Product Service



Frequency MHz	*Max-Peak dBµV/m*	*Aver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2439.500000	85.47	---	---*	---	1000	1000	150.0	H	165.0	25.4
2440.000000	---	83.57	---*	---	1000	1000	150.0	H	165.0	25.4
4184.500000	---	40.46	53.98	13.53	1000	1000	150.0	H	-135.0	31.9
5608.500000	---	44.79	53.98	9.21	1000	1000	400.0	H	45.0	33.5
6990.500000	---	50.67	53.98	3.32	1000	1000	150.0	V	165.0	35.6
6990.500000	---	50.67	53.98	3.32	1000	1000	150.0	V	165.0	35.6
6994.500000	61.97	---	73.98	12.03	1000	1000	250.0	H	15.0	35.6
10015.500000	---	42.31	53.98	11.68	1000	1000	250.0	H	45.0	39.9
13448.500000	---	46.57	53.98	7.43	1000	1000	350.0	H	-45.0	43.5
17149.500000	---	52.82	53.98	1.17	1000	1000	400.0	H	-135.0	48.2
17923.500000	63.62	---	73.98	10.37	1000	1000	250.0	V	135.0	47.1

*: Carrier frequency

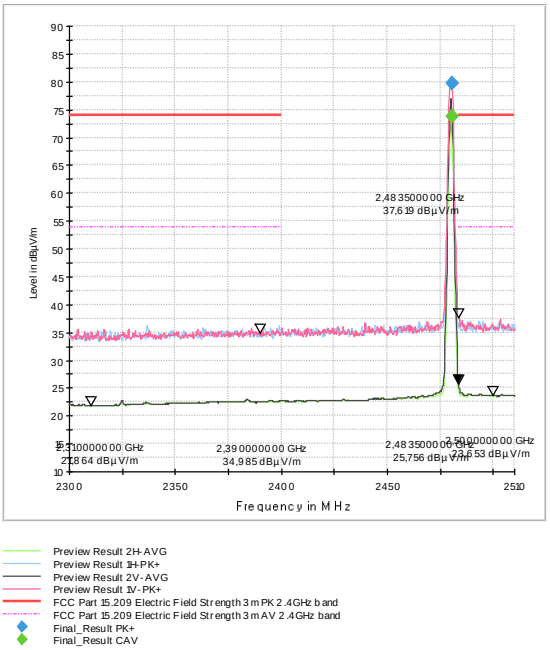
Product Service



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
21787.500000	---	32.72	53.98	21.26	1000	1000	162.0	V	162.0	26.2
21787.500000	46.05	---	73.98	27.93	1000	1000	162.0	V	162.0	26.2

Product Service

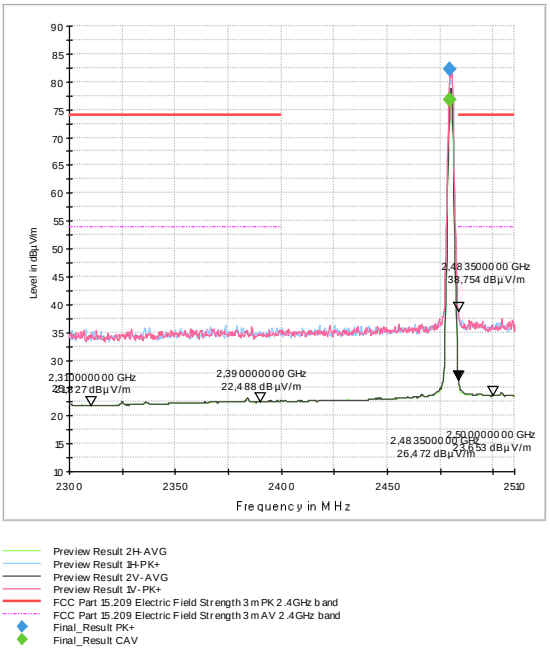
2480MHz, EUT in upright position:



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2480.500000	---	73.87	---*	---	1000	1000	150.0	V	-150.0	25.7
2480.500000	79.76	---	---*	---	1000	1000	150.0	V	-150.0	25.7

Product Service

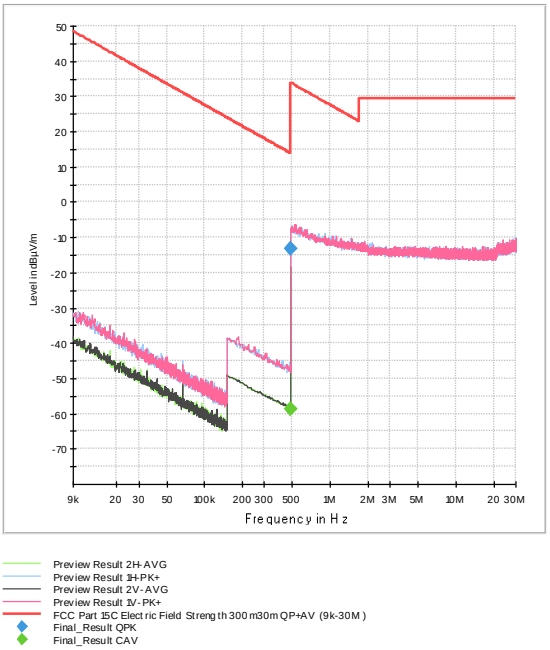
2480MHz, EUT on long side:



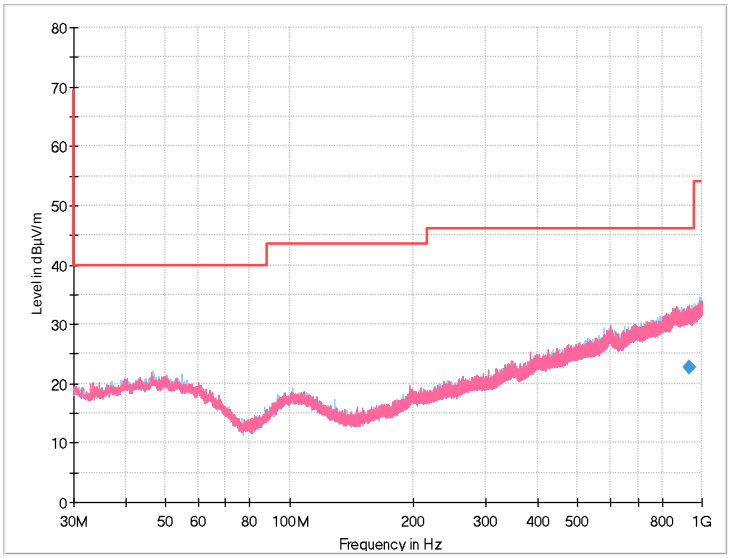
Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2479.500000	---	76.67	---*	---	1000	1000	150.0	V	98.0	25.7
2479.500000	82.31	---	---*	---	1000	1000	150.0	V	98.0	25.7

Product Service

2480MHz, EUT flat on table:

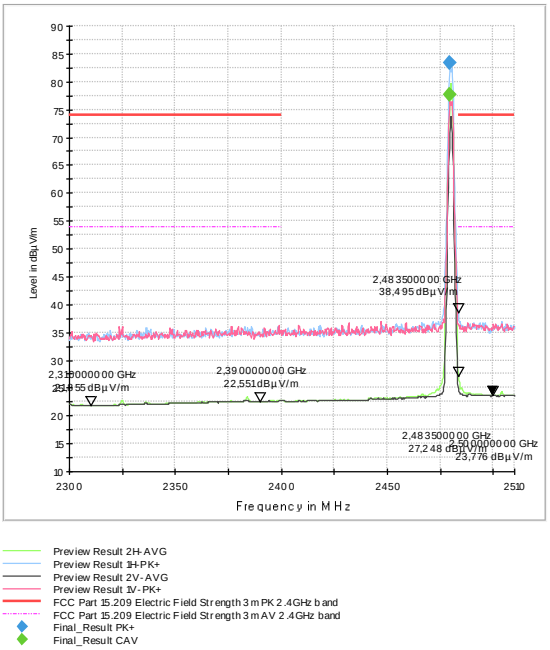


Frequency MHz	QuasiPeak dBµV/m	CAverage dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
0.490000	---	-58.74	---	---	1000	9	100.0	H	-8.0	-20.6
0.490000	-13.22	---	13.80	27.02	1000	9	100.0	H	-8.0	-20.6



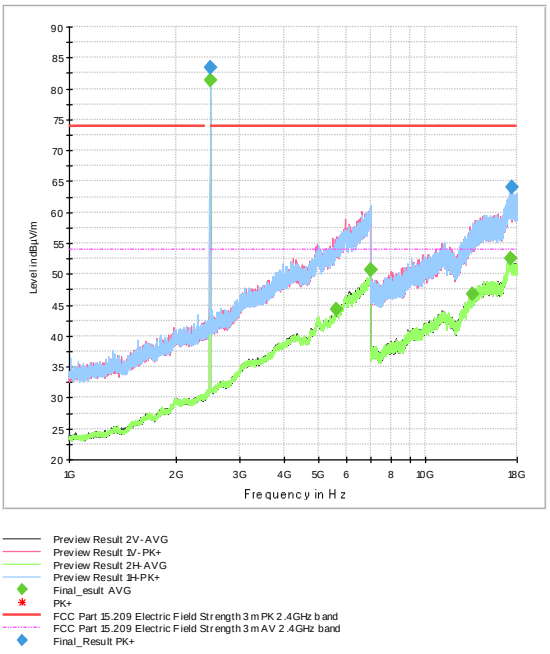
Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg
930.510000	22.84	46.02	23.18	1000	120	146.0	V	112.0

Product Service



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
2479.500000	---	77.77	---*	---	1000	1000	150.0	H	158.0	25.7
2479.500000	83.42	---	---*	---	1000	1000	150.0	H	158.0	25.7

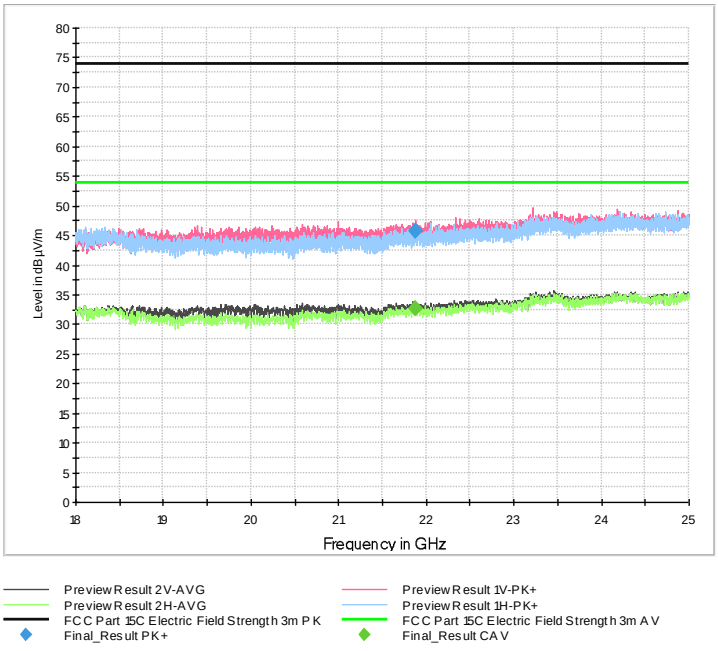
Product Service



Frequency MHz	*Max-Peak dBµV/m*	*Average dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB*
2479.500000	83.34	---	---*	---	1000	1000	150.0	H	150.0	25.7
2480.000000	---	81.37	---*	---	1000	1000	150.0	H	150.0	25.7
5620.000000	---	44.39	53.98	9.60	1000	1000	400.0	H	-30.0	33.5
6995.500000	---	50.73	53.98	3.27	1000	1000	150.0	V	-150.0	35.6
6995.500000	---	50.73	53.98	3.27	1000	1000	150.0	V	-150.0	35.6
13481.000000	---	46.78	53.98	7.22	1000	1000	400.0	H	90.0	43.6
17239.500000	---	52.48	53.98	1.51	1000	1000	150.0	H	-90.0	48.0
17395.000000	64.10	---	73.98	9.89	1000	1000	150.0	H	150.0	47.7

*: Carrier frequency

Product Service



Frequency MHz	*Max-Peak dBµV/m*	*CAver-age dBµV/m*	*Limit dBµV/m*	*Mar-gin dB*	*Meas. Time ms*	*Band-width kHz*	*Height cm*	*Pol*	*Azi-muth deg*	*Corr. dB/m*
21875.750000	---	32.67	53.98	21.31	1000.0	1000.000	106.0	V	69.0	26.4
21875.750000	45.80	---	73.98	28.17	1000.0	1000.000	106.0	V	69.0	26.4

Product Service

2.6.8 Test Location and Test Equipment

The test was carried out in Radio Test Laboratoy

Instrument	*Manufacturer*	*Type No*	*TE No*	*Calibration Period (months)*	*Calibration Due*
Signal and spectrum analysator	Rohde & Schwarz	FSV40 for TS8997	38807	24	2026-03-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2026-07-31
EMC measurement software	Rohde & Schwarz	EMC32 TS8997 – V10.60.00	44381	---	---

Table 18

The test was carried out in semi anechoic room, Cabin No. 3

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESU8	19904	12	2025-05-31
Signal and Spectrum analyzer	Rohde & Schwarz	FSV40	20219	24	2026-03-31
Loop antenna	Schwarzbeck	FMZB 1519C	72526	36	2028-01-31
Double ridged horn antenna	Rohde & Schwarz	HF907	64145	24	2025-06-30
EMC measurement software	Rohde & Schwarz	EMC32 K3 – V10.60.20	44376	---	---
Semi anechoic room	Frankonia	Cabin No. 3	56331	---	---

Table 19

The test was carried out in semi anechoic room, Cabin No. 8

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2025-04-30
TRILOG Broadband Antenna	Schwarzbeck	VULB 9162	20116	36	2028-02-29
Fixed attenuator	Weinschel	Model 1: 4 dB	39625	36	2028-02-29
EMC measurement software	Rohde & Schwarz	EMC32 K8 – V10.60.20	19927	---	---
Semi anechoic room	Albatross Projects	Cabin No. 8	19927	---	---

Table 20

Product Service

The test was carried out in semi anechoic room, Cabin No. 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	74060	12	2026-01-31
Horn antenna with preamplifier	Rohde & Schwarz	LB-180400H-KF + TS-LNA1840	43661	24	2027-01-31
EMC measurement software	Rohde & Schwarz	EMC32 K11 – V11.50.	42986	---	---
Semi anechoic room	Frankonia	Cabin No. 11	42961	---	---

Table 21

Product Service

2.7 Temperature Stability

2.7.1 Specification Reference

ISED RSS-Gen, Clause 6.11, 8.11

2.7.2 Equipment under Test and Modification State

iSpiro Pro; S/N S409900030; Modification state 0

2.7.3 Date of Test

2025-03-20 and 2025-03-20

2.7.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	24 %

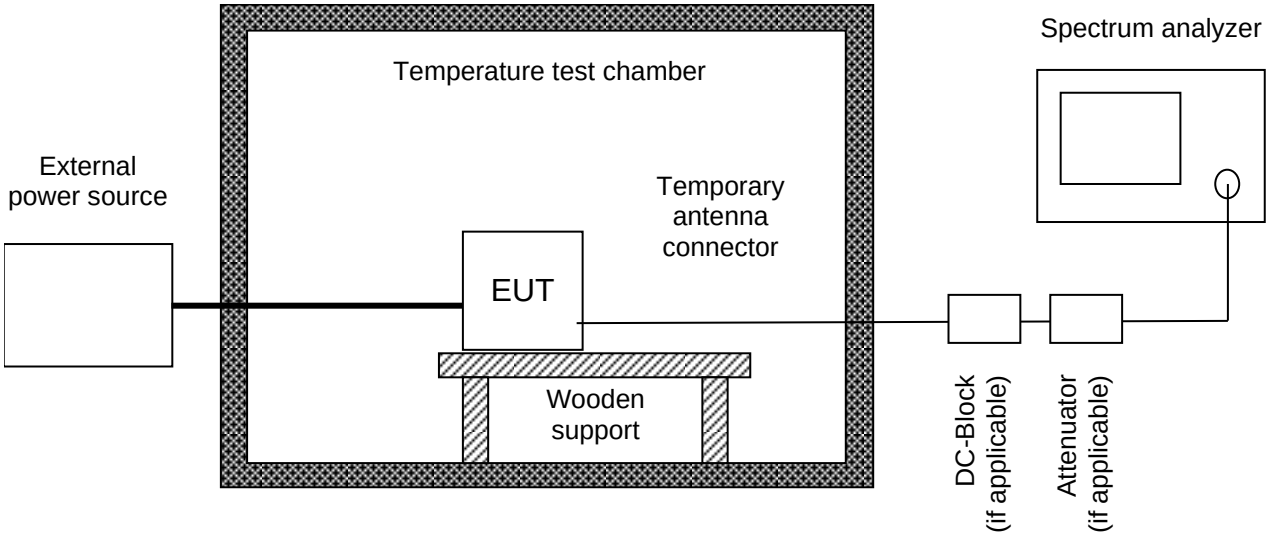
2.7.5 Specification Limits

If the stability of the license-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80 % of its permitted operating frequency band in order to minimize the possiblilty of out-of-band operation. In additions, its occupied bandwidth shall be entirely outside the resitricted bands and the prohibited TV bands of 85 MHz – 72 MHz, 76 MHz – 88 MHz, 174 MHz – 216 MHz, and 470 MHz – 602 MHz, unless otherwise indicated.

Product Service

2.7.6 Test Method

The test was performed according to ANSI C63.10, section 6.8.



The frequency tolerance of the carrier signal is measured over a temperature variation of -20 °C to +50 °C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rates supply voltage at a temperature of 20 °C. Temperature and voltage range may vary if the manufacturer states another temperature or voltage range.
If the EUT provides an antenna connector the spectrum analyzer is connected to this port. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as a DC block and appropriate (50 Ω) attenuators. In case where the EUT does not provide an antenna connector or a test fixture is used.
For battery operated equipment, the test is performed using a new battery. Alternatively, an external supply voltage can be used and is at least set to:

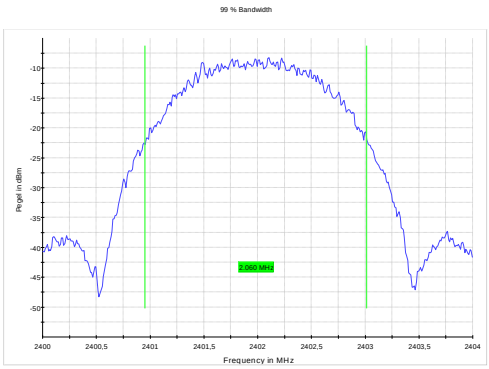
- The maximum battery voltage as delivered by a new battery or 115 % of the battery nominal voltage;
- The battery nominal voltage
- 85 % of the battery nominal voltage
- The battery operating end point voltage which shall be specified by the equipment manufacturer.

The EUT is operating providing an unmodulated carrier for frequency error tests. The peak detector of the spectrum analyzer is selected and resolution as well as video bandwidth are set to values appropriate to shape of the spectrum of the EUT. The frequency counter mode of the spectrum analyzer is used to maximize the accuracy of the measured frequency tolerance.
If an unmodulated carrier is not available a significant and stable point of the spectrum is selected and the span is reduced to a value that delivers an accuracy which shall be better than 1 % of the maximum frequency tolerance allowed for the carrier signal. This method may be performed as long as the margin to the frequency tolerance is larger than the uncertainty of the measured frequency tolerance.

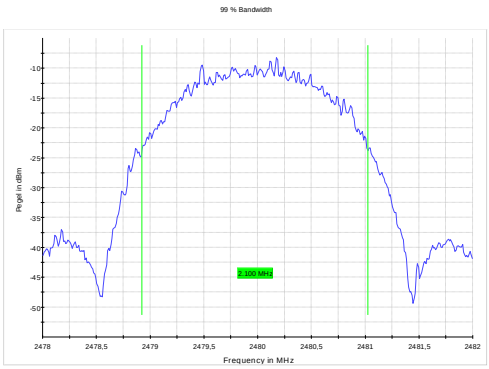
Product Service

2.7.7 Test Results

2M PHY

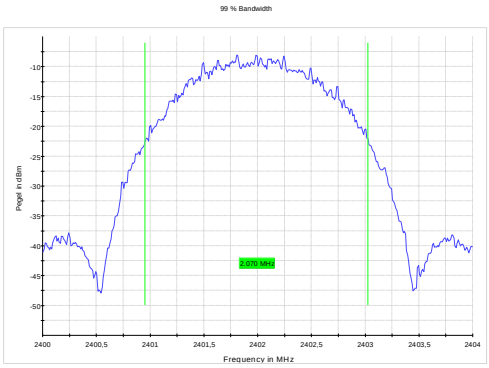


2400.955 – 2403.015 MHz

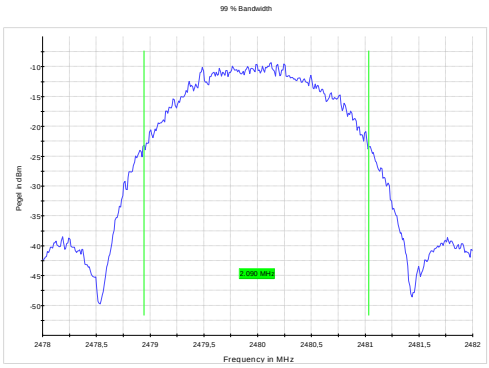


2479.925 – 2481.025 MHz

-20 °C

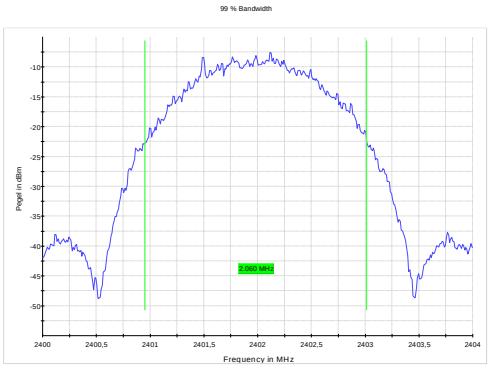


2400.950 – 2403.025 MHz

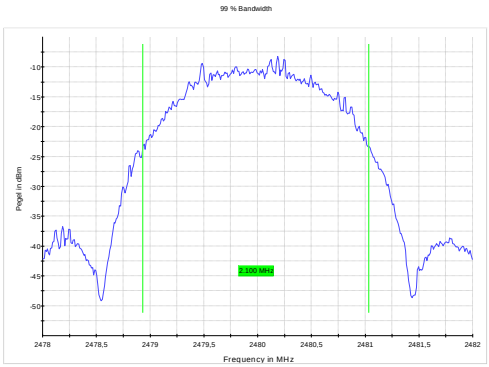


2479.945 – 2481.035 MHz

-10 °C



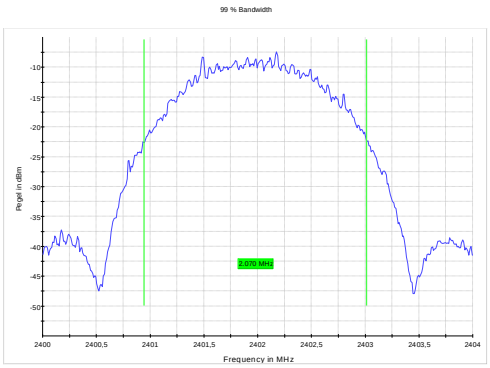
2400.955 – 2403.015 MHz



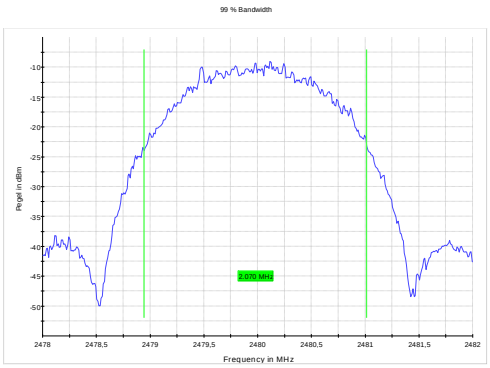
2478.935 – 2481.035 MHz

0 °C

Product Service

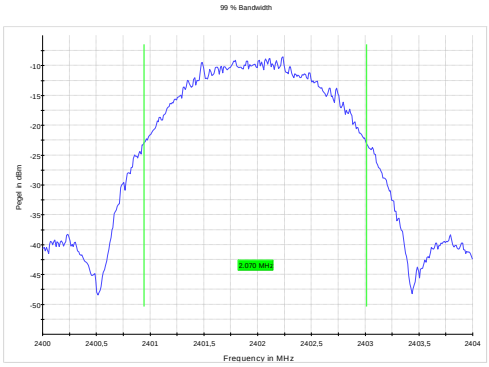


2400.945 – 2403.015 MHz

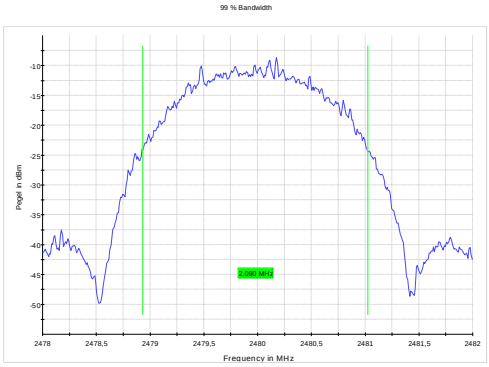


2479.945 – 2481.015 MHz

10 °C

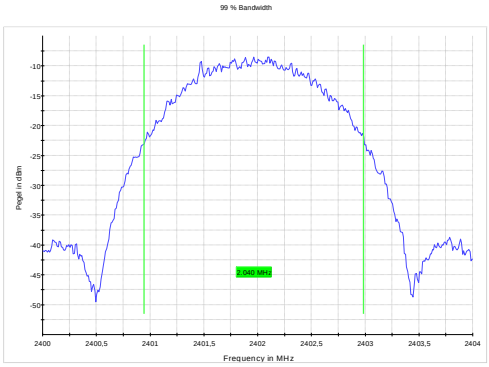


2400.945 – 2403.015 MHz

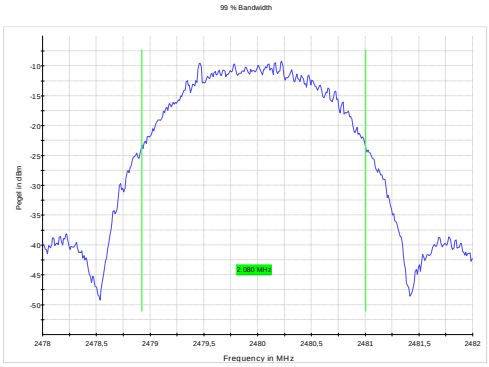


2479.935 – 2481.025 MHz

20 °C



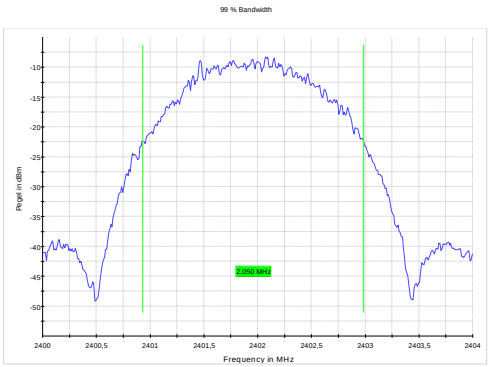
2400.945 – 2402.985 MHz



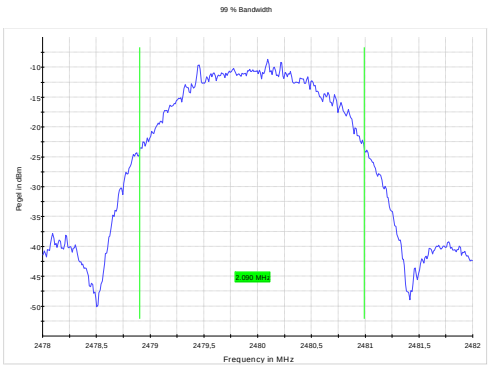
2479.925 – 2481.005 MHz

30 °C

Product Service

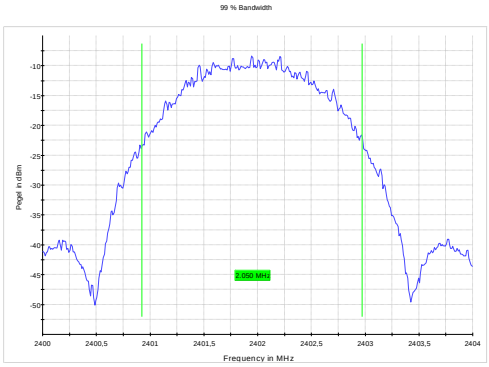


2400.935 – 2402.985 MHz

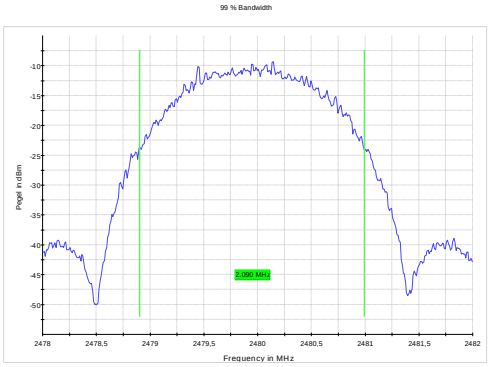


2479.905 – 2480.995 MHz

40 °C



2400.925 – 2402.975 MHz



2479.905 – 2480.995 MHz

50 °C

2.7.8 Test Location and Test Equipment

The test was carried out in Radio Test Laboratoy

Instrument	*Manufacturer*	*Type No*	*TE No*	*Calibration Period (months)*	*Calibration Due*
Signal and spectrum analysator	Rohde & Schwarz	FSV40 for TS8997	38807	24	2026-03-31
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2026-07-31
EMC measurement software	Rohde & Schwarz	EMC32 TS8997 – V10.60.00	44381	---	---

Table 22

Product Service

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5µH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 23 Measurement uncertainty based on CISPR 16-4-2

Product Service

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Occupied Bandwdith	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
25 MHz – 6 GHz	1.96	±4.4 dB
1 GHz – 18 GHz	1.96	±4.7 dB
18 GHz – 40 GHz	1.96	±4.9 dB
40 GHz – 325 GHz	1.96	±6.1 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10^{-7}
The expanded uncertainty reported according to to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 24 Measurement uncertainty based on ETSI TR 100 028

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}) and as specified in the test report below. This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

Test Name	*Expanded Uncertainty*
Occupied Bandwidth	±5 %
Conducted Power	
9 kHz ≤ f < 30 MHz	±1.0 dB
30 MHz ≤ f < 1 GHz	±1.5 dB
1 GHz ≤ f ≤ 40 GHz	±2.5 dB
1 MS/s power sensor (2.4 / 5 GHz band)	±1.5 dB
Power Spectral Density	±3.0 dB
Radiated Power	
25 MHz – 26.5 GHz	±6.0 dB
26.5 GHz – 66 GHz	±8.0 dB
40 GHz – 325 GHz	±10.0 dB
Conducted Spurious Emissions	±3.0 dB
Radiated Field Strength 9 kHz – 40 GHz	±6.0 dB
Voltage	
DC	± 1.0 %
AC	± 2.0 %
Time (automatic)	± 5 %
Frequency	± 10^{-7}

Table 25 Decision Rule: Maximum allowed measurement uncertainty

End of Test Report