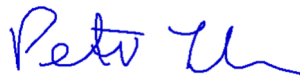
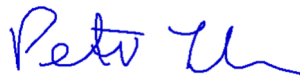
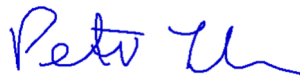




Report No. REP106115

FCC TEST REPORT / ISED TEST REPORT

Product	LIAISON XL, LIAISON XL LAS			
Name and address of the applicant	DiaSorin Italia S.p.A Via Crescentino, snc I- 13040 Saluggia (VC), Italy			
Name and address of the manufacturer	DiaSorin Italia S.p.A Via Crescentino, snc I- 13040 Saluggia (VC), Italy			
Model	LIAISON XL, LIAISON XL LAS REF: I0050, REF: I0050LAS			
Rating	6 - 2.5 A / 100 - 240 V AC / 50 - 60 Hz			
Trademark	DiaSorin			
Serial number	2210007664, 2210100766			
FCC ID IC	2BRB8LIAISONXL 34319-LIAISONXL			
Additional information	Radio Frequency Identification (RFID) - 13.56 MHz			
Tested according to	FCC Part 15.225 Low Power Transmitter, Operation within the band 13.110 - 14.010 MHz ISED RSS-210, Issue 11 Low Power Licence-Exempt Radio Apparatus, B.6 Band 13.110 - 14.010 MHz			
Order number	REP106115			
Arrival of EUT	2025-07-03			
Tested in period	2025-07-08, 2025-07-09, 2025-07-11, 2025-07-15, 2025-07-16			
Issue date	2025-08-04			
Name and address of the testing laboratory	Nemko GmbH Reetzstraße 58 D-76327 Pfinztal Germany Tel.: + 49 (0) 7240 - 63 - 0 Fax: + 49 (0) 7240 - 63 - 11  Bundesnetzagentur BNetzA-CAB-17/21-17	FCC No: 973501 ISED No: 10921A		
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center; width: 50%;">  Prepared by [F. Hupbauer] </td> <td style="text-align: center; width: 50%;">  Approved by [Dipl.-Ing. P. Lukas] </td> </tr> </table>			 Prepared by [F. Hupbauer]	 Approved by [Dipl.-Ing. P. Lukas]
 Prepared by [F. Hupbauer]	 Approved by [Dipl.-Ing. P. Lukas]			

MS-R-8-178 rev. 03 / 2024-06-19 / FCC Radio

Template version: B

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1 TEST INFORMATION

1.1 Test item

Name:	LIAISON XL, LIAISON XL LAS
Model/version:	LIAISON XL, LIAISON XL LAS REF: I0050, REF: I0050LAS
Serial number:	2210007664, 2210100766
FCC ID:	2BRB8LIAISONXL
IC:	34319-LIAISONXL
Software version:	00.01.22.00 (Instrument setup) HTML-Developer2_STC34 (Interpreter for running macros) LXL_Nemko_RFID.mac (Macro for addressing RFID modules)
Type of Power Supply:	Entire Unit: 100 - 240 V AC / 50 - 60 Hz RFID Modules: 24 V DC

RFID:

Frequency Range:	13.553 - 13.567 MHz
Number of Channels:	1
Operating Modes:	Transmitter
Type of Modulation:	ASK
User Frequency Adjustment:	None
Maximum field strength @ 3m:	57.76 dBμV/m
Antenna Connector:	Integral antenna
Number of Antennas	Module 1: 4 identical antennas Module 2: 29 identical antennas
Type of Antenna	Loop antenna
Antenna Diversity Supported	None

Description of test item

The LIAISON XL is a fully automated, non-patient contact immunoassay analyzer system for in-vitro diagnostic use. The main modules are the cuvette loader with oscillating conveyor, the incubator, the washer, the measuring chamber, the reagent module with RFID reader, the starter reagent module with RFID reader, the sample module with barcode scanner and the two pipettor arms.

The LIAISON XL LAS is almost identical to the LIAISON XL. The only difference is the pipettor, which is extended to the left side to connect the instrument to a lab automation system. This difference has no influence on the performed radio tests. The tests are therefore valid for both variants.

Both systems incorporate two RFID modules each with 4 identical antennas on module 1 for the starter bay and 29 identical antennas on module 2 for the reagent bay that are switched via multiplexers.

1.2 Normal test condition

Temperature:	24 - 25 °C
Relative humidity:	50 - 58 %
Atmospheric pressure	1001 - 1003 mbar
Normal test voltage:	120 V / 60 Hz

The values are the limit registered during the test period.

1.3 Test Engineer(s)

Frederic Hupbauer
Sören Marahrens

1.4 Description of modification for Modification Filing

Not applicable.

1.5 Family List Rational

Not Applicable.

1.6 Antenna Requirement

Is the antenna detachable?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

Type of antenna connector: N/A

Ref. FCC §15.203

1.7 Worst-Case Configuration and Mode

The modules were set to continuous operation and the maximum output level was set in the software.

For every antenna with the highest output with and without tag was tested.

The radiated measurements are tested on three axes.

The worst-case-scenario is reported.

1.1 Decision rule

Decision rule is the Simple Acceptance Method (see MS-D-8-047).

1.2 Comments

The radiated measurements are tested on three axes.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards. The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15, Paragraph 15.225, ISED RSS-210 Issue 11 and RSS-Gen, Issue 5+Amd.1-2019+Amd.2-2021.

Tests were performed in accordance with ANSI C63.4-2014+C63.4a-2017 and ANSI C63.10-2020+Cor.1-2023.

Radiated tests were performed in a semi-anechoic shielded room ($f < 1$ GHz) and a fully anechoic shielded room ($f > 1$ GHz) at a measuring distance of 3 m. A description of the test facility is on file with the FCC and ISED.

Test setup photo document: REP106115TRFFCC Annex - Test set-up photos

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

DXT Equipment Code

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test summary

Name of test	FCC Part 15 reference	RSS-210 Issue 11 & RSS-Gen Issue 5	Result
Supply Voltage Variations	15.31 (e)	6.11 (RSS-Gen)	Complies
Antenna Requirement	15.203	6.8 (RSS-Gen)	N/A ¹
AC Power Line Conducted Emission	15.207 (a)	8.8 (RSS-Gen)	Complies
Occupied Bandwidth	N/A	6.7 (RSS-Gen)	--
Fundamental Field Strength	15.225 (a)	B.6 (a i)	Complies
Band Emissions	15.225 (b)(c)	B.6 (a ii)(a iii)	Complies
Spurious Emissions	15.225 (d) 15.209	B.6 (a iv) 6.13 (RSS-Gen) 8.9 (RSS-Gen)	Complies
Frequency Stability	15.225 (e)	B.6 (b)	Complies

¹ The tested equipment has integral loop antennas only

RSS Gen Issue 5 covers section 6 & 8

RSS 210 Issue 11 covers section B.6

3 TEST RESULTS

3.1 AC Power Line Conducted Emission

Para. No.: 15.207 (a)

Para. No.: 8.8

Test Performed By: S. Marahrens

Date of Test: 2025-07-08

Measurement procedure: ANSI C63.4-2014+C63.4a-2017 using 50 μ H/50 ohms LISN.

Test Results: Complies.

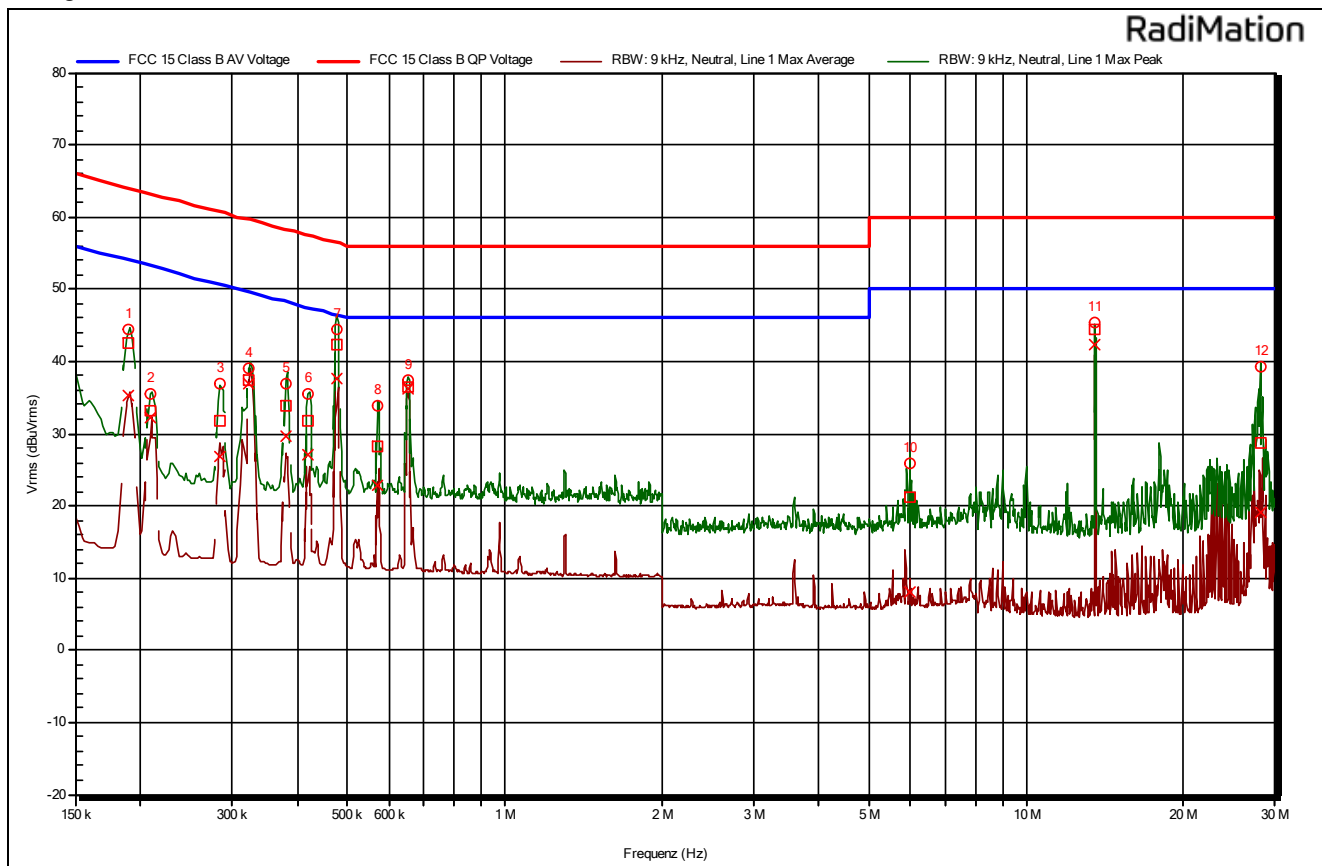
Test Equipment Used: 1-1313, 1-1260, 1-0365, 1-1118, 1-0604, 1-0361

Measurement Data: See attached graph.

Input voltage to EUT: 120V/60Hz and 240V/50Hz

Highest measured value (L1 and N):

Diagram 120V/60Hz



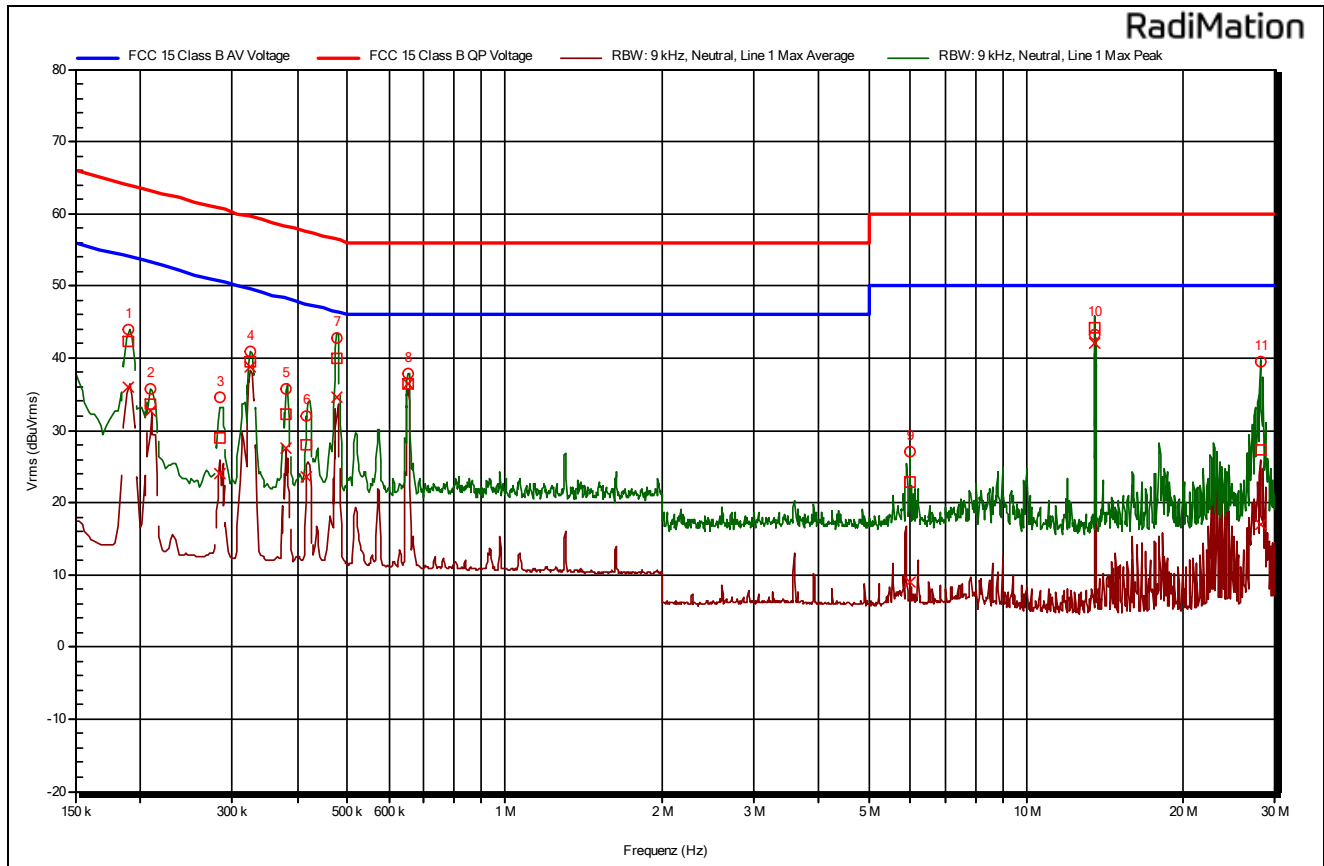
Final measurements QP with Quasi-Peak-Detector 120V/60Hz

Peak Number	Frequency (MHz)	Quasi-Peak (dBUrms)	Quasi-Peak Limit (dBUrms)	Quasi-Peak Correction (dB)	Quasi-Peak Difference (dB)	LISN
1	0.1905	42.56	64.01	9.7	-21.45	Neutral
2	0.2085	33.18	63.26	9.7	-30.08	Neutral
3	0.2850	31.75	60.67	9.7	-28.92	Neutral
4	0.3232	37.30	59.62	9.7	-22.32	Neutral
5	0.3817	33.97	58.24	9.7	-24.27	Neutral
6	0.4200	31.70	57.45	9.7	-25.75	Neutral
7	0.4762	42.33	56.40	9.7	-14.07	Neutral
8	0.5707	28.15	56.00	9.7	-27.85	Line 1
9	0.6517	36.43	56.00	9.7	-19.57	Neutral
10	5.9955	21.28	60.00	9.9	-38.72	Line 1
11	13.5600	44.49	60.00	10.0	-15.51	Line 1
12	28.0815	28.59	60.00	10.1	-31.41	Neutral

Final measurements AV with Average-Detector 120V/60Hz

Peak Number	Frequency (MHz)	Average (dBUrms)	Average Limit (dBUrms)	Average Correction (dB)	Average Difference (dB)	LISN
1	0.1905	35.40	54.01	9.7	-18.62	Neutral
2	0.2085	32.32	53.26	9.7	-20.95	Neutral
3	0.2850	26.79	50.67	9.7	-23.88	Neutral
4	0.3232	36.93	49.62	9.7	-12.69	Neutral
5	0.3817	29.67	48.24	9.7	-18.57	Neutral
6	0.4200	27.06	47.45	9.7	-20.39	Neutral
7	0.4762	37.60	46.40	9.7	-8.81	Neutral
8	0.5707	22.90	46.00	9.7	-23.10	Line 1
9	0.6517	36.34	46.00	9.7	-9.66	Neutral
10	5.9955	8.14	50.00	9.9	-41.86	Line 1
11	13.5600	42.44	50.00	10.0	-7.56	Line 1
12	28.0815	19.10	50.00	10.1	-30.90	Neutral

Diagram 240V/50Hz



Final measurements QP with Quasi-Peak-Detector 240V/50Hz

Peak Number	Frequency (MHz)	Quasi-Peak (dBuVrms)	Quasi-Peak Limit (dBuVrms)	Quasi-Peak Correction (dB)	Quasi-Peak Difference (dB)	LISN
1	0.1905	42.23	64.01	9.7	-21.78	Neutral
2	0.2085	33.52	63.26	9.7	-29.74	Neutral
3	0.2850	28.89	60.67	9.7	-31.77	Neutral
4	0.3255	39.57	59.57	9.7	-20.00	Neutral
5	0.3817	32.18	58.24	9.7	-26.06	Line 1
6	0.4177	28.03	57.49	9.7	-29.47	Line 1
7	0.4762	39.90	56.40	9.7	-16.50	Line 1
8	0.6517	36.52	56.00	9.7	-19.48	Neutral
9	5.9955	22.74	60.00	9.9	-37.26	Neutral
10	13.5600	44.28	60.00	10.0	-15.72	Line 1
11	28.1063	27.38	60.00	10.1	-32.62	Line 1

Final measurements AV with Average-Detector 240V/50Hz

Peak Number	Frequency (MHz)	Average (dBUVrms)	Average Limit (dBUVrms)	Average Correction (dB)	Average Difference (dB)	LISN
1	0.1905	35.87	54.01	9.7	-18.14	Neutral
2	0.2085	32.66	53.26	9.7	-20.61	Neutral
3	0.2850	24.00	50.67	9.7	-26.67	Neutral
4	0.3255	38.84	49.57	9.7	-10.72	Neutral
5	0.3817	27.44	48.24	9.7	-20.80	Line 1
6	0.4177	23.58	47.49	9.7	-23.91	Line 1
7	0.4762	34.65	46.40	9.7	-11.76	Line 1
8	0.6517	36.43	46.00	9.7	-9.57	Neutral
9	5.9955	8.93	50.00	9.9	-41.07	Neutral
10	13.5600	42.17	50.00	10.0	-7.83	Line 1
11	28.1063	17.06	50.00	10.1	-32.94	Line 1

The complete correction factor (CF) is made up of the correction factor of the instruments used.
For calculating the disturbance voltage U and the Margin the following formulas were employed:

$$U = U_M + CF \quad \text{with: } CF = VDF_{AMN} + a_{Cb1} + a_{Cb2} + a_{Cb3} + a_{PL}$$

U Value in dBμV (Quasi-peak or Average in the table)

U_M Measured value at receiver input in dBμV

CF Correction factor (Quasi-peak correction or Average correction in the table)

VDF_{AMN} Voltage division factor of AMN in dB

a_{Cb1} Cable loss of cable from AMN to wall in dB

a_{Cb2} Cable loss of cable from wall to coax switch in dB

a_{Cb3} Cable loss of cable from coax switch to pulse limiter in dB

a_{PL} Attenuation Pulse limiter in dB

$$\text{Margin} = \text{Result} - \text{Limit}$$

3.2 Occupied Bandwidth

Para. No.: N/A

Para. No.: 6.7

Test Performed by: F. Hupbauer

Date of Test: 2025-07-16

Test Results: Complies

Test Equipment Used: 1-0923, 1-0872, 1-0611, 1-0361

Measurement Data:

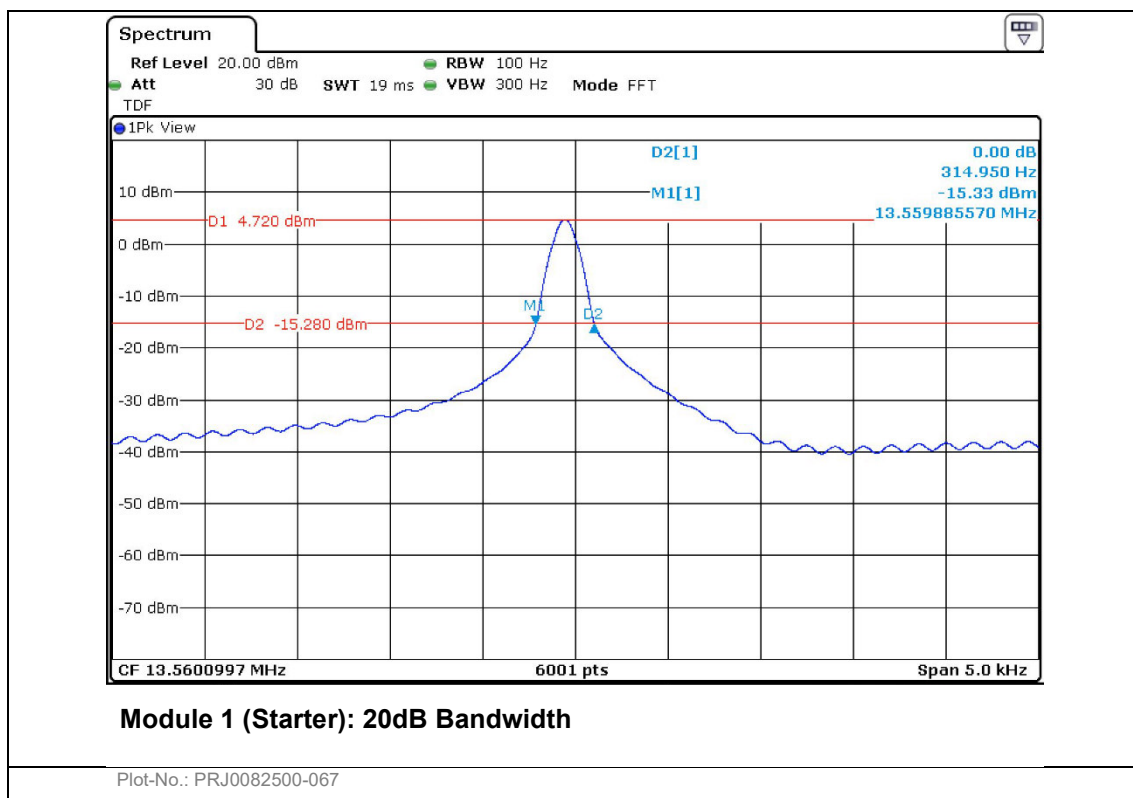
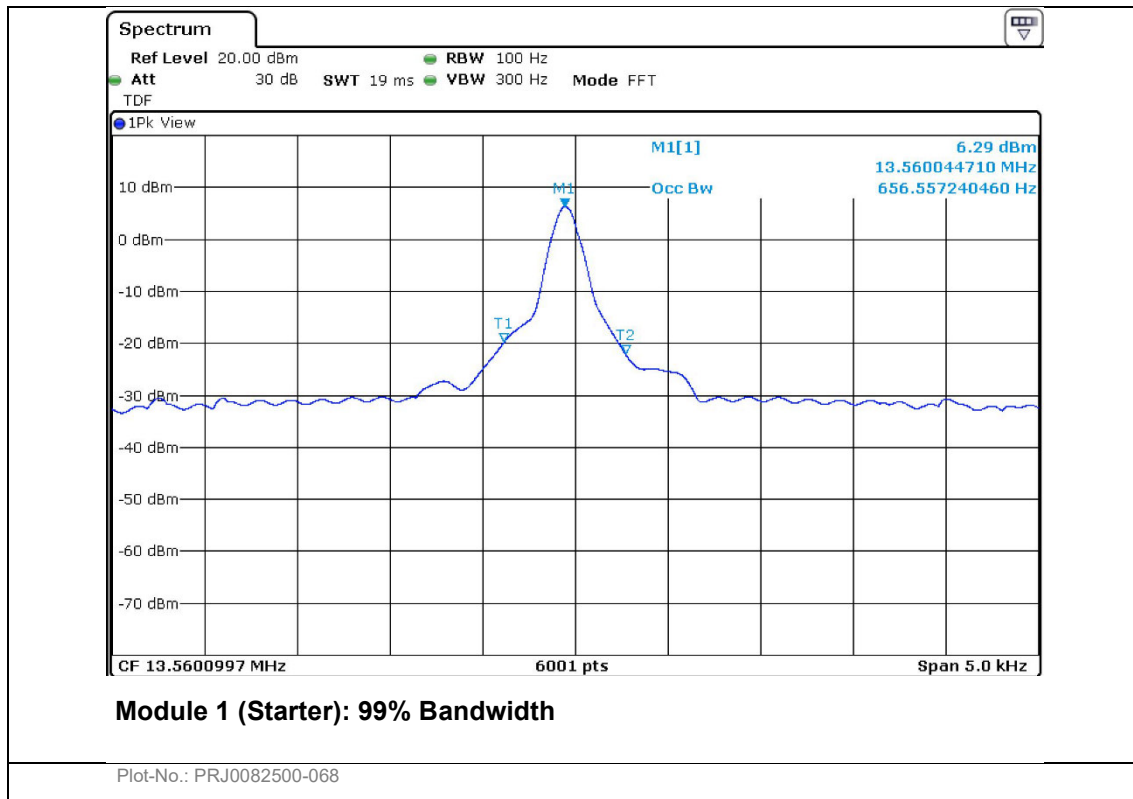
Module	Frequency (MHz)	99% Bandwidth (Hz)	20dB Bandwidth (Hz)
Module 1 (Starter)	13.56	657	315
Module 2 (Reagent)	13.56	1044	250

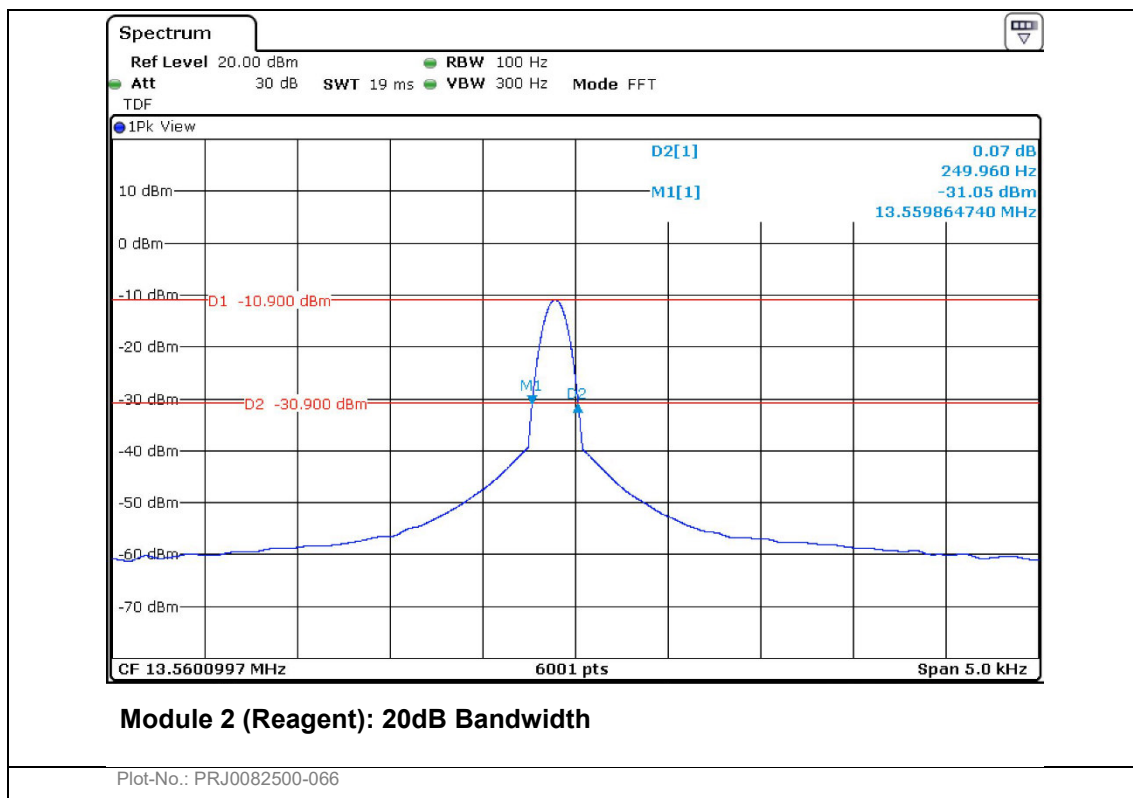
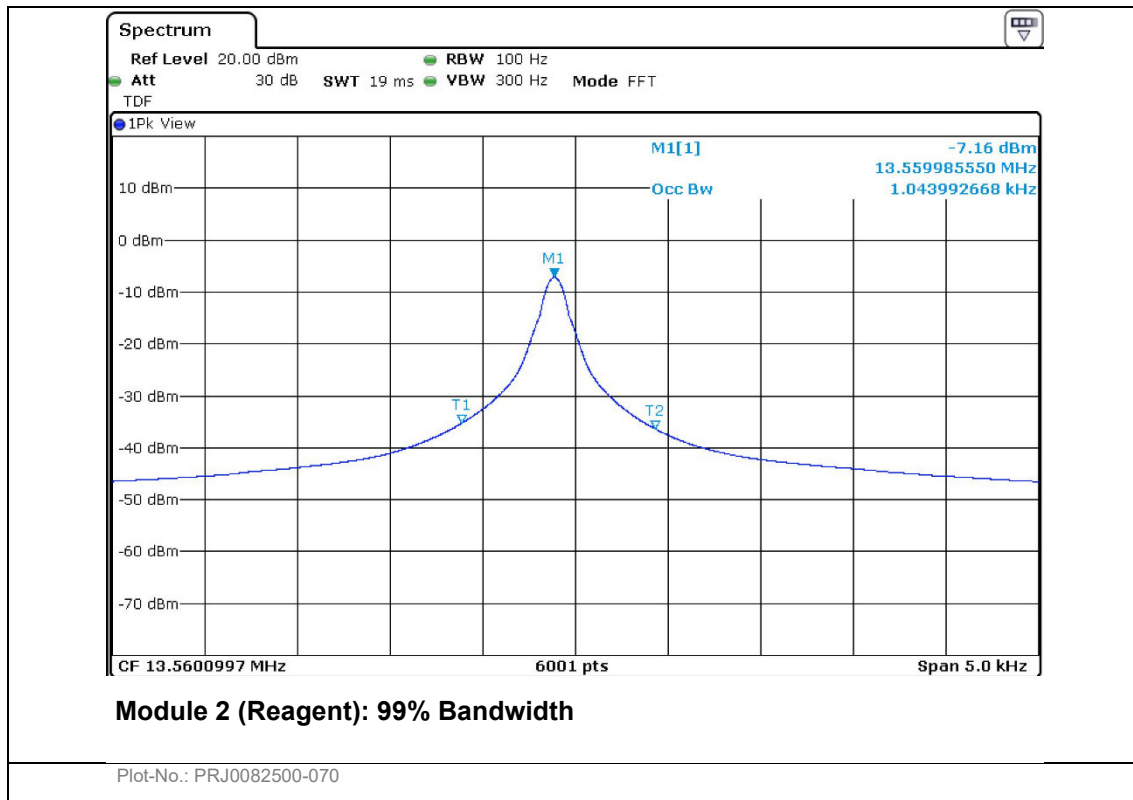
Requirements:

No requirements for bandwidth for this frequency band.

Measurement data are reported for information only.

Occupied Bandwidth Plots





3.3 Fundamental Field Strength and Band Emissions

Para. No.: 15.225 (a)

Para. No.: B.6 (a i)

Test Performed By: F. Hupbauer

Date of Test: 2025-07-11

Test Results: Complies

Test Equipment Used: 1-1289, 1-1260, 1-0619, 1-0611, 1-0361, 1-0806, 1-0080

Measurement data:

Maximum field strength

Module	RF channel (MHz)	Measured PK value (dB μ V/m) @ 3m	Converted Limit (dB μ V/m) @ 3m
Module 1 (Starter)	13.56	57.60	124.0
Module 2 (Reagent)	13.56	57.76	124.0

The limit line given in the graph is corrected to 3 m distance.

Radiated measurements are performed at 3 m distance.

Detachable antenna?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

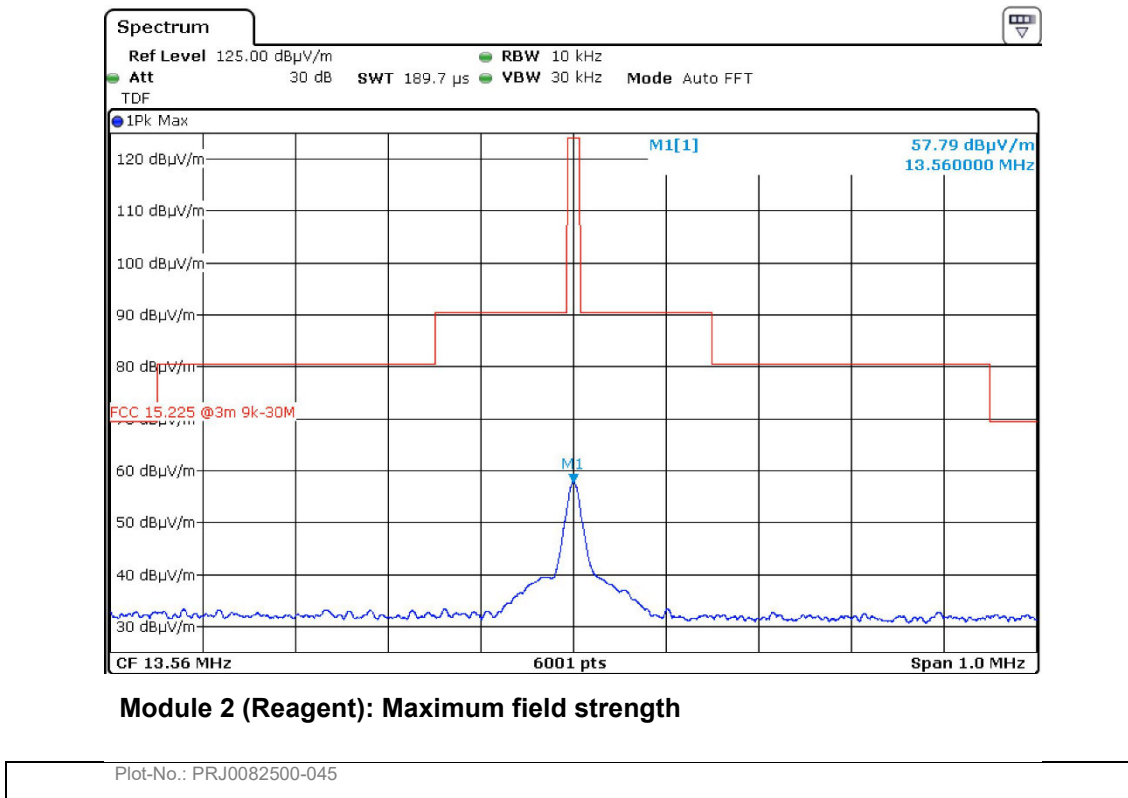
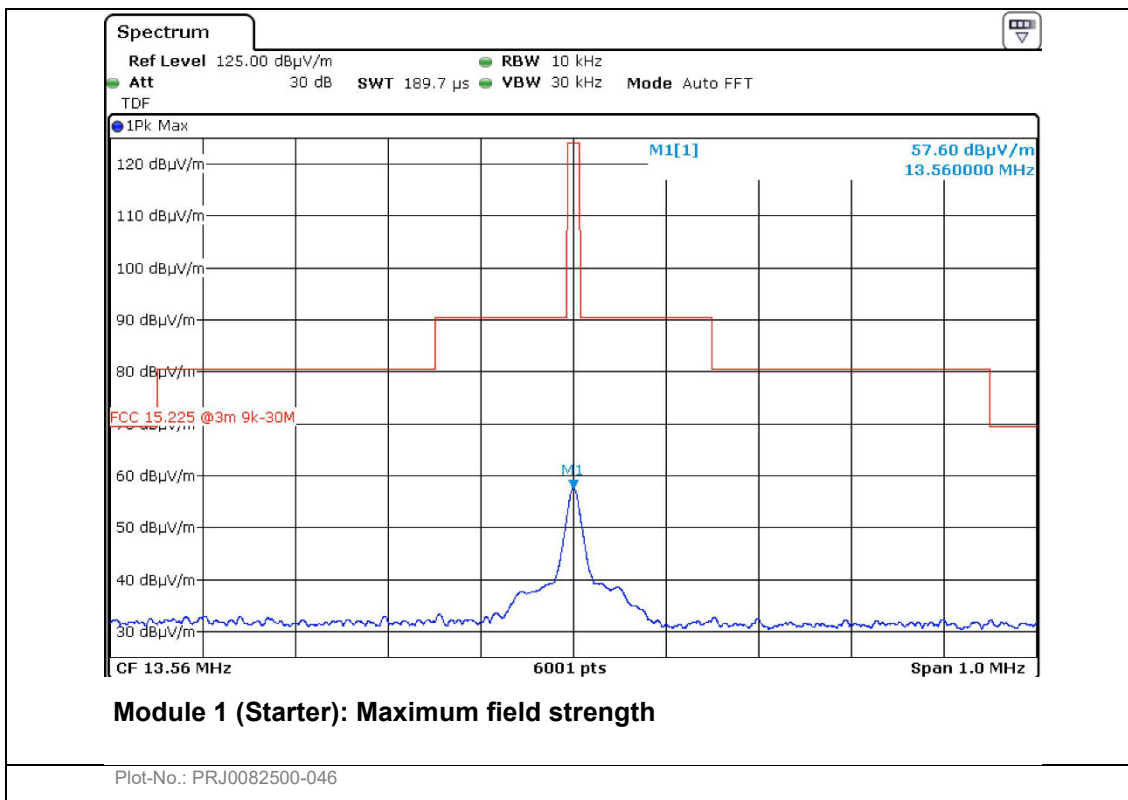
Integral loop antenna

Requirements:

The maximum field strength within band 13.553 - 13.567 MHz at 30 meters shall be ≤ 84.0 dB μ V/m (at 3 meters ≤ 124.0 dB μ V/m).

(b) 334 microvolts/m (50.5 dB μ V/m) at 30 meters, within the bands 13.410 - 13.553 MHz and 13.567 - 13.710 MHz. (at 3 meters ≤ 90.5 dB μ V/m).

(c) 106 microvolts/m (40.5 dB μ V/m) at 30 meters, within the bands 13.110 - 13.410 MHz and 13.710 - 14.010 MHz. (at 3 meters ≤ 80.5 dB μ V/m).



3.4 Spurious Emissions

Para. No.: 15.209 / 15.225 (b, c, d)

Para. No.: B.6 (a ii, a iii, a iv)

Test Performed By: F. Hupbauer

Date of Test: 2025-07-11, 2025-07-15, 2025-07-16

Test Results: Complies

Test Equipment Used:

9 kHz - 30 MHz: 1-1289, 1-1260, 1-0619, 1-0611, 1-0361, 1-0806, 1-0080

30 MHz - 200 MHz: 1-0040, 1-0993, 1-1260, 1-1000, 1-0619, 1-0604, 1-0361, 1-0806, 1-0807, 1-0080

200 MHz - 1 GHz: 1-0055, 1-1260, 1-1000, 1-0619, 1-0604, 1-0361, 1-0806, 1-0807, 1-0080

Measurement Data:

Radiated Emissions with loop antenna, 9 kHz - 30 MHz

measured at a distance of 3 m.

All modules are operating simultaneously at 13.56 MHz

Measured with Peak Detector:

Frequency	Dist. corr. factor	Measured Field strength, Peak @ 3m	Duty cycle corr. factor	Calculated Field strength, Peak @ 300m	Limit @ 300m	Margin
kHz	dB	dB μ V/m	dB	dB μ V/m	dB μ V/m	dB
9.331	80	75.79	-	-4.21	48.2	52.41

The maximum is observed in coplanar horizontal polarization.

Frequency	Dist. corr. factor	Measured Field strength, Peak @ 3m	Duty cycle corr. factor	Calculated Field strength, Peak @ 30m	Limit @ 30m	Margin
MHz	dB	dB μ V/m	dB	dB μ V/m	dB μ V/m	dB
2.014	40	39.11	-	-0.89	29.5	30.39

The maximum is observed in coplanar vertical polarization.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

The limit line given in the graph is corrected to 3 m distance using 40 dB/decade according to 15.31 (f) (2).

Requirement:

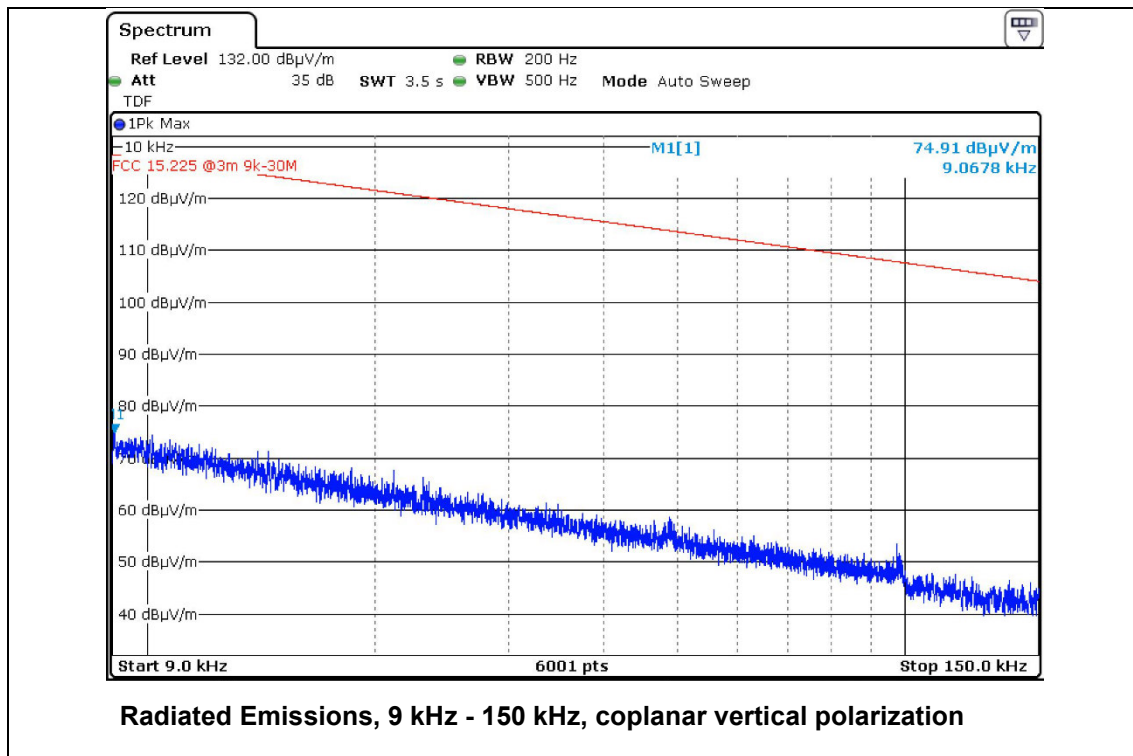
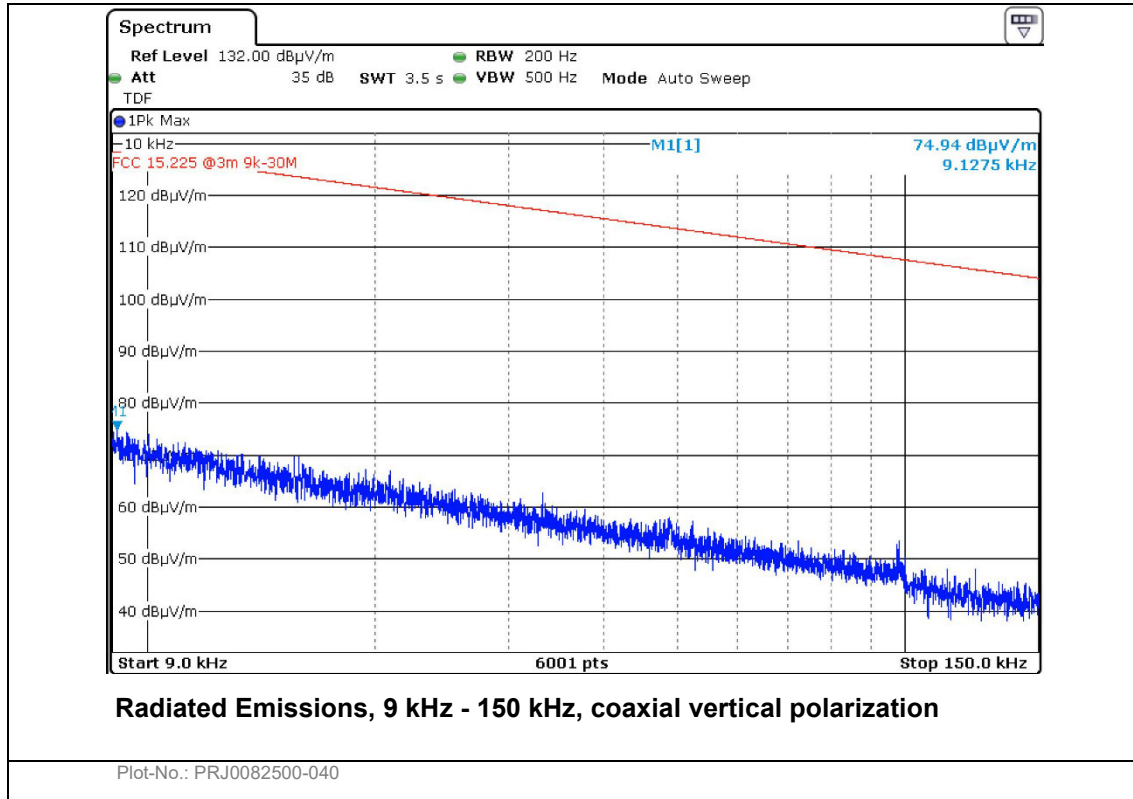
(d) The field strength of any emissions appearing outside of the 13.110 - 14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Requirements/Limit according §15.209

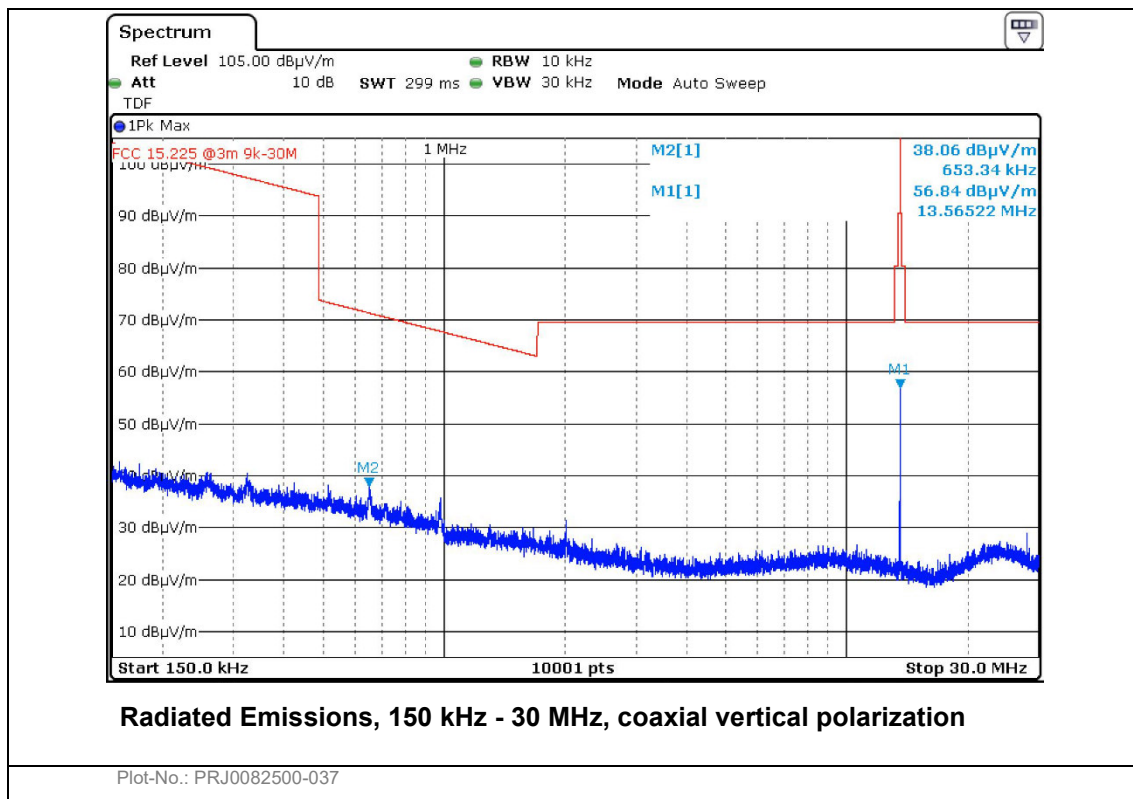
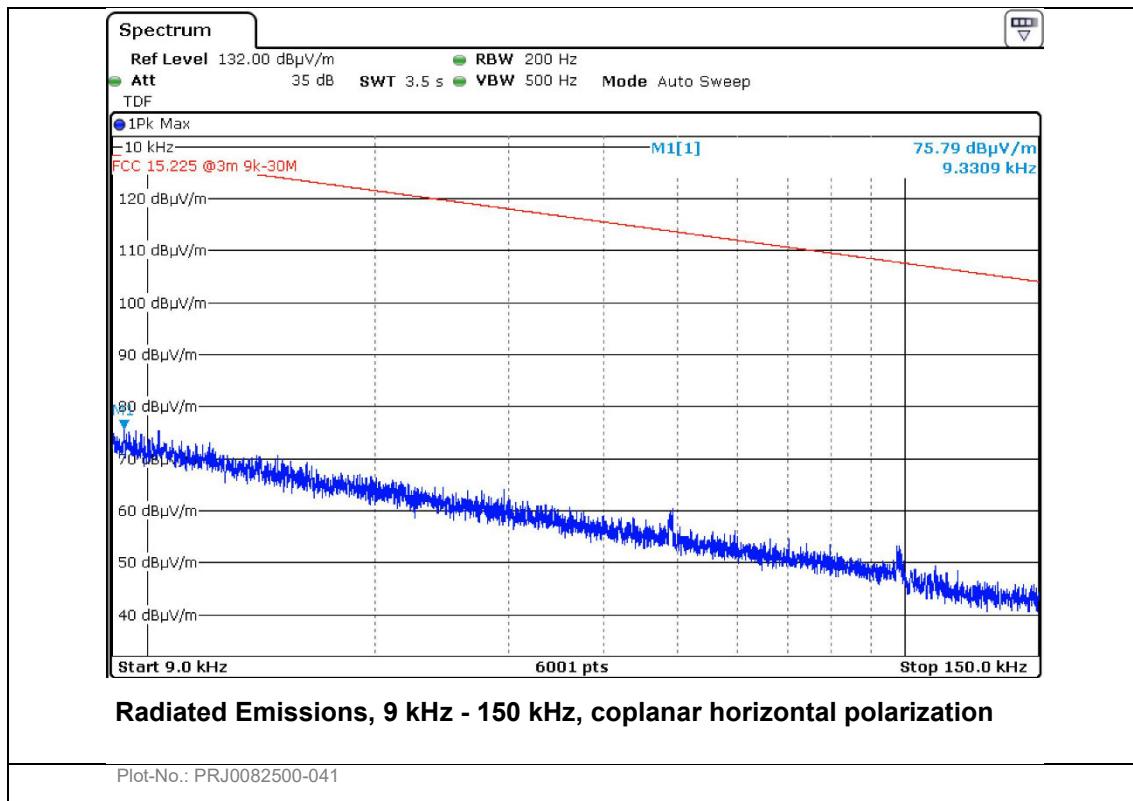
FCC	Part 15.209 @ frequencies defined in §15.205		
ISED	RSS-GEN Issue 5, Clause 8.9 @ frequencies defined in clause 8.10		
	Radiated emission limit		
Frequency (MHz)	Quasi Peak (µV/m)	Quasi Peak (dBµV/m)	@ Measurement distance (meters)
0.009 – 0.490	2400/f(kHz)	20log(2400/f(kHz))	300
0.490 – 1.705	24000/f(kHz)	20log(24000/f(kHz))	30
1.705 – 30	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

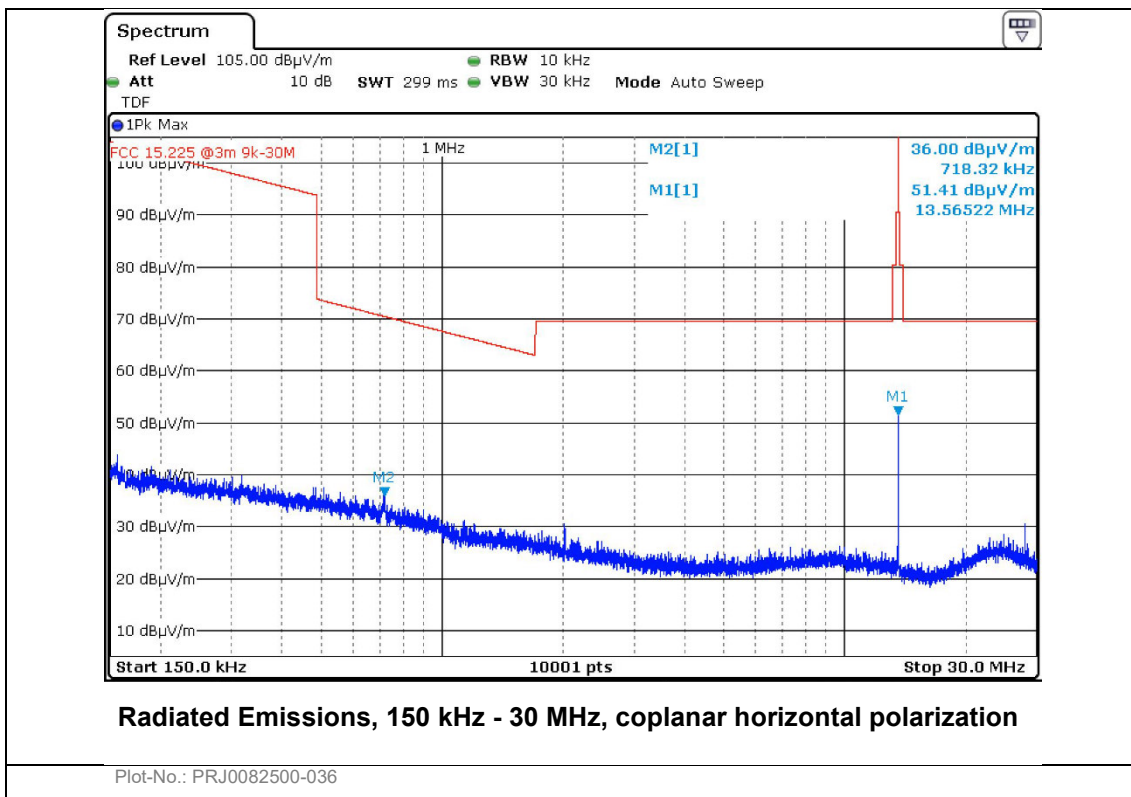
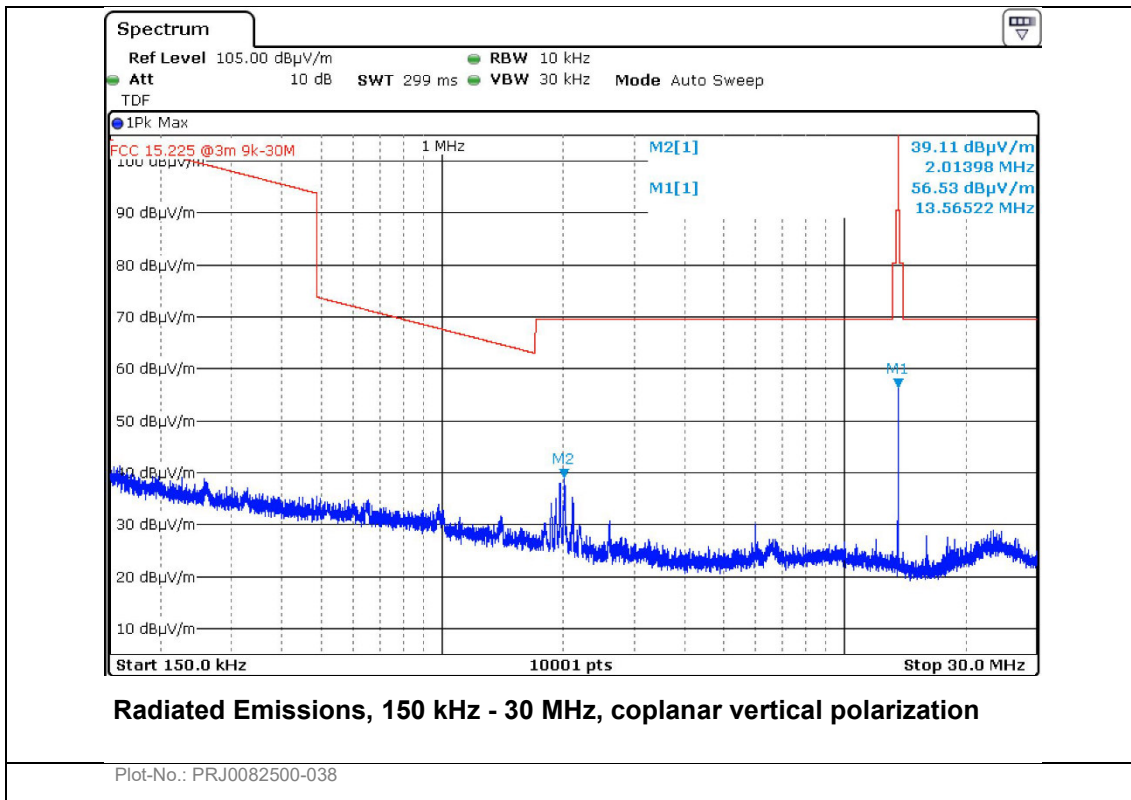
Radiated emissions 9 kHz - 30 MHz.

Measuring distance 3 m, measured with Peak detector.



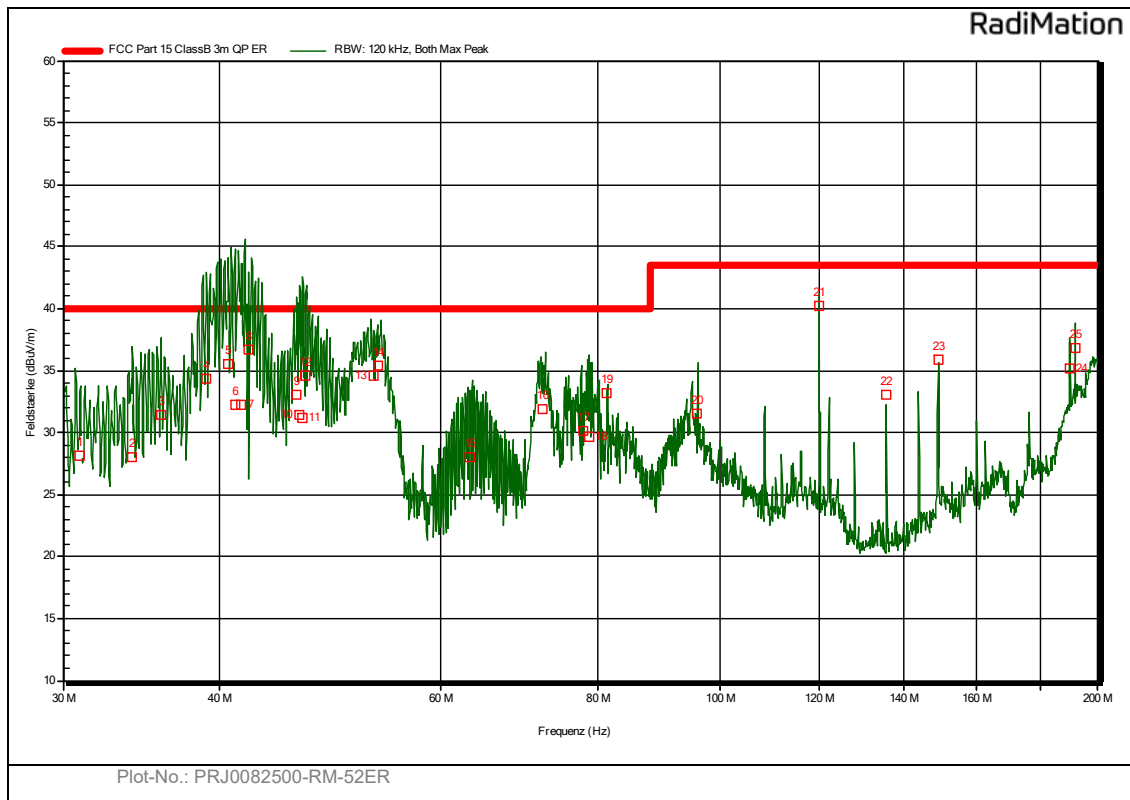
Plot-No.: PRJ0082500-039





Radiated emissions 30 - 200 MHz.

Measuring distance 3 m, measured with Quasi Peak detector.

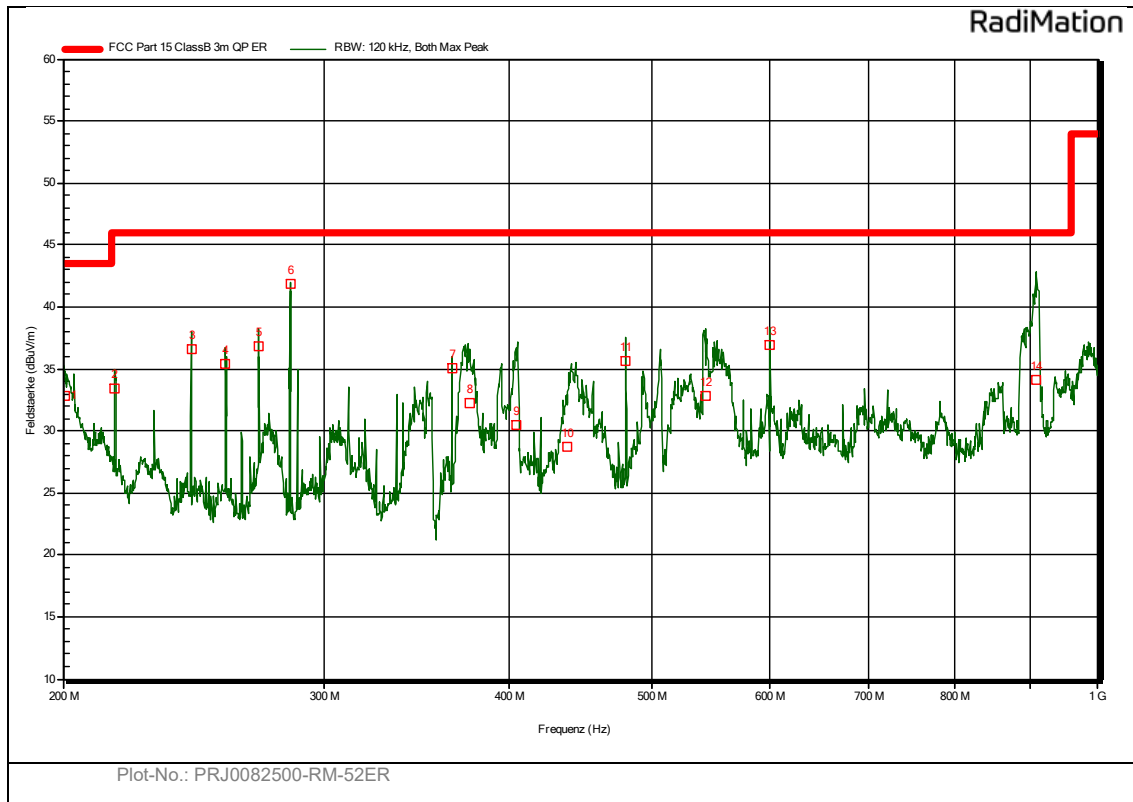


Final measurements QP with Quasi-Peak-Detector

Peak Number	Frequency (MHz)	Quasi-Peak (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Quasi-Peak Correction (dB)	Quasi-Peak Difference (dB)	Angle (Grad)	Height (m)	Polarization
1	30.96	28.12	40.00	20.1	-11.88	337.0	1.00	Vertical
2	34.08	28.07	40.00	19.2	-11.93	315.0	1.00	Vertical
3	35.88	31.38	40.00	18.8	-8.62	22.0	1.00	Vertical
4	39.00	34.34	40.00	18.0	-5.66	329.0	1.00	Vertical
5	40.56	35.53	40.00	17.7	-4.47	295.0	1.00	Vertical
6	41.13	32.19	40.00	17.6	-7.81	377.0	1.00	Vertical
7	41.64	32.23	40.00	17.5	-7.77	351.0	1.00	Vertical
8	42.15	36.73	40.00	17.4	-3.27	311.0	1.00	Vertical
9	46.05	33.12	40.00	16.7	-6.88	337.0	2.50	Vertical
10	46.32	31.43	40.00	16.7	-8.57	21.0	1.00	Vertical
11	46.59	31.18	40.00	16.6	-8.82	-3.0	1.00	Vertical
12	46.83	34.55	40.00	16.6	-5.45	45.0	1.00	Vertical
13	53.10	34.53	40.00	15.8	-5.47	45.0	1.00	Vertical
14	53.40	35.47	40.00	15.8	-4.53	45.0	1.00	Vertical
15	63.24	27.98	40.00	15.3	-12.02	45.0	4.00	Horizontal
16	72.30	31.87	40.00	15.0	-8.13	67.0	1.00	Vertical
17	77.79	30.11	40.00	14.9	-9.89	337.0	1.00	Vertical
18	78.81	29.67	40.00	14.9	-10.33	-23.0	1.00	Vertical
19	81.36	33.15	40.00	14.9	-6.85	-45.0	1.00	Vertical
20	96.00	31.49	43.50	15.5	-12.01	22.0	1.00	Vertical
21	120.00	40.20	43.50	17.4	-3.30	90.0	2.50	Horizontal
22	135.60	33.12	43.50	18.3	-10.38	0.0	1.00	Vertical
23	149.16	35.83	43.50	18.8	-7.67	225.0	1.00	Vertical
24	189.84	35.21	43.50	20.3	-8.29	22.0	1.00	Vertical
25	192.00	36.86	43.50	20.5	-6.64	22.0	1.00	Vertical

Radiated emissions 200 - 1000 MHz.

Measuring distance 3 m, measured with Quasi Peak detector.



Final measurements QP with Quasi-Peak-Detector

Peak Number	Frequency (MHz)	Quasi-Peak (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Quasi-Peak Correction (dB)	Quasi-Peak Difference (dB)	Angle (Grad)	Height (m)	Polarization
1	200.81	32.80	43.50	11.0	-10.70	382.0	1.00	Vertical
2	216.95	33.46	46.00	11.6	-12.54	0.0	2.50	Horizontal
3	244.10	36.62	46.00	12.4	-9.38	359.0	2.50	Vertical
4	257.66	35.36	46.00	12.8	-10.64	360.0	2.50	Vertical
5	271.19	36.87	46.00	13.4	-9.13	0.0	1.00	Horizontal
6	284.78	41.84	46.00	13.7	-4.16	21.0	1.15	Horizontal
7	366.14	35.04	46.00	15.8	-10.96	359.0	2.50	Vertical
8	376.19	32.19	46.00	16.0	-13.81	112.0	1.00	Horizontal
9	404.69	30.44	46.00	17.4	-15.56	0.0	4.00	Vertical
10	438.65	28.70	46.00	17.9	-17.30	135.0	1.00	Horizontal
11	480.02	35.60	46.00	18.5	-10.40	45.0	1.00	Horizontal
12	543.29	32.78	46.00	20.0	-13.22	0.0	4.00	Vertical
13	600.02	36.95	46.00	20.1	-9.05	337.0	4.00	Vertical
14	907.70	34.07	46.00	24.2	-11.93	337.0	2.50	Vertical

Restricted Bands of operation

Restricted Bands of operation for FCC and ISED are defined in FCC Part 15.205 and ISED RSS-GEN, Issue 5 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands, and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 5, clause 8.9.

FCC (MHz)	ISED (MHz)	FCC (GHz)	ISED (GHz)
0.090-0.110		0.96-1.24 1.3-1.427	0.96-1.427
0.495-0.505		1.435-1.6265	
2.1735-2.1905		1.6455-1.6465	
	3.020-3.026	1.660-1.710	
4.125-4.128		1.7188-1.7222	
4.17725-4.17775		2.2-2.3	
4.20725-4.20775		2.31-2.39	
	5.677-5.683	2.4835-2.5	
6.215-6.218		2.69-2.9	2.655-2.9
6.26775-6.26825		3.26-3.267	
6.31175-6.31225		3.332-3.339	
8.291-8.294		3.3458-3.358	
8.362-8.366		3.6-4.4	3.5-4.4
8.37625-8.38675		4.5-5.15	
8.41425-8.41475		5.35-5.46	
12.29-12.293		7.25-7.75	
12.51975-12.52025		8.025-8.5	
12.57675-12.57725		9.0-9.2	
13.36-13.41		9.3-9.5	
16.42-16.423		10.6-12.7	
16.69475-16.69525		13.25-13.4	
16.80425-16.80475		14.47-14.5	
25.5-25.67		15.35-16.2	
37.5-38.25		17.7-21.4	
73-74.6		22.01-23.12	
74.8-75.2		23.6-24.0	
108-121.94 123-138	108-138	31.2-31.8	
149.9-150.05		36.43-36.5	
156.52475-156.52525		Above 38.6	
156.7-156.9			
162.0125-167.17			
167.72-173.2			
240-285			
322-335.4			
399.9-410			
608-614			

Frequencies in **Bold** text are specific for FCC or ISED, all other frequencies are common.

3.5 Supply Voltage Variations and Frequency Stability

Para. No.: 15.225 (e)

Para. No.: B.6 (b)

Test Performed By: F. Hupbauer

Date of Test: 2025-07-09, 2025-07-10

Test Results: Complies

Test Equipment Used: 1-0923, 1-0872, 1-0611, 1-0964, 1-0929, 1-0380

Measurement Data:

Module 1 (Starter)

Temperature	Module supply voltage	Given Frequency (MHz)	Measured Value (MHz)	Deviation (%)
+50 °C	24.0 V DC	13.56	13.5599734	-0.00019617
+40 °C	24.0 V DC	13.56	13.5600081	0.00005973
+30 °C	24.0 V DC	13.56	13.5600580	0.00042773
+20 °C	24.0 V DC	13.56	13.5600959	0.00070723
+20 °C	27.6 V DC	13.56	13.5600955	0.00070428
+20 °C	20.4 V DC	13.56	13.5600959	0.00070723
+10 °C	24.0 V DC	13.56	13.5601414	0.00104277
+0 °C	24.0 V DC	13.56	13.5601882	0.00138791
-10 °C	24.0 V DC	13.56	13.5601767	0.00130310
-20 °C	24.0 V DC	13.56	13.5601592	0.00117404

Module 2 (Reagent)

Temperature	Module supply voltage	Given Frequency (MHz)	Measured value (MHz)	Deviation (%)
+50 ° C	24.0 V DC	13.56	13.5599901	-0.00007301
+40 ° C	24.0 V DC	13.56	13.5600017	0.00001254
+30 ° C	24.0 V DC	13.56	13.5600399	0.00029425
+20 ° C	24.0 V DC	13.56	13.5600879	0.00064823
+20 ° C	27.6 V DC	13.56	13.5600879	0.00064823
+20 ° C	20.4 V DC	13.56	13.5600880	0.00064897
+10 ° C	24.0 V DC	13.56	13.5601244	0.00091740
+0 ° C	24.0 V DC	13.56	13.5601849	0.00136357
-10 ° C	24.0 V DC	13.56	13.5601540	0.00113569

-20 ° C	24.0 V DC	13.56	13.5601389	0.00102434
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Requirement:

(e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage and for a variation in the supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.8 dB
Power Spectral Density		±0.8 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.8 dB
	> 3.6 GHz	±1.2 dB
Spurious Emissions, Radiated	9 kHz - 30 MHz	±4.37 dB
	30 MHz - 200 MHz	±3.42 dB
	200 MHz - 1 GHz	±3.95 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		±1.62 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2.

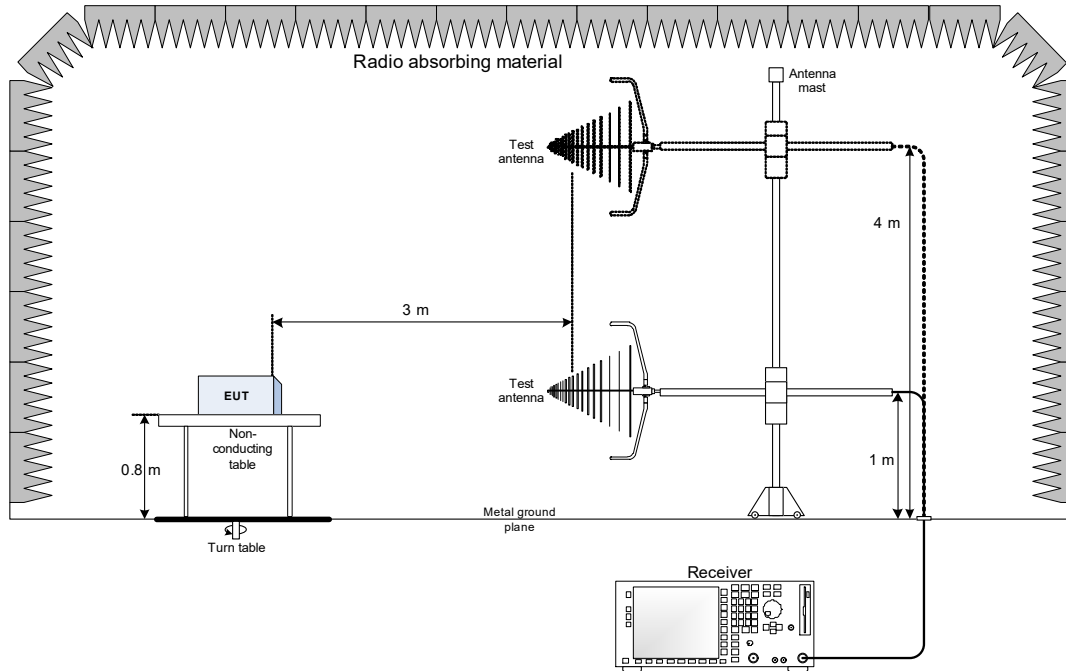
5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

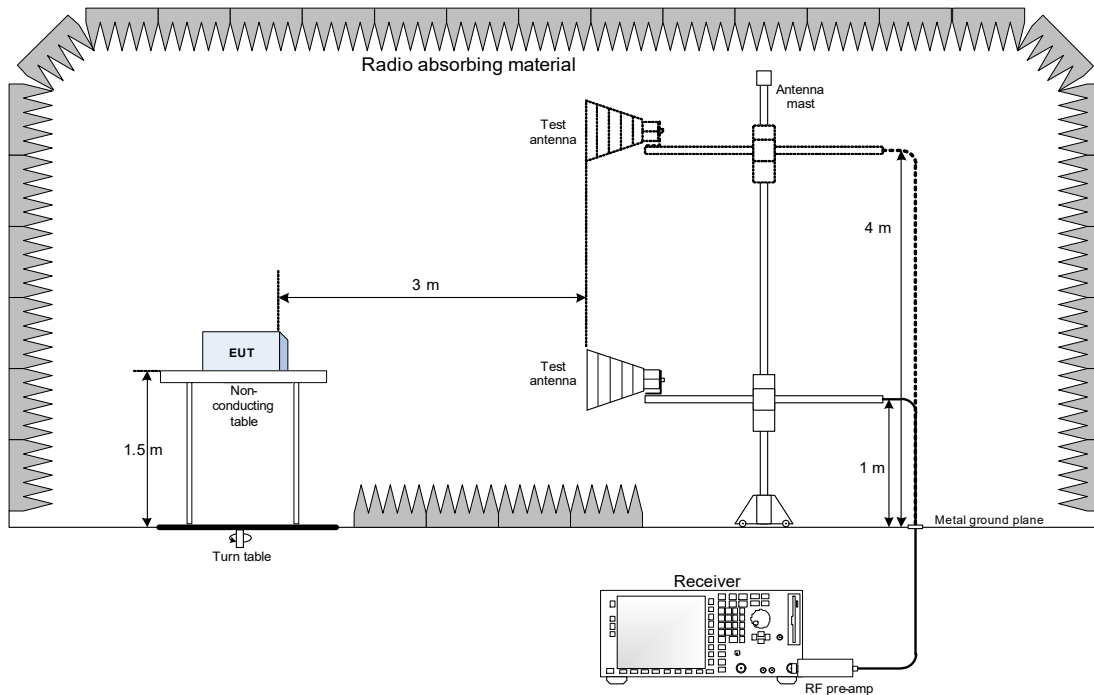
Inv.-Nr.	Instrument/ ancillary	Manufacturer	Type	Serial number	Cal. Date	Cal. Due	mon
1-0040	Biconical antenna	Rohde & Schwarz	HK116	888945/007	2023-08	2026-08	36
1-0054	Pulse limiter	Rohde & Schwarz	ESH3-Z2	3MSE/0099	2024-09	2025-09	12
1-0055	LogPer antenna	Rohde & Schwarz	HL223	826517/014	2022-11	2025-11	36
1-0080	Turntable	H. Deisel	DS 420	1361114	N / A	N / A	
1-0200	Trilog antenna	Schwarzbeck	VULB 9163	VULB 9163-107	2024-10	2027-01	27
1-0361	Semi anechoic chamber	Reinhold & Mahla	3m	1124	2024-10	2027-10	36
1-0365	Coaxial cable (to SAC)	SSB electronic	Aircom plus	none	2022-09	2025-09	36
1-0380	Digital thermometer	Fluke	52 II	74380217	2024-10	2025-10	12
1-0604	EMI test receiver	Rohde & Schwarz	ESU8	100203	2024-09	2025-09	12
1-0611	Spectrum analyzer	Rohde & Schwarz	FSV 40	100898	2024-09	2025-09	12
1-0619	Coaxial cable (to SAC)	Huber+Suhner	SF106/2x11N-651/2m	70168/6	2023-09	2026-09	36
1-0624	EMI-Software Radimation	DARE	Radimation	not applicable	N / A	N / A	
1-0782	Antenna cable	Huber & Suhner	FB142A1060002020	75193-01	2023-09	2026-09	36
1-0794	Coaxial cable	Rosenberger	FB142A0010002020	65627-01	2023-09	2026-09	36
1-0806	Controller	Innco	CO 3000	821/34571114/L	N / A	N / A	
1-0807	Antenna mast	Innco	MA-400-XPET	4681114	N / A	N / A	
1-0872	10 dB Attenuator	mini circuits	BW-S10-2W263+	1437	2022-09	2025-09	36
1-0923	Coaxial cable	HARBOUR	RG316 MIL	#001	2022-09	2025-09	36
1-0924	Coaxial cable	HARBOUR	RG316 MIL	#002	2022-09	2025-09	36
1-0925	Coaxial cable	HARBOUR	RG316 MIL	#003	2022-09	2025-09	36
1-0926	Coaxial cable	HARBOUR	RG316 MIL	#004	2022-09	2025-09	36
1-0927	Coaxial cable	HARBOUR	RG316 MIL	#005	2022-09	2025-09	36
1-0929	Power supply	ELEKTRO-AUTOMATIK	PS 2042-20 B	2772230129	N / A	N / A	
1-0964	Climate chamber	Weiss Umwelttechnik	WK3-1000/70	58226174700010	2024-10	2025-10	12
1-0993	6 dB Attenuator	mini circuits	BW-N6W5+	1725	2023-09	2026-09	36
1-1000	Low Noise Preamplifier	Nemko GmbH	BBV 30M1G	001	2024-09	2025-09	12
1-1118	Coaxial cable (to switch)	-	RG 213	-	2022-09	2025-09	36
1-1176	EMC Wandler	Magnetec GmbH	M-116-03	-	N / A	N / A	
1-1177	EMC Wandler	Magnetec GmbH	M-116-03	-	N / A	N / A	
1-1223	Coaxial cable	Huber & Suhner	SUCOLFEX104	586221/4	2024-09	2027-09	36
1-1248	Coaxial cable	Harbour Industries	EA02-07-07-5M	23011084	2023-02	2026-02	36
1-1260	Coaxial cable	Harbour Industries	EA02-07-07-7M	23080362	2023-09	2026-09	36
1-1289	Loop Antenna	Seibersdorf	PLA-R	PLAR039/X	2025-03	2026-03	12
1-1313	Artificial mains network, 1ph	Rohde & Schwarz	ENV 216	103191	2024-11	2025-11	12

6 BLOCK DIAGRAM

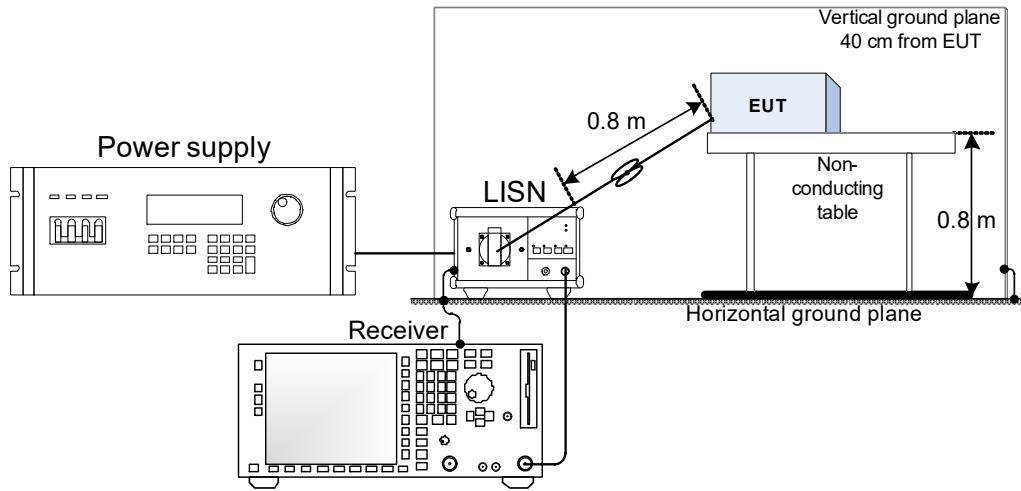
6.1 Radiated emissions set-up for frequencies below 1 GHz



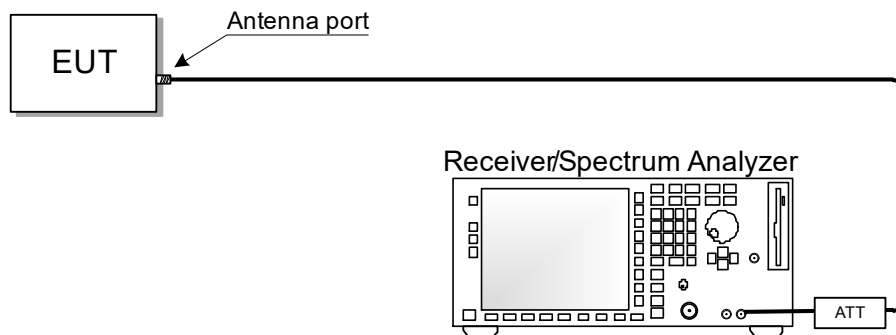
6.2 Radiated emissions set-up for frequencies above 1 GHz



6.3 Power Line Conducted Emissions set-up



6.4 Antenna port set-up



7 Revision history

Version	Date	Comment	Sign
00	2025-07-18	First version	SM

- End of test report -