



EMI - TEST REPORT

- FCC Part 15.225, RSS 210-

Type / Model Name : Artist-1024

Product Description : Modular Intercom Matrix System
RFID technology 13.56 MHz

Applicant : RIEDEL Communications GmbH & Co. KG

Address : Uellendahler Str. 353
42109 Wuppertal, GERMANY

Manufacturer : RIEDEL Communications GmbH & Co. KG

Address : Uellendahler Str. 353
42109 Wuppertal, GERMANY

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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Test Report No. : 80171682-01 Rev_0	11. December 2023 Date of issue
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Deutsche
Akkreditierungsstelle
D-PL-12030-01-03
D-PL-12030-01-04

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (June 2023)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (June 2023)

Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.225	Operation within the band 13.110 - 14.010 MHz

RSS Rules and Regulations

RSS-Gen Issue 5, March 2018 Amendment 1 (March 2019) Amendment 2 (February 2021)	General Requirements and Information for the Certification of Radiocommunication Equipment
RSS-210 Issue 10, December 2019 Amendment (April 2020)	Low Power Licence – Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment
ANSI C63.10: 2013	Testing Unlicensed Wireless Devices

2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

2.3 Photo documentation of the EUT

Detailed photos see ATTACHMENT A and ATTACHMENT B

ATTACHMENT A: External views

ATTACHMENT B: Internal views

2.4 Short description of the equipment under test (EUT)

Modular Intercom Matrix
RFID technology 13.56 MHz

The EUT is tested together with a TAG.

Number of tested samples:	1
Serial number:	460107220159
HVIN:	Artist-1024

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Continuous reading mode (13.56 MHz), NFC function

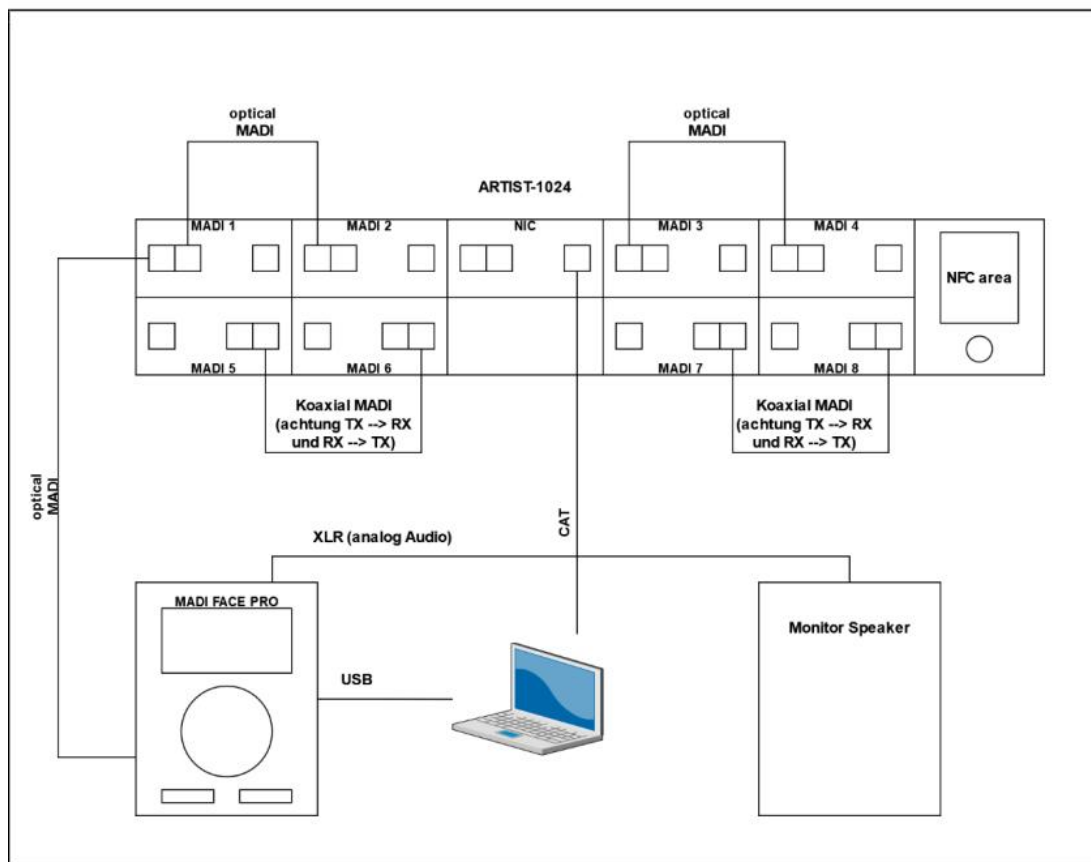
EUT configuration:

The following peripheral devices and interface cables were connected during the measurements:

- Laptop Model: DELL, SN.: 736SCS1
- MADI FACE PRO Model: RME, SN.: 79250986
- Monitor Speaker Model: the box pro, SN.: (21)72475VDE00143
- TAG Model: RIEDEL Communications GmbH & Co. KG

Hardware Setup under test:

Peripheral devices: Laptop, MADI FACE PRO, Monitor Speaker, TAG



2.5 Power supply system utilised

Power supply voltage : 100 – 240 V AC, 50/60 Hz

All tests were carried out with a supply voltage of 120 V, 60 Hz unless otherwise stated. Exceptions are described in the detailed test conditions.

The EUT have two AC ports. Both AC ports were supplied with the same power supply voltage at the same time.

3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
15.207	RSS Gen, 8.8	AC power line conducted emissions	passed
15.225	RSS-210, B.6	Field strength of fundamental	passed
15.209	RSS Gen, 8.9	Spurious emissions	passed
15.225	RSS-210, B.6	Frequency tolerance	passed
15.215	RSS-Gen, 6.7	Occupied bandwidth	passed
15.225	RSS-210, B.6	Transmitter spectrum mask	passed

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80171682-01	0	11 December 2023	Initial test report

The test report with the highest revision number replaces the previous test reports.

3.2 FINAL ASSESSMENT

The equipment under test **fulfills** the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 03 July 2023

Testing concluded on : 20 July 2023

Checked by:

Tested by:

Klaus Gegenfurtner
Team Lead Radio

Markus Friedl
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY**

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15 - 35 ° C

Humidity: 30 - 60 %

Atmospheric pressure: 86 - 106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	± 3.29 dB
20 dB Bandwidth	Center frequency of EuT	95%	$\pm 2.5 \cdot 10^{-7}$
99% Occupied Bandwidth	Center frequency of EuT	95%	$\pm 2.5 \cdot 10^{-7}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	± 3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	± 3.71 dB
Radiated Spurious Emissions	1000 MHz to 10000 MHz	95%	± 2.34 dB
Peak conducted output power	902 MHz to 928 MHz	95%	± 0.35 dB
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	± 2.15 dB

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).
 Details can be found in the procedure CSA_B_V50_29.

4.5 Measurement protocol for FCC and ISED

4.5.1 GENERAL INFORMATION

CSA Group Bayern GmbH is recognized as wireless testing laboratory under the CAB identifier:

FCC: DE 0011
ISED: DE0009

4.5.2 General Standard information

The test methods used comply with ANSI C63.10 - "Testing Unlicensed Wireless Devices".

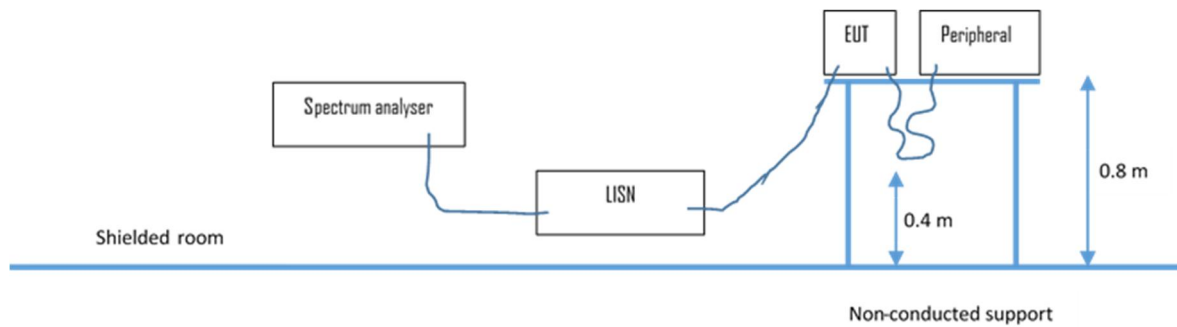
4.5.2.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions.

4.5.3 Details of test procedures

4.5.3.1 Conducted emission

Test setup according ANSI C63.10



The final level, expressed in dBmV, is arrived at by taking the reading directly from the Spectrum analyser. This level is compared to the limit.

To convert between dBmV and mV, the following conversions apply:

$$\text{dBmV} = 20(\log \text{mV})$$

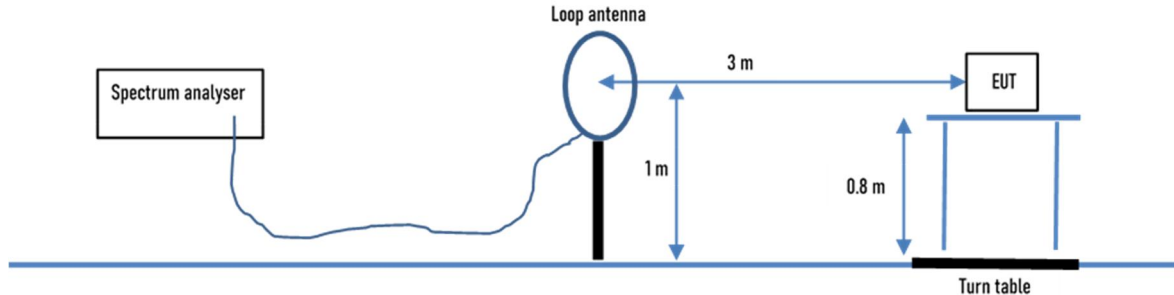
$$\text{mV} = \text{Inverse log}(\text{dBmV}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 W / 50 mH (CISPR 16) characteristics. The receiver is protected by means of an impedance matched pulse limiter connected directly to the RF input. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission is re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.5.3.2 Radiated emission

4.5.3.2.1 OATS1 test site (9 kHz - 30 MHz):

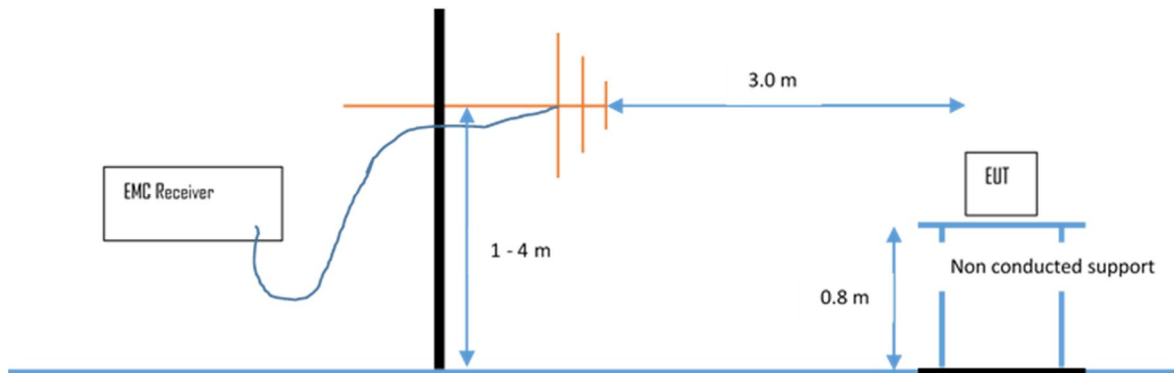
Test setup according ANSI C63.10



Emissions from the EUT are measured in the frequency range of 9 MHz to 30 MHz using a tuned receiver and a calibrated loop antenna. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 metres horizontally from the EUT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied along the site axis and the EUT is rotated 360 degrees.

4.5.3.2.2 OATS1 test site (30 MHz - 1 GHz):

Test setup according ANSI C63.10.



Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees. The final level in dBµV/m is calculated by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (dB). The FCC limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

The resolution bandwidth setting:

30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	-	Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used, see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

5.1.3 Applicable standard

FCC Part 15, Section 15.207.

5.1.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 3.45 dB at 0.204 MHz AC power line (1/2, up)
3.92 dB at 0.204 MHz AC power line (2/2, below)

Limit according to FCC Part 15, Section 15.207:

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocols.

The EUT have two AC ports. Both AC ports were supplied with the same power supply voltage at

the same time during the test. However, each AC port was measured separately:

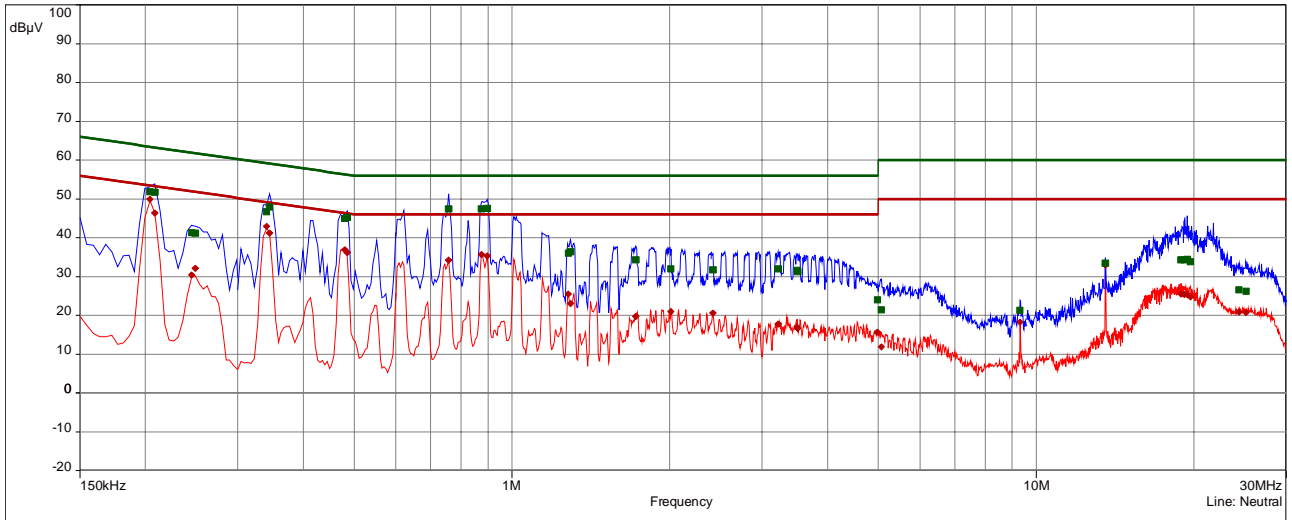
AC power line (1/2, up) / AC power line (2/2, below)

Measurement was performed on 03.07.2023

5.1.6 Test protocol

AC power line (1/2, up)

- FCC/FCC Part 15C (15.207) B - Avg/
- FCC/FCC Part 15C (15.207) B - Q-Peak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- ◆ CISPR AV (Finals) (Neutral)

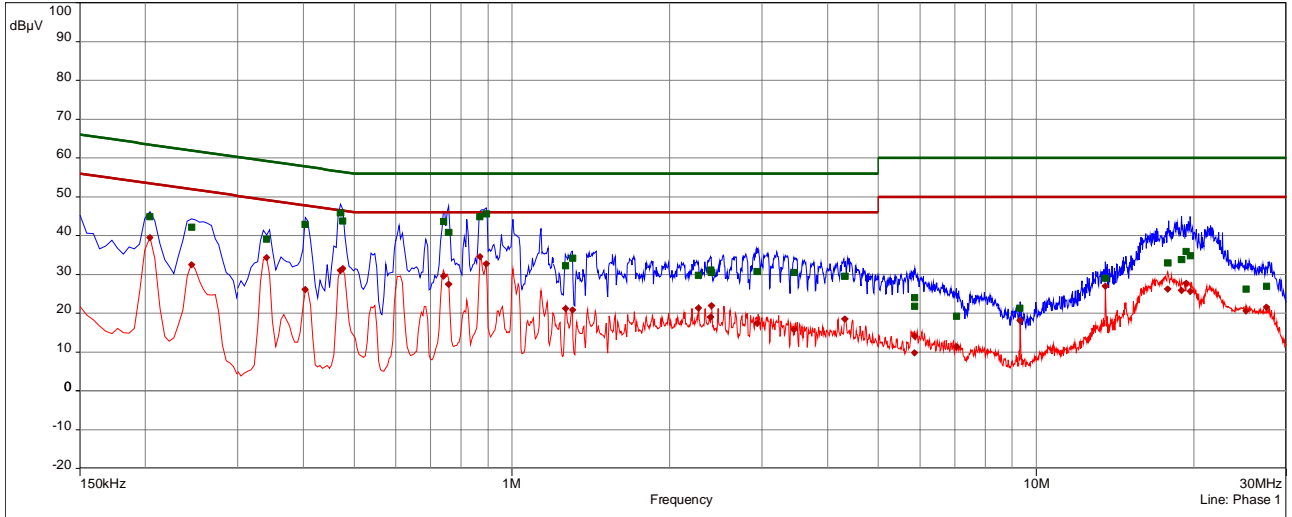


FCC/FCC Part 15C (15.207)B

freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dBµV	dB	dBµV	dBµV	dB	dBµV		dB
0.204	51.90	-11.55	63.45	50.00	-3.45	53.45	Neutral	10.07
0.2085	51.84	-11.42	63.26	46.44	-6.83	53.26	Neutral	10.07
0.2445	41.32	-20.62	61.94	30.49	-21.45	51.94	Neutral	10.07
0.249	41.29	-20.51	61.79	32.12	-19.67	51.79	Neutral	10.08
0.3405	46.77	-12.42	59.19	42.99	-6.20	49.19	Neutral	10.09
0.345	48.02	-11.06	59.08	41.22	-7.86	49.08	Neutral	10.09
0.48	45.05	-11.29	56.34	36.99	-9.35	46.34	Neutral	10.09
0.4845	45.24	-11.02	56.26	36.15	-10.11	46.26	Neutral	10.09
0.7575	47.52	-8.48	56.00	34.28	-11.72	46.00	Neutral	10.12
0.8745	47.49	-8.51	56.00	35.67	-10.33	46.00	Neutral	10.12
0.897	47.56	-8.44	56.00	35.41	-10.59	46.00	Neutral	10.12
1.281	36.05	-19.95	56.00	25.55	-20.45	46.00	Neutral	10.16
1.2945	36.46	-19.54	56.00	23.08	-22.92	46.00	Neutral	10.16
1.722	34.33	-21.67	56.00	19.79	-26.21	46.00	Neutral	10.18
2.01	32.01	-23.99	56.00	20.99	-25.01	46.00	Neutral	10.18
2.418	31.80	-24.20	56.00	20.59	-25.41	46.00	Neutral	10.21
3.219	32.05	-23.95	56.00	17.74	-28.26	46.00	Neutral	10.24
3.5025	31.71	-24.29	56.00	16.91	-29.09	46.00	Neutral	10.24
3.5115	31.32	-24.68	56.00	16.70	-29.30	46.00	Neutral	10.24
4.9755	24.02	-31.98	56.00	15.73	-30.27	46.00	Neutral	10.32
5.07	21.50	-38.50	60.00	11.93	-38.07	50.00	Neutral	10.32
9.327	21.34	-38.66	60.00	18.34	-31.66	50.00	Neutral	10.50
13.56	33.52	-26.48	60.00	33.00	-17.00	50.00	Neutral	10.68
18.8925	34.36	-25.64	60.00	25.51	-24.49	50.00	Neutral	10.80
19.194	34.33	-25.67	60.00	25.36	-24.64	50.00	Neutral	10.80
19.4205	34.48	-25.52	60.00	25.43	-24.57	50.00	Neutral	10.80
19.722	33.93	-26.07	60.00	24.85	-25.15	50.00	Neutral	10.80
24.4065	26.62	-33.38	60.00	20.91	-29.09	50.00	Neutral	11.00
25.0905	26.21	-33.79	60.00	20.73	-29.27	50.00	Neutral	11.01

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

- FCC/FCC Part 15C (15.207) B - Avg/
- FCC/FCC Part 15C (15.207) B - Q-Peak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- ◆ CISPR AV (Finals) (Phase 1)



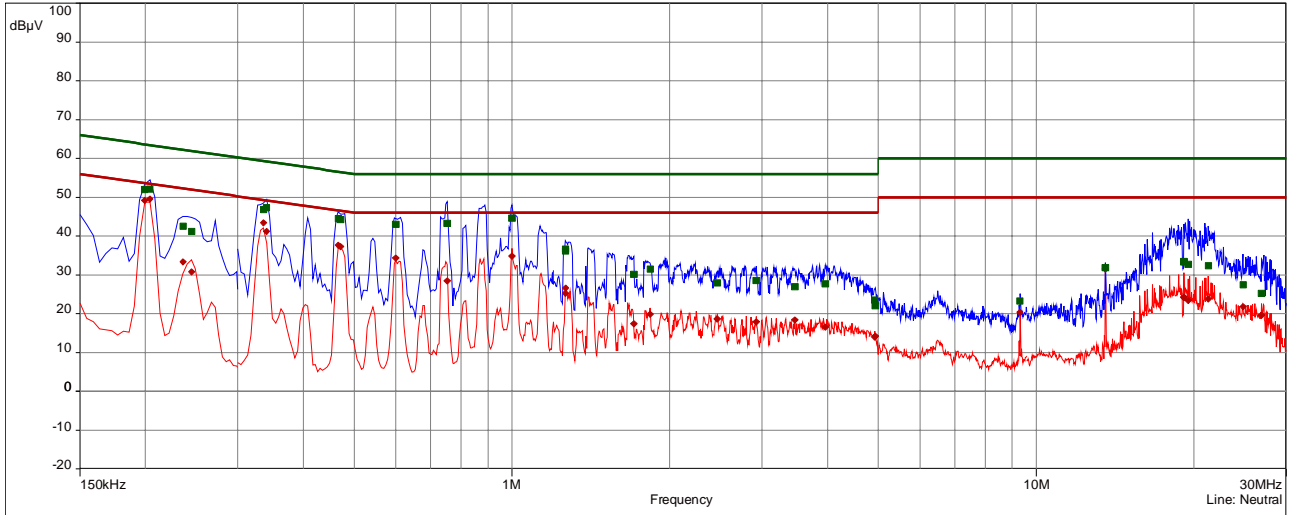
FCC/FCC Part 15C (15.207)B

freq MHz	QP dBµV	margin dB	limit dBµV	AV dBµV	margin dB	limit dBµV	line	corr dB
0.204	44.94	-18.50	63.45	39.46	-13.99	53.45	Phase 1	10.08
0.2445	42.19	-19.76	61.94	32.49	-19.46	51.94	Phase 1	10.08
0.3405	39.12	-20.07	59.19	34.42	-14.77	49.19	Phase 1	10.10
0.4035	42.95	-14.83	57.78	26.17	-21.61	47.78	Phase 1	10.10
0.471	45.92	-10.58	56.50	31.04	-15.46	46.50	Phase 1	10.10
0.4755	43.79	-12.63	56.42	31.58	-14.84	46.42	Phase 1	10.10
0.7395	43.73	-12.27	56.00	29.54	-16.46	46.00	Phase 1	10.12
0.7575	40.93	-15.07	56.00	27.53	-18.47	46.00	Phase 1	10.12
0.87	44.88	-11.12	56.00	34.60	-11.40	46.00	Phase 1	10.12
0.8925	45.65	-10.35	56.00	32.79	-13.21	46.00	Phase 1	10.12
1.2675	32.30	-23.70	56.00	21.29	-24.71	46.00	Phase 1	10.15
1.3035	34.29	-21.71	56.00	20.91	-25.09	46.00	Phase 1	10.15
2.271	29.83	-26.17	56.00	21.30	-24.70	46.00	Phase 1	10.19
2.3925	31.20	-24.80	56.00	18.98	-27.02	46.00	Phase 1	10.20
2.4045	30.61	-25.39	56.00	21.91	-24.09	46.00	Phase 1	10.20
2.9355	30.82	-25.18	56.00	17.39	-28.61	46.00	Phase 1	10.23
3.4485	30.62	-25.38	56.00	15.89	-30.11	46.00	Phase 1	10.23
4.317	29.57	-26.43	56.00	18.48	-27.52	46.00	Phase 1	10.28
5.862	21.87	-38.13	60.00	9.85	-40.15	50.00	Phase 1	10.34
5.871	24.02	-35.98	60.00	14.15	-35.85	50.00	Phase 1	10.34
7.041	19.28	-40.72	60.00	11.43	-38.57	50.00	Phase 1	10.39
9.327	21.36	-38.64	60.00	18.16	-31.84	50.00	Phase 1	10.46
13.56	29.14	-30.86	60.00	27.00	-23.00	50.00	Phase 1	10.66
17.835	33.00	-27.00	60.00	26.23	-23.77	50.00	Phase 1	10.74
18.942	33.92	-26.08	60.00	25.85	-24.15	50.00	Phase 1	10.73
19.3215	35.93	-24.07	60.00	27.73	-22.27	50.00	Phase 1	10.74
19.6545	34.80	-25.20	60.00	25.66	-24.34	50.00	Phase 1	10.76
25.0905	26.23	-33.77	60.00	20.62	-29.38	50.00	Phase 1	10.96
27.4665	26.94	-33.06	60.00	21.67	-28.33	50.00	Phase 1	11.03

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

AC power line (2/2, below)

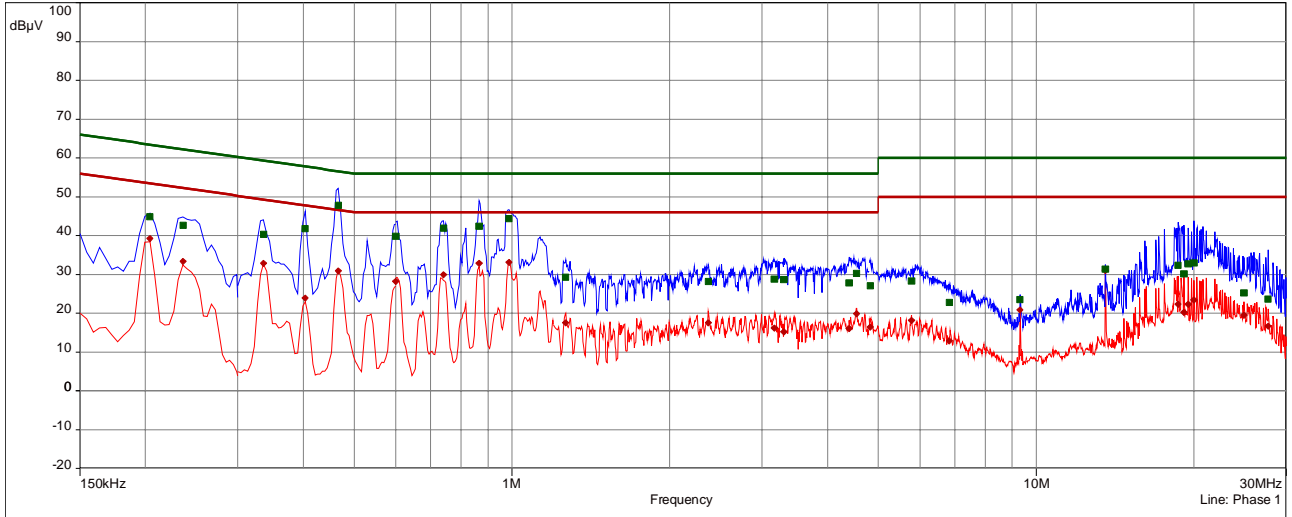
- FCC/FCC Part 15C (15.207) B - Avg/
- FCC/FCC Part 15C (15.207) B - Q-Peak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



FCC/FCC Part 15C (15.207)B

freq MHz	QP dBµV	margin dB	limit dBµV	AV dBµV	margin dB	limit dBµV	line	corr dB
0.1995	52.07	-11.57	63.63	49.19	-4.45	53.63	Neutral	10.07
0.204	52.10	-11.34	63.45	49.53	-3.92	53.45	Neutral	10.07
0.2355	42.59	-19.66	62.25	33.41	-18.85	52.25	Neutral	10.07
0.2445	41.20	-20.74	61.94	30.80	-21.14	51.94	Neutral	10.07
0.336	46.84	-12.47	59.30	43.47	-5.84	49.30	Neutral	10.09
0.3405	47.41	-11.78	59.19	41.24	-7.95	49.19	Neutral	10.09
0.4665	44.57	-12.00	56.58	37.65	-8.92	46.58	Neutral	10.09
0.471	44.35	-12.14	56.50	37.35	-9.15	46.50	Neutral	10.09
0.6	43.10	-12.90	56.00	34.37	-11.63	46.00	Neutral	10.10
0.753	43.28	-12.72	56.00	28.45	-17.55	46.00	Neutral	10.12
1.0005	44.65	-11.35	56.00	34.84	-11.16	46.00	Neutral	10.12
1.263	36.16	-19.84	56.00	25.32	-20.68	46.00	Neutral	10.16
1.2675	36.70	-19.30	56.00	26.59	-19.41	46.00	Neutral	10.16
1.7085	30.23	-25.77	56.00	17.42	-28.58	46.00	Neutral	10.18
1.8345	31.49	-24.51	56.00	19.91	-26.09	46.00	Neutral	10.18
2.463	27.98	-28.02	56.00	18.65	-27.35	46.00	Neutral	10.22
2.922	28.56	-27.44	56.00	17.91	-28.09	46.00	Neutral	10.24
3.4665	27.05	-28.95	56.00	18.36	-27.64	46.00	Neutral	10.24
3.957	27.70	-28.30	56.00	16.54	-29.46	46.00	Neutral	10.27
4.926	23.62	-32.38	56.00	14.04	-31.96	46.00	Neutral	10.32
4.935	22.10	-33.90	56.00	14.19	-31.81	46.00	Neutral	10.32
9.327	23.34	-36.66	60.00	20.43	-29.57	50.00	Neutral	10.50
13.56	31.90	-28.10	60.00	31.54	-18.46	50.00	Neutral	10.68
19.14	33.52	-26.48	60.00	24.19	-25.81	50.00	Neutral	10.80
19.1445	33.35	-26.65	60.00	24.32	-25.68	50.00	Neutral	10.80
19.5105	32.81	-27.19	60.00	23.41	-26.59	50.00	Neutral	10.80
21.2745	32.45	-27.55	60.00	23.86	-26.14	50.00	Neutral	10.90
24.816	27.46	-32.54	60.00	21.80	-28.20	50.00	Neutral	11.01
26.8905	25.31	-34.69	60.00	19.63	-30.37	50.00	Neutral	11.04

- FCC/FCC Part 15C (15.207) B - Avg/
- FCC/FCC Part 15C (15.207) B - Q-Peak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- ◆ CISPR AV (Finals) (Phase 1)



FCC/FCC Part 15C (15.207)B

freq MHz	QP dBµV	margin dB	limit dBµV	AV dBµV	margin dB	limit dBµV	line	corr dB
0.204	44.92	-18.53	63.45	39.27	-14.18	53.45	Phase 1	10.08
0.2355	42.73	-19.52	62.25	33.40	-18.85	52.25	Phase 1	10.08
0.336	40.39	-18.91	59.30	32.92	-16.38	49.30	Phase 1	10.10
0.4035	41.87	-15.91	57.78	23.88	-23.90	47.78	Phase 1	10.10
0.4665	47.89	-8.69	56.58	30.98	-15.60	46.58	Phase 1	10.10
0.6	39.87	-16.13	56.00	28.25	-17.75	46.00	Phase 1	10.10
0.7395	41.92	-14.08	56.00	29.98	-16.02	46.00	Phase 1	10.12
0.8655	42.51	-13.49	56.00	32.92	-13.08	46.00	Phase 1	10.12
0.987	44.42	-11.58	56.00	33.19	-12.81	46.00	Phase 1	10.12
1.2675	29.36	-26.64	56.00	17.60	-28.40	46.00	Phase 1	10.15
2.37	28.20	-27.80	56.00	17.60	-28.40	46.00	Phase 1	10.20
3.1695	28.87	-27.13	56.00	16.26	-29.74	46.00	Phase 1	10.23
3.3	28.66	-27.34	56.00	15.20	-30.80	46.00	Phase 1	10.23
4.398	27.88	-28.12	56.00	16.14	-29.86	46.00	Phase 1	10.28
4.5465	30.36	-25.64	56.00	19.86	-26.14	46.00	Phase 1	10.29
4.818	27.08	-28.92	56.00	16.43	-29.57	46.00	Phase 1	10.29
5.781	28.41	-31.59	60.00	18.11	-31.89	50.00	Phase 1	10.33
6.825	22.78	-37.22	60.00	12.83	-37.17	50.00	Phase 1	10.39
9.327	23.51	-36.49	60.00	20.89	-29.11	50.00	Phase 1	10.46
13.56	31.46	-28.54	60.00	31.04	-18.96	50.00	Phase 1	10.66
18.672	32.39	-27.61	60.00	22.38	-27.62	50.00	Phase 1	10.73
19.131	30.21	-29.79	60.00	20.26	-29.74	50.00	Phase 1	10.74
19.488	32.74	-27.26	60.00	22.39	-27.61	50.00	Phase 1	10.75
19.9875	33.01	-26.99	60.00	23.40	-26.60	50.00	Phase 1	10.77
24.9015	25.27	-34.73	60.00	19.56	-30.44	50.00	Phase 1	10.95
27.7095	23.64	-36.36	60.00	16.70	-33.30	50.00	Phase 1	11.04

5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part CPR 1.

5.2.1 Description of the test location

Test location: OATS 1
 Test distance: 3 metres

5.2.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

5.2.3 Applicable standard

FCC Part 15, Section 15.225(a) and RSS-210, B.6.

5.2.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10.

5.2.5 Test result

- a) Result at a measurement distance of 3m

Frequency (MHz)	Level QP (dBµV)	Ant. factor (dB 1/m)	Field strength dB(µV/m)
13.56	-8.8	20.0	11.2

- b) Result extrapolated to a distance of 30 m

Frequency (MHz)	Field strength dB(µV/m) @3m	Extrapolation factor (dB)	Field strength dB(µV/m) @30m	Limit dB(µV/m)	Delta (dB)
13.56	11.2	-40	-28.8	84.0	112.8

Limit according to FCC Part 15, Section 15.225(a) and RSS-210, B.6:

Frequency (MHz)	Field strength of fundamental wave		Measurement distance (metres)
	(µV/m)	dB(µV/m)	
13.553 - 13.567	15848	84.0	30

The requirements are **FULFILLED**.

Remarks: Measurement was performed on 14.07.2023

5.3 Spurious emissions

For test instruments and accessories used see section 6 Part **SER 1, SER 2**

5.3.1 Description of the test location

Test location: OATS 1 / Anechoic Chamber A1
 Test distance: 3 metres

5.3.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

5.3.3 Applicable standard

FCC Part 15, Section 15.209 (a) and RSS Gen, 8.9.

5.3.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10.

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz
 150 kHz – 30 MHz: RBW: 9 kHz
 30 MHz – 1000 MHz: RBW: 120 kHz

Detector: QP (9 kHz – 1000 MHz)

(In frequency range 9-90 kHz and 110-490 kHz a linear average detector is used for iSED)

5.3.5 Test result

9 kHz – 30 MHz (SER1)

f (MHz)	Level QP@3m (dB μ V)	Ant. factor (dB/m)	Field strength QP@3m dB(μ V/m)	Distance corr. 3m to 30m (dB)	Corrected level QP@30m dB(μ V/m)	Limit QP@30m dB(μ V/m)	Delta (dB)
27.12	-11.2	20	8.8	-40	-31.2	29.5	60.7

f (MHz)	Level QP@3m (dB μ A)	Ant. factor (dB/m)	Field strength QP@3m dB(μ A/m)	Distance corr. 3m to 30m (dB)	Corrected level QP@30m dB(μ A/m)	Limit QP@30m dB(μ A/m)	Delta (dB)
27.12	-62.7	20	-42.7	-40	-82.7	-22	60.7

30 MHz – 1 GHz (SER2)

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Dlimit (dB)
176.28	10.8	14.3	18.6	18.1	29.4	32.4	43.5	-11.1
352.56	-0.9	7.3	21.8	22.3	20.9	29.6	46.0	-16.4
379.68	0.6	3.5	22.7	23.0	23.3	26.5	46.0	-19.5
461.04	-3.7	-2.1	24.8	25.1	21.1	23.0	46.0	-23.0
542.40	6.3	0.5	26.9	27.2	33.2	27.7	46.0	-12.8
691.56	3.6	3.6	29.7	30.2	33.3	33.8	46.0	-12.2

Note: The correction factor includes cable loss and antenna factor.

Limit according to FCC Part 15 Subpart 15.209(a)

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(µV/m)	dB(µV/m)	
0.009 - 0.490	2400/F(kHz)	--	300
0.490 - 1.705	24000/F (kHz)	--	30
1.705 - 30.0	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Limit according to RSS-Gen clause 8.9

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(µA/m)	dB(µA/m)	
0.009 - 0.490	6.37/F(kHz)	--	300 (Note 1)
0.490 - 1.705	63.7/F (kHz)	--	30
1.705 - 30.0	0.08	-22	30
Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(µV/m)	dB(µV/m)	
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

The requirements are **FULFILLED**.

Remarks: Measurement has been performed up to 1000 MHz.
SER1: Measurement was performed on 14.07.2023
SER2: Measurement was performed on 17.07.2023

5.4 Frequency tolerance

For test instruments and accessories used see section 6 Part FE.

5.4.1 Description of the test location

Test location: AREA4

5.4.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

5.4.3 Applicable standard

According to FCC Part 15, Section 15.225(e) and RSS-210, B.6 (b).

5.4.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10.

5.4.5 Test result

Test conditions		Test result	Tolerance	Limit
		Frequency (kHz)	(kHz)	(kHz)
T_{min} (-30)°C	V_{nom} (120 V)	13.5599790	- 0.0210	± 1.356
T (-20)°C	V_{nom} (120 V)	13.5599790	- 0.0210	± 1.356
T (-10)°C	V_{nom} (120 V)	13.5599790	- 0.0210	± 1.356
T (0)°C	V_{nom} (120 V)	13.5599790	- 0.0210	± 1.356
T (10)°C	V_{nom} (120 V)	13.5599790	- 0.2010	± 1.356
T_{nom} (20)°C	V_{min} (85 V)	13.5599660	- 0.0340	± 1.356
	V_{nom} (120 V)	13.5599550	- 0.0450	± 1.356
	V_{max} (276 V)	13.5599660	- 0.0340	± 1.356
T (30)°C	V_{nom} (120 V)	13.5599540	- 0.0460	± 1.356
T (40)°C	V_{nom} (120 V)	13.5599420	- 0.0580	± 1.356
T_{max} (50)°C	V_{nom} (120 V)	13.5599420	- 0.0580	± 1.356

Limit Calculation:

Carrier frequency: $f_c = 13.56$ MHz

Max. tolerance: ± 0.01 % of 13.559706 MHz = ± 1.356 kHz

Limit according to FCC Part 15, Section 15.225(e) and RSS-210 clause B.6(b):

The frequency tolerance of the carrier signal shall be maintained within ±0.01 % of the operating frequency.

FCC ID: YFJART1024

IC ID: 8706A-ART1024

The requirements are **FULFILLED**.

Remarks: Measurements started at T=20°C

Measurement was performed on 20.07.2023

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

5.5 Bandwidth

For test instruments and accessories used see section 6 Part MB.

5.5.1 Description of the test location

Test location: AREA4

5.5.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

5.5.3 Applicable standard

According to FCC Part 15, Section 15.215(c) and RSS-Gen, 6.7.

5.5.4 Test result

Measured Bandwidth	result (kHz)	Limit (kHz)
20dB	0.264	--
99%	0.260	--

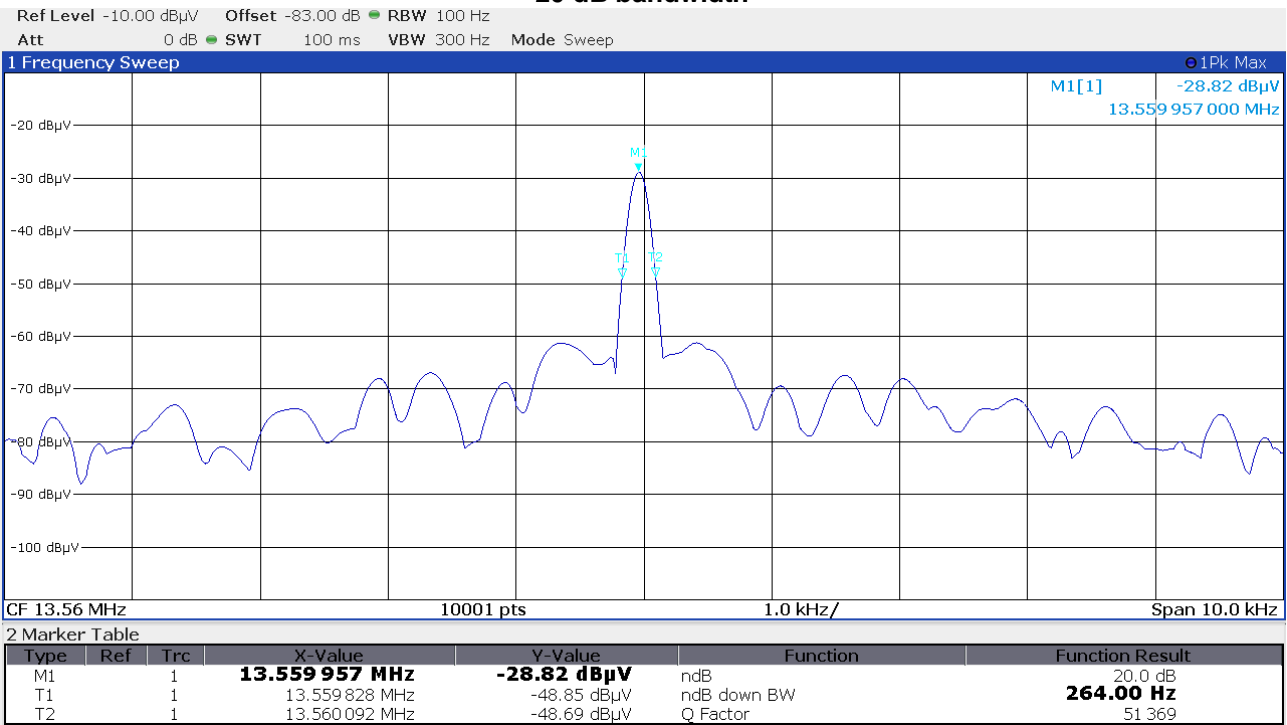
The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

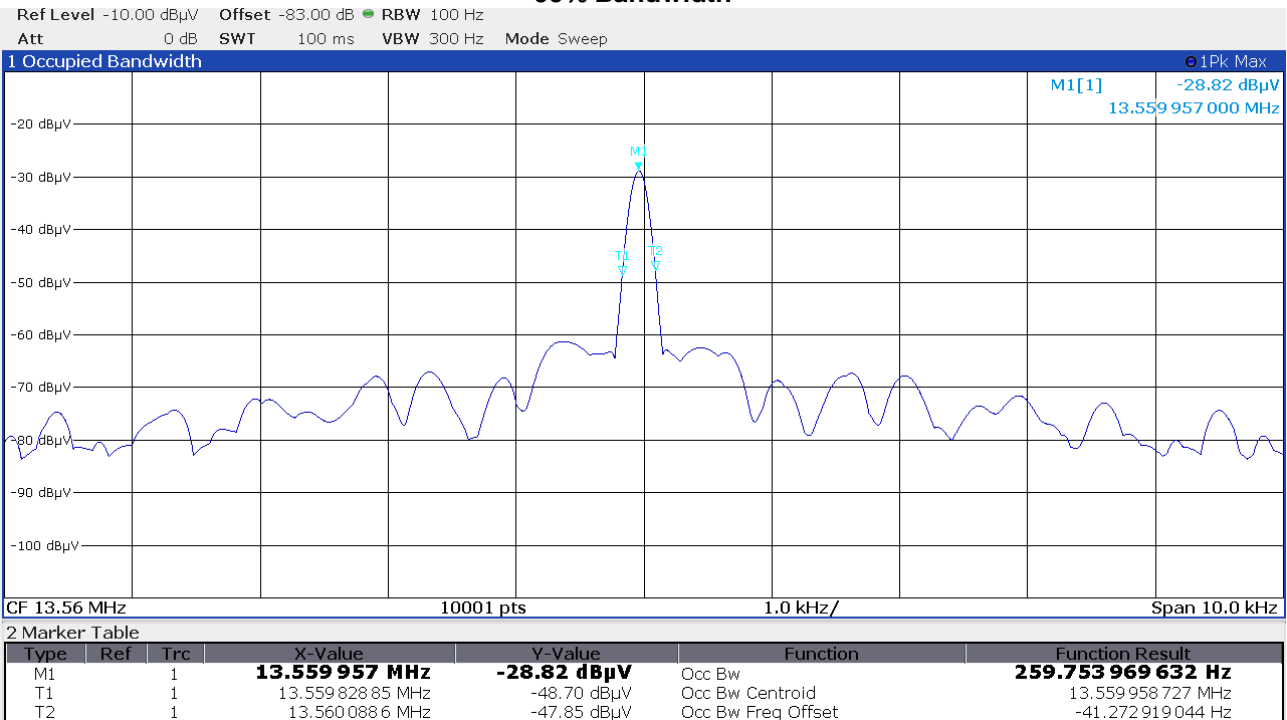
Measurement was performed on 20.07.2023

5.5.5 Test protocol

20 dB bandwidth



99% Bandwidth



5.6 Transmitter spectrum mask

For test instruments and accessories used see section 6 Part MB.

5.6.1 Description of the test location

Test location: AREA4

5.6.2 Photo documentation of the test set-up

See ATTACHMENT C to this test report.

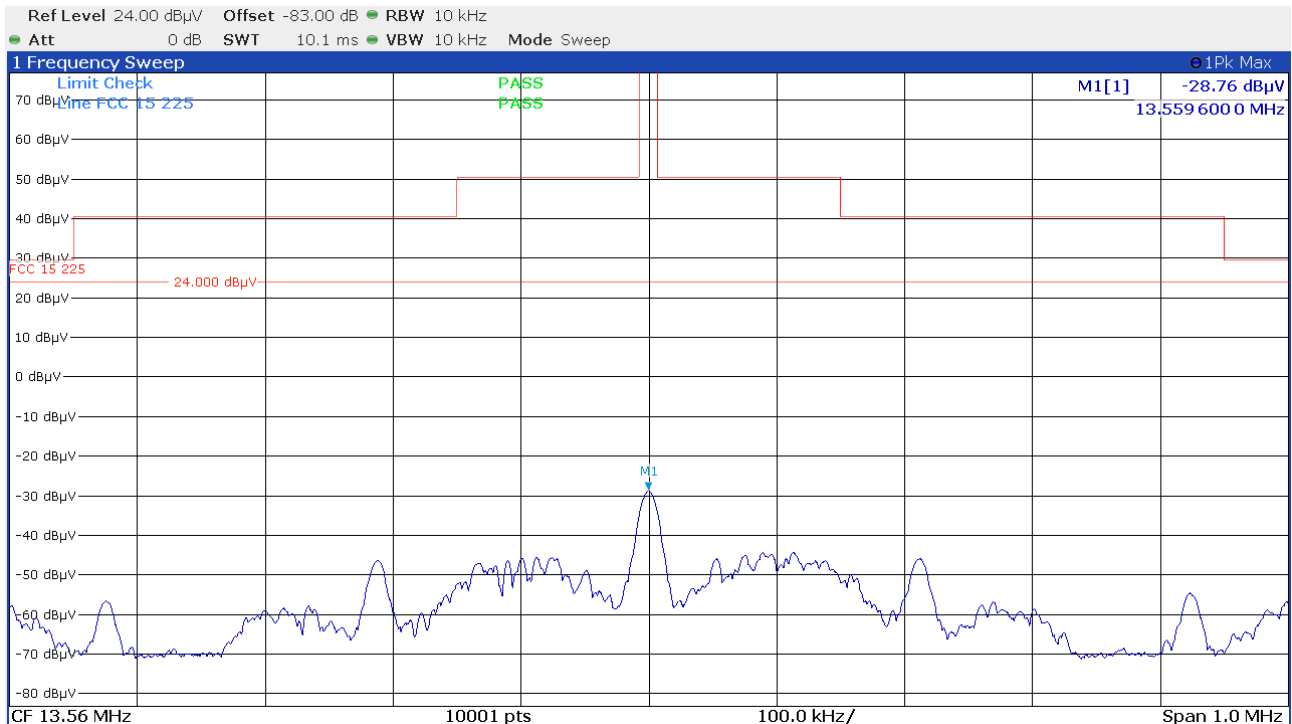
5.6.3 Applicable standard

According to FCC Part 15, Section 15.225 (a-d) and RSS-210, B.6. (i-iv).

5.6.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10.

5.6.5 Test result



FCC ID: YFJART1024
IC ID: 8706A-ART1024

Limits according to FCC Part 15, Section 15.225(a-d)

Frequency band (MHz)	Emission level limit at 30 m ($\mu\text{V}/\text{m}$)	Emission level limit at 30 m ($\text{dB}\mu\text{V}/\text{m}$)
13.110 – 13.410	106	40.5
13.410 - 13.553	334	50.5
13.553 - 13.567	15.848	84.0
13.567 – 13.710	334	50.5
13.710 – 14.010	106	40.5
outside of 13.110 – 14.010	30	29.5

Limits according to RSS-210 clause B.6 (i-iv)

Frequency band (MHz)	Emission level limit at 30 m ($\mu\text{V}/\text{m}$)	Emission level limit at 30 m ($\text{dB}\mu\text{V}/\text{m}$)
13.110 – 13.410	106	40.5
13.410 - 13.553	334	50.5
13.553 - 13.567	15.848	84.0
13.567 – 13.710	334	50.5
13.710 – 14.010	106	40.5
Frequency band (MHz)	Emission level limit at 30 m ($\mu\text{A}/\text{m}$)	Emission level limit at 30 m ($\text{dB}\mu\text{A}/\text{m}$)
outside of 13.110 – 14.010	0.08	-22

 The requirements are **FULFILLED**.

Remarks: Measurement was performed on 20.07.2023

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	BAT-EMC 2022.0.23.0	01-02/68-13-001				
	ESCI	02-02/03-15-001	03/07/2024	03/07/2023		
	ESH 2 - Z 5	02-02/20-05-004	13/10/2025	13/10/2022	17/10/2023	17/04/2023
	N-4000-BNC	02-02/50-05-138				
	ESH 3 - Z 2	02-02/50-05-155	09/11/2025	09/11/2022	25/07/2023	25/01/2023
6430		02-02/50-13-014				
CPR 1	ESR 7	02-02/03-17-001	01/08/2023	01/08/2022		
	HFH 2 - Z 2	02-02/24-15-001	01/06/2025	01/06/2022	05/09/2023	05/09/2022
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
6430		02-02/50-13-014				
FE	FSW43	02-02/11-15-001	04/05/2024	04/05/2023		
	HFRAE 5161 _ 50 kHz-120	02-02/24-11-004				
	WK-340/40	02-02/45-05-001	27/07/2023	27/07/2022	27/07/2023	27/01/2023
	6430		02-02/50-13-014			
MB	FSW43	02-02/11-15-001	04/05/2024	04/05/2023		
	HFRAE 5161 _ 50 kHz-120	02-02/24-11-004				
	6430		02-02/50-13-014			
SER 1	ESR 7	02-02/03-17-001	01/08/2023	01/08/2022		
	HFH 2 - Z 2	02-02/24-15-001	01/06/2025	01/06/2022	05/09/2023	05/09/2022
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
6430		02-02/50-13-014				
SER 2	ESVS 30	02-02/03-05-006	27/07/2023	27/07/2022		
	VULB 9168	02-02/24-05-005	20/04/2024	20/04/2023	03/05/2024	03/05/2023
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
	50F-003 N 3 dB	02-02/50-21-010				
6430		02-02/50-13-014				

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.