



EMI – TEST REPORT

- FCC Part 15.209 -

Type / Model Name : MU03065 – Y Soft USB Reader 3 MF+

Product Description : USB Card Reader

Applicant : Y Soft Corporation, a.s.

Address : U Knezske louky 2151/18

Prague, 130 00, Czeck Republic

Manufacturer : Y Soft Corporation, a.s.

Address : U Knezske louky 2151/18

Prague, 130 00, Czeck Republic

Licence holder : Y Soft Corporation, a.s.

Address : Technicka 13

Brno, 61600, Czeck Republic

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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Test Report No. : T41552-00-03HU	25. August 2016 Date of issue
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Deutsche
Akkreditierungsstelle
D-PL-12030-01-01
D-PL-12030-01-02

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.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (October, 2015)

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 (October, 2015)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements

ANSI C63.10: 2013 Testing Unlicensed Wireless Devices

ANSI C95.1:2005 IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

CISPR 16-4-2: 2003 Uncertainty in EMC measurement

2 SUMMARY

GENERAL REMARKS:

For testing, the USB Card Reader was set via test software in TX-continuous mode. The test software is available for testing only. Radiated tests are performed with the USB Card Reader in TX-continuous mode.

All radiated measurements were made with the device positioned in three orientations. Such as orientations X, Y and Z (Lying flat, lying on its end and lying on its side). The values in the test report shows only the maximum measured value.

For detailed information about the USB Card Reader, please refer to the user manual.

FINAL ASSESSMENT:

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

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

Testing commenced on : 08. August 2016

Testing concluded on : 11. August 2016

Checked by:

Tested by:

Gegenfurtner Klaus
Teamleader Radio

Huber Markus

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see Attachment A

3.2 Power supply system utilised

Power supply voltage: : Powered via USB Port, 5.0 V / DC

3.3 Short description of the Equipment under Test (EUT)

The EuT is a Card Reader wich could be connected via USB Port to a device.

Number of tested samples: 1
Serial number: Prototype

EUT operation mode:

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

- Tx mode at 125 kHz

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EUT configuration:

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

- Test software Model : Supplied by manufacturer
- LapTop Model : Supplied by CSA Group Bayern GmbH
- Model :
- customer specific cables
- unscreened power cables

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

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

4.2 Statement regarding the usage of logos in test reports

The accreditation and notification body logos displayed in this test report are only valid for standards listed in the accreditation or notification scope of CSA Group Bayern GmbH.

4.3 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

4.4 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 acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. 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%	± 2.5 x 10 ⁻⁷
99% Occupied Bandwidth	Center frequency of EuT	95%	± 2.5 x 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

4.5 Measurement Protocol for FCC, VCCI and AUSTEL

4.5.1 GENERAL INFORMATION

4.5.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.5.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

5 TEST CONDITIONS AND RESULTS

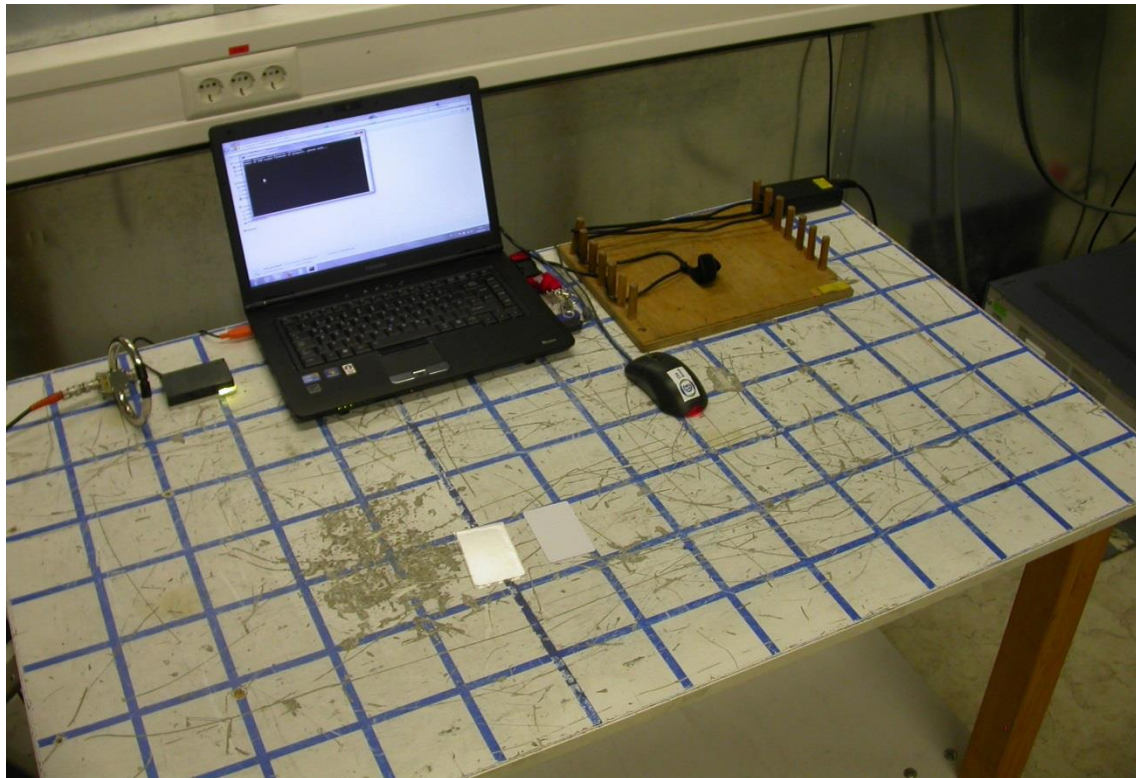
5.1 Conducted emissions

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



5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

* Decreases with the logarithm of the frequency

5.1.4 Test result

Frequency range: 0.15 MHz - 30 MHz
Min. limit margin 2.22 dB at 0.57 MHz

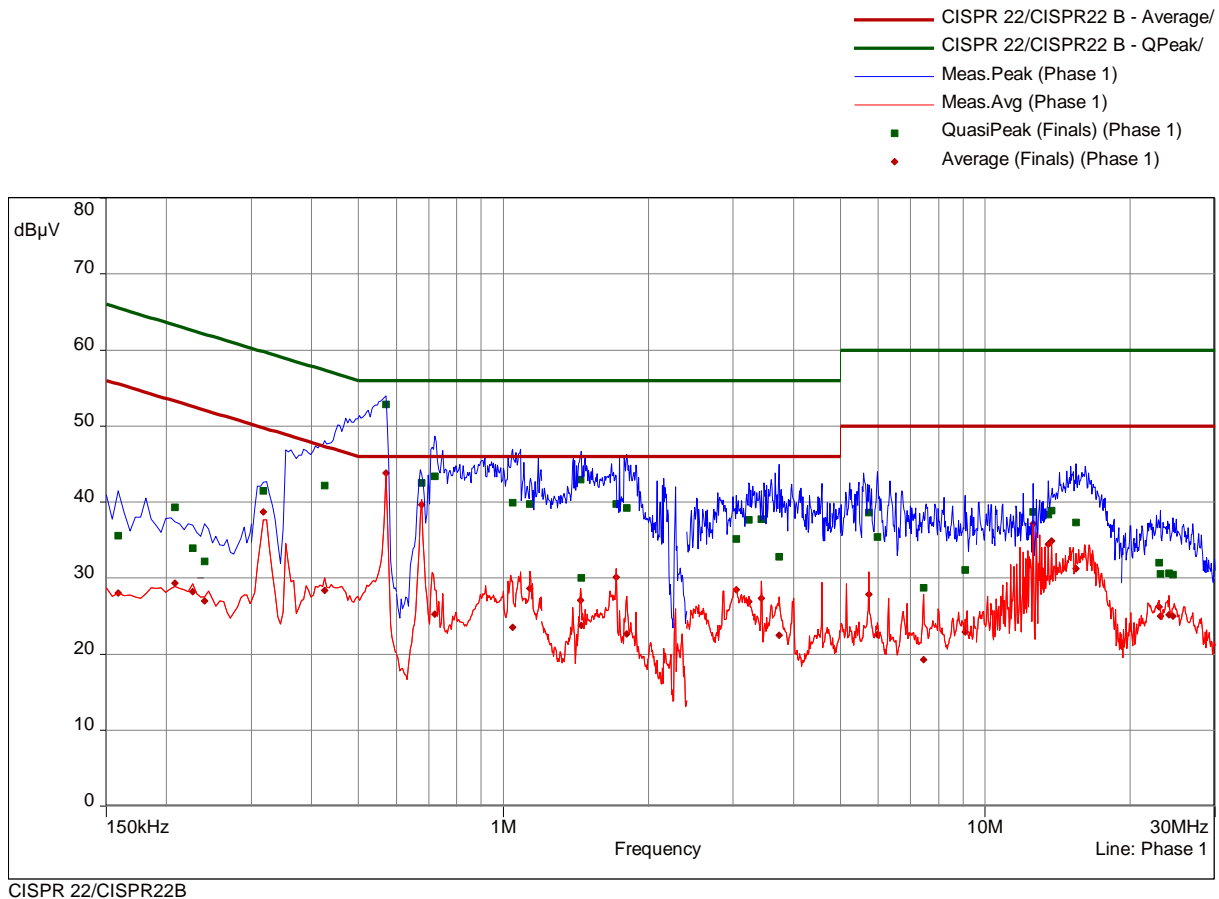
The requirements are **FULFILLED**.

Remarks:

5.1.5 Test protocol

Test point: L1
 Operation mode: Standby – Config_set_default
 Remarks: Antenna load 50 Ohm connected
 Tested by: Huber Ma.

Result: Passed



freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.159	1	35.61	29.91	65.52	28.03	27.48	55.52	Phase 1	9.84
0.2085	1	39.35	23.92	63.26	29.33	23.93	53.26	Phase 1	9.83
0.2265	1	33.90	28.68	62.58	28.17	24.41	52.58	Phase 1	9.83
0.24	1	32.20	29.90	62.10	26.99	25.11	52.10	Phase 1	9.83
0.318	2	41.48	18.27	59.76	38.68	11.08	49.76	Phase 1	9.82
0.426	2	42.16	15.17	57.33	28.40	18.93	47.33	Phase 1	9.81
0.57	2	52.83	3.17	56.00	43.78	2.22	46.00	Phase 1	9.82
0.6765	3	42.52	13.48	56.00	39.66	6.34	46.00	Phase 1	9.81
0.7215	3	43.37	12.63	56.00	25.28	20.72	46.00	Phase 1	9.81

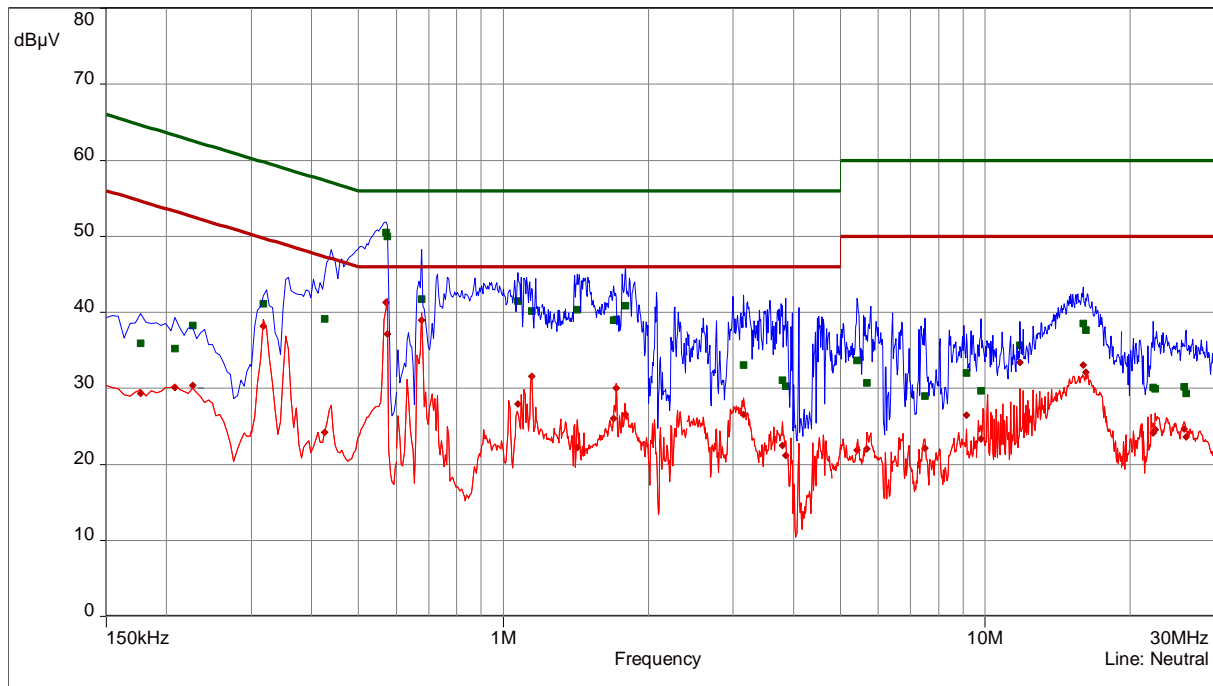
freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
1.0455	3	39.89	16.11	56.00	23.53	22.47	46.00	Phase 1	9.81
1.1355	3	39.72	16.28	56.00	28.67	17.33	46.00	Phase 1	9.81
1.4475	4	43.00	13.00	56.00	27.11	18.89	46.00	Phase 1	9.79
1.452	4	30.01	25.99	56.00	23.77	22.23	46.00	Phase 1	9.79
1.7175	4	39.71	16.29	56.00	30.10	15.90	46.00	Phase 1	9.79
1.803	4	39.21	16.79	56.00	22.66	23.34	46.00	Phase 1	9.80
3.0435	5	35.18	20.82	56.00	28.44	17.56	46.00	Phase 1	9.80
3.2325	5	37.68	18.32	56.00	26.86	19.14	46.00	Phase 1	9.80
3.435	5	37.79	18.21	56.00	27.30	18.70	46.00	Phase 1	9.82
3.7365	5	32.80	23.20	56.00	22.45	23.55	46.00	Phase 1	9.81
5.7315	6	38.65	21.35	60.00	27.88	22.12	50.00	Phase 1	9.83
5.9655	6	35.41	24.59	60.00	22.59	27.41	50.00	Phase 1	9.83
7.4595	6	28.74	31.26	60.00	19.29	30.71	50.00	Phase 1	9.85
9.084	6	31.04	28.96	60.00	22.90	27.10	50.00	Phase 1	9.87
12.5745	7	38.71	21.29	60.00	37.16	12.84	50.00	Phase 1	10.00
13.5285	7	38.35	21.65	60.00	34.45	15.55	50.00	Phase 1	10.04
13.7175	7	38.87	21.13	60.00	34.92	15.08	50.00	Phase 1	10.05
15.4185	7	37.34	22.66	60.00	31.24	18.76	50.00	Phase 1	10.13
22.926	8	32.04	27.96	60.00	26.23	23.77	50.00	Phase 1	10.34
23.0925	8	30.53	29.47	60.00	24.96	25.04	50.00	Phase 1	10.34
24.0915	8	30.65	29.35	60.00	25.14	24.86	50.00	Phase 1	10.34
24.5595	8	30.48	29.52	60.00	25.01	24.99	50.00	Phase 1	10.35

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.177	9	35.94	28.69	64.63	29.33	25.30	54.63	Neutral	9.85
0.2085	9	35.21	28.06	63.26	30.11	23.16	53.26	Neutral	9.85
0.2265	9	38.24	24.34	62.58	30.36	22.21	52.58	Neutral	9.84
0.318	10	41.14	18.62	59.76	38.22	11.53	49.76	Neutral	9.82
0.426	10	39.10	18.23	57.33	24.24	23.09	47.33	Neutral	9.81
0.57	10	50.47	5.53	56.00	41.28	4.72	46.00	Neutral	9.82
0.5745	10	49.97	6.03	56.00	37.19	8.81	46.00	Neutral	9.82
0.6765	11	41.75	14.25	56.00	39.01	6.99	46.00	Neutral	9.81
1.0725	11	41.52	14.48	56.00	27.93	18.07	46.00	Neutral	9.81
1.1445	11	40.17	15.83	56.00	31.61	14.39	46.00	Neutral	9.81
1.425	12	40.34	15.66	56.00	22.25	23.75	46.00	Neutral	9.79
1.695	12	38.98	17.02	56.00	26.05	19.95	46.00	Neutral	9.79
1.7175	12	39.04	16.96	56.00	30.03	15.97	46.00	Neutral	9.79
1.794	12	40.88	15.12	56.00	26.52	19.48	46.00	Neutral	9.79
3.1515	13	33.10	22.90	56.00	26.52	19.48	46.00	Neutral	9.80
3.7905	13	31.04	24.96	56.00	22.48	23.52	46.00	Neutral	9.81
3.858	13	30.28	25.72	56.00	21.14	24.86	46.00	Neutral	9.81
5.4255	14	33.64	26.36	60.00	21.89	28.11	50.00	Neutral	9.81
5.682	14	30.68	29.32	60.00	22.00	28.00	50.00	Neutral	9.81
7.4865	14	29.02	30.98	60.00	22.14	27.86	50.00	Neutral	9.81
9.147	14	31.99	28.01	60.00	26.50	23.50	50.00	Neutral	9.81
9.807	15	29.66	30.34	60.00	23.38	26.62	50.00	Neutral	9.83
11.814	15	35.64	24.36	60.00	33.40	16.60	50.00	Neutral	9.85
15.9585	15	38.56	21.44	60.00	33.04	16.96	50.00	Neutral	9.96
16.197	15	37.62	22.38	60.00	32.12	17.88	50.00	Neutral	9.97
22.2915	16	30.13	29.87	60.00	24.14	25.86	50.00	Neutral	10.03
22.521	16	29.91	30.09	60.00	24.58	25.42	50.00	Neutral	10.02
25.842	16	30.20	29.80	60.00	24.68	25.32	50.00	Neutral	9.89
26.1525	16	29.33	30.67	60.00	23.58	26.42	50.00	Neutral	9.87

Test point N
Operation mode: Standby – Config_set_default
Remarks: Antenna load 50 Ohm connected
Tested by: Huber Ma.

Result: Passed

— CISPR 22/CISPR22 B - Average/
— CISPR 22/CISPR22 B - QPeak/
— Meas.Peak (Neutral)
— Meas.Avg (Neutral)
■ QuasiPeak (Finals) (Neutral)
♦ Average (Finals) (Neutral)



CISPR 22/CISPR22B

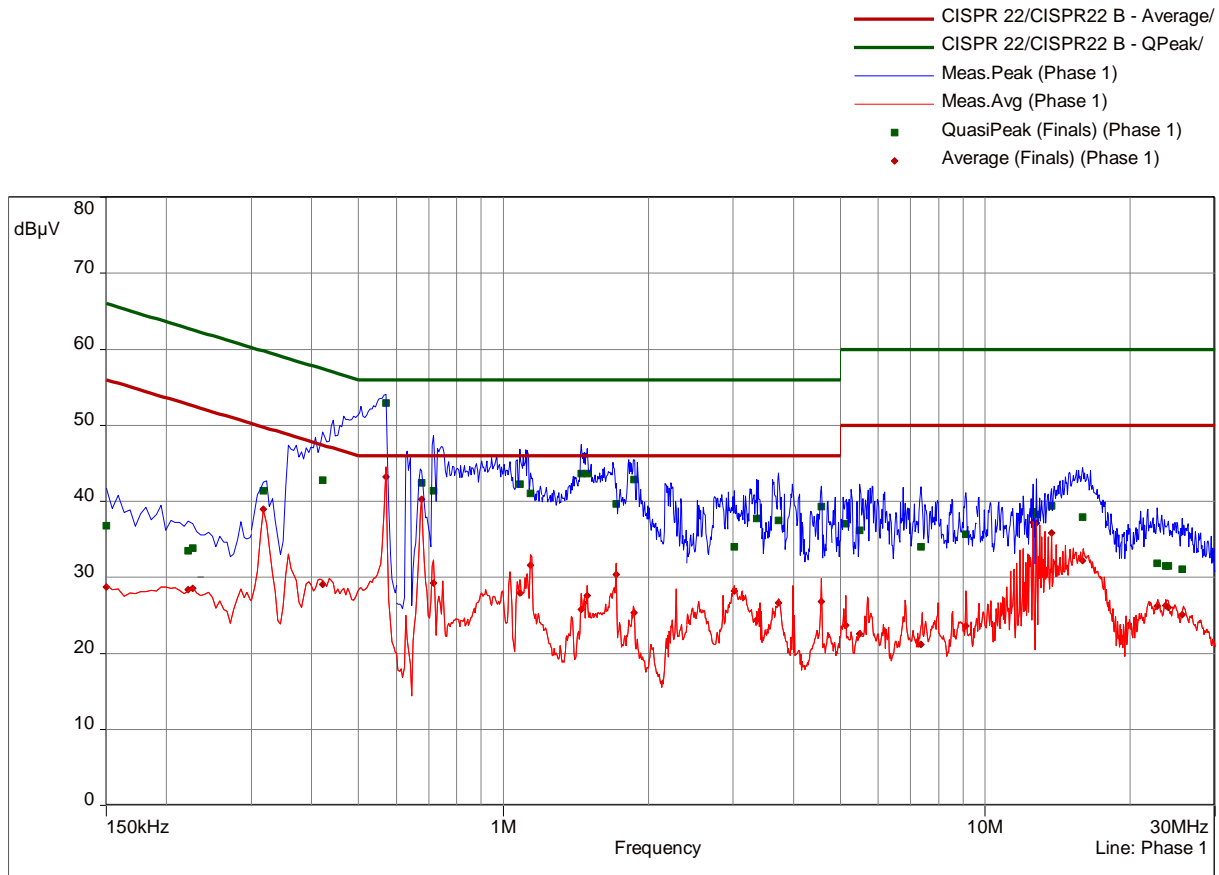
freq MHz	SR	QP dB(μV)	margin dB	limit dB	AV dB(μV)	margin dB	limit dB	line	corr dB
0.159	1	35.61	29.91	65.52	28.03	27.48	55.52	Phase 1	9.84
0.2085	1	39.35	23.92	63.26	29.33	23.93	53.26	Phase 1	9.83
0.2265	1	33.90	28.68	62.58	28.17	24.41	52.58	Phase 1	9.83
0.24	1	32.20	29.90	62.10	26.99	25.11	52.10	Phase 1	9.83
0.318	2	41.48	18.27	59.76	38.68	11.08	49.76	Phase 1	9.82
0.426	2	42.16	15.17	57.33	28.40	18.93	47.33	Phase 1	9.81
0.57	2	52.83	3.17	56.00	43.78	2.22	46.00	Phase 1	9.82
0.6765	3	42.52	13.48	56.00	39.66	6.34	46.00	Phase 1	9.81
0.7215	3	43.37	12.63	56.00	25.28	20.72	46.00	Phase 1	9.81

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
1.0455	3	39.89	16.11	56.00	23.53	22.47	46.00	Phase 1	9.81
1.1355	3	39.72	16.28	56.00	28.67	17.33	46.00	Phase 1	9.81
1.4475	4	43.00	13.00	56.00	27.11	18.89	46.00	Phase 1	9.79
1.452	4	30.01	25.99	56.00	23.77	22.23	46.00	Phase 1	9.79
1.7175	4	39.71	16.29	56.00	30.10	15.90	46.00	Phase 1	9.79
1.803	4	39.21	16.79	56.00	22.66	23.34	46.00	Phase 1	9.80
3.0435	5	35.18	20.82	56.00	28.44	17.56	46.00	Phase 1	9.80
3.2325	5	37.68	18.32	56.00	26.86	19.14	46.00	Phase 1	9.80
3.435	5	37.79	18.21	56.00	27.30	18.70	46.00	Phase 1	9.82
3.7365	5	32.80	23.20	56.00	22.45	23.55	46.00	Phase 1	9.81
5.7315	6	38.65	21.35	60.00	27.88	22.12	50.00	Phase 1	9.83
5.9655	6	35.41	24.59	60.00	22.59	27.41	50.00	Phase 1	9.83
7.4595	6	28.74	31.26	60.00	19.29	30.71	50.00	Phase 1	9.85
9.084	6	31.04	28.96	60.00	22.90	27.10	50.00	Phase 1	9.87
12.5745	7	38.71	21.29	60.00	37.16	12.84	50.00	Phase 1	10.00
13.5285	7	38.35	21.65	60.00	34.45	15.55	50.00	Phase 1	10.04
13.7175	7	38.87	21.13	60.00	34.92	15.08	50.00	Phase 1	10.05
15.4185	7	37.34	22.66	60.00	31.24	18.76	50.00	Phase 1	10.13
22.926	8	32.04	27.96	60.00	26.23	23.77	50.00	Phase 1	10.34
23.0925	8	30.53	29.47	60.00	24.96	25.04	50.00	Phase 1	10.34
24.0915	8	30.65	29.35	60.00	25.14	24.86	50.00	Phase 1	10.34
24.5595	8	30.48	29.52	60.00	25.01	24.99	50.00	Phase 1	10.35

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.177	9	35.94	28.69	64.63	29.33	25.30	54.63	Neutral	9.85
0.2085	9	35.21	28.06	63.26	30.11	23.16	53.26	Neutral	9.85
0.2265	9	38.24	24.34	62.58	30.36	22.21	52.58	Neutral	9.84
0.318	10	41.14	18.62	59.76	38.22	11.53	49.76	Neutral	9.82
0.426	10	39.10	18.23	57.33	24.24	23.09	47.33	Neutral	9.81
0.57	10	50.47	5.53	56.00	41.28	4.72	46.00	Neutral	9.82
0.5745	10	49.97	6.03	56.00	37.19	8.81	46.00	Neutral	9.82
0.6765	11	41.75	14.25	56.00	39.01	6.99	46.00	Neutral	9.81
1.0725	11	41.52	14.48	56.00	27.93	18.07	46.00	Neutral	9.81
1.1445	11	40.17	15.83	56.00	31.61	14.39	46.00	Neutral	9.81
1.425	12	40.34	15.66	56.00	22.25	23.75	46.00	Neutral	9.79
1.695	12	38.98	17.02	56.00	26.05	19.95	46.00	Neutral	9.79
1.7175	12	39.04	16.96	56.00	30.03	15.97	46.00	Neutral	9.79
1.794	12	40.88	15.12	56.00	26.52	19.48	46.00	Neutral	9.79
3.1515	13	33.10	22.90	56.00	26.52	19.48	46.00	Neutral	9.80
3.7905	13	31.04	24.96	56.00	22.48	23.52	46.00	Neutral	9.81
3.858	13	30.28	25.72	56.00	21.14	24.86	46.00	Neutral	9.81
5.4255	14	33.64	26.36	60.00	21.89	28.11	50.00	Neutral	9.81
5.682	14	30.68	29.32	60.00	22.00	28.00	50.00	Neutral	9.81
7.4865	14	29.02	30.98	60.00	22.14	27.86	50.00	Neutral	9.81
9.147	14	31.99	28.01	60.00	26.50	23.50	50.00	Neutral	9.81
9.807	15	29.66	30.34	60.00	23.38	26.62	50.00	Neutral	9.83
11.814	15	35.64	24.36	60.00	33.40	16.60	50.00	Neutral	9.85
15.9585	15	38.56	21.44	60.00	33.04	16.96	50.00	Neutral	9.96
16.197	15	37.62	22.38	60.00	32.12	17.88	50.00	Neutral	9.97
22.2915	16	30.13	29.87	60.00	24.14	25.86	50.00	Neutral	10.03
22.521	16	29.91	30.09	60.00	24.58	25.42	50.00	Neutral	10.02
25.842	16	30.20	29.80	60.00	24.68	25.32	50.00	Neutral	9.89
26.1525	16	29.33	30.67	60.00	23.58	26.42	50.00	Neutral	9.87

Test point L1
Operation mode: Cont. Tx at 125 kHz
Remarks:
Tested by: Huber Ma.

Result: Passed



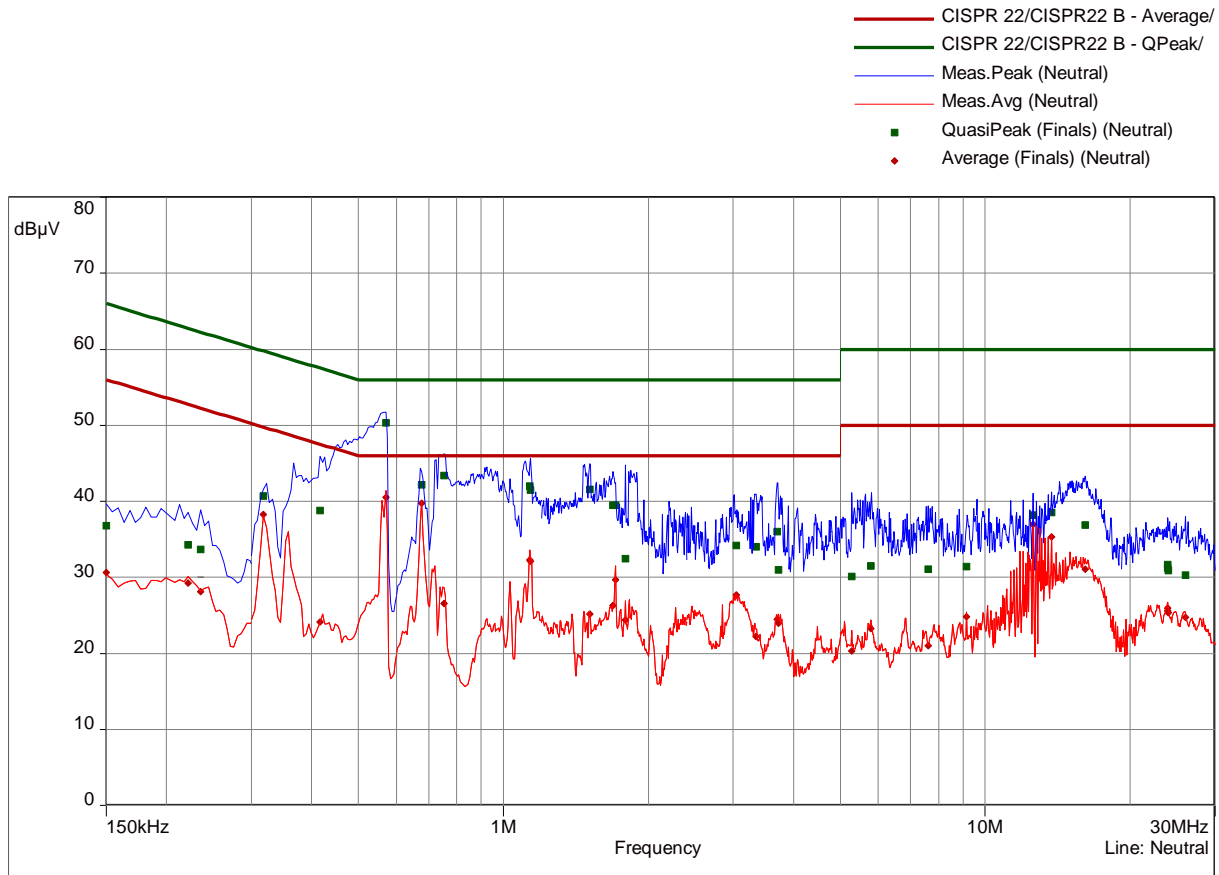
CISPR 22/CISPR22B

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.15	1	36.76	29.24	66.00	28.69	27.31	56.00	Phase 1	9.84
0.222	1	33.52	29.23	62.74	28.41	24.34	52.74	Phase 1	9.83
0.2265	1	33.85	28.72	62.58	28.58	24.00	52.58	Phase 1	9.83
0.318	2	41.39	18.37	59.76	38.97	10.79	49.76	Phase 1	9.82
0.4215	2	42.80	14.62	57.42	29.05	18.37	47.42	Phase 1	9.81
0.57	2	52.95	3.05	56.00	43.18	2.82	46.00	Phase 1	9.82
0.6765	3	42.43	13.57	56.00	40.26	5.74	46.00	Phase 1	9.81
0.717	3	41.43	14.57	56.00	29.23	16.77	46.00	Phase 1	9.81

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
1.0815	3	42.22	13.78	56.00	27.94	18.06	46.00	Phase 1	9.81
1.14	3	41.07	14.93	56.00	31.60	14.40	46.00	Phase 1	9.81
1.452	4	43.64	12.36	56.00	25.74	20.26	46.00	Phase 1	9.79
1.4925	4	43.64	12.36	56.00	27.61	18.39	46.00	Phase 1	9.79
1.713	4	39.69	16.31	56.00	30.42	15.58	46.00	Phase 1	9.79
1.866	4	42.86	13.14	56.00	25.33	20.67	46.00	Phase 1	9.80
3.012	5	34.06	21.94	56.00	28.18	17.82	46.00	Phase 1	9.80
3.3585	5	37.72	18.28	56.00	24.40	21.60	46.00	Phase 1	9.81
3.7275	5	37.53	18.47	56.00	26.63	19.37	46.00	Phase 1	9.81
4.569	5	39.30	16.70	56.00	26.82	19.18	46.00	Phase 1	9.81
5.1375	6	37.02	22.98	60.00	23.66	26.34	50.00	Phase 1	9.83
5.493	6	36.19	23.81	60.00	22.53	27.47	50.00	Phase 1	9.82
7.347	6	34.02	25.98	60.00	21.16	28.84	50.00	Phase 1	9.85
9.1245	6	35.66	24.34	60.00	23.57	26.43	50.00	Phase 1	9.87
12.5745	7	38.60	21.40	60.00	37.27	12.73	50.00	Phase 1	10.00
12.768	7	38.26	21.74	60.00	37.11	12.89	50.00	Phase 1	10.01
13.7175	7	39.39	20.61	60.00	35.84	14.16	50.00	Phase 1	10.05
15.927	7	37.95	22.05	60.00	32.20	17.80	50.00	Phase 1	10.15
22.764	8	31.82	28.18	60.00	26.24	23.76	50.00	Phase 1	10.33
23.6865	8	31.51	28.49	60.00	26.28	23.72	50.00	Phase 1	10.34
24.0195	8	31.49	28.51	60.00	26.04	23.96	50.00	Phase 1	10.34
25.6395	8	31.08	28.92	60.00	25.10	24.90	50.00	Phase 1	10.35

Test point N
Operation mode: Cont. Tx at 125 kHz
Remarks:
Tested by: Huber Ma.

Result: Passed



CISPR 22/CISPR22B

freq MHz	SR	QP dB(µV)	margin dB	limit dB	AV dB(µV)	margin dB	limit dB	line	corr dB
0.15	9	36.79	29.21	66.00	30.62	25.38	56.00	Neutral	9.84
0.222	9	34.31	28.44	62.74	29.25	23.50	52.74	Neutral	9.85
0.2355	9	33.64	28.61	62.25	28.14	24.12	52.25	Neutral	9.84
0.318	10	40.73	19.03	59.76	38.27	11.49	49.76	Neutral	9.82
0.417	10	38.75	18.76	57.51	24.12	23.39	47.51	Neutral	9.81
0.57	10	50.29	5.71	56.00	40.54	5.46	46.00	Neutral	9.82
0.6765	11	42.14	13.86	56.00	39.73	6.27	46.00	Neutral	9.81
0.753	11	43.37	12.63	56.00	26.55	19.45	46.00	Neutral	9.80

freq	SR	QP	margin	limit	AV	margin	limit	line	corr
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB		dB
1.1355	11	41.97	14.03	56.00	32.26	13.74	46.00	Neutral	9.81
1.14	11	41.44	14.56	56.00	32.11	13.89	46.00	Neutral	9.81
1.5105	12	41.59	14.41	56.00	25.13	20.87	46.00	Neutral	9.79
1.686	12	39.46	16.54	56.00	26.34	19.66	46.00	Neutral	9.79
1.7085	12	39.52	16.48	56.00	29.65	16.35	46.00	Neutral	9.79
1.794	12	32.44	23.56	56.00	24.39	21.61	46.00	Neutral	9.79
3.048	13	34.21	21.79	56.00	27.67	18.33	46.00	Neutral	9.79
3.345	13	34.04	21.96	56.00	22.19	23.81	46.00	Neutral	9.81
3.705	13	36.00	20.00	56.00	24.51	21.49	46.00	Neutral	9.81
3.723	13	31.02	24.98	56.00	23.95	22.05	46.00	Neutral	9.81
5.2905	14	30.14	29.86	60.00	20.34	29.66	50.00	Neutral	9.81
5.7945	14	31.50	28.50	60.00	23.30	26.70	50.00	Neutral	9.81
7.626	14	31.06	28.94	60.00	21.04	28.96	50.00	Neutral	9.81
9.147	14	31.41	28.59	60.00	24.79	25.21	50.00	Neutral	9.81
12.5745	15	38.23	21.77	60.00	36.98	13.02	50.00	Neutral	9.87
13.7175	15	38.51	21.49	60.00	35.30	14.70	50.00	Neutral	9.90
16.107	15	36.90	23.10	60.00	31.04	18.96	50.00	Neutral	9.97
23.88	16	31.68	28.32	60.00	25.94	24.06	50.00	Neutral	9.97
23.934	16	31.24	28.76	60.00	25.58	24.42	50.00	Neutral	9.96
24.0105	16	30.90	29.10	60.00	25.37	24.63	50.00	Neutral	9.96
26.0355	16	30.31	29.69	60.00	24.72	25.28	50.00	Neutral	9.88

5.2 Field strength of the fundamental wave

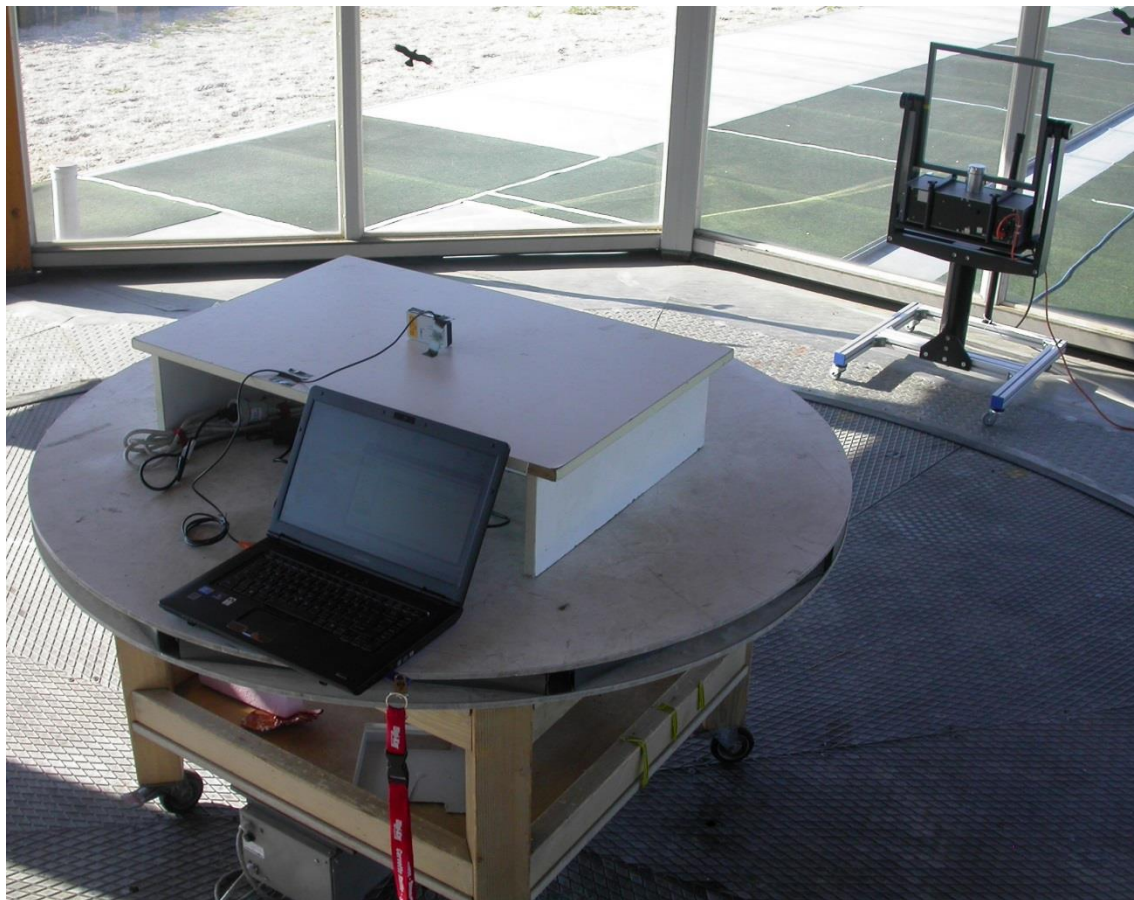
For test instruments and accessories used see section 6 Part **CPR 1**.

5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.2.2 Photo documentation of the test set-up



5.2.1 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.2.2 Description of Measurement

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

Example:

Frequency (MHz)	Level (dBμV)	+	Factor (dB)	=	Level dB(μV/m)	-	Limit dB(μV/m)	=	Delta (dB)
1.705	5	+	20	=	25	-	30	=	-5

5.2.3 Test result

Measurement distance: 3 m

Frequency (MHz)	Level PK (dBμV)	Level QP (dBμV)	Level AV (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level QP dB(μV/m)	Corrected Level AV dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.125	73.0	72.7	72.3	0.2	20	93.0	92.7	92.3	105.0	-12.7

Calculated value at distance: 300 m

Frequency (MHz)	Level PK (dBμV)	Level QP (dBμV)	Level AV (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level QP dB(μV/m)	Corrected Level AV dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.125	-7.0	-7.3	-7.7	0.2	20	13.0	12.7	12.3	25.0	-12.7

Limit according to FCC Part 15C, Section 15.209(a):

Frequency (MHz)	Field strength of fundamental wave (μV/m)	Field strength of fundamental wave dB(μV/m)	Measurement distance (metres)
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

5.3 Spurious emissions (magnetic field) 9 kHz – 30 MHz

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

5.3.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.3.2 Photo documentation of the test set-up



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.3.4 Description of Measurement

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

5.3.5 Test result

Measurement distance: 3 m

Frequency (MHz)	Level PK (dBμV)	Level QP (dBμV)	Level AV (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level QP dB(μV/m)	Corrected Level AV dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.375	33.4	26.7	18.5	9	20	53.4	46.7	38.5	96.1	-57.6
0.625	26.8	20.1	11.3	9	20	46.8	40.1	31.3	71.7	-40.4

Calculated value at distance: 300m

Frequency (MHz)	Level PK (dBμV)	Level QP (dBμV)	Level AV (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level QP dB(μV/m)	Corrected Level AV dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.375	-46.6	-53.3	-61.5	9	20	-26.6	-33.3	-41.5	16.1	-57.6

Values at distance: 30m

Frequency (MHz)	Level PK (dBμV)	Level QP (dBμV)	Level AV (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level QP dB(μV/m)	Corrected Level AV dB(μV/m)	Limit dB(μV/m)	Delta (dB)
0.625	-13.2	-19.9	-28.7	9	20	6.8	0.1	-8.7	31.7	-40.4
1.705 – 30.0				9	20				29.5	> 40

Limit according to FCC Part 15 Subpart 15.209(a):

Frequency (MHz)	Field strength of spurious emissions (μV/m)	Field strength of spurious emissions dB(μV/m)	Measurement distance (metres)
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

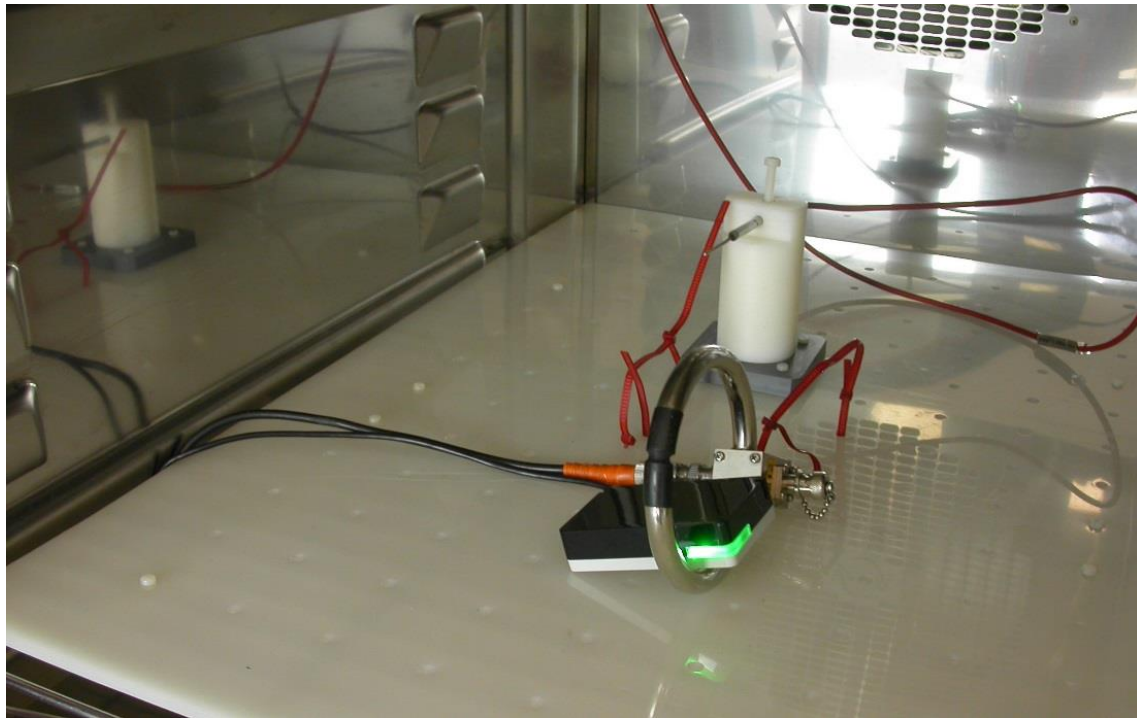
5.4 Emission Bandwidth

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

5.4.1 Description of the test location

Test location: AREA 4 (Climatic Chamber)

5.4.2 Photo documentation of the test set-up

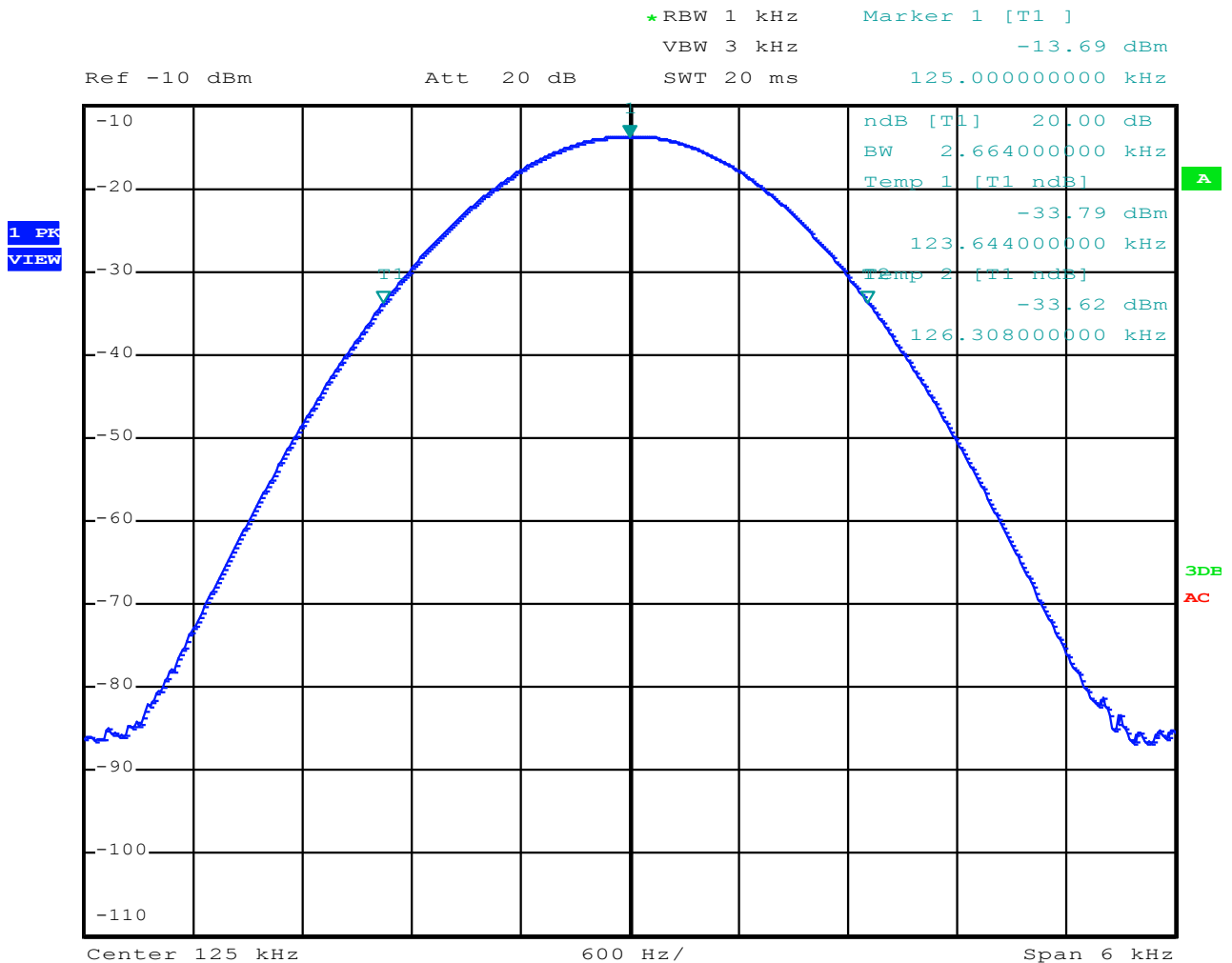


Fundamental [kHz] See Plot 1	20dB Bandwidth F1	20dB Bandwidth F2	Measured Bandwidth [kHz]
125.00	123.664	126.308	2.664

Remarks:

5.4.3 Test protocol

Emission Bandwidth plots



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.
CPR 1	FMZB 1516	01-02/24-01-018			21/01/2017	21/01/2016
	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
MB	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	HFRAE 5161 _ 50 kHz-120	02-02/24-11-004				
	METRAHIT WORLD	02-02/32-15-001	24/11/2016	24/11/2015		
	WK-340/40	02-02/45-05-001	07/07/2016	07/07/2015		
	6543A	02-02/50-05-157				
SER 1	FMZB 1516	01-02/24-01-018			21/01/2017	21/01/2016
	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				