

FCC ID: XUY0YX0MP04087

EMI - TEST REPORT

- FCC Part 15.225 -

Test Report No. : T38738-00-01GK

13. October 2014

Date of issue

Type / Model Name : MP04087**Product Description** : Terminal Pro Multireader HF**Applicant** : Y SOFT Corporation, a.s.

Address : Czech Technology Park, Podnikatelska 2902/4

612 00 BRNO, Czech Republic

Manufacturer : Y SOFT Corporation, a.s.

Address : Czech Technology Park, Podnikatelska 2902/4

612 00 BRNO, Czech Republic

Licence holder : Y SOFT Corporation, a.s.

Address : U Knezske louky 2151/18

130 00 Praha 3, Czech republic

Test Result according to the standards listed in clause 1 test standards:**POSITIVE**

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, 2013)

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
Part 15, Subpart A, Section 15.207	AC Line conducted emissions

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (October, 2013)

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
Part 15, Subpart C, Section 15.225	Operation within the band 13.110-14.010 MHz
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C95.1:1992	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:

The EuT is working at a frequency of 13.56 MHz.

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 : 18. September 2014

Testing concluded on : 06. October 2014

Checked by:



Klaus Gegenfurtner
I confirm the correctness
and Integrity of this
documents
2014.10.08 11:04:34
+02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:



Konrad Graßl
2014.10.08
10:42:06 +02'00'

Konrad Graßl

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3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EuT- For detailed photos see Attachment A

3.2 Power supply system utilised

Power supply voltage : Primary: 115 V / 60 Hz / 1 ϕ
Secondary: 12.0 V / DC

3.3 Short description of the Equipment under Test (EuT)

The EuT is a multi reading terminal for reading of authentication cards

Number of tested samples: 2
Serial number: SQPRC48353FBC8E
For Conducted emissions test: SQPRA033534F3AE

EuT operation mode:

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

- Continuous TX-mode at 13.56 MHz

-

EuT configuration:

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

- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____
- _____ Model : _____

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.

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



FCC ID: XUY0YX0MP04087**5.1.3 Description of Measurement**

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

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 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters 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 emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.4 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 9.07 dB @ 0.1545 MHz

The requirements are **FULFILLED**.

Remarks: The EUT with serial number SQPRC48353FBC8E failed the test at the fundamental frequency.
The EUT with serial number SQPRA033534F3AE passed the test. This EUT was terminated with
a 50 ohm load at the antenna port. See photos in Attachment A.
Test procedure described in FCC KDB 174176

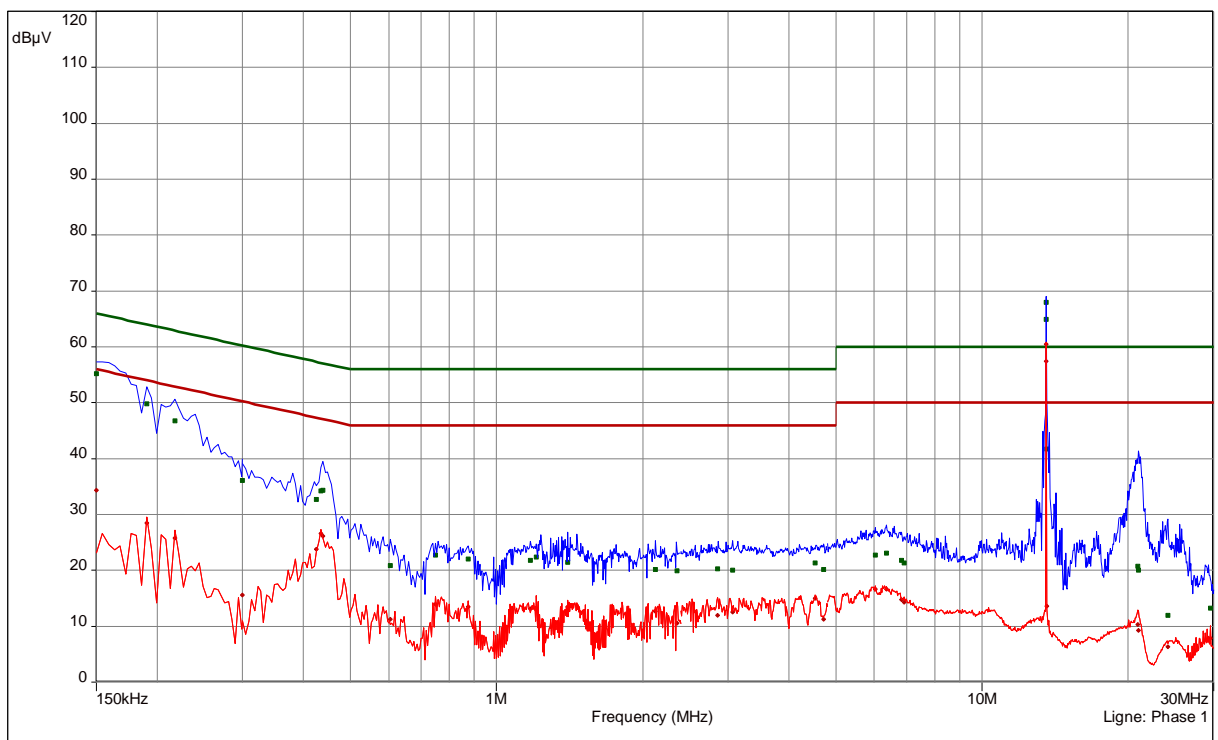
FCC ID: XUY0YX0MP04087

5.1.5 Test protocol

Test point: L1
 Operation mode: Continuous TX mode
 Remarks: Serialnumber: SQPRC48353FBC8E
 Date: 30.09.14
 Tested by: Konrad Graßl

Result: failed

- CISPR 22/CISPR22 - Class B - Average/
- CISPR 22/CISPR22 - Class B - QPeak/
- Meas.Peak (Phase 1)
- Meas.Avg (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- Average (Finals) (Phase 1)



CISPR 22/CISPR22B

FCC ID: XUY0YX0MP04087

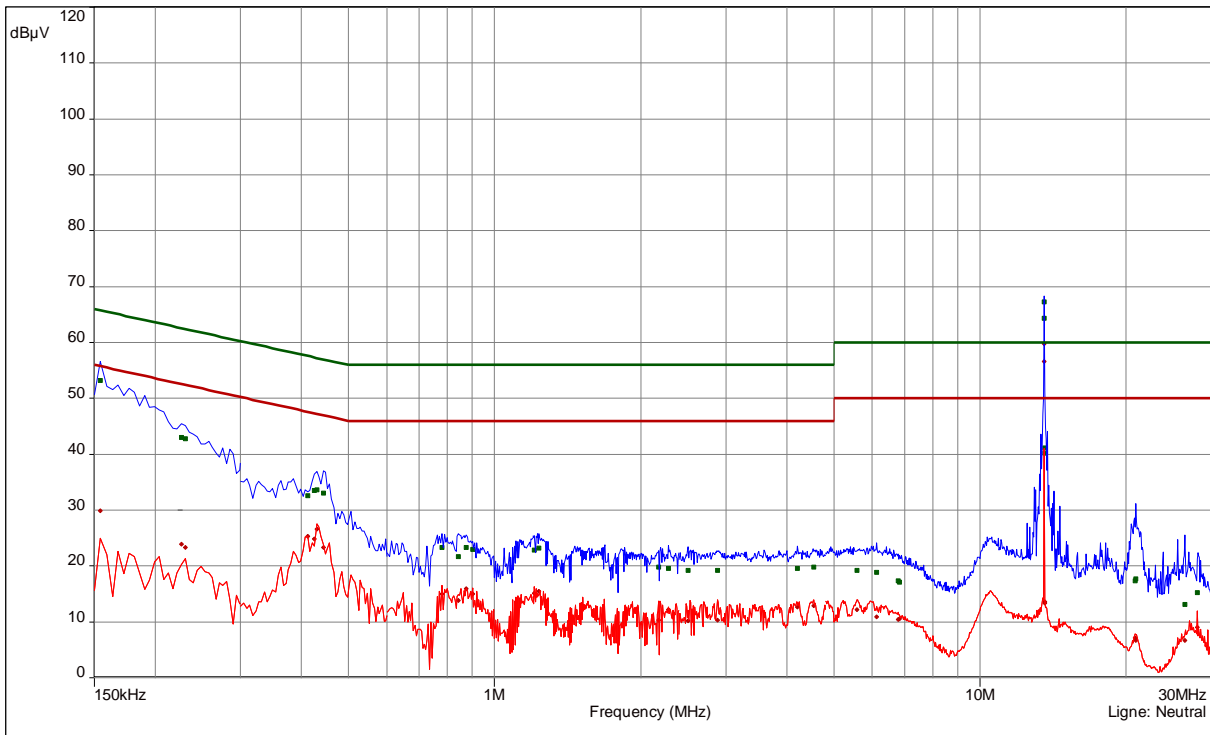
freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB	
0.15	1	55.18	10.82	66	34.38	21.62	56	Phase 1
0.1905	1	49.83	14.18	64.01	28.53	25.48	54.01	Phase 1
0.2175	1	46.71	16.2	62.91	25.75	27.16	52.91	Phase 1
0.3	2	36.14	24.1	60.24	15.64	34.6	50.24	Phase 1
0.426	2	32.72	24.61	57.33	23.77	23.56	47.33	Phase 1
0.435	2	34.29	22.87	57.16	26.61	20.55	47.16	Phase 1
0.4395	2	34.39	22.69	57.07	26.15	20.93	47.07	Phase 1
0.6045	3	20.85	35.15	56	11.32	34.68	46	Phase 1
0.7485	3	22.72	33.28	56	13.92	32.08	46	Phase 1
0.8745	3	22	34	56	13.43	32.57	46	Phase 1
1.176	3	21.79	34.21	56	13.09	32.91	46	Phase 1
1.209	4	22.38	33.62	56	13.24	32.76	46	Phase 1
1.4025	4	21.51	34.49	56	13.53	32.47	46	Phase 1
2.1225	4	20.18	35.82	56	12.64	33.36	46	Phase 1
2.352	4	19.95	36.05	56	10.51	35.49	46	Phase 1
2.85	5	20.33	35.67	56	11.99	34.01	46	Phase 1
3.066	5	20.02	35.98	56	12.54	33.46	46	Phase 1
4.5285	5	21.3	34.7	56	14.99	31.01	46	Phase 1
4.713	5	20.22	35.78	56	11.28	34.72	46	Phase 1
6.024	6	22.73	37.27	60	16.59	33.41	50	Phase 1
6.3615	6	23.09	36.91	60	16.64	33.36	50	Phase 1
6.834	6	21.84	38.16	60	14.77	35.23	50	Phase 1
6.9015	6	21.34	38.66	60	14.27	35.73	50	Phase 1
13.5555	7	64.9	-4.9	60	57.39	-7.39	50	Phase 1
13.56	7	68.01	-8.01	60	60.47	-10.47	50	Phase 1
13.6095	7	41.76	18.24	60	13.61	36.39	50	Phase 1
20.9595	8	20.76	39.24	60	10.34	39.66	50	Phase 1
21.0045	8	20.08	39.92	60	9.23	40.77	50	Phase 1
24.1185	8	12.01	47.99	60	6.32	43.68	50	Phase 1
29.559	8	13.24	46.76	60	7.82	42.18	50	Phase 1

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Test point: N
 Operation mode: Continuous TX mode
 Remarks: Serialnumber: SQPRC48353FBC8E
 Date: 30.09.14
 Tested by: Konrad Graßl

Result: failed

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



CISPR 22/CISPR22B

FCC ID: XUY0YX0MP04087

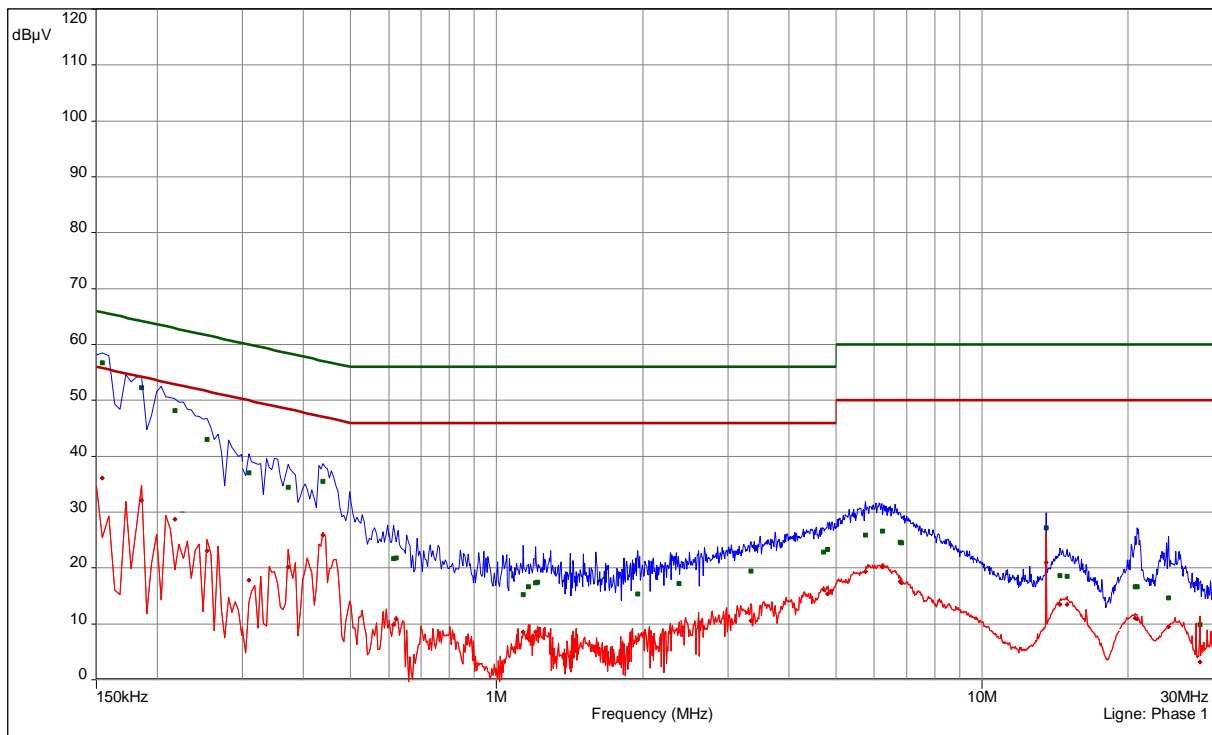
freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB	
0.1545	9	53.23	12.53	65.75	29.86	25.9	55.75	Neutral
0.2265	9	43.01	19.56	62.58	23.9	28.67	52.58	Neutral
0.231	9	42.78	19.64	62.41	23.32	29.1	52.41	Neutral
0.4125	10	32.56	25.04	57.6	25.37	22.23	47.6	Neutral
0.426	10	33.52	23.81	57.33	24.87	22.46	47.33	Neutral
0.4305	10	33.69	23.56	57.24	26.57	20.68	47.24	Neutral
0.444	10	33.03	23.96	56.99	23.39	23.6	46.99	Neutral
0.78	11	23.33	32.67	56	15.06	30.94	46	Neutral
0.843	11	21.72	34.28	56	13.86	32.14	46	Neutral
0.8745	11	23.3	32.7	56	15.99	30.01	46	Neutral
0.9015	11	22.94	33.06	56	15.02	30.98	46	Neutral
1.209	12	22.84	33.16	56	15.1	30.9	46	Neutral
1.236	12	23.2	32.8	56	15.48	30.52	46	Neutral
2.181	12	19.76	36.24	56	10.33	35.67	46	Neutral
2.28	12	19.55	36.45	56	12.22	33.78	46	Neutral
2.5035	13	19.26	36.74	56	10.26	35.74	46	Neutral
2.877	13	19.23	36.77	56	10.32	35.68	46	Neutral
4.2045	13	19.59	36.41	56	12.68	33.32	46	Neutral
4.551	13	19.84	36.16	56	12.9	33.1	46	Neutral
5.583	14	19.27	40.73	60	12.14	37.86	50	Neutral
6.123	14	18.83	41.17	60	10.93	39.07	50	Neutral
6.7935	14	17.35	42.65	60	10.49	39.51	50	Neutral
6.8205	14	17.15	42.85	60	10.5	39.5	50	Neutral
13.5555	15	64.3	-4.3	60	56.62	-6.62	50	Neutral
13.56	15	67.3	-7.3	60	59.83	-9.83	50	Neutral
13.6005	15	40.21	19.79	60	13.62	36.38	50	Neutral
13.6095	15	41.13	18.87	60	13.39	36.61	50	Neutral
20.8695	16	17.36	42.64	60	7.21	42.79	50	Neutral
20.937	16	17.71	42.29	60	6.74	43.26	50	Neutral
26.4	16	13.15	46.85	60	6.74	43.26	50	Neutral
27.9885	16	15.24	44.76	60	9.02	40.98	50	Neutral

FCC ID: XUY0YX0MP04087

Test point: L1
 Operation mode: Continuous TX mode
 Remarks: SQPRA033534F3AE
 Date: 06.10.14
 Tested by: Konrad Graßl

Result: passed

- CISPR 22/CISPR22 - Class B - Average/
- CISPR 22/CISPR22 - Class B - QPeak/
- Meas.Peak (Phase 1)
- Meas.Avg (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- Average (Finals) (Phase 1)



CISPR 22/CISPR22B

FCC ID: XUY0YX0MP04087

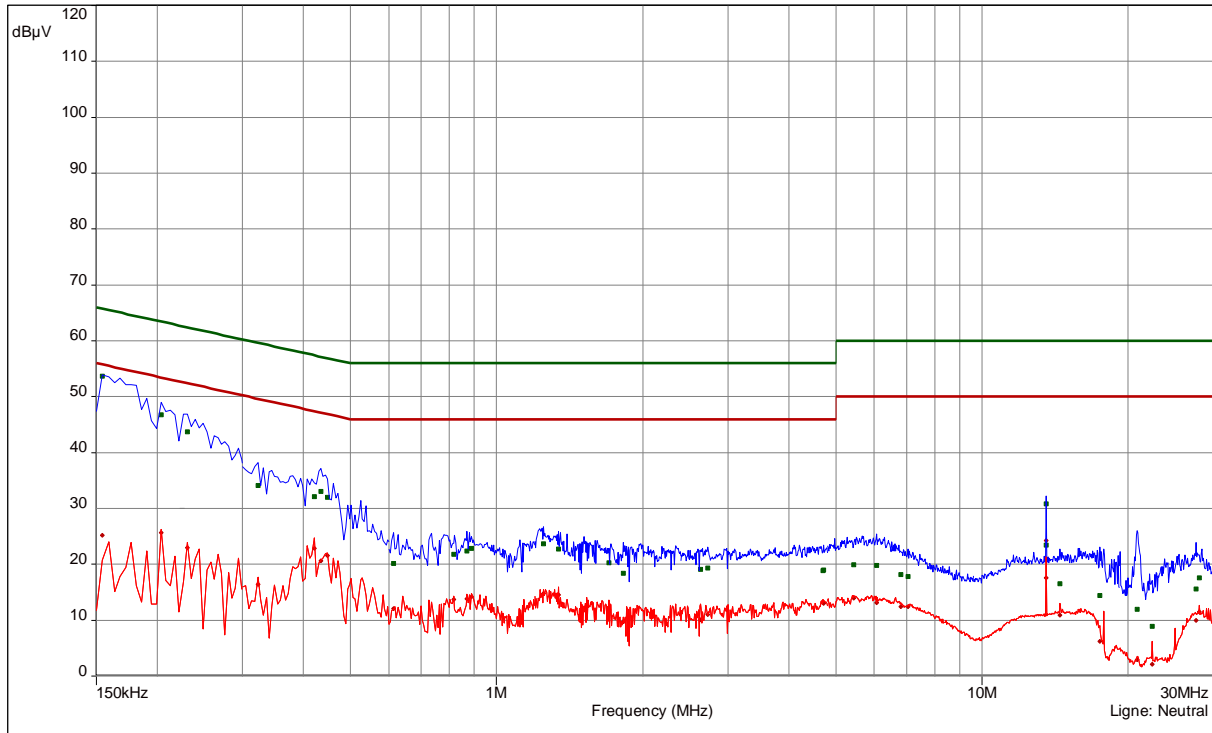
freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB	
0.1545	1	56.69	9.07	65.75	36.12	19.64	55.75	Phase 1
0.186	1	52.22	11.99	64.21	32.08	22.13	54.21	Phase 1
0.2175	1	48.13	14.78	62.91	28.69	24.22	52.91	Phase 1
0.2535	1	42.98	18.66	61.64	23.12	28.52	51.64	Phase 1
0.309	2	37.05	22.94	60	17.81	32.18	50	Phase 1
0.372	2	34.48	23.98	58.46	20.16	28.3	48.46	Phase 1
0.4395	2	35.49	21.59	57.07	25.94	21.14	47.07	Phase 1
0.6135	3	21.64	34.36	56	9.91	36.09	46	Phase 1
0.6225	3	21.78	34.22	56	10.95	35.05	46	Phase 1
1.1355	3	15.28	40.72	56	8.51	37.49	46	Phase 1
1.1625	3	16.64	39.36	56	7.45	38.55	46	Phase 1
1.2045	4	17.35	38.65	56	8.55	37.45	46	Phase 1
1.2135	4	17.45	38.55	56	8.09	37.91	46	Phase 1
1.956	4	15.37	40.63	56	7.19	38.81	46	Phase 1
2.3745	4	17.23	38.77	56	8.62	37.38	46	Phase 1
3.3405	5	19.45	36.55	56	10.61	35.39	46	Phase 1
4.713	5	22.89	33.11	56	16.12	29.88	46	Phase 1
4.8	5	23.29	32.71	56	15.41	30.59	46	Phase 1
5.7585	6	25.92	34.08	60	19.38	30.62	50	Phase 1
6.2355	6	26.57	33.43	60	20.22	29.78	50	Phase 1
6.7935	6	24.58	35.42	60	17.64	32.36	50	Phase 1
6.825	6	24.54	35.46	60	17.4	32.6	50	Phase 1
13.5555	7	27.19	32.81	60	20.94	29.06	50	Phase 1
14.46	7	18.69	41.31	60	13.48	36.52	50	Phase 1
14.9595	7	18.49	41.51	60	13.44	36.56	50	Phase 1
20.685	8	16.69	43.31	60	11.03	38.97	50	Phase 1
20.838	8	16.68	43.32	60	10.94	39.06	50	Phase 1
24.249	8	14.6	45.4	60	9.46	40.54	50	Phase 1
28.083	8	9.81	50.19	60	3.21	46.79	50	Phase 1

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Test point: N
 Operation mode: Continuous TX mode
 Remarks: SQPRA033534F3AE
 Date: 06.10.14
 Tested by: Konrad Graßl

Result: passed

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



CISPR 22/CISPR22B

FCC ID: XUY0YX0MP04087

freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB	
0.1545	9	53.7	12.06	65.75	25.23	30.53	55.75	Neutral
0.204	9	46.79	16.65	63.45	25.71	27.73	53.45	Neutral
0.231	9	43.7	18.72	62.41	23	29.42	52.41	Neutral
0.3225	10	34.12	25.53	59.64	16.45	33.2	49.64	Neutral
0.4215	10	32.16	25.26	57.42	22.89	24.53	47.42	Neutral
0.435	10	33.05	24.11	57.16	20.6	26.56	47.16	Neutral
0.4485	10	32.05	24.86	56.9	21.52	25.39	46.9	Neutral
0.6135	11	20.17	35.83	56	12.04	33.96	46	Neutral
0.816	11	21.84	34.16	56	13.7	32.3	46	Neutral
0.87	11	22.34	33.66	56	13.86	32.14	46	Neutral
0.888	11	22.88	33.12	56	14.17	31.83	46	Neutral
1.2495	12	23.68	32.32	56	14.78	31.22	46	Neutral
1.344	12	22.69	33.31	56	14.52	31.48	46	Neutral
1.704	12	20.31	35.69	56	11.83	34.17	46	Neutral
1.8255	12	18.46	37.54	56	9.76	36.24	46	Neutral
2.6295	13	19.1	36.9	56	10.08	35.92	46	Neutral
2.7195	13	19.32	36.68	56	11.03	34.97	46	Neutral
4.7085	13	18.84	37.16	56	13.12	32.88	46	Neutral
4.713	13	18.94	37.06	56	13.02	32.98	46	Neutral
5.4435	14	19.92	40.08	60	13.93	36.07	50	Neutral
6.0645	14	19.8	40.2	60	13.11	36.89	50	Neutral
6.8115	14	18.23	41.77	60	12.45	37.55	50	Neutral
7.05	14	17.85	42.15	60	12.38	37.62	50	Neutral
13.56	15	30.85	29.15	60	24.24	25.76	50	Neutral
13.5645	15	23.42	36.58	60	17.61	32.39	50	Neutral
14.487	15	16.54	43.46	60	10.89	39.11	50	Neutral
17.466	15	14.44	45.56	60	6.25	43.75	50	Neutral
20.8875	16	12.02	47.98	60	2.92	47.08	50	Neutral
22.4085	16	8.89	51.11	60	2.12	47.88	50	Neutral
27.552	16	15.56	44.44	60	10.02	39.98	50	Neutral
28.002	16	17.55	42.45	60	11.47	38.53	50	Neutral

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



5.2.3 Description of Measurement

The magnetic field strength from the EuT will be measured on an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003. The antenna was positioned 3, 10 or 30 meters horizontally from the EuT. Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions. In the case where larger measuring distances are required the results will extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with an EMI Receiver set to 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) [2].

The final level, expressed in $\text{dB}\mu\text{V}/\text{m}$, is arrived at by taking the reading from the EMI receiver (Level $\text{dB}\mu\text{V}$) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: ResBW: 200 Hz

150 kHz – 30 MHz: ResBW: 9 kHz

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Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	Limit (dB μ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	30	=	5

5.2.4 Test result
Measured value at 3m

Frequency [MHz]	L: PK [dB μ V]	L: AV [dB μ V]	L: QP [dB μ V]	Correct. [dB]	L: PK [dB μ V/m]	L: AV [dB μ V/m]	L: QP [dB μ V/m]	Limit [dB μ V/m]	Delta [dB]
13.56	55.4	50.1	53.7	20.0	75.4	70.1	73.7	124.0	-50.3

Calculated value at 30m:

Frequency [MHz]	L: PK [dB μ V]	L: AV [dB μ V]	L: QP [dB μ V]	Correct. [dB]	L: PK [dB μ V/m]	L: AV [dB μ V/m]	L: QP [dB μ V/m]	Limit [dB μ V/m]	Delta [dB]
13.56	15.4	10.1	13.7	20.0	35.4	30.1	33.7	84.0	-50.3

Limit according to FCC Part 15 Subpart 15.225(a)

Frequency (MHz)	Field strength of fundamental wave		Measurement distance (meters)
	(μ V/m)	dB (μ V/m)	
13.553-13.567	15848	84	30

 The requirements are **FULFILLED**.

Remarks:

FCC ID: XUY0YX0MP04087**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 Description of Measurement**

The spurious emissions from the EuT will be measured on an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The antenna was positioned 3, 10 or 30 meters horizontally from the EuT. Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with an EMI Receiver set to 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) [2].

The final level, expressed in $\text{dB}\mu\text{V}/\text{m}$, is arrived at by taking the reading from the EMI receiver (Level $\text{dB}\mu\text{V}$) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: ResBW: 200 Hz

150 kHz – 30 MHz: ResBW: 9 kHz

FCC ID: XUY0YX0MP04087

Example:

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

5.3.4 Test result

Frequency [MHz]	L: QP [dB μ V]	L: AV [dB μ V]	Bandwidth [kHz]	Correct. [dB]	L: QP [dB μ V/m]	L: AV [dB μ V/m]	Limit [dB μ V/m]	Delta [dB]
27.12	3.3	-1.5	9.0	20	23.3	18.5	69.5	-46.2

Calculated value at 30m:(values of test distance 3 m minus 40 dB)

Frequency [MHz]	L: QP [dB μ V]	L: AV [dB μ V]	Bandwidth [kHz]	Correct. [dB]	L: QP [dB μ V/m]	L: AV [dB μ V/m]	Limit [dB μ V/m]	Delta [dB]
27.12	-36.7	-41.5	9.0	20	-16.7	-21.5	29.5	-46.2

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

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(μ V/m)	dB(μ V/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

 The requirements are **FULFILLED**.

Remarks:

FCC ID: XUY0YX0MP04087**5.4 Radiated emissions (electric field) 30 MHz – 1 GHz**

For test instruments and accessories used see section 6 Part SER 2.

5.4.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.4.2 Photo documentation of the test set-up**5.4.3 Description of Measurement**

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 polarized 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 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003. The Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EuT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarization`s and the EuT are rotated 360 degrees.

The final level, expressed in dB μ V/m, is arrived by taking the reading from the EMI receiver (Level dB μ V) and adding the correction factors and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver, where the correction factors are stored. This result then has the FCC or CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets at page.

FCC ID: XUY0YX0MP04087

The resolution bandwidth during the measurement is as follows:
30 MHz – 1000 MHz: ResBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	Limit (dBµV/m)	=	Delta (dB)
719	75	+	32.6	=	107.6	110	=	-2.4

5.4.4 Test result

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)
40.68	10.6		14.2		24.8		40.0	-15.2
54.24	4.1		14.8		18.9		40.0	-21.1
67.80		5.6		13.1		18.7	40.0	-21.3
81.36	10.0	11.2	10.7	10.2	20.7	21.4	40.0	-18.6
108.48	14.1	18.9	10.0	11.0	24.1	29.9	43.5	-13.6
122.04	4.7	12.4	11.8	12.6	16.5	25.0	43.5	-18.5
135.60	9.7	18.7	12.6	13.5	22.3	32.2	43.5	-11.3

Limit according to FCC Part 15 Subpart 15.209(a)

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (meters)
	(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

The requirements are **FULFILLED**.

Remarks: Measurement was performed up to the 10th harmonic (135.6 MHz)

FCC ID: XUY0YX0MP04087
5.5 Frequency tolerance of the carrier

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

5.5.1 Description of the test location

Test location: AREA 4

5.5.2 Photo documentation of the test set-up

5.5.3 Test result

Test conditions		Test result		
		Frequency (MHz)		
T_{min} (-20)°C	V_{nom} (115)V	13.55998		
T (-10)°C	V_{nom} (115)V	13.55998		
T (0)°C	V_{nom} (115)V	13.55996		
T (10)°C	V_{nom} (115)V	13.55992		
T_{nom} (20)°C	V_{min} (97.8)V	13.55992		
	V_{nom} (115)V	13.55992		
	V_{max} (132.3)V	13.55992		
T (30)°C	V_{nom} (115)V	13.55990		
T (40)°C	V_{nom} (115)V	13.55990		
T_{max} (50)°C	V_{nom} (115)V	13.55988		
Maximum tolerance of carrier frequency (Hz)		-120		
Measurement uncertainty		± 10 Hz		

FCC ID: XUY0YX0MP04087

Limit according to FCC Part 15 Subpart 15.225 (e): ± 0.01 % of carrier frequency at 13.560 MHz = ± 1.356 kHz

The requirements are **FULFILLED**.

Remarks:

5.6 Emission Bandwidth

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

5.6.1 Description of the test location

Test location: AREA 4

5.6.2 Photo documentation of the test set-up

5.6.3 Description of Measurement

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio of -20 dB. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or the first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The resolution bandwidth of measuring instrument was set to a value as shown in the following table below according to ANSI C63.4-2003.

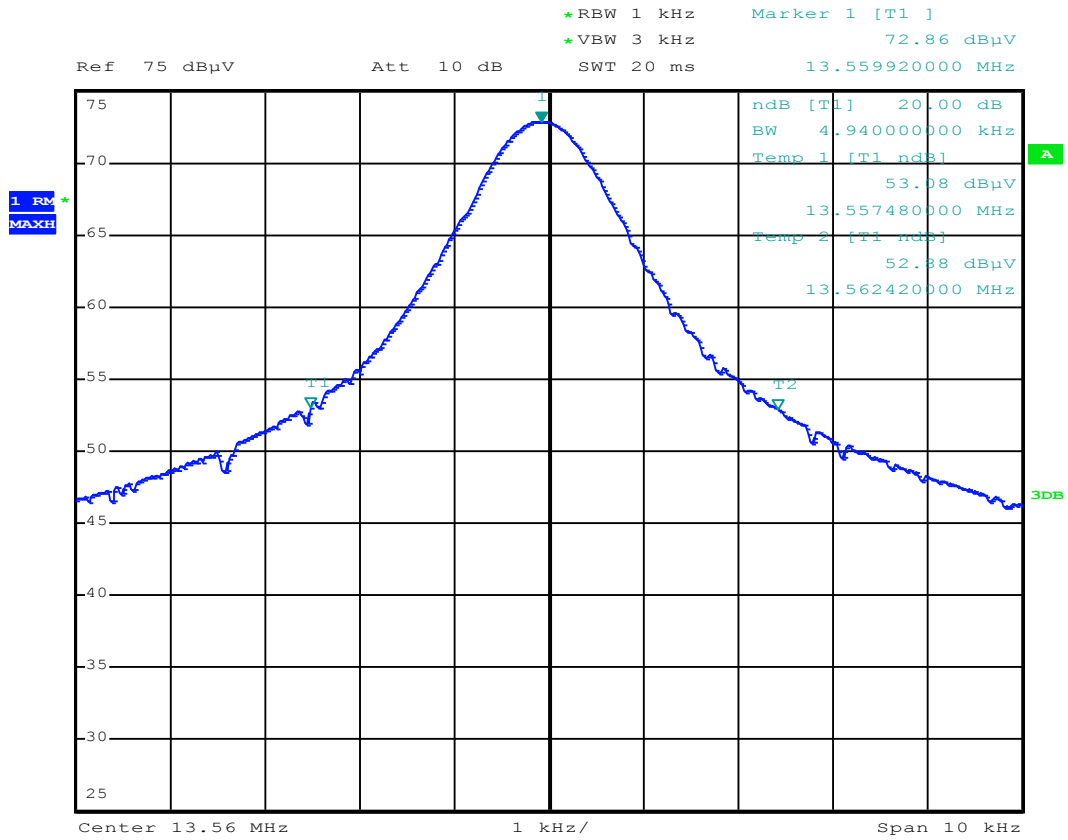
Fundamental frequency	Minimum resolution bandwidth
9 kHz to 30 MHz	1kHz
30 to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

5.6.4 Test result

Channel Frequency [MHz]	20 dB Bandwidth [kHz]
13.56	4.94

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

5.6.5 Test protocol



FCC ID: XUY0YX0MP04087

5.7 Transmitter spectrum mask

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

5.7.1 Description of the test location

Test location: AREA 4

5.7.2 Photo documentation of the test set-up



5.7.3 Test result

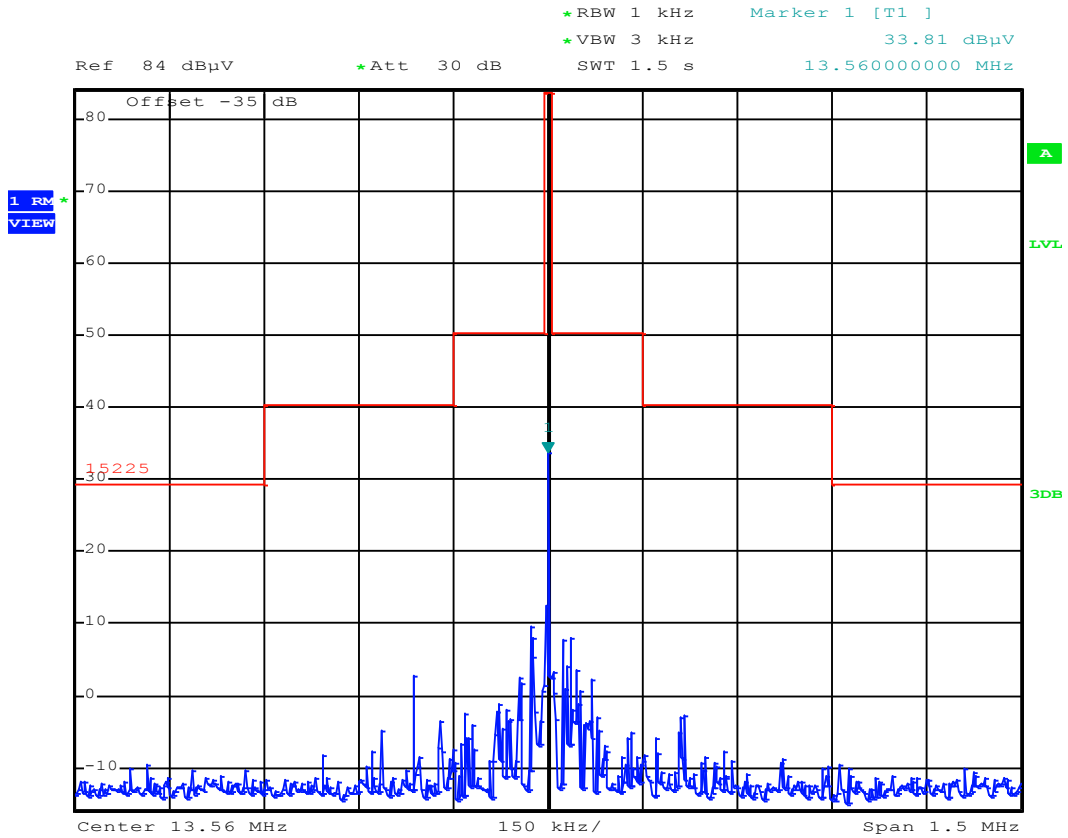
The absolute levels of RF power at any frequency shall not exceed the limits defined in FCC Part §15.225 a-d

The requirements are **FULFILLED**.

Remarks:

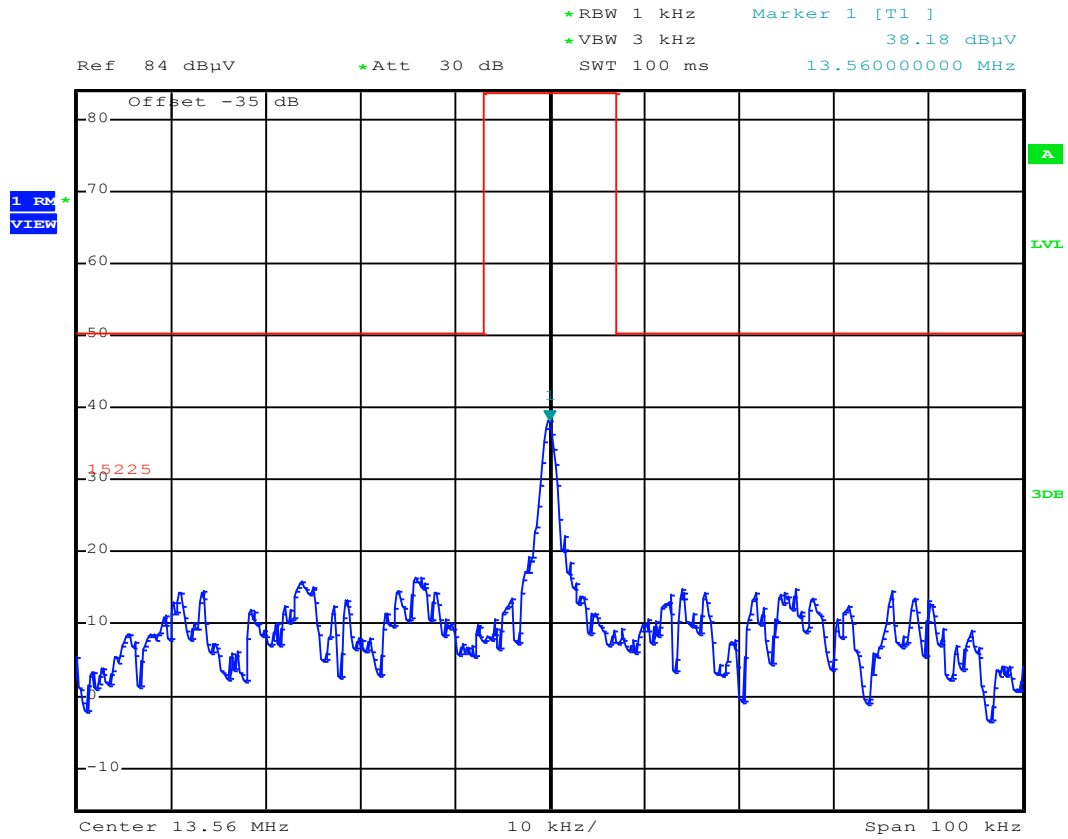
5.7.4 Test protocol

Spectrum mask for modulated signal



FCC ID: XUY0YX0MP04087

Spectrum mask for modulated signal



6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

The calibration intervals and the calibration history will be given out on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	17/07/2015	17/07/2014		
	ESH 2 - Z 5	02-02/20-05-004	18/10/2015	18/10/2013	02/03/2015	02/09/2014
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155			12/03/2015	12/09/2014
	SP 103 /3.5-60	02-02/50-05-182				
CPR 1	FMZB 1516	01-02/24-01-018			13/02/2015	13/02/2014
	ESCI	02-02/03-05-005	12/12/2014	12/12/2013		
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
FE	FSP 30	02-02/11-05-001	24/10/2014	24/10/2013		
	HZ-10	02-02/24-05-012				
	METRA HIT World	02-02/32-10-001	21/08/2015	21/08/2014		
	WK-340/40	02-02/45-05-001	24/06/2017	24/06/2014	24/12/2014	24/06/2014
	6543A	02-02/50-05-157				
	LTS 002	02-02/50-05-200				
MB	FSP 30	02-02/11-05-001	24/10/2014	24/10/2013		
	HZ-10	02-02/24-05-012				
	METRA HIT World	02-02/32-10-001	21/08/2015	21/08/2014		
	WK-340/40	02-02/45-05-001	24/06/2017	24/06/2014	24/12/2014	24/06/2014
	6543A	02-02/50-05-157				
	LTS 002	02-02/50-05-200				
SER 1	FMZB 1516	01-02/24-01-018			13/02/2015	13/02/2014
	ESCI	02-02/03-05-005	12/12/2014	12/12/2013		
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
SER 2	ESVS 30	02-02/03-05-006	03/07/2015	03/07/2014		
	VULB 9168	02-02/24-05-005	08/04/2015	08/04/2014	04/03/2015	04/09/2014
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				