

EMI – TEST REPORT

- FCC 15.223 & FCC 15.247-

Type / Model Name : E10 RF RFID ECO Variant 2.0

Product Description : Electronic Article Surveillance Detection System
with UHF RFID-Reader

Applicant : Checkpoint Systems, Inc.

Address : 101 Wolf Drive, Thorofare

New Jersey, USA 08086

Manufacturer : See general remarks

Address :

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

POSITIVE

Test Report No. : **T39198-01-02JP**

06. October 2015

Date of issue



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
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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (September, 2014)

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2014)

Part 15, Subpart C, Section 15.223

Operation in the band 1.705-10 MHz

§15.223(a) Radiated emissions, Fundamental & Harmonics

Part 15, Subpart C, Section 15.247

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and
5725 - 5850 MHz

ANSI C63.10: 2013

Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2 EQUIPMENT UNDER TEST

2.1 Short description of the equipment under test (EUT)

The E10 Antenna with TR4240 is an Electronic Article Surveillance System (EAS). The system detects target tags attached to merchandise. The targets resonate in the region of 8.2 MHz or 9.5 MHz. When an article of merchandise is purchased, the target is deactivated which causes it to no longer resonate. The E10 Antenna with TR4240 Electronic monitors an area 3-feet on either side of the antenna in the 7.4 to 10.0 MHz range and triggers an alarm when a non-deactivated target is detected.

The WRTZ-2000 is a UHF RFID reader. It can read active and passive Tags in the frequency range from 902 to 928 MHz. 8 antenna connectors are available.

Number of tested samples: 1

2.2 Transmit operating modes

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

- Continuous sweep mode
- TAG reading mode supplying 30.0 dBm

2.3 Power supply system utilised

Power supply voltage, V_{nom} : 115 V / 60 Hz / 1 ϕ
24 V / DC – RF Electronic
12 V / DC – WRTZ-2000

2.4 Peripheral devices and interface cables

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

- PSU (Power Supply Unit), EOS Model : LFZVC36FS24591, E01-A-L113
- PSU (Power Supply Unit), XP Power Model : AEB70US12
- customer specific cables

FCC ID: DO4TR7240 and DO4WRTZ2000**2.5 Operation in Restricted Bands**

The RF Electronic is a digital swept frequency hopping transmitter. The EUT hops on discrete frequencies. The discrete frequencies that can be transmitted by the EUT are as follows:

Frequency table:

/* Center frequency 8.2MHz +/- 410KHz */
8610, 8555, 8500, 8446, 8391, 8337, 8282, 8227, 8173, 8118, 8063, 8009, 7954, 7899, 7845, 7790

/* Center frequency 8.6MHz +/- 430KHz */
9030, 8973, 8915, 8858, 8801, 8743, 8686, 8629, 8571, 8514, 8457, 8399, 8342, 8285, 8227, 8170

/* Center frequency 9.0MHz +/- 450KHz */
9450, 9390, 9330, 9270, 9210, 9150, 9090, 9030, 8970, 8910, 8850, 8790, 8730, 8670, 8610, 8550

/* Center frequency 9.2MHz +/- 460KHz */
9660, 9599, 9537, 9476, 9415, 9353, 9292, 9231, 9169, 9108, 9047, 8985, 8924, 8863, 8801, 8740

/* Center frequency 9.5MHz +/- 480KHz */
9980, 9916, 9852, 9788, 9724, 9660, 9596, 9532, 9468, 9404, 9340, 9276, 9212, 9148, 9084, 9020

/* This table is used for multi band (8.2/9.2) skinny pulse, using PW of 4us JRG_SP */
9325, 9325, 9325, 9325, 9075, 9075, 9075, 9075, 8325, 8325, 8325, 8325, 8075, 8075, 8075, 8075

The restricted frequency bands (per FCC Part 15 Clause 15.205) in the operating frequency band of the EUT are as follows:

8.291 – 8.294 MHz
8.362 – 8.366 MHz
8.37625 – 8.38675 MHz
8.41425 – 8.41475 MHz

The transmitter is not capable of hopping into, or operating, in the restricted frequency bands and therefore complies with the restriction.

2.6 Deviations or Exclusions from the Requirements and Standards

The Evolve E10 is a digital swept frequency hopping transmitter. The EUT hops on discrete frequencies. The hop can not stop on one of the frequencies. It is not possible to find the “true peak” with a measuring receiver by using an average detector.

Following measurement method was used to find the “true peak”.

Measurement of the fundamental – 7.4 to 10.0 MHz – was performed by setting a spectrum analyzer to “max-hold”, peak detector, a 300 kHz bandwidth and a span from 6.5 MHz to 10 MHz. A resolution bandwidth of 300 kHz was used in performing the “true peak” measurements, because increasing the bandwidth above 300 kHz did not increase the detected peak of the fundamental.

FCC ID: DO4TR7240 and DO4WRTZ2000

3 Test result summary

FCC Rule Part	Description	Result
15.207	AC power line conducted emissions	passed
15.223	Field strength of the fundamental wave	passed
15.247	Maximum peak conducted output power	passed
15.209	Spurious emissions (magnetic field) 9 kHz – 30 MHz	passed
15.209	Spurious emissions radiated	passed

GENERAL REMARKS:

Manufacturer of the RF Electronic:

CHECKPOINT SYSTEMS INC

MID-ATLANTIC PARK 101 WOLF DR PO BOX 188

THOROFARE NJ 08086 UNITED STATES

Manufacturer of the WRTZ-2000:

Welco Technology (Suzhou) Limited

198 XINGLONG STREET

SUZHOU 215126 CN

The frequency range was scanned from 9 kHz to 10 GHz.

All emissions not reported in this test report were more than 10 dB below the specified limit.

Connected cables:

Name of the cable	Digital	Length/m	shielded	Ferrite
Light and Sounder cable	Yes	3.2	No	No
RFID coax cable	no	3.0	Yes	No
RF coax cable	no	3.9	Yes	Yes
Light and Sounder power cable	no	3.4	No	No

FCC ID: DO4TR7240 and DO4WRTZ2000

The E10 antenna consists of following systems:

- WRTZ-2000 (FCCID: DO4WRTZ2000):

The UHF sytem is a frequency hopping system using 50 channels in the frequency band from 902 to 928 MHz. The device has a maximum of eigth external antenna ports for connection of the transmission/reception antennas for communication with RFID tags.

Measurements have been made with power settings of 30.0 dBm.

For detailed information please refer to the user manual.

It is not possible to set the EuT only in receiving mode.

- RF Electronic (FCCID: DO4TR7240):

The RF Electronic is a digital swept frequency hopping transmitter. The EUT hops on discrete frequencies. The hop can not stop on one of the frequencies.

In pratical use both systems (E10 and WRTZ-2000) are in continuous sweep mode at the same time (simultan transmission) in the two different frequency ranges.

3.1 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 : 26 January 2015

Testing concluded on : 07 May 2015

Checked by:

Issued by:

Klaus Gegenfurtner
Teamleader Radio

Markus Huber

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 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.

FCC ID: DO4TR7240 and DO4WRTZ2000**4.4 Measurement Protocol for FCC****4.4.1 GENERAL INFORMATION****4.4.1.1 Test methodology**

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

In compliance with 47 CFR Part 15 Subpart A Section 15.38 testing for FCC compliance may be done following the ANSI C63.4-2003 procedures and using the CISPR 22 Limits.

4.4.1.2 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.

4.4.1.3 General Standard information

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.

4.4.2 Conducted emission**Description of measurement**

The final level in dB μ V is taken directly from the EMI receiver. This level is compared to the FCC limit or to the CISPR limit.

To convert dB μ V to μ V, the following conversions apply:

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

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)};$$

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 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin of a peak mode measurement appears to be less than 20 dB, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

FCC ID: DO4TR7240 and DO4WRTZ2000

4.4.3 Radiated emission (electrical field 30 MHz - 1 GHz)

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 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. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so that 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 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 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 or CISPR 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	Level	+	Factor	=	Level	-	CISPR Limit	=
Delta								
(MHz)	(dBμV)		(dB)		(dBμV/m)		(dBμV/m)	(dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	= -2.4

4.4.4 Radiated emission (electrical field 1 GHz - 40 GHz)

Description of measurement

Radiated emissions from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. 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 screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyzer set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty and are calculated at the specified test distance.

5 TEST 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 Applicable standard

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

5.1.3 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.10. 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 7.98 dB at 0.4575 MHz

Limit according to FCC Part 15, Section 15.207(a):

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

The requirements are **FULFILLED**.

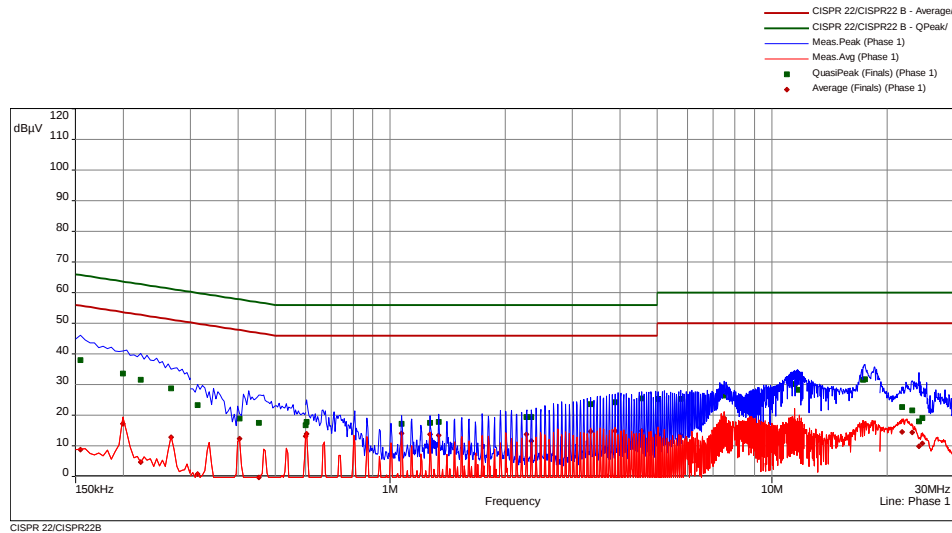
Remarks: For detailed test results please see the following test protocols.

FCC ID: DO4TR7240 and DO4WRTZ2000

5.1.5 Test protocol

Test point L1
Operation mode: TAG reading mode supplying 30.0 dBm
Remarks: none

Result: PASS



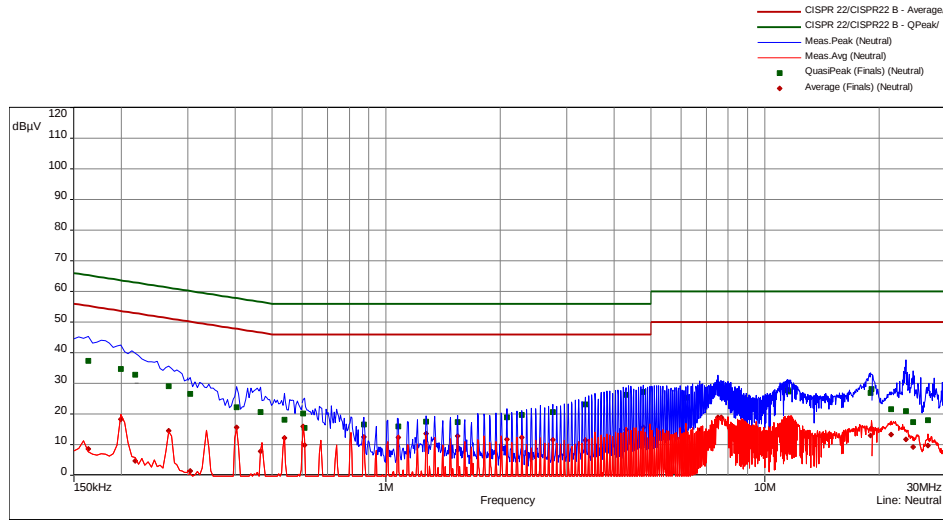
freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.1545	38.03	27.72	65.75	8.73	47.03	55.75	Phase 1	9.84
0.1995	33.61	30.02	63.63	17.18	36.46	53.63	Phase 1	9.83
0.222	31.61	31.14	62.74	4.71	48.03	52.74	Phase 1	9.83
0.267	28.83	32.39	61.21	12.84	38.37	51.21	Phase 1	9.82
0.3135	23.31	36.56	59.88	0.83	49.05	49.88	Phase 1	9.82
0.4035	18.93	38.85	57.78	12.36	35.42	47.78	Phase 1	9.81
0.453	17.58	39.24	56.82	-0.38	47.20	46.82	Phase 1	9.81
0.6	16.80	39.20	56.00	13.08	32.92	46.00	Phase 1	9.82
0.6045	17.80	38.20	56.00	13.90	32.10	46.00	Phase 1	9.82
1.0725	17.16	38.84	56.00	14.00	32.00	46.00	Phase 1	9.81
1.272	17.59	38.41	56.00	13.84	32.16	46.00	Phase 1	9.79
1.3395	17.84	38.16	56.00	13.39	32.61	46.00	Phase 1	9.79
2.2755	19.41	36.59	56.00	13.71	32.29	46.00	Phase 1	9.79
2.343	19.33	36.67	56.00	11.65	34.35	46.00	Phase 1	9.79
3.3495	23.54	32.46	56.00	14.74	31.26	46.00	Phase 1	9.81
3.885	24.17	31.83	56.00	14.83	31.17	46.00	Phase 1	9.81
4.5555	25.43	30.57	56.00	14.88	31.12	46.00	Phase 1	9.81
5.025	25.30	34.70	60.00	13.77	36.23	50.00	Phase 1	9.82
5.763	25.35	34.65	60.00	13.39	36.61	50.00	Phase 1	9.83
7.5045	26.44	33.56	60.00	19.04	30.96	50.00	Phase 1	9.85
11.463	30.24	29.76	60.00	17.04	32.96	50.00	Phase 1	9.95
11.661	28.22	31.78	60.00	12.41	37.59	50.00	Phase 1	9.96
17.2995	31.57	28.43	60.00	16.82	33.18	50.00	Phase 1	10.21
17.5065	31.75	28.25	60.00	16.82	33.18	50.00	Phase 1	10.22
21.9315	22.73	37.27	60.00	14.48	35.52	50.00	Phase 1	10.34
23.295	21.60	38.40	60.00	14.34	35.66	50.00	Phase 1	10.34
24.276	17.99	42.01	60.00	9.92	40.08	50.00	Phase 1	10.34
24.762	19.06	40.94	60.00	10.73	39.27	50.00	Phase 1	10.35

FCC ID: DO4TR7240 and DO4WRTZ2000

Test point
Operation mode:
Remarks:

N
TAG reading mode supplying 30.0 dBm
none

Result: PASS



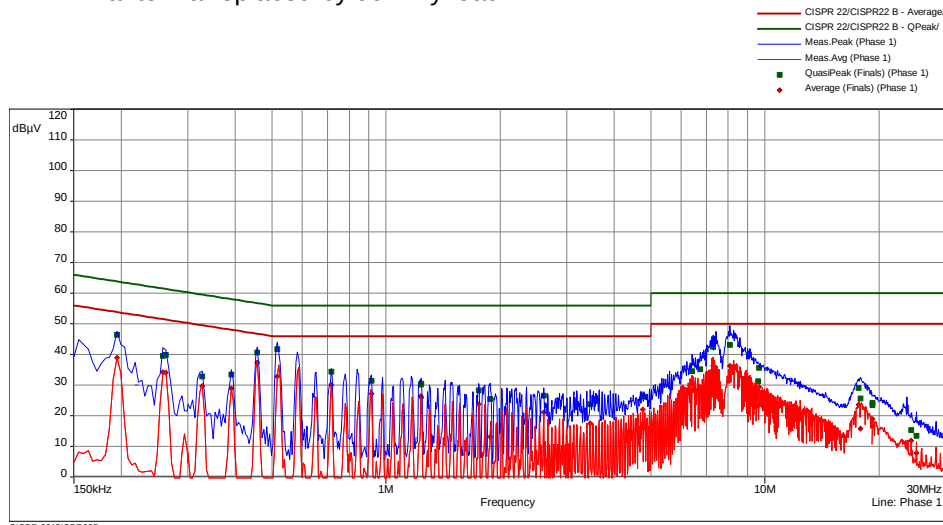
freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.1635	37.33	27.96	65.28	8.65	46.64	55.28	Neutral	9.84
0.1995	34.75	28.88	63.63	18.36	35.27	53.63	Neutral	9.85
0.2175	32.80	30.12	62.91	4.67	48.25	52.91	Neutral	9.84
0.267	29.04	32.17	61.21	14.61	36.60	51.21	Neutral	9.83
0.3045	26.56	33.56	60.12	1.47	48.65	50.12	Neutral	9.82
0.4035	22.20	35.58	57.78	15.71	32.07	47.78	Neutral	9.81
0.4665	20.65	35.93	56.58	7.75	38.82	46.58	Neutral	9.81
0.5385	18.09	37.91	56.00	12.27	33.73	46.00	Neutral	9.82
0.6045	20.13	35.87	56.00	16.00	30.00	46.00	Neutral	9.82
0.609	15.49	40.51	56.00	9.88	36.12	46.00	Neutral	9.82
0.8745	16.56	39.44	56.00	12.58	33.42	46.00	Neutral	9.81
1.077	16.02	39.98	56.00	12.40	33.60	46.00	Neutral	9.81
1.2765	17.56	38.44	56.00	13.54	32.46	46.00	Neutral	9.79
1.5465	17.30	38.70	56.00	12.86	33.14	46.00	Neutral	9.78
2.082	18.99	37.01	56.00	11.69	34.31	46.00	Neutral	9.80
2.2845	19.65	36.35	56.00	12.32	33.68	46.00	Neutral	9.79
2.7555	20.57	35.43	56.00	11.54	34.46	46.00	Neutral	9.78
3.3585	23.19	32.81	56.00	11.45	34.55	46.00	Neutral	9.81
4.299	26.33	29.67	56.00	14.85	31.15	46.00	Neutral	9.80
4.7715	27.17	28.83	56.00	15.59	30.41	46.00	Neutral	9.81
6.1815	25.31	34.69	60.00	14.11	35.89	50.00	Neutral	9.81
6.7215	26.44	33.56	60.00	14.73	35.27	50.00	Neutral	9.81
7.527	28.94	31.06	60.00	18.87	31.13	50.00	Neutral	9.81
7.662	28.39	31.61	60.00	18.92	31.08	50.00	Neutral	9.81
11.4945	27.89	32.11	60.00	17.58	32.42	50.00	Neutral	9.85
11.562	27.28	32.72	60.00	17.36	32.64	50.00	Neutral	9.85
19.023	26.92	33.08	60.00	12.92	37.08	50.00	Neutral	10.08
19.095	28.10	31.90	60.00	15.34	34.66	50.00	Neutral	10.09
21.5175	21.65	38.35	60.00	13.23	36.77	50.00	Neutral	10.07
23.583	21.02	38.98	60.00	11.72	38.28	50.00	Neutral	9.98
24.645	17.31	42.69	60.00	9.28	40.72	50.00	Neutral	9.94
26.904	18.06	41.94	60.00	9.73	40.27	50.00	Neutral	9.84

FCC ID: DO4TR7240 and DO4WRTZ2000

Test point
Operation mode:
Remarks:

L1
Continuous sweep mode at 8.2 MHz Band
antenna replaced by dummy load

Result: PASS



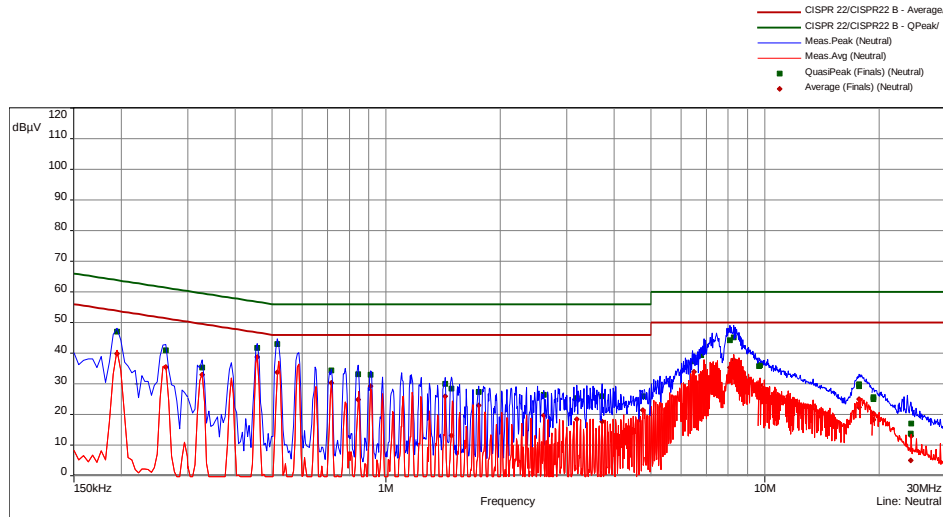
freq MHz	QP dB(μV)	margin dB	limit dB	AV dB(μV)	margin dB	limit dB	line	corr dB
0.195	46.41	17.42	63.82	38.99	14.83	53.82	Phase 1	9.83
0.258	39.48	22.02	61.50	34.23	17.26	51.50	Phase 1	9.82
0.2625	39.85	21.50	61.35	34.10	17.25	51.35	Phase 1	9.82
0.327	32.77	26.75	59.53	29.75	19.77	49.53	Phase 1	9.81
0.39	33.46	24.60	58.06	28.91	19.15	48.06	Phase 1	9.81
0.4575	40.68	16.06	56.74	37.31	9.43	46.74	Phase 1	9.81
0.516	41.75	14.25	56.00	32.79	13.21	46.00	Phase 1	9.82
0.717	34.31	21.69	56.00	30.04	15.96	46.00	Phase 1	9.81
0.915	31.44	24.56	56.00	27.21	18.79	46.00	Phase 1	9.81
1.236	30.16	25.84	56.00	26.45	19.55	46.00	Phase 1	9.80
1.2405	30.55	25.45	56.00	25.88	20.12	46.00	Phase 1	9.80
1.758	28.26	27.74	56.00	23.81	22.19	46.00	Phase 1	9.79
1.884	25.50	30.50	56.00	13.17	32.83	46.00	Phase 1	9.80
2.607	26.54	29.46	56.00	21.12	24.88	46.00	Phase 1	9.79
3.453	23.74	32.26	56.00	17.53	28.47	46.00	Phase 1	9.82
4.758	26.23	29.77	56.00	22.12	23.88	46.00	Phase 1	9.82
6.42	34.53	25.47	60.00	30.72	19.28	50.00	Phase 1	9.84
6.7575	35.24	24.76	60.00	28.21	21.79	50.00	Phase 1	9.84
7.2975	42.48	17.52	60.00	36.31	13.69	50.00	Phase 1	9.85
8.0805	43.09	16.91	60.00	36.22	13.78	50.00	Phase 1	9.86
9.6045	31.23	28.77	60.00	23.27	26.73	50.00	Phase 1	9.89
9.645	35.58	24.42	60.00	29.42	20.58	50.00	Phase 1	9.89
17.664	29.03	30.97	60.00	23.55	26.45	50.00	Phase 1	10.22
17.871	25.70	34.30	60.00	15.81	34.19	50.00	Phase 1	10.23
19.227	24.22	35.78	60.00	18.92	31.08	50.00	Phase 1	10.30
19.2315	23.47	36.53	60.00	16.57	33.43	50.00	Phase 1	10.30
24.339	15.38	44.62	60.00	11.88	38.12	50.00	Phase 1	10.34
25.1265	13.50	46.50	60.00	7.78	42.22	50.00	Phase 1	10.35

FCC ID: DO4TR7240 and DO4WRTZ2000

Test point
Operation mode:
Remarks:

N
Continuous sweep mode at 8.2 MHz Band
antenna replaced by dummy load

Result: PASS



freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.195	46.97	16.85	63.82	39.78	14.04	53.82	Neutral	9.85
0.2625	40.99	20.36	61.35	35.41	15.94	51.35	Neutral	9.83
0.327	35.30	24.23	59.53	33.06	16.47	49.53	Neutral	9.81
0.4575	41.73	15.00	56.74	38.76	7.98	46.74	Neutral	9.81
0.516	43.04	12.96	56.00	33.70	12.30	46.00	Neutral	9.82
0.717	34.42	21.58	56.00	30.34	15.66	46.00	Neutral	9.81
0.843	33.15	22.85	56.00	24.88	21.12	46.00	Neutral	9.81
0.9105	33.00	23.00	56.00	29.27	16.73	46.00	Neutral	9.81
1.434	30.03	25.97	56.00	25.97	20.03	46.00	Neutral	9.78
1.488	28.44	27.56	56.00	13.15	32.85	46.00	Neutral	9.78
1.758	27.37	28.63	56.00	23.00	23.00	46.00	Neutral	9.79
2.607	26.34	29.66	56.00	19.76	26.24	46.00	Neutral	9.79
3.192	25.35	30.65	56.00	18.39	27.61	46.00	Neutral	9.80
3.714	25.98	30.02	56.00	17.72	28.28	46.00	Neutral	9.81
4.758	25.97	30.03	56.00	21.37	24.63	46.00	Neutral	9.81
6.5055	37.40	22.60	60.00	33.97	16.03	50.00	Neutral	9.81
6.78	39.37	20.63	60.00	32.90	17.10	50.00	Neutral	9.81
8.085	44.21	15.79	60.00	35.25	14.75	50.00	Neutral	9.82
8.2785	45.09	14.91	60.00	37.81	12.19	50.00	Neutral	9.81
9.6495	35.84	24.16	60.00	28.17	21.83	50.00	Neutral	9.83
9.7125	36.11	23.89	60.00	29.49	20.51	50.00	Neutral	9.83
17.727	29.80	30.20	60.00	25.02	24.98	50.00	Neutral	10.03
17.7315	29.18	30.82	60.00	22.30	27.70	50.00	Neutral	10.03
19.3575	25.67	34.33	60.00	20.36	29.64	50.00	Neutral	10.10
19.362	25.08	34.92	60.00	18.36	31.64	50.00	Neutral	10.10
24.2715	13.84	46.16	60.00	4.96	45.04	50.00	Neutral	9.95
24.339	17.08	42.92	60.00	13.05	36.95	50.00	Neutral	9.95

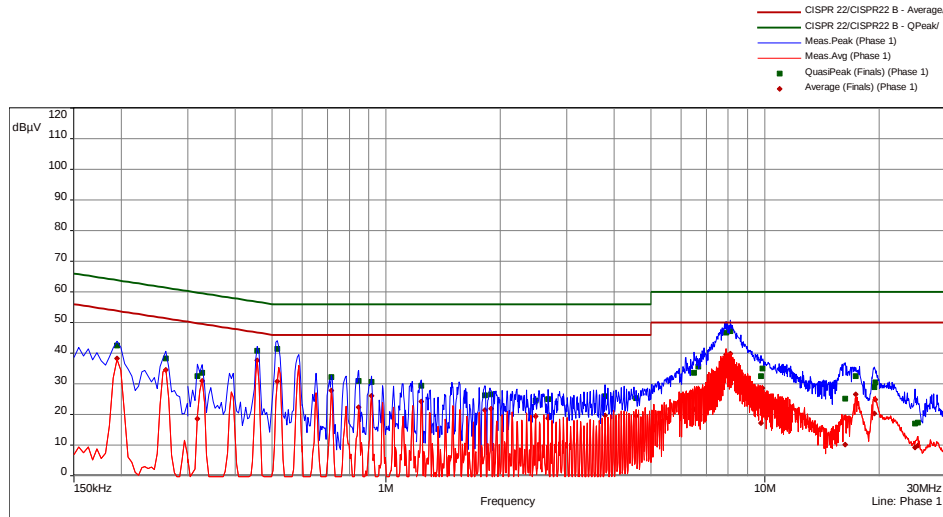
FCC ID: DO4TR7240 and DO4WRTZ2000

Test point
Operation mode:

L1
TAG reading mode supplying 30.0 dBm & Continuous
sweep mode at 8.2 MHz Band
8.2MHz antenna replaced by dummy load

Result: PASS

Remarks:



freq MHz	QP dB(μV)	margin dB	limit dB	AV dB(μV)	margin dB	limit dB	line	corr dB
0.195	42.54	21.28	63.82	38.23	15.59	53.82	Phase 1	9.83
0.2625	38.25	23.10	61.35	34.60	16.75	51.35	Phase 1	9.82
0.318	32.54	27.22	59.76	18.65	31.11	49.76	Phase 1	9.81
0.327	33.55	25.97	59.53	31.00	18.53	49.53	Phase 1	9.81
0.4575	40.82	15.92	56.74	37.65	9.09	46.74	Phase 1	9.81
0.516	41.38	14.62	56.00	30.72	15.28	46.00	Phase 1	9.82
0.717	32.16	23.84	56.00	27.87	18.13	46.00	Phase 1	9.81
0.8475	30.90	25.10	56.00	22.32	23.68	46.00	Phase 1	9.81
0.915	30.60	25.40	56.00	26.12	19.88	46.00	Phase 1	9.81
1.2405	29.39	26.61	56.00	24.23	21.77	46.00	Phase 1	9.80
1.8255	26.30	29.70	56.00	21.44	24.56	46.00	Phase 1	9.79
1.893	26.50	29.50	56.00	21.87	24.13	46.00	Phase 1	9.80
2.481	24.55	31.45	56.00	19.33	26.67	46.00	Phase 1	9.79
2.679	25.02	30.98	56.00	18.71	27.29	46.00	Phase 1	9.79
3.786	26.02	29.98	56.00	19.67	26.33	46.00	Phase 1	9.81
4.5735	25.34	30.66	56.00	19.57	26.43	46.00	Phase 1	9.81
6.5055	33.56	26.44	60.00	21.79	28.21	50.00	Phase 1	9.84
6.663	35.71	24.29	60.00	27.54	22.46	50.00	Phase 1	9.84
7.905	46.71	13.29	60.00	39.58	10.42	50.00	Phase 1	9.86
8.0985	47.20	12.80	60.00	39.80	10.20	50.00	Phase 1	9.86
9.771	32.59	27.41	60.00	17.25	32.75	50.00	Phase 1	9.90
9.861	35.06	24.94	60.00	28.67	21.33	50.00	Phase 1	9.90
16.2825	25.17	34.83	60.00	10.09	39.91	50.00	Phase 1	10.17
17.367	32.56	27.44	60.00	26.63	23.37	50.00	Phase 1	10.21
19.4655	28.99	31.01	60.00	20.27	29.73	50.00	Phase 1	10.31
19.587	30.45	29.55	60.00	24.81	25.19	50.00	Phase 1	10.31
24.9105	16.99	43.01	60.00	9.25	40.75	50.00	Phase 1	10.35
25.3155	17.42	42.58	60.00	9.91	40.09	50.00	Phase 1	10.35

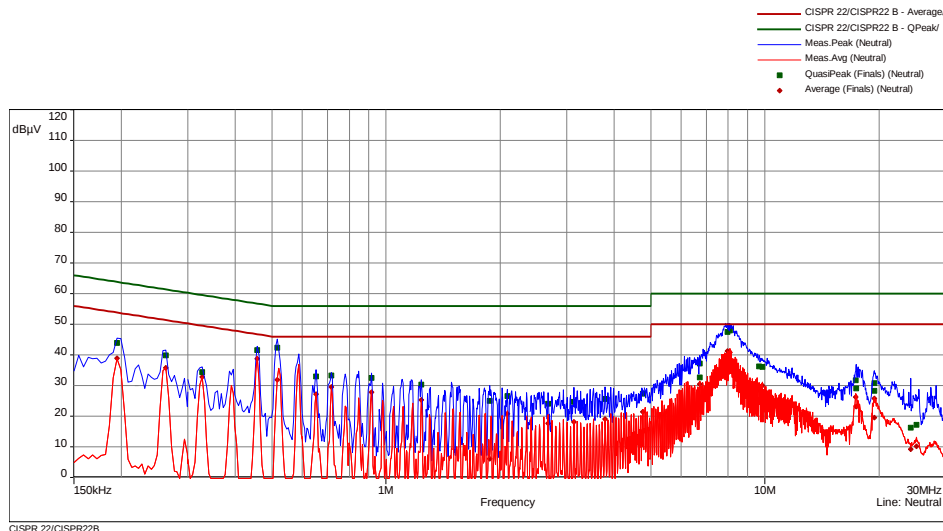
FCC ID: DO4TR7240 and DO4WRTZ2000

Test point
Operation mode:

N
TAG reading mode supplying 30.0 dBm & Continuous
sweep mode at 8.2 MHz Band
8.2MHz antenna replaced by dummy load

Result: PASS

Remarks:



freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.195	43.89	19.93	63.82	38.90	14.92	53.82	Neutral	9.85
0.2625	39.79	21.57	61.35	35.79	15.57	51.35	Neutral	9.83
0.327	34.44	25.08	59.53	32.81	16.71	49.53	Neutral	9.81
0.4575	41.60	15.14	56.74	38.78	7.96	46.74	Neutral	9.81
0.516	42.42	13.58	56.00	31.81	14.19	46.00	Neutral	9.82
0.654	33.02	22.98	56.00	27.23	18.77	46.00	Neutral	9.81
0.717	33.34	22.66	56.00	29.52	16.48	46.00	Neutral	9.81
0.915	32.48	23.52	56.00	27.87	18.13	46.00	Neutral	9.81
1.2405	30.37	25.63	56.00	25.37	20.63	46.00	Neutral	9.80
1.8795	24.99	31.01	56.00	6.15	39.85	46.00	Neutral	9.80
2.091	26.52	29.48	56.00	20.86	25.14	46.00	Neutral	9.80
2.679	24.09	31.91	56.00	17.66	28.34	46.00	Neutral	9.78
3.1335	24.77	31.23	56.00	18.10	27.90	46.00	Neutral	9.79
3.786	25.70	30.30	56.00	19.01	26.99	46.00	Neutral	9.81
4.767	27.32	28.68	56.00	21.38	24.62	46.00	Neutral	9.81
6.7215	37.15	22.85	60.00	30.43	19.57	50.00	Neutral	9.81
6.735	32.66	27.34	60.00	25.88	24.12	50.00	Neutral	9.81
7.9635	47.57	12.43	60.00	41.25	8.75	50.00	Neutral	9.81
8.094	47.99	12.01	60.00	40.78	9.22	50.00	Neutral	9.82
9.663	36.30	23.70	60.00	28.64	21.36	50.00	Neutral	9.83
9.8565	36.12	23.88	60.00	30.04	19.96	50.00	Neutral	9.83
17.3625	31.70	28.30	60.00	26.33	23.67	50.00	Neutral	10.02
17.421	29.13	30.87	60.00	23.18	26.82	50.00	Neutral	10.02
19.452	30.84	29.16	60.00	25.84	24.16	50.00	Neutral	10.10
19.461	28.27	31.73	60.00	19.52	30.48	50.00	Neutral	10.10
24.276	16.31	43.69	60.00	9.27	40.73	50.00	Neutral	9.95
25.1175	17.17	42.83	60.00	10.19	39.81	50.00	Neutral	9.93

FCC ID: DO4TR7240 and DO4WRTZ2000

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 m

5.2.1 Applicable standard

According to FCC Part 15C, Section 15.223:

5.2.2 Description of Measurement

The radiated field strength of the fundamental wave from the EUT is measured using a tuned EMI-receiver. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.10. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

5.2.3 Test result

3m Distance measured:

Frequency (MHz)	Level PK (dBμV)	Correct. factor (dB)	Corrected level dB(μV/m)
7.4	55.9	20	75.9
8.2	74.8	20	94.8
9.5	63.1	20	83.1

conversion to 30m Distance:

Frequency (MHz)	Level PK (dBμV)	Correct. factor (dB)	Corrected level dB(μV/m)	Llimit dB(μV/m)	Delta (dB)
7.4	15.9	20	35.9	60	-24.1
8.2	34.8	20	54.8	60	-5.2
9.5	23.1	20	43.1	60	-16.9

Limit according to FCC Part 15 Subpart 15.223, 15.35(b):

Frequency (MHz)	Field strength of fundamental – Average Detector @ 30m	
	(μV/m)	dB (μV/m)
1.705-10.0	100	40

Frequency (MHz)	Field strength of fundamental – Peak Detector @ 30m	
	(μV/m)	dB (μV/m)
1.705-10.0	1000	60

The requirements are **FULFILLED**.

Remarks: Please refer to subclause 2.6 of this report.

FCC ID: DO4TR7240 and DO4WRTZ2000

5.3 Maximum peak conducted output power

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

5.3.1 Description of the test location

Test location: Shielded Room S4

5.3.2 Applicable standard

According to FCC Part 15C, Section 15.247(b)(2):

5.3.3 Description of Measurement

A spectrum analyzer is connected to the output of the transmitter via a suitable attenuator while EUT was operating in transmit mode using the assigned frequency.

Spectrum analyser settings:

RBW	300 kHz	Sweep time	5 ms (Auto)
VBW	1 MHz	Power Mode	Max. hold
Detector	Peak	Span	500 kHz

5.3.4 Test result

a.) Power setting 30.0 dBm
= Antenna gain: 4.5 dBi

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Delta (dB)
1	902.75	23.27	30.0	-6.73
25	914.75	22.99	30.0	-7.01
50	927.25	22.84	30.0	-7.16

Note: Correction means fixed attenuation of 20 dB.

Test cable loss is included in the analyzer reading (Transducer factor).

Peak Power Limit according to FCC Part 15C, Section 15.247(b)(2):

Frequency (MHz)	Hopping channels	Hop. CH carrier frequ. separation	Peak Power Limit	
			(dBm)	(W)
902-928	≥ 50		30	1.0

The requirements are **FULFILLED**.

Remarks: This measurement was only performed with WRTZ-2000 which is necessary accd. the relevant
standard.

FCC ID: DO4TR7240 and DO4WRTZ2000

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

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

5.4.1 Description of the test location

Test location: OATS1

Test distance: 3 m

5.4.2 Applicable standard

According to FCC Part 15C, Section 15.209:

5.4.3 Description of Measurement

The magnetic field strength of spurious emission from the EUT is measured in 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 setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8.3. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

According to Section 15.31 (f) (2): The measurement below 30 MHz is performed at a distance of 3 m. The results are extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor of 40 dB/decade.

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

5.4.4 Test result

3m Distance measured:

Frequency (kHz)	Level QP (dBμV)	Correct. factor (dB)	Corrected level dB(μV/m)
536.8	24.1	20	44.1
1073.6	23.4	20	43.4
1342.0	21.6	20	41.6

Note: The level above means the noise level in the band. No emission could be detected.
Correction factor means fixed attenuation of 20 dB from the receiving antenna FMZB1516.

conversion to 30m Distance:

Frequency (kHz)	Level QP (dBμV)	Correct. factor (dB)	Corrected level dB(μV/m)	Llimit dB(μV/m)	Delta (dB)
536.8	-15.9	20	4.1	33	-28.9
1073.6	-16.6	20	3.4	27	-23.6
1342.0	-18.4	20	1.6	25	-23.4

Note: The level above means the noise level in the band. No emission could be detected.
Correction factor means fixed attenuation of 20 dB from the receiving antenna FMZB1516

NOTE: The measured values are represents and extract of the critical values from both systems (RF electronic and WRTZ-2000) during the continuous sweep mode from both systems in the different frequency ranges.

FCC ID: DO4TR7240 and DO4WRTZ2000

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

Frequency (MHz)	Field strength of spurious emissions		Measurement distance
	($\mu\text{V/m}$)	dB($\mu\text{V/m}$)	(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: Both systems (RF and UHF) are in continuous sweep mode in the relevant frequency ranges.
No unwanted emissions from the EuT could be measured in the relevant frequency ranges.
Only ambient noises could be detected.

FCC ID: DO4TR7240 and DO4WRTZ2000

5.5 Spurious emissions radiated (electric field)

For test instruments and accessories used see section 6 Part SER 2, SER 3.

5.5.1 Description of the test location

Test location: OATS1
 Test location: Anechoic Chamber A1
 Test distance: 3 m

5.5.2 Applicable standard

According to FCC Part 15C, Section 15.209:

5.5.3 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 C63.4, Item 8.3. If the emission level of the EUT in peak mode complies with the average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average mode again and reported.

Instrument settings:
 30 MHz – 1000 MHz: RBW: 120 kHz
 1000 MHz – 4500 MHz: RBW: 1 MHz
 Example:

Frequency (MHz)	Level (dBμV)	+	Factor (dB)	=	Level dB(μV/m)	-	Limit dB(μV/m)	=	Delta (dB)
170.5	5	+	20	=	25	-	30	=	-5

5.5.4 Test result f < 1 GHz

Extract of the critical values:

Evolve E10, Tx Frequency Dual Band, Tx1&Tx2:31
 WRTZ-2000, Power setting 30.0 dBm

Frequency (MHz)	Level QP (dBμV)	Bandwidth (kHz)	Correct. factor (dB)	Corrected level dB(μV/m)	Limit dB(μV/m)	Delta (dB)
32.31	17.3	120	14.0	31.3	40.0	-8.7
33.30	21.3	120	14.0	35.3	40.0	-4.7
33.80	24.1	120	14.0	38.1	40.0	-1.9
42.19	11.2	120	14.7	25.9	40.0	-14.1
47.70	15.7	120	15.1	30.8	40.0	-9.2
49.99	14.5	120	15.4	29.9	40.0	-10.1
55.68	20.0	120	15.0	35.0	40.0	-5.0
56.52	18.2	120	15.0	33.2	40.0	-6.8
58.33	19.6	120	14.9	34.5	40.0	-5.5
108.24	19.7	120	10.1	29.8	43.5	-13.7
121.17	16.0	120	12.7	28.7	43.5	-14.8
129.38	25.6	120	13.0	38.6	43.5	-4.9
241.51	12.7	120	13.5	26.2	46.0	-19.8
320.00	20.3	120	17.5	37.8	46.0	-8.2

NOTE: The measured values are represents and extract of the critical values from both systems (RF electronic and WRTZ-2000) during the continuous sweep mode from both systems in the different frequency ranges.

FCC ID: DO4TR7240 and DO4WRTZ2000

5.5.5 Test result $f > 1$ GHz

Frequency (MHz)	L: PK (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB(μ V/m)	Limit AV dB(μ V/m)	Delta (dB)
2.710	47.5	1000	3.7	51.2	54	-2.8
2.752	46.8	1000	3.4	50.2	54	-3.8
3.613	42.8	1000	2.5	45.3	54	-8.7

Peak level is below average limit → no average measurement was performed.

NOTE: The measured values (5.5.4 and 5.5.5) are represents and extract of the critical values from both systems (RF electronic and WRTZ-2000) during the continuous sweep mode from both systems in the different frequency ranges.

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

Frequency (MHz)	15.209 Limits (μ V/m)	15.209 Limits dB(μ V/m)
30 - 88	100	40
88 - 216	150	43,5
216 - 960	200	46
Above 960	500	54

The requirements are **FULFILLED**.

Remarks: The measurement was performed up to the 10th harmonic.

Both systems (RF and UHF) are in continuous sweep mode in the relevant frequency ranges.

The table shows an extract of the critical values.

FCC ID: DO4TR7240 and DO4WRTZ2000**5.6 Spurious radiated emissions in restricted bands**

For test instruments and accessories used see section 6 Part SER 1, SER 2, SER 3.

5.6.1 Description of the test location

Test location: OATS1
Test distance: 3 metres

Test location: Anechoic Chamber A2
Test distance: 3 metres

5.6.2 Photo documentation of the test set-up

See Attachment C

5.6.3 Applicable standard

According to FCC Part 15, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency bands 902 to 928 MHz, the digitally modulated radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a) (see Section 15.205(c)).

5.6.4 Description of Measurement

Radiated spurious emissions from the EUT are measured in the frequency range of 9 kHz to 1000 MHz using a tuned receiver and appropriate broadband linear polarized antennas. The measurements are made with 120 kHz bandwidth and quasi-peak detection (200 Hz, 9 kHz up to 30 MHz). The EUT was placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the equipment under test will be in accordance to ANSI C63.4. The antenna was positioned 3 metres horizontally from the EUT. To locate maximum emissions from the EUT the antenna is shifted in height from 1 to 4 metres, after the EUT is rotated 360 degrees. The measurement scan is made in horizontal and vertical polarization of the antenna. The correction factors for antenna gain and cable loss are stored in the EMI receiver and automatically added to a measurement data to display the final level in dB μ V/m.

For the radiated measurement up from 1 GHz to maximum frequency as specified in Section 15.33, a spectrum analyzer and appropriate linear polarized antennas are used. The EUT is placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the EUT will be in accordance to ANSI C63.4. The antenna was positioned 3 m horizontally from the EUT. To locate maximum emissions the EUT was rotated 360 degrees in the fully anechoic chamber. The measurement scan is made in horizontal and vertical polarization of the antenna. For testing above 1 GHz, if the emission level of the EUT in peak mode complies with the average limit is 20 dB lower, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.

FCC ID: DO4TR7240 and DO4WRTZ2000

5.6.5 Test result

5.6.5.1 Radiated emission test $f < 1$ GHz

Frequency [kHz]	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]
536.8	24.1	19.7	9.0	20	44.1	39.7	73.0	-33.3
1073.6	23.4	18.0	9.0	20	43.4	38.0	67.0	-29.0
1342.0	21.6	15.9	9.0	20	41.6	35.9	65.0	-29.1

Frequency [MHz]	L: QP [dB μ V]	Correct. [dB]	L: QP [dB μ V/m]	Limit [dB μ V/m]	Delta [dB]
8.377	-68.5	20	-48.5	69.5	-122.5
33.78	3.7	13.4	17.1	40.0	-22.9
118.54	9.3	12.9	22.2	43.5	-21.3
517.43	4.8	21.9	26.7	46.0	-19.3

Note: No unwanted emissions from the EuT could be measured in the relevant frequency ranges and each antenna with the different power setting. Only ambient noises could be detected!
Both systems (RF and UHF) are in continuous sweep mode in the relevant frequency ranges.

5.6.5.2 Radiated emission test $f > 1$ GHz

- Power setting 30.0 dBm
- Antenna: PAM915UN1CP01SK110MM

Frequency (GHz)	L: PK (dB μ V)	L: AV (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB(μ V/m)	L: AV dB(μ V/m)	Limit AV dB(μ V/m)	Delta (dB)
2.710	47.5	42.9	1000	3.7	51.2	46.6	54.0	-7.4
2.752	46.8	39.7	1000	3.4	50.2	43.1	54.0	-10.9
3.613	42.8	37.5	1000	2.5	45.3	40.0	54.0	-14.0

Radiated limits according to FCC Part 15C, Section 15.209(a) for spurious emissions which fall in restricted bands:

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

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Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

The requirements are **FULFILLED**.

Remarks: During the test the EUT was set into TX continuous mode with normal modulation.

The measurement was performed up to the 10th harmonic (10000 MHz).

Both systems (RF and UHF) are in continuous sweep mode in the relevant frequency ranges.

FCC ID: DO4TR7240 and DO4WRTZ2000
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	ESCI	02-02/03-05-004	12/11/2015	12/11/2014		
	ESH 2 - Z 5	02-02/20-05-004	18/10/2015	18/10/2013	09/08/2015	09/02/2015
	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	19/11/2015	19/11/2014	09/12/2015	09/06/2015
CPC 2	FSP 40	02-02/11-11-001	02/10/2015	02/10/2014		
	Inmet 18N50W-20 dB	02-02/50-10-001				
CPR 1	FMZB 1516	01-02/24-01-018			19/01/2016	19/01/2015
	ESCI	02-02/03-05-005	09/12/2015	09/12/2014		
	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				
SER 1	FMZB 1516	01-02/24-01-018			19/01/2016	19/01/2015
	ESCI	02-02/03-05-005	09/12/2015	09/12/2014		
	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				
SER 2	ESVS 30	02-02/03-05-006	03/07/2015	03/07/2014		
	VULB 9168	02-02/24-05-005	17/04/2016	17/04/2015	20/11/2015	20/05/2015
	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				
SER 3	FSP 40	02-02/11-11-001	02/10/2015	02/10/2014		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	3117	02-02/24-05-009	12/05/2016	12/05/2015		
	Sucoflex N-2000-SMA	02-02/50-05-075				
	SF104/11N/11N/1500MM	02-02/50-13-015				