

EMI – TEST REPORT

- FCC Part 15.247, RSS-247 -

Type / Model Name : RR02

Product Description : Active Timing System

Applicant : race result AG

Address : Haid-und-Neu-Str. 7

76131 Karlsruhe

GERMANY

Manufacturer : race result AG

Address : Haid-und-Neu-Str. 7

76131 Karlsruhe

GERMANY

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

POSITIVE

Test Report No. : **T39567-00-01JP**

11. November 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
without the written permission of the test laboratory.

Contents

1	<u>TEST STANDARDS</u>	3
2	<u>EQUIPMENT UNDER TEST</u>	4
2.1	Photo documentation of the EUT	4
2.2	Short description of the equipment under test (EUT)	5
2.3	Variants of the EUT	5
2.4	Operation frequency and channel plan	6
2.5	EuT operation mode:	6
2.6	Antenna	6
2.7	Power supply system utilised	6
2.8	Peripheral devices and interface cables	6
2.9	Final assessment	7
3	<u>TEST ENVIRONMENT</u>	8
3.1	Address of the test laboratory	8
3.2	Environmental conditions	8
3.3	Statement of the measurement uncertainty	8
3.4	Measurement protocol for FCC and IC	9
4	<u>TEST CONDITIONS AND RESULTS</u>	10
4.1	AC power line conducted emissions	10
4.2	EBW	14
4.3	Maximum peak conducted output power	17
4.4	Power spectral density	19
4.6	Unwanted emissions	22
4.7	Correction for pulse operation (duty cycle)	26
5	<u>USED TEST EQUIPMENT AND ACCESSORIES</u>	29

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 15.209

Radiated emission limits, general requirements

Part 15, Subpart C, Section 15.249

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz,
5725 - 5875 MHz, and 24.0 - 24.25 GHz

RSS-Gen Issue 4, Nov 2014

General Requirements and Information for the Certification of Radio
Apparatus

RSS-247 Issue 1, May 2015

Digital Transmission Systems (DTSS), Frequency Hopping Systems
(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

ANSI C63.10: 2013

Testing Unlicensed Wireless Devices

CISPR 16-4-2: 2013

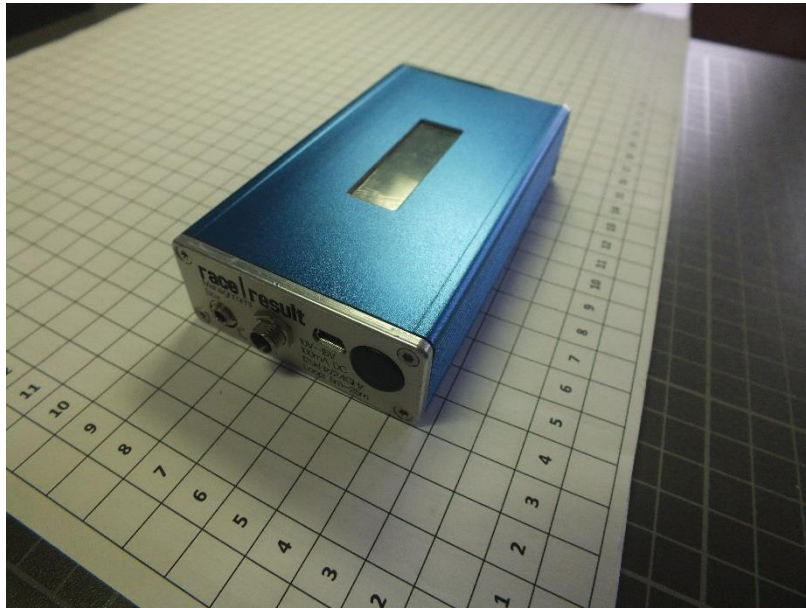
Uncertainty in EMC measurement

KDB 558074 D01 v03r03

Guidance for performing compliance measurements on DTS
operating under §15.247, June 9, 2015.

2 EQUIPMENT UNDER TEST

2.1 Photo documentation of the EUT





2.2 Short description of the equipment under test (EUT)

The active timing system is used for time measurements in sport events and consists out of the RR02 (base station) and the RR01 (transponder). The RR02's 125 kHz loop antenna is placed on the time measurement position. The RR01 is mounted on the participant of the event or its equipment. The 125 kHz signal triggers a 2.4GHz transmission between the RR02 and the RR01. This message contains the required information and is stored.

Number of tested samples: 1
Serial number: none

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

2.3 Variants of the EUT

none

2.4 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel plan:

Channels	Frequency
0*	2480*
1*	2405*
2	2425
3	2475
4	2415
5	2460
6	2435
7*	2450*

* Frequencies tested.

2.5 EuT operation mode:

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

- 2.4GHz communication is active, 125kHz RFID reading is active

2.6 Antenna

LAIRD-RD2458 is used.

2.7 Power supply system utilised

Power supply voltage : 115 V / 60 Hz / 1 ϕ (AC/DC adapter) or
5.0V DC (USB port) or
4.0V DC (battery supplied)

2.8 Peripheral devices and interface cables

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

- Antenna Model : RD2458, Laird
- Power supply unit Model : ETSA120150U-P5P-SZ, CUI Inc.

1 TEST RESULT SUMMERY

FCC Rule Part	RSS Rule Part	Description	Result
15.207	RSS-Gen, 8.8	AC power line conducted emissions	passed
15.247	RSS-247, 5.2	-6 dB BW	passed
15.247	RSS-247, 5.4	Peak power	passed
15.209	RSS-Gen, 8.9	General radiated emission limits	passed
15.247	RSS-247, 5.2	PSD	passed

This test report deals with the 2.4 GHz DTS function of the EuT.

2.9 Final assessment

Select final Assessment

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

Testing commenced on : 08 April 2015

Testing concluded on : 26 October 2015

Checked by:

Tested by:



Klaus Gegenfurtner
I confirm the correctness and
Integrity of this documents
2015.11.11 14:54:02 +01'00'

Klaus Gegenfurtner
Teamleader Radio



Jürgen Pessinger
2015.11.11
14:41:33 +01'00'

Jürgen Pessinger

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

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

3.2 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

3.3 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.

3.4 Measurement protocol for FCC and IC

3.4.1 General information

3.4.1.1 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 Open Area test site is listed under the Canadian Test-Sites File-No:

IC 3009A-1

In compliance with RSS 247 testing for RSS compliance may be achieved by following the procedures set out in ANSI C63.10 and applying the CISPR 22 limits.

3.4.1.2 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.

3.4.1.3 Details of test procedures

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 C63.10 and applying the CISPR 22 limits.

4 TEST CONDITIONS AND RESULTS

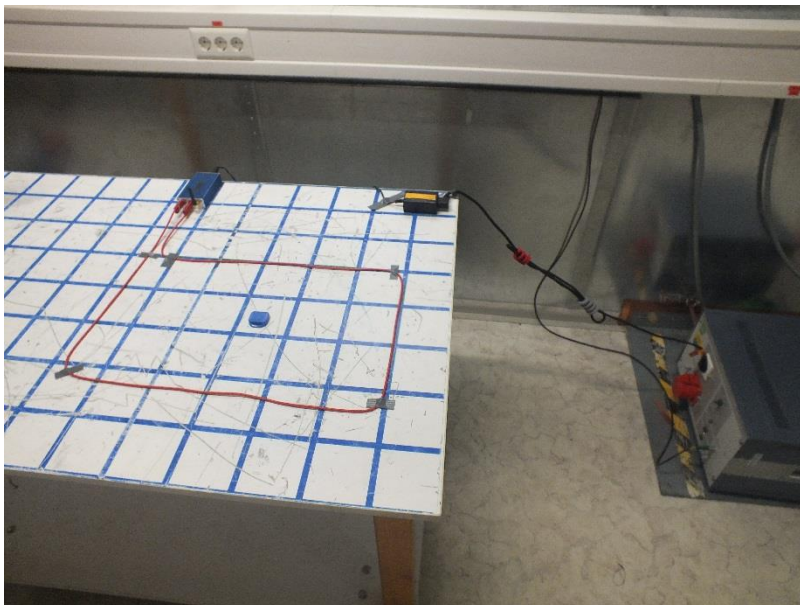
4.1 AC power line conducted emissions

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

4.1.1 Description of the test location

Test location: Shielded Room S2

4.1.2 Photo documentation of the test set-up



4.1.3 Applicable standard

According to FCC Part 15, Section 15.207 and RSS-Gen 8.8

4.1.4 Description of Measurement

The measurements are performed according the procedures set out in ANSI C63.10.

4.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 4.19 dB at 0.3945 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

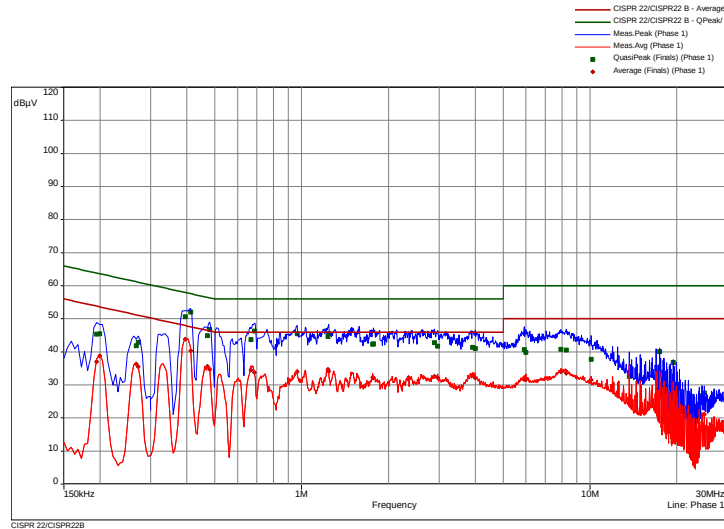
The requirements are **FULFILLED**.

Remarks: Pretests indicates that shorter loop antenna length leads to higher emission results. To create
a worst case scenario a loop antenna length of 2m was used even though the specification lists a
minimum length of 5m. The measurement was made at the AC input of the dedicated AC/DC
power adapter.

4.1.6 Test protocol

Test point L1
 Operation mode: 125kHz TX signal is active, 2.4GHz communication is active
 Remarks: none

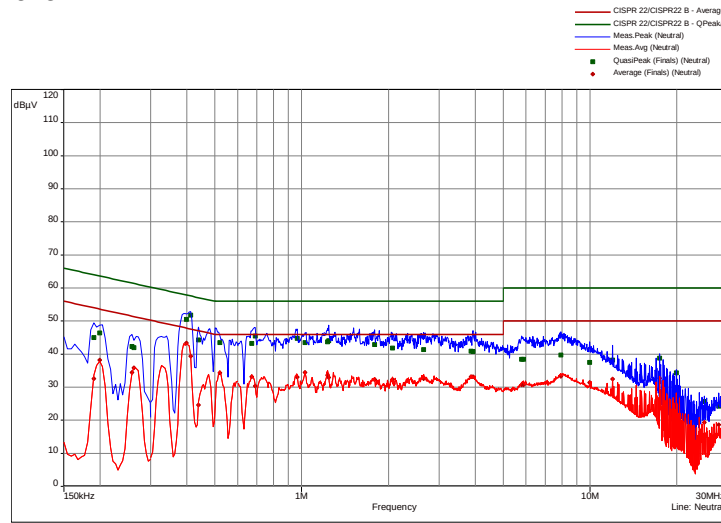
Result: PASS



freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.195	45.35	18.48	63.82	37.08	16.74	53.82	Phase 1	9.83
0.1995	45.48	18.15	63.63	38.74	14.89	53.63	Phase 1	9.83
0.267	41.81	19.40	61.21	36.28	14.93	51.21	Phase 1	9.82
0.2715	42.85	18.22	61.07	35.52	15.55	51.07	Phase 1	9.82
0.3945	50.58	7.39	57.97	43.78	4.19	47.97	Phase 1	9.81
0.4125	52.02	5.57	57.60	40.28	7.32	47.60	Phase 1	9.81
0.471	44.94	11.56	56.50	35.61	10.88	46.50	Phase 1	9.81
0.48	46.73	9.61	56.34	34.72	11.62	46.34	Phase 1	9.81
0.6675	43.70	12.30	56.00	34.47	11.53	46.00	Phase 1	9.81
0.6855	46.31	9.69	56.00	33.80	12.20	46.00	Phase 1	9.81
0.9645	45.53	10.47	56.00	33.94	12.06	46.00	Phase 1	9.81
1.236	44.70	11.30	56.00	34.71	11.29	46.00	Phase 1	9.80
1.2405	45.47	10.53	56.00	34.12	11.88	46.00	Phase 1	9.80
1.7625	42.36	13.64	56.00	32.29	13.71	46.00	Phase 1	9.79
1.776	42.45	13.55	56.00	32.14	13.86	46.00	Phase 1	9.79
2.8905	42.83	13.17	56.00	32.57	13.43	46.00	Phase 1	9.79
2.958	41.78	14.22	56.00	32.20	13.80	46.00	Phase 1	9.79
3.912	41.36	14.64	56.00	32.93	13.07	46.00	Phase 1	9.81
4.0065	41.06	14.94	56.00	32.16	13.84	46.00	Phase 1	9.81
5.916	40.72	19.28	60.00	31.68	18.32	50.00	Phase 1	9.84
5.9835	39.90	20.10	60.00	31.63	18.37	50.00	Phase 1	9.84
7.923	40.84	19.16	60.00	33.95	16.05	50.00	Phase 1	9.86
8.265	40.53	19.47	60.00	33.57	16.43	50.00	Phase 1	9.86
10.0905	37.75	22.25	60.00	31.58	18.42	50.00	Phase 1	9.91
13.6635	32.58	27.42	60.00	25.76	24.24	50.00	Phase 1	10.05
17.439	40.11	19.89	60.00	34.01	15.99	50.00	Phase 1	10.21
19.4295	36.82	23.18	60.00	30.89	19.11	50.00	Phase 1	10.31
24.4155	26.67	33.33	60.00	21.00	29.00	50.00	Phase 1	10.34
24.9105	27.53	32.47	60.00	21.15	28.85	50.00	Phase 1	10.35

Test point: N
 Operation mode: 125kHz TX signal is active, 2.4GHz communication is active
 Remarks: none

Result: PASS



freq	QP	margin	limit	AV	margin	limit	line	corr
MHz	dB(μV)	dB	dB	dB(μV)	dB	dB		dB
0.1905	45.01	19.00	64.01	32.53	21.48	54.01	Neutral	9.85
0.1995	46.37	17.26	63.63	38.20	15.43	53.63	Neutral	9.85
0.258	42.30	19.20	61.50	34.43	17.06	51.50	Neutral	9.83
0.2625	41.98	19.37	61.35	35.88	15.48	51.35	Neutral	9.83
0.399	50.50	7.38	57.87	43.38	4.50	47.87	Neutral	9.81
0.4125	51.77	5.83	57.60	39.35	8.24	47.60	Neutral	9.81
0.4395	44.33	12.74	57.07	24.61	22.46	47.07	Neutral	9.81
0.5205	43.49	12.51	56.00	34.37	11.63	46.00	Neutral	9.82
0.672	43.25	12.75	56.00	33.20	12.80	46.00	Neutral	9.81
0.69	45.51	10.49	56.00	30.38	15.62	46.00	Neutral	9.81
0.9645	44.77	11.23	56.00	33.07	12.93	46.00	Neutral	9.81
1.0275	43.53	12.47	56.00	34.42	11.58	46.00	Neutral	9.81
1.2315	43.72	12.28	56.00	33.65	12.35	46.00	Neutral	9.80
1.2405	44.06	11.94	56.00	32.90	13.10	46.00	Neutral	9.80
1.7895	42.87	13.13	56.00	32.40	13.60	46.00	Neutral	9.79
2.064	41.83	14.17	56.00	32.30	13.70	46.00	Neutral	9.80
2.6475	41.36	14.64	56.00	32.57	13.43	46.00	Neutral	9.78
3.8625	40.94	15.06	56.00	33.17	12.83	46.00	Neutral	9.81
3.93	40.84	15.16	56.00	33.13	12.87	46.00	Neutral	9.81
5.7855	38.47	21.53	60.00	30.66	19.34	50.00	Neutral	9.81
5.8845	38.48	21.52	60.00	30.77	19.23	50.00	Neutral	9.82
7.932	39.72	20.28	60.00	33.32	16.68	50.00	Neutral	9.81
9.9645	37.46	22.54	60.00	31.39	18.61	50.00	Neutral	9.83
11.958	38.27	21.73	60.00	32.47	17.53	50.00	Neutral	9.86
17.439	38.79	21.21	60.00	32.69	17.31	50.00	Neutral	10.02
19.929	34.34	25.66	60.00	28.10	21.90	50.00	Neutral	10.13
24.9105	25.64	34.36	60.00	19.32	30.68	50.00	Neutral	9.94
27.903	24.25	35.75	60.00	18.67	31.33	50.00	Neutral	9.79

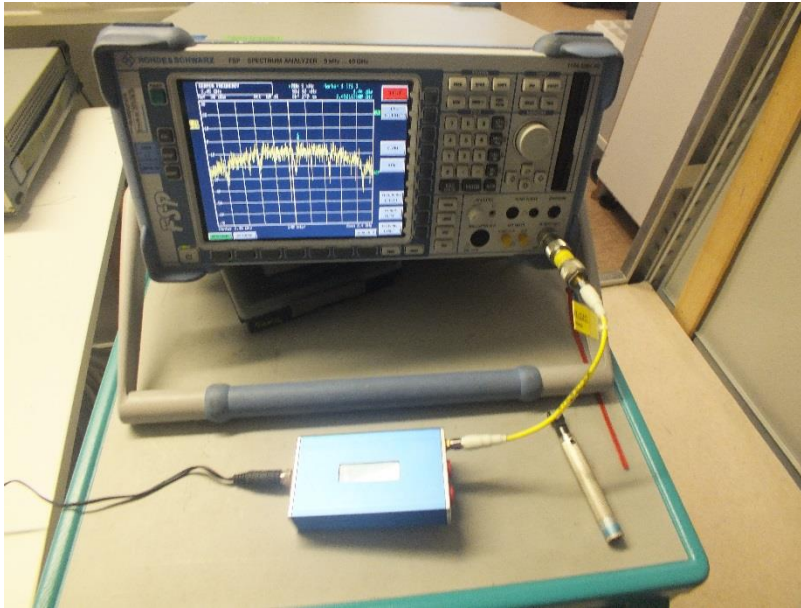
4.2 EBW

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

4.2.1 Description of the test location

Test location: AREA4

4.2.2 Photo documentation of the test set-up



4.2.3 Applicable standard

According to FCC Part 15, Section 15.247 and RSS-247 5.2:

4.2.4 Description of Measurement

The measurements are performed according the procedures set out in ANSI C63.10.

4.2.5 Test result

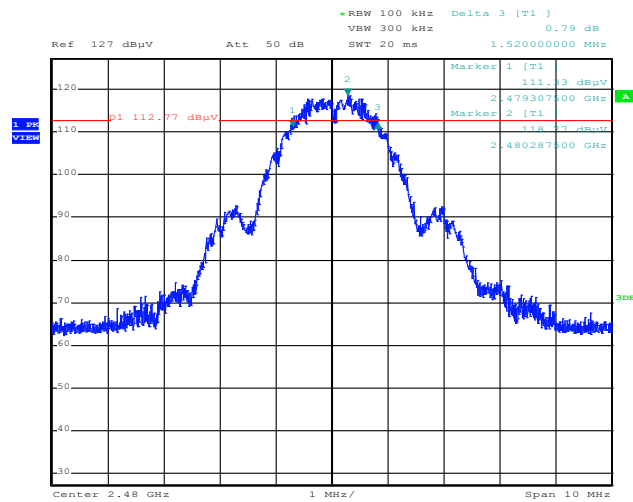
Channel	6 dB Bandwidth (MHz)	Limit (MHz)
0 (2480 MHz)	1.52	0.5
1 (2405 MHz)	1.45	0.5
7 (2450 MHz)	1.56	0.5

The requirements are **FULFILLED**.

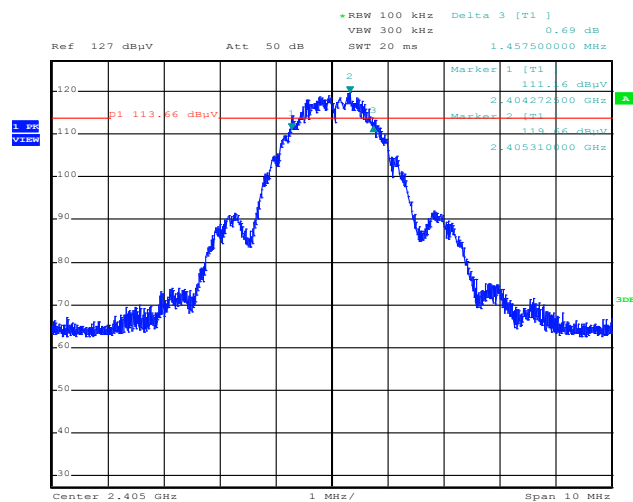
Remarks: none

4.2.6 Test protocols

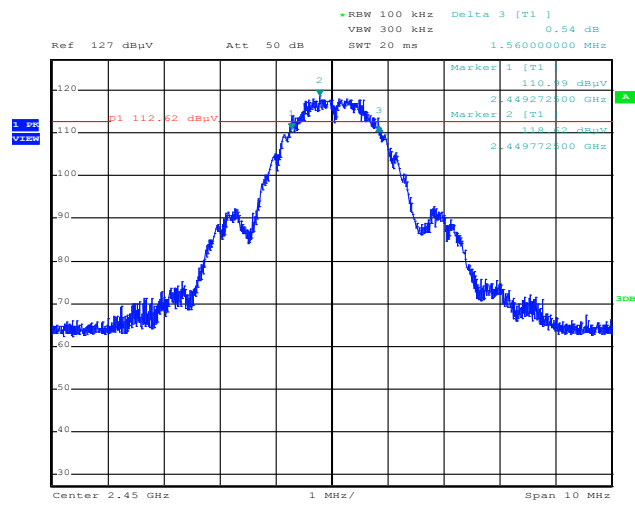
Channel 0 (2480 MHz)



Channel 1 (2405 MHz)



Channel 7 (2450 MHz)



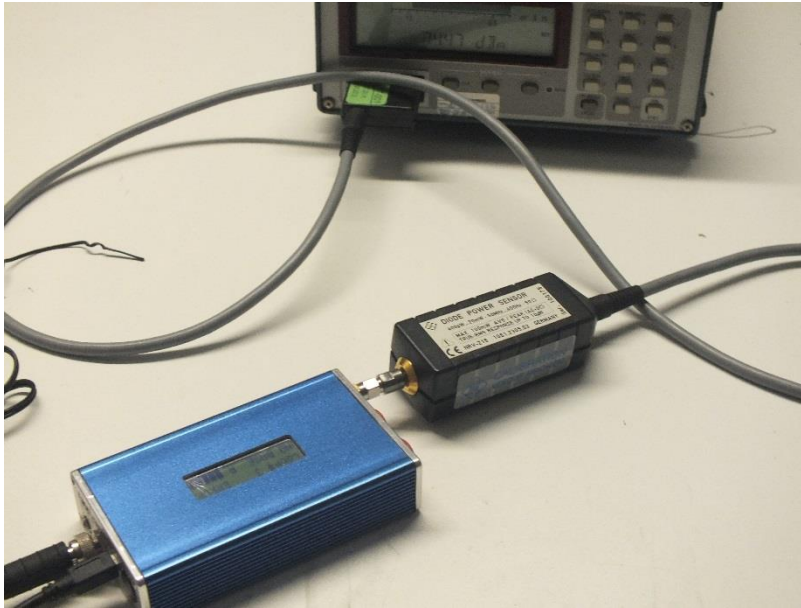
4.3 Maximum peak conducted output power

For test instruments and accessories used see section 6 Part **CPC 3**.

4.3.1 Description of the test location

Test location: AREA4

4.3.2 Photo documentation of the test set-up



4.3.3 Applicable standard

According to FCC Part 15, Section 15.247 and RSS-247 5.4:

4.3.4 Description of Measurement

The maximum peak conducted output power is measured using a peak power meter following the procedure set out in KDB 558074, item 9.1.2. The EUT is set in TX continuous mode while measuring.

4.3.5 Test result

Channel	Peak power measured (dBm)	Limit (dBm)
0 (2480 MHz)	16.2	30
1 (2405 MHz)	16.4	30
7 (2450 MHz)	16.4	30

Peak Power Limit according to FCC Part 15, Section 15.247 and RSS-247 5.4:

Frequency (MHz)	Peak Power Limit	
	(dBm)	(Watt)
902-928	30	1.0
2400-2483.5	30	1.0
5725-5850	30	1.0

The requirements are **FULFILLED**.

Remarks: none

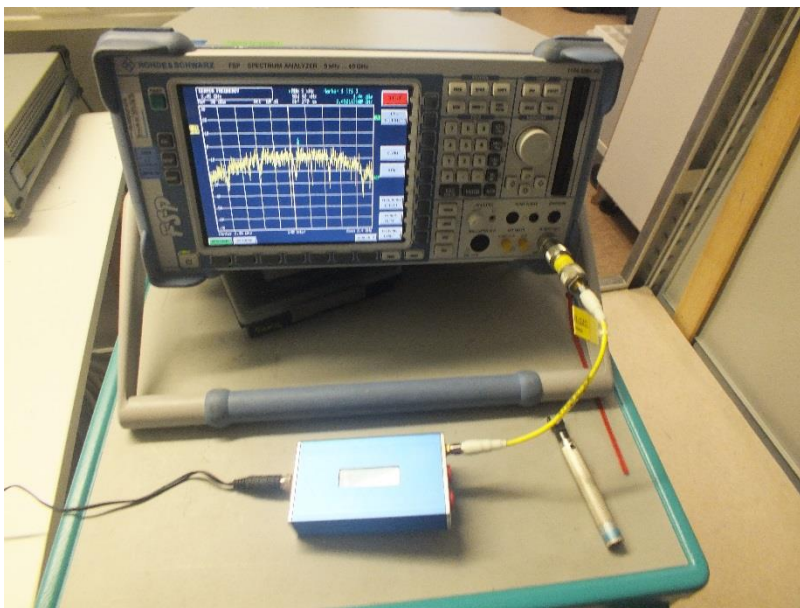
4.4 Power spectral density

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

4.4.1 Description of the test location

Test location: AREA4

4.4.2 Photo documentation of the test set-up



4.4.3 Applicable standard

According to FCC Part 15, Section 15.247 and RSS-247 5.2:

4.4.4 Description of Measurement

The measurement is performed using the procedure 10.2 set out in KDB-558074. The power measurement was done as peak power measurement. Therefore the PKPSD is measured. The max peak was located and with the spectrum analyser and a marker set to peak.

Spectrum analyser settings:

RBW: 3 kHz,

VBW: 10 kHz,

Detector: Peak,

Sweep time: Auto couple

4.4.5 Test result

Channel	Power spectral density measured (dBm)	Limit (dBm)
0 (2480 MHz)	1.3	8
1 (2405 MHz)	1.5	8
7 (2450 MHz)	1.4	8

Power spectral density limit according to FCC Part 15, Section 15.247 and RSS-247 5.2:

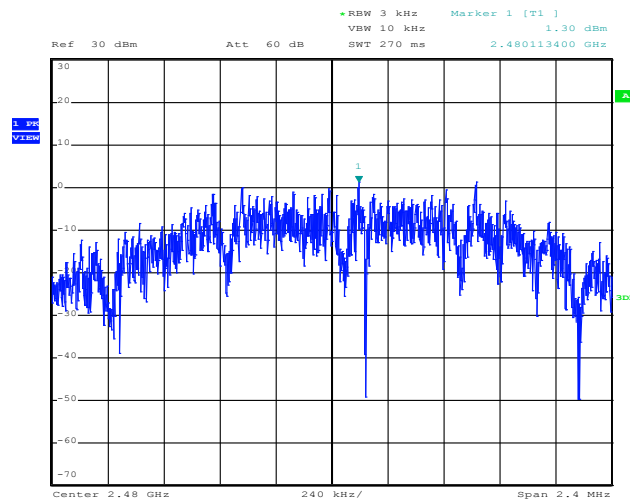
Frequency (MHz)	Power spectral density limit (dBm/3 kHz)
2400 - 2483.5	8

The requirements are **FULFILLED**.

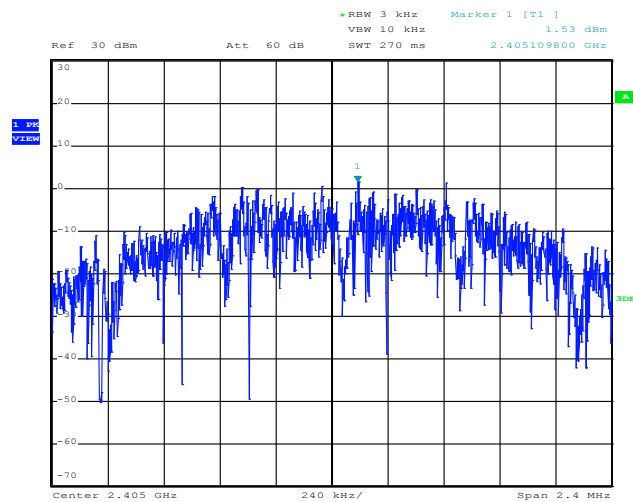
Remarks: none

4.4.6 Power spectral density plots

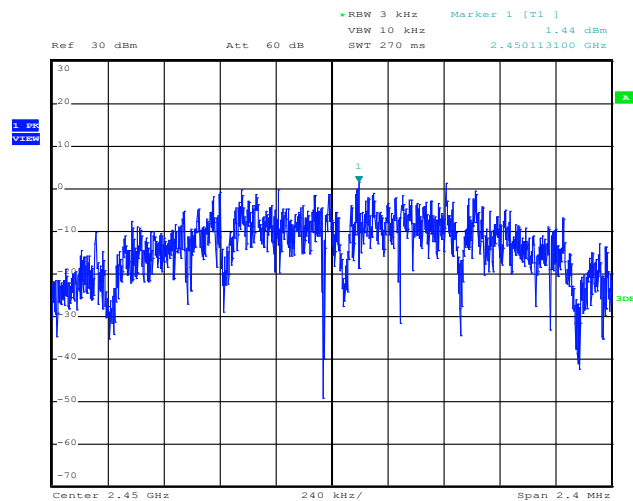
Channel 0 (2480 MHz)



Channel 1 (2405 MHz)



Channel 7 (2450 MHz)



4.6 Unwanted emissions

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

4.6.1 Description of the test location

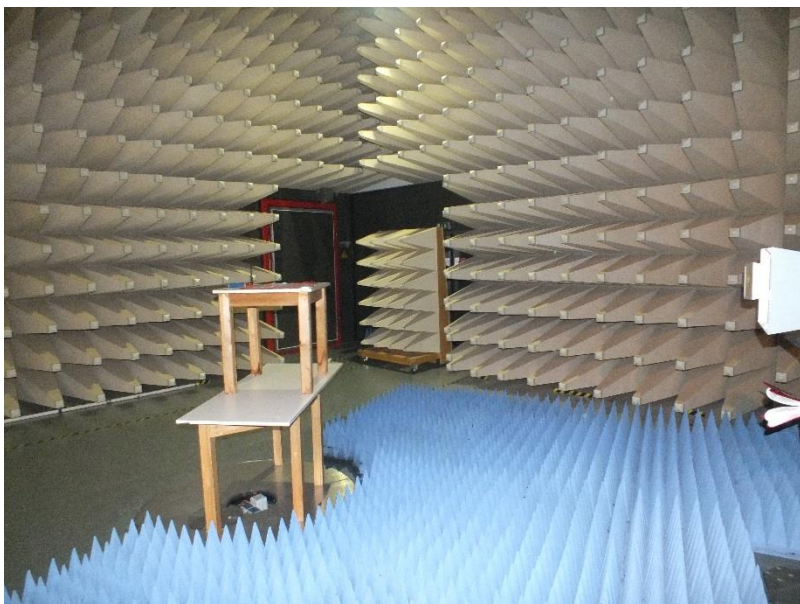
Test location: OATS 1

4.6.2 Photo documentation of the test set-up

Test setup 30 MHz – 1000 MHz:



Test setup >1 GHz:



4.6.3 Applicable standard

According to FCC Part 15, Section 15.209 and RSS-Gen 8.9:

4.6.4 Description of Measurement

The measurements are performed according the procedures set out in ANSI C63.10.

Spectrum analyser settings:

RBW: 1 MHz, VBW: 3 MHz, Detector: Max. peak, Trace: Max. hold, Sweep: Auto

4.6.1 Test result $f < 30$ MHz

Note: In the frequency range 9 kHz to 30 MHz no emission could be detected. The frequencies mention the noise level. The measurement results from distance 3 m are extrapolated (D factor) to the specified distance.

Frequency (MHz)	Reading PK dB(μ V)	D factor dB(μ V/m)	Level PK dB(μ V/m)	Limit AV dB(μ V/m)	Delta (dB)
0.047	52.0	-80.0	-28.0	34.2	-62.2
1.5	51.0	-40.0	11.0	24.1	-13.1
18.2	39.0	-40.0	-1.0	29.5	-30.5

4.6.2 Test result $f < 1$ GHz

Channel 0

Frequency (MHz)	Reading level QP dB μ V	Correction factor (dB/m)	Corrected level QP dB(μ V/m)	Limit dB(μ V/m)	Delta (dB)
127.26	11.5	13.6	25.1	43.5	-18.4
137.51	6.2	14.3	20.5	43.5	-23.0
211.36	16.5	12.3	28.8	43.5	-14.7
332.81	8.7	17.7	26.4	46.0	-19.6

Channel 1

Frequency (MHz)	Reading level QP dB μ V	Correction factor (dB/m)	Corrected level QP dB(μ V/m)	Limit dB(μ V/m)	Delta (dB)
127.26	11.7	13.6	25.3	43.5	-18.2
137.51	6.0	14.3	20.3	43.5	-23.2
211.36	16.5	12.3	28.8	43.5	-14.7
332.81	8.9	17.7	26.6	46.0	-19.4

Channel 7

Frequency (MHz)	Reading level QP (dB μ V)	Correction factor (dB/m)	Corrected level QP dB(μ V/m)	Limit dB(μ V/m)	Delta (dB)
127.26	11.0	13.6	24.6	43.5	-18.9
137.51	6.2	14.3	20.5	43.5	-23.0
211.36	16.4	12.3	28.7	43.5	-14.8
332.81	8.7	17.7	26.4	46.0	-19.6

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

4.6.3 Test result f > 1 GHz
Channel 0
PK results

Frequency (MHz)	Reading level PK (dB μ V)	Correction factor (dB)	Corrected level PK dB(μ V/m)	Limit PK dB(μ V/m)	Delta (dB)
1330,00	61,3	-19,8	41,5	74,0	-32,5
1918,00	62,1	-16,4	45,7	74,0	-28,3
4960,00	41,9	3,2	45,1	74,0	-28,9
7440,00	39,4	7,1	46,5	74,0	-27,5
9920,00	39,4	8,1	47,5	74,0	-26,5
12400,00	49,5	1,3	50,8	74,0	-23,2

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

Note: For frequencies were the PK value is below the average limit, no duty cycle correction was performed

Channel 1
PK results

Frequency (MHz)	Reading level PK (dB μ V)	Correction factor (dB)	Corrected level PK dB(μ V/m)	Limit PK dB(μ V/m)	Delta (dB)
1864,00	64,6	-17,0	47,6	74,0	-26,4
4810,00	44,9	2,7	47,5	74,0	-26,5
7215,00	39,1	7,2	46,3	74,0	-27,7
9620,00	38,0	7,6	45,6	74,0	-28,4

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

Note: For frequencies were the PK value is below the average limit, no duty cycle correction was performed

Channel 7
PK results

Frequency (MHz)	Reading level PK (dB μ V)	Correction factor (dB)	Corrected level PK dB(μ V/m)	Limit PK dB(μ V/m)	Delta (dB)
1324,00	57,2	-19,8	37,4	74,0	-36,6
1936,00	59,7	-16,2	43,5	74,0	-30,5
4896,00	41,7	2,9	44,5	74,0	-29,5
7344,00	38,2	7,0	45,2	74,0	-28,8
9808,00	39,0	8,0	47,1	74,0	-26,9

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

Note: For frequencies were the PK value is below the average limit no duty cycle correction was performed

Limit according to FCC Part 15C, Section 15.209 and RSS-Gen 8.9:

Frequency (MHz)	Limit ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.49	$2400/f(\text{kHz})$	300
0.49 - 1.705	$24000/f(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

The requirements are **FULFILLED**.

Remarks: The measurement was performed up to 25GHz.

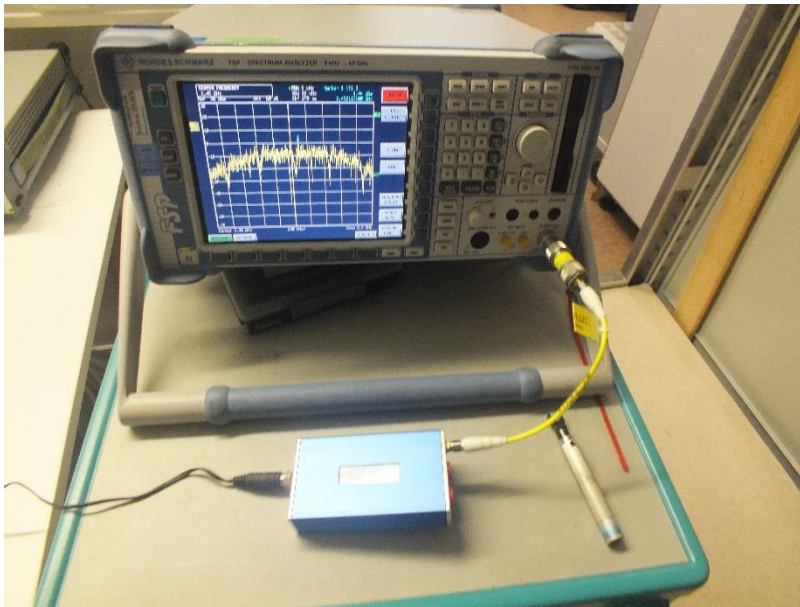
4.7 Correction for pulse operation (duty cycle)

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

4.7.1 Description of the test location

Test location: AREA4

4.7.2 Photo documentation of the test set-up



4.7.3 Applicable standard

According to FCC Part 15A, Section 15.35 and RSS-Gen 6.10:

When the radiated emission limits are expressed in terms of average value and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete puls train, including blanking intervals, as long as the pulse train does not exceed 0.1s. In cases where the puls train exceeds 0.1s, the measured field strength shall be determined from the average absolute voltage during a 0.1s interval during which the field strength is at its maximum. The exact method of calculating the average field strength shall be submitted.

4.7.4 Description of Measurement

The duty cycle correction factor (dB) is calculated applying the following formula:

$$\delta(\text{dB}) = 20 \log ((t_1 + t_2 + \dots + t_n) / T)$$

$\delta(\text{dB})$ duty cycle correction factor expressed in dB

t_1 duration of pulse 1 in the defined time period T

t_n duration of pulse n in the defined time period T

T period of one complete puls train or 100ms if the complete puls train is longer 100ms

4.7.5 Test result

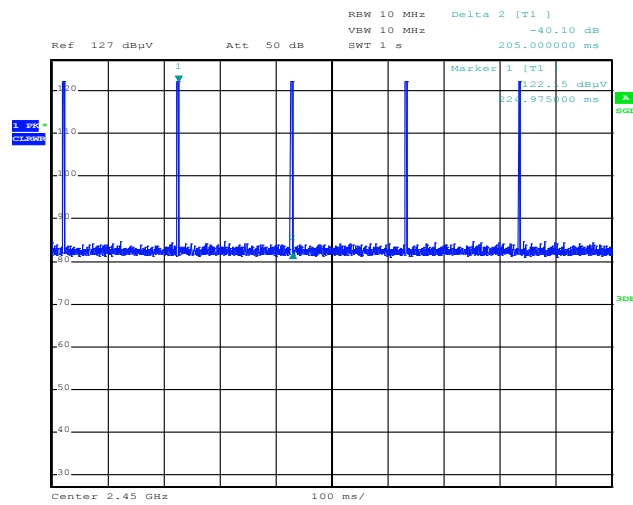
t_1 [ms]	t_2 [ms]	t_3 [ms]	t_4 [ms]	T [ms]
2.92	--	--	--	100

RESULT $\delta(\text{dB}) = -30.6$

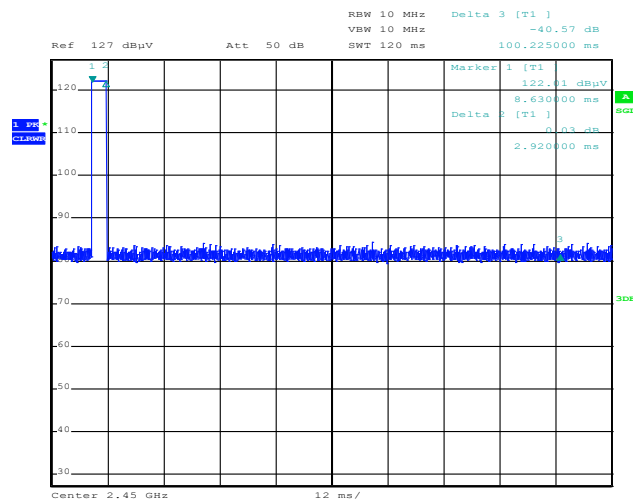
Remarks: Maximum possible duty cycle used for calculation.

4.7.6 Test protocol

Determination of $T = 205\text{ms}$ (due to 100ms maximum 100ms are used)



Determination of $t_1 = 2.92\text{ms}$



5 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	ESHS 30	02-02/03-05-002	17/07/2016	17/07/2015		
	ESH 2 - Z 5	02-02/20-05-004	26/10/2017	26/10/2015	21/01/2016	21/07/2015
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2 6430	02-02/50-05-155 02-02/50-13-014	06/11/2016	06/11/2015	06/05/2016	06/11/2015
CPC 3	NRVS	02-02/07-06-003				
	NRV-Z15	02-02/07-07-001	17/07/2016	17/07/2015		
MB	FSP 40	02-02/11-11-001	28/10/2016	28/10/2015		
	KMS102-0.2 m	02-02/50-11-020				
SER 1	FMZB 1516	01-02/24-01-018			19/01/2016	19/01/2015
	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				
SER 2	ESVS 30	02-02/03-05-003	09/07/2016	09/07/2015		
	VULB 9168	02-02/24-05-005	17/04/2016	17/04/2015	29/02/2016	31/08/2015
	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	28/10/2016	28/10/2015		
	JS4-18004000-30-5A	02-02/17-05-017				
	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 3117	02-02/17-13-003 02-02/24-05-009	12/05/2016	12/05/2015		
	BBHA 9170	02-02/24-05-014	02/06/2018	02/06/2015	02/06/2016	02/06/2015
	Sucoflex N-2000-SMA	02-02/50-05-075				
	KMS102-0.2 m	02-02/50-11-020				
	SF104/11N/11N/1500MM	02-02/50-13-015				