

EMI – TEST REPORT

- FCC Part 15.249, RSS210 -

Type / Model Name : PR 30-HVSG A12 (02)

Product Description : Rotating Laser

Applicant : Hilti AG

Address : Feldkircherstrasse 100

9494 SCHAAN, LIECHTENSTEIN

Manufacturer : HILLOS GmbH

Address : Prüssingstraße 41

07745 JENA, GERMANY

Licence holder : Hilti AG

Address : Feldkircherstrasse 100

9494 SCHAAN, LIECHTENSTEIN

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

POSITIVE

Test Report No. : T43200-00-00WP

25. September 2017

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.

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ATTACHMENT A as separate supplement

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (September, 2016)

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

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2016)

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 15.207	Conducted limits
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

ANSI C63.4: 2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
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ANSI C63.10: 2013	Testing Unlicensed Wireless Devices
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ANSI C95.1: 2005	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
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CISPR 16-4-2: 2013	Uncertainty in EMC measurement
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CISPR 22: 2008 EN 55022: 2010	Information technology equipment
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2 EQUIPMENT UNDER TEST

2.1 Photo documentation of the EuT – Detailed photos see attachment A

2.2 General Remarks

According to the customers modification a re-test of the EuT was performed to show further compliance. The EuT is tested and compliant according CFR 47, Part 15.249, FCC ID: SDL-PR3XR01 with the Test Report No. T33893-01-02HS, 2010-08-02 and RSS 210, IC ID: 5228A-PR3XR01 with the Test Report No. T33893-01-03HS, 2010-08-03 by **mikes testing partners GmbH**. The EuT is re-tested and compliant according CFR 47, Part 15.249, FCC ID: SDL - PR3XR02 and IC ID: 5228A – PR3XR02 within the Test Report No. T36776-01-01TK, 2013-07-05 by **mikes testing partners GmbH** and Test Report No. T39470-00-01TK, 2015-07-14 and T40621-00-01TK, 2016-08-01 by **CSA Group Bayern GmbH**.

The EuT is modified in the laser section and now uses a green laser beam instead of the red one. Also, the keyboard of the EuT has been modified. It has 2 LED's less than the previous version, and one key function is different.

This Test Report shows the further compliance with CFR 47, Part 15.249 by re-measurement of the most concerned tests to the RF part.

- field strength of fundamental
- out-of-band emission, radiated (30 MHz – 18 GHz)

2.3 Equipment category

WPAN Zigbee device, portable equipment.

2.4 Short description of the equipment under test (EuT)

The EuT is a rotating laser alignment system and is equipped with an RF transceiver operating within the frequency range from 2.4 GHz up to 2.4835 GHz making available to the user to control the whole alignment system remotely. The RF section is not modified.

Number of tested samples : 1
Serial number : 233150028

2.5 Variants of the EuT

None

2.6 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel plan:

Channels	Frequency
1	2405
2	2440
3	2480

Note: the marked frequencies are determined for final testing.

2.7 Transmit operating modes

The EuT use GFSK and provide following data rate:
250 kbps (kbps = kilobits per second)

2.8 Antenna

The following antennas shall be used with the EuT:

Number	Characteristic	Model number	Plug	Frequency range (MHz)
1	F-type PCB-antenna	-	-	2400 -2483.5

Note: The EuT uses a PCB antenna. Due to the absence of an antenna connector no temporary antenna can be connected.

2.9 Power supply system utilised

Power supply voltage, V_{nom} : 12 VDC Lithium accumulator battery
Power supply voltage (alternative) : none

2.10 Peripheral devices and interface cables

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

- Power supply battery Model : B 12 / 2.6 Li-Ion
- Radio remote control Model : PRA 30G (02)
- - Model : -

2.11 Determination of worst case conditions for final measurement

Measurements have been made in all three orthogonal axes and the settings of the EuT were changed to locate at which position and at what setting of the EuT produce the maximum of the emissions.

2.11.1 Test jig

No test jig was used.

2.11.2 Test software

No special test software was used.

3 TEST RESULT SUMMARY

Operating in the 2400 MHz – 2483.5 MHz band:

FCC Rule Part	RSS Rule Part	Description	Result
15.35(c)	RSS-Gen, 6.10	Pulsed operation	passed
15.203	RSS Gen, 8.3	Antenna requirement	not tested
15.204	RSS Gen, 8.2	External radio frequency power amplifiers	not tested
15.205(a)	RSS Gen, 8.1	Emissions in restricted bands	not tested
15.207(a)	RSS Gen, 8.8	AC power line conducted emissions	not tested
15.215(c)	-	EBW	not tested
-	RSS-Gen, 6.6	OBW	not tested
15.249(a)	RSS-210, B10(a)	Field strength of fundamental	passed
15.249(d)	RSS-210, B10(b)	Out-of-band emission, radiated	passed
-	RSS-Gen, 6.11	Transmitter frequency stability	not applicable

The mentioned RSS Rule Parts in the above table are related to:

RSS Gen, Issue 4, November 2014

RSS 210, Issue 9, August 2016

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 : 28 August 2017

Testing concluded on : 29 August 2017

Checked by:

Tested by:

Klaus Gegenfurtner
Teamleader Radio

Willibald Probst
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

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

4.2 Environmental conditions

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

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level	Calculated Uncertainty
AC power line conducted emissions	0.15 MHz to 30 MHz	95%	$\pm 3.29 \text{ dB}$
EBW and OBW	2400 MHz to 3000 MHz	95%	$\pm 2.5 \times 10^{-7}$
Maximum peak conducted output power	2400 MHz to 3000 MHz	95%	$\pm 0.62 \text{ dB}$
Power spectral density	2400 MHz to 3000 MHz	95%	$\pm 0.62 \text{ dB}$
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	$\pm 2.15 \text{ dB}$
Conducted Spurious Emissions	10000 MHz to 40000 MHz	95%	$\pm 3.47 \text{ dB}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	$\pm 3.53 \text{ dB}$
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	$\pm 3.71 \text{ dB}$
Radiated Spurious Emissions	1000 MHz to 10000 MHz	95%	$\pm 2.34 \text{ dB}$
Field strength of the fundamental	100 kHz to 100 MHz	95%	$\pm 3.53 \text{ dB}$

4.1 Measurement protocol for FCC and ISED

4.1.1 Test methodology

The Open Area test site is a listed Open Site under the Canadian Test-Sites File-No:

IC 3009A-1

The Anechoic chamber is a listed test site under the Canadian Test-Sites File-No:

IC 3009A-2

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.

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.

4.1.2.1 General Standard information

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.

4.1.2.1.1 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 C63.10. 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

4.1.2.1.2 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, 1.5 metre 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 C63.10. 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 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 CONDITIONS AND RESULTS

5.1 AC power line conducted emissions

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

5.1.1 Description of the test location

Test location: NONE

Remarks: Not applicable, the EuT is battery powered and has no externally connectable cables.

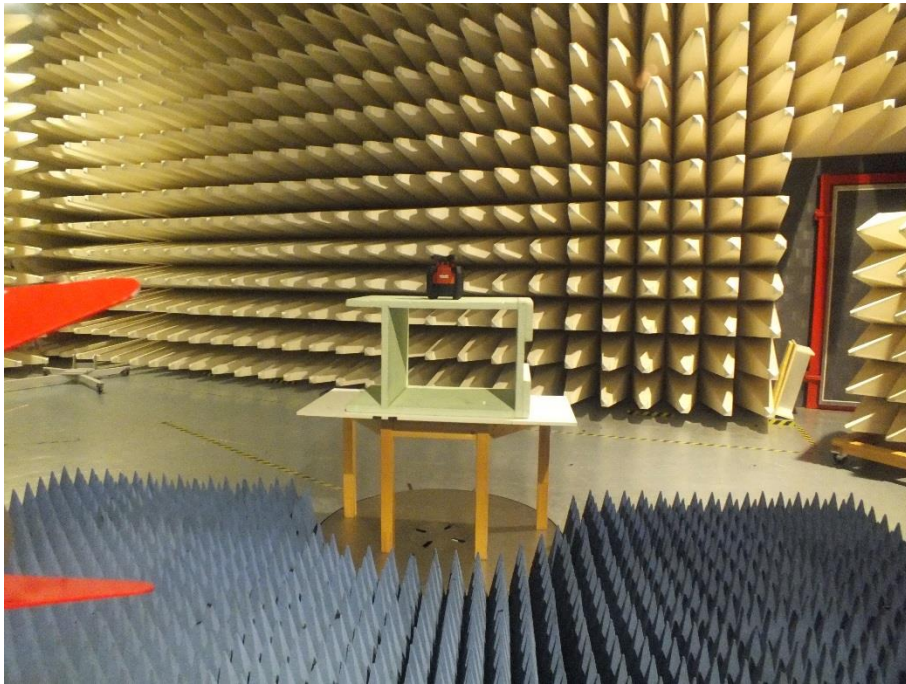
Field strength of fundamental

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

5.2.1 Description of the test location

Test location: Anechoic chamber 1
Test distance: 3 m

5.2.2 Photo documentation of the test set-up



5.2.1 Applicable standard

According to FCC Part 15C, Section 15.249(a):

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the effective limits.

5.2.2 Description of Measurement

The radiated emission of the fundamental wave from the EuT is measured using a spectrum analyser and appropriate linear polarized antennas. The set up of the EuT and the measurement procedure is in accordance to ANSI C63.10, Item 6.5. The EuT is measured in TX continuous mode unmodulated under normal conditions.

Analyser settings:

Peak measurement: RBW: 1 MHz
AV measurement: RBW: 1 MHz

VBW: 1 MHz
VBW: 10 Hz

Detector: Max peak
Detector: Max peak

5.2.3 Test result

Frequency	Reading level PK	Bandwidth	Correction factor	Corrected level PK	Limit PK	Duty cycle correction factor K_E	Corrected level AV	Limit AV
(MHz)	(dB μ V)	(kHz)	(dB)	dB(μ V/m)	dB(μ V/m)	(dB)	dB(μ V/m)	dB(μ V/m)
2405	114.8	1000	-14.6	100.2	114	-30.8	69.4	94
2440	114.6	1000	-14.4	100.2	114	-30.8	69.4	94
2480	112.8	1000	-14.0	98.8	114	-30.8	68.0	94
Measurement uncertainty				± 2.34 dB				

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

Average-Limit according to FCC Part 15C, Section 15.249(a):

Frequency	Field strength of fundamental	
(MHz)	(mV/m)	dB(μ V/m)
902 - 928	50	94
2400 - 2483.5	50	94
5725-5875	50	94
24000 - 24250	250	108

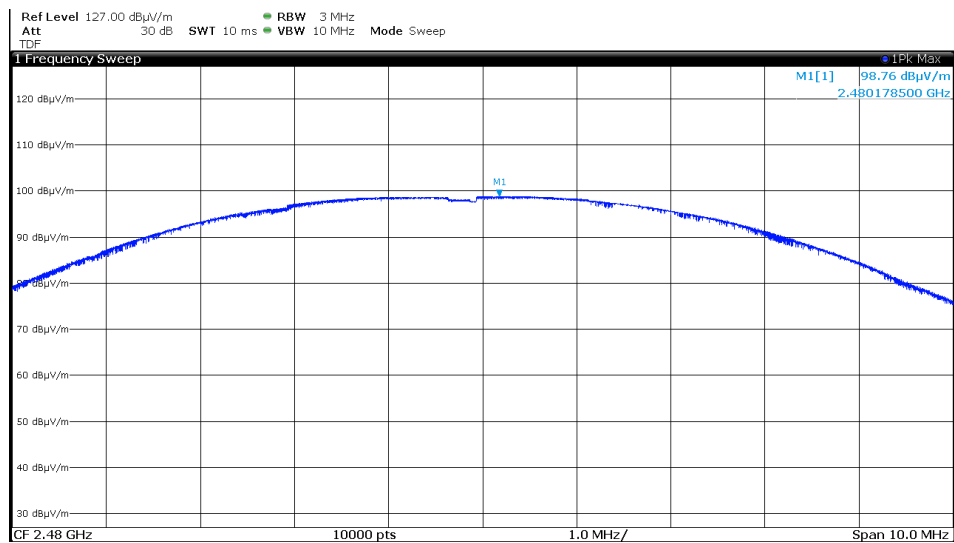
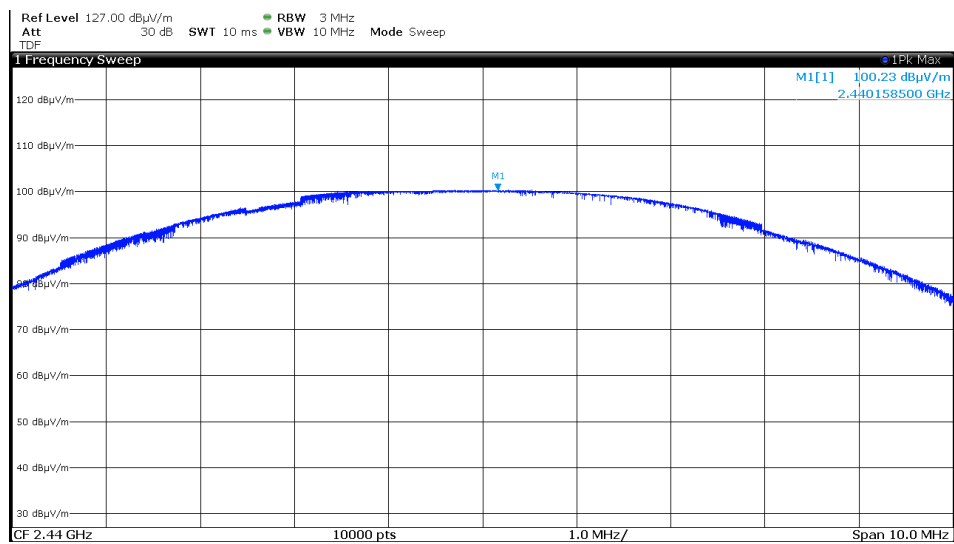
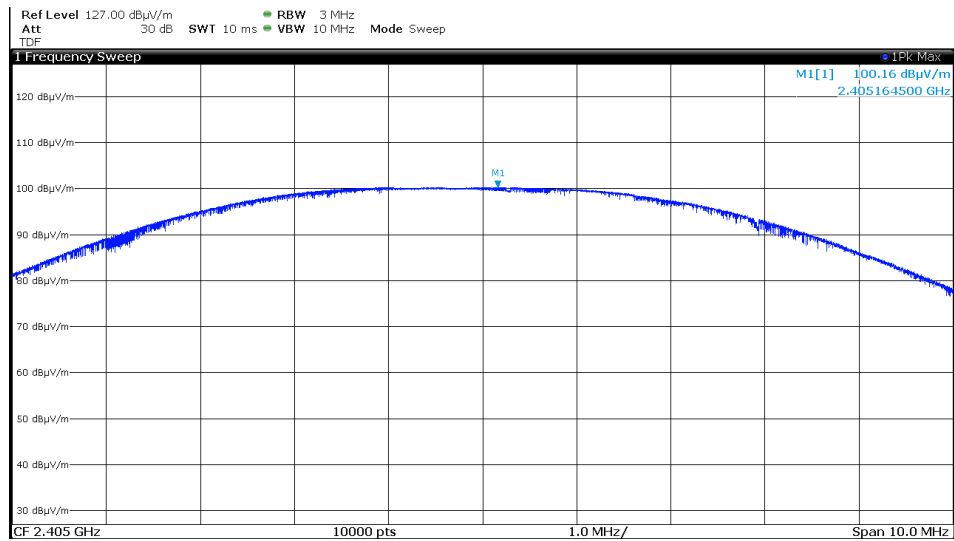
Peak-Limit according to FCC Part 15C, Section 15.249(e):

However the peak fieldstrength shall not exceed the maximum permitted average limit by more than 20 dB.

The requirements are **FULFILLED**.

Remarks:

5.2.4 Test protocols



5.3 Out-of-band emission, radiated

For test instruments and accessories used see section 6 Part **SER1**, **SER 2**, **SER 3**.

5.3.1 Description of the test location

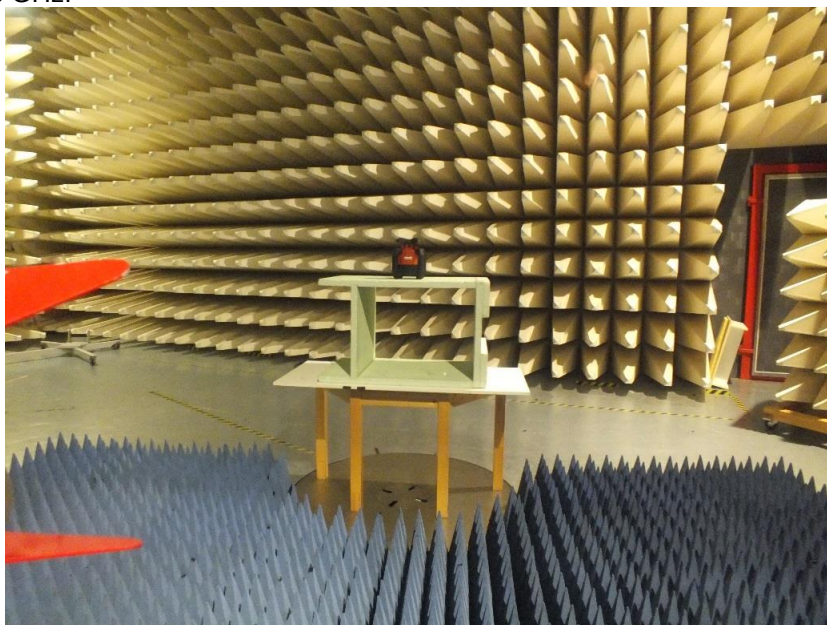
Test location: OATS 1
Test location: Anechoic chamber 1
Test distance: 3 m

5.3.2 Photo documentation of the test set-up

Test setup 30 MHz – 1000 MHz:



Test setup 1 GHz – 18 GHz:



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.249 (d):

Emission radiated outside of the specified frequency bands, except harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limit in FCC Part 15C, Section 15.209, whichever is the lesser attenuation.

5.3.4 Description of Measurement

The radiated emissions from the EuT are measured in the frequency range of 9 kHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. The setup of the EuT and the measurement procedure is in accordance to ANSI C63.10, Item 6.3. In the frequency range above 1 GHz a spectrum analyser is used with appropriate linear polarized antennas. If the emission level in peak mode complies with the average limit testing is stopped and peak values will be reported, otherwise, the emission is measured in average mode again and reported. The EuT is measured in TX continuous mode unmodulated under normal conditions.

Note:

According to section 2.2 of the present document the measurements in the frequency ranges from 9 kHz to 30 MHz and 18 GHz to 25 GHz were not performed because within these frequency ranges no emissions could be detected within former tests.

Instrument settings:

30 MHz – 1000 MHz:	RBW:	120 kHz
1000 MHz – 25 GHz	RBW:	1 MHz

5.3.5 Test result f 30 - 1000 MHz

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)
63.70	1.5	8.9	14.5	13.6	16.0	22.5	40.0	-17.5
79.72	2.3	3.9	11.2	10.9	13.5	14.8	40.0	-25.2
111.60	5.2	2.2	10.9	11.7	16.1	13.9	43.5	-27.4
216.02	3.4	6.8	12.1	12.6	15.5	19.4	46.0	-26.6

5.3.6 Test result f 1 GHz – 18 GHz
Channel 1

Test conditions:								
active communication			Test results					
Start frequency (MHz)	Stop frequency (MHz)	RBW (kHz)	Maximum emission		AV Limit (dBµV/m)	Duty cycle correction (dB)	Margin (dB)	Detector
			(MHz)	(dBµV/m)				
1000	2400	1000	2400	67.5	54.0	-30.8	-17.3	PK
2483.5	4000	1000	3974	41.7	54.0	0.0	-12.3	PK
4000	6000	1000	4810	49.3	54.0	0.0	-4.7	PK
6000	12000	1000	11961	48.5	54.0	0.0	-5.5	PK
12000	18000	1000	16709	52.0	54.0	0.0	-2.0	PK
Measurement uncertainty				±6 dB				

Channel 2

Test conditions:								
active communication			Test results					
Start frequency (MHz)	Stop frequency (MHz)	RBW (kHz)	Maximum emission		AV Limit (dBµV/m)	Duty cycle correction (dB)	Margin (dB)	Detector
			(MHz)	(dBµV/m)				
1000	2400	1000	2398	45.0	54.0	0.0	-9.0	PK
2483.5	4000	1000	2494	43.3	54.0	0.0	-10.7	PK
4000	6000	1000	4879	49.1	54.0	0.0	-4.9	PK
6000	12000	1000	11953	49.0	54.0	0.0	-5.0	PK
12000	18000	1000	17956	52.5	54.0	0.0	-1.5	PK
Measurement uncertainty				±6 dB				

Channel 3

Test conditions:								
active communication			Test results					
Start frequency (MHz)	Stop frequency (MHz)	RBW (kHz)	Maximum emission		AV Limit (dBµV/m)	Duty cycle correction (dB)	Margin (dB)	Detector
			(MHz)	(dBµV/m)				
1000	2400	1000	2053	40.3	54.0	0.0	-13.7	PK
2483.5	4000	1000	2484	59.4	54.0	-30.8	-25.5	PK
4000	6000	1000	4959	47.2	54.0	0.0	-6.8	PK
6000	12000	1000	11947	49.1	54.0	0.0	-4.9	PK
12000	18000	1000	17965	52.0	54.0	0.0	-2.0	PK
Measurement uncertainty				±6 dB				

Limit according to FCC Part 15C, Section 15.209:

Frequency (MHz)	15.209 Limits ($\mu\text{V/m}$)	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

Average limit according to FCC Part 15C, Section 15.249(a):

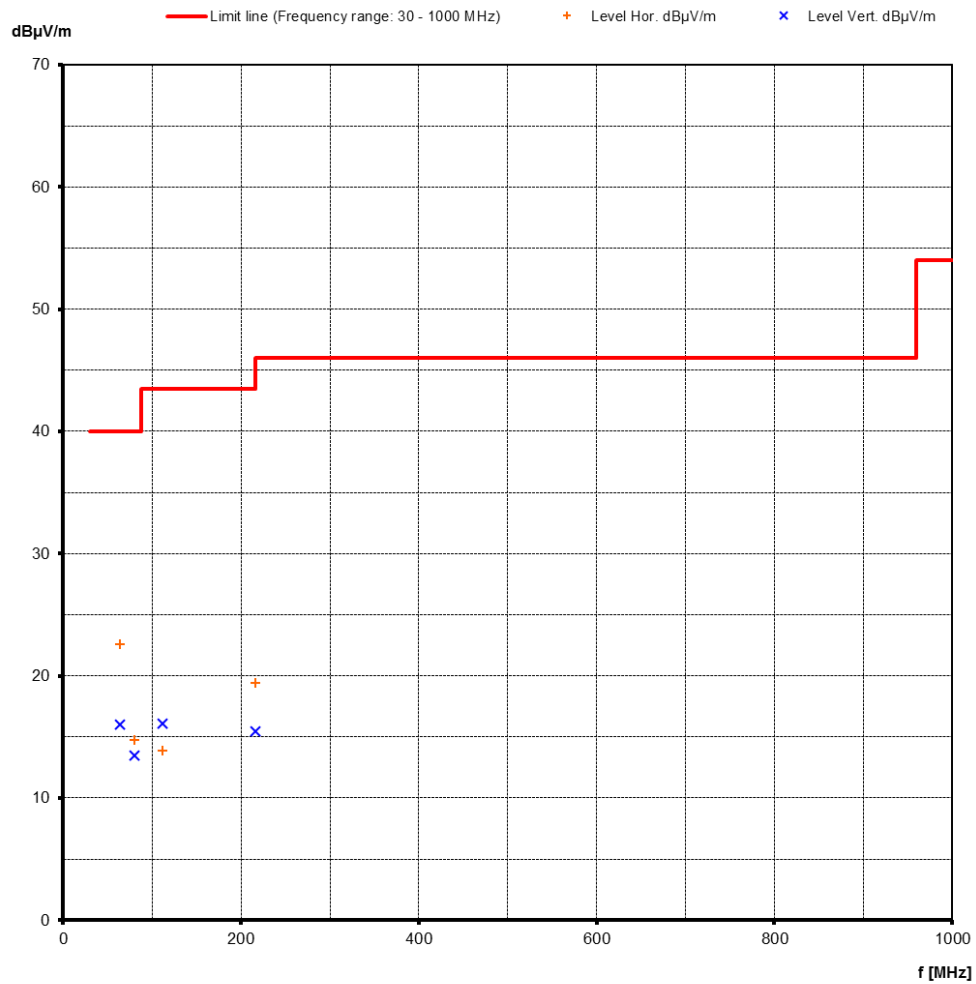
Fundamental frequency (MHz)	Field strength of harmonics	
	($\mu\text{V/m}$)	$\text{dB}(\mu\text{V/m})$
902 - 928	500	54
2400 - 2483.5	500	54
5725 - 5875	500	54
24000 - 24250	2500	68

The requirements are **FULFILLED**.

Remarks:

For detailed test results please refer the following test protocols.

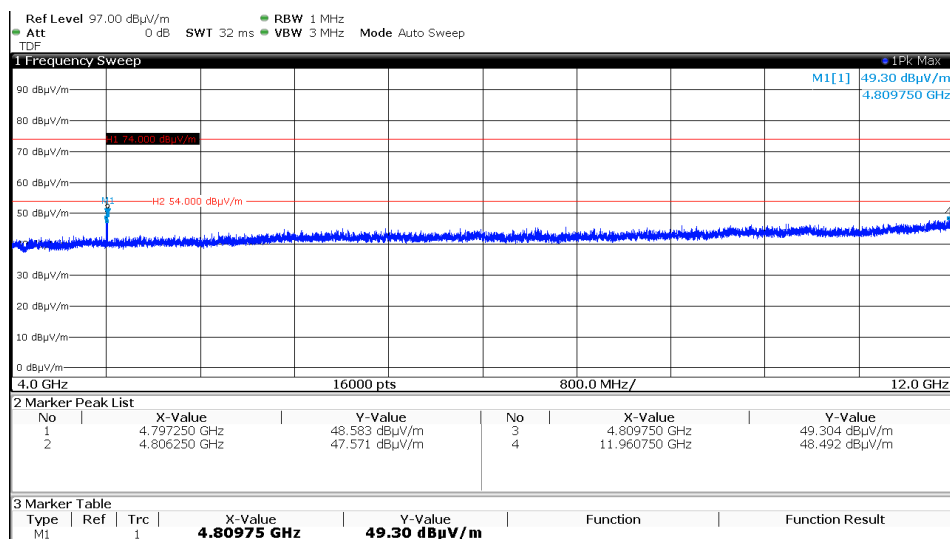
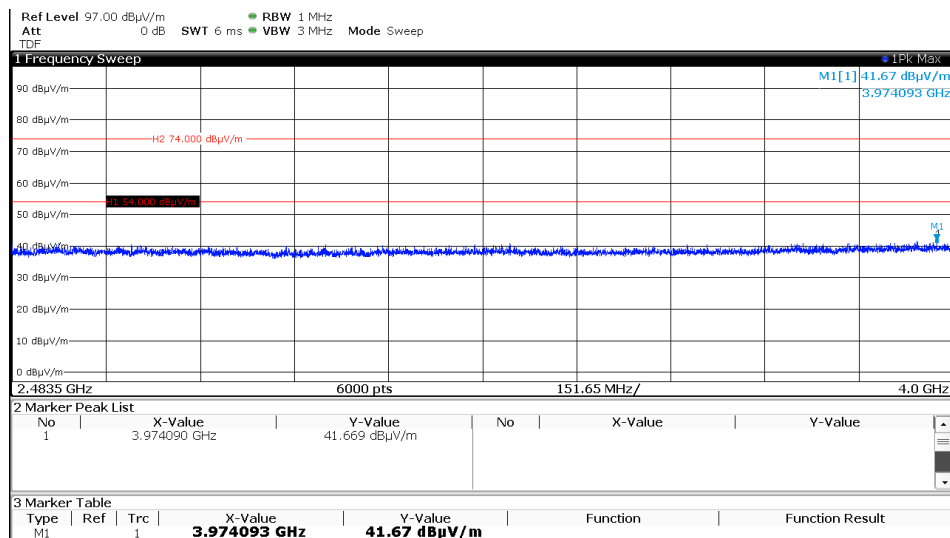
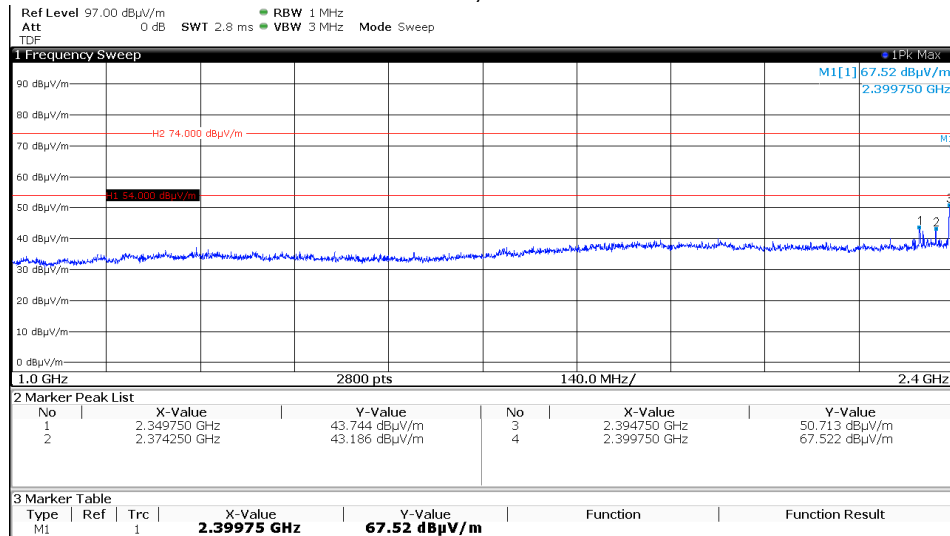
5.3.7 Test protocols



FCC ID: SDL – PR3XR02

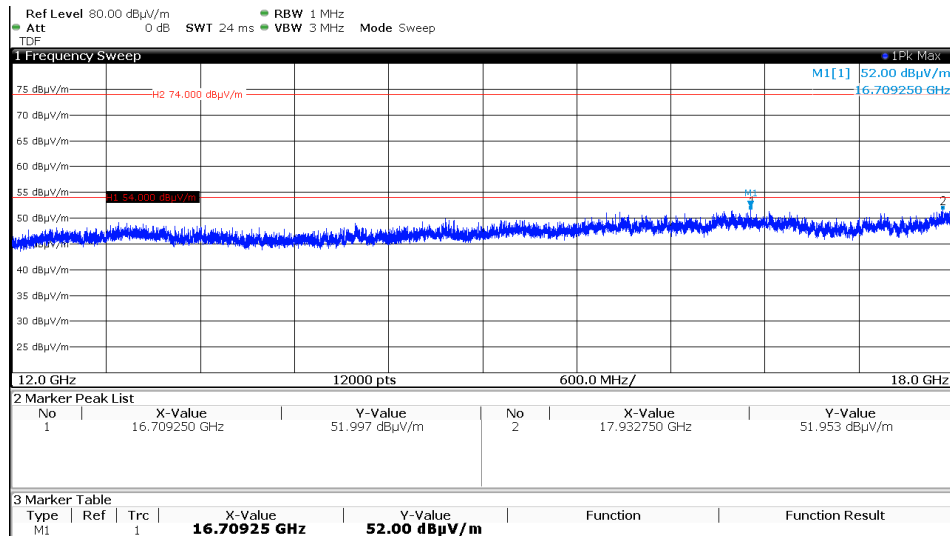
IC: 5228A – PR3XR02

Channel 1, 2405 MHz

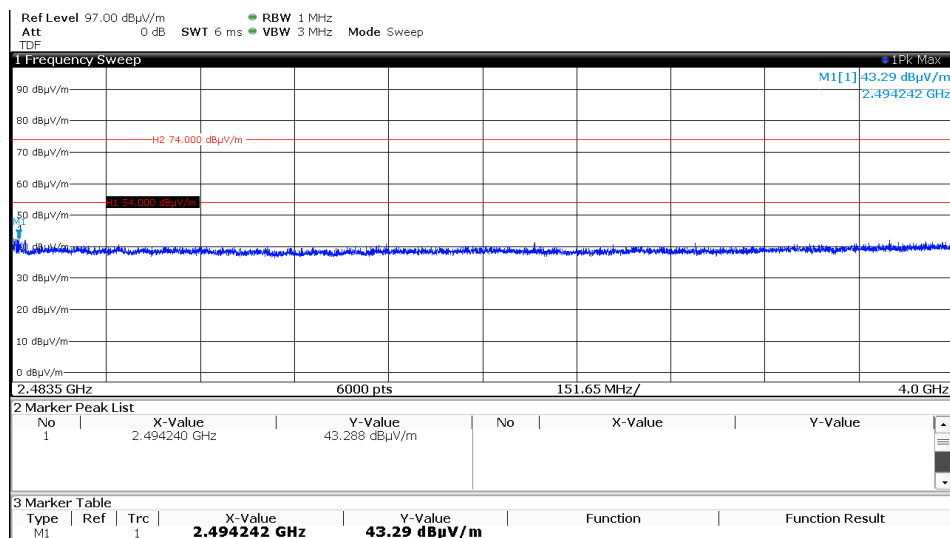
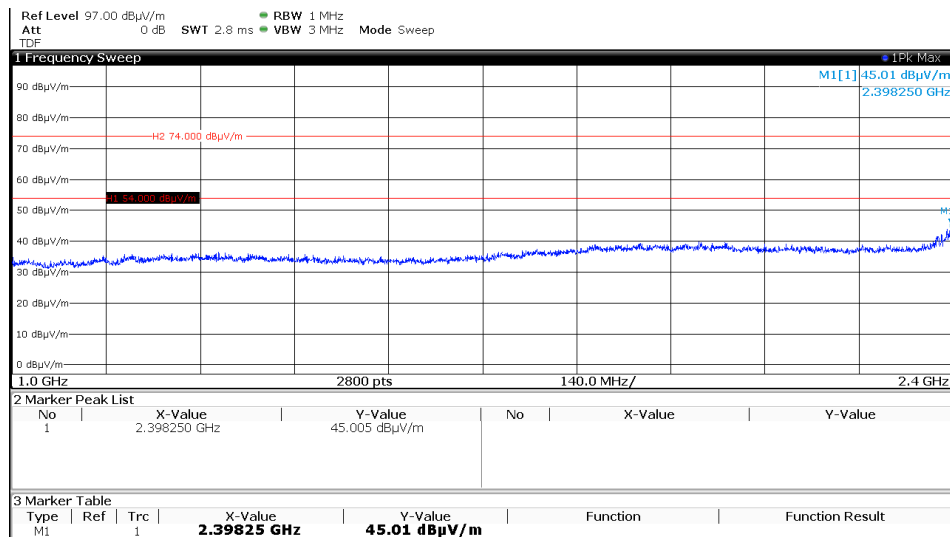


FCC ID: SDL – PR3XR02

IC: 5228A – PR3XR02

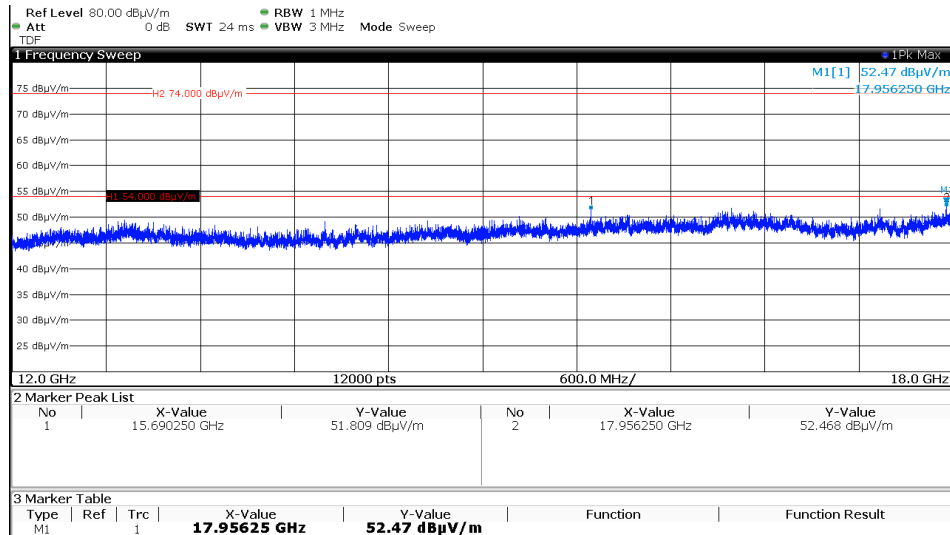
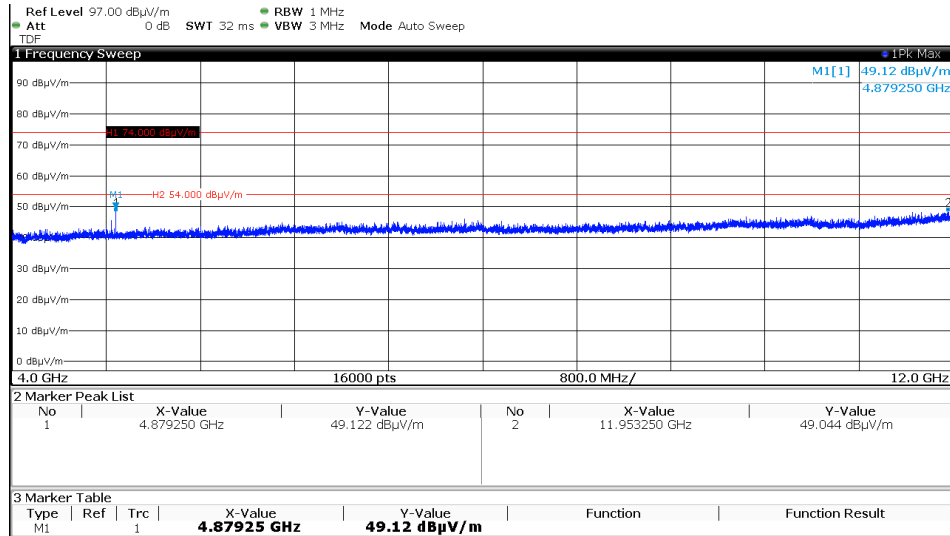


Channel 2, 2440 MHz

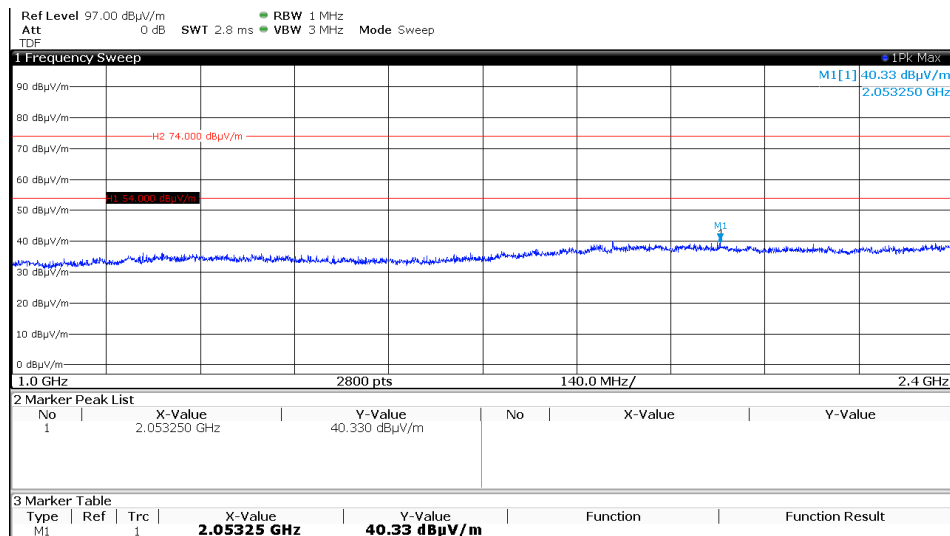


FCC ID: SDL – PR3XR02

IC: 5228A – PR3XR02

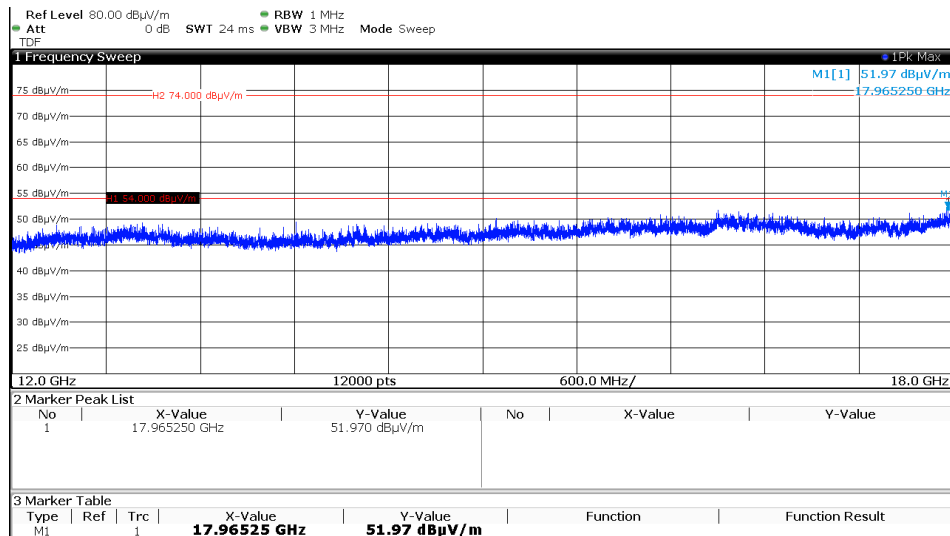
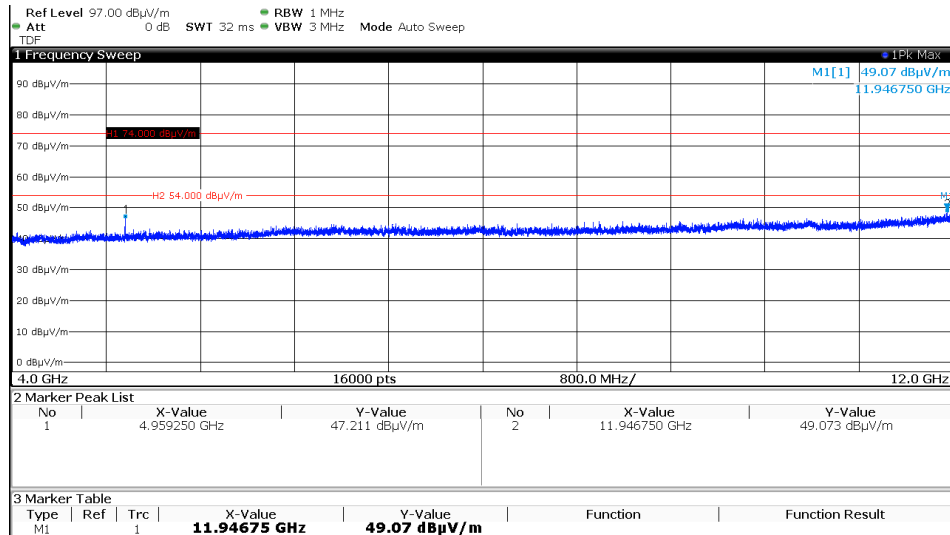
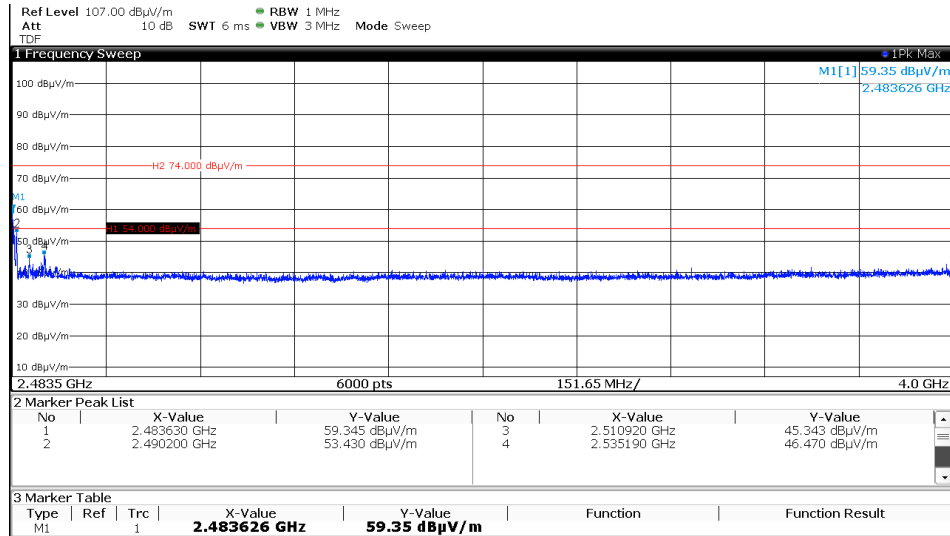


Channel 3, 2480 MHz



FCC ID: SDL – PR3XR02

IC: 5228A – PR3XR02



5.4 EBW and OBW

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

5.4.1 Description of the test location

Test location: NONE

Remarks: Not tested, because the RF section was not modified.

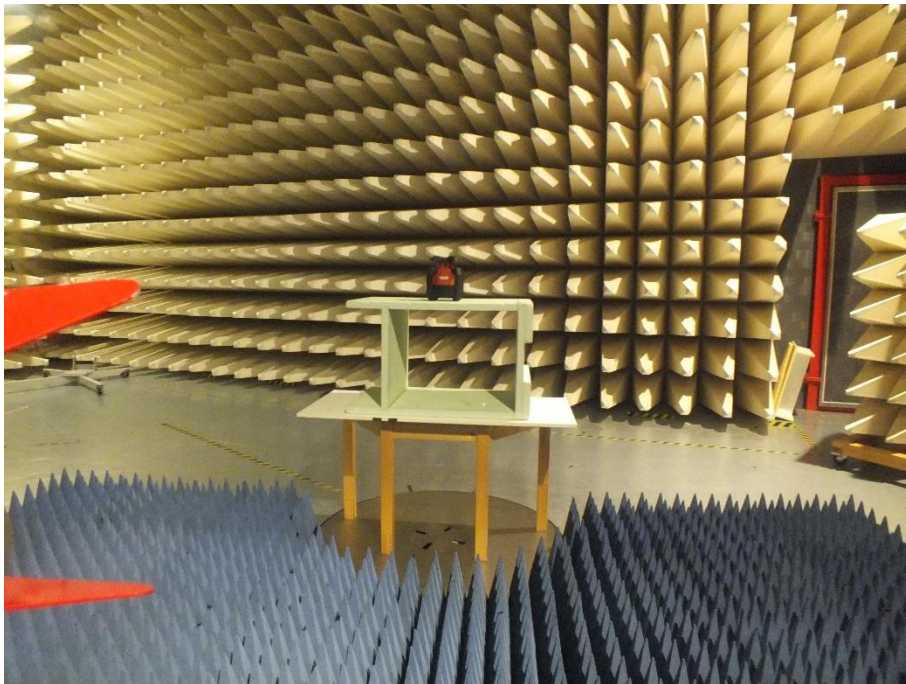
5.5 Correction for pulse operation (duty cycle)

For test instruments and accessories used see section 6 Part CPR1.

5.5.1 Description of the test location

Test location: Anechoic chamber 1
Test distance: 3 m

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15A, Section 15.35(c):

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 pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1s. In cases where the pulse 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.

5.5.4 Description of Measurement

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

$$KE = 20 \log \left((t_{iw}/T_w) * (t_{iB}/T_B) \right)$$

KE: pulse operation correction factor
t_{iw}: pulse duration for one complete pulse track
t_{iB}: pulse duration for one pulse
T_w: a period of the pulse track
T_B: a period of one pulse

5.5.5 Test result

t_{iw} (ms)	T_w (ms)	t_{iB} (ms)	T_B (ms)	K_E (dB)
100	100	2.86	100	-30.8

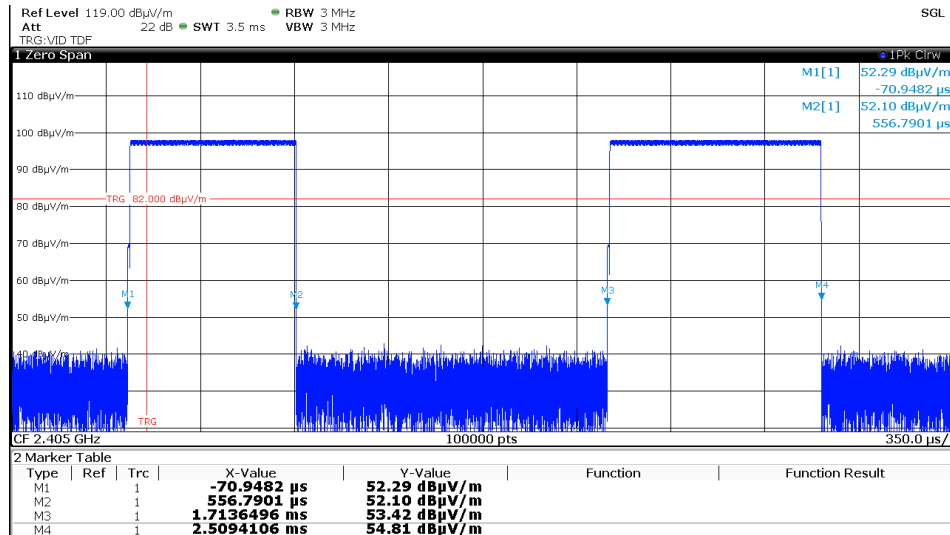
Remarks: The pulse train (T_w) exceeds 100 ms, therefore the duty cycle have been calculated by averaging the sum of the pulse widths over the 100 ms width with the highest average value.

For detailed results, please see the test protocol below.

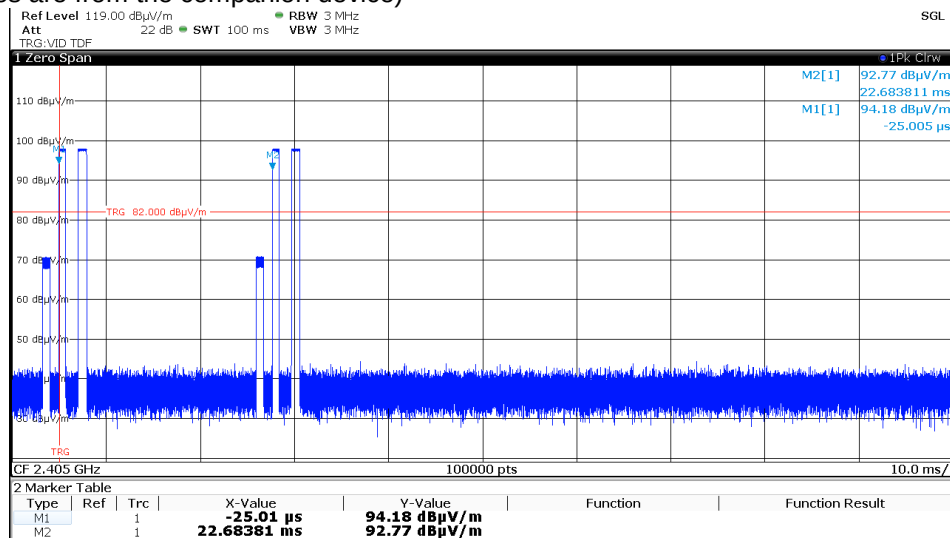
5.5.6 Test protocol

Correction for Pulse Operation (Duty Cycle) FCC Part 15A, Section 15.35(c)

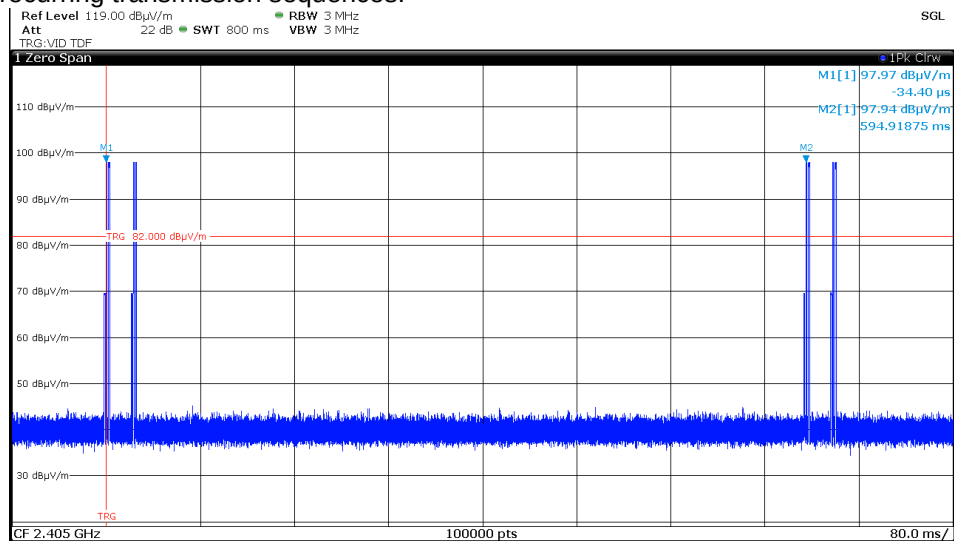
Single pulse train:



2 separate single pulses in a 100ms observation interval:
(the smaller pulses are from the companion device)



interval between recurring transmission sequences:



5.6 Antenna application

5.6.1 Applicable standard

According to FCC Part 15C, Section 15.203(a):

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

Remarks: Not applicable, because the RF section was not modified.

6 USED TEST EQUIPMENT AND ACCESSORIES

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

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
CPR 3	FSW43	02-02/11-15-001	07/04/2018	07/04/2017		
	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	10/05/2018	10/05/2017			
	Sucoflex N-2000-SMA	02-02/50-05-075				
	SF104/11N/11N/1500MM	02-02/50-13-015				
SER 2	ESVS 30	02-02/03-05-006	03/07/2018	03/07/2017		
	VULB 9168	02-02/24-05-005	12/04/2018	12/04/2017	12/10/2017	12/04/2017
	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	FSW43	02-02/11-15-001	07/04/2018	07/04/2017		
	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	10/05/2018	10/05/2017			
	Sucoflex N-2000-SMA	02-02/50-05-075				
	WHK 3.0/18G-10EF	02-02/50-05-180				
	SF104/11N/11N/1500MM	02-02/50-13-015				