DEKRA Testing and Certification, S.A.U.
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DEKRA

ilac-MRA ENAC ENSAYOS Nº 51/LE147

Test report No:

NIE: 60085RRF.003

Partial test report

USA FCC Part 15.209, 15.225,15.247
CANADA RSS-Gen, RSS-210, RSS-247

USA FCC Part 15 - Radio Frequency Devices: 15.209 Radiated emission limits; general requirements. 15.225 Operation within the band 13.110-14.010 MHz. 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. CANADA - Radio Standards Specifications:
RSS-Gen General Requirements for Compliance of Radio Apparatus.
RSS-210 Licence-Exempt Radio Apparatus: Category I Equipment.
RSS-247 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

(*) Identification of item tested	Industrial HMI controller for weaving machine
(*) Trademark	PICANOL
(*) Model and/or type reference	PD15
Other identification of the product	Hardware version: BE322130.04 Software version: 19083.0.0.2 FCC ID: 2ATV5-PD15; IC: 25229-PD15
(*) Features	Wifi; Bluetooth 4.0, NFC
Applicant	PICANOL N.V. Steverlyncklaan 15. 8900 Ieper, Belgium
Test method requested, standard	USA FCC Part 15.209 (10-1-18 Edition): Radiated emission limits; general requirements. USA FCC Part 15.225 (10-1-18 Edition): Operation within the band 13.110 -14.010 MHz. USA FCC Part 15.247 (10-1-18 Edition): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. CANADA RSS-Gen Issue 5 (April 2018). CANADA RSS-210 Issue 9 (August 2016). CANADA RSS-247 Issue 2 (February 2017). Transmitter out of band radiated emissions with simultaneous transmissions. Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05 dated August 2, 2019. Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013 ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager RAFAEL LÓPEZ MARTÍN 2020.01.13 16:01:16 +01'00'
Date of issue	2020-01-13
Report template No	FDT08_22 (*) "Data provided by the client"

Index

Competences and guarantees 3
General conditions 3
Uncertainty 3
Data provided by the client 3
Usage of samples 4
Test sample description 4
Identification of the client 5
Testing period and place 6
Document history 6
Environmental conditions 6
Remarks and comments 7
Testing verdicts 8
Summary 8
Appendix A: Test results 9

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample consists of an industrial HMI for Picanol weaving machinery, contains:

   - Wifi + BT combo module (Redpine RS9113-NB0-S1N; RF module and antenna integrated)
   - NFC: SOC with antenna glued on PD15 housing
   - 2 internal USB's for future dongles
   - 2 external USB's for data sticks
   - Communication cable based on ethernet for single communication with the machine
   - 26Vdc SELV supply

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
60085B/025	Industrial HMI controller for weaving machine	PD15	PS1911 980471	2019/10/07

Auxiliary elements used with sample S/01:

Control Nº	Description	Model	Serial Nº	Date of reception
60085B/030	NFC card	---	---	2019/10/07
60085B/024	Industrial HMI controller for weaving machine	PD15	PS1917 980392	2019/10/07
60085B/028	Dongle USB	---	---	2019/10/07
60085B/026	Power Cable DC	---	---	2019/10/07
60085B/027	Power Cable DC	---	---	2019/10/07
60085B/029	Dongle USB	---	---	2019/10/07

Sample S/01 has undergone the following test(s): All RADIATED tests indicated in Appendix A.

Test sample description

Ports…… :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	Supply 26Vdc	testsetup 5m application 12m	☒	☐	☐
	Ethernet Communication *point to point*	testsetup 5m application 12m	☒	☐	☐
Supplementary information to the ports…… :	-				

Rated power supply .....:	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	☒ DC: 26Vdc from SELV					

Rated Power .....:	26V; 1A max, 26W max
Clock frequencies.....:	• Main switcher: 500kHz • Display backlight: 20kHz • Display LVDS: +/- 80Mhz • iMX6 Core: 1.0GHz • iMX6 DDR3: 533Mhz • BT/Wifi: 2.4Ghz • NFC: 13.56Mhz
Other parameters .....:	
Software version .....:	19083.0.0.2
Hardware version .....:	PD15-2V1 – AXAA1388.02
Dimensions in cm (W x H x D) ....:	43cm x 28cm x 5cm
Mounting position .....:	☒ Other: mounted on standard

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	BOM	PD15	PICANOL
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Master Control Unit	PD15	PICANOL
Documents as provided by the applicant.....:	Description	File name	Issue date
	--		

Identification of the client

PSICONTROL
Steverlyncklaan 15
8900 Ieper, Belgium

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-10-31
Date (finish)	2019-10-31

Document history

Report number	Date	Description
55846RRF.001	2020-01-13	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Francisco J. Alcaide, José M. Jiménez

Used instrumentation:

Radiated Measurements

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
3.	EMI Test Receiver ROHDE AND SCHWARZ ESR7	2018/10	2020/10
4.	Active Loop Antenna SCHWARZBECK FMZB 1519B	2018/01	2021/01
5.	RF Pre-amplifier 40 dB, 10 MHz-6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/02	2020/08
6.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2017/09	2020/09
7.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/01	2021/01
8.	Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07
9.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2018/02	2020/02
10.	RF Pre-amplifier, 30 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-3A	2019/04	2020/04
11.	RF Pre-amplifier 30 dB, 18 GHz-40 GHz BONN ELEKTRONIK BLMA 1840-1M	2019/02	2021/02
12.	DC Power Supply Keysight Technologies U8002A	---	---
13.	Digital multimeter FLUKE 179	2019/06	2020/06

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

FCC PART 15 PARAGRAPH / RSS-Gen, RSS-210, RSS-247		
Requirement – Test case	**Verdict**	**Remark**
FCC 15.209 (a), FCC 15.225 (d), FCC 15.247 (d) / RSS-Gen 8.9, RSS-210 B.6 (d), RSS-247 5.5. - Transmitter out of band radiated emissions with simultaneous transmissions	P	
Supplementary information and remarks: (1) None.		

Appendix A: Test results.

INDEX

TEST CONDITIONS 11

FCC 15.209 (a), FCC 15.225 (d), FCC 15.247 (d) / RSS-Gen 8.9, RSS-210 B.6 (d), RSS-247 5.5. Transmitter out of band radiated emissions with simultaneous transmissions 14

TEST CONDITIONS

POWER SUPPLY (V):

Vn: 26 Vdc (*)

Type of Power Supply: External power supply.

ANTENNA:

Type of NFC Antenna:	Flex PCB antenna.
Maximum Declared Gain for NFC Antenna:	Not Applicable.
Type of Bluetooth Antenna:	PCB Antenna
Maximum Declared Gain for Bluetooth Antenna:	0.99 dBi
Type of WLAN 2.4GHz Antenna:	PCB Antenna
Maximum Declared Gain for Bluetooth Antenna:	0.99 dBi

The test set-up was made in accordance to the general provisions of FCC DTS Measurement 558074 D01 DTS Meas Guidance v05 dated 24/08/2018 and FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuous transmission with a modulated carrier at maximum power in all required channels selecting the supported data rates/modulations types.

The following configurations were selected based on preliminary testing that identified those corresponding to the worst cases:

Transmission modes selected with each radio:

* NFC: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in NFC mode

* Bluetooth Low Energy: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in Low Energy mode.

* WLAN 2.4GHz: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in WLAN mode.

Simultaneous transmission modes selected:

*** NFC, Bluetooth Low Energy, WLAN 2.4GHz mode B co-location**, with the EUT configured to simultaneously transmit three signals at maximum output power.

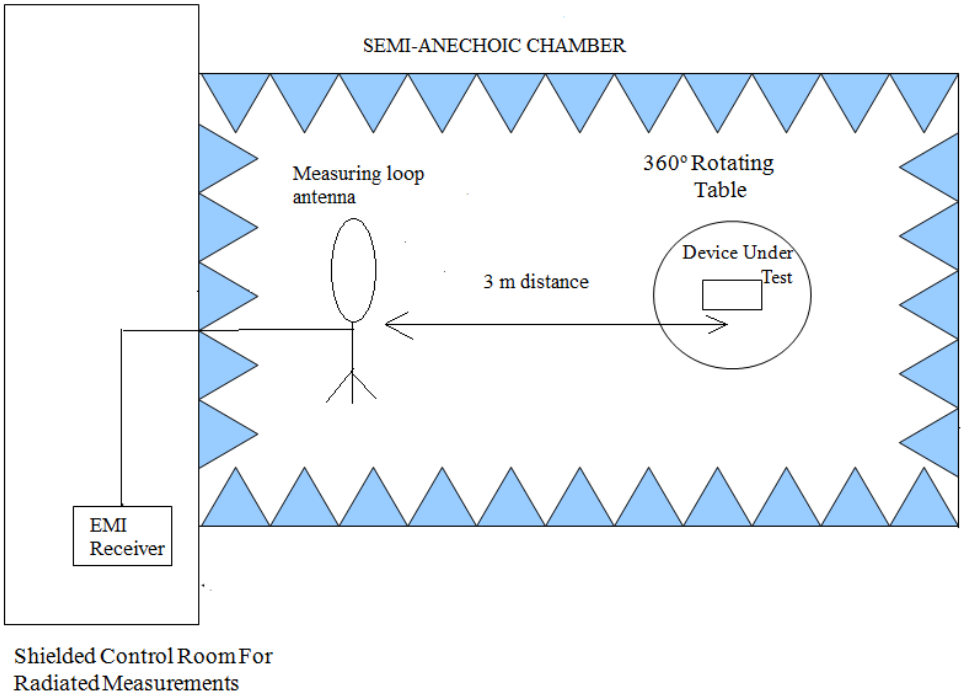
RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the center of the chamber turntable to perform the measurements below 1GHz and The EUT was placed at a height of 1.5 meters above the test chamber floor in the center of the chamber turntable to perform the measurements above 1GHz. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

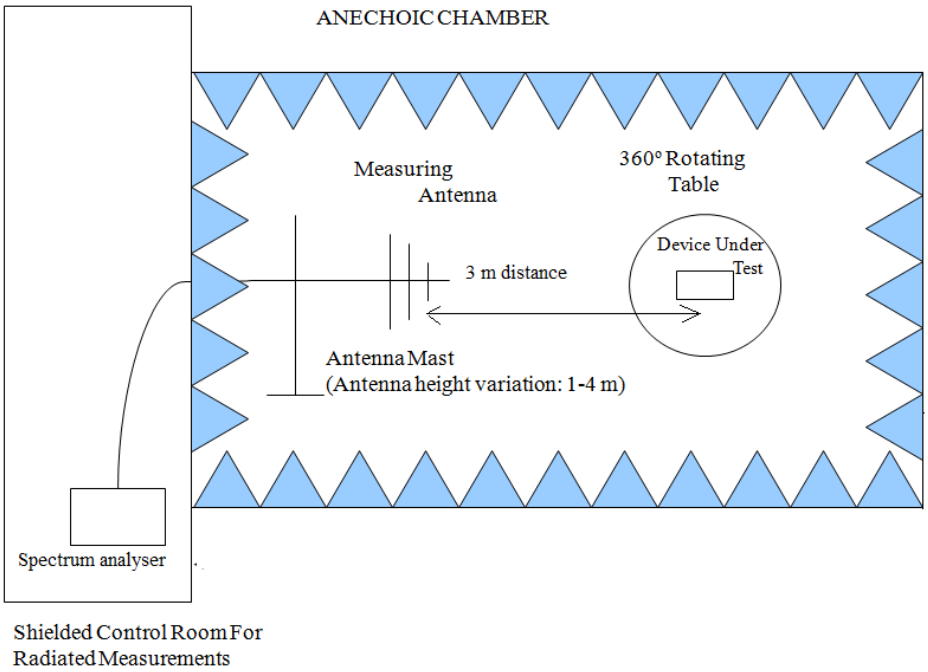
Measurements were made in both horizontal and vertical planes of polarization.

The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor, preamplifier gain (if used) and cable losses.

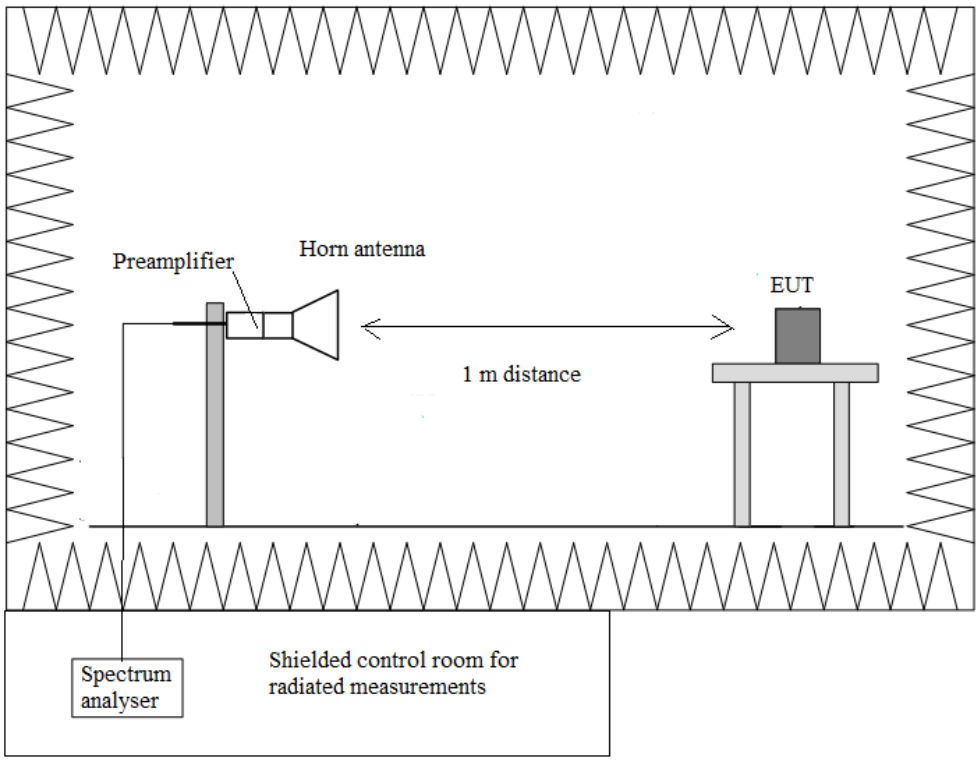
Radiated measurements setup 9 kHz < f < 30 MHz:



Radiated measurements setup 30 MHz < f < 1 GHz



Radiated measurements setup f > 1 GHz



FCC 15.209 (a), FCC 15.225 (d), FCC 15.247 (d) / RSS-Gen 8.9, RSS-210 B.6 (d), RSS-247 5.5. Transmitter out of band radiated emissions with simultaneous transmissions

SPECIFICATION:

Radiated emissions which fall in the restricted bands, as defined in §15.205 (a), appearing outside of the band 13.110 MHz - 14.010 MHz band must also comply with the radiated emission limits specified in §15.209 (a) (see §15.205 (c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-40 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Test performed on the following worst cases in all relevant tests channels.

Frequency range 9 KHz - 30 MHz

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

No spurious frequencies at less than 20 dB below the limit.

Frequency range 30 MHz - 1 GHz

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Limit (dBµV/m)	Measurement Uncertainty (dB)
40.686	V	Quasi-Peak	36.7	40	± 3.88
88.863	H	Quasi-Peak	21.6	43.5	± 3.88
205.716	V	Quasi-Peak	42.6	43.5	± 3.88
288.650	V	Quasi-Peak	30.5	46	± 3.88
411.420	H	Quasi-Peak	40.5	46	± 3.88
600.021	H	Quasi-Peak	38.1	46	± 3.88
791.337	H	Quasi-Peak	31.6	46	± 3.88

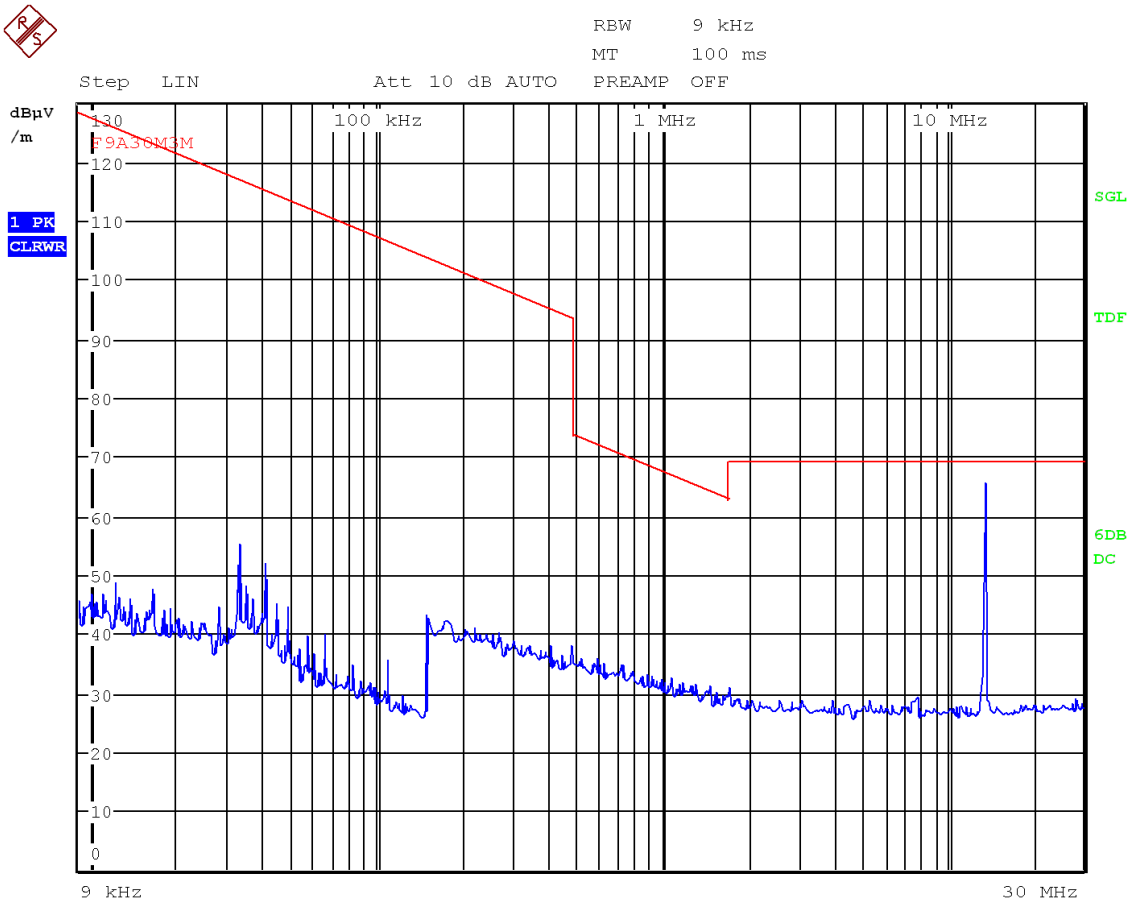
Frequency range 1 - 25 GHz

Spurious frequencies at less than 20 dB below the limit:

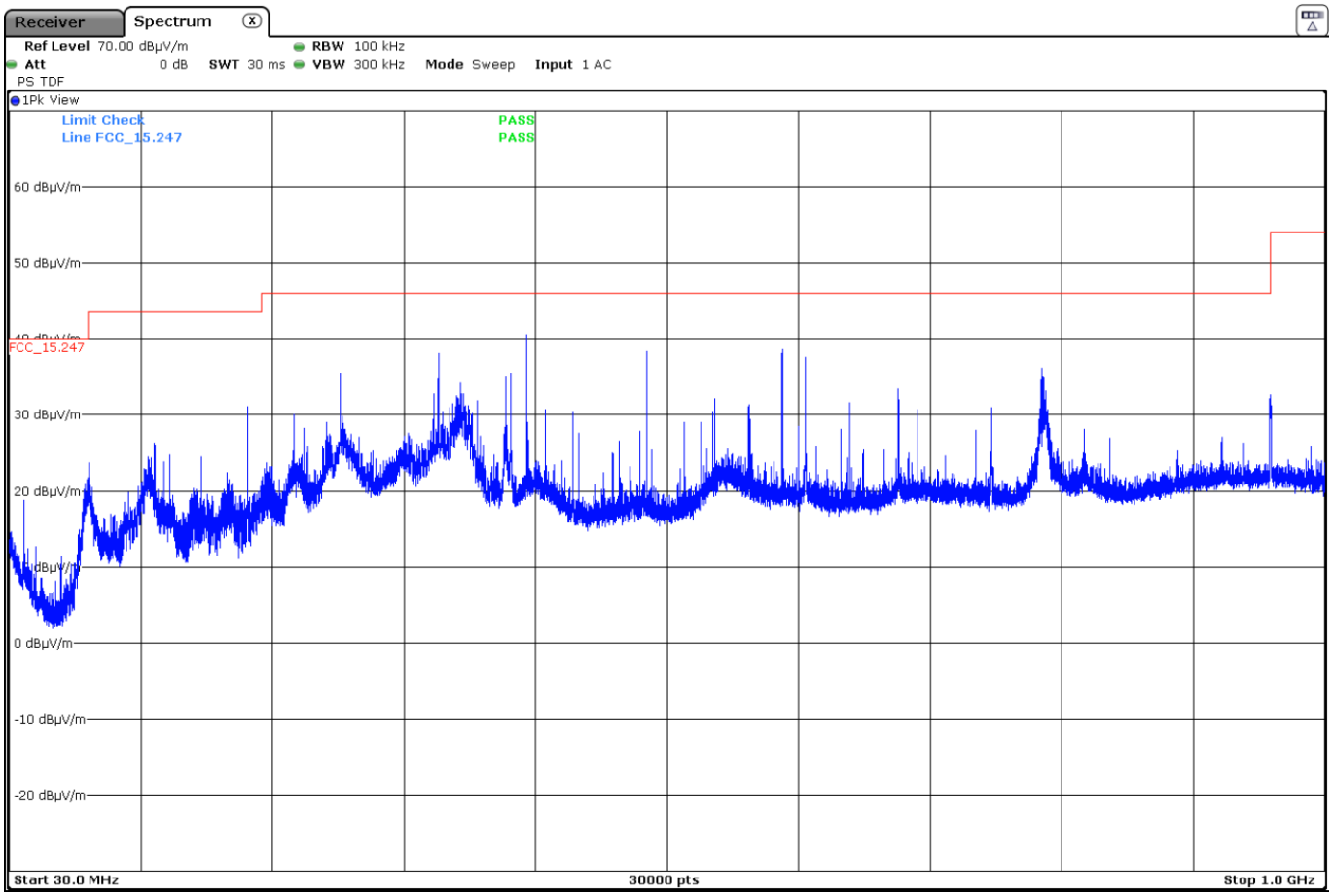
Spurious frequency (GHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
1.16576	Peak	46.51	H	<± 4.88
1.45203	Peak	47.18	H	<± 4.88
1.58430	Peak	47.22	H	<± 4.88
1.91956	Peak	49.70	V	<± 4.88
2.63990	Peak	53.27	H	<± 4.88
3.69600	Peak	44.56	V	<± 4.88
3.96017	Peak	40.65	H	<± 4.88
4.87390	Peak	40.99	V	<± 4.88
6.60850	Peak	45.52	V	<± 4.88
7.31177	Peak	44.23	V	<± 4.88

Verdict: PASS

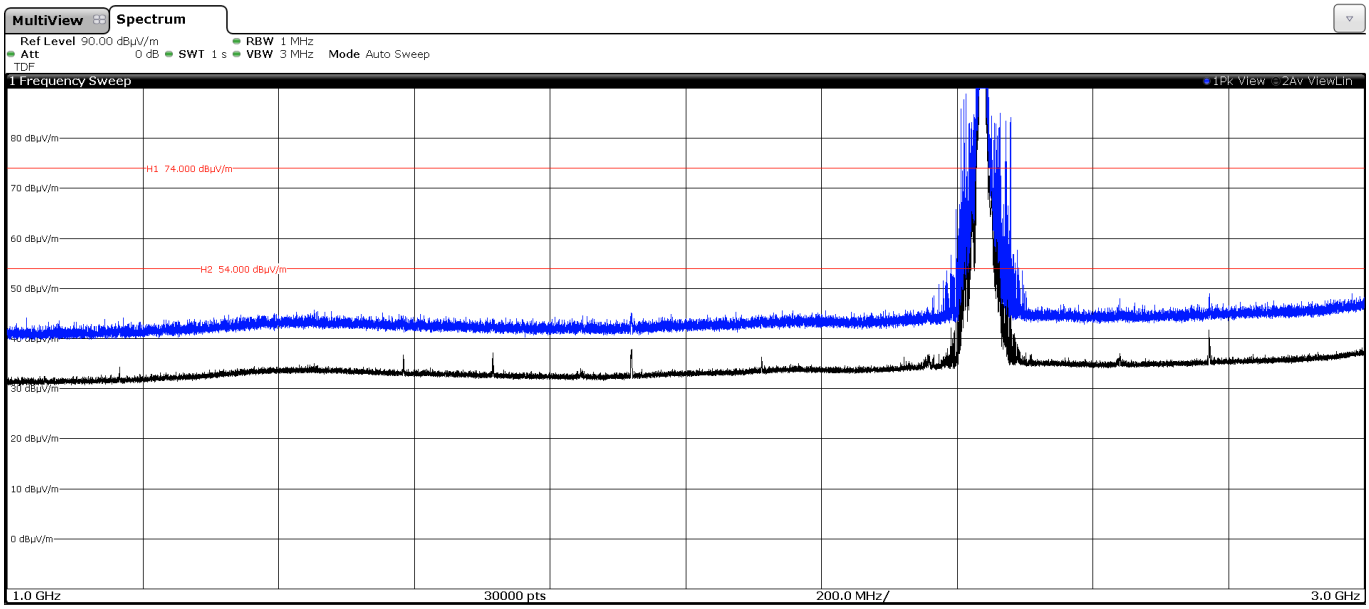
FREQUENCY RANGE 9 kHz - 30 MHz

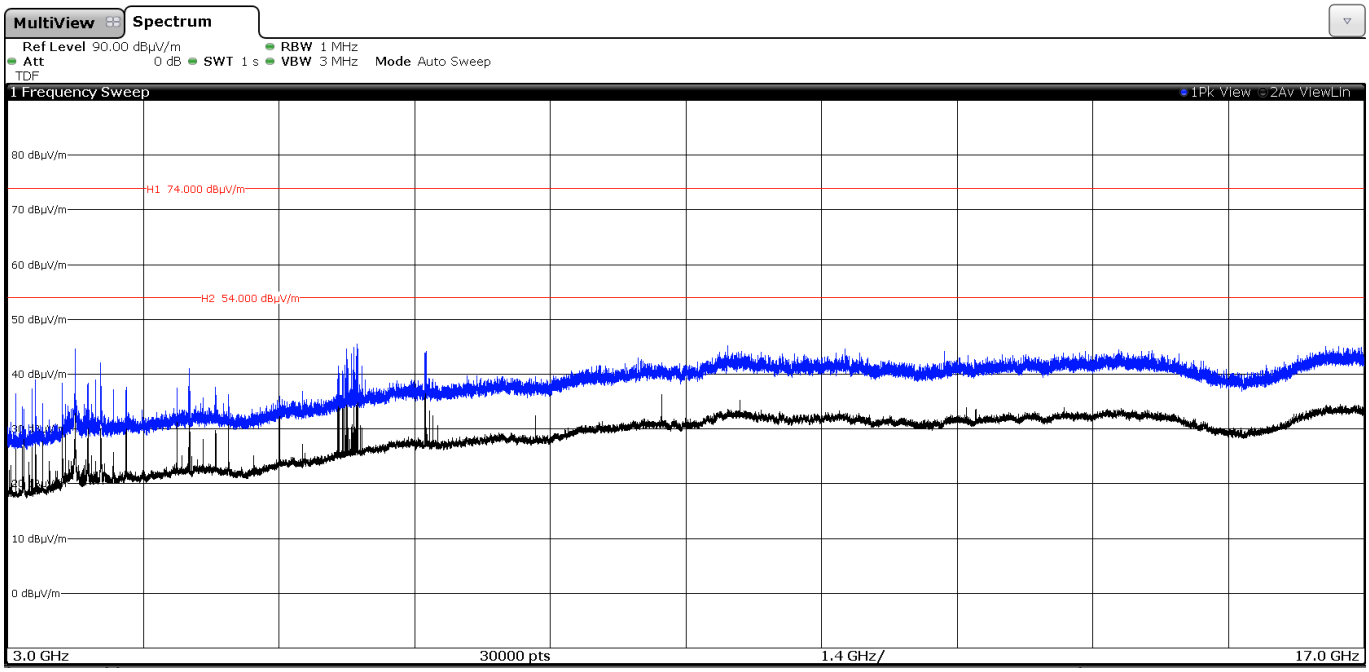


FREQUENCY RANGE 30 MHz - 1 GHz



FREQUENCY RANGE 1 - 3 GHz



Note: The peaks shown in the plot above the limit are the carrier frequencies.

FREQUENCY RANGE 3 - 17 GHz