



Test report No:
NIE: 63682RRF.001

Partial Test report

USA FCC Part 15.249 & 15.209

CANADA RSS-210, RSS-Gen

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, 5725 - 5875 MHz, and 24.0 – 24.25 GHz.

(*) Identification of item tested	Safety edge wireless receiver
(*) Trademark	JCM
(*) Model and /or type reference	RB-P-RX10C
Other identification of the product	FCC ID: U5Z-RB-P-RX10C HW Version: S-RB3OSE916-EL SW Version: RB3ROSER_ULMEX_02.04.11.01
(*) Features	Power supply: 12/24V ac/dc Power supply range: 9-35Vdc / 8-28Vac Frequency: Multifrequency system 916MHz auto-adjustable Operating consumption: Max 100mA Radiated power < 25mW Range (in open field): 50m
Applicant	JCM TECHNOLOGIES, S.A. C/Costa d'en paratge, 6B, 08500, Vic, Barcelona (SPAIN)
Test method requested, standard	USA FCC Part 15.249 10-1-18 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, 5725 - 5875 MHz, and 24.0 – 24.25 GHz. USA FCC Part 15.209 10-1-18 Edition: Radiated emission limits; general requirements. CANADA RSS-210 Issue 9 (August 2016). CANADA RSS-Gen Issue 5 (April 2018). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Approved by (name / position & signature)	Jose Carlos Luque RF Lab. Supervisor 74841983Y JOSE CARLOS LUQUE (C:A29507456)	Firmado digitalmente por 74841983Y JOSE CARLOS LUQUE (C:A29507456) Fecha: 2020.02.24 13:25:47 +01'00'
Date of issue	2020-02-24	
Report template No	FDT08_22 (*) "Data provided by the client"	

Index

Competences and guarantees4

General conditions4

Uncertainty4

Data provided by the client.....4

Usage of samples5

Test sample description5

Identification of the client.....7

Testing period and place.....7

Document history7

Environmental conditions7

Remarks and comments8

Testing verdicts.....8

Summary8

Appendix A: Test results9

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.

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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 is a 916MHz multifrequency receiver for working with a safety edge wireless transmitter.

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 N°	Description	Model	Serial N°	Date of reception
63682/002	Receiver	RB-P-RX10C	---	2020-01-16

1. Sample S/01 has undergone the following test(s):

All radiated tests indicated in Appendix A except the duty cycle.

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
63682/003	Receiver	RB-P-RX10C	---	2020-01-16

- Auxiliary elements used with the sample S/02:

Control N°	Description	Model	Serial N°	Date of reception
63682/001	Transceiver	RB-P-TX10C	---	2020-01-16

1. Sample S/02 has undergone the following test(s):

The duty cycle test indicated in Appendix A.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified length [m]		Attached during test		Shielded	
	PSE_13f – not used	Not specified		☐		☐	
	OSE1_2FA pulse input	Not specified		☒		☐	
	OSE1_2FB common pulse input	Not specified		☒		☐	
	NC2 output	Not specified		☒		☐	
Supplementary information to the ports..... :	N/A						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE

	☒	AC: 12V	☒	☐	☐	☒	☐
	☒	AC: 24V	☒	☐	☐	☒	☐
	☒	DC: 12V					
	☒	DC: 24V					
Rated Power	Max 100mA						
Internal operating frequencies	CLK SOURCE 1: 16MHz CLK SOURCE 2: 32,768kHz						
Other parameters	Not provided data						
Software version	RB3ROSER_ULMEX_02.04.11.01						
Hardware version	S-RB3OSE916-EL						
Dimensions in cm (L x W x D).....	9,347 x 15,062 x 4,750 cm						
Mounting position	☐	Table top equipment					
	☒	Wall mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					
Modules/parts.....	Module/parts of test item		Type		Manufacturer		
	N/A						
Accessories (not part of the test item)	Description		Type		Manufacturer		
	RB-TX10C transmitter (already FCC certified)		RB-TX10C		JCM		
Documents as provided by the applicant	Description		File name		Issue date		
	Layout		RG10.5_S-RB3OSE916-EL_Rev02.PDF		19/07/2016		
	Schematics		RG10.7_S-RB3OSE916-EL_Rev01.PDF		19/07/2016		
	Block diagram		RB-P-RX10C_Block diagram_REV00.pdf		15/01/2020		
	Internal photographs		INTERNAL PHOTOS RB-P-RX10C.pdf		15/01/2020		
	External photographs		EXTERNAL PHOTOS RB-P-RX10C.pdf		15/01/2020		
	User's manual		UM_3200923_RB-P-RX10C_Rev00_DRAFT.pdf		15/01/2020		
	Marking information		RG10.6_RB-P-RX10C-SERI-BOTTOM_MEI_Rev00.pdf		15/01/2020		

Identification of the client

JCM TECHNOLOGIES, S.A.
C/Costa d'en paratge, 6B,
08500, Vic, Barcelona (SPAIN).

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-01-17
Date (finish)	2020-01-21

Document history

Report number	Date	Description
63682RRF.001	2020-02-24	First release

Environmental conditions

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

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

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: José Gabriel Pendón and Nicolás Salguero.

Used instrumentation:

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2.	Hybrid Bilog Antenna 30Mhz-6GHz ETS LINDGREN 3142E	2017/04	2020/04
3.	RF pre-amplifier 30MHz-6GHz Bonn Elektronik BLNA 0360-01N	2019/09	2020/09
4.	EMI Test Receiver 9kHz-7GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
5.	Horn Antenna 1-18GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
6.	RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-3A	2019/04	2020/04
7.	Spectrum analyser Rohde & Schwarz FSW50	2018/02	2020/02
8.	AC power supply CHROMA 6490	2018/09	2020/09

Testing verdicts

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

Summary

FCC PART 15 / RSS-210 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 15.249 Subclause (a) / RSS-210 B.10. (a) Field strength of fundamental and harmonics emissions	P	
FCC 15.249 Subclause (d) / RSS-210 B.10. (b) Emissions radiated outside of the specific frequency bands	P	
<u>Supplementary information and remarks:</u> None.		

Appendix A: Test results

INDEX

TEST CONDITIONS11

Duty cycle13

Section 15.249 Subclause (a) / RSS-210 B.10. (a) Field strength of Fundamental.....15

Section 15.249 Subclause (a) and (d) / RSS-210 B.10 (b) Emissions limitations radiated (Transmitter).....18

TEST CONDITIONS

Power supply (V): External power supply

Vnominal = 12/24 V

Type of antenna = Pluggable.

Declared Gain for antenna = 0 dB

TEST FREQUENCIES:

Lowest channel: 902.30 MHz

Middle channel: 915.65 MHz

Highest channel: 927.70 MHz

RADIATED MEASUREMENTS

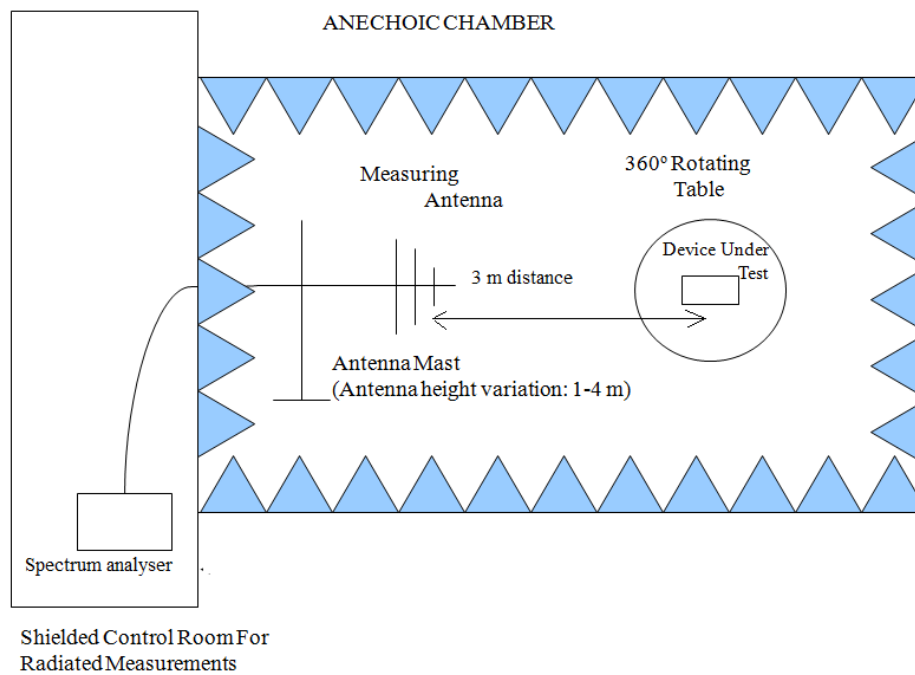
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-10 GHz (1 GHz-18 GHz Double ridge horn antenna).

For radiated emissions in the range 1 GHz-10 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

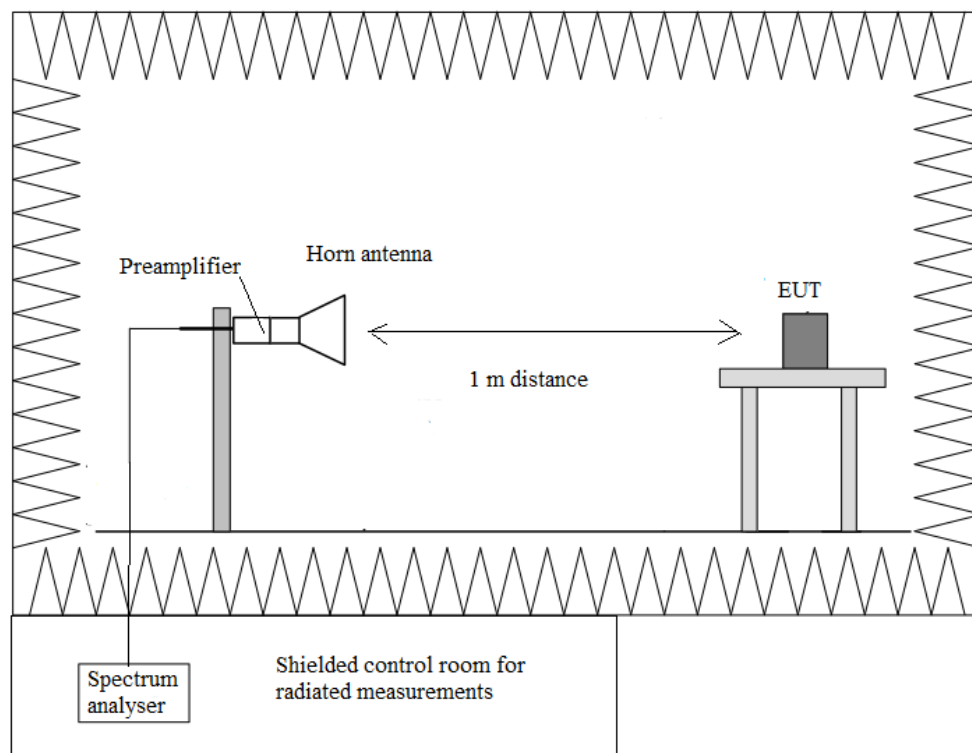
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

Radiated measurements setup $f < 1$ GHz



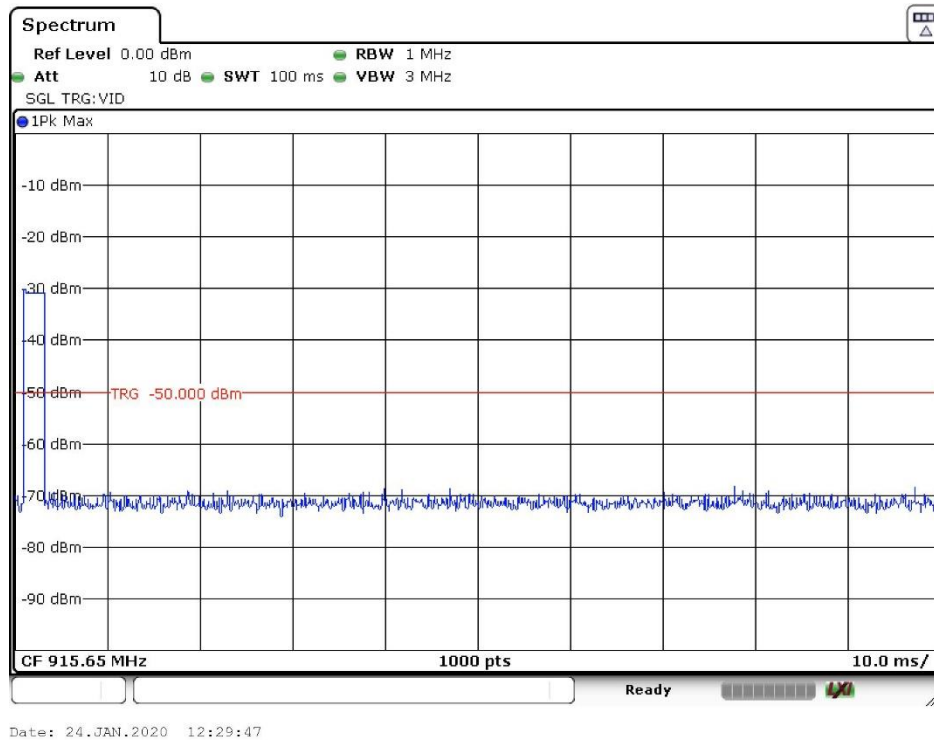
Radiated measurements setup $f > 1$ GHz



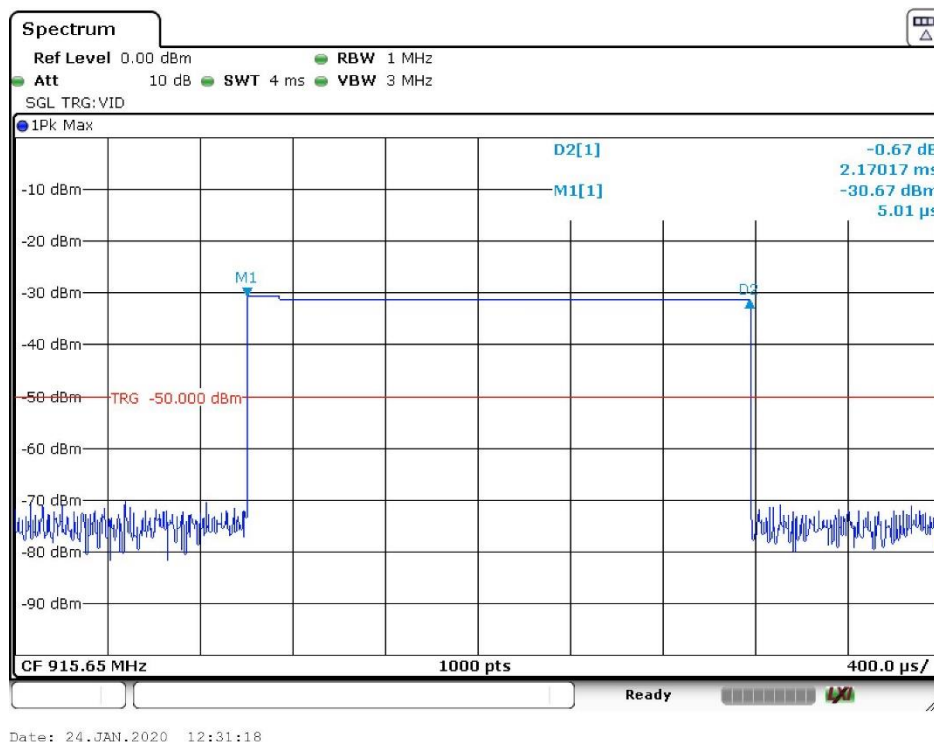
Duty cycle

Computation of duty-cycle correction factor

Number of pulses within 100 ms: 1



Pulse duration: 2.170 ms.



Duty-cycle correction factor calculation.

Sub-pulse	Duration (ms)	Number of pulses	Sub-pulse "On Time" (ms)
1	2.170	1	2.170
		TOTAL ON TIME	2.170

Duty cycle correction factor $\delta = 2.170/100 = 0.0217$

$\delta = 20 \log (0.0217) = -33.27 \text{ dB}$

Section 15.249 Subclause (a) / RSS-210 B.10. (a) Field strength of Fundamental.

SPECIFICATION

The field strength of emissions from intentional radiators shall comply with the following

Fundamental frequency (MHz)	Field strength of fundamental (mV/m)	Field strength (dB μ V/m)	Measurement distance (m)
902 - 928	50	93.98	3
2400 – 2483.5	50	93.98	3
5725 - 5875	50	93.98	3
24000-24250	250	107.96	3

For frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

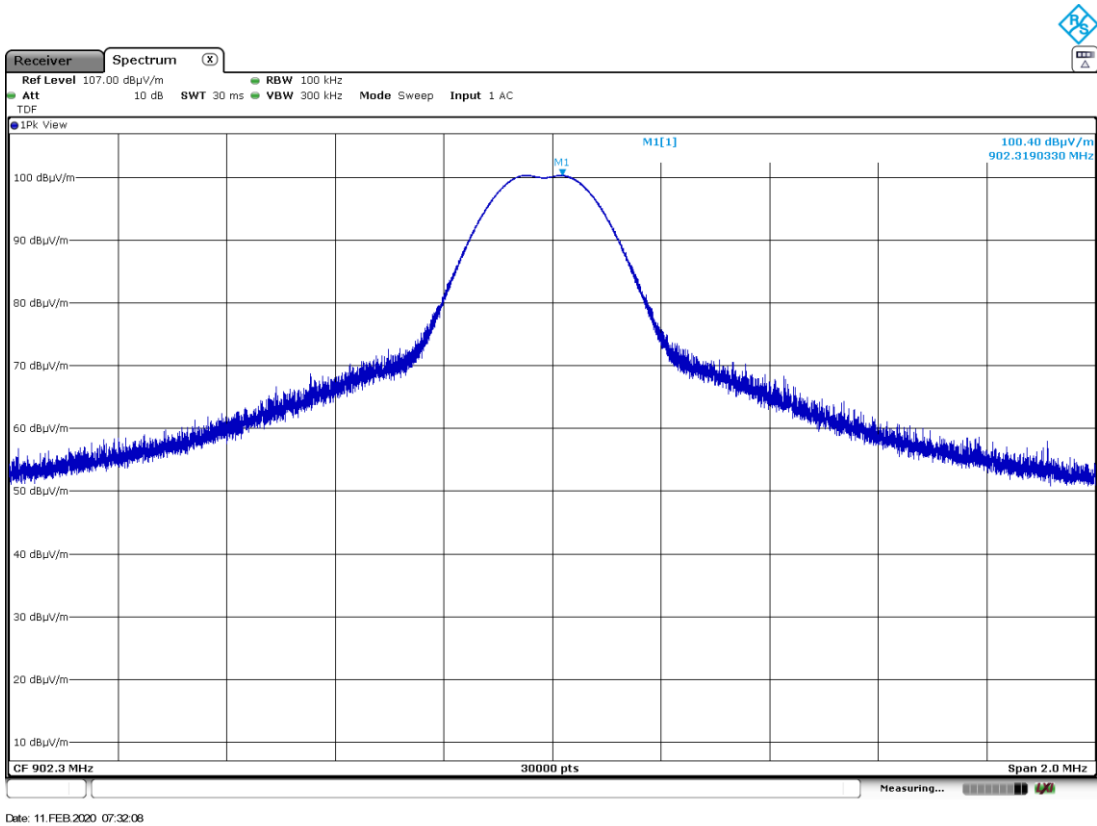
RESULTS

The transmission is pulsed so the average values of transmitter fundamental emissions are calculated from the measured peak values using the duty cycle correction factor δ as indicated in standard ANSI C63.10-2013.

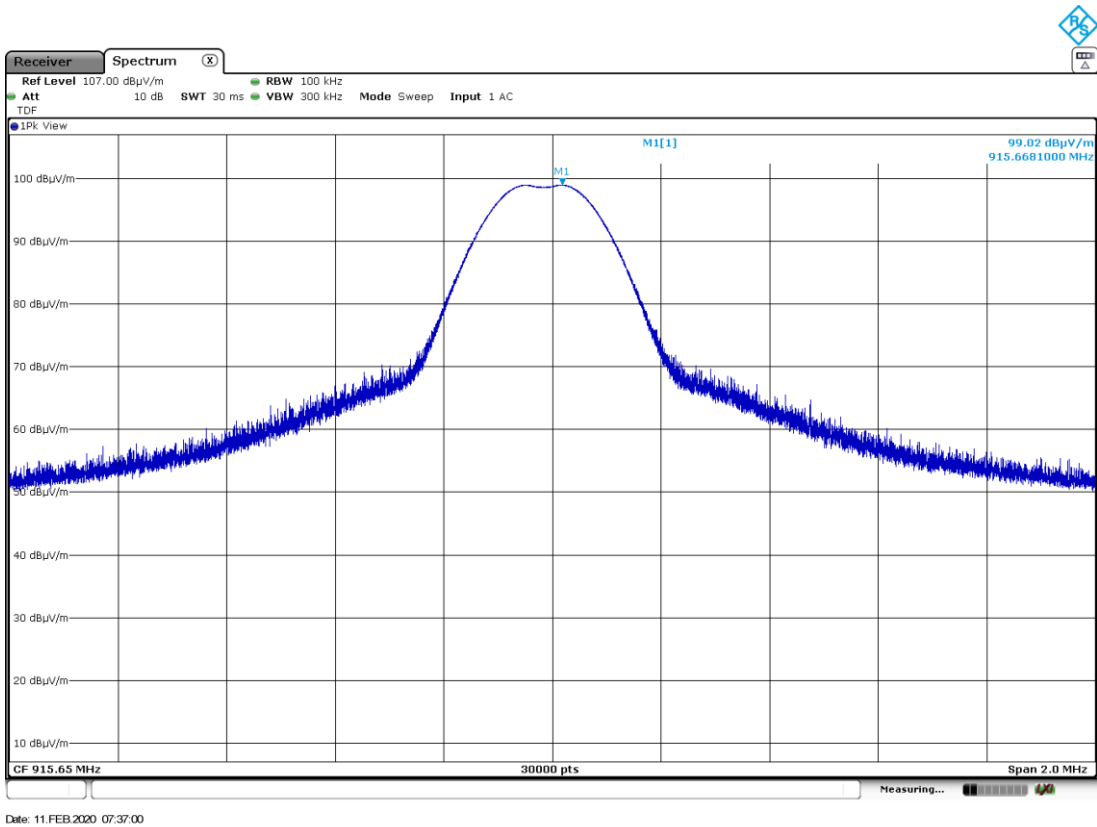
	Lowest frequency 902.30 MHz	Middle frequency 915.65 MHz	Highest frequency 927.70 MHz
Field strength (dB μ V/m) peak	100.40	99.02	98.64
Duty cycle correction factor δ	-33.27	-33.27	-33.27
Field strength (dB μ V/m) average	67.13	65.75	65.37
Measurement uncertainty (dB)	< $\pm$ 3.43		

Verdict: PASS

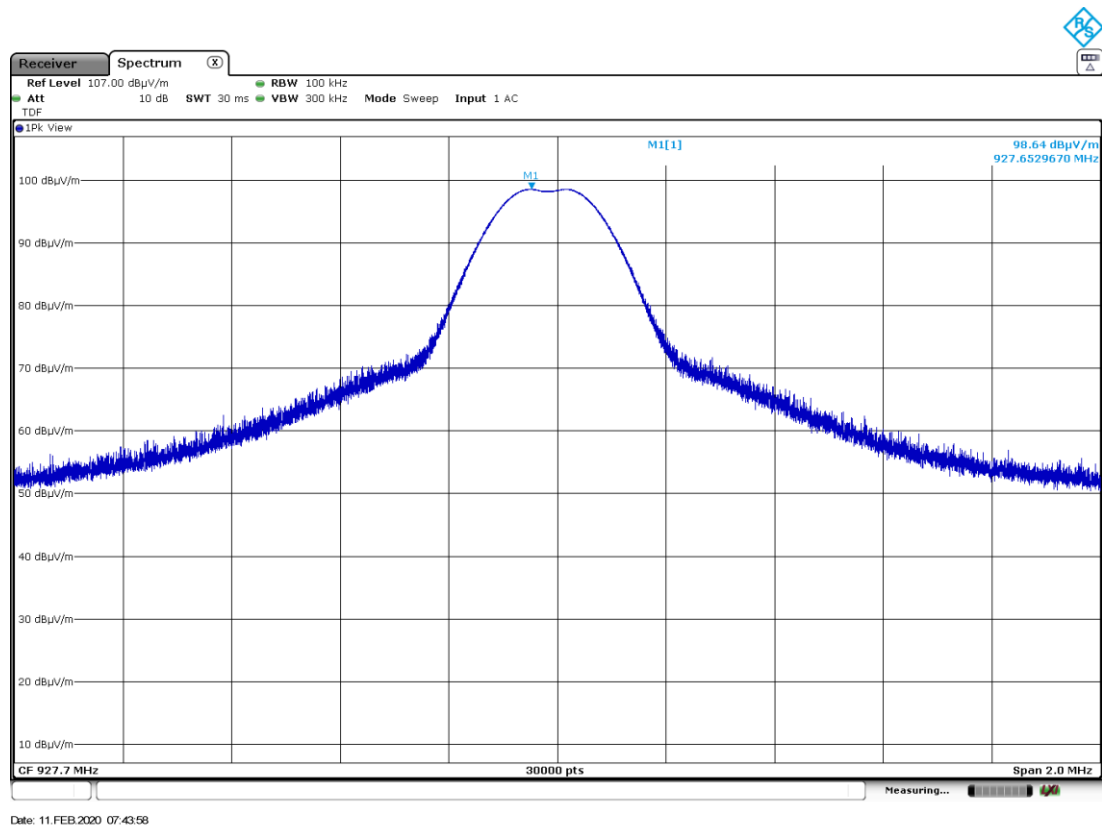
FIELD STRENGTH
Lowest Channel



Middle Channel



Highest Channel



Section 15.249 Subclause (a) and (d) / RSS-210 B.10 (b) Emissions limitations radiated (Transmitter).

SPECIFICATION

The field strength of harmonics from intentional radiators shall comply with the following

Fundamental frequency (MHz)	Field strength of harmonics ($\mu\text{V/m}$)	Field strength of harmonics ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
902 - 928	500	54	3
2400 – 2483.5	500	54	3
5725 - 5875	500	54	3
24000-24250	2500	67.96	3

Emissions radiated outside of the specific frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits specified in section 15.209:

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	$2400/F(\text{kHz})$	-	300
0.490-1.705	$24000/F(\text{kHz})$	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

Whichever is the lesser attenuation.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° 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-1000 MHz and at distance of 1m for the frequency range 1 GHz-10 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.

The transmission is pulsed so the average values of spurious emissions are calculated from the measured peak values using the duty cycle correction factor δ as indicated in standard ANSI C63.10-2013.

Frequency range 30 MHz-1000 MHz.

1. CHANNEL: LOWEST (902.30 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
142.892	V	Quasi-Peak	29.2	< $\pm$ 3.81
157.539	V	Quasi-Peak	28.6	< $\pm$ 3.81
184.052	V	Quasi-Peak	32.9	< $\pm$ 3.81
225.601	V	Quasi-Peak	31.4	< $\pm$ 3.81
244.516	V	Quasi-Peak	37.1	< $\pm$ 3.81
280.823	V	Quasi-Peak	32.1	< $\pm$ 3.81
338.735	H	Quasi-Peak	29.1	< $\pm$ 3.81
560.121	V	Quasi-Peak	23.0	< $\pm$ 3.81
589.771	V	Quasi-Peak	26.6	< $\pm$ 3.81
642.313	V	Quasi-Peak	22.5	< $\pm$ 3.81

2. CHANNEL: MIDDLE (915.65 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
160.578	V	Quasi-Peak	22.3	< $\pm$ 3.81
188.223	V	Quasi-Peak	27.9	< $\pm$ 3.81
242.608	V	Quasi-Peak	29.1	< $\pm$ 3.81
279.436	H	Quasi-Peak	33.8	< $\pm$ 3.81
378.861	H	Quasi-Peak	29.1	< $\pm$ 3.81
594.395	V	Quasi-Peak	25.9	< $\pm$ 3.81
746.620	V	Quasi-Peak	24.4	< $\pm$ 3.81

3. CHANNEL: HIGHEST (927.70 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
153.303	V	Quasi-Peak	22.6	< $\pm$ 3.81
188.385	V	Quasi-Peak	28.8	< $\pm$ 3.81
243.287	V	Quasi-Peak	29.4	< $\pm$ 3.81
279.306	H	Quasi-Peak	32.3	< $\pm$ 3.81
323.280	H	Quasi-Peak	25.4	< $\pm$ 3.81
390.145	H	Quasi-Peak	22.5	< $\pm$ 3.81
593.716	V	Quasi-Peak	24.6	< $\pm$ 3.81

Frequency range 1 GHz-10 GHz

All detected signals are harmonics of the fundamental emission.

1. CHANNEL: LOWEST (902.30 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
1.80443	V	Peak	54.11	< $\pm$ 4.72
		Average (*)	20.84	< $\pm$ 4.72
5.41372	V	Peak	69.02	< $\pm$ 4.72
		Average (*)	35.75	< $\pm$ 4.72

(*): The average values are calculated from the measured peak values using the duty cycle correction factor δ .

All other peaks are more than 20 dB below the limit.

2. CHANNEL: MIDDLE (915.65 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.49352	V	Peak	59.06	< $\pm$ 4.72
		Average (*)	25.79	< $\pm$ 4.72

(*): The average values are calculated from the measured peak values using the duty cycle correction factor δ .

All other peaks are more than 20 dB below the limit.

3. CHANNEL: HIGHEST (927.70 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.56655	V	Peak	56.07	< $\pm$ 4.72
		Average (*)	22.8	< $\pm$ 4.72
6.49382	V	Peak	57.49	< $\pm$ 4.72
		Average (*)	24.22	< $\pm$ 4.72
7.42132	V	Peak	54.43	< $\pm$ 4.72
		Average (*)	21.16	< $\pm$ 4.72

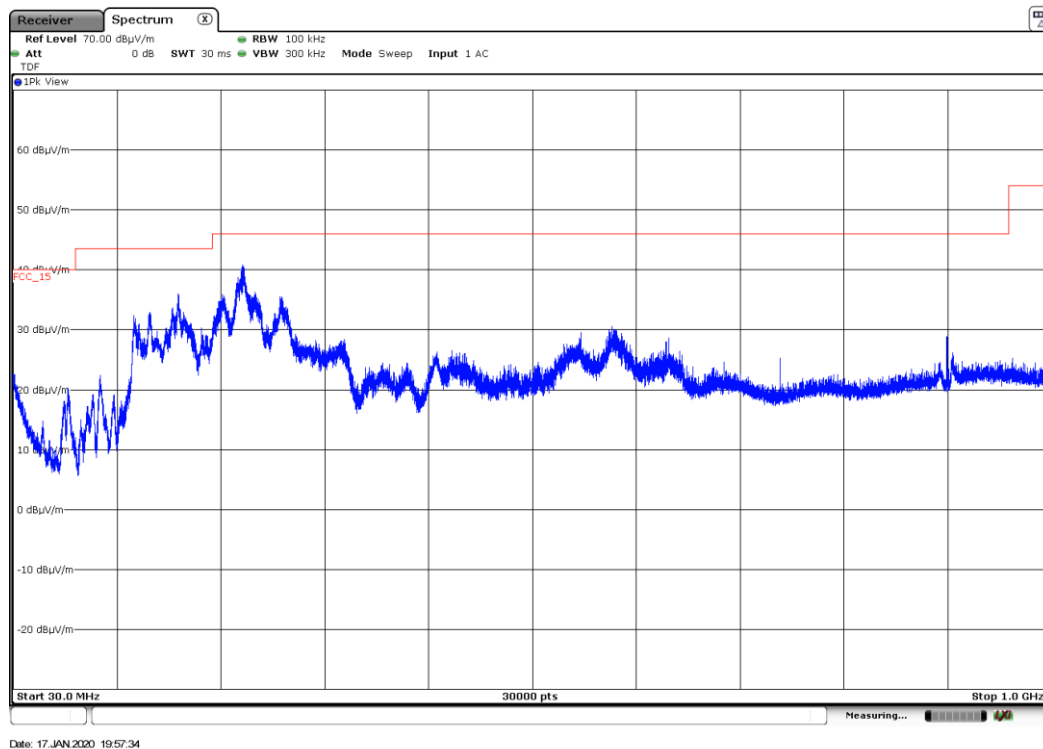
(*): The average values are calculated from the measured peak values using the duty cycle correction factor δ .

All other peaks are more than 20 dB below the limit.

Verdict: PASS

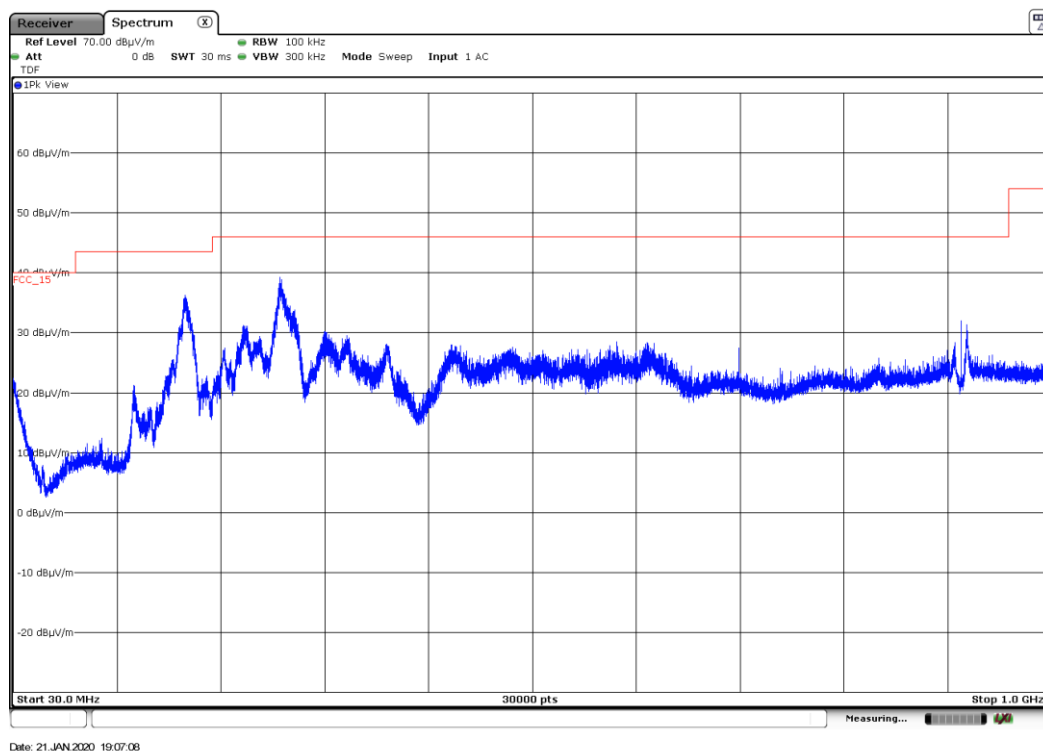
FREQUENCY RANGE 30 MHz-1000 MHz.

CHANNEL: Lowest (902.30 MHz).



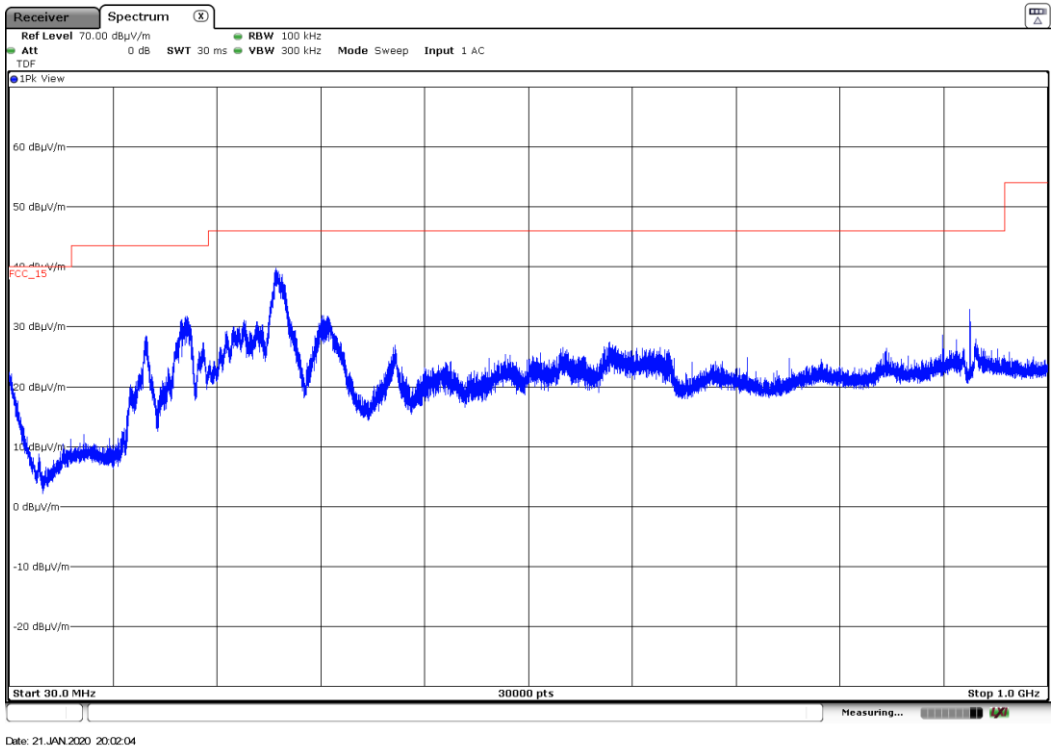
Note: The carrier was attenuated using a notch filter.

CHANNEL: Middle (915.65 MHz).



Note: The carrier was attenuated using a notch filter.

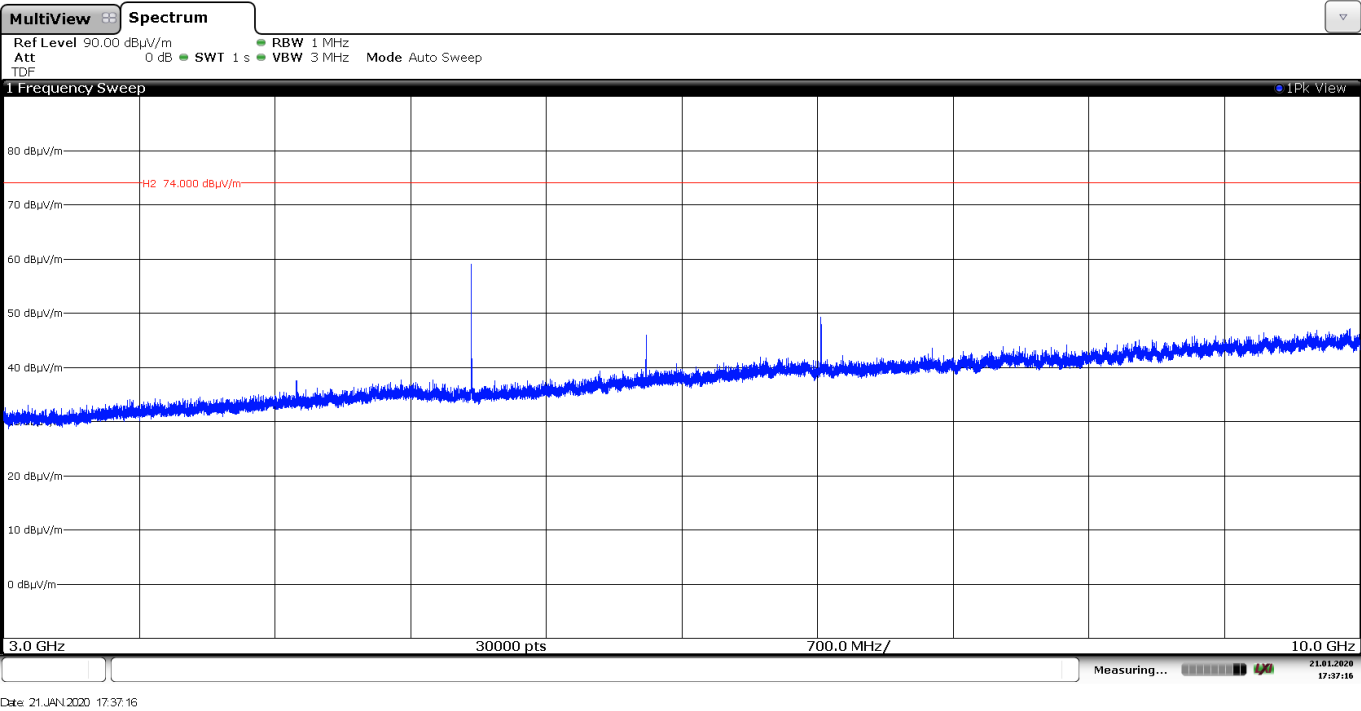
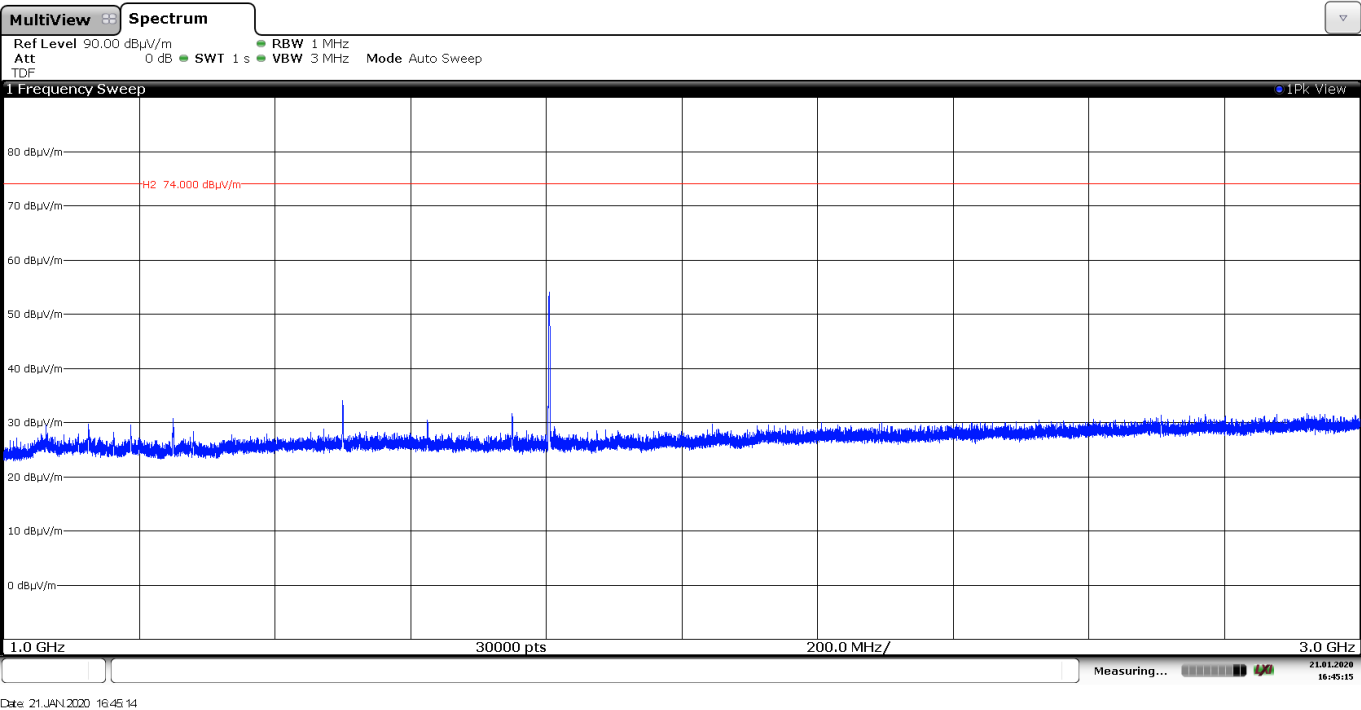
CHANNEL: Highest (927.70 MHz).



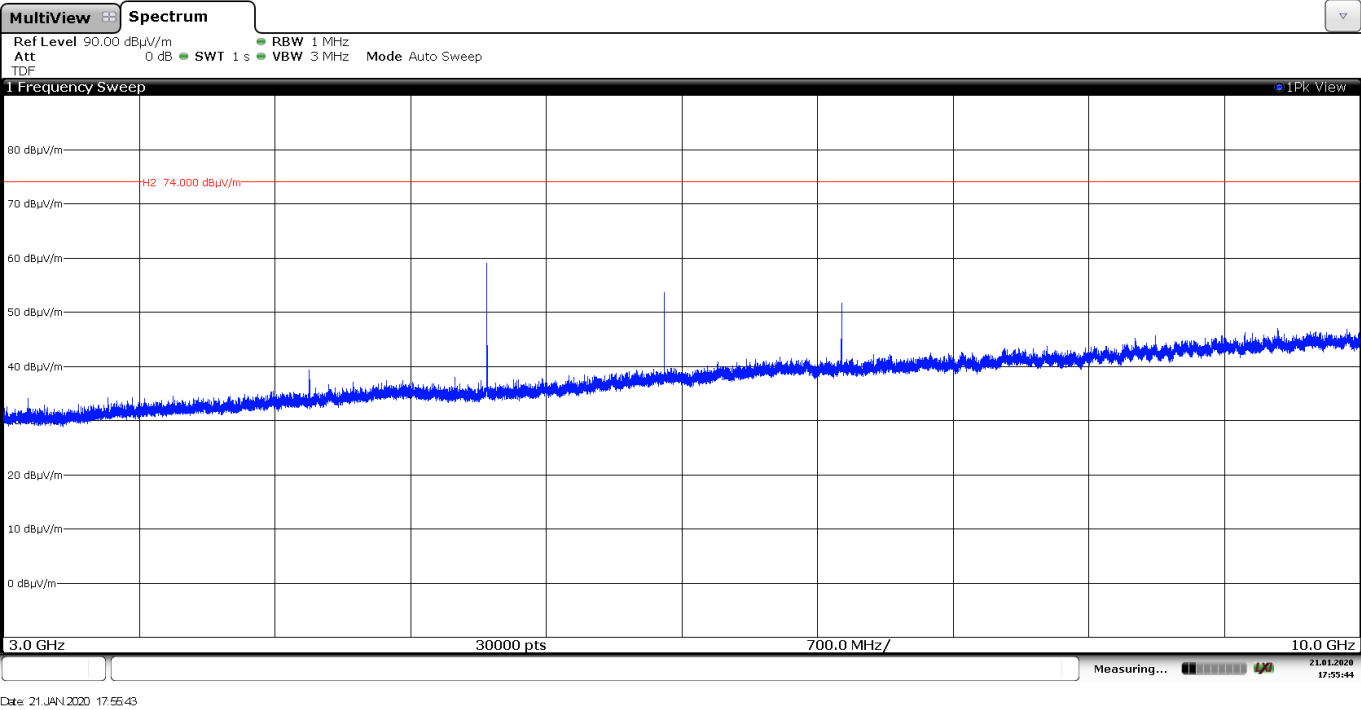
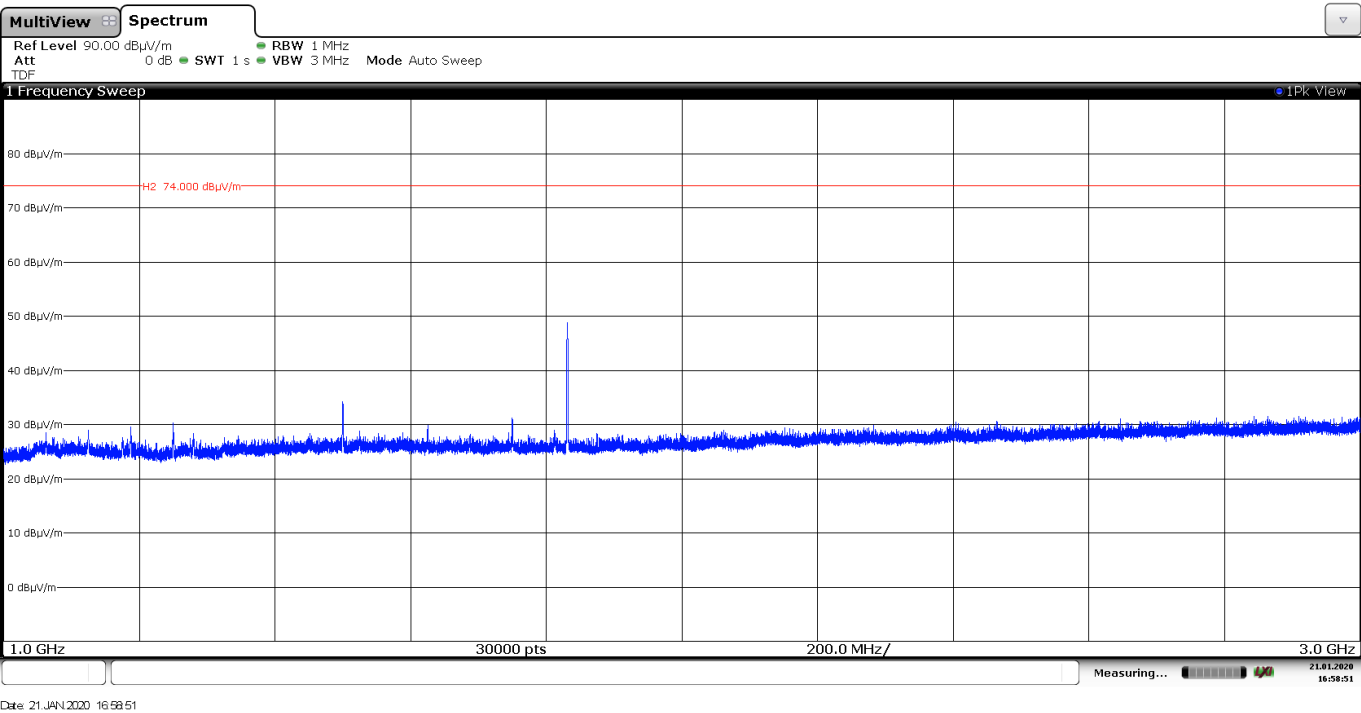
Note: The carrier was attenuated using a notch filter.

FREQUENCY RANGE 1 GHz to 10 GHz.

CHANNEL: Lowest (902.30 MHz).



CHANNEL: Middle (915.65 MHz).



CHANNEL: Highest (927.70 MHz).

