

ISED CABid: ES1909

Test report No:

Lab. Company Number: 4621A

NIE: 74540RRF.002

## Test report

USA FCC Part 15.249, 15.209

CANADA RSS-210, RSS-Gen

(*) Identification of item tested	Powermeter for bikes
(*) Trademark	ROTOR INspiderMTB
(*) Model and /or type reference	ROT118
Other identification of the product	FCC ID: R3AROT118 IC: 10992A-ROT118
(*) Features	Features: ANT+ and Bluetooth Smart HW version: Rev C SW version: 1.004
Applicant	Rotor Componentes Tecnológicos S.L. C/ Miño, 14 28864 Ajalvir, Madrid, SPAIN
Test method requested, standard	USA FCC Part 15.249 (10-1-21 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 (10-1-21 Edition): Radiated emission limits; general requirements. CANADA RSS-210 Issue 10 (December 2019). CANADA RSS-Gen Issue 5 Amendment 2 (February 2021). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2023-02-24
Report template No	FDT08_24 (* "Data provided by the client")

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## Competences and guarantees

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DEKRA Testing and Certification S.A.U. is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

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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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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

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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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## Uncertainty

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

## Data provided by the client

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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 a power meter for mountain bikes that gives the user data about power and cadence during a ride, among other information.

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.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	74540_8.1	Powermeter	ROT118	9994	2023-01-19	Element Under Test
S/01	74540_5.1	USB Cable	--	--	2023-01-19	Element Under Test
S/02	74540_6.1	Powermeter (conducted)	ROT118	9996	2023-01-19	Element Under Test
S/02	74540_7.1	Battery	--	--	2023-01-19	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Sample used for radiated test
S/02	Sample used for conducted test

## Test sample description

Ports..... :	Port name and description		Cable			
			Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>
	Charge		[ ]	[ ]	[ ]	
	.....	.....	[ ]	[ ]	[ ]	
Supplementary information to the ports..... :	Internal battery charge port.					
Rated power supply..... :	Voltage and Frequency		Reference poles			
			L1	L2	L3	N
	[ ]	AC: .....	[ ]	[ ]	[ ]	[ ]
	[X]	DC: 3,7 V (internal battery)				
Rated Power..... :	3 mW					
Clock frequencies..... :	32 MHz					
Other parameters..... :	.....					
Software version..... :	1.004					
Hardware version..... :	Rev C					
Dimensions in cm (W x H x D)..... :	115 x 115 x 10 mm					
Mounting position..... :	[ ]	Table top equipment				
	[ ]	Wall/Ceiling mounted equipment				
	[ ]	Floor standing equipment				
	[ ]	Hand-held equipment				
	[X]	Other: Assembled on a bicycle.				
Modules/parts..... :	Module/parts of test item		Type	Manufacturer		
	.....		.....	.....		
Accessories (not part of the test item)..... :	Description		Type	Manufacturer		
	Power cord		Magnetic-USB			
	.....		.....	.....		
Documents as provided by the applicant..... :	Description		File name	Issue date		
	Configuration Manual for testing					
	.....		.....	.....		

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

Rotor Componentes Tecnológicos S.L.  
C/ Miño, 14  
28864 Ajalvir, Madrid, SPAIN

## Testing period and place

<b>Test Location</b>	DEKRA Testing and Certification S.A.U.
<b>Date (start)</b>	2023-01-23
<b>Date (finish)</b>	2023-01-31

## Document history

Report number	Date	Description
74540RRF.002	2023-02-24	First release

## Environmental conditions

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

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

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

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

<b>Temperature</b>	Min. = 15 °C Max. = 35 °C
<b>Relative humidity</b>	Min. = 20 % Max. = 75 %

## Remarks and comments

The tests have been performed by the technical personnel: Daniel Mejías and Victoria Olmedo.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS PROJECTS GMBH	N/A
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	N/A
6165	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2023-11-08
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2026-01-13
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2023-03-25
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
6495	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2024-03-19
7862	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-3G	BONN ELEKTRONIK	2023-02-15
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
8661	SHIELDED ROOM	--	SIEPEL	N/A
6158	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-10-22
7796	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2024-03-16
8848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE AND SCHWARZ	2024-12-21
7798	SOFTWARE FOR EMC/RF TESTING	WMS32	ROHDE AND SCHWARZ	N/A

## Testing verdicts

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

## Summary

### ANT+

FCC PART 15 PARAGRAPH / RSS-210			
Requirement – Test case		Verdict	Remark
15.249 (a) / RSS-210 B.10 (a)	Field strength of fundamental and harmonic emissions	P	--
15.249 (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. ANT+

## INDEX

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## TEST CONDITIONS

### POWER SUPPLY (V) and ANTENNA:

V nominal:	3.7Vdc
Type of Power Supply:	Battery
Type of Antenna:	SMD passive
Declared Antenna Gain:	+3.7 dBi

### TEST FREQUENCIES:

Channel:	2457 MHz
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### POWER SETTING:

The next power setting was used to configure the sample for the tests:

		Output Power
ANT+	Middle Channel: 2457 MHz	-12dBm

## CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



## RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

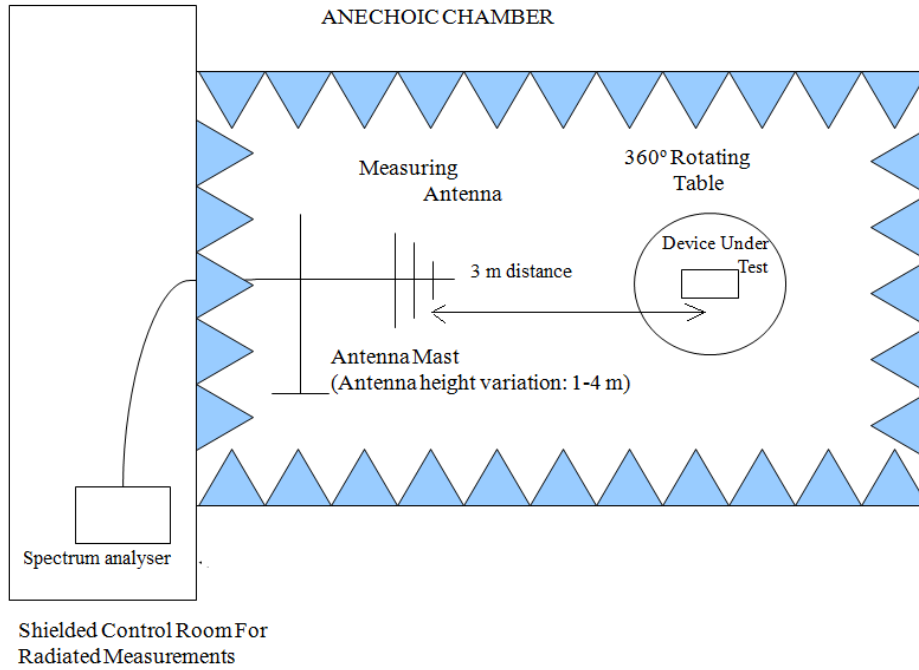
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

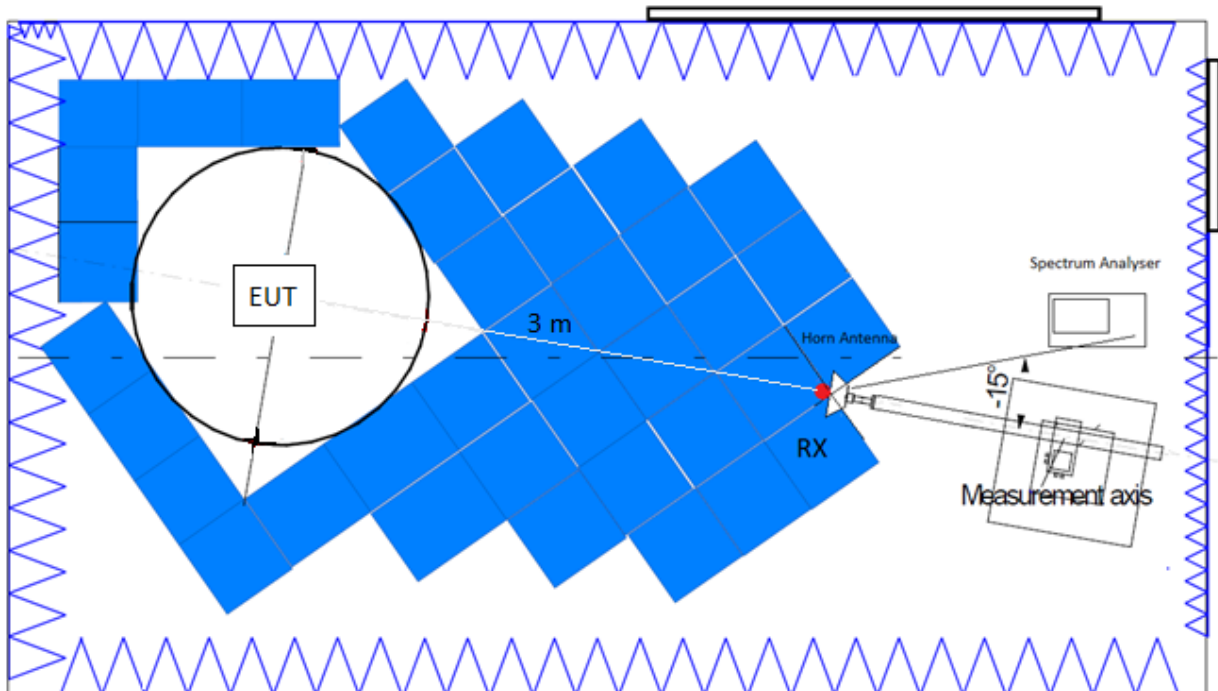
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

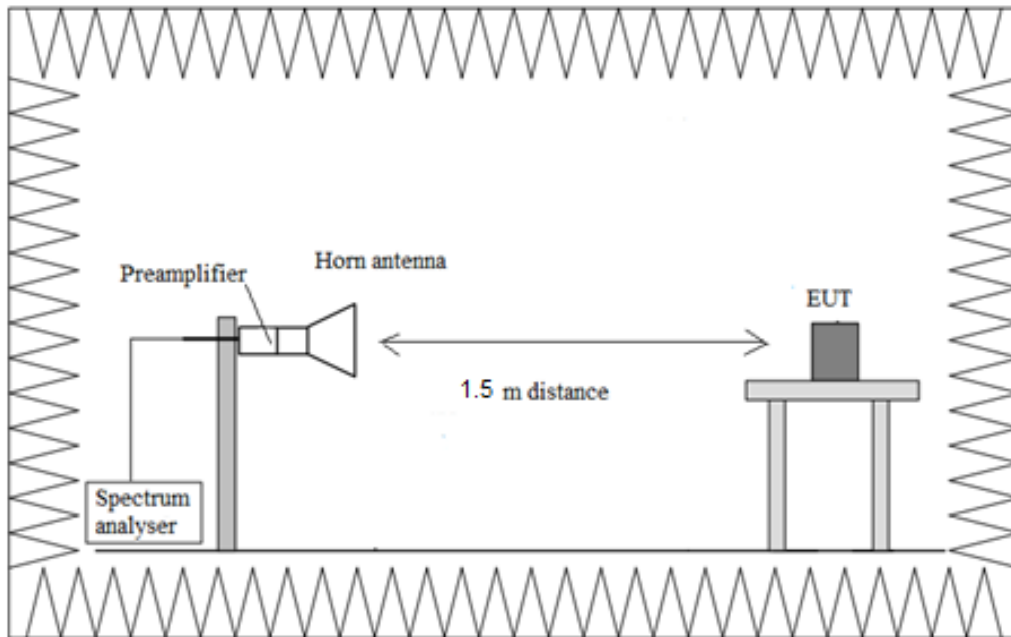
Radiated measurements setup  $f < 1$  GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup  $f > 17$  GHz:



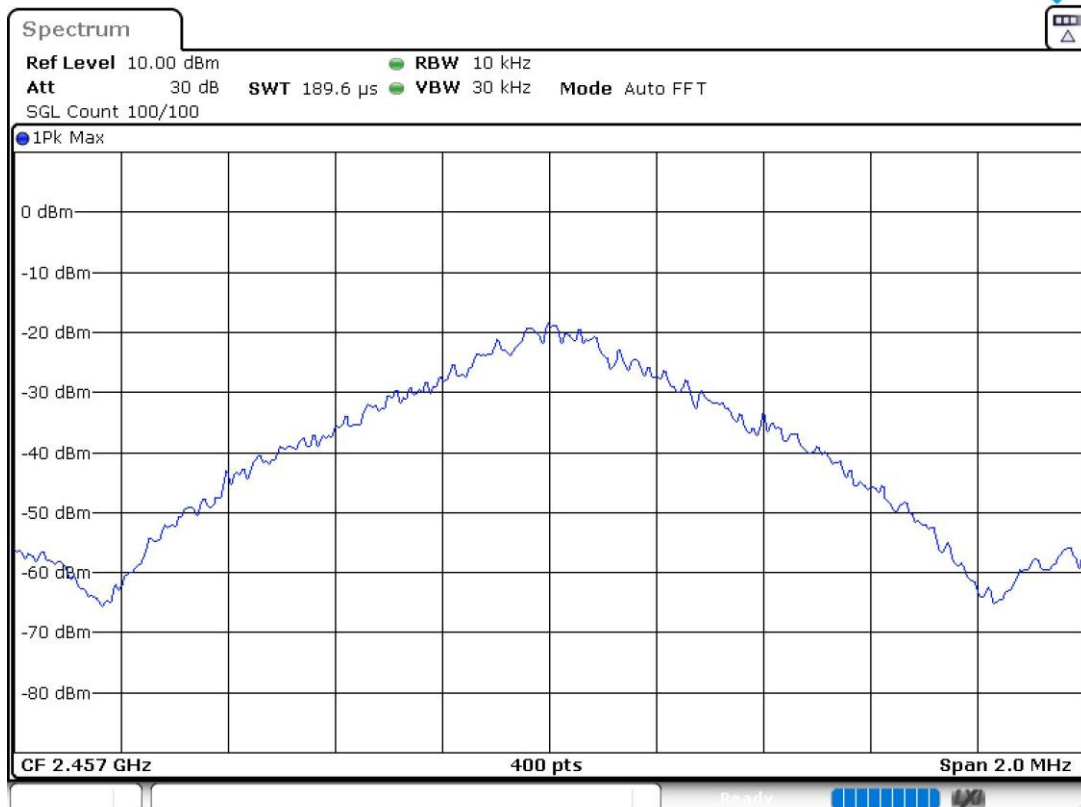
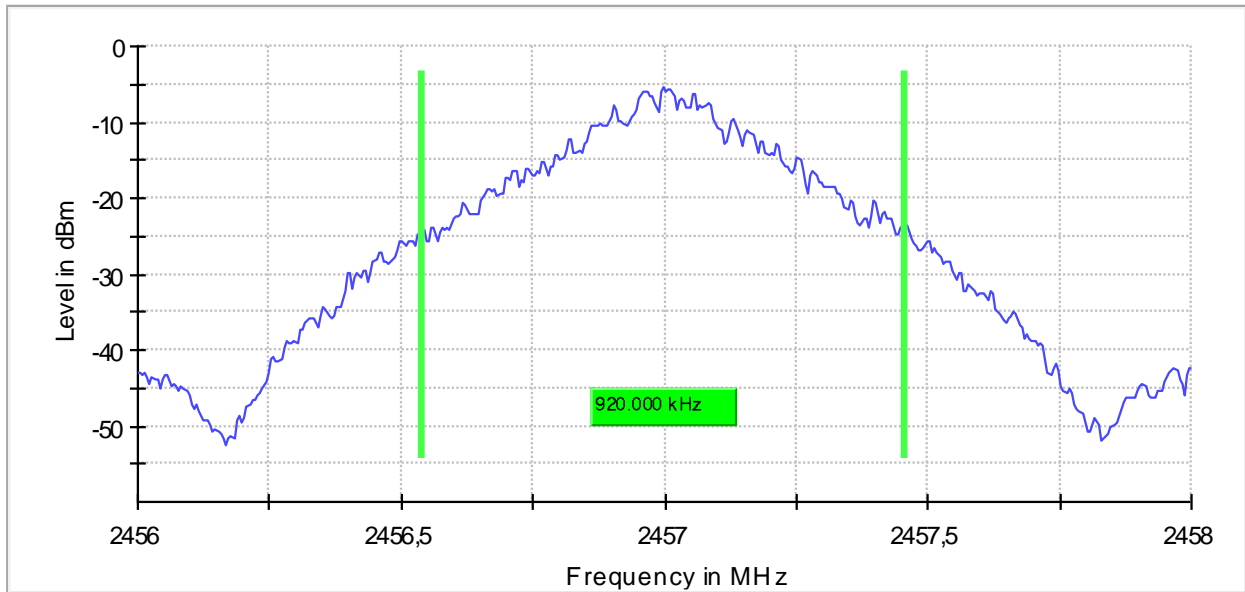
## Occupied Bandwidth

### RESULTS:

	Channel 2457 MHz
99% Bandwidth (MHz)	0.920
Measurement Uncertainty (%)	< 1.17

Verdict: Pass

99 % Bandwidth



## 15.249 (a) / RSS-210 B.10 (a) Field strength of fundamental and harmonics emissions

### 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 $\mu$ 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

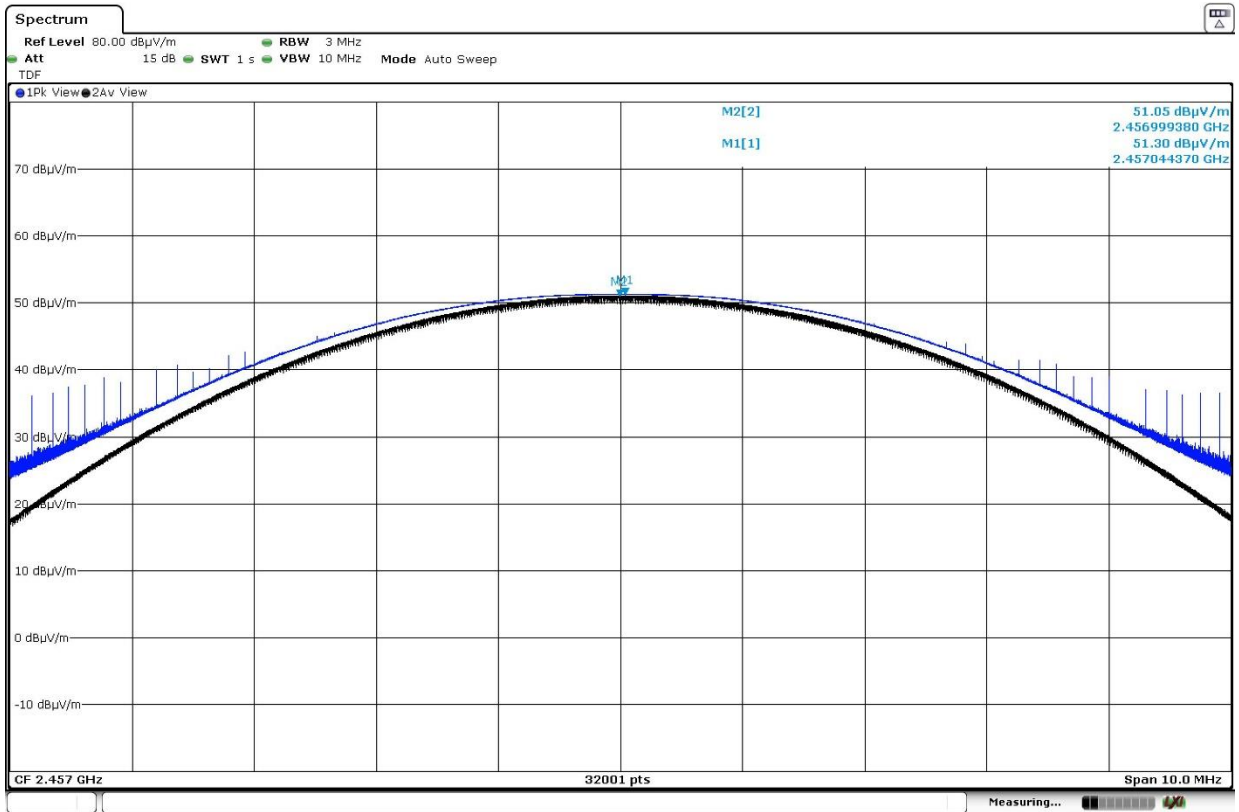
For frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

### RESULTS:

	Channel 2457 MHz
Average Field Strength (dB $\mu$ V/m)	51.05
Peak Field Strength (dB $\mu$ V/m)	51.30
Measurement Uncertainty (dB)	$\pm$ 4.32

Verdict: Pass





## 15.249 (d) / RSS-210 B.10 (b) Emissions radiated outside of the specific frequency bands

**SPECIFICATION:**

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

Fundamental frequency (MHz)	Field strength of harmonics (µV/m)	Field strength of harmonics (dBµV/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 (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	-	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-17 GHz and at distance of 1m for the frequency range 17 GHz-26 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.

### Frequency range 30 MHz - 1 GHz:

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

Measurement Uncertainty  $<\pm 4.94$  dB

### Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

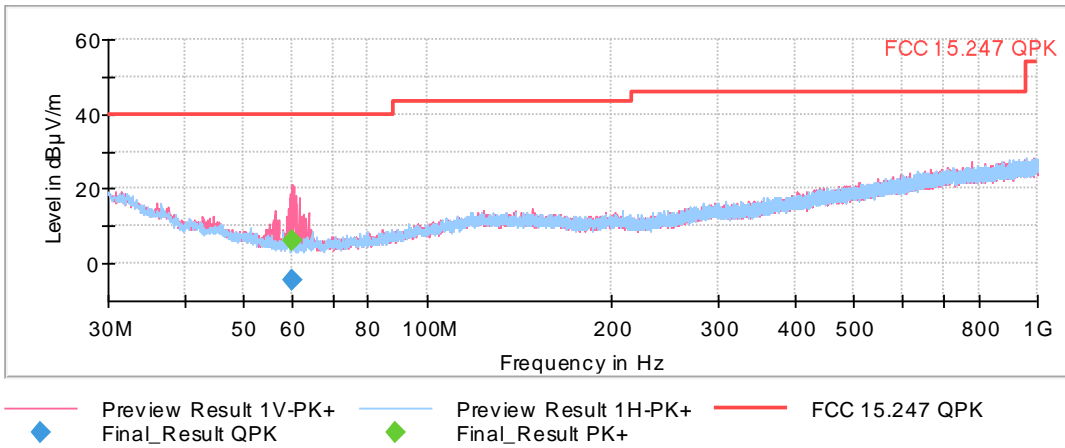
Spurious signals with peak levels above the average limit (54 dB $\mu$ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

Spurious frequency (GHz)	Emission Level (dB $\mu$ V/m)	Polarization	Detector
4.9140	49.97	V	Peak

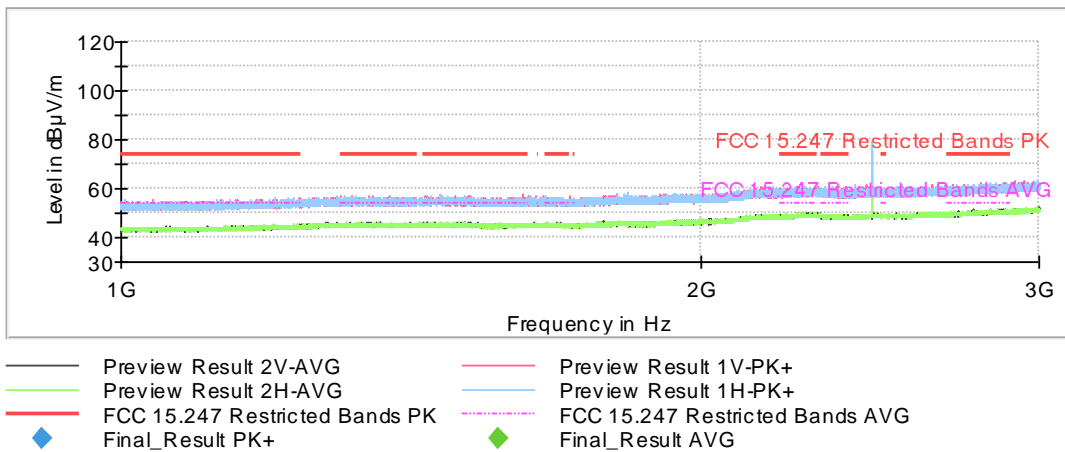
Measurement Uncertainty: 1-3 GHz  $<\pm 4.01$  dB  
3-17 GHz  $<\pm 4.28$  dB  
17-26 GHz  $<\pm 4.89$  dB

Verdict: PASS

**FREQUENCY RANGE 30 MHz - 1 GHz**

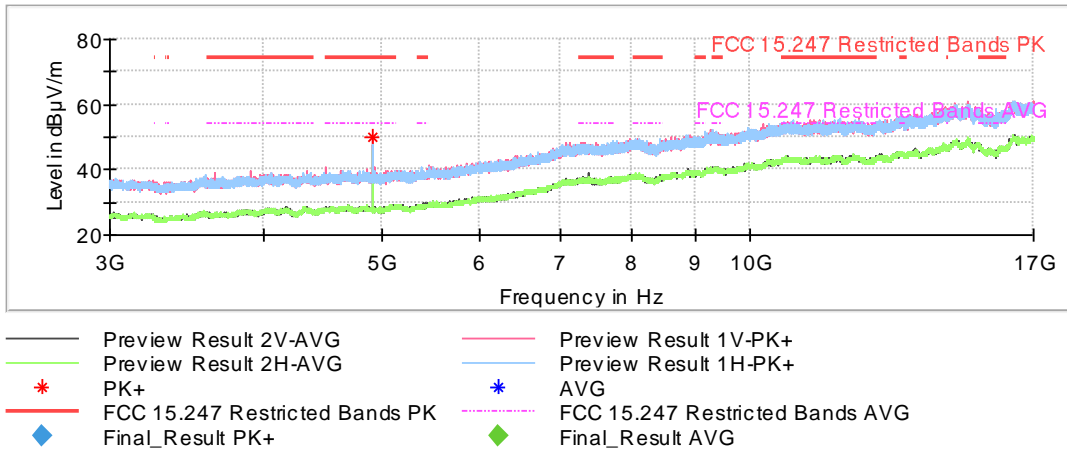


**FREQUENCY RANGE 1 - 3 GHz**

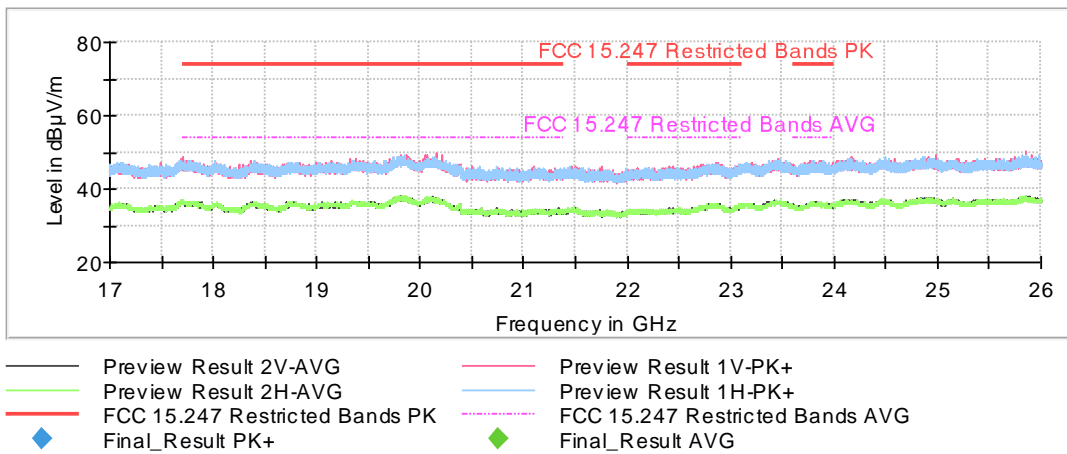


The peak above the limit is the carrier frequency.

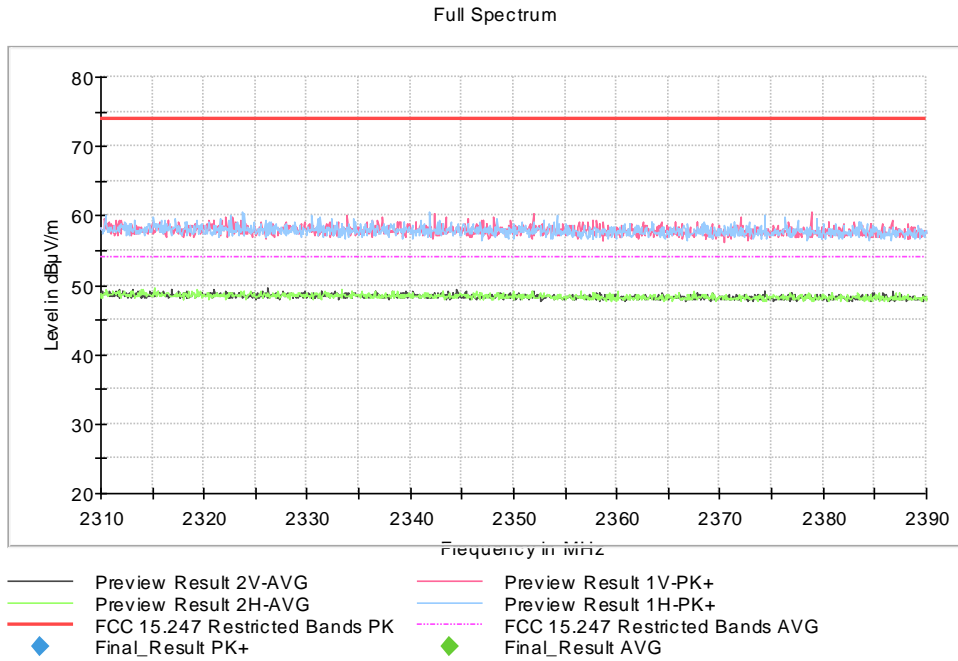
### FREQUENCY RANGE 3 - 17 GHz



### FREQUENCY RANGE 17 - 26 GHz



**FREQUENCY RANGE 2.31-2.39 GHz**



**FREQUENCY RANGE 2.4835-2.5 GHz**

