DEKRA Testing and Certification, S.A.U.
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ilac-MRA ENAC ENSAYOS Nº 51/LE147

Test report No:
NIE: 62453RRF.001

Partial Test Report

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

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.
Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.
General Requirements and Information for the Certification of Radio Apparatus.

(*) Identification of item tested	This product together with an app on the smartphone makes sure the user cannot access the smartphone screen while driving. The product acts as a beacon, closes the iPhone screen and detect whether the car is moving or standing still.
(*) Trademark	SafeDrivePod
(*) Model and /or type reference	TruckPod
Other identification of the product	HW version: V1.3 SW version: V3.1.4 FCC ID: 2ASQJ-TP1 IC: Data not provided
(*) Features	Bluetooth LE
Applicant	SAFEDRIVEPOD INTERNATIONAL BV Stationsweg 6a, 6861 EG Oosterbeek, The Netherlands
Test method requested, standard	USA FCC Part 15.247 (10-1-18) Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-18) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (April 2018). 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 v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	J. Carlos Luque RF Lab. Supervisor 74841983Y JOSE CARLOS LUQUE (C:A29507456) Firmado digitalmente por 74841983Y JOSE CARLOS LUQUE (C:A29507456) Fecha: 2019.12.19 10:26:24 +01'00'
Date of issue	2019-12-19
Report template No	FDT08_22 (*) "Data provided by the client"

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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.

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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
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 S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. 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 of TruckPod consists of the CC2640 microprocessor with BLE radio and a separate accelerometer. The accelerometer measures vibrations to detect driving. The BLE radio also is a HID device, able to send a signal to the iPhone to press the on/off button on the side. The beacon functionality is standard for BLE.

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 result.

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
62014/005	Bluetooth Truckpod device	TruckPod	CC78AB15B6EA	2019/07/07

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)	
	NA		☐	☐	☐	
Supplementary information to the ports..... :	NA					
Rated power supply .....:	Voltage and Frequency					
	☒	DC: 3.6 V				
Rated Power .....:	NA					
Clock frequencies .....:	32 kHz, 24 MHz					
Other parameters.....:	Not provided					
Software version .....:	3.1.4					
Hardware version.....:	1.3					
Dimensions in cm (W x H x D)....:	48x36x17mm					
Mounting position.....:	☒	Other: mounted in car (not fixed)				
Modules/parts .....:	Module/parts of test item		Type	Manufacturer		
	2 normal Truckpods			SafeDrivePod		
	2 Truckspods with special testing firmware			SafeDrivePod		
Accessories (not part of the test item) .....:	Description		Type	Manufacturer		
	NA					

Documents as provided by the applicant.....:	Description	File name	Issue date
	Explanation on how to modify radio characteristic when DUT has special firmware	How to start TX_TEST mode on Proteus 2019-05-21.pdf	May 21, 2019

Identification of the client

SAFEDRIVEPOD INTERNATIONAL BV
Stationsweg 6a, 6861 EG Oosterbeek, The Netherlands

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-10-08
Date (finish)	2019-10-08

Document history

Report number	Date	Description
62453RRF.001	2019-12-19	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 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Nicolás Salguero, Verónica García, Ignacio Cabra.

Used instrumentation:

Radiated Measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Multi-device Controller EMCO 2090	N.A.	N.A.
3.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
4.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2018/10	2020/10
5.	Pre-Amplifier G>40dB 10MHz-6GHz, BONN ELEKTRONIK, BLNA 0160-01N	2019/02	2020/02
6.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2017/04	2020/04
7.	Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
8.	RF Pre-amplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2019/04	2020/04
9.	Low Noise Amplifier G>30dB, 18 - 40 GHz BONN ELEKTRONIK BLMA 1840-1M	2018/02	2020/02
10.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2016/11	2019/11
11.	Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07

Testing verdicts

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

Summary

1. Bluetooth Low Energy.

FCC PART 15 PARAGRAPH / RSS-247 Requirement – Test case		Verdict	Remark
Section 15.247 Subclause (a) (1) / RSS-247 5.1. (b)	20 dB Bandwidth and Carrier frequency separation	N/M	
Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Number of hopping channels	N/M	
Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Time of occupancy (Dwell Time)	N/M	
Section 15.247 Subclause (b) / RSS-247 5.4. (b)	Maximum peak output power and antenna gain	N/M	
Section 15.247 Subclause (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	N/M	
Section 15.247 Subclause (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	(1)
Supplementary information and remarks: (1) Only test requested.			

Appendix A: Test results. Bluetooth Low Energy

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TEST CONDITIONS

POWER SUPPLY (V):

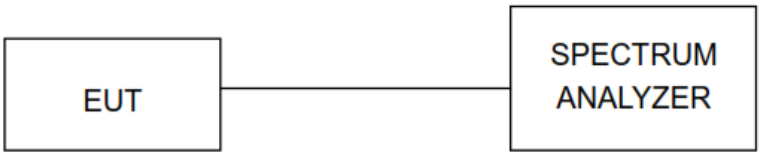
V nonimal:	3.6 Vdc.
Type of Power Supply:	Internal battery.
Type of Antenna:	Internal (Planar inverted-F antenna mounted on printed board)
Maximum Declared Antenna Gain:	0 dBi (Antenna gain plus antenna cable loss).

TEST FREQUENCIES:

Low Channel:	2402 MHz
Middle Channel:	2440 MHz
High Channel:	2480 MHz

CONDUCTED MEASUREMENTS:

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



The DC supply voltage is applied using an external calibrated power supply with a multimeter.

RADIATED MEASUREMENTS:

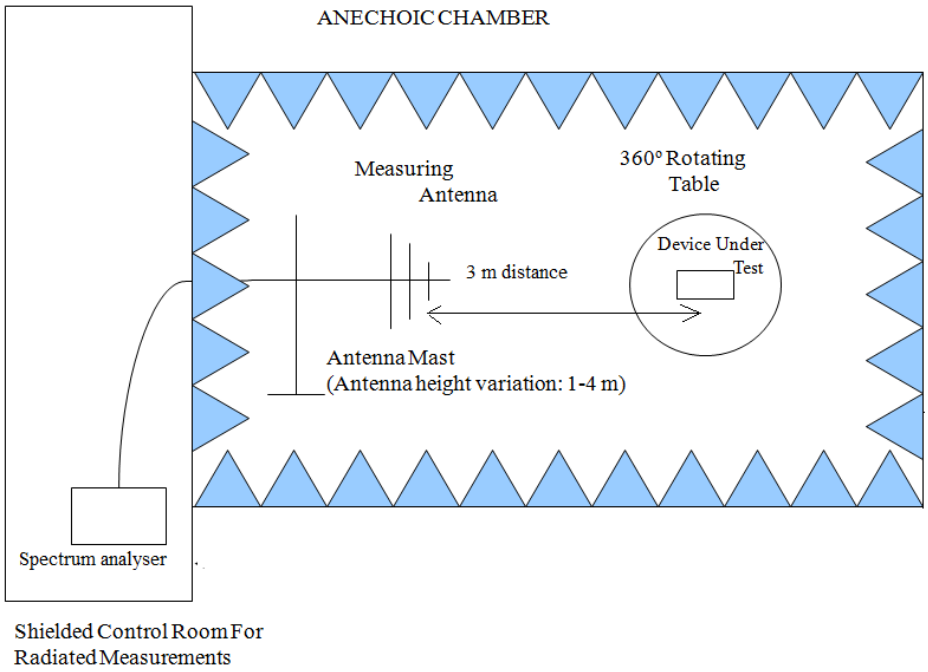
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz) is situated at a distance of 3 m and at a distance of 1m for the frequency range 1 GHz-26 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 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.

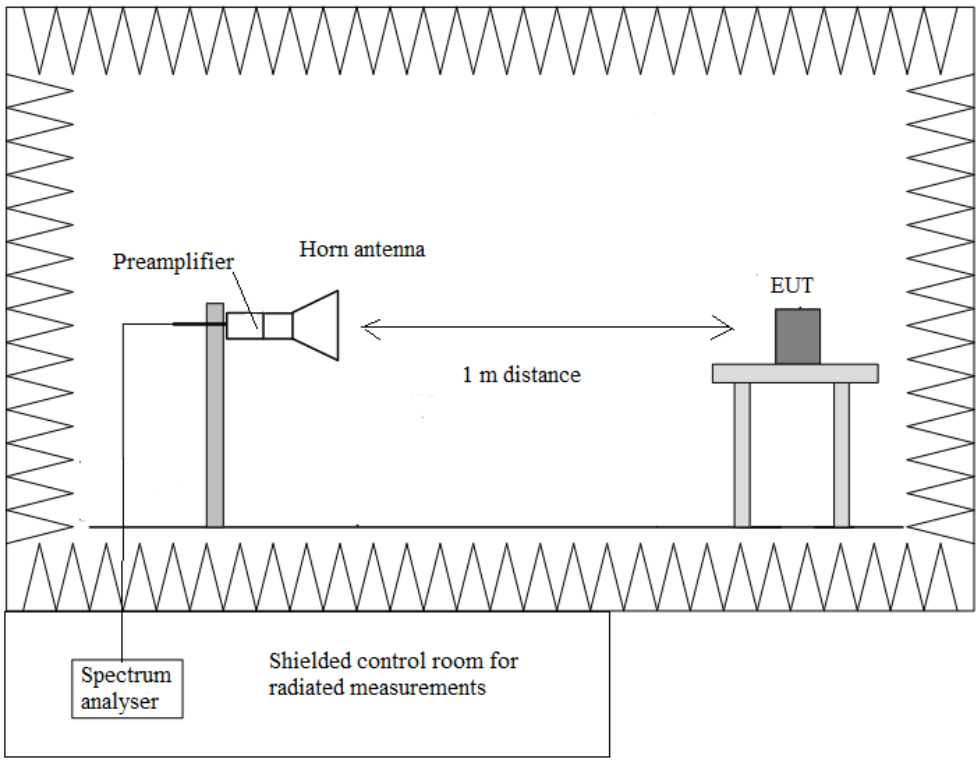
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find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

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

Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup f > 1 GHz:



FCC Section 15.247 Subclause (d) / RSS-247 Clause 5.5. Emission limitations radiated. (Transmitter)

SPECIFICATION:

Radiated emissions which fall in the restricted bands. as defined in §15.205(a). 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	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	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-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 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:

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

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

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.

Spurious frequencies with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

- Low Channel (2402 MHz). Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
2.38956	Peak	61.84	H	<± 3.04
	Average	37.52		<± 3.04
2.48673	Peak	48.61	V	<± 3.04
4.80343	Peak	46.8	H	<± 4.88
7.20583	Peak	43.78	V	<± 4.88
9.60683	Peak	43.14	V	<± 4.88

- Middle Channel (2441 MHz). Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
2.38854	Peak	50.9	H	<± 3.04
2.49611	Peak	50.03	H	<± 3.04
4.88043	Peak	44.87	H	<± 4.88
7.32017	Peak	41.72	V	<± 4.88
9.75990	Peak	43.20	V	<± 4.88

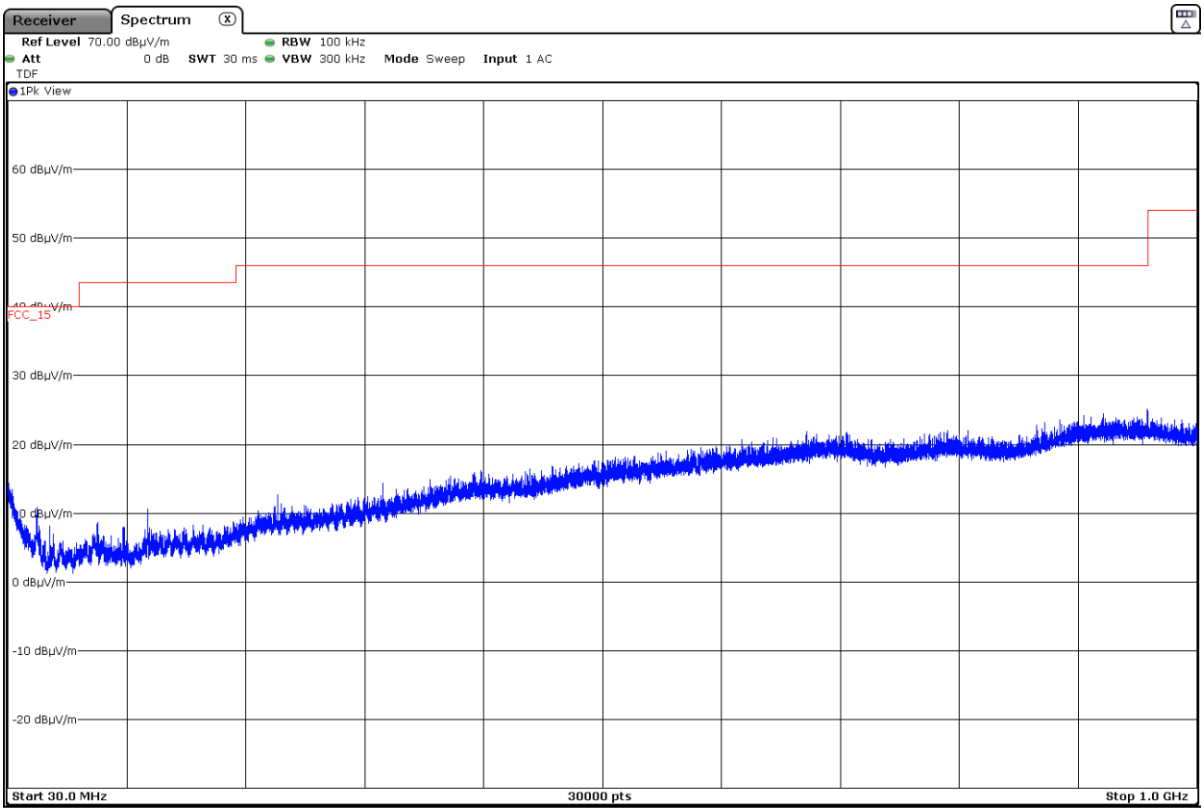
- High Channel (2480 MHz). Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
2.37990	Peak	49.51	H	<± 3.04
2.48355	Peak	69.01	H	<± 3.04
	Peak	41.01		<± 3.04
4.95977	Peak	41.83	H	<± 4.88
7.43917	Peak	41.03	H	<± 4.88
9.91997	Peak	43.66	V	<± 4.88

Verdict: PASS

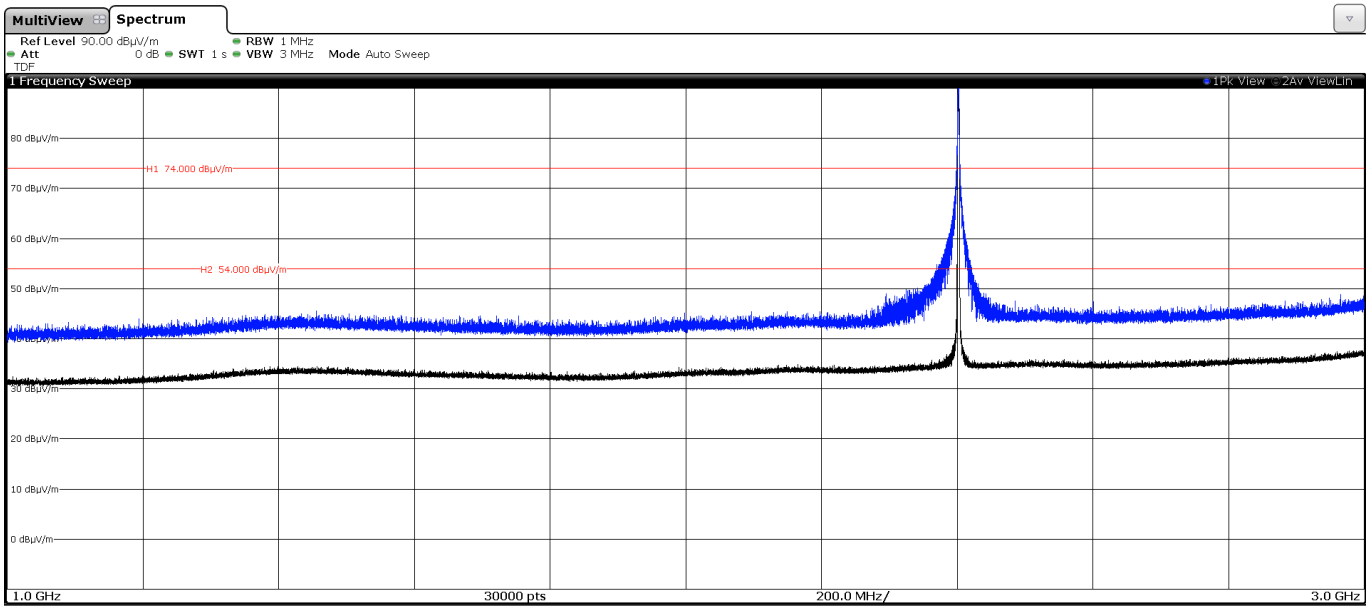
FREQUENCY RANGE 30 MHz - 1 GHz:

The spurious signals detected do not depend on either the operating channel or the modulation mode.



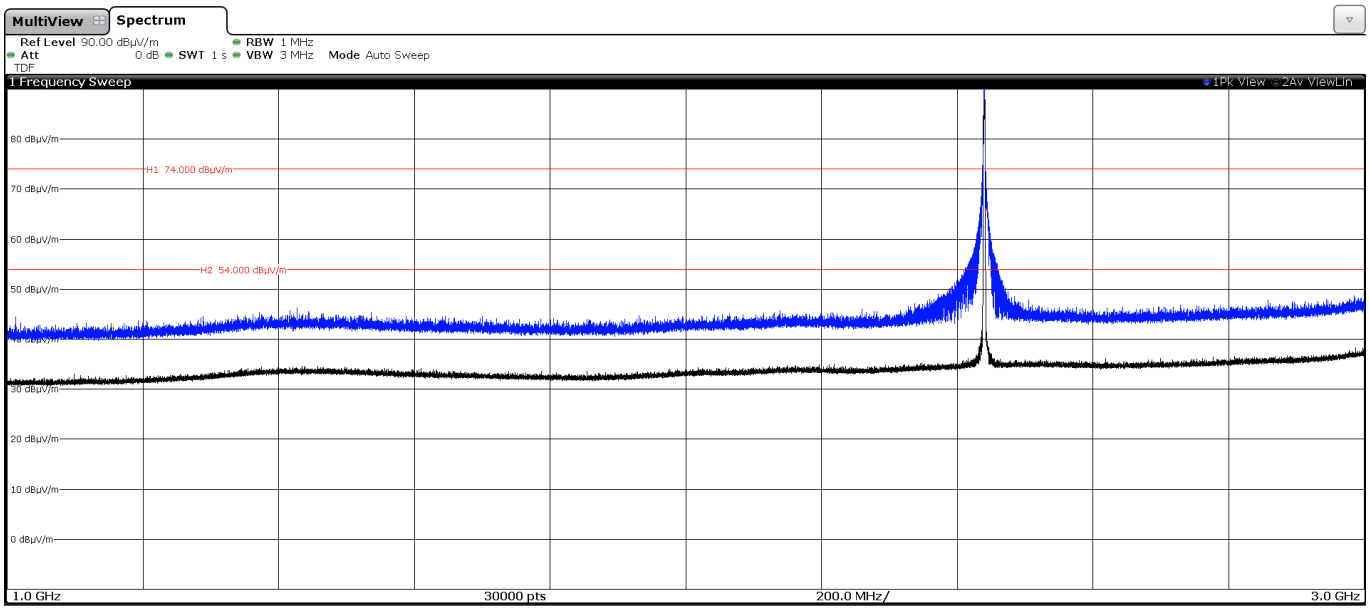
FREQUENCY RANGE 1 - 3 GHz:

- Low Channel (2402 MHz):



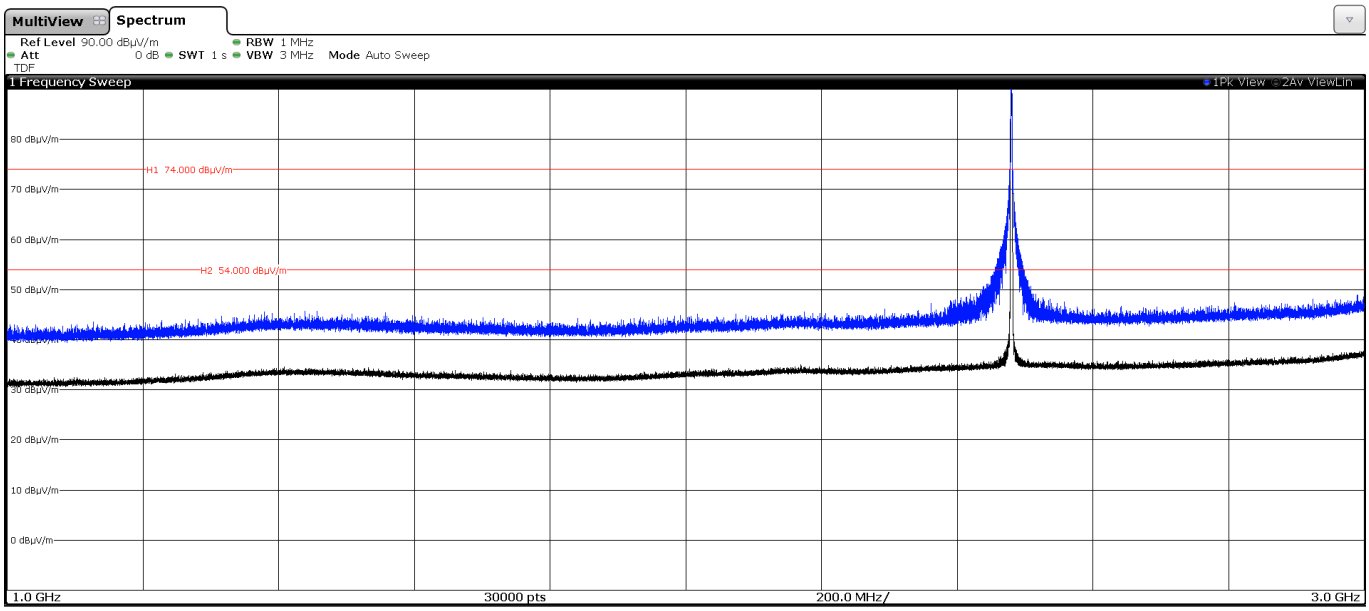
The peak above the limit is the carrier frequency.

- Middle Channel (2440 MHz):



The peak above the limit is the carrier frequency.

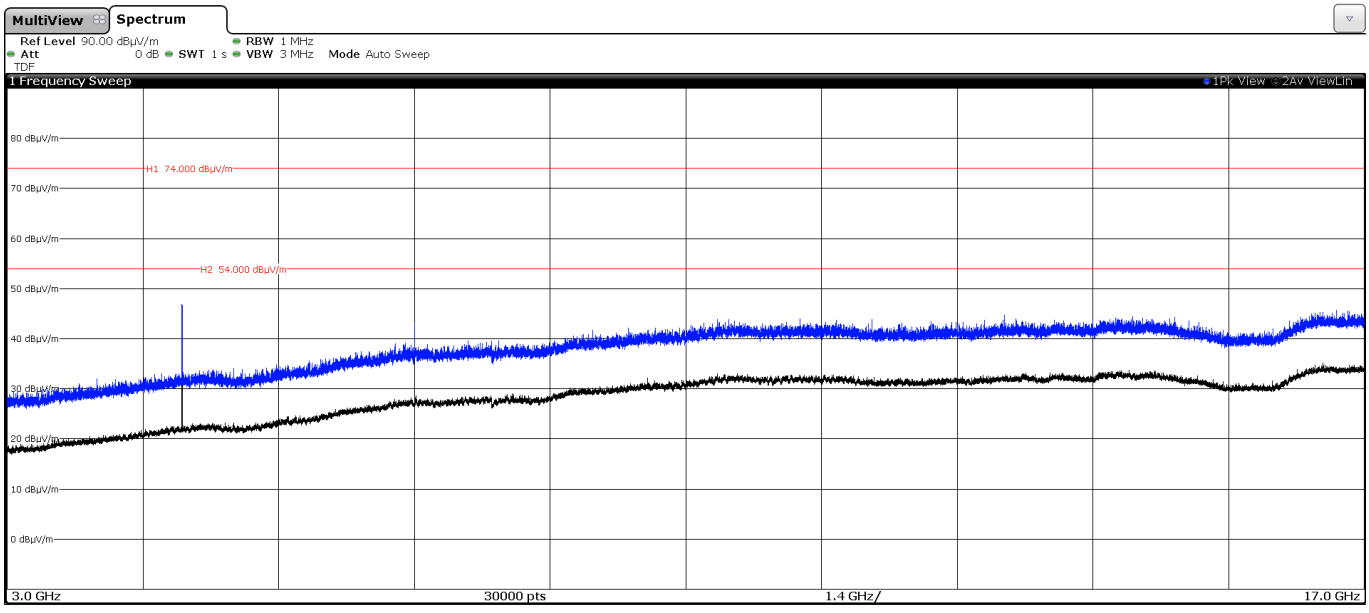
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

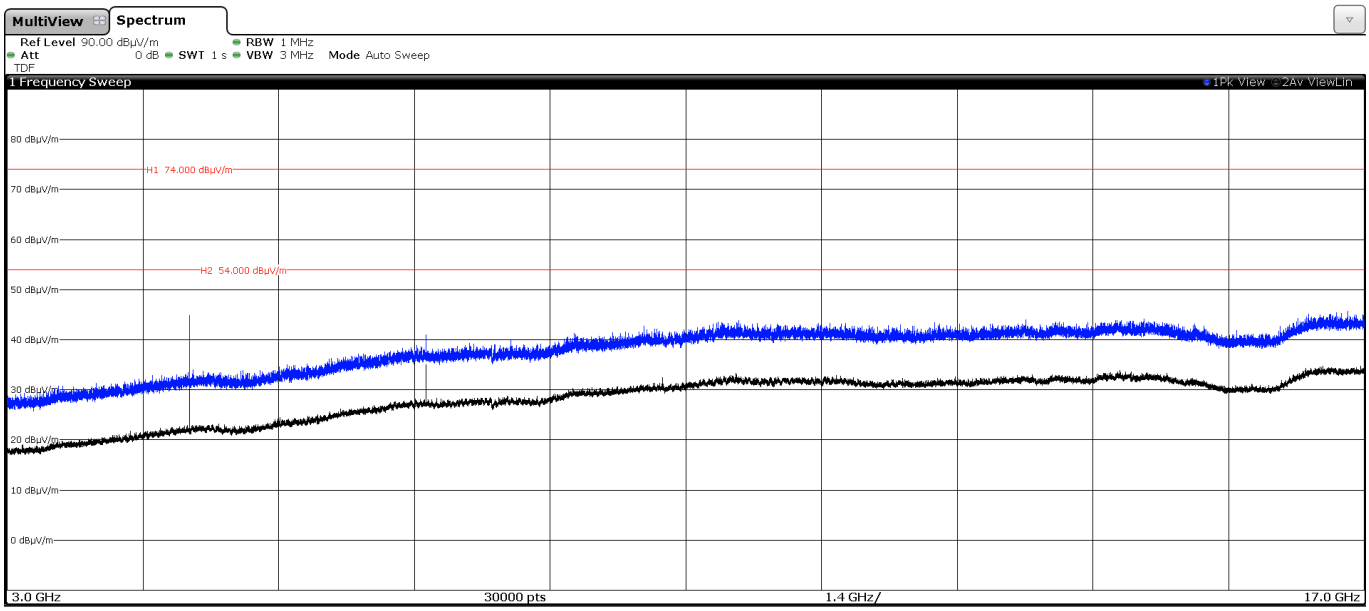
FREQUENCY RANGE 3 - 17 GHz:

- Low Channel (2402 MHz):



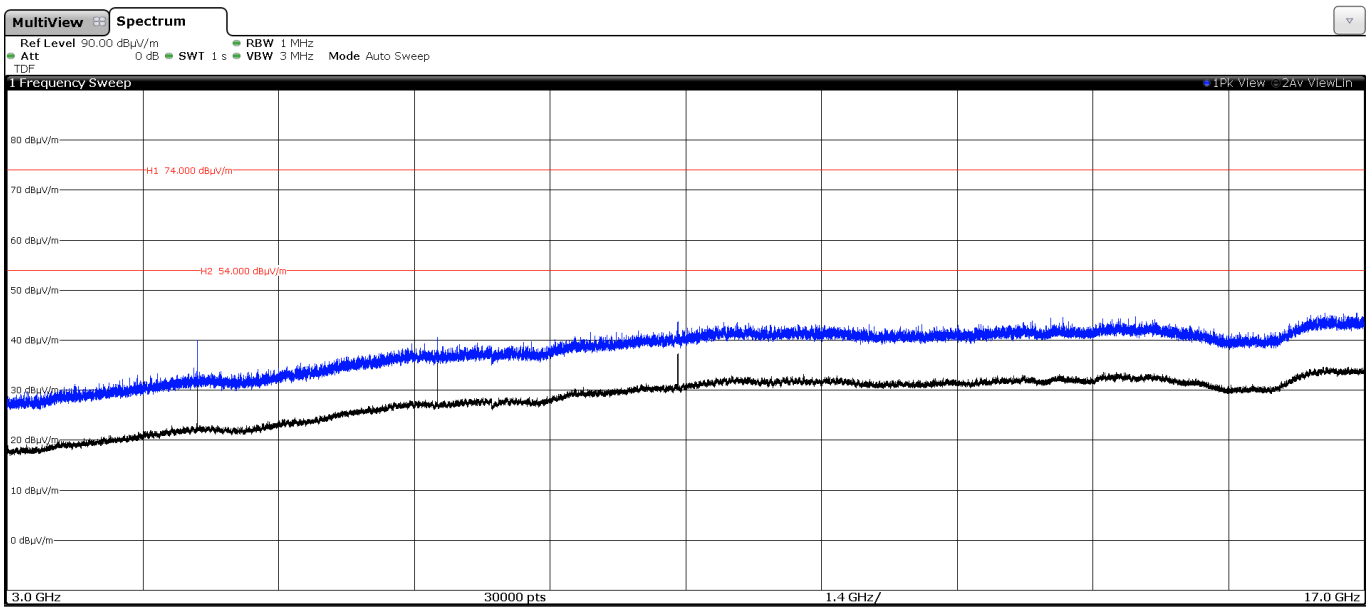
The peak above the limit is the carrier frequency.

- Middle Channel (2440 MHz):



The peak above the limit is the carrier frequency.

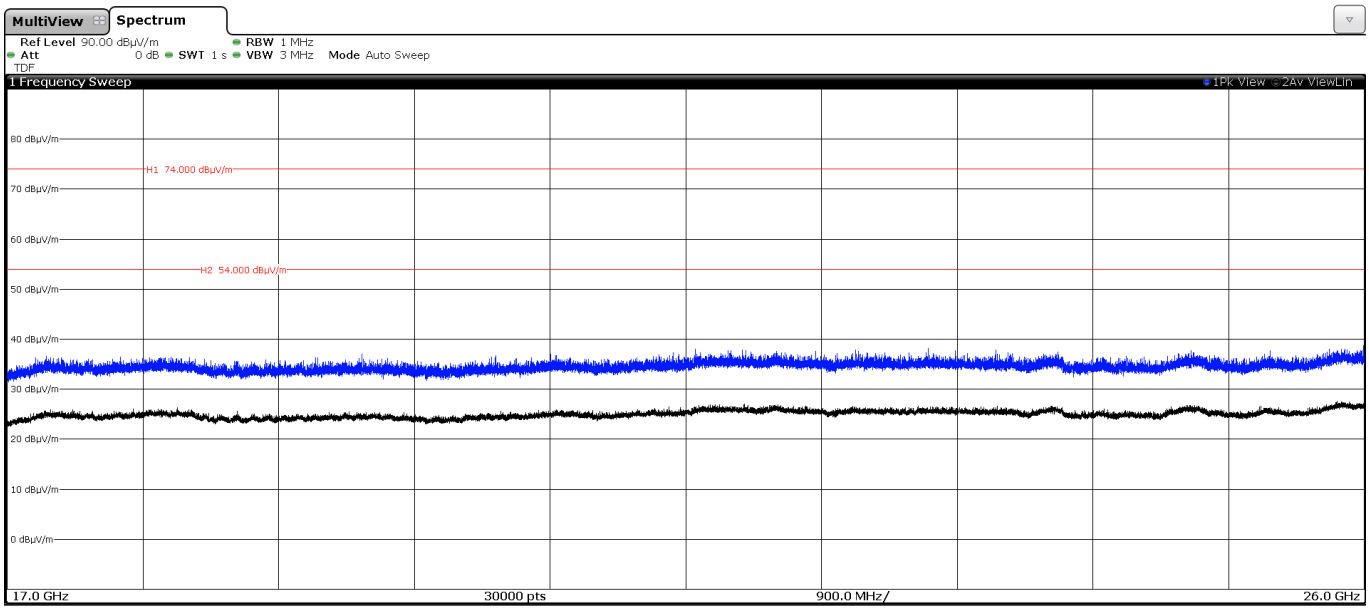
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

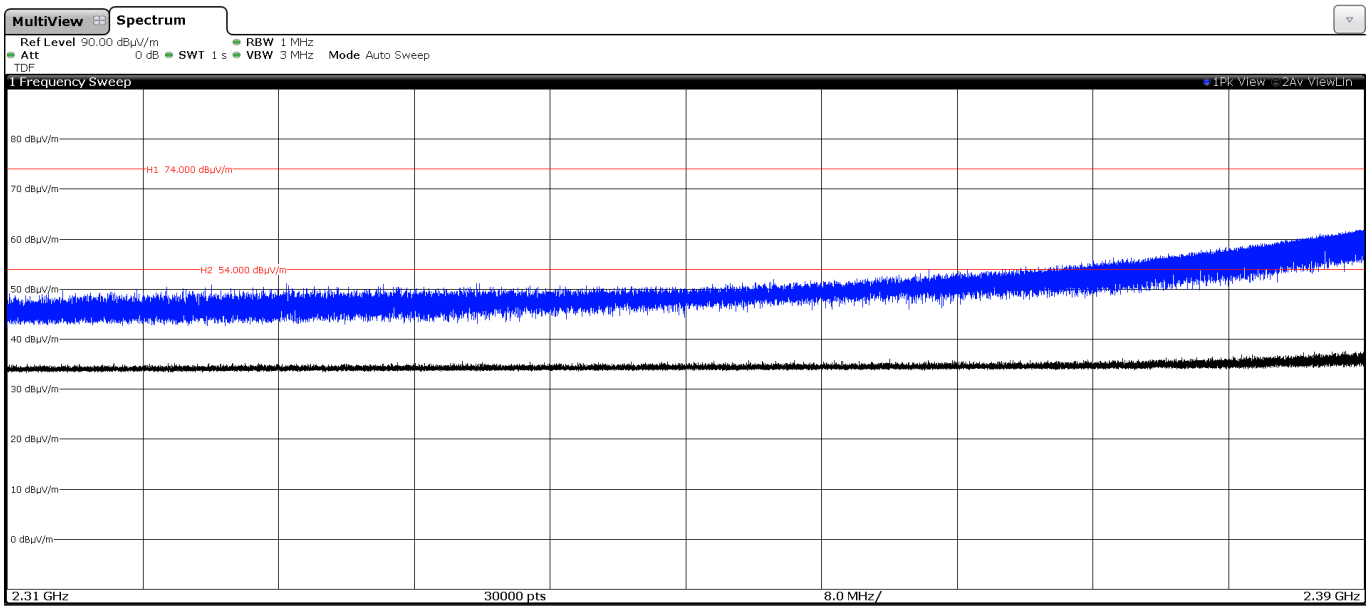
FREQUENCY RANGE 17 - 26 GHz:

This plot is valid for the Low. Middle and High Channels and all the modulation modes.

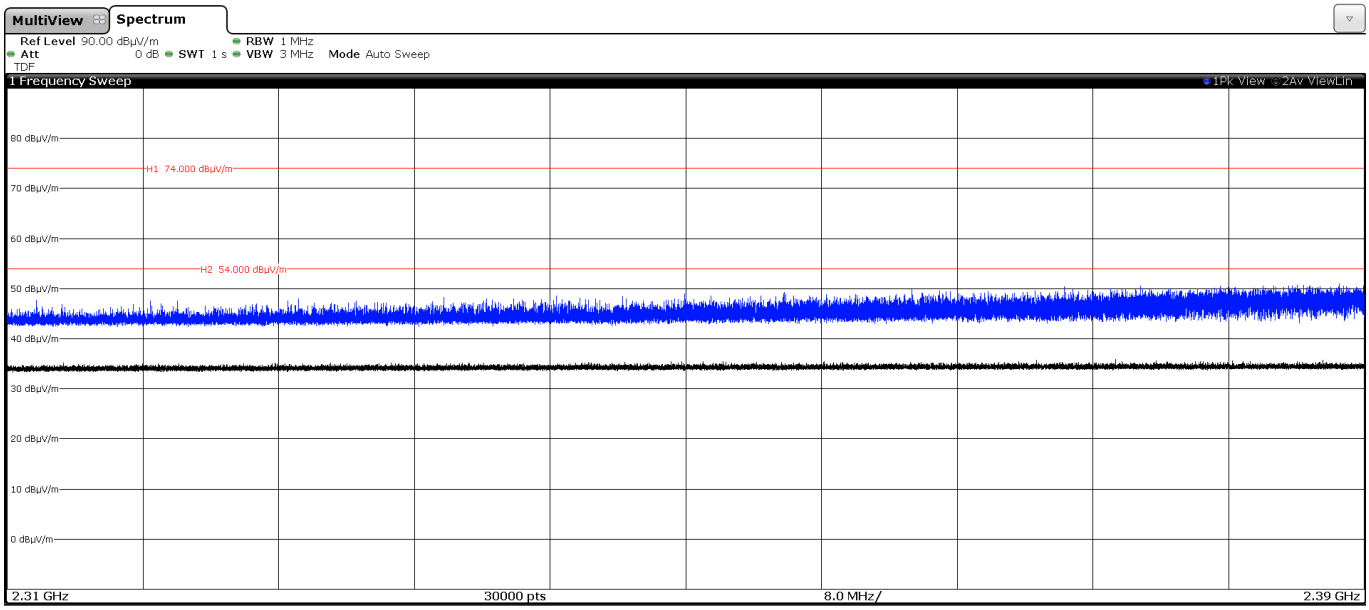


FREQUENCY RANGE 2.31-2.39 GHz:

- Low Channel (2402 MHz):



- Middle Channel (2440 MHz):



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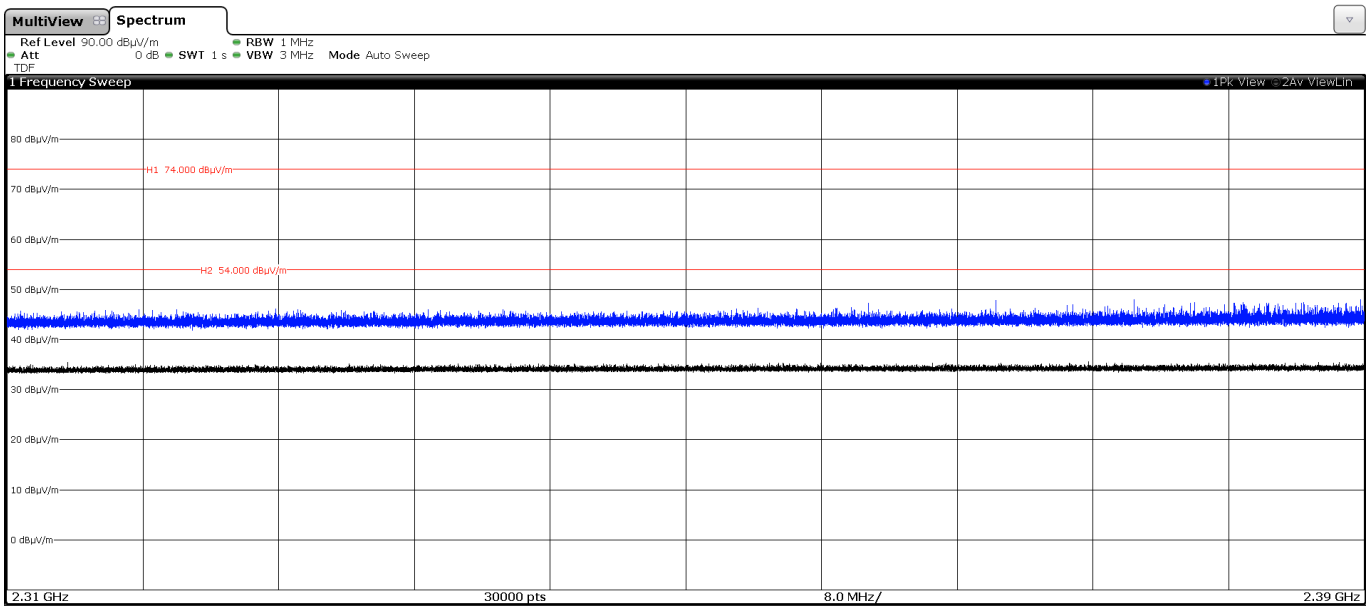
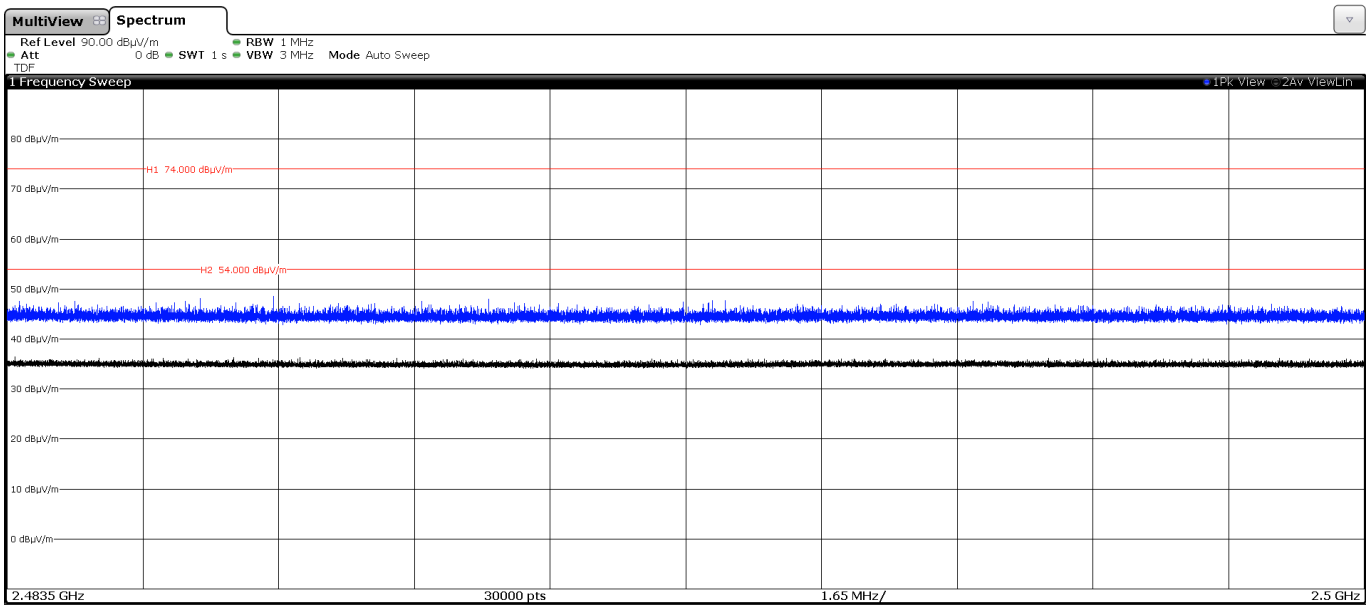
High Channel (2480 MHz):

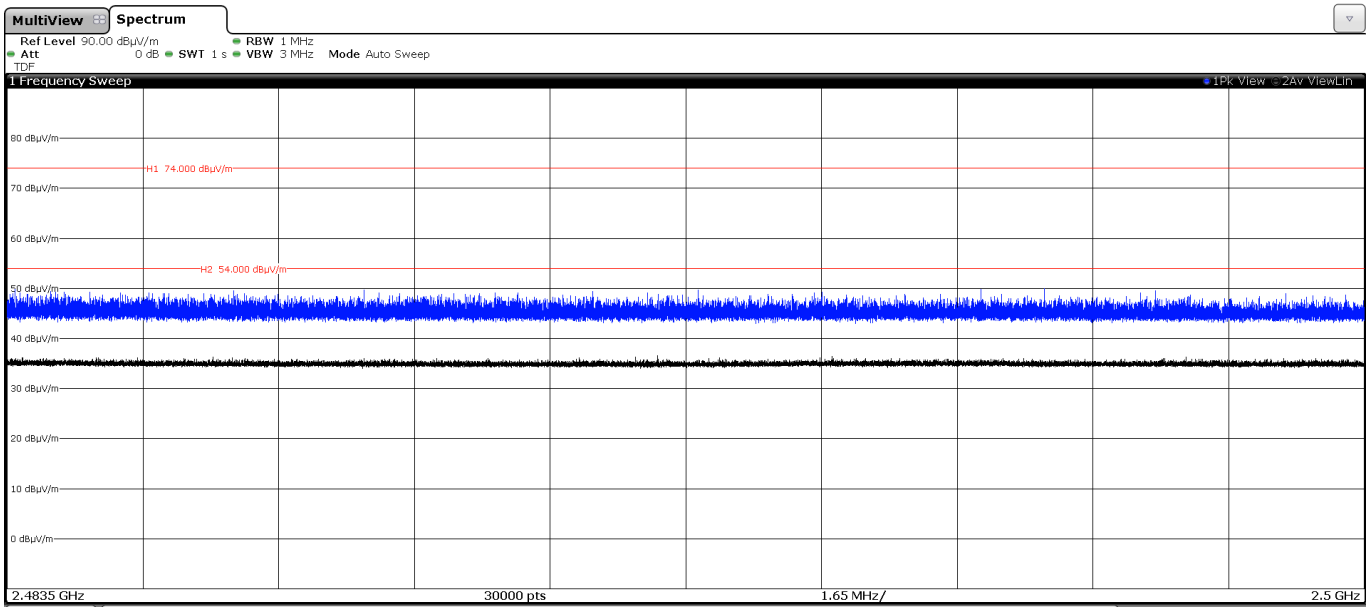


FREQUENCY RANGE 2.4835-2.5 GHz:

- Low Channel (2402 MHz):



- Middle Channel (2440 MHz):



- High Channel (2480 MHz):