DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa No. 2 · 29590 Campanillas · Málaga · España
C.I.F. A29507456

ISED CABid: ES1909

Test Report No:
NIE: 70437RRF.002A1

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

(*) Identification of item tested	AirCurve 11
(*) Trademark	ResMed
(*) Model and /or type reference	39428
(*) Derived test models not tested	For USA: 39491, 39492, 39493, 39494, 51400. For Canada: 39495, 39496, 39497, 39498, 51400.
Other identification of the product	HW version: 1.0 SW version: SW04600 FCC ID: 2ACHL-AIR11M1B IC: 9103A-AIR11M1B
(*) Features	LTE Cat-M1, BLE
Applicant	ResMed Pty Ltd. 1 Elizabeth Macarthur Drive Bella Vista, NSW 2153 Australia
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 2 (February 2021). 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.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager 2022.05.06 10:20:24 +02'00'
Date of issue	2022-05-06
Report template No	FDT08_24 (*) "Data provided by the client"

ENAC ENSAYO ISO 17025 Nº51 / LE147

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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 S.A.U is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification S.A.U is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this 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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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.
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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 the model 39428 is a bilevel device with integrated cellular and Bluetooth connectivity.

3. Derived models of 39428 are not tested: 39491, 39492, 39493, 39494, 39495, 39496, 39497, 39498 and 51400.

ResMed
Changing lives with every breath

Date: 01 Dec 2021

DECLARATION OF EQUIVALENCE

This document declares that the following designated products are equivalent to the unit under test **39428**.

For USA:

Model Name / Product Code	Marketing Name
39491	AIRCURVE 11 ASV USA
39492	AIRCURVE 11 S USA
39493	AIRCURVE 11 ST USA
39494	AIRCURVE 11 VAUTO USA

For Canada:

Model Name / Product Code	Marketing Name
39495	AIRCURVE 11 VAUTO CAN
39496	AIRCURVE 11 S CAN
39497	AIRCURVE 11 ST CAN
39498	AIRCURVE 11 ASV CAN

For USA & Canada:

Model Name / Product Code	Marketing Name
51400	AIRCURVE 11 ST NORTH AMERICA

All the above stated products have the same hardware, cellular firmware and Bluetooth firmware.

Applicant:
Company Name: ResMed Pty Ltd
Address: 1 Elizabeth Macarthur Drive,
Bella Vista NSW 2153
Australia

By,

Christopher Jenkins

Christopher Jenkins
Title: Associate Manager – Systems Engineering
Company: ResMed Pty Ltd
Telephone: +61 2 8884 1517
e-mail: Christopher.jenkins@resmed.com.au

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
71004/014	AirCurve 11	39428	22211764430	2022/02/15
70437B/006	AC/DC adapter	390001	210002829XB	2021/11/19

Sample S/01 has undergone the test(s): FCC 15.247 (b)/RSS-247 5.4 (d) Maximum output power and antenna gain in Appendix A.

- Sample S/02 is composed of the following elements:

Control No.	Description	Model	Serial No.	Date of reception
70437B/003	AirCurve 11	39428	22211762279	2021/11/19
70437B/006	AC/DC adapter	390001	210002829XB	2021/11/19
63467B/015	ClimateLine	AIR11	22201142041	2020/10/14

Sample S/02 has undergone the test(s): The Radiated tests indicated in the Appendix A.

- Sample S/03 is composed of the following elements:

Control No.	Description	Model	Serial No.	Date of reception
68649/005	Continuous Positive Airway Pressure (CPAP) Device	39001	22201142382	2021/07/29
68649/009	AC/DC adapter	39000	00005600	2021/07/29

Sample S/03 has undergone the test(s): All Conducted test indicated in Appendix A except FCC 15.247 (b)/RSS-247 5.4 (d) Maximum output power and antenna gain.

Test sample description

Ports……..:	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)	
	Power			☒	☐	☐	
Supplementary information to the ports……..:	---						
Rated power supply ..... :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 100-240V~50-60 Hz 1.0-1.5A	☒	☐	☐	☒	☐
	☒	AC: 115V~400Hz 1.5A	☒	☐	☐	☒	☐
	☐	DC:					
Rated Power..... :	24 VDC, 3.75A						
Clock frequencies..... :	N/A						
Other parameters ..... :	390001 (PSU Model Number)						
Software version..... :	SW04600 (DUT)						
Hardware version ..... :	1.0 (DUT)						
Dimensions in cm (W x H x D) ... :	13.85 cm x 25.94 cm x 9.45 cm						
Mounting position ..... :	☒	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					

Modules/parts..... :	Module/parts of test item	Type	Manufacturer
	Wireless Module	EXS62-W	Thales
	Bluetooth LE	EFR32BG1	SiLabs
	Power Supply Unit 390001	N/A	ResMed

Accessories (not part of the test item) ..... :	Description	Type	Manufacturer
	---		

Documents as provided by the applicant ..... :	Description	File name	Issue date
	-		

(3) Only applicable to medical equipment

Identification of the client

ResMed Pty Ltd.
1 Elizabeth Macarthur Drive
Bella Vista, NSW 2153
Australia

Testing period and place

First period: All Conducted test indicated in Appendix A except FCC 15.247 (b)/RSS-247 5.4 (d) Maximum output power and antenna gain.

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-08-04
Date (finish)	2021-08-11

Second period: All Radiated test and FCC 15.247 (b)/RSS-247 5.4 (d) Maximum output power and antenna gain.

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2021-12-02
Date (finish)	2022-02-16

Document history

Report number	Date	Description
70437RRF.002	2022-03-16	First release.
70437RRF.002A1	2022-05-06	First modification: added clarification for supported power supply. This modification test report cancels and replaces the test report 70437RRF.002.

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 semi-anechoic 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 chamber for conducted measurements, 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: Nicolás Salguero.

Used instrumentation:

Conducted Measurements First Period:

Equipment	Model	Manufacturer	Last Calibration	Due Calibration
SHIELDED ROOM	S101	ETS LINDGREN	N.A.	N.A.
SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2021-02	2023-02
OPEN SWITCH UNIT	OSP120	ROHDE AND SCHWARZ	2019-09	2022-09
OPEN SWITCH UNIT UP TO 18 GHz	OSP150	ROHDE AND SCHWARZ	2021-10	2022-10
AC POWER SUPPLY 135/270V 5/10/20/40A	CS-AC35(351SL)	ELGAR	2019-09	2022-09

Conducted Measurements Second Period:

Equipment	Model	Manufacturer	Last Calibration	Due Calibration
SHIELDED ROOM	S101	ETS LINDGREN	N.A.	N.A.
SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2021-10	2023-10
AC POWER SUPPLY 135/270V 5/10/20/40A	CS-AC35(351SL)	ELGAR	2019-09	2022-09
DIGITAL MULTIMETER	175	FLUKE	2021-10	2022-10

Radiated Measurements:

Equipment	Model	Manufacturer	Last Calibration	Due Calibration
SEMIANECHOIC ABSORBER LINED CHAMBER II	FACT 3 200 STP	ETS LINDGREN	N.A.	N.A.
SHIELDED ROOM	S101	ETS LINDGREN	N.A.	N.A.
PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2021-03	2022-03
HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2020-04	2023-04
PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2021-06	2022-06
HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS- ELEKTRONIK	2019-11	2022-11

Equipment	Model	Manufacturer	Last Calibration	Due Calibration
PRE-AMPLIFIER G>30dB 17-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2021-09	2022-09
HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2020-05	2023-05
EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2020-12	2022-12
SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2020-07	2022-07
AC POWER SUPPLY 135/270V 5/10/20/40A	CS-AC35(351SL)	ELGAR	2019-09	2022-09
DIGITAL MULTIMETER	175	FLUKE	2021-10	2022-10

Testing verdicts

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

Summary

Bluetooth Low Energy 5.0 (1Mbps)

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.247 (a)(2) / RSS-247 5.2 (a)	6 dB Bandwidth	P	(1)
FCC 15.247 (b) / RSS-247 5.4 (d)	Maximum output power and antenna gain	P	
FCC 15.247 (d) / RSS-247 5.5	Band-edge emissions compliance (Transmitter)	P	(1)
FCC 15.247 (e) / RSS-247 5.2 (b)	Power spectral density	P	(1)
FCC 15.247 (d) / RSS-247 5.5	Emission limitations radiated (Transmitter)	P	

Supplementary information and remarks:

(1) Conducted testing inherited from 39001 model due to the BLE module is the same for 39001 and 39428 models.

Appendix A: Test results. Bluetooth Low Energy.

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TEST CONDITIONS

(*) Declared by the Applicant

POWER SUPPLY (*):

Vnominal: 115 Vac / 60Hz (*)

Type of Power Supply: AC external mains.

(*): Preliminary RSE scan determined 115Vac / 60Hz as worst case of power supply.

ANTENNA (*):

Type of Antenna: Internal.

Maximum Declared Antenna Gain: 1.98 dBi

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 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 AC 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 from 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 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

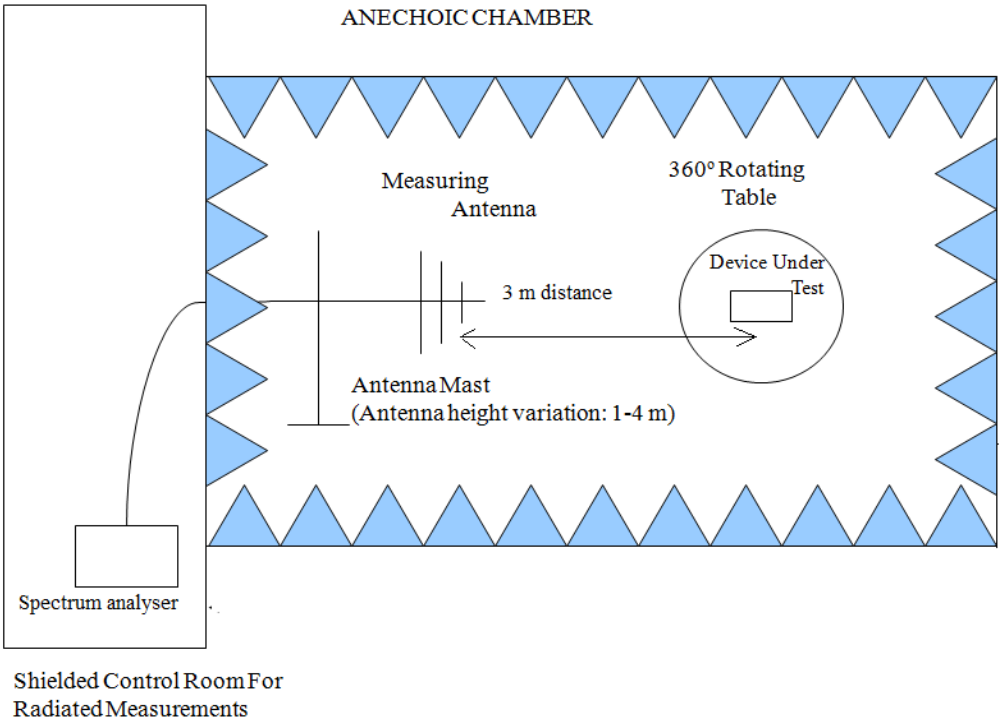
For radiated emissions in the range 17 GHz – 26 GHz measured at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 was varied from 1 to 4 meters to find the maximum radiated emission.

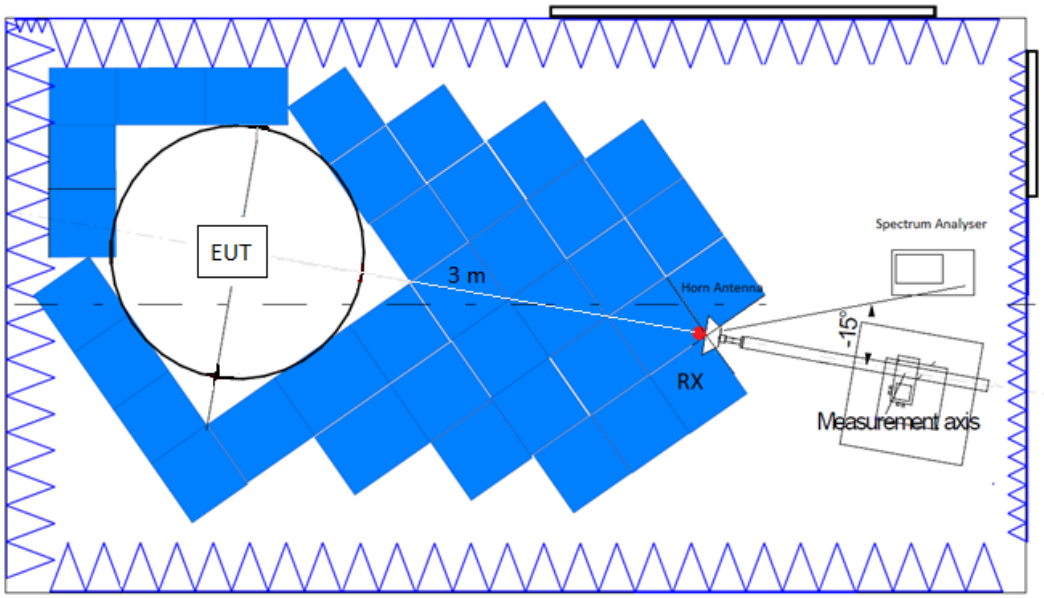
Measurements were made in both horizontal and vertical planes of polarization.

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.

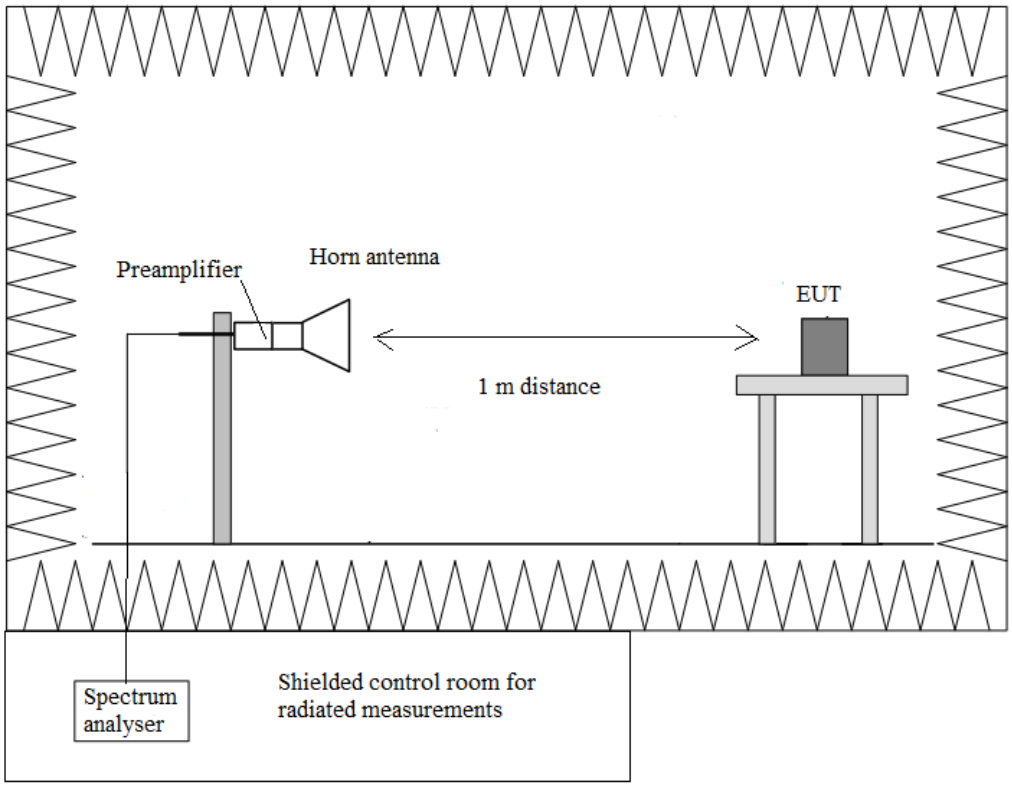
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup f > 17 GHz:



Occupied Bandwidth

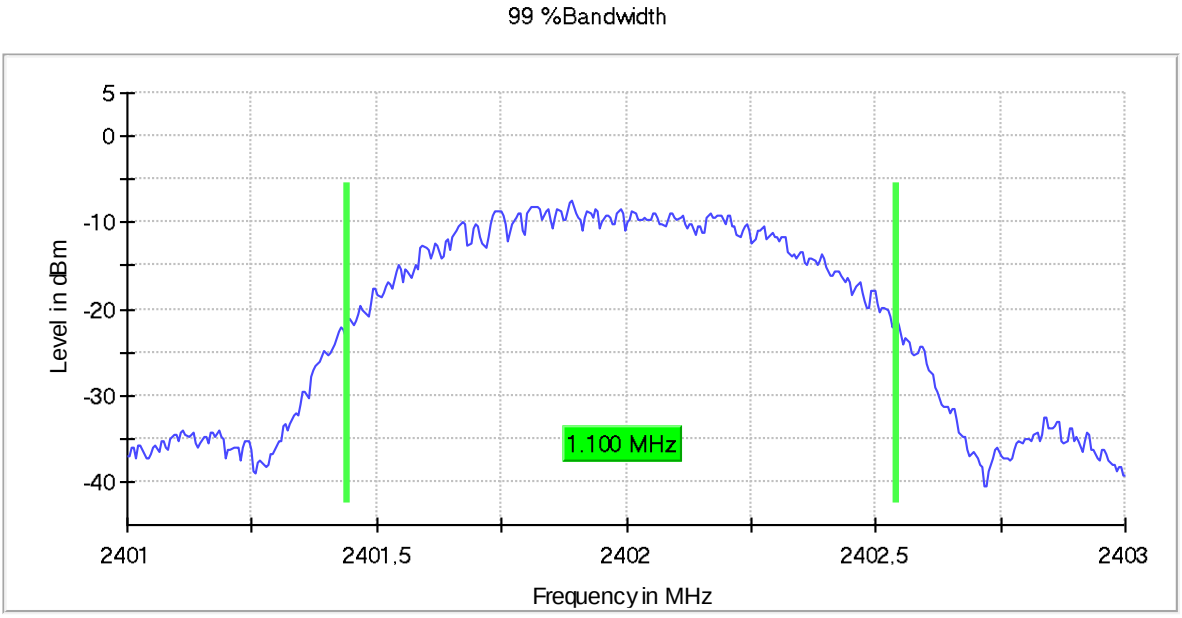
RESULTS:

- **1M modulation:**

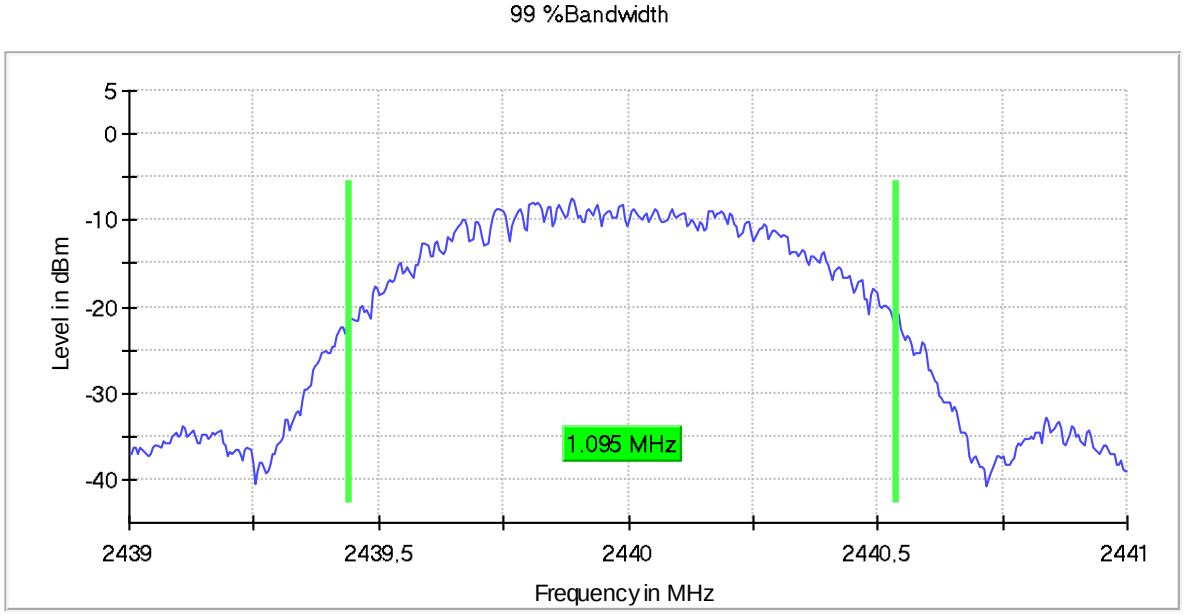
	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
99% bandwidth (MHz)	1.10	1.09	1.09
Measurement uncertainty (%)	<± 1.17		

Verdict: PASS

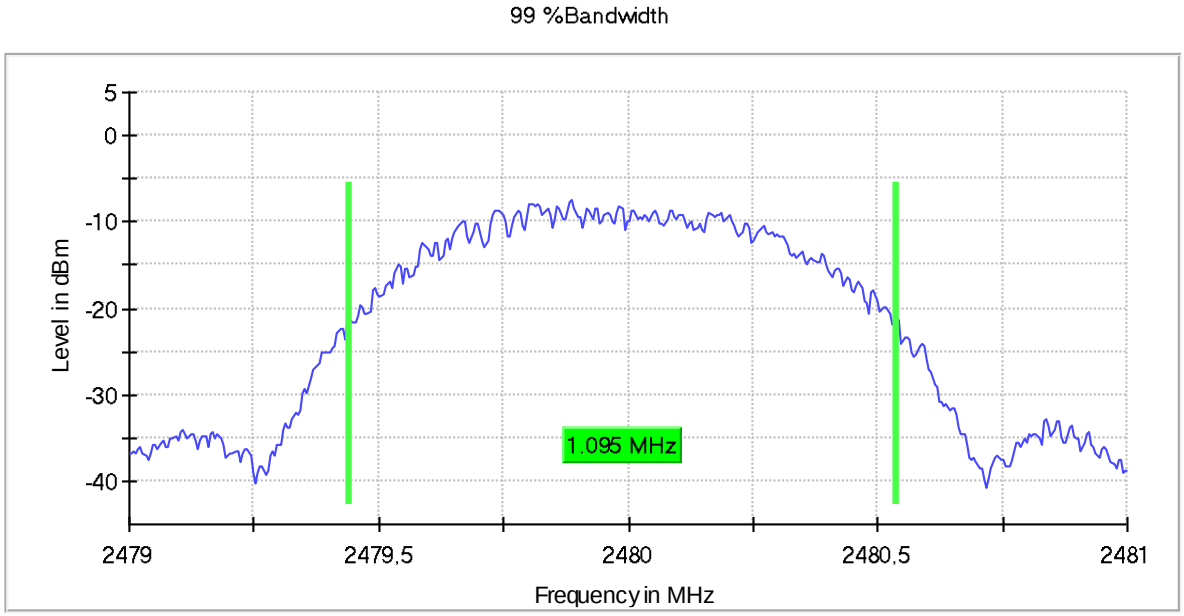
- Low Channel:



- Middle Channel:



- High Channel:



FCC 15.247 (a)(2) / RSS-247 5.2. (a) 6 dB Bandwidth

SPECIFICATION:

The minimum 6 dB bandwidth shall be at least 500 kHz.

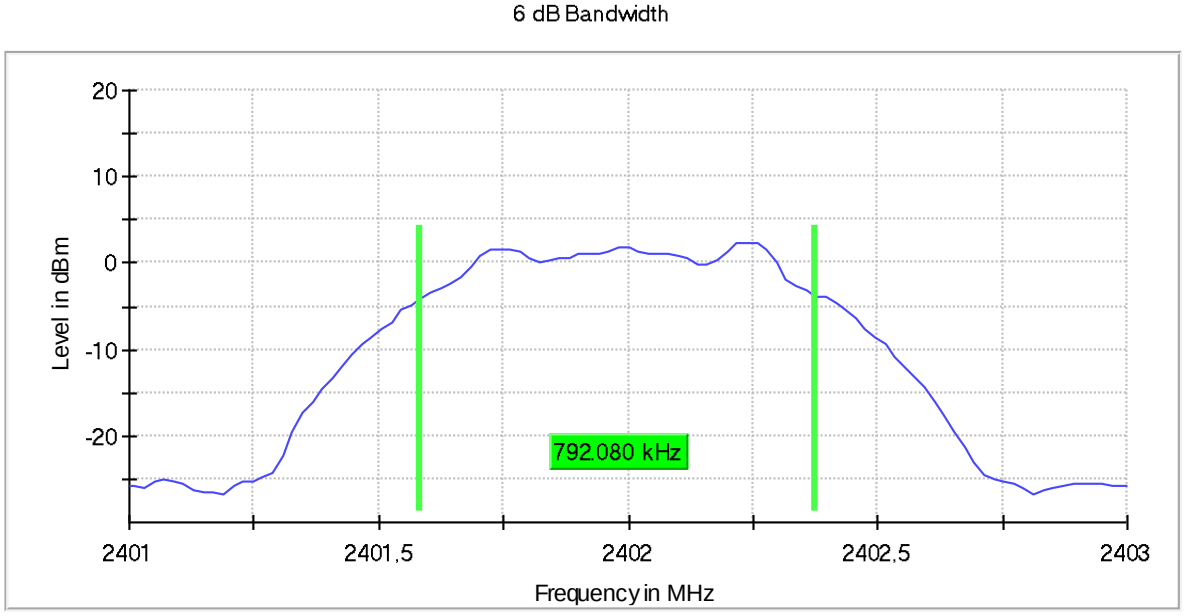
RESULTS:

- **1M modulation:**

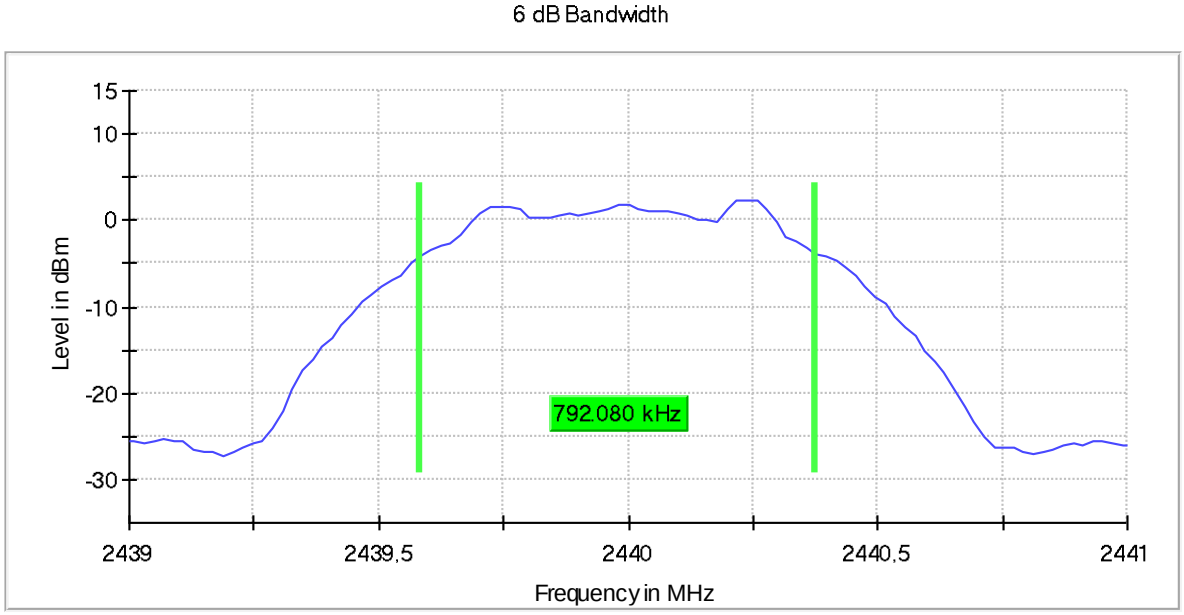
	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
6 dB Bandwidth (MHz)	0.792080	0.792080	0.792080
Measurement uncertainty (%)	<± 2.84		

Verdict: PASS

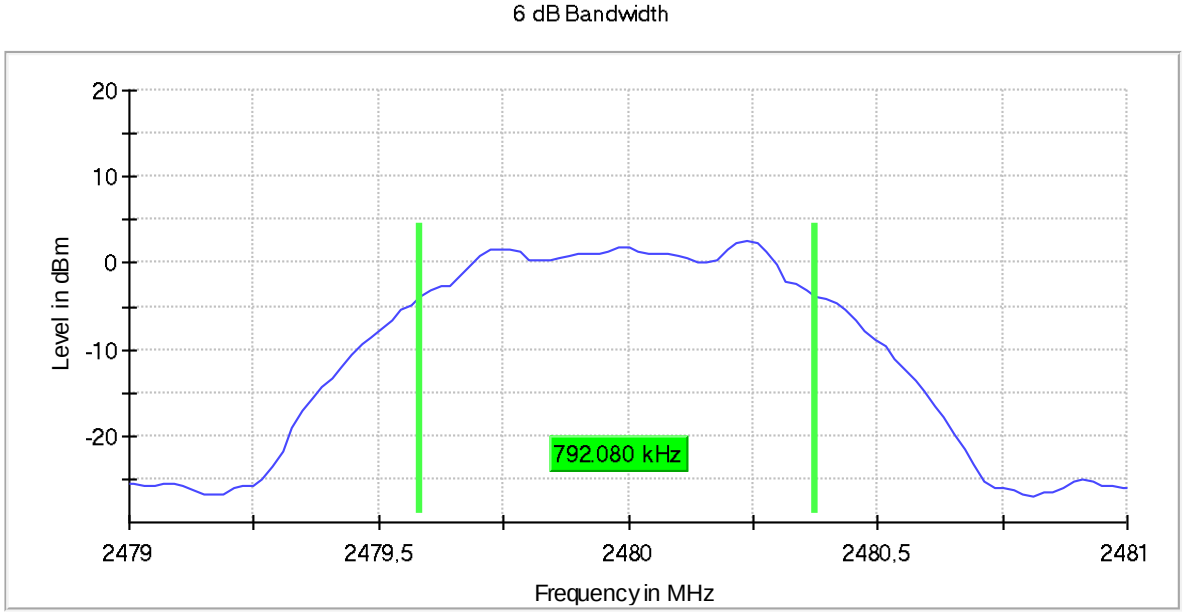
- Low Channel:



- Middle Channel:



- High Channel:



FCC 15.247 (b) / RSS-247 5.4 (d). Maximum Output Power and Antenna Gain

SPECIFICATION:

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).
The e.i.r.p. shall not exceed 4 W (36 dBm) (RSS-247).

RESULTS:

The maximum peak conducted output power level in the fundamental emission was measured using the method according to clause 11.9.1.1 “RBW ≥ DTS bandwidth” of ANSI C.63.10-2013.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: 1.98 dBi

39428 model	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	2.76	3.27	3.02
Maximum EIRP Power (dBm)	4.74	5.25	5.00
Measurement uncertainty (dB)	< ±1.95		

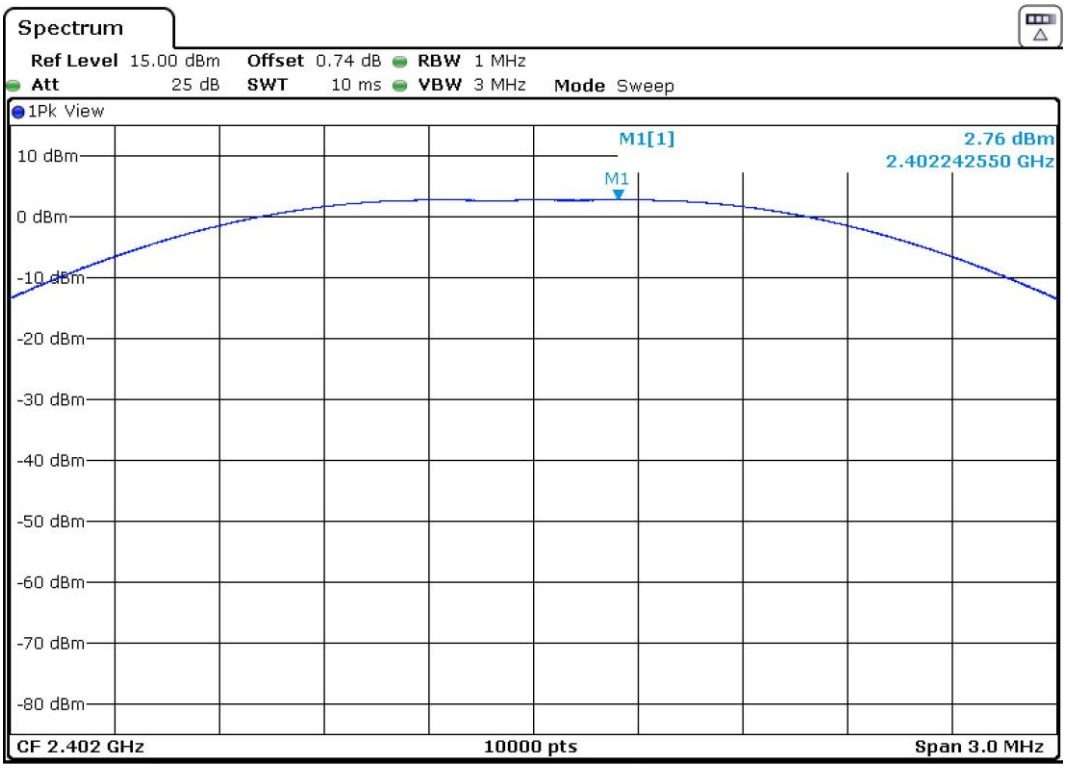
(*) EIRP values for 39428 model are less than +/- 1.5 dB difference from EIRP values for 39001:

39001 model	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	3.20	3.20	3.30
Maximum EIRP Power (dBm)	5.18	5.18	5.28
Measurement uncertainty (dB)	< ±1.95		

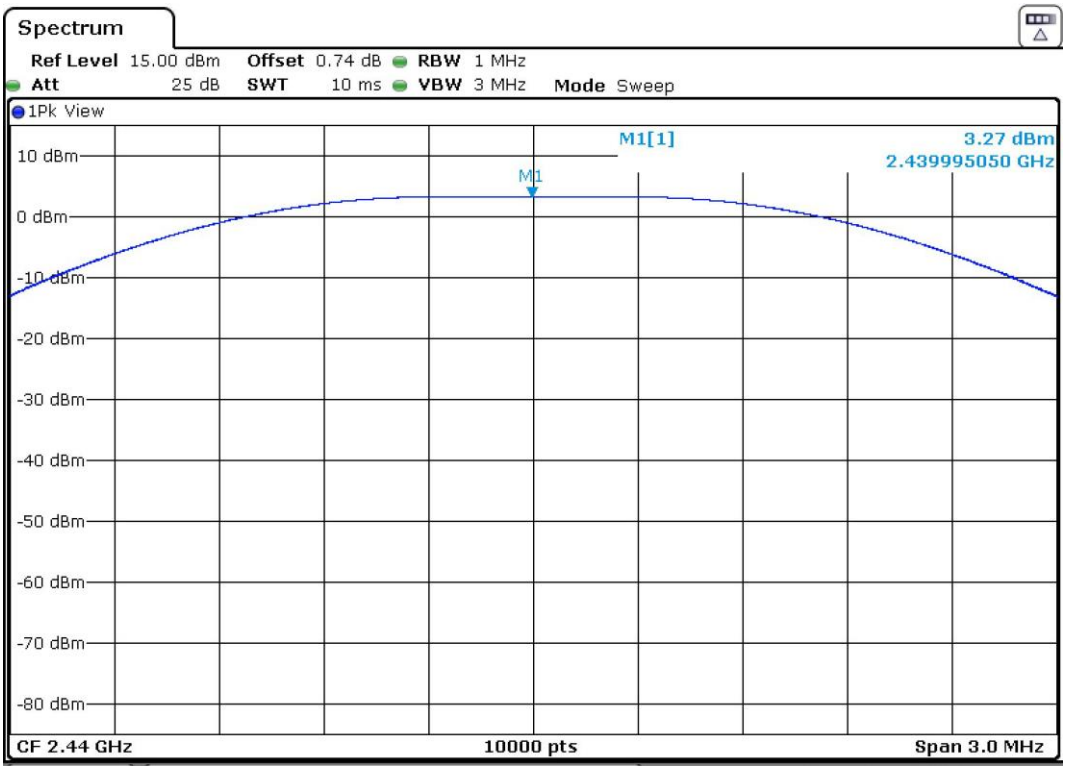
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Verdict: PASS

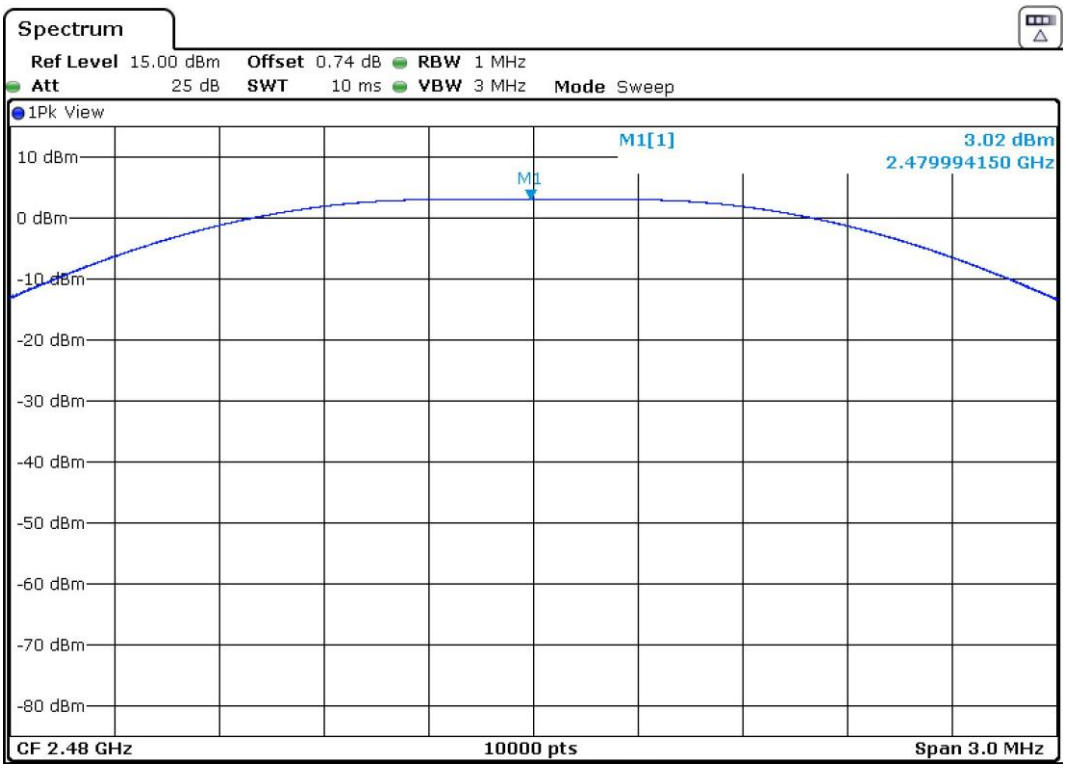
- Low Channel:



- Middle Channel:



- High Channel:



FCC 15.247 (d) / RSS-247 5.5. Band-edge emissions compliance (Transmitter)

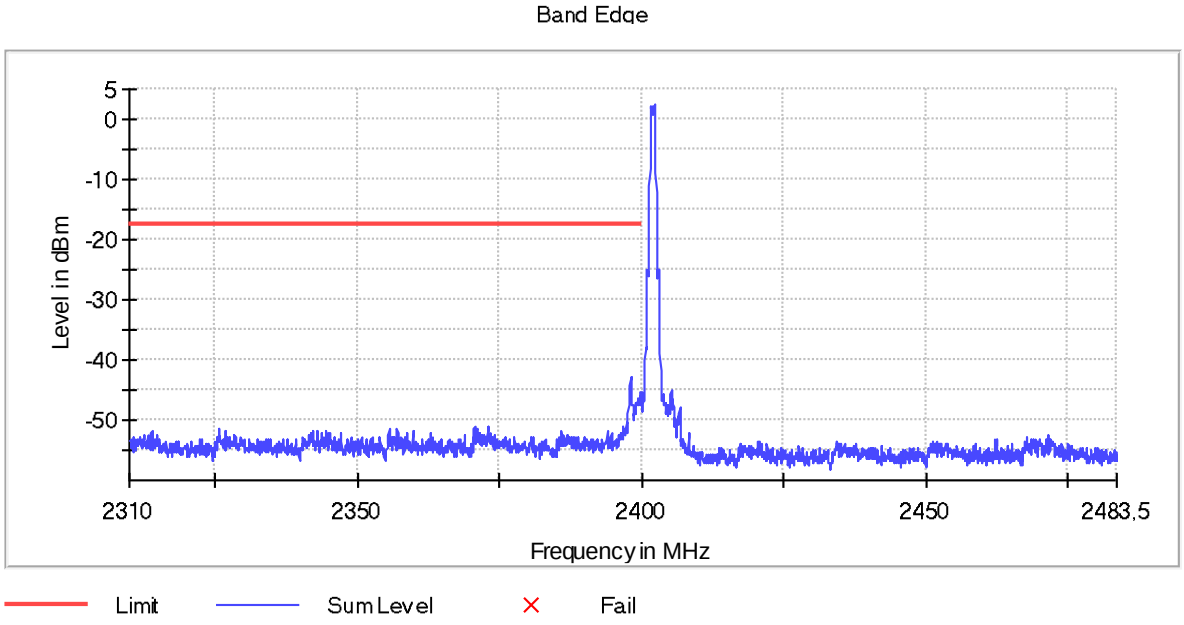
SPECIFICATION:

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

RESULTS:

- **1M modulation:**

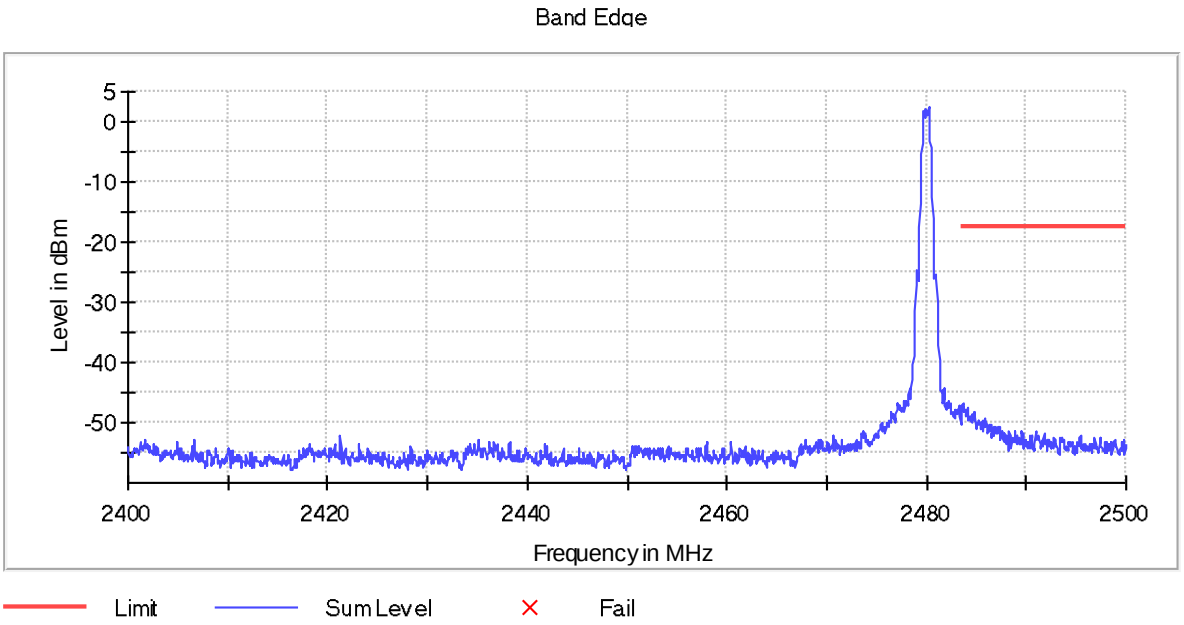
- Low Channel:



Measurement uncertainty (dB) <± 1.53

Verdict: PASS

- High Channel:



Measurement uncertainty (dB) <± 1.53

Verdict: PASS

FCC 15.247 (e) / RSS-247 5.2. (b) Power spectral density

SPECIFICATION:

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS:

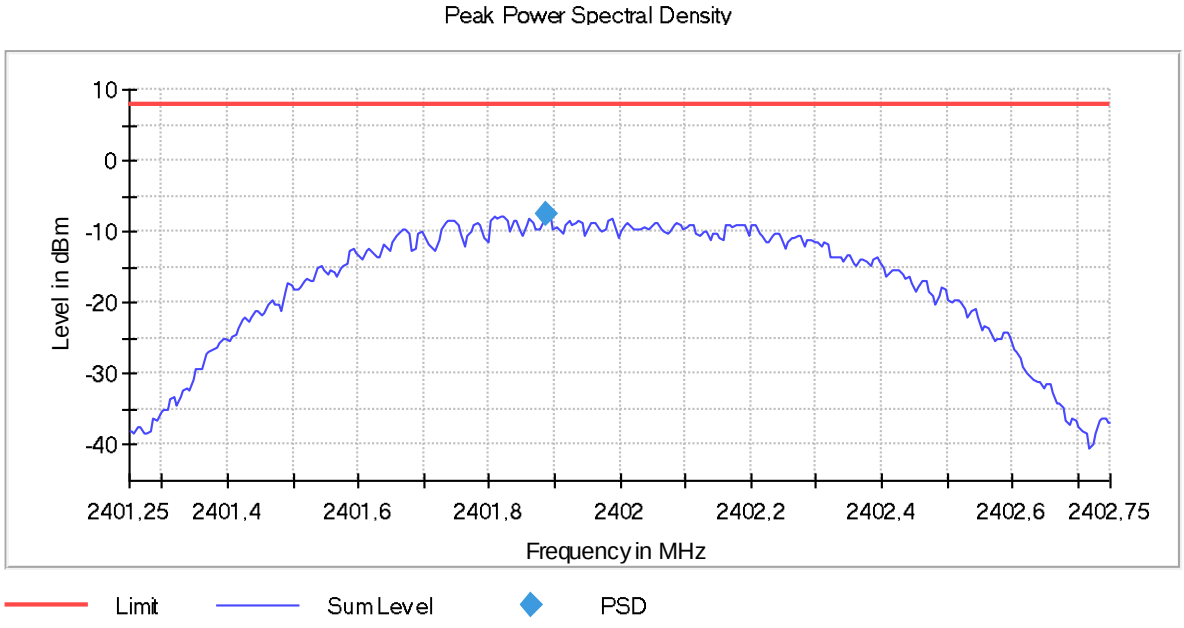
The maximum power spectral density level in the fundamental emission was measured using the method according to point 11.10.2." Method PKPSD (peak PSD)" of ANSI C.63.10-2013.

- **1M modulation:**

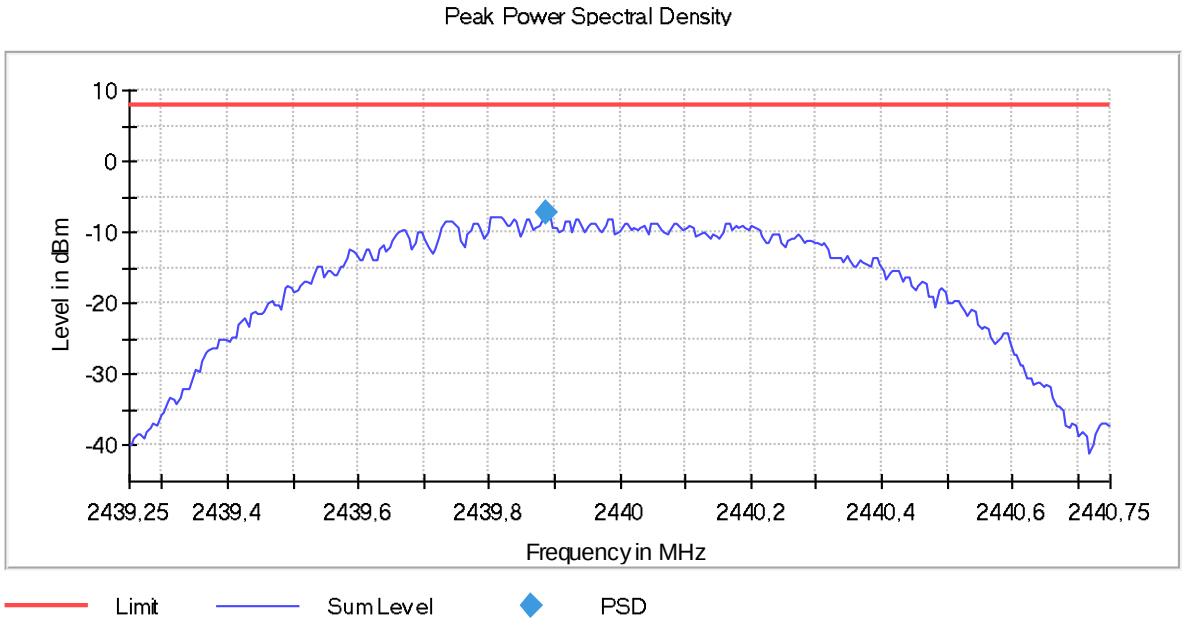
	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Power Spectral Density (dBm)	-7.457	-7.363	-7.362
Measurement uncertainty (dB)	<± 0.99		

Verdict: PASS

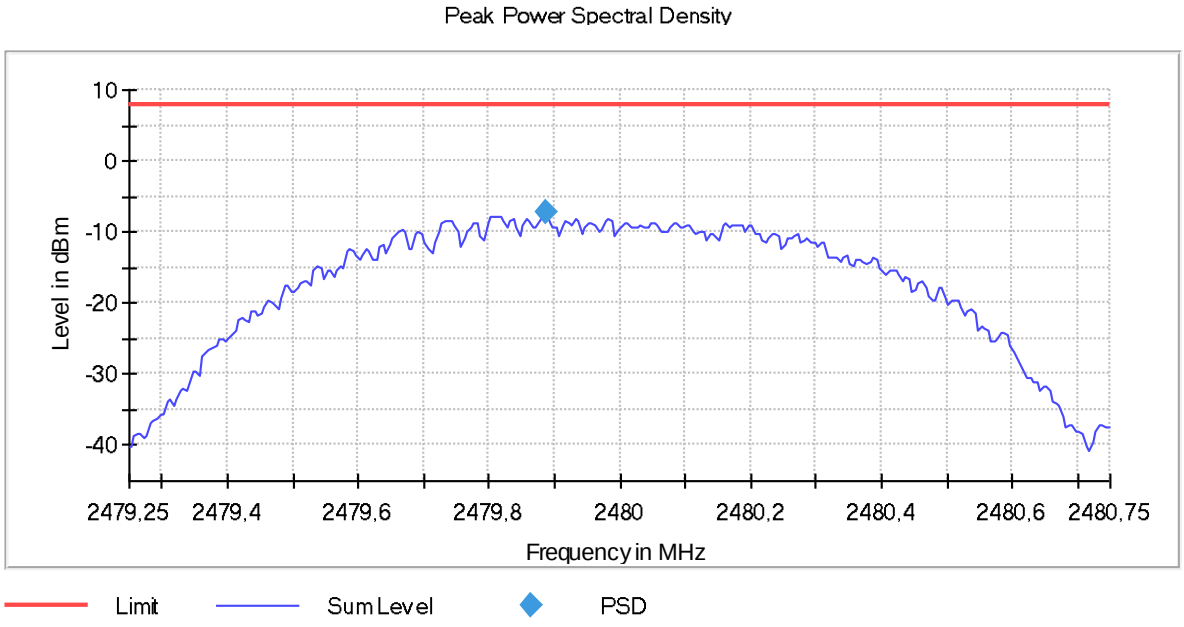
- Low Channel:



- Middle Channel:



- High Channel:



FCC 15.247 (d) / RSS-247 5.5. Emission Limitations Radiated (Transmitter)

SPECIFICATION:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205 (a), must also comply with the radiated emission limits specified in Section 15.209 (a) (see Section 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
Above 960	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, 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 of the equipment 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 – 17 GHz and at distance of 1 m for the frequency range 17 GHz – 26 GHz.

The field strength is calculated by adding a 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 signals detected do not depend on the operating channel.

Spurious frequencies detected at less than 20 dB below the limit:

Spurious Frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
33.104000	29.90	V	Quasi-Peak
47.977333	22.48	V	Quasi-Peak
112.256000	28.07	V	Quasi-Peak
147.822667	26.55	V	Quasi-Peak

Measurement Uncertainty (dB): < ±5.01

Frequency range 1 GHz – 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 compliance checking with the average limit.

- Low Channel:

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

- Middle Channel:

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

- High Channel:

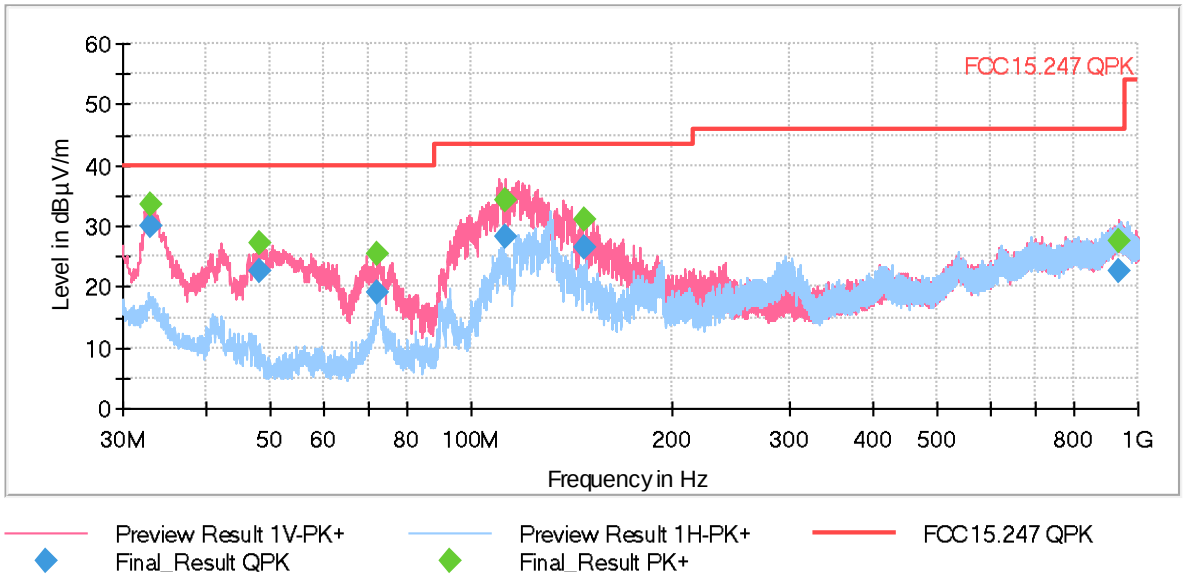
  No spurious frequencies detected at less than 20 dB below the limit.

Measurement uncertainty (dB):
<± 4.00 for f ≥ 1 GHz up to 3 GHz
<± 4.22 for f ≥ 3 GHz up to 17 GHz
<± 4.71 for f ≥ 17 GHz up to 26 GHz

Verdict: PASS

FREQUENCY RANGE 30 MHz – 1 GHz

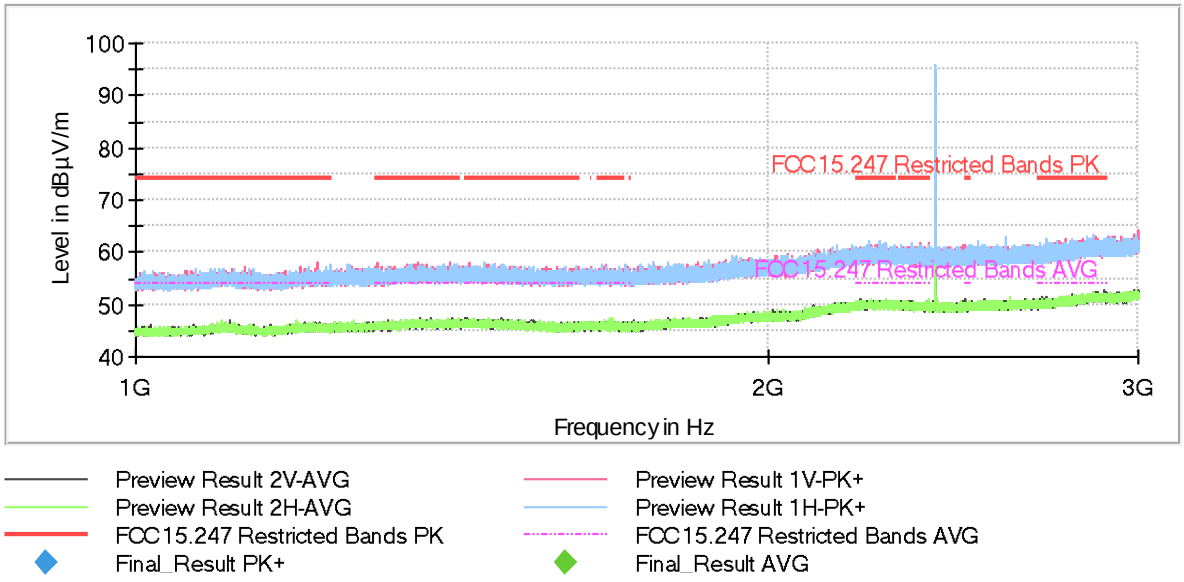
The spurious frequencies detected do not depend on the operating channel.



This plot is valid for the Low, Middle and High Channels.

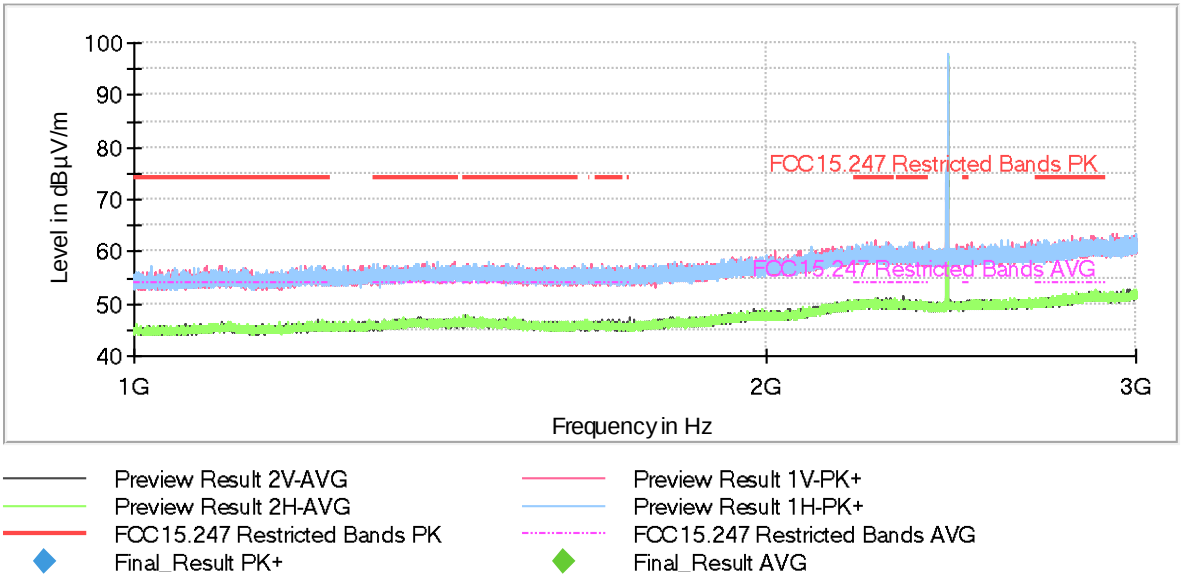
FREQUENCY RANGE 1 GHz – 3 GHz

- Low Channel:



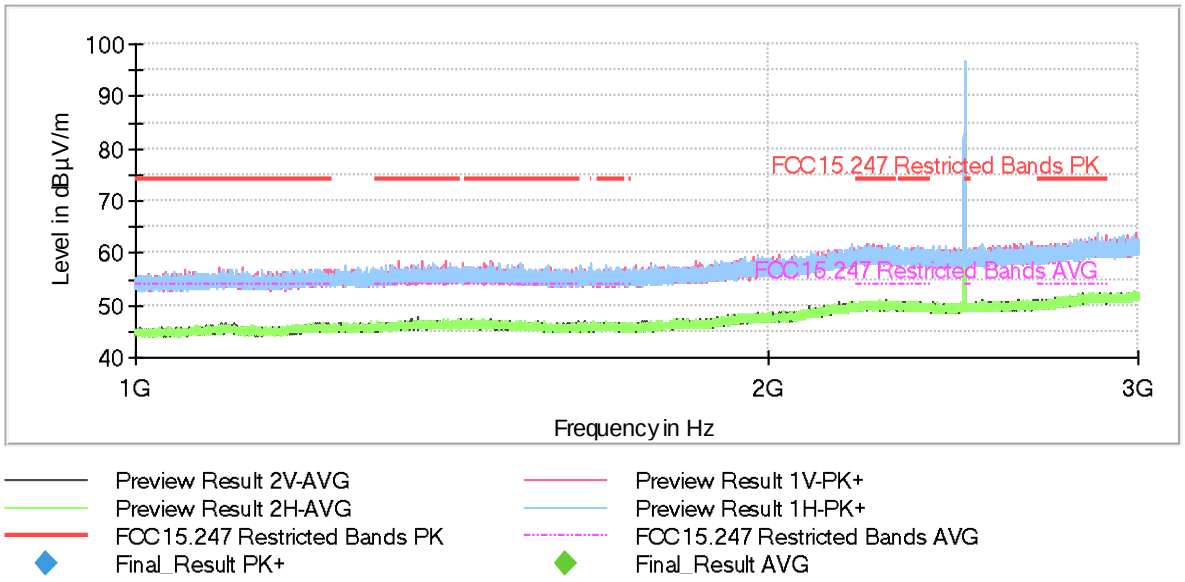
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

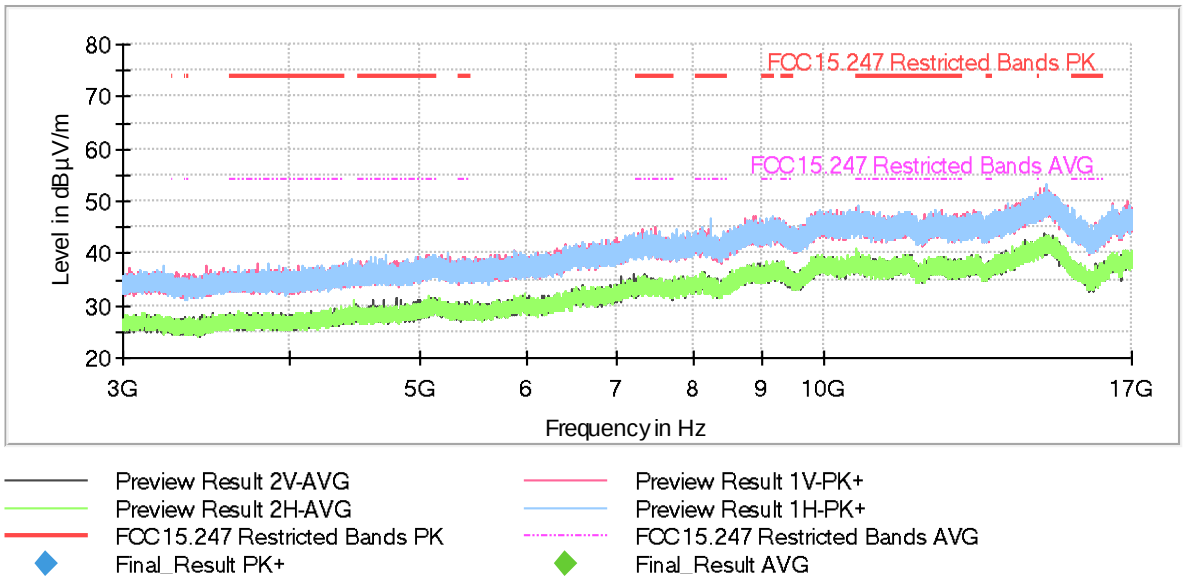
- High Channel:



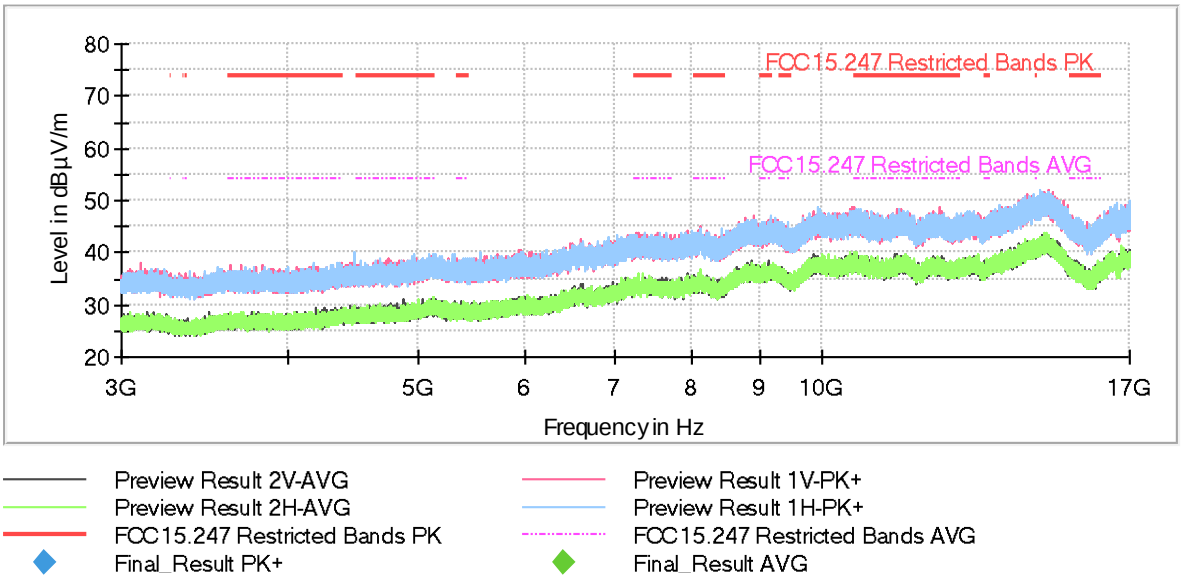
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 GHz – 17 GHz

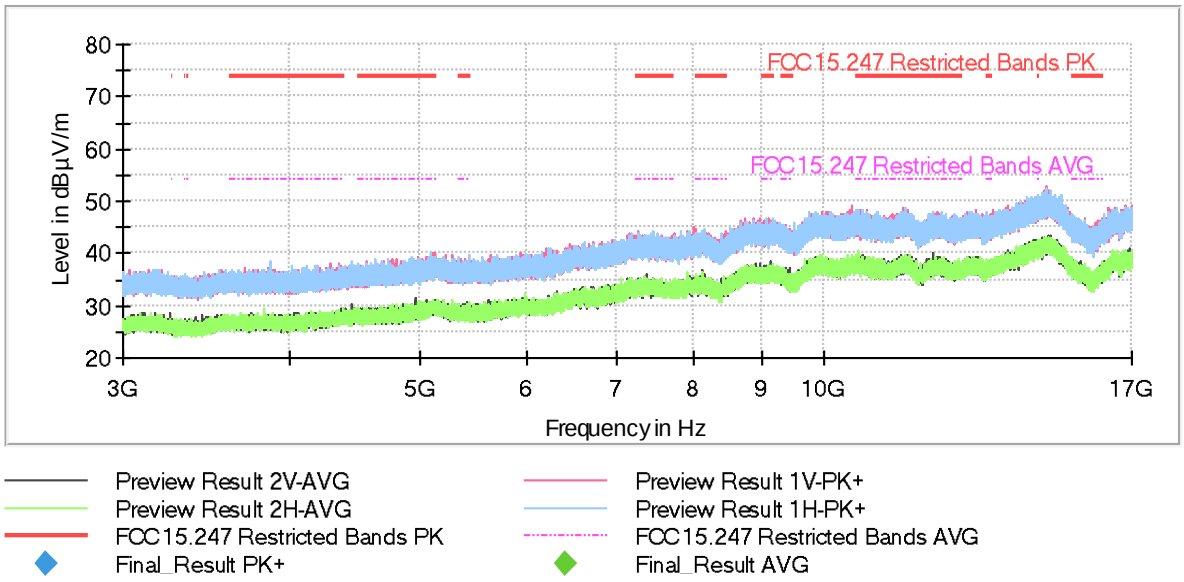
- Low Channel:



- Middle Channel:

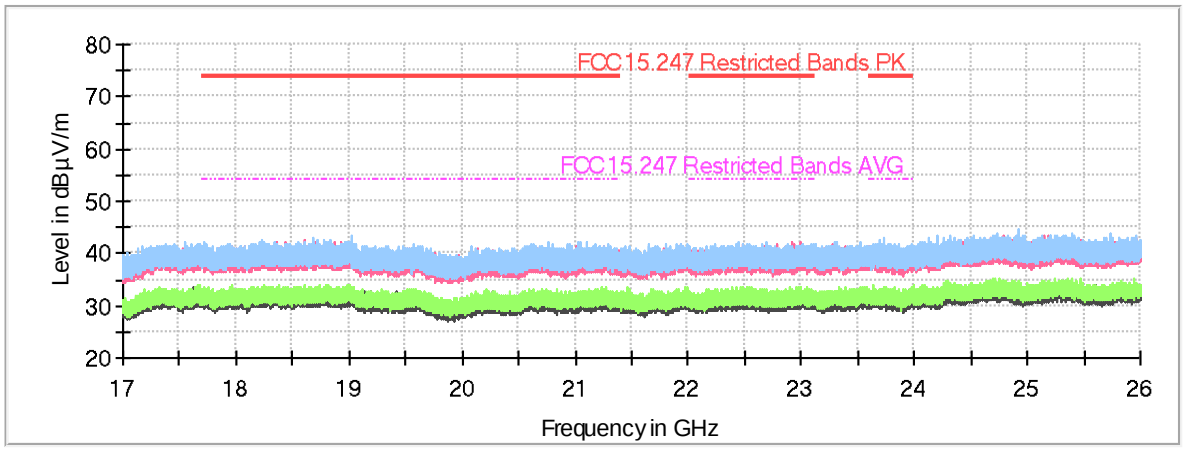


- High Channel:



FREQUENCY RANGE 17 GHz – 26 GHz

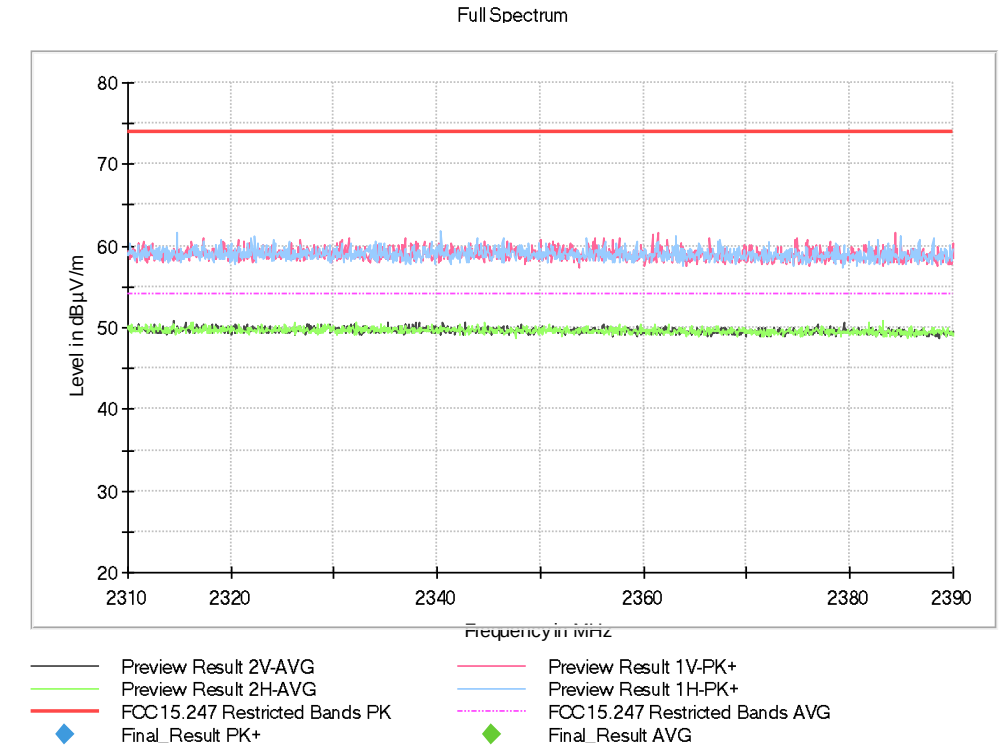
The spurious frequencies detected do not depend on the operating channel.



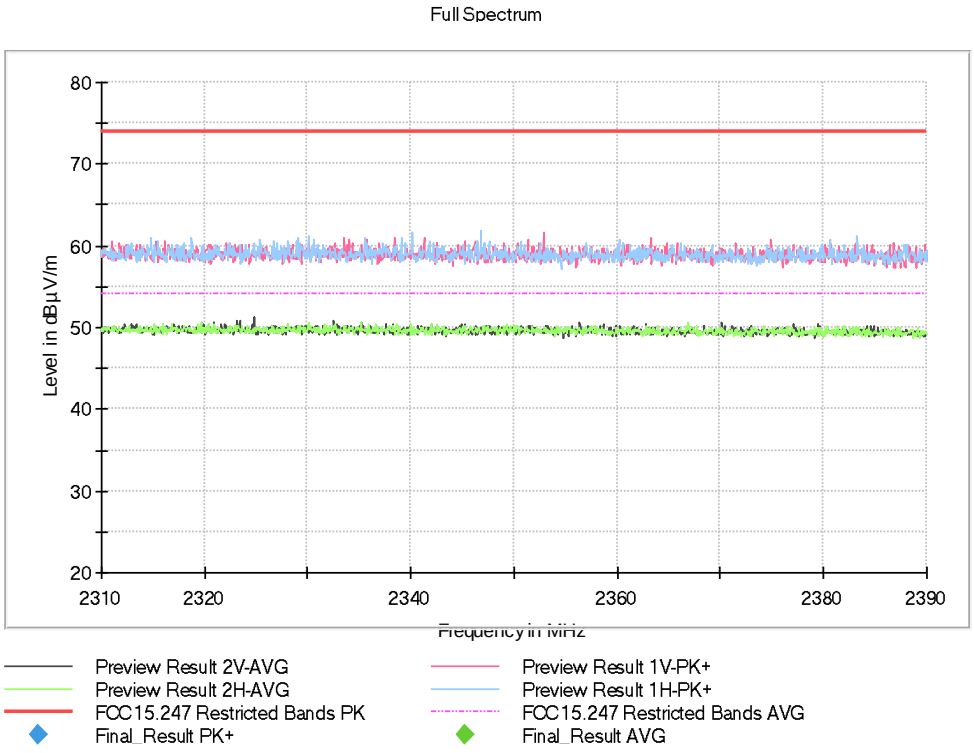
This plot is valid for the Low, Middle and High Channels.

FREQUENCY RANGE 2.31 GHz – 2.39 GHz

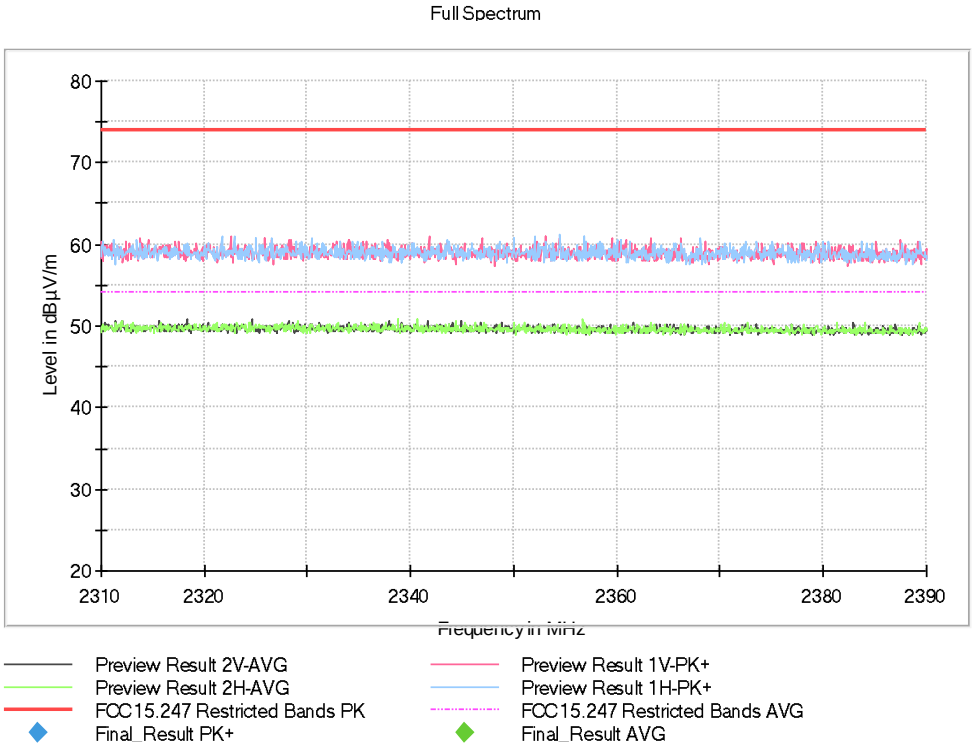
- Low Channel:



- Middle Channel:



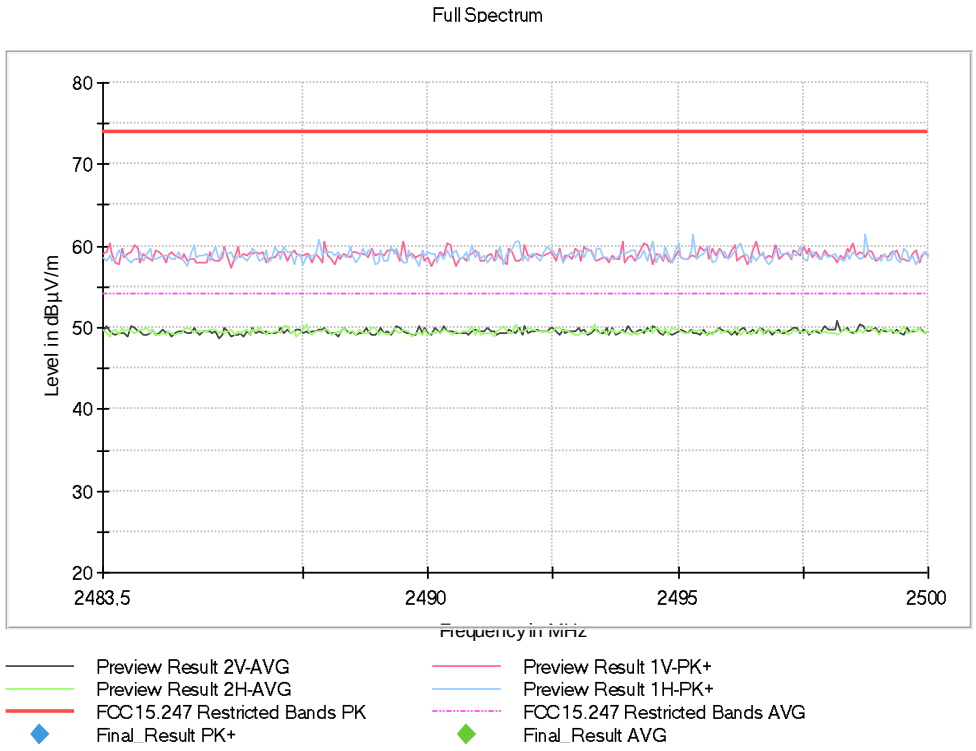
- High Channel:



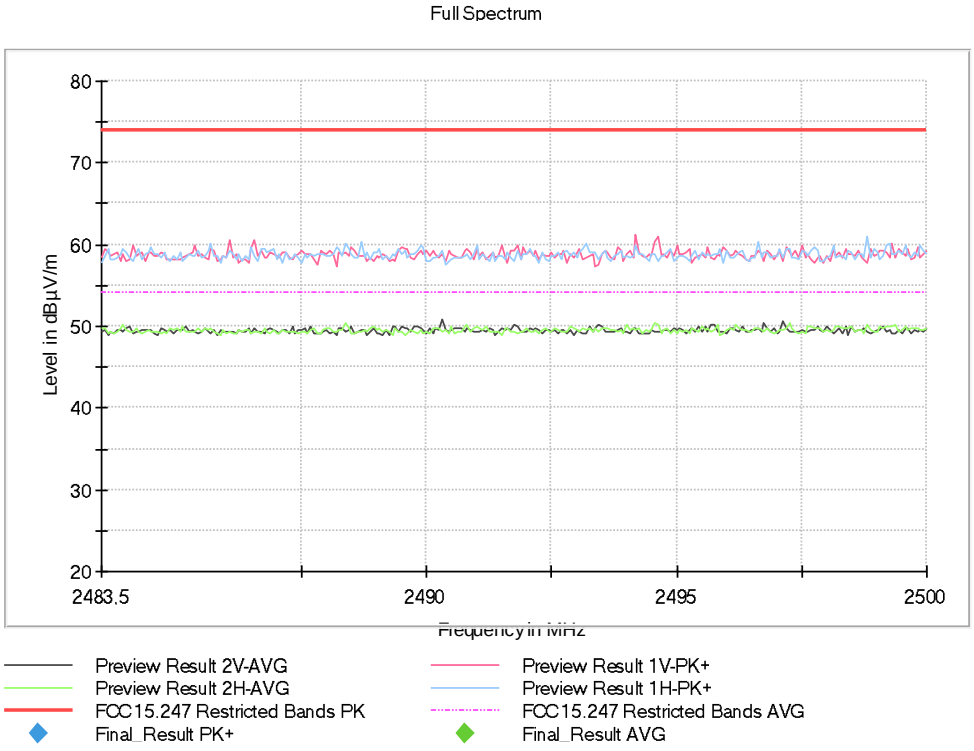
3

FREQUENCY RANGE 2.4835 GHz – 2.5 GHz

- Low Channel:



- Middle Channel:



- High Channel: