

FCC LISTED, REGISTRATION
NUMBER: 720267

Informe de ensayo nº:
Test report No:

IC LISTED REGISTRATION
NUMBER IC 4621A-1

NIE: 47969RRF.001

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.

Identificación del objeto ensayado.....: Identification of item tested	Digital camera
Marca Trademark	Nokia OZO
Modelo y/o referencia tipo Model and /or type reference	OZO Professional VR Camera PC-01
Other identification of the product	FCC ID: 2AEJS-PC0100 IC: 661F-PC0100
Final HW version	HW build MK1.1 HWID 0201
Final SW version	Week 01 (v0.1.5) release, Firmware: 201601072333
Características Features	Video and audio capture on local storage. Video and audio streaming over SDI interface for live monitoring and for recording on external storage. Local control of the camera with on-device user interface. Wireless remote control of the camera over WiFi. Operates on battery power or on external AC/DC power supply.
Fabricante Manufacturer	NOKIA TECHNOLOGIES LTD Yrttipellontie 1, 90230 Oulu, Finland
Método de ensayo solicitado, norma.....: Test method requested, standard	USA FCC Part 15.247 10-1-15 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 10-1-15 Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 1 (May 2015). CANADA RSS-Gen Issue 4 (November 2014). Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r04 dated 01/07/2016. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Resultado.....: Summary	IN COMPLIANCE

Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	A. Llamas RF Lab. Manager
Fecha de realización Date of issue	2016-02-05
Formato de informe No. Report template No	FDT08_17

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Competences and guarantees

AT4 wireless is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

AT4 wireless is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621A-1.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless 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 AT4 wireless at the time of performance of the test.

AT4 wireless 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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of AT4 wireless.

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 AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the AT4 wireless internal document PODT000.

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
47969/001	Digital Camera with integral antenna	OZO Professional VR Camera PC-01	PC01001068	2016-01-20
47969/004	AC/DC power supply	SDI65-12-U	---	2016-01-20
47969/003	Battery	---	---	2016-01-20
47969/028	SSD Media Module	---	---	2016-01-20
47969/002	Magnesit Copter	---	---	2016-01-20

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

All radiated tests indicated in appendix A.

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
47969/013	Digital Camera with temporary antenna connector	OZO Professional VR Camera PC-01	PC01001063	2016-01-20
47969/020	AC/DC power supply	SDI65-12-U	---	2016-01-20

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

All conducted tests indicated in appendix A.

Test sample description

The test sample consists of a Digital virtual reality cinematography camera utilizing 8 integrated image sensors and 8 microphones for recording 360 degree stereoscopic virtual reality content to removable data storage media or wired external data storage. Supports battery powered or external powered operation.

Identification of the client

NOKIA TECHNOLOGIES LTD.

Karaportti 3, 02610 Espoo, Finland

Testing period

The performed test started on 2016-01-20 and finished on 2016-01-21.

The tests have been performed at AT4 wireless.

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 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

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
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements, 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
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Remarks and comments

1: Used instrumentation:

Conducted Measurements

		Last Cal. date	Cal. due date
1.	Spectrum analyser Agilent PSA E4440A	2014/05	2016/05
2.	DC power supply R&S NGPE 40/40	2014/11	2017/11

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2.	BiconicalLog antenna ETS LINDGREN 3142E	2014/03	2017/03
3.	Multi Device Controller EMCO 2090	N.A.	N.A.
4.	Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D	2013/11	2016/11
5.	Broadband Horn antenna 18-40 GHz SCHWARZBECK BBHA 9170	2014/03	2017/03
6.	EMI Test Receiver R&S ESU 40	2014/02	2016/02
7.	Spectrum analyser Rohde & Schwarz FSW50	2015/12	2017/12
8.	RF pre-amplifier 10 MHz-6 GHz SCHWARZBECK BBV9743	2015/03	2016/03
9.	RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-3A	2015/05	2016/05
10.	RF pre-amplifier 18-40 GHz Bonn Elektronik BLMA 1840-1M	2015/12	2017/12

Testing verdicts

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

1. WiFi 2.4 GHz (802.11b/g/n20)

FCC PART 15 PARAGRAPH / RSS-247		VERDICT			
		NA	P	F	NM
Section 15.247 Subclause (a) (2) / RSS-247 5.2. (1)	6 dB Bandwidth	P			
Section 15.247 Subclause (b) / RSS-247 5.4. (4)	Maximum output power and antenna gain	P			
Section 15.247 Subclause (d) / RSS-247 5.5	Emission limitations conducted (Transmitter)	P			
Section 15.247 Subclause (d) / RSS-247 5.5. ..	Band-edge conducted emissions compliance (Transmitter)	P			
Section 15.247 Subclause (e) / RSS-247 5.2. (2)	Power spectral density	P			
Section 15.247 Subclause (d) / RSS-247 5.5. ...	Emission limitations radiated (Transmitter)	P			

Appendix A – Test result “WiFi 2.4 GHz (802.11b/g/n20)”

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TEST CONDITIONS

Power supply (V):

$V_{\text{nominal}} = 115\text{Vac}$

Type of power supply = AC/DC adapter or Battery.

Type of antenna: Integral antenna

Declared Gain for antenna (maximum) = 2.6 dBi

TEST FREQUENCIES:

For WiFi 802.11b/g/n20:

Channel (6): 2437 MHz. The equipment operates only in one channel (channel 6).

The test set-up was made in accordance to the general provisions of FCC DTS Measurement KDB 558074 D01 DTS Meas Guidance v03r04.

The laptop computer was used to configure the EUT to continuously transmit at a specified output power with different modes and modulation schemes.

WiFi 2.4 GHz: 802.11b, 802.11g, 802.11n20 (20 MHz channel bandwidth).

The field strength at the band edges was evaluated for each mode for the channel under test.

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the test channel as required and in each of the different modulation modes.

The data rates of 1Mb/s for 802.11b, 6Mb/s for 802.11g, MCS0 (SISO) for 802.11n20 were selected based on preliminary testing that identified those rates corresponding to the worst cases for output power and band edge levels at restricted bands.

CONDUCTED MEASUREMENTS

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



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-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

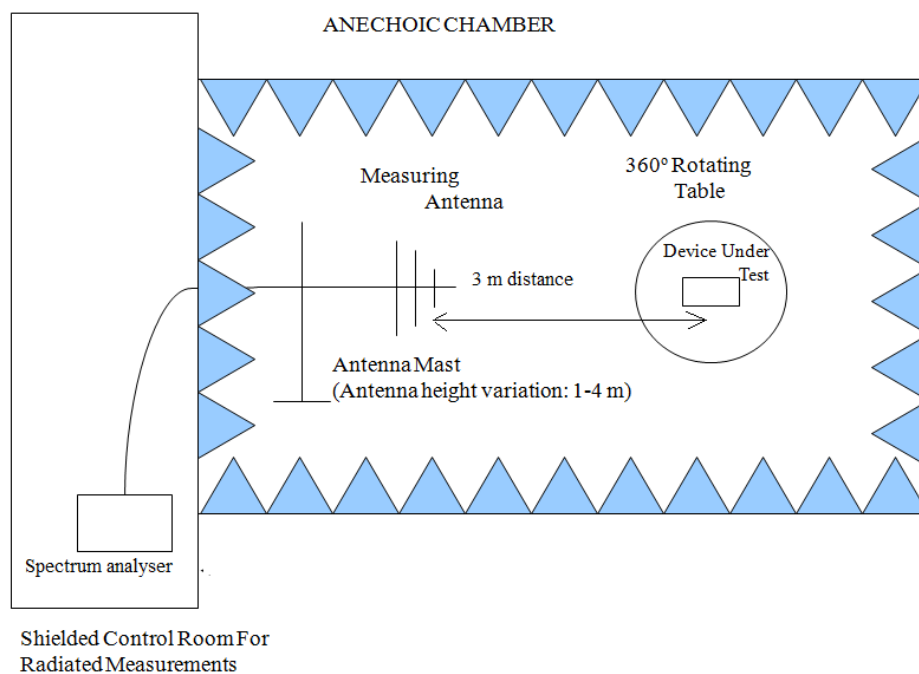
For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform 1.5 meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission.

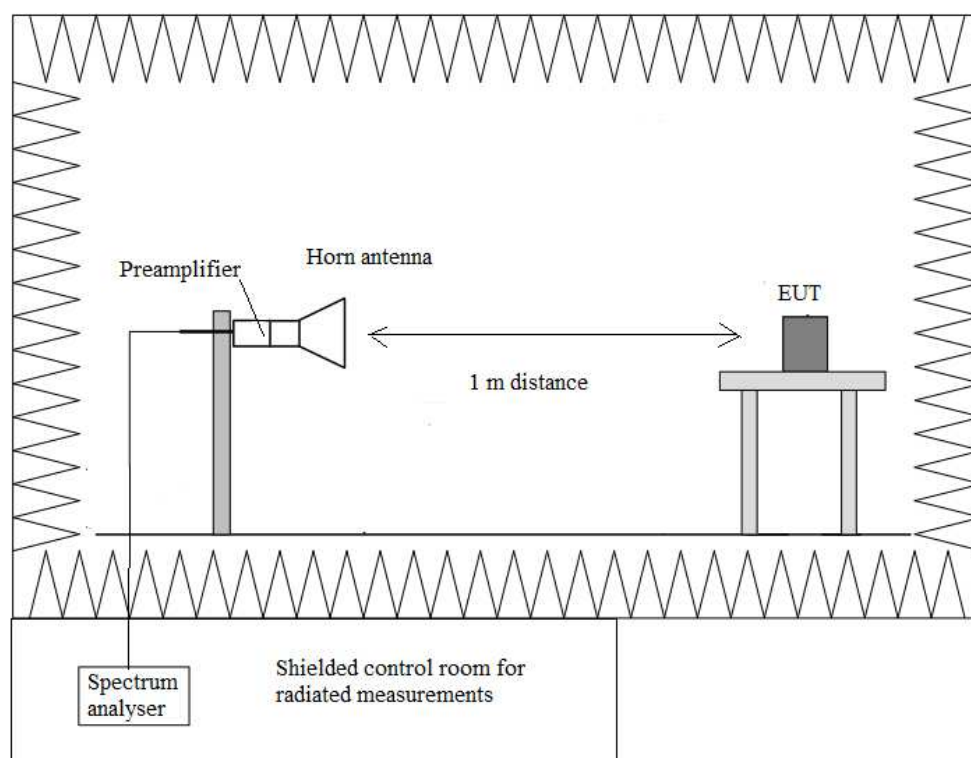
It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



Occupied Bandwidth

RESULTS

(see next plots)

Mode B

99% bandwidth (MHz)	14.589
-26 dBc bandwidth (MHz)	18.257
Measurement uncertainty (kHz)	< ±50.00

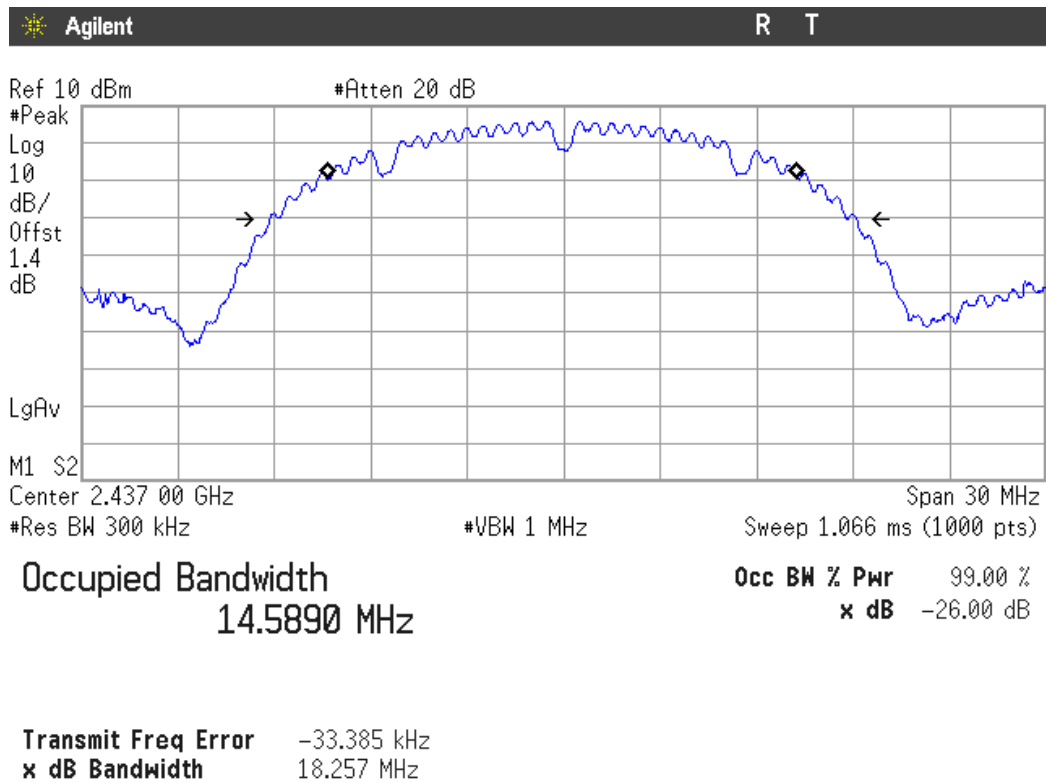
Mode G

99% bandwidth (MHz)	20.255
-26 dBc bandwidth (MHz)	34.008
Measurement uncertainty (kHz)	< ±50.00

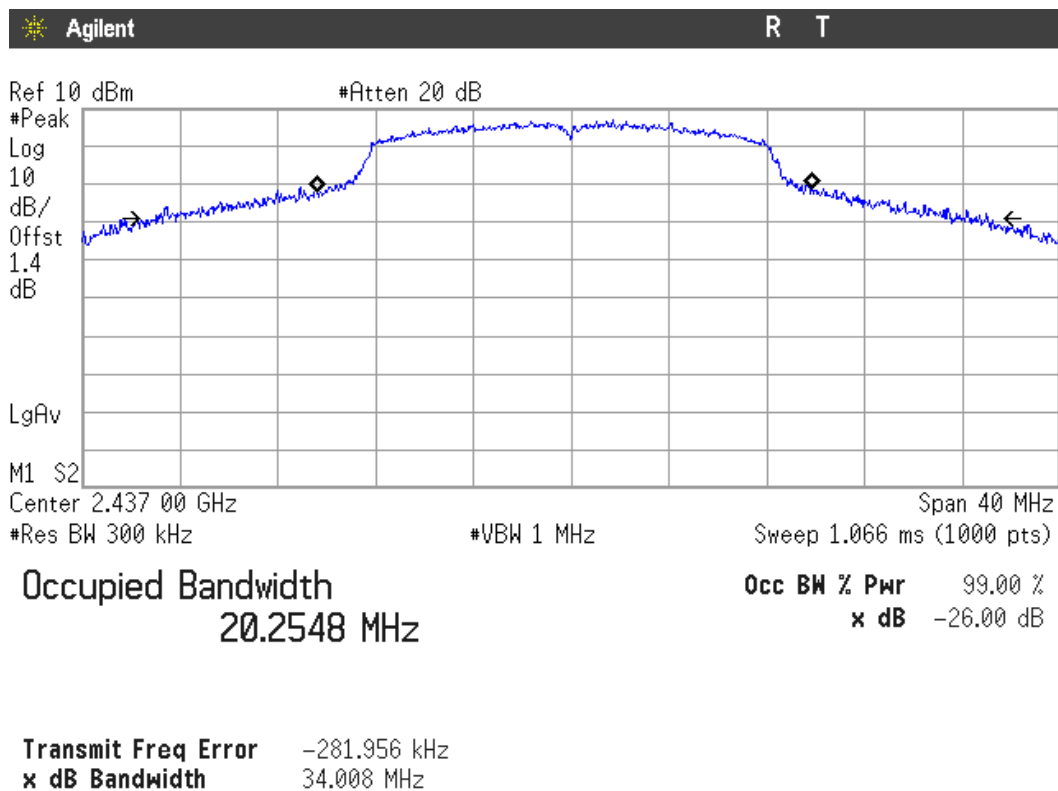
Mode n20

99% bandwidth (MHz)	18.957
-26 dBc bandwidth (MHz)	32.280
Measurement uncertainty (kHz)	< ±50.00

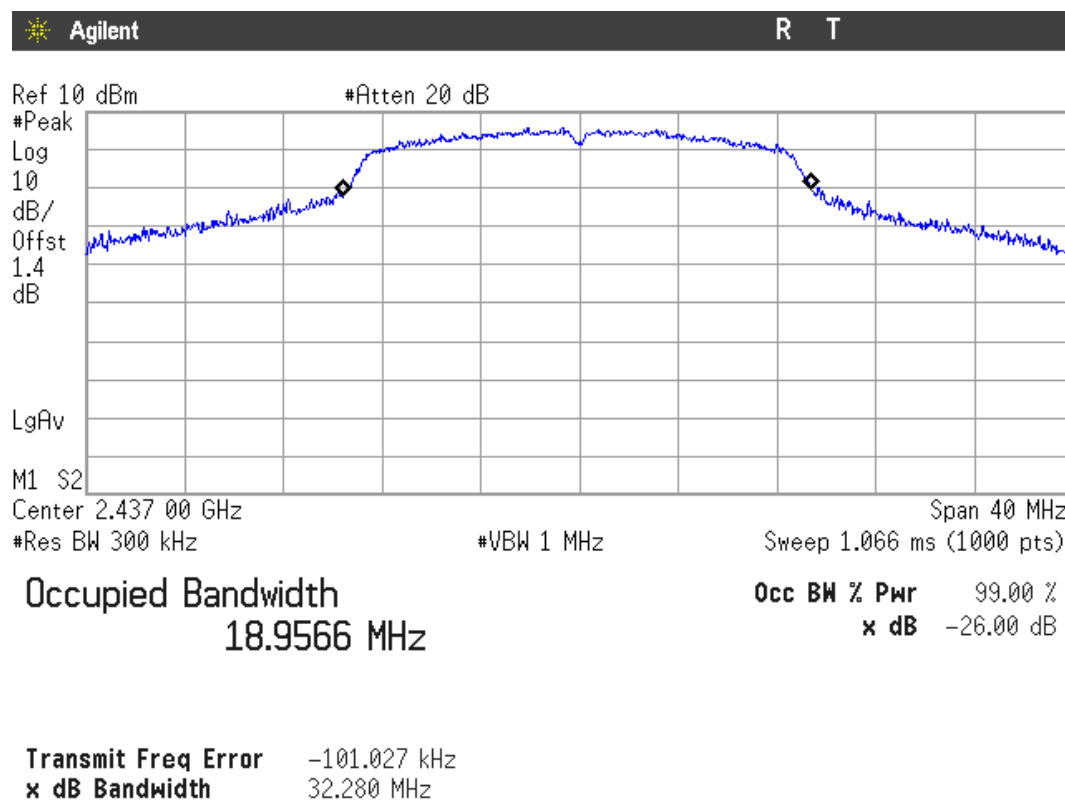
Mode B



Mode G



Mode n20



Section 15.247 Subclause (a) (2) / RSS-247 5.2. (1). 6 dB Bandwidth

SPECIFICATION

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

RESULTS

6 dB Bandwidth (see next plots).

Mode B

6 dB Spectrum bandwidth (MHz)	10.080
Measurement uncertainty (kHz)	< ±65.01

Mode G

6 dB Spectrum bandwidth (MHz)	15.095
Measurement uncertainty (kHz)	< ±65.01

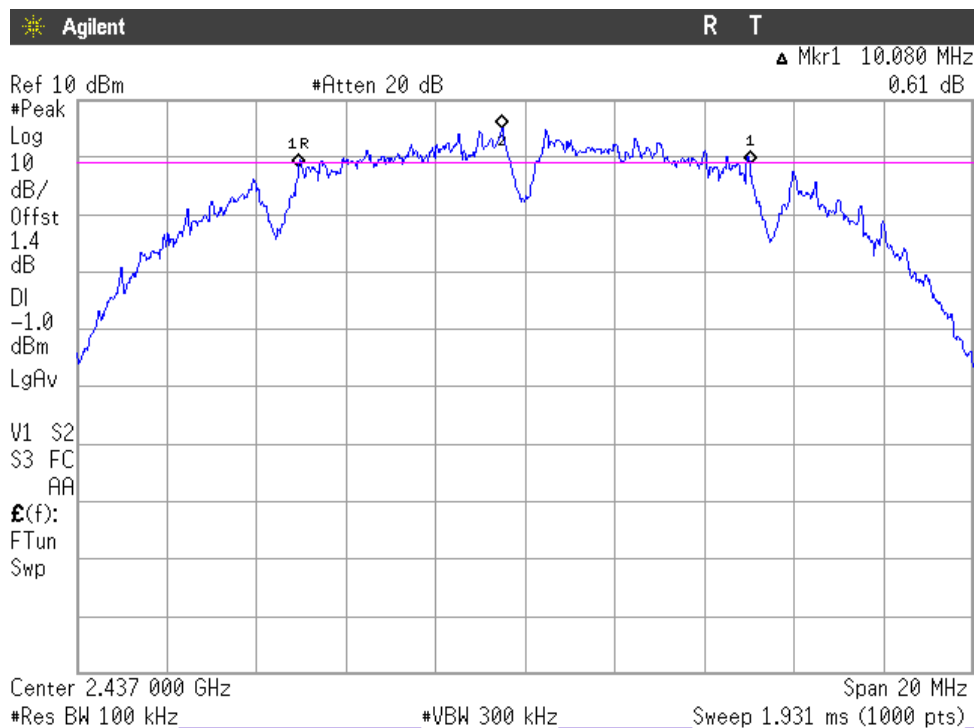
Mode n20

6 dB Spectrum bandwidth (MHz)	15.115
Measurement uncertainty (kHz)	< ±65.01

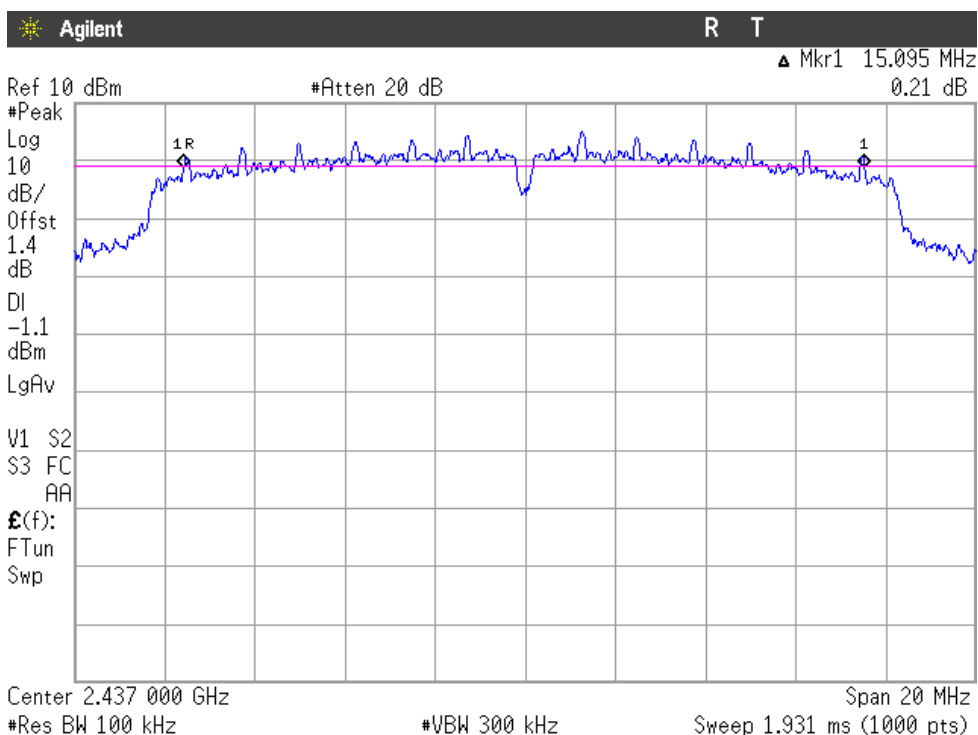
Verdict: PASS

6 dB BANDWIDTH.

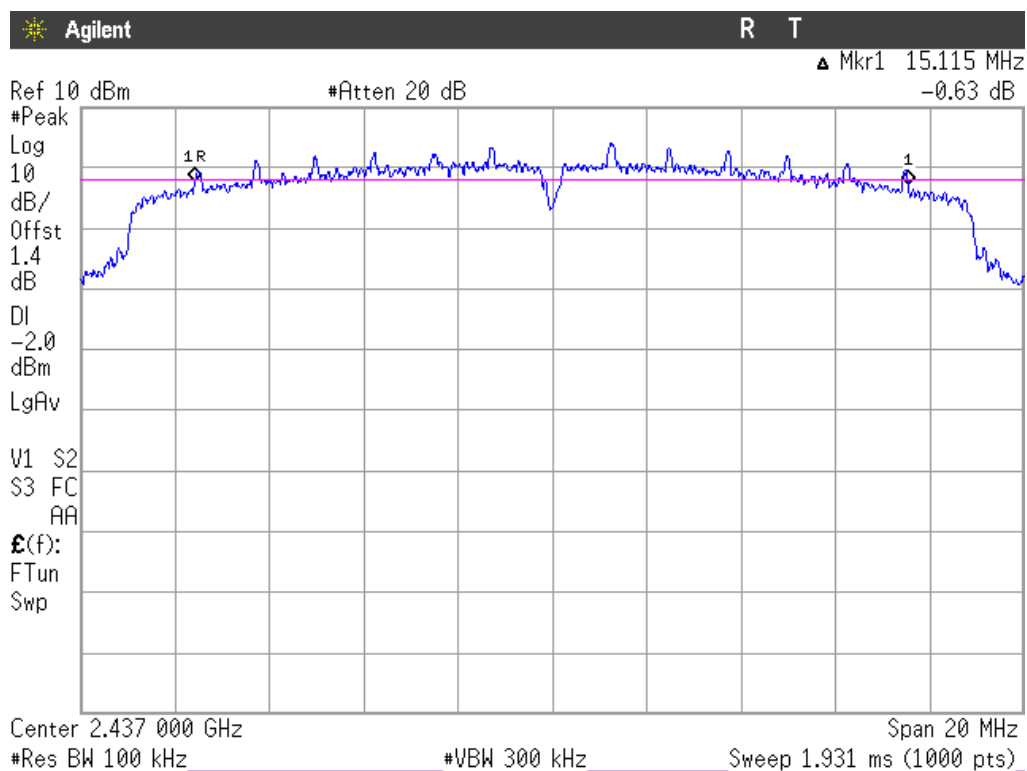
Mode B



Mode G



Mode n20



Section 15.247 Subclause (b) / RSS-247 5.4. (4). 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) (Canada).

RESULTS

The maximum Peak Conducted Output Power was measured using the channel integration with peak detector method according to point 2.0. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r04 dated 01/07/2016.

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

MAXIMUM OUTPUT POWER. See next plots.

Maximum declared antenna gain: 2.6 dBi.

Mode B

Maximum conducted power (dBm)	15.44
Maximum EIRP power (dBm)	18.04
Measurement uncertainty (dB)	< ±0.79

Mode G

Maximum conducted power (dBm)	15.67
Maximum EIRP power (dBm)	18.27
Measurement uncertainty (dB)	< ±0.79

Mode n20

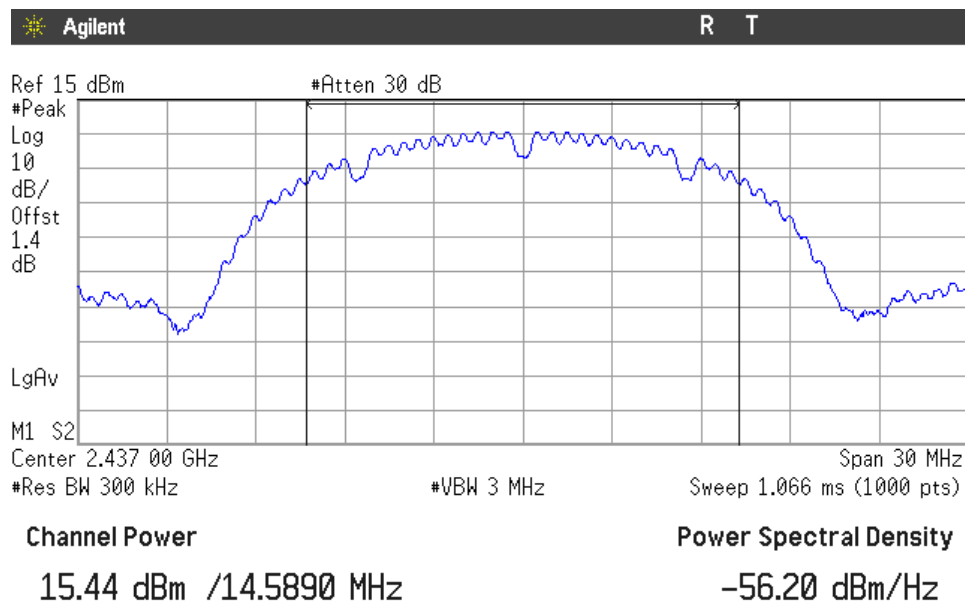
Maximum conducted power (dBm)	14.64
Maximum EIRP power (dBm)	17.24
Measurement uncertainty (dB)	< ±0.79

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.

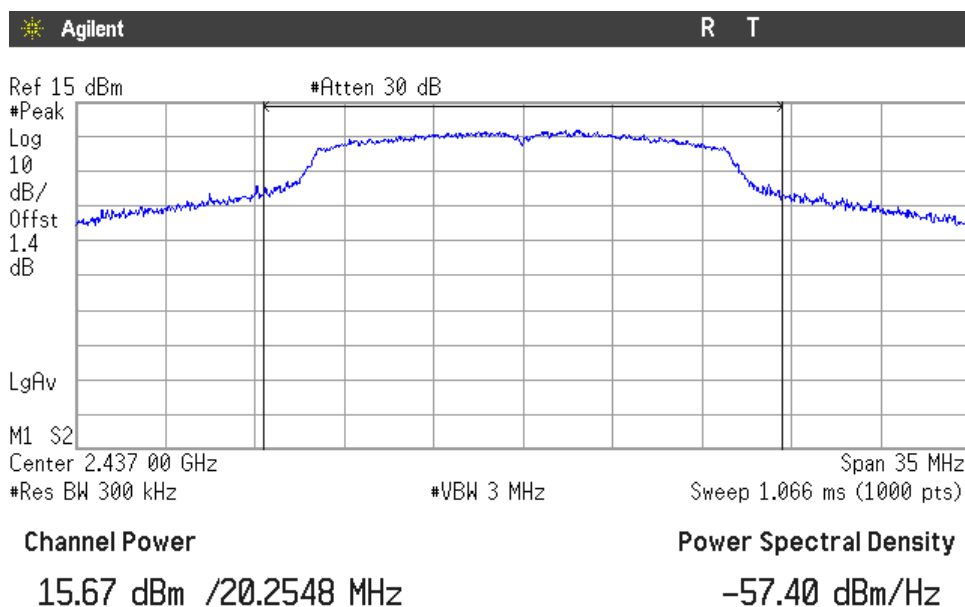
Verdict: PASS

CONDUCTED PEAK POWER.

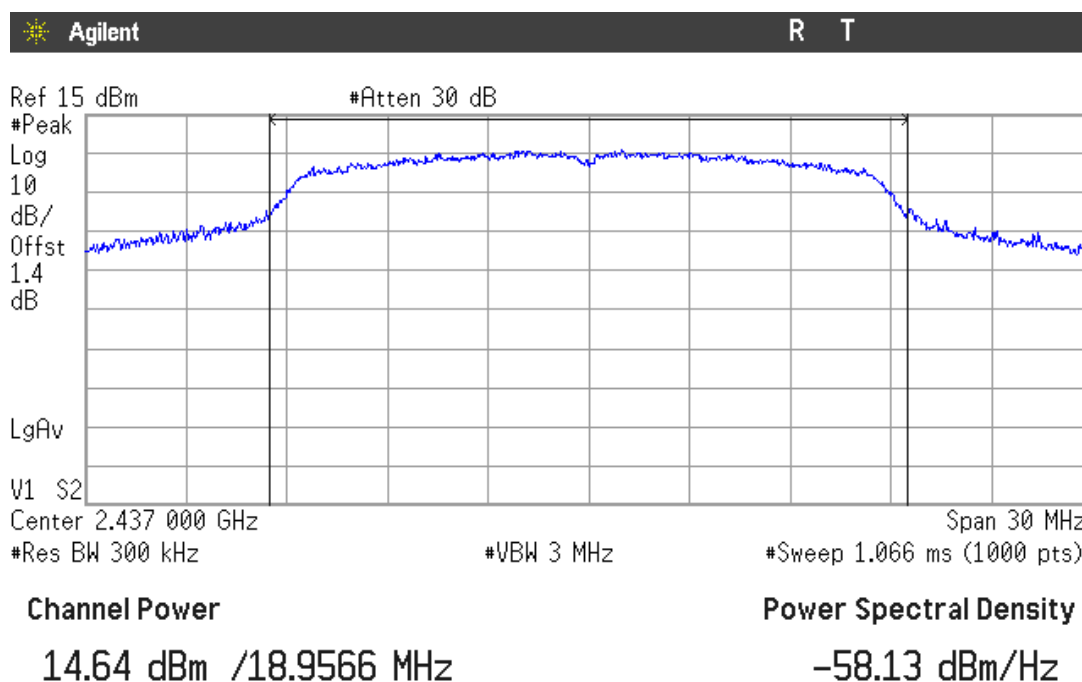
Mode B



Mode G



Mode n20



Section 15.247 Subclause (d) / RSS-247 5.5. Emission limitations conducted (Transmitter)

SPECIFICATION

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

RESULTS:

Reference Level Measurement

Mode B

Reference Level Measurement (dBm)	5.52
Measurement uncertainty (dB)	< ±2.03

Mode G

Reference Level Measurement (dBm)	4.91
Measurement uncertainty (dB)	< ±2.03

Mode n20

Reference Level Measurement (dBm)	4.03
Measurement uncertainty (dB)	< ±2.03

Mode B

All peaks are more than 20 dB below the limit.

Mode G

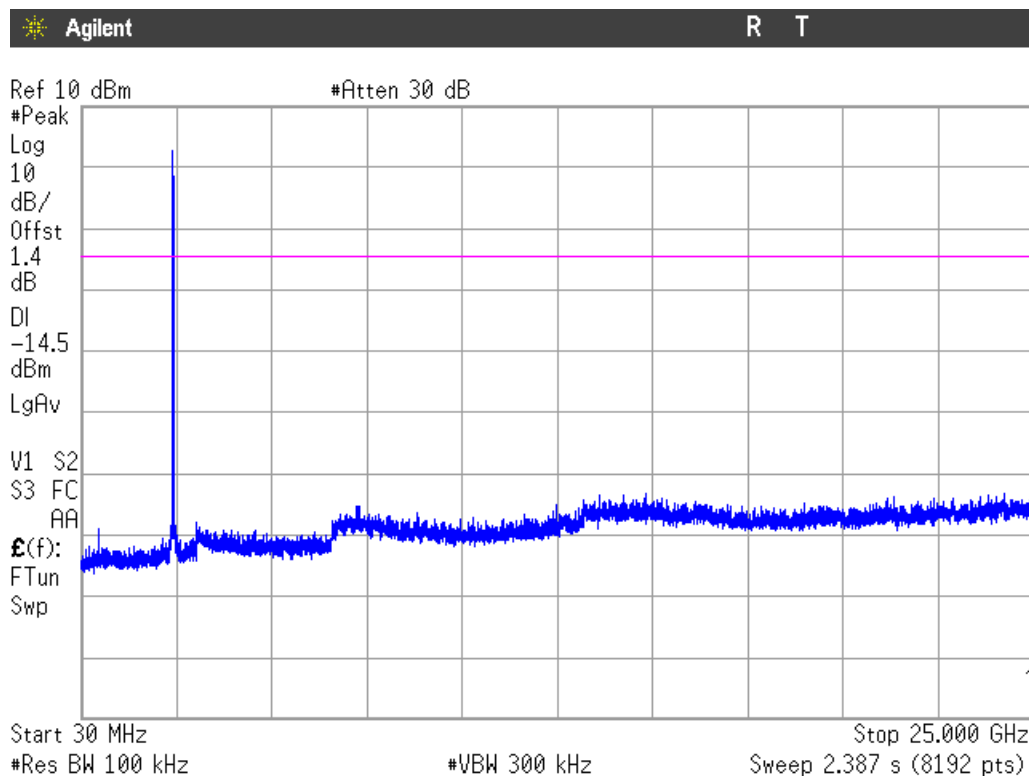
All peaks are more than 20 dB below the limit.

Mode n20

All peaks are more than 20 dB below the limit.

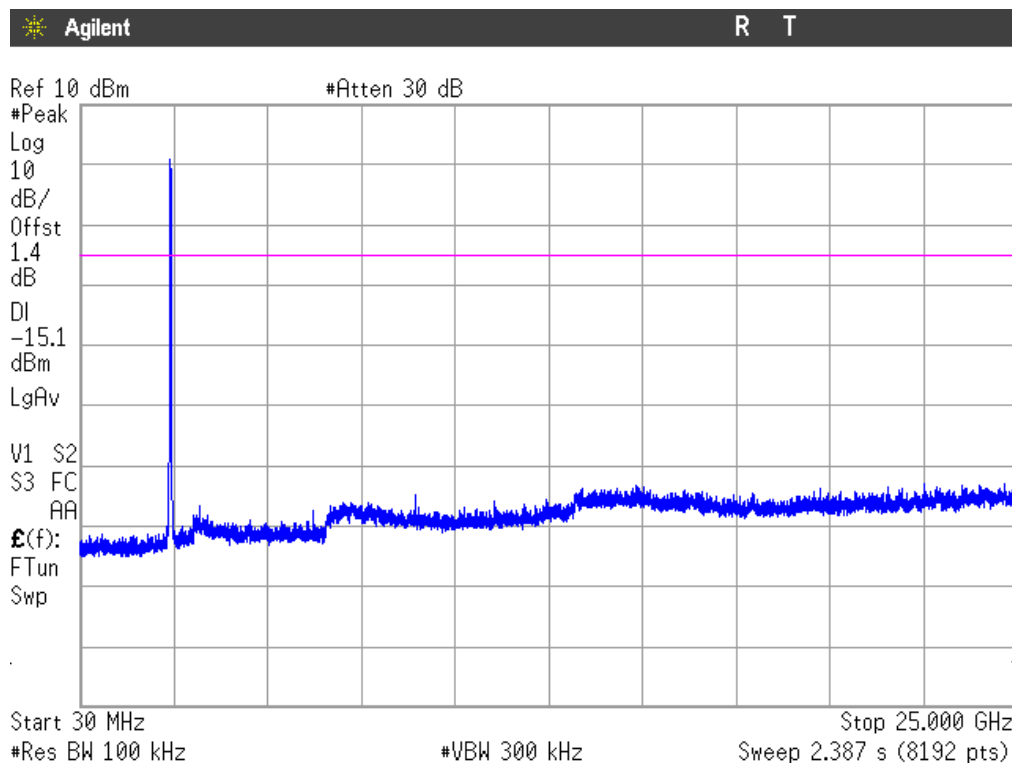
Verdict: PASS

Mode B



Note: The peak shown in the plot above the limit is the carrier frequency.

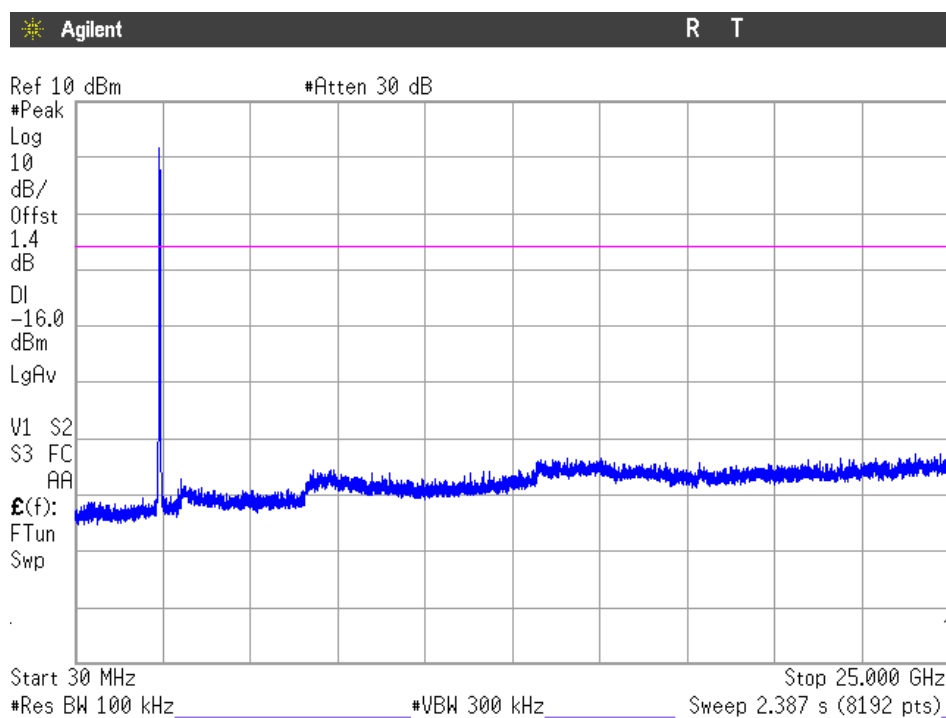
Mode G



Note: The peak shown in the plot above the limit is the carrier frequency.

Mode n20

Middle frequency



Note: The peak shown in the plot above the limit is the carrier frequency.

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

SPECIFICATION

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

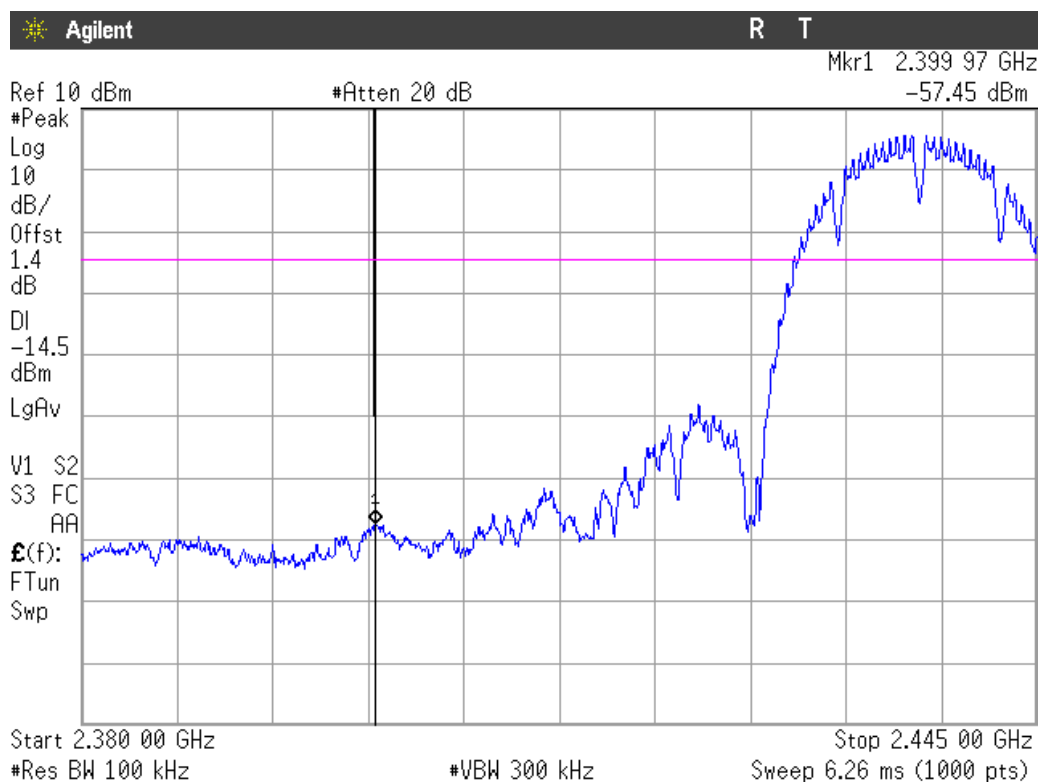
RESULTS:

Note: Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Mode B

1. LOW FREQUENCY SECTION. CONDUCTED.

See next plot.



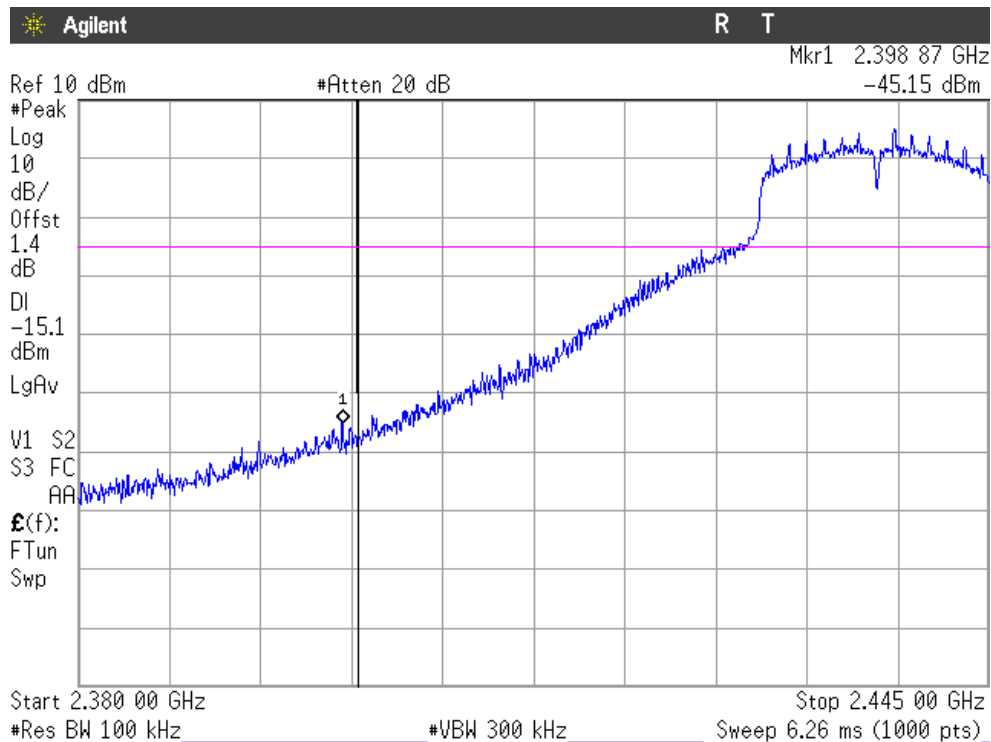
Measurement uncertainty (dB)	< ±2.03
------------------------------	---------

Verdict: PASS

Mode G

1. LOW FREQUENCY SECTION. CONDUCTED.

See next plot.



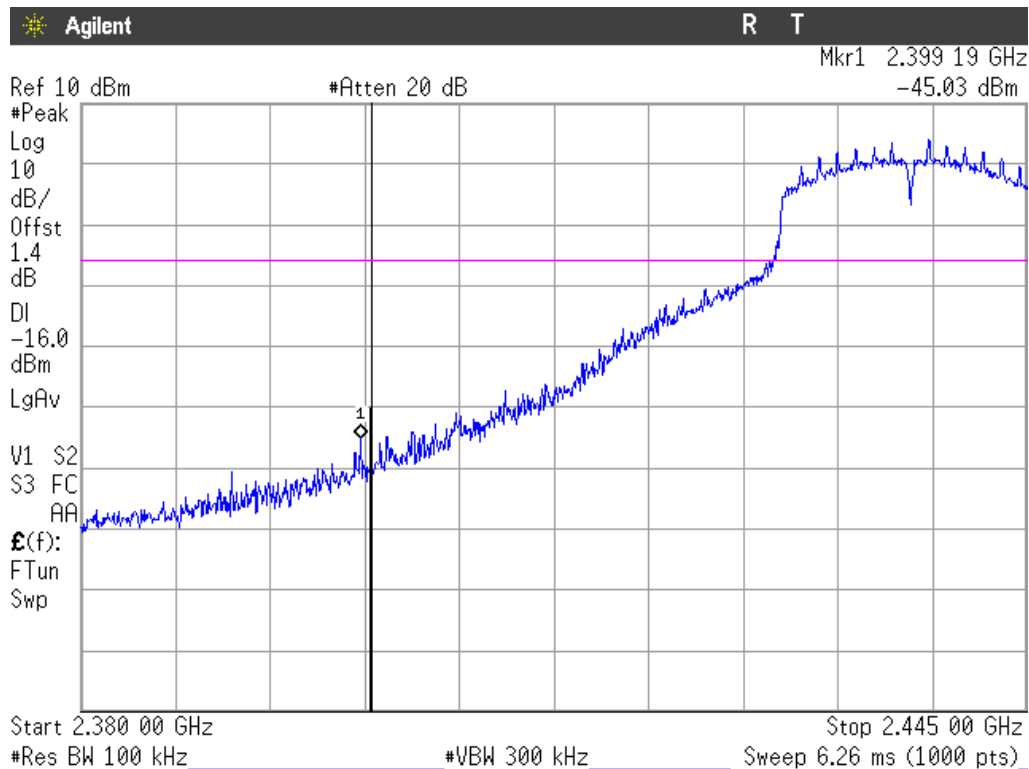
Measurement uncertainty (dB)	< ±2.03
------------------------------	---------

Verdict: PASS

Mode n20

1. LOW FREQUENCY SECTION. CONDUCTED.

See next plot.



Measurement uncertainty (dB)	< ±2.03
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Verdict: PASS

Section 15.247 Subclause (e) / RSS-247 5.2. (2) 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 PKPSD (Peak PSD) according to point 10.2. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r04 dated 01/07/2016.

Power spectral density (see next plots).

Mode B

Power spectral density (dBm)	5.59
Measurement uncertainty (dB)	< ±0.78

Mode G

Power spectral density (dBm)	4.91
Measurement uncertainty (dB)	< ±0.78

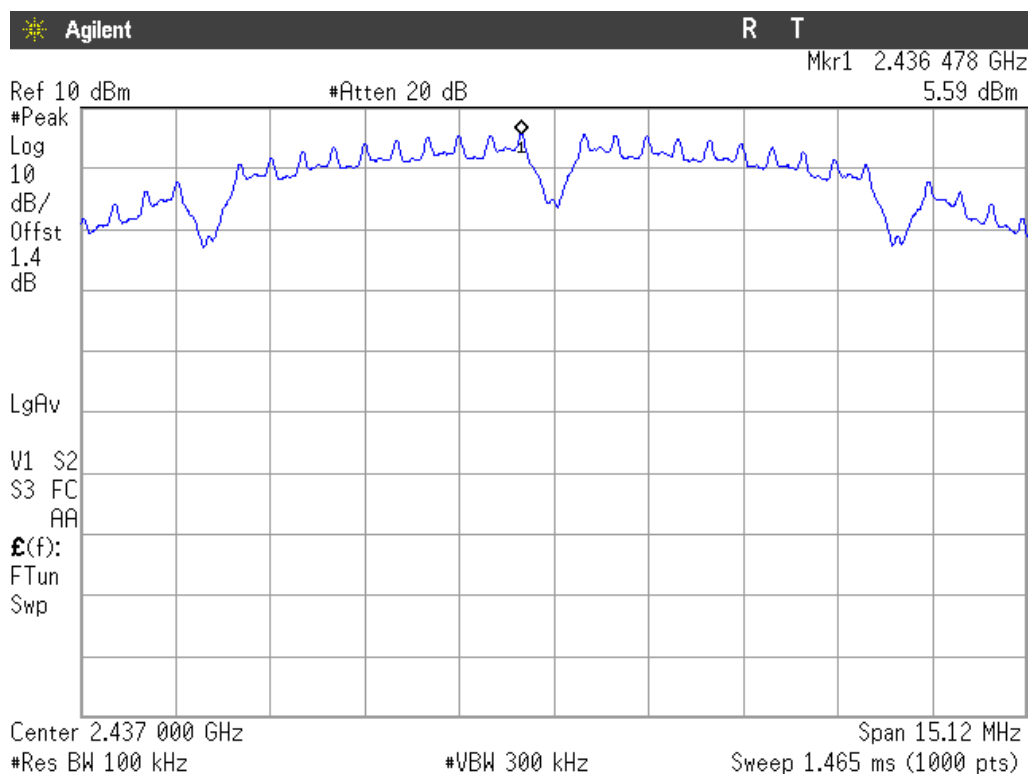
Mode n20

Power spectral density (dBm)	3.65
Measurement uncertainty (dB)	< ±0.78

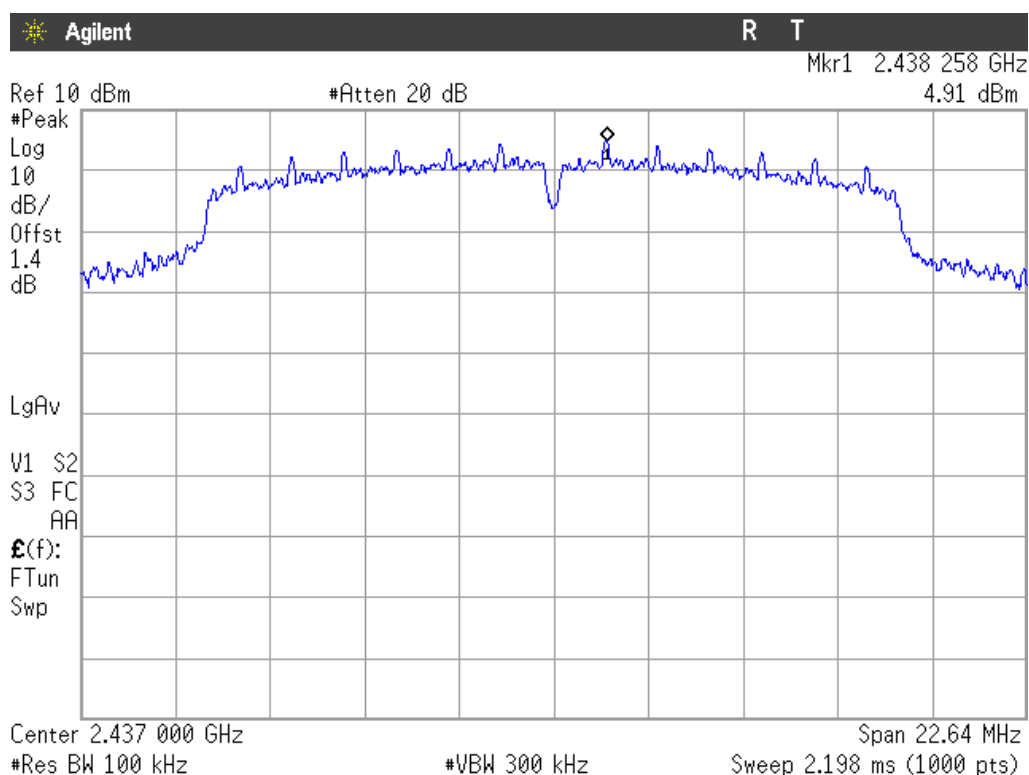
Verdict: PASS

Power spectral density.

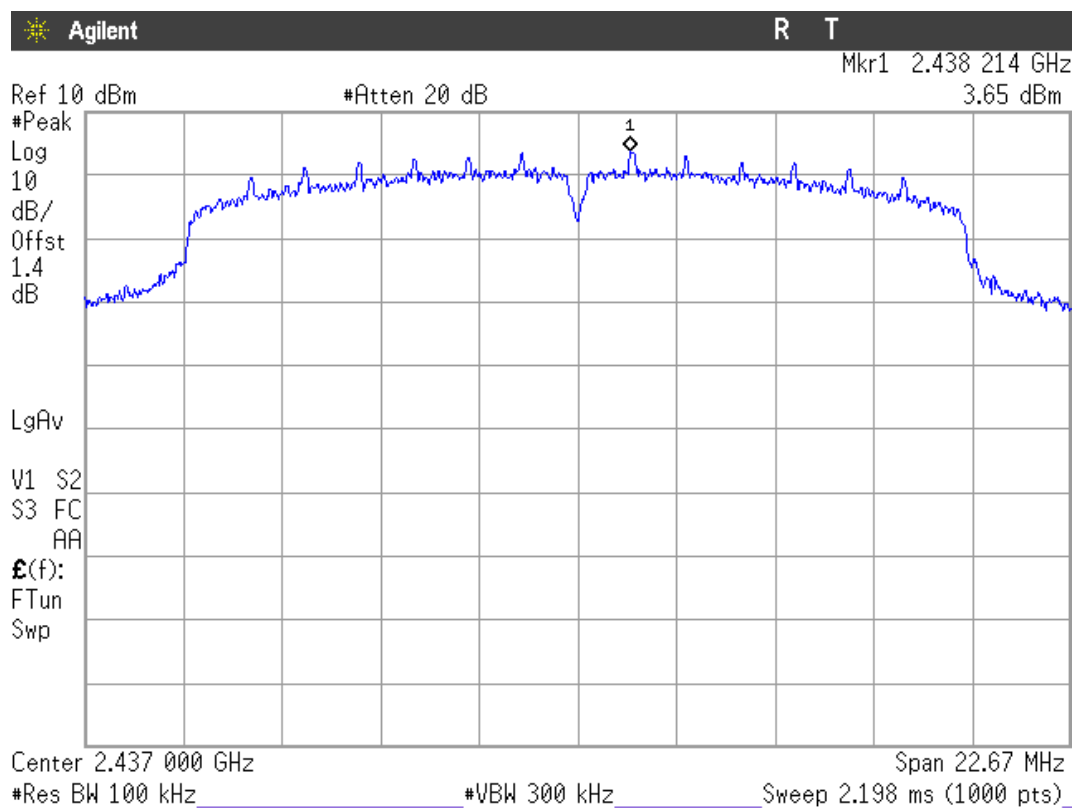
Mode B



Mode G



Mode n20



Section 15.247 Subclause (d) / RSS-247 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 8.9.:

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(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.

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-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-1000 MHz.

Spurious levels closest to the limit:

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
95.184	PV	Quasi-Peak	31.60	± 3.88
975.071	PV	Quasi-Peak	36.07	± 3.88

The spurious signals detected do not depend on the modulation mode.

Frequency range 1 GHz-25 GHz.

The results in the next tables show the maximum measured levels in the 1-25 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

The field strength at the band edges was evaluated for each mode for the channel under test.

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

1. WiFi 2.4GHz 802.11 b mode.

Out-of-band spurious emissions in the 1-25 GHz range and inside restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dBμV/m)	Measurement Uncertainty (dB)
2.388428	PV	Peak	49.58	± 4.69
2.484752	PV	Peak	50.40	± 4.69
5.568750	PV	Peak	48.27	± 4.69
5.939750	PV	Peak	43.25	± 4.69
7.425250	PV	Peak	48.53	± 4.69

Verdict: PASS

2. WiFi 2.4GHz 802.11 g mode

Out-of-band spurious emissions in the 1-25 GHz range and inside restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dBμV/m)	Measurement Uncertainty (dB)
2.389572	PV	Peak	59.71	± 4.69
		Average	39.84	± 4.69
2.485671	PV	Peak	59.40	± 4.69
		Average	41.05	± 4.69
5.568750	PV	Peak	44.59	± 4.69
5.939750	PV	Peak	42.36	± 4.69
6.310750	PV	Peak	45.26	± 4.69
7.425250	PV	Peak	48.70	± 4.69

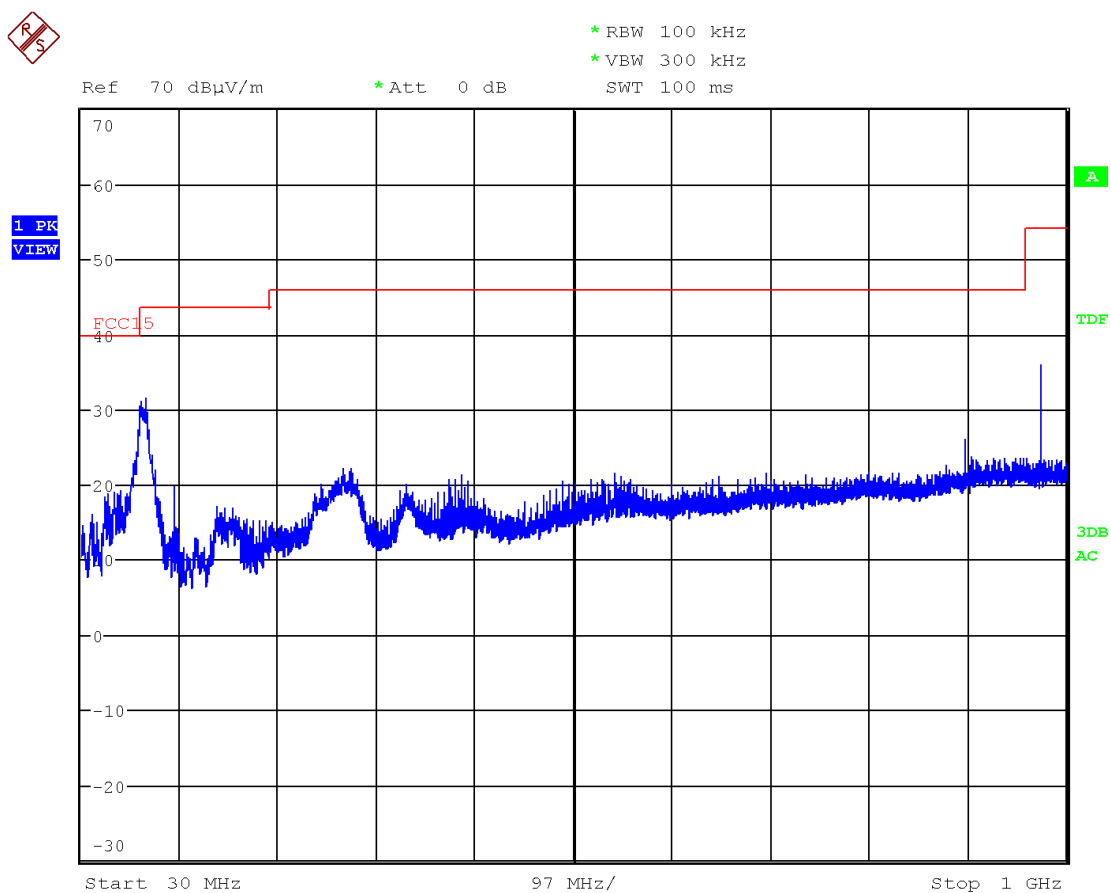
Verdict: PASS

3. WiFi 2.4GHz 802.11 n20 mode

Out-of-band spurious emissions in the 1-25 GHz range and inside restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dBμV/m)	Measurement Uncertainty (dB)
2.389588	PV	Peak	60.06	± 4.69
		Average	38.85	± 4.69
2.484692	PV	Peak	57.73	± 4.69
		Average	39.93	± 4.69
5.578750	PV	Peak	47.23	± 4.69
5.940250	PV	Peak	44.49	± 4.69
6.311250	PV	Peak	51.95	± 4.69
7.424750	PV	Peak	49.10	± 4.69

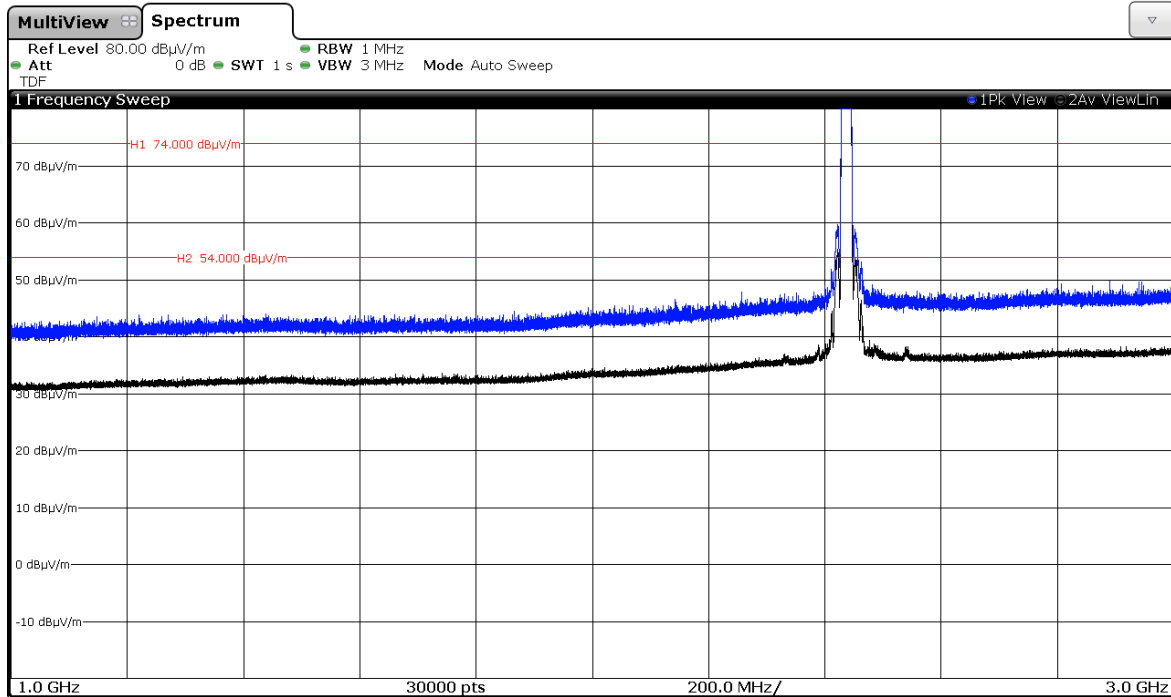
FREQUENCY RANGE 30 MHz-1000 MHz.



(This plot is valid for all modulation modes).

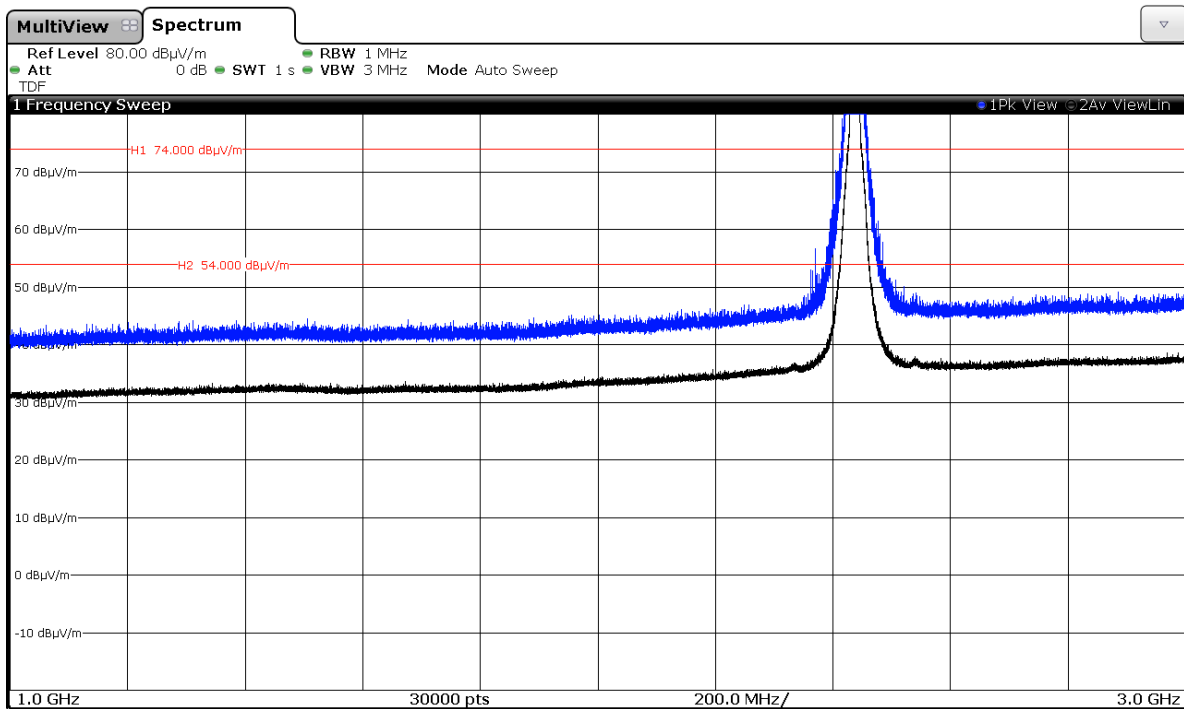
FREQUENCY RANGE 1 GHz to 3 GHz.

1. WiFi 2.4GHz 802.11 b mode



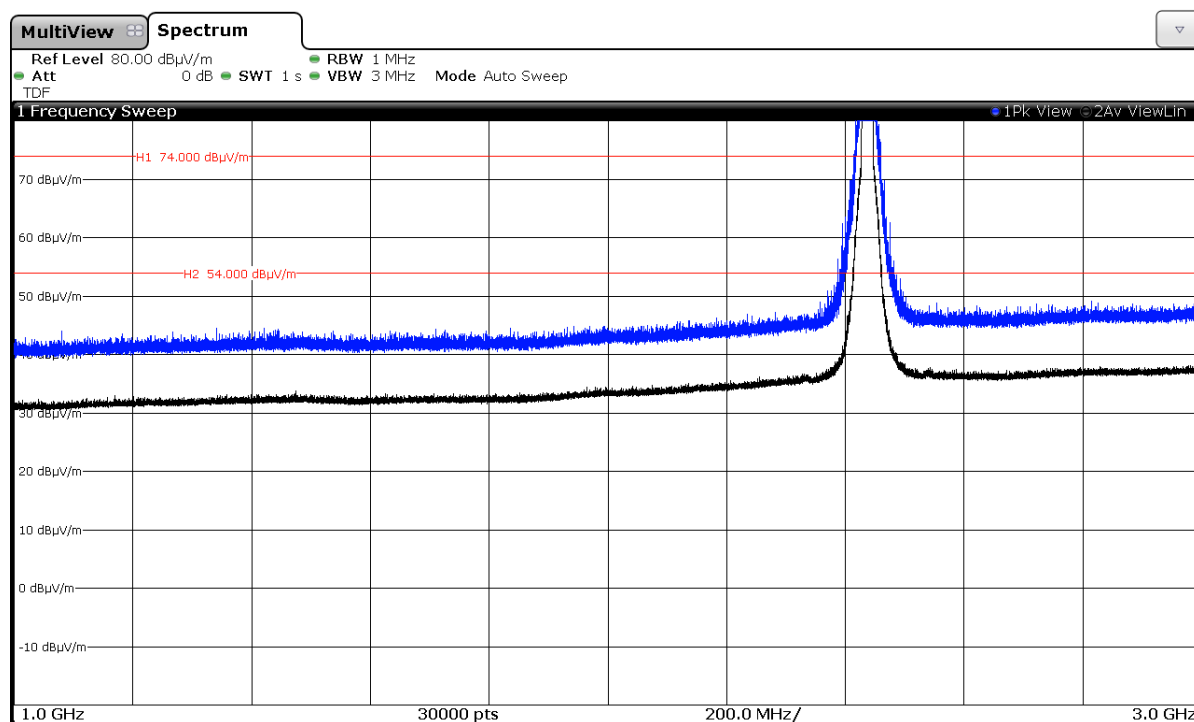
Note: The peak above the limit is the carrier frequency.

2. WiFi 2.4GHz 802.11 g mode



Note: The peak above the limit is the carrier frequency.

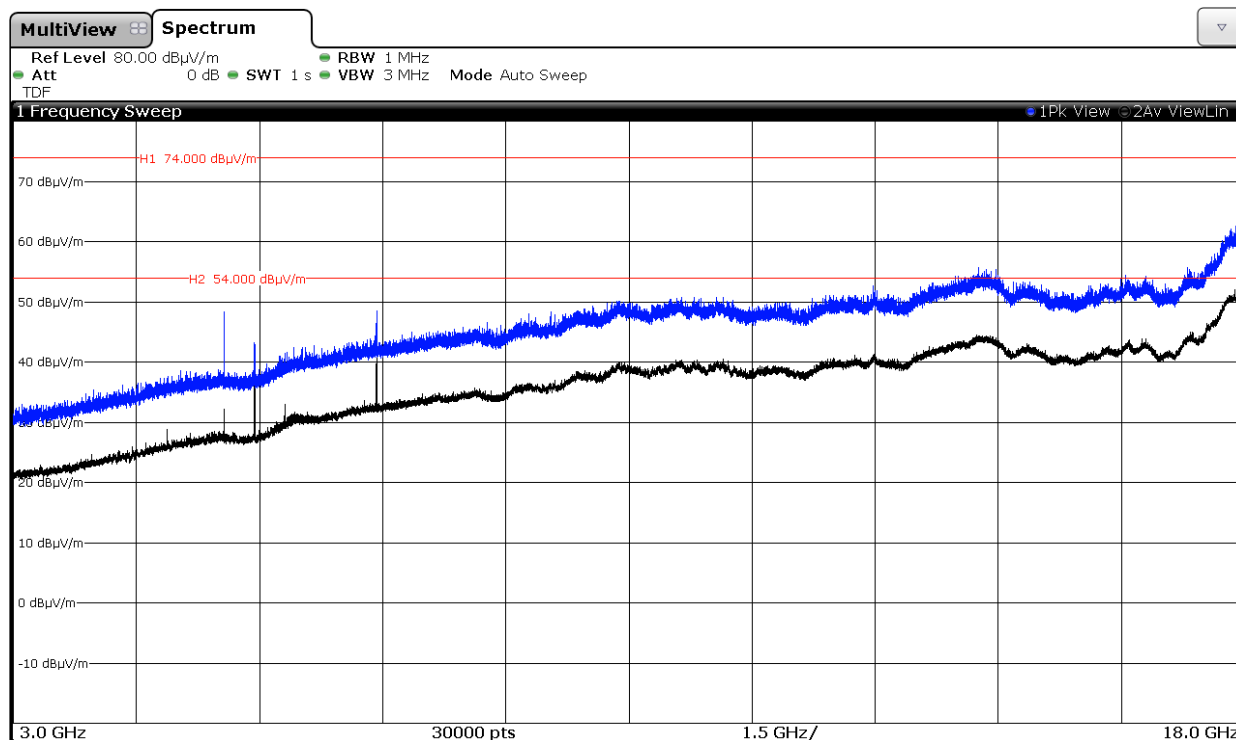
3. WiFi 2.4GHz 802.11 n20 mode



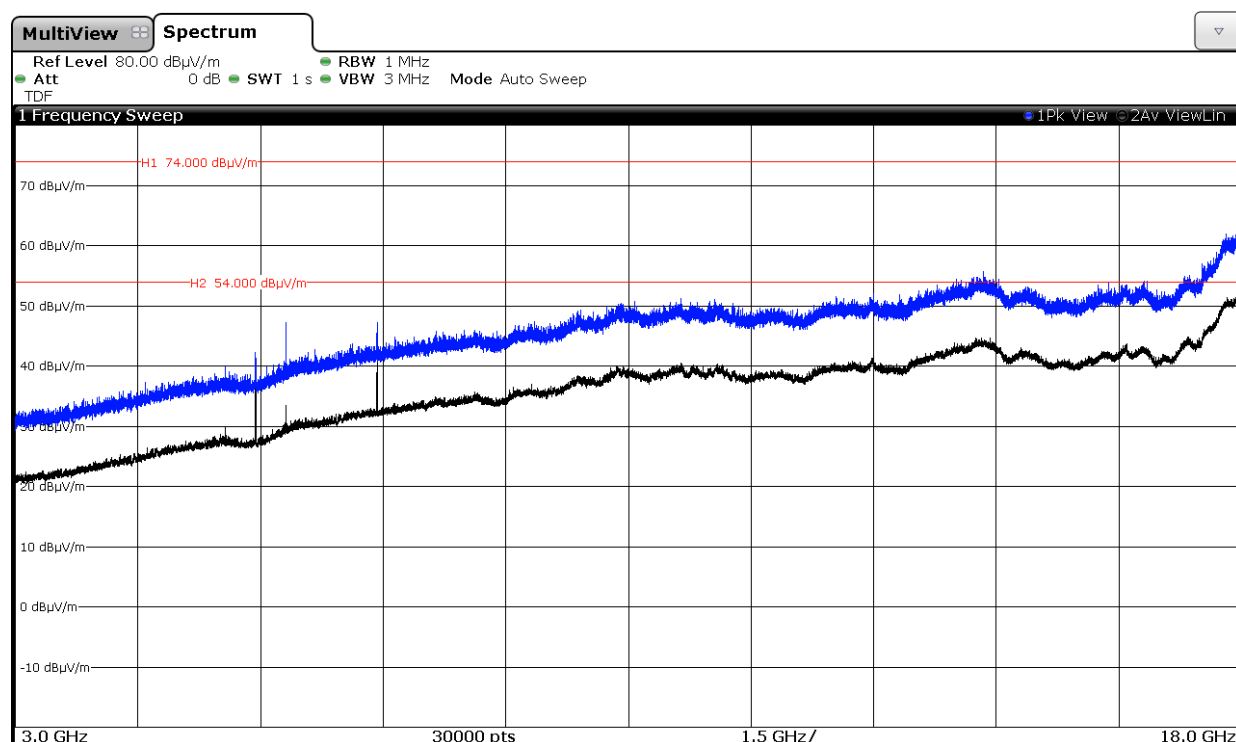
Note: The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 GHz to 18 GHz.

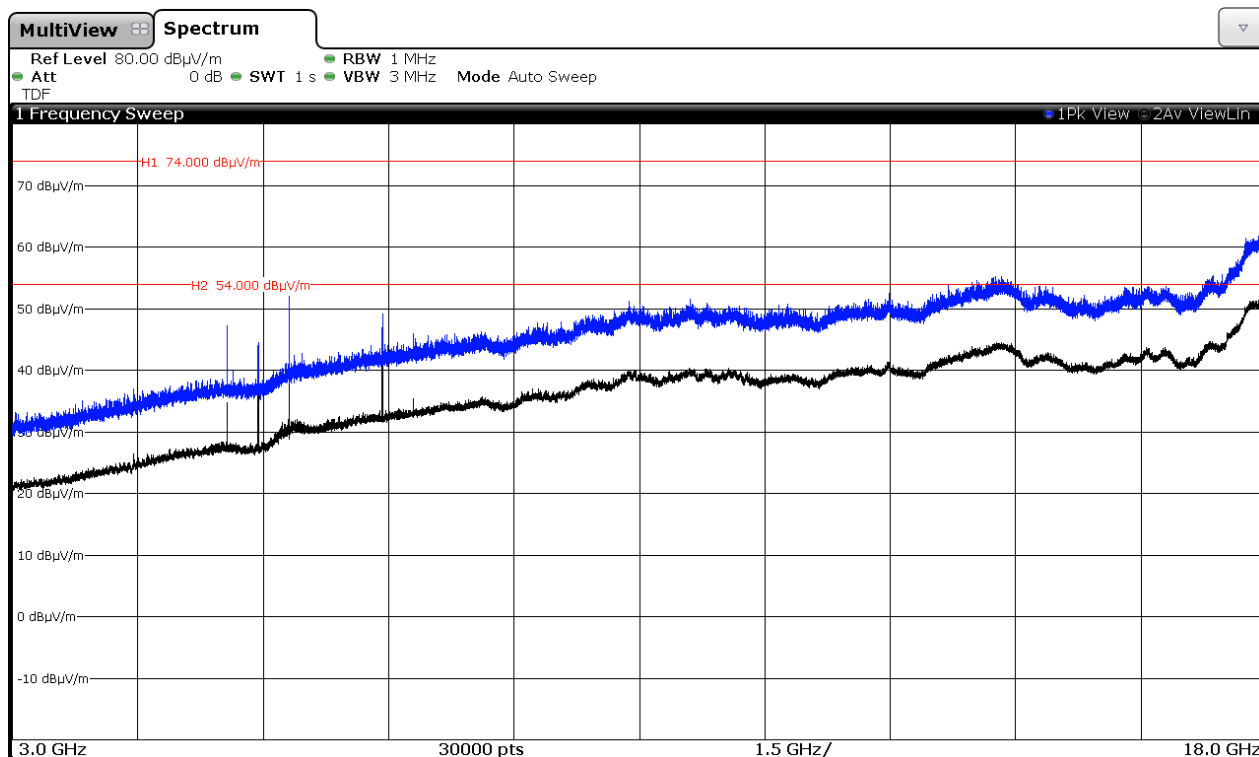
1. WiFi 2.4GHz 802.11 b mode



2. WiFi 2.4GHz 802.11 g mode

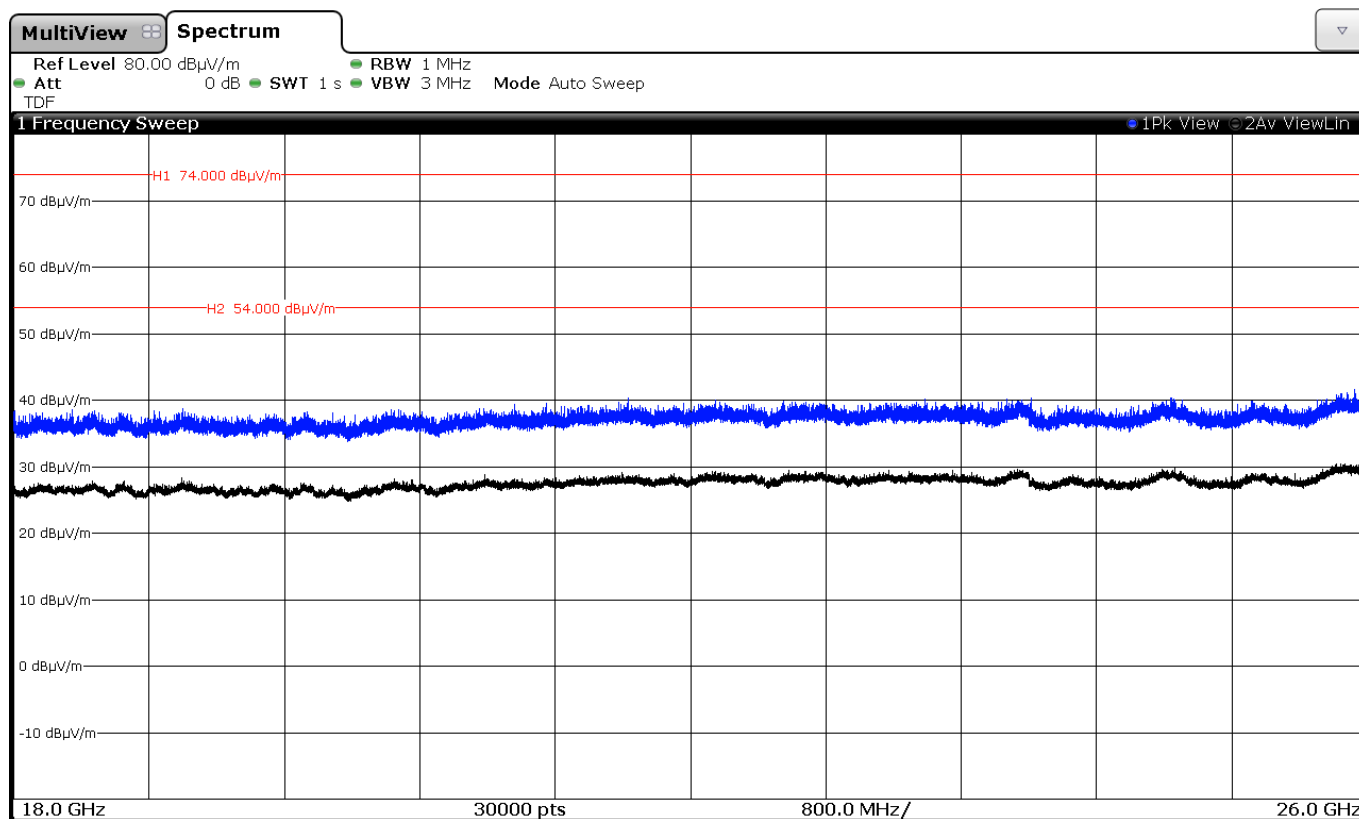


3. WiFi 2.4GHz 802.11 n20 mode



FREQUENCY RANGE 18 GHz to 26 GHz.

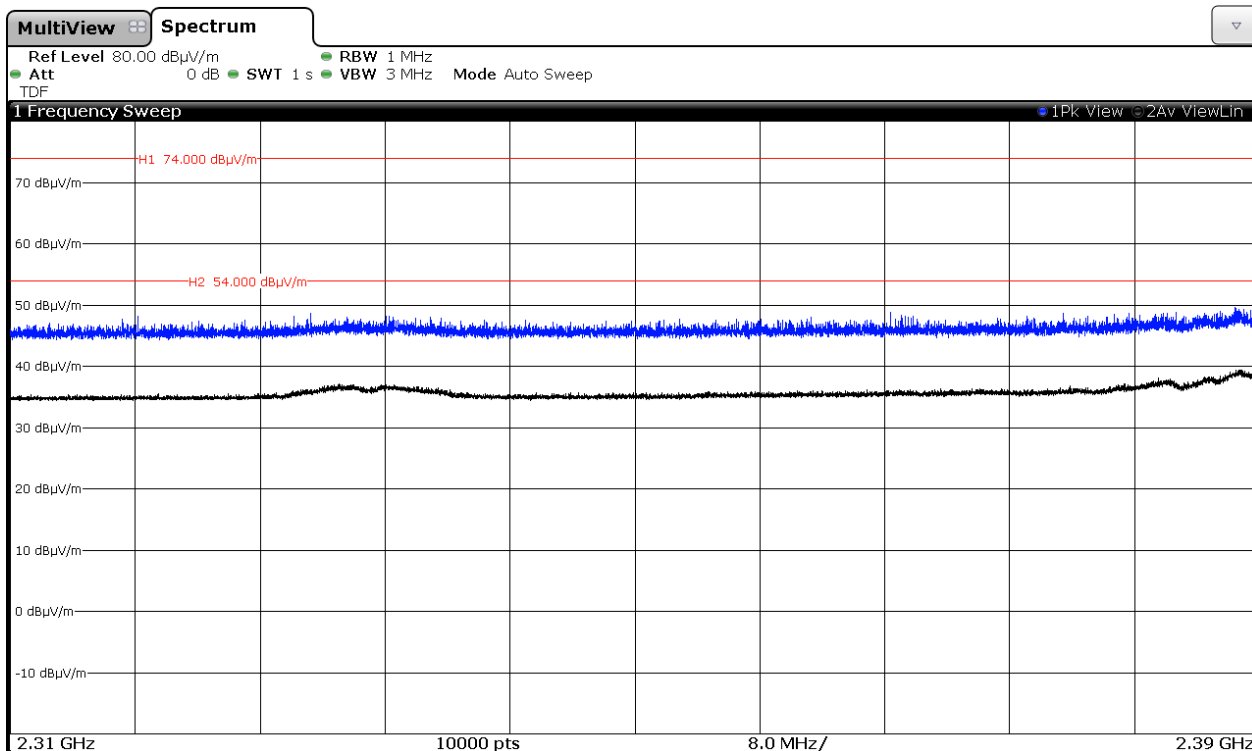
No spurious signals were detected.



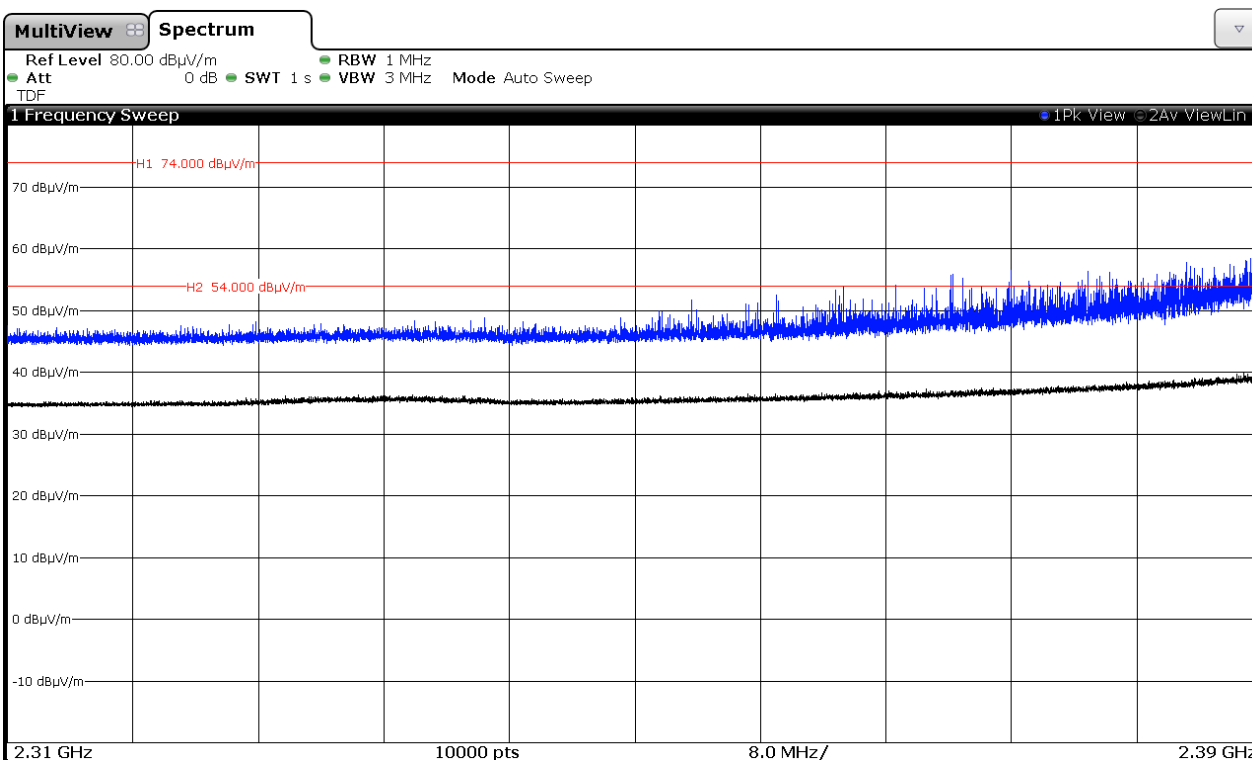
(This plot is valid for all modes).

FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

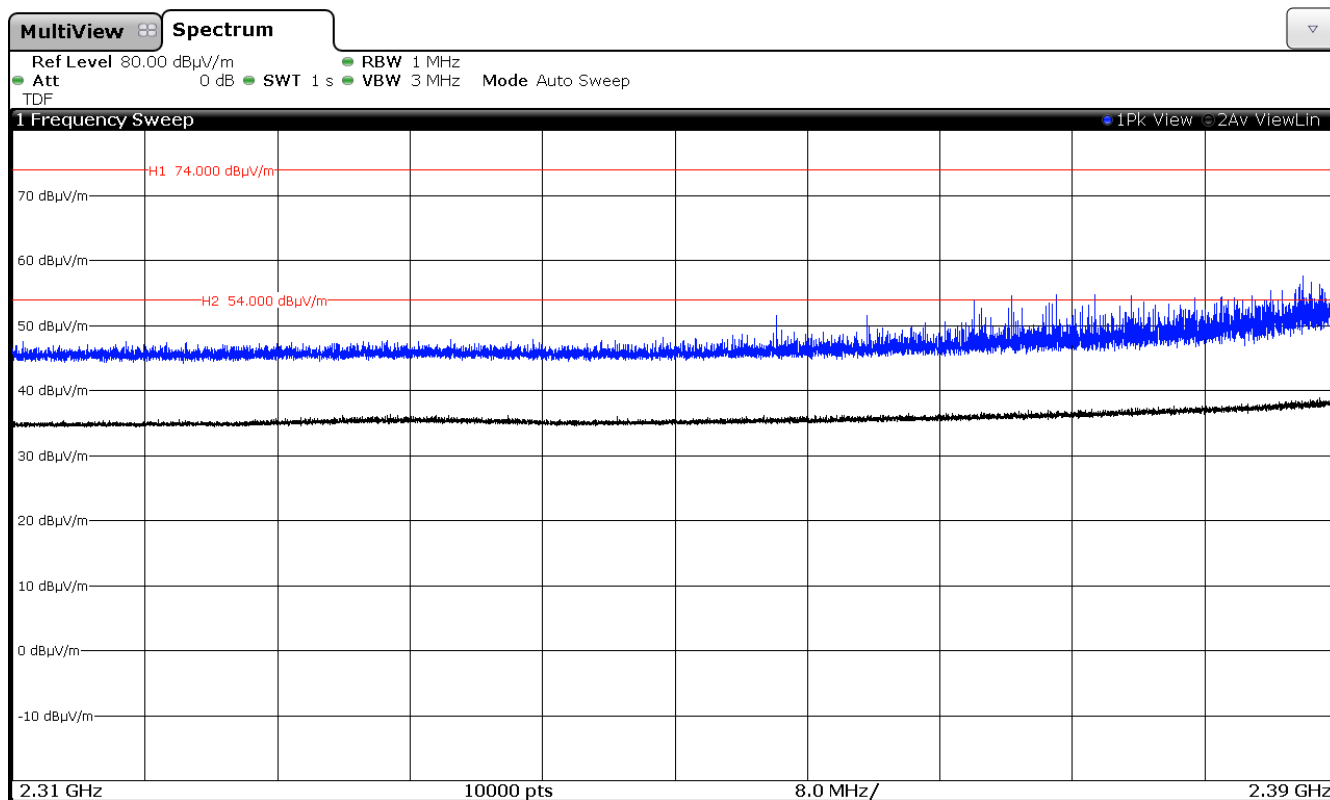
1. WiFi 2.4GHz 802.11 b mode



2. WiFi 2.4GHz 802.11 g mode

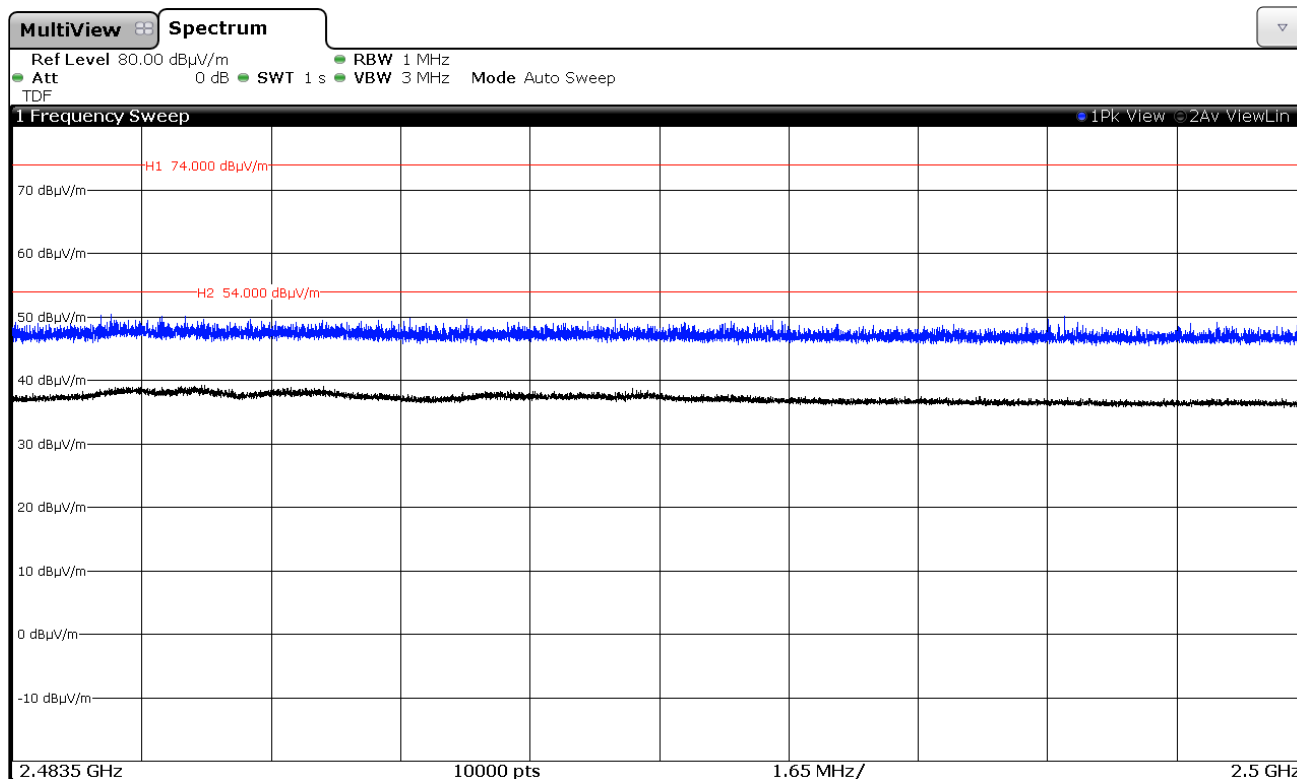


3. WiFi 2.4GHz 802.11 n20 mode

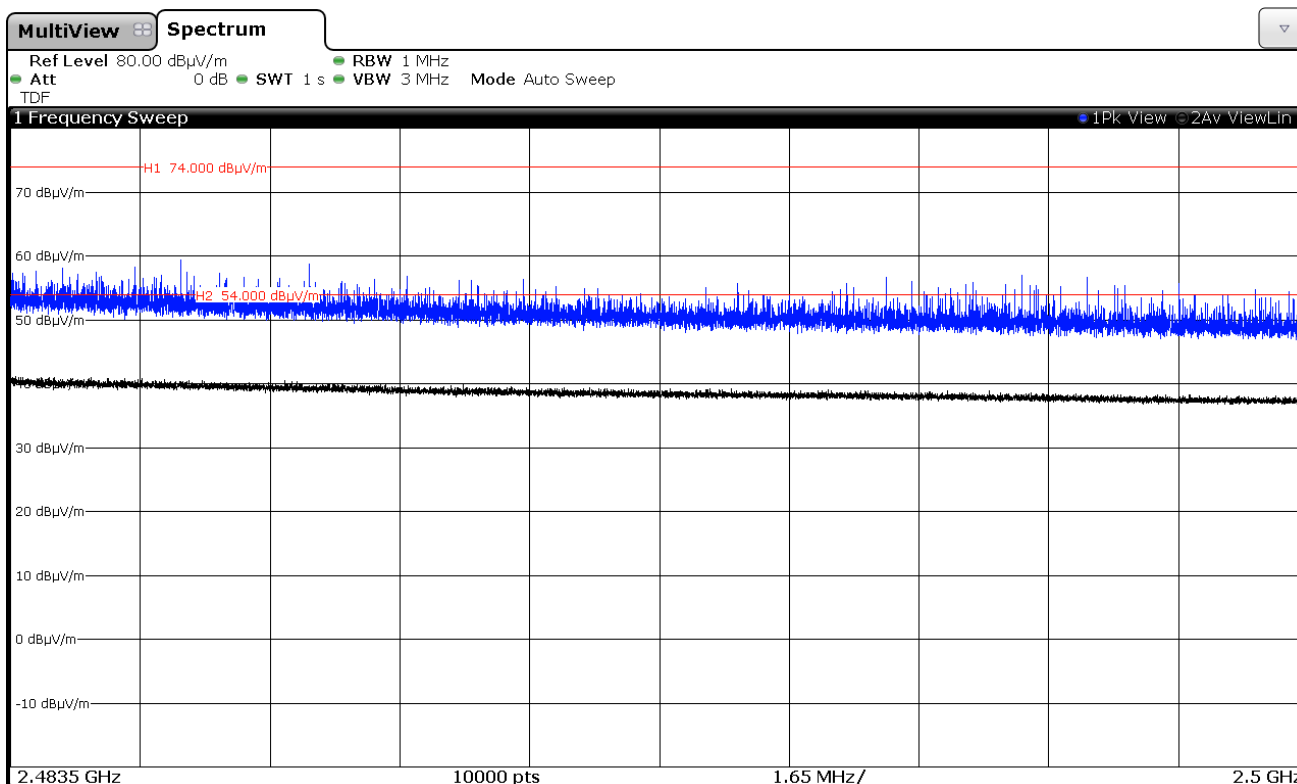


FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

1. WiFi 2.4GHz 802.11 b mode



2. WiFi 2.4GHz 802.11 g mode



3. WiFi 2.4GHz 802.11 n20 mode

