DEKRA Testing and Certification, S.A.U.
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c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

DEKRA

ENAC ENSAYOS Nº 51/LE147

Test report No:
NIE: 61152RRF.002

Test report

USA FCC Part 15.407, 15.209
CANADA RSS-247, RSS-Gen

Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements.
Radiated emission limits; general requirements.
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	Automotive Infotainment System
(*) Trademark	Mercedes-Benz
(*) Model and /or type reference	NTG7 HIGH LFT2
Other identification of the product	HW version: D5 SW version: E17.100 FCC ID: 2AOUZNTG7HIGHLFT2 IC: 23650-NTG7HIGHLFT2
(*) Features	FM/AM/DAB/DVBT, USB, Bluetooth, WLAN, GNSS.
Applicant	CONTINENTAL AUTOMOTIVE GMBH VDO-Strasse 1, 64832 Babenhausen, Germany
Test method requested, standard	- USA FCC Part 15.407 (10-1-19 Edition): Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. - USA FCC Part 15.209 (10-1-19 Edition): Radiated emission limits; general requirements. - CANADA RSS-247 Issue 2 (February 2017). - CANADA RSS-Gen Issue 5 (March 2019). - Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017. - ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Jose Carlos Luque RF Lab. Supervisor 74841983Y JOSE CARLOS LUQUE (C:A29507456) Firmado digitalmente por 74841983Y JOSE CARLOS LUQUE (C:A29507456) Fecha: 2020.08.14 11:39:55 +02'00'
Date of issue	2020-08-12
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification 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 has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification 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 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 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 NTG7 HIGH LFT2 is an automotive head unit to be installed in cars with the following features: FM/AM/DAB/DVBT, USB, Bluetooth, WLAN and GNSS.

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
61152E/040	Automotive Infotainment System	NTG7 HIGH LFT2	COM634LB0000001	2020/03/26
61152E/032	Harness	--	--	2020/03/24
60268/125	RF Cable with 4 Antennas	--	--	2019/09/30

Sample S/01 has undergone the following test(s): All RADIATED tests indicated in Appendixes B and C.

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

Control Nº	Description	Model	Serial Nº	Date of reception
61152E/030	Automotive Infotainment System	NTG7 HIGH LFT2	COM634LB0000004	2020/03/24
61152E/038	Harness	--	--	2020/03/24

Auxiliary elements used with the Sample S/02:

Control Nº	Description	Model	Serial Nº	Date of reception
61152E/039	SMA Adapter Cable	--	--	2020/03/24

Sample S/02 has undergone the following test(s): All CONDUCTED tests indicated in Appendixes A, B and C

Test sample description

Ports…… :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	Car Connector A	>3m(x1)	☒	☐	☐
	Car Connector B	>3m(x1)	☒	☐	☐
	Display Connector CID/PIP / RVC	>3m(x1)	☒	☒	☐
	USB Connector	<3m(x2)	☒	☒	☐
	Eth Connector	>3m(x1)	☒	☐	☐
	BT/WLAN-Antenna	>3m(x1)	☒	☒	☐
	FM/AM, TV/SDARS Ant	>3m(x1)	☒	☒	☐
	GNSS Antenna	>3m(x1)	☒	☒	☐
Supplementary information to the ports…… :	-				
Rated power supply .....:	Voltage and Frequency	Reference poles			
		L1	L2	L3	N	PE
	☒ DC: 12V Car battery / attenuator (9,5-15,5V normal operation)					
Rated Power .....:	9,5-15,5V normal operation					
Clock frequencies.....:	see schematics					
Other parameters .....:	See Technical Description					
Software version .....:	E17.100					
Hardware version .....:	D5					
Dimensions in cm (W x H x D) ....:	182 x 78 x 160 mm					
Mounting position .....:	☒ Other: automotive headunit					
Modules/parts.....:	Module/parts of test item	Type	Manufacturer		
	n/a	-			
Accessories (not part of the test item) .....:	Description	Type	Manufacturer		
	Display	-	LG		

	HARMANeco RasPi / headless	-	HBAS
	Cable harness	-	HBAS
	BT/WLAN-Antenna	-	Hirschmann
Documents as provided by the applicant.....:	Description	File name	Issue date
	Technical Description	Technical Description NTG7_A16 200324 SOP2 AllVariant.doc	
	-		

Identification of the client

CONTIENTAL AUTOMOTIVE GMBH

VDO-Strasse 1, 64832 Babenhausen, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-04-30
Date (finish)	2020-05-07

Document history

Report number	Date	Description
61152RRF.002	2020-08-12	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

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. = 35 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Miguel Ángel Torres, Javier Nadales and José Gabriel Pendón.

Used instrumentation:

Radiated Measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
3.	RF Pre-amplifier, G>40 dB, 10 MHz-6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/09	2020/09
4.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2018/07	2021/07
5.	EMI Test Receiver 20 Hz-40 GHz ROHDE AND SCHWARZ ESU40	2019/09	2021/09
6.	RF Pre-amplifier, 30 dB, 500 MHz-18 GHz NARDA AMF-3D-00501800-24-10P	2019/12	2020/12
7.	RF Pre-amplifier, G>55dB, 1-18GHz NARDA AMF-7D-01001800-22-10P	2020/05	2021/05
8.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/06	2021/06
9.	Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07
10.	Pre-Amplifier G>30dB 18-40GHz, BONN ELEKTRONIK, BLMA 1840-1M	2019/02	2021/02
11.	DC Power Supply Keysight Technologies U8002A	N/A	N/A
12.	Digital multimeter FLUKE 179	2019/06	2020/06

Conducted Measurements

		Last Calibration	Due Calibration
1.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
2.	Signal and Spectrum Analyzer AGILENT TECHNOLOGIES E4440A	2019/11	2021/11
3.	DC Power Supply 30V/5A Rohde & Schwarz U8002A	N/A	N/A
4.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2020/03	2022/03
5.	Digital multimeter FLUKE 179	2019/06	2020/06

Testing verdicts

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

Summary

A. Common requirements for all bands

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.35 (c) / RSS-Gen 6.10	Duty Cycle	P	
RSS-Gen 6.6 / RSS-247 6.2.	Transmitter 99% Occupied Bandwidth	P	
FCC 15.403 (i)	Transmitter 26 dB Emission Bandwidth (EBW)	P	
FCC 15.407 (g) / RSS-Gen 6.11	Frequency Stability (Temperature & Voltage Variation)	N/M	(1)
Supplementary information and remarks: (1) The manufacturer is responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual.			

B. 5.15 GHz – 5.25 GHz Band

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.407 (a)(1)(iv)	Transmitter Maximum conducted Output Power	P	
RSS-247 6.2.1.1	Transmitter Maximum Equivalent Isotropically Radiated Power EIRP	P	
FCC 15.407 (a)(1)(iv)	Transmitter Maximum Power Spectral Density	P	
RSS-247 6.2.1.1	Transmitter EIRP Spectral Density	P	
FCC 15.407 (b)(1)(6) / RSS-247 6.2.1.2	Transmitter Out of Band Radiated Emissions	P	
FCC 15.407 (b)(1) / RSS-247 6.2.1.2	Transmitter Band Edge Radiated Emissions	P	
Supplementary information and remarks: None.			

C. 5.725 GHz – 5.85 GHz Band

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.407 (e) / RSS-247 Clause 6.2.4.1	6 dB Bandwidth.	P	
FCC 15.407 (a)(3) / RSS-247 6.2.4.1	Transmitter Maximum conducted Output Power	P	
FCC 15.407 (a)(3) / RSS-247 Clause 6.2.4.1	Transmitter Maximum Power Spectral Density	P	
FCC 15.407 (b) (4) / RSS-247 6.2.4.2	Transmitter Band Edge Radiated Emissions	P	
FCC 15.407 (b) (4) (6) / RSS-247 6.2.4.2	Transmitter Out of Band Radiated Emissions	P	
Supplementary information and remarks: None.			

Appendix A: Test Common requirements for all bands

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FCC 15.35 (c) / RSS-Gen 6.10. Duty Cycle

SPECIFICATION:

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

RESULTS:

The results below are for data rates with a duty cycle less than 98%. The results for all rest of modes having a value > 98%.

Tests performed on the SISO mode CORE-0_Port3 Antenna.

Sub-band	Technique	Mode	Pulse Duration (us)	Period (us)	Duty Cycle correction (dB)
U-NII-1	SISO (*)	802.11a / 20 MHz	2036.35	2572.52	0.971
U-NII-3	SISO (*)	802.11a / 20 MHz	2036.35	2572.52	1.015
U-NII-1	SISO	802.11n / 20 MHz	1887.96	2422.14	1.082
U-NII-3	SISO	802.11n / 20 MHz	1882.29	2440.48	1.128
U-NII-1	SISO	802.11n / 40 MHz	923.64	1445.82	1.946
U-NII-3	SISO	802.11ac / 40 MHz	945.32	1461.15	1.891
U-NII-1	SISO	802.11ac / 80 MHz	422.47	961.99	3.574
U-NII-3	SISO	802.11ac / 80 MHz	435.83	961.84	3.438

RSS-Gen 6.6 / RSS-247 6.2. 99% Occupied Bandwidth

The following modes and date rates were selected based on preliminary testing that identified those corresponding to the worst cases:

- 802.11a: 6 Mbit/s.
- 802.11n HT20: MCS0.
- 802.11n HT40: MCS0.
- 802.11ac VHT40: MCS0.
- 802.11ac VHT80: MCS0

Tests performed on the SISO mode CORE-0_Port3 Antenna.

SISO CORE-0_Port3 Antenna:

Mode 802.11 a20:

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
99% Occupied Bandwidth (MHz)	16.84	16.90	17.97
Measurement uncertainty (kHz)	<±140.51		

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
99% Occupied Bandwidth (MHz)	17.053333	17.053333	17.04
Measurement uncertainty (kHz)	<±42.41		

Mode 802.11 n20 (HT20):

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
99% Occupied Bandwidth (MHz)	18.16	18.186667	18.20
Measurement uncertainty (kHz)	<±42.39		

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
99% Occupied Bandwidth (MHz)	18.226667	18.24	18.20
Measurement uncertainty (kHz)	<±42.41		

Mode 802.11 n40 (HT40):

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
99% Occupied Bandwidth (MHz)	36.266667	36.293333
Measurement uncertainty (kHz)	<±73.17	

Mode 802.11 ac40 (VHT40):

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
99% Occupied Bandwidth (MHz)	36.32	36.266667
Measurement uncertainty (kHz)	<±73.18	

Mode 802.11 ac80 (VHT80):

U-NII-1 (5150-5250 MHz)

Channel	Single Channel 42 (5210 MHz)
99% Occupied Bandwidth (MHz)	75.52
Measurement uncertainty (kHz)	<±146.29

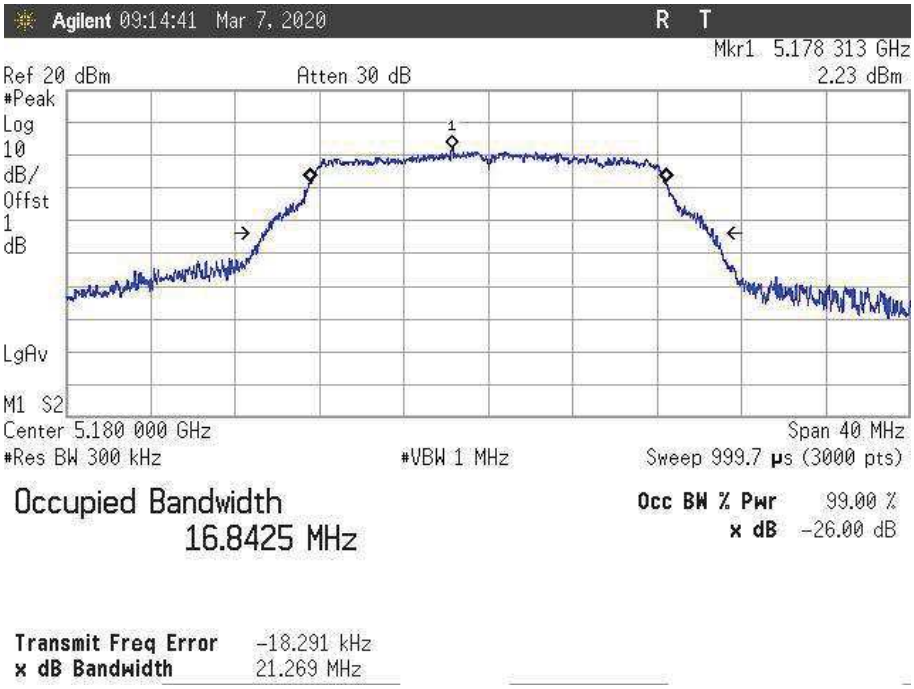
U-NII-3 (5725-5850 MHz)

Channel	Single Channel 155 (5775 MHz)
99% Occupied Bandwidth (MHz)	75.84
Measurement uncertainty (kHz)	<±146.30

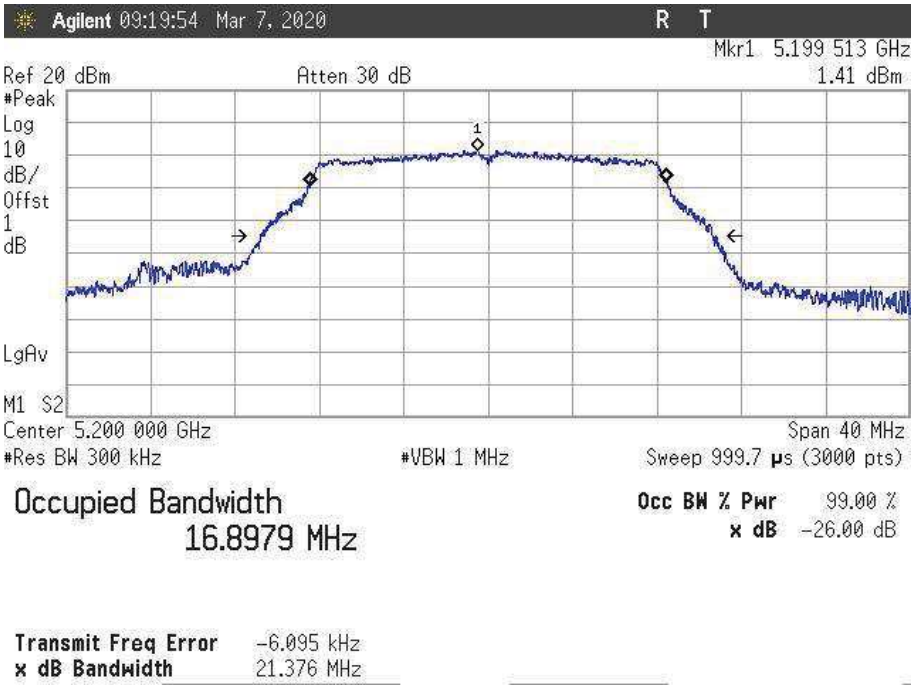
Mode 802.11 a20:

U-NII-1 (5150-5250 MHz)

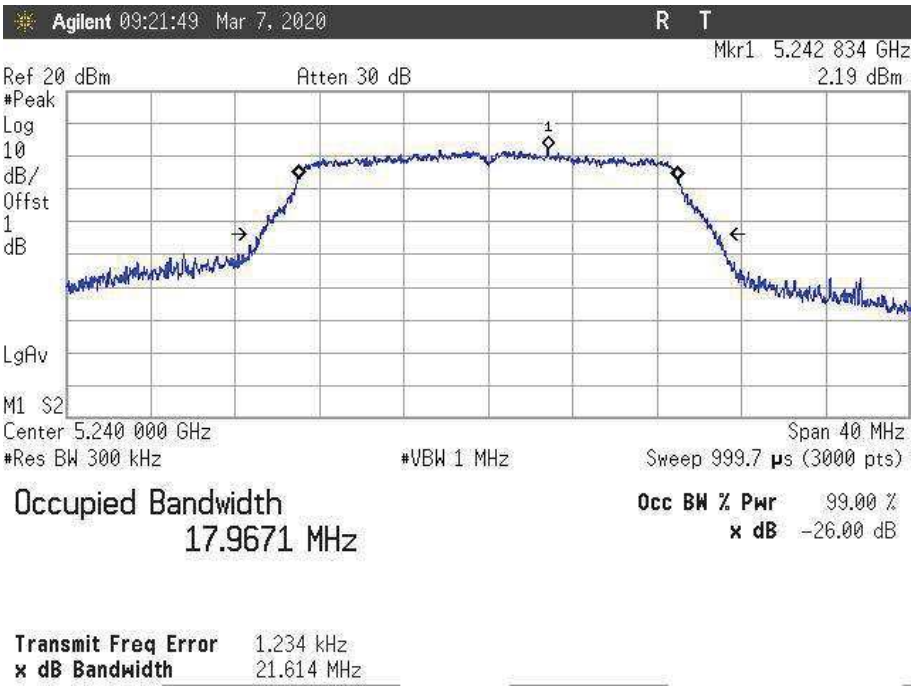
- Low Channel 36 (5180 MHz):



- Middle Channel 40 (5200 MHz):

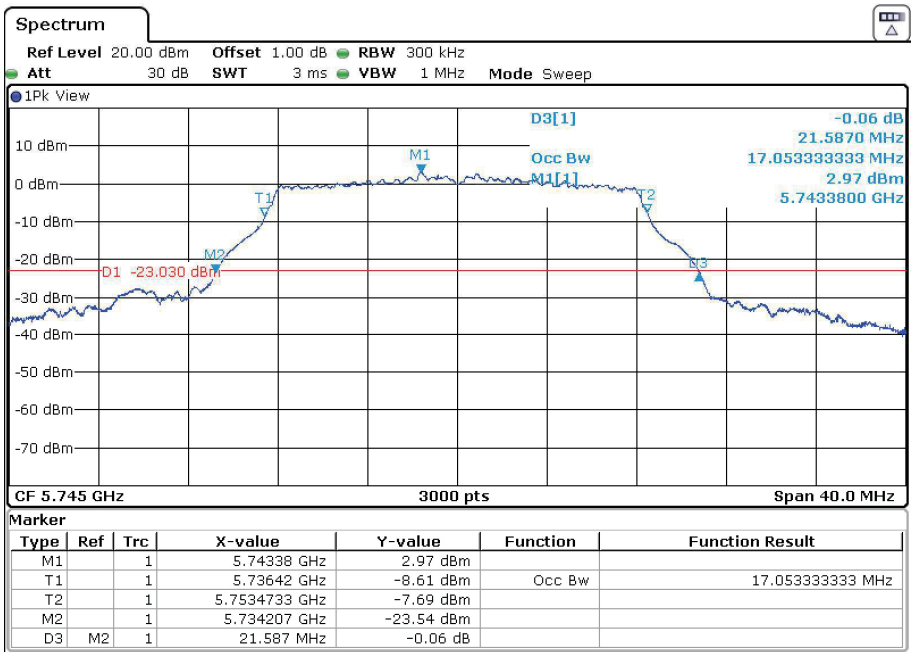


- High Channel 48 (5240 MHz):

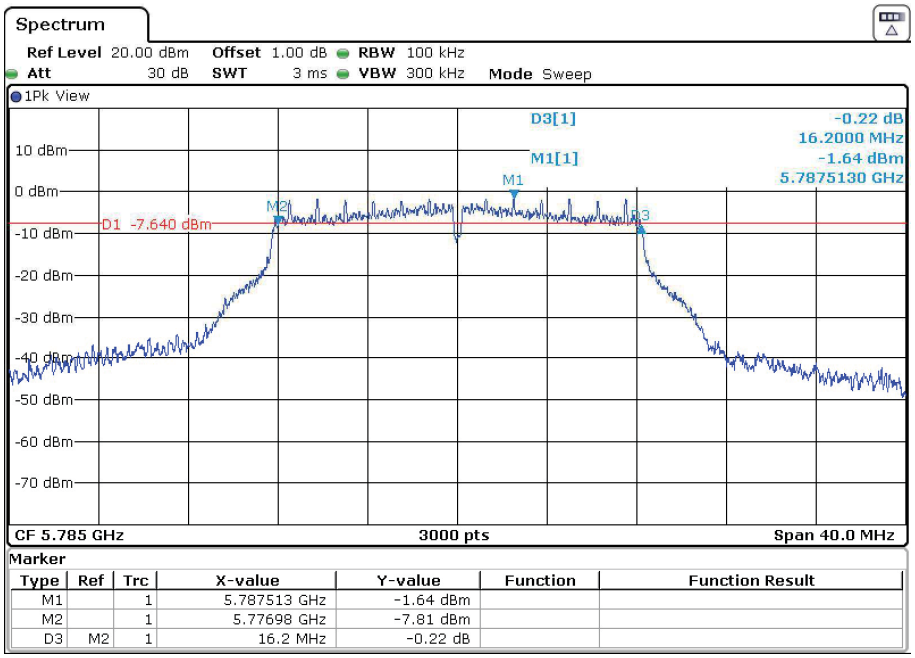


U-NII-3 (5725-5850 MHz)

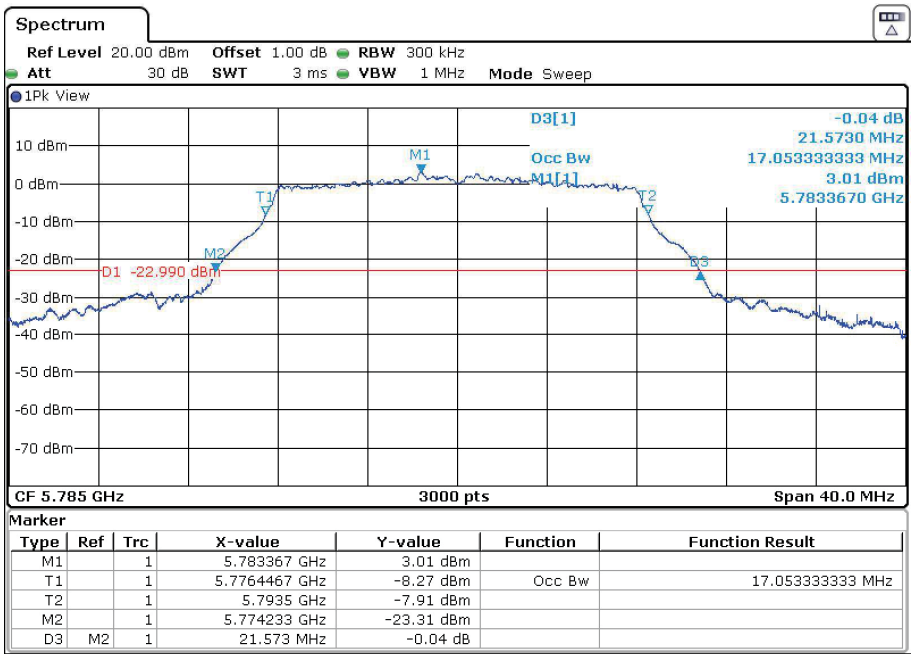
- Low Channel 149 (5745 MHz):



- Middle Channel 157 (5785 MHz):



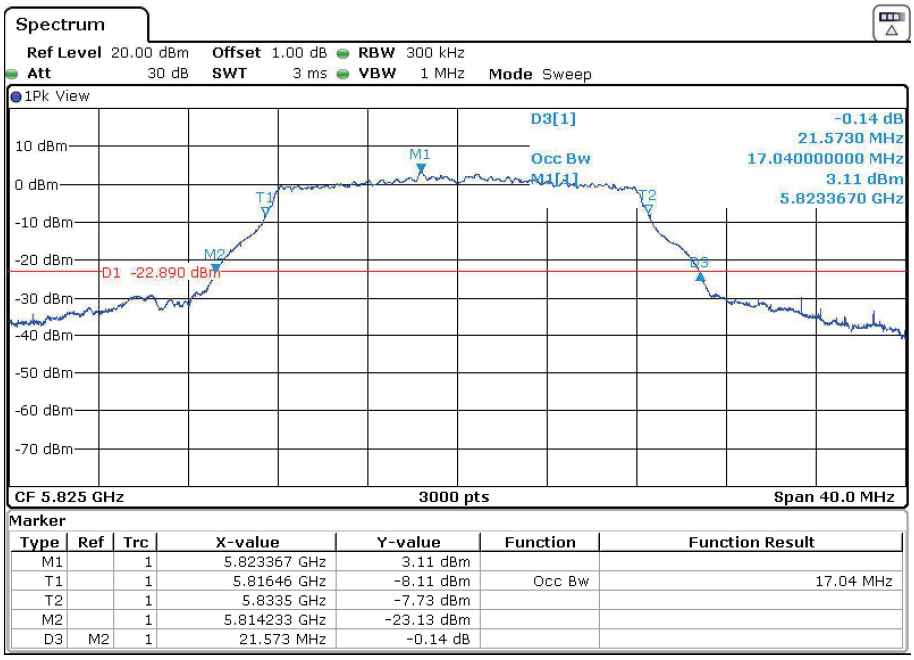
- High Channel 165 (5825 MHz):



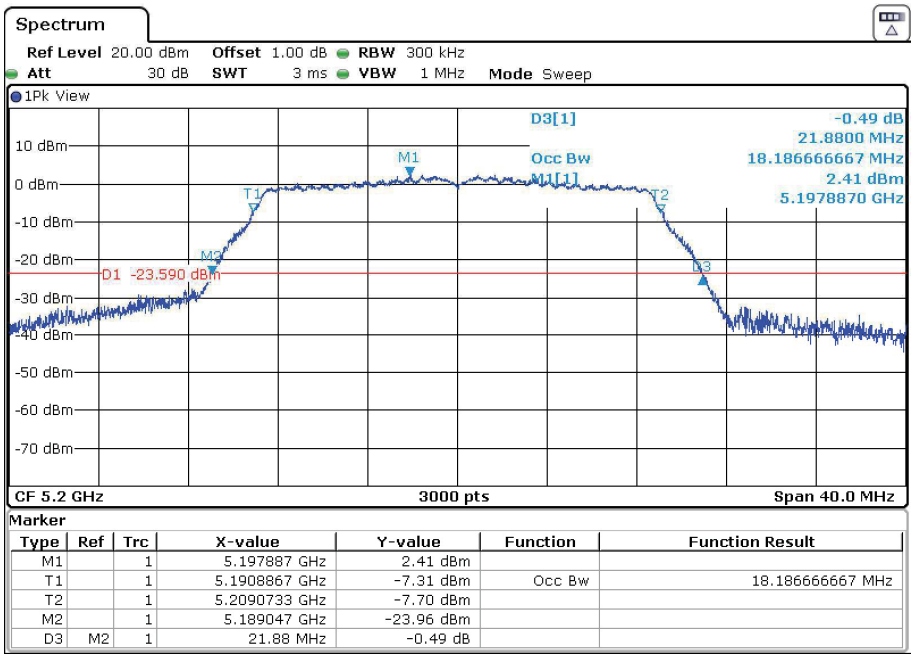
Mode 802.11 n20 HT20:

U-NII-1 (5150-5250 MHz)

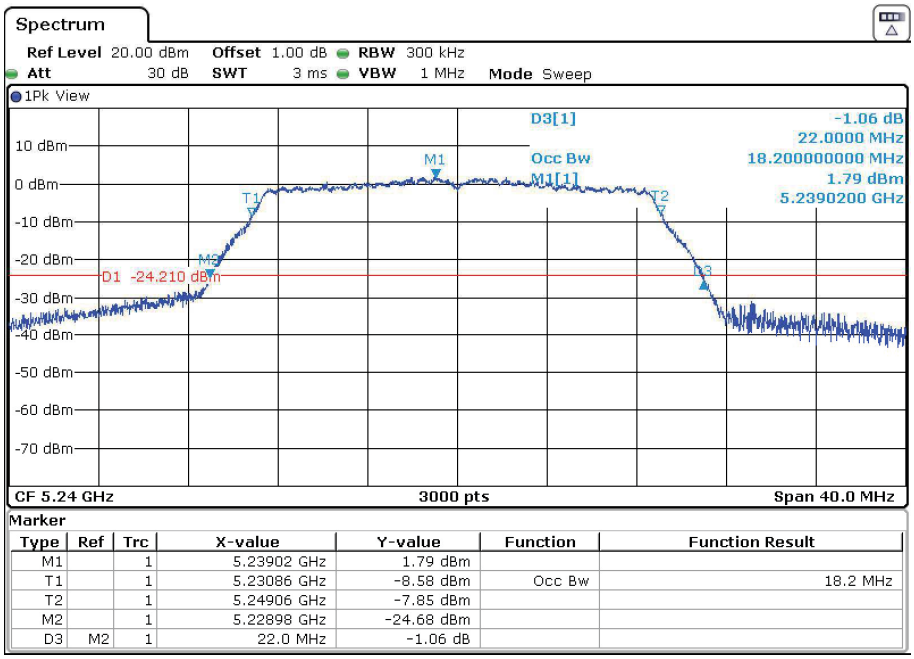
- Low Channel 36 (5180 MHz):



- Middle Channel 40 (5200 MHz):



- High Channel 48 (5240 MHz):

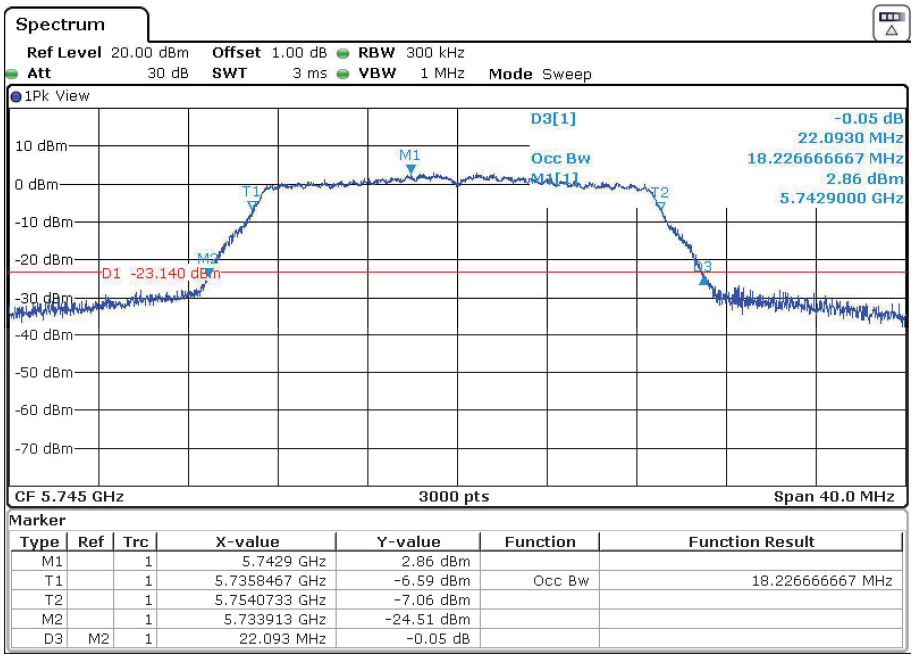


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.23902 GHz	1.79 dBm		
T1		1	5.23086 GHz	-8.58 dBm	Occ Bw	18.2 MHz
T2		1	5.24906 GHz	-7.85 dBm		
M2		1	5.22898 GHz	-24.68 dBm		
D3	M2	1	22.0 MHz	-1.06 dB		

U-NII-3 (5725-5850 MHz)

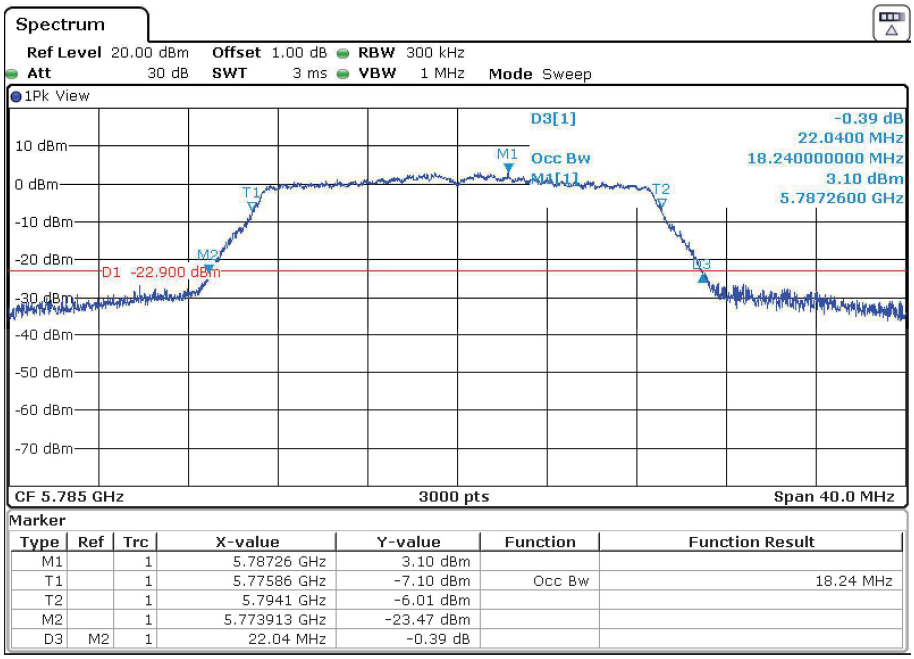
- Low Channel 149 (5745 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.7429 GHz	2.86 dBm		
T1		1	5.7358467 GHz	-6.59 dBm	Occ Bw	18.226666667 MHz
T2		1	5.7540733 GHz	-7.06 dBm		
M2		1	5.733913 GHz	-24.51 dBm		
D3	M2	1	22.093 MHz	-0.05 dB		

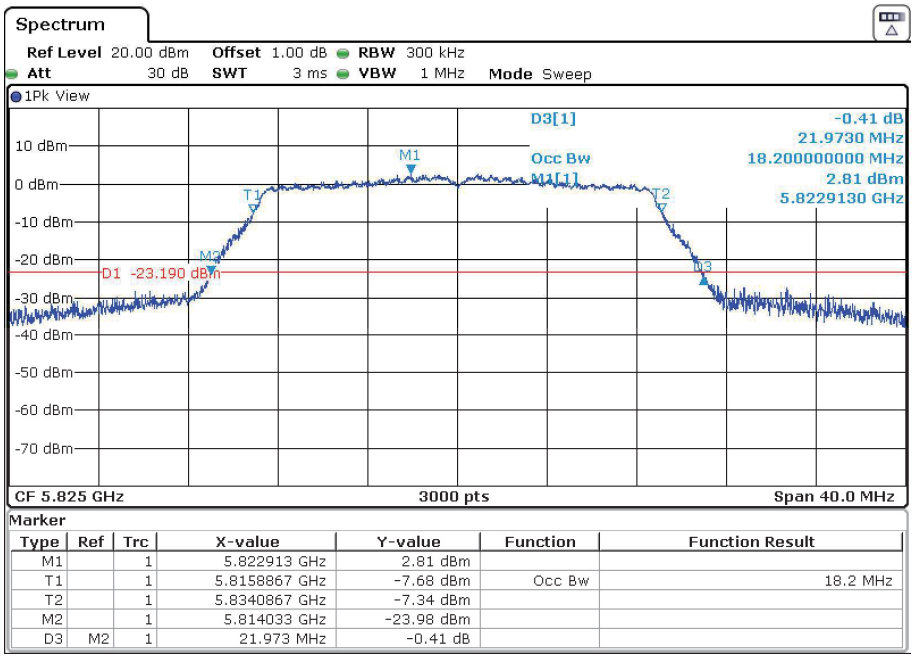
- Middle Channel 157 (5785 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.78726 GHz	3.10 dBm		
T1		1	5.77586 GHz	-7.10 dBm	Occ Bw	18.24 MHz
T2		1	5.7941 GHz	-6.01 dBm		
M2		1	5.773913 GHz	-23.47 dBm		
D3	M2	1	22.04 MHz	-0.39 dB		

- High Channel 165 (5825 MHz):



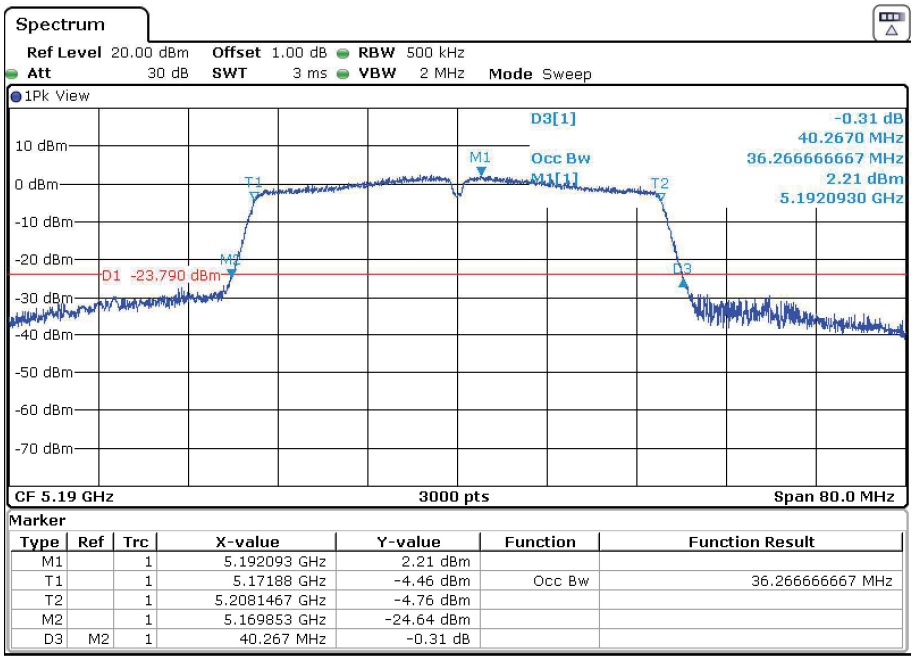
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.822913 GHz	2.81 dBm		
T1		1	5.8158867 GHz	-7.68 dBm	Occ Bw	18.2 MHz
T2		1	5.8340867 GHz	-7.34 dBm		
M2		1	5.814033 GHz	-23.98 dBm		
D3	M2	1	21.973 MHz	-0.41 dB		

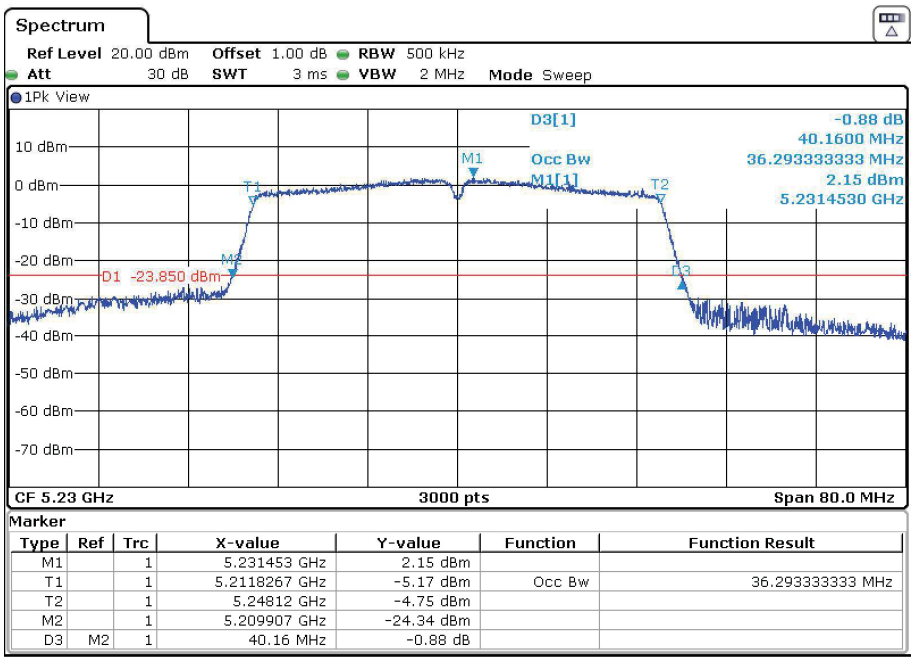
Mode 802.11 n40 (HT40):

U-NII-1 (5150-5250 MHz)

- Low Channel 38 (5190 MHz):



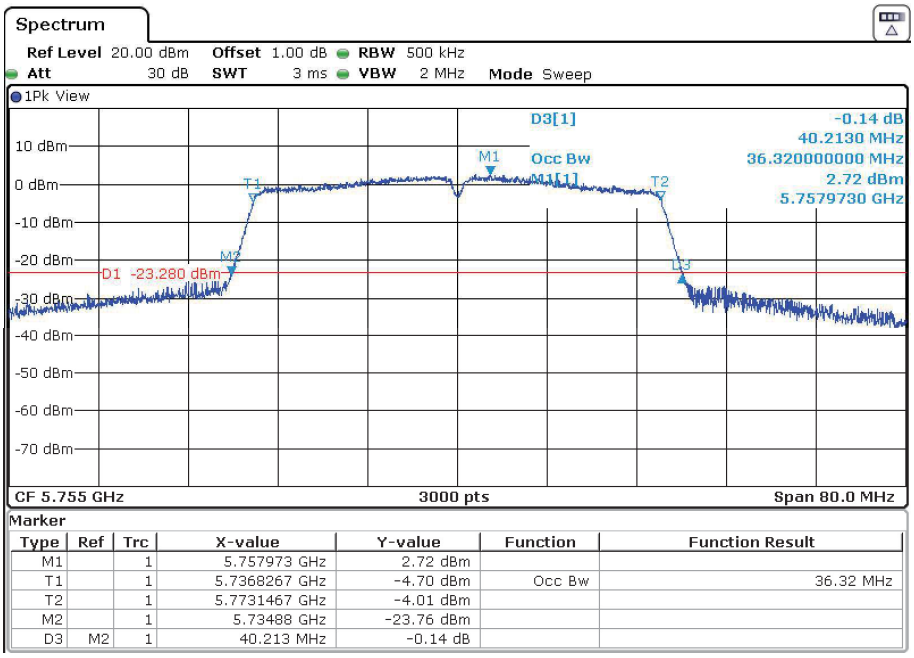
- High Channel 46 (5230 MHz):



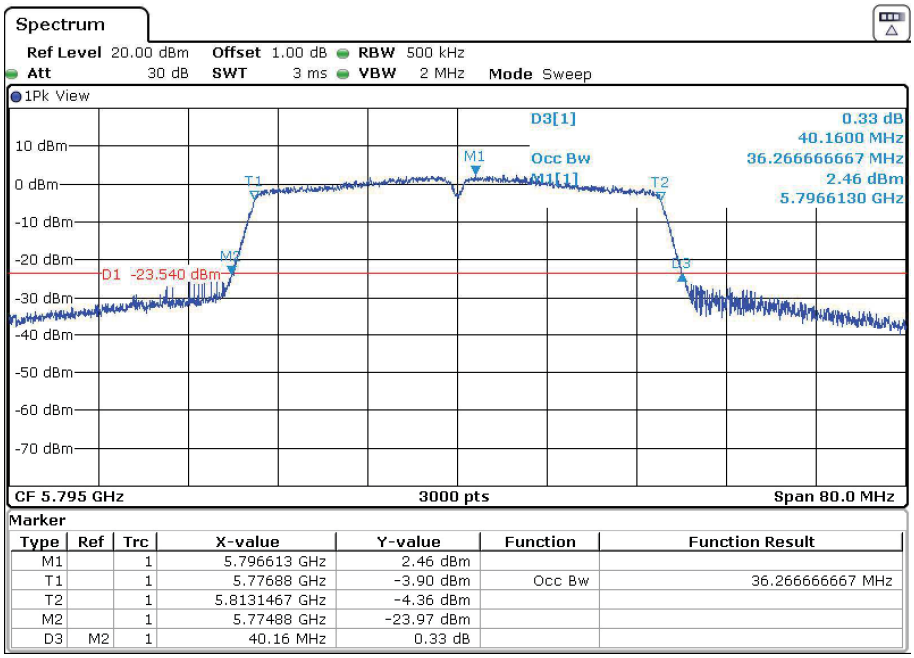
Mode 802.11 ac40 (VHT40):

U-NII-3 (5725-5850 MHz)

- Low Channel 151 (5755 MHz):



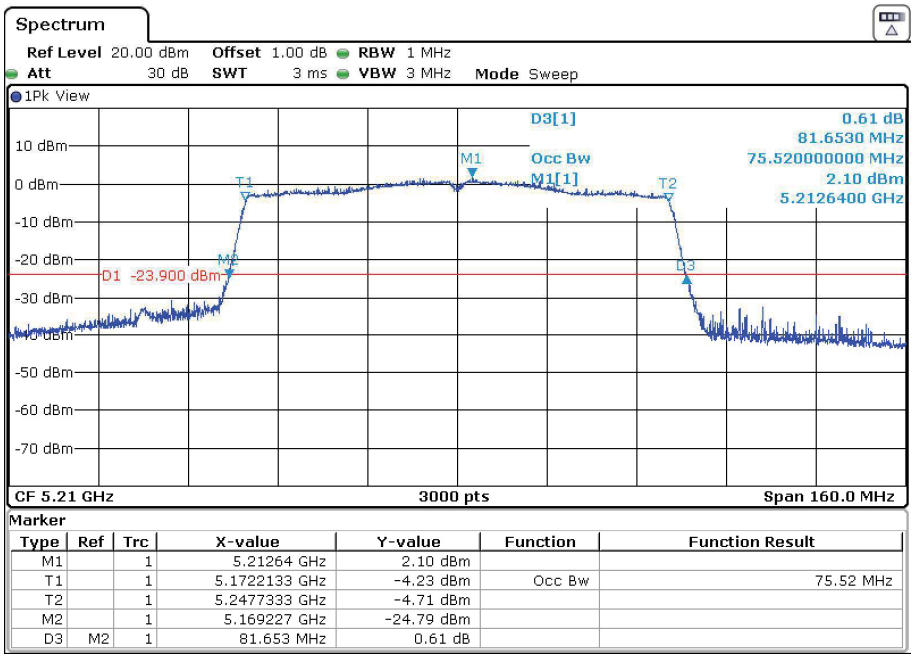
- High Channel 159 (5795 MHz):



Mode 802.11 ac80 (VHT80):

U-NII-1 (5150-5250 MHz)

- Single Channel 42 (5210 MHz):

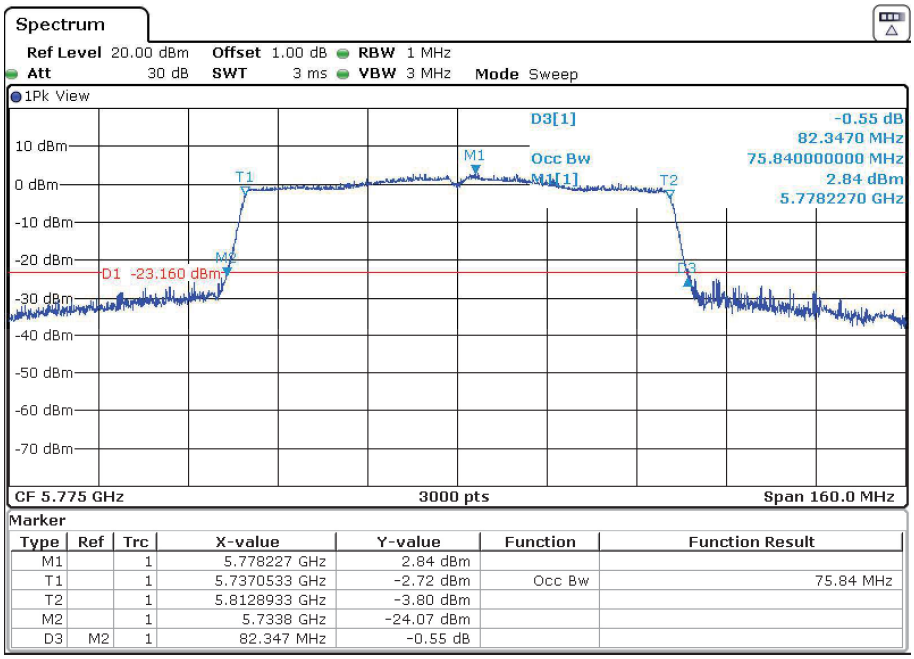


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.21264 GHz	2.10 dBm		
T1		1	5.1722133 GHz	-4.23 dBm	Occ Bw	75.52 MHz
T2		1	5.2477333 GHz	-4.71 dBm		
M2		1	5.169227 GHz	-24.79 dBm		
D3	M2	1	81.653 MHz	0.61 dB		

U-NII-3 (5725-5850 MHz)

- Single Channel 155 (5775 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.778227 GHz	2.84 dBm		
T1		1	5.7370533 GHz	-2.72 dBm	Occ Bw	75.84 MHz
T2		1	5.8128933 GHz	-3.80 dBm		
M2		1	5.7338 GHz	-24.07 dBm		
D3	M2	1	82.347 MHz	-0.55 dB		

FCC 15.403 (i) 26 dB Emission Bandwidth (EBW)

RESULTS:

The 26 dB Emission Bandwidth was measured using the method according to point C) 1) of 789033 D02 General UNII Test Procedures New Rules v02r01.

The following modes and date rates were selected based on preliminary testing that identified those corresponding to the worst cases:

- 802.11a: 6 Mbit/s.
- 802.11n HT20: MCS0.
- 802.11n HT40: MCS0.
- 802.11ac VHT40: MCS0.
- 802.11ac VHT80: MCS0

Tests performed on the SISO mode CORE-0_Port3 Antenna.

SISO CORE-0_Port3 Antenna:

Mode 802.11 a20:

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
26 dB Emission Bandwidth (MHz)	21.269	21.376	21.614
Measurement uncertainty (kHz)	<±140.51		

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
26 dB Emission Bandwidth (MHz)	21.587	21.573	21.573
Measurement uncertainty (kHz)	<±42.41		

Mode 802.11 n20 (HT20):

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
26 dB Emission Bandwidth (MHz)	21.933	21.880	22.000
Measurement uncertainty (kHz)	<±42.39		

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
26 dB Emission Bandwidth (MHz)	22.093	22.040	21.973
Measurement uncertainty (kHz)	<±42.41		

Mode 802.11 n40 (HT40):

U-NII-1 (5150-5250 MHz)

Channels	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
26 dB Emission Bandwidth (MHz)	40.267	40.160
Measurement uncertainty (kHz)	<±73.17	

Mode 802.11 ac40 (VHT40):

U-NII-3 (5725-5850 MHz)

Channels	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
26 dB Emission Bandwidth (MHz)	40.213	40.160
Measurement uncertainty (kHz)	<±73.18	

Mode 802.11 ac80 (VHT80):

U-NII-1 (5150-5250 MHz)

Channel	Single Channel 42 (5210 MHz)
26 dB Emission Bandwidth (MHz)	81.653
Measurement uncertainty (kHz)	<±146.29

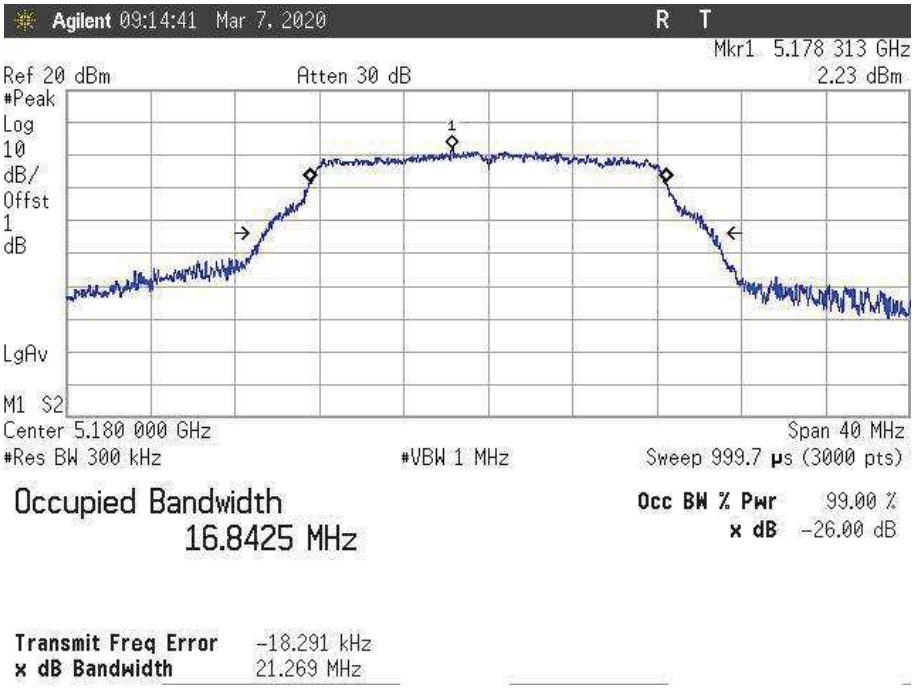
U-NII-3 (5725-5850 MHz)

Channel	Single Channel 155 (5775 MHz)
26 dB Emission Bandwidth (MHz)	82.347
Measurement uncertainty (kHz)	<±146.30

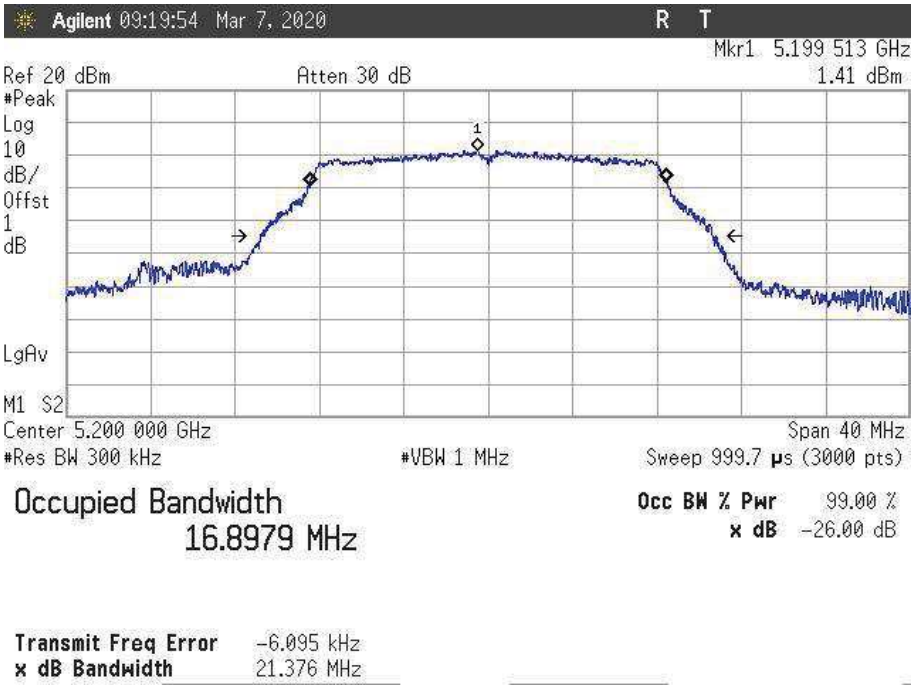
Mode 802.11 a20:

U-NII-1 (5150-5250 MHz)

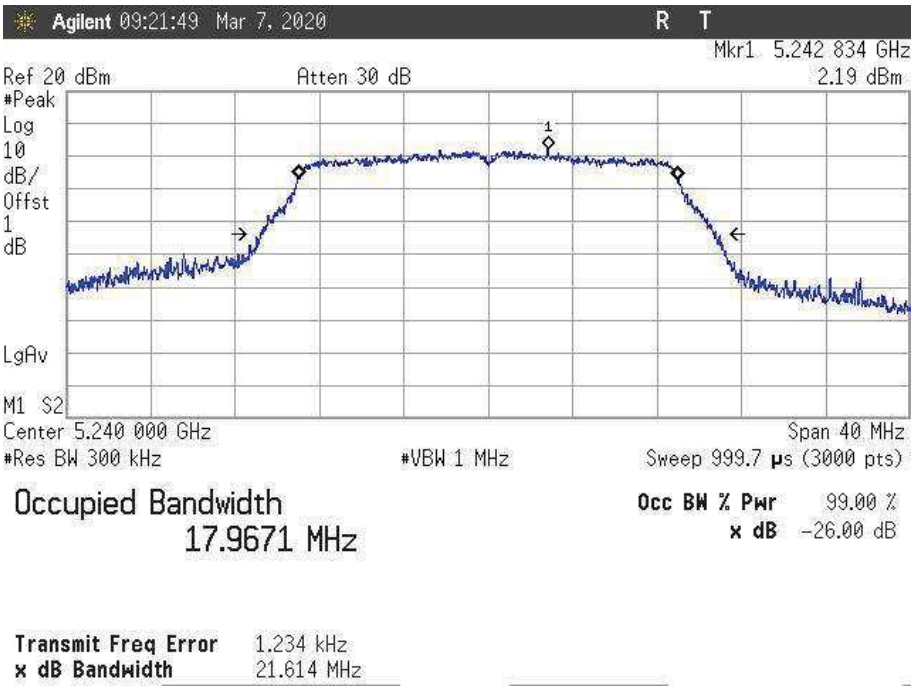
- Low Channel 36 (5180 MHz):



- Middle Channel 40 (5200 MHz):

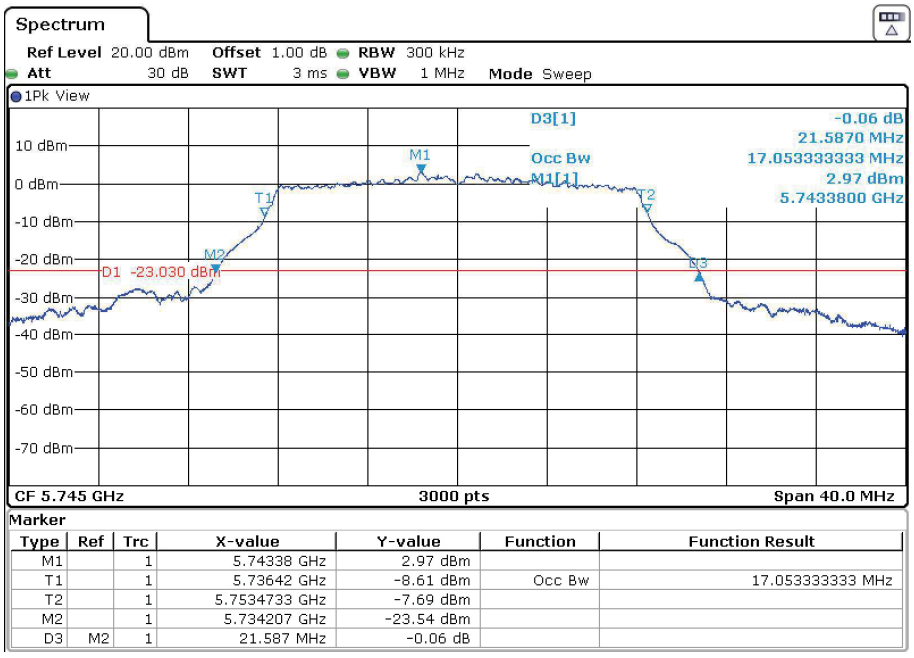


- High Channel 48 (5240 MHz):

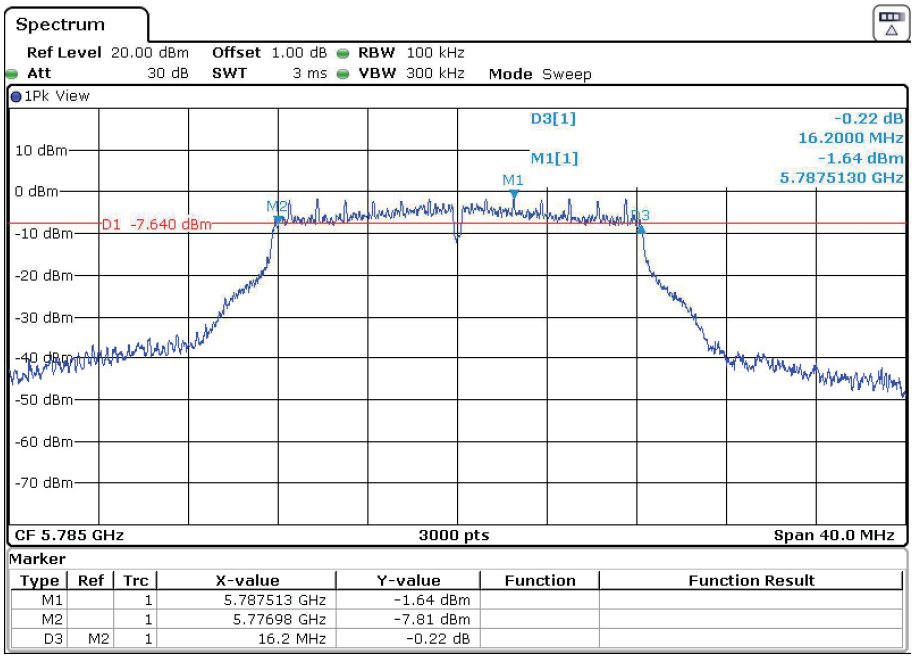


U-NII-3 (5725-5850 MHz)

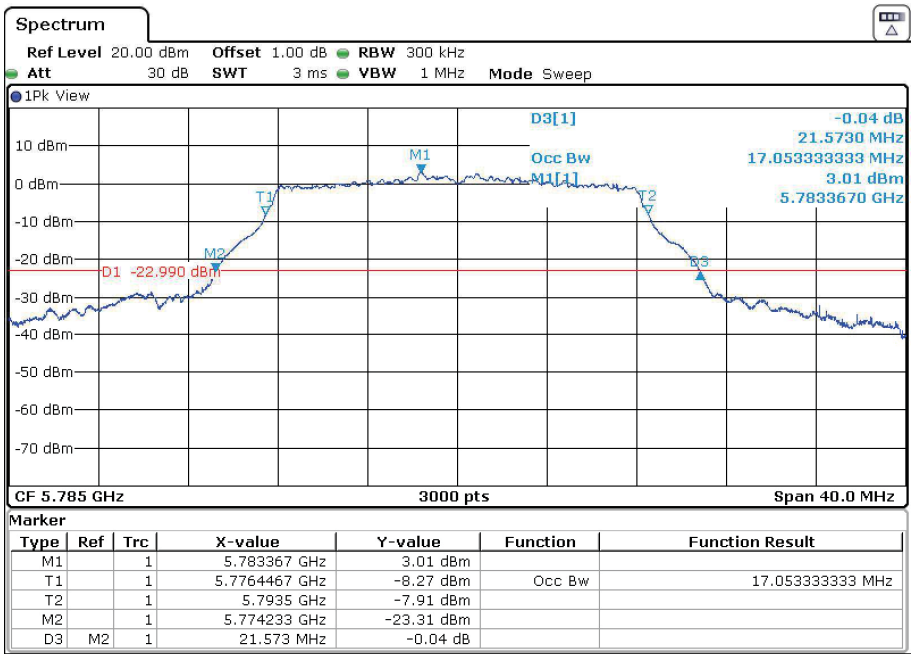
- Low Channel 149 (5745 MHz):



- Middle Channel 157 (5785 MHz):



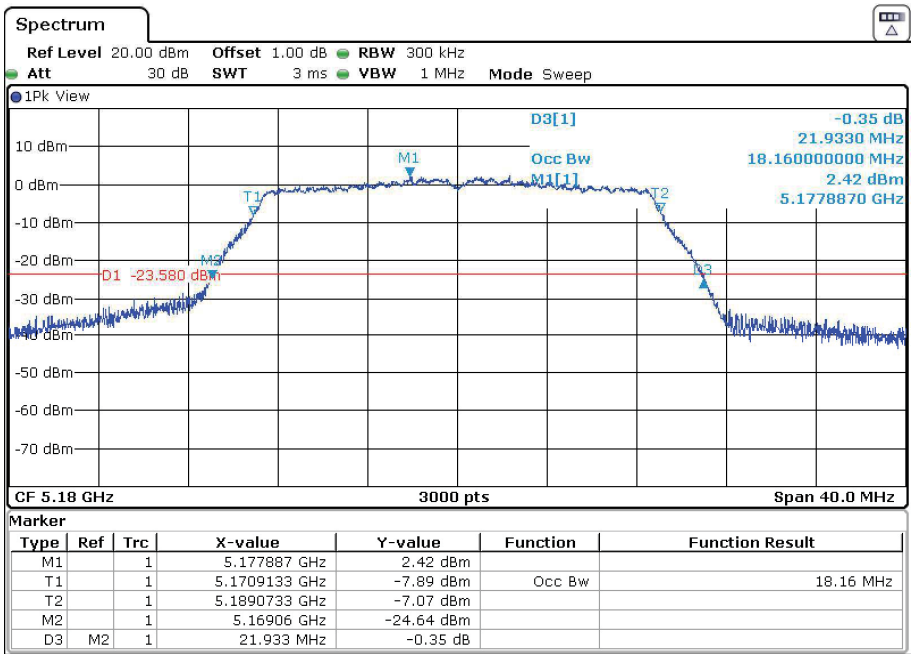
- High Channel 165 (5825 MHz):



Mode 802.11 n20 HT20:

U-NII-1 (5150-5250 MHz)

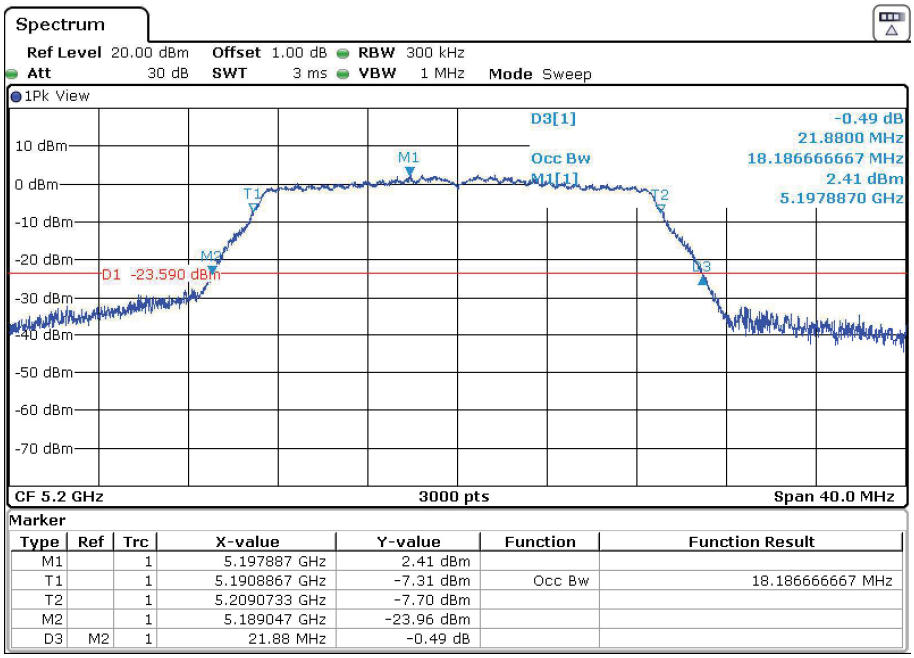
- Low Channel 36 (5180 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.177887 GHz	2.42 dBm		
T1		1	5.1709133 GHz	-7.89 dBm	Occ Bw	18.16 MHz
T2		1	5.1890733 GHz	-7.07 dBm		
M2		1	5.16906 GHz	-24.64 dBm		
D3	M2	1	21.933 MHz	-0.35 dB		

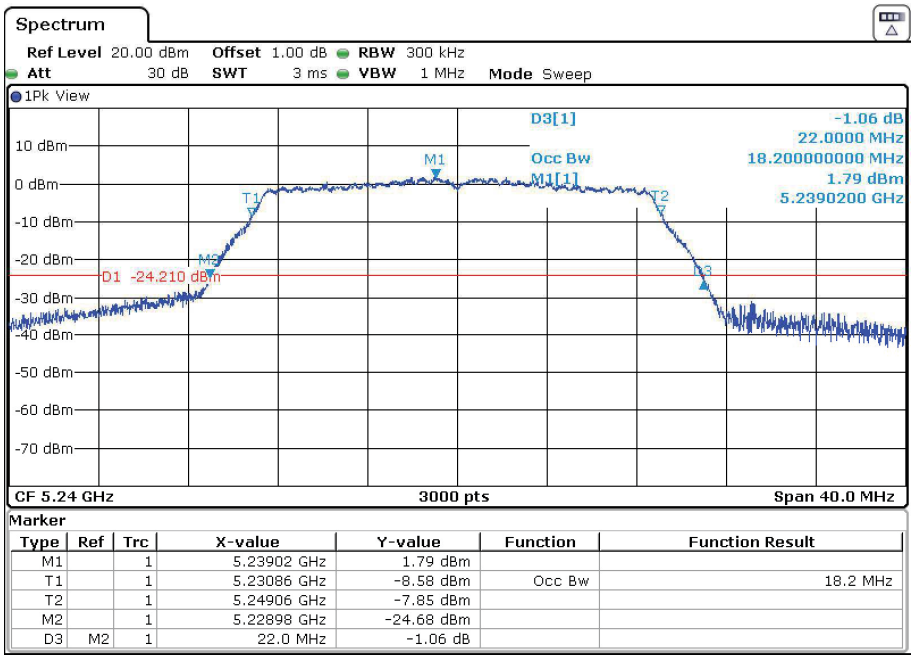
- Middle Channel 40 (5200 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.197887 GHz	2.41 dBm		
T1		1	5.1908867 GHz	-7.31 dBm	Occ Bw	18.186666667 MHz
T2		1	5.2090733 GHz	-7.70 dBm		
M2		1	5.189047 GHz	-23.96 dBm		
D3	M2	1	21.88 MHz	-0.49 dB		

- High Channel 48 (5240 MHz):

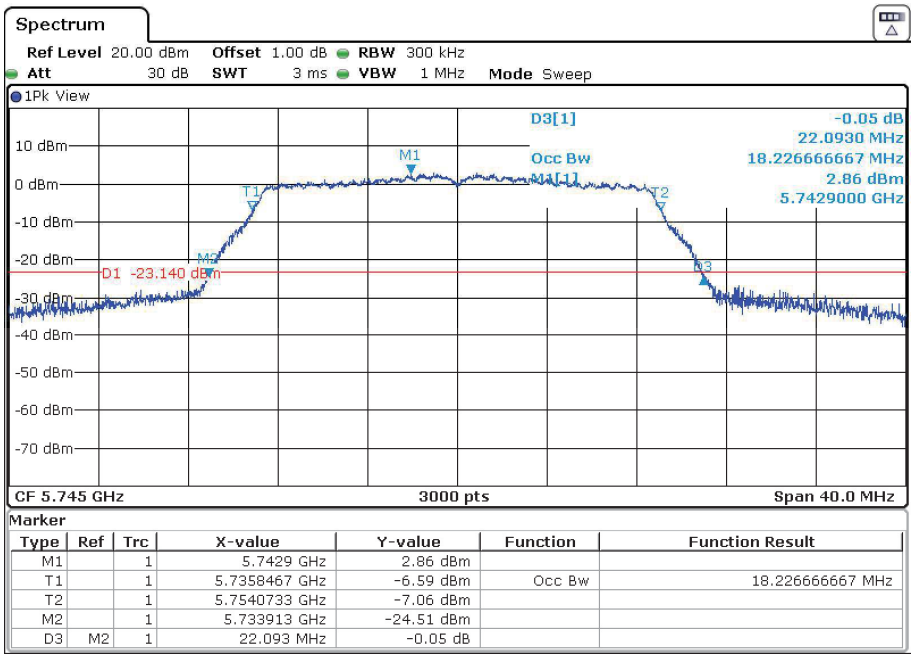


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.23902 GHz	1.79 dBm		
T1		1	5.23086 GHz	-8.58 dBm	Occ Bw	18.2 MHz
T2		1	5.24906 GHz	-7.85 dBm		
M2		1	5.22898 GHz	-24.68 dBm		
D3	M2	1	22.0 MHz	-1.06 dB		

U-NII-3 (5725-5850 MHz)

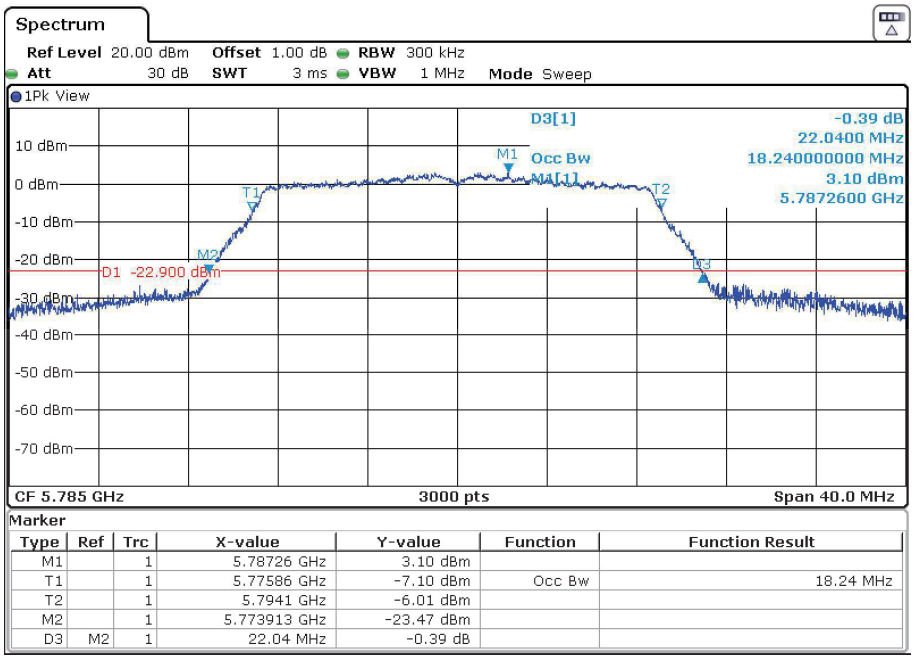
- Low Channel 149 (5745 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.7429 GHz	2.86 dBm		
T1		1	5.7358467 GHz	-6.59 dBm	Occ Bw	18.226666667 MHz
T2		1	5.7540733 GHz	-7.06 dBm		
M2		1	5.733913 GHz	-24.51 dBm		
D3	M2	1	22.093 MHz	-0.05 dB		

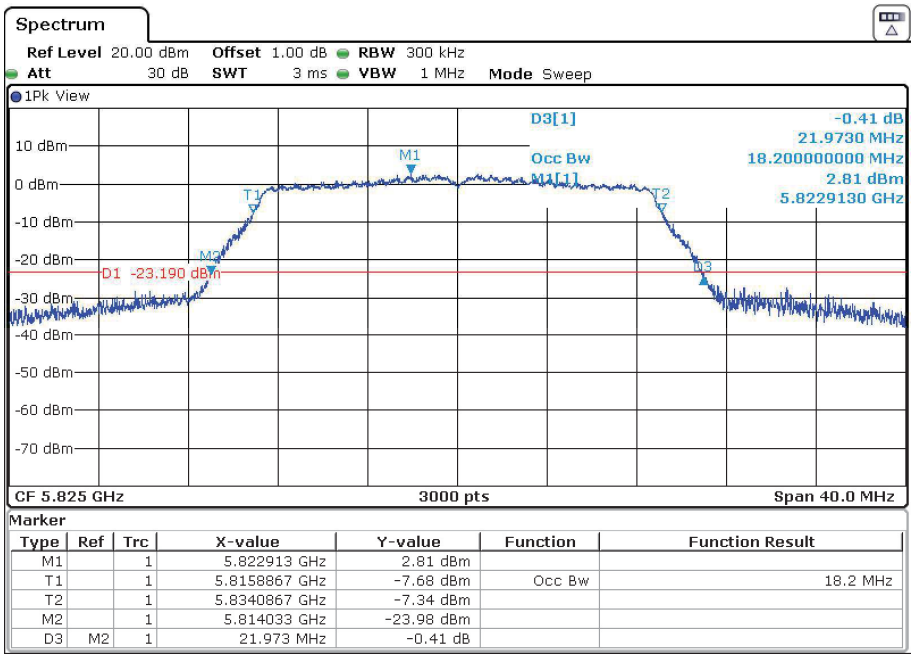
- Middle Channel 157 (5785 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.78726 GHz	3.10 dBm		
T1		1	5.77586 GHz	-7.10 dBm	Occ Bw	18.24 MHz
T2		1	5.7941 GHz	-6.01 dBm		
M2		1	5.773913 GHz	-23.47 dBm		
D3	M2	1	22.04 MHz	-0.39 dB		

- High Channel 165 (5825 MHz):



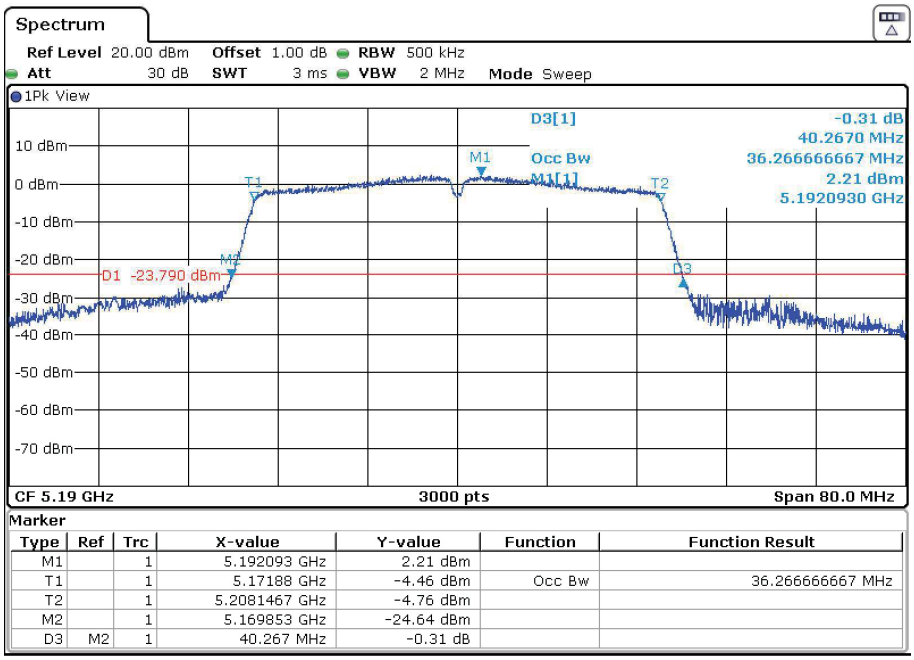
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.822913 GHz	2.81 dBm		
T1		1	5.8158867 GHz	-7.68 dBm	Occ Bw	18.2 MHz
T2		1	5.8340867 GHz	-7.34 dBm		
M2		1	5.814033 GHz	-23.98 dBm		
D3	M2	1	21.973 MHz	-0.41 dB		

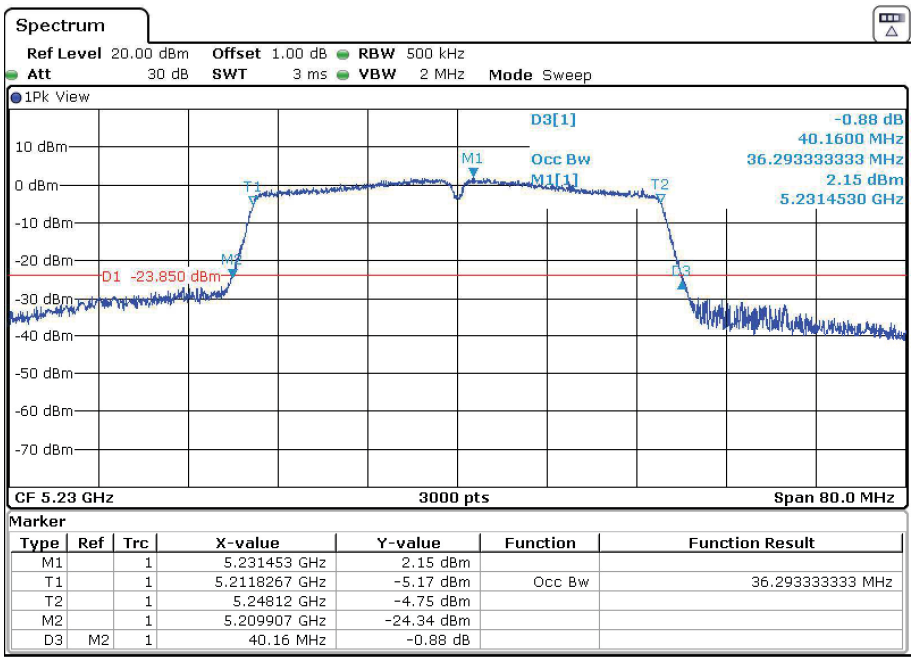
Mode 802.11 n40 (HT40):

U-NII-1 (5150-5250 MHz)

- Low Channel 38 (5190 MHz):



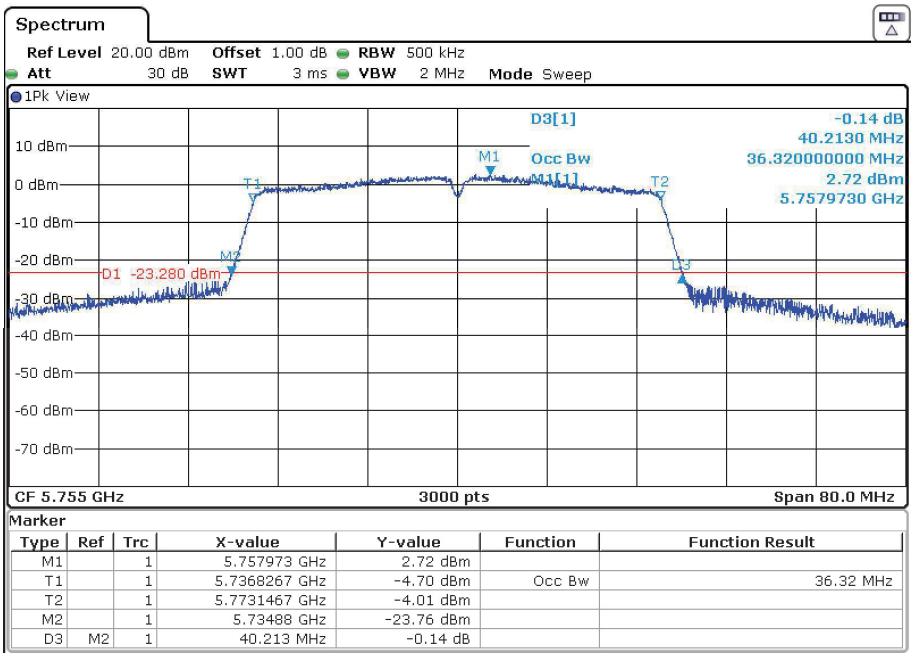
- High Channel 46 (5230 MHz):



Mode 802.11 ac40 (VHT40):

U-NII-3 (5725-5850 MHz)

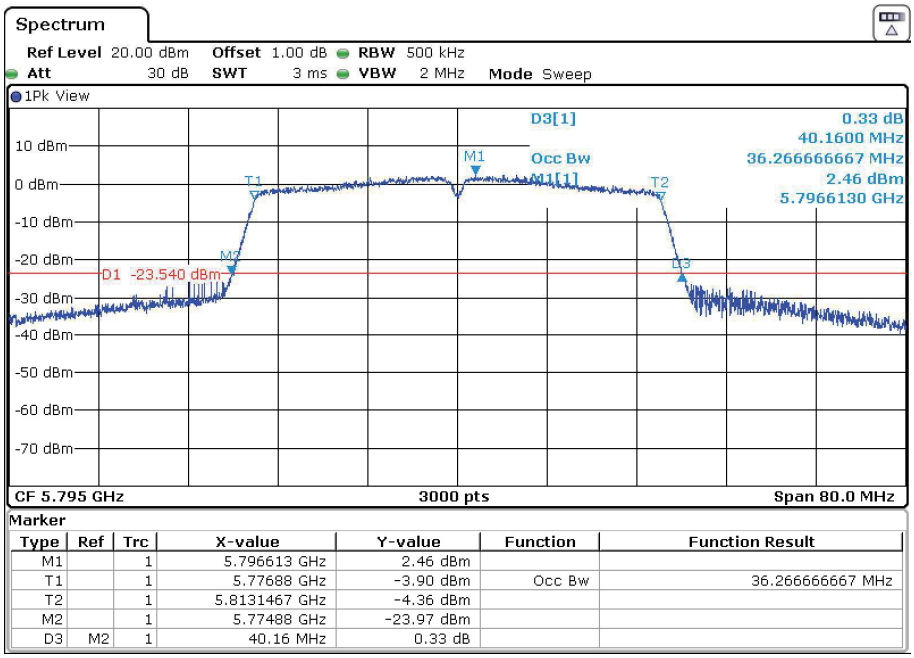
- Low Channel 151 (5755 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.757973 GHz	2.72 dBm		
T1		1	5.7368267 GHz	-4.70 dBm	Occ Bw	36.32 MHz
T2		1	5.7731467 GHz	-4.01 dBm		
M2		1	5.73488 GHz	-23.76 dBm		
D3	M2	1	40.213 MHz	-0.14 dB		

- High Channel 159 (5795 MHz):



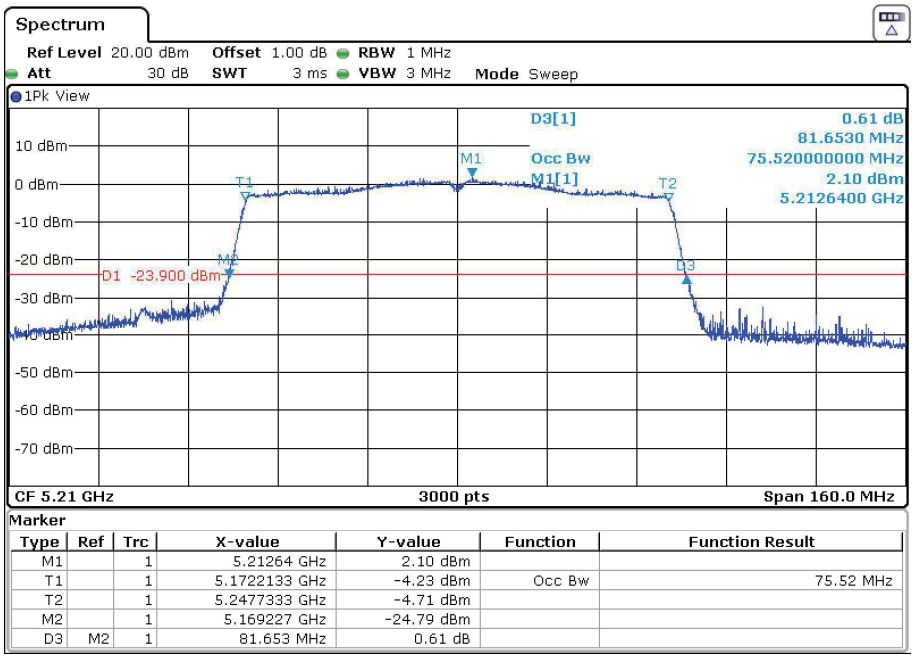
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.796613 GHz	2.46 dBm		
T1		1	5.77688 GHz	-3.90 dBm	Occ Bw	36.266666667 MHz
T2		1	5.8131467 GHz	-4.36 dBm		
M2		1	5.77488 GHz	-23.97 dBm		
D3	M2	1	40.16 MHz	0.33 dB		

Mode 802.11 ac80 (VHT80):

U-NII-1 (5150-5250 MHz)

- Single Channel 42 (5210 MHz):

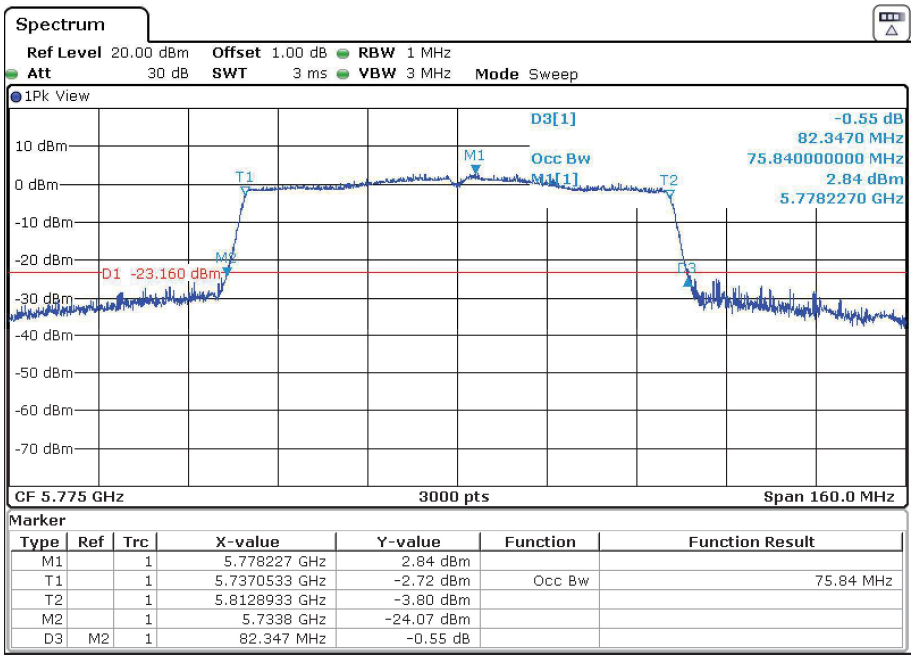


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.21264 GHz	2.10 dBm		
T1		1	5.1722133 GHz	-4.23 dBm	Occ Bw	75.52 MHz
T2		1	5.2477333 GHz	-4.71 dBm		
M2		1	5.169227 GHz	-24.79 dBm		
D3	M2	1	81.653 MHz	0.61 dB		

U-NII-3 (5725-5850 MHz)

- Single Channel 155 (5775 MHz):



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.778227 GHz	2.84 dBm		
T1		1	5.7370533 GHz	-2.72 dBm	Occ Bw	75.84 MHz
T2		1	5.8128933 GHz	-3.80 dBm		
M2		1	5.7338 GHz	-24.07 dBm		
D3	M2	1	82.347 MHz	-0.55 dB		

Appendix B: Tests results for the U-NII-1 Band 5.15 – 5.25 GHz

INDEX

TEST CONDITIONS

POWER SUPPLY (V):

V nonimal:	12 Vdc
Type of Power Supply:	DC voltage from external power supply (car battery).

ANTENNAS:

Type of Antenna: External.

Antennas Gain:

- SISO – CORE-0_Port3 Antenna – Declared Maximum Antenna Gain: +2.5 dBi

TEST FREQUENCIES:

Technology Tested:	WLAN (IEEE 802.11 a,n,ac) / U-NII-1	
Modes:	802.11a20: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps	
	802.11n HT20: MCS0 to MCS23	
	802.11n HT40: MCS0 to MCS23	
	802.11ac VHT20: MCS0 to MCS9	
	802.11ac VHT40: MCS0 to MCS9	
	802.11ac VHT80: MCS0 to MCS9	
Setting of cores / ports:	3	
Beamforming:	No.	
Frequency Range:	5150 MHz to 5250 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 36	5180
	Middle: 40	5200
	Highest: 48	5240
Channel Spacing:	40 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 38	5190
	Highest: 46	5230
Channel Spacing:	80 MHz	
Transmit Channels	Middle: 42	5210

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a document containing the setup instructions.