



# TEST REPORT

**Test Report No. : UL-RPT-RP11066287JD09A**

**Manufacturer** : Flextronics International Sweden AB  
**Model No.** : SR0020-W  
**FCC ID** : 2AIP8I  
**Technology** : WLAN  
**Test Standard(s)** : FCC Parts 15.207, 15.209(a) & 15.407

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0

**Date of Issue:** 31 August 2016

**Checked by:** *Sarah Williams*  
Sarah Williams  
Engineer, Radio Laboratory

**Company Signatory:** *Steven White*  
Steven White  
Service Lead, Radio Laboratory  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
performed in accordance with its terms  
of accreditation.

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## **UL VS LTD**

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## **1. Customer Information**

### **1.1. Customer Information**

<b>Company Name:</b>	Sirin Labs AG
<b>Address:</b>	Muhlentalstrasse 2 8200 Schaffhausen Switzerland

### **1.2. Manufacturer Information**

<b>Manufacturer Name:</b>	Flextronics International Sweden AB
<b>Address:</b>	Datalinjen 3A SE – 583 30 Linköping Sweden

## **2. Summary of Testing**

### **2.1. General Information**

<b>Specification Reference:</b>	47CFR15.407 and 47CFR15.403
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
<b>Specification Reference:</b>	47CFR15.207 and 47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	27 April 2016 to 17 June 2016

## 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	✓
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth	✓
Part 15.407(e)	Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band)	✓
Part 15.407(e)	Transmitter Minimum 6 dB Bandwidth (Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz)	✓
Part 15.35(c)	Transmitter Duty Cycle	Note 1
Part 15.407(a)(1)(iv)	Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band)	✓
Part 15.407(a)(2)	Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands)	✓
Part 15.407(a)(2)	Transmitter Maximum Conducted Output Power (Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz)	✓
Part 15.407(a)(3)	Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band)	✓
Part 15.407(a)(1)(iv)	Transmitter Peak Power Spectral Density (5.15-5.25 GHz band)	✓
Part 15.407(a)(2)	Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)	✓
Part 15.407(a)(2)	Transmitter Peak Power Spectral Density (Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz)	✓
Part 15.407(a)(3)	Transmitter Peak Power Spectral Density (5.725-5.85 GHz band)	✓
Part 15.407(b) / 15.209(a)	Transmitter Out of Band Radiated Emissions	✓
Part 15.407(b) / 15.209(a)	Transmitter Band Edge Radiated Emissions	✓
Part 15.407(g)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Note 2
Part 15.407(h)(1)	Transmitter Power Control	Note 3

### **Key to Results**

✓ = Complied    ✘ = Did not comply

### **Note(s):**

1. The measurement was performed to assist in the calculation of the level of average output power, power spectral density and emissions, as the EUT employs pulsed operation.
2. Frequency stability is better than 20 ppm which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.
3. Transmit Power Control was not tested as the maximum EIRP is less than 500 mW (27 dBm).

### **2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<b>Reference:</b>	KDB 789033 D02 General UNII Test Procedures New Rules v01r03 August 22, 2016
<b>Title:</b>	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E
<b>Reference:</b>	KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
<b>Title:</b>	AC Power-line Conducted Emissions Frequently asked questions
<b>Reference:</b>	KDB 662911 D01 Multiple Transmitter Output v02r01 October 31, 2013
<b>Title:</b>	Emissions Testing of Transmitter with Multiple Outputs in the Same Band

### **2.4. Deviations from the Test Specification**

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specifications identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	SOLARIN
<b>Model Name:</b>	SR0020-W
<b>Test Sample Serial Number:</b>	0087 ( <i>Radiated sample</i> )
<b>Test Sample IMEI:</b>	357232070004146
<b>Hardware Version:</b>	TP1
<b>Software Version:</b>	LRC1TA.1.0.2.3
<b>Handset Cover Material:</b>	Technical leather with titanium coating
<b>FCC ID:</b>	2AIP8I

<b>Brand Name:</b>	SOLARIN
<b>Model Name:</b>	SR0020-W
<b>Test Sample Serial Number:</b>	0013 ( <i>Conducted sample</i> )
<b>Test Sample IMEI:</b>	357232070003098
<b>Hardware Version:</b>	TP1
<b>Software Version:</b>	LRC1TA.1.0.2.3
<b>Handset Cover Material:</b>	Technical leather with titanium coating
<b>FCC ID:</b>	2AIP8I

#### **3.2. Description of EUT**

The equipment under test was a Mobile device supporting Cellular, WLAN, BT, BTLE, RFID & GPS Technologies.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

<b>Technology Tested:</b>	WLAN (IEEE 802.11a,n,ac) / U-NII		
<b>Type of Unit:</b>	Transceiver		
<b>Modulation:</b>	BPSK, QPSK, 16QAM, 64QAM & 256QAM		
<b>Data rates:</b>	802.11a	6, 9, 12, 18, 24, 36 ,48 & 54 Mbps (2-chain TX CDD)	
	802.11n HT20	MCS0 to MCS7 (1 spatial stream with 2-chain MIMO CDD operation) MCS8 to MCS15 (2 spatial streams)	
	802.11n HT40	MCS0 to MCS7 (1 spatial stream with 2-chain MIMO CDD operation) MCS8 to MCS15 (2 spatial streams)	
	802.11ac VHT20	MCS0 to MCS8 (1 or 2 spatial streams)	
	802.11ac VHT40	MCS0 to MCS9 (1 or 2 spatial streams)	
	802.11ac VHT80	MCS0 to MCS9 (1 or 2 spatial streams)	
<b>Power Supply Requirement(s):</b>	Nominal	3.9 VDC	
<b>Antenna Gains:</b>	<b>Frequency (GHz)</b>	<b>Antenna 1</b>	<b>Antenna 2</b>
	5.15 to 5.85 GHz	-4.37 dBi	-0.11 dBi
<b>Maximum Conducted Output Power:</b>	20 MHz	18.4 dBm	
	40 MHz	16.3 dBm	
	80 MHz	17.0 dBm	

**Additional Information Related to Testing (continued)**

<b>Channel Spacing:</b>	20 MHz		
<b>Transmit Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	36	5180
	Middle	40	5200
	Top	48	5240
<b>Transmit Frequency Band:</b>	5250 MHz to 5350 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	52	5260
	Middle	56	5280
	Top	64	5320
<b>Transmit Frequency Band:</b>	5470 MHz to 5725 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	100	5500
	Middle	116	5580
	Top	140	5700
<b>Transmit Frequency Band:</b>	Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz		
<b>Transmit Channel Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Single	144	5720
<b>Transmit Frequency Band:</b>	5725 MHz to 5850 MHz		
<b>Transmit Channels Tested:</b>	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	149	5745
	Middle	157	5785
	Top	165	5825

**Additional Information Related to Testing (continued)**

<b>Channel Spacing:</b>	40 MHz		
<b>Transmit Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	38	5190
	Top	46	5230
<b>Transmit Frequency Band:</b>	5250 MHz to 5350 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	54	5270
	Top	62	5310
<b>Transmit Frequency Band:</b>	5470 MHz to 5725 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	102	5510
	Middle	110	5550
	Top	134	5670
<b>Transmit Frequency Band:</b>	Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz		
<b>Transmit Channel Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	142	5710
<b>Transmit Frequency Band:</b>	5725 MHz to 5850 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	151	5755
	Top	159	5795

**Additional Information Related to Testing (continued)**

<b>Channel Spacing:</b>	80 MHz		
<b>Transmit Frequency Band:</b>	5150 MHz to 5250 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	42	5210
<b>Transmit Frequency Band:</b>	5250 MHz to 5350 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	58	5290
<b>Transmit Frequency Band:</b>	5470 MHz to 5725 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	106	5530
	Top	122	5610
<b>Transmit Frequency Band:</b>	Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz		
<b>Transmit Channel Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	138	5690
<b>Transmit Frequency Band:</b>	5725 MHz to 5850 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single	155	5775

### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Laptop PC
<b>Brand Name:</b>	Lenovo
<b>Model Name or Number:</b>	L440
<b>Serial Number:</b>	R9-019E92

<b>Description:</b>	Laptop PC
<b>Brand Name:</b>	Lenovo
<b>Model Name or Number:</b>	L440
<b>Serial Number:</b>	R9-019E4A

<b>Description:</b>	USB cable (length 1.2 metres)
<b>Brand Name:</b>	Not stated
<b>Model Name or Number:</b>	Not stated
<b>Serial Number:</b>	Not stated

<b>Description:</b>	USB charger
<b>Brand Name:</b>	Sirin
<b>Model Name or Number:</b>	SRN15B1200150D6
<b>Serial Number:</b>	Not stated

<b>Description:</b>	Personal Hand-Free (PHF)
<b>Brand Name:</b>	Sirin
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	Nano SIM Card
<b>Brand Name:</b>	COMPRION
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Continuously transmitting with a modulated carrier at maximum power on the bottom, middle and top channels as required using the supported data rates/modulation types.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- Transmit tests: The EUT was placed into WLAN test mode using a laptop PC and running an ADB (Android Debug Bridge) application via USB. The customer supplied instructions to configure the EUT into test mode. Once in WLAN test mode, the test channels and modulation modes were set as required using command line text strings.
- For all tests, Aircraft Mode was selected on the EUT to disable unwanted transmissions from radios not under test.
- For conducted tests, the EUT was powered via a laboratory power supply and dummy battery through a 4-wire connection. Charging was disabled using a selection switch on the dummy battery.
- All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and widest bandwidth for all bands were:
  - Highest power
    - 802.11a – 16QAM / 36 Mbps
    - 802.11n HT20 – 16QAM / 39 Mbps / MCS4
    - 802.11n HT40 – BPSK / 13.5 Mbps / MCS0
    - 802.11ac VHT80 – 64QAM / 263.3 Mbps / MCS6x1
  - Highest power spectral density
    - 802.11a – 16QAM / 36 Mbps
    - 802.11n HT20 – QPSK / 19.5 Mbps / MCS2
    - 802.11n HT40 – BPSK / 13.5 Mbps / MCS0
    - 802.11ac VHT80 – 64QAM / 263.3 Mbps / MCS6x1
  - Widest bandwidth
    - 802.11a – 16QAM / 36 Mbps
    - 802.11n HT20 – 16QAM / 39 Mbps / MCS4
    - 802.11n HT40 – 64QAM / 108 Mbps / MCS5
    - 802.11ac VHT80 – 64QAM / 263.3 Mbps / MCS6x1

Pre-scan results for all modes are archived on the Company server and available for inspection if required.

## **Configuration and Peripherals (continued)**

- All supported modes and channel widths were initially investigated on one channel. The modes that produced the narrowest bandwidth for the 5725 to 5850 MHz band were:
  - Narrowest bandwidth
    - 802.11a – BPSK / 9 Mbps
    - 802.11n HT20 – BPSK / 13 Mbps / MCS8
    - 802.11n HT40 – BPSK / 27 Mbps / MCS8
    - 802.11ac VHT80 – BPSK / 29.3 Mbps / MCS0x1

Pre-scan results for all modes are archived on the Company server and available for inspection if required.

- For the tests in this report, Antenna 1 corresponds to the antenna identified by the manufacturer as Main WiFi Antenna (#5), Antenna 2 corresponds to the antenna identified by the manufacturer as Secondary WiFi Antenna (#3). Port 1 and Port 2 correspond to antenna 1 and antenna 2 respectively.
- RF cables and attenuators connecting the test equipment to the EUT were calibrated before use and the calibration data incorporated into the conducted measurement results.
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 36 Mbps (802.11a). This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest transmit output power level, it was deemed to be the worst case.
- Radiated spurious emissions were performed with the EUT in the worst case position for radiated spurious emissions. Tests were performed with the EUT connected to its AC charger and USB cable. The AC charger was powered by 120 VAC 60 Hz. A pair of headphones were also connected to the EUT. An SDRAM card and USIM were fitted. There were no other ports to terminate.
- AC conducted tests were performed with all active ports terminated.
- The conducted sample with IMEI 357232070003098 was used for 26 dB emission bandwidth, minimum 6 dB bandwidth, duty cycle, maximum output power and power spectral density tests.
- The radiated sample with IMEI 357232070004146 was used for all other tests.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6 Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## **5.2. Test Results**

### **5.2.1. Transmitter AC Conducted Spurious Emissions**

#### **Test Summary:**

Test Engineer:	Matthew Galbraith	Test Dates:	23 May 2016 to 02 June 2016
Test Sample IMEI:	357232070004146		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2

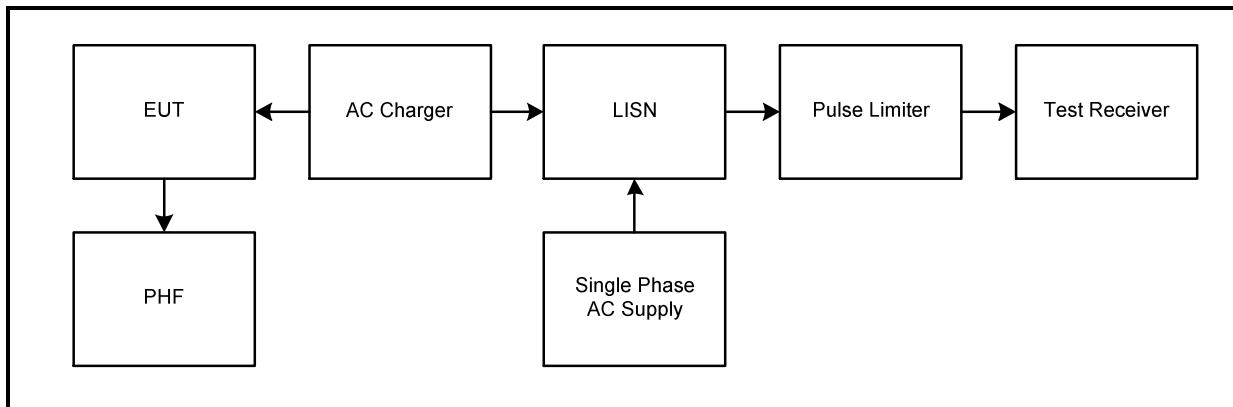
#### **Environmental Conditions:**

Temperature (°C):	24
Relative Humidity (%):	31 to 37

#### **Note(s):**

1. The EUT was connected to an AC charger via a USB cable. The AC charger was connected to 120 VAC 60 Hz single phase supply via a LISN.
2. In accordance with FCC KDB 174176 Q4, tests were also performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the AC charger.
3. Pre-scans were performed and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into the tables below.
4. A pulse limiter was fitted between the LISN and the test receiver.

#### **Test setup:**



**Transmitter AC Conducted Spurious Emissions (continued)****Results: Live / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.200	Live	41.9	63.6	21.7	Complied
0.294	Live	39.3	60.4	21.1	Complied
0.510	Live	38.0	56.0	18.0	Complied
0.681	Live	35.0	56.0	21.0	Complied
1.212	Live	32.6	56.0	23.4	Complied
1.586	Live	30.5	56.0	25.5	Complied

**Results: Live / Average / 120 VAC 60 Hz**

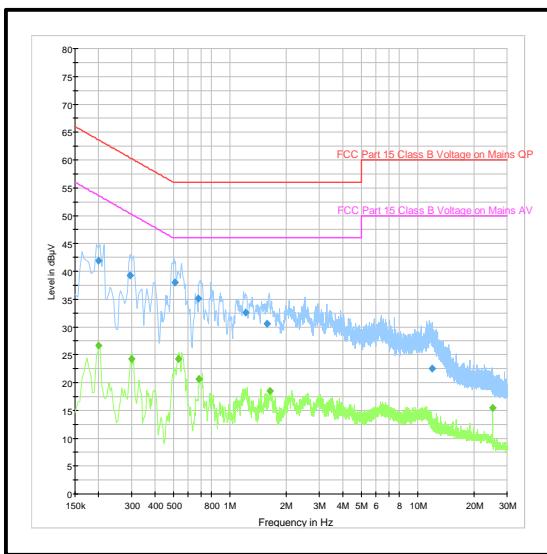
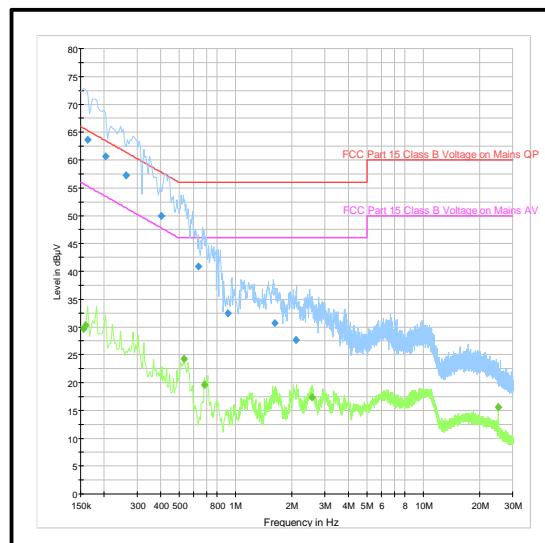
Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.200	Live	26.7	53.6	26.9	Complied
0.299	Live	24.3	50.3	26.0	Complied
0.533	Live	24.3	46.0	21.7	Complied
0.686	Live	20.6	46.0	25.4	Complied
1.640	Live	18.5	46.0	27.5	Complied
25.058	Live	15.5	50.0	34.5	Complied

**Results: Neutral / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.164	Neutral	63.7	65.3	1.6	Complied
0.204	Neutral	60.7	63.4	2.7	Complied
0.263	Neutral	57.3	61.4	4.1	Complied
0.402	Neutral	49.9	57.8	7.9	Complied
0.636	Neutral	40.8	56.0	15.2	Complied
0.915	Neutral	32.5	56.0	23.5	Complied

**Results: Neutral / Average / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.155	Neutral	29.6	55.8	26.2	Complied
0.159	Neutral	30.3	55.5	25.2	Complied
0.533	Neutral	24.3	46.0	21.7	Complied
0.686	Neutral	19.7	46.0	26.3	Complied
2.558	Neutral	17.3	46.0	28.7	Complied
25.058	Neutral	15.5	50.0	34.5	Complied

**Transmitter AC Conducted Spurious Emissions (continued)****Results: 120 VAC 60 Hz****Live****Neutral**

*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Live / Quasi Peak / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Live	55.9	66.0	10.1	Complied
0.154	Live	55.6	65.8	10.2	Complied
0.263	Live	47.5	61.4	13.8	Complied
0.362	Live	42.3	58.7	16.4	Complied
0.726	Live	40.9	56.0	15.1	Complied
0.911	Live	36.4	56.0	19.6	Complied

**Results: Live / Average / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.182	Live	37.6	54.4	16.8	Complied
0.290	Live	31.1	50.5	19.4	Complied
0.366	Live	36.1	48.6	12.5	Complied
0.546	Live	32.0	46.0	14.0	Complied
0.731	Live	35.7	46.0	10.4	Complied
0.911	Live	29.8	46.0	16.2	Complied

**Results: Neutral / Quasi Peak / 240 VAC 60 Hz**

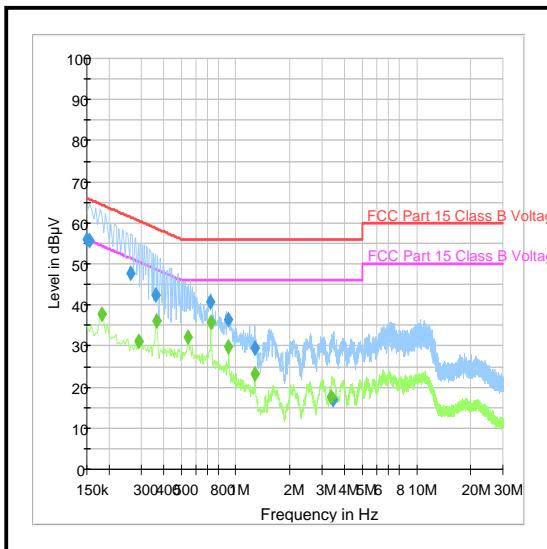
Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.182	Neutral	41.2	64.4	23.3	Complied
0.357	Neutral	38.9	58.8	19.9	Complied
0.551	Neutral	37.2	56.0	18.8	Complied
0.713	Neutral	40.5	56.0	15.5	Complied
0.915	Neutral	36.3	56.0	19.7	Complied
1.235	Neutral	27.2	60.0	28.8	Complied

**Results: Neutral / Average / 240 VAC 60 Hz**

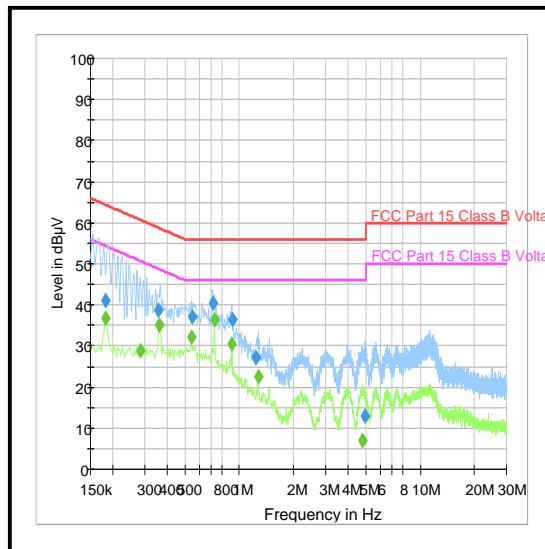
Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.182	Neutral	36.7	54.4	17.7	Complied
0.285	Neutral	28.7	50.7	22.0	Complied
0.362	Neutral	35.2	48.7	13.5	Complied
0.546	Neutral	32.1	46.0	13.9	Complied
0.731	Neutral	36.4	46.0	9.6	Complied
0.911	Neutral	30.3	46.0	15.7	Complied

### Transmitter AC Conducted Spurious Emissions (continued)

## Results: 240 VAC 60 Hz



Live



## Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

### Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1623	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	11 Jan 2017	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	27 Aug 2016	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	08 Mar 2017	12
M1263	Test Receiver	Rohde & Schwarz	ESIB-7	100265	16 Oct 2016	12
M1273	Test Receiver	Rohde & Schwarz	ESIB-26	100275	11 Apr 2017	12
A1829	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100671	05 May 2017	12
M1625	Thermohygrometer	JM Handelspunkt	30.2015.06	None stated	11 Jan 2017	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	14 Jul 2016	12

**5.2.2. Transmitter 26 dB Emission Bandwidth****Test Summary:**

<b>Test Engineer:</b>	Georgios Vrezas	<b>Test Dates:</b>	28 April 2016 to 17 June 2016
<b>Test Sample IMEI:</b>	357232070003098		

<b>FCC Reference:</b>	Part 15.403(i)
<b>Test Method Used:</b>	KDB 789033 D02 Section II.C.1.

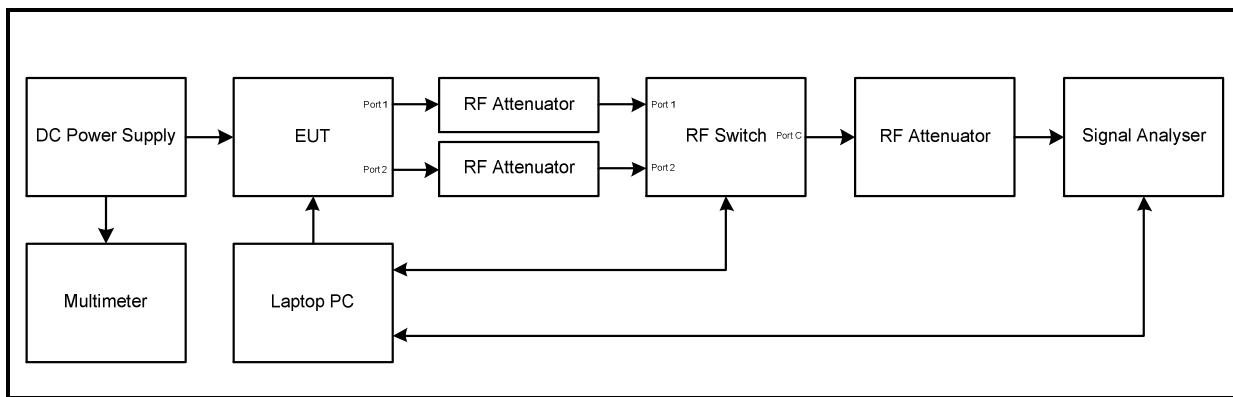
**Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 26
<b>Relative Humidity (%):</b>	28 to 45

**Note(s):**

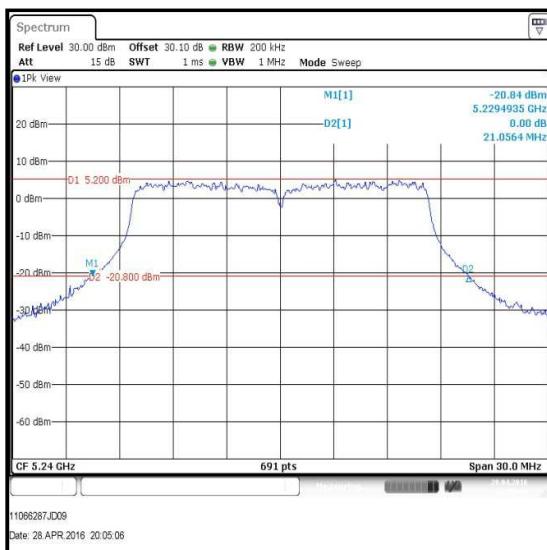
1. All configurations supported by the EUT were investigated on the one channel in accordance with KDB 789033 Section II.C.1. Emission Bandwidth (EBW) test procedure. The data rates that produced the widest bandwidth and therefore deemed worst case were:
  - o 802.11a – 16QAM / 36 Mbps
  - o 802.11n HT20 – 16QAM / 39 Mbps / MCS4
  - o 802.11n HT40 – 64QAM / 108 Mbps / MCS5
  - o 802.11ac VHT80 – 64QAM / 263.3 Mbps / MCS6x1
2. Final measurements were performed in each supported operating band using the above configurations on the bottom, middle and top or single channels.
3. Plots for all data rates are archived on the Company server and available for inspection upon request.
4. The signal analyser was connected to the RF port on the EUT using an RF switch, suitable attenuation and RF cables. An RF level offset was entered on the signal analyser to compensate for the loss of the switch, attenuators and RF cables.
5. For the power measurements in this report, the highest power output level was recorded when the EUT was configured as:
  - o 802.11a – 16QAM / 36 Mbps
  - o 802.11n HT20 – 16QAM / 39 Mbps / MCS4
  - o 802.11n HT40 – BPSK / 13.5 Mbps / MCS0
  - o 802.11ac VHT80 – 64QAM / 263.3 Mbps / MCS6x1

Emission bandwidth plots for 802.11n HT40 – BPSK / 13.5 Mbps / MCS0 configuration have been included as 'Reference plots' at the end of this section.

**Transmitter 26 dB Emission Bandwidth (continued)****Test setup:**

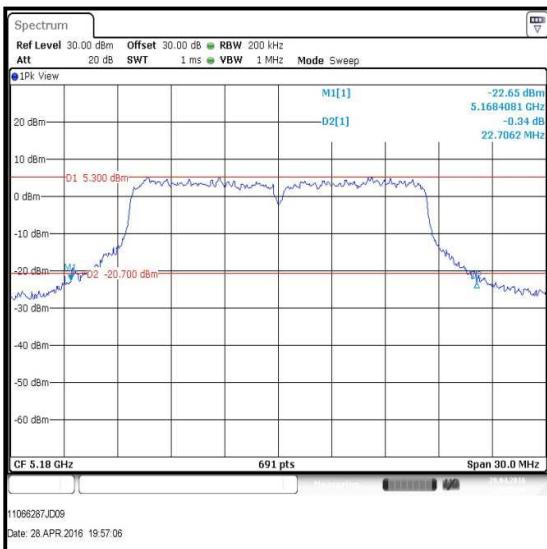
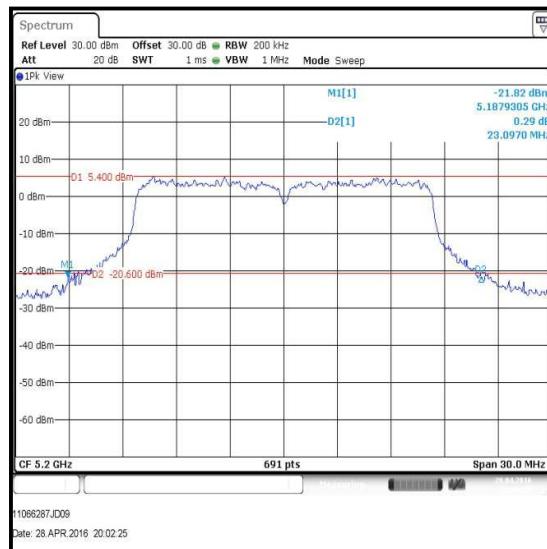
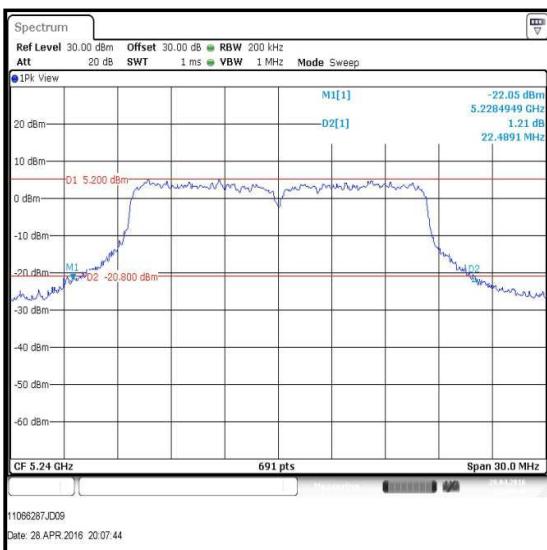
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.15-5.25 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5180	16QAM	36	21.056
Middle	5200	16QAM	36	21.143
Top	5240	16QAM	36	21.056

**Bottom Channel****Middle Channel****Top Channel**

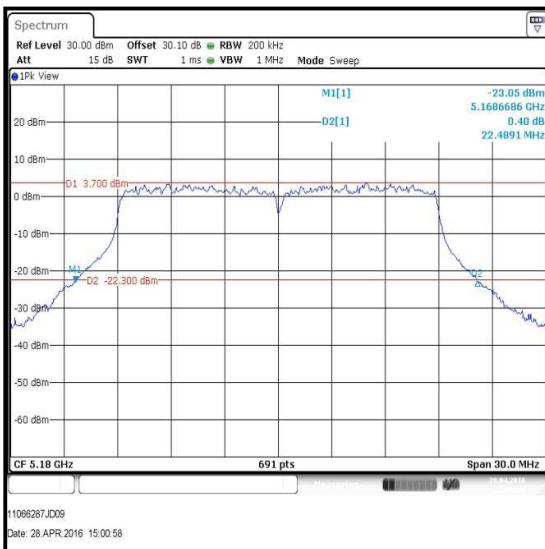
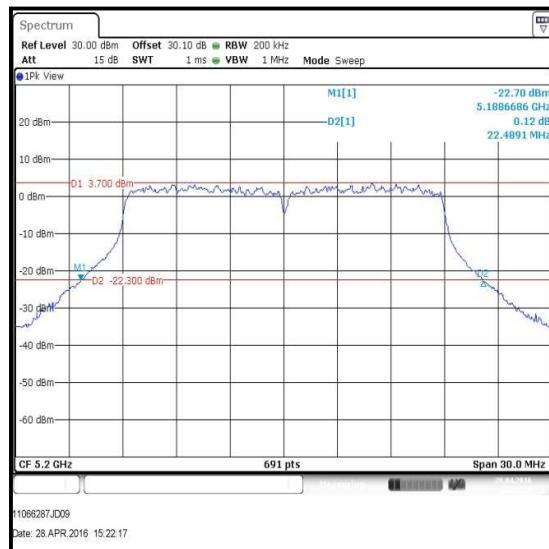
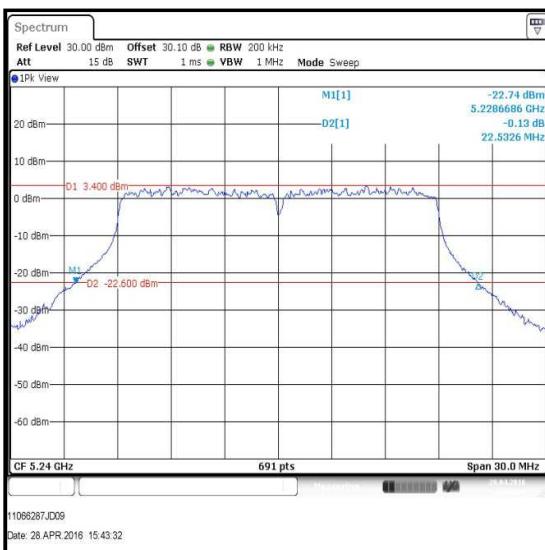
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.15-5.25 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5180	16QAM	36	22.706
Middle	5200	16QAM	36	23.097
Top	5240	16QAM	36	22.489

**Bottom Channel****Middle Channel****Top Channel**

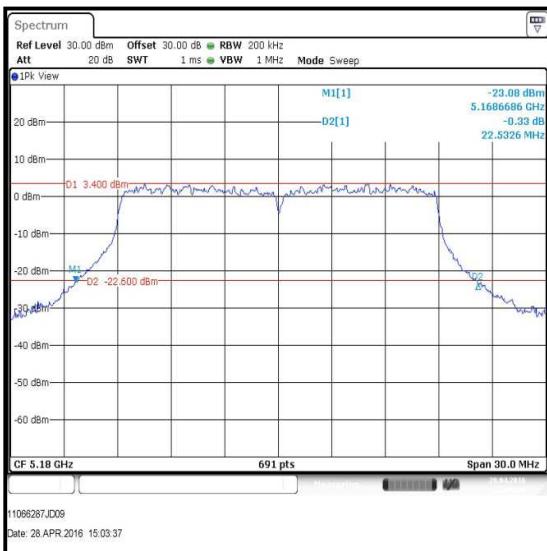
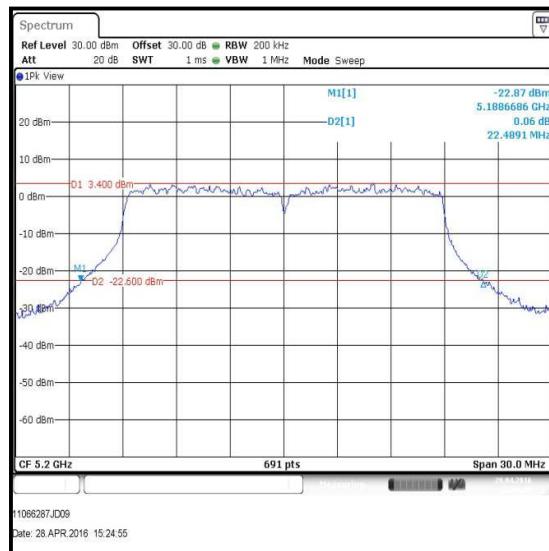
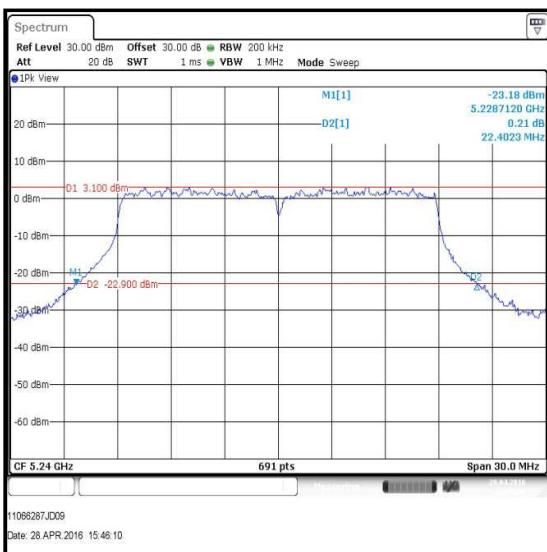
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.15-5.25 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	16QAM	39 / 4	22.489
Middle	5200	16QAM	39 / 4	22.489
Top	5240	16QAM	39 / 4	22.533

**Bottom Channel****Middle Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.15-5.25 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	16QAM	39 / 4	22.533
Middle	5200	16QAM	39 / 4	22.490
Top	5240	16QAM	39 / 4	22.402

**Bottom Channel****Middle Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.15-5.25 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	64QAM	108 / 5	45.673
Top	5230	64QAM	108 / 5	45.586



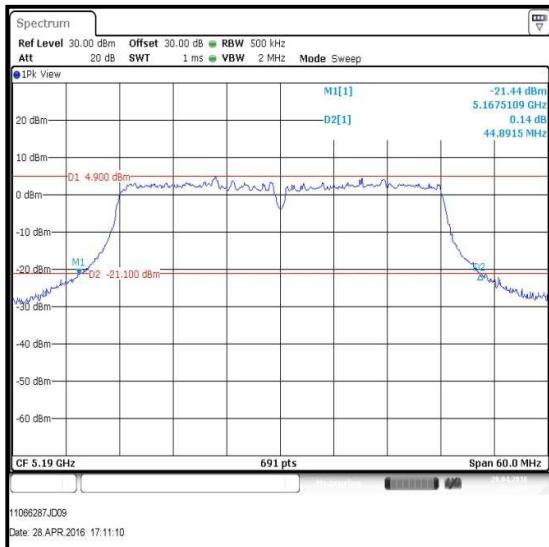
Bottom Channel



Top Channel

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.15-5.25 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	64QAM	108 / 5	44.892
Top	5230	64QAM	108 / 5	45.586



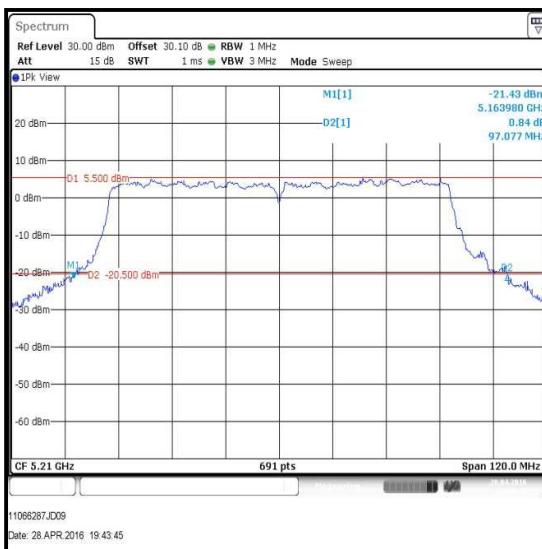
Bottom Channel



Top Channel

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11ac / 80 MHz / 5.15-5.25 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Single	5210	64QAM	263.3 / 6x1	97.077



Single Channel

**Results: 802.11ac / 80 MHz / 5.15-5.25 GHz band / Port 2**

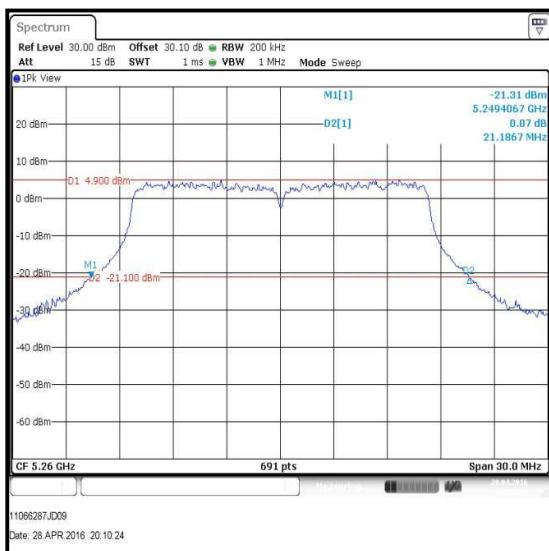
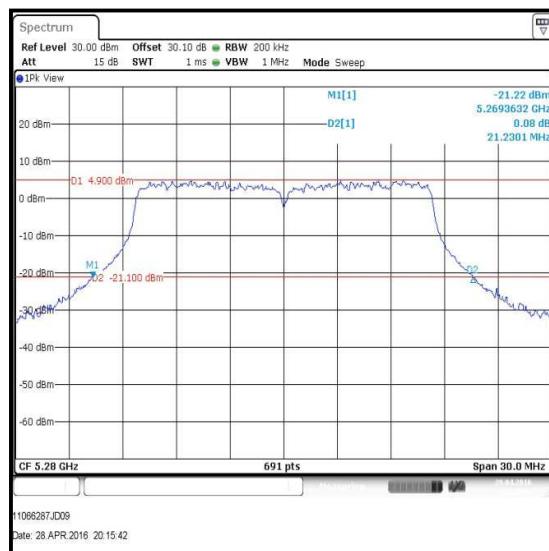
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Single	5210	64QAM	263.3 / 6x1	91.693



Single Channel

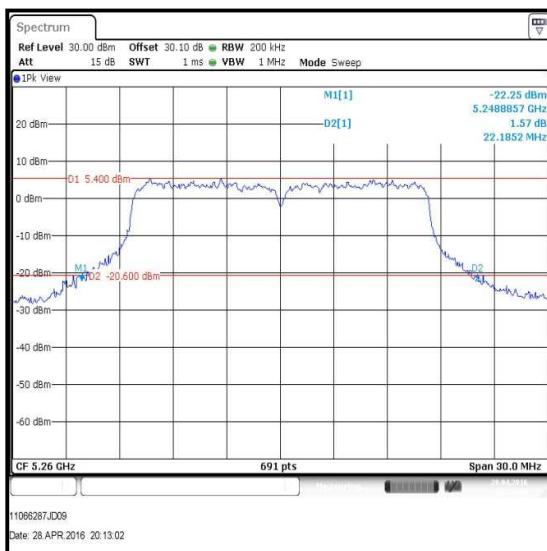
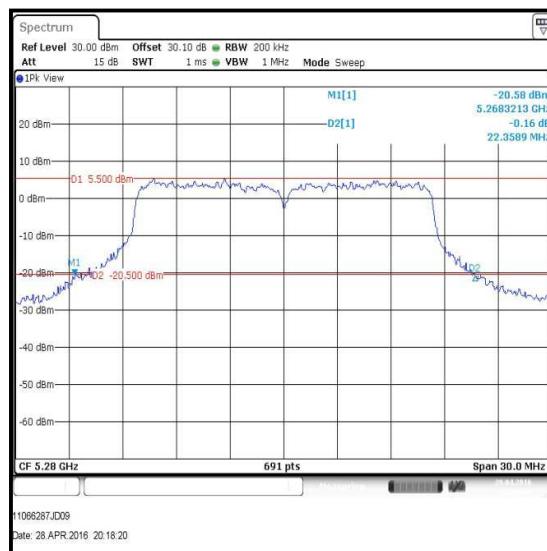
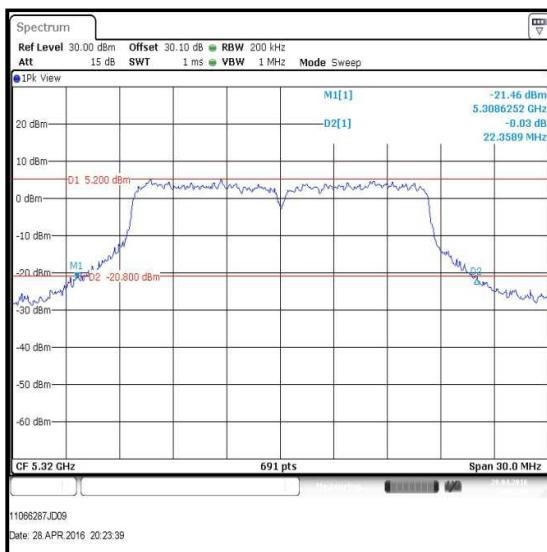
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.25-5.35 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5260	16QAM	36	21.187
Middle	5280	16QAM	36	21.230
Top	5320	16QAM	36	21.187

**Bottom Channel****Middle Channel****Top Channel**

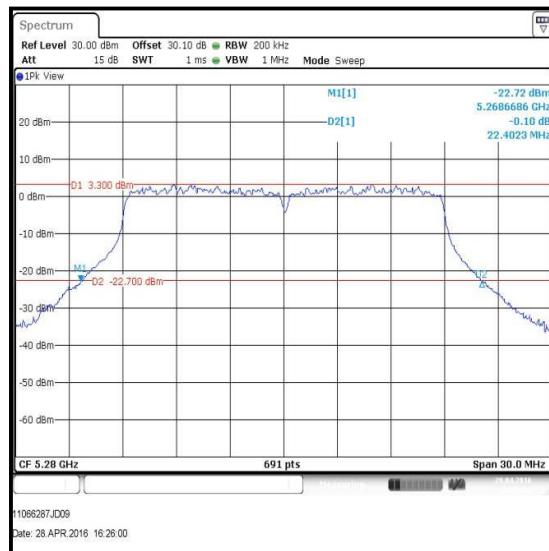
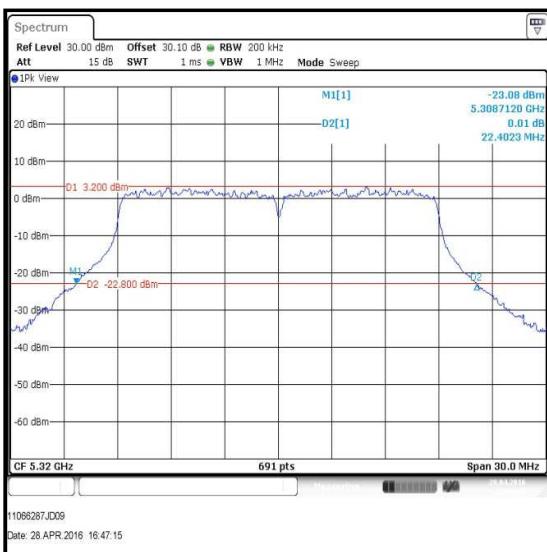
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.25-5.35 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5260	16QAM	36	22.185
Middle	5280	16QAM	36	22.359
Top	5320	16QAM	36	22.359

**Bottom Channel****Middle Channel****Top Channel**

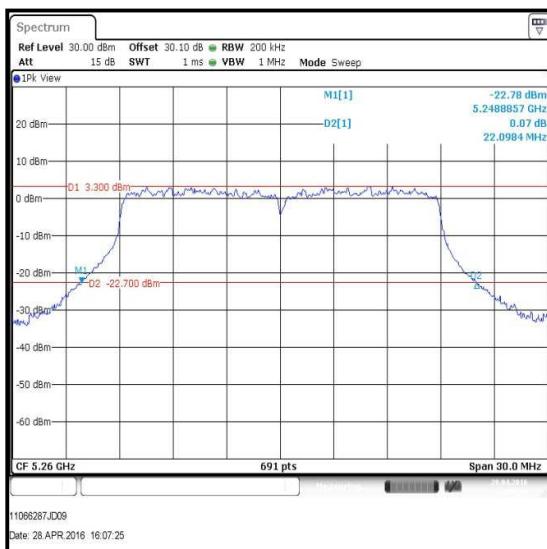
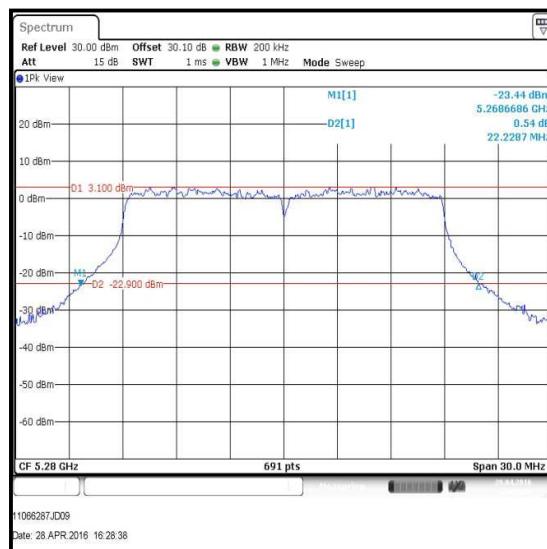
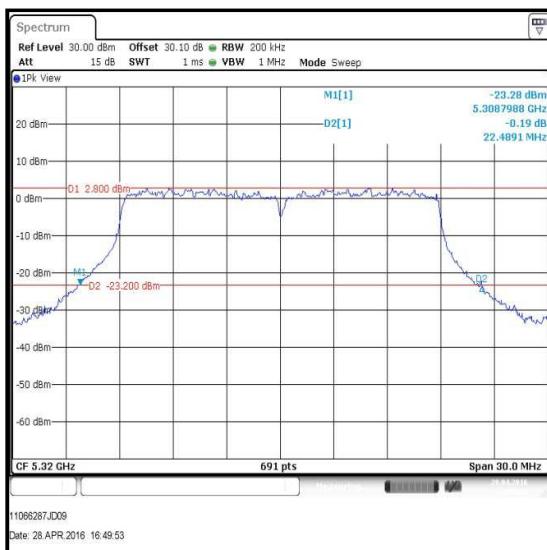
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.25-5.35 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	16QAM	39 / 4	22.402
Middle	5280	16QAM	39 / 4	22.402
Top	5320	16QAM	39 / 4	22.402

**Bottom Channel****Middle Channel****Top Channel**

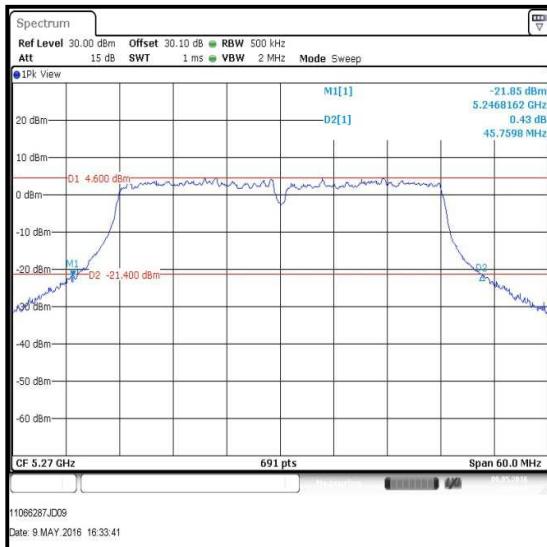
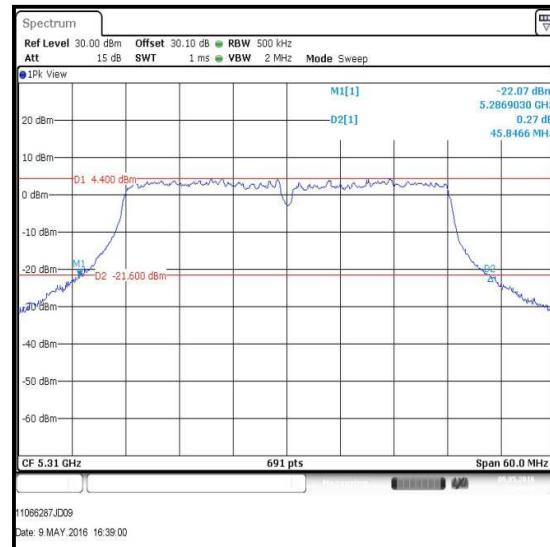
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.25-5.35 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	16QAM	39 / 4	22.098
Middle	5280	16QAM	39 / 4	22.229
Top	5320	16QAM	39 / 4	22.489

**Bottom Channel****Middle Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.25-5.35 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	64QAM	108 / 5	45.760
Top	5310	64QAM	108 / 5	45.847

**Bottom Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.25-5.35 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	64QAM	108 / 5	45.326
Top	5310	64QAM	108 / 5	44.805



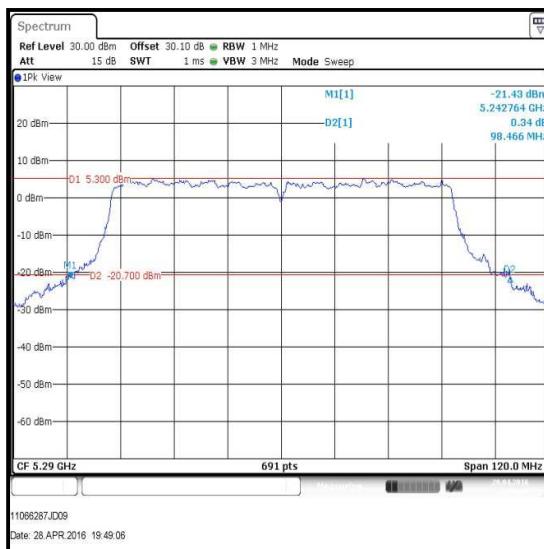
Bottom Channel



Top Channel

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11ac / 80 MHz / 5.25-5.35 GHz band / Port 1**

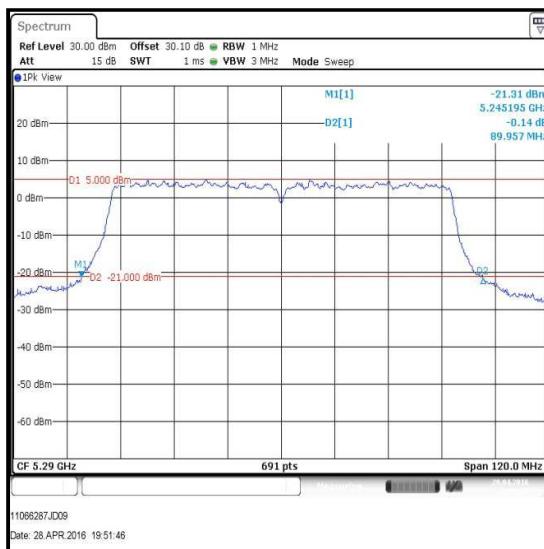
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Single	5290	64QAM	263.3 / 6x1	98.466



Single Channel

**Results: 802.11ac / 80 MHz / 5.25-5.35 GHz band / Port 2**

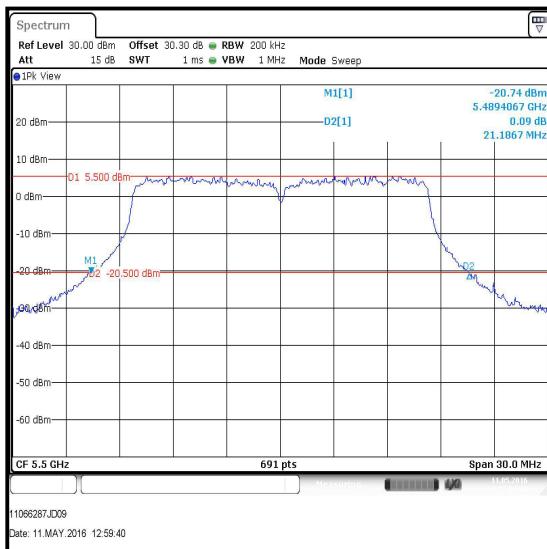
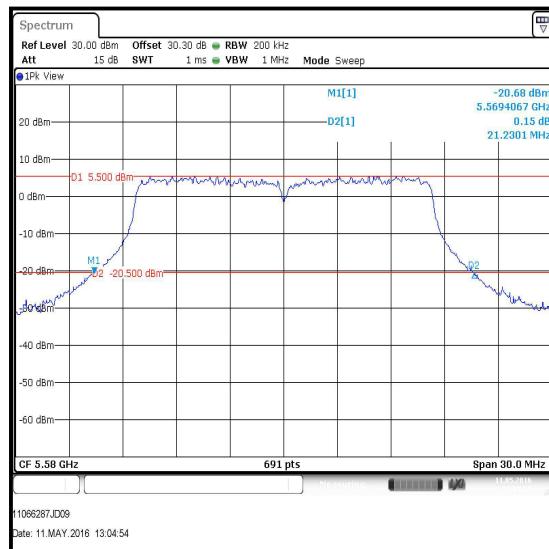
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Single	5290	64QAM	263.3 / 6x1	89.957



Single Channel

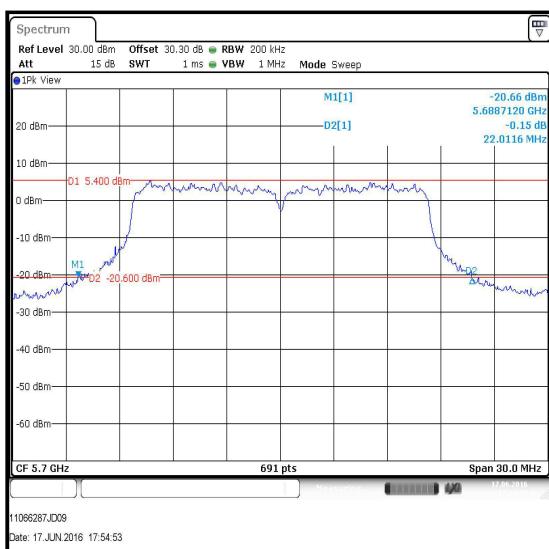
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.47-5.725 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5500	16QAM	36	21.187
Middle	5580	16QAM	36	21.230
Top	5700	16QAM	36	21.360

**Bottom Channel****Middle Channel****Top Channel**

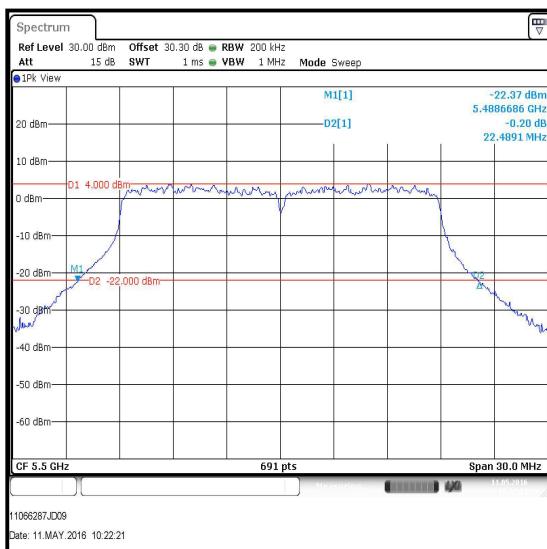
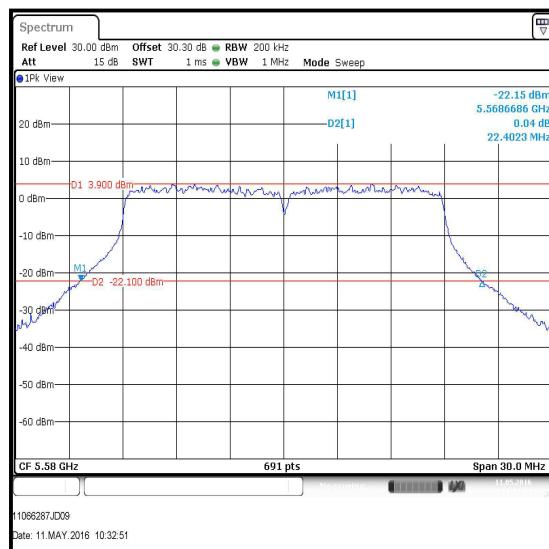
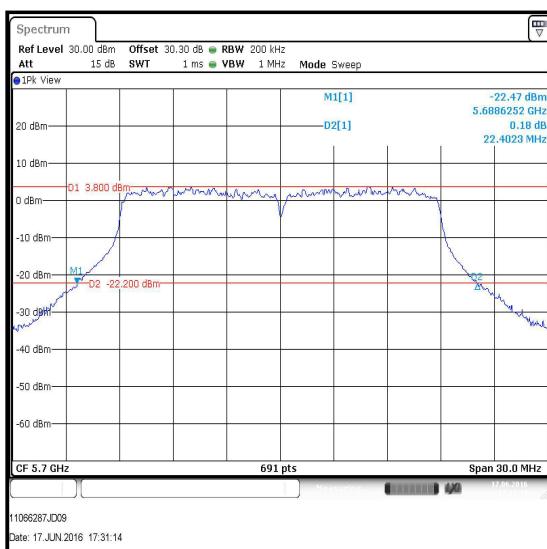
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / 5.47-5.725 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5500	16QAM	36	21.968
Middle	5580	16QAM	36	22.533
Top	5700	16QAM	36	22.012

**Bottom Channel****Middle Channel****Top Channel**

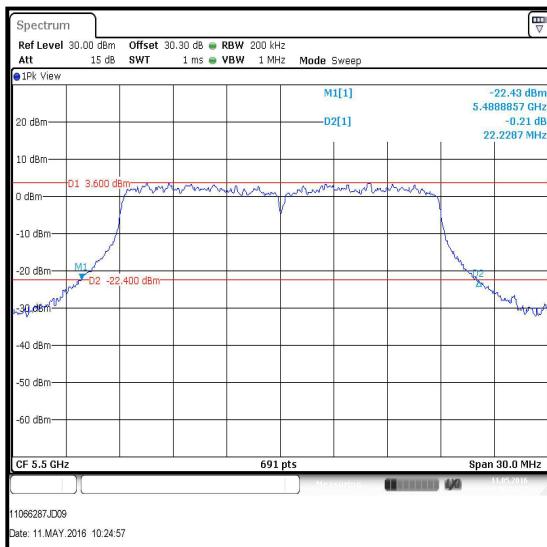
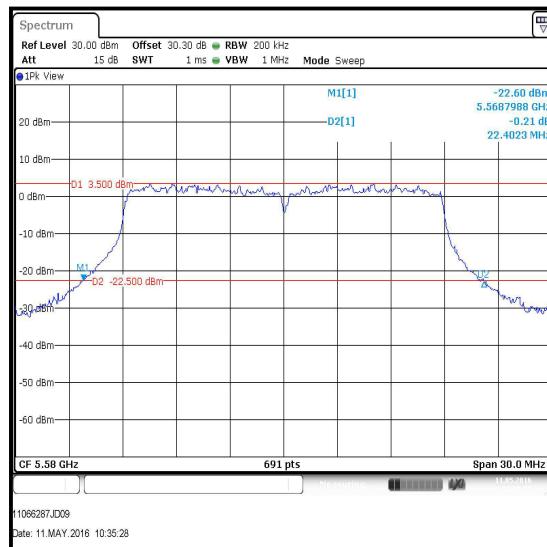
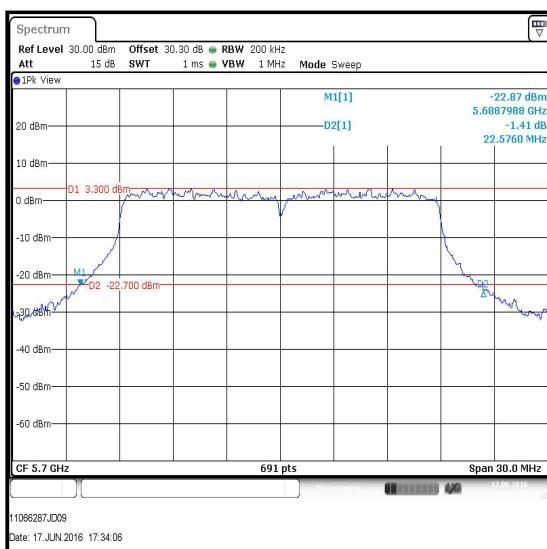
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.47-5.725 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	16QAM	39 / 4	22.489
Middle	5580	16QAM	39 / 4	22.402
Top	5700	16QAM	39 / 4	22.402

**Bottom Channel****Middle Channel****Top Channel**

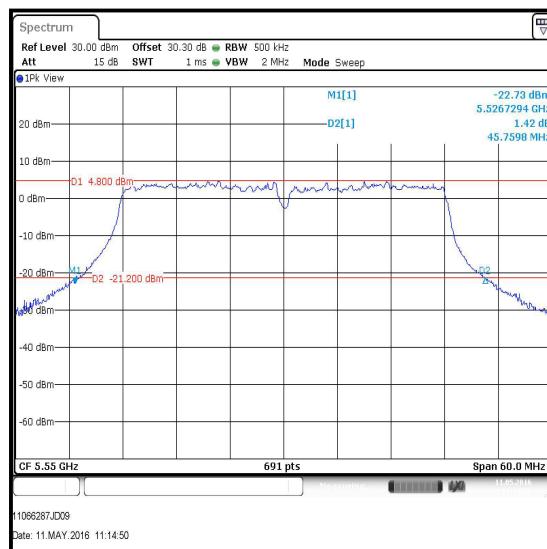
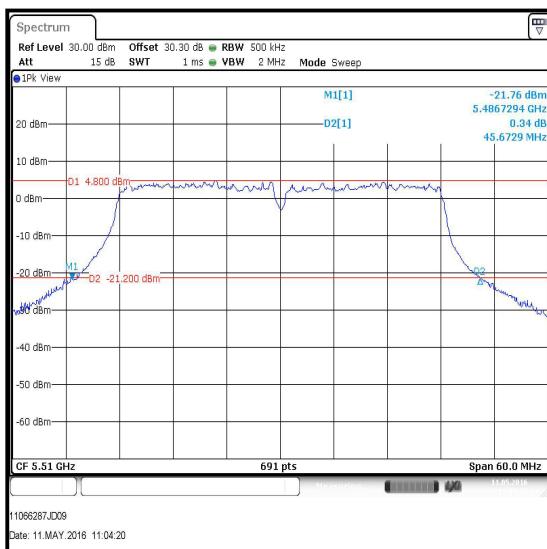
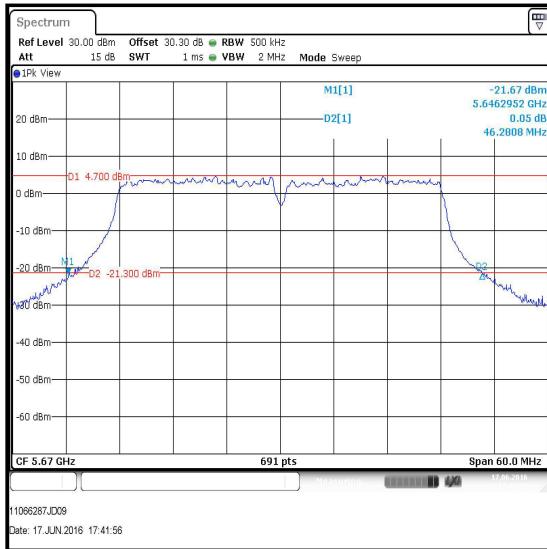
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 20 MHz / 5.47-5.725 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	16QAM	39 / 4	22.229
Middle	5580	16QAM	39 / 4	22.402
Top	5700	16QAM	39 / 4	22.576

**Bottom Channel****Middle Channel****Top Channel**

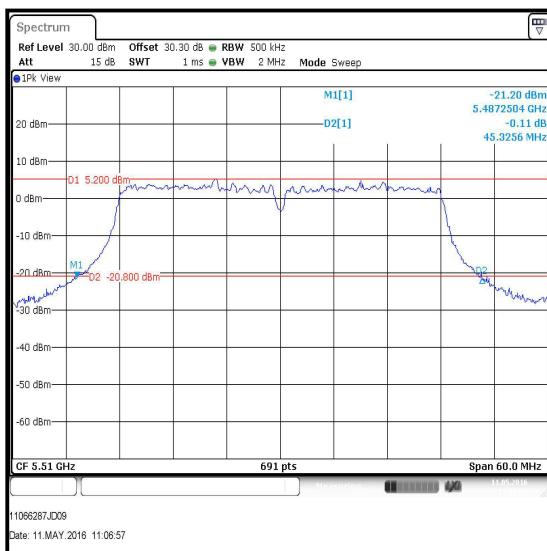
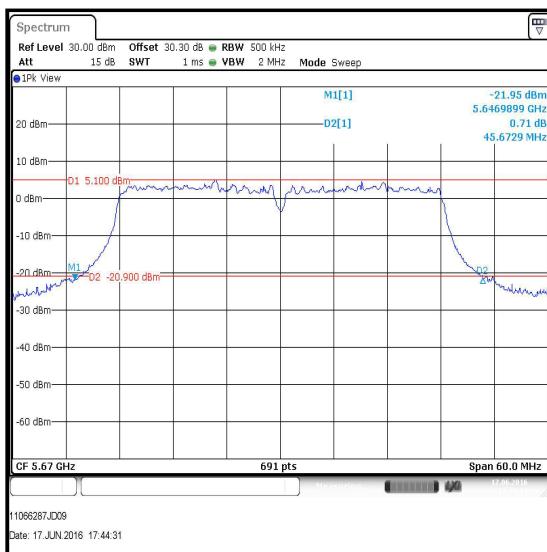
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.47-5.725 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	64QAM	108 / 5	45.673
Middle	5550	64QAM	108 / 5	45.760
Top	5670	64QAM	108 / 5	46.281

**Bottom Channel****Middle Channel****Top Channel**

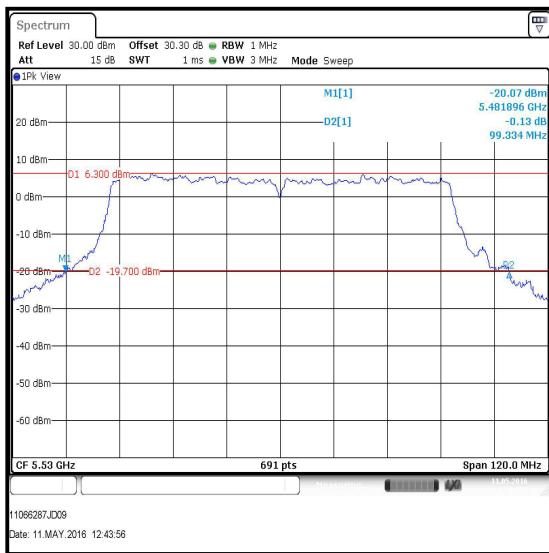
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11n / 40 MHz / 5.47-5.725 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	64QAM	108 / 5	45.326
Middle	5550	64QAM	108 / 5	44.805
Top	5670	64QAM	108 / 5	45.673

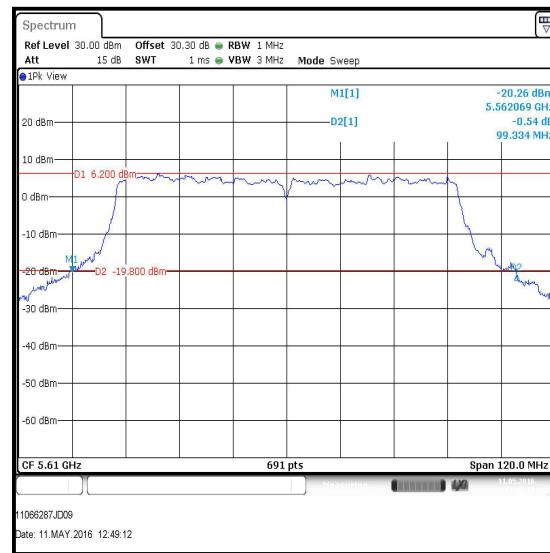
**Bottom Channel****Middle Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11ac / 80 MHz / 5.47-5.725 GHz band / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5530	64QAM	263.3 / 6x1	99.334
Top	5610	64QAM	263.3 / 6x1	99.334



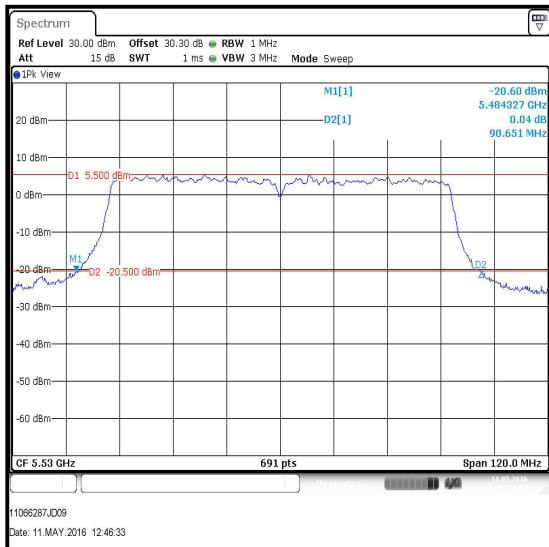
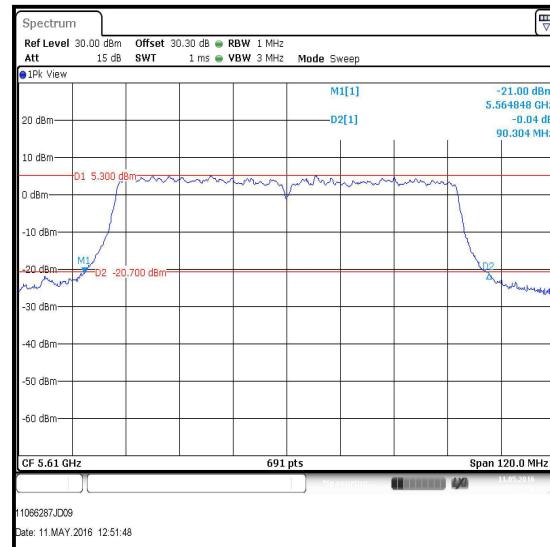
Bottom Channel



Top Channel

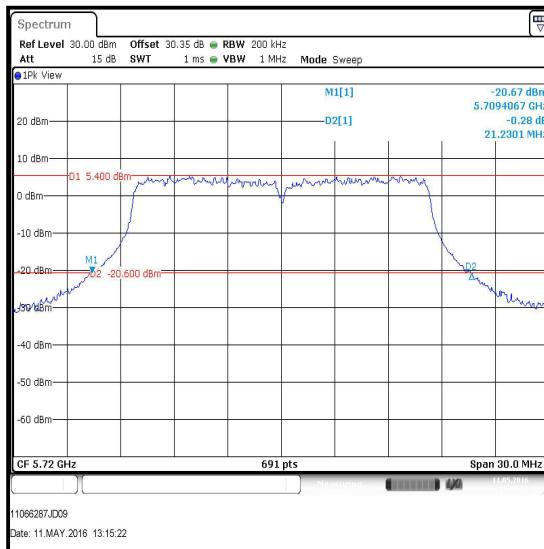
**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11ac / 80 MHz / 5.47-5.725 GHz band / Port 2**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5530	64QAM	263.3 / 6x1	90.651
Top	5610	64QAM	263.3 / 6x1	90.304

**Bottom Channel****Top Channel**

**Transmitter 26 dB Emission Bandwidth (continued)****Results: 802.11a / 20 MHz / Channels that straddle the U-NII-2C and U-NII-3 bands at 5725 MHz / Port 1**

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Single	5720	16QAM	36	21.230

**Single Channel**