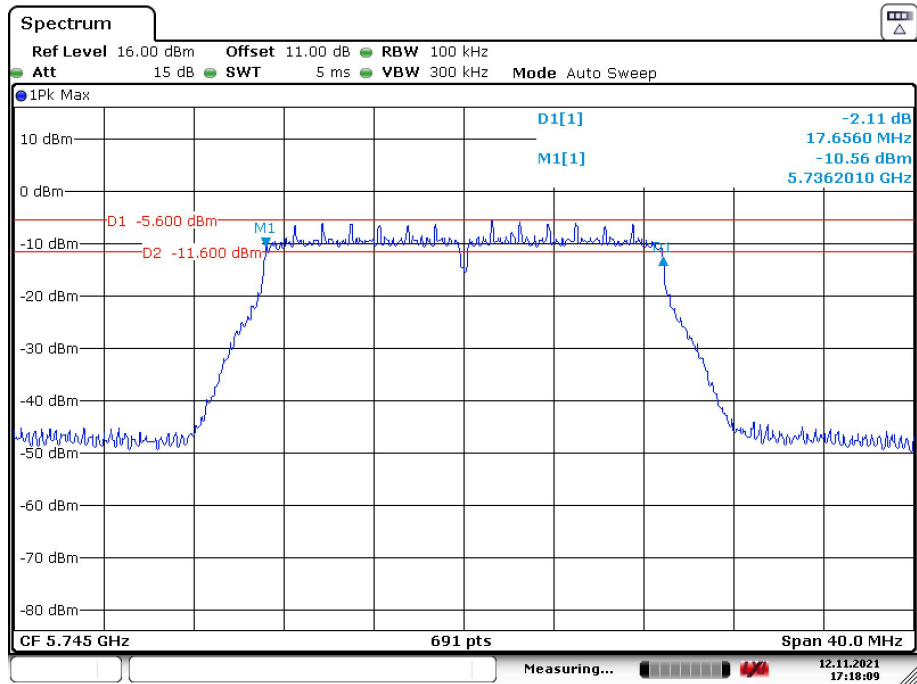
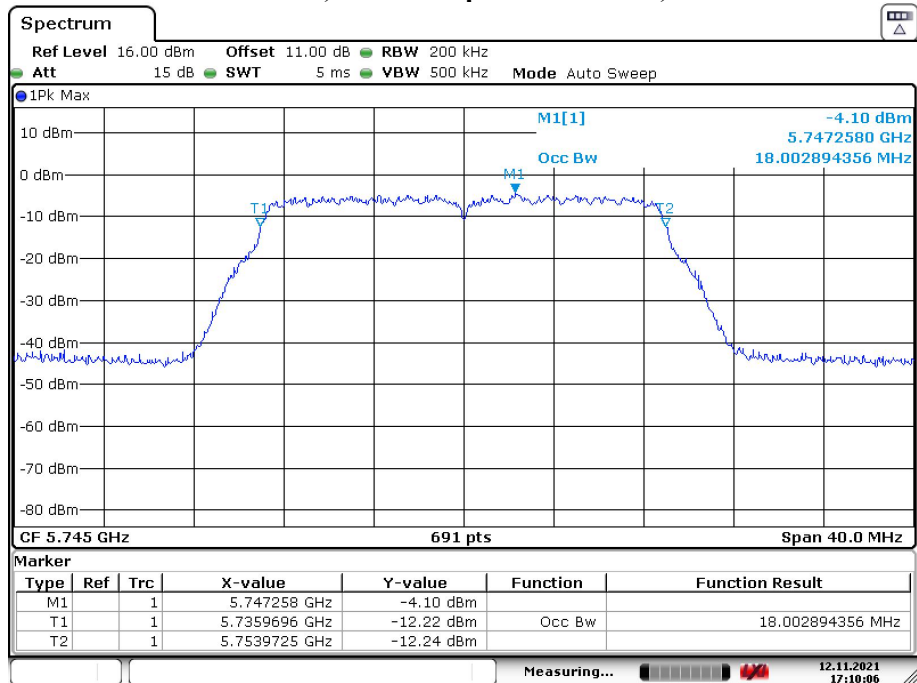


## 802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



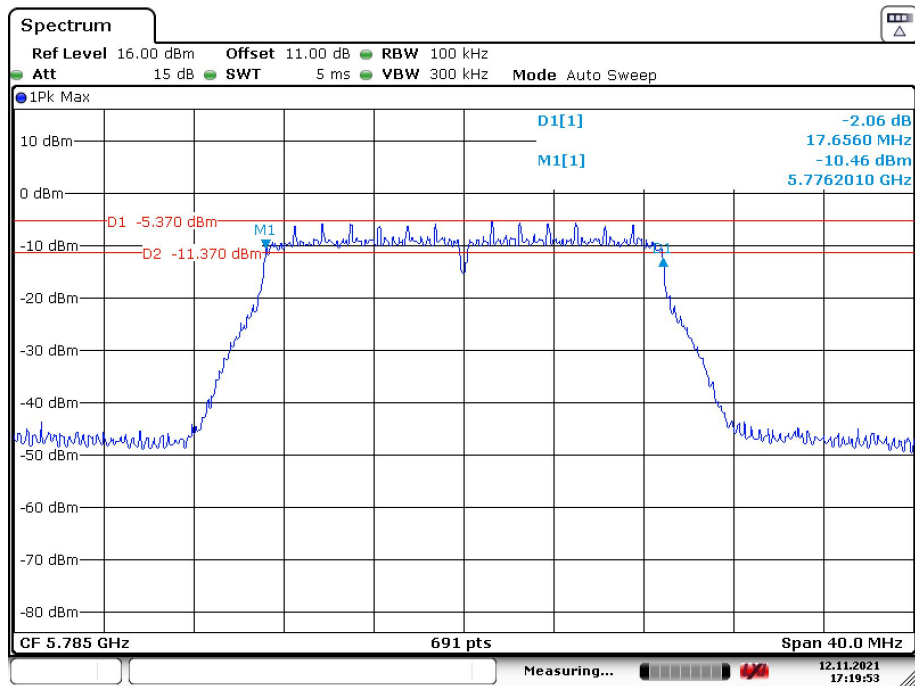
Date: 12.NOV.2021 17:18:09

## 802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



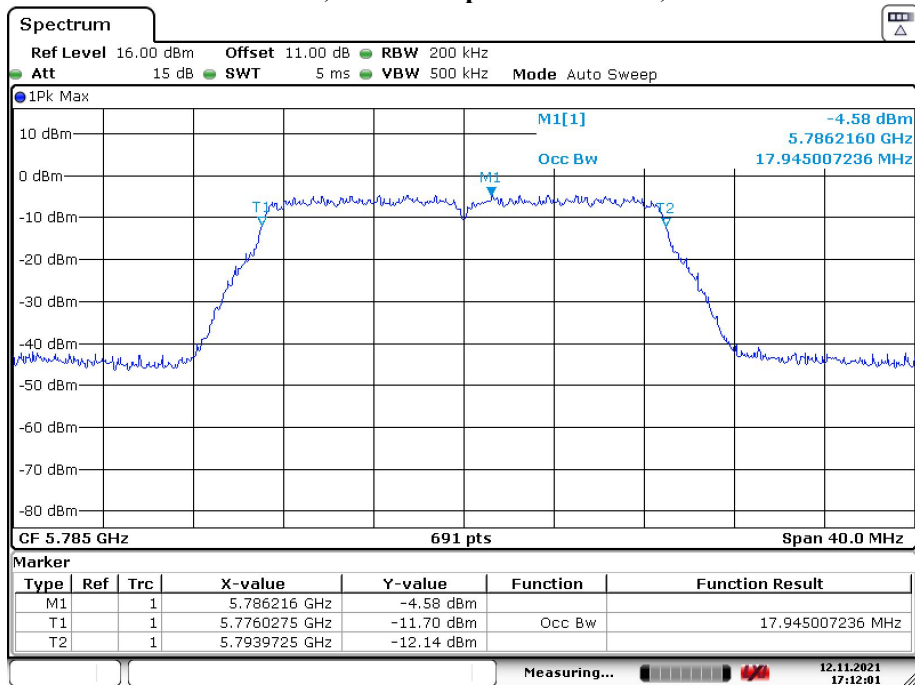
Date: 12.NOV.2021 17:10:06

## 802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



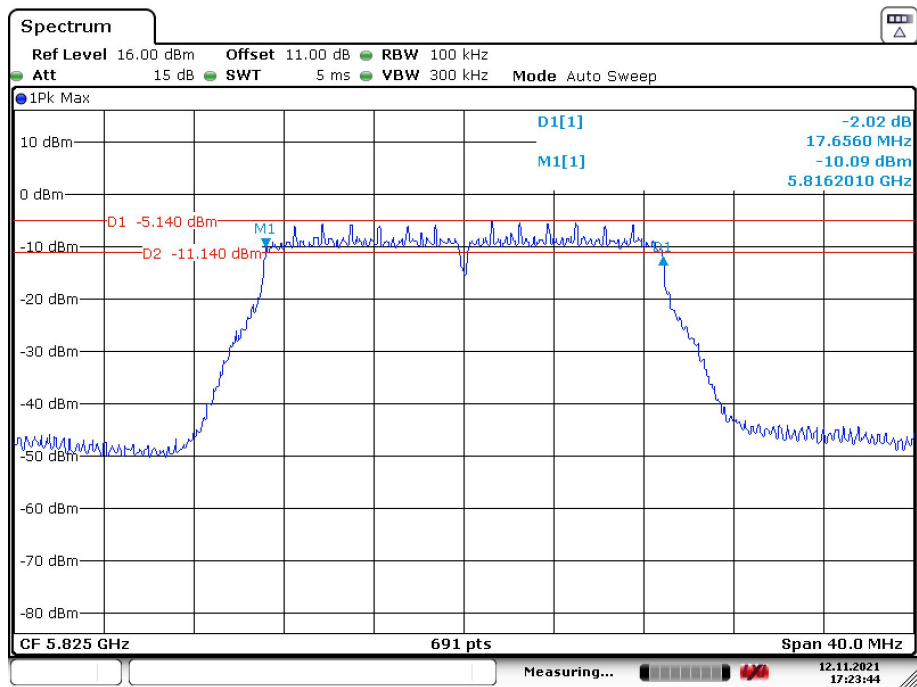
Date: 12.NOV.2021 17:19:53

## 802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



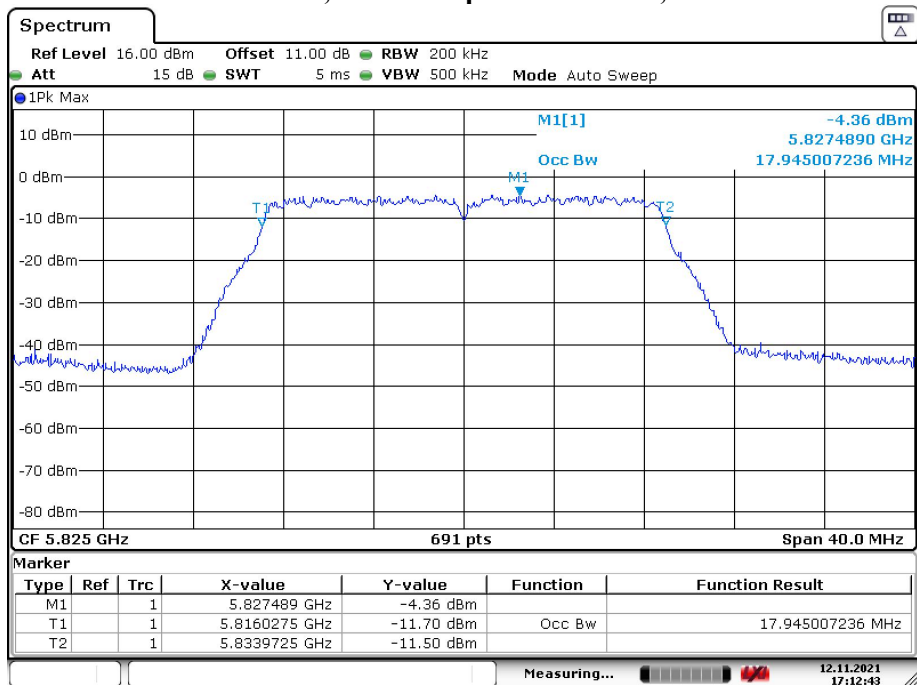
Date: 12.NOV.2021 17:12:00

## 802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



Date: 12.NOV.2021 17:23:43

## 802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



Date: 12.NOV.2021 17:12:42

## **FCC §15.407(a) & RSS-247 §6.2 – CONDUCTED TRANSMITTER OUTPUT POWER**

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### **Applicable Standard**

#### **FCC § 15.407(a):**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

#### **RSS-247 §6.2:**

##### **Frequency band 5150-5250 MHz:**

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log 10B$ , dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log 10B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

##### **Frequency band 5250-5350 MHz:**

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log 10B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log 10B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5470-5600 MHz and 5650-5725MHz:

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

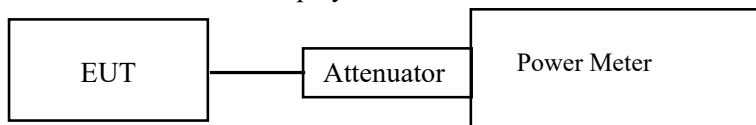
The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Frequency band 5725-5850 MHz:

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipointFootnote3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

## Test Procedure

- d. Place the EUT on a bench and set it in transmitting mode.
- e. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
- f. Add a correction factor to the display.



## Test Data

### Environmental Conditions

Temperature:	25.7 °C
Relative Humidity:	47 %
ATM Pressure:	101.0 kPa

*The testing was performed by Fan Yang on 2021-11-12.*

*EUT operation mode: Transmitting*

### Test Result: Pass

Please refer to the following tables.

**5150 MHz – 5250 MHz**

For FCC:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5180	11.84	24
5200	11.32	
5240	10.91	
802.11n20		
5180	12.22	24
5200	12.05	
5240	11.89	

For ISSED:

Frequency (MHz)	Conducted Average Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)
802.11a				
5180	11.84	3.0	14.84	22.23
5200	11.32	3.0	14.32	22.23
5240	10.91	3.0	13.91	22.23
802.11n20				
5180	12.22	3.0	15.22	22.55
5200	12.05	3.0	15.05	22.55
5240	11.89	3.0	14.89	22.54

**5250 MHz – 5350 MHz**

For FCC:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5260	10.42	24
5280	10.18	
5320	9.62	
802.11n20		
5260	10.81	24
5280	10.55	
5320	9.84	

ForISED C:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
802.11a					
5260	10.42	23.23	3.0	13.42	29.23
5280	10.18	23.23	3.0	13.18	29.23
5320	9.62	23.23	3.0	12.62	29.23
802.11n20					
5260	10.81	23.54	3.0	13.81	29.54
5280	10.55	23.54	3.0	13.55	29.54
5320	9.84	23.54	3.0	12.84	29.54

**5470 MHz – 5725 MHz**

For FCC:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5500	8.37	24
5580	8.75	
5700	10.14	
802.11n20		
5500	8.60	24
5580	9.03	
5700	10.56	

ForISED C:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
802.11a					
5500	8.37	23.23	3.0	11.37	29.23
5580	8.75	23.23	3.0	11.75	29.23
5700	10.14	23.23	3.0	13.14	29.23
802.11n20					
5500	8.60	23.55	3.0	11.6	29.55
5580	9.03	23.55	3.0	12.03	29.55
5700	10.56	23.55	3.0	13.56	29.55

**5725 MHz – 5825 MHz:**

For FCC&amp;ISED:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5745	10.49	30
5785	10.88	
5825	11.01	
802.11n20		
5745	10.87	30
5785	11.22	
5825	11.18	



## **FCC §15.407(a) & RSS-247 §6.2- POWER SPECTRAL DENSITY**

### **Applicable Standard**

#### **FCC § 15.407(a)**

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

#### **RSS-247 §6.2:**

##### **Frequency band 5150-5250 MHz:**

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log 10B$ , dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log 10B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

##### **Frequency band 5250-5350 MHz:**

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log 10B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log 10B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

##### **Frequency band 5470-5600 MHz and 5650-5725MHz:**

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log 10B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log 10B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall

implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

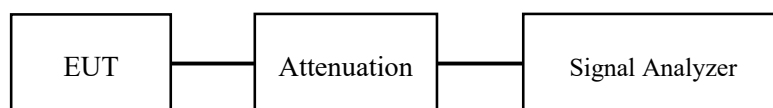
Frequency band 5725-5850 MHz:

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipointFootnote3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

### Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set  $RBW \geq 1/T$ , where T is defined in section II.B.1.a).
- b) Set  $VBW \geq 3 RBW$ .
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz}/RBW)$  to the measured result, whereas  $RBW (< 500 \text{ kHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1\text{MHz}/RBW)$  to the measured result, whereas  $RBW (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.



**Test Data****Environmental Conditions**

<b>Temperature:</b>	25.7 °C
<b>Relative Humidity:</b>	47 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Fan Yang on 2021-11-12.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

Please refer to the following tables and plots.

**5150 MHz – 5250MHz:**

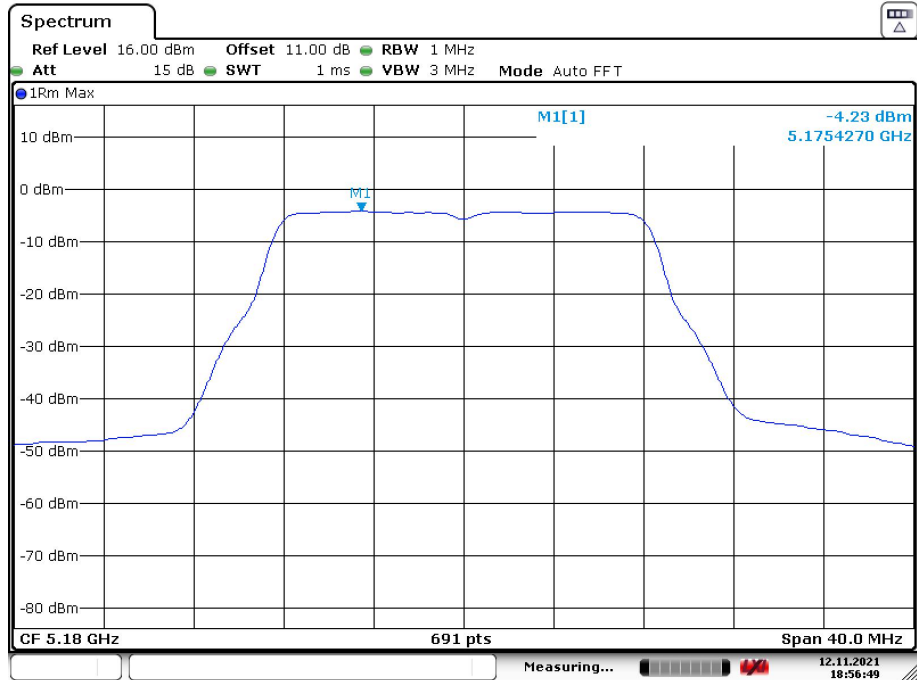
For FCC:

Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5180	-4.23	11
5200	-4.64	
5240	-5.14	
802.11n20		
5180	-4.65	11
5200	-4.99	
5240	-5.42	

For ISED:

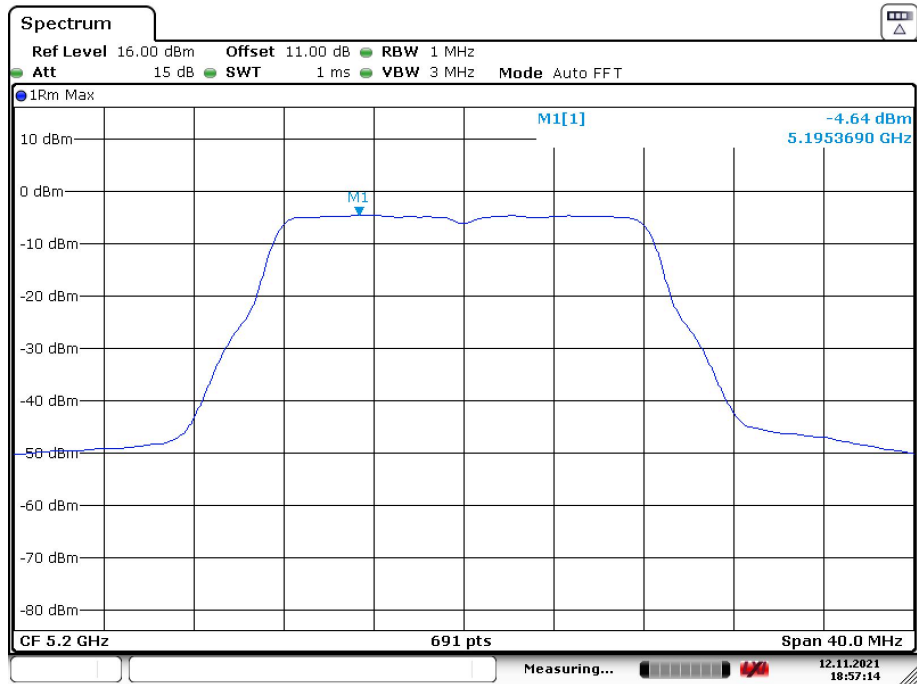
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Antenna Gain (dBi)	EIRP Spectral Density (dBm)	Limit (dBm/MHz)
<b>802.11a</b>				
5180	-4.23	3.0	-1.23	10
5200	-4.64	3.0	-1.64	10
5240	-5.14	3.0	-2.14	10
<b>802.11n20</b>				
5180	-4.65	3.0	-1.65	10
5200	-4.99	3.0	-1.99	10
5240	-5.42	3.0	-2.42	10

## 802.11a mode, Power Spectral Density, 5180 MHz



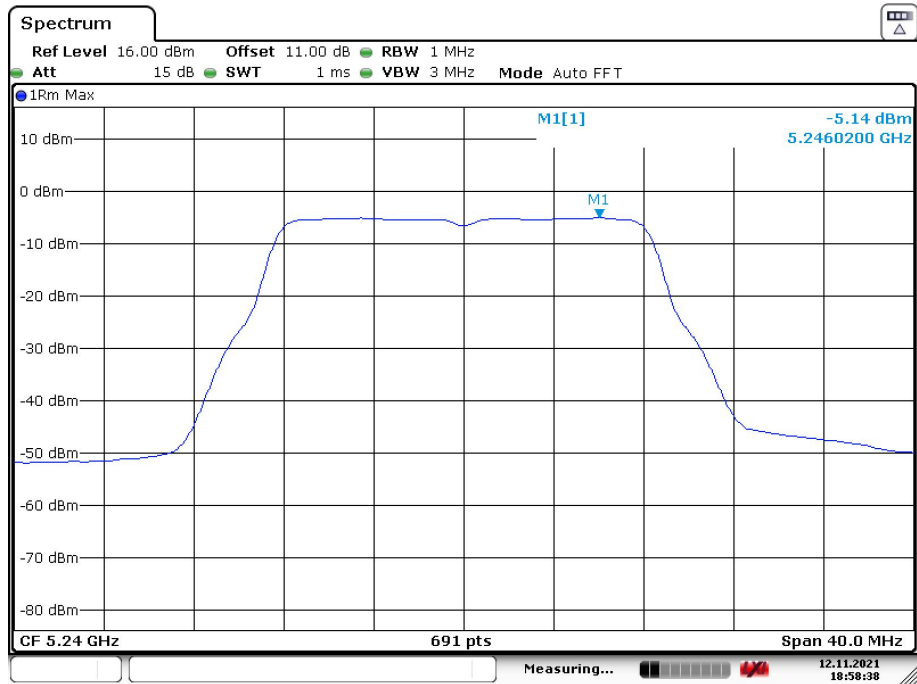
Date: 12.NOV.2021 18:56:49

## 802.11a mode, Power Spectral Density, 5200 MHz



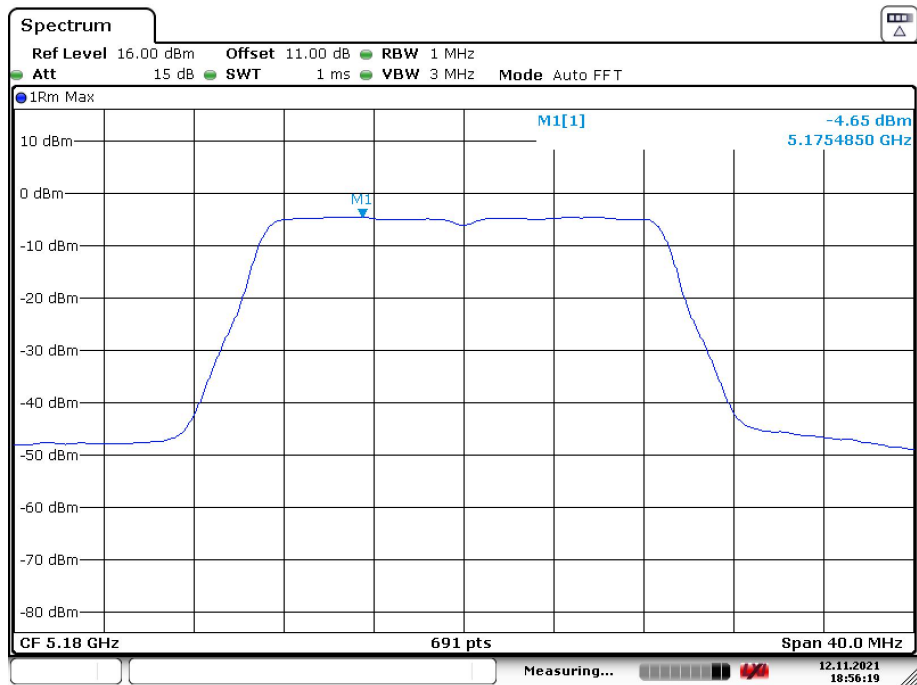
Date: 12.NOV.2021 18:57:14

## 802.11a mode, Power Spectral Density, 5240 MHz



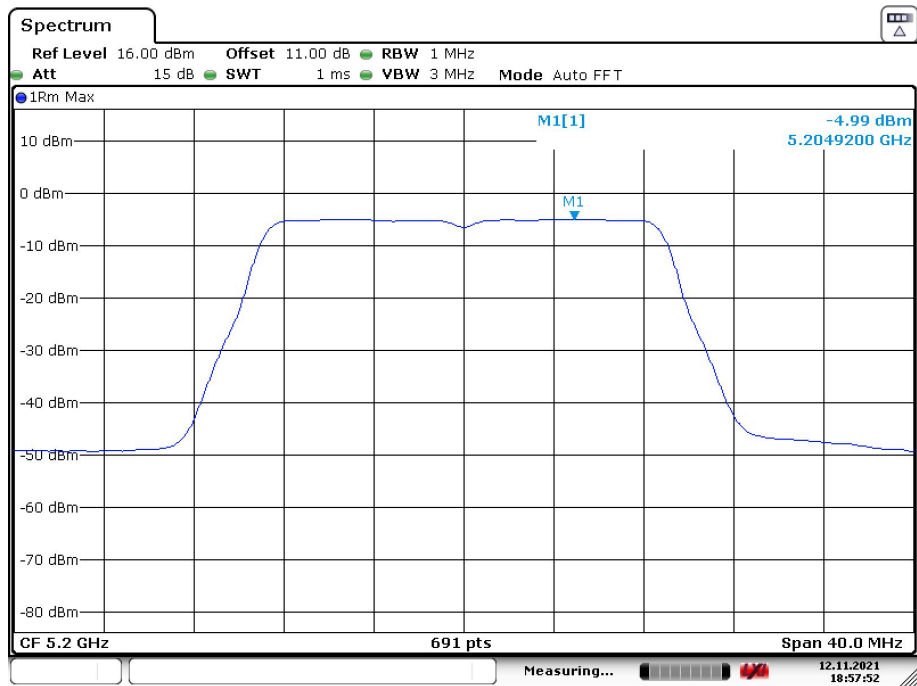
Date: 12.NOV.2021 18:58:38

## 802.11n20 mode, Power Spectral Density, 5180 MHz



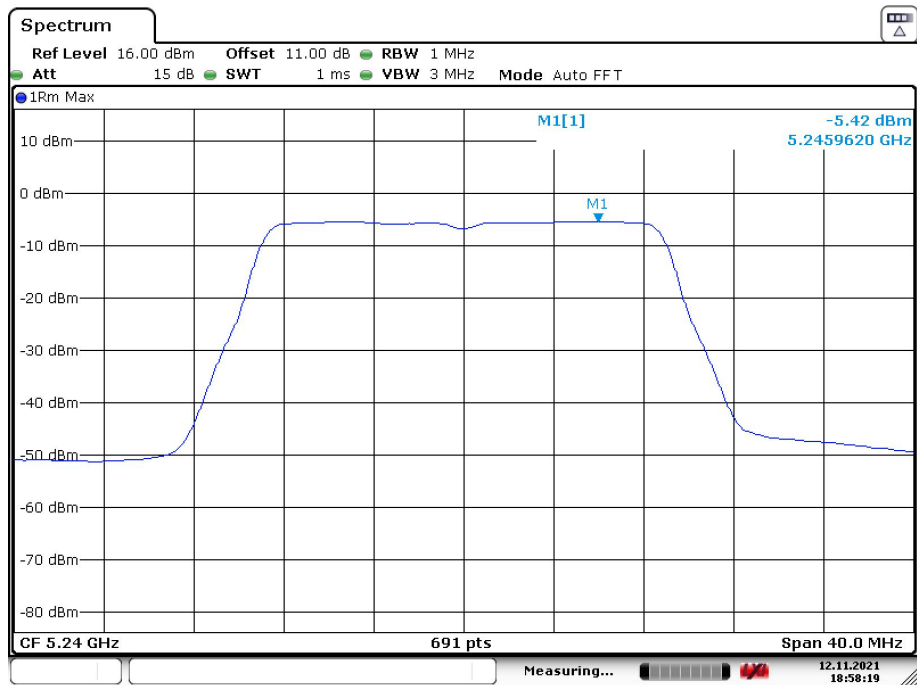
Date: 12.NOV.2021 18:56:19

## 802.11n20 mode, Power Spectral Density, 5200 MHz



Date: 12.NOV.2021 18:57:52

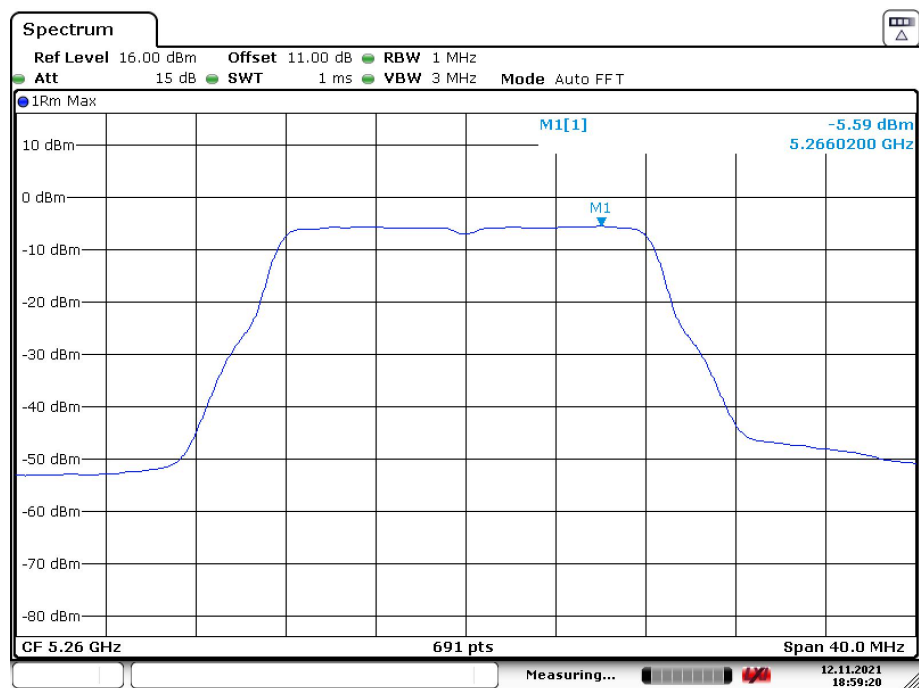
## 802.11n20 mode, Power Spectral Density, 5240 MHz



Date: 12.NOV.2021 18:58:19

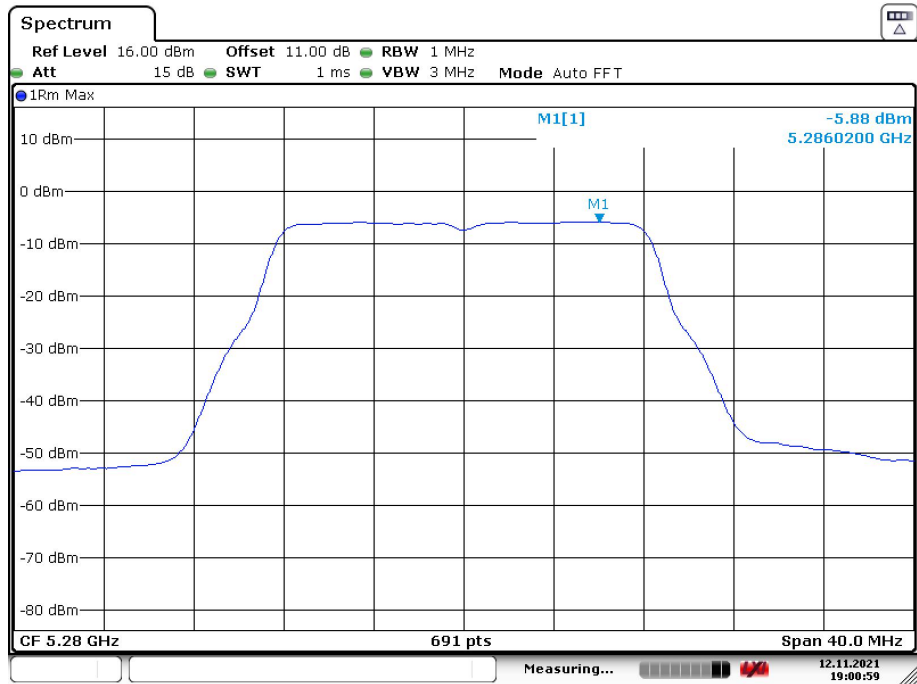
**5250 MHz – 5350 MHz:**

Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5260	-5.59	11
5280	-5.88	
5320	-6.43	
802.11n20		
5260	-6.00	11
5280	-6.24	
5320	-6.80	

**802.11a mode, Power Spectral Density, 5260 MHz**

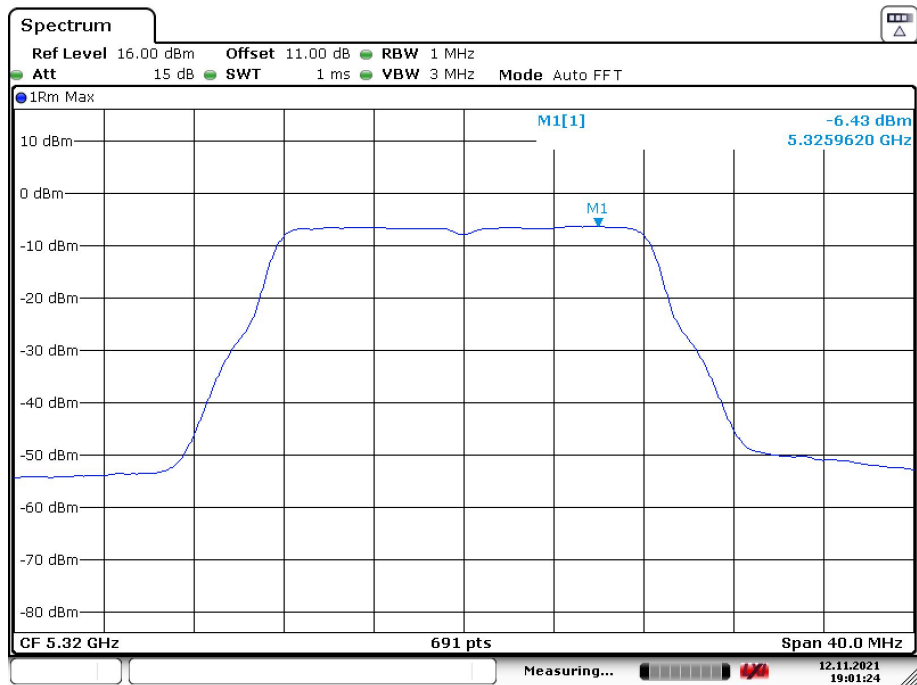
Date: 12.NOV.2021 18:59:20

## 802.11a mode, Power Spectral Density, 5280 MHz



Date: 12.NOV.2021 19:00:59

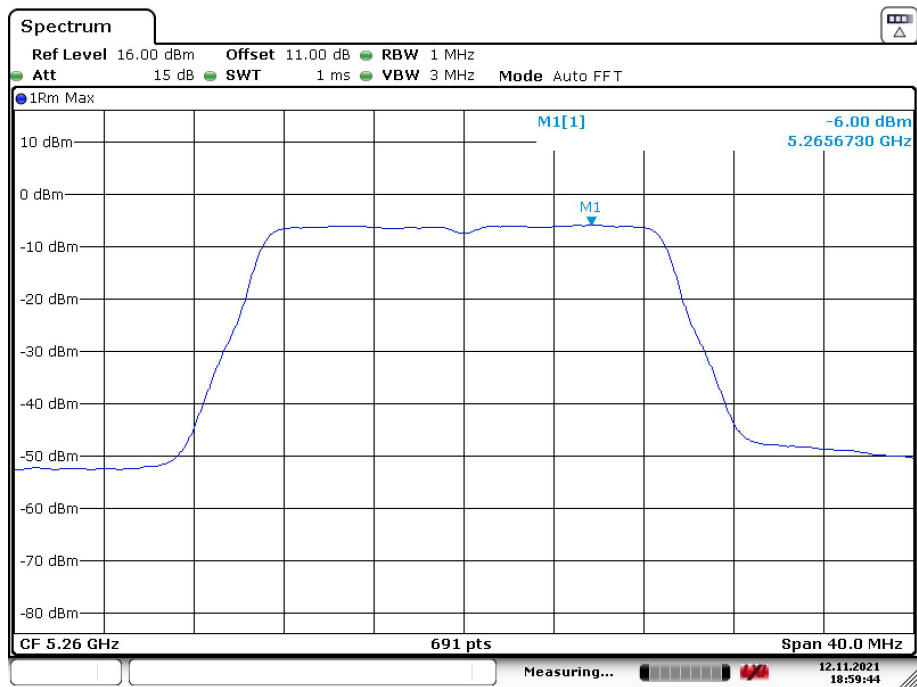
## 802.11a mode, Power Spectral Density, 5320 MHz



Date: 12.NOV.2021 19:01:24

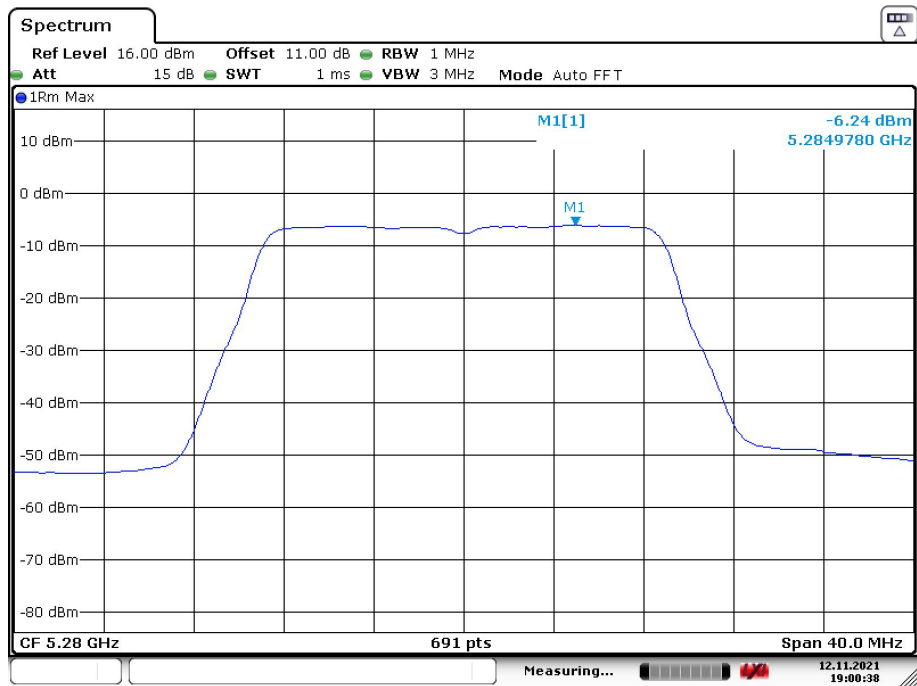


## 802.11n20 mode, Power Spectral Density, 5260 MHz



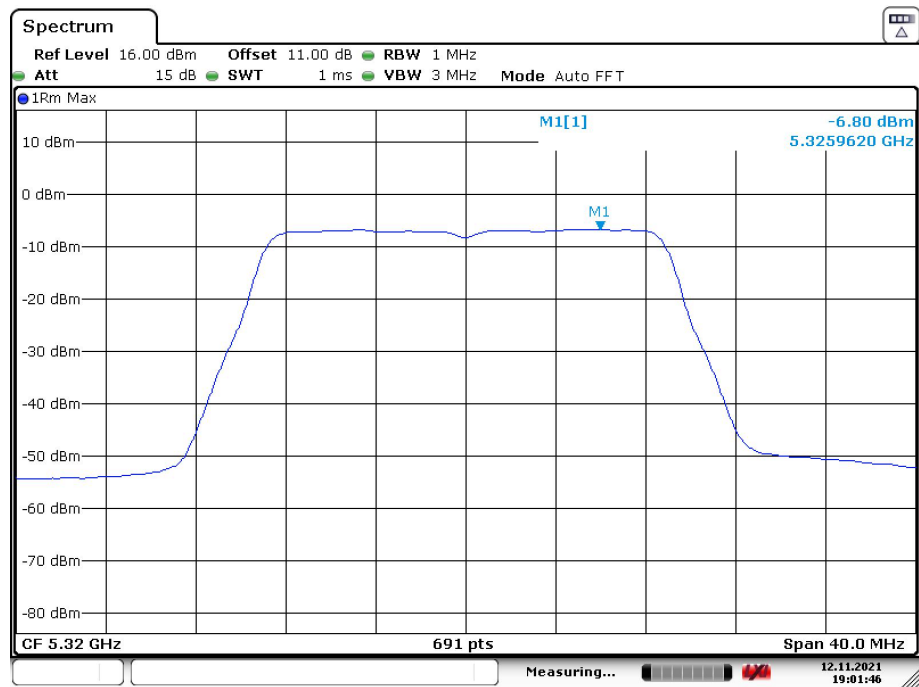
Date: 12.NOV.2021 18:59:44

## 802.11n20 mode, Power Spectral Density, 5280 MHz



Date: 12.NOV.2021 19:00:38

## 802.11n20 mode, Power Spectral Density, 5320 MHz

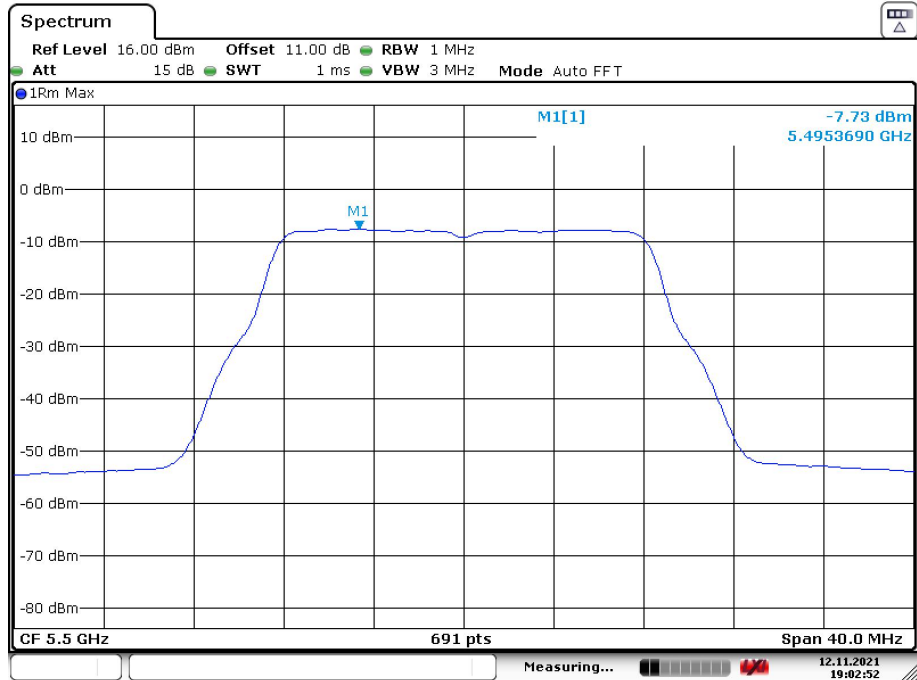


Date: 12.NOV.2021 19:01:46

## 5470 MHz – 5725 MHz:

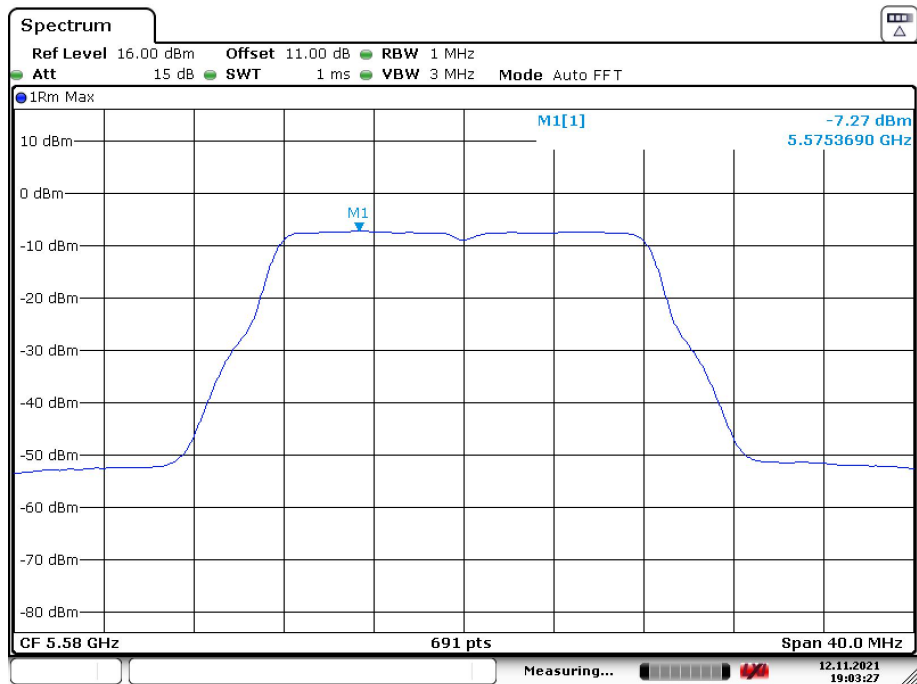
Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a		
5500	-7.73	11
5580	-7.27	
5700	-6.01	
802.11n20		
5500	-8.14	11
5580	-7.62	
5700	-6.04	

## 802.11a mode, Power Spectral Density, 5500 MHz



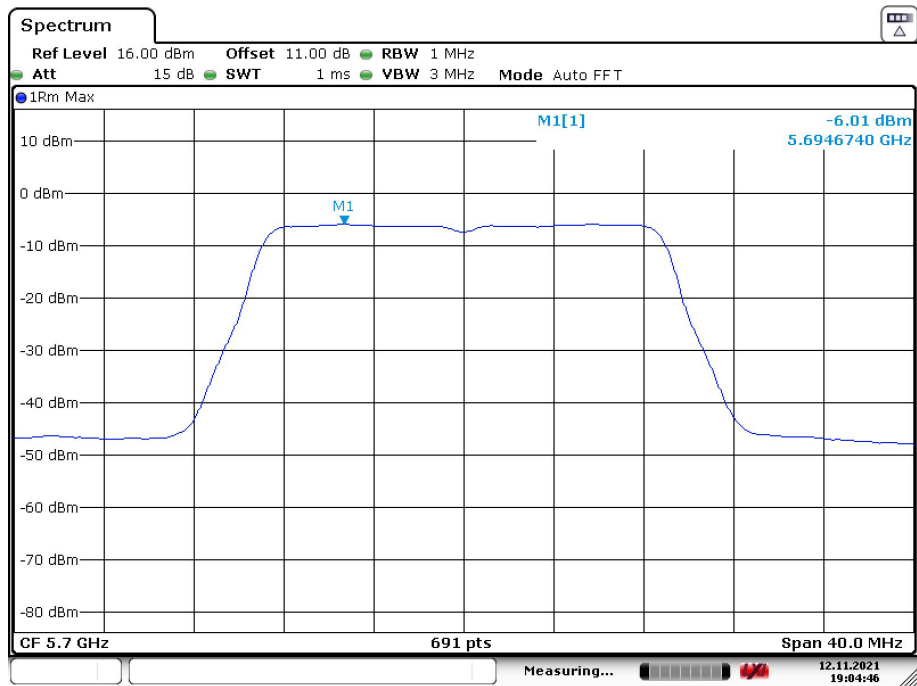
Date: 12.NOV.2021 19:02:52

## 802.11a mode, Power Spectral Density, 5580 MHz



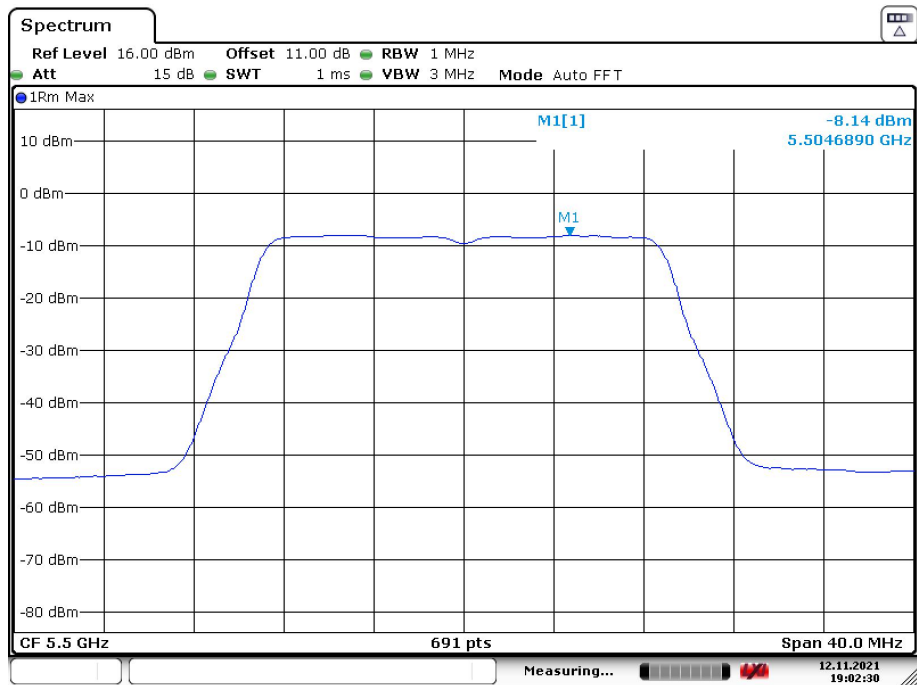
Date: 12.NOV.2021 19:03:27

## 802.11a mode, Power Spectral Density, 5700 MHz



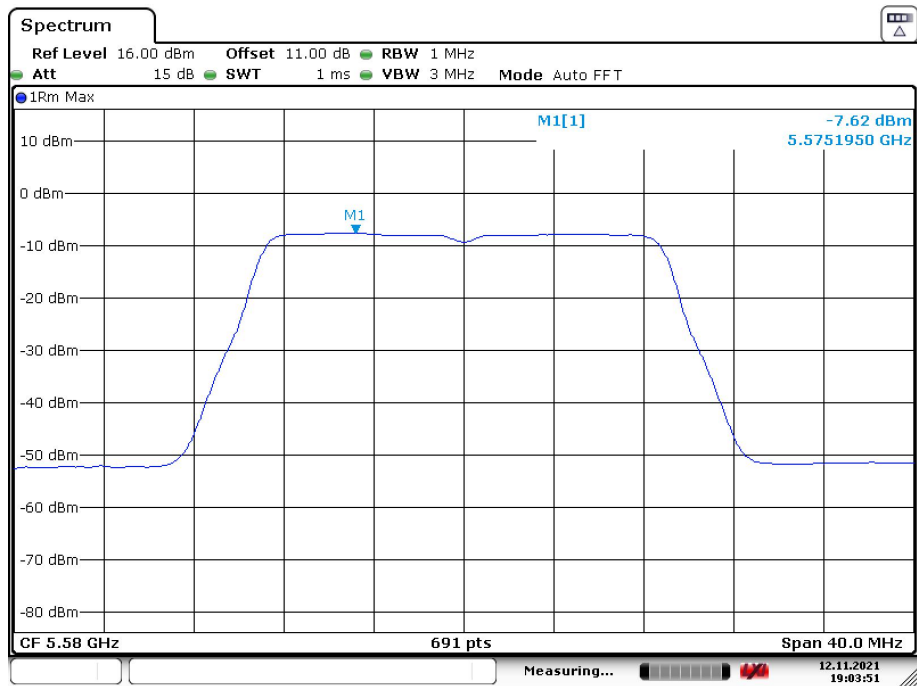
Date: 12.NOV.2021 19:04:46

## 802.11n20 mode, Power Spectral Density, 5500 MHz



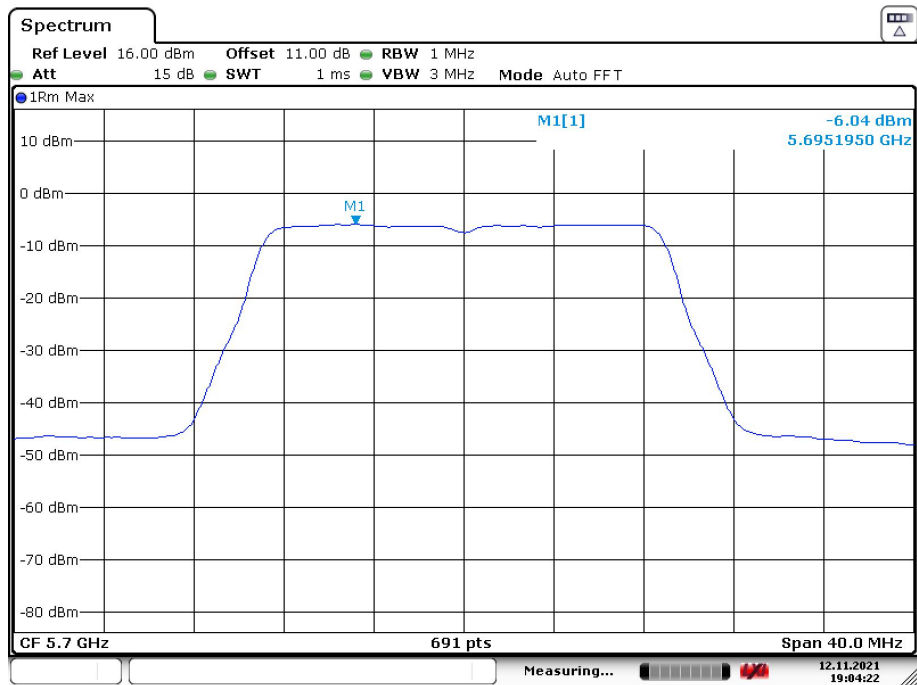
Date: 12.NOV.2021 19:02:30

## 802.11n20 mode, Power Spectral Density, 5580 MHz



Date: 12.NOV.2021 19:03:52

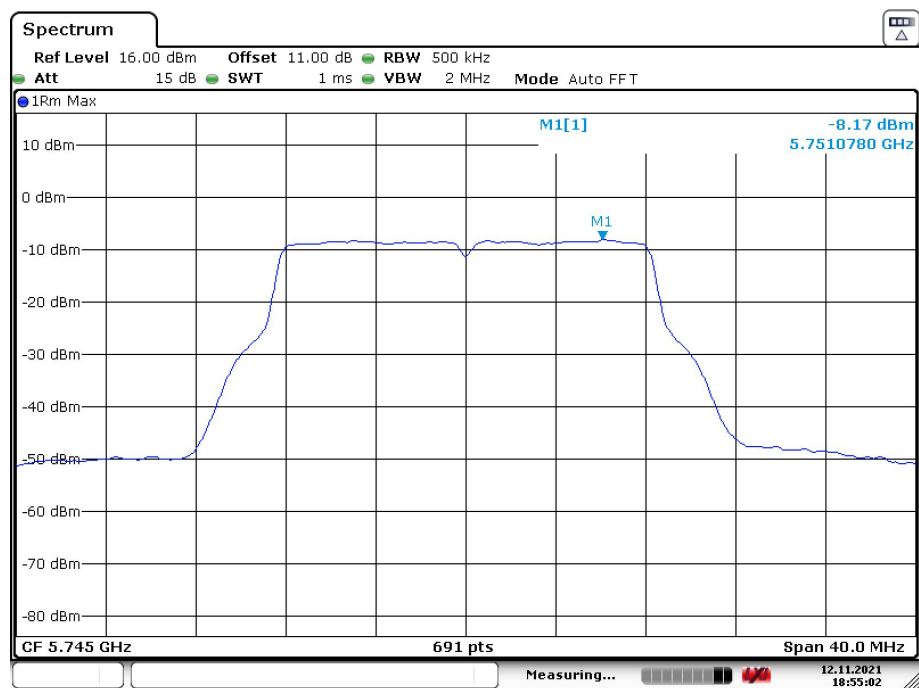
## 802.11n20 mode, Power Spectral Density, 5700 MHz



Date: 12.NOV.2021 19:04:22

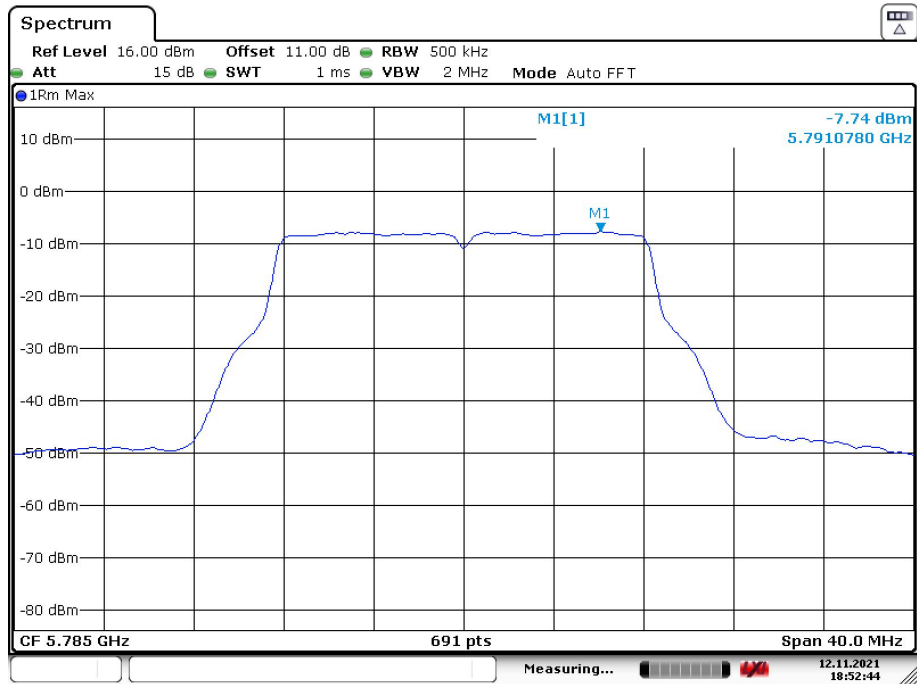
**5725 MHz – 5850 MHz:**

Frequency (MHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500KHz)
802.11a		
5745	-8.17	30
5785	-7.74	
5825	-7.69	
802.11n20		
5745	-8.52	30
5785	-8.22	
5825	-8.26	

**802.11a mode, Power Spectral Density, 5745 MHz**

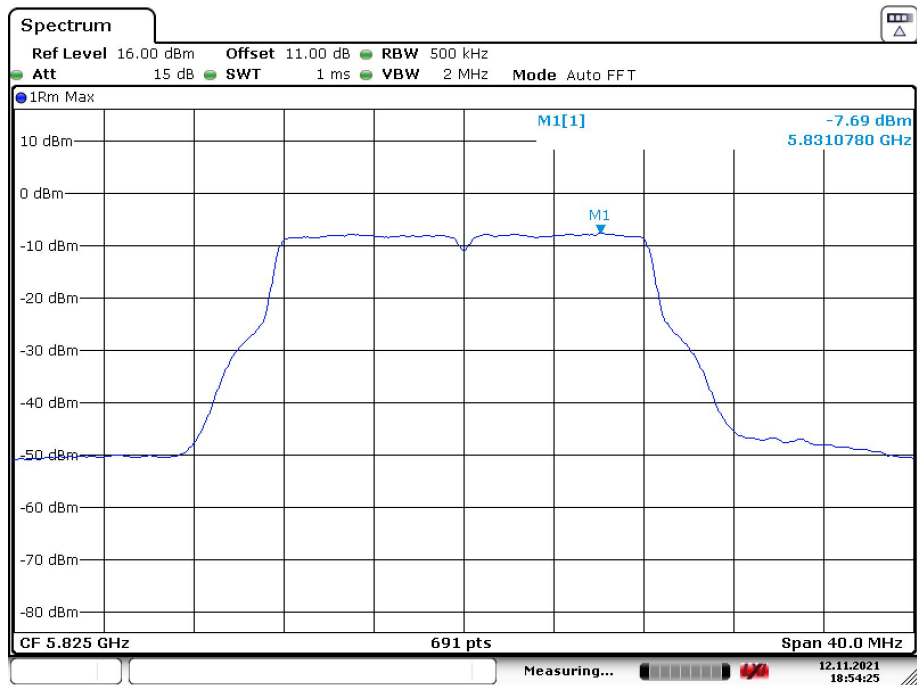
Date: 12.NOV.2021 18:55:02

## 802.11a mode, Power Spectral Density, 5785 MHz



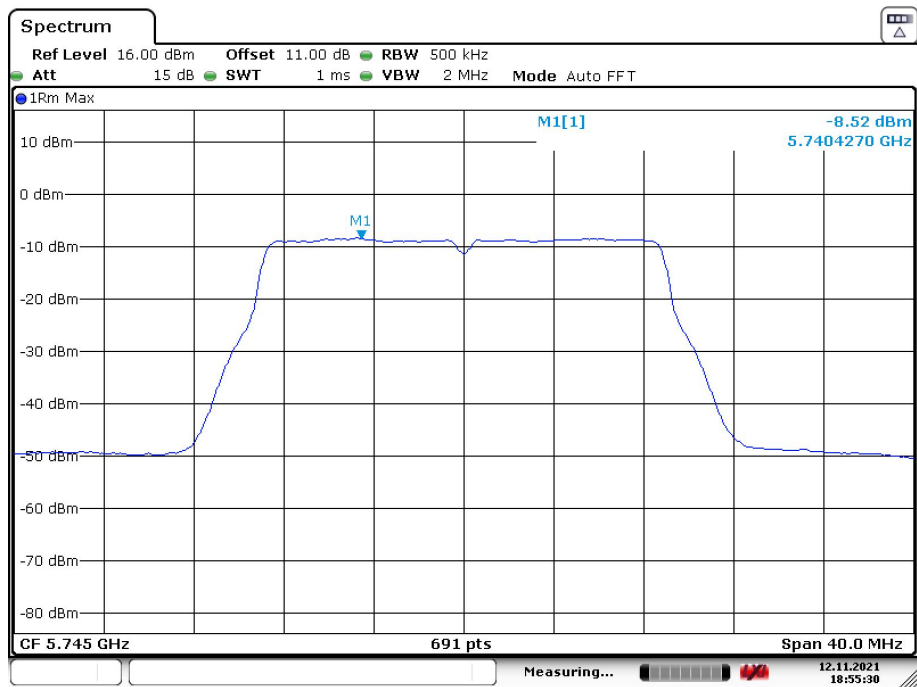
Date: 12.NOV.2021 18:52:44

## 802.11a mode, Power Spectral Density, 5825 MHz



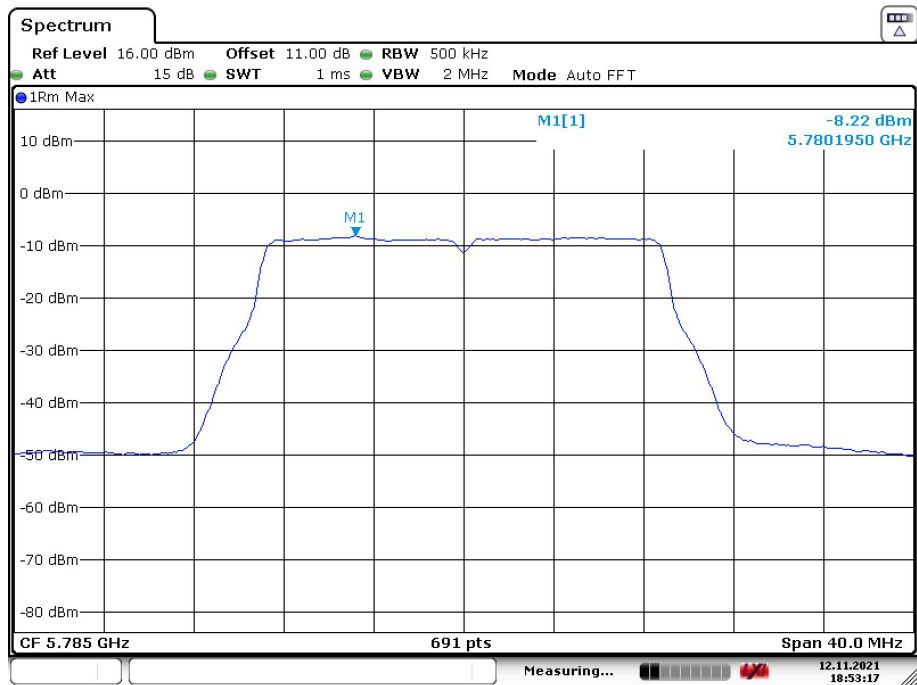
Date: 12.NOV.2021 18:54:25

## 802.11n20 mode, Power Spectral Density, 5745 MHz



Date: 12.NOV.2021 18:55:30

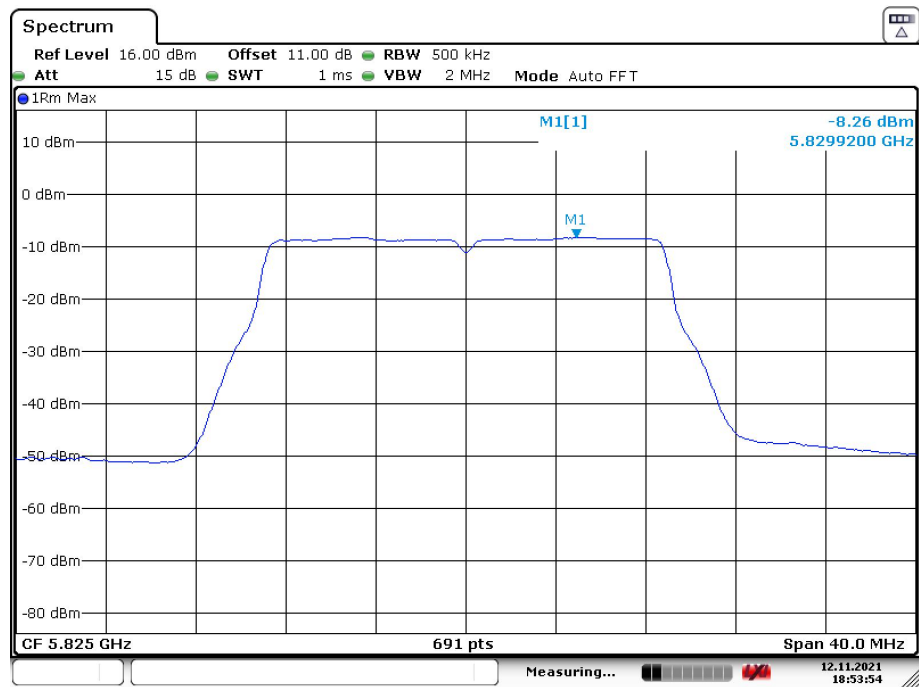
## 802.11n20 mode, Power Spectral Density, 5785 MHz



Date: 12.NOV.2021 18:53:17



## 802.11n20 mode, Power Spectral Density, 5825 MHz



Date: 12.NOV.2021 18:53:54

## **RSS-247 §6.4 - ADDITIONAL REQUIREMENTS**

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### **Applicable Standard**

According to RSS-247 Clause 6.4 Additional requirement

The following requirements shall apply:

- a. The device shall automatically discontinue transmission in cases of absence of information to transmit, or operational failure. A description on how this is done shall accompany the application for equipment certification. Note that this is not intended to prohibit transmission of control or signalling information or the use of repetitive codes where required by the technology.
- b. All LE-LAN devices must contain security features to protect against modification of software by unauthorized parties.

Manufacturers must implement security features in any digitally modulated devices capable of operating in any of the frequency ranges within the 5 GHz band, so that third parties are not able to reprogram the device to operate outside the parameters for which the device was certified. The software must prevent the user from operating the transmitter with operating frequencies, output power, modulation types or other radio frequency parameters outside those that were approved for the device. Manufacturers may use various means, including the use of a private network that allows only authenticated users to download software, electronic signatures in software or coding in hardware that is decoded by software to verify that new software can be legally loaded into a device to meet these requirements and must describe the methods in their application for equipment certification.

Manufacturers must take steps to ensure that DFS functionality cannot be disabled by the operator of the LE-LAN device.

- c. The user manual for LE-LAN devices shall contain instructions related to the restrictions mentioned in the above sections, namely that:
  - i. the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;[Footnote4](#)
  - ii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
  - iii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate; and
  - iv. where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

**Result****Pass**

RSS-247 Clause 6.4 a):

The device shall automatically discontinue transmission in cases of absence of information to transmit, or operation failure. Please refer to declaration.

RSS-247 Clause 6.4 b):

The device must contain security features to protect against modification of software by unauthorized parties. Please refer to declaration.

RSS-247 Clause 6.4 c):

1. the device for operation in the band 5150–5250MHz is only for indoor.
2. the device has one integral antennas for bands 5250-5350MHz and 5470-5725MHz.
3. the device has one integral antennas for band 5725-5850MHz.
4. For band 5250-5350MHz, the maximum e.i.r.p. of the device is 13.81dBm =24.04mW<200mW.

**\*\*\*\*\* END OF REPORT \*\*\*\*\***