



Prüfbericht-Nr.: Test report no.:	ULR-TC568820300000050F	Auftrags-Nr.: Order no.:	166489005 0010	Seite 1 von 108 Page 1 of 108	
Kunden-Referenz-Nr.: Client reference no.:	NA	Auftragsdatum Order date:	2020-10-08		
Auftraggeber: Client:	GE Vingmed Ultrasound AS Strandpromenaden 45, N-3183, Horten, Norway				
Prüfgegenstand: Test item:	Vscan Air CL				
Bezeichnung: Identification.:	A1				
Auftrags-Inhalt: Order content:	Testing and issue of Test Report and Grant Certificate				
Prüfgrundlage: Test specification:	FCC Part 15 Subpart E 15.407,15.207 RSS 247 Issue 2 and RSS GEN Issue 5				
Wareneingangsdatum: Date of sample receipt:	2020-03-10				
Prüfmuster-Nr & Serien-Nr.: Test sample no & serial no.:	A002935536-001 A002935536-002 & VA004000417				
Prüfzeitraum: Testing period:	2020-10-23 - 2020-10-27				
Ort der Prüfung: Place of testing:	Wireless laboratory, Bangalore				
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (India) Pvt. Ltd. 27/B,2nd cross road, Electronic city Phase1, Banglore-560100, India FCC Test Site Registration No: 496599 ISED Test Site Registration No.: 3466E-1				
Prüfergebnis*: Test result*:	Pass				
geprüft von: tested by:	genehmigt von: authorized by:				
Datum: Date: 2020-11-27			Ausstattatum: Issue date: 2020-12-11		
Stellung / Position:	Rajesh M Gowda Engineer	Stellung / Position:	Mahammadgouse Kaladagi Assistant Manager		
Sonstiges / Other:	FCC ID: YOM-VSCANAIR IC ID: 9136A-VSCANAIR				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht	5 = mangelhaft N/T = nicht
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested	5 = poor N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.					

Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882030000050F

Seite 2 von 108
Page 2 of 108

TEST SUMMARY

Test Item	Applicable Standard		Result
	FCC	ISED	
Emission Bandwidth	15.407 (a) & (e)	RSS Gen Issue 5 Section 6.7 RSS 247 Issue 2 Section 6.2.4.1	Pass
Frequency Stability	15.407 (g)	RSS Gen Issue 5 Section 8.11	Pass
Maximum conducted output power	15.407 (a)	RSS 247 Issue 2 Section 6.2.1.1 & Section 6.2.4.1	Pass
Maximum Power spectral density	15.407 (a)	RSS 247 Issue 2 Section 6.2.1.1 & Section 6.2.4.1	Pass
Spurious Radiated Emissions & Restricted Bands of Operation	15.407 (b) / (15.205 & 15.209)	RSS 247 Issue 2 Section 6.2.1.2 & 6.2.4.2 RSS Gen Issue 5 Section 8.9 & 8.10	Pass
Conducted AC Power Lines	15.207	RSS Gen Issue 5 Section 8.8	Pass

Product Category: Electronics Testing
Test Discipline : EMC Test Facility

Prüfbericht - Nr.:
Test Report No.:

ULR-TC568820300000050F

Seite 3 von 108
Page 3 of 108

REVISION HISTORY OF THIS REPORT

Report Number	Version	Description	Issue date
ULR-TC568820300000050F	01	Initial issue of report	2020-11-27
ULR-TC568820300000050F	02	Reviewer comment updated	2020-12-11

Table of Contents

1	GENERAL REMARKS.....	5
1.1	Attachments	5
2	TEST SITES.....	6
2.1	Testing Facilities	6
2.2	List of Test and Measurement Instruments	6
3	GENERAL PRODUCT INFORMATION	7
3.1	Product Function and Intended Use	7
3.2	Ratings and System Details of Equipment under Test	7
3.3	Measurement Uncertainty:.....	8
4	TEST SET-UP AND OPERATION MODE.....	9
4.1	Principle of Configuration Selection.....	9
4.2	Test Operation and Test Software.....	10
4.3	Special Accessories and Auxiliary Equipment	10
4.4	Countermeasures to achieve EMC Compliance	10
4.5	List of frequencies	11
4.6	Report Reference.....	11
5	TEST METHODOLOGY.....	12
5.1	Conducted Spurious Emission AC Power line Test	12
5.1.1	Test Setup Configuration.....	12
5.2	Radiated Emission Test.....	13
5.2.1	Test Setup Configuration.....	13
6	TEST RESULTS.....	17
6.1	Emission Bandwidth	17
6.2	Maximum Conducted Output Power	32
6.3	Maximum Power Spectral Density.....	45
6.4	Spurious Radiated Emissions & Restricted Bands of Operation	59
7	Frequency Stability.....	103
8	Conducted Spurious Emission test on AC Power Line	105
9	LIST OF TABLES	108

1 GENERAL REMARKS

1.1 Attachments

All attachments are part of this test report and are issued in separate document

1. TEST SETUP PHOTOS
- 2: EUT EXTERNAL PHOTOS
- 3: EUT INTERNAL PHOTOS
- 4: FCC LABEL AND LABEL LOCATION
- 5: BLOCK DIAGRAM
- 6: SPECIFICATION OF EUT
- 7: SCHEMATIC DIAGRAM
- 8: BILL OF MATERIAL
- 9: USER MANUAL
- 10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

- | | |
|--|---|
| <p>1. TÜV Rheinland (India) Pvt.Ltd.,
27/B, 2nd Cross,
ElectronicCityPhase1
Bangalore – 560 100,
India</p> | <p>2. TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.
India</p> |
|--|---|

2.2 List of Test and Measurement Instruments

Table 1: List of test and measurement instruments

Equipment	Manufacturer	Model Name	Serial Number	Firmware Versions	Calibration Due Date	Periodicity	Test Facility
EMI Receiver	Rohde & Schwarz	ESU 40	100288	4.43 SP3	09.06.2021	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	LAX-10	LAX-10-800	-	16.07.2021	Yearly	
Biconical Antenna	Schwarzbeck	VHBB9124+BBA9106	9124-1208+9106-0525	-	16.01.2021	Yearly	
Log – Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	-	31/08/2021	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1944	-	17.07.2021	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-0904	-	29.01.2021	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	-	
Fully Anechoic Chamber	Albatross	-	-	-	-	-	
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	A.14.06	28.08.2021	Yearly	Antenna - Port Measurements
EMI Receiver	Rohde & Schwarz	ESW 44	101732	30-2018-0455	10.12.2020	Yearly	AC Power line conducted emission
LISN	Rohde & Schwarz	ENV 216	100022	-	05.09.2021	Yearly	
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100811	-	05.09.2021	Yearly	

Table 2: Instrument application Software versions

SL. No.	Test Type	Application software	Version
1	Radiated spurious emission measurement in SAC	EMC 32	10.60.00
2	Radiated spurious emission measurement in FAC	EMC 32	10.60.00

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

Vscan Air CL consists of a dual headed probe which integrates both, curved and linear array transducers, and an app which can be installed on Android or iOS mobile devices.

Vscan Air CL is a battery-operated software-based general-purpose ultrasound imaging system for use by qualified and trained healthcare professionals or practitioners that are legally authorized or licensed by law in the country, state or other local municipality in which he or she practices. The users may or may not be working under supervision or authority of a physician. Users may also include Medical Students working under the supervision or authority of a physician during their education / training. The device is enabling visualization and measurement of anatomical structures and fluid including blood flow.

3.2 Ratings and System Details of Equipment under Test

Table 3: Ratings and System Details as declared by the Client*

Radio Protocol	WI-FI	
Operating Frequency Range	UNII-1 _ 5150MHz to 5250MHz UNII-3 _ 5725MHz to 5825MHz	
No. of Channels	4 (Refer Table 5)	
Channel Spacing	20 MHz	
Modulation	802.11a/n: OFDM with BPSK, QPSK, 16-QAM, 64-QAM	
Maximum Measured Power (e.i.r.p)	13.59 dBm (MCS4 5240MHz)	
Number of antennas	1	
Frequency range of Antenna Gain	UNII-1 = 4.00 dBi UNII-3 = 4.68 dBi	
Antenna Type	PCB Antenna	
Supply Voltage to Product	3.6V DC Li-Ion battery	
Environmental Conditions	Storage	-40°C to + 70°C relative humidity<95%
	Operating	0°C to + 35°C relative humidity<95%
EUT Dimension	131.34 x 63.84 x 31.33 mm (L x W x H)	

***Disclaimer:** The information/data is supplied by the client and the same is considered to arrive at the final value. Any changes made apart from the specified specification, can directly impact on the tests results.

Note: Product Vscan Air CL has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, refer clause 4.6 Report reference

3.3 Measurement Uncertainty:

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

Table 4: Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
SAC, radiated measurement	±6 dB
FAC, radiated measurement	±6 dB
Temperature	±3 °C
Supply Voltages	±3 %
Time	±5 %

Note: The listed uncertainties are the worst case uncertainty for the entire range of measurements and are for the reporting purpose only and are not used in determining the PASS/FAIL of the results.

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle on low, mid and high channels.

This product operates in 2 mode (Linear and Convex) as described in the below table of this test report, these mode of operations are related to analog circuitry and do not affect the RF characteristics.

4.1.1 EUT Mode of operation

Mode	Description
Convex / Curved	Deep scanning uses curved transducer, with Wi-Fi in Tx and Rx mode and BLE is used for initial paring
Linear	Shallow scanning uses Linear transducer with Wi-Fi in Tx and Rx mode and BLE is used for initial paring
Charging mode	Probe will automatically turn off during charging, i.e. Wi-Fi and BLE are turned off

4.1.2 Following configurations are used for testing

Test cases	Mode of operation
All conducted RF test cases	Special configuration tool is used to enable the Wi-Fi and BLE continuous transmission as needed
All radiated test cases < 1 GHz	<u>Linear mode</u> , <u>Convex mode</u> and <u>charging mode</u> as defined in 4.1.1
All radiated test cases > 1 GHz	Special configuration tool is used to enable the Wi-Fi and BLE continuous transmission as needed
Powerline conducted spurious emission	<u>charging mode</u> as defined in 4.1.1

4.2 Test Operation and Test Software

Hardware Version of Vscan Air CL: GP000010 Rev7
 Hardware Version of Digital board: GP200400 Rev7
 Hardware Version of HV board: GP200401 Rev6
 Hardware Version of Analog board: GP200402 Rev5
 Hardware Version of USB flex: GP200109 Rev1

Software Version of Vscan Air: 1.0.14.289
 APP Software name: Vscan Air
 APP Software Version: 1.0.14.14997

EUT can be configured for different test conditions using calibrator tool commands
 Calibrator tool version = 0.80

Medical Device name of the probe: Vscan Air CL
 Medical Device name of the application SW (app): Vscan Air

Brand	Model	REF	Part Number
Vscan	Air for Android	Vscan Air for Android	GP000240
	Air for iOS	Vscan Air for iOS	GP000250

Wireless Charging Pad - Anker A2503
 AC/DC Power adapter - XP Power VEU10US050

4.3 Special Accessories and Auxiliary Equipment

None

4.4 Countermeasures to achieve EMC Compliance

None

4.5 List of frequencies

Frequency Band	Channel No.	Frequency (MHz)
5150–5250 MHz	36	5180
	38	5190
	46	5230
	48	5240
5725-5825 MHz	149	5745
	151	5755
	159	5795
	165	5825

Table 5: List of Wi-Fi center Frequencies

Channel used for Wi-Fi Testing

Channel Bandwidth: 20MHz

Channel Bandwidth: 40MHz

Channel Low: 5180MHz

Channel Low: 5190MHz

Channel High: 5240MHz

Channel High: 5230MHz

Channel Low: 5745MHz

Channel Low: 5755MHz

Channel High: 5825MHz

Channel High: 5795MHz

Note:

TUV Sample Identification number : A002935536-002-Radiated & SAR test Sample
A002935536-001– Conducted test Sample

4.6 Report Reference

Note: Product Vscan Air CL has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, following table lists the report numbers .

Radio Protocol	Report Number
RF test report for Wi-Fi (2.4GHz) & BLE (2.4GHz)	ULR-TC568820300000049F
RF test report for Wi-Fi (5GHz) – (This report)	ULR-TC568820300000050F
SAR test report for Wi-Fi (2.4 & 5GHz)	ULR-TC568820300000054F
RF test report for Wireless power transmission systems, Wireless charger (111 kHz to 205 kHz)	ULR-TC568820300000053F

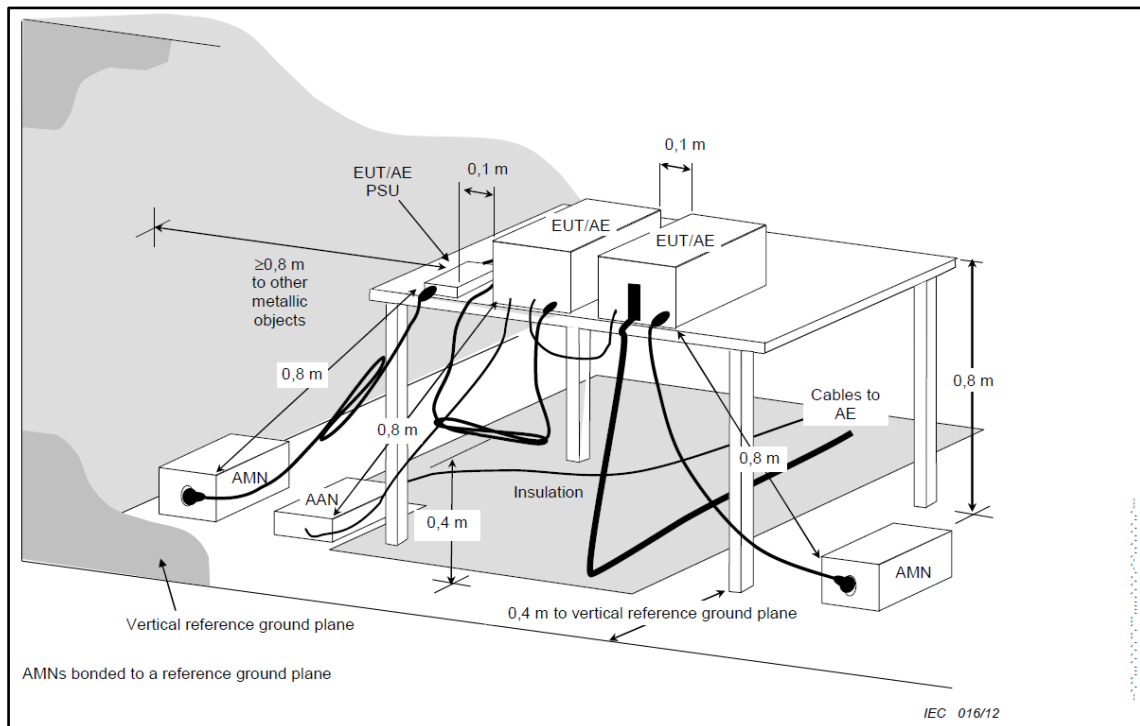
5 TEST METHODOLOGY

5.1 Conducted Spurious Emission AC Power line Test

Measured levels of ac power-line conducted emission across the 50Ω LISN port (to which the EUT is connected). All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer.

The device is placed on the test table, raised 80cm above the reference ground plane. The vertical conducting plane is located 40cm to the rear of the device. AC Conducted emission measurement is made over frequency range from 150kHz to 30MHz, this measurement was performed with EUT powered by 2 methods and both method are tested individually, one with an AC adaptor with 110V AC 60Hz supply and second with Wireless charger with supply 110V AC 60Hz.

5.1.1 Test Setup Configuration



5.2 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and measurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded

5.2.1 Test Setup Configuration

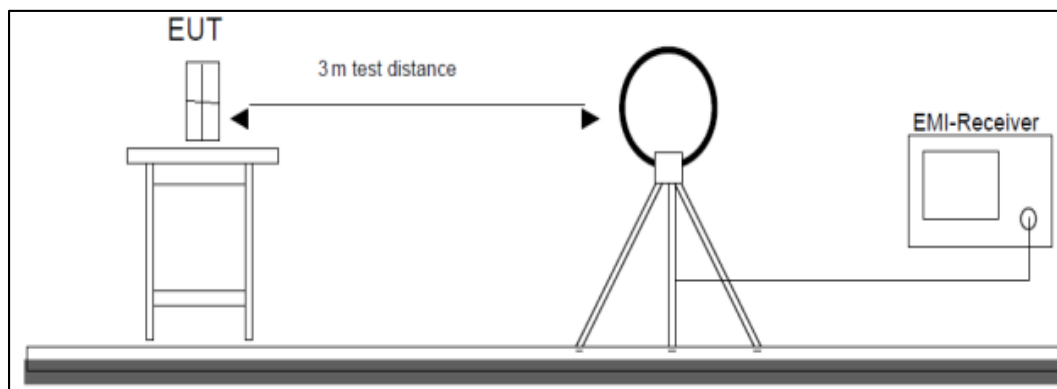


Figure 1: Frequency Range 9 kHz- 30 MHz

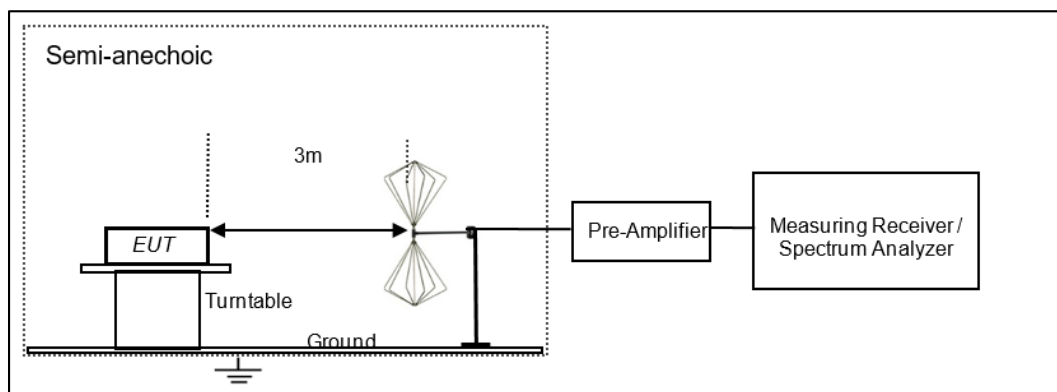


Figure 2: Frequency Range 30 MHz – 200 MHz

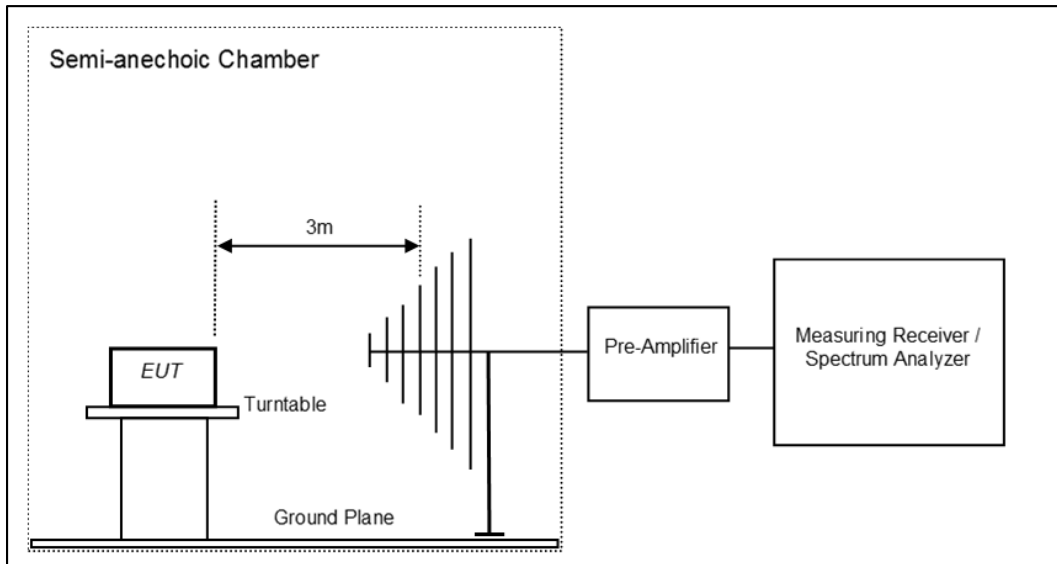


Figure 3: Frequency Range 200 MHz - 1GHz

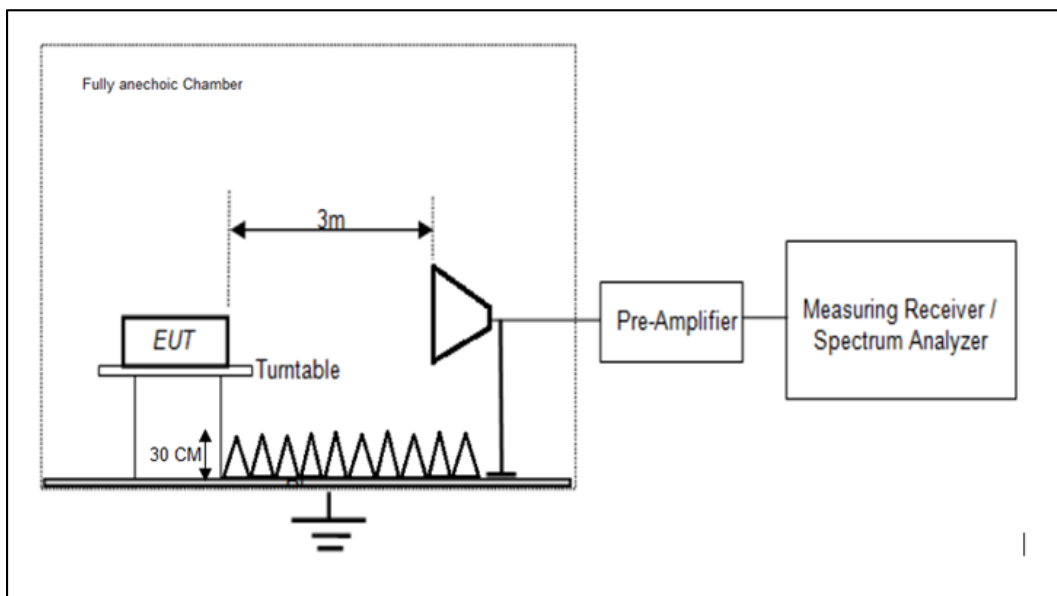


Figure 4: Frequency Range above 1 GHz

Frequency Range 30MHz to 10th harmonics of the highest fundamental frequency

Test performed as per ANSI C63.10-2013

Radiated spurious emission test are performed as below.

All the radiated emission measurements are performed in accordance with common requirement specified in 5.2 followed by substitution measurement as listed below

The equipment under test is placed on non-conductive table at 3m away from the receive antenna in accordance with above mentioned standard. Turn table is rotated through 360 degree, and receiver antenna height is varied in order to determine the level of maximum emission. The maximum emission level and position of the maximized emission is recorded with use of spectrum analyzer.

EUT power measured in a radiated test configuration using the signal (antenna) substitution techniques as per ANSI C63.10-2013 clause G.5.3

The ERP/EIRP may be determined from the power setting of a signal generator used in the signal (antenna) substitution test configuration as follows in Equation

$$ERP \text{ EIRP} = PT +GT - LC$$

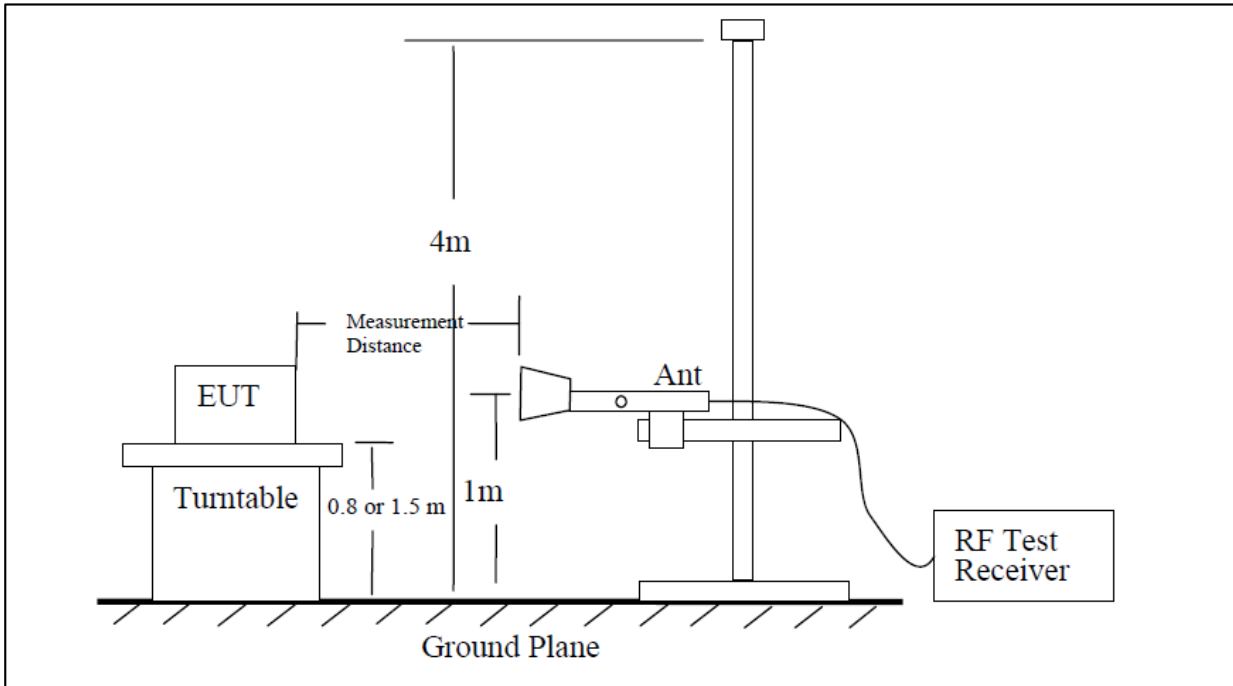
where

PSG is the power setting of the signal generator that produces the same received power reading as the DUT, in dBm, dBW, or psd

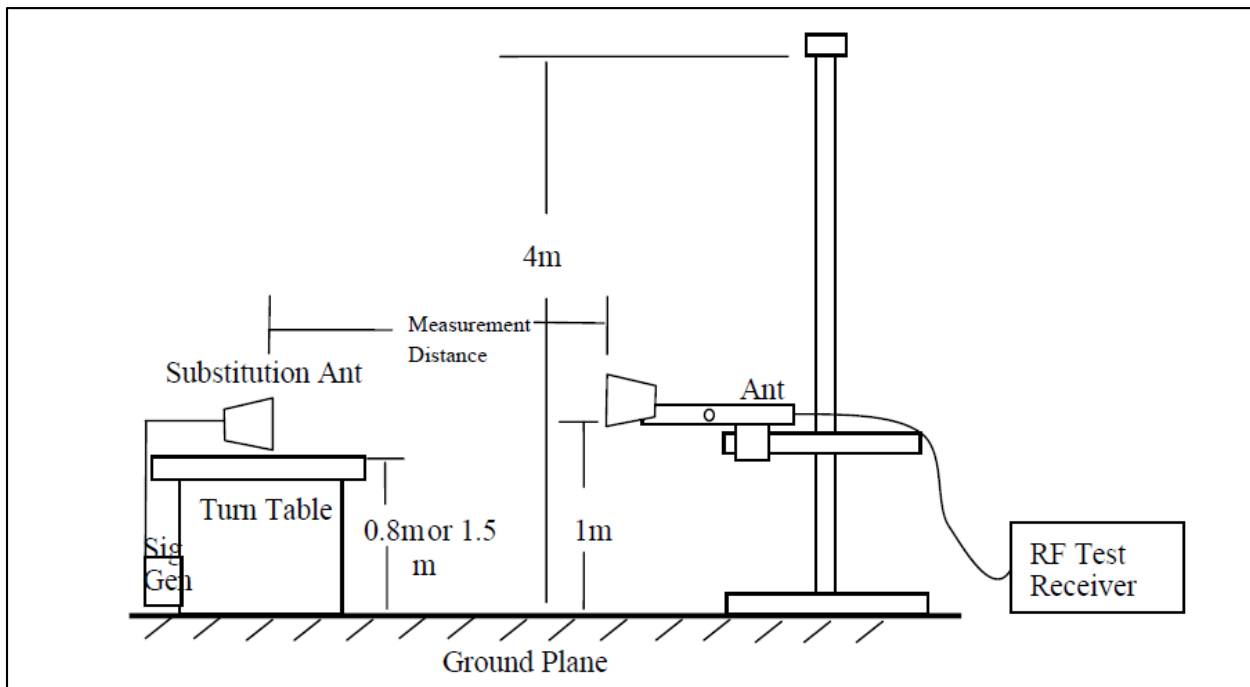
GT is the gain of the substitute antenna, in dBd (i.e., ERP) or dBi (i.e., EIRP)

LC is the signal loss in the cable connecting the signal generator to the substitute antenna, in dB

Test site-up for radiated measurements



Substitution method set-up for radiated emission



6 TEST RESULTS

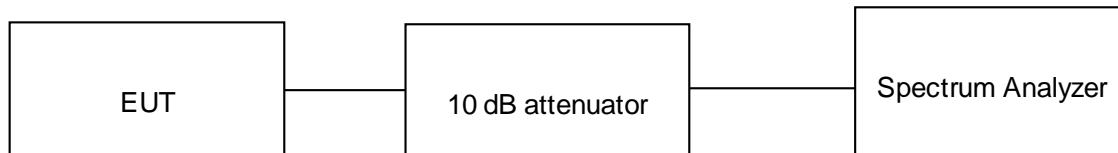
6.1 Emission Bandwidth

Result

Pass

Test Specification	FCC part 15 Subpart C 15.407 (a) & (e) / RSS 247 Issue 2, Section 6.2.4.1 & RSS Gen Issue 5, Section 6.7
Test Method	Subclause 6.9.2 of ANSI C63.10
Measurement Bandwidth	Refer Test Method below
Detector	Refer Test Method below
Port of testing	Antenna port
Requirement	<ol style="list-style-type: none"> 1. 99% emission band width measurement for reporting purpose only in the band 5150-5250 MHz 2. For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Method:



The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times the OBW
3. Set RBW = 1% to 5% of the OBW
4. Set VBW $\geq 3 \times$ RBW
5. Use the 99% power bandwidth function of the instrument
6. Use sample detector with single sweep mode, or use Peak detector and Max Hold mode (until the trace is stabilized)

The following procedure shall be used for measuring 6dB or 26dB emission bandwidth:

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times the OBW
3. Set RBW = 1% to 5% of the OBW (for 26 dB BW) & 100 kHz (for 6dB BW)
4. Set VBW $\geq 3 \times$ RBW
5. Determine the “-xx dB down amplitude” using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

Note : All the steps in measurement method of KDB 789033 D02, ANSI C63.10 section 6.9.2 & 6.9.3, RSS GEN section 6.9 are followed

Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882030000050F

Seite 18 von 108
Page 18 of 108

Test Condition:

Normal Test Condition:

Temperature (Norm) = + 25 °C Voltage = 3.6V DC Li-Ion battery Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section C & D in KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test results:

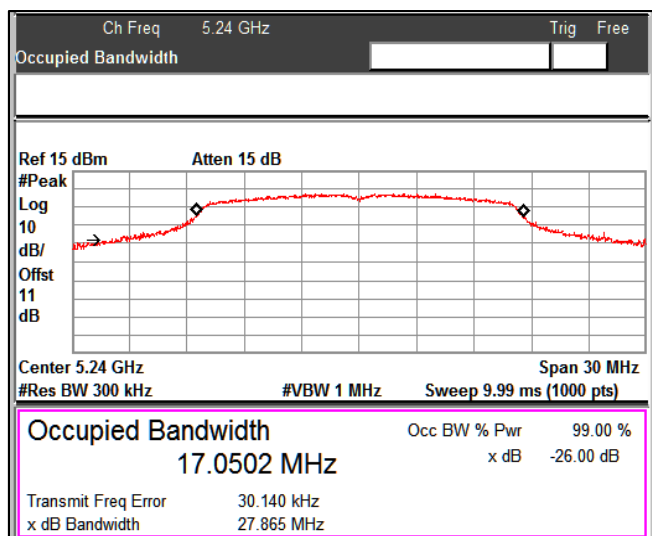
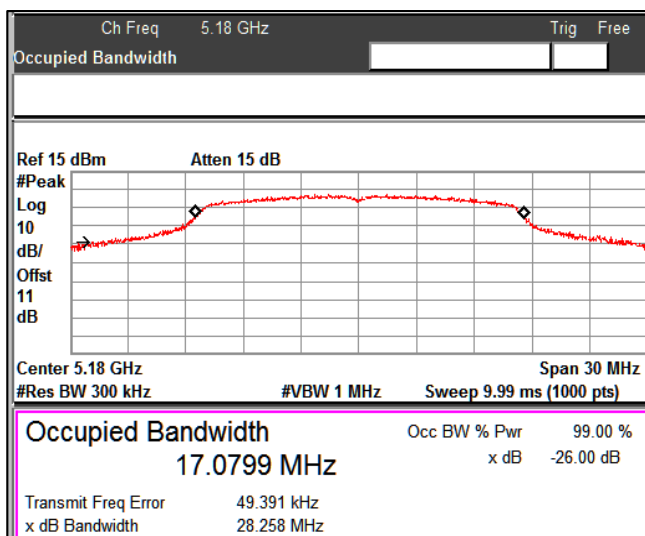
Note:

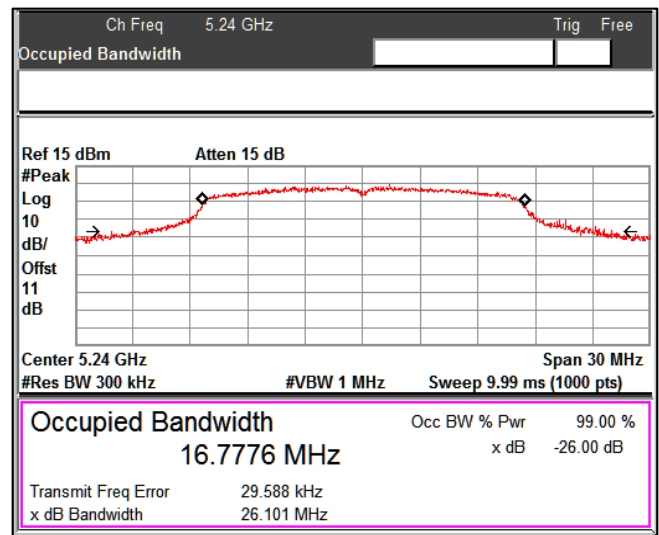
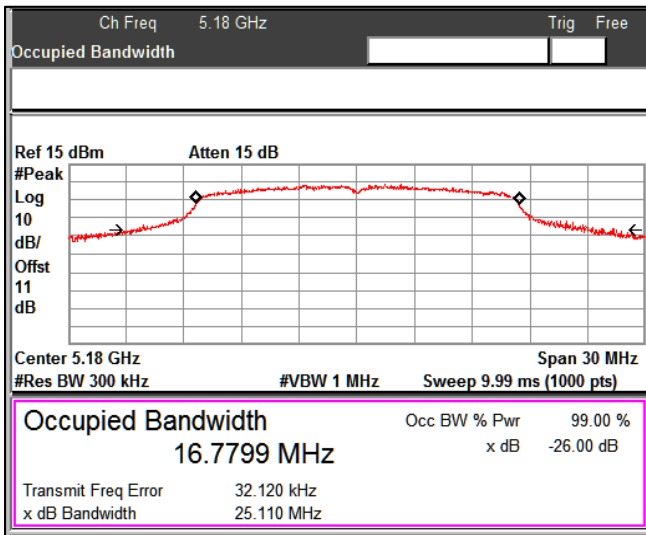
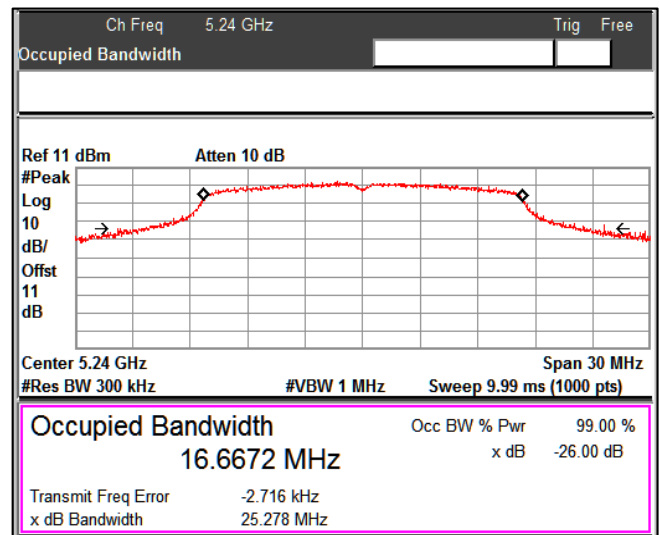
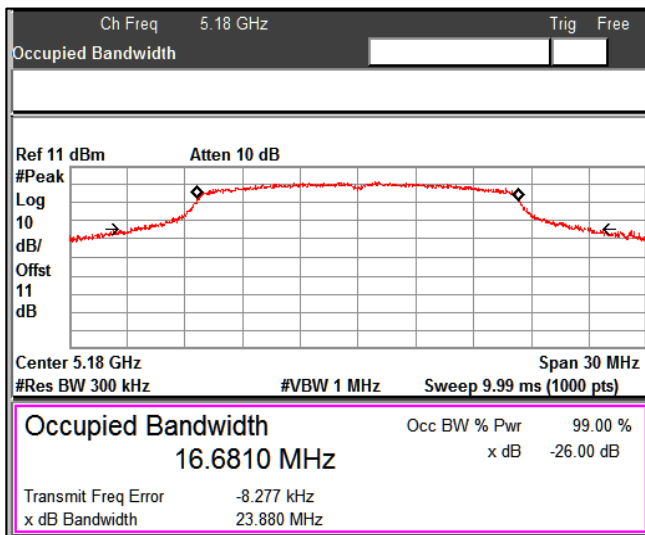
- All the losses are included during measurement and final values are mentioned in the test report.
10 dB attenuator + 1 dB Cable loss = 11 dB total offset

Modulation: 802.11a : UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
6	5180	28.58	17.07
	5240	27.86	17.05
24	5180	25.11	16.77
	5240	26.10	16.77
54	5180	23.88	16.68
	5240	25.27	16.66

Data rate: 6Mbps

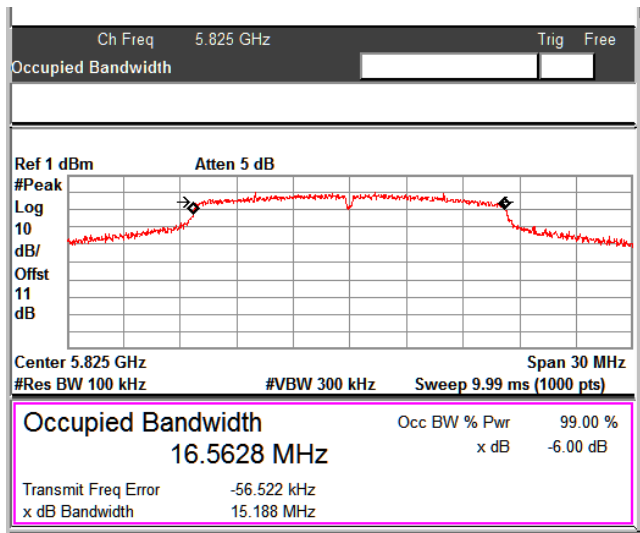
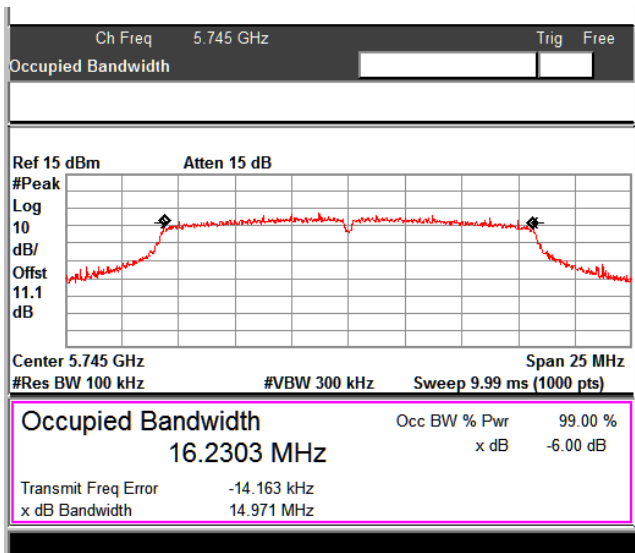


Data rate: 24Mbps

Data rate: 54Mbps


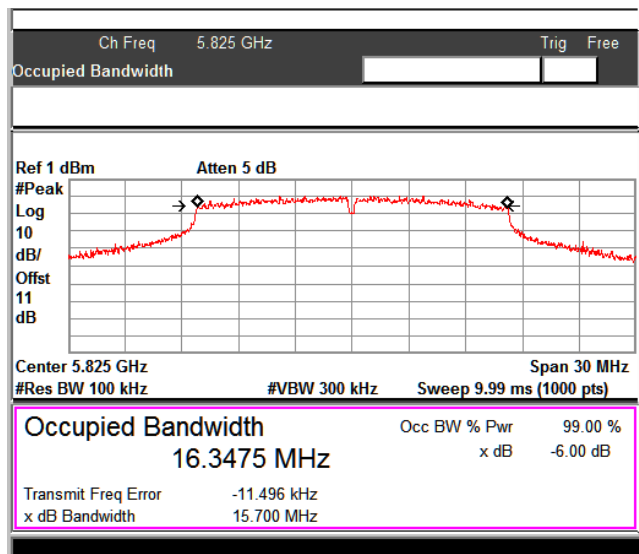
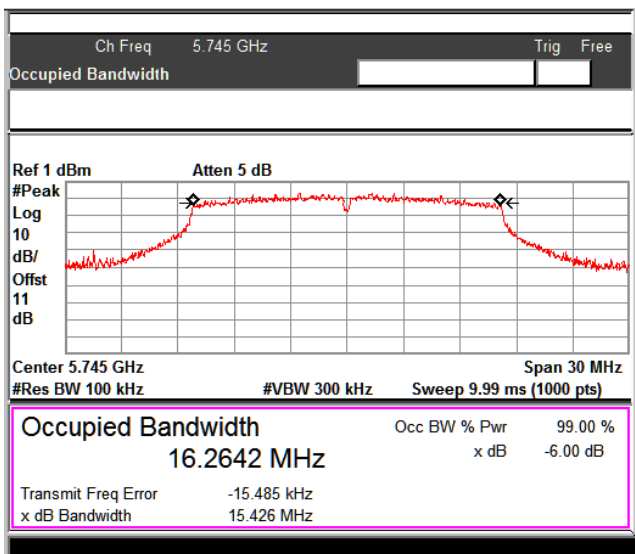
Modulation: 802.11a : UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
6	5745	14.97	0.5
	5825	15.18	0.5
24	5745	15.42	0.5
	5825	15.70	0.5
54	5745	15.65	0.5
	5825	15.39	0.5

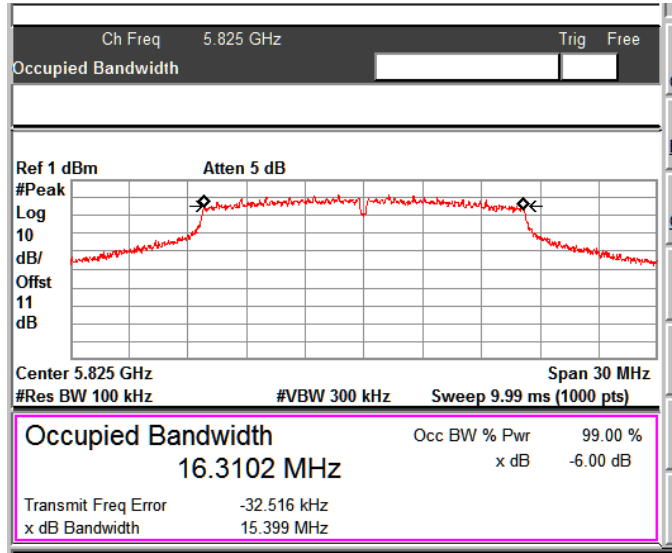
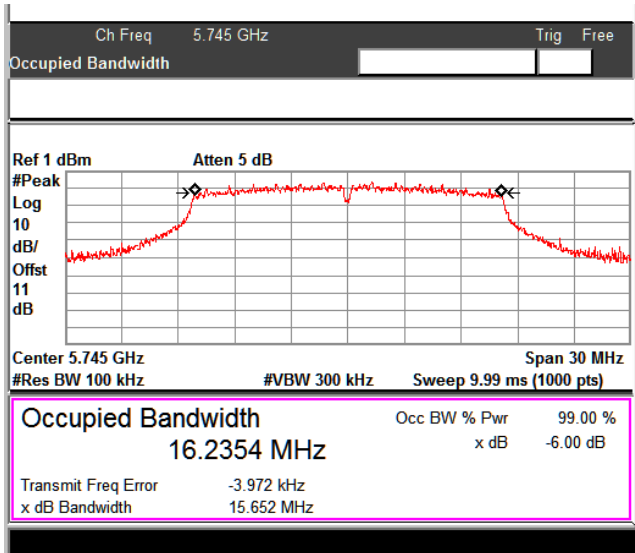
Data Rate 6 Mbps



Data Rate: 24Mbps

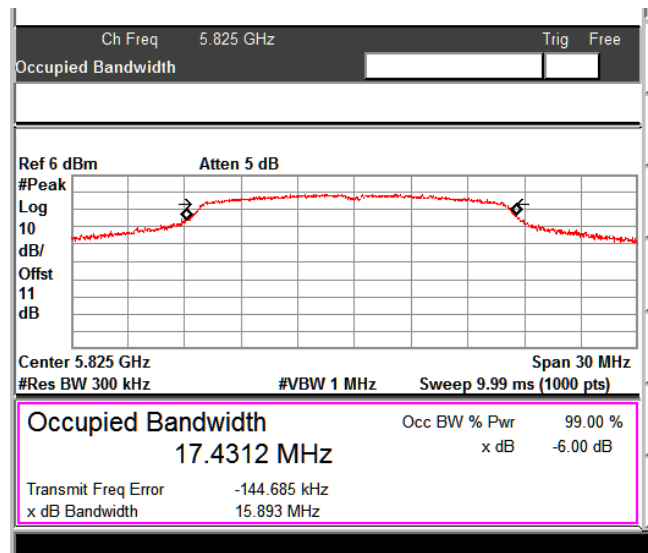
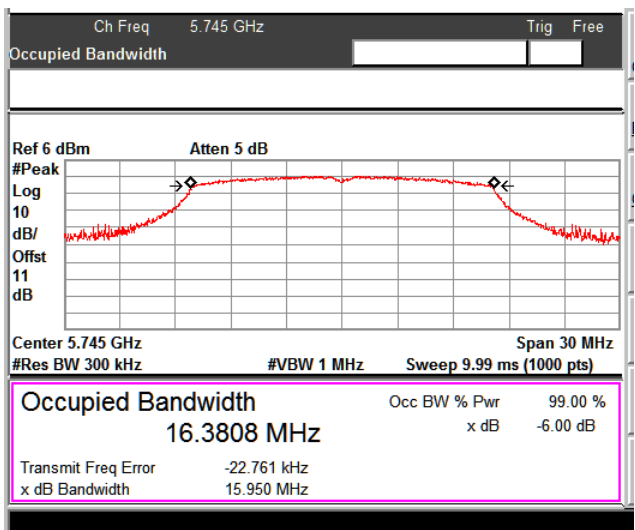


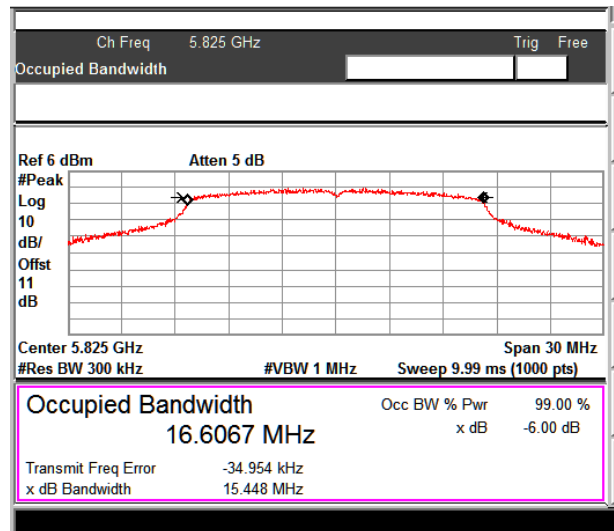
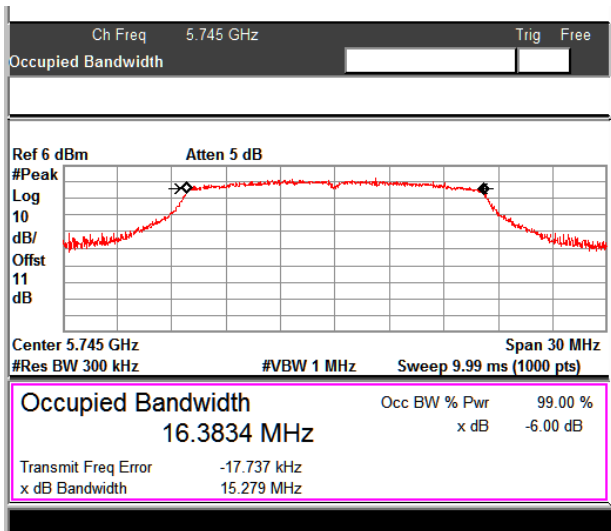
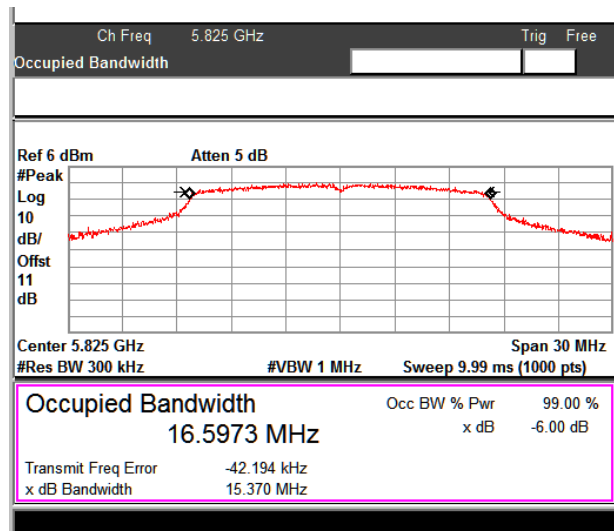
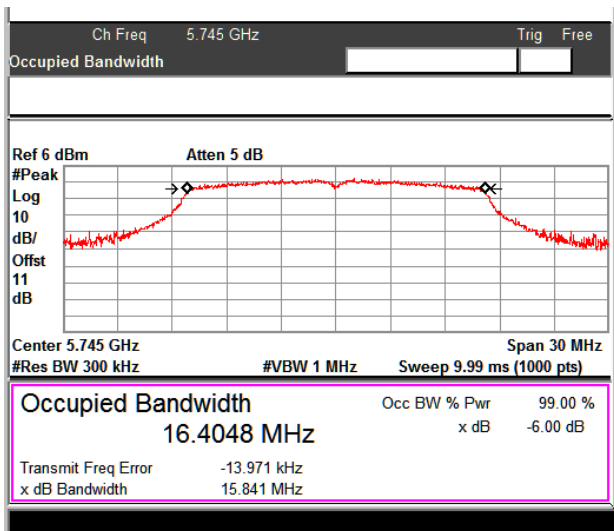
Data Rate: 54Mbps



Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
6	5745	16.38
	5825	17.43
24	5745	16.38
	5825	16.60
54	5745	16.40
	5825	16.59

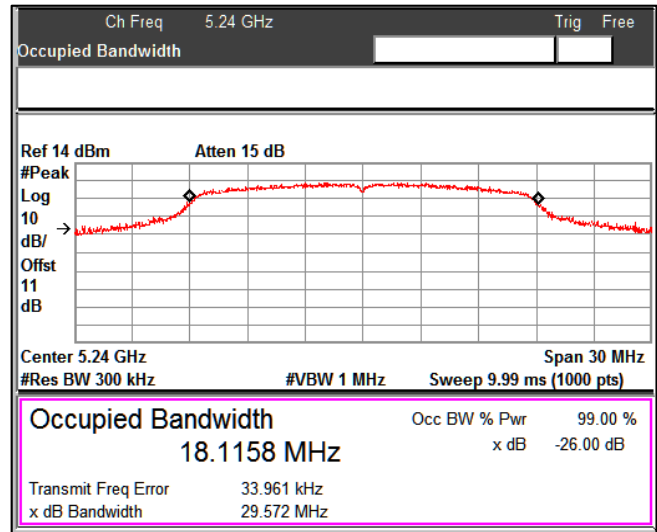
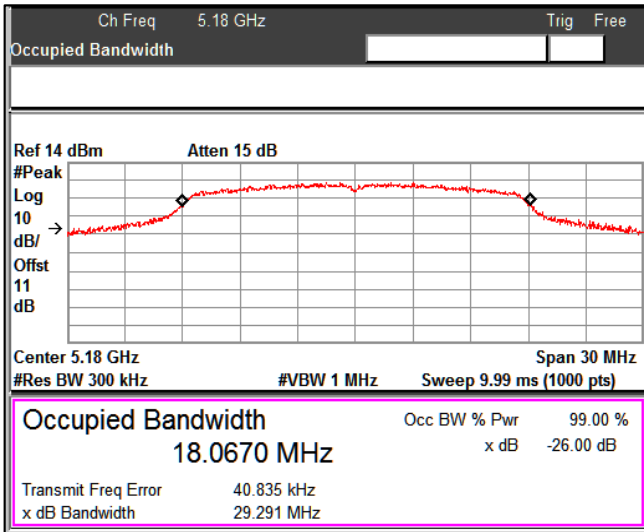
Data Rate: 6Mbps



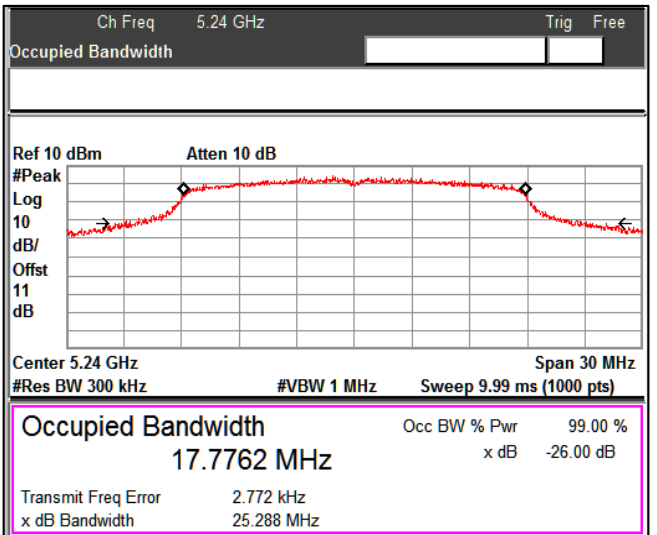
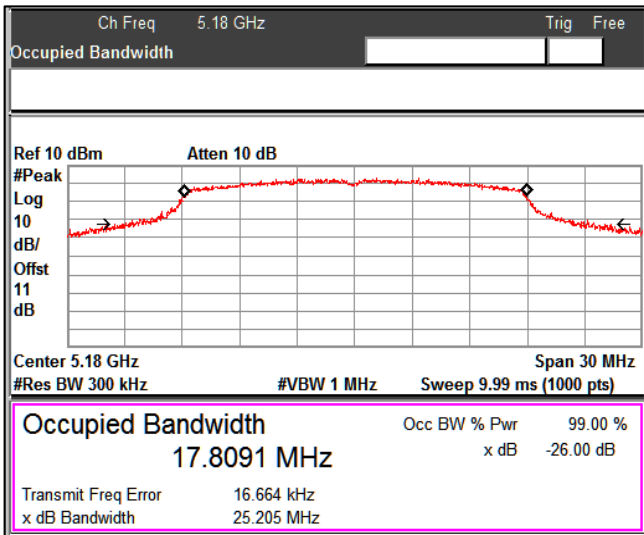
Data Rate: 24 Mbps

Data Rate: 54 Mbps

Modulation: 802.11n-20MHz : UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5180	29.29	18.06
	5240	29.57	18.11
MCS4	5180	25.20	17.80
	5240	25.28	17.77
MCS7	5180	24.50	17.41
	5240	23.28	17.72

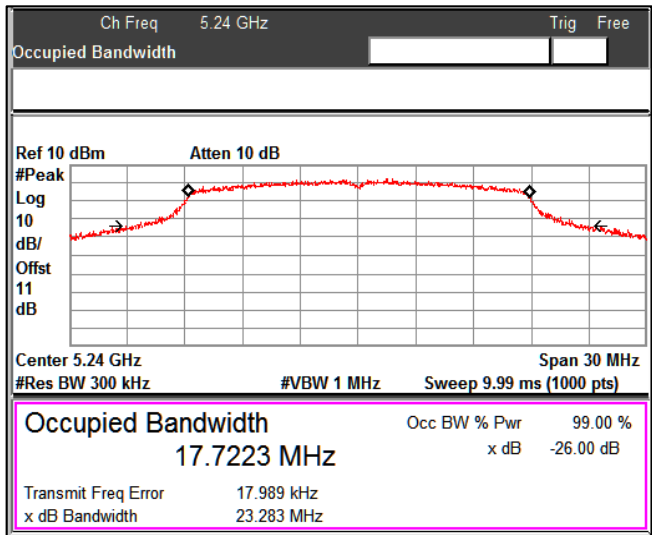
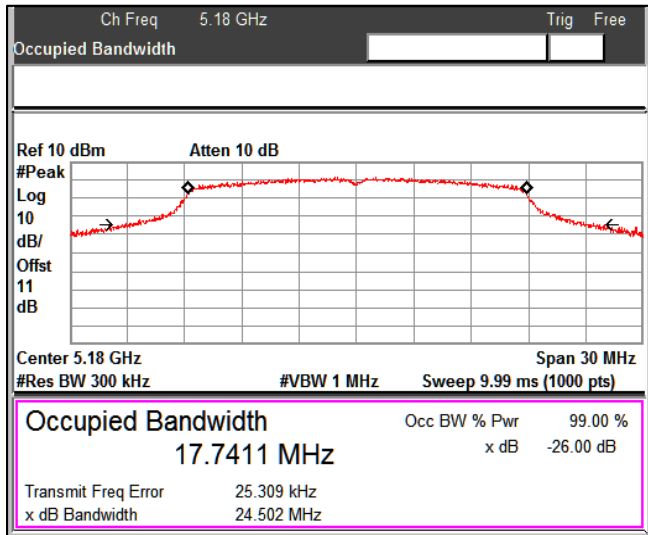
Data Rate: MCS0



Data Rate: MCS4



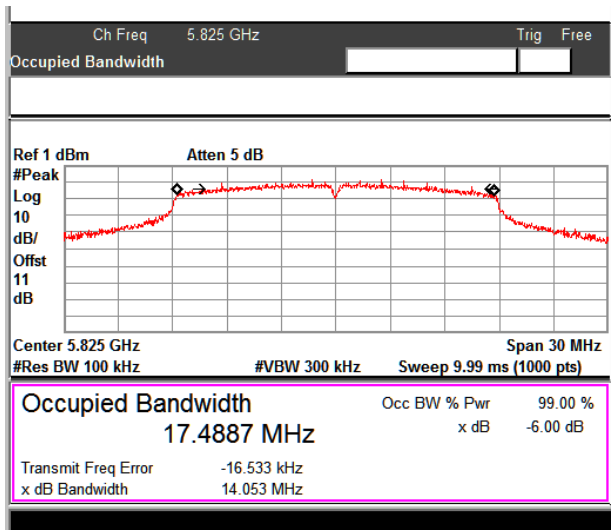
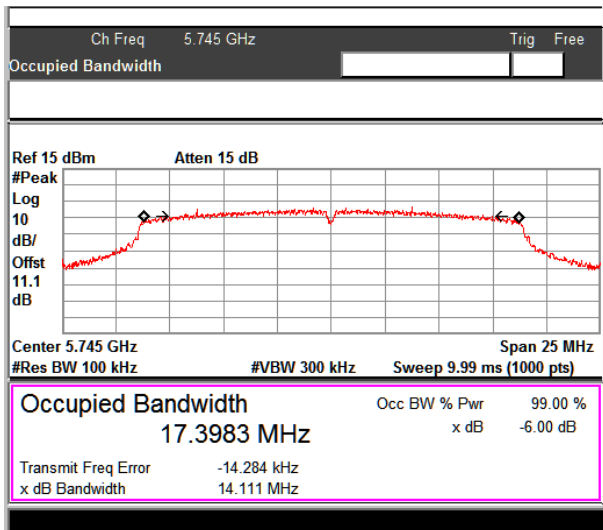
Data Rate: MSC7



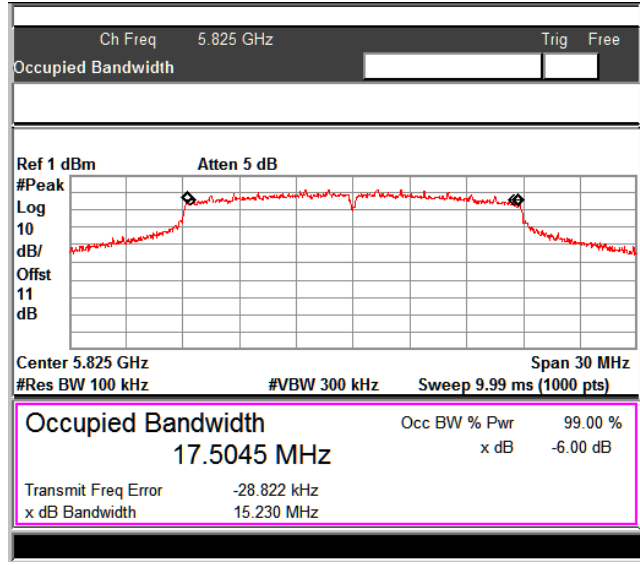
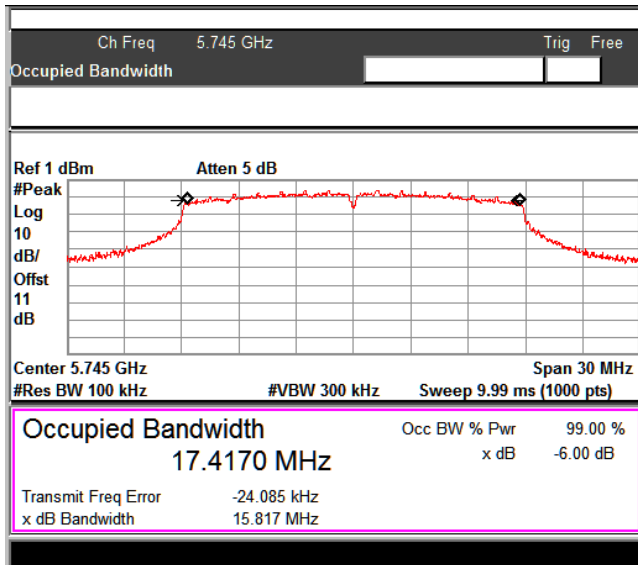
Modulation: 802.11n-20MHz : UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5745	14.11	0.5
	5825	14.05	0.5
MCS4	5745	15.81	0.5
	5825	15.23	0.5
MCS7	5745	15.15	0.5
	5825	15.59	0.5

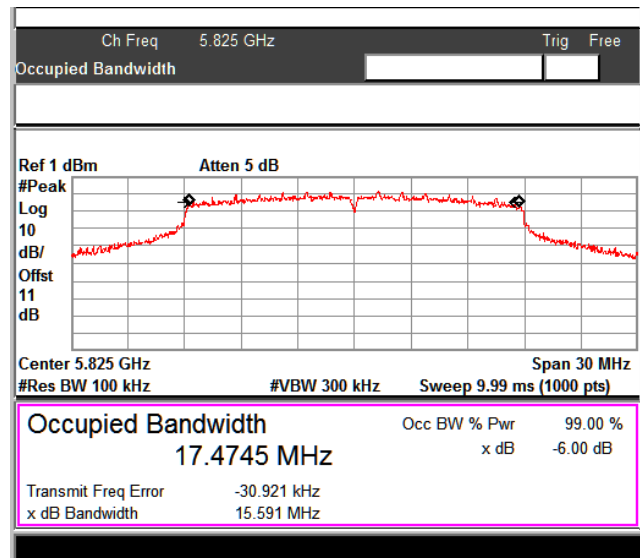
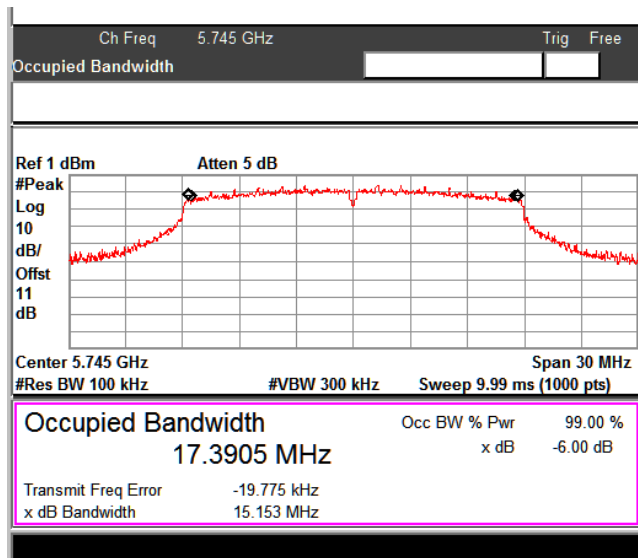
Data Rate: MCS 0



Data Rate: MCS 4

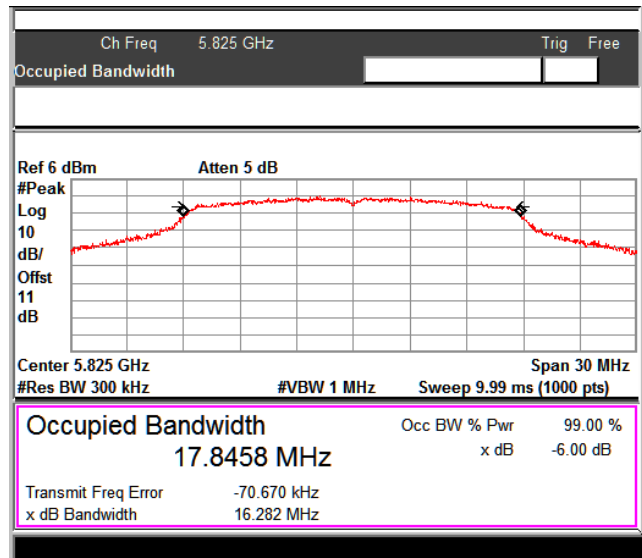
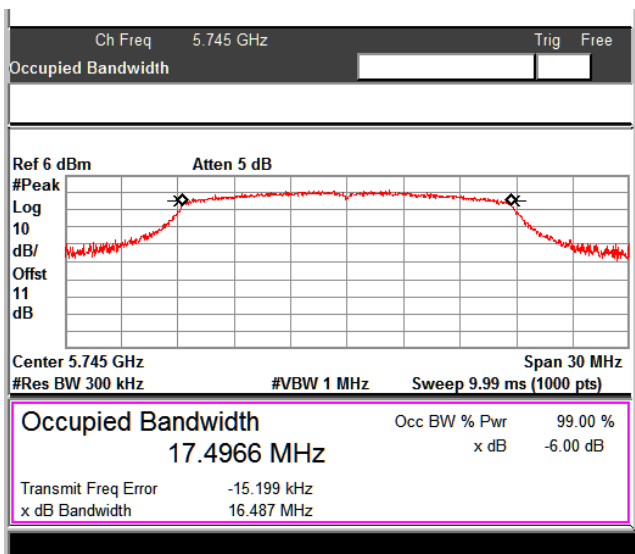


Data Rate: MCS 7

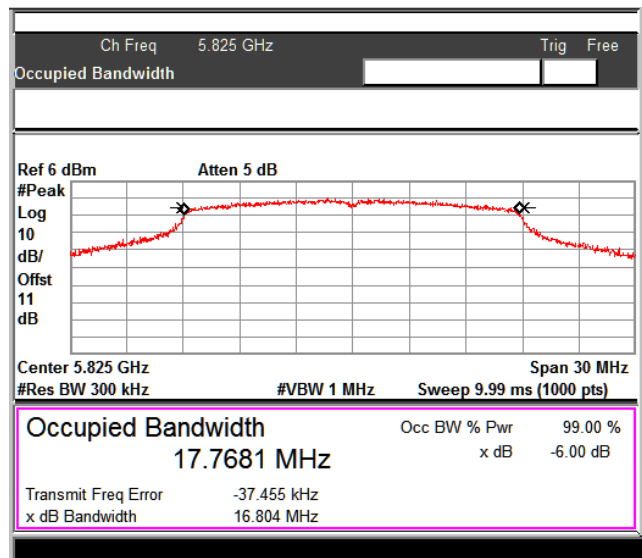
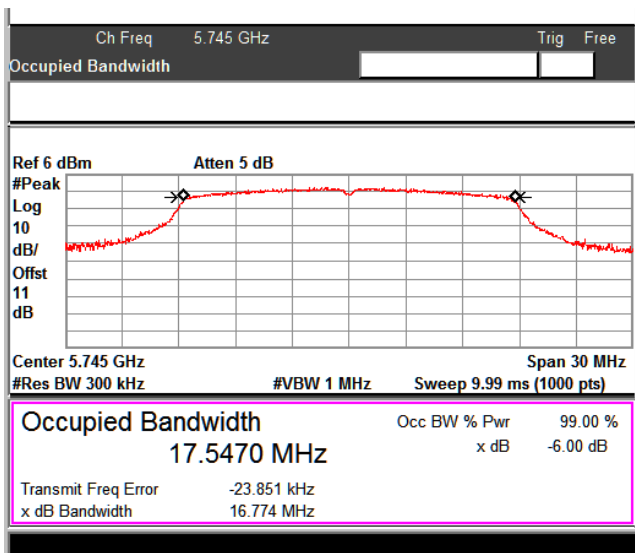


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5745	17.49
	5825	17.84
MCS4	5745	17.54
	5825	17.76
MCS7	5745	17.54
	5825	17.74

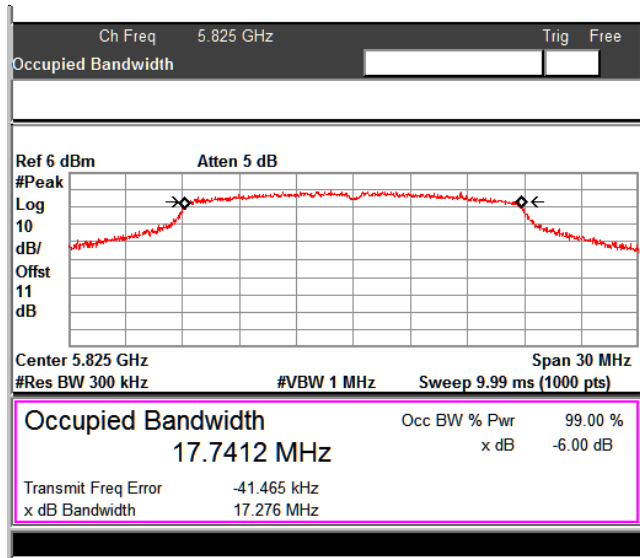
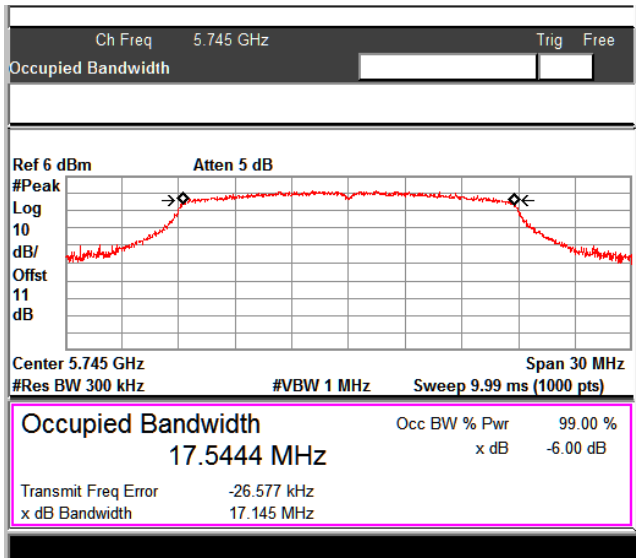
Data Rate: MCS 0



Data Rate: MCS 4



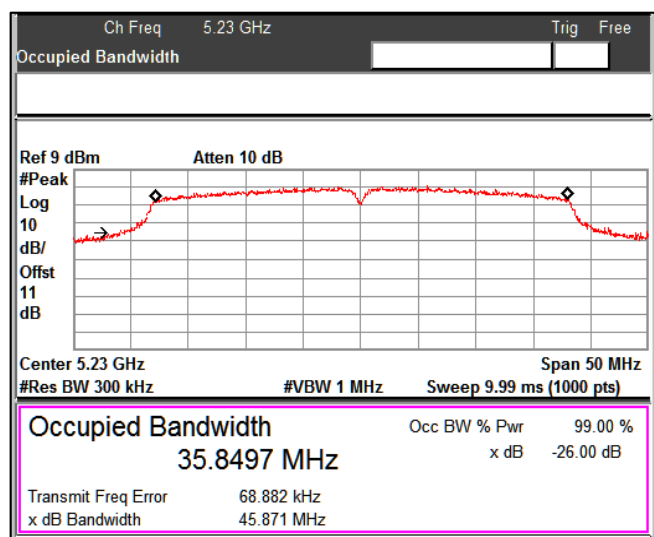
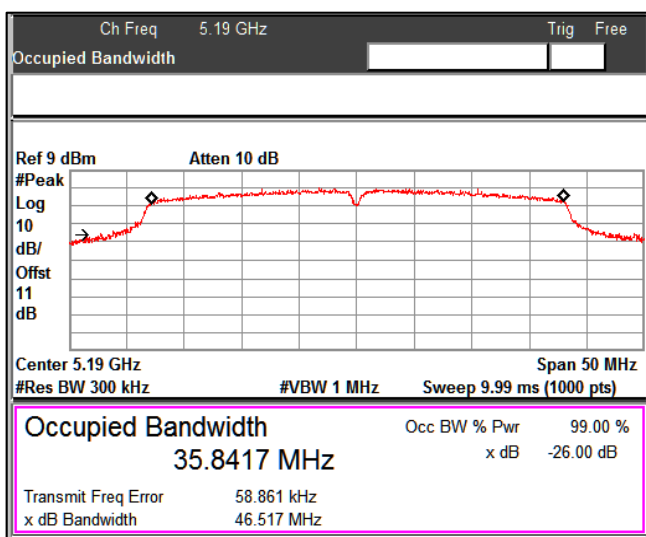
Data Rate: MCS 7

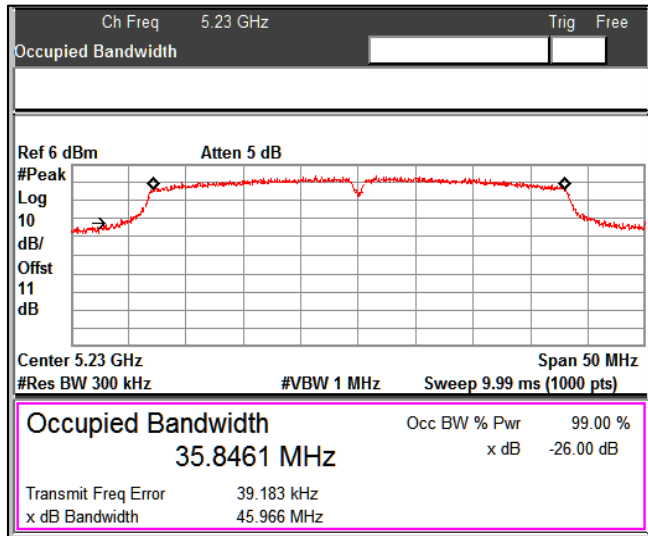
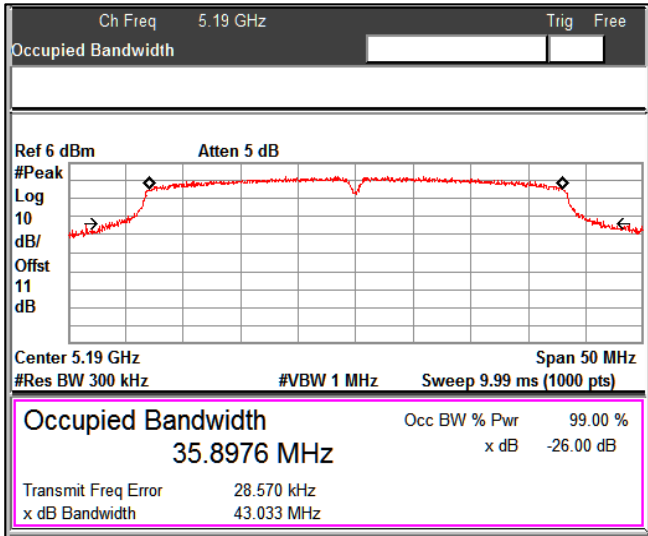
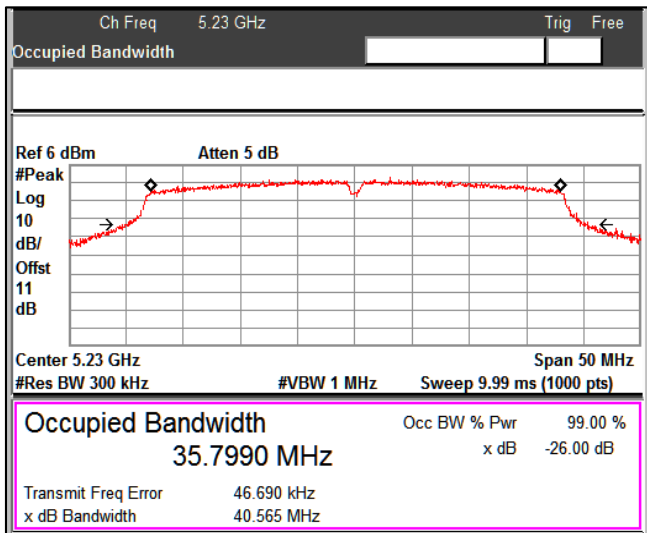
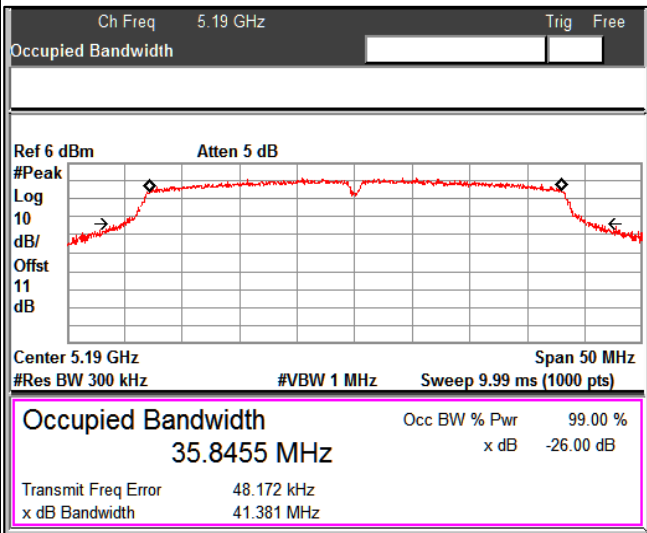


Modulation: 802.11n-40MHz: UNII 1

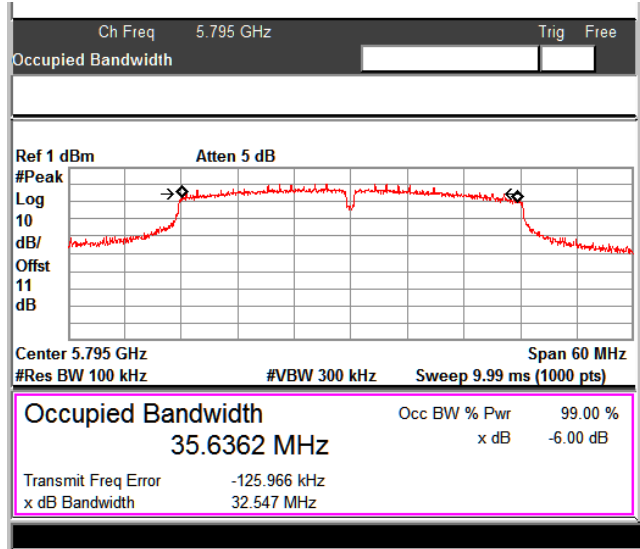
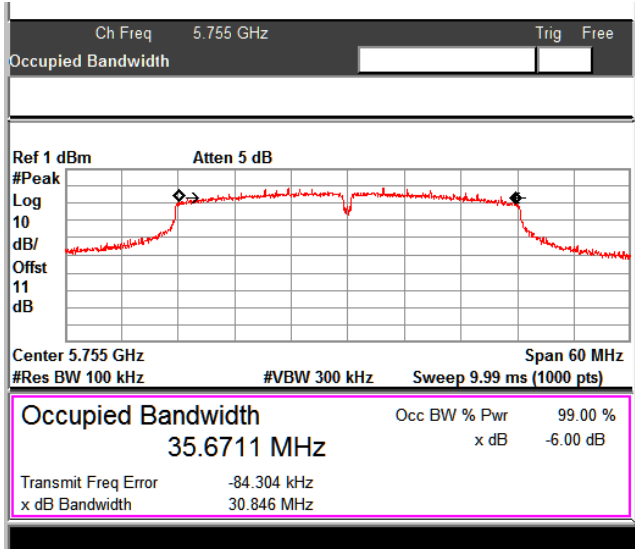
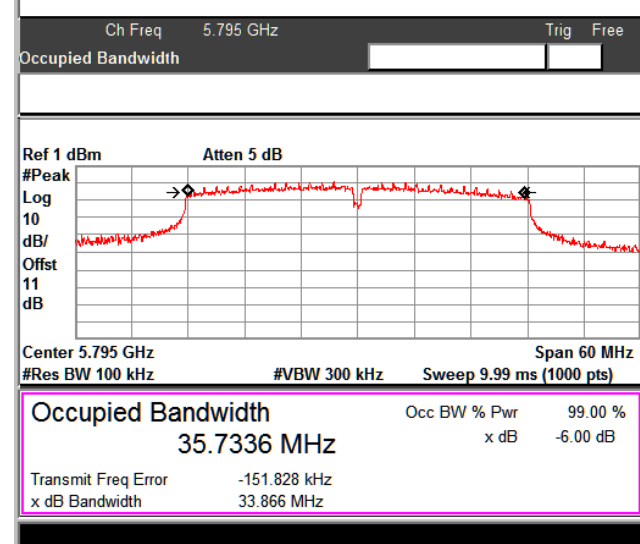
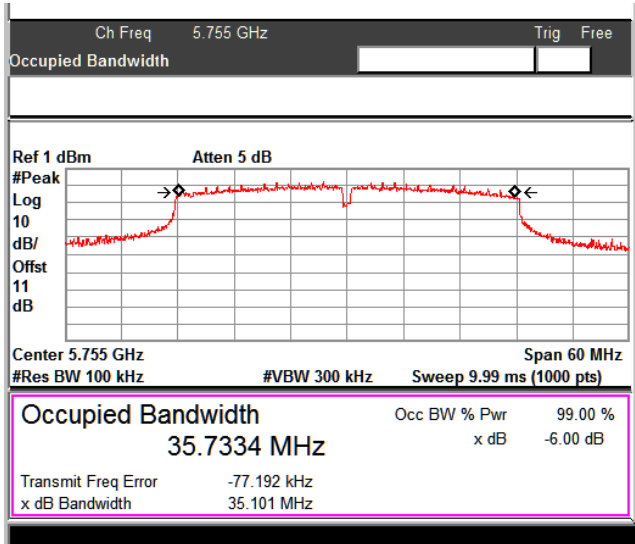
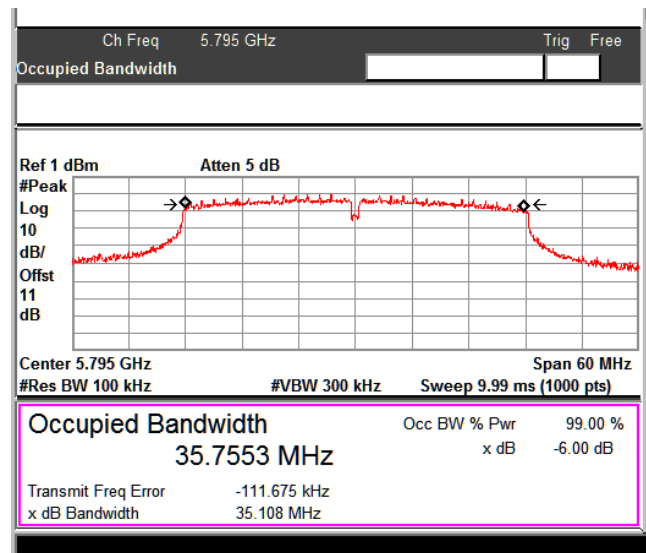
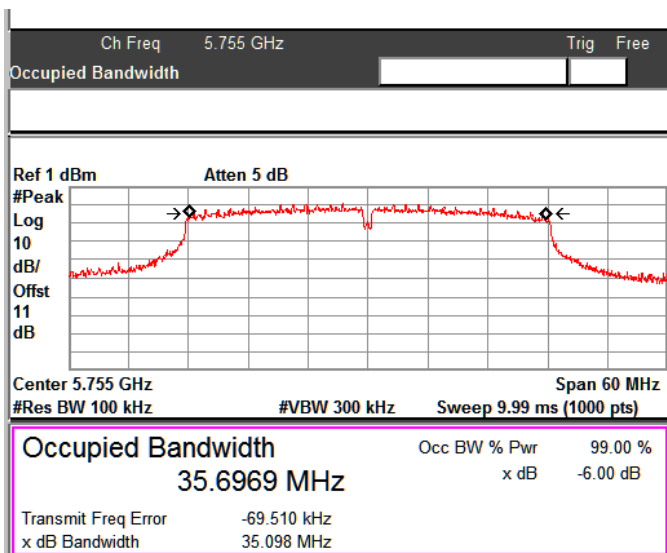
Data rate (Mbps)	Measured Frequency (MHz)	26 dB emission bandwidth (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5190	46.51	35.84
	5230	45.87	35.84
MCS4	5190	43.03	35.89
	5230	45.96	35.84
MCS7	5190	41.38	35.84
	5230	40.56	35.79

Data Rate: MCS 0



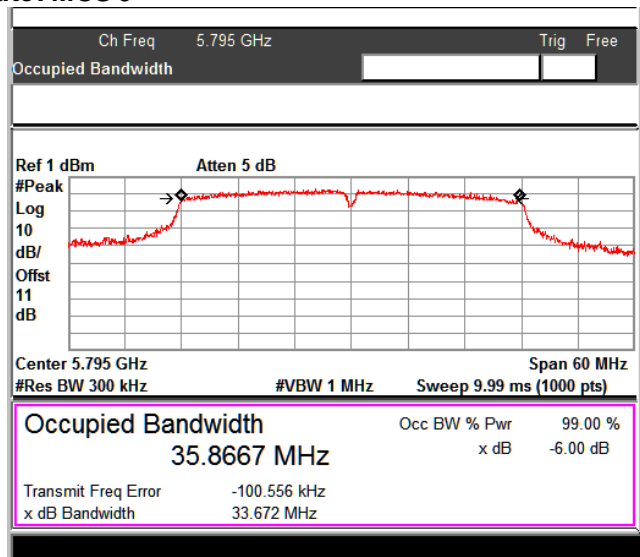
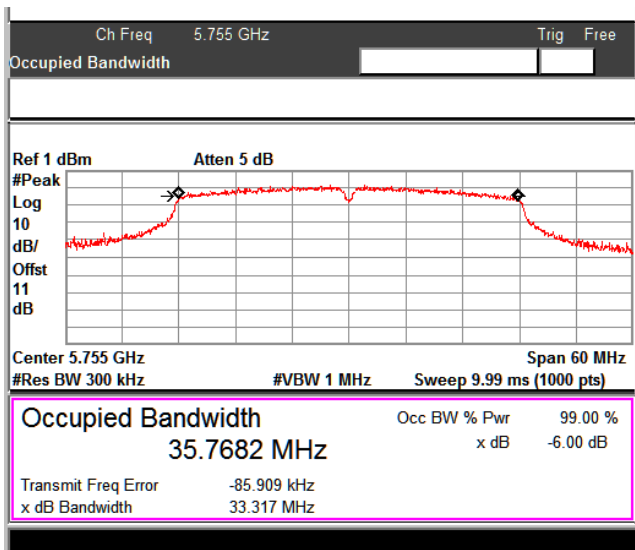
Data Rate: MCS 4

Data Rate : MCS 7

Modulation: 802.11n-40MHz: UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	6 dB emission bandwidth (MHz)	Minimum Limit (MHz)
MCS0	5755	30.84	0.5
	5795	32.54	0.5
MCS4	5755	35.10	0.5
	5795	33.86	0.5
MCS7	5755	35.09	0.5
	5795	35.10	0.5

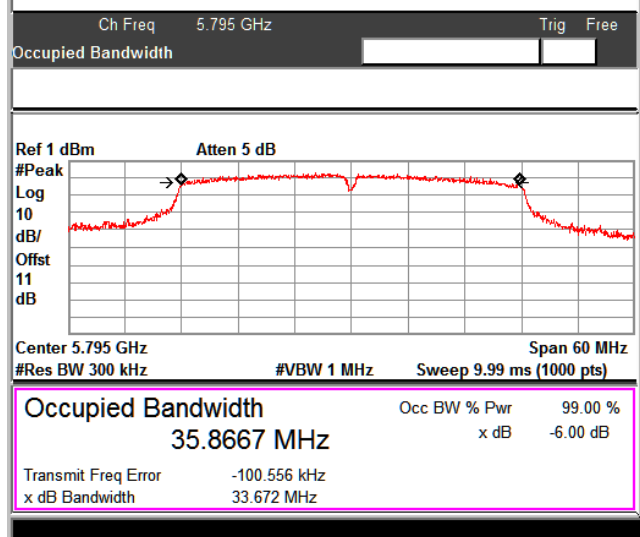
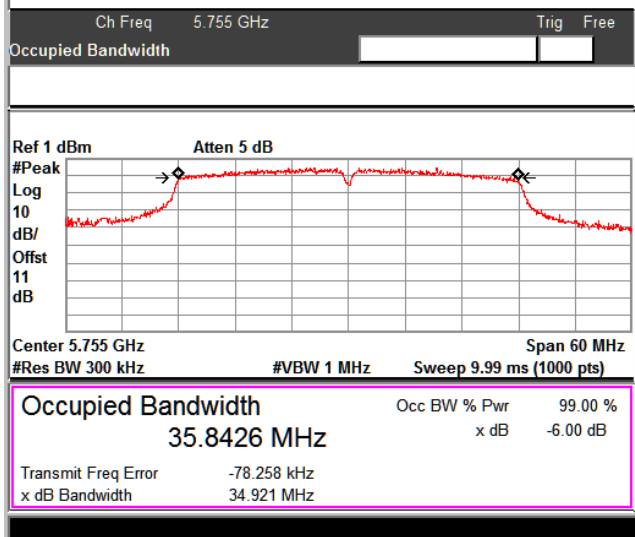
Data Rate: MCS0

Data Rate: MCS4

Data Rate: MCS7


Data rate (Mbps)	Measured Frequency (MHz)	99% Occupied Bandwidth (MHz)
MCS0	5755	35.76
	5795	35.86
MCS4	5755	35.84
	5795	35.86
MCS7	5755	35.87
	5795	35.86

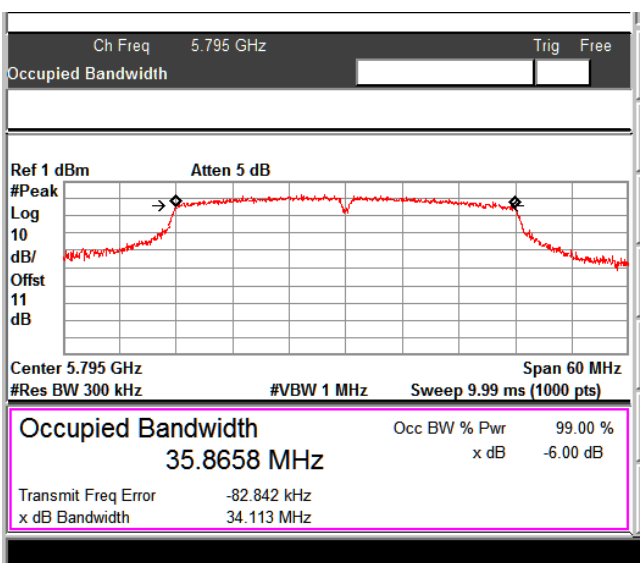
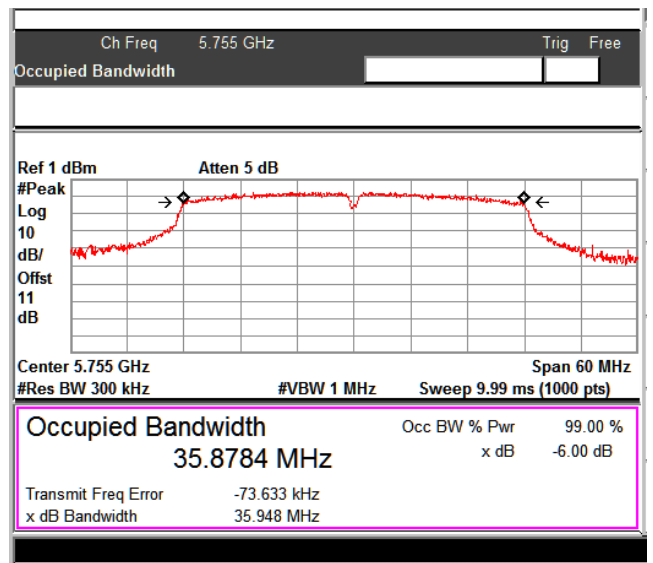
Data Rate: MCS 0



Data Rate: MCS 4



Data Rate: MCS 7



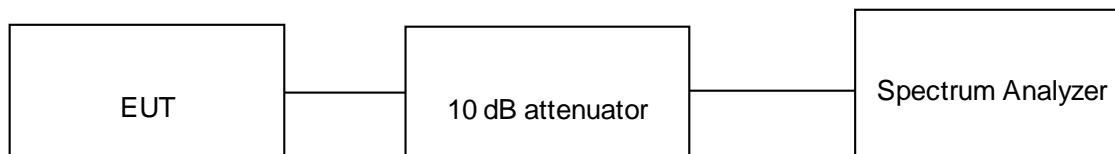
6.2 Maximum Conducted Output Power

Result

Pass

Test Specification	FCC part 15 Subpart C 15.407 (a)(1)(iv) & (a)(3) / RSS 247 Issue 2, Section 6.2.1.1 & Section 6.2.4.1
Test Method	Subclause 12.3.2.4 of ANSI C63.10
Measurement Bandwidth	Refer the remarks below
Detector	Average sample detector mode
Port of testing	Antenna port
Requirement for FCC	1. 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 2. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W
Requirement for IC	1. For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10}(B)$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz 2. For the band 5.725-5.85 GHz, The maximum conducted output power shall not exceed 1 W

Test Method



The following procedure shall be used (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

1. Set center frequency to the nominal EUT channel center frequency
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Set RBW = 1MHz
4. Set VBW $\geq 3 \times$ RBW
5. Number of points in sweep $\geq 2 \times$ span / RBW. (This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode
8. Do not use sweep triggering. Allow the sweep to "free run."
9. Trace average at least 100 traces and Compute power by integrating the spectrum across the EBW
10. Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission)

Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882030000050F

Seite 33 von 108
Page 33 of 108

Test Condition:

Normal Test Condition:

Temperature (Norm) = + 25 °C Voltage = 3.6V DC Li-Ion battery Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section E (2) sub-section (d) in KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test results:

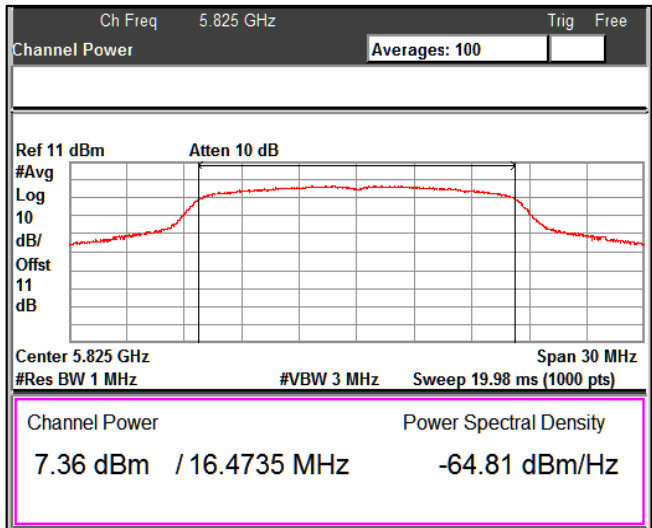
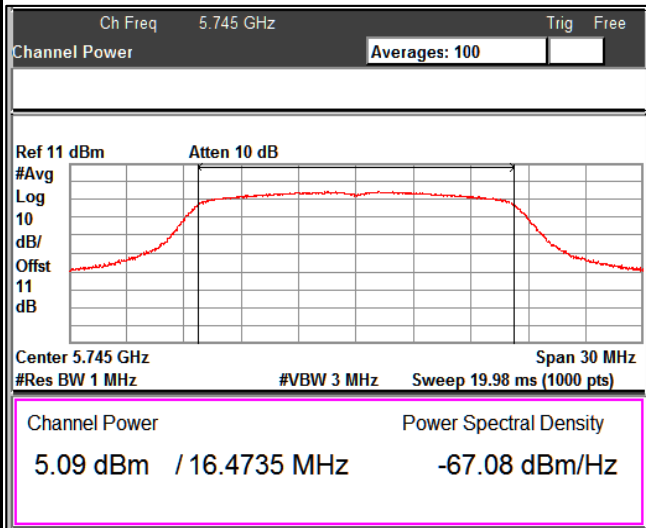
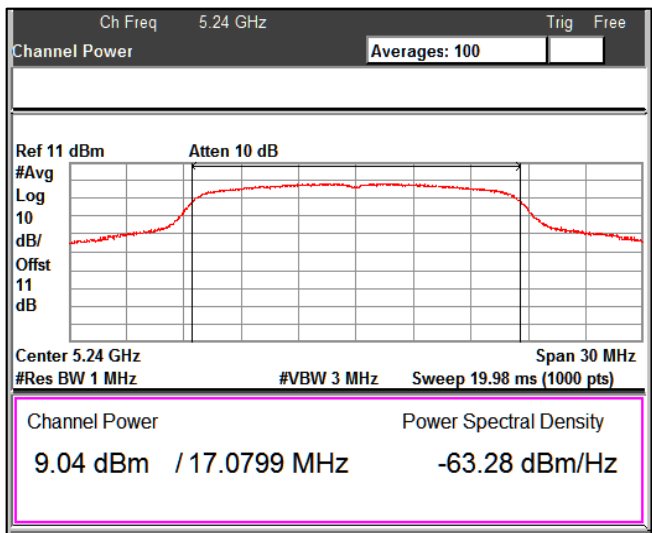
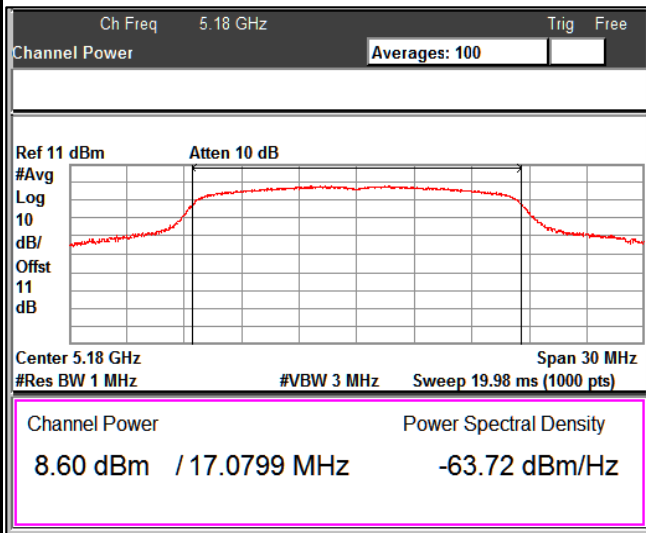
Note:

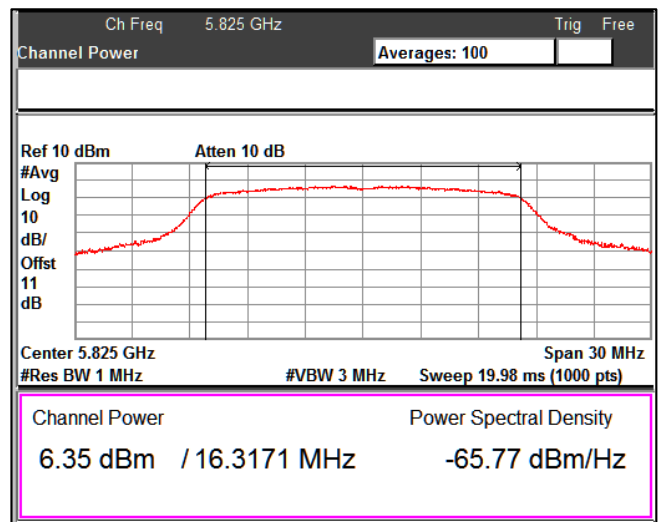
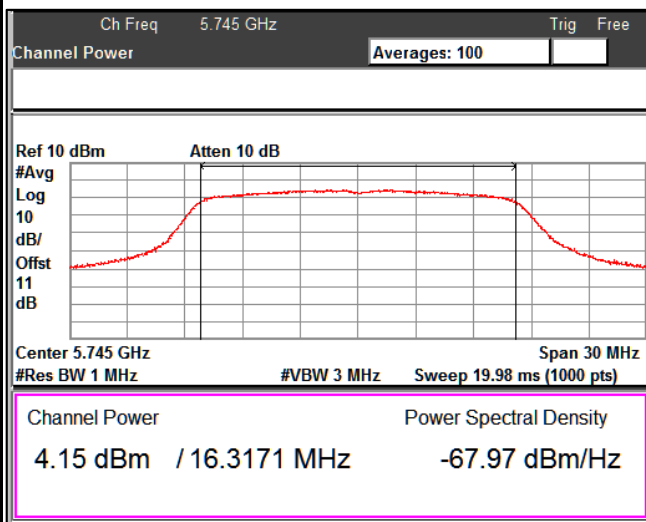
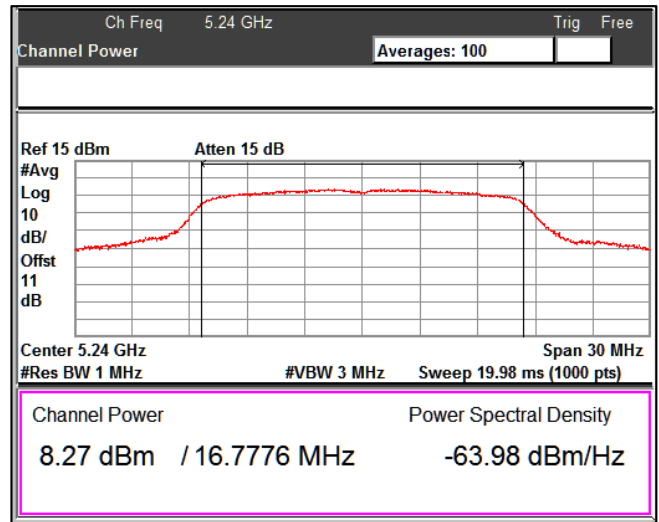
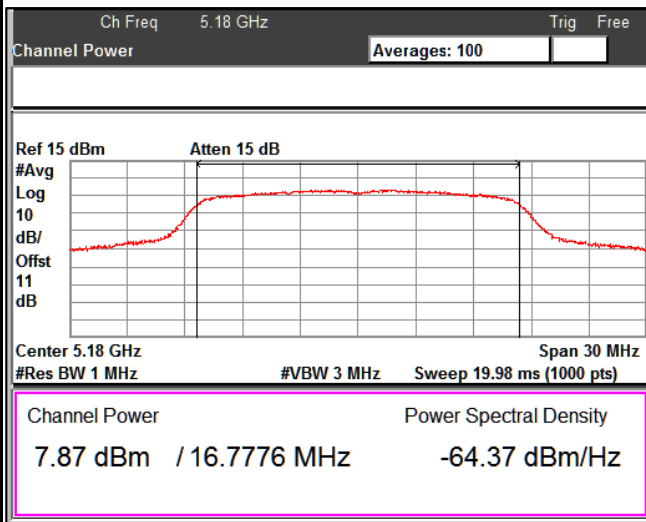
1. All the losses are included during measurement and final values are mentioned in the test report
10 dB attenuator + 1 dB Cable loss = 11 dB total offset
2. Duty cycle correction factor is considered in Final Average power
Duty cycle Correction factor = $10^{\text{LOG}(1/X)}$ Where X is Duty Cycle
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is (For UNII 1 - 4dBi and for UNII 3 – 4.68 dBi.)
4. e.i.r.p = Maximum Average output power (dBm) + Antenna gain in dBi

Modulation: 802.11a

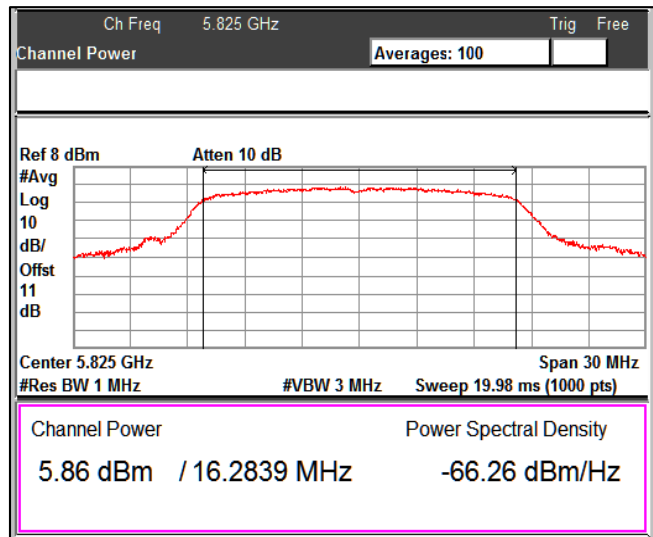
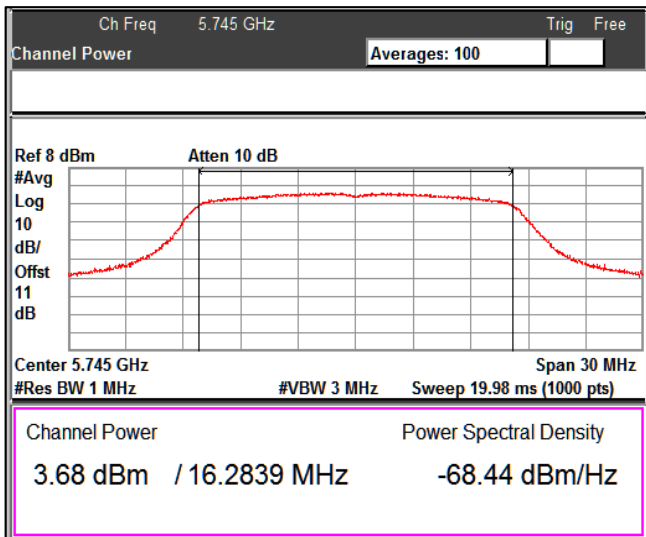
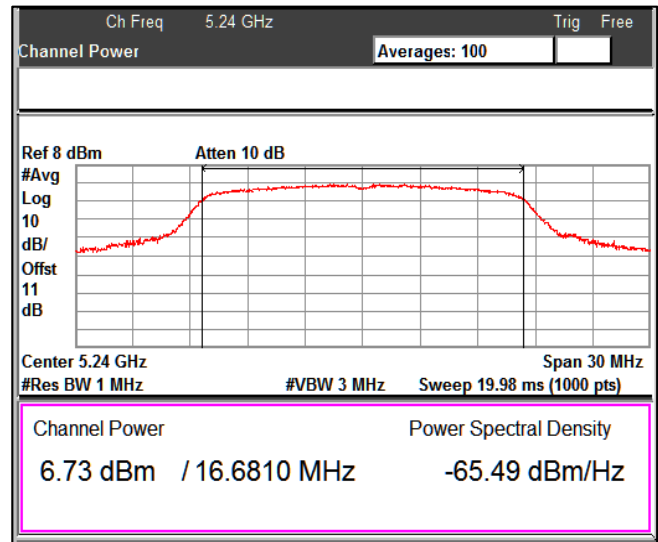
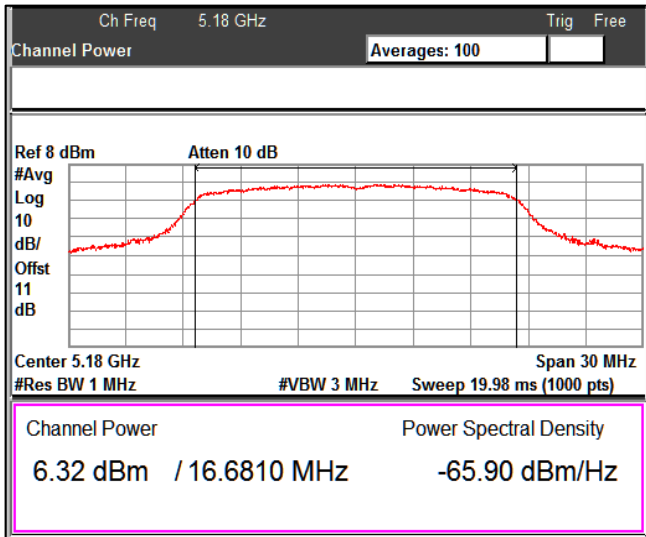
Data rate (Mbps)	Measured Frequency (MHz)	Measured Average Power (dBm)	Duty Cycle X (%)	Duty cycle correction factor (dB)	Maximum Average output power (dBm)	Power e.i.r.p (dBm)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC e.i.r.p Limit (dBm)
6	5180	8.60	95.90	0.18	8.78	12.78	24	-	22.32
	5240	9.04	95.72	0.19	9.23	13.23	24	-	22.32
	5745	5.09	95.90	0.18	5.27	9.95	30	30	30.00
	5825	7.36	95.55	0.20	7.56	12.24	30	30	30.00
24	5180	7.91	84.27	0.74	8.65	12.65	24	-	22.25
	5240	8.27	84.37	0.74	9.01	13.01	24	-	22.25
	5745	4.15	85.00	0.71	4.86	9.54	30	30	30.00
	5825	6.34	85.44	0.68	7.02	11.70	30	30	30.00
54	5180	6.32	72.61	1.39	7.71	11.71	24	-	22.22
	5240	6.73	72.61	1.39	8.12	12.12	24	-	22.22
	5745	3.68	72.61	1.39	5.07	9.75	30	30	30.00
	5825	5.86	72.61	1.39	7.25	11.93	30	30	30.00

Data Rate : 6Mbps



Data Rate: 24Mbps


Data Rate: 54Mbps



Prüfbericht - Nr.:
Test Report No.:

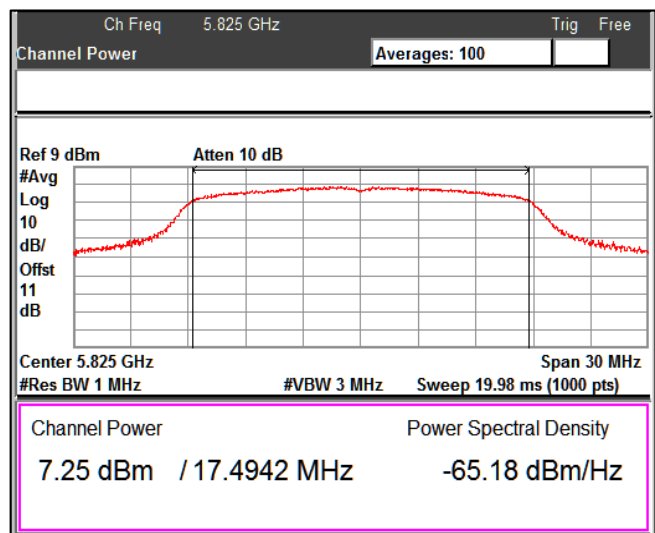
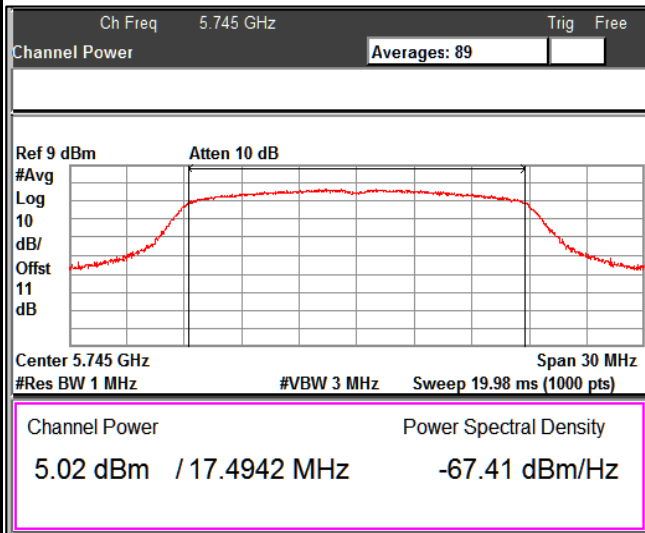
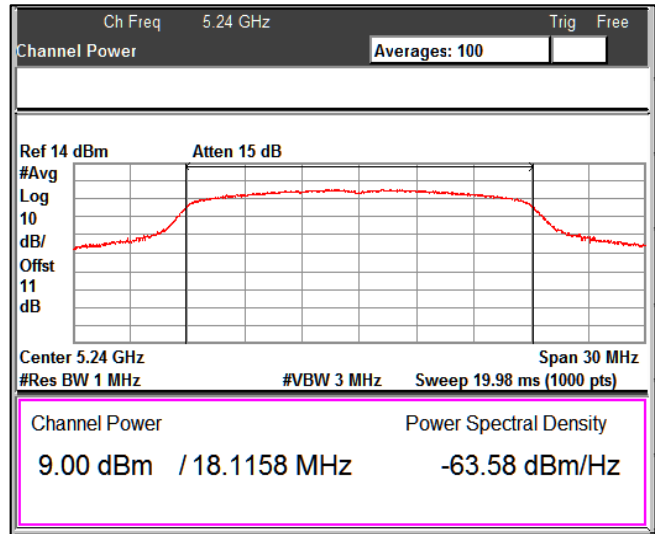
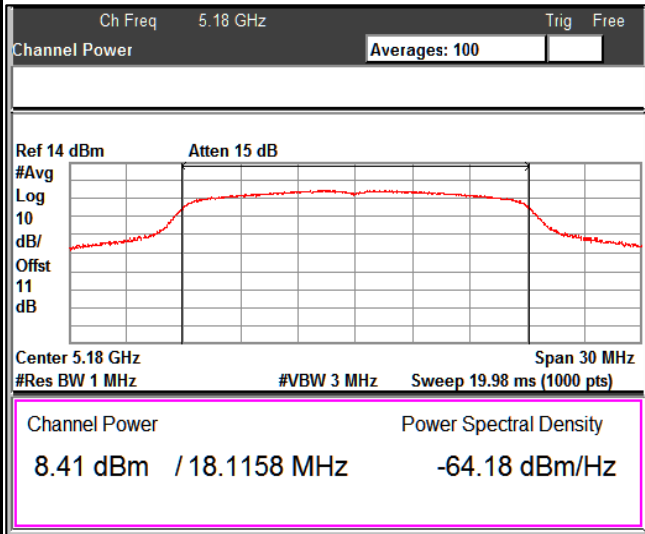
ULR-TC568820300000050F

Seite 37 von 108
Page 37 of 108

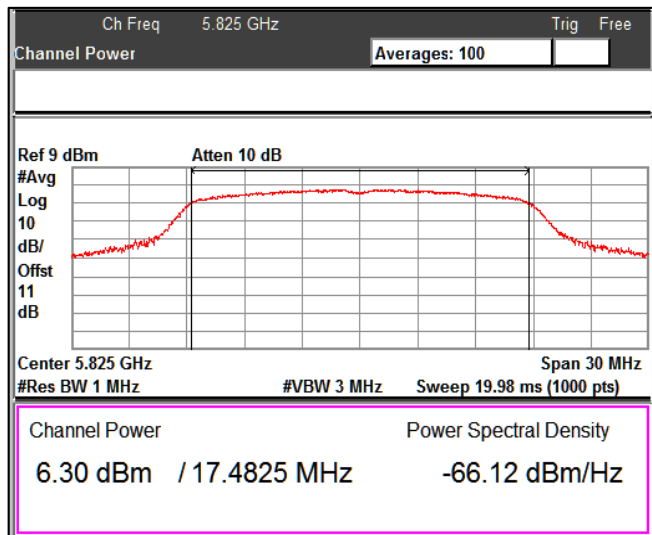
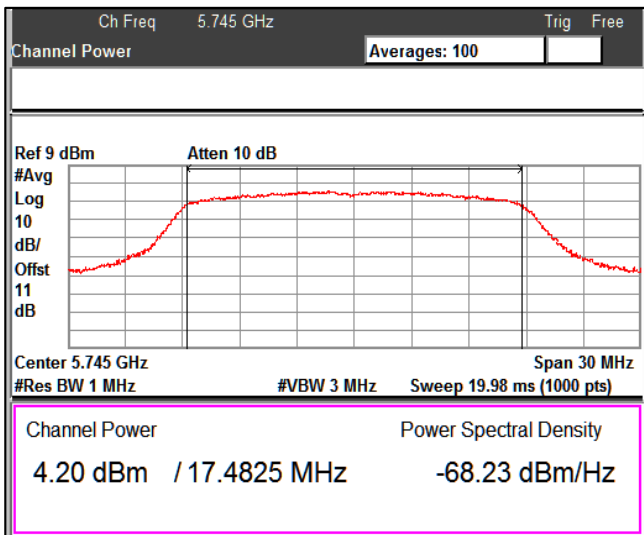
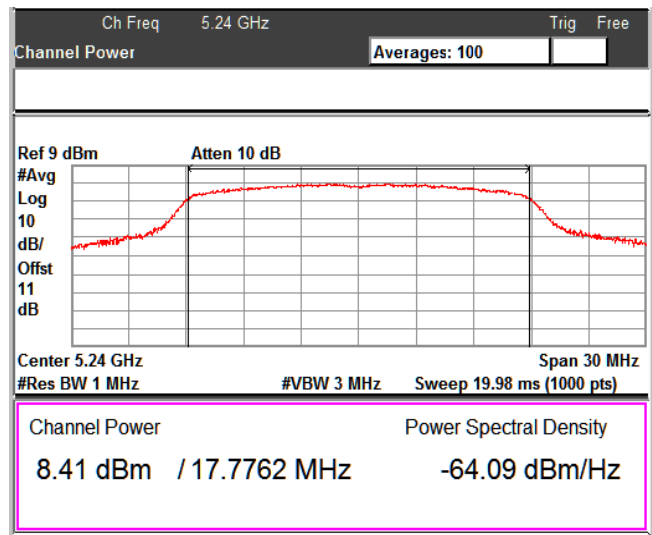
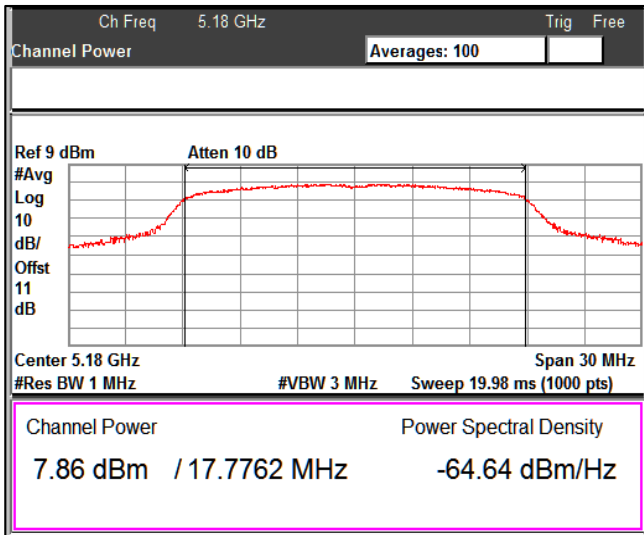
Modulation: 802.11n-20MHz

Data rate (Mbps)	Channel Frequency (MHz)	Measured Average Power (dBm)	Duty Cycle X (%)	Duty Correction Factor (dB)	Maximum Average power (dBm)	e.i.r.p (dBm)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC e.i.r.p Limit (dBm)
MCS0	5180	8.41	94.90	0.23	8.64	12.64	24	-	22.57
	5240	9.00	95.12	0.22	9.22	13.22	24	-	22.58
	5745	5.02	94.72	0.24	5.26	9.94	30	30	30.00
	5825	7.25	95.13	0.22	7.47	12.15	30	30	30.00
MCS4	5180	7.86	77.00	1.14	9.00	13.00	24	-	22.50
	5240	8.41	76.23	1.18	9.59	13.59	24	-	22.50
	5745	4.20	76.23	1.18	5.38	10.06	30	30	30.00
	5825	6.30	77.22	1.12	7.42	12.10	30	30	30.00
MCS7	5180	5.47	67.60	1.70	7.17	11.17	24	-	22.41
	5240	5.80	66.66	1.76	7.56	11.56	24	-	22.48
	5745	3.66	67.60	1.70	5.36	10.04	30	30	30.00
	5825	5.28	67.60	1.70	6.98	11.66	30	30	30.00

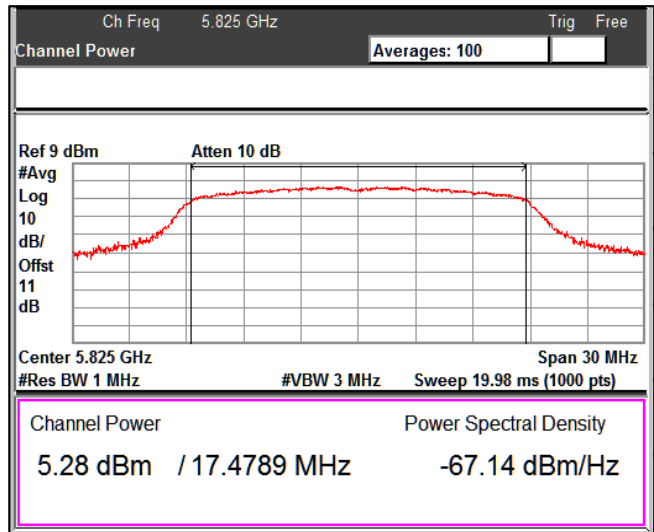
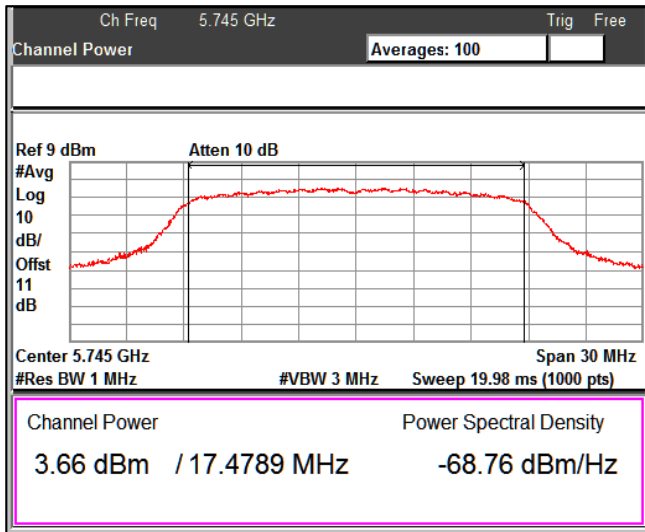
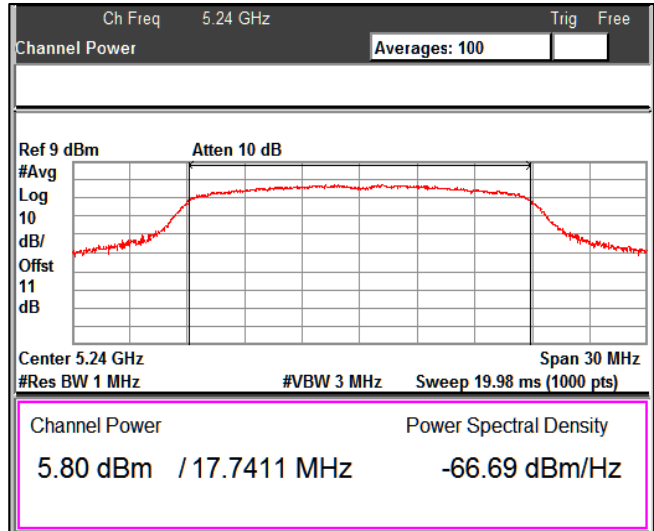
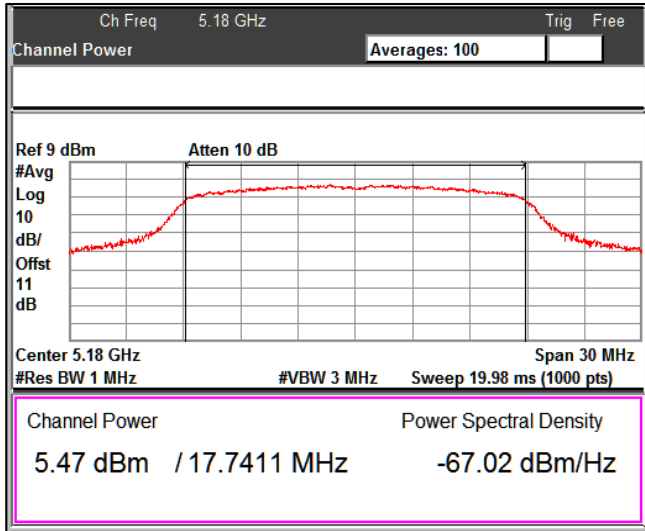
Data Rate: MCS0



Data Rate: MCS4



Data Rate: MCS7



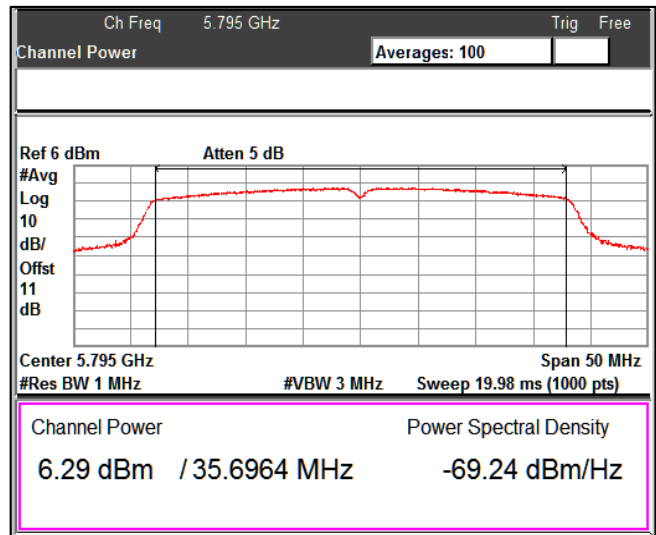
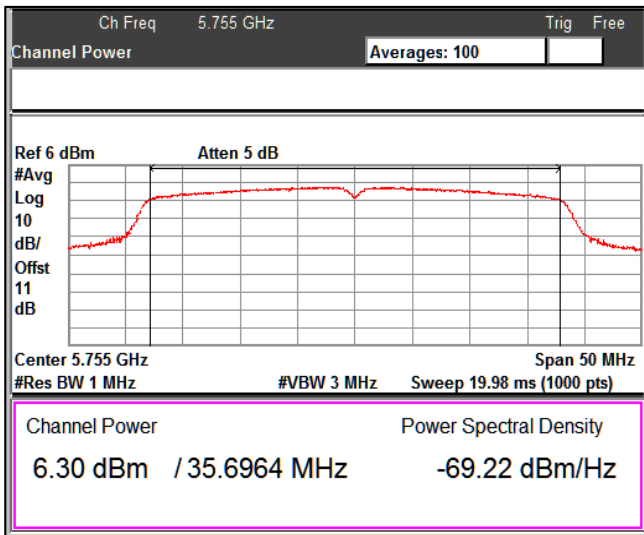
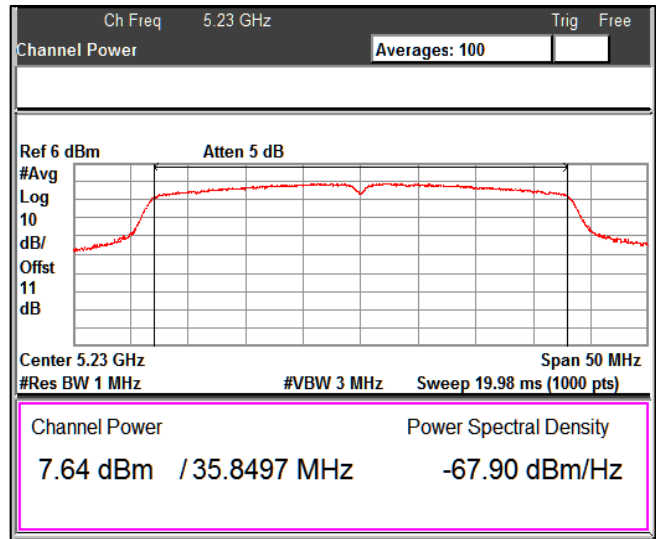
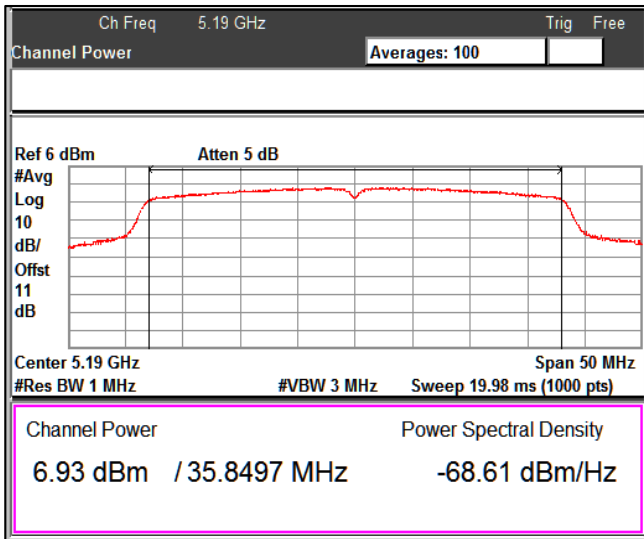
Prüfbericht - Nr.:
Test Report No.:

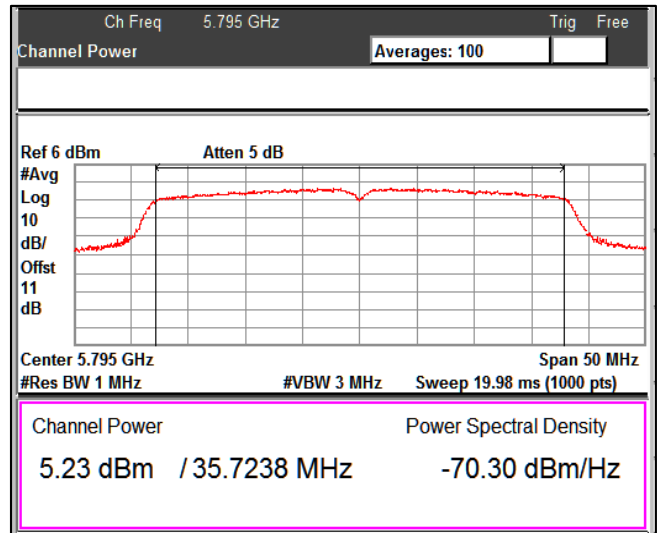
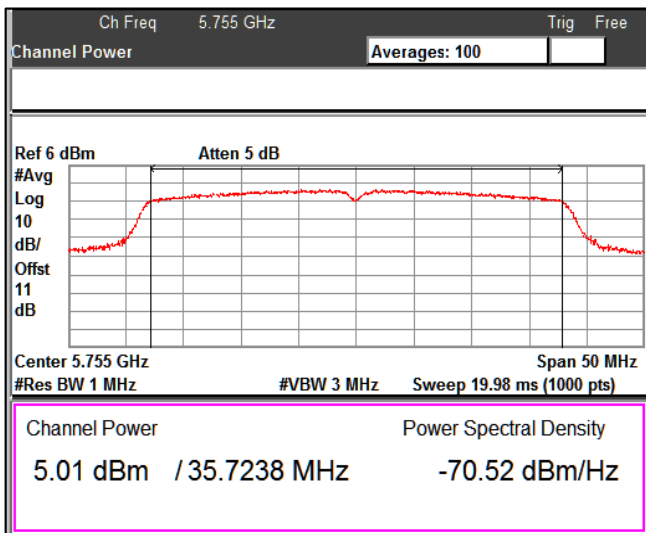
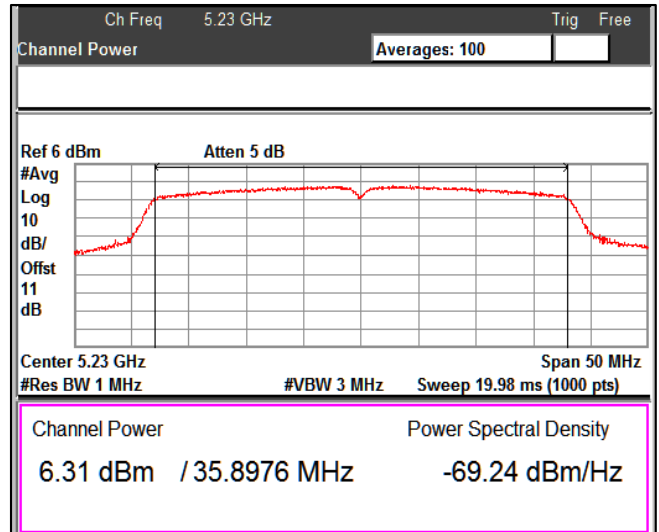
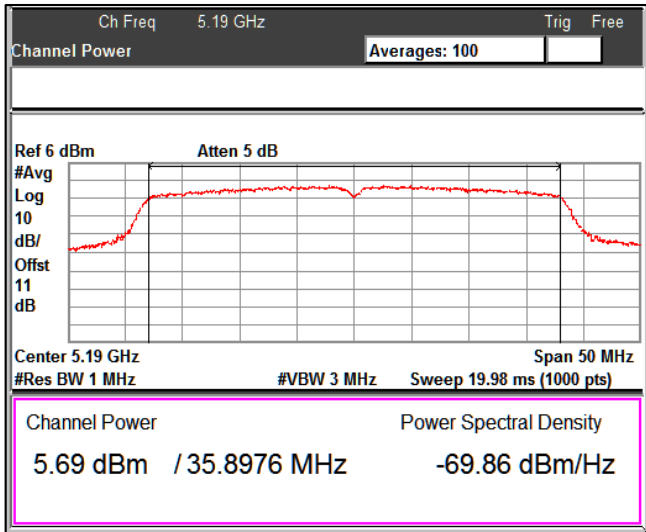
ULR-TC568820300000050F

Seite 41 von 108
Page 41 of 108

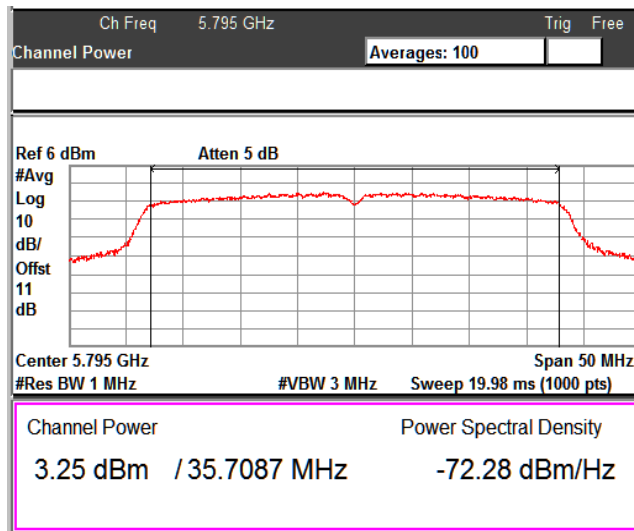
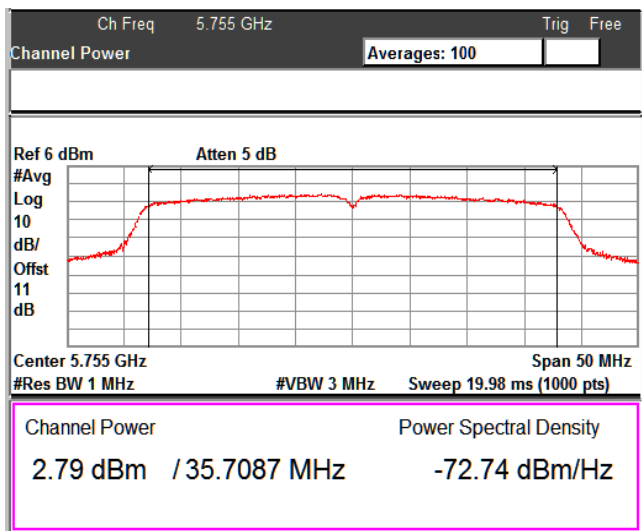
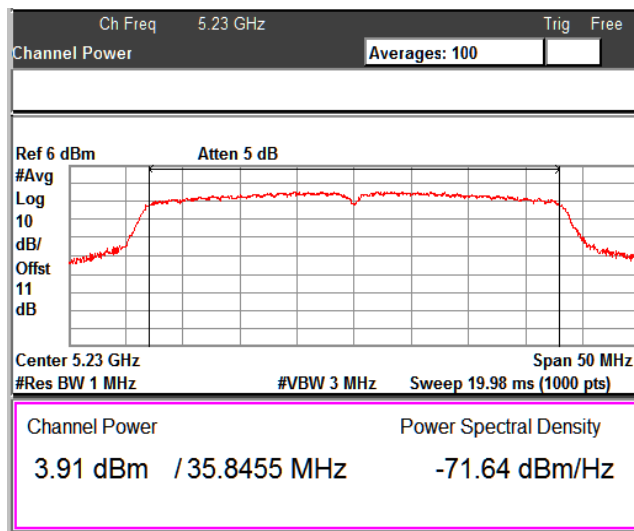
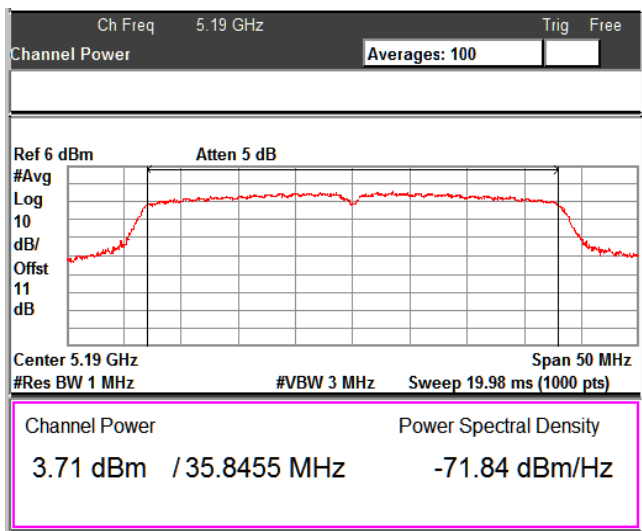
Modulation: 802.11n-40MHz

Data rate (Mbps)	Channel Frequency (MHz)	Measured Average power (dBm)	Duty Cycle X (%)	Duty Correction Factor (dB)	Maximum Average Power (dBm)	e.i.r.p (dBm)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC e.i.r.p Limit (dBm)
MCS0	5190	6.93	89.25	0.49	7.42	11.42	24	-	25.54
	5230	7.64	89.62	0.48	8.12	12.12	24	-	25.54
	5755	6.30	88.84	0.51	6.81	11.49	30	30	30.00
	5795	6.29	90.45	0.44	6.73	11.41	30	30	30.00
MCS4	5190	5.69	58.33	2.34	8.03	12.03	24	-	25.55
	5230	6.31	57.14	2.43	8.74	12.74	24	-	25.54
	5755	5.01	60.31	2.20	7.21	11.89	30	30	30.00
	5795	5.23	61.90	2.08	7.31	11.99	30	30	30.00
MCS7	5190	3.71	45.83	3.39	7.10	11.10	24	-	25.55
	5230	3.91	46.80	3.30	7.21	11.21	24	-	25.55
	5755	2.79	44.68	3.50	6.29	10.97	30	30	30.00
	5795	3.25	47.82	3.20	6.45	11.13	30	30	30.00

Data Rate: MCS0


Data Rate: MCS4


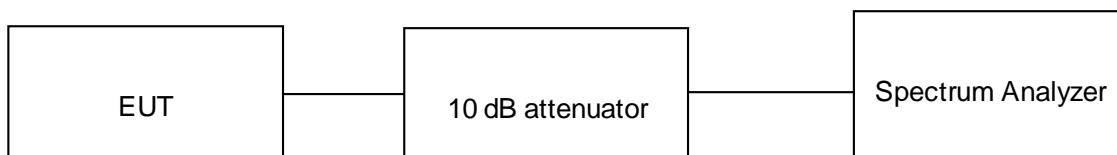
Data Rate: MCS 7



6.3 Maximum Power Spectral Density

Result	Pass
Test Specification	FCC part 15 Subpart C 15.407 (a)(1)(iv) & (a)(3) / RSS 247 Issue 2, Section 6.2.1.1 & Section 6.2.4.1
Test Method	Subclause 12.5 of ANSI C63.10
Measurement Bandwidth	1 MHz
Detector	Average sample detector
Port of testing	Antenna port
Requirement for FCC	1. For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band 2. For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band
Requirement for IC	1. For the band 5.15-5.25 GHz, The e.i.r.p. spectral density shall not exceed 10 dBm in any 1 MHz band 2. For the band 5.725-5.85 GHz, The output power spectral density shall not exceed 30 dBm in any 500 kHz band

Test Method:



The following procedure shall be used:

1. Set center frequency to the nominal EUT channel center frequency
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal
3. Set RBW = 1MHz (5.15-5.25 GHz band) / 500kHz (5.725-5.85 GHz band)
4. Set VBW $\geq 3 \times$ RBW
5. Number of points in sweep $\geq 2 \times$ span / RBW. (This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode
8. Do not use sweep triggering. Allow the sweep to "free run."
9. Trace average at least 100 traces and Compute power by integrating the spectrum across the EBW

Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882030000050F

Seite 46 von 108
Page 46 of 108

10. Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission)

11. 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 = 300 kHz
- b. Set VBW ≥ 3 RBW
- c. If measurement bandwidth of Maximum PSD is specified in 500 kHz

$$\text{PSD bandwidth correction Factor} = 10 * \log(500 \text{ kHz} / \text{RBW})$$

Test Condition:

Normal Test Condition:

Temperature (Norm) = + 25 °C Voltage = 3.6V DC Li-Ion battery Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section F in KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test results:

Note:

1. All the losses are included during measurement and final values are mentioned in the test report
10 dB attenuator + 1 dB Cable loss = 11 dB total offset
2. Duty cycle correction factor is considered in Final Average power
Duty cycle Correction factor = $10 * \text{LOG}(1/X)$ Where X is Duty Cycle
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is (For UNII 1 - 4dBi and for UNII 3 - 4.68 dBi.)
4. e.i.r.p = Maximum Average PSD (dBm) + Antenna gain in dBi

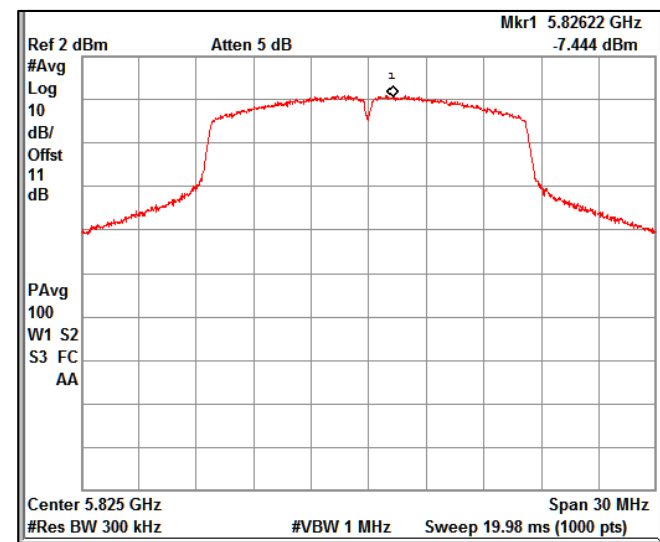
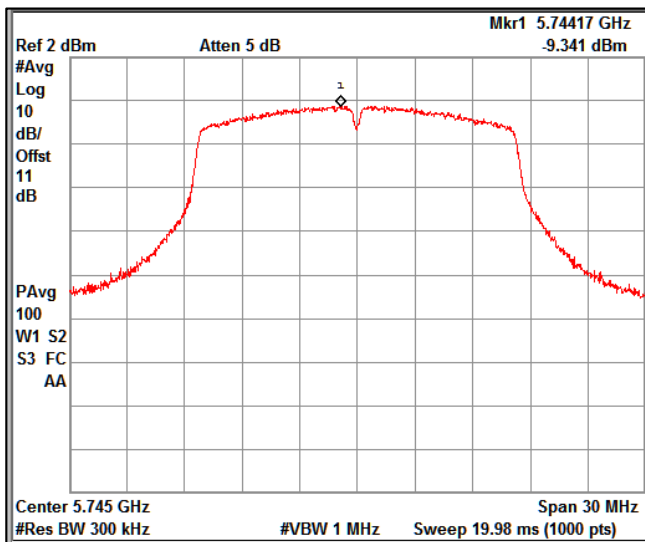
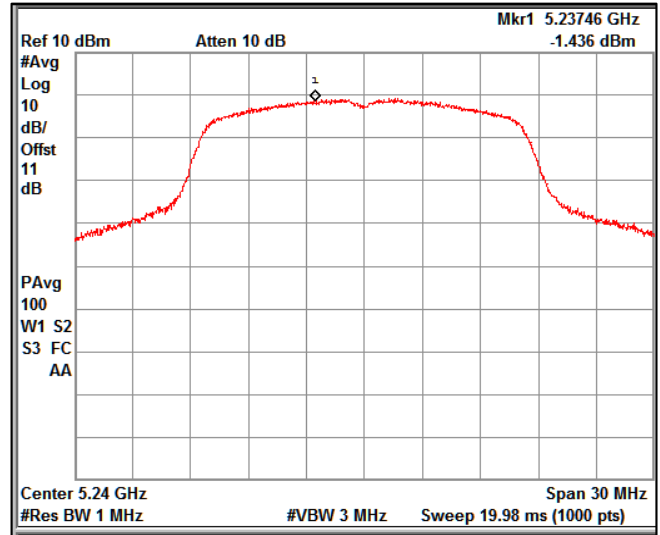
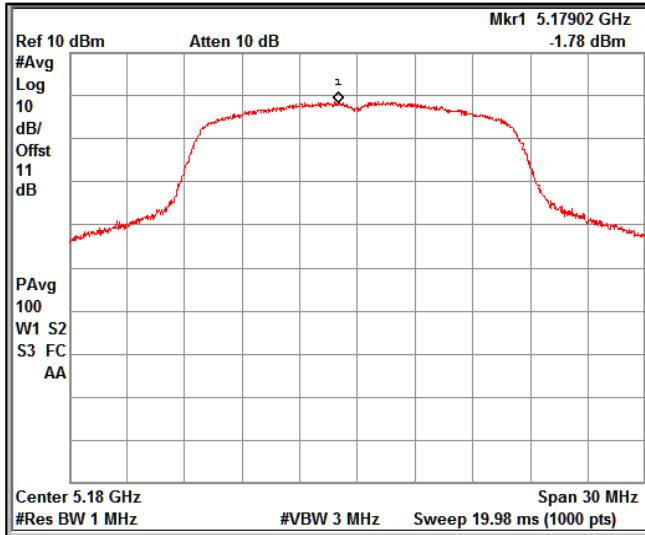
Modulation: 802.11a – UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/ 1MHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/ 1MHz)	PSD (e.i.r.p) (dBm/ 1MHz)	FCC PSD Limit (dBm/ 1MHz)	IC e.i.r.p SD (dBm/ 1MHz)
6	5180	-1.78	95.90	0.18	-	-1.60	2.40	11.00	10.00
	5240	-1.43	95.72	0.19	-	-1.24	2.76	11.00	10.00
24	5180	-2.65	84.27	0.74	-	-1.91	2.09	11.00	10.00
	5240	-2.66	84.37	0.74	-	-1.92	2.08	11.00	10.00
54	5180	-4.12	72.61	1.39	-	-2.73	1.27	11.00	10.00
	5240	-3.08	72.61	1.39	-	-1.69	2.31	11.00	10.00

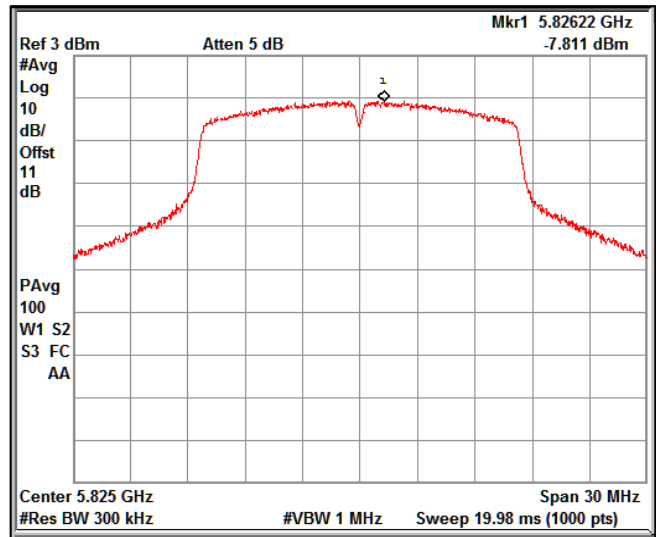
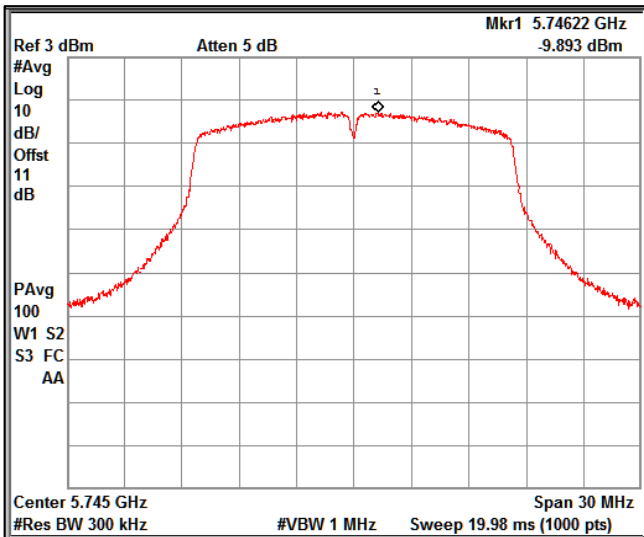
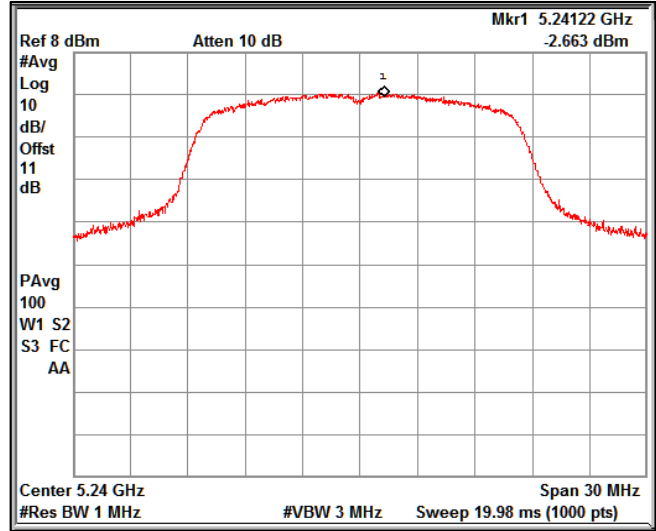
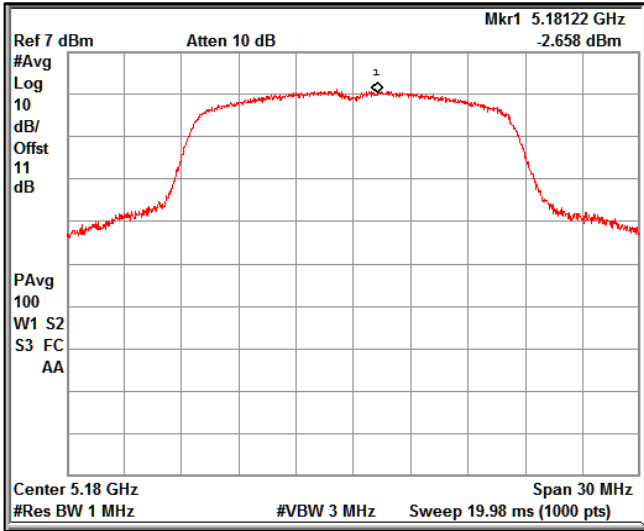
Modulation: 802.11a – UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/500kHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/ 500kHz)	PSD (e.i.r.p) (dBm/ 500kHz)	FCC PSD Limit (dBm/ 500kHz)	IC PSD Limit (dBm/ 500kHz)
6	5745	-9.43	95.90	0.18	2.22	-7.03	-3.03	30.00	30.00
	5825	-7.44	95.55	0.20	2.22	-5.02	-1.02	30.00	30.00
24	5745	-9.89	85.00	0.71	2.22	-6.97	-2.97	30.00	30.00
	5825	-7.81	85.44	0.68	2.22	-4.91	-0.91	30.00	30.00
54	5745	-10.66	72.61	1.39	2.22	-7.05	-3.05	30.00	30.00
	5825	-7.77	72.61	1.39	2.22	-4.16	-0.16	30.00	30.00

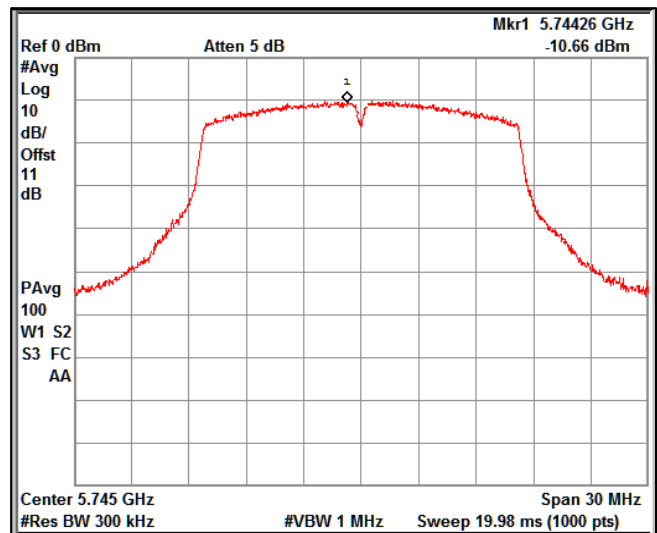
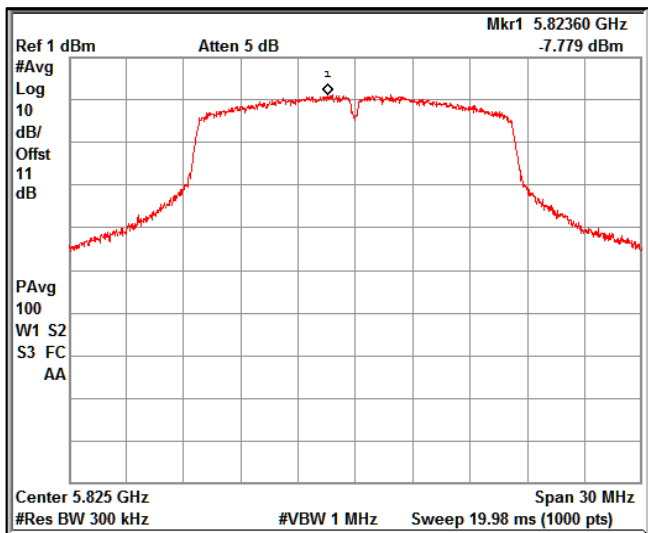
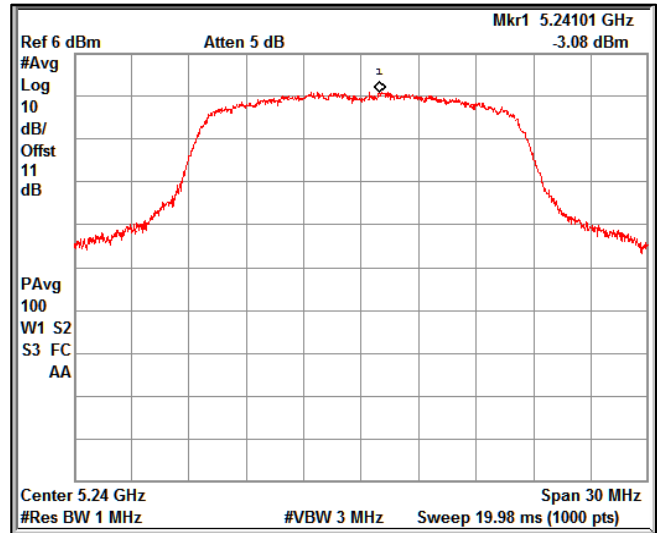
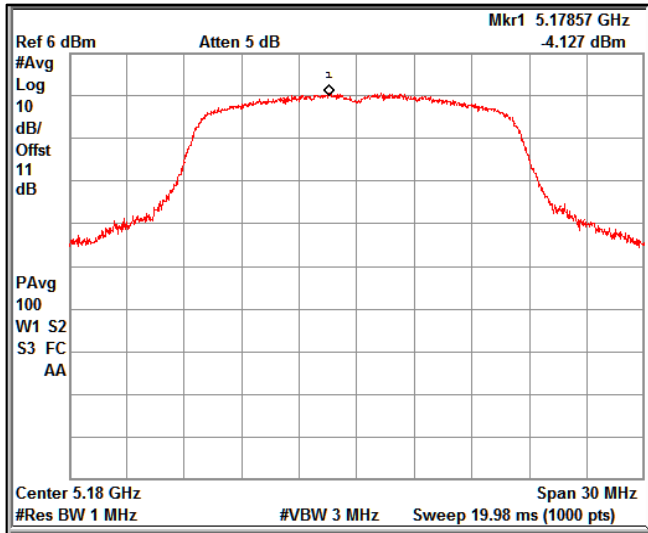
Data Rate: 6 Mbps



Data Rate: 24Mbps



Data Rate: 54Mbps



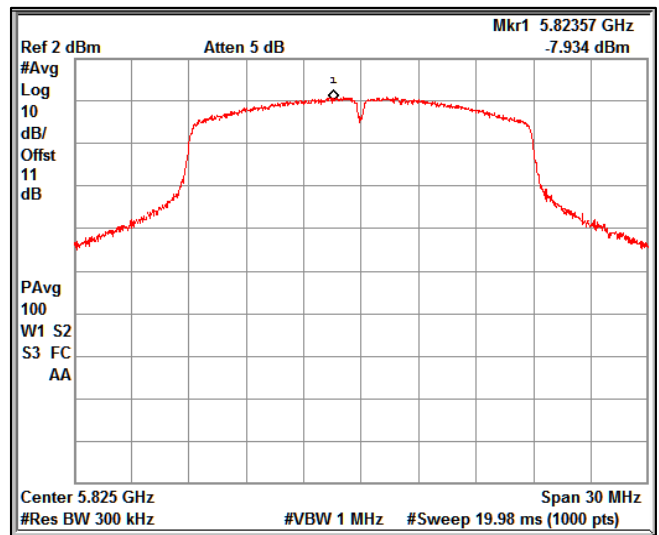
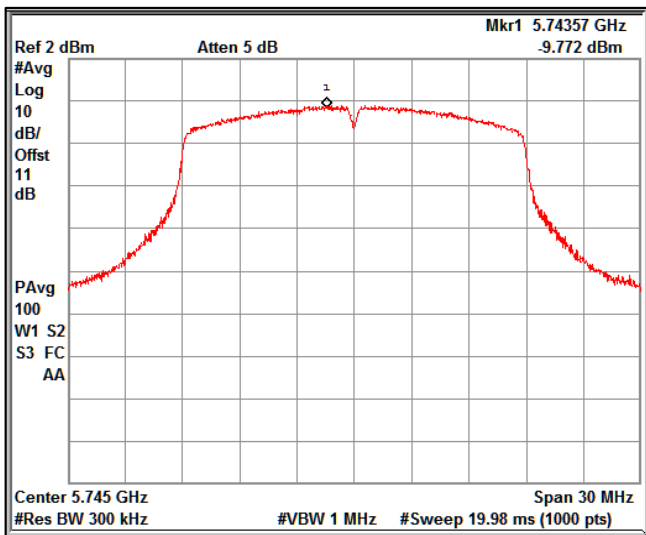
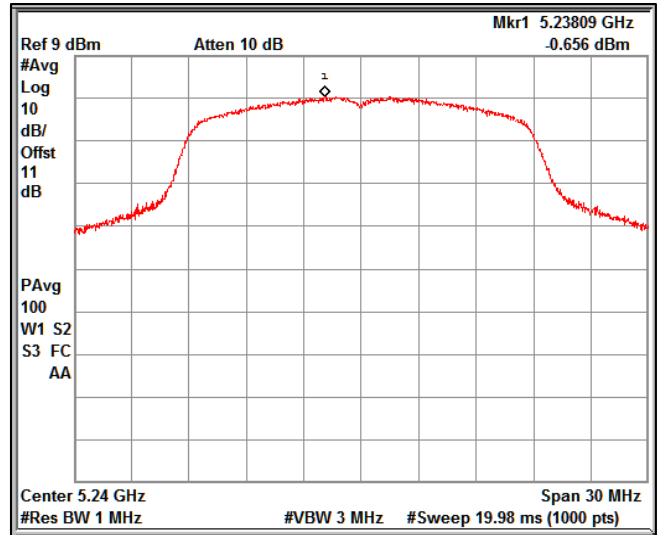
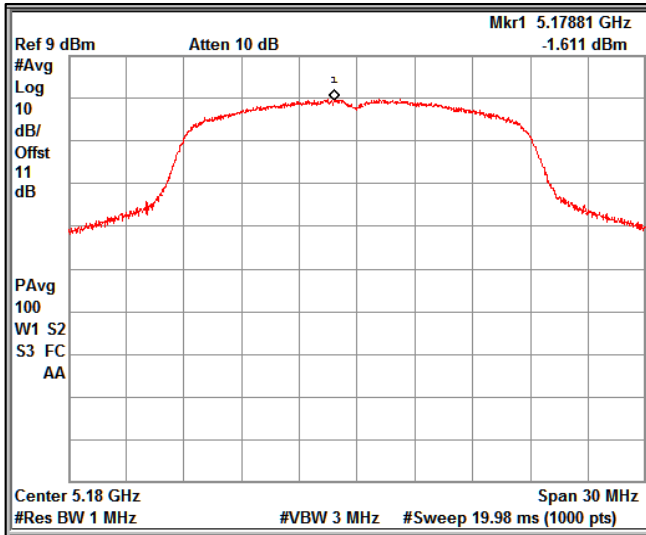
Modulation: 802.11n – UNII 1

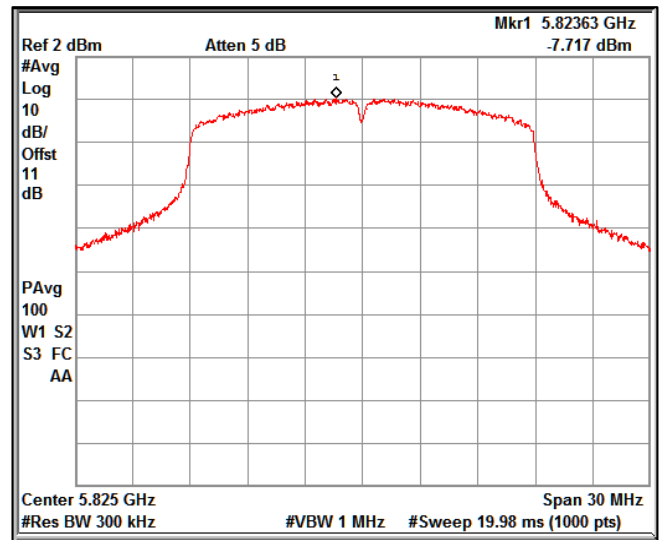
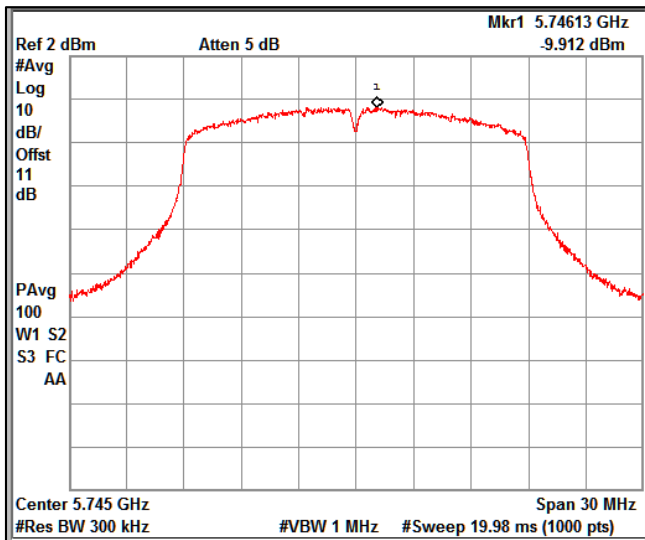
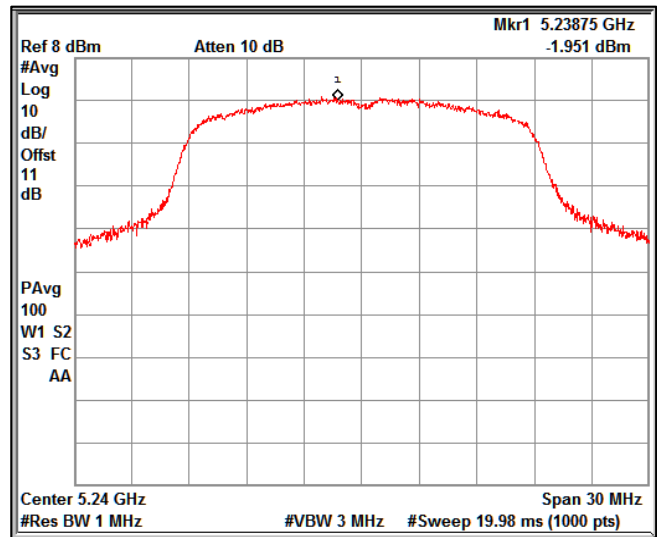
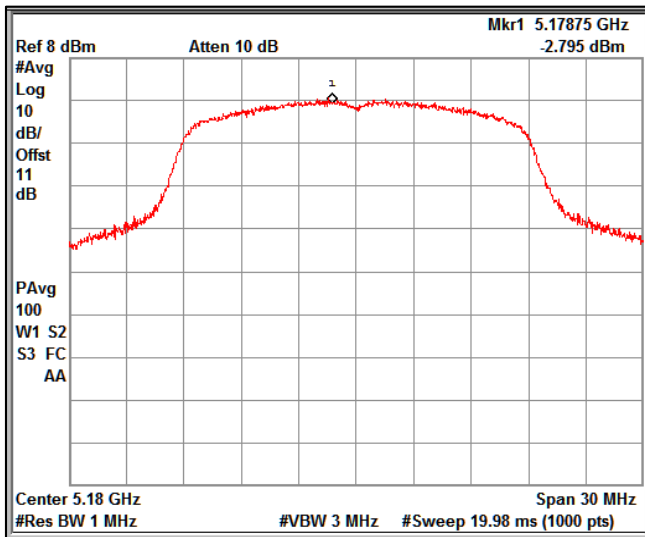
Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/1MHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/1MHz)	PSD (e.i.r.p) (dBm/1MHz)	FCC PSD Limit (dBm/1MHz)	IC e.i.r.p SD (dBm/1MHz)
MCS0	5180	-1.61	94.90	0.23	-	-1.38	2.62	11.00	10.00
	5240	-0.65	95.12	0.22	-	-0.43	3.57	11.00	10.00
MCS4	5180	-2.79	77.00	1.14	-	-1.65	2.35	11.00	10.00
	5240	-1.95	76.23	1.18	-	-0.77	3.23	11.00	10.00
MCS7	5180	-3.87	67.60	1.70	-	-2.17	1.83	11.00	10.00
	5240	-3.64	66.66	1.76	-	-1.88	2.12	11.00	10.00

Modulation: 802.11n – UNII 3

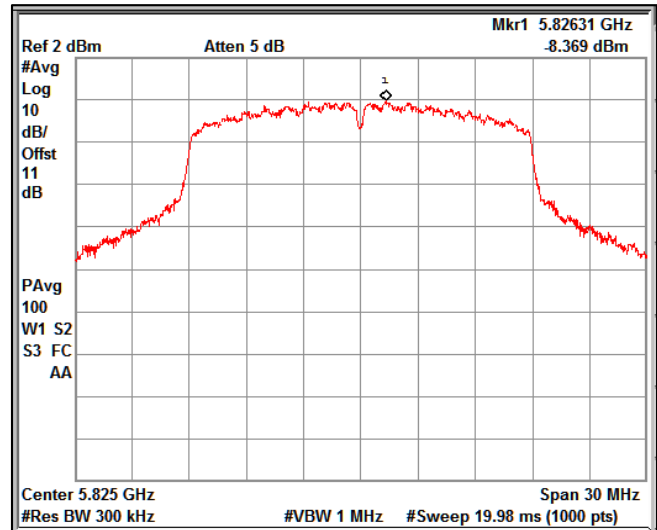
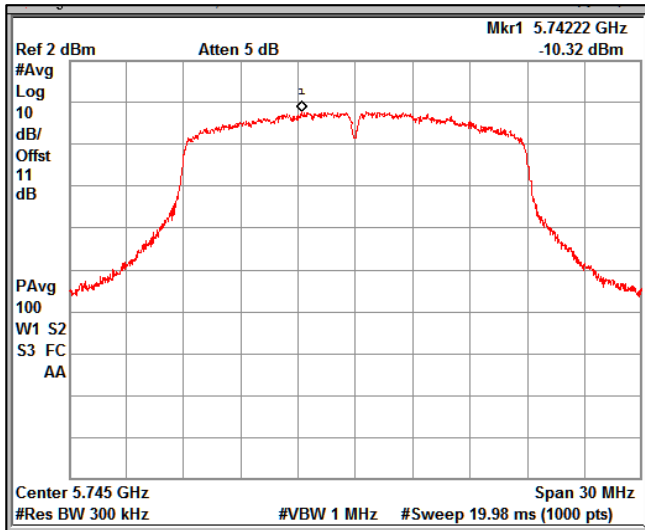
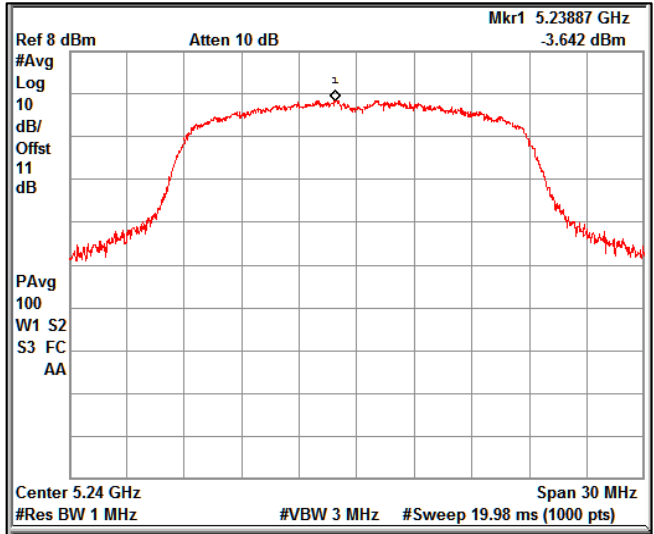
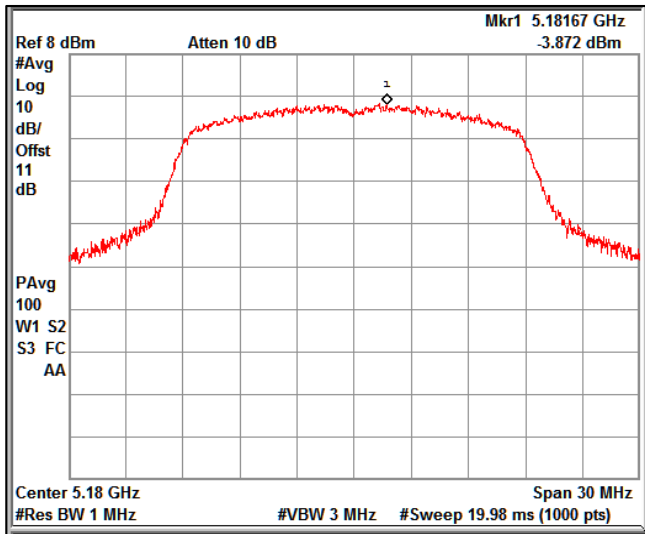
Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/500kHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/500kHz)	PSD (e.i.r.p) (dBm/500kHz)	FCC PSD Limit (dBm/500kHz)	IC PSD Limit (dBm/500kHz)
MCS0	5745	-9.77	94.72	0.24	2.22	-7.32	-3.32	30.00	30.00
	5825	-7.93	95.13	0.22	2.22	-5.49	-1.49	30.00	30.00
MCS4	5745	-9.92	76.23	1.18	2.22	-6.52	-2.52	30.00	30.00
	5825	-7.71	77.22	1.12	2.22	-4.37	-0.37	30.00	30.00
MCS7	5745	-10.32	67.60	1.70	2.22	-6.40	-2.40	30.00	30.00
	5825	-8.36	67.60	1.70	2.22	-4.44	-0.44	30.00	30.00

Data Rate: MCS 0



Data Rate: MCS4


Data Rate: MCS7



Prüfbericht - Nr.:
Test Report No.:

ULR-TC56882030000050F

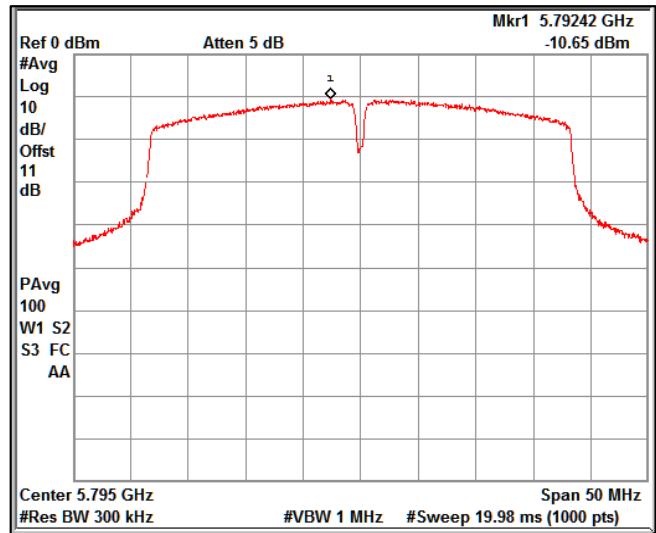
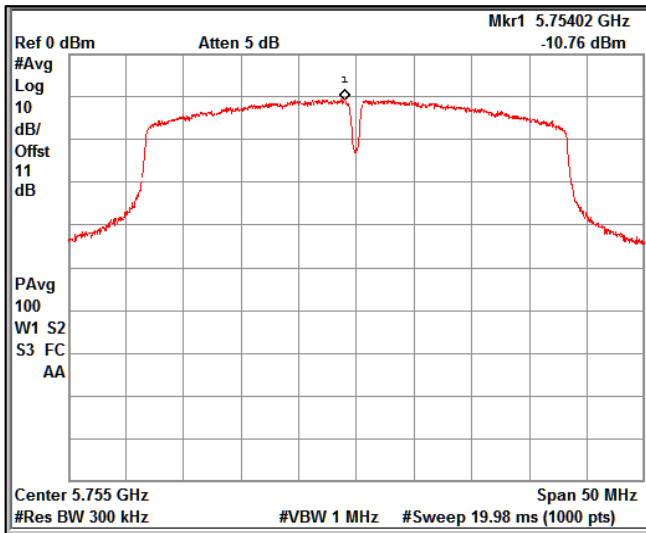
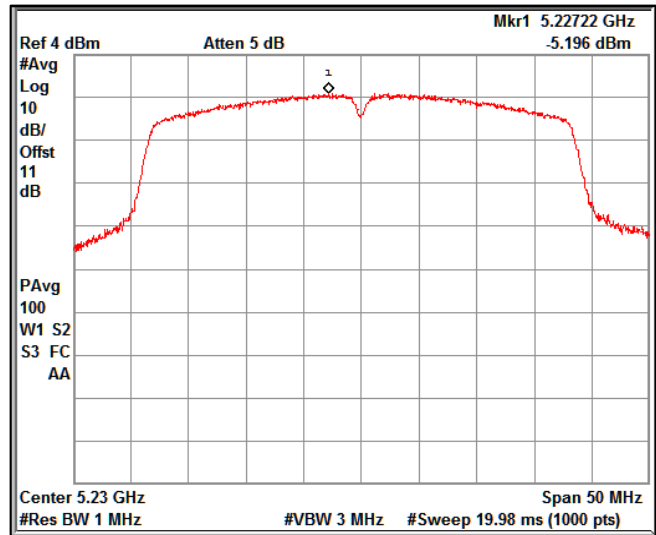
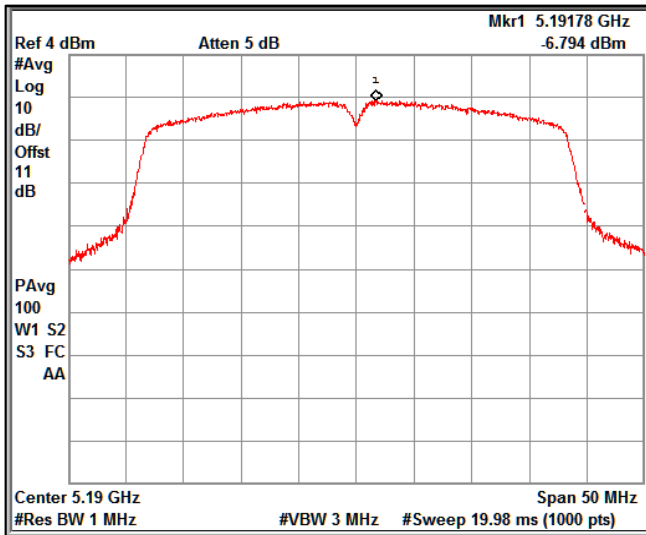
Seite 55 von 108
Page 55 of 108

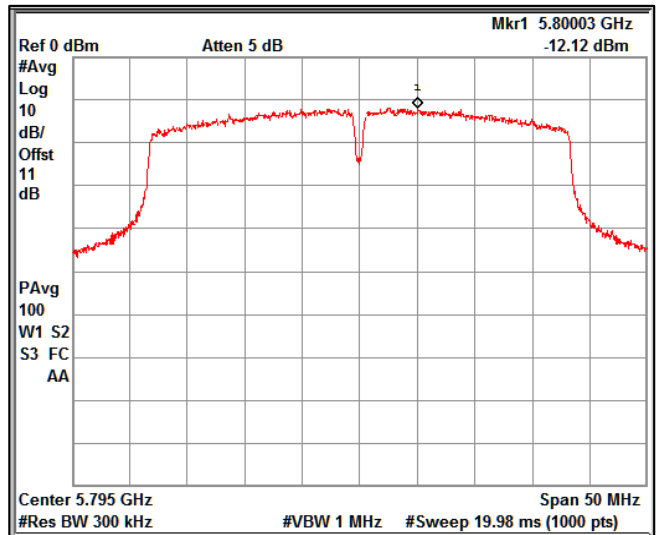
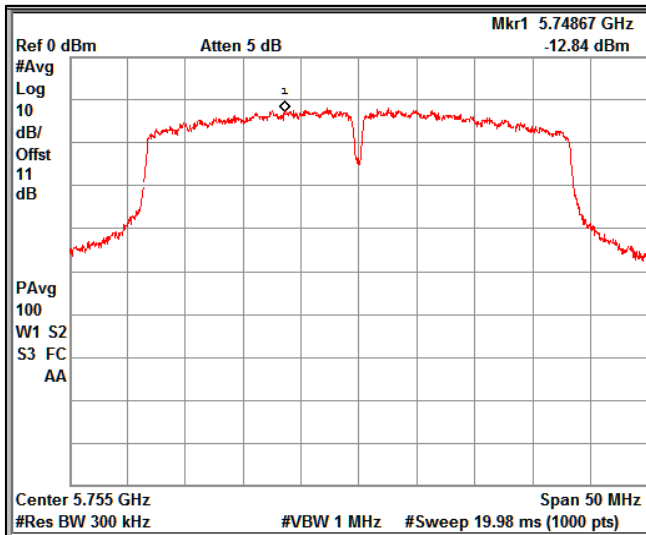
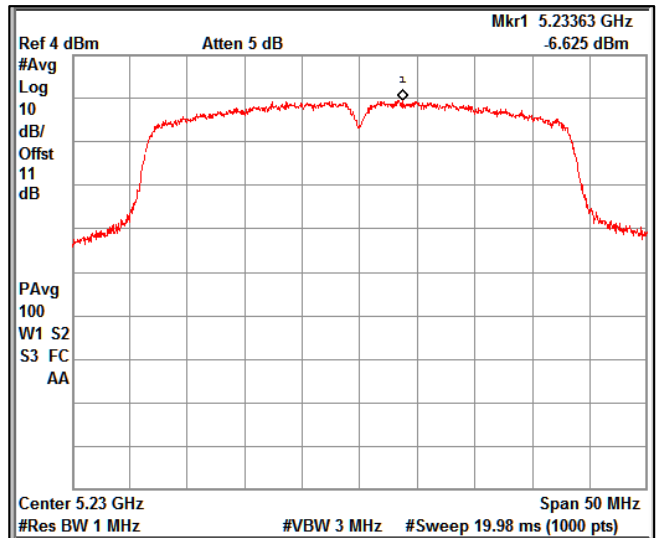
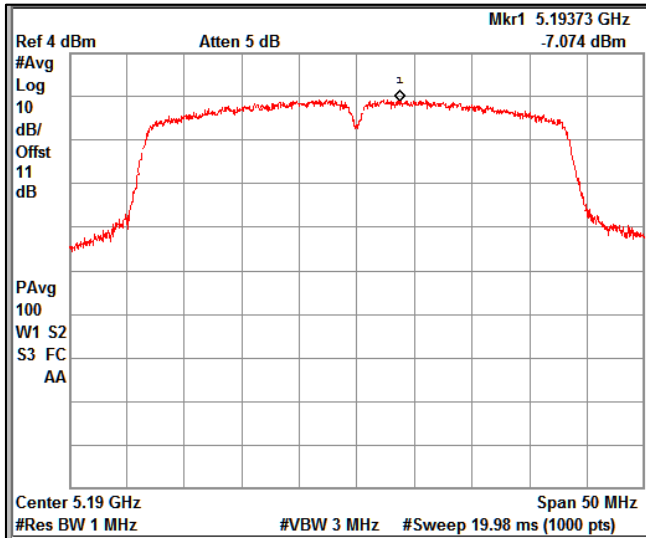
Modulation: 802.11n-40MHz - UNII 1

Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/1MHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/1MHz)	PSD (e.i.r.p) (dBm/1MHz)	FCC PSD Limit (dBm/1MHz)	IC e.i.r.p SD (dBm/1MHz)
MCS0	5190	-6.79	89.25	0.49	-	-6.30	-2.30	11.00	10.00
	5230	-5.19	89.62	0.48	-	-4.71	-0.71	11.00	10.00
MCS4	5190	-7.07	58.33	2.34	-	-4.73	-0.73	11.00	10.00
	5230	-6.62	57.14	2.43	-	-4.19	-0.19	11.00	10.00
MCS7	5190	-7.07	45.83	3.39	-	-3.68	0.32	11.00	10.00
	5230	-6.62	46.80	3.30	-	-3.32	0.68	11.00	10.00

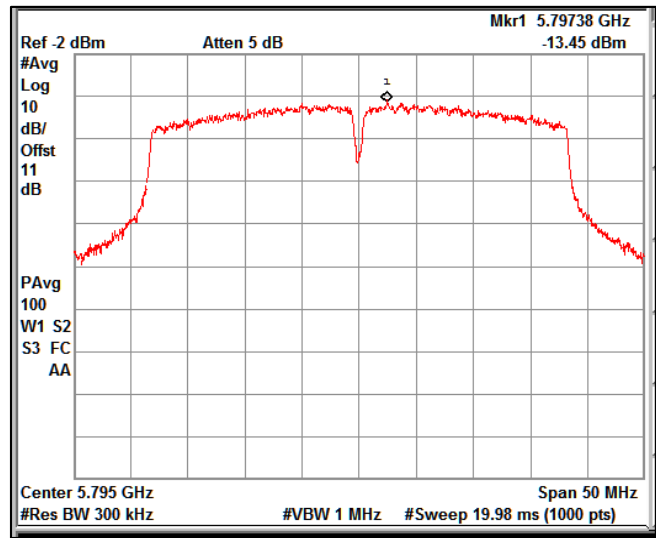
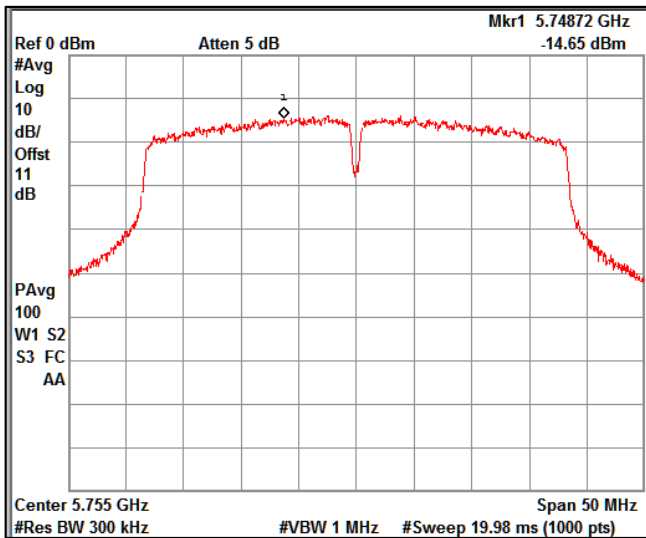
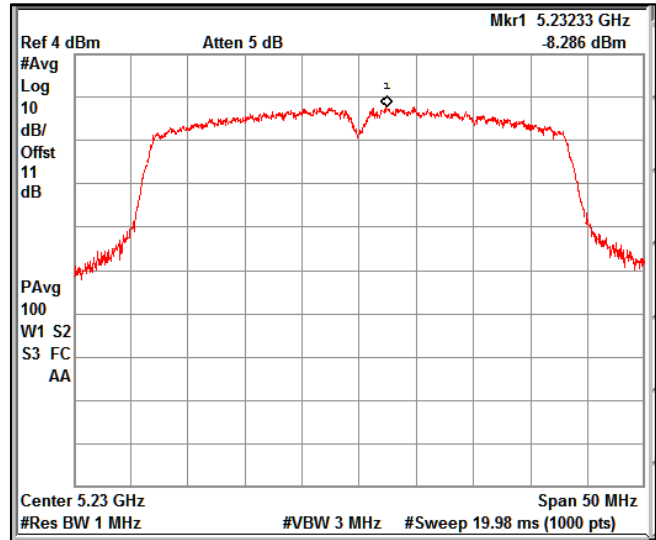
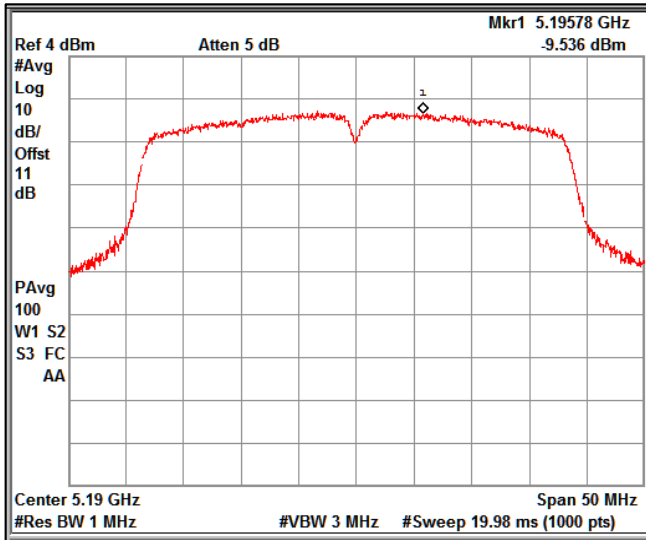
Modulation: 802.11n-40MHz - UNII 3

Data rate (Mbps)	Measured Frequency (MHz)	Measured Average PSD (dBm/500kHz)	Duty Cycle X (%)	Duty Correction Factor (dBm)	Bandwidth Correction (dB)	Maximum Average PSD (dBm/500kHz)	PSD (e.i.r.p) (dBm/500kHz)	FCC PSD Limit (dBm/500kHz)	IC PSD Limit (dBm/500kHz)
MCS0	5755	-10.76	88.84	0.51	2.22	-8.03	-4.03	30.00	30.00
	5795	-10.65	90.45	0.44	2.22	-8.00	-4.00	30.00	30.00
MCS4	5755	-12.84	60.31	2.20	2.22	-8.43	-4.43	30.00	30.00
	5795	-12.12	61.90	2.08	2.22	-7.82	-3.82	30.00	30.00
MCS7	5755	-12.84	44.68	3.50	2.2	-7.12	-3.12	30.00	30.00
	5795	-12.12	47.82	3.20	2.2	-6.70	-2.70	30.00	30.00

Data Rate: MCS0


Data rate: MCS4


Data Rate: MCS7



6.4 Spurious Radiated Emissions & Restricted Bands of Operation

Result

Pass

Test Specification	FCC part 15 Subpart C Section 15.407 (b) (15.205 & 15.209) / RSS 247 Issue 2 Section 6.2.1.2 & 6.2.4.2 / RSS Gen Issue 5 Section 8.9 & 8.10
Test Method	ANSI C 63.10 – 2013
Measurement Bandwidth	100kHz for below 1GHz 1MHz for above 1GHz
Measurement Location	Semi Anechoic Chamber 30MHz - 1 GHz Fully Anechoic Chamber 1 GHz - 40GHz
Measuring Distance	3 m
Detector	Refer Remark
Requirement	As per the limits mentioned in the below table
Test setup	Refer TEST METHODOLOGY

Limit:

Table 6: Undesirable emission limits

Frequency Band	Limit
5.15-5.25 GHz	e.i.r.p. -27dBm [68.2 dBuV/3m]
5.25-5.35 GHz	e.i.r.p. -27dBm [68.2 dBuV/3m]
5.47-5.725 GHz	e.i.r.p. -27dBm [68.2 dBuV/3m]
5.725-5.85 GHz	5.715 GHz to 5.725 GHz - e.i.r.p. -17dBm [78.2 dBuV/3m] 5.85 GHz to 5.86 GHz - e.i.r.p. -17dBm [78.2 dBuV/3m] other frequency range - e.i.r.p. -27dBm [68.2 dBuV/3m]

Table 7: Transmitter limits for Radiated emission

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength ($\text{dB}\mu\text{V}/\text{m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 $\text{dB}\mu\text{V}/\text{m}$ at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Condition:

Normal Test Condition:

Temperature (Norm) = + 25 °C

Voltage = 3.6V DC Li-Ion battery

Relative humidity: 62 %

Test results:

Note: All the losses are included during measurement and final values are mentioned in the test report. Refer TEST METHODOLOGY for more details

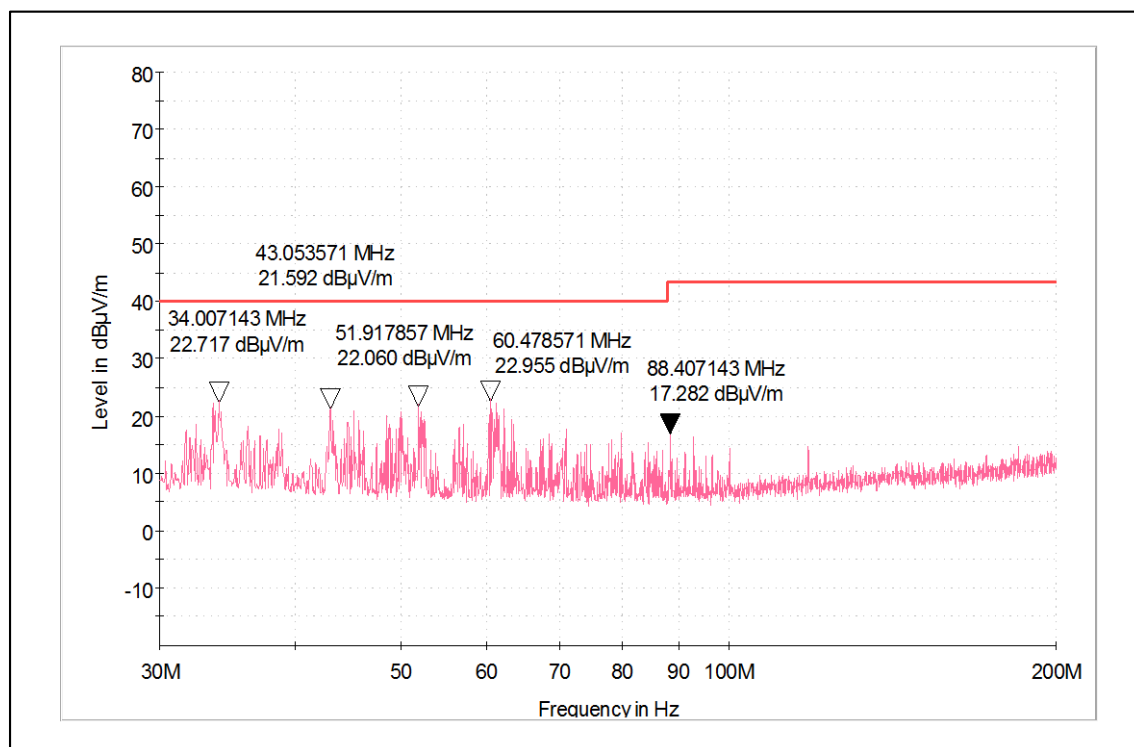
Test results for Frequency range : 9kHz – 30MHz

No Emissions found in the frequency range 9kHz – 30MHz

Test results for Frequency range : 30MHz – 1GHz

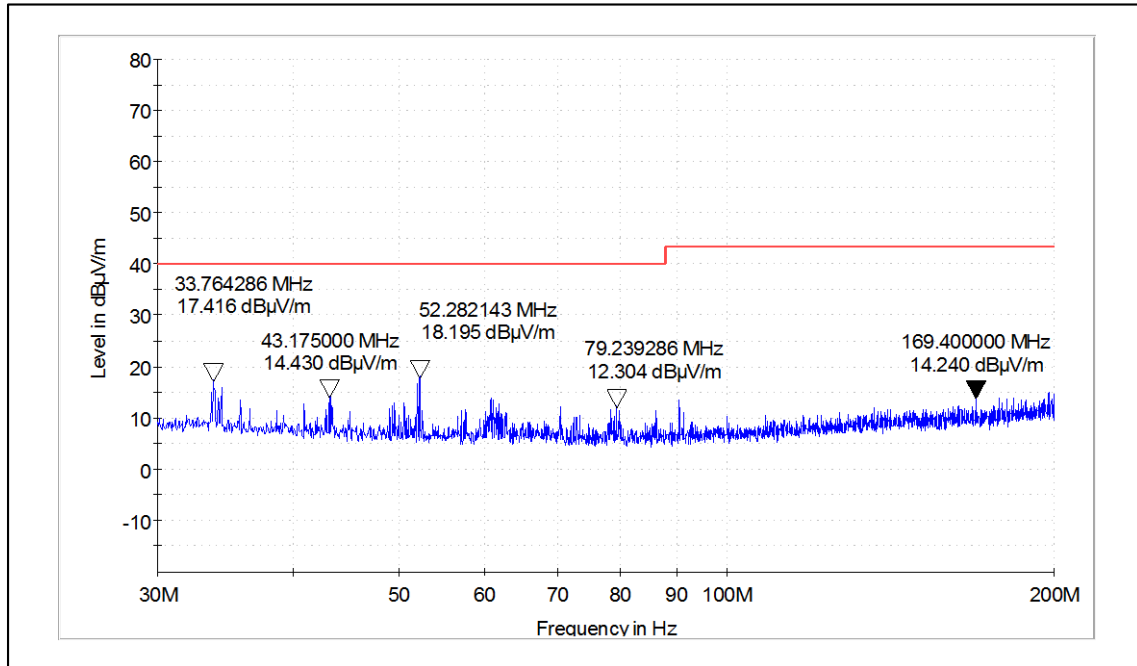
Mode of Operation: Curved Mode

Polarization	Frequency (MHz)	Measured value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	34.00	22.71	40	-17.29
	51.91	22.06	40	-17.94
	60.47	22.95	40	-17.05
	228.80	24.23	46	-21.77
	274.20	18.21	46	-27.79
	900.00	38.52	46	-7.48
Horizontal	33.76	17.41	40	-22.59
	52.28	18.19	40	-21.81
	169.40	14.24	43.5	-29.26
	299.93	20.33	46	-25.67
	500.00	25.90	46	-20.10
	900.06	34.38	46	-11.62



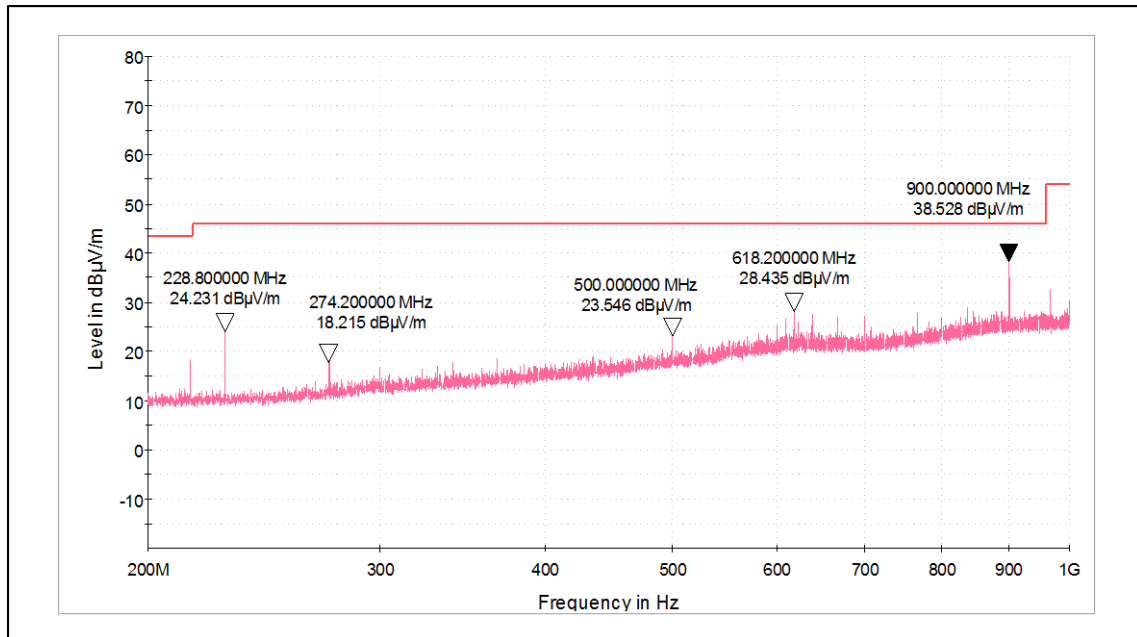
Channel Frequency 30MHz – 200MHz

Polarization Vertical



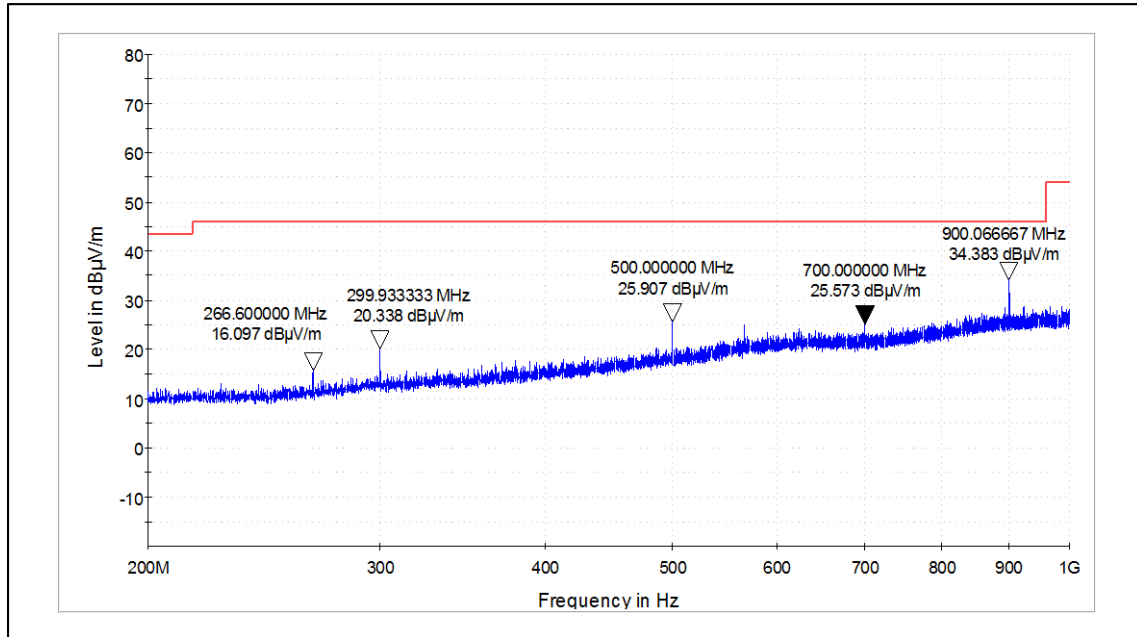
Channel Frequency 30MHz – 200MHz

Polarization Horizontal



Channel Frequency 200MHz – 1GHz

Polarization Vertical

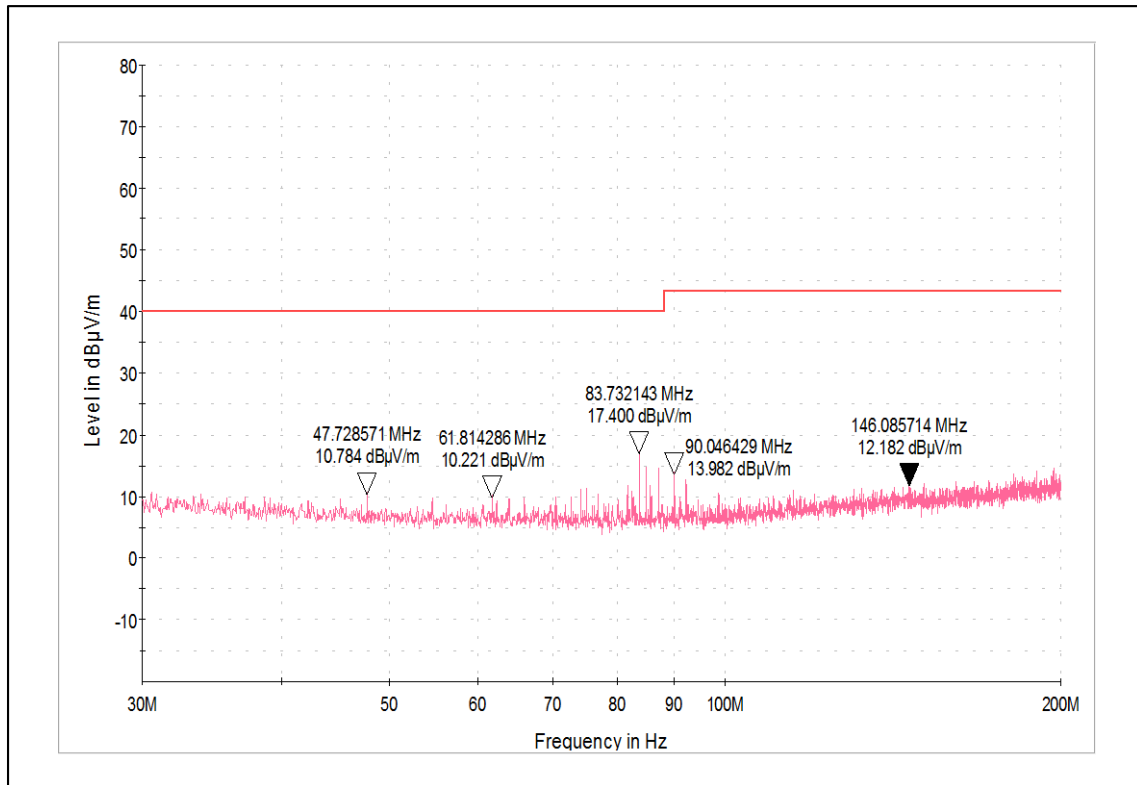


Channel Frequency 200MHz – 1GHz

Polarization Horizontal

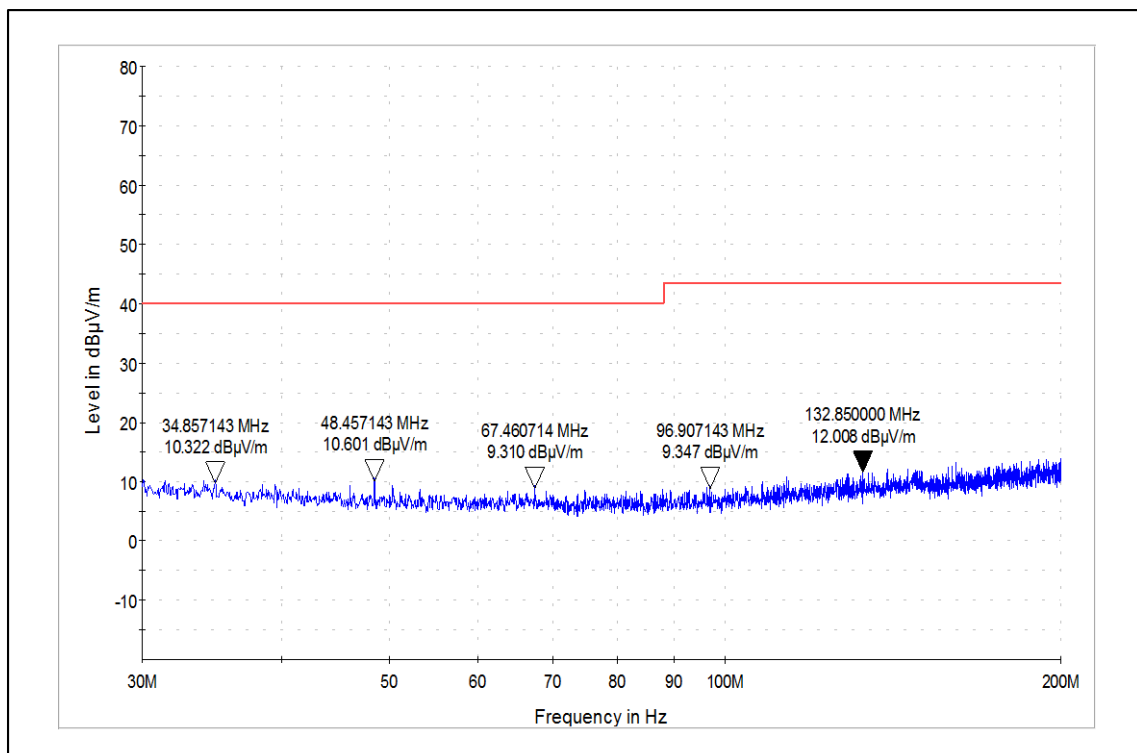
Mode of Operation: Linear Mode

Polarization	Frequency (MHz)	Measured value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	47.72	10.78	40	-29.22
	61.81	10.22	40	-29.78
	83.73	17.40	43.5	-26.10
	499.98	22.58	46	-23.42
	700.02	24.97	46	-21.03
	900.00	37.79	46	-8.21
Horizontal	34.85	10.32	40	-29.68
	48.45	10.60	40	-29.40
	67.46	9.31	40	-30.69
	300.01	18.42	46	-27.58
	499.98	26.15	46	-19.85
	900.00	30.23	46	-15.77



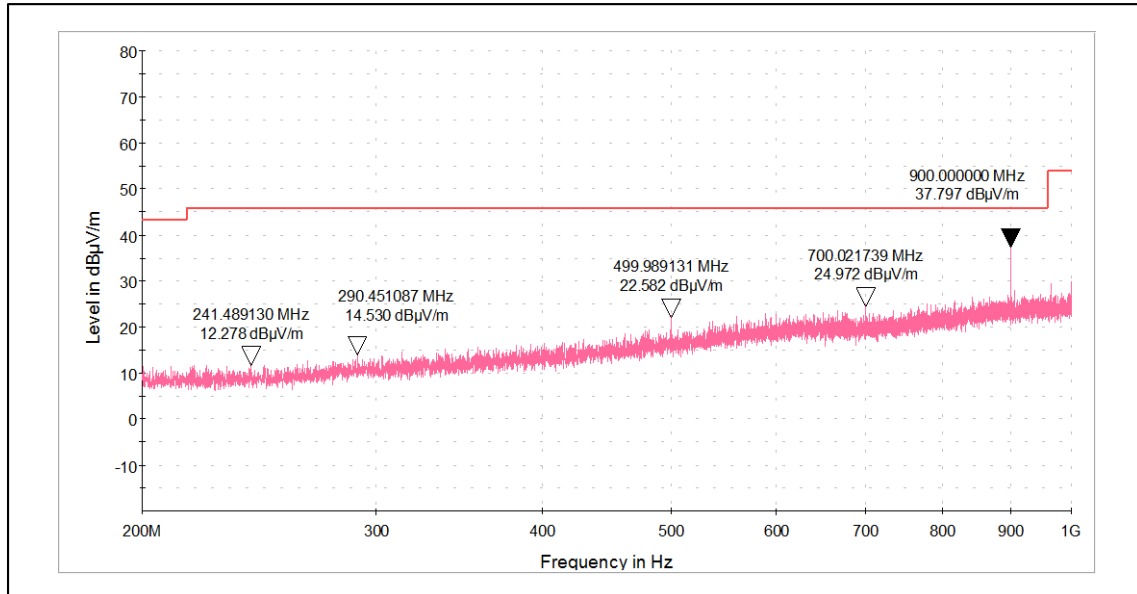
Channel Frequency 30MHz – 200MHz

Polarization Vertical



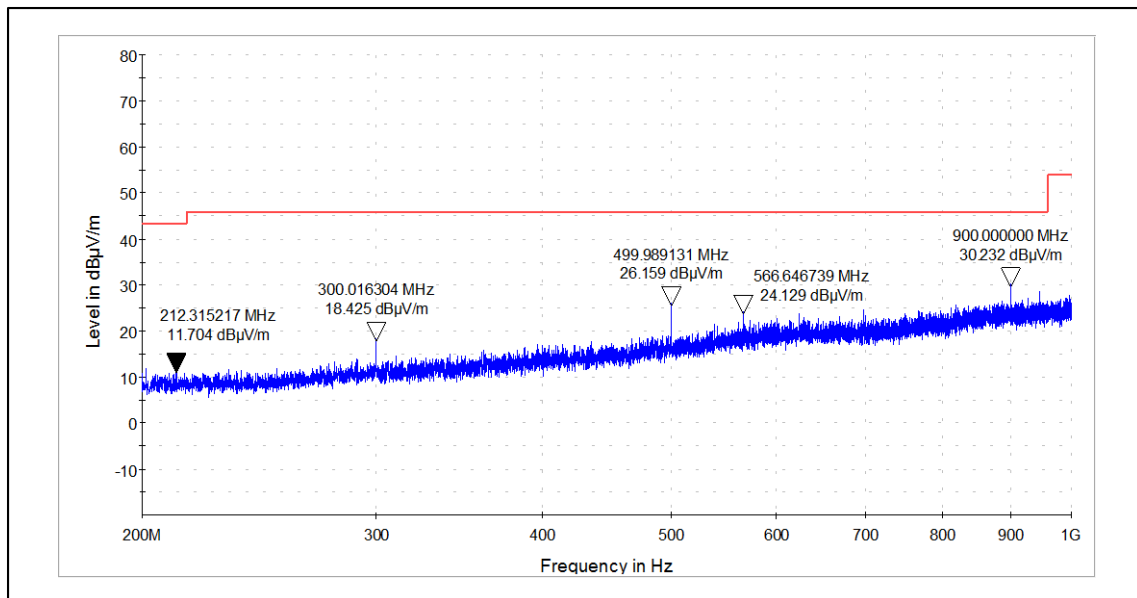
Channel Frequency 30MHz – 200MHz

Polarization Horizontal



Channel Frequency 200MHz – 1GHz

Polarization Vertical



Channel Frequency 200MHz – 1GHz

Polarization Horizontal

Test results for frequency range – 1GHz to 40 GHz

Modulation: 802.11a
Data rate: 6Mbps

Frequency Band	Channel No. or Frequency (MHz)	Polarization	Frequency (MHz)	Emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150-5250 (UNII-1)	36(5180)	Vertical	5150(PK)	61.83	74.00*	-12.17
			5150(Av)	48.12	54.00*	-5.88
			5180(PK)	105.64	-	-
			5180(Av)	95.31	-	-
			10360(Pk)	53.67	68.20	-14.53
		10360(Av)	40.99	54.00	-13.01	
		Horizontal	5150(PK)	56.66	74.00*	-17.34
			5150(Av)	43.28	54.00*	-10.72
			5180(PK)	101.77	-	-
			5180(Av)	91.56	-	-
	10360(Pk)		53.38	68.20	-14.82	
	48(5240)	Vertical	10360(Av)	40.97	54.00	-13.03
			5240(PK)	104.7	-	-
			5240(Av)	95.41	-	-
			5350(PK)	51.02	74.00*	-22.98
			5350(Av)	38.96	54.00*	-15.04
		Horizontal	10480(Pk)	55.25	68.20	-12.95
			10480(Av)	41.84	54.00	-12.16
			5240(PK)	101.76	-	-
			5240(Av)	90.98	-	-
5350(PK)			47.72	74.00*	-26.28	
5725-5825 (UNII-3)	Vertical	5350(Av)	34.81	54.00*	-19.19	
		10480(Pk)	54.29	68.20	-13.91	
		10480(Av)	43.21	54.00	-10.79	
		5715(Pk)	51.97	78.2	-26.23	
		5725(Pk)	64.27	78.2	-13.93	
		5745(Pk)	100.55	-	-	
	Horizontal	5745(Av)	90.34	-	-	
		11490(Pk)	55.79	74.00*	-18.21	
		11490(Av)	43.44	54.00*	-10.56	
		5715(Pk)	48.33	78.2	-29.87	
		5725(Pk)	60.13	78.2	-18.07	
		5745(PK)	96.24	-	-	
149(5745)	Horizontal	5745(Av)	85.70	-	-	
		11490(Pk)	55.77	74.00*	-18.23	
		11490(Av)	43.40	54.00*	-10.60	
		5715(Pk)	48.33	78.2	-29.87	

Note:

* :- Indicate restricted band frequency in 15.205
Pk: Peak Detector; Av: Average Detector

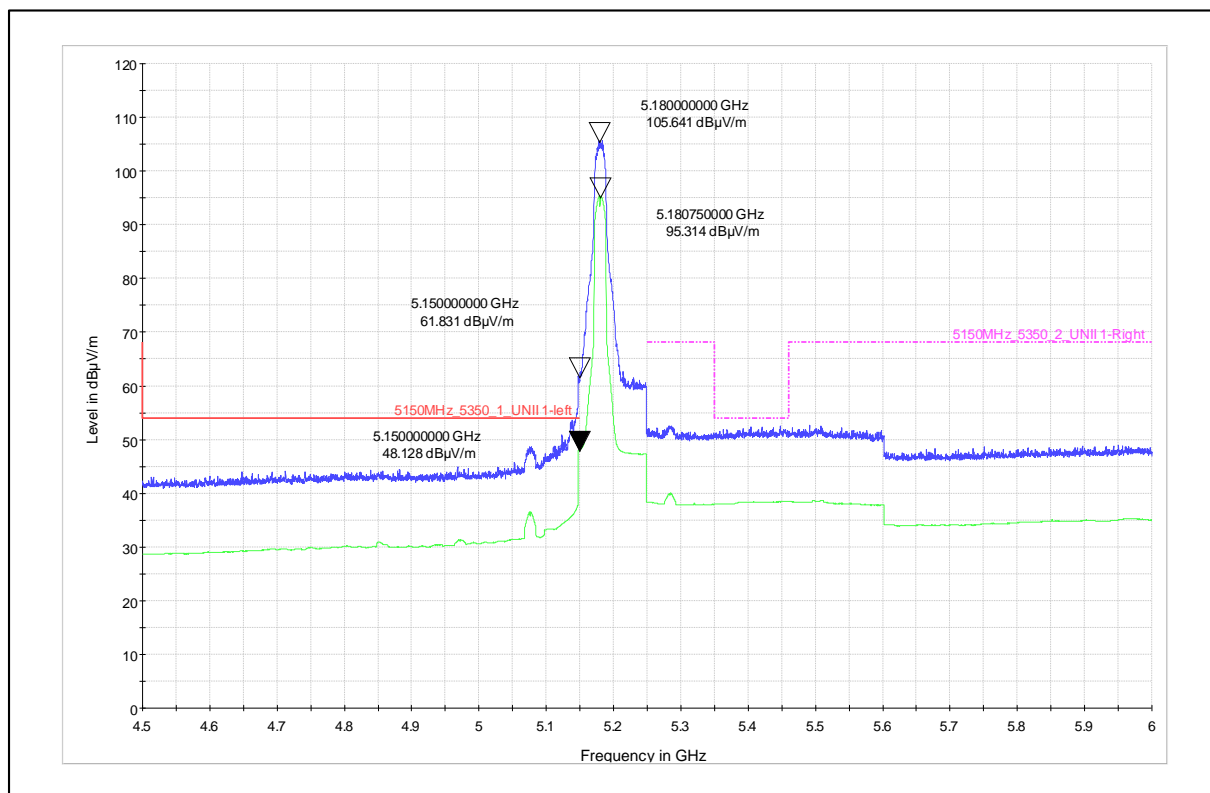
5725-5825 (UNII-3)	157(5825)	Vertical	5825(PK)	101.87	-	-
			5825(Av)	91.68	-	-
			5850(Pk)	61.51	78.2	-16.69
			5860(Pk)	51.70	78.2	-26.5
			11650(Pk)	56.61	74.00*	-17.39
			11650(Av)	44.23	54.00*	-9.77
	Horizontal	5825(PK)	98.44	-	-	
		5825(Av)	87.64	-	-	
		5850(Pk)	57.51	78.2	-20.69	
		5860(Pk)	48.75	78.2	-29.45	
		11650(Pk)	56.07	74.00*	-17.93	
		11650(Av)	43.56	54.00*	-10.44	

Note:

* :- Indicate restricted band frequency in 15.205

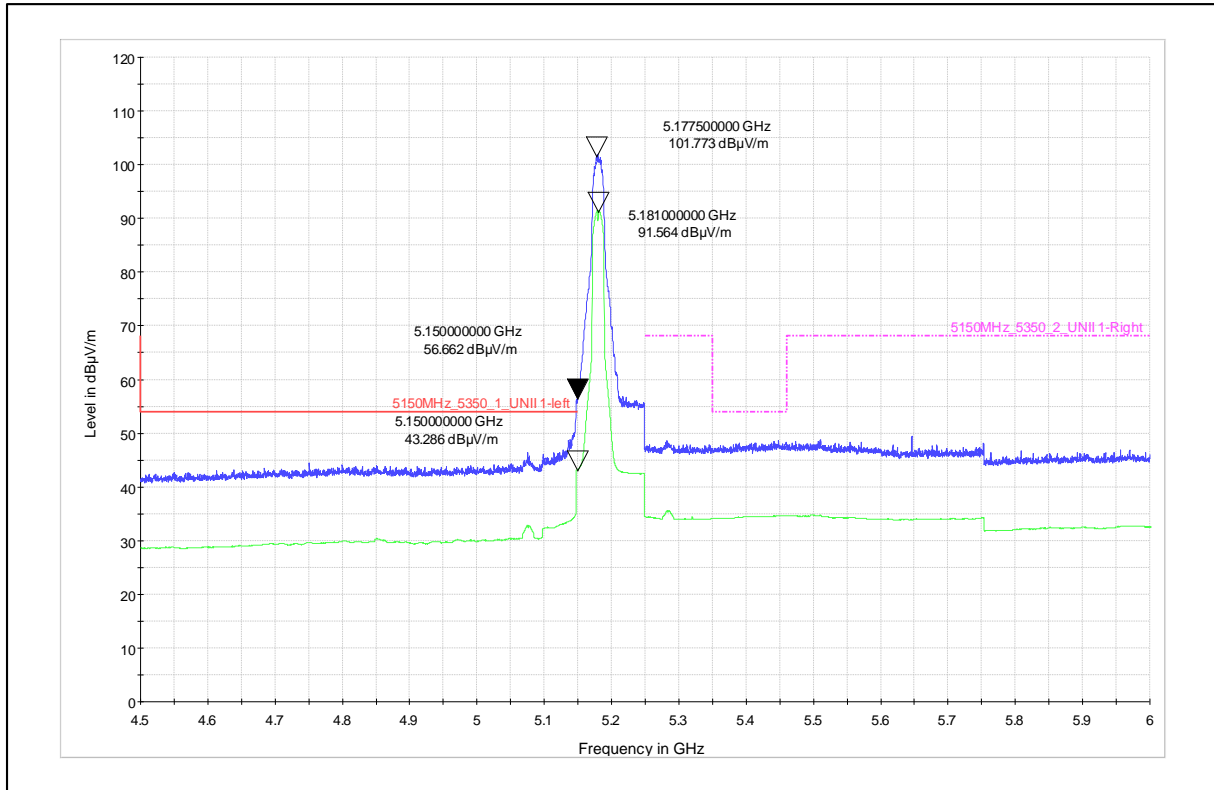
Pk: Peak Detector; Av: Average Detector

Worst case emissions for restricted band of operation



Channel Frequency: 5180MHz

Polarization: Vertical



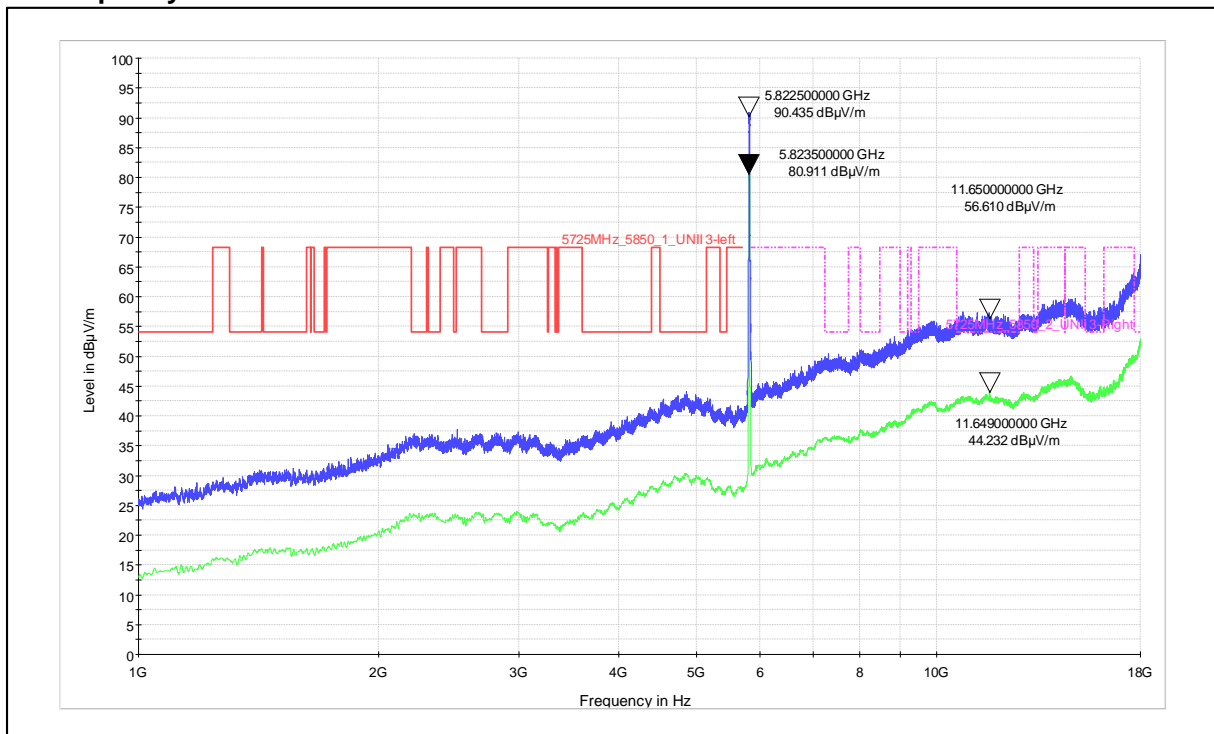
Channel Frequency: 5180MHz

Polarization: Horizontal

Worst case emissions for Spurious radiated emissions above 1GHz

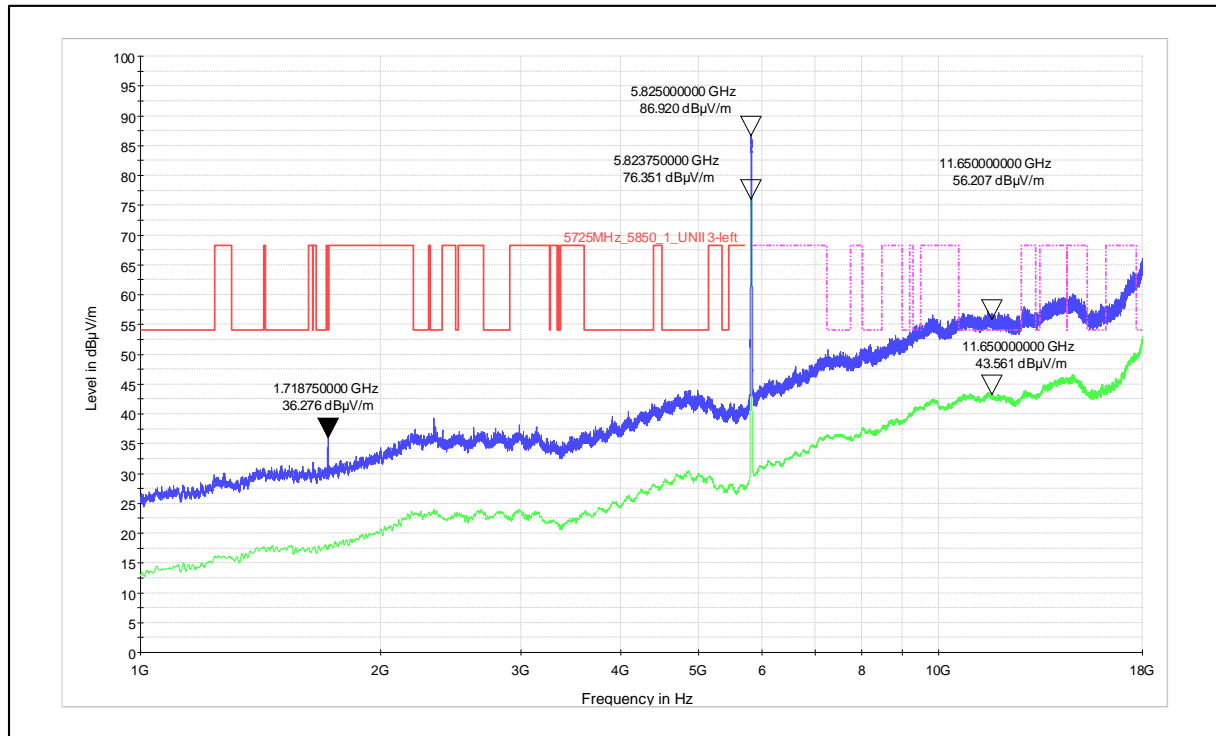
Data rate: 6Mbps

Channel Frequency: 5825MHz



Frequency Range: 1 to 18GHz

Polarization: Vertical



Frequency Range: 1 to 18GHz

Polarization: Horizontal

Prüfbericht - Nr.:

ULR-TC56882030000050F

Seite 70 von 108

Test Report No.:

Page 70 of 108

Modulation: 802.11a

Data rate: 24Mbps

Frequency Band	Channel No. or Frequency (MHz)	Polarization	Frequency (MHz)	Emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150-5250 (UNII-1)	36(5180)	Vertical	5150(PK)	64.80	74.00*	-9.20
			5150(Av)	48.90	54.00*	-5.10
			5180(PK)	106.65	-	-
			5180(Av)	94.16	-	-
			10360(Pk)	53.62	68.20	-14.58
		10360(Av)	40.93	54.00	-13.07	
		Horizontal	5150(PK)	60.53	74.00*	-13.47
			5150(Av)	44.41	54.00*	-9.59
			5180(PK)	103.73	-	-
			5180(Av)	90.65	-	-
	10360(PK)		52.80	68.20	-15.40	
	48(5240)	Vertical	10360(Av)	40.94	54.00	-13.06
			5240(PK)	107.95	-	-
			5240(Av)	95.03	-	-
			5350(PK)	52.15	74.00*	-21.85
			5350(Av)	39.05	54.00*	-14.95
		Horizontal	10480(Pk)	53.41	68.20	-14.79
			10480(Av)	41.78	54.00	-13.22
			5240(PK)	102.25	-	-
			5240(Av)	89.92	-	-
5350(PK)			47.24	74.00*	-26.76	
5725-5825 (UNII-3)	Vertical	5350(Av)	34.65	54.00*	-19.35	
		10480(Pk)	53.80	68.20	-14.40	
		10480(Av)	41.79	54.00	-12.21	
		5715(Pk)	53.23	78.2	-24.97	
		5725(Pk)	65.66	78.2	-12.54	
		5745(PK)	101.30	-	-	
	Horizontal	5745(Av)	89.29	-	-	
		11490(Pk)	55.61	74.00*	-18.39	
		11490(Av)	43.37	54.00*	-10.63	
		5715(Pk)	61.53	78.2	-16.67	
		5725(Pk)	49.99	78.2	-28.21	
		5745(PK)	97.06	-	-	
			5745(Av)	84.90	-	-
			11490(Pk)	55.46	74.00*	-18.54
			11490(Av)	43.33	54.00*	-10.67

Note:

* - Indicate restricted band frequency in 15.205

Pk: Peak Detector; Av: Average Detector

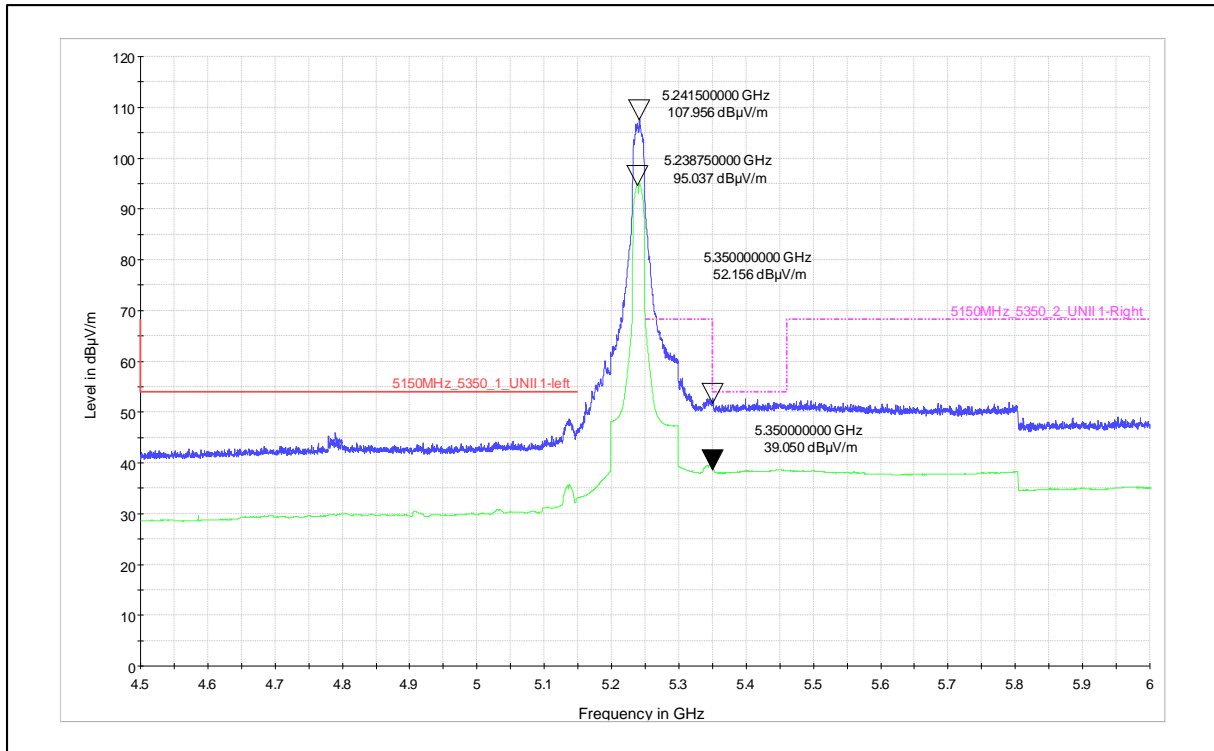
157(5825)	Vertical	5825(PK)	102.82	-	-
		5825(Av)	90.31	-	-
		5850(Pk)	62.66	78.2	-15.54
		5860(Pk)	57.92	78.2	-20.28
		11650(Pk)	56.61	74.00*	-17.39
		11650(Av)	44.12	54.00*	-9.88
	Horizontal	5825(PK)	99.25	-	-
		5825(Av)	86.12	-	-
		5850(Pk)	59.73	78.2	-18.47
		5860(Pk)	57.17	78.2	-21.03
		11650(Pk)	55.41	74.00*	-18.59
		11650(Av)	43.40	54.00*	-10.60

Note:

* :- Indicate restricted band frequency in 15.205

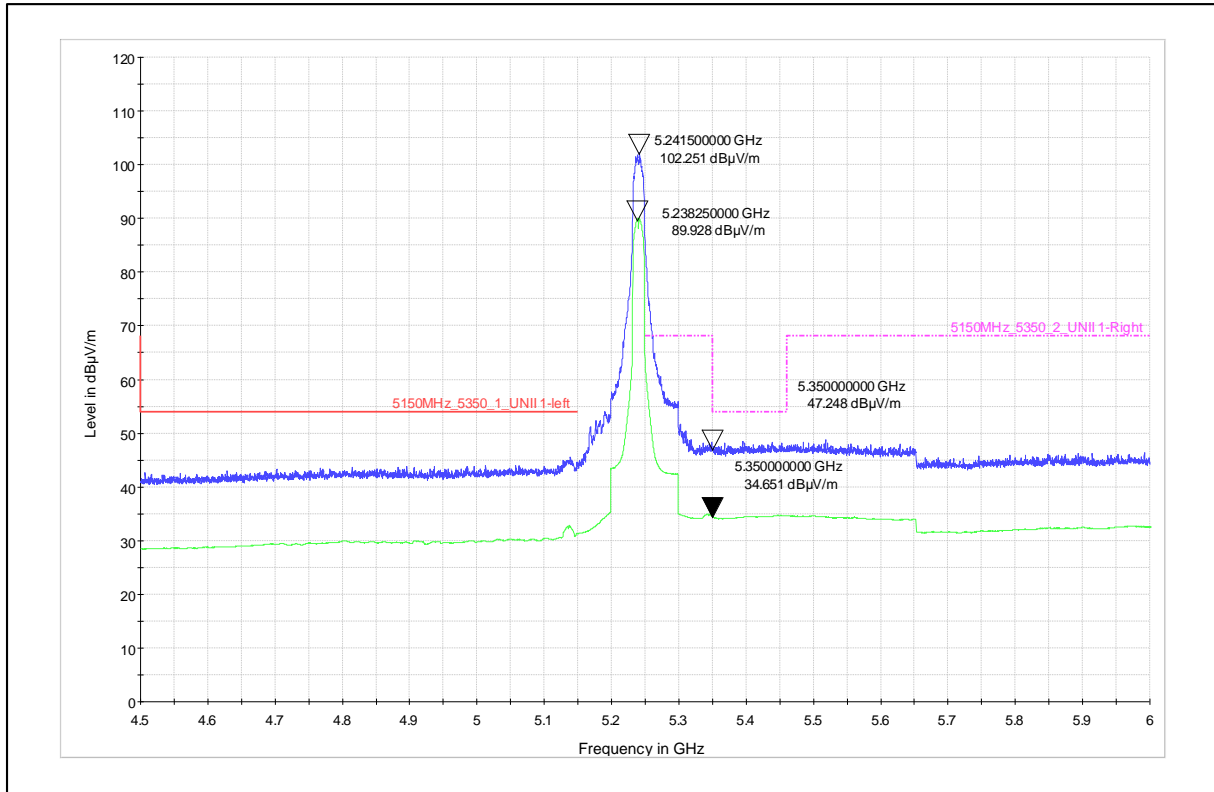
Pk: Peak Detector; Av : Average Detector

Worst case emissions for restricted band of operation



Channel Frequency: 5240MHz

Polarization: Vertical



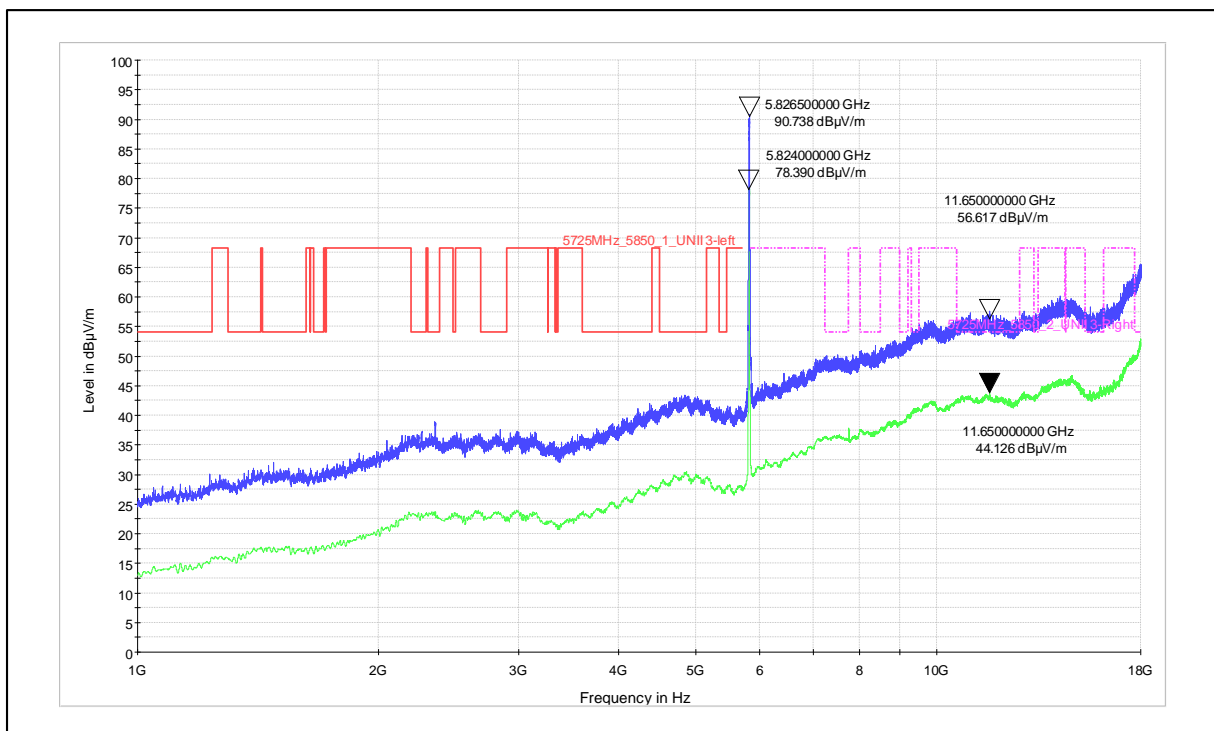
Channel Frequency: 5240MHz

Polarization: Horizontal

Worst case emissions for Spurious radiated emissions above 1GHz

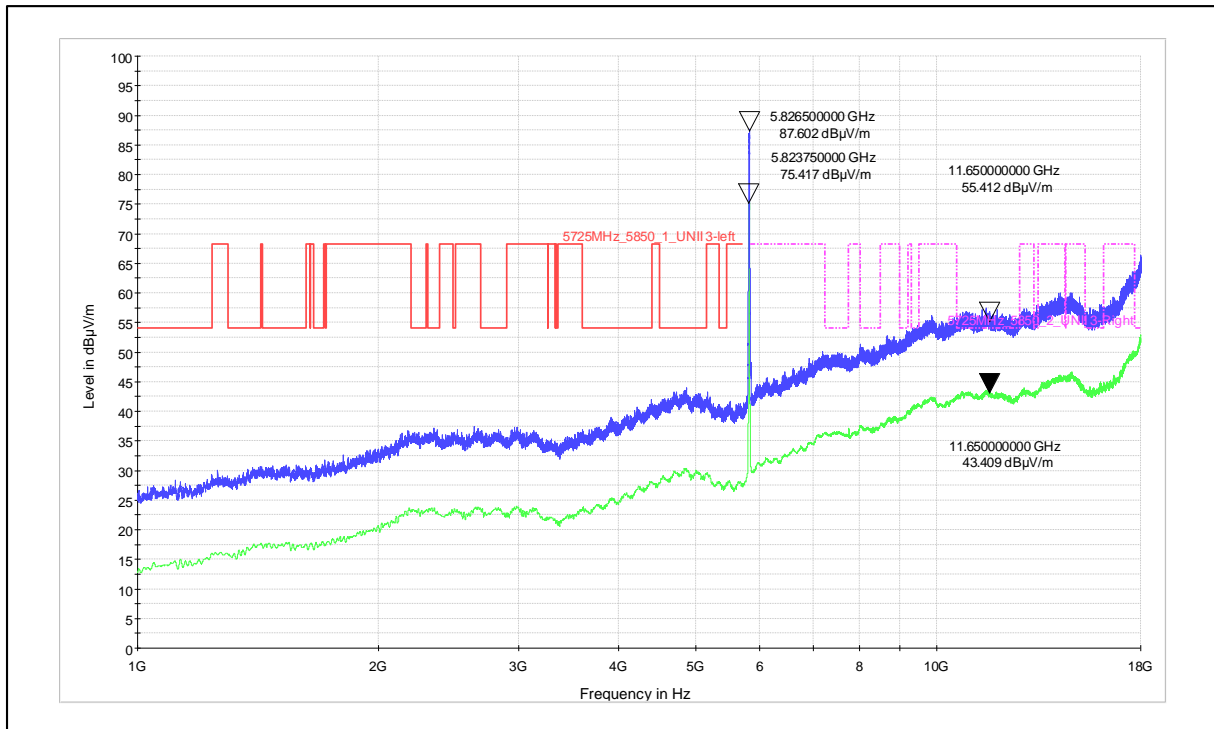
Data rate: 24Mbps

Channel Frequency: 5825MHz



Frequency Range: 1 to 18GHz

Polarization: Vertical



Frequency Range: 1 to 18GHz

Polarization: Horizontal

Modulation: 802.11a
Data rate: 54Mbps

Frequency Band	Channel No. or Frequency	Polarization	Frequency (MHz)	Emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150-5250 (UNII-1)	36(5180)	Vertical	5150(PK)	62.22	74.00*	-11.78
			5150(Av)	48.18	54.00*	-5.82
			5180(PK)	105.53	-	-
			5180(Av)	92.34	-	-
			10360(Pk)	53.65	68.20	-14.55
		10360(Av)	40.91	54.00	-13.09	
		Horizontal	5150(PK)	57.79	74.00*	-16.21
			5150(Av)	43.45	54.00*	-10.55
			5180(PK)	102.03	-	-
			5180(Av)	88.56	-	-
	10360(Pk)		53.99	68.20	-14.21	
	48(5240)	Vertical	5240(PK)	105.36	-	-
			5240(Av)	92.79	-	-
			5350(PK)	51.78	74.00*	-22.22
			5350(Av)	39.23	54.00*	-14.77
			10480(Pk)	54.10	68.20	-14.10
		Horizontal	10480(Av)	41.80	54.00	-12.20
			5240(PK)	99.71	-	-
			5240(Av)	86.10	-	-
			5350(PK)	46.51	74.00*	-27.49
5350(Av)			34.44	54.00*	-19.56	
5725-5825 (UNII-3)	Vertical	10480(Pk)	53.24	68.20	-14.96	
		10480(Av)	40.95	54.00	-13.05	
		5715(Pk)	64.68	78.2	-13.52	
		5725(Pk)	53.24	78.2	-24.96	
		5745(PK)	101.31	-	-	
	Horizontal	5745(Av)	87.53	-	-	
		11490(Pk)	54.97	74.00*	-19.03	
		11490(Av)	43.33	54.00*	-10.67	
		5715(Pk)	50.62	78.2	-27.58	
		5725(Pk)	60.86	78.2	-17.34	
		Horizontal	5745(PK)	97.24	-	-
			5745(Av)	84.04	-	-
			11490(Pk)	57.68	74.00*	-16.32
			11490(Av)	43.37	54.00*	-10.63

Note:

* - Indicate restricted band frequency in 15.205

Pk: Peak Detector; Av: Average Detector

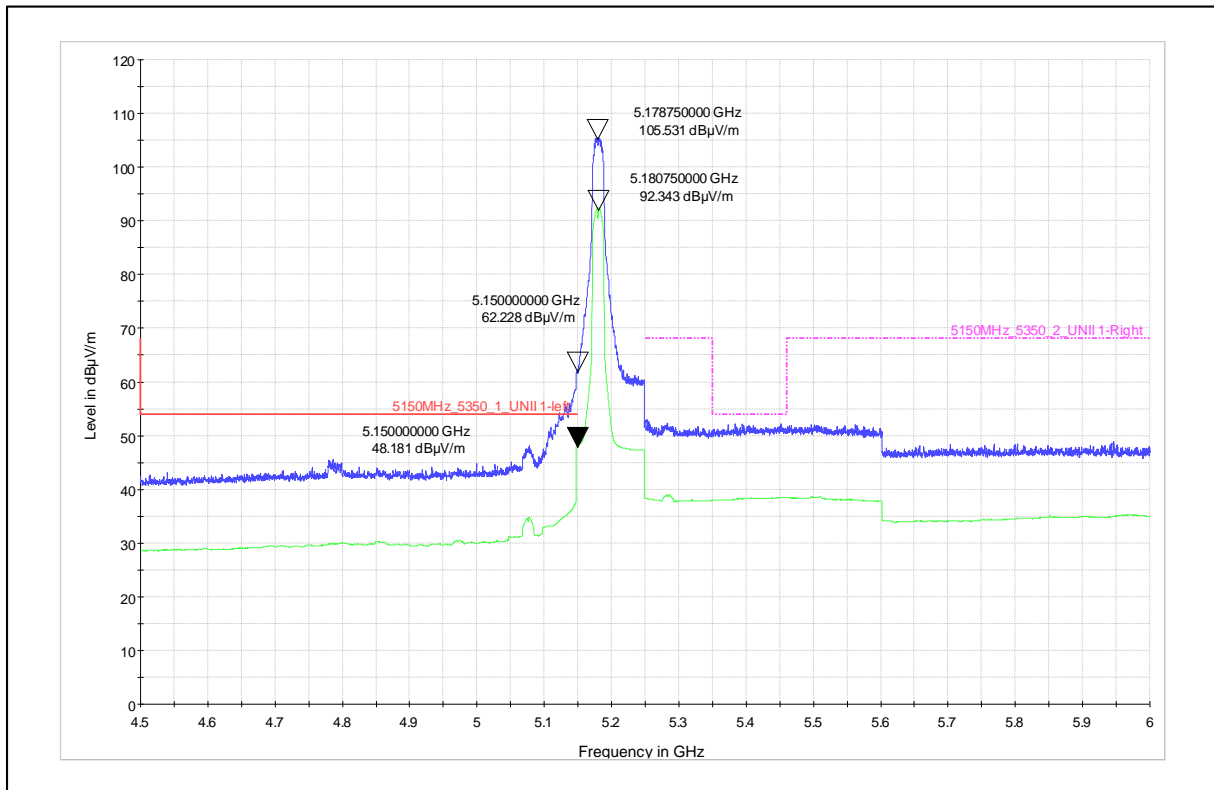
5725-5825 (UNII-3)	157(5825)	Vertical	5825(PK)	98.55	-	-
			5825(Av)	85.03	-	-
			5850(Pk)	49.81	78.2	-28.39
			5860(PK)	51.47	78.2	-26.73
			11650(Pk)	57.65	74.00*	-16.35
			11650(Av)	44.09	54.00*	-9.91
	Horizontal	5825(PK)	98.44	-	-	
		5825(Av)	85.21	-	-	
		5850(Pk)	61.20	78.2	-17.00	
		5860(Pk)	51.07	78.2	-27.13	
		11650(Pk)	55.89	74.00*	-18.11	
		11650(Av)	43.45	54.00*	-10.55	

Note:

* :- Indicate restricted band frequency in 15.205

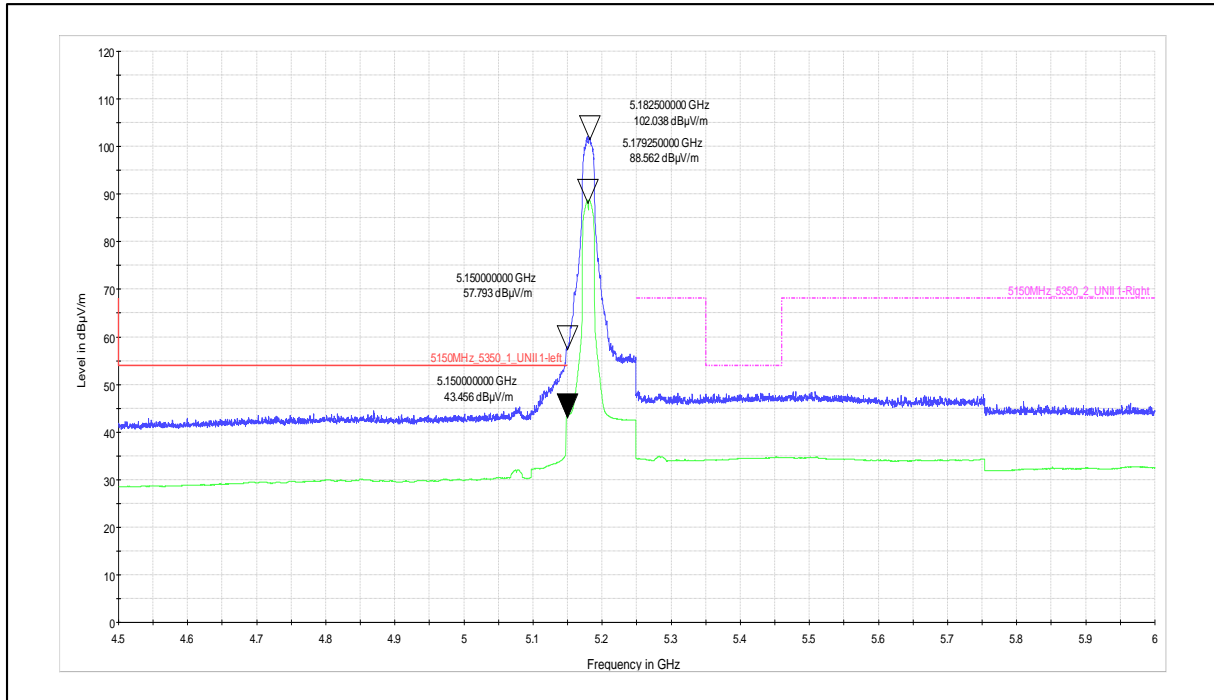
Pk: Peak Detector; Av: Average Detector

Worst case emissions for restricted band of operation



Channel Frequency: 5180MHz

Polarization: Vertical



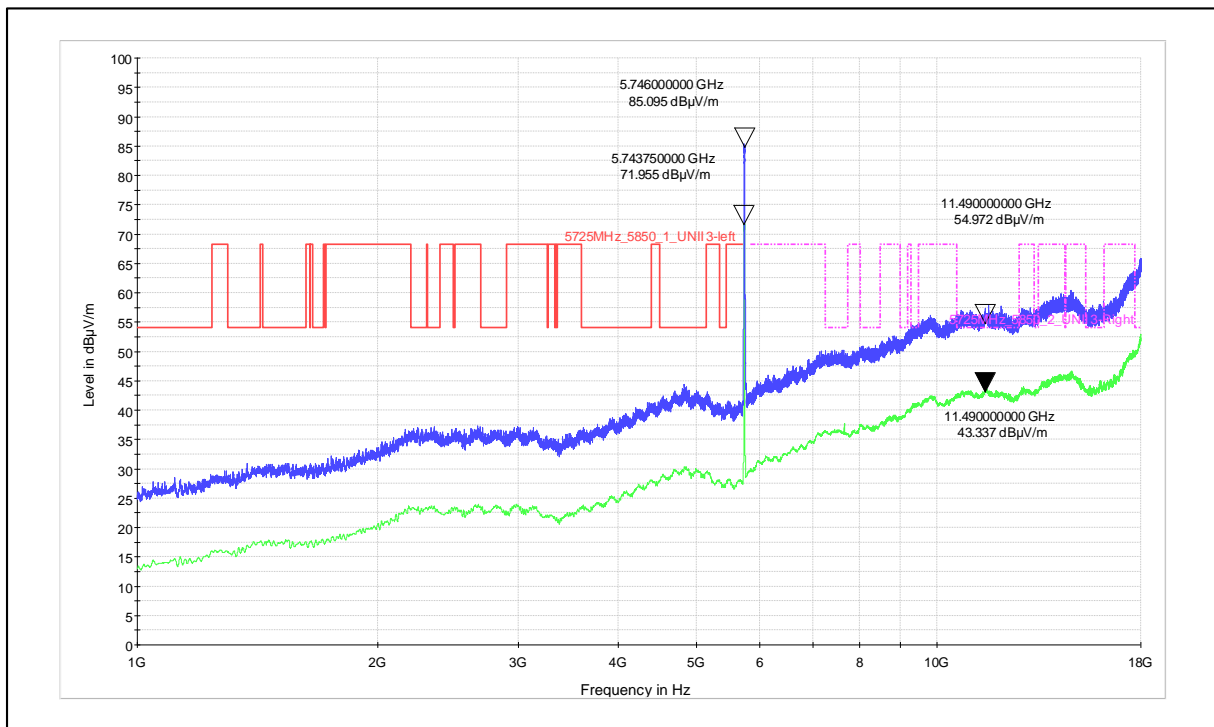
Channel Frequency: 5180MHz

Polarization: Horizontal

Worst case emissions for Spurious radiated emissions above 1GHz

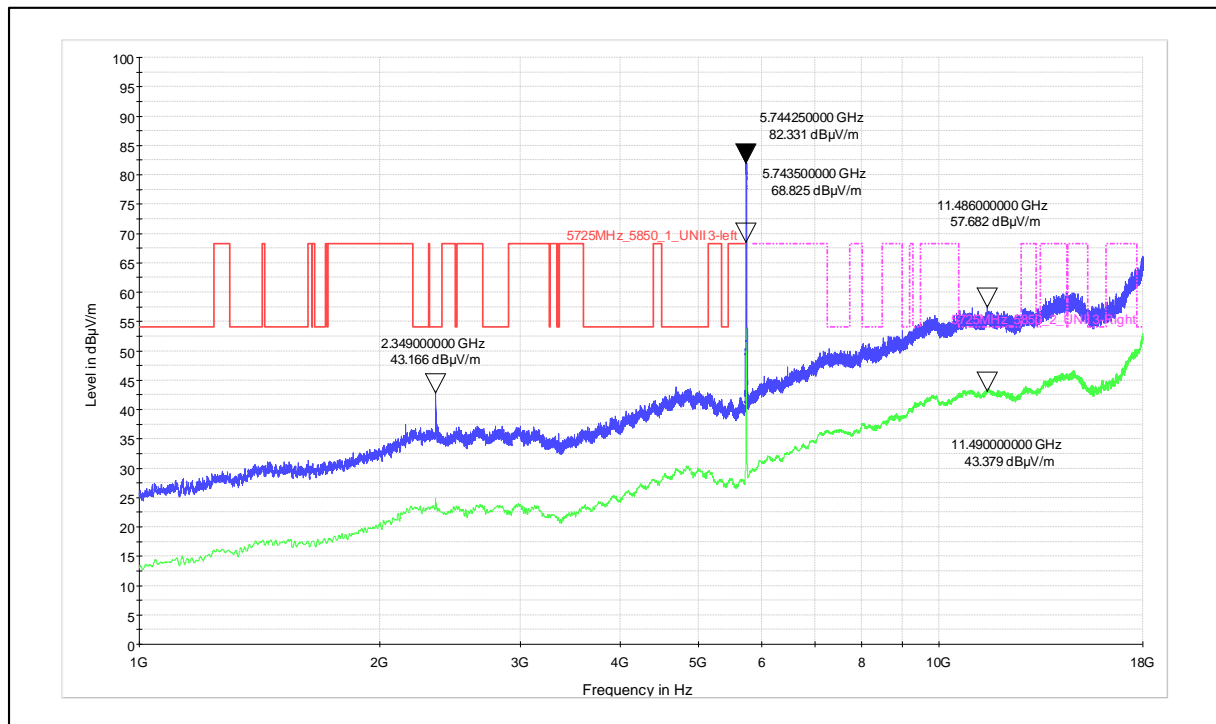
Data rate: 54Mbps

Channel Frequency: 5745 MHz



Frequency Range: 1 to 18GHz

Polarization: Vertical



Frequency Range: 1 to 18 GHz

Polarization: Horizontal

Modulation: 802.11n-20MHz
Data rate: MCS0

Frequency Band	Channel No. or Frequency (MHz)	Polarization	Frequency (MHz)	Emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	
5150-5250 (UNII-1)	36(5180)	Vertical	5150(PK)	62.05	74.00*	-11.95	
			5150(Av)	48.11	54.00*	-5.89	
			5180(PK)	106.03	-	-	
			5180(Av)	95.45	-	-	
			10360(Pk)	53.20	68.20	-15.00	
			10360(Av)	40.89	54.00	-13.11	
		Horizontal	5150(PK)	57.00	74.00*	-17.00	
			5150(Av)	43.43	54.00*	-10.57	
			5180(PK)	102.87	-	-	
			5180(Av)	91.46	-	-	
	48(5240)	Vertical	10360(PK)	53.38	68.20	-14.82	
			10360(Av)	40.91	54.00	-13.09	
			5240(PK)	106.82	-	-	
			5240(Av)	95.44	-	-	
			5350(PK)	51.95	74.00*	-22.05	
			5350(Av)	39.10	54.00*	-14.90	
		Horizontal	10480(Pk)	53.15	68.20	-15.05	
			10480(Av)	41.77	54.00	-12.23	
			5240(PK)	101.96	-	-	
			5240(Av)	91.02	-	-	
5725-5825 (UNII-3)	149(5745)	Vertical	5350(PK)	47.50	74.00*	-26.50	
			5350(Av)	34.89	54.00*	-19.11	
			10480(PK)	54.07	68.20	-14.13	
			10480(Av)	41.76	54.00	-12.24	
			5715(Pk)	51.81	78.20	-26.39	
			5725(Pk)	66.44	78.20	-11.76	
		Horizontal	5745(PK)	101.88	-	-	
			5745(Av)	90.23	-	-	
			11490(Pk)	55.78	74.00*	-18.22	
			11490(Av)	43.58	54.00*	-10.42	
			Horizontal	5715(Pk)	47.91	78.20	-30.29
				5725(Pk)	62.23	78.20	-15.97
				5745(PK)	97.86	-	-
				5745(Av)	85.88	-	-
			11490(Pk)	55.23	74.00*	-18.77	
			11490(Av)	43.35	54.00*	-10.65	

Note:

* :- Indicate restricted band frequency in 15.205
Pk: Peak Detector; Av: Average Detector

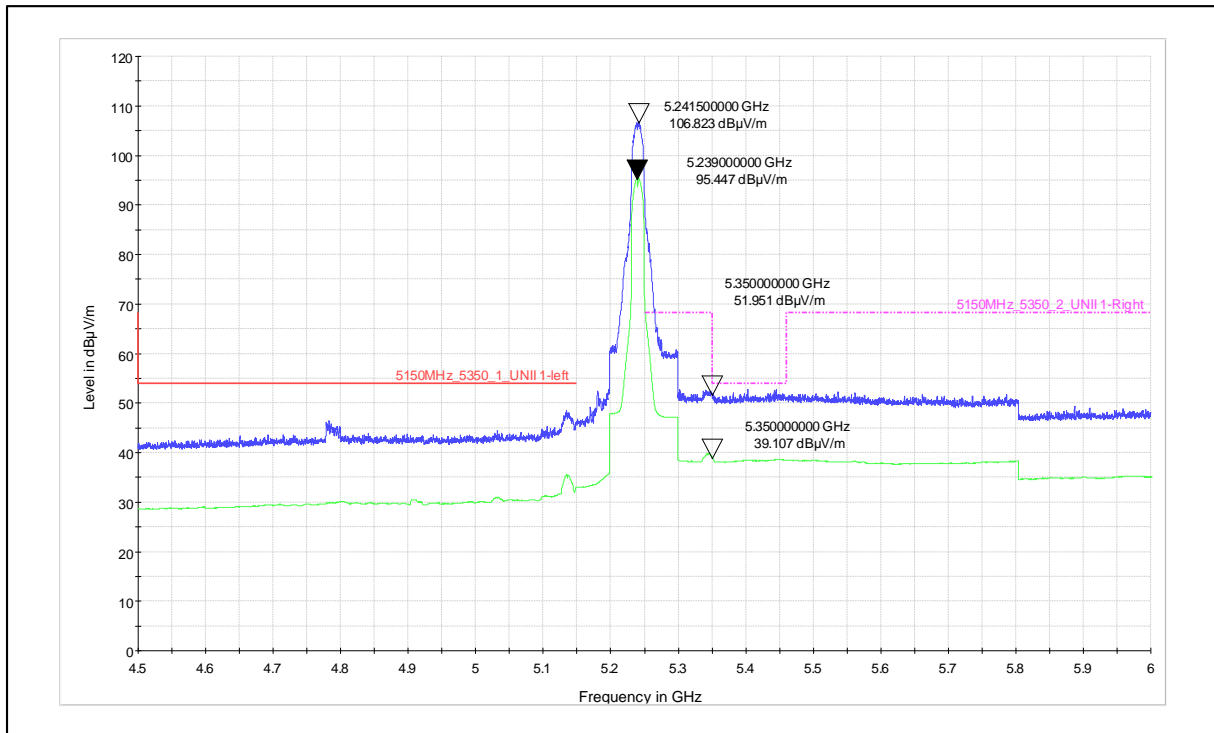
157(5825)	Vertical	5825(PK)	103.18	-	-
		5825(Av)	91.95	-	-
		5850(Pk)	63.30	78.20	-14.90
		5860(Pk)	55.34	78.20	-22.86
		11650(Pk)	58.52	74.00*	-15.48
		11650(Av)	44.25	54.00*	-9.75
	Horizontal	5825(PK)	98.52	-	-
		5825(Av)	87.39	-	-
		5850(Pk)	59.21	78.20	-18.99
		5860(Pk)	50.89	78.20	-27.31
		11650(Pk)	55.49	74.00*	-18.51
		11650(Av)	43.48	54.00*	-10.52

Note:

* :- Indicate restricted band frequency in 15.205

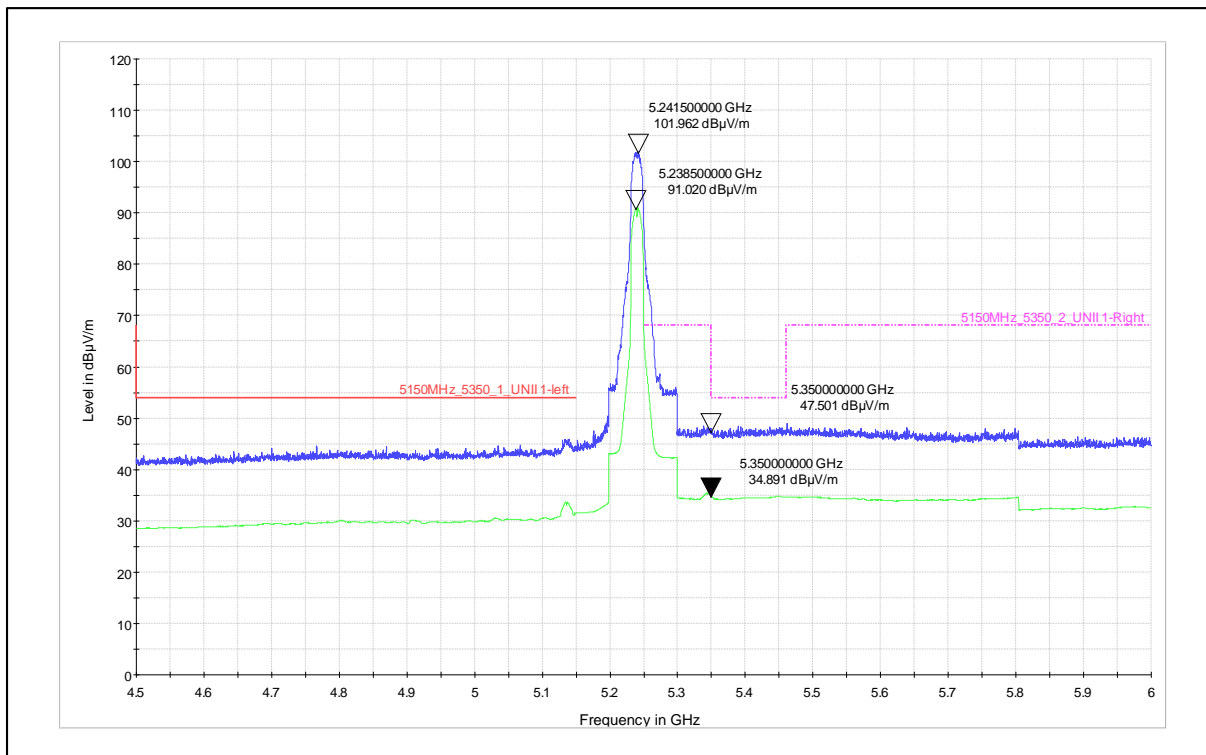
Pk: Peak Detector; Av: Average Detector

Worst case emissions for restricted band of operation



Channel Frequency: 5240MHz

Polarization: Vertical

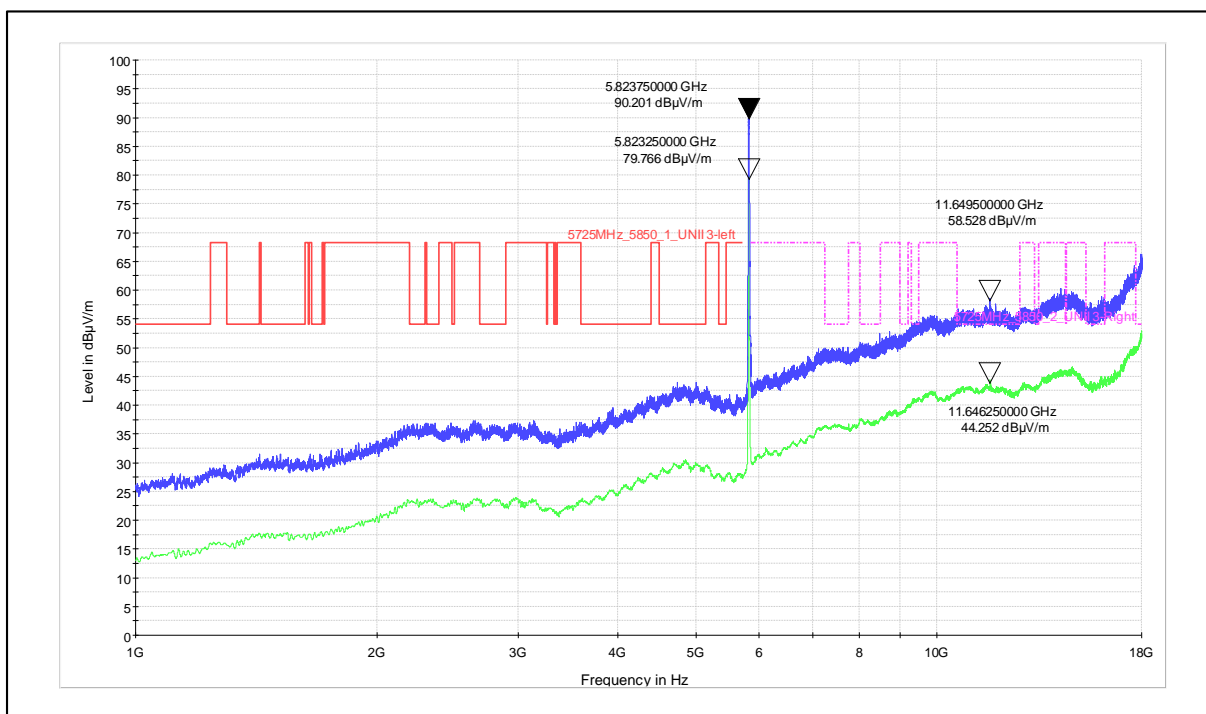


Channel Frequency: 5180MHz

Polarization: Horizontal

Worst case emissions for Spurious radiated emissions above 1GHz

Modulation: 802.11n-20MHz
Channel Frequency: 5825 MHz



Frequency Range: 1 to 18GHz

Polarization: Vertical