NOKIA

TEST REPORT NO: D563462429

FCC ID: VBNAZRA-01

Date:	Oulu 8. May 2018
Pages:	282
Appendices:	-

Equipment Under Test:	AirScale BTS RRH 5 GHz
	Radio Access technology: E-UTRA (FDD)
Type:	AZRA
Manufacturer:	Nokia Solutions and Networks Oy
Address:	P.O. Box 319,
	Kaapelitie 4, FI-90620, Oulu, Finland
Task:	Conformance test according to the specifications mentioned below
Test Specification(s):	
	FCC CFR 47 part 15E and part 2 (2018)
Result:	The EUT complies with the requirements of the specification

The results relate only to the items tested as described in this test report.

Approved by:	Date	Signature
Jari Virta
Product Conformity
Manager
NSN	8. May 2018	

CONTENTS

1. SUMMARY

The following tests were performed according to the FCC rules in order to verify the compliance of the EUT with the FCC requirements:

Test No.	Measurement	FCC Rule	Page Number of this Report	Result
1	RF Power Output	§ 2.1046, § 15.407	9	compliant
	Maximum Power Spectral Density	§ 2.1046, § 15.407		
3	Modulation Characteristics	§ 2.1047, § 2.201	21	compliant
4	Bandwidth Measurements	§ 2.1049, §15.407	26	compliant
5	Spurious Emissions at Antenna Terminals	§ 2.1051, § 2.1057, § 15.407.53	33	compliant
6	Field Strength of Spurious Radiation	§ 2.1053, § 2.1057, §15.407, §15.209	38	compliant
7	Frequency Stability	§ 2.1055, § 15.407	46	compliant

Table 1 Results – Summary

In accordance with the FCC Rule §15.3 (z) the equipment was tested with the limits that are valid for an *unintentional radiator*.

Measurements guidance: FCC OET laboratory KDB: 662911 D01 Multiple Transmitter Output v01r02, FCC KDB 971168 D01 Power Meas License Digital Systems v02r02 and FCC KDB 789033 D02 General U-NII Test Procedures New Rules v01r04.

Test Laboratory:

Nokia Solutions and Networks Oy

Kaapelitie 4,

FI-90620, Oulu, Finland

Jari Virta

FCC Reg. No: 411251

Testing laboratory accreditation number: T297

1.1 Time Schedule

Test No.	1, 2, 3, 4	5	6
Start of Test:	11 Jan 2018	11 Jan 2018	13 Feb 2018
End of Test:	27 Feb 2018	23 Feb 2018	14 Feb 2018

1.2 Participants

Name	Function	Signature
RF Test person (Nokia) Jari Vähämäki	Tests nos: 1,2,3,4,6 Setup of EUT	
EMC Test person (Nokia) Sami Riuttanen	Test no 5, Setup of EUT	

2. EQUIPMENT UNDER TEST

The EUT is a LTE Base transceiver station 5 GHz RRH (UNII-1 and UNII-3) with 2 power amplifiers.

The BTS performs the full RAN function of LTE system (evolved UTRA). This is sometimes referred to as collapsed RAN, where equivalent functions of former 3G BTS and 3G RNC are all integrated into BTS. BTS is connected directly to the core network via S1 interface, and to mobile stations via Air interface (Uu). In addition BTS's are optionally connected directly to each other via X2 interface for handover purposes.

The tested equipment is representative for serial production.

2.1 Configuration of EUT

The used different EUT configurations are shown by the following table.

Module Type	Flexi Multiradio BTS RRH 5 GHz	
Radio Access Technology	E-UTRA	
Duplex mode	FDD	
Channel Bandwidth	Single carrier 20MHz (Config. A, 1 X 27.0 dBm), Dual carrier 20MHz (Config. B, 2 X 24.0 dBm), Triple carrier 20MHz (Config. C, 3 X 22.0 dBm).	
Supply Voltage	48.0 V DC	
Frequency Bands		
UNII-1 Channel Bandwidth 20MHz (Unlisensed National Information Infrastructure)	**Lowest** tunable freq. Singe carrier	5180.0 MHz
	Dual carriers	5180.0/ 5200.0MHz
	Triple carriers	5180.0/ 5200.0/ 5220.0 MHz
	Highest tunable freq. Single carrier	5240.0 MHz
	Dual carriers	5220.0/ 5240.0 MHz
	Triple carriers	5200.0/ 5220.0/ 5240.0 MHz
UNII-3 Channel Bandwidth 20 MHz (Unlisensed National Information Infrastructure)	**Lowest** tunable freq. Singe carrier	5745.0 MHz
	Dual carriers	5745.0/ 5765.0 MHz
	Triple carriers	5745.0/ 5765.0/ 5785.0 MHz
	Highest tunable freq. Single carrier	5825.0 MHz
	Dual carriers	5805.0/ 5825.0 MHz
	Triple carriers	5785.0/ 5805.0/ 5825.0 MHz
Single carrier		
Rated Output Power (Prat)	Maximum 0.5 W/ antenna (tuneable: +17 dBm - +27 dBm)	
Downlink/Uplink ratio	-	
	RX	**TX**
Number of Antenna Ports	-	2 (ANT1 to ANT2)
MiMo	-	Yes

Table 2 Overview of EUT configuration

The tests were performed with one EUT at the antenna ports ANT1 and ANT2.

The used different EUT configurations are shown by the following table.

Module Name	Serial-No.	Module Type	Config.
AZRA	1M174252460	RRH	A, B, C
Other Modules	Module Type		Config.
AMIA	AirScale Subrack		A, B, C
ASIA	AirScale Common unit		A, B, C
ABIA	AirScale Capacity unit		A, B, C

Table 3 Configuration of EUT

For a functional description of the modules, please refer to the appropriate related parts and exhibit sections of this certification application.

2.2 Operating Conditions

The EUT supports QPSK, 16QAM, 64QAM and 256QAM modulation. If not stated otherwise, the following standard setup procedure for the EUT was used:

The transmitter was set up according to 3GPP TS 36.141 E-UTRA Test Models (E-TM) for all tests:

- E-TM 1.1: All QPSK modulation testing

- E-TM 3.1: All 64QAM modulation testing

- E-TM 3.2: All 16QAM modulation testing

- E-TM 3.1A: All 256QAM modulation testing

During the measurements, one carrier channel was tested at a time. The carrier was set to the maximum power level to ensure the maximum emission amplitudes during all measurements.

During the tests, the Flexi Multiradio BTS is transmitting a pseudo random bit pattern on the data channels. This ensures that the measurements of the emission characteristics of the transmitter are pursuant to § 2.1049.

2.3 Antenna description

Currently there are two antennas available to be used with the AZRA LAA RRH.
Approved antennas are listed in Installation and Cabling -manual and in following
table.

Table 1 U-NII-1/3 Antenna data from manufacturers

Antenna No	Model Name	Antenna Type/Size (mm)	Frequency (MHz)	Tx/Rx Port	Max Gain (dBi)	
					Port 1	Port 2
1	AARC	Directional 295(L) × 270(W) × 30(D)	5150 ~ 5850	Tx/Rx 1/2	4.91	4.91
2	FA2RC	Directional 160(L) × 110(W) × 44(D)	5150 ~ 5850	Tx/Rx 1/2	6.0	6.0

The antenna patterns in the UNII-1 band (5.17-5.25GHz) were measured for each
port in the elevation angle above 30° from the horizontal plane and provided below,
to demostrate compliancy against FCC section 15.203 and FCC OET KDB 789033
D02 section H.

Antenna data measurements presented in exhibits antenna data files.

**Table 2 Measured antenna gains in UNII-1 band in Elevation Angles 30° above the
horizontal plane for Outdoor EUT**

Antenna No	Model	Antenna Type	Max Gain in Elevation Angle 30° above Horizont (dBi)
1	AARC	Directional	-9.1
2	FA2RC	Directional	-7.0

3.   TEST CONFIGURATION

If not stated otherwise, the following measurement configuration was used to perform all measurements (see figure below).
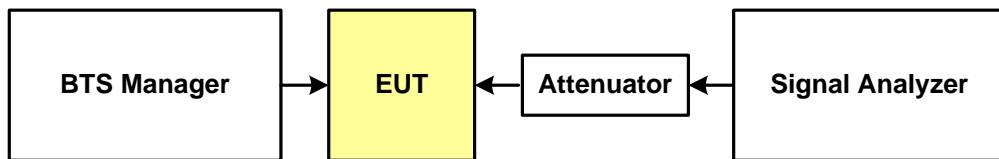
Figure 1 Test Configuration (single output)

The RF output of the transceiver (cell) under test is connected to a signal analyzer via a high power attenuator to protect the input of the signal analyzer from high RF power levels. A description of the analyzer settings is given in each of the sections describing the measurements. The other transceivers are terminated.

A complete list of the measurement equipment is included on page 53 of this measurement report.

3.1   Calibration of the Test Equipment

All relevant test equipment has a valid calibration from an external calibration laboratory. Additionally the signal analyzer has a built-in self-calibration procedure. This calibration procedure was activated prior to the measurements so that the analyzer is deemed accurate. High quality cables were used to connect the measurement equipment to the EUT. The actual loss of the attenuator and the cables was measured with a high precision network analyzer and taken into account for all measurements.

4.   TEST RESULTS

4.1   Test No. 1: RF Output Power and Maximum Power Spectral Density (FCC CFR 47 Part 2 §2.1046, FCC CFR 47 Part 15 §15.407)

4.1.1. Limits

FCC part §15.407, Power limits:

For the band 5.15-5.25 GHz, maximum conducted output power shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

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.

789033 D02 General UNII Test Procedures New Rules v01r04, section H:

Outdoor Point-to-Multipoint device operating in the band 5.15-5.25 GHz, the rules require that the maximum EIRP at any elevation angle above 30° not exceed 125 mW (21 dBm) as measured from the horizon.

4.1.2. Test Procedure and Results

Detachable Antenna: The maximum output power at the antenna terminals was measured using a signal analyzer.

The RF power was measured with a frequency sweep across the carrier (see screenshots). The carrier power was calculated from the signal analyzer by integration over the result. The base station maximum output power is the sum of the measured carrier power and the external attenuation (cable loss of the test set up).

For the MiMo output, RF power output was measured from each antenna port individually and the results summed mathematically in accordance to FCC KDB 662911 D01 -guidance.

Peak to average power (PAPR) was examined using CCDF method and 0.1% value recorded in dB to the tables below.

Power spectral density was measured according to §15.407(1)(iv)(5) and FCC KDB 789033 D02 General U-NII Test Procedures New Rules v01r04 point F.

Cables insertion losses were measured with ZVA network analyzer. These losses should be added to measured output power results to get correct values in output power test.

The following table shows the measured output powers at the antenna connector.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
2 – 12. Feb 16	24.5°C	24.6 °C	5.8 RH%	13.3 RH%

Config A UNII-1:

Table 3 Output Power 20 MHz Bandwidth

Carrier Frequency [MHz]	RF Power Output		Limit §15.407(a)(1)	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				
5180	26.14	0.41	0.5	compliant
5220	25.95	0.39	0.5	compliant
5240	25.78	0.38	0.5	compliant
QPSK-Modulation ANT2				
5180	25.79	0.38	0.5	compliant
5220	25.79	0.38	0.5	compliant
5240	25.8	0.38	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5180	28.98	0.79	1	compliant
5220	28.88	0.77	1	compliant
5240	28.8	0.76	1	compliant
64QAM-Modulation ANT1				
5180	26.14	0.41	0.5	compliant
5220	25.95	0.39	0.5	compliant
5240	25.72	0.37	0.5	compliant
64QAM-Modulation ANT2				
5180	25.75	0.38	0.5	compliant
5220	25.84	0.38	0.5	compliant
5240	25.83	0.38	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5180	28.96	0.79	1	compliant
5220	28.91	0.78	1	compliant
5240	28.79	0.76	1	compliant
16QAM-Modulation ANT1				
5180	26.12	0.41	0.5	compliant
5220	25.94	0.39	0.5	compliant
5240	25.75	0.38	0.5	compliant

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16QAM-Modulation ANT2				
5180	25.78	0.38	0.5	compliant
5220	25.79	0.38	0.5	compliant
5240	25.86	0.39	0.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5180	28.96	0.79	1	compliant
5220	28.88	0.77	1	compliant
5240	28.82	0.76	1	compliant
256QAM-Modulation ANT1				
5180	26.1	0.41	0.5	compliant
5220	25.91	0.39	0.5	compliant
5240	25.77	0.38	0.5	compliant
256QAM-Modulation ANT2				
5180	25.81	0.38	0.5	compliant
5220	25.82	0.38	0.5	compliant
5240	25.81	0.38	0.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5180	28.97	0.79	1	compliant
5220	28.88	0.77	1	compliant
5240	28.8	0.76	1	compliant

Config A UNII-1:

Table 4 Power Spetral Density over 1 MHz emission at 20 MHz Bandwidth

Carrier Frequency [MHz]	Power Spectral Density [dBm]	Power Spectral Density [W]	Limit (§15.407(a)(1)) [dBm]	Result
QPSK-Modulation ANT1				
5180	13.98	0.025	17	compliant
5220	13.82	0.0241	17	compliant
5240	13.58	0.0228	17	compliant
QPSK-Modulation ANT2				
5180	13.57	0.0228	17	compliant
5220	13.61	0.023	17	compliant
5240	13.62	0.023	17	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5180	16.79	0.0478	17	compliant
5220	16.73	0.0471	17	compliant
5240	16.61	0.0458	17	compliant

64QAM-Modulation ANT1				
5180	13.8	0.024	17	compliant
5220	13.83	0.0242	17	compliant
5240	13.53	0.0225	17	compliant
64QAM-Modulation ANT2				
5180	13.57	0.0228	17	compliant
5220	13.65	0.0232	17	compliant
5240	13.58	0.0228	17	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5180	16.7	0.0467	17	compliant
5220	16.75	0.0473	17	compliant
5240	16.57	0.0453	17	compliant
16QAM-Modulation ANT1				
5180	14.07	0.0255	17	compliant
5220	14.01	0.0252	17	compliant
5240	14.07	0.0255	17	compliant
16QAM-Modulation ANT2				
5180	13.99	0.0251	17	compliant
5220	14.05	0.0254	17	compliant
5240	14.05	0.0254	17	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5180	16.99	0.05	17	compliant
5220	17.04	0.0506	17	compliant
5240	17.04	0.0506	17	compliant
256QAM-Modulation ANT1				
5180	13.85	0.0243	17	compliant
5220	13.82	0.0241	17	compliant
5240	13.56	0.0227	17	compliant
256QAM-Modulation ANT2				
5180	13.79	0.0239	17	compliant
5220	13.48	0.0223	17	compliant
5240	13.62	0.023	17	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5180	16.02	0.04	17	compliant
5220	16.02	0.04	17	compliant
5240	16.02	0.04	17	compliant

Config A UNII-1:

FCC CFR 47 part 15E and
part 2 (2018)

Table 5 Peak to Average Power Ratio (PAPR) 20 MHz Bandwidth

Carrier Frequency [MHz]	PAPR	Limit (Manufacturer's specification)	Result
	[dB]	[dB]	
QPSK-Modulation ANT1			
5180	8.08	8.5	compliant
5220	8.08	8.5	compliant
5240	8.08	8.5	compliant
QPSK-Modulation ANT2			
5180	8.05	8.5	compliant
5220	8.05	8.5	compliant
5240	8.05	8.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total			
5180	-	-	compliant
5220	-	-	compliant
5240	-	-	compliant
64QAM-Modulation ANT1			
5180	8.08	8.5	compliant
5220	8.08	8.5	compliant
5240	8.08	8.5	compliant
64QAM-Modulation ANT2			
5180	8.05	8.5	compliant
5220	8.05	8.5	compliant
5240	8.05	8.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total			
5180	-	-	compliant
5220	-	-	compliant
5240	-	-	compliant
16QAM-Modulation ANT1			
5180	8.08	8.5	compliant
5220	8.08	8.5	compliant
5240	8.08	8.5	compliant
16QAM-Modulation ANT2			
5180	8.05	8.5	compliant
5220	8.05	8.5	compliant
5240	8.05	8.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total			
5180	-	-	compliant

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5220	-	-	compliant
5240	-	-	compliant
256QAM-Modulation ANT1			
5180	8.08	8.5	compliant
5220	8.08	8.5	compliant
5240	8.08	8.5	compliant
256QAM-Modulation ANT2			
5180	8.05	8.5	compliant
5220	8.05	8.5	compliant
5240	8.05	8.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total			
5180	-	-	compliant
5220	-	-	compliant
5240	-	-	compliant

Config B UNII-1:

Table 6 Output Power 2X 20 MHz

Carrier Frequency [MHz]	RF Power Output		Limit (§15.407(a)(1))	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				
5180/ 5200	23.23/ 23.41	0.21/ 0.22	0.5	compliant
5200/ 5220	23.21/ 23.33	0.21/ 0.22	0.5	compliant
5220/ 5240	23.37/ 23.38	0.22/ 0.22	0.5	compliant
QPSK-Modulation ANT2				
5180/ 5200	22.75/ 22.9	0.19/ 0.19	0.5	compliant
5200/ 5220	22.75/ 22.75	0.19/ 0.19	0.5	compliant
5220/ 5240	22.88/ 22.89	0.19/ 0.19	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200	26.03/ 26.19	0.4/ 0.42	1	compliant
5200/ 5220	25.96/ 26.09	0.39/ 0.41	1	compliant
5220/ 5240	26.16/ 26.17	0.41/ 0.41	1	compliant
64QAM-Modulation ANT1				
5180/ 5200	23.2/ 23.44	0.21/ 0.22	0.5	compliant
5200/ 5220	23.13/ 23.32	0.21/ 0.21	0.5	compliant
5220/ 5240	23.33/ 23.42	0.22/ 0.22	0.5	compliant
64QAM-Modulation ANT2				

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5180/ 5200	22.75/ 22.75	0.19/ 0.19	0.5	compliant
5200/ 5220	22.86/ 22.65	0.19/ 0.18	0.5	compliant
5220/ 5240	22.86/ 22.93	0.19/ 0.2	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5180/5200	26.01/ 26.14	0.4/ 0.41	1	compliant
5200/ 5220	26.03/ 26.03	0.4/ 0.4	1	compliant
5220/ 5240	26.13/ 26.21	0.41/ 0.42	1	compliant
16QAM-Modulation ANT1				
5180/ 5200	23.35/ 23.31	0.22/ 0.21	0.5	compliant
5200/ 5220	23.14/ 23.28	0.21/ 0.21	0.5	compliant
5220/ 5240	23.27/ 23.34	0.21/ 0.22	0.5	compliant
16QAM-Modulation ANT2				
5180/5200	22.75/ 22.75	0.19/ 0.19	0.5	compliant
5200/ 5220	22.65/ 22.8	0.18/ 0.19	0.5	compliant
5220/ 5240	22.78/ 22.74	0.19/ 0.19	0.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200	26.09/ 26.07	0.4/ 0.419	1	compliant
5200/ 5220	25.68/ 25.83	0.4/ 0.4	1	compliant
5220/ 5240	26.06/ 26.13	0.41/ 0.42	1	compliant
256QAM-Modulation ANT1				
5180/5200	23.22/ 23.38	0.21/ 0.22	0.5	compliant
5200/ 5220	23.19/ 23.27	0.21/ 0.21	0.5	compliant
5220/ 5240	23.35/ 23.35	0.22/ 0.22	0.5	compliant
256QAM-Modulation ANT2				
5180/ 5200	22.73/ 22.92	0.19/ 0.2	0.5	compliant
5200/ 5220	22.62/ 22.78	0.18/ 0.19	0.5	compliant
5220/ 5240	22.83/ 22.89	0.19/ 0.19	0.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200	26.01/ 26.19	0.4/ 0.42	1	compliant
5200/ 5220	25.95/ 26.07	0.39/ 0.4	1	compliant
5220/ 5240	26.13/ 26.16	0.41/ 0.41	1	compliant

Config C UNII-1:

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Table 7 Output Power 3 X 20 MHz

Carrier Frequency [MHz]	RF Power Output		Limit (§15.407(a)(1))	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				
5180/ 5200/5220	21.22/ 21.37/21.47	0.13/ 0.14/0.14	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	21.27/ 21.34/21.44	0.13/ 0.14/0.14	0.5	compliant
QPSK-Modulation ANT2				
5180/ 5200/5220	20.8/ 20.95/21.11	0.12/ 0.12/0.13	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	20.76/ 20.9/20.98	0.12/ 0.12/0.13	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200/5220	24.06/ 24.21/24.34	0.25/ 0.26/0.27	1	compliant
-	-	-	1	compliant
5200/ 5220/ 5240	24.07/ 24.17/24.26	0.26/ 0.26/0.27	1	compliant
64QAM-Modulation ANT1				
5180/ 5200/5220	21.24/ 21.45/21.52	0.13/ 0.14/0.14	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	21.25/ 21.33/21.42	0.13/ 0.14/0.14	0.5	compliant
64QAM-Modulation ANT2				
5180/ 5200/5220	20.8/ 20.95/21.1	0.12/ 0.12/0.13	0.5	compliant
-			0.5	compliant
5200/ 5220/ 5240	20.72/ 20.87/20.95	0.12/ 0.12/0.12	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200/5220	24.07/ 24.25/24.36	0.26/ 0.27/0.27	1	compliant
-	-	-	1	compliant
5200/ 5220/ 5240	24.04/ 24.15/24.23	0.25/ 0.26/0.27	1	compliant
16QAM-Modulation ANT1				
5180/ 5200/5220	21.26/ 21.5/21.58	0.13/ 0.14/0.14	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	21.29/ 21.33/21.44	0.13/ 0.14/0.14	0.5	compliant
16QAM-Modulation ANT2				
5180/ 5200/5220	20.77/ 20.86/21.12	0.12/ 0.12/0.13	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	20.72/ 20.88/20.94	0.12/ 0.12/0.12	0.5	compliant

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16QAM-Modulation ANT1+ANT2 Calculated Total				
5180/ 5200/5220	24.06/ 24.21/24.34	0.26/ 0.27/0.28	1	compliant
-	-	-	1	compliant
5200/ 5220/ 5240	24.07/ 24.17/24.26	0.25/ 0.26/0.27	1	compliant
256QAM-Modulation ANT1				
5180/ 5200/5220	21.24/ 21.45/21.52	0.13/ 0.14/0.14	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	21.25/ 21.33/21.42	0.13/ 0.14/0.14	0.5	compliant
256QAM-Modulation ANT2				
5180/ 5200/5220	20.8/ 20.95/21.1	0.12/ 0.12/0.13	0.5	compliant
-	-	-	0.5	compliant
5200/ 5220/ 5240	20.72/ 20.87/20.95	0.12/ 0.12/0.12	0.5	compliant
256QAM-Modulation ANT1+ANT2+ANT3+ANT4 Calculated Total				
5180/ 5200/5220	24.07/ 24.25/24.36	0.25/ 0.27/0.27	1	compliant
-	-	-	1	compliant
5200/ 5220/ 5240	24.04/ 24.15/24.25	0.25/ 0.26/0.27	1	compliant

Config A UNII-3:

Table 8 Output Power 20 MHz

Carrier Frequency [MHz]	RF Power Output		Limit §15.407(a)(3)	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				
5745	26.3	0.43	0.5	compliant
5785	26.19	0.42	0.5	compliant
5825	26.16	0.41	0.5	compliant
QPSK-Modulation ANT2				
5745	26.09	0.41	0.5	compliant
5785	25.91	0.39	0.5	compliant
5825	26	0.4	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5745	29.21	0.83	1	compliant
5785	29.06	0.81	1	compliant
5825	29.09	0.81	1	compliant
64QAM-Modulation ANT1				

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5745	26.28	0.42	0.5	compliant
5785	26.18	0.41	0.5	compliant
5825	26.14	0.41	0.5	compliant
64QAM-Modulation ANT2				
5745	26.06	0.4	0.5	compliant
5785	25.9	0.39	0.5	compliant
5825	25.99	0.4	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5745	29.18	0.83	1	compliant
5785	29.05	0.8	1	compliant
5825	29.08	0.81	1	compliant
16QAM-Modulation ANT1				
5745	26.28	0.42	0.5	compliant
5785	26.17	0.41	0.5	compliant
5825	26.13	0.41	0.5	compliant
16QAM-Modulation ANT2				
5745	26.01	0.4	0.5	compliant
5785	25.93	0.39	0.5	compliant
5825	26.04	0.4	0.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5745	29.16	0.82	1	compliant
5785	29.06	0.81	1	compliant
5825	29.1	0.81	1	compliant
256QAM-Modulation ANT1				
5745	26.28	0.42	0.5	compliant
5785	26.19	0.42	0.5	compliant
5825	26.11	0.41	0.5	compliant
256QAM-Modulation ANT2				
5745	26.01	0.4	0.5	compliant
5785	25.91	0.39	0.5	compliant
5825	26.01	0.4	0.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5745	29.16	0.82	1	compliant
5785	29.06	0.81	1	compliant
5825	29.07	0.81	1	compliant

Table 9 Power Spectral Density over 500 kHz emission at 20 MHz Bandwidth

Carrier Frequency [MHz]	Power Spectral Density [dBm]	Power Spectral Density [W]	Limit §15.407(a)(3) [dBm]	Result
QPSK-Modulation ANT1				
5745	11.12	0.01	30	compliant
5785	10.98	0.01	30	compliant
5825	10.98	0.01	30	compliant
QPSK-Modulation ANT2				
5745	10.86	0.01	30	compliant
5785	10.69	0.01	30	compliant
5825	10.8	0.01	30	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5745	13.01	0.02	30	compliant
5785	13.01	0.02	30	compliant
5825	13.01	0.02	30	compliant
64QAM-Modulation ANT1				
5745	11.17	0.01	30	compliant
5785	11	0.01	30	compliant
5825	10.95	0.01	30	compliant
64QAM-Modulation ANT2				
5745	10.87	0.01	30	compliant
5785	10.69	0.01	30	compliant
5825	10.8	0.01	30	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5745	13.01	0.02	30	compliant
5785	13.01	0.02	30	compliant
5825	13.01	0.02	30	compliant
16QAM-Modulation ANT1				
5745	11.88	0.02	30	compliant
5785	11.85	0.02	30	compliant
5825	11.85	0.02	30	compliant
16QAM-Modulation ANT2				
5745	10.85	0.01	30	compliant
5785	11.64	0.01	30	compliant
5825	11.77	0.02	30	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				

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5745	14.77	0.03	30	compliant
5785	14.77	0.03	30	compliant
5825	16.02	0.04	30	compliant
256QAM-Modulation ANT1				
5745	11.19	0.01	30	compliant
5785	11.03	0.01	30	compliant
5825	10.97	0.01	30	compliant
256QAM-Modulation ANT2				
5745	10.85	0.01	30	compliant
5785	10.72	0.01	30	compliant
5825	10.83	0.01	30	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5745	13.01	0.02	30	compliant
5785	13.01	0.02	30	compliant
5825	13.01	0.02	30	compliant

Table 10 Peak to Average Power Ratio (PAPR) 20 MHz Bandwidth

Carrier Frequency [MHz]	PAPR	Limit (Manufacturer's specification)	Result
	[dB]	[dB]	
QPSK-Modulation ANT1			
5745	8.08	8.5	compliant
5785	8.08	8.5	compliant
5825	8.08	8.5	compliant
QPSK-Modulation ANT2			
5745	8.05	8.5	compliant
5785	8.05	8.5	compliant
5825	8.05	8.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total			
5745	-	-	compliant
5785	-	-	compliant
5825	-	-	compliant
64QAM-Modulation ANT1			
5745	8.08	8.5	compliant
5785	8.08	8.5	compliant
5825	8.08	8.5	compliant
64QAM-Modulation ANT2			
5745	8.05	8.5	compliant

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5785	8.05	8.5	compliant	
5825	8.05	8.5	compliant	
64QAM-Modulation ANT1+ANT2 Calculated Total				
5745	-	-	compliant	
5785	-	-	compliant	
5825	-	-	compliant	
16QAM-Modulation ANT1				
5745	8.08	8.5	compliant	
5785	8.08	8.5	compliant	
5825	8.08	8.5	compliant	
16QAM-Modulation ANT2				
5745	8.05	8.5	compliant	
5785	8.05	8.5	compliant	
5825	8.05	8.5	compliant	
16QAM-Modulation ANT1+ANT2 Calculated Total				
5745	-	-	compliant	
5785	-	-	compliant	
5825	-	-	compliant	
256QAM-Modulation ANT1				
5745	8.08	8.5	compliant	
5785	8.08	8.5	compliant	
5825	8.08	8.5	compliant	
256QAM-Modulation ANT2				
5745	8.05	8.5	compliant	
5785	8.05	8.5	compliant	
5825	8.05	8.5	compliant	
256QAM-Modulation ANT1+ANT2 Calculated Total				
5745	-	-	compliant	
5785	-	-	compliant	
5825	-	-	compliant	

Config B UNII-3:

Table 11 Output Power 2 X 20 MHz

Carrier Frequency [MHz]	RF Power Output		Limit §15.407(a)(3)	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				

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5745/ 5765	23.44/ 23.56	0.22/ 0.23	0.5	compliant
5765/ 5785	23.36/ 23.43	0.22/ 0.22	0.5	compliant
5805/ 5825	23.17/ 23.35	0.21/ 0.22	0.5	compliant
QPSK-Modulation ANT2				
5745/ 5765	23.02/ 23.17	0.2/ 0.21	0.5	compliant
5765/ 5785	23.01/ 23.04	0.2/ 0.2	0.5	compliant
5805/ 5825	22.97/ 23.13	0.2/ 0.21	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765	26.26/ 26.4	0.42/ 0.44	1	compliant
5765/ 5785	26.22/ 26.27	0.42/ 0.42	1	compliant
5805/ 5825	26.1/ 26.27	0.41/ 0.42	1	compliant
64QAM-Modulation ANT1				
5745/ 5765	23.38/ 23.47	0.22/ 0.22	0.5	compliant
5765/ 5785	23.32/ 23.43	0.21/ 0.22	0.5	compliant
5805/ 5825	23.23/ 23.33	0.21/ 0.22	0.5	compliant
64QAM-Modulation ANT2				
5745/ 5765	23.05/ 23.17	0.2/ 0.21	0.5	compliant
5765/ 5785	23.04/ 23.03	0.2/ 0.2	0.5	compliant
5805/ 5825	22.95/ 23.11	0.2/ 0.2	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765	26.25/ 26.35	0.42/ 0.43	1	compliant
5765/ 5785	26.21/ 26.26	0.42/ 0.42	1	compliant
5805/ 5825	26.12/ 26.25	0.41/ 0.42	1	compliant
16QAM-Modulation ANT1				
5745/ 5765	23.23/ 23.45	0.21/ 0.22	0.5	compliant
5765/ 5785	23.47/ 23.37	0.22/ 0.22	0.5	compliant
5805/ 5825	23.21/ 23.39	0.21/ 0.22	0.5	compliant
16QAM-Modulation ANT2				
5745/ 5765	22.79/ 23.22	0.19/ 0.21	0.5	compliant
5775/ 5795	23.07/ 23.15	0.2/ 0.21	0.5	compliant
5805/ 5825	23.04/ 23.21	0.2/ 0.21	0.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765	26.05/ 26.37	0.4/ 0.43	1	compliant
5765/ 5785	26.31/ 26.29	0.43/ 0.43	1	compliant
5805/ 5825	26.16/ 26.34	0.41/ 0.43	1	compliant

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256QAM-Modulation ANT1				
5745/ 5765	23.28/ 23.51	0.21/ 0.22	0.5	compliant
5775/ 5795	23.31/ 23.47	0.21/ 0.22	0.5	compliant
5805/ 5825	23.29/ 23.32	0.21/ 0.21	0.5	compliant
256QAM-Modulation ANT2				
5745/ 5765	23.28/ 23.51	0.2/ 0.21	0.5	compliant
5765/ 5785	23.31/ 23.47	0.2/ 0.2	0.5	compliant
5805/ 5825	23.29/ 23.32	0.2/ 0.2	0.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765	26.15/ 26.4	0.4/ 0.44	1	compliant
5765/ 5785	26.18/ 26.29	0.41/ 0.43	1	compliant
5805/ 5825	26.14/ 26.25	0.41/ 0.42	1	compliant

Config C UNII-3:

Table 12 Output Power 3 X 20 MHz

Carrier Frequency [MHz]	RF Power Output		Limit §15.407(a)(3)	Result
	[dBm]	[W]	[W]	
QPSK-Modulation ANT1				
5745/ 5765/5785	21.19/ 21.38/21.56	0.13/ 0.14/0.14	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	21.16/ 21.3/21.42	0.13/ 0.13/0.14	0.5	compliant
QPSK-Modulation ANT2				
5745/ 5765/5785	20.77/ 21.04/21.12	0.13/ 0.14/0.14	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	20.99/ 21/21.21	0.13/ 0.13/0.13	0.5	compliant
QPSK-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765/5785	24.23/ 24.42/24.59	0.26/ 0.28/0.29	1	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	24.12/ 24.2/24.36	0.26/ 0.26/0.27	1	compliant
64QAM-Modulation ANT1				
5745/ 5765/5785	21.18/ 21.37/21.55	0.13/ 0.14/0.14	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	21.21/ 21.35/21.46	0.13/ 0.14/0.14	0.5	compliant
64QAM-Modulation ANT2				
5745/ 5765/5785	20.73/ 21.04/21.09	0.12/ 0.13/0.13	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	20.96/ 21.04/21.24	0.12/ 0.13/0.13	0.5	compliant
64QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765/5785	24.01/ 24.25/24.25	0.25/ 0.27/0.27	1	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	24.13/ 24.24/24.39	0.26/ 0.27/0.28	1	compliant
16QAM-Modulation ANT1				
5745/ 5765/5785	21.13/ 21.33/21.51	0.13/ 0.14/0.14	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	21.16/ 21.28/21.41	0.13/ 0.13/0.14	0.5	compliant
16QAM-Modulation ANT2				
5745/ 5765/5785	20.81/ 21.03/21.12	0.12/ 0.13/0.13	0.5	compliant
-	-	-	-	compliant

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5785/ 5805/ 5825	20.97/ 21/21.2	0.13/ 0.13/0.13	0.5	compliant
16QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765/5785	24.02/ 24.23/24.36	0.25/ 0.26/0.27	1	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	24.11/ 24.19/24.35	0.26/ 0.26/0.27	1	compliant
256QAM-Modulation ANT1				
5745/ 5765/5785	21.14/ 21.14/21.51	0.13/ 0.13/0.14	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	21.18/ 21.3/21.43	0.13/ 0.13/0.14	0.5	compliant
256QAM-Modulation ANT2				
5745/ 5765/5785	20.78/ 21.07/21.13	0.12/ 0.13/0.13	0.5	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	20.97/ 21.05/21.22	0.13/ 0.13/0.13	0.5	compliant
256QAM-Modulation ANT1+ANT2 Calculated Total				
5745/ 5765/5785	24.01/ 24.15/24.37	0.25/ 0.26/0.27	1	compliant
-	-	-	-	compliant
5785/ 5805/ 5825	24.12/ 24.22/24.37	0.26/ 0.26/0.27	1	compliant

The base station maximum output power was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

Emissions at elevation angle higher than 30° from horizon

The maximum antenna gains at any elevation angle above 30 degrees as measured from the horizon were provided in Table 2. Per KDB 789033 D02 Section II.H.1a), for a fixed infrastructure without electrically or mechanically steerable beam antennas, the elevation plane radiation pattern can be used to calculate the maximum EIRP. The following step by step process was followed since the elevation plane radiation pattern Max Directional Gain above 30° (dBi) was available to calculate the maximum EIRP. (see Table 13):

For MIMO devices, the maximum gain of each antenna was considered, and guidance in KDB 662911 for calculating the overall gain including directional gain for maximum EIRP calculation was applied. The EUT does not have beamforming function and two signals are not correlated. The directional antenna gain is the gain of an individual antenna per KDB 662911.

The maximum EIRPs of the EUT equipped with any antennas (#1-#2) given in Section 2.3 at the elevation angles above 30 degrees are tabulated below and are all below the 21dBm limit for an outdoor access point in UNII-1 band.

Table 13 Maximum EIRP (dBm) in the Elevation Angle above 30 Degrees in UNII-1 Band (5.15-5.25 GHz)

Antenna No	Max power (dBm)	Antenna Max Directional Gain above 30° (dBi)	Max EIRP above 30° (dBm)	Limit (dBm)	Results
1	26.14	-9.1	17.04	21	Pass
2	26.14	-7	19.14	21	Pass

For the antennas #1 and #2, the maximum combined mean RF power outputs of the EUT at its antenna transmitting terminals across the UNII-1 and UNII-3 bands for all operation modes are a) 26.14dBm (0.41W, one-20MHz carrier), 29.19dBm (0.83W, two-20MHz carriers) and 29.03dBm (0.8W, three-20MHz carriers) for UNII-1 and b) 26.3dBm (0.43W, one-20MHz carrier), 29.34dBm (0.86W, two-20MHz carriers) and 29.19dBm (0.83W, three-20MHz carriers) for UNII-3, respectively. The maximum EIRPs of the EUT equipped with any antennas #1 or #2 are all less than 35.34dBm.

They are all below FCC required limits and are in full compliance with the Rules of the Commission.

4.2 Test No. 2: Modulation Characteristics (§ 2.1047, § 2.201)

The occupied bandwidth was measured to be 18 MHz (Config. A), which represents the 99% power bandwidth (see the following section and screenshots on pages 70).

Therefore, the modulation characteristic of the base stations transceiver is:

Config A, B, C: 18M0D9W (Channel bandwidth 20 MHz)

No further testing is required under this section of the FCC rules. No measurements other than the occupied bandwidth are required.

Sample modulation screenshots are on page 58, in I/Q constellation diagrams and tables, showing QPSK, 16QAM, 64QAM and 256QAM –modulation generation.

The modulation characteristics were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.3 Test No. 3: Bandwidth Measurements FCC CFR 47 Part 2 §2.1049, FCC CFR 47 Part 15 §15.407)

4.3.1. Limits

FCC Part 15 §15.407 (e): Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII 3 devices shall be at least 500 kHz.

4.3.2. Test Procedure and Results

Both 26 dB bandwidth, Occupied bandwidth and 6 dB bandwidth were measured in accordance with FCC CFR 47 Part 15 §15.407 (i), and FCC KDB 789033 D02 General U-NII Test Procedures New Rules v01r04.

The following tables summarize the results:

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
11 Jan – 2 Feb -18	22.4 °C	24.6 °C	5.8 RH%	19.7 RH%

Config A (UNII-1):

Table 14

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [MHz]	Limit [MHz] §2.1049(h)	Result
QPSK-Modulation ANT1				
5180	17.9	19.1	20	compliant
5220	17.9	18.98	20	compliant
5240	17.9	18.92	20	compliant
QPSK-Modulation ANT2				
5180	17.9	18.98	20	compliant
5220	17.9	18.98	20	compliant
5240	17.9	18.98	20	compliant
64QAM-Modulation ANT1				
5180	17.9	18.46	20	compliant
5220	17.9	18.93	20	compliant
5240	17.9	18.98	20	compliant
64QAM-Modulation ANT2				
5180	17.9	18.92	20	compliant
5220	17.9	18.98	20	compliant
5240	17.9	18.98	20	compliant
16QAM-Modulation ANT1				

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			20	compliant
5180	17.9	18.46		
5220	17.9	18.98	20	compliant
5240	17.9	18.92	20	compliant
16QAM-Modulation ANT2				
5180	17.9	18.98	20	compliant
5220	17.9	18.81	20	compliant
5240	17.9	18.98	20	compliant
256QAM-Modulation ANT1				
5180	17.9	19.04	20	compliant
5220	17.9	18.92	20	compliant
5240	17.9	19.04	20	compliant
256QAM-Modulation ANT2				
5180	17.9	18.98	20	compliant
5220	17.9	19.1	20	compliant
5240	17.9	19.04	20	compliant
Measurement Uncertainty:				±48kHz

Config B (UNII-1):

Table 15

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [MHz]	Result
QPSK-Modulation ANT1			
5180/ 5200	38	40.32	compliant
5200/ 5220	38	40.32	compliant
5220/ 5240	38	40.24	compliant
QPSK-Modulation ANT2			
5180/ 5200	38	40.32	compliant
5200/ 5220	38	40.24	compliant
5220/ 5240	38	40.32	compliant
64QAM-Modulation ANT1			
5180/ 5200	38	40.32	compliant
5200/ 5220	38	40.32	compliant
5220/ 5240	38	40.24	compliant
64QAM-Modulation ANT2			
5180/ 5200	38	40.24	compliant
5200/ 5220	38	40.32	compliant
5220/ 5240	38	40.24	compliant

16QAM-Modulation ANT1			
5180/ 5200	37.92	40.24	compliant
5200/ 5220	37.92	40.16	compliant
5220/ 5240	38	40.24	compliant
16QAM-Modulation ANT2			
5180/ 5200	37.92	40.24	compliant
5200/ 5220	38	40.24	compliant
5220/ 5240	38	40.16	compliant
256QAM-Modulation ANT1			
5180/ 5200	38	40.4	compliant
5200/ 5220	38	40.42	compliant
5220/ 5240	38	40.4	compliant
256QAM-Modulation ANT2			
5180/ 5200	38	40.32	compliant
5200/ 5220	38	40.24	compliant
5220/ 5240	38	40.32	compliant
Measurement Uncertainty:		±48kHz	

Config C (UNII-1):

Table 16

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [MHz]	Result
QPSK-Modulation ANT1			
5180/ 5200/5220	57.8	60.32	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.9	60.36	compliant
QPSK-Modulation ANT2			
5180/ 5200/5220	57.72	60.6	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.9	60.36	compliant
64QAM-Modulation ANT1			
5180/ 5200/5220	57.8	60.48	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.9	60.48	compliant
64QAM-Modulation ANT2			
5180/ 5200/5220	57.72	60.32	compliant

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-	-	-	compliant
5200/ 5220/ 5240	57.9	60.36	compliant
16QAM-Modulation ANT1			
5180/ 5200/5220	57.9	60.24	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.9	60.12	compliant
16QAM-Modulation ANT2			
5180/ 5200/5220	57.72	60.24	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.6	60.36	compliant
256QAM-Modulation ANT1			
5180/ 5200/5220	57.9	60.36	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.9	60.36	compliant
256QAM-Modulation ANT2			
5180/ 5200/5220	57.72	60.36	compliant
-	-	-	compliant
5200/ 5220/ 5240	57.72	60.36	compliant
Measurement Uncertainty:			±48kHz

Config A (UNII-3):

Table 17

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [MHz]	Limit [MHz] §2.1049(h)	Bandwidth 6 dB [MHz]	Limit [MHz] §15.407 (e)	Result
QPSK-Modulation ANT1						
5745	17.9	18.98	20	18.06	0.5	compliant
5785	17.9	18.92	20	18.06	0.5	compliant
5825	17.9	18.98	20	18	0.5	compliant
QPSK-Modulation ANT2						
5745	17.9	18.92	20	18.08	0.5	compliant
5785	17.9	18.96	20	18.04	0.5	compliant
5825	17.9	19	20	18	0.5	compliant
64QAM-Modulation ANT1						
5745	17.9	18.98	20	18.06	0.5	compliant
5785	17.9	18.92	20	18.06	0.5	compliant
5825	17.9	18.92	20	18	0.5	compliant

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64QAM-Modulation ANT2						
5745	17.9	18.96	20	18.04	0.5	compliant
5785	17.9	18.88	20	18.04	0.5	compliant
5825	17.9	18.84	20	18.04	0.5	compliant
16QAM-Modulation ANT1						
5745	17.9	18.87	20	0.984	0.5	compliant
5785	17.9	18.87	20	18.06	0.5	compliant
5825	17.9	18.98	20	2.89	0.5	compliant
16QAM-Modulation ANT2						
5745	17.9	18.84	20	1.04	0.5	compliant
5785	17.9	18.84	20	1.16	0.5	compliant
5825	17.9	18.84	20	1.04	0.5	compliant
256QAM-Modulation ANT1						
5745	17.9	18.92	20	18.06	0.5	compliant
5785	17.9	18.92	20	18	0.5	compliant
5825	17.9	18.92	20	18.06	0.5	compliant
256QAM-Modulation ANT2						
5745	17.9	18.92	20	18	0.5	compliant
5785	17.9	19	20	18	0.5	compliant
5825	17.9	19.08	20	18	0.5	compliant
Measurement Uncertainty:						±48kHz

Config B (UNII-3):

Table 18

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [Mhz]	Result
QPSK-Modulation ANT1			
5745/ 5765	38	40.56	compliant
5765/ 5785	38	40.32	compliant
5805/ 5825	38	40.24	compliant
QPSK-Modulation ANT2			
5745/ 5765	38	40.4	compliant
5765/ 5785	38	40.32	compliant
5805/ 5825	38	40.48	compliant
64QAM-Modulation ANT1			
5745/ 5765	38	40.4	compliant

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	38	40.32	compliant
5765/ 5785	38	40.24	compliant
5805/ 5825			
64QAM-Modulation ANT2			
5745/ 5765	38	40.32	compliant
5765/ 5785	38	40.32	compliant
5805/ 5825	38	40.4	compliant
16QAM-Modulation ANT1			
5745/ 5765	37.92	40.08	compliant
5765/ 5785	37.92	40.32	compliant
5805/ 5825	37.92	40.32	compliant
16QAM-Modulation ANT2			
5745/ 5765	37.92	40.32	compliant
5765/ 5785	37.92	40.08	compliant
5805/ 5825	37.92	40.24	compliant
256QAM-Modulation ANT1			
5745/ 5765	38	40.24	compliant
5765/ 5785	38	40.32	compliant
5805/ 5825	38	40.24	compliant
256QAM-Modulation ANT2			
5745/ 5765	38	40.24	compliant
5765/ 5785	38	40.32	compliant
5805/ 5825	38	40.32	compliant
Measurement Uncertainty:			±48kHz

Note: the first row reads "5765/ 5785" — 38 — 40.32 — compliant; correcting: the top row "5765/ 5785", 38, 40.32; then "5805/ 5825", 38, 40.24.

Config C (UNII-3):

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Bandwidth 26 dB [MHz]	Result
QPSK-Modulation ANT1			
5745/ 5765/5785	57.9	60.6	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.9	60.6	compliant
QPSK-Modulation ANT2			
5745/ 5765/5785	57.72	60.6	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.9	60.36	compliant
64QAM-Modulation ANT1			
5745/ 5765/5785	57.9	60.36	compliant

-	-	-	compliant
5785/ 5805/ 5825	57.3	60.36	compliant
64QAM-Modulation ANT2			
5745/ 5765/5785	57.72	60.32	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.9	60.36	compliant
16QAM-Modulation ANT1			
5745/ 5765/5785	57.9	60.36	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.6	60.36	compliant
16QAM-Modulation ANT2			
5745/ 5765/5785	57.72	60.24	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.6	60.36	compliant
256QAM-Modulation ANT1			
5745/ 5765/5785	57.9	60.6	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.9	60.36	compliant
256QAM-Modulation ANT2			
5745/ 5765/5785	57.72	60.36	compliant
-	-	-	compliant
5785/ 5805/ 5825	57.72	60.36	compliant
Measurement Uncertainty:			±48kHz

The occupied bandwidth was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

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4.4 Test No. 4: Spurious Emissions at Antenna Terminals (FCC part 15 §15.407 (b) and §15.209, FCC part 2 §2.1051 and §2.1057)

4.4.1. Limits

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

For MiMo output from 2 TX -antenna connectors, each antenna connectors were measured individually and each individual limit lime was reduced by 10 Log (2). Limit line was calculated to show -30 dB emission limit, according to FCC KDB 662911 D01 guidance.

4.4.2. Test Procedure and Results

The tests were carried out in accordance with §15.407 and FCC KDB 789033 D02 General U-NII Test Procedures New Rules v01r04.

According to § 2.1057, all emissions including the fundamental frequency from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 40 GHz were investigated.

The following tables summarize the worst case detected emission levels (see screenshots on page 102 for details). The external attenuation (cable loss of the set up) is already added in the results. It can be seen separately as the 'Offset' value in the screenshots.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
29 – Jan to 26 -Feb 2018	24 °C	25 °C	4.6 RH%	23.4 RH%

Config A (UNII-1)

Table 4 Spurious Emissions (20 MHz CH BW)

Carrier Frequency: 5220 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				

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0.009 – 40 000	5365	-31.88	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5135	-32.06	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5362	-32.89	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5359	-32.16	-30	compliant
16QAM-Modulation ANT1				
0.009 – 40 000	5369	-32.30	-30	compliant
16QAM-Modulation ANT2				
0.009 – 40 000	5452	-32.44	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5373	-32.89	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5410	-32.44	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

Config B (UNII-1)

Table 5 Spurious Emissions (2 X 20 MHz CH BW)

Carrier Frequency: 5200/ 5220 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
0.009 – 40 000	5646	-32.45	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5358	-32.61	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5121	-32.91	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5358	-32.61	-30	compliant
16QAM-Modulation ANT1				
0.009 – 40 000	5368	-31.83	-30	compliant
16QAM-Modulation ANT2				

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0.009 – 40 000	5419	-32.79	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5381	-32.57	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5352	-33.17	-30	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB		

Config C (UNII-1)

Table 6 Spurious Emissions (3 X 20 MHz Channel BW)

Carrier Frequency: 5180/ 5220/ 5240 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
0.009 – 40 000	5125	-32.13	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5420	-32.55	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5136	-32.50	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5462	-31.34	-30	compliant
16QAM-Modulation ANT1				
0.009 – 40 000	5104	-33.22	-30	compliant
16QAM-Modulation ANT2				
0.009 – 40 000	5371	-32.01	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5414	-32.23	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5466	-32.58	-30	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB		

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Config A (UNII-1)

Table 7 Spurious Emissions at lower band edge (20 MHz CH BW)

Carrier Frequency: 5180.0 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
	5150	-35.99	-30	compliant
QPSK-Modulation ANT2				
	5150	-32.82	-30	compliant
64QAM-Modulation ANT1				
	5150	-35.63	-30	compliant
64QAM-Modulation ANT2				
	5150	-34.81	-30	compliant
16QAM-Modulation ANT1				
	5150	-34.44	-30	compliant
16QAM-Modulation ANT2				
	5150	-34.91	-30	compliant
256QAM-Modulation ANT1				
	5150	-35.78	-30	compliant
256QAM-Modulation ANT2				
	5150	-35.40	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

Config B (UNII-1)

Table 8 Spurious Emissions at lower band edge (2 X 20 MHz CH BW)

Carrier Frequency: 5180.0/ 5200.0 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
	5150	-36.19	-30	compliant
QPSK-Modulation ANT2				
	5150	-34.74	-30	compliant
64QAM-Modulation ANT1				
	5150	-35.49	-30	compliant
64QAM-Modulation ANT2				
	5150	-35.85	-30	compliant

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16QAM-Modulation ANT1				
	5150	-35.78	-30	compliant
16QAM-Modulation ANT2				
	5150	-36.60	-30	compliant
256QAM-Modulation ANT1				
	5150	-35.75	-30	compliant
256QAM-Modulation ANT2				
	5150	-34.25	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

Config C (UNII-1)

Table 9 Spurious Emissions at lower band edge (3 X 20 MHz CH BW)

Carrier Frequency: 5180.0/ 5200.0/ 5220 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
	5150	-35.23	-30	compliant
QPSK-Modulation ANT2				
	5150	-34.79	-30	compliant
64QAM-Modulation ANT1				
	5150	-35.96	-30	compliant
64QAM-Modulation ANT2				
	5150	-34.72	-30	compliant
16QAM-Modulation ANT1				
	5150	-35.64	-30	compliant
16QAM-Modulation ANT2				
	5150	-36.38	-30	compliant
256QAM-Modulation ANT1				
	5150	-36.68	-30	compliant
256QAM-Modulation ANT2				
	5150	-35.15	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

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Config C (UNII-1)

Table 10 Spurious Emissions at upper band edge (20 MHz CH BW)

Carrier Frequency: 5240.0 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
	5350	-34.03	-30	compliant
QPSK-Modulation ANT2				
	5350	-34.22	-30	compliant
64QAM-Modulation ANT1				
	5350	-35.35	-30	compliant
64QAM-Modulation ANT2				
	5350	-36.39	-30	compliant
16QAM-Modulation ANT1				
	5350	-33.88	-30	compliant
16QAM-Modulation ANT2				
	5350	--34.72	-30	compliant
256QAM-Modulation ANT1				
	5350	-36.04	-30	compliant
256QAM-Modulation ANT2				
	5350	-34.86	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

Config B (UNII-1)

Table 11 Spurious Emissions at upper band edge (2 X 20 MHz CH BW)

Carrier Frequency: 5220.0/ 5240.0 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit[dBm] §15.407(b)	Result

QPSK-Modulation ANT1				
	5350	-36.40	-30	compliant
QPSK-Modulation ANT2				
	5350	-34.97	-30	compliant
64QAM-Modulation ANT1				
	5350	-35.82	-30	compliant
64QAM-Modulation ANT2				
	5350	-35.03	-30	compliant
16QAM-Modulation ANT1				
	5350	-36.01	-30	compliant
16QAM-Modulation ANT2				
	5350	-35.86	-30	compliant
256QAM-Modulation ANT1				
	5350	-35.37	-30	compliant
256QAM-Modulation ANT2				
	5350	-36.42	-30	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB		

Config C (UNII-1)

Table 12 Spurious Emissions at upper band edge (3 X 20 MHz CH BW)

Carrier Frequency: 5200.0/ 5220.0/ 5240.0 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
	5350	-34.68	-30	compliant
QPSK-Modulation ANT2				
	5350	-35.13	-30	compliant
64QAM-Modulation ANT1				

	5350	-35.06	-30	compliant
64QAM-Modulation ANT1				
	5350	-35.66	-30	compliant
16QAM-Modulation ANT1				
	5350	-35.68	-30	compliant
16QAM-Modulation ANT1				
	5350	-35.00	-30	compliant
256QAM-Modulation ANT1				
	5350	-34.37	-30	compliant
256QAM-Modulation ANT2				
	5350	-35.65	-30	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB		

Config A (UNII-3)

Table 13 Spurious Emissions (20 MHz CH BW)

Carrier Frequency: 5785 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
0.009 – 40 000	5954	-31.87	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5943	-32.44	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5961	-32.37	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5954	-32.22	-30	compliant
16QAM-Modulation ANT1				

0.009 – 40 000	5953	-32.01	-30	compliant
16QAM-Modulation ANT2				
0.009 – 40 000	5952	-32.14	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5932	-32.25	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5963	-33.03	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB			

Config B (UNII-3)

Table 14 Spurious Emissions (2 X 20 MHz CH BW)

Carrier Frequency: 5785/ 5805 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
0.009 – 40 000	5929	-32	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5946	-32.44	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5933	-32.50	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5945	-32.22	-30	compliant
16QAM-Modulation ANT1				
0.009 – 40 000	5962	-32.31	-30	compliant
16QAM-Modulation ANT2				
0.009 – 40 000	5952	-32.14	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5943	-32.05	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5968	-32.40	-30	compliant
Measurement Uncertainty:	f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB,			

| | 8.0GHz ≤ f: ±1.9dB | |

Config C (UNII-3)

Table 15 Spurious Emissions (3 X 20 MHz CH BW)

Carrier Frequency: 5765/ 5785/ 5805 MHz				
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Limit [dBm] §15.407(b)	Result
QPSK-Modulation ANT1				
0.009 – 40 000	5945	-32.62	-30	compliant
QPSK-Modulation ANT2				
0.009 – 40 000	5960	-31.90	-30	compliant
64QAM-Modulation ANT1				
0.009 – 40 000	5957	-31.06	-30	compliant
64QAM-Modulation ANT2				
0.009 – 40 000	5969	-31.99	-30	compliant
16QAM-Modulation ANT1				
0.009 – 40 000	5962	-32.19	-30	compliant
16QAM-Modulation ANT2				
0.009 – 40 000	5961	-31.95	-30	compliant
256QAM-Modulation ANT1				
0.009 – 40 000	5955	-32.67	-30	compliant
256QAM-Modulation ANT2				
0.009 – 40 000	5939	-32.56	-30	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB		

The measured conducted emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

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4.5 Test No. 5: Field Strength of Spurious Radiation (§ 2.1053, § 2.1057, § 15.33)

4.5.1. Limits

Para. No. 15.33(m). For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

(m)(2) For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB (P = transmitter power in Watts).

4.5.2. Test Configuration

The measurements were performed in an anechoic chamber. The radiated test site complies with the site attenuation requirements listed in ANSI C63.4 2003 and is listed with the FCC.
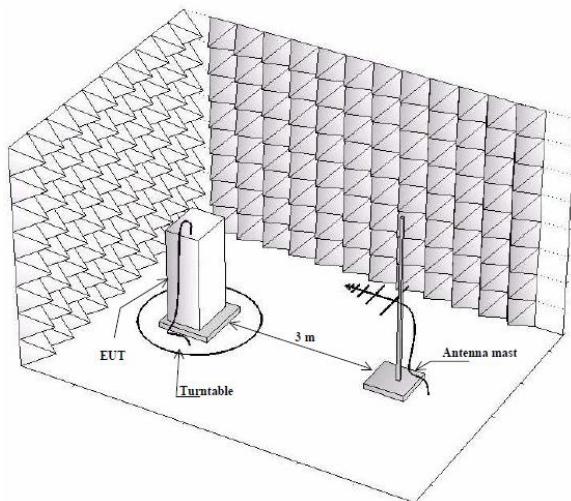
Figure 2 Test Configuration

Photographs of the EUT in the anechoic chamber are shown on page 255 of this measurement report.

4.5.3. Test Procedure and Results

TIA/EIA-603-C-2004, Section 2.2.12

The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable. During the test in the frequency range 30 - 40000 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations.

Vertical and horizontal polarizations in the frequency range 30 - 40000 MHz was first measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 2.5 m.

The limit of -23.5 dBm has been calculated to correspond 73.9 dB (µV/m). Spurious emissions closer than 20 dB to the limit was measured with average detector.

According to § 2.1057, all emissions from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 10th harmonic were investigated.

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The EUT was replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator $G_{Antenna[dBi]}$. This antenna was fed with a signal at the spurious frequency $P_{Gen[dBm]}$. The level of the signal was adjusted to repeat the previously measured level. The resulting

EIRP is the signal level fed to the reference antenna corrected for gain referenced to an isotropic.

The formula below was used to calculate the EIRP of the EUT.

$$P_{EIRP[dbm]} = P_{Gen[dBm]} - L_{Cable[dB]} + G_{Antenna[dBi]}$$

Worst case detected emission levels are reported in the following table (refer to spectral plots included on pages 100 for details). The antenna factor and cable loss is according to the manufacturer's specification.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
31 Jan – 11 Feb 18	20.8 °C	24.8 °C	5.8 RH%	14.3 RH%

Config A, B, C:

Carrier Frequency: 5180 MHz, 5220 MHz and 5240 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation TX1			
30 - 40000	24575.976960	-40.77dBm	compliant
Measurement Uncertainty:			±5.4dB

Table 16 Field Strength of Spurious Radiation (20 MHz Channel BW)

The measured emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.6   Test No. 6: Frequency Stability (§ 2.1055, § 27.54)

4.6.1. Purpose

Frequency stability measurements were performed to verify that the frequency deviation of the emission stays within the licensee's frequency block under extreme temperature

4.6.2. Limits

Para. No. 27.54. (-30 °C to +50 °C) and supply voltage conditions according to § 2.1055.

4.6.3. Test Configuration
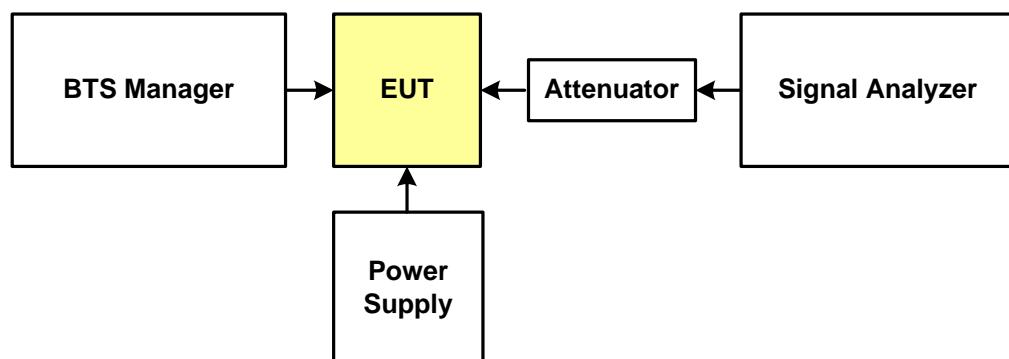
Figure 3 Test Configuration for frequency stability with voltage variation
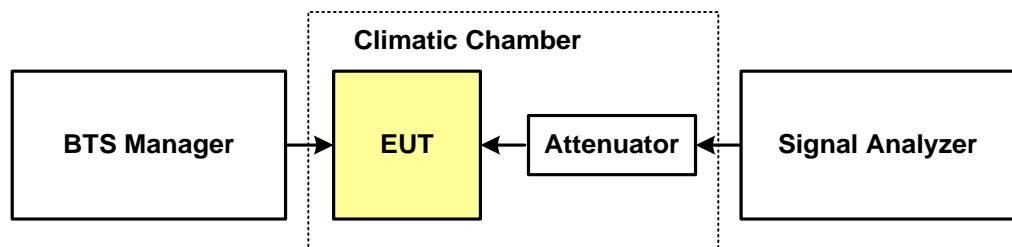
Figure 4 Test Configuration for frequency stability with temperature variation

A complete list of the measurement equipment is included on page 57 of this measurement report.

4.6.4. Test Procedure and Results

Frequency Stability with Temperature Variation:

The supply voltage of the EUT was set to the nominal value and the temperature of the environmental chamber was varied in 10 degree steps from -30 degrees Celsius to +50 degrees Celsius. The EUT was allowed to stabilize 60 min. at each temperature and the frequency error was measured.

Config A:

Table 10 Frequency stability with temp. var. UNII-1 (20 MHz Channel BW)

Carrier Frequency: 5220.0 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
-48	-30	-2.8336	-0.001	261	0.05	compliant
-48	-20	-3.7543	-0.001	261	0.05	compliant
-48	-10	-4.7717	-0.001	261	0.05	compliant
-48	0	12.2759	0.002	261	0.05	compliant
-48	10	-5.1621	-0.001	261	0.05	compliant
-48	30	-2.5567	0.000	261	0.05	compliant
-48	40	-6.3416	-0.001	261	0.05	compliant
-48	50	-4.5932	-0.001	261	0.05	compliant
QPSK Modulation ANT2						
-48	-30	-3.9005	-0.001	261	0.05	compliant
-48	-20	-7.5885	-0.001	261	0.05	compliant
-48	-10	-3.1214	-0.001	261	0.05	compliant
-48	0	18.5477	0.004	261	0.05	compliant
-48	10	-4.8254	-0.001	261	0.05	compliant
-48	30	3.5912	0.001	261	0.05	compliant
-48	40	-8.1020	-0.002	261	0.05	compliant
-48	50	-4.5774	-0.001	261	0.05	compliant
64QAM Modulation ANT1						
-48	-30	-2.8336	-0.001	261	0.05	compliant
-48	-20	-5.2096	-0.001	261	0.05	compliant
-48	-10	-3.9199	-0.001	261	0.05	compliant

-48	0	9.5404	0.002	261	0.05	compliant
-48	10	-6.7020	-0.001	261	0.05	compliant
-48	30	-6.3792	-0.001	261	0.05	compliant
-48	40	-3.9792	-0.001	261	0.05	compliant
-48	50	-5.5847	-0.001	261	0.05	compliant
64QAM Modulation ANT2						
-48	-30	-4.3367	-0.001	261	0.05	compliant
-48	-20	-7.0163	-0.001	261	0.05	compliant
-48	-10	-5.9817	-0.001	261	0.05	compliant
-48	0	-9.9375	-0.002	261	0.05	compliant
-48	10	8.0122	0.002	261	0.05	compliant
-48	30	-5.8037	-0.001	261	0.05	compliant
-48	40	-3.7012	-0.001	261	0.05	compliant
-48	50	-4.2467	-0.001	261	0.05	compliant
16QAM Modulation ANT1						
-48	-30	-5.2876	-0.001	261	0.05	compliant
-48	-20	-6.4366	-0.001	261	0.05	compliant
-48	-10	-4.8539	-0.001	261	0.05	compliant
-48	0	9.4500	0.002	261	0.05	compliant
-48	10	-4.0451	-0.001	261	0.05	compliant
-48	30	7.4157	0.001	261	0.05	compliant
-48	40	-4.8137	-0.001	261	0.05	compliant
-48	50	-3.7493	-0.001	261	0.05	compliant
16QAM Modulation ANT2						
-48	-30	-5.2860	-0.001	261	0.05	compliant
-48	-20	-7.0163	-0.001	261	0.05	compliant
-48	-10	-4.1710	-0.001	261	0.05	compliant
-48	0	11.6725	0.002	261	0.05	compliant
-48	10	-2.3890	0.000	261	0.05	compliant
-48	30	-6.0922	-0.001	261	0.05	compliant
-48	40	-4.4583	-0.001	261	0.05	compliant
-48	50	-6.5870	-0.001	261	0.05	compliant
256QAM Modulation ANT1						
-48	-30	5.9351	0.001	261	0.05	compliant
-48	-20	-3.0609	-0.001	261	0.05	compliant
-48	-10	-6.3918	-0.001	261	0.05	compliant
-48	0	-9.8316	-0.002	261	0.05	compliant
-48	10	4.7891	0.001	261	0.05	compliant

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-48	30	-2.0171	0.000	261	0.05	compliant
-48	40	-6.6598	-0.001	261	0.05	compliant
-48	50	-6.2351	-0.001	261	0.05	compliant
256QAM Modulation ANT2						
-48	-30	-6.3105	-0.001	261	0.05	compliant
-48	-20	-3.3036	-0.001	261	0.05	compliant
-48	-10	-4.2430	-0.001	261	0.05	compliant
-48	0	18.1850	0.003	261	0.05	compliant
-48	10	-2.3890	0.000	261	0.05	compliant
-48	30	4.4035	0.001	261	0.05	compliant
-48	40	-6.3873	-0.001	261	0.05	compliant
-48	50	-5.6439	-0.001	261	0.05	compliant

Config A:

Table 17 Frequency stability with temp. var. UNII-3 (20 MHz Channel BW)

Carrier Frequency: 5785.0 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
-48	-30	-2.8336	-0.001	289	0.05	compliant
-48	-20	-3.7543	-0.001	289	0.05	compliant
-48	-10	-4.7717	-0.001	289	0.05	compliant
-48	0	12.2759	0.002	289	0.05	compliant
-48	10	-5.1621	-0.001	289	0.05	compliant
-48	30	-2.5567	0.000	289	0.05	compliant
-48	40	-6.3416	-0.001	289	0.05	compliant
-48	50	-4.5932	-0.001	289	0.05	compliant
QPSK Modulation ANT2						
-48	-30	-3.9005	-0.001	289	0.05	compliant
-48	-20	-7.5885	-0.001	289	0.05	compliant
-48	-10	-3.1214	-0.001	289	0.05	compliant
-48	0	18.5477	0.004	289	0.05	compliant

-48	10	-4.8254	-0.001	289	0.05	compliant
-48	30	3.5912	0.001	289	0.05	compliant
-48	40	-8.1020	-0.002	289	0.05	compliant
-48	50	-4.5774	-0.001	289	0.05	compliant
64QAM Modulation ANT1						
-48	-30	-2.8336	-0.001	289	0.05	compliant
-48	-20	-5.2096	-0.001	289	0.05	compliant
-48	-10	-3.9199	-0.001	289	0.05	compliant
-48	0	9.5404	0.002	289	0.05	compliant
-48	10	-6.7020	-0.001	289	0.05	compliant
-48	30	-6.3792	-0.001	289	0.05	compliant
-48	40	-3.9792	-0.001	289	0.05	compliant
-48	50	-5.5847	-0.001	289	0.05	compliant
64QAM Modulation ANT2						
-48	-30	-4.3367	-0.001	289	0.05	compliant
-48	-20	-7.0163	-0.001	289	0.05	compliant
-48	-10	-5.9817	-0.001	289	0.05	compliant
-48	0	-9.9375	-0.002	289	0.05	compliant
-48	10	8.0122	0.002	289	0.05	compliant
-48	30	-5.8037	-0.001	289	0.05	compliant
-48	40	-3.7012	-0.001	289	0.05	compliant
-48	50	-4.2467	-0.001	289	0.05	compliant
16QAM Modulation ANT1						
-48	-30	-5.2876	-0.001	289	0.05	compliant
-48	-20	-6.4366	-0.001	289	0.05	compliant
-48	-10	-4.8539	-0.001	289	0.05	compliant
-48	0	9.4500	0.002	289	0.05	compliant
-48	10	-4.0451	-0.001	289	0.05	compliant
-48	30	7.4157	0.001	289	0.05	compliant
-48	40	-4.8137	-0.001	289	0.05	compliant
-48	50	-3.7493	-0.001	289	0.05	compliant
16QAM Modulation ANT2						
-48	-30	-5.2860	-0.001	289	0.05	compliant
-48	-20	-7.0163	-0.001	289	0.05	compliant
-48	-10	-4.1710	-0.001	289	0.05	compliant
-48	0	11.6725	0.002	289	0.05	compliant
-48	10	-2.3890	0.000	289	0.05	compliant
-48	30	-6.0922	-0.001	289	0.05	compliant

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-48	40	-4.4583	-0.001	289	0.05	compliant
-48	50	-6.5870	-0.001	289	0.05	compliant
256QAM Modulation ANT1						
-48	-30	5.9351	0.001	289	0.05	compliant
-48	-20	-3.0609	-0.001	289	0.05	compliant
-48	-10	-6.3918	-0.001	289	0.05	compliant
-48	0	-9.8316	-0.002	289	0.05	compliant
-48	10	4.7891	0.001	289	0.05	compliant
-48	30	-2.0171	0.000	289	0.05	compliant
-48	40	-6.6598	-0.001	289	0.05	compliant
-48	50	-6.2351	-0.001	289	0.05	compliant
256QAM Modulation ANT2						
-48	-30	-6.3105	-0.001	289	0.05	compliant
-48	-20	-3.3036	-0.001	289	0.05	compliant
-48	-10	-4.2430	-0.001	289	0.05	compliant
-48	0	18.1850	0.003	289	0.05	compliant
-48	10	-2.3890	0.000	289	0.05	compliant
-48	30	4.4035	0.001	289	0.05	compliant
-48	40	-6.3873	-0.001	289	0.05	compliant
-48	50	-5.6439	-0.001	289	0.05	compliant

Frequency Stability with Voltage Variation:

The EUT was placed in a climatic chamber and allowed to stabilize at +20 degrees Celsius for at least 60 minutes. With the supply voltage of the EUT set to 85% of the nominal value, the frequency error was measure. This procedure was repeated at 100% and 115% of the nominal supply voltage value.

Config A:

Table 18 Frequency stability with voltage var. UNII-1 (20 MHz Channel BW)

Carrier Frequency: 5220.0 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
40.8	20	-9.7639	-0.002	261	0.05	compliant
48	20	10.9845	0.002	261	0.05	compliant
55.2	20	10.2621	0.002	261	0.05	compliant
QPSK Modulation ANT2						
40.8	20	15.4702	0.003	261	0.05	compliant
48	20	-11.4146	-0.002	261	0.05	compliant
55.2	20	8.6142	0.002	261	0.05	compliant
64QAM Modulation ANT1						
40.8	20	12.6053	0.002	261	0.05	compliant
48	20	-8.8064	-0.002	261	0.05	compliant
55.2	20	13.4831	0.003	261	0.05	compliant
64QAM Modulation ANT2						
40.8	20	-12.9625	-0.002	261	0.05	compliant
48	20	12.4921	0.002	261	0.05	compliant
55.2	20	14.2226	0.003	261	0.05	compliant
16QAM Modulation ANT1						
40.8	20	13.2146	0.003	261	0.05	compliant
48	20	13.5614	0.003	261	0.05	compliant
55.2	20	12.2342	0.002	261	0.05	compliant
16QAMModulation ANT2						
40.8	20	11.0250	0.002	261	0.05	compliant
48	20	-10.4072	-0.002	261	0.05	compliant
55.2	20	-11.3405	-0.002	261	0.05	compliant
256QAM Modulation ANT1						
40.8	20	14.3147	0.003	261	0.05	compliant

48	20	-9.4819	-0.002	261	0.05	compliant
55.2	20	12.3988	0.002	261	0.05	compliant
256QAM Modulation ANT2						
40.8	20	-13.4995	-0.003	261	0.05	compliant
48	20	15.6228	0.003	261	0.05	compliant
55.2	20	-11.4939	-0.002	261	0.05	compliant

Config A:

Table 19 Frequency stability with voltage var. UNII-3 (20 MHz Channel BW)

Carrier Frequency: 5785.0 MHz						
Supply Voltage (DC) [V]	Ambient Temperature [°C]	Frequency Deviation		Manufacturer's Specification		Result
		[Hz]	[ppm]	[Hz]	[ppm]	
QPSK Modulation ANT1						
40.8	20	-10.7815	-0.002	289	0.05	compliant
48	20	11.3505	0.002	289	0.05	compliant
55.2	20	14.8763	0.003	289	0.05	compliant
QPSK Modulation ANT2						
40.8	20	-12.3450	-0.002	289	0.05	compliant
48	20	15.5371	0.003	289	0.05	compliant
55.2	20	13.8155	0.002	289	0.05	compliant
64QAM Modulation ANT1						
40.8	20	10.3440	0.002	289	0.05	compliant
48	20	-10.5986	-0.002	289	0.05	compliant
55.2	20	16.4075	0.003	289	0.05	compliant
64QAM Modulation ANT2						
40.8	20	12.5004	0.002	289	0.05	compliant
48	20	11.8443	0.002	289	0.05	compliant
55.2	20	-12.6082	-0.002	289	0.05	compliant
16QAM Modulation ANT1						
40.8	20	-12.2344	-0.002	289	0.05	compliant
48	20	15.5395	0.003	289	0.05	compliant
55.2	20	-12.5250	-0.002	289	0.05	compliant
16QAMModulation ANT2						
40.8	20	-13.6225	-0.002	289	0.05	compliant
48	20	-12.4955	-0.002	289	0.05	compliant
55.2	20	15.3740	0.003	289	0.05	compliant

256QAM Modulation ANT1						
40.8	20	-12.3440	-0.002	289	0.05	compliant
48	20	12.9308	0.002	289	0.05	compliant
55.2	20	13.1192	0.002	289	0.05	compliant
256QAM Modulation ANT2						
40.8	20	14.9294	0.003	289	0.05	compliant
48	20	12.7648	0.002	289	0.05	compliant
55.2	20	-12.7898	-0.002	289	0.05	compliant

The measured frequency stability was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

5. TEST DATA AND SCREENSHOTS

5.1 Part List of the RF Measurement Test Equipment

No.	Test Equipment	Manufacturer & Type	Serial Number	Calibration date	Calibration due	Test No.
1	Signal Analyzer	Rohde & Schwarz: FSV 13	101041	12/2017	12/2018	1, 2, 3, 4, 6
2	Signal Analyzer	Rohde & Schwarz: FSW 43	104001	07/2017	7/2018	1, 2, 3, 4, 6
3	Vector Signal Generator	-	-	-	-	-
4	Attenuator 20 dB	Aeroflex/ Weinschel	402	-	-	1, 2, 3, 4, 6
5	Attenuator 20 dB	Aeroflex/ Weinschel	BW3346	-	-	1, 2, 3, 4, 6
4	Signal Generator	-	-	-	-	1, 2, 3, 6
6	Vector Network Analyzer	Rohde & Schwarz: ZVA40	100146	01/2018	1/2019	1, 2, 3, 4, 6
7	Vector Network Analyzer	Rohde & Schwarz: ZVL13	101177	07/2017	7/2018	1, 2, 3, 4, 6
8	Calibration Unit	Rohde & Schwarz: ZV-Z54	100125	07/2017	06/2018	4
9	Calibration Kit	Hewlett-Packard: HP85032B	2919A04843	07/2017	07/2018	4
10	Power Meter	Rohde & Schwarz: NRP-Z21	-	-		-
11	Frequency Standard	Symmetricom 8040	161730115011	07/2017	07/2018	6
12	Multimeter	Fluke 83	65870302	01/2018	03/2019	1, 2, 3, 4, 6
13	Humidity and Temperature Indicator	Vaisala: HMP110	M2710515	03/2017	03/2018	1, 2, 3, 4, 6
14	DC Power Supply	Agile 6674A	MY41001083	cnn	-	1, 2, 3, 4, 6
15	Interface Unit	-	-	-	-	-
16	Attenuator	Aeroflex/Weinschel: 48-20-34	BV3390	cnn	-	4
17	EMI Test Receiver	R&S ESU40	100262	06/2017	6/2018	5
18	Bilog Antenna	Schaffner Chase CBL6112	6346	07/2017	07/2018	5
19	Horn Antenna	ETS-Lindgren 3116C-PA	2694	08/2017	08/2018	5
20	Horn Antenna	ETS-Lindgren ETS3115	356749/012	08/2017	08/2018	5
21	Amplifier	Miteq AFSX4	902638	cnn	-	5
22	Antenna Mast	Deisel HD240	2401323194	cnn	-	5
23	Mast Controller	Deisel HD100	1001331	cnn	-	5
24	Anechoic chamber	S&MC	B83317-C6019-T232	12/2016	12/2019	5

Table 20 Part List of the RF Measurement Test Equipment

5.2   Spectral Plots

5.2.1. Test No. 2: Modulation Characteristics

No additional measurements are required for the modulation characteristics. Please refer to test no. 3, occupied bandwidth on page 29.

Screenshots below shows information about the modulations I/Q constellation form and modulation information table, displaying error to ideal modulation symbols.

Date: 10.JAN.2018 15:04:19
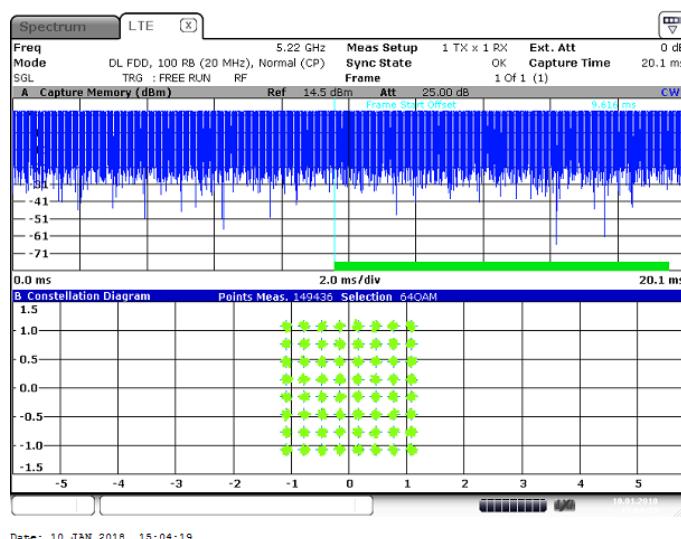
Figure 5 I/Q constellation diagram with capture buffer – 64QAM (2593.0 MHz) (20MHz Channel BW)

Date: 11.JAN.2018 10:23:44
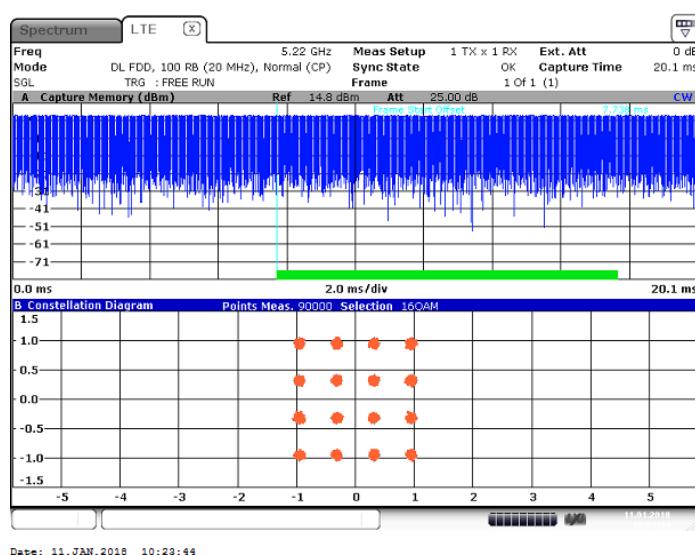
Figure 6 I/Q constellation diagram with capture buffer – 16QAM (5220.0 MHz) (20MHz Channel BW)

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Date: 10.JAN.2018 14:58:09
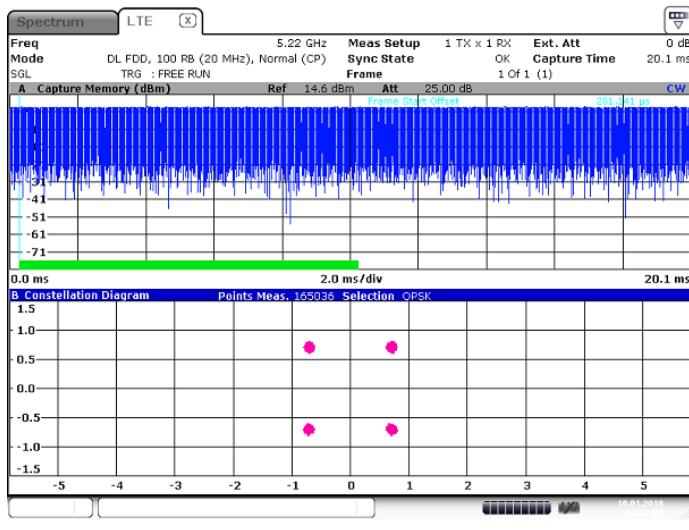
Figure 7 I/Q constellation diagram with capture buffer – QPSK (5220.0 MHz) (20MHz Channel BW)

Date: 11.JAN.2018 08:56:19
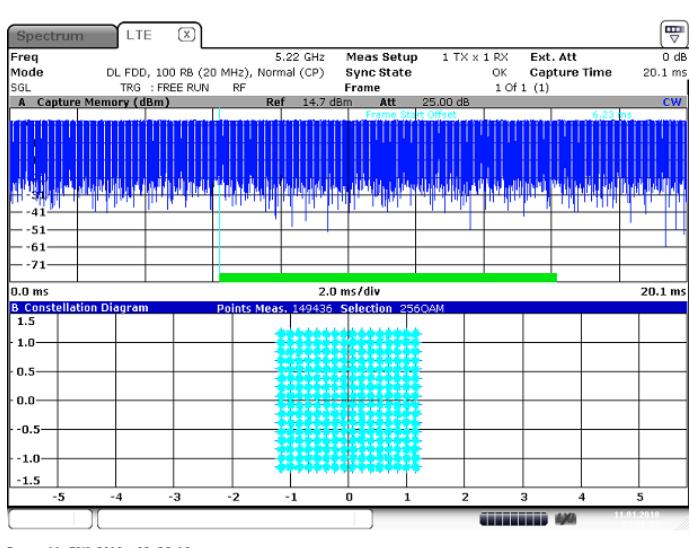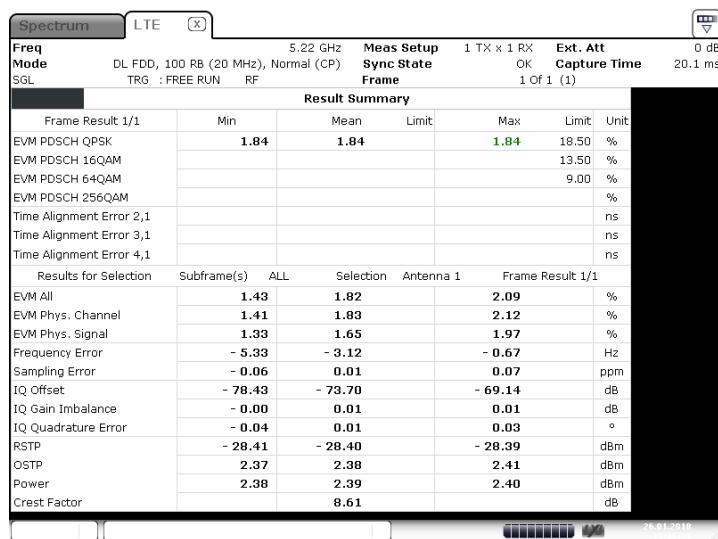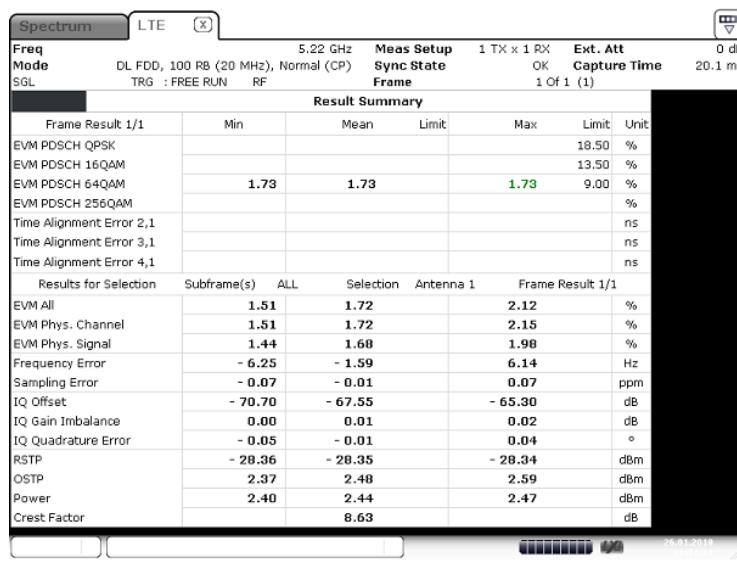
Figure 8 I/Q constellation diagram with capture buffer – 256QAM (5220.0 MHz) (20MHz Channel BW)

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Date: 26.JAN.2018 11:16:31

Figure 9 I/Q constellation table with I/Q error – QPSK (5220.0 MHz) (20MHz Channel BW)

Date: 26.JAN.2018 11:21:21

Figure 10 I/Q constellation diagram with capture buffer – 64QAM (5220.0 MHz) (20MHz Channel BW)

Figure 11 I/Q constellation table with I/Q error – 16QAM (5220.0 MHz) (20MHz Channel BW)
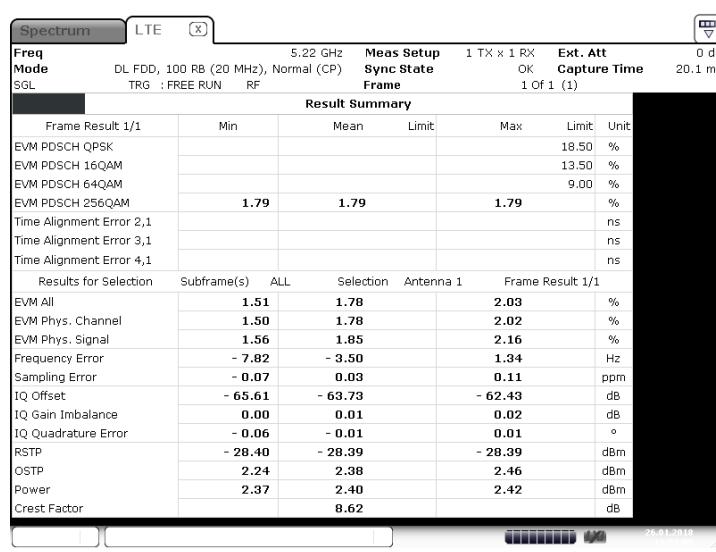
Figure 12 I/Q constellation table with I/Q error – 256QAM (5220.0 MHz) (20MHz Channel BW)

5.2.2. Test No. 1: Output Power and Power Spectral Density

Config A ANT1 UNII-1:
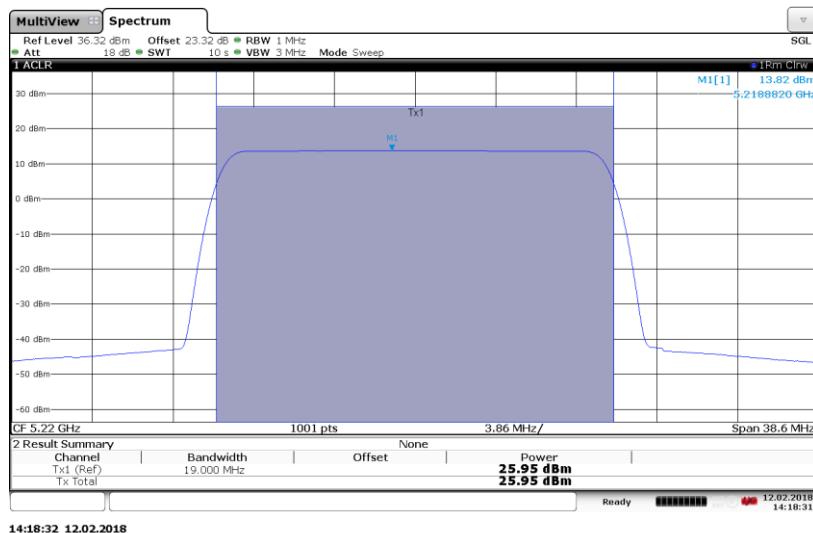
Figure 13 Output Power and Power Spectral Density – QPSK (5220.0 MHz) (20MHz Channel BW)
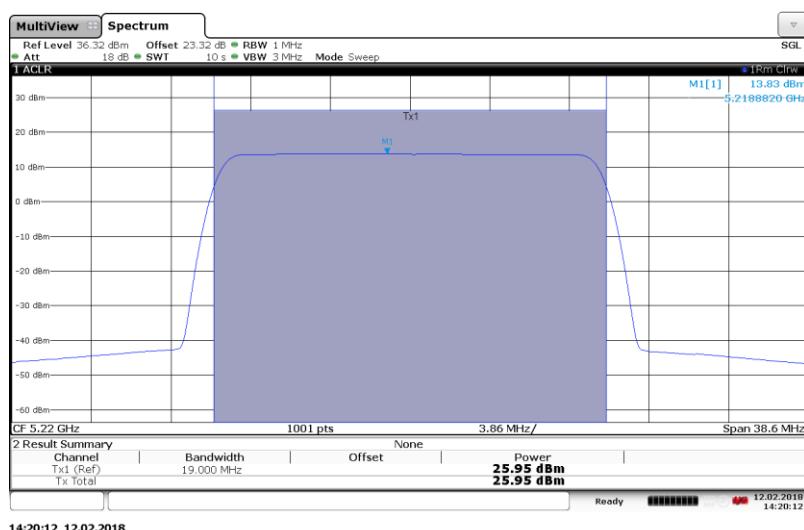
Figure 14 Output Power and Power Spectral Density – 64QAM (5220.0 MHz) (20MHz Channel BW)

14:22:39 12.02.2018
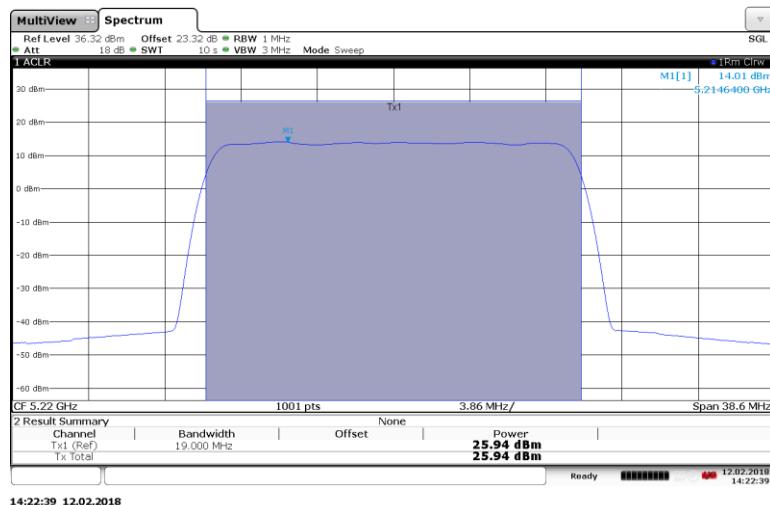
Figure 15 Output Power and Power Spectral Density – 16QAM (5220.0 MHz) (20MHz Channel BW)

14:24:20 12.02.2018
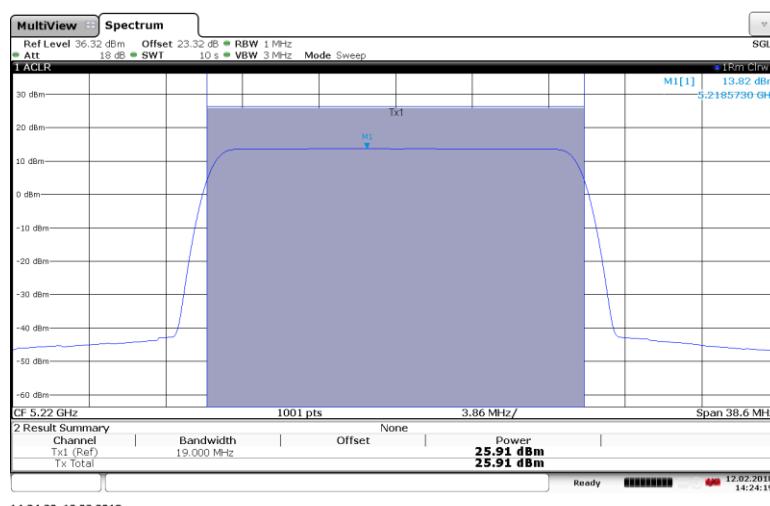
Figure 16 Output Power and Power Spectral Density – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-1:

14:29:17 12.02.2018
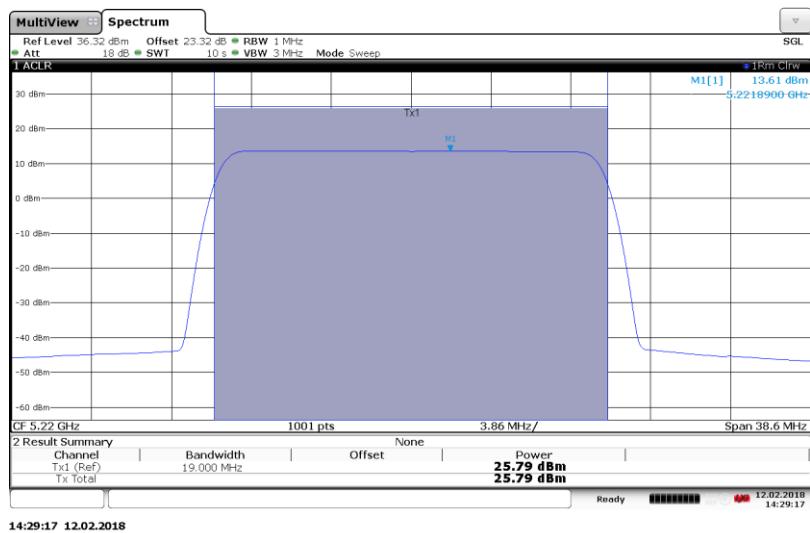
Figure 17 Output Power and Power Spectral Density – QPSK (5220.0 MHz) (20MHz Channel BW)

14:37:07 12.02.2018
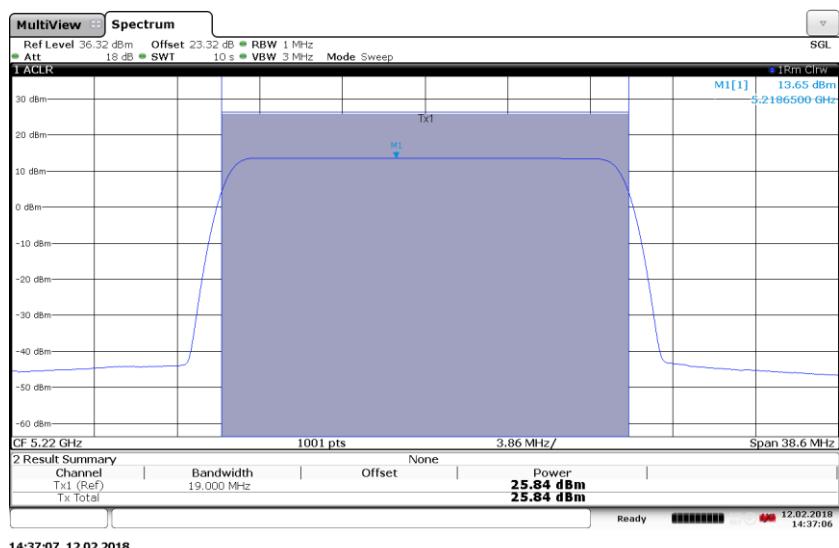
Figure 18 Output Power and Power Spectral Density – 64QAM (5220.0 MHz) (20MHz Channel BW)
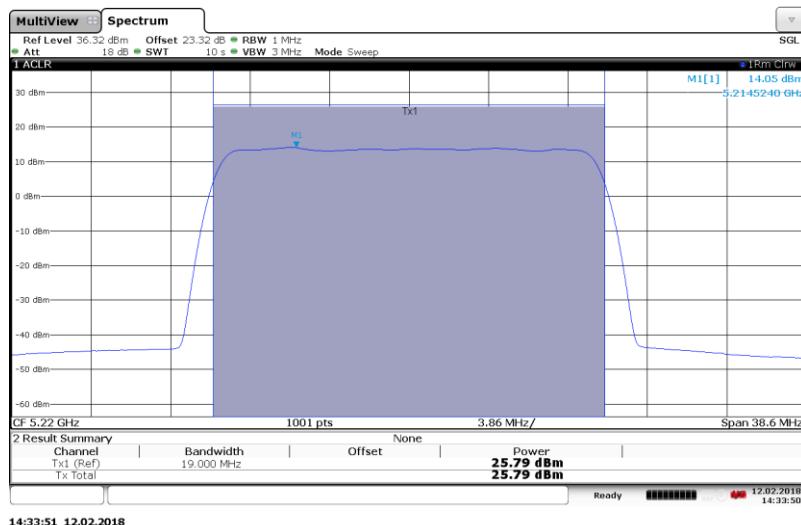
Figure 19 Output Power and Power Spectral Density – 16QAM (5220.0 MHz) (20MHz Channel BW)
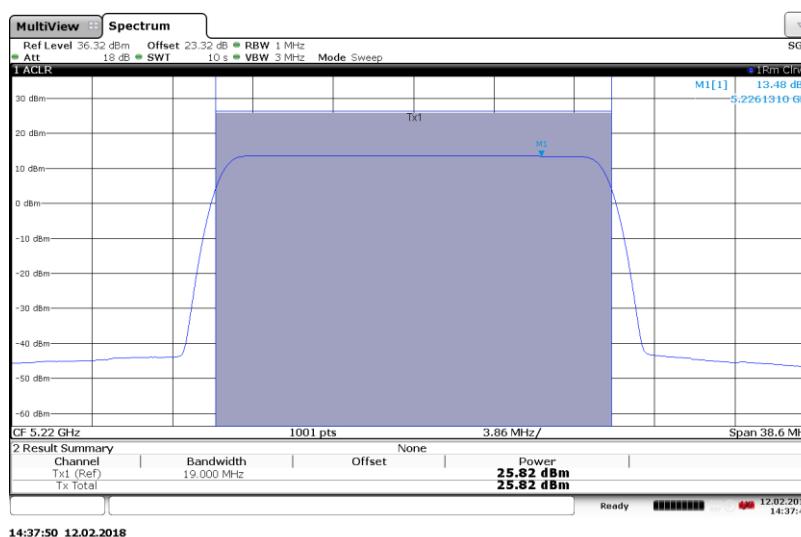
Figure 20 Output Power and Power Spectral Density – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-3:
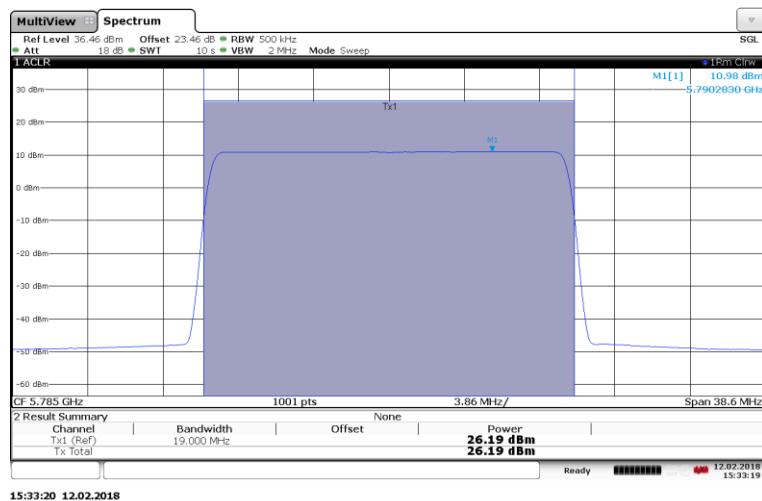
Figure 21 Output Power and Power Spectral Density – QPSK (5785.0 MHz) (20MHz Channel BW)
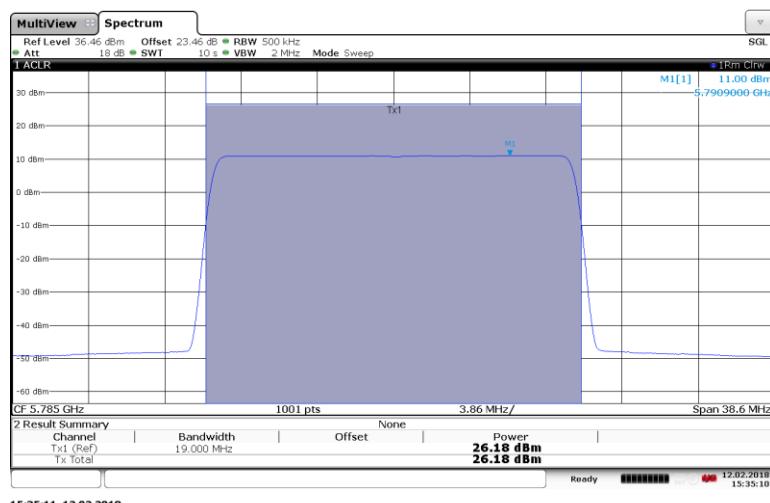
Figure 22 Output Power and Power Spectral Density – 64QAMQPSK (5785.0 MHz) (20MHz Channel BW)
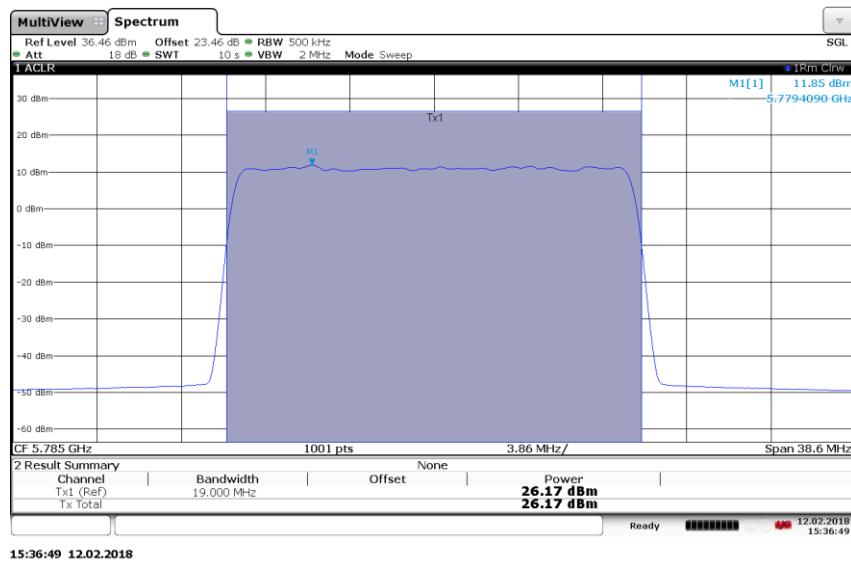
Figure 23 Output Power and Power Spectral Density – 16QAMQPSK (5785.0 MHz) (20MHz Channel BW)
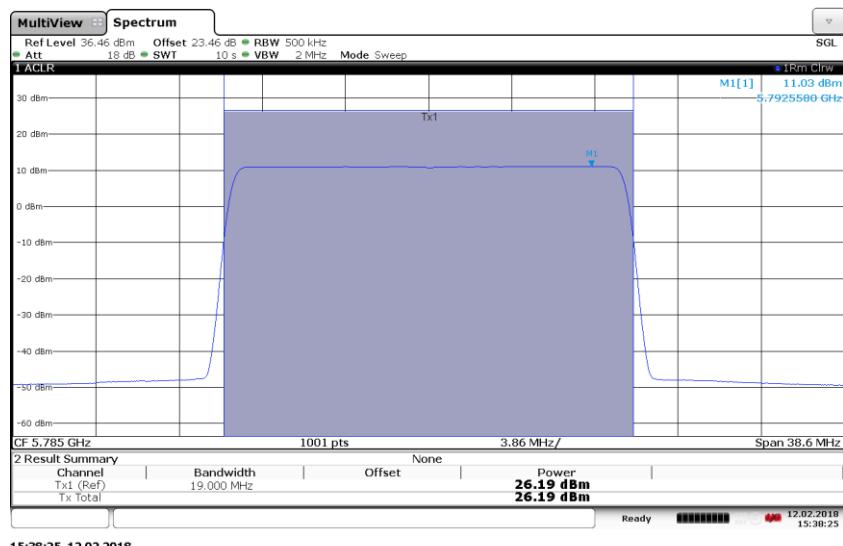
Figure 24 Output Power and Power Spectral Density – 256QAMQPSK (5785.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-3:

15:43:11 12.02.2018
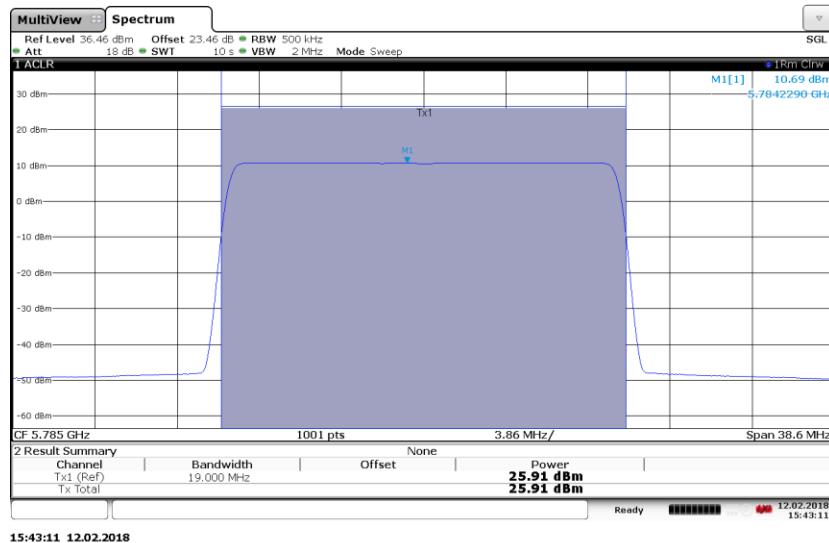
Figure 25 Output Power and Power Spectral Density – QPSK (5785.0 MHz) (20MHz Channel BW)

15:45:23 12.02.2018
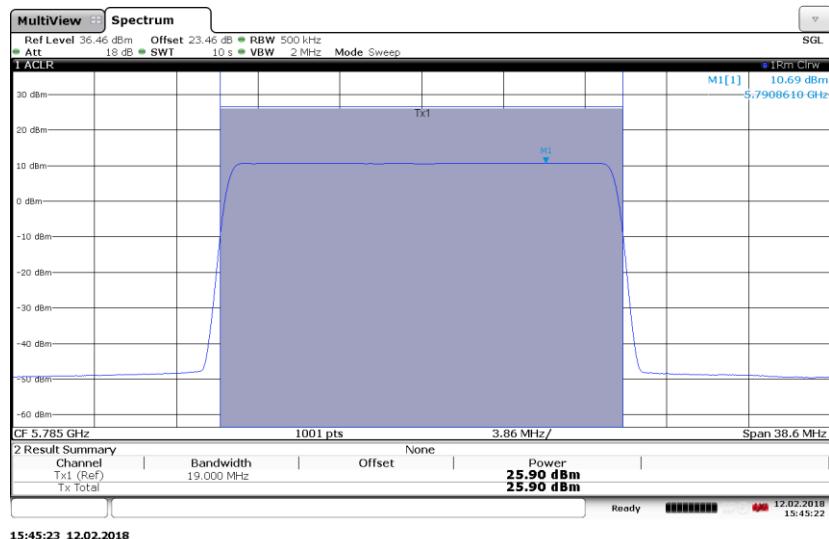
Figure 26 Output Power and Power Spectral Density – 64QAMQPSK (5785.0 MHz) (20MHz Channel BW)
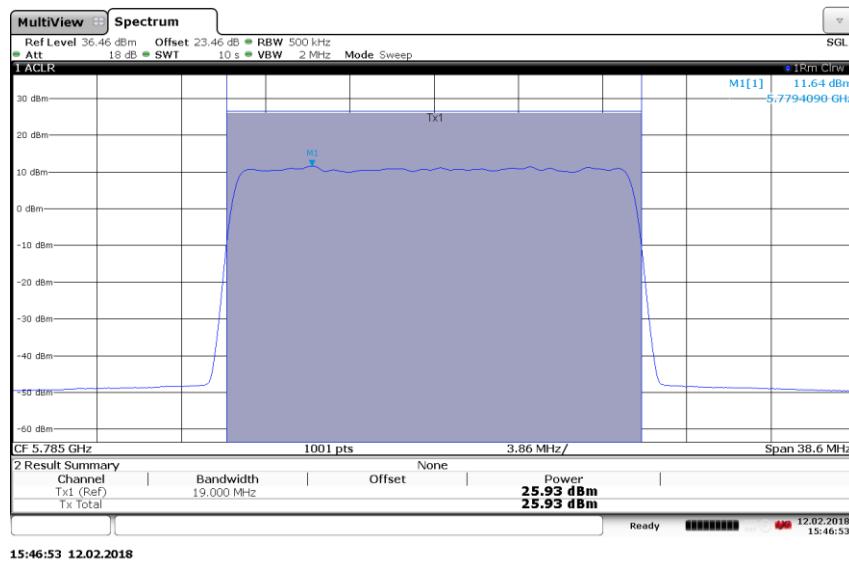
Figure 27 Output Power and Power Spectral Density – 16QAMQPSK (5785.0 MHz) (20MHz Channel BW)
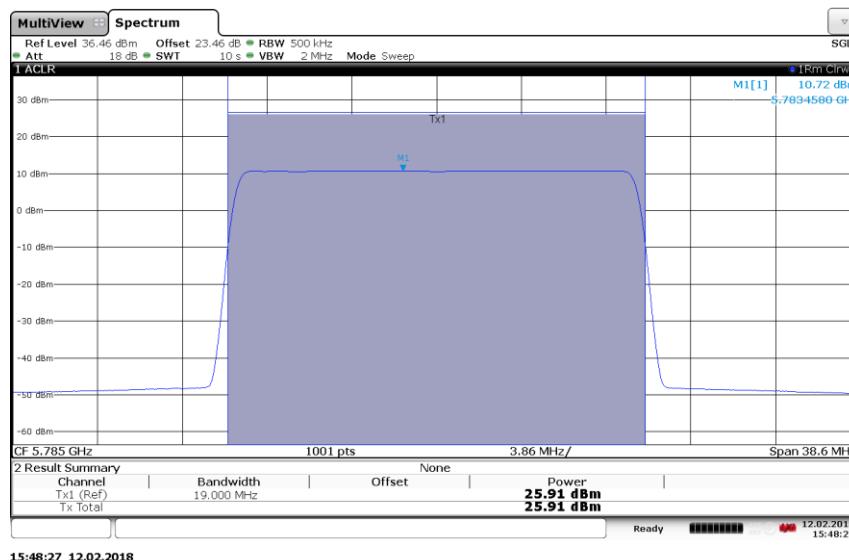
Figure 28 Output Power and Power Spectral Density – 256QAMQPSK (5785.0 MHz) (20MHz Channel BW)

5.2.3. Test No. 3: Occupied Bandwidth

The value 'Occ Bw' is the measured occupied bandwidth.

Config A ANT1 UNII-1 OBW:
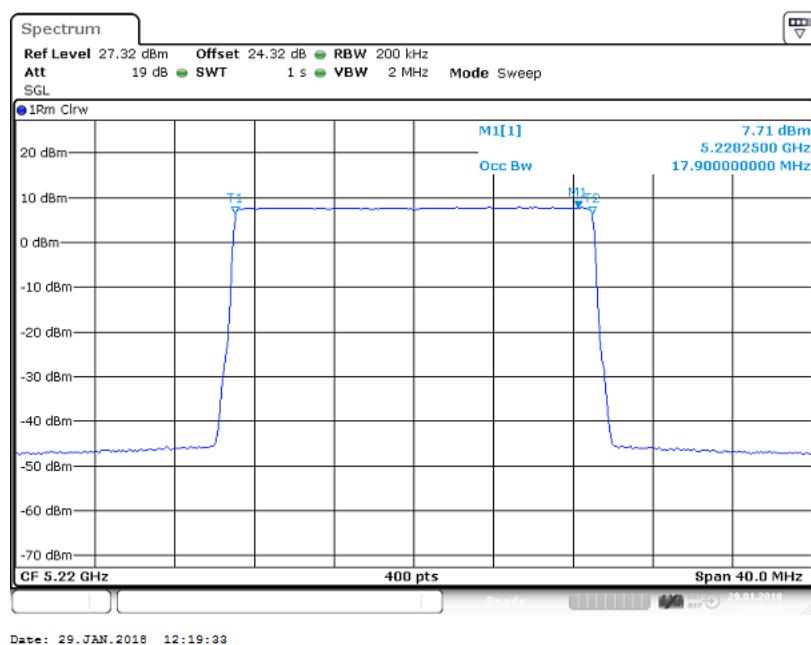
Figure 29 Occupied Bandwidth – QPSK (5220.0 MHz) (20MHz Channel BW)
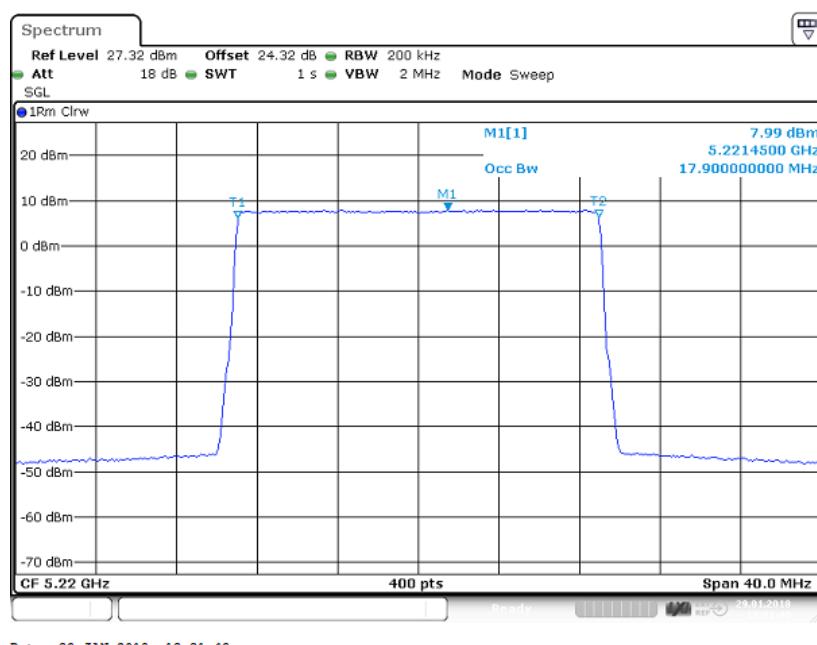
Figure 30 Occupied Bandwidth – 64QAM (5220.0 MHz) (20MHz Channel BW)

Date: 29.JAN.2018 12:23:29
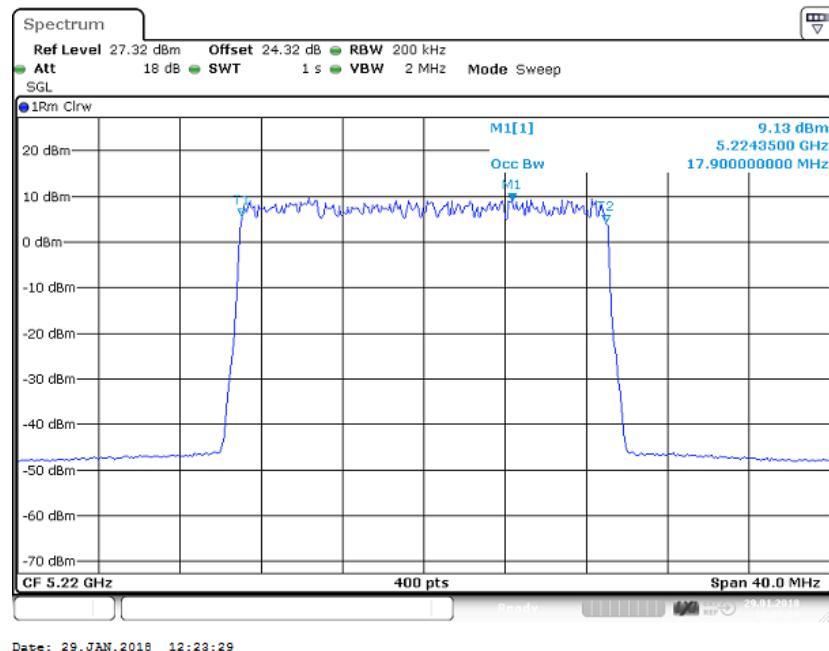
Figure 31 Occupied Bandwidth – 16QAM (5220.0 MHz) (20MHz Channel BW)

Date: 29.JAN.2018 12:25:29
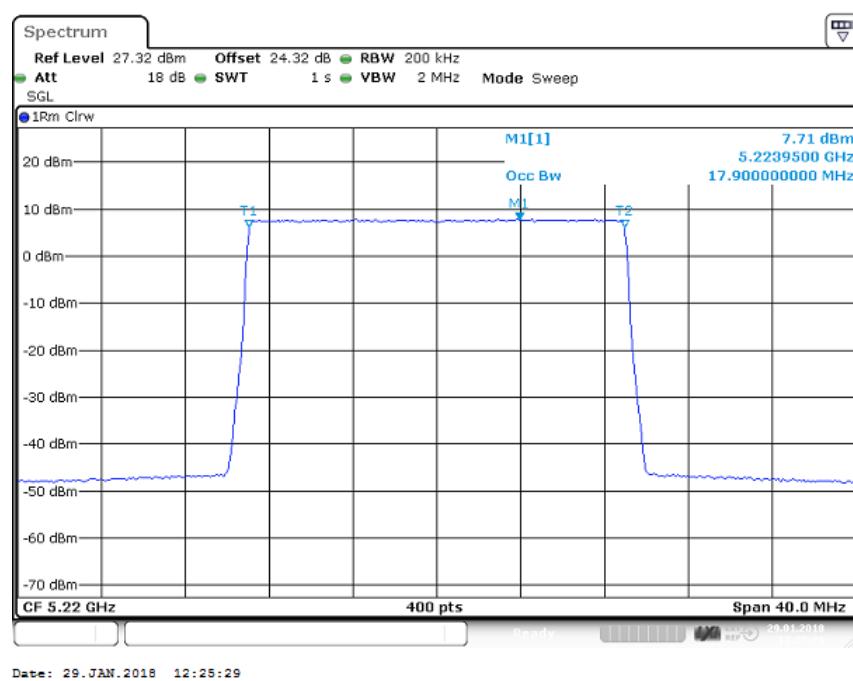
Figure 32 Occupied Bandwidth – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-1 OBW:

Date: 29.JAN.2018 12:29:41
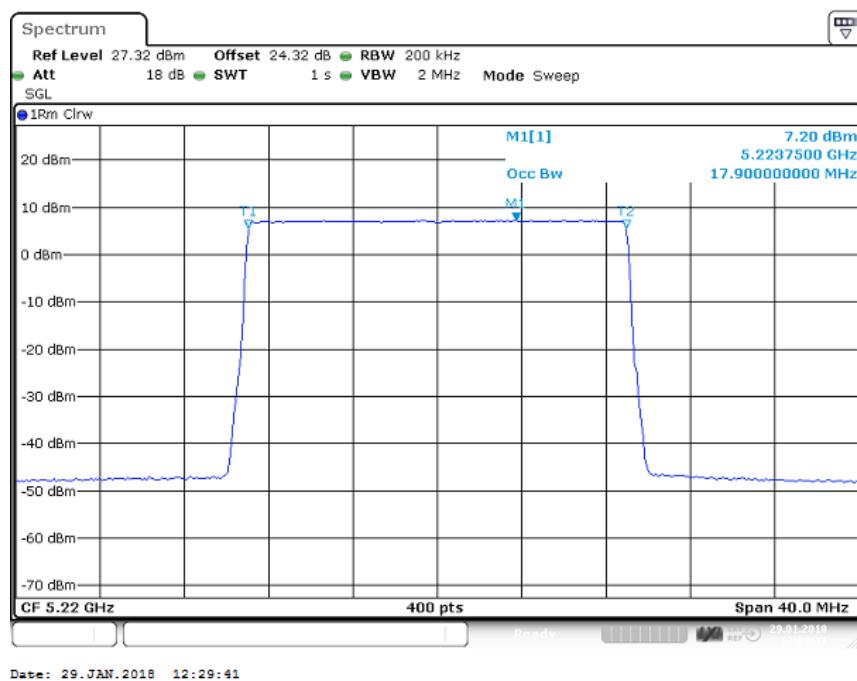
Figure 33 Occupied Bandwidth – QPSK (5220.0 MHz) (20MHz Channel BW)

Date: 29.JAN.2018 12:31:43
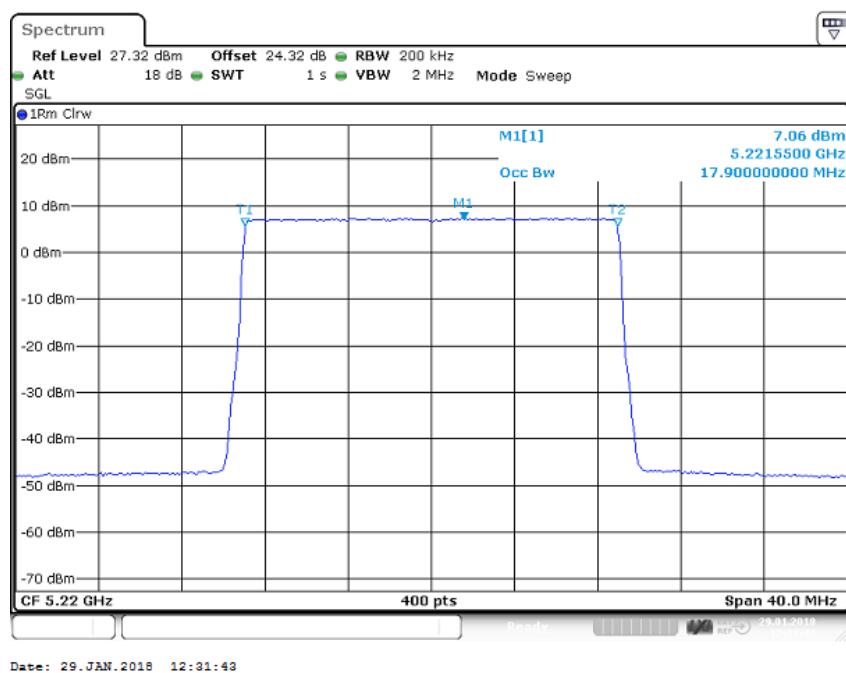
Figure 34 Occupied Bandwidth – 64QAM (5220.0 MHz) (20MHz Channel BW)
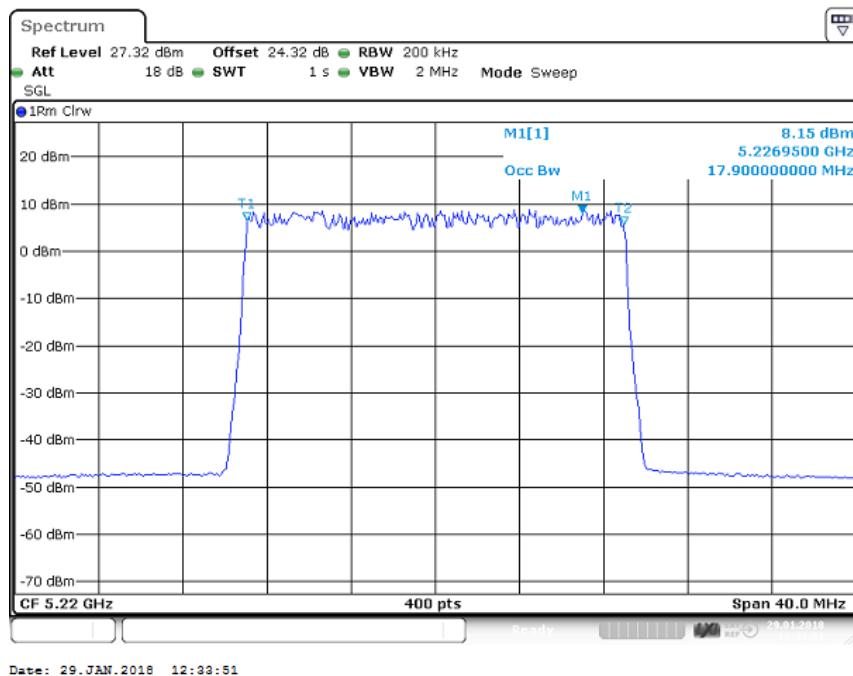
**Figure 35 Occupied Bandwidth – 16QAM (5220.0 MHz) (20MHz Channel BW)**
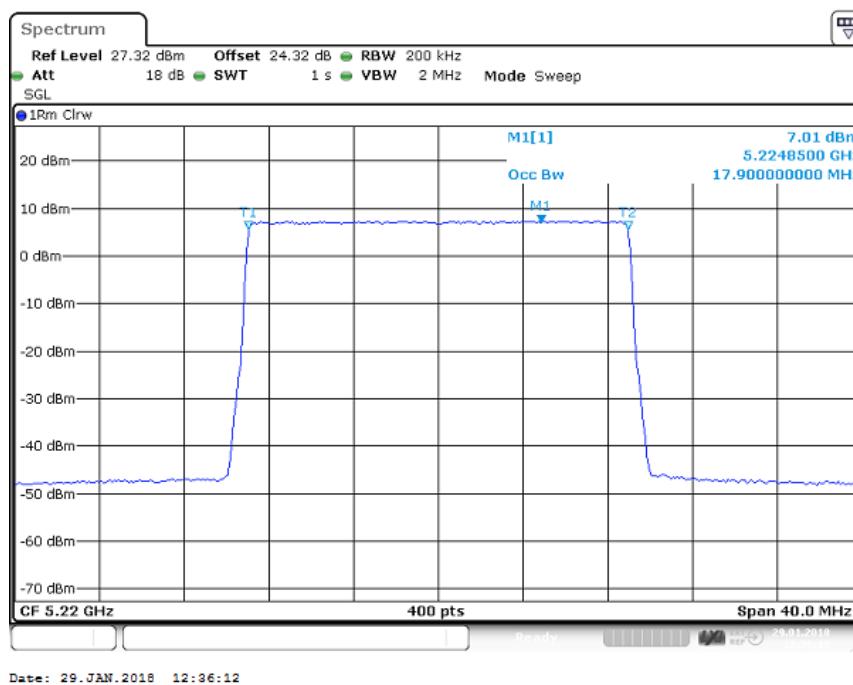
Figure 36 Occupied Bandwidth – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT1 UNII-1 26 dB:

Date: 11.JAN.2018 09:17:17
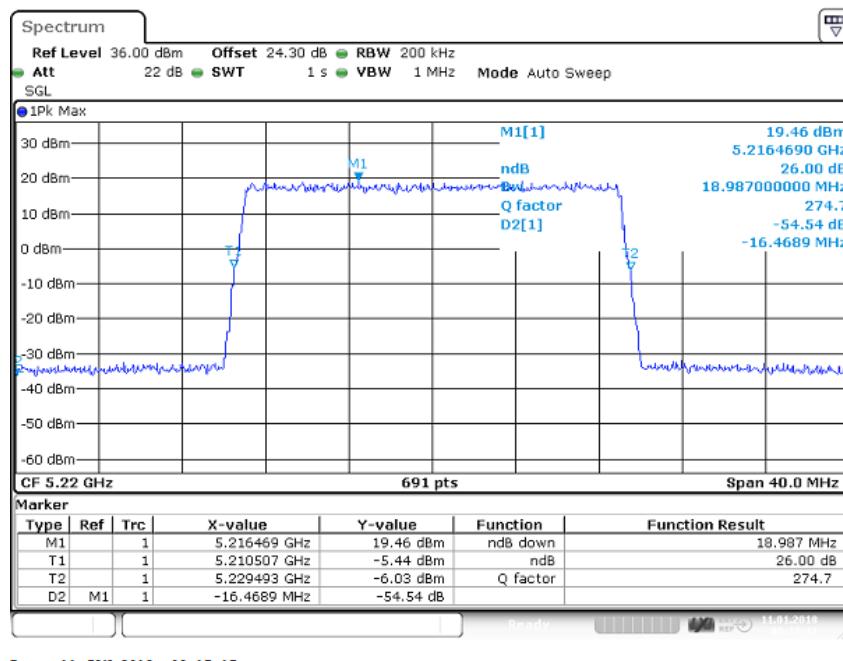
Figure 37 Occupied Bandwidth – QPSK (5220.0 MHz) (20MHz Channel BW)

Date: 11.JAN.2018 09:33:45
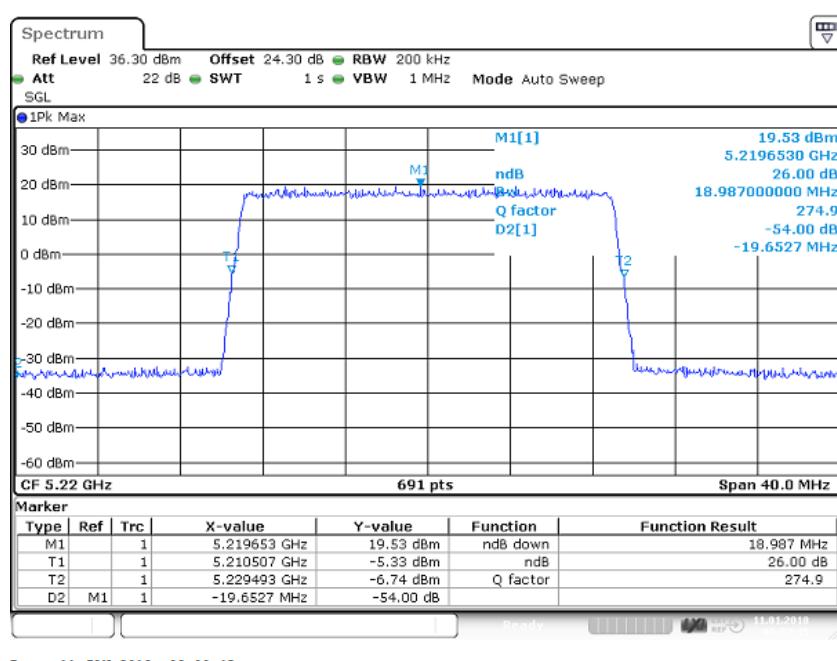
**Figure 38 Occupied Bandwidth – 64QAM (5220.0 MHz) (20MHz Channel BW)**
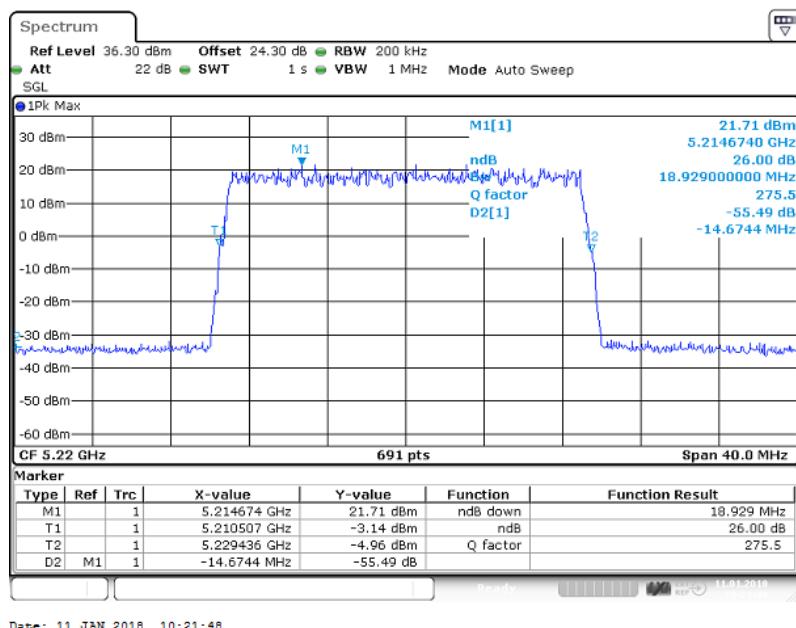
Figure 39 Occupied Bandwidth – 16QAM (5220.0 MHz) (20MHz Channel BW)
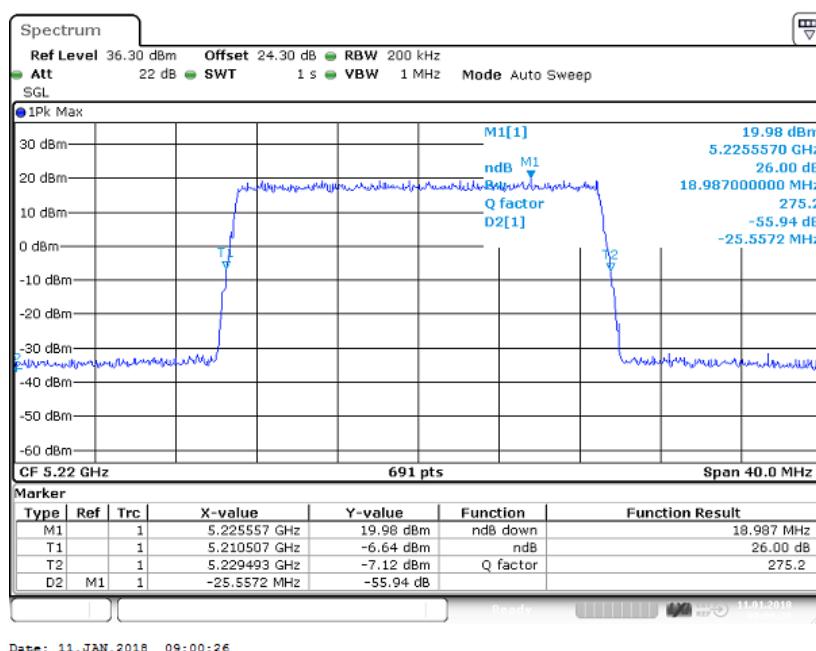
Figure 40 Occupied Bandwidth – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-1 26 dB:

Date: 15.JAN.2018 12:19:16
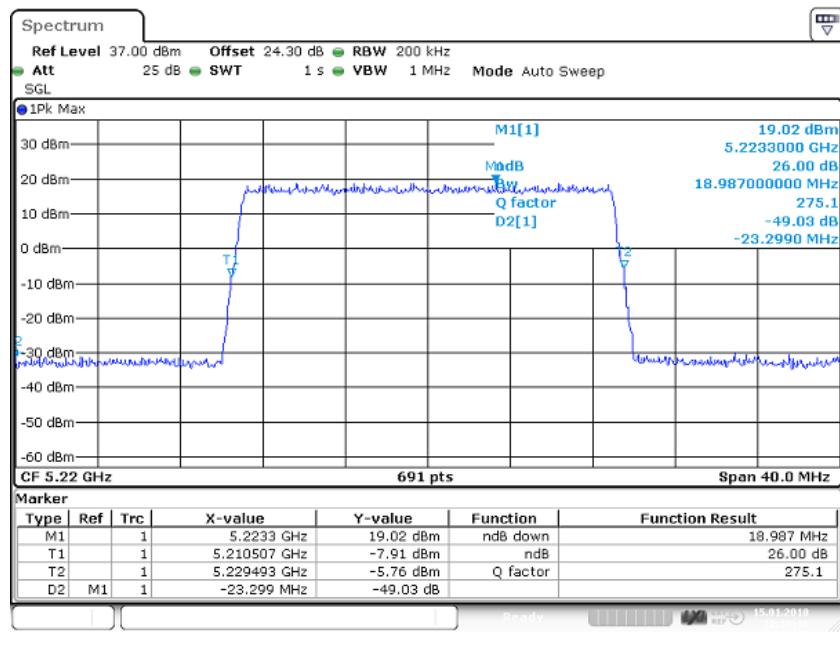
Figure 41 Occupied Bandwidth – QPSK (5220.0 MHz) (20MHz Channel BW)

Date: 15.JAN.2018 12:20:42
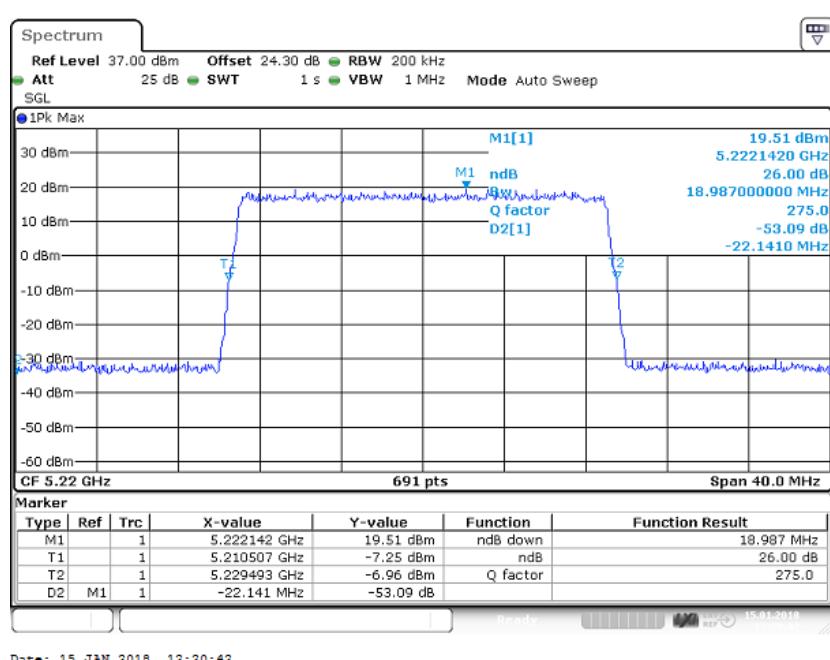
Figure 42 Occupied Bandwidth – 64QAM (5220.0 MHz) (20MHz Channel BW)

Date: 15.JAN.2018 12:33:08
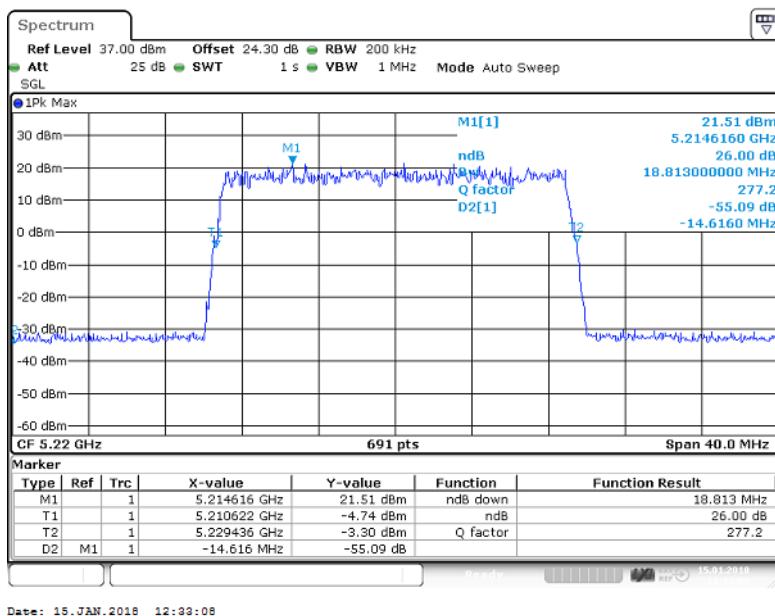
Figure 43 Occupied Bandwidth – 16QAM (5220.0 MHz) (20MHz Channel BW)


Date: 15.JAN.2018 12:38:25
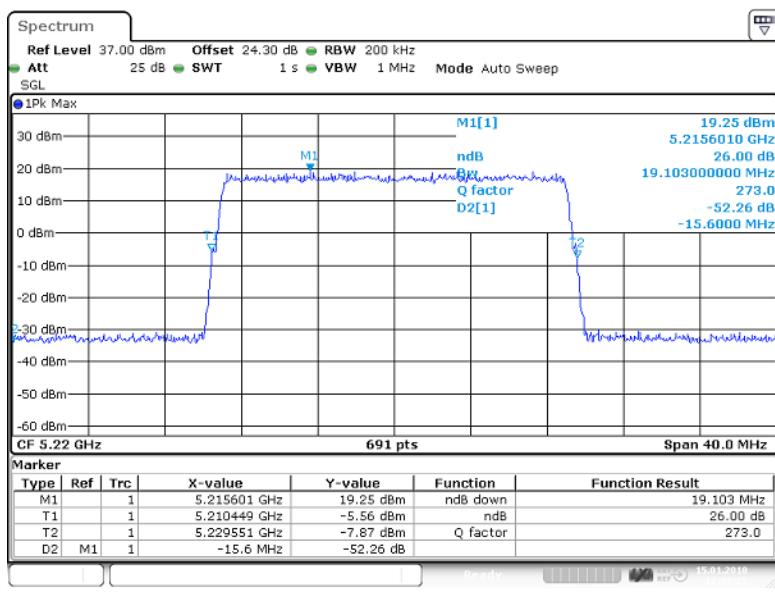
Figure 44 Occupied Bandwidth – 256QAM (5220.0 MHz) (20MHz Channel BW)

Config A ANT1 UNII-3 26 dB:
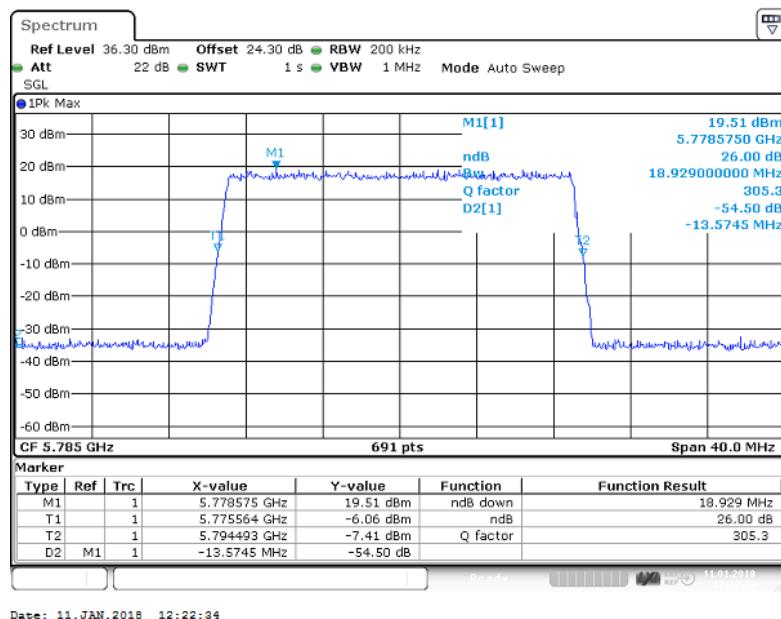
Figure 45 Occupied Bandwidth – QPSK (5785.0 MHz) (20MHz Channel BW)
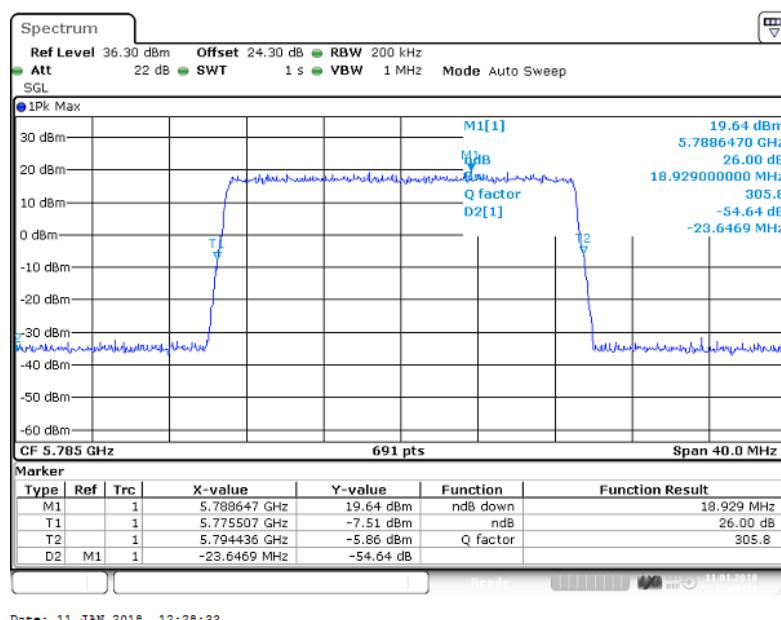
**Figure 46 Occupied Bandwidth – 64QAM (5785.0 MHz) (20MHz Channel BW)**
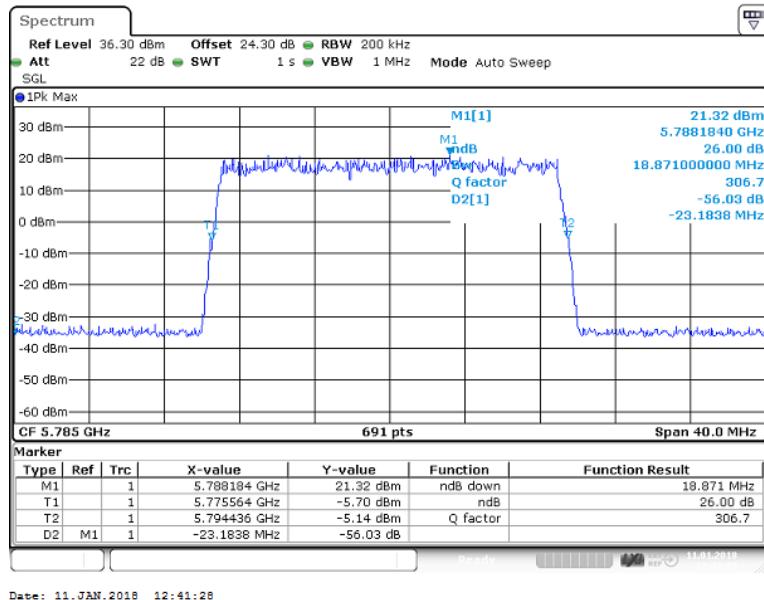
Figure 47 Occupied Bandwidth – 16QAM (5785.0 MHz) (20MHz Channel BW)
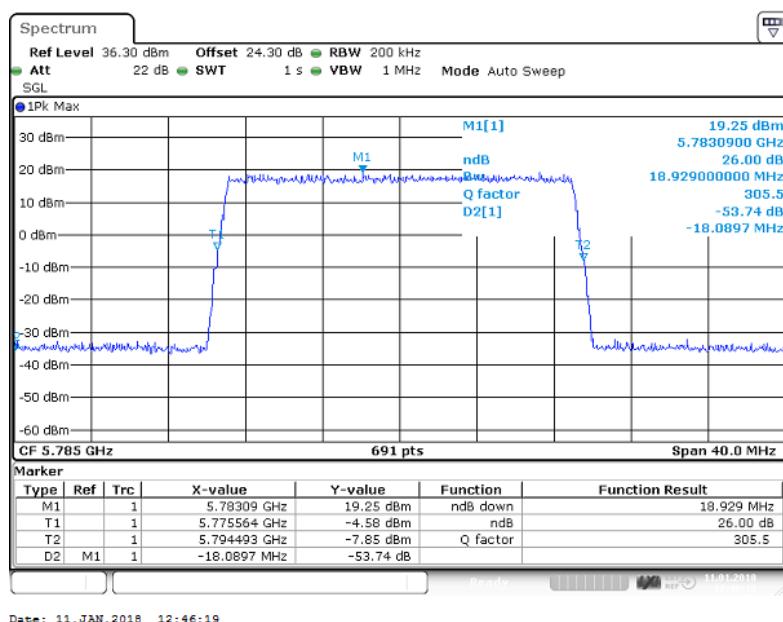
Figure 48 Occupied Bandwidth – 256QAM (5785.0 MHz) (20MHz Channel BW)

Config A ANT2 UNII-3 26dB:

Date: 17.JAN.2018 08:40:16
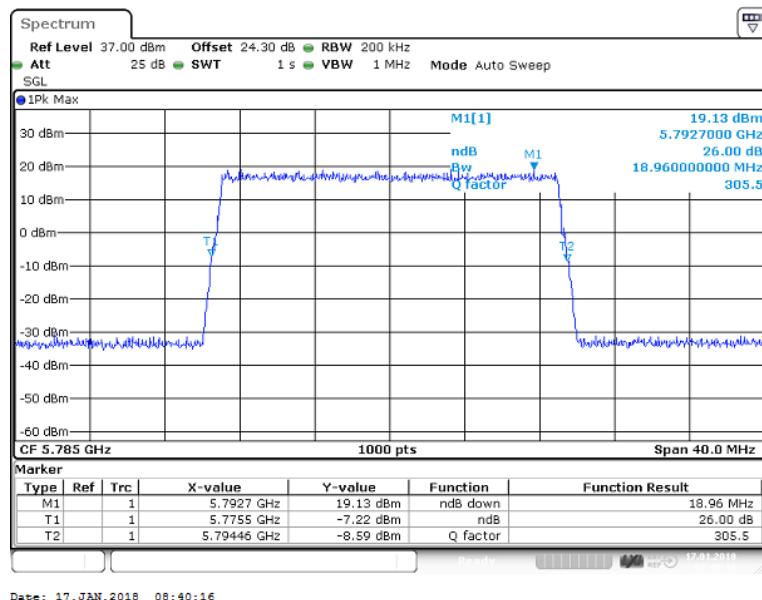
Figure 49 Occupied Bandwidth – QPSK (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 08:43:58
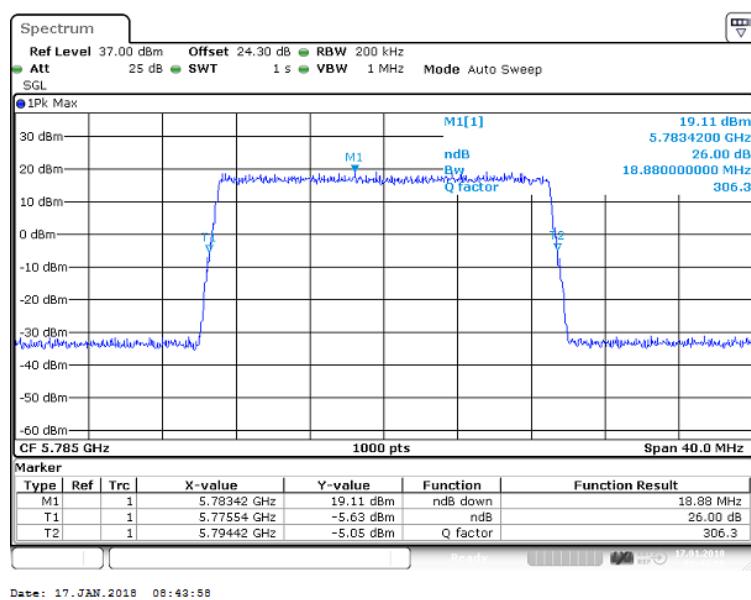
Figure 50 Occupied Bandwidth – 64QAM (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 08:58:40
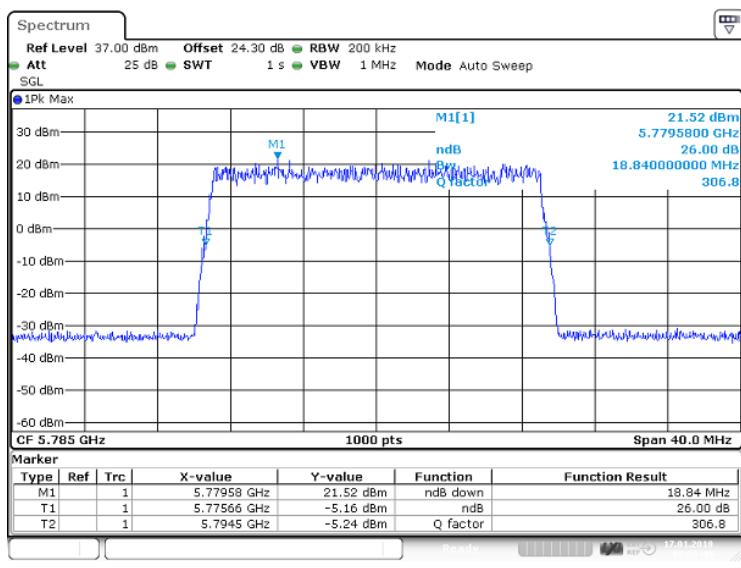
Figure 51 Occupied Bandwidth – 16QAM (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 09:04:26
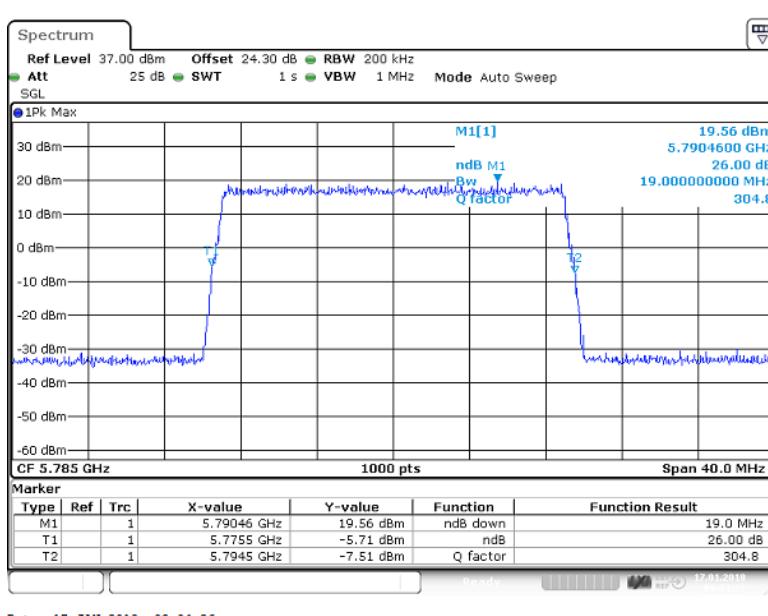
Figure 52 Occupied Bandwidth – 256QAM (5785.0 MHz) (20MHz Channel BW)

Config A ANT1 UNII-3 6 dB:

Date: 11.JAN.2018 14:20:13
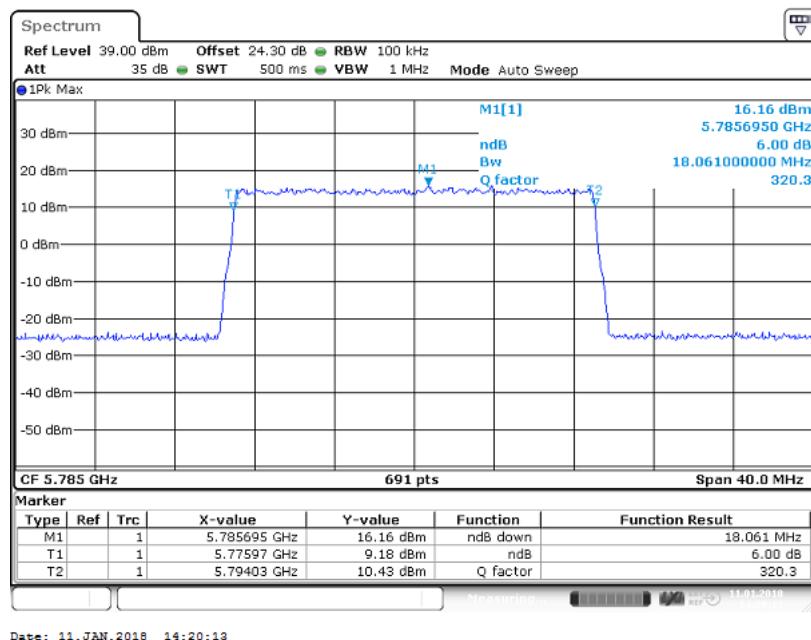
Figure 53 Occupied Bandwidth – QPSK (5785.0 MHz) (20MHz Channel BW)

Date: 11.JAN.2018 14:22:30
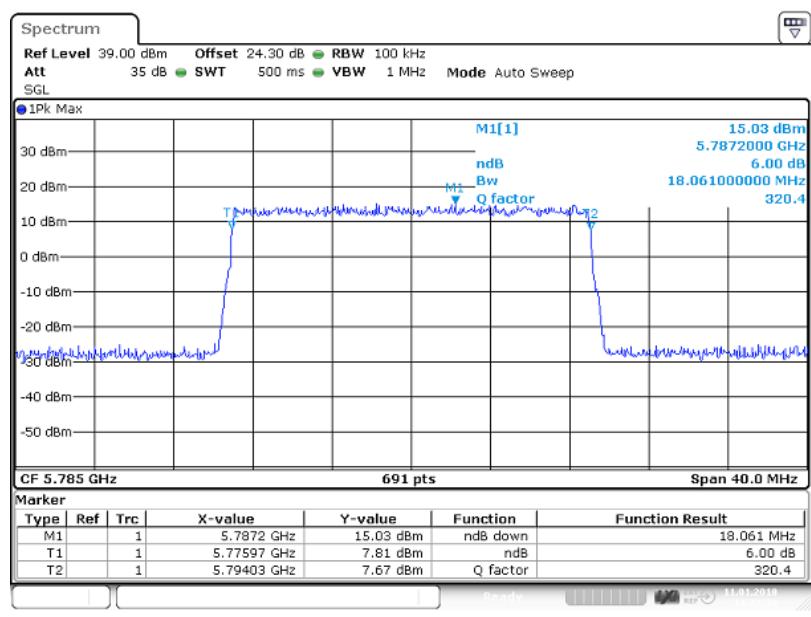
**Figure 54 Occupied Bandwidth – 64QAM (5785.0 MHz) (20MHz Channel BW)**
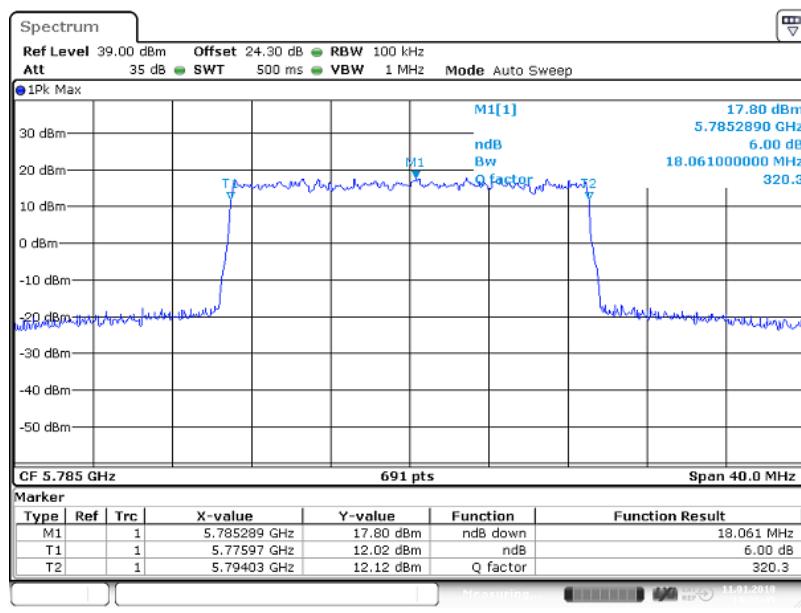
Figure 55 Occupied Bandwidth – 16QAM (5785.0 MHz) (20MHz Channel BW)
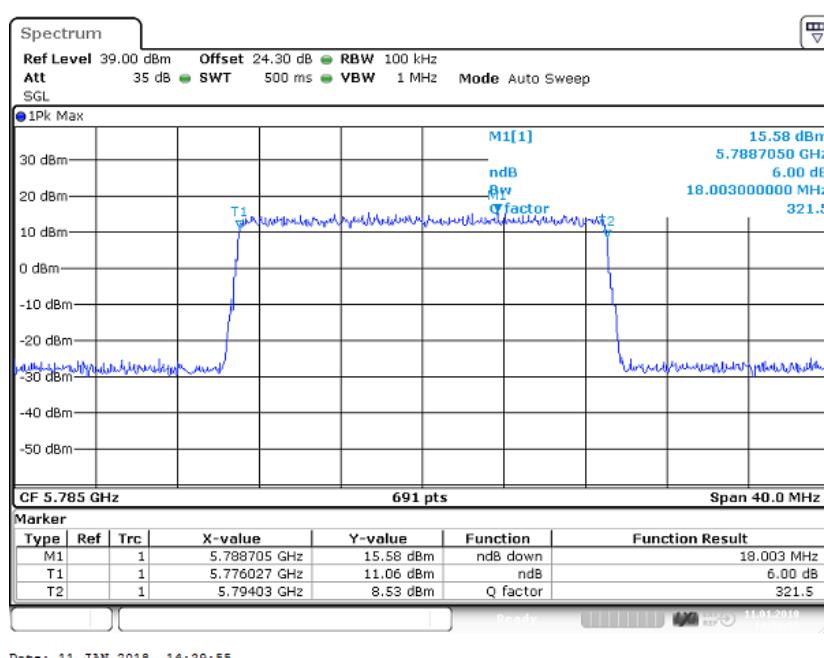
**Figure 56 Occupied Bandwidth – 256QAM (5785.0 MHz) (20MHz Channel BW)**

Config A ANT2 UNII-3 6 dB:

Date: 17.JAN.2018 08:41:32
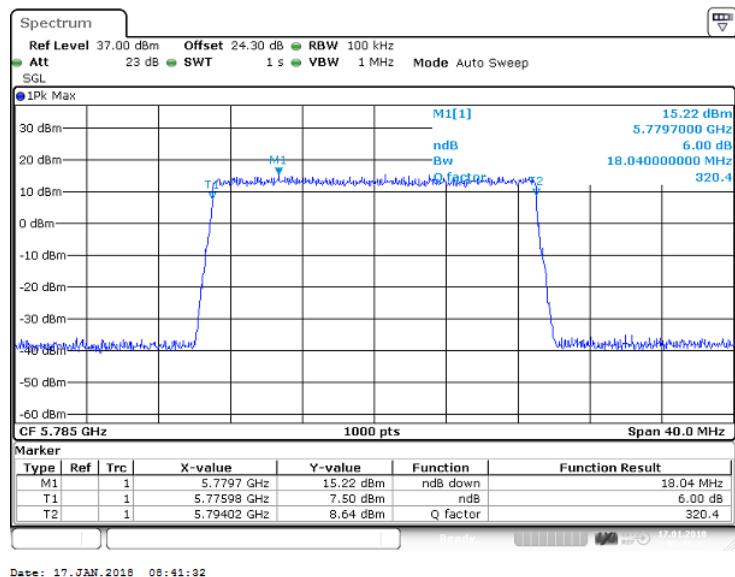
Figure 57 Occupied Bandwidth – QPSK (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 08:42:50
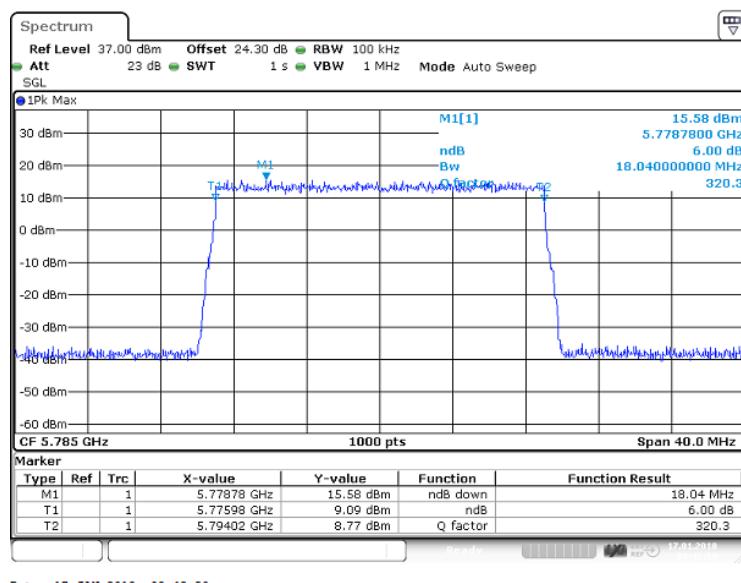
Figure 58 Occupied Bandwidth – 64QAM (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 09:02:09
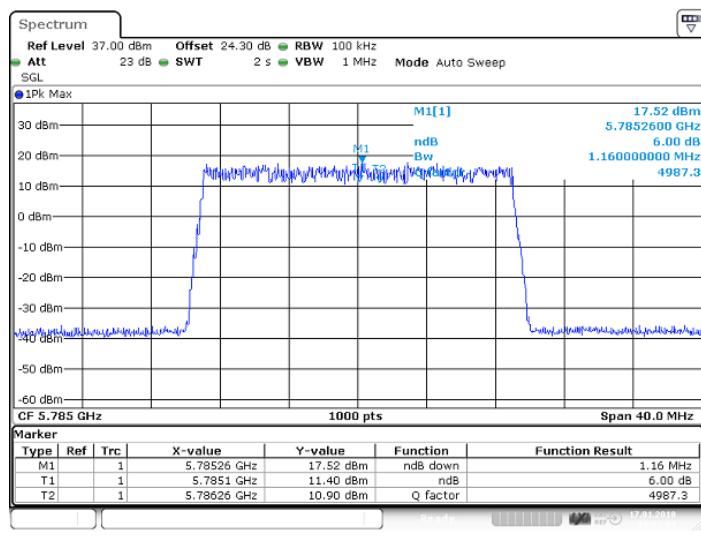
Figure 59 Occupied Bandwidth – 16QAM (5785.0 MHz) (20MHz Channel BW)

Date: 17.JAN.2018 09:05:42
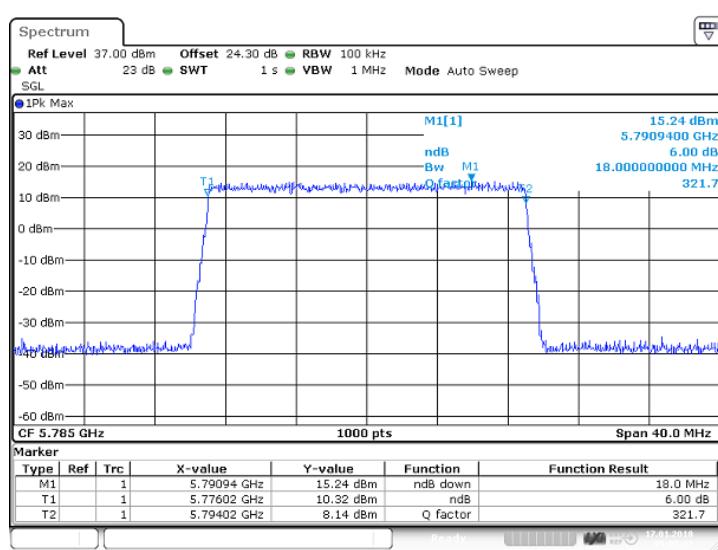
Figure 60 Occupied Bandwidth – 256QAM (5785.0 MHz) (20MHz Channel BW)

Config B ANT1 UNII-1 26 dB:
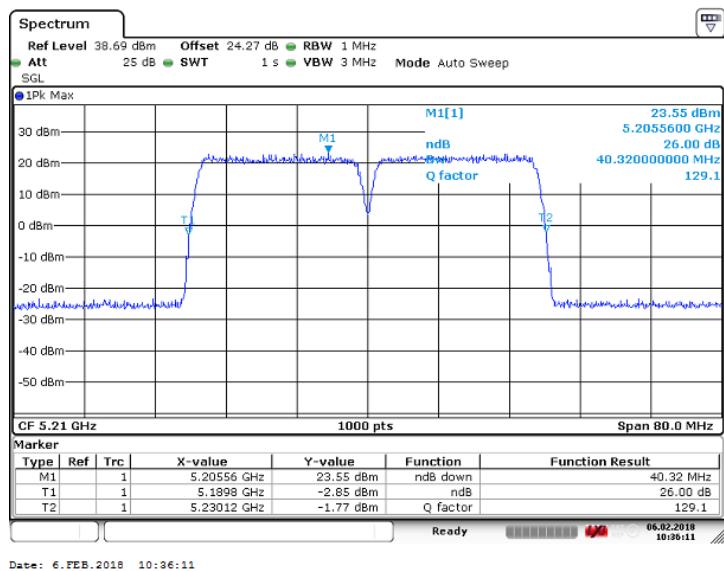
Figure 61 Occupied Bandwidth – QPSKQAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)
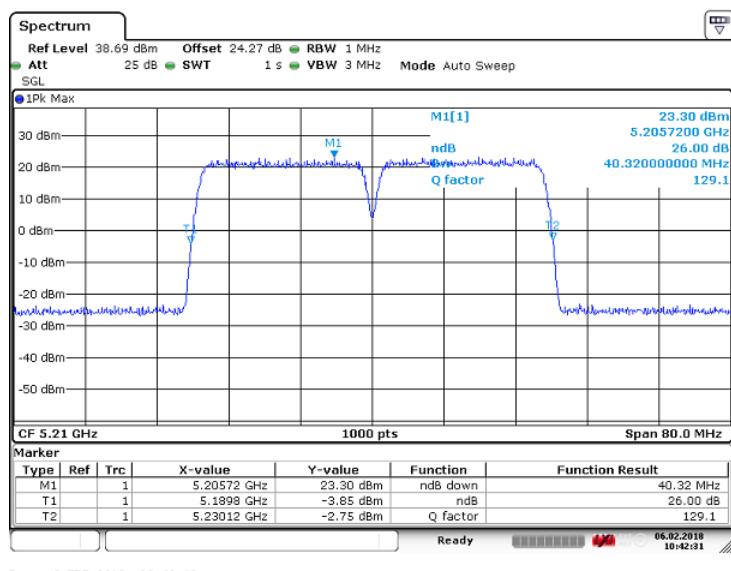

**Figure 62 Occupied Bandwidth – 64QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)**
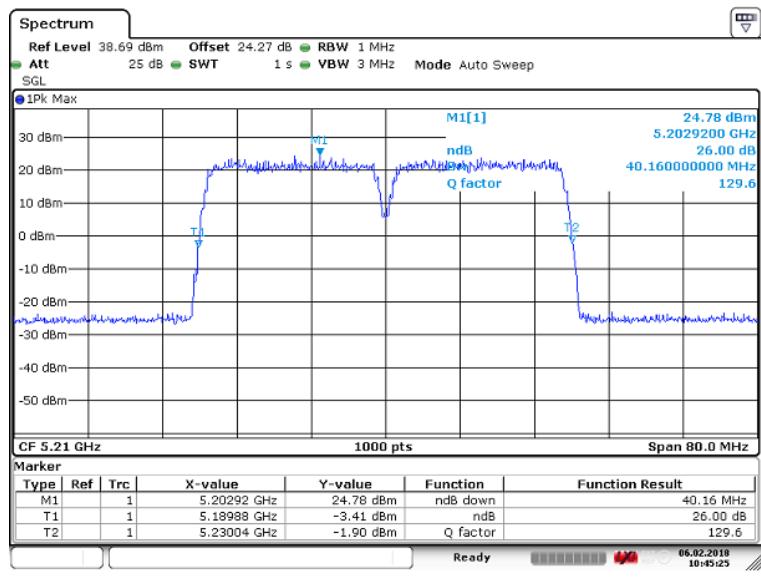
Figure 63 Occupied Bandwidth – 16QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)
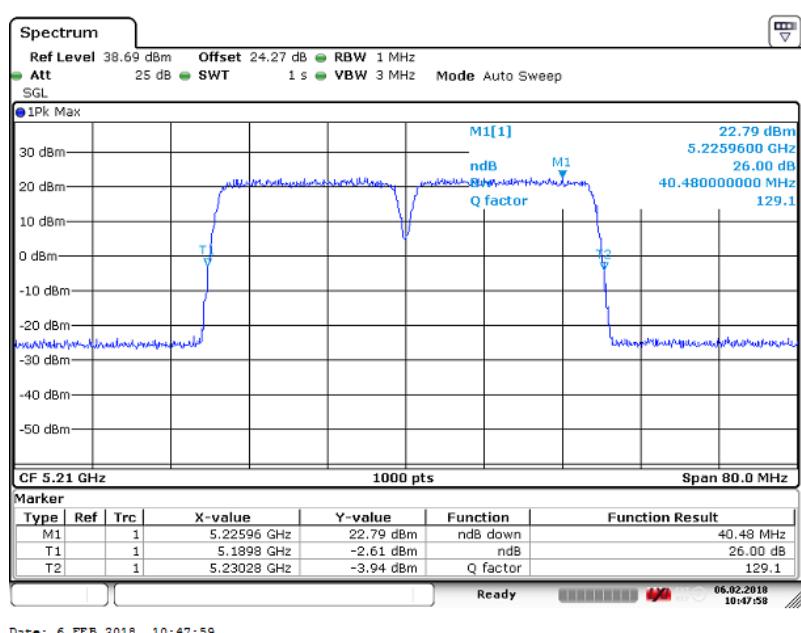
Figure 64 Occupied Bandwidth – 256QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)

Config B ANT2 UNII-1 26 dB:

Date: 6.FEB.2018 11:20:39
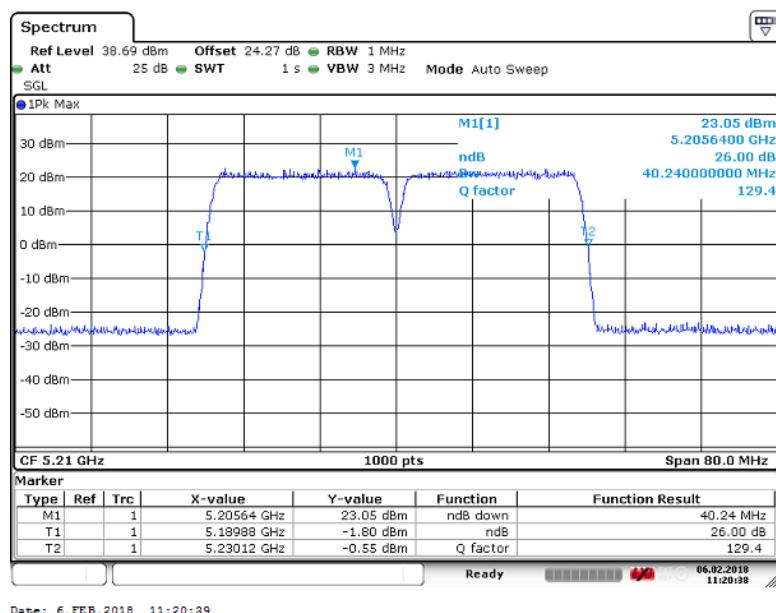
Figure 65 Occupied Bandwidth – QPSKQAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)

Date: 6.FEB.2018 11:24:14
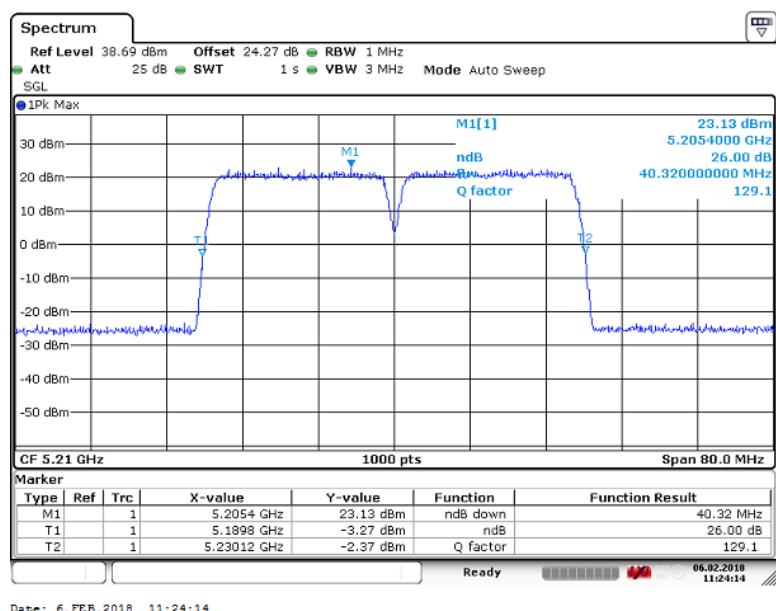
Figure 66 Occupied Bandwidth – 64QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)

Date: 6.FEB.2018 11:26:09
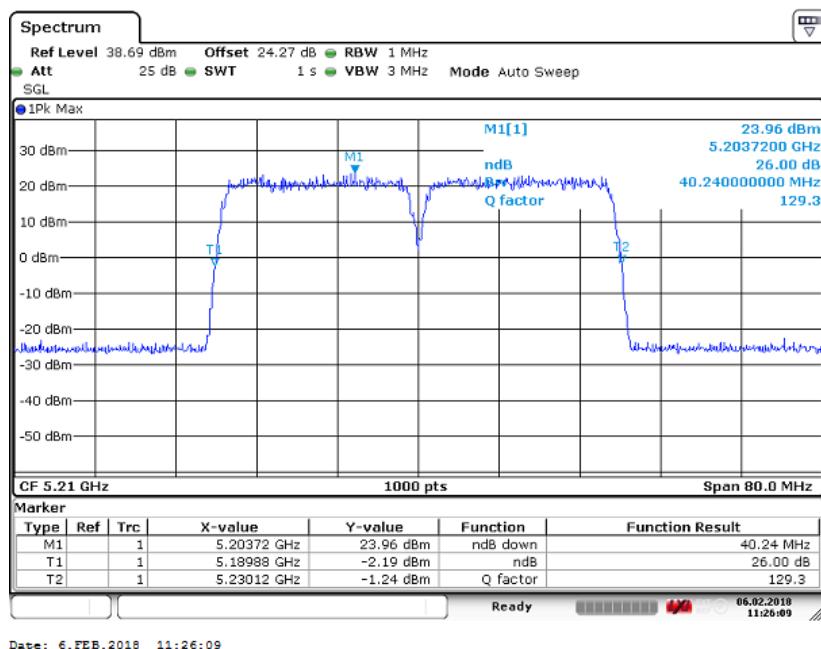
Figure 67 Occupied Bandwidth – 16QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)

Date: 6.FEB.2018 11:27:56
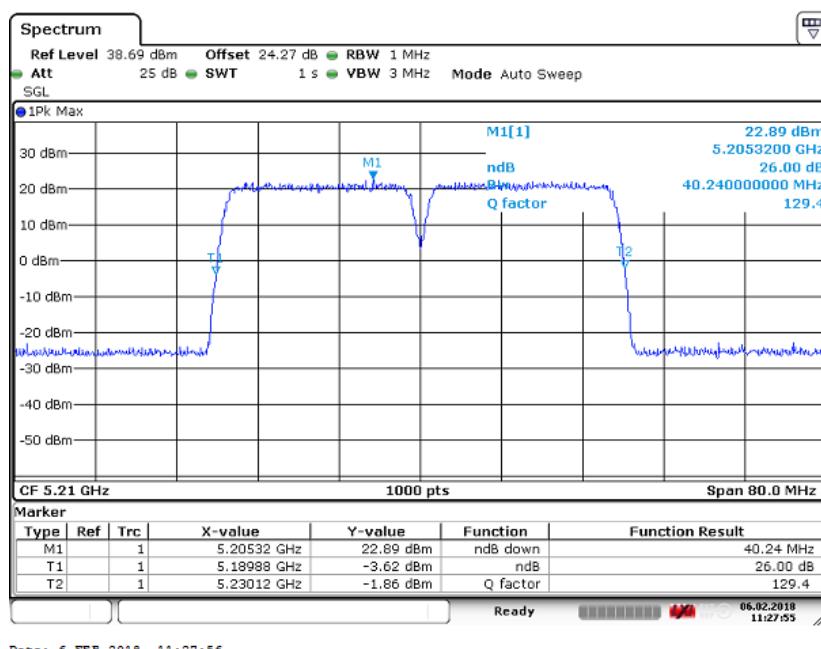
Figure 68 Occupied Bandwidth – 256QAM (5200.0/ 5220.0 MHz) (20MHz Channel BW)

Config B ANT1 UNII-3 26 dB:

Date: 6.FEB.2018 14:00:41
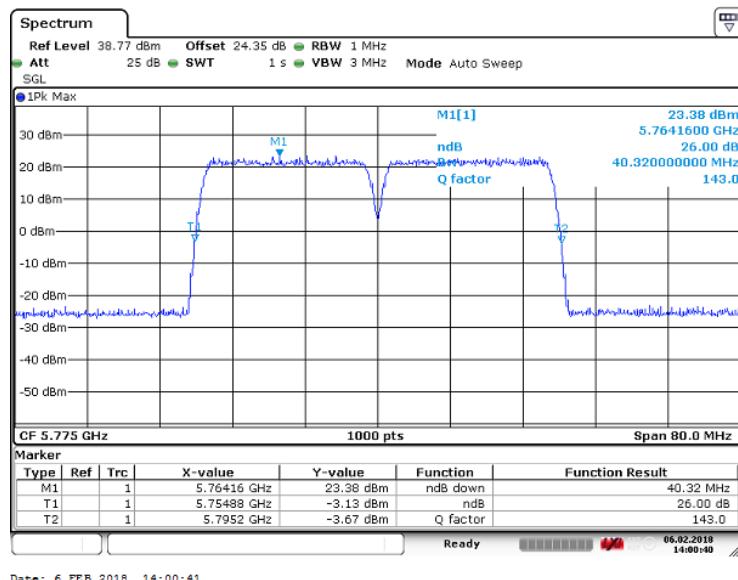
Figure 69 Occupied Bandwidth – QPSKQAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)

Date: 6.FEB.2018 14:02:12
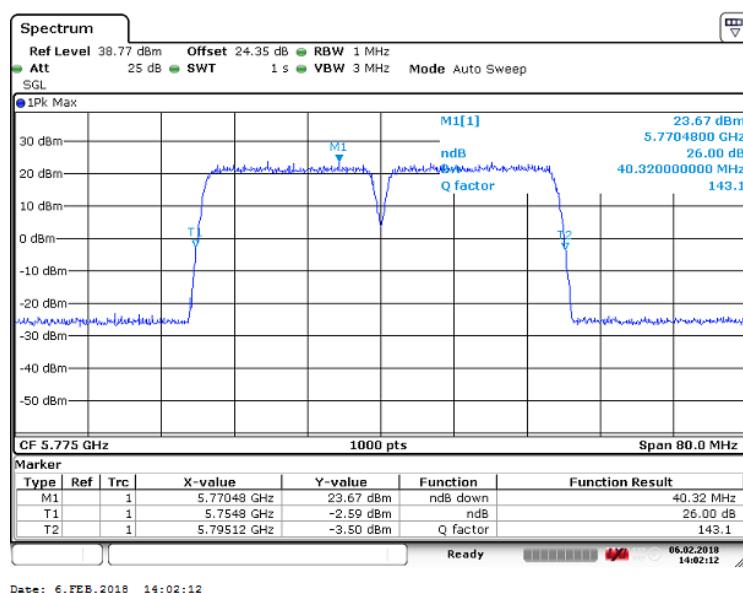
Figure 70 Occupied Bandwidth – 64QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)
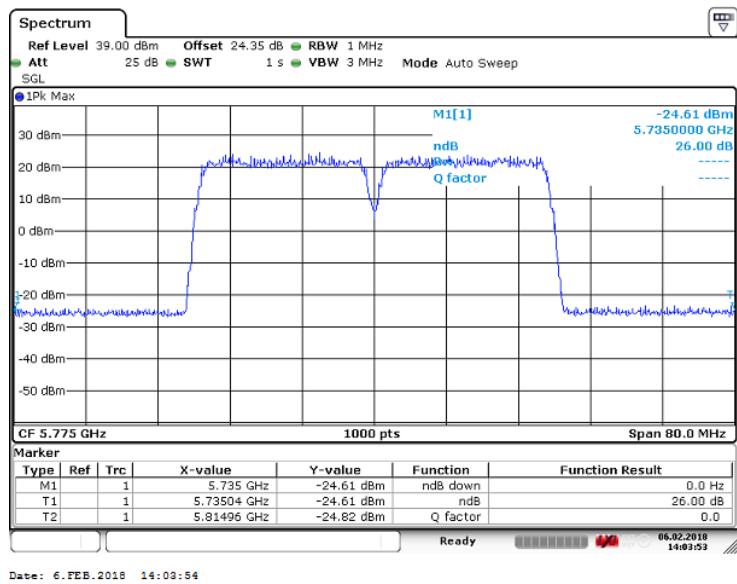
Figure 71 Occupied Bandwidth – 16QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)
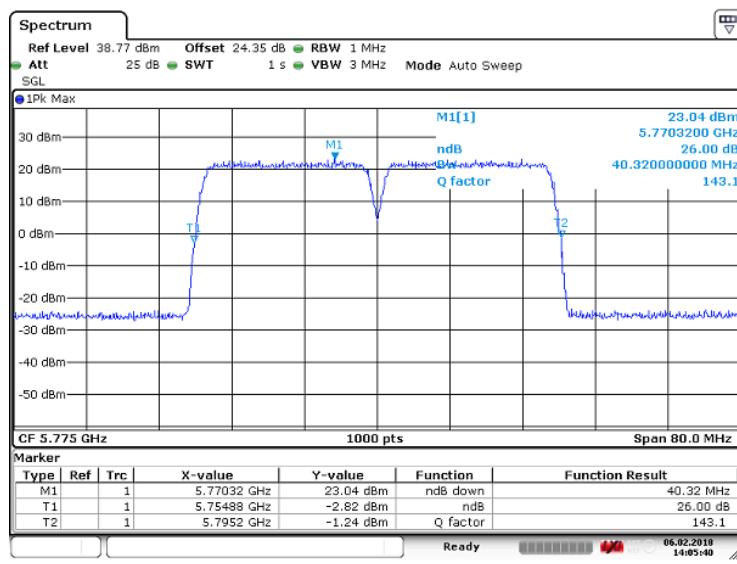
Figure 72 Occupied Bandwidth – 256QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)

Config B ANT2 UNII-3 26 dB:

Date: 6.FEB.2018 14:26:56
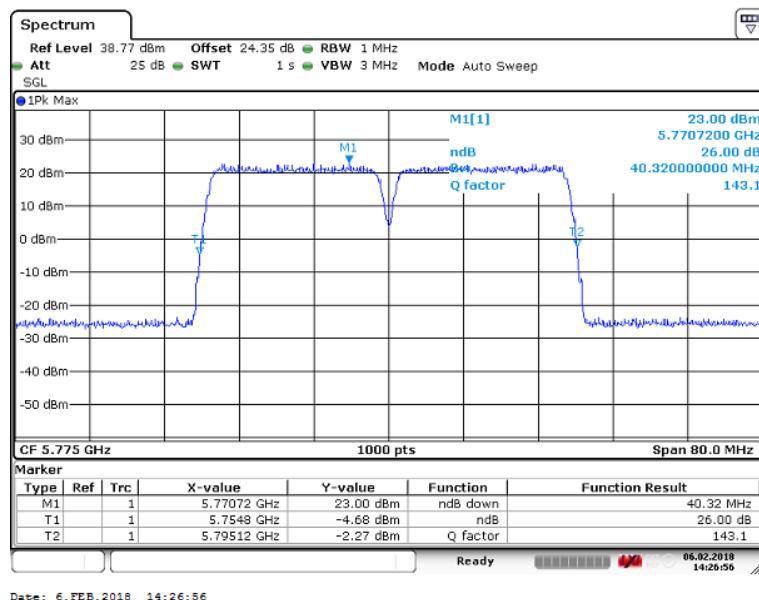
Figure 73 Occupied Bandwidth – QPSKQAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)

Date: 6.FEB.2018 14:28:30
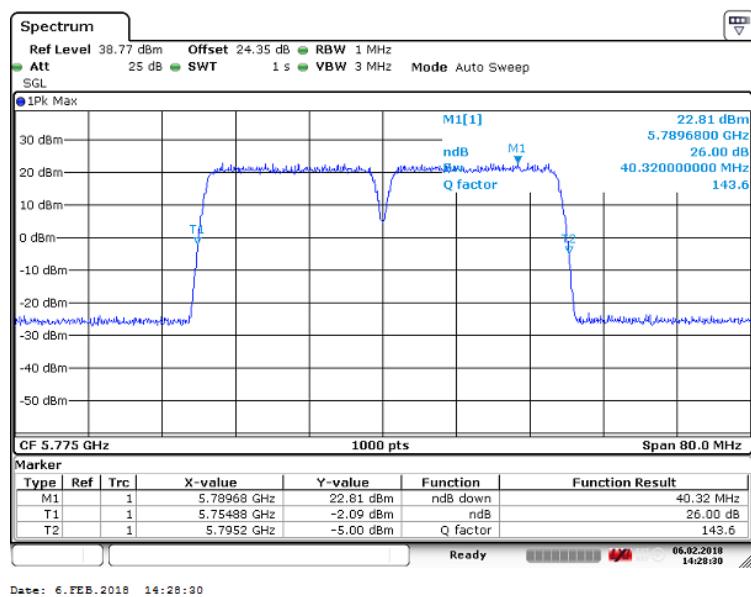
Figure 74 Occupied Bandwidth – 64QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)
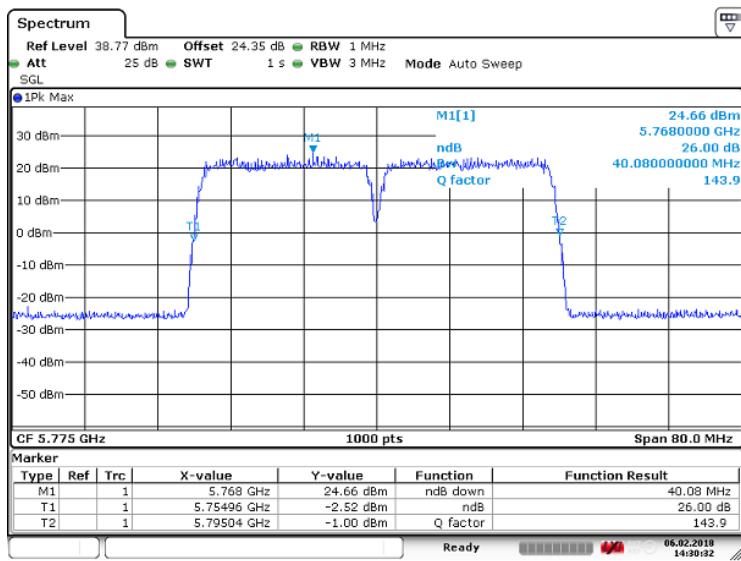
**Figure 75 Occupied Bandwidth – 16QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)**
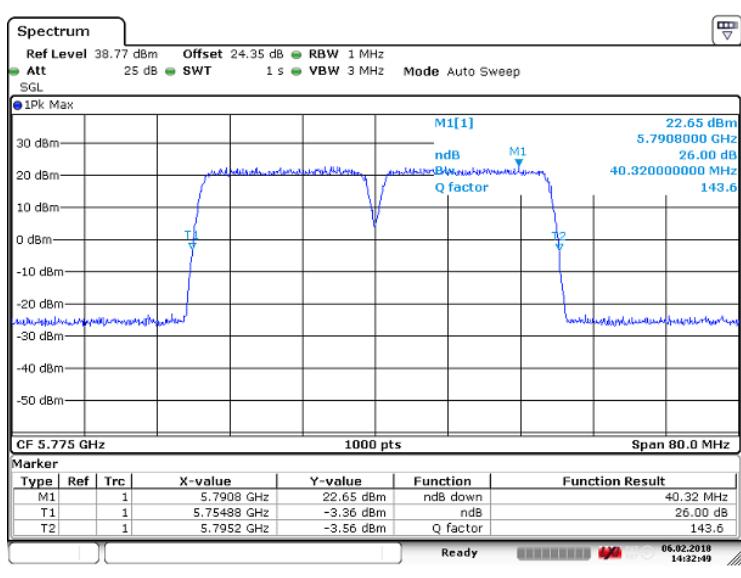
Figure 76 Occupied Bandwidth – 256QAM (5765.0/ 5785.0 MHz) (20MHz Channel BW)