FCC RF TEST REPORT

APPLICANT	:	ASUSTeK COMPUTER INC.
EQUIPMENT	:	ASUS Phone(Mobile Phone)
BRAND NAME	:	ASUS
MODEL NAME	:	ASUS_AI2201_F, ASUS_AI2201_D
FCC ID	:	MSQAI2201
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	15E 6 GHz Low Power Indoor Client (6XD)
TEST DATE(S)	:	Apr. 09, 2022 ~ Jul. 07, 2022

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.01

Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FR230112	01	Initial issue of report	Jul. 28, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i) 15.407(a)(10)	26dB Emission Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)(8)	Maximum Conducted Output Power	Reporting only	-
3.2	15.407(a)(8)	Fundamental Maximum EIRP	Pass	-
3.3	15.407(a)(8)	Fundamental Power Spectral Density	Pass	-
3.4	15.407(b)(6)	In-Band Emissions (Channel Mask)	Pass	-
3.5	15.407(d)(6)	Contention Based Protocol	Pass	-
3.6	15.407(b)	Unwanted Emissions	Pass	Under limit 2.04 dB at 7125.00 MHz
3.7	15.207	AC Conducted Emission	Pass	Under limit 9.32 dB at 0.160 MHz
3.8	15.203 15.407(a)	Antenna Requirement	Pass	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

ASUSTeK COMPUTER INC.
1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

1.2 Manufacturer

ASUSTeK COMPUTER INC.
1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	ASUS Phone(Mobile Phone)
Brand Name	ASUS
Model Name	ASUS_AI2201_F, ASUS_AI2201_D
FCC ID	MSQAI2201
IMEI Code	Conducted: 359157510101616/359157510101624 Conduction: 353700810104479/353700810104487 Radiation: 353700810105195/353700810105203 CBP: 359157510101954/359157510101962
HW Version	R3.0
SW Version	Android 12
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
All the test were performed by SKU 2

Sample Information		
SKU	SKU 1	SKU 2
Build Stage	PR	
Config.	WW-High (with LGF)	WW-High (with PMOLED)
RF module board	WW-High(Entry)	WW-PRO
LCD + Touch front frame	AI2201 FRONT CASE ASSY WW	AI2201 FRONT CASE ASSY WW
DDR	16G (Samsung) LPDDR5 SAMSUNG/K3LK6K60BM-BGCP	18G(HYNIX) LPDDR5 HYNIX/H58GU6MK6HX042
UFS	512G (HYNIX) HYNIX HN8T25DEHKX077	512G (HYNIX) HYNIX HN8T25DEHKX077
MB	AI2201_MB	AI2201_MB
Battery	SCUD/C21P2101	SWD/C21P2101
Rear Camera 50+13M	PRIMAX/50-704JQASC8	TRIPLEWIN/CASAF-001A
Front Camera 12M	TSPRECISION/TNBF1166	LUXVISIONS/FRA-00000658
Rear Camera 5M	SHINE PHOTICS/BF515B	TSPRECISION/O5F9323 VERA1
PCB	COMPEQ	COMPEQ
CPU	QUALCOMM MPSP1518B / SM-8475-1 MPSP1518B ES	QUALCOMM MPSP1518B / SM-8475-1 MPSP1518B ES

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	U-NII-5: 5925 MHz ~ 6425 MHz U-NII-6: 6425 MHz ~ 6525 MHz U-NII-7: 6525 MHz ~ 6875 MHz U-NII-8: 6875 MHz ~ 7125 MHz
Maximum EIRP	**<5925 MHz ~ 7125 MHz >** **MIMO Ant. 4+5:** 802.11a : 7.50 dBm / 0.0056 W 802.11n HT20 : 7.89 dBm / 0.0062 W 802.11n HT40 : 10.47 dBm / 0.0111 W 802.11ac VHT20 : 7.67 dBm / 0.0058 W 802.11ac VHT40 : 10.42 dBm / 0.0110 W 802.11ac VHT80 : 13.42 dBm / 0.0220 W 802.11ac VHT160 : 15.73 dBm / 0.0374 W 802.11ax HE20 : 7.96 dBm / 0.0063 W 802.11ax HE40 : 10.51 dBm / 0.0112 W 802.11ax HE80 : 13.45 dBm / 0.0221 W 802.11ax HE160 : 15.78 dBm / 0.0378 W **MIMO Ant. 5+6:** 802.11a : 8.43 dBm / 0.0070 W 802.11n HT20 : 6.99 dBm / 0.0050 W 802.11n HT40 : 11.48 dBm / 0.0141 W 802.11ac VHT20 : 6.92 dBm / 0.0049 W 802.11ac VHT40 : 11.43 dBm / 0.0139 W 802.11ac VHT80 : 13.35 dBm / 0.0216 W 802.11ac VHT160 : 16.00 dBm / 0.0398 W 802.11ax HE20 : 7.05 dBm / 0.0051 W 802.11ax HE40 : 11.48 dBm / 0.0141 W 802.11ax HE80 : 13.40 dBm / 0.0219 W 802.11ax HE160 : 16.05 dBm / 0.0403 W
99% Occupied Bandwidth	**<5925 MHz ~ 7125 MHz >** **MIMO Ant. 4+5:** 802.11a : 16.48 MHz 802.11ax HE20 : 18.98 MHz 802.11ax HE40 : 38.06 MHz 802.11ax HE80 : 77.32 MHz 802.11ax HE160 : 156.32 MHz **MIMO Ant. 5+6:** 802.11a : 16.53 MHz 802.11ax HE20 : 18.98 MHz 802.11ax HE40 : 38.06 MHz 802.11ax HE80 : 77.44 MHz 802.11ax HE160 : 156.32 MHz
Antenna Type / Gain	**<5925 MHz ~ 6425 MHz>** <Ant. 4> : PIFA Antenna with gain 0.507 dBi <Ant. 5> : PIFA Antenna with gain 1.57 dBi <Ant. 6> : PIFA Antenna with gain 0.68 dBi **<6425 MHz ~ 6525 MHz>** <Ant. 4> : PIFA Antenna with gain -0.20 dBi <Ant. 5> : PIFA Antenna with gain 0.48 dBi <Ant. 6> : PIFA Antenna with gain -1.20 dBi **<6525 MHz ~ 6875 MHz>**

	<Ant. 4> : PIFA Antenna with gain -3.00 dBi <Ant. 5> : PIFA Antenna with gain -0.83 dBi <Ant. 6> : PIFA Antenna with gain -2.90 dBi **<6875 MHz ~ 7125 MHz>** <Ant. 4> : PIFA Antenna with gain -2.70 dBi <Ant. 5> : PIFA Antenna with gain -2.75 dBi <Ant. 6> : PIFA Antenna with gain -1.49 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)

Remark:

1. For 802.11n/ac/ax 20/40/80/160MHz mode, the whole testing has assessed only 802.11ax HE20/HE40/HE80/HE160MHz by referring to the higher output power.
2. WLAN support CDD MIMO mode.
3. The device supports WLAN MIMO Ant.4+5 for normal mode and MIMO Ant.5+6 for active camera mode.
4. 802.11ax support full RU tone and partial RU tone.
5. The EUT does not support channel puncturing mode.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ DFS01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO02-SZ 03CH03-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24
2.	CO02-SZ	AUDIX	E3	6.2009-8-24al
3.	DFS01-SZ	Sporton	Test Tools	1.0

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 987594 D02 U-NII 6 GHz EMC Measurement v01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

<U-NII-5, 6, 7, 8>

BW 20M	**Channel**	2	1	5	9	13	17	21	25	29
	Freq. (MHz)	5935	5955	5975	5995	6015	6035	6055	6075	6095
BW 40M	**Channel**	3			11		19		27	
	Freq. (MHz)	5965			6005		6045		6085	
BW 80M	**Channel**	7					23			
	Freq. (MHz)	5985					6065			
BW 160M	**Channel**	15								
	Freq. (MHz)	6025								

BW 20M	**Channel**	33	37	41	45	49	53	57	61
	Freq. (MHz)	6115	6135	6155	6175	6195	6215	6235	6255
BW 40M	**Channel**	35		43		51		59	
	Freq. (MHz)	6125		6165		6205		6245	
BW 80M	**Channel**	39				55			
	Freq. (MHz)	6145				6225			
BW 160M	**Channel**	47							
	Freq. (MHz)	6185							

BW 20M	**Channel**	65	69	73	77	81	85	89	93
	Freq. (MHz)	6275	6295	6315	6335	6355	6375	6395	6415
BW 40M	**Channel**	67		75		83		91	
	Freq. (MHz)	6285		6325		6365		6405	
BW 80M	**Channel**	71				87			
	Freq. (MHz)	6305				6385			
BW 160M	**Channel**	79							
	Freq. (MHz)	6345							

BW 20M	Channel	97	101	105	109	113	117	121	125
	Freq. (MHz)	6435	6455	6475	6495	6515	6535	6555	6575
BW 40M	Channel	99		107		115		123	
	Freq. (MHz)	6445		6485		6525		6565	
BW 80M	Channel	103				119			
	Freq. (MHz)	6465				6545			
BW 160M	Channel	111							
	Freq. (MHz)	6505							

BW 20M	Channel	129	133	137	141	145	149	153	157
	Freq. (MHz)	6595	6615	6635	6655	6675	6695	6715	6735
BW 40M	Channel	131		139		147		155	
	Freq. (MHz)	6605		6645		6685		6725	
BW 80M	Channel	135				151			
	Freq. (MHz)	6625				6705			
BW 160M	Channel	143							
	Freq. (MHz)	6665							

BW 20M	Channel	161	165	169	173	177	181	185	189
	Freq. (MHz)	6755	6775	6795	6815	6835	6855	6875	6895
BW 40M	Channel	163		171		179		187	
	Freq. (MHz)	6765		6805		6845		6885	
BW 80M	Channel	167				183			
	Freq. (MHz)	6785				6865			
BW 160M	Channel	175							
	Freq. (MHz)	6825							

BW 20M	Channel	193	197	201	205	209	213	217	221
	Freq. (MHz)	6915	6935	6955	6975	6995	7015	7035	7055
BW 40M	Channel	195		203		211		219	
	Freq. (MHz)	6925		6965		7005		7045	
BW 80M	Channel	199				215			
	Freq. (MHz)	6945				7025			
BW 160M	Channel	207							
	Freq. (MHz)	6985							

BW 20M	Channel	225	229	233
	Freq. (MHz)	7075	7095	7115
BW 40M	Channel	227		
	Freq. (MHz)	7085		

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0

RSE Co-location Modes
LTE B13_BW 5M Link + WLAN 6G 802.11ax HE20 CH233 Tx
LTE B13_BW 5M Link + WLAN 6G 802.11ax HE20 CH233 Tx + BLE (1Mbps) CH00 Tx

Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(6G) + USB Cable 1(Charging from Adapter 1) + Earphone + Battery 1
Remark: For Radiated Test Cases, the tests were performed with Adapter 1, Battery 1, Earphone and USB Cable 1.	

Ch. #		5925-7125 MHz UNII-5	5925-7125 MHz UNII-6	5925-7125 MHz UNII-7	5925-7125 MHz UNII-8
		802.11a/ax HE20	802.11a/ax HE20	802.11a/ax HE20	802.11a/ax HE20
L	Low	002 001	097	117	189
M	Middle	045	105	149	209
H	High	093	113	181	229 233
Straddle		-	-	185	-

Ch. #		5925-7125 MHz UNII-5	5925-7125 MHz UNII-6	5925-7125 MHz UNII-7	5925-7125 MHz UNII-8
		802.11ax HE40	802.11ax HE40	802.11ax HE40	802.11ax HE40
L	Low	003	099	123	-
M	Middle	043	-	147	203
H	High	091	107	179	227
Straddle		-	115	-	187

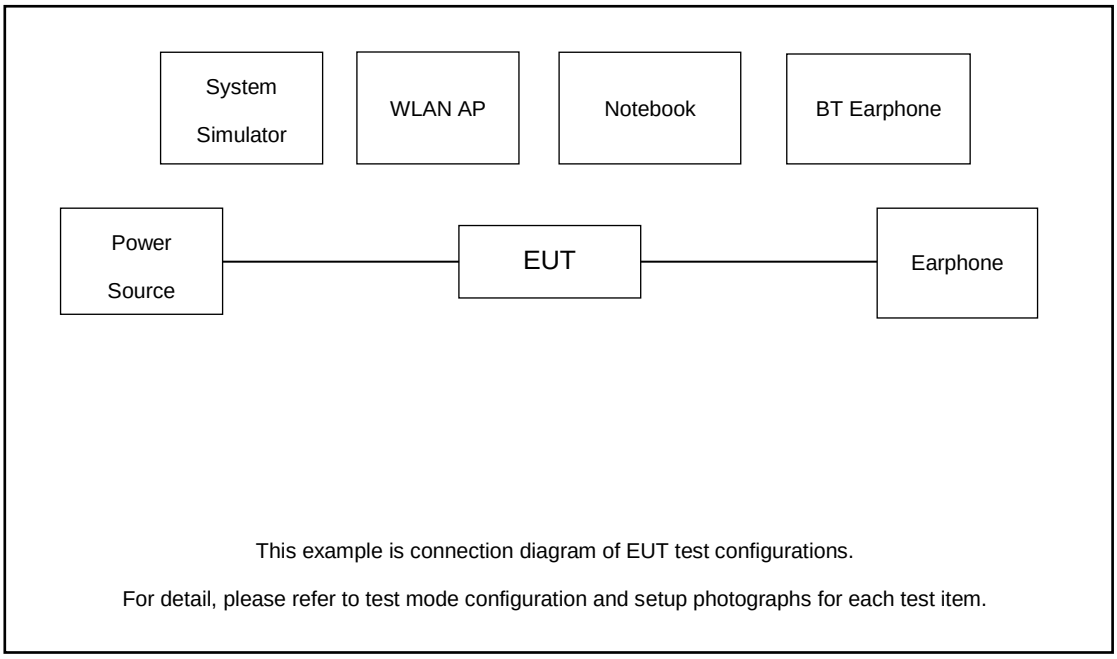
Ch. #		5925-7125 MHz UNII-5	5925-7125 MHz UNII-6	5925-7125 MHz UNII-7	5925-7125 MHz UNII-8
		802.11ax HE80	802.11ax HE80	802.11ax HE80	802.11ax HE80
L	Low	007	103	135	199
M	Middle	039		151	-
H	High	087		167	215
Straddle		-	119	183	-

Ch. #		5925-7125 MHz UNII-5	5925-7125 MHz UNII-6	5925-7125 MHz UNII-7	5925-7125 MHz UNII-8
		802.11ax HE160	802.11ax HE160	802.11ax HE160	802.11ax HE160
L	Low	015	-	143	207
M	Middle	047			
H	High	079			
Straddle		-	111	175	-

Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

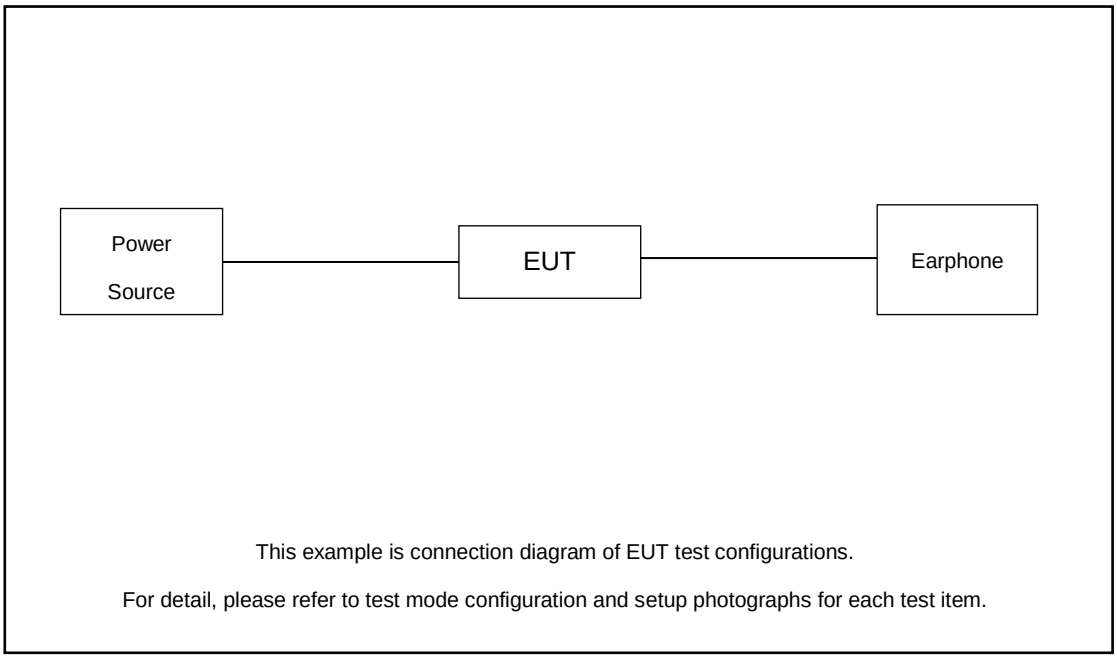
For AC Conducted Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

For Radiated Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
5.	Earphone	ASUS	EA009B	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program (QRCT function) was provided and enabled to make EUT continuously transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.4 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 2.4 + 10 = 12.4 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Limit of 26dB & 99% Occupied Bandwidth

<FCC 14-30 CFR 15.407>

(a)(10) The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

3.1.4 Test Setup

3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

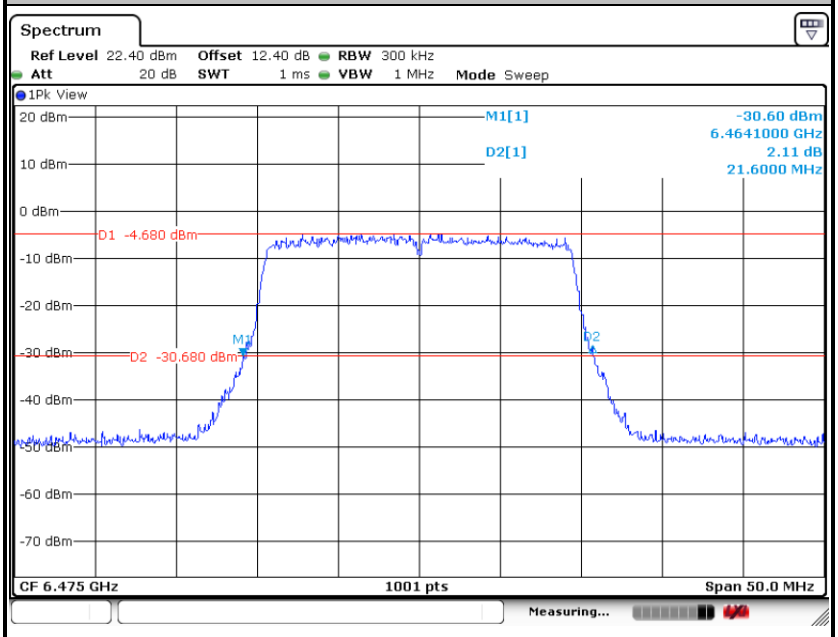
Please refer to Appendix A.

Only the maximum 26dB & 99% OBW plots of each bandwidth are shown in the report.

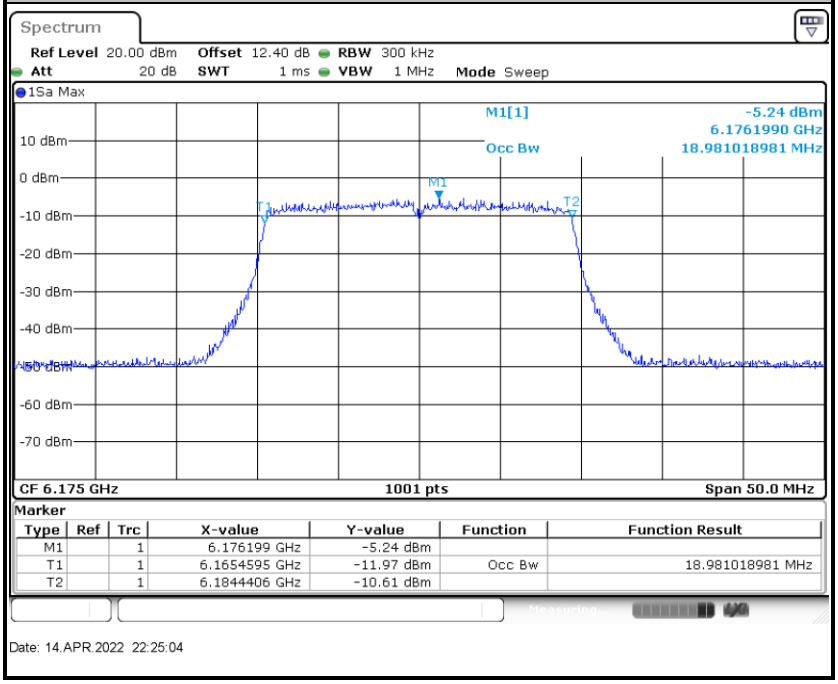
MIMO <Ant.4+5>

For 20MHz:

Maximum 26dB Bandwidth

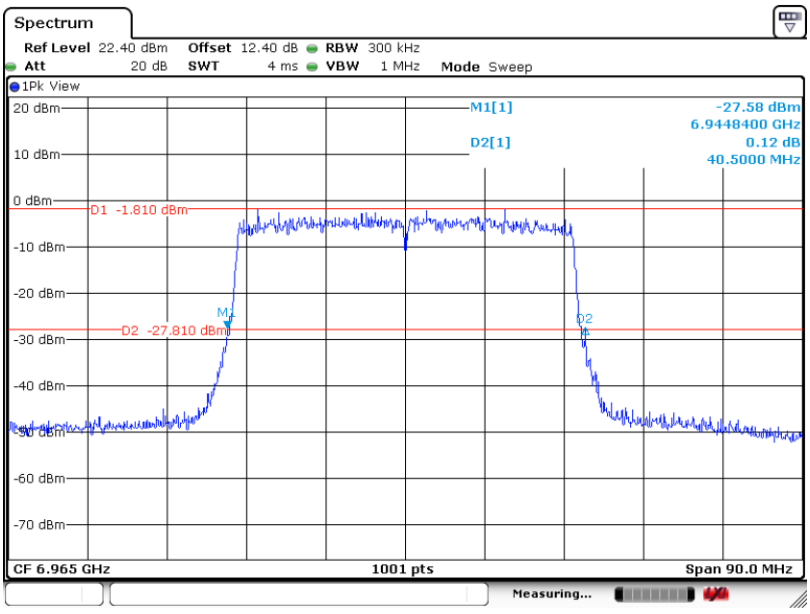


Maximum 99% Occupied Bandwidth

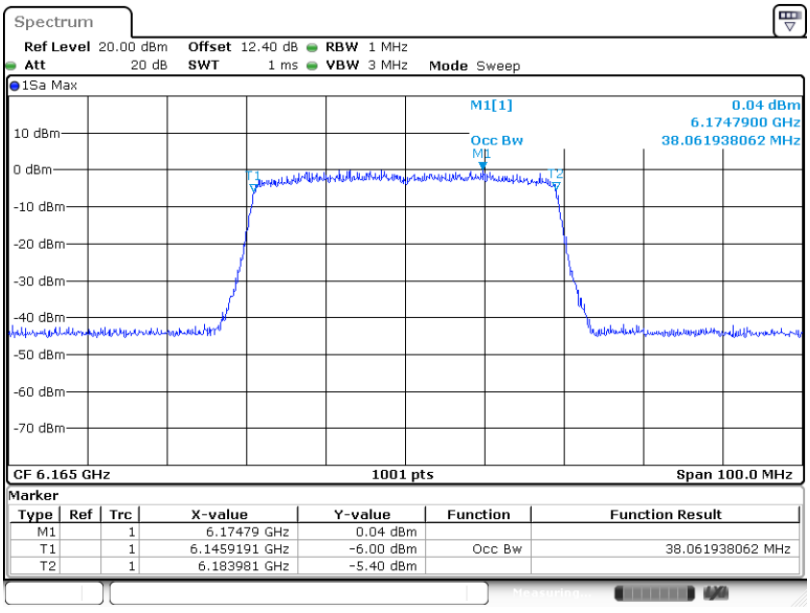


For 40MHz:

Maximum 26dB Bandwidth

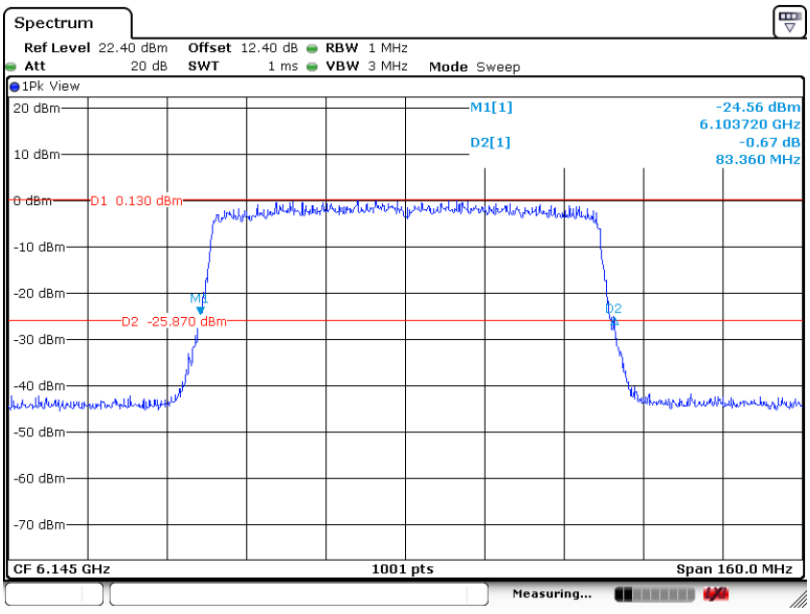


Maximum 99% Occupied Bandwidth

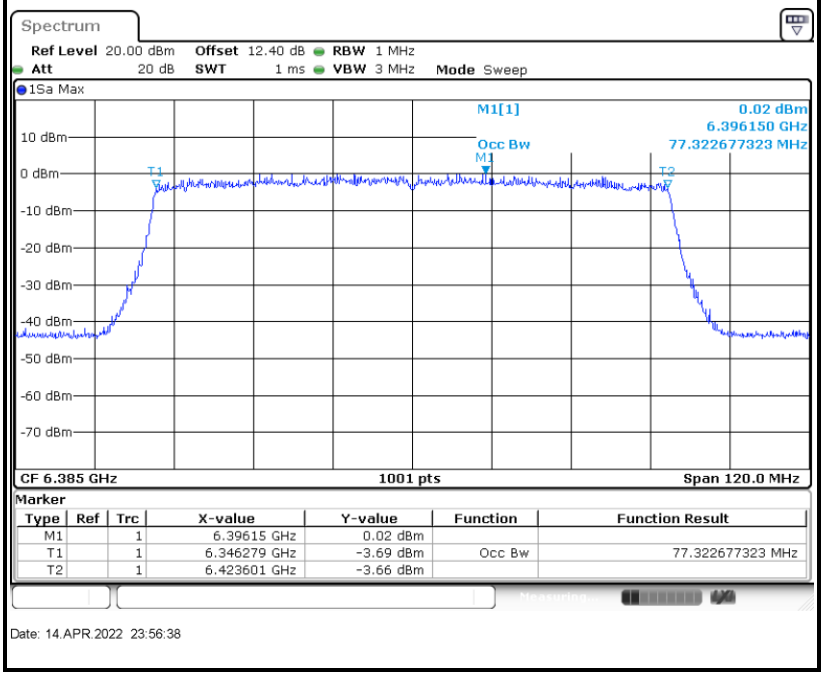


For 80MHz:

Maximum 26dB Bandwidth

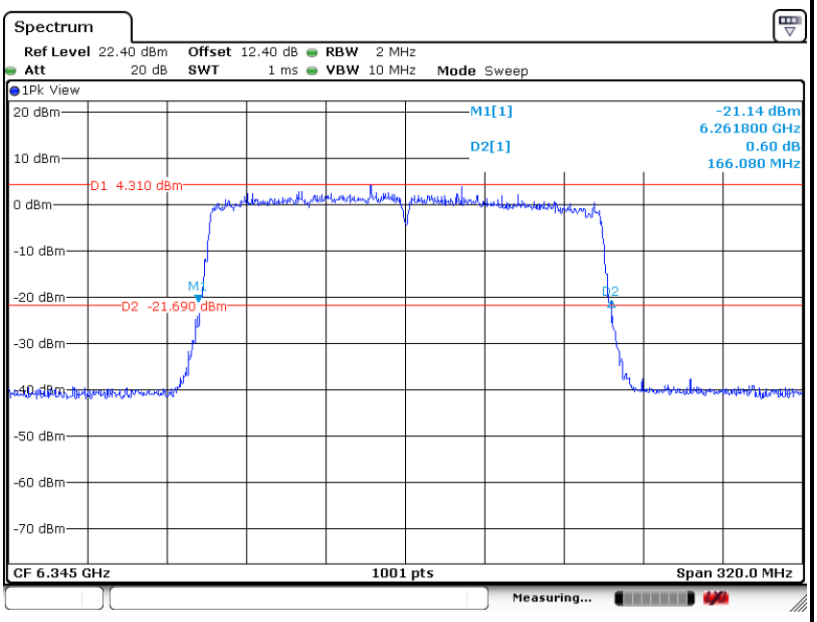


Maximum 99% Occupied Bandwidth

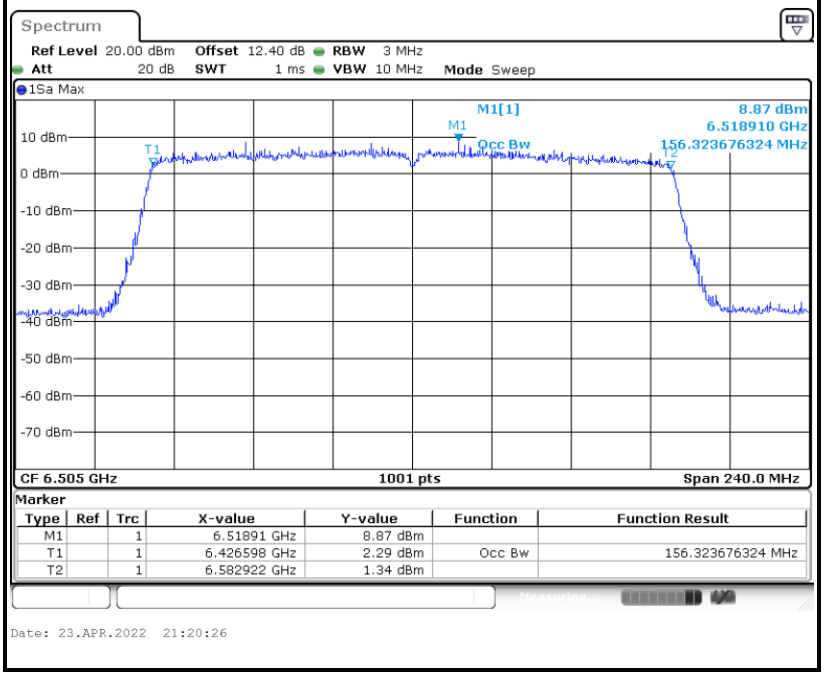


For 160MHz:

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth

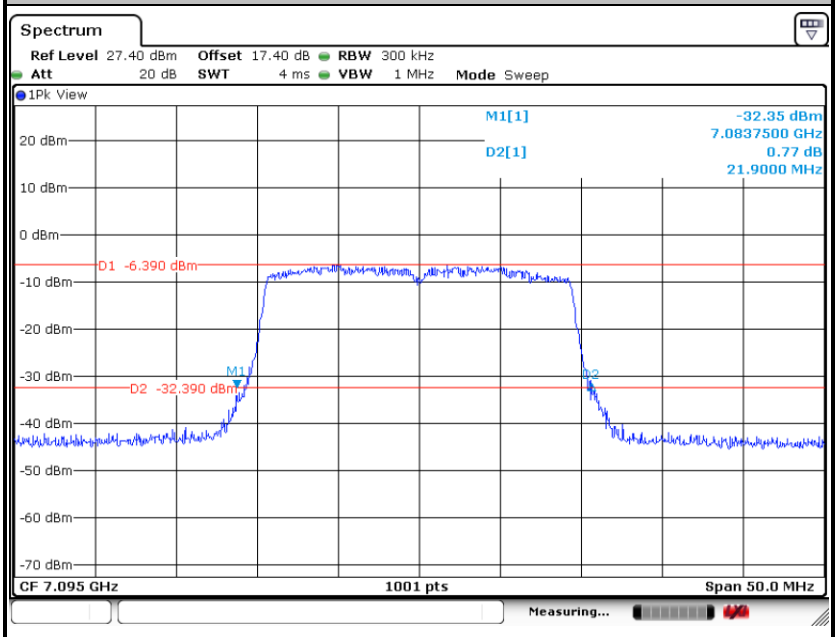


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

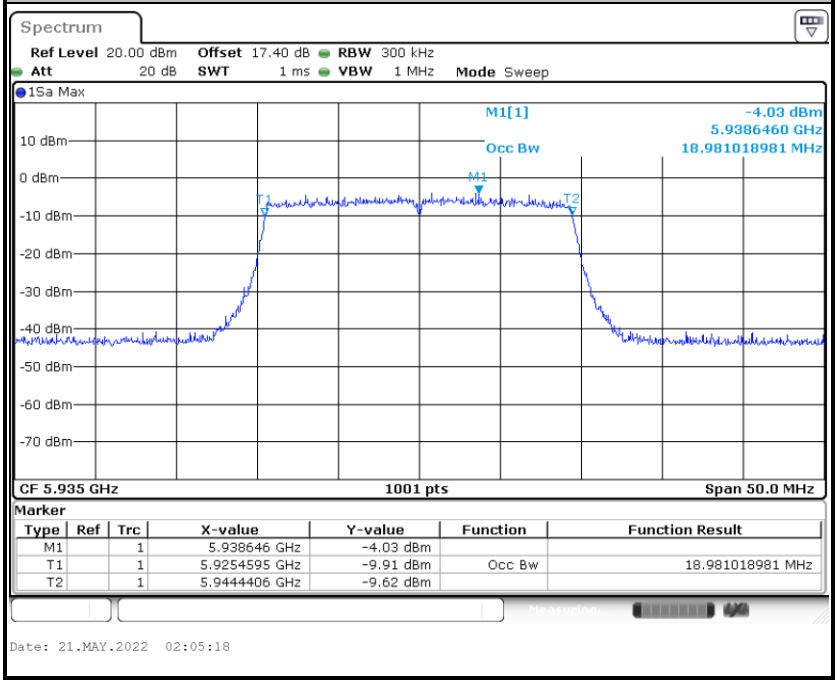
MIMO <Ant.5+6>

For 20MHz:

Maximum 26dB Bandwidth

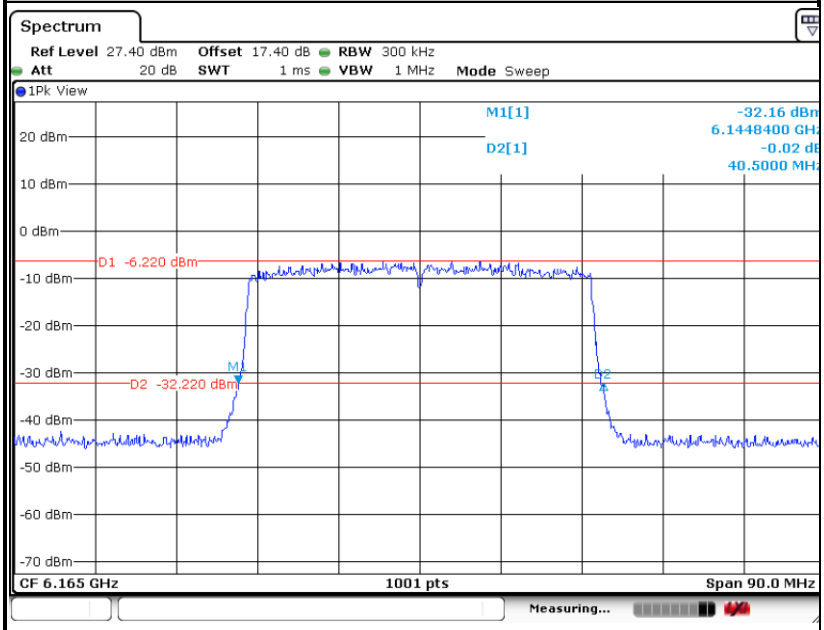


Maximum 99% Occupied Bandwidth

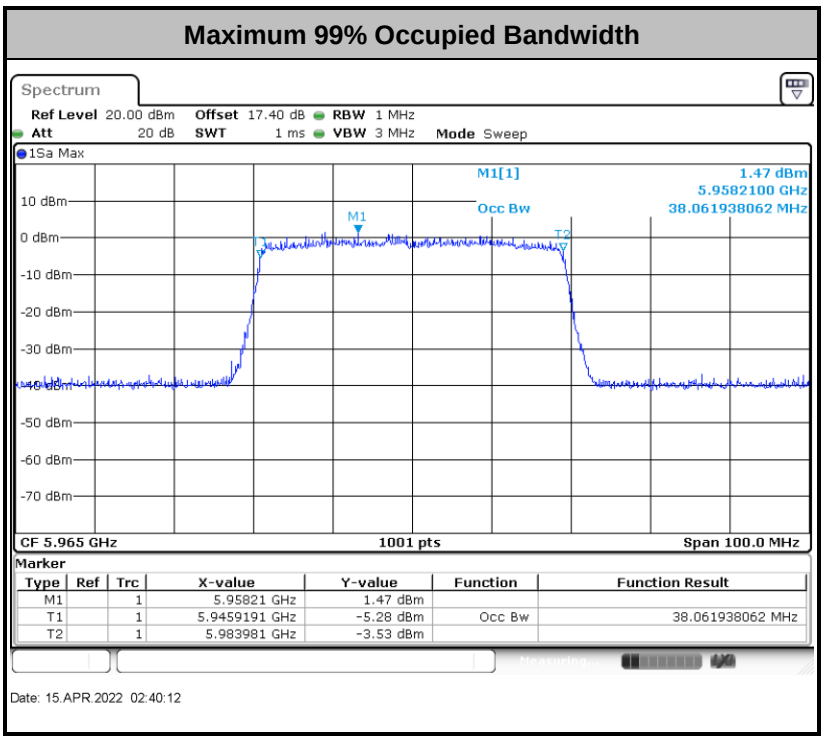


For 40MHz:

Maximum 26dB Bandwidth

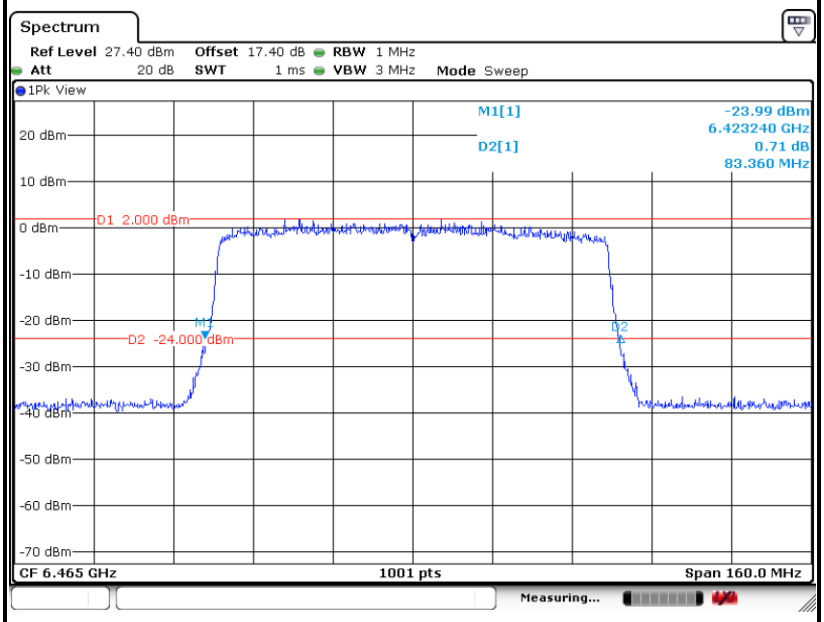


Maximum 99% Occupied Bandwidth

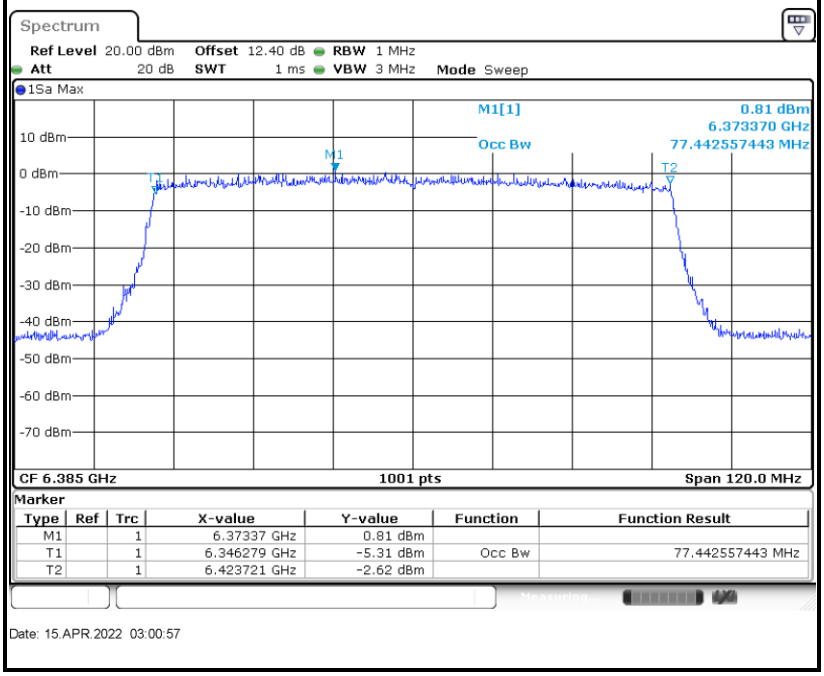


For 80MHz:

Maximum 26dB Bandwidth

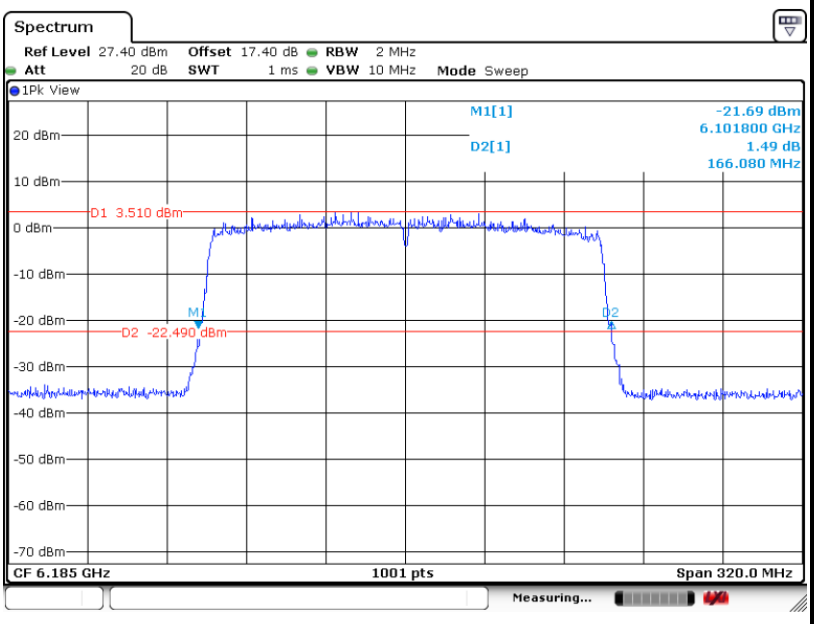


Maximum 99% Occupied Bandwidth

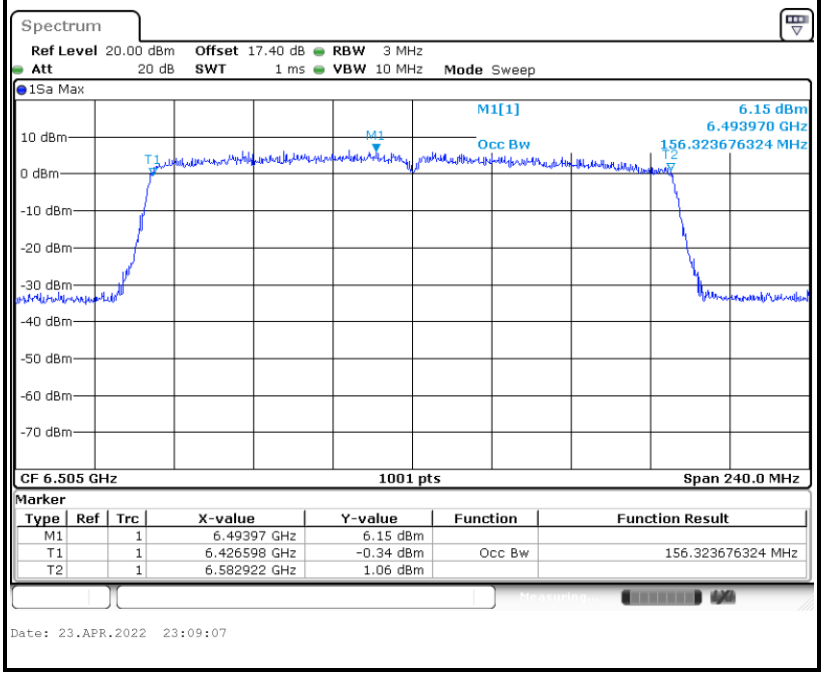


For 160MHz:

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum conducted Output Power and Fundamental Maximum EIRP Measurement

3.2.1 Limit of Fundamental Maximum EIRP

<FCC 14-30 CFR 15.407>

(a)(8) For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

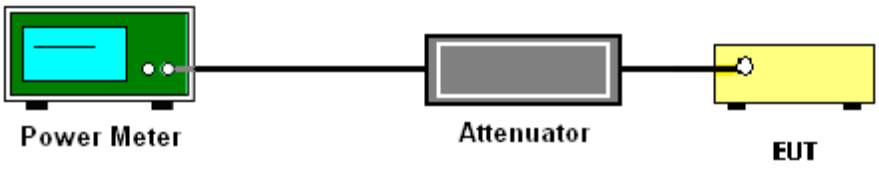
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.
4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

3.2.4 Test Setup



3.2.5 Test Result of Fundamental Maximum EIRP

Please refer to Appendix A.

3.3 Fundamental Power Spectral Density Measurement

3.3.1 Limit of Fundamental Power Spectral Density

<FCC 14-30 CFR 15.407>

(a)(8) For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum power spectral density must not exceed −1 dBm e.i.r.p. in any 1-megahertz band.

3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Section F) Maximum power spectral density.

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   MIMO 5+6:

   Method (a): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is the bin-by-bin summation to obtain the combined spectrum. For the device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 5

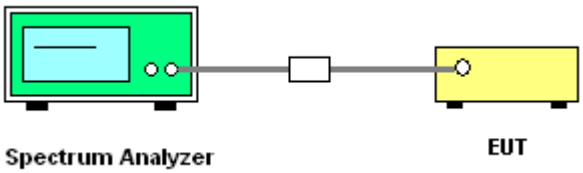
and output 6 to obtain the value for the first frequency bin of the summed spectrum.

MIMO 5+4:

Method (b): Measure and sum spectral maxima across the outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

3.3.4 Test Setup

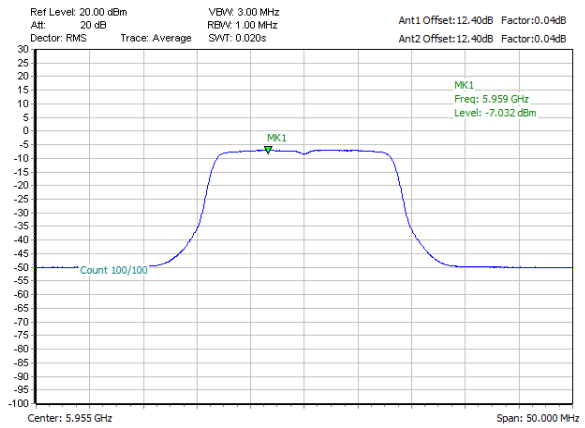
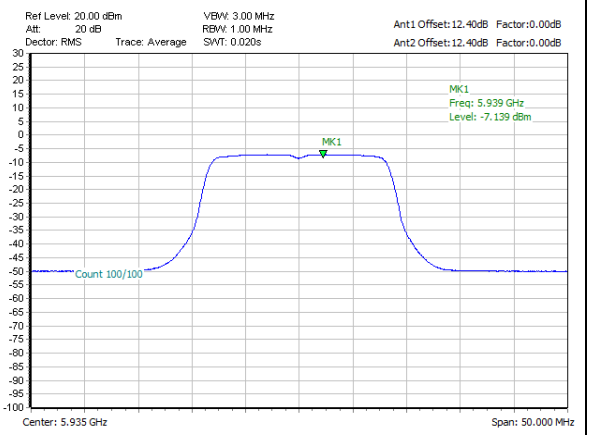
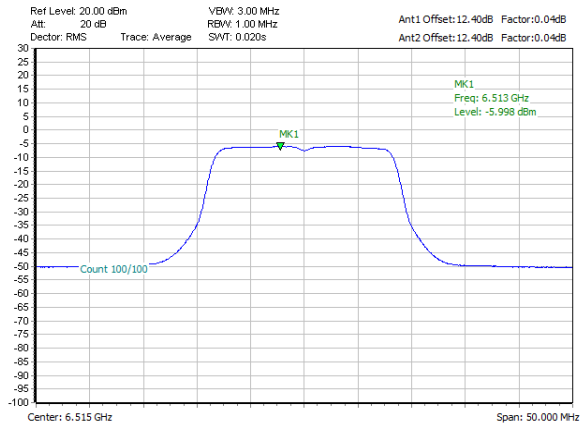
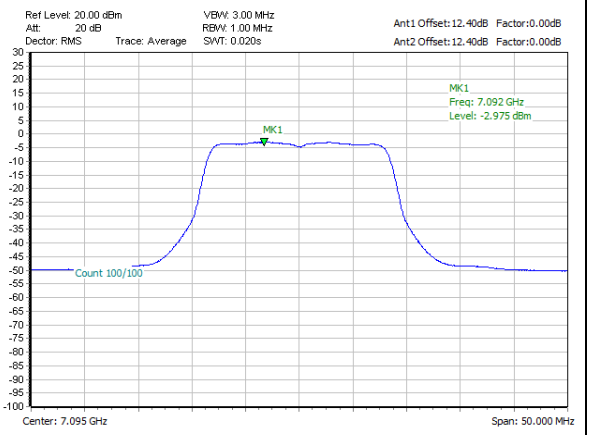
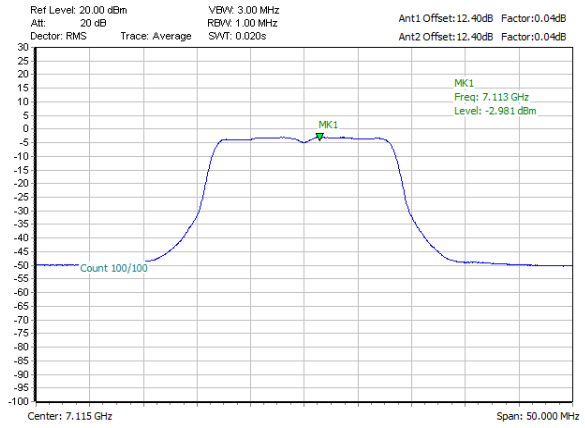


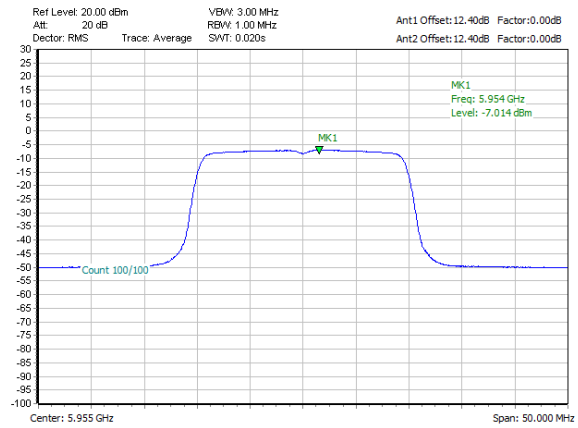
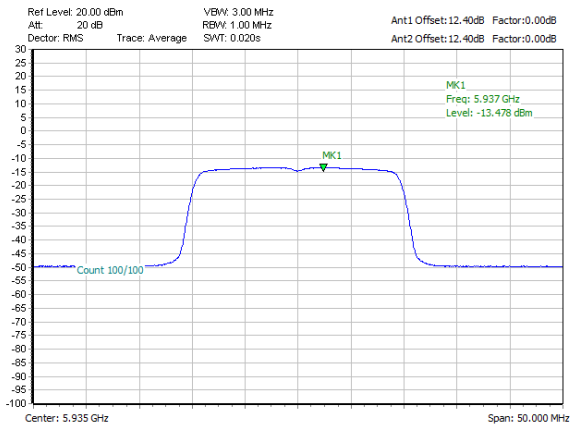
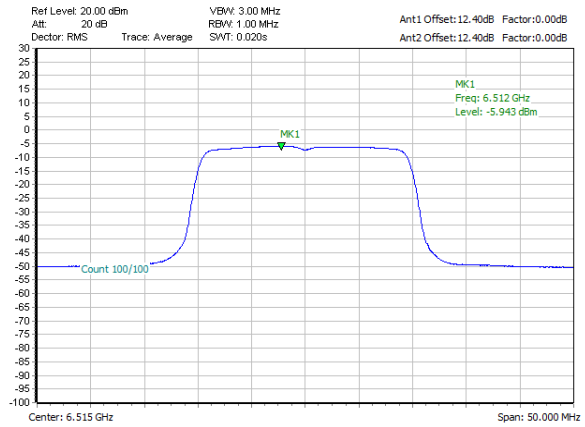
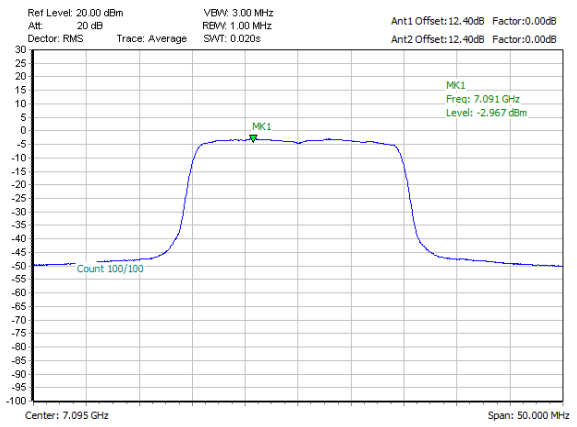
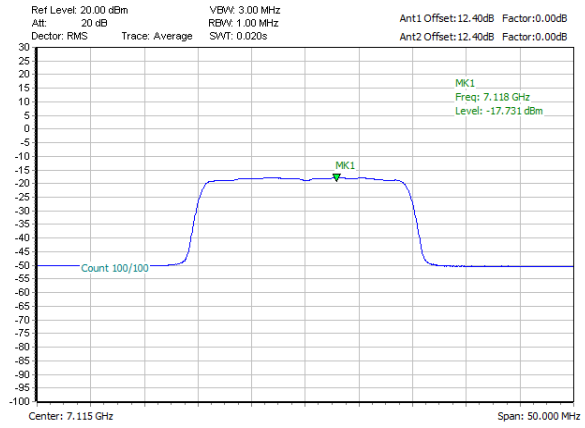
3.3.5 Test Result of Power Spectral Density

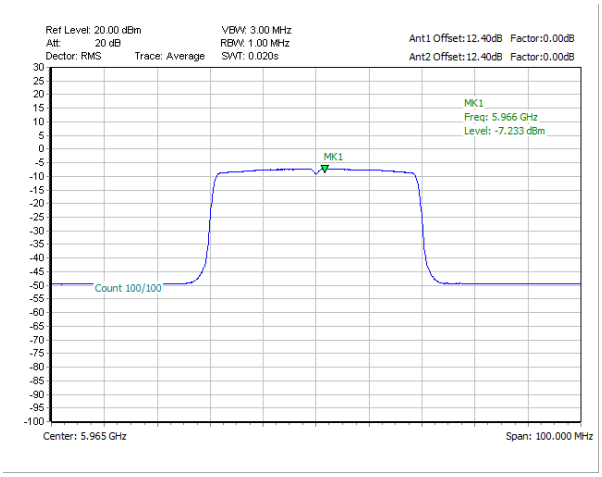
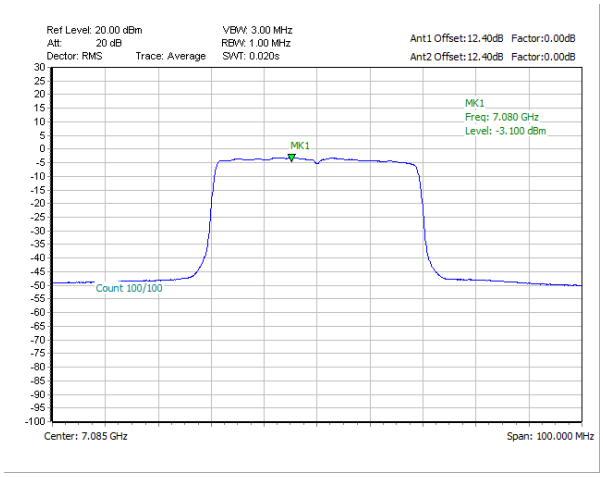
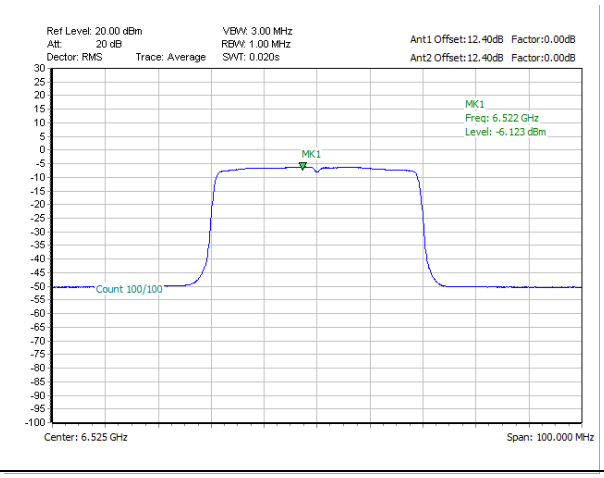
Please refer to Appendix A.

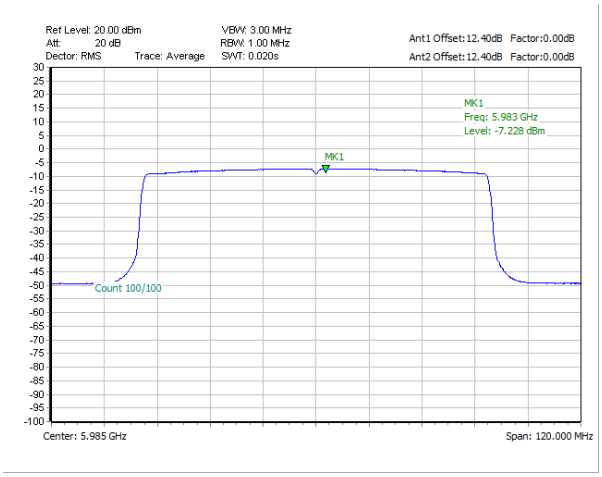
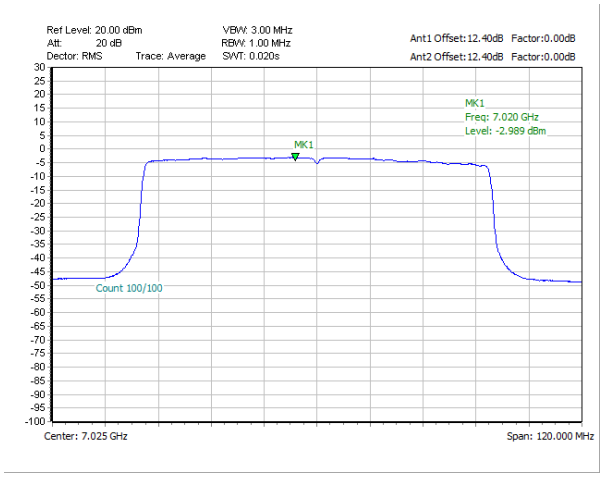
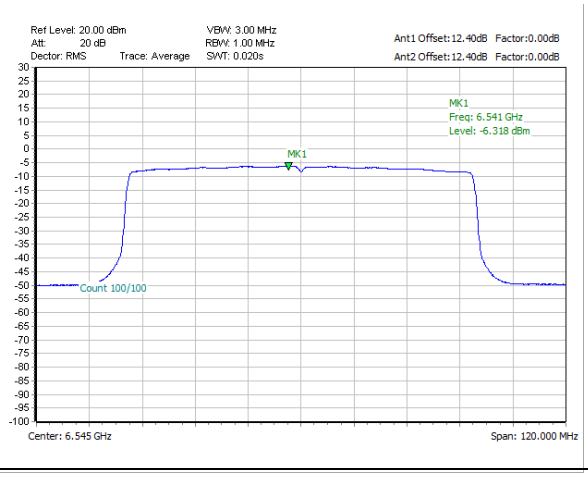
Only the L/M/H channel PSD plots of each bandwidth shown in the report.

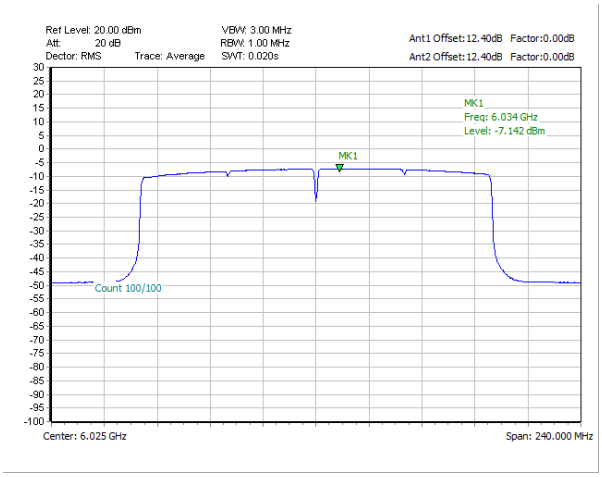
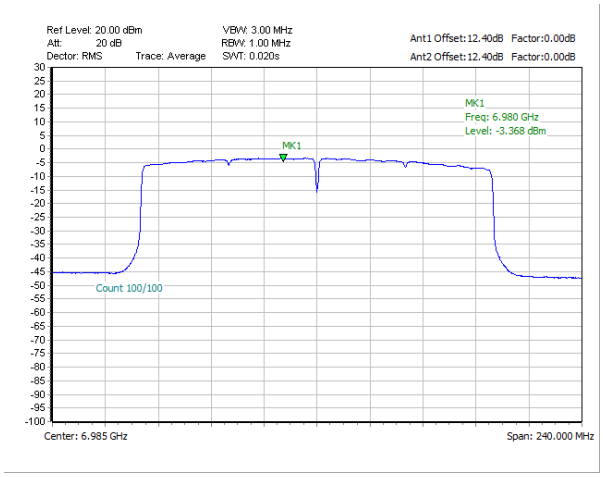
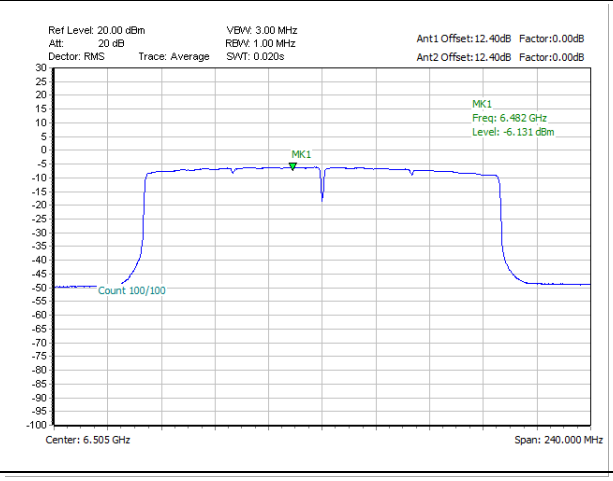
MIMO <Ant. 4+5>

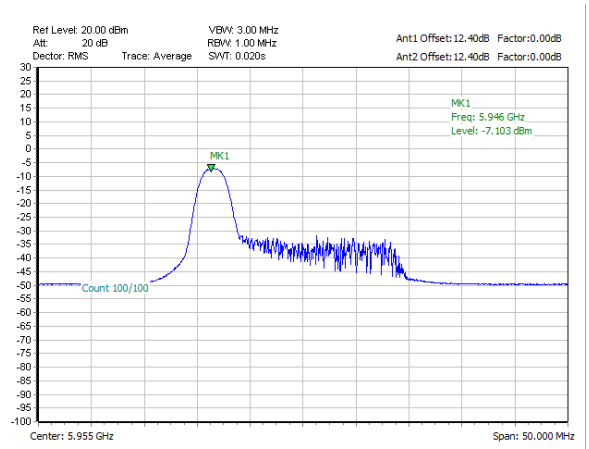
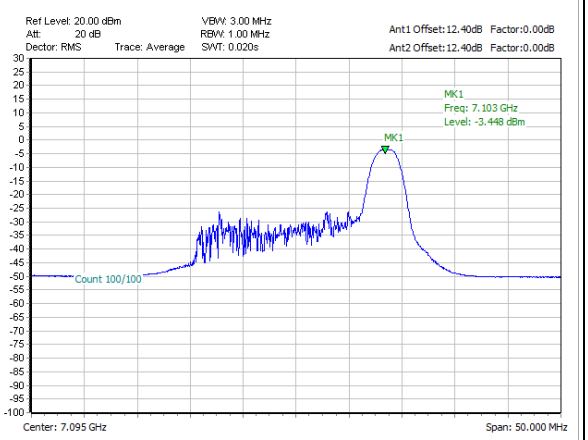
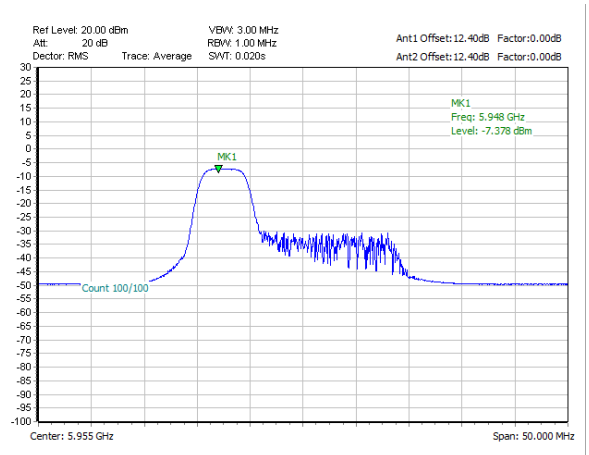
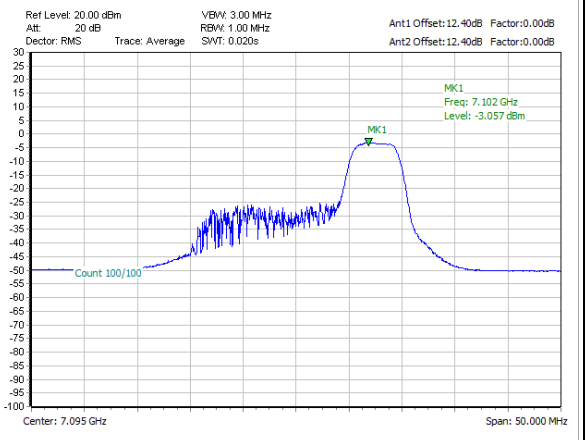
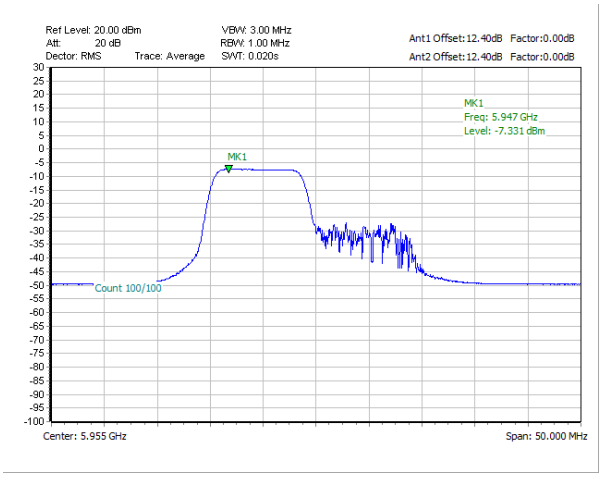
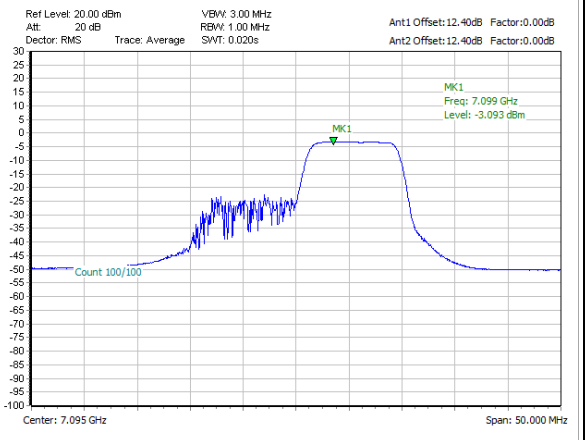
802.11a	
Low CH01 5955MHz	**Low CH02 5935MHz**
	
Middle CH 113 6515MHz	**High CH229 7095MHz**
	
High CH233 7115MHz	**N/A**
	N/A

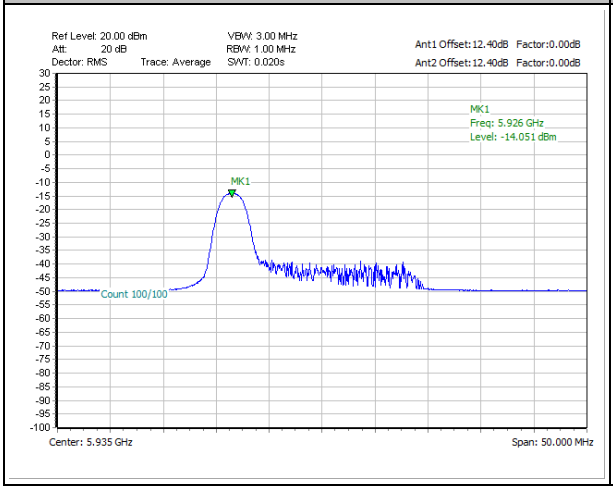
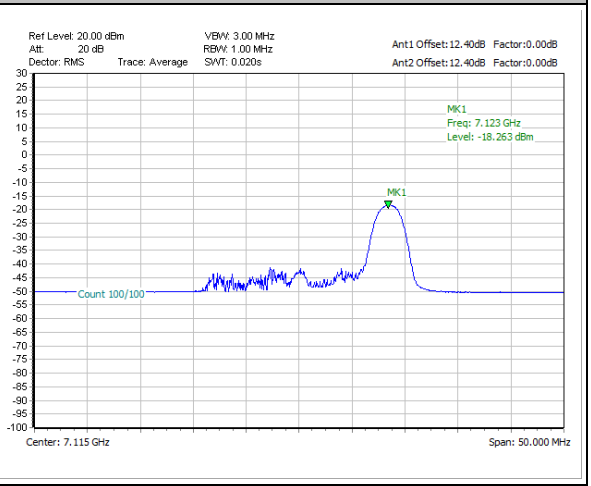
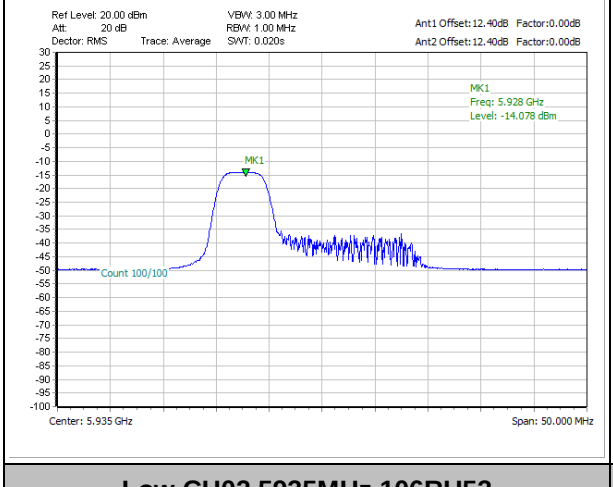
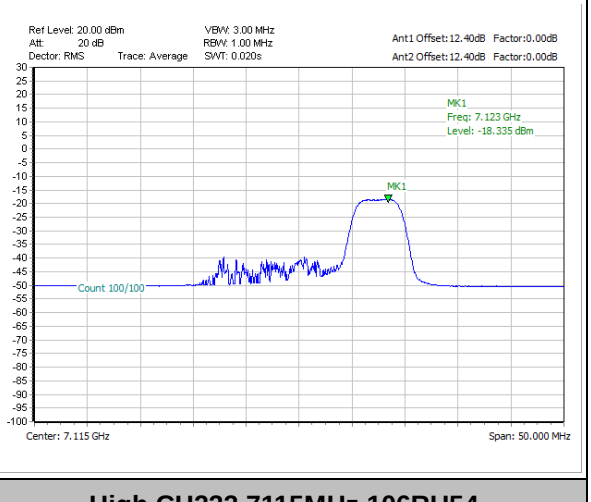
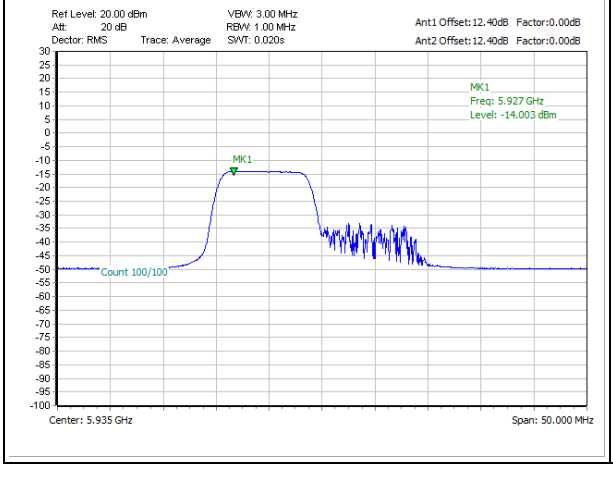
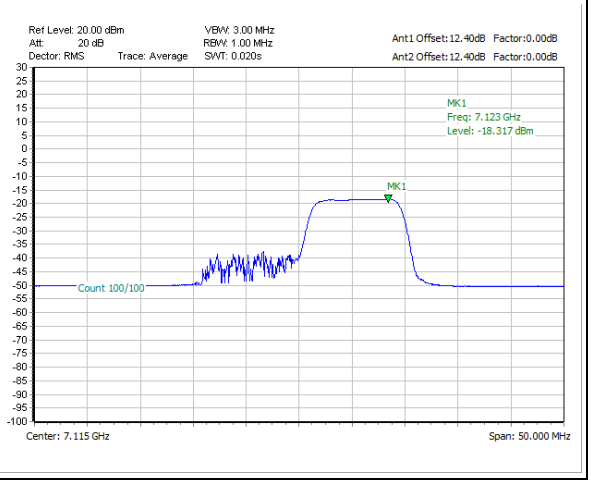
802.11ax HE20 Full RU	
Low CH01 5955MHz	**Low CH02 5935MHz**
	
Middle CH 113 6515MHz	**High CH229 7095MHz**
	
High CH233 7115MHz	**N/A**
	N/A

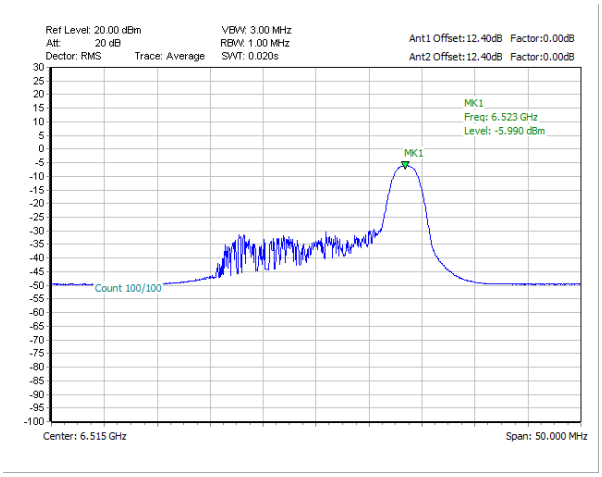
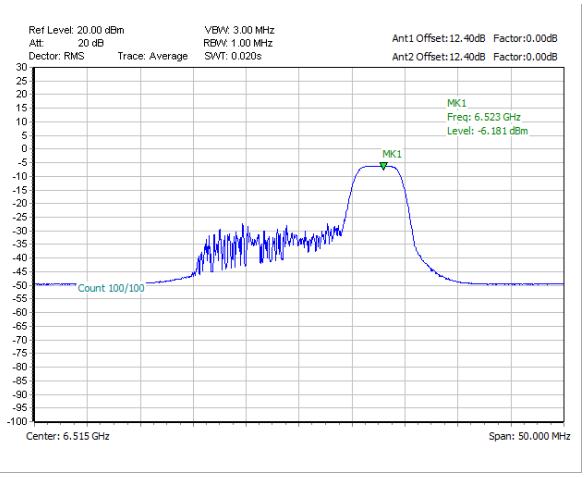
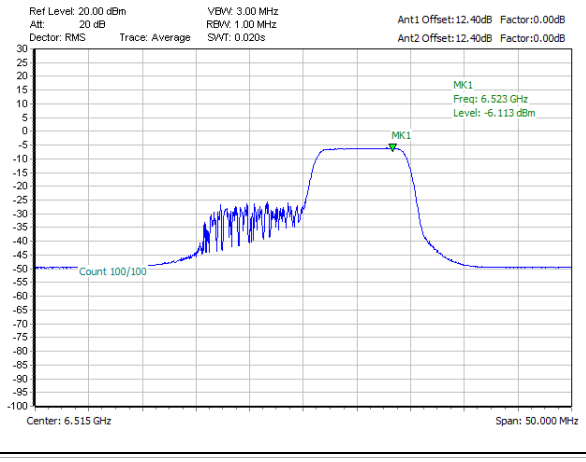
802.11ax HE40 Full RU	
Low CH03 5965MHz	High CH227 7085MHz
	
Middle CH115 6525MHz	
	

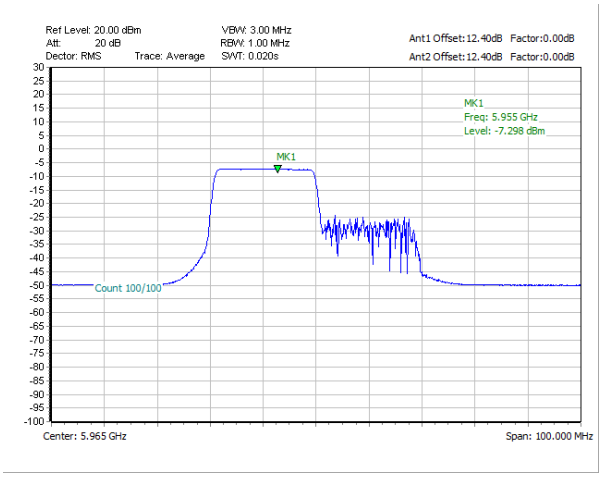
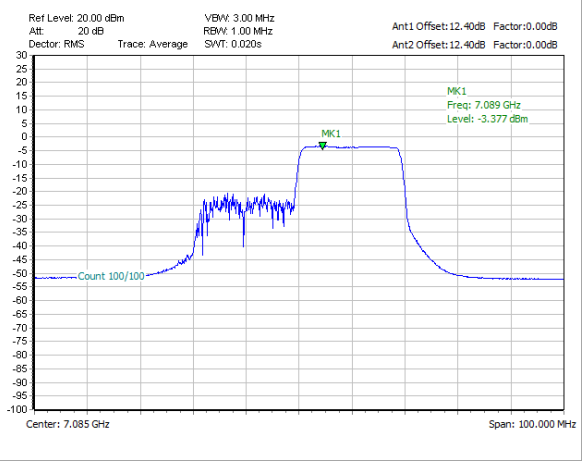
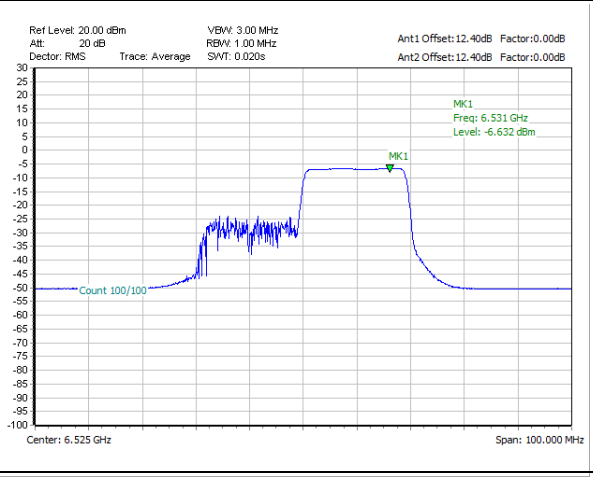
802.11ax HE80 Full RU	
Low CH07 5985MHz	High CH215 7025MHz
	
Middle CH 119 6545MHz	
	

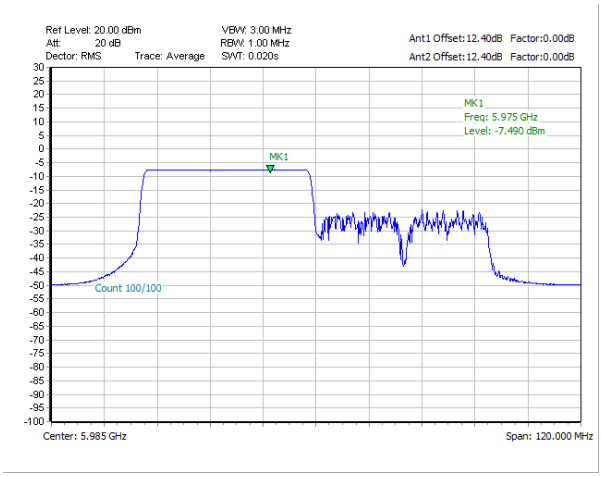
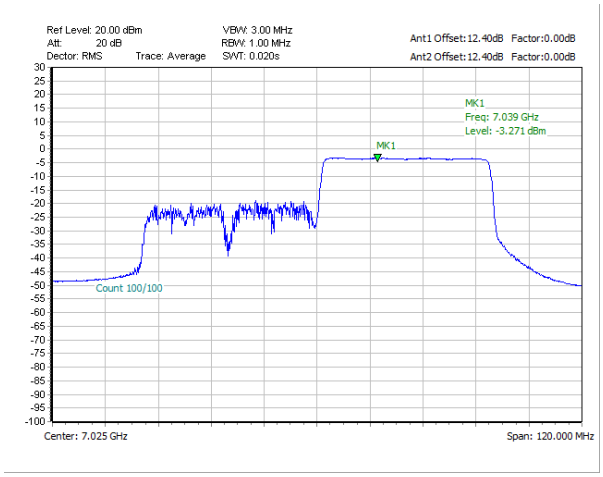
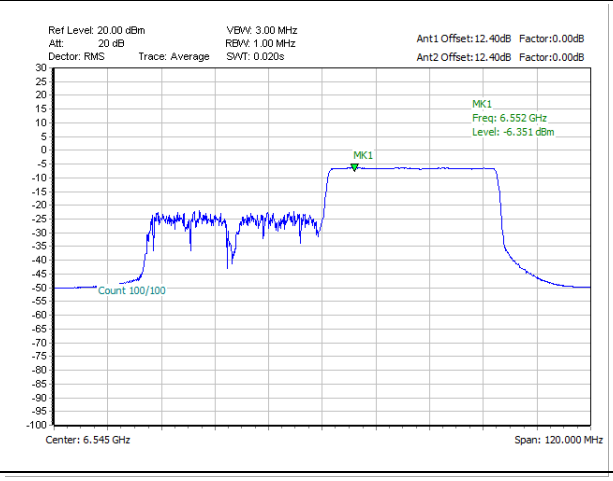
802.11ax HE160 Full RU	
Low CH015 6025MHz	High CH207 6985MHz
	
Middle CH 111 6505MHz	
	

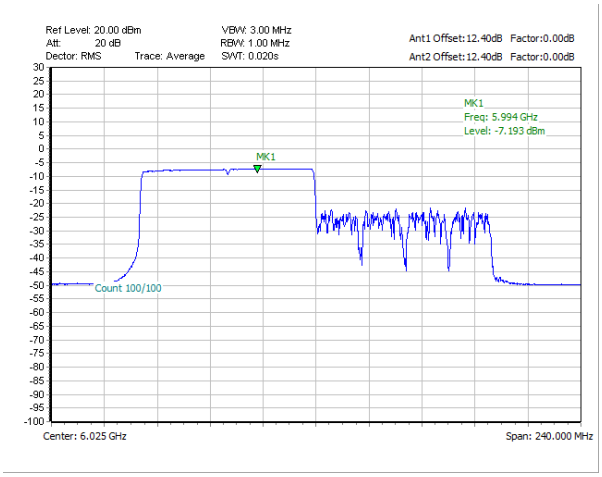
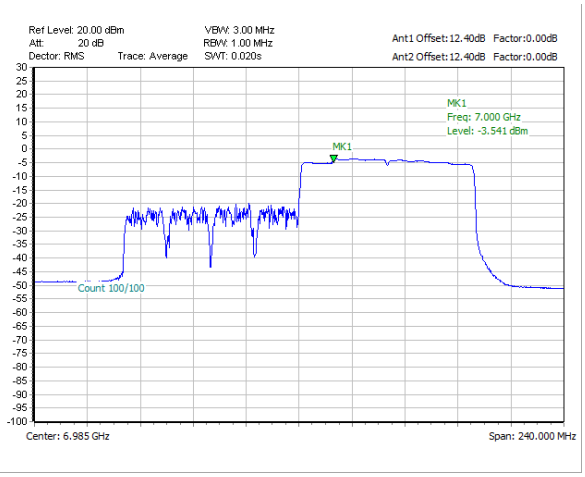
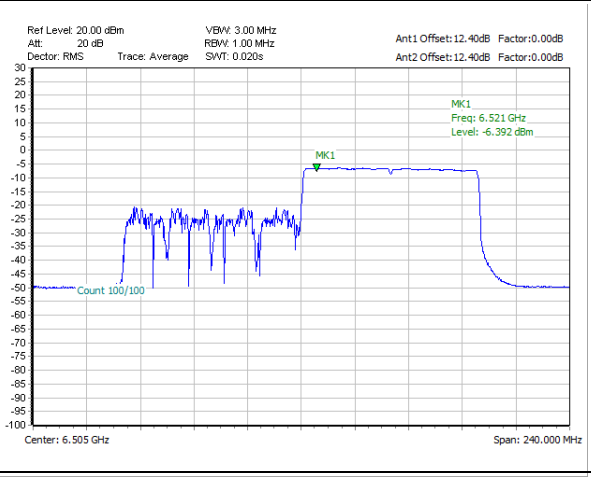
802.11ax HE20 Partial RU	
Low CH01 5955MHz 26RU0	High CH229 7095MHz 26RU8
	
Low CH01 5955MHz 52RU37	High CH229 7095MHz 52RU40
	
Low CH01 5955MHz 106RU53	High CH229 7095MHz 106RU54
	

802.11ax HE20 Partial RU	
Low CH02 5935MHz 26RU0	High CH233 7115MHz 26RU8
	
Low CH02 5935MHz 52RU37	High CH233 7115MHz 52RU40
	
Low CH02 5935MHz 106RU53	High CH233 7115MHz 106RU54
	

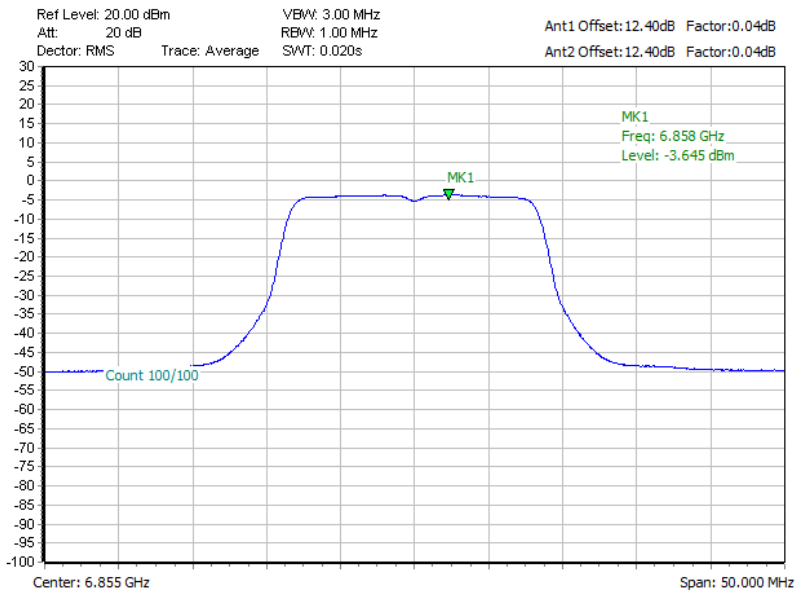
802.11ax HE20 Partial RU	
Middle CH 113 6515MHz 26RU8	Middle CH 113 6515MHz 52RU40
	
Middle CH 113 6515MHz 106RU54	
	

802.11ax HE40 Partial RU	
Low CH03 5965MHz 242RU61	High CH227 7085MHz 242RU62
	
Middle CH115 6525MHz 242RU62	
	

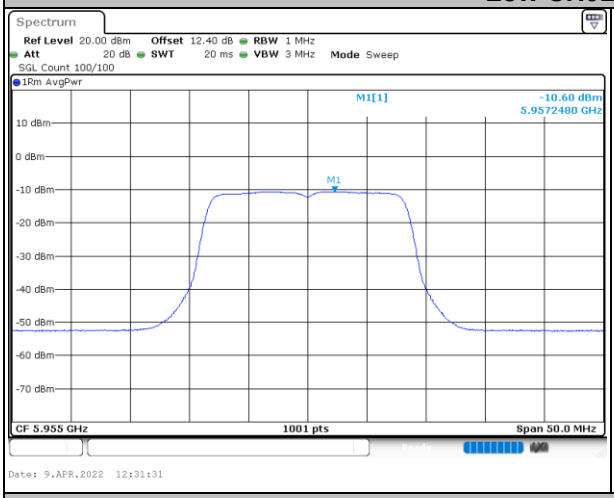
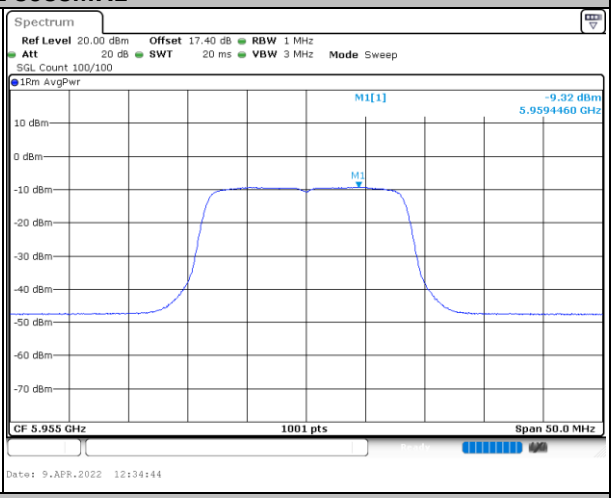
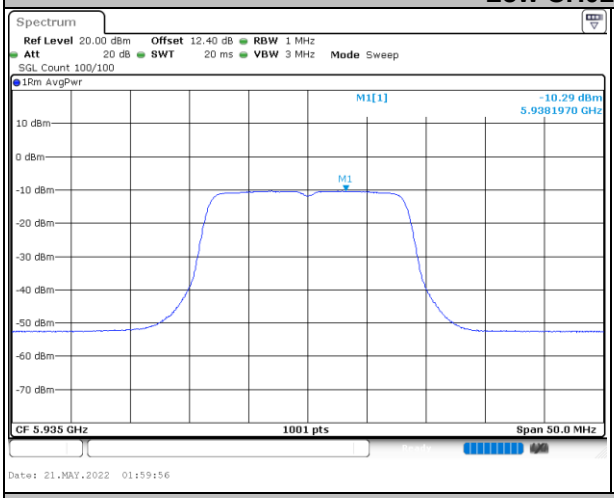
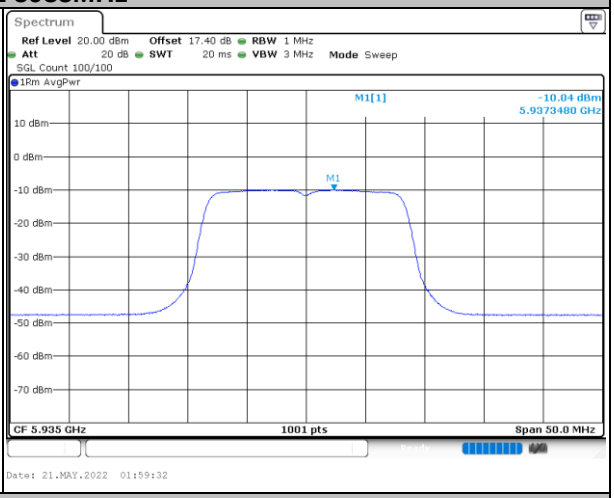
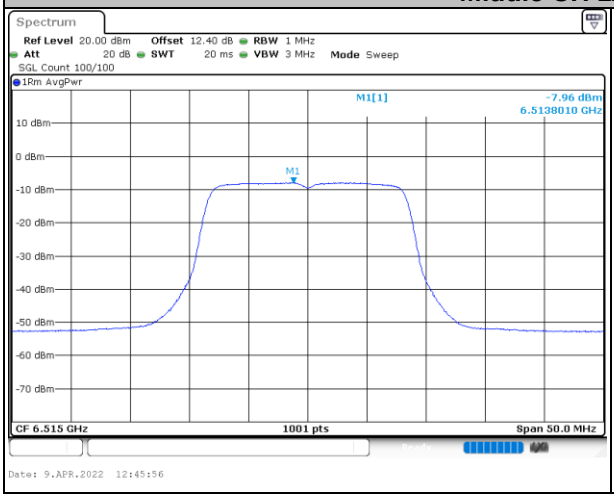
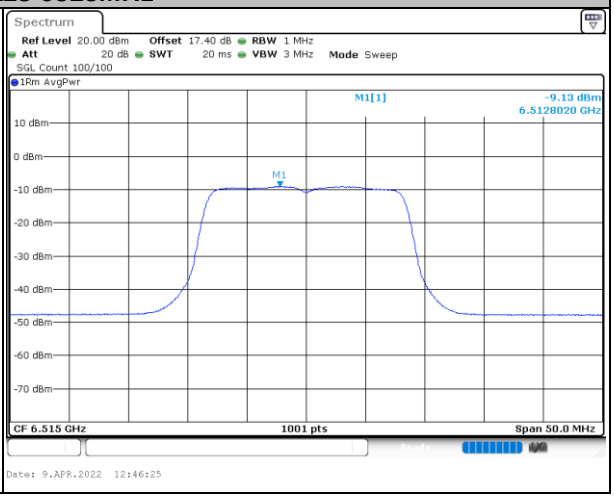
802.11ax HE80 Partial RU	
Low CH07 5985MHz 484RU65	High CH215 7025MHz 484RU66
	
Middle CH 119 6545MHz 484RU66	
	

802.11ax HE160 Partial RU	
Low CH015 6025MHz 996RU67	High CH207 6985MHz 996RUS67
	
Middle CH 111 6505MHz 996RUS67	
	

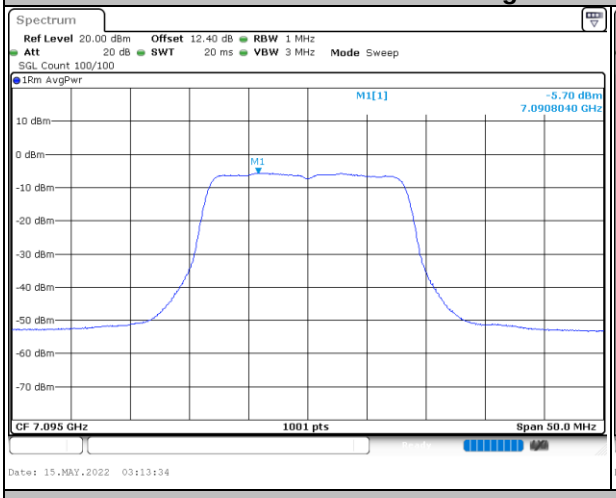
Worst Case Power Density (dBm/MHz) for MIMO Ant. 4+5
802.11a CH181 (6855MHz)

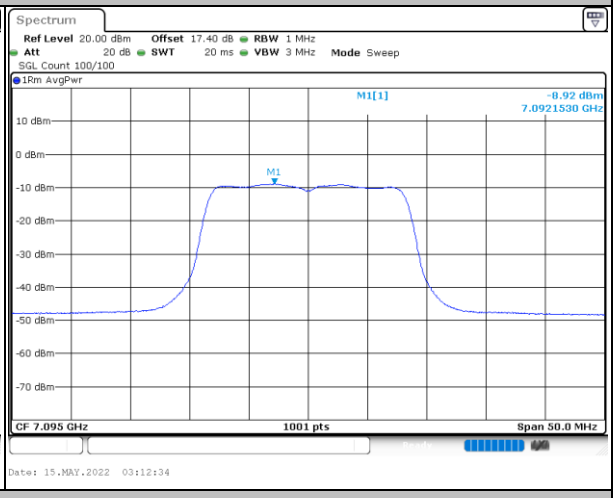


MIMO <Ant. 5+6>

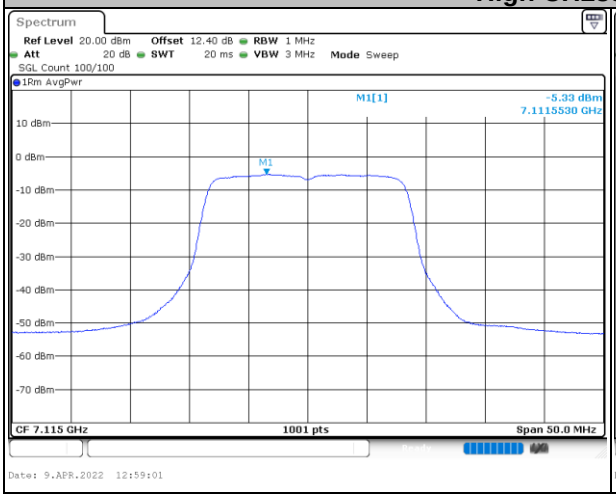
802.11a	
MIMO Ant. 5	**MIMO Ant. 6**
Low CH01 5955MHz	
	
Low CH02 5935MHz	
	
Middle CH 113 6515MHz	
	

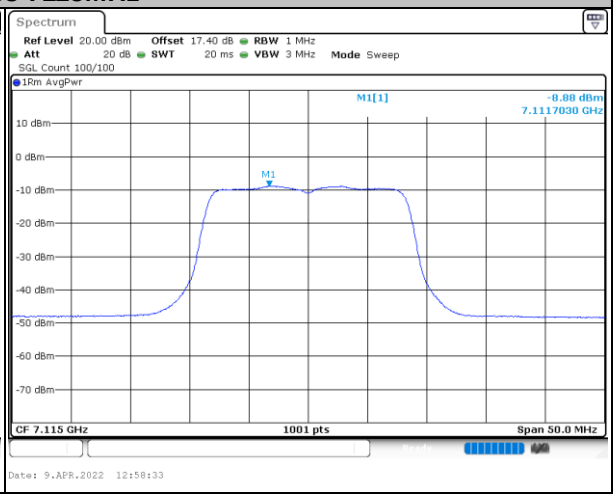
High CH229 7095MHz

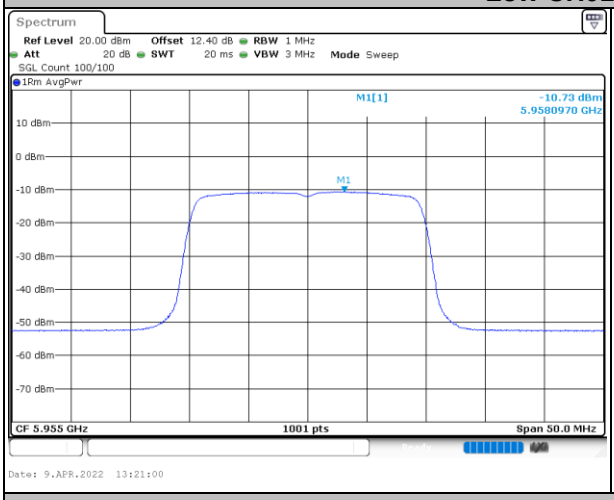
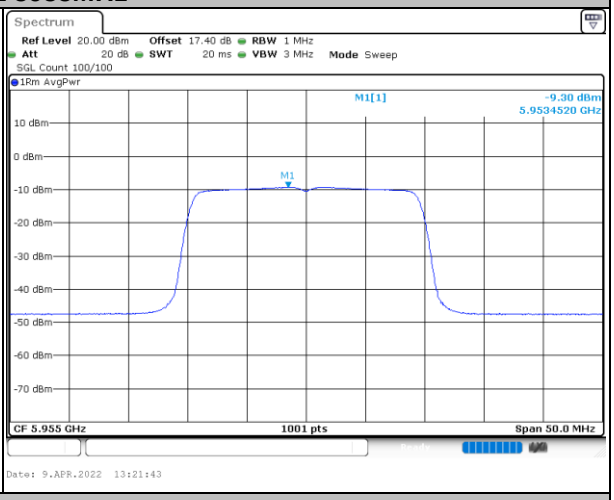
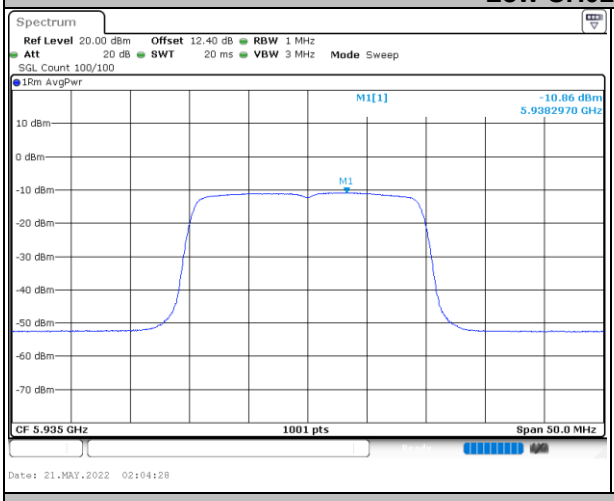
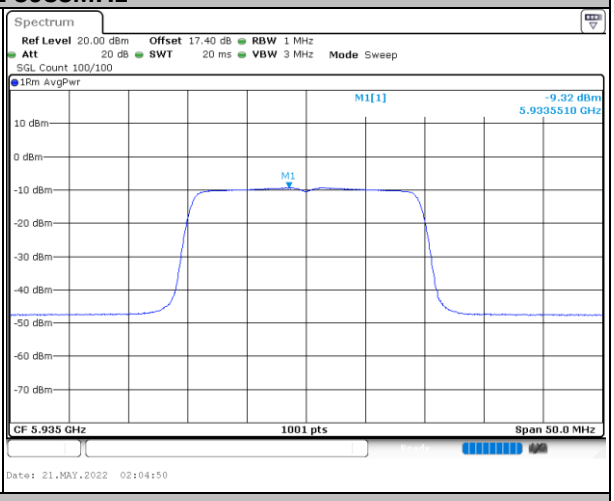
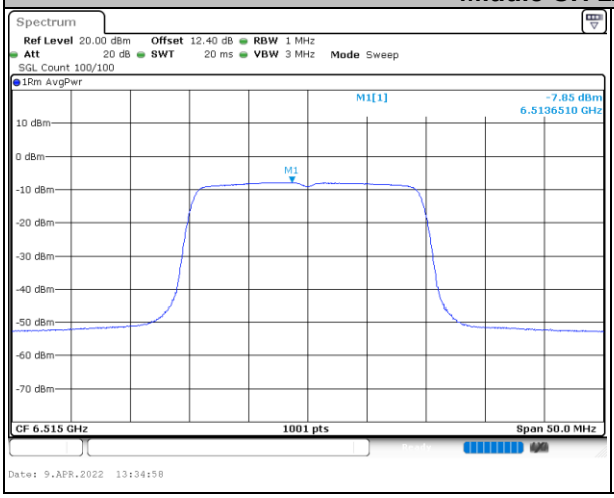
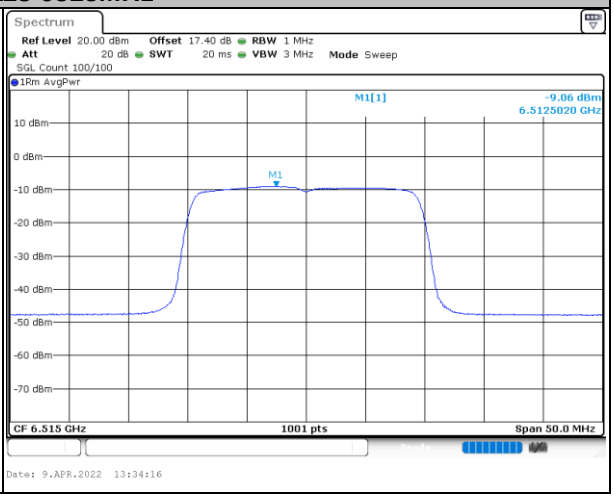




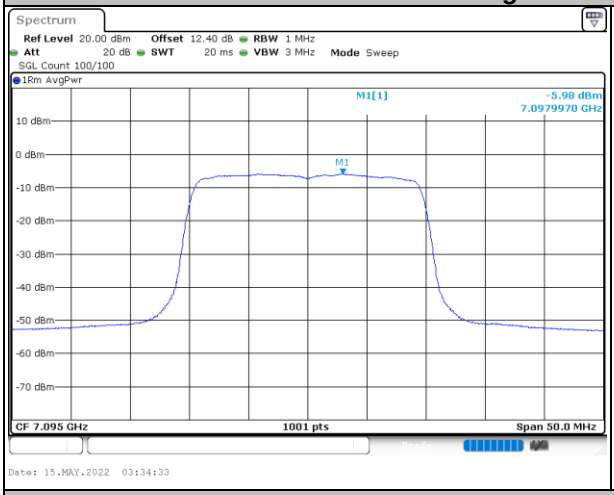
High CH233 7115MHz

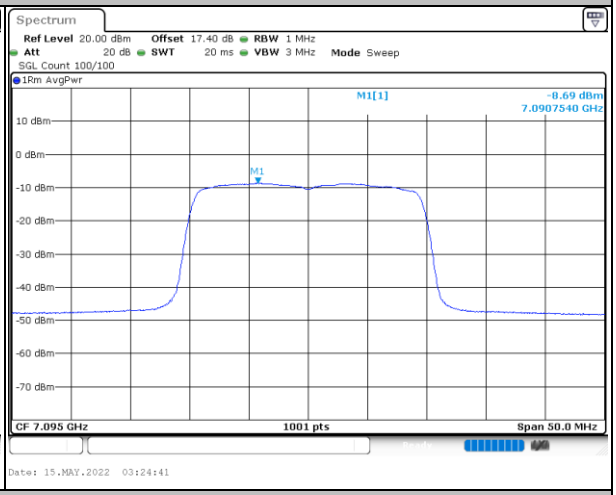




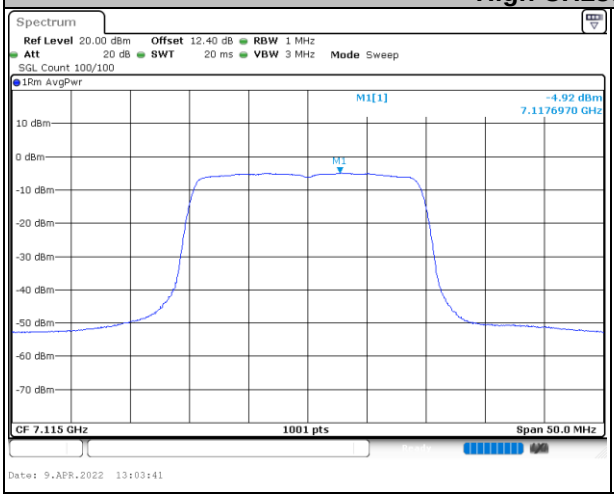
802.11ax HE20 Full RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH01 5955MHz	
	
Low CH02 5935MHz	
	
Middle CH 113 6515MHz	
	

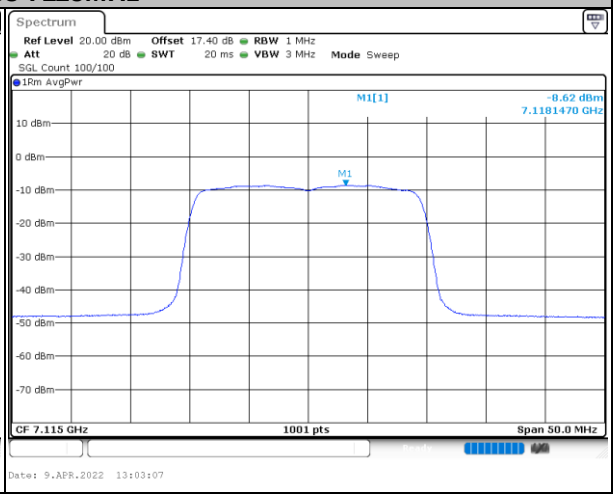
High CH229 7095MHz

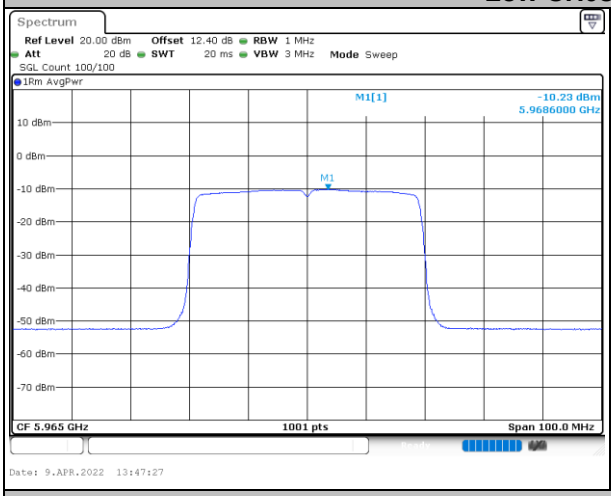
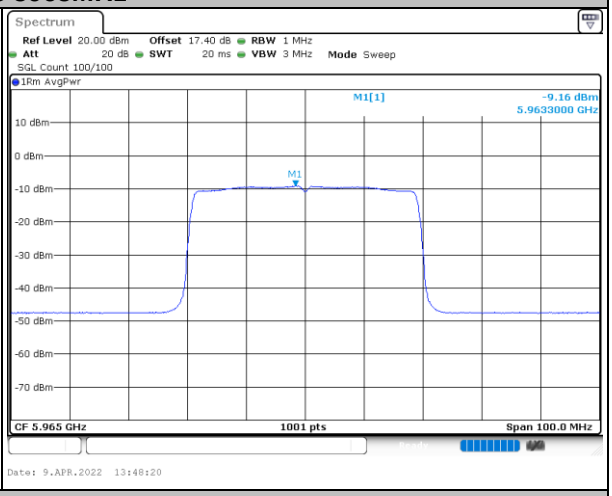
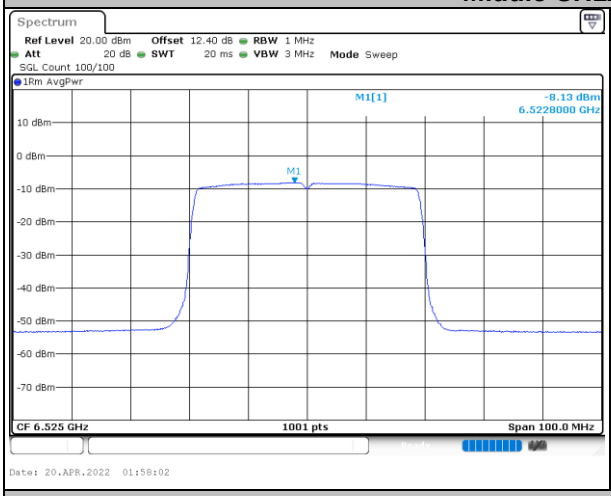
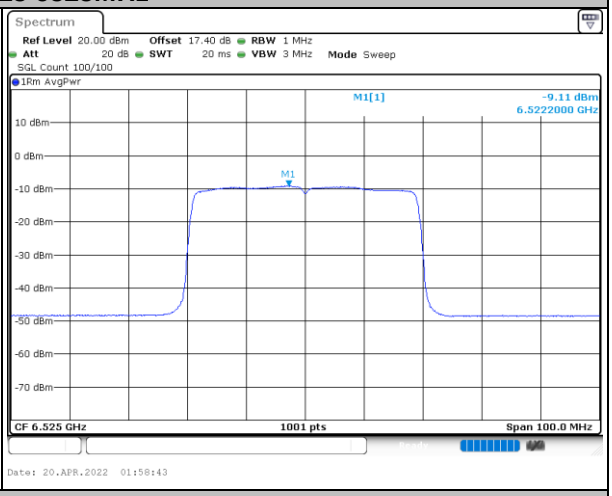
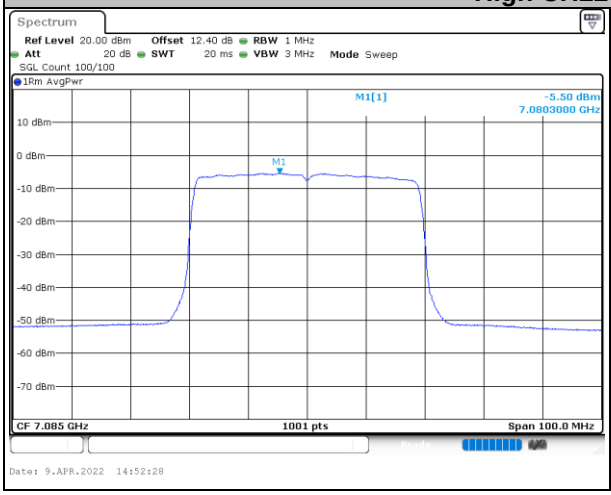
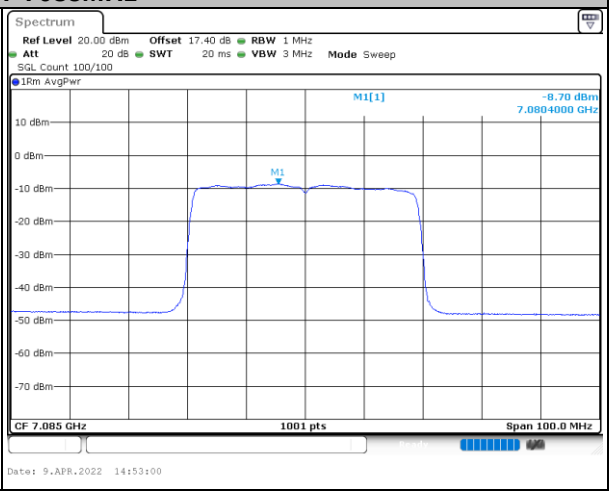


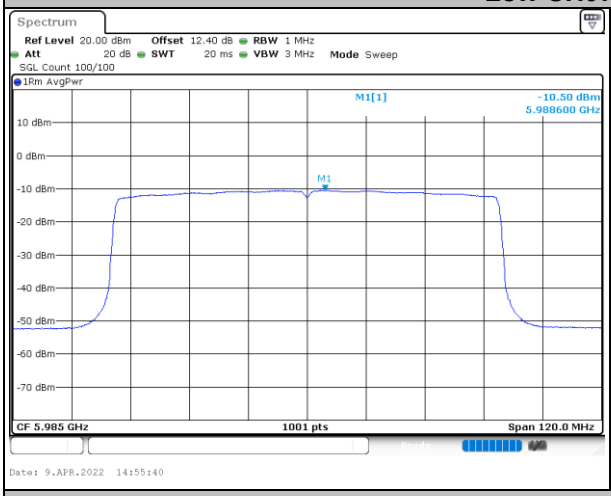
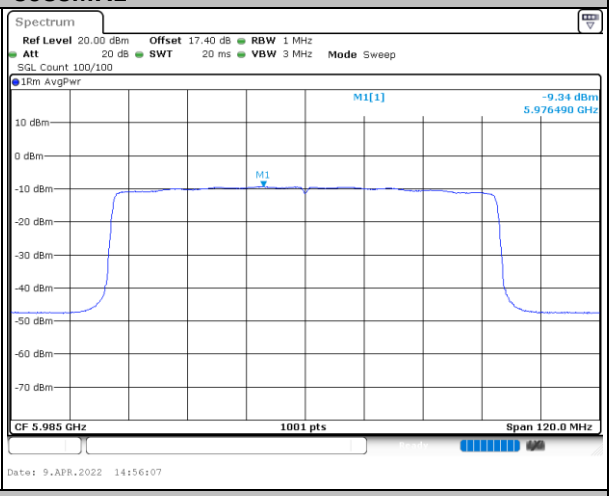
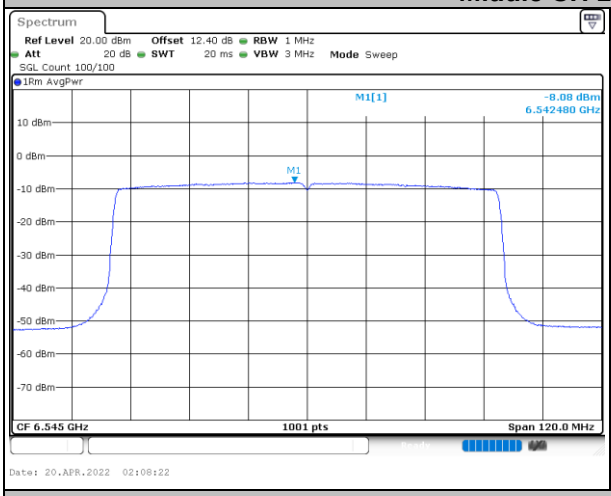
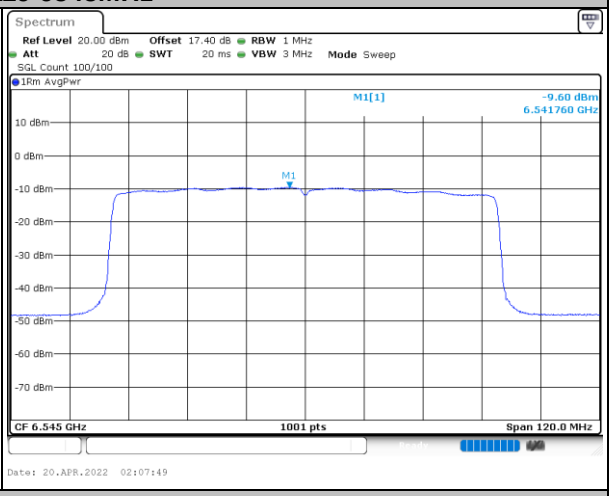
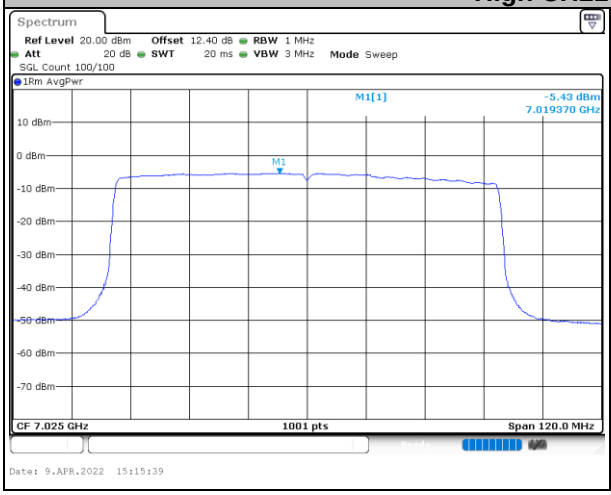
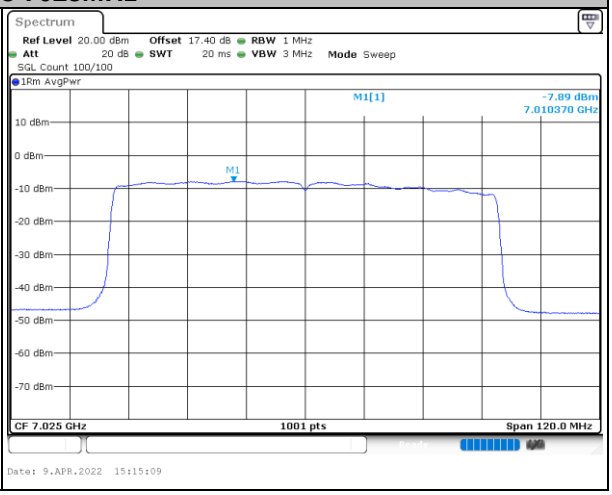


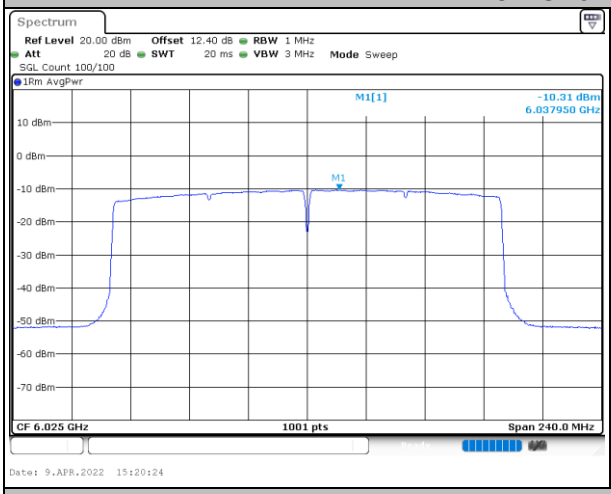
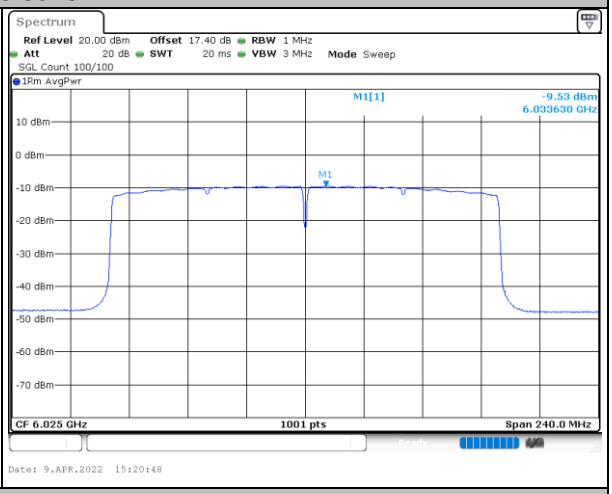
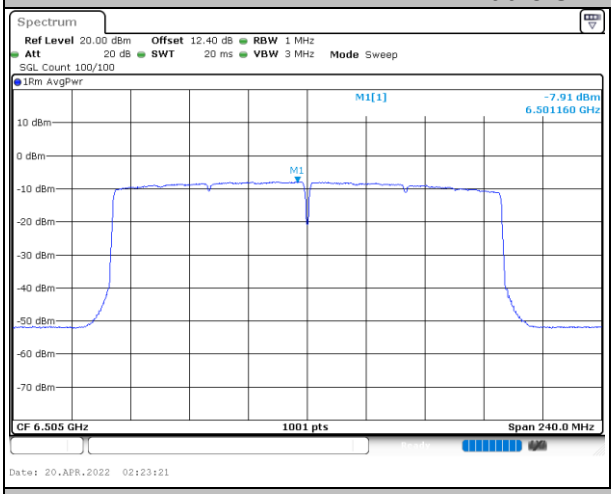
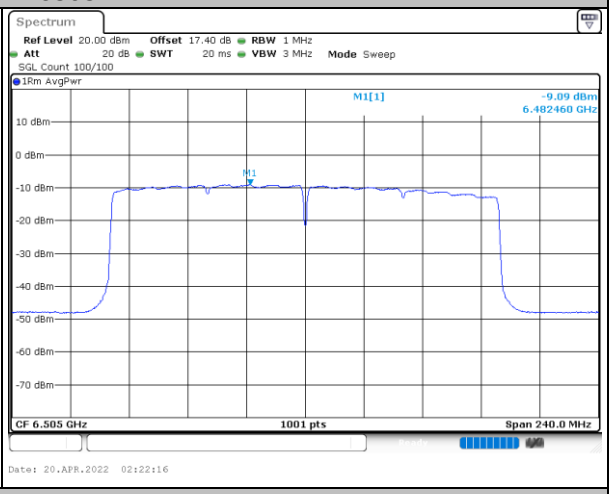
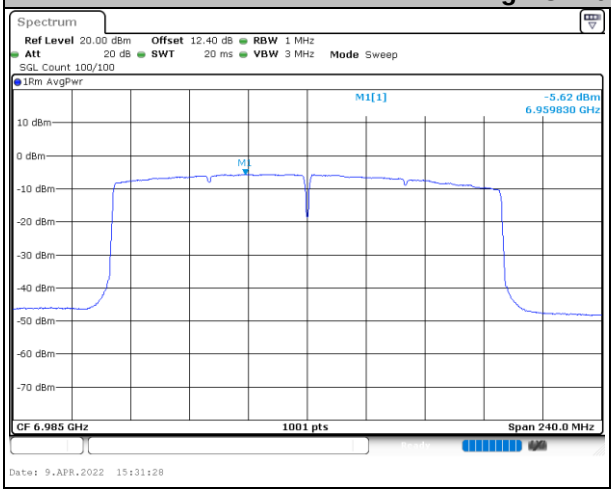
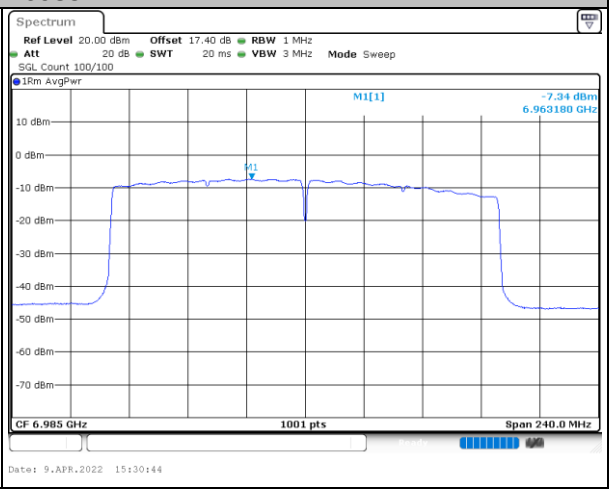
High CH233 7115MHz

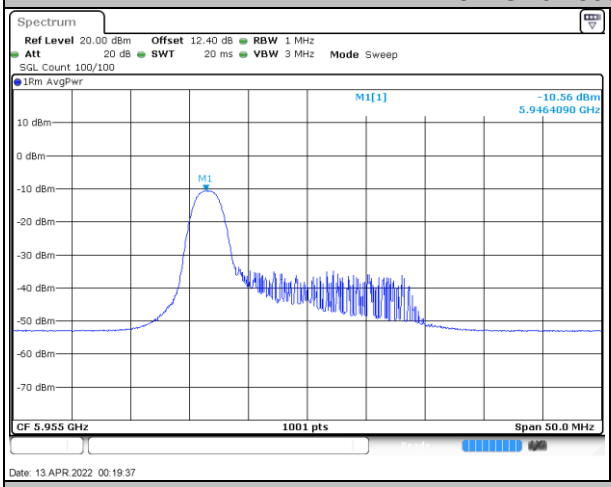
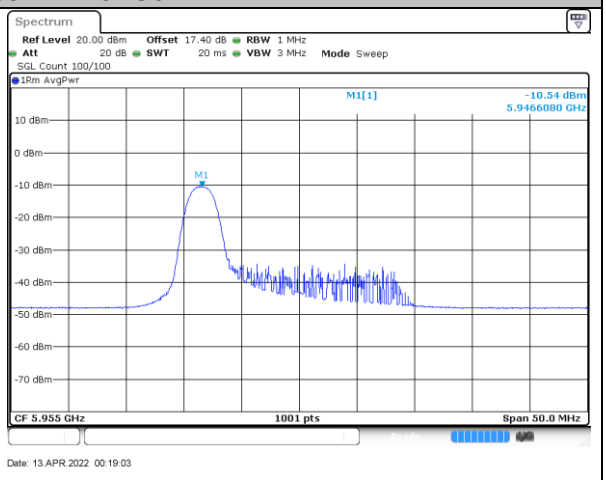
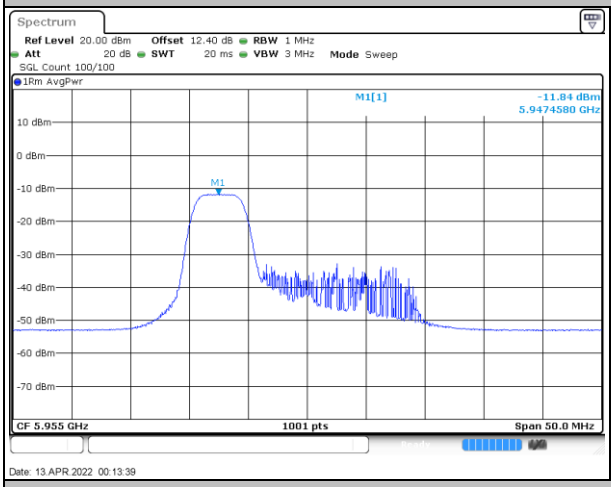
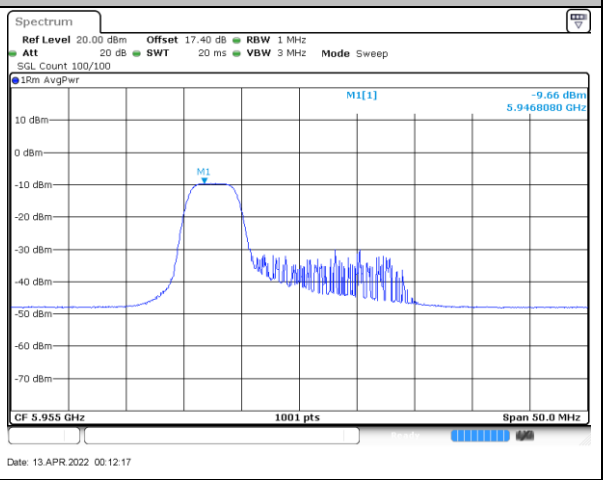
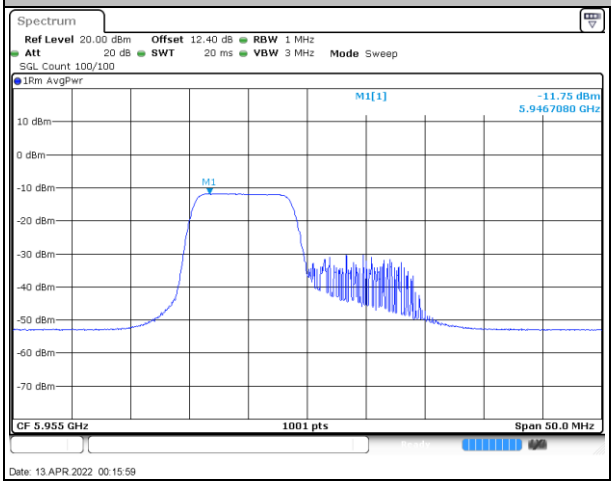
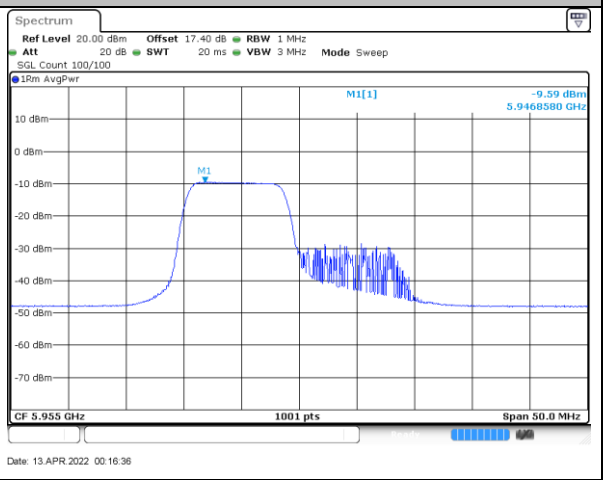




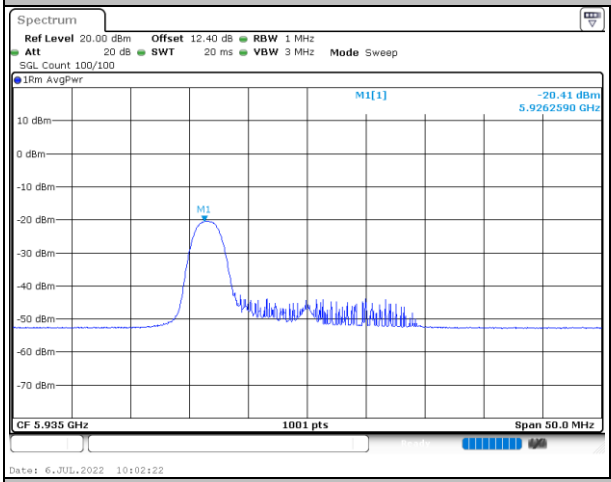
802.11ax HE40 Full RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH03 5965MHz	
	
Middle CH115 6525MHz	
	
High CH227 7085MHz	
	

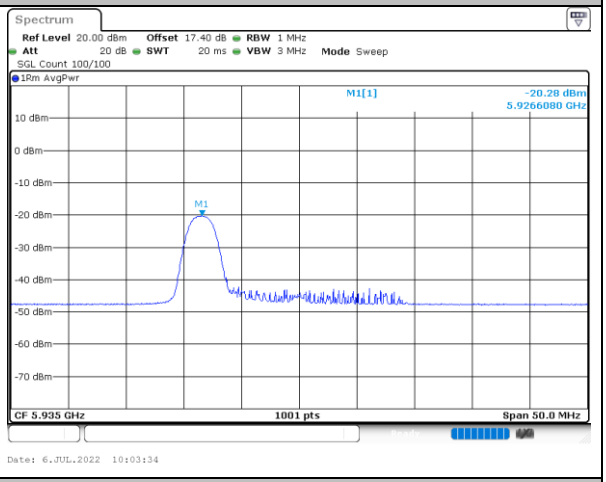
802.11ax HE80 Full RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH07 5985MHz	
	
Middle CH 119 6545MHz	
	
High CH215 7025MHz	
	

802.11ax HE160 Full RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH015 6025MHz	
	
Middle CH 111 6505MHz	
	
High CH207 6985MHz	
	

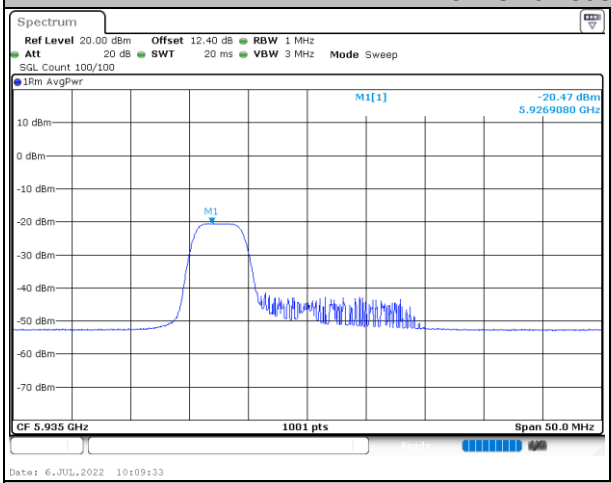
802.11ax HE20 Partial RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH01 5955MHz 26RU0	
	
Low CH01 5955MHz 52RU37	
	
Low CH01 5955MHz 106RU53	
	

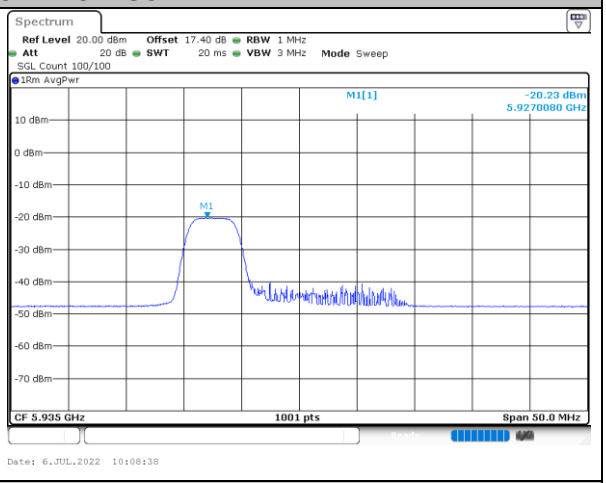
Low CH02 5935MHz 26RU0



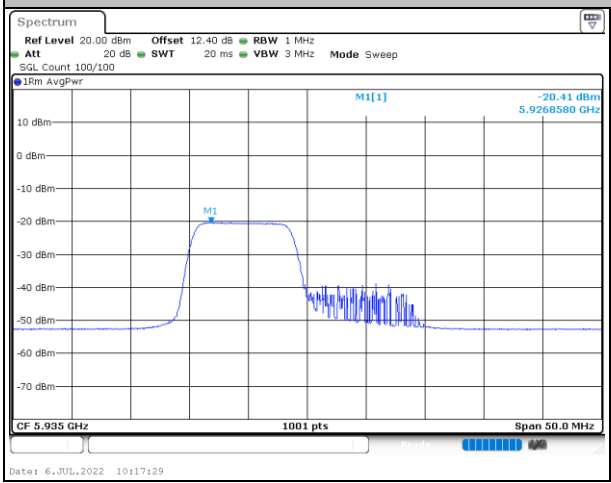


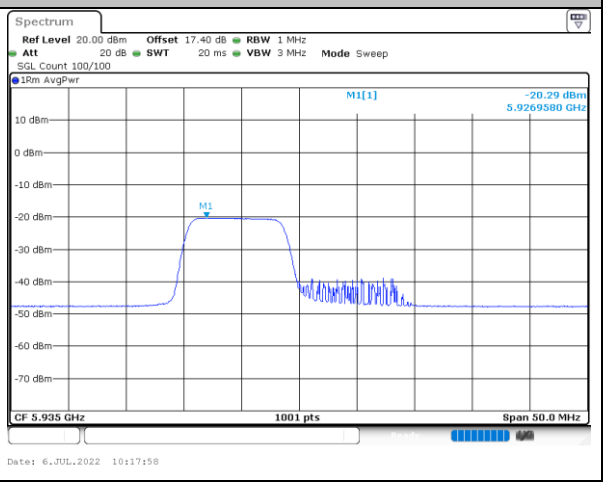
Low CH02 5935MHz 52RU37



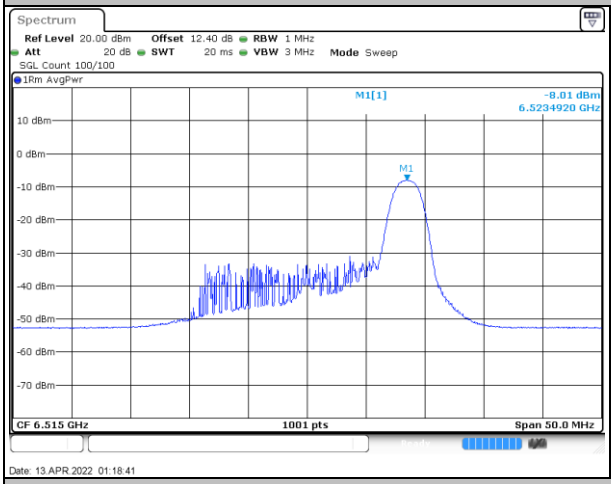


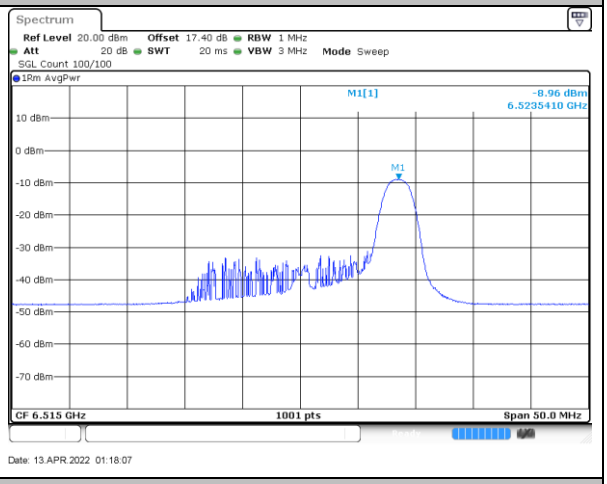
Low CH02 5935MHz 106RU53



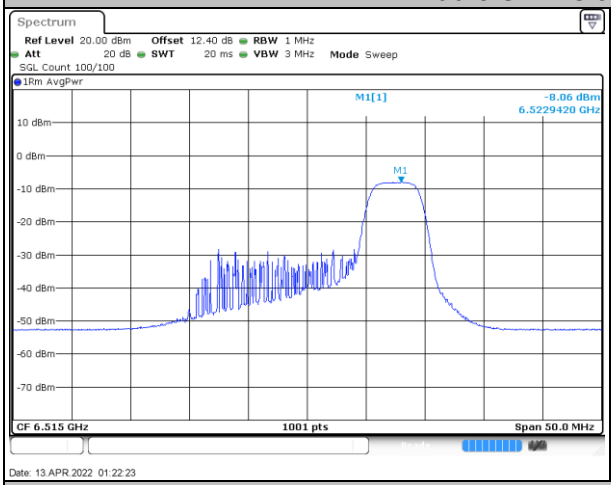


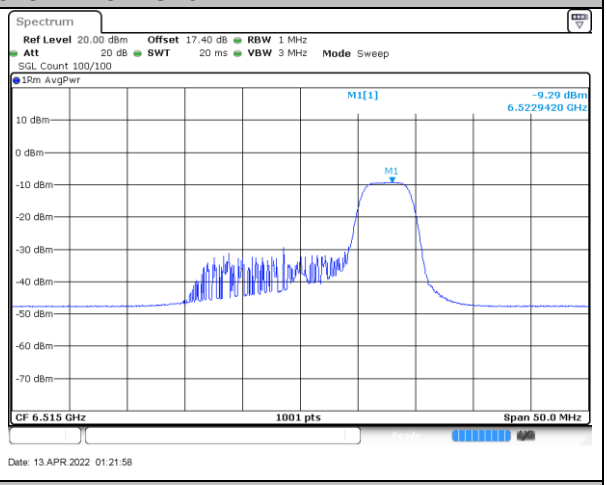
Middle CH 113 6515MHz 26RU8



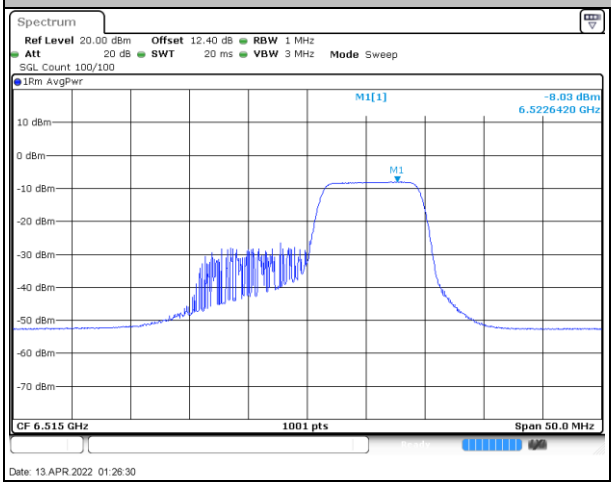


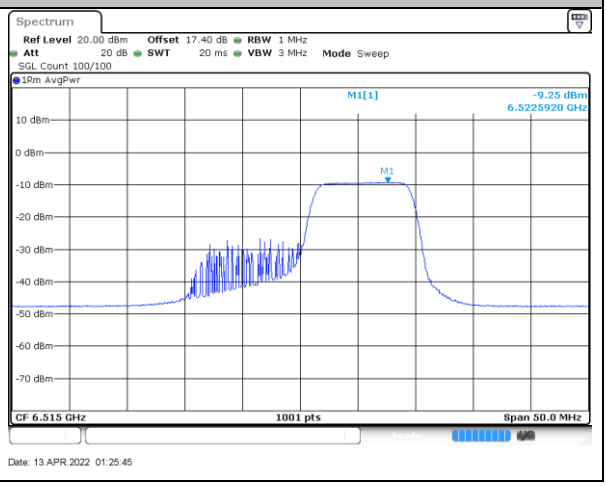
Middle CH 113 6515MHz 52RU40



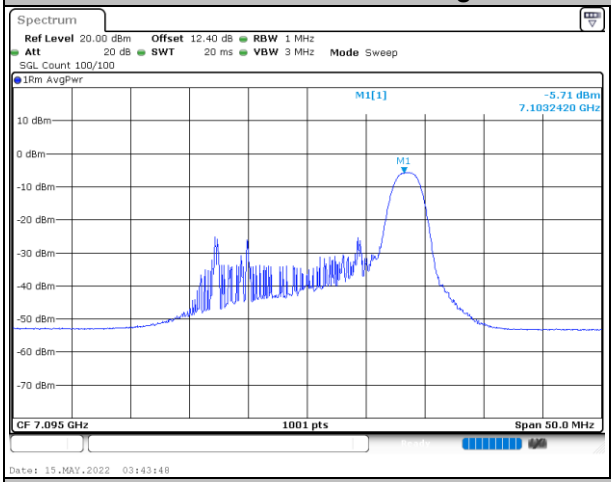


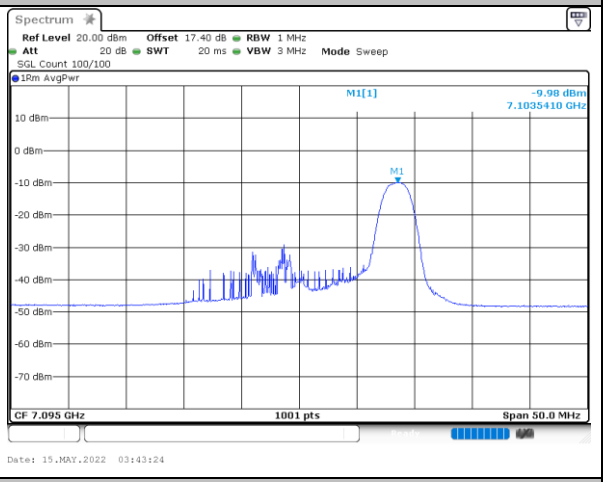
Middle CH 113 6515MHz 106RU54



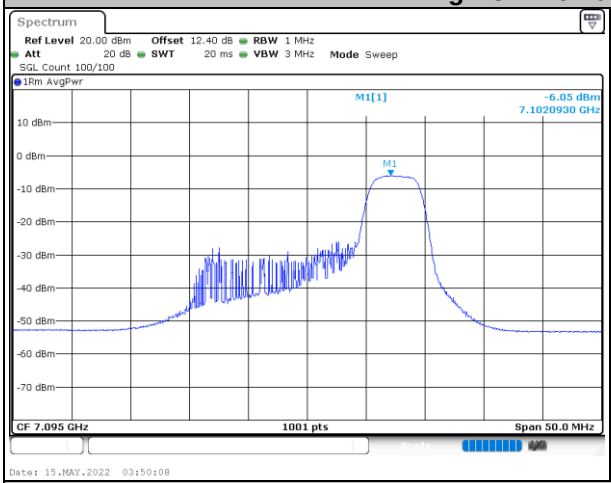


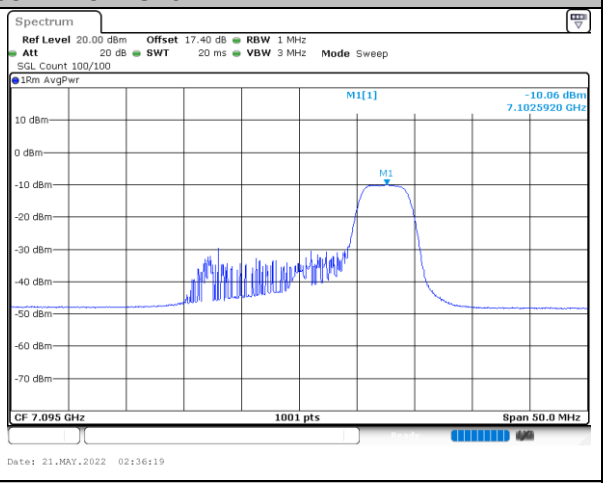
High CH229 7095MHz 26RU8



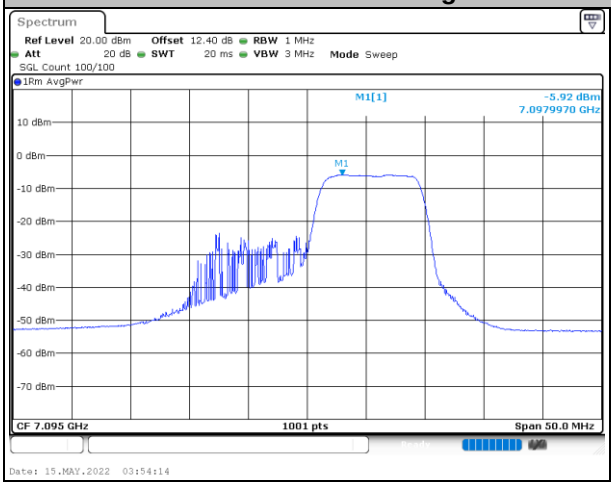


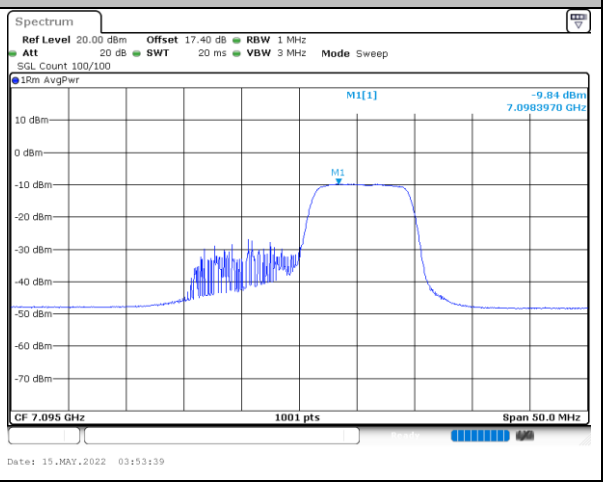
High CH229 7095MHz 52RU40



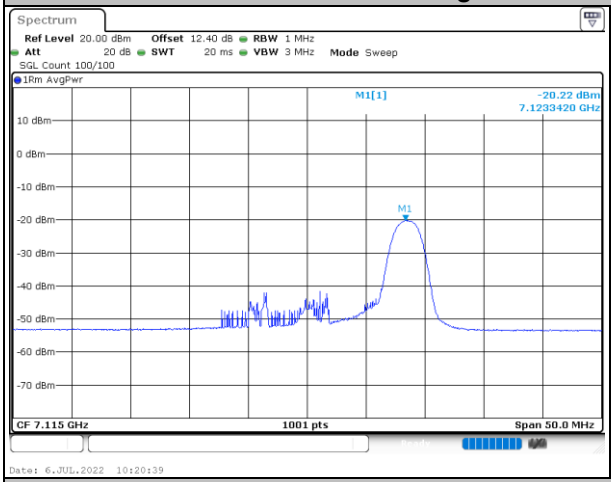


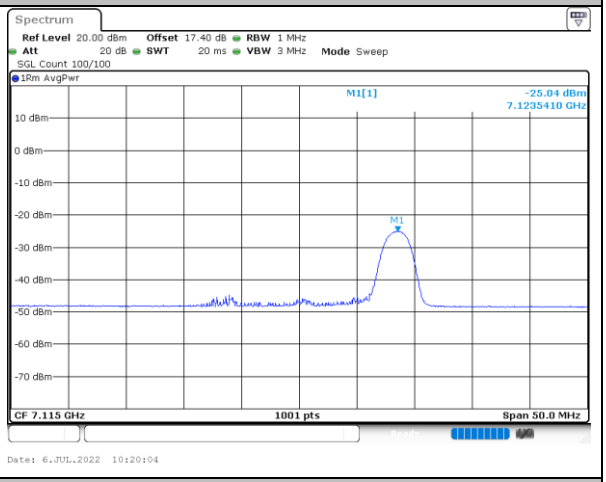
High CH229 7095MHz 106RU54



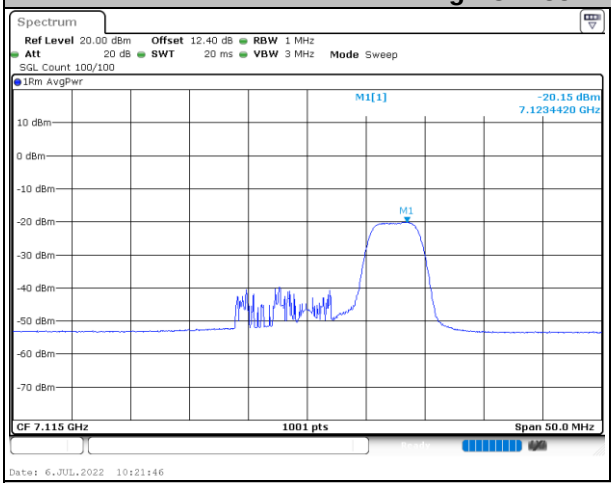


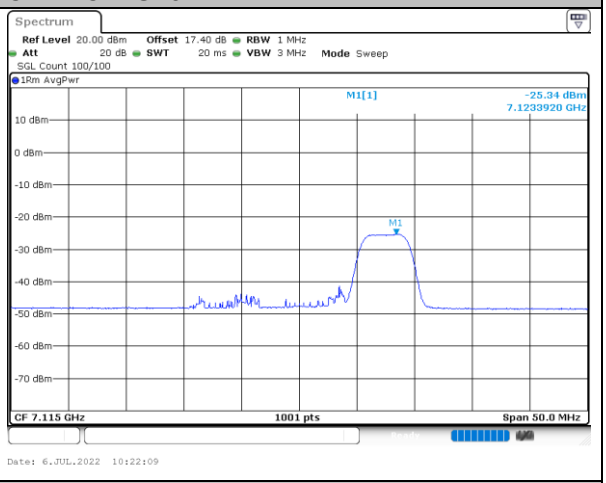
High CH233 7115MHz 26RU8



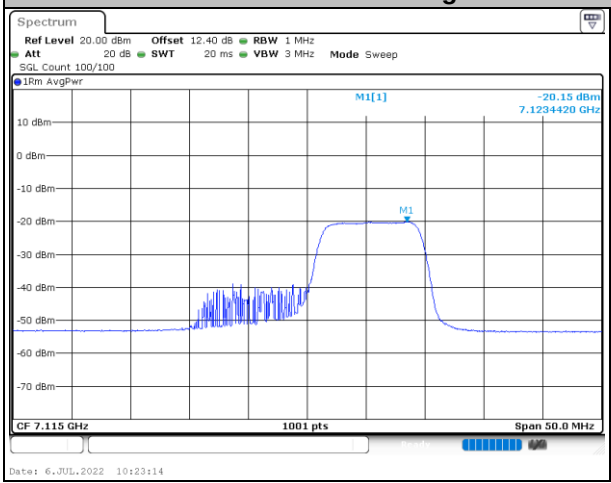


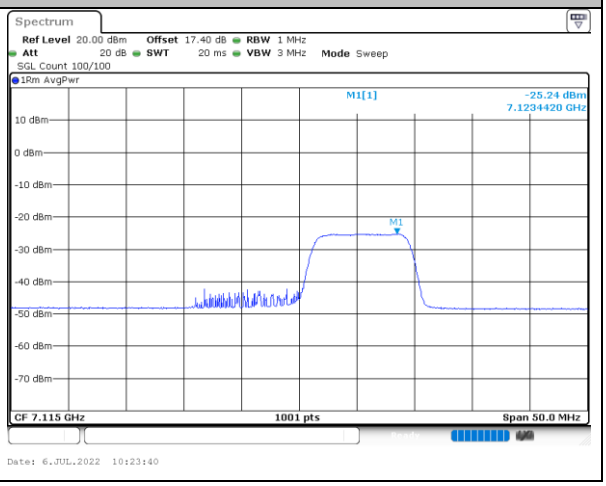
High CH233 7115MHz 52RU40

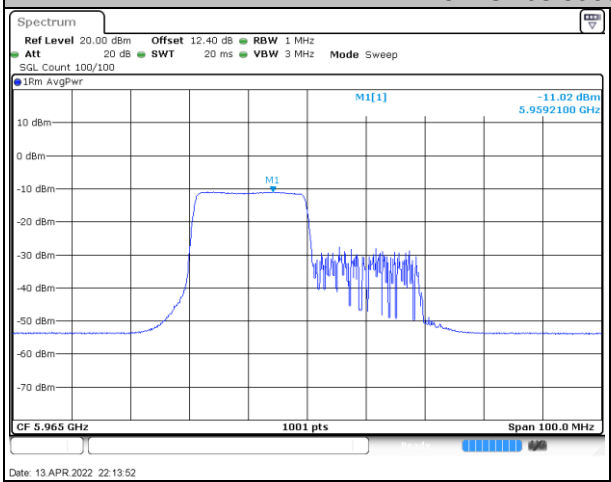
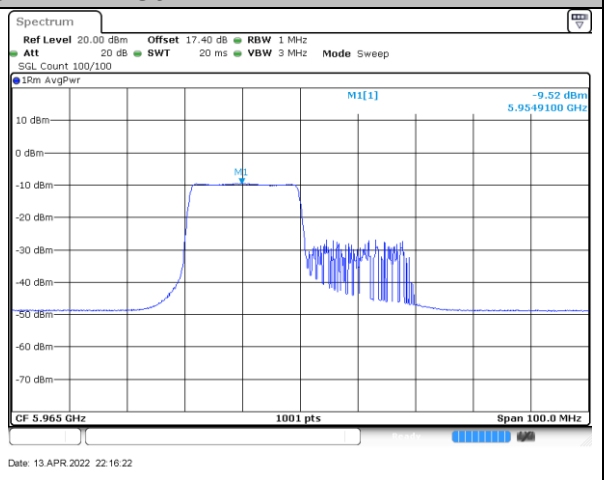
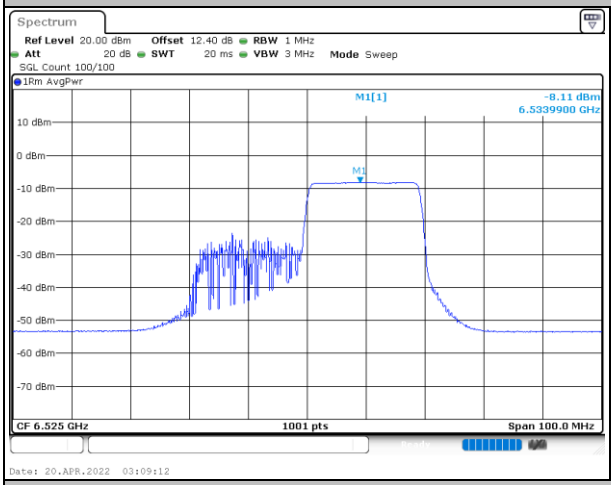
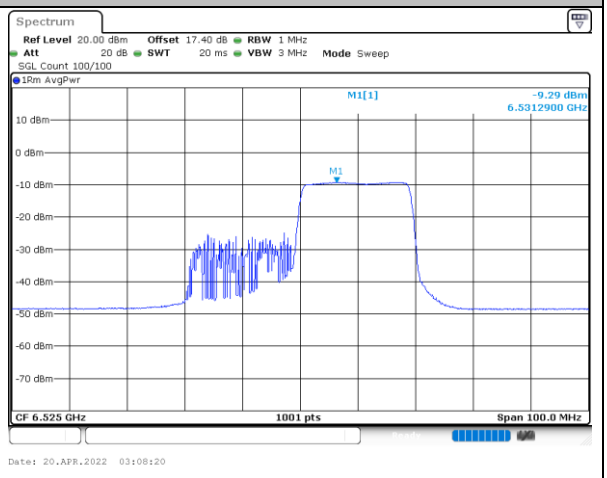
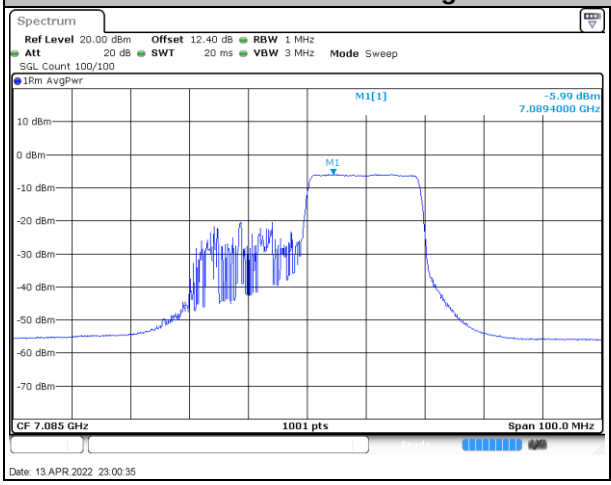
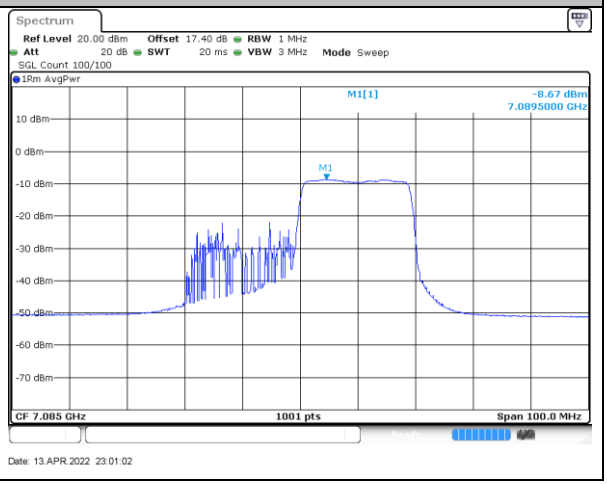


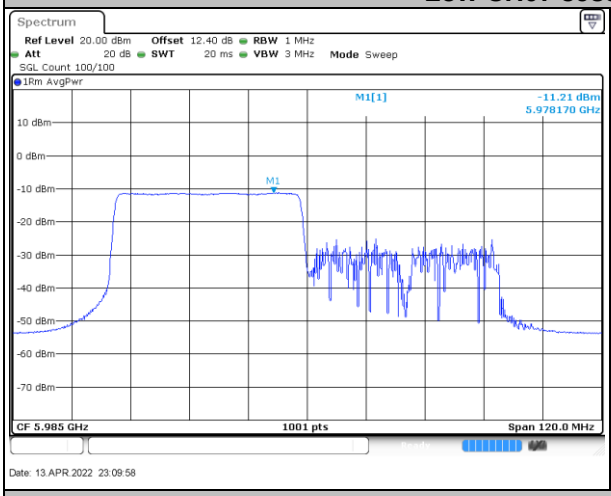
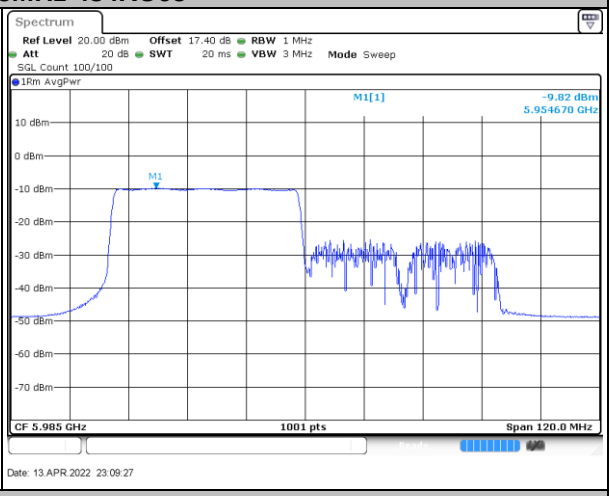
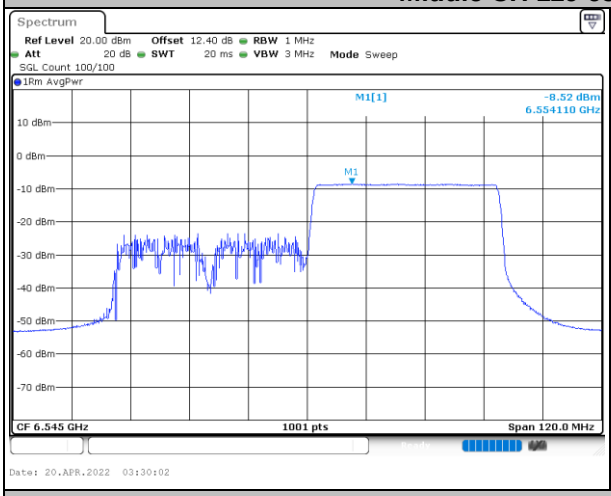
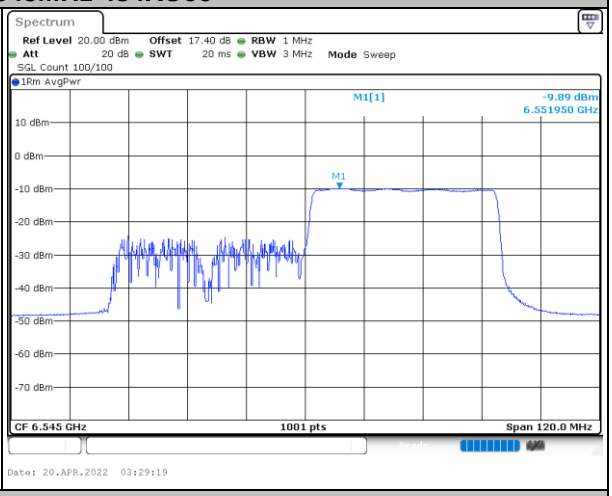
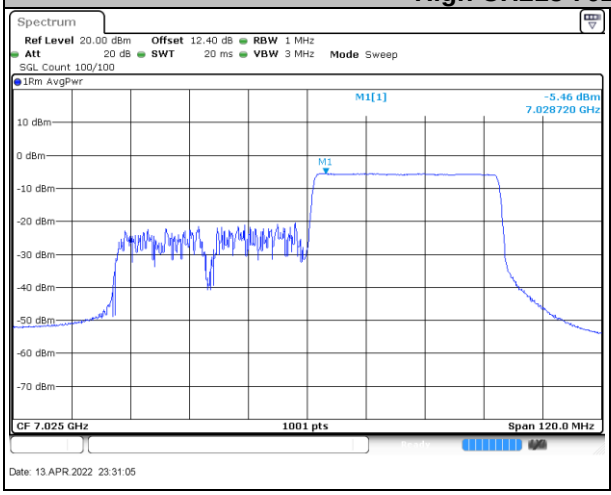
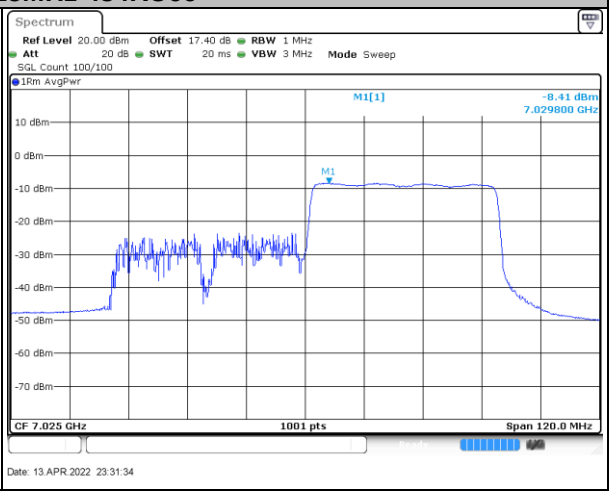


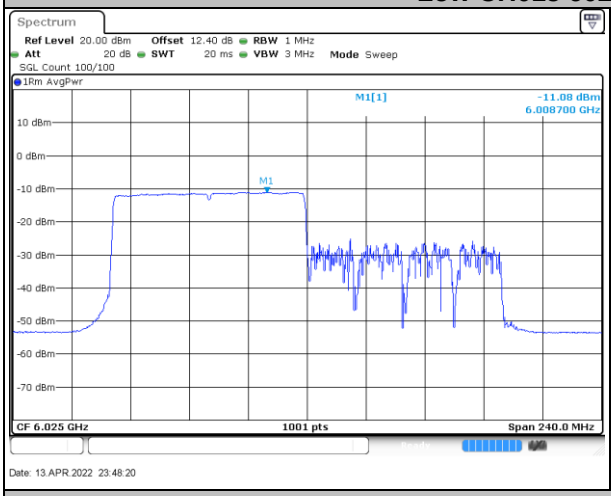
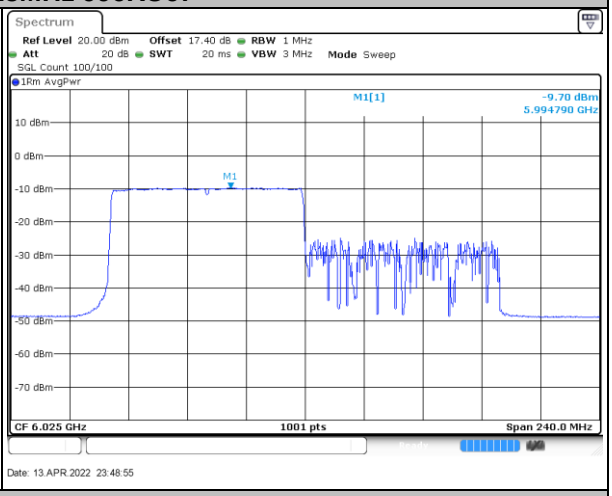
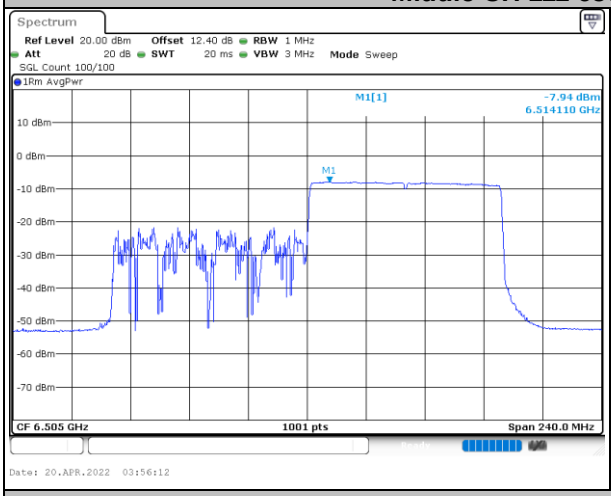
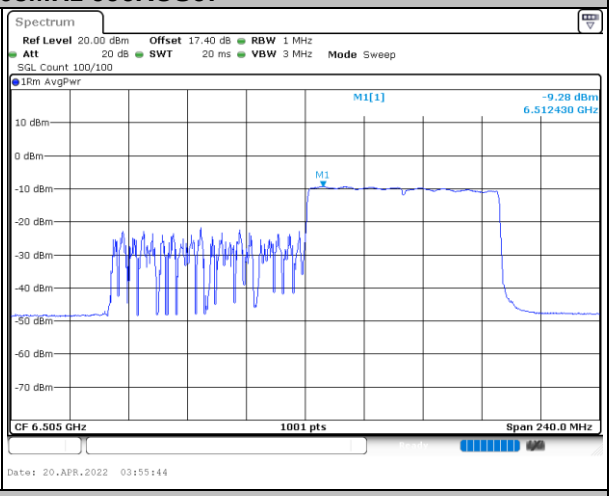
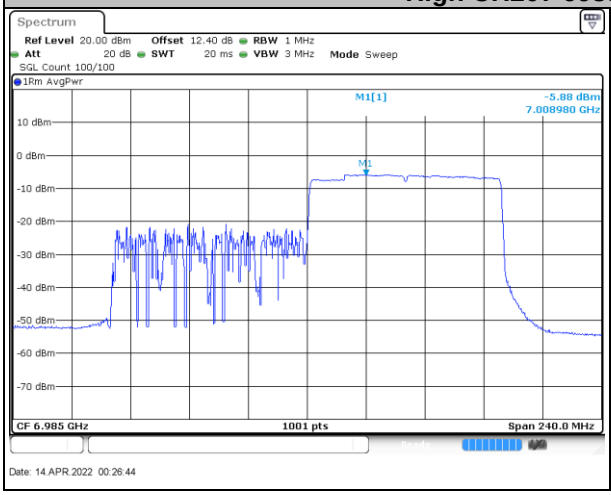
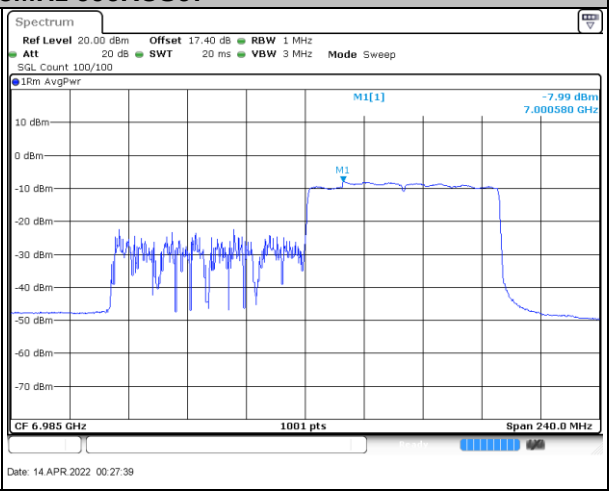
High CH233 7115MHz 106RU54



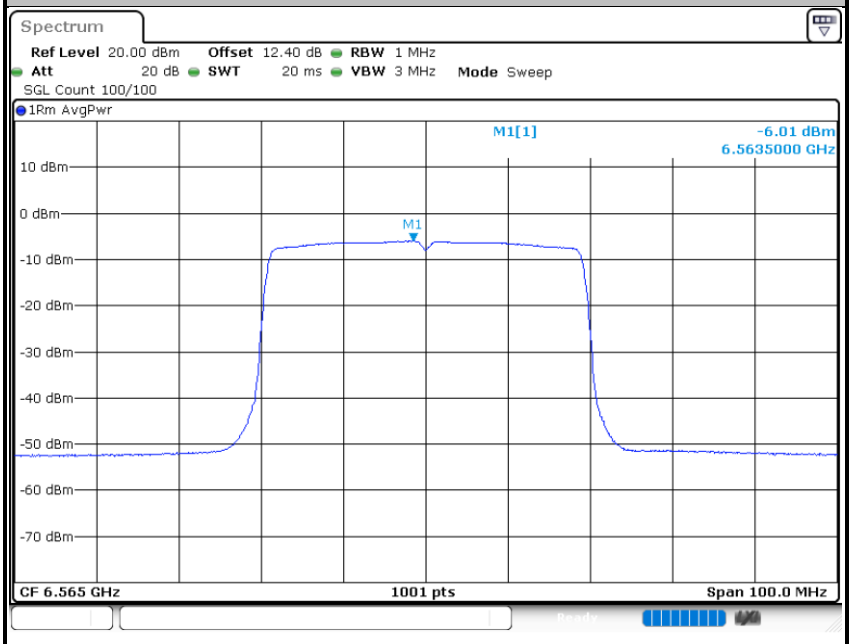


802.11ax HE40 Partial RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH03 5965MHz 242RU61	
	
Middle CH115 6525MHz 242RU62	
	
High CH227 7085MHz 242RU62	
	

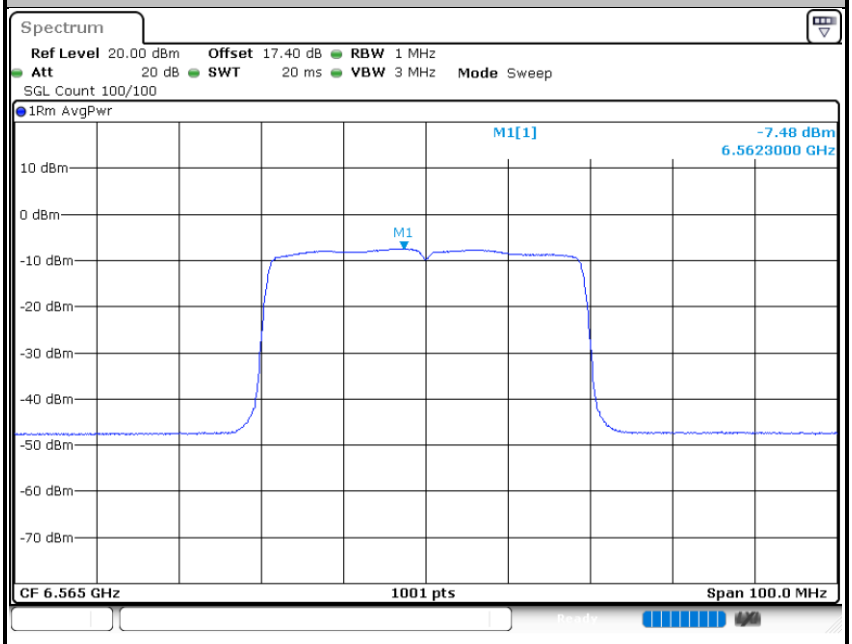
802.11ax HE80 Partial RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH07 5985MHz 484RU65	
	
Middle CH 119 6545MHz 484RU66	
	
High CH215 7025MHz 484RU66	
	

802.11ax HE160 Partial RU	
MIMO Ant. 5	MIMO Ant. 6
Low CH015 6025MHz 996RU67	
	
Middle CH 111 6505MHz 996RUS67	
	
High CH207 6985MHz 996RUS67	
	

Worst Case Power Density (dBm/MHz)
802.11ax HE40 CH123 (6565MHz) MIMO Ant. 5



802.11ax HE40 CH123 (6565MHz) MIMO Ant. 6



3.4 In-Band Emissions (Channel Mask)

3.4.1 Limit of Unwanted Emissions

<FCC 14-30 CFR 15.407>

(b)(6) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

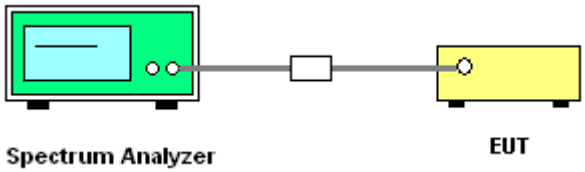
The testing follows FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01.

Section J) In-Band Emissions.

1. Take nominal bandwidth as reference channel bandwidth provided that 26 dB emission bandwidth is always larger than nominal bandwidth
2. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:
   a) Set the span to encompass the entire 26 dB EBW of the signal.
   b) Set RBW = same RBW used for 26 dB EBW measurement.
   c) Set VBW ≥ 3 X RBW
   d) Number of points in sweep ≥ [2 X span / RBW].
   e) Sweep time = auto.
   f) Detector = RMS (i.e., power averaging)
   g) Trace average at least 100 traces in power averaging (rms) mode.
   h) Use the peak search function on the instrument to find the peak of the spectrum.

3. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
   a. Suppressed by 20 dB at 1 MHz outside of the channel edge.
   b. Suppressed by 28 dB at one channel bandwidth from the channel center.
   c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.
4. Adjust the span to encompass the entire mask as necessary.
5. Clear trace.
6. Trace average at least 100 traces in power averaging (rms) mode.
7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

3.4.4 Test Setup

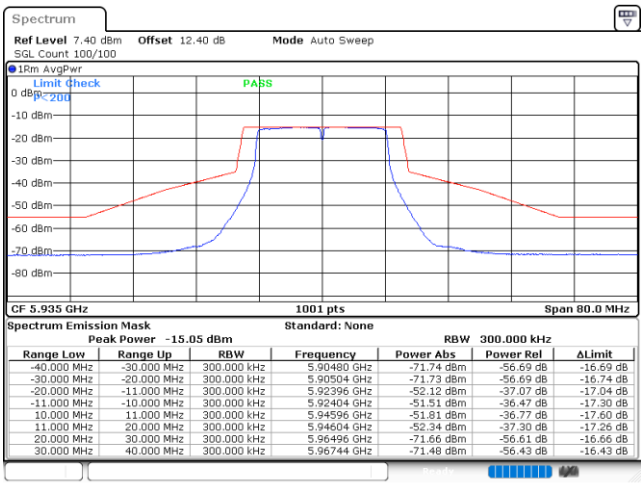


3.4.5 Test Result

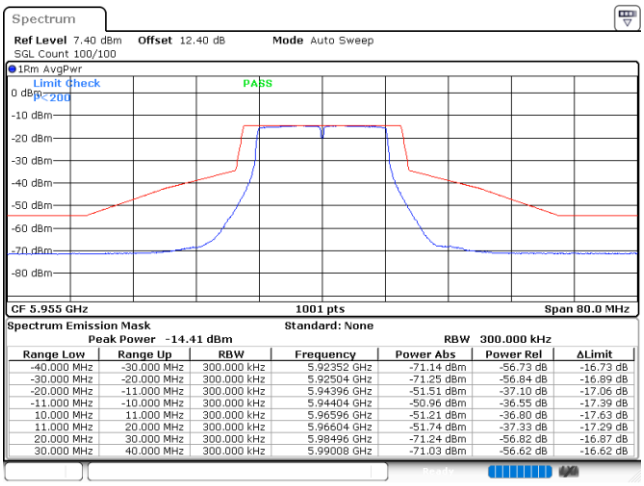
MIMO <Ant. 4+5(4)>

EUT Mode :	802.11a

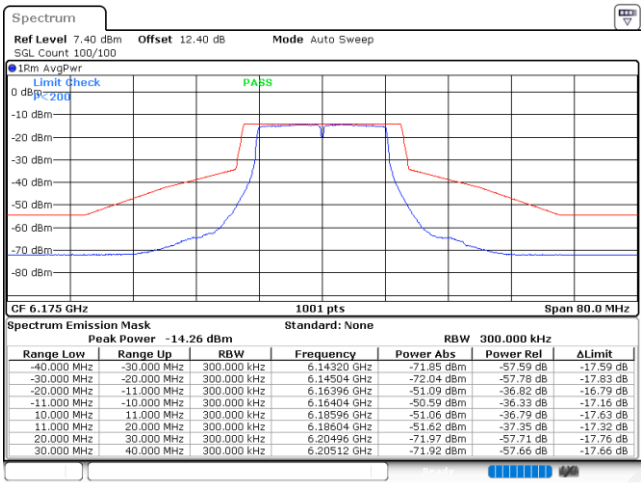
Plot on Channel 5935MHz



Plot on Channel 5955MHz



Plot on Channel 6175MHz



Plot on Channel 6415MHz