TEST REPORT

KES Co., Ltd.
#3002, #3503, #3701, 40, Simin-daero365beon-gil, Dongan-gu,
Anyang-si, Gyeonggi-do, 14057, Republic of Korea
Tel : +82-31-425-6200, Fax : +82-31-341-3838

■ **FCC TEST REPORT**

1. Client

○ Name : Hanwha Vision Co., Ltd.
○ Address : 6, Pangyo-ro 319beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea

2. Sample Description

○ Product item : Rugged Body Worn Camera
○ Model name : TWC-S6010
○ Manufacturer etc. : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.

3. Date of test : 2025.06.27 ~ 2025.07.29

4. Location of Test : ☑ Permanent Testing Lab ☐ On Site Testing

○ Address : 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea

5. Test method used : Part 15 Subpart E 15.407

6. Test result : PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This laboratory is not accredited for the test results marked *.
This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Technical Manager
	Name : Gu-Bong, Kang (Signature) [강구봉]2025/08/27	Name : Yeong-Jun Cho (Signature) [조영준]2025/08/27

2025. 08. 27.

KES Co., Ltd.

Accredited by KOLAS, Republic of KOREA

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
2025.08.27	KES-RF250554	Initial

Use of uncertainty of measurement for decisions on conformity (decision rule):

■ No decision rule is specified by the standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty(“simple acceptance” decision rule, previously known as “accuracy method”).

☐ Other (to be specified, for example when required by the standard or client)

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1. General information

Applicant:	Hanwha Vision Co., Ltd.
Applicant address:	6, Pangyo-ro 319beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea
Test site:	KES Co., Ltd.
Test site address:	☐ #3002, #3503, #3701, 40, Simin-daero365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Republic of Korea ☒ 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
Test Facility	FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s):	15.407
FCC ID:	2BNRG-TWCS6010

1.1. EUT description

Equipment under test	Rugged Body Worn Camera
Frequency range & Number of channels	2 402 ㎒ ~ 2 480 ㎒ (BDR/EDR) : 79 ch 2 402 ㎒ ~ 2 480 ㎒ (LE 1 Mbps) : 40 ch 2 412 ㎒ ~ 2 462 ㎒ (802.11b/g/n_HT20) : 11 ch **UNII-1 5 180 ㎒ ~ 5 240 ㎒ (802.11a/n_HT20/ac_VHT20) : 4 ch** **UNII-2A 5 260 ㎒ ~ 5 320 ㎒ (802.11a/n_HT20/ac_VHT20) : 4 ch** **UNII-2C 5 500 ㎒ ~ 5 720 ㎒ (802.11a/n_HT20/ac_VHT20) : 12 ch** **UNII-3 5 745 ㎒ ~ 5 825 ㎒ (802.11a/n_HT20/ac_VHT20) : 5 ch**
Model	TWC-S6010
Modulation technique	GFSK, π/4DQPSK, 8DPSK, DSSS, **OFDM**
Antenna specification	2.4 ㎓ band FPCB Antenna // Peak gain: 0.23 ㏈i 5.15 ~ 5.35 ㎓ FPCB Antenna // Peak gain: 2.07 ㏈i 5.47 ~ 5.85 ㎓ FPCB Antenna // Peak gain: 2.52 ㏈i
Power source	DC 3.8 V (Battery)
H/W version	PV2
S/W version	25.00.58_250626_155221
Serial Number	ZWD370GY40003GT

1.2. Test configuration

The **Hanwha Vision Co., Ltd. // Rugged Body Worn Camera // TWC-S6010 // FCC ID: 2BNRG-TWCS6010 // IC Number: 33572-TWCS6010** was tested according to the specification of EUT, the EUT must comply with following standards and KDB documents.

FCC Part 15.407
KDB 789033 D02 v02r01
ANSI C63.10-2013

1.3. Information about derivative model

N/A

1.4. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
Docking station (optional)	-	TWA-SD010	-	DC 12 V
Docking station (optional)	-	TWA-SD080	-	DC 12 V
Battery Pack (optional)		TWASB42500	-	-

1.5. Device modifications

N/A

1.6. Sample calculation

Where relevant, the following sample calculation is provided
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.

Offset(㏈) = RF cable loss(㏈) + attenuator factor(㏈).
= 1.35 + 20 = 21.35 (㏈)

For Radiation test :
Field strength level (㏈㎶/m) = Measured level (㏈㎶) + Antenna factor (㏈) + Cable loss (㏈) – Amplifier gain (㏈)

1.7. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Conduction emission test		2.22 ㏈ (SHIELD ROOM #6)
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1 ㎓	4.04 ㏈ (SAC #6)
	Above 1 ㎓	5.32 ㏈ (SAC #5)
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

1.8. Worst case data rate

1. Worst-case data rates were:

Mode	Data rate
802.11a	6 Mbps
802.11n_HT20	MCS0
802.11ac_VHT20	MCS0

1.9. Frequency/channel operations

Ch.	Frequency (㎒)	Rate(Mbps)
00	2 402	BDR 1 Mbps, EDR 2 Mbps, EDR 3 Mbps
.	.	.
40	2 442	BDR 1 Mbps, EDR 2 Mbps, EDR 3 Mbps
.	.	.
78	2 480	BDR 1 Mbps, EDR 2 Mbps, EDR 3 Mbps

Ch.	Frequency (㎒)	Rate(Mbps)
00	2 402	LE 1 Mbps
.	.	.
20	2 442	LE 1 Mbps
.	.	.
39	2 480	LE 1 Mbps

Ch.	Frequency (㎒)	Mode
1	2 412	802.11b/g/n_HT20
.	.	.
6	2 437	802.11b/g/n_HT20
.	.	.
11	2 462	802.11b/g/n_HT20

UNII-1 (FCC only)

Ch.	Frequency (㎒)
36	**5 180**
44	**5 220**
48	**5 240**

UNII-2A (FCC only)

Ch.	Frequency (㎒)
52	**5 260**
56	**5 280**
64	**5 320**

UNII-2C (FCC & IC)

Ch.	Frequency (㎒)
100	**5 500**
120	**5 600**
144	**5 720**

UNII-3 (FCC & IC)

Ch.	Frequency (㎒)
149	**5 745**
157	**5 785**
165	**5 825**

802.11a/n_HT20/ac_VHT20 mode

2. Summary of tests

Section in FCC Part 15	Parameter	Test results
15.407(a)	26 ㏈ bandwidth & 99 % bandwidth	Pass
15.407(a)	6 ㏈ bandwidth	Pass
15.407(a)	Maximum conducted output power	Pass
15.407(a)	Power spectral density	Pass
15.407(g)	Frequency stability	Pass
15.205, 15.209, 15.407(b)	Radiated restricted band and emission	Pass
15.207(a)	AC power line conducted emissions	Pass
15.203	Antenna Requirement	Pass

Note.

1. By the request of applicant, test is performed with power setting value below :

Mode	UNII-1 & UNII-2A	
	Frequency(㎒)	Setting value
802.11a (6 Mbps)	5 180 ~ 5 320	76
802.11n_HT20 (MCS0)		74
802.11ac_VHT20 (MCS0)		74

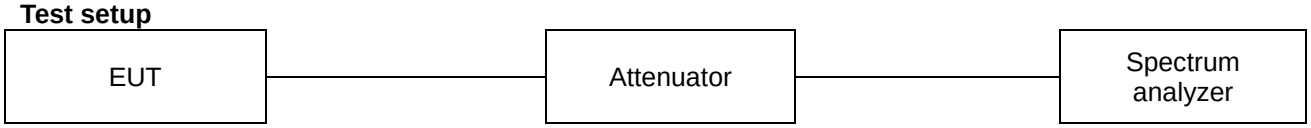
Mode	UNII-2C			
	Frequency (㎒)	Setting value	Frequency (㎒)	Setting value
802.11a (6 Mbps)	5 500 ~ 5 720 (except for 5 700)	80	5 700	80
802.11n_HT20 (MCS0)		80		68
802.11ac_VHT20 (MCS0)		80		68

Mode	UNII-3	
	Frequency(㎒)	Setting value
802.11a (6 Mbps)	5 725 ~ 5 825	60
802.11n_HT20 (MCS0)		56
802.11ac_VHT20 (MCS0)		56

3. Test results

3.1. 26 dB bandwidth & 99% Occupied Bandwidth

Test setup



Test procedure

26 dB bandwidth

KDB 789033 D02 v02r01– Section C.1

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. 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%.

99 % bandwidth

KDB 789033 D02 v02r01– Section D

1. Set span = 1.5 times to 5.0 times the OBW.
2. Set RBW = 1% to 5% of the OBW
3. Set the VBW > 3 x RBW.
4. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak bandwidth function of the instrument (if available).
5. Use the 99% power bandwidth function of the instrument (if available).
6. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Limit

N/A

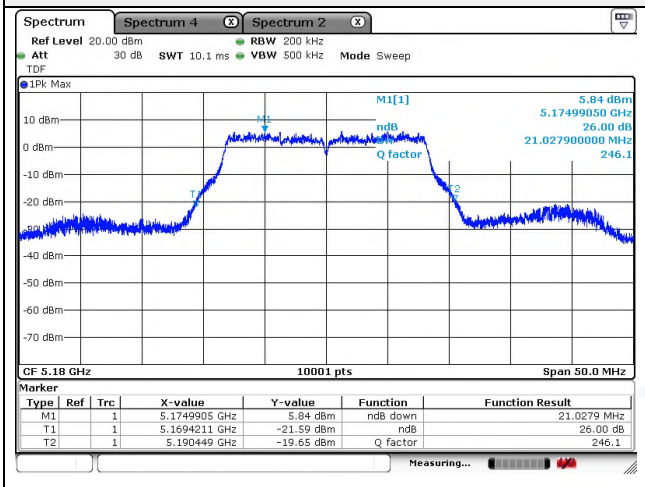
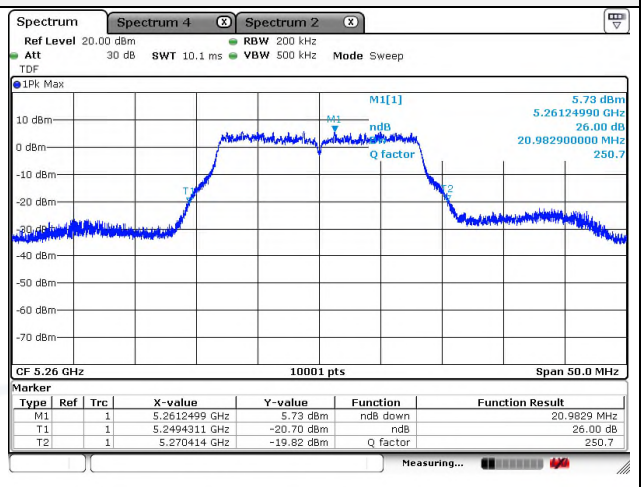
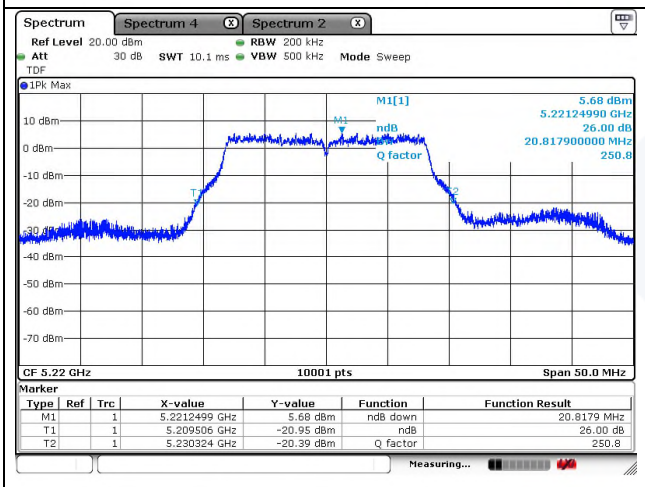
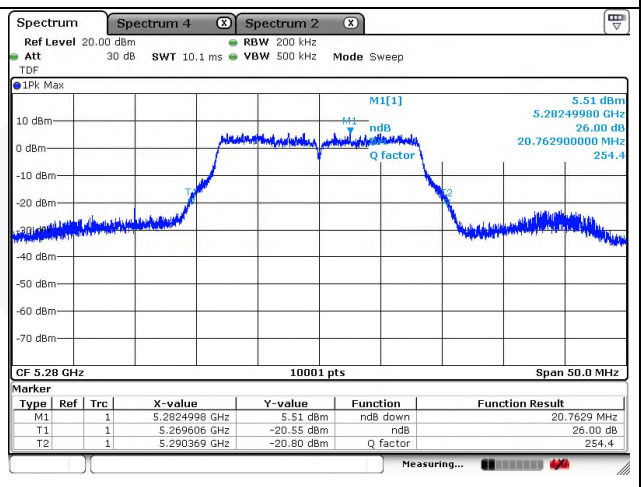
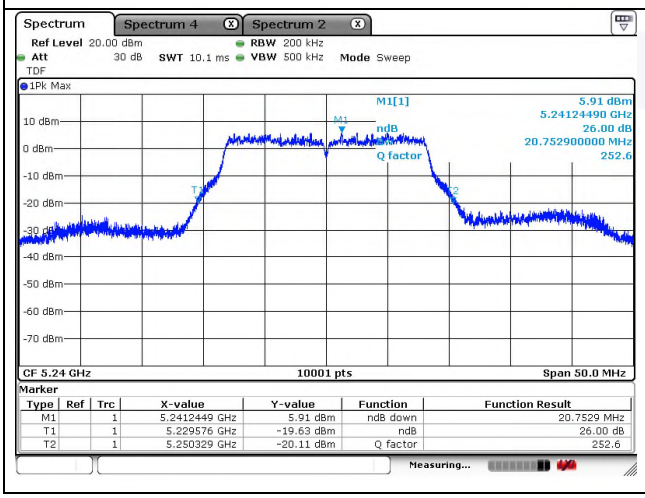
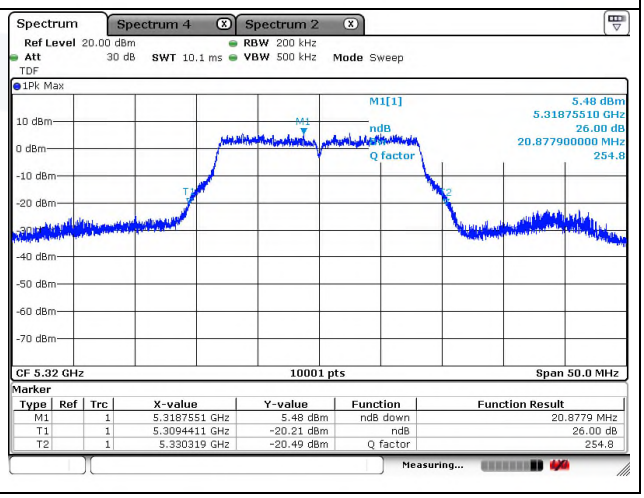
Test results

Band	Frequency(㎒)	Mode	26 ㏈ bandwidth(㎒)	99 % bandwidth(㎒)
UNII-1	5 180	802.11a (6 Mbps)	21.03	16.90
	5 220		20.82	16.66
	5 240		20.75	16.74
UNII-2A	5 260		20.98	16.74
	5 280		20.76	16.76
	5 320		20.88	16.73
UNII-2C	5 500		21.52	20.94
	5 600		21.09	17.26
	5 720		20.88	17.11
UNII-3	5 745		21.12	16.76
	5 785		21.36	16.70
	5 825		21.32	16.71
UNII-2C (Band-crossing channels)	5 720		26.49	N/A
UNII-1	5 180	802.11n_ HT20 (MCS0)	21.26	17.92
	5 220		21.04	17.92
	5 240		21.10	17.89
UNII-2A	5 260		21.15	17.98
	5 280		21.02	17.93
	5 320		21.13	18.01
UNII-2C	5 500		21.13	18.27
	5 600		21.36	18.75
	5 720		21.13	18.35
UNII-3	5 745		21.48	18.02
	5 785		21.34	18.02
	5 825		21.58	18.10
UNII-2C (Band-crossing channels)	5 720		15.82	N/A

Band	Frequency(㎒)	Mode	26 ㏈ bandwidth(㎒)	99 % bandwidth(㎒)
UNII-1	5 180	802.11ac_ VHT20 (MCS0)	21.04	18.00
	5 220		20.98	17.98
	5 240		21.19	17.87
UNII-2A	5 260		21.23	17.86
	5 280		20.91	17.96
	5 320		21.10	17.96
UNII-2C	5 500		21.12	18.05
	5 600		21.14	18.17
	5 720		21.18	18.43
UNII-3	5 745		21.57	17.95
	5 785		21.49	18.05
	5 825		21.67	17.97
UNII-2C (Band-crossing channels)	5 720		15.74	N/A

26 ㏈ bandwidth

Mode : 802.11a (6 Mbps)

UNII-1	UNII-2A
	
	
	

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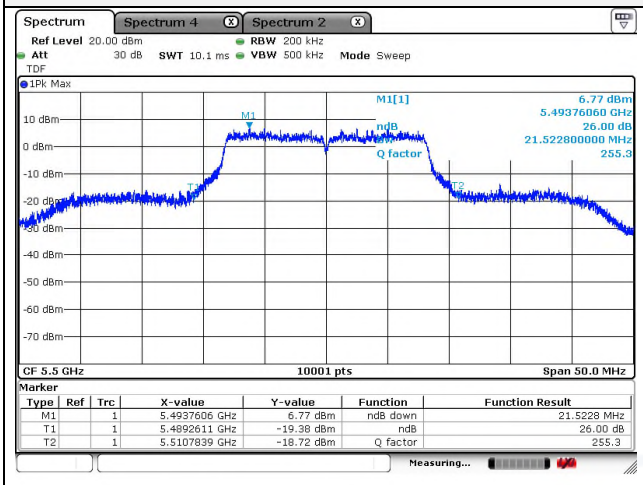	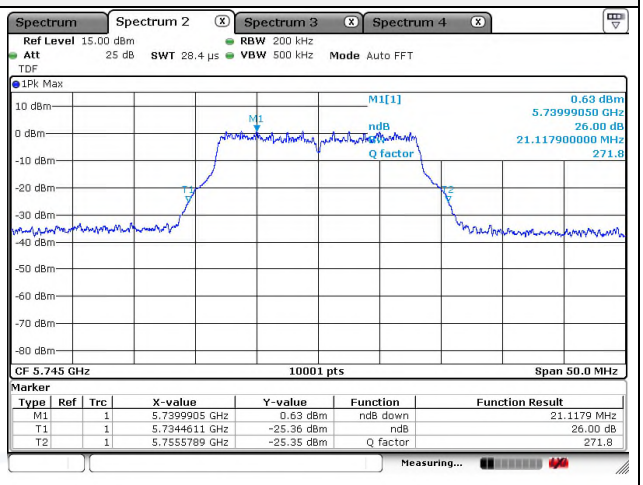
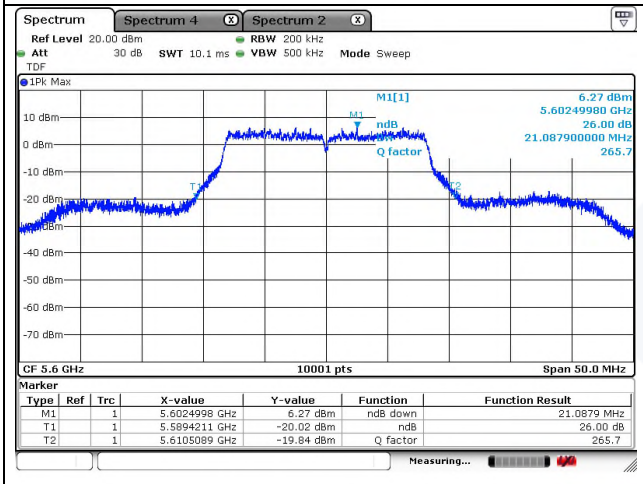	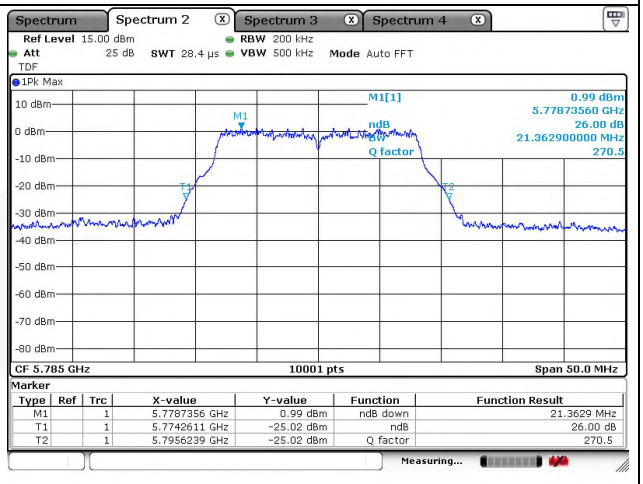
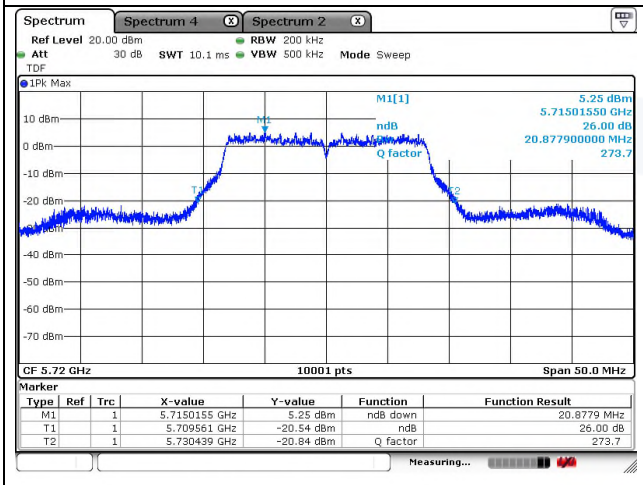	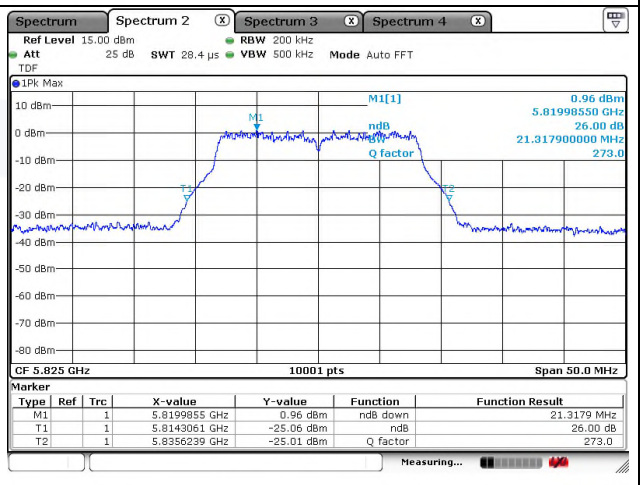

Mode : 802.11n_HT20 (MCS0)

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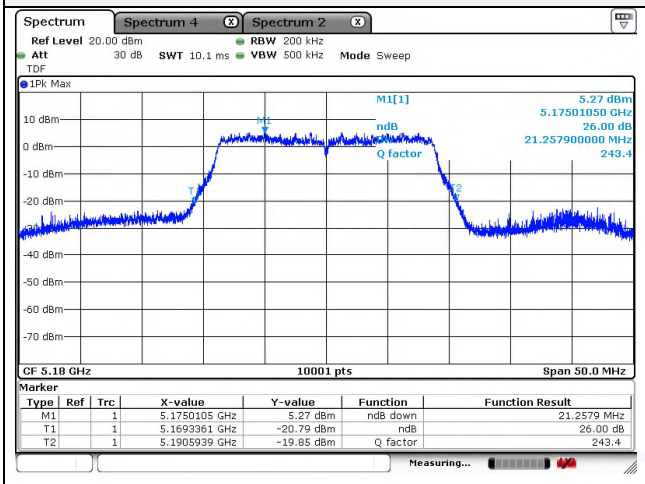
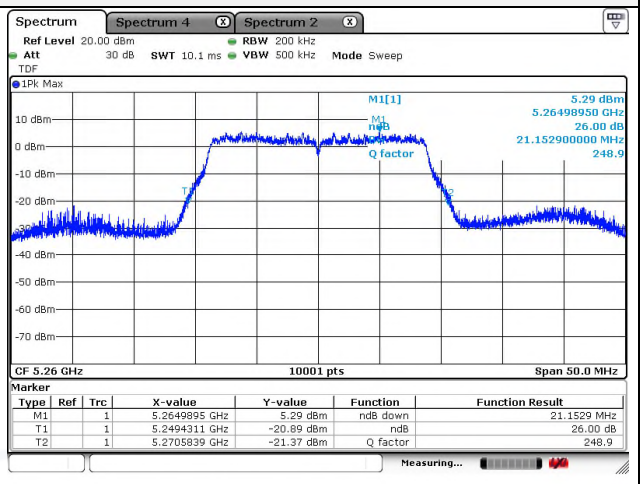
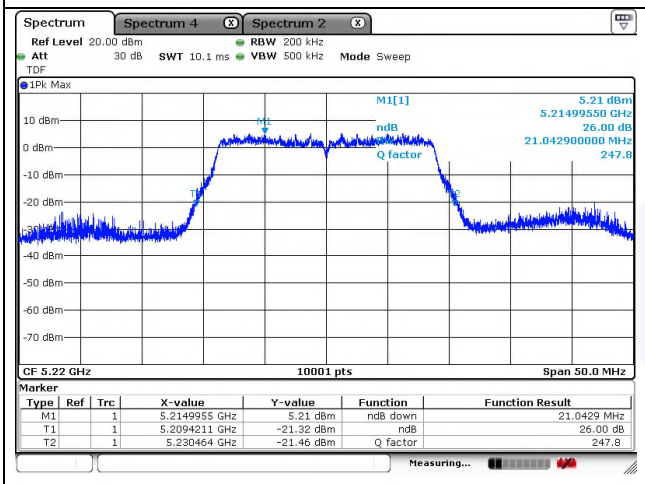
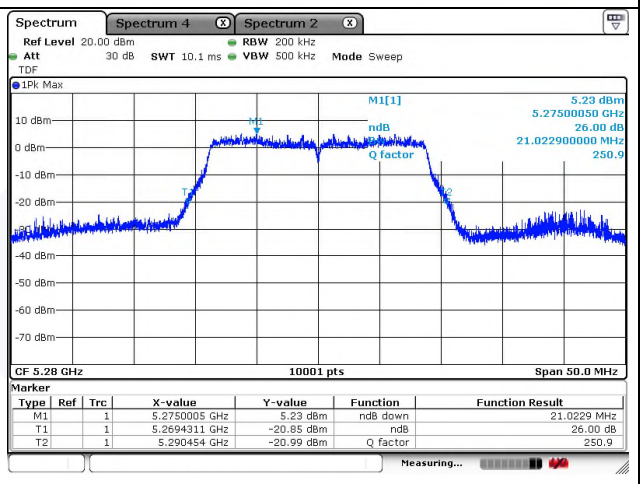
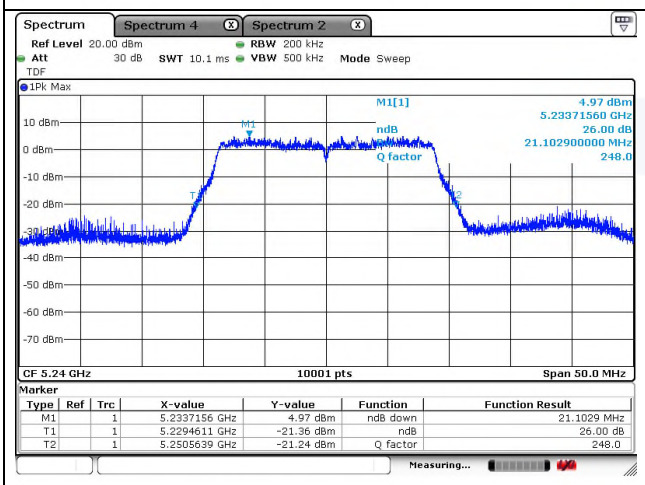
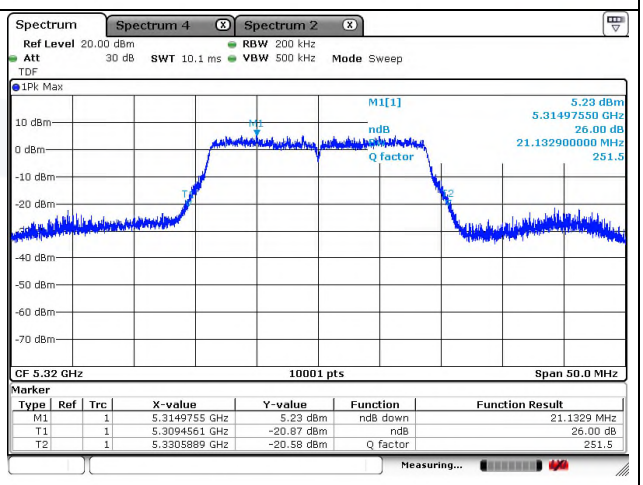
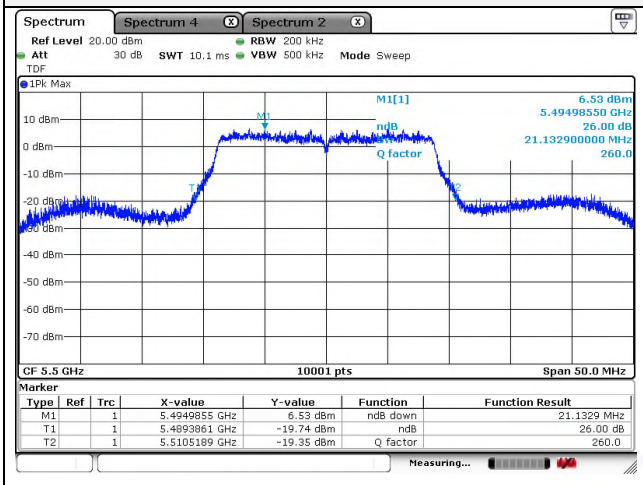
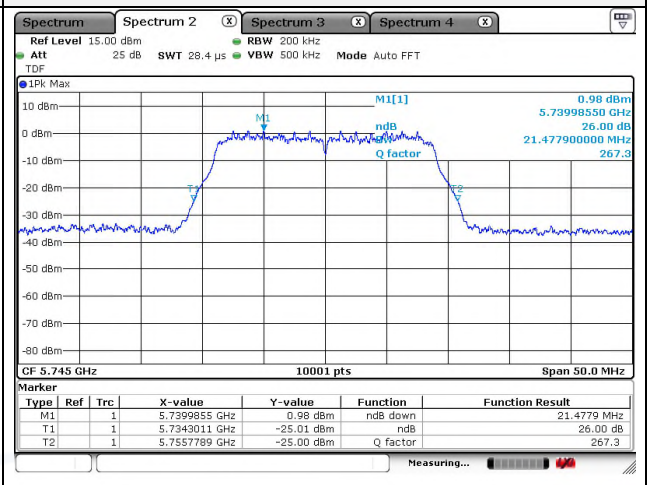
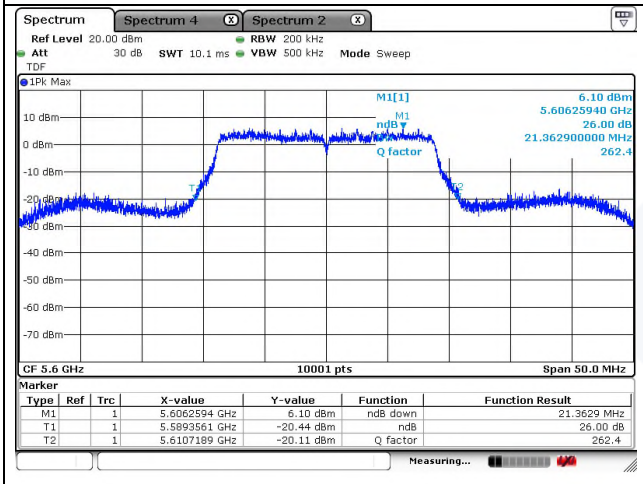
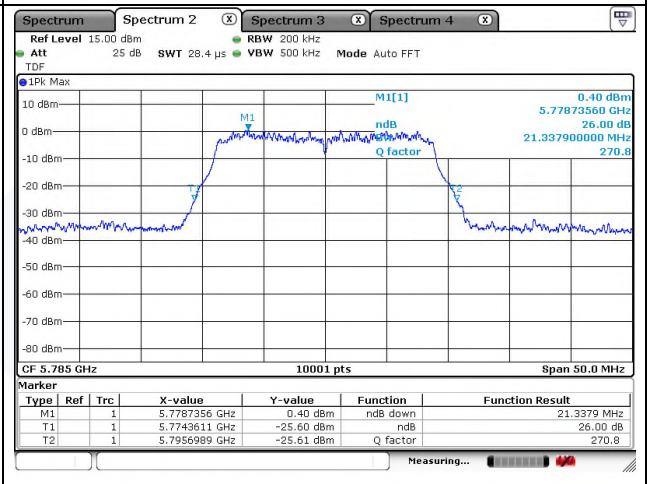
	
	
	

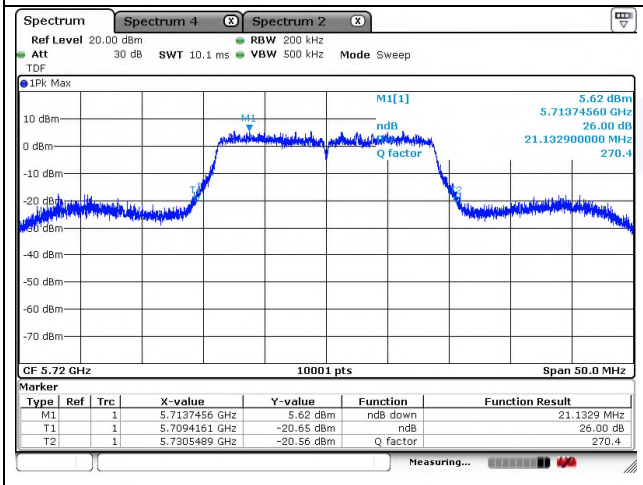
UNII-2C	UNII-3

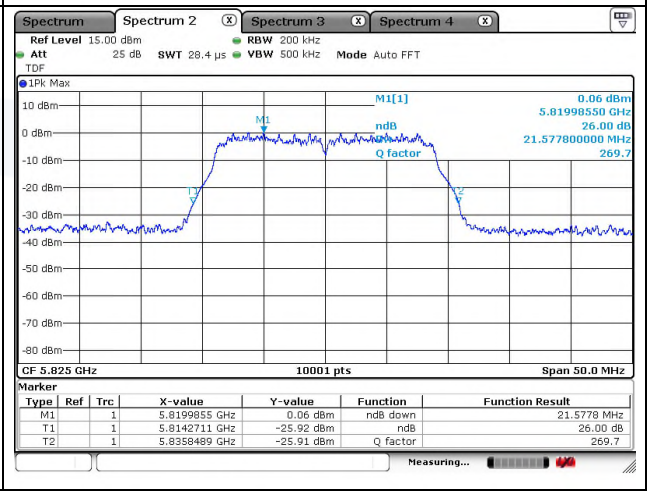












Mode : 802.11ac_VHT20 (MCS0)

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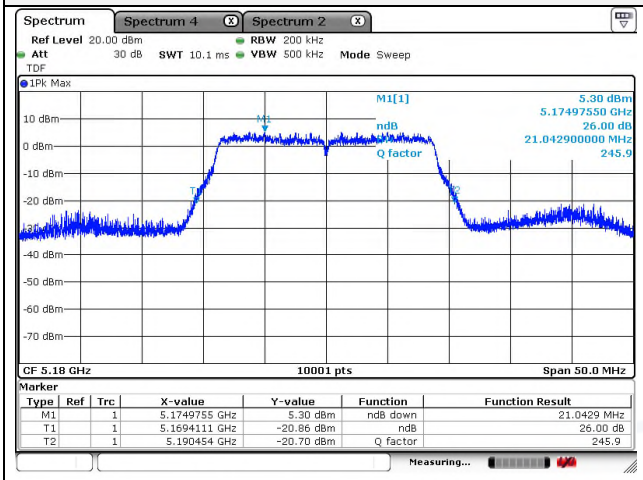	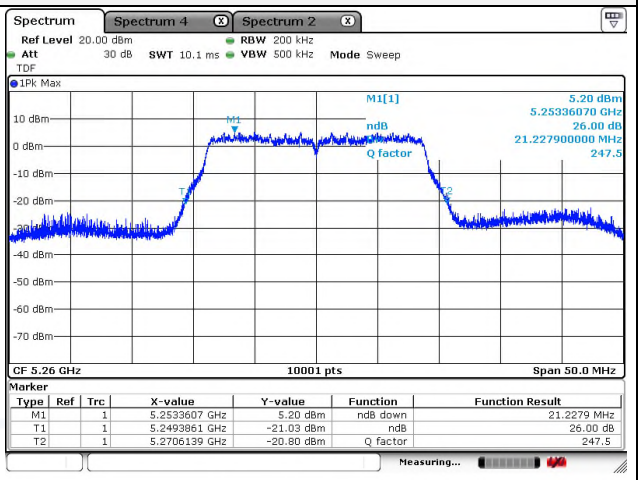
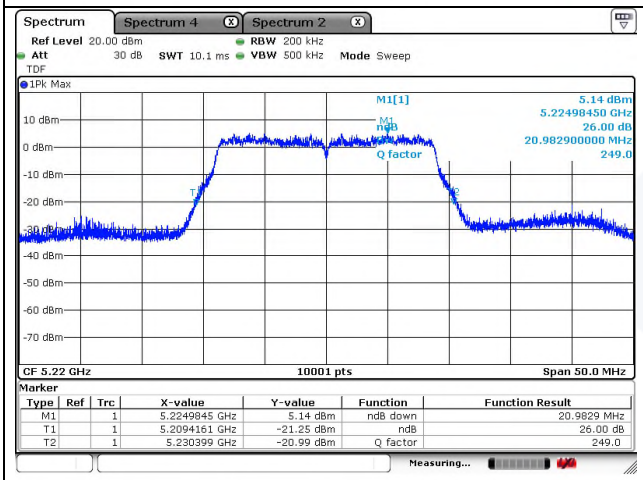	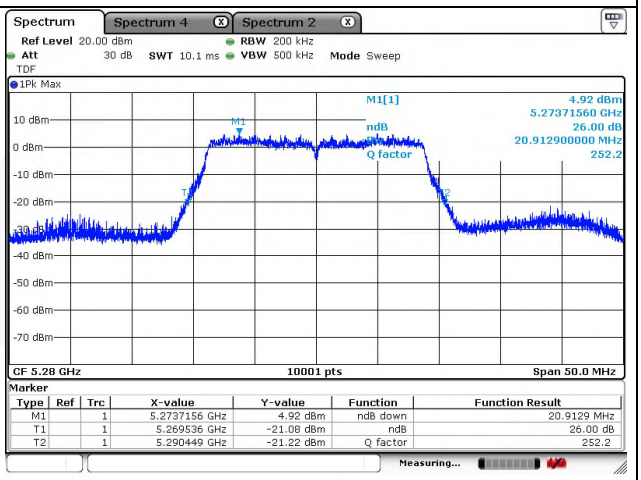
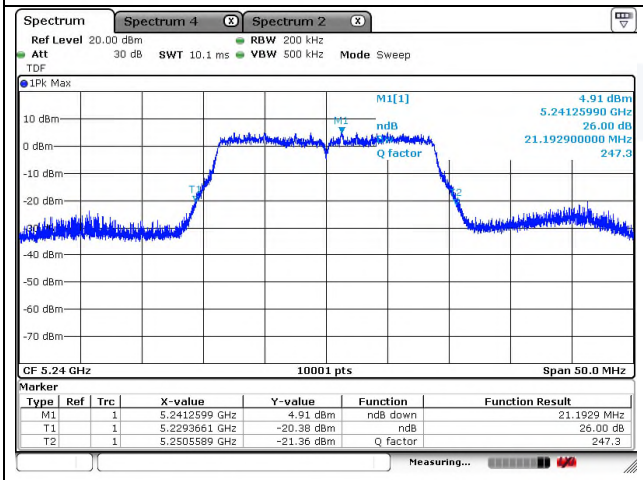	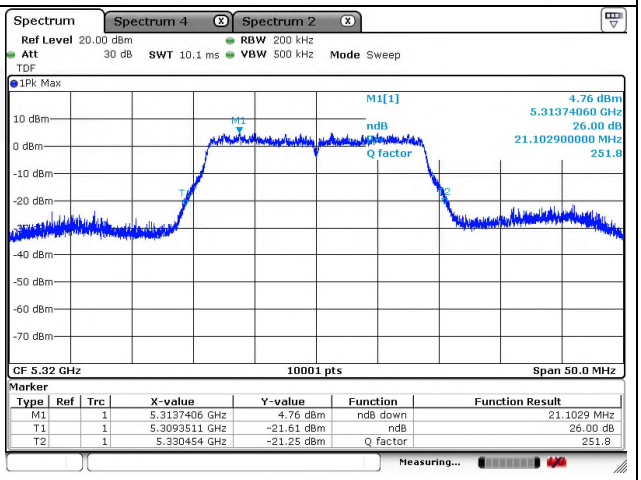

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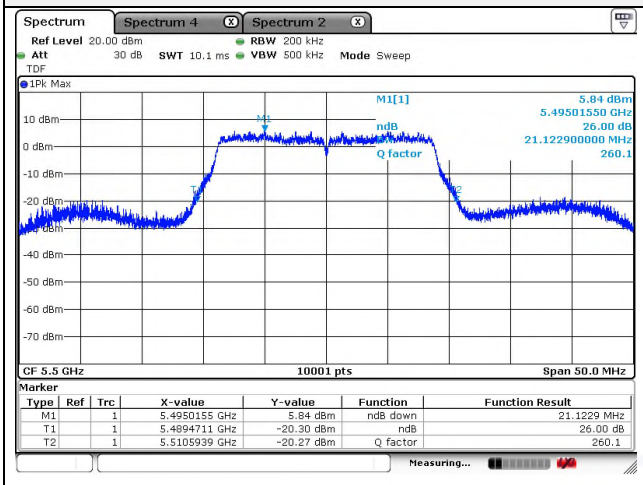
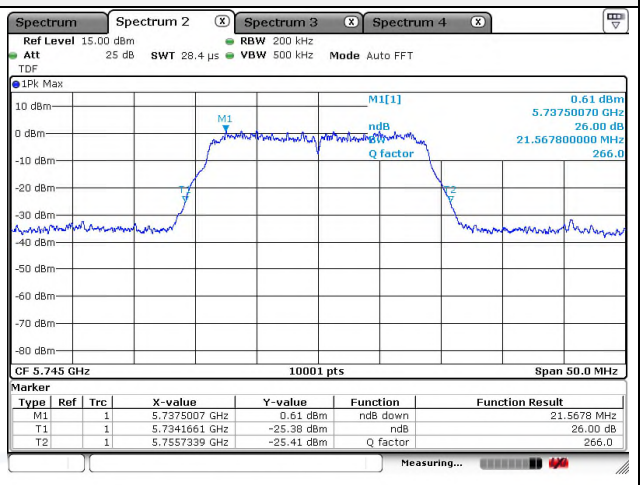
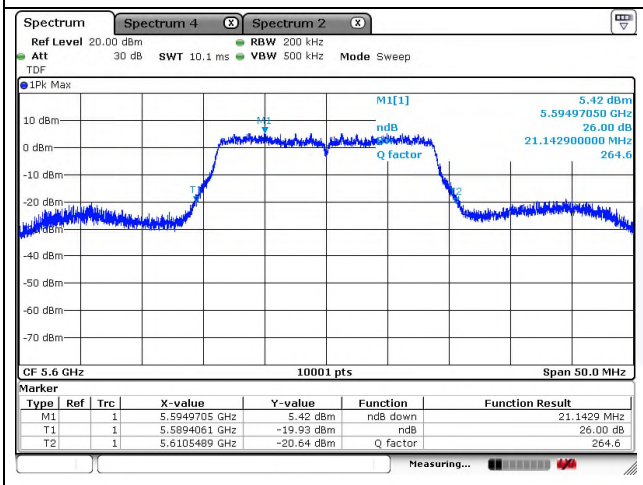
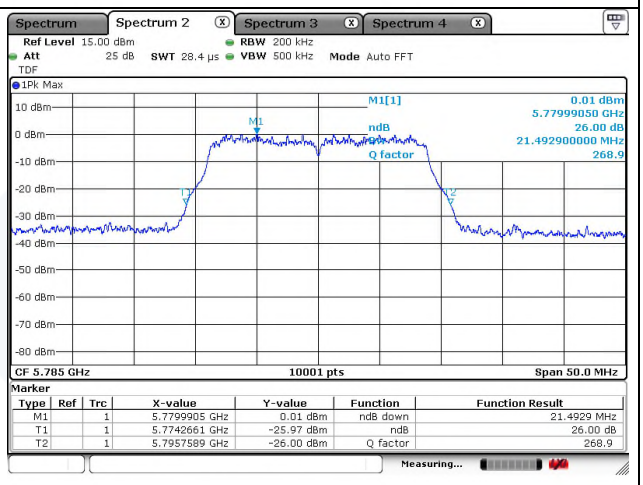
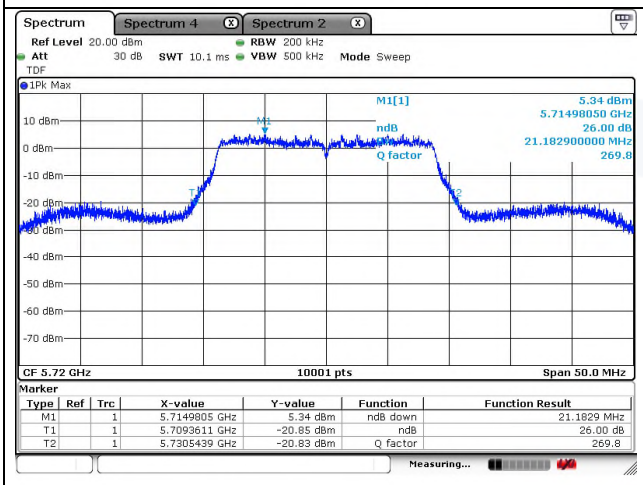
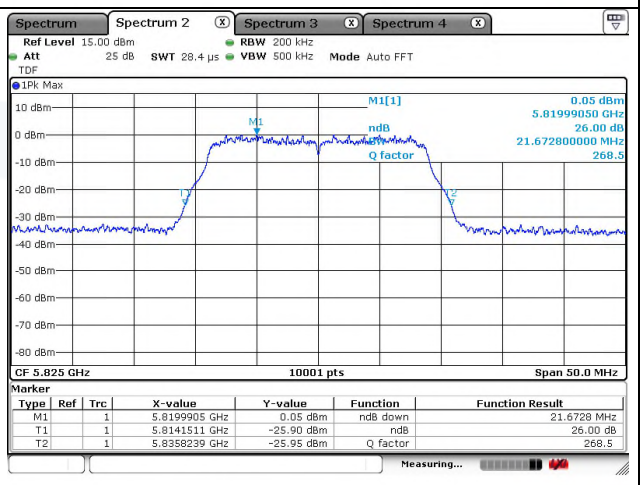
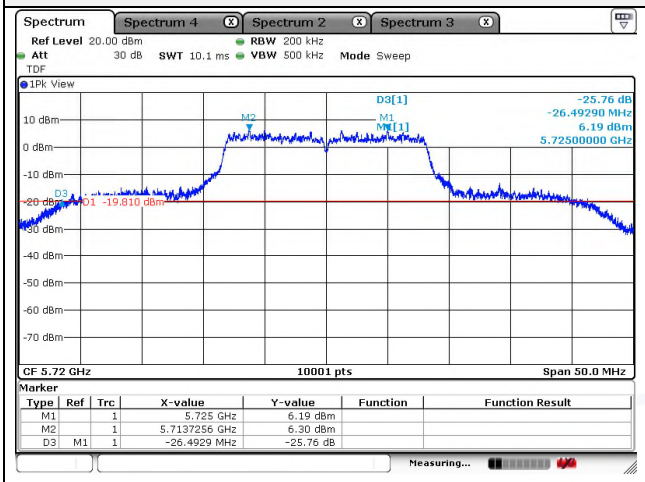
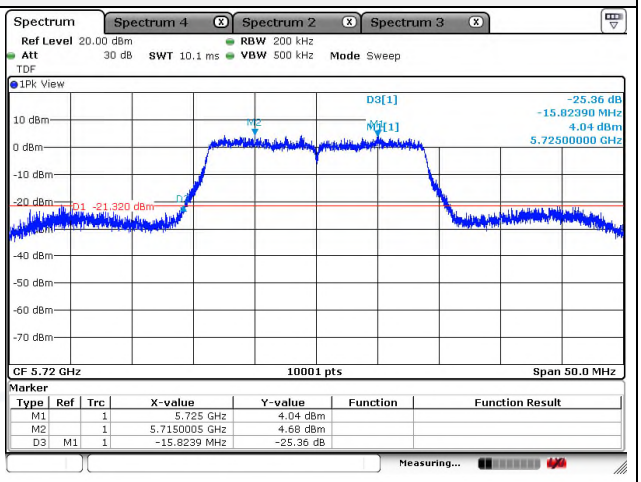
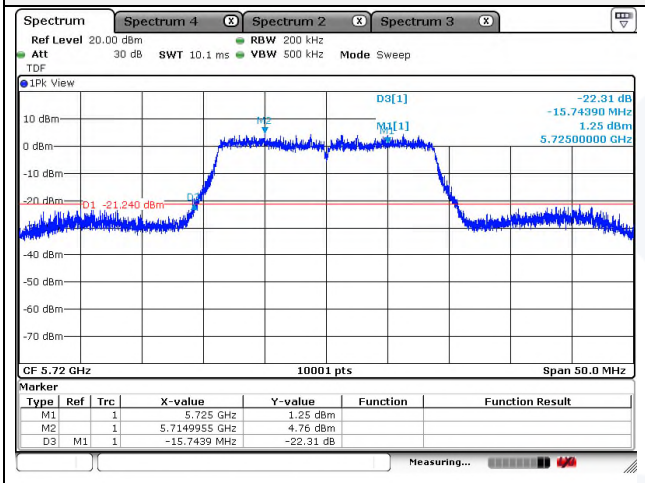
	
	
	

Band-crossing channels

802.11a (6 Mbps)	802.11n_HT20 (MCS0)
	
802.11ac_VHT20 (MCS0)	**-**
	Blank

99% bandwidth

Mode : 802.11a (6 Mbps)

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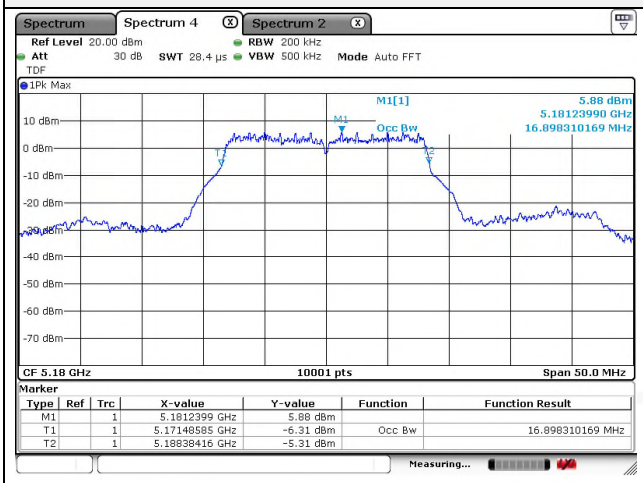	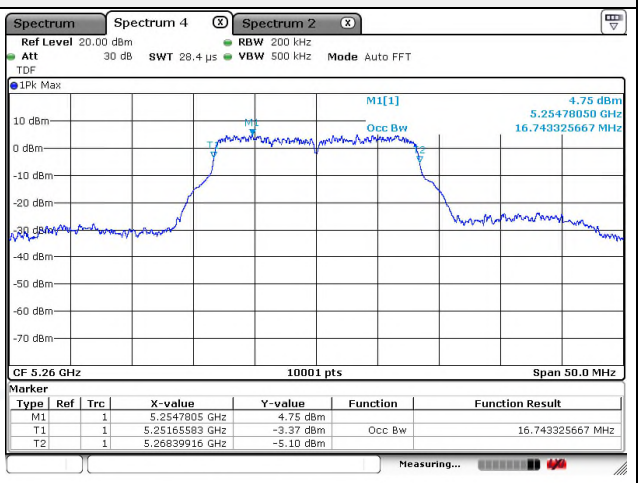
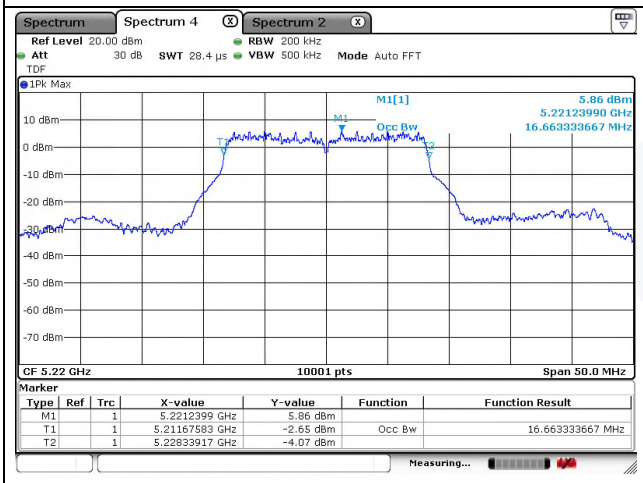	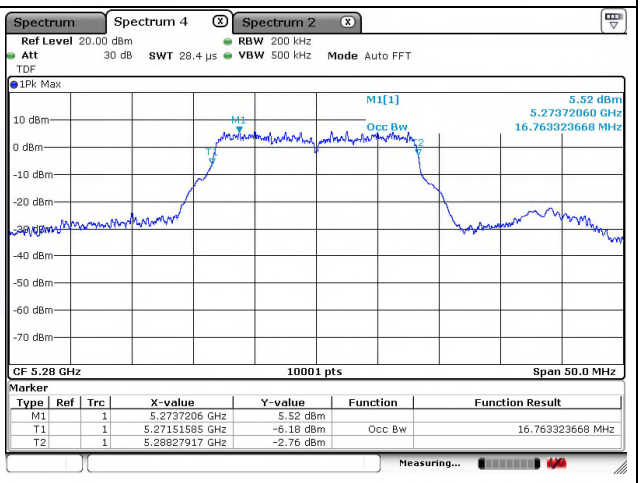
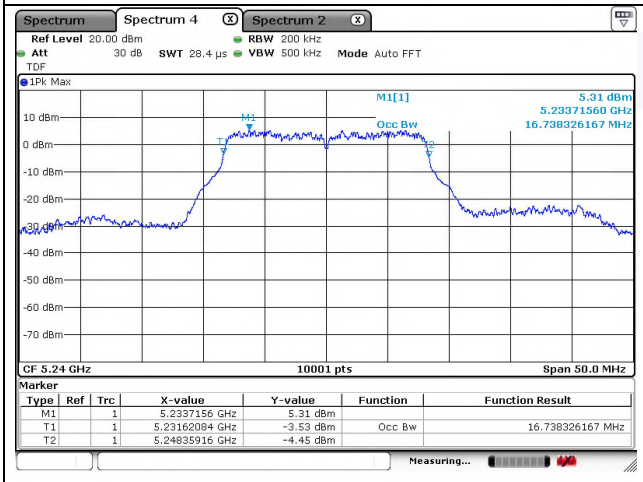	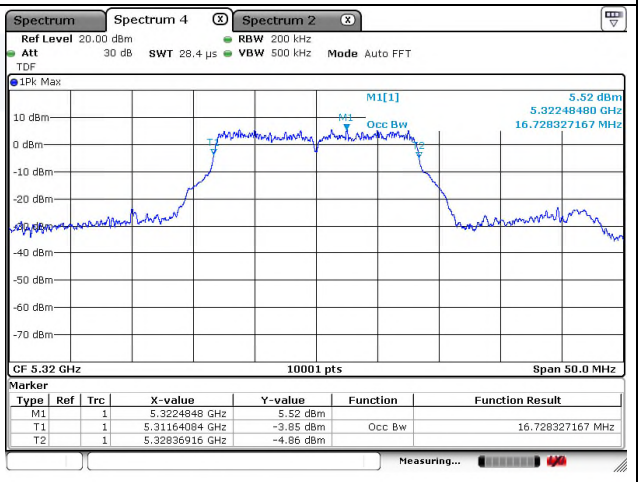

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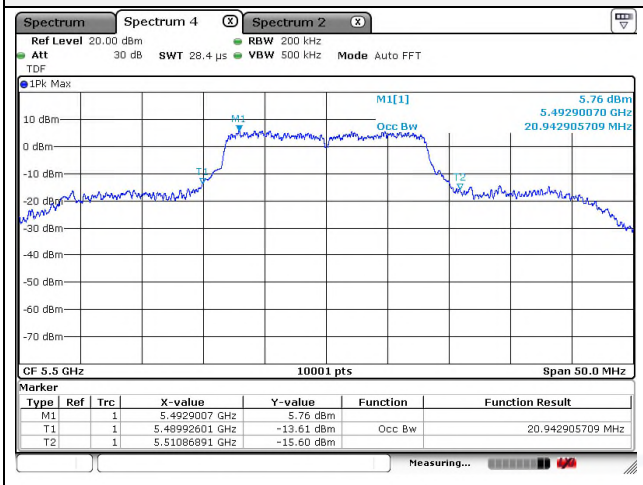
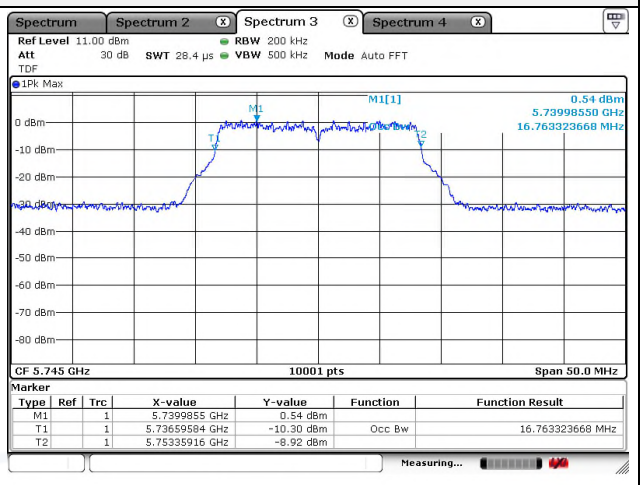
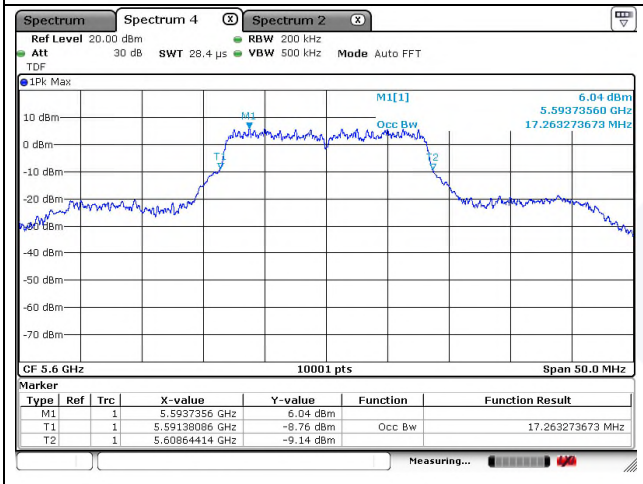
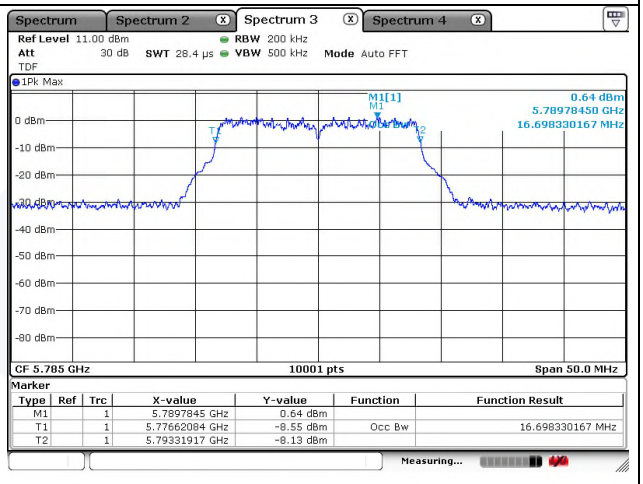
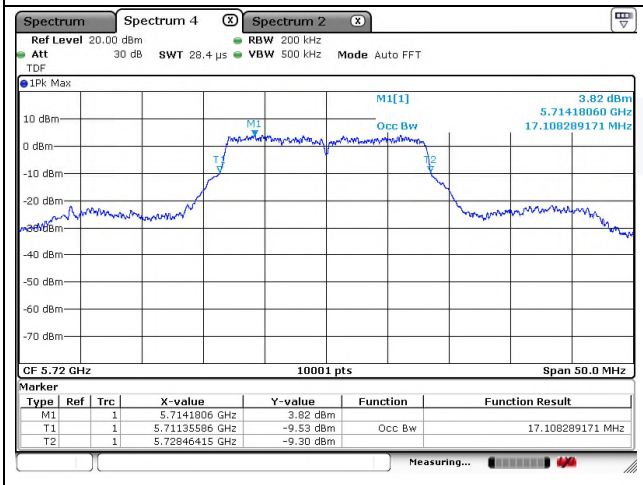
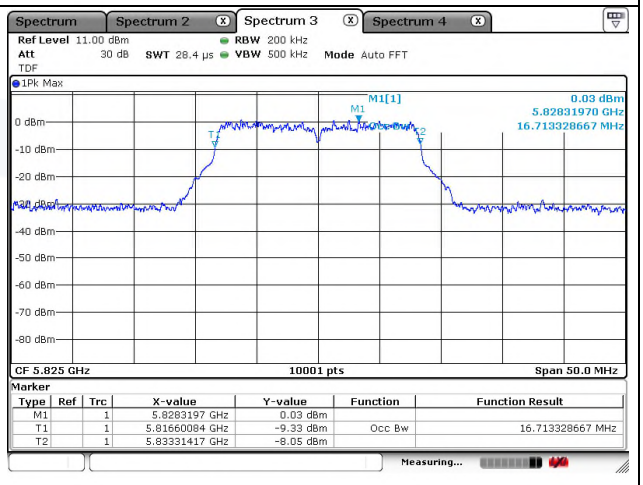




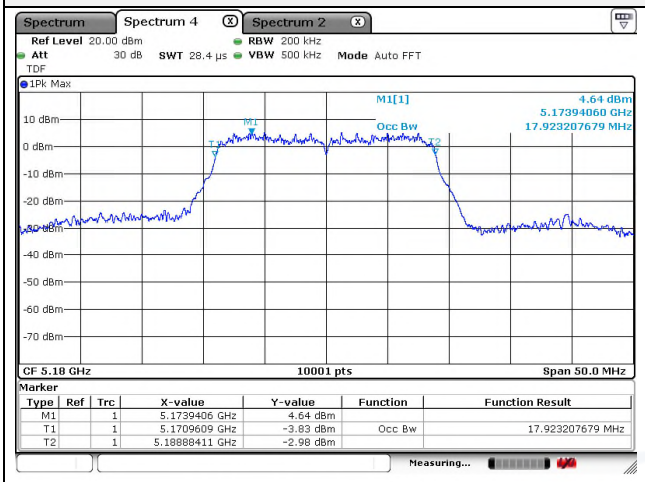
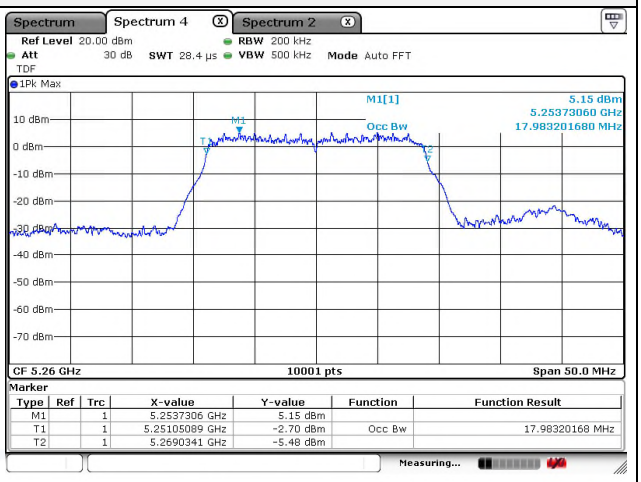
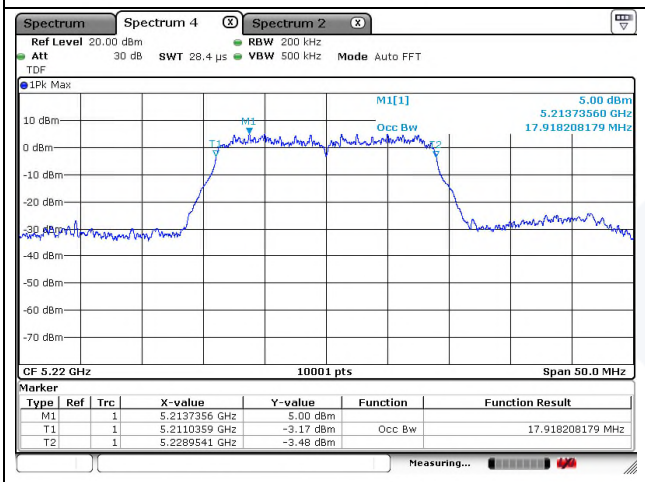
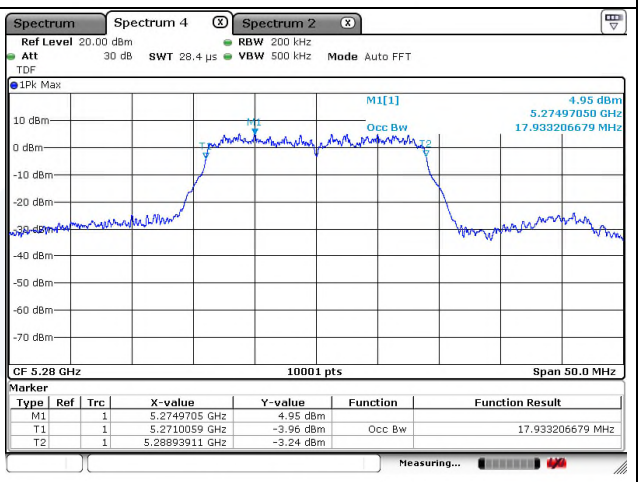
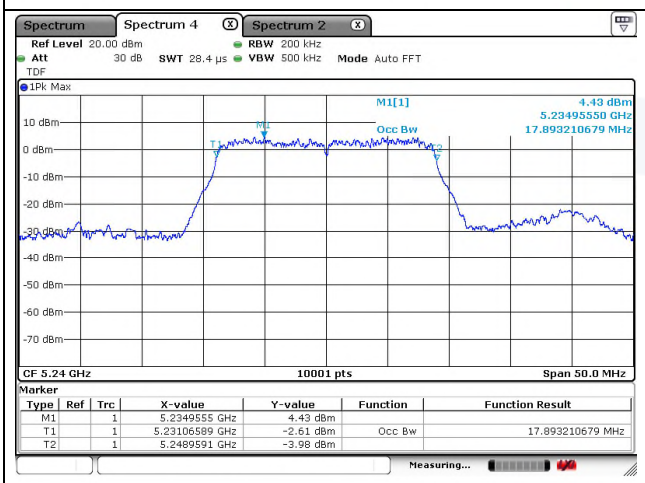
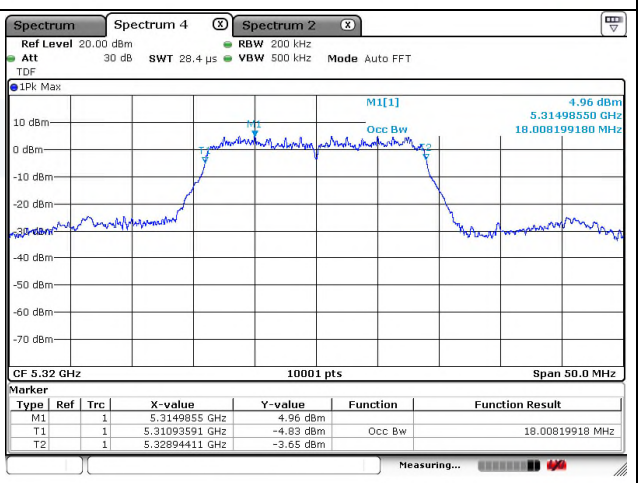








Mode : 802.11n_HT20 (MCS0)

UNII-1	UNII-2A
	
	
	

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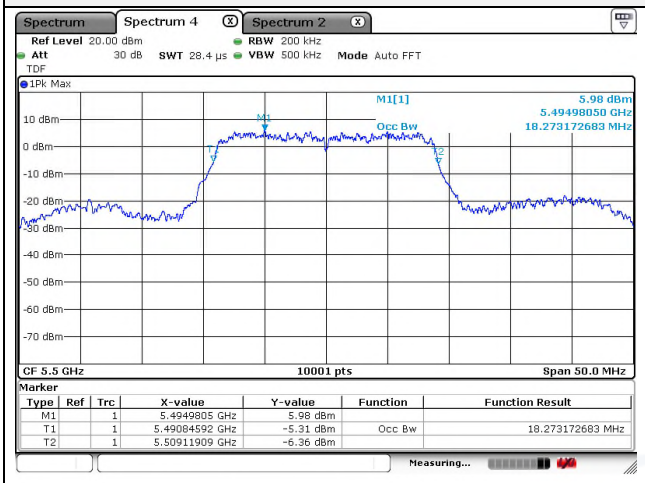	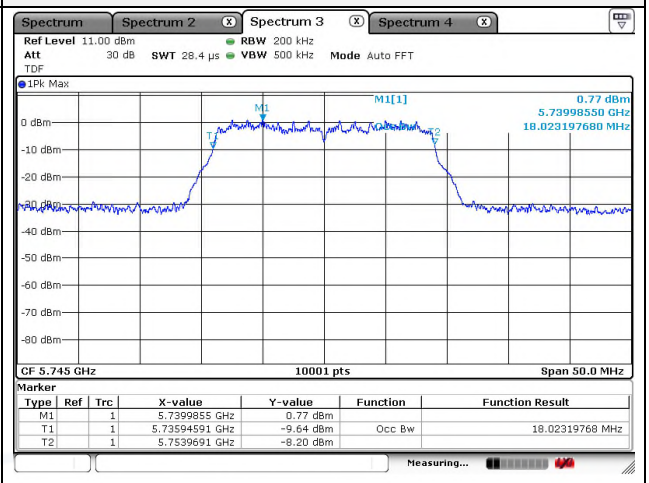
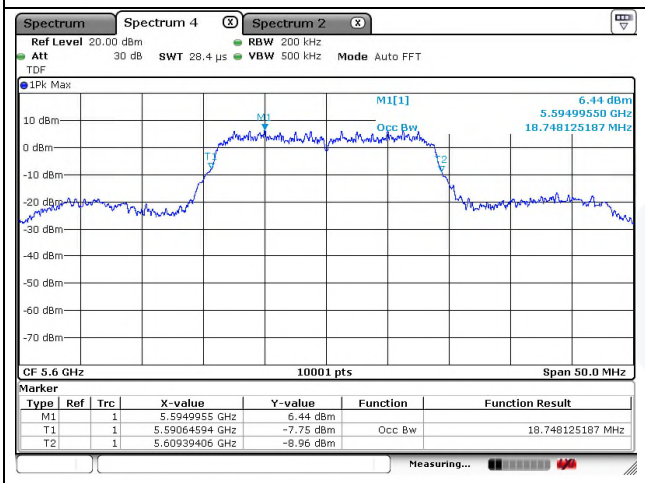	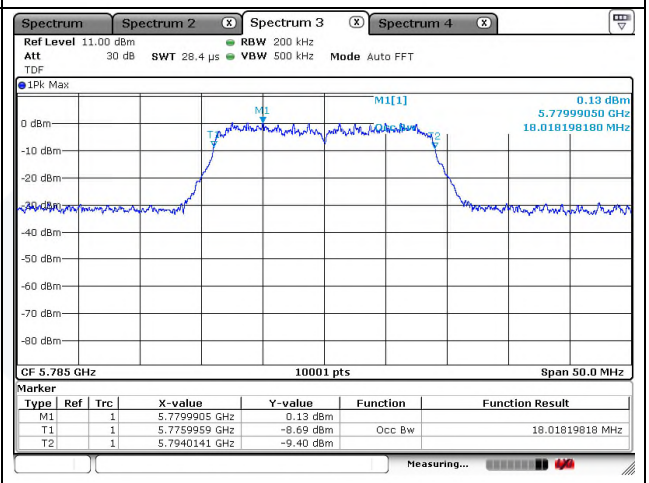
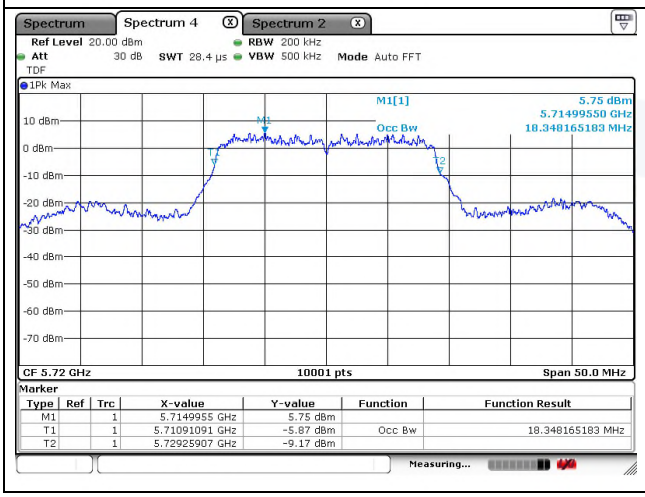	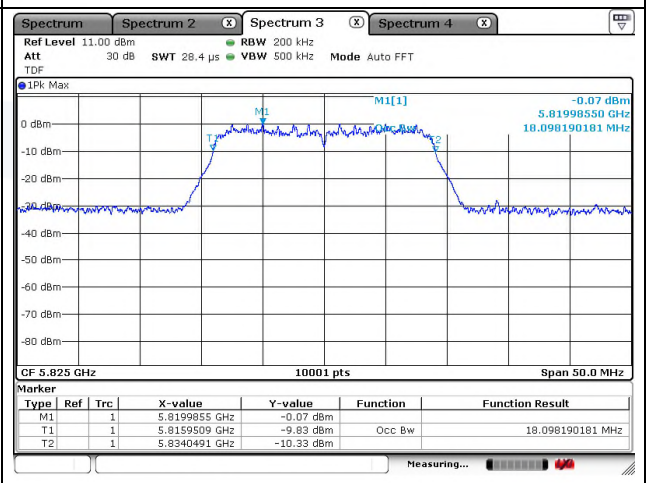

Mode : 802.11ac_VHT20 (MCS0)

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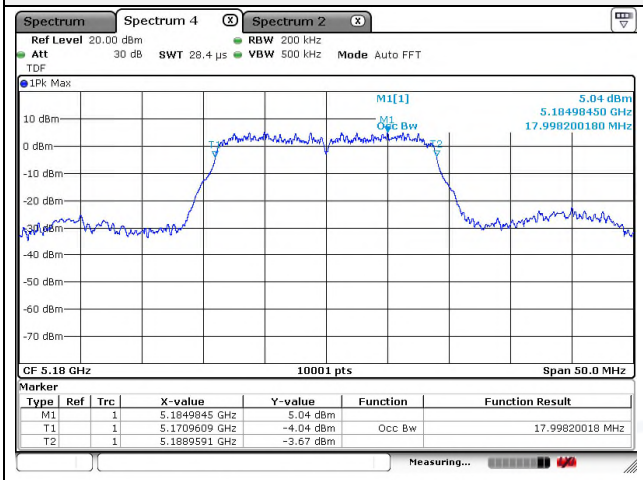	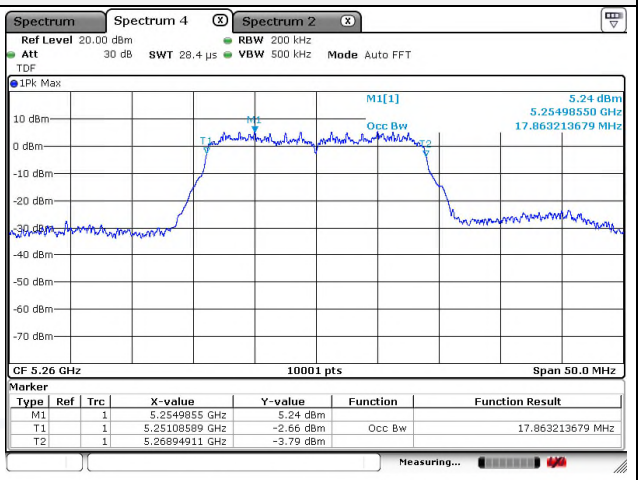
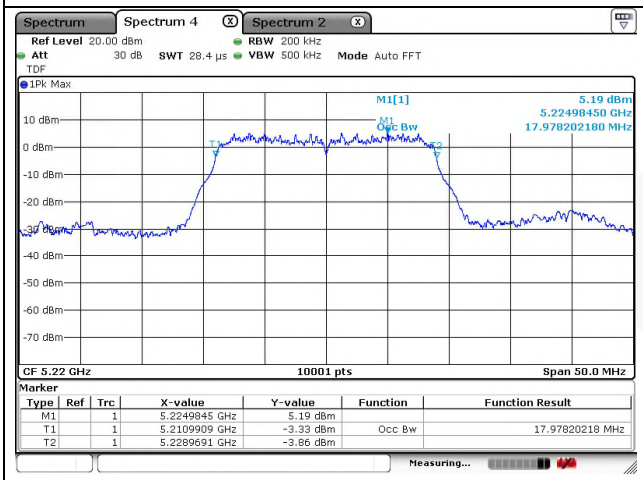	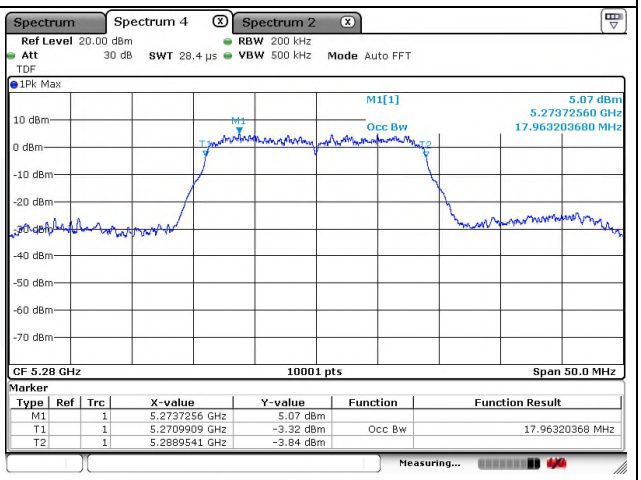
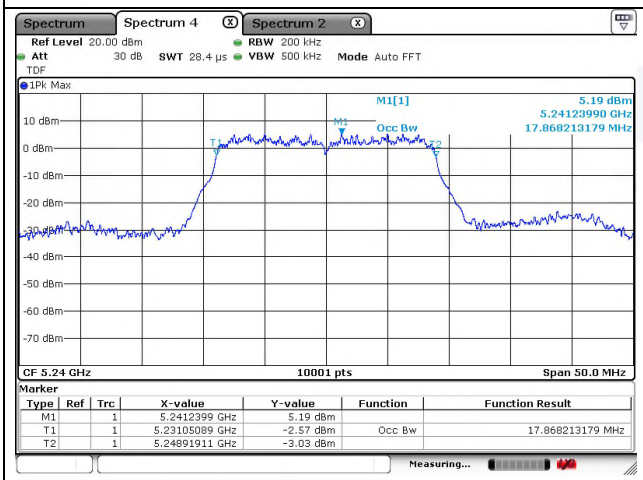	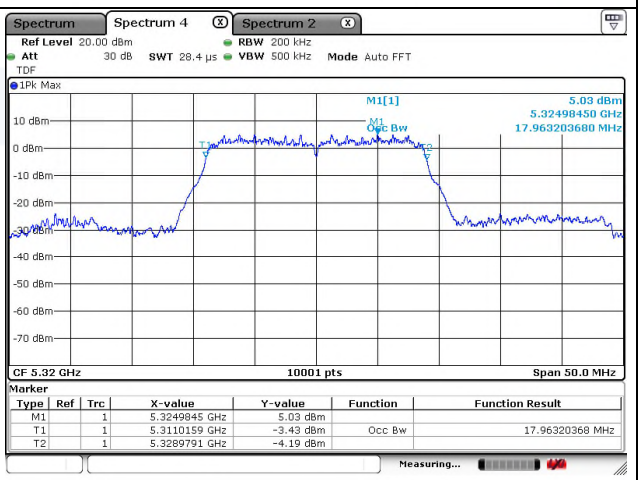

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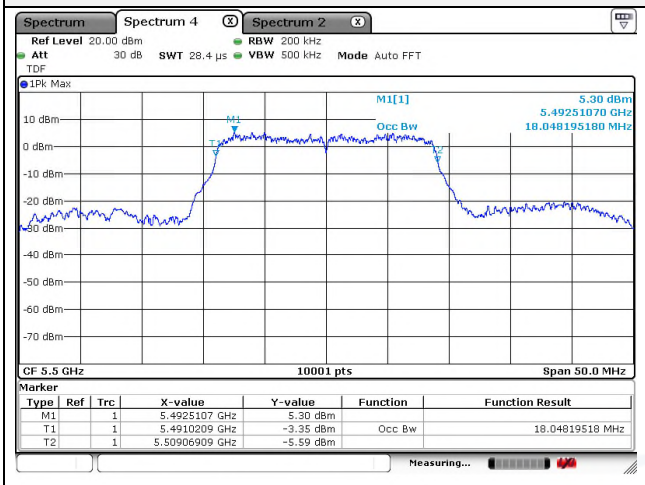
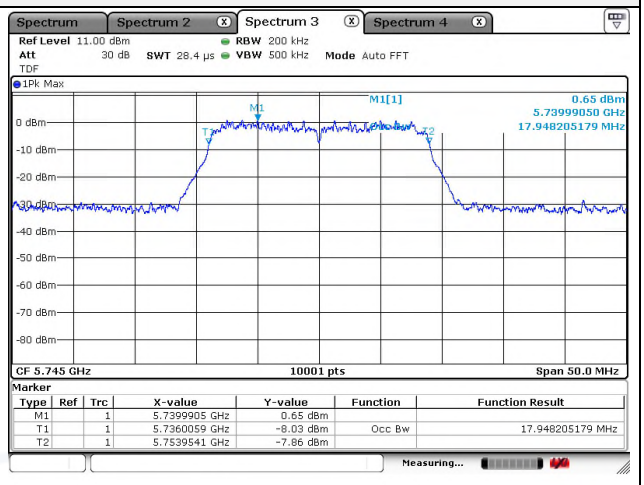
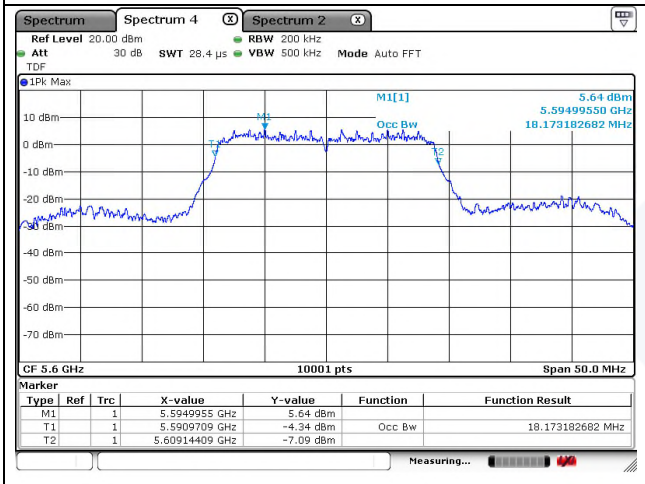
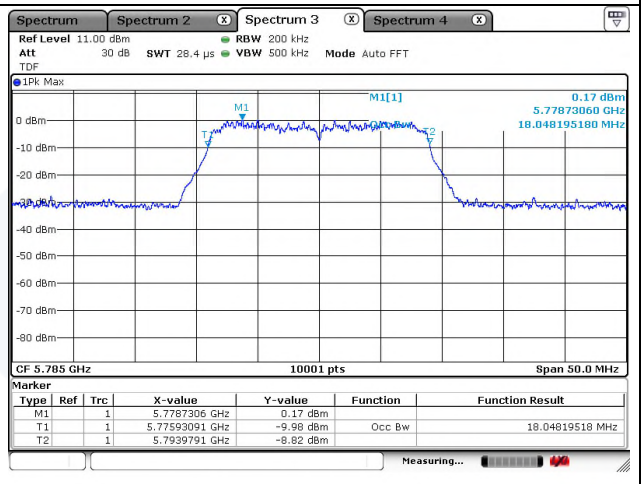
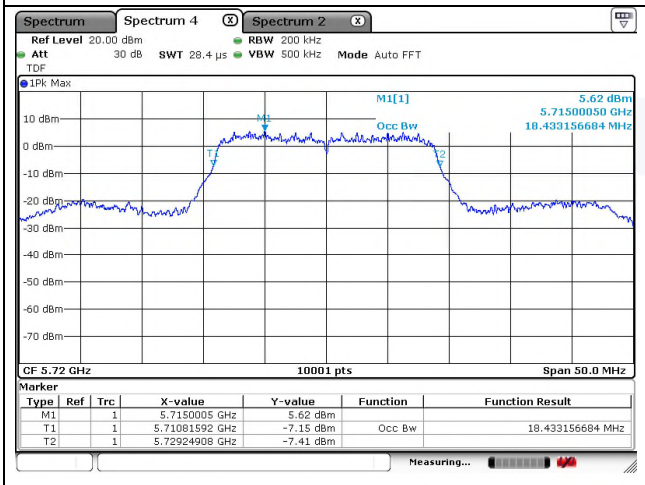
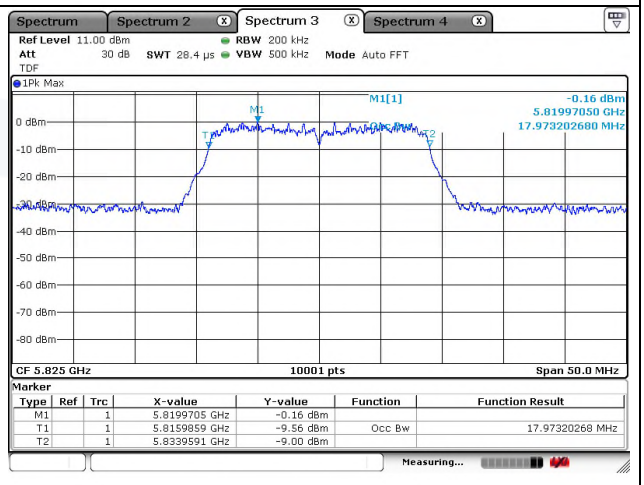










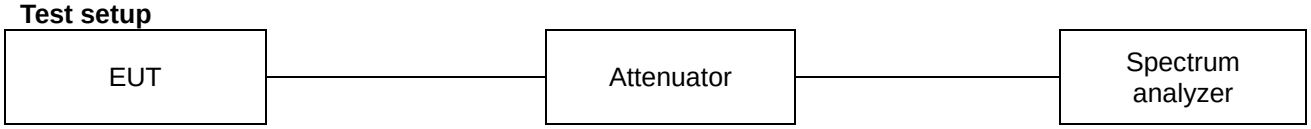


3.2. 6 dB bandwidth

Test procedure

KDB 789033 D02 v02r01– Section C.2

Test setup



Section C.2

1. Set RBW = 100 ㎑
2. Set the video bandwidth (VBW) ≥ 3 × RBW.
3. Detector = peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission.

Limit

Within the 5.725-5.85 ㎓ band, the minimum 6 ㏈ bandwidth of U-NII devices shall be at least 500 ㎑.