



TEST REPORT



Report No. : KES-RF250856
Page 1 / 257

KES Co., Ltd.
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■ FCC & IC TEST REPORT

1. Client

- Name : Viewworks Co., Ltd.
- Address : 41-3, Burim-ro, 170beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055, Republic of Korea

2. Sample Description

- Product item : Wireless Module
- Model name : F1CS43752_HP
- Variant Moedl name : VWLM-1
- Manufacturer etc. : F1 Media Co., Ltd.

3. Date of test : 2025.08.12 ~ 2025.12.12

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

- Adress : 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea

5. FCC & IC Rule part(s) : Part 15 Subpart E 15.407, RSS-247 (Issue 4), RSS-Gen (Issue 5)

6. Test result : PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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Affirmation	Tested by	Technical Manager
	Name : Gu-Bong, Kang (Signature)	Name : Yeong-Jun Cho (Signature)

[정구봉]2025/12/16

[조영준]2025/12/16

2025. 12. 16.

KES Co., Ltd.



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
2025.12.16	KES-RF250856	Initial

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TABLE OF CONTENTS

1.	General information	4
1.1.	EUT description	4
1.2.	Test configuration.....	5
1.3.	Information about derivative model	5
1.4.	Accessory information	5
1.5.	Device modifications.....	5
1.6.	Sample calculation	5
1.7.	Worst case data rate.....	5
1.8.	Antenna information	6
1.9.	Measurement Uncertainty	6
1.10.	Frequency/channel operations	7
2.	Summary of tests	9
3.	Test results	10
3.1.	26 dB bandwidth & 99% Occupied Bandwidth	10
3.2.	6 dB bandwidth	59
3.3.	Maximum conducted output power.....	78
3.4.	Power spectral density	83
3.5.	Frequency Stability	111
3.6.	Radiated restricted band and emissions	116
3.7.	AC conducted emissions	254
3.8.	Antenna Requirement.....	256
Appendix A.	Measurement equipment.....	257



1. General information

Applicant: Vieworks Co., Ltd.
Applicant address: 41-3, Burim-ro, 170beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055, Republic of 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, Yeosu-si, Gyeonggi-do, Korea
Test Facility: FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s): 15.247
FCC ID: PFR-F1CS43752HP
IC rule part(s): RSS-247 (Issue 4), RSS-Gen (Issue 5)
IC Number: 11233A-F1CS43752HP
Test device serial No.: ☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test: Wireless Module
Frequency range & Number of channels:
2 402 MHz ~ 2 480 MHz (BDR) : 79 ch
2 402 MHz ~ 2 480 MHz (LE 1 Mbps) : 40 ch
2 412 MHz ~ 2 462 MHz (802.11n_HT20) : 11 ch
5 180 MHz ~ 5 240 MHz (802.11a/n_HT20/ac_VHT20) : 4 ch
UNII-1 5 190 MHz ~ 5 230 MHz (802.11n_HT40/ac_VHT40) : 2 ch
5 210 MHz (802.11ac_VHT80) : 1 ch
5 745 MHz ~ 5 825 MHz (802.11a/n_HT20/ac_VHT20) : 5 ch
UNII-3 5 755 MHz ~ 5 795 MHz (802.11n_HT40/ac_VHT40) : 2 ch
5 775 MHz (802.11ac_VHT80) : 1 ch
Model: F1CS43752_HP
Derivative Model: VWLM-1
Modulation technique: GFSK, **OFDM**
Antenna specification: ANT1 : FPCB Antenna (BT & WLAN), ANT2 : FPCB Antenna (WLAN only)
ANT1 : 2.4 GHz : 2.13 dBi / 5.15~5.25 GHz : 0.699 dBi / 5.725~5.85 GHz : 1.889 dBi
ANT2 : 2.4 GHz : 2.13 dBi / 5.15~5.25 GHz : 0.699 dBi / 5.725~5.85 GHz : 1.889 dBi
Power source: DC 3.3 V
H/W version: 1.0
S/W version: 1.0
Serial Number: WM00010



1.2. Test configuration

The Vieworks Co., Ltd. // Wireless Module // F1CS43752 HP // FCC ID: PFR-F1CS43752HP // IC number : 11233A-F1CS43752HP 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 C63.10-2020 for FCC

ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 for IC

1.3. Information about derivative model

Derivative model **VWLM-1** has no electrical, circuitry, appearance, or color differences from the basic model **F1CS43752_HP**.

It is simply a way to manage different names for different vendors.

1.4. Accessory information

N/A

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.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 1.43 + 10 = 11.43 \text{ (dB)}\end{aligned}$$

For Radiation test :

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) – Amplifier gain (dB)

1.7. Worst case data rate

1. Worst-case data rates were:

SISO_802.11a : 6 Mbps

SISO_802.11n: **MCS0**

MIMO_802.11n: **MCS8**

SISO_802.11ac: **MCS0**

MIMO_802.11ac: **MCS0**

**1.8. Antenna information**

Mode	SISO		MIMO
	Antenna 1	Antenna 2	Antenna 1 + 2
BDR	✓	×	×
LE 1 Mbps	✓	×	×
802.11a	✓	✓	×
802.11n/ac	✓	✓	✓

✓ = Support; × = Not support

Antenna Model

Ant0 : 1832-6104-01A[B]

Ant1 : 1832-6104-01A[B]

Ant1 Gain (dBi)	Ant2 Gain (dBi)	Note
2.130	2.130	2 400 to 2 500 MHz
0.699	0.699	5 150 to 5 250 MHz
1.889	1.889	5 725 to 5 850 MHz

1.9. Measurement Uncertainty

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

**1.10. Frequency/channel operations**

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

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

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

**UNII-1**

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

UNII-3

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

802.11a/n_HT20/ac_VHT20 mode**UNII-1**

Ch.	Frequency (MHz)
38	5 190
46	5 230

UNII-3

Ch.	Frequency (MHz)
151	5 755
159	5 795

802.11n_HT40/ac_VHT40 mode**UNII-1**

Ch.	Frequency (MHz)
42	5 210

UNII-3

Ch.	Frequency (MHz)
155	5 775

802.11ac_VHT80 mode



2. Summary of tests

Section in FCC Part 15	Section in RSS-247 & Gen	Parameter	Test results
15.407(a)	RSS-247 6.2	26 dB bandwidth	Pass
15.407(a)	-	Maximum conducted output power	Pass
15.407(a)	RSS-247 6.2	Power spectral density	Pass
15.407(g)	RSS-247 6.2	Frequency stability	Pass
15.205, 15.209, 15.407(b)	RSS-Gen 6.11	Radiated restricted band and emission	Pass
15.207(a)	RSS-247 6.2, RSS-Gen 8.9, 8.10	AC power line conducted emissions	Pass
15.203	RSS-Gen 8.8	Antenna Requirement	Pass

Note.

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

SISO

Mode	UNII-1		UNII-3	
	Frequency (MHz)	Setting value	Frequency (MHz)	Setting value
802.11a (6 Mbps)	5 180 ~ 5 240	15	5 745 ~ 5 825	14
802.11n_HT20 (MCS0)		15		14
802.11ac_VHT20 (MCS0)		14		14
802.11n_HT40 (MCS0)	5 190 ~ 5 230	13	5 755 ~ 5 795	12
802.11ac_VHT40 (MCS0)		13		13
802.11ac_VHT80 (MCS0)	5 210	13	5 775	13

MIMO

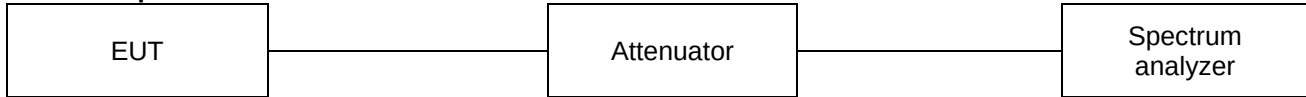
Mode	UNII-1		UNII-3	
	Frequency (MHz)	Setting value	Frequency (MHz)	Setting value
802.11n_HT20 (MCS8)	5 180 ~ 5 240	11	5 745 ~ 5 825	11
802.11ac_VHT20 (MCS0)		11		11
802.11n_HT40 (MCS8)	5 190 ~ 5 230	11	5 755 ~ 5 795	10
802.11ac_VHT40 (MCS0)		11		10
802.11ac_VHT80 (MCS0)	5 210	11	5 775	10



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

SISO (Ant 1)

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	802.11a	21.61	16.48
	5 220		21.54	16.44
	5 240		21.26	16.52
	5 180	802.11n _HT20	21.66	17.81
	5 220		21.75	17.70
	5 240		21.54	17.79
	5 180	802.11ac _VHT20	21.37	17.68
	5 220		21.76	17.75
	5 240		21.67	17.70
	5 190	802.11n _HT40	39.69	36.33
	5 230		39.57	36.32
	5 190	802.11ac _VHT40	39.60	36.18
	5 230		39.67	36.31
	5 210	802.11ac _VHT80	80.55	75.81

**SISO (Ant 2)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	802.11a	21.15	16.54
	5 220		21.16	16.53
	5 240		21.12	16.60
	5 180	802.11n _HT20	22.09	17.76
	5 220		21.44	17.80
	5 240		21.86	17.77
	5 180	802.11ac _VHT20	21.82	17.73
	5 220		21.73	17.73
	5 240		21.56	17.84
	5 190	802.11n _HT40	39.99	36.50
	5 230		39.67	36.50
	5 190	802.11ac _VHT40	39.87	36.55
	5 230		39.83	36.23
	5 210	802.11ac _VHT80	80.99	75.65

**MIMO (Ant 1)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	802.11n _HT20	21.75	17.64
	5 220		21.88	17.77
	5 240		21.49	17.86
	5 180	802.11ac _VHT20	22.27	17.75
	5 220		21.83	17.84
	5 240		21.66	17.78
	5 190	802.11n _HT40	39.61	36.36
	5 230		39.48	36.38
	5 190	802.11ac _VHT40	40.54	36.88
	5 230		39.92	36.55
	5 210	802.11ac _VHT80	80.95	76.21

**MIMO (Ant 2)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	802.11n _HT20	21.67	17.75
	5 220		21.25	17.76
	5 240		21.74	17.68
	5 180	802.11ac _VHT20	21.71	17.82
	5 220		21.52	17.82
	5 240		21.48	17.75
	5 190	802.11n _HT40	39.55	36.38
	5 230		39.57	36.30
	5 190	802.11ac _VHT40	39.36	36.51
	5 230		39.08	36.45
	5 210	802.11ac _VHT80	80.43	76.33

**SISO (Ant 1)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-3	5 745	802.11a	21.54	16.88
	5 785		21.29	16.48
	5 825		21.42	16.67
	5 745	802.11n _HT20	21.56	18.06
	5 785		21.54	18.03
	5 825		21.47	18.10
	5 745	802.11ac _VHT20	21.52	17.89
	5 785		21.49	17.97
	5 825		21.76	17.91
	5 755	802.11n _HT40	39.75	36.54
	5 795		39.72	36.30
	5 755	802.11ac _VHT40	39.50	36.32
	5 795		39.76	36.48
	5 775	802.11ac _VHT80	79.93	75.73

**SISO (Ant 2)**

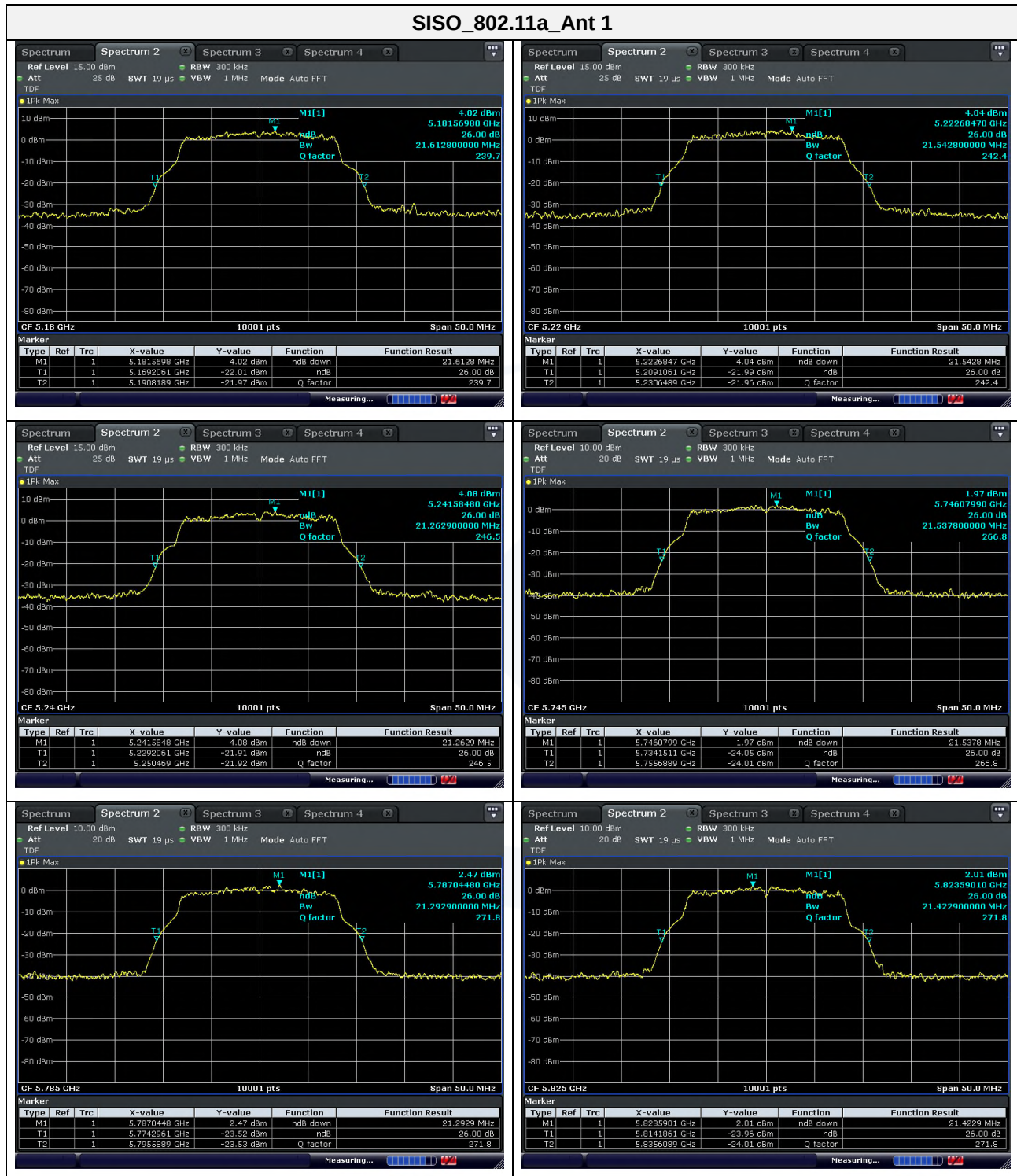
Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-3	5 745	802.11a	21.33	16.72
	5 785		21.33	17.01
	5 825		21.40	16.72
	5 745	802.11n _HT20	21.68	18.02
	5 785		21.61	18.03
	5 825		21.54	18.07
	5 745	802.11ac _VHT20	21.72	18.07
	5 785		21.62	17.91
	5 825		21.52	17.89
	5 755	802.11n _HT40	39.55	36.43
	5 795		39.15	36.48
	5 755	802.11ac _VHT40	39.95	36.27
	5 795		39.53	36.30
	5 775	802.11ac _VHT80	80.29	75.79

**MIMO (Ant 1)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-3	5 745	802.11n _HT20	21.71	17.96
	5 785		21.44	18.02
	5 825		21.49	17.98
	5 745	802.11ac _VHT20	21.55	18.04
	5 785		21.36	18.02
	5 825		21.50	18.04
	5 755	802.11n _HT40	39.68	36.46
	5 795		39.61	36.40
	5 755	802.11ac _VHT40	40.07	36.96
	5 795		40.04	36.38
	5 775	802.11ac _VHT80	80.87	76.49

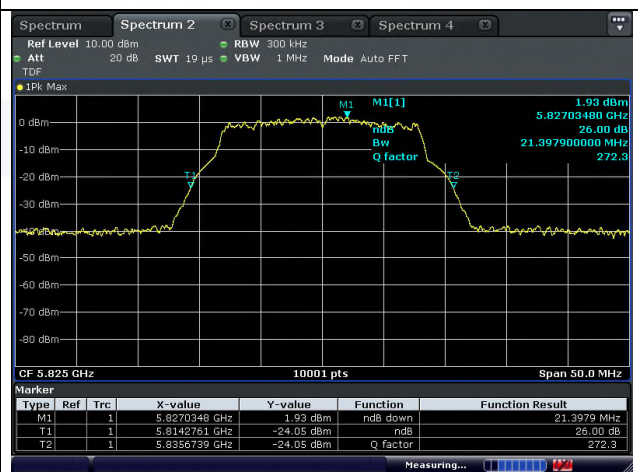
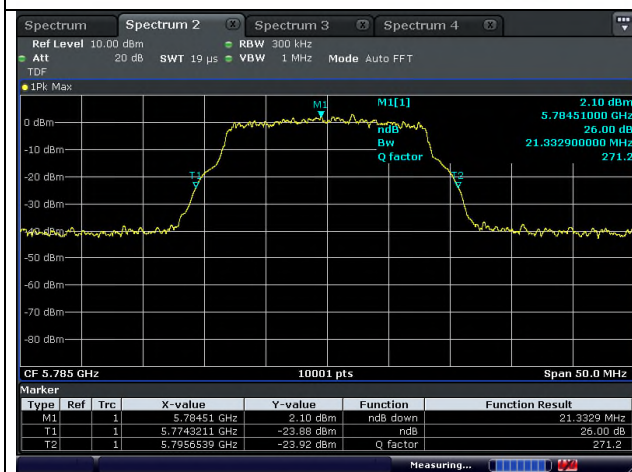
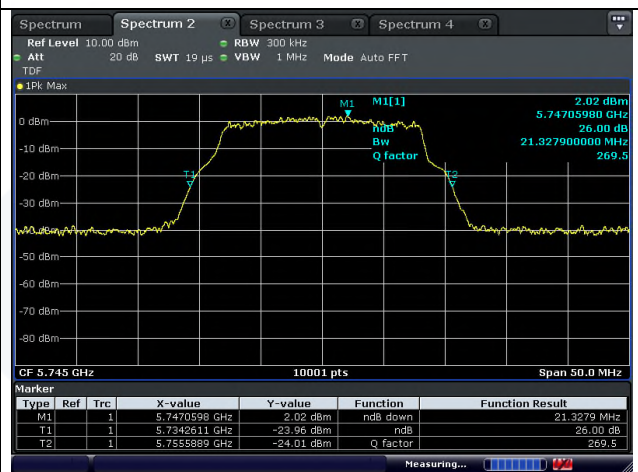
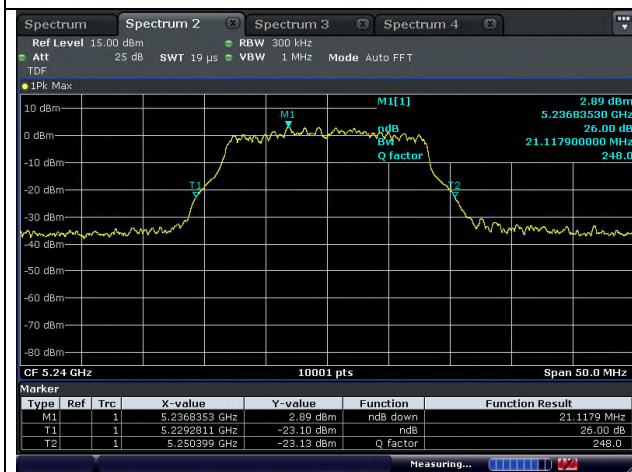
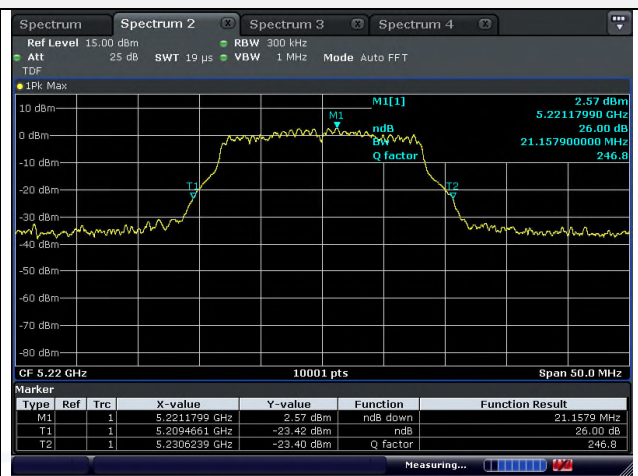
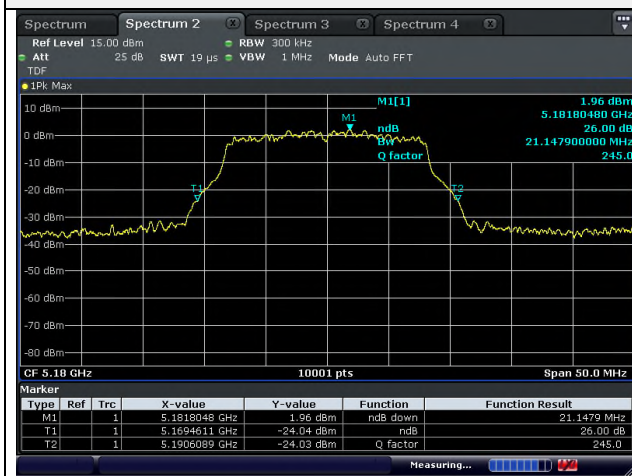
**MIMO (Ant 2)**

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-3	5 745	802.11n _HT20	21.64	17.96
	5 785		21.40	17.87
	5 825		21.39	17.92
	5 745	802.11ac _VHT20	21.51	17.86
	5 785		21.56	18.05
	5 825		21.31	18.08
	5 755	802.11n _HT40	39.55	36.46
	5 795		39.22	36.40
	5 755	802.11ac _VHT40	40.16	36.51
	5 795		39.65	36.45
	5 775	802.11ac _VHT80	80.73	76.57

**26 dB bandwidth**

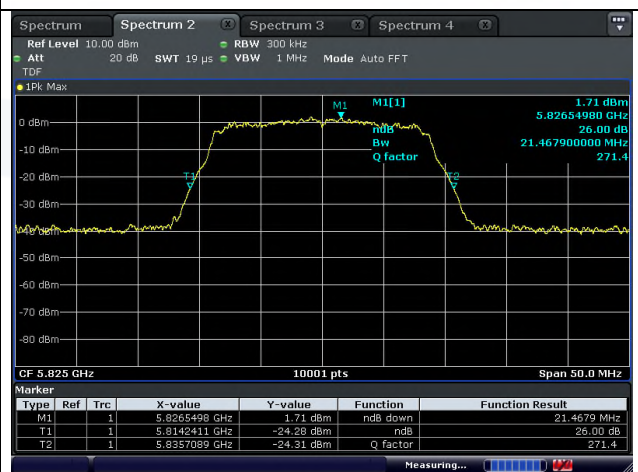
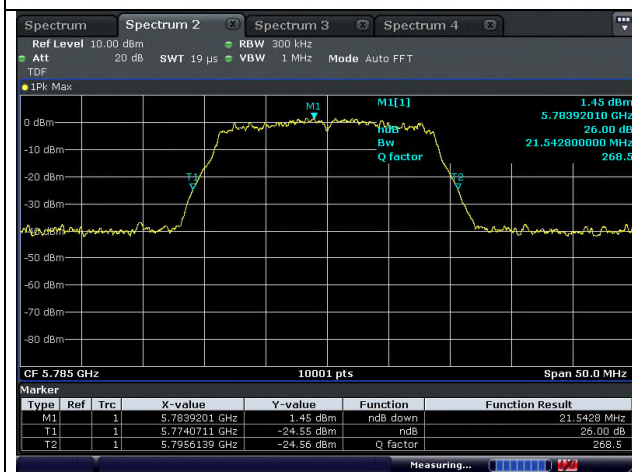
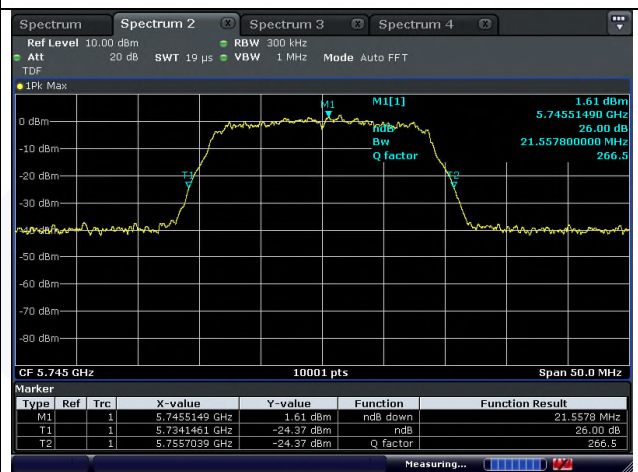
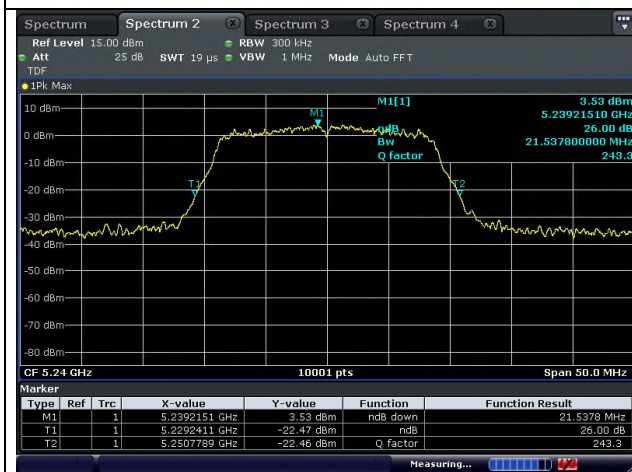
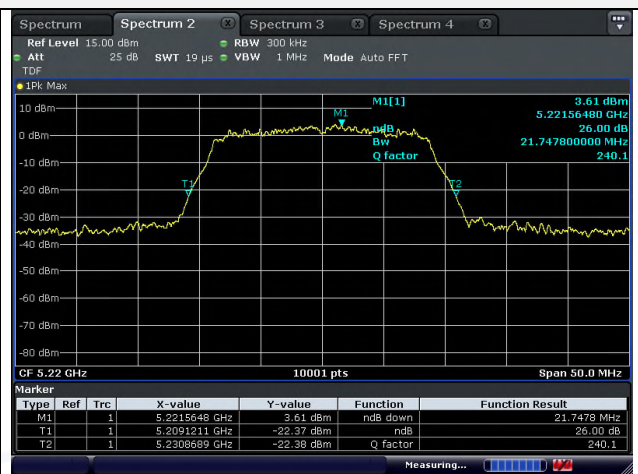
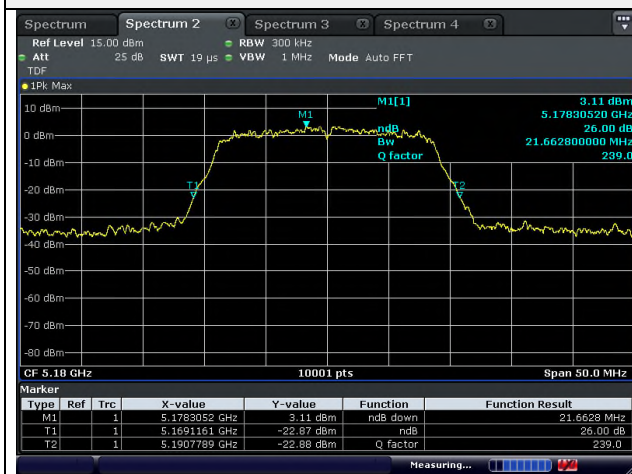


SISO_802.11a_Ant 2



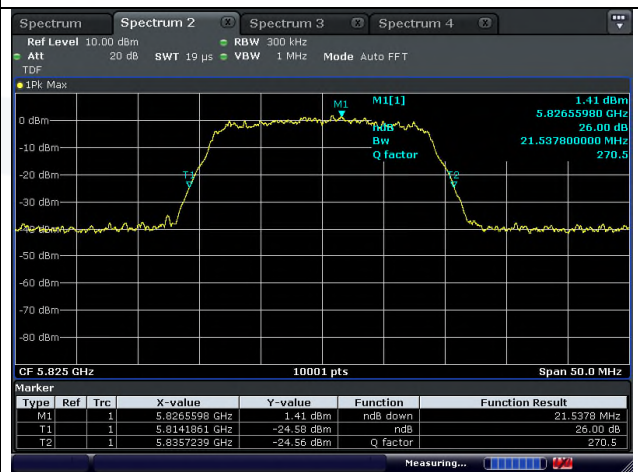
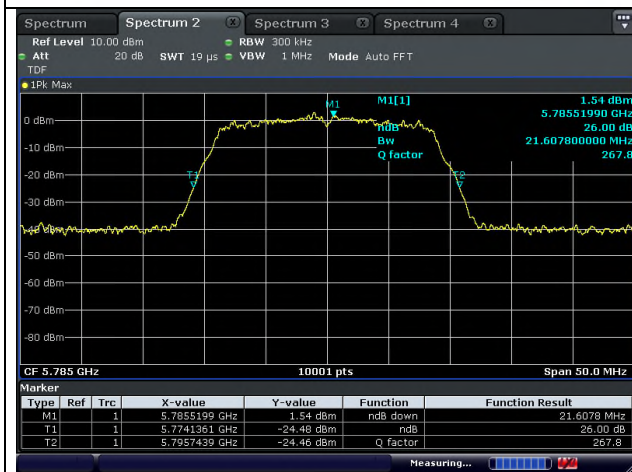
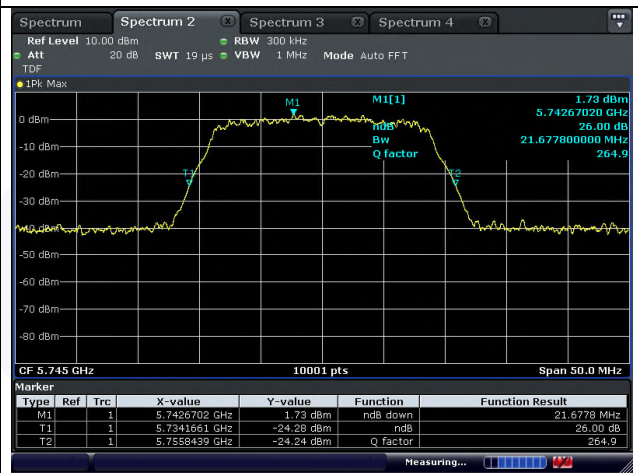
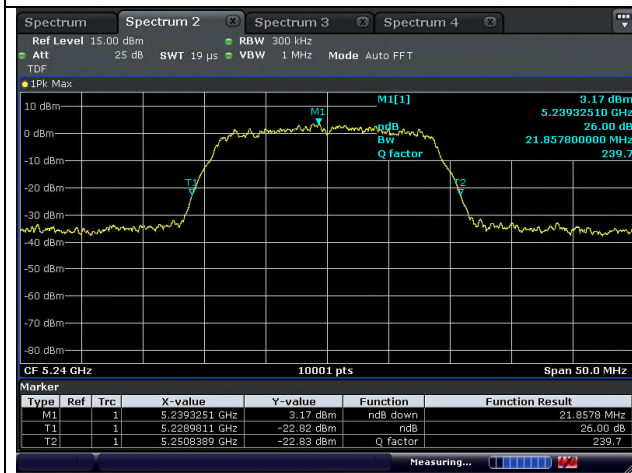
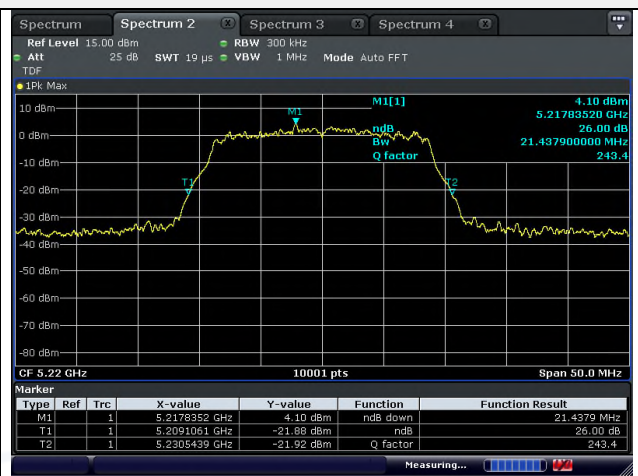
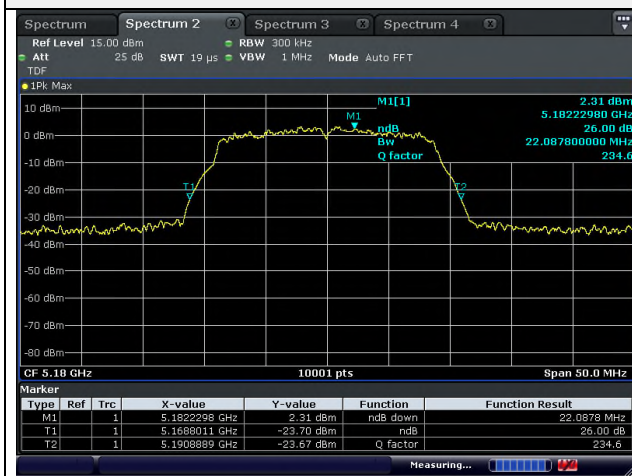


SISO_802.11n_HT20_Ant 1



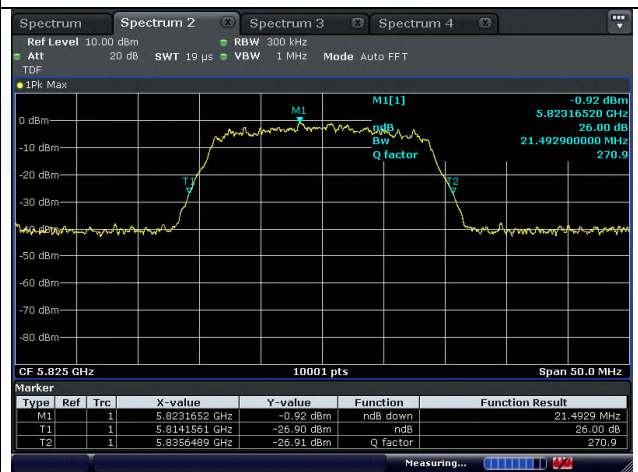
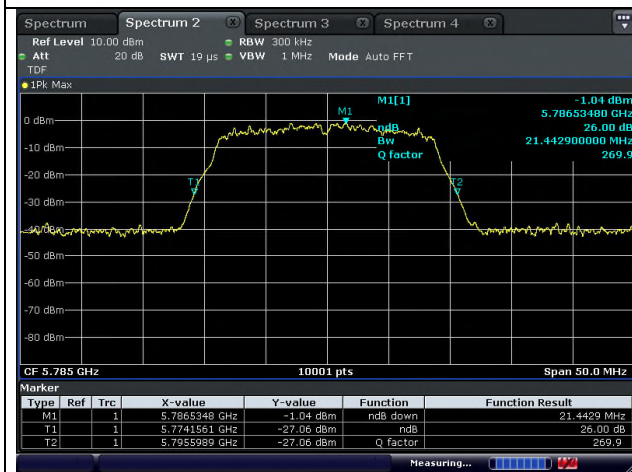
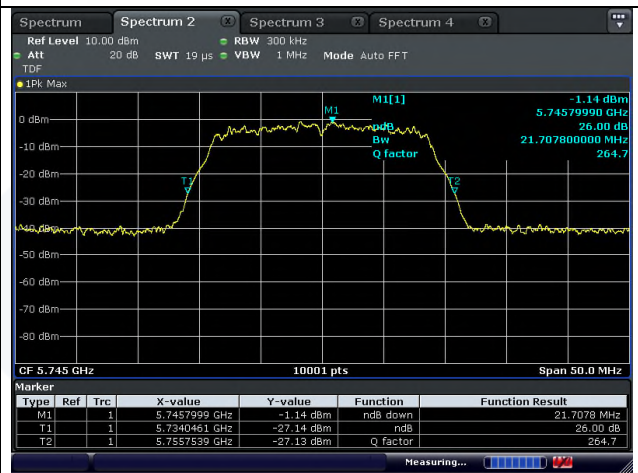
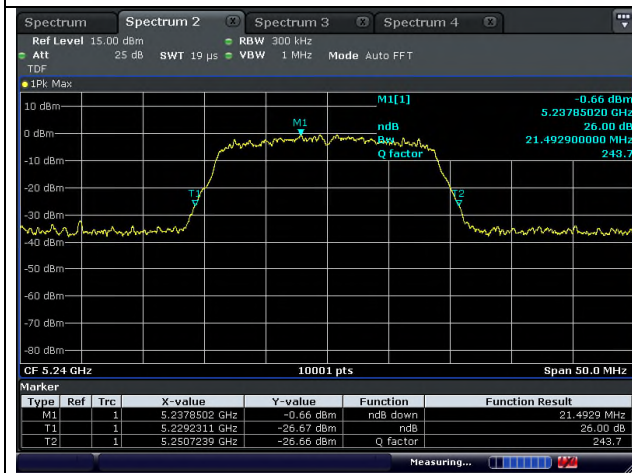
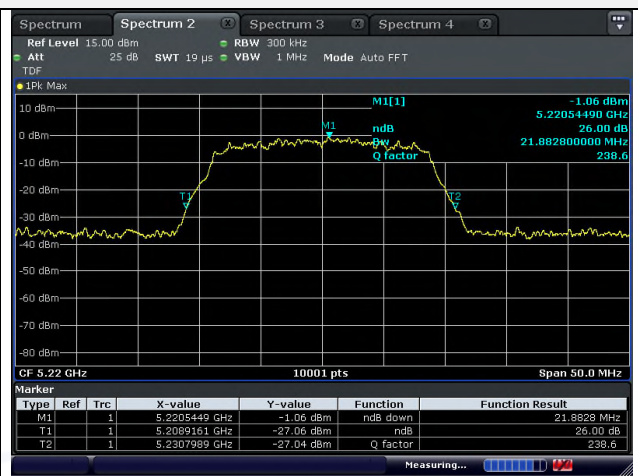
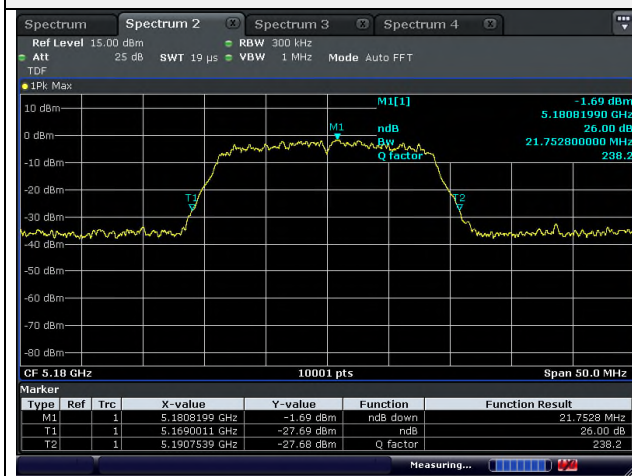


SISO_802.11n_HT20_Ant 2



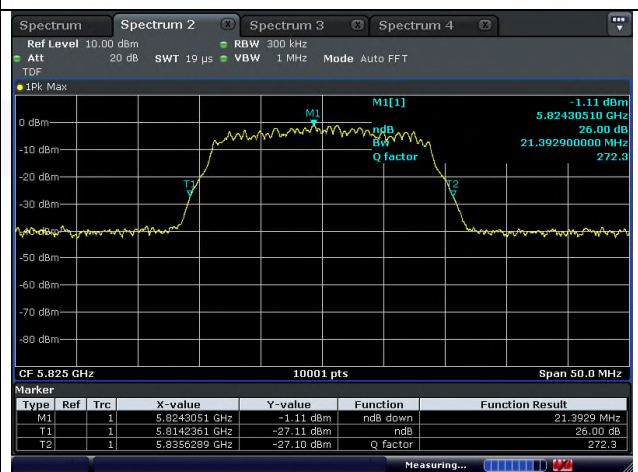
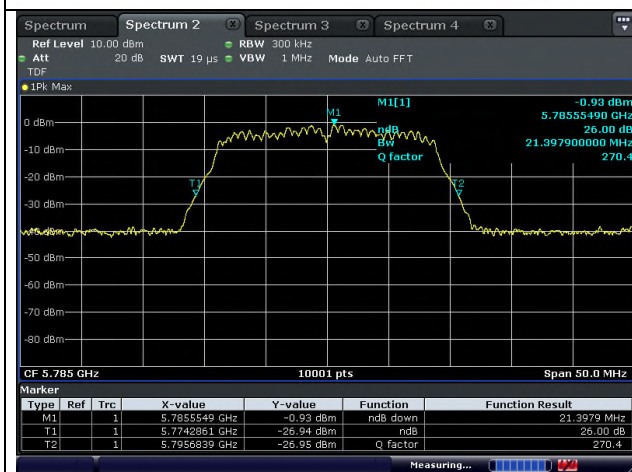
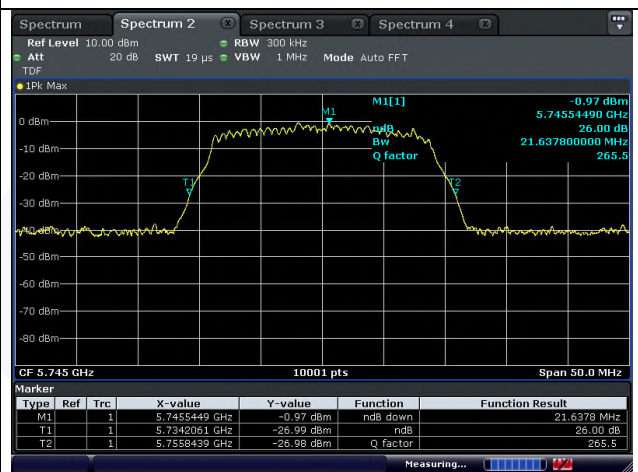
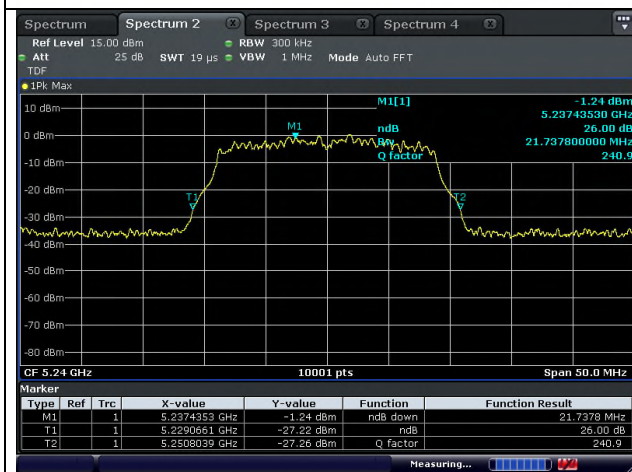
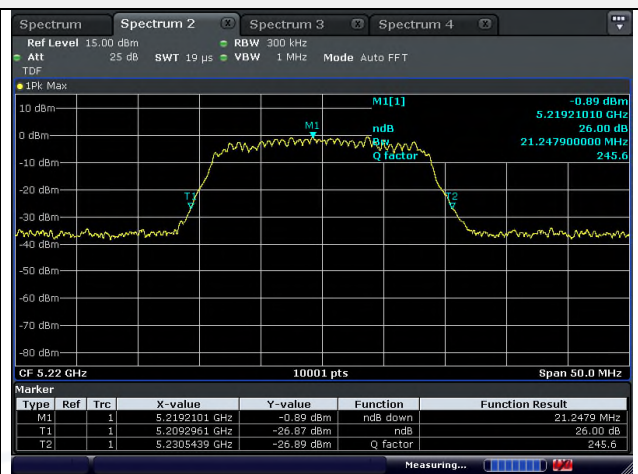
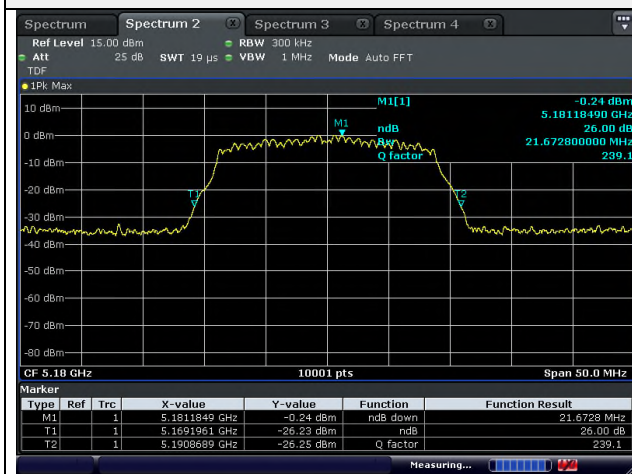


MIMO_802.11n_HT20_Ant 1



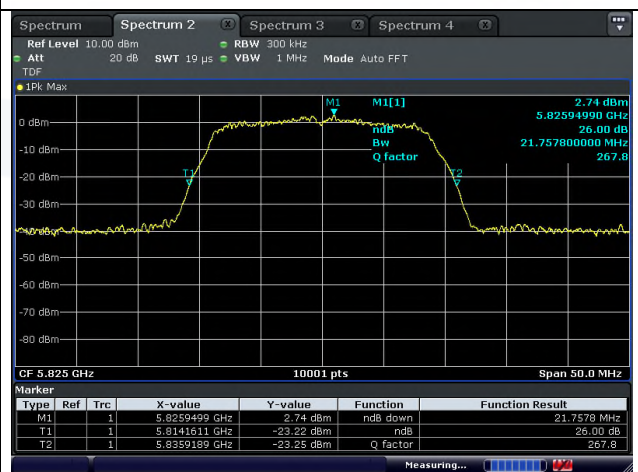
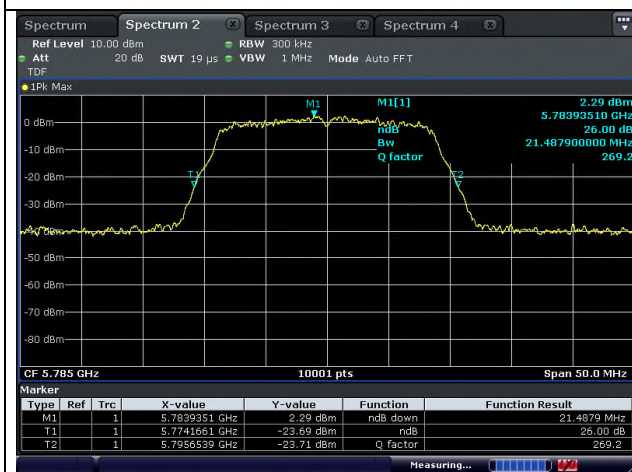
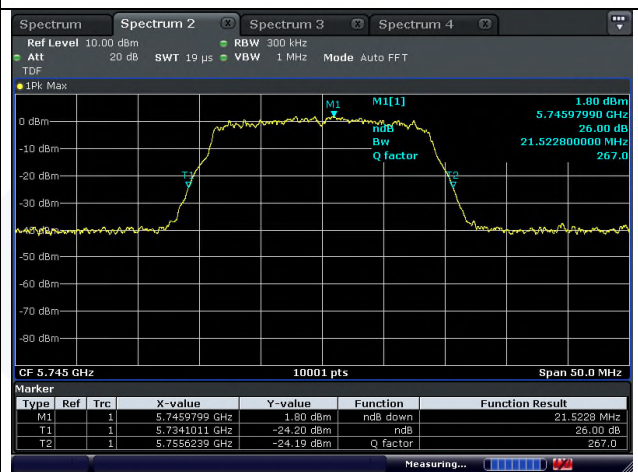
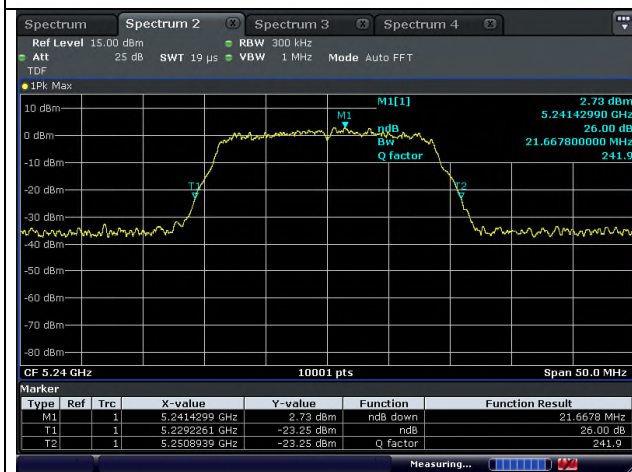
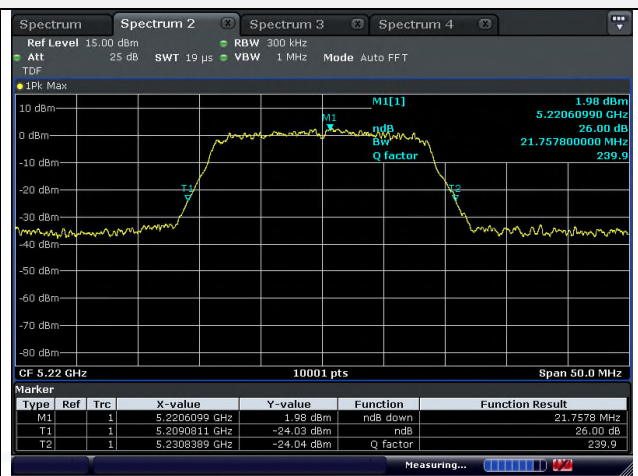
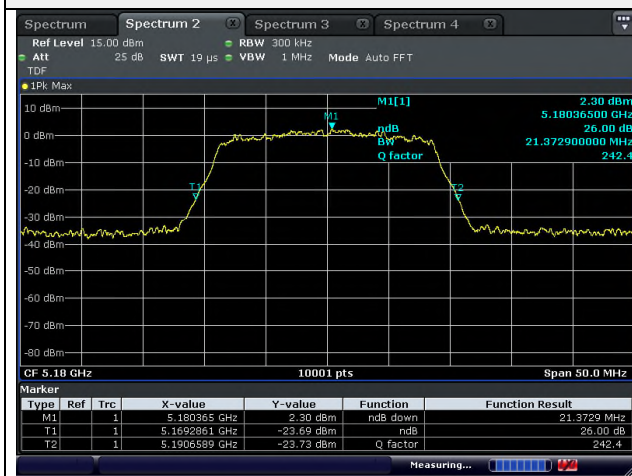


MIMO_802.11n_HT20_Ant 2



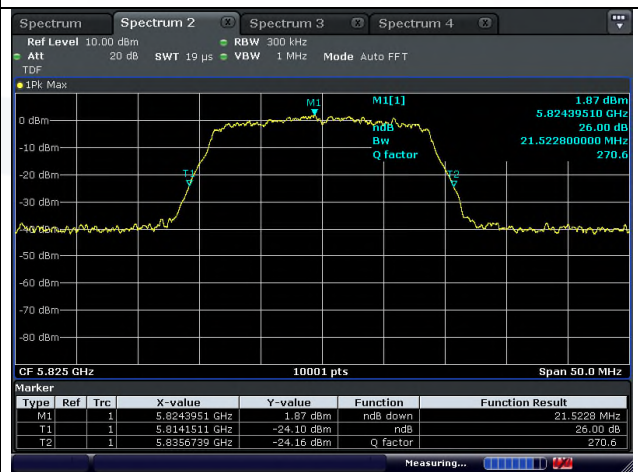
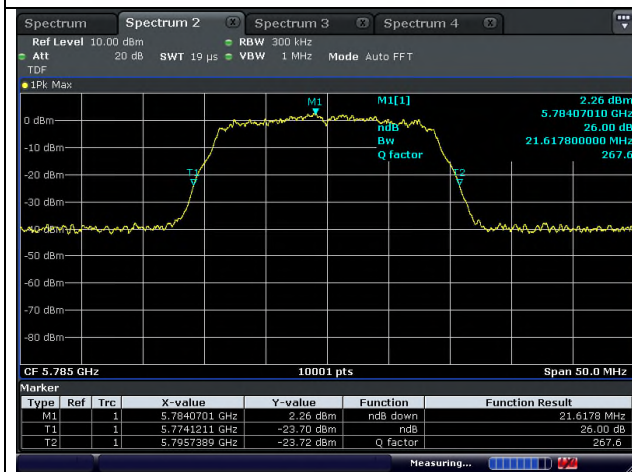
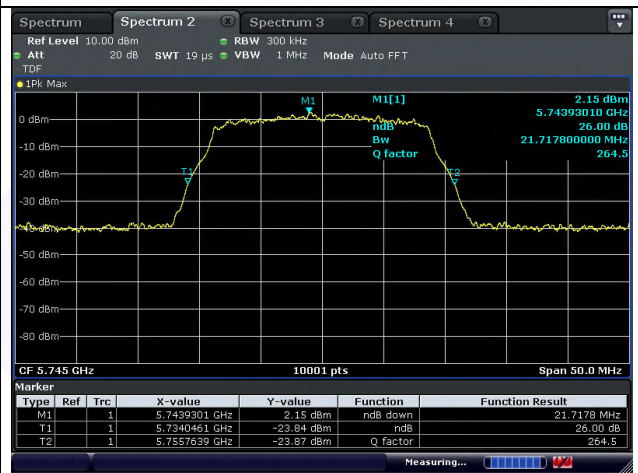
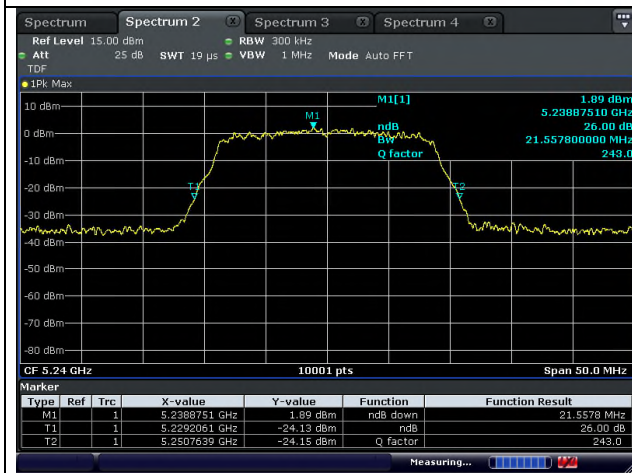
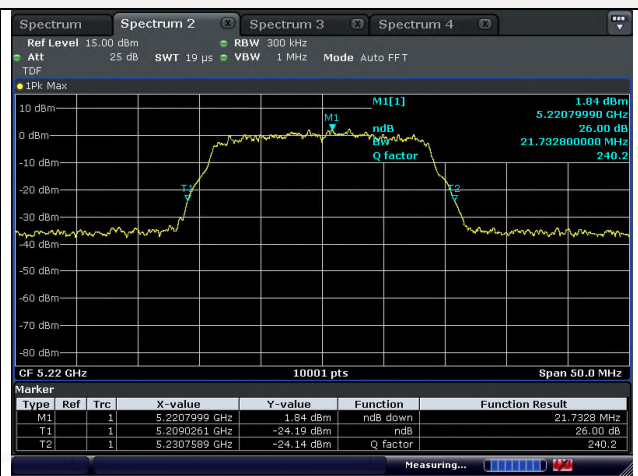
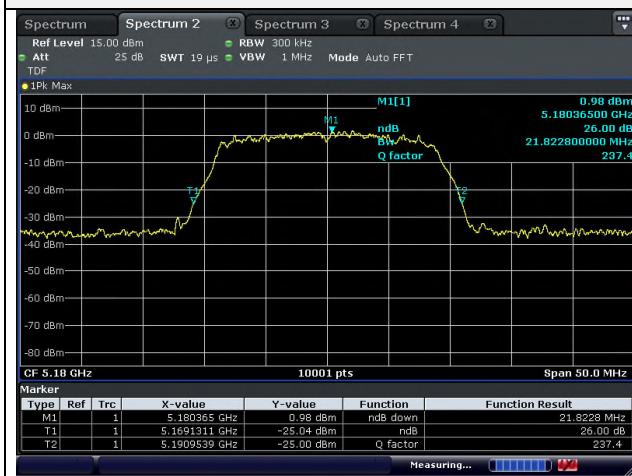


SISO_802.11ac VHT20_Ant 1



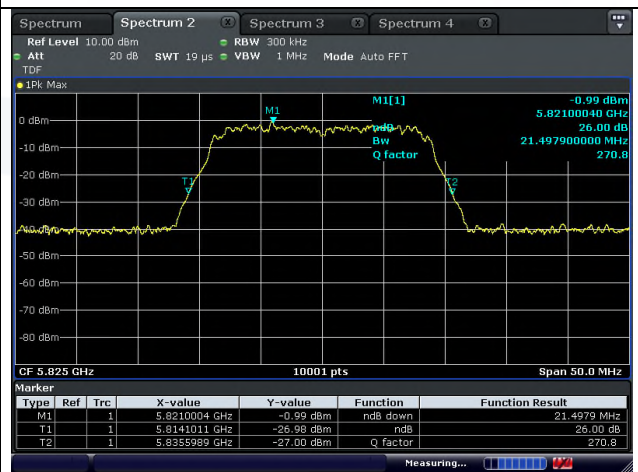
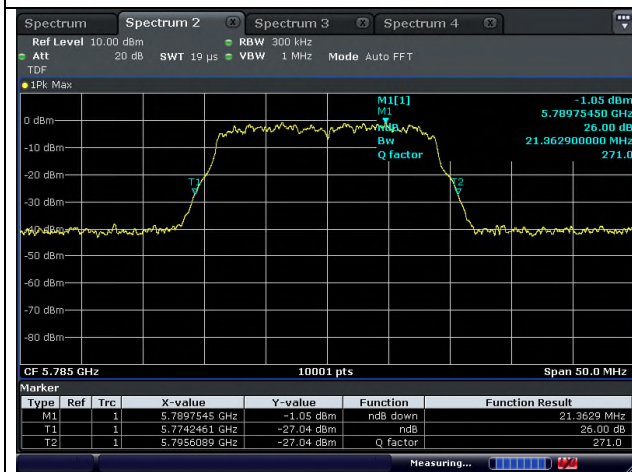
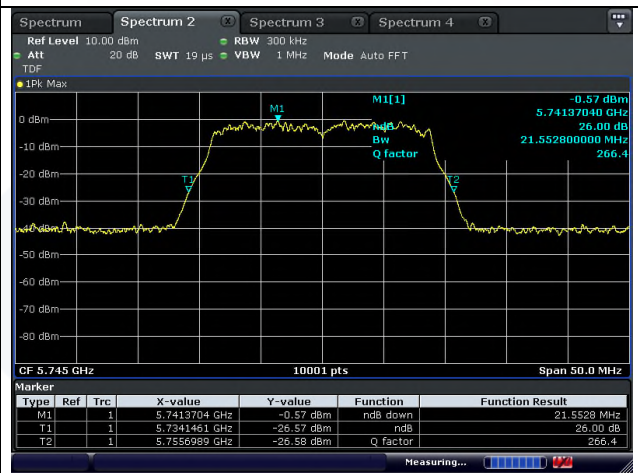
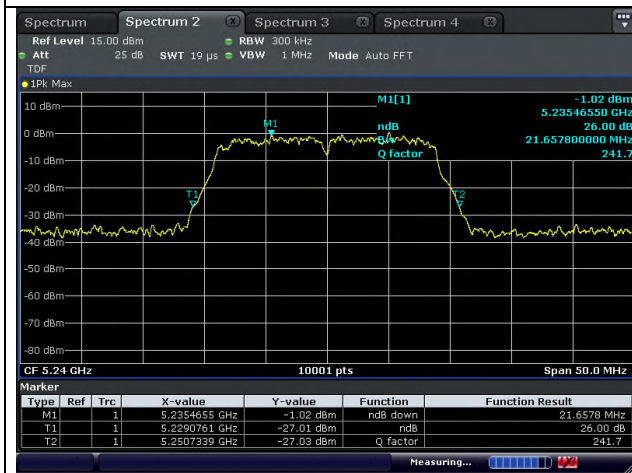
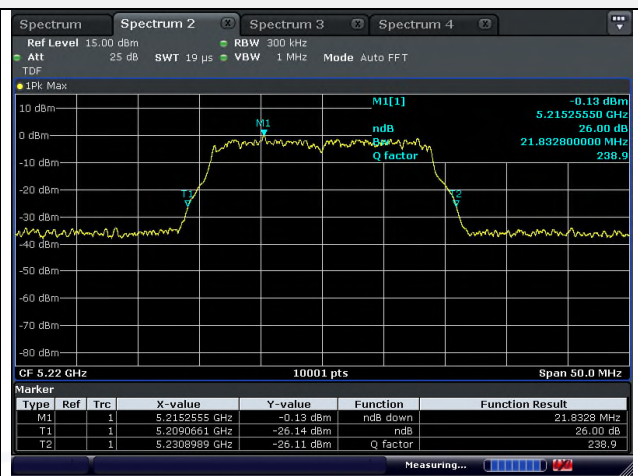
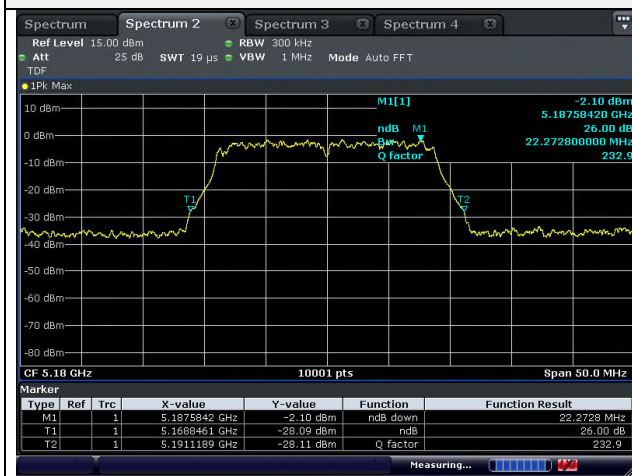


SISO_802.11ac VHT20_Ant 2





MIMO_802.11ac_VHT20_Ant 1





MIMO_802.11ac_VHT20_Ant 2

