KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
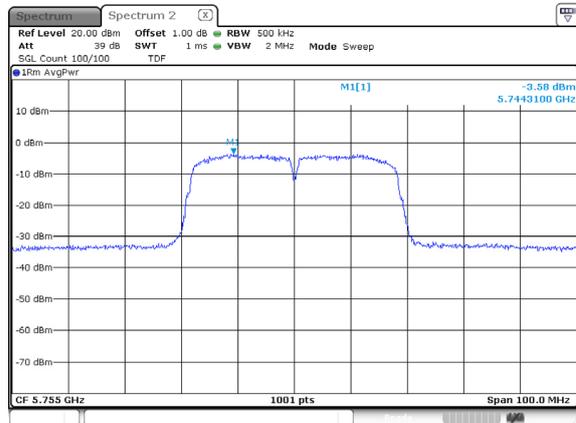KR19-SRF0117-B

Page (44) of (199)

KCTL

UNII-2C / 802.11ac VHT40 / Low ch.

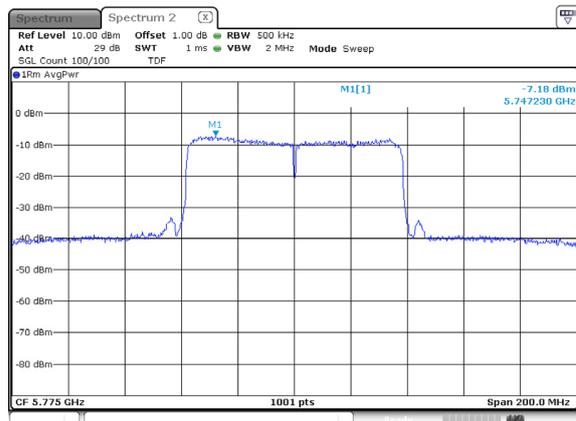## UNII-3 / 802.11ac VHT40 / Low ch.

UNII-2C / 802.11ac VHT40 / Mid ch.


UNII-3 / 802.11ac VHT40 / High ch.

UNII-2C / 802.11ac VHT40 / High ch.

Blank

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (45) of (199)

KCTL

UNII-1 / 802.11ac VHT80 / Low ch.

Spectrum | Spectrum 2
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 1 MHz
Att 29 dB   SWT 1 ms   VBW 3 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -6.70 dBm
5.178230 GHz
CF 5.21 GHz   1001 pts   Span 200.0 MHz

UNII-2A / 802.11ac VHT80 / Low ch.

Spectrum | Spectrum 2
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 1 MHz
Att 29 dB   SWT 1 ms   VBW 3 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -5.85 dBm
5.257030 GHz
CF 5.29 GHz   1001 pts   Span 200.0 MHz

UNII-2C / 802.11ac VHT80 / Low ch.

Spectrum | Spectrum 2
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 1 MHz
Att 29 dB   SWT 1 ms   VBW 3 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -5.87 dBm
5.562770 GHz
CF 5.53 GHz   1001 pts   Span 200.0 MHz

UNII-2C / 802.11ac VHT80 / Mid ch.

Spectrum
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 1 MHz
Att 29 dB   SWT 1 ms   VBW 3 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -5.79 dBm
5.637970 GHz
CF 5.61 GHz   1001 pts   Span 200.0 MHz

UNII-2C / 802.11ac VHT80 / High ch.

Spectrum | Spectrum 2
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 1 MHz
Att 29 dB   SWT 1 ms   VBW 3 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -5.41 dBm
5.721770 GHz
CF 5.69 GHz   1001 pts   Span 200.0 MHz

UNII-3 / 802.11ac VHT80 / Low ch.

Spectrum | Spectrum 2
Ref Level 10.00 dBm   Offset 1.00 dB   RBW 500 kHz
Att 29 dB   SWT 1 ms   VBW 2 MHz   Mode Sweep
SGL Count 100/100   TDF
1Rm AvgPwr
M1[1]   -7.18 dBm
5.747230 GHz
CF 5.775 GHz   1001 pts   Span 200.0 MHz

KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
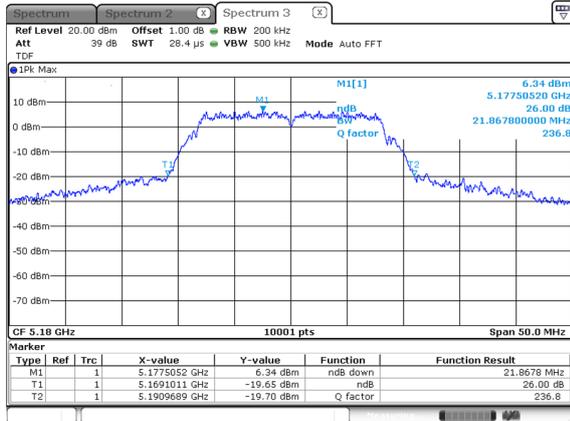www.kctl.co.kr
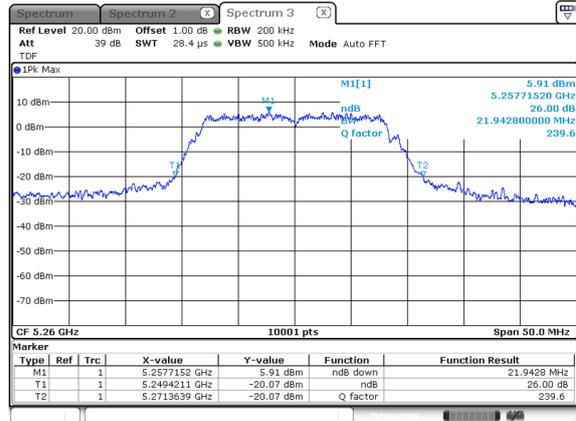
Report No.:
KR19-SRF0117-B

Page (46) of (199)

KCTL

7.3.   26 ㏈ Bandwidth & 99% Occupied Bandwidth

Test setup

EUT		Attenuator		Spectrum analyzer
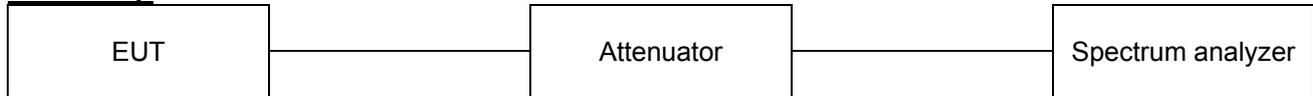
Limit
N/A

Test procedure
ANSI C63.10-2013 Section 12.4
KDB 789033 D02 v02r01 - Section C.1 (26㏈bandwidth)
KDB 789033 D02 v02r01 - Section D (99% bandwidth)

Test settings

1. 26 ㏈ Bandwidth
   a. Set RBW = approximately 1% of the emission bandwidth.
   b. Set the VBW > RBW.
   c. Detector = Peak.
   d. Trace mode = max hold.
   e. Measure the maximum width of the emission that is 26 ㏈ down from the maximum 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%.

2. 99% Occupied Bandwidth

   a. Set center frequency to the nominal EUT channel center frequency.
   b. Set span = 1.5 times to 5.0 times the OBW.
   c. Set RBW = 1% to 5% of the OBW
   d. Set VBW ≥ 3 x RBW
   e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
   f. Use the 99% power bandwidth function of the instrument (if available).
   g. 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.
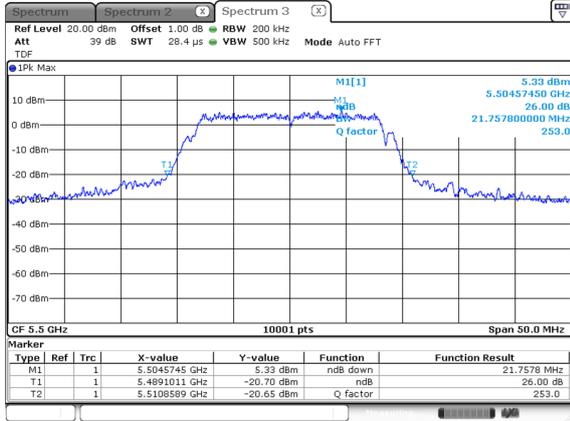
Notes:
1. 1) means Band-crossing channels.

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
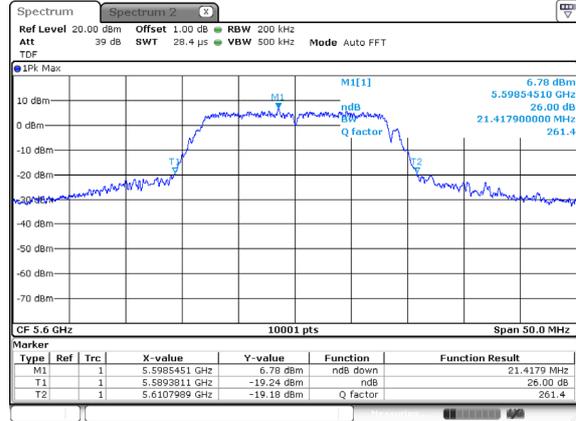www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (47) of (199)

Test results
### 26 ㏈ bandwidth

Test mode	Band	Frequency(㎒)	Measured Bandwidth (㎒)
802.11a	UNII-1	5 180	21.87
		5 200	21.81
		5 240	21.76
	UNII-2A	5 260	21.94
		5 280	21.69
		5 320	21.57
	UNII-2C	5 500	21.76
		5 600	21.42
		5 720[1]	15.53
802.11n HT20	UNII-1	5 180	24.64
		5 200	24.04
		5 240	24.00
	UNII-2A	5 260	24.86
		5 280	25.02
		5 320	24.80
	UNII-2C	5 500	24.04
		5 600	24.13
		5 720[1]	15.87
802.11n HT40	UNII-1	5 190	42.28
		5 230	42.38
	UNII-2A	5 270	42.16
		5 310	42.25
	UNII-2C	5 510	42.23
		5 590	42.41
		5 710[1]	35.93

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
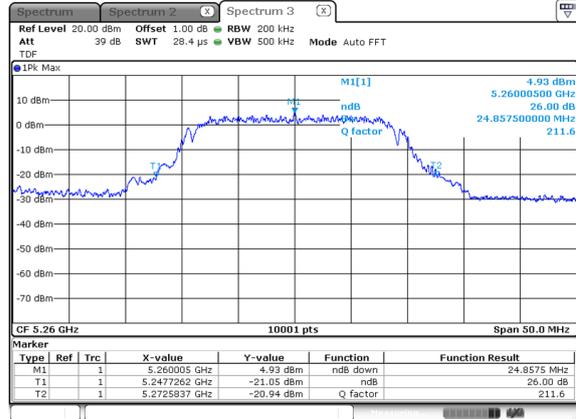www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (48) of (199)

| Test mode	Band	Frequency(㎒)	Measured Bandwidth (㎒)
802.11ac VHT20	UNII-1	5 180	25.14
		5 200	24.47
		5 240	24.01
	UNII-2A	5 260	24.34
		5 280	24.67
		5 320	24.01
	UNII-2C	5 500	23.77
		5 600	24.20
		5 720[1]	17.29
802.11ac VHT40	UNII-1	5 190	42.45
		5 230	42.43
	UNII-2A	5 270	42.47
		5 310	42.20
	UNII-2C	5 510	42.32
		5 590	42.36
		5 710[1]	35.99
802.11ac VHT80	UNII-1	5 210	82.99
	UNII-2A	5 290	82.85
	UNII-2C	5 530	82.63
		5 610	82.97
		5 690[1]	75.44

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (49) of (199)

KCTL

26 ㏈ bandwidth

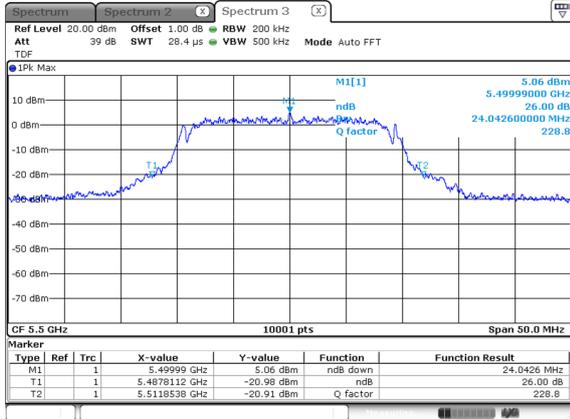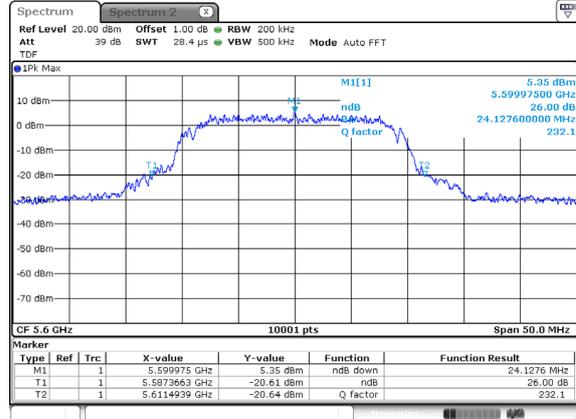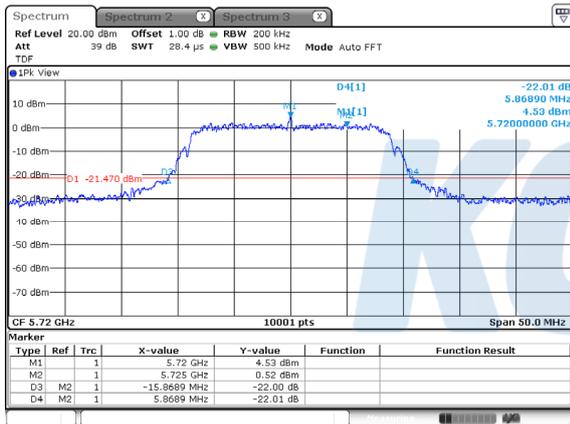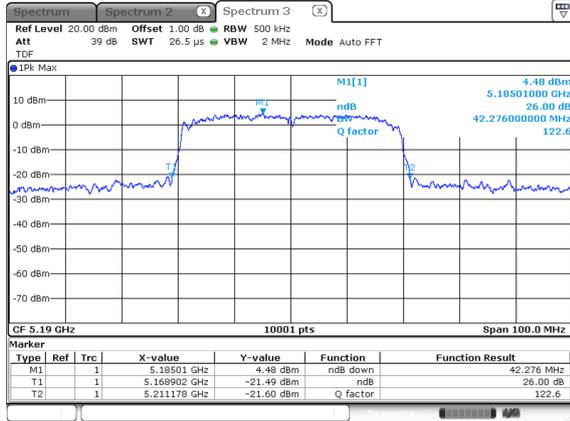| UNII-1 / 802.11a / Low ch.	UNII-2A / 802.11a / Low ch.
UNII-1 / 802.11a / Mid ch.	UNII-2A / 802.11a / Mid ch.
UNII-1 / 802.11a / High ch.	UNII-2A / 802.11a / High ch.
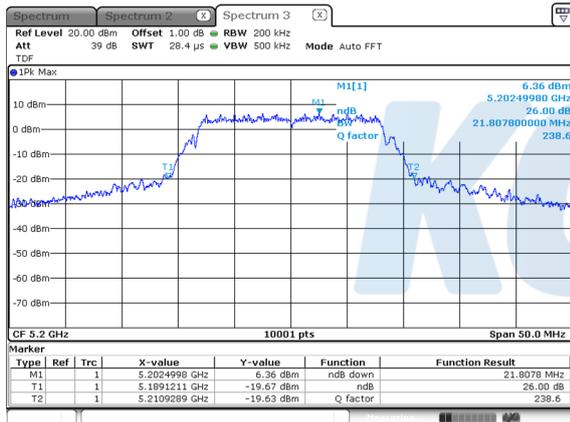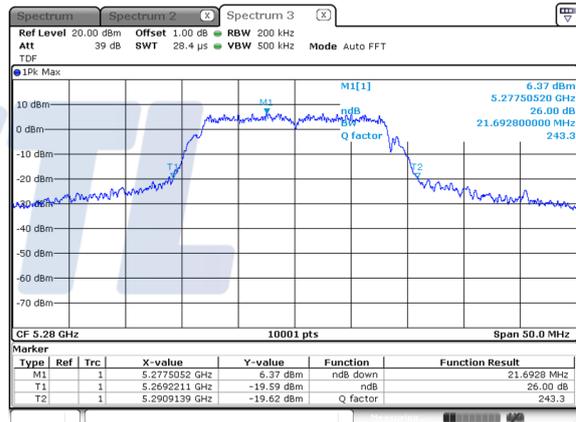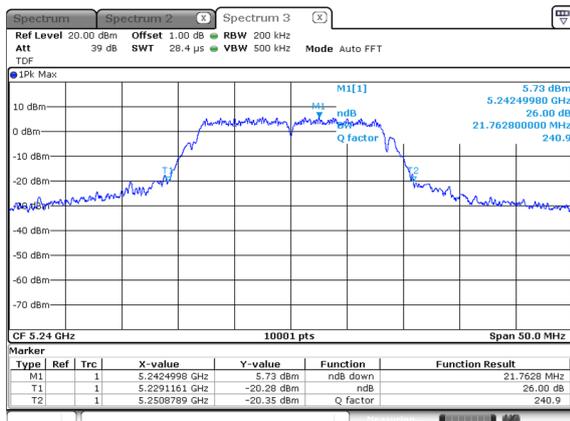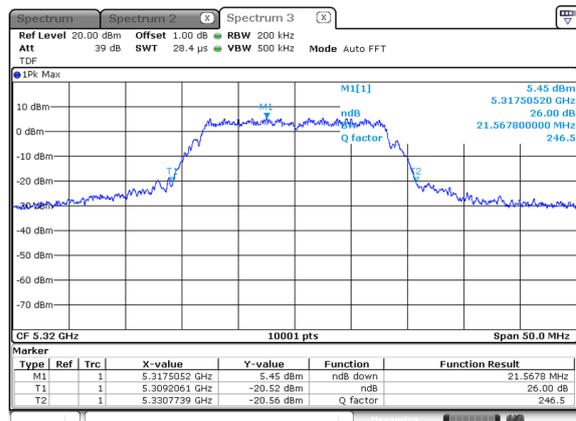
KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (50) of (199)

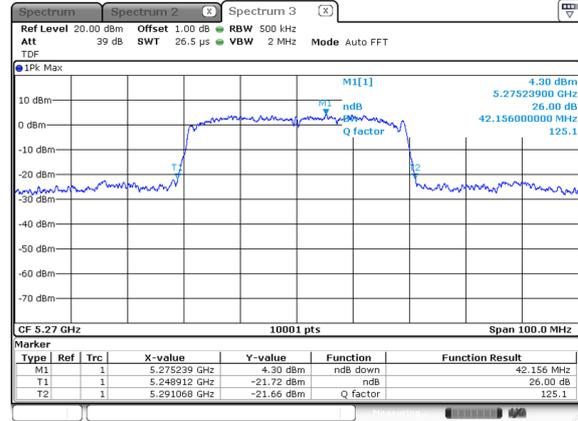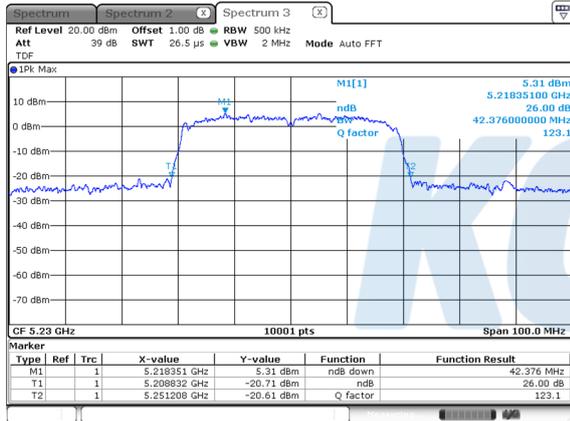**KCTL**

UNII-2C / 802.11a / Low ch.	UNII-2C / 802.11a / Mid ch.

UNII-2C / 802.11a / High ch.	
	Blank
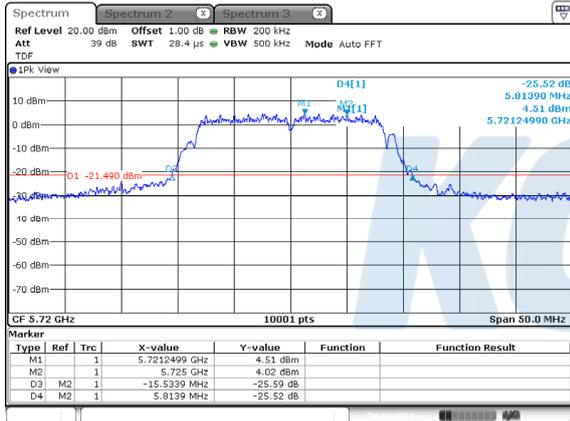
KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

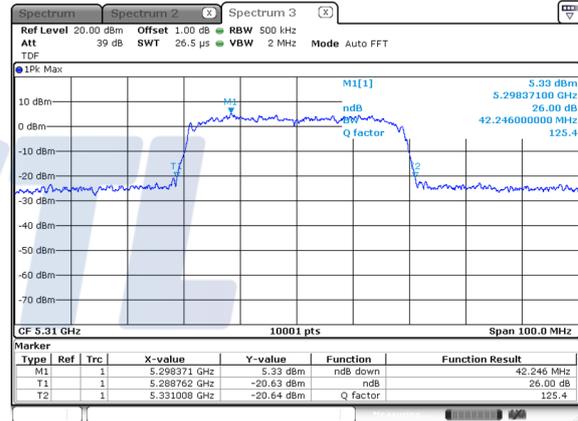Page (51) of (199)

KCTL

UNII-1 / 802.11n HT20 / Low ch.
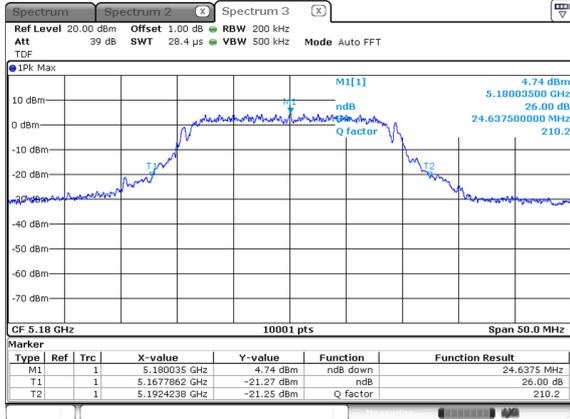
UNII-2A / 802.11n HT20 / Low ch.

UNII-1 / 802.11n HT20 / Mid ch.
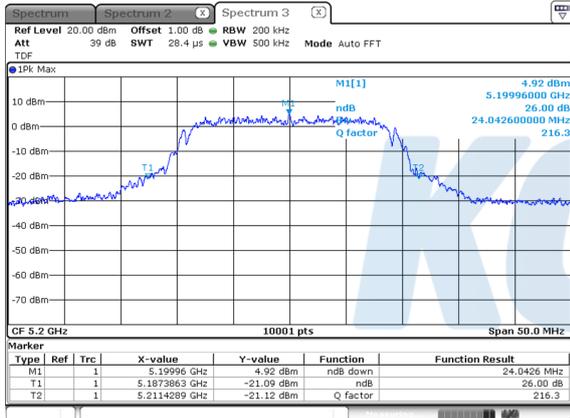
UNII-2A / 802.11n HT20 / Mid ch.
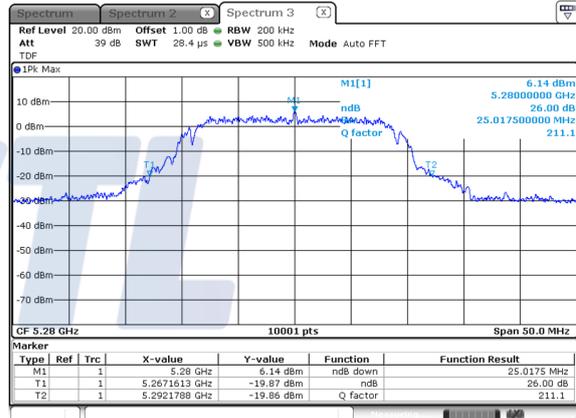
UNII-1 / 802.11n HT20 / High ch.
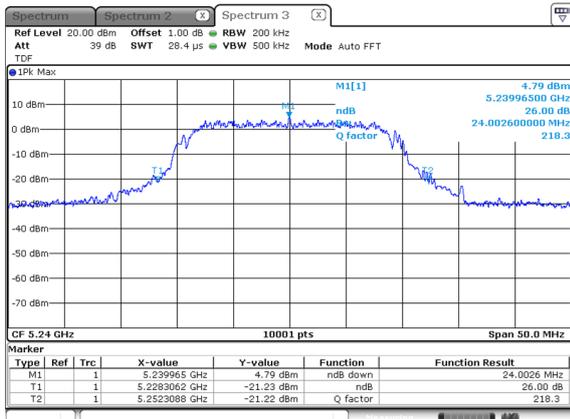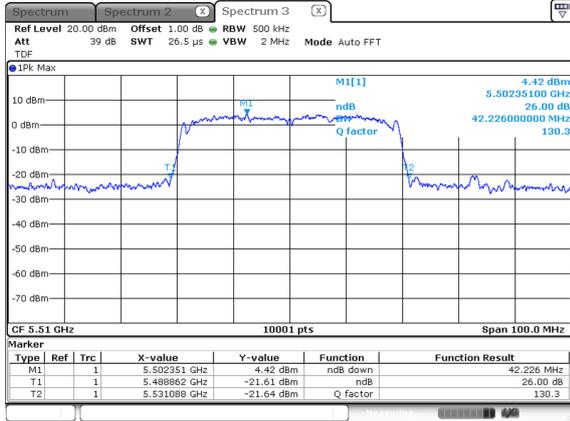

UNII-2A / 802.11n HT20 / High ch.
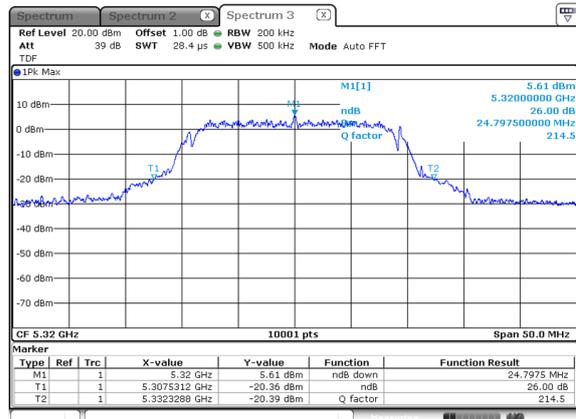
KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (52) of (199)

KCTL

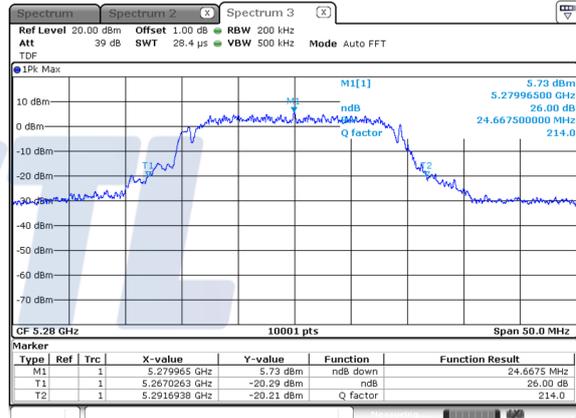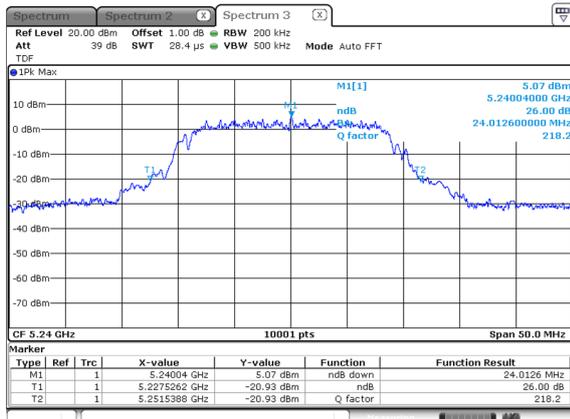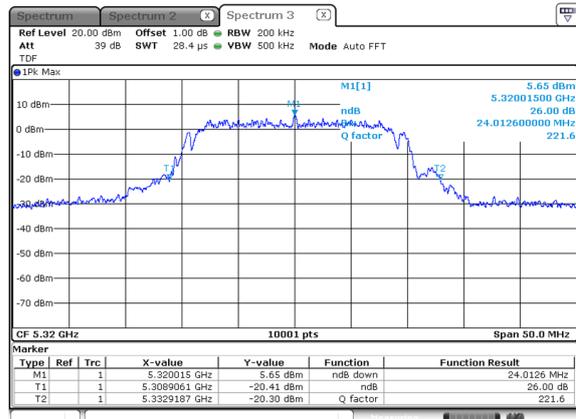## UNII-2C / 802.11n HT20 / Low ch.

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.49999 GHz	5.06 dBm	ndB down	24.0426 MHz
T1		1	5.4878112 GHz	-20.98 dBm	ndB	26.00 dB
T2		1	5.5118538 GHz	-20.91 dBm	Q factor	228.8

UNII-2C / 802.11n HT20 / Mid ch.

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.599975 GHz	5.35 dBm	ndB down	24.1276 MHz
T1		1	5.5873663 GHz	-20.61 dBm	ndB	26.00 dB
T2		1	5.6114939 GHz	-20.64 dBm	Q factor	232.1

UNII-2C / 802.11n HT20 / High ch.

| Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.72 GHz	4.53 dBm		
M2		1	5.725 GHz	0.52 dBm		
D3	M2	1	-15.8689 MHz	-22.00 dB		
D4	M2	1	5.8689 MHz	-22.01 dB		

Blank

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
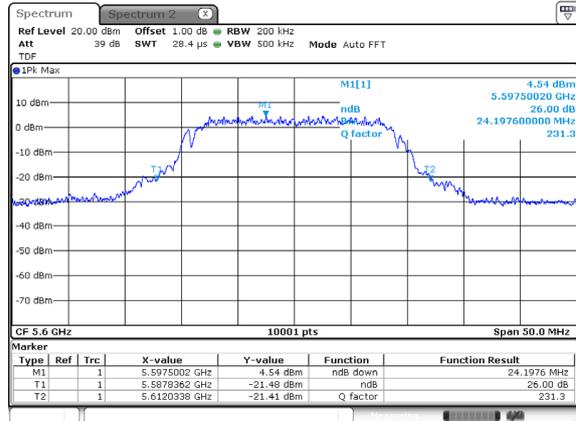www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (53) of (199)

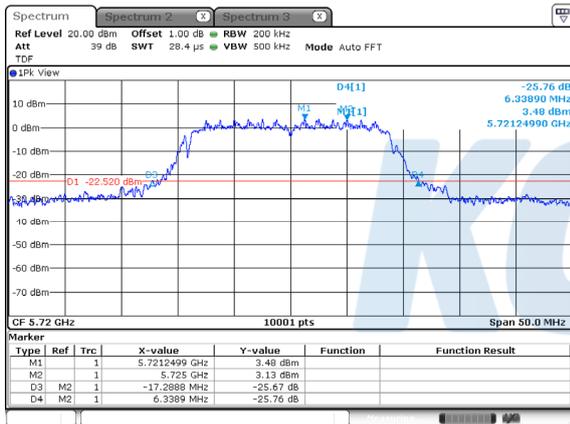| UNII-1 / 802.11n HT40 / Low ch.	UNII-2A / 802.11n HT40 / Low ch.

UNII-1 / 802.11n HT40 / High ch.	UNII-2A / 802.11n HT40 / High ch.

KCTL-TIR002-001/2

KCTL Inc.
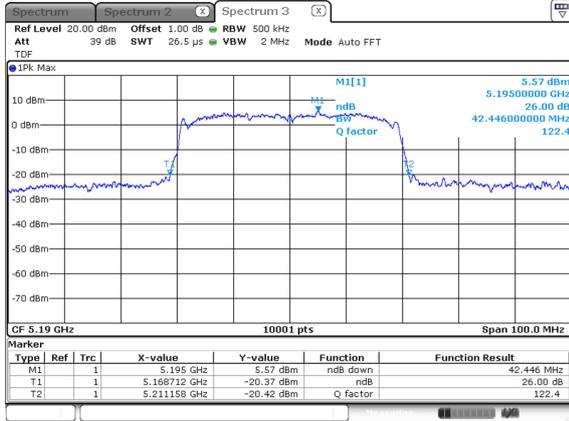
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311

www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (54) of (199)

UNII-2C / 802.11n HT40 / Low ch.	UNII-2C / 802.11n HT40 / Mid ch.
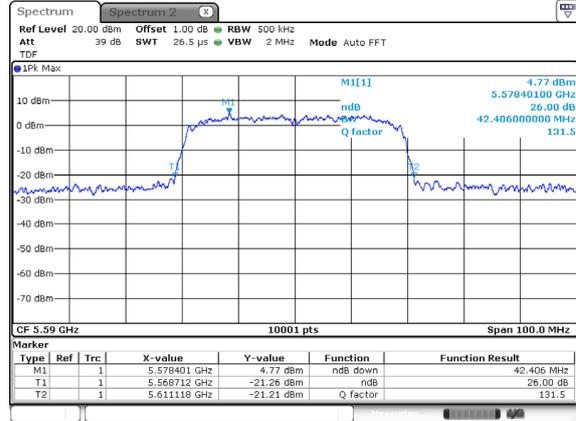
UNII-2C / 802.11n HT40 / High ch.	
	Blank

KCTL-TIR002-001/2

KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

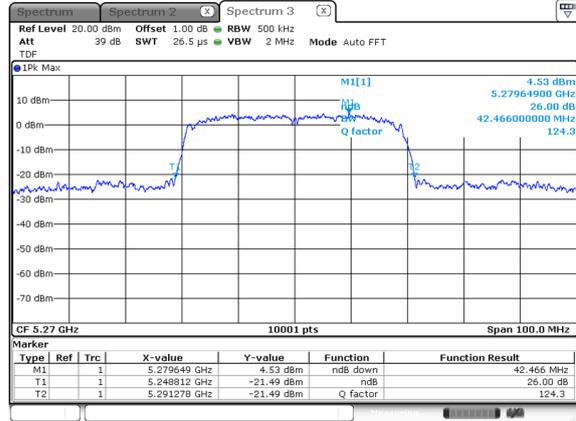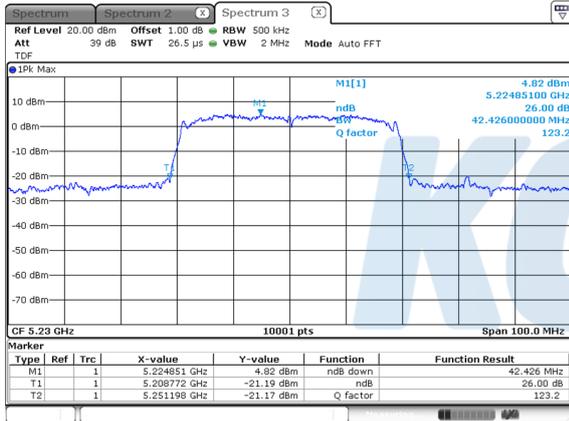Report No.:
KR19-SRF0117-B

Page (55) of (199)
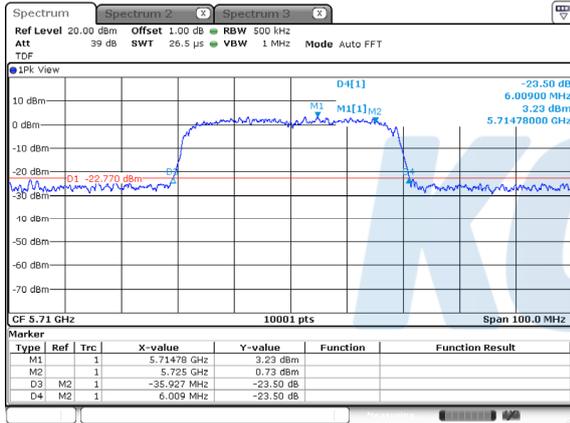
UNII-1 / 802.11ac VHT20 / Low ch.
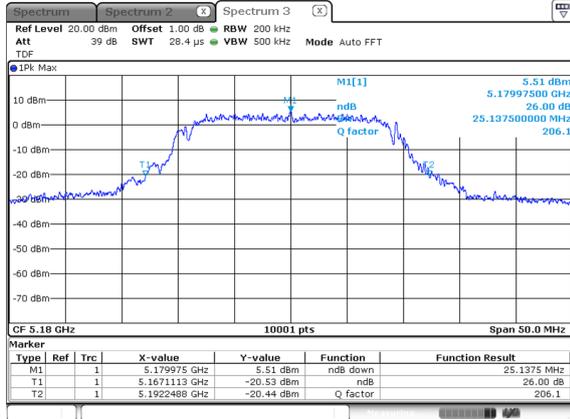
UNII-2A / 802. 11ac VHT20 / Low ch.
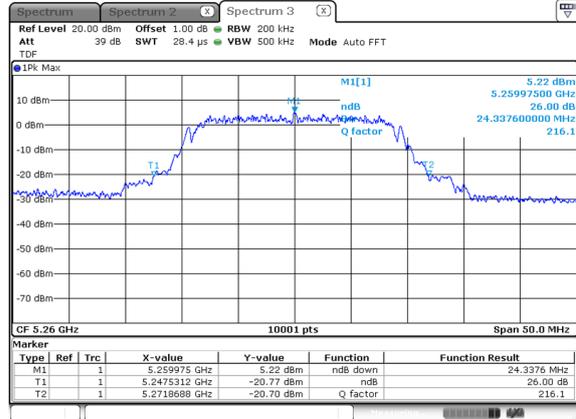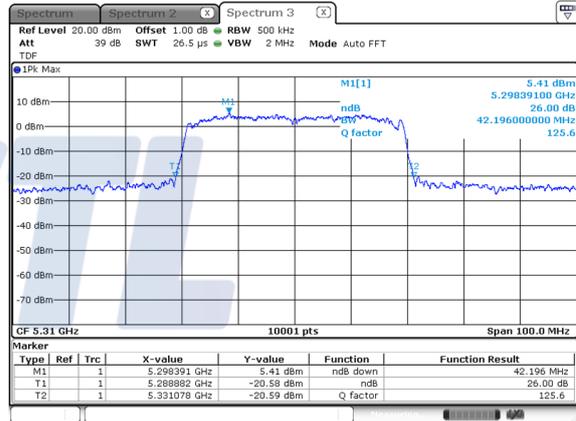

UNII-1 / 802. 11ac VHT20 / Mid ch.
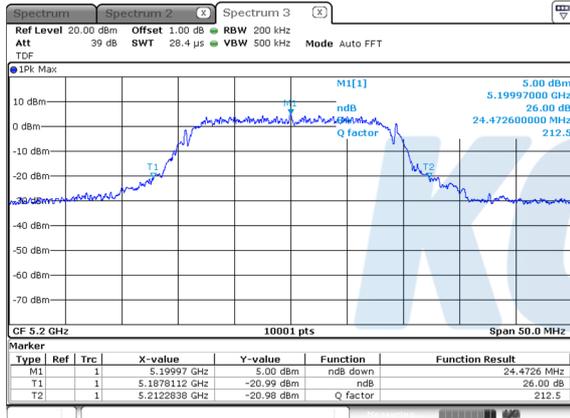
UNII-2A / 802. 11ac VHT20 / Mid ch.

UNII-1 / 802. 11ac VHT20 / High ch.

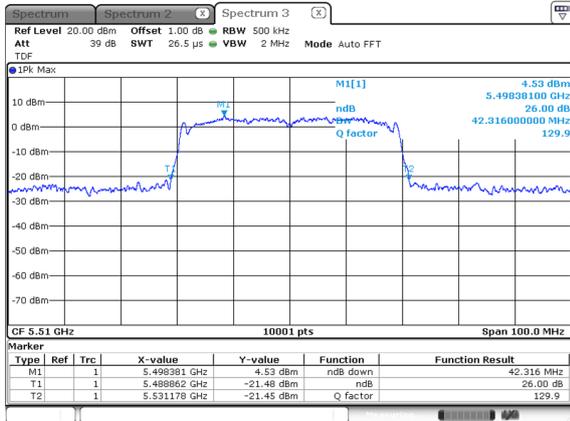## UNII-2A / 802. 11ac VHT20 / High ch.

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311

www.kctl.co.kr

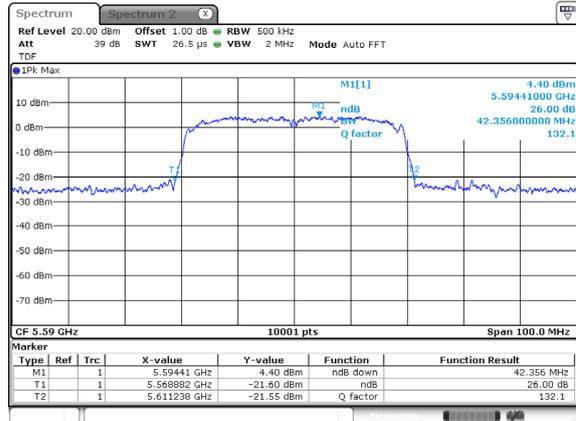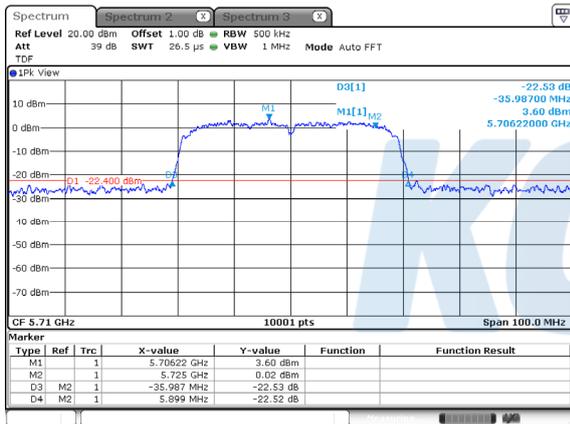Report No.:
KR19-SRF0117-B

Page (56) of (199)

UNII-2C / 802.11ac VHT20 / Low ch.
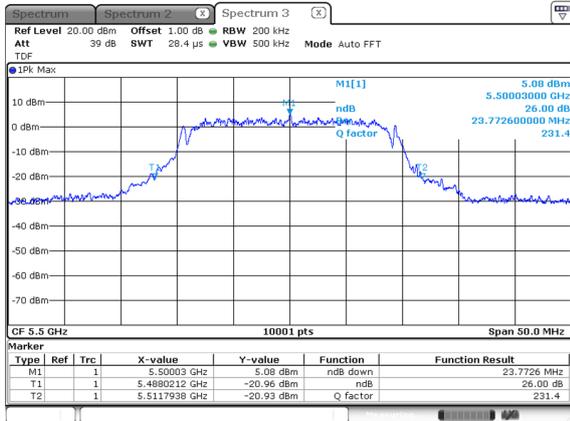
UNII-2C / 802.11ac VHT20 / Mid ch.

UNII-2C / 802.11ac VHT20 / High ch.

Blank

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (57) of (199)

UNII-1 / 802.11ac VHT40 / Low ch.

UNII-2A / 802.11ac VHT40 / Low ch.

UNII-1 / 802.11ac VHT40 / High ch.

UNII-2A / 802.11ac VHT40 / High ch.

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311

www.kctl.co.kr

Report No.:
KR19-SRF0117-B

Page (58) of (199)

UNII-2C / 802.11ac VHT40 / Low ch.

UNII-2C / 802.11ac VHT40 / Mid ch.

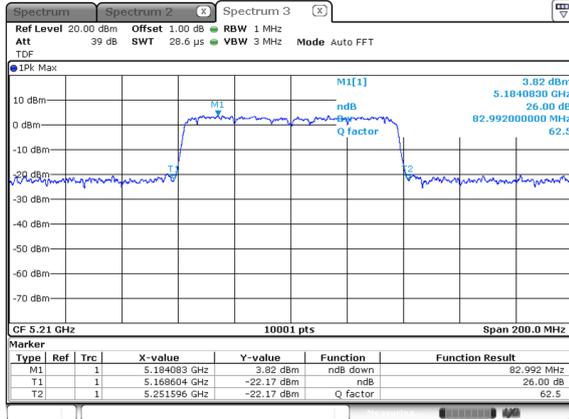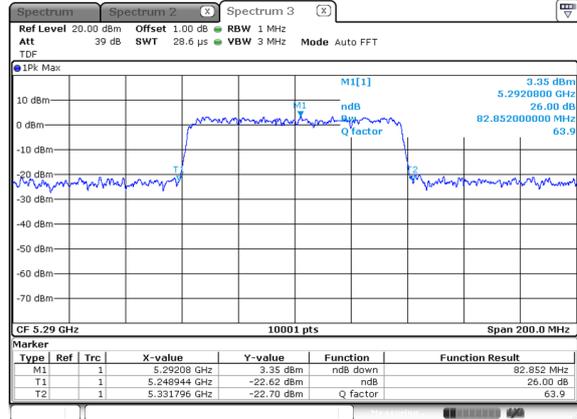## UNII-2C / 802.11ac VHT40 / High ch.

Blank

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894   FAX: 82-505-299-8311
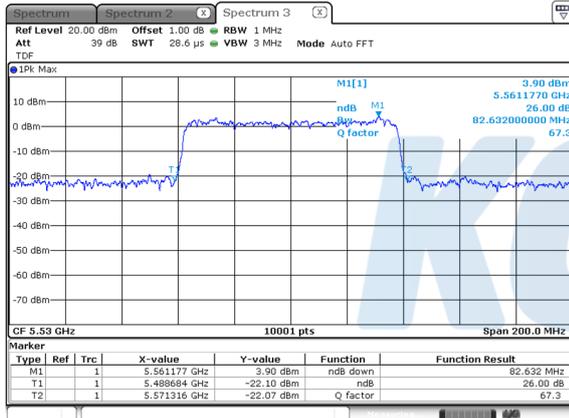www.kctl.co.kr

Report No.:
KR19-SRF0117-B

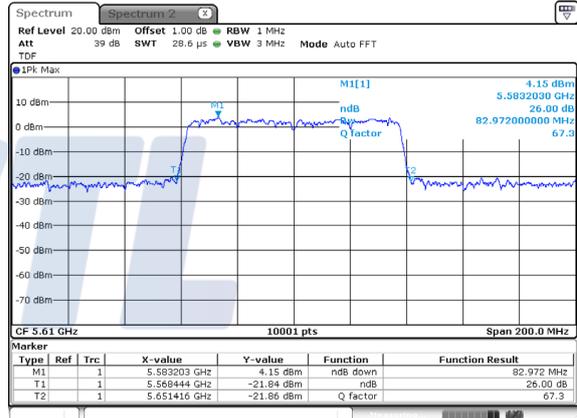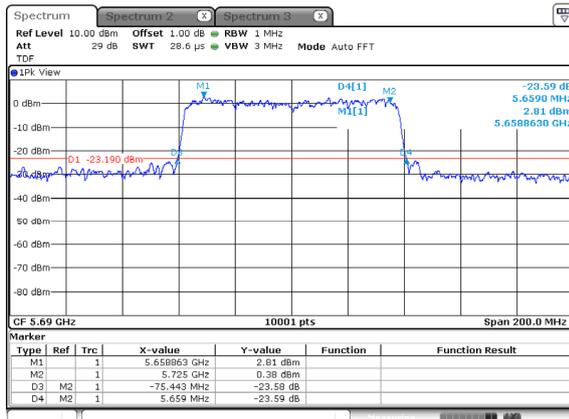Page (59) of (199)

KCTL

UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.

UNII-2C / 802.11ac VHT80 / Low ch.	UNII-2C / 802.11ac VHT80 / Mid ch.

UNII-2C / 802.11ac VHT80 / High ch.	

Blank